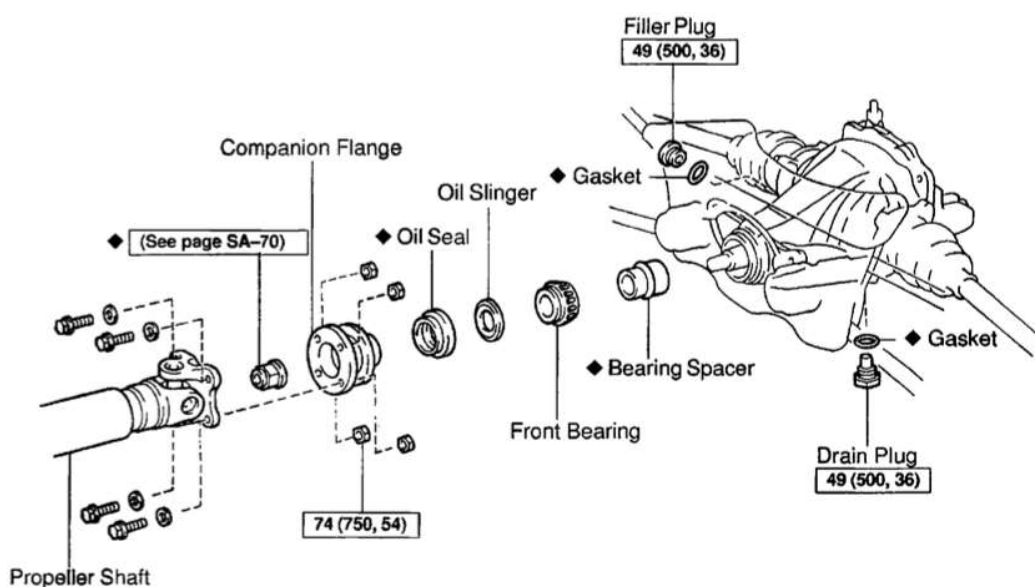


2002 DRIVE/AXLE

Differentials & Drive Axles - RAV4

REAR DIFFERENTIAL FRONT OIL SEAL (4WD)

COMPONENTS



N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non-reusable part

G01084319

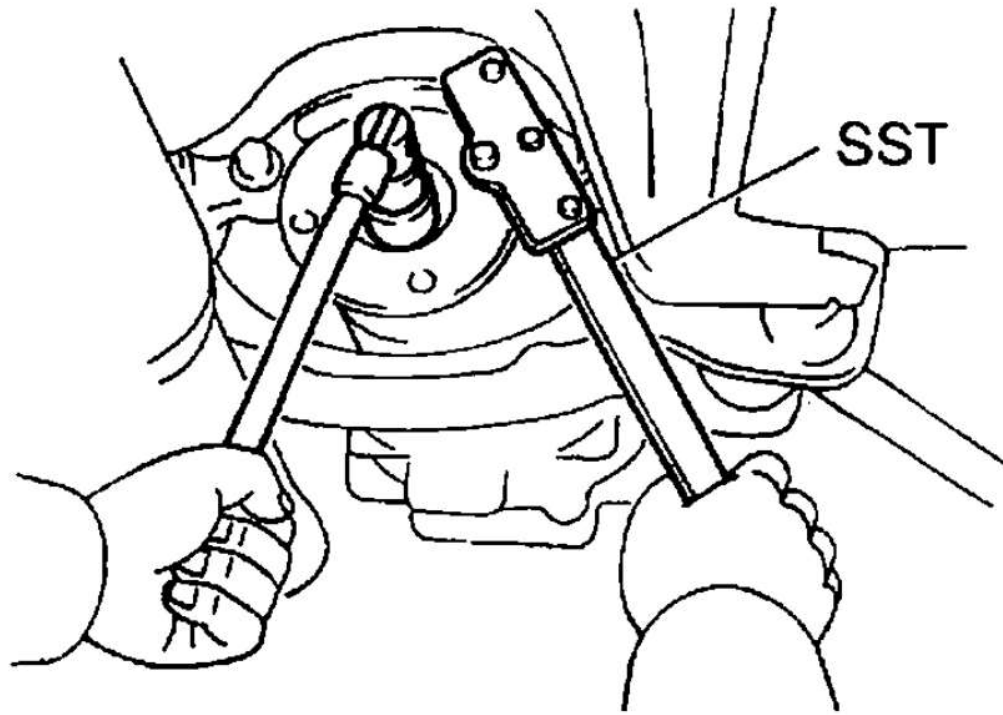
Fig. 1: Identifying Rear Differential Front Oil Seal (4WD)

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

REPLACEMENT

1. Drain differential oil .
2. Remove propeller shaft (See **REMOVAL**) .
3. Remove companion flange .
 - a. Using a chisel and a hammer, unstake the staked part of the nut.
 - b. Using SST to hold the flange, remove the nut.

SST 09330-00021

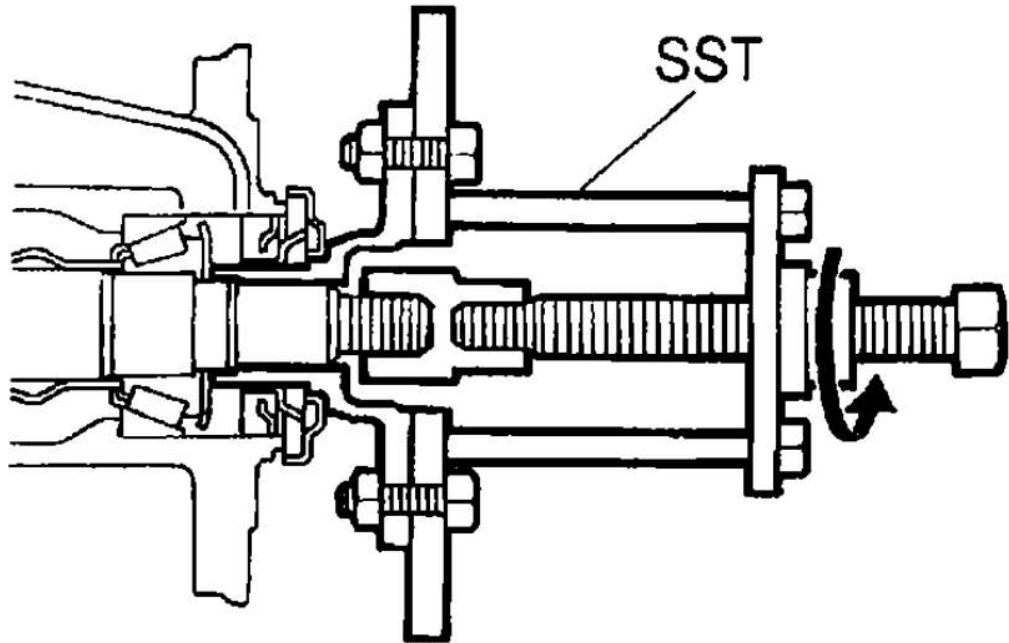


G01084320

Fig. 2: Removing Nut Using SST
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- c. Using SST, remove the companion flange.

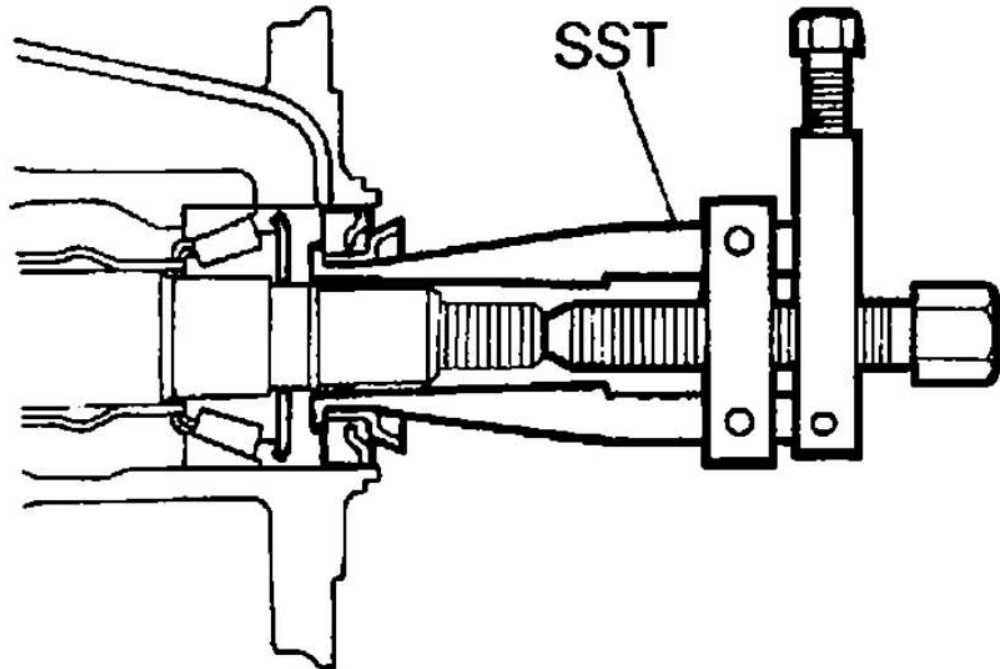
SST 09950-30012 (09951-03010, 09953-03010, 09954-03010, 09955-03040, 09956- 03020)



G01084321

Fig. 3: Removing Companion Flange
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

4. Remove front oil seal and oil slinger .
 - a. Using SST, remove the oil seal.
SST 09308-10010



G01084322

Fig. 4: Removing Oil Seal & Oil Slinger
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Remove the oil slinger.
5. **Remove front bearing and bearing spacer .**
 - a. Using SST, remove the front bearing.

SST 09556-22010

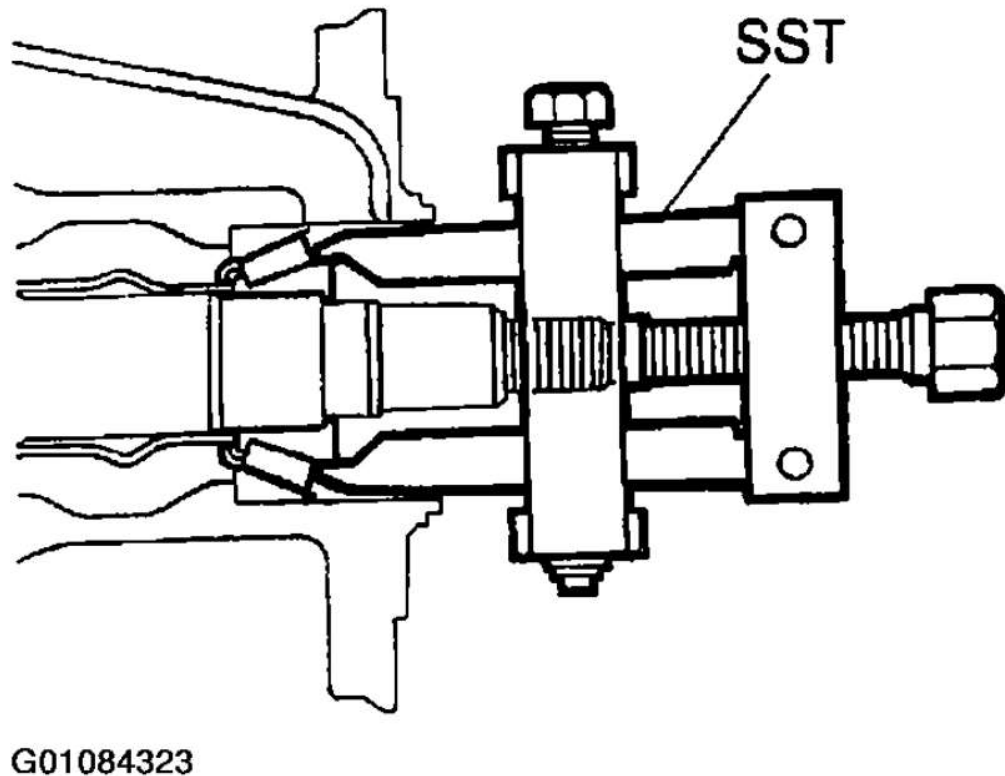
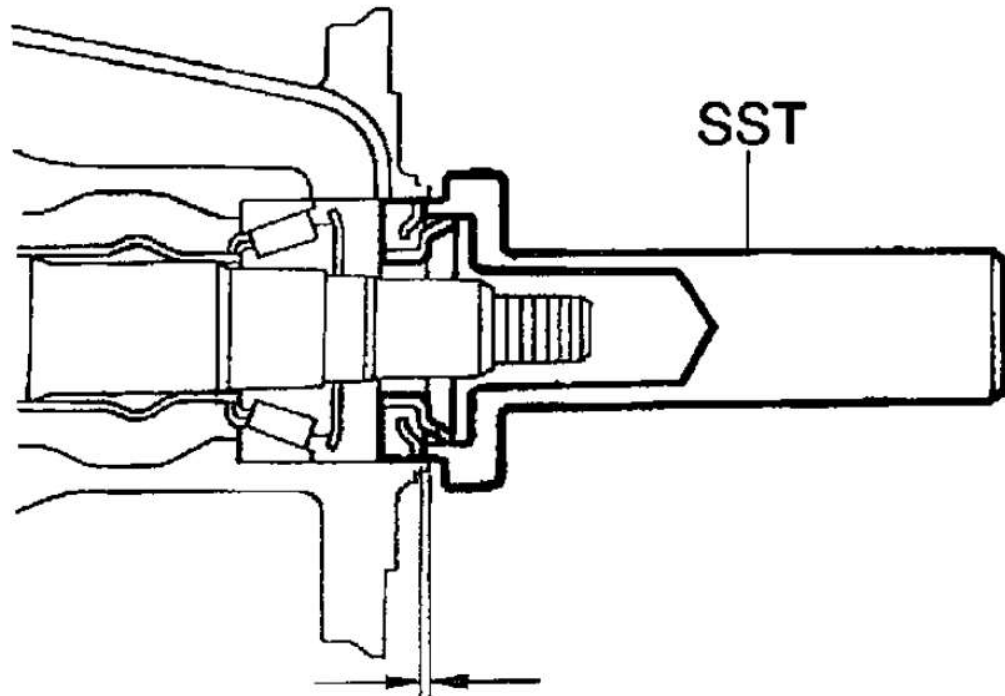


Fig. 5: Removing Front Bearing & Bearing Spacer
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Remove the bearing spacer.
- 6. **Install new bearing spacer and front bearing .**
 - a. Install a new bearing spacer on the shaft.
 - b. Install the front bearing on the shaft.
- 7. **Install oil slinger and new oil seal .**
 - a. Install the oil slinger.
 - b. Using SST, install a new oil seal.

SST 09554-22010



G01084324

Fig. 6: Installing New Oil Seal

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

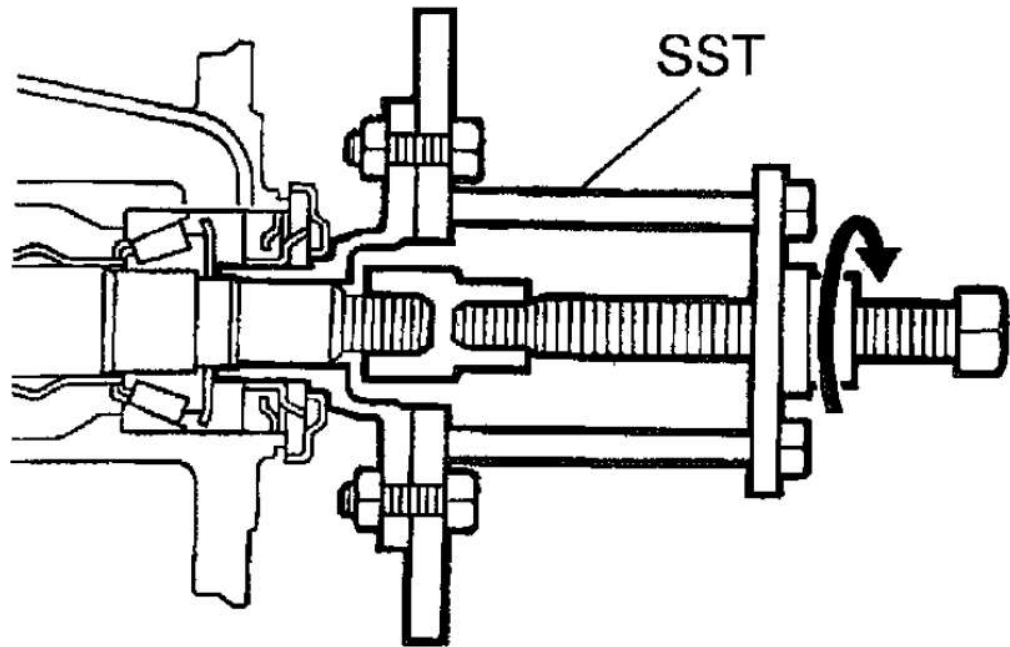
Oil seal drive in depth: 2.0 mm (0.079 in.)

- c. Apply MP grease to the oil seal lip.

8. Install companion flange .

- a. Using SST, install the companion flange on the shaft.

SST 09950-30012 (09951-03010, 09953-03010, 09954-03010, 09955-03040, 09956- 03020)



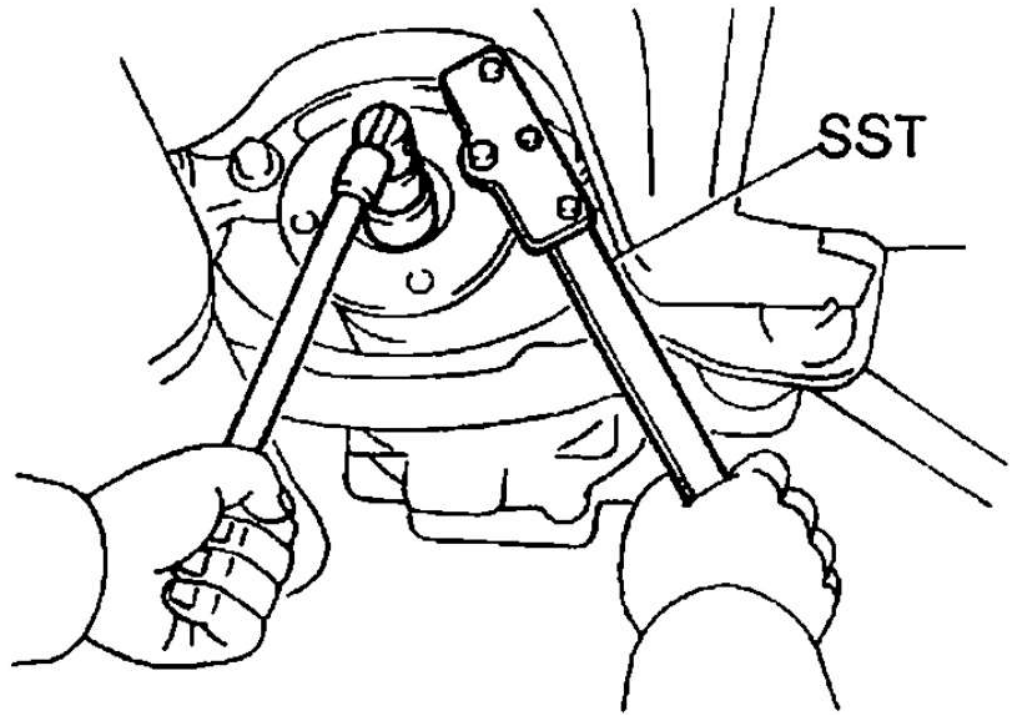
G01084325

Fig. 7: Installing Companion Flange
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Coat the threads of a new nut with hypoid gear oil.
- c. Using SST to hold the flange, torque the nut.

SST 09330-00021

Torque: 108 N.m (1,100 kgf.cm, 80 ft.lbf)



G01084326

Fig. 8: Using SST To Hold Flange & Torque Nut
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- d. Adjust the preload of bearing on the drive pinion (See step 7).
9. Stake drive pinion nut .
10. Install propeller shaft (See INSTALLATION) .
11. Fill differential with differential oil (See step d) .

REAR DIFFERENTIAL CARRIER (4WD)

ON-VEHICLE REPAIR

Replace Rear Differential Oil

- a. Remove the filler plug and gasket.
- b. Remove the drain plug and gasket, and drain the oil.
- c. Reinstall the drain plug with a new gasket.

Torque: 49 N.m (500 kgf.cm, 36 ft.lbf)

d. Fill new differential oil as shown in **Fig. 9** .

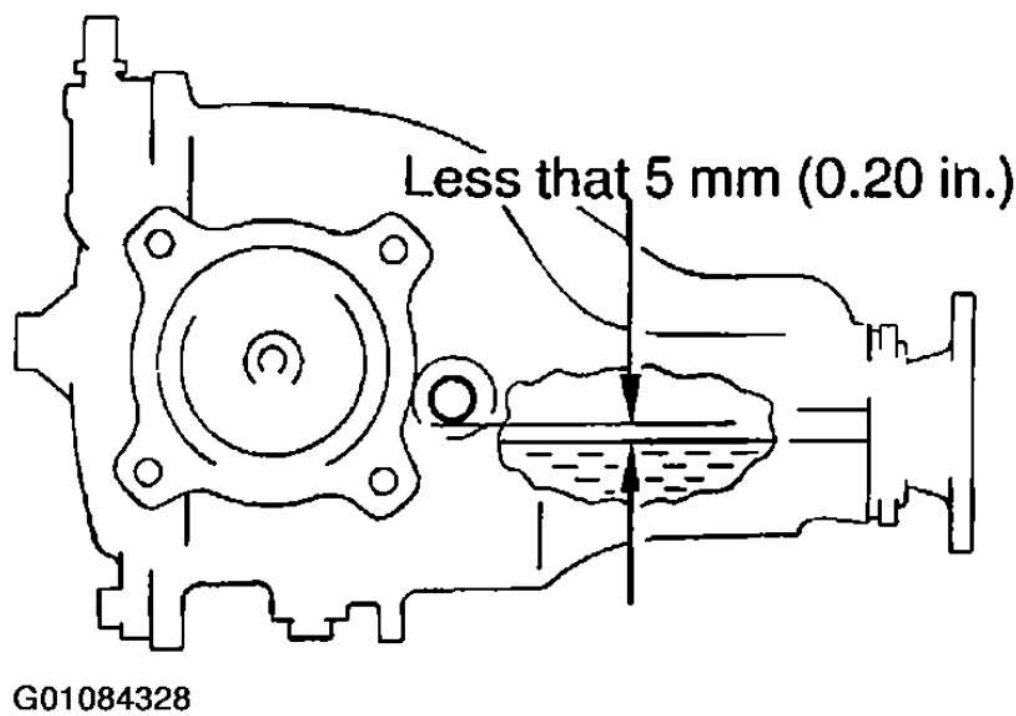


Fig. 9: Identifying Differential Oil Fill Level
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Capacity: 0.9 liter (1.0 US qts, 0.8 imp. qts)
Oil grade: Hypoid gear oil API GL-5

Recommended oil viscosity:

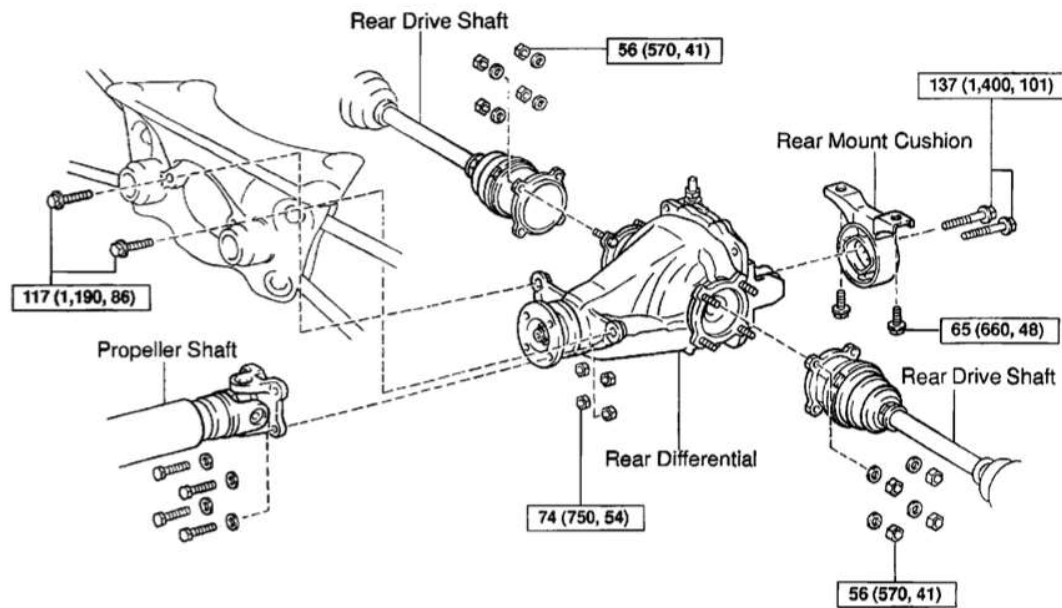
Above -18°C (0°F)	SAE 90
Below -18°C (0°F)	SAE 80W or 80W-90

G01084327

Fig. 10: Identifying Differential Oil Viscosity Specifications
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- e. Reinstall the filler plug with a new gasket.

COMPONENTS



N·m (kgf·cm, ft·lbf) : Specified torque

G01084329

Fig. 11: Identifying Components For Rear Differential Carrier Removal (4WD)
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

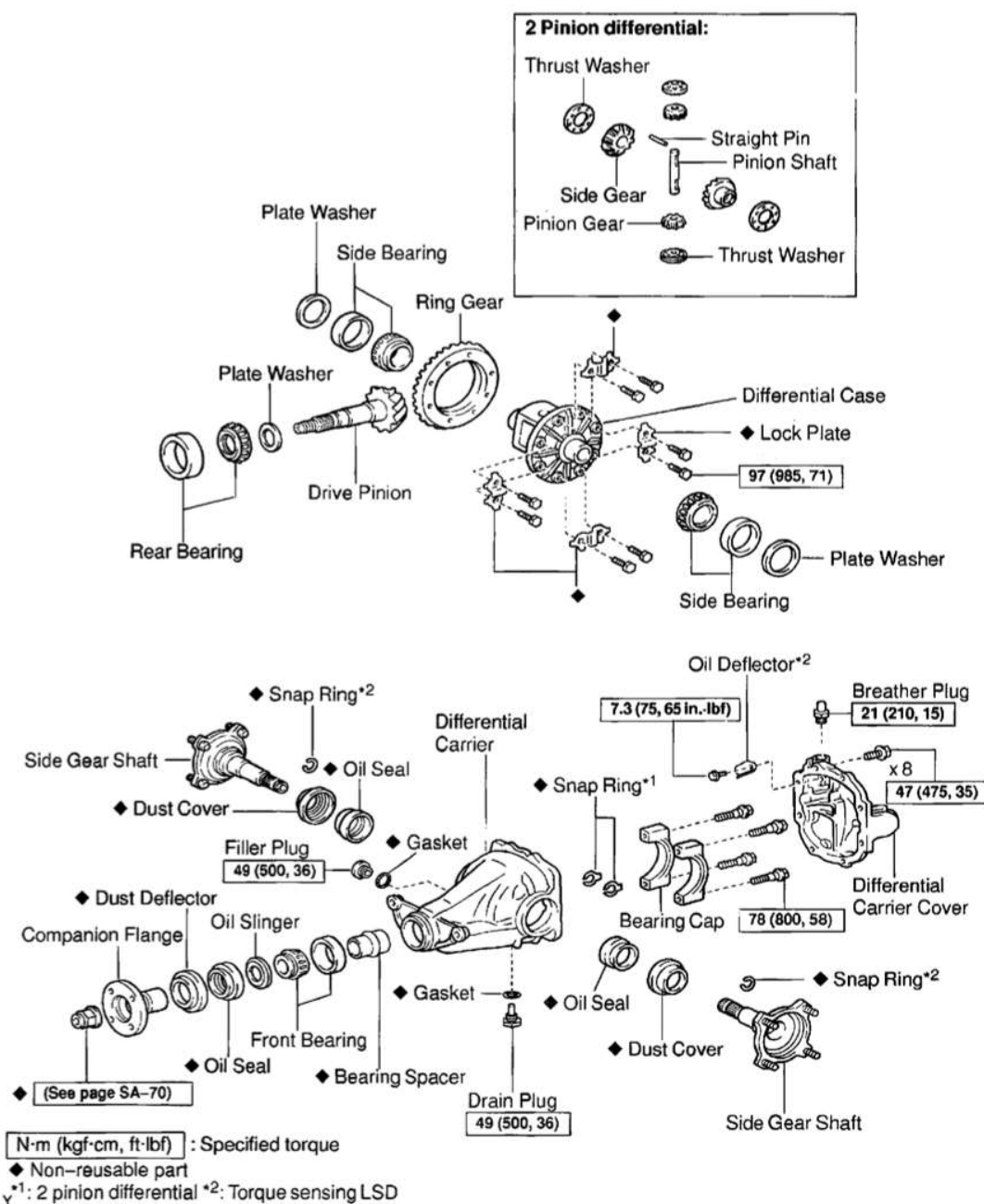


Fig. 12: Exploded View Of Rear Differential Carrier (4WD)

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

REMOVAL

1. Remove drive shafts (See **REMOVAL**) .

NOTE: Support the drive shafts securely.

2. Remove propeller shaft (See REMOVAL) .

NOTE: Support the propeller shaft securely.

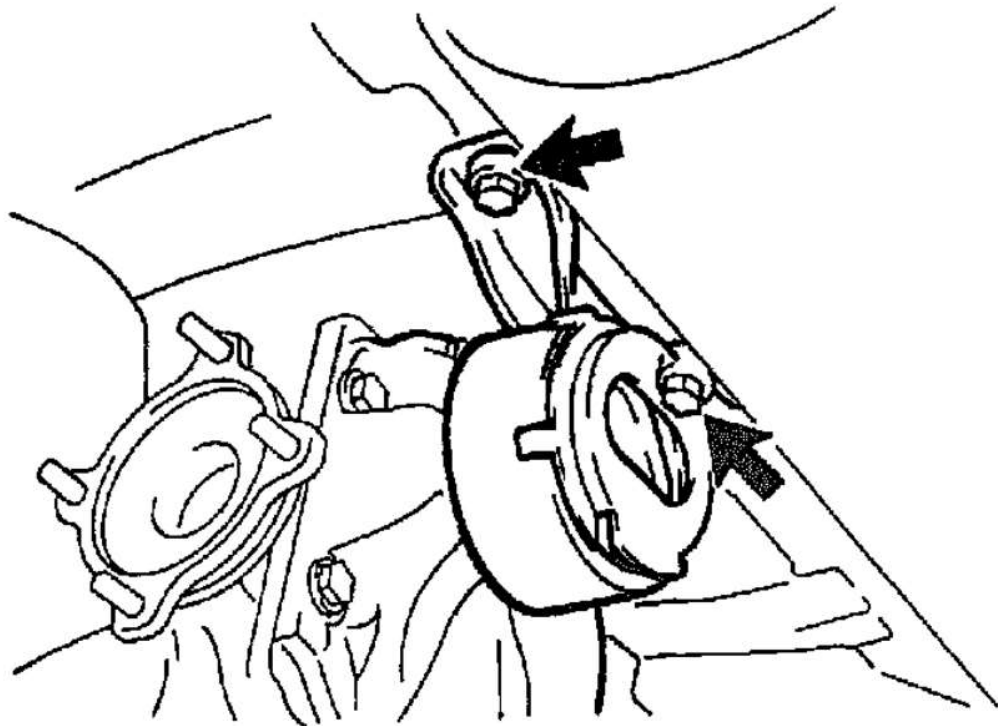
3. Drain differential oil .

Torque: 49 N.m (500 kgf.cm, 36 ft.lbf)

4. Remove differential .

- a. Support the differential with a jack.
- b. Remove the 2 rear mounting bolts.

Torque: 65 N.m (660 kgf.cm, 48 ft.lbf)

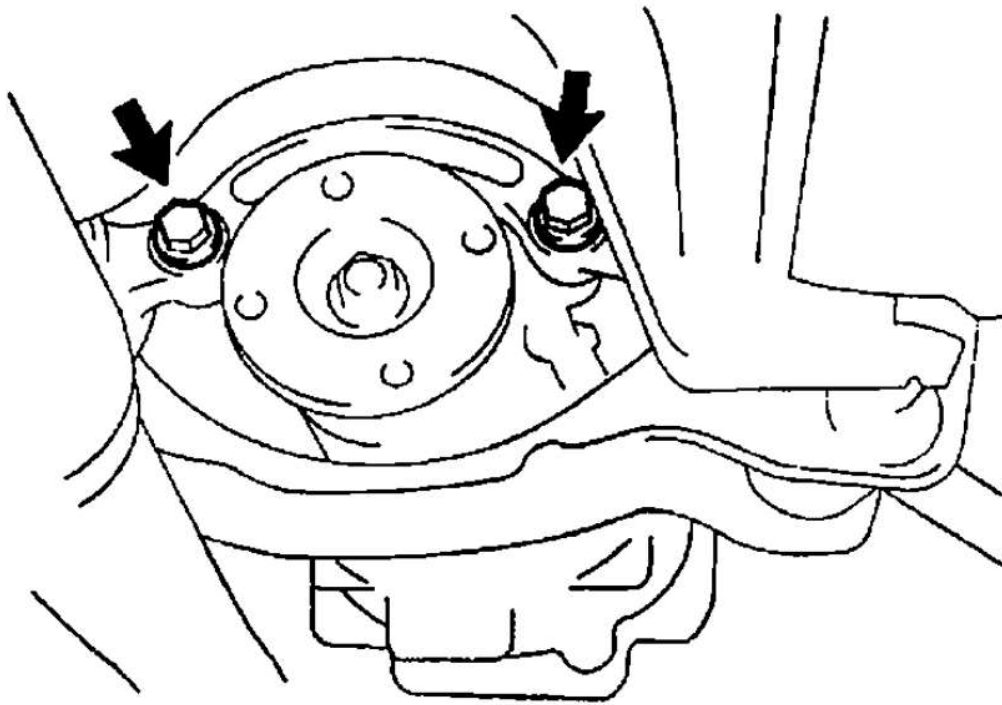


G01084331

Fig. 13: Removing Differential Rear Mounting Bolts
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

5. Remove the 2 front mounting bolts and differential.

Torque: 117 N.m (1,190 kgf.cm, 86 ft.lbf)



G01084332

Fig. 14: Removing Front Differential Mounting Bolts
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

6. Remove the 2 bolts and differential rear mount cushion from the differential.

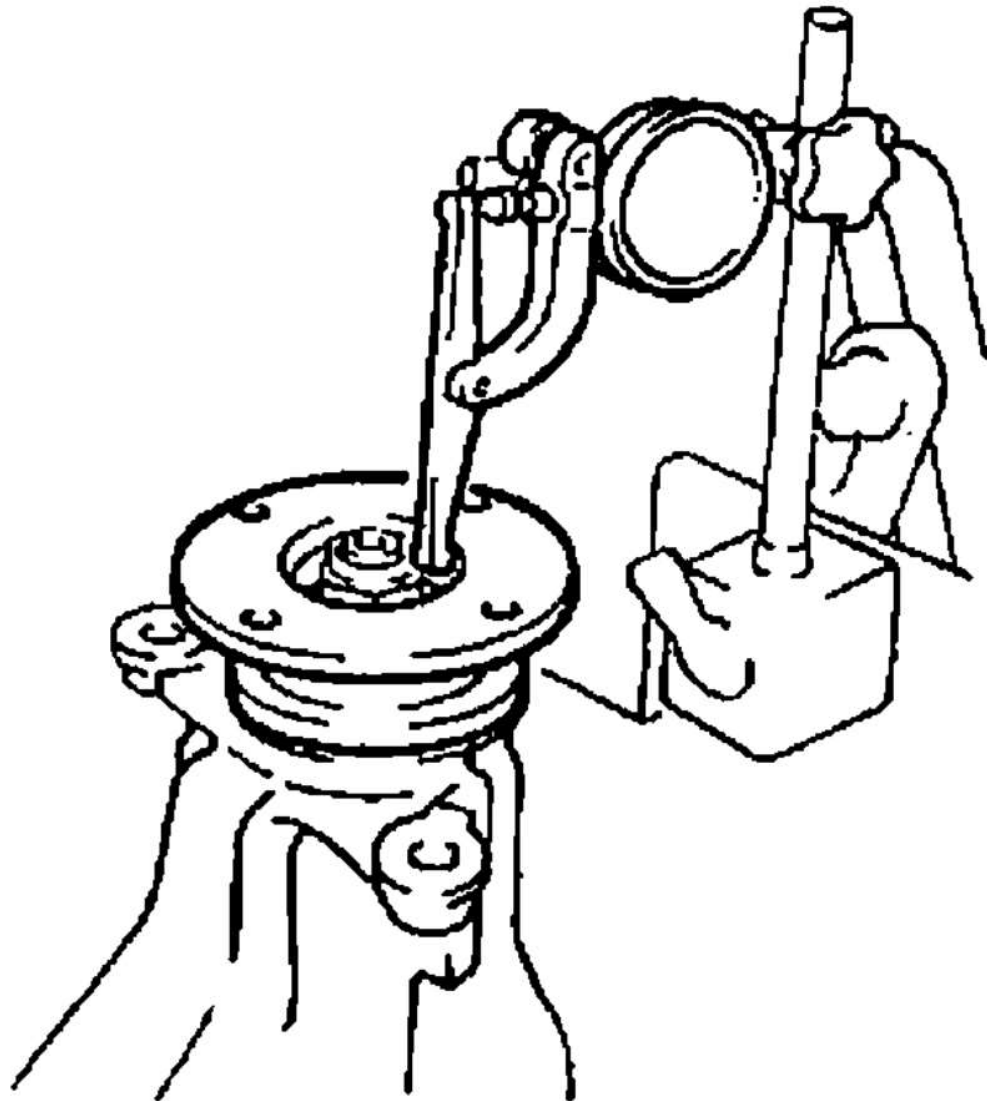
Torque: 137 N.m (1,400 kgf.cm, 101 ft.lbf)

DISASSEMBLY

1. **Remove differential carrier cover .**
 - a. Remove the 8 bolts from the carrier cover.
 - b. Using a brass bar and a hammer, separate the cover from the carrier.
 - c. Remove the breather plug from the differential carrier cover.
 - d. Torque sensing LSD: Remove the bolt and oil deflector from the differential.
2. **Check runout of companion flange .**

- a. Using a dial indicator, measure the runout of the companion flange vertically.

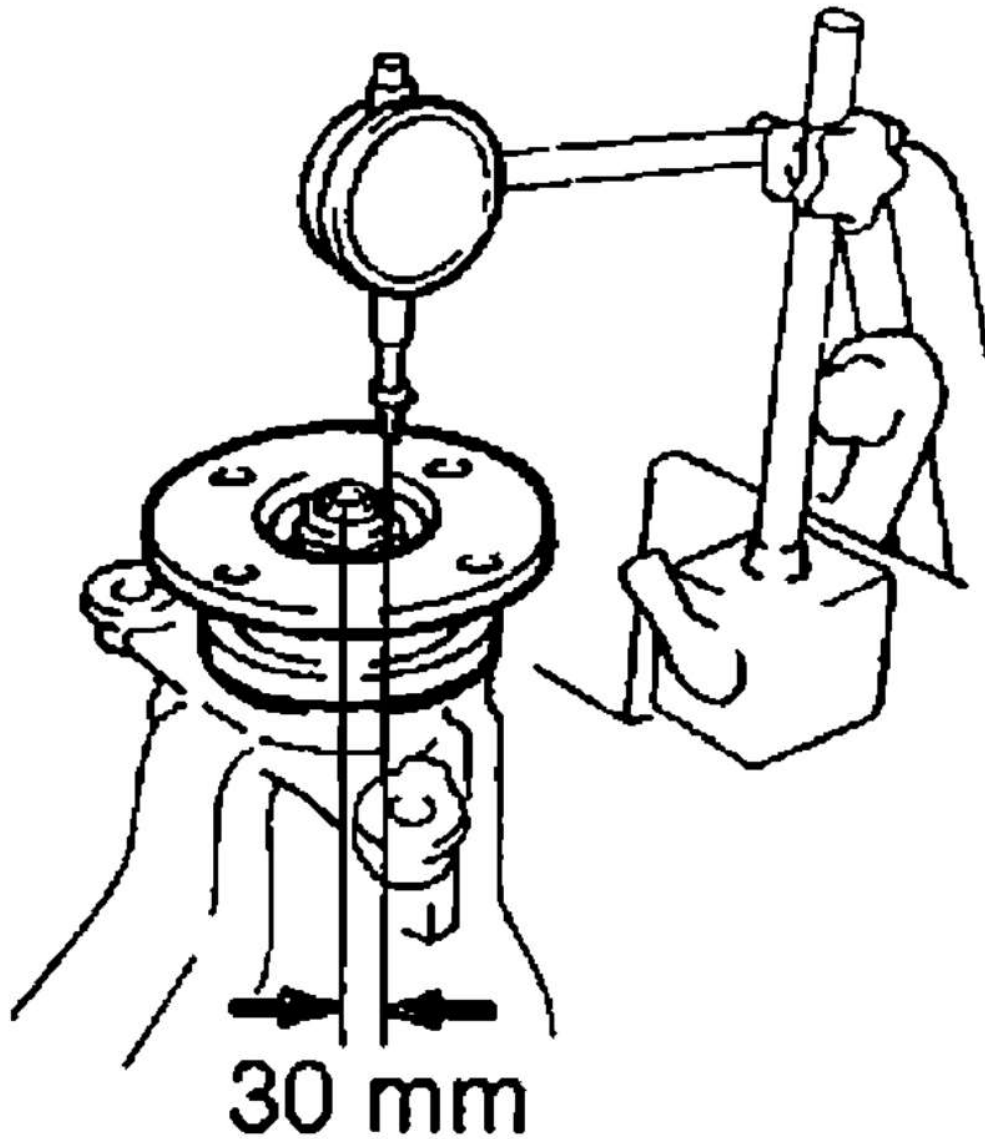
Maximum runout: 0.10 mm (0.0039 in.)



G01084333

Fig. 15: Checking Runout Of Companion Flange
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Place a dial indicator on the place 30 mm (1.181 in.) apart from the center of the companion flange.



G01084334

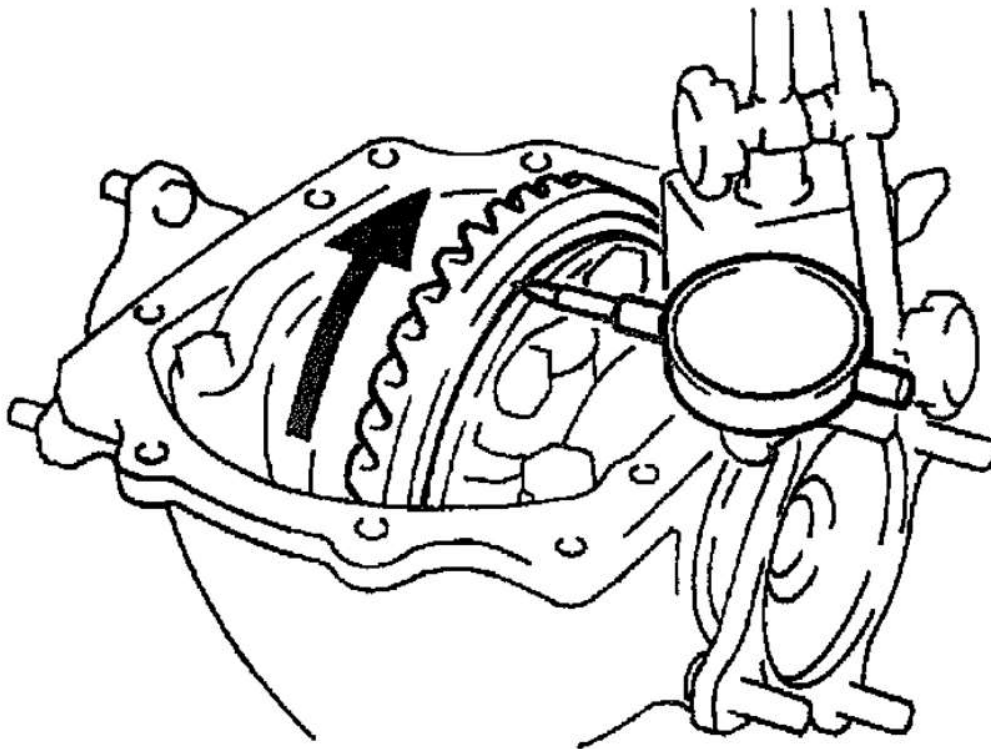
Fig. 16: Identifying Dial Indicator Setup Position
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- c. Measure the runout of the companion flange horizontally.

Maximum runout: 0.10 mm (0.0039 in.)

3. Check ring gear .

- a. Check the runout.



G01084335

Fig. 17: Checking Ring Gear Runout

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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

Maximum runout: 0.07 mm (0.0028 in.)

If the runout is greater than the maximum value, replace it with a new ring gear.

- b. Check the backlash.

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

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

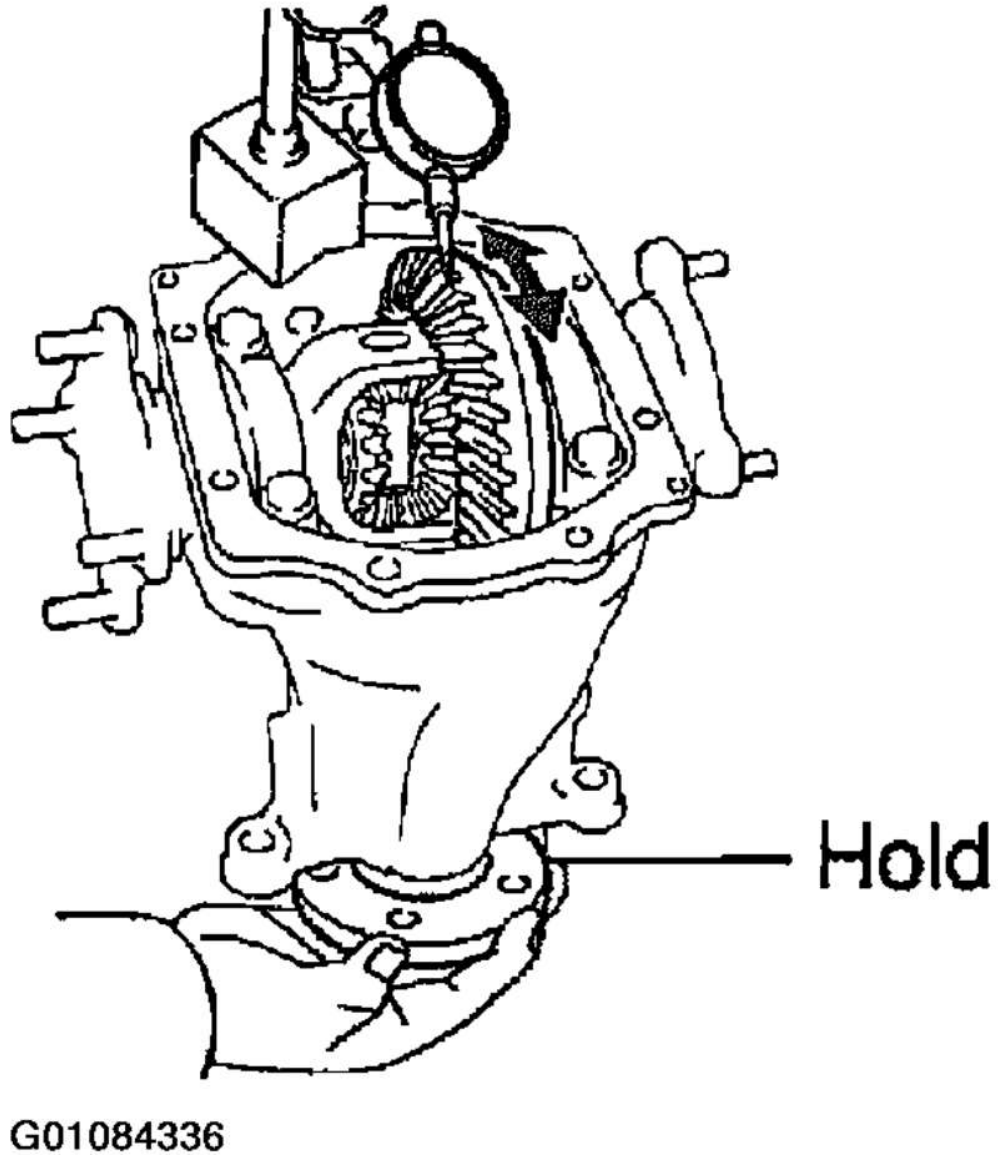


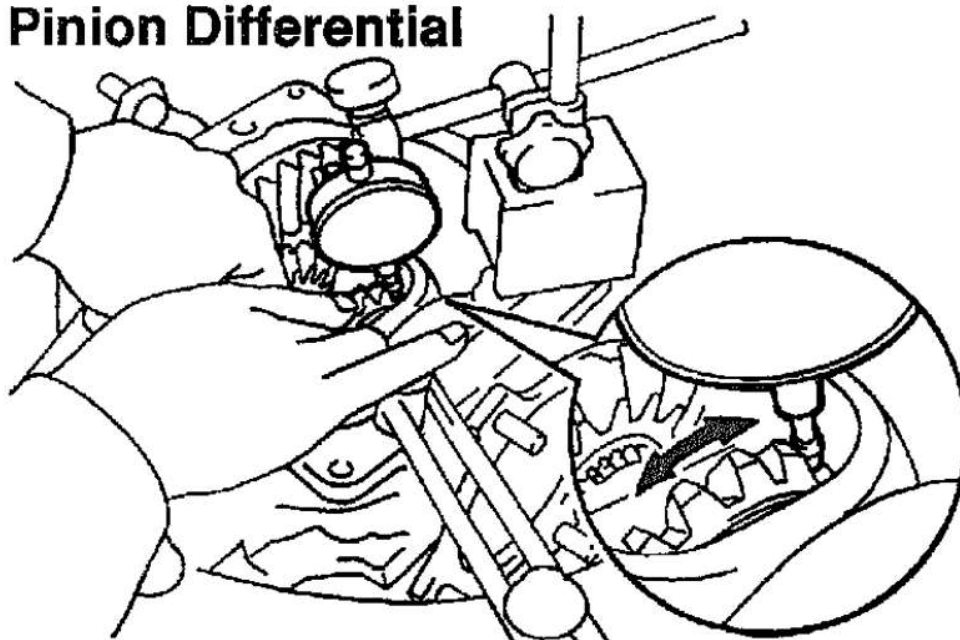
Fig. 18: Using Dial Indicator To Check Backlash
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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

4. **Check tooth contact between ring gear and drive pinion (See step22) .**
5. **2 pinion differential: Check backlash of side gear .**

Using a dial indicator, check the backlash of the side gear with holding 1 pinion gear toward the differential case.

2 Pinion Differential



G01084337

Fig. 19: Checking Backlash Of Side Gear
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

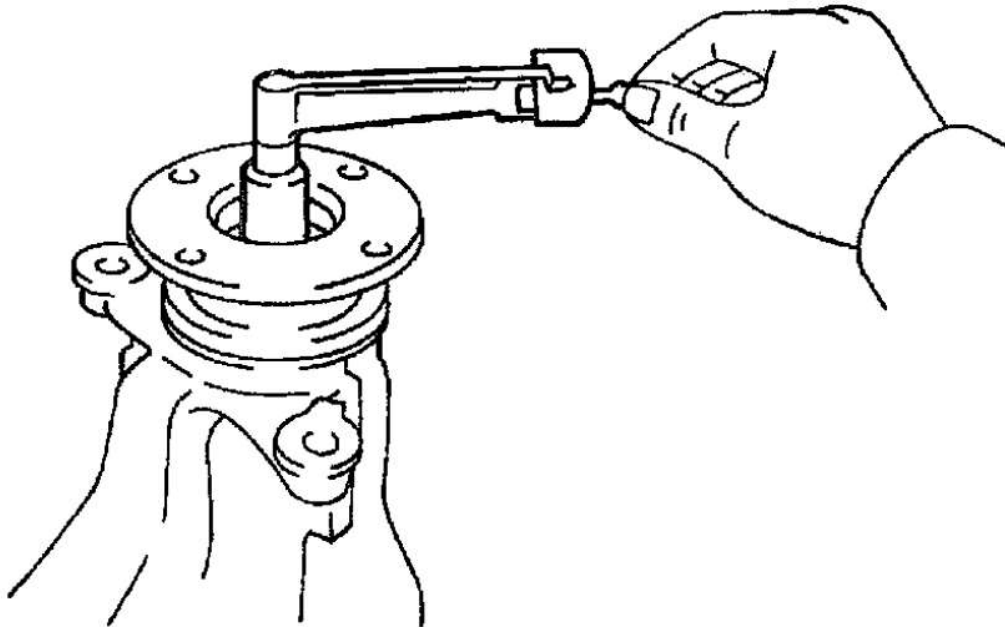
Backlash: 0.05 - 0.20 mm (0.0020 - 0.0079 in.)

If the backlash is not within the specification, install the 2 side gear thrust washers of different thickness (See 1).

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): 0.6 - 0.9 N.m (6 - 9 kgf.cm, 5.3 - 8.0 in..lbf)



G01084338

Fig. 20: Measuring Drive Pinion Preload

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

7. Check total preload .

Using a torque wrench, measure the preload.

Total preload (at starting) :

Drive pinion preload plus

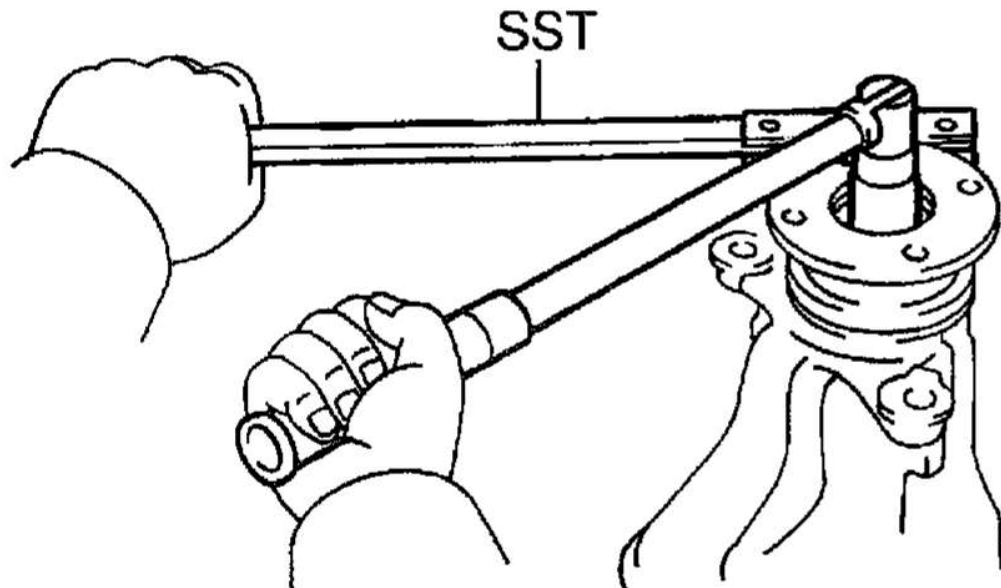
0.3 - 0.5 N.m (3 - 5 kgf.cm, 2.6 - 4.3 in..lbf)

If necessary, disassemble and inspect the differential.

8. Remove companion flange .

- a. Using a chisel and a hammer, unstake the staked part of the nut.
- b. Using SST to hold the flange, remove the nut.

SST 09330-00021



G01084339

Fig. 21: Using SST To Remove Companion Flange Nut
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- c. Using SST, remove the companion flange.

SST 09950-30012 (09951-03010, 09953-03010, 09954-03010, 09955-03040, 09956- 03020)

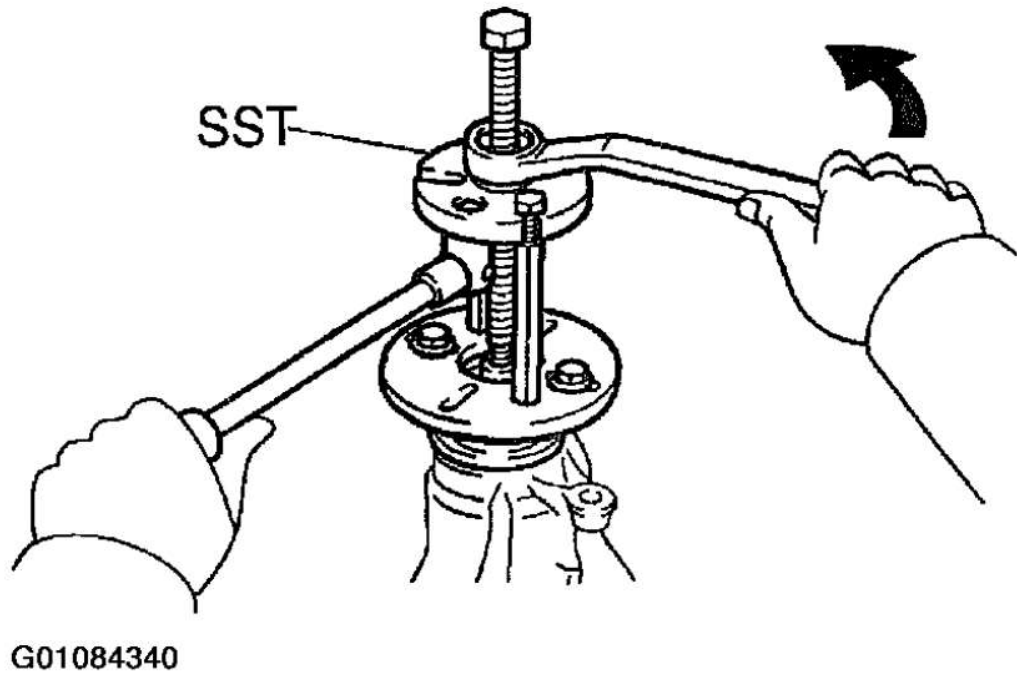
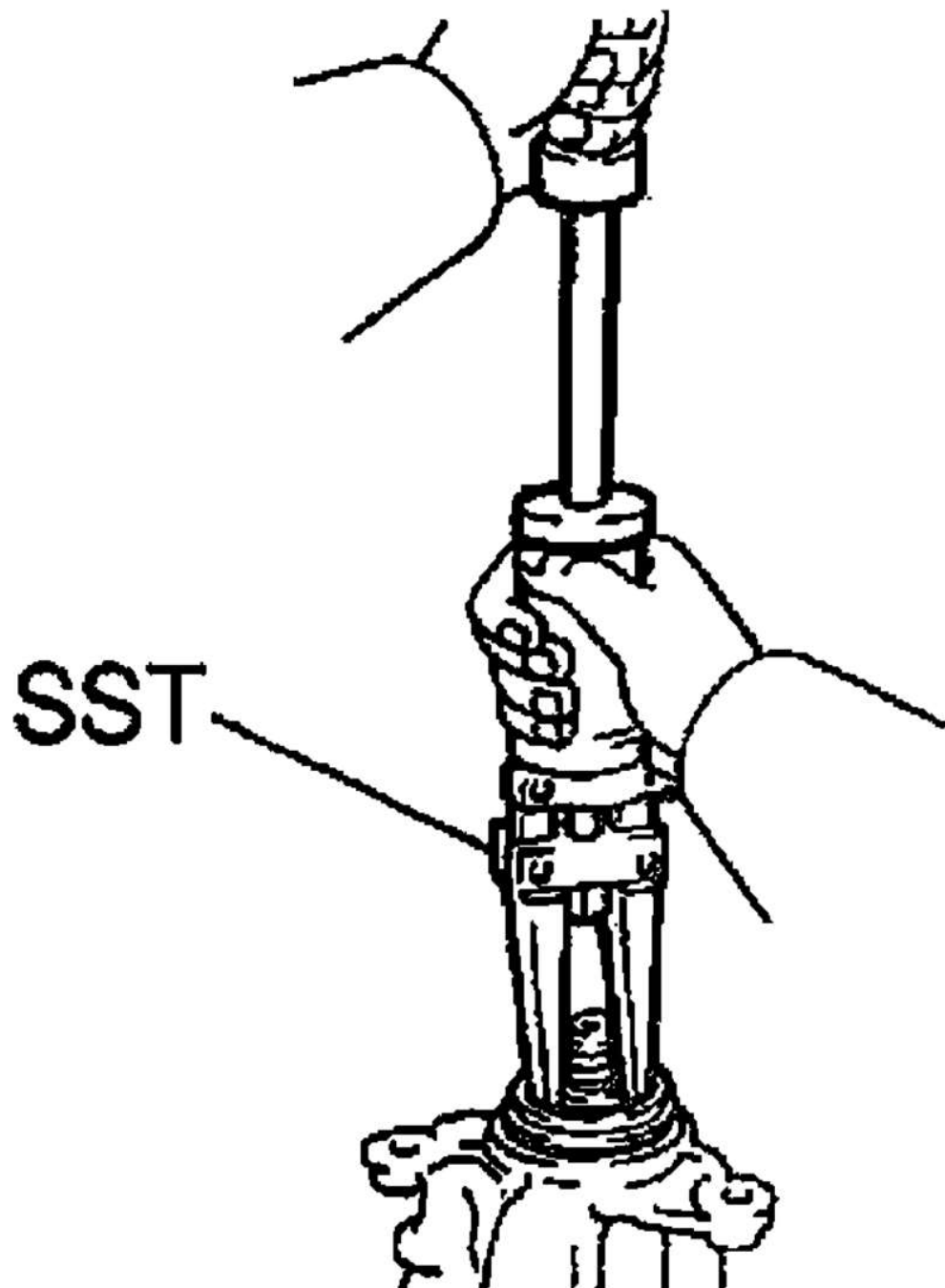


Fig. 22: Removing Companion Flange
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

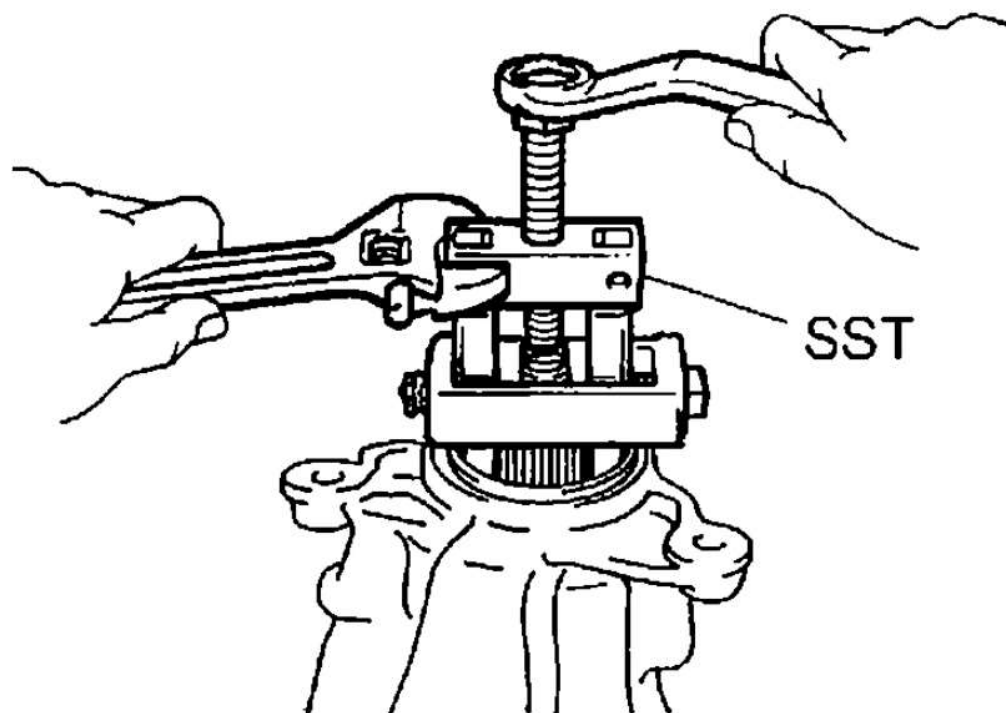
9. Remove front oil seal and oil slinger .
 - a. Using SST, remove the oil seal from the differential carrier.
SST 09308-10010



G01084341

Fig. 23: Remove Front Oil Seal & Oil Slinger
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Remove the oil slinger.
- 10. **Remove front bearing and bearing spacer .**
 - a. Using SST, remove the front bearing from the drive pinion.
SST 09556-22010

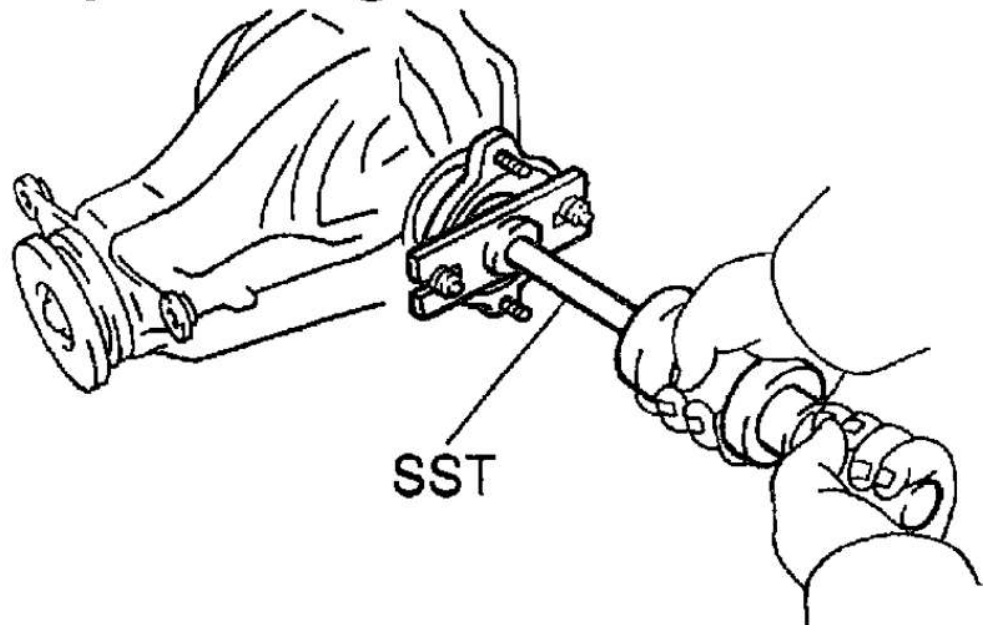


G01084342

Fig. 24: Removing Front Bearing & Bearing Spacer
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Remove the bearing spacer.
- 11. **Torque sensing LSD: Remove side gear shafts .**
 - a. Using SST, remove the 2 side gear shafts from the differential carrier.
SST 09520-24010 (09520-04010, 09520-32040)

Torque Sensing LSD

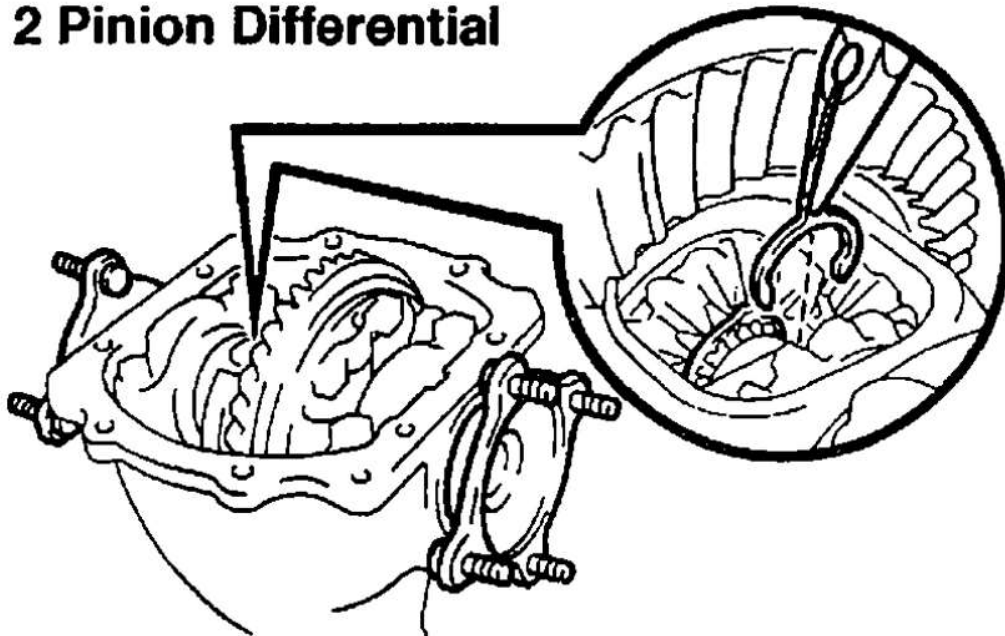


G01084343

Fig. 25: Using SST To Remove Side Gear Shafts
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Using a screwdriver, remove the 2 snap rings from the 2 side gear shafts.
- 12. **2 pinion differential: Remove side gear shafts .**
 - a. Using needle nose pliers, remove the 2 snap rings from the 2 side gear shafts.

2 Pinion Differential



G01084344

Fig. 26: Removing Snap Rings From Side Gear Shafts
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Remove the 2 side gear shafts.
- 13. **Remove side gear shaft oil seals .**

Using SST, remove the 2 oil seals from the housing.

SST 09308-10010

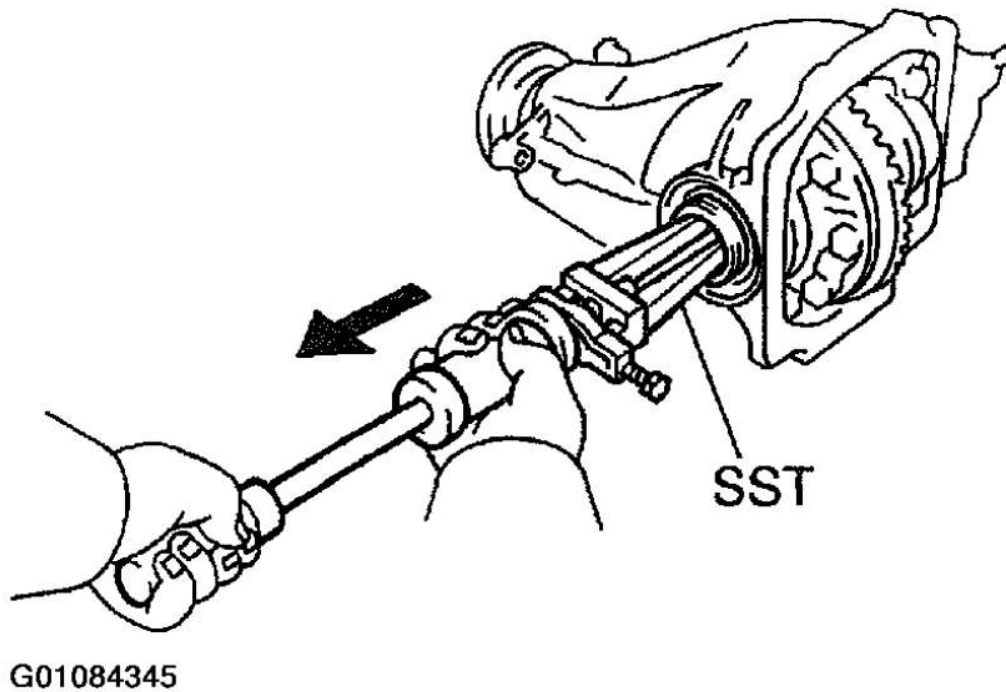
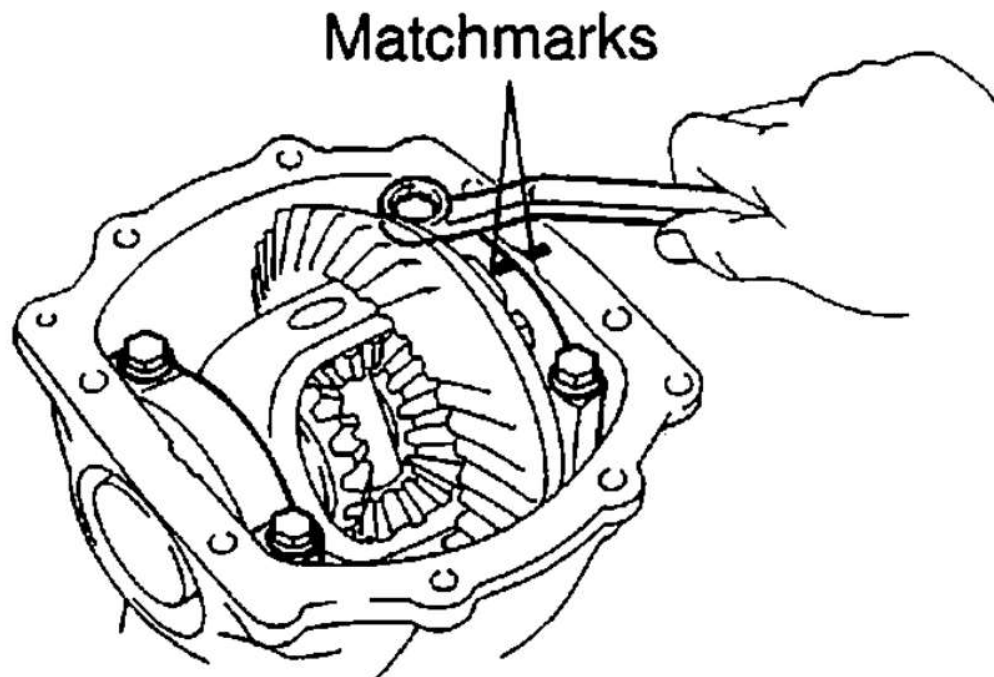


Fig. 27: Removing Side Gear Shaft Oil Seals
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

14. Remove differential case .
 - a. Place matchmarks on the bearing cap and differential carrier.

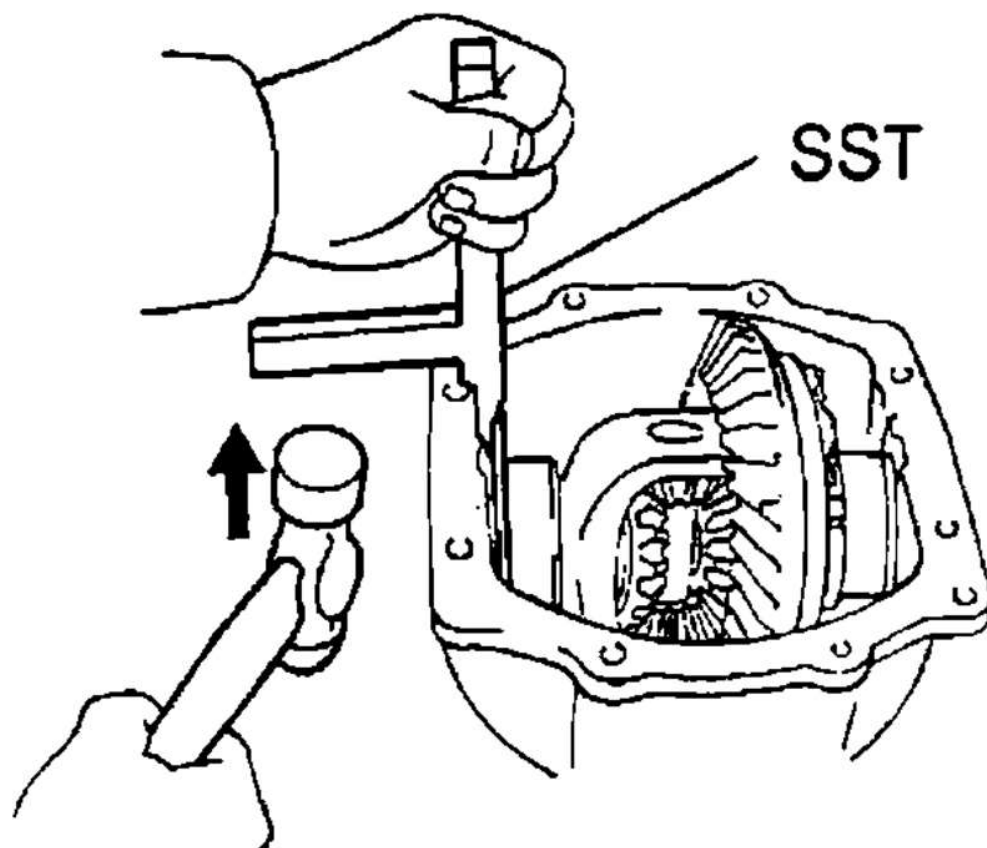


G01084346

Fig. 28: Showing Placement Of Matchmarks
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Remove the 4 bolts and 2 bearing caps.
- c. Using SST and a hammer, remove the 2 plate washers.

SST 09504-22012



G01084347

Fig. 29: Removing Plate Washers

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

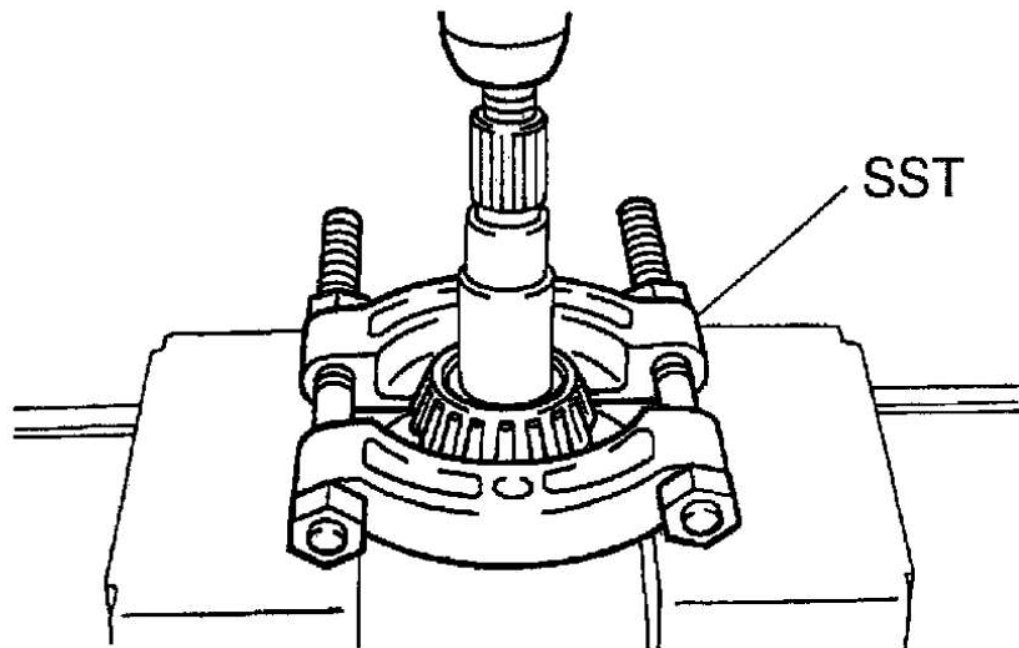
NOTE: Measure the plate washer and note the thickness.

- d. Remove the differential case and 2 bearing outer races from the carrier.

NOTE: Tag the 2 bearing outer races to show the location of reassembling.

15. Remove drive pinion from differential carrier .
16. Remove drive pinion rear bearing .
 - a. Using SST and a press, remove the bearing from the drive pinion.

SST 09950-00020



G01084348

Fig. 30: Removing Drive Pinion & Bearing
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

NOTE: If the drive pinion and ring gear are damaged, replace them as a set.

b. Remove the plate washer.

17. Remove front and rear bearing outer races .

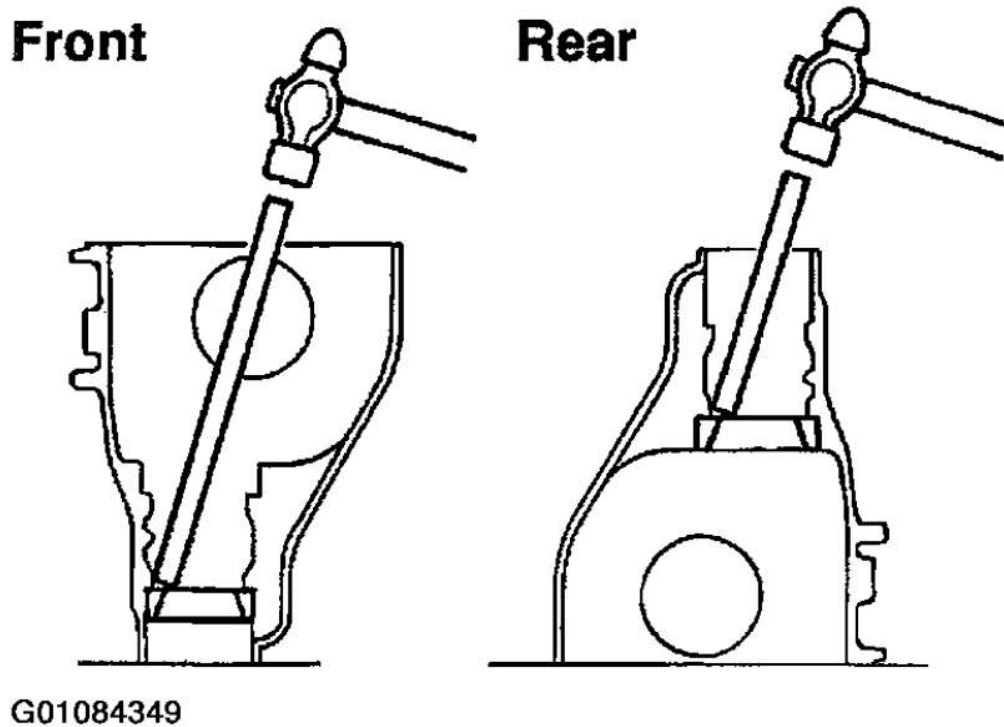


Fig. 31: Removing Front & Rear Bearing Outer Races
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Using a brass bar and a hammer, remove the 2 outer races from the carrier.

18. **Remove ring gear .**
 - a. Place matchmarks on the ring gear and differential case.
 - b. Using a screwdriver and a hammer, unstake the 4 lock plates.

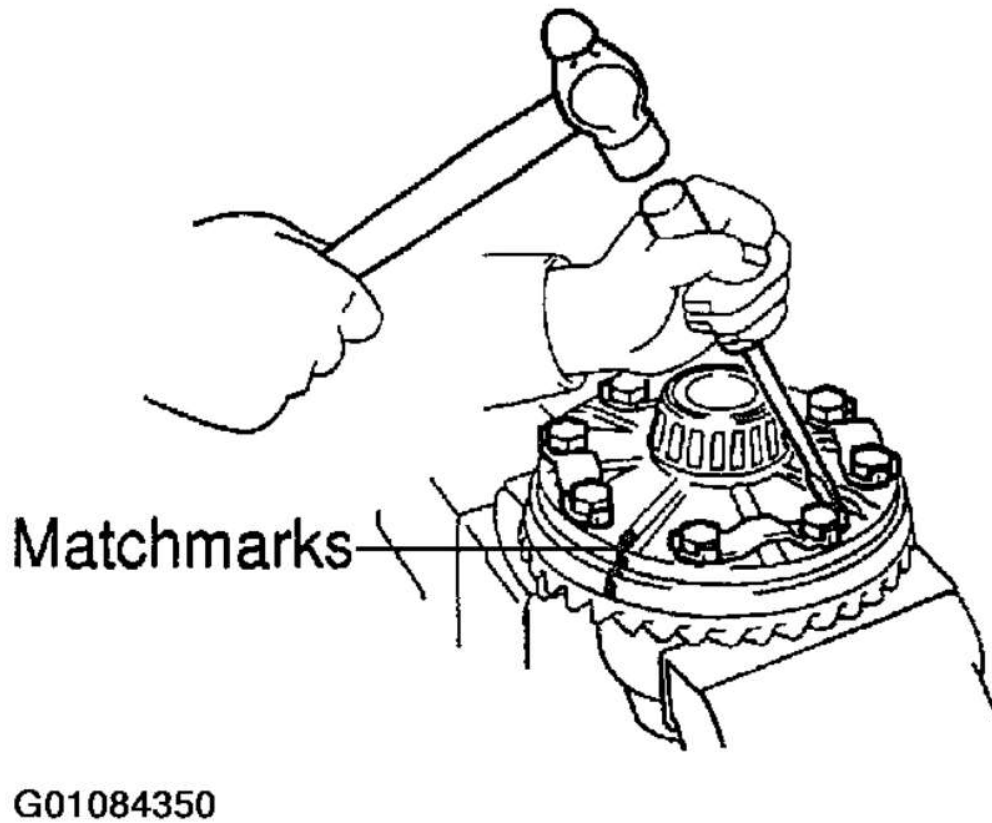


Fig. 32: Unstaking Ring Gear Lock Plates
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- c. Remove the 8 ring gear set bolts and 4 lock plates.
 - d. Using a plastic hammer, tap the ring gear to separate it from the differential case.
19. **Remove side bearings .**

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

SST 09950-00020

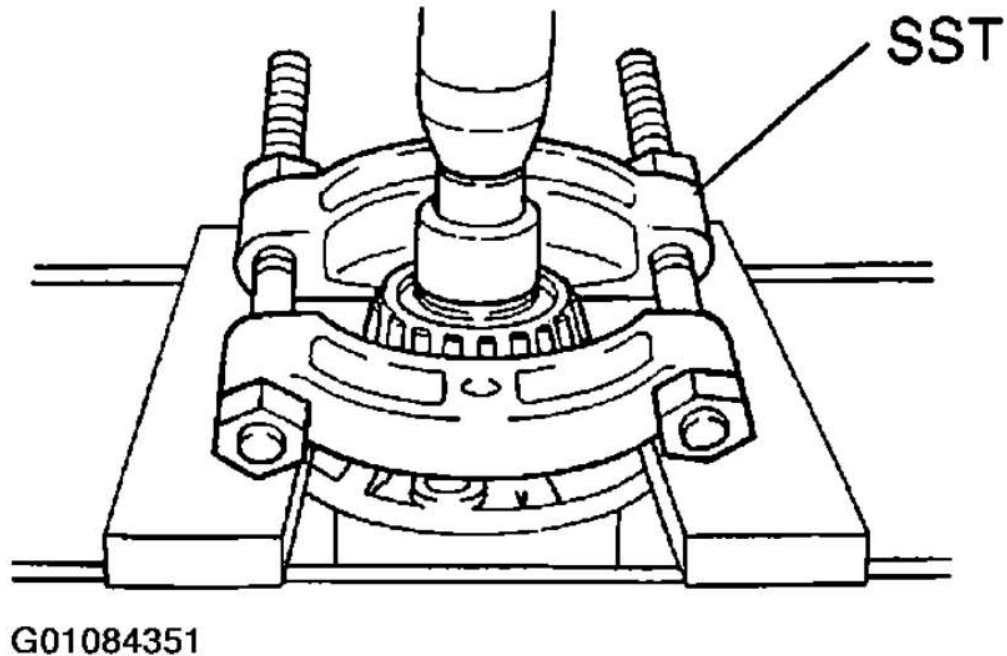


Fig. 33: Removing Side Bearings

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

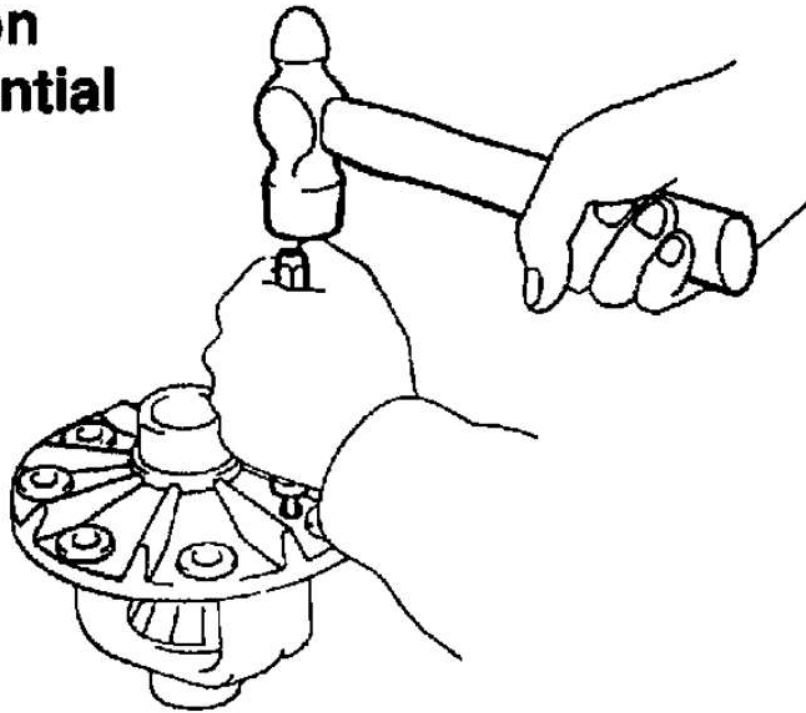
NOTE: Be careful not to drop the differential case.

20. 2 pinion differential: Disassemble differential case .

NOTE: If equipped with torque sensing LSD, do not disassemble the differential case.

- a. Using a pin punch and a hammer, remove the straight pin.
- b. Remove the pinion shaft, 2 pinion gears, 2 pinion gear thrust washers, 2 side gears and 2 side gear thrust washers.

2 Pinion Differential



G01084352

Fig. 34: Removing Straight Pin
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

REPLACEMENT

1. **Replace side gear shaft dust cover .**
 - a. Using a screwdriver and a hammer, remove the side gear shaft dust cover.
 - b. Using a steel plate and a press, install a new dust cover to the side gear shaft.

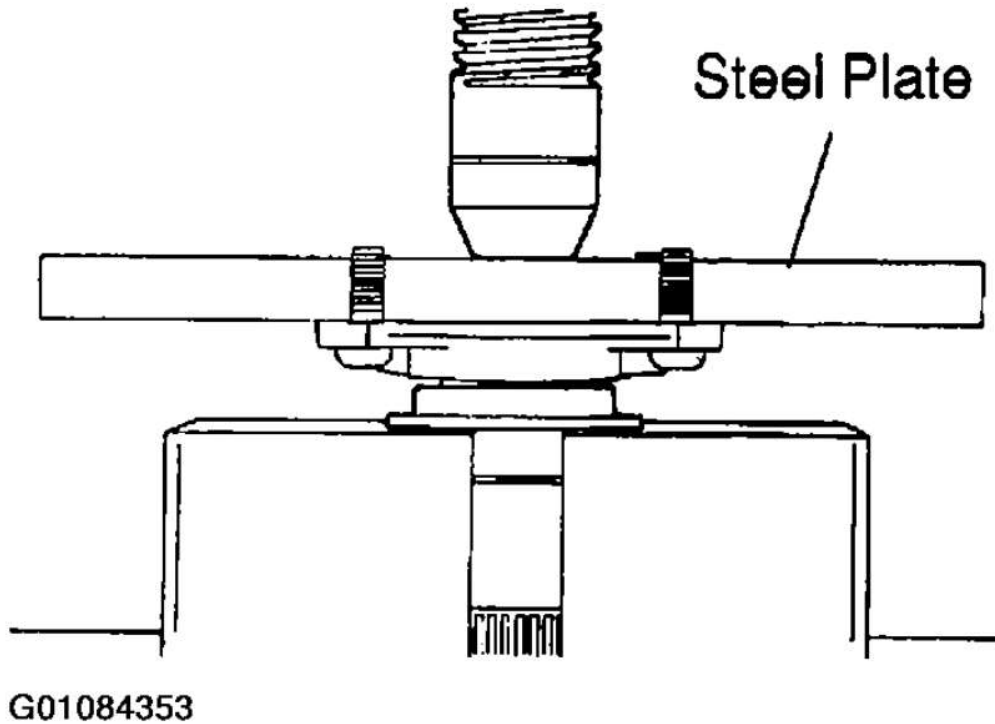
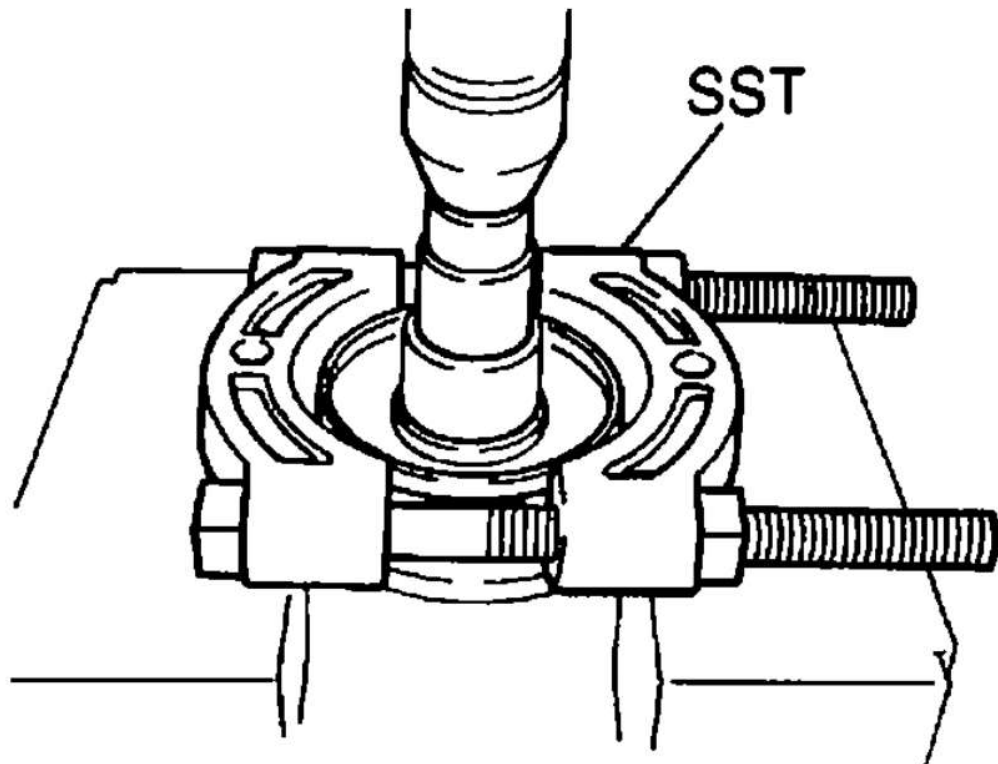


Fig. 35: Installing New Dust Cover

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

NOTE: Be careful not to damage the dust cover.

2. Replace companion flange dust deflector .
 - a. Using SST and a press, remove the dust deflector.
SST 09950-00020



G01084354

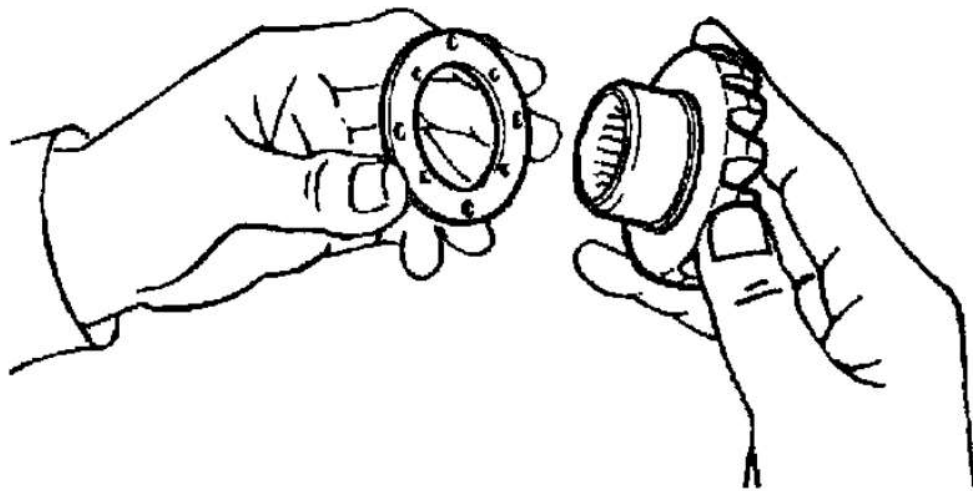
Fig. 36: Replacing Companion Flange Dust Deflector
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Using a press, install a new dust deflector.

REASSEMBLY

1. **2 pinion differential: Reassemble differential case**
 - a. Install the 2 proper thrust washers on the 2 side gears.

2 Pinion Differential



G01084355

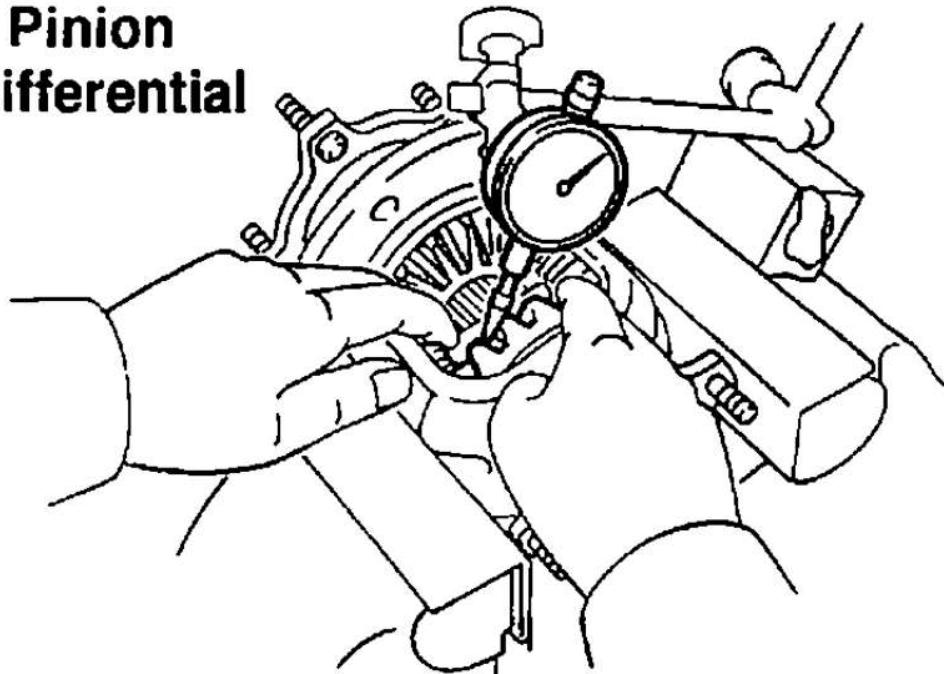
Fig. 37: Installing Thrust Washers On Side Gears
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Install the 2 side gears, 2 pinion gears, 2 pinion gear thrust washers and pinion shaft in the differential case.

NOTE: **Align the holes of the differential case and pinion shaft.**

- c. Measure the side gear backlash.

2 Pinion Differential



N

G01084357

Fig. 38: Measuring Side Gear Backlash

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

1. Install the 2 side gear shafts.
2. Measure the side gear backlash with holding 1 pinion gear toward the differential case.

Backlash: 0.05 - 0.20 mm (0.0020 - 0.0079 in.)

If the backlash is not within specification, install the 2 side gear thrust washers with different thicknesses.

NOTE: Refer to Fig. 39 the table below and select 2 thrust washers which ensures that the backlash is within the specification.

Thrust washer thickness [mm (in.)] (See Fig. 39) .

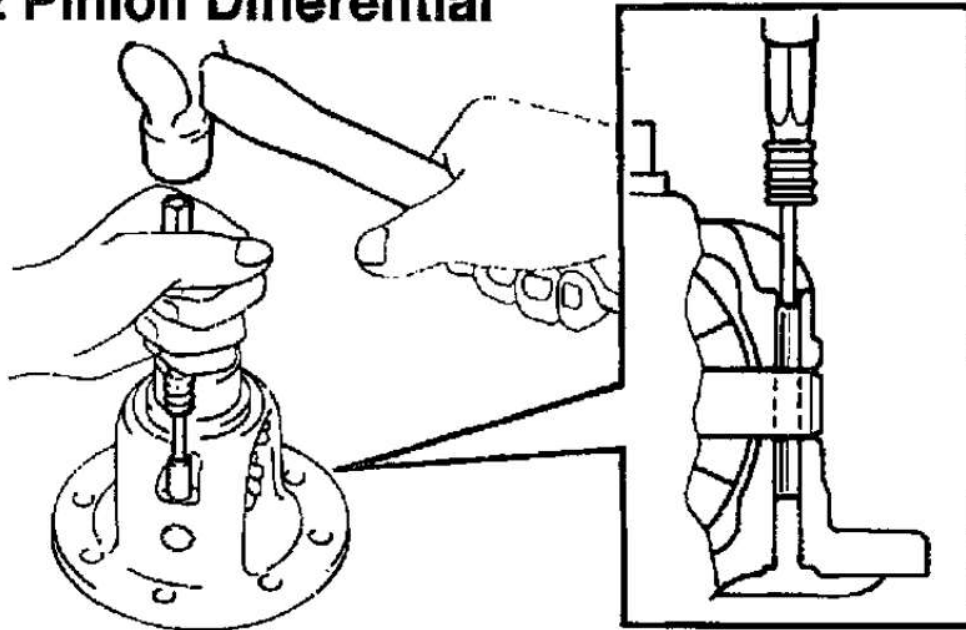
0.93 – 0.97 (0.0366 – 0.0382)	1.18 – 1.22 (0.0465 – 0.0480)
0.98 – 1.02 (0.0386 – 0.0402)	1.23 – 1.27 (0.0484 – 0.0500)
1.03 – 1.07 (0.0406 – 0.0421)	1.28 – 1.32 (0.0503 – 0.0520)
1.08 – 1.12 (0.0425 – 0.0441)	1.33 – 1.37 (0.0523 – 0.0539)
1.13 – 1.17 (0.0445 – 0.0461)	1.38 – 1.42 (0.0543 – 0.0559)

G01084356

Fig. 39: Displaying Thrust Washer Thickness Specifications
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

3. Remove the 2 side gear shafts.
- d. Using a pin punch and a hammer, install the straight pin through the differential case and hole of the pinion shaft.

2 Pinion Differential

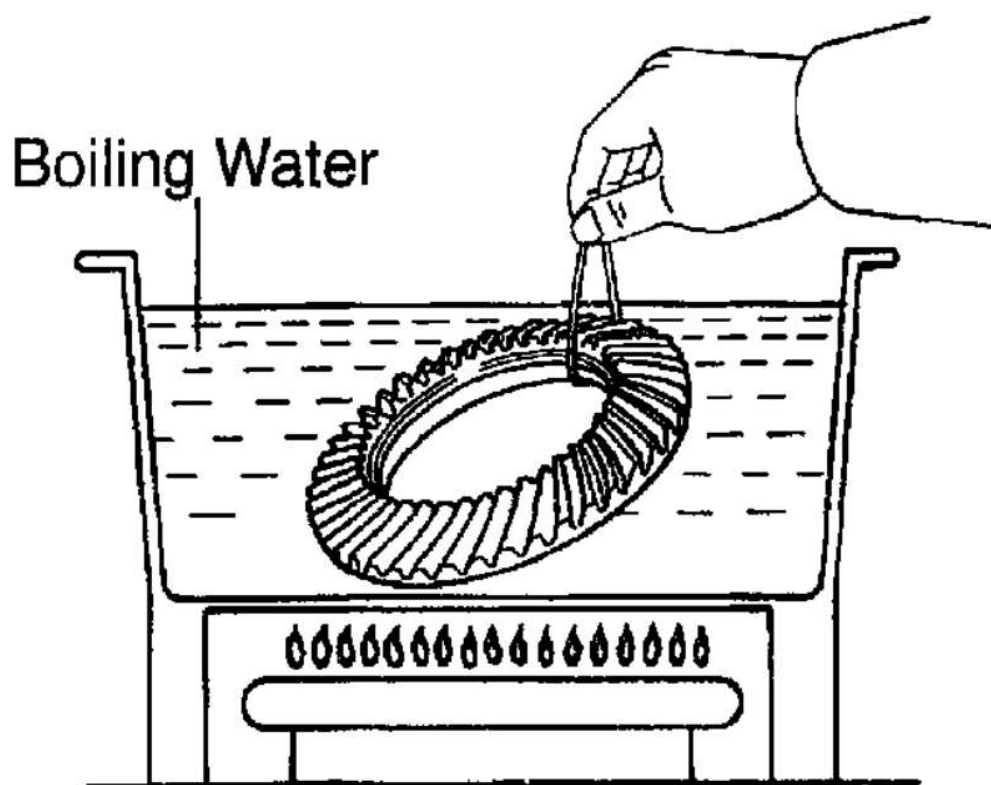


G01084358

Fig. 40: Installing Straight Pin

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- e. Using a chisel and a hammer, stake the outside of the differential case pin hole.
- 2. Install ring gear on differential case .



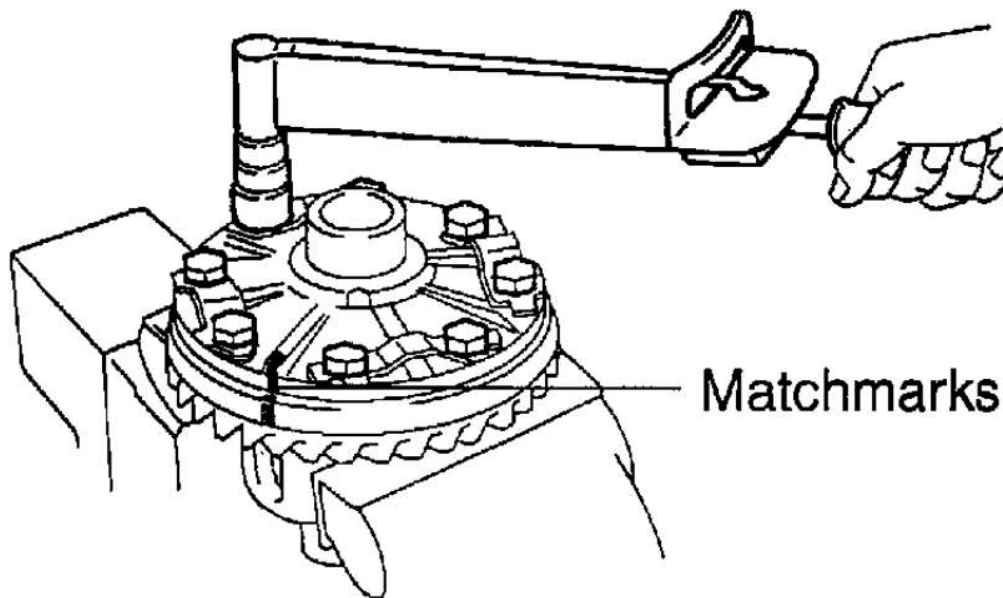
G01084359

Fig. 41: Install Ring Gear On Differential Case

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- a. Clean the contact surfaces of the differential case and ring gear.
- b. Heat the ring gear 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 4 new lock plates and the 8 bolts.



G01084360

Fig. 42: Installing New Lock Plates & Bolts

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- g. After the ring gear cools down enough, torque the 8 bolts uniformly at a time.

Torque: 97 N.m (985 kgf.cm, 71 ft.lbf)

- h. Using a chisel and a hammer, raise up claws of the 4 lock plates.

NOTE:

- Bend one of the claws which touches the flat surface of the bolt so that the claw can contact the surface firmly.
- If one of the claws is divided into two due the protruding portion of the bolt, make the claw contact firmly with the tightening side of the bolt.

3. Install side bearings .

Using SST and a press, install the 2 side bearings into the differential case.

SST 09710-22021 (09710-01031)

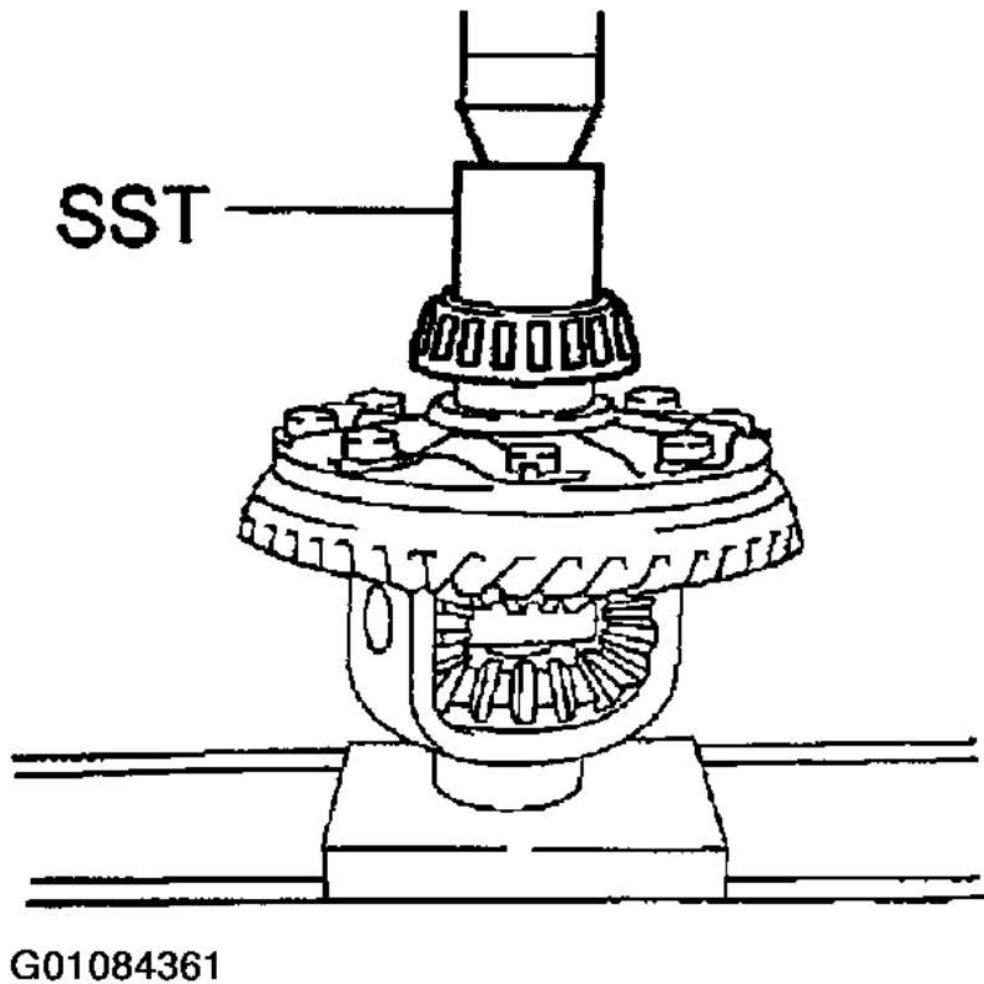
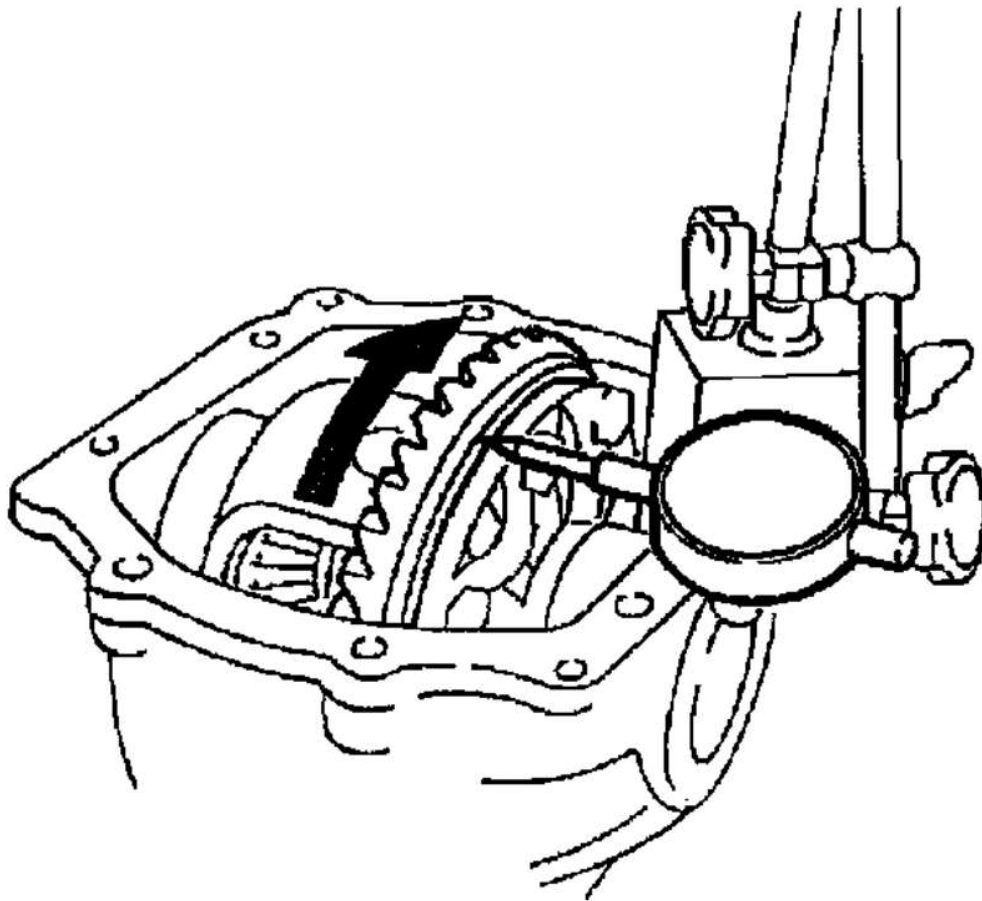


Fig. 43: Installing Side Bearings

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

4. Inspect ring gear runout .

- a. Install the differential case on the carrier, and install the 2 plate washers so that there is no play in the bearing.
- b. Install the bearing caps.
- c. Using a dial indicator, measure the runout of the ring gear.



G01084362

Fig. 44: Measuring Runout Of Ring Gear
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Maximum runout: 0.07 mm (0.0028 in.)

- d. Remove the 2 bearing caps, 2 plate washers and differential carrier.

5. Install front and rear bearing outer races .

- a. Front side:

Using SST and a press, install the outer race to the carrier.

SST 09950-60020 (09951-00790), 09950-70010 (09951-07150)

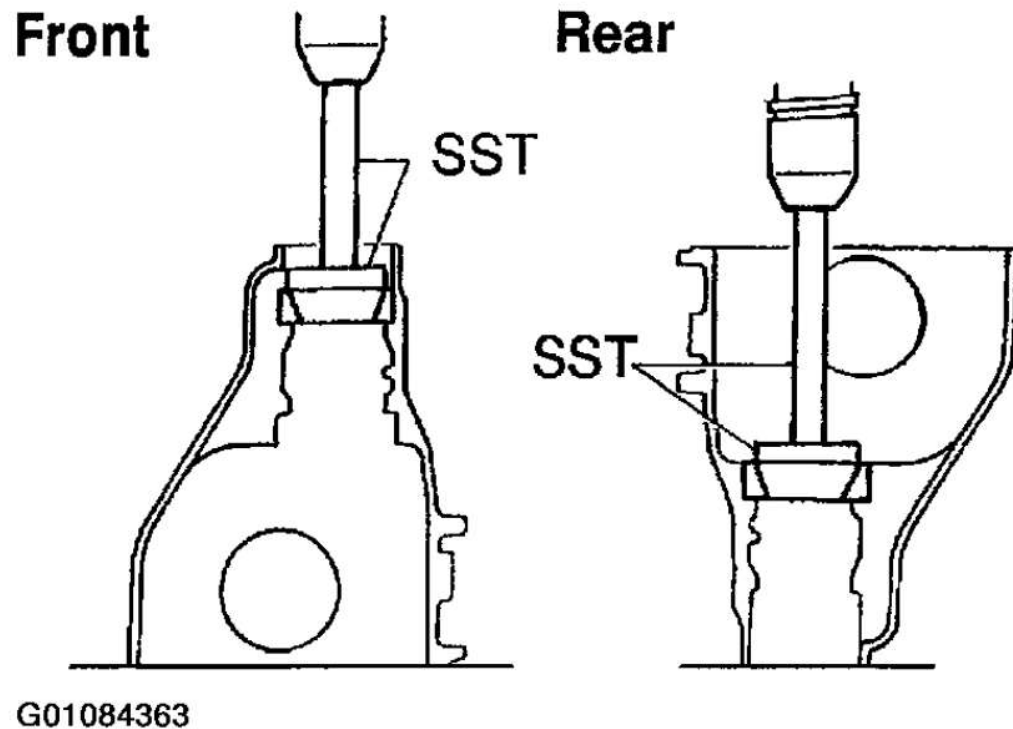


Fig. 45: Installing Front & Rear Bearing Outer Races
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

b. Rear side:

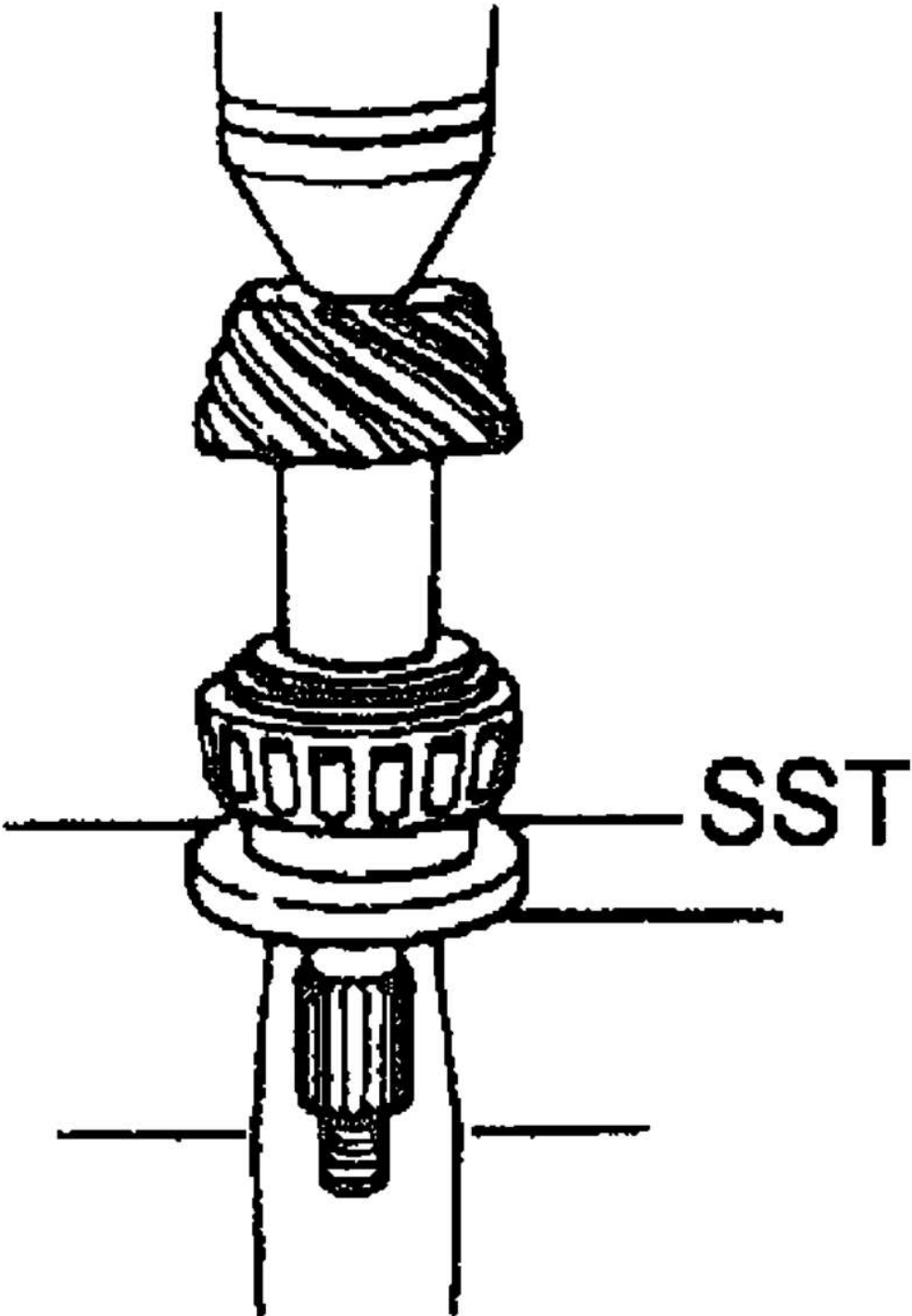
Using SST and a press, install the 2 outer races to the carrier.

SST 09950-60020 (09951-00710), 09950-70010 (09951-07150)

6. Install drive pinion rear bearing .

- a. Install the removed plate washer on the drive pinion.
- b. Using SST and a press, install the rear bearing onto the drive pinion.

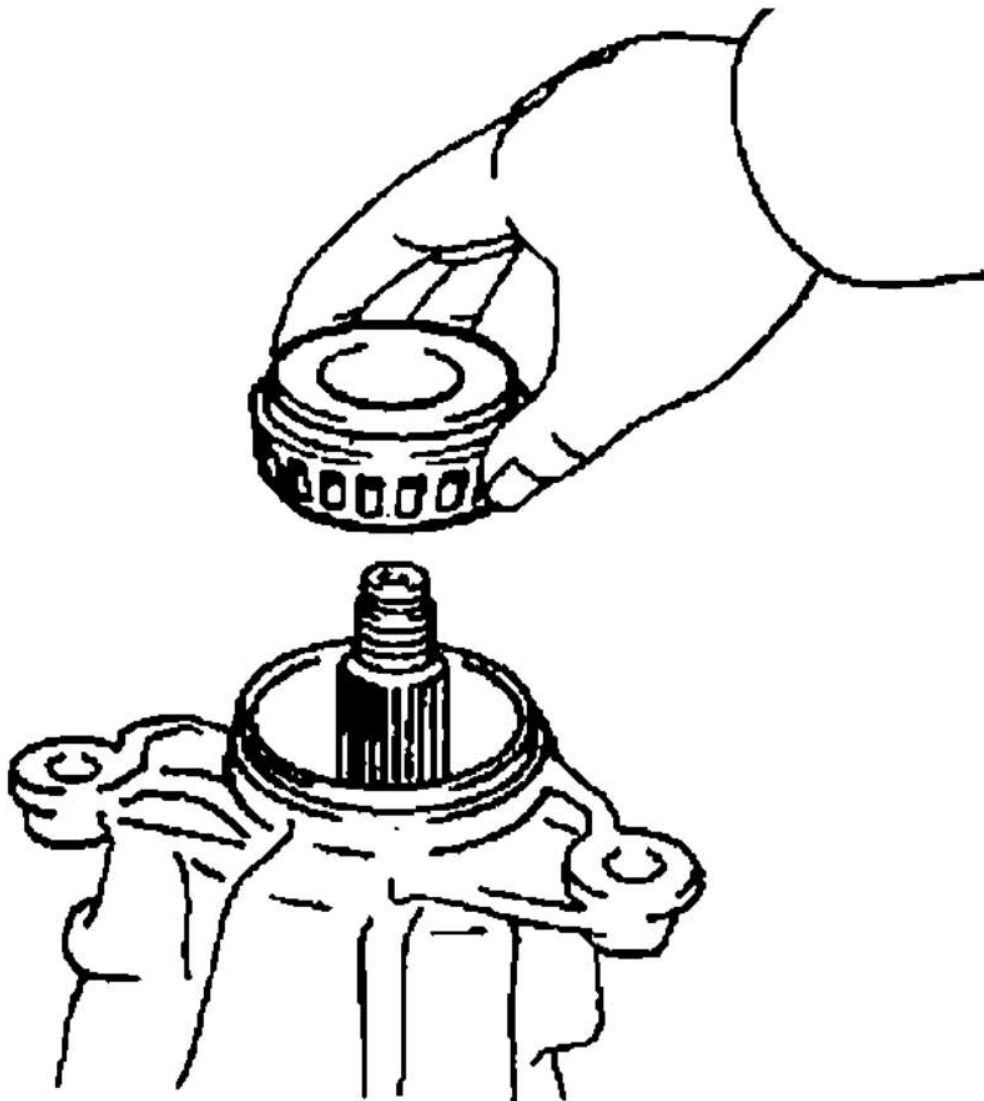
SST 09506-30012



G01084364

Fig. 46: Installing Rear Bearing Onto Drive Pinion
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

7. Temporarily adjust drive pinion preload .
 - a. Install the drive pinion and front bearing.



G01084365

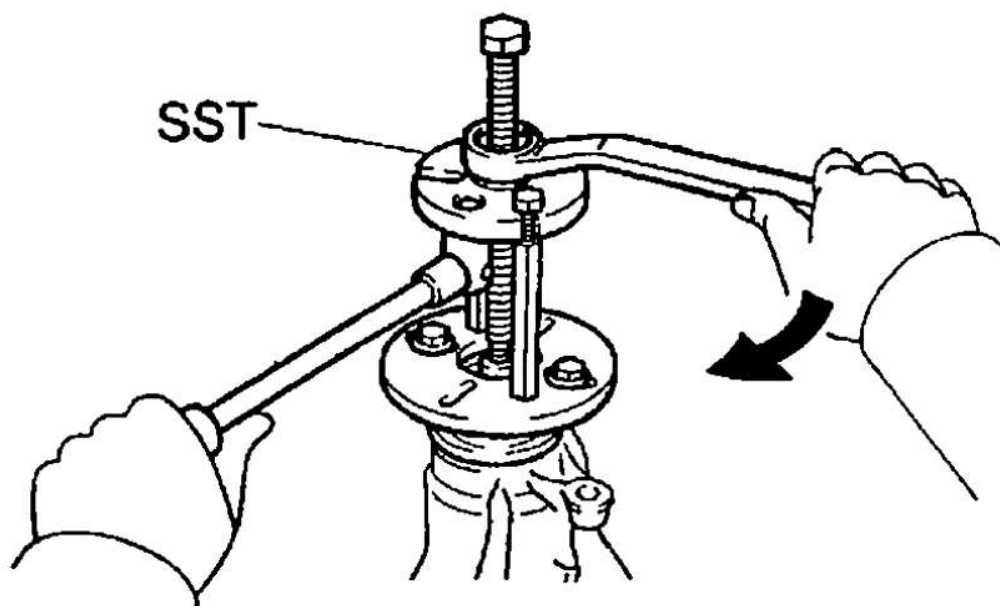
Fig. 47: Installing Drive Pinion & Front Bearing
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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

- b. Using SST, install the companion flange.

SST 09950-30012 (09951-03010, 09953-03010, 09954-03010, 09955-03040, 09956- 03020)

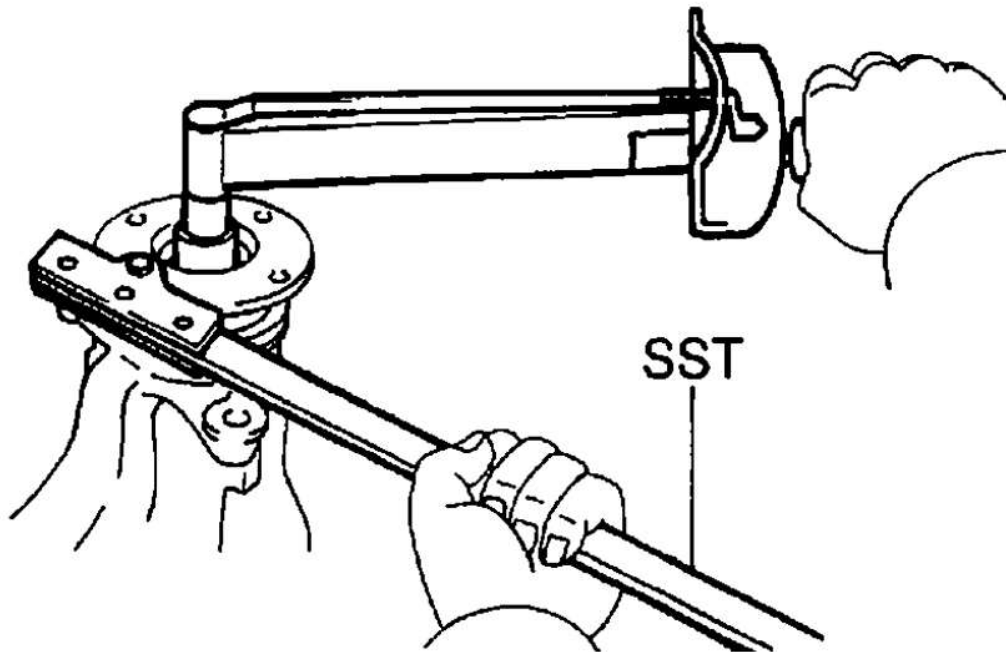
- c. Coat the threads of the nut with MP grease.



G01084366

Fig. 48: Installing Companion Flange
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- d. Adjusting the drive pinion preload by tightening the companion flange nut.



G01084367

Fig. 49: Adjusting Drive Pinion Preload
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

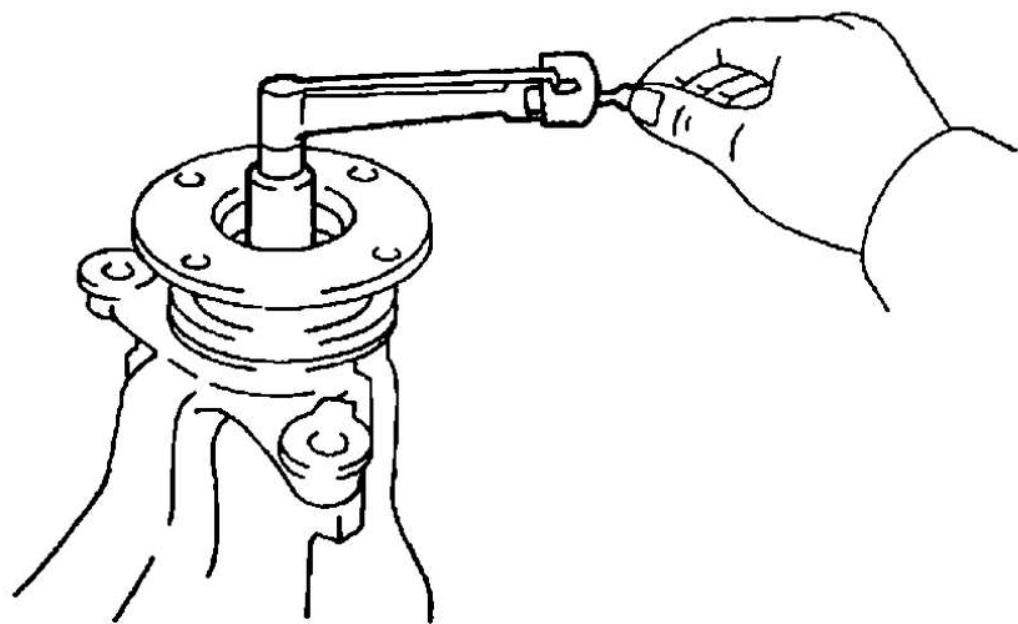
Using SST to hold the flange, tighten the nut.

Torque: 108 - 235 N.m (1,100 - 2,400 kgf.cm, 80 - 173 ft.lbf)

SST 09330-00021

NOTE: Without a spacer, torque a little at a time, being careful not to over tighten it.

- e. Using a torque wrench, measure the preload.



G01084369

Fig. 50: Measuring Preload Using Torque Wrench
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Preload (at starting):

New bearing	1.1 – 1.7 N·m (11 – 17 kgf·cm, 9.5 – 14.7 in.·lbf)
Reused bearing	0.6 – 0.9 N·m (6 – 9 kgf·cm, 5.2 – 7.8 in.·lbf)

G01084368

Fig. 51: Displaying Preload Specifications
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

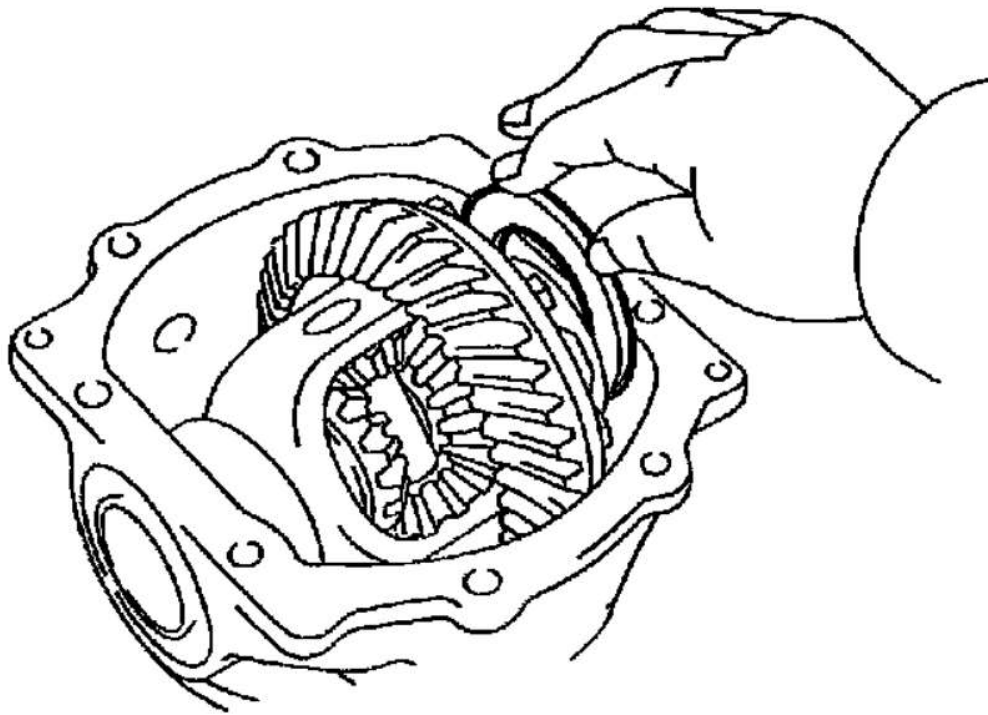
8. **Install differential case in carrier .**
- a.

Place the 2 bearing outer races on their respective bearings. Make sure the left and right races are not interchanged.
- b.

Install the differential case in the carrier.

9. **Adjust ring gear backlash .**

- a. Install only the plate washer on the ring gear back side.



G01084370

Fig. 52: Adjusting Ring Gear Backlash

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Make the washer and bearing fit by tapping the ring gear with a plastic hammer.
- c. Using a dial indicator, hold the companion flange and measure the ring gear backlash.

Backlash (reference): 0.13 - 0.18 mm (0.0051 - 0.0071 in.)

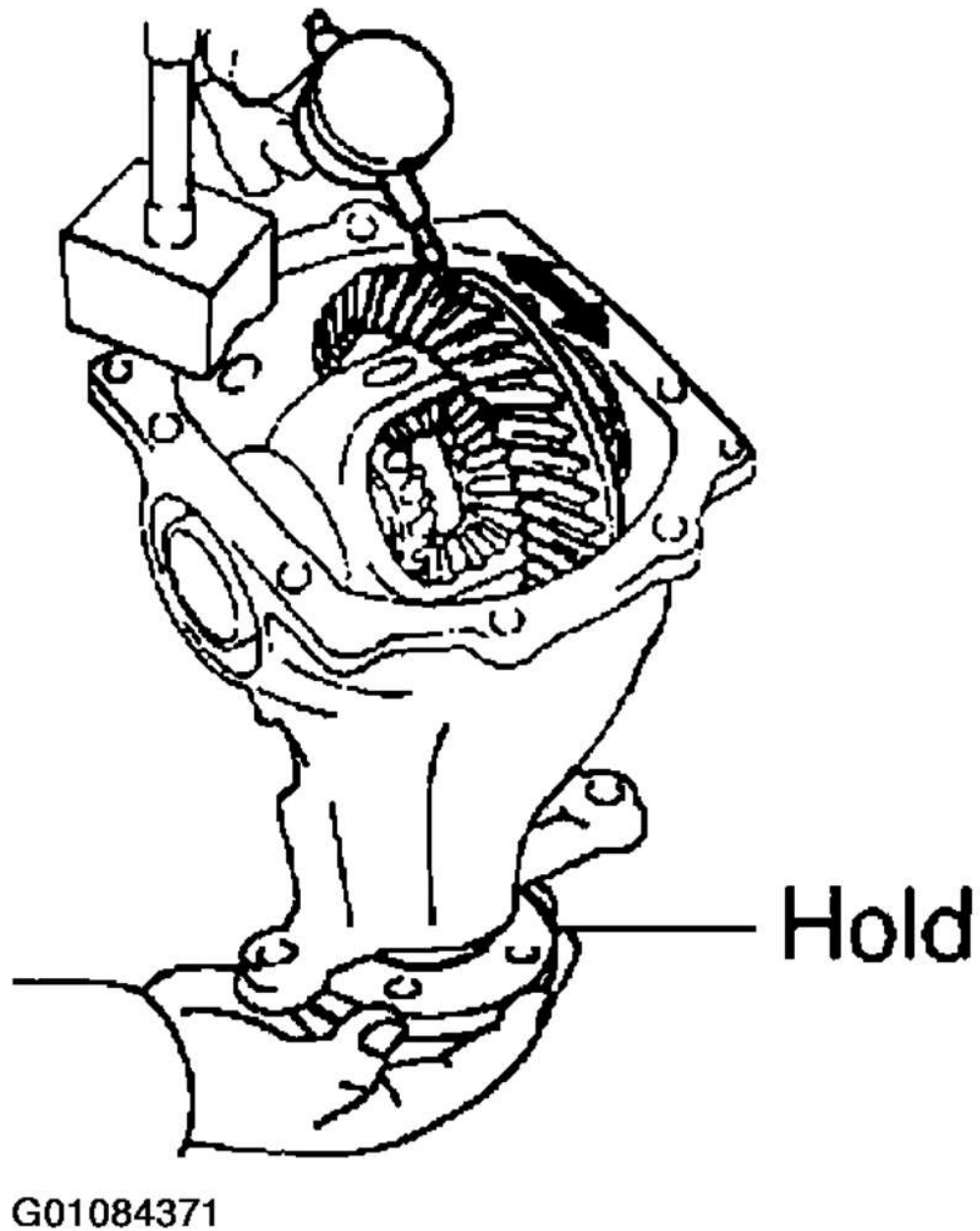
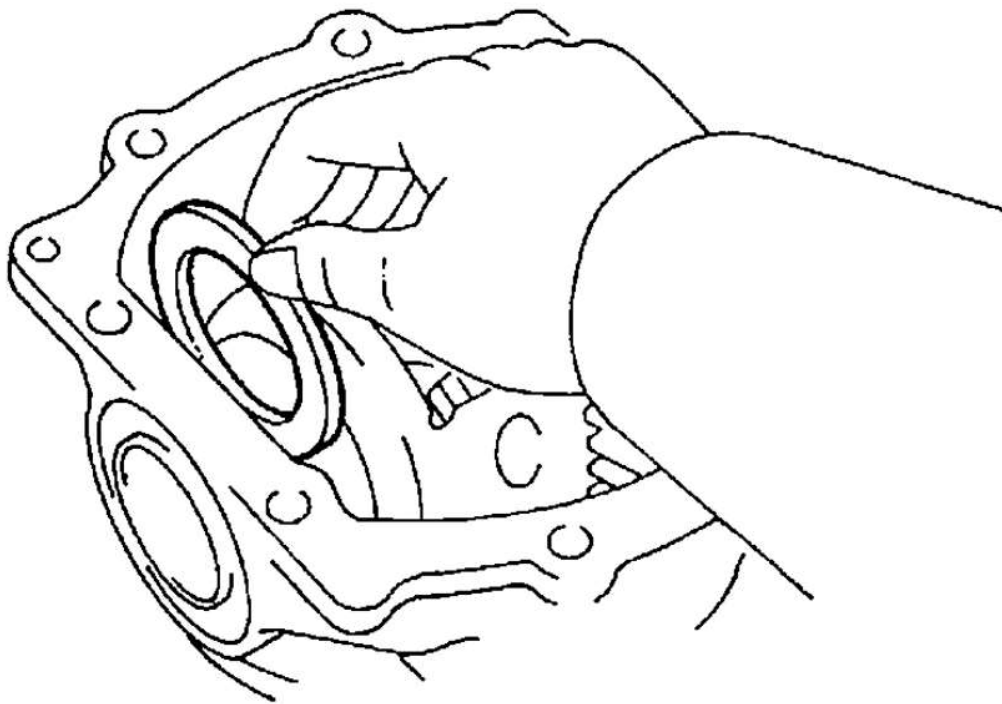


Fig. 53: Measuring Gear Ring Gear Backlash
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- d. Select a ring gear back side plate washer so that the backlash becomes 0.13-0.18 mm (0.0051-

0.0071 in.).

- e. Select a ring gear teeth side washer so that there is no clearance between the outer race and case.

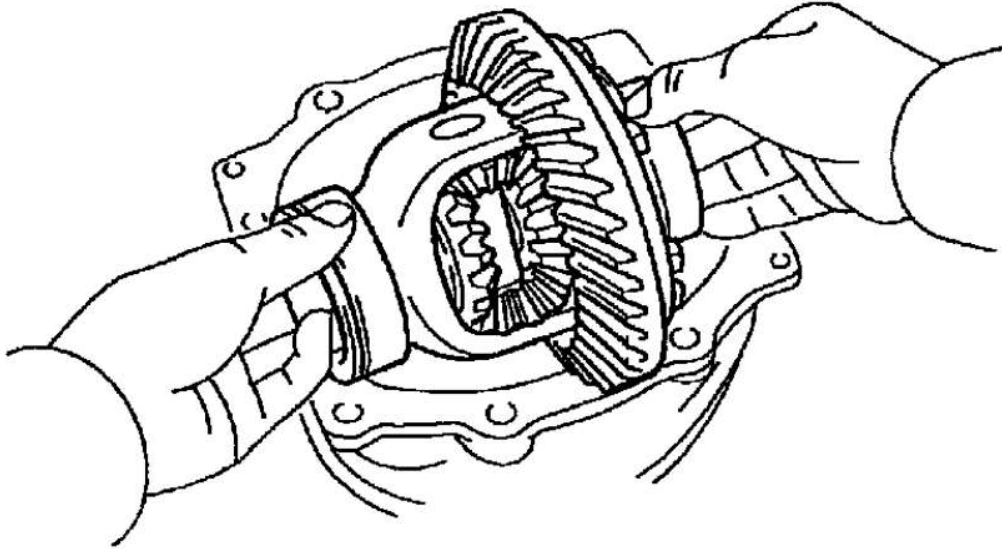


G01084372

Fig. 54: Installing Ring Gear Side Washer

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- f. Remove the plate washer and differential case.
- g. Install the plate washer into the ring gear back side.
- h. Place the outer plate washer on the differential case together with the outer race, and install the differential case with the outer race into the carrier.



G01084373

Fig. 55: Installing Differential Case Into Carrier
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- i. Using a plastic hammer, make the washer fit and bearing by tapping the ring gear.
- j. Using a dial indicator, measure the ring gear backlash while holding the companion flange.

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

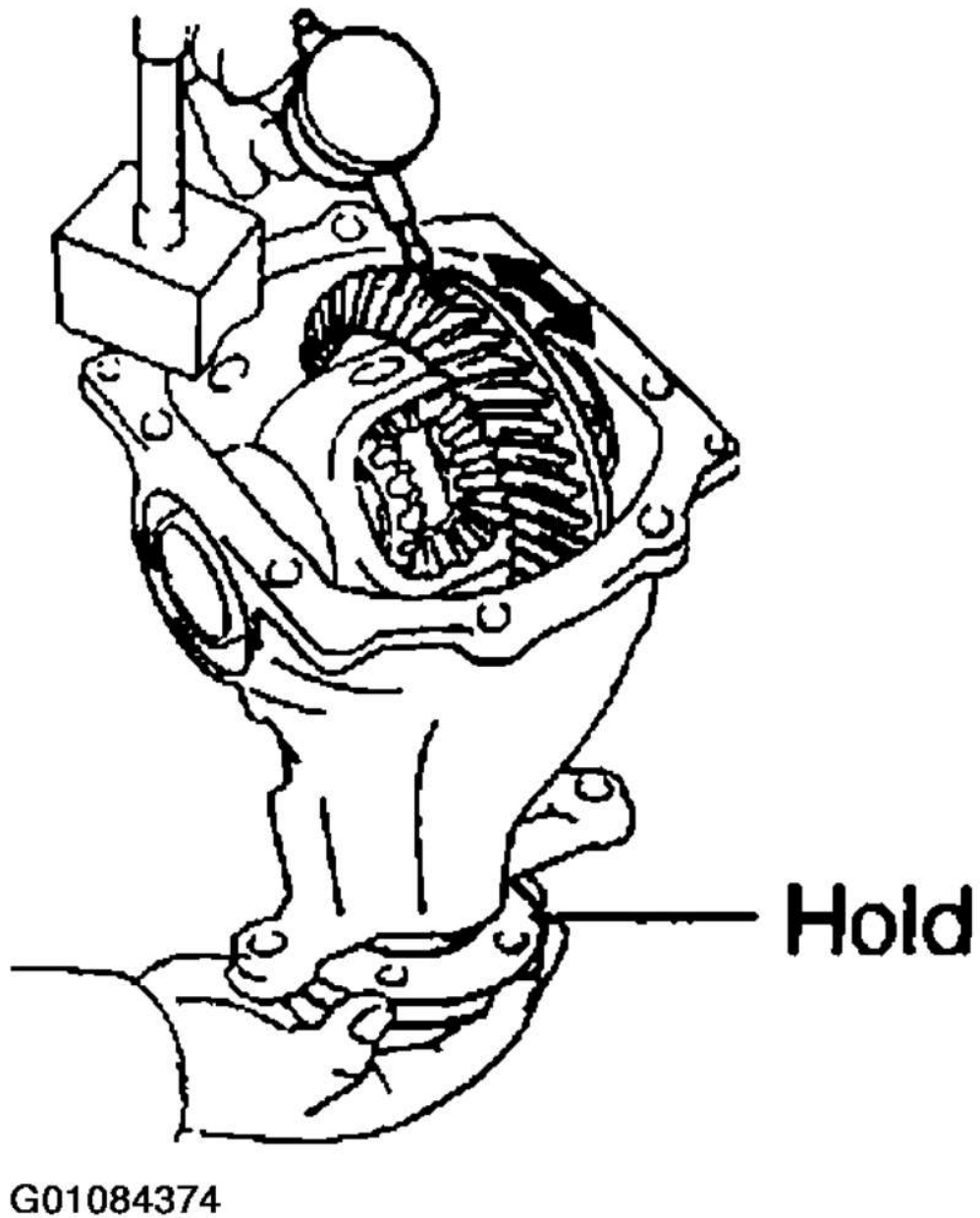


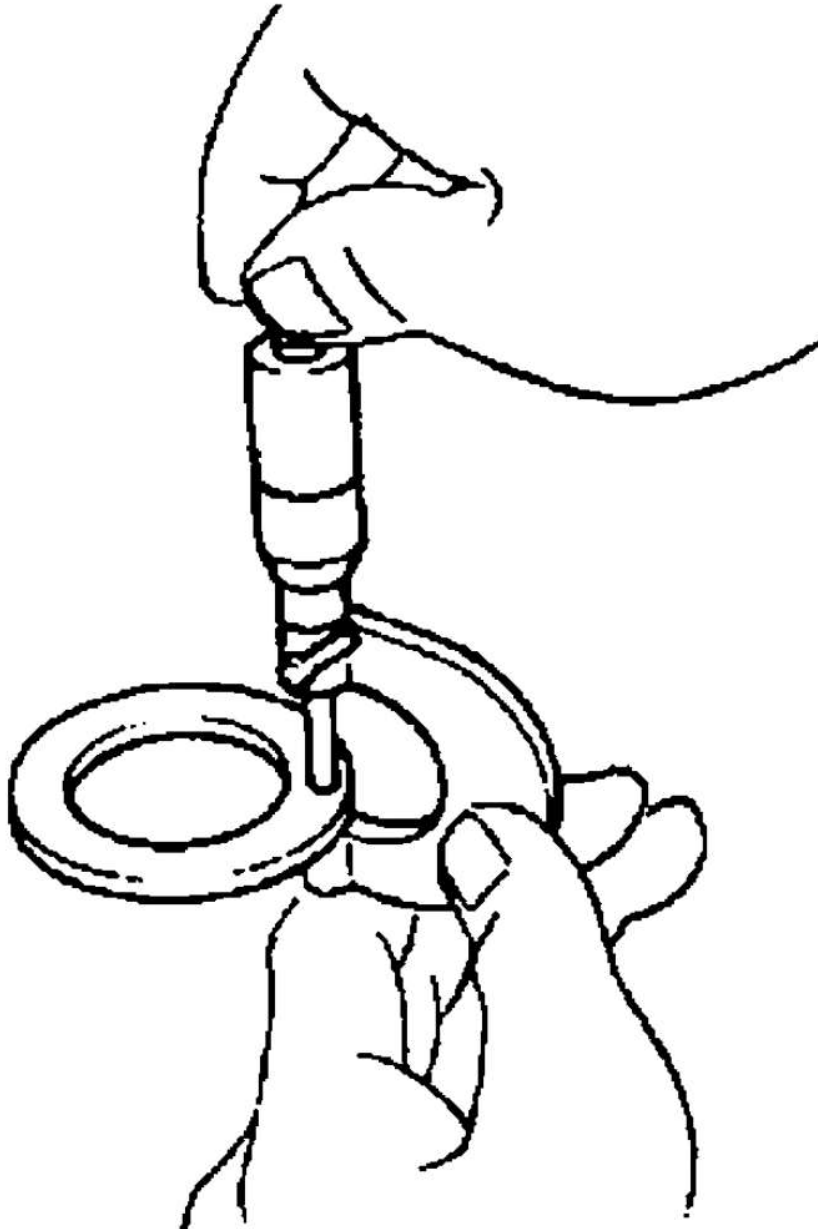
Fig. 56: Measuring Ring Gear Backlash
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

If the value is not within the specification, adjust it by either increasing or decreasing the thickness of the washers on both sides by an equal amount.

NOTE: **There should be clearance between the plate washer and case. Ensure that there is the ring gear backlash.**

10. Adjust side bearing preload .

- a. After adjusting the ring gear backlash as reference, remove the teeth side plate washer.
- b. Using a micrometer, measure the thickness of the removed plate washer.



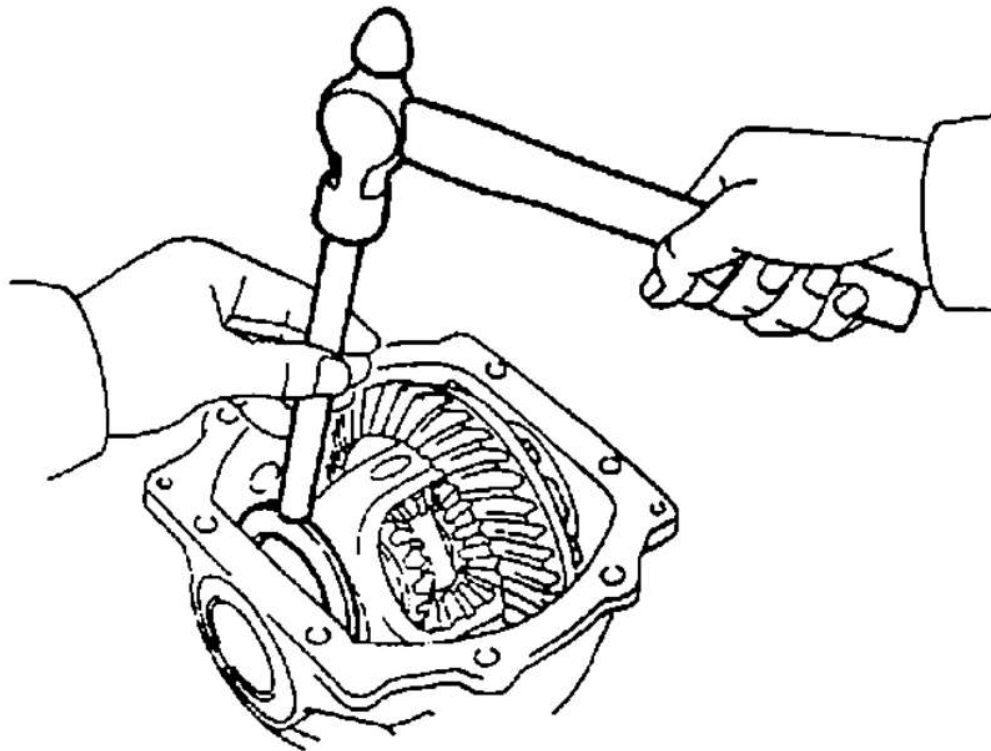
G01084375

Fig. 57: Measuring Removed Plate Washer Thickness
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- c. Install a new washer of 0.06 - 0.09 mm (0.0024 - 0.0035 in.) thicker than the removed washer.

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

- d. Using a brass bar and a hammer, tap the plate washer.

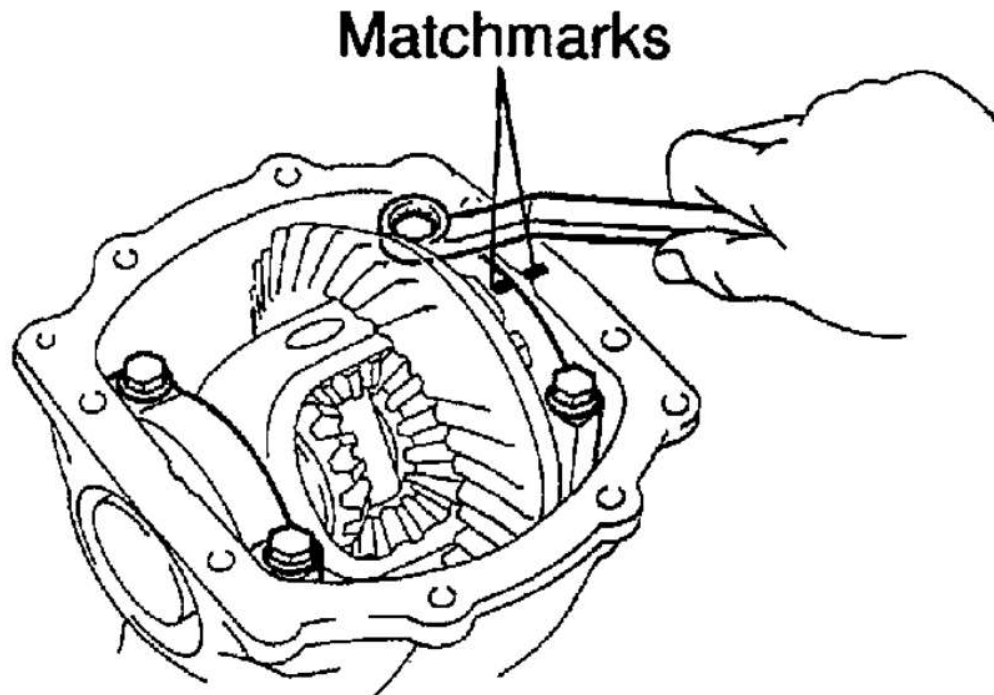


G01084376

Fig. 58: Tapping Plate Washer

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- e. Align the matchmarks on the cap and carrier, and install the 2 bearing caps with the 4 bolts.

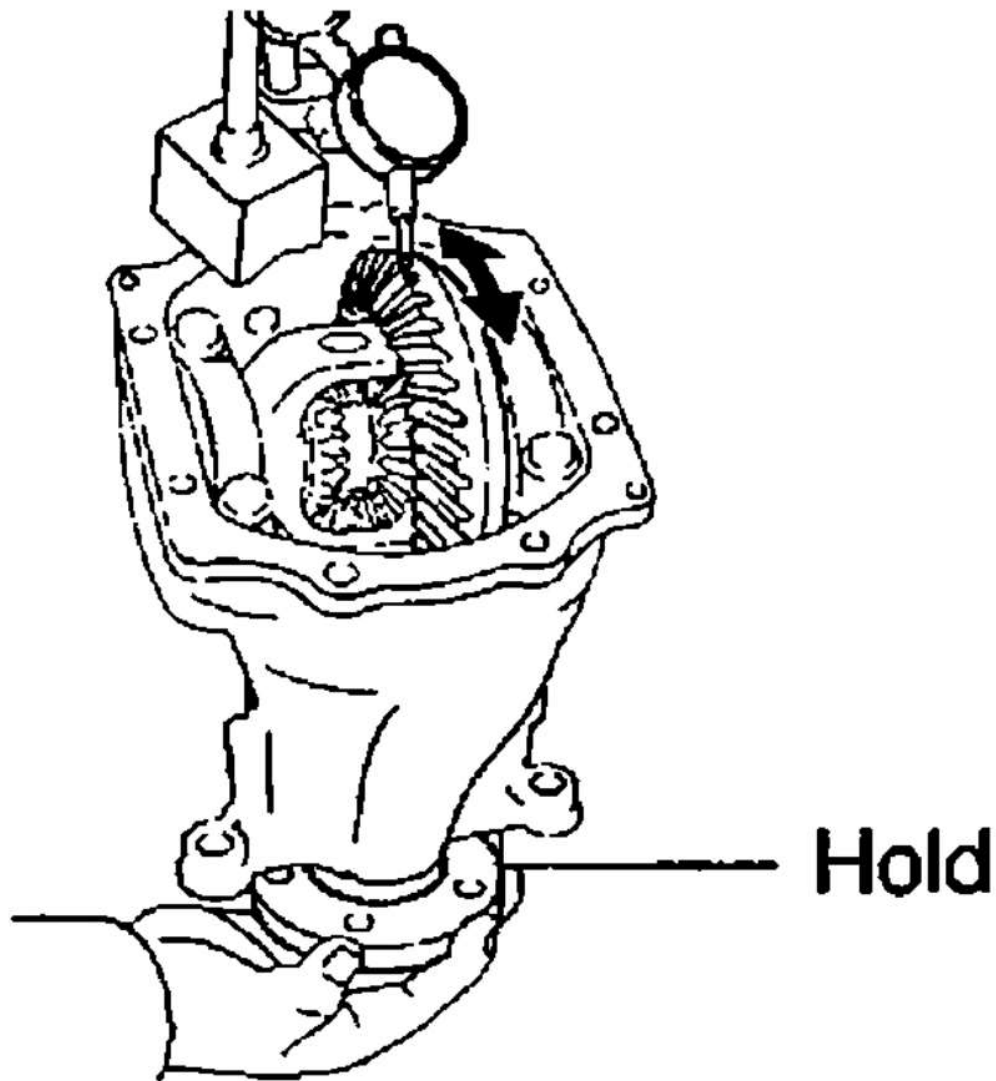


G01084377

Fig. 59: Aligning Matchmarks & Installing Bearing Fasteners
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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

- f. Recheck the ring gear backlash.



G01084378

Fig. 60: Rechecking Gear Backlash
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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

If the value is not within the specification, adjust it by either increasing or decreasing the washers thickness on both sides by equal amount.

NOTE: The backlash will change by about 0.02 mm (0.0008 in.) corresponding to 0.03 mm (0.0012 in.) change in the plate washer thickness.

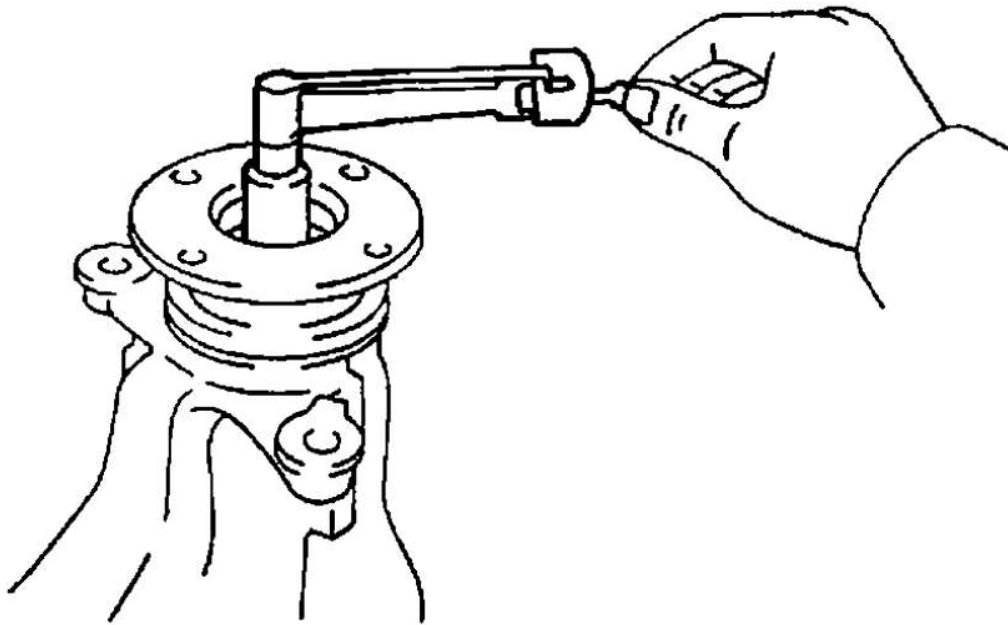
Washer thickness:

Thickness mm (in.)	Thickness mm (in.)	Thickness mm (in.)
2.21 – 2.23 (0.0870 – 0.0878)	2.57 – 2.59 (0.1012 – 0.1020)	2.93 – 2.95 (0.1154 – 0.1161)
2.24 – 2.26 (0.0882 – 0.0890)	2.60 – 2.62 (0.1024 – 0.1031)	2.96 – 2.98 (0.1165 – 0.1173)
2.27 – 2.29 (0.0894 – 0.0902)	2.63 – 2.65 (0.1035 – 0.1043)	2.99 – 3.01 (0.1177 – 0.1185)
2.30 – 2.32 (0.0906 – 0.0913)	2.66 – 2.68 (0.1047 – 0.1055)	3.02 – 3.04 (0.1189 – 0.1197)
2.33 – 2.35 (0.0917 – 0.0925)	2.69 – 2.71 (0.1059 – 0.1067)	3.05 – 3.07 (0.1201 – 0.1209)
2.36 – 2.38 (0.0929 – 0.0937)	2.72 – 2.74 (0.1071 – 0.1079)	3.08 – 3.10 (0.1213 – 0.1220)
2.39 – 2.41 (0.0941 – 0.0949)	2.75 – 2.77 (0.1083 – 0.1091)	3.11 – 3.13 (0.1224 – 0.1232)
2.42 – 2.44 (0.0953 – 0.0961)	2.78 – 2.80 (0.1094 – 0.1102)	3.14 – 3.16 (0.1236 – 0.1244)
2.45 – 2.47 (0.0965 – 0.0972)	2.81 – 2.83 (0.1106 – 0.1114)	3.17 – 3.19 (0.1248 – 0.1256)
2.48 – 2.50 (0.0976 – 0.0984)	2.84 – 2.86 (0.1118 – 0.1126)	3.20 – 3.22 (0.1260 – 0.1268)
2.51 – 2.53 (0.0988 – 0.0996)	2.87 – 2.89 (0.1130 – 0.1138)	–
2.54 – 2.56 (0.1000 – 0.1008)	2.90 – 2.92 (0.1142 – 0.1150)	–

G01084379

Fig. 61: Displaying Washer Thickness Specifications
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

11. Measure total preload .



G01084380

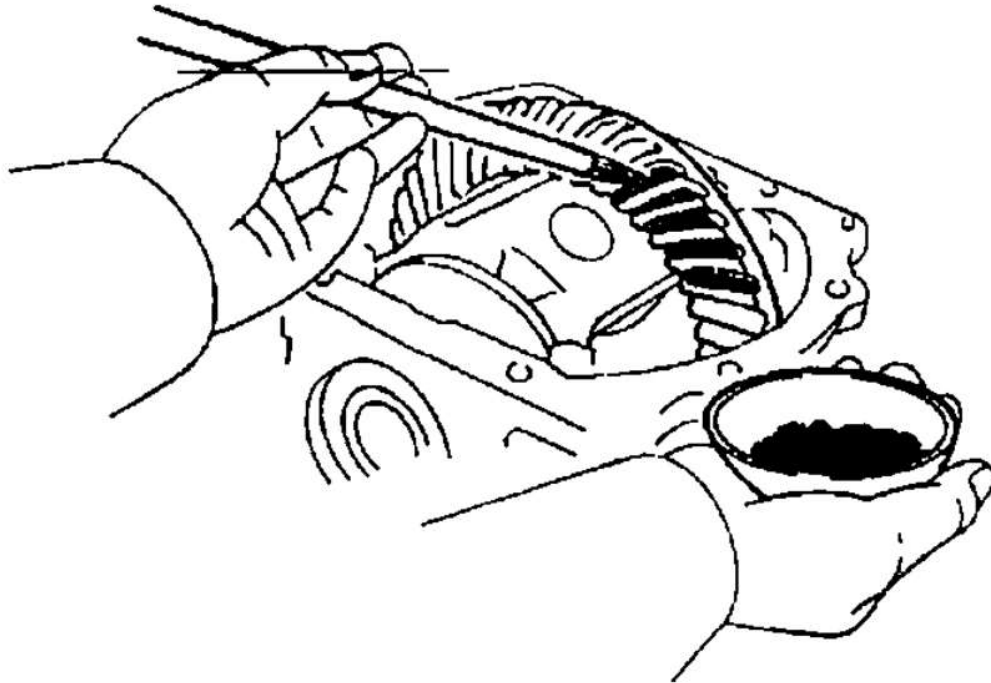
Fig. 62: Measuring Total Preload

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Using a torque wrench, measure the preload.

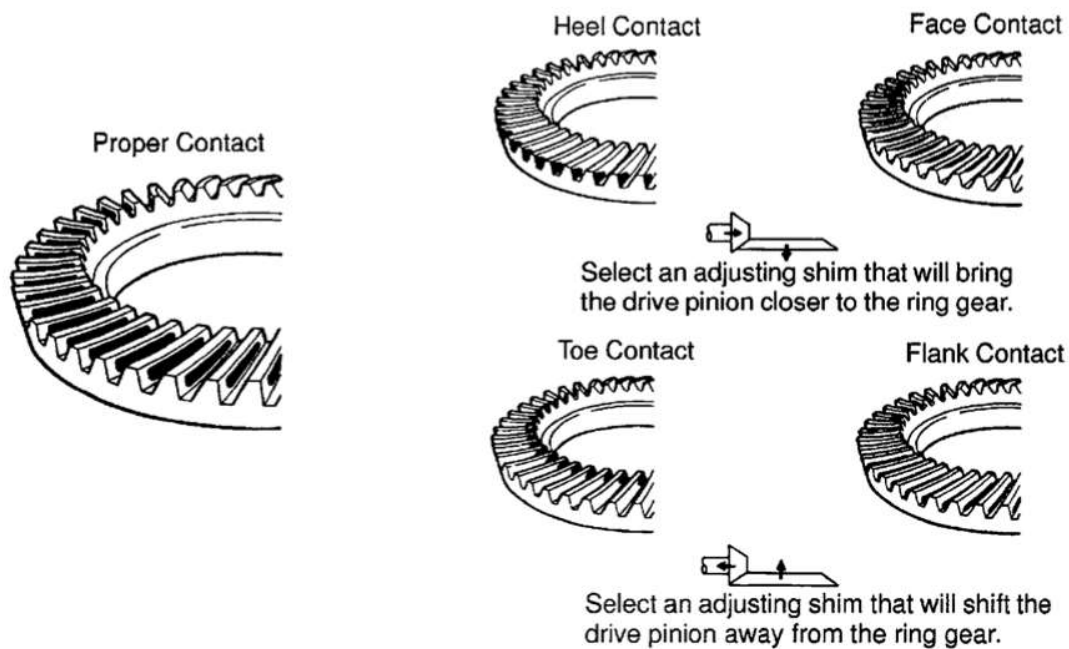
Total preload (at starting): Drive pinion preload plus 0.3 - 0.5 N.m (3 - 5 kgf.cm, 2.6 - 4.3 in..lbf)

12. **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 primer.
 - b. Hold the companion flange firmly and rotate the ring gear in both directions.
 - c. Inspect the tooth contact pattern.



G01084381

Fig. 63: Coating Ring Gear With Lead Primer
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.



G01084382

Fig. 64: Displaying Tooth Contact Between Ring Gear & Drive Pinion
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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

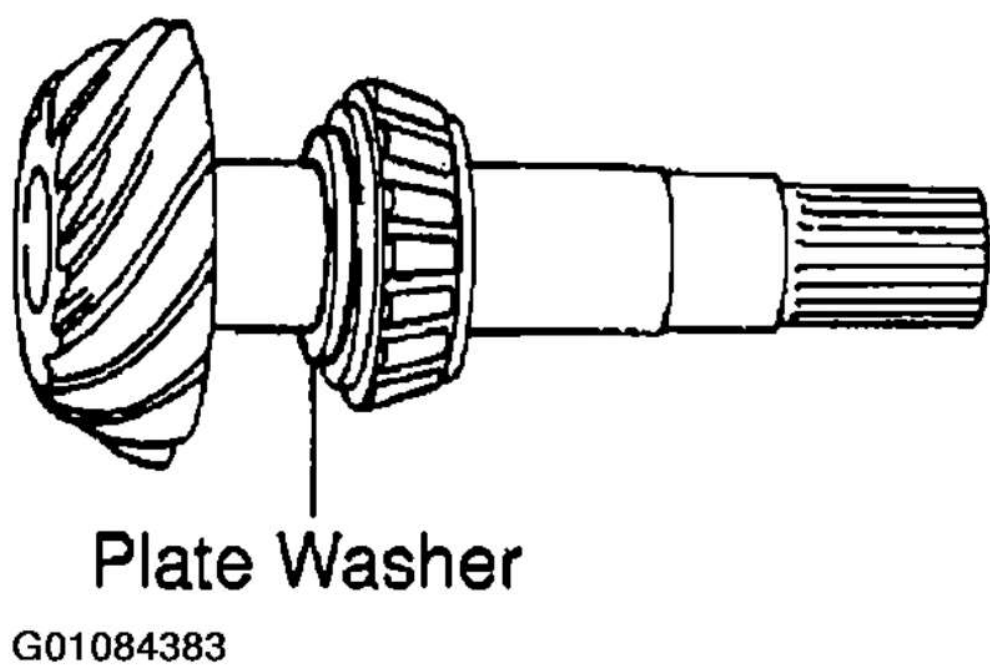


Fig. 65: Locating Plate Washer
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

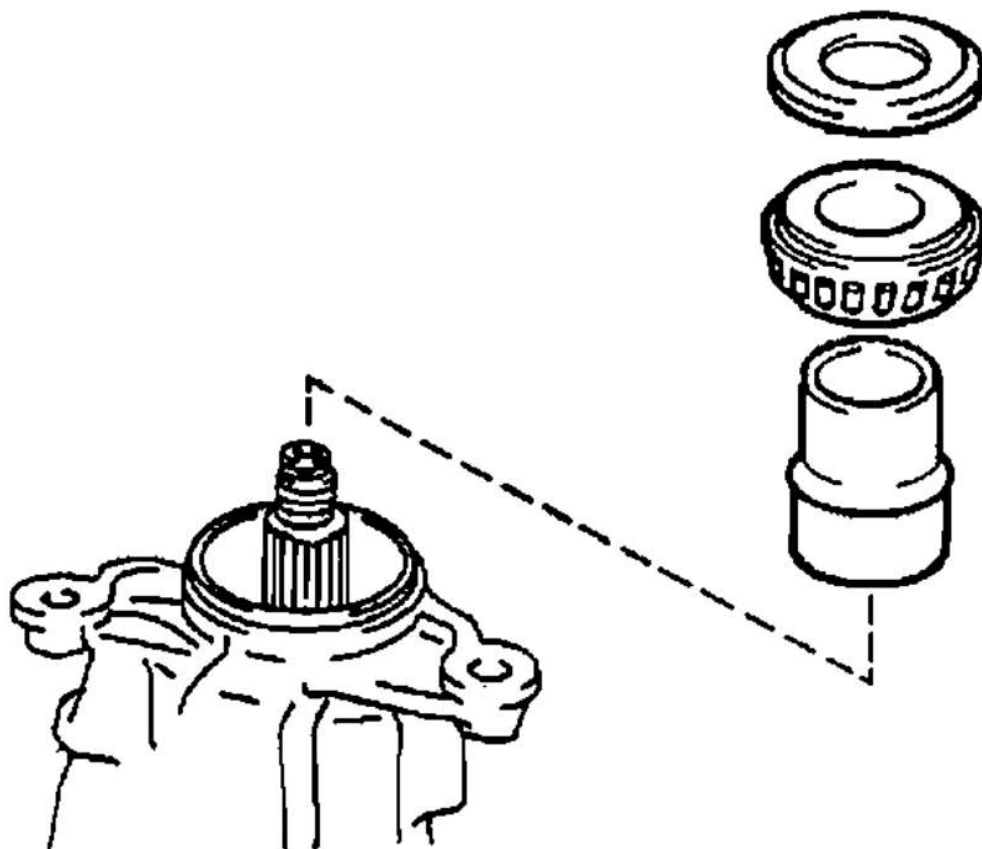
Washer thickness:

Thickness mm (in.)	Thickness mm (in.)	Thickness mm (in.)
2.26 – 2.28 (0.0890 – 0.0898)	2.41 – 2.43 (0.0949 – 0.0957)	2.56 – 2.58 (0.1008 – 0.1016)
2.29 – 2.31 (0.0902 – 0.0909)	2.44 – 2.46 (0.0961 – 0.0969)	2.59 – 2.61 (0.1020 – 0.1028)
2.32 – 2.34 (0.0913 – 0.0921)	2.47 – 2.49 (0.0972 – 0.0980)	2.62 – 2.64 (0.1031 – 0.1039)
2.35 – 2.37 (0.0925 – 0.0933)	2.50 – 2.52 (0.0984 – 0.0992)	2.65 – 2.67 (0.1043 – 0.1051)
2.38 – 2.40 (0.0937 – 0.0945)	2.53 – 2.55 (0.0996 – 0.1004)	2.68 – 2.70 (0.1055 – 0.1063)

G01084384

Fig. 66: Displaying Washer Thickness Specifications
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

13. Remove companion flange (See 3) .



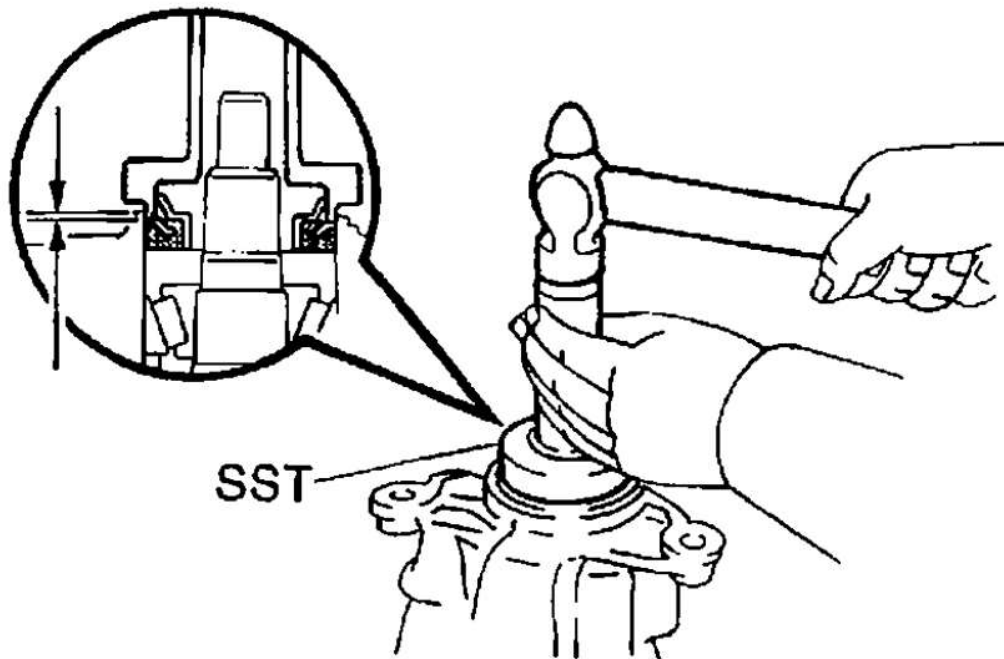
G01084385

Fig. 67: Removing Companion Flange
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

14. **Remove front bearing (See 10) .**
15. **Install new bearing spacer and front bearing .**

Install a new bearing spacer and the front bearing on the drive pinion.

16. **Install oil slinger .**
17. **Install new front oil seal .**
 - a. Using SST and a hammer, install a new oil seal.



G01084386

Fig. 68: Installing New Front Oil Seal

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

SST 09554-22010

Oil seal drive in depth: 2.0 mm (0.079 in.)

- b. Apply MP grease to the oil seal lip.
- 18. **Install companion flange .**
 - a. Using SST, install the companion flange on the drive pinion.

SST 09950-30012 (09951-03010, 09953-03010, 09954-03010, 09955-03040, 09956- 03020)

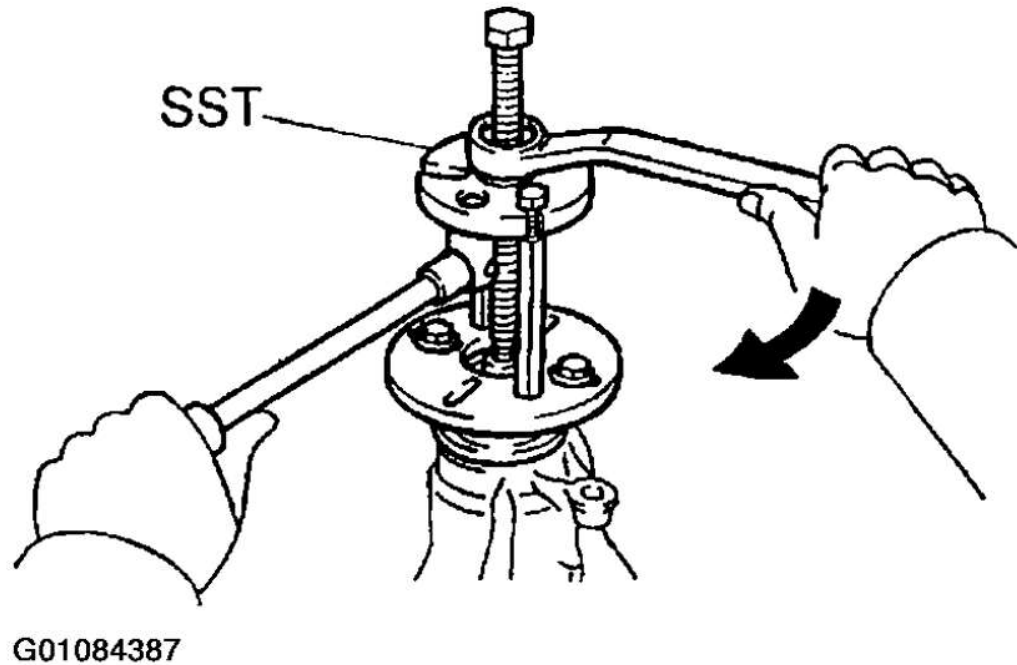
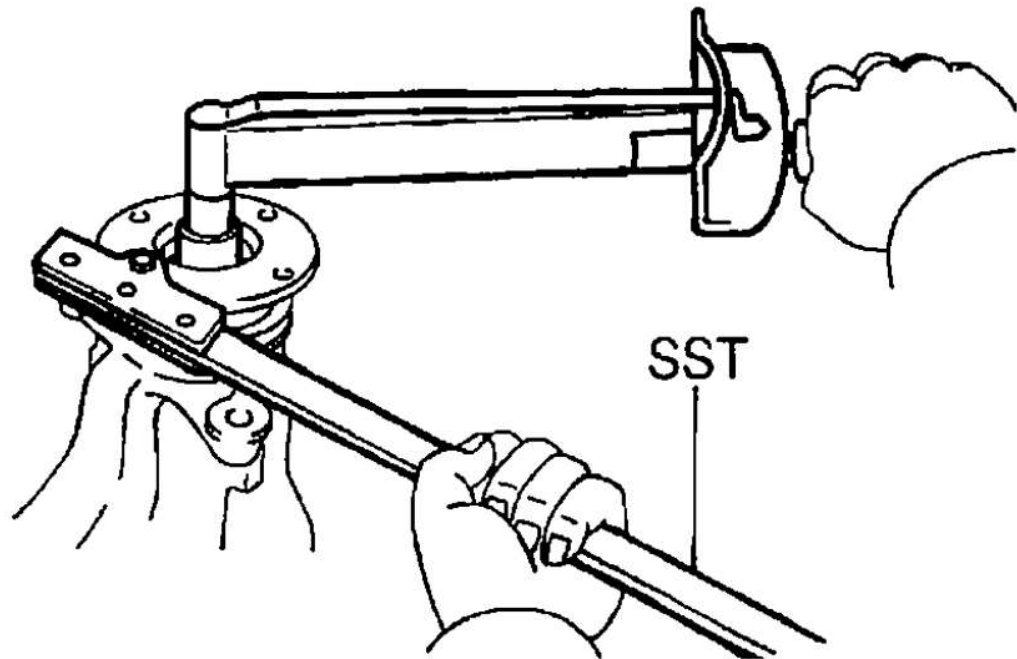


Fig. 69: Installing Companion Flange On Drive Pinion
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Coat the threads of a new nut with hypoid gear oil.
- c. Using SST to hold the flange, torque the nut.

SST 09330-00021

Torque: 108 N.m (1,100 kgf.cm, 80 ft.lbf)

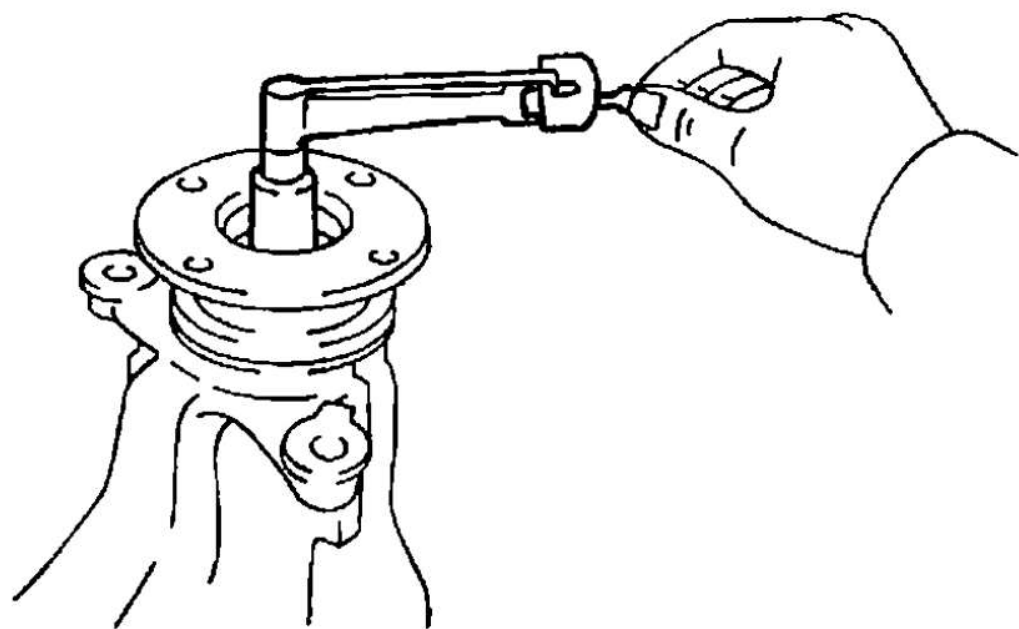


G01084388

Fig. 70: Using SST To Hold Flange & Torque Nut
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

19. Check drive pinion preload .

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



G01084390

Fig. 71: Measuring Preload Of Backlash
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Preload (at starting): see Fig. 72 .

New bearing	1.1 – 1.7 N·m (11 – 17 kgf·cm, 9.5 – 14.7 in.·lbf)
Reused bearing	0.6 – 0.9 N·m (6 – 9 kgf·cm, 5.2 – 7.8 in.·lbf)

G01084389

Fig. 72: Displaying Pinion Preload Specifications
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

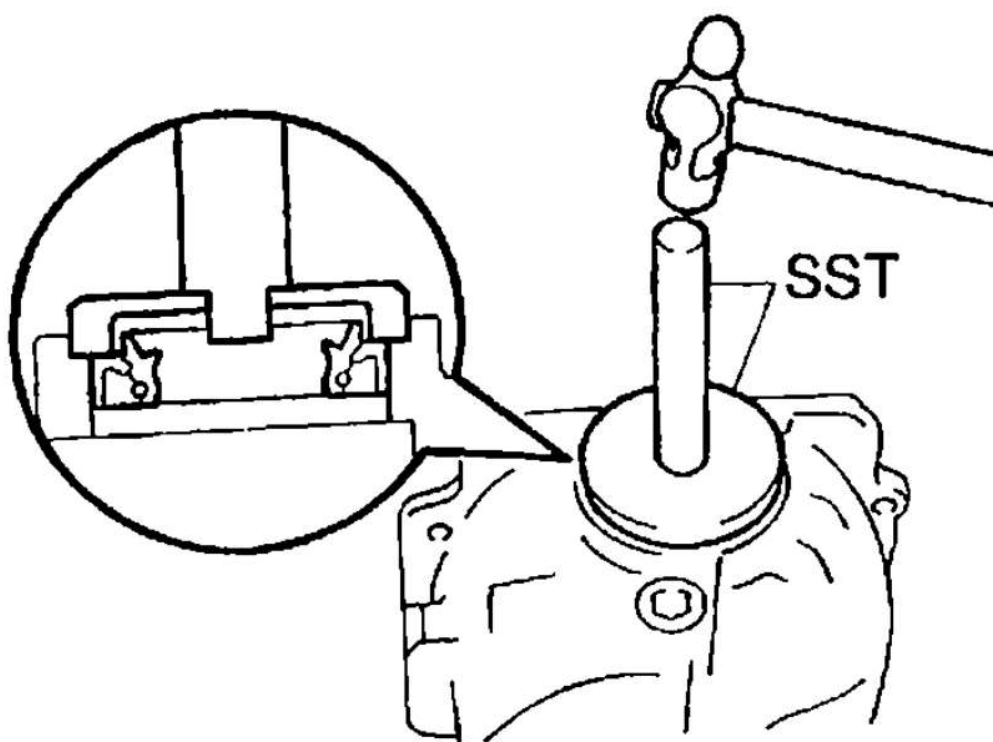
If the preload is larger than the specification, replace the bearing spacer.

If the preload is less than the specification, retighten the nut 13 N.m (130 kgf.cm, 9 ft.lbf) of torque at a time until reaching the specified value.

Torque: 235 N.m (2,400 kgf.cm, 174 ft.lbf) or less

If the torque exceeds the maximum value while retighten the nut, replace the bearing spacer and repeat the preload procedure. Do not loosen the pinion nut to reduce the preload.

20. **Recheck total preload (See step 7) .**
21. **Recheck ring gear backlash (See step 3) .**
22. **Recheck tooth contact between ring gear and drive pinion (See step 12) .**
23. **Check companion flange runout (See step 2) .**
24. **Stake drive pinion nut .**
25. **Install side gear shaft oil seals .**
 - a. Using SST and a hammer, install 2 oil seals until they are flush with the carrier end surface.
SST 09550-00032, 09950-70010 (09951-07150)
 - b. Coat the oil seal lip with MP grease.
26. **Torque sensing LSD: Install side gear shafts .**
 - a. Install 2 new snap rings to the side gear shafts.

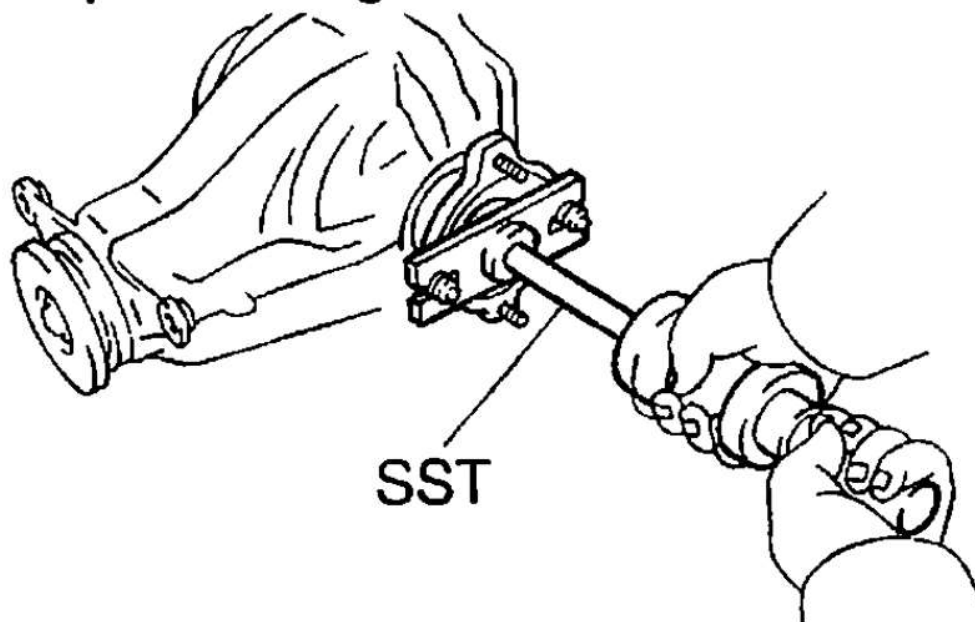


G01084391

Fig. 73: Installing Side Gear Shaft Oil Seal
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Using SST, install the 2 side gear shafts until they contact the pinion shaft.
SST 09520-24010 (09520-04010, 09520-32040)

Torque Sensing LSD



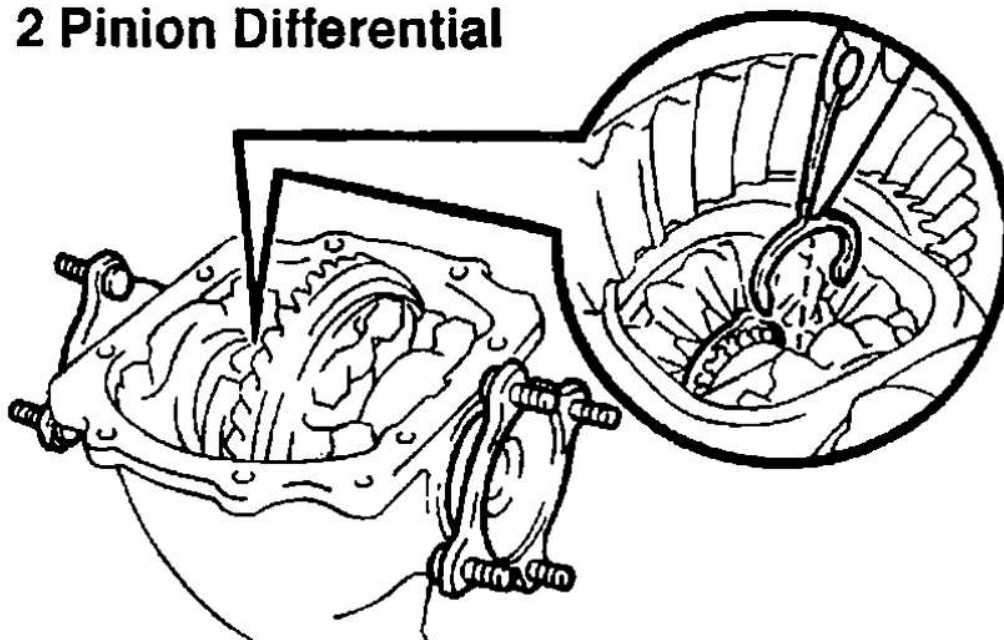
G01084392

Fig. 74: Using SST To Install Side Gear Shafts
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

NOTE: Check that the shaft is fully inserted by the noise being made when it is tapped.

27. **2 pinion differential: Install side gear shafts .**
- a. Install the 2 side gear shafts to the differential case.
 - b. Using needle nose pliers, install 2 new snap rings to the 2 side gear shafts.

2 Pinion Differential



G01084393

Fig. 75: Installing Side Gear Shaft Snap Rings
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

28. Install differential carrier cover .

- a. Torque sensing LSD:

Install the oil deflector and bolt to the carrier cover.

Torque: 7.3 N.m (75 kgf.cm, 65 in..lbf)

- b. Install the breather plug to the carrier cover.

Torque: 21 N.m (210 kgf.cm, 15 ft.lbf)

- c. Clean contacting surfaces of any residual FIPG material by using gasoline or alcohol.

- d. Apply FIPG to the carrier.

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

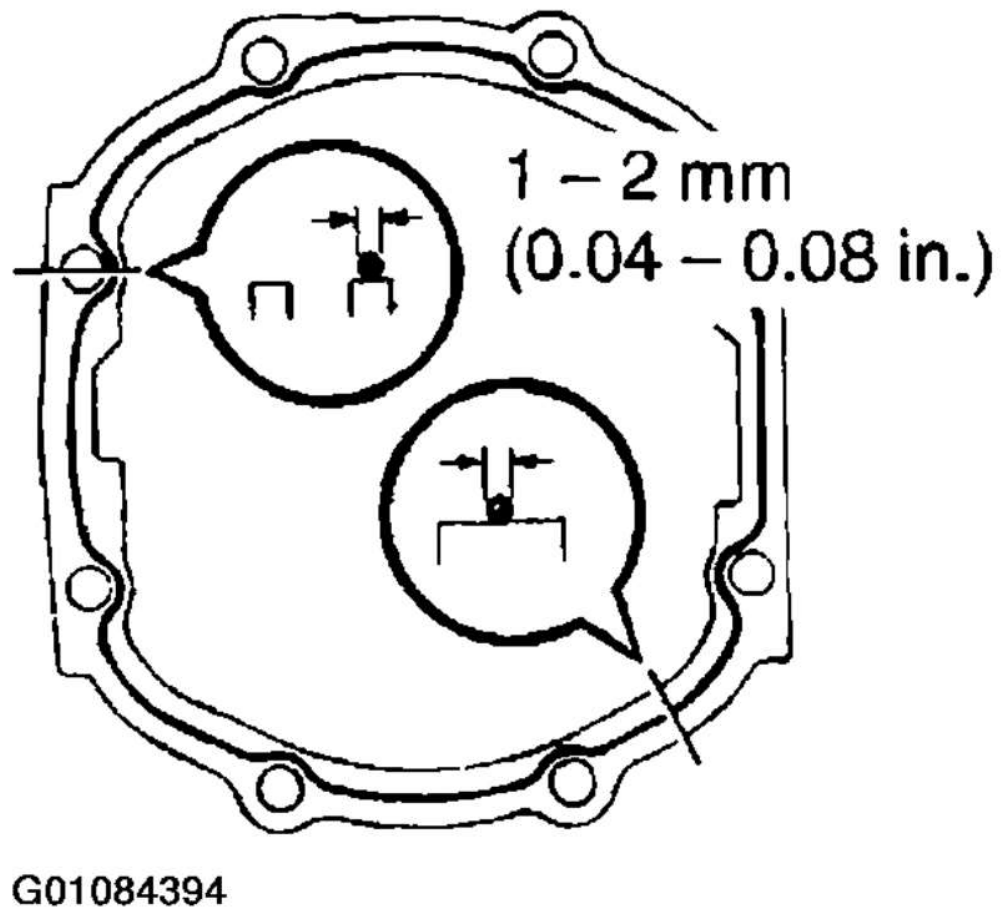


Fig. 76: Applying FIPG To Carrier
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

NOTE: Install the carrier cover within 3 minutes after applying FIPG.

e. Torque the 8 bolts.

Torque: 47 N.m (475 kgf.cm, 34 ft.lbf)

INSTALLATION

Installation is in the reverse order of removal procedure (See REMOVAL) .

NOTE: After installation, fill the differential with differential oil (See REPLACE REAR

DIFFERENTIAL OIL).