REAR AXLE AND SUSPENSION

TROUBLESHOOTING

Problem	Possible cause	Remedy	Page
Oil leak at rear axle	Oil seals worn or damaged	Replace oil seal	RA-5, 8
	Bearing retainer loose	Replace retainer	RA-5, 8
	Rear axle housing cracked	Repair as necessary	
Oil leak at pinion shaft	Oil level too high or wrong grade	Drain and replace oil	
	Oil seal worn or damaged	Replace oil seal	RA-21, 36
	Companion flange loose or damaged	Tighten or replace flange	RA-21, 36
Oil leak at side gear shaft	Oil level too high or wrong grade	Drain and replace oil	
	Oil seal worn or damaged	Replace oil seal	RA-35
	Side gear shaft loose or damaged	Tighten or replace shaft	RA-35
Noises in rear axle	Oil level low or wrong grade	Drain and replace oil	
	Excessive backlash between drive pinion and ring or side gear	Check backlash	RA-23, 41
	Ring, drive pinion or side gears worn or chipped	Inspect gears	RA-23, 40
	Drive pinion bearing worn	Replace bearing	RA-23, 40
	Axle shaft bearing worn	Replace bearing	RA-5
	Side bearing loose or worn	Tighten or replace bearings	RA-29, 49
Bottoming	Vehicle overloaded	Check loading	
	Shock absorber worn out	Replace shock absorber	RA-56, 67
	Springs weak	Replace spring	RA-56, 67

REAR WHEEL ALIGNMENT (IRS)

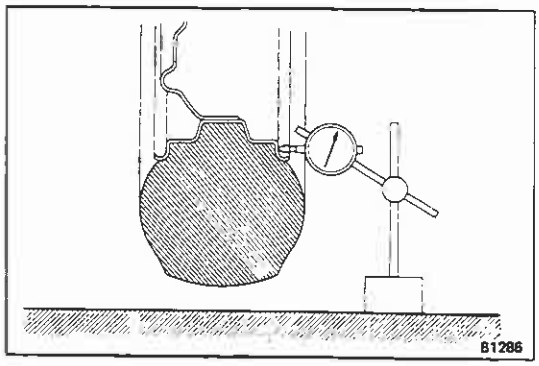
1. MAKE FOLLOWING CHECKS AND CORRECT ANY PROBLEMS

(a) Check the tires for wear and proper inflation.

Cold tire inflation pressure:

kg/cm^2 (psi, kPa)

Tire	Front	Rear
225/60 HR14	1.9 (27,186)	1.9 (27,186)



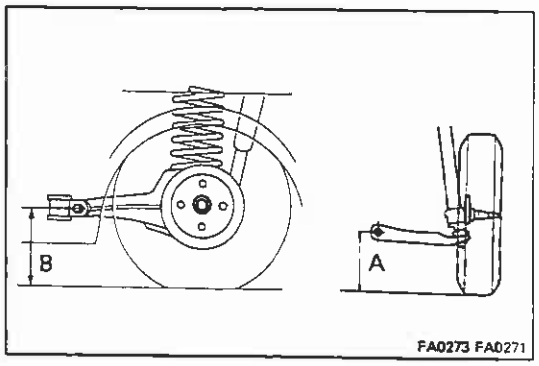
(b) Check the rear wheel bearings for looseness.

(c) Check wheel runout.

Lateral runout: 1.0 mm (0.039 in.) or less

(d) Check the rear suspension for looseness.

(e) Check that the rear absorbers work properly by the standard bounce test.

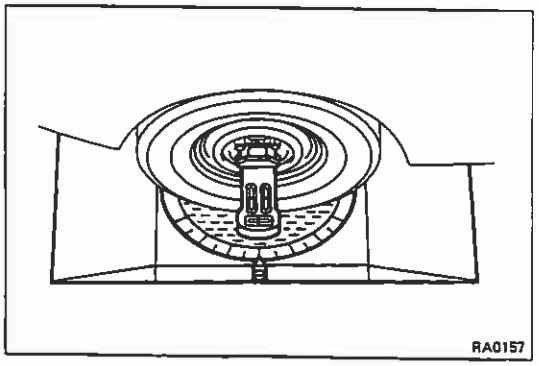


2. MEASURE VEHICLE HEIGHT

Vehicle height mm (in.)

Tire	Front (A)	Rear (B)
225/60 HR 14	231.0 (9.094)	CP 263.0 (10.354) LB 267.5 (10.531)

If height of the vehicle is not as specified, try to level the vehicle by shaking it down. If the height of the vehicle is still not correct, check for bad springs and worn or loose suspension parts.



3. INSTALL WHEEL ALIGNMENT EQUIPMENT

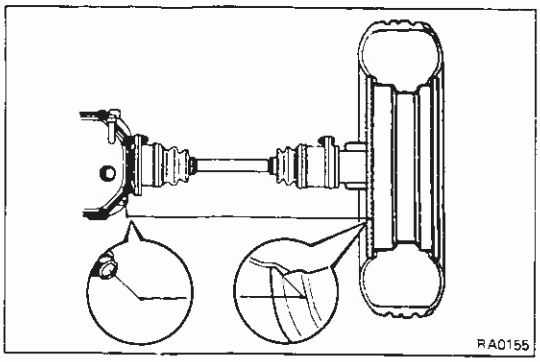
Follow the specific instructions of the equipment manufacturer.

4. INSPECT CAMBER

Inspect the camber with a wheel alignment tester.

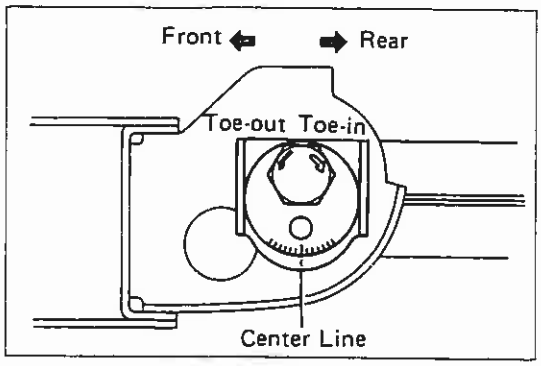
Inspection standard: –10′ ± 45′
Adjustment standard: –10′ ± 30′
Left-right error: 30′

If camber is out of tolerance, inspect and replace damaged or worn rear suspension parts.

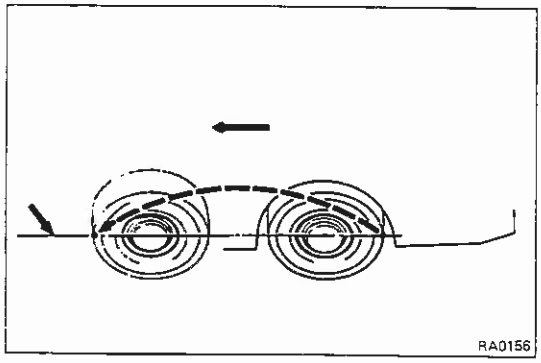


5. ADJUST TOE-IN

(a) Measure the distance between each disc wheel and the differential carrier cover bolt of the suspension member and comfirm that both are the same.



(b) If the distances are not the same but within 5 mm (0.20 in.), adjust with the toe-in adjusting bolt.

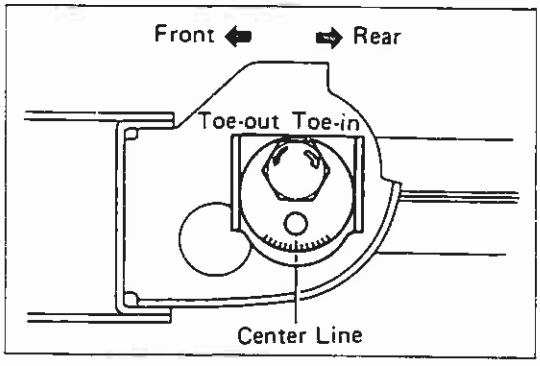


(c) Move the vehicle forward a few meters with the front wheels in the straight-ahead position on a level place.

(d) Mark on each center of rear tread and measure the distance between marks of the right and left tires.

(e) Advance the vehicle till the marks on the rear sides of the tires come to the measuring heights of the gauge on the front sides.

NOTE: Toe-in should be measured at the same point on the tire and at the same level.



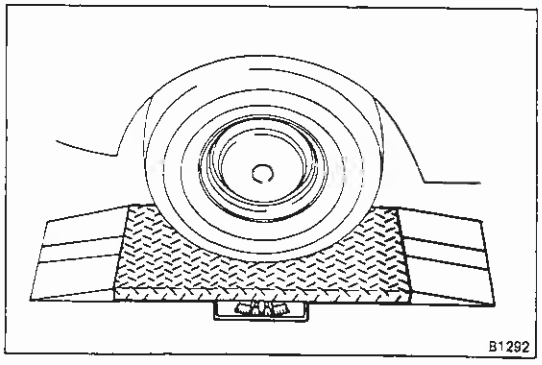
	Inspection standard	Adjustment standard
Toe-in	0 ± 4 mm (0 ± 0.16 in.)	0 ± 2 mm (0 ± 0.08 in.)

(f) If not within specification, turn the left and right adjusting bolts an equal amount to adjust.

NOTE: The toe-in will change about 1 mm (0.04 in.) with each graduation of the cam (one side).

(g) Tighten the bolts after adjustment the toe-in.

Torque: 1,325 kg-cm (96 ft-lb, 130 N·m)



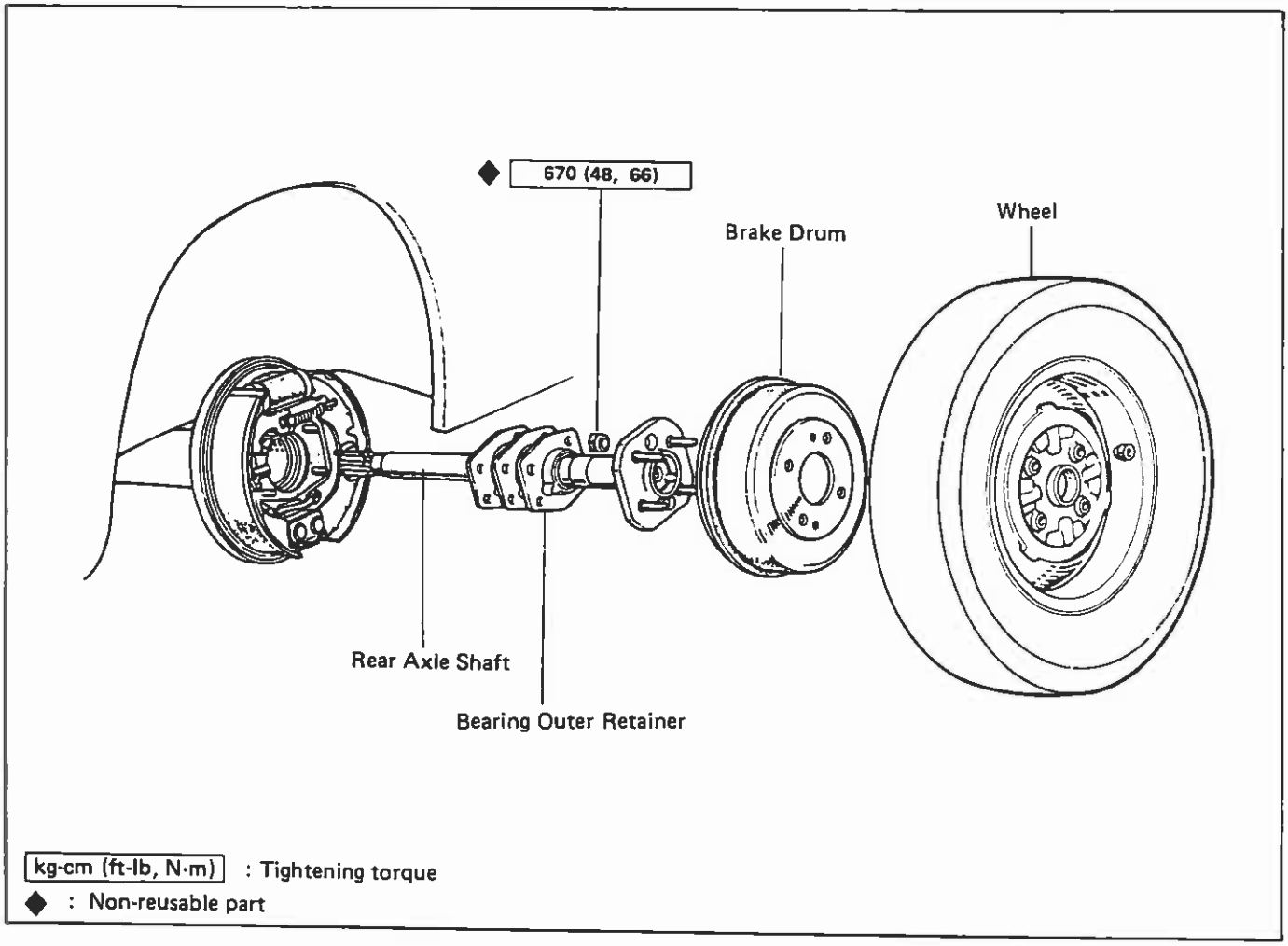
6. INSPECT SIDE SLIP WITH SIDE SLIP TESTER

Side slip limit: Less than 3.0 mm per meter (0.118 in. per 3.3 ft)

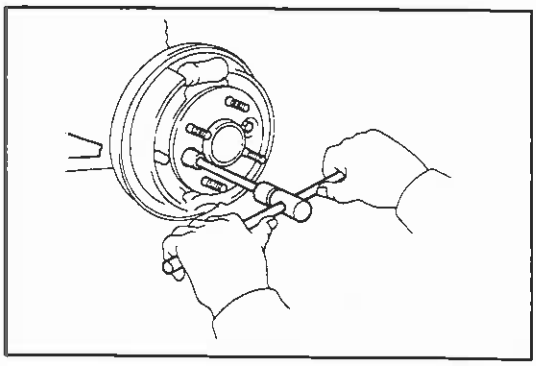
If the side slip exceeds this limit, the toe-in or camber may not be correct.

FOUR LINK TYPE REAR AXLE SHAFT

COMPONENTS

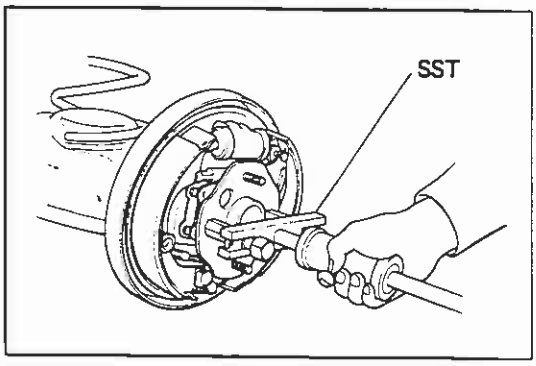


kg-cm (ft-lb, N·m) : Tightening torque
◆ : Non-reusable part



REMOVAL OF REAR AXLE SHAFT

1. **REMOVE WHEEL AND BRAKE DRUM**
2. **REMOVE FOUR BACKING PLATE MOUNTING NUTS**

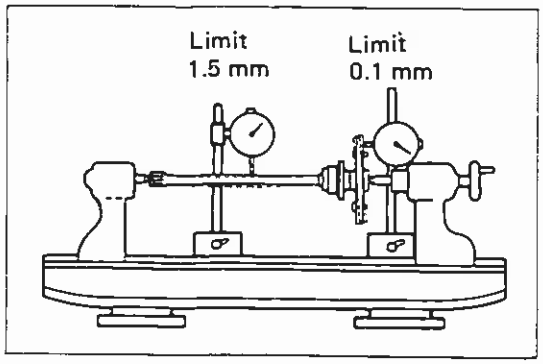


3. **REMOVE REAR AXLE**

   Using SST, pull out the rear axle.

   SST 09520-00031

   CAUTION: When pulling out the rear axle, be careful not to damage the oil seal.

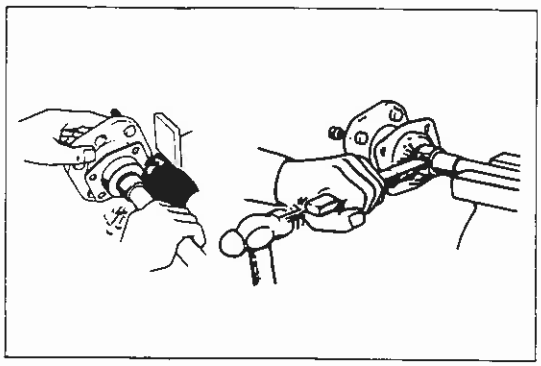


INSPECTION AND REPAIR OF REAR AXLE SHAFT COMPONENTS

1. **INSPECT REAR AXLE SHAFT AND FLANGE FOR WEAR, DAMAGE OR RUNOUT**

   Maximum shaft runout: 1.5 mm (0.059 in.)
   Maximum flange runout: 0.1 mm (0.004 in.)

   If the rear axle shaft or flange are damaged or worn, or if runout is greater than maximum, replace the rear axle shaft.



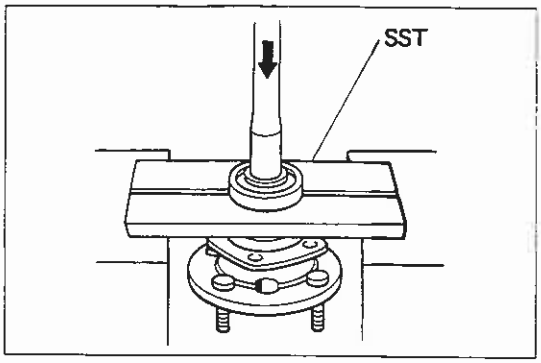
2. **INSPECT REAR AXLE BEARING FOR WEAR OR DAMAGE**

   If the bearing is damaged or worn, replace it.

3. **REMOVE BEARING INNER RETAINER**

   (a) Using a grinder, grind down the inner retainer.

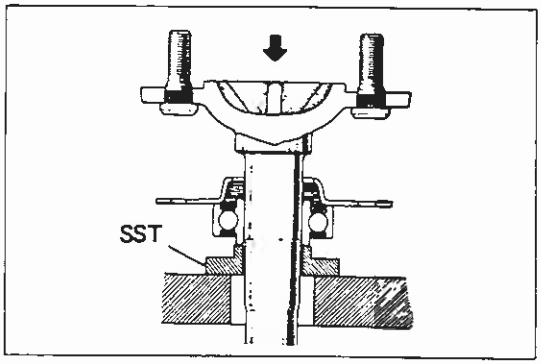
   (b) Using a hammer and chisel, cut off the retainer and remove it from the shaft.



4. **REMOVE BEARING FROM SHAFT**

   Using SST, press the bearing off of the shaft.

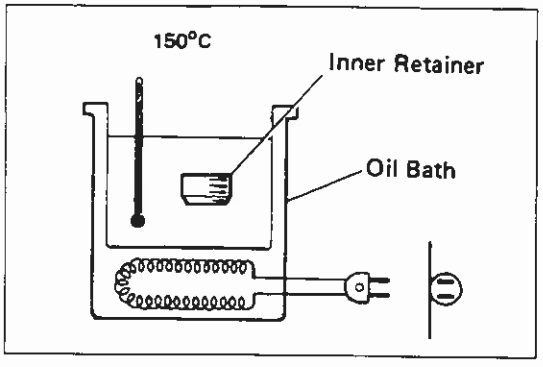
   SST 09527-21011



5. **INSTALL BEARING OUTER RETAINER AND NEW BEARING ON SHAFT**

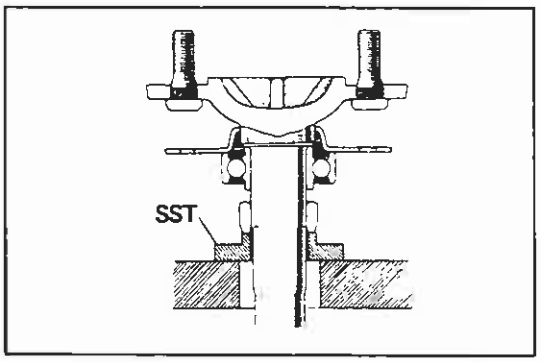
   Using SST, press on the bearing outer retainer and new bearing.

   SST 09515-21010



6. **INSTALL BEARING INNER RETAINER ON SHAFT**

   (a) Heat the bearing inner retainer to about 150°C (302°F) in an oil bath.

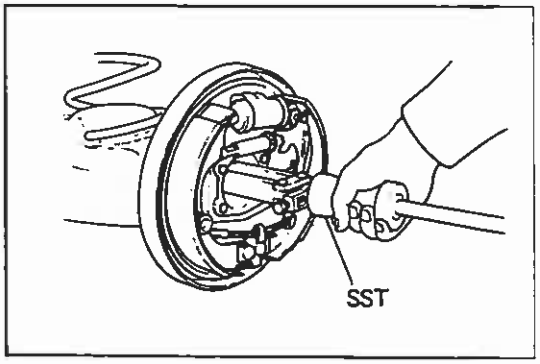


(b) Using SST, with the inner retainer still hot, press the retainer onto the shaft.

SST 09515-21010

NOTE:

- Be sure that there is no oil or grease on the rear axle shaft or retainer.
- Face the non-beveled side of the inner retainer toward the bearing.



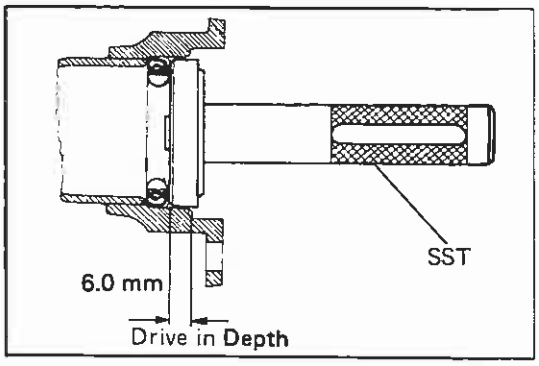
7. INSPECT OIL SEAL FOR WEAR OR DAMAGE

If the seal is damaged or worn, replace it.

8. REMOVE OIL SEAL FROM AXLE HOUSING

Using SST, remove the oil seal.

SST 09308-00010

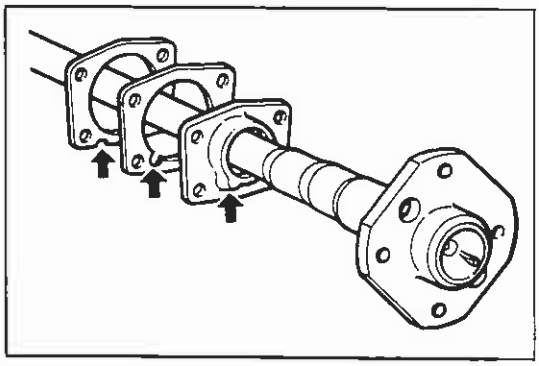


9. INSTALL NEW OIL SEAL IN AXLE HOUSING

(a) Apply MP grease to the oil seal.

(b) Using SST, drive in the oil seal to a depth of 6.0 mm (0.236 in.).

SST 09517-30010



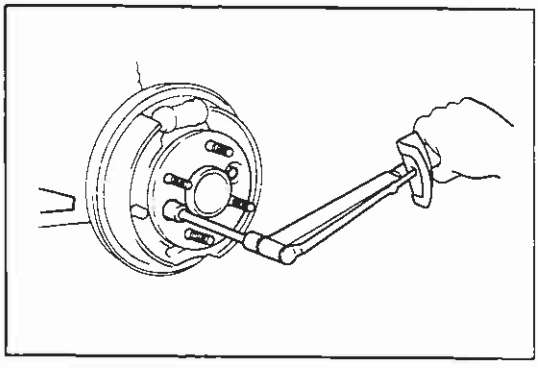
INSTALLATION OF REAR AXLE SHAFT

(See page RA-5)

1. CLEAN FLANGE OF AXLE HOUSING AND BACKING PLATE

2. PLACE BEARING RETAINER AND GASKET ON AXLE SHAFT

Install the retainer and gasket with notches (indicated by arrows in drawing) pointing downward.



3. INSTALL REAR AXLE IN HOUSING

Install the rear axle with four new self-locking nuts.

Torque: 670 kg-cm (48 ft-lb, 66 N·m)

NOTE:

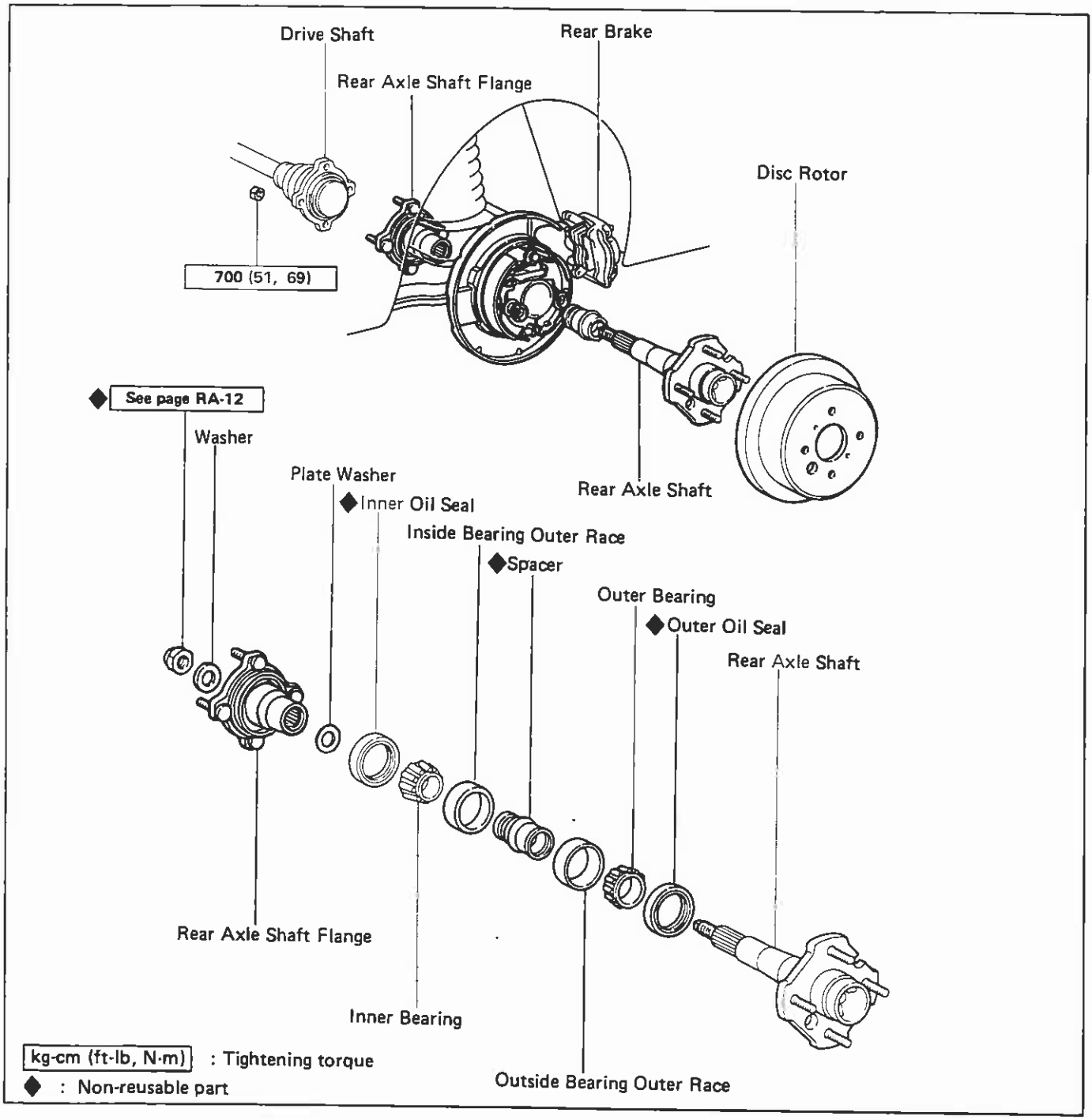
(a) Be careful not to damage the oil seal.

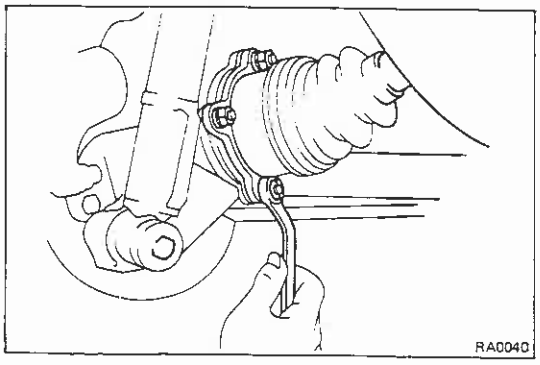
(b) When inserting the axle shaft be careful not to hit or deform the oil deflector inside the axle housing.

4. INSTALL BRAKE DRUM AND WHEEL

IRS TYPE REAR AXLE SHAFT

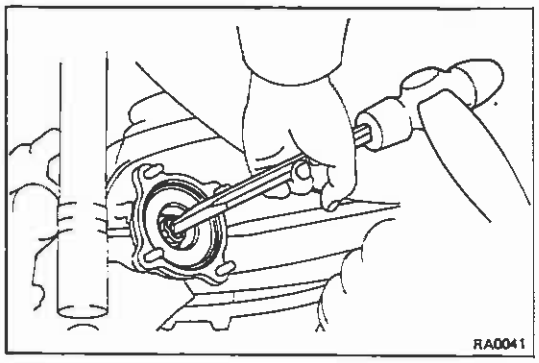
COMPONENTS





REMOVAL OF REAR AXLE SHAFT

1. REMOVE REAR WHEEL
2. DISCONNECT DRIVE SHAFT
   NOTE: Disconnect the rear axle shaft side only.
3. REMOVE REAR BRAKE
   Remove the brake caliper and disc rotor.



4. REMOVE AXLE FLANGE NUT

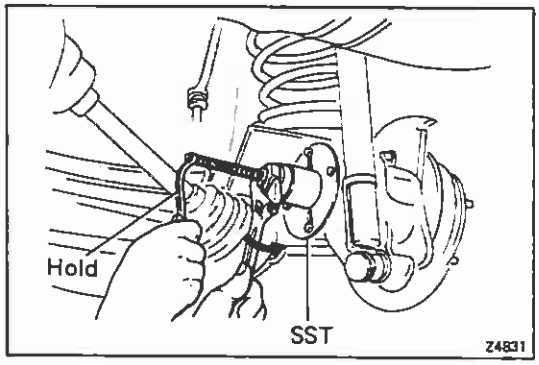
(a) Using a hammer and chisel, loosen the staked part of the nut.

(b) Remove the nut and washer.

NOTE: Be sure to remove the washer from the axle shaft.

If not, the axle flange cannot be removed with SST in the next step.

SST 09557-22022

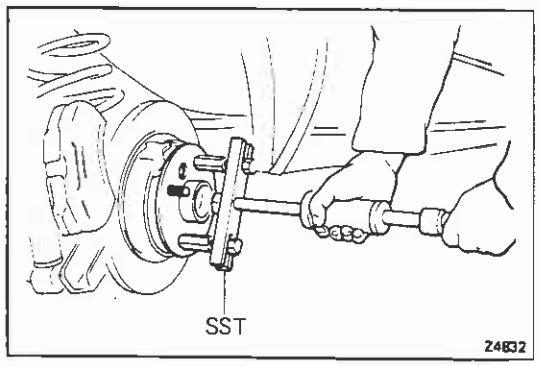


5. REMOVE AXLE FLANGE

Using SST, disconnect the axle flange and the washer.

SST 09557-22022

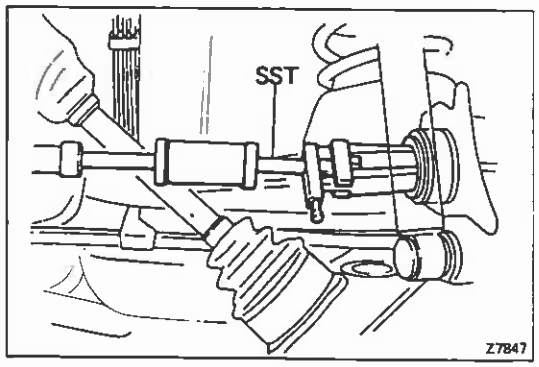
NOTE: Be careful not to lose the plate washer on the tip of the flange bearing side.



6. REMOVE REAR AXLE SHAFT AND SPACER

Using SST, pull out the rear axle shaft with the oil seal and outer bearing.

SST 09520-00031

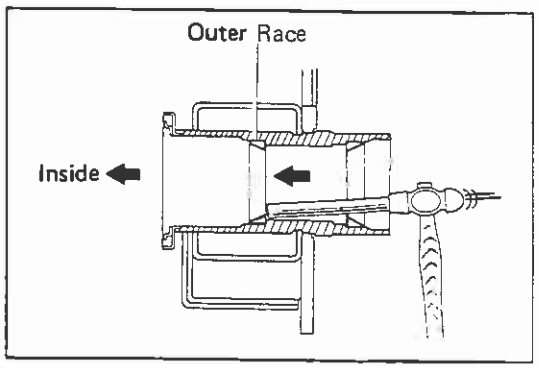


7. REMOVE INNER OIL SEAL AND BEARING

(a) Using SST, pull out the inner oil seal from rear axle housing.

SST 09308-00010

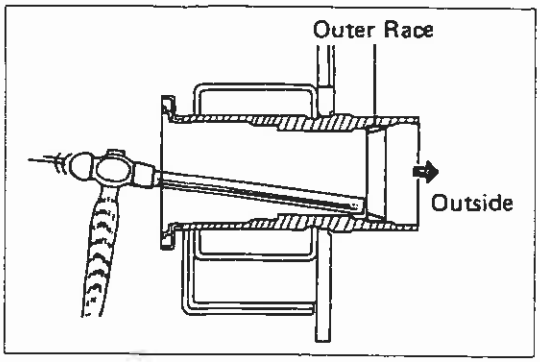
(b) Remove the inner bearing.



8. REMOVE INSIDE BEARING OUTER RACE

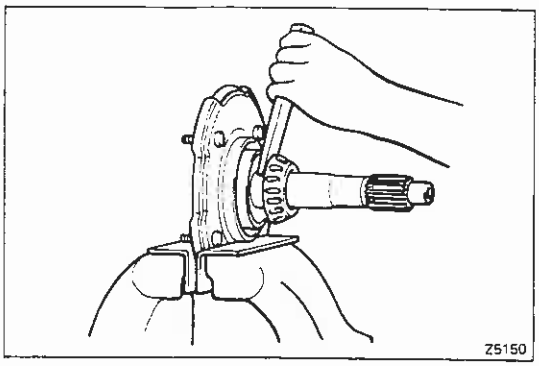
(a) Using a brass bar, remove the bearing outer race from the rear axle housing.

(b) If necessary, replace the outer race.



9. REMOVE OUTSIDE BEARING OUTER RACE

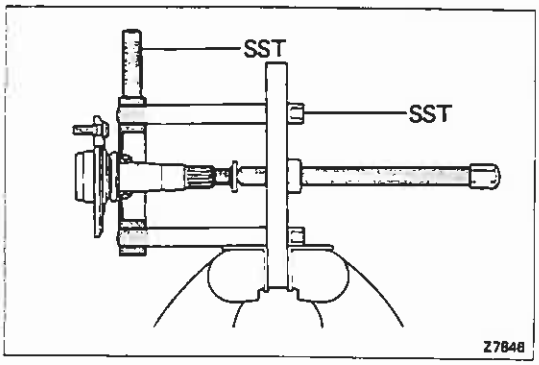
Using a brass bar, remove the axle shaft outer bearing race from the axle housing.



10. REMOVE OUTSIDE BEARING AND OIL SEAL

(a) Using a chisel, open a clearance between the hub and bearing.

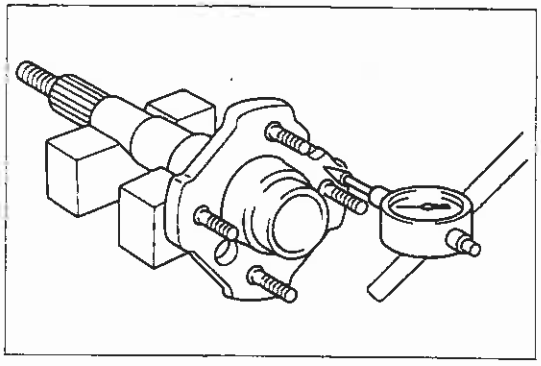
CAUTION: Be careful not to damage the bearing or shaft.



(b) Using SST, remove the outer bearing from the rear axle shaft.

SST 09950-00020 and 09950-00030

(c) Remove the oil seal from axle shaft.



INSPECTION AND REPLACEMENT OF REAR AXLE SHAFT COMPONENTS

1. **INSPECT REAR AXLE SHAFT AND FLANGE FOR WEAR, DAMAGE OR RUNOUT**

Maximum flange runout: 0.1 mm (0.004 in.)

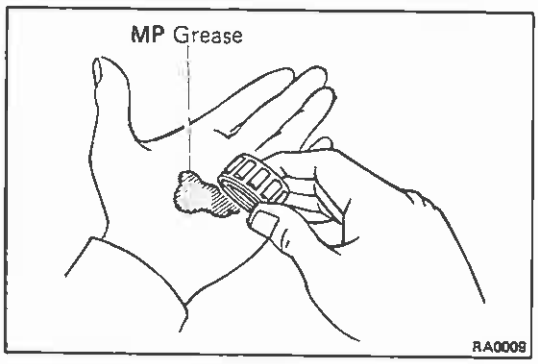
If the rear axle flange is damaged or worn, or if runout is greater than maximum, replace the rear axle shaft.

2. **CLEAN AND INSPECT BEARINGS AND RACES**

(a) Clean with solvent and dry with low-pressure compressed air.

(b) Inspect inner and outer bearings and races for wear or damage.

If a bearing or race requires replacement, it must be replaced as a set with the appropriate bearing or race.

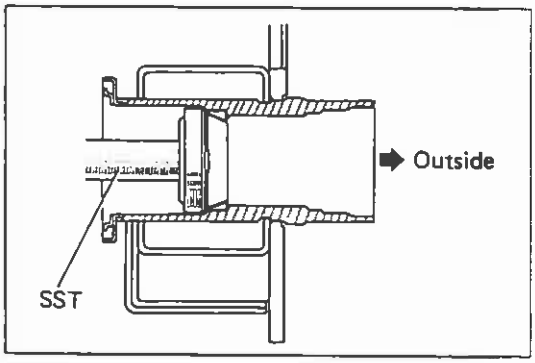


3. PACK BEARINGS WITH MP GREASE

- Use a pressure bearing lubricator if available.

OR

- Place bearings in a handful of grease. Force grease into the bearing until completely filled.

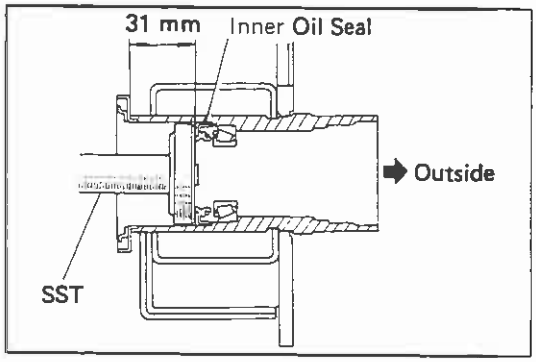


4. INSTALL INSIDE BEARING OUTER RACE

(a) Using SST, install the bearing inside outer race in the rear axle housing.

SST 09550-22010

(b) Install the bearing.

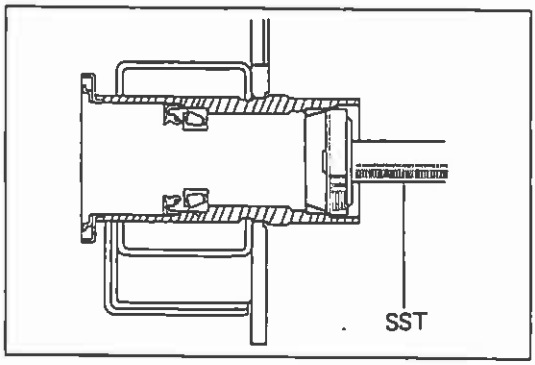


5. INSTALL NEW INNER OIL SEAL

(a) Using SST, drive in a new oil seal to a depth of 31 mm (1.22 in.).

SST 09550-22010

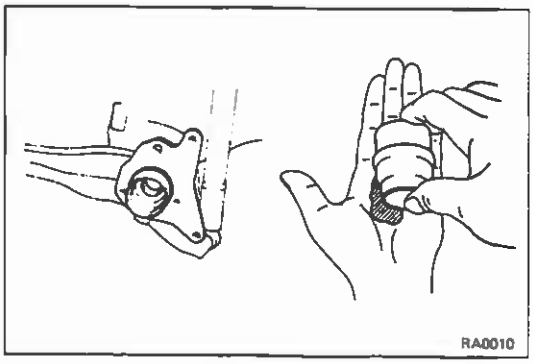
(b) Apply MP grease to the oil seal lip.



6. INSTALL OUTSIDE BEARING OUTER RACE

Using SST, install the bearing outside outer race in the rear axle housing.

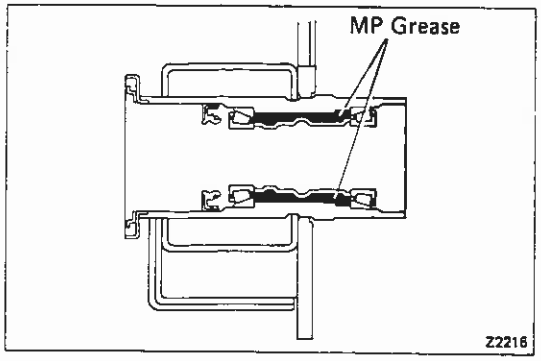
SST 09550-22010



7. PACK INSIDE OF REAR AXLE HOUSING WITH MP GREASE

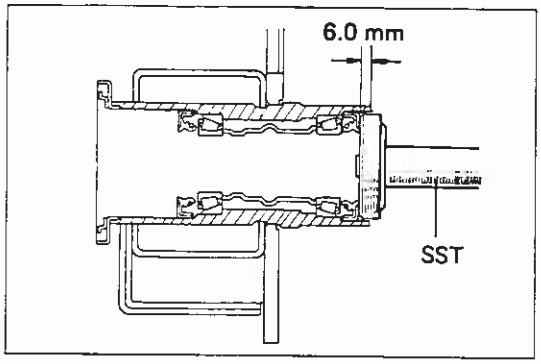
8. COAT OUTSIDE OF NEW SPACER WITH MP GREASE

9. INSTALL NEW SPACER INTO HUB



10. INSTALL NEW OUTER BEARING AND NEW OUTER OIL SEAL

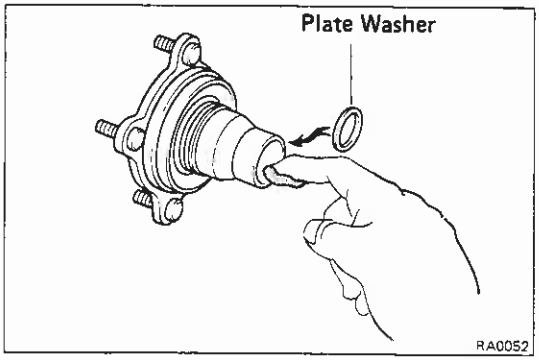
(a) Install the bearing.



(b) Using SST, drive in a new oil seal to a depth of 6.0 mm (0.236 in.).

SST 09550-22010

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



INSTALLATION OF REAR AXLE SHAFT

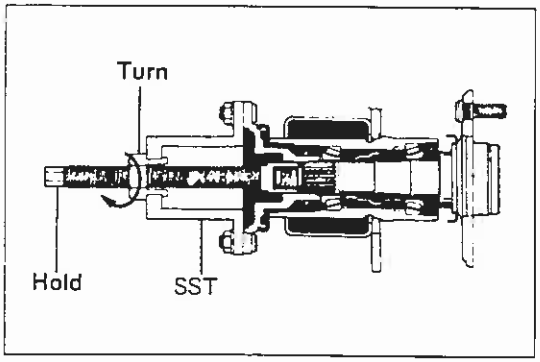
(See page RA-8)

1. INSTALL REAR AXLE SHAFT AND FLANGE

(a) Install the rear axle shaft into the housing.

(b) Install the flange with plate washer.

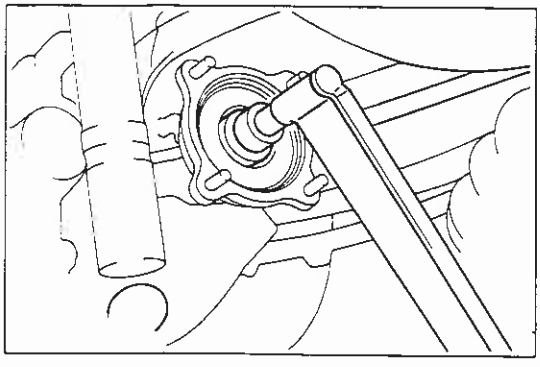
NOTE: Before assembly, apply a thin coat of grease to the flange.



(c) When installing the axle shaft and flange, use SST and tighten to the point where the flange and shaft deflector tip are aligned.

SST 09557-22022

NOTE: Do not allow grease to get on the axle shaft threads.



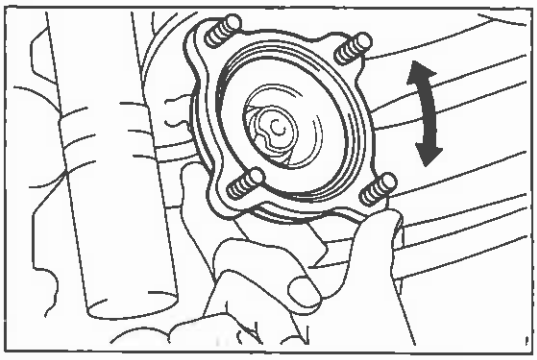
2. ADJUST PRELOAD

(a) Install a new axle shaft flange nut.

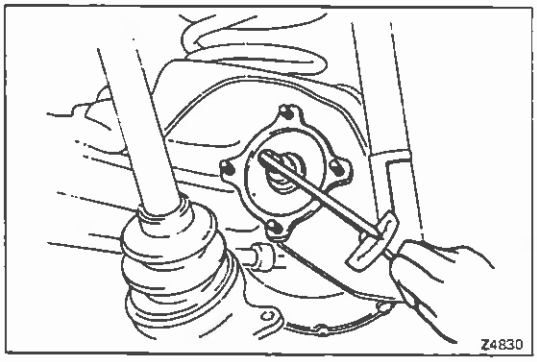
(b) Using a bar to hold the shaft, tighten the nut. Torque the nut.

Torque: 400 kg-cm (29 ft-lb, 39 N·m)

NOTE: Check that the rear axle shaft has axial play.

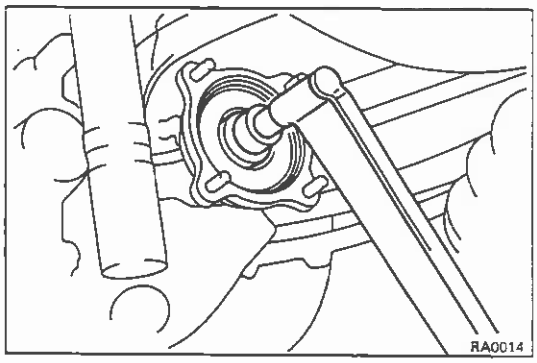


(c) Revolve the shaft back and forth to snug it down.



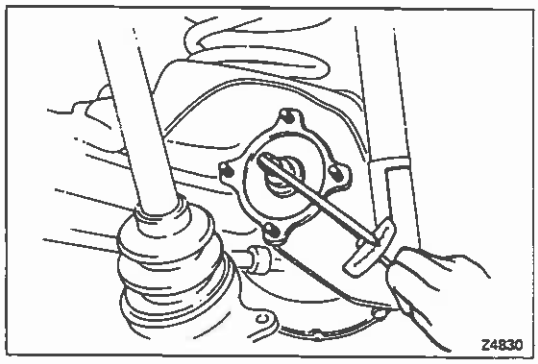
(d) Measure the rotation torque (initial resistance) while turning the axle shaft.

NOTE: Turn the axle shaft one turn per 6 seconds.



(e) Torque the nuts.

Torque: 800 kg-cm (58 ft-lb, 78 N·m)



(f) Using torque wrench, check the preload rotation.

Preload (rotation): Add initial resistance torque
1 – 4 kg-cm (0.9 – 3.5 in.-lb, 0.1 – 0.4 N·m)

NOTE: Turn the flange one turn per 6 seconds and measure the preload.

If preload is less than specification, retighten the nut 5 – 10° at a time until the specified preload is reached.

Maximum torque: 2,000 kg-cm (145 ft-lb, 196 N·m)

3. **IF THERE IS EXCESS PRELOAD, CORRECT IN FOLLOWING PROCEDURE**

(a) Remove the axle flange.

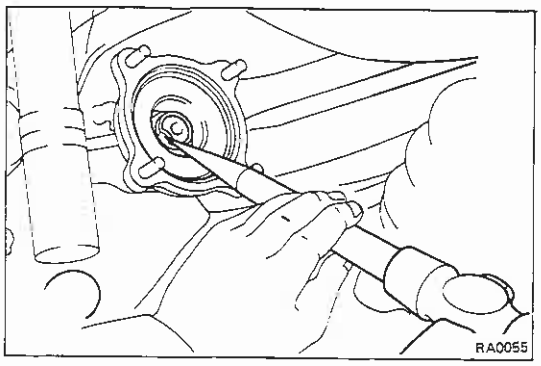
(b) Remove the rear axle shaft and spacer.

(c) Remove the outside bearing and oil seal.

(d) Install the outer bearing and oil seal.

(e) Install the rear axle shaft, new bearing spacer and flange.

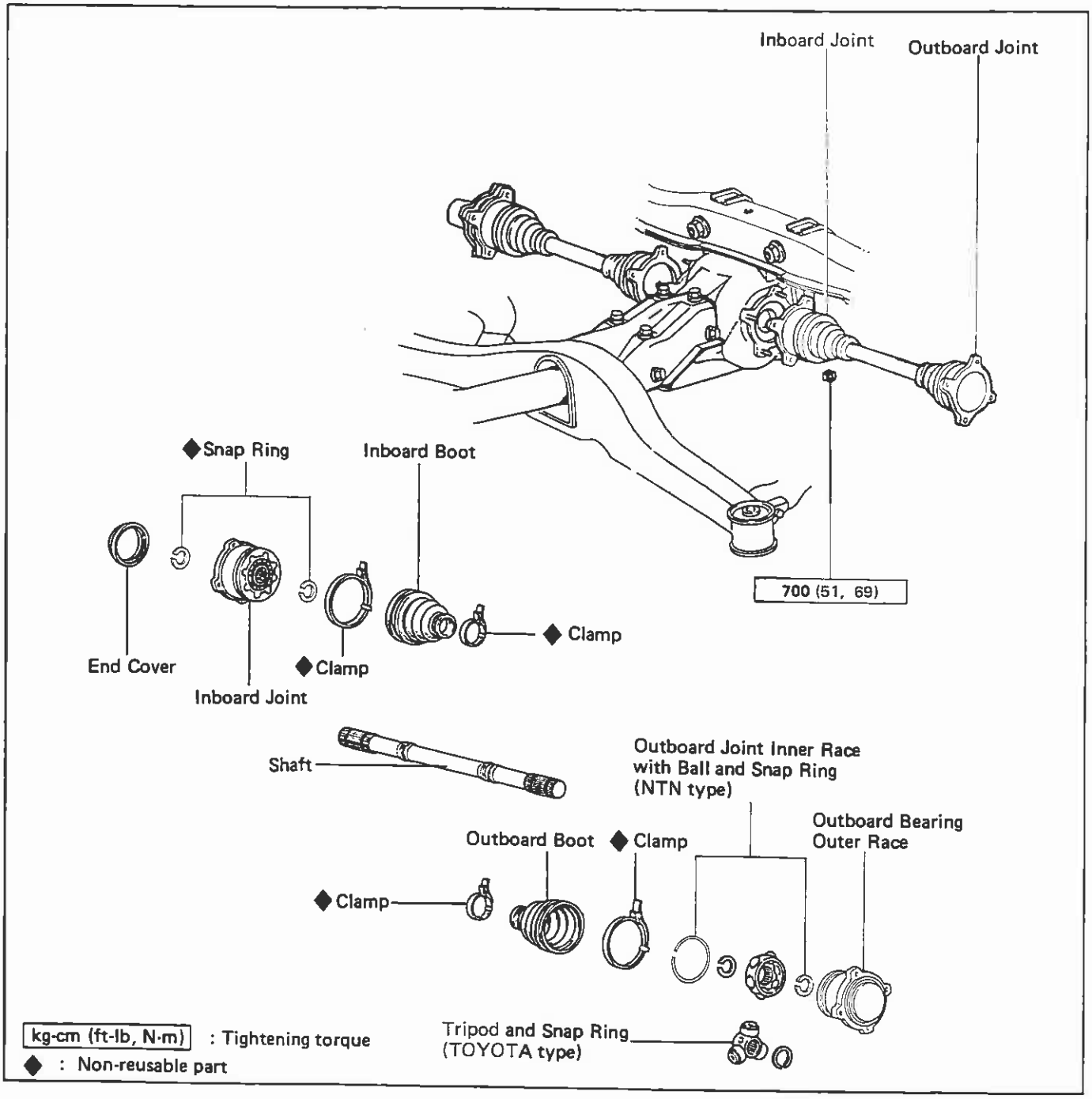
(f) Readjust preload.

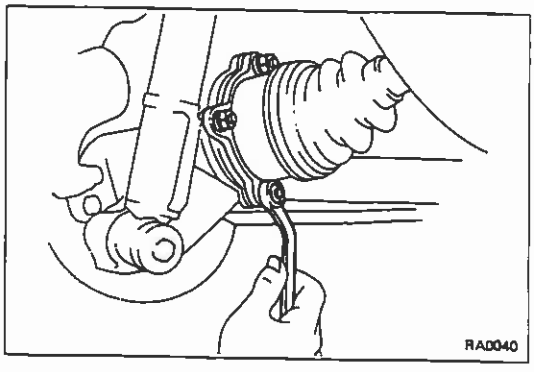


4. STAKE NUT WITH PUNCH
5. INSTALL REAR BRAKE
6. CONNECT DRIVE SHAFT
   Torque: 700 kg-cm (51 ft-lb, 69 N·m)
7. INSTALL REAR WHEEL

REAR DRIVE SHAFT

COMPONENTS





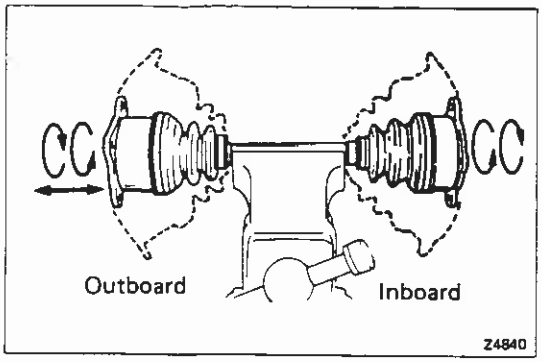
REMOVAL OF REAR DRIVE SHAFT

REMOVE DRIVE SHAFT

NOTE: Be careful not to damage the boots.

(a) Disconnect the drive shaft from the differential.

(b) Disconnect the drive shaft from the axle shaft.



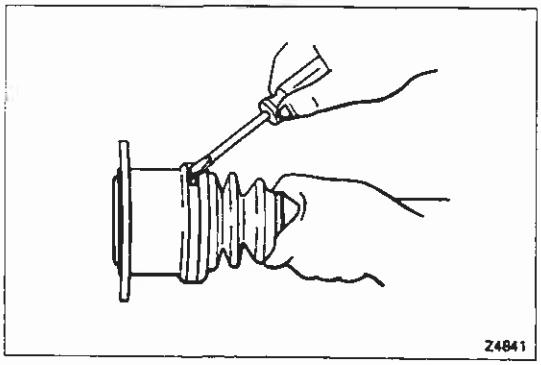
DISASSEMBLY OF REAR DRIVE SHAFT

(See page RA-15)

1. CHECK BOOT AND CLAMP

(a) Check to see that the outboard joint slides smoothly in the thrust direction.
Check to see that there is no remarkable play in the radial direction of the outboard joint.

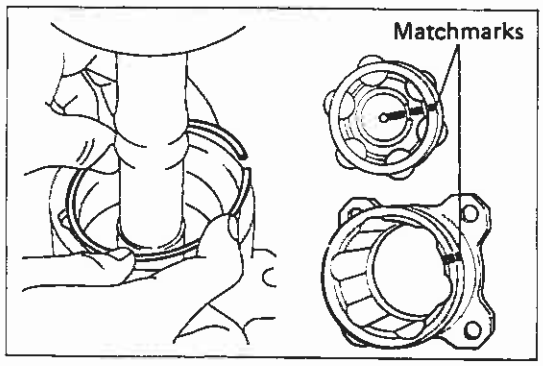
(b) Check to see that there is no remarkable play in the radial direction of the inboard joint.



2. DISASSEMBLE FOUR BOOT CLAMPS OF OUTBOARD AND INBOARD JOINTS

NOTE: Slide the clamp toward the drive shaft and remove it.

3. SLIDE BOOTS TO CENTER OF SHAFT



4.-1 (NTN Type)

REMOVE OUTBOARD JOINT OUTER RACE

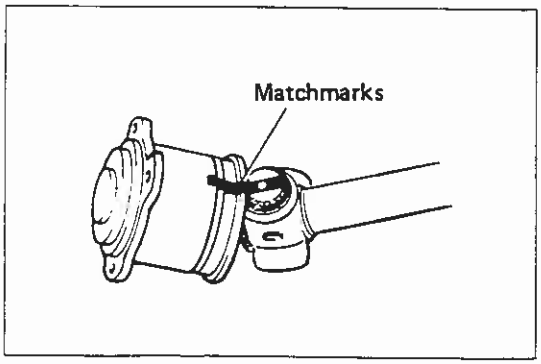
(a) Remove the snap ring.

(b) Place matchmarks on the outer race and drive shaft.

NOTE: Do not use a punch.

(c) Remove the outer race to the drive shaft.

NOTE: If the end cover is damaged or worn, replace it.



4.-2 (TOYOTA Type)

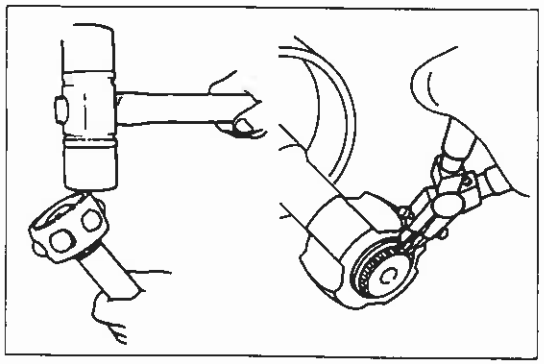
REMOVE OUTBOARD JOINT OUTER RACE

(a) Place matchmarks on the outer race and tripod.

NOTE: Do not use a punch.

(b) Remove the outer race from the drive shaft.

NOTE: If the outboard joint end cover is damaged or worn, replace it.



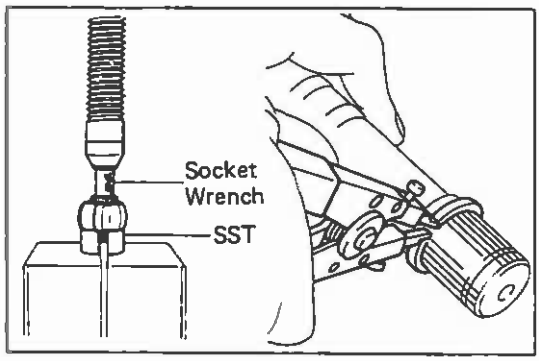
5.-1 (NTN Type)

REMOVE OUTBOARD JOINT INNER RACE

(a) Using a plastic hammer, remove the balls by lightly tapping on the outer circumference of the cage in the shaft axial direction.

(b) Lower the cage to the inboard side.

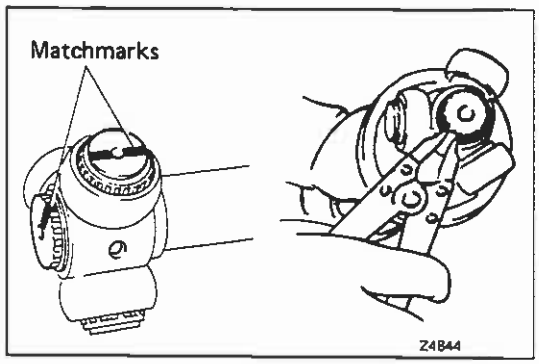
(c) Using snap ring pliers, remove the snap ring.



(d) Using SST and a press, remove the outboard joint inner race from the drive shaft.

SST 09726-10010

(e) Using snap ring pliers, remove the snap ring.



5.-2 (TOYOTA Type)

REMOVE TRIPOD JOINT

(a) Place matchmarks on the tripod joint and shaft.

(b) Using snap ring pliers, remove the snap ring.

(c) Using SST and a press, remove the tripod from the drive shaft.

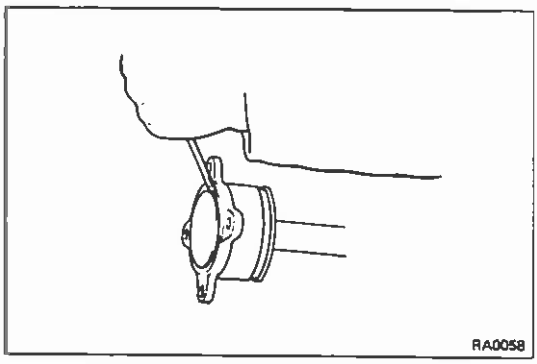
SST 09726-10010

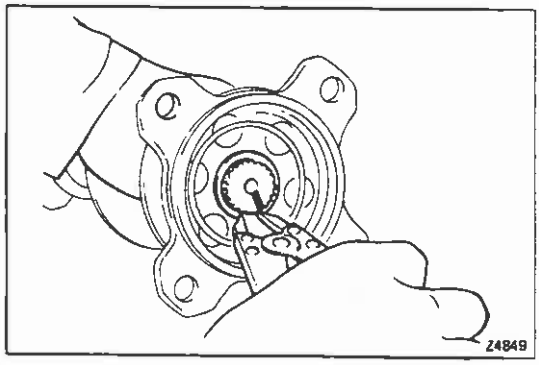
NOTE: Do not press on the roller.

6. REMOVE OUTBOARD AND INBOARD JOINT BOOT

7. **DISASSEMBLE INBOARD JOINT**

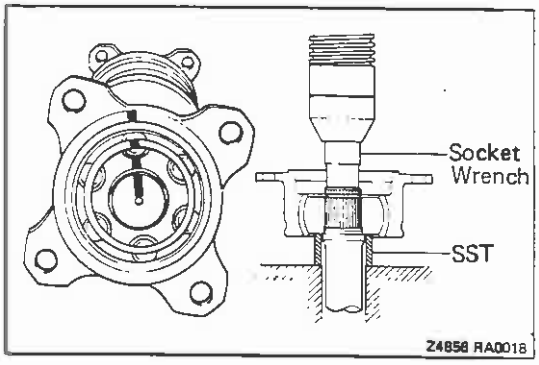
(a) Using a screwdriver, remove the end cover from the inboard joint.





(b) Place matchmarks on the inboard joint and drive shaft.

(c) Using snap ring pliers, remove the snap ring.

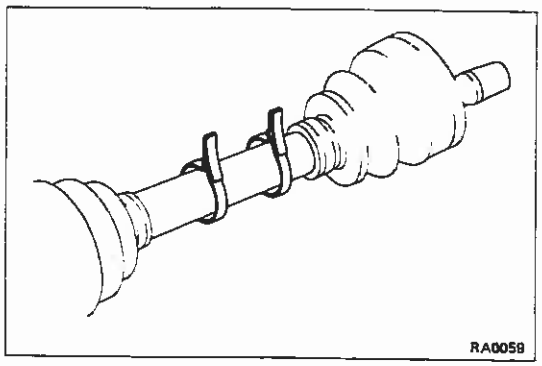


(d) Using SST and a press, remove the inboard joint from the drive shaft.

SST 09726-10010

INSPECTION OF REAR DRIVE SHAFT COMPONENTS

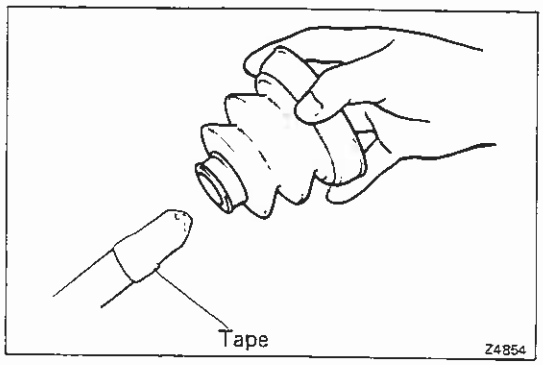
1. AFTER REMOVAL CHECK BOOTS FOR DAMAGE
2. CLEAN ALL PARTS
3. CHECK ALL PARTS FOR CRACKS, WEAR OR DAMAGE AND REPLACE AS NECESSARY



ASSEMBLY OF REAR DRIVE SHAFT

(See page RA-15)

1. ASSEMBLE NEW CLAMPS ONTO DRIVE SHAFT



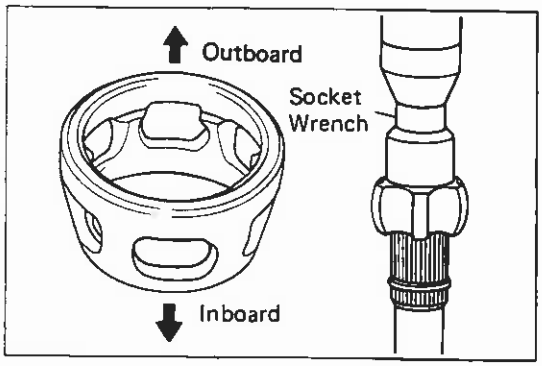
2. ASSEMBLE BOOT ONTO DRIVE SHAFT

CAUTION: Wrap the shaft serrations with vinyl tape so as to prevent damage to the boot.

(a) Place the outboard and inboard boots and new clamps on the shaft.

(b) Install a new snap ring.

NOTE: TOYOTA-manufactured boots are designed to fit only the inboard or outboard side. Be careful not to interchange them.



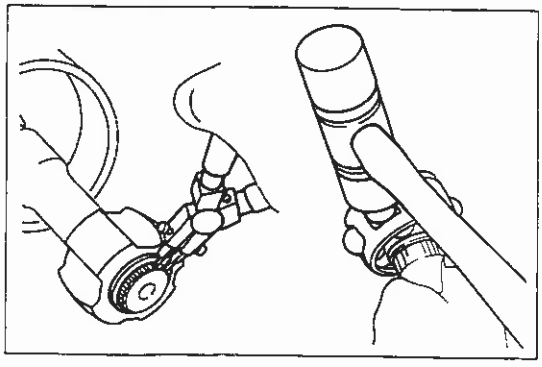
3.-1 (NTN Type)

INSTALL OUTBOARD JOINT INNER RACE

(a) Place the cage onto shaft.

NOTE: The larger diameter end should face toward the outboard side.

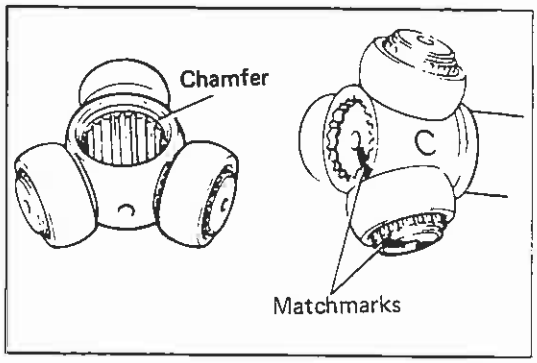
(b) Align the matchmarks and, using a press and socket wrench, install the inner race onto the shaft.



(c) Using snap ring pliers, install the snap ring.

(d) Lightly tap in the balls with a plastic hammer.

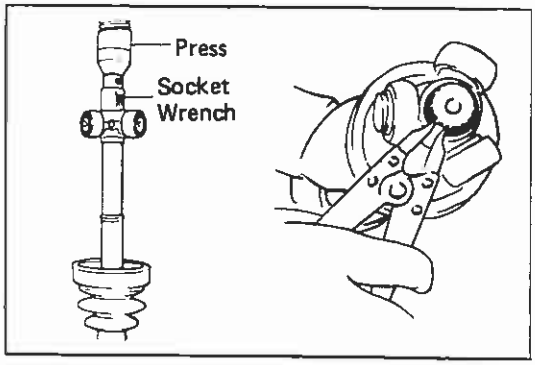
NOTE: Coat the inner race, the cage and balls with the grease supplied in the boot kit.



3.-2 (TOYOTA Type)

INSTALL OUTBOARD JOINT TRIPOD

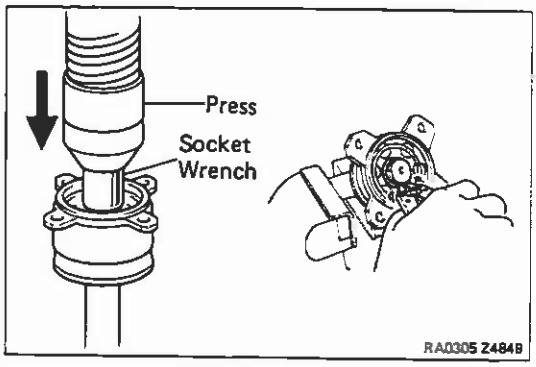
(a) Install with chamfered side inboard and align the matchmarks.



(b) Using a press and socket wrench, install tripod onto drive shaft.

NOTE: Do not press the roller.

(c) Install the new snap ring.

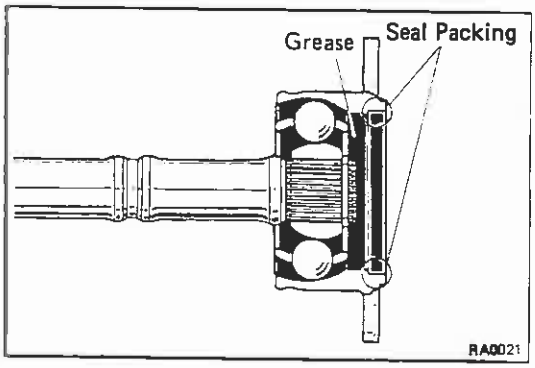


4. ASSEMBLE INBOARD JOINT

(a) Align the matchmarks placed before assembly.

(b) Using a press and socket wrench, inboard joint onto drive shaft.

(c) Using snap ring pliers, install new snap ring.



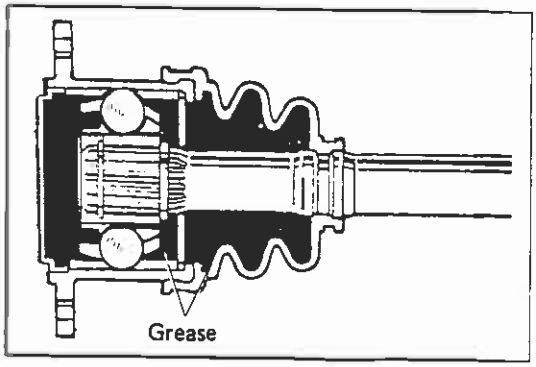
(d) Pack 60g (0.13 lb) of grease into the flange side.

NOTE: Use the grease supplied in the kit.

(e) Apply seal packing No. 5 around inboard side of the end cover.

(f) Install it to the inboard joint.

NOTE: Install the end cover by tapping around it.

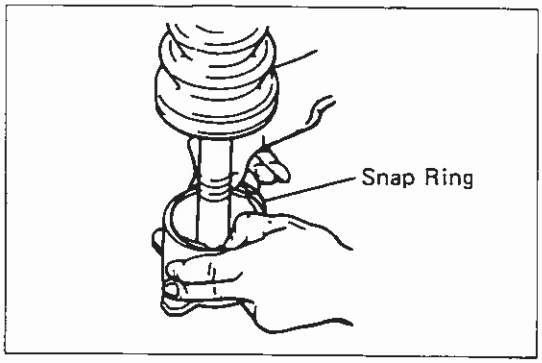


5. APPLY GREASE OUTBOARD AND INBOARD

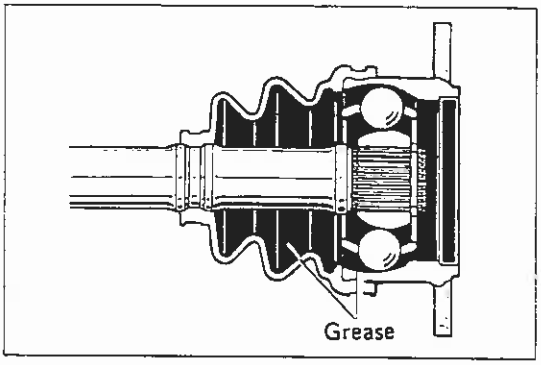
NOTE: Use the grease supplied in the boot kit.

(a) Apply grease into the outboard joint.

Outboard joint:		
	NTN type	Pack in 60 g (0.13 lb) of grease
	TOYOTA type	Pack in 90 g (0.20 lb) of grease
Outboard boot:		
	NTN type	Pack in 60 g (0.13 lb) of grease
	TOYOTA type	Pack in 90 g (0.20 lb) of grease



(b) Install the snap ring to the outer race. (NTN type only)



(c) Apply grease into the inboard joint.

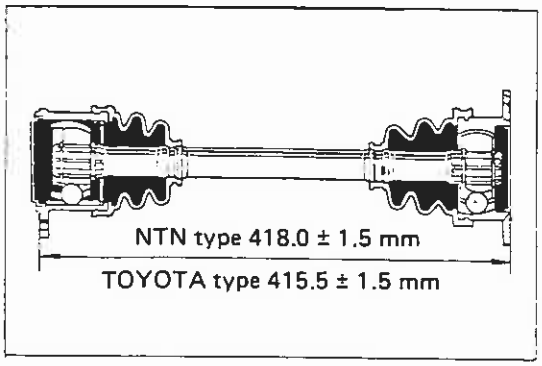
Inboard joint:

NTN type	Pack in 60 g (0.13 lb) of grease
TOYOTA type	Pack in 70 g (0.15 lb) of grease

Inboard boot:

NTN type	Pack in 60 g (0.13 lb) of grease
TOYOTA type	Pack in 70 g (0.15 lb) of grease

NOTE: Use the grease supplied in the boot kit.



6. ASSEMBLY BOOT CLAMPS

(a) Clamp the boots in a position permitting the following shaft dimension.

Shaft dimension:

NTN type	418.0 ± 1.5 mm (16.457 ± 0.059 in.)
TOYOTA type	415.5 ± 1.5 mm (16.358 ± 0.059 in.)

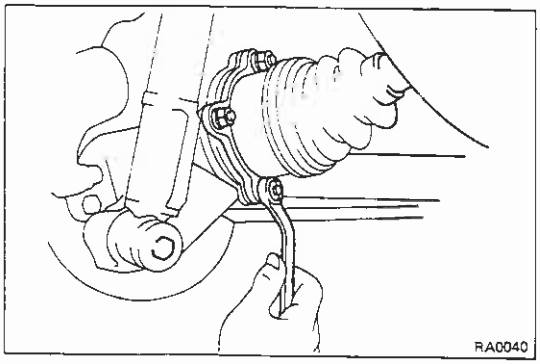
(b) Lock the clamps.

NOTE: Position the lock between the flange bolt holes.

(c) Turn both joints and stretch the boot to check that it does not deform.

INSTALLATION OF REAR DRIVE SHAFT

(See page RA-15)



INSTALL DRIVE SHAFT

(a) Install the drive shaft with the narrow distance between the flange and boot band at the differential side.

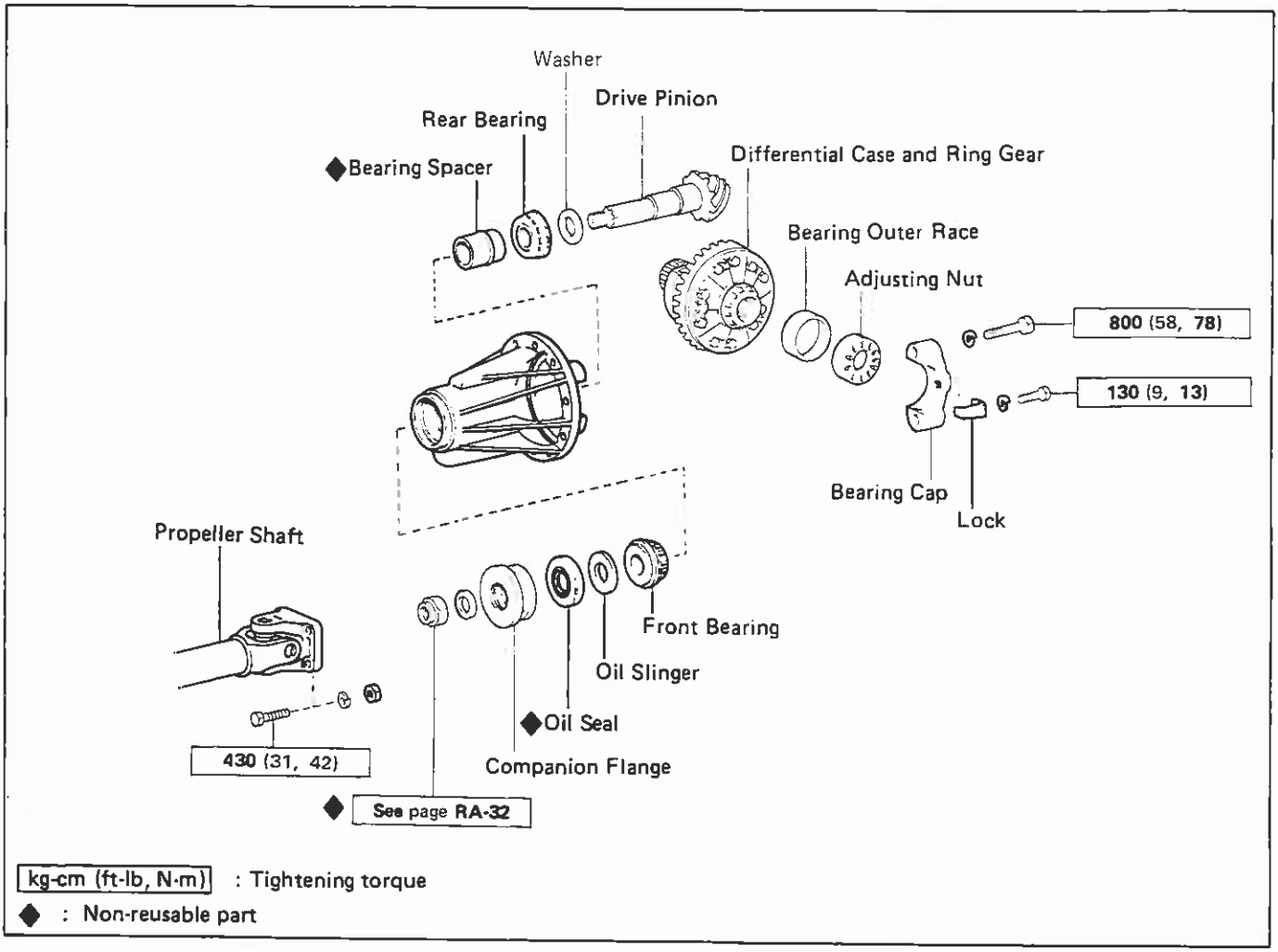
NOTE: Be careful not to damage the boot when installing it to the vehicle.

(b) Torque the nuts.

Torque: 700 kg-cm (51 ft-lb, 69 N·m)

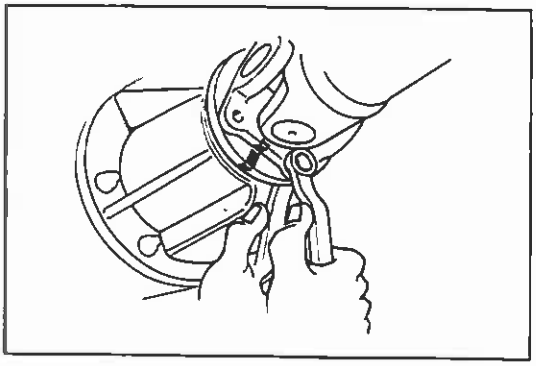
CONVENTIONAL TYPE DIFFERENTIAL

COMPONENTS



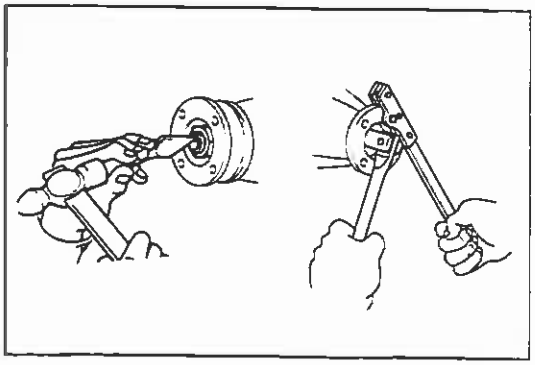
kg-cm (ft-lb, N·m) : Tightening torque

◆ : Non-reusable part

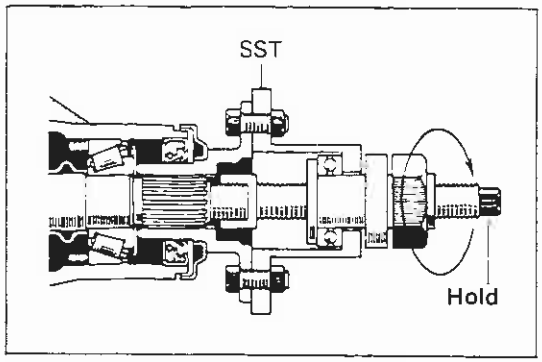


ON-VEHICLE REPLACEMENT OF OIL SEAL

1. DISCONNECT PROPELLER SHAFT FROM DIFFERENTIAL
   (a) Place matchmarks on the flanges.
   (b) Remove the four bolts and nuts.



2. REMOVE COMPANION FLANGE
   (See step 7 on page RA-24)
3. REMOVE OIL SEAL AND OIL SLINGER
   (See step 8 on page RA-24)
4. REMOVE FRONT BEARING AND BEARING SPACER
   (See step 9 on page RA-24)

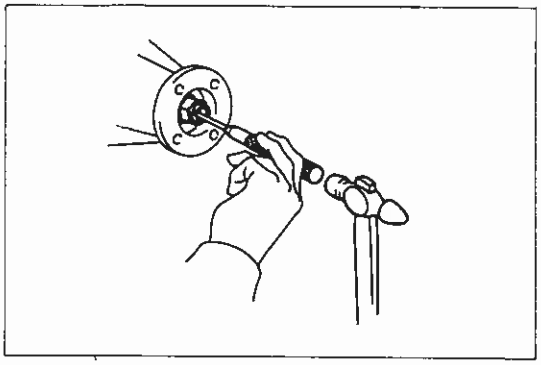


5. INSTALL NEW BEARING SPACER AND FRONT BEARING (See step 9 on page RA-32)

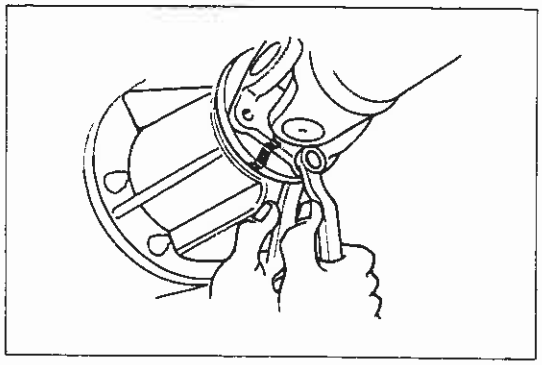
6. INSTALL OIL SLINGER AND NEW OIL SEAL (See step 10 on page RA-32)

7. INSTALL COMPANION FLANGE (See step 11 on page RA-32)

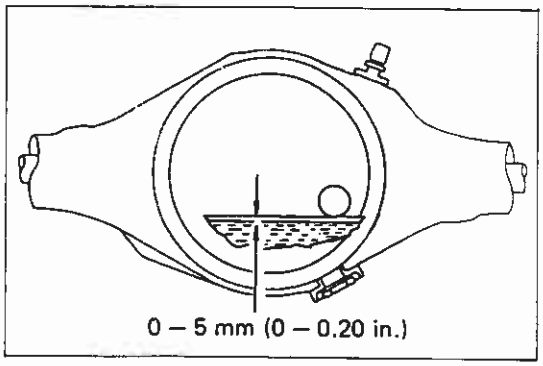
8. ADJUST FRONT BEARING PRELOAD (See step 12 on page RA-33)



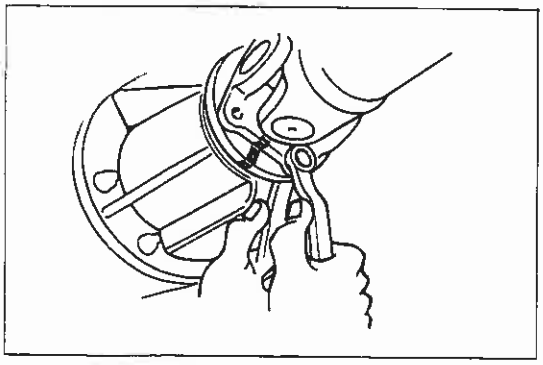
9. STAKE DRIVE PINION NUT



10. CONNECT PROPELLER SHAFT FLANGE TO COMPANION FLANGE
    (a) Align the matchmarks on the flanges and connect the flanges with four bolts and nuts.
    (b) Torque the four bolts and nuts.
    Torque: 430 kg-cm (31 ft-lb, 42 N·m)



11. CHECK DIFFERENTIAL OIL LEVEL
    Fill with hypoid gear oil if necessary.
    Hypoid gear oil: SAE 90 APL GL–5
    SAE 80W or 80W–90
    at temperature below – 18°C (0°F)
    Capacity: 1.3 liters (1.4 US qts, 1.1 Imp. qts)



REMOVAL OF DIFFERENTIAL

(See page RA-21)

1. REMOVE DRAIN PLUG AND DRAIN DIFFERENTIAL OIL

2. REMOVE REAR AXLE SHAFT (See page RA-5)

3. DISCONNECT PROPELLER SHAFT FROM DIFFERENTIAL (See page RA-21)

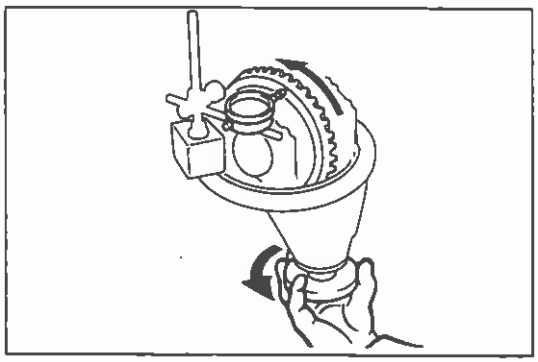
4. REMOVE DIFFERENTIAL CARRIER ASSEMBLY

DISASSEMBLY OF DIFFERENTIAL

(See page RA-21)

NOTE: If the differential is noisy, perform the following pre-inspection before disassembly to determine the cause of the noise.

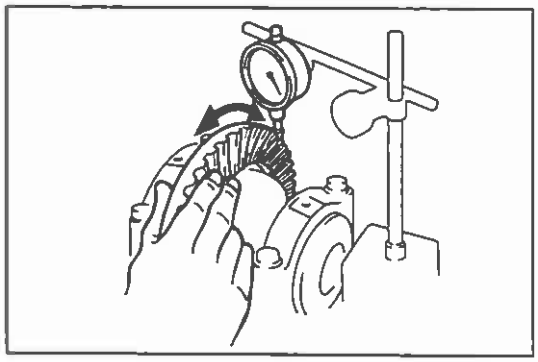
If the differential has severe problems, disassemble and repair it as necessary.



1. **CHECK RING GEAR RUNOUT**

   If the runout is greater than maximum, install a new ring gear.

   Maximum runout: 0.07 mm (0.0028 in.)



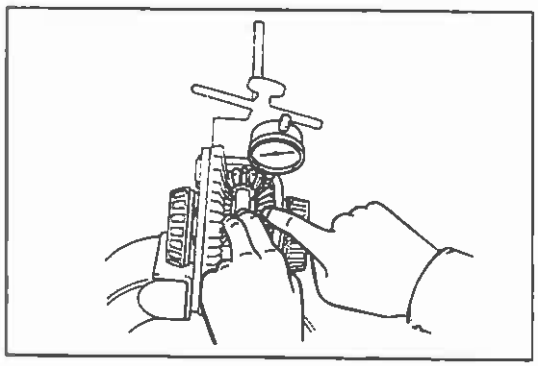
2. **CHECK RING GEAR BACKLASH**

   If the backlash is not within specifications, adjust the side bearing preload or repair as necessary.
   (See step 5 on page RA-29)

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

3. **INSPECT TOOTH CONTACT BETWEEN RING GEAR AND DRIVE PINION (See step 6 on page RA-29)**

   Note the tooth contacting position.

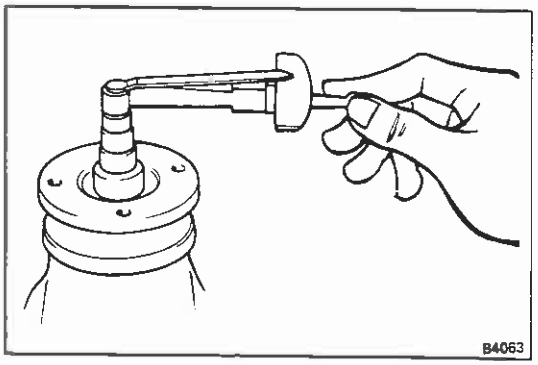


4. **CHECK SIDE GEAR BACKLASH**

   Measure the side gear backlash while holding one pinion gear toward the case.

   Standard backlash:
   0.05 – 0.20 mm (0.0020 – 0.0079 in.)

   If the backlash is not within specification, install correct thrust washers.



5. **MEASURE DRIVE PINION PRELOAD**

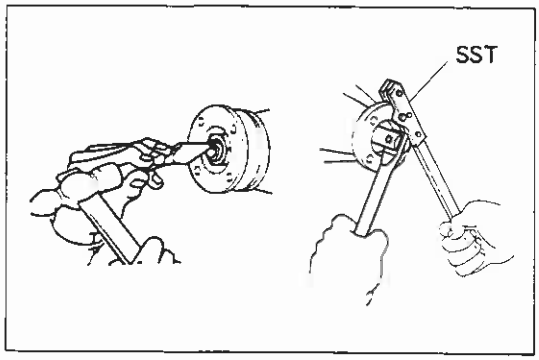
   Using a torque wrench, measure the preload of the backlash between the drive pinion and ring gear.

   Preload: 5 – 8 kg-cm
   (4.3 – 6.9 in.-lb, 0.5 – 0.8 N·m)

6. **CHECK TOTAL PRELOAD**

   Using a torque wrench, measure the total preload.

   Total preload: In addition to drive pinion preload
   3 – 5 kg-cm (2.6 – 4.3 in.-lb, 0.3 – 0.5 N·m)

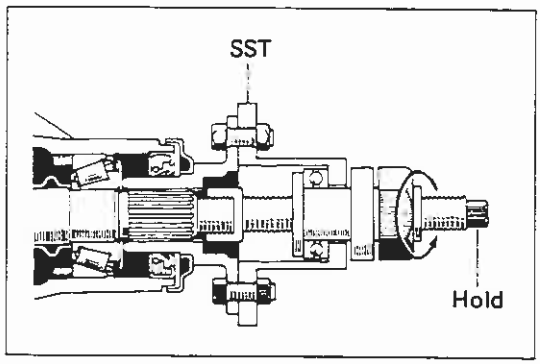


7. REMOVE COMPANION FLANGE

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

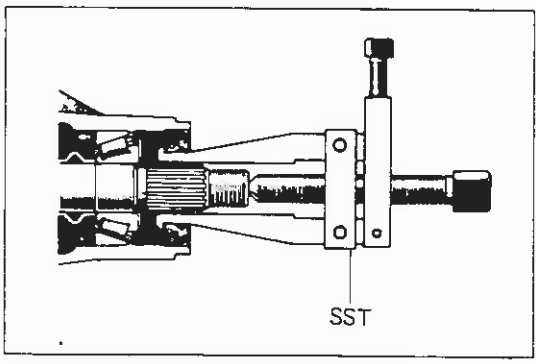
(b) Using SST to hold the flange, remove the nut.

SST 09330-00020



(c) Using SST, remove the companion flange.

SST 09557-22022

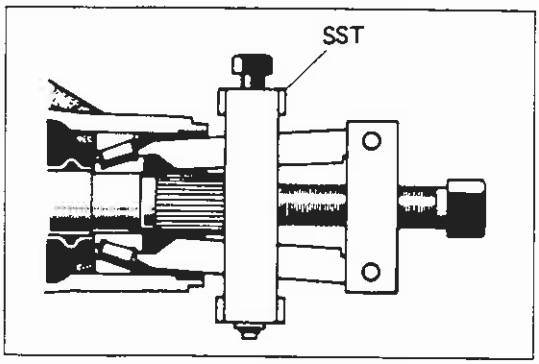


8. REMOVE OIL SEAL AND OIL SLINGER

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

SST 09308-10010

(b) Remove the oil slinger.



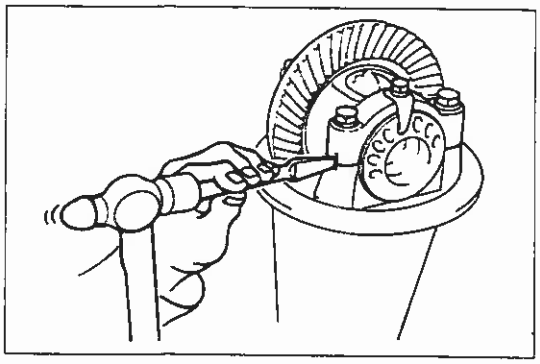
9. REMOVE FRONT BEARING AND BEARING SPACER

(a) Using SST, remove the front bearing from the housing.

SST 09556-22010

(b) Remove the bearing spacer.

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

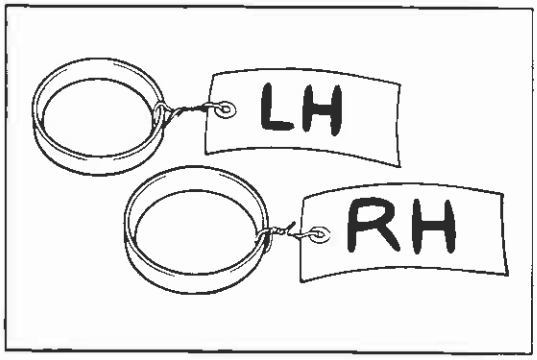


10. REMOVE DIFFERENTIAL CASE AND RING GEAR

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

(b) Remove the two adjusting nut locks.

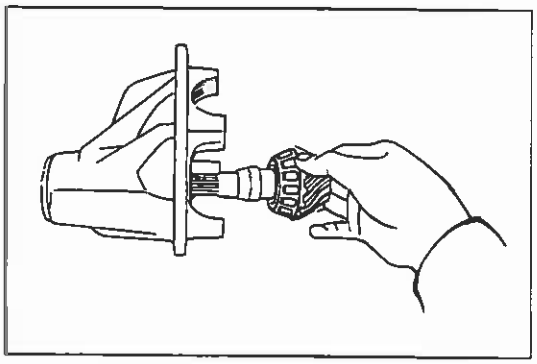
(c) Remove the two bearing caps and two adjusting nuts.



(d) Remove the bearing outer races.

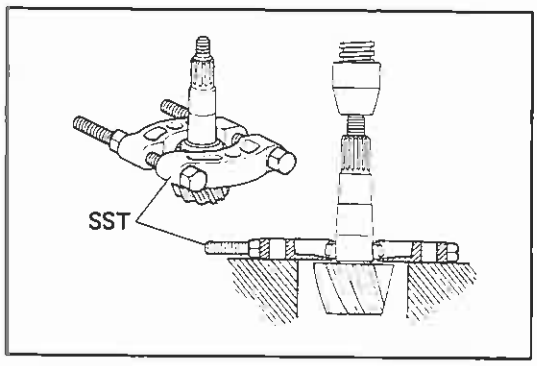
(e) Remove the differential case from the carrier.

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



11. REMOVE DRIVE PINION FROM DIFFERENTIAL CARRIER

INSPECTION AND REPLACEMENT OF DIFFERENTIAL

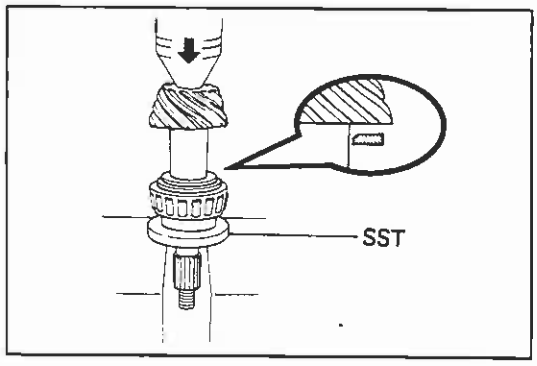


1. REPLACE DRIVE PINION REAR BEARING RACE

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

SST 09950-00020

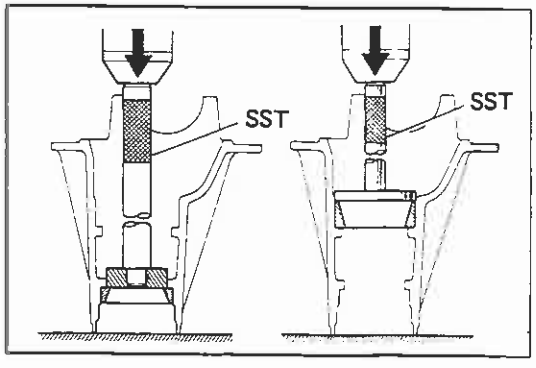
NOTE: If replacing the drive pinion, do so together with the ring gear.



(b) Install the washer on the drive pinion with the chamfered end facing the pinion gear.

(c) Using SST and a press, press the reused washer and rear bearing onto the drive pinion.

SST 09506-30011

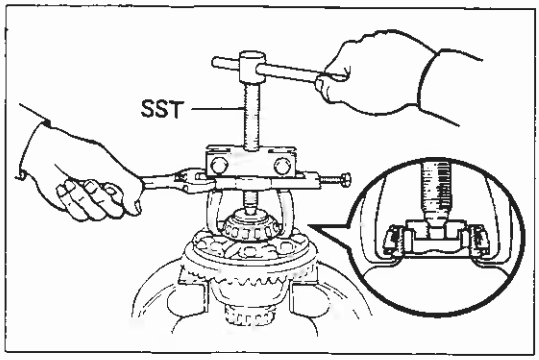


2. REPLACE DRIVE PINION FRONT AND REAR BEARING OUTER RACE

(a) Using a press and SST, push out the outer race.

(b) Using a press and SST, push in a new outer race.

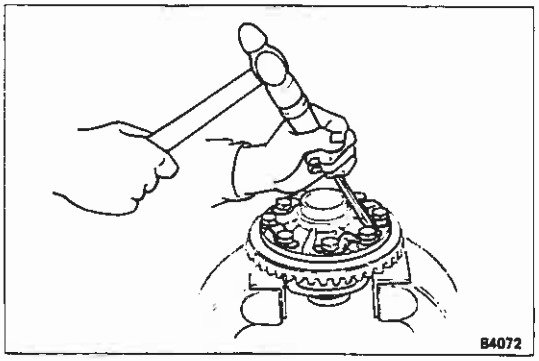
SST 09608-30011 (Front bearing)
09608-30030 (Rear bearing)



3. REMOVE SIDE BEARINGS FROM DIFFERENTIAL CASE

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

SST 09950-20016

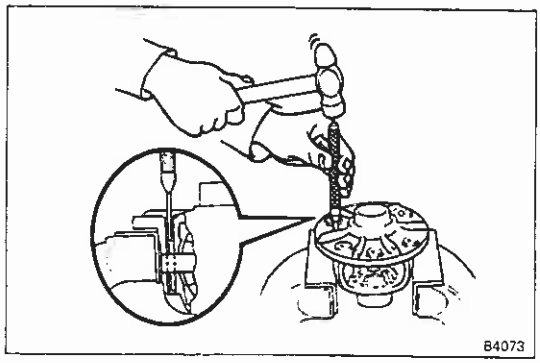


4. REMOVE RING GEAR

(a) Remove the ring gear set bolts and lock plates.

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

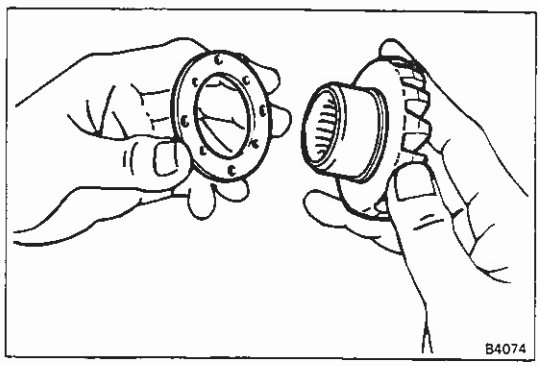
(c) Using a plastic or copper hammer, tap on the ring gear to separate it from the differential case.



5. DISASSEMBLE DIFFERENTIAL CASE

(a) Using a hammer and punch, drive out the straight pin.

(b) Remove the pinion shaft, two pinion gears, two side gears and two thrust washers.



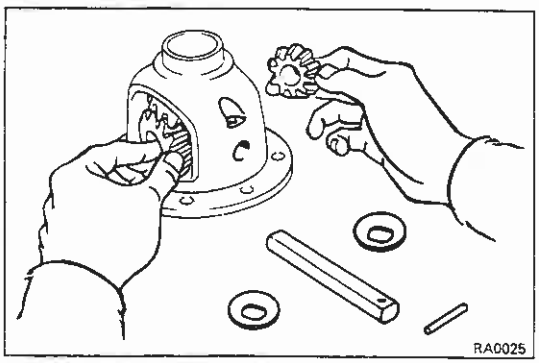
6. ASSEMBLE DIFFERENTIAL CASE

(a) Install the correct thrust washers and side gears. Referring to the table below, select thrust washers which will ensure that the backlash is within specification. Try to select washers of the same size for both sides.

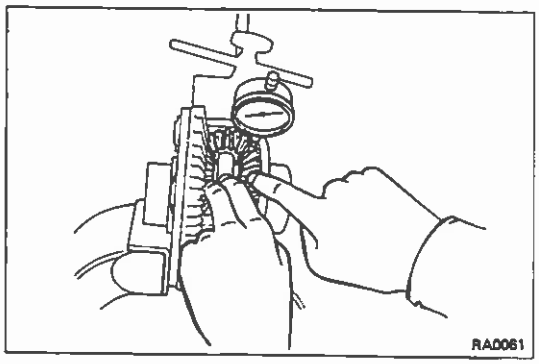
Standard backlash: 0.05 – 0.20 mm (0.0020 – 0.0079 in.)

Thrust washer thickness

Thickness	mm (in.)
0.92 – 0.98	(0.0362 – 0.0386)
0.97 – 1.03	(0.0382 – 0.0406)
1.02 – 1.08	(0.0402 – 0.0425)
1.07 – 1.13	(0.0421 – 0.0445)
1.12 – 1.18	(0.0441 – 0.0465)
1.17 – 1.23	(0.0461 – 0.0484)
1.27 – 1.33	(0.0500 – 0.0524)
1.37 – 1.43	(0.0539 – 0.0563)



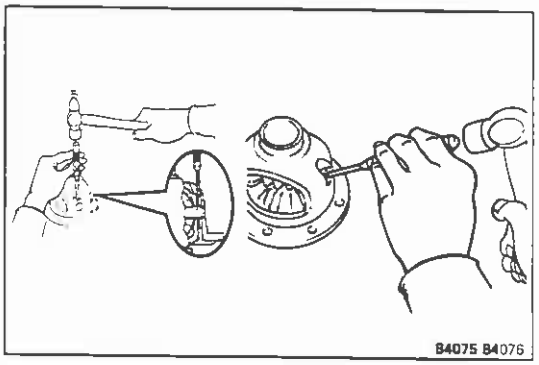
Install the thrust washers and side gears in the differential case.



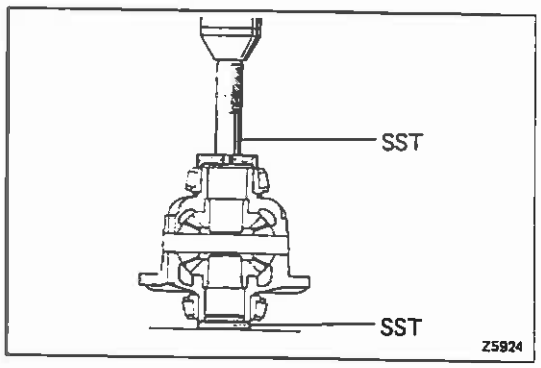
(b) Check the side gear backlash.
Measure the side gear backlash while holding one pinion gear toward the case.

Standard backlash: 0.05 – 0.20 mm (0.0020 – 0.0079 in.)

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



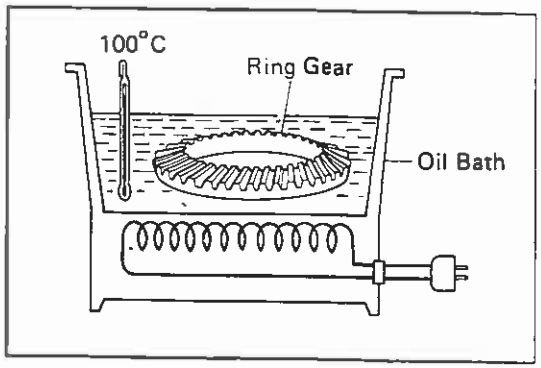
(c) Install the straight pin.
- Using a hammer and punch, drive the straight pin through the case and hole in the pinion shaft.
- Stake the pin and differential case.



7. INSTALL NEW SIDE BEARING

Using SST and a press, drive a new side bearing on the differential case.

SST 09550-10012



8. INSTALL RING GEAR ON DIFFERENTIAL CASE

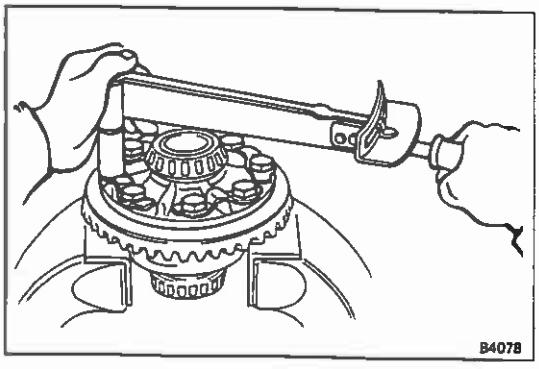
(a) Clean the contact surface of the differential case.

(b) Heat the ring gear to about 100°C (212°F) in an oil bath.

(c) Clean the contact surface of the ring gear with cleaning solvent.

(d) Then quickly install the ring gear on the differential case.

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

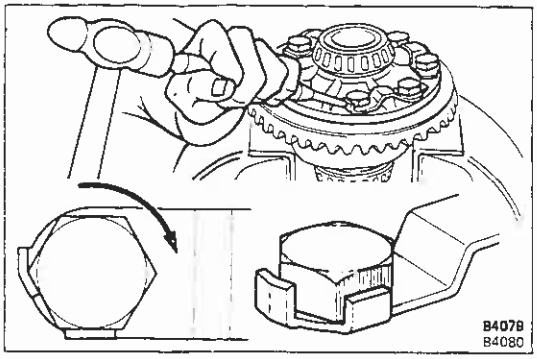


CAUTION: Do not heat the ring gear above 110°C (230° F).

(f) Coat the ring gear set bolts with gear oil.

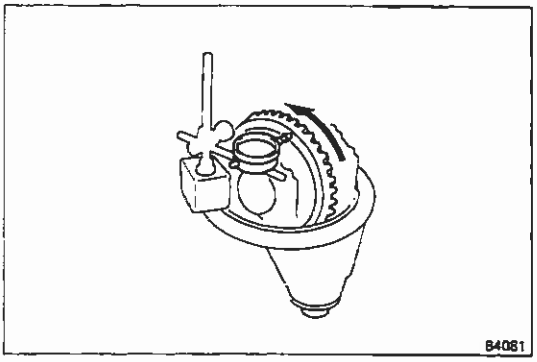
(g) Install the lock plates and set bolts. Tighten the set bolts uniformly, a little at a time. Torque the bolts.

Torque: 985 kg-cm (71 ft-lb, 97 N·m)



(h) Using a hammer and drift punch, stake the lock plates.

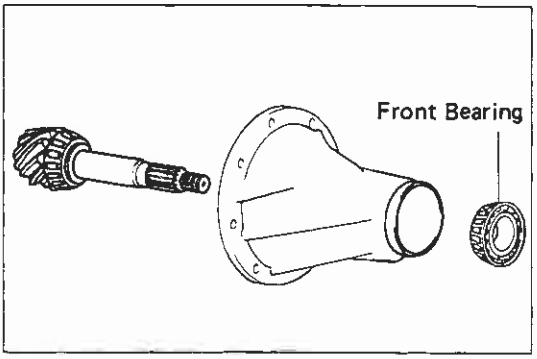
NOTE: Stake one claw flush with the flat surface of the nut. For the claw contacting the protruding portion of the nut, stake only the half on the tightening side.



(i) Check the ring gear runout.

Maximum runout: 0.07 mm (0.0028 in.)

Install the differential case onto the carrier and tighten the adjusting nut just to where there is no play in the bearing.



ASSEMBLY OF DIFFERENTIAL

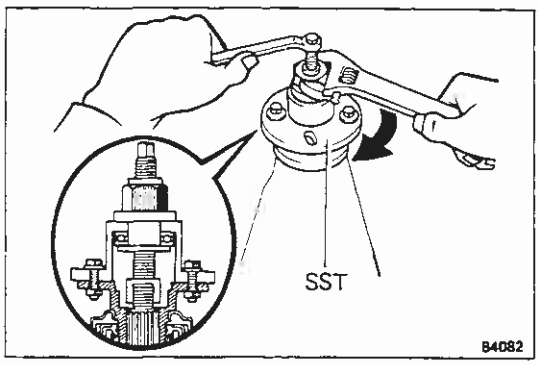
(See page RA-21)

1. TEMPORARILY ADJUST DRIVE PINION PRELOAD

(a) Install the following parts.

- Drive pinion
- Front bearing

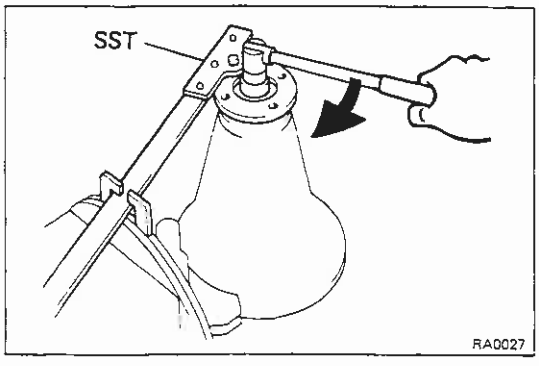
NOTE: Assemble the spacer, oil slinger and oil seal after adjusting the gear contact pattern.



(b) Install the companion flange with SST.

Coat the threads of the nut with MP grease.

SST 09557-22022

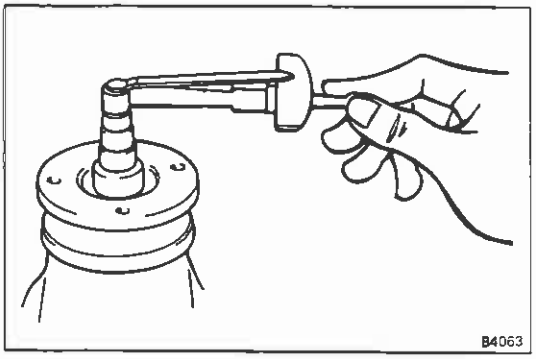


(c) Adjust the drive pinion preload by tightening the companion flange nut.

Using SST to hold the flange, tighten the nut.

SST 09330-00020

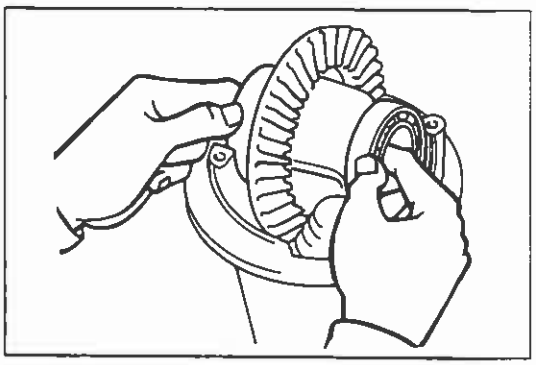
CAUTION: As there is no spacer, tighten a little at a time, being careful not to overtighten.



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

Preload:

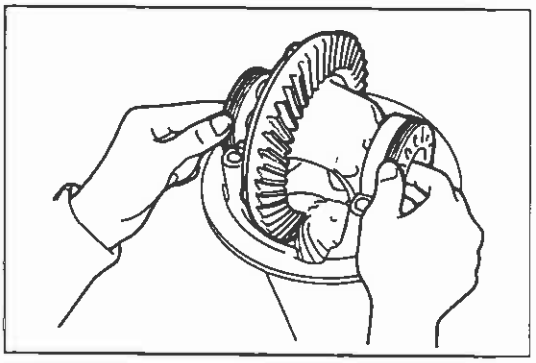
New bearing	10 – 16 kg-cm (8.7 – 13.9 in.-lb, 1.0 – 1.6 N·m)
Reused bearing	5 – 8 kg-cm (4.3 – 6.9 in.-lb, 0.5 – 0.8 N·m)



2. INSTALL DIFFERENTIAL CASE IN CARRIER

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

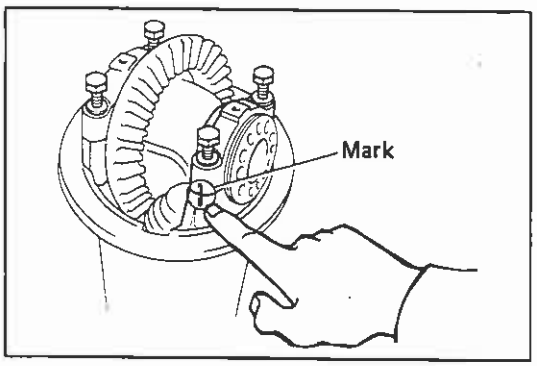
(b) Install the case in the carrier.



3. INSTALL ADJUSTING NUTS

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

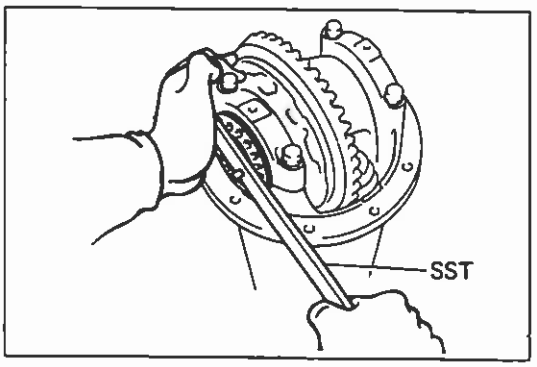
NOTE: Make sure that there is backlash between the ring gear and drive pinion.



4. INSTALL BEARING CAPS

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

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

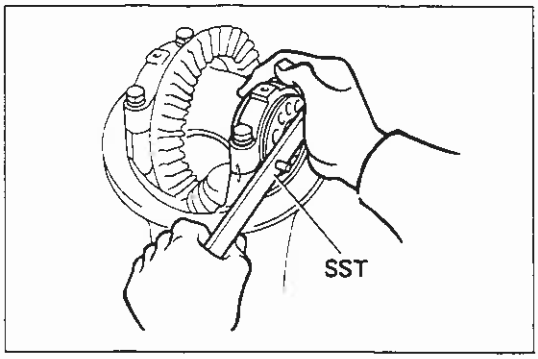


5. ADJUST SIDE BEARING PRELOAD

(a) Tighten the bearing cap bolts until the spring washers are slightly compressed.

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

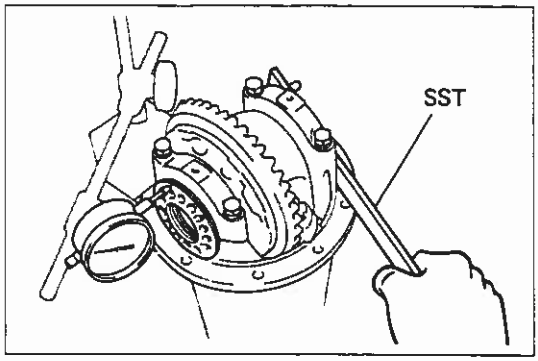
SST 09504-00011



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

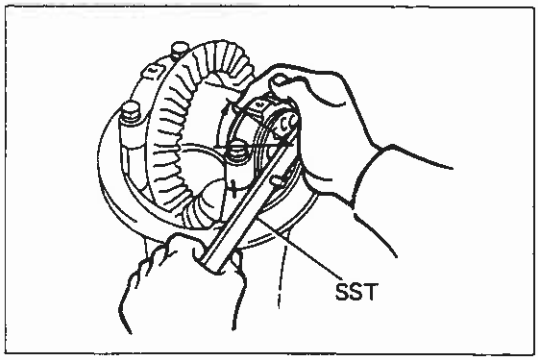
(d) Check the ring gear backlash.

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

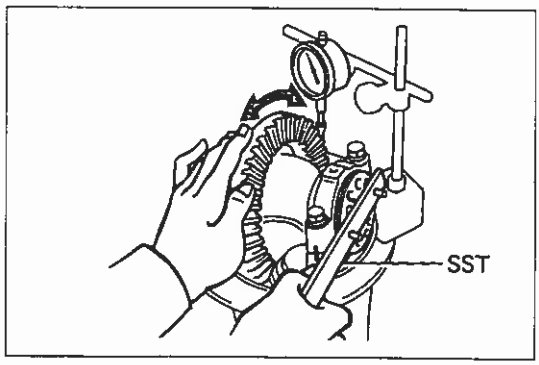


(e) Place a dial indicator on the top of the bearing cap on the ring gear side.

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



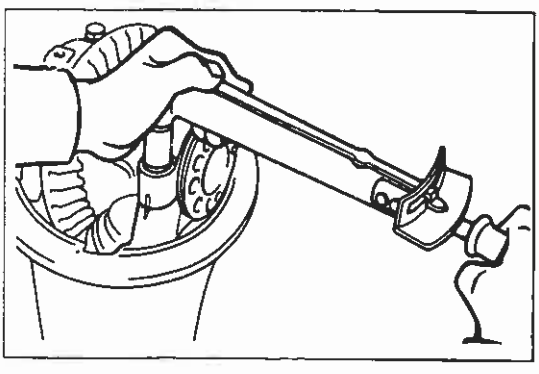
(g) Tighten the adjusting nut 1 – 1½ notches from the zero preload position.



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

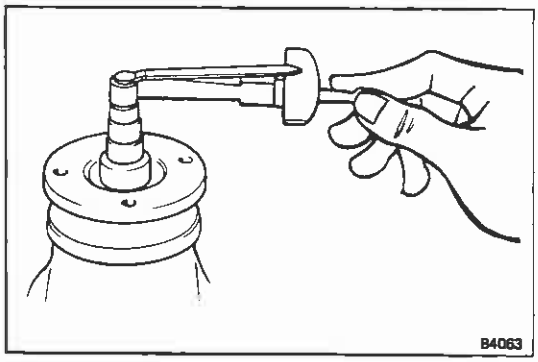
Backlash: 0.13 – 0.18 mm (0.0051 – 0.0071 in.)

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



(i) Torque the bearing cap bolts.

Torque: 800 kg-cm (58 ft-lb, 78 N·m)

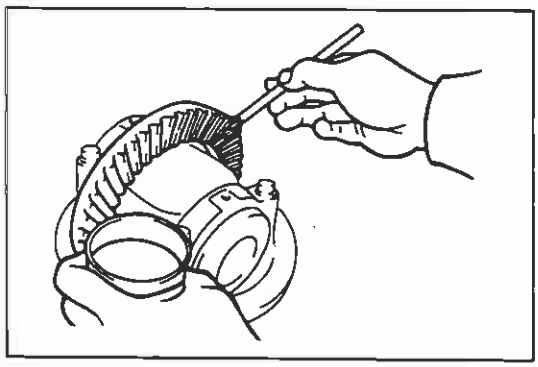


(j) Recheck the ring gear backlash.

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

Total preload: In addition to drive pinion preload
3 – 5 kg-cm (2.6 – 4.3 in.-lb, 0.3 – 0.5 N·m)

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

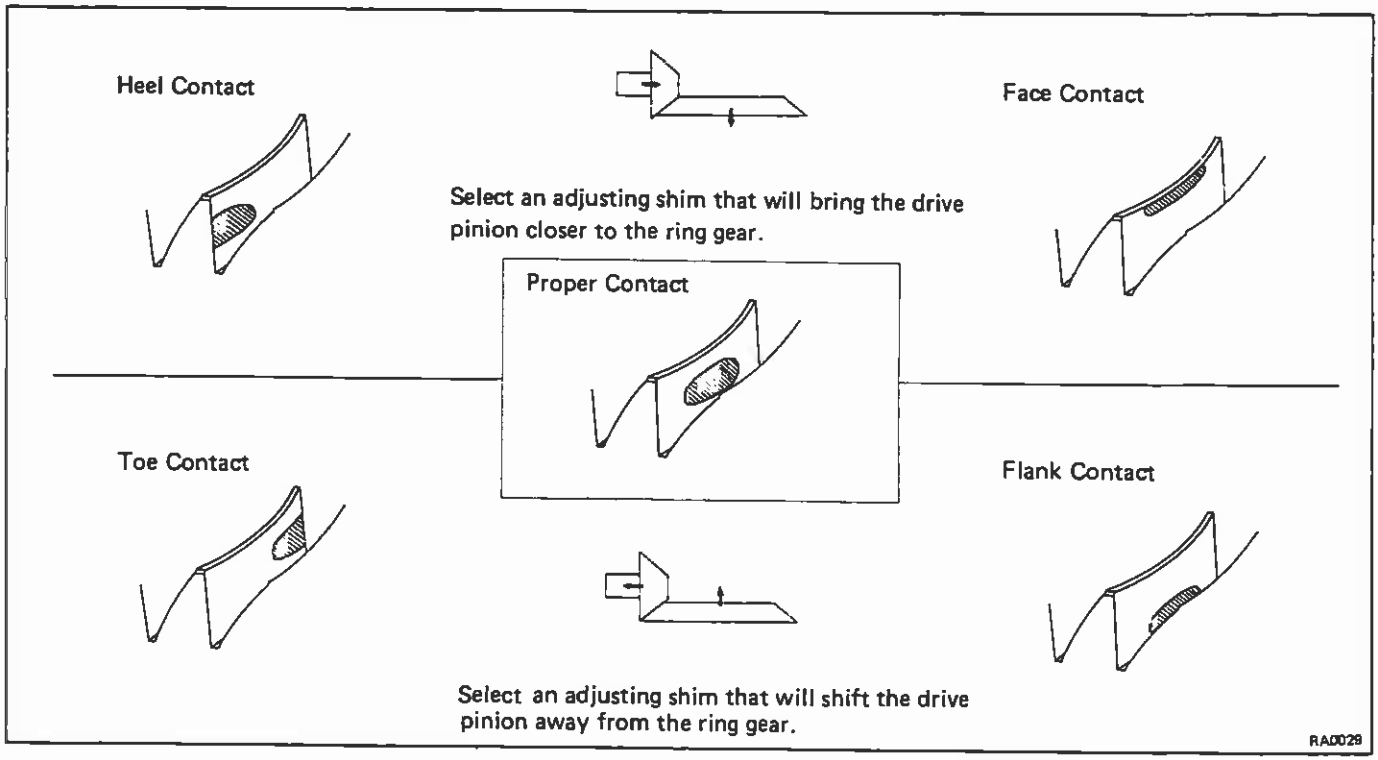


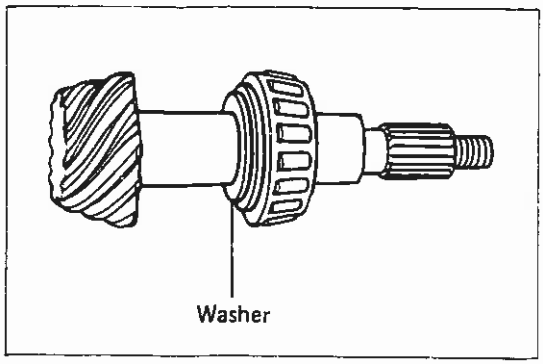
6. INSPECT TOOTH CONTACT BETWEEN RING GEAR AND DRIVE PINION

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

(b) Hold the companion flange firmly and rotate the ring gear in both directions.

(c) Inspect the tooth pattern.





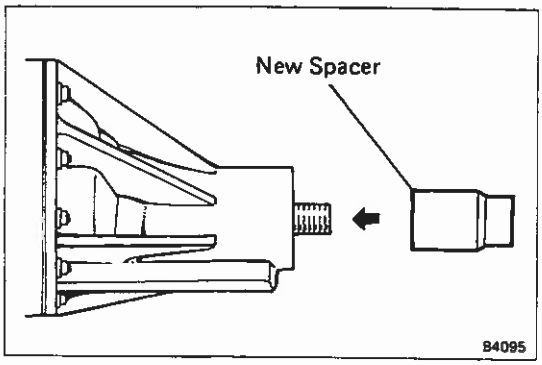
If the teeth are not contacting properly, use the following chart to select a proper washer for correction.

Washer thickness

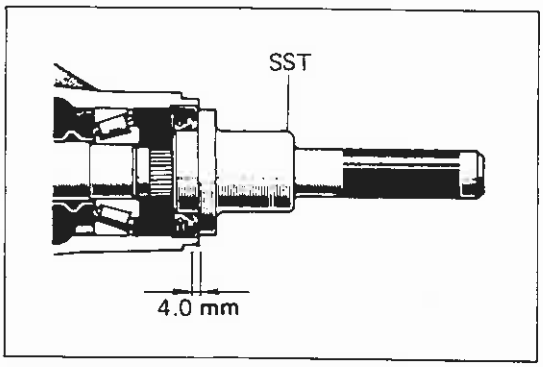
Thickness	mm (in.)
2.26 – 2.28	(0.0890 – 0.0898)
2.29 – 2.31	(0.0902 – 0.0909)
2.32 – 2.34	(0.0913 – 0.0921)
2.35 – 2.37	(0.0925 – 0.0933)
2.38 – 2.40	(0.0937 – 0.0945)
2.41 – 2.43	(0.0949 – 0.0957)
2.44 – 2.46	(0.0961 – 0.0969)
2.47 – 2.49	(0.0972 – 0.0980)
2.50 – 2.52	(0.0984 – 0.0992)
2.53 – 2.55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

7. REMOVE COMPANION FLANGE
(See step 7 on page RA-24)

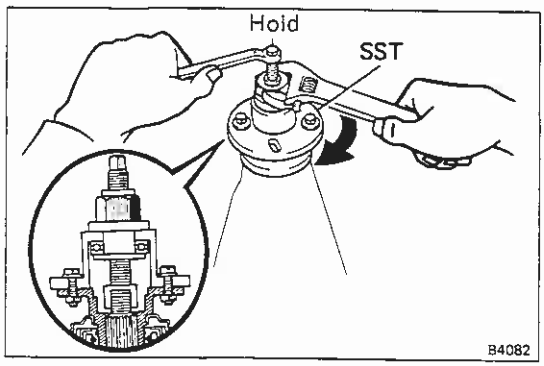
8. REMOVE FRONT BEARING
(See step 9 on page RA-24)



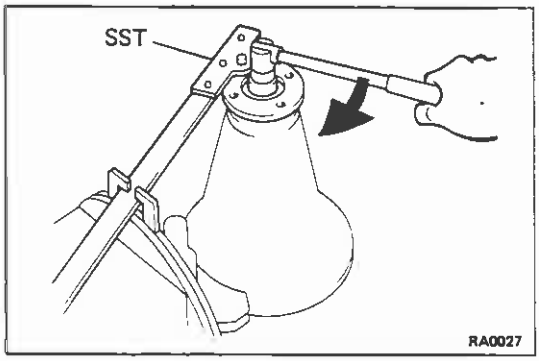
9. INSTALL NEW BEARING SPACER AND FRONT BEARING
   (a) Install a new bearing spacer on the shaft.
   (b) Install the front bearing on the shaft.



10. INSTALL OIL SLINGER AND NEW OIL SEAL
   (a) Install the oil slinger facing as shown.
   (b) Using SST, drive in a new oil seal as shown.
   Oil seal drive in depth: 4.0 mm (0.157 in.)
   SST 09554-22010
   (c) Apply MP grease to the oil seal lip.



11. INSTALL COMPANION FLANGE
   (a) Install the companion flange with SST.
   Coat the threads of nut with MP grease.
   SST 09557-22022

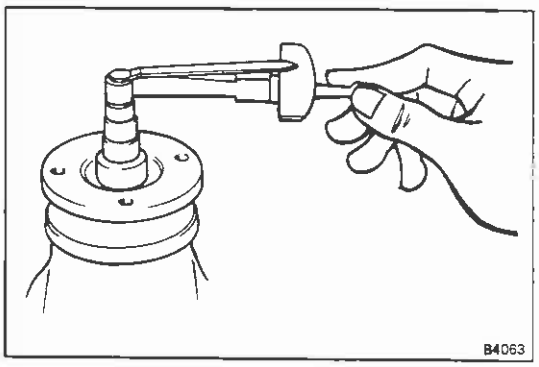


(b) Coat the threads of a new nut with MP grease.

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

Torque: 1,100 kg-cm (80 ft-lb, 108 N·m)

SST 09330-00020



12. ADJUST FRONT BEARING PRELOAD

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

Preload:

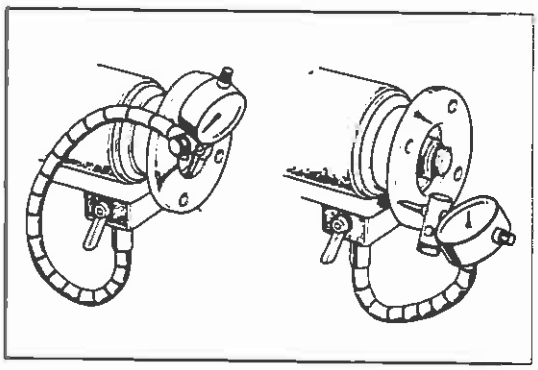
New bearing	**10 – 16 kg-cm (8.7 – 13.9 in.-lb, 1.0 – 1.6 N·m)**
Reused bearing	**5 – 8 kg-cm (4.3 – 6.9 in.-lb, 0.5 – 0.8 N·m)**

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

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

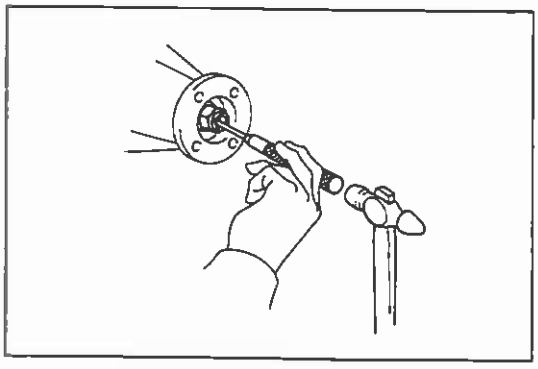
If the maximum torque is exceeded while retightening the nut, replace the bearing spacer and repeat the preload procedure. Do not back off pinion nut to reduce the preload.

Maximum torque: 2,400 kg-cm (174 ft-lb, 235 N·m)

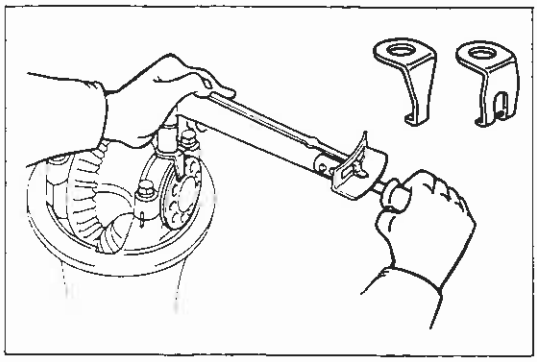


13. CHECK RUNOUT OF COMPANION FLANGE

Maximum lateral runout: 0.10 mm (0.0039 in.)
Maximum radial runout: 0.10 mm (0.0039 in.)



14. STAKE DRIVE PINION NUT



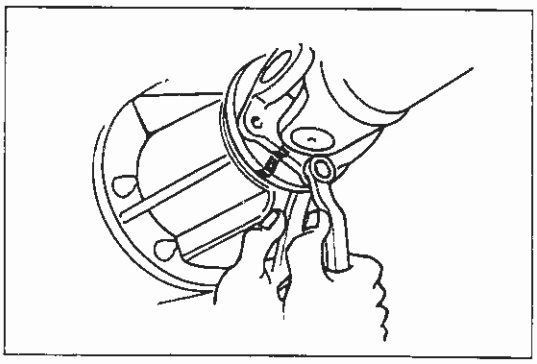
15. INSTALL ADJUSTING NUT LOCKS
    (a) Select either a lock No. 1 or No. 2 which will fit the adjusting nuts.
    (b) Install the lock on the bearing caps.
    Torque: 130 kg-cm (9 ft-lb, 13 N·m)

INSTALLATION OF DIFFERENTIAL

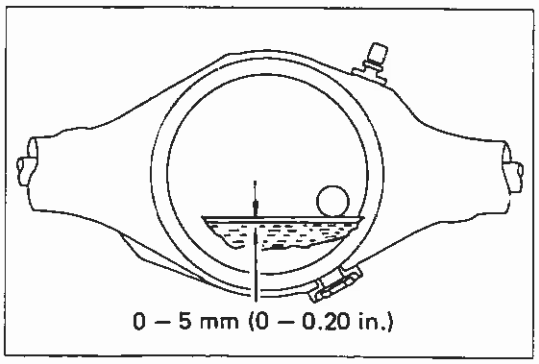
(See page RA-21)

1. INSTALL NEW GASKET

2. INSTALL DIFFERENTIAL CARRIER ASSEMBLY
   Install differential carrier assembly in the axle housing and install twelve nuts.



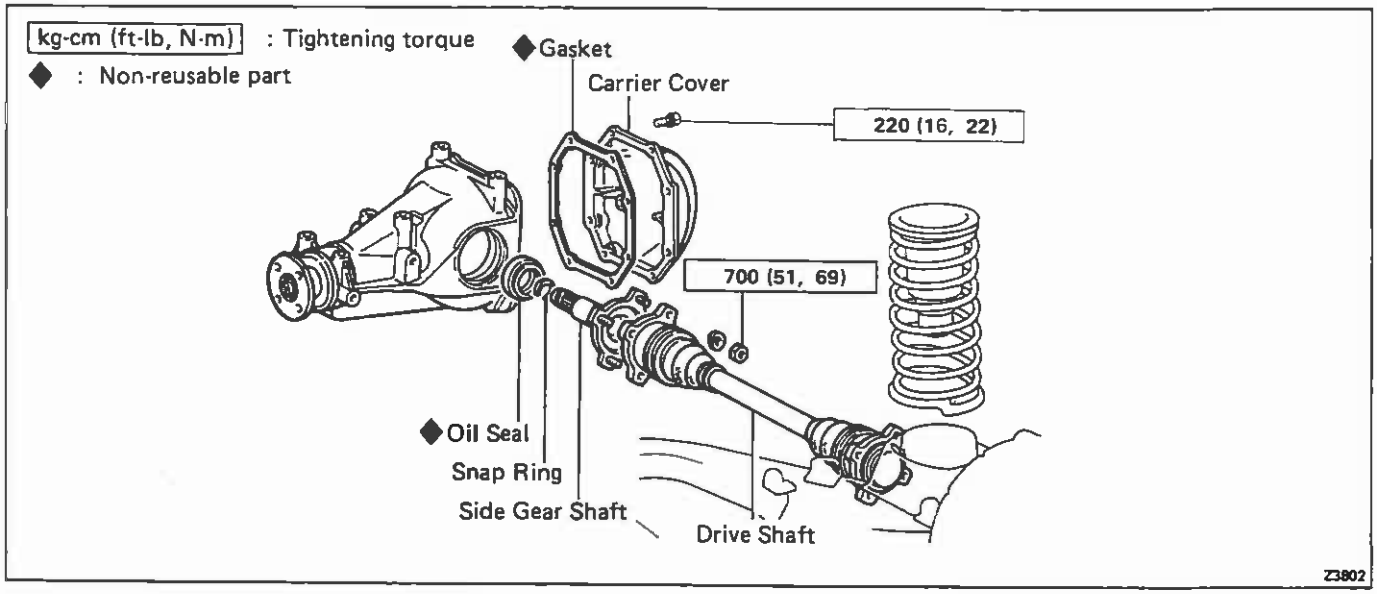
3. CONNECT PROPELLER SHAFT FLANGE TO COMPANION FLANGE



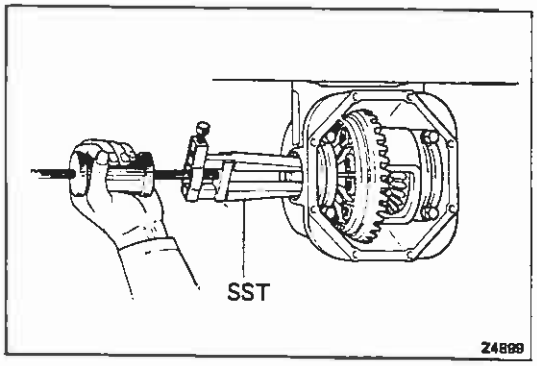
4. INSTALL REAR PLUG AND FILL DIFFERENTIAL WITH GEAR OIL
   Hypoid gear oil: SAE 90
   SAE 80W or 80W – 90
   at temperature below – 18°C (0°F)
   Capacity: 1.3 liters (1.4 US qts, 1.1 Imp. qts)
   Install a filler plug.

IRS TYPE DIFFERENTIAL

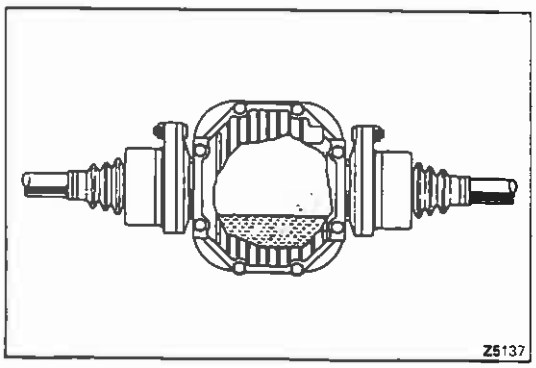
ON-VEHICLE REPLACEMENT OF SIDE GEAR SHAFT OIL SEAL



1. DRAIN OUT DIFFERENTIAL OIL
2. DISCONNECT DRIVE SHAFT FROM DIFFERENTIAL
3. REMOVE CARRIER COVER
4. REMOVE SIDE GEAR SHAFT (See step 2 on page RA-40)
5. REMOVE SIDE GEAR SHAFT OIL SEAL (See step 4 on page RA-40)
6. INSTALL SIDE GEAR SHAFT OIL SEAL (See step 16 on page RA-52)



7. INSTALL SIDE GEAR SHAFT (See step 17 on page RA-53)
8. MEASURE SIDE GEAR SHAFT RUNOUT (See step 19 on page RA-53)
9. INSTALL CARRIER COVER (See step 20 on page RA-53)
10. CONNECT DRIVE SHAFT (See step 4 on page RA-54)



11. INSTALL DRAIN PLUG AND FILL DIFFERENTIAL WITH GEAR OIL

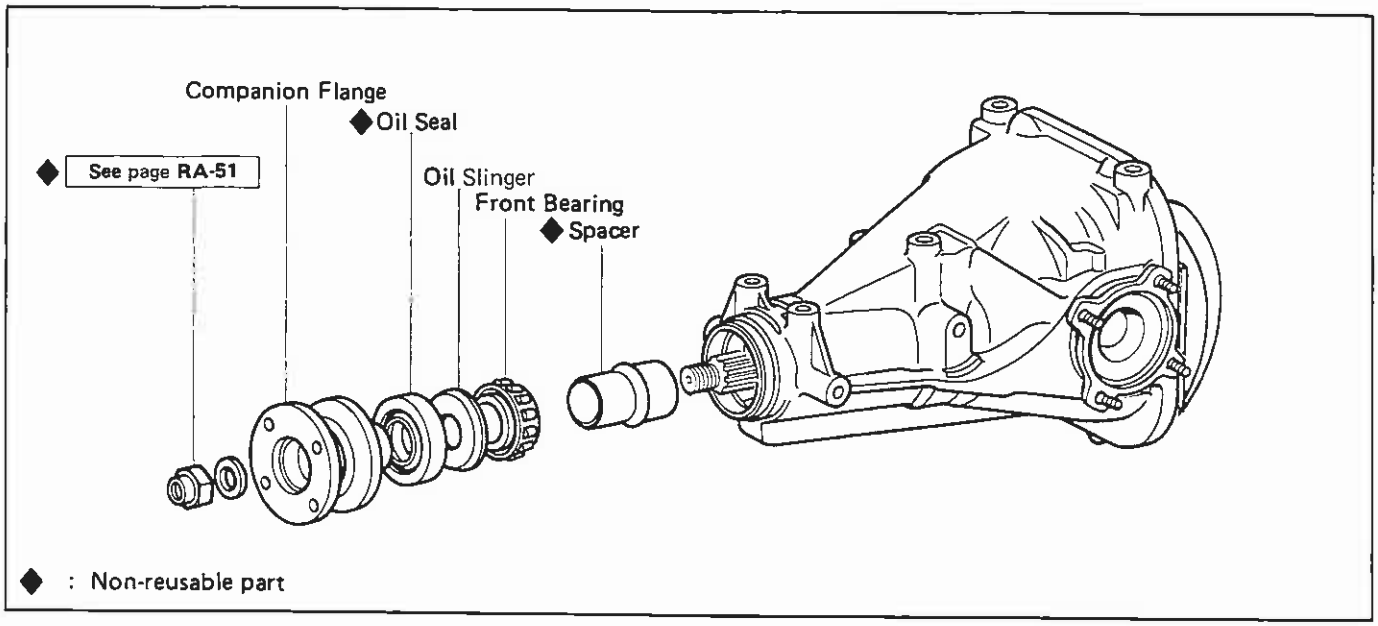
Hypoid gear oil: SAE 90 above – 18°C (0°F)
SAE 80W or 80W – 90
at temperature below – 18°C (0°F)

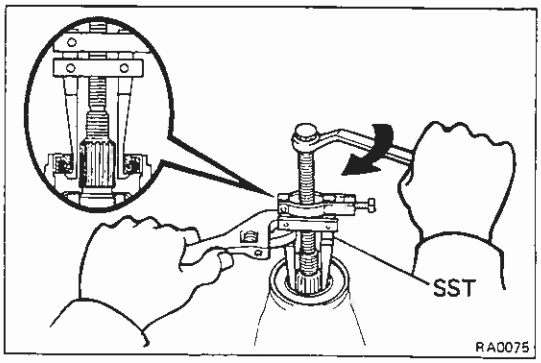
Capacity:

6.7 in.	1.0 liters (1.1 US qts, 0.9 Imp. qts)
7.5 in.	1.2 liters (1.3 US qts, 1.1 Imp. qts)

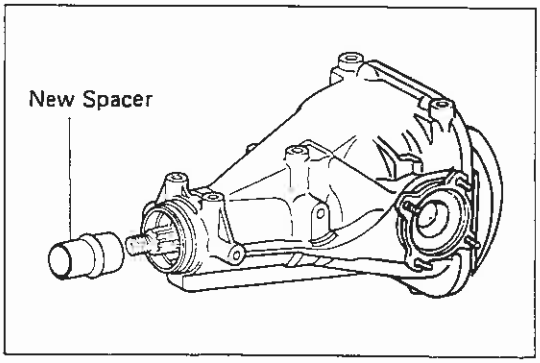
Install a filler plug.

REPLACEMENT OF FRONT OIL SEAL COMPONENTS

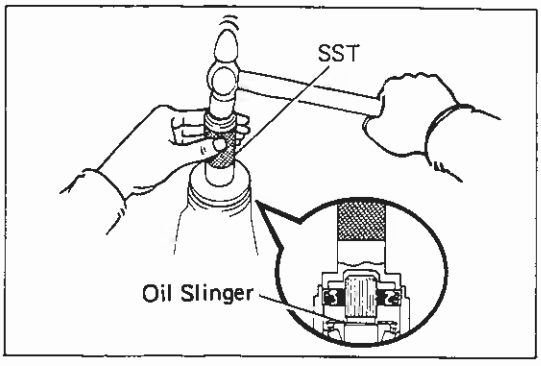




1. REMOVE DIFFERENTIAL (See page RA-37)
2. REMOVE COMPANION FLANGE (See step 11 on page RA-41)
3. REMOVE OIL SEAL
   (a) Using SST, remove the oil seal from the housing.
   SST 09308-10010
   (b) Remove the oil slinger.
4. REMOVE FRONT BEARING AND BEARING SPACER (See step 13 on page RA-42)



5. INSTALL NEW BEARING SPACER AND FRONT BEARING
   (a) Install a new bearing spacer on the shaft.
   (b) Install the front bearing on the shaft.



6. INSTALL OIL SLINGER AND NEW OIL SEAL
   (a) Install the oil slinger facing as shown.
   (b) Using SST, drive in a new oil seal.
   SST 09554-22010 (6.7 in.)
   09316-60010 (7.5 in.)
   Oil seal drive in depth:

6.7 in.	**2.0 mm (0.079 in.)**
7.5 in.	**1.5 mm (0.059 in.)**

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

7. INSTALL COMPANION FLANGE
(See step 12 on page RA-51)

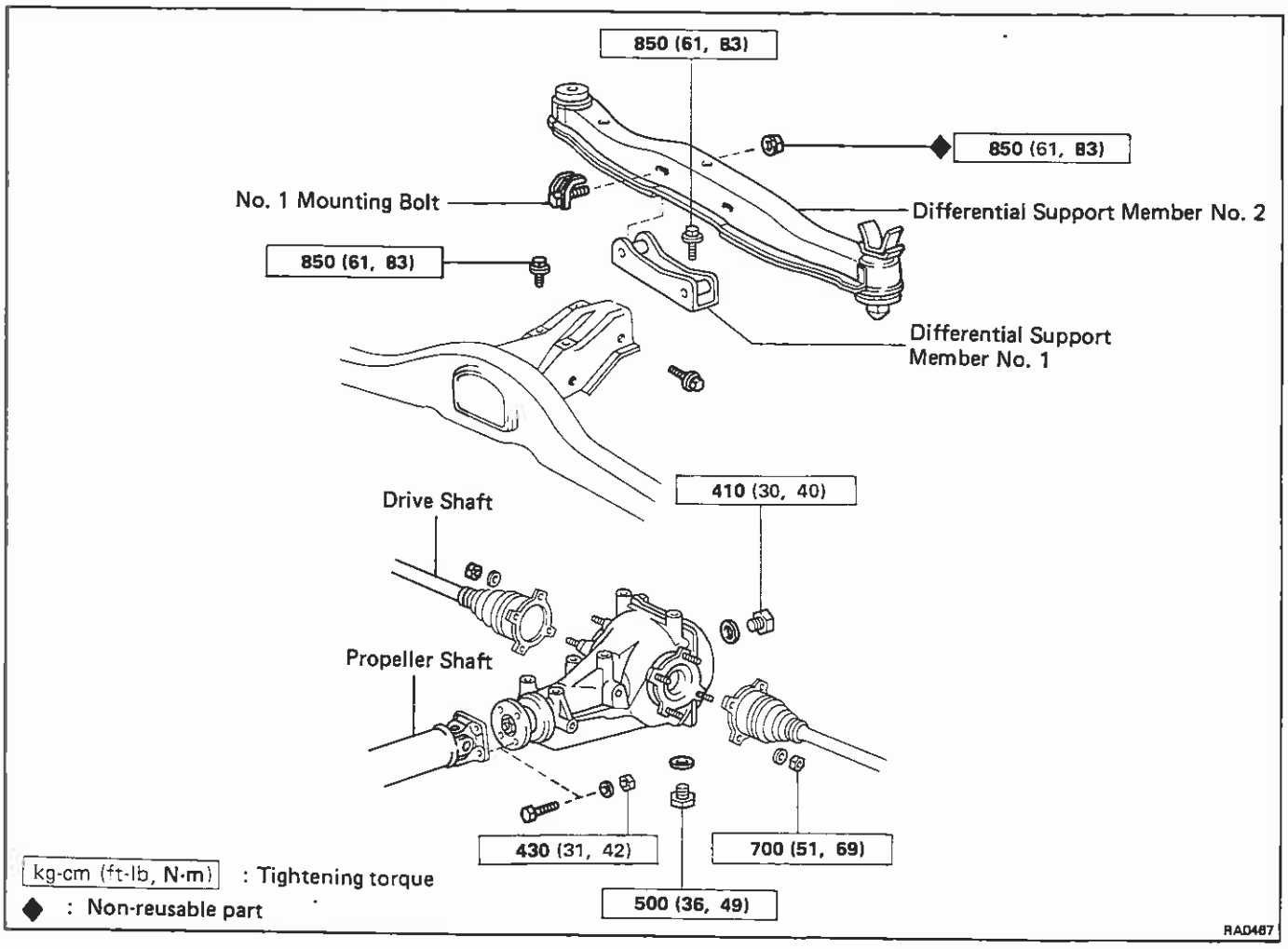
8. CHECK FRONT BEARING PRELOAD
(See step 13 on page RA-52)

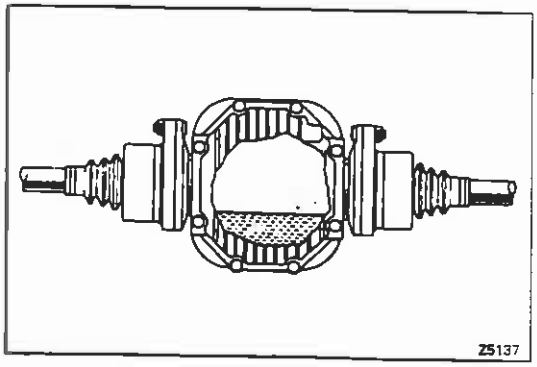
9. CHECK DEVIATION OF COMPANION FLANGE
(See step 14 on page RA-52)

10. STAKE DRIVE PINION NUT

11. INSTALL DIFFERENTIAL (See page RA-54)

REMOVAL OF DIFFERENTIAL



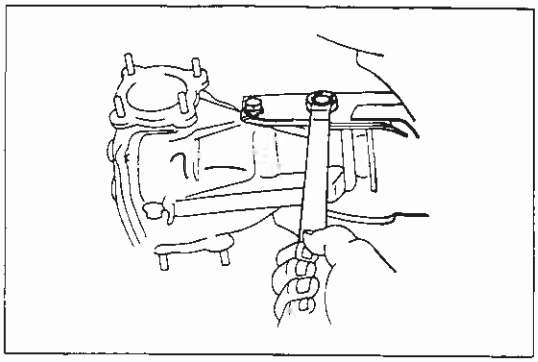


1. REMOVE DRAIN PLUG AND DRAIN DIFFERENTIAL OIL

2. DISCONNECT REAR DRIVE SHAFT

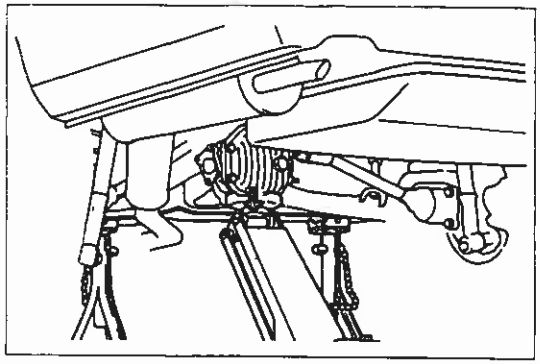
3. DISCONNECT PROPELLER SHAFT FLANGE FROM COMPANION FLANGE

4. REMOVE DIFFERENTIAL SUPPORT MEMBER NO.1 MOUNTING BOLT (See page RA-75)



5. REMOVE DIFFERENTIAL

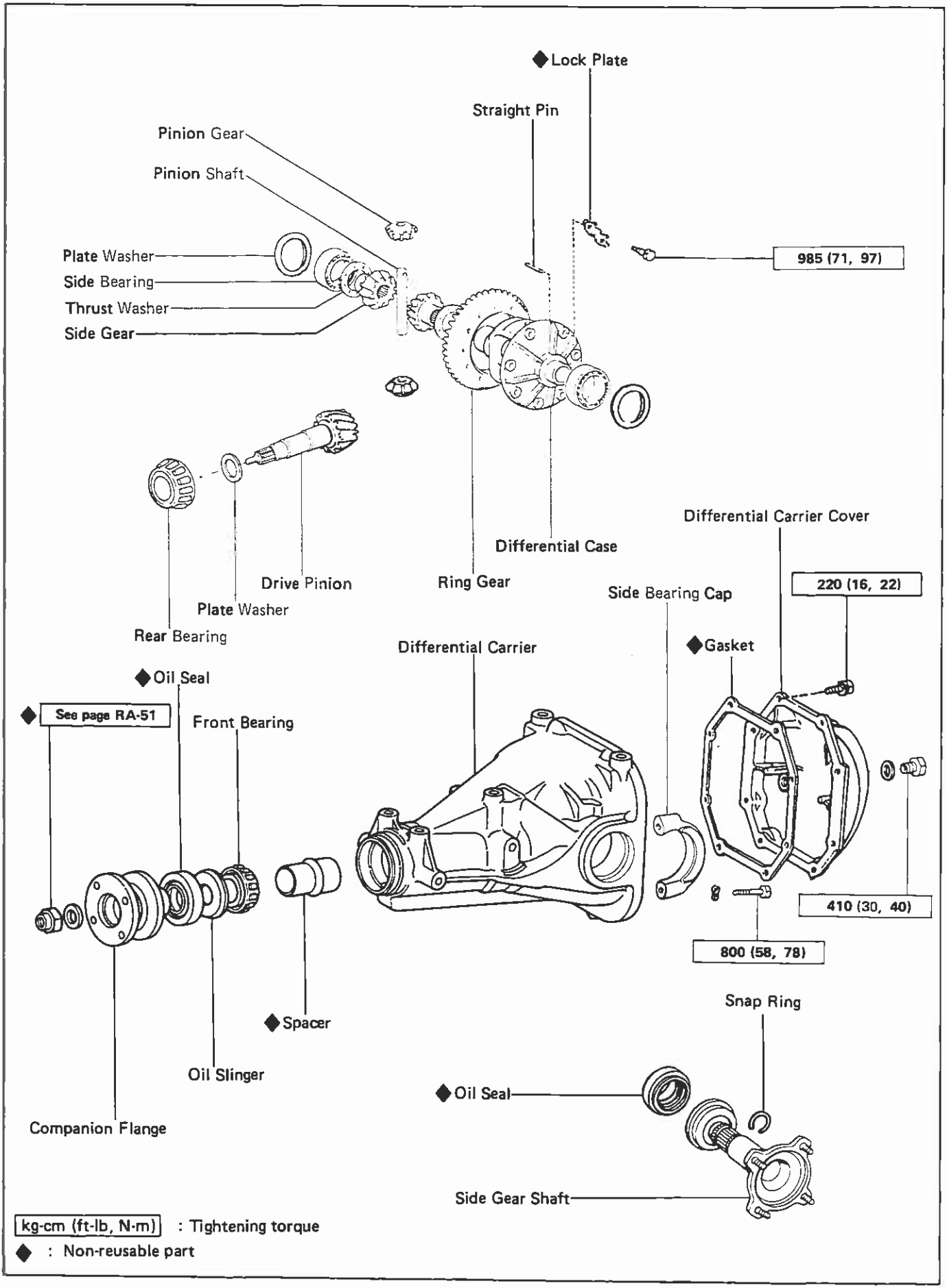
(a) Jack up differential and remove the carrier bolts.



(b) Lower the differential carrier with a jack.

NOTE: When lowering the carrier, be careful that the differential does not separate.

COMPONENTS



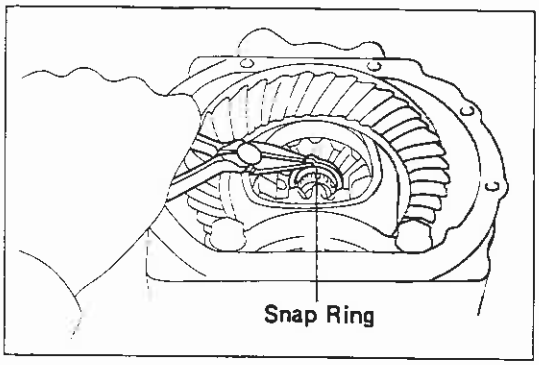
kg-cm (ft-lb, N·m) : Tightening torque

◆ : Non-reusable part

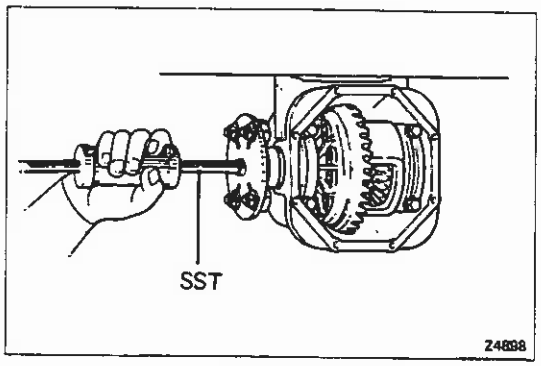
DISASSEMBLY OF DIFFERENTIAL

1. REMOVE DIFFERENTIAL CARRIER COVER

Remove the eight bolts, cover and gasket.



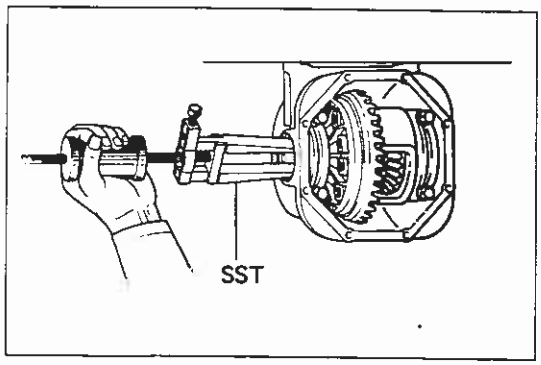
2. REMOVE SNAP RING FROM SIDE GEAR SHAFT



3. REMOVE SIDE GEAR SHAFT

Using SST, remove the side gear shaft from the differential carrier.

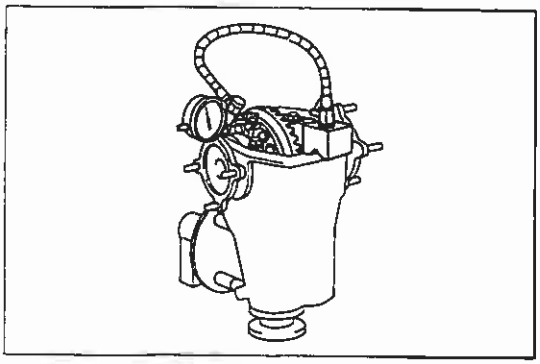
SST 09520-22011



4. REMOVE SIDE GEAR SHAFT OIL SEAL

Using SST, remove the oil seal.

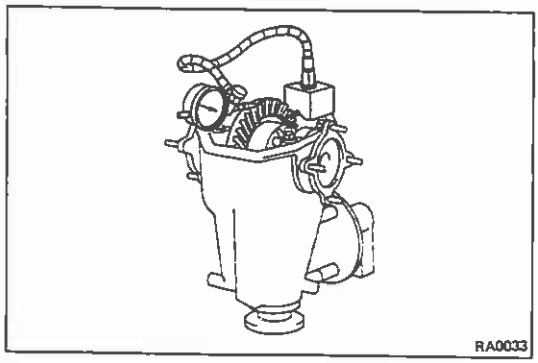
SST 09308-00010



5. CHECK RING GEAR RUNOUT

If the runout is greater than maximum, install a new ring gear.

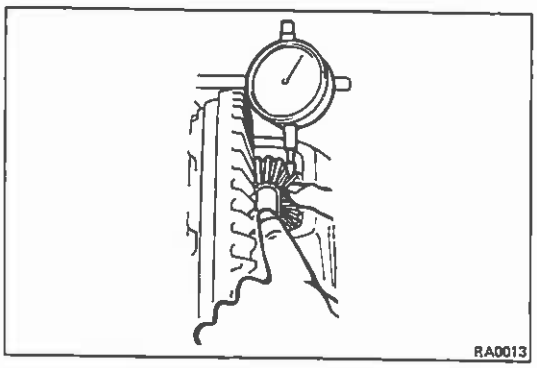
Maximum runout: 0.07 mm (0.0028 in.)



6. CHECK RING GEAR BACKLASH

If the backlash is not within specification, adjust the side bearing preload or repair as necessary. (See page RA-49)

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

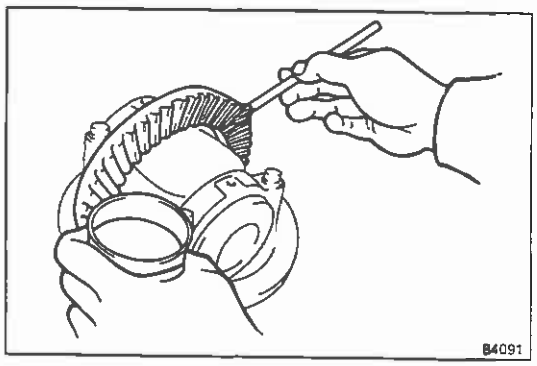


7. CHECK SIDE GEAR BACKLASH

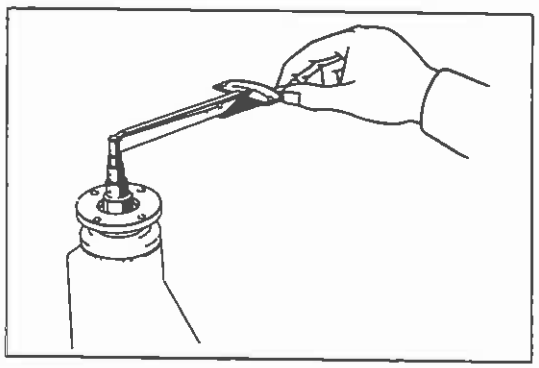
Measure the side gear backlash while holding one pinion gear toward the case.

Standard backlash: 0.05 – 0.20 mm (0.0020 – 0.0079 in.)

If the backlash is out of specification, install the correct thrust washer. (See step 6 on page RA-44)



8. CHECK TOOTH CONTACT (See page RA-50)

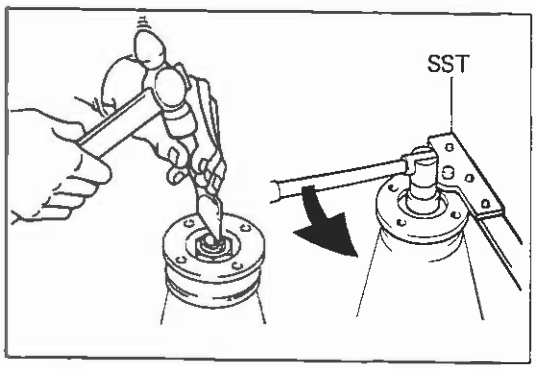


9. MEASURE DRIVE PINION PRELOAD

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

Preload (starting):

6.7 in. 5 – 8 kg-cm (4.3 – 6.9 in.-lb, 0.5 – 0.8 N·m)
7.5 in. 6 – 10 kg-cm (5.2 – 8.7 in.-lb, 0.6 – 1.0 N·m)



10. CHECK TOTAL PRELOAD

Using a torque wrench, measure the total preload.

Total preload: In addition to drive pinion preload

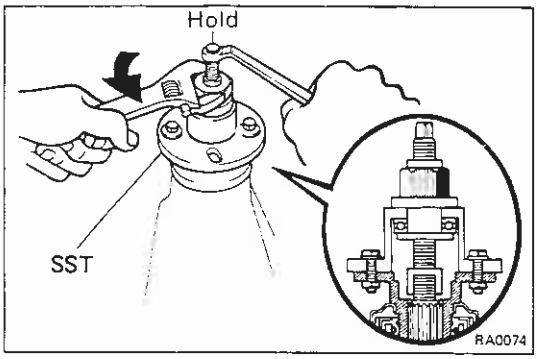
6.7 in. 3 – 5 kg-cm (2.6 – 4.3 in.-lb, 0.3 – 0.5 N·m)
7.5 in. 4 – 6 kg-cm (3.5 – 5.2 in.-lb, 0.4 – 0.6 N·m)

11. REMOVE COMPANION FLANGE

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

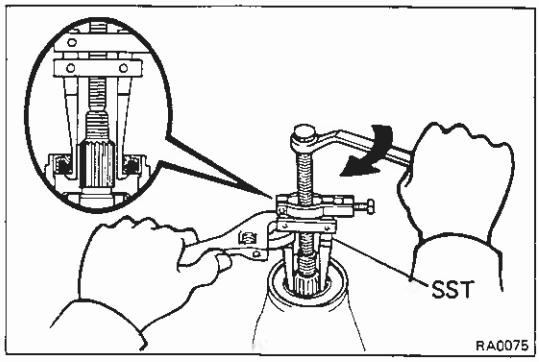
(b) Using SST to hold the flange, remove the nut.

SST 09330-00020



(c) Using SST, remove the companion flange.

SST 09557-22022

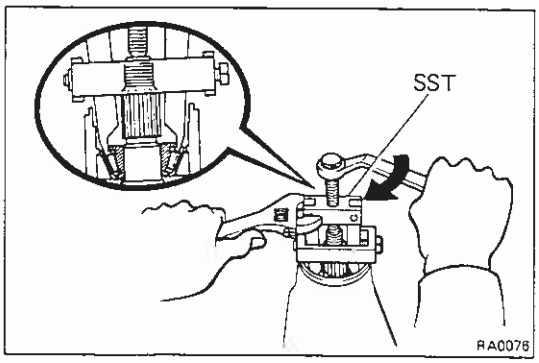


12. REMOVE OIL SEAL AND OIL SLINGER

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

SST 09308-10010

(b) Remove the oil slinger.



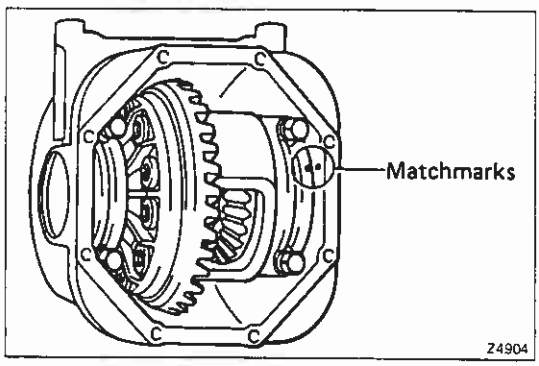
13. REMOVE FRONT BEARING AND BEARING SPACER

(a) Using SST, remove the front bearing from the housing.

SST 09556-22010 (6.7 in.)
09556-30010 (7.5 in.)

(b) Remove the bearing spacer.

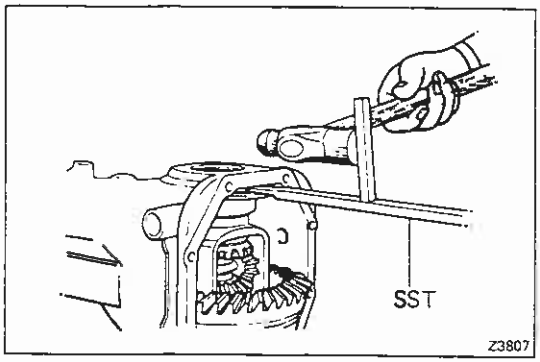
If the front bearing is damaged or worn, replace the bearing.



14. REMOVE DIFFERENTIAL CASE AND RING GEAR

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

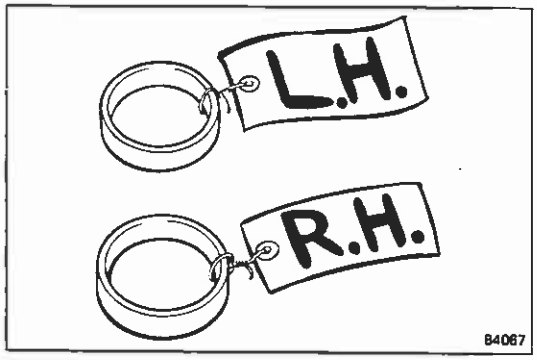
(b) Remove the two bearing caps.



(c) Remove the two side bearing preload adjusting plate washers with SST.

SST 09504-22010

NOTE: Measure the adjusting plate washer and note the thickness.

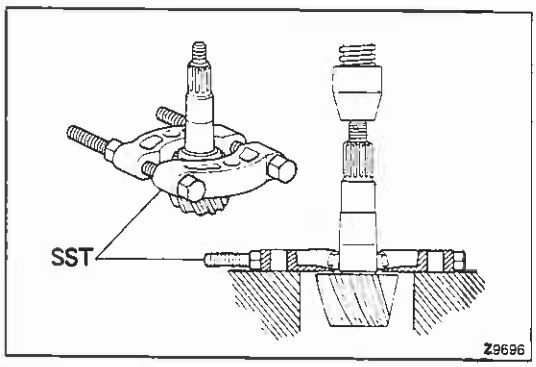


(d) Remove the differential case bearing outer race from the carrier.

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

15. REMOVE DRIVE PINION FROM DIFFERENTIAL CARRIER

INSPECTION AND REPLACEMENT OF DIFFERENTIAL

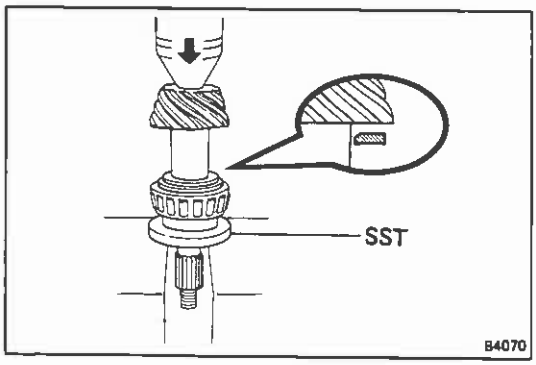


1. REPLACE DRIVE PINION REAR BEARING

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

SST 09950-00020

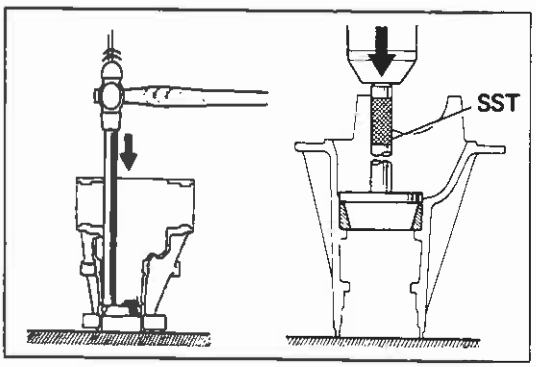
NOTE: If the drive pinion or ring gear are damaged replace them as a set.



(b) Install the washer on the drive pinion with the chamfered end facing the pinion gear.

(c) Using SST and a press, press the reused washer and rear bearing onto the drive pinion.

SST 09506-30011

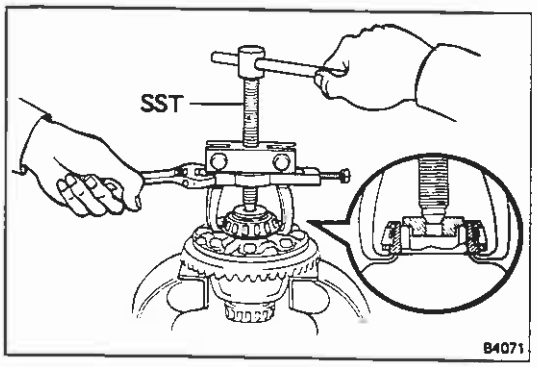


2. REPLACE DRIVE PINION FRONT AND REAR BEARING OUTER RACE

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

(b) Using SST, drive in a new outer race.

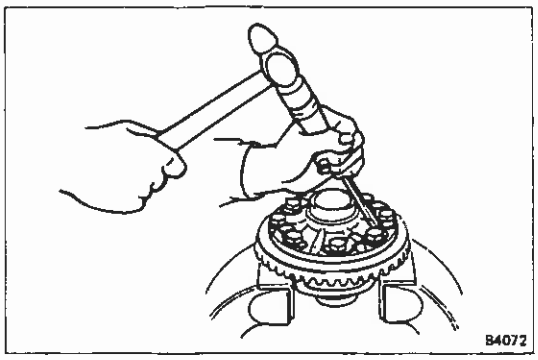
SST 09608-35013



3. REMOVE SIDE BEARINGS FROM DIFFERENTIAL CASE

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

SST 09950-20016

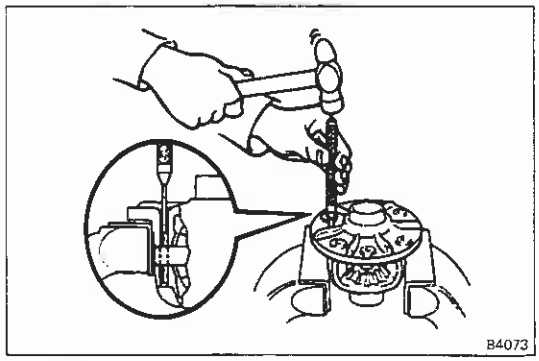


4. REMOVE RING GEAR

(a) Remove the ring gear set bolts and lock plates.

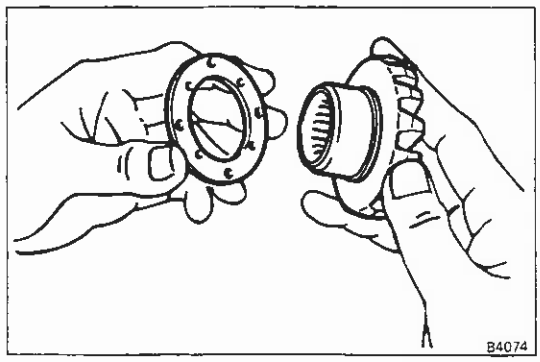
(b) Place matchmarks on the ring gear and differential case.

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



5. DISASSEMBLE DIFFERENTIAL CASE

Using a hammer and punch, drive out the straight pin. Remove the pinion shaft, two pinion gears, two side gears and two thrust washers.



6. ASSEMBLE DIFFERENTIAL CASE

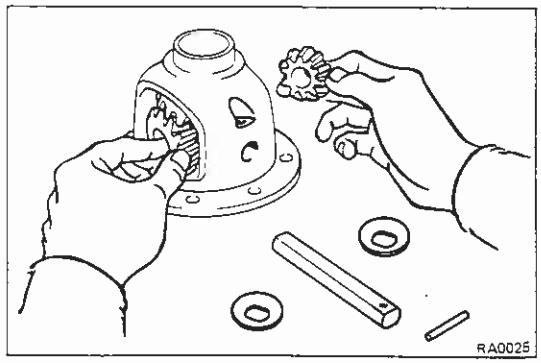
(a) Install correct thrust washer and side gears.
Select thrust washers from the table below that will ensure the backlash is within specification. Try to select washers of the same thickness for both sides.

Standard backlash: 0.05 – 0.20 mm (0.0020 – 0.0079 in.)

Thrust washer thickness

Thickness mm (in.)	
6.7 in.	7.5 in.
0.92 – 0.98 (0.0362 – 0.0386)	0.96 – 1.04 (0.0378 – 0.0409)
0.97 – 1.03 (0.0382 – 0.0406)	1.06 – 1.14 (0.0417 – 0.0449)
1.02 – 1.08 (0.0402 – 0.0425)	1.16 – 1.24 (0.0457 – 0.0488)
1.07 – 1.13 (0.0421 – 0.0445)	1.26 – 1.34 (0.0496 – 0.0528)
1.12 – 1.18 (0.0441 – 0.0465)	
1.17 – 1.23 (0.0461 – 0.0484)	

Install thrust washers and side gears in the differential case.

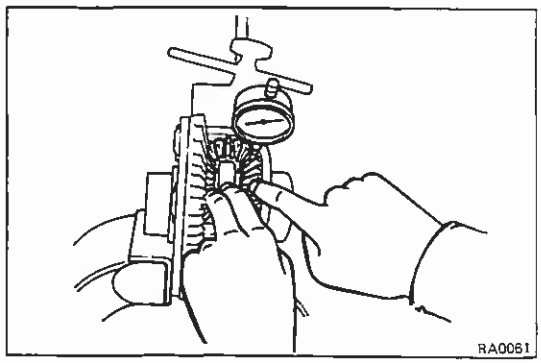


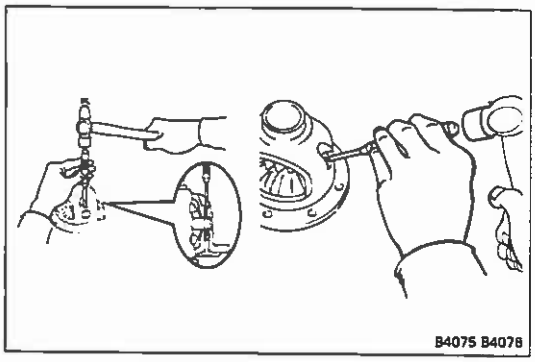
(b) Check the side gear backlash.

Measure the side gear backlash while holding one pinion gear toward the case.

Standard backlash: 0.05 – 0.20 mm (0.0020 – 0.0079 in.)

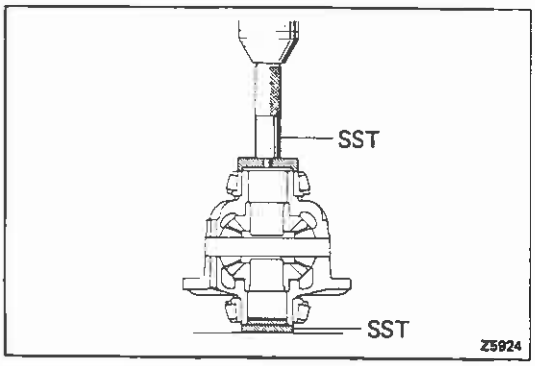
If the backlash is not within specification, install a thrust washer of different thickness.





(c) Install straight pin.

- Using a hammer and punch, drive the straight pin through the case and hole in the pinion shaft.
- Stake the pin and differential case.



7. INSTALL NEW SIDE BEARING

Using SST and a press, drive a new side bearing into the differential case.

SST 09550-10012 (6.7 in.)
09726-12021 (7.5 in.)

8. INSTALL RING GEAR ON DIFFERENTIAL CASE

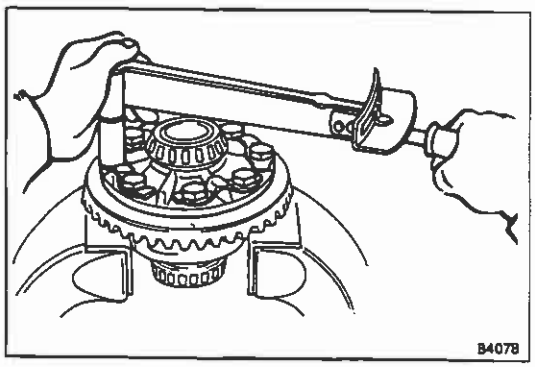
(a) Clean the contact surface of the differential case.

(b) Heat the ring gear to about 100°C (212°F) in an oil bath.

(c) Clean the contact surface of the ring gear with cleaning solvent.

(d) Then quickly install the ring gear on the differential case.

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

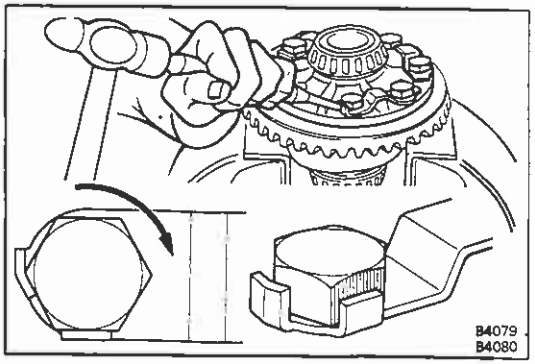


CAUTION: Do not heat the ring gear more than 110°C (230°F).

(f) Coat the ring gear set bolts with gear oil.

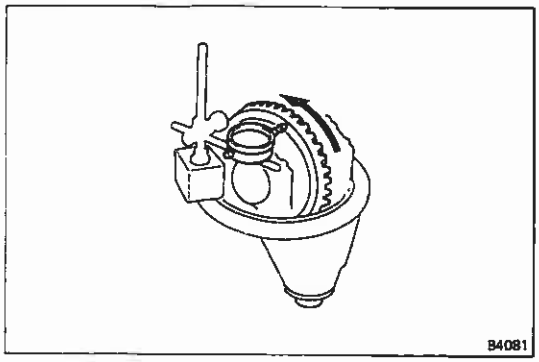
(g) Install the lock plates and set bolts. Tighten the set bolts uniformly, a little at a time. Torque the bolts.

Torque: 985 kg-cm (71 ft-lb, 97 N·m)



(h) Using a hammer and drift punch, stake the lock plates.

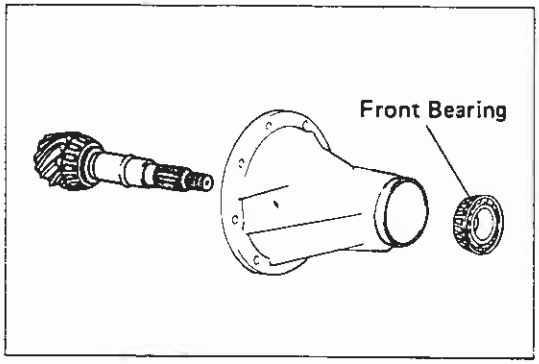
NOTE: Stake one claw flush with the flat surface of the nut. For the claw contacting the protruding portion of the nut, stake only the half on the tightening side.



(i) Check the ring gear runout.

Maximum runout: 0.07 mm (0.0028 in.)

Install the differential case onto the carrier and tighten the adjusting nut just to where there is no play in the bearing.



ASSEMBLY OF DIFFERENTIAL

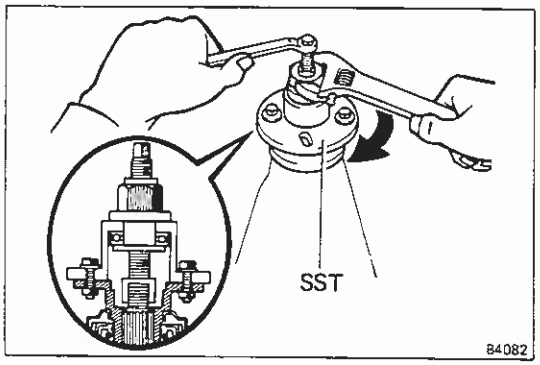
(See page RA-39)

1. TEMPORARILY ADJUST DRIVE PINION PRELOAD

(a) Install the following parts.

- Drive pinion
- Front bearing

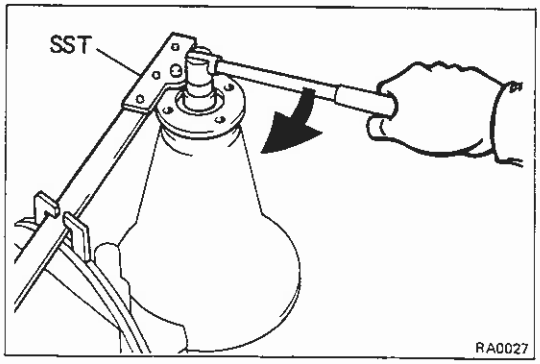
NOTE: Assemble the spacer, oil slinger and oil seal after adjusting the gear contact pattern.



(b) Install the companion flange with SST.

Coat the threads of the nut with MP grease.

SST 09557-22022

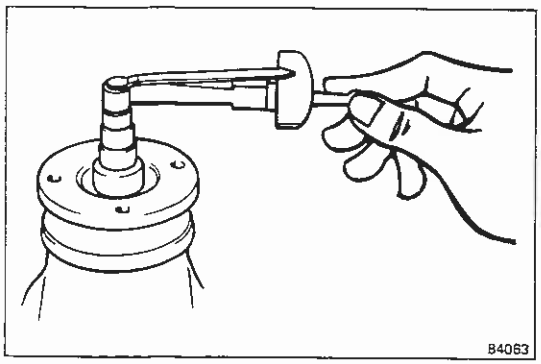


(c) Adjust the drive pinion preload by tightening the companion flange nut.

Using SST to hold the flange, tighten the nut.

SST 09330-00020

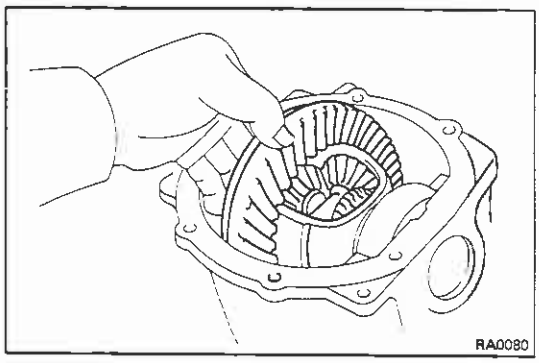
CAUTION: As there is no spacer, tighten a little at a time, being careful not to overtighten it.



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

Preload:

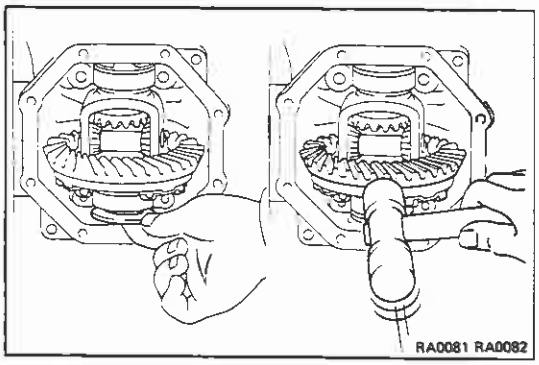
6.7 in.	**New bearing**	**10 – 16 kg-cm (8.7 – 13.9 in.-lb, 1.0 – 1.6 N·m)**
	Reused bearing	**5 – 8 kg-cm (4.3 – 6.9 in.-lb, 0.5 – 0.8 N·m)**
7.5 in.	**New bearing**	**12 – 19 kg-cm (10.4 – 16.5 in.-lb, 1.2 – 1.9 N·m)**
	Reused bearing	**6 – 10 kg-cm (5.2 – 8.7 in.-lb, 0.6 – 1.0 N·m)**



2. INSTALL DIFFERENTIAL CASE IN CARRIER

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

(b) Install the differential case in the carrier.

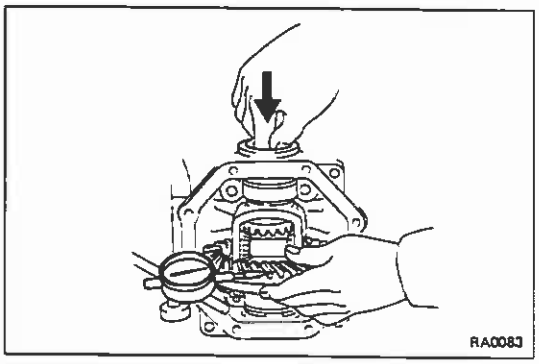


3. ADJUST RING GEAR BACKLASH

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

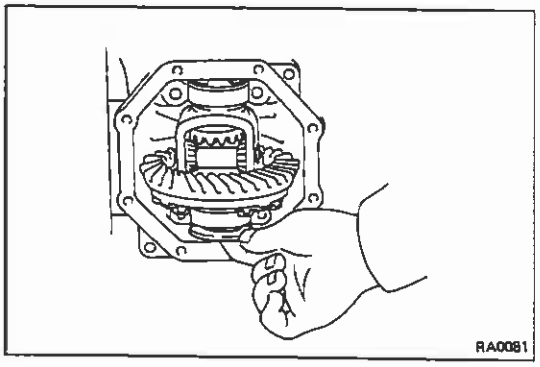
NOTE: Insure that the ring gear has a backlash.

(b) Snug down the washer and bearing by tapping on the ring gear with a plastic hammer.

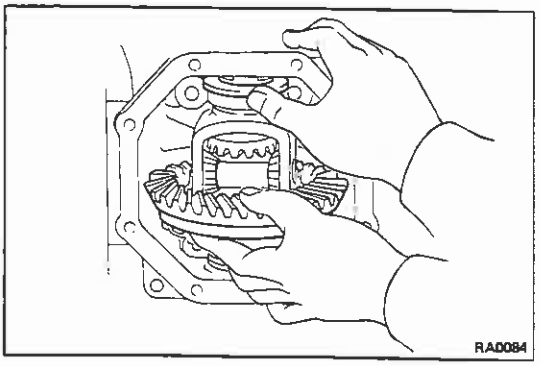


(c) Hold the side bearing boss on the teeth surface of the ring gear and measure the backlash.

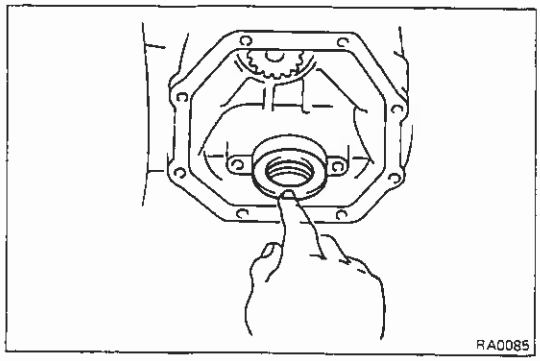
Backlash (reference): 0.10 mm (0.0039 in.)



(d) Select a ring gear back plate washer using the backlash as reference. (See page RA-49)

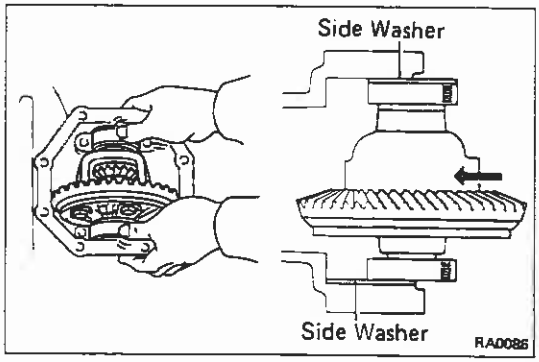


(e) Select a ring gear teeth side washer of a thickness which eliminates any clearance between the outer race and case.

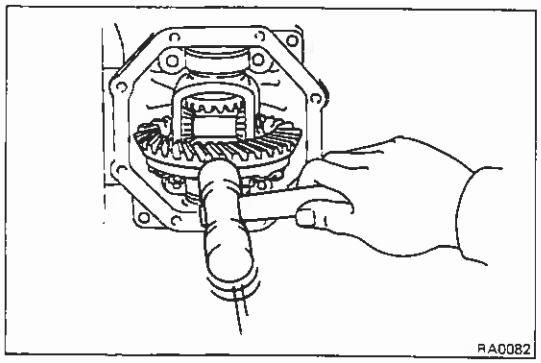


(f) Remove the plate washers and differential case.

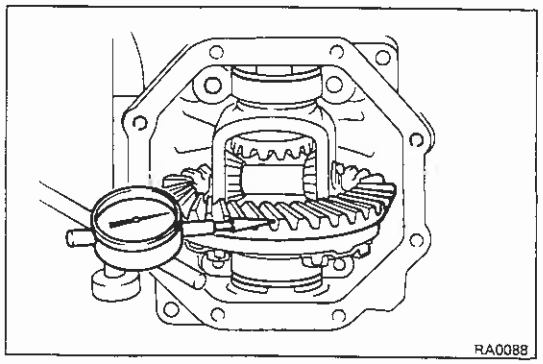
(g) Install the plate washer into the lower part of the carrier.



(h) Place the other plate washer onto the differential case together with the outer race, and install the differential case with the outer race into the carrier.

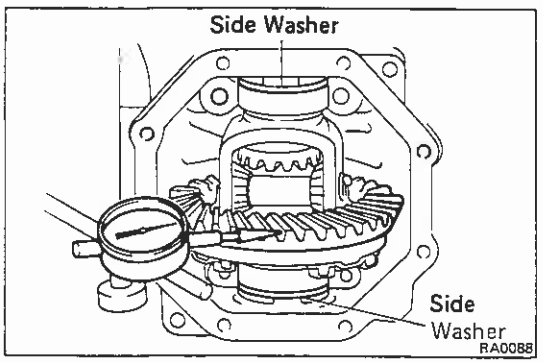


(i) Using a plastic hammer, snug down the washer and bearing by tapping the ring gear.



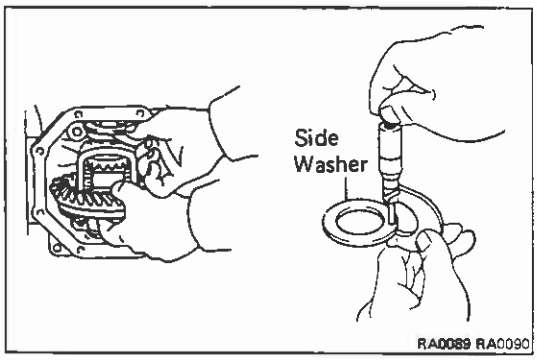
(j) Using a dial indicator, measure the ring gear backlash.

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



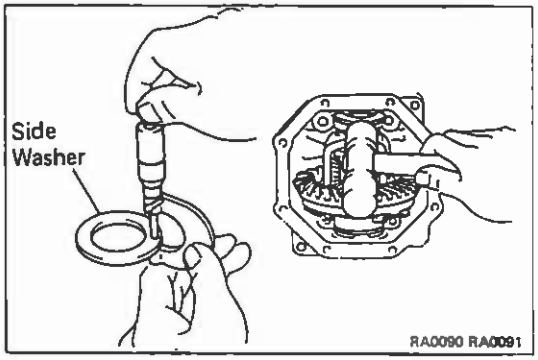
(k) If not within specification, adjust by either increasing or decreasing the number of washers on both sides by an equal amount.

NOTE: There should be no clearance between the plate washer and case.
Insure that there is ring gear backlash.



4. ADJUST SIDE BEARING PRELOAD

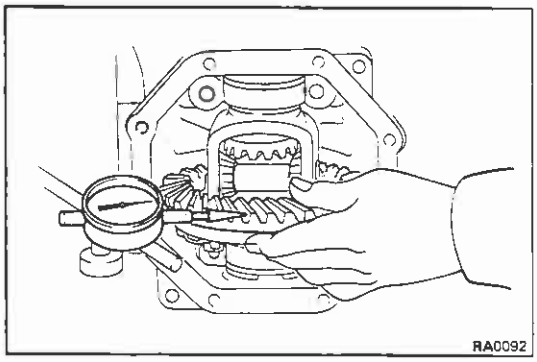
(a) After adjustment with the backlash as reference, remove the ring gear teeth plate washer and measure the thickness.



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

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

(c) Using a plastic hammer, tap in the side washer.

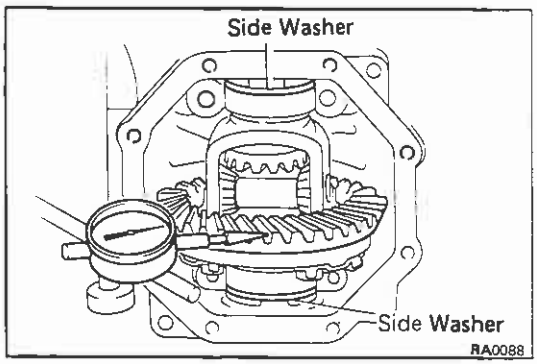


(d) Recheck the ring gear backlash.

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

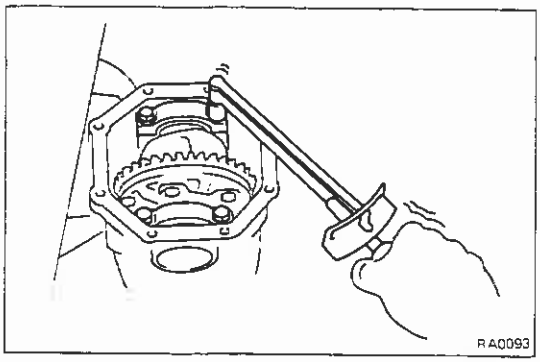
(e) If not within standard, adjust by either increasing or decreasing the washers on both sides by equal amount.

NOTE: The backlash will change about 0.02 mm (0.0008 in.) with 0.03 mm (0.0012 in.) alteration of the side washer.



Washer thickness

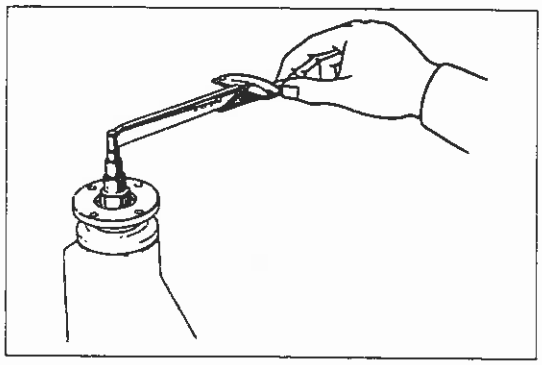
Thickness mm (in.)			
6.7 in.		7.5 in.	
2.21 – 2.23	(0.0870 – 0.0878)	2.57 – 2.59	(0.1012 – 0.1020)
2.24 – 2.26	(0.0882 – 0.0890)	2.60 – 2.62	(0.1024 – 0.1031)
2.27 – 2.29	(0.0894 – 0.0902)	2.63 – 2.65	(0.1035 – 0.1043)
2.30 – 2.32	(0.0906 – 0.0913)	2.66 – 2.68	(0.1047 – 0.1055)
2.33 – 2.35	(0.0917 – 0.0925)	2.69 – 2.71	(0.1059 – 0.1067)
2.36 – 2.38	(0.0929 – 0.0937)	2.72 – 2.74	(0.1071 – 0.1079)
2.39 – 2.41	(0.0941 – 0.0949)	2.75 – 2.77	(0.1083 – 0.1091)
2.42 – 2.44	(0.0953 – 0.0961)	2.78 – 2.80	(0.1094 – 0.1102)
2.45 – 2.47	(0.0965 – 0.0972)	2.81 – 2.83	(0.1106 – 0.1114)
2.48 – 2.50	(0.0976 – 0.0984)	2.84 – 2.86	(0.1118 – 0.1126)
2.51 – 2.53	(0.0988 – 0.0998)	2.87 – 2.89	(0.1130 – 0.1138)
2.54 – 2.56	(0.1000 – 0.1008)	2.90 – 2.92	(0.1142 – 0.1150)
2.57 – 2.59	(0.1012 – 0.1020)	2.93 – 2.95	(0.1154 – 0.1161)
2.60 – 2.62	(0.1024 – 0.1031)	2.96 – 2.98	(0.1165 – 0.1173)
2.63 – 2.65	(0.1035 – 0.1043)	2.99 – 3.01	(0.1177 – 0.1185)
2.66 – 2.68	(0.1047 – 0.1055)	3.02 – 3.04	(0.1189 – 0.1197)
2.69 – 2.71	(0.1059 – 0.1067)	3.05 – 3.07	(0.1201 – 0.1209)
2.72 – 2.74	(0.1071 – 0.1079)	3.08 – 3.10	(0.1213 – 0.1220)
2.75 – 2.77	(0.1083 – 0.1091)	3.11 – 3.13	(0.1224 – 0.1232)
2.78 – 2.80	(0.1094 – 0.1102)	3.14 – 3.16	(0.1236 – 0.1244)
2.81 – 2.83	(0.1106 – 0.1114)	3.17 – 3.19	(0.1248 – 0.1256)
2.84 – 2.86	(0.1118 – 0.1126)	3.20 – 3.22	(0.1260 – 0.1268)
2.87 – 2.89	(0.1130 – 0.1138)	3.23 – 3.25	(0.1272 – 0.1280)
2.90 – 2.92	(0.1142 – 0.1150)		
2.93 – 2.95	(0.1154 – 0.1161)		
2.96 – 2.98	(0.1165 – 0.1173)		
2.99 – 3.01	(0.1177 – 0.1185)		
3.02 – 3.04	(0.1189 – 0.1197)		
3.05 – 3.07	(0.1201 – 0.1209)		
3.08 – 3.10	(0.1213 – 0.1220)		
3.11 – 3.13	(0.1224 – 0.1232)		
3.14 – 3.16	(0.1236 – 0.1244)		
3.17 – 3.19	(0.1248 – 0.1256)		
3.20 – 3.22	(0.1260 – 0.1268)		



5. INSTALL SIDE BEARING CAPS

Align the marks on the cap and carrier.

Torque: 800 kg-cm (58 ft-lb, 78 N·m)



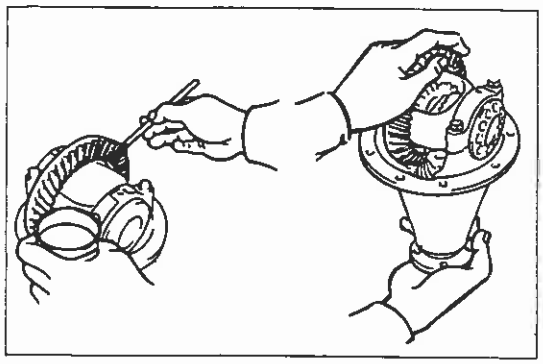
6. MEASURE TOTAL PRELOAD

Using a torque wrench, measure the total preload.

Total preload: In addition to drive pinion preload

6.7 in. 3 – 5 kg-cm (2.6 – 4.3 in.-lb, 0.3 – 0.5 N·m)

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

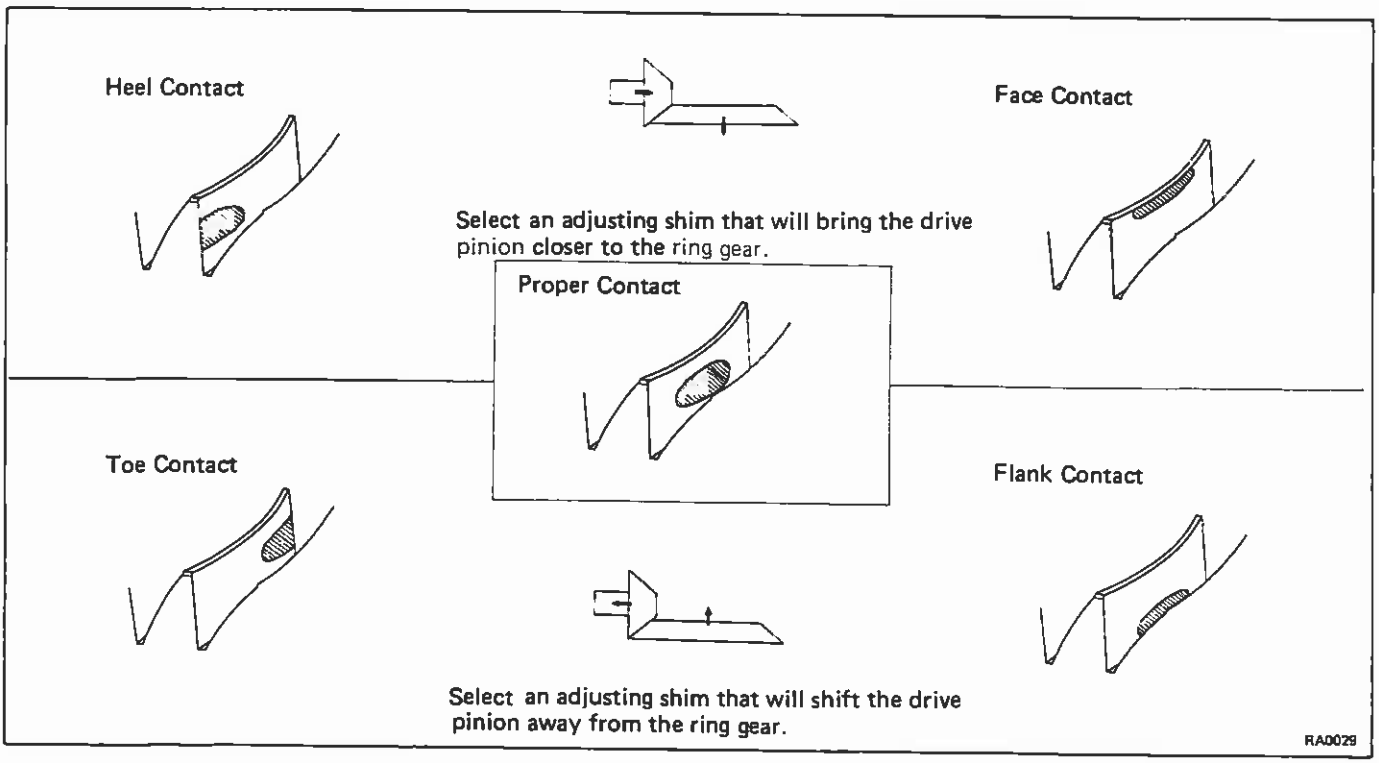


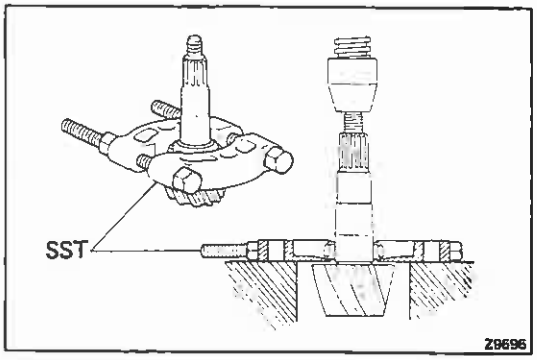
7. INSPECT TOOTH CONTACT BETWEEN RING GEAR AND DRIVE PINION

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

(b) Hold the companion flange firmly and rotate the ring gear in both directions.

(c) Inspect the tooth pattern.

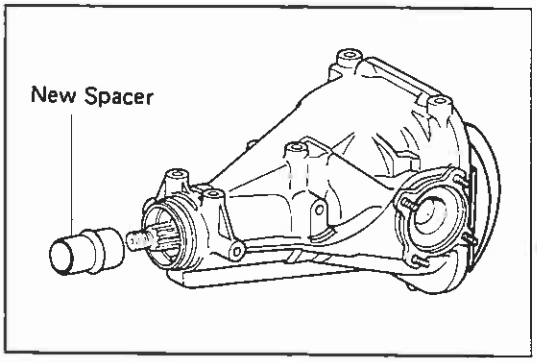




If the teeth are not contacting properly, use the following chart to select a proper washer for correction.

Washer thickness mm (in.)

Thickness		Thickness	
2.27	(0.0894)	2.51	(0.0988)
2.30	(0.0906)	2.54	(0.1000)
2.33	(0.0917)	2.57	(0.1012)
2.36	(0.0929)	2.60	(0.1024)
2.39	(0.0941)	2.63	(0.1035)
2.42	(0.0953)	2.66	(0.1047)
2.45	(0.0965)	2.69	(0.1059)
2.48	(0.0976)		



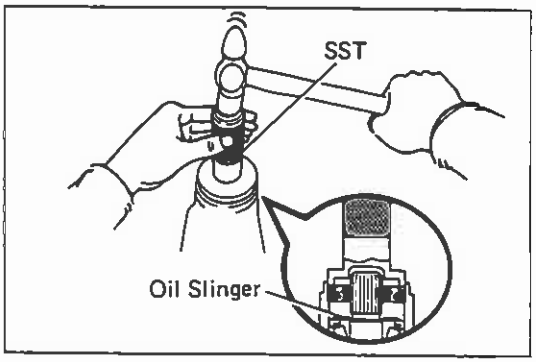
8. REMOVE COMPANION FLANGE
(See step 11 on page RA-41)

9. REMOVE FRONT BEARING AND BEARING SPACER
(See step 13 on page RA-42)

10. INSTALL NEW BEARING SPACER AND FRONT BEARING

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

(b) Install the front bearing on the shaft.



11. INSTALL OIL SLINGER AND NEW OIL SEAL

(a) Install the oil slinger facing as shown.

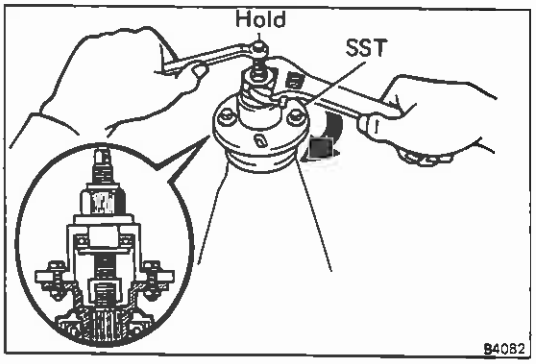
(b) Using SST, drive in a new oil seal.

SST 09554-22010 (6.7 in.)
09316-60010 (7.5 in.)

Oil seal drive in depth:

6.7 in.	**2.0 mm (0.079 in.)**
7.5 in.	**1.5 mm (0.059 in.)**

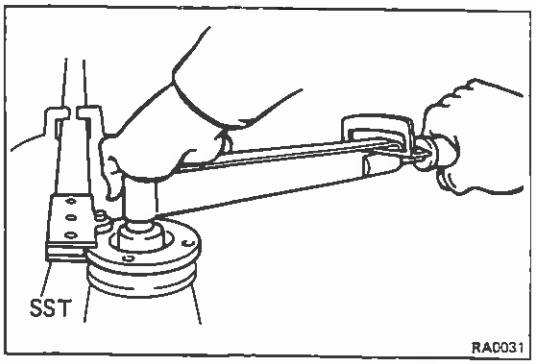
(c) Apply MP grease to the oil seal lip.



12. INSTALL COMPANION FLANGE

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

SST 09557-22022

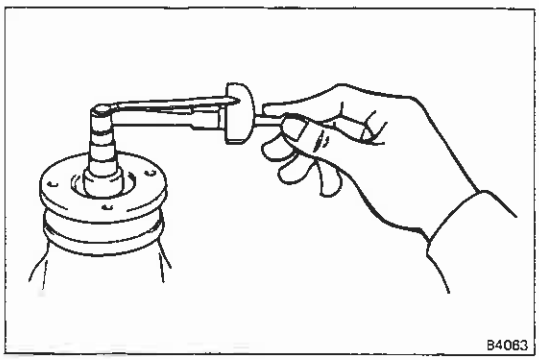


(b) Coat the threads of a new nut with MP grease.

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

SST 09330-00020

Torque: 1,100 kg-cm (80 ft-lb, 108 N·m)



13. CHECK FRONT BEARING PRELOAD

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

Preload:

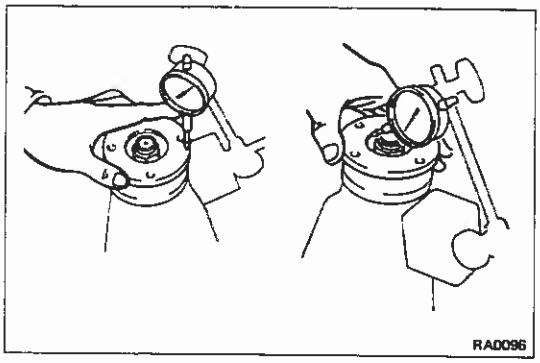
6.7 in.	New bearing	10 – 16 kg-cm (8.7 – 13.9 in.-lb, 1.0 – 1.6 N·m)
	Reused bearing	5 – 8 kg-cm (4.3 – 6.9 in.-lb, 0.5 – 0.8 N·m)
7.5 in.	New bearing	12 – 19 kg-cm (10.4 – 16.5 in.-lb, 1.2 – 1.9 N·m)
	Reused bearing	6 – 10 kg-cm (5.2 – 8.7 in.-lb, 0.6 – 1.0 N·m)

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

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

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

Maximum torque: 2,400 kg-cm (174 ft-lb, 235 N·m)

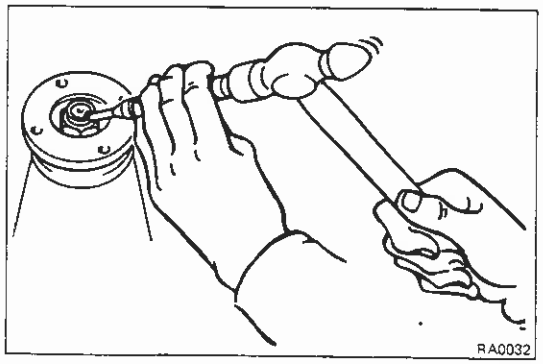


14. CHECK RUNOUT OF COMPANION FLANGE

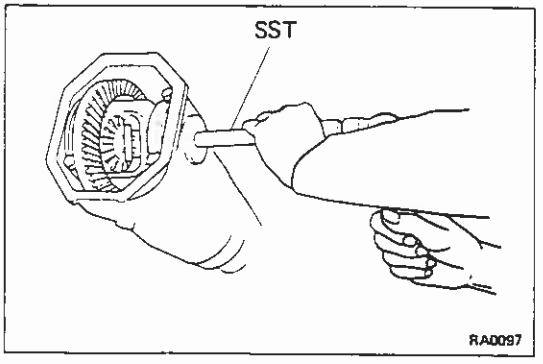
Using a dial indicator, measure the lateral and radial runout of the companion flange.

If the runout is greater than the maximum, inspect the bearings.

Maximum lateral runout: 0.10 mm (0.0039 in.)
Maximum radial runout: 0.10 mm (0.0039 in.)



15. STAKE DRIVE PINION NUT

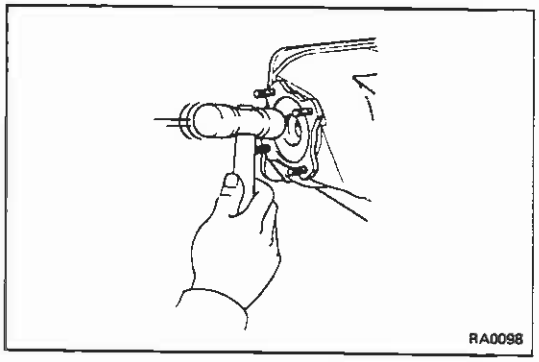


16. INSTALL SIDE GEAR SHAFT OIL SEAL

(a) Coat the oil seal lip with MP grease.

(b) Using SST, drive in the oil seal until it is flush with the carrier end surface.

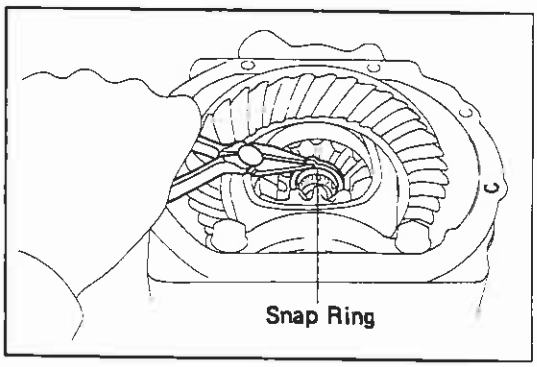
SST 09550-22010



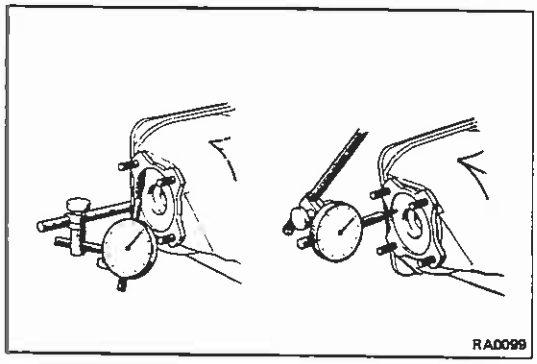
17. INSTALL SIDE GEAR SHAFT

(a) Before installing the shaft, replace the snap ring.

(b) Using a plastic hammer, drive in the side gear shaft until it contacts the pinion shaft.



18. INSTALL SNAP RING ON SIDE GEAR SHAFT

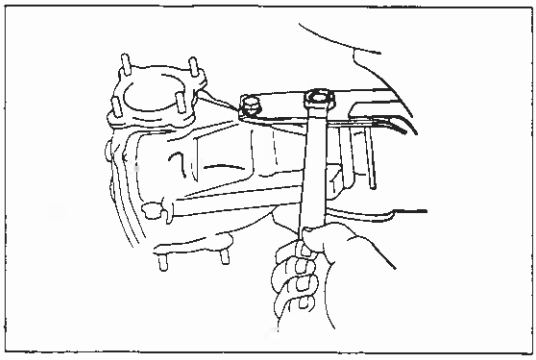


19. MEASURE SIDE GEAR SHAFT RUNOUT

Maximum runout: 0.20 mm (0.0079 in.)

If the runout is greater than the maximum, replace the side gear shaft.

20. INSTALL DIFFERENTIAL CARRIER COVER



INSTALLATION OF DIFFERENTIAL

(See page RA-41)

1. INSTALL DIFFERENTIAL

   Support the differential with a jack and install the carrier bolt.

   Torque: 850 kg-cm (61 ft-lb, 83 N·m)

2. INSTALL DIFFERENTIAL SUPPORT MEMBER MOUNTING BOLT NO. 1

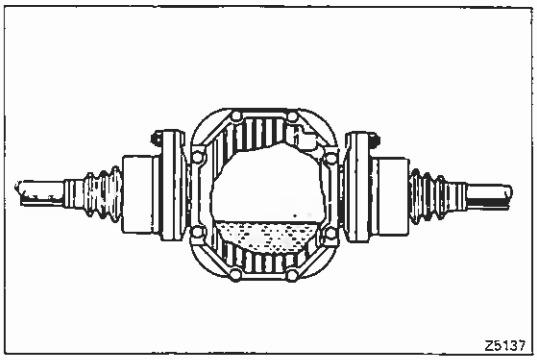
   Torque: 850 kg-cm (61 ft-lb, 83 N·m)

   Lower the differential and remove the jack.

3. CONNECT PROPELLER SHAFT FLANGE FROM COMPANION FLANGE

4. CONNECT DRIVE SHAFT

   Torque: 700 kg-cm (51 ft-lb, 69 N·m)



5. INSTALL DRAIN PLUG AND FILL DIFFERENTIAL WITH GEAR OIL

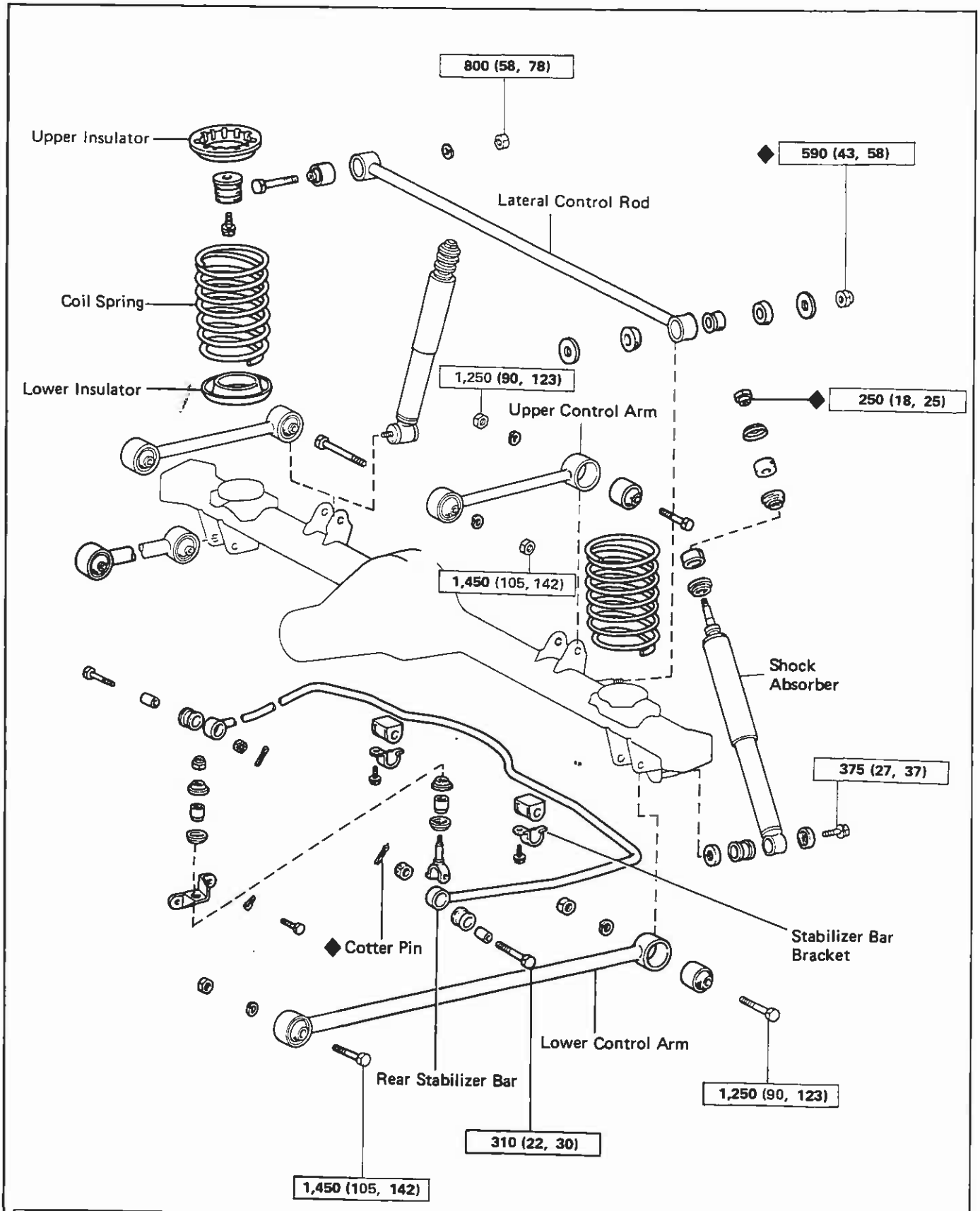
   Hypoid gear oil: SAE 90 above – 18°C (0°F)
   SAE 80W or 80W – 90
   at temperature below – 18°C (0°F)

   Capacity:
   6.7 in. 1.0 liters (1.1 US qts, 0.9 Imp. qts)
   7.5 in. 1.2 liters (1.3 US qts, 1.1 Imp. qts)

   Install filler plug.

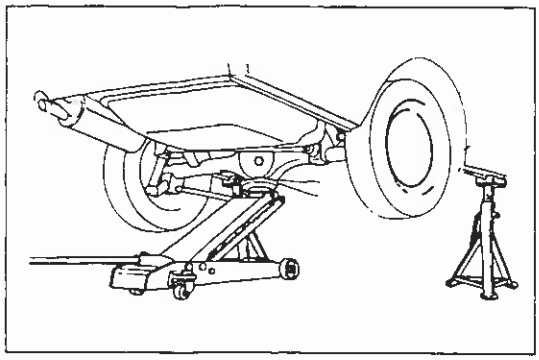
FOUR LINK TYPE REAR SUSPENSION

COMPONENTS



kg-cm (ft-lb, N·m) : Tightening torque

◆ : Non-reusable part



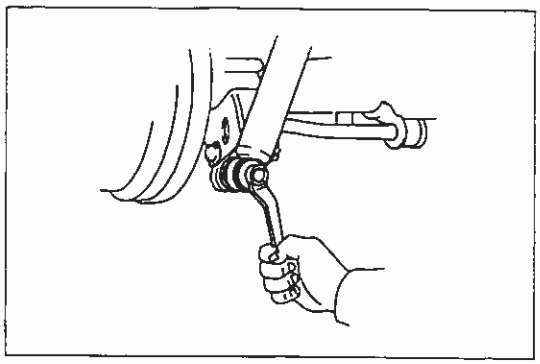
Coil Spring and Rear Shock Absorber

(See page RA-55)

REMOVAL OF COIL SPRING AND SHOCK ABSORBER

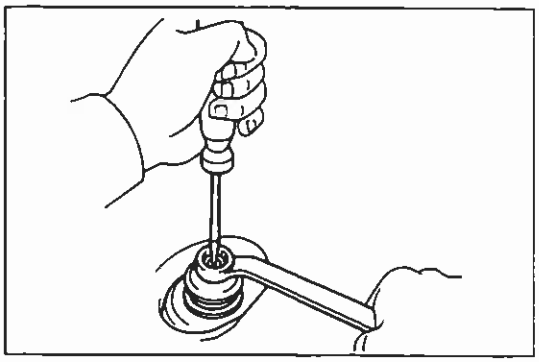
1. JACK UP VEHICLE

Jack up the rear axle housing and support the body with stands. Leave the jack under the rear axle.



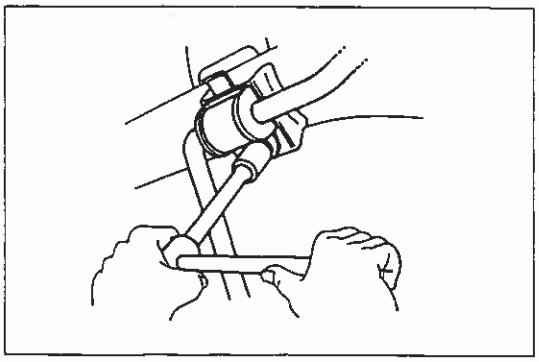
2. REMOVE REAR SHOCK ABSORBER

(a) Remove the bolt holding the shock absorber to the rear axle housing and disconnect the shock absorber.



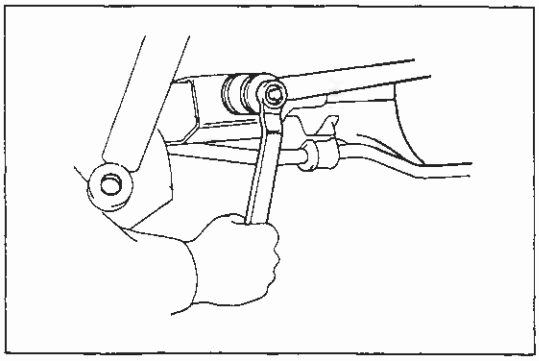
(b) If replacing the shock absorber, remove the nut holding the shock absorber to the body, and remove the shock absorber.

NOTE: Use a screwdriver to keep the bolt from turning.



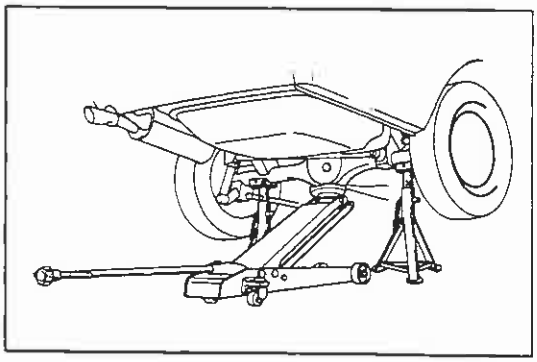
3. REMOVE STABILIZER BAR BUSHING BRACKETS

Remove the bolts holding the stabilizer bar brackets to the rear axle housing.



4. DISCONNECT LATERAL CONTROL ROD FROM REAR AXLE HOUSING

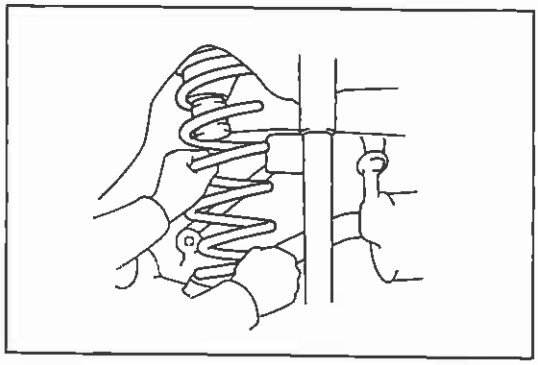
Remove the nut holding the lateral control rod to the rear axle housing and disconnect the lateral control rod.



5. REMOVE COIL SPRING

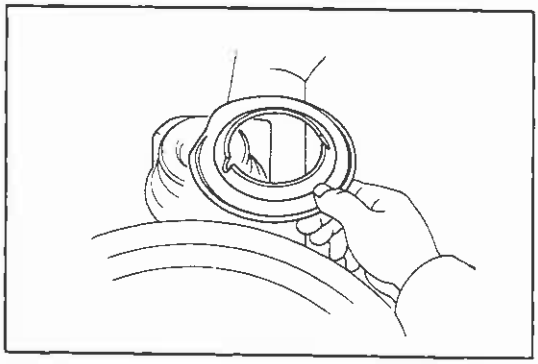
(a) Start to lower the rear axle housing.

NOTE: Be careful not to pull the brake line and parking brake cable.

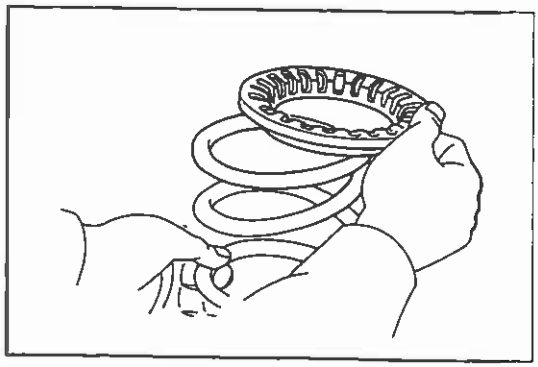


(b) While lowering the rear axle housing, remove the coil spring and upper and lower the insulators.

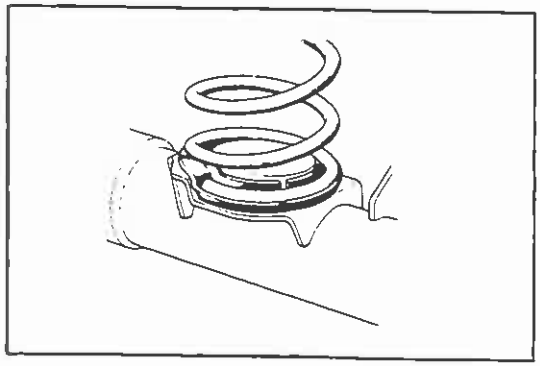
INSTALLATION OF COIL SPRING AND SHOCK ABSORBER



1. PUT LOWER INSULATOR ON AXLE HOUSING



2. PUT UPPER INSULATOR ON COIL SPRING



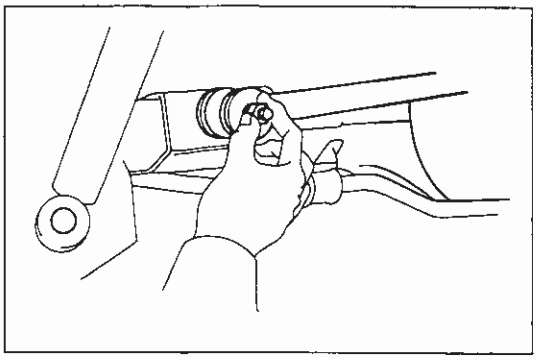
3. INSTALL COIL SPRING

4. CHECK POSITION OF LOWER INSULATOR

(a) Jack up the rear axle housing.

(b) Check that the lower insulator is installed correctly.

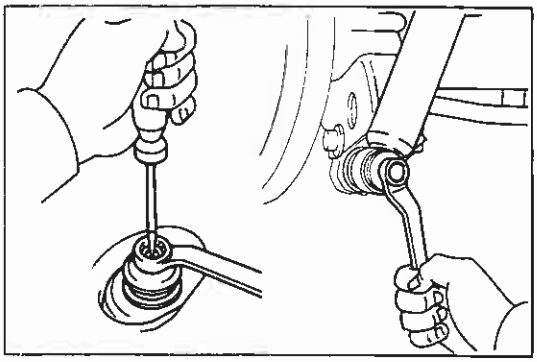
If the insulator is not in correct position, reinstall the coil spring.



5. INSTALL LATERAL CONTROL ROD

In order, install a washer, bushing, spacer, lateral control rod, bushing, washer and nut on the rear axle housing.

NOTE: Do not tighten the nut.



6. INSTALL SHOCK ABSORBER

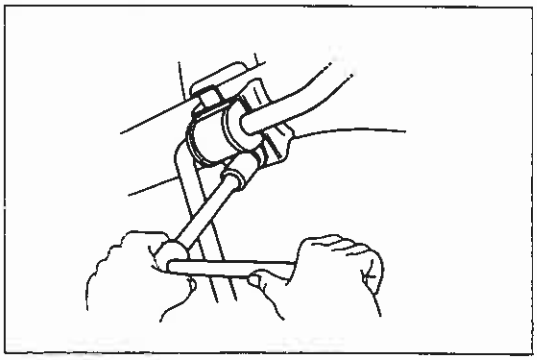
(a) Connect the shock absorber to the body with the nut.

Hold the bolt with a screwdriver. Torque the nut.

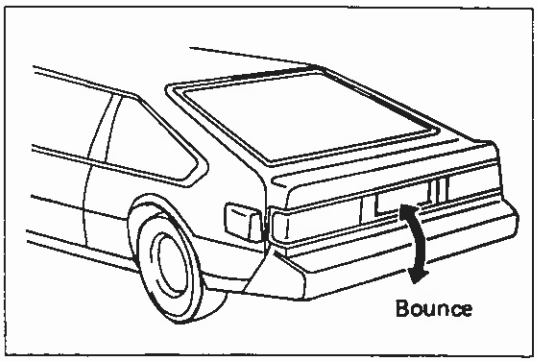
Torque: 250 kg-cm (18 ft-lb, 25 N·m)

(b) Connect the shock absorber to the rear axle housing with the nut. Torque the nut.

Torque: 375 kg-cm (27 ft-lb, 37 N·m)

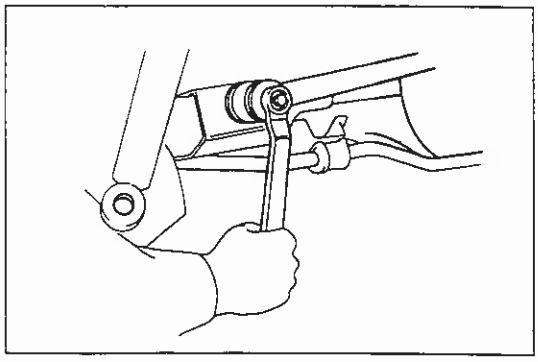


7. INSTALL STABILIZER BAR BUSHING BRACKETS TO REAR AXLE



8. STABILIZE SUSPENSION

Remove the stands and bounce the car to stabilize the suspension.

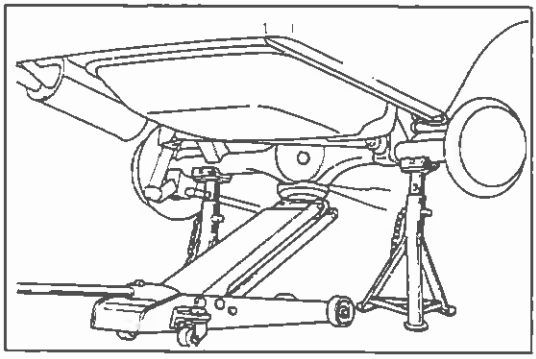


9. TIGHTEN LATERAL CONTROL ROD NUT

(a) Raise the axle housing until the body is free from the stands.

(b) Torque the lateral control rod nut.

Torque: 590 kg-cm (43 ft-lb, 58 N·m)



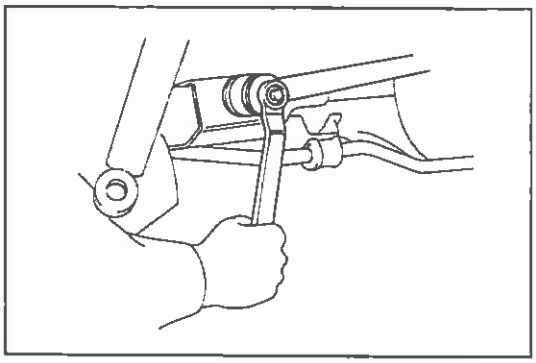
Lateral Control Rod

(See page RA-55)

REMOVAL OF LATERAL CONTROL ROD

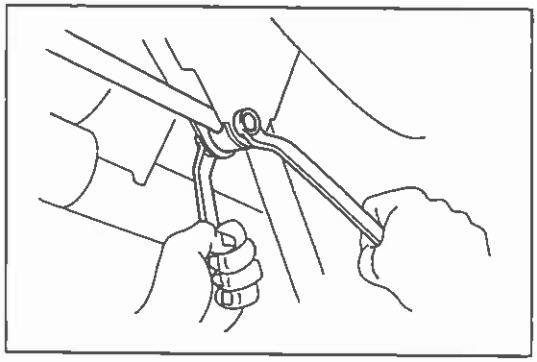
1. SUPPORT REAR AXLE HOUSING

Jack up the rear axle housing and support it with stands.



2. DISCONNECT LATERAL CONTROL ROD FROM REAR AXLE HOUSING

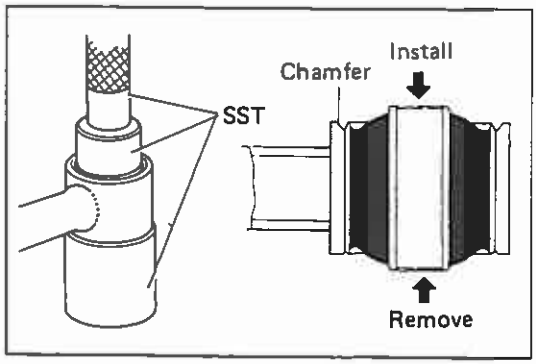
Remove the nut holding the lateral control rod to the rear axle housing, and disconnect the lateral control rod.



3. DISCONNECT LATERAL CONTROL ROD FROM BODY

Remove the nut holding the lateral control rod to the body and remove the lateral control rod.

REPLACEMENT OF LATERAL CONTROL ROD BUSHING

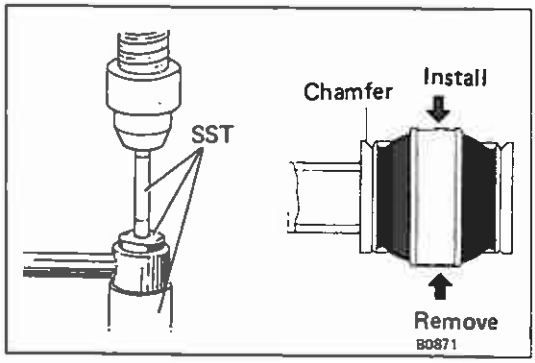


1. REMOVE BUSHING

Using SST, press out the bushing from the lateral control rod.

SST 09710-14012

NOTE: When inserting and removing the bushing, press or pull from the chamfered side as shown in the figure.

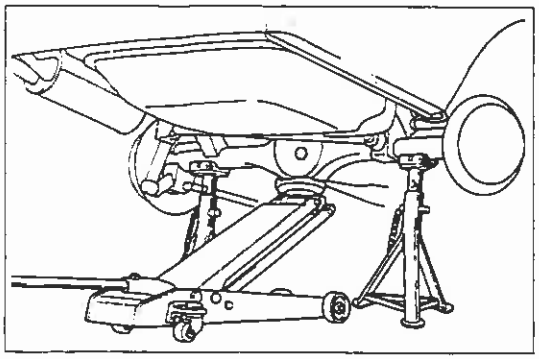


2. INSTALL BUSHING

Using SST, press the new bushing into the lateral control rod.

SST 09710-14012

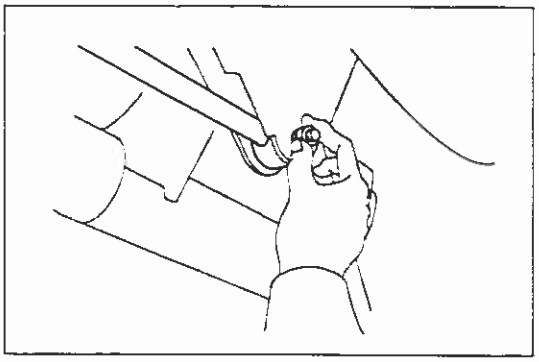
NOTE: Do not use a lubricant when pressing in the bushing.



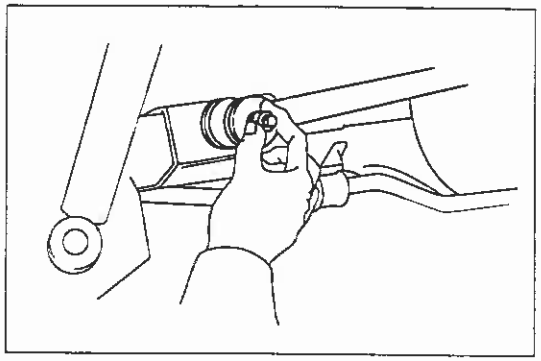
INSTALLATION OF LATERAL CONTROL ROD

1. INSTALL LATERAL CONTROL ROD TO BODY

(a) Raise the axle housing until the housing is free from the stands.

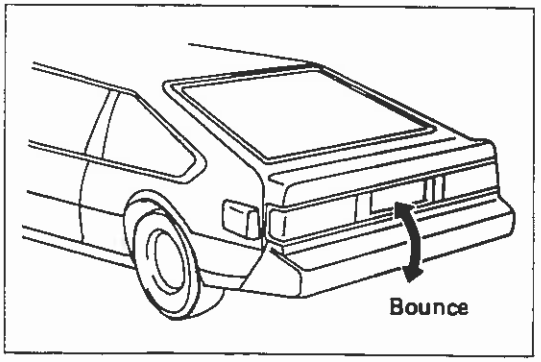


(b) Install the lateral control rod to the frame with the nut.

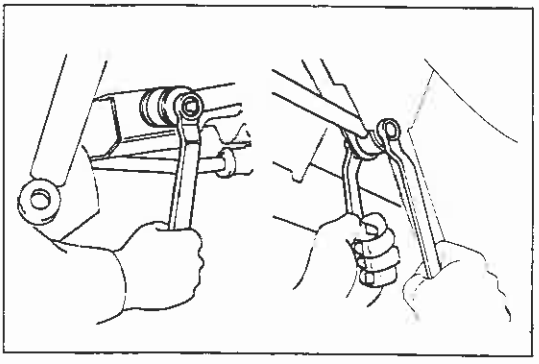


2. INSTALL LATERAL CONTROL ROD TO REAR AXLE HOUSING

(a) In this order, install the washer, bushing, spacer, lateral control arm, bushing, washer and nut on the rear axle housing.



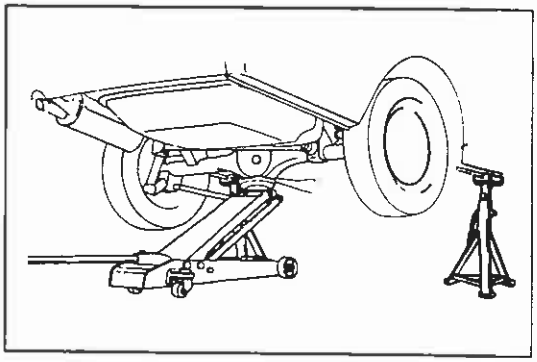
(b) Remove the stands and bounce the car to stabilize the suspension.



(c) Jack up the axle housing.

(d) Torque the nut.

Torque:	**Body side**	**800 kg-cm (58 ft-lb, 78 N·m)**
	Axle housing side	**590 kg-cm (43 ft-lb, 58 N·m)**



Upper and Lower Control Arm

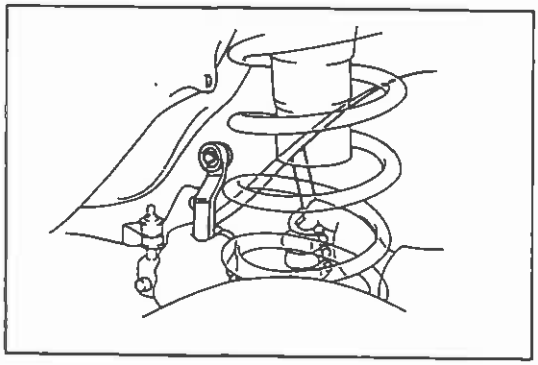
(See page RA-55)

REMOVAL OF UPPER AND LOWER CONTROL ARM

1. JACK UP VEHICLE

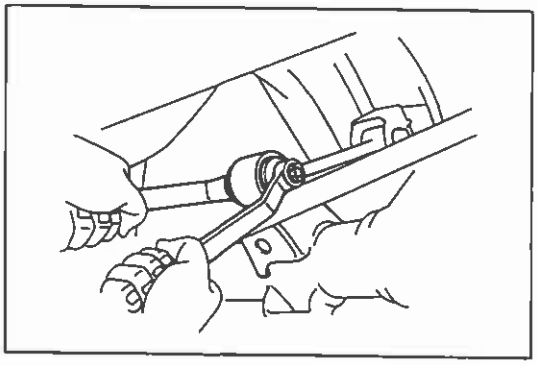
Jack up the vehicle and support the body with stands.

Hold the rear axle housing with a jack.

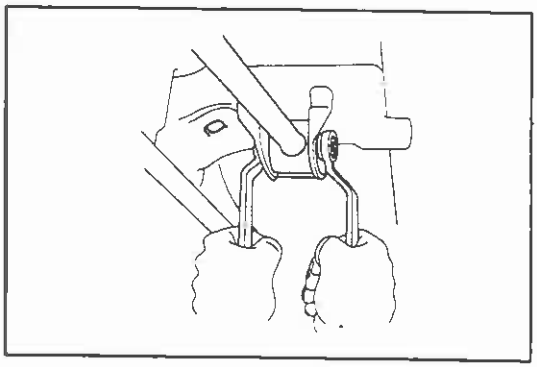


2. REMOVE UPPER CONTROL ARM

(a) Remove the bolt holding the upper control arm to the body.

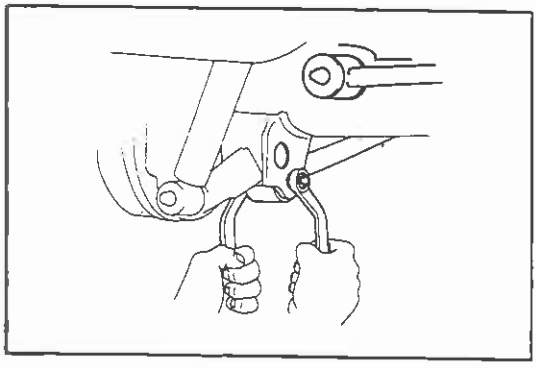


(b) Remove the bolt holding the upper control arm to the rear axle housing, and remove the upper control arm.

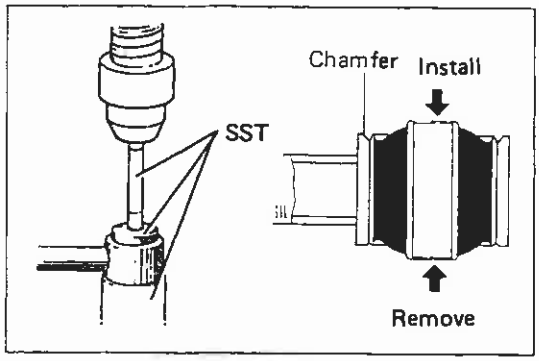


3. REMOVE LOWER CONTROL ARM

(a) Remove the bolt holding the lower control arm to the body.



(b) Remove the bolt holding the lower control arm to the rear axle housing, and remove lower control arm.



REPLACEMENT OF UPPER AND LOWER CONTROL ARM BUSHING

1. **REMOVE BUSHING**

Using SST, press out the bushing from the control arm.

SST 09710-14012

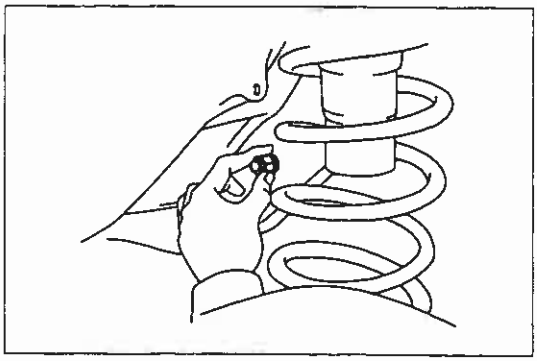
NOTE: When inserting and removing the bushing, press or pull from the chamfered side as shown in the figure.

2. **INSTALL BUSHING**

Using SST, press a new bushing into the control arm.

SST 09710-14012

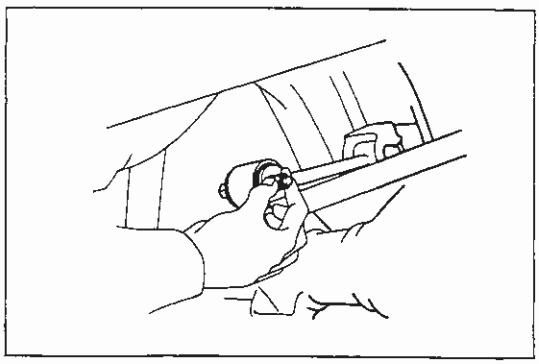
NOTE: Do not use a lubricant when pressing in the bushing.



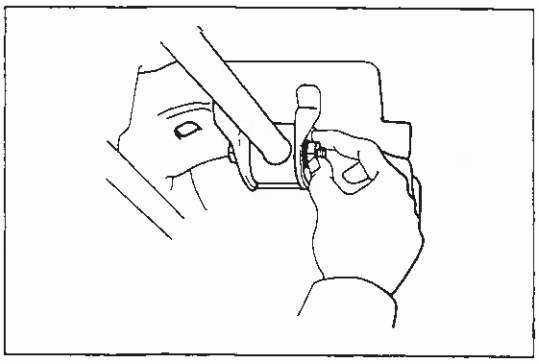
INSTALLATION OF UPPER AND LOWER CONTROL ARM

1. **INSTALL UPPER CONTROL ARM**

(a) Install the upper control arm on the body with the bolt and nut. Do not tighten the nut.

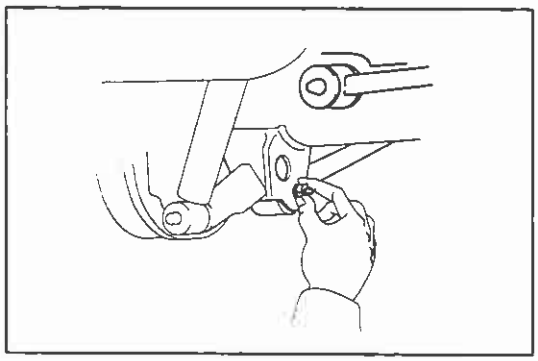


(b) Install the upper control arm on the rear axle housing with the bolt and nut. Do not tighten the nut.

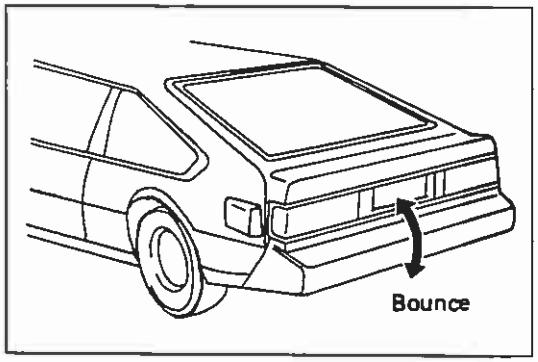


2. **INSTALL LOWER CONTROL ARM**

(a) Install the lower control arm on the body with the bolt and nut. Do not tighten the nut.

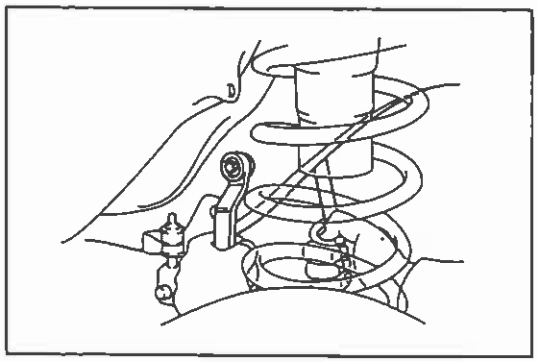


(b) Install the lower control arm on the rear axle housing with bolt and nut. Do not tighten the nut.



3. STABILIZE SUSPENSION

Remove the stands and bounce the car to stabilize the suspension.



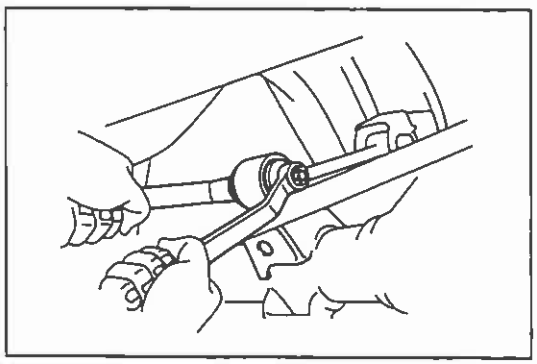
4. JACK UP VEHICLE

Raise the axle housing until the body is free from the stands.

5. TIGHTEN BOLT HOLDING UPPER CONTROL ARM TO BODY

Torque the bolt.

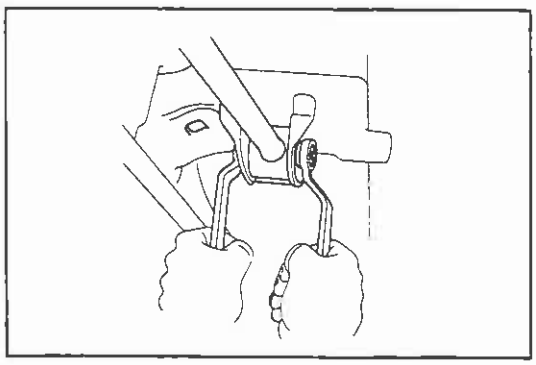
Torque: 1,450 kg-cm (105 ft-lb, 142 N·m)



6. TIGHTEN BOLT HOLDING UPPER CONTROL ARM TO REAR AXLE HOUSING

Torque the bolt.

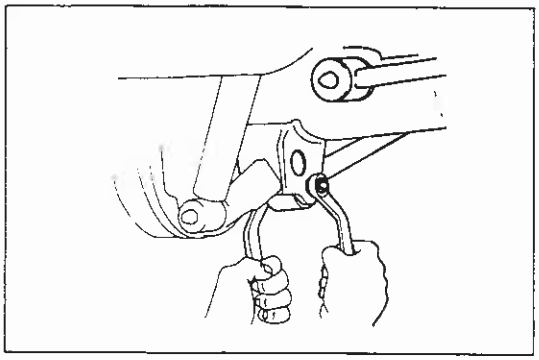
Torque: 1,250 kg-cm (90 ft-lb, 123 N·m)



7. TIGHTEN BOLT HOLDING LOWER CONTROL ARM TO BODY

Torque the bolt.

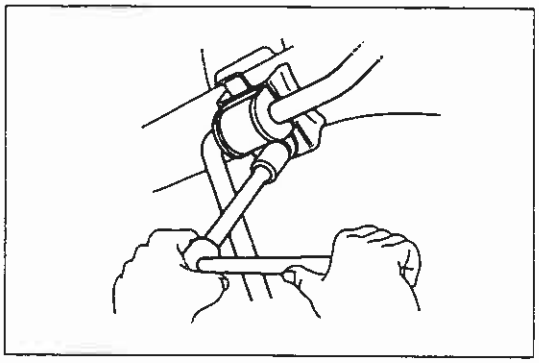
Torque: 1,450 kg-cm (105 ft-lb, 142 N·m)



8. TIGHTEN BOLT HOLDING LOWER CONTROL ARM TO REAR AXLE HOUSING

Torque the bolt.

Torque: 1,250 kg-cm (90 ft-lb, 123 N·m)

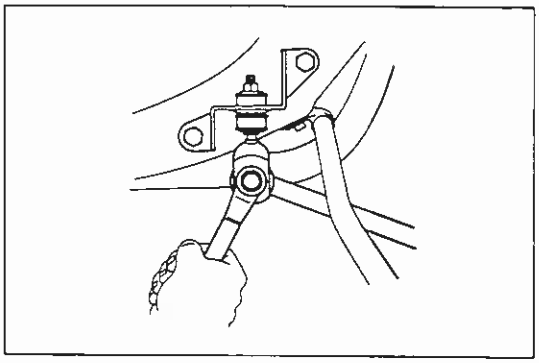


Rear Stabilizer Bar

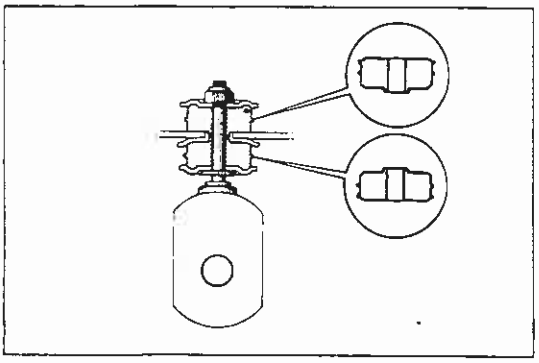
(See page RA-55)

REMOVAL OF REAR STABILIZER BAR

1. REMOVE STABILIZER BAR BUSHING BRACKETS
2. REMOVE BUSHINGS FROM BAR



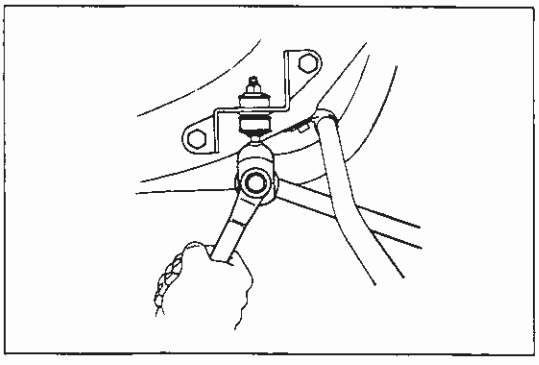
3. REMOVE REAR STABILIZER BAR FROM BODY
   (a) Disconnect the link from the bracket.
   (b) Disconnect the link from the bar end.



INSTALLATION OF REAR STABILIZER BAR

1. INSTALL STABILIZER LINK TO BODY

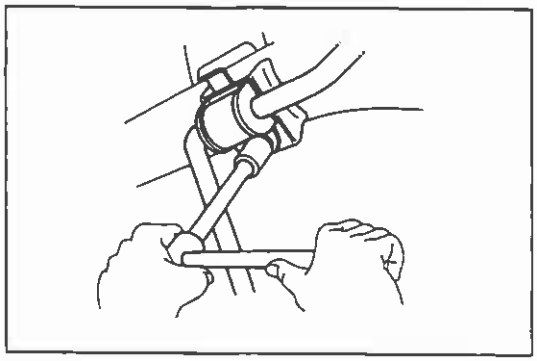
Install the link onto the body as shown.



2. INSTALL STABILIZER BAR TO LINK

Connect the stabilizer bar on both sides to the link with bolts, collars, cushions, nut and new cotter pins.

Torque: 310 kg-cm (22 ft-lb, 30 N·m)

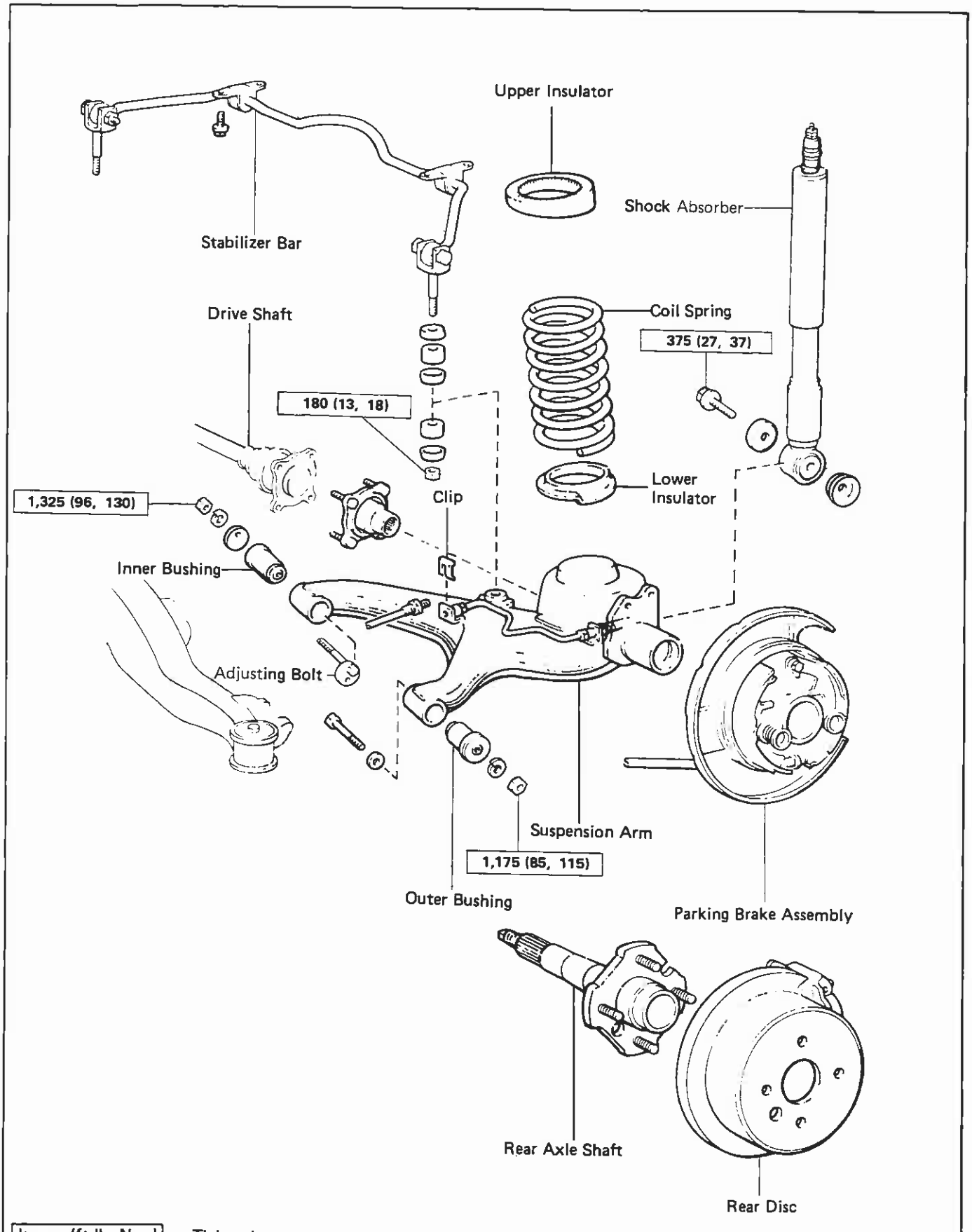


3. INSTALL BRACKETS TO REAR AXLE HOUSING OVER BUSHING

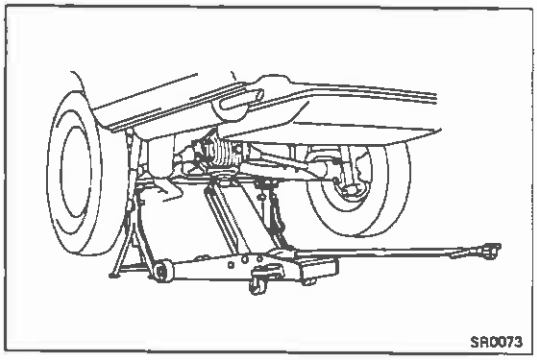
Torque: 185 kg-cm (13 ft-lb, 18 N·m)

IRS TYPE REAR SUSPENSION

COMPONENTS



kg-cm (ft-lb, N·m) : Tightening torque

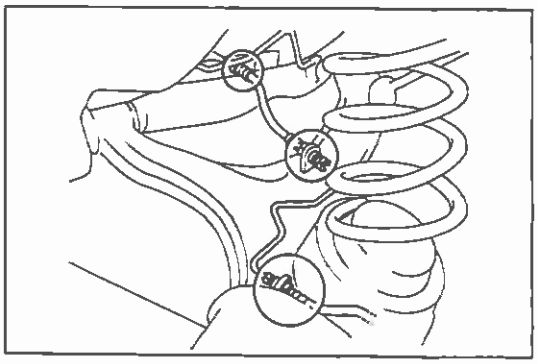


Coil Spring and Rear Shock Absorber

REMOVAL OF COIL SPRING AND SHOCK ABSORBER

1. JACK UP VEHICLE

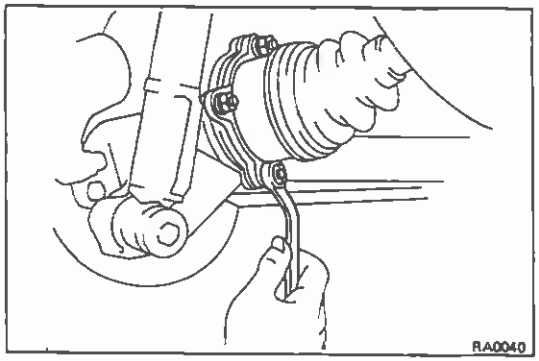
Jack up the differential carrier assembly and support the rear suspension member with stands.



2. REMOVE BRAKE HOSE CLIPS

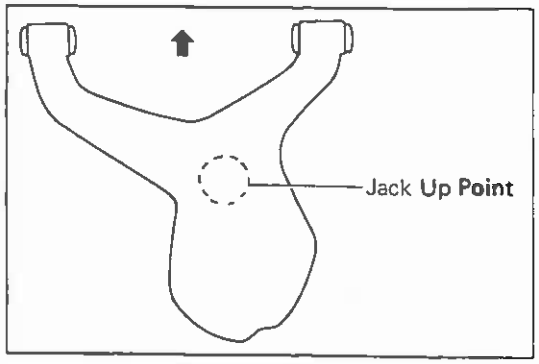
3. REMOVE STABILIZER BAR END

Disconnect the nut, cushion and retainer from suspension arm.

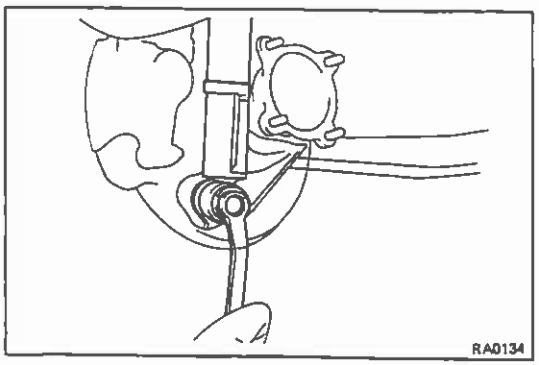


4. REMOVE DRIVE SHAFT

Remove the nut holding the rear drive shaft.

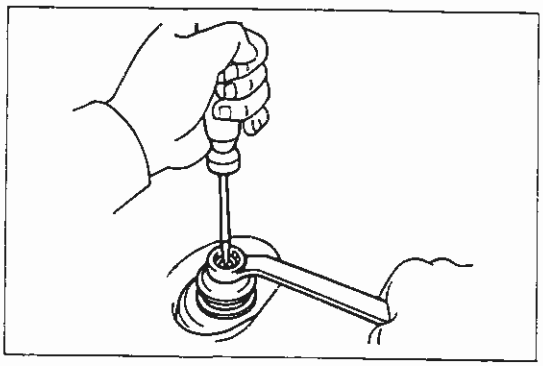


5. LEAVE A JACK UNDER SUSPENSION ARM



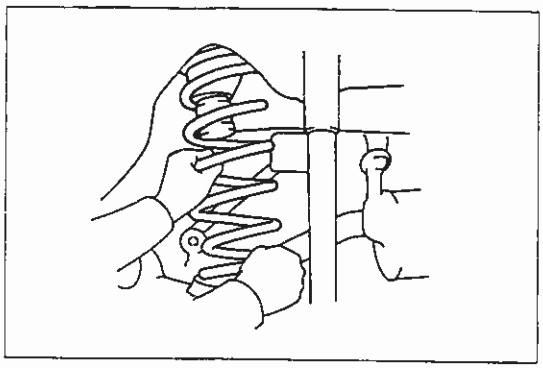
6. REMOVE REAR SHOCK ABSORBER

(a) Remove the bolt holding the shock absorber to the rear suspension arm and disconnect the shock absorber.



(b) If replacing the shock absorber, remove the nut holding the shock absorber to the body, and remove the shock absorber.

NOTE: Use a screwdriver to keep the shaft from turning.

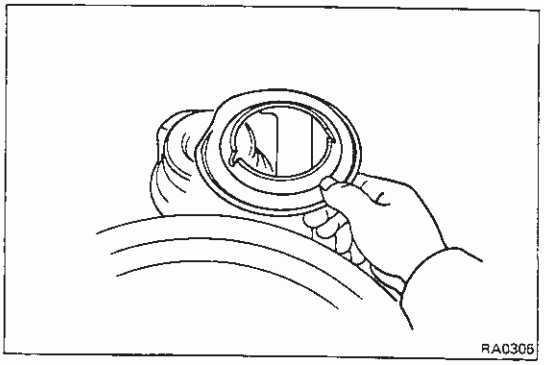


7. REMOVE REAR COIL SPRING

(a) Start to lower the rear suspension arm.

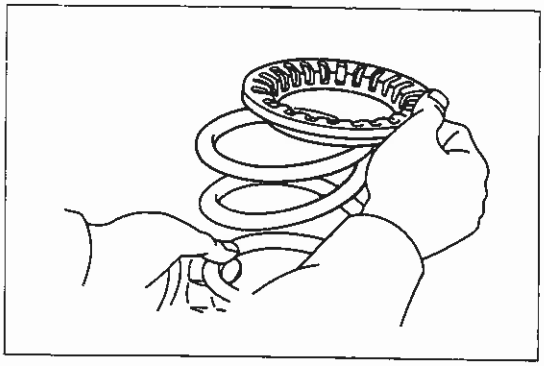
NOTE: Be careful not to pull the brake line and parking brake cable.

(b) While lowering the rear suspension arm, remove the coil spring and upper and lower insulators.

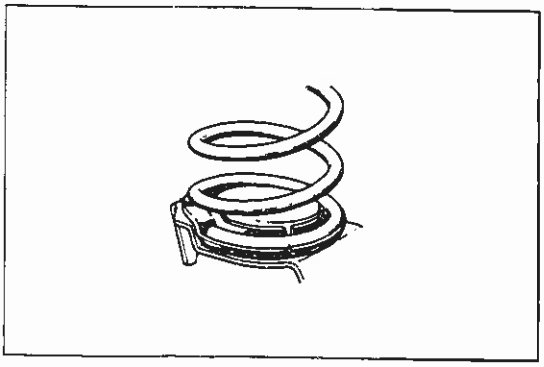


INSTALLATION OF COIL SPRING AND SHOCK ABSORBER

1. PUT LOWER INSULATOR ON REAR SUSPENSION ARM



2. PUT UPPER INSULATOR ON COIL SPRING



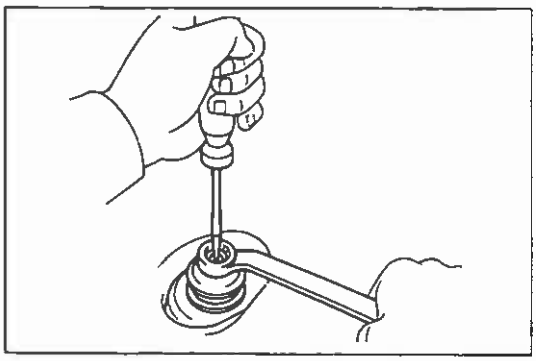
3. INSTALL COIL SPRING

4. CHECK POSITION OF LOWER INSULATOR

(a) Jack up the rear suspension arm.

(b) Check that the lower insulator is installed correctly.

If the insulator is not in correct position, reinstall the coil spring.

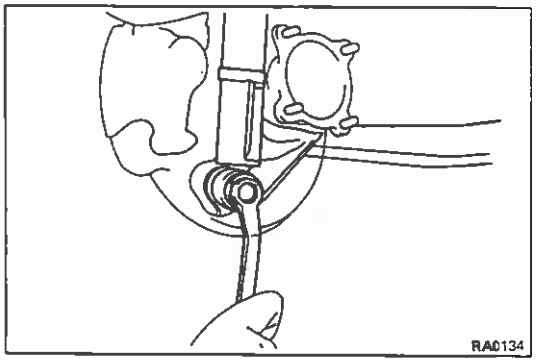


5. INSTALL SHOCK ABSORBER

(a) Connect the shock absorber to the body with the nuts. Hold the shaft with a screwdriver.

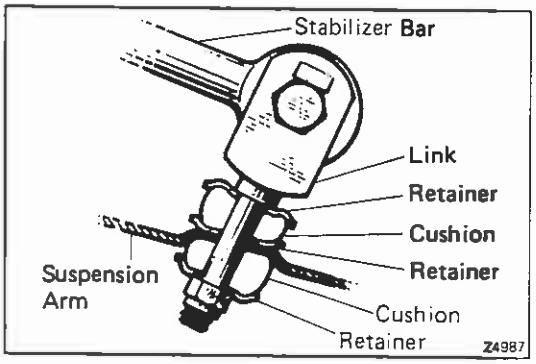
Torque the nut.

Torque: 250 kg-cm (18 ft-lb, 25 N·m)



(b) Connect the shock absorber to the rear suspension arm with the bolt. Torque the bolt.

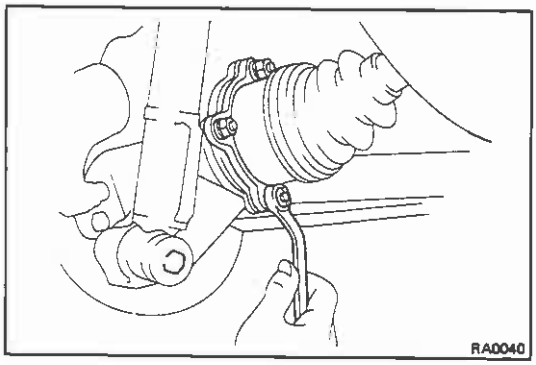
Torque: 375 kg-cm (27 ft-lb, 37 N·m)



6. CONNECT STABILIZER BAR END TO REAR SUSPENSION

Connect the cushion, retainer to the rear suspension arm with the nut. Torque the nut.

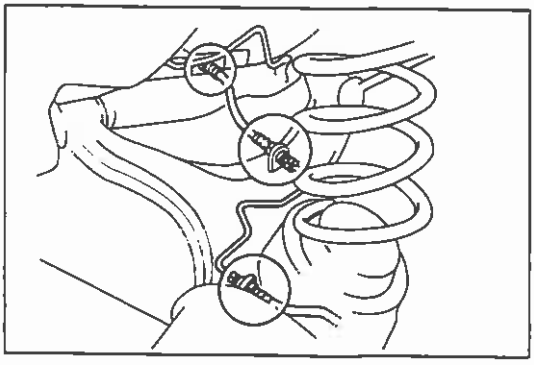
Torque: 180 kg-cm (13 ft-lb, 18 N·m)



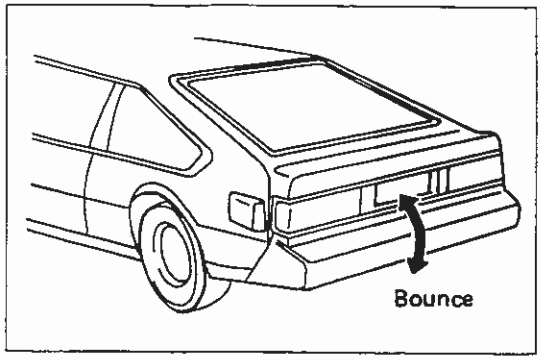
7. INSTALL DRIVE SHAFT

Connect the drive shaft to the rear axle shaft with the nuts.

Torque: 700 kg-cm (51 ft-lb, 69 N·m)

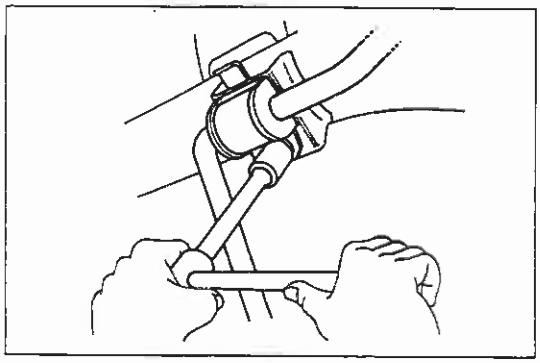


8. INSTALL BRAKE HOSE CLIPS



9. REMOVE STAND

Remove the stands and bounce the car to stabilize the suspension.



Rear Stabilizer Bar

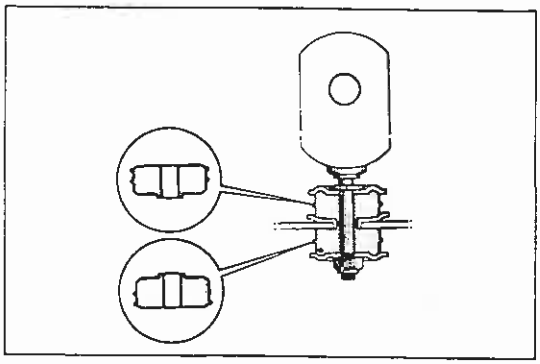
(See page RA-66)

REMOVAL OF REAR STABILIZER BAR

1. REMOVE STABILIZER BAR BRACKETS

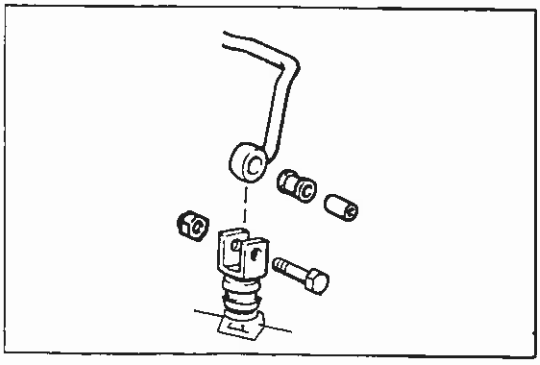
2. REMOVE STABILIZER BAR FROM ARMS

Remove the nuts, cushions, and links holding both sides of the stabilizer bar from suspension arms, and disconnect the stabilizer bar.



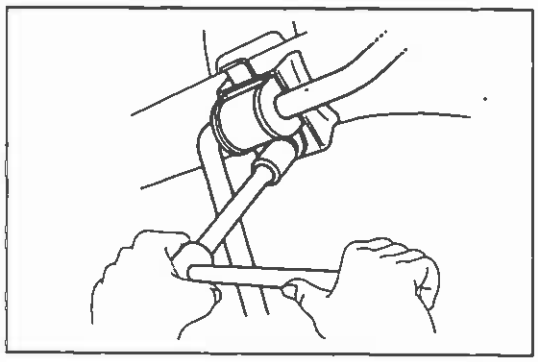
INSTALLATION OF REAR STABILIZER BAR

1. ASSEMBLE STABILIZER LINK SUBASSEMBLY AND INSTALL LINK TO ARM

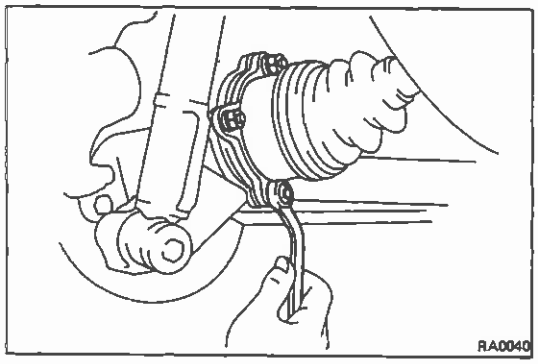


2. INSTALL STABILIZER BAR TO LINK

Connect the stabilizer bar on both sides of the link with bolts, collars, cushions and nut.



3. INSTALL STABILIZER BAR BRACKET TO DIFFERENTIAL SUPPORT MEMBER NO. 2

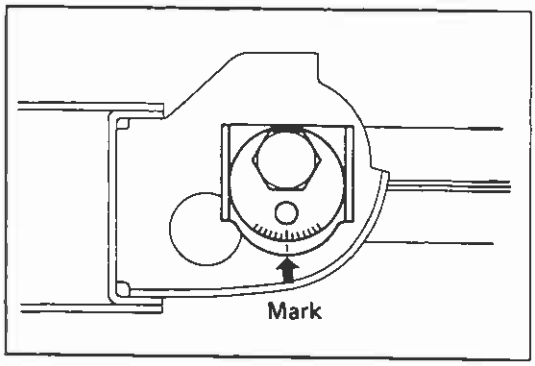


Rear Suspension Arm

(See page RA-66)

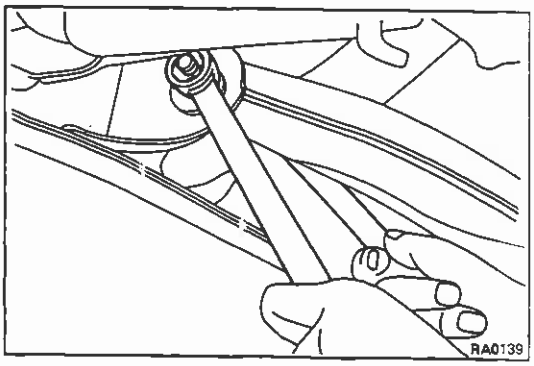
REMOVAL OF REAR SUSPENSION ARM

1. DISCONNECT STABILIZER BAR FROM LOWER ARM
2. DISCONNECT REAR DRIVE SHAFT
3. REMOVE REAR AXLE SHAFT FLANGE
4. REMOVE BRAKE DRUM OR DISC ROTOR
5. REMOVE REAR AXLE SHAFT
6. REMOVE BACKING PLATE OR DUST COVER
7. DISCONNECT BRAKE LINE
8. DISCONNECT SHOCK ABSORBER FROM LOWER ARM
9. REMOVE COIL SPRING

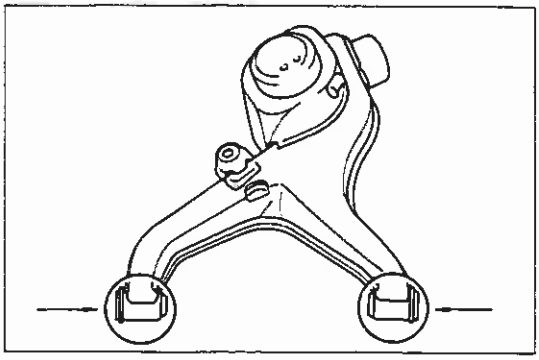


10. REMOVE REAR SUSPENSION ARM AND LOWER CONTROL BUSHING

NOTE: Remember where the mark is when removing the suspension arm.



(a) Remove the two mounting bolts.
(b) Remove the camber adjusting cam.
(c) Remove the suspension arm.

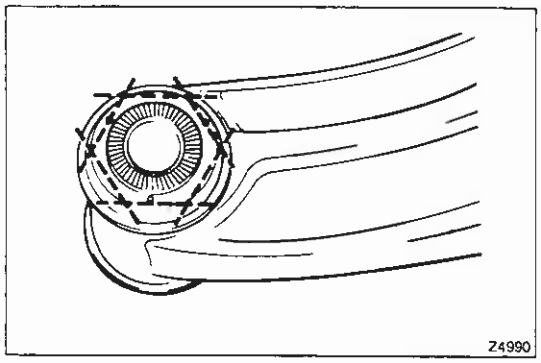


REPLACEMENT OF REAR SUSPENSION ARM BUSHING

1. CHECK ARM AND BUSHING

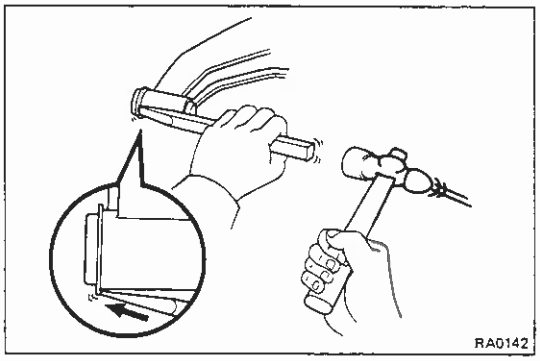
(a) Check the bushing for wear, cracks or deterioration.

(b) Check the arm for damage, cracks or deformation.



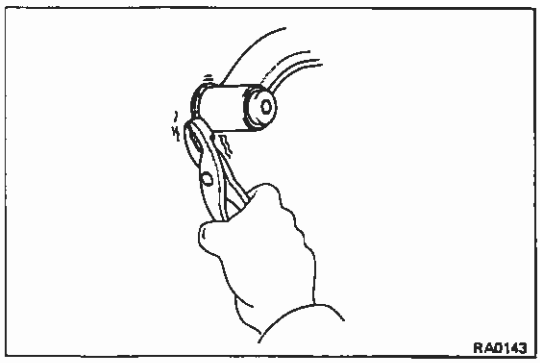
2. REPLACE INNER AND OUTER BUSHING

(a) Cut off the flange tip of the bushing as shown in the figure.



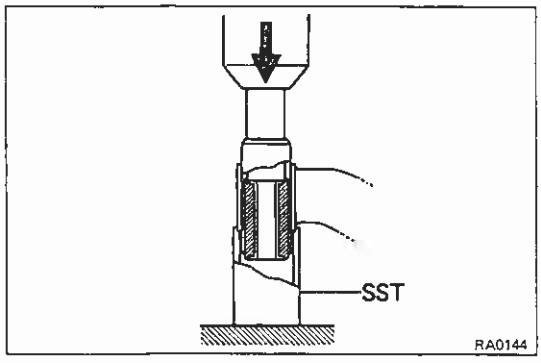
(b) Bend the remaining portions inward with a cold chisel.

NOTE: Be careful not to damage the flange.



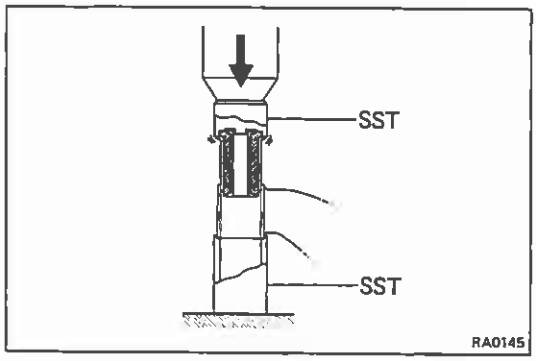
(c) Bend in the flange tips and pull off the flange with a pair of pliers.

Bend the remaining flange portion so the SST can be installed to the lower arm.



(d) Using SST, press out the outer bushing from the arm.

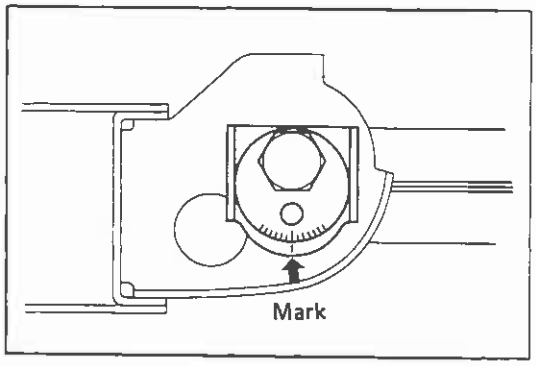
SST 09710-22041



(e) Using SST, press the outer and inner bushings into the arm.

SST 09710-22041

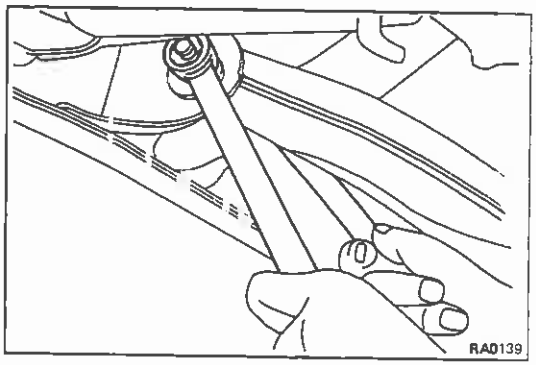
NOTE: Do not allow grease or oil to get on the bushings.



INSTALLATION OF REAR SUSPENSION ARM

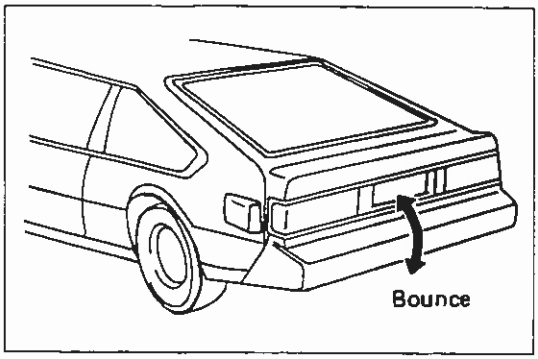
1. INSTALL ARM

(a) Align the complete mark at the same position it was before removal.



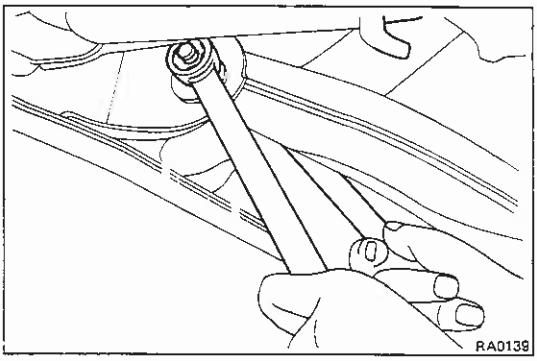
(b) Provisionally tighten the suspension arm.

2. INSTALL COIL SPLING
3. INSTALL SHOCK ABSORBER
4. INSTALL BACKING PLATE OR DUST COVER
5. CONNECT BRAKE LINE
6. CONNECT PARKING BRAKE CABLE
7. INSTALL REAR AXLE SHAFT
8. INSTALL BRAKE DRUM OR DISC ROTOR
9. CONNECT REAR DRIVE SHAFT
10. CONNECT STABILIZER BAR TO LOWER ARM



11. LOWER VEHICLE

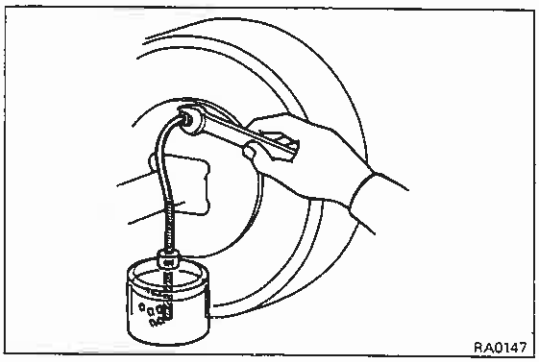
Lower the vehicle and bounce it several times.



12. TIGHTEN SUSPENSION ARM

Torque:

Inside	**1,325 kg-cm (96 ft-lb, 130 N·m)**
Outside	**1,175 kg-cm (85 ft-lb, 115 N·m)**

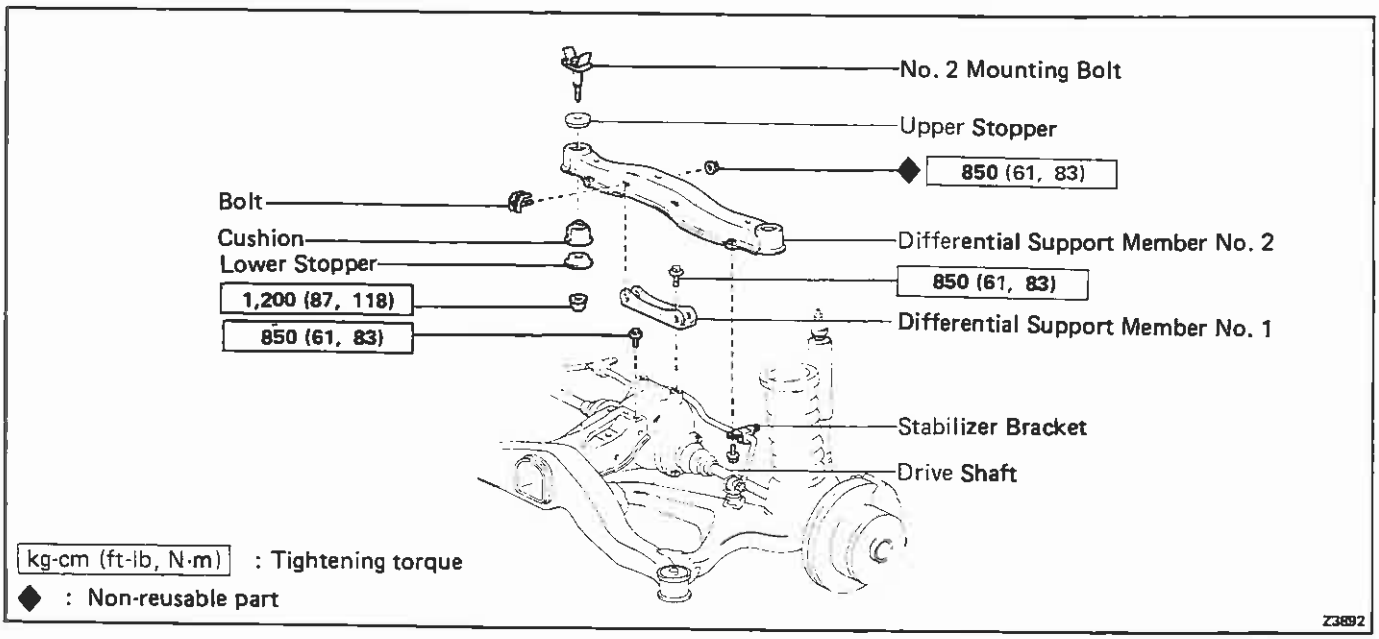


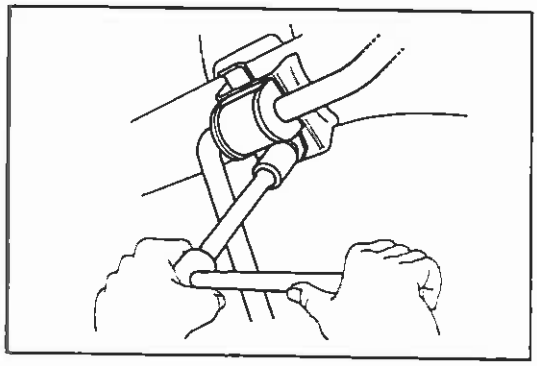
13. CHECK AND ADJUST REAR WHEEL ALIGNMENT
(See page RA-3)

14. BLEED BRAKE LINE

DIFFERENTIAL SUPPORT MEMBER

COMPONENTS



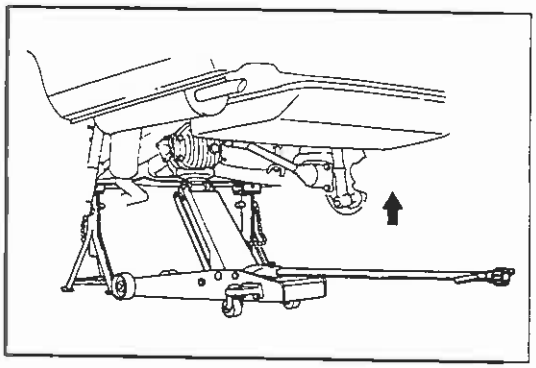


REMOVAL OF DIFFERENTIAL SUPPORT MEMBER

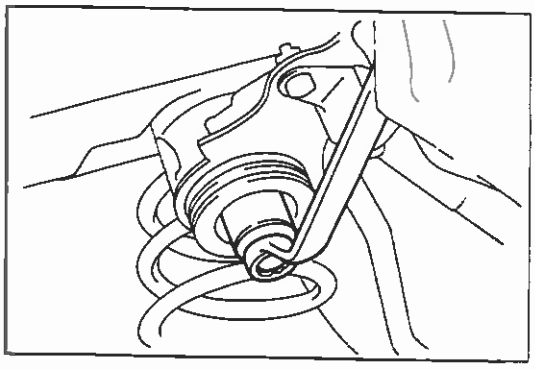
1. REMOVE STABILIZER BRACKET

2. **REMOVE DIFFERENTIAL SUPPORT MEMBER NO. 1 MOUNTING BOLT NUTS**

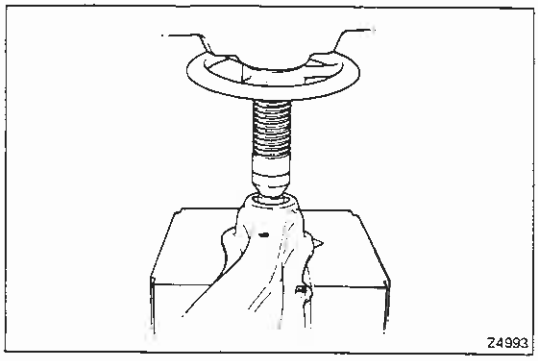
3. **DISCONNECT DRIVE SHAFT FROM DIFFERENTIAL**



4. REMOVE DIFFERENTIAL CARRIER BOLT
(See page RA-38)



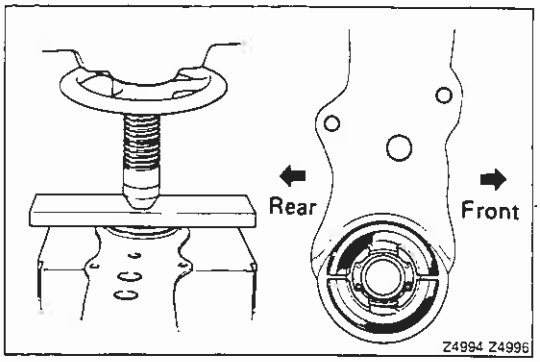
5. **REMOVE DIFFERENTIAL SUPPORT MEMBER**
   (a) Remove the No. 2 mounting bolt nuts and lower stopper.
   (b) Remove the differential support member with upper stopper.



REPLACEMENT OF DIFFERENTIAL SUPPORT MEMBER CUSHION

1. REMOVE CUSHION

Using a press, press out the cushion from the support member.



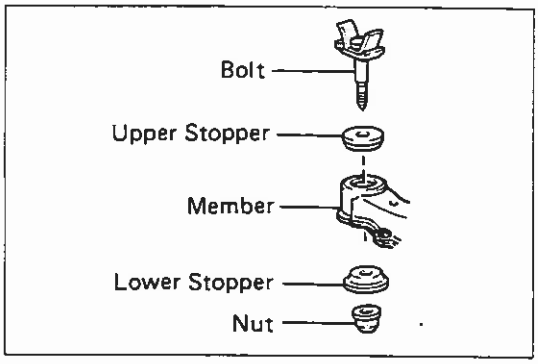
2. INSTALL NEW CUSHION

Using a press, press the new cushion into the support member.

NOTE: Assemble the cushion with the recesses at right angle to the support member.

3. CHECK DIFFERENTIAL SUPPORT MEMBER

If the support member is damaged or worn, replace it.



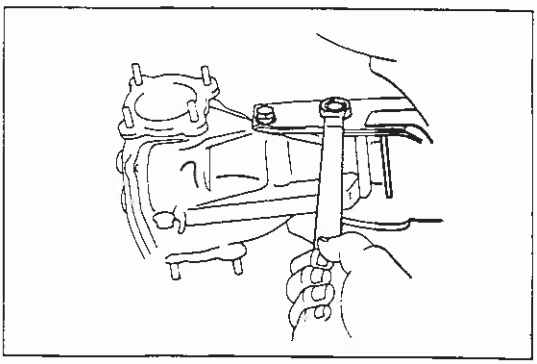
INSTALLATION OF DIFFERENTIAL SUPPORT MEMBER

1. INSTALL SUPPORT MEMBER

(a) Put upper stopper on member.

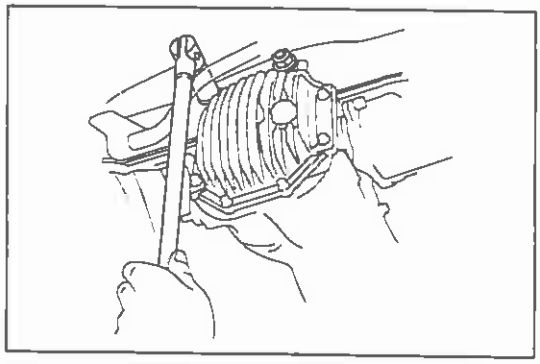
(b) Install the support member and lower stopper with nuts.

NOTE: Hand tighten the nuts.



2. INSTALL DIFFERENTIAL CARRIER BOLT

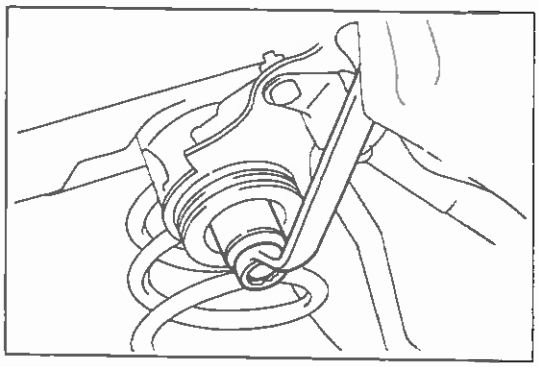
Install the differential carrier bolts.



3. **INSTALL DIFFERENTIAL SUPPORT MEMBER MOUNTING BOLT NO. 1**

Install the No. 1 mounting bolts to the support member with nuts. Torque the nuts.

Torque: 850 kg-cm (61 ft-lb, 83 N·m)



4. **TIGHTEN SUPPORT MEMBER NUTS**

Torque the nuts.

Torque: 1,200 kg-cm (87 ft-lb, 118 N·m)

5. CONNECT DRIVE SHAFT

6. INSTALL STABILIZER BAR BRACKET
(See page RA-71)