

REAR AXLE AND SUSPENSION

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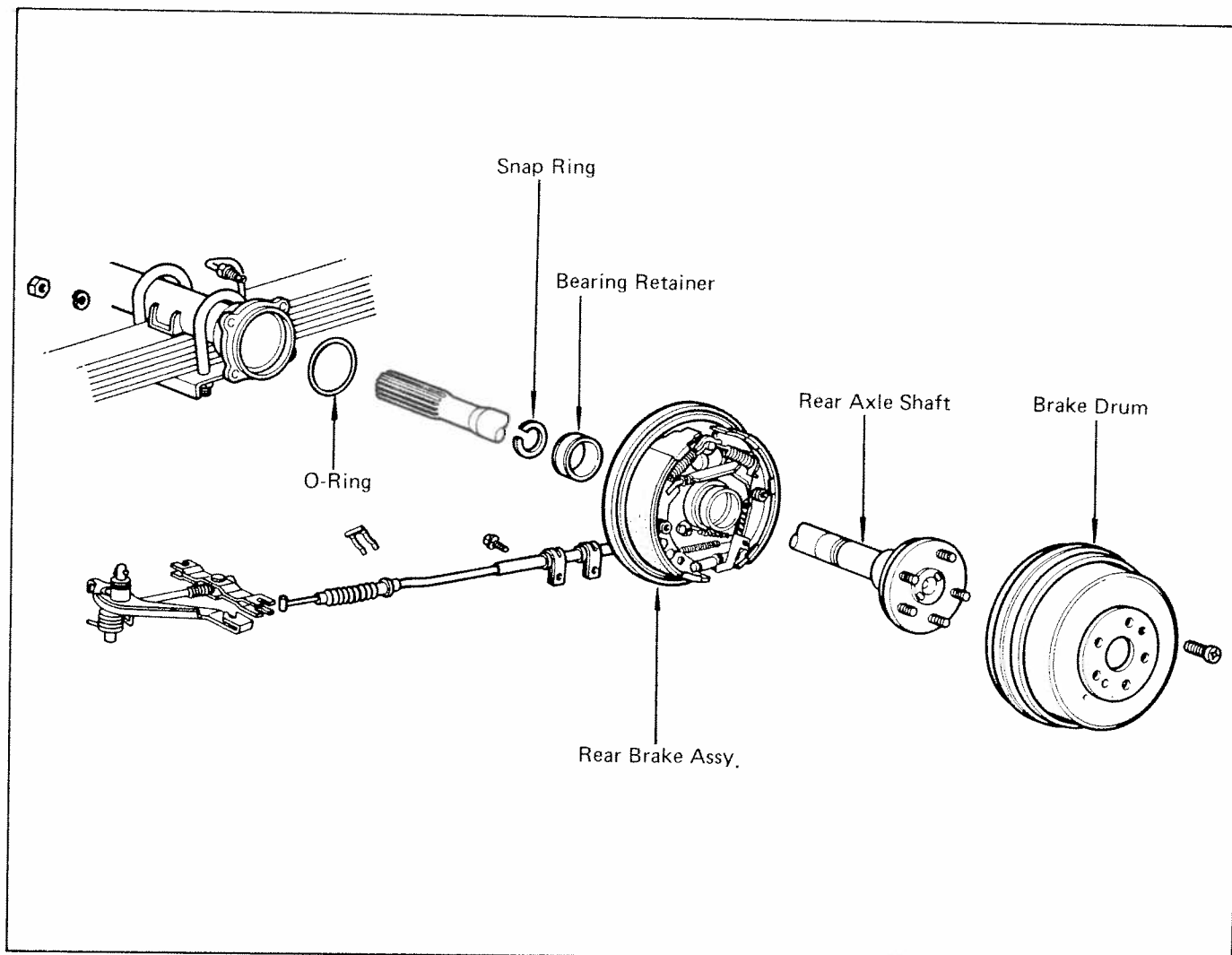
TROUBLESHOOTING

Problem	Possible cause	Remedy	Page
Oil leak at rear axle	Oil seals damaged or worn	Replace oil seal	14-7
	Bearing retainer loose	Replace retainer	14-4
	Rear axle housing cracked	Repair as necessary	
Oil leak at pinion shaft	Oil level too high or wrong grade	Drain and replace oil	2-11
	Oil seal worn or damaged	Replace oil seal	14-9
	Companion flange loose or damaged	Tighten or replace flange	14-9
Noises in rear axle	Oil level low or wrong grade	Drain and replace oil	2-11
	Excessive backlash between pinion and ring or side gear	Check backlash	14-13
	Ring, pinion or side gears worn or chipped	Inspect gears	14-15
	Pinion shaft bearing worn	Replace bearing	14-15
	Axle shaft bearing worn	Replace bearing	14-3
	Differential bearing loose or worn	Tighten or replace bearings	14-17

SPECIAL TOOLS AND TEST EQUIPMENT

Tool	SST No.	Use
Flare nut wrench	09751-36011 or Commercial	To loosen or tighten brake line
Snap ring pliers	09905-00012 or Commercial	To remove snap ring
Rear axle shaft puller	09521-25011	To remove rear axle shaft
Oil seal puller	09308-00010 or Commercial	To remove rear axle shaft outer and inner oil seals
Bearing driver	09608-30011 or Commercial	To install rear axle shaft outer and inner oil seals
		To remove rear axle shaft bearing
		To install drive pinion bearing races
Bearing collar	09228-44010 or Commercial	To install rear axle shaft outer oil seal
		To remove rear axle shaft bearing
Bearing collar	09608-35012 or Commercial	To install rear axle shaft bearing
Companion flange holder	09515-30010 or Commercial	To install rear axle shaft
Companion flange remover	09330-00020 or Commercial	To remove and install companion flange
Oil seal puller	09557-22022	To remove companion flange
Bearing puller	09308-10010 or Commercial	To remove drive pinion oil seal
Oil seal driver	09556-22010 or 00001-00008-02	To remove drive pinion front bearing
Universal puller	09554-30011 or Commercial	To install drive pinion oil seal
Bearing collar	09950-20014	To remove drive pinion rear bearing
Drive pinion adjusting gauge	09506-30011 or Commercial	To install drive pinion rear bearing
Drive pinion adjusting gauge	09530-30012 and 09536-30030	To adjust drive pinion protrusion (1/2 ton and 3/4 ton)
Side bearing adjusting nut wrench	09530-30012 and 09536-26010	To adjust drive pinion protrusion (C&C and 4x4)
	09504-00010 or Commercial	To install side bearing adjusting nuts

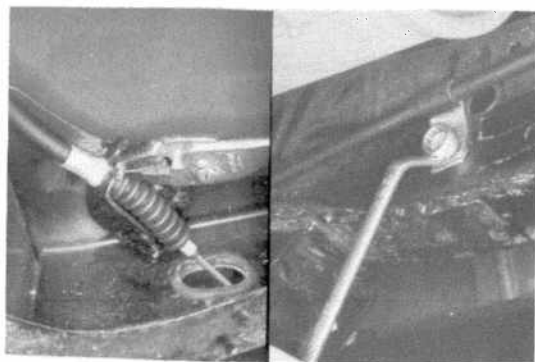
REAR AXLE SHAFT



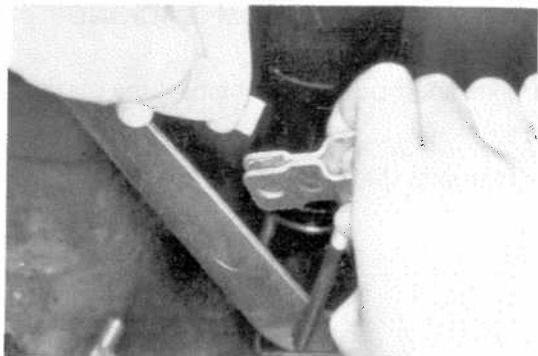
REMOVAL OF REAR AXLE SHAFT

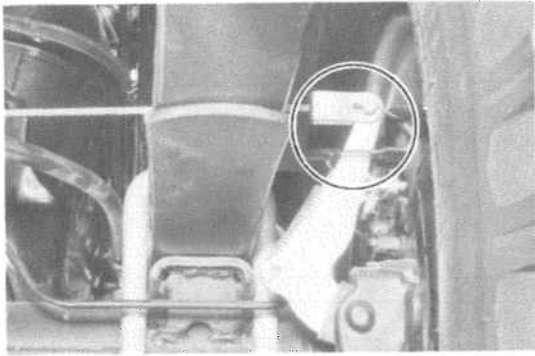
1. DISCONNECT PARKING BRAKE REAR CABLE (4 x 2)

(a) Remove the clip and clamp bolt from the frame.



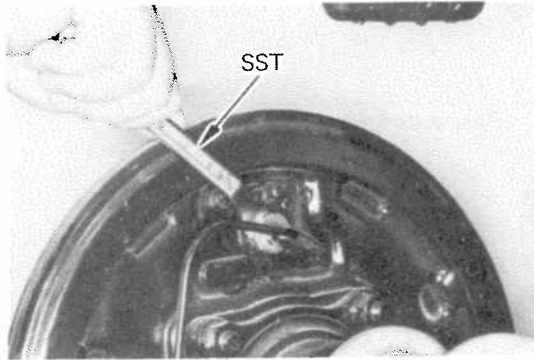
(b) Disconnect the parking brake rear cable from the equalizer.





(4 x 4)

Remove the pin and disconnect the parking brake rear cable from the bell crank.



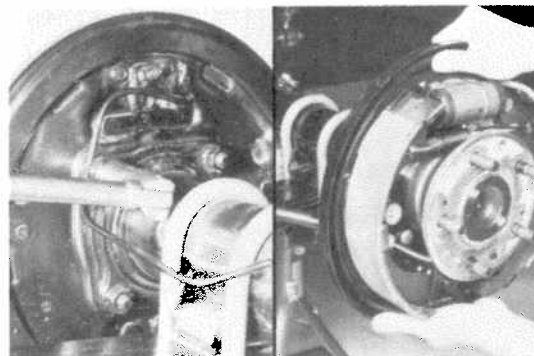
2. REMOVE WHEEL AND BRAKE DRUM

3. REMOVE DRAIN PLUG AND DIFFERENTIAL OIL

4. DISCONNECT BRAKE TUBE

Using a flare nut wrench*, disconnect the brake tube.

*SST 09751-36011 or Commercial wrench

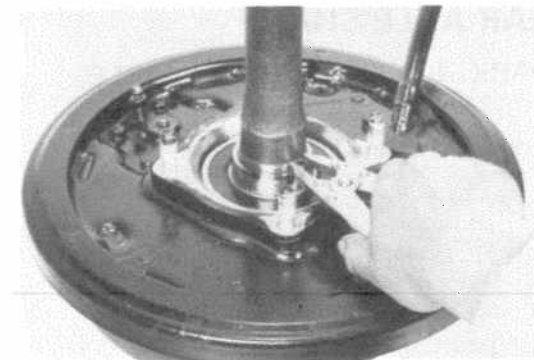


5. REMOVE REAR AXLE SHAFT FROM AXLE HOUSING

(a) Remove the four backing plate mounting nuts behind the backing plate.

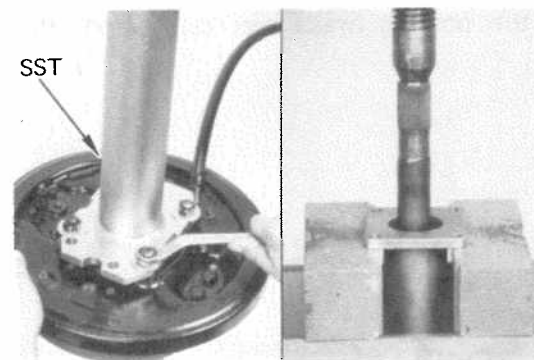
(b) Pull out the rear axle shaft together with the backing plate.

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



6. REMOVE SNAP RING

Using snap ring pliers, remove the snap ring.

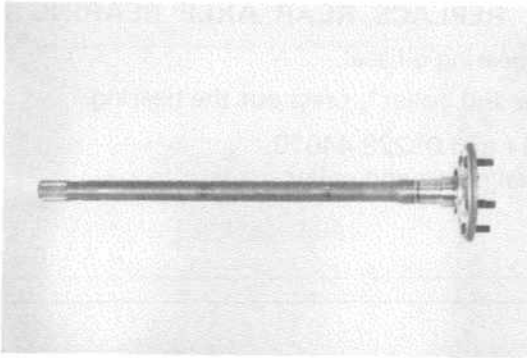


7. REMOVE REAR AXLE SHAFT FROM BACKING PLATE

(a) Attach a rear axle shaft puller* to the backing plate.

*SST 09521-25011

(b) Press out the rear axle shaft from the backing plate.



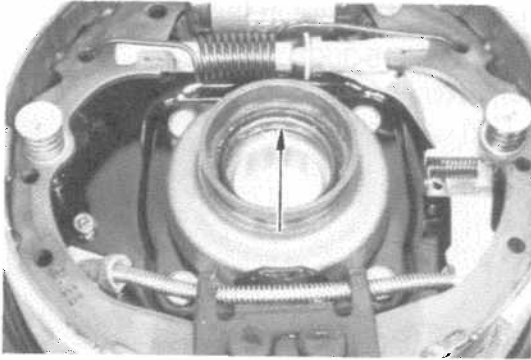
INSPECTION OF REAR AXLE SHAFT COMPONENTS

1. INSPECT REAR AXLE SHAFT AND FLANGE

- (a) Check for wear or damage.
- (b) Using a dial indicator, check the shaft and flange runout.

Maximum shaft runout: 2.0 mm (0.079 in.)

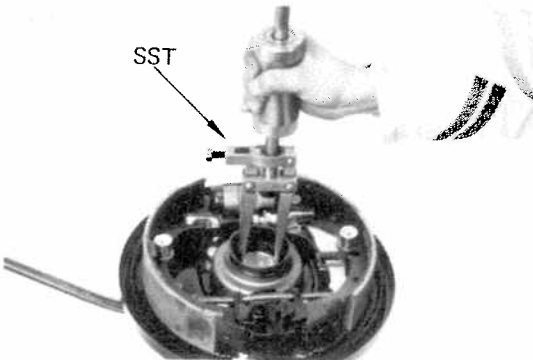
Maximum flange runout: 0.2 mm (0.008 in.)



2. INSPECT OUTER OIL SEAL

Check for wear or damage.

If the seal is worn or damaged, replace it.



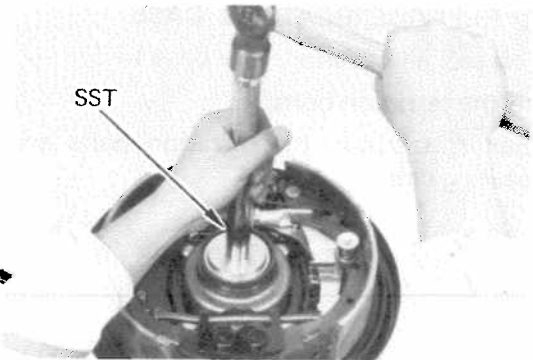
3. IF NECESSARY, REPLACE OUTER OIL SEAL

- (a) Using a puller*, remove the oil seal.

*SST 09308-00010 or Commercial puller

- (b) Using a driver*, drive in the new oil seal.

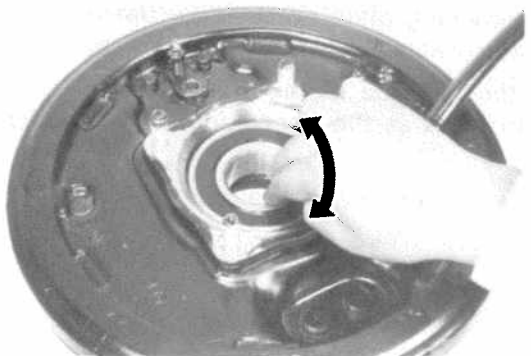
*SST 09608-30011 or Commercial driver

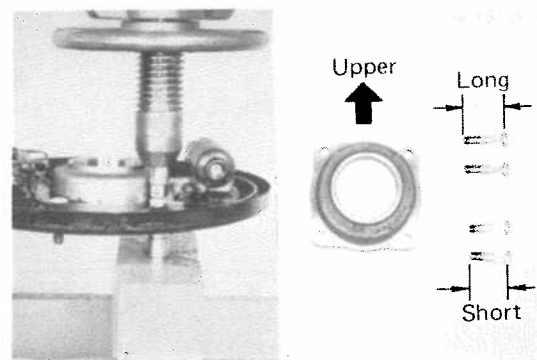
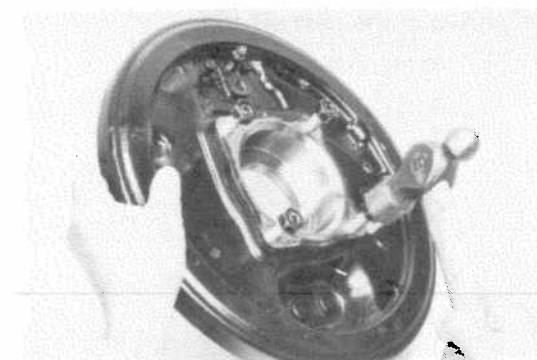
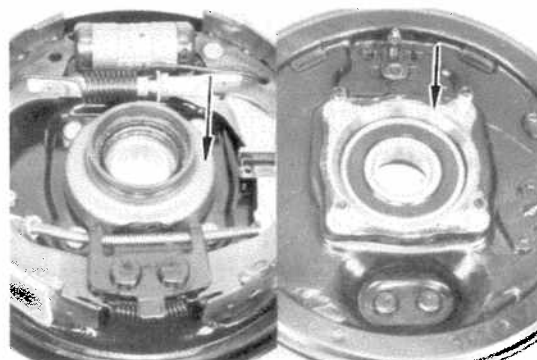
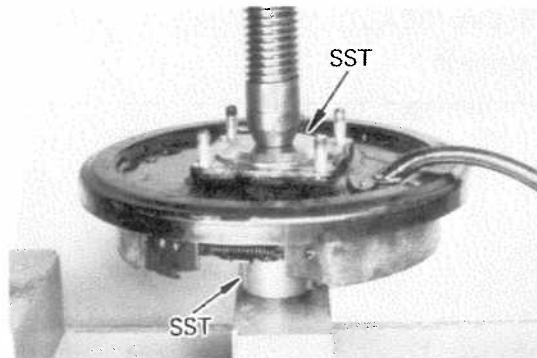
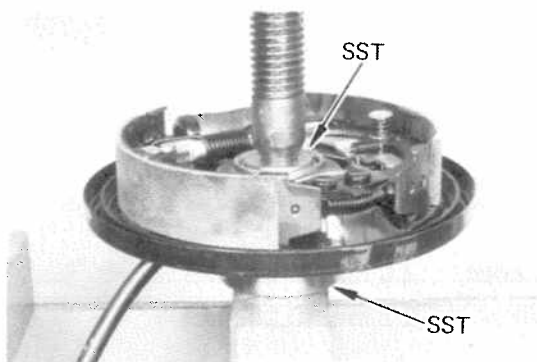


4. INSPECT REAR AXLE BEARING

Check for wear or damage.

If the bearing is worn or damaged, replace it.





5. IF NECESSARY, REPLACE REAR AXLE BEARING

- (a) Remove the bearing oil seal.
- (b) Using a driver and collar*, press out the bearing.

*SST 09608-30011 and 09228-44010,
or Commercial driver and collar

- (c) Using a driver and collar*, press in the new bearing.

*SST 09608-35012 and 09515-30010,
or Commercial driver and collar

- (d) Install the new oil seal. (See page 14-5)

6. INSPECT BEARING CASE

Check for damage or cracks.

If the bearing case is damaged or cracked, replace it.

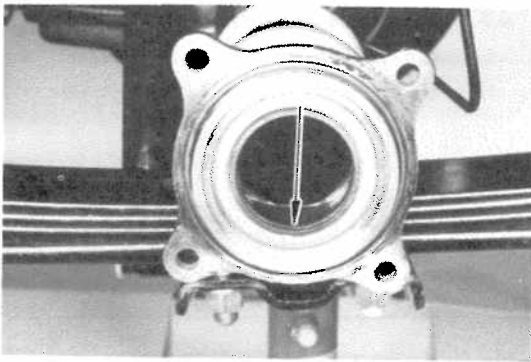
7. IF NECESSARY, REPLACE BEARING CASE

- (a) Remove the oil seal and bearing. (See page 14-5)
- (b) Install nuts to the serration bolts.
- (c) Using a hammer, tap out the serration bolts and remove the bearing case.

- (d) Position the backing plate on the new bearing case and, using two sockets, press in the serration bolts.

NOTE: Position the flat side of the bearing case and the two long serration bolts at the upper side of the bearing case.

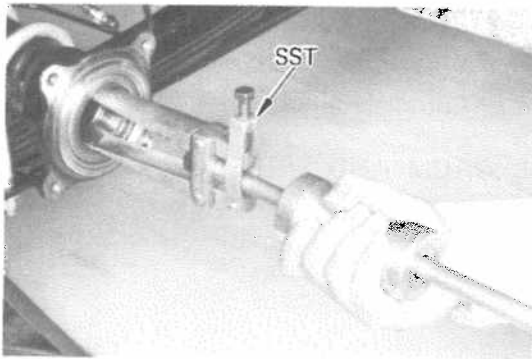
- (e) Install the new bearing and oil seal. (See page 14-5)



8. INSPECT INNER OIL SEAL

Check for wear or damage.

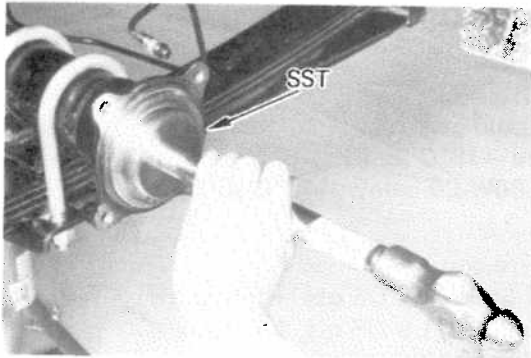
If the seal is worn or damaged, replace it.



9. IF NECESSARY, REPLACE INNER OIL SEAL

(a) Using a puller*, remove the oil seal.

*SST 09308-00010 or Commercial puller



(b) Using a driver*, drive in the new oil seal.

*SST 09608-30011 or Commercial driver

INSTALLATION OF REAR AXLE SHAFT (See illustration on page 14-3)

1. INSTALL REAR AXLE SHAFT IN BACKING PLATE

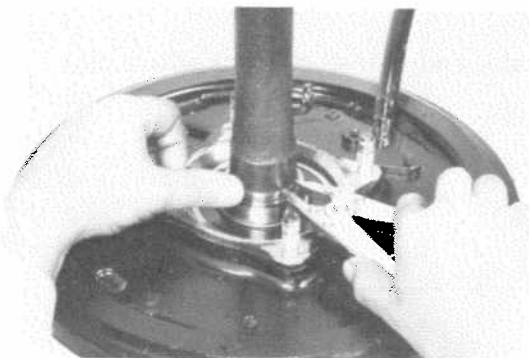
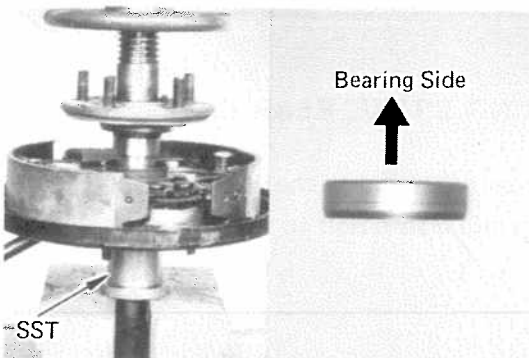
(a) Apply multipurpose grease on the oil seal.

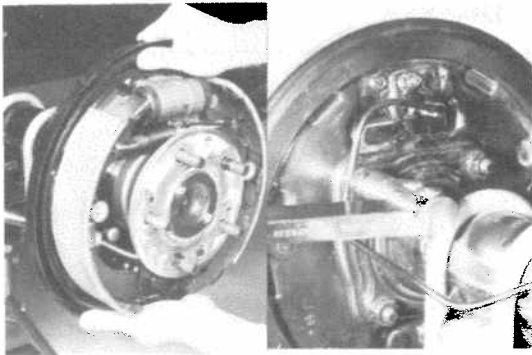
(b) Insert the backing plate and bearing retainer on the rear axle shaft.

(c) Using a collar*, press the rear axle shaft in the backing plate.

*SST 09515-30010 or Commercial collar

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

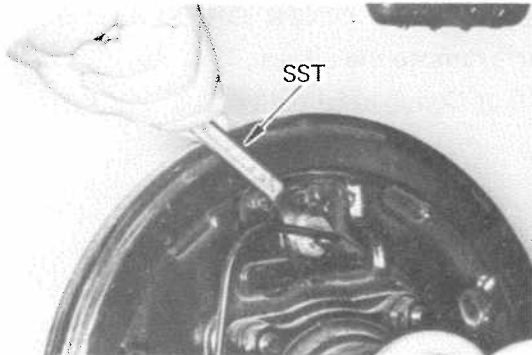




2. INSTALL REAR AXLE SHAFT TO REAR AXLE HOUSING

Install the rear axle shaft with four nuts.
Torque the nuts.

Torque: 600 – 800 kg-cm (44 – 57 ft-lb)

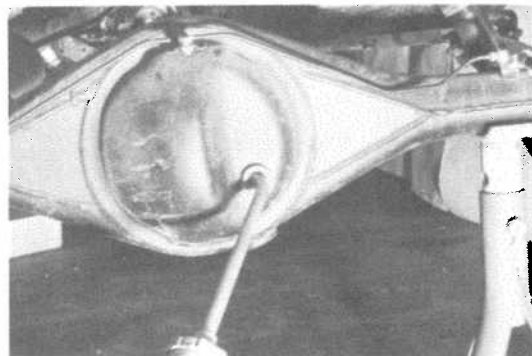


3. CONNECT BRAKE TUBE

Using a flare nut wrench*, connect the brake tube.

*SST 09751-36011 or Commercial wrench

4. INSTALL BRAKE DRUM AND WHEEL



5. INSTALL DRAIN PLUG AND FILL DIFFERENTIAL WITH GEAR OIL

Differential oil:

API GL-5 hypoid gear oil

SAE 90 above -18°C (0°F)

SAE 80W or 80W-90 below -18°C (0°F)

Capacity:

1/2 ton and 3/4 ton

1.7 liters (1.8 US qts, 1.5 Imp.qts)

C&C 1.8 liters (1.9 US qts, 1.6 Imp.qts)

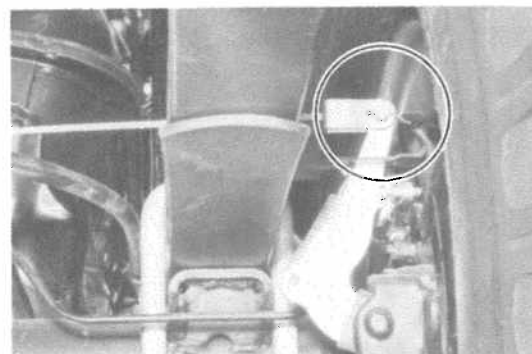
4x4 2.2 liters (2.3 US qts, 1.9 Imp.qts)



6. CONNECT PARKING BRAKE REAR CABLE (4 x 2)

(a) Connect the rear cable end to the equalizer.

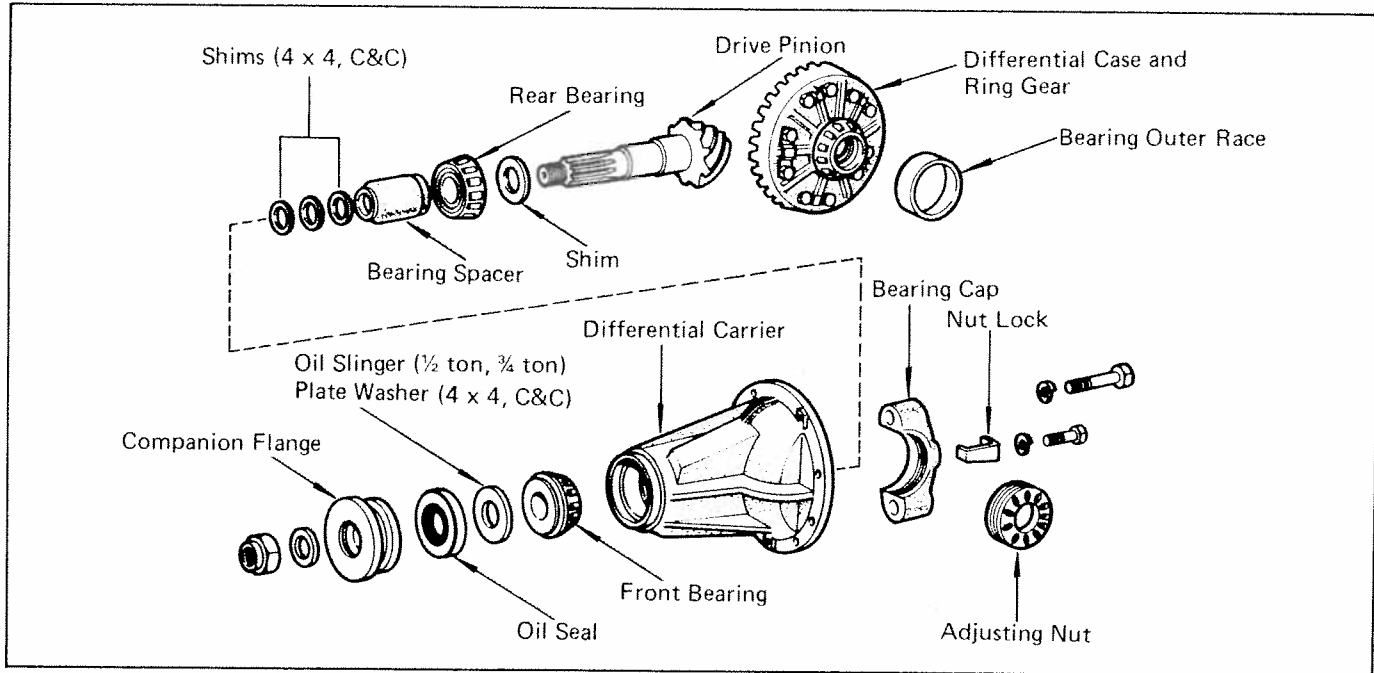
(b) Install the clip and clamp bolt to the frame.



(4 x 4)

Connect the rear cable end to the bell crank with a pin.

DIFFERENTIAL



ON-VEHICLE REPLACEMENT OF OIL SEAL

1. DISCONNECT PROPELLER SHAFT FLANGE FROM COMPANION FLANGE (See page 12-3)

2. MEASURE DRIVE PINION PRELOAD (C&C and 4 x 4)

Slowly turning the torque meter, measure the preload within the backlash of the drive pinion gear and the ring gear.

Drive pinion preload: 9 — 13 kg-cm (7.8 — 11.3 in-lb)

NOTE: If the preload is not within limits, adjust with shim before assembling the new oil seal.

3. REMOVE COMPANION FLANGE

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

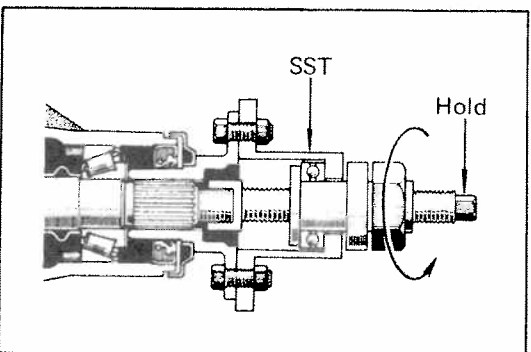
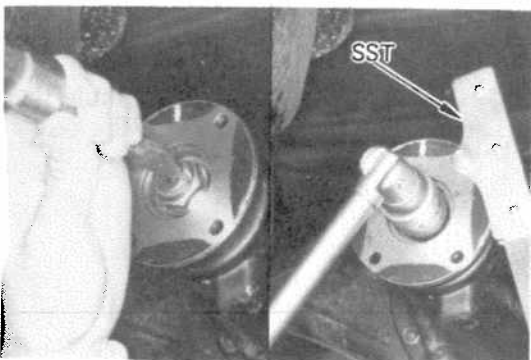
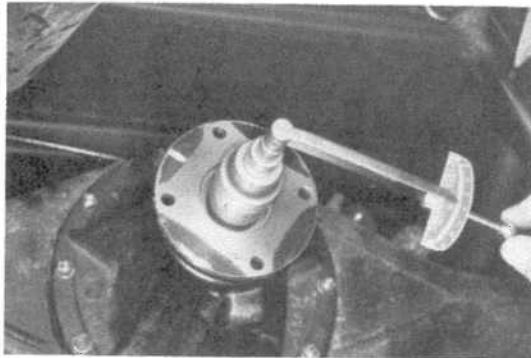
(b) Using a holder* to hold the flange, remove the nut.

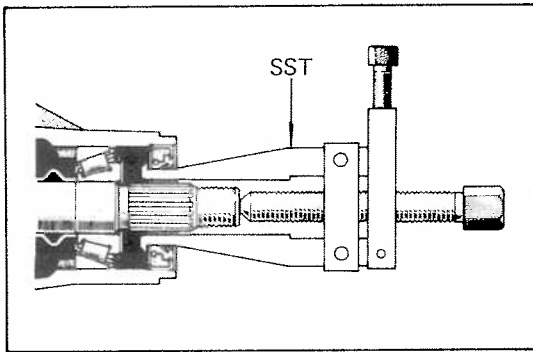
*SST 09330-00020 or Commercial holder

(c) Using a hammer, tap the companion flange off the shaft.

NOTE: If a flange remover* is available, remove the companion flange with it.

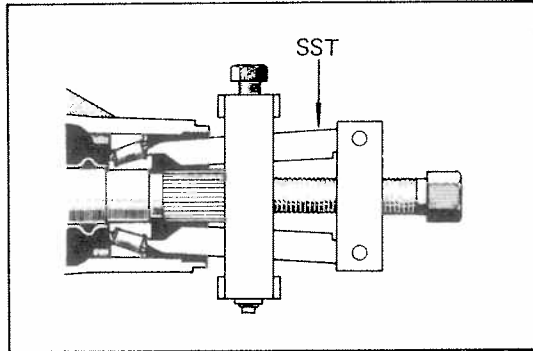
*SST 09557-22022



**4. REMOVE OIL SEAL**

Using a puller*, remove the oil seal from the housing.

*SST 09308-10010 or Commercial puller

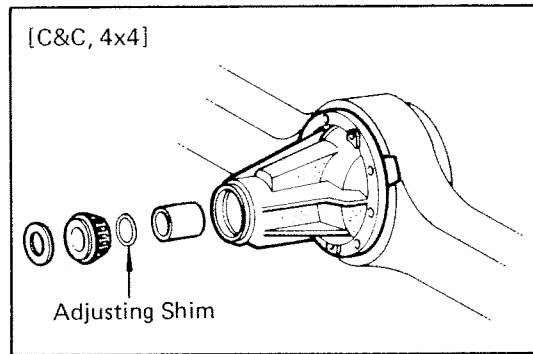
**5. REMOVE FRONT BEARING AND BEARING SPACER (1/2 ton and 3/4 ton)**

(a) Remove the oil slinger.

(b) Using a puller*, remove the front bearing from the housing.

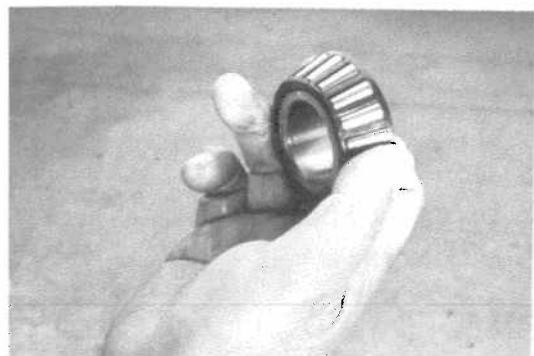
*SST 09556-22010 or 00001-00008-02

(c) Remove the bearing spacer.

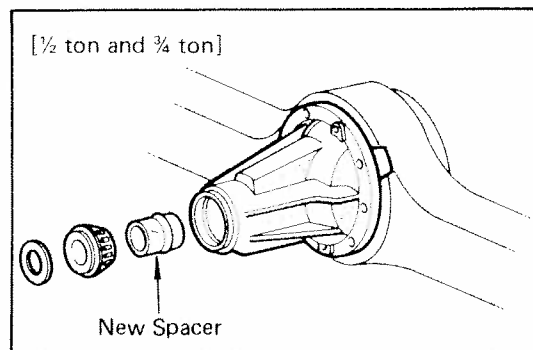
**6. IF DRIVE PINION PRELOAD IS INCORRECT, REMOVE FRONT BEARING AND BEARING SPACER (C&C and 4 x 4)**

Remove the following parts:

- (a) Plate washer
- (b) Front bearing
- (c) Shims
- (d) Bearing spacer

**7. INSPECT FRONT BEARING FOR WEAR OR DAMAGE**

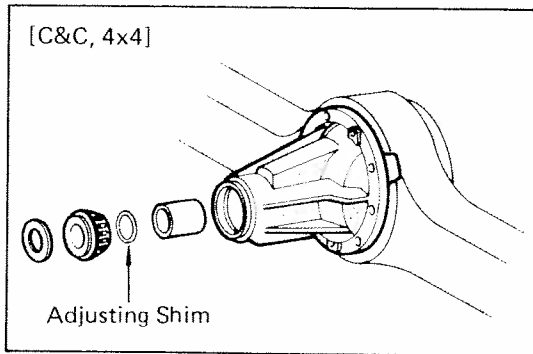
If the front bearing is damaged or worn, disassemble the differential carrier and replace the bearing with the outer race as a set.

**8. INSTALL NEW BEARING SPACER AND FRONT BEARING (1/2 ton and 3/4 ton)**

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

(b) Install the front bearing on the shaft.

(c) Install the oil slinger.



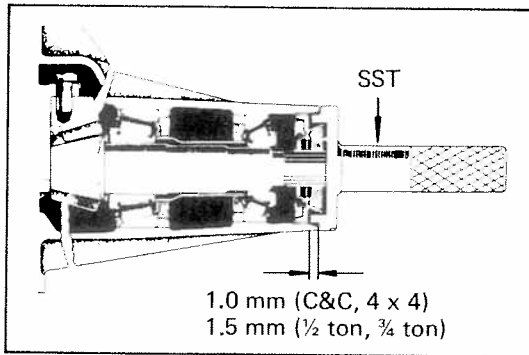
9. INSTALL BEARING SPACER AND FRONT BEARING (C&C and 4 x 4)

Install the following parts:

- (a) Bearing spacer
- (b) Shims
- (c) Front bearing
- (d) Plate washer

If drive pinion preload is not within limits, adjust with shim when assembling the oil seal.

Shim thickness		
Part No.	No.	Thickness mm (in.)
90564-30035	1	0.23 – 0.27 (0.0091 – 0.0106)
90564-30193	2	0.28 – 0.32 (0.0110 – 0.0126)
90564-30194	3	0.33 – 0.37 (0.0130 – 0.0146)
90564-30195	4	0.38 – 0.42 (0.0150 – 0.0165)
90564-30063	5	0.43 – 0.47 (0.0169 – 0.0185)

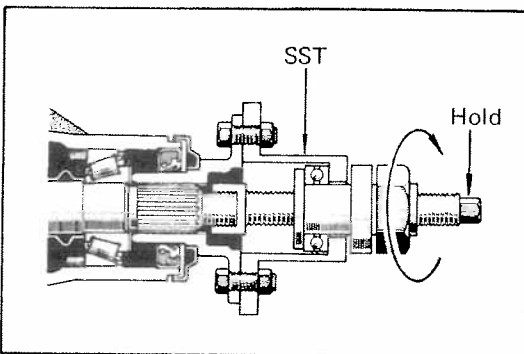


10. INSTALL NEW OIL SEAL

- (a) Using a driver*, drive in a new oil seal to a depth of 1.0 mm (0.039 in.) for C&C and 4x4, and to a depth of 1.5 mm (0.059 in.) for 1/2 ton and 3/4 ton.

*SST 09554-30011 or Commercial driver

- (b) Apply multipurpose grease to the oil seal.



11. INSTALL COMPANION FLANGE

Using a plastic hammer, tap the companion flange on the shaft.

NOTE: If a flange replacer* is available, install the companion flange with it.

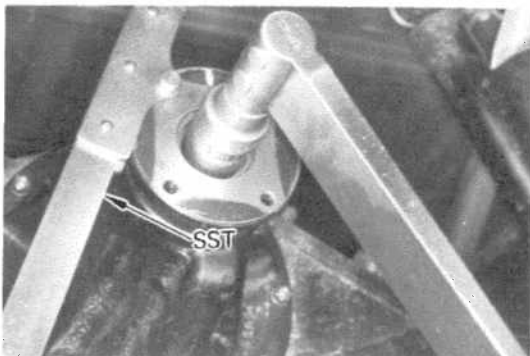
*SST 09557-22022

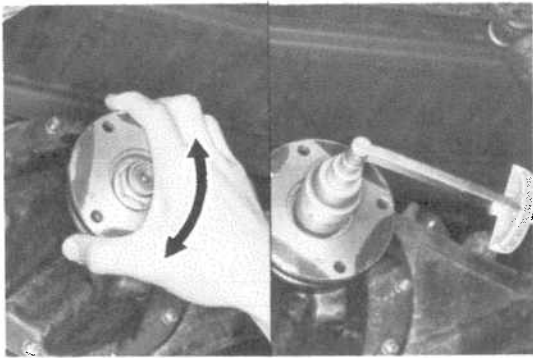
12. TIGHTEN DRIVE PINION NUT AND ADJUST PRELOAD (1/2 ton and 3/4 ton)

- (a) Coat the threads of a new nut with multipurpose grease.
- (b) Using a holder* to hold the flange, tighten the nut. Torque the nut.

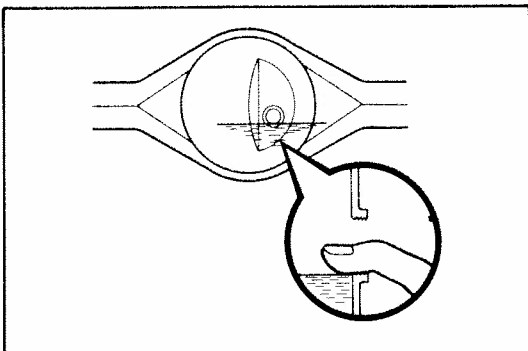
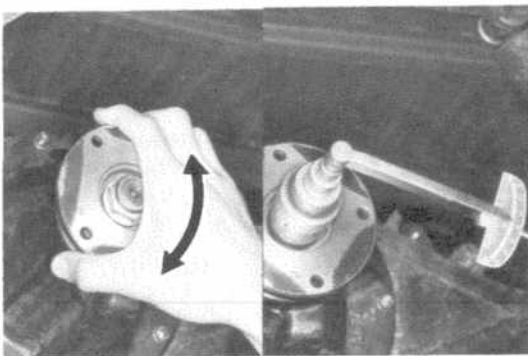
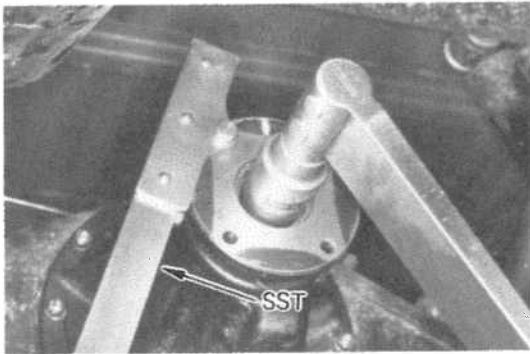
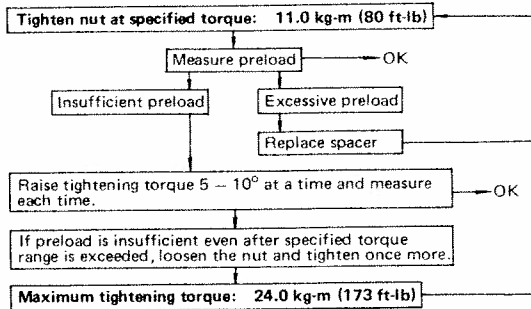
Torque: 1,100 kg-cm (80 ft-lb)

*SST 09330-00020 or Commercial holder





Preload adjusting procedure (½ ton and ¾ ton)



- (c) Turn the companion flange several times to snug down the bearing.
- (d) Using a torque meter, measure the preload of the backlash between the drive pinion and ring gear.

Preload (starting): 6 – 10 kg-cm (5.2 – 8.7 in.-lb)

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

If the maximum torque is exceeded while re-tightening 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 (173 ft-lb)

- (e) Using a punch, stake the nut.

13. TIGHTEN DRIVE PINION NUT

(C&C and 4 x 4)

- (a) Coat the threads of a new nut with multipurpose grease.
- (b) Using a holder* to hold the flange, tighten the nut. Torque the nut.

Torque: 1,700 – 2,100 kg-cm (123 – 151 ft-lb)

*SST 09330-00020 or Commercial holder

- (c) Turn the companion flange several times to snug down the bearing.
- (d) Using a torque meter, measure the preload of the backlash between the drive pinion and ring gear.

Preload (starting): 9 – 13 kg-cm (7.8 – 11.3 in.-lb)

- (e) Using a punch, stake the nut.

14. CONNECT PROPELLER SHAFT FLANGE TO COMPANION FLANGE

(See page 12-8)

15. CHECK DIFFERENTIAL OIL LEVEL

Fill with gear oil if necessary.

Differential oil:

API GL-5 hypoid gear oil

SAE 90 above –18°C (0°F)

SAE 80W or 80W-90 below –18°C (0°F)

Capacity:

1/2 ton and 3/4 ton

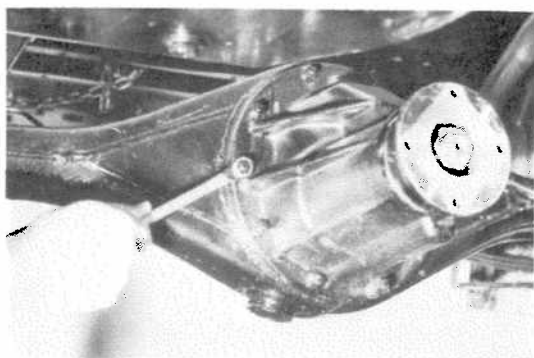
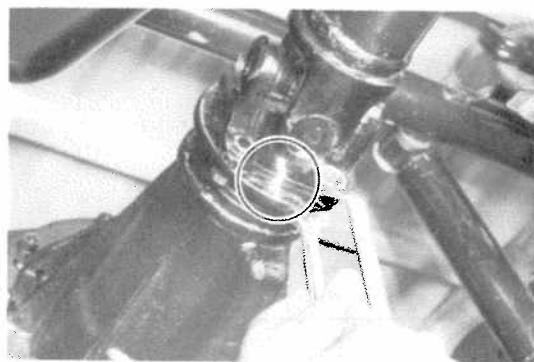
1.7 liters (1.8 US qts, 1.5 Imp.qts)

C&C 1.8 liters (1.9 US qts, 1.6 Imp.qts)

4x4 2.2 liters (2.3 US qts, 1.9 Imp.qts)

REMOVAL OF DIFFERENTIAL

1. REMOVE DRAIN PLUG AND DRAIN DIFFERENTIAL OIL
2. REMOVE REAR AXLE SHAFT (See page 14-3)
3. DISCONNECT PROPELLER SHAFT FLANGE FROM COMPANION FLANGE (See page 12-3)
Remove four bolts and nuts.
4. REMOVE DIFFERENTIAL CARRIER ASSEMBLY
Remove 10 nuts and pull out the differential carrier assembly.



DISASSEMBLY OF DIFFERENTIAL (See illustration on page 14-9)

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

1. PERFORM DIFFERENTIAL PRE-INSPECTION

- (a) Check ring gear runout.

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

Maximum runout:

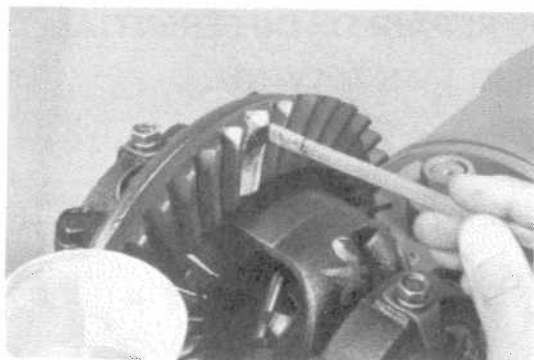
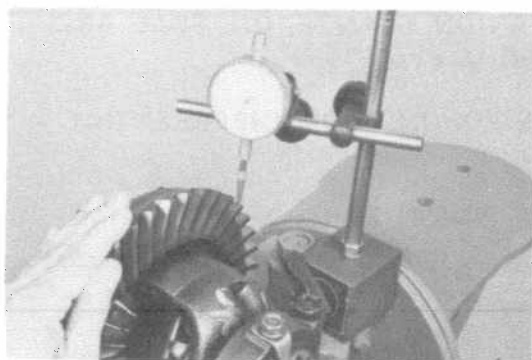
1/2 ton and 3/4 ton	0.07 mm (0.0028 in.)
C&C and 4 x 4	0.10 mm (0.0039 in.)

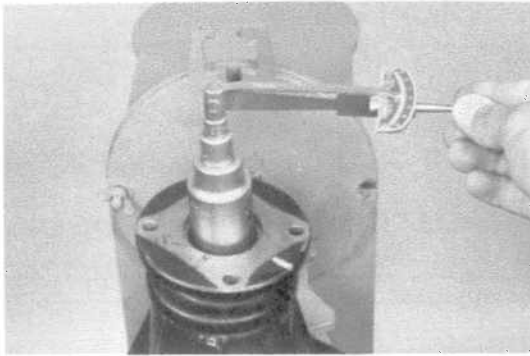
- (b) Check ring gear backlash.

If the backlash is not within specification, adjust the side bearing preload or repair as necessary. (See step 4, page 14-25)

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

- (c) Check the tooth contact. (See step 5, page 14-26)

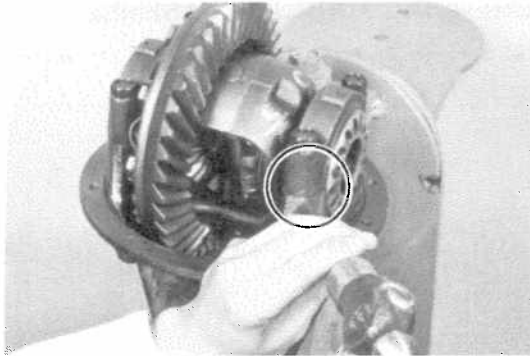




(d) Using a torque meter, measure the total preload.

Total preload (Starting):

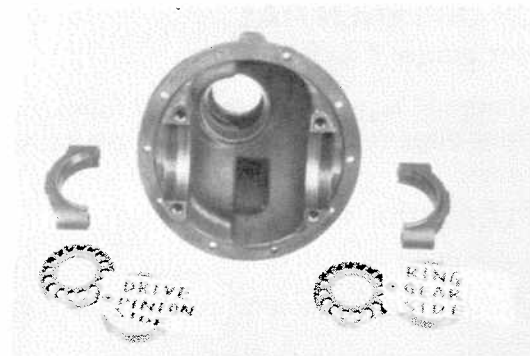
Drive pinion preload plus 4 — 6 kg-cm
(3.5 — 5.2 in.-lb)



2. REMOVE DIFFERENTIAL CASE AND RING GEAR

(a) Put alignment marks on the bearing cap and differential carrier.

(b) Remove two adjusting nut locks.

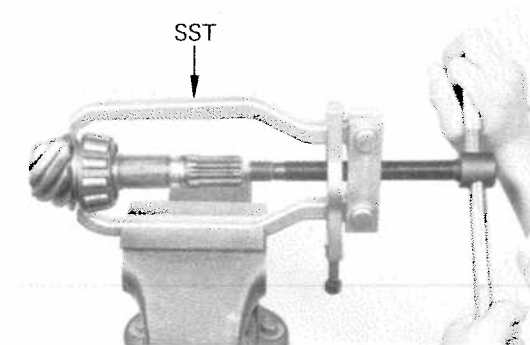


(c) Remove two bearing caps and two adjusting nuts.

(d) Remove the bearing outer races.

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

(e) Remove the differential case from the carrier.



3. REMOVE COMPANION FLANGE, OIL SEAL AND FRONT BEARING (See page 14-9)

4. REMOVE DRIVE PINION FROM DIFFERENTIAL CARRIER

5. REMOVE DRIVE PINION REAR BEARING

Using a universal puller*, remove the rear bearing from the drive pinion.

*SST 09950-20014

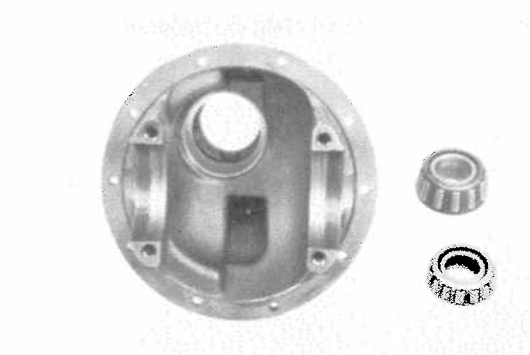
INSPECTION AND REPAIR OF DIFFERENTIAL

1. CLEAN ALL PARTS WITH SOLVENT

2. INSPECT DRIVE PINION BEARINGS AND OUTER RACES

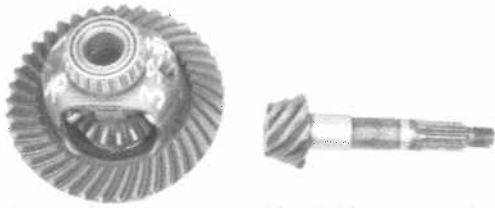
If the bearing or outer race are damaged or worn, replace them as a set.

(See page 14-15)



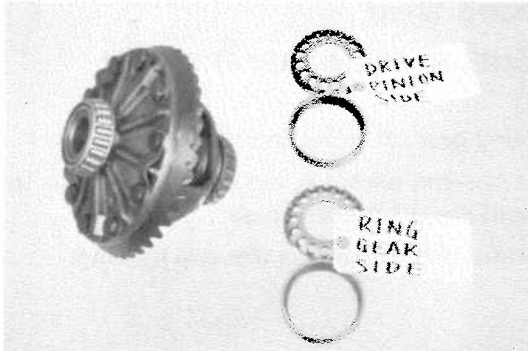
3. INSPECT RING GEAR AND DRIVE PINION

If the ring gear or drive pinion are damaged or worn, replace them as a set. (See page 14-16)



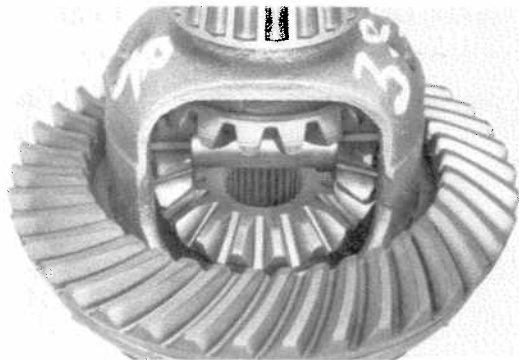
4. INSPECT SIDE BEARINGS AND OUTER RACES

If the side bearings or outer races are damaged or worn, replace the bearing and race. (See page 14-17)



5. INSPECT PINION AND SIDE GEARS

If the pinion or side gears are damaged or worn, replace the gears. (See page 14-17)



6. 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.)

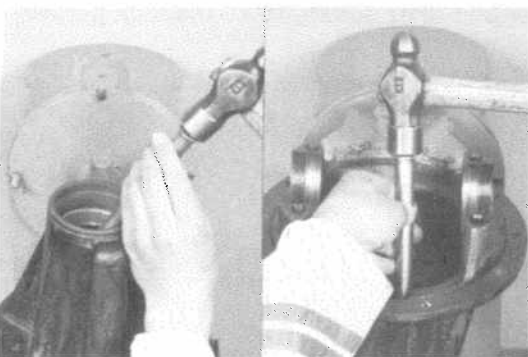
If the backlash is out of specification, install the correct thrust washers. (See page 14-18)

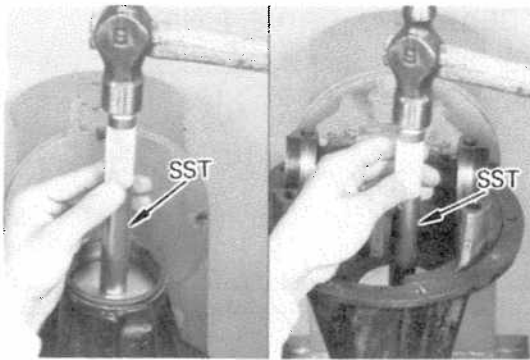


Replacement of Drive Pinion Bearing Outer Races

1. REMOVE FRONT OR REAR DRIVE PINION BEARING OUTER RACE

Using a hammer and punch, drive out the outer race.

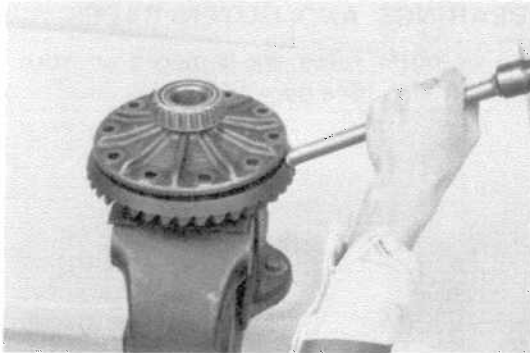




2. INSTALL NEW FRONT OR REAR DRIVE PINION BEARING OUTER RACE

Using a hammer and driver*, drive in a new outer race.

*SST 09608-30011 or Commercial driver

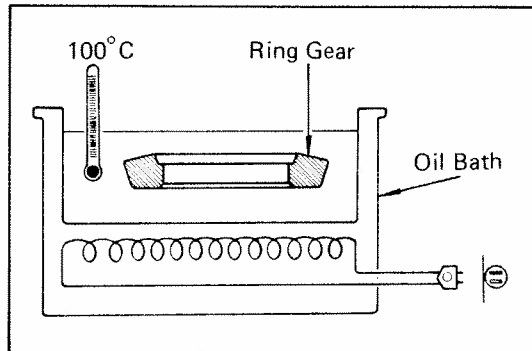


Replacement of Ring Gear

1. REMOVE RING GEAR FROM DIFFERENTIAL CASE

- Remove the ring gear set bolts and lock plates.
- Using a brass bar and hammer, tap on the ring gear to separate it from the differential case.

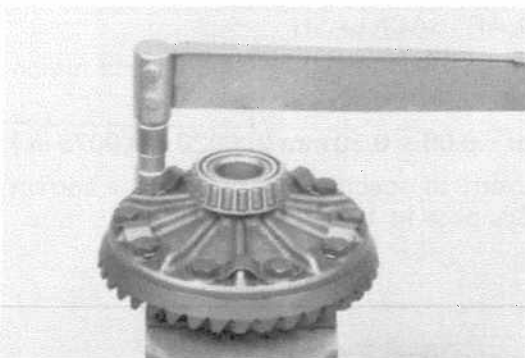
CAUTION: Be careful not to damage the side bearing.



2. INSTALL RING GEAR ON DIFFERENTIAL CASE

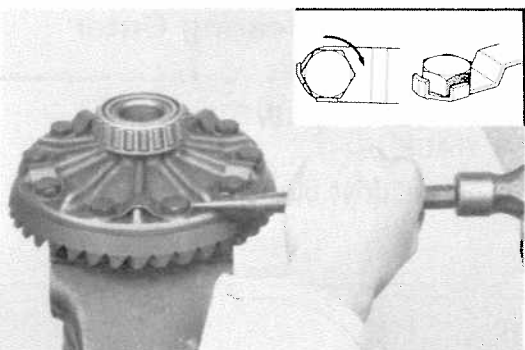
- Clean the contact surface of the differential case.
- Heat the ring gear to 90 – 110°C (194 – 230°F) in an oil bath. Then quickly install the ring gear on the differential case.

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

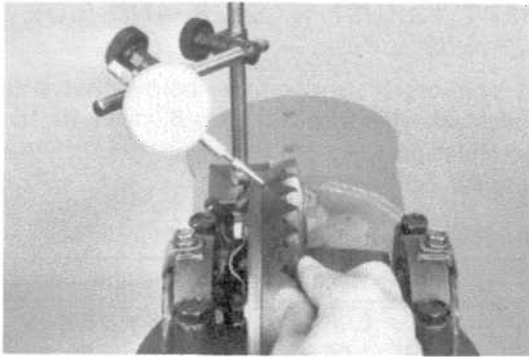


- Coat the ring gear set bolts with gear oil.
- Install the lock plates and set bolts. Tighten the set bolts uniformly, a little at a time. Torque the bolts.

Torque: 920 – 1,050 kg-cm (67 – 75 ft-lb)



- Using hammer and drift punch, stake the lock plates.



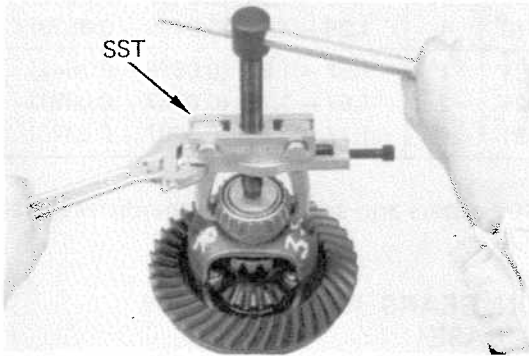
3. CHECK RING GEAR RUNOUT

- Install the differential case in the differential carrier.
- Measure the ring gear runout.

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

Maximum runout:

1/2 ton and 3/4 ton	0.07 mm (0.0028 in.)
C&C and 4 x 4	0.10 mm (0.0039 in.)

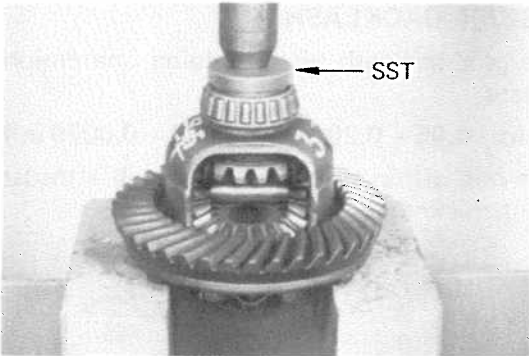


REPLACEMENT OF SIDE BEARINGS

1. REMOVE SIDE BEARINGS FROM DIFFERENTIAL CASE

Using a universal puller*, pull the side bearing from the differential case.

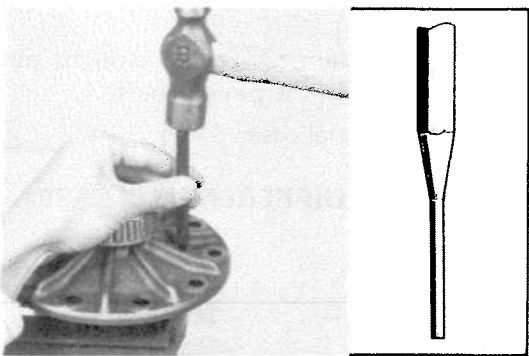
*SST 09950-20014



2. INSTALL NEW SIDE BEARINGS

Using a press and driver*, install a new bearing in the differential case.

*SST 09505-20010 or 09608-30011 or Commercial driver



Replacement of Differential Pinion and Side Gears

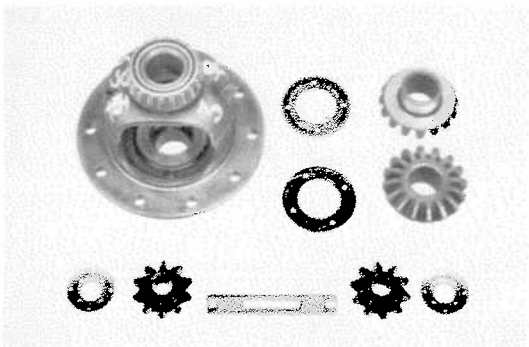
1. REMOVE RING GEAR FROM DIFFERENTIAL CASE (See page 14-16)

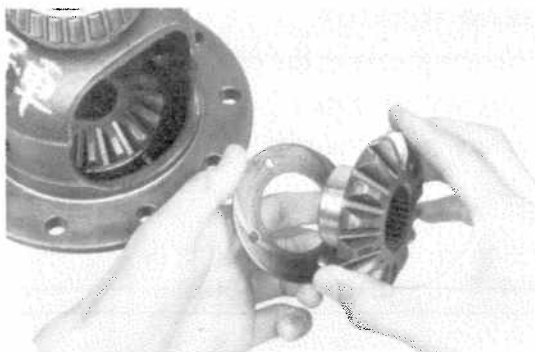
2. DISASSEMBLE DIFFERENTIAL CASE

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

3. INSPECT DIFFERENTIAL CASE PARTS

Replace parts that are damaged or worn.





4. INSTALL CORRECT THRUST WASHER AND SIDE GEARS

- (a) Select thrust washers from the table below that will ensure the backlash measured in step 6, page 14-15, is within specification. Try to select washers of the same thickness for both sides.

Thrust washer thickness

Model	Part No.	No.	Thickness	mm (in.)
1/2 ton and 3/4 ton	41361-30040	1	0.96 – 1.04	(0.0378 – 0.0409)
	41361-30050	2	1.06 – 1.14	(0.0417 – 0.0449)
	41361-30060	3	1.16 – 1.24	(0.0457 – 0.0488)
	41361-30070	4	1.26 – 1.34	(0.0496 – 0.0528)
C&C and 4 x 4	41361-40021	1	1.57 – 1.63	(0.0618 – 0.0642)
	41362-40021	2	1.67 – 1.73	(0.0657 – 0.0681)
	41363-40021	3	1.77 – 1.83	(0.0697 – 0.0720)

- (b) Install thrust washers and side gears in the differential case.

5. INSTALL PINION GEARS AND SHAFT IN DIFFERENTIAL CASE

6. CHECK SIDE GEAR BACKLASH

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

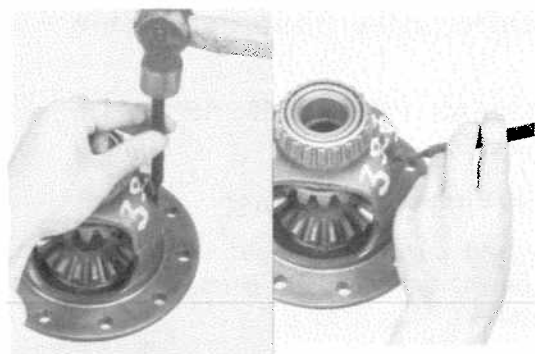
Standard backlash: 0.05 – 0.20 mm (0.0020 – 0.0079 in.)

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



7. INSTALL STRAIGHT PIN

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



8. INSTALL RING GEAR ON DIFFERENTIAL CASE (See page 14-16)

ASSEMBLY OF DIFFERENTIAL (See illustration on page 14-9)

Installation of Drive Pinion (1/2 ton and 3/4 ton)

1. ADJUST DRIVE PINION PROTRUSION

- (a) Install the bearings and adjusting gauge* in the differential carrier in the order listed below:

- (1) Rear bearing
- (2) Base rod
- (3) Drive pinion front bearing
- (4) Collar
- (5) Flange
- (6) Nut
- (7) Base rod head (SST 09536-30030)
- (8) Bolt

*SST 09530-30012 and 09536-30030

NOTE: Tighten the bolt only to the point where the drive pinion gear has no play.

- (b) Place the master gauge on the differential carrier.

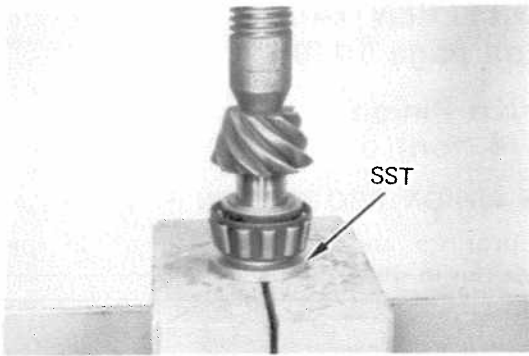
- (c) Align the marks and install the bearing caps. Torque the bearing cap bolts.

Torque: 700 – 900 kg-cm (51 – 65 ft-lb)

- (d) Select a washer that can just be inserted into the clearance between the master gauge and the base rod. Remove the adjusting gauge.

Plate washer thickness (1/2 ton and 3/4 ton)

Part No.	No.	Thickness	mm (in.)	Part No.	No.	Thickness	mm (in.)
90201-35434	1	2.23 – 2.25	(0.0878 – 0.0886)	90201-35401	10	2.50 – 2.52	(0.0984 – 0.0992)
90201-35435	2	2.26 – 2.28	(0.0890 – 0.0898)	90201-35402	11	2.53 – 2.55	(0.0996 – 0.1004)
90201-35436	3	2.29 – 2.31	(0.0902 – 0.0909)	90201-35403	12	2.56 – 2.58	(0.1008 – 0.1016)
90201-35437	4	2.32 – 2.34	(0.0913 – 0.0921)	90201-35404	13	2.59 – 2.61	(0.1020 – 0.1028)
90201-35396	5	2.35 – 2.37	(0.0925 – 0.0933)	90201-35438	14	2.62 – 2.64	(0.1031 – 0.1039)
90201-35397	6	2.38 – 2.40	(0.0937 – 0.0945)	90201-35439	15	2.65 – 2.67	(0.1043 – 0.1051)
90201-35398	7	2.41 – 2.43	(0.0949 – 0.0957)	90201-35440	16	2.68 – 2.70	(0.1055 – 0.1063)
90201-35399	8	2.44 – 2.46	(0.0961 – 0.0969)	90201-35441	17	2.71 – 2.73	(0.1067 – 0.1075)
90201-35400	9	2.47 – 2.49	(0.0972 – 0.0980)				

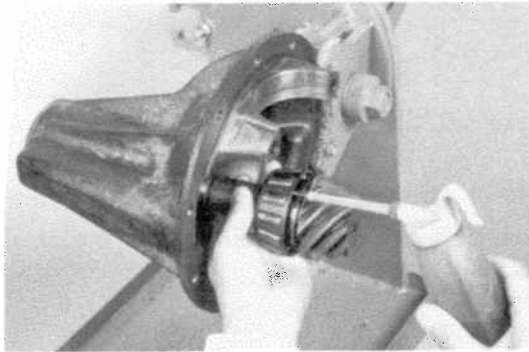


2. INSTALL REAR BEARING AND WASHER ON DRIVE PINION

Using a press and bearing replacer*, press the washer and rear bearing on the drive pinion.

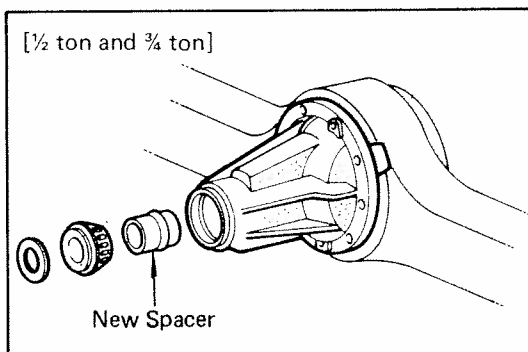
NOTE: The chamfered end of the washer should face toward the gear.

*SST 09506-30011 or Commercial replacer

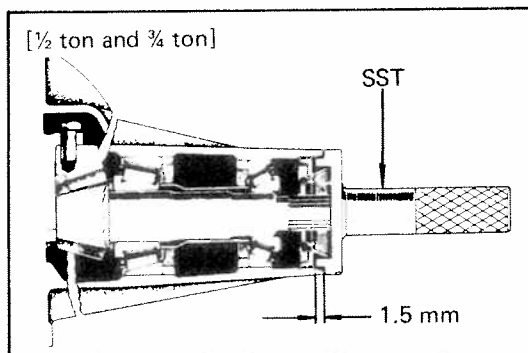


3. INSTALL DRIVE PINION IN DIFFERENTIAL CARRIER

Coat the bearings with gear oil and install the drive pinion.



4. INSTALL NEW BEARING SPACER, FRONT BEARING AND OIL SLINGER

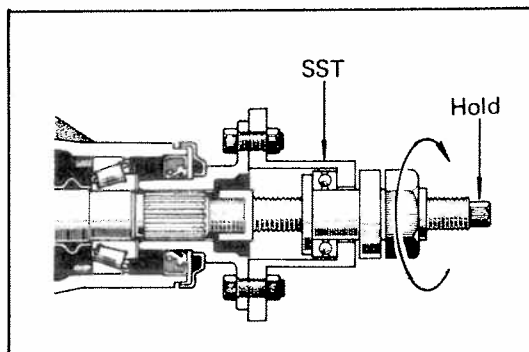


5. INSTALL NEW OIL SEAL

(a) Using a driver*, drive in a new oil seal to a depth of 1.5 mm (0.059 in.).

*SST 09554-30011 or Commercial driver

(b) Apply multipurpose grease to the oil seal.

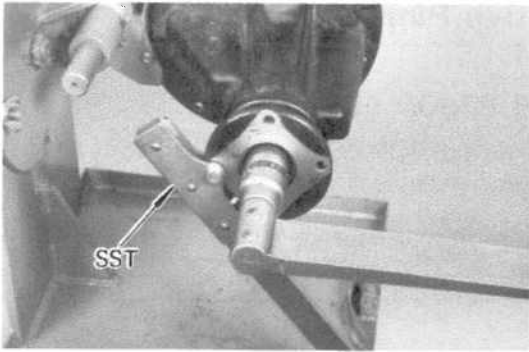


6. INSTALL COMPANION FLANGE

Using a plastic hammer, tap the companion flange on the shaft.

NOTE: If a flange replacer* is available, install the companion flange with it.

*SST 09557-22022

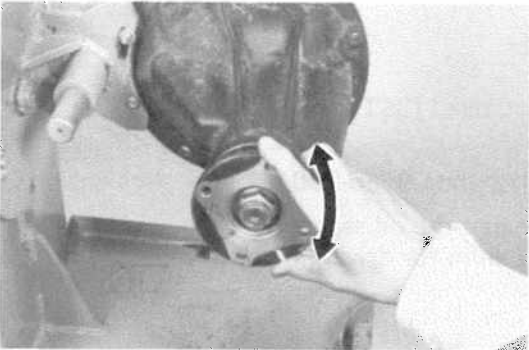


7. TIGHTEN DRIVE PINION NUT AND ADJUST PRELOAD

- (a) Coat the threads of a new nut with multipurpose grease.
- (b) Using a holder* to hold the flange, tighten the nut.
Torque the nut.

Torque: 1,100 kg-cm (80-ft-lb)

*SST 09330-00020 or Commercial holder



- (c) Turn the companion flange several times to snug down the bearing.

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

Preload (starting):

New bearing 12 — 19 kg-cm (10.4 — 16.5 in.-lb)

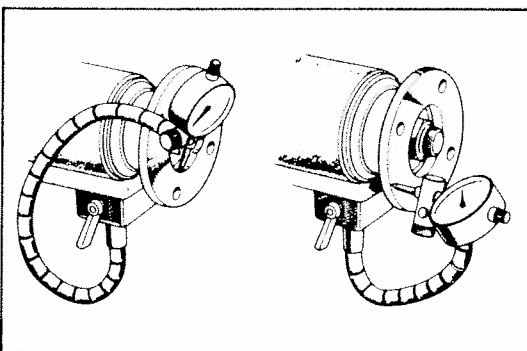
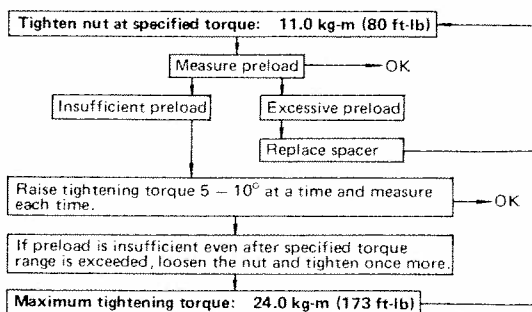
Reused bearing 6 — 10 kg-cm (5.2 — 8.7 in.-lb)

- If preload is greater than specification, replace the bearing spacer.
- If preload is less than specification, retighten the nut 5 — 10° 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 (173 ft-lb)

Preload adjusting procedure (½ ton and ¾ ton)



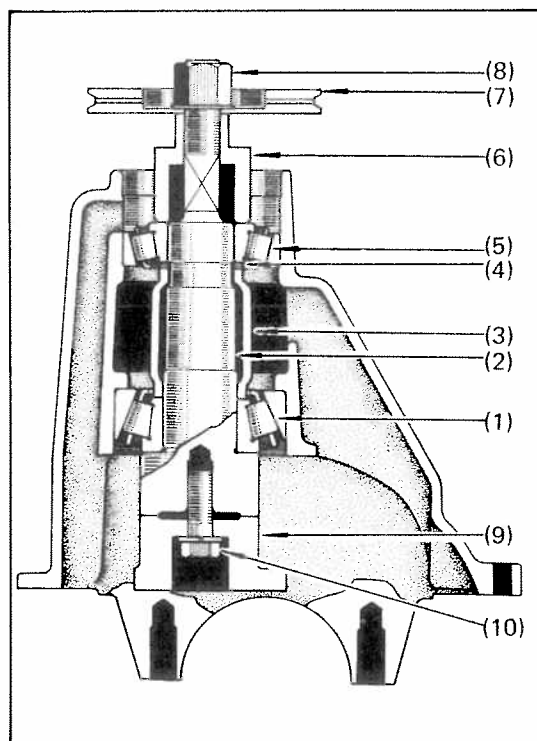
8. CHECK DEVIATION OF COMPANION FLANGE

Using a dial indicator, measure the longitudinal and latitudinal deviation of the companion flange.

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

Maximum longitudinal deviation: 0.10 mm (0.0039 in.)

Maximum latitudinal deviation: 0.10 mm (0.0039 in.)



Installation of Drive Pinion (C & C and 4 × 4)

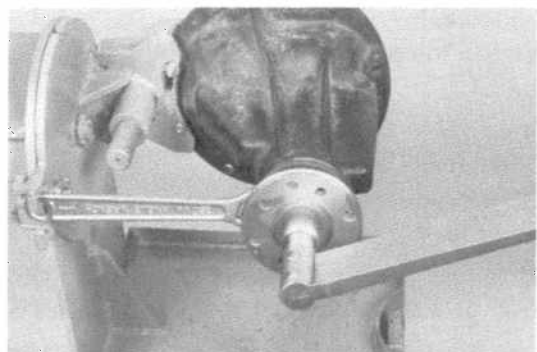
1. ADJUST DRIVE PINION PRELOAD

- (a) Install the bearings, spacer, shim and adjusting gauge* in the differential carrier in the order listed below:

- (1) Drive pinion rear bearing
- (2) Base rod
- (3) Spacer
- (4) Shim
- (5) Drive pinion front bearing
- (6) Collar
- (7) Flange
- (8) Nut
- (9) Base rod head (SST 09536-26010)
- (10) Bolt

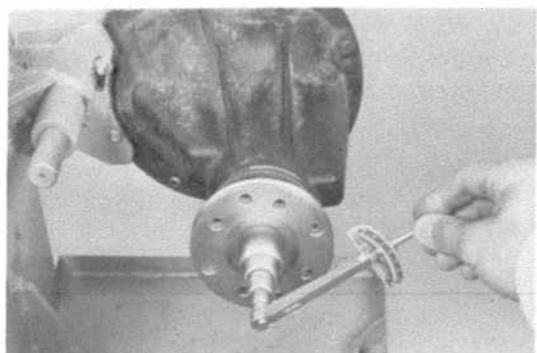
*SST 09530-30012 and 09536-26010

NOTE: Do not install the oil seal.
Do not install the shim for drive pinion height.



- (b) Using a wrench to hold the collar, tighten the nut.
Torque the nut.

Torque: 1,700 – 2,100 kg-cm (123 – 151 ft-lb)



- (c) Using a torque meter, measure the preload.

Preload (starting):

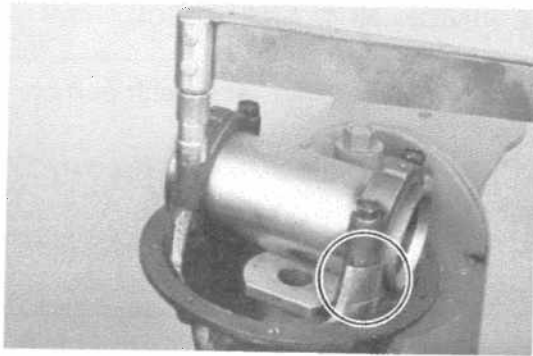
New bearing 19 – 26 kg-cm (16.5 – 22.6 in.-lb)

Reused bearing 9 – 13 kg-cm (7.8 – 11.3 in.-lb)

Shim thickness (C&C and 4 × 4)

Part No.	No.	Thickness mm (in.)
90564-30035	1	0.23 – 0.27 (0.0091 – 0.0106)
90564-30193	2	0.28 – 0.32 (0.0110 – 0.0126)
90564-30194	3	0.33 – 0.37 (0.0130 – 0.0146)
90564-30195	4	0.38 – 0.42 (0.0150 – 0.0165)
90564-30063	5	0.43 – 0.47 (0.0169 – 0.0185)

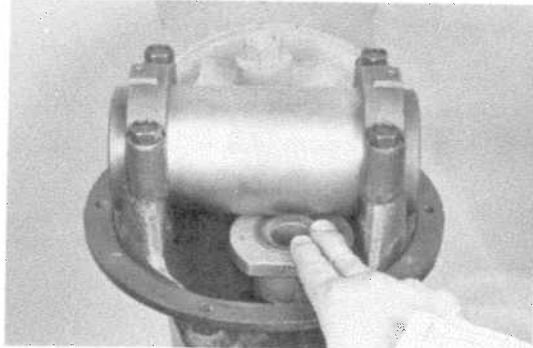
If the preload is not within specification, correct by increasing or decreasing the number of shims.



2. ADJUST DRIVE PINION PROTRUSION

- (a) Place the master gauge on the differential carrier.
- (b) Align the marks and install the bearing caps. Torque the bearing cap bolts.

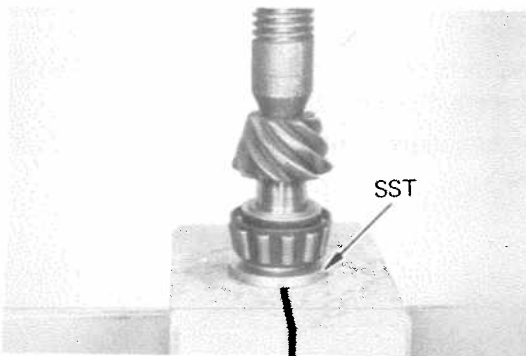
Torque: 700 – 900 kg-cm (51 – 65 ft-lb)



- (c) Select a washer that can just be inserted into the clearance between the master gauge and the base rod. Remove the adjusting gauge.

Plate washer thickness (C&C and 4 x 4)

Part No.	No.	Thickness	mm (in.)	Part No.	No.	Thickness	mm (in.)
90201-35497	1	1.69 – 1.71	(0.0665 – 0.0673)	90201-35508	12	2.02 – 2.04	(0.0795 – 0.0803)
90201-35498	2	1.72 – 1.74	(0.0677 – 0.0685)	90201-35509	13	2.05 – 2.07	(0.0807 – 0.0815)
90201-35499	3	1.75 – 1.77	(0.0689 – 0.0697)	90201-35510	14	2.08 – 2.10	(0.0819 – 0.0827)
90201-35500	4	1.78 – 1.80	(0.0701 – 0.0709)	90201-35511	15	2.11 – 2.13	(0.0831 – 0.0839)
90201-35501	5	1.81 – 1.83	(0.0713 – 0.0720)	90201-35512	16	2.14 – 2.16	(0.0843 – 0.0850)
90201-35502	6	1.84 – 1.86	(0.0724 – 0.0732)	90201-35513	17	2.17 – 2.19	(0.0854 – 0.0862)
90201-35503	7	1.87 – 1.89	(0.0736 – 0.0744)	90201-35514	18	2.20 – 2.22	(0.0866 – 0.0874)
90201-35504	8	1.90 – 1.92	(0.0748 – 0.0756)	90201-35515	19	2.23 – 2.25	(0.0878 – 0.0886)
90201-35505	9	1.93 – 1.95	(0.0760 – 0.0768)	90201-35516	20	2.26 – 2.28	(0.0890 – 0.0898)
90201-35506	10	1.96 – 1.98	(0.0772 – 0.0780)	90201-35517	21	2.29 – 2.31	(0.0902 – 0.0909)
90201-35507	11	1.99 – 2.01	(0.0783 – 0.0791)	90201-35518	22	2.32 – 2.34	(0.0913 – 0.0921)

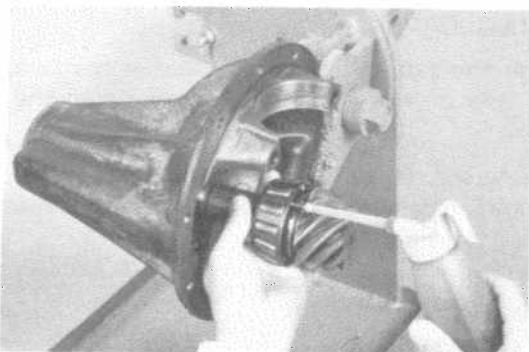


3. INSTALL REAR BEARING AND WASHER ON DRIVE PINION

Using a press and bearing replacer*, press the washer and rear bearing on the drive pinion.

NOTE: The chamfered end of the washer should face the gear.

*SST 09506-30011 or Commercial replacer

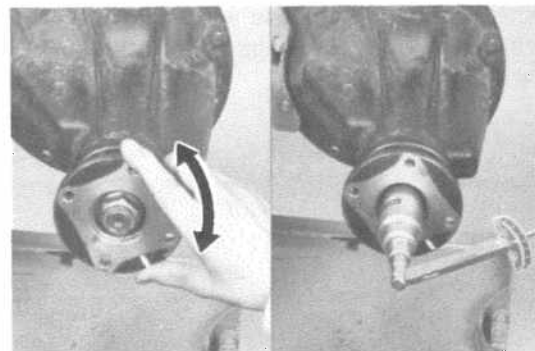


4. INSTALL DRIVE PINION, BEARING SPACER, SHIM, FRONT BEARING AND WASHER IN DIFFERENTIAL CARRIER

Coat the bearings with gear oil and install the drive pinion.

5. INSTALL NEW OIL SEAL (See page 14-11)

6. INSTALL COMPANION FLANGE (See page 14-11)



7. TIGHTEN DRIVE PINION NUT AND CHECK PRELOAD

- (a) Coat the threads of a new nut with multipurpose grease.
- (b) Using a holder* to hold the flange, tighten the nut.
Torque the nut.

Torque: 1,700 – 2,100 kg-cm (123 – 151 ft-lb)

*SST 09330-00020 or Commercial holder

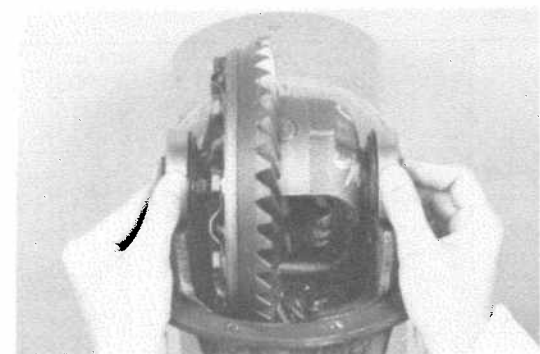
- (c) Turn the companion flange several times to snug down the bearing.
- (d) Using a torque meter, measure the preload.

Preload (starting):

New bearing 19 – 26 kg-cm (16.5 – 22.6 in.-lb)

Reused bearing 9 – 13 kg-cm (7.8 – 11.3 in.-lb)

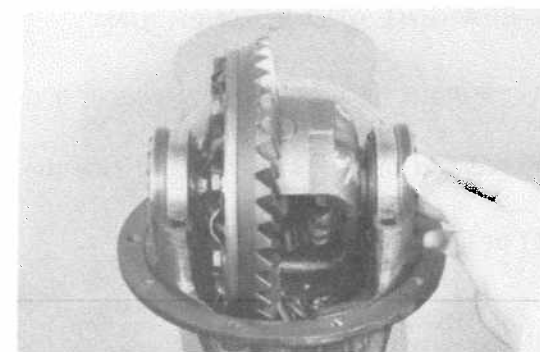
8. CHECK DEVIATION OF COMPANION FLANGE (See page 14-21)



Installation of Differential Case

1. INSTALL DIFFERENTIAL CASE IN CARRIER

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



2. INSTALL ADJUSTING NUTS

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

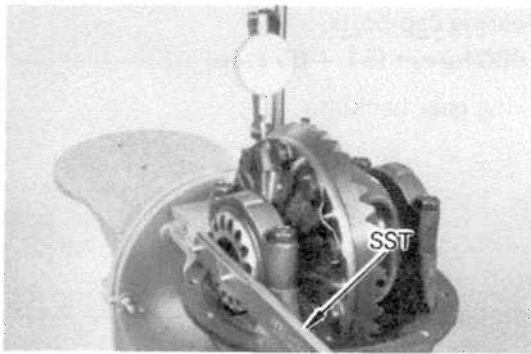
NOTE: Make sure that there is backlash between the ring gear and drive pinion.



3. 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.

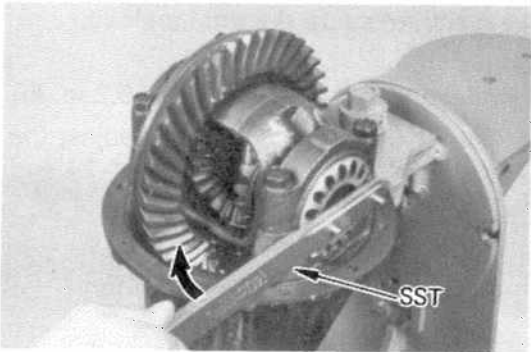
NOTE: If the bearing cap does not fit tightly on the carrier, the adjusting nut threads are not threaded properly. Reinstall adjusting nuts if necessary.



4. ADJUST SIDE BEARING PRELOAD

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

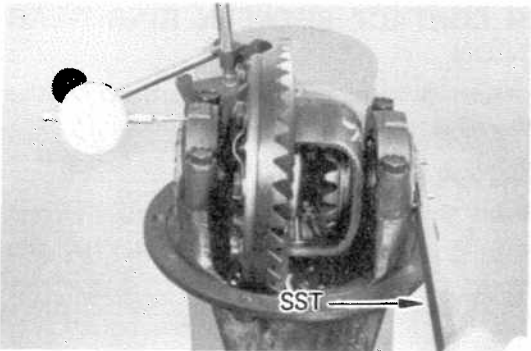
*SST 09504-00010 or Commercial wrench



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

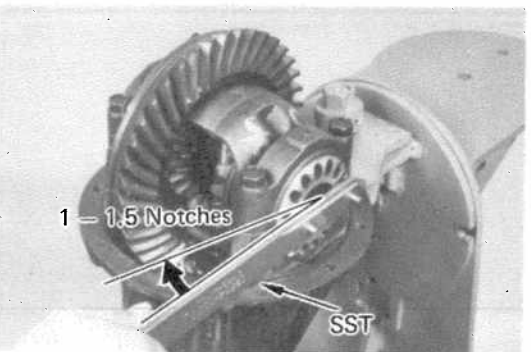
- (d) Check the ring gear backlash.

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

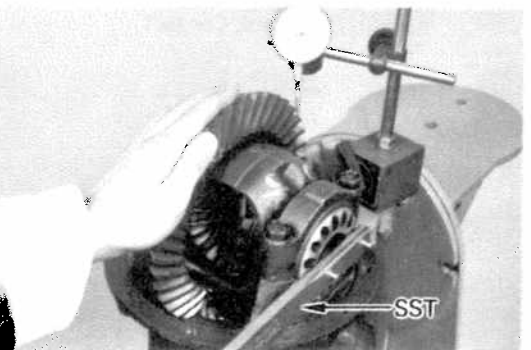


- (e) Place a dial indicator on the top of the bearing cap on the ring gear side.

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



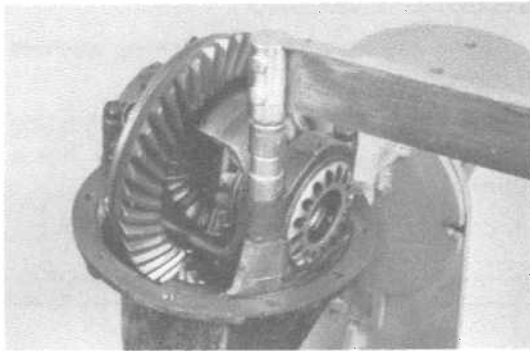
- (g) Tighten the adjusting nut 1 to 1-1/2 notches from the zero preload position.



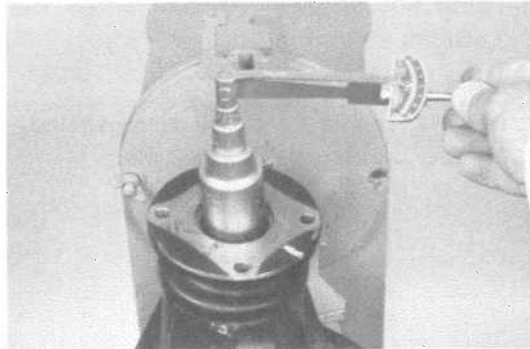
- (h) Using a dial indicator and adjusting nut wrench, adjust the ring gear backlash until the backlash is within specification.

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: 700 — 900 kg-cm (51 — 65 ft-lb)
- (j) Recheck the ring gear backlash.

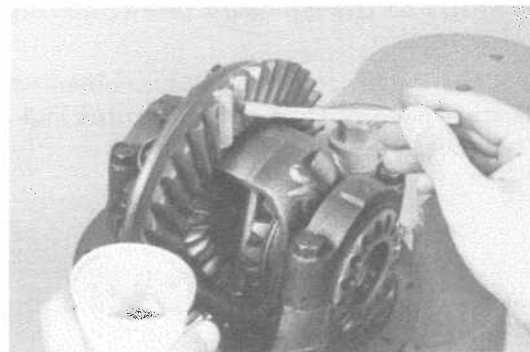


- (k) Using a torque meter, measure the total preload.

Total preload (Starting):

Drive pinion preload plus 4–6 kg-cm (3.5–5.2 in.-lb)

If the total preload is not within specification, readjust the preloads in step 7, page 14-21 or step 7, page 14-24 and step 4, page 14-25.

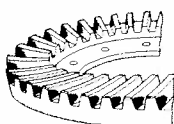


5. INSPECT TOOTH CONTACT BETWEEN RING GEAR AND DRIVE PINION

- (a) Coat 3 or 4 teeth at three different positions on the ring gear with red lead.
- (b) Rotate the ring gear in both directions.
- (c) Inspect the tooth pattern.

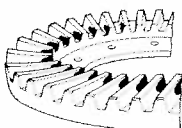
If the teeth are not contacting properly, correct by the method shown below.

Heel Contact



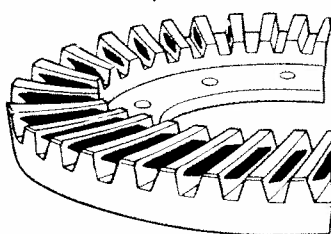
Select a washer that will bring drive pinion closer to ring gear.

Toe Contact

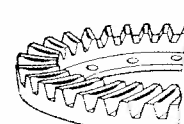


Select a washer that will shift drive pinion away from ring gear.

Proper Contact

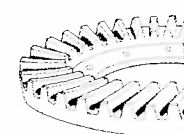


Face Contact

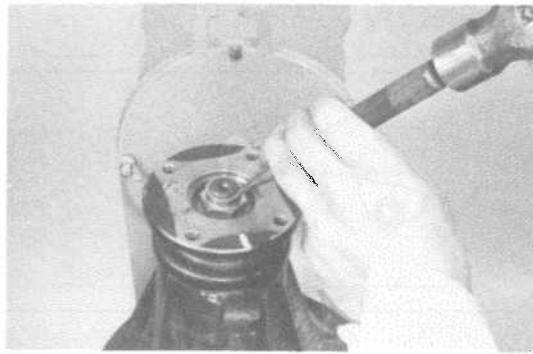


Select a washer that will bring drive pinion closer to ring gear.

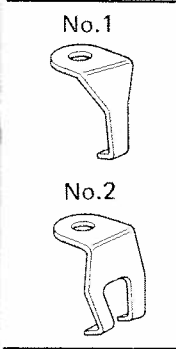
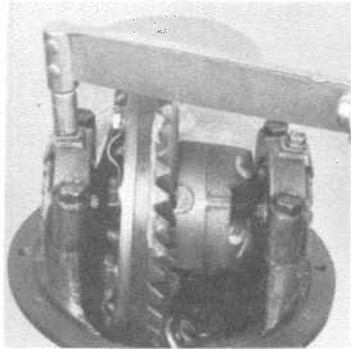
Flank Contact



Select a washer that will shift drive pinion away from ring gear.

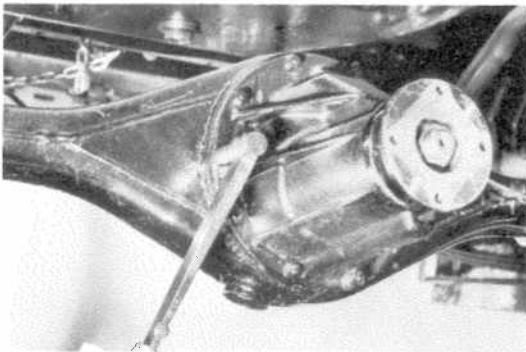


6. STAKE DRIVE PINION NUT



7. INSTALL ADJUSTING NUT LOCKS

- Select lock No. 1 or No. 2 that will fit in the adjusting nuts.
- Install the lock on the bearing caps.

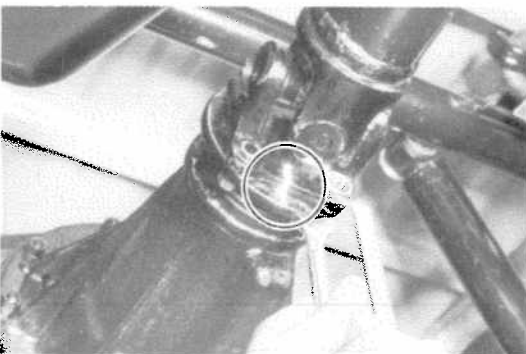


INSTALLATION OF DIFFERENTIAL

1. INSTALL DIFFERENTIAL CARRIER ASSEMBLY

Install differential carrier assembly in the axle and install 10 nuts.

Torque: 200 — 300 kg-cm (15 — 21 ft-lb)



2. CONNECT PROPELLER SHAFT FLANGE TO COMPANION FLANGE (See page 12-8)

Torque four bolts and nuts.

Torque: 300 — 500 kg-cm (22 — 36 ft-lb)

3. INSTALL REAR AXLE SHAFT (See page 14-7)

4. INSTALL DRAIN PLUG AND FILL DIFFERENTIAL WITH GEAR OIL

Differential oil:

API GL-5 hypoid gear oil

SAE 90 above -18°C (0°F)

SAE 80W or 80W-90 below -18°C (0°F)

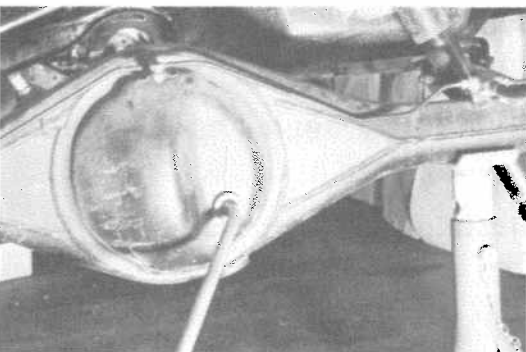
Capacity:

1/2 ton, 3/4 ton

1.7 liters (1.8 US qts, 1.5 Imp.qts)

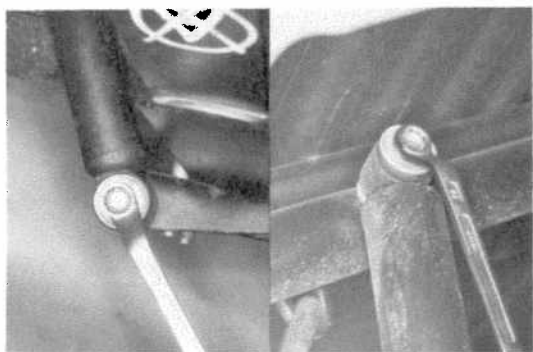
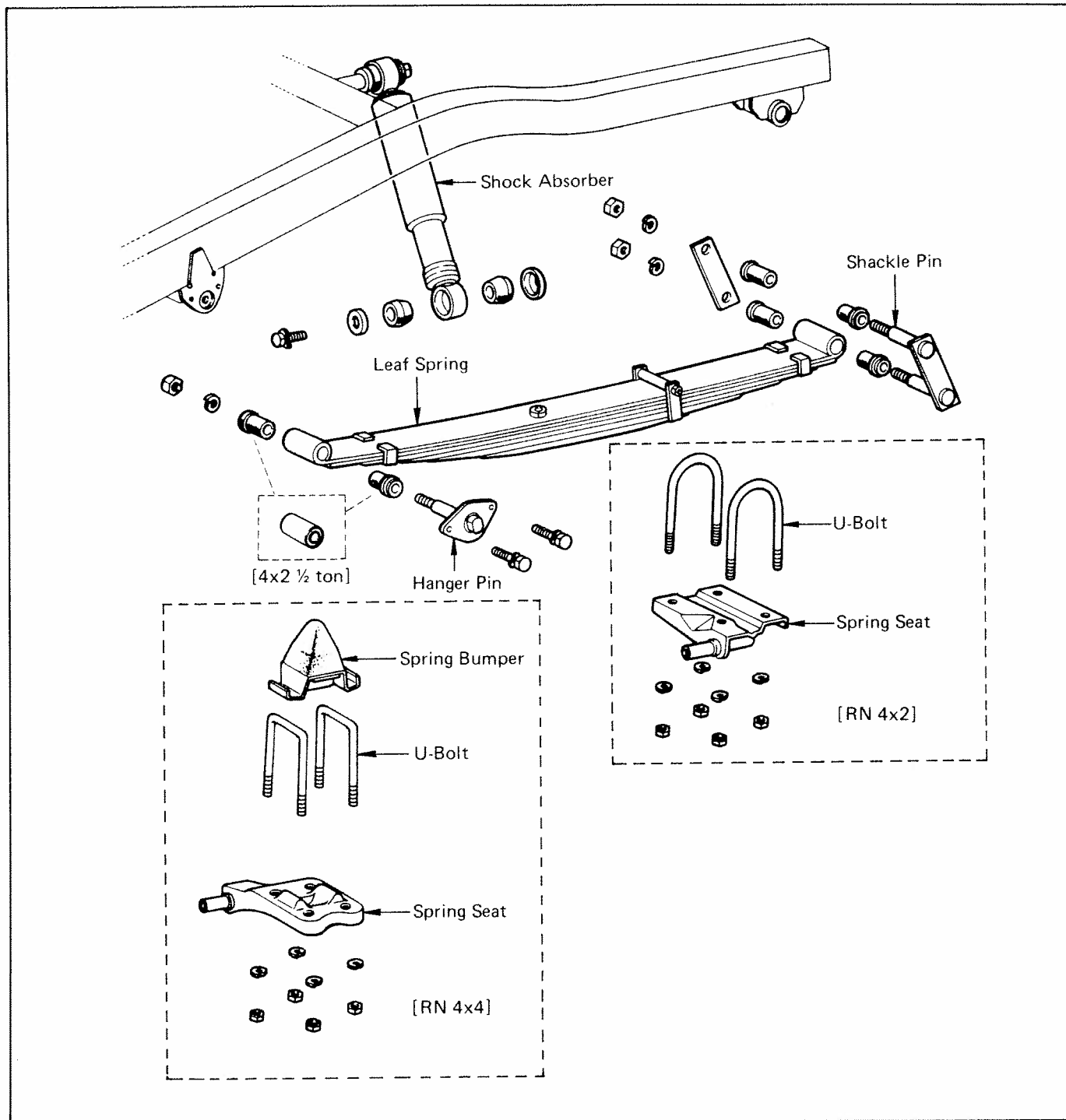
C&C 1.8 liters (1.9 US qts, 1.6 Imp.qts)

4x4 2.2 liters (2.3 US qts, 1.9 Imp.qts)



Install a filler plug.

REAR SUSPENSION



Rear Shock Absorber

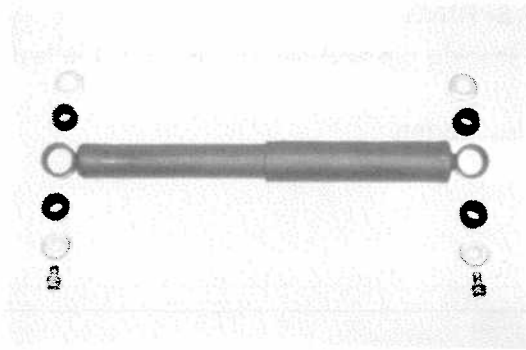
REMOVAL OF REAR SHOCK ABSORBER

1. DISCONNECT SHOCK ABSORBER FROM SPRING SEAT
2. DISCONNECT SHOCK ABSORBER FROM FRAME

INSPECTION OF REAR SHOCK ABSORBER

INSPECT REAR SHOCK ABSORBER

- (a) Inspect the rear shock absorber component parts for wear or damage.
- (b) Inspect the rear shock absorber operation.



INSTALLATION OF REAR SHOCK ABSORBER (See illustration on page 14-28)

1. CONNECT SHOCK ABSORBER TO FRAME

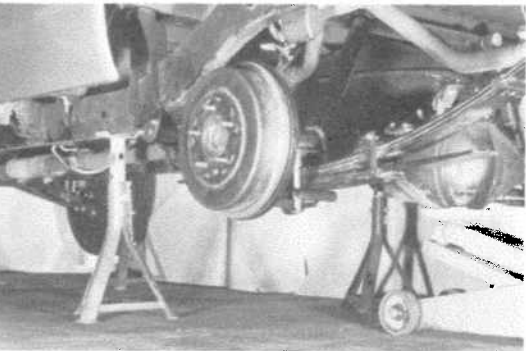
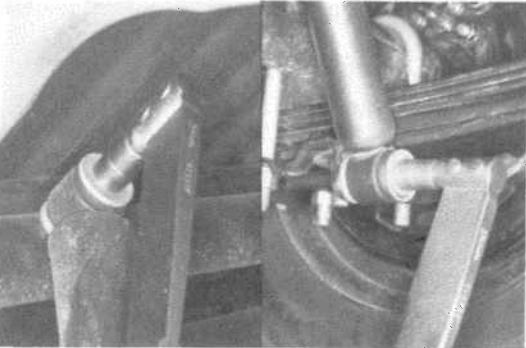
Connect the shock absorber to the frame with the bolt. Tighten the bolt.

Torque: 190 – 310 kg-cm (14 – 22 ft-lb)

2. CONNECT SHOCK ABSORBER TO SPRING SEAT

Connect the shock absorber to the spring seat with the bolt. Tighten the bolt.

Torque: 190 – 310 kg-cm (14 – 22 ft-lb)



Leaf Spring

REMOVAL OF LEAF SPRING

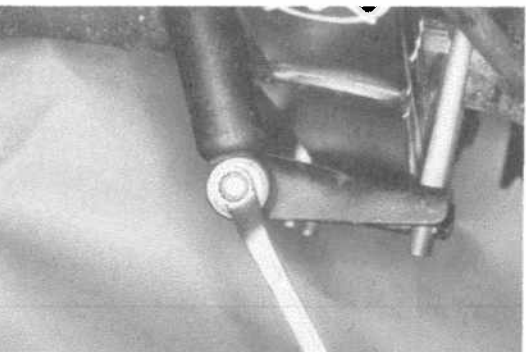
(See illustration on page 14-28)

1. JACK UP AND SUPPORT FRAME

- (a) Jack up and support the frame on the stands.
- (b) Lower the axle housing until the leaf spring force is free, and keep it at this position.

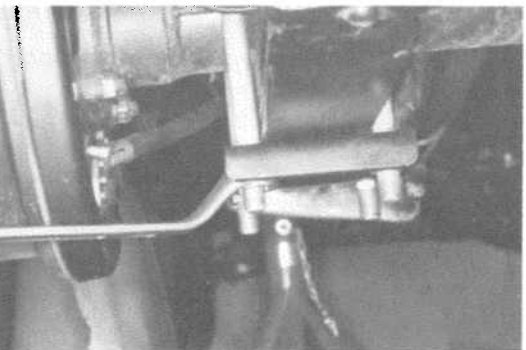
2. DISCONNECT REAR SHOCK ABSORBER FROM SPRING SEAT

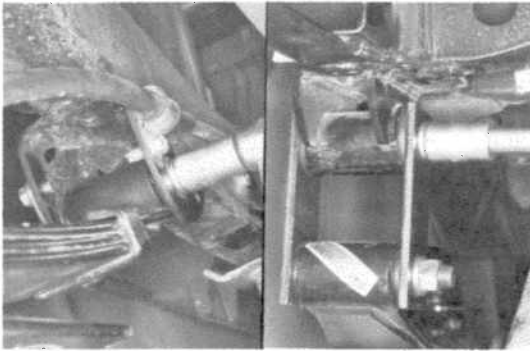
Remove the bolt and disconnect the shock absorber from the spring seat.



3. REMOVE U-BOLTS

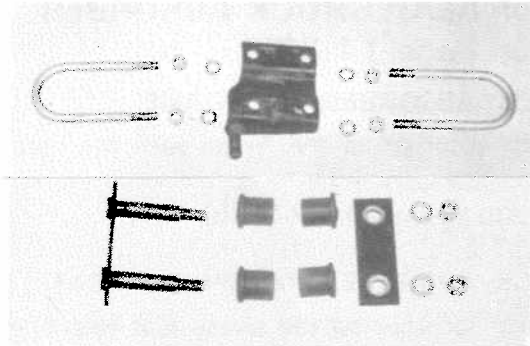
- (a) Remove the U-bolt mounting nuts.
- (b) Remove the following parts:
 - Spring seat
 - U-bolts
 - Spring bumper (4 x 4)





4. REMOVE LEAF SPRING

- (a) Remove the shackle pin and hanger pin from the leaf spring.
- (b) Remove the leaf spring.



INSPECTION OF LEAF SPRING

1. INSPECT U-BOLTS AND SPRING SEAT

Inspect the parts for wear or damage.

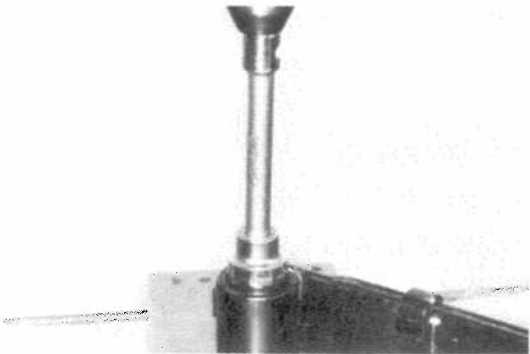
2. INSPECT SHACKLE PIN AND HANGER PIN

Inspect the parts for wear or damage.

3. INSPECT LEAF SPRING

Inspect the leaf spring for weakness or damage.

If the leaf spring is weakened or damaged, replace the leaf.



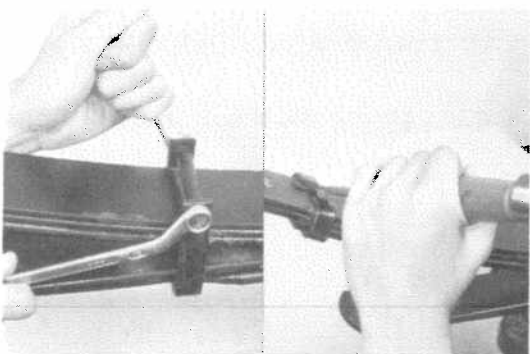
Replacement of Eye Bushing

1. PRESS OUT EYE BUSHING

Using a socket wrench, press out the eye bushing.

2. PRESS IN EYE BUSHING

Using a socket wrench, press in the new eye bushing.



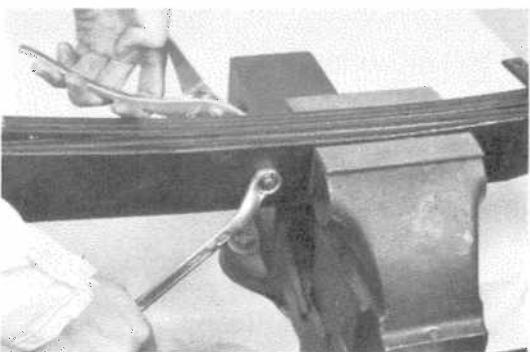
Replacement of Leaf

1. REMOVE CLIP BOLT

Remove the clip bolt and collar from the clip.

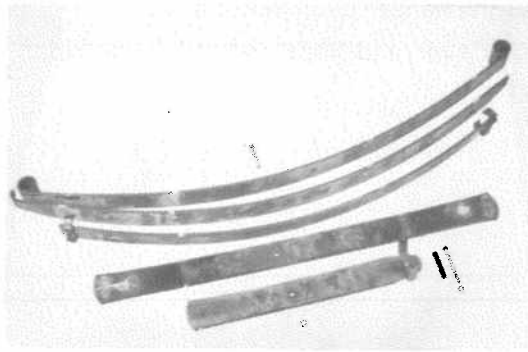
2. PRY UP SPRING CLIP

Using a chisel, pry up the spring clip.



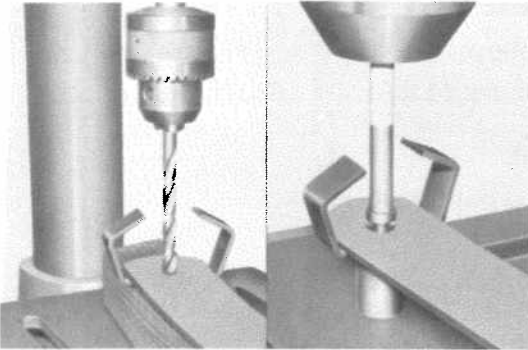
3. REMOVE SPRING CENTER BOLT

Secure the spring with a vise and remove the spring center bolt.



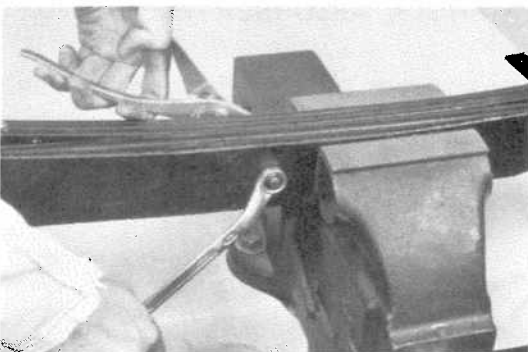
4. INSPECT LEAVES

- (a) Inspect the leaves for weakness or damage.
 - (b) Inspect the spring clip for damage.
- If the spring clip is damaged, replace it.



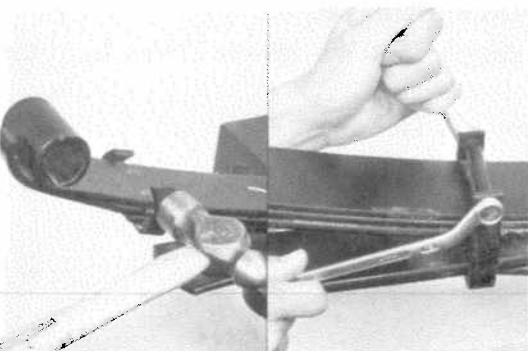
5. IF NECESSARY, REPLACE SPRING CLIP

- (a) Drill off the head of the rivet, then drive it out.
- (b) Install a new rivet into the holes of the spring leaf and clip, then rivet with a press.



6. INSTALL SPRING CENTER BOLT

- (a) Align the leaf holes and secure the leaves with a vise.
- (b) Install and tighten the spring center bolt firmly.
- (c) Stake the nut.

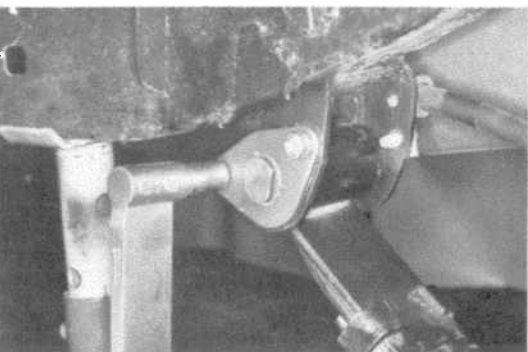


7. INSTALL CLIP BOLT

Position the collar and install the clip bolt. Tighten the bolt.

8. BEND SPRING CLIP

Using a hammer, bend the spring clip into the position.

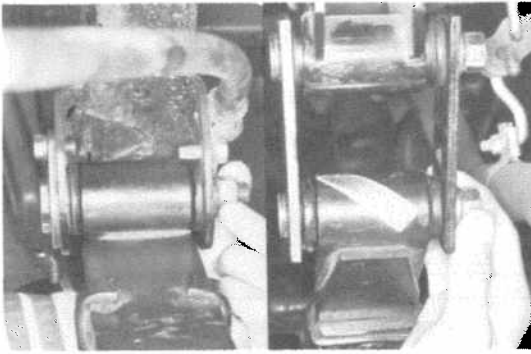


INSTALLATION OF LEAF SPRING (See illustration on page 14-28)

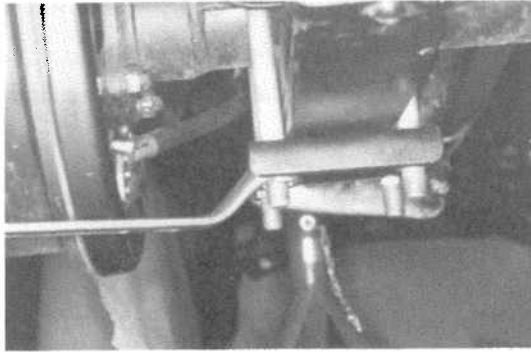
1. INSTALL LEAF SPRING

- (a) Insert the bushings into the frame and into both ends of the spring.
- (b) Place the leaf spring in position, and install the hanger pin. Tighten the bolts.

Torque: 100 — 160 kg-cm (8 — 11 ft-lb)



- (c) Finger tighten the hanger pin mounting nut.
- (d) Install the shackle pin and finger tighten the nuts.

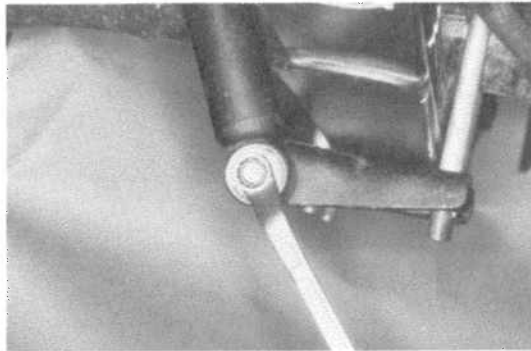


2. INSTALL U-BOLTS

- (a) Install the following parts:
 - Spring bumper (4 x 4)
 - U-bolts
 - Spring seat
- (b) Tighten the U-bolt mounting nuts.

Torque:

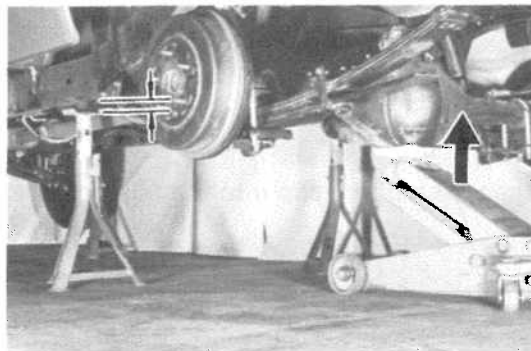
4 x 2	800 – 1,200 kg-cm (58 – 86 ft-lb)
4 x 4	1,000 – 1,500 kg-cm (73 – 108 ft-lb)



3. CONNECT REAR SHOCK ABSORBER TO SPRING SEAT

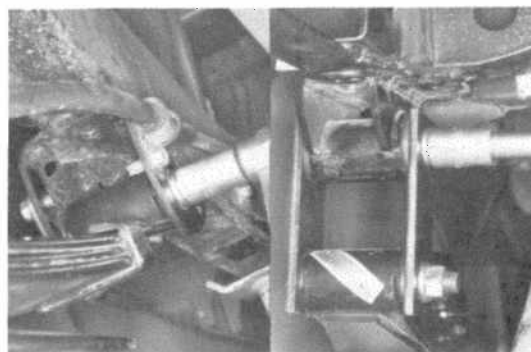
Connect the shock absorber to the spring seat with the bolt. Tighten the bolt.

Torque: 190 – 310 kg-cm (14 – 22 ft-lb)



4. RAISE REAR AXLE HOUSING

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



5. TIGHTEN HANGER PIN AND SHACKLE PIN

Tighten the hanger pin and shackle pin nuts.

Torque: 750 – 1,100 kg-cm (55 – 79 ft-lb)