

# TRANSFER

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## TROUBLESHOOTING

Problem	Possible cause	Remedy	Page
Hard to shift or will not shift	Tires improperly inflated	Inflate tires to proper pressure	13-28
	Front and rear tire size different	Correct tire size	13-28
	Transfer faulty	Disassemble and inspect transfer	11-3
Transfer jumps out of gear	Transfer faulty	Disassemble and inspect transfer	11-3
Oil leak at companion flange	Oil seal worn or damaged	Replace oil seal	11-17, 18
	Wrong oil seal	Correct oil seal	11-17, 18

## SPECIAL TOOLS AND TEST EQUIPMENT

Tool	SST No.	Use
Transmission shift lever remover	09305-20012	To remove transmission shift lever
Companion flange holder	09330-00020 or Commercial	To remove and install companion flange
Companion flange remover	09557-22022	To remove companion flange
Snap ring pliers	09905-00012 or Commercial	To remove snap ring
Universal pullers	09950-20014 or Commercial	To remove input gear bearing and counter gear bearing
Bearing replacer	09316-60010 or Commercial	To install input gear bearing, output shaft bearing, counter gear bearing, idler gear bearing and front drive gear bearing
Oil seal puller	09308-00010 or Commercial	To remove extension housing oil seal and oil pump screw oil seal
Bearing replacer	09310-35010 or Commercial	To remove and install front case roller bearing To install rear case roller bearing and oil pump screw oil seal
Bearing puller	09612-30012 or Commercial	To remove front case roller bearing and rear case roller bearing
Transmission oil plug	09325-20010 or Commercial	To install extension housing oil seal To remove and install front drive gear bearing retainer oil seal

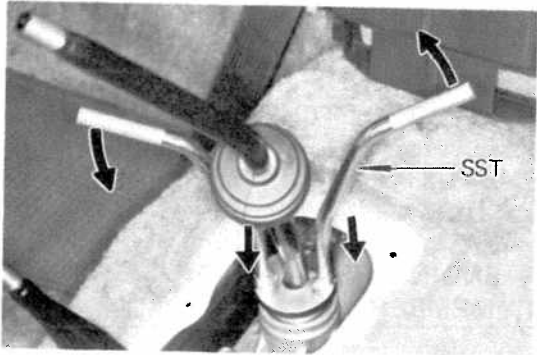
## TRANSFER

### REMOVAL OF TRANSFER

1. REMOVE TRANSMISSION SHIFT LEVER FROM INSIDE OF VEHICLE

Using SST\*, remove the transmission shift lever from the transmission.

\*SST 09305-20012

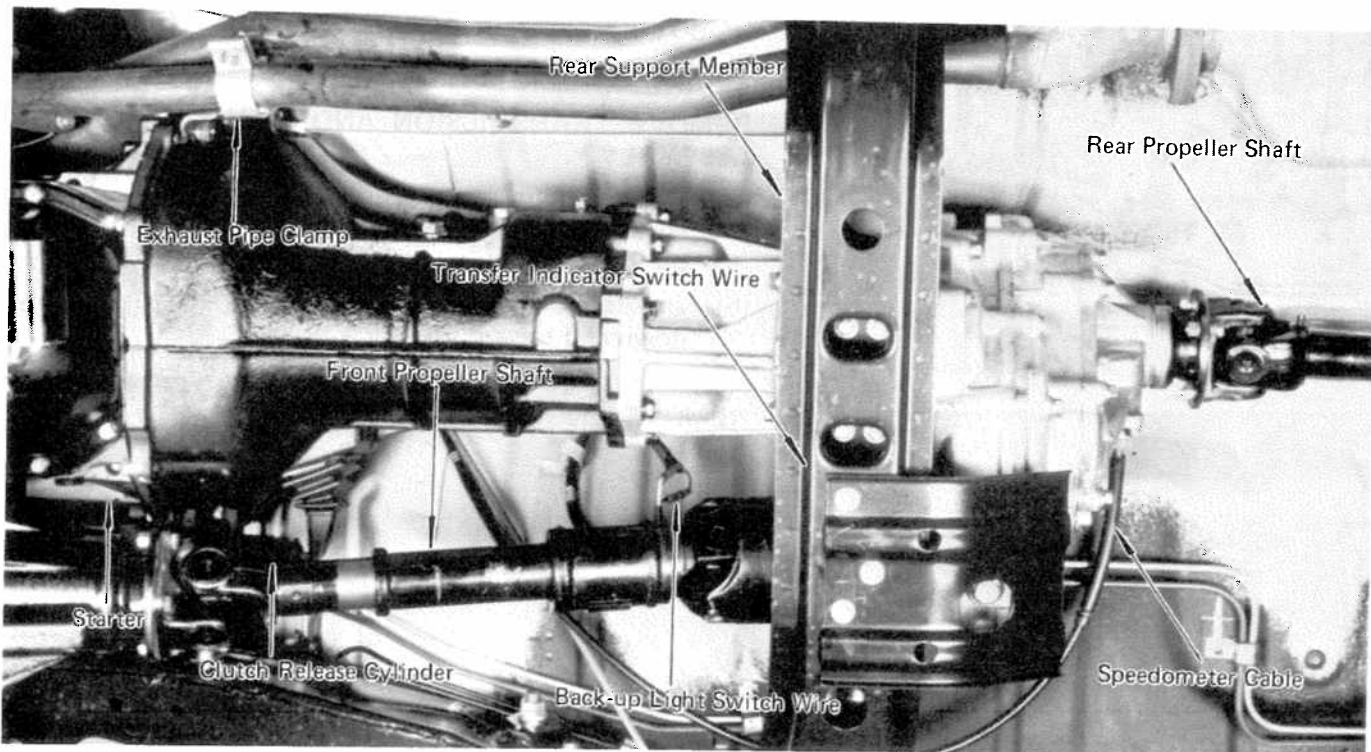
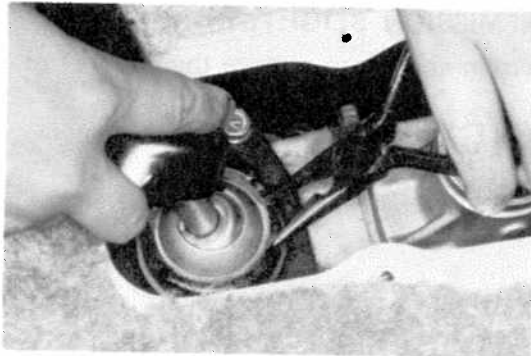


2. REMOVE TRANSFER SHIFT LEVER FROM INSIDE OF VEHICLE

Using pliers remove the transfer shift lever from the transfer.

3. RAISE VEHICLE AND DRAIN TRANSMISSION AND TRANSFER

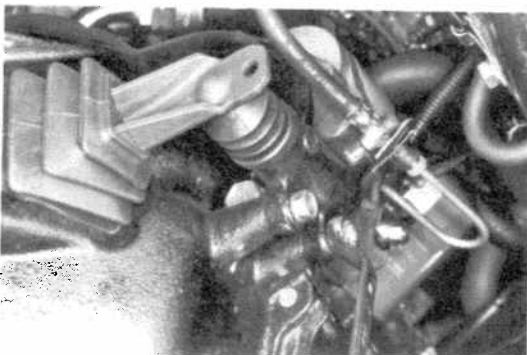
**CAUTION:** Be sure the vehicle is securely supported.

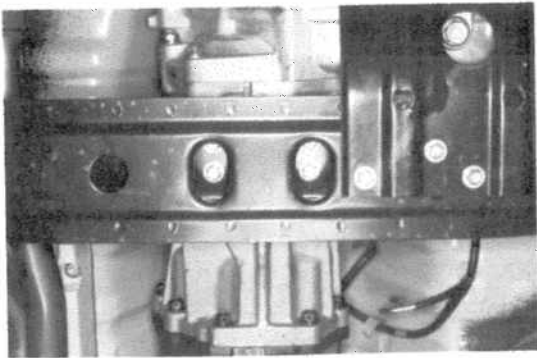


4. REMOVE PROPELLER SHAFT (See page 12-3)

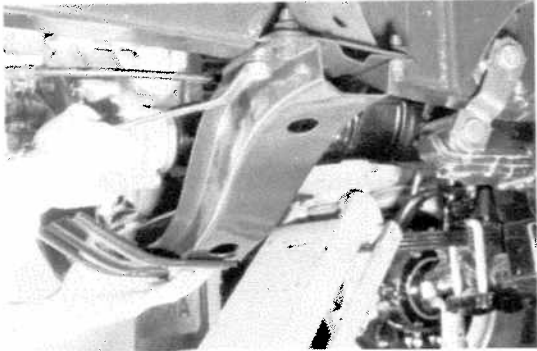
5. REMOVE CLUTCH RELEASE CYLINDER AND STARTER

- (a) Remove the release cylinder mounting bolts and the starter mounting bolt and nut.
- (b) Lay the release cylinder and starter alongside the engine.





6. DISCONNECT SPEEDOMETER CABLE
7. DISCONNECT BACK-UP LIGHT SWITCH WIRE AND TRANSFER INDICATOR SWITCH WIRE
8. DISCONNECT EXHAUST PIPE CLAMP FROM TRANSMISSION HOUSING
9. REMOVE FOUR ENGINE REAR MOUNTING BOLTS FROM SUPPORT MEMBER



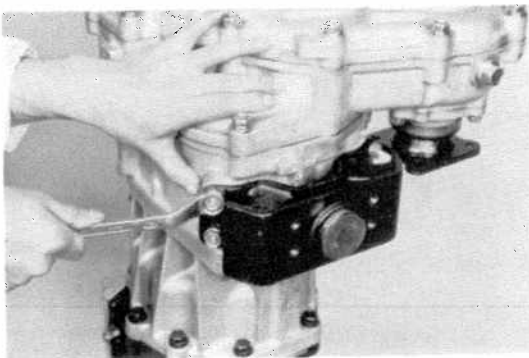
10. JACK UP TRANSMISSION SLIGHTLY  
Raise the transmission enough to remove the weight from the rear support.
11. REMOVE REAR SUPPORT MEMBER  
Remove eight bolts, and remove the support member.



12. REMOVE REMAINING TRANSMISSION HOUSING BOLTS

13. REMOVE TRANSMISSION AND TRANSFER ASSEMBLY

- (a) Place a safety support with a wooden block under the engine and lower the jack until the engine is resting on the support.
- (b) Draw out the transmission and transfer assembly down and toward the rear.

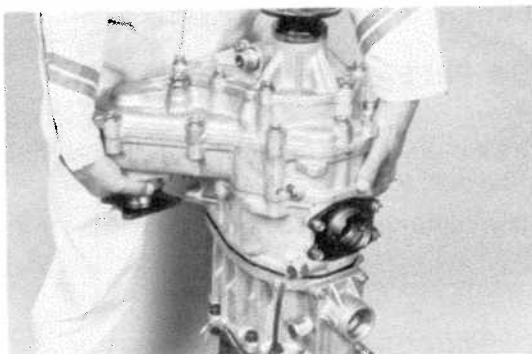


14. REMOVE ENGINE REAR MOUNTING

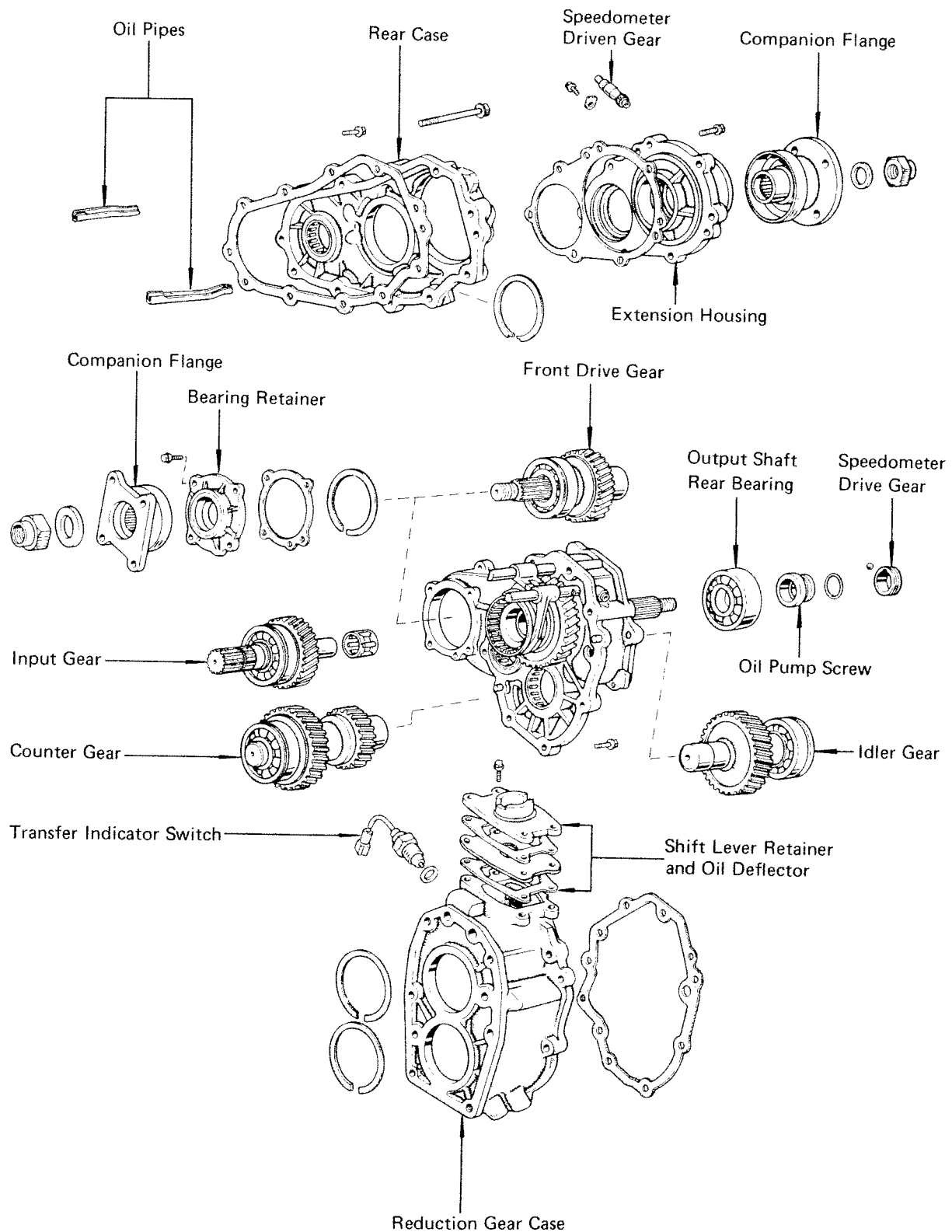
15. REMOVE TRANSFER FROM TRANSMISSION

- (a) Remove the transfer adapter rear mounting bolts.
- (b) Pull the transfer straight up and remove it from the transmission.

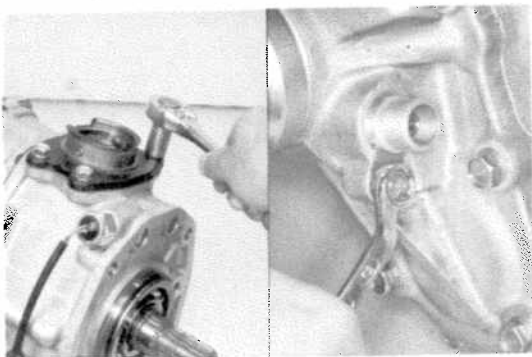
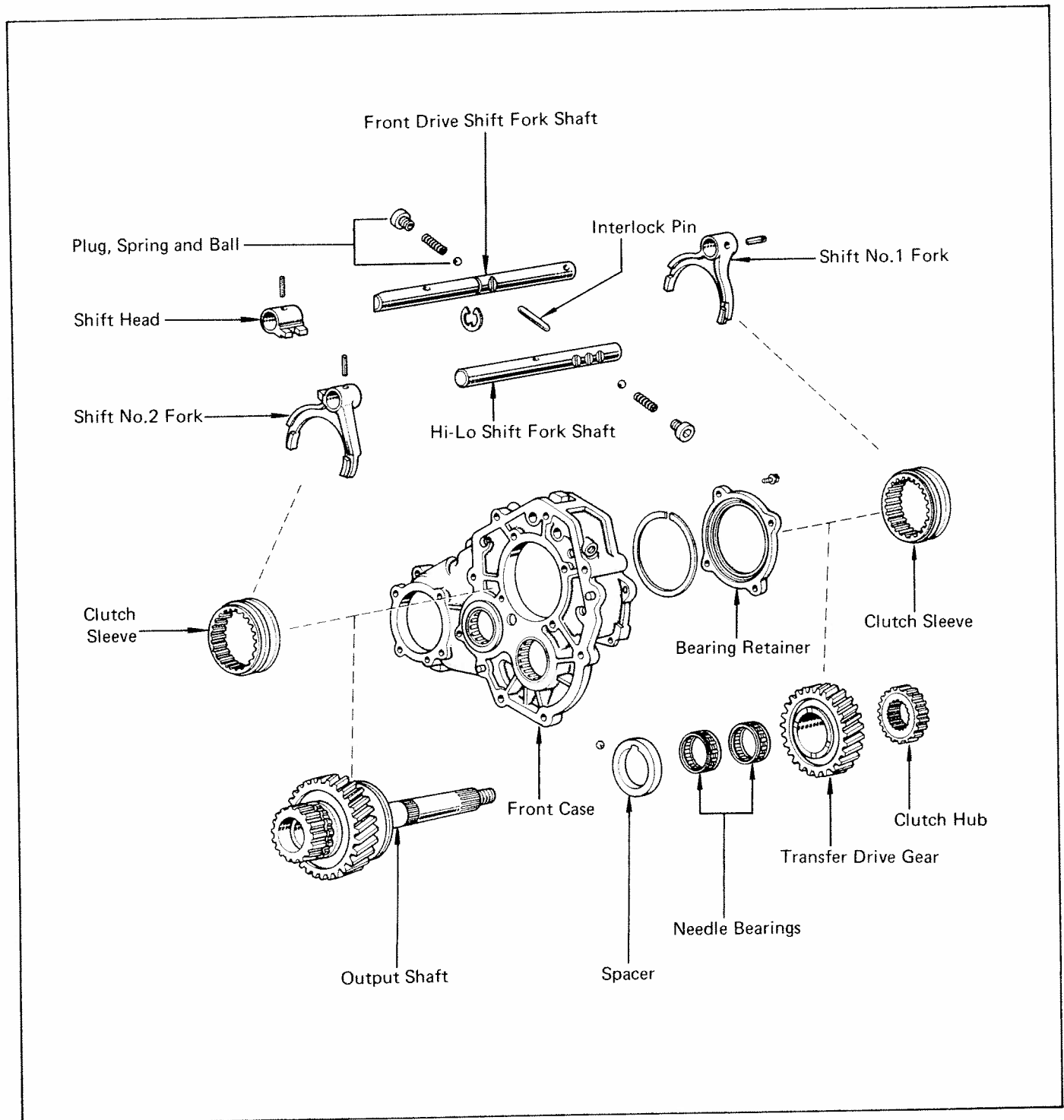
**CAUTION:** Take care not to damage the adapter rear oil seal by the transfer input gear spline.



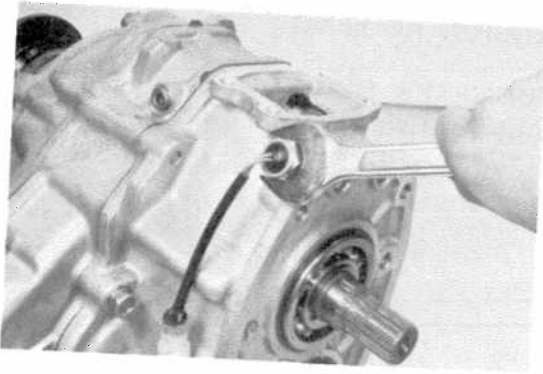
## TRANSFER DISASSEMBLY VIEW



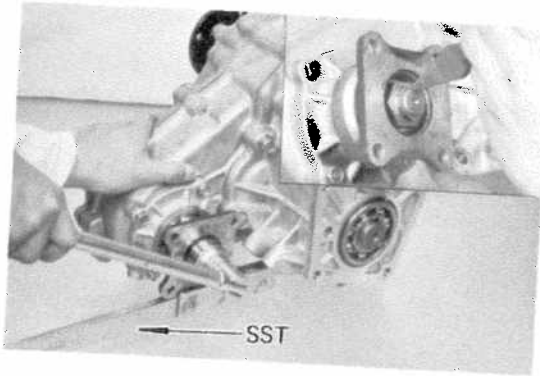
## TRANSFER DISASSEMBLY VIEW (CONT'D)

**DISASSEMBLY OF TRANSFER**

1. REMOVE TRANSFER SHIFT LEVER RETAINER AND OIL DEFLECTOR
2. REMOVE SPEEDOMETER DRIVEN GEAR



### 3. REMOVE TRANSFER INDICATOR SWITCH



### 4. REMOVE FRONT COMPANION FLANGE

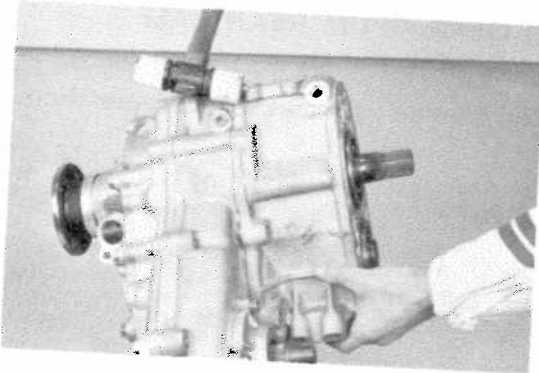
- Using a hammer and chisel, loosen the staked part of the nut.
- Using a holder\* to hold the flange, remove the nut.  
\*SST 09330-00020 or Commercial holder
- Using a hammer, tap the companion flange off the shaft.

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

\*SST 09557-22022

### 5. REMOVE REDUCTION GEAR CASE

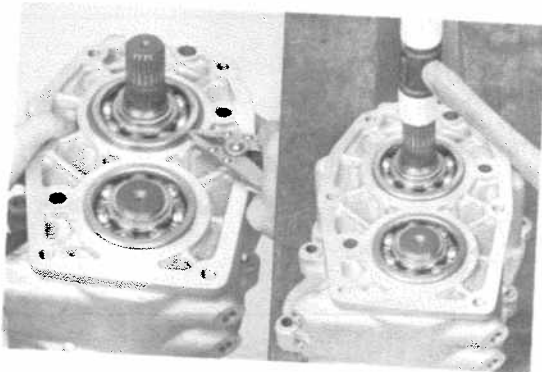
- Remove the four long mounting bolts and four short ones.
- Using a plastic hammer, remove the reduction gear case with the input gear and counter gear.



### 6. REMOVE INPUT GEAR AND COUNTER GEAR FROM REDUCTION GEAR CASE

- Using a snap ring pliers, remove the two snap rings.
- Using a plastic hammer, tap out the input gear and counter gear from the reduction gear case.

NOTE: Place the reduction gear case on something soft such as wooden blocks.

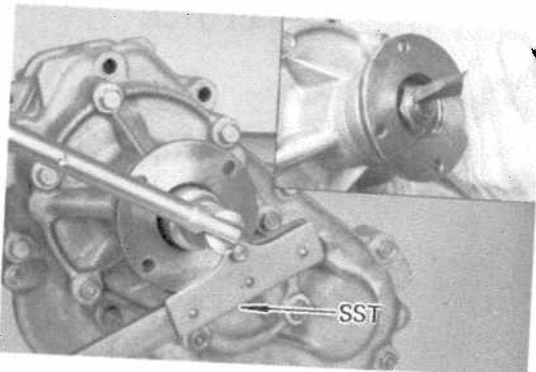


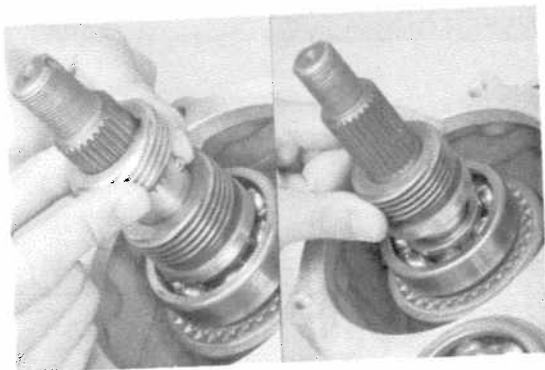
### 7. REMOVE REAR COMPANION FLANGE

- Using a hammer and chisel, loosen the staked part of the nut.
- Using a holder\* to hold the flange, remove the nut.  
\*SST 09330-00020 or Commercial holder
- Using a hammer, tap the companion flange off the shaft.

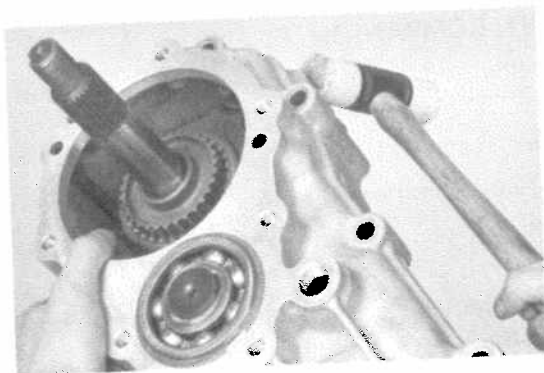
NOTE: If a flange remover\* is available, remove the companion flange with it.

\*SST 09557-22022





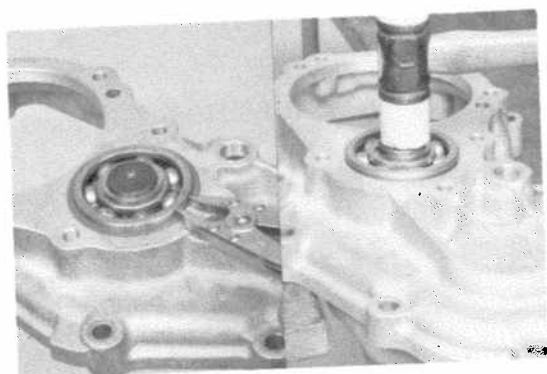
8. REMOVE EXTENSION HOUSING
9. REMOVE SPEEDOMETER DRIVE GEAR, STEEL BALL, OIL PUMP SCREW AND BEARING



#### 10. REMOVE REAR CASE

- (a) Remove the six mounting bolts.
- (b) Using a plastic hammer, remove the rear case with the idler gear.

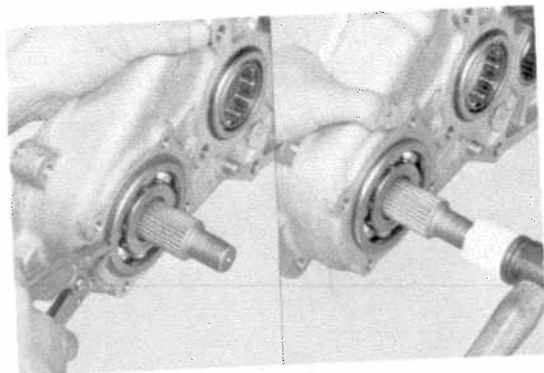
NOTE: Hold the front case so the rear is not lowered. If it is lowered, the clutch hub and steel ball may fall out.



#### 11. REMOVE IDLER GEAR FROM REAR CASE

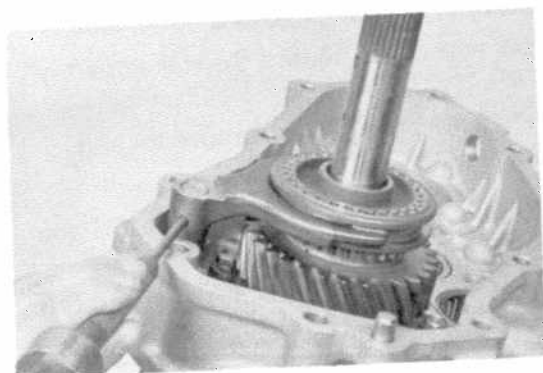
- (a) Using a snap ring pliers, remove the snap ring.
- (b) Using a plastic hammer, tap out the idler gear from the rear case.

NOTE: Place the rear case on something soft such as wooden blocks.



#### 12. REMOVE FRONT DRIVE GEAR

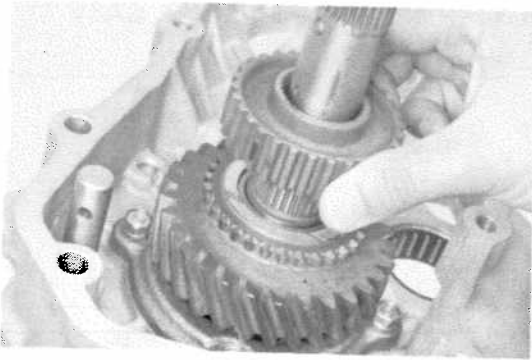
- (a) Using a snap ring pliers, remove the snap ring.
- (b) Using a plastic hammer, tap out the front drive gear from the front case.



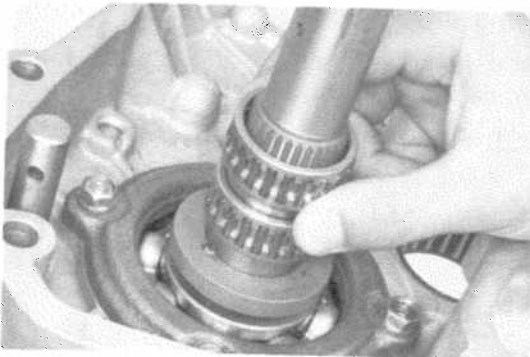
#### 13. REMOVE SHIFT NO.1 FORK AND CLUTCH SLEEVE

- (a) Shift the shift fork shafts to the high-two position.
- (b) Using a pin punch, drive out the slotted spring pin.
- (c) Remove the shift No. 1 fork together with the clutch sleeve.

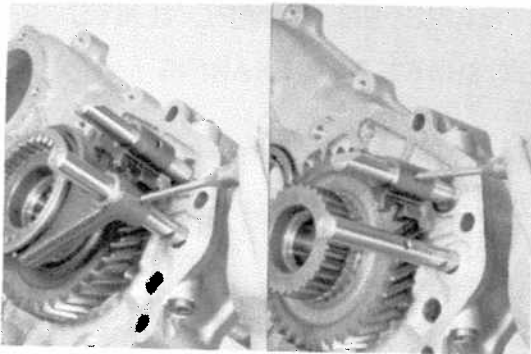




**14. REMOVE CLUTCH HUB AND TRANSFER DRIVE GEAR**



**15. REMOVE NEEDLE ROLLER BEARINGS, NO. 2 SPACER AND STEEL BALL**

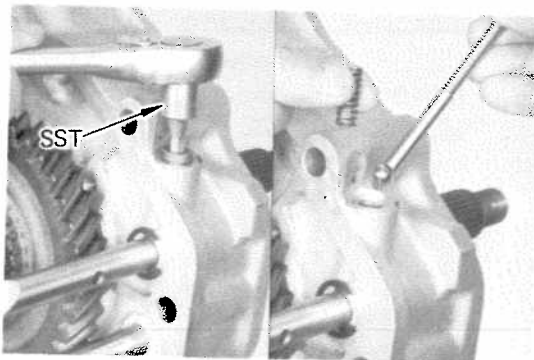


**16. REMOVE SHIFT NO. 2 FORK AND CLUTCH SLEEVE**

Using a pin punch, drive out the slotted spring pin and remove the shift No.2 fork together with the clutch sleeve.

**17. REMOVE SHIFT HEAD**

Using a pin punch, drive out the slotted spring pin, and remove the shift head.

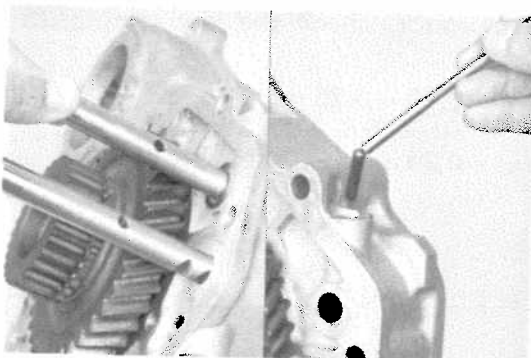


**18. REMOVE STRAIGHT SCREW PLUGS SPRINGS AND BALLS**

- (a) Using an Allen wrench\*, remove the plug on the right side.

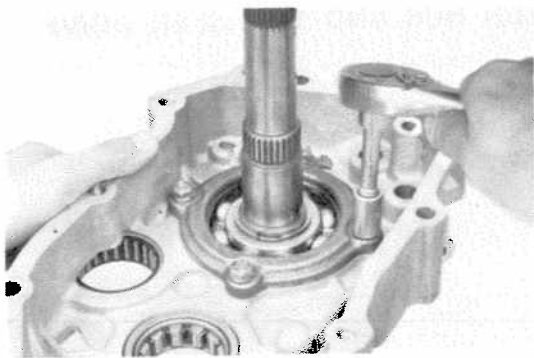
\*SST 09313-30020 or Commercial wrench

- (b) Using a magnet, remove the spring and ball.  
(c) Remove the plug, spring and ball on the left side by the same procedure.



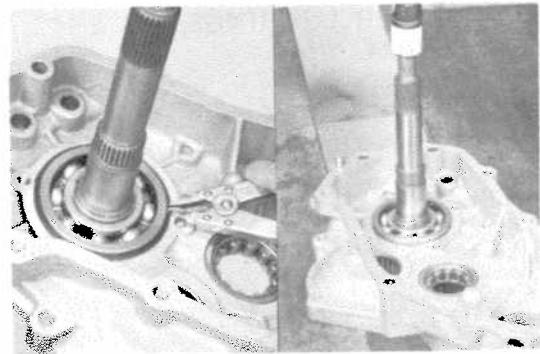
**19. REMOVE TWO SHIFT FORK SHAFTS AND INTERLOCK PIN**

- (a) Remove the front drive shift fork shaft.  
(b) Using a magnet, remove the interlock pin.  
(c) Remove the high—low shift fork shaft.



## 20. REMOVE OUTPUT SHAFT FROM FRONT CASE

(a) Remove the bearing retainer.



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

(c) Using a plastic hammer, tap out the output shaft from the front case.

NOTE: Place the front case on something soft such as wooden blocks.

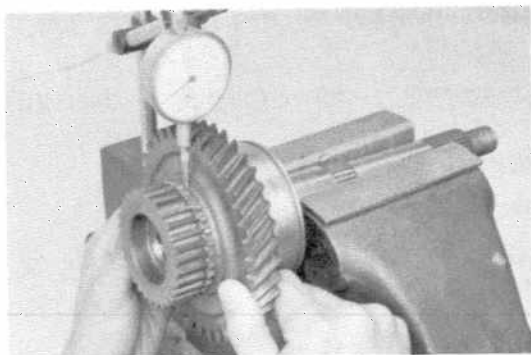


## INSPECTION OF TRANSFER COMPONENTS

### 1. INSPECT OUTPUT SHAFT AND BEARING

(a) Check for wear or damage.

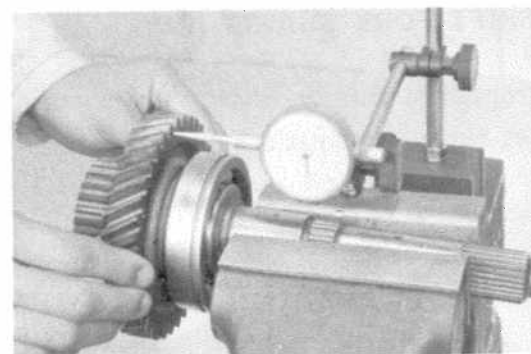
If bearing is worn or damaged, replace it.



(b) Using a dial indicator, check the low gear oil clearance.

Standard clearance: 0.010 – 0.055 mm  
(0.0004 – 0.0022 in.)

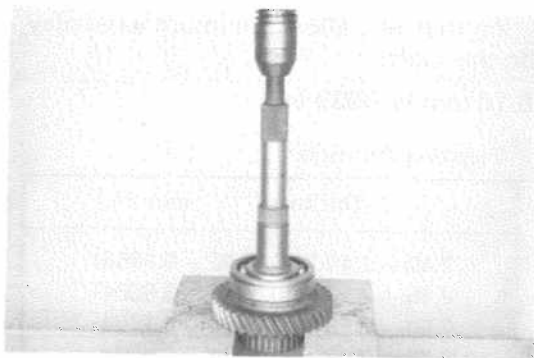
Maximum clearance: 0.075 mm (0.0030 in.)



(c) Using a dial indicator, check the low gear thrust clearance.

Standard clearance: 0.10 – 0.25 mm  
(0.0039 – 0.0098 in.)

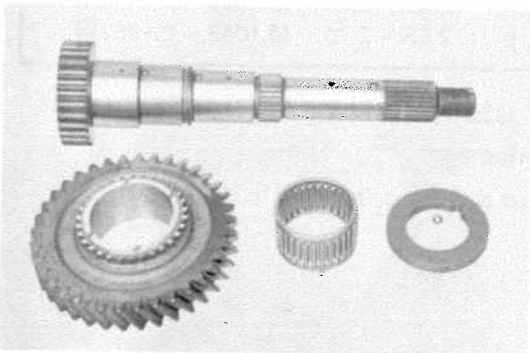
Maximum clearance: 0.30 mm (0.0118 in.)



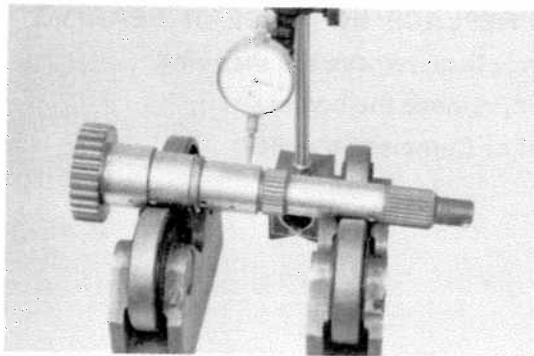
2. IF NECESSARY, REPLACE OUTPUT SHAFT BEARING

- (a) Using snap ring pliers, remove the snap ring.
- (b) Using a press, remove the bearing.

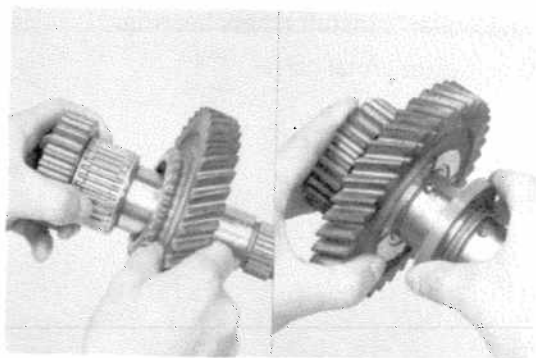
- (c) Check the parts for wear or damage.



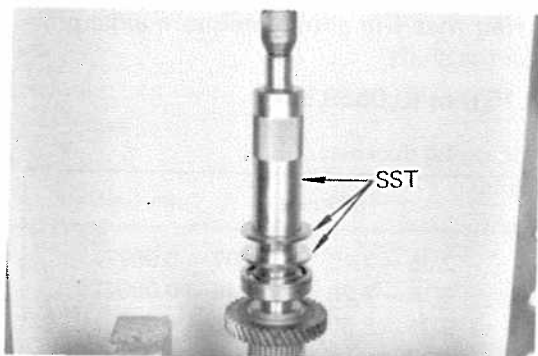
- (d) Using a dial indicator, check the shaft runout.  
**Maximum runout: 0.03 mm (0.0012 in.)**

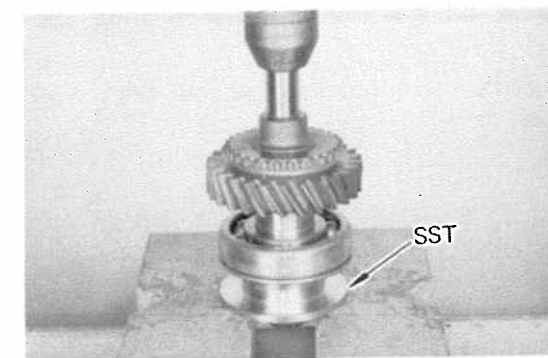
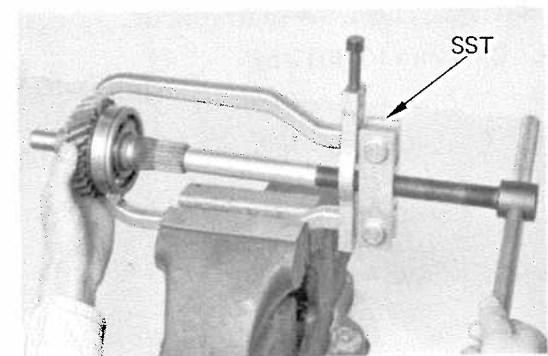


- (e) Apply gear oil on the needle roller bearing and spacer.
- (f) Install the needle roller bearing and low gear, steel ball and spacer.



- (g) Using a press and collar\*, install a new bearing.  
\*SST 09316-60010 or Commercial collar





- (h) Select a snap ring that will allow minimum axial play and install it on the shaft.

**Maximum play: 0.10 mm (0.0039 in.)**

Snap ring thickness

Mark	Part No.	Thickness	mm (in.)
0	90520-36250	2.40 – 2.45	(0.0945 – 0.0965)
1	90520-36251	2.45 – 2.50	(0.0965 – 0.0984)
2	90520-36252	2.50 – 2.55	(0.0984 – 0.1004)
3	90520-36253	2.55 – 2.60	(0.1004 – 0.1024)
4	90520-36254	2.60 – 2.65	(0.1024 – 0.1043)
5	90520-36255	2.65 – 2.70	(0.1043 – 0.1063)

### 3. INSPECT INPUT GEAR AND BEARING

Check for wear or damage.

If bearing is worn or damaged, replace it.

### 4. IF NECESSARY, REPLACE INPUT GEAR BEARING

- (a) Using snap ring pliers, remove the snap ring.

- (b) Using a puller\*, remove the bearing.

\*SST 09950-20014 or Commercial puller

- (c) Using a press and collar\*, install a new bearing.

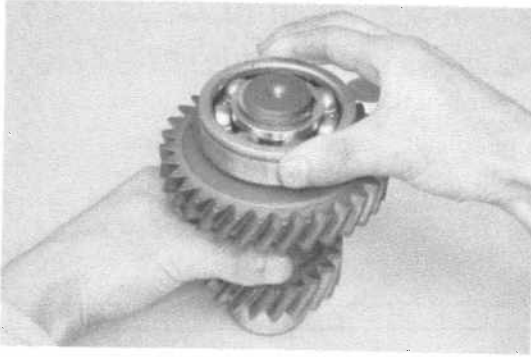
\*SST 09316-60010 or Commercial collar

- (d) Select a snap ring that will allow minimum axial play and install it on the shaft.

**Maximum play: 0.15 mm (0.0059 in.)**

Snap ring thickness

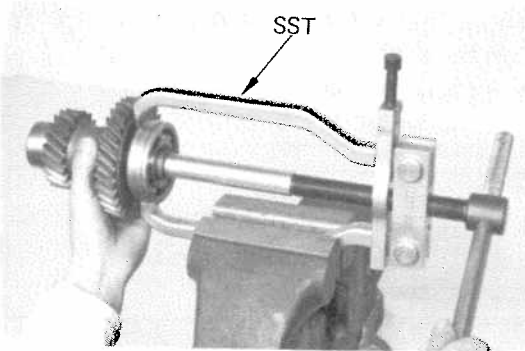
Mark	Part No.	Thickness	mm (in.)
1	90520-33168	2.05 – 2.10	(0.0807 – 0.0827)
3	90520-33170	2.15 – 2.20	(0.0846 – 0.0866)
5	90520-33172	2.25 – 2.30	(0.0886 – 0.0906)



## 5. INSPECT COUNTER GEAR AND BEARING

Check for wear or damage.

If bearing is worn or damaged, replace it.



## 6. IF NECESSARY, REPLACE COUNTER GEAR BEARING

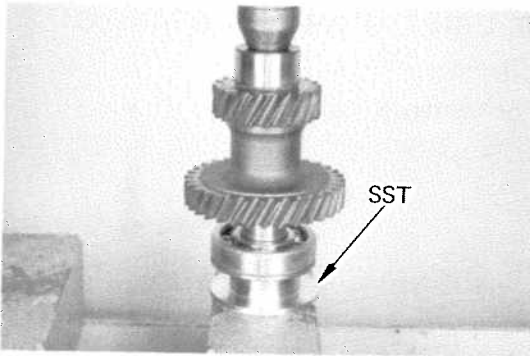
(a) Using snap ring pliers, remove the snap ring.

(b) Using a puller\*, remove the bearing.

\*SST 09950-20014 or Commercial puller

(c) Using a press and collar\*, install a new bearing.

\*SST 09316-60010 or Commercial collar



(d) Select a snap ring that will allow minimum axial play and install it on the shaft.

**Maximum play: 0.15 mm (0.0059 in.)**

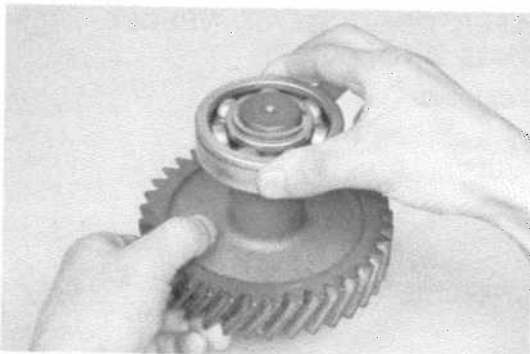
Snap ring thickness

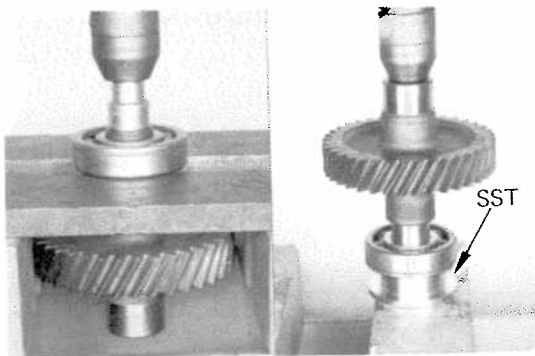
Mark	Part No.	Thickness	mm (in.)
1	90520-30215	2.10 – 2.15	(0.0827 – 0.0846)
3	90520-30217	2.20 – 2.25	(0.0866 – 0.0886)

## 7. INSPECT IDLER GEAR AND BEARING

Check for wear or damage.

If bearing is worn or damaged, replace it.





## 8. IF NECESSARY, REPLACE IDLER GEAR BEARING

- Using snap ring pliers, remove the snap ring.
- Using a press, remove the bearing.
- Using press and collar\*, install a new bearing.

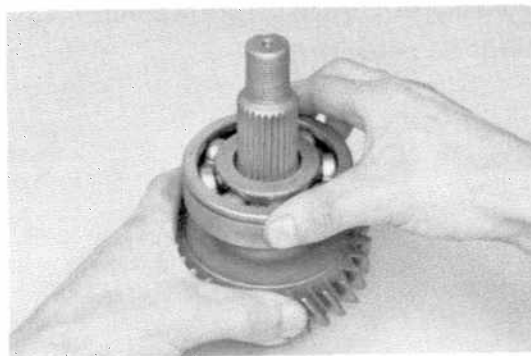
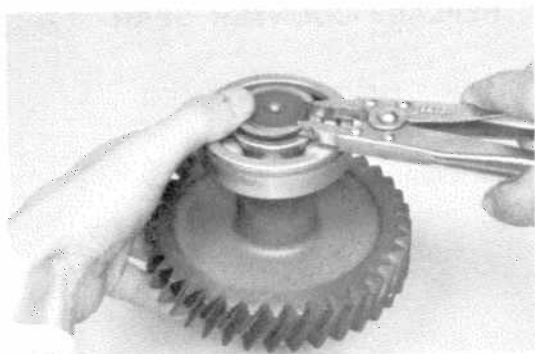
\*SST 09316-60010 or Commercial collar

- Select a snap ring that will allow minimum axial play and install it on the shaft.

**Maximum play: 0.15 mm (0.0059 in.)**

Snap ring thickness

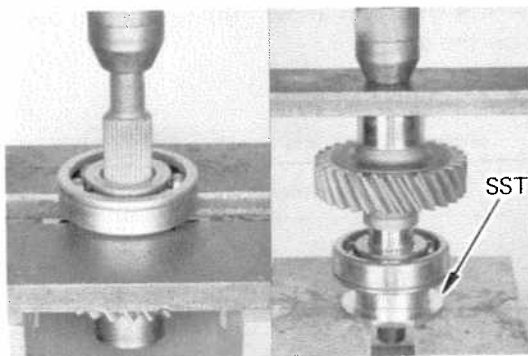
Mark	Part No.	Thickness	mm (in.)
A	90520-28242	1.50 – 1.55	(0.0591 – 0.0610)
B	90520-28243	1.60 – 1.65	(0.0630 – 0.0650)



## 9. INSPECT FRONT DRIVE GEAR AND BEARING

Check for wear or damage.

If bearing is worn or damaged, replace it.



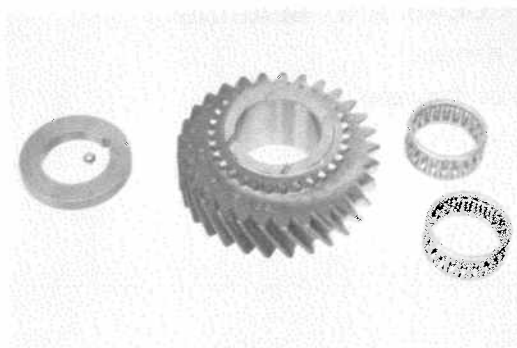
## 10. IF NECESSARY, REPLACE FRONT DRIVE GEAR BEARING

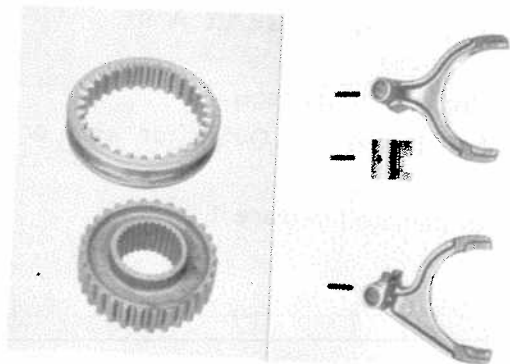
- Using a press remove the bearing.
- Using a press and collar\*, install a new bearing.

\*SST 09316-60010 or Commercial collar

## 11. INSPECT TRANSFER DRIVE GEAR, NEEDLE ROLLER BEARINGS AND SPACER

Check for wear or damage.





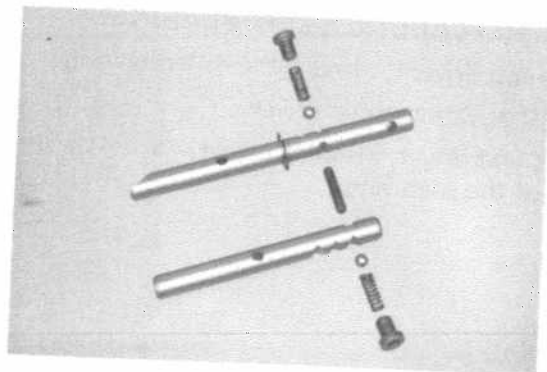
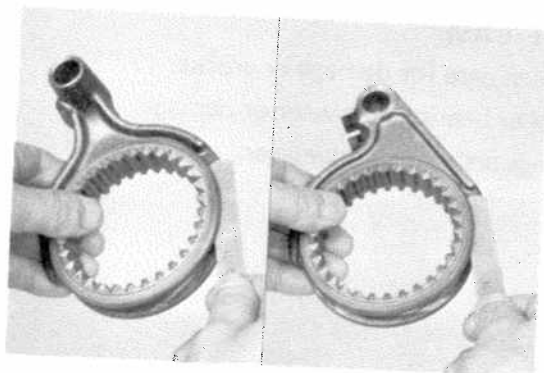
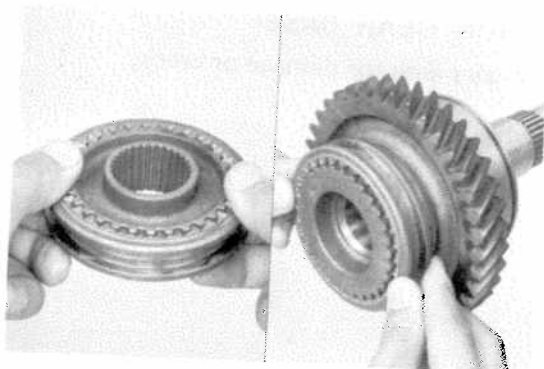
## 12. INSPECT HUB, HUB SLEEVES AND SHIFT FORKS

(a) Check parts for wear or damage.

(b) Check that the sleeves slide on the hub or output shaft smoothly.

(c) Check the clearance between the hub sleeve and the shift fork.

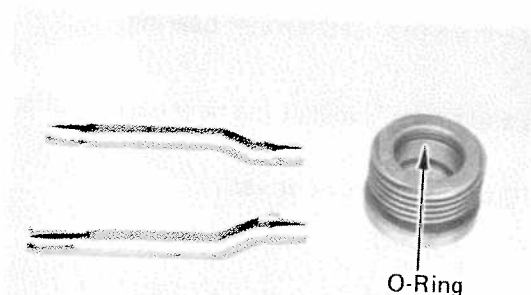
Maximum clearance: 1.0 mm (0.039 in.)



## 13. INSPECT SHIFT FORK SHAFTS

(a) Check sliding surfaces for wear or damage.

(b) Check springs, balls and interlock pin for wear or damage.

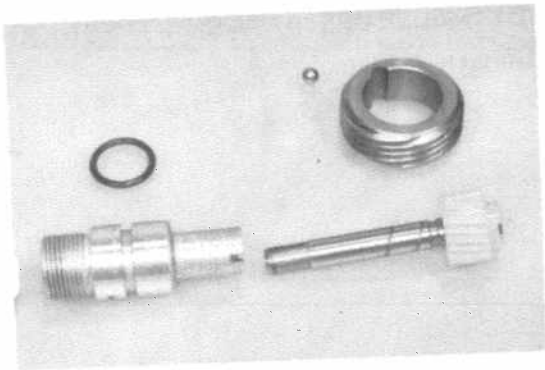


## 14. INSPECT OIL PUMP SCREW AND OIL PIPES

(a) Check the oil pump screw and O-ring for wear or damage.

(b) Check the oil pipes for damage.

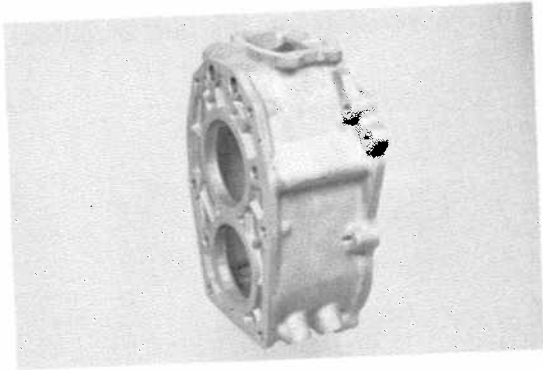




### 15. INSPECT SPEEDOMETER DRIVE GEAR AND DRIVEN GEAR

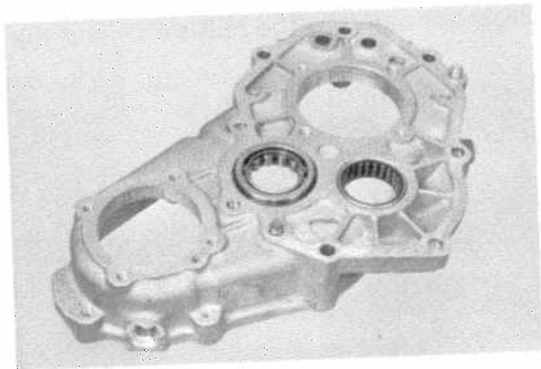
- (a) Check gear teeth for wear or damage.
- (b) Check gear shaft, oil seal and O-ring for wear or damage.

If the oil seal is worn or damaged, replace it.  
(See page 9-34)



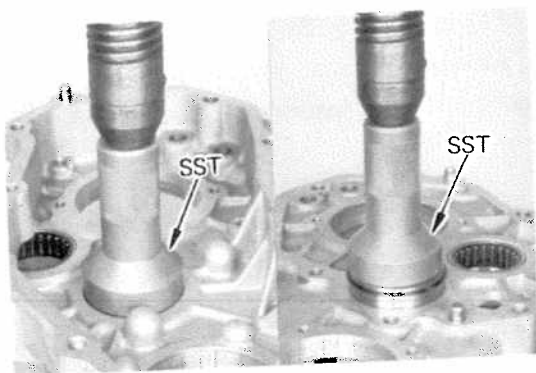
### 16. INSPECT REDUCTION GEAR CASE

Check the reduction gear case for damage or cracks.



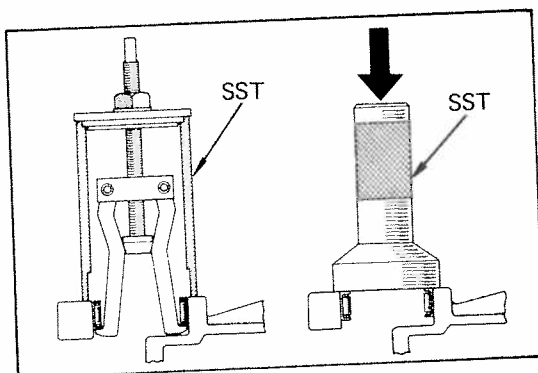
### 17. INSPECT FRONT CASE

- (a) Check the front case for damage or cracks.
  - (b) Check the roller bearings for wear or damage.
- If the roller bearings are worn or damaged, replace them.



### 18. IF NECESSARY, REPLACE ROLLER BEARINGS

- (a) Using a press and driver\*, remove the roller bearing.  
\*SST 09310-35010 or Commercial driver
- (b) Using a press and driver, install the new bearing up to the position of the snap ring.



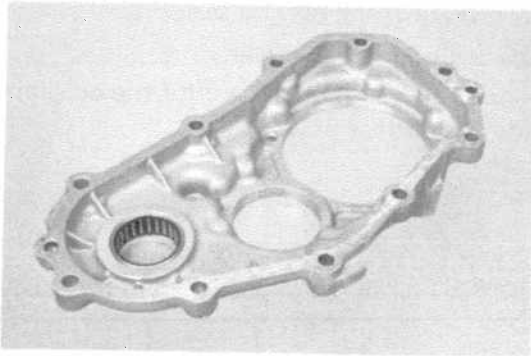
- (c) Using SST\*, remove the needle roller bearing.

\*SST 09612-30012

- (d) Using a press and driver\*, install the new needle roller bearing.

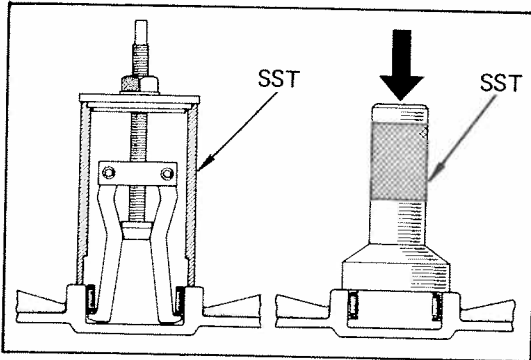
\*SST 09310-35010 or Commercial driver





## 19. INSPECT REAR CASE

- (a) Check the rear case for damage or cracks.
  - (b) Check the needle roller bearing for wear or damage.
- If the needle roller bearing is worn or damaged, replace it.

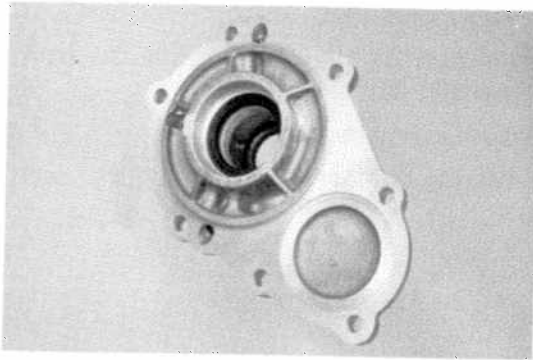


## 20. IF NECESSARY, REPLACE REAR CASE NEEDLE ROLLER BEARING

- (a) Using SST\*, remove the needle roller bearing.
- (b) Using a press and driver\*, install the new needle roller bearing.

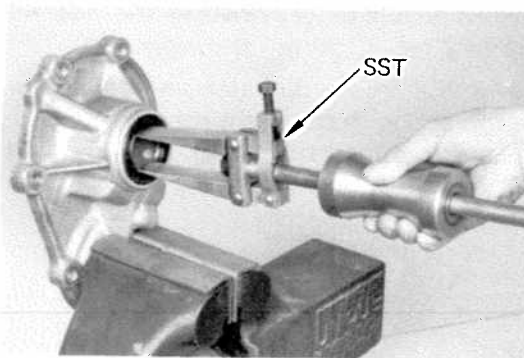
\*SST 09612-30012

\*SST 09310-35010 or Commercial driver



## 21. INSPECT EXTENSION HOUSING

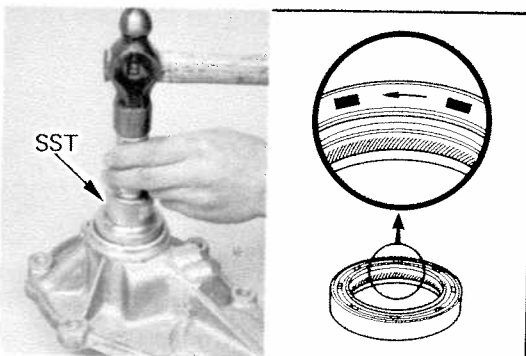
- (a) Check the extension housing for damage or cracks.
  - (b) Check the oil seals for wear or damage.
- If the oil seals are worn or damaged, replace them.



## 22. IF NECESSARY, REPLACE OIL SEALS

- (a) Using a puller\*, remove the two oil seals.

\*SST 09308-00010 or Commercial puller

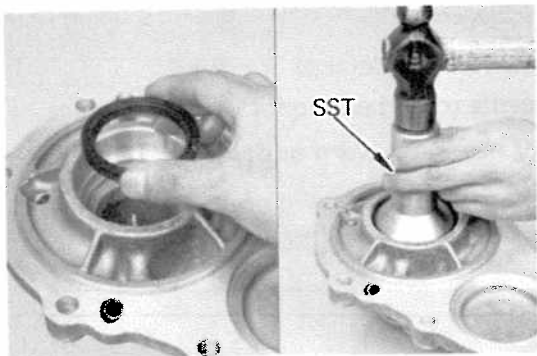


- (b) Using a transmission oil plug\*, drive in the new oil seal.

\*SST 09325-20010 or Commercial driver

NOTE: Take note of the groove direction and be careful not to interchange this seal with the front drive gear oil seal.

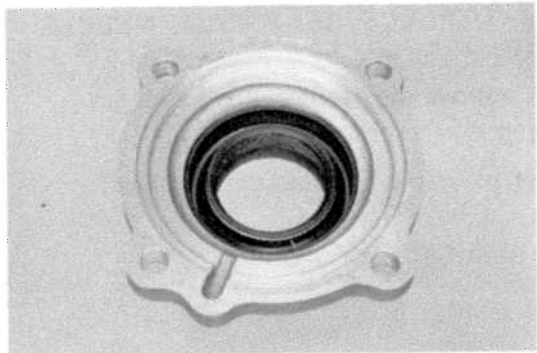
This oil seal has one arrow mark pointing counterclockwise to distinguish it from the front drive gear oil seal.



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

\*SST 09310-35010 or Commercial driver

NOTE: When assembling the new oil seal for the oil pump screw, position the flat surface upward.

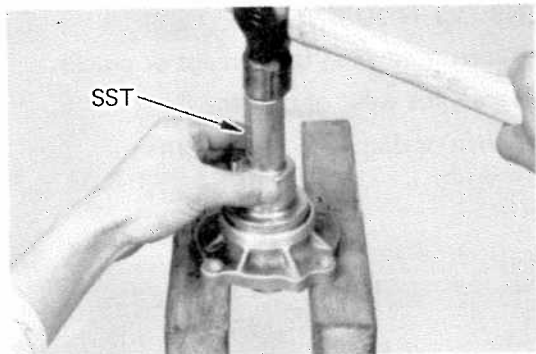


## 23. INSPECT FRONT DRIVE GEAR BEARING RETAINER

(a) Check the bearing retainer for damage or cracks.

(b) Check the oil seal for wear or damage.

If the oil seal is worn or damaged, replace it.

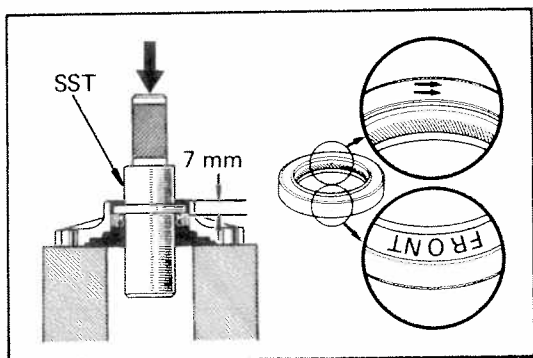


## 24. IF NECESSARY REPLACE OIL SEAL

(a) Using a transmission oil plug\*, drive out the front drive gear oil seal and dust seal.

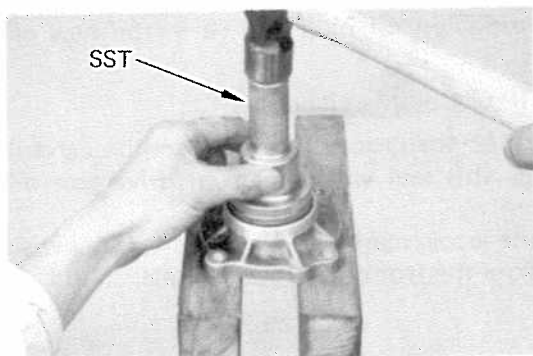
\*SST 09325-20010 or Commercial driver

NOTE: Place the bearing retainer on something soft such as wooden blocks.

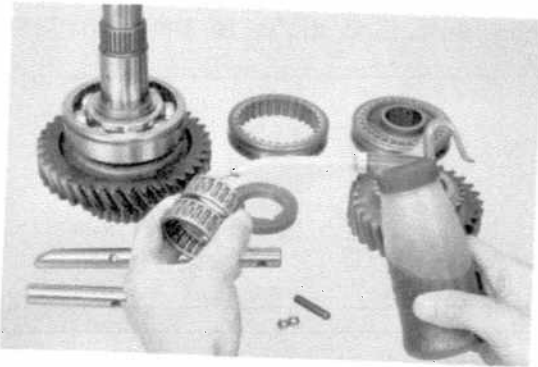


(b) Using a transmission oil plug\*, drive in the new oil seal to a depth of 7 mm (0.28 in.) from the end.

NOTE: Take note of the groove direction and be careful not to interchange this seal with the output shaft oil seal. This oil seal has two arrow marks pointing clockwise and the word FRONT to distinguish it from the output shaft oil seal.



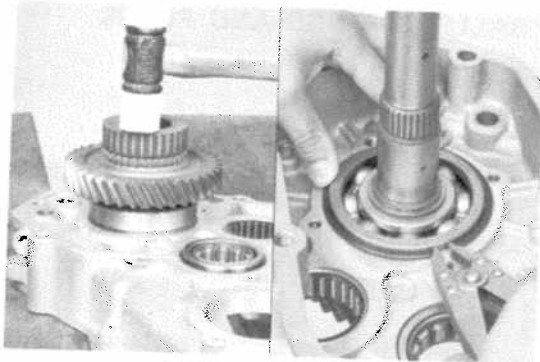
(c) Using a transmission oil plug\*, drive in the new dust seal.



## ASSEMBLY OF TRANSFER

(See illustration on page 11-5)

1. APPLY GEAR OIL TO BEARINGS, GEARS AND SHAFTS

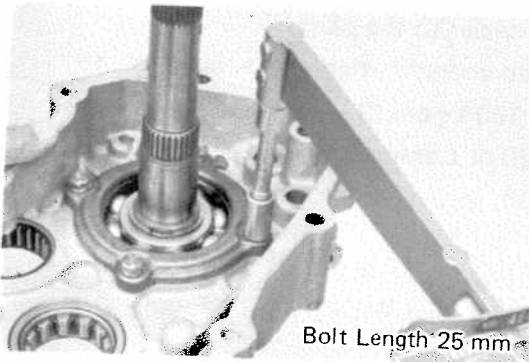


2. INSTALL OUTPUT SHAFT TO FRONT CASE

(a) Using a plastic hammer, install the output shaft to the front case.

NOTE: Place the front case on something soft such as wooden blocks.

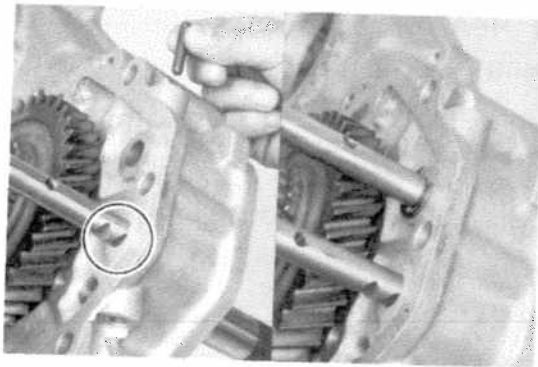
(b) Using snap ring pliers, install the snap ring.



3. INSTALL BEARING RETAINER

Install the bearing retainer and torque the mounting bolts.

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

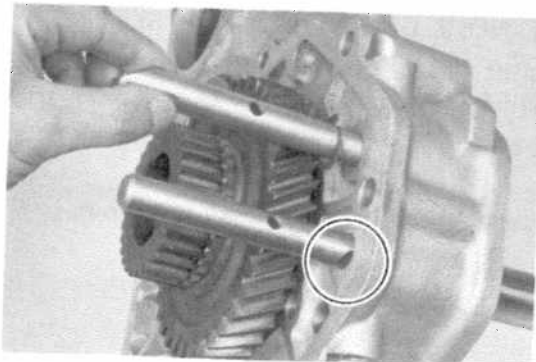


4. INSTALL SHIFT FORK SHAFTS AND INTERLOCK PIN

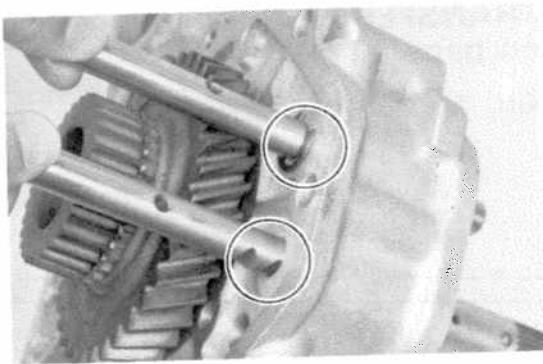
(a) Install the high-low shift fork shaft with the three grooves facing outside and align the interlock groove with the interlock pin hole.

(b) Install the interlock pin.

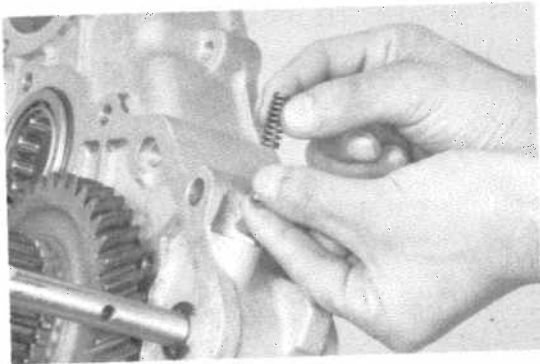
(c) Install the front drive shift fork shaft with the two grooves facing outside.



(d) Verify the front drive shift fork shaft does not move when the high-low shift fork shaft is shifted to the neutral or low speed position.

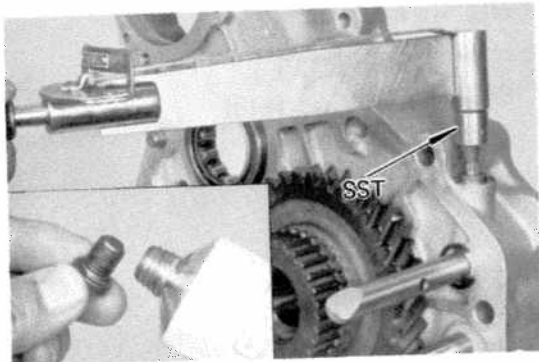


- (e) Shift the two shift fork shafts to the high—two position.



## 5. INSTALL TWO BALLS, SPRINGS AND PLUGS

- (a) Install the ball and spring.



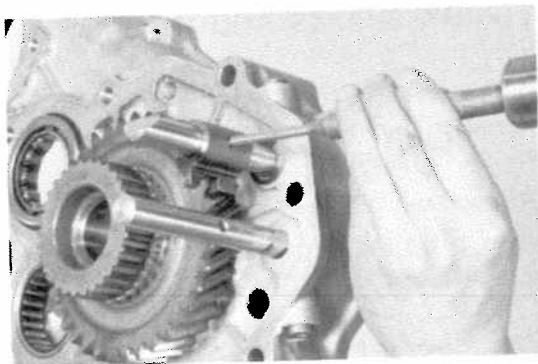
- (b) Apply liquid sealer to the plug.

- (c) Using an Allen wrench\*, tighten the plug.

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

\*SST 09313-30020 or Commercial wrench

- (d) Install the ball, spring and plug to the opposite side.

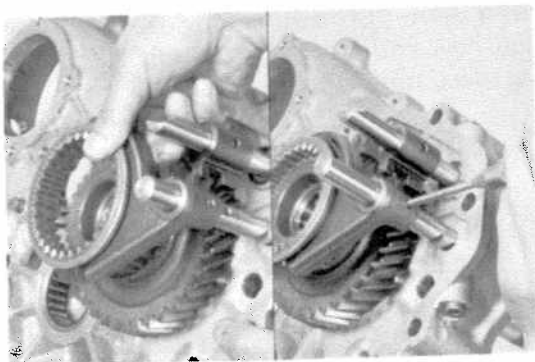


## 6. INSTALL SHIFT HEAD

- (a) Install the shift head to the front drive shift fork shaft.

- (b) Align the slotted spring pin hole in the shift head with the hole in the shaft.

- (c) Using a pin punch, drive in the slotted spring pin.

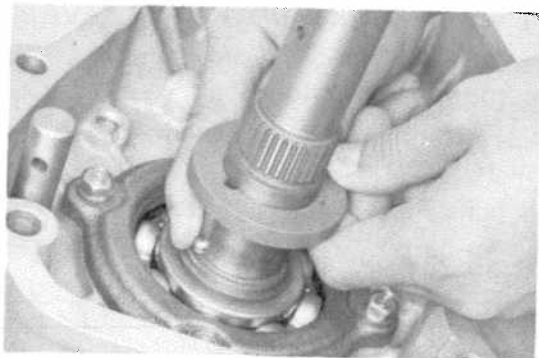


## 7. INSTALL SHIFT NO. 2 FORK AND HUB SLEEVE

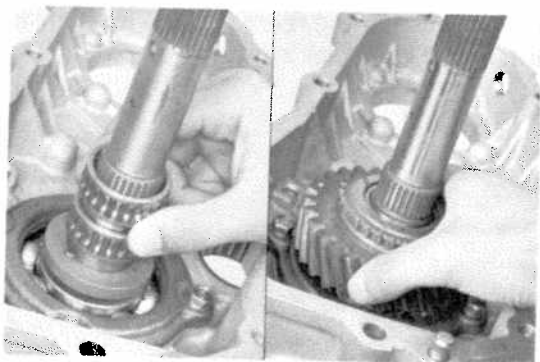
- (a) Install the shift No. 2 fork together with the hub sleeve to the high—low shift fork shaft.

- (b) Align the slotted spring hole in the fork with the hole in the shaft.

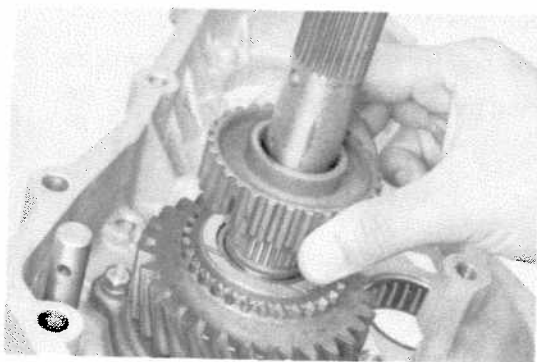
- (c) Using a pin punch, drive in the slotted spring pin.



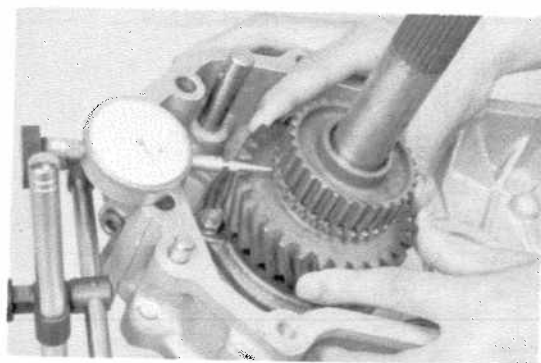
**8. INSTALL LOCK BALL AND SPACER**



**9. INSTALL NEEDLE ROLLER BEARINGS AND TRANSFER DRIVE GEAR**



**10. INSTALL CLUTCH HUB**

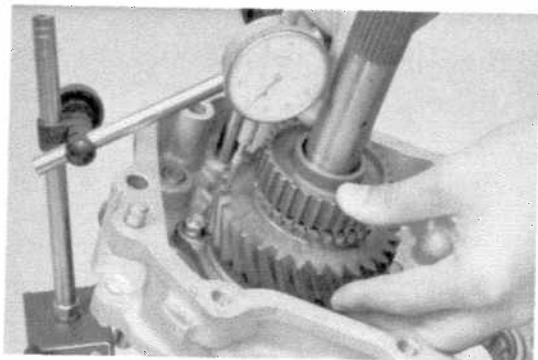


**11. INSPECT TRANSFER DRIVE GEAR OIL CLEARANCE AND THRUST CLEARANCE**

(a) Using a dial indicator, check the transfer drive gear oil clearance.

**Standard clearance:** 0.009 – 0.051 mm  
(0.0004 – 0.0020 in.)

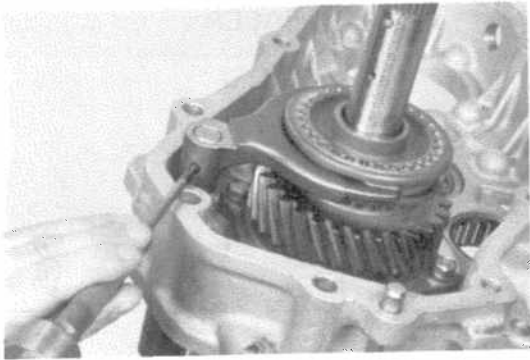
**Maximum clearance:** 0.071 mm (0.0028 in.)



(b) Using a dial indicator, check the transfer drive gear thrust clearance.

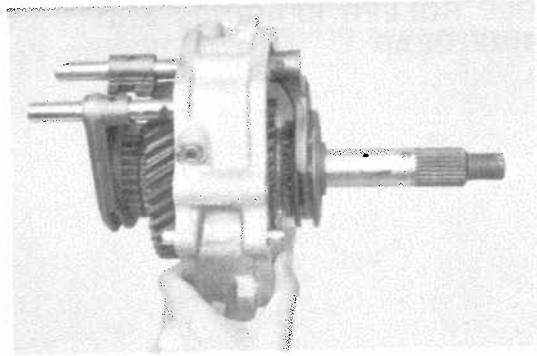
**Standard clearance:** 0.09 – 0.27 mm  
(0.0035 – 0.0106 in.)

**Maximum clearance:** 0.32 mm (0.0126 in.)



## 12. INSTALL SHIFT NO. 1 FORK AND HUB SLEEVE

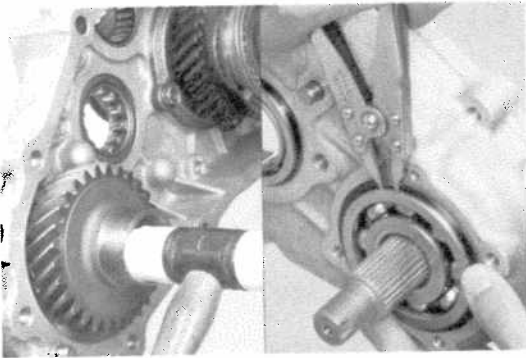
- (a) Install the shift No. 1 fork together with the hub sleeve to the front drive shift fork shaft.
- (b) Align the slotted spring pin hole in the fork with the hole in the shaft.
- (c) Using a pin punch and hammer, install the slotted spring pin.



**NOTE:** Hold the front case so the rear is not lowered. If it is lowered, the clutch hub and steel ball may fall out.

## 13. INSTALL FRONT DRIVE GEAR

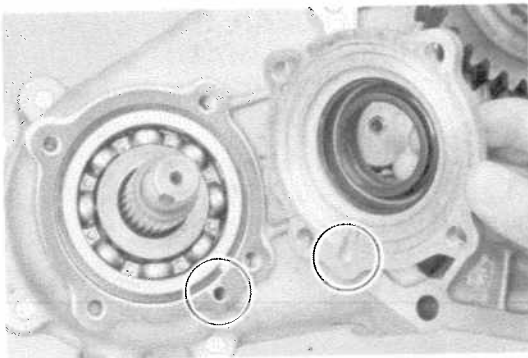
- (a) Using a plastic hammer, install the front drive gear.
- (b) Using snap ring pliers, install the snap ring.



## 14. INSTALL BEARING RETAINER WITH NEW GASKET

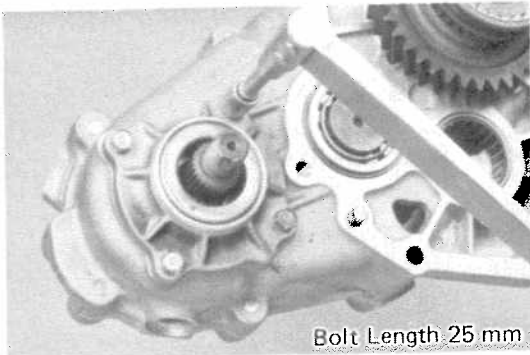
- (a) Place the gasket in position on the front case.
- (b) Apply multipurpose grease on the oil seal.
- (c) Install the bearing retainer.

**NOTE:** Align the retainer oil passage with the front case oil hole.



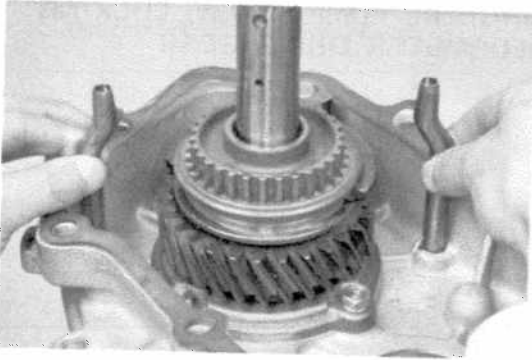
- (d) Torque the retainer mounting bolts.

**Torque:** 150 – 220 kg-cm (11 – 15 ft-lb)



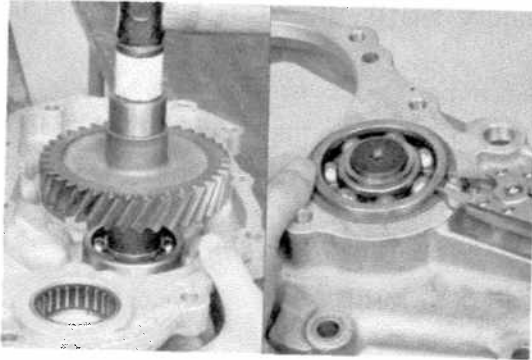
Bolt Length 25 mm





### 15. INSTALL OIL PIPES

Install the two oil pipes with the cutout sides positioned upward.

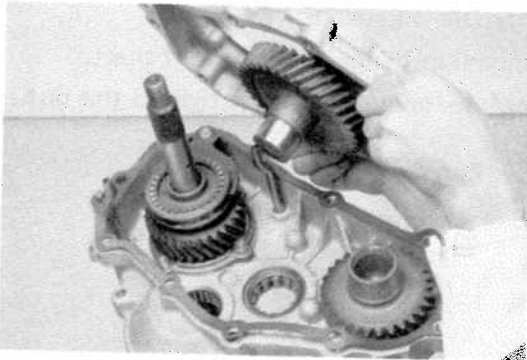


### 16. INSTALL IDLER GEAR TO REAR CASE

- (a) Using a plastic hammer, install the idler gear to the rear case.

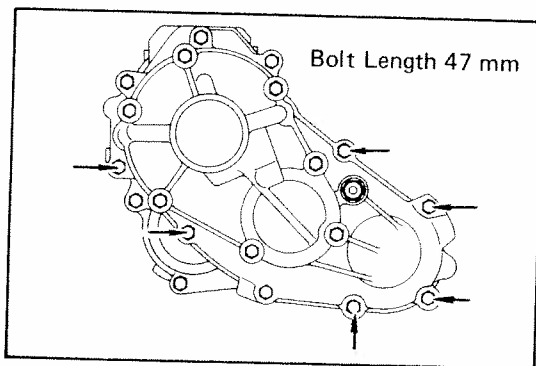
NOTE: Place the rear case on something soft such as wooden blocks.

- (b) Using snap ring pliers, install the snap ring.

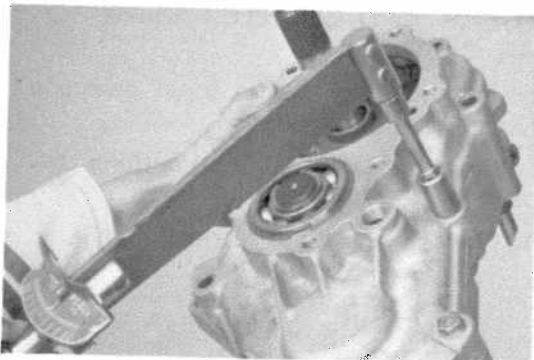


### 17. INSTALL REAR CASE WITH NEW GASKET

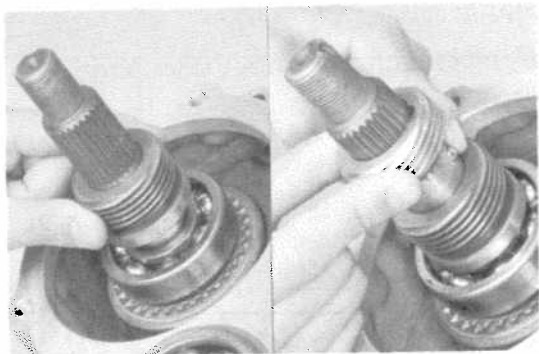
- (a) Place the gasket in position on the front case.
- (b) Install the rear case together with the idler gear.



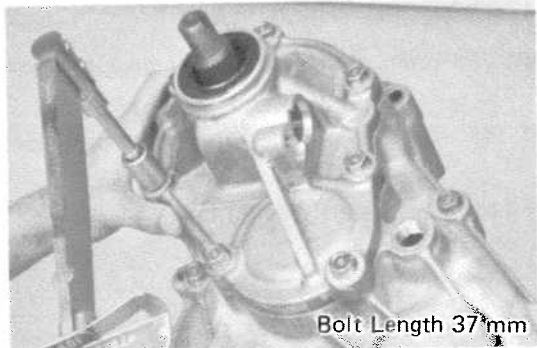
- (c) Install the rear case mounting bolts in the positions shown in the figure.



- (d) Torque the rear case mounting bolts.
- Torque: 300 — 450 kg-cm (22 — 32 ft-lb)



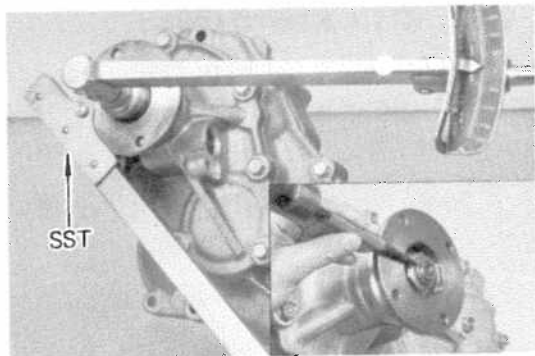
### 18. INSTALL BEARING, OIL PUMP SCREW, LOCKING BALL AND SPEEDOMETER DRIVE GEAR



### 19. INSTALL EXTENSION HOUSING WITH NEW GASKET

- (a) Place the gasket in position on the rear case.
- (b) Apply multipurpose grease on the two oil seals.
- (c) Install the extension housing and torque the mounting bolts.

**Torque: 300 – 450 kg-cm (22 – 32 ft-lb)**



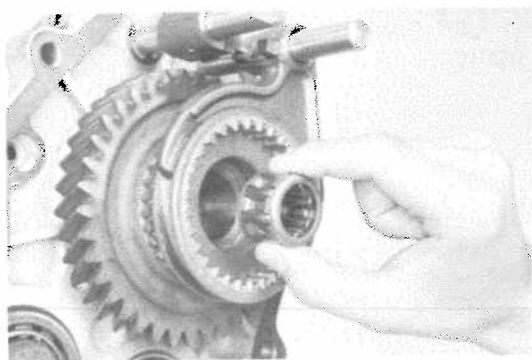
### 20. INSTALL COMPANION FLANGE

- (a) Install the companion flange to the output shaft.
- (b) Using a holder\* to hold the flange, tighten the nut. Torque the nut.

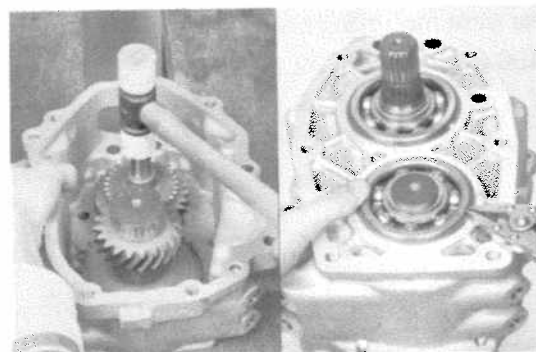
**Torque: 1,100 – 1,400 kg-cm (80 – 101 ft-lb)**

\*SST 09330-00020 or Commercial holder

- (c) Stake the nut.



### 21. INSTALL ROLLER BEARING IN OUTPUT SHAFT



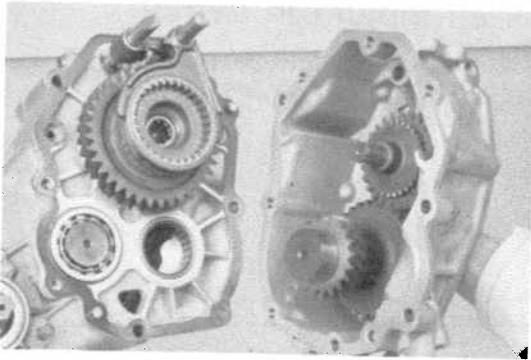
### 22. INSTALL INPUT GEAR AND COUNTER GEAR TO REDUCTION GEAR CASE

- (a) Using a plastic hammer, install the input gear and counter gear to the reduction gear case.

**NOTE:** Place the reduction gear case on something soft such as wooden blocks.

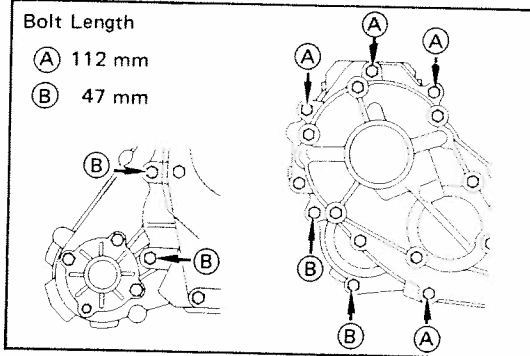
- (b) Using snap ring pliers, install the snap rings.





### 23. INSTALL REDUCTION GEAR CASE WITH NEW GASKET

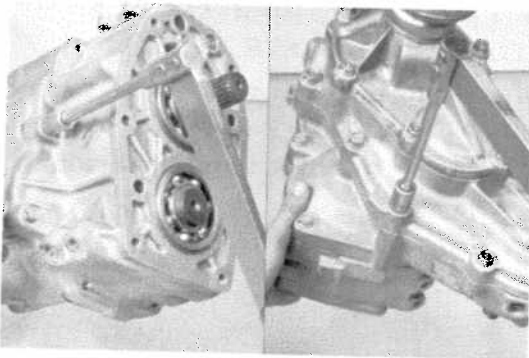
- (a) Place the gasket in position on the front case.
- (b) Install the reduction gear case together with the input gear and counter gear.



- (c) Install the reduction gear case mounting bolts in the positions shown in the figure.

- (d) Torque the reduction gear case mounting bolts.

**Torque: 300 – 450 kg-cm (22 – 32 ft-lb)**



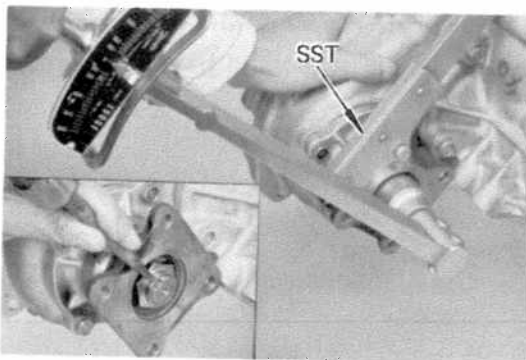
### 24. INSTALL COMPANION FLANGE

- (a) Install the companion flange to the front drive gear.
- (b) Using a holder\* to hold the flange, tighten the nut. Torque the nut.

**Torque: 1,100 – 1,400 kg-cm (80 – 101 ft-lb)**

\*SST 09330-00020 or Commercial holder

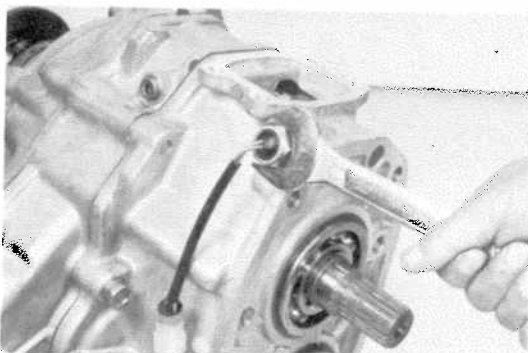
- (c) Stake the nut.

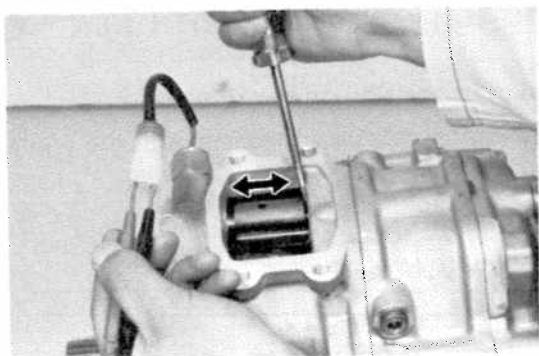


### 25. INSTALL TRANSFER INDICATOR SWITCH WITH WASHER

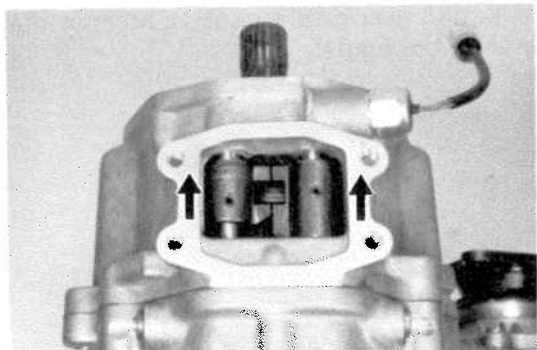
Tighten the indicator switch.

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

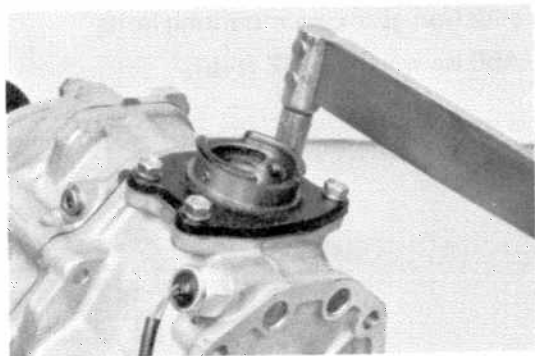


**26. INSPECT TRANSFER INDICATOR SWITCH**

Using an ohmmeter, check the switch for continuity. If no continuity, replace the switch.

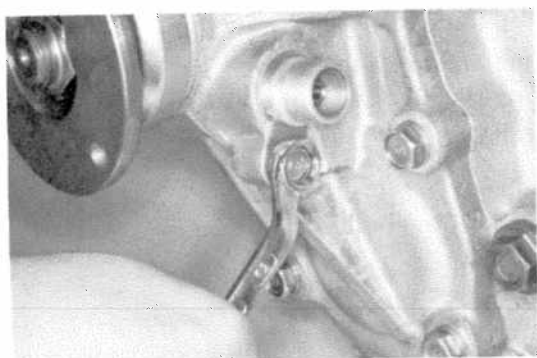
**27. SHIFT TWO SHIFT FORKS TO HIGH-FOUR POSITION**

Using a screwdriver, shift the two shift forks to the front.

**28. INSTALL SHIFT LEVER RETAINER AND OIL DEFLECTOR WITH NEW GASKETS**

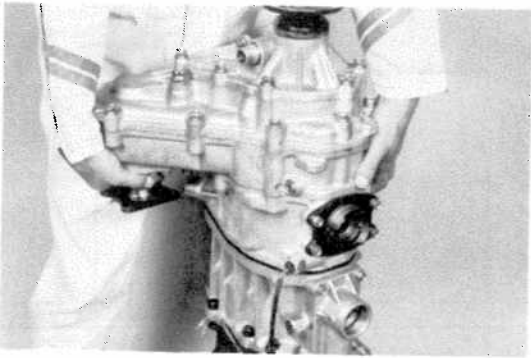
- (a) Place the oil deflector between the two gaskets and position them on the reduction gear case.
- (b) Install the shift lever retainer and torque the mounting bolts.

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

**29. INSTALL SPEEDOMETER DRIVEN GEAR**

Secure the gear with the lock plate and bolt. Torque the bolt.

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

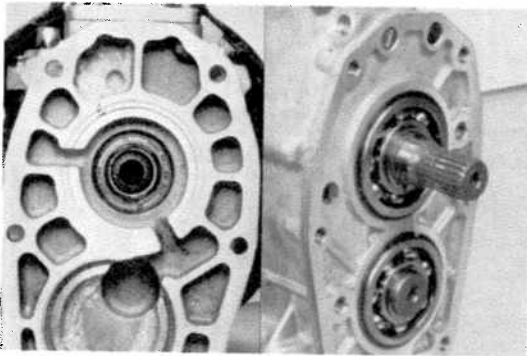


## INSTALLATION OF TRANSFER

### 1. INSTALL TRANSFER TO TRANSMISSION WITH NEW GASKET

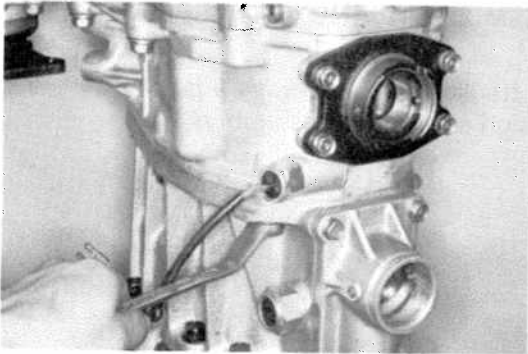
- (a) Apply multipurpose grease on the adapter rear oil seal.
- (b) Place the gasket in position on the adapter.
- (c) Insert the transfer input gear straight into the adapter rear oil seal and install the transfer to the transmission.

**CAUTION:** Take care not to damage the oil seal by the input gear spline when installing the transfer.



- (d) Torque the mounting bolts.

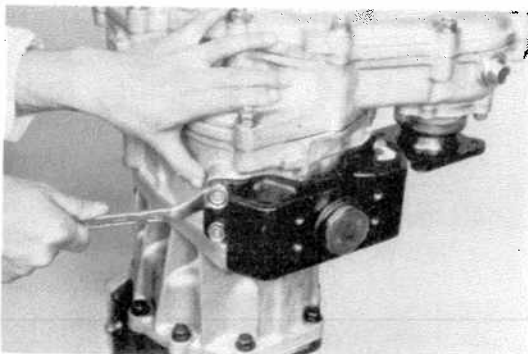
**Torque:** 300 — 450 kg-cm (22 — 32 ft-lb)



### 2. INSTALL ENGINE REAR MOUNTING

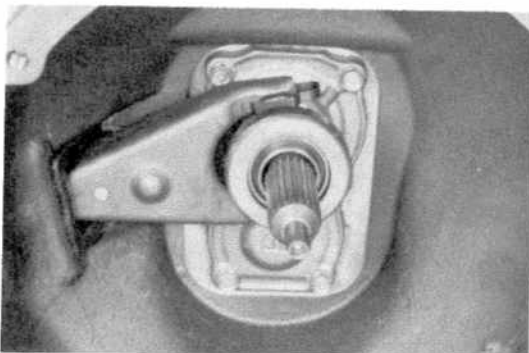
Install and torque the mounting bolts.

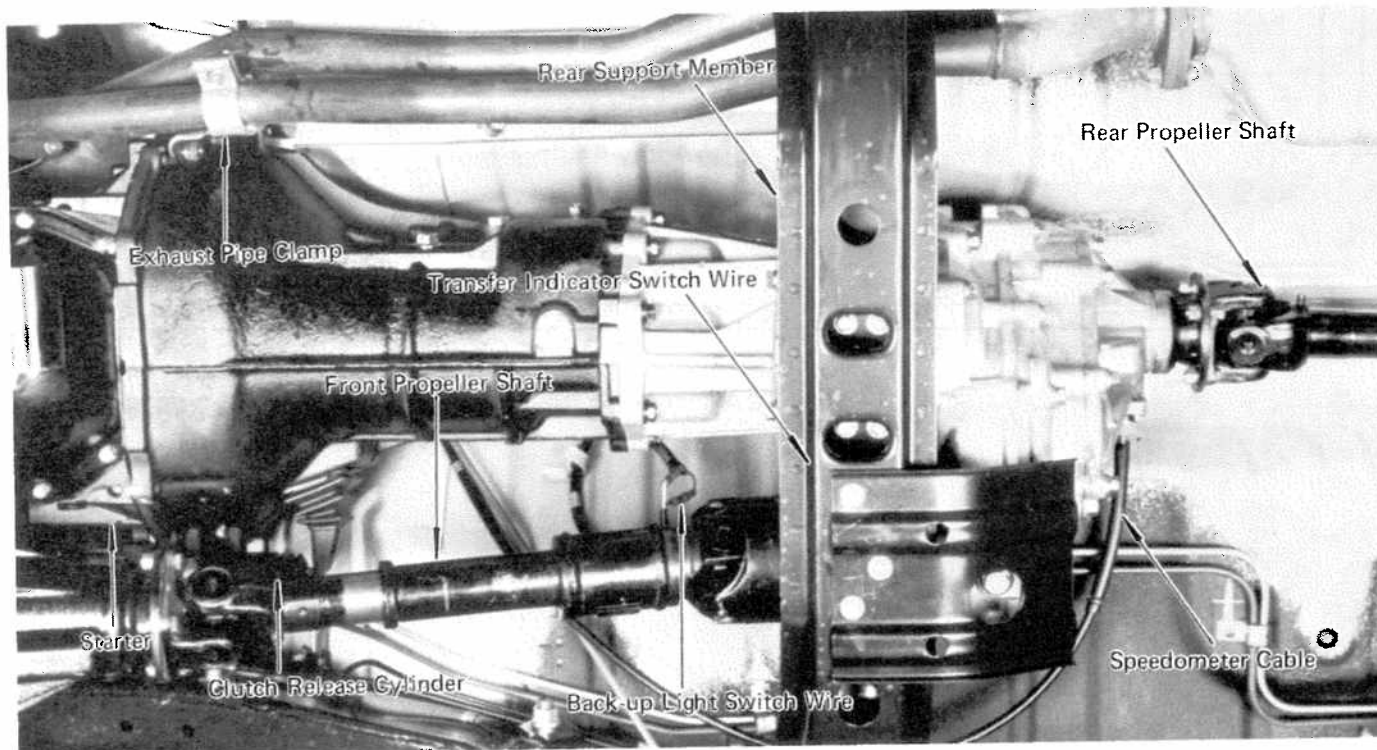
**Torque:** 100 — 160 kg-cm (8 — 11 ft-lb)



### 3. APPLY GREASE TO FOLLOWING AREAS

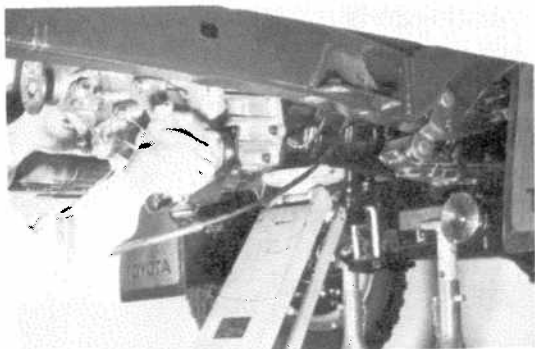
Area	Grease
Clutch disc spline Release bearing hub inside Release fork and hub contact points Release fork pivot point Release fork and push rod contact point	Molybdenum disulphide lithium base, NLGI No.2
Release bearing front	Lithium base multi-purpose, NLGI No.2





#### 4. INSTALL TRANSMISSION AND TRANSFER ASSEMBLY

- (a) Support the transmission case with a jack and install the transmission and transfer assembly.

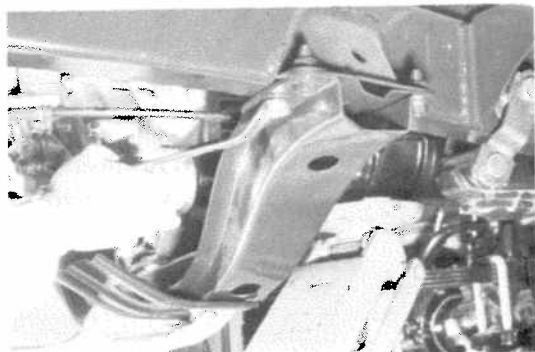


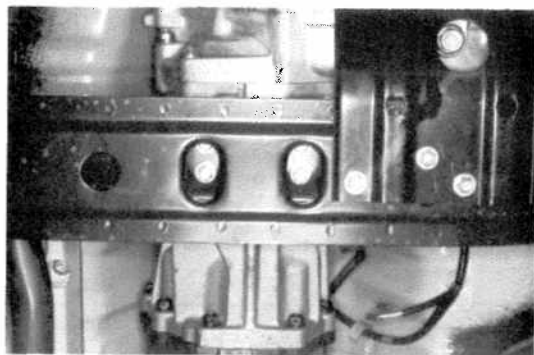
- (b) Torque the transmission mounting bolts.  
Torque: 500 – 800 kg-cm (37 – 57 ft-lb)



#### 5. INSTALL REAR SUPPORT MEMBER

- (a) Support the transmission case with a jack and install the rear support member to the frame.
- (b) Torque the rear support member mounting bolts.  
Torque: 750 – 1,050 kg-cm (55 – 75 ft-lb)





## 6. INSTALL TWO ENGINE REAR MOUNTING BOLTS TO REAR SUPPORT MEMBER

(a) Remove the safety support under the engine, and lower the jack.

(b) Torque the four mounting bolts.

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

## 7. CONNECT EXHAUST PIPE CLAMP TO TRANSMISSION HOUSING

## 8. CONNECT BACK-UP LIGHT SWITCH WIRE AND TRANSFER INDICATOR SWITCH WIRE

## 9. CONNECT SPEEDOMETER CABLE

Using pliers, tighten the collar.

## 10. INSTALL STARTER AND CLUTCH RELEASE CYLINDER

(a) Install the starter with the brake hose bracket.

(b) Install the clutch release cylinder and connect the return spring.

## 11. INSTALL PROPELLER SHAFT (See page 12-8)

## 12. FILL TRANSMISSION AND TRANSFER WITH GEAR OIL

Oil type: API GL-4 or GL-5  
SAE 80W-90

Quantity:

Transmission

4-Speed 2.0 liters (2.1 USqts, 1.8 Imp.qts)

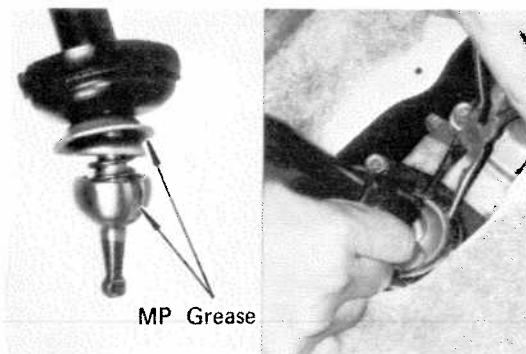
5-Speed 1.8 liters (1.9 USqts, 1.6 Imp.qts)

Transfer 1.6 liters (1.7 USqts, 1.4 Imp.qts)

## 13. LOWER VEHICLE AND INSTALL TRANSFER SHIFT LEVER

(a) Apply multipurpose grease to the transfer shift lever.

(b) Using pliers, install the transfer shift lever.



## 14. INSTALL TRANSMISSION SHIFT LEVER

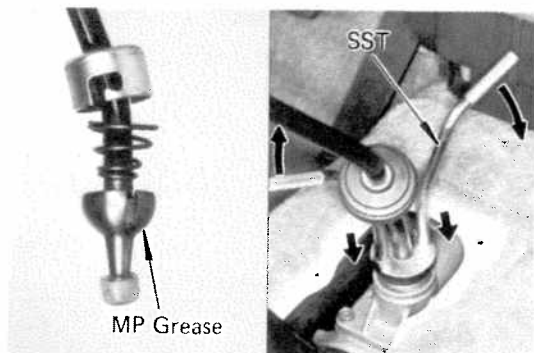
(a) Apply multipurpose grease to the transmission shift lever.

(b) Using SST\*, install the transmission shift lever.

\*SST 09305-20012

## 15. PERFORM ROAD TEST

Check for abnormal noise and smooth operation.



— MEMO —

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# PROPELLER SHAFT

	Page
TROUBLESHOOTING .....	12-2
SPECIAL TOOLS AND TEST EQUIPMENT .....	12-2
PROPELLER SHAFT .....	12-2

## TROUBLESHOOTING

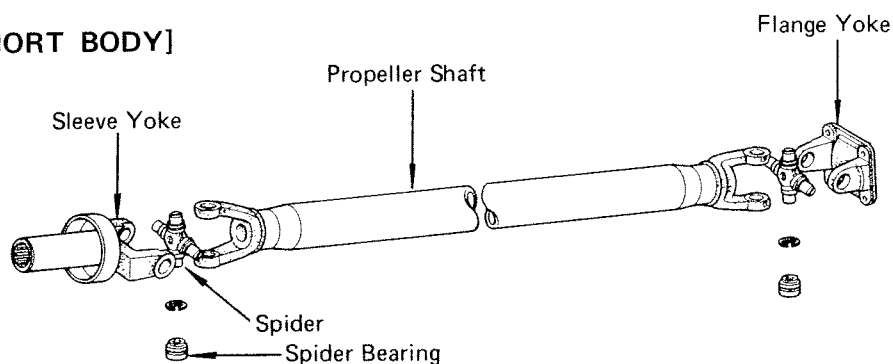
Problem	Possible cause	Remedy	Page
Noise	Sleeve yoke spline worn	Replace sleeve yoke	12-4
	Center bearing worn	Replace center bearing	12-4
	Spider bearing worn or stuck	Replace spider bearing	12-6
Vibration	Propeller shaft runout	Replace propeller shaft	12-3
	Propeller shaft unbalance	Balance propeller shaft	
	Transmission extension housing rear bushing worn	Replace bushing	9-35
	Sleeve yoke spline stuck	Replace sleeve yoke	12-4

## SPECIAL TOOLS AND TEST EQUIPMENT

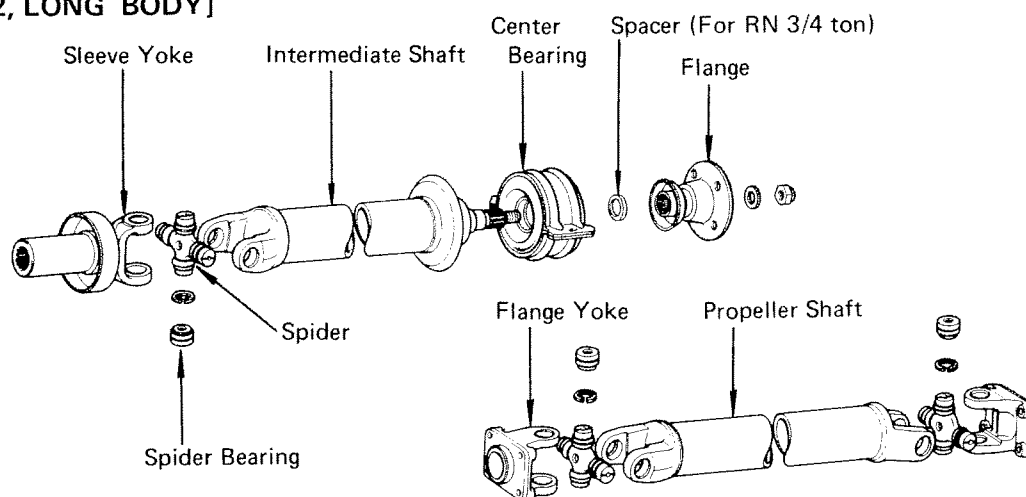
Tool	SST No.	Use
Transmission oil plug	09325-20010 or Commercial	To insert in transmission
Companion flange holder	09330-00020 or Commercial	To remove and install center bearing flange
Universal joint bearing replacer	09332-25010	To remove and install bearing outer race

## PROPELLER SHAFT

### [RN 4x2, SHORT BODY]

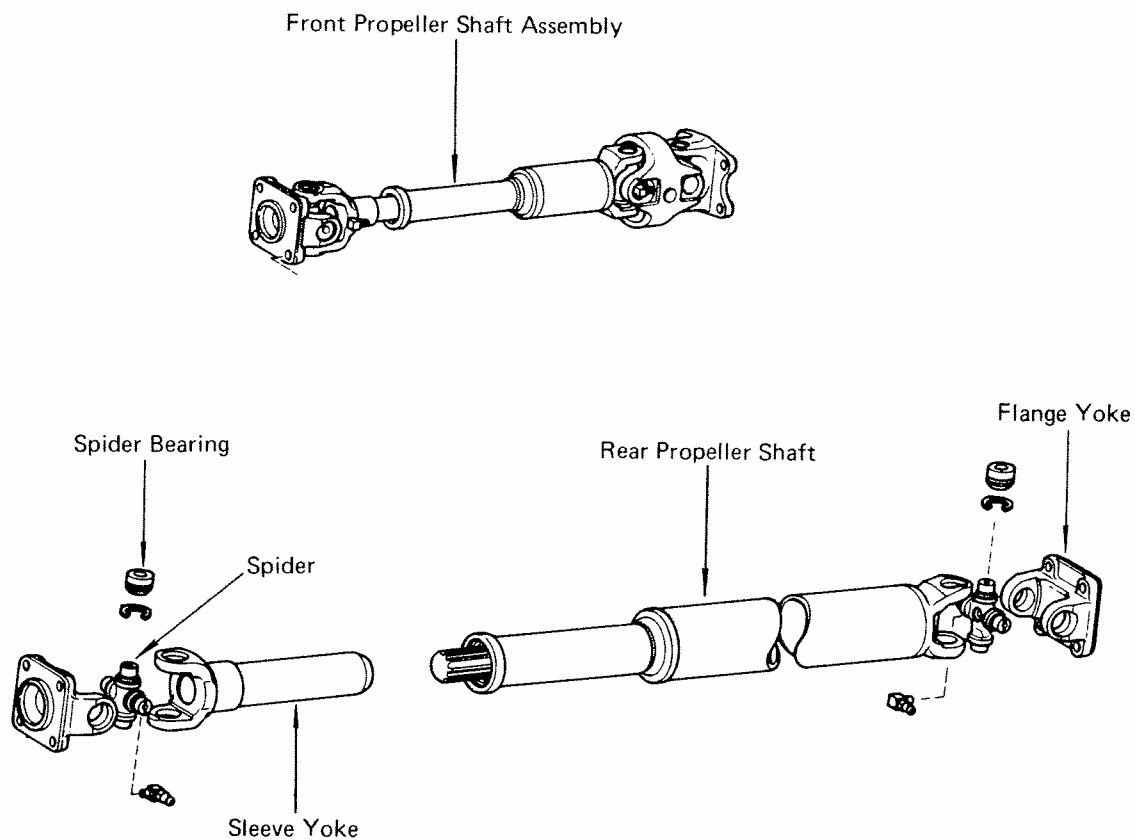


### [RN 4x2, LONG BODY]





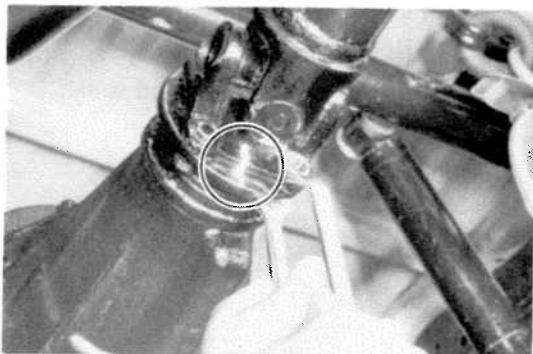
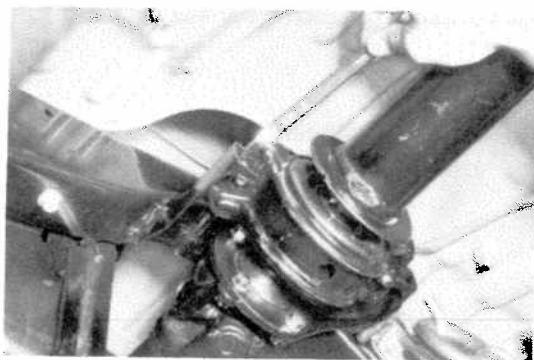
[RN 4x4]

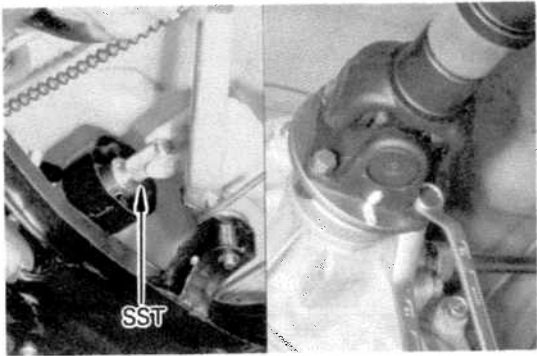


## REMOVAL AND DISASSEMBLY OF PROPELLER SHAFT

**CAUTION:** Do not disassemble the front propeller shaft of RN 4x4.

1. REMOVE TWO BOLTS HOLDING CENTER SUPPORT BEARING TO FRAME (THREE-JOINT TYPE)
2. DISCONNECT PROPELLER SHAFT FLANGE FROM FLANGE ON DIFFERENTIAL
  - (a) Put alignment marks on the flanges.
  - (b) Remove four bolts and nuts.





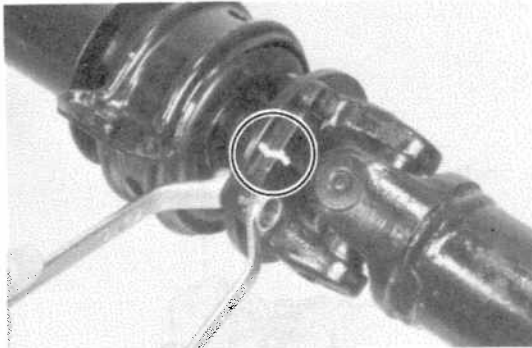
### 3. PULL PROPELLER SHAFT OUT OF TRANSMISSION (RN 4x2)

- Pull the yoke from the transmission.
- Insert a transmission oil plug\* in the transmission to prevent oil leakage.

\*SST 09325-20010 or Commercial plug

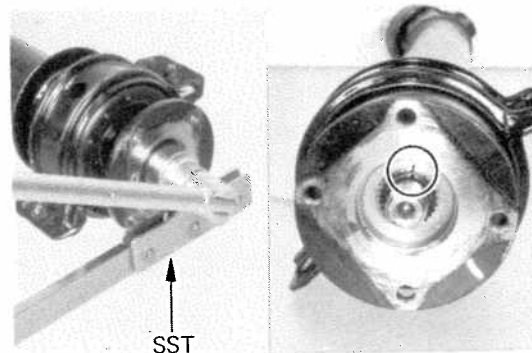
### 4. DISCONNECT PROPELLER SHAFT FLANGE FROM FLANGE ON TRANSFER (RN 4x4)

- Put alignment marks on the flanges.
- Remove four bolts and nuts.



### 5. SEPARATE PROPELLER SHAFT AND INTERMEDIATE SHAFT (THREE-JOINT TYPE)

- Put alignment marks on the flanges.
- Remove four bolts and nuts.



### 6. REMOVE CENTER SUPPORT BEARING FROM INTERMEDIATE SHAFT (THREE-JOINT TYPE)

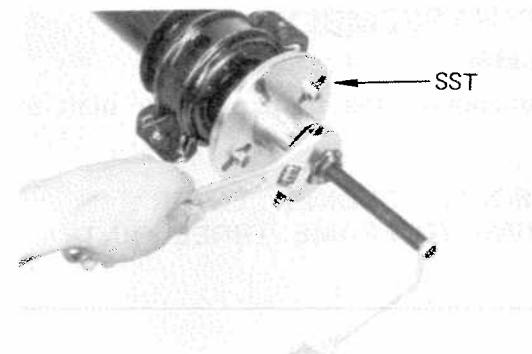
- Using a hammer and chisel, loosen the staked part of the nut.
- Using a holder\* to hold the flange, remove the nut.
- Put alignment marks on the flange and shaft.

\*SST 09330-00020 or Commercial holder

- Using a flange remover\*, remove the flange from the shaft.

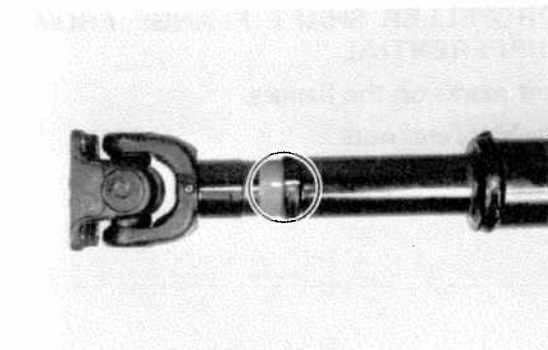
\*SST 09557-22022

- Remove the center support bearing from the shaft.



### 7. REMOVE SLEEVE YOKE FROM PROPELLER SHAFT (REAR PROPELLER SHAFT OF RN 4x4)

- Put alignment marks on the sleeve yoke and shaft.
- Pull out the sleeve yoke from the shaft.

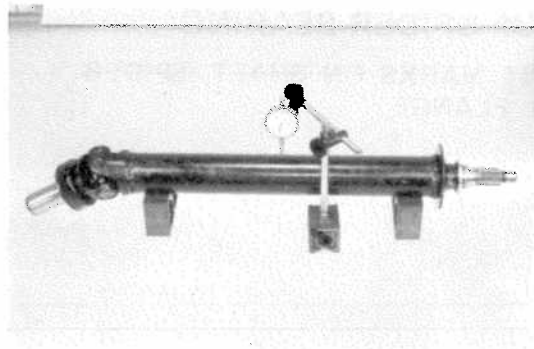


## INSPECTION OF PROPELLER SHAFT COMPONENTS

### 1. INSPECT PROPELLER AND INTERMEDIATE SHAFTS FOR DAMAGE AND RUNOUT

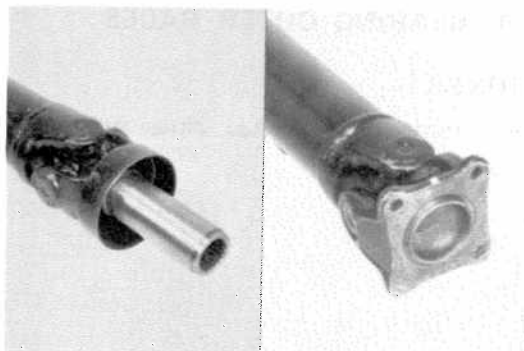
If shaft runout is greater than maximum, replace the shaft.

Maximum runout: 0.8 mm (0.031 in)



### 2. INSPECT YOKE AND FLANGES FOR DAMAGE AND WEAR

Replace if damaged or worn.



### 3. INSPECT CENTER SUPPORT BEARING FOR WEAR OR DAMAGE

Check that the bearing turns freely.

If the bearing is damaged, worn, or does not turn freely, replace it.

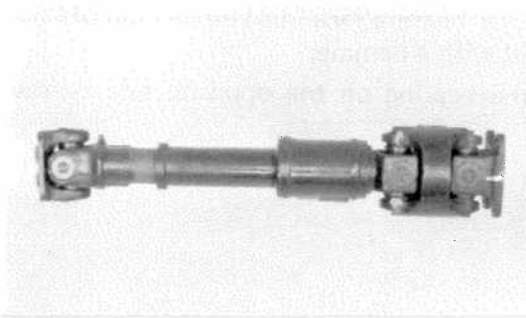


### 4. INSPECT FRONT PROPELLER SHAFT

(a) Inspect the shaft for wear or damage.

(b) Inspect the double Cardan joint for wear or damage.

NOTE: If any problem is found, replace the front propeller shaft assembly.



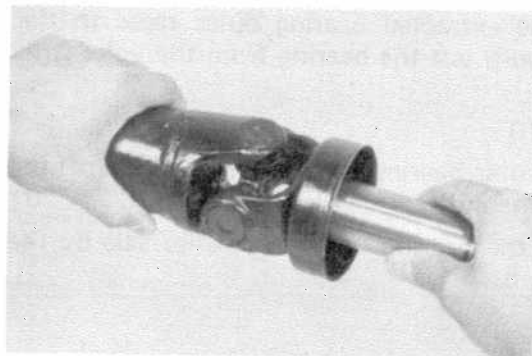
### 5. INSPECT SPIDER BEARINGS

(a) Inspect the spider bearings for wear or damage.

(b) Check the spider bearing axial play by turning the yoke while holding the shaft tightly.

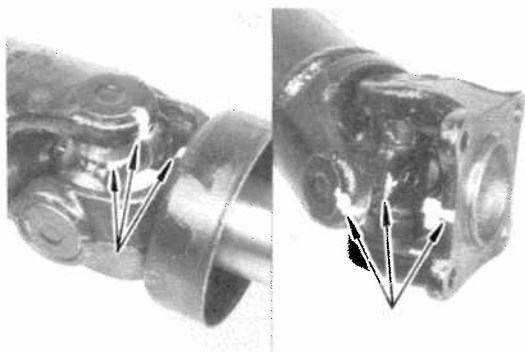
Bearing axial play: Less than 0.05 mm (0.0020 in.)

If necessary, replace the spider bearing.



## REPLACEMENT OF SPIDER BEARING

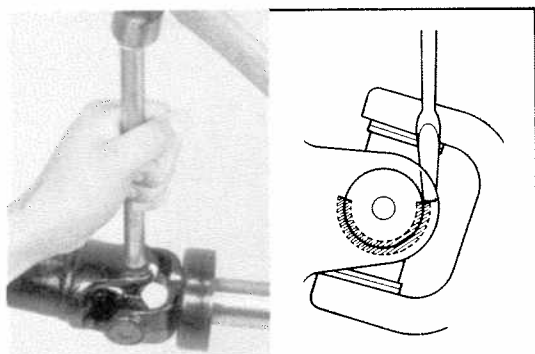
1. PUT ALIGNMENT MARKS ON SHAFT, SPIDER AND YOKE OR FLANGE



2. SLIGHTLY TAP IN BEARING OUTER RACES

3. REMOVE SNAP RINGS

Using a screwdriver, remove four snap rings from the grooves.

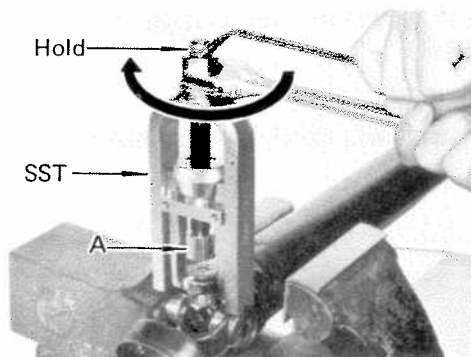


4. REMOVE SPIDER BEARINGS

- (a) Using SST\*, push out the bearing from the propeller shaft.

\*SST 09332-25010

NOTE: Sufficiently raise the part indicated by A so that it does not come into contact with the bearing.



- (b) Clamp the outer bearing race in a vise and tap off the propeller shaft with a hammer.

NOTE: Remove the bearing on the opposite side by the same procedure.

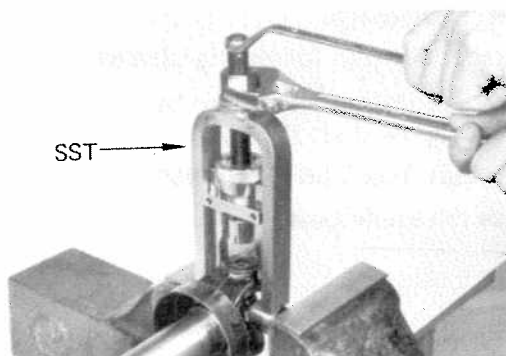


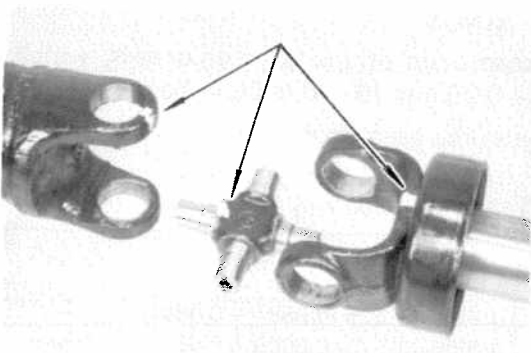
- (c) Assemble the extracted bearing outer races to the spider and push out the bearing from the yoke with SST\*.

\*SST 09332-25010

- (d) Clamp the outer bearing race in a vise and tap off the yoke with a hammer.

NOTE: Remove the bearing on the opposite side by the same procedure.



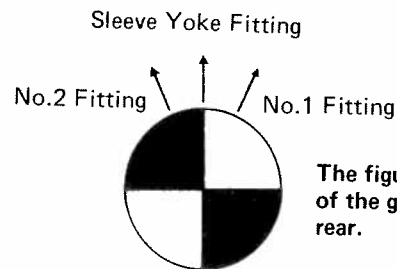
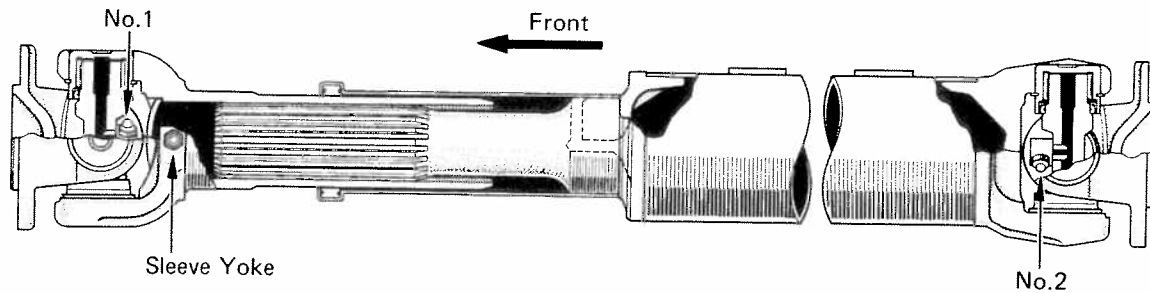


### 5. INSTALL SPIDER BEARINGS

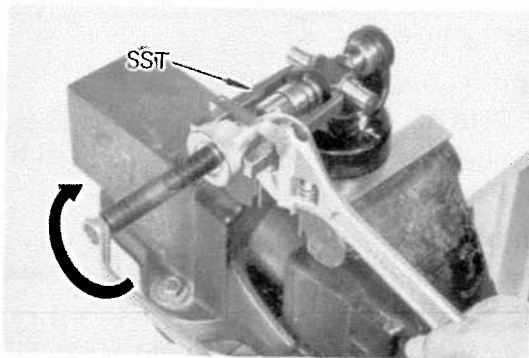
- (a) Apply multipurpose grease to the spider and bearings.
- (b) Align the marks on the yoke, spider and shaft.

NOTE: When replacing the rear propeller shaft spider of RN 4x4, be sure that the grease fitting assembly hole is facing in the direction shown in the figure.

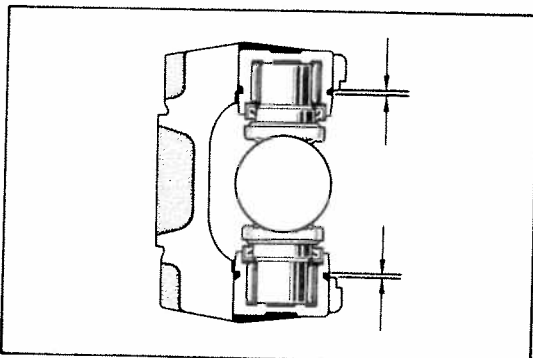
#### SPIDER GREASE FITTING ASSEMBLY DIRECTION FOR RN 4x4 REAR PROPELLER SHAFT



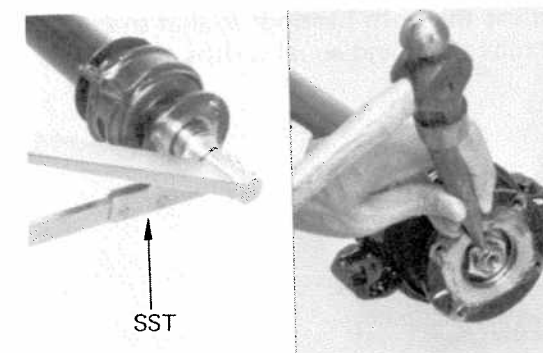
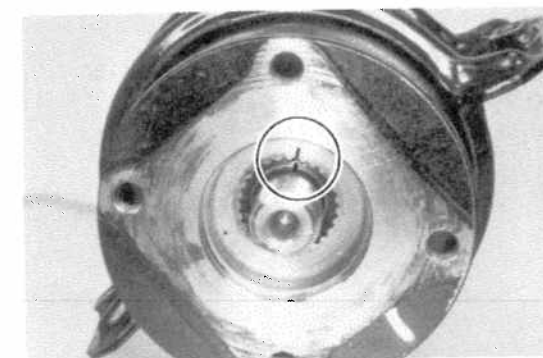
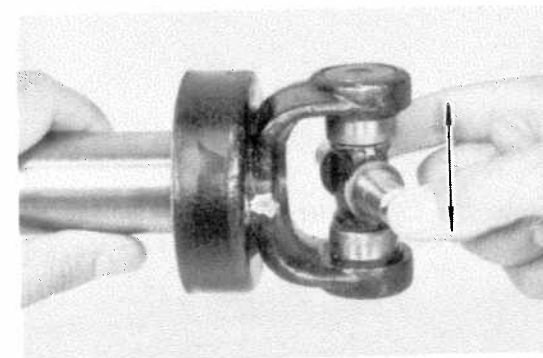
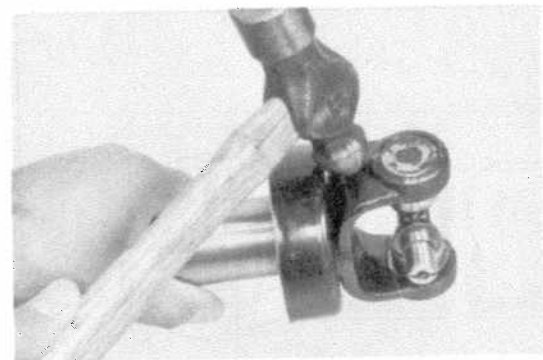
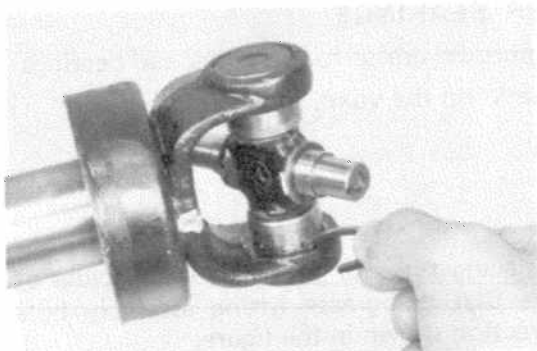
The figure at left shows the locations of the grease fittings as seen from the rear.



- (c) Fit the spider in the yoke.
  - (d) Using SST\*, install the new bearings on the spider.
- \*SST 09332-25010



- (e) Using SST, adjust the both bearings so that snap ring grooves are at maximum and equal widths.



## 6. INSTALL SNAP RINGS

- (a) Install two snap rings of the same thickness, which will allow 0 – 0.05 mm (0 – 0.0020 in.) axial play.

NOTE: Do not reuse the snap rings.

Thickness of snap ring

Model	Part No.	Thickness mm (in.)	Color
1/2 ton and 4x4	90520-26233	1.475 – 1.525 (0.0581 – 0.0600)	—
	90520-26234	1.525 – 1.575 (0.0600 – 0.0620)	Brown
	90520-26235	1.575 – 1.625 (0.0620 – 0.0640)	Blue
3/4 ton and C&C	90521-29070	2.375 – 2.425 (0.0935 – 0.0955)	—
	90521-29071	2.425 – 2.475 (0.0955 – 0.0974)	Brown
	90521-29072	2.475 – 2.525 (0.0974 – 0.0994)	Blue

- (b) Using a hammer, tap the yoke until the clearance between the bearing outer race and snap ring is zero.

## 7. CHECK SPIDER BEARING

- (a) Check that the spider bearing moves smoothly.  
(b) Check the spider bearing axial play.

**Bearing axial play: Less than 0.05 mm (0.0020 in.)**

NOTE: Install the new spider bearings in the shaft side using the procedure above.

## ASSEMBLY AND INSTALLATION OF PROPELLER SHAFT

(See illustration on page 12-2)

### 1. INSTALL CENTER SUPPORT BEARING ON INTERMEDIATE SHAFT (THREE-JOINT TYPE)

- (a) Coat the splines of the intermediate shaft with multipurpose grease.

- (b) Place the flange on the shaft and align the marks.

NOTE: For RN 3/4 ton, install the spacer to the back side of the bearing before installing the flange.

- (c) Using a holder\* to hold the flange, tighten a new nut to press the bearing into position.

**Torque: 1,700 – 2,000 kg-cm (123 – 144 ft-lb)**

\*SST 09330-00020 or Commercial holder

- (d) Loosen the nut.

- (e) Torque the nut again.

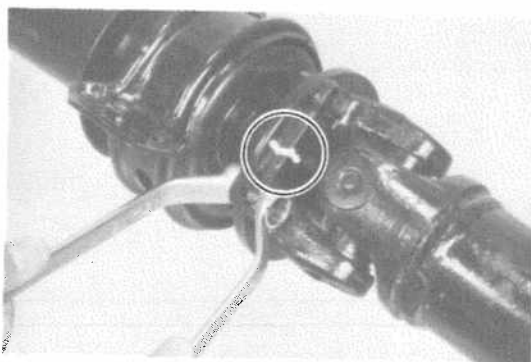
**Torque:**

RN 1/2 ton 250 – 350 kg-cm (19 – 25 ft-lb)

RN 3/4 ton, RN C&C

300 – 400 kg-cm (22 – 28 ft-lb)

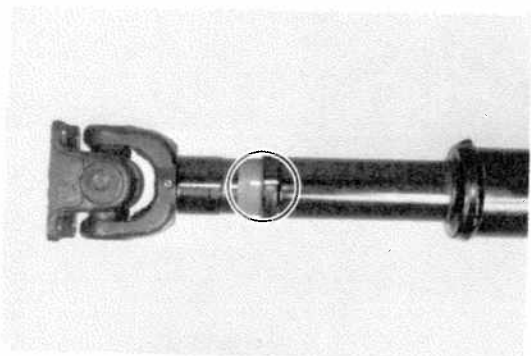
- (f) Using a hammer and punch, stake the nut.



**2. INSTALL PROPELLER SHAFT ON CENTER SUPPORT BEARING FLANGE (THREE-JOINT TYPE)**

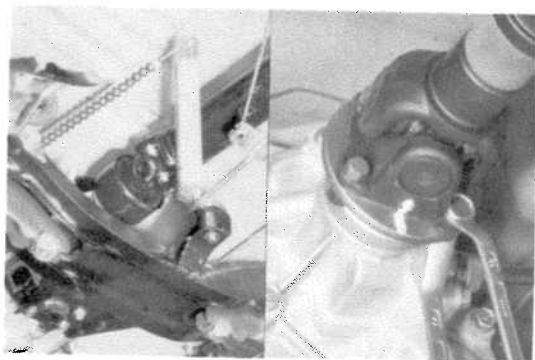
- (a) Align the marks on the flanges and connect the flanges with four bolts and nuts.
- (b) Torque the bolts and nuts.

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



**3. INSERT SLEEVE YOKE INTO PROPELLER SHAFT (REAR PROPELLER SHAFT OF RN 4x4)**

- (a) Apply multipurpose grease to the propeller shaft spline and sleeve yoke sliding surface.
- (b) Align the marks on the sleeve yoke and propeller shaft.
- (c) Insert the sleeve yoke into the propeller shaft.

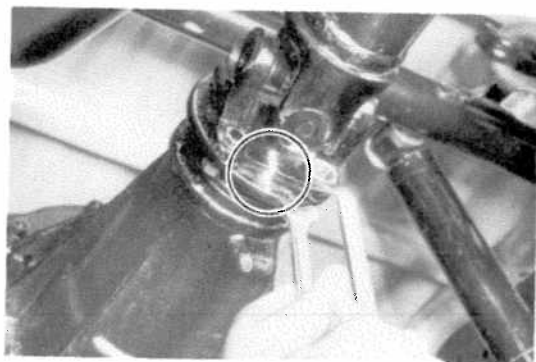


**4. INSERT YOKE IN TRANSMISSION (RN 4x2)**

**5. CONNECT PROPELLER SHAFT FLANGE TO COMPANION FLANGE ON TRANSFER (RN 4x4)**

- (a) Align the marks on the flanges and connect the flanges with four bolts and nuts.
- (b) Torque the bolts and nuts.

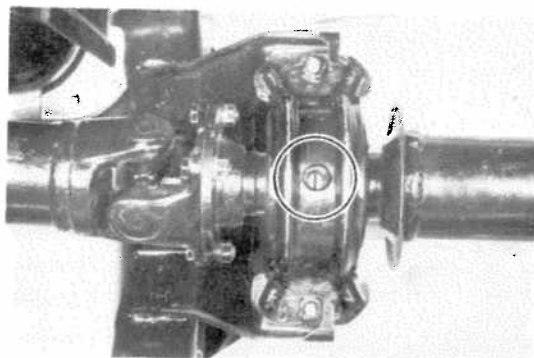
**Torque: 300 – 500 kg-cm (22 – 36 ft-lb)**



**6. CONNECT PROPELLER SHAFT FLANGE TO COMPANION FLANGE ON DIFFERENTIAL**

- (a) Align the marks on the flanges and connect the flanges with four bolts and nuts.
- (b) Torque the bolts and nuts.

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



**7. CONNECT CENTER BEARING TO MEMBER (THREE-JOINT TYPE)**

- (a) Finger tighten the two mounting bolts.
- (b) Check that the bearing bracket is at right angles to the propeller shaft and the bearing center line is in the center of the bracket hole.
- (c) Torque the mounting bolts.

**Torque: 150 – 200 kg-cm (11 – 14 ft-lb)**

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# FRONT AXLE AND SUSPENSION

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Front Shock Absorber .....	13-18
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## TROUBLESHOOTING (4×2)

Problem	Possible cause	Remedy	Page
Wander/pulls	Tires worn or improperly inflated	Replace tire or inflate tires to proper pressure	13-3
	Alignment incorrect	Check front end alignment	13-3
	Wheel bearing adjusted too tight	Adjust wheel bearing	13-9
	Front or rear suspension parts loose or broken	Tighten or replace suspension part	
	Steering linkage loosen or worn	Tighten or replace steering linkage	16-73
	Steering gear out of adjustment or broken	Adjust or repair steering gear	16-3
Bottoming	Vehicle overloaded	Check loading	
	Shock absorber worn out	Replace shock absorber	13-18
	Springs weak	Replace spring	13-13
Sways/pitches	Tires improperly inflated	Inflate tires to proper pressure	13-3
	Stabilizer bar bent or broken	Inspect stabilizer bar	13-16
	Shock absorber worn out	Replace shock absorber	13-18
Front wheel shimmy	Tires worn or improperly inflated	Replace tire or inflate tires to proper pressure	13-3
	Wheels out of balance	Balance wheels	
	Shimmy damper worn out	Replace steering damper	16-76
	Shock absorber worn out	Replace shock absorber	13-18
	Alignment incorrect	Check front end alignment	13-3
	Wheel bearings worn or improperly adjusted	Replace or adjust wheel bearings	13-7
	Ball joints or bushings worn	Inspect ball joints and bushings	13-20, 22 24
	Steering linkage loosen or worn	Tighten or replace steering linkage	16-73
	Steering gear out of adjustment or broken	Adjust or repair steering gear	16-3
Abnormal tire wear	Tires improperly inflated	Inflate tires to proper pressure	13-3
	Shock absorbers worn out	Replace shock absorber	13-18
	Alignment incorrect	Check toe-in	13-6
	Suspension parts worn	Replace suspension part	

## SPECIAL TOOLS AND TEST EQUIPMENT (4×2)

Tool	SST No.	Use
Wheel alignment equipment	Commercial	To check front end alignment
Flare nut wrench	09751-36011 or Commercial	To loosen and tighten brake line
Bearing driver	09608-30011 or Commercial	To install wheel bearing outer race
Ball joint puller	09628-62010 or Commercial	To disconnect ball joint
Ball joint puller	09610-20011 or Commercial	To disconnect ball joint
Bushing replacer	09726-35010	To replace lower arm bushing
Bushing replacer	09710-30020	To replace upper arm bushing

## FRONT WHEEL ALIGNMENT (4×2)

### 1. MAKE FOLLOWING CHECKS AND CORRECT ANY PROBLEMS

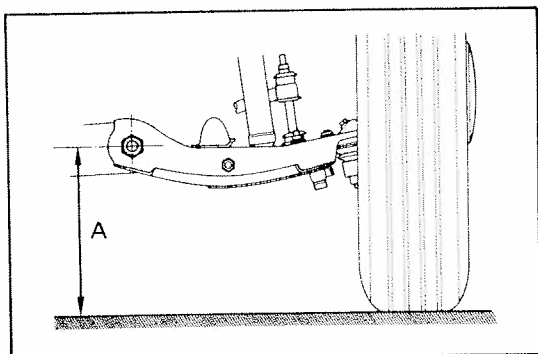
- (a) Check wheel runout and balance.
- (b) Check the front wheel bearings for looseness.
- (c) Check the front suspension for looseness.
- (d) Check the steering linkage for looseness.
- (e) Check that the front absorbers work properly by using the standard bounce test.
- (f) Check the tires for wear and proper inflation.

### Cold tire inflation pressure

Model	Tire size	kg/cm <sup>2</sup> (psi)	
		Front	Rear
RN34L RN44L (STD)(DLX,OPT)	7.00-14-6PR	1.7 (24)	2.5 (36)
RN34L RN44L (DLX, SR5)	E78-14B	1.7 (24)	2.2 (32)
RN34L RN44L (SR5, OPT)	205/70 SR14	1.7 (24)	2.2 (32)
RN44L-KH3 (3/4 ton)	7.50-14-6PR	1.7 (24)	2.5 (36)
RN44L-K3W (C&C)	7.50-14-6PR	1.7 (24)	2.5 (36)

\* Do not drive over 120 km/h (75 mph) with 400 kg (882 lb) or more cargo.

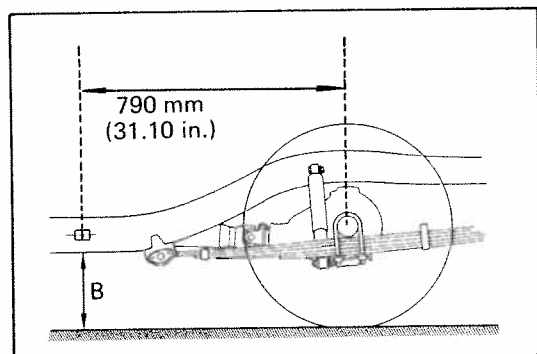
\*\* Do not drive over 120 km/h (75 mph) with 600 kg (1,323 lb) or more cargo.



## 2. MEASURE VEHICLE HEIGHT

(a) Measure the vehicle front height.

If the vehicle is not at standard height, 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, and adjust the vehicle front height with the torsion bar springs.



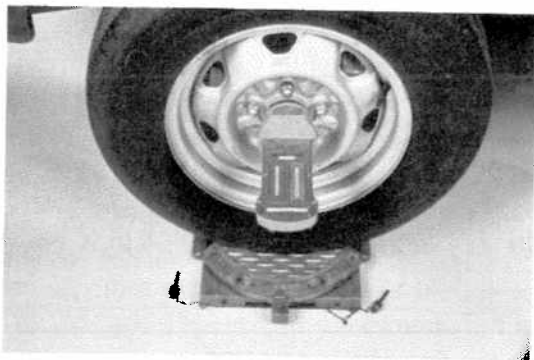
(b) Measure the vehicle rear height.

If the vehicle is not at standard height, 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.

### Vehicle height

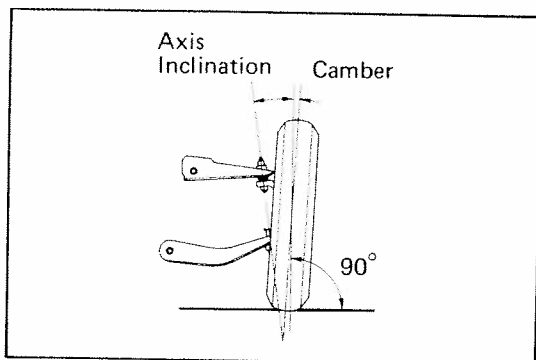
mm (in.)

Model	Pay load	Tire size	Unloaded		Loaded	
			Front (A)	Rear (B)	Front (A)	Rear (B)
RN34L RN44L (STD) (DLX, OPT)	1/2 ton	7.00-14-6PR	261.4 (10.291)	288.3 (11.350)	242.3 (9.539)	231.0 (9.094)
RN34L RN44L (DLX)	1/2 ton	E78-14B	254.4 (10.016)	281.3 (11.075)	235.3 (9.264)	224.0 (8.819)
RN34L RN44L (SR5)	1/2 ton	ER78-14B	250.6 (9.866)	271.0 (10.669)	231.3 (9.106)	205.0 (8.071)
RN34L RN44L (SR5, OPT)	1/2 ton	205/70 SR14	241.6 (9.512)	262.0 (10.315)	222.3 (8.752)	196.0 (7.717)
RN44L-KH3 (3/4 ton)	3/4 ton	7.50-14-6PR	278.4 (10.961)	305.3 (12.020)	259.3 (10.209)	248.0 (9.764)
RN44L-K3W (C&C)	1 ton	7.50-14-6PR	278.4 (10.961)	305.3 (12.020)	259.3 (10.209)	248.0 (9.764)



### 3. INSTALL WHEEL ALIGNMENT EQUIPMENT

Follow the specific instructions of the equipment manufacturer.



### 4. CHECK CAMBER, STEERING AXIS INCLINATION AND CASTER

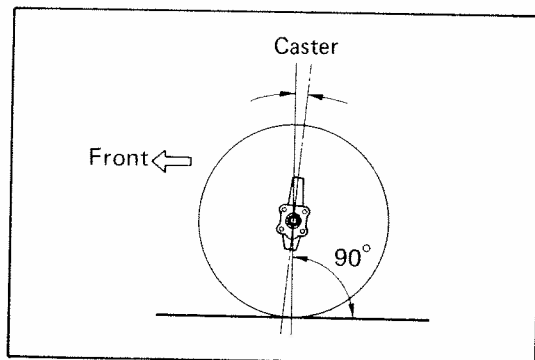
#### Camber:

Inspection STD  $1^{\circ} 05' \pm 45'$

Adjustment STD  $1^{\circ} 05' \pm 30'$

Left right error 30'

Steering axis inclination:  $7^{\circ} 10'$



#### Caster:

RN 1/2 ton

Inspection STD  $1^{\circ} \pm 45'$

Adjustment STD  $1^{\circ} \pm 30'$

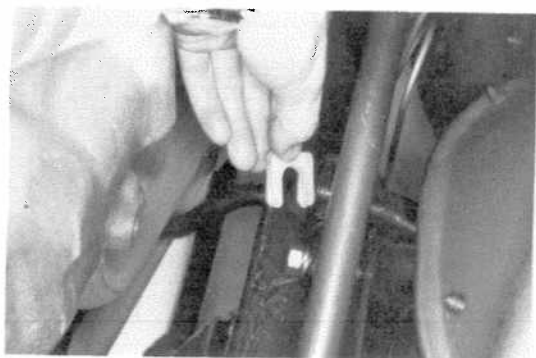
Left right error 30'

RN 3/4 ton and RN C&C

Inspection STD  $30' \pm 45'$

Adjustment STD  $30' \pm 30'$

Left right error 30'

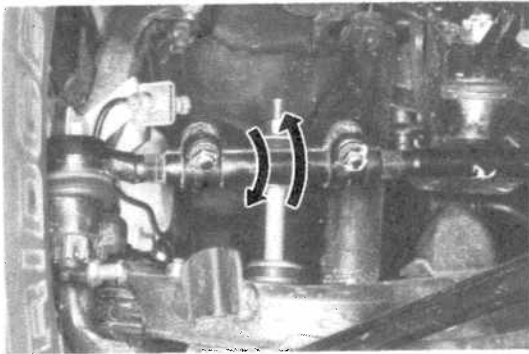
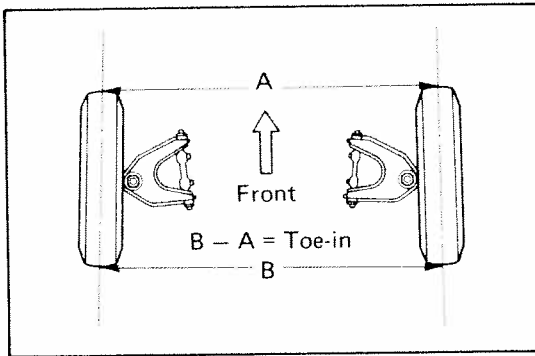


If camber or caster is out of specified value, adjust them by adding or removing shims on the upper arm.

Shim thickness

Part No.	Thickness	mm (in.)
90565-12023	2.3	(0.091)
90565-12024	1.6	(0.063)
90565-12025	1.2	(0.047)

If steering axis inclination is not as specified after camber and caster have been correctly adjusted, recheck steering knuckle and front wheel for bending or looseness.



## 5. ADJUST TOE-IN

Toe-in:

	Inspection STD	Adjustment STD
Bias tire	$5 \pm 4$ mm ( $0.20 \pm 0.16$ in.)	$5 \pm 1$ mm ( $0.20 \pm 0.04$ in.)
Radial tire	$2 \pm 4$ mm ( $0.08 \pm 0.16$ in.)	$2 \pm 1$ mm ( $0.08 \pm 0.04$ in.)

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

- Make sure the steering gear is centered.
- Loosen nuts holding the clamps on the left and right tie rods.
- Adjust toe-in to the correct value by turning left and right tie rod tubes an equal amount.
- Tighten nuts on the tie rod ends.

NOTE: Make sure that tie rods are the same length.

- Torque nuts holding the tube clamps.

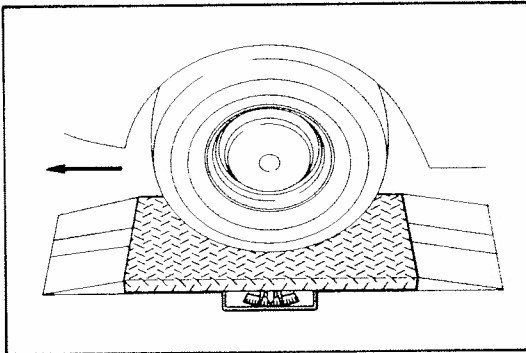
Torque: 200 – 300 kg-cm (15 – 21 ft-lb)

## 6. CHECK SIDE SLIP WITH SIDE SLIP TESTER

Side slip:

Less than 3.0 mm/m (0.118 in./3.3 ft)

If the side slip exceeds the limit, the toe-in or other front wheel alignment may not be correct.

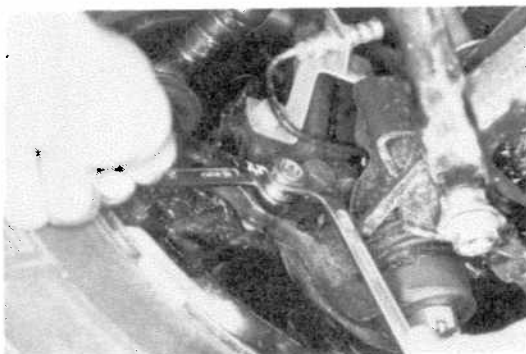
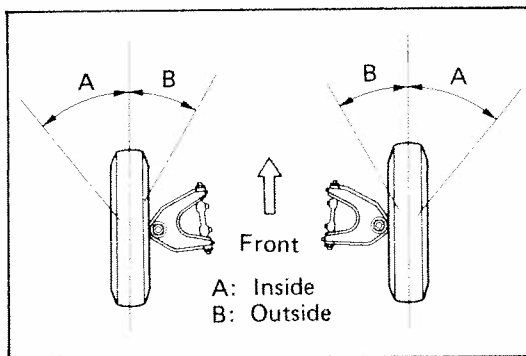


## 7. CHECK STEERING ANGLES

NOTE: When the steering wheel is turned fully, make sure that the wheel is not touching the body or brake flexible hose.

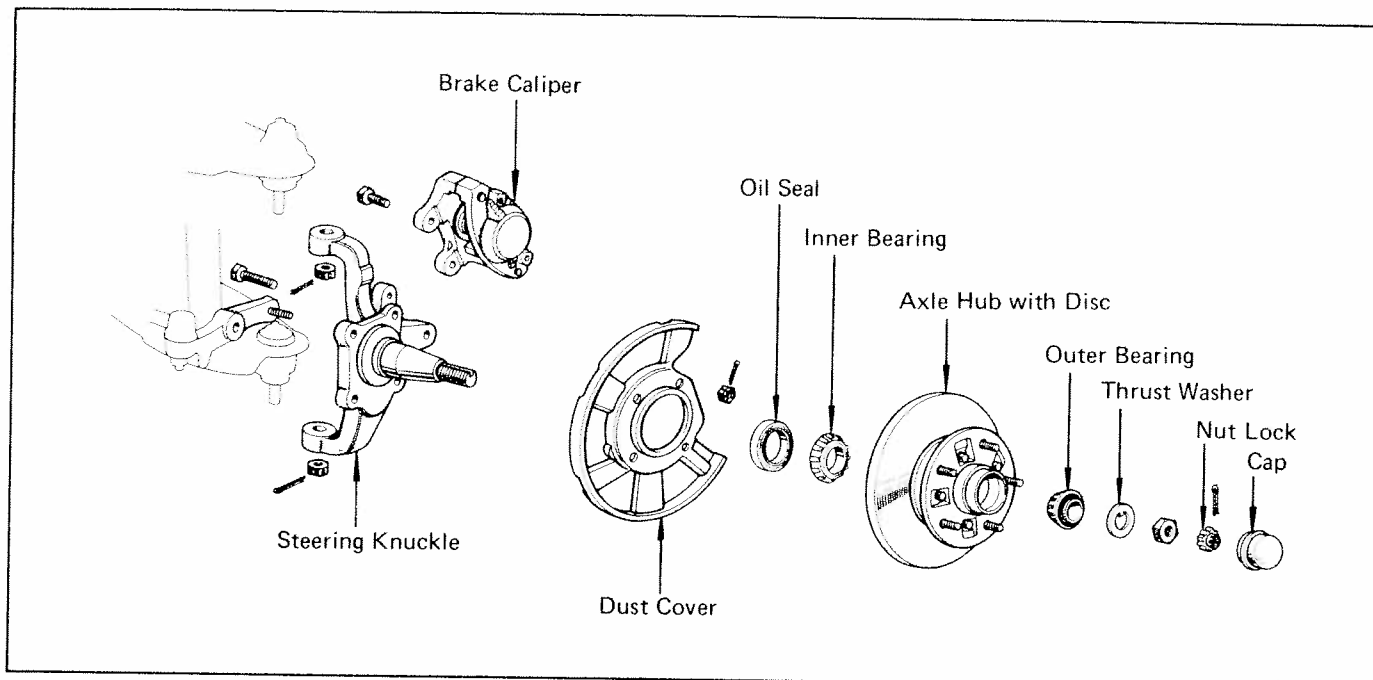
Wheel angle:

Inside  $36^{\circ} +1^{\circ} -2^{\circ}$   
Outside  $29^{\circ}$



If steering angles differ from standard value, adjust the steering angle with knuckle stopper bolts. If the steering angle still cannot be adjusted within limits, inspect and replace damaged or worn steering parts.

## FRONT AXLE HUB AND STEERING KNUCKLE (4×2)



### Front Axle Hub

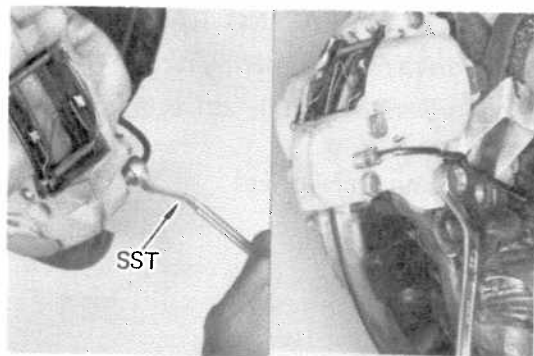
#### DISASSEMBLY OF FRONT AXLE HUB

##### 1. REMOVE CALIPER

- (a) Using a flare nut wrench\*, disconnect the brake tube from the caliper.

\*SST 09751-36011 or Commercial wrench

- (b) Remove the caliper from the knuckle.



##### 2. REMOVE AXLE HUB WITH DISC

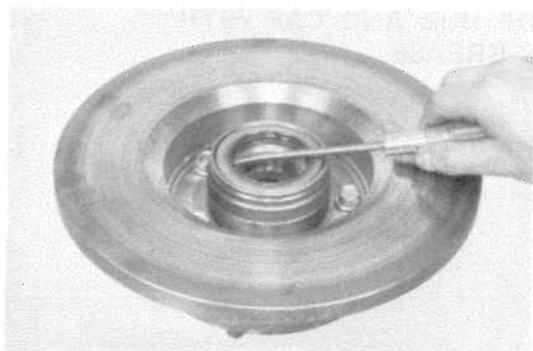
Remove cap, cotter pin, nut lock, nut and axle hub.

##### 3. REMOVE THRUST WASHER AND OUTER BEARING

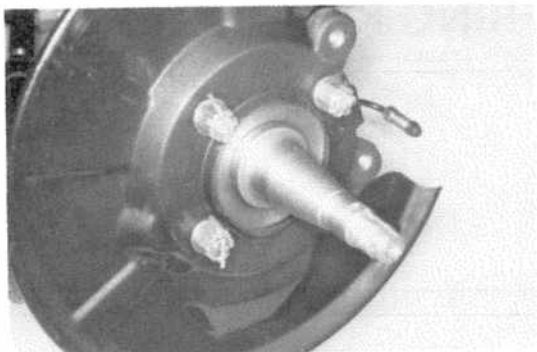


##### 4. REMOVE INNER BEARING AND OIL SEAL

Using a screwdriver, pry out the oil seal.



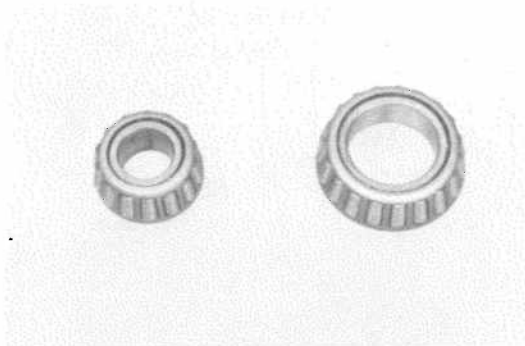




## INSPECTION OF FRONT AXLE HUB

### 1. CLEAN AND INSPECT SPINDLE

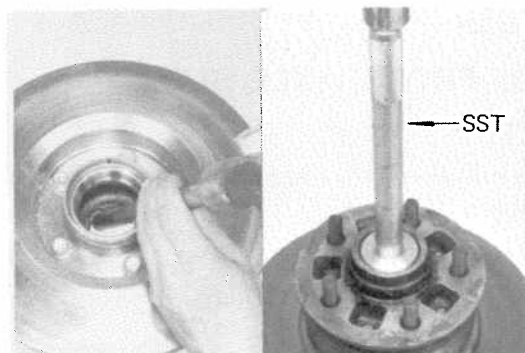
Using a magnetic flaw detector or flaw detecting penetrant, check for damage or cracks.



### 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.

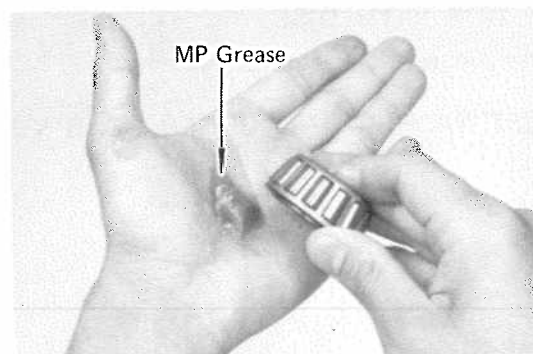
If a bearing or race requires replacement, it must be replaced as a set.



### 3. IF NECESSARY, REPLACE BEARING RACE

- (a) Using a brass bar, drive out the bearing race.
- (b) Using a bearing driver\*, carefully drive in the new race.

\*SST 09608-30011 or Commercial driver

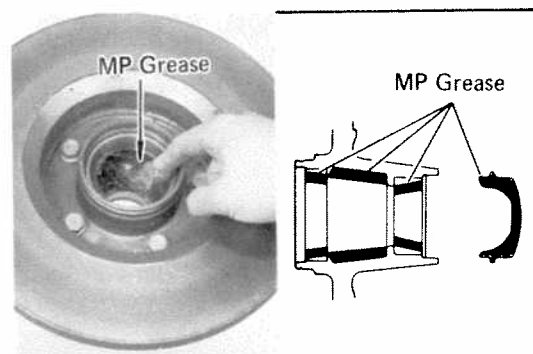


## ASSEMBLY OF FRONT AXLE HUB (See illustration on page 13-7)

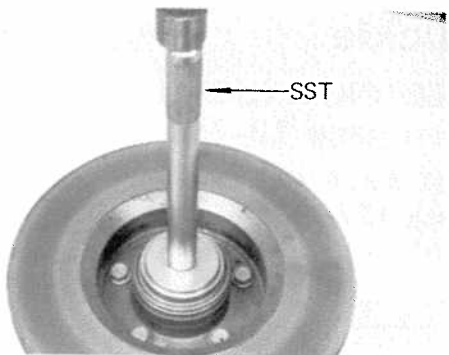
### 1. PACK BEARINGS WITH MULTIPURPOSE GREASE

Place some grease in your hand and force grease into bearing until completely filled.

NOTE: If available, use a pressure bearing lubricator.



### 2. COAT INSIDE OF HUB AND CAP WITH MULTIPURPOSE GREASE

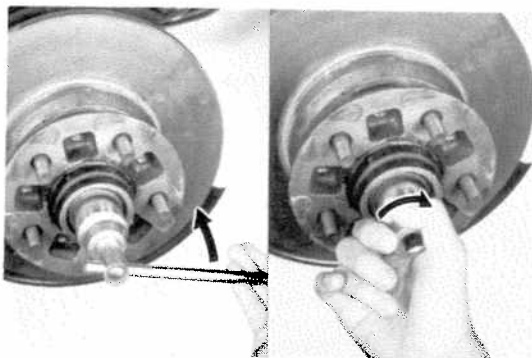


### 3. INSTALL INNER BEARING AND OIL SEAL

Place inner bearing into the hub. Using a seal driver, drive the oil seal into the hub. Coat the oil seal with multi-purpose grease.

### 4. INSTALL AXLE HUB ON SPINDLE

- (a) Place the axle hub on the spindle.
- (b) Install the outer bearing and thrust washer.



### 5. ADJUST PRELOAD

- (a) Install and torque the nut.

**Torque: 300 kg-cm (22 ft-lb)**

- (b) Turn the hub right and left two or three times.
- (c) Loosen the nut until it can be turned by hand. Using a socket, tighten the nut as tight as possible by hand.

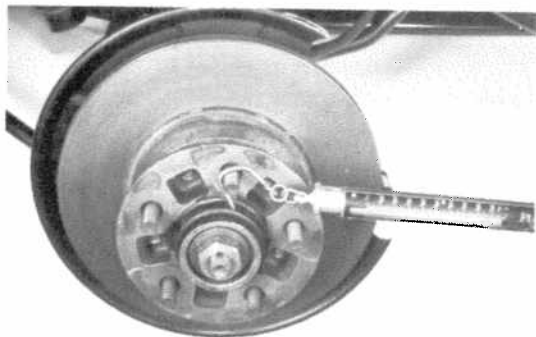
- (d) Using a spring tension gauge, check the preload.

**Preload (at starting): 0.6 – 1.8 kg  
(1.3 – 4.0 lb)**

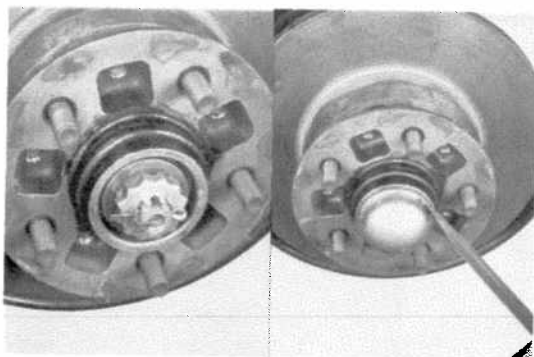
If preload is less than specification, tighten the nut slightly and check again.

If preload is excessive, loosen the nut and using a socket, retighten it as tight as possible by hand.

Check the preload again.



### 6. INSTALL NUT LOCK, COTTER PIN AND CAP



### 7. INSTALL BRAKE CALIPER

- (a) Install brake caliper to the knuckle. Torque the mounting bolts.

**Torque:**

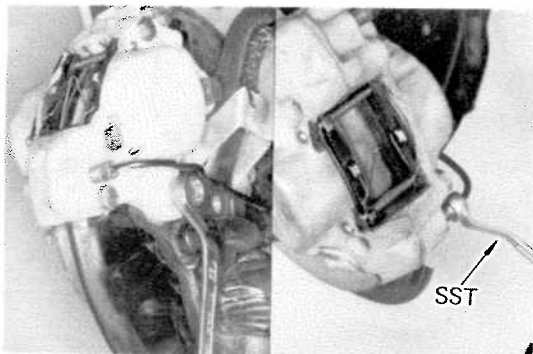
**1/2 ton and 3/4 ton**

**930 – 1,200 kg-cm (68 – 86 ft-lb)**

**C & C 1,100 – 1,750 kg-cm (80 – 126 ft-lb)**

- (b) Using a flare nut wrench\*, connect the brake tube to the brake capliper.

\*SST 09751-36011 or Commerical wrench



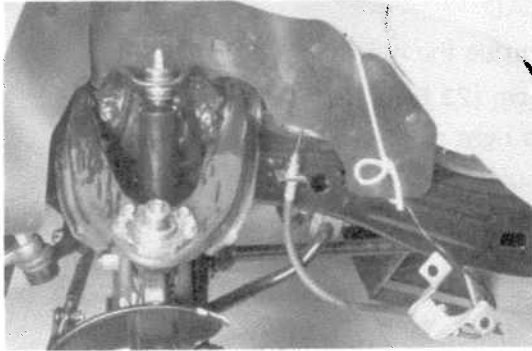


## Steering Knuckle

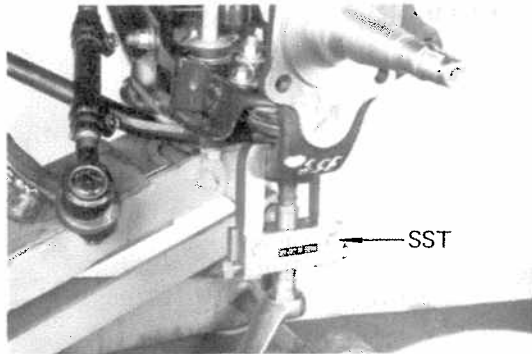
### REMOVAL OF STEERING KNUCKLE

(See illustration on page 13-7)

1. REMOVE FRONT AXLE HUB AND BRAKE CALIPER (See page 13-7)

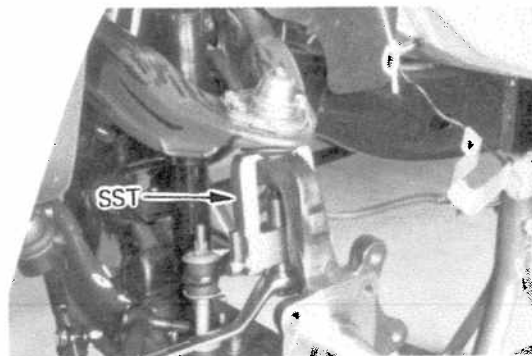


2. REMOVE KNUCKLE ARM AND DUST COVER
3. SUSPEND BRAKE HOSE FROM APPROPRIATE PLACE



4. DISCONNECT LOWER BALL JOINT FROM STEERING KNUCKLE
  - (a) Support the lower arm with a jack.
  - (b) Using a ball joint puller\*, disconnect the lower ball joint from the steering knuckle.

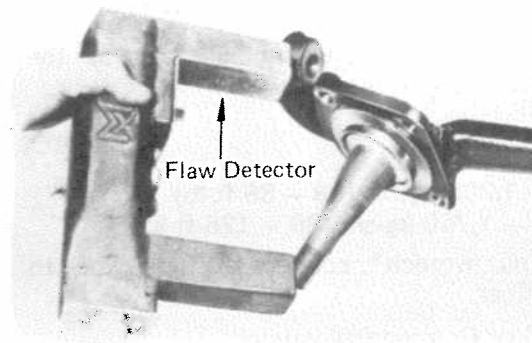
\*SST 09628-62010 or Commercial puller



5. DISCONNECT UPPER BALL JOINT FROM STEERING KNUCKLE

Using a ball joint puller\*, disconnect the upper ball joint from the steering knuckle.

\*SST 09628-62010 or Commercial puller



### INSPECTION OF STEERING KNUCKLE

#### INSPECT STEERING KNUCKLE

Inspect the knuckle for damage or cracks.

NOTE: It is recommended that a flaw detector or liquid penetrate be used for this inspection.

If the steering knuckle is damaged or cracked, replace it.

## INSTALLATION OF STEERING KNUCKLE

### 1. CONNECT UPPER BALL JOINT TO STEERING KNUCKLE

- (a) Insert the steering knuckle on the upper ball joint and tighten the nut.

Torque: 900 — 1,300 kg-cm (66 — 94 ft-lb)

- (b) Secure the nut with a cotter pin.

### 2. CONNECT LOWER BALL JOINT TO STEERING KNUCKLE

- (a) Insert the lower ball joint in the steering knuckle and tighten the nut.

Torque: 1,200 — 1,700 kg-cm (87 — 122 ft-lb)

- (b) Secure the nut with a cotter pin.

### 3. INSTALL KNUCKLE ARM AND DUST COVER

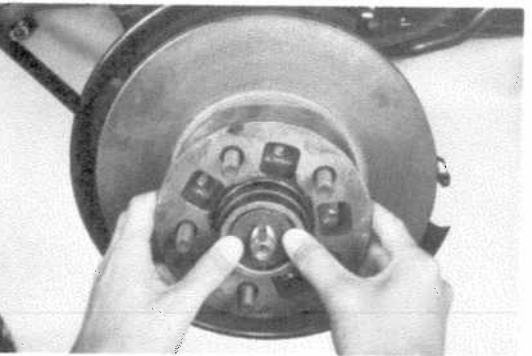
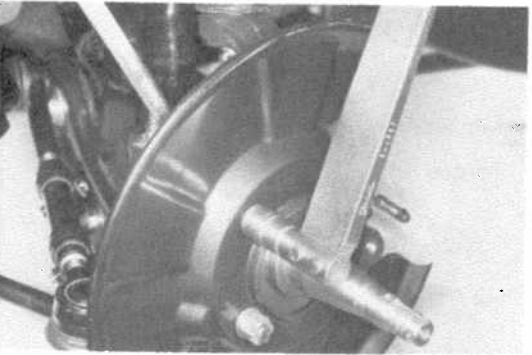
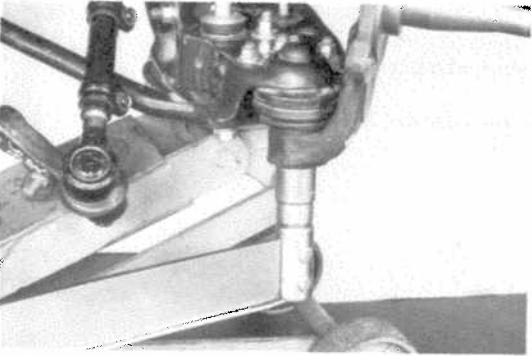
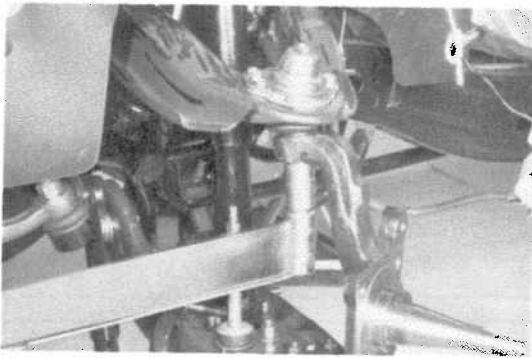
- (a) Insert the knuckle arm bolt in the steering knuckle.
- (b) Place the dust cover and brake hose bracket in position.
- (c) Insert the bolts and tighten the nuts.

Torque: 900 — 1,300 kg-cm (66 — 94 ft-lb)

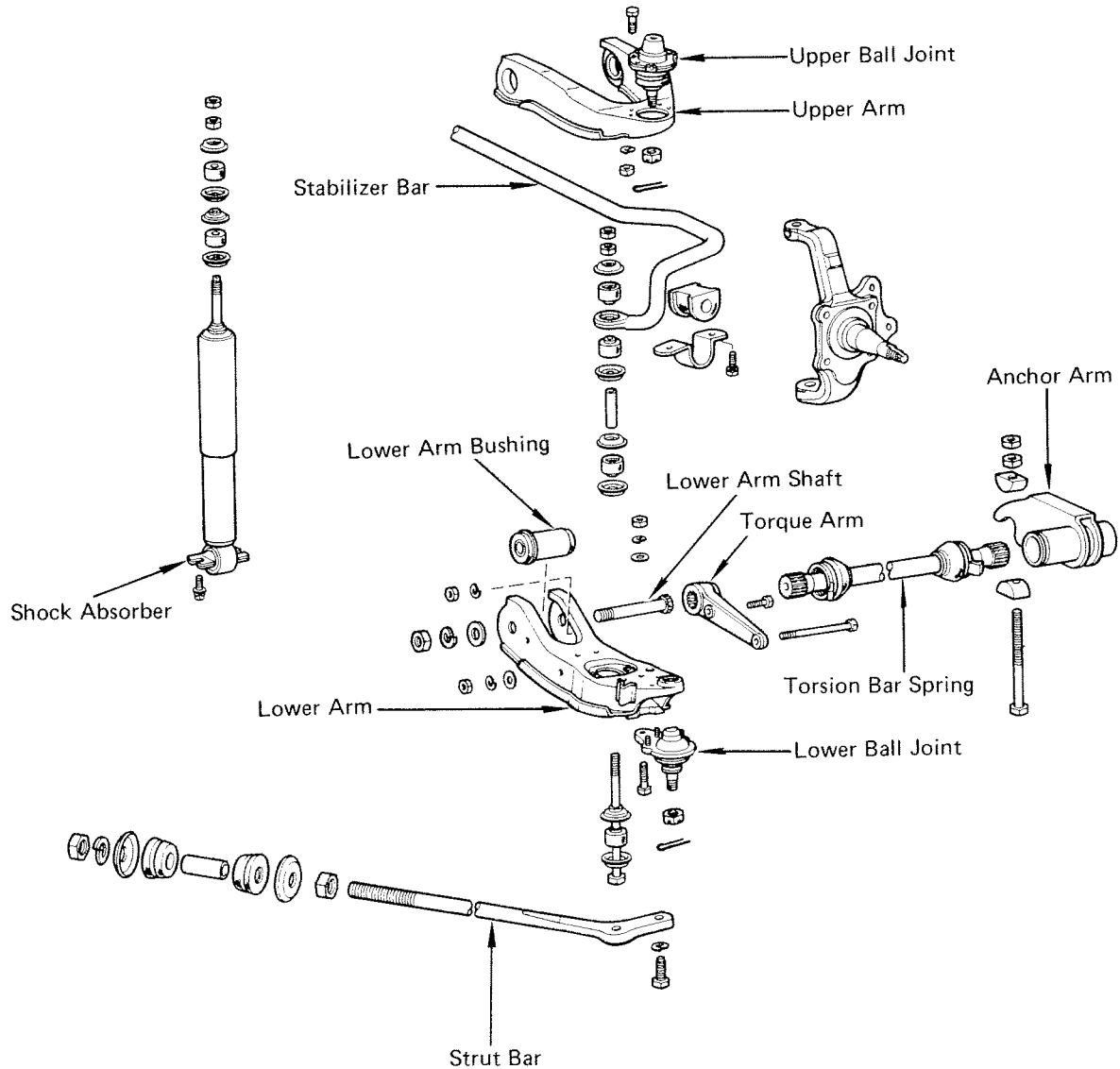
- (d) Secure the nuts with cotter pins.

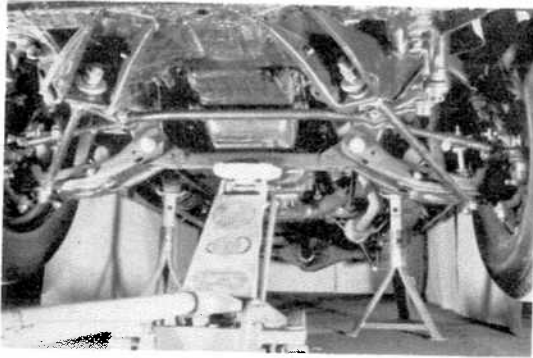
### 4. INSTALL FRONT AXLE HUB AND BRAKE CALIPER (See page 13-8)

### 5. CHECK FRONT WHEEL ALIGNMENT (See page 13-3)



## FRONT SUSPENSION (4×2)

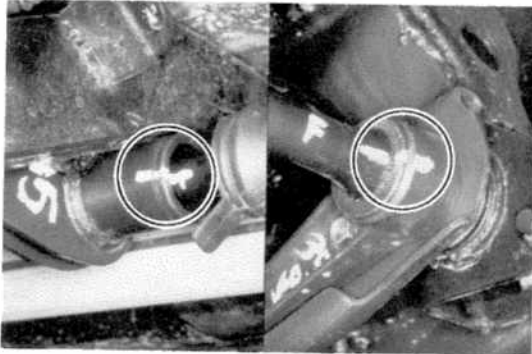




## Torsion Bar Spring

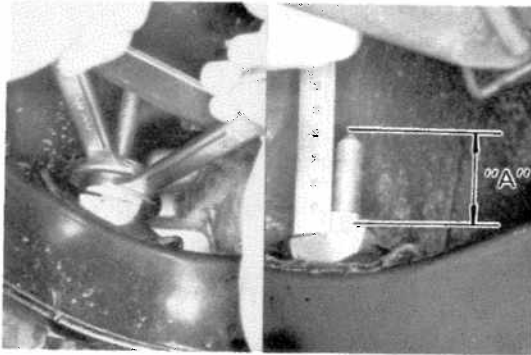
### REMOVAL OF TORSION BAR SPRING

1. JACK UP AND SUPPORT FRAME ON STANDS



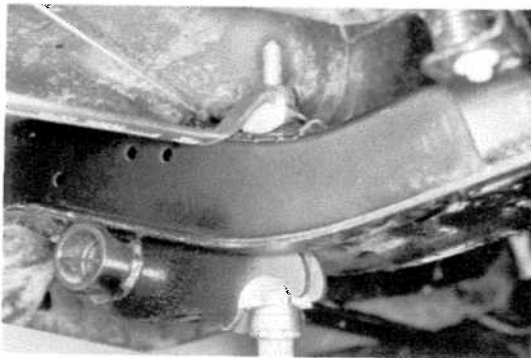
2. PLACE ALIGNMENT MARKS ON TORSION BAR SPRING, ANCHOR ARM AND TORQUE ARM

Remove the boots and place alignment marks on the torsion bar spring, anchor arm and torque arm.



3. REMOVE LOCK NUT AND MEASURE PROTRUDING BOLT END "A", AS SHOWN

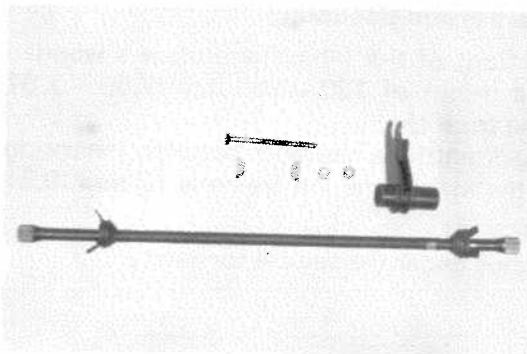
NOTE: Use this measurement for reference when adjusting the vehicle height.

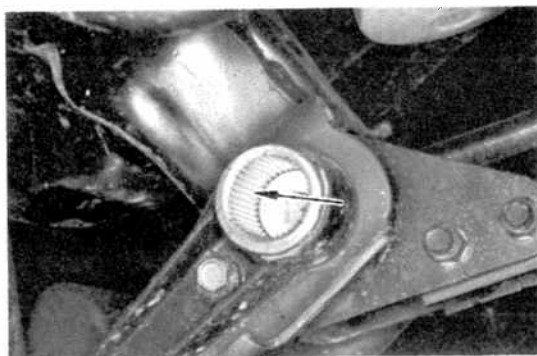


4. LOOSEN ADJUSTING NUT AND REMOVE ANCHOR ARM AND TORSION BAR SPRING

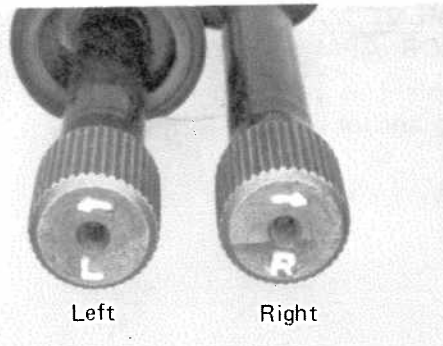
### INSPECTION OF TORSION BAR SPRING

1. INSPECT PARTS FOR WEAR OR DAMAGE



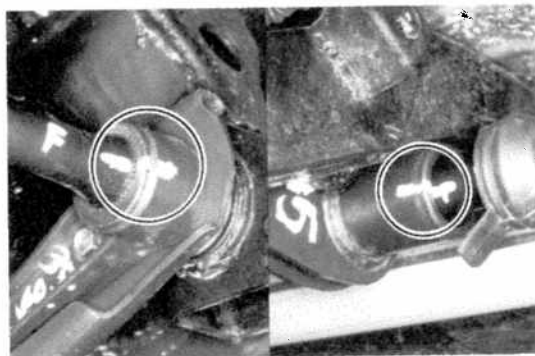


## 2. INSPECT SPLINE OF TORQUE ARM FOR DAMAGE



## INSTALLATION OF TORSION BAR SPRING (See illustration on page 13-12)

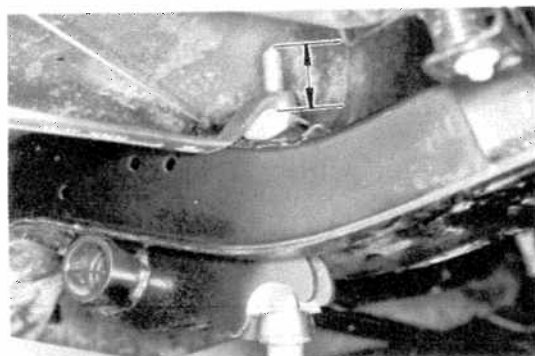
NOTE: There are left and right identification marks on the rear end of the torsion bar springs.  
Be careful not to interchange them.



## 1. INSTALL TORSION BAR SPRING AND ANCHOR ARM

### When Reusing Torsion Bar Spring

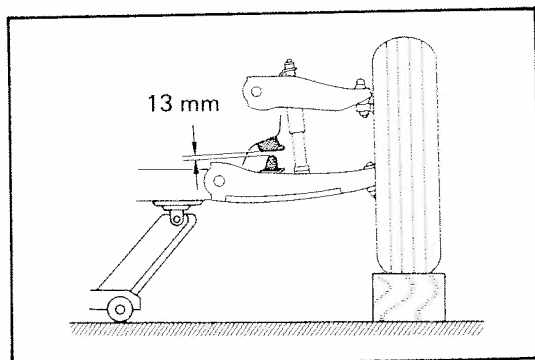
- Apply a light coat of multipurpose grease to the spline of the torsion bar spring.
- Align the alignment marks and install the torsion bar spring to the torque arm.
- Align the alignment marks and install the anchor arm to the torsion bar spring.
- Tighten the adjusting nut so that the bolt protrusion is equal to that before removal.



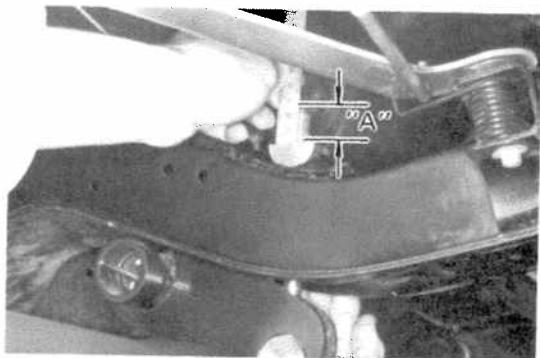
### When Using a New Torsion Bar Spring

- Jack up the front of the vehicle and place a wooden block with a height of 180 – 200 mm (7.09 – 7.87 in.) under the front tire.  
Lower the jack until the clearance between the spring bumper on the lower arm and frame is 13 mm (0.51 in.).

NOTE: Place stands under the vehicle for safety.







- (b) Apply a light coat of multipurpose grease to the spline of the torsion bar spring.
- (c) Insert the anchor arm onto the torsion bar spring so that bolt protrusion "A" is the extent shown below.

**Bolt protrusion "A":**

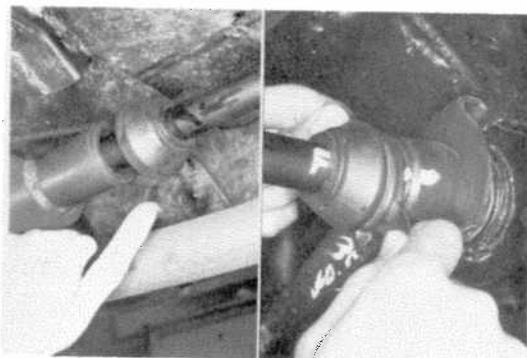
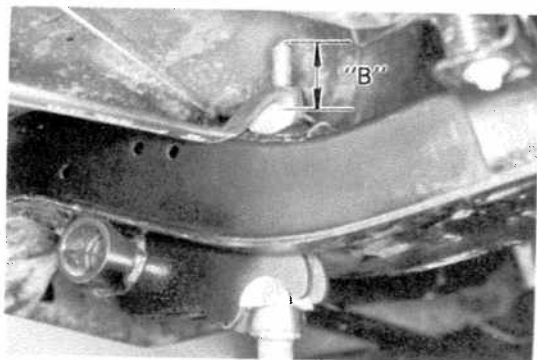
**1/2 ton 8 – 28 mm (0.31 – 1.10 in.)**

**3/4 ton and C&C**

**11 – 31 mm (0.43 – 1.22 in.)**

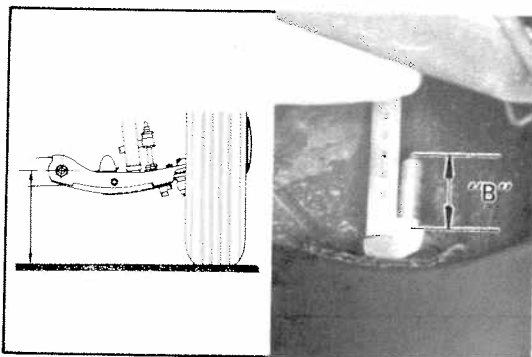
- (d) Remove the wooden block and lower the front of the vehicle until it rests on the stands.
- (e) Tighten the adjusting nut so that bolt protrusion "B" is the extent shown below.

**Bolt protrusion "B": 69 – 89 mm (2.72 – 3.50 in.)**



## 2. INSTALL BOOTS

- (a) Apply multipurpose grease to the boot lips.
- (b) Assemble the boots to the torque arm and the anchor arm.



## 3. ADJUST VEHICLE HEIGHT (See page 13-4)

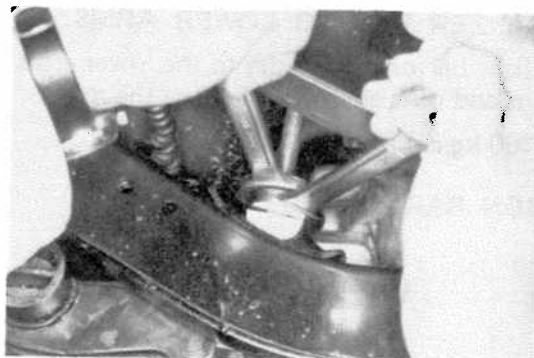
- (a) Remove the stands and bounce the vehicle several times to settle the suspension.
- (b) Adjust the vehicle height to the standard value with the adjusting nut.

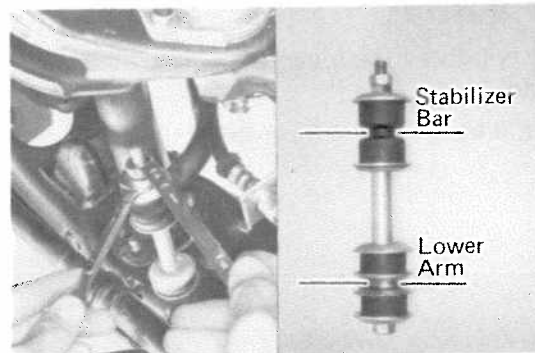
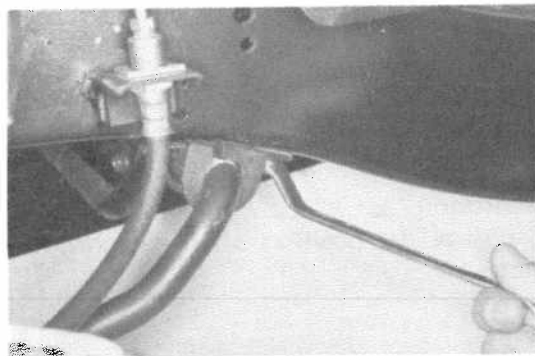
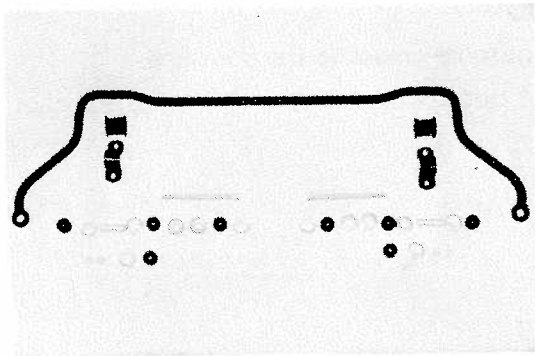
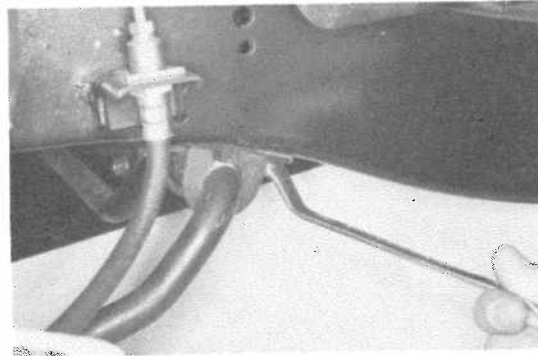
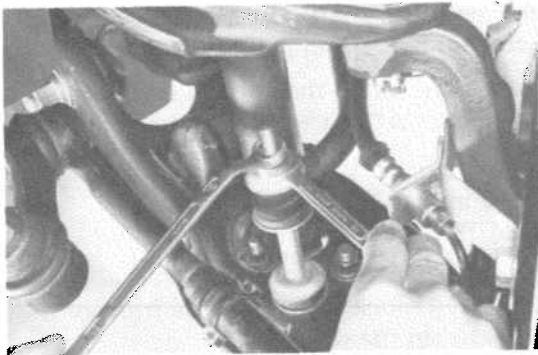
**NOTE:** If bolt protrusion "B" is not within 69 – 89 mm (2.72 – 3.50 in.), change the position of the anchor arm spline and reassemble.

## 4. TIGHTEN LOCK NUT

Using two wrenches, tighten the lock nut.  
Torque the lock nut.

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





## Stabilizer Bar

### REMOVAL OF STABILIZER BAR (See illustration on page 13-12)

1. REMOVE ONE TORSION BAR SPRING  
(See page 13-13)
2. REMOVE STABILIZER BAR FROM LOWER ARMS
  - (a) Remove the nuts, cushions and bolts holding both sides of stabilizer bar to lower arms, and disconnect the stabilizer bar.
  - (b) Remove both stabilizer bar bushings and brackets from the frame, and remove the stabilizer bar.

## INSPECTION OF STABILIZER BAR

### INSPECT STABILIZER BAR

Inspect the stabilizer bar component parts for wear or damage.

## INSTALLATION OF STABILIZER BAR (See illustration on page 13-12)

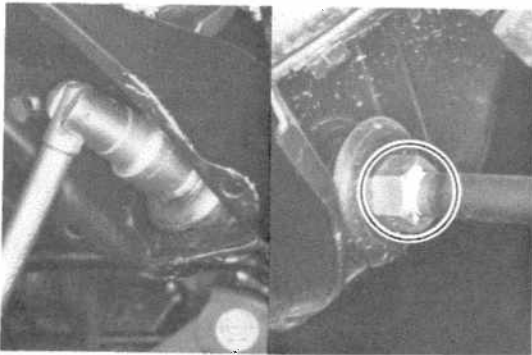
1. INSTALL STABILIZER BAR TO FRAME
 

Place the stabilizer bar in position and install both stabilizer bushings and brackets to the frame.  
Torque the bolts.

**Torque: 100 – 160 kg-cm (8 – 11 ft-lb)**
2. CONNECT STABILIZER BAR TO LOWER ARMS
 

Connect the stabilizer bar on both sides to the lower arms with bolts, cushions and nuts as shown. Torque the nuts.

**Torque: 100 – 160 kg-cm (8 – 11 ft-lb)**
3. INSTALL TORSION BAR SPRING  
(See page 13-14)

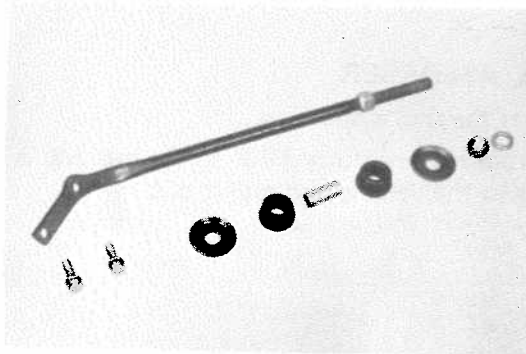
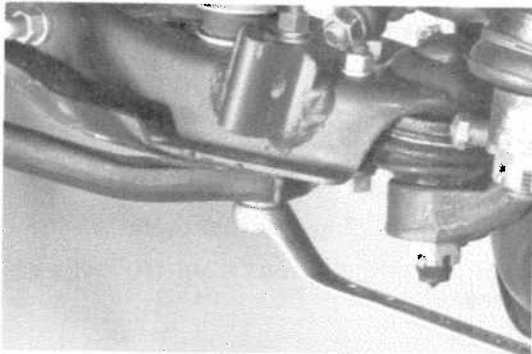


## Strut Bar

### REMOVAL OF STRUT BAR

(See illustration on page 13-12)

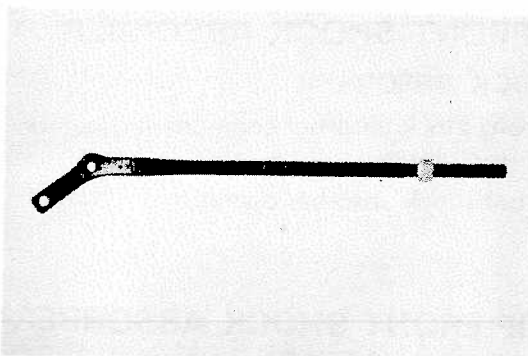
1. PLACE MATCHMARKS ON STRUT BAR THREADED PORTION
2. REMOVE NUT FROM STRUT BAR
3. REMOVE STRUT BAR FROM LOWER ARM  
Remove the bolt holding the strut bar to the lower arm, and remove the strut bar.



### INSPECTION OF STRUT BAR

#### INSPECT STRUT BAR

Inspect the strut bar component parts for wear or damage.

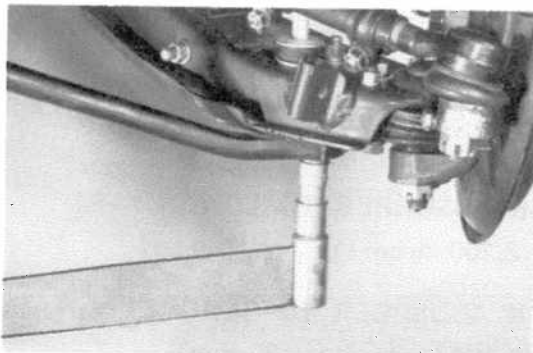


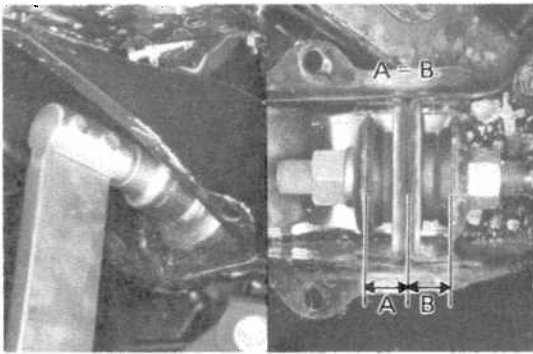
### INSTALLATION OF STRUT BAR

(See illustration on page 13-12)

1. ASSEMBLE REAR NUT, WASHER AND CUSHION
  - (a) Assemble the rear nut to the strut bar according to the matchmarks placed with removing.
  - (b) Assemble the rear washer and cushion to the strut bar.

2. INSERT STRUT BAR IN BRACKET
3. CONNECT STRUT BAR TO LOWER ARM  
Tighten the bolts.  
Torque: 750 — 1,050 kg-cm (55 — 75 ft-lb)





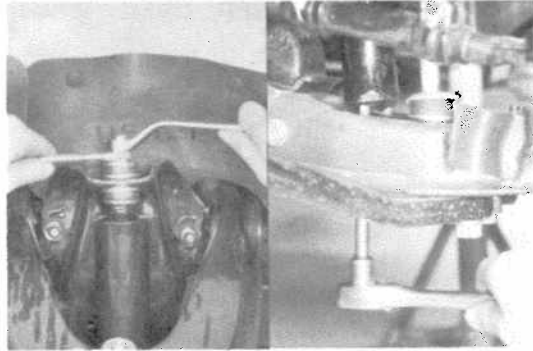
#### 4. CONNECT STRUT BAR TO BRACKET

Install the collar, cushion and washer to the strut bar, and tighten the nut.

**Torque: 950 – 1,500 kg-cm (69 – 108 ft-lb)**

NOTE: When replacing the strut bar, do so with the vehicle unloaded and vehicle weight on the tires.

Tighten the front and rear nuts a little at a time and equally. Assemble so that A and B in the figure are equal.



## Front Shock Absorber

### REMOVAL OF FRONT SHOCK ABSORBER

(See illustration on page 13-12)

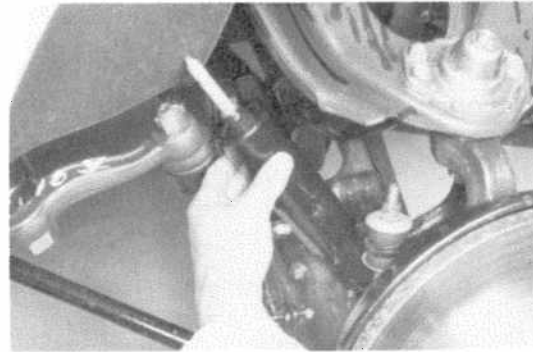
#### 1. DISCONNECT SHOCK ABSORBER FROM BRACKET

- Remove the two nuts holding absorber to the bracket.
- Remove the washers and cushions from the shaft of the shock absorber.

#### 2. DISCONNECT SHOCK ABSORBER FROM LOWER ARM

#### 3. REMOVE SHOCK ABSORBER

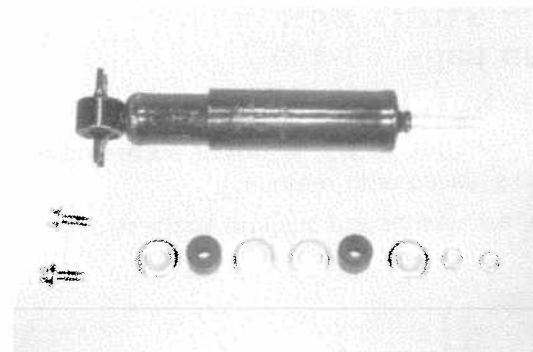
- Fully compress the shock absorber.
- Tilt the absorber forward, turn it 90° so the bushing is at right angles to the vehicle and pull it out.



## INSPECTION OF FRONT SHOCK ABSORBER

### INSPECT FRONT SHOCK ABSORBER

- Inspect the front shock absorber component parts for wear, damage or oil leaks.
- Inspect the front shock absorber operation.



## INSTALLATION OF FRONT SHOCK ABSORBER

(See illustration on page 13-12)

#### 1. INSERT SHOCK ABSORBER IN LOWER ARM

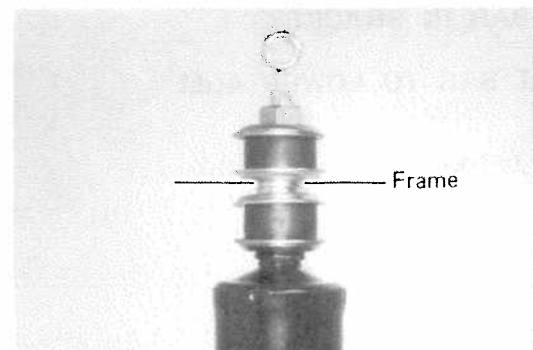
- Fully compress the shock absorber.
- Tilt the absorber forward and insert so the bushing is at right angle to the vehicle.

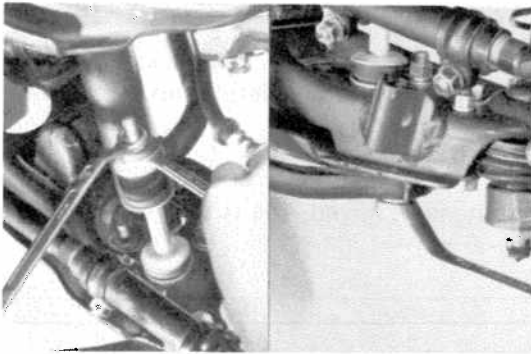
#### 2. CONNECT SHOCK ABSORBER TO LOWER ARM

**Torque: 1,500 – 2,200 kg-cm (11 – 15 ft-lb)**

#### 3. CONNECT SHOCK ABSORBER TO BRACKET

**Torque: 1,900 – 3,100 kg-cm (14 – 22 ft-lb)**

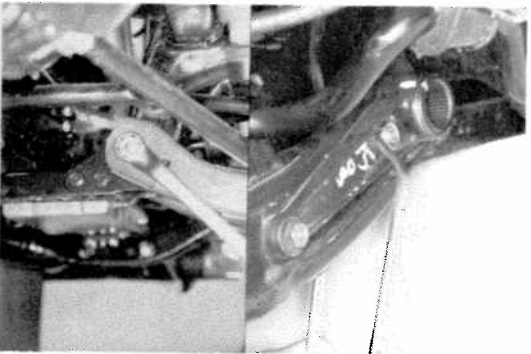
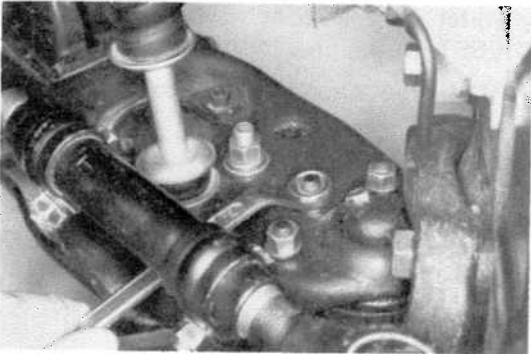




## Lower Suspension Arm

### REMOVAL OF LOWER SUSPENSION ARM (See illustration on page 13-12)

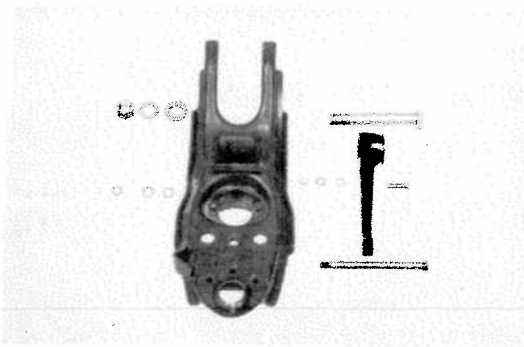
1. REMOVE TORSION BAR SPRING  
(See page 13-13)
2. DISCONNECT STABILIZER BAR FROM LOWER ARM
3. DISCONNECT STRUT BAR FROM LOWER ARM
4. REMOVE FRONT SHOCK ABSORBER  
(See page 13-18)
5. DISCONNECT LOWER BALL JOINT FROM LOWER ARM
6. REMOVE LOWER ARM
  - (a) Remove the lower arm shaft nut.
  - (b) Remove the torque arm and lower arm shaft from the lower arm, and pull down the lower arm.



### INSPECTION OF LOWER ARM

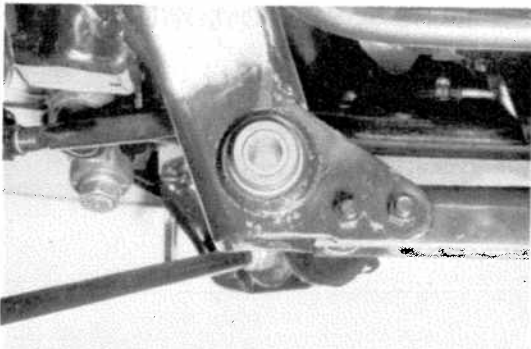
#### 1. INSPECT LOWER ARM

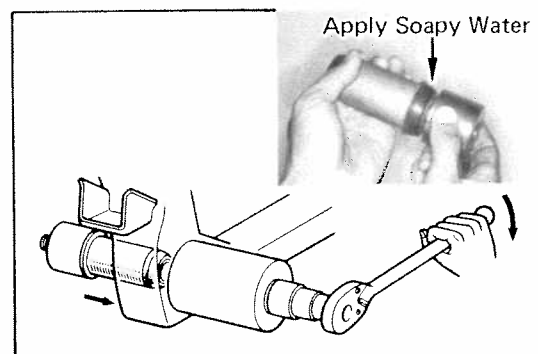
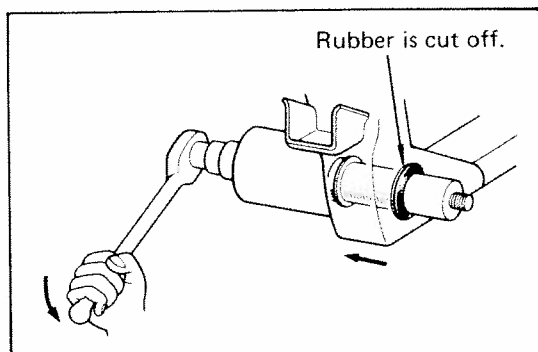
Inspect the lower arm component parts for wear or damage.



#### 2. INSPECT LOWER ARM BUSHING

Inspect the lower arm bushing for wear or damage.  
If the bushing is worn or damaged, replace it.





### 3. IF NECESSARY, REPLACE LOWER ARM BUSHING

- (a) Using SST\*, remove the bushing from the cross member.

\*SST 09726-35010

NOTE: As the bushing is removed, the rubber on the rear side will be cut off.

- (b) Apply soapy water on the front rubber part of the bushing and fit SST on the new bushing.

- (c) Using SST, install the new bushing to the cross member.

## INSTALLATION OF LOWER ARM (See illustration on page 13-12)

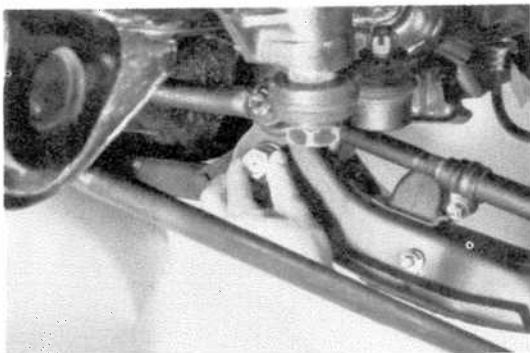
### 1. INSTALL LOWER ARM

- (a) Place the lower arm in position and insert the shaft in the lower arm.
- (b) Finger tighten the mounting nut.

NOTE: Do not torque the nut.

- (c) Install the torque arm to the lower arm. Tighten the bolts and nuts.

**Torque: 400 – 550 kg-cm (29 – 39 ft-lb)**



### 2. CONNECT LOWER BALL JOINT TO LOWER ARM

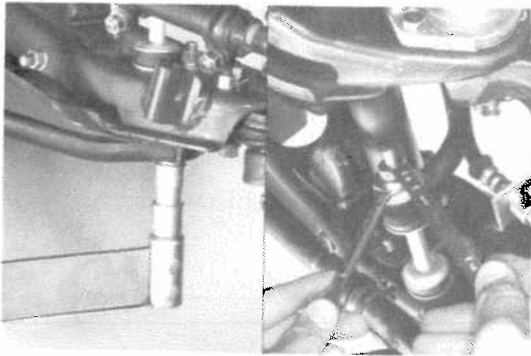
Tighten the bolts and nuts.

**Torque:**

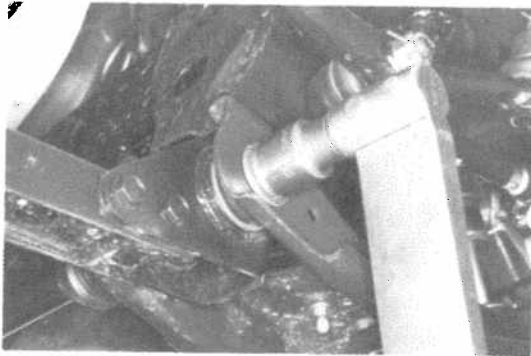
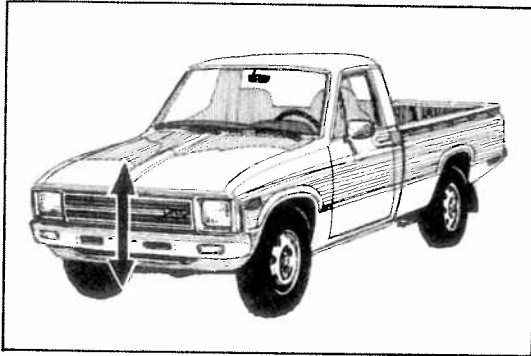
8 mm bolts 200 – 300 kg-cm (15 – 21 ft-lb)

10 mm bolt 400 – 550 kg-cm (29 – 39 ft-lb)





3. **INSTALL FRONT SHOCK ABSORBER**  
(See page 13-18)
4. **CONNECT STRUT BAR TO LOWER ARM**  
Torque: 750 — 1,050 kg-cm (55 — 75 ft-lb)
5. **CONNECT STABILIZER BAR TO LOWER ARM**  
Torque: 100 — 160 kg-cm (8 — 11 ft-lb)
6. **INSTALL TORSION BAR SPRING**  
(See page 13-14)
7. **REMOVE STANDS AND BOUNCE VEHICLE TO STABILIZE LOWER ARM BUSHING**

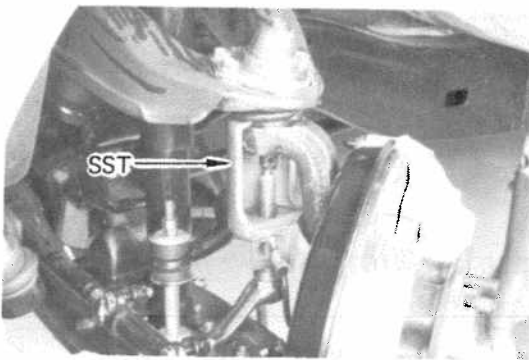


8. **TIGHTEN LOWER ARM SHAFT NUT**  
Torque the nut.  
Torque: 2,000 — 3,000 kg-cm (145 — 216 ft-lb)

## Upper Suspension Arm

### REMOVAL OF UPPER ARM (See illustration on page 13-12)

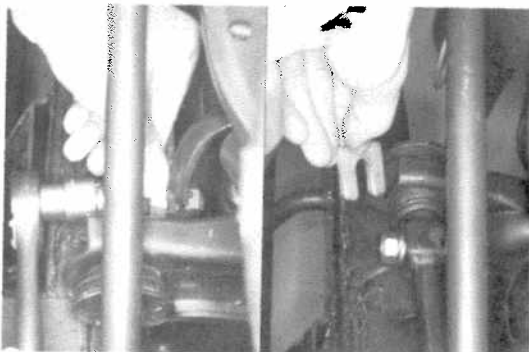
1. **DISCONNECT UPPER BALL JOINT FROM STEERING KNUCKLE** (See page 13-25)



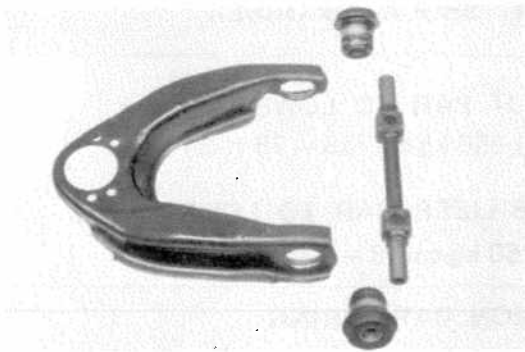
2. **REMOVE UPPER ARM**

Remove the upper arm mounting bolts and camber adjusting shims.

**NOTE:** Do not lose the camber adjusting shims. Record the position, and the thickness of camber adjusting shims so that these can be reinstalled to their original location.







## INSPECTION OF UPPER ARM

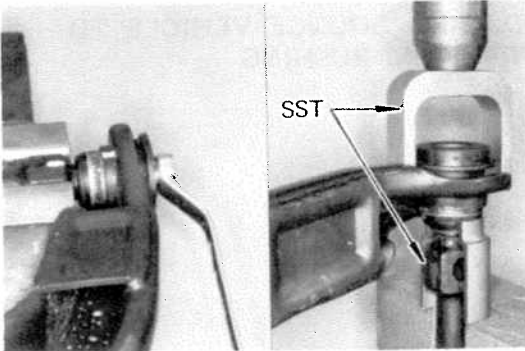
### 1. INSPECT UPPER ARM

- (a) Inspect the upper arm for damage.
  - (b) Inspect the bushings for wear or damage.
- If the bushings are worn or damaged, replace them.

### 2. IF NECESSARY, REPLACE UPPER ARM BUSHINGS

- (a) Remove the bolts and washers from the upper arm.
- (b) Using SST\*, press out the bushings from the upper arm.

\*SST 09710-30020

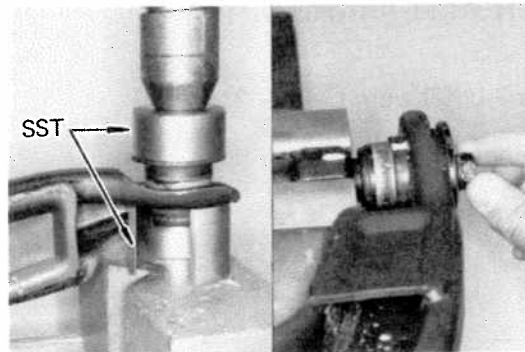


- (c) Using SST\*, press the new bushings into the upper arm.

\*SST 09710-30020

- (d) Install the washers to the upper arm. Finger tighten the bolts.

NOTE: Do not torque the bolts.



## INSTALLATION OF UPPER ARM (See illustration on page 13-12)

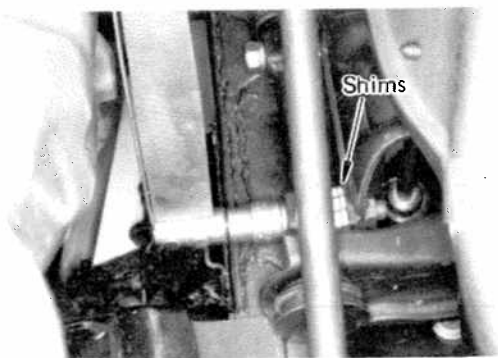
### 1. INSTALL UPPER ARM

Install the upper arm together with the camber adjusting shims.

Torque the bolts.

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

NOTE: Install an equal number and thickness of shims in their original position.

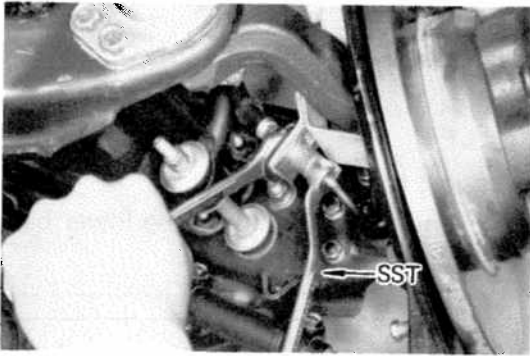


### 2. CONNECT UPPER BALL JOINT TO STEERING KNUCKLE

Tighten the castle nut and secure it with a cotter pin.

**Torque: 900 – 1,300 kg-cm (66 – 94 ft-lb)**





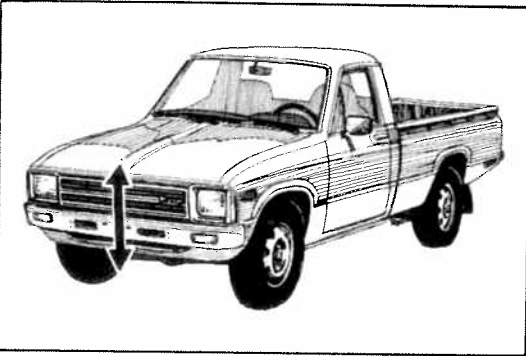
### 3. CONNECT BRAKE HOSE AND TUBE

Using a flare nut wrench\*, connect the hose and tube.  
Torque the connection.

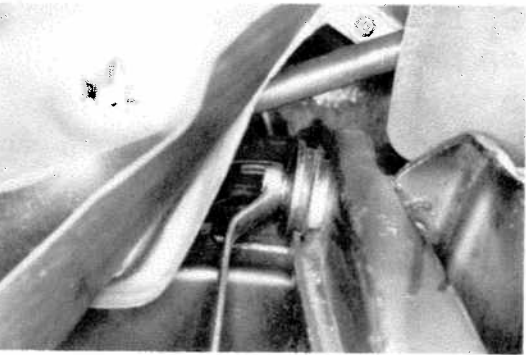
Torque: 130 – 180 kg-cm (10 – 13 ft-lb)

\*SST 09751-36011 or Commercial wrench

### 4. BLEED BRAKE SYSTEM



### 5. REMOVE STANDS AND BOUNCE VEHICLE TO STABILIZE UPPER ARM BUSHINGS



### 6. TIGHTEN UPPER ARM SHAFT BOLTS

Torque the bolts.

Torque: 850 – 1,100 kg-cm (62 – 79 ft-lb)

## Ball Joints

### INSPECTION OF BALL JOINTS

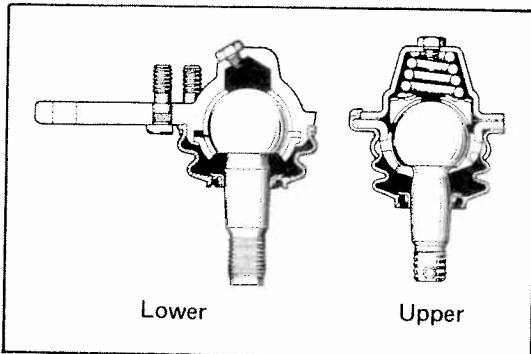
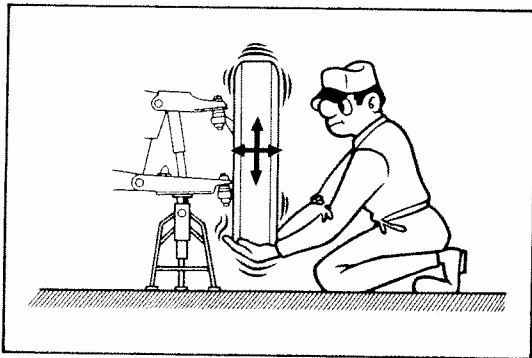
#### 1. INSPECT BALL JOINTS FOR EXCESSIVE LOOSENESS

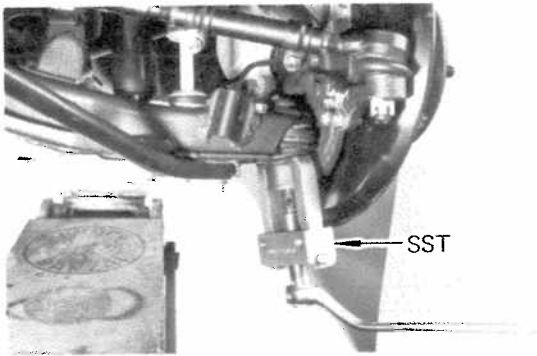
- Jack up the lower arm until the tire is off the ground.
- Move the tire up and down and check that there is no excessive play.

Maximum ball joint vertical play: 2.3 mm (0.091 in.)

NOTE: Perform this inspection with the brake pedal depressed to prevent occurrence of wheel bearing play.

#### 2. INSPECT DUST COVER FOR DAMAGE



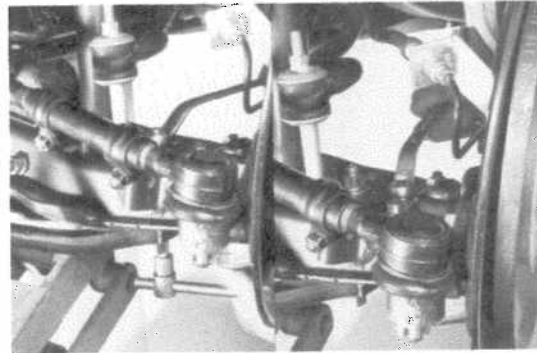


## REMOVAL OF LOWER BALL JOINT (See illustration on page 13-12)

### 1. DISCONNECT LOWER BALL JOINT FROM STEERING KNUCKLE

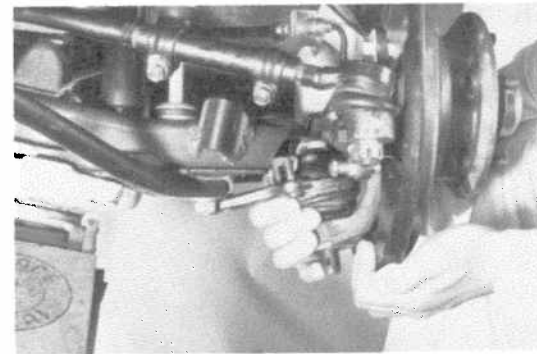
- Using a jack, support the lower arm.
- Using a ball joint puller\*, disconnect the lower ball joint from the steering knuckle.

\*SST 09628-62010 or Commercial puller



### 2. REMOVE LOWER BALL JOINT

Remove the bolts and nuts, and remove the lower ball joint from the lower arm.



## INSTALLATION OF LOWER BALL JOINT (See illustration on page 13-12)

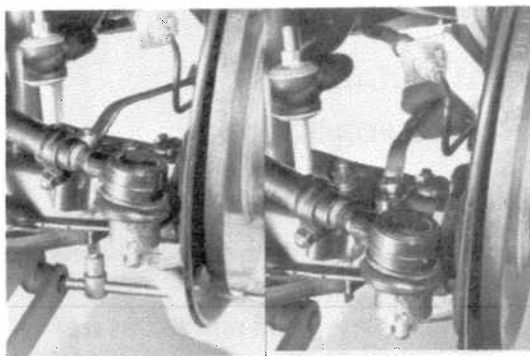
### 1. INSTALL LOWER BALL JOINT

- Install the lower ball joint between the lower arm and steering knuckle.

- Tighten the lower ball joint mounting bolts and nuts.

Torque:

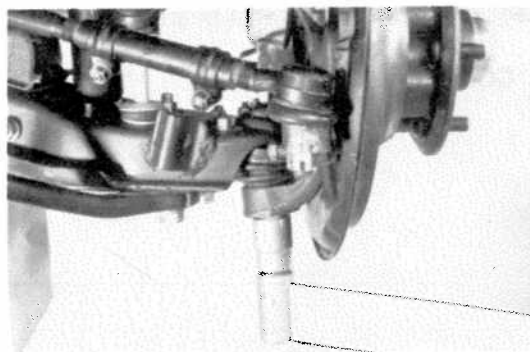
8 mm bolt	200 – 300 kg-cm (15 – 21 ft-lb)
10 mm bolt	400 – 550 kg-cm (29 – 39 ft-lb)



### 2. CONNECT BALL JOINT TO STEERING KNUCKLE

Tighten the castle nut and secure it with a cotter pin.

Torque: 1,200 – 1,700 kg-cm (87 – 122 ft-lb)



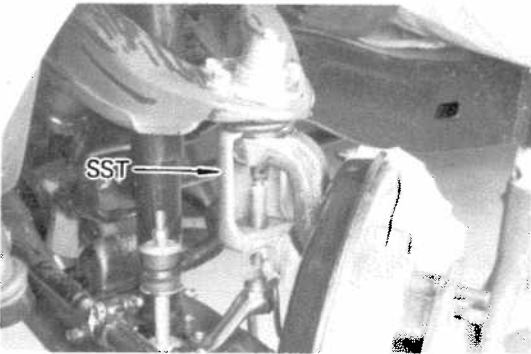


## REMOVAL OF UPPER BALL JOINT (See illustration on page 13-12)

### 1. DISCONNECT BRAKE HOSE AND TUBE

Using a flare nut wrench\*, disconnect the brake hose from the tube, and remove the clip.

\*SST 09751-36011 or Commercial wrench

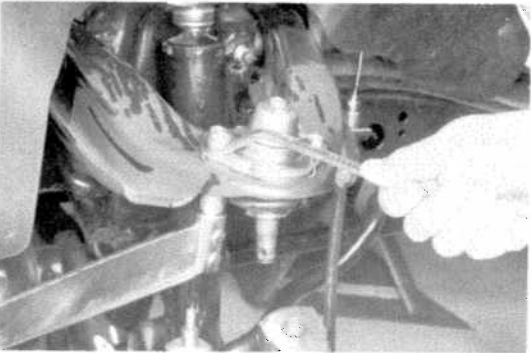


### 2. DISCONNECT UPPER BALL JOINT FROM STEERING KNUCKLE

Using a puller\*, disconnect the upper ball joint from the steering knuckle.

\*SST 09610-20011 or Commercial puller

### 3. REMOVE UPPER BALL JOINT FROM UPPER ARM

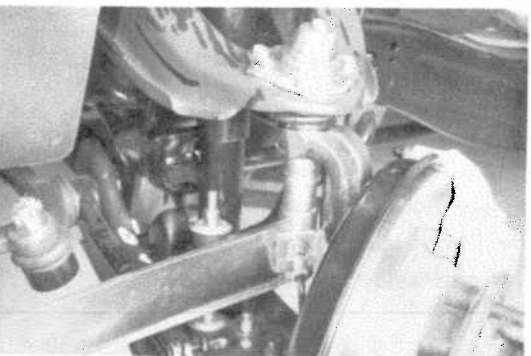


## INSTALLATION OF UPPER JOINT (See illustration on page 13-12)

### 1. INSTALL UPPER BALL JOINT TO UPPER ARM

Tighten the upper ball joint mounting bolts and nuts.

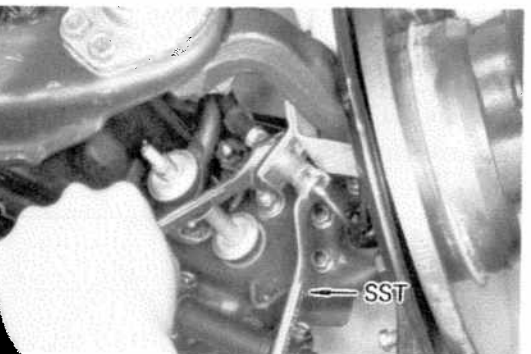
Torque: 200 – 300 kg-cm (15 – 21 ft-lb)



### 2. CONNECT UPPER BALL JOINT TO STEERING KNUCKLE

Tighten the castle nut and secure it with a cotter pin.

Torque: 900 – 1,300 kg-cm (66 – 94 ft-lb)



### 3. CONNECT BRAKE HOSE AND TUBE

Using a flare nut wrench\*, connect the hose and tube. Torque the connection.

Torque: 1,300 – 1,800 kg-cm (94 – 130 ft-lb)

\*SST 09751-36011 or Commercial wrench

### 4. BLEED BRAKE SYSTEM

## TROUBLESHOOTING (4×4)

Problem	Possible cause	Remedy	Page
Oil leak at front axle	Oil seals damaged or worn Front axle housing cracked	Replace oil seal Repair as necessary	14-7
Oil leak at pinion shaft	Oil level too high or wrong grade Oil seal worn or damaged Companion flange loose or damaged	Drain and replace oil Replace oil seal Tighten or replace flange	2-34 14-10 14-9
Noises in front axle	Oil level low or wrong grade Excessive backlash between pinion and ring or side gear Ring, pinion or side gears worn or chipped Pinion shaft bearing worn Wheel bearing worn Differential bearing loose or worn	Drain and replace oil Check backlash  Inspect gears Replace bearing Replace bearing Tighten or replace bearings	2-34 14-13  14-15 14-15 13-36 14-17
Wander/pulls	Tires worn or improperly inflated  Alignment incorrect Wheel bearing adjusted too tight Front or rear suspension parts loose or broken Steering linkage loosen or worn Steering gear out of adjustment or broken	Replace tire or inflate tires to proper pressure  Check front end alignment Adjust wheel bearing Tighten or replace suspension part Tighten or replace steering linkage Adjust or repair steering gear	13-28  13-28 13-38 13-53 16-77 16-3
Bottoming	Vehicle overloaded Shock absorber worn out Springs weak	Check loading Replace shock absorber Replace spring	 13-53 13-56
Sways/pitches	Tires improperly inflated Stabilizer bar bent or broken Shock absorber worn out	Inflate tires to proper pressure Inspect stabilizer bar Replace shock absorber	13-28 13-54 13-53
Front wheel shimmy	Tires worn or improperly inflated  Wheels out of balance Steering damper worn out Shock absorber worn out Alignment incorrect Wheel bearings worn or improperly adjusted Steering knuckle bearing worn Steering linkage loosen or worn Steering gear out of adjustment or broken	Replace tire or inflate tires to proper pressure  Balance wheels Replace steering damper Replace shock absorber Check front end alignment Replace or adjust wheel bearings Replace bearing Tighten or replace steering linkage Adjust or repair steering gear	13-28  16-78 13-53 13-28 13-36 13-40 16-77 16-3
Abnormal tire wear	Tires improperly inflated Shock absorbers worn out Alignment incorrect	Inflate tire to proper pressure Replace shock absorber Check toe-in	13-28 13-53 13-29

**SPECIAL TOOLS AND TEST EQUIPMENT (4×4)**

Tool	SST No.	Use
Wheel alignment equipment	Commercial	To check front end alignment
Snap ring pliers	09905-00012 or Commercial	To remove snap ring
Flare nut wrench	09751-36011 or Commercial	To loosen and tighten brake line
Wheel bearing adjusting nut wrench	09607-60020	To loosen and tighten wheel bearing adjusting nut
Bearing driver	09608-35013 or Commercial	To install wheel bearing outer race and knuckle spindle bushing
Tie rod end puller	09611-22011 or Commercial	To disconnect steering damper
Steering knuckle bearing cap remover	09606-60020	To remove and install steering knuckle bearing cap
Bearing driver	09605-60010 or Commercial	To install steering knuckle bearing race
Steering knuckle centering gauge	09634-60013	To adjust steering knuckle alignment and bearing preload
Oil seal puller	09308-00010 or Commercial	To remove axle shaft oil seal
Oil seal driver	09618-60010 or Commercial	To install axle shaft oil seal
Bushing collar	09726-35010 or Commercial	To replace torque rod bushing
Bushing plate	09527-10010 or Commercial	To replace torque rod bushing

## FRONT WHEEL ALIGNMENT (4×4)

### 1. MAKE FOLLOWING CHECKS AND CORRECT ANY PROBLEMS

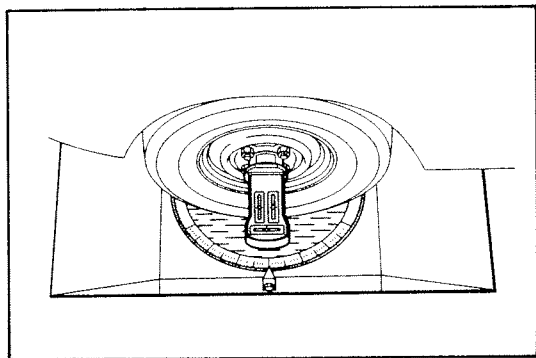
- Check wheel runout and balance.
- Check the front wheel bearings for looseness.
- Check the front suspension for looseness.
- Check the steering linkage for looseness.
- Check that the front absorbers work properly by using the standard bounce test.
- Check the tires for wear and proper inflation.

#### Cold tire inflation pressure

kg/cm<sup>2</sup> (psi)

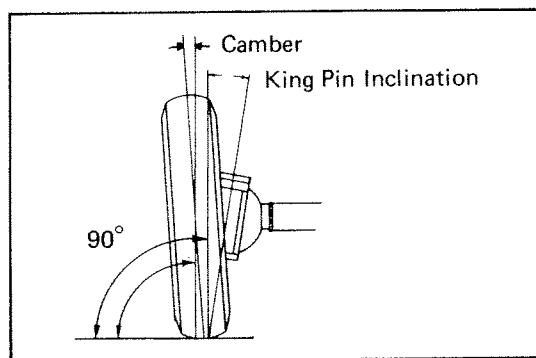
Tire size	Front	Rear
H78-15B HR78-15B	1.7 (24)	2.0 (28)

NOTE: For sustained high speeds above 120 km/h (75 mph), add 0.3 kg/cm<sup>2</sup> (4 psi), but never exceed the maximum cold tire pressure molded on the tire sidewall.



### 2. INSTALL WHEEL ALIGNMENT EQUIPMENT

Follow the specific instructions of the equipment manufacturer.

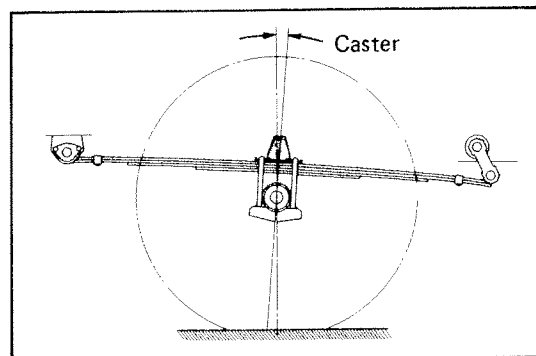


### 3. CHECK CAMBER AND KING PIN INCLINATION

**Camber:**  $1^{\circ} \pm 45'$

**King pin inclination:**  $9^{\circ} 30'$

If camber or king pin inclination checks are not within specification, recheck steering knuckle parts and front wheel for bending or looseness.

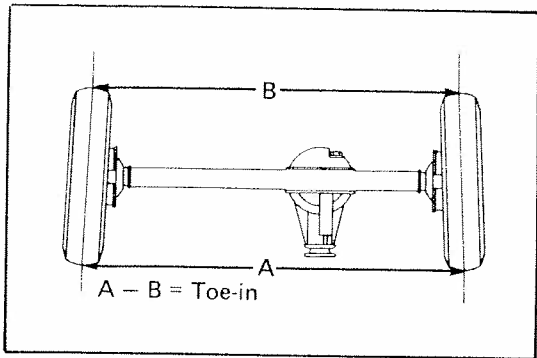


### 4. CHECK CASTER

**Caster (at unloaded):**  $3^{\circ} 30' \pm 45'$

If caster is not as specified, inspect and replace damaged or worn leaf spring parts.



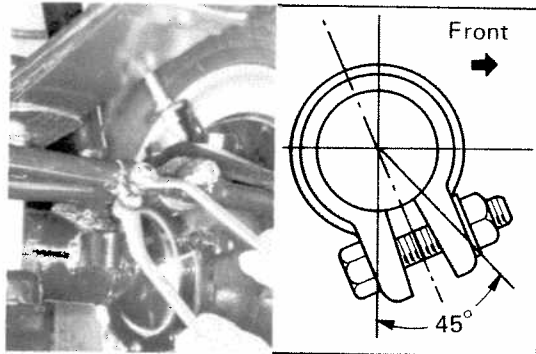


## 5. ADJUST TOE-IN

Toe-in:

	Inspection STD	Adjustment STD
H78-15 (B)	$4 \pm 4$ mm	$4 \pm 1$ mm
(Bias tire)	$(0.16 \pm 0.16$ in.)	$(0.16 \pm 0.04$ in.)
HR78-15 (B)	$1 \pm 4$ mm	$1 \pm 1$ mm
(Radial tire)	$(0.04 \pm 0.16$ in.)	$(0.04 \pm 0.04$ in.)

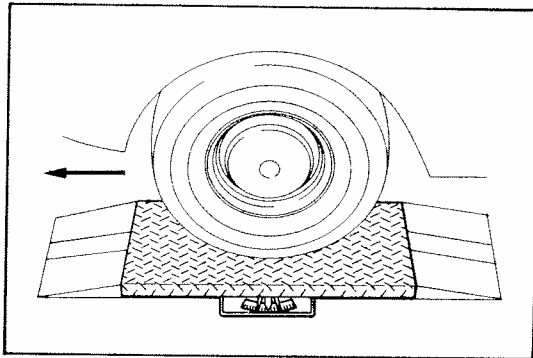
NOTE: The toe-in should be measured at the same point on the tire and at the same level.



- Make sure the steering gear is centered.
- Loosen nuts holding the clamps on the tie rod.
- Adjust toe-in to the correct value by turning the tie rod.
- Torque nuts holding the clamps.

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

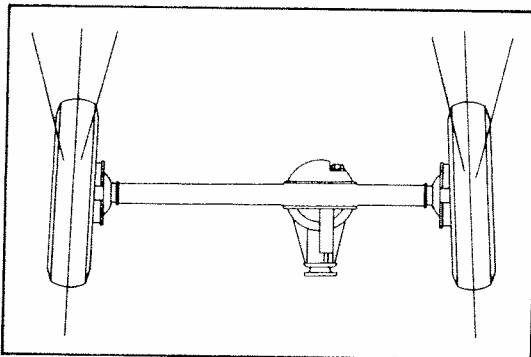
NOTE: The steering damper side clamp opening must be positioned at the front of the tie rod, and face within 45° from straight down as shown in the figure.



## 6. CHECK SIDE SLIP WITH SIDE SLIP TESTER

Side slip: Less than 3.0 mm/m (0.118 in./3.3 ft)

If the side slip exceeds the limit, the toe-in or other front wheel alignment may not be correct.

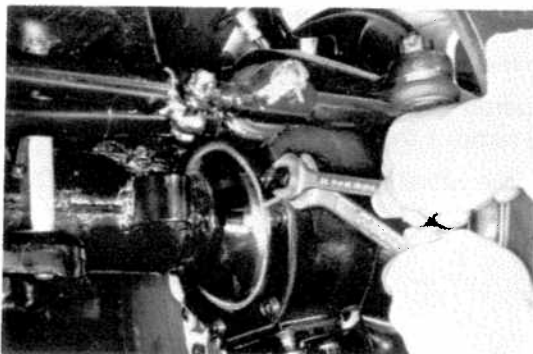


## 7. CHECK STEERING ANGLES

NOTE: When the steering wheel is fully turned, make sure that the wheel is not touching the body or brake flexible hose.

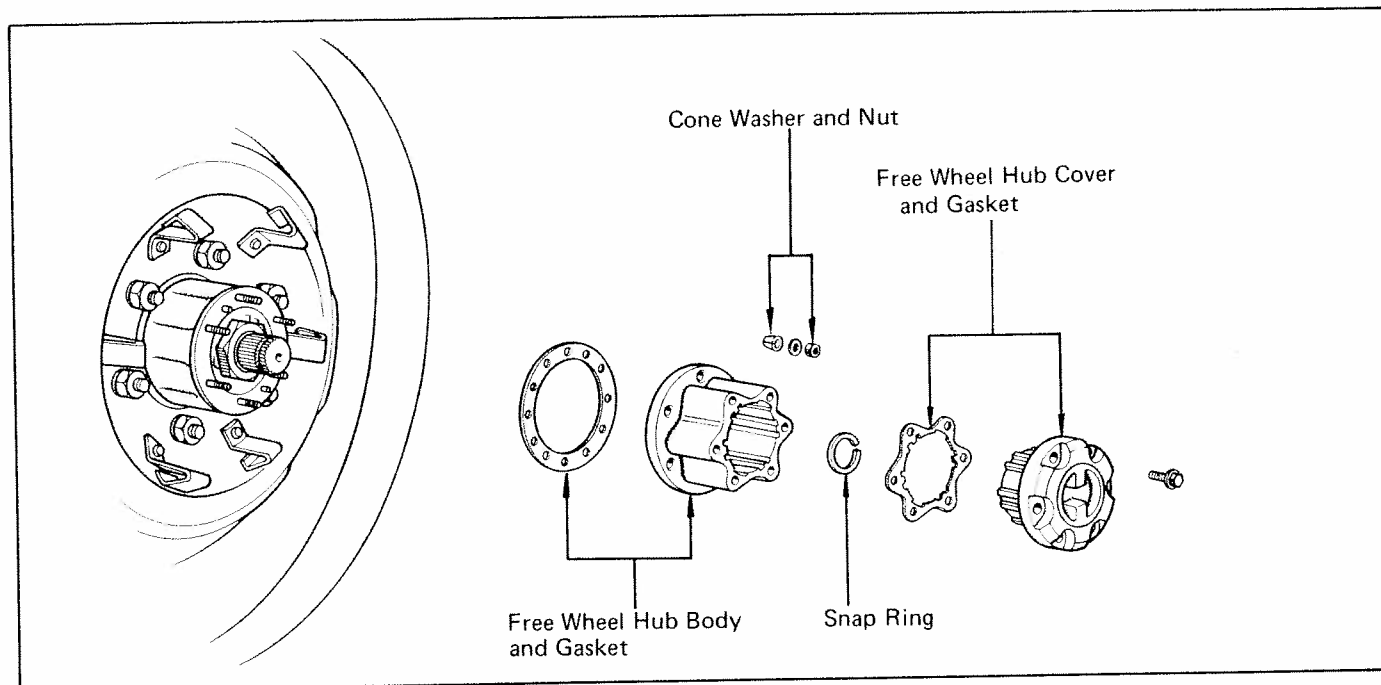
Wheel angle:

Inside  $30^{\circ} 30'$  (+1, -2)  
Outside  $29^{\circ}$



If steering angles differ from standard value, adjust the steering angle with knuckle stopper bolts. If the steering angle still cannot be adjusted within limits, inspect and replace damaged or worn steering parts.

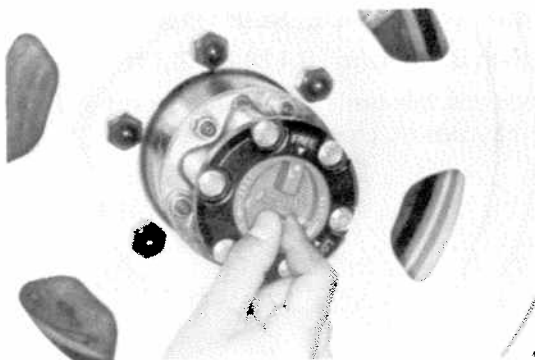
## FREE WHEEL HUB (4×4)



### REMOVAL OF FREE WHEEL HUB

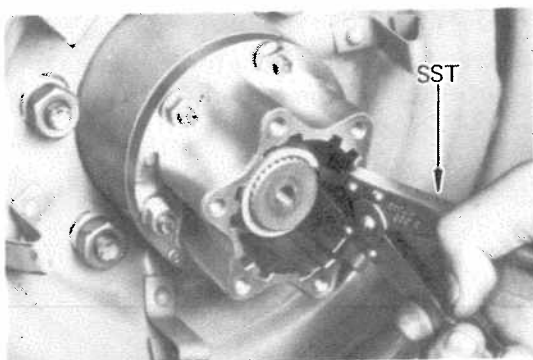
#### 1. REMOVE FREE WHEEL HUB COVER

- Set the control handle to FREE.
- Remove the cover mounting bolts and pull off the cover.



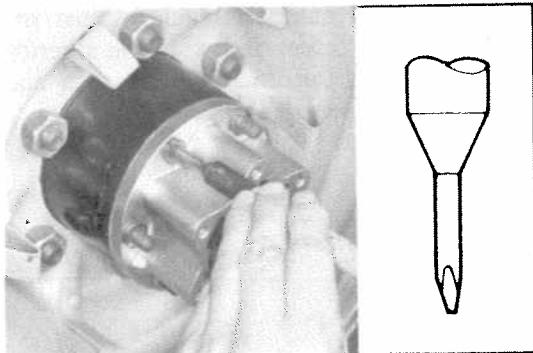
#### 2. REMOVE SNAP RING

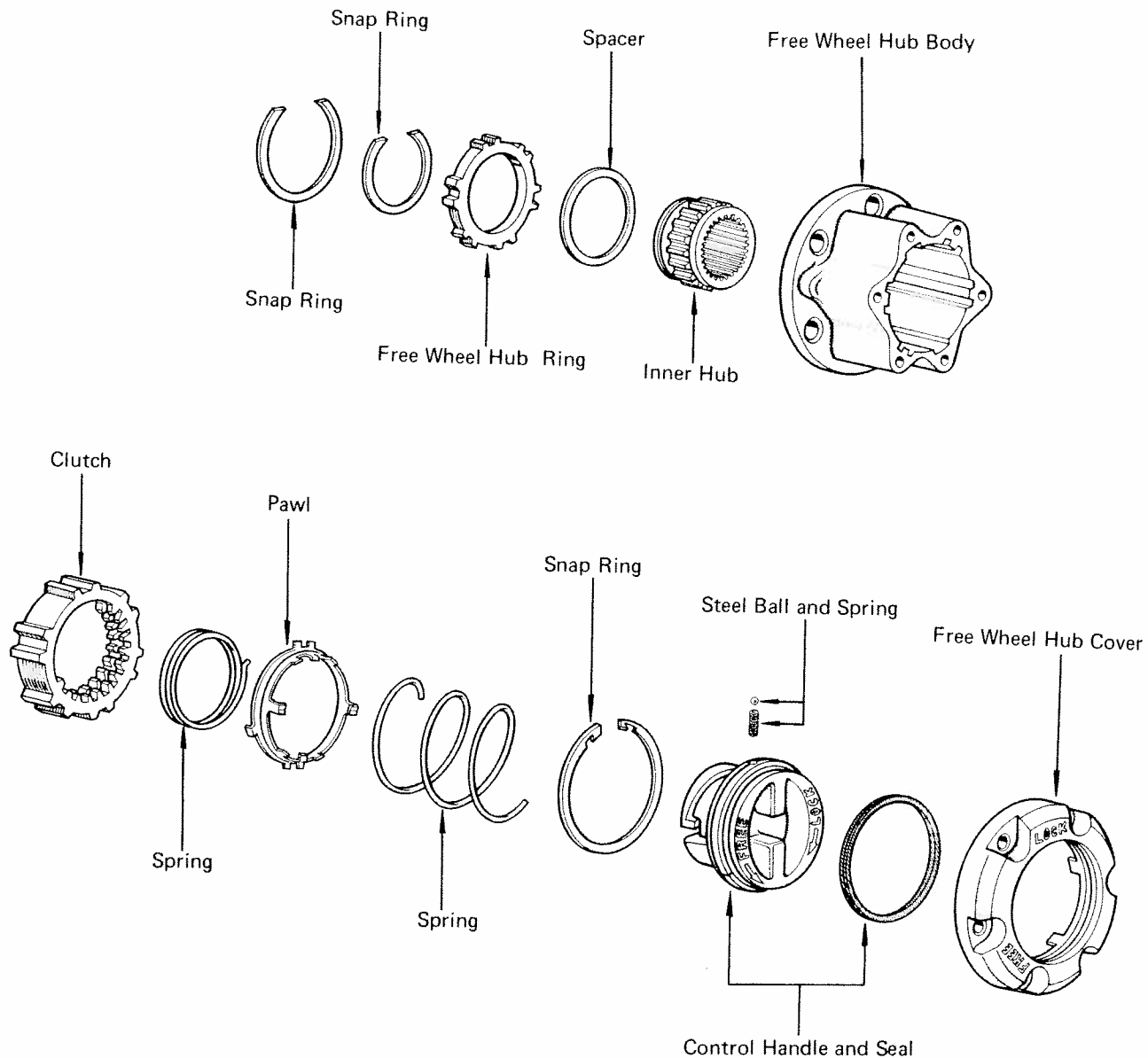
Using snap ring pliers, remove the snap ring.



#### 3. REMOVE FREE WHEEL HUB BODY

- Remove the mounting nuts.
- Using a tapered punch, tap on the slits of the cone washers and remove them.
- Pull off the free wheel hub body from the axle hub.

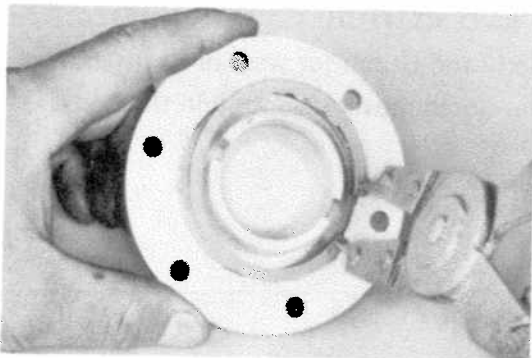


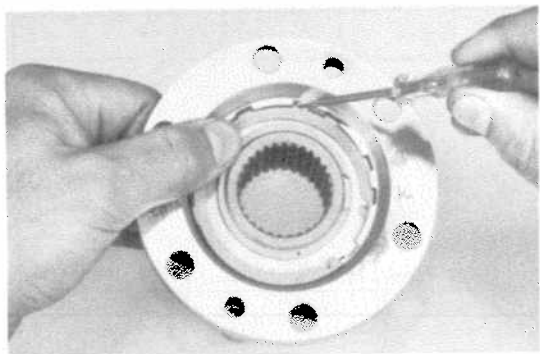


## DISASSEMBLY OF FREE WHEEL HUB

### 1. REMOVE CONTROL HANDLE FROM FREE WHEEL HUB COVER

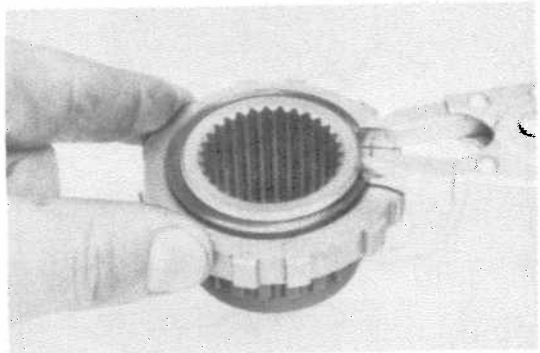
- Using snap ring pliers, remove the snap ring.
- Remove the control handle from the cover.
- Remove the steel ball and spring from the control handle.





## 2. REMOVE INNER HUB AND FREE WHEEL HUB RING FROM FREE WHEEL HUB BODY

- (a) Using a screwdriver, remove the snap ring.
- (b) Remove the inner hub and free wheel hub ring from the body.



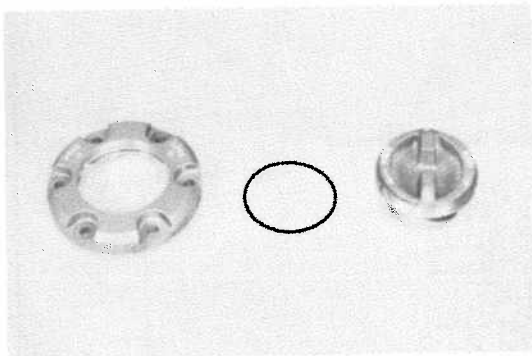
## 3. REMOVE FREE WHEEL HUB RING FROM INNER HUB

- (a) Using snap ring pliers, remove the snap ring.
- (b) Remove the free wheel hub ring and spacer from the inner hub.

## INSPECTION OF FREE WHEEL HUB

### 1. INSPECT COVER, HANDLE AND SEAL

- (a) Inspect the cover, handle and seal for wear or damage.

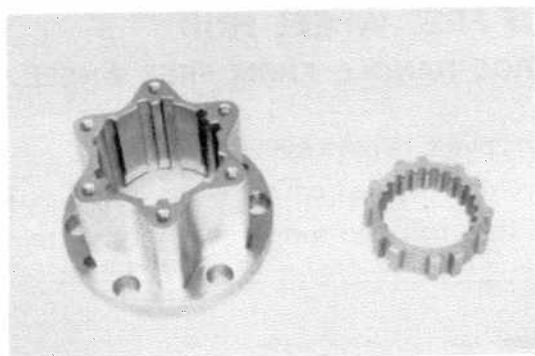


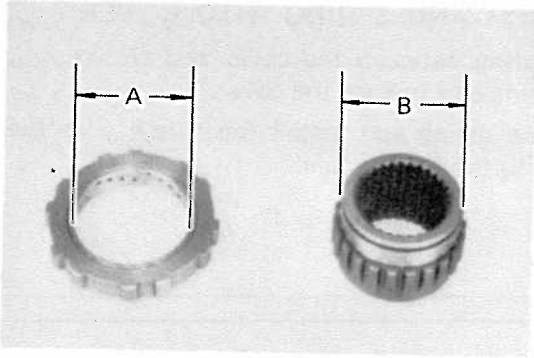
- (b) Temporarily install the handle in the cover and check that the handle moves smoothly and freely.



### 2. INSPECT BODY AND CLUTCH

- (a) Inspect the body and clutch for wear or damage.
- (b) Check that the clutch moves smoothly in the body.





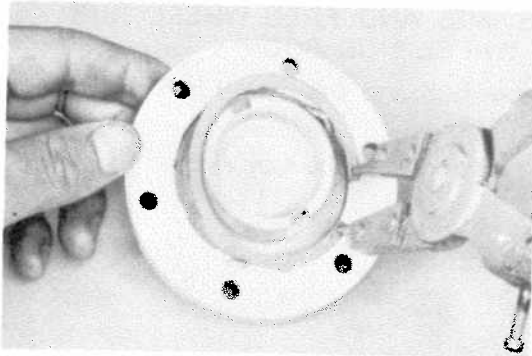
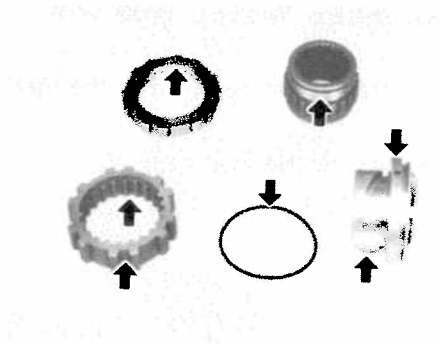
### 3. INSPECT INNER HUB AND FREE WHEEL HUB RING

Inspect the inner hub and free wheel hub ring for wear or damage.

Oil clearance (A-B): 0.3 mm (0.012 in.)

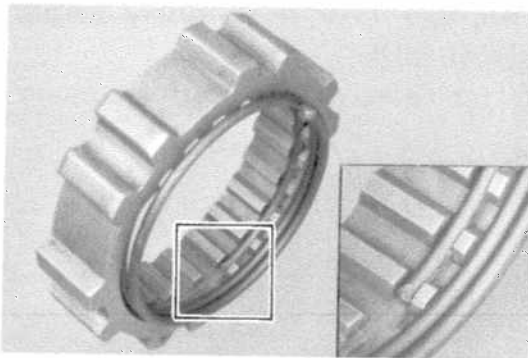
## ASSEMBLY OF FREE WHEEL HUB (See illustration on page 13-31)

### 1. APPLY MULTIPURPOSE GREASE TO SLIDING SURFACE OF PARTS



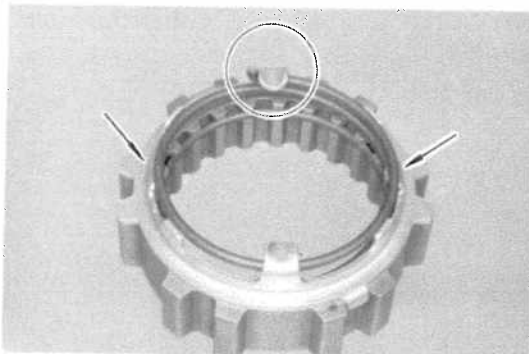
### 2. INSTALL CONTROL HANDLE TO COVER

- Install the seal, spring and steel ball to the handle.
- Insert the handle in the cover and install the snap ring with snap ring pliers.



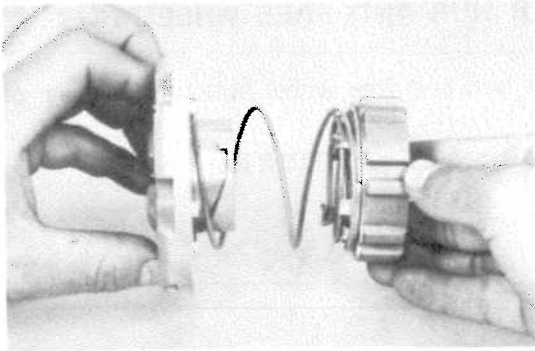
### 3. INSTALL TENSION SPRING IN CLUTCH

Install the tension spring in the clutch with the spring end aligned with the initial groove.

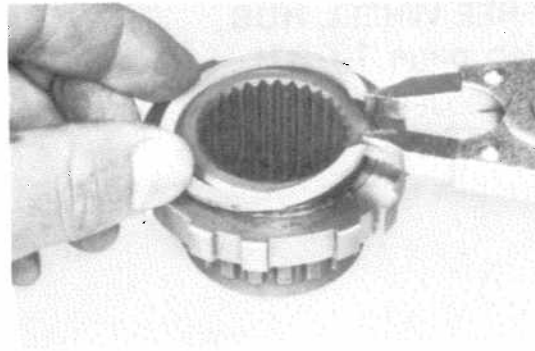


### 4. INSTALL FOLLOWER PAWL TO CLUTCH

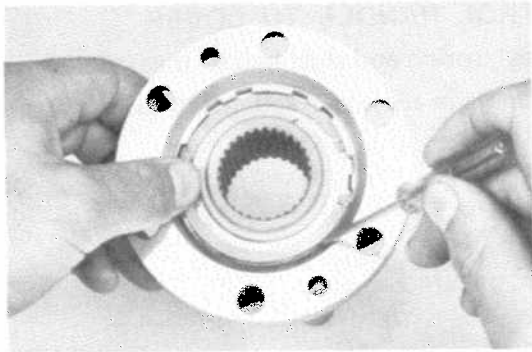
- Place the follower pawl on the tension spring with one of the large tabs against the bent spring end.
- Place the top ring of the spring on the small tabs.

**5. INSTALL CLUTCH AND SPRING INTO COVER**

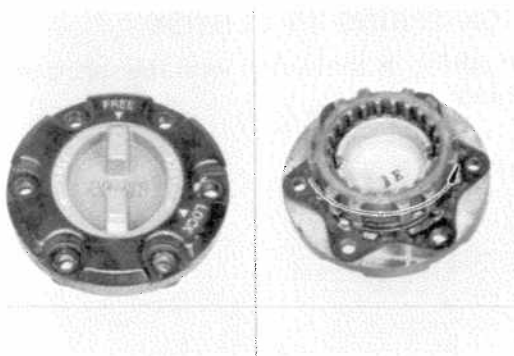
- (a) Place the spring between the cover and clutch with the large spring end toward the cover.
- (b) Compress the spring and install the clutch with the pawl tab fit to the handle cam.

**6. INSTALL SPACER AND FREE WHEEL HUB RING TO INNER HUB**

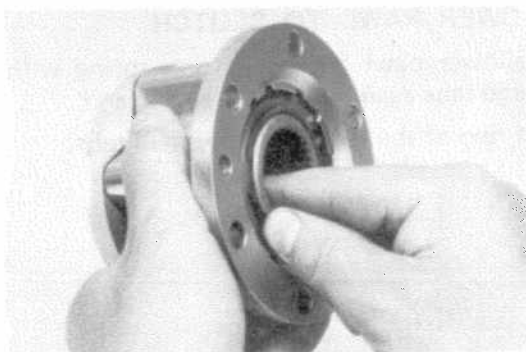
- (a) Install the spacer and free wheel hub ring to the inner hub.
- (b) Using snap ring pliers, install the snap ring.

**7. INSTALL INNER HUB AND FREE WHEEL HUB RING IN FREE WHEEL HUB BODY**

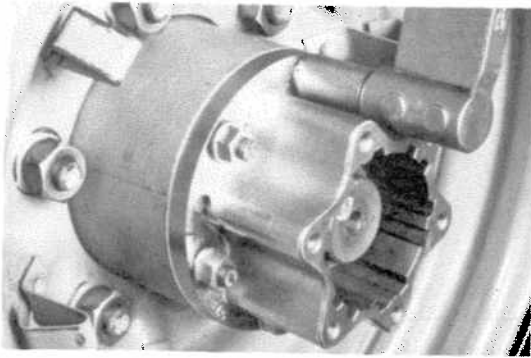
- (a) Insert the inner hub and free wheel hub ring in the body.
- (b) Using a screwdriver, install the snap ring.

**8. TEMPORARILY INSTALL COVER TO BODY AND CHECK FREE WHEEL HUB**

- (a) Set the control handle and clutch to the free position.



- (b) Insert the cover in the body and verify that the inner hub turns smoothly.
- (c) Remove the cover from the body.

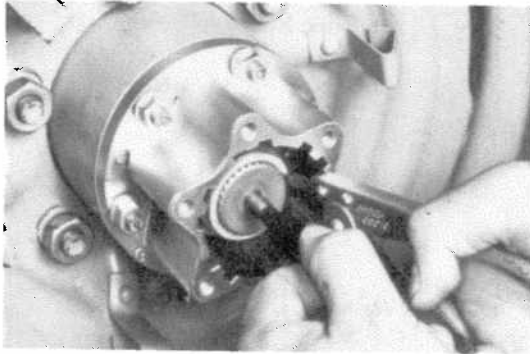


## INSTALLATION OF FREE WHEEL HUB (See illustration on page 13-30)

### 1. INSTALL FREE WHEEL HUB BODY WITH NEW GASKET

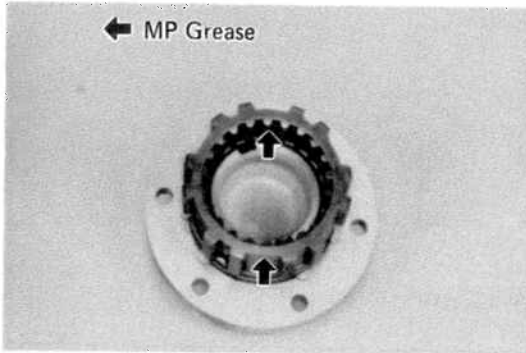
- Place the gasket in position on the front axle hub.
- Install the free wheel hub body with six cone washes and nuts. Tighten the nuts.

Torque: 280 – 350 kg-cm (21 – 25 ft-lb)



### 2. INSTALL SNAP RING

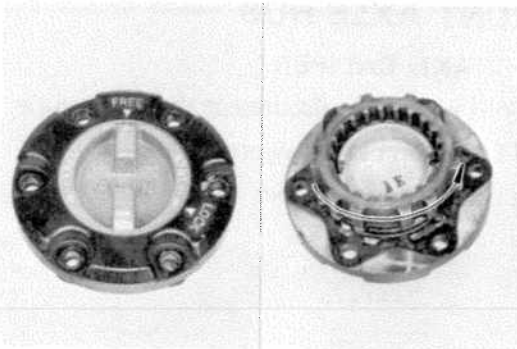
- Install a bolt in the axle shaft and pull it out.
- Using snap ring pliers, install the snap ring.
- Remove the bolt.



### 3. APPLY MULTIPURPOSE GREASE TO INNER HUB SPLINES

### 4. INSTALL FREE WHEEL HUB COVER WITH NEW GASKET

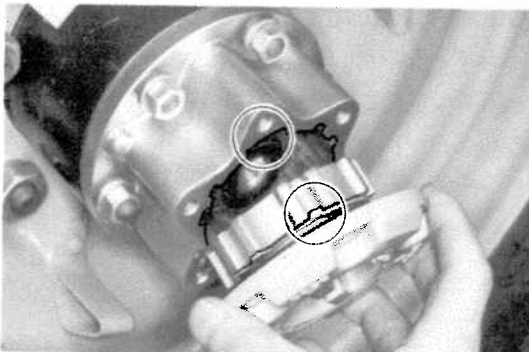
- Set the control handle and clutch to the free position.
- Place the gasket in position on the cover.



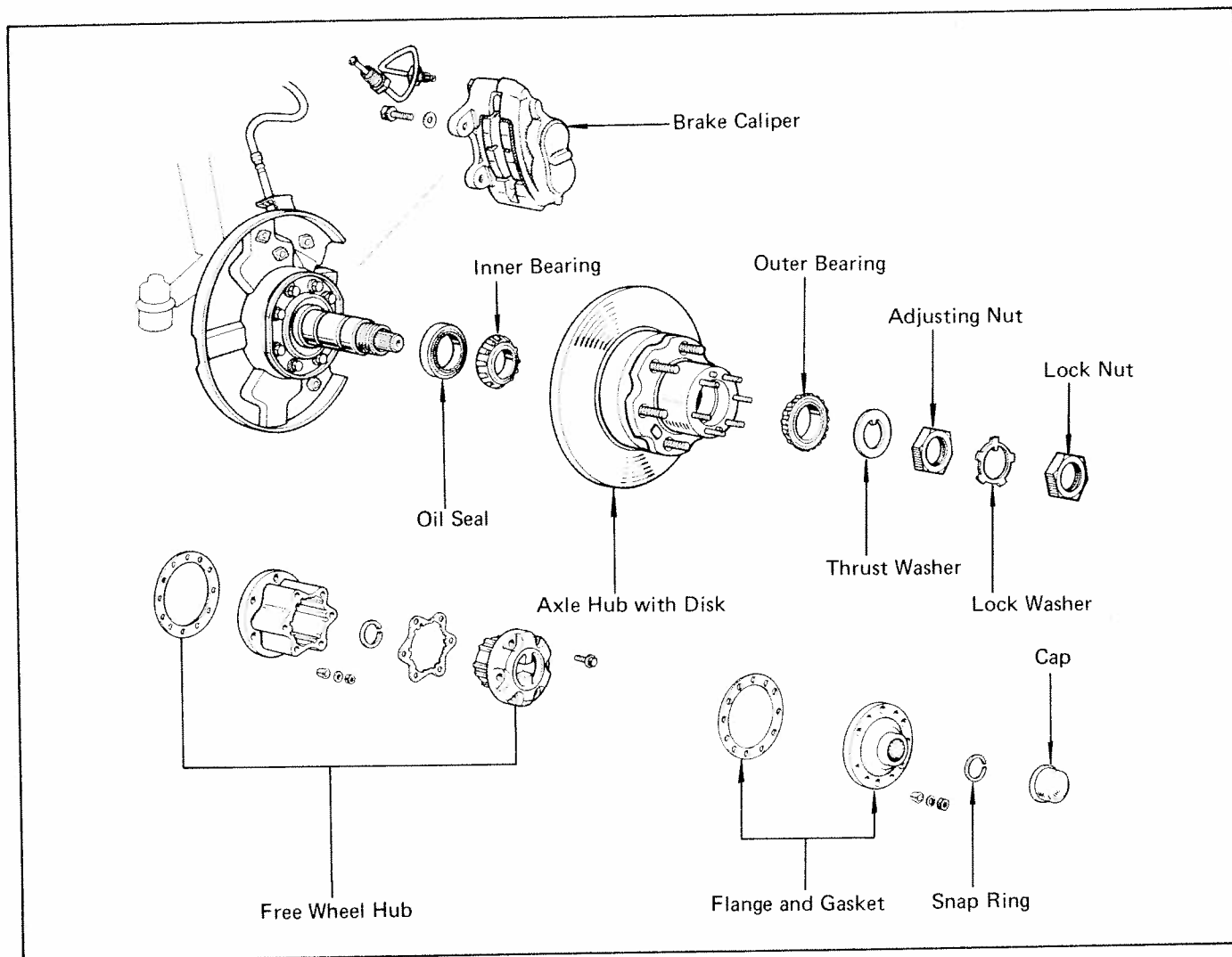
- Install the cover to the body with the follower pawl tabs aligned with the non-toothed portions of the body.

- Tighten the cover mounting bolts.

Torque: 80 – 120 kg-cm (70 – 104 in.-lb)



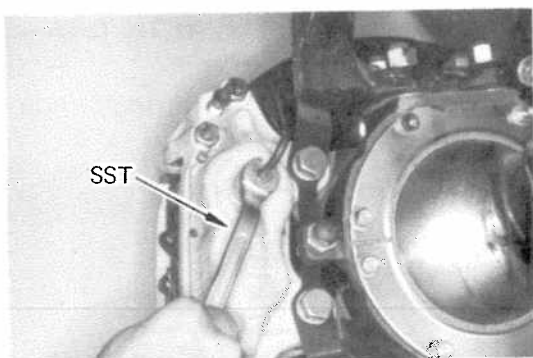
## FRONT AXLE HUB (4×4)



### REMOVAL OF FRONT AXLE HUB

#### 1. REMOVE DISC BRAKE CALIPER

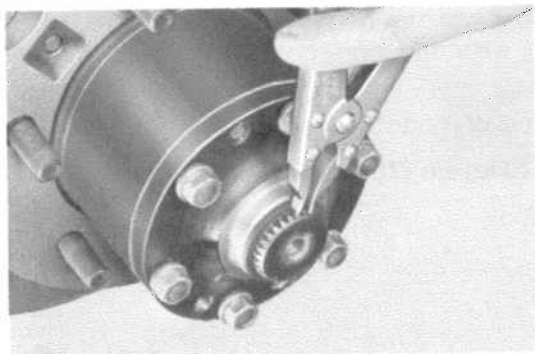
- (a) Using a flare nut wrench\*, disconnect the brake tube.
- \*SST 09751-36011 or Commercial wrench
- (b) Remove the disc brake caliper from the steering knuckle.



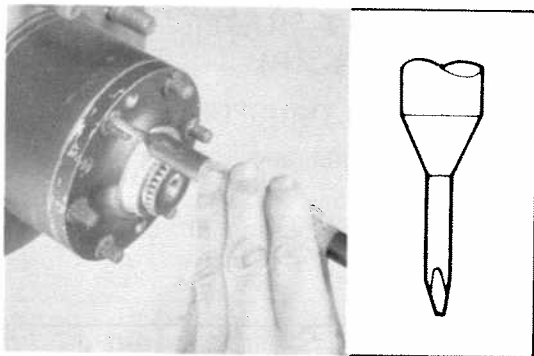
#### 2. REMOVE FLANGE OR FREE WHEEL HUB

NOTE: In case of the free wheel hub, see page 13-30.

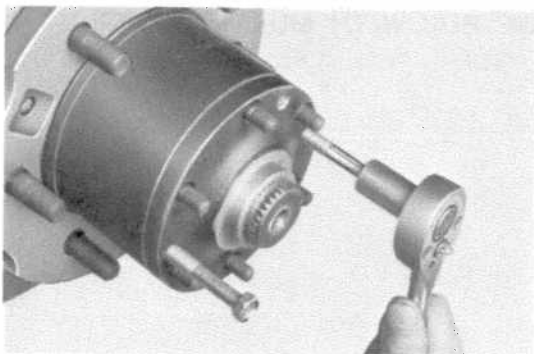
- (a) Remove the cap from the flange.
- (b) Using snap ring pliers, remove the snap ring.



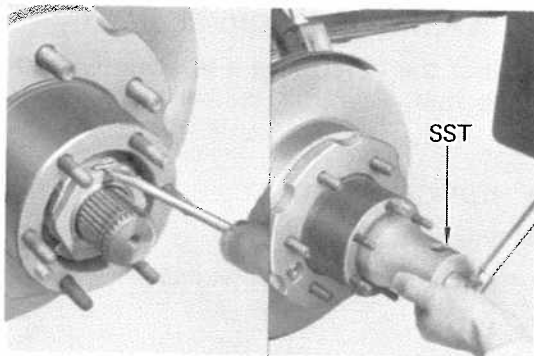




- (c) Remove the mounting nuts.
- (d) Using a tapered punch, tap the slits of the cone washers and remove them.

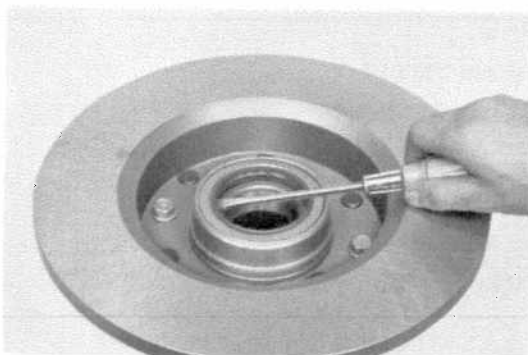


- (e) Install and tighten two bolts, and remove the flange.



### 3. REMOVE AXLE HUB WITH DISC

- (a) Using a screwdriver, release the lock washer.
  - (b) Using SST\*, remove the lock nut.
- \*SST 09607-60020
- (c) Remove the lock washer and adjusting nut.
  - (d) Remove the axle hub with the disc.



### 4. REMOVE THRUST WASHER AND OUTER BEARING

### 5. REMOVE OIL SEAL AND INNER BEARING

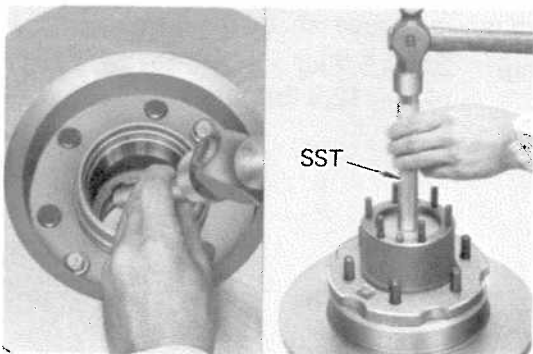
Using a screwdriver, pry out the oil seal.

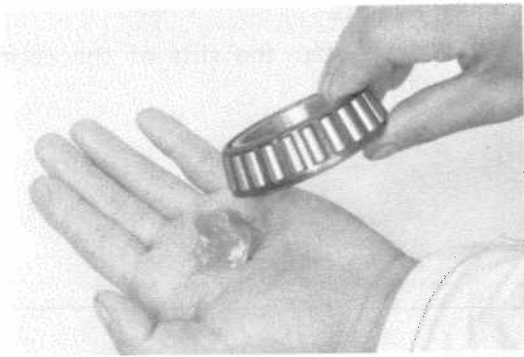
## INSPECTION OF FRONT AXLE HUB (See page 13-8)

### IF NECESSARY, REPLACE BEARING RACE

- (a) Using a brass bar, drive out the bearing race.
- (b) Using a bearing driver\*, carefully drive in the new race.

\*SST 09608-35013 or Commercial driver



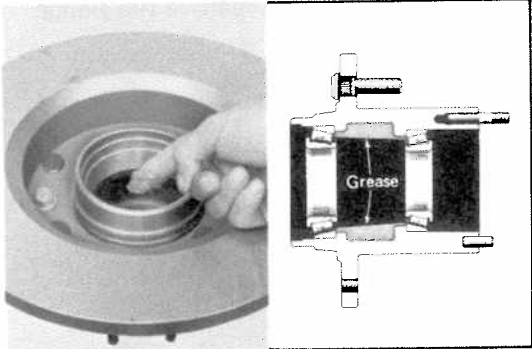


## ASSEMBLY OF FRONT AXLE HUB (See illustration on page 13-36)

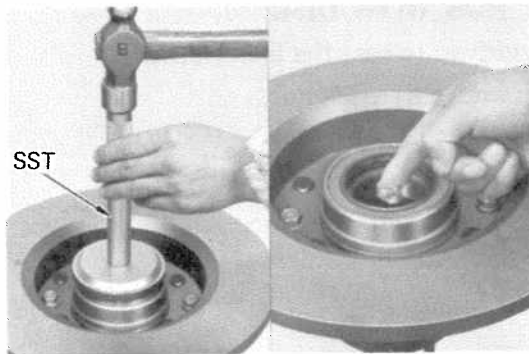
### 1. PACK BEARINGS WITH MULTIPURPOSE GREASE

Place some grease in your hand and force grease into bearing until completely filled.

NOTE: If available, use a pressure bearing lubricator.



### 2. COAT INSIDE OF HUB WITH MULTIPURPOSE GREASE

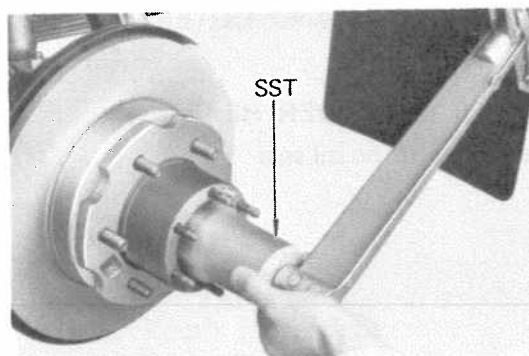


### 3. INSTALL INNER BEARING AND OIL SEAL

Place inner bearing into the hub. Using a seal driver, drive the oil seal into the hub. Coat the oil seal with multi-purpose grease.

### 4. INSTALL AXLE HUB ON SPINDLE

- Place the axle hub on the spindle.
- Install the outer bearing and thrust washer.



### 5. ADJUST PRELOAD

- Install and torque the nut.

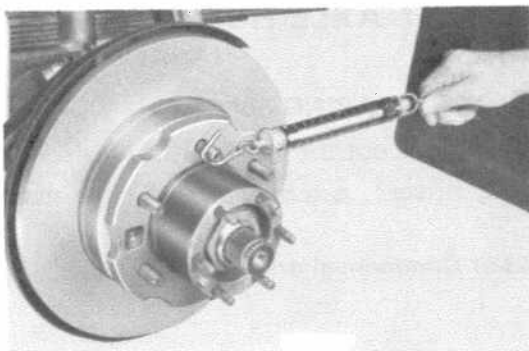
**Torque: 600 kg-cm (43 ft-lb)**

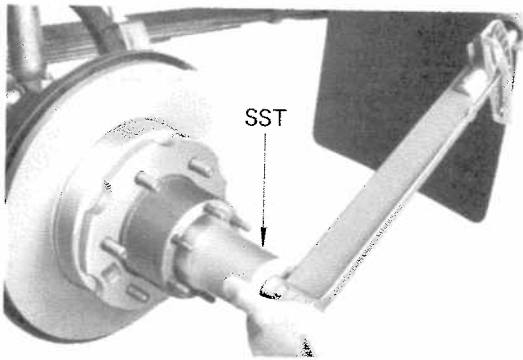
- Turn the hub right and left two or three times.
- Loosen the nut until it can be turned by hand.
- Retighten the adjusting nut.

**Torque: 40 – 70 kg-cm (35 – 60 in.-lb)**

- Using a spring tension gauge, check the preload.

**Preload (at starting): 2.8 – 5.7 kg  
(6.2 – 12.6 lb)**



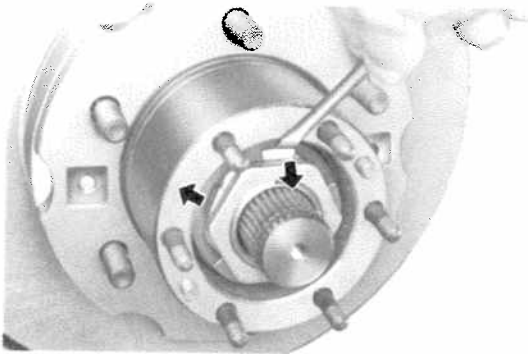
**6. INSTALL LOCK WASHER AND LOCK NUT**

- (a) Install the lock washer and lock nut.
- (b) Using SST\*, tighten the lock nut.

\*SST 09607-60020

**Torque: 800 — 1,000 kg-cm (58 — 72 ft-lb)**

- (c) Secure the lock nut by bending one of the lock washer teeth inward and another lock washer teeth outward.

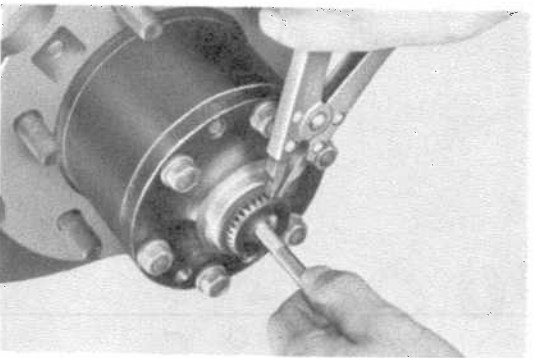
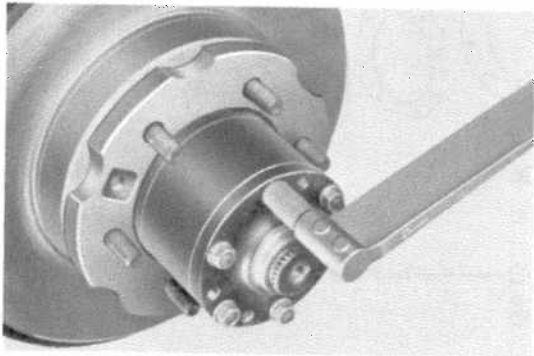
**7. INSTALL FLANGE OR FREE WHEEL HUB**

**NOTE:** In case of the free wheel hub, see page 13-35.

- (a) Place the gasket in position on the axle hub.
- (b) Install the flange to the axle hub.
- (c) Install six cone washers and nuts.  
Tighten the nuts.

**Torque: 280 — 350 kg-cm (21 — 25 ft-lb)**

- (d) Install a bolt in the axle shaft and pull it out.
- (e) Using snap ring pliers, install the snap ring.
- (f) Remove the bolt.
- (g) Install the cap to the flange.

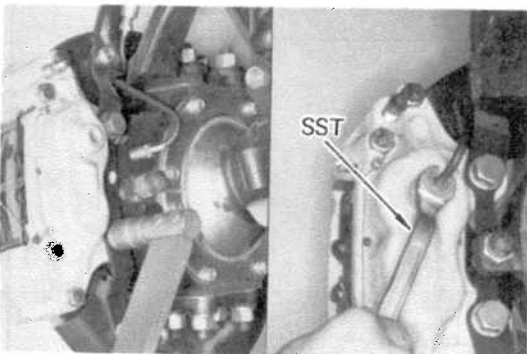
**8. INSTALL BRAKE CALIPER**

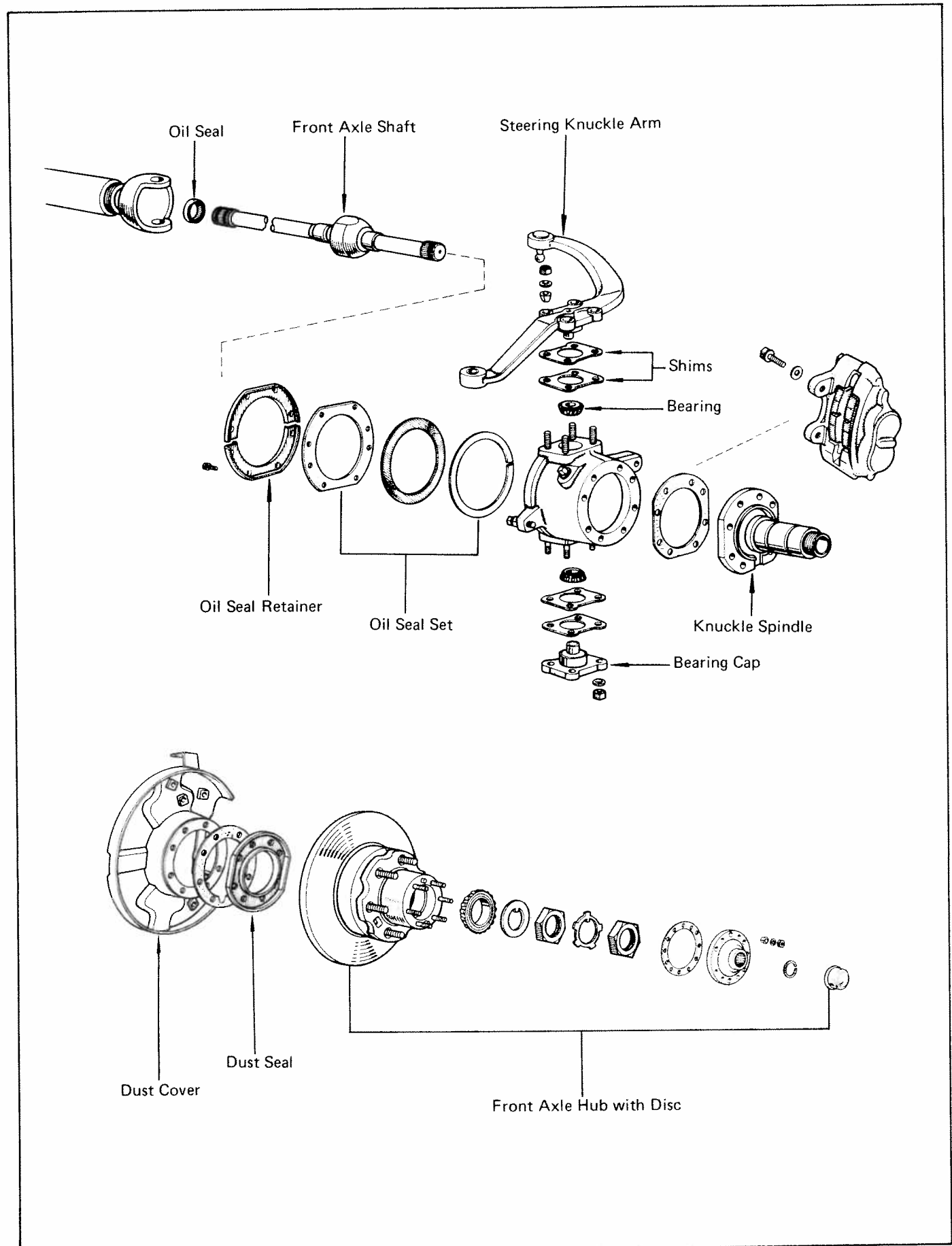
- (a) Install the brake caliper to the steering knuckle.  
Tighten the mounting bolts.

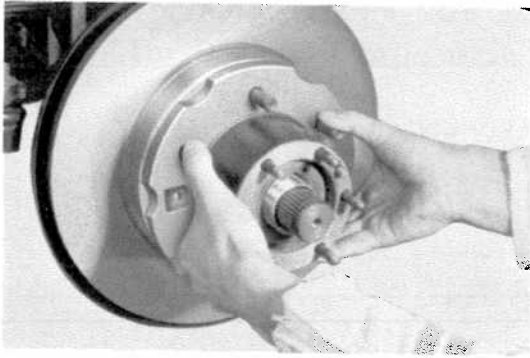
**Torque: 750 — 1,050 kg-cm (55 — 75 ft-lb)**

- (b) Using a flare nut wrench\*, connect the brake tube.

\*SST 09751-36011 or Commercial wrench

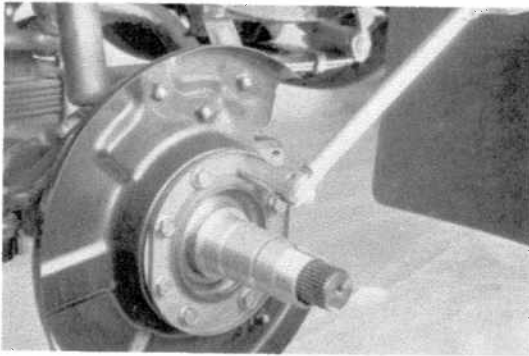


**STEERING KNUCKLE AND AXLE SHAFT (4×4)**

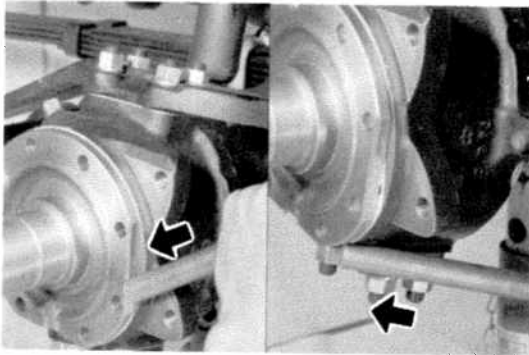


## DISASSEMBLY OF STEERING KNUCKLE AND AXLE SHAFT

1. REMOVE FRONT AXLE HUB  
(See page 13-36)

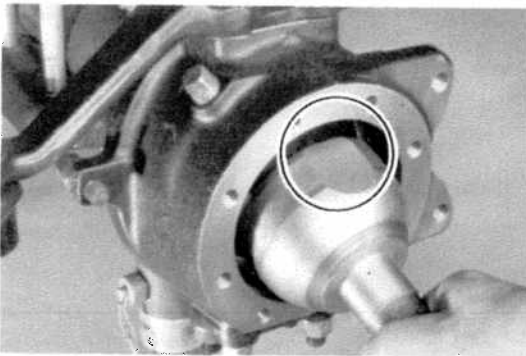


2. REMOVE KNUCKLE SPINDLE MOUNTING BOLTS
3. REMOVE DUST SEAL AND DUST COVER



4. REMOVE KNUCKLE SPINDLE

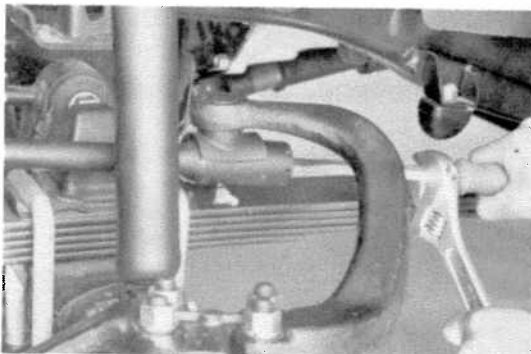
Using a brass bar, tap the knuckle spindle off of the steering knuckle.



5. REMOVE AXLE SHAFT

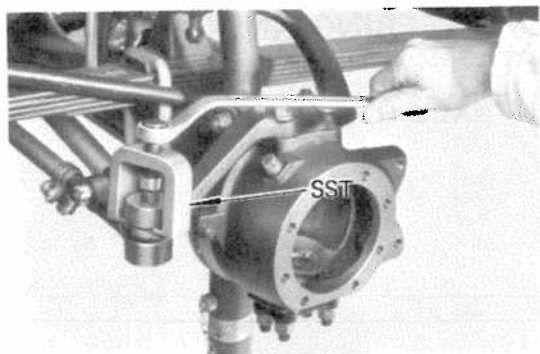
Position one flat part of the outer shaft upward and pull out the axle shaft.

6. REMOVE OIL SEAL SET RETAINER



7. DISCONNECT DRAG LINK FROM KNUCKLE ARM

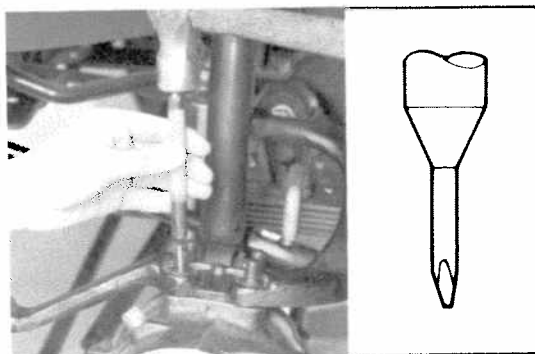
- (a) Remove the cotter pin from the drag link end.
- (b) Using a screwdriver, remove the plug.
- (c) Disconnect the drag link from the knuckle arm.



## 8. DISCONNECT TIE ROD FROM KNUCKLE ARM

Using a ball joint puller\*, disconnect the tie rod from the knuckle arm.

\*SST 09611-22011 or Commercial puller



## 9. REMOVE KNUCKLE ARM AND BEARING CAP

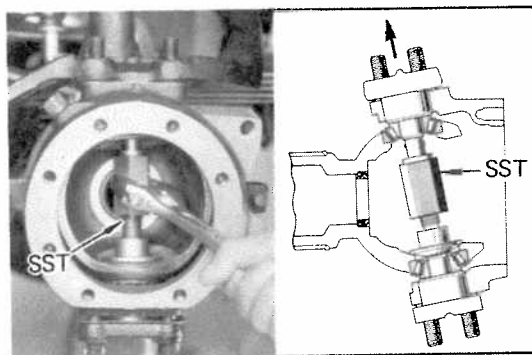
(a) Remove the knuckle arm and bearing cap mounting nuts.

(b) Using a tapered punch, tap the slits of the cone washers and remove them from the knuckle arm.

(c) Using SST\*, push out the knuckle arm and shims from the steering knuckle.

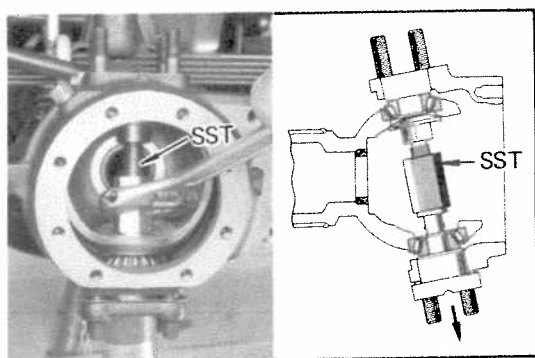
\*SST 09606-60020

NOTE: Use the SST without a collar.



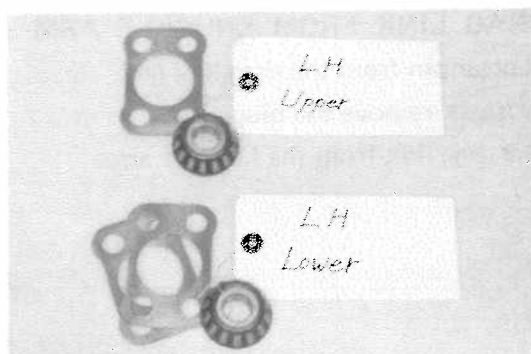
(d) Using SST\*, push out the bearing cap and shims from the steering knuckle.

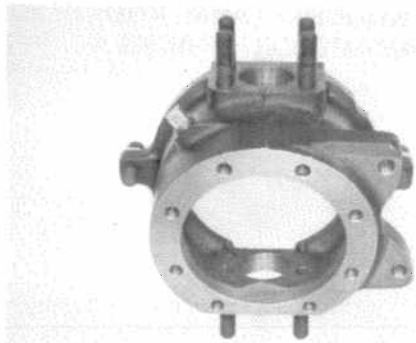
\*SST 09606-60020



## 10. REMOVE STEERING KNUCKLE AND BEARINGS

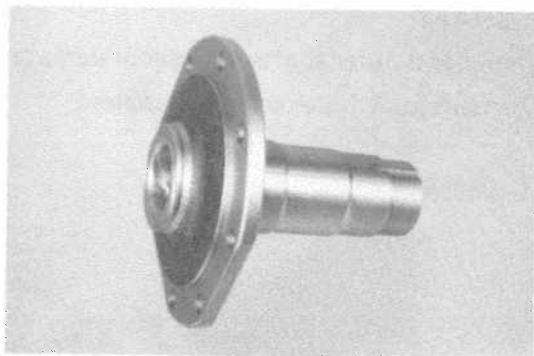
NOTE: Mark the removed adjusting shims and bearings so as to enable reassembling them back to their proper positions.





## INSPECTION OF STEERING KNUCKLE AND AXLE SHAFT

1. CLEAN AND INSPECT STEERING KNUCKLE FOR DAMAGE OR CRACKS



2. CLEAN AND INSPECT KNUCKLE SPINDLE

- (a) Check the spindle for wear or damage.
- (b) Check the bushing for wear or damage.  
If the bushing is worn or damaged replace it.

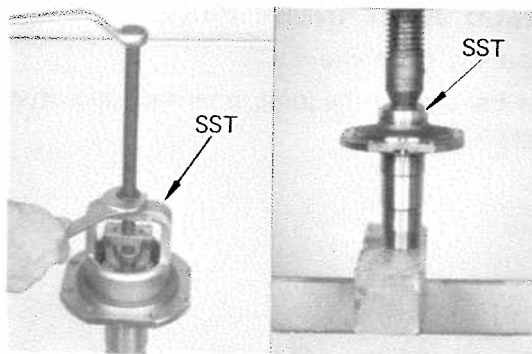
3. IF NECESSARY, REPLACE BUSHING

- (a) Using a steering worm bearing puller\*, remove the bushing.

\*SST 09612-65013

- (b) Using a driver\*, press in the new bushing into the spindle.

\*SST 09608-35013 or Commercial driver



4. CLEAN AND INSPECT KNUCKLE BEARINGS AND RACES

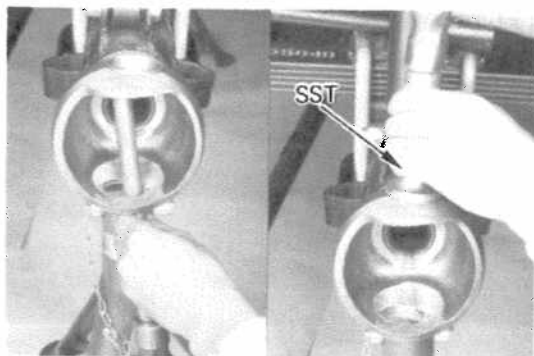
- (a) Clean with solvent and dry with low-pressure compressed air.
- (b) Inspect the bearings and races for wear or damage.  
If a bearing or race requires replacement, it must be replaced as a set.



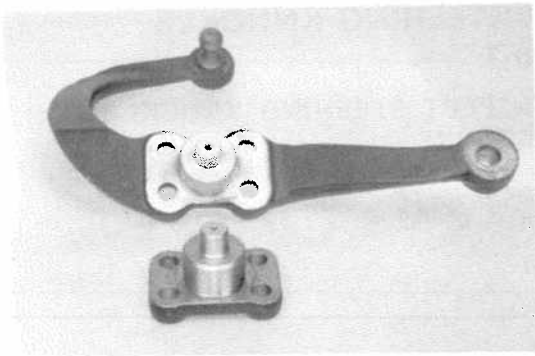
5. IF NECESSARY, REPLACE BEARING RACE

- (a) Using a brass bar, drive out the bearing race.
- (b) Using a bearing driver\*, carefully drive in the new race.

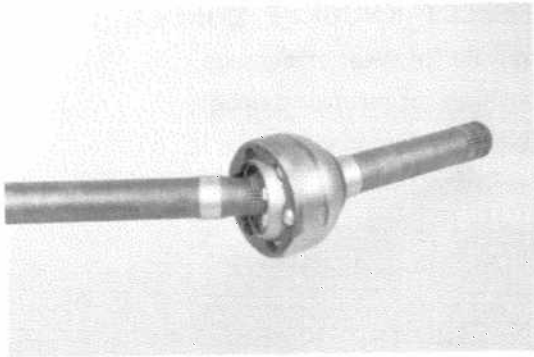
\*SST 09605-60010 or Commercial driver





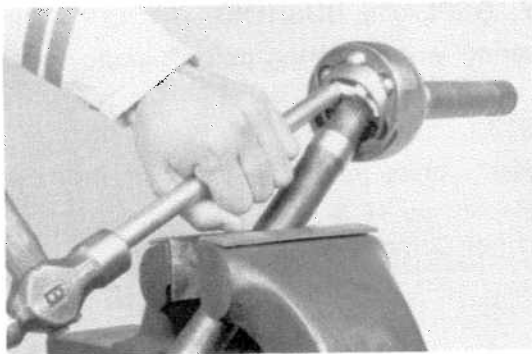


6. **CLEAN AND INSPECT KNUCKLE ARM AND BEARING CAP FOR DAMAGE OR CRACKS**



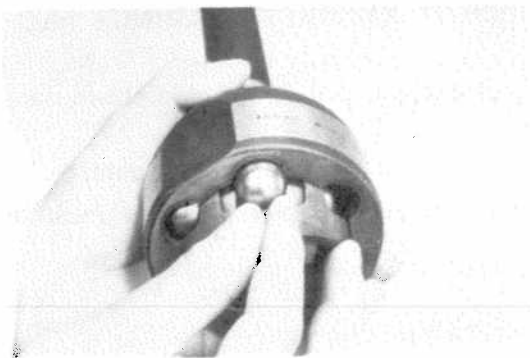
7. **INSPECT AXLE SHAFT**

- (a) Inspect the inner and outer shafts for wear or damage.
- (b) Inspect the Birfield joint for excessive looseness.



8. **INSPECT BIRFIELD JOINT INNER PARTS**

- (a) Hold the inner shaft in a vise.
- (b) Place a brass bar against the joint inner race and drive out the outer shaft.

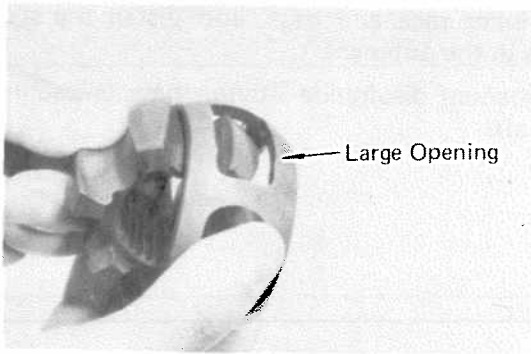


- (c) Tilt the inner race and cage and take out the bearing balls one by one.

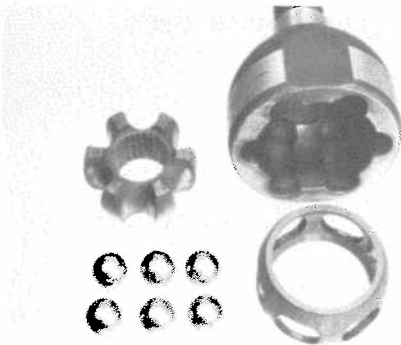


- (d) Fit the two large openings in the cage against the protruding parts of the outer shaft, and pull out the cage and inner race.

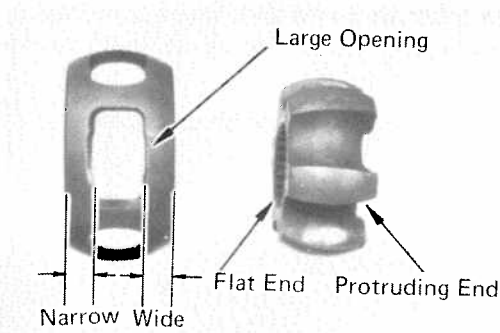




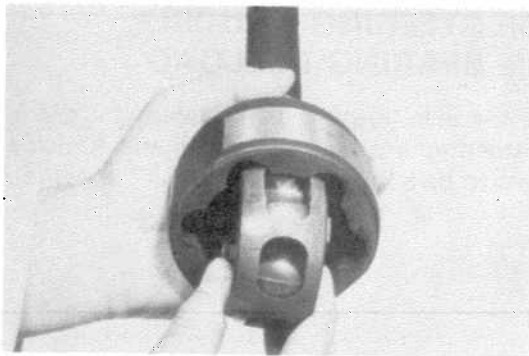
- (e) Take out the inner race from the cage through the large opening.



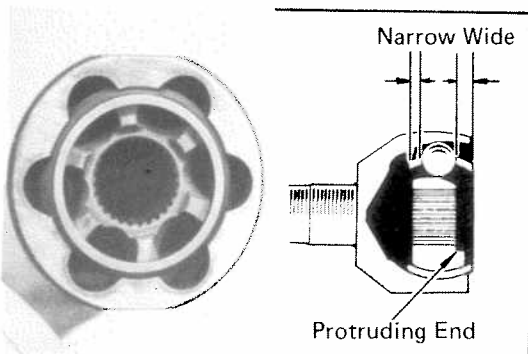
- (f) Clean and inspect the joint inner parts for wear or damage.



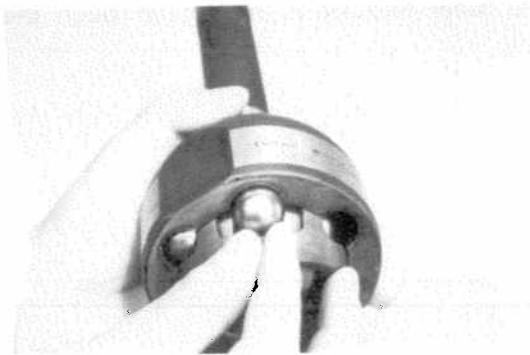
- (g) Coat the joint inner parts and outer shaft inside with molybdenum disulphide grease.  
 (h) Insert the inner race in the cage through the large opening.  
 (i) Position the protruding end of the inner race toward the wide side of the cage.



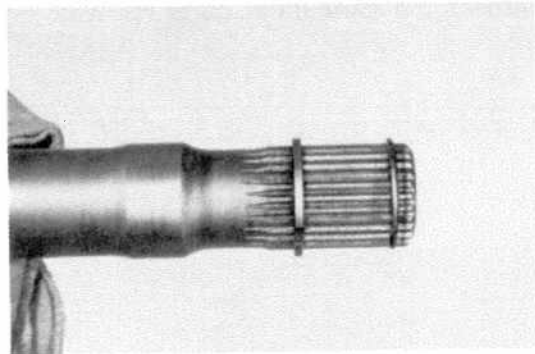
- (j) Assemble the cage and inner race to the outer shaft by fitting the two large openings in the cage against the protruding parts of the outer shaft.



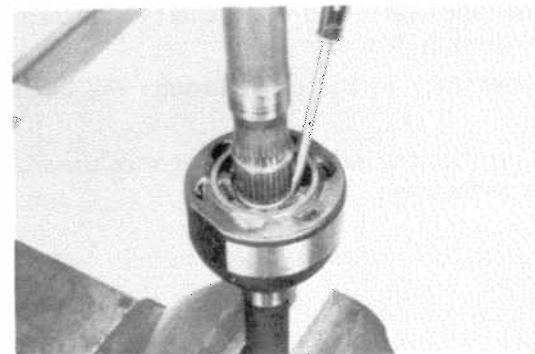
- (k) Make sure to position the wide side of the cage and the inner race protruding end outward.



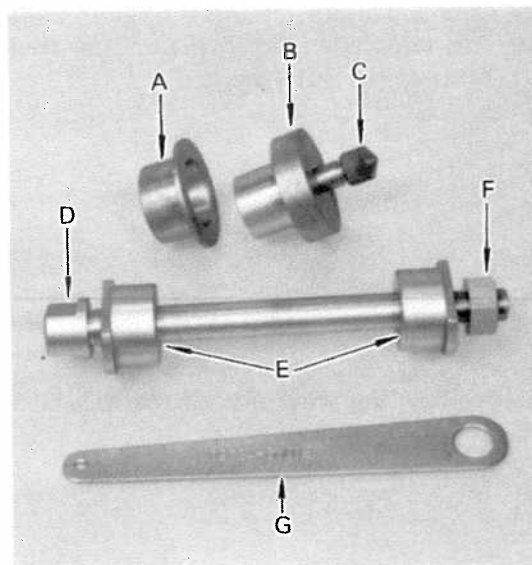
- (l) Fit in the inner race and cage, and install the six bearing balls in the outer shaft.
- (m) Pack molybdenum disulphide lithium base grease in the outer shaft.



- (n) Install the new snap rings on the inner shaft.



- (o) Hold the outer shaft in a vise and, while compressing the snap ring (inner), install the inner shaft to the outer shaft.
- (p) Verify that the inner shaft cannot be pulled out.

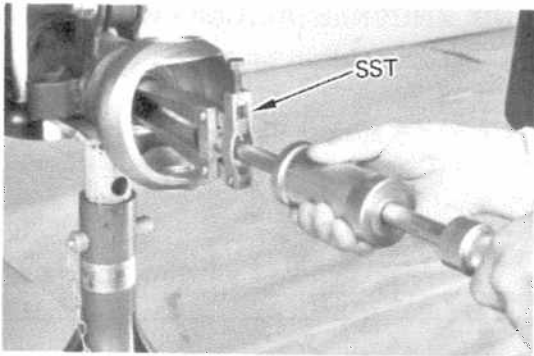


### ADJUSTMENT OF STEERING KNUCKLE ALIGNMENT AND BEARING PRELOAD

NOTE: Whenever the axle housing or the steering knuckle is replaced, the steering knuckle alignment and knuckle bearing preload are to be adjusted with the SST\* shown in the figure.

\*SST 09634-60013

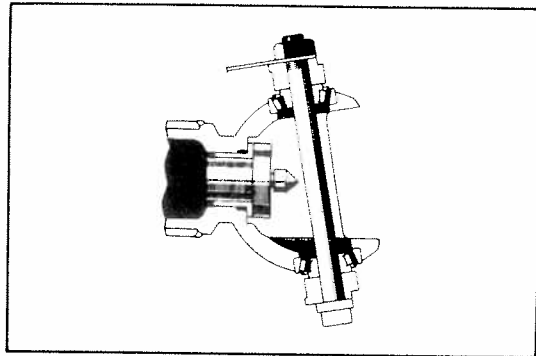
- |                 |               |
|-----------------|---------------|
| A. Adapter Ring | E. Attachment |
| B. Adapter      | F. Nut        |
| C. Plug         | G. Lever      |
| D. Rod          |               |



# 1. ADJUST BEARING PRELOAD

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

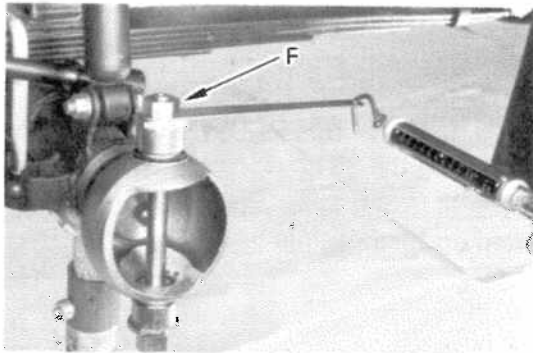
\*SST 09308-00010 or Commercial puller



(b) Coat knuckle bearings lightly with molybdenum disulphide lithium base grease.

(c) Mount the SST\* on the housing with the bearings.

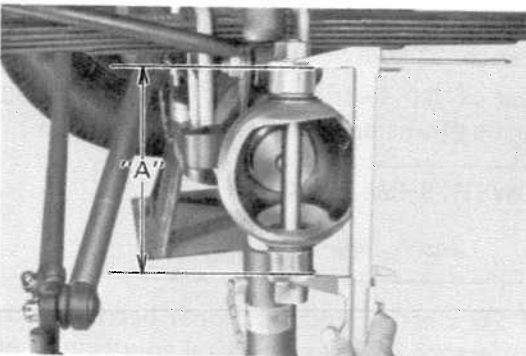
\*SST 09634-60013



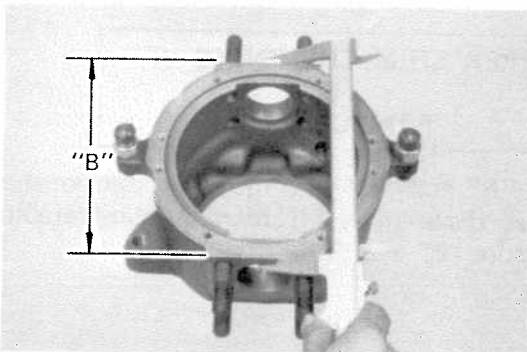
(d) Add preload to the bearings by tightening nut F.

Using a spring tension gauge, measure the preload.

**Preload (rotating): 1.8 — 3.8 kg (4.0 — 8.4 lb)**



(e) Measure distance "A".

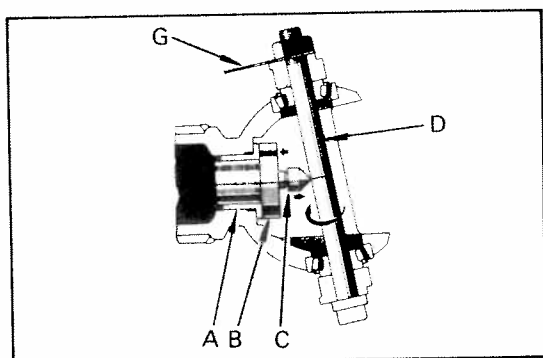


(f) Measure distance "B".

The difference between "A" and "B" is the total adjusting shim thickness that is required to maintain the correct bearing preload.

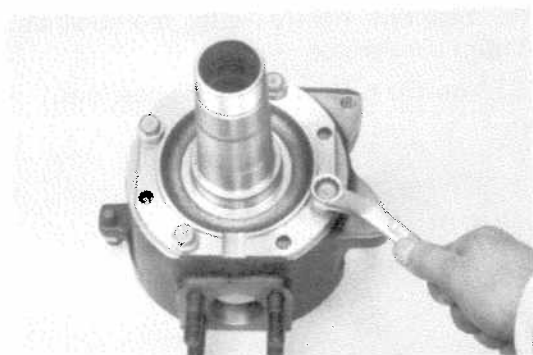
**TOTAL SHIM THICKNESS "C"**

**"C" = "A" — "B"**

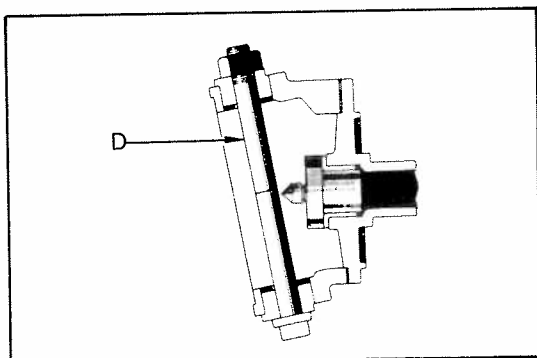


## 2. ADJUST STEERING KNUCKLE ALIGNMENT

- (a) Apply a light coat of red lead on the center part of rod D.
- (b) Press adapters A and B against the housing, press plug C against the rod D, and turn lever G so that a line will be scribed on rod D.



- (c) Temporarily install the spindle to the knuckle. Tighten the bolt with two washers.

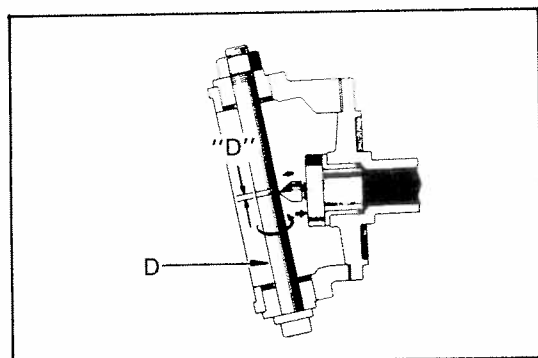


- (d) Dismount the SST\* from the housing, and mount it on the knuckle.

\*SST 09634-60013

NOTE: Use care not to erase the scribed line when dismounting and remounting the SST.

Make sure that rod D is in the same vertical direction that it was when mounted on the housing.



- (e) Turn rod D and scribe another line on it. Measure distance "D" between the two scribed lines. The thickness of the steering knuckle lower bearing shim "E" will be the distance "D" less 3 mm (0.12 in.).

### LOWER SHIM THICKNESS "E"

$$\text{"E"} = \text{"D"} - 3 \text{ mm}$$

The thickness of the steering knuckle upper bearing shim "F" will be the difference between the total adjusting shim thickness "C" and shim thickness "E".

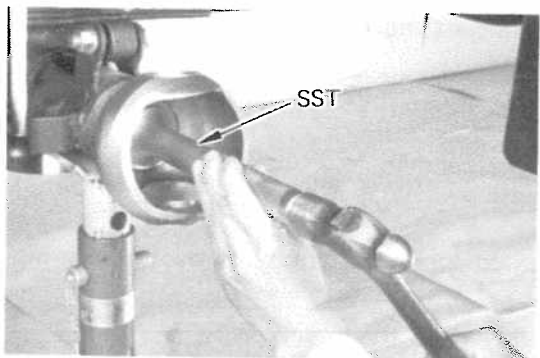
### UPPER SHIM THICKNESS "F"

$$\text{"F"} = \text{"C"} - \text{"E"}$$

NOTE: Compare "E" and "F" with the thicknesses of the shims removed at disassembly. If there is considerable difference, remeasure "E" and "F".

Adjusting shim thickness

Part No.	Thickness mm (in.)
43236-60010	0.1 (0.004)
43233-60011	0.2 (0.008)
43234-60011	0.5 (0.020)
43235-60010	1.0 (0.039)



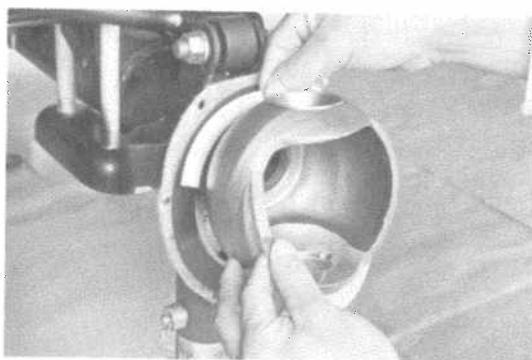
## ASSEMBLY OF STEERING KNUCKLE AND AXLE SHAFT

(See illustration on page 13-40)

### 1. INSTALL OIL SEAL TO AXLE HOUSING

Using a seal driver\*, drive the oil seal into the axle housing.

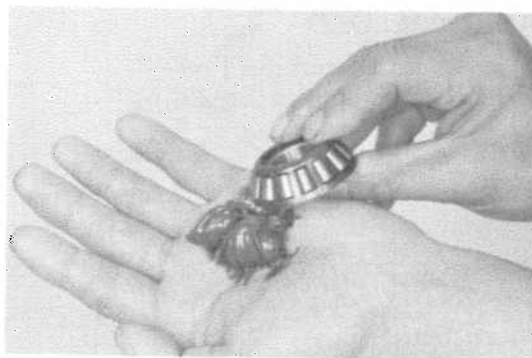
\*SST 09618-60010 or Commercial driver



### 2. INSTALL OIL SEAL SET

Install the parts in the following order:

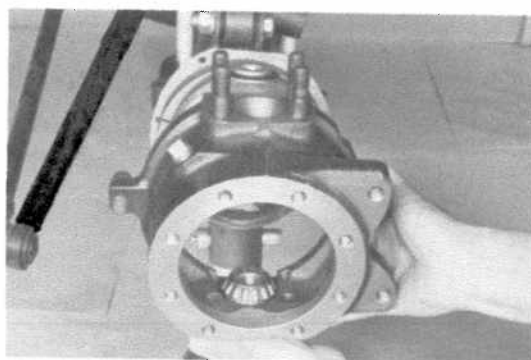
- (a) Felt dust seal
- (b) Rubber seal
- (c) Steel ring



### 3. PACK BEARINGS WITH MOLYBDENUM DISULPHIDE LITHIUM BASE GREASE

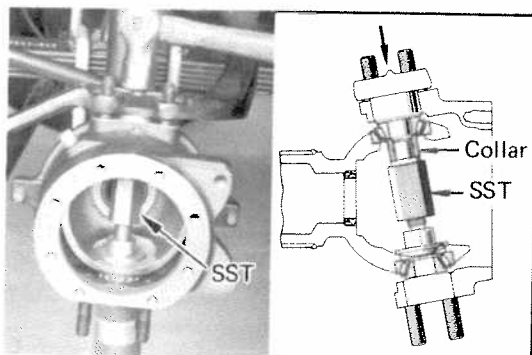
Place some grease in your hand and force grease into bearing until completely filled.

NOTE: If available, use a pressure bearing lubricator.



### 4. INSTALL STEERING KNUCKLE AND BEARINGS

- (a) Place the bearings in positions on the knuckle and axle housing.
- (b) Insert the knuckle on the axle housing.



### 5. INSTALL KNUCKLE ARM AND BEARING CAP

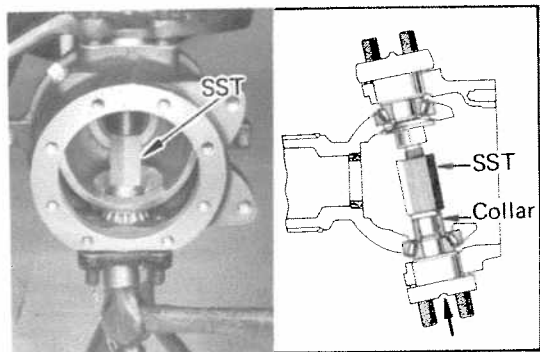
- (a) Using SST\*, support the upper bearing inner race.

\*SST 09606-60020

NOTE: Use SST with a collar.

- (b) Install the knuckle arm over the shims that were originally used or were selected as described in adjustment operations.

- (c) Using a hammer, tap the knuckle arm into the bearing inner race.



(d) Using SST\*, support the lower bearing inner race.

\*SST 09606-60020

NOTE: Use SST with a collar.

(e) Install the bearing cap over the shims that were originally used or were selected as described in adjustment operations.

(f) Using a hammer, tap the bearing cap into the bearing inner race.

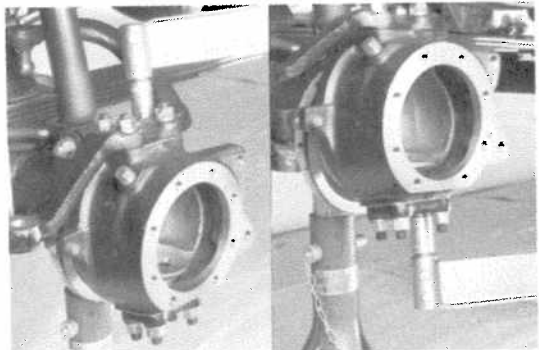
(g) Remove the SST from the knuckle.

(h) Install the cone washers to the knuckle arm and tighten the nuts.

**Torque: 850 – 1,100 kg-cm (62 – 79 ft-lb)**

(i) Install and tighten the bearing cap mounting nuts.

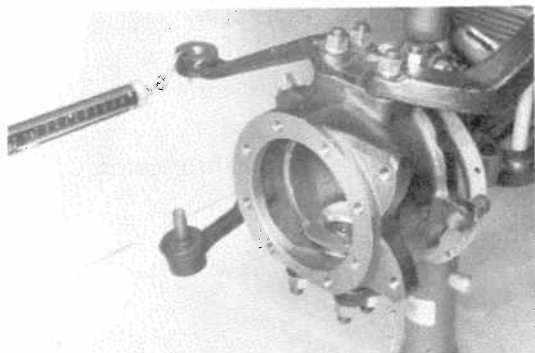
**Torque: 850 – 1,100 kg-cm (62 – 79 ft-lb)**



## 6. MEASURE BEARING PRELOAD

Using a spring tension gauge, measure the preload.

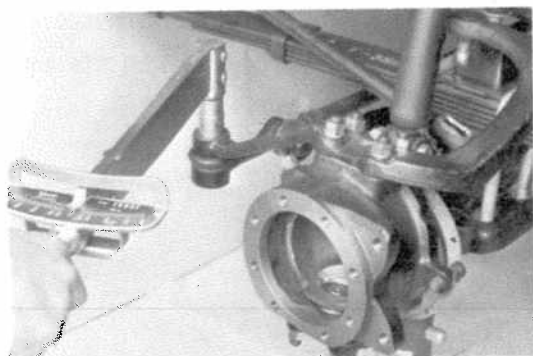
**Preload (rotating): 1.8 – 3.8 kg (4.0 – 8.4 lb)**



## 7. CONNECT TIE ROD TO KNUCKLE ARM

Tighten the castle nut and secure it with a cotter pin.

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



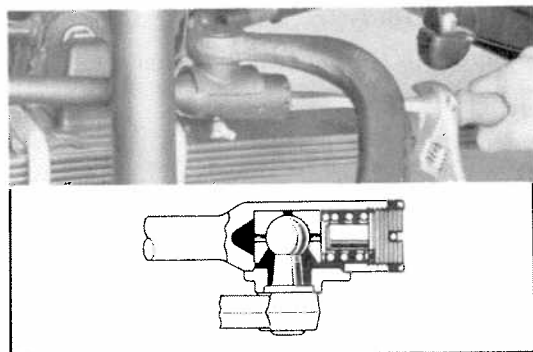
## 8. CONNECT DRAG LINK TO KNUCKLE ARM

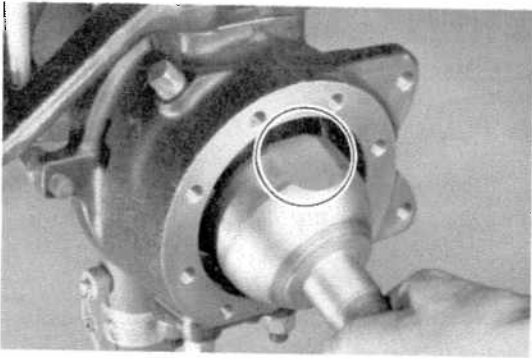
(a) Insert the drag link on the knuckle arm.

(b) Install the ball stud seat, spring, spring seat and plug in the drag link end.

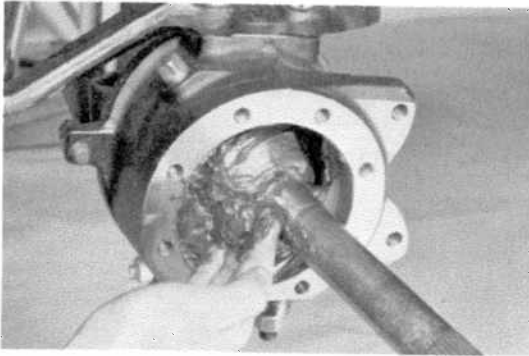
(c) Tighten the plug completely and then loosen 1-1/3 turns.

(d) Secure the plug with a cotter pin.

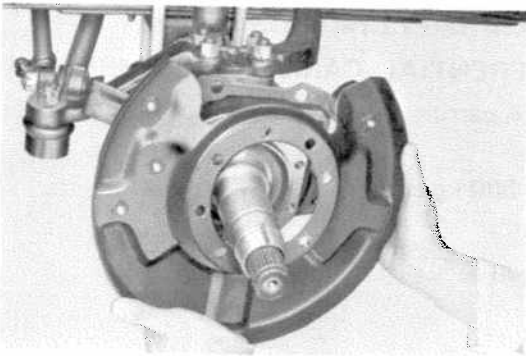


**9. INSTALL OIL SEAL SET RETAINER TO KNUCKLE****10. INSTALL AXLE SHAFT**

Position one flat part of the outer shaft upward, and install the shaft.

**11. PACK MOLIBDENUM DISULPHIDE LITHIUM BASE GREASE IN KNUCKLE**

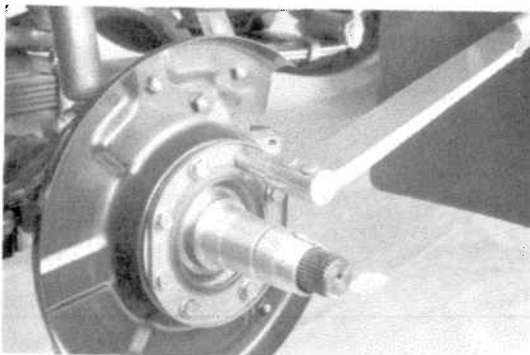
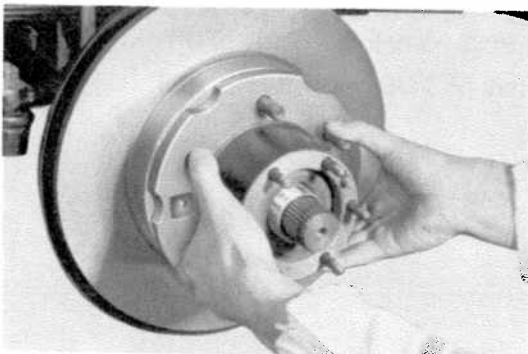
Pack molibdenum disulphide lithium base grease into the knuckle to about three fourths of the knuckle volume.

**12. INSTALL KNUCKLE SPINDLE, DUST COVER AND DUST SEAL WITH NEW GASKETS**

- (a) Place the gasket in position on the knuckle and install the spindle.
- (b) Place the dust cover, gasket and dust seal on the spindle.

- (c) Tighten the spindle mounting bolts.

Torque: 400 — 550 kg-cm (29 — 39 ft-lb)

**13. INSTALL AXLE HUB (See page 13-38)**





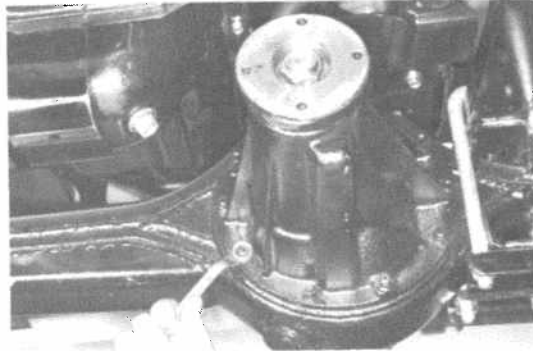
## FRONT DIFFERENTIAL (4×4)

### REMOVAL OF DIFFERENTIAL

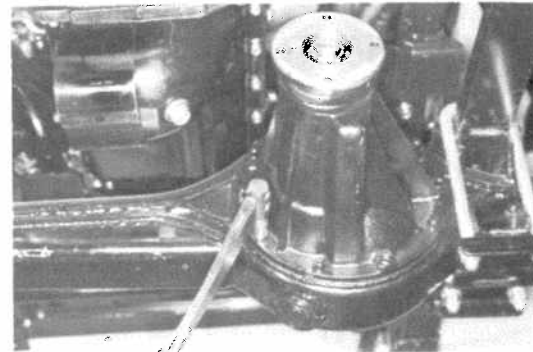
1. REMOVE DRAIN PLUG AND DRAIN DIFFERENTIAL OIL
2. REMOVE FRONT AXLE SHAFT (See page 13-40)
3. DISCONNECT FRONT PROPELLER SHAFT FLANGE FROM COMPANION FLANGE

Remove four bolts and nuts.

4. REMOVE DIFFERENTIAL CARRIER ASSEMBLY  
Remove 10 nuts and pull out the differential carrier assembly.



### DISASSEMBLY OF DIFFERENTIAL (See page 14-13)



### 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 FRONT PROPELLER SHAFT FLANGE TO COMPANION FLANGE

Torque four bolts and nuts.

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

3. INSTALL FRONT AXLE SHAFT (See page 13-51)
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)

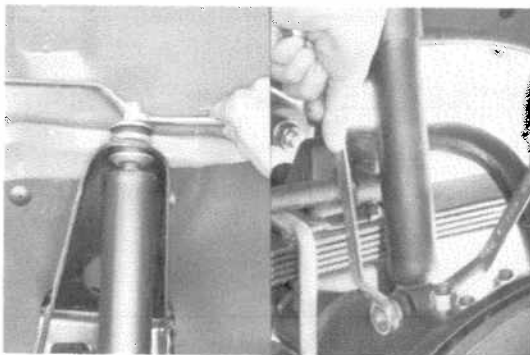
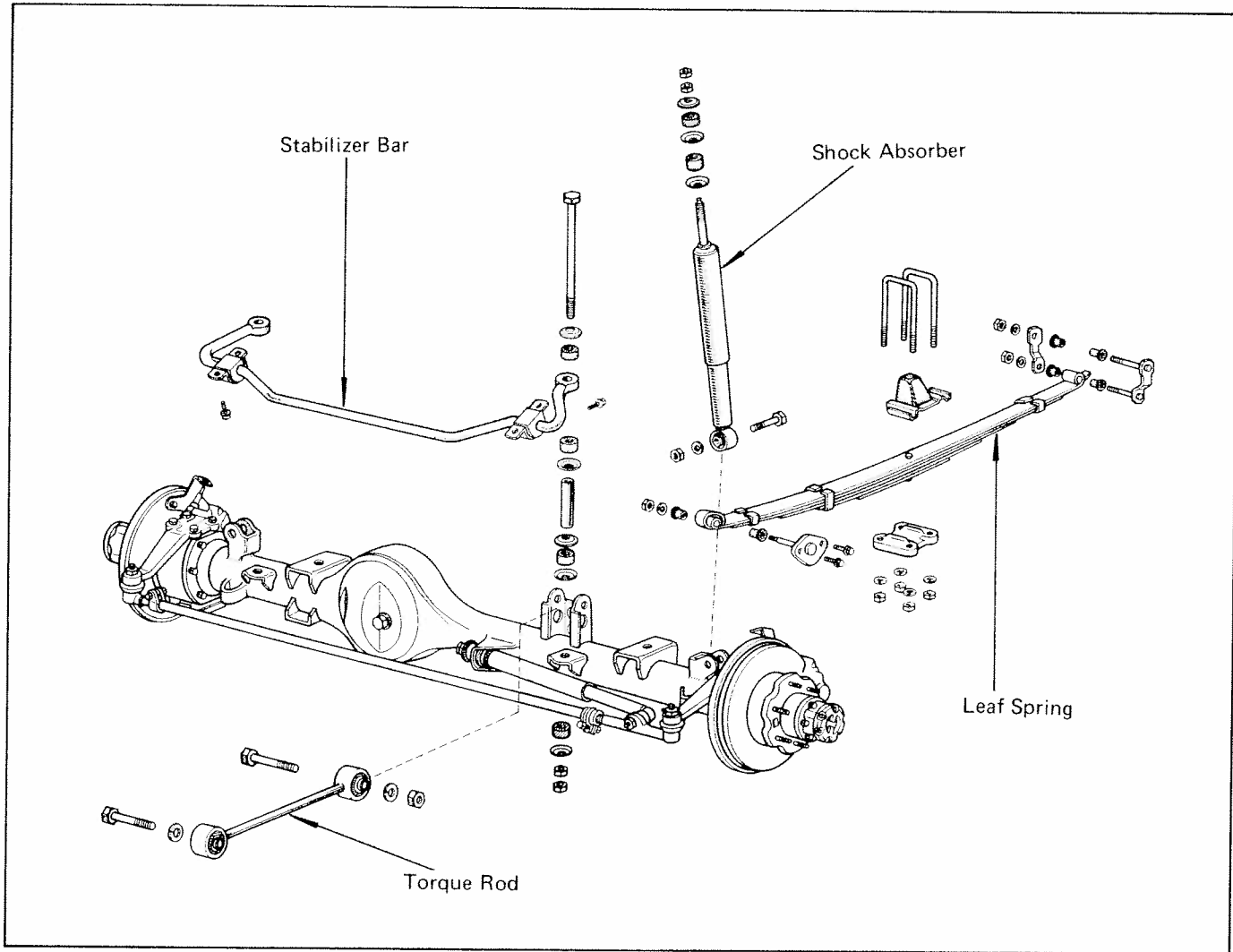
Capacity: 2.2 liters (2.3 US qts, 1.9 Imp. qts)

Install a filler plug.





## FRONT SUSPENSION (4×4)



### Front Shock Absorber

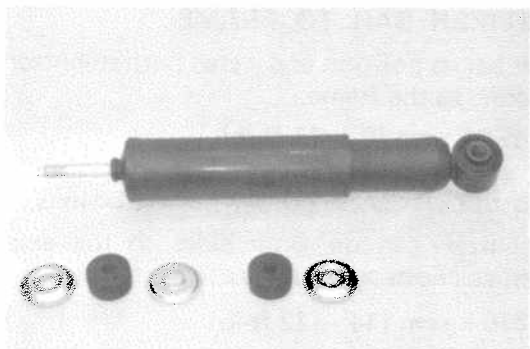
#### REMOVAL OF FRONT SHOCK ABSORBER

1. DISCONNECT SHOCK ABSORBER FROM BRACKET

Remove the two nuts holding shock absorber to the bracket.

2. DISCONNECT SHOCK ABSORBER FROM FRONT AXLE HOUSING

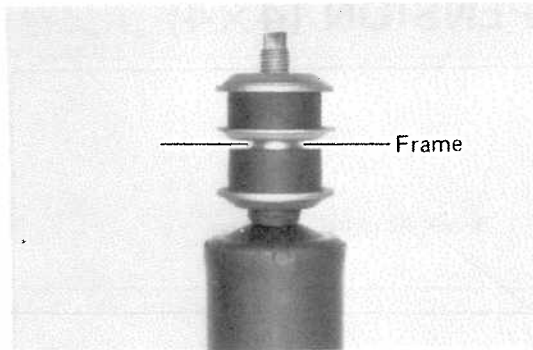
Remove the bolt holding shock absorber to the front axle housing and remove the shock absorber.



#### INSPECTION OF FRONT SHOCK ABSORBER

##### INSPECT FRONT SHOCK ABSORBER

- (a) Inspect the front shock absorber component parts for wear, damage or oil leaks.
- (b) Inspect the front shock absorber operation.

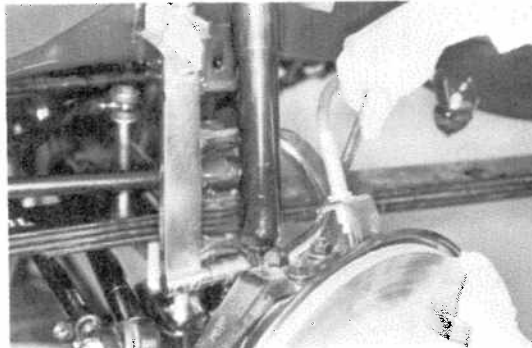


## INSTALLATION OF FRONT SHOCK ABSORBER (See illustration on page 13-53)

### 1. CONNECT SHOCK ABSORBER TO BRACKET

Connect the shock absorber to the bracket with two nuts. Tighten the nuts.

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

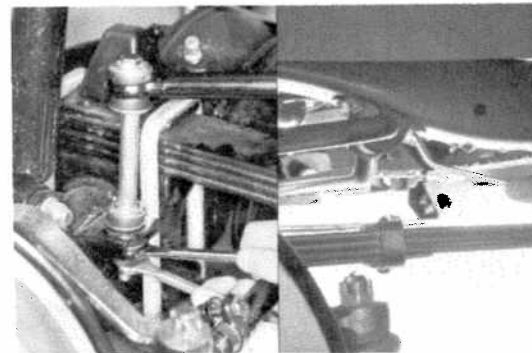


### 2. CONNECT SHOCK ABSORBER TO FRONT AXLE HOUSING

Connect the shock absorber to the front axle housing with the bolt and nut.

Tighten the bolt and nut.

Torque: 350 – 550 kg-cm (26 – 39 ft-lb)



## Stabilizer Bar

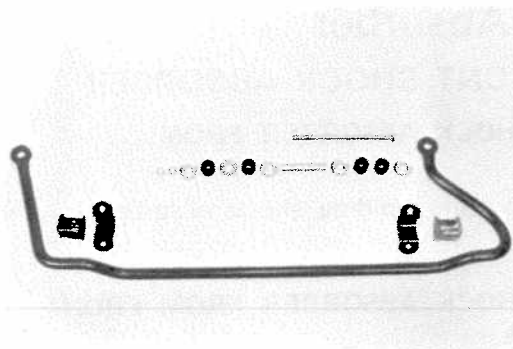
### REMOVAL OF STABILIZER BAR (See illustration on page 13-53)

#### 1. DISCONNECT STABILIZER BAR FROM FRONT AXLE HOUSING

Remove the nuts, cushions and bolts holding both sides of the stabilizer bar to axle housing.

#### 2. DISCONNECT STABILIZER BAR FROM FRAME

Remove both stabilizer bar brackets from the frame, and remove the stabilizer bar.



## INSPECTION OF STABILIZER BAR

### INSPECT STABILIZER BAR

Inspect the stabilizer bar component parts for wear or damage.

### INSTALLATION OF STABILIZER BAR (See illustration on page 13-53)

#### 1. INSTALL STABILIZER BAR TO FRAME

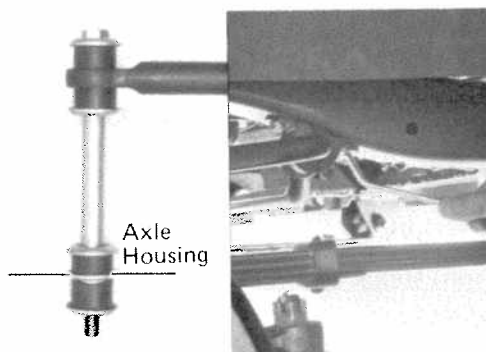
Place the stabilizer bar in position and install both stabilizer bushings and brackets to the frame.

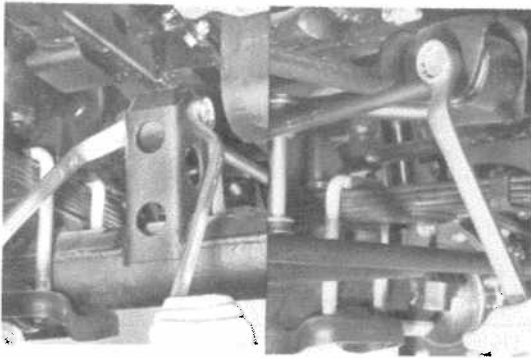
Torque: 100 – 160 kg-cm (8 – 11 ft-lb)

#### 2. CONNECT STABILIZER BAR TO AXLE HOUSING

Connect the stabilizer bar on both sides to the axle housing with bolts, cushions and nuts as shown.

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





## Torque Rod

### REMOVAL OF TORQUE ROD (See illustration on page 13-53)

1. DISCONNECT TORQUE ROD FROM AXLE HOUSING
2. DISCONNECT TORQUE ROD FROM FRAME

### INSPECTION OF TORQUE ROD

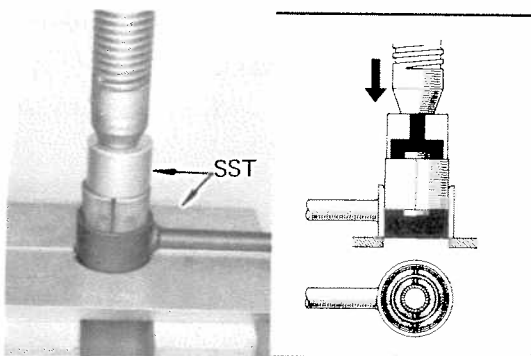
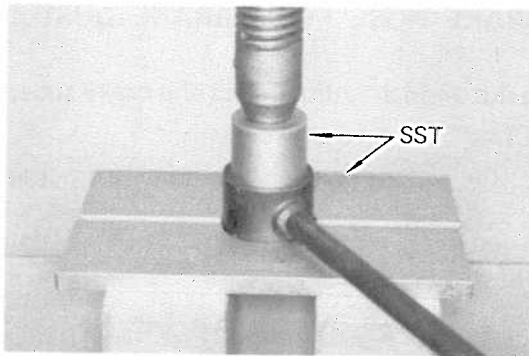
1. INSPECT TORQUE ROD
  - (a) Inspect the torque rod for damage.
  - (b) Inspect the bushings for wear or damage.
 If the bushings are worn or damaged, replace them.



### 2. IF NECESSARY REPLACE BUSHING

- (a) Using a press and collar\*, remove the bushing.

\*SST 09726-35010 and 09527-10010 or Commercial collar



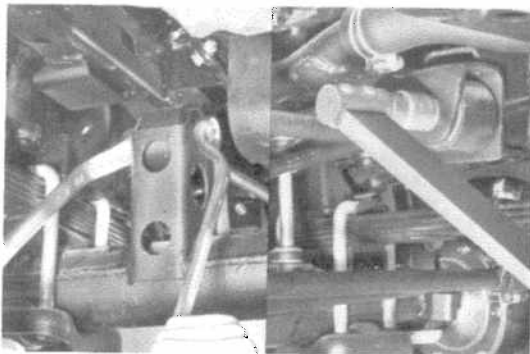
- (b) Using a press and collar\*, install the new bushing.

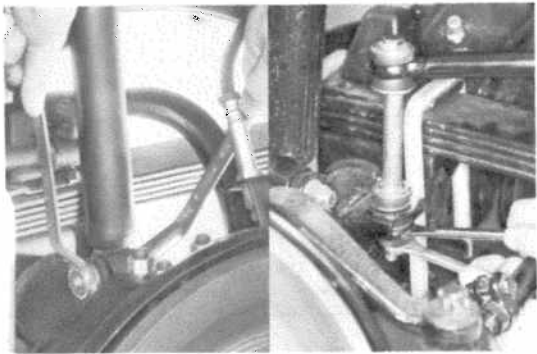
\*SST 09726-35010 and 09527-10010 or Commercial collar

NOTE: Position the bushing holes at right angle to the rod. Press in the bushing from the beveled end.

### INSTALLATION OF TORQUE ROD (See illustration on page 13-53)

1. INSTALL TORQUE ROD  
Finger tighten the mounting bolts.
2. BOUNCE VEHICLE TO STABILIZE BUSHINGS
3. TIGHTEN TORQUE ROD MOUNTING BOLTS  
Torque: 1,200 — 1,700 kg-cm (87 — 122 ft-lb)

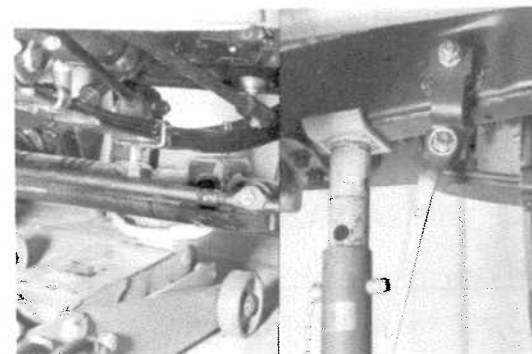
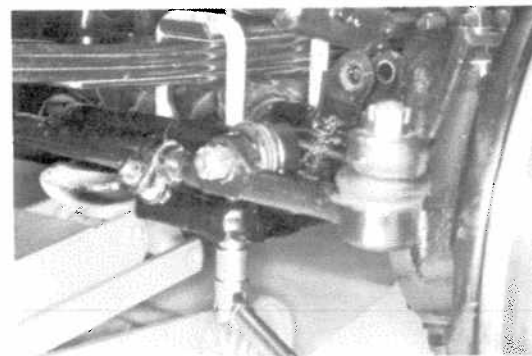
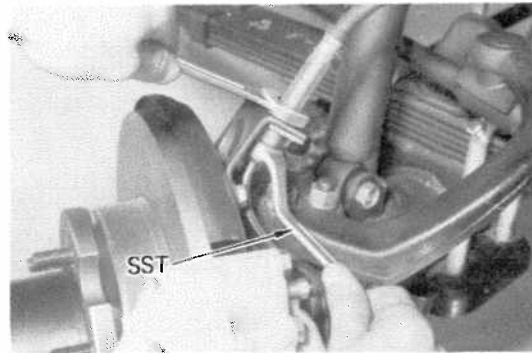
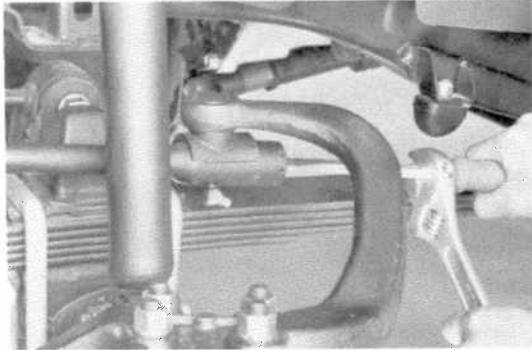


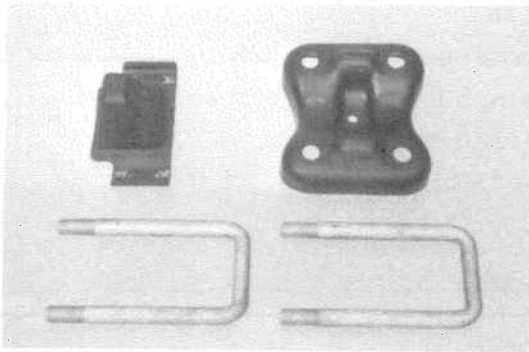


## Leaf Spring

### REMOVAL OF LEAF SPRING (See illustration on page 13-53)

1. DISCONNECT SHOCK ABSORBER FROM AXLE HOUSING
2. DISCONNECT STABILIZER BAR FROM AXLE HOUSING
3. DISCONNECT DRAG LINK FROM KNUCKLE ARM
  - (a) Remove the cotter pin from the drag link end.
  - (b) Using a screwdriver, remove the plug.
  - (c) Disconnect the drag link from the knuckle arm.
4. DISCONNECT BRAKE HOSE FROM BRAKE DUST COVER
  - (a) Using a flare nut wrench\*, disconnect the brake tube.  
\*SST 09751-36011 or Commercial wrench
  - (b) Remove the clip and disconnect the hose from the dust cover.
5. REMOVE U-BOLTS
  - (a) Using a jack, support the axle housing.
  - (b) Remove the U-bolts, spring seat and spring bumper from the leaf spring.
6. REMOVE LEAF SPRING
  - (a) Lower the axle housing and free the leaf spring.
  - (b) Remove the shackle pin and hanger pin from the leaf spring.
  - (c) Remove the leaf spring.

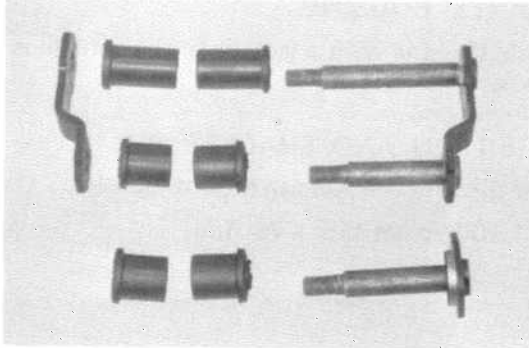




## INSPECTION OF LEAF SPRING

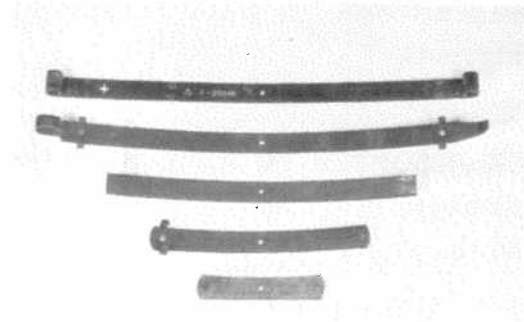
### 1. INSPECT U-BOLTS, SPRING SEAT AND SPRING BUMPER

Inspect the parts for wear or damage.



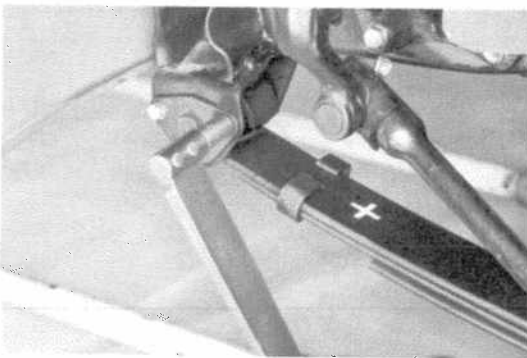
### 2. INSPECT SHACKLE PIN, HANGER PIN AND BUSHINGS

Inspect the parts for wear or damage.



### 3. INSPECT LEAF SPRING

Inspect the leaf spring for weakness or damage.

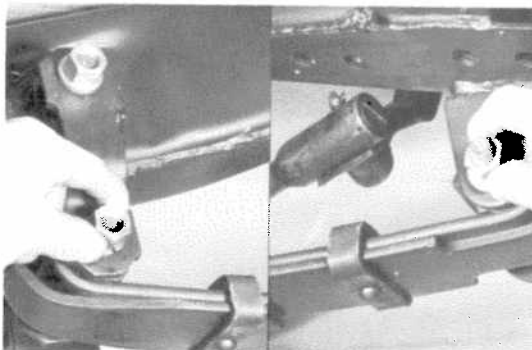


## INSTALLATION OF LEAF SPRING (See illustration on page 13-53)

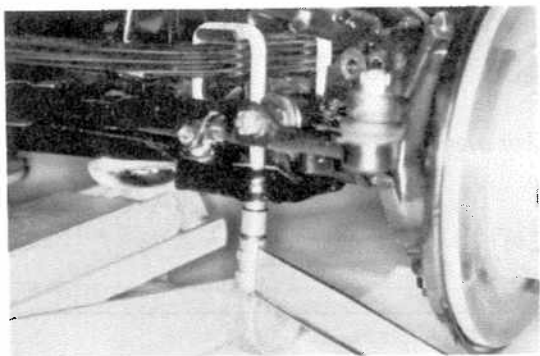
### 1. INSTALL LEAF SPRING

- (a) Insert the bushings into the frame and into both ends of the leaf spring.
- (b) Place the leaf spring in position.
- (c) Install the hanger pin and tighten the bolts.

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



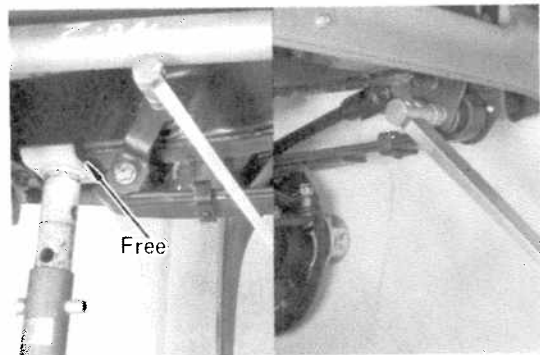
- (d) Finger tighten the hanger pin mounting nut.
- (e) Install the shackle pin and finger tighten the nuts.



## 2. INSTALL U-BOLTS

- Support the axle housing with a jack.
- Install the spring bumper, spring seat and U-bolts.
- Tighten the U-bolt mounting nuts.

Torque: 1,000 – 1,500 kg-cm (73 – 108 ft-lb)



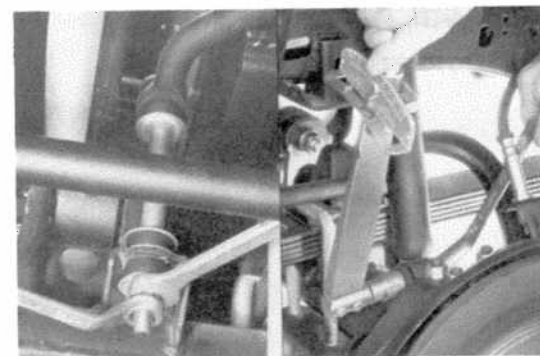
## 3. RAISE FRONT AXLE HOUSING

Raise the front axle housing with a jack until the vehicle is free from the stands.

## 4. TIGHTEN HANGER PIN AND SHACKLE PIN

Tighten the hanger pin and shackle pin mounting nuts.

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



## 5. CONNECT STABILIZER BAR TO AXLE HOUSING

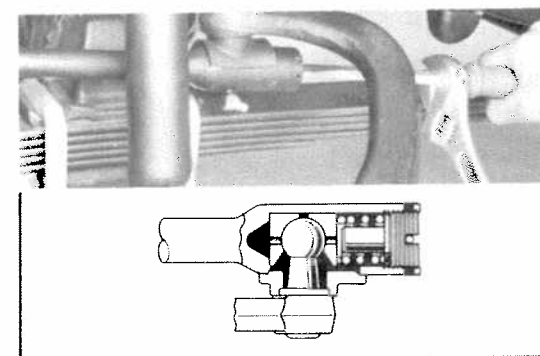
Tighten the mounting nuts.

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

## 6. CONNECT SHOCK ABSORBER TO AXLE HOUSING

Tighten the mounting bolt.

Torque: 350 – 550 kg-cm (26 – 39 ft-lb)



## 7. CONNECT DRAG LINK TO KNUCKLE ARM

- Insert the drag link on the knuckle arm.
- Install the ball stud seat, spring, spring seat and plug in the drag link end.
- Tighten the plug completely and then loosen 1-1/3 turns.
- Secure the plug with a cotter pin.

## 8. CONNECT BRAKE HOSE TO DUST COVER

- Connect the brake hose to the dust cover with the clip.
- Using a flare nut wrench\*, connect the brake tube.

\*SST 09751-36011 or Commercial wrench

