

# STEERING

	Page
PRECAUTIONS.....	SR-2
TROUBLESHOOTING .....	SR-2
ON-VEHICLE INSPECTION .....	SR-3
STEERING COLUMN ASSEMBLY (2WD) .....	SR-4
STEERING COLUMN ASSEMBLY (4WD) .....	SR-11
STEERING COLUMN ASSEMBLY WITH TILT STEERING .....	SR-18
STEERING GEAR HOUSING (2WD).....	SR-25
STEERING GEAR HOUSING (4WD).....	SR-33
POWER STEERING .....	SR-41
On-Vehicle Inspection.....	SR-41
Bleeding of Power Steering System .....	SR-43
Oil Pressure Check.....	SR-43
Power Steering Pump.....	SR-45
Gear Housing (2WD) .....	SR-54
Gear Housing (4WD) .....	SR-61
STEERING LINKAGE (2WD) .....	SR-68
Pitman Arm.....	SR-68
Tie Rod .....	SR-69
Relay Rod .....	SR-70
Knuckle Arm .....	SR-71
Steering Damper.....	SR-72
Idler Arm Bracket.....	SR-73
STEERING LINKAGE (4WD) .....	SR-75
Pitman Arm.....	SR-75
Tie Rod .....	SR-76
Steering Damper.....	SR-77
Drag Link.....	SR-78
Knuckle Arm .....	SR-78

## PRECAUTIONS

Care must be taken to replace parts properly because they can affect the performance of the steering system and result in a driving hazard.

## TROUBLESHOOTING

Problem	Possible cause	Remedy	Page
Hard steering	Tires improperly inflated	Inflate tires to proper pressure	FA-3,25
	Excessive caster	Check front end alignment	FA-3,25
	Ball joints worn	Replace ball joints	FA-13
	Steering knuckle bearing worn	Replace knuckle bearing	FA-51
	Insufficient lubricant	Lubricate suspension and steering linkage	
	Steering linkage worn or bent	Check linkage	SR-68,75
	Steering gear out of adjustment or broken	Adjust or repair steering gear	SR-3,25,54
	Power steering belt loose	Tighten belt	SR-41
	Oil level in reservoir low	Check reservoir	SR-41
	Power steering fluid foaming	Check power steering fluid	SR-41
Power steering unit faulty	Check power steering unit	SR-41	
Steering column binding	Check steering column	SR-4	
Poor return	Tire improperly inflated	Inflate tires to proper pressure	FA-3,25
	Wheel alignment incorrect	Check front end alignment	FA-3,25
	Steering column binding	Check steering column	SR-4
	Insufficient lubricant	Lubricate suspension and steering linkage	
Steering gear out of adjustment or broken	Adjust or repair steering gear	SR-3,25,54	
Excessive play	Steering linkage worn	Check linkage	SR-68,75
	Steering gear loose	Tighten gear bolts	
	Steering shaft coupling worn	Inspect coupling	
	Ball joints worn	Replace ball joint	FA-13
	Steering knuckle bearing worn	Replace knuckle bearing	FA-46
	Steering gear out of adjustment or broken	Adjust or repair steering gear	SR-3,25,54

## ON-VEHICLE INSPECTION

### STEERING WHEEL FREEPLAY

#### 1. CHECK THAT STEERING WHEEL FREEPLAY IS CORRECT

With the vehicle stopped and pointed straight ahead, rock the steering wheel gently back and forth with light finger pressure. Freeplay should not exceed the maximum limit.

**Maximum play: 30 mm (1.18 in.)**

If incorrect, adjust or repair as required.

#### 2. POINT WHEELS STRAIGHT AHEAD

#### 3. ADJUST STEERING GEAR BOX

(a) Loosen the lock nut.

(b) Turn the adjusting screw clockwise to decrease wheel freeplay and counterclockwise to increase it.

**NOTE:** Turn the adjusting screw in small increments and check the wheel freeplay between each adjustment.

#### 4. CHECK THAT STEERING DOES NOT BIND

Turn the steering wheel half way around in both directions.

Check that the freeplay is correct and steering is smooth and without rough spots.

#### 5. HOLD ADJUSTING SCREW AND TIGHTEN LOCK NUT

## OIL LEVEL

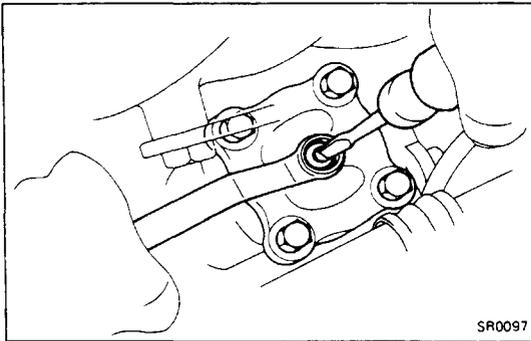
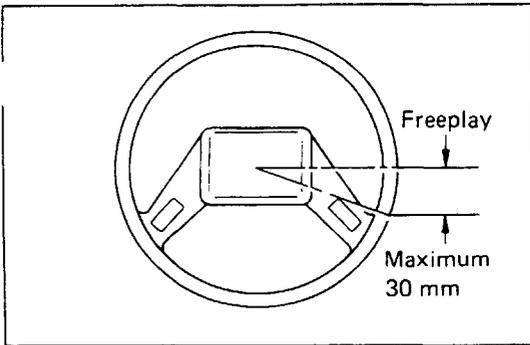
### CHECK STEERING GEAR BOX OIL LEVEL

Oil level:

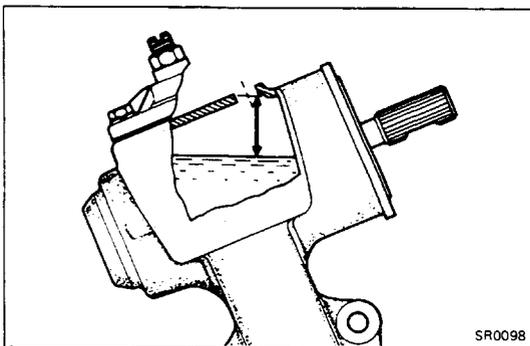
**2WD 18 – 28 mm (0.71 – 1.10 in.) from top**

**4WD 12 – 17 mm (0.47 – 0.67 in.) from top**

If low, fill with gear oil and check for oil leaks.



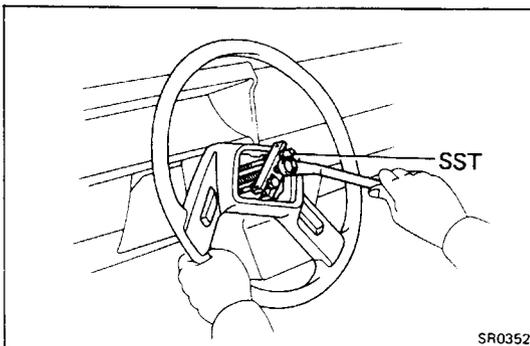
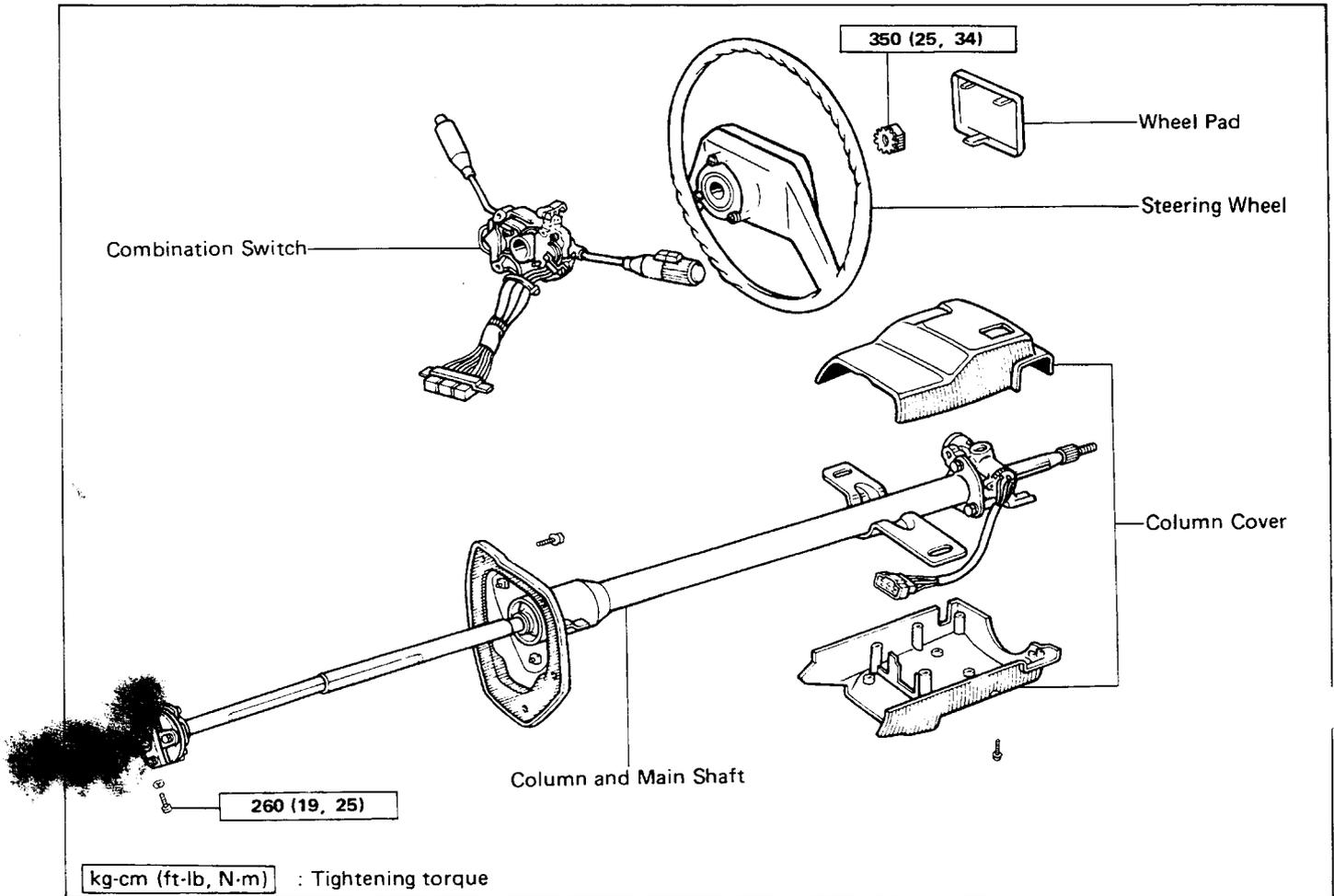
SR0097



SR0098

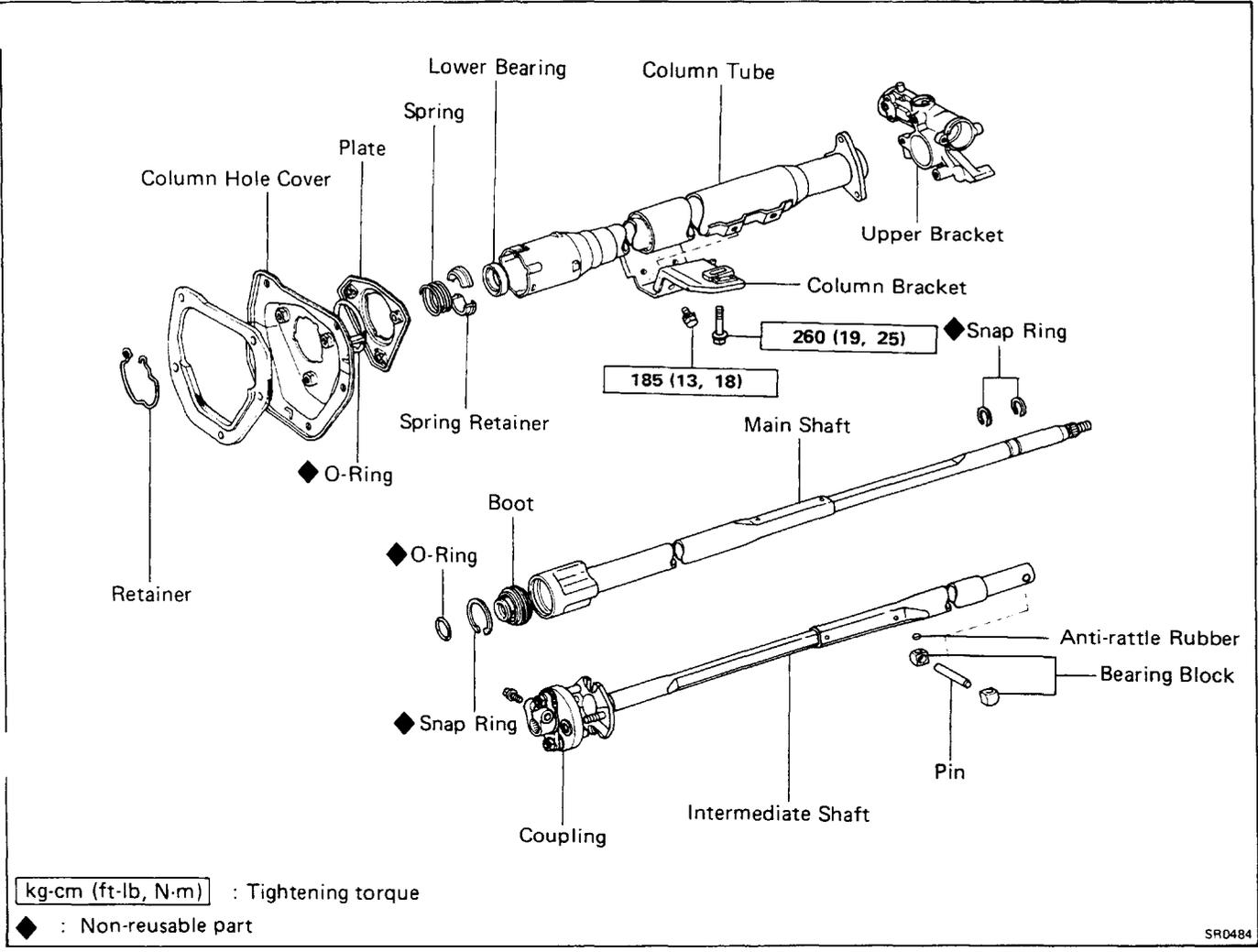
# STEERING COLUMN ASSEMBLY (2WD)

## REMOVAL OF STEERING COLUMN ASSEMBLY

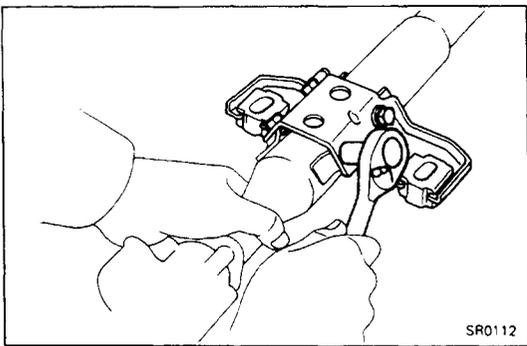


1. **DISCONNECT NEGATIVE CABLE FROM BATTERY**
2. **REMOVE COUPLING MOUNT BOLT**
3. **REMOVE STEERING WHEEL**
  - (a) Remove the steering wheel pad.
  - (b) Remove the steering wheel nut.
  - (c) Using SST, remove the steering wheel.  
SST 09609-20011
4. **REMOVE INSTRUMENT LOWER FINISH PANEL AND AIR DUCT**
5. **REMOVE COLUMN COVER AND COMBINATION SWITCH**
6. **REMOVE FIVE BOLTS FROM COLUMN HOLE COVER**
7. **REMOVE MAIN SHAFT**  
Remove the mount bolts and pull out the main shaft.

COMPONENTS



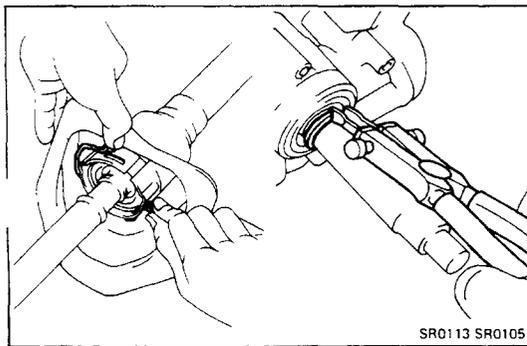
SR0484



SR0112

DISASSEMBLY OF STEERING COLUMN ASSEMBLY

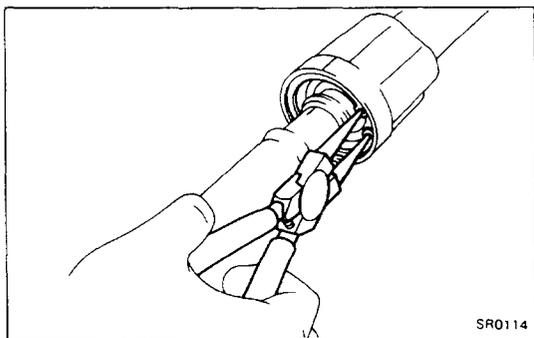
1. REMOVE STEERING COLUMN BRACKET



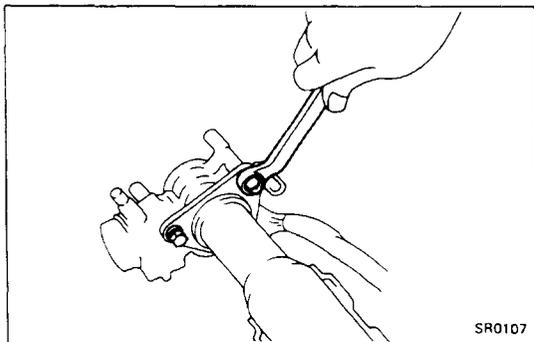
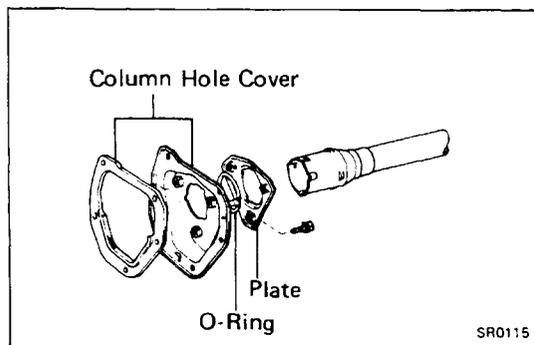
SR0113 SR0105

2. REMOVE STEERING MAIN SHAFT

- (a) Remove the retainer.
- (b) Using snap ring pliers, remove the snap ring.
- (c) Pull out the steering main shaft with intermediate shaft.

**3. REMOVE INTERMEDIATE SHAFT FROM MAIN SHAFT**

- (a) Place matchmarks on the main shaft and intermediate shaft.
- (b) Using snap ring pliers, remove the snap ring.
- (c) Pull the intermediate shaft out of the main shaft.

**4. REMOVE UPPER BRACKET FROM COLUMN TUBE****5. REMOVE COLUMN HOLE COVER FROM COLUMN TUBE**

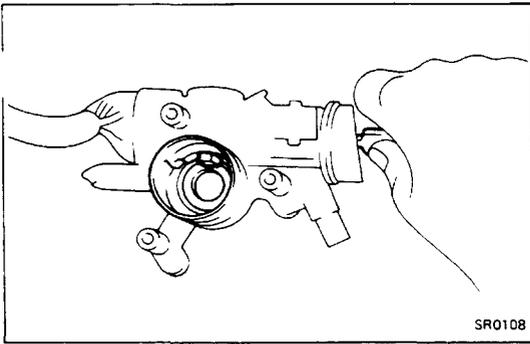
Remove the following parts from the column tube.

- (a) Column hole cover
- (b) O-ring
- (c) Plate

## INSPECTION AND REPAIR OF STEERING COLUMN ASSEMBLY

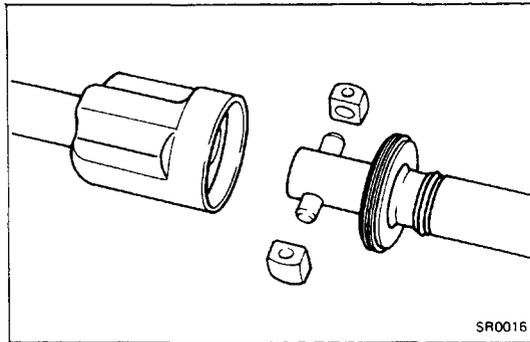
### 1. INSPECT UPPER BRACKET

- (a) Check that the steering lock mechanism operates properly.
- (b) Check the upper bearing rotation condition and check for abnormal noise.  
If the bearing is worn or damaged, replace the upper bracket.



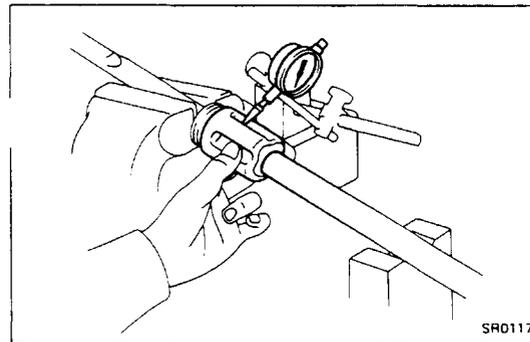
### 2. INSPECT TRUNNION JOINT

- (a) Check the joint parts for wear or damage.



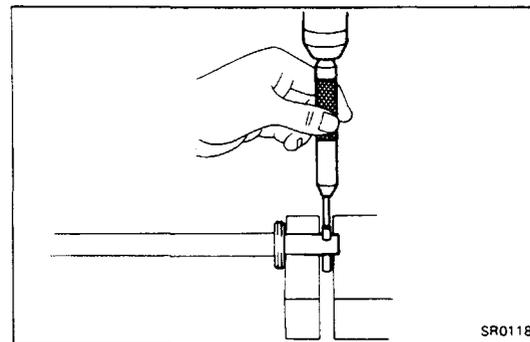
- (b) Temporarily assemble the joint and measure the joint radial play with a dial indicator.

**Maximum radial play: 0.06 mm (0.0024 in.)**

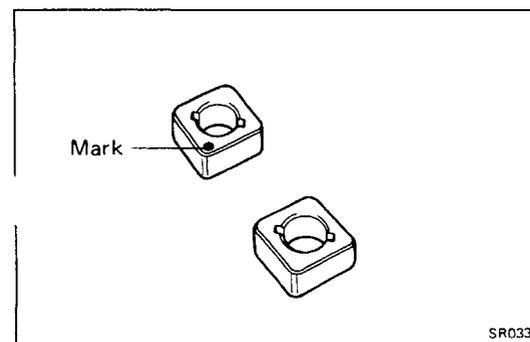


### 3. IF NECESSARY, REPLACE TRUNNION JOINT PARTS

- (a) Using a press, remove the pin from the intermediate shaft.
- (b) Replace the boot with a new one.
- (c) Using a press, install the pin to the shaft until both protrusions are equal.

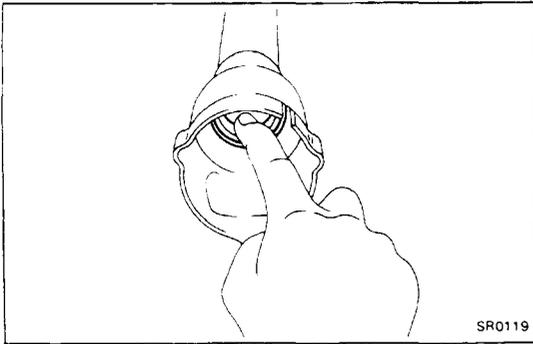


- (d) Select a bearing block that will allow minimum radial play.



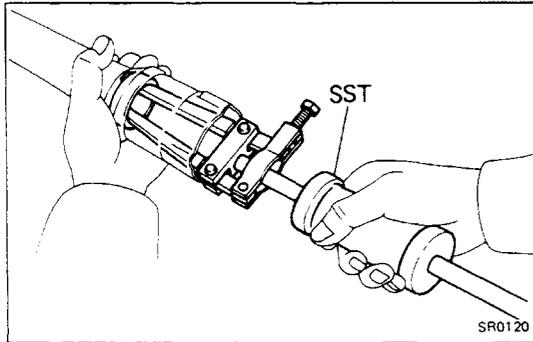
Bearing block width

Punch mark	width	mm (in.)
Yes	15.97 — 16.00	(0.6287 — 0.6299)
No	16.00 — 16.03	(0.6299 — 0.6311)



#### 4. INSPECT MAIN SHAFT LOWER BEARING

Check the lower bearing for wear or damage.

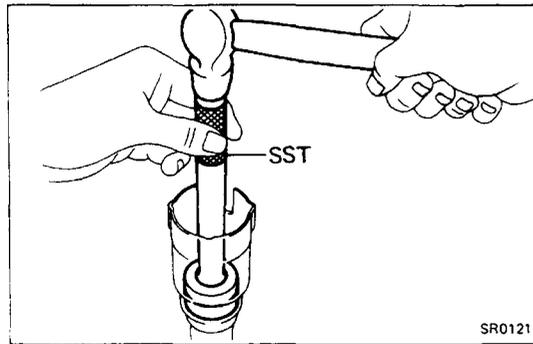


#### 5. IF NECESSARY, REPLACE MAIN SHAFT LOWER BEARING

(a) Using SST, remove the lower bearing from the column tube.

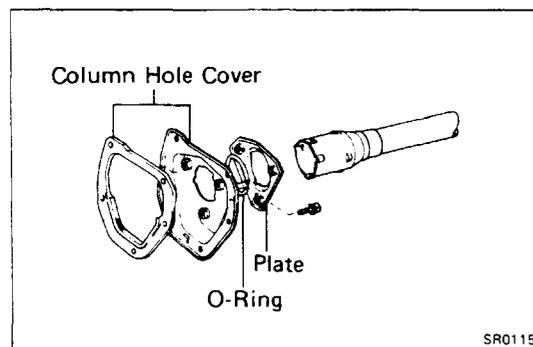
SST 09308-00010

(b) Pack a new bearing with MP grease.



(c) Using SST, tap in a new bearing.

SST 09620-30010



### ASSEMBLY OF STEERING COLUMN ASSEMBLY

(See page SR-5)

#### 1. INSTALL COLUMN HOLE COVER TO COLUMN TUBE

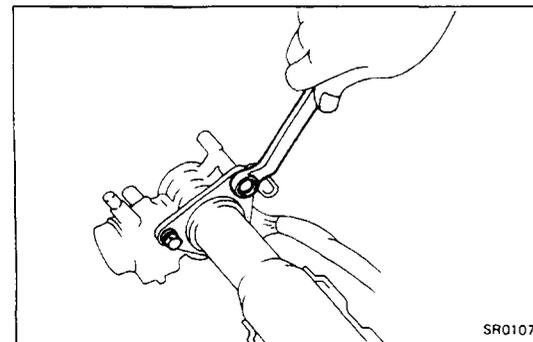
Install the following parts on the column tube.

(a) Plate

(b) O-ring

(c) Column hole cover

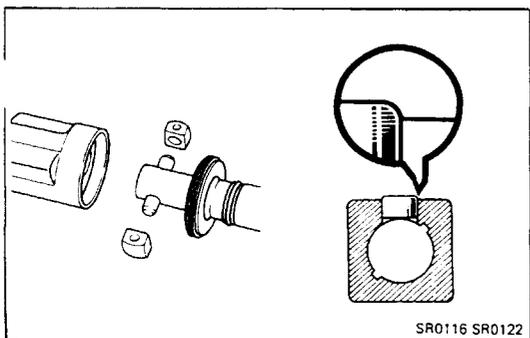
NOTE: Align the protrusion so that it fits into the column tube groove.



#### 2. INSTALL UPPER BRACKET TO COLUMN TUBE

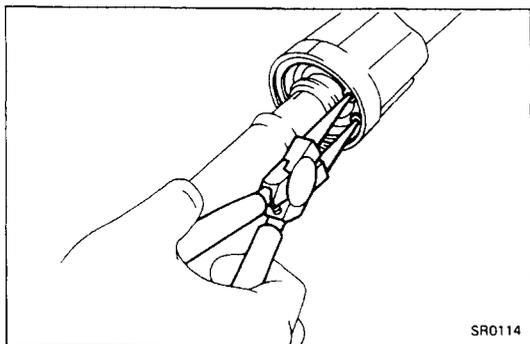
Install the upper bracket and torque the bolts.

Torque: 55 kg-cm (48 in.-lb, 5.4 N·m)



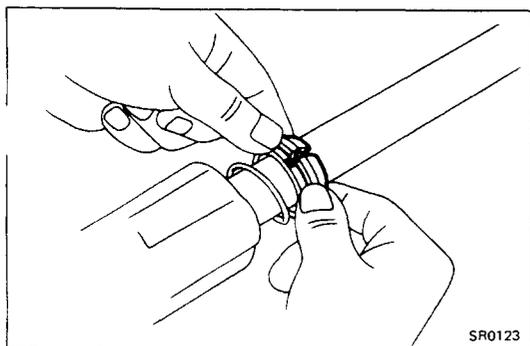
**3. INSTALL INTERMEDIATE SHAFT TO MAIN SHAFT**

- (a) Pack MP grease on the bearing blocks and inner main shaft housing.
- (b) Install the bearing blocks on the intermediate shaft.
- (c) Insert the anti-rattle rubbers in the bearing blocks with the chamfered edge facing outward.



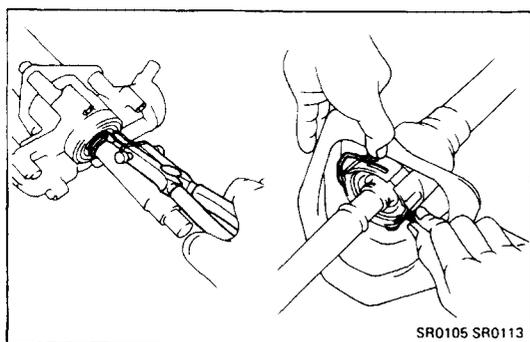
- (d) Align the matchmarks on the intermediate shaft and main shaft.
- (e) Insert the intermediate shaft in the main shaft housing with the anti-rattle rubbers positioned at right angle to the shaft and both facing same direction.
- (f) Push in the boot and install the snap ring with snap ring pliers.

**4. INSTALL SPRING AND SPRING RETAINER TO MAIN SHAFT**



**5. INSERT MAIN SHAFT IN COLUMN TUBE**

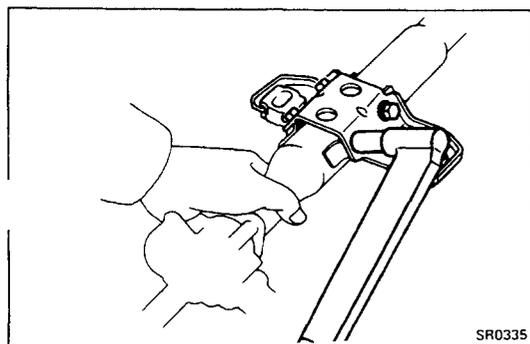
Push the main shaft into the column tube.



**6. INSTALL SNAP RING**

Using snap ring pliers, install the snap ring.

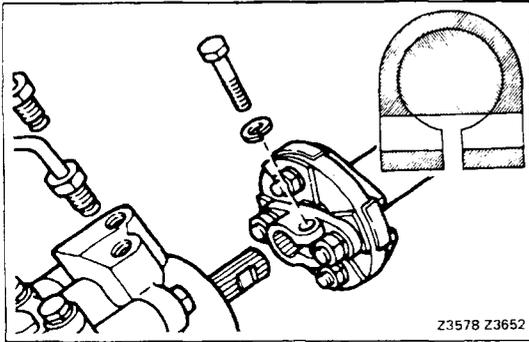
**7. INSTALL RETAINER**



**8. INSTALL COLUMN TUBE BRACKET**

Tighten the column tube bracket mount bolts.

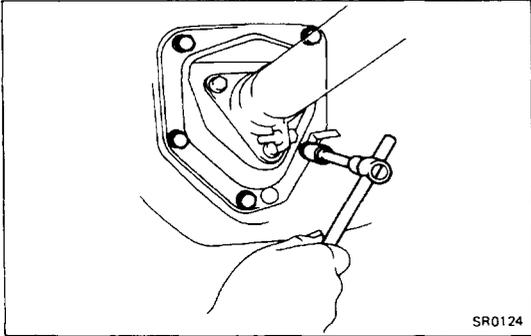
**Torque: 195 kg-cm (14 ft-lb, 19 N·m)**



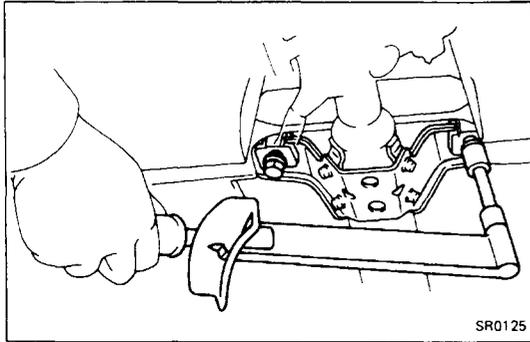
## INSTALLATION OF STEERING COLUMN ASSEMBLY

(See page SR-4)

1. PLACE COLUMN AND MAIN SHAFT IN INSTALLED POSITION
2. INSTALL COUPLING ON WORM SHAFT  
Line up the marks on the coupling and worm shaft.
3. INSTALL COLUMN BRACKET MOUNT BOLTS BY HAND

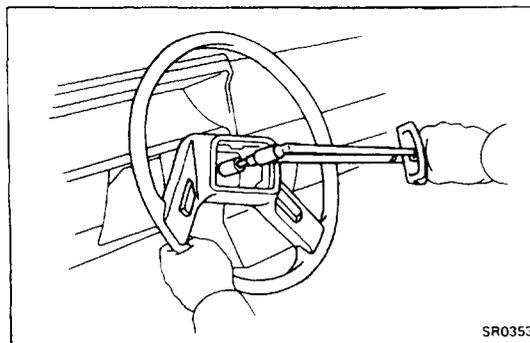


4. INSTALL STEERING COLUMN HOLE COVER  
Torque the five bolts.  
Torque: 75 kg-cm (65 in.-lb, 7.4 N·m)



5. TORQUE TWO COLUMN BRACKET MOUNT BOLTS  
Torque: 260 kg-cm (19 ft-lb, 25 N·m)
6. INSTALL COUPLING MOUNT BOLT  
Install and torque the coupling mount bolt.  
Torque: 260 kg-cm (19 ft-lb, 25 N·m)

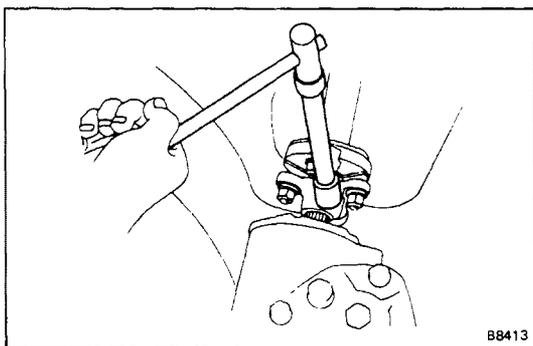
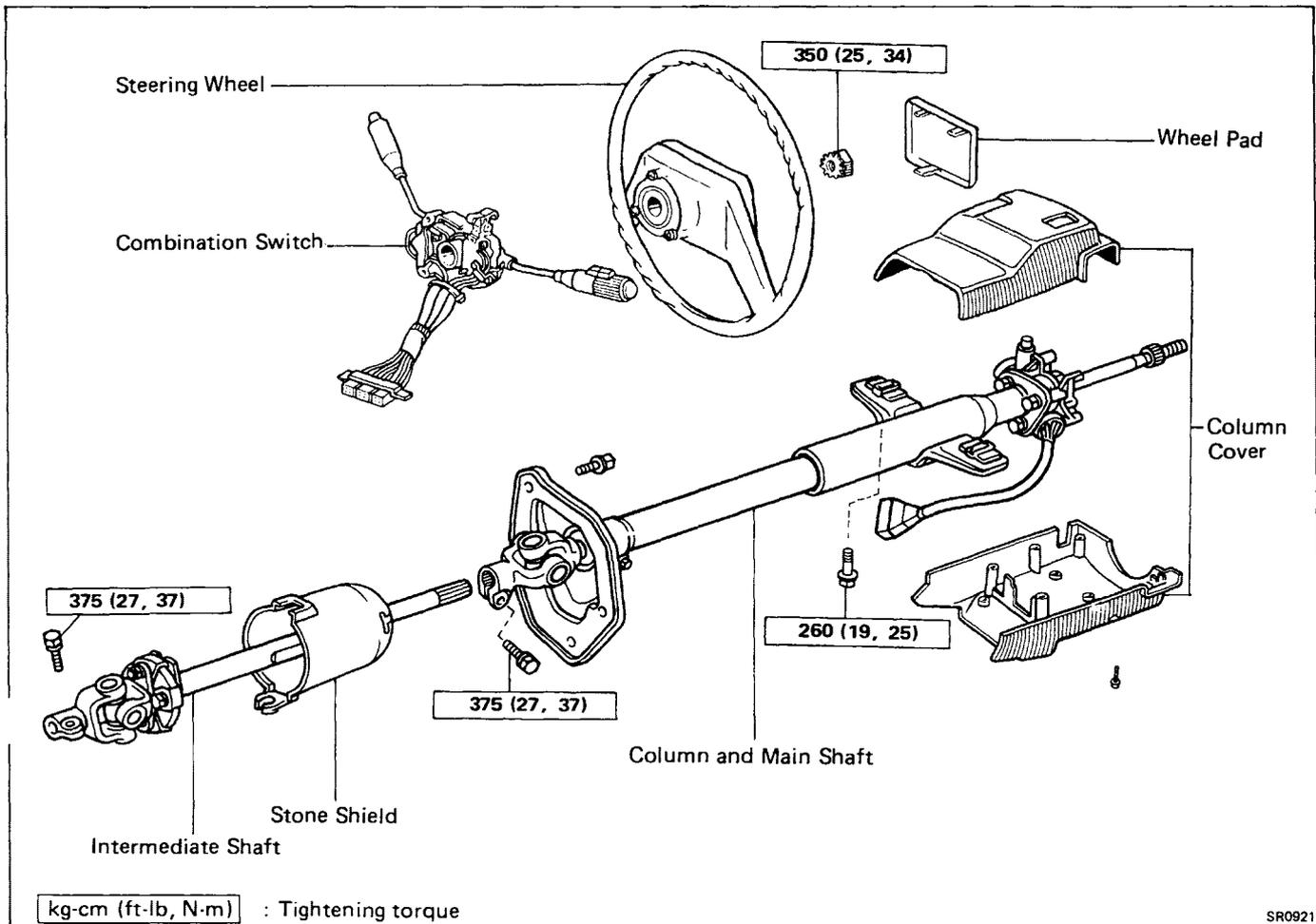
7. INSTALL COMBINATION SWITCH AND COLUMN COVER
8. INSTALL AIR DUCT AND INSTRUMENT LOWER FINISH PANEL



9. INSTALL STEERING WHEEL
  - (a) Position the front wheels straight ahead and install the steering wheel in neutral position.
  - (b) Torque the nut.  
Torque: 350 kg-cm (25 ft-lb, 34 N·m)
  - (c) Install the steering wheel pad.
10. CONNECT NEGATIVE CABLE TO BATTERY

# STEERING COLUMN ASSEMBLY(4WD)

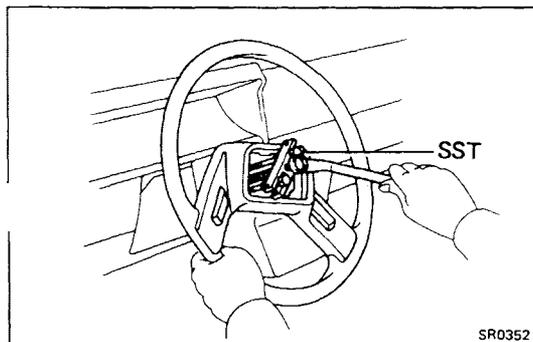
## REMOVAL OF STEERING COLUMN ASSEMBLY



**1. DISCONNECT NEGATIVE CABLE FROM BATTERY**

**2. REMOVE INTERMEDIATE SHAFT**

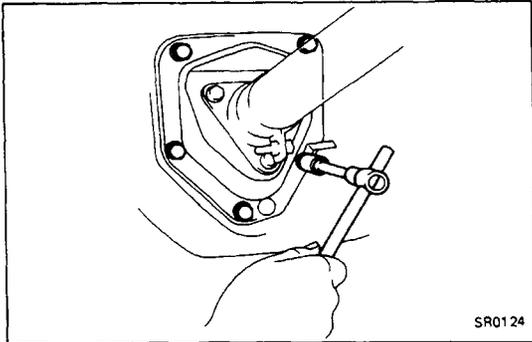
- (a) Remove the stone shield from the gear housing.
- (b) Place matchmarks on the joint yoke and worm shaft.
- (c) Remove the two mount bolts.
- (d) First pull the intermediate shaft from the gear housing, and then pull it out from the main shaft.



**3. REMOVE STEERING WHEEL**

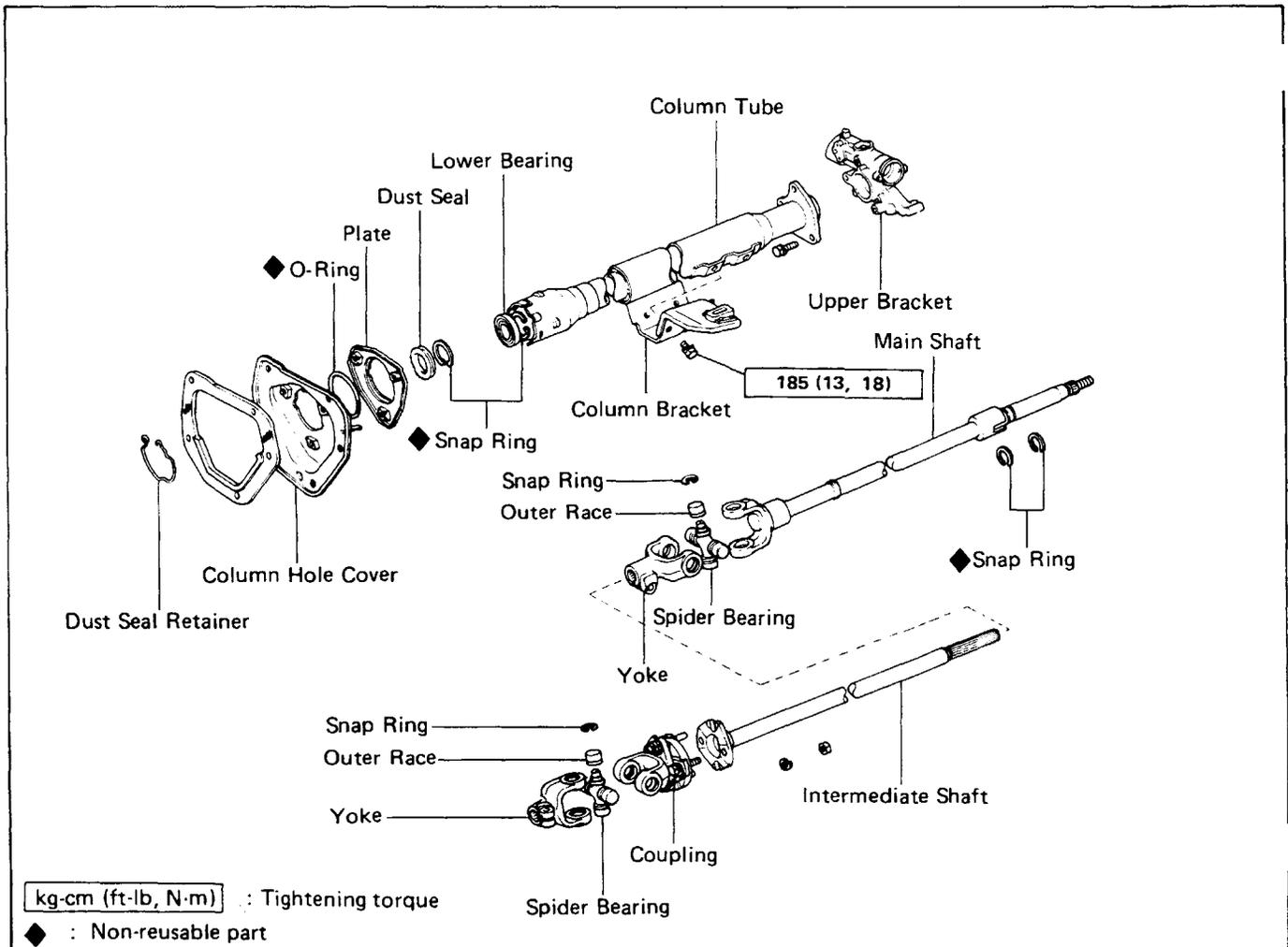
- (a) Remove the steering wheel pad.
  - (b) Remove the steering wheel nut.
  - (c) Using SST, remove the steering wheel.
- SST 09609-20011

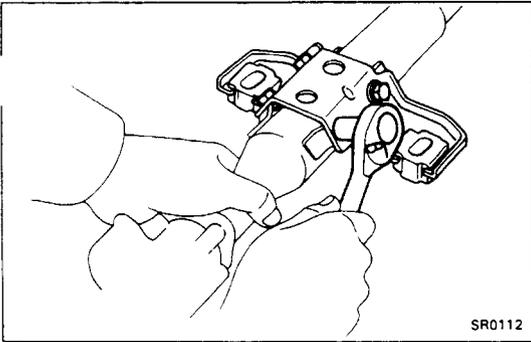
4. REMOVE INSTRUMENT LOWER FINISH PANEL AND AIR DUCT
5. REMOVE COLUMN COVER AND COMBINATION SWITCH



6. REMOVE FIVE BOLTS FROM COLUMN HOLE COVER
7. REMOVE MAIN SHAFT
  - (a) Remove the mount bolts.
  - (b) Pull out the main shaft.

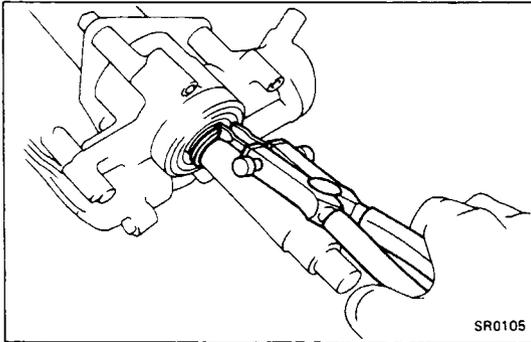
### COMPONENTS





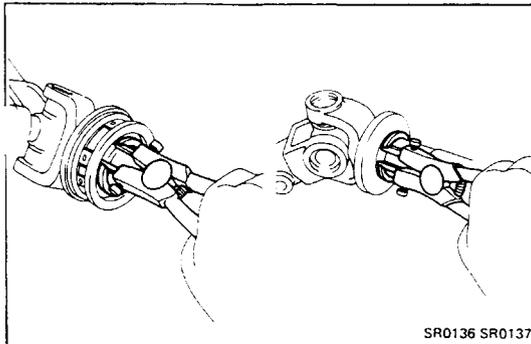
**DISASSEMBLY OF STEERING COLUMN ASSEMBLY**

**1. REMOVE STEERING COLUMN BRACKET**



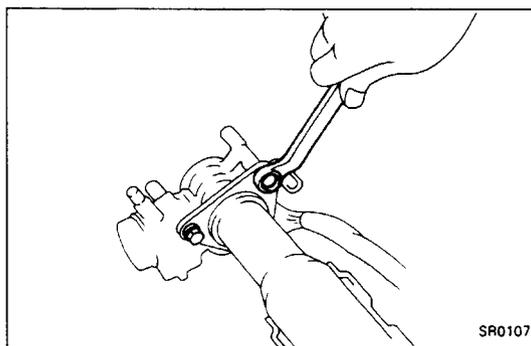
**2. REMOVE STEERING MAIN SHAFT**

- (a) Using snap ring pliers, remove the snap ring.
- (b) Remove the dust seal retainer.
- (c) Pull out the main shaft.

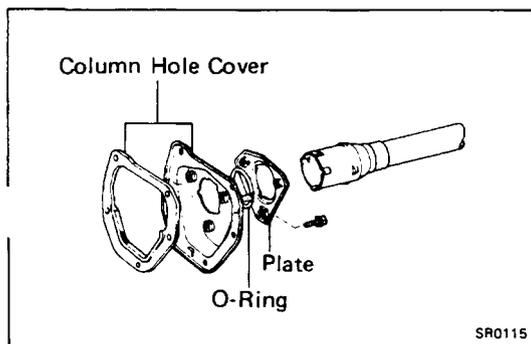


**3. REMOVE LOWER BEARING AND DUST SEAL**

- (a) Using snap ring pliers, remove the snap ring.
- (b) Pull out the lower bearing from the main shaft.
- (c) Remove the other snap ring.
- (d) Remove the dust seal.



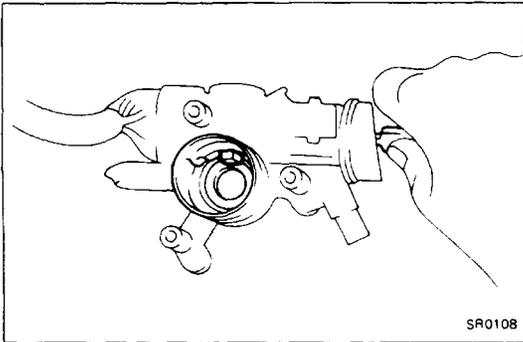
**4. REMOVE UPPER BRACKET FROM COLUMN TUBE**



**5. REMOVE COLUMN HOLE COVER FROM COLUMN TUBE**

Remove the following parts from the column tube.

- (a) Column hole cover
- (b) O-ring
- (c) Plate



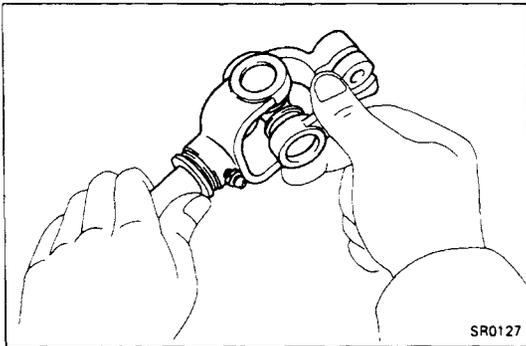
## INSPECTION AND REPAIR OF STEERING COLUMN ASSEMBLY

### 1. INSPECT UPPER BRACKET

- (a) Check that the steering lock mechanism operates properly.
  - (b) Check the upper bearing rotation condition and check for abnormal noise.
- If the bearing is worn or damaged, replace the upper bracket.

### 2. INSPECT LOWER BEARING

- Check the lower bearing for wear or damage.  
If the bearing is worn or damaged, replace it.

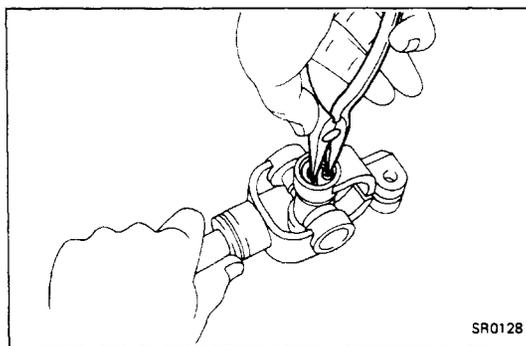


### 3. INSPECT SPIDER BEARINGS

- (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.

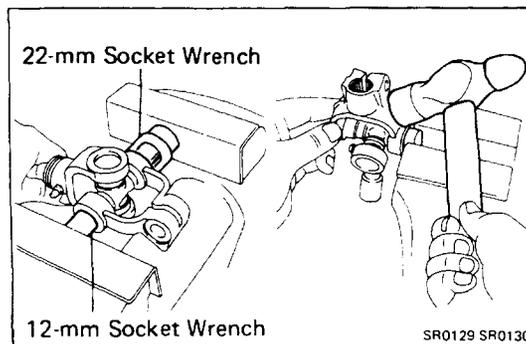
**Bearing axial play: Less than 0.05 mm (0.0020 in.)**

If necessary, replace the spider bearing.



### 4. IF NECESSARY, REPLACE SPIDER BEARING

- (a) Using needle-nose pliers, remove the four snap rings.



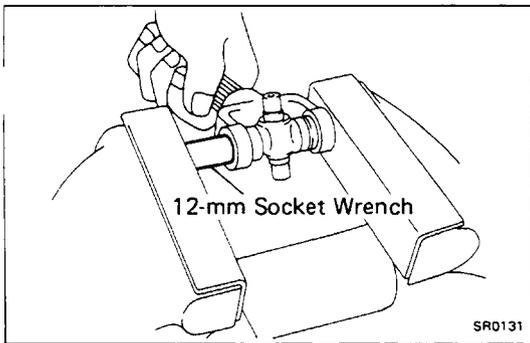
- (b) Using a 12-mm and 22-mm socket wrench and vise, press out the yoke side outer race.

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

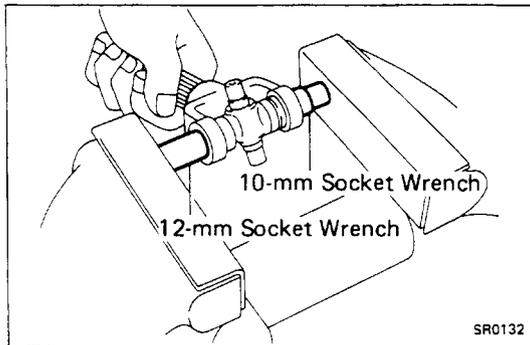
**NOTE:** Remove the other bearing races in the same procedure.

- (d) Apply molybdenum disulphide lithium base grease to the spider and bearings.

**NOTE:** Be careful not to apply too much grease.



- (e) Using a 12-mm socket wrench and vise, press the bearing outer race.



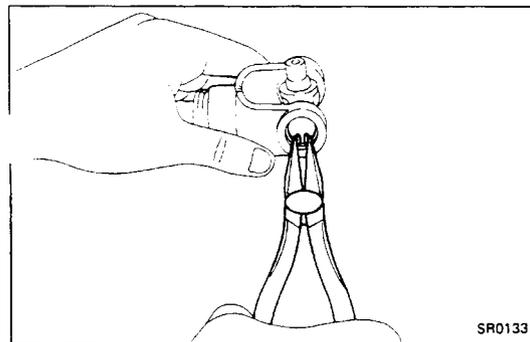
- (f) Using a 10-mm and 12-mm socket wrench, adjust both bearings so that the snap ring grooves are at maximum and equal widths.

- (g) Select two snap rings with the same thickness, which will allow 0 – 0.05 mm (0 – 0.0020 in.) axial play.

NOTE: Do not reuse the snap rings.

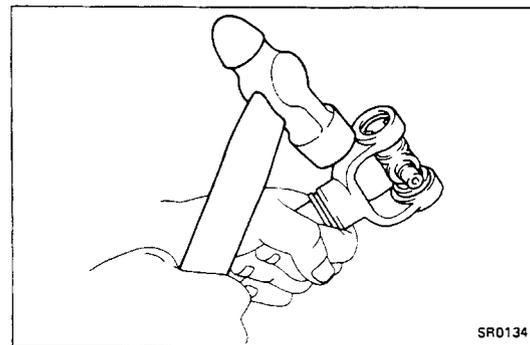
Thickness of snap ring

Mark	Thickness	mm (in.)
None	1.175 – 1.225	(0.0463 – 0.0482)
Brown	1.225 – 1.275	(0.0482 – 0.0502)
Blue	1.275 – 1.325	(0.0502 – 0.0522)



- (h) Using needle-nose pliers, install the snap rings.

NOTE: Install the bearing outer races in the yoke side in the same procedure.



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

- (j) Check the spider bearing.

- Check that the spider bearing moves smoothly.
- Check the spider bearing axial play.

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

**ASSEMBLY OF STEERING COLUMN ASSEMBLY**

(See page SR-12)

**1. INSTALL COLUMN HOLE COVER ON COLUMN TUBE**

Install the following parts on the column tube.

- (a) Plate
- (b) O-ring
- (c) Column hole cover

NOTE: Align the protrusion so that it fits into the column tube groove.

**2. INSTALL UPPER BRACKET TO COLUMN TUBE**

Install the upper bracket and the bolts.

Torque: 55 kg-cm (48 in-lb, 5.4 N·m)

**3. INSTALL DUST SEAL AND LOWER BEARING TO MAIN SHAFT**

- (a) Apply MP grease to the main shaft and install the dust seal.
- (b) Using snap ring pliers, install the snap ring.
- (c) Install the lower bearing to the main shaft.
- (d) Using snap ring pliers, install the snap ring.

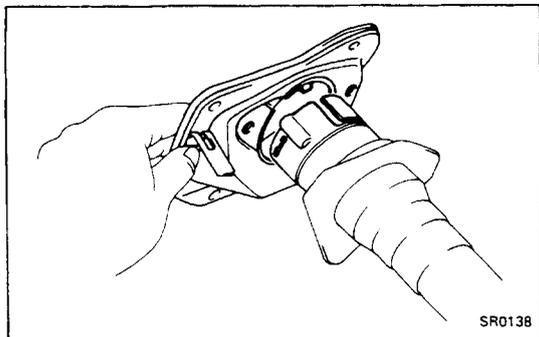
**4. INSTALL MAIN SHAFT TO COLUMN TUBE**

- (a) Insert the main shaft in the column tube.
- (b) Install the dust seal retainer to the column tube.
- (c) Using snap ring pliers, install the snap ring.

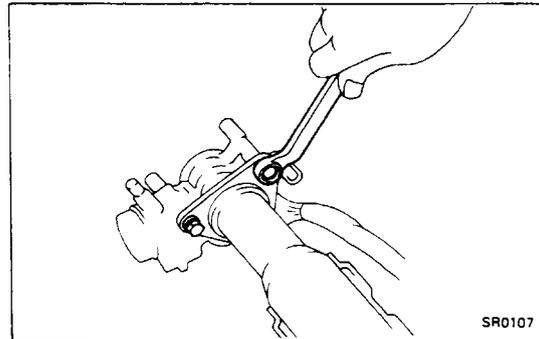
**5. INSTALL COLUMN TUBE BRACKET**

Torque the four mount bolts.

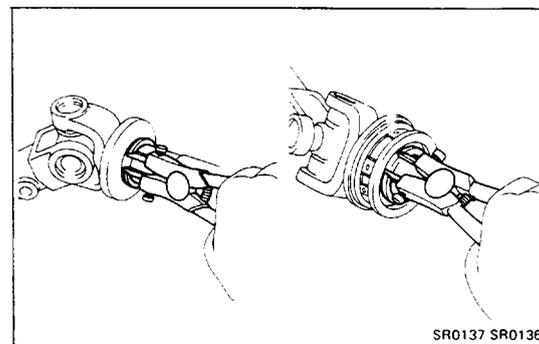
Torque: 195 kg-cm (14 ft-lb, 19 N·m)



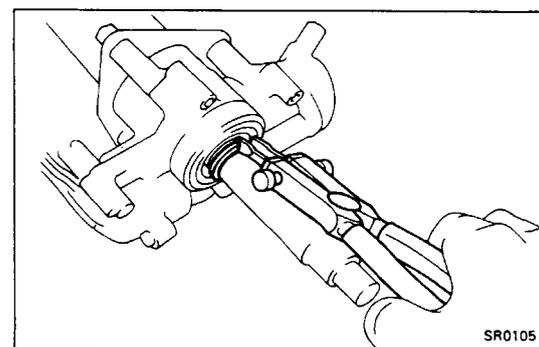
SR0138



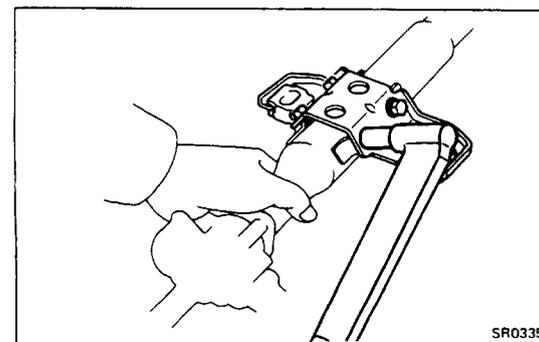
SR0107



SR0137 SR0136



SR0105

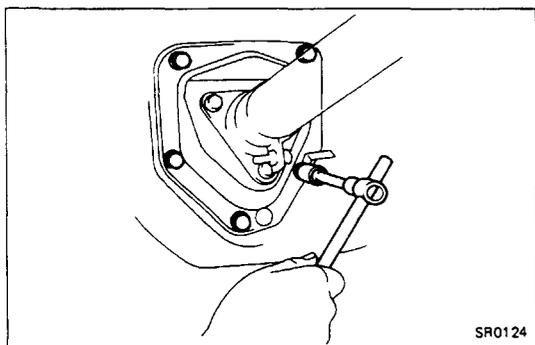


SR0335

## INSTALLATION OF STEERING COLUMN ASSEMBLY

(See page SR-11)

1. PLACE COLUMN AND MAIN SHAFT IN INSTALLED POSITION
2. INSTALL COLUMN BRACKET MOUNT BOLTS BY HAND



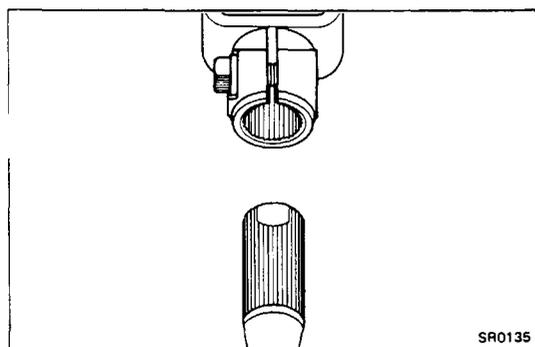
3. INSTALL STEERING COLUMN HOLE COVER

Torque the five bolts.

Torque: 75 kg-cm (65 in.-lb, 7.4 N·m)

4. TORQUE TWO COLUMN BRACKET MOUNT BOLTS

Torque: 260 kg-cm (19 ft-lb, 25 N·m)



5. INSTALL INTERMEDIATE SHAFT

(a) Align the non-toothed portions of the intermediate shaft and the joint yoke.

(b) Insert the intermediate shaft in the joint yoke.

(c) Align the matchmarks on the intermediate shaft and worm shaft.

(d) Torque the coupling mount bolt.

Torque: 375 kg-cm (27 ft-lb, 37 N·m)

(e) Torque the joint yoke bolt.

Torque: 375 kg-cm (27 ft-lb, 37 N·m)

(f) Install the stone shield to the gear housing.

6. INSTALL COMBINATION SWITCH AND COLUMN COVER

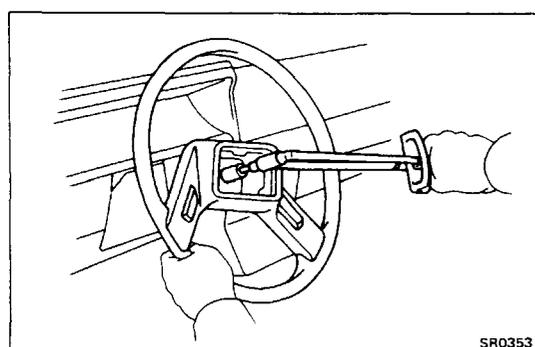
7. INSTALL AIR DUCT AND LOWER FINISH PANEL

8. INSTALL STEERING WHEEL

(a) Torque the mount nut.

Torque: 350 kg-cm (25 ft-lb, 34 N·m)

(b) Install the steering wheel pad.



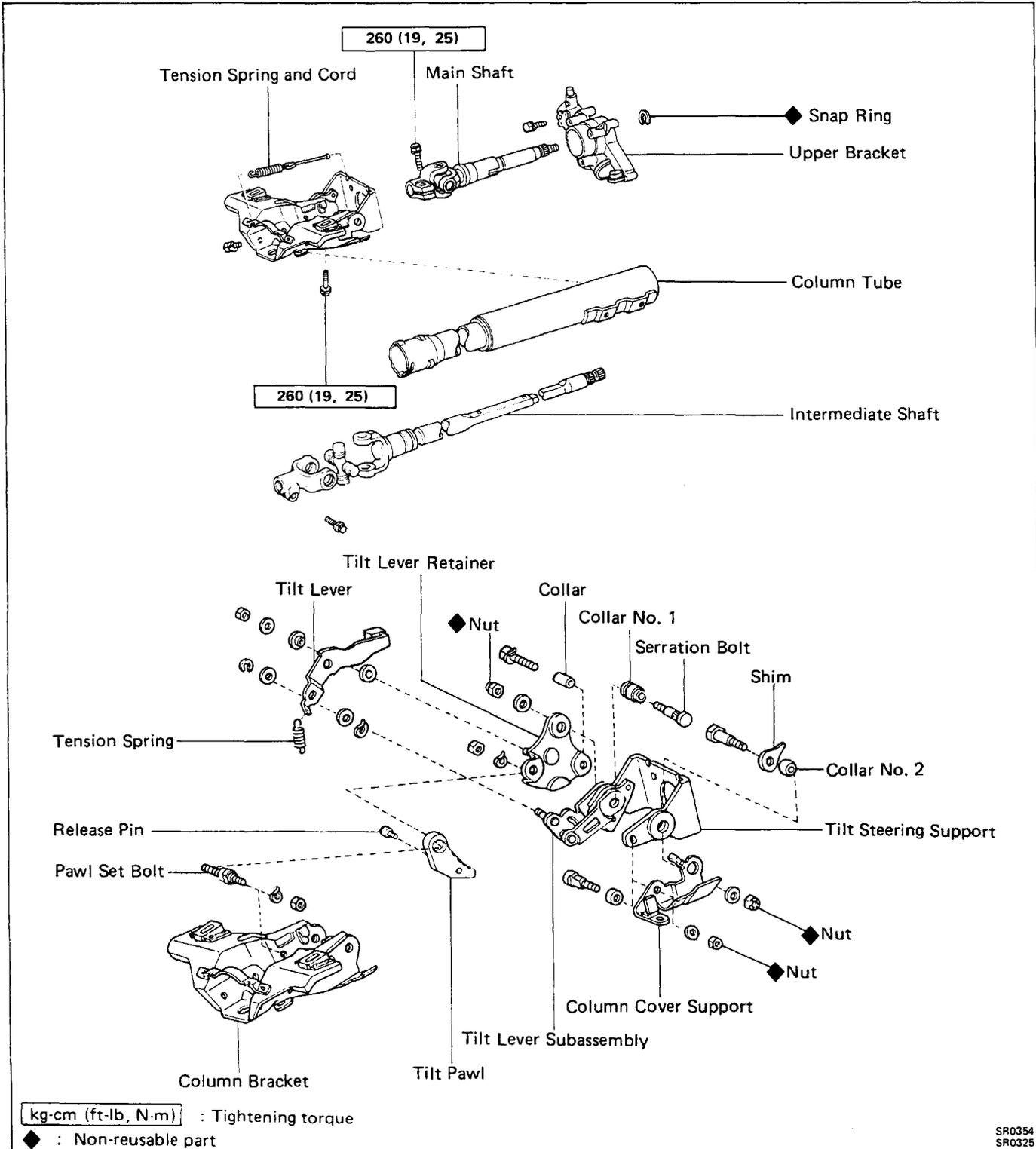
9. CONNECT NEGATIVE CABLE TO BATTERY

# STEERING COLUMN ASSEMBLY WITH TILT STEERING

## REMOVAL OF STEERING COLUMN ASSEMBLY

(See page SR-4 or SR-11)

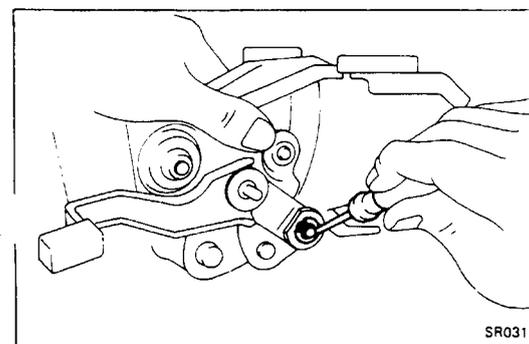
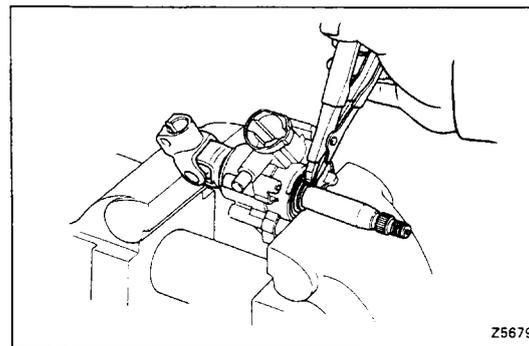
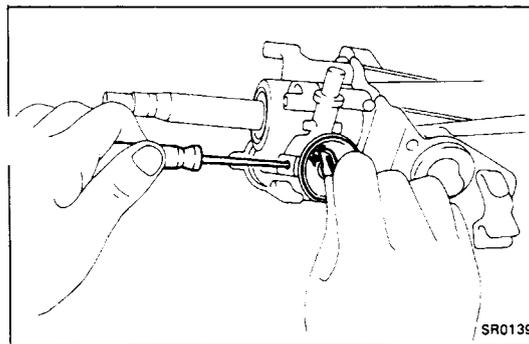
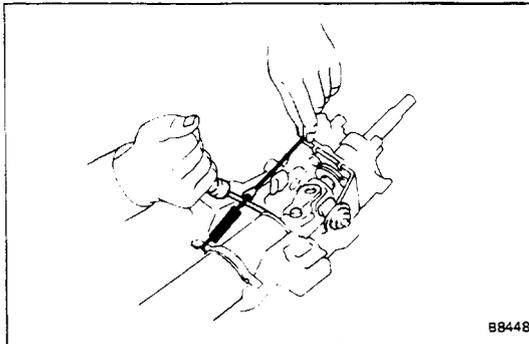
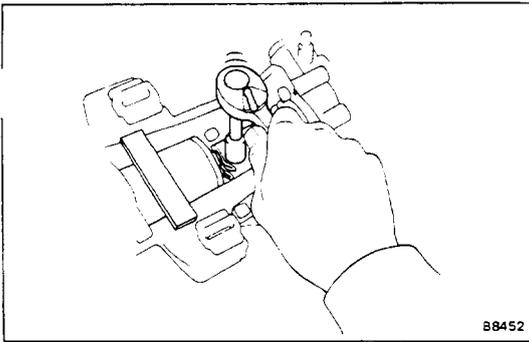
### COMPONENTS

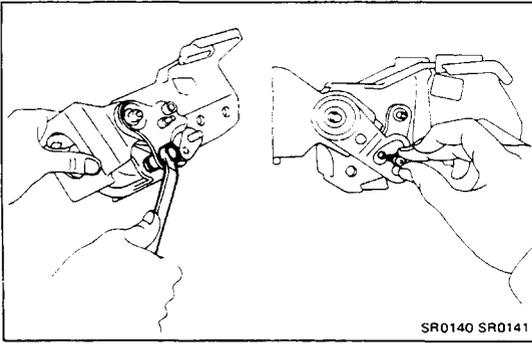


## DISASSEMBLY OF STEERING COLUMN ASSEMBLY AND TILT MECHANISM

(See page SR-18)

1. **DISCONNECT INTERMEDIATE SHAFT FROM MAIN SHAFT**
  - (a) Place matchmarks on the intermediate shaft and universal joint.
  - (b) Remove the bolt.
  - (c) Remove the dust seal retainer.
  - (d) Pull out the intermediate shaft from the main shaft.
2. **REMOVE TENSION SPRINGS AND CORDS**
  - (a) Fully tilt the main shaft upward.
  - (b) Release the cord from the hook.
  - (c) Using a screwdriver, pry out the cord tip and remove the spring and cord.
3. **REMOVE COLUMN TUBE FROM COLUMN BRACKET**
4. **REMOVE IGNITION KEY CYLINDER**
  - (a) Place the ignition key at the ACC position.
  - (b) Push down the stop key with a thin rod, and pull out the key cylinder.
5. **REMOVE UPPER BRACKET WITH MAIN SHAFT FROM COLUMN BRACKET**
6. **REMOVE IGNITION SWITCH**
7. **REMOVE MAIN SHAFT FROM UPPER BRACKET**
  - (a) Using a soft jaws vise and snap ring pliers, remove the snap ring.
  - (b) Pull out the main shaft from the bracket.
8. **REMOVE TILT LEVER**
  - (a) Remove the tension spring.
  - (b) Remove the E-ring and bushing.
  - (c) Remove the nut, plate washer and nylon bushing.
  - (d) Remove the lever, bushing, wave washer and nylon bushing.

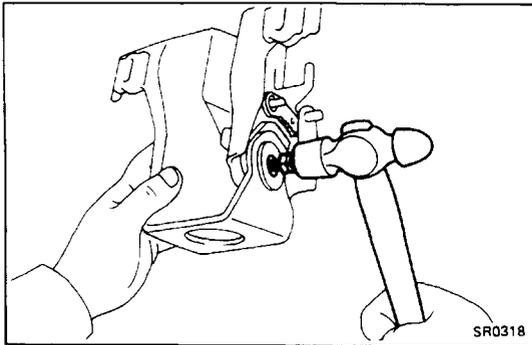




SR0140 SR0141

**9. REMOVE TILT LEVER RETAINER**

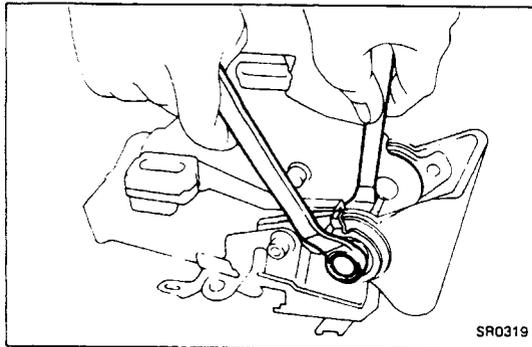
- (a) Remove the bolt, two nuts and two washers.
- (b) Remove the lever retainer and collar.

**10. REMOVE RELEASE PIN**

SR0318

**11. REMOVE SERRATION BOLT**

Temporarily install another nut flat with the end of the bolt and tap it in with a hammer.

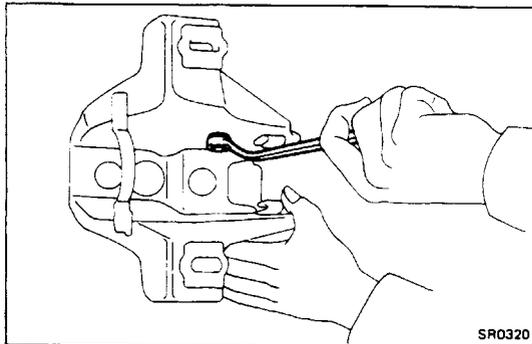
**12. REMOVE TILT PAWL**

SR0319

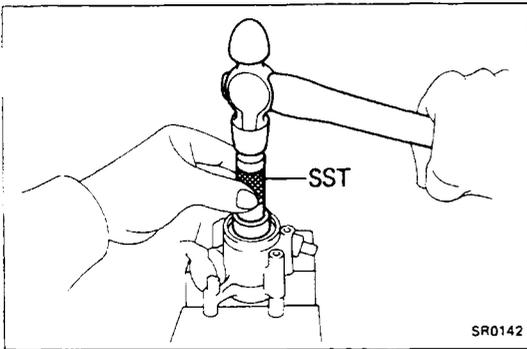
**13. REMOVE COLUMN COVER SUPPORT**

Remove the following parts:

- (a) Nuts
- (b) Bolts
- (c) Collars
- (d) Washers
- (e) Shim

**14. REMOVE TILT STEERING SUPPORT WITH TILT LEVER SUBASSEMBLY****15. REMOVE PAWL SET BOLT**

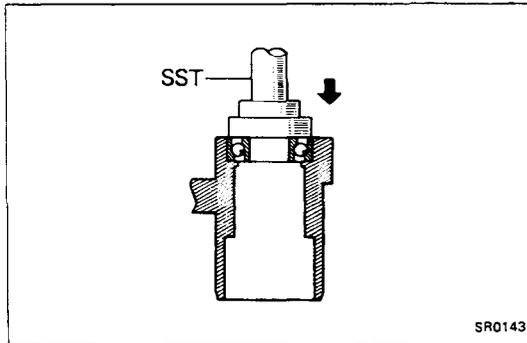
SR0320



## INSPECTION AND REPAIR OF STEERING COLUMN ASSEMBLY

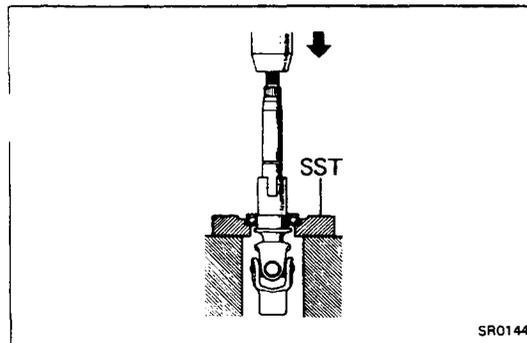
### 1. IF NECESSARY, REPLACE BEARING IN UPPER BRACKET

- (a) Using a hammer and SST, remove the bearing.  
SST 09620-30010



- (b) Pack MP grease into the bearing.

- (c) Using a hammer and SST, drive the bearing into the bracket.  
SST 09620-30010

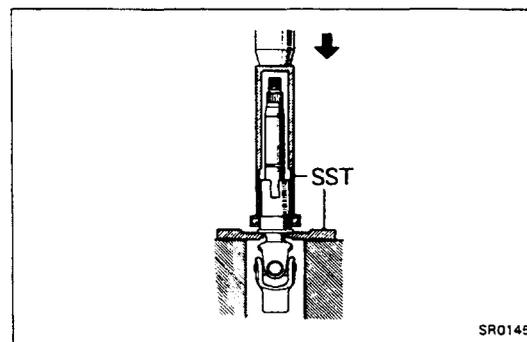


### 2. IF NECESSARY, REPLACE LOWER BEARING

- (a) Using a press and SST, remove the lower bearing from the main shaft.  
SST 09527-20011

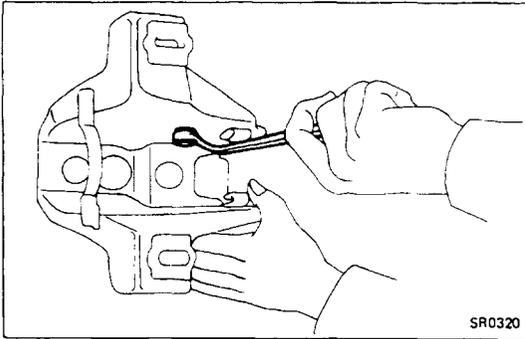
SST 09527-20011

- (b) Pack MP grease into the bearing.



- (c) Using a press and SST, assemble the lower bearing and main shaft.

SST 09236-00101 and 09612-22011



SR0320

## ASSEMBLY OF STEERING COLUMN ASSEMBLY AND TILT MECHANISM

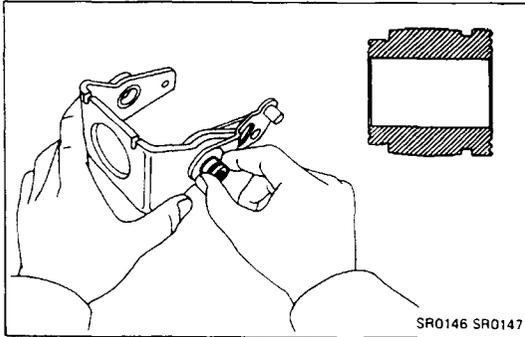
(See page SR-18)

### 1. APPLY MP GREASE TO ALL RUBBING PARTS

### 2. INSTALL PAWL SET BOLT

Install the bolt and torque the nut.

Torque: 185 kg-cm (13 ft-lb, 18 N·m)



SR0146 SR0147

### 3. ASSEMBLE TILT LEVER SUBASSEMBLY, COLLAR NO.1 AND NO.2

(a) Select a collar No.1 which will eliminate all play.

Collar No.1 outer diameter

Outer diameter	mm (in.)
17.989 – 17.996	(0.7082 – 0.7085)
17.996 – 18.003	(0.7085 – 0.7088)
18.003 – 18.010	(0.7088 – 0.7091)
18.010 – 18.017	(0.7091 – 0.7093)
18.017 – 18.024	(0.7093 – 0.7096)

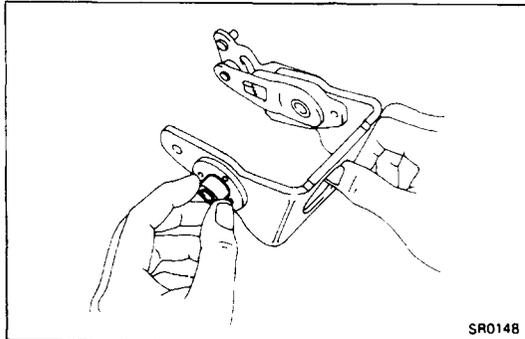
(b) Install the tilt lever subassembly and collar No.1 to the support.

(c) Select a collar No.2 which will eliminate all play.

Collar No.2 outer diameter

Outer diameter	mm (in.)
17.982 – 18.000	(0.7080 – 0.7087)
18.000 – 18.018	(0.7087 – 0.7094)

(d) Install collar No.2 to the support.



SR0148

### 4. INSTALL TILT PAWL

### 5. INSTALL TILT STEERING SUPPORT TO COLUMN BRACKET

Install the tilt steering support to the column bracket and drive in the serration bolt.

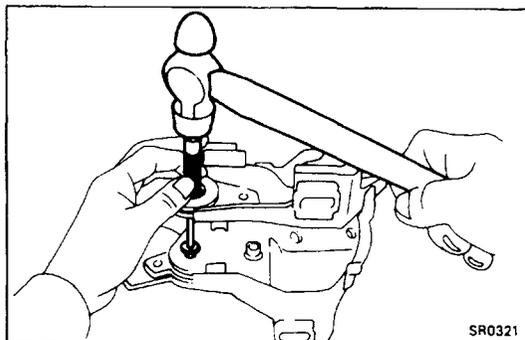
### 6. INSTALL SHIM AND BOLT

(a) Select a shim which fits snugly when pressed in by hand.

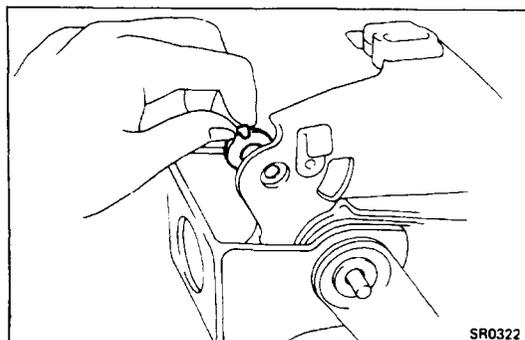
Shim thickness

Thickness	mm (in.)
0.2	(0.008)
0.5	(0.020)
0.8	(0.031)
1.4	(0.055)
1.8	(0.071)

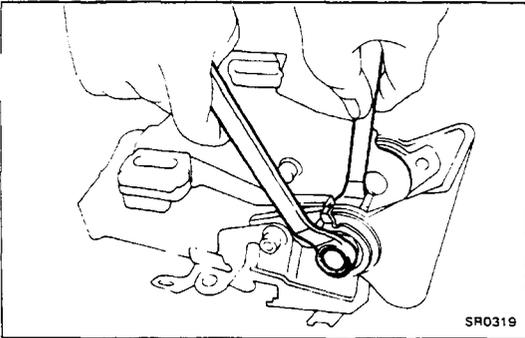
(b) Install the shim and bolt.



SR0321

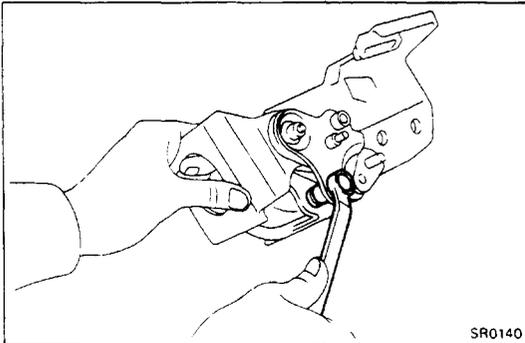


SR0322

**7. INSTALL COLUMN COVER SUPPORT**

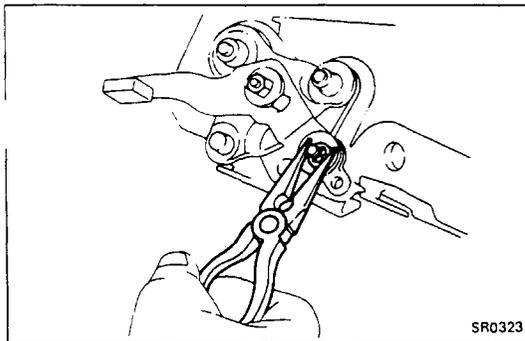
Install the following parts:

- (a) Column cover support
- (b) Bolt and collar
- (c) Washers and nuts

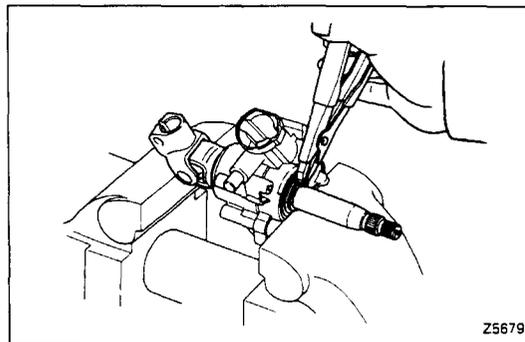
**8. INSTALL RELEASE PIN TO TILT PAWL****9. INSTALL TILT LEVER RETAINER**

- (a) Install the collar and lever retainer.
- (b) Install the bolt, two nuts and washers.

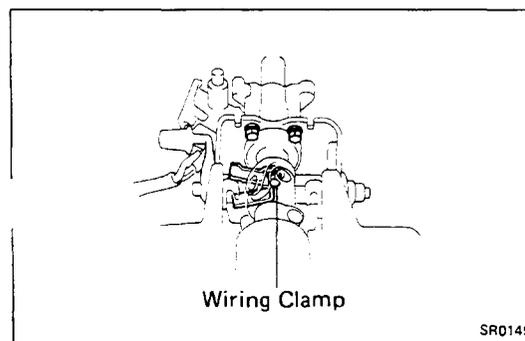
**Torque: 185 kg-cm (13 ft-lb, 18 N·m)**

**10. INSTALL TILT LEVER**

- (a) Install the nylon bushing, wave washer, bushing and lever.
- (b) Install the nylon bushing, plate washer and nut.
- (c) Install the bushing and E-ring.
- (d) Install the tension spring.

**11. INSTALL MAIN SHAFT TO UPPER BRACKET**

- (a) Insert the main shaft to the upper bracket.
- (b) Using a soft-jaw vise and snap ring pliers, install a new snap ring.

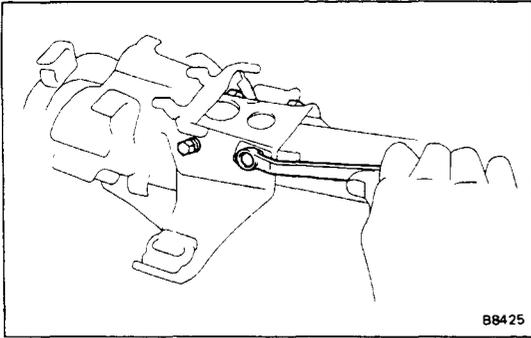
**12. INSTALL IGNITION SWITCH****13. INSTALL IGNITION KEY CYLINDER****14. INSTALL UPPER BRACKET WITH MAIN SHAFT TO COLUMN BRACKET**

- (a) Apply anaerobic adhesive and sealant [THREE BOND 1324 (Part No.08833-00070) or equivalent] to 1 or 2 threads of the bolt end.

**NOTE:** This adhesive will not harden while exposed to air. It will act as a sealer or binding agent only when applied to threads, etc. and air is cut off.

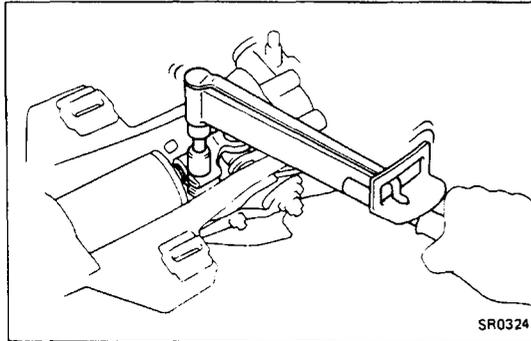
- (b) Install the two bolts; one with a wiring clamp.

**Torque: 75 kg-cm (65 in.-lb, 7.4 N·m)**

**15. INSTALL COLUMN TUBE TO COLUMN BRACKET**

Install the four bolts.

**Torque: 185 kg-cm (13 ft-lb, 18 N·m)**

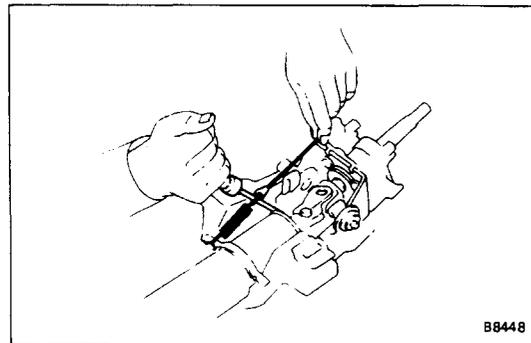
**16. CONNECT INTERMEDIATE SHAFT**

(a) Align the matchmarks on the universal joint and intermediate shaft.

(b) Torque the bolt.

**Torque: 260 kg-cm (19 ft-lb, 25 N·m)**

(c) Install the dust cover retainer.

**17. INSTALL TENSION SPRINGS AND CORDS**

(a) Connect the spring and cord, and hook the spring to the hanger.

(b) Hook the cord end to the tilt steering support.

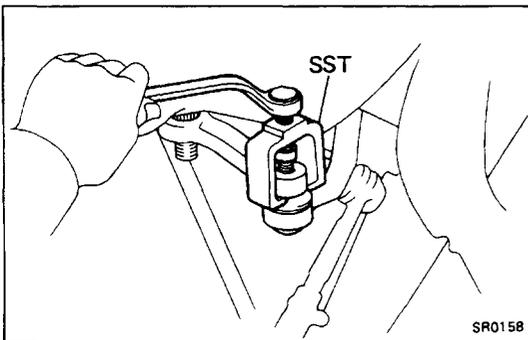
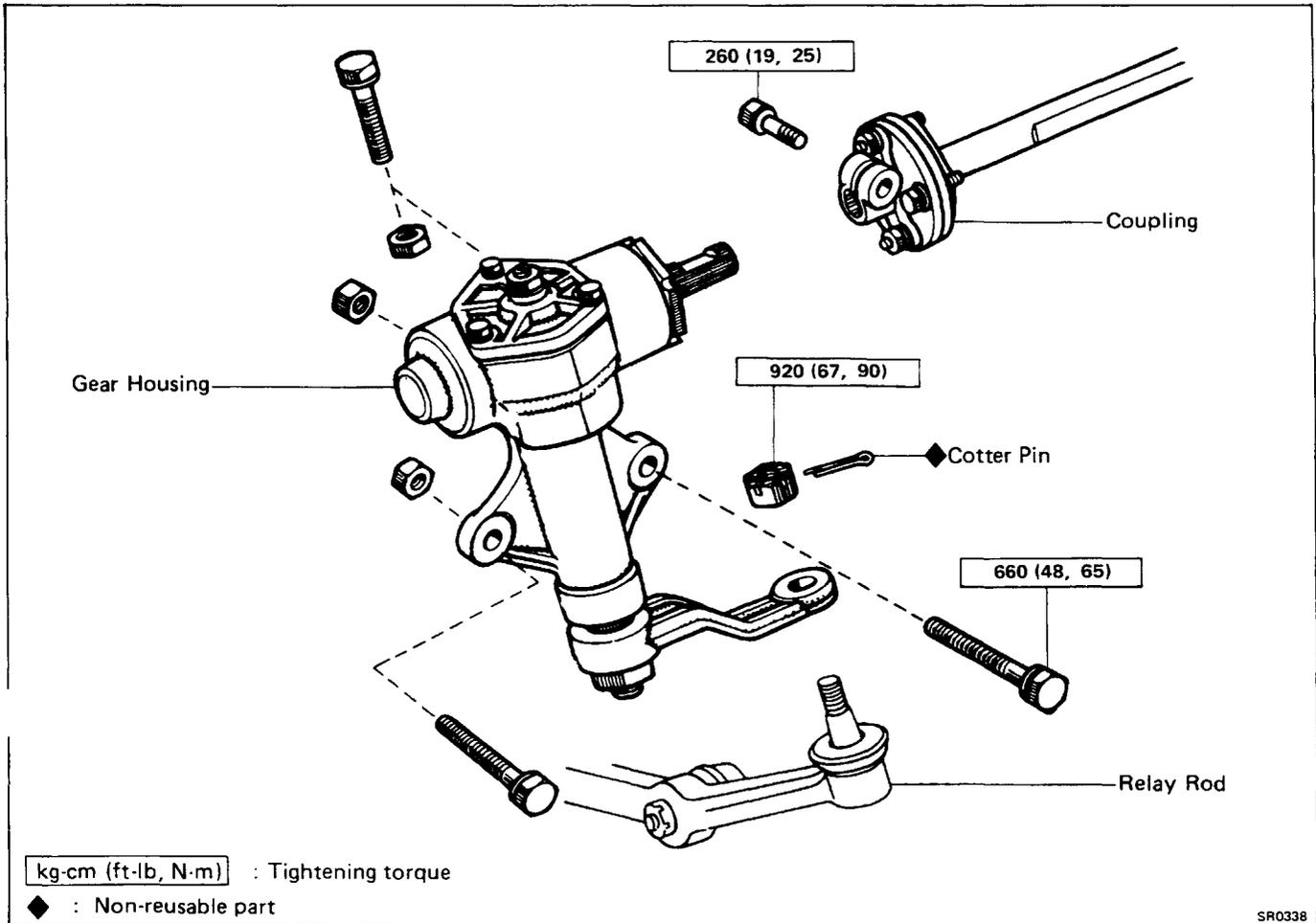
(c) Hook the cord to the tilt steering support hook.

**INSTALLATION OF STEERING COLUMN ASSEMBLY**

(See page SR-10 or SR-17)

## STEERING GEAR HOUSING (2WD)

### REMOVAL OF GEAR HOUSING

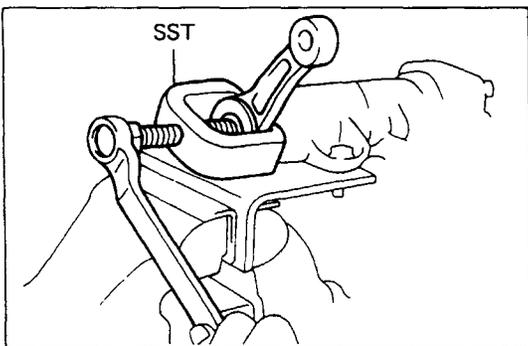
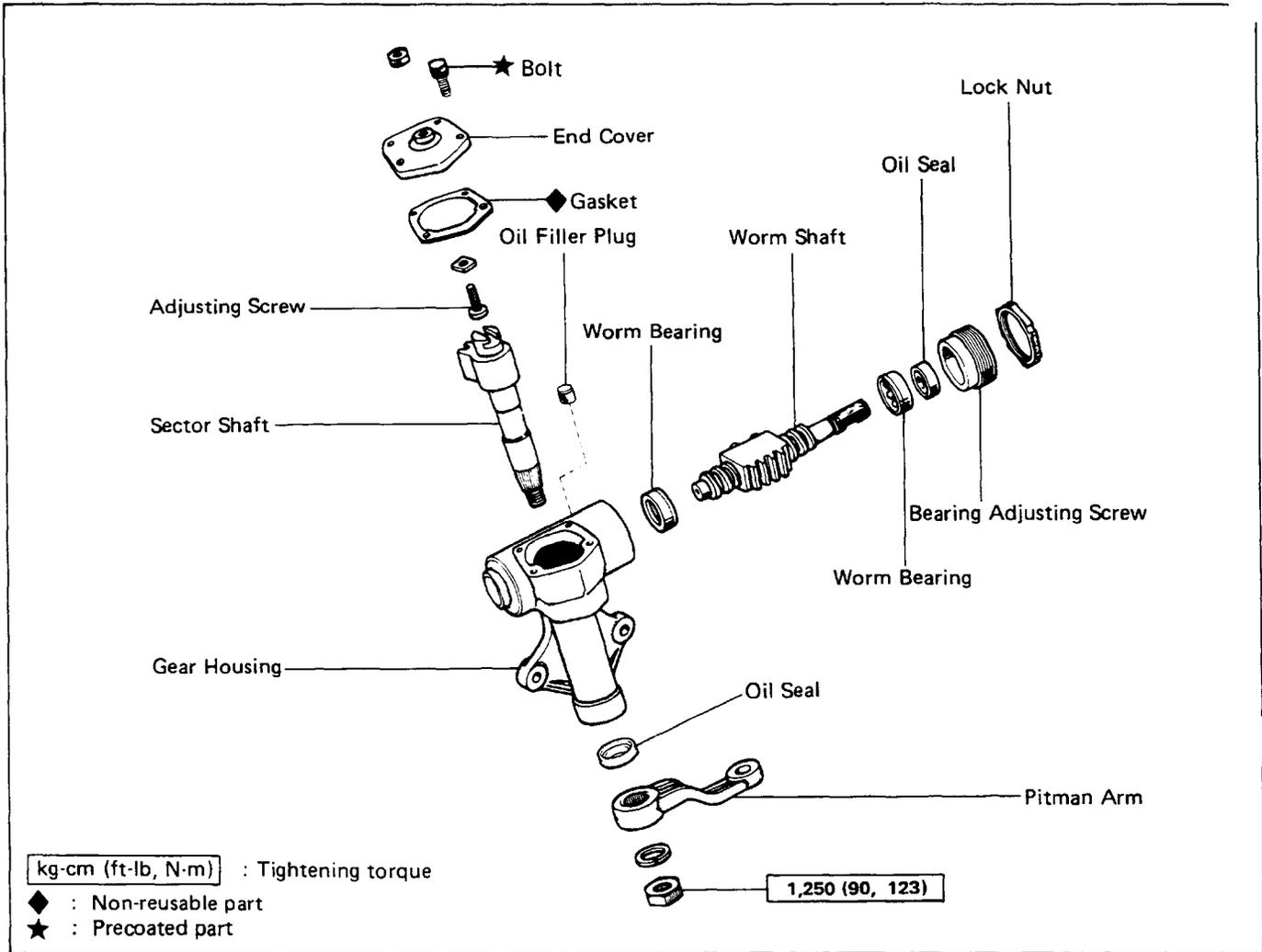


1. REMOVE COUPLING MOUNT BOLT
2. DISCONNECT RELAY ROD FROM PITMAN ARM
  - (a) Loosen the pitman arm mount nut.
  - (b) Using SST, disconnect the relay rod from the pitman arm.

SST 09611-22012
3. REMOVE GEAR HOUSING
 

Remove the three bolts and the gear housing.

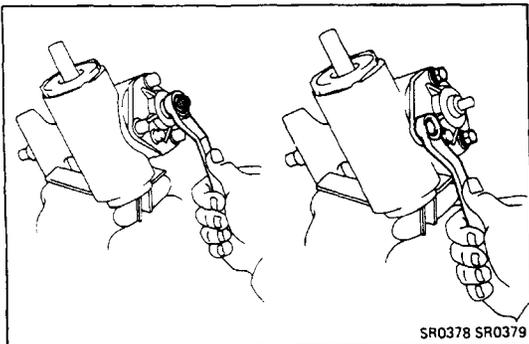
COMPONENTS



**DISASSEMBLY OF STEERING GEAR HOUSING**

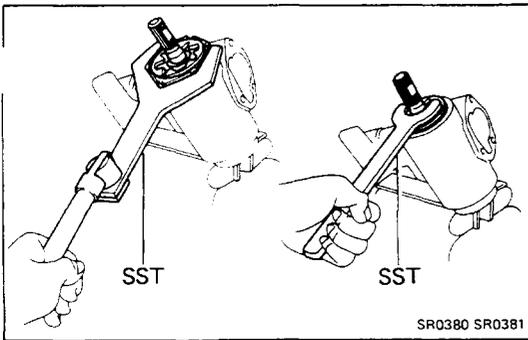
1. REMOVE OIL FILLER PLUG AND DRAIN GEAR OIL
2. REMOVE PITMAN ARM

Using SST, pull the pitman arm off the sector shaft.  
SST 09610-55012



3. REMOVE END COVER AND SECTOR SHAFT

- (a) Remove the adjusting screw lock nut and four bolts.
- (b) Remove the end cover by turning the adjusting screw clockwise.
- (c) Pull out the sector shaft and adjusting screw from the gear housing.
- (d) Remove the needle rollers.

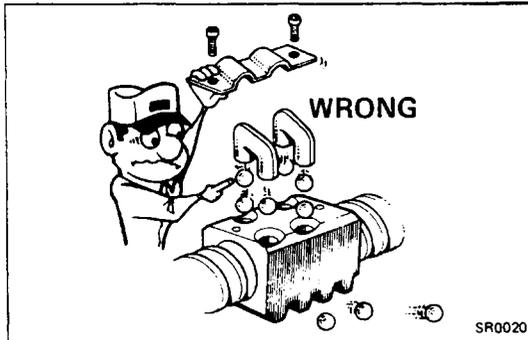


**4. REMOVE LOCK NUT**

Using SST, remove the lock nut.  
SST 09617-30040

**5. REMOVE BEARING ADJUSTING SCREW**

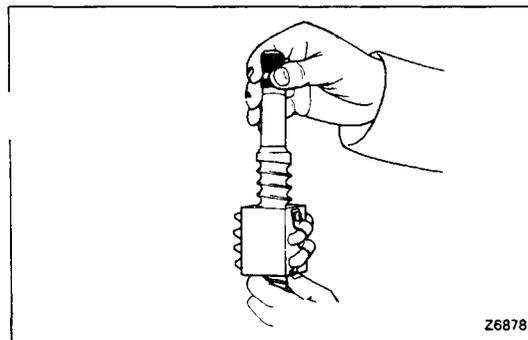
Using SST, remove the adjusting screw.  
SST 09616-22010



**6. REMOVE WORM SHAFT**

Pull the worm shaft out of the gear housing.

**CAUTION:** Do not disassemble the ball nut from the steering worm shaft.



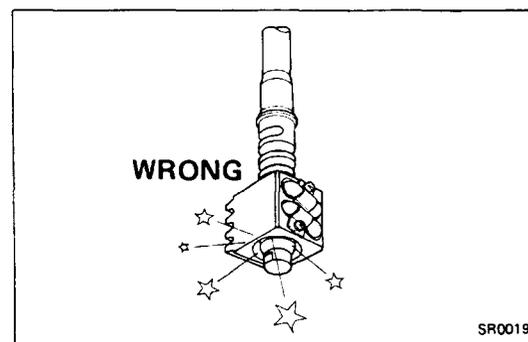
**INSPECTION AND REPAIR OF STEERING GEAR HOUSING**

**1. INSPECT WORM AND BALL NUT**

- (a) Check the worm and ball nut for wear or damage.
- (b) Check that the nut rotates smoothly down the shaft by its own weight.

If a problem is found, repair or replace the worm.

**CAUTION:** Do not allow the ball nut to hit the end of the worm shaft.



**2. INSPECT WORM BEARINGS AND OIL SEAL**

Check for wear or damage.

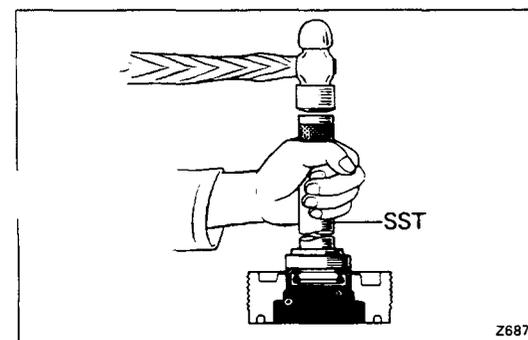
If a problem is found, replace the bearings, bearing races and oil seal.

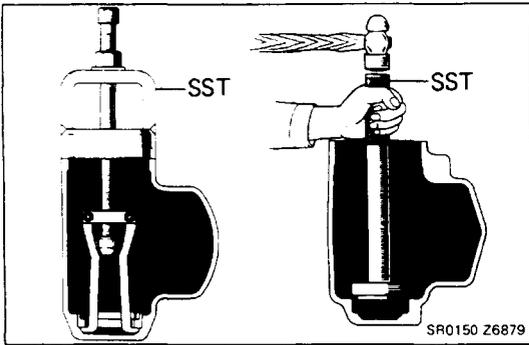
**3. IF NECESSARY, REPLACE OIL SEAL**

- (a) Remove the oil seal with a screwdriver.

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

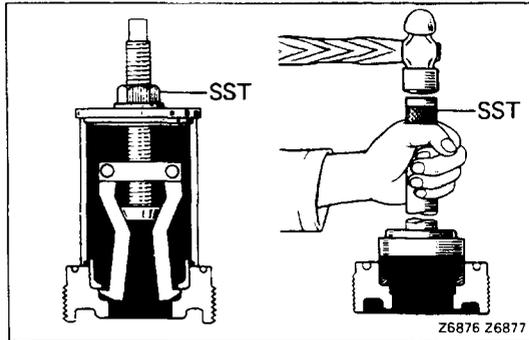
SST 09620-30010





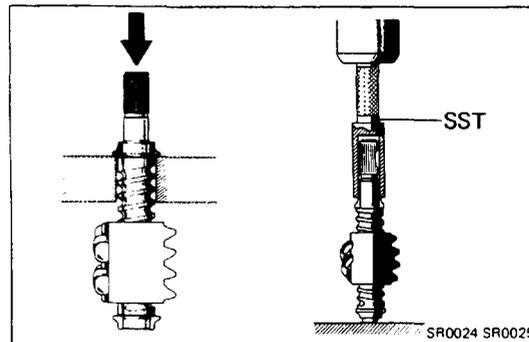
#### 4. IF NECESSARY, REPLACE OUTER RACE IN GEAR HOUSING

- Using SST, remove the outer race from the housing.  
SST 09612-65013
- Using SST, install the outer race into the housing.  
SST 09620-30010



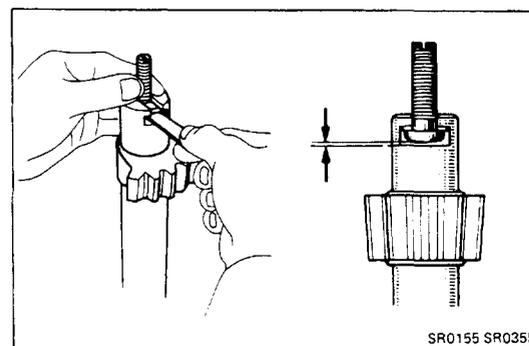
#### 5. IF NECESSARY, REPLACE OUTER RACE IN ADJUSTING NUT

- Remove the oil seal with a screwdriver.
- Using SST, remove the outer race from the nut.  
SST 09612-30012
- Using SST, install the race into the nut.  
SST 09620-30010
- Using SST, install the oil seal into the nut.  
SST 09620-30010



#### 6. IF NECESSARY, REPLACE INNER RACE ON WORM SHAFT

- Using a press, remove the inner races from the shaft
- Using SST, press the inner races into the shaft.  
SST 09620-30010



#### 7. INSPECT SECTOR SHAFT

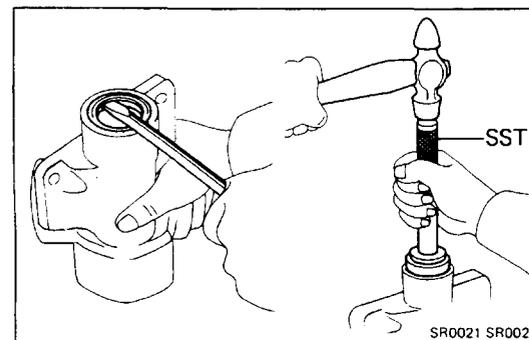
Measure shaft thrust clearance with a feeler gauge.

**Maximum clearance: Less than 0.05 mm (0.0020 in.)**

If necessary, install a new thrust washer which will provide the minimum clearance between the sector shaft and the adjusting screw.

Thrust washer thickness

Thickness mm (in.)		Thickness mm (in.)	
2.00	(0.0787)	2.12	(0.0835)
2.04	(0.0803)	2.16	(0.0850)
2.08	(0.0819)	2.20	(0.0866)



#### 8. IF NECESSARY, REPLACE OIL SEAL

- Remove the oil seal with a screwdriver from the gear housing.
- Using SST and hammer, install a new oil seal.  
SST 09620-30010

**ASSEMBLY OF STEERING GEAR HOUSING**

(See page SR-26)

1. **APPLY MP GREASE TO BUSHING, NEEDLE ROLLER BEARINGS AND OIL SEALS**

2. **INSERT WORM SHAFT INTO GEAR HOUSING**

Place the worm bearings on the shaft and insert the shaft into the housing.

3. **INSTALL AND ADJUST BEARING ADJUSTING SCREW**

(a) Using SST, gradually tighten the adjusting screw until it is snug.

SST 09616-22010

(b) Using a torque wrench and SST, measure the bearing preload in both directions. Turn the adjusting screw until the preload is correct.

**Preload (starting): 3 – 4 kg-cm  
(2.6 – 3.5 in.-lb, 0.3 – 0.4 N·m)**

SST 09616-00010

(c) Hold the adjusting screw in position with SST and tighten the lock nut with SST.

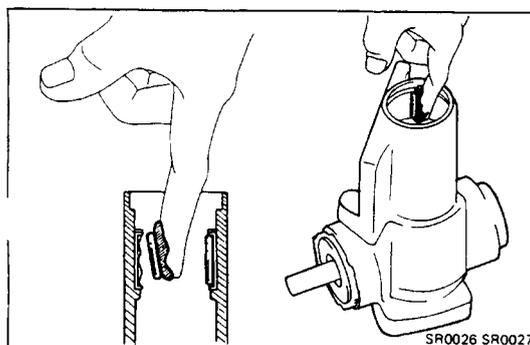
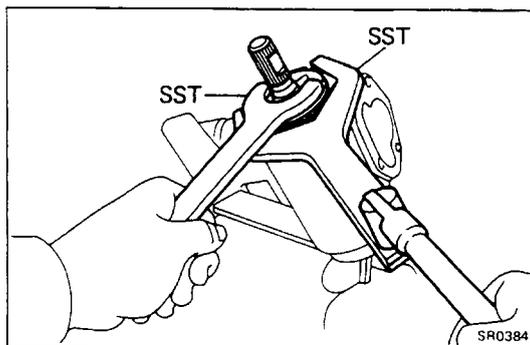
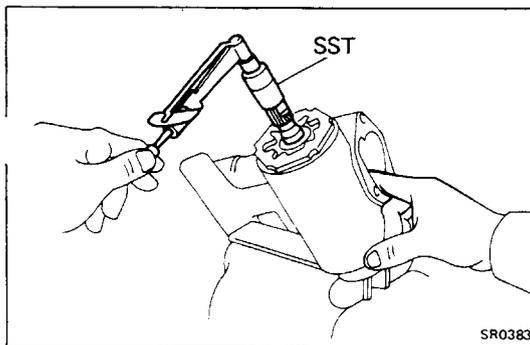
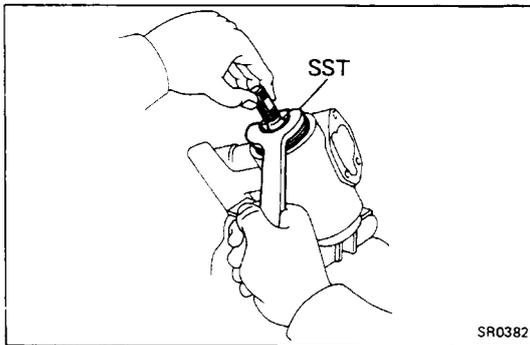
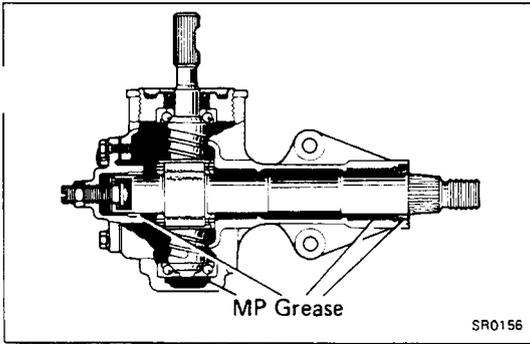
**Torque: 1,500 kg-cm (108 ft-lb, 147 N·m)**

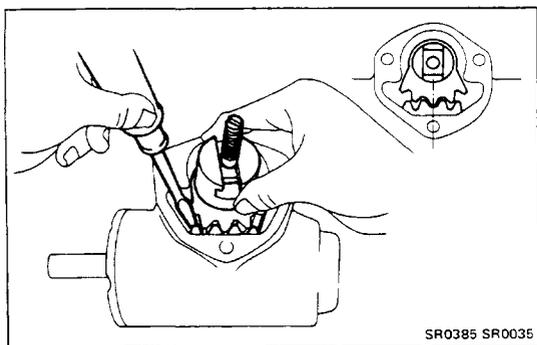
SST 09616-22010 and 09617-30040

NOTE: Check that the bearing preload is still correct.

4. **INSTALL NEEDLE ROLLER BEARING**

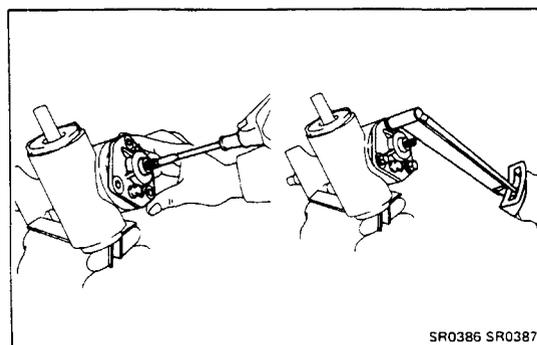
Apply MP grease to the needle rollers and install them into the housing.





### 5. INSTALL SECTOR SHAFT

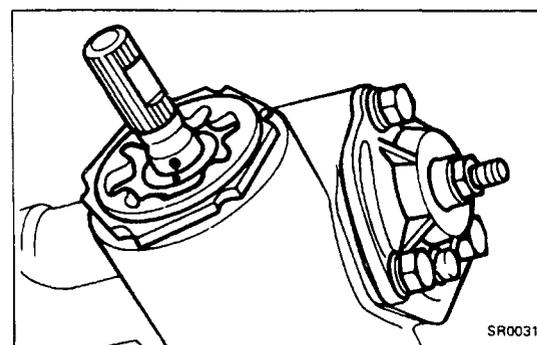
- Install the adjusting screw and thrust washer onto the sector shaft.
- Set the ball nut at the center of the worm shaft. Insert the sector shaft into the gear housing so that the center teeth mesh together.



### 6. INSTALL END COVER

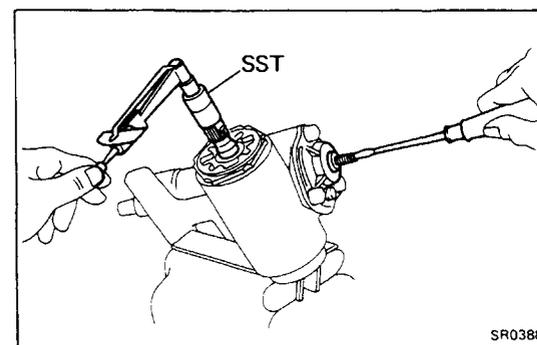
- Apply liquid sealer to the gasket and end cover.
- Install the end cover over the gasket.
- Loosen the adjusting screw as far as possible.
- Torque the four cover bolts.

**Torque: 185 kg-cm (13 ft-lb, 18 N·m)**



### 7. PLACE WORM SHAFT IN NEUTRAL POSITION

- Count the total shaft rotations and turn the shaft back half of that number.
- The worm shaft is now in neutral position.
- Place matchmarks on the worm shaft and housing to show neutral position.



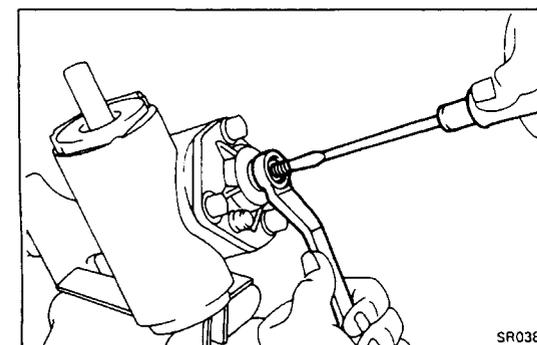
### 8. ADJUST TOTAL PRELOAD

Using a torque wrench and SST, turn the adjusting screw while measuring the preload until it is correct.

**NOTE:** Be sure that the worm shaft is in neutral position.

**Preload (starting): 8.0 – 10.5 kg-cm  
(6.9 – 9.1 in.-lb, 0.8 – 1.0 N·m)**

SST 09616-00010

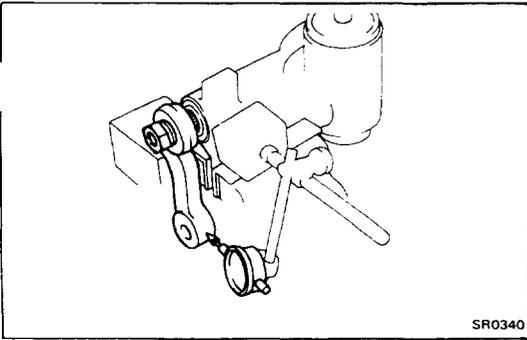


### 9. TIGHTEN ADJUSTING SCREW LOCK NUT

- Apply liquid sealer to the lock nut.
- Hold the screw with a screwdriver while tightening the lock nut.
- Torque the lock nut.

**Torque: 250 kg-cm (18 ft-lb, 25 N·m)**

**NOTE:** Check that the preload is still correct.

**10. INSTALL PITMAN ARM**

Align the marks on the sector shaft with the pitman arm. Install the pitman arm and tighten the nut finger tight.

**11. MEASURE SECTOR SHAFT BACKLASH**

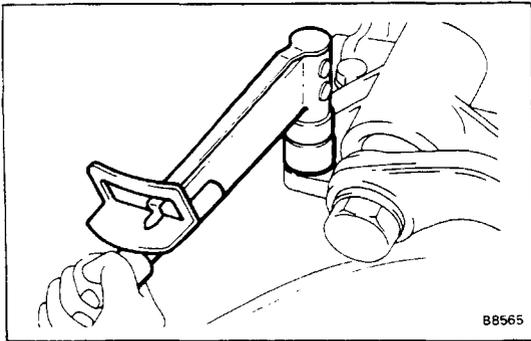
Install a backlash gauge. Check that the sector shaft has no backlash within 100 degrees of the left and right sides from neutral position.

**12. REPLENISH WITH GEAR OIL**

Oil type: API GL-4, SAE 90

Capacity: 380 — 400 cc (23.2 — 24.4 cu in.)

**13. INSTALL OIL FILLER PLUG**



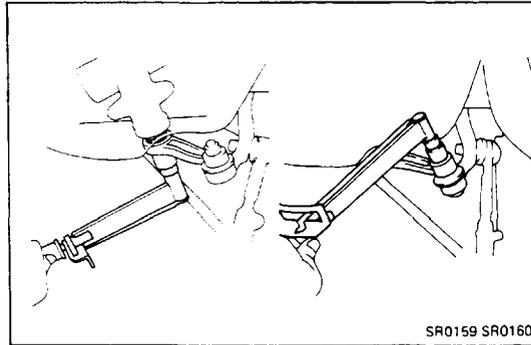
## INSTALLATION OF GEAR HOUSING

(See page SR-25)

### 1. INSTALL GEAR HOUSING

- (a) Line up the marks on the coupling and worm shaft.
- (b) Torque the three mount bolts.

**Torque: 660 kg-cm (48 ft-lb, 65 N·m)**



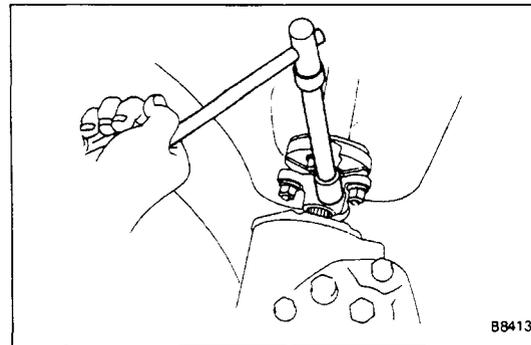
### 2. TORQUE PITMAN ARM MOUNT NUT

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

### 3. CONNECT PITMAN ARM TO RELAY ROD

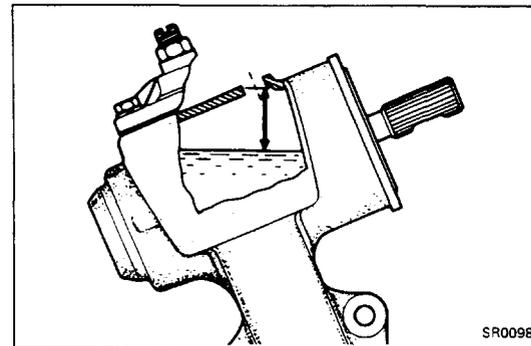
Connect the pitman arm to the relay rod and torque the mount nut.

**Torque: 920 kg-cm (67 ft-lb, 90 N·m)**



### 4. TORQUE COUPLING MOUNT BOLT

**Torque: 260 kg-cm (19 ft-lb, 25 N·m)**



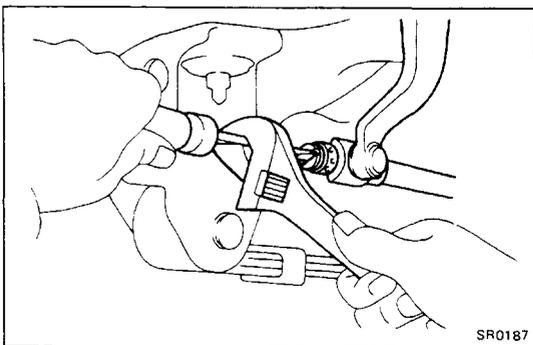
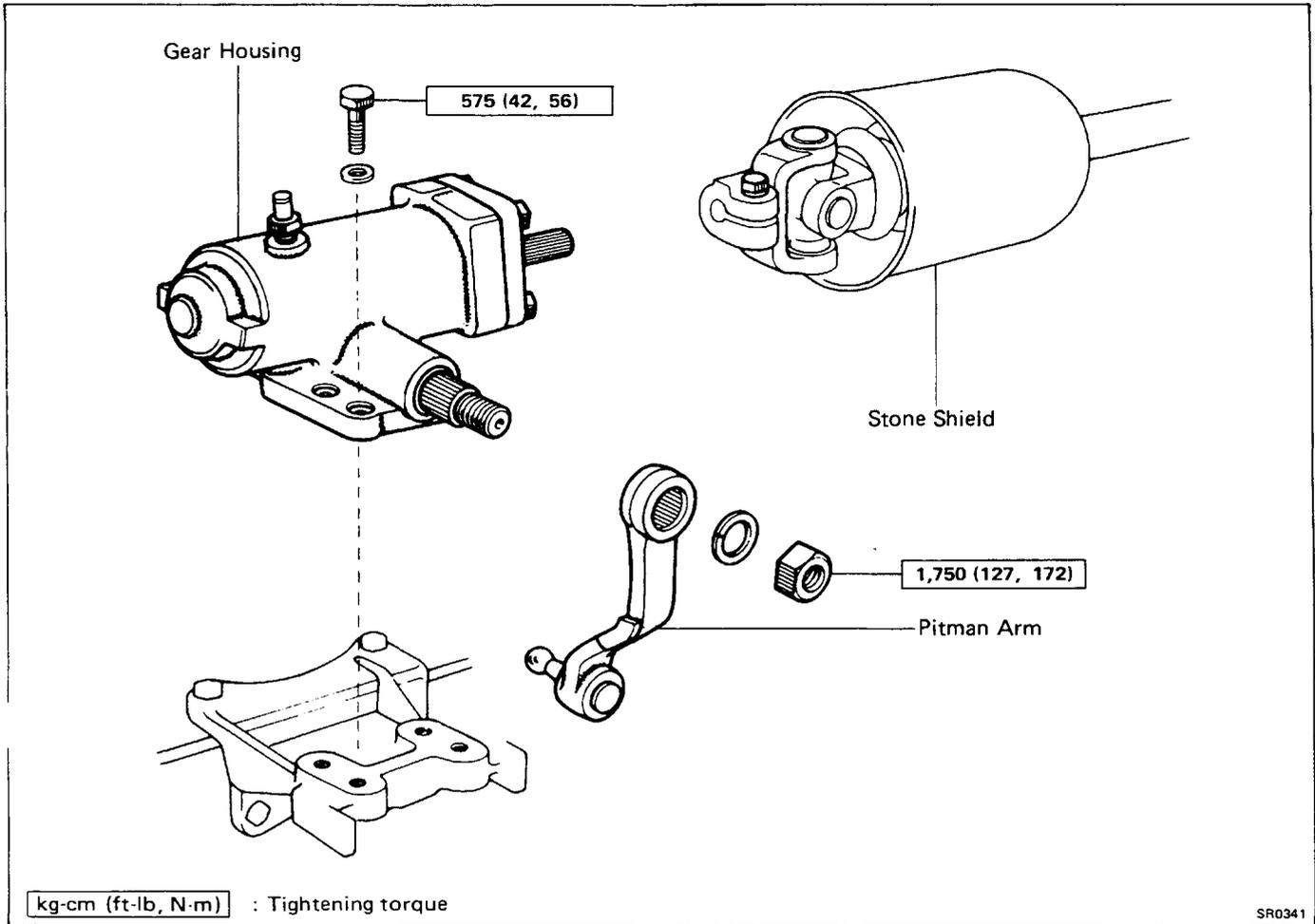
### 5. FILL GEAR HOUSING WITH GEAR OIL

**Oil type: API GL-4, SAE 90**

**Oil level: 18 – 28 mm (0.71 – 1.10 in.) from top**

**Capacity: 380 – 400 cc (23.2 – 24.4 cu in.)**

## STEERING GEAR HOUSING (4WD) REMOVAL OF GEAR HOUSING

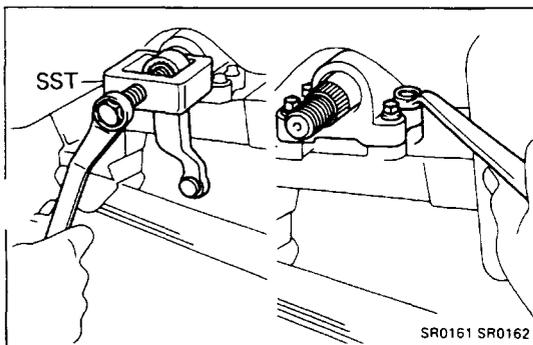


**1. DISCONNECT JOINT YOKE FROM WORM SHAFT**

- (a) Remove the stone shield from the gear housing.
- (b) Place matchmarks on the worm shaft and joint yoke.
- (c) Remove the joint yoke mount bolt.

**2. DISCONNECT DRAG LINK FROM PITMAN ARM**

- (a) Remove the cotter pin and plug from the drag link.
- (b) Disconnect the drag link from the pitman arm.



**3. REMOVE PITMAN ARM**

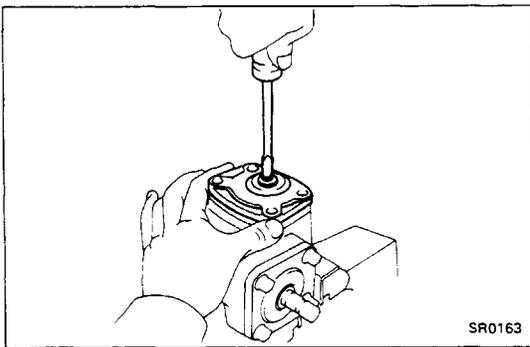
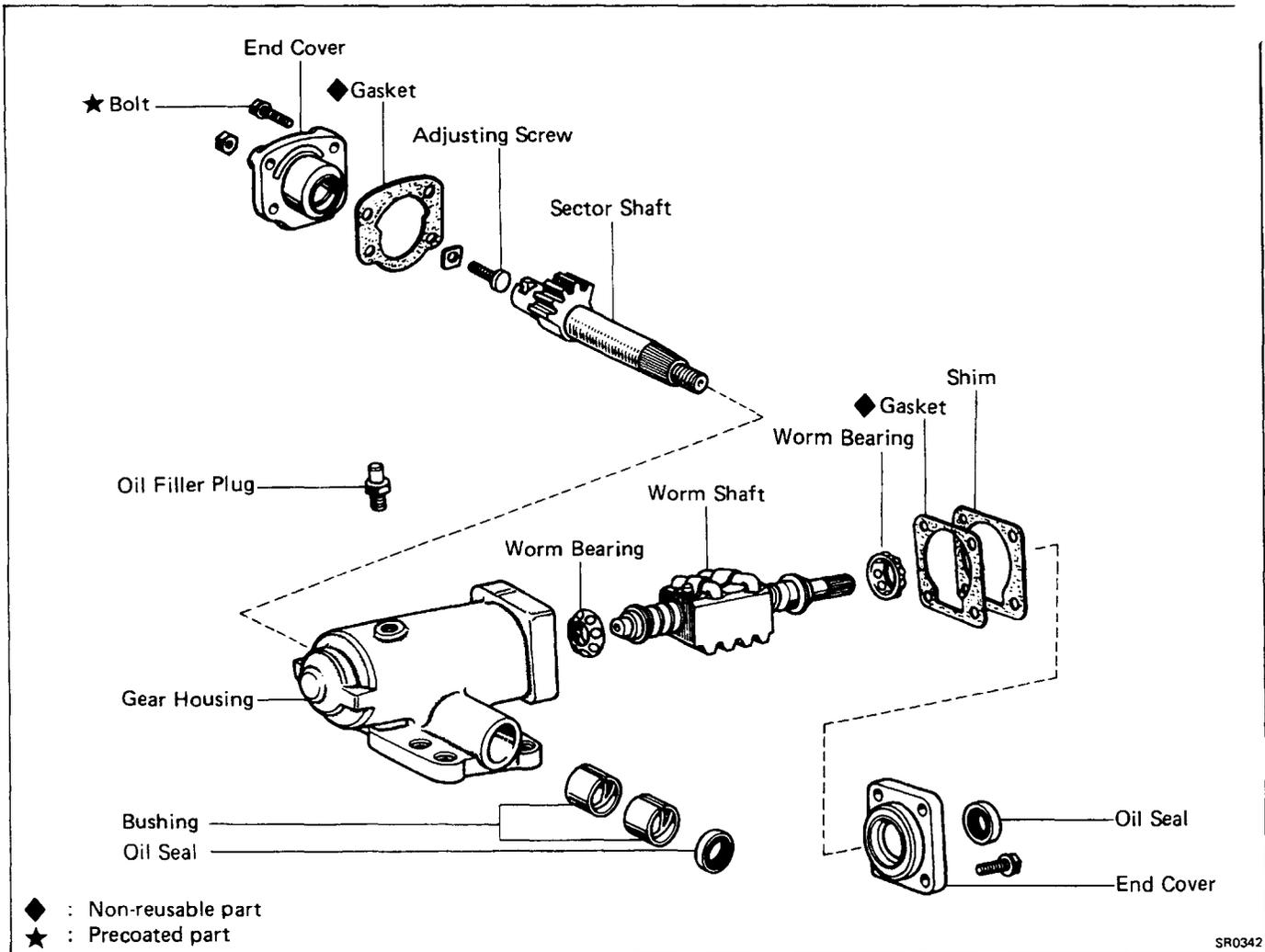
- (a) Loosen the pitman arm mount nut.
- (b) Using SST, disconnect the pitman arm from the gear housing.

SST 09610-55012

**4. REMOVE GEAR HOUSING**

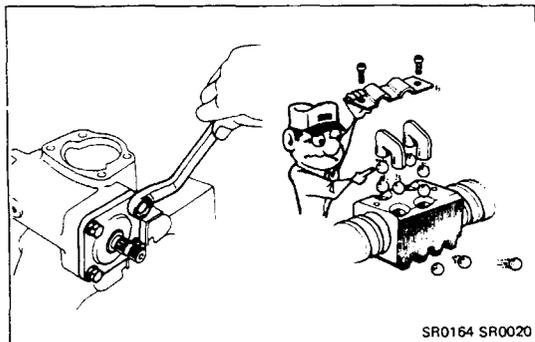
Remove the four bolts and the gear housing.

## COMPONENTS



## DISASSEMBLY OF STEERING GEAR HOUSING

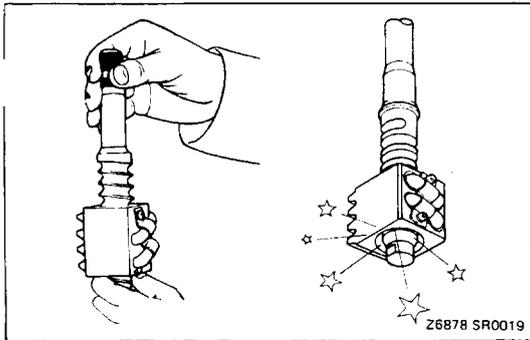
1. REMOVE OIL FILLER PLUG AND DRAIN GEAR HOUSING OIL
2. REMOVE END COVER AND SECTOR SHAFT
  - (a) Remove the adjusting screw lock nut and four bolts.
  - (b) Remove the end cover by turning the adjusting screw clockwise.
  - (c) Pull the sector shaft from the housing.



## 3. REMOVE END COVER AND WORM SHAFT

- (a) Remove the end cover and shims.
- (b) Remove the worm shaft and the two bearings.

**CAUTION:** Do not disassemble the ball nut from the steering worm shaft.



## INSPECTION AND REPAIR OF STEERING GEAR HOUSING

### 1. INSPECT WORM AND BALL NUT

- Check worm and ball nut for wear or damage.
- Check that the nut rotates smoothly down the shaft by its own weight.

**CAUTION:** Do not allow the ball nut to hit the end of the worm shaft.

If a problem is found, repair or replace the worm.

### 2. INSPECT WORM BEARING AND OIL SEAL

Check for wear or damage.

If a problem is found, replace the bearings, bearing races and oil seal.

### 3. IF NECESSARY, REPLACE OIL SEAL IN END COVER

- Remove the oil seal with a screwdriver.
- Using SST, install the new oil seal.

SST 09620-30010

### 4. IF NECESSARY, REPLACE OUTER RACE IN END COVER

- Using SST, remove the outer race from the end cover.
- SST 09612-65013

- Using SST, install the outer race in the end cover.
- SST 09608-35013

### 5. IF NECESSARY, REPLACE OUTER RACE IN GEAR HOUSING

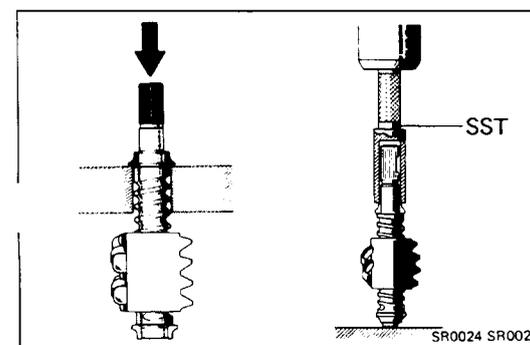
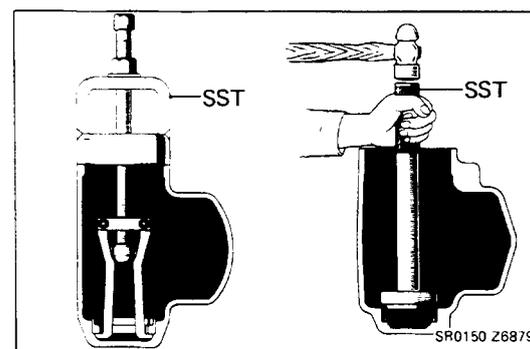
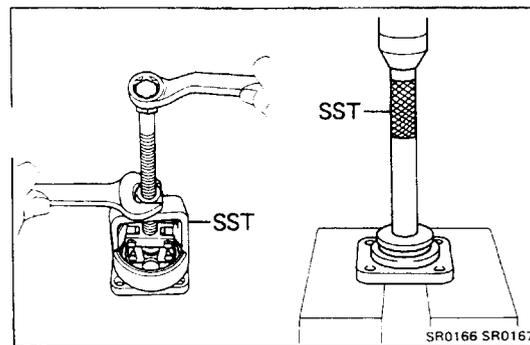
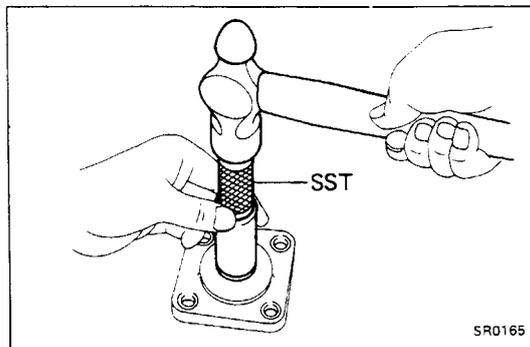
- Using SST, remove the outer race from the housing.
- SST 09612-65013

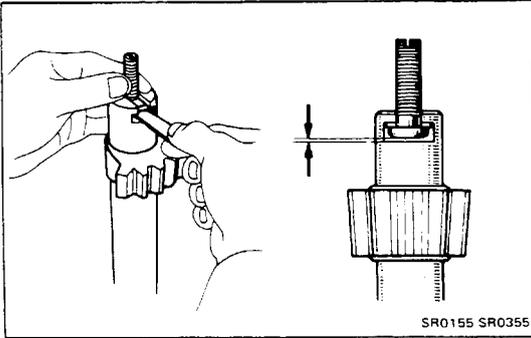
- Using SST, install the outer race into the housing.
- SST 09608-35013

### 6. IF NECESSARY, REPLACE INNER RACE ON WORM SHAFT

- Using a press, remove the inner races from the shaft.
- Using SST, press the inner races into the shaft.

SST 09620-30010





## 7. INSPECT SECTOR SHAFT

(a) Measure that thrust clearance with a feeler gauge

**Maximum clearance: 0.05 mm (0.0020 in.)**

If necessary, install a new thrust washer to provide the minimum clearance between the sector shaft and the adjusting screw.

Thrust washer thickness

Thickness	mm (in.)	Thickness	mm (in.)
2.00	(0.0787)	2.15	(0.0846)
2.05	(0.0807)	2.20	(0.0866)
2.10	(0.0827)		

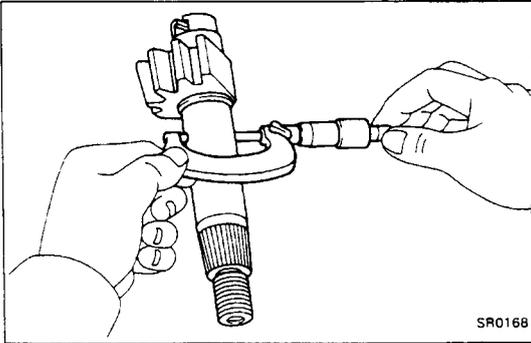
(b) Check the shaft, thrust washer and adjusting screw for wear or damage.

(c) Measure the shaft outer diameter.

**Outer diameter:**

**Standard 31.970 – 31.992 mm  
(1.2587 – 1.2595 in.)**

**Minimum 31.95 mm (1.2579 in.)**



## 8. INSPECT GEAR HOUSING BUSHINGS

(a) Check the bushings for wear or damage.

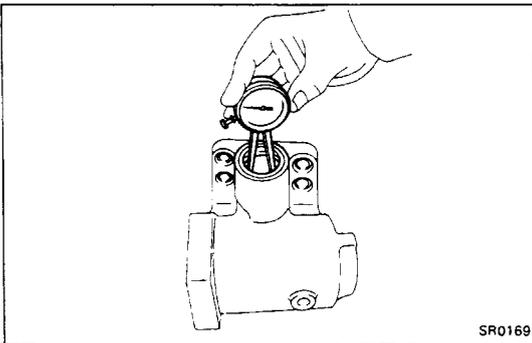
(b) Using calipers, measure the sector shaft oil clearance

**Oil clearance:**

**Standard 0.01 – 0.06 mm  
(0.0004 – 0.0024 in.)**

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

If necessary, replace the bushings.



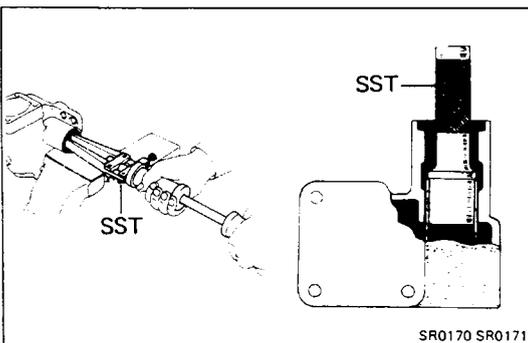
## 9. IF NECESSARY, REPLACE BUSHING AND OIL SEAL

(a) Using SST, remove the oil seal.

SST 09308-00010

(b) Using SST and press, remove the two bushings together in the same direction.

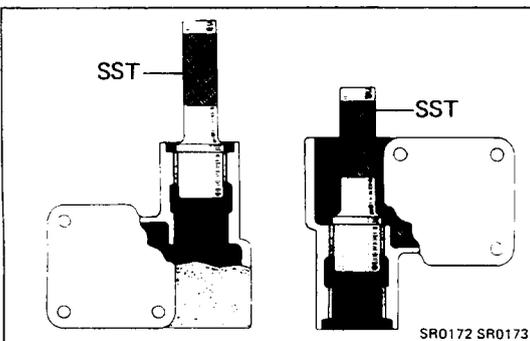
SST 09307-12010

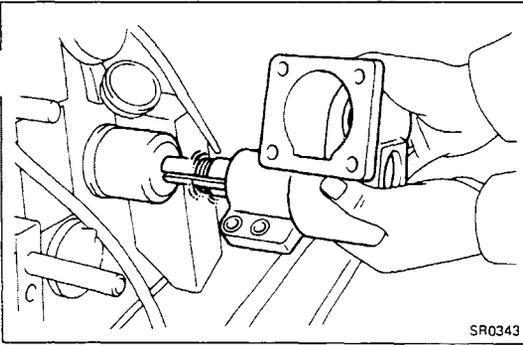


(c) Using SST and press, install the outer bushing to the gear housing.

SST 09307-12010

(d) Install the inner bushing by the same procedure.



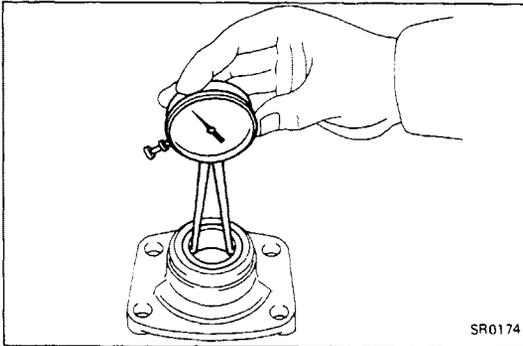


- (e)hone the inner surface of the bushings until standard oil clearance is obtained between the bushings and sector shaft.

**Standard oil clearance:**

**0.01 — 0.06 mm (0.0004 — 0.0024 in.)**

- (f) Install a new oil seal to the gear housing.



**10. INSPECT END COVER BUSHING**

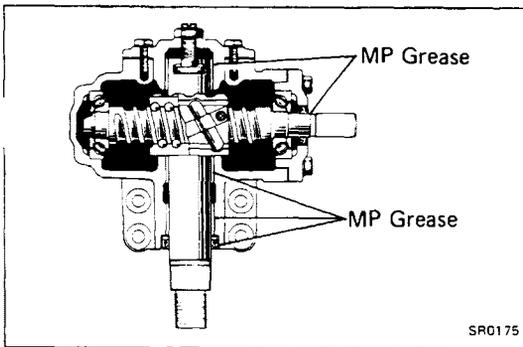
- (a) Check the bushing for wear or damage.
- (b) Using calipers, measure the sector shaft oil clearance.

**Oil clearance:**

**Standard 0.009 — 0.060 mm  
(0.0004 — 0.0024 in.)**

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

If the oil clearance is excessive or damage is found, the end cover must be replaced.



**ASSEMBLY OF STEERING GEAR HOUSING**

(See page SR-34)

**1. APPLY MP GREASE TO BUSHINGS AND OIL SEAL**

**2. INSERT WORM SHAFT INTO GEAR HOUSING**

Place worm bearings on the shaft and insert the shaft into the housing.

**3. INSTALL SHIMS AND END COVER, AND ADJUST WORM BEARING PRELOAD**

- (a) Install the same number of shims as there was before disassembly.
- (b) Install the end cover and torque the four bolts.

**Torque: 400 kg-cm (29 ft-lb, 39 N·m)**

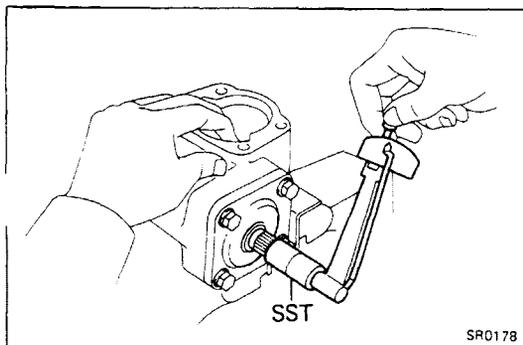
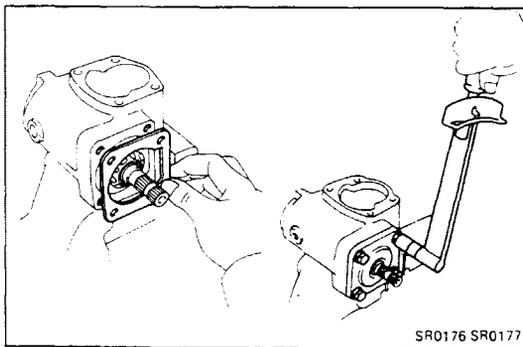
**NOTE:** While tightening the bolts, check the worm shaft to see that it turns properly.

- (c) Using a torque wrench and SST, measure the bearing preload.

**SST 09616-00010**

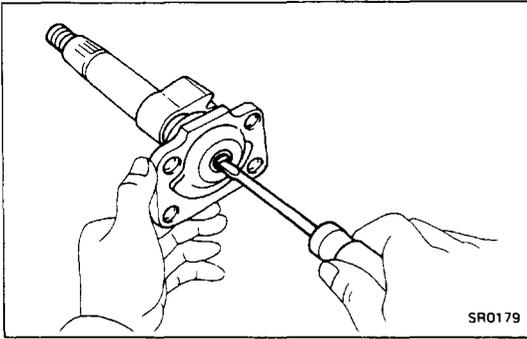
**Preload (starting): 3.5 — 6.5 kg-cm  
(3.0 — 5.6 in.-lb, 0.3 — 0.6 N·m)**

If the preload is not within limit, correct by selecting shims of proper thickness.



Shim thickness

Thickness mm (in.)		Thickness mm (in.)	
0.05	(0.0020)	0.09	(0.0035)
0.06	(0.0024)	0.10	(0.0039)
0.07	(0.0028)	0.20	(0.0079)
0.08	(0.0031)	0.50	(0.0197)



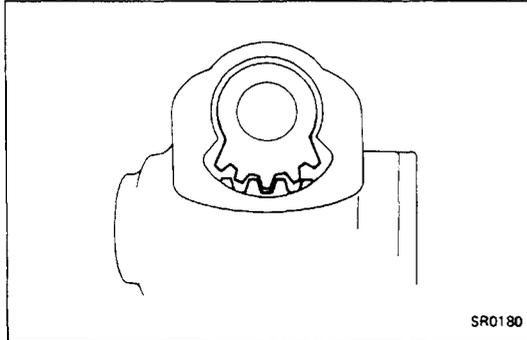
SR0179

#### 4. INSTALL SECTOR SHAFT AND END COVER

- (a) Apply liquid sealer to the adjusting screw threads and insert it in the thrust washer.
- (b) Assemble the sector shaft and adjusting screw to the end cover.

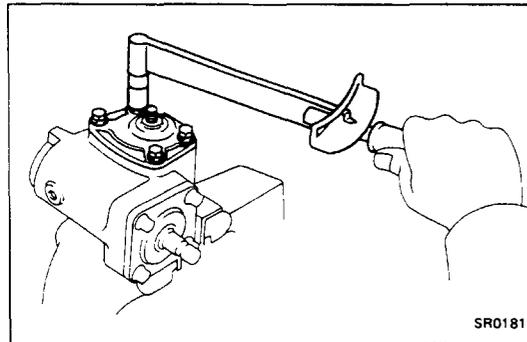
NOTE: Fully loosen the adjusting screw.

- (c) Apply liquid sealer to the gear housing.



SR0180

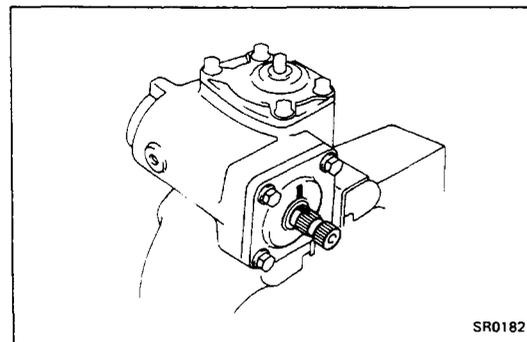
- (d) Set and support the ball nut at the center of the gear housing by inserting a screwdriver into the breather plug hole.
- (e) Insert the sector shaft into the gear housing so that the center teeth mesh together.



SR0181

- (f) Torque the four bolts.

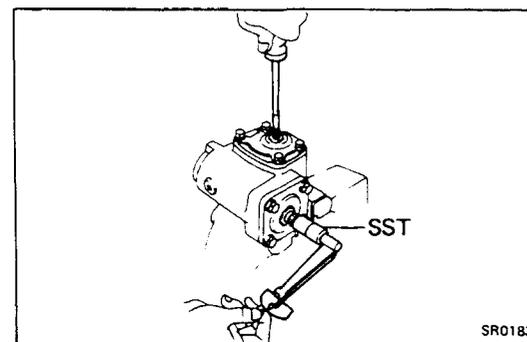
**Torque: 400 kg-cm (29 ft-lb, 39 N·m)**



SR0182

#### 5. PLACE WORM SHAFT IN NEUTRAL POSITION

- (a) Count the total shaft rotations and turn the shaft back half of that number.
- (b) The worm shaft is now in neutral position.
- (c) Place matchmarks on the worm shaft and housing to show neutral position.



SR0183

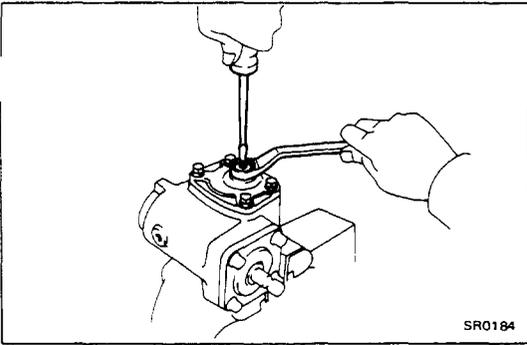
#### 6. ADJUST TOTAL PRELOAD

Using a torque wrench and SST, turn the adjusting screw while measuring the preload until it is correct.

NOTE: Be sure that the worm shaft is in neutral position.

**Preload(starting): 8 – 11 kg-cm  
(6.9 – 9.5 in.-lb 0.8 – 1.1 N·m)**

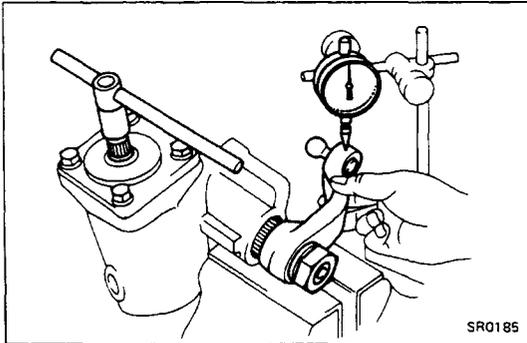
SST 09616-00010

**7. TIGHTEN ADJUSTING SCREW LOCK NUT**

- (a) Hold the screw with a screwdriver while tightening the lock nut.
- (b) Torque the lock nut.

**Torque: 425 kg-cm (31 ft-lb, 42 N·m)**

**NOTE:** Check that the preload is still correct.

**8. INSTALL PITMAN ARM**

Align the marks on the sector shaft with the pitman arm. Install the pitman arm and tighten the nut finger tight.

**9. MEASURE SECTOR SHAFT BACKLASH**

Install the backlash gauge. Check that the sector shaft has backlash 0 – 0.27 mm (0 – 0.0106 in.) within 100 degrees of the left and right sides from neutral position.

**10. REPLENISH WITH GEAR OIL**

**Oil type: API GL-4, SAE 90**

**Capacity: 580 cc (35.4 cu in.)**

**11. INSTALL OIL FILLER PLUG**

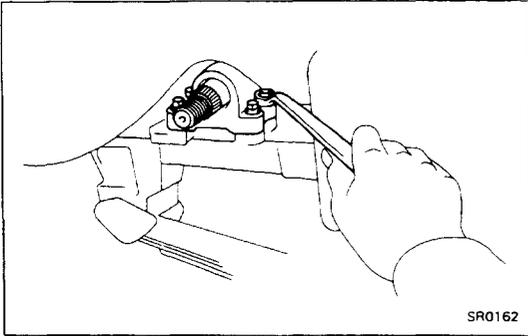
## INSTALLATION OF GEAR HOUSING

(See page SR-33)

### 1. INSTALL GEAR HOUSING

Install the gear housing and torque the four mount bolts.

**Torque: 575 kg-cm (42 ft-lb, 56 N·m)**



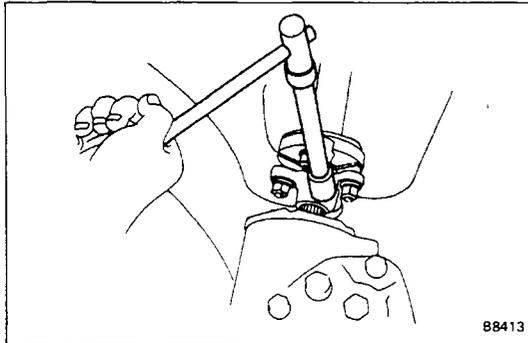
### 2. CONNECT INTERMEDIATE SHAFT TO WORM SHAFT

(a) Align matchmarks on the intermediate shaft and the worm shaft.

(b) Torque the coupling mount bolt.

**Torque: 400 kg-cm (29 ft-lb, 39 N·m)**

(c) Install the stone shield to the gear housing.

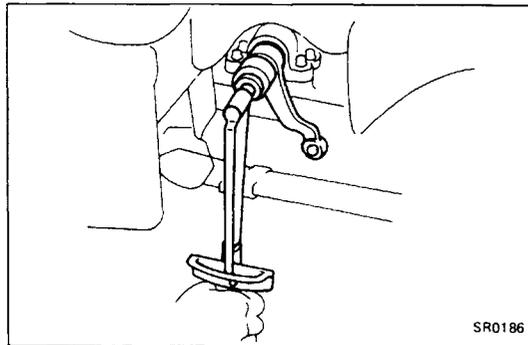


### 3. INSTALL PITMAN ARM

(a) Align marks on the sector shaft and the pitman arm.

(b) Torque the mount nut.

**Torque: 1,750 kg-cm (127 ft-lb, 172 N·m)**

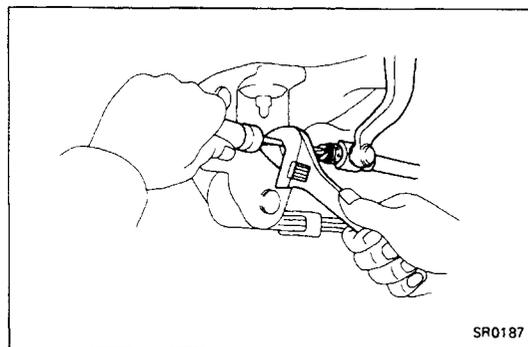


### 4. CONNECT DRAG LINK

(a) Insert the pitman arm in the drag link.

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

(c) Secure the plug by inserting a cotter pin.

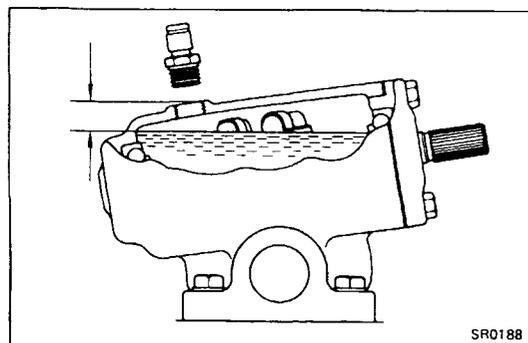


### 5. FILL GEAR HOUSING WITH GEAR OIL

**Oil type: API GL-4, SAE90**

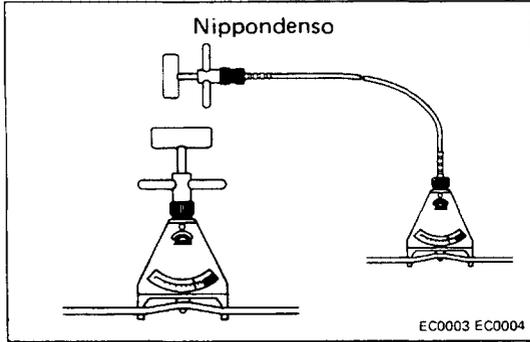
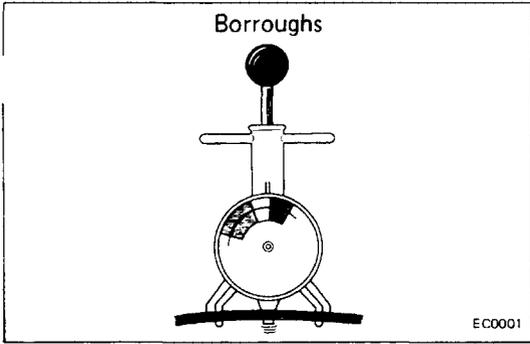
**Oil level: 12 – 17 mm (0.47 – 0.67 in.) from top**

**Capacity: 580 cc (35.4 cu in.)**



# POWER STEERING On-Vehicle Inspection

## CHECK OF DRIVE BELT TENSION



Using belt tension gauge, check the drive belt tension.  
Belt tension gauge:

Nippondenso BTG-20 (95506-00020) or  
Borroughs No. BT-33-73F

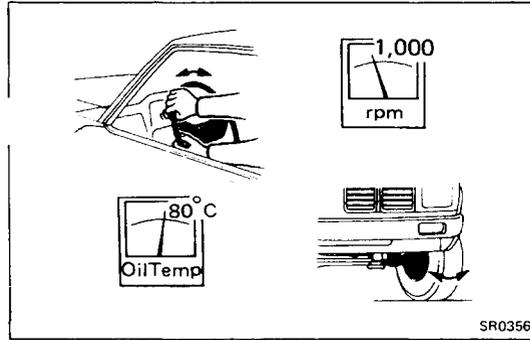
Drive belt tension:

New belt  $125 \pm 25$  lb  
Used belt  $80 \pm 20$  lb

**NOTE:**

- "New belt" refers to a brand new belt which has never before been used.
- "Used belt" refers to a belt which has been used on a running engine for 5 minutes or more.

## FLUID LEVEL CHECK



1. **KEEP VEHICLE LEVEL**

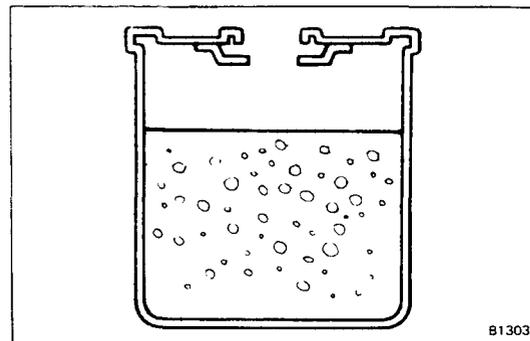
2. **BOOST FLUID TEMPERATURE**

With the engine idling at 1,000 rpm or less, turn the steering wheel from lock to lock several times to boost fluid temperature.

Fluid temperature:  $80^{\circ}\text{C}(176^{\circ}\text{F})$

3. **CHECK FOR FOAMING OR EMULSIFICATION**

NOTE: Foaming and emulsification indicate the existence of air in the system or that the fluid level is too low.

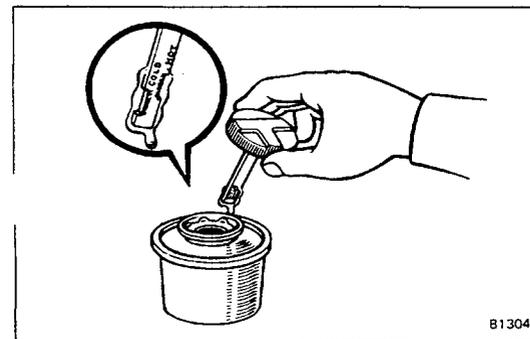


4. **CHECK FLUID LEVEL IN RESERVOIR**

Check the fluid level and add fluid if necessary.

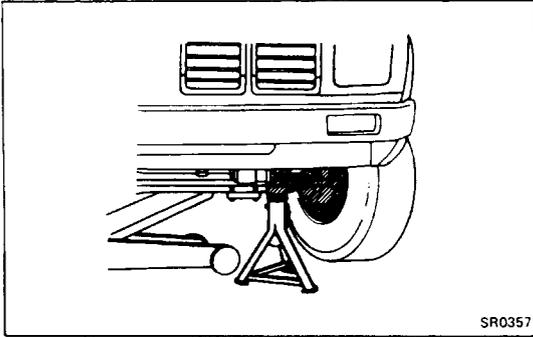
Fluid: **ATF DEXRON or DEXRON II**

NOTE: Check that the fluid level is within the **HOT LEVEL** of the dipstick. If the fluid is cold, check that it is within the **COLD LEVEL** of the dipstick.

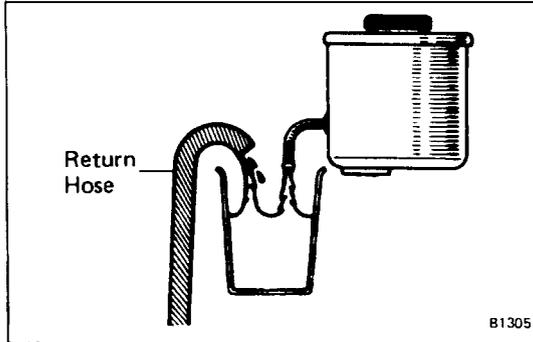


**REPLACEMENT OF POWER STEERING FLUID**

1. JACK UP FRONT OF VEHICLE AND SUPPORT IT WITH STANDS

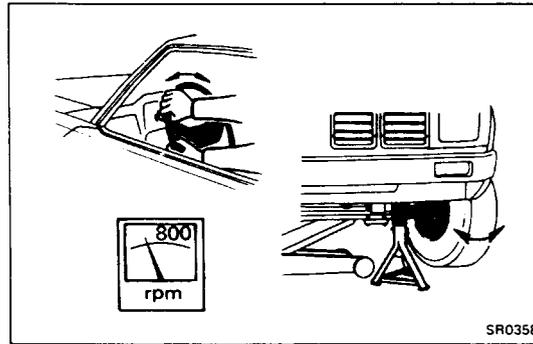


2. REMOVE FLUID RETURN HOSE FROM RESERVOIR TANK AND DRAIN FLUID INTO CONTAINER

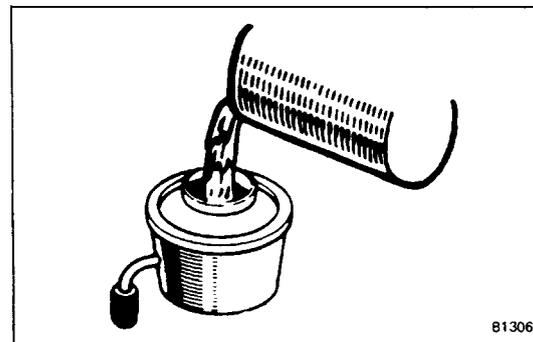


3. WITH ENGINE IDLING, TURN STEERING WHEEL FROM LOCK TO LOCK WHILE DRAINING FLUID

4. STOP ENGINE



5. FILL RESERVOIR TANK WITH FRESH FLUID  
Fluid: ATF DEXRON or DEXRON II



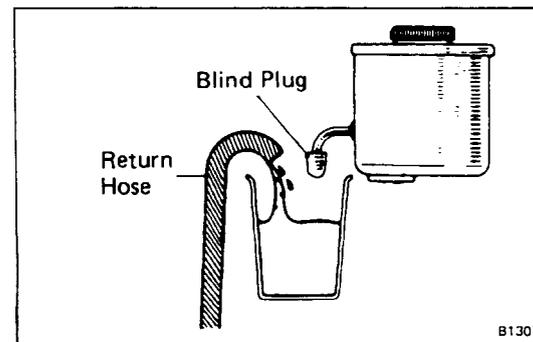
6. START ENGINE AND RUN IT AT 1,000 RPM

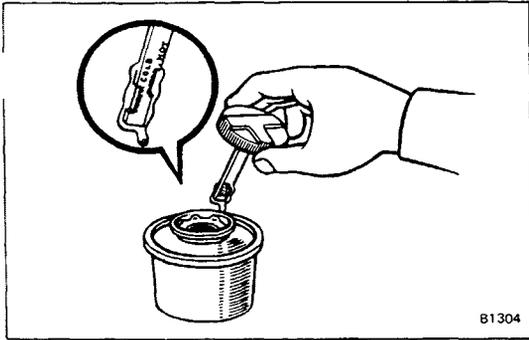
After 1 or 2 seconds, fluid will begin to discharge from the return hose. Stop the engine immediately at this time.

7. REPEAT STEPS 5 AND 6 FOUR OR FIVE TIMES UNTIL THERE IS NO MORE AIR IN FLUID

8. CONNECT RETURN HOSE TO RESERVOIR TANK

9. BLEED POWER STEERING SYSTEM





B1304

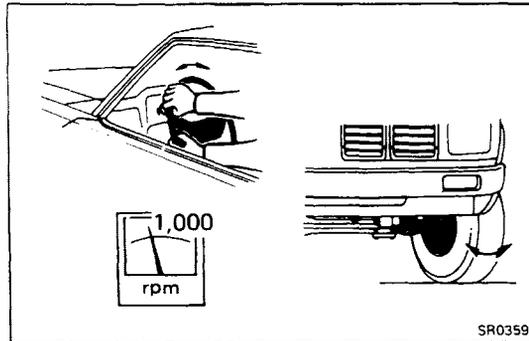
## Bleeding of Power Steering System

### 1. CHECK FLUID LEVEL IN RESERVOIR TANK

Check the fluid level and add fluid if necessary.

Fluid: ATF DEXRON or DEXRON II

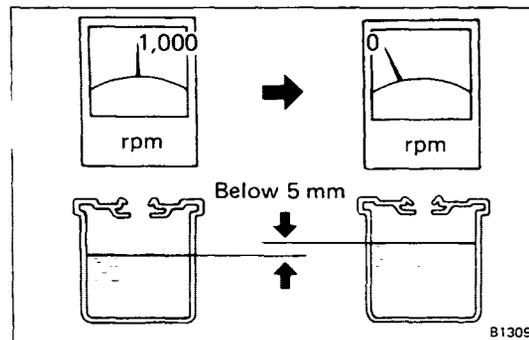
NOTE: Check that the fluid level is within the HOT LEVEL of the dipstick. If the fluid is cold, check that it is within the COLD LEVEL of the dipstick.



SR0359

### 2. START ENGINE AND TURN STEERING WHEEL FROM LOCK TO LOCK THREE OR FOUR TIMES

Run the engine at 1,000 rpm or less.



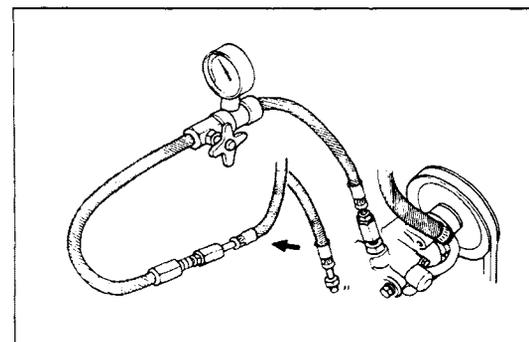
B1309

### 3. CHECK THAT FLUID IN RESERVOIR IS NOT FOAMY OR CLOUDY AND DOES NOT RISE OVER MAXIMUM WHEN ENGINE IS STOPPED

Measure the fluid level with the engine running. Stop the engine and measure the fluid level.

Maximum rise: 5 mm (0.20 in.)

If a problem is found, repeat steps 7 and 8. Repair the vane pump if the problem persists.



## Oil Pressure Check

### 1. CONNECT PRESSURE GAUGE

(a) Using SST, remove the pressure line from the vane pump.

SST 09631-22020

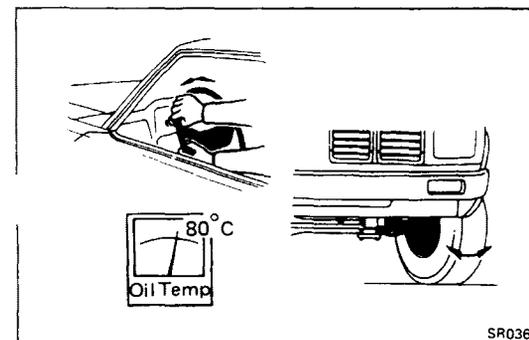
(b) Connect the gauge side of the pressure gauge to the vane pump and the valve side to the pressure line.

(c) Bleed the system. Start the engine and turn the steering wheel from lock to lock two or three times.

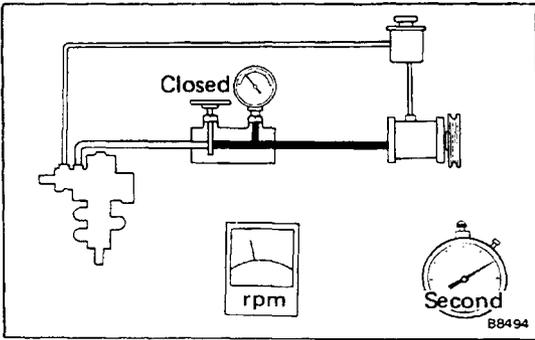
(d) Check that the fluid level is correct.

### 2. CHECK THAT FLUID TEMPERATURE IS AT LEAST 80°C (176°F)

### 3. START ENGINE AND RUN IT AT IDLE



SR0360



**4. CHECK FLUID PRESSURE READING WITH VALVE CLOSED**

Close the pressure gauge valve and observe the reading on the gauge.

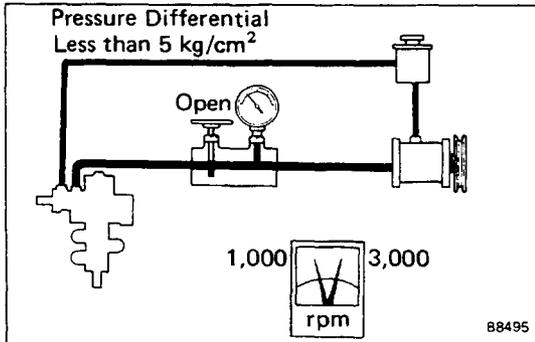
**Minimum pressure:**

2WD 75 kg/cm<sup>2</sup> (1,067 psi, 7,355 kPa)

4WD 65 kg/cm<sup>2</sup> (924 psi, 6,374 kPa)

**NOTE:** Do not keep the valve closed for more than 10 seconds.

If pressure is low, repair or replace the vane pump.



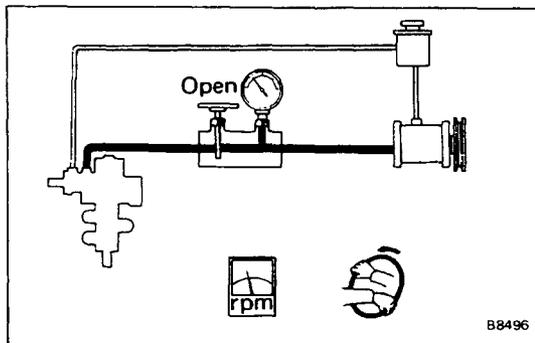
**5. OPEN VALVE FULLY**

**6. CHECK AND RECORD PRESSURE READING AT 1,000 RPM**

**7. CHECK AND RECORD PRESSURE READING AT 3,000 RPM**

Check that there is less than 5 kg/cm<sup>2</sup> (71 psi, 490 kPa) difference in pressure between the 1,000 rpm and 3,000 rpm checks.

If the difference is greater, repair or replace the vane pump flow control valve.



**8. CHECK PRESSURE READING WITH STEERING WHEEL TURNED TO FULL LOCK**

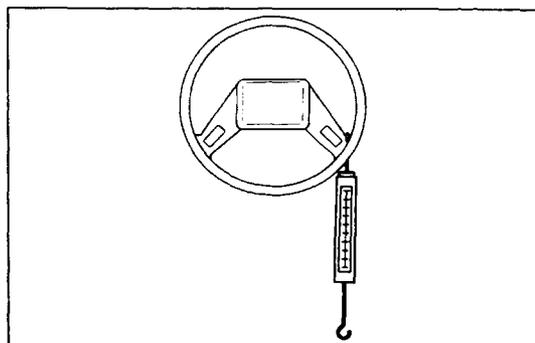
Be sure the pressure gauge valve is fully opened and the engine idling.

**Minimum pressure:**

2WD 75 kg/cm<sup>2</sup> (1,067 psi, 7,355 kPa)

4WD 65 kg/cm<sup>2</sup> (924 psi, 6,374 kPa)

If pressure is low, the gear housing has an internal leak and must be repaired or replaced.



**9. MEASURE STEERING EFFORT**

Center the steering wheel and run the engine at idle.

Using a scale, measure the steering effort in both directions.

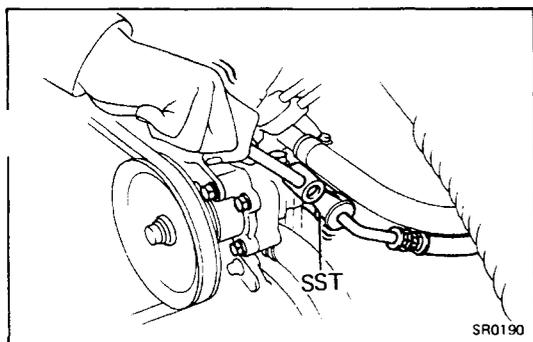
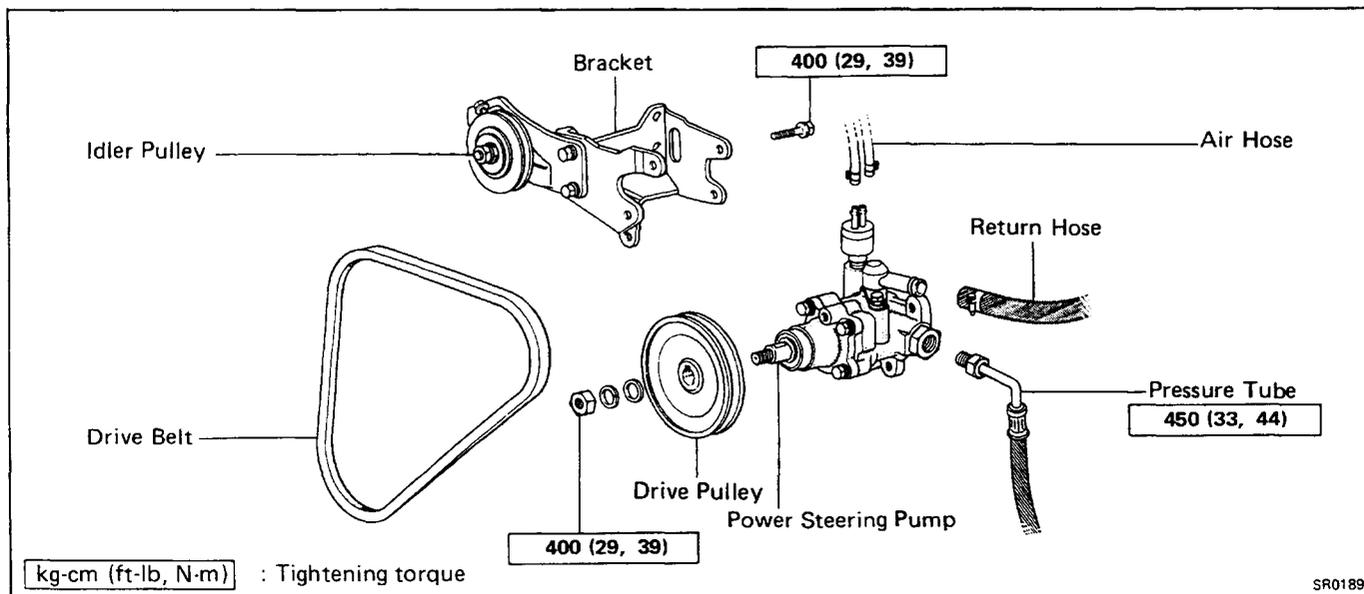
**Maximum steering effort: 4 kg (8.8 lb, 39N)**

If steering effort is excessive, repair the power steering unit.

**NOTE:** Be sure to consider the tire type, pressure and contact surface before making your diagnosis.

# Power Steering Pump

## REMOVAL OF PS PUMP



1. **DISCONNECT AIR HOSES FROM AIR CONTROL VALVE**
  - (a) Disconnect the high tension cords from the distributor.
  - (b) Disconnect the air hoses from the air valve.

2. **DRAW OUT FLUID FROM RESERVOIR TANK**

3. **DISCONNECT RETURN HOSE FROM PS PUMP**

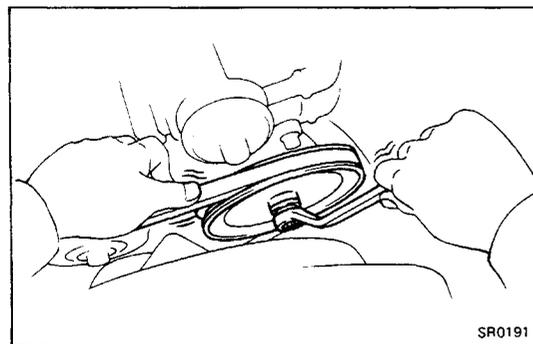
4. **DISCONNECT PRESSURE TUBE FROM PS PUMP**

Using SST, loosen and disconnect the pressure tube.

SST 09631-22020

5. **LOOSEN DRIVE PULLEY NUT**

Push on the drive belt to hold the pulley in place and loosen the pulley nut.



6. **REMOVE DRIVE BELT**

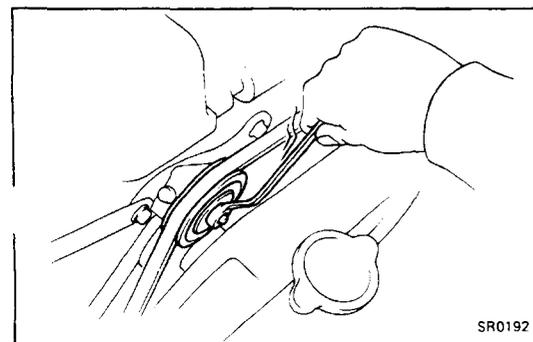
(a) Loosen the idler pulley nut.

(b) Loosen the adjusting bolt and remove the drive belt.

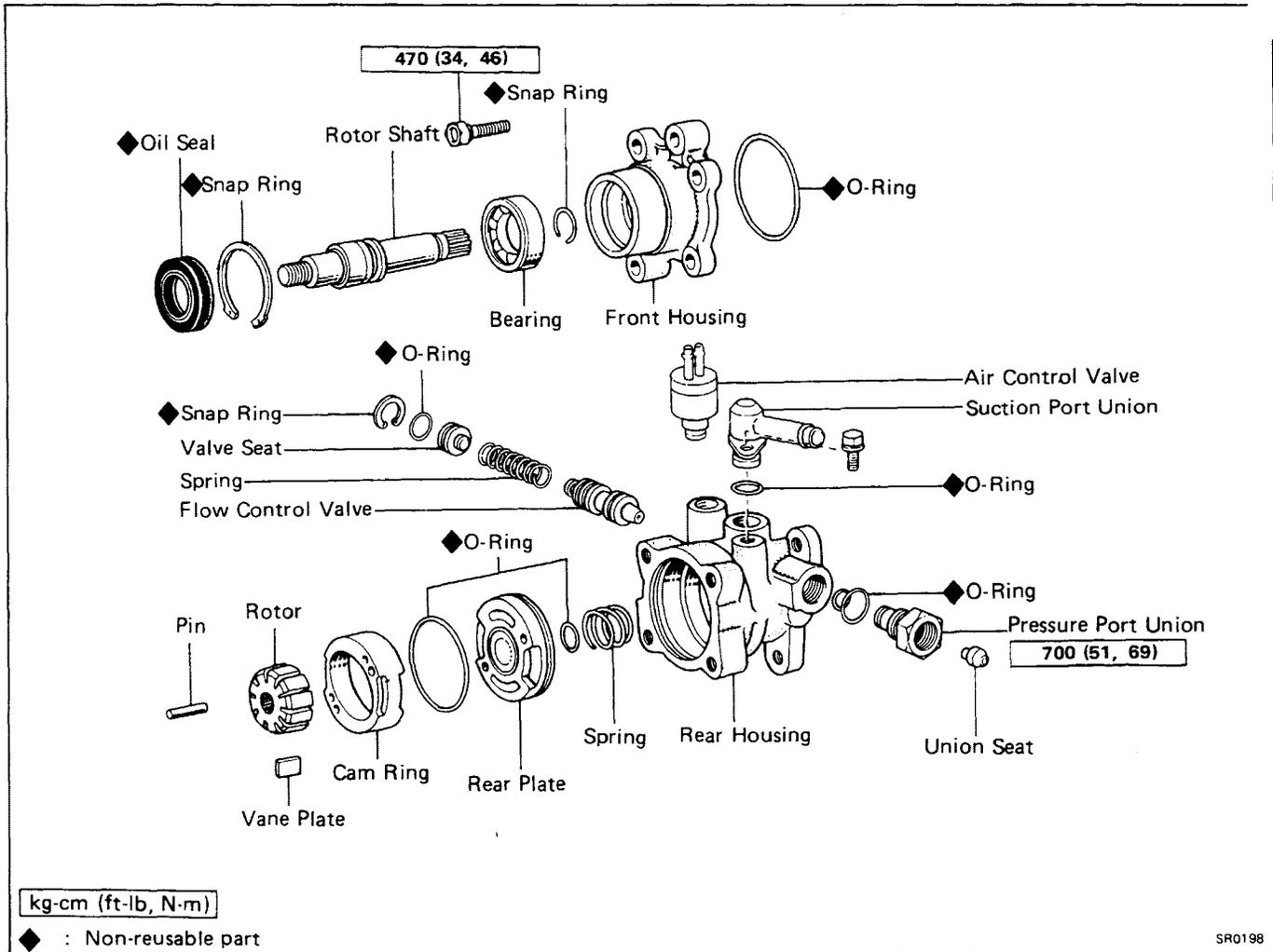
7. **REMOVE DRIVE PULLEY AND WOODRUFF KEY**

8. **REMOVE PS PUMP**

Remove the PS pump mount bolts, and remove the PS pump from the bracket.

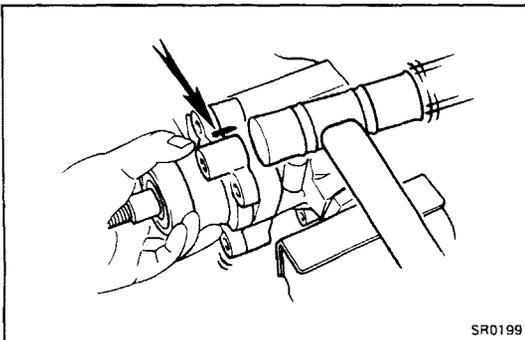


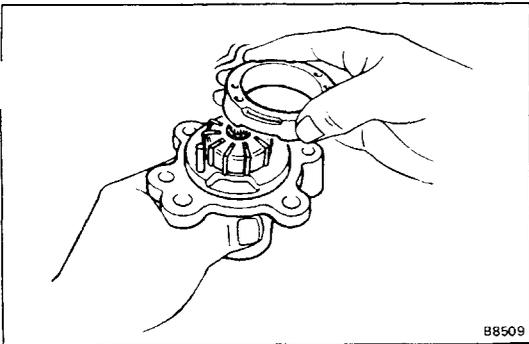
## COMPONENTS



## DISASSEMBLY OF PS PUMP

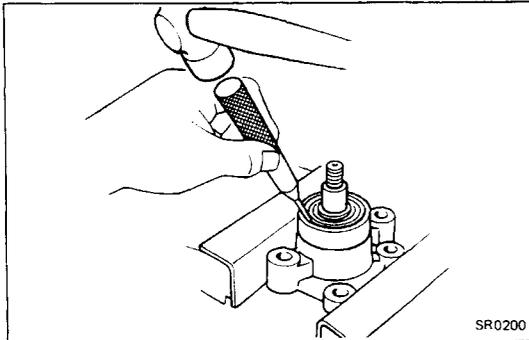
1. CLAMP PS PUMP IN VISE  
CAUTION: Do not tighten the vise too tight.
2. REMOVE AIR CONTROL VALVE FROM REAR HOUSING (22R-E only)
3. REMOVE SUCTION PORT UNION FROM REAR HOUSING
4. REMOVE FRONT HOUSING
  - (a) Place matchmarks on the front and rear housing.
  - (b) Remove the four front housing bolts.
  - (c) Using a plastic hammer, tap off the front housing.
 CAUTION: Be careful that the vane plates, rotor and cam ring do not fall out.





### 5. REMOVE CAM RING, ROTOR AND VANE PLATES

**CAUTION:** Be careful not to scratch the cam ring, rotor or vane plates.



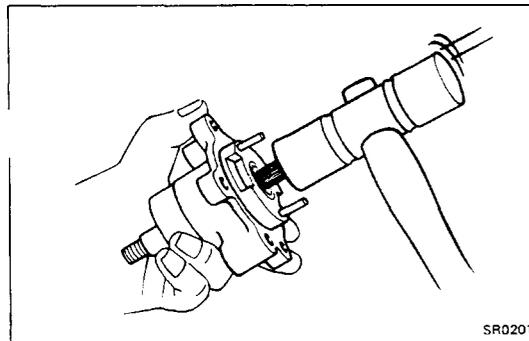
### 6. REMOVE ROTOR SHAFT

(a) Clamp the front housing in a vise.

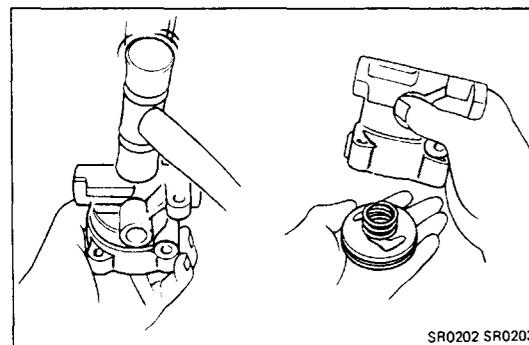
**CAUTION:** Do not tighten the vise too tight.

(b) Using a chisel and hammer, pry off the oil seal.

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



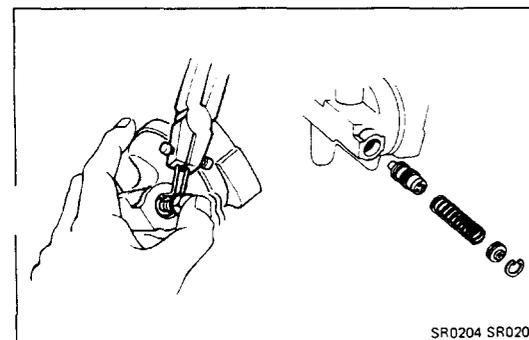
(d) Using a plastic hammer, lightly tap the rotor shaft out of the front housing.



### 7. REMOVE REAR PLATE AND SPRING

Using a plastic hammer, tap the bottom end of the rear housing, and remove the rear plate and spring.

**CAUTION:** Avoid gripping the rear plate with pliers as this could damage it.



### 8. REMOVE FLOW CONTROL VALVE

(a) Temporarily install a bolt to the plug.

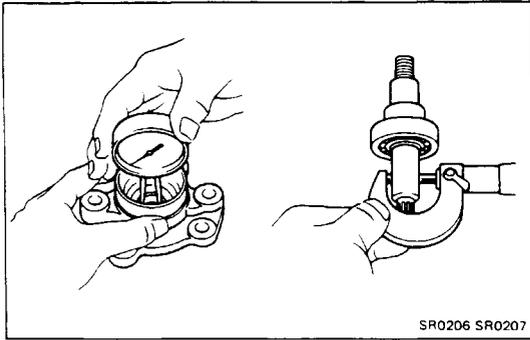
(b) Push the bolt and remove the snap ring with snap ring pliers.

(c) Pull out the bolt and remove the plug.

(d) Remove the spring and flow control valve by hand.

**CAUTION:** Use care not to drop, scratch or nick this valve.

### 9. REMOVE PRESSURE PORT UNION



SR0206 SR0207

## INSPECTION OF PS PUMP

### 1. INSPECT BUSHING AND MEASURE BUSHING OIL CLEARANCE

(a) Check the bushing for wear or damage. The bushing cannot be replaced separately.

If wear or damage is found, replace entire housing.

(b) Check the oil clearance between the bushing and rotor shaft.

**Maximum oil clearance: 0.07 mm (0.0028 in.)**

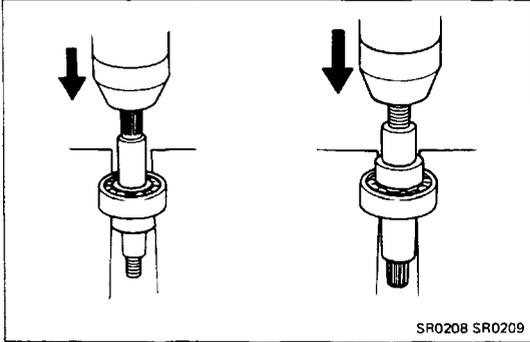
### 2. IF NECESSARY, REPLACE ROTOR SHAFT BEARING

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

(b) Using a press, press out the bearing.

(c) Using a press, press in the bearing.

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



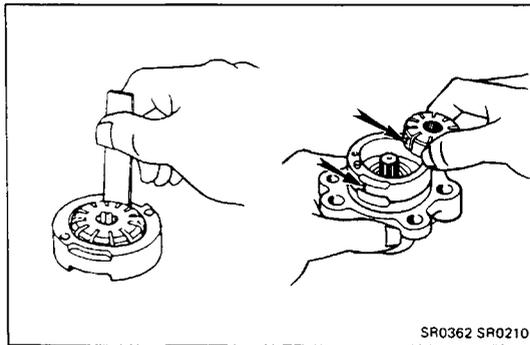
SR0208 SR0209

### 3. INSPECT ROTOR AND CAM RING

Measure the cam ring thickness. Check that the difference between the rotor and cam ring measurement is less than maximum.

**Maximum difference: 0.06 mm (0.0024 in.)**

If the difference is excessive, replace the cam ring with one having the same letter as on the rotor.



SR0362 SR0210

### 4. INSPECT AND MEASURE VANE PLATES

(a) Check the vane plates for wear or scratches.

(b) Measure the length, height and thickness of the vane plates.

**Minimum length: 14.97 mm (0.5894 in.)**

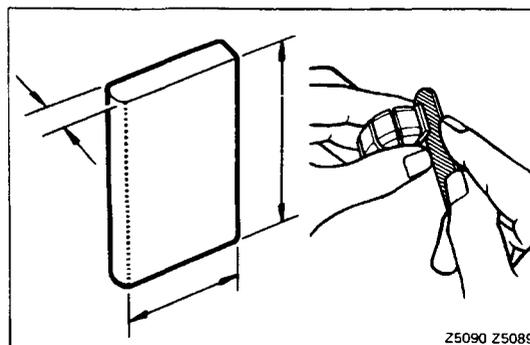
**Minimum height: 7.8 mm (0.307 in.)**

**Minimum thickness: 1.7 mm (0.067 in.)**

(c) Measure the clearance between the vane plate and rotor groove.

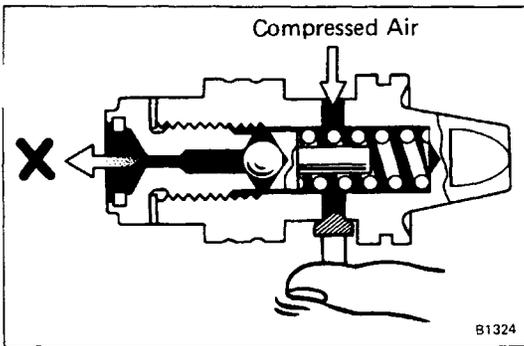
**Maximum clearance: 0.06 mm (0.0024 in.)**

**NOTE:** There are five vane lengths with the following rotor and cam ring numbers:



Z5090 Z5089

Rotor and cam ring number	Vane length	mm (in.)
None	14.996 — 14.998	(0.5904 — 0.5905)
1	14.994 — 14.996	(0.5903 — 0.5904)
2	14.992 — 14.994	(0.5902 — 0.5903)
3	14.992 — 14.994	(0.59016 — 0.59024)
4	14.988 — 14.990	(0.5901 — 0.5902)



### 5. INSPECT FLOW CONTROL VALVE

- (a) Check the flow control valve for wear or damage.
- (b) Apply fluid to the valve and check that it falls smoothly into the valve hole by its own weight.
- (c) Check the flow control valve for leakage.
  - Close one of the holes and apply compressed air [4 or 5 kg/cm<sup>2</sup> (57 or 71 psi, 392 or 490 kPa)] into the opposite side.
  - Confirm that air does not come out from the end hole.

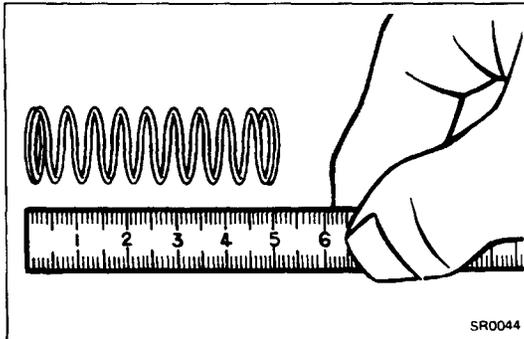
If necessary, replace the valve with one having the same letter on the rear housing.

### 6. INSPECT FLOW CONTROL VALVE SPRING

Check that the spring is within specification.

**Spring length: 47 – 50 mm (1.85 – 1.97 in.)**

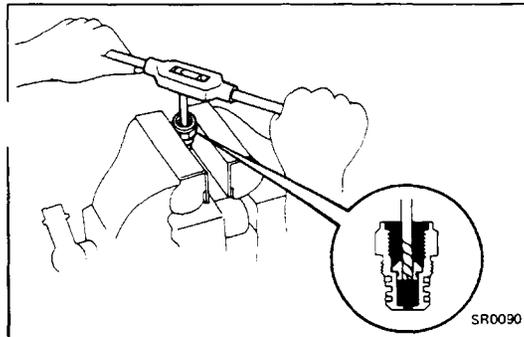
If the spring is not within specification, replace it.



### 7. IF NECESSARY, REPLACE UNION SEAT

- (a) Using a screw extractor, remove the union seat.
- (b) Install a new floating type union seat.

**NOTE:** Only floating type parts are available.



**ASSEMBLY OF PS PUMP**

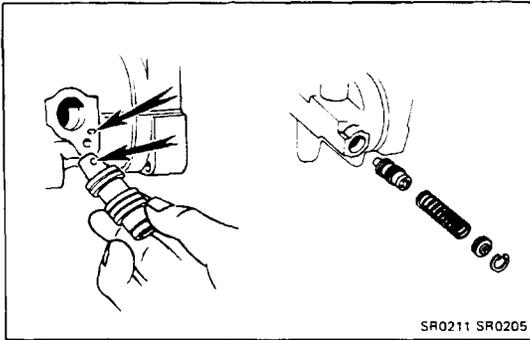
(See page SR-46)

**1. INSTALL FLOW CONTROL VALVE**

NOTE: Be sure the letter inscribed on the flow control valve matches the letter stamped on the rear of the pump body.

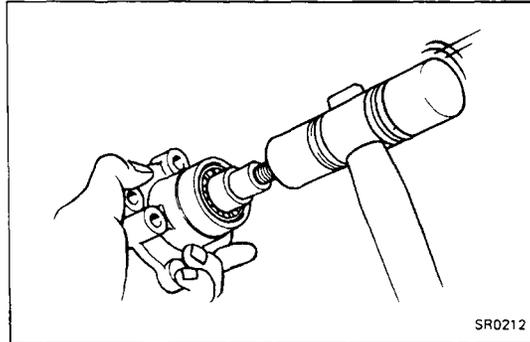
Inscribed mark: A, B, C, D, E or F

Install the flow control valve, spring, plug and snap ring.

**2. INSTALL PRESSURE PORT UNION**

Install and torque the union.

Torque: 700 kg-cm (51 ft-lb, 69 N·m)

**3. INSTALL ROTOR SHAFT TO FRONT HOUSING**

Install the rotor shaft into the front housing by tapping it in with a plastic hammer.

**4. INSTALL SNAP RING**

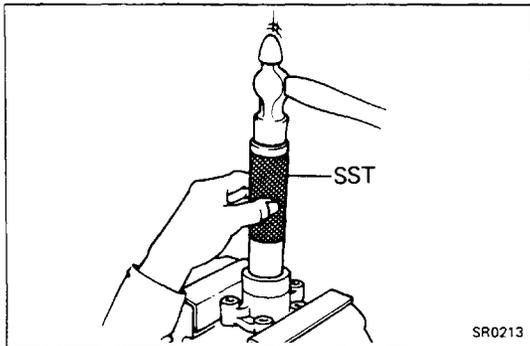
Using snap ring pliers, install the snap ring to the front housing.

**5. INSTALL OIL SEAL**

(a) Apply a light coat of MP grease to the oil seal lip.

(b) Using SST and hammer, install the oil seal.

SST 09608-30011

**6. INSTALL O-RING****7. INSTALL CAM RING**

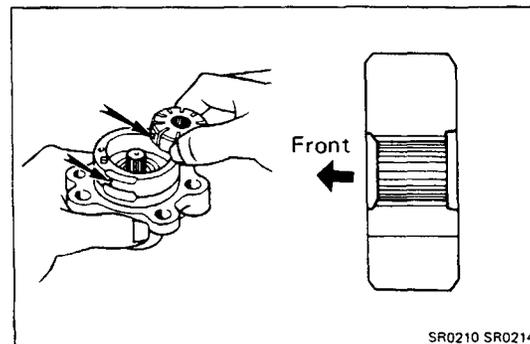
Align the fluid passages of the cam ring and front housing, and install the cam ring.

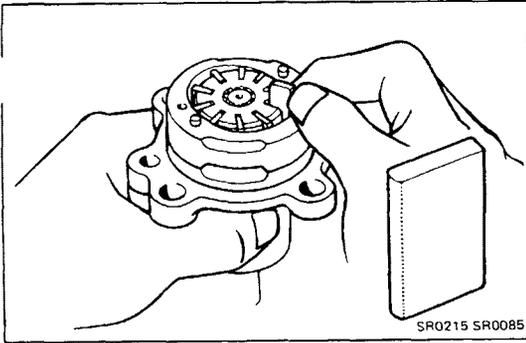
**8. INSTALL ROTOR**

Install the rotor with the chamfered end facing toward the front.

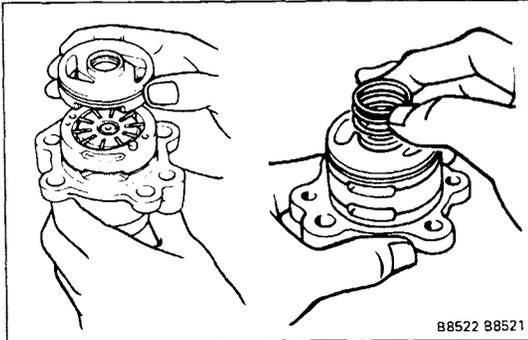
NOTE: Be sure the letters inscribed on the cam ring and rotor match.

Inscribed mark: 1, 2, 3, 4 or None

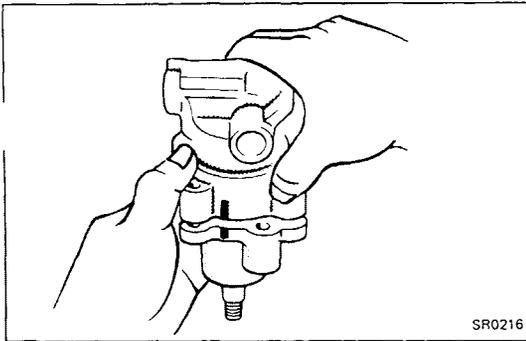


**9. INSTALL VANE PLATES**

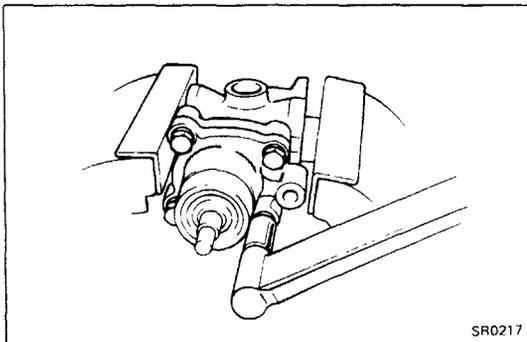
Install the vane plates with the round end facing outward.

**10. INSTALL REAR PLATE AND SPRING**

- (a) Align the fluid passages of the rear plate and cam ring, and install the rear plate with the spring.
- (b) Place the spring on the rear plate.

**11. INSTALL REAR HOUSING**

- (a) Align the matchmarks on the front and rear housing, and assemble them.
- (b) Tighten the front and rear housing mounting bolts by hand.

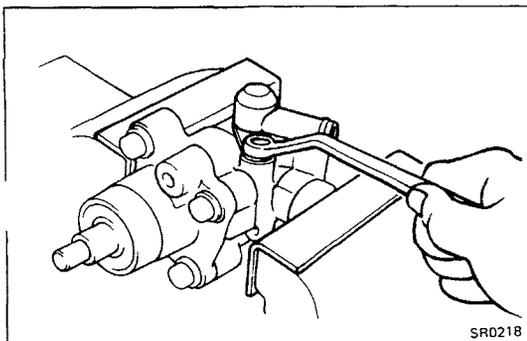
**12. TIGHTEN FOUR HOUSING BOLTS**

- (a) Clamp the rear housing in a vise.

**CAUTION:** Do not tighten the vise too tight.

- (b) Tighten the four housing bolts evenly in 3 or 4 passes.

**Torque:** 470 kg-cm (34 ft-lb, 46 N·m)

**13. INSTALL UNION TO REAR HOUSING**

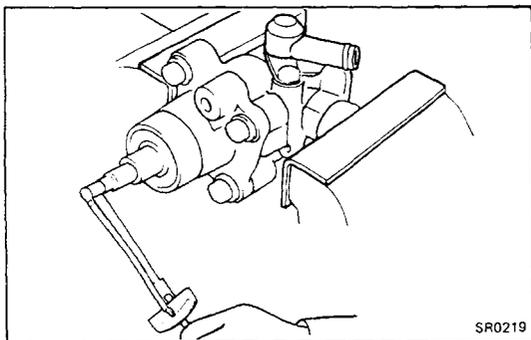
Insert and tighten the union.

**Torque:** 130 kg-cm (9 ft-lb, 13 N·m)

**14. INSTALL AIR CONTROL VALVE TO REAR HOUSING (22R-E only)**

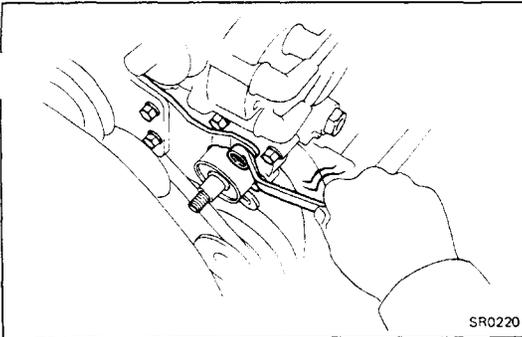
Install and tighten the air control valve.

**Torque:** 370 kg-cm (27 ft-lb, 36 N·m)

**15. CHECK ROTOR SHAFT ROTATION CONDITION**

- (a) Check that the rotor shaft rotates smoothly without abnormal noise.
- (b) Provisionally install the pulley nut and check the rotating torque.

**Rotating torque: Less than 2.8 kg-cm  
(2.4 in.-lb, 0.3 N·m)**



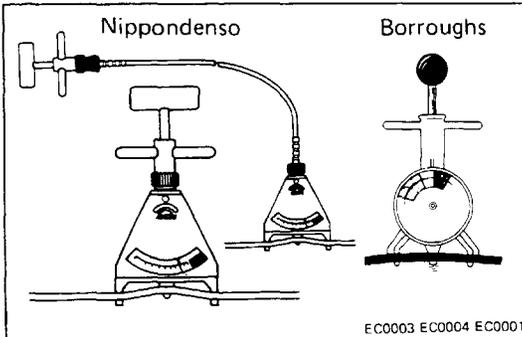
## INSTALLATION OF PS PUMP

(See page SR-45)

### 1. INSTALL PS PUMP

Place the PS pump in position and torque the mount bolts.

**Torque: 400 kg-cm (29 ft-lb, 39 N·m)**



### 2. INSTALL PULLEY AND DRIVE BELT

(a) Install the woodruff key, pulley and set nut.

(b) Install the drive belt.

(c) Turn the adjusting bolt until the belt tension is at specified value.

Belt tension gauge:

Nippondenso BTG-20 (95506-00020) or  
Borroughs No. BT-33-73F

Drive belt tension:

New belt	$125 \pm 25$ lb
Used belt	$80 \pm 20$ lb

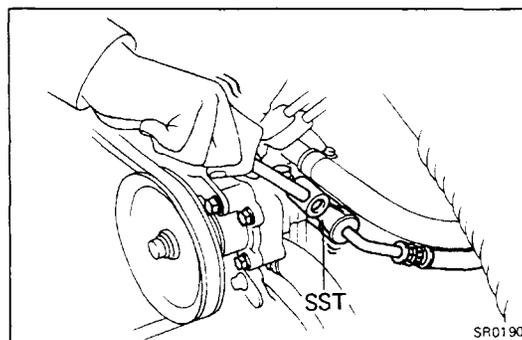
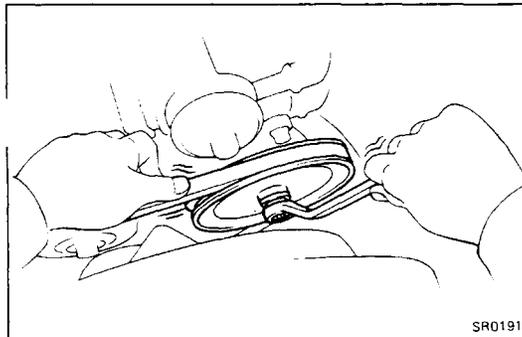
NOTE: "New belt" refers to a brand new belt which has never before been used.

"Used belt" refers to a belt which has been used on a running engine for 5 minutes or more.

(d) Tighten the idler pulley nut and adjusting bolt.

(e) Push down on the drive belt to hold the pulley in place and torque the pulley set nut.

**Torque: 440 kg-cm (32 ft-lb, 43 N·m)**



### 3. CONNECT PRESSURE TUBE TO PS PUMP

Using SST, torque the flare nut.

SST 09631-22020

**Torque: 450 kg-cm (33 ft-lb, 44 N·m)**

### 4. CONNECT RETURN HOSE TO PS PUMP

### 5. CONNECT AIR HOSES TO AIR CONTROL VALVE

(a) Connect the air hoses to the air control valve.

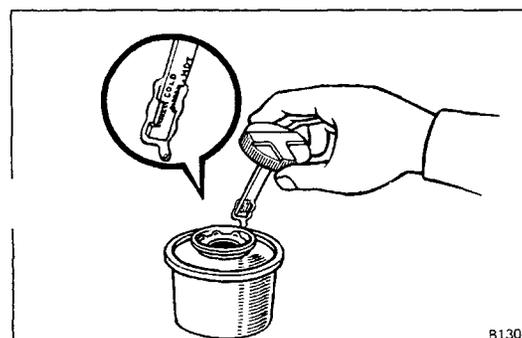
(b) Connect the high tension cords to the distributor.

### 6. FILL RESERVOIR WITH FLUID

Fluid: ATF DEXRON or DEXRON II

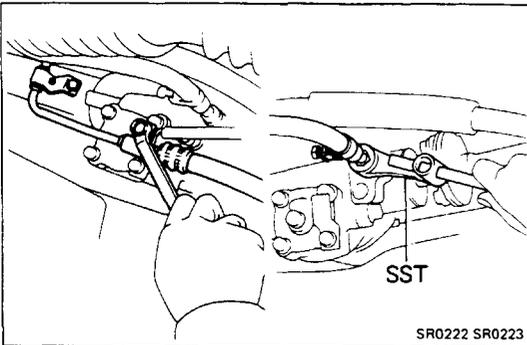
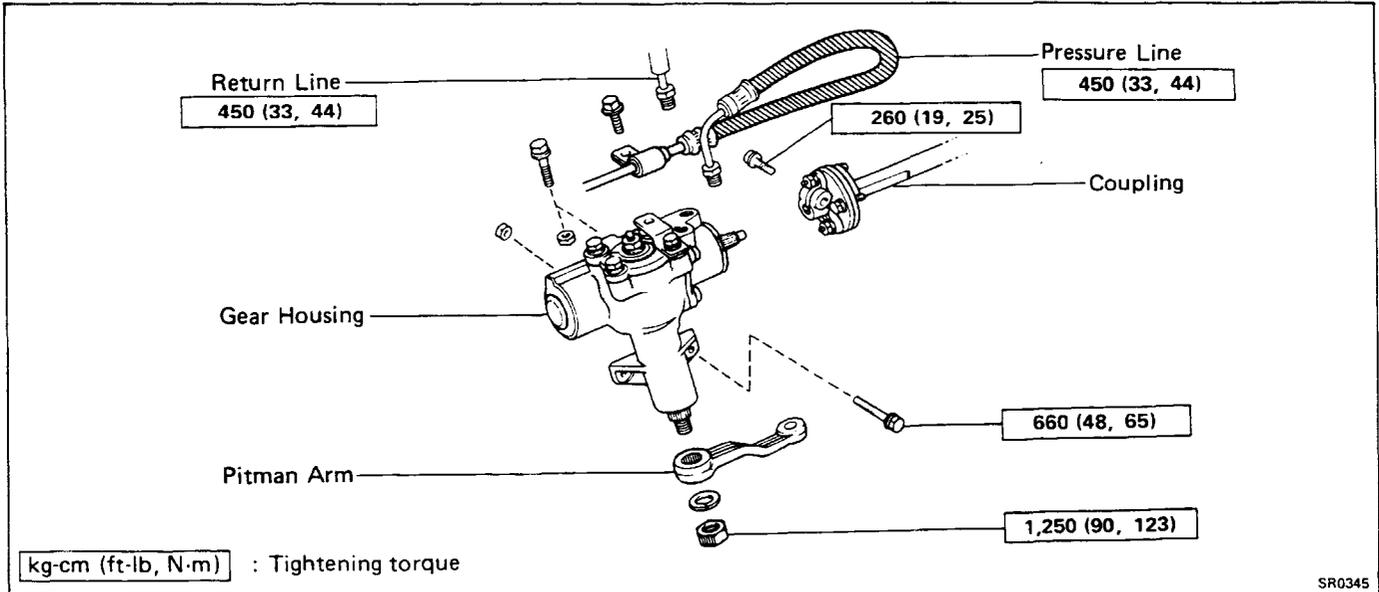
### 7. BLEED POWER STEERING

### 8. CHECK FOR FLUID LEAKS



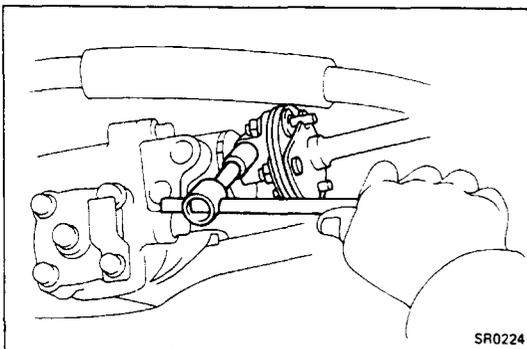
## Gear Housing (2WD)

### REMOVAL OF GEAR HOUSING



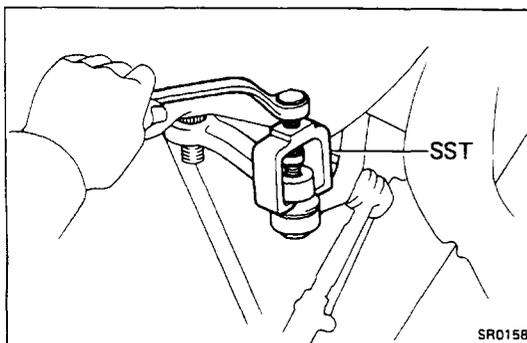
#### 1. DISCONNECT RETURN LINE AND PRESSURE LINE

- (a) Remove the pressure line clamp bolts.
- (b) Using SST, disconnect the pressure and return lines.  
SST 09631-22020



#### 2. REMOVE COUPLING BOLT

#### 3. REMOVE PITMAN ARM MOUNT NUT



#### 4. DISCONNECT RELAY ROD FROM PITMAN ARM

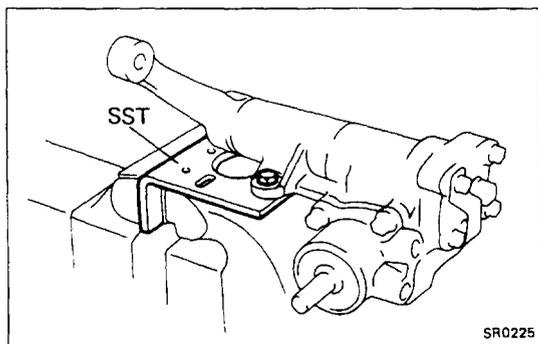
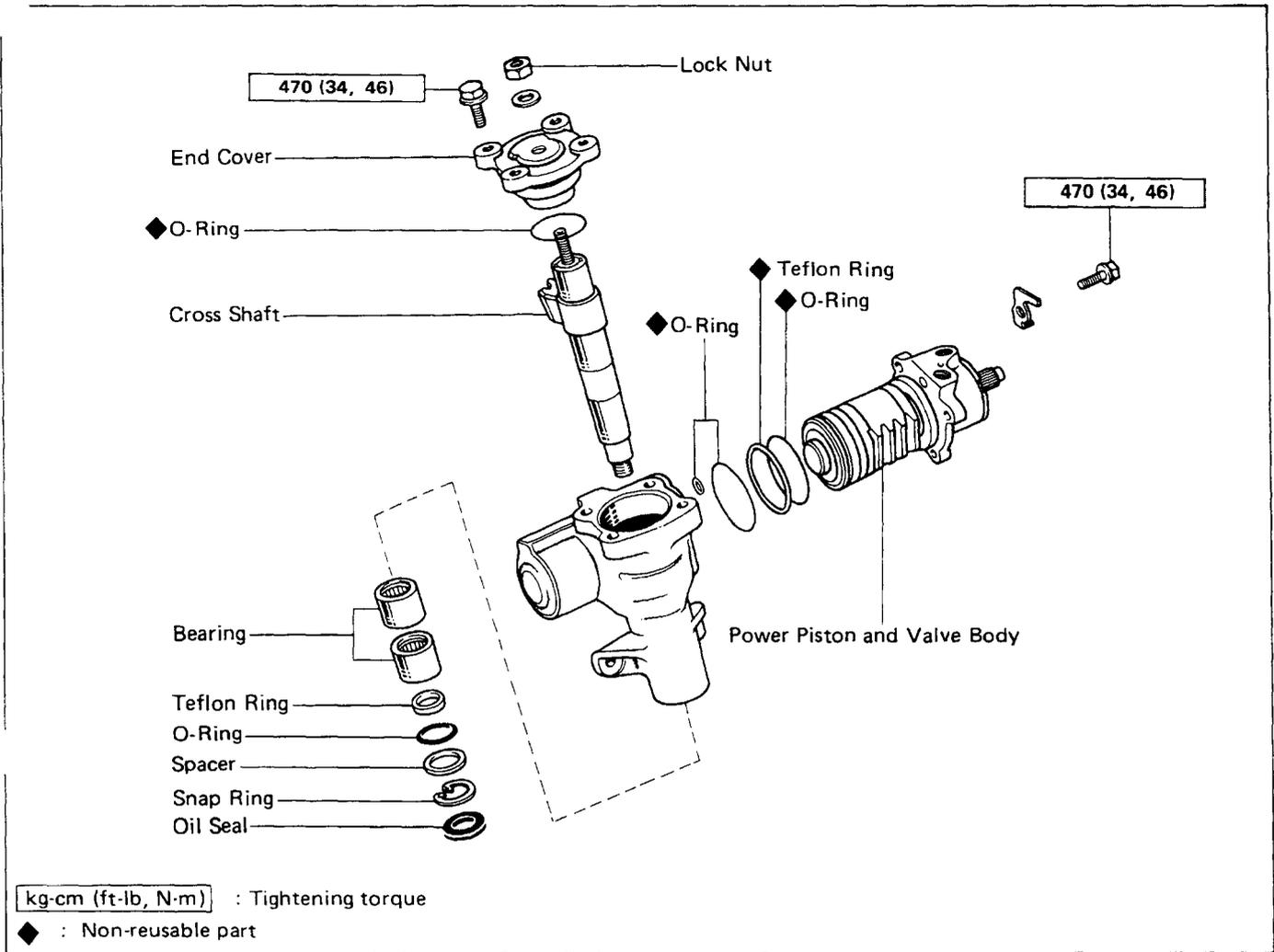
- (a) Remove the relay rod mount nut.
- (b) Using SST, disconnect the relay rod from the pitman arm.

SST 09611-22012

#### 5. REMOVE GEAR HOUSING

Remove the three bolts and take out the gear housing.

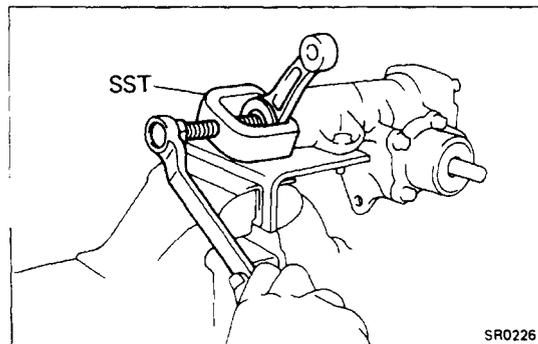
COMPONENTS



DISASSEMBLY OF GEAR HOUSING

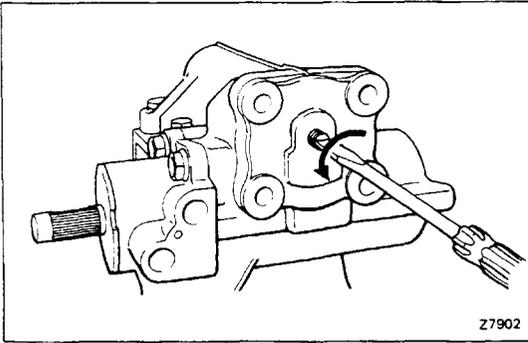
1. MOUNT HOUSING ON STAND

Mount the gear housing on SST and clamp SST in a vise.  
SST 09630-00011



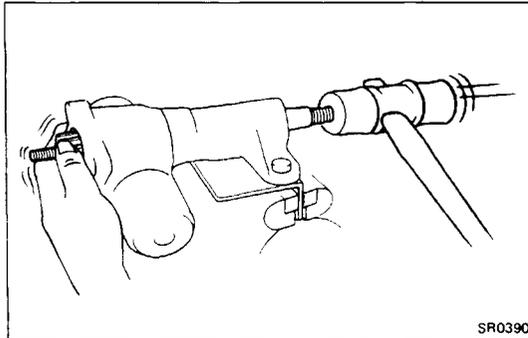
2. REMOVE PITMAN ARM

Using SST, remove the pitman arm.  
SST 09610-55012



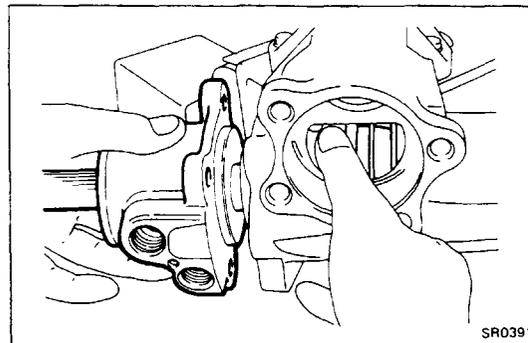
### 3. REMOVE END COVER

- (a) Remove the adjusting screw lock nut.
- (b) Remove the four bolts.
- (c) Screw in the adjusting screw until the cover comes off.



### 4. REMOVE CROSS SHAFT

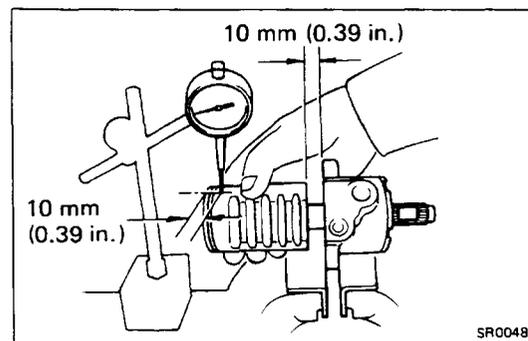
Using a plastic hammer, tap on the cross shaft end and pull out the shaft.



### 5. REMOVE WORM GEAR VALVE BODY ASSEMBLY

- (a) Remove the four cap screws from the housing.
- (b) Hold the power piston nut with your thumb so it cannot move, and turn the worm shaft clockwise. Then withdraw the valve body and power piston assembly.

**CAUTION:** Ensure that the power piston nut does not come off the worm shaft.



## INSPECTION AND REPAIR OF STEERING GEAR HOUSING

### 1. CHECK BALL CLEARANCE

- (a) Mount the valve body in a vise.
- (b) Using a dial indicator, check the ball clearance. Move the worm gear up and down.

**Maximum ball clearance: 0.15 mm (0.0059 in.)**

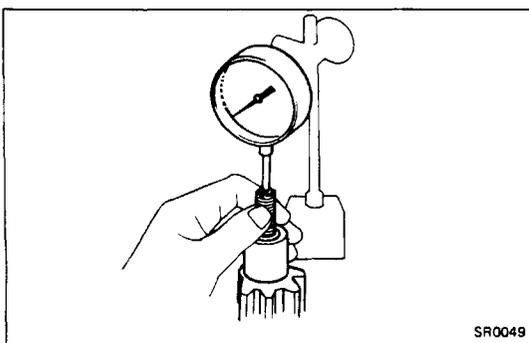
If clearance is excessive, the power control valve assembly must be replaced.

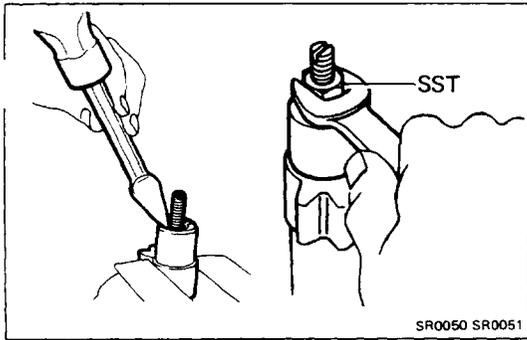
### 2. CHECK CROSS SHAFT ADJUSTING SCREW END PLAY

- (a) Clamp the cross shaft in a vise.
- (b) Using a dial indicator, check the end play.

**End play: 0.03 – 0.05 mm (0.0012 – 0.0020 in.)**

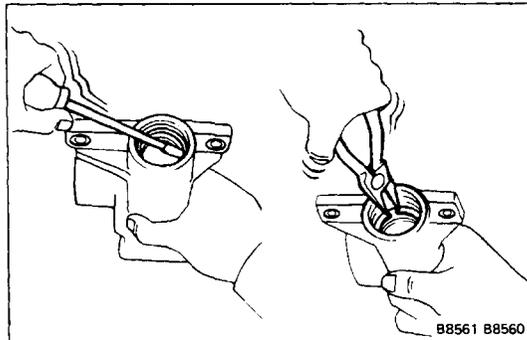
If end play is not correct, see step 4 for adjustment procedure.





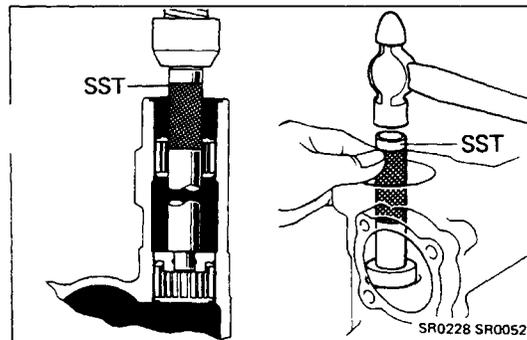
**3. IF NECESSARY, ADJUST END PLAY**

- (a) Using a chisel and hammer, remove the lock nut stake.
- (b) Using SST, loosen the lock nut.  
SST 09630-00011
- (c) Adjust the adjusting screw for correct end play and tighten the lock nut.
- (d) Stake the lock nut.

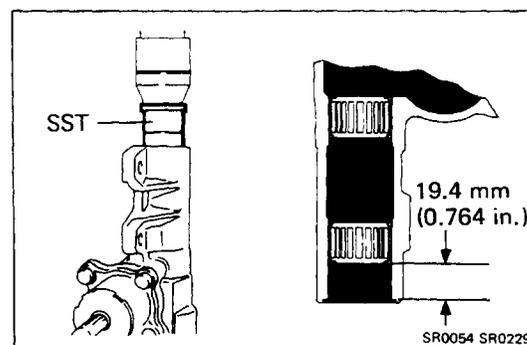


**4. REPLACE TEFLON RING AND NEEDLE ROLLER BEARINGS**

- (a) Pry out the oil seal from the pitman arm end of the housing.
- (b) Using snap ring pliers, remove the snap ring.
- (c) Remove the metal spacer, teflon ring and O-ring.



- (d) Using SST, drive out the bearings.  
SST 09630-00011

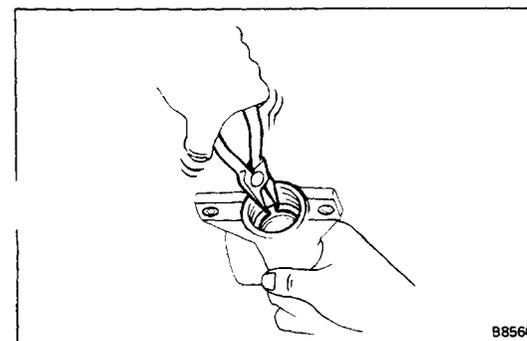


- (e) Using SST, install the top bearing with the long flange out. Drive the bearing in flush with the inside casting surface.

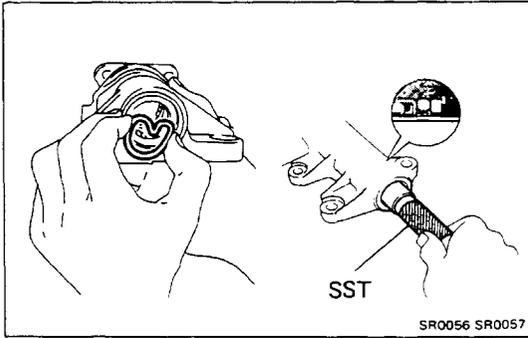
SST 09630-00011

- (f) Using SST, install the lower bearing with the long flange out. The SST will bottom and correctly position the bearing.

SST 09630-00011



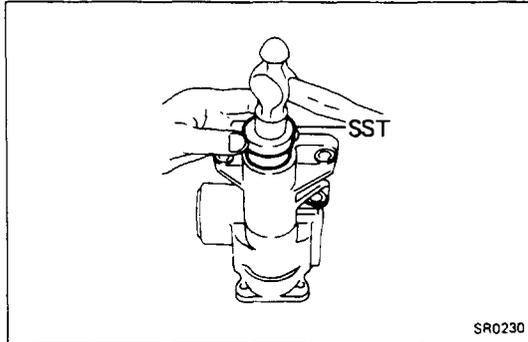
- (g) Install the O-ring and metal spacer.
- (h) Using snap ring pliers, install the snap ring.



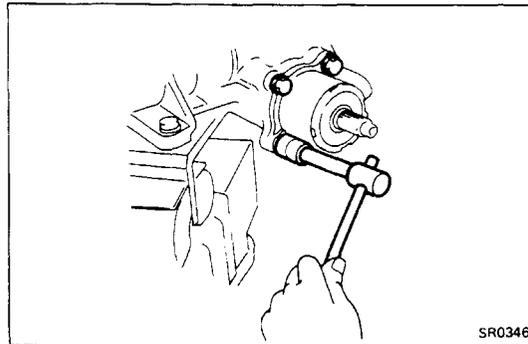
- (i) Form the seal into a heart shape and install it by hand.
- (j) Using SST, form the seal.

**CAUTION:** The seal must be squeezed before inserting it into the sector shaft or damage will result.

SST 09630-00011



- (k) Using SST, drive the oil seal into the gear housing.
- SST 09630-00011



## ASSEMBLY OF GEAR HOUSING

(See page SR-55)

### 1. INSTALL WORM GEAR VALVE BODY

- (a) Install two new O-rings.
- (b) Insert the valve body into the housing.
- (c) Torque cap screws in a diagonal pattern.

**Torque: 470 kg-cm (34 ft-lb, 46 N·m)**

### 2. INSPECT WORM SHAFT BEARING

**NOTE:** If a new worm gear valve body is being installed, skip this procedure.

- (a) Using SST, remove the lock nut.  
SST 09630-00011
- (b) Using SST, remove the bearing cap.  
SST 09630-00011
- (c) Remove the worm bearing and O-ring.
- (d) Install a new O-ring and bearing cap.

### 3. ADJUST WORM BEARING PRELOAD

- (a) Using SST, tighten the bearing cap until the preload is correct.

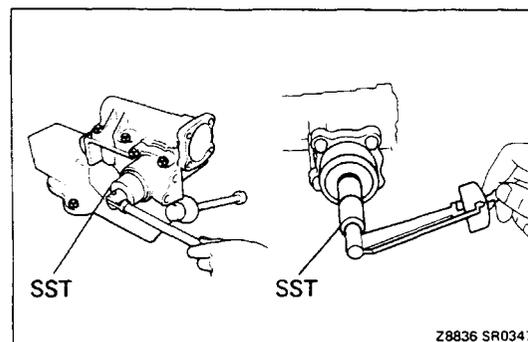
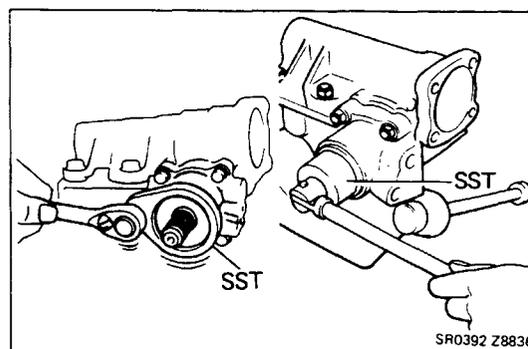
SST 09630-00011

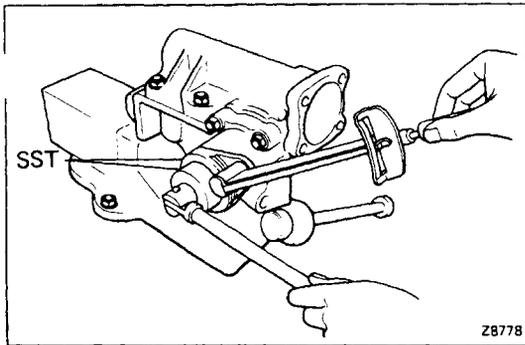
- (b) Using SST and torque wrench, check the preload of the bearing.

SST 09616-00010

**Preload: 4.0–6.5 kg-cm (3.5–5.6 in.-lb, 0.4–0.6 N·m)**

**NOTE:** Hold the power piston nut to prevent it from turning.



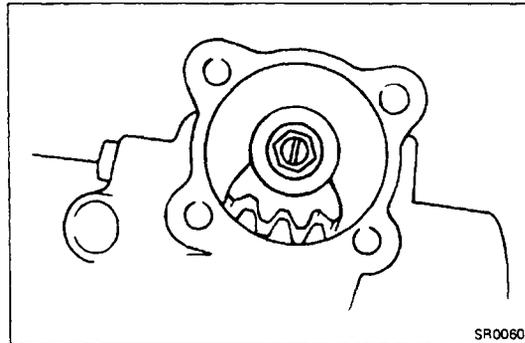


(c) Using SST, tighten the lock nut while holding the bearing cap with SST.

SST 09630-00011

**Torque: 500 kg-cm (36 ft-lb, 49 N·m)**

(d) Recheck the preload.



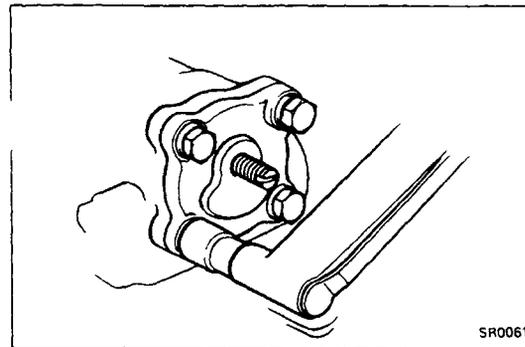
**4. INSTALL CROSS SHAFT AND END COVER**

(a) Install a new O-ring on the end cover.

(b) Assemble the cross shaft to the end cover.

**NOTE:** Fully loosen the adjusting screw.

(c) Set the worm gear at the center of the gear housing.



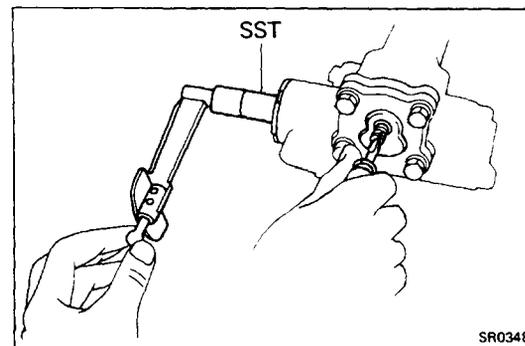
(d) Insert and push the cross shaft into the gear housing so that the center teeth mesh together.

(e) Install the four cap bolts, Torque the bolts in a diagonal pattern.

**Torque: 470 kg-cm (34 ft-lb, 46 N·m)**

**5. DETERMINE CENTER POSITION OF GEAR BOX**

Turn the worm shaft to full lock in both directions and determine the exact center.



**6. ADJUST TOTAL PRELOAD**

(a) Install SST with a torque wrench on the center worm shaft.

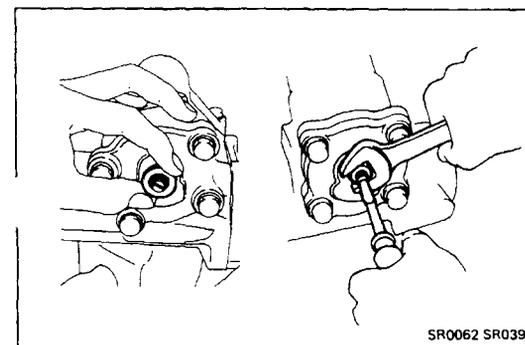
SST 09616-00010

(b) Turn the adjusting screw while measuring the preload until it is correct.

**Total preload:**

**Add worm shaft preload**

**2 – 3 kg-cm (1.7 – 2.6 in.-lb, 0.2 – 0.3 N·m)**



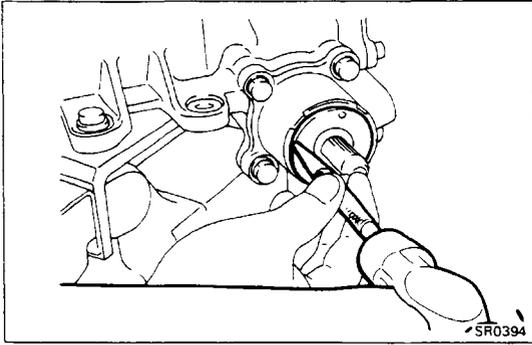
**7. INSTALL NEW WASHER**

**8. INSTALL AND TIGHTEN LOCK NUT**

Torque the lock nut while holding the adjusting screw.

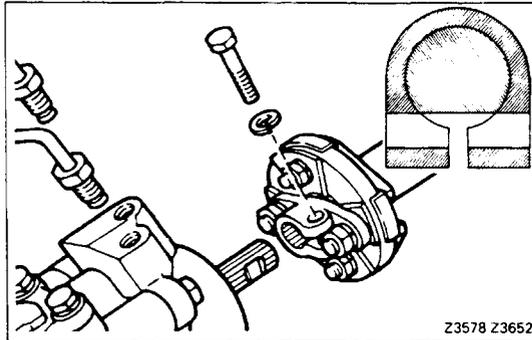
**Torque: 470 kg-cm (34 ft-lb, 46 N·m)**

**9. RECHECK TOTAL PRELOAD**



## 10. STAKE LOCK NUT

Using a punch and hammer, stake the lock nut at three places.



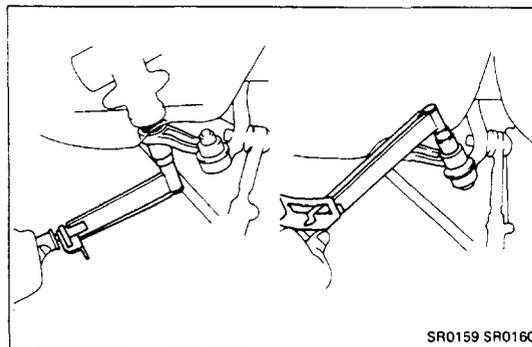
## INSTALLATION OF GEAR HOUSING

(See page SR-54)

### 1. INSTALL GEAR HOUSING

- Line up the marks on the coupling and worm shaft.
- Torque the three mounting bolts.

Torque: 660 kg-cm (48 ft-lb, 65 N·m)



### 2. CONNECT PITMAN ARM TO GEAR HOUSING

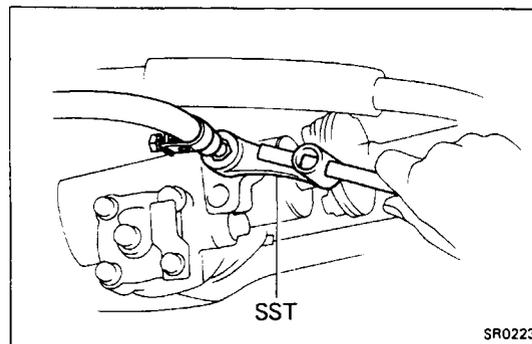
- Align the marks on the pitman arm and cross shaft.
- Torque the pitman arm nut.

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

### 3. CONNECT PITMAN ARM TO RELAY ROD

Connect the pitman arm to the relay rod and torque the mount nut.

Torque: 920 kg-cm (67 ft-lb, 90 N·m)



### 4. TORQUE COUPLING SET BOLT

Torque the coupling mount bolt.

Torque: 260 kg-cm (19 ft-lb, 25 N·m)

### 5. CONNECT PRESSURE LINE AND RETURN LINE

- Using SST, install and torque the union nuts.

Torque: 450 kg-cm (33 ft-lb, 44 N·m)

SST 09631-22020

NOTE: Be sure the hose is not touching the fender.

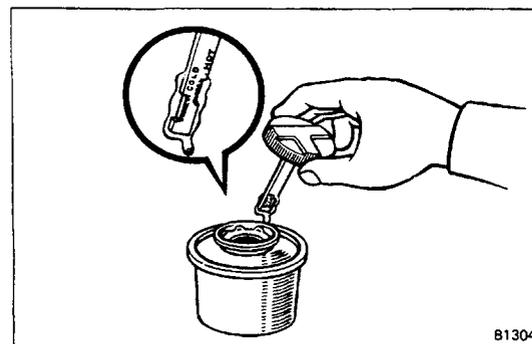
- Install the pressure line clamp bolts.

### 6. FILL RESERVOIR TANK WITH FLUID

Fluid: ATF DEXRON or DEXRON II

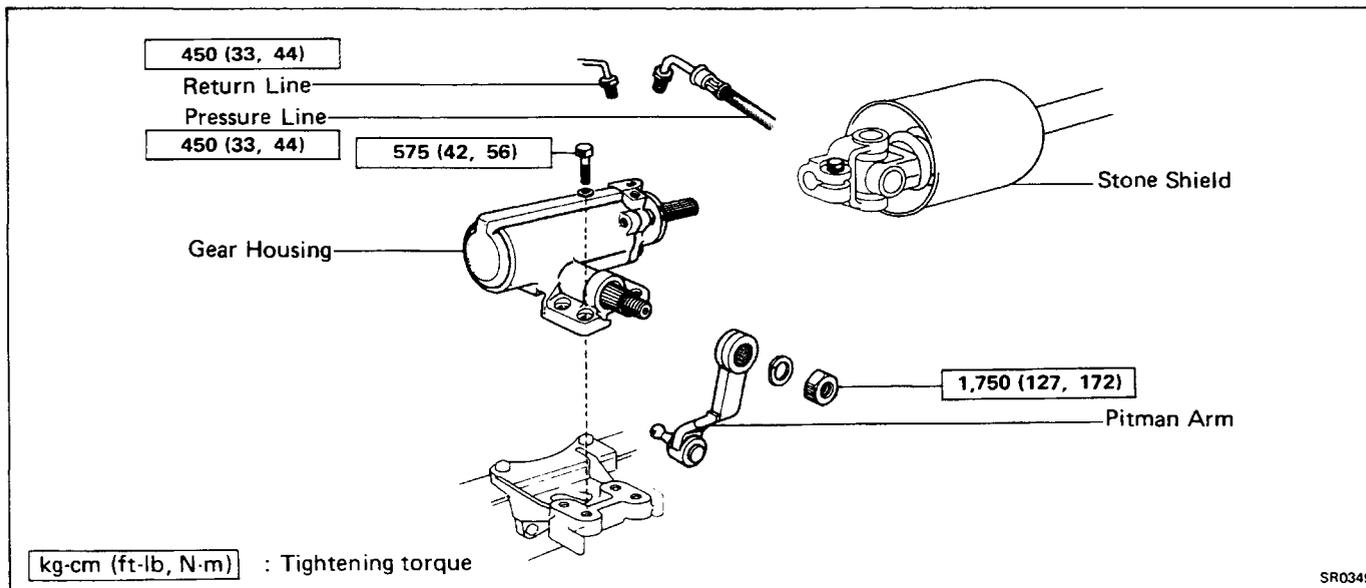
### 7. BLEED SYSTEM AND PERFORM PRESSURE CHECK

(See page SR-43)



## Gear Housing (4WD)

### REMOVAL OF GEAR HOUSING



SR0349

#### 1. REMOVE BATTERY

#### 2. DISCONNECT RETURN LINE AND PRESSURE LINE

- Remove the engine under cover.
- Remove the pressure and return line clamp bolts.
- Using SST, disconnect the pressure and return lines from the gear housing.

SST 09631-22020

#### 3. REMOVE COUPLING BOLT

- Remove the stone shield from the gear housing.
- Remove the coupling bolt.

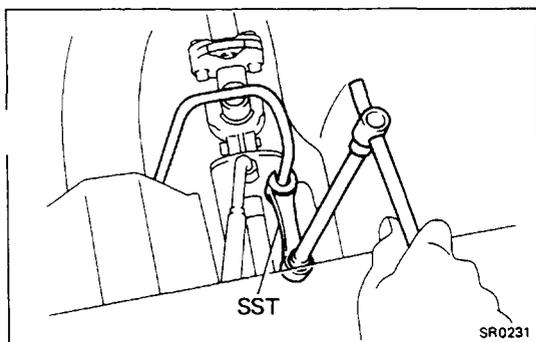
#### 4. DISCONNECT PITMAN ARM FROM GEAR HOUSING

- Remove the pitman arm set nut.
- Using SST, disconnect the pitman arm from the gear housing.

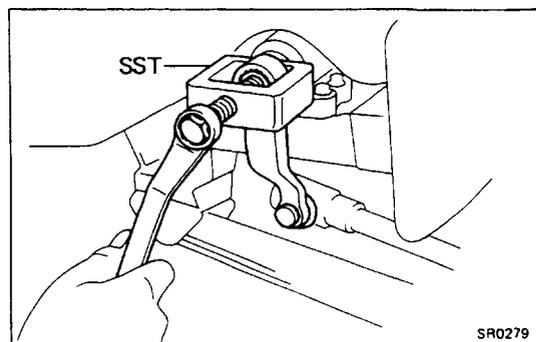
SST 09610-55012

#### 5. REMOVE GEAR HOUSING

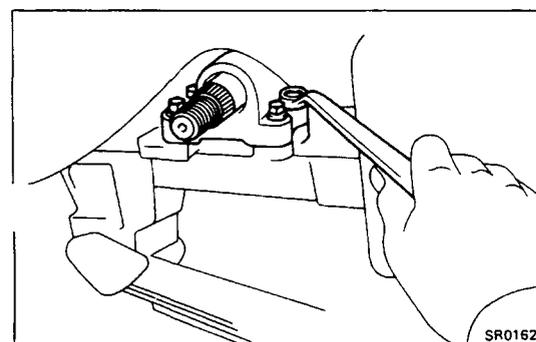
Remove the four bolts and the gear housing.



SR0231

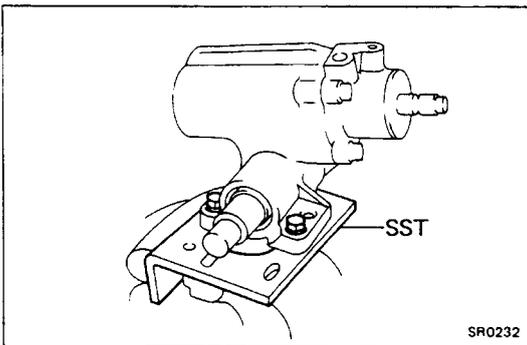
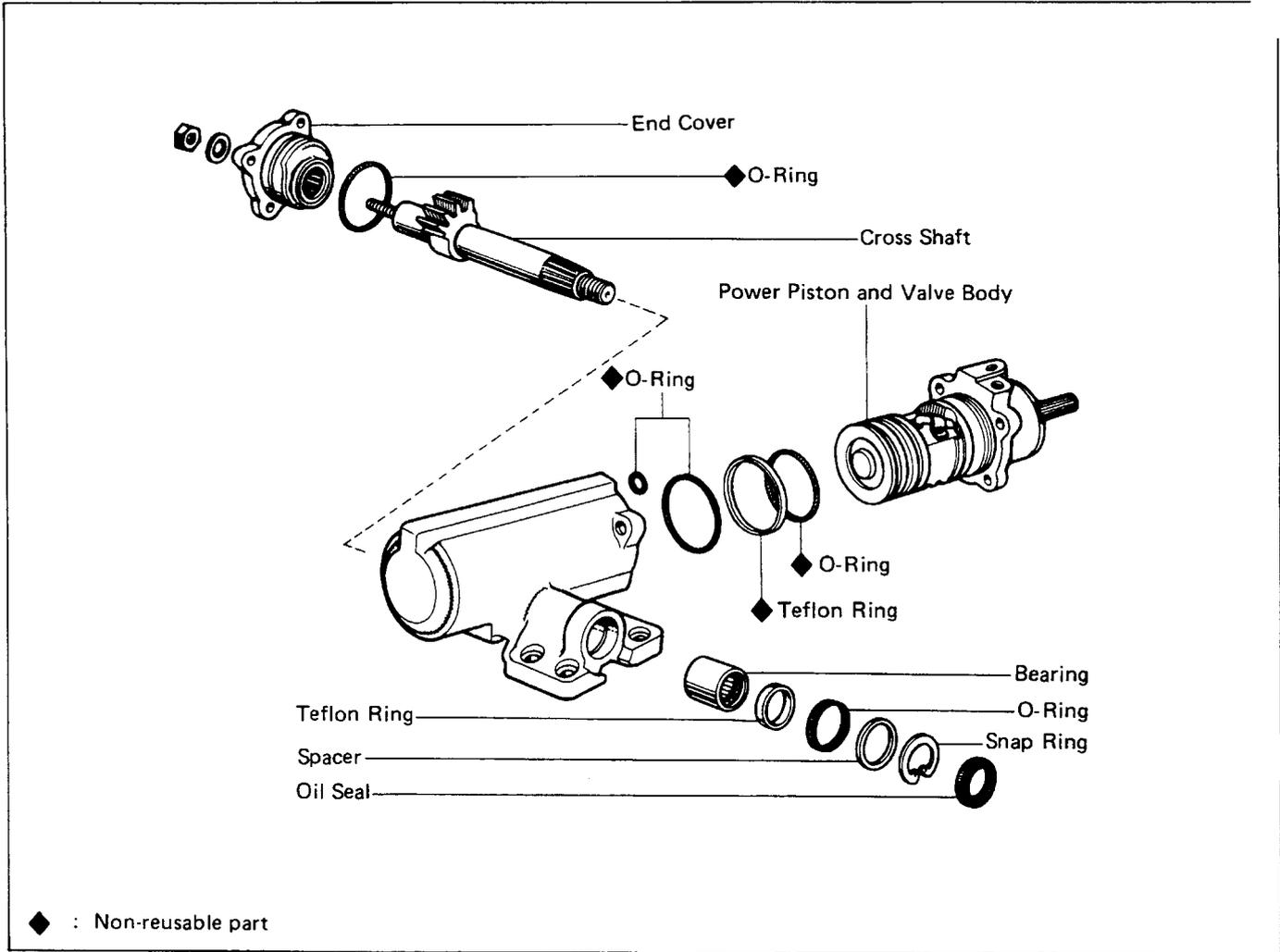


SR0279



SR0162

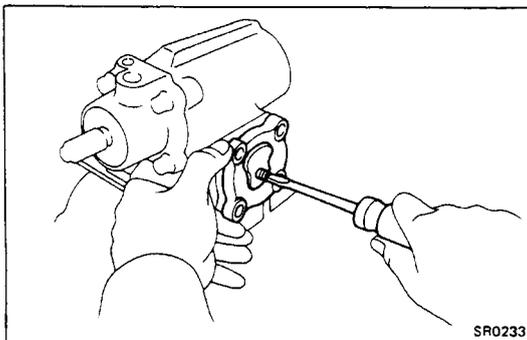
## COMPONENTS



## DISASSEMBLY OF GEAR HOUSING

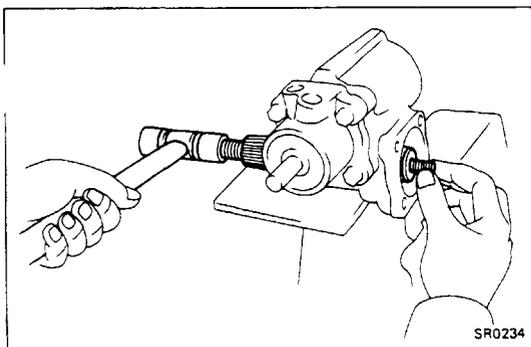
## 1. MOUNT HOUSING ON STAND

Mount the gear housing on SST and clamp SST in a vise.  
SST 09630-00011



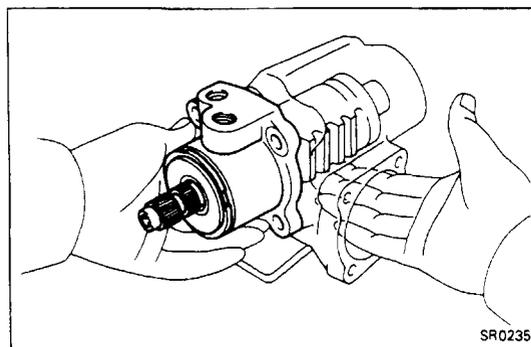
## 2. REMOVE END COVER

- Remove the adjusting screw lock nut and washer.
- Remove the four bolts.
- Screw in the adjusting screw until the cover comes off.



### 3. REMOVE CROSS SHAFT

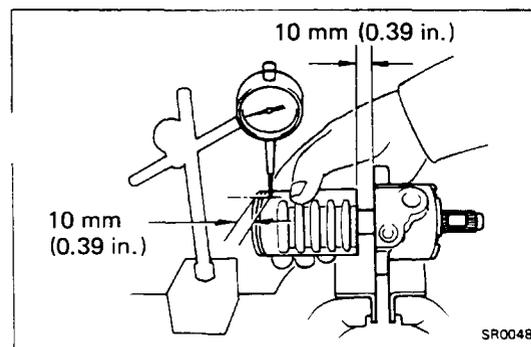
Using a plastic hammer, tap on the cross shaft end and pull out the shaft.



### 4. REMOVE WORM GEAR VALVE BODY ASSEMBLY

- (a) Remove the four cap screws from the housing.
- (b) Hold the power piston nut with your finger so it cannot move, and turn the worm shaft clockwise. Then, with draw the valve body and power piston assembly.

**CAUTION:** Ensure that the power piston nut does not come off the worm shaft.



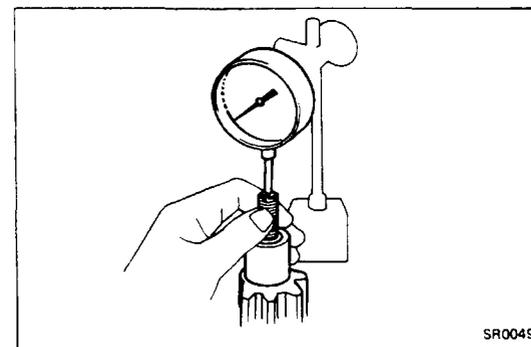
## INSPECTION AND REPAIR OF STEERING GEAR HOUSING

### 1. CHECK BALL CLEARANCE

- (a) Mount the valve body in a vise.
- (b) Using a dial indicator, check the ball clearance. Move the worm gear up and down.

**Maximum ball clearance: 0.15 mm (0.0059 in.)**

If clearance is excessive, the power control valve assembly must be replaced.

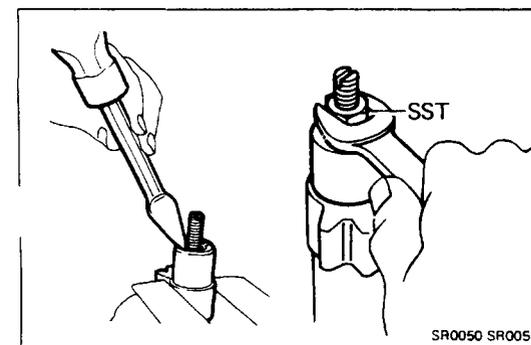


### 2. CHECK CROSS SHAFT ADJUSTING SCREW END PLAY

- (a) Clamp the cross shaft in a vise.
- (b) Using a dial indicator, check the end play.

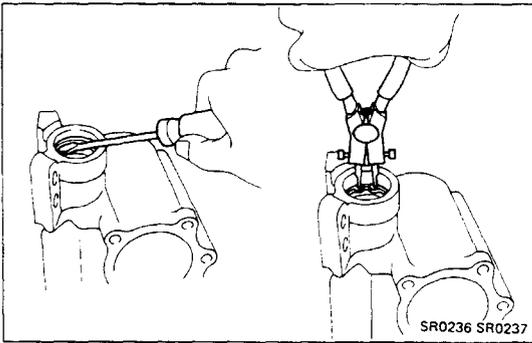
**End play: 0.03 – 0.05 mm (0.0012 – 0.0020 in.)**

If end play is not correct, see step 4 to adjust the end play.



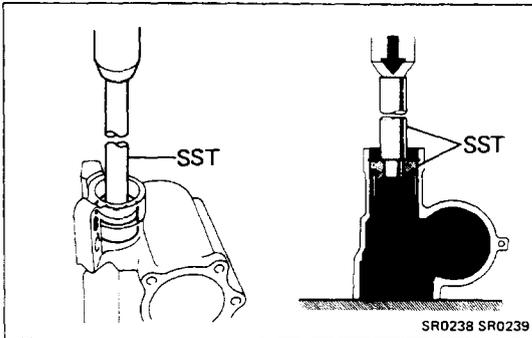
### 3. IF NECESSARY, ADJUST END PLAY

- (a) Using a chisel and hammer, remove the lock nut stake.
- (b) Using SST, loosen the lock nut.  
SST 09630-00011
- (c) Adjust the adjusting screw for correct end play and tighten the lock nut.
- (d) Stake the lock nut.

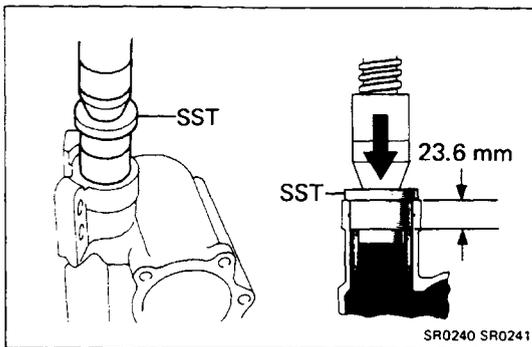


#### 4. REPLACE TEFLON RING AND NEEDLE ROLLER BEARING

- (a) Pry out the oil seal from the pitman arm end of the housing.
- (b) Using snap ring pliers, remove the snap ring.
- (c) Remove the metal spacer, teflon seal and O-ring.

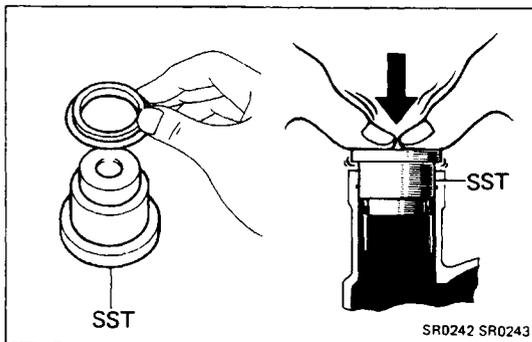


- (d) Using SST, drive out the bearing.  
SST 09630-00011



- (e) Using SST, install a new bearing so that it is positioned 23.6 mm (0.929 in.) away from the housing inner end surface.

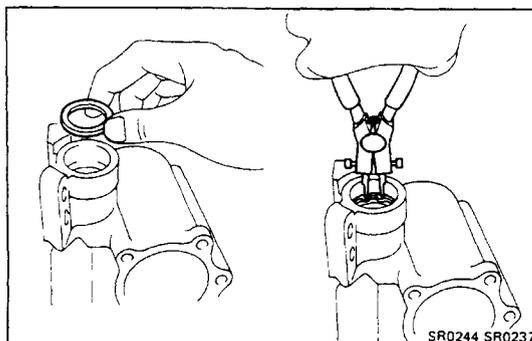
SST 09631-60010



- (f) Install a new teflon ring together with a new O-ring to SST.

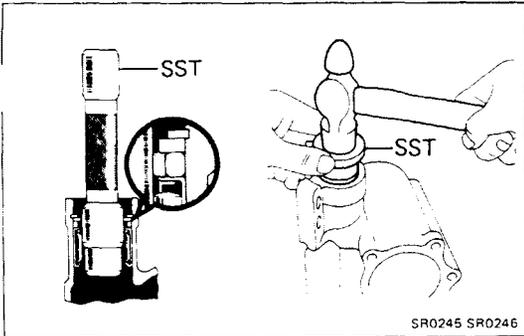
SST 09631-60010

- (g) Install the teflon ring and O-ring to the gear housing with the SST.



- (h) Install the metal spacer.

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



(j) Using SST, form the seal.

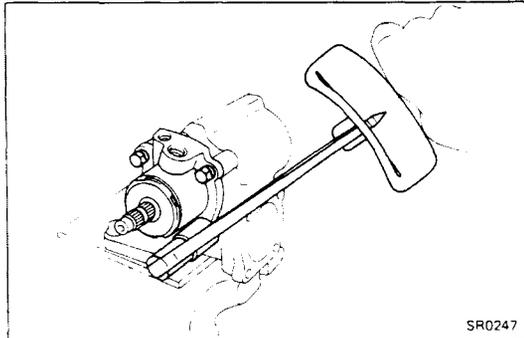
SST 09630-00011

(k) Using SST, drive the oil seal into the gear housing.

SST 09631-60010

## ASSEMBLY OF GEAR HOUSING

(See page SR-62)



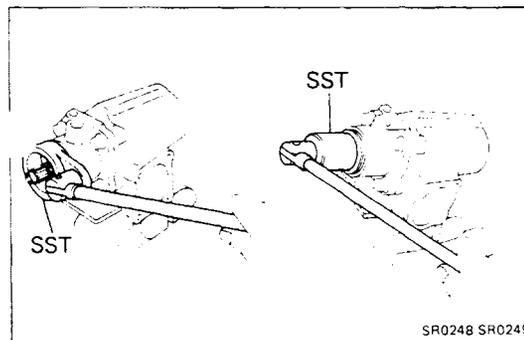
### 1. INSTALL WORM GEAR VALVE BODY

(a) Install two new O-rings.

(b) Insert the valve body into the housing.

(c) Torque the cap screws in a diagonal pattern.

**Torque: 470 kg-cm (34 ft-lb, 46 N·m)**



### 2. INSPECT WORM SHAFT BEARING

**NOTE:** If a new worm gear valve body is being installed, skip this procedure.

(a) Using SST, remove the lock nut.

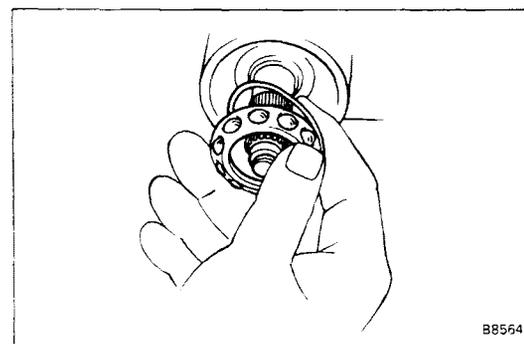
SST 09630-00011

(b) Using SST, remove the bearing cap.

SST 09630-00011

(c) Remove the worm bearing and O-ring.

(d) Install a new O-ring and bearing cap.



### 3. ADJUST WORM BEARING PRELOAD

(a) Using SST, tighten the bearing cap until the preload is correct.

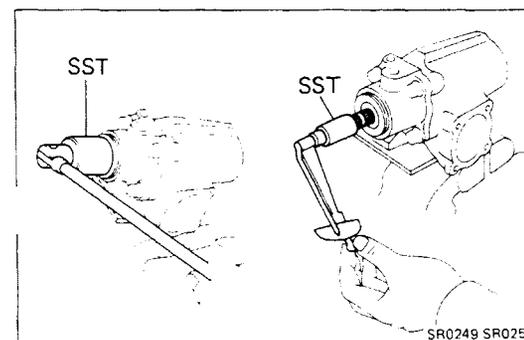
SST 09630-00011

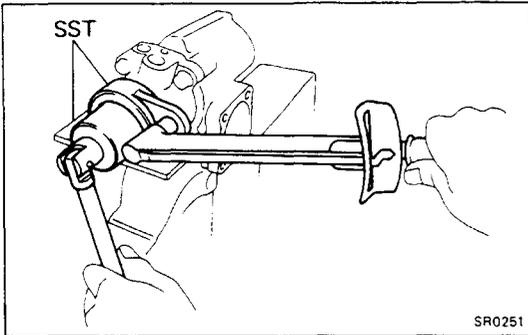
(b) Using SST and torque wrench, check the preload of the bearing.

SST 09616-00010

**Preload: 4.0 – 6.5 kg-cm  
(3.5 – 5.6 in.-lb, 0.4 – 0.6 N·m)**

**NOTE:** Hold the power piston nut to prevent it from turning.





- (c) Using SST, tighten the lock nut while holding the bearing cap with SST.

SST 09630-00011

**Torque: 500 kg-cm (36 ft-lb, 49 N·m)**

- (d) Recheck the preload.

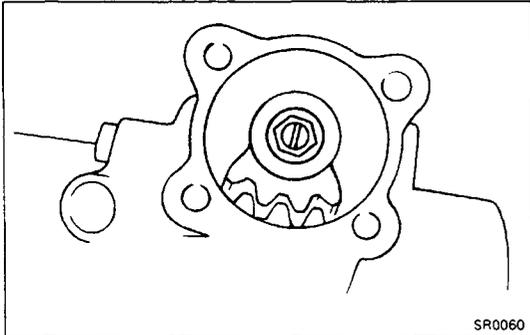
#### 4. INSTALL CROSS SHAFT AND END COVER

- (a) Install a new O-ring on the end cover.

- (b) Assemble the cross shaft to the end cover.

NOTE: Fully loosen the adjusting screw.

- (c) Set the worm gear at the center of the gear housing.



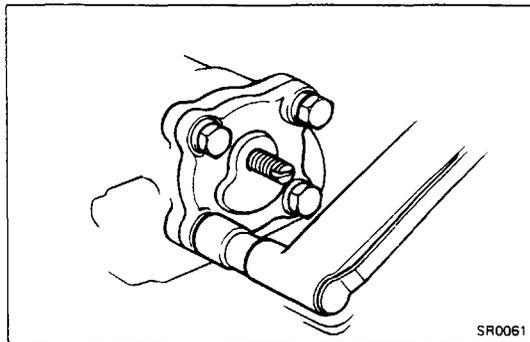
- (d) Insert and push the cross shaft into the gear housing so that the center teeth mesh together.

- (e) Install the four cap bolts. Torque the bolts in a diagonal pattern.

**Torque: 470 kg-cm (34 ft-lb, 46 N·m)**

#### 5. DETERMINE CENTER POSITION OF GEAR BOX

Turn the worm shaft to full lock in both directions and determine the exact center.



#### 6. ADJUST TOTAL PRELOAD

- (a) Install SST with a torque wrench on the center worm shaft.

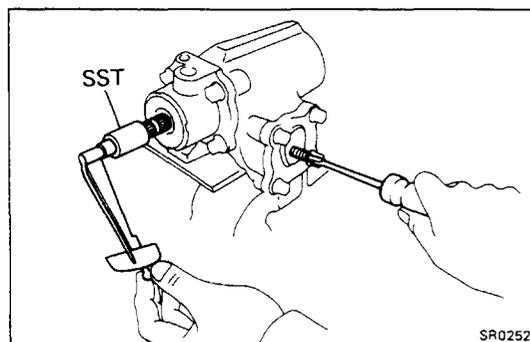
SST 09616-00010

- (b) Turn the adjusting screw while measuring the preload until it is correct.

**Total preload:**

**Add worm shaft preload**

**2 – 3 kg-cm (1.7 – 2.6 in.-lb, 0.2 – 0.3 N·m)**



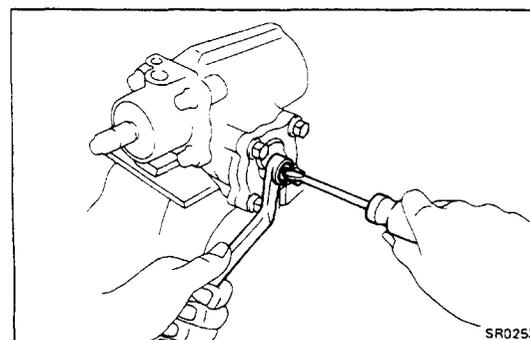
#### 7. INSTALL NEW WASHER

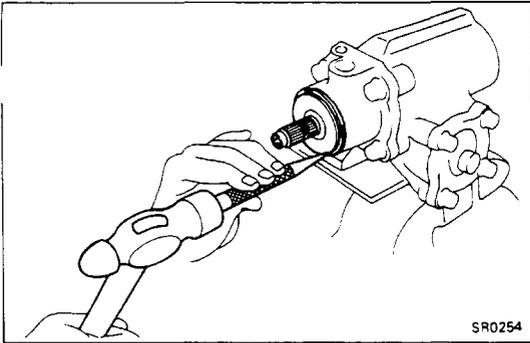
#### 8. INSTALL AND TIGHTEN LOCK NUT

Torque the lock nut while holding the adjusting screw.

**Torque: 470 kg-cm (34 ft-lb, 46 N·m)**

#### 9. RECHECK TOTAL PRELOAD

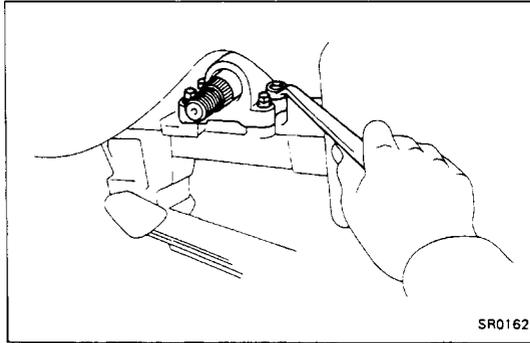




SR0254

**10. STAKE LOCK NUT**

Using a punch and hammer, stake the lock nut at three places.



SR0162

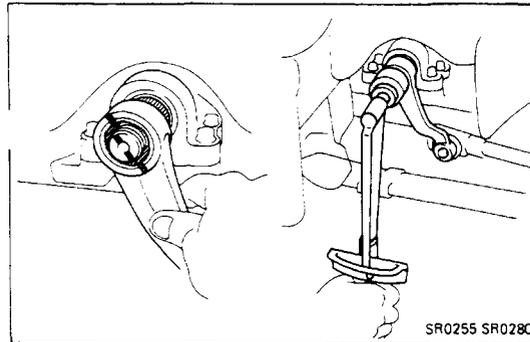
**INSTALLATION OF GEAR HOUSING**

(See page SR-61)

**1. INSTALL GEAR HOUSING**

- (a) Line up the marks on the coupling and worm shaft.
- (b) Torque the four mounting bolts.

**Torque: 575 kg-cm (42 ft-lb, 56 N·m)**



SR0255 SR0280

**2. CONNECT PITMAN ARM**

- (a) Align the marks on the pitman arm and cross shaft.
- (b) Torque the pitman arm nut.

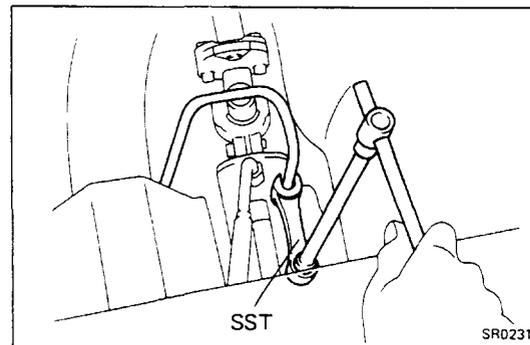
**Torque: 1,750 kg-cm (127 ft-lb, 172 N·m)**

**3. TORQUE COUPLING MOUNT BOLT**

- (a) Torque the coupling mount bolt.

**Torque: 400 kg-cm (29 ft-lb, 39 N·m)**

- (b) Install the stone shield to the gear housing.



SST

SR0231

**4. CONNECT RETURN LINE AND PRESSURE LINE**

- (a) Using SST, install and torque the union nuts.

**Torque: 450 kg-cm (33 ft-lb, 44 N·m)**

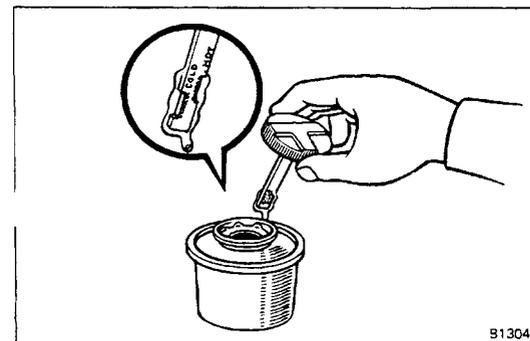
SST 09631-22020

NOTE: Be sure the hose is not touching the fender.

- (b) Install the pressure and return line clamp bolts.

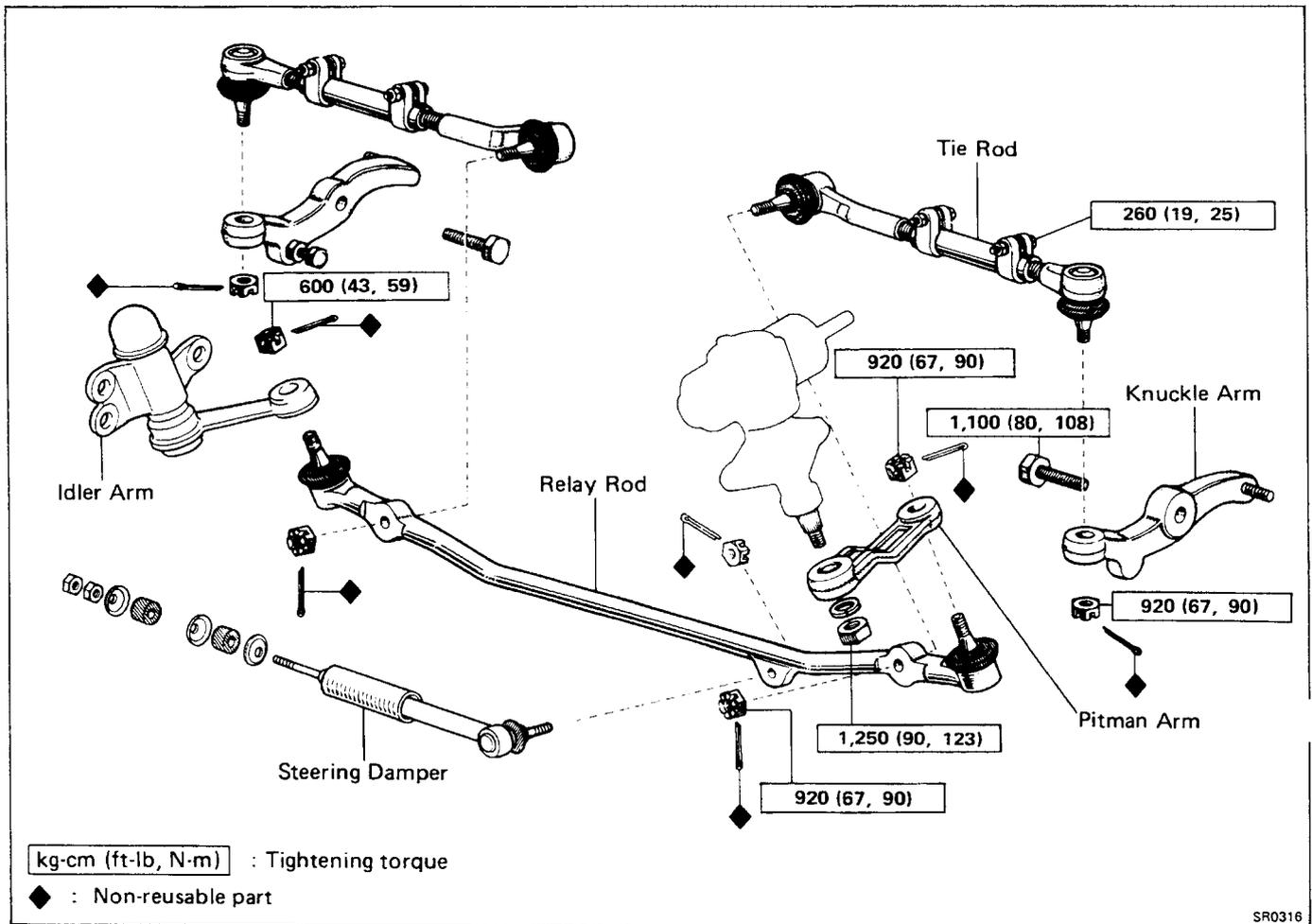
**5. INSTALL ENGINE UNDER COVER****6. INSTALL BATTERY****7. FILL RESERVOIR WITH FLUID**

Fluid: **ATF DEXRON or DEXRON II**

**8. BLEED SYSTEM AND PERFORM PRESSURE CHECK**  
(See page SR-41)

B1304

## STEERING LINKAGE (2WD) COMPONENTS



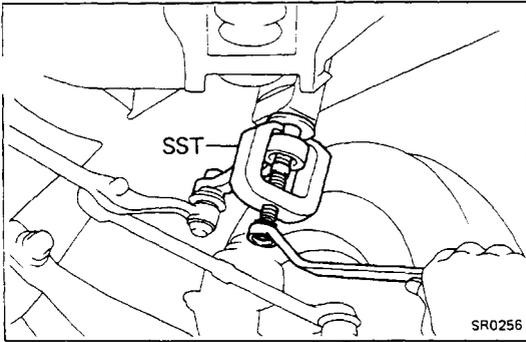
### NOTE:

- Before connecting the ball stud to the arm or rod, remove the grease on the joint surfaces.
- After torquing the ball stud nut to specified torque, advance the nut just enough to insert the cotter pin. Secure the nut.
- After installing any of the steering linkage components, check the front wheel alignment and side slip. (See page FA-3)

## Pitman Arm

### REMOVAL AND INSPECTION OF PITMAN ARM

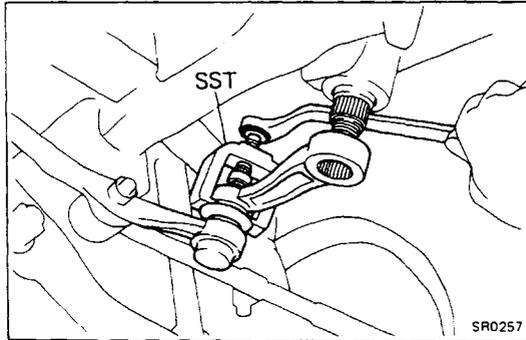
1. REMOVE STRUT BAR  
(See page FA-22)
2. LOOSEN PITMAN ARM NUT



**3. DISCONNECT PITMAN ARM FROM SECTOR SHAFT**

Using SST, disconnect the pitman arm from the sector shaft.

SST 09610-55012

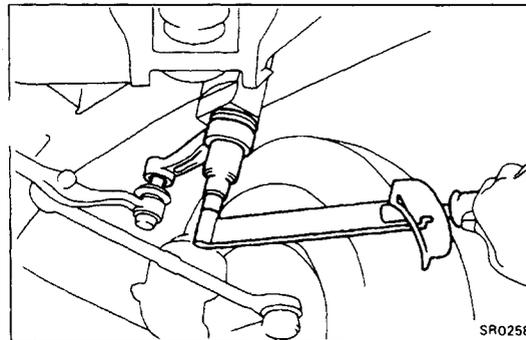


**4. DISCONNECT PITMAN ARM FROM RELAY ROD**

Using SST, disconnect the pitman arm from the relay rod.

SST 09611-22012

**5. INSPECT ARM FOR WEAR, DAMAGE OR CRACKS**



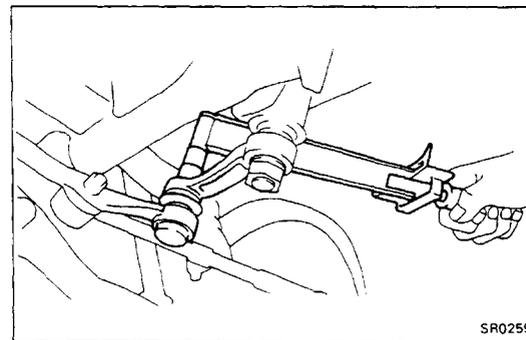
**INSTALLATION OF PITMAN ARM**

**1. CONNECT PITMAN ARM TO SECTOR SHAFT**

(a) Align marks on the pitman arm and the sector shaft.

(b) Torque the pitman arm nut.

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

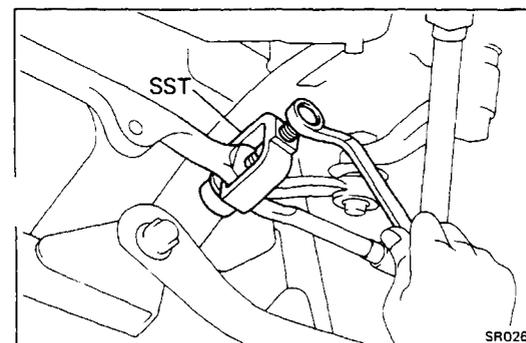


**2. CONNECT PITMAN ARM TO RELAY ROD**

Torque the mounting nut.

Torque: 920 kg-cm (67 ft-lb, 90 N·m)

**3. INSTALL STRUT BAR  
(See page FA-22)**



**Tie Rod**

**REMOVAL AND INSPECTION OF TIE ROD**

(See page SR-68)

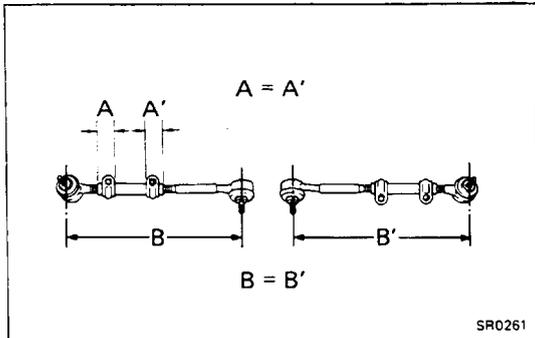
**1. DISCONNECT TIE ROD FROM RELAY ROD AND KNUCKLE ARM**

Using SST, disconnect the tie rod from the relay rod and knuckle arm.

SST 09611-22012

**2. INSPECT TIE ROD FOR WEAR, DAMAGE OR CRACKS**

Check for cracks with flaw detecting penetrant.

**INSTALLATION OF TIE ROD****1. ASSEMBLE TIE ROD**

Screw the tie rod ends into the tie rod.

The tie rod length should be approximately 314.5 mm (12.382 in.), and the remaining length of threads on both tie rod ends should be equal.

**2. ADJUST TIE ROD END ANGLE**

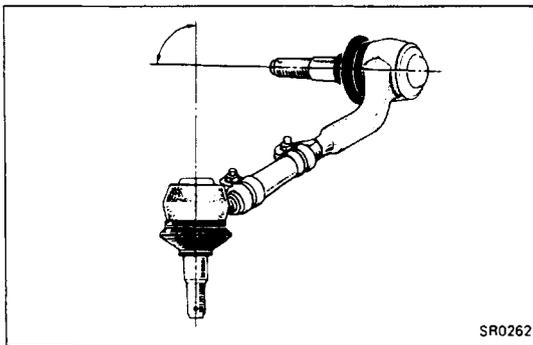
- (a) Turn the tie rods so they cross at about 90 degrees.
- (b) Tighten the tie rod clamps to lock the tie rod ends in position.

**Torque: 260 kg-cm (19 ft-lb, 25 N·m)**

**3. CONNECT TIE ROD TO RELAY ROD AND KNUCKLE ARM**

Torque the mounting nuts.

**Torque: 920 kg-cm (67 ft-lb, 90 N·m)**

**Relay Rod****REMOVAL AND INSPECTION OF RELAY ROD**

(See page SR-68)

**1. DISCONNECT TIE ROD ENDS FROM RELAY ROD**

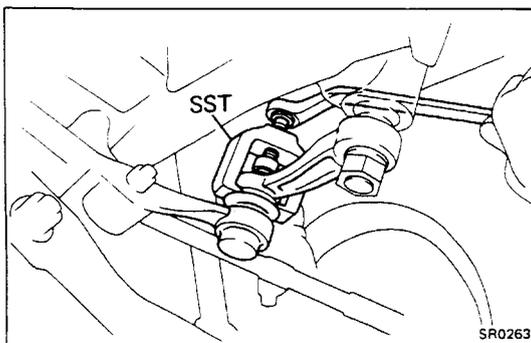
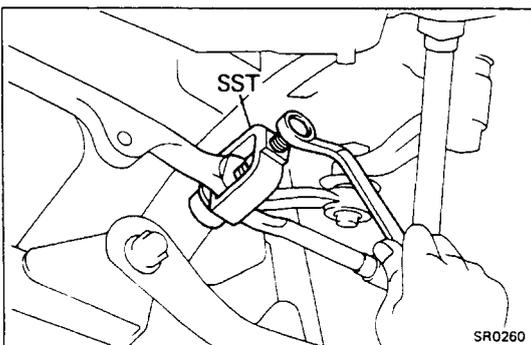
Using SST, disconnect the tie rod ends from the relay rod.  
SST 09611-22012

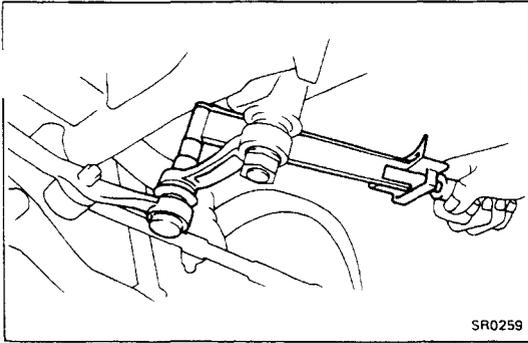
**2. DISCONNECT RELAY ROD FROM PITMAN ARM AND IDLER ARM**

Using SST, disconnect and remove the relay rod.  
SST 09611-22012

**3. INSPECT RELAY ROD FOR DAMAGE OR CRACKS**

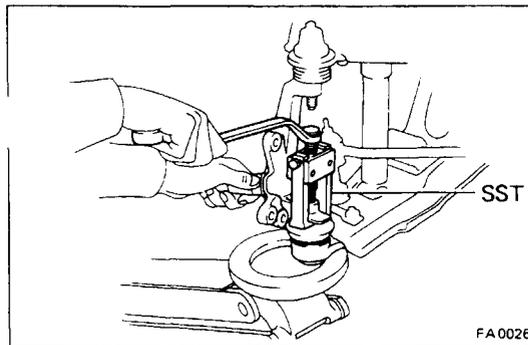
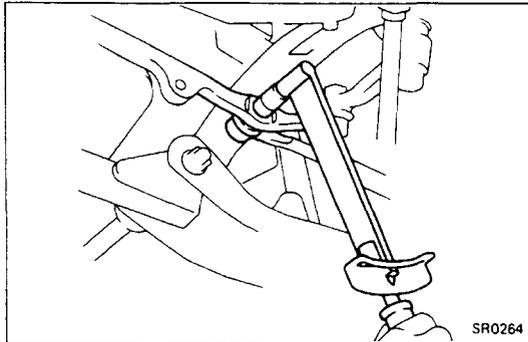
Check for cracks with flaw detecting penetrant.





## INSTALLATION OF RELAY ROD

1. **CONNECT RELAY ROD TO IDLER ARM**  
Torque the mount nut.  
Torque: 600 kg-cm (43 ft-lb, 59 N·m)
2. **CONNECT RELAY ROD TO PITMAN ARM**  
Torque the mount nut.  
Torque: 920 kg-cm (67 ft-lb, 90 N·m)
3. **CONNECT RELAY ROD TO TIE ROD ENDS**  
Torque the mount nuts.  
Torque: 920 kg-cm (67 ft-lb, 90 N·m)

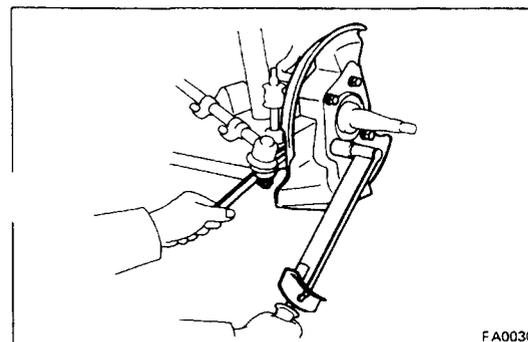


## Knuckle Arm

### REMOVAL AND INSPECTION OF KNUCKLE ARM

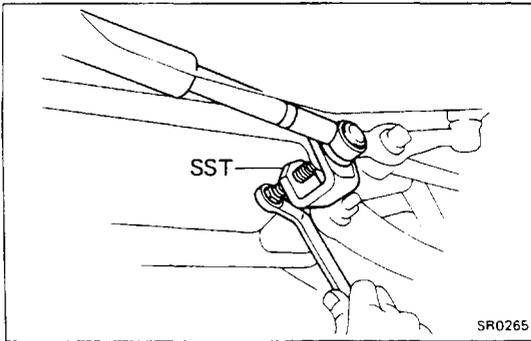
(See page SR-68)

1. **REMOVE FRONT AXLE HUB**  
(See page FA-7)
2. **DISCONNECT TIE ROD FROM KNUCKLE ARM**  
Using SST, disconnect the tie rod from the knuckle arm.  
SST 09628-62011
3. **REMOVE KNUCKLE ARM**
4. **INSPECT KNUCKLE ARM FOR DAMAGE OR CRACKS**  
Check for cracks with flaw detecting penetrant.



### INSTALLATION OF KNUCKLE ARM

1. **INSTALL KNUCKLE ARM TO STEERING KNUCKLE**  
Torque: 1,100 kg-cm (80 ft-lb, 108 N·m)
2. **CONNECT TIE ROD TO KNUCKLE ARM**  
Torque the nuts.  
Torque: 920 kg-cm (67 ft-lb, 90 N·m)
3. **INSTALL FRONT AXLE HUB**  
(See page FA-8)



## Steering Damper

### REMOVAL AND INSPECTION OF STEERING DAMPER

(See page SR-68)

#### 1. DISCONNECT STEERING DAMPER FROM RELAY ROD

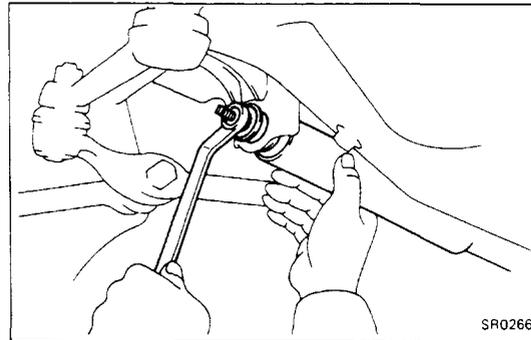
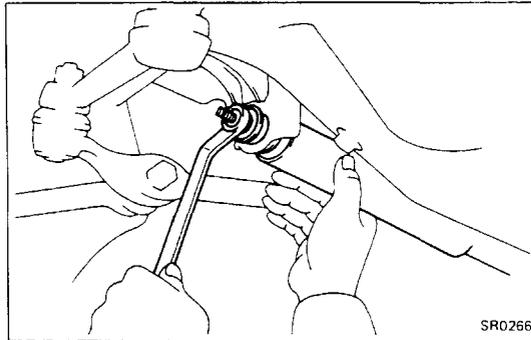
Using SST, disconnect the steering damper from the relay rod.

SST 09611-12010

#### 2. REMOVE STEERING DAMPER

Remove the nut, washers, cushions and the steering damper.

#### 3. INSPECT STEERING DAMPER FOR DAMAGE OR OIL LEAKAGE



### INSTALLATION OF STEERING DAMPER

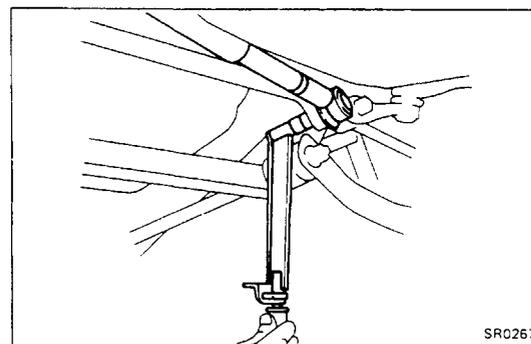
#### 1. INSTALL STEERING DAMPER

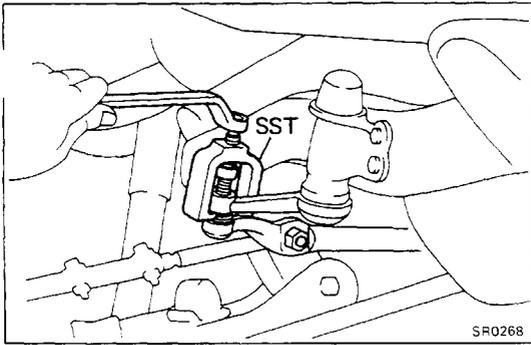
(a) Install the cushions and washers, and torque the mount nut.

**Torque: 130 kg-cm (9 ft-lb, 13 N·m)**

(b) Connect the steering damper to the tie rod, and torque the mount nut.

**Torque: 600 kg-cm (43 ft-lb, 59 N·m)**





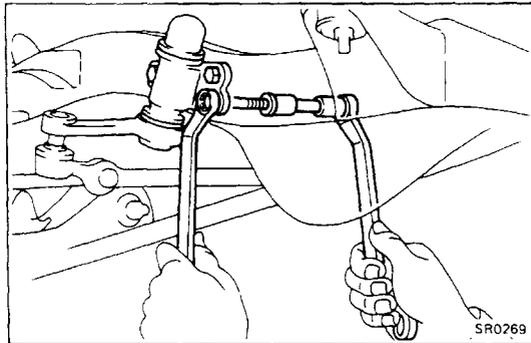
## Idler Arm Bracket

### REMOVAL OF IDLER ARM BRACKET

(See page SR-68)

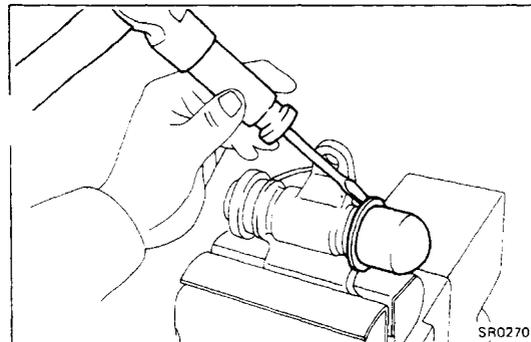
#### 1. DISCONNECT RELAY ROD FROM IDLER ARM

Using SST, disconnect the relay rod from the idler arm.  
SST 09611-22012



#### 2. REMOVE IDLER ARM BRACKET

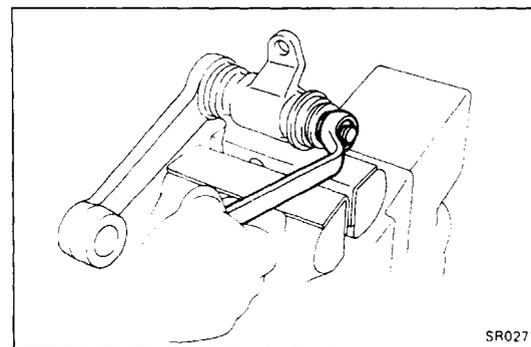
Remove the three bolts and nuts.



### DISASSEMBLY OF IDLER ARM BRACKET

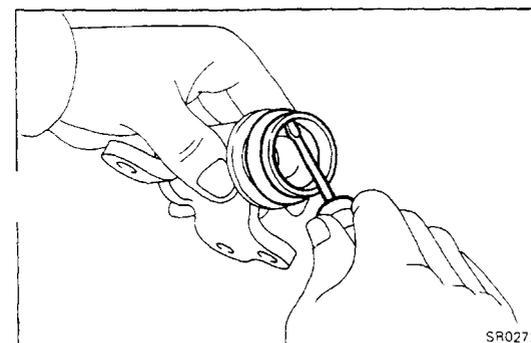
#### 1. REMOVE IDLER ARM BRACKET CAP

Using a screwdriver and hammer, remove the idler arm bracket cap.



#### 2. REMOVE IDLER ARM WITH SHAFT

Remove the nut and pull the idler arm with the shaft off the idler arm bracket.



#### 3. REMOVE OIL SEAL AND BUSHINGS

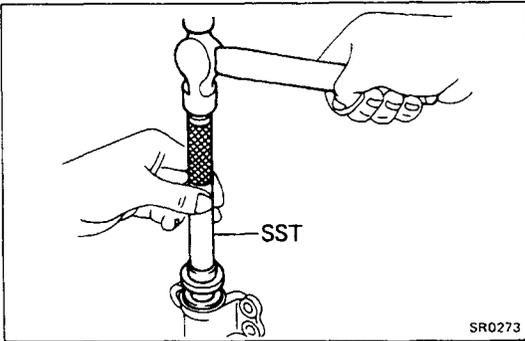
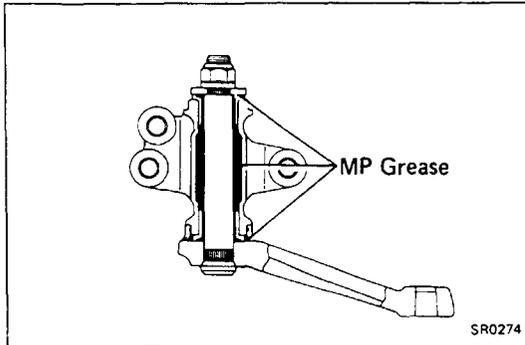
Using a screwdriver, remove the oil seal and the two bushings.

**ASSEMBLY OF IDLER ARM BRACKET****1. INSTALL BUSHING AND OIL SEAL**

- (a) Using SST, install new bushings to the idler arm bracket.

SST 09620-30010

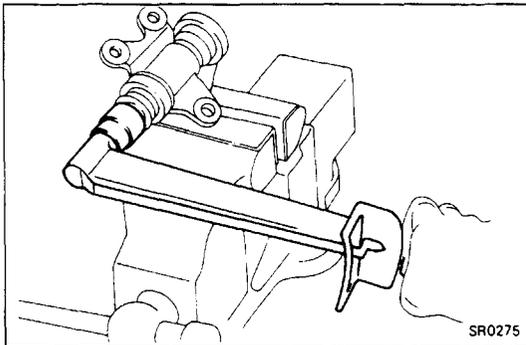
- (b) Using a screwdriver, install a new oil seal.

**2. APPLY MP GREASE****3. INSTALL IDLER ARM WITH SHAFT**

- (a) Insert the idler arm shaft to the bracket.

- (b) Install the washer and nut.

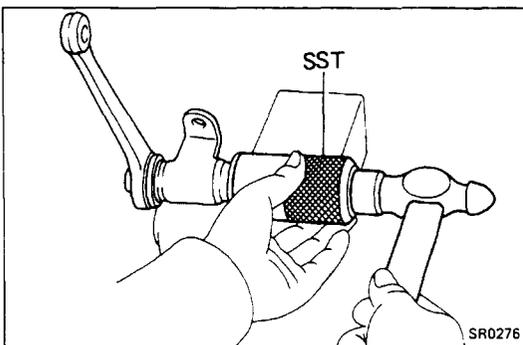
**Torque: 800 kg-cm (58 ft-lb, 78 N·m)**

**4. INSTALL IDLER ARM BRACKET CAP**

- (a) Apply liquid sealer to the cap end.

- (b) Using SST, install the idler arm bracket cap.

SST 09636-20010

**INSTALLATION OF IDLER ARM BRACKET**

(See page SR-68)

**1. INSTALL IDLER ARM BRACKET**

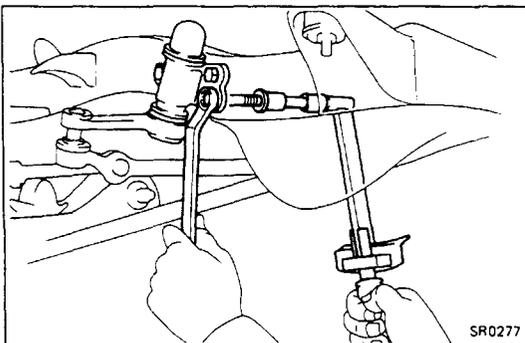
Torque the three bolts and nuts.

**Torque: 660 kg-cm (48 ft-lb, 65 N·m)**

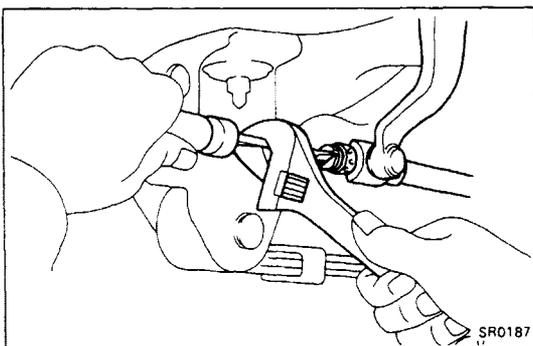
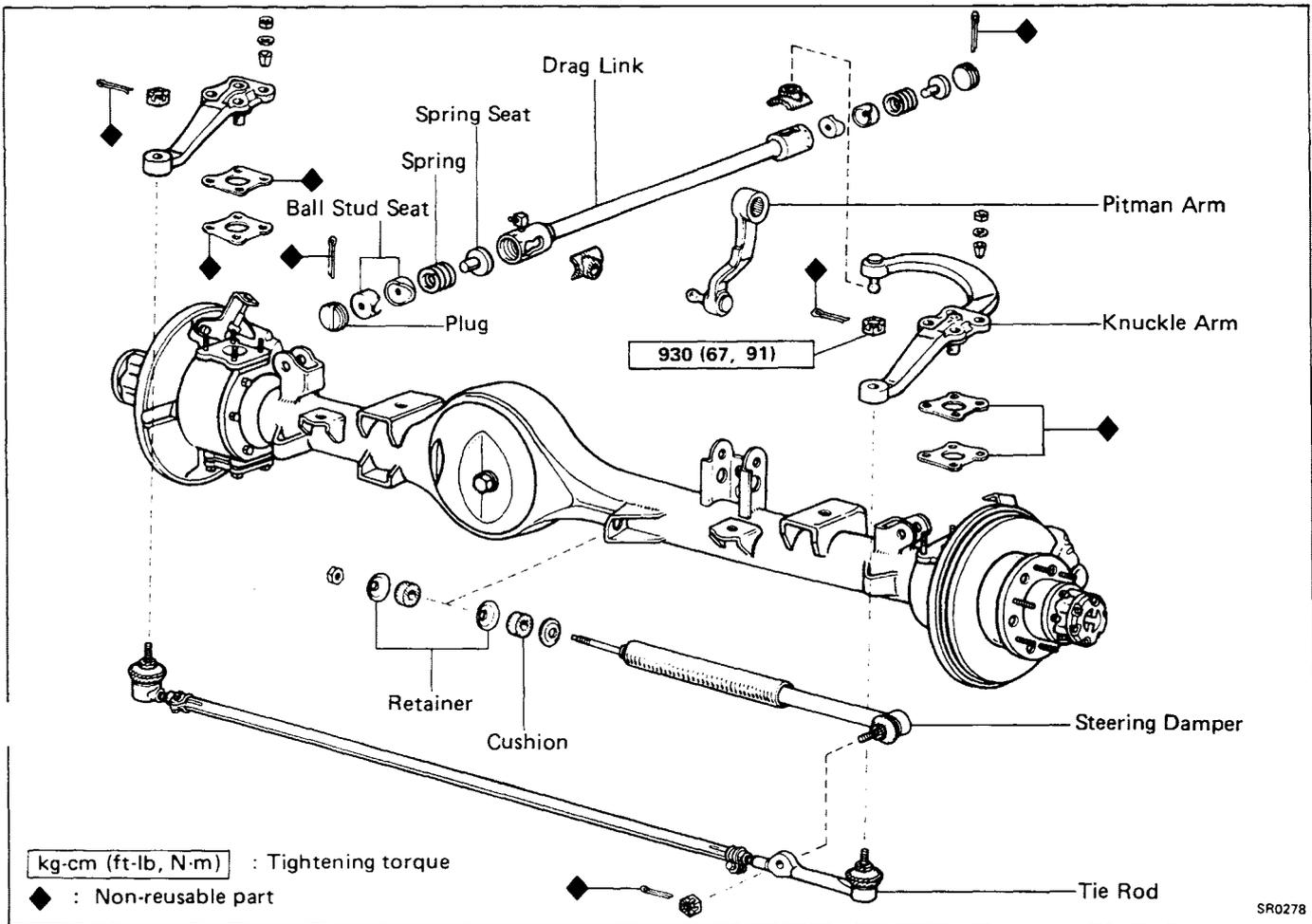
**2. CONNECT IDLER ARM TO RELAY ROD**

Torque the mount nut.

**Torque: 600 kg-cm (43 ft-lb, 59 N·m)**



## STEERING LINKAGE (4WD) COMPONENTS

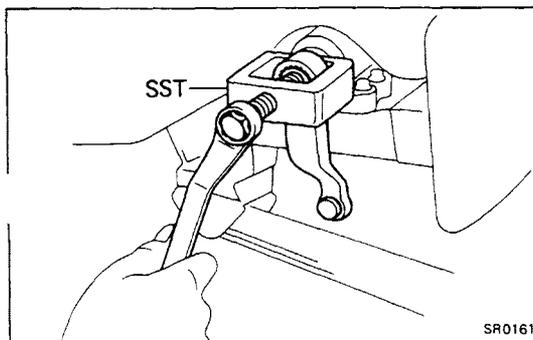


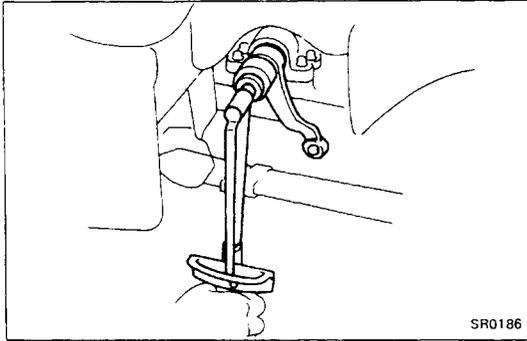
### Pitman Arm

#### REMOVAL AND INSPECTION OF PITMAN ARM

1. **DISCONNECT PITMAN ARM FROM DRAG LINK**
  - (a) Remove the cotter pin and plug.
  - (b) Disconnect the pitman arm from the drag link.
2. **DISCONNECT PITMAN ARM FROM SECTOR SHAFT**
  - (a) Loosen the pitman arm nut.
  - (b) Using SST, disconnect the pitman arm from the sector shaft.

SST 09610-55012
3. **INSPECT PITMAN ARM FOR WEAR, DAMAGE OR CRACKS**





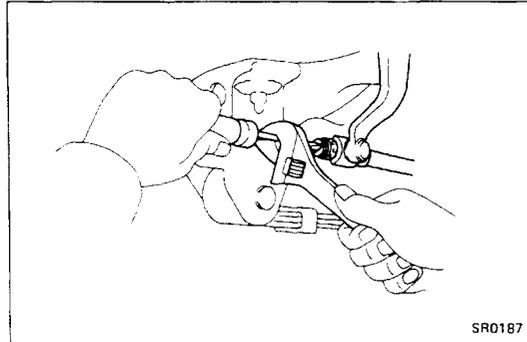
## INSTALLATION OF PITMAN ARM

(See page SR-75)

### 1. CONNECT PITMAN ARM TO SECTOR SHAFT

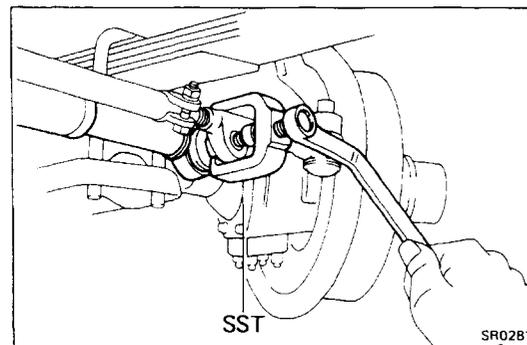
- (a) Align the marks on the pitman arm and the sector shaft.
- (b) Torque the pitman arm bolt.

Torque: 1,750 kg-cm (127 ft-lb, 172 N·m)



### 2. CONNECT PITMAN ARM TO DRAG LINK

- (a) Insert the spring seat, spring and ball stud seat into the drag link.
- (b) Install the drag link with dust seal to the pitman arm.
- (c) Insert the ball stud seat and plug, and tighten the plug completely.
- (d) Loosen the plug 1-1/3 turns and install the cotter pin.



## Tie Rod

### REMOVAL AND INSPECTION OF TIE ROD

(See page SR-75)

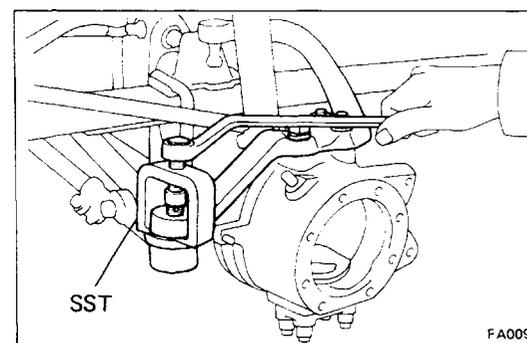
#### 1. DISCONNECT STEERING DAMPER FROM TIE ROD

Using SST, disconnect the steering damper from the tie rod.  
SST 09611-22012

#### 2. DISCONNECT TIE ROD FROM KNUCKLE ARM

Using SST, disconnect the tie rod from the knuckle arm.  
SST 09611-22012

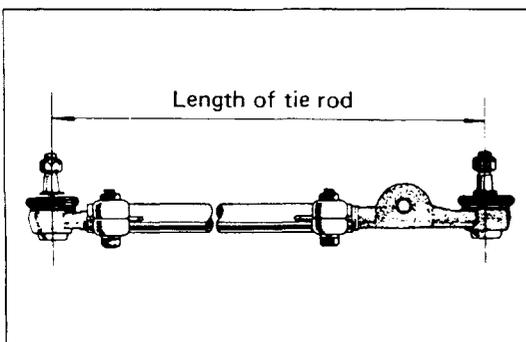
#### 3. INSPECT TIE ROD FOR WEAR, DAMAGE OR CRACKS

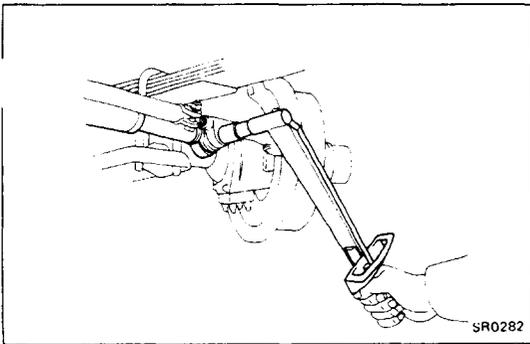


### INSTALLATION OF TIE ROD

#### 1. ASSEMBLE AND ADJUST TIE ROD TO SPECIFIED LENGTH

Turn the tie rod ends equal amounts into the tie rod tube.  
Tie rods should be approximately 120 cm (47.24 in.).





## 2. CONNECT TIE ROD TO KNUCKLE ARM

Torque the bolts.

**Torque: 930 kg-cm (67 ft-lb, 91 N·m)**

## 3. CONNECT STEERING DAMPER TO TIE ROD

Torque the bolt.

**Torque: 600 kg-cm (43ft-lb, 59 N·m)**

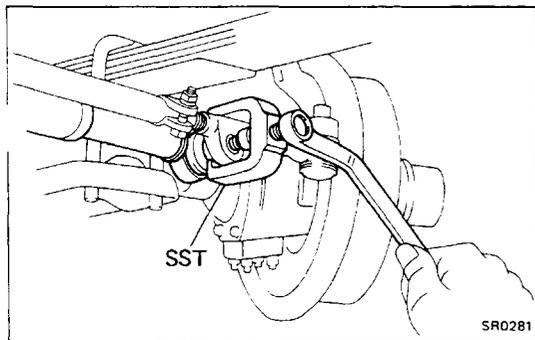
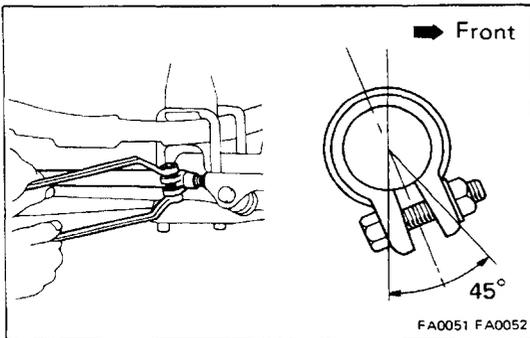
## 4. ADJUST TOE-IN (See page FA-26)

## 5. TIGHTEN CLAMP BOLTS

Torque the clamp bolts.

**Torque: 375 kg-cm (27 ft-lb, 37 N·m)**

**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.



## Steering Damper

### REMOVAL AND INSPECTION OF STEERING DAMPER

(See page SR-75)

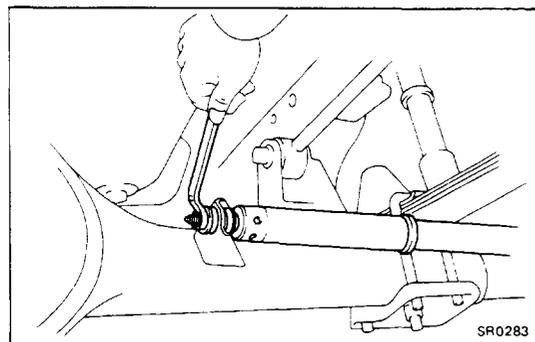
## 1. DISCONNECT STEERING DAMPER FROM TIE ROD

Using SST, disconnect the steering damper from the tie rod.  
SST 09611-22012

## 2. REMOVE STEERING DAMPER

Remove the nut, retainers, cushions and the steering damper.

## 3. INSPECT STEERING DAMPER FOR DAMAGE OR OIL LEAKAGE



### INSTALLATION OF STEERING DAMPER

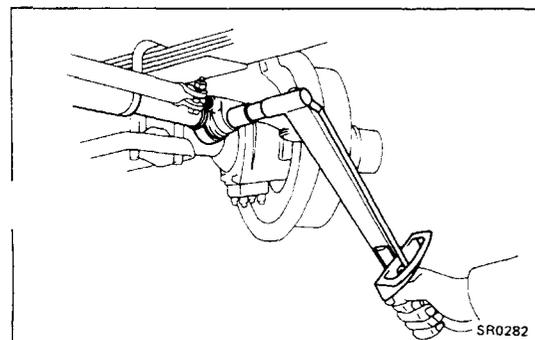
## 1. INSTALL STEERING DAMPER

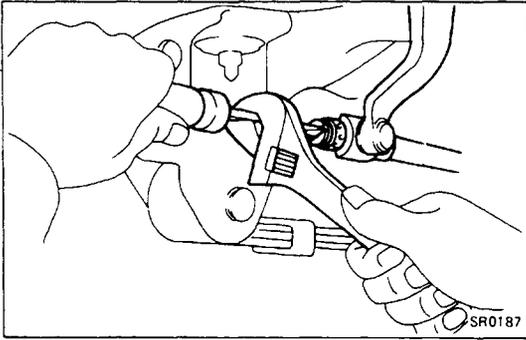
(a) Install the cushions and retainers, and torque the nut.

**Torque: 130 kg-cm (9 ft-lb, 13 N·m)**

(b) Connect the steering damper to the tie rod, and torque the nut.

**Torque: 600 kg-cm (43 ft-lb, 59 N·m)**





## Drag Link

### REMOVAL AND INSPECTION OF DRAG LINK

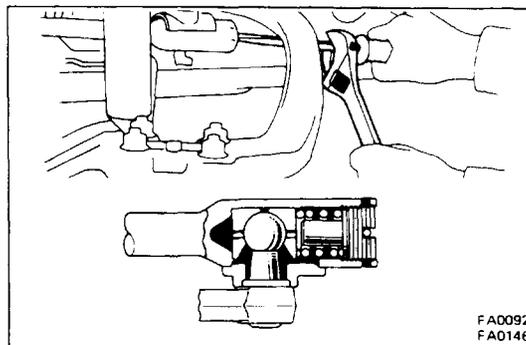
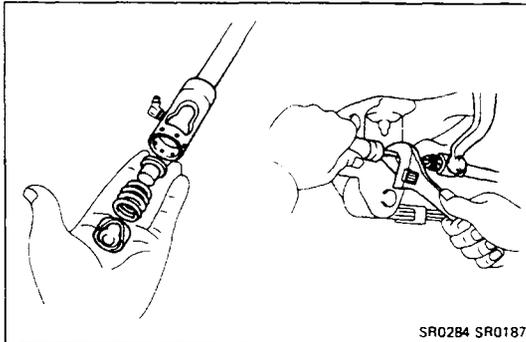
(See page SR-75)

1. **DISCONNECT DRAG LINK FROM PITMAN ARM AND KNUCKLE ARM**
  - (a) Using a screwdriver, remove the two cotter pins and plugs on both sides.
  - (b) Remove the drag link.

2. **INSPECT PARTS FOR WEAR OR DAMAGE**

### INSTALLATION OF DRAG LINK

1. **CONNECT DRAG LINK TO PITMAN ARM**
  - (a) Insert the spring seat, spring and ball stud seat into the drag link.
  - (b) Install the drag link with dust seal to the pitman arm.
  - (c) Insert the ball stud seat and plug, and tighten the plug completely.
  - (d) Loosen the plug 1-1/3 turns and install the cotter pin.
2. **CONNECT DRAG LINK TO KNUCKLE ARM**
  - (a) Insert the ball stud seat into the drag link.
  - (b) Install the drag link with dust seal to the knuckle arm.
  - (c) Insert the ball stud seat, spring, spring seat and plug, and tighten the plug completely.
  - (d) Loosen the plug 1-1/3 turns and install the cotter pin.
3. **APPLY MOLYBDENUM DISULPHIDE LITHIUM BASE GREASE TO BOTH NIPPLES**



## Knuckle Arm

(See page FA-48)