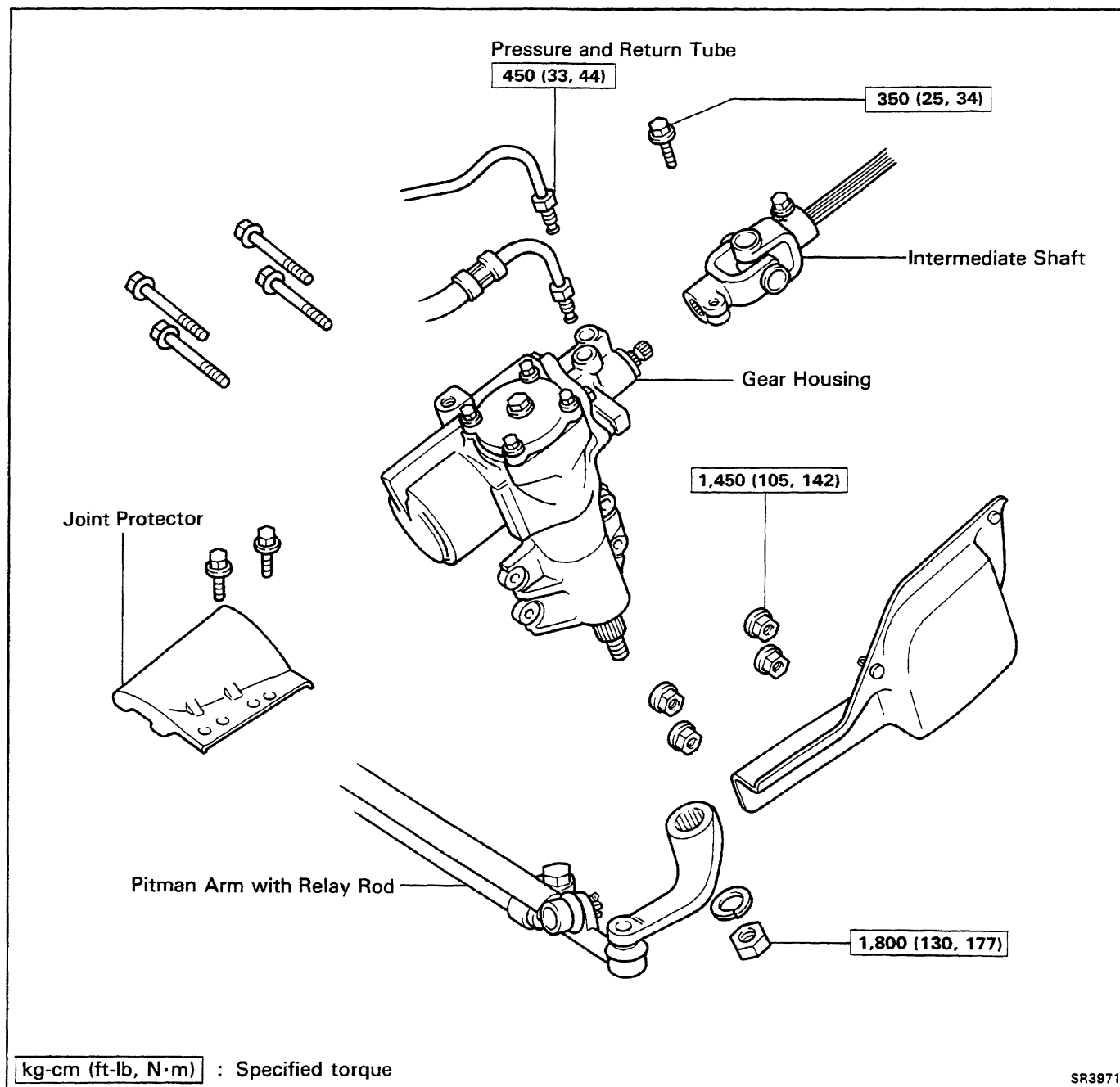


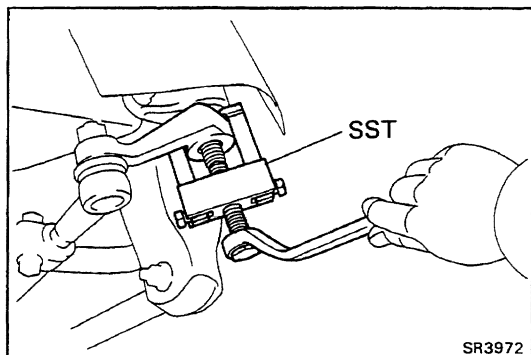
# Gear Housing

## REMOVAL AND INSTALLATION OF GEAR HOUSING

Remove and install the parts as shown.



SR3971



SR3972

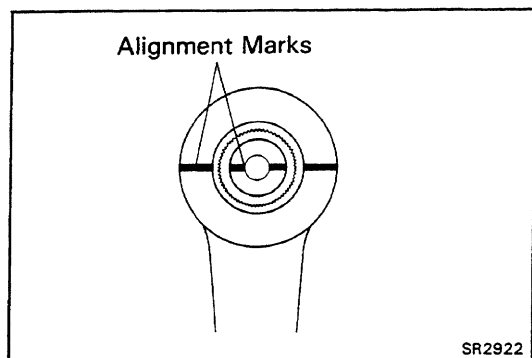
## (MAIN POINTS OF REMOVAL AND INSTALLATION)

### 1. DISCONNECT PITMAN ARM

- Loosen the pitman arm nut.
- Using SST, disconnect the pitman arm from the sector shaft.

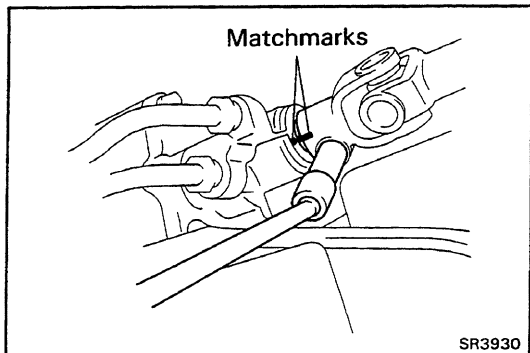
SST 09628-62011

- Remove the nut, the spring washer and the arm.



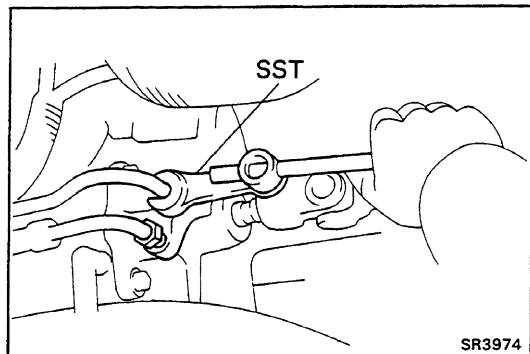
- (d) When connecting the pitman arm, align alignment marks on the pitman arm and the sector shaft, and install the spring washer and nut.

**Torque: 1,800 kg-cm (130 ft-lb, 177 N-m)**



## 2. DISCONNECT UNIVERSAL JOINT FROM GEAR HOUSING

- Loosen the universal joint upper bolt.
- Remove the universal joint lower bolt.
- Slide the joint backward to disconnect the joint from the worm shaft.

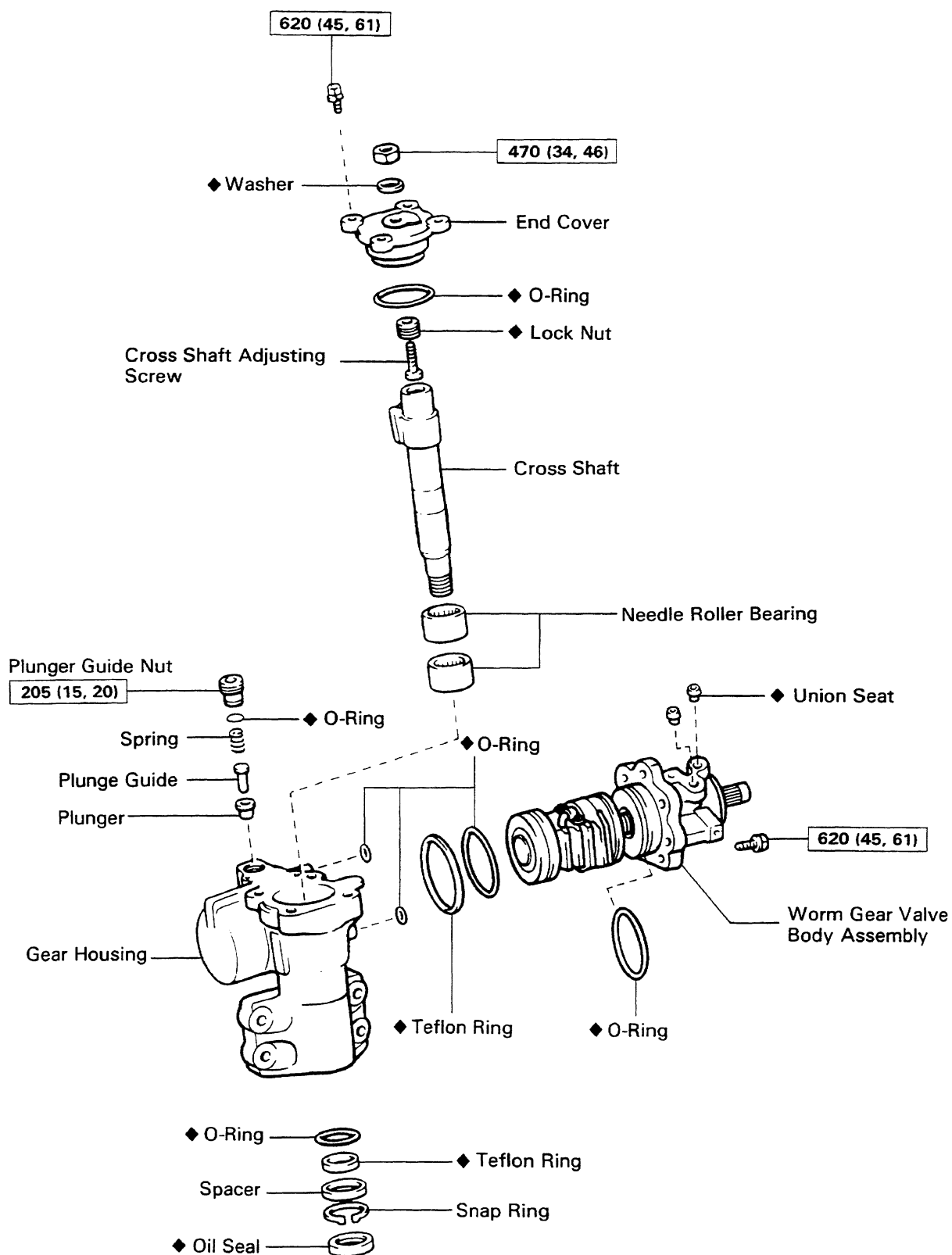


## 3. DISCONNECT PRESSURE AND RETURN TUBES

Using SST, disconnect the pressure and return tubes from the gear housing.

SST 09631-22022

## COMPONENTS



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

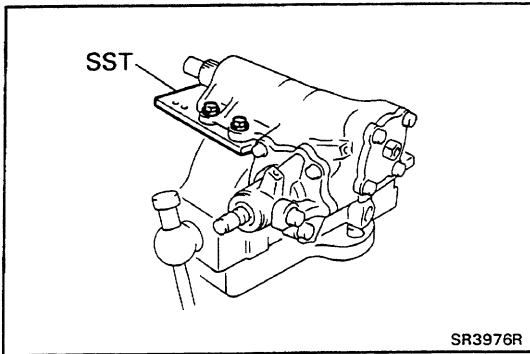
◆ Non-reusable part

## DISASSEMBLY OF GEAR HOUSING

(See page [SR-34](#))

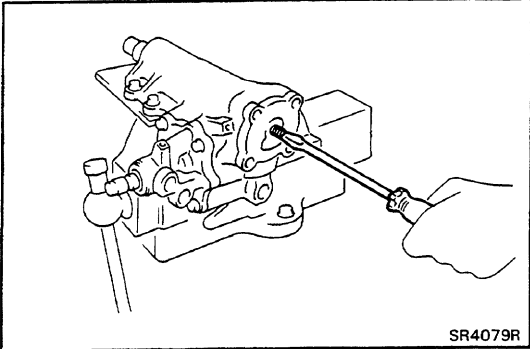
### 1. MOUNT HOUSING ON STAND

Mount the gear housing on SST and clamp SST in a vise.  
SST 09630-00012 (09631-00140)



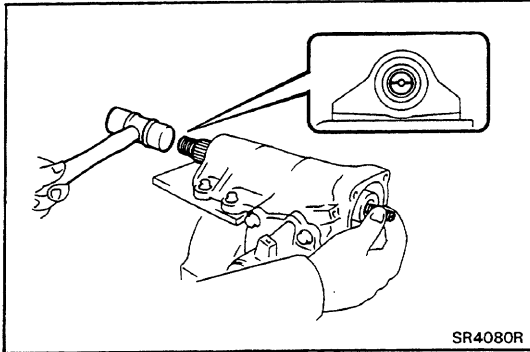
### 2. REMOVE END COVER

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



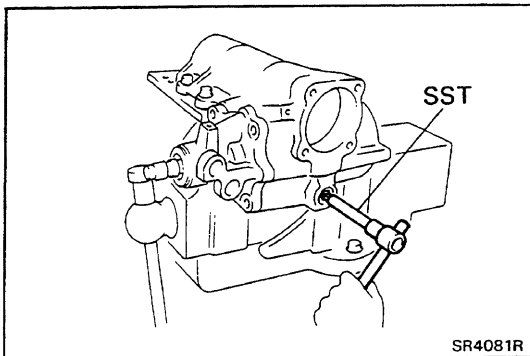
### 3. REMOVE CROSS SHAFT

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



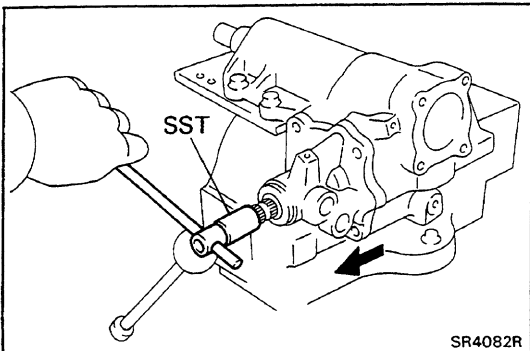
### 4. REMOVE PLUNGER GUIDE NUT

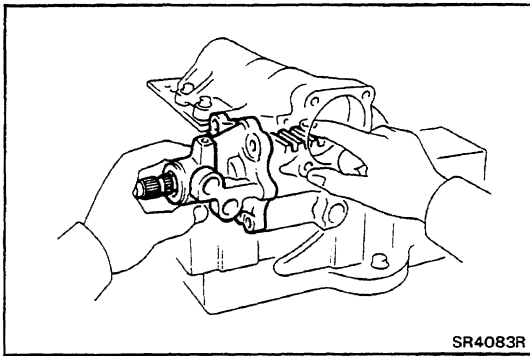
- Using SST, remove the plunger guide nut.  
SST 09043-38100
- Remove the spring, plunger and plunger guide.
- Remove the O-ring.



### 5. REMOVE WORM GEAR VALVE BODY ASSEMBLY

- Remove the four cap bolts from the housing.
- Using SST, turn the shaft clockwise to disconnect the worm gear valve body assembly from gear housing.  
SST 09616-00010

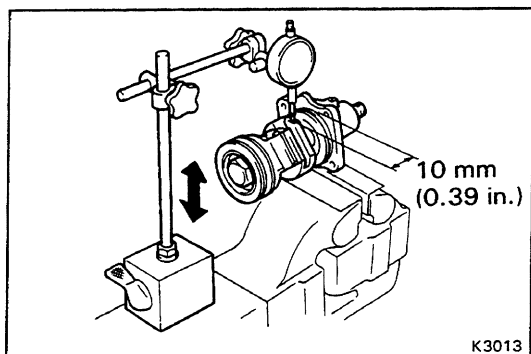




- (c) Hold the power piston nut with your thumb so it cannot move, then withdraw the valve body and power piston assembly.

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

- (d) Remove the O-ring.



## INSPECTION AND REPLACEMENT OF GEAR HOUSING

### 1. CHECK BALL CLEARANCE

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

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

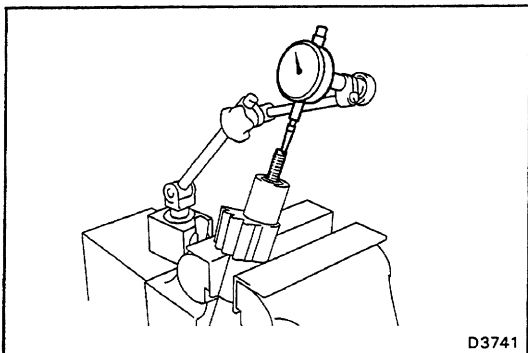
If clearance is excessive, the power control valve assembly must be replaced.

### 2. INSPECT CROSS SHAFT ADJUSTING SCREW THRUST CLEARANCE

- Clamp the cross shaft in a vise.
- Using a dial indicator, measure the thrust clearance.

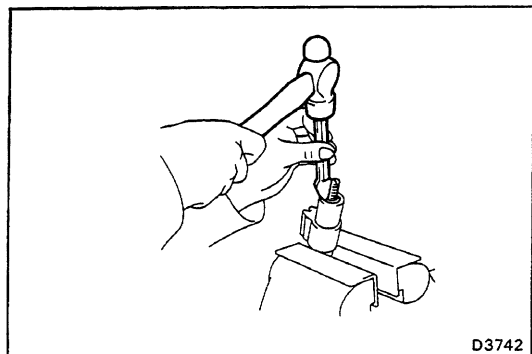
**Thrust clearance: 0.03 – 0.05 mm  
(0.0012 – 0.0020 in.)**

If thrust clearance is not correct, adjust the thrust clearance.

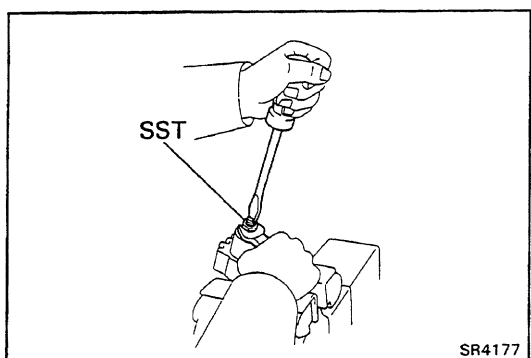


### 3. IF NECESSARY, ADJUST THRUST CLEARANCE

- Using a chisel and hammer, remove the lock nut stake.

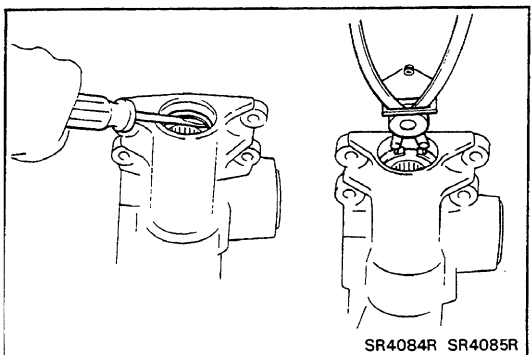


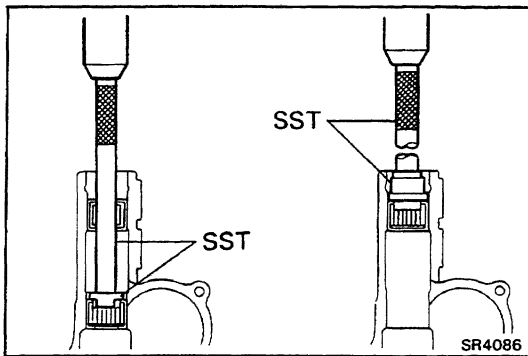
- Using SST, remove the lock nut.  
SST 09630-00012 (09631-00050)
- Adjust the adjusting screw for correct thrust clearance and tighten a new lock nut.
- Stake the lock nut.



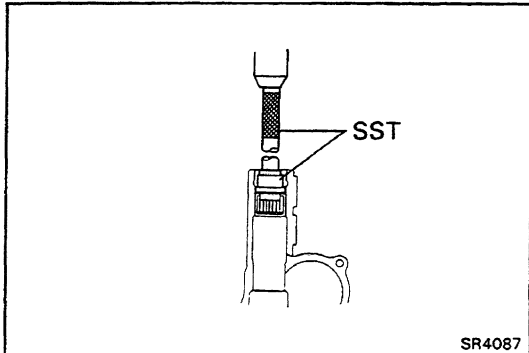
### 4. IF NECESSARY, REPLACE NEEDLE ROLLER BEARING

- Using a screwdriver, pry out the oil seal.
- Using snap ring pliers, remove the snap ring.
- Remove the metal spacer, teflon ring and O-ring.

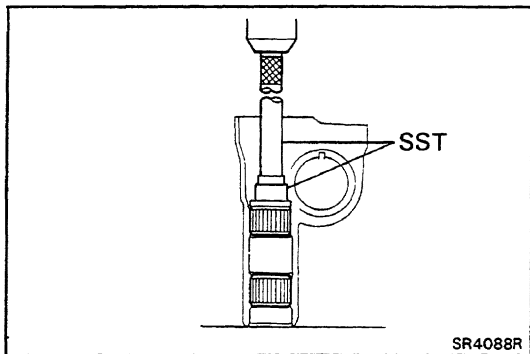




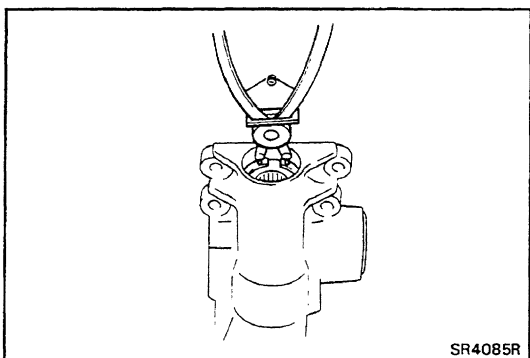
- (d) Using SST, press out the upper bearing.  
SST 09630-00012 (09631-00020, 09631-00070)  
(e) Using SST, press out the lower bearing.  
SST 09630-00012 (09631-00020, 09631-00090)



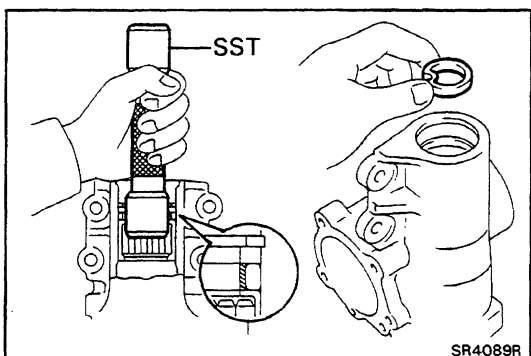
- (f) Using SST, press in a new lower bearing.  
SST 09630-00012 (09631-00020, 09631-00090)  
HINT: Install the lower bearing so that it is positioned 23.1 mm (0.909 in.) away from the housing inner end surface.



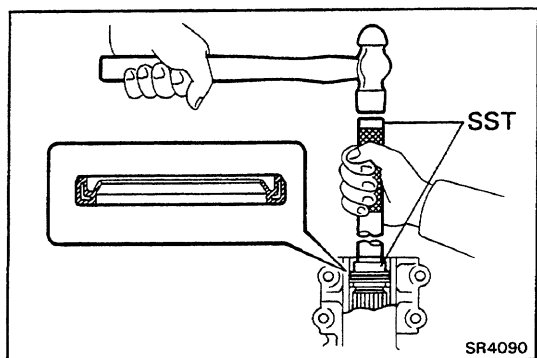
- (g) Using SST, press in a new upper bearing.  
SST 09630-00012 (09631-00020, 09631-00090)  
HINT: The bearing's top end should be installed so that it aligns with the housing end surface.  
(h) Install a new O-ring and metal spacer.



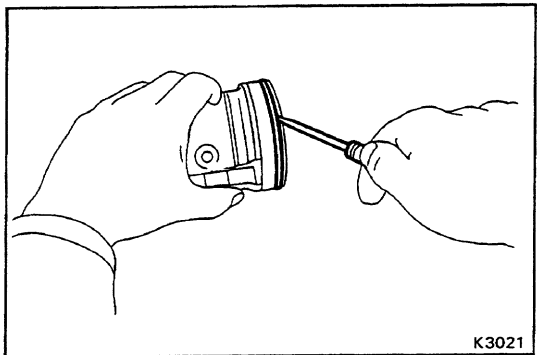
- (i) Using snap ring pliers, install the snap ring.



- (j) Form a new teflon ring into a heart shape and install it with hand.  
(k) Using SST, form the teflon ring.  
**NOTICE: The teflon ring must be squeezed before inserting the sector shaft or damage will result.**  
SST 09630-00012 (09631-00120)



- (l) Using SST, drive a new oil seal into the gear housing.  
SST 09630-00012 (09631-00020, 09631-00090)



#### 5. IF NECESSARY, REPLACE CONTROL VALVE TEFLON RING

- (a) Using a screwdriver, remove the teflon ring and O-ring.

**NOTICE: Be careful not to damage the control valve.**

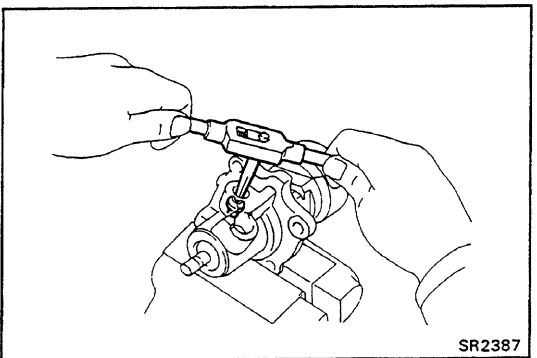
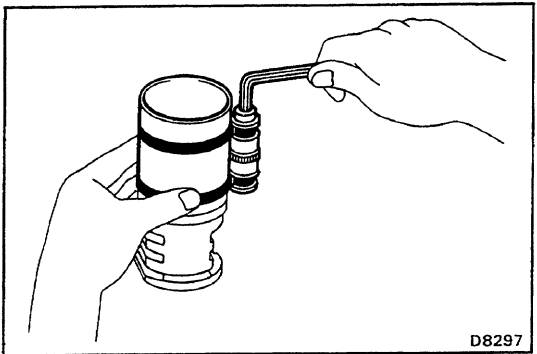
- (b) Install a new O-ring.

- (c) Expand a new teflon ring with your fingers.

**NOTICE: Be careful not to over-expand the teflon ring.**

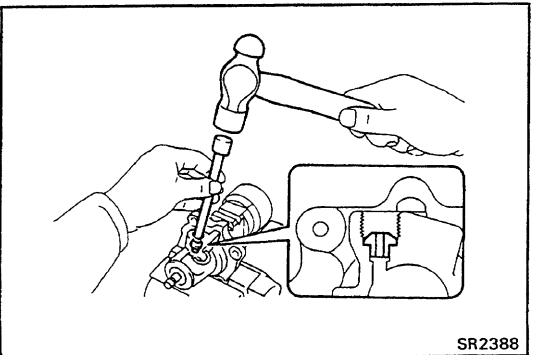
Install a new teflon ring.

- (e) Coat the teflon ring with power steering fluid and snug it down with piston ring compressor for 5 - 7 minutes.

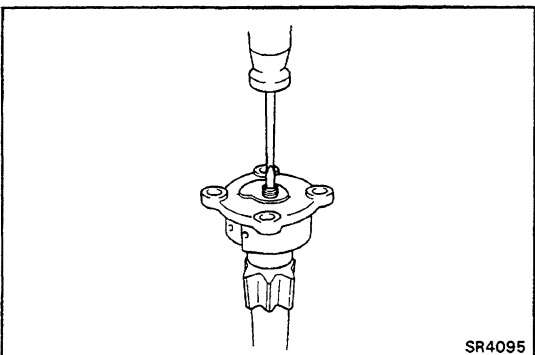
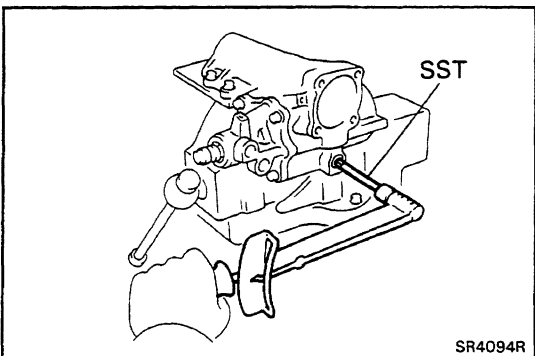
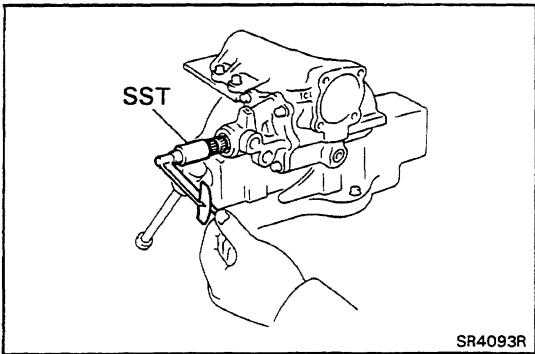
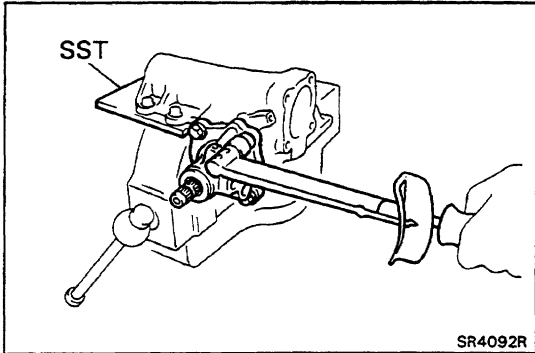
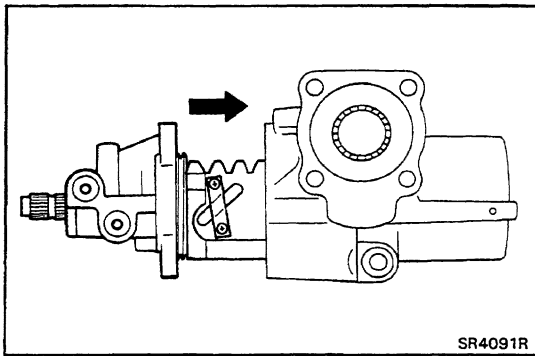


#### 6. IF NECESSARY, REPLACE UNION SEAT

- (a) Using a screw extractor, remove the union seat.



- (b) Using a plastic hammer and extension bar, tap in a new union seat.



## ASSEMBLY OF GEAR HOUSING

(See page [SR-34](#))

### 1. INSTALL WORM GEAR VALVE BODY ASSEMBLY

(a) Install the three O-rings to the gear housing and valve body.

(b) Mount the gear housing on SST and clamp SST in vise.

SST 09630-00012 (09631-00140)

(c) Insert the worm gear valve body assembly to the gear housing as shown.

(d) Install and torque the four bolts.

**Torque: 620 kg-cm (45 ft-lb, 61 N-m)**

**NOTICE: Be careful not to damage the teflon ring.**

(e) Using SST, check the worm gear preload.

SST 09616-00010

**Preload: (at starting)**

**3 - 5.5 kg-cm (2.6 - 4.8 in.-lb, 0.3 - 0.5 N-m)**

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

If preload is not correct, replace the worm gear assembly.

### 2. INSTALL PLUNGER GUIDE NUT

(a) Install the plunger, plunger guide and spring.

(b) Install a new O-ring to the plunger guide nut and install the plunger guide nut with SST.

SST 09043-38100

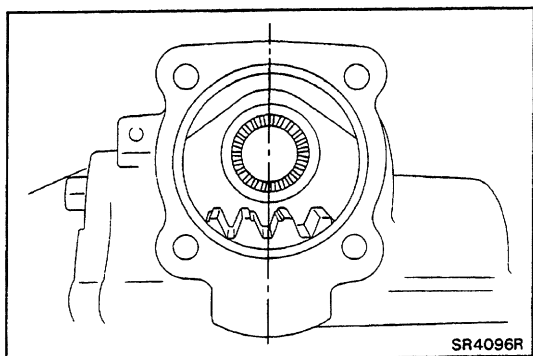
**Torque: 205 kg-cm (15 ft-lb, 20 N-m)**

### 3. INSTALL CROSS SHAFT AND END COVER

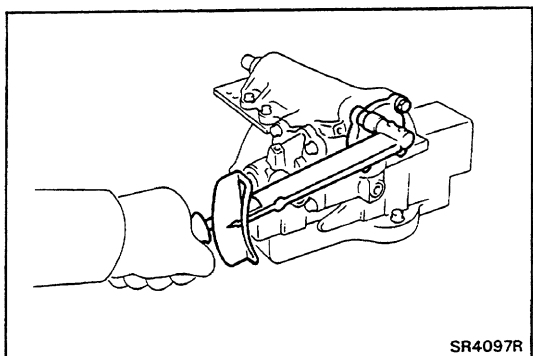
(a) Install a new O-ring on the end cover.

(b) Using a screwdriver, assemble the cross shaft to the end cover.

HINT: Fully loosen the adjusting screw.

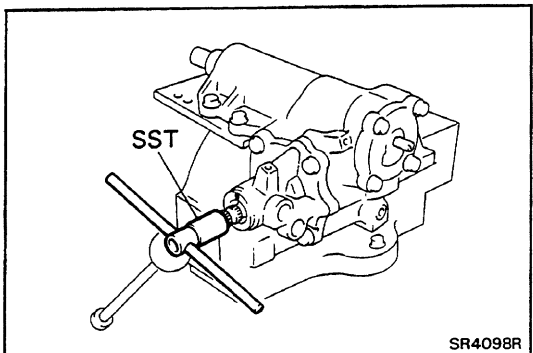


- (c) Set the worm gear at the center of the gear housing.
- (d) insert and push the cross shaft into the gear housing so that the center teeth mesh together.



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

**Torque: 620 kg-cm (45 ft-lb, 61 N-m)**

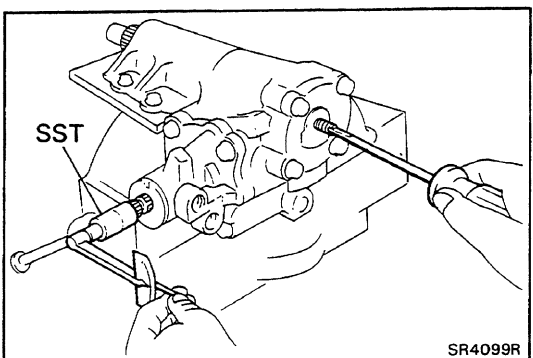


#### 4. DETERMINE CENTER POSITION OF GEAR HOUSING

- (a) Using SST, turn the worm shaft so full lock in both directions and determine the exact center.

SST 09616-00010

- (b) Place matchmarks on the worm shaft and housing to show neutral position.



#### 5. ADJUST CROSS SHAFT ADJUSTING SCREW

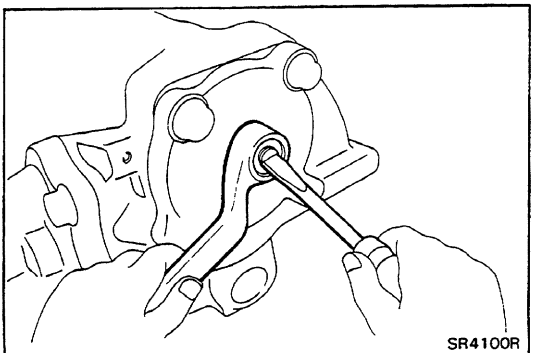
- (a) Install SST with a torque meter on the worm shaft.

SST 09616-00010

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

**Total preload: (at starting)**

**7.5 - 11 kg-cm (6.5 - 9.6 in.-lb, 0.74 - 9.6 N-m)**



#### 6. INSTALL NEW WASHER

#### 7. INSTALL AND TIGHTEN LOCK NUT

Torque the lock nut while holding the adjusting screw.

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

#### 8. CHECK TOTAL PRELOAD