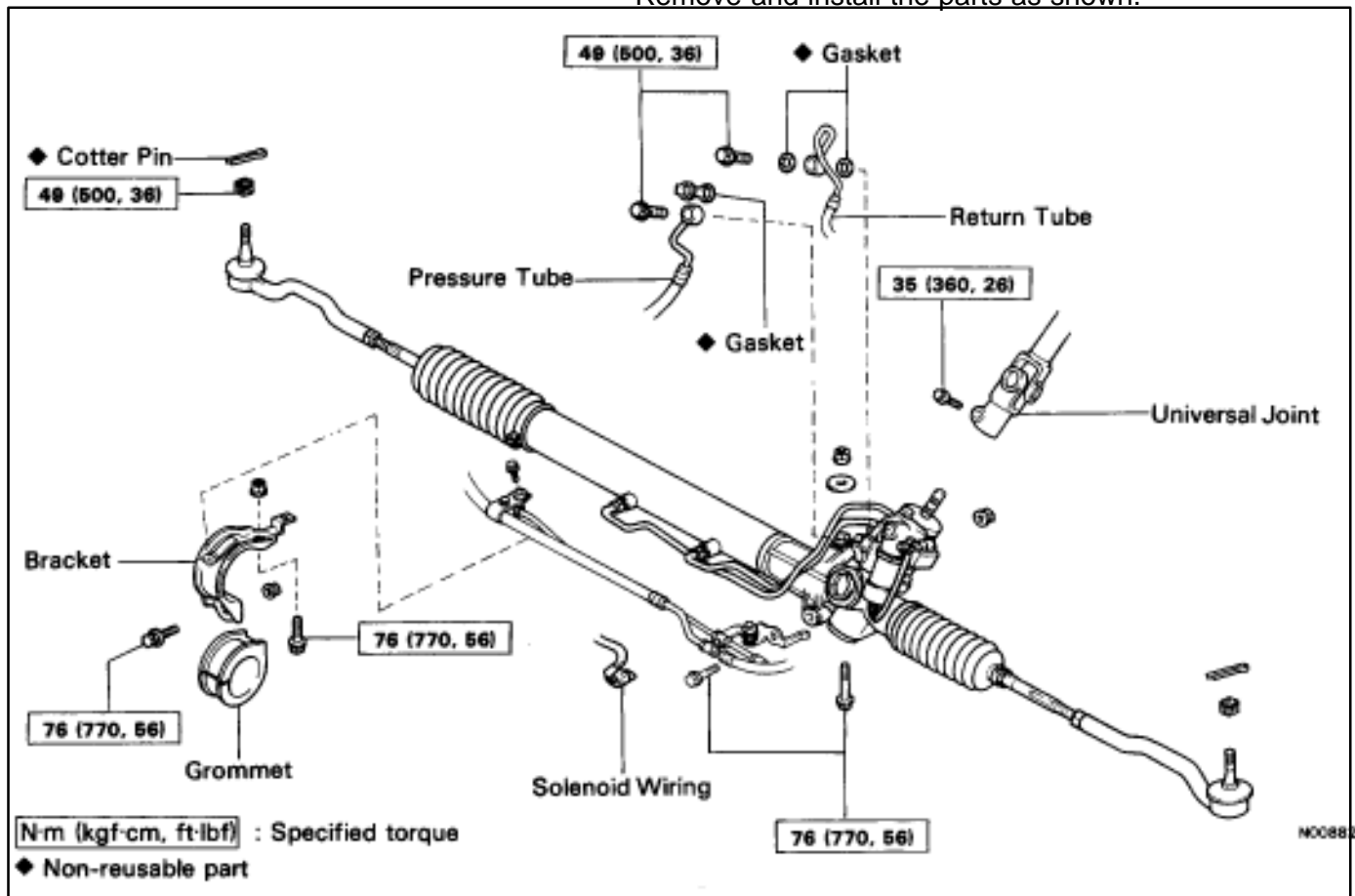


Gear Housing REMOVAL AND INSTALLATION OF GEAR HOUSING

Remove and install the parts as shown.



(MAIN POINTS OF REMOVAL AND INSTALLATION)

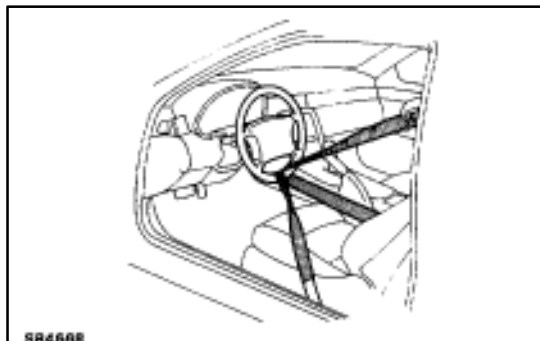
NOTICE: When disconnecting the universal joint during removal of the gear housing, remove the steering wheel and perform centering of the spiral cable.

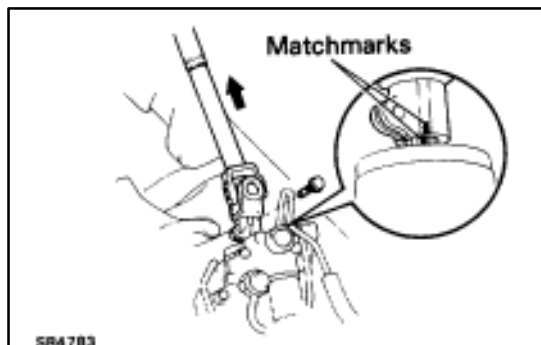
(See page AB-14)

If the operation is performed without removing the steering wheel, use the procedure below to make sure the steering wheel is firmly fixed in position and cannot turn.

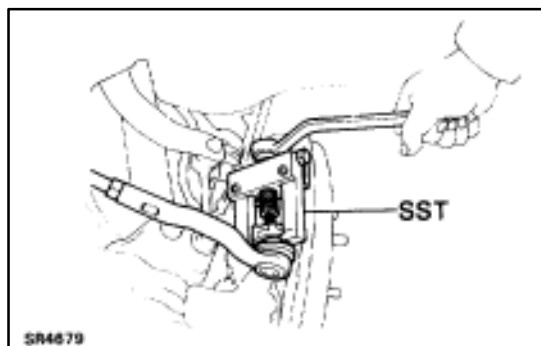
1. DISCONNECT UNIVERSAL JOINT

- Position the front wheels facing straight ahead.
- Using the seat belt of the driver's seat, fix the steering wheel so that it does not turn.





- (c) Place matchmarks on the universal joint and control valve shaft.
- (d) Loosen the bolt on the upper side of the universal joint, remove the bolt on the lower side and disconnect the universal joint.



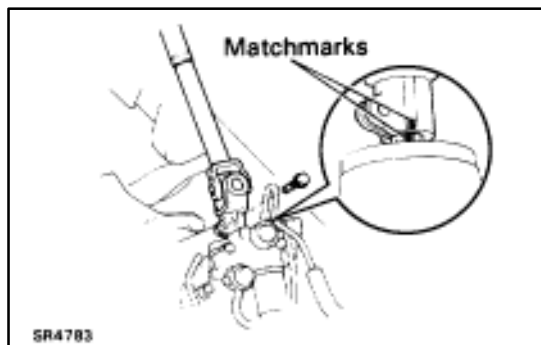
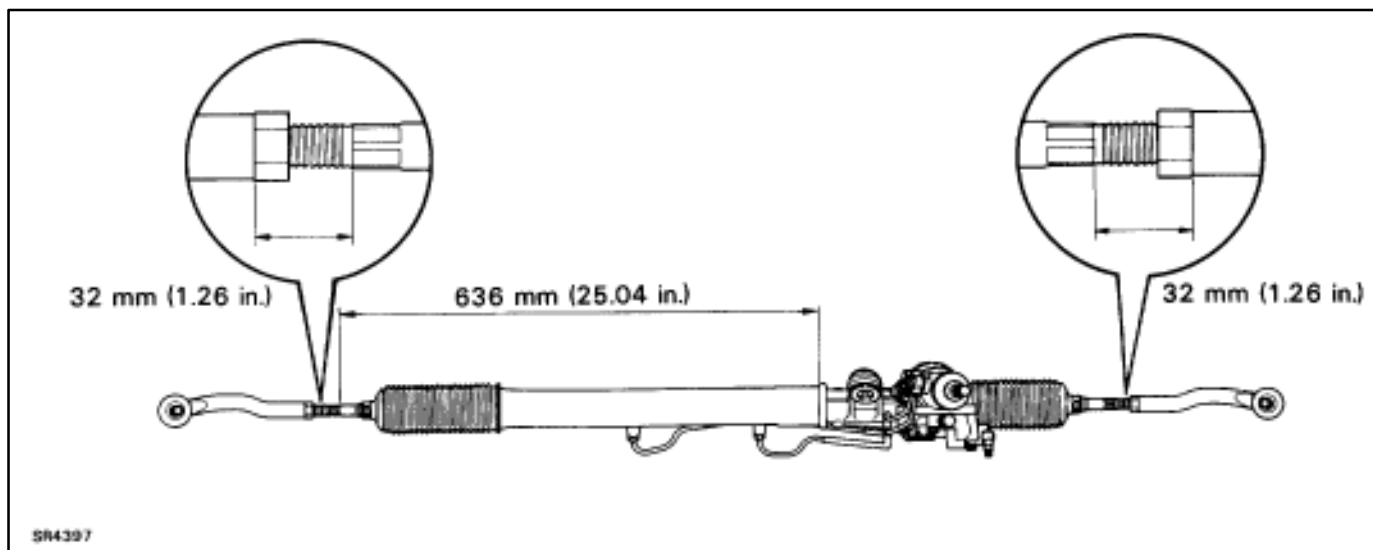
2. DISCONNECT TIE ROD ENDS

- (a) Remove the cotter pin and nut.
- (b) Using SST, disconnect the tie rod end from the knuckle arm.

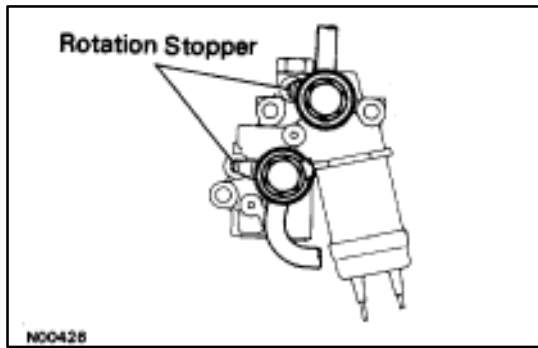
SST 09628-62011

3. CONNECT UNIVERSAL JOINT

- (a) Set the gear housing so that it matches the dimensions shown below, with the gear housing at the center point.



- (b) Align matchmarks on the universal joint and control valve shaft and connect them.

**4. CONNECT PRESSURE AND RETURN TUBES**

After inserting the rotation stopper in the valve housing holes, tighten the union bolts.

5. CENTER SPIRAL CABLE

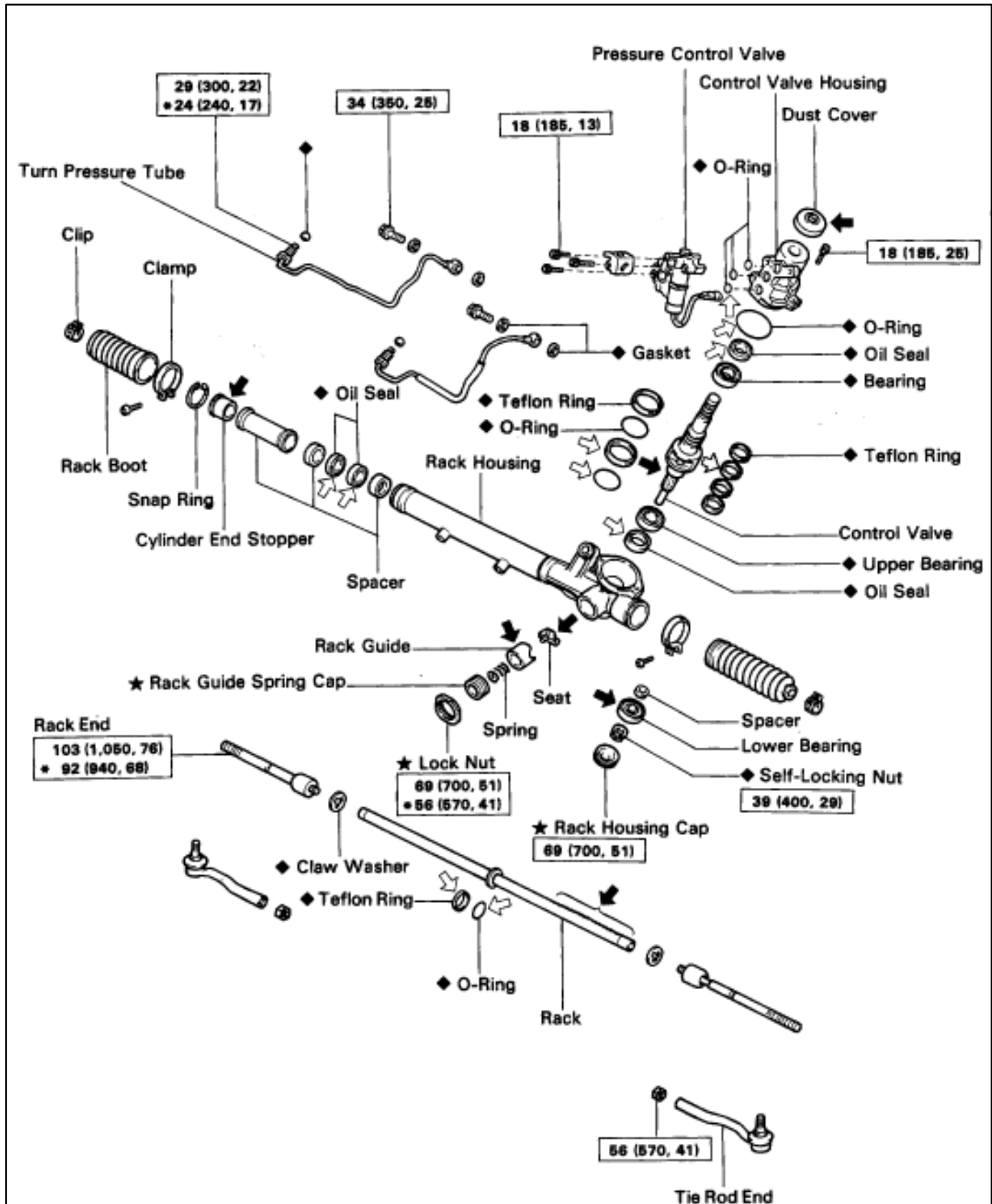
If the steering wheel has been removed, or the steering wheel may have moved during the operation, always perform centering of the spiral cable.

(See page AB-15)

6. CHECK STEERING WHEEL CENTER POINT**7. CHECK TOE-IN**

(See page [SA-6](#))

COMPONENTS



N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non-reusable part

★ Precoated part

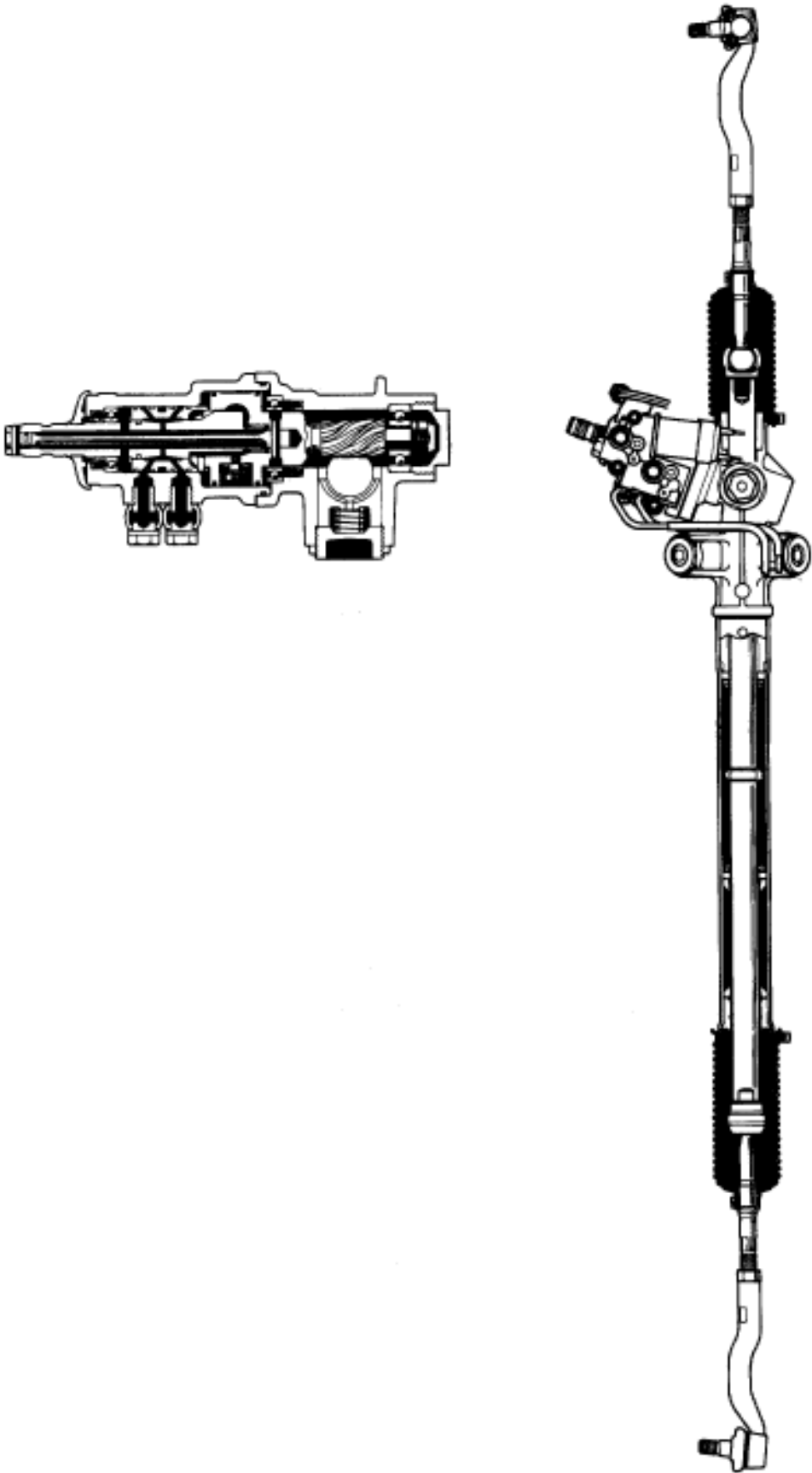
• For use with SST

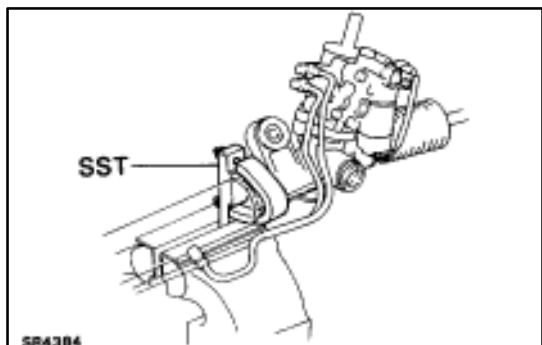
◆ : Apply Molybdenum Disulphide Lithium Base Grease

← : Apply Power Steering Fluid

SR4409

SECTIONAL VIEW

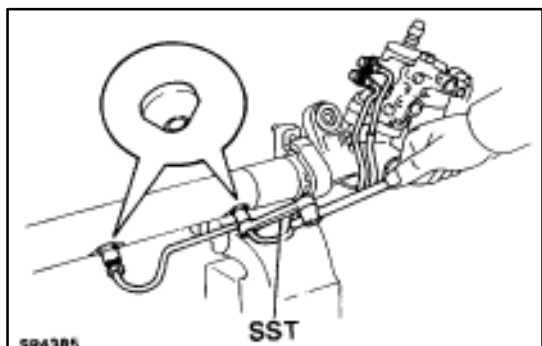




DISASSEMBLY OF STEERING GEAR HOUSING

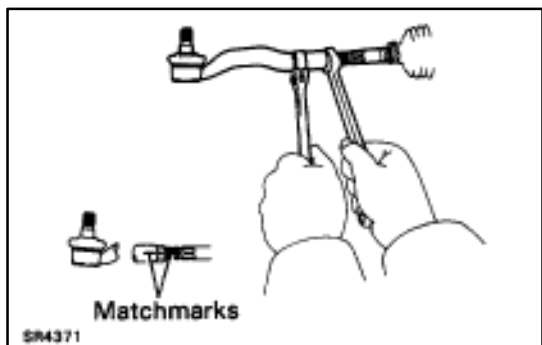
1. CLAMP GEAR HOUSING IN VISE

Using SST, secure the steering gear in a vise.
SST 09612-00012



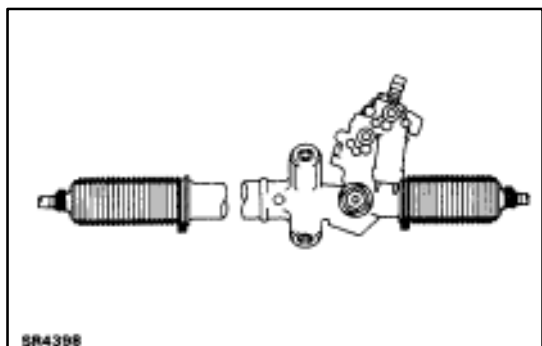
2. REMOVE RIGHT AND LEFT TURN PRESSURE TUBES

- Remove the two union bolts and four gaskets.
- Using SST, remove the pressure tubes.
SST 09633-00020
- Remove the two union seats.



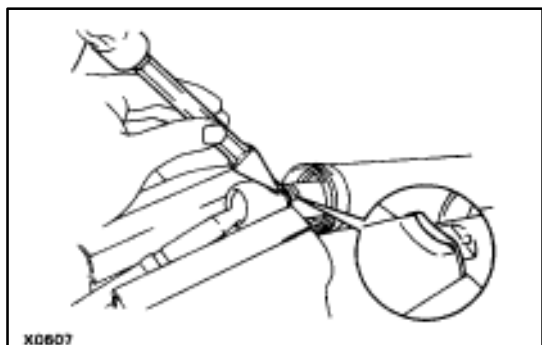
3. REMOVE TIE ROD ENDS

- Loosen the lock nuts and place matchmarks on the tie rod ends and rack ends.
- Remove the tie rod ends and lock nuts.



4. REMOVE RACK BOOTS, CLAMPS AND CLIPS

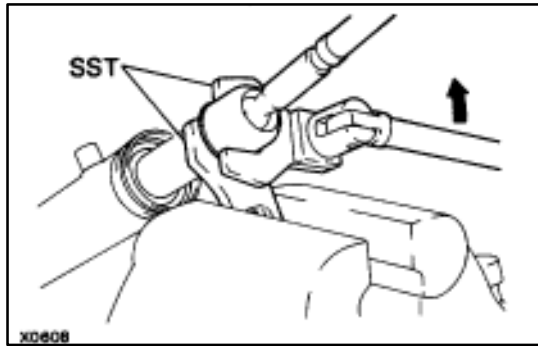
- Remove the clips and clamps.
- Remove the rack boots.
- Mark the left and right boots.



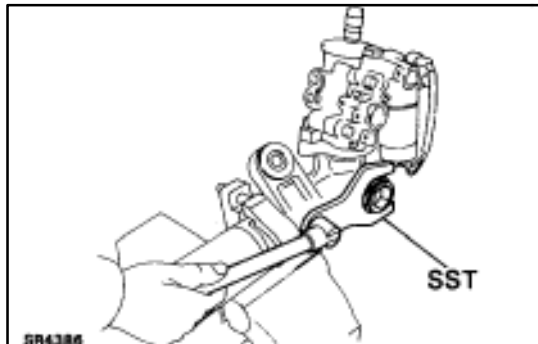
5. REMOVE RACK ENDS AND CLAW WASHERS

- Unstake the claw washers.

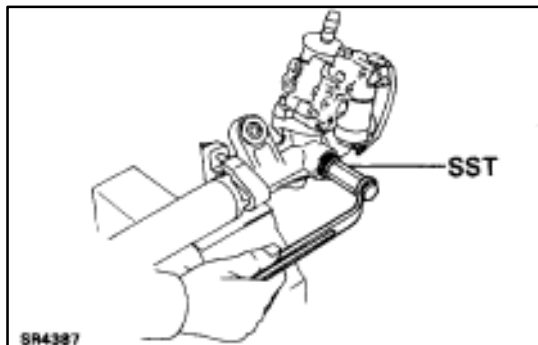
NOTICE: Avoid any impact to the rack.



- (b) Using SST, remove the rack ends.
SST 09612-24014 (09617-24011) 09617-14010
- (c) Remove the claw washers.



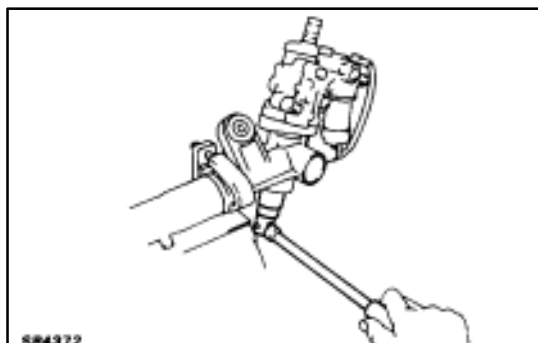
- 6. **REMOVE RACK GUIDE SPRING LOCK NUT**
Using SST, remove the rack guide spring cap lock nut.
SST 09612-24014 (09617-24020)



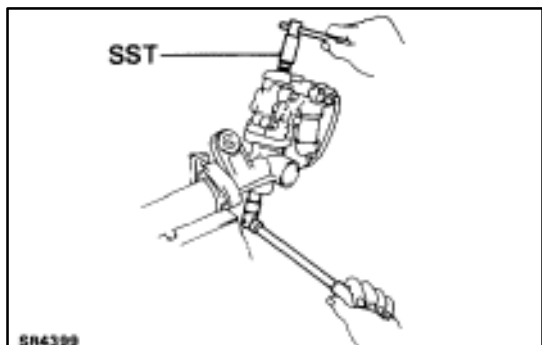
- 7. **REMOVE RACK GUIDE SPRING CAP**
Using SST, remove the rack guide spring cap.
SST 09612-24014 (09612-10022)



- 8. **REMOVE RACK GUIDE SPRING, RACK GUIDE AND SEAT**

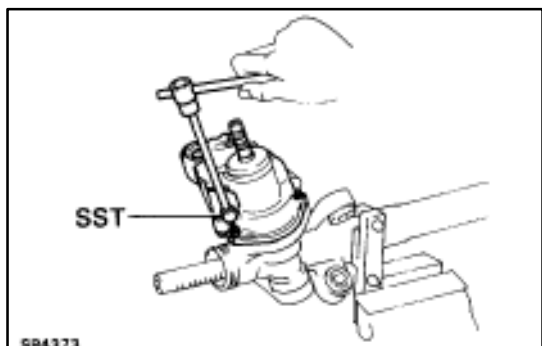


- 9. **REMOVE RACK HOUSING CAP**

**10. REMOVE SELF-LOCKING NUT**

Using SST, remove the self-locking nut.

SST 09616-00010

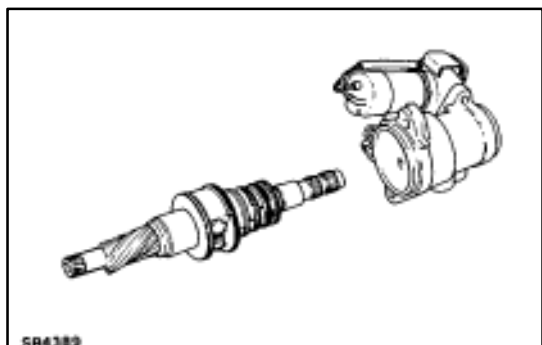
11. REMOVE DUST COVER**12. REMOVE CONTROL VALVE HOUSING**

(a) Using SST, remove the two bolts.

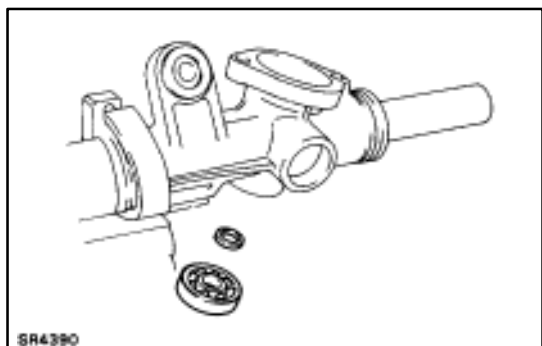
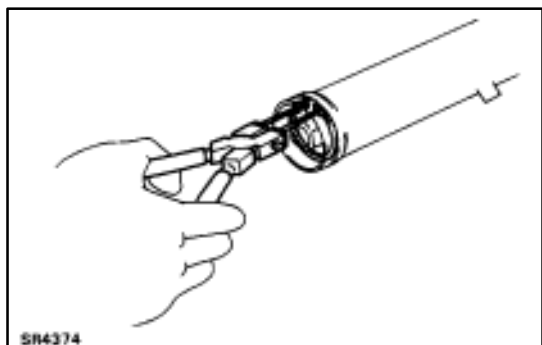
SST 09313-30021

(b) Pull out the valve with the valve housing.

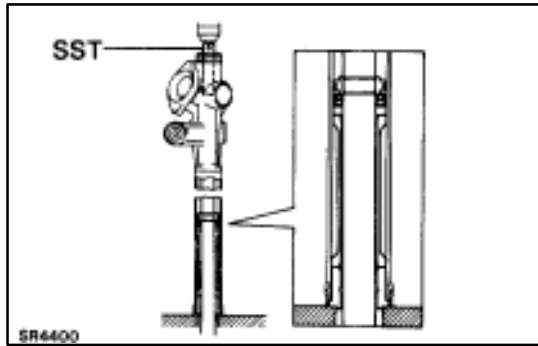
(c) Remove the O-ring from the valve housing.

**13. REMOVE CONTROL VALVE**

Using a plastic hammer, tap out the control valve.

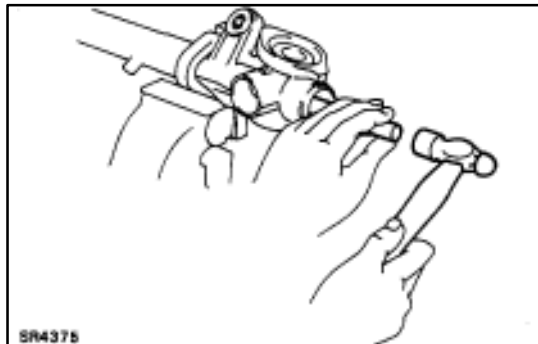
**14. REMOVE LOWER BEARING AND SPACER****15. REMOVE CYLINDER END STOPPER, SPACERS, OIL SEAL AND RACK**

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

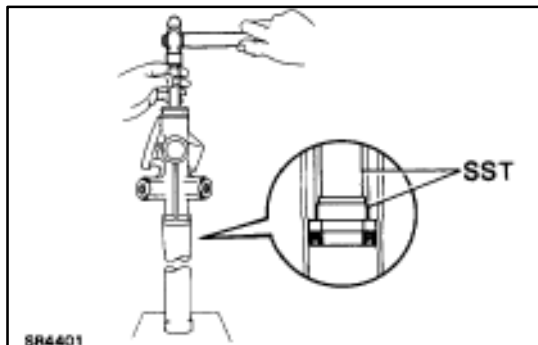


- (b) Using SST, press the rack until the end stopper slightly touches the press block.

SST 09612-24014 (09612-10061)



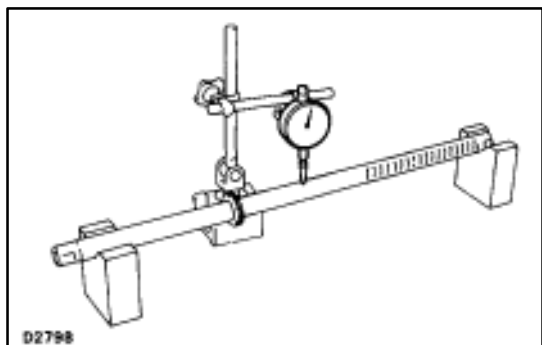
- (c) Slightly tap the rack end with a brass bar and hammer.
(d) Pull out the rack with the cylinder end stopper, two spacers and oil seal.



16. REMOVE RACK HOUSING OIL SEAL AND SPACER

Using SST, tap out the oil seal and spacer.

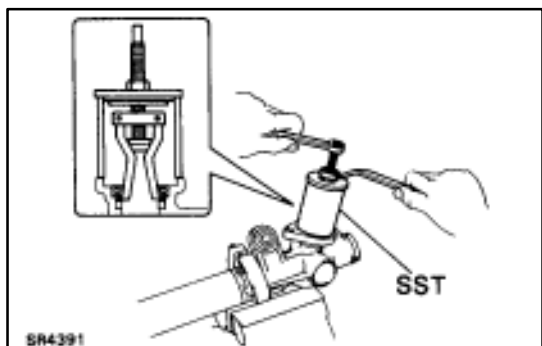
SST 09631-12020, 09631-20031



INSPECTION AND REPAIR OF GEAR HOUSING COMPONENTS

1. INSPECT RACK

- (a) Check the rack for runout and for teeth wear or damage.
Maximum runout: 0.3 mm (0.012 in.)
- (b) Check the back surface for wear or damage. If faulty, replace it.

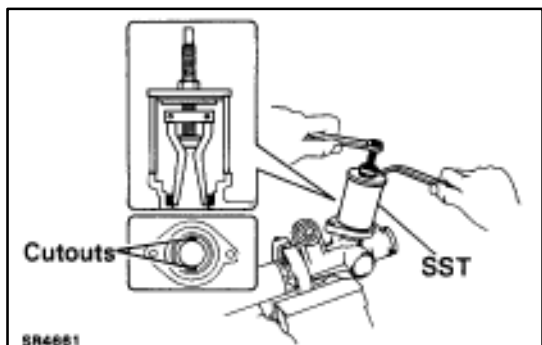


2. IF NECESSARY, REPLACE RACK HOUSING BEARING AND OIL SEAL

- (a) Using SST, remove the bearing.

SST 09612-30012

NOTICE: Be careful not to damage the rack housing.

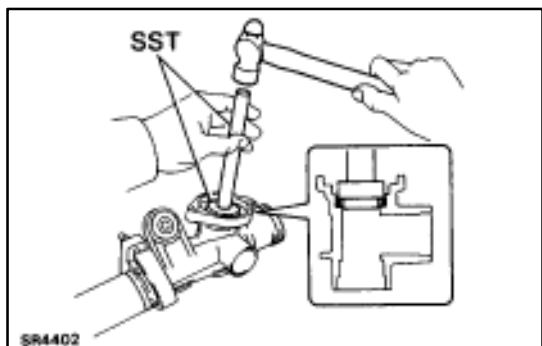


- (b) Using SST, remove the oil seal.

SST 09612-30012

NOTICE: Be careful not to damage the rack housing.

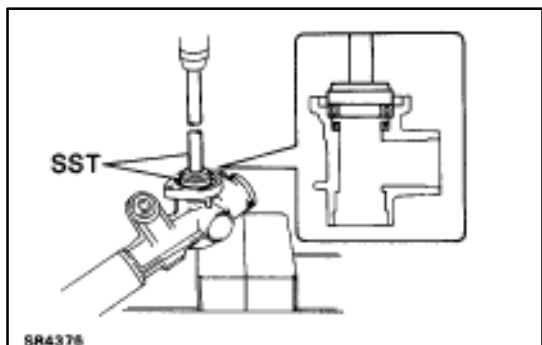
HINT: When using the SST, apply the tips of the SST to the cutouts in the housing.



- (c) Coat a new oil seal lip with power steering fluid.

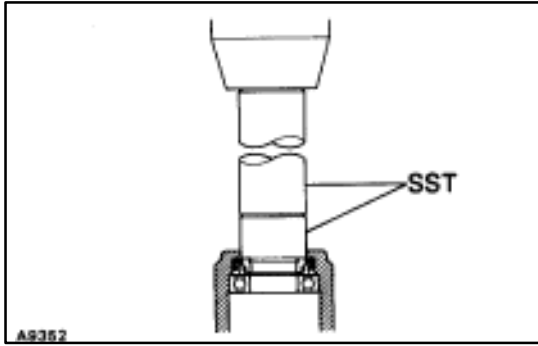
- (d) Using SST, install the new oil seal.

SST 09620-30010 (09624-30010, 09631-00020)



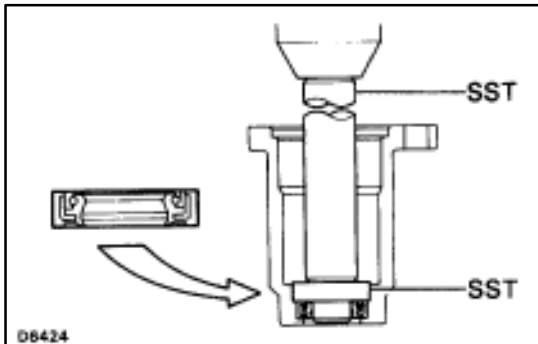
- (e) Using SST, press in a new bearing.

SST 09620-30010 (09626-30010, 09631-00020)

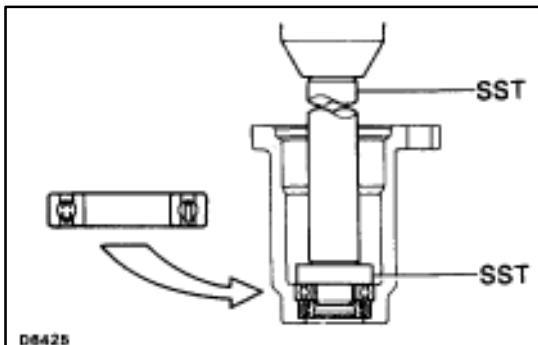


3. IF NECESSARY, REPLACE CONTROL VALVE HOSE OIL SEAL AND BEARING

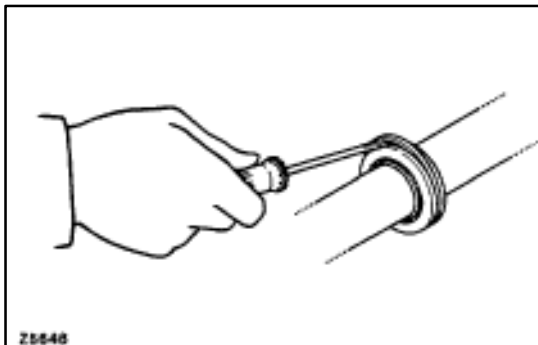
- (a) Using SST, press out the oil seal with the bearing.
SST 09630-24013 (09620-24010), 09631-12020



- (b) Coat the lip of a new oil seal with power steering fluid.
(c) Using SST, press in the new oil seal.
SST 09630-24013 (09620-24020), 09631-12020

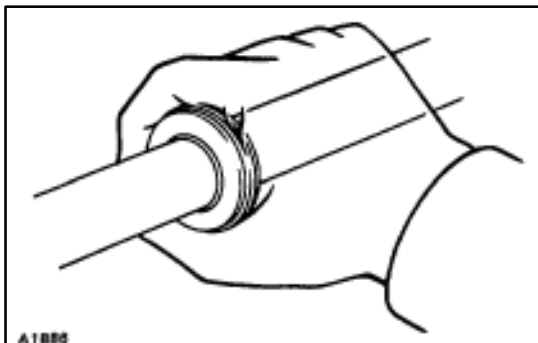


- (d) Using SST, press in a new bearing.
SST 09630-24013 (09620-24030), 09631-12020

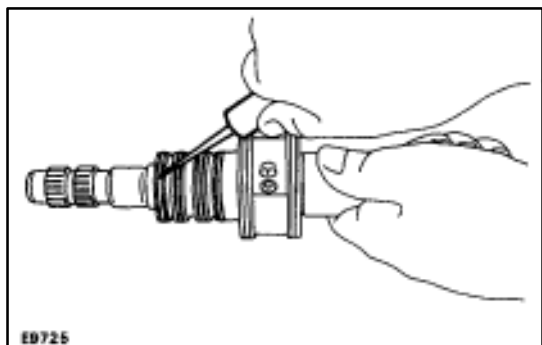


4. IF NECESSARY, REPLACE STEERING RACK TEFLON RING AND O-RING

- (a) Remove the teflon ring and O-ring.
NOTICE: Be careful not to damage the steering rack.
(b) Coat a new O-ring with power steering fluid, and install it.
(c) Expand a new teflon ring with your fingers.
NOTICE: Be careful not to over-expand the teflon ring.



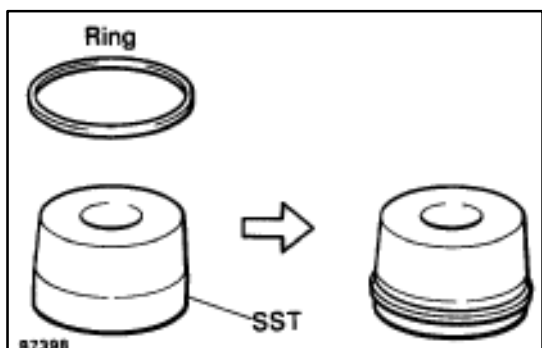
- (d) Install the new teflon ring to the steering rack.
(e) Coat the teflon ring with power steering fluid and snug it down with your fingers.



5. IF NECESSARY, REPLACE CONTROL VALVE TEFLON RINGS

(a) Using a screwdriver, remove the teflon rings.

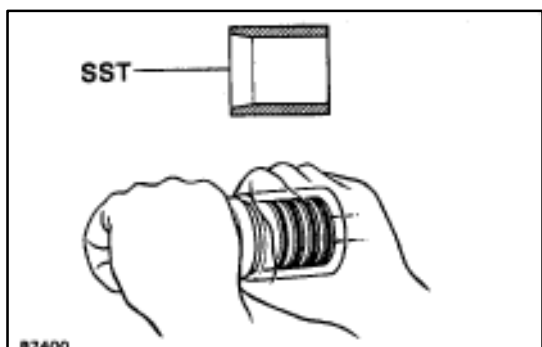
NOTICE: Be careful not to damage the control valve.



(b) Install new teflon rings to SST and expand them.

SST 09631-20070

(c) Install the expanded teflon rings to the control valve.

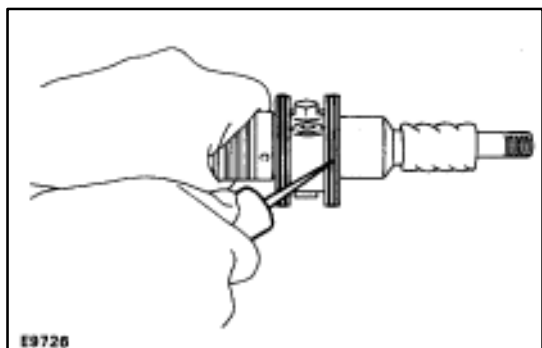


(d) Coat the teflon rings with power steering fluid, and snug them down with your fingers.

NOTICE: Be careful not to damage the teflon rings.

(e) Carefully slide the tapered end of the SST over the teflon rings to seat the rings.

SST 09631-20081



6. IF NECESSARY, REPLACE HYDRAULIC REACTION CHAMBER TEFLON RINGS AND O-RINGS

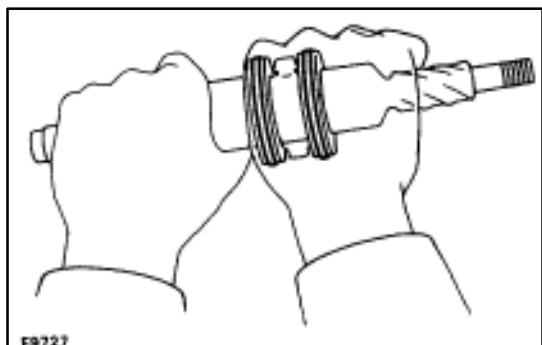
(a) Remove the teflon rings and O-rings.

NOTICE: Be careful not to damage the control valve.

(b) Coat two new O-rings with power steering fluid, and install them.

(c) Expand new teflon rings with your fingers.

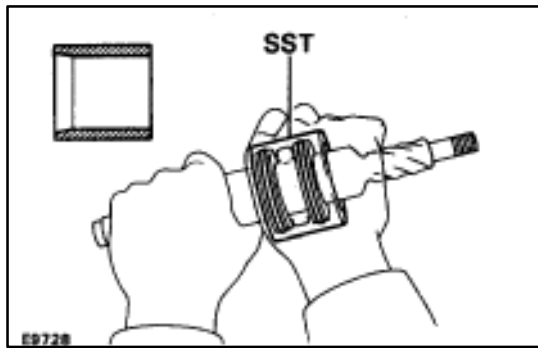
NOTICE: Be careful not to over-expand the teflon rings.



(d) Install the expanded teflon rings to the control valve.

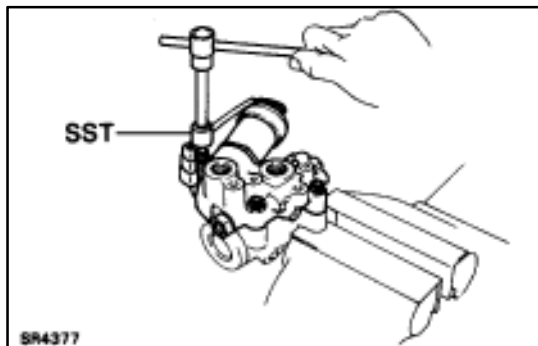
(e) Coat the teflon rings with power steering fluid, and snug them down with your fingers.

NOTICE: Be careful not to damage the teflon rings.



- (f) Carefully slide the tapered end of the SST over the teflon rings to seat the rings.

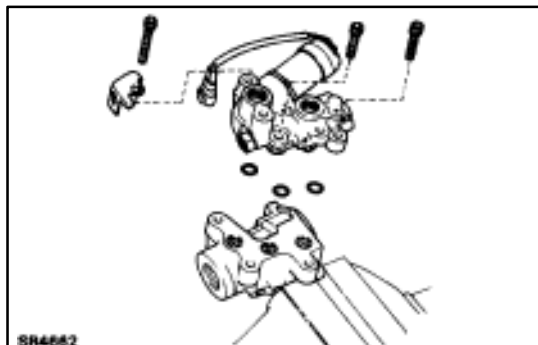
SST 09631-32020



7. IF NECESSARY, REPLACE PRESSURE CONTROL VALVE

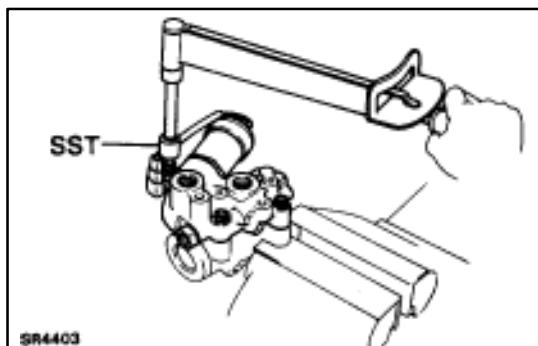
- (a) Using SST, remove the three bolts.

SST 09313-30021



- (b) Remove the three O-rings from the housing.

- (c) Coat three new O-rings with power steering fluid, and install them on the control valve housing.



- (d) Using SST, install a new pressure control valve with the three bolts.

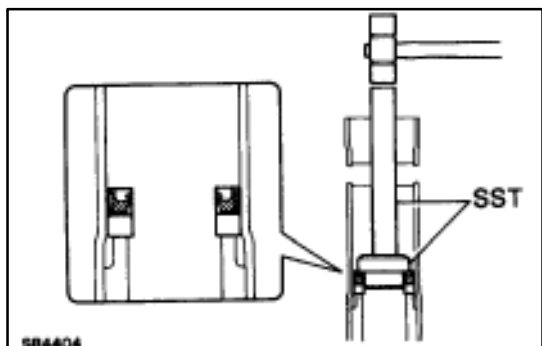
SST 09313-30021

Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)

ASSEMBLY OF STEERING GEAR HOUSING

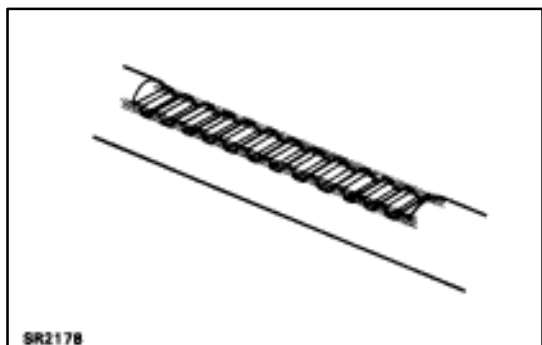
(See page [SR-99](#))

1. **COAT WITH POWER STEERING FLUID OR MOLYBDENUM DISPLHIDE LITHIUM BASE GREASE**
(See page [SR-99](#))



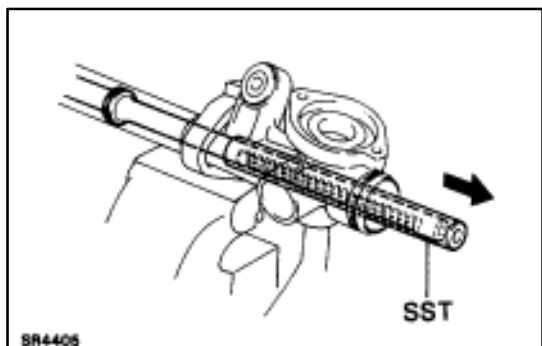
2. **INSTALL RACK HOUSING OIL SEAL AND SPACER**

- (a) Coat a new oil seal lip with power steering fluid.
 - (b) Insert SST into the oil seal and spacer.
- SST 09631-12020, 09631-32010
- (c) Softly tap in the spacer and oil seal.

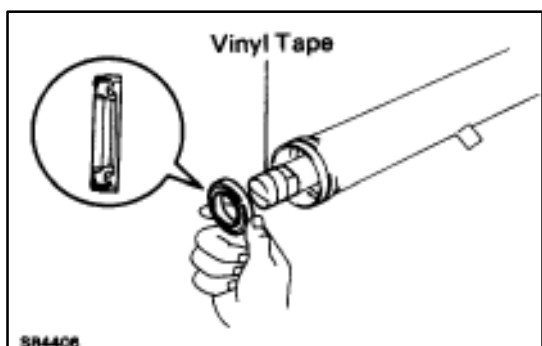


3. **INSTALL RACK**

- (a) Install SST to the rack.
- HINT: If necessary, scrape the burrs off the rack teeth end and burnish.
- SST 09631-20102

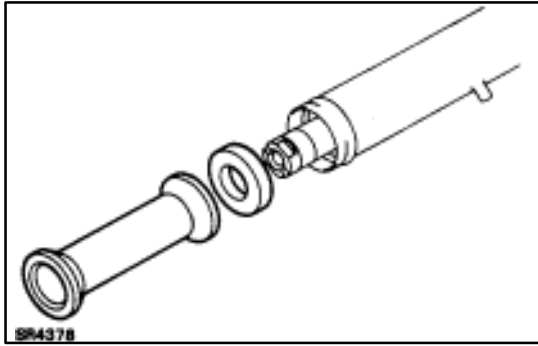


- (b) Coat SST with power steering fluid.
- (c) Insert the rack into the cylinder.
- (d) Remove SST.

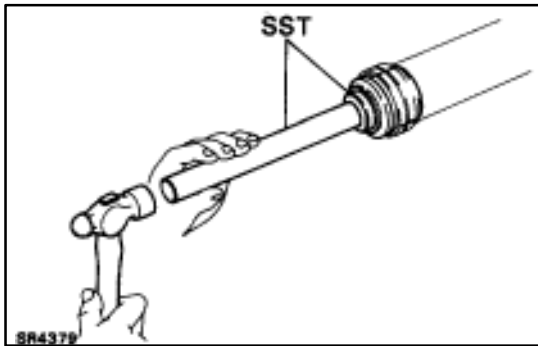


4. **INSTALL CYLINDER END STOPPER, OIL SEAL AND SPACERS**

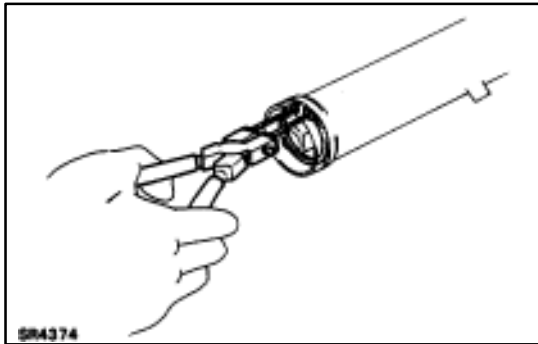
- (a) To prevent oil seal lip damage, wind vinyl tape on the steering rack end, and apply power steering fluid.
- (b) Install the oil seal by pushing it into the cylinder in the direction shown in drawing, without tilting.



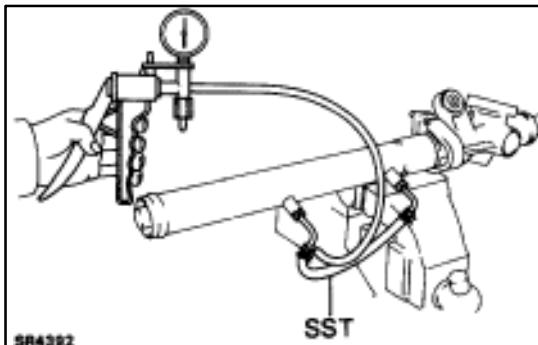
(c) Install the two spacers.



(d) Using SST, drive in the cylinder end stopper.
SST 09620-30010 (09627-30010, 09631-00020)

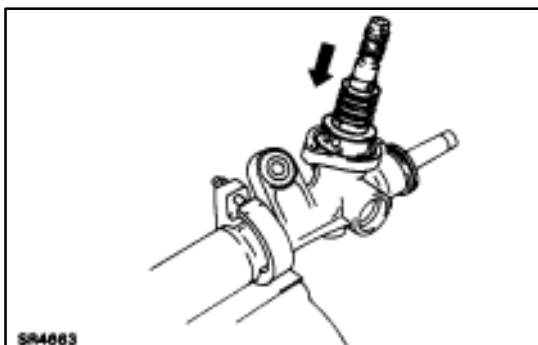


(e) Using snap ring pliers, install the snap ring.



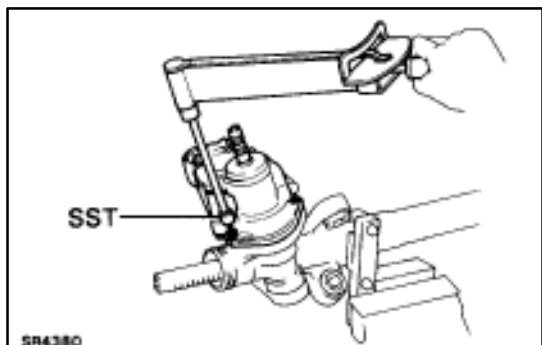
5. AIR TIGHTNESS TEST

- Install SST to the unions of the rack housing.
SST 09631-12071
- Apply 53.3 kPa (400 mmHg, 15.75 in.Hg) of vacuum for about 30 seconds.
- Check that there is no change in the vacuum.
If there is change in the vacuum, check the installation of the rack housing oil seals.



6. INSTALL CONTROL VALVE

- Coat the teflon rings with power steering fluid.
- Push the control valve into the rack housing.



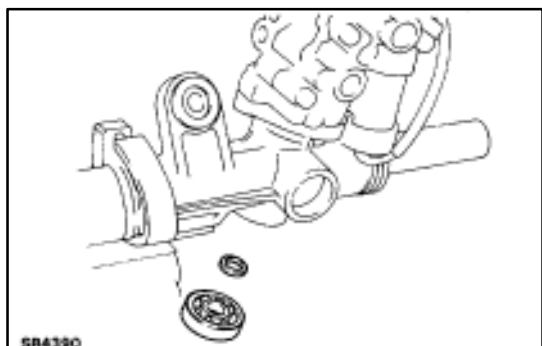
7. INSTALL CONTROL VALVE HOUSING

- (a) Coat a new O-ring with power steering fluid, and install it to the valve housing.
- (b) Using SST, tighten the two bolts.

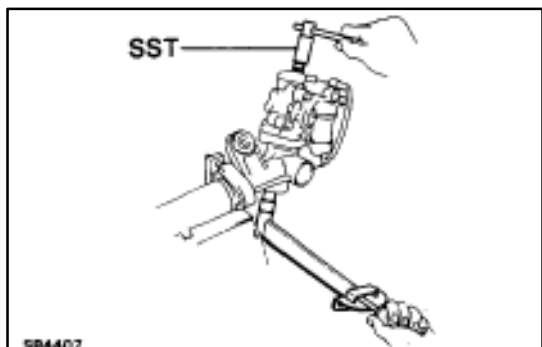
SST 09313-30021

Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)

NOTICE: To prevent oil seal lip damage, wind vinyl tape on the serration part of the control valve shaft.



8. INSTALL LOWER BEARING AND SPACER

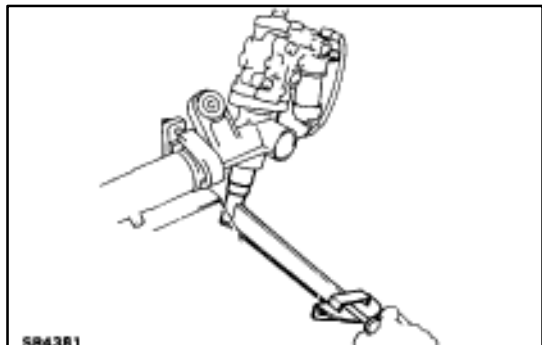


9. INSTALL SELF-LOCKING NUT

Using SST, install a new self-locking nut.

SST 09616-00010

Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)



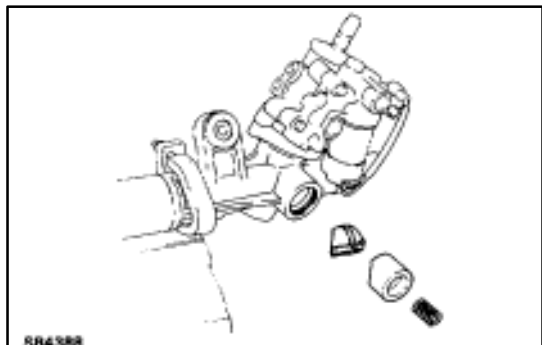
10. INSTALL RACK HOUSING CAP

- (a) Apply sealant to 2 or 3 threads of the cap.

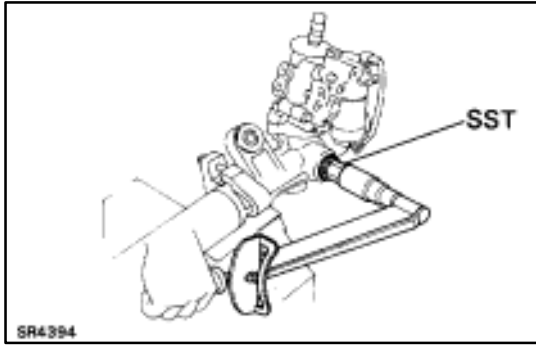
Sealant: Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent

- (b) Install the cap.

Torque: 69 N·m (700 kgf·cm, 51 ft·lbf)



11. INSTALL RACK GUIDE SEAT, RACK GUIDE AND RACK GUIDE SPRING



12. ADJUST TOTAL PRELOAD

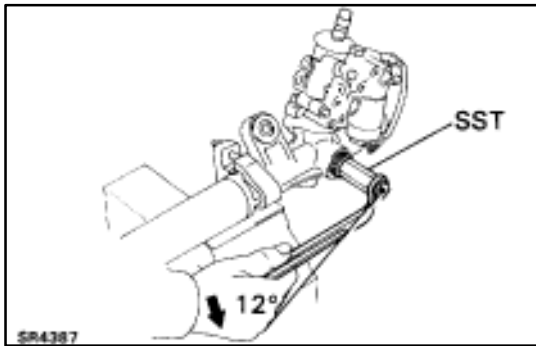
(a) Apply sealant to 2 or 3 threads of the spring cap.

Sealant: Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent

(b) Using SST, install and torque the spring cap.

SST 09612-24014 (09612-10022)

Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)



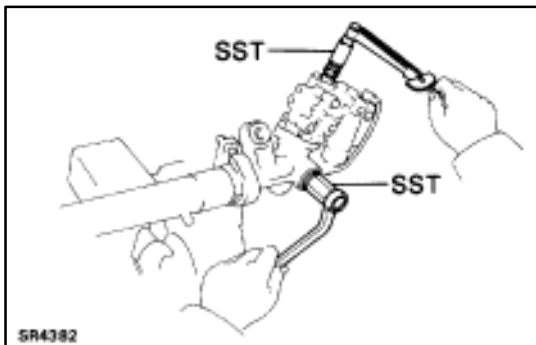
(c) Using SST, return the rack guide spring cap 12°.

SST 09612-24014 (09612-10022)

(d) Using SST, turn the control valve shaft right and left one or two times.

SST 09616-00010

(e) Loosen the spring cap until the rack guide compression spring is not functioning.



(f) Using SST and a torque meter, tighten the rack guide spring cap until the preload is within specification.

SST 09612-24014 (09612-10022), 09616-00010

Preload (turning): 0.9–1.9 N·m

(9–20 kgf·cm, 7.9–17.3 in·lbf)

13. INSTALL RACK GUIDE SPRING CAP LOCK NUT

(a) Apply sealant to 2 or 3 threads of the lock nut.

Sealant: Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent

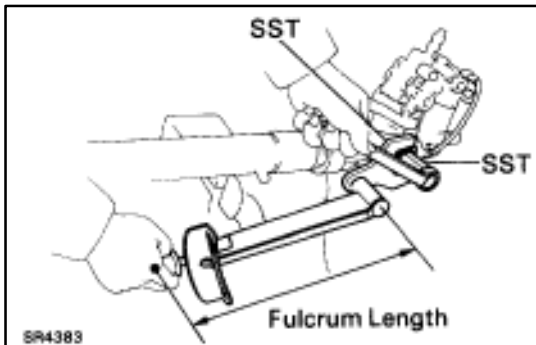
(b) Using SST, install and torque the lock nut.

SST 09612-24014 (09612-10022, 09617-24020)

Torque: 56 N·m (570 kgf·cm, 41 ft·lbf)

HINT: Use a torque wrench with a fulcrum length of 340 mm (13.39 in.).

(c) Recheck the total preload.



14. INSTALL DUST COVER

15. INSTALL CLAW WASHERS AND RACK ENDS

(a) Install new claw washers.

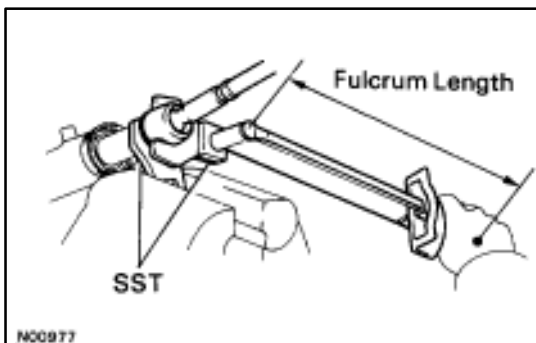
HINT: Align the claws of the claw washer with the rack grooves.

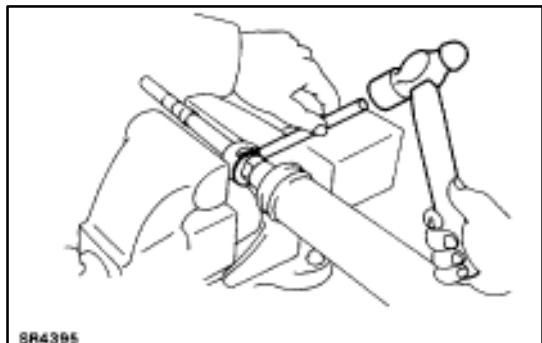
(b) Using SST, install and torque the rack ends.

SST 09612-24014 (09617-24011), 09617-14010

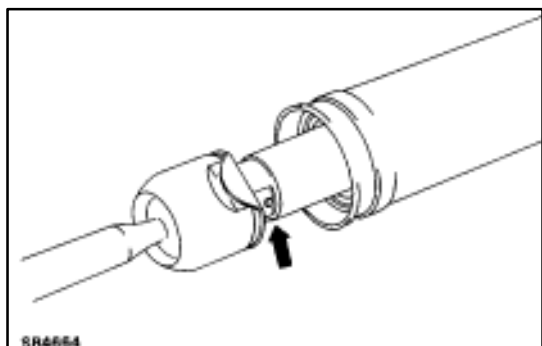
Torque: 92 N·m (940 kgf·cm, 68 ft·lbf)

HINT: Use a torque wrench with a fulcrum length of 340 mm (13.39 in.).





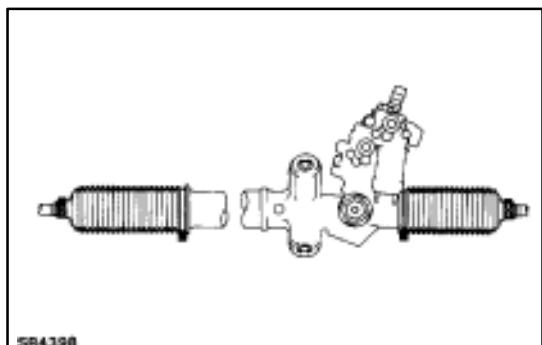
- (c) Using a brass bar and hammer, stake the claw washers.



16. INSTALL RACK BOOTS, CLAMPS AND CLIPS

- (a) Insure that the tube hole is not clogged with grease.

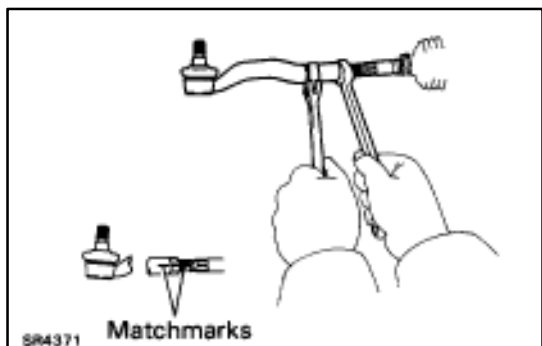
HINT: If the tube hole is clogged, the pressure inside the boot will change after it is assembled and the steering wheel turned.



- (b) Install the boots.

NOTICE: Be careful not to damage or twist the boots.

- (c) Install the clamps and clips to the boots.

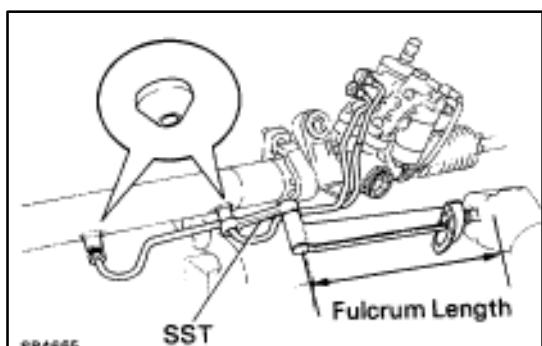


17. INSTALL TIE ROD ENDS

- (a) Screw the lock nuts and tie rod ends onto the rack ends until the matchmarks are aligned.

- (b) After adjusting toe-in, torque the lock nuts.

Torque: 56 N·m (570 kgf·cm, 41 ft·lbf)



18. INSTALL RIGHT AND LEFT TURN PRESSURE TUBES

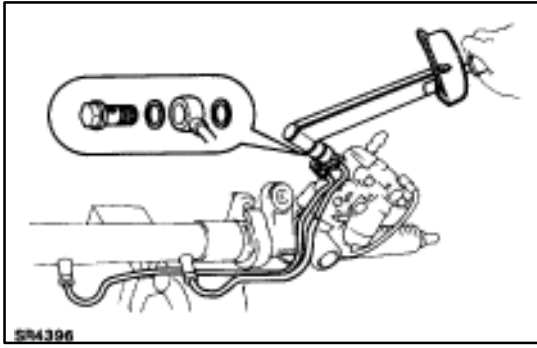
- (a) Install two new union seats.

- (b) Using SST, tighten nuts.

SST 09633-00020

Torque: 24 N·m (240 kgf·cm, 17 ft·lbf)

HINT: Use a torque wrench with a fulcrum length of 300 mm (11.81 in.).



- (c) Install the union bolts over the new gaskets and torque them.
Torque: 34 N·m (350 kgf·cm, 25 ft·lbf)