

STEERING

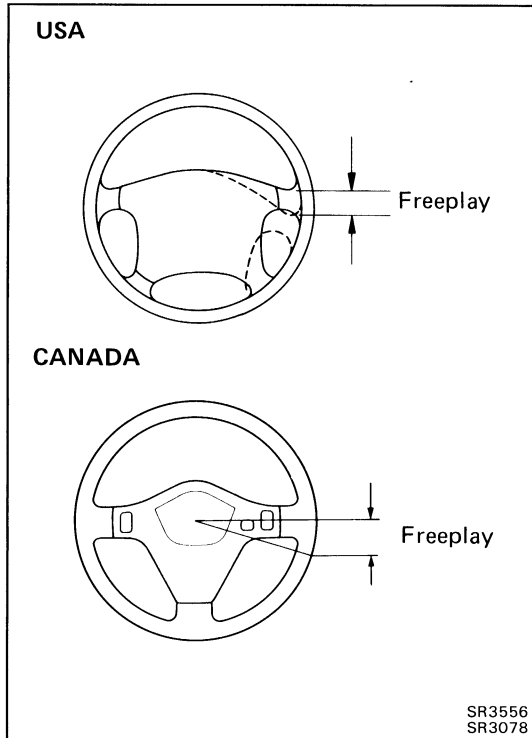
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PRECAUTIONS

- Care must be taken to replace parts properly because they could affect the performance of the steering system and result in a driving hazard.
- (USA)
The steering wheel pad has an airbag built in, so take all due precautions when handling it. For more details, see the SRS AIRBAG section.

TROUBLESHOOTING

Problem	Possible cause	Remedy	Page
Hard steering	Tires improperly inflated	Inflate tires to proper pressure	FA-3
	Excessive caster	Check front wheel alignment	FA-3
	Steering system joint worn	Replace steering system joints	SR-57
	Ball joints worn	Inspect upper and lower ball joints	FA-21
	Steering column binding	Inspect steering column	SR-4
	Steering gear out of adjustment or broken	Adjust or repair steering gear	SR-57
	Power steering belt loose	Adjust belt tension	SR-40
	Fluid level in reservoir low	Check reservoir oil level	SR-40
	Power steering unit faulty	Check power steering unit	SR-40
	Solenoid valve faulty	Inspect solenoid valve	SR-94
Electronic control faulty	Inspect electronic control	SR-90	
Poor return	Tires improperly inflated	Inflate tires to proper pressure	FA-3
	Wheel alignment incorrect	Check front wheel alignment	FA-3
	Steering column binding	Inspect steering column	SR-4
	Steering gear out of adjustment or broken	Adjust or repair steering gear	SR-57
Excessive play	Front hub bearing worn	Replace front hub bearing	FA-8
	Main shaft yoke or intermediate shaft yoke worn	Replace main shaft or intermediate shaft	
	Ball joints worn	Inspect upper and lower ball joints	FA-21
	Steering system joints worn	Replace steering system joints	SR-57
	Steering gear out of adjustment or broken	Adjust or repair steering gear	SR-57
Abnormal noise	Steering linkage loose	Tighten steering linkage	
	Steering system joints worn	Replace steering system joints	SR-57
	Steering gear out of adjustment or broken	Adjust or repair steering gear	SR-57



ON-VEHICLE INSPECTION

1. CHECK THAT STEERING WHEEL FREEPLAY IS CORRECT

With the vehicle stopped and tires 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, repair.

2. CHECK STEERING LINKAGE AND GEAR HOUSING

(a) Check the steering linkage for looseness or damage.

Check that:

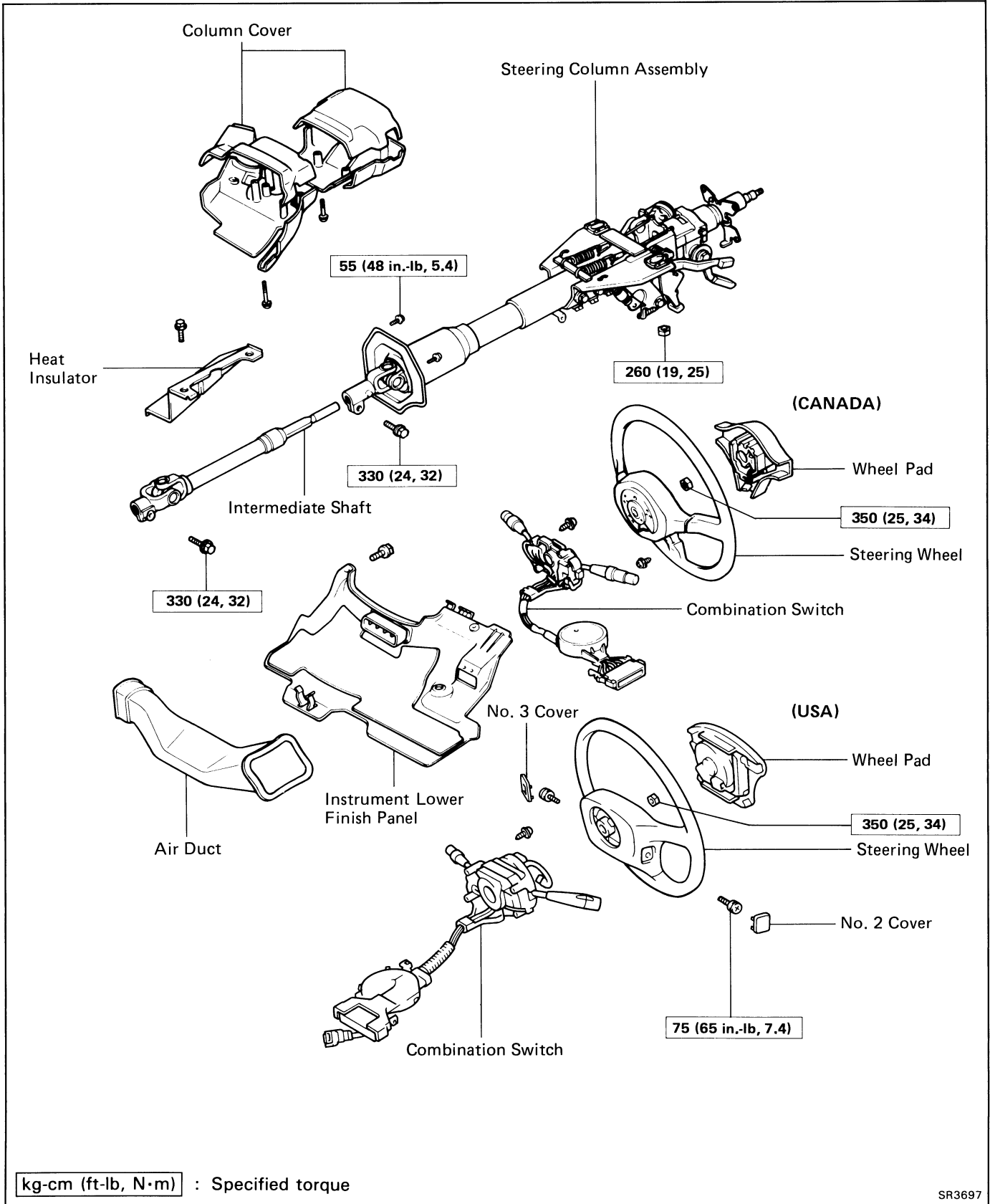
- Tie rod ends do not have excessive play.
- Boots are not damaged.
- Boots clamps are not loose.

(b) Check gear housing for grease leakage or oozing.

STEERING COLUMN

REMOVAL AND INSTALLATION OF STEERING COLUMN

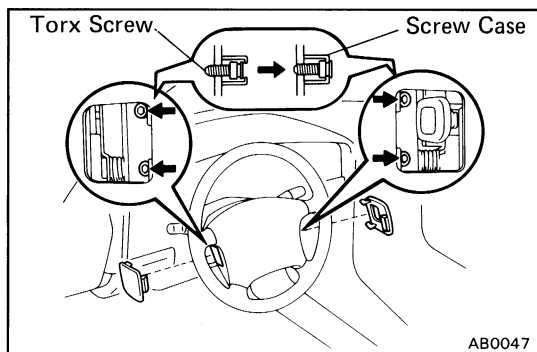
Remove and install the parts as shown.



(MAIN POINTS OF REMOVAL AND INSTALLATION)**(USA)**

CAUTION: Work must be started after approx. 20 seconds or longer from the time the ignition switch is turned to the LOCK position and the negative (–) terminal cable is disconnected from the battery (See page AB-2).

NOTICE: If the wiring connector of the airbag system is disconnected with the ignition switch at ON or ACC, diagnostic codes will be recorded.

**1. REMOVE STEERING WHEEL PAD**

- (a) Disconnect the battery negative (–) terminal.
- (b) Place the front wheels facing straight ahead.
- (c) Using a torx wrench, loosen the four screws.

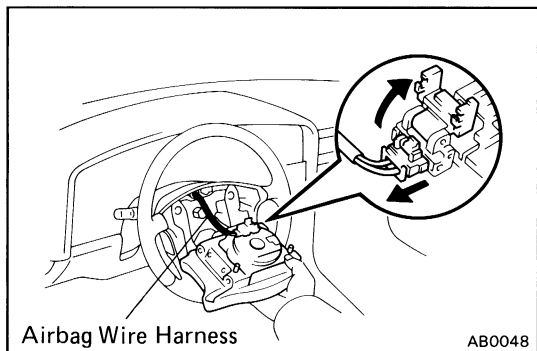
Torx wrench: T30 (Part No.09042-00010 or locally manufactured tool)

- (d) Loosen the torx screws until the groove along the screw circumference catches on the screw case.

- (e) Pull the wheel pad out from the steering wheel and disconnect the airbag connector.

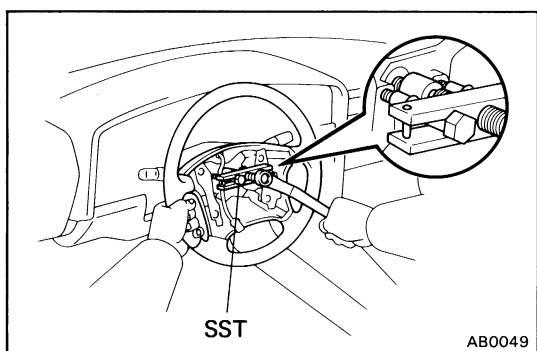
NOTICE: When removing the wheel pad, take care not to pull the airbag wire harness.

CAUTION: When storing the wheel pad, keep the upper surface of the pad facing upward.

**2. REMOVE STEERING WHEEL**

- (a) Disconnect the connector.
- (b) Remove the set nut.
- (c) Using SST, remove the steering wheel.

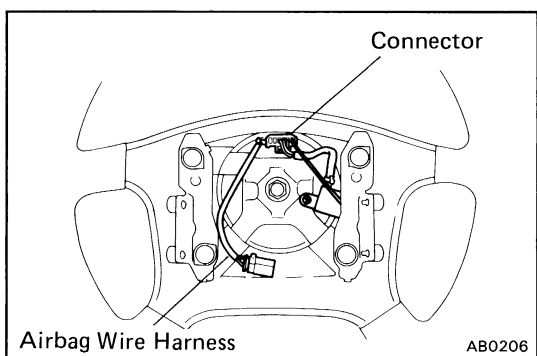
SST 09213-31021

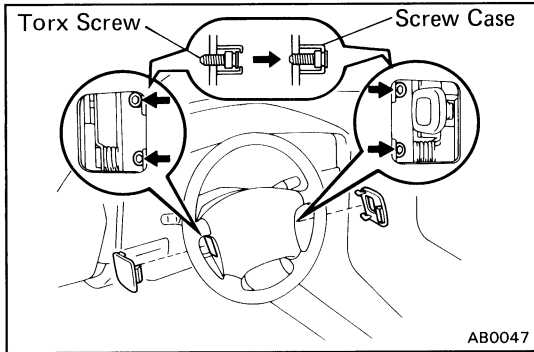
**3. INSTALL STEERING WHEEL AND WHEEL PAD**

- (a) Check that the front wheels are facing straight ahead.
- (b) Center the spiral cable.
(See page AB-16)
- (c) Install the steering wheel and torque the set nut.

Torque: 350 kg-cm (25 ft-lb, 34 N·m)

- (d) Connect the connector.





(e) Install the wheel pad after confirming that the circumference groove of the torx screws is caught on the screw case.

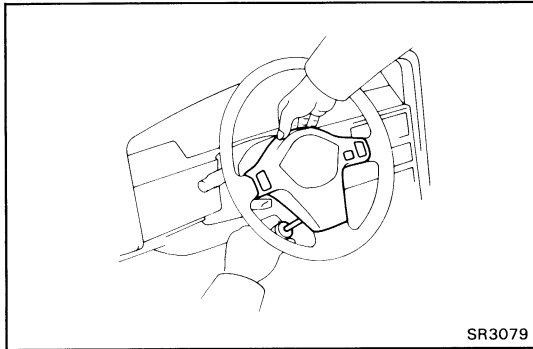
(f) Using a torx wrench, tighten the four screws.

Torque: 75 kg-cm (65 in.-lb, 7.4 N·m)

NOTICE:

- Make sure the wheel pad is installed to the specified torque.
- If the wheel pad has been dropped, or there are cracks, dents or other defects in the case or connector, replace the wheel pad with a new one.
- When installing the wheel pad, take care that the wirings do not interfere with other parts and are not pinched between other parts.

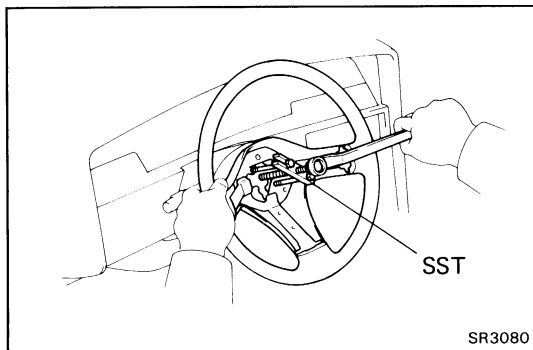
4. CHECK STEERING WHEEL CENTER POINT AFTER INSTALLING STEERING COLUMN



(CANADA)

1. REMOVE STEERING WHEEL

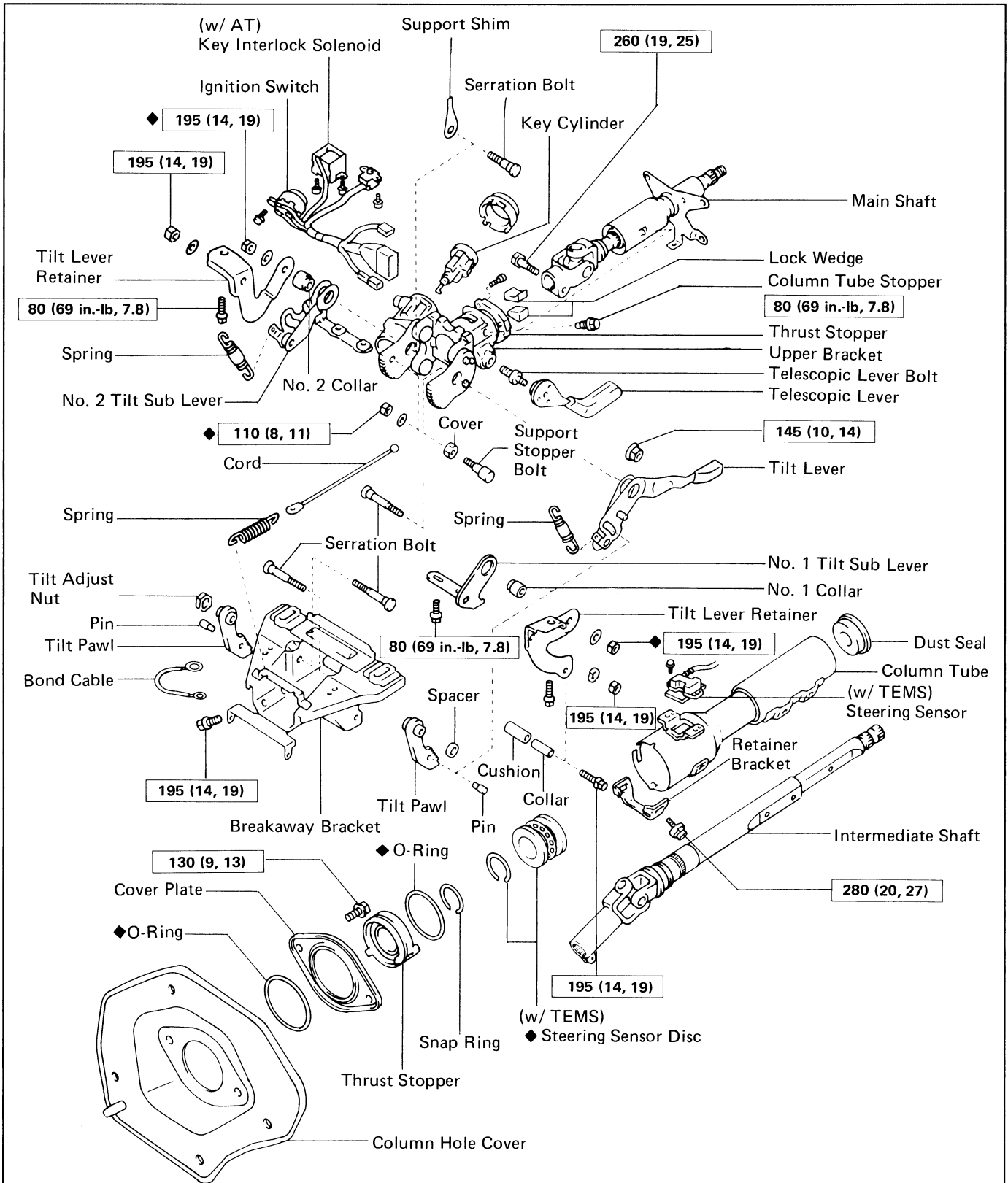
- (a) Remove the screw at the lower portion of the steering wheel pad and pull the pad out upward.
- (b) Remove the steering wheel set nut.



(c) Using SST, remove the steering wheel.
SST 09609-20011

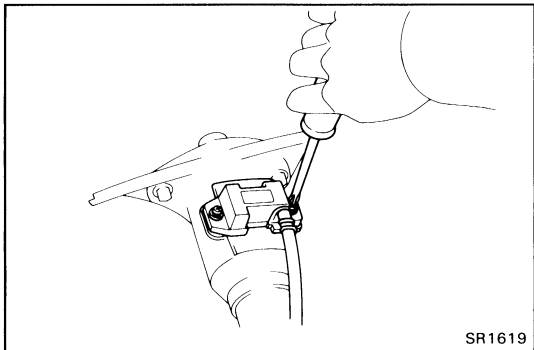
2. CHECK STEERING WHEEL CENTER POINT AFTER INSTALLING STEERING COLUMN

USA COMPONENTS



kg-cm (ft-lb, N·m) : Specified torque

◆ Non-reusable part



DISASSEMBLY OF STEERING COLUMN

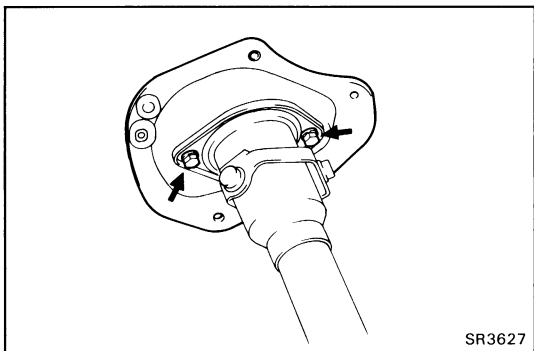
1. (w/ TEMS)

REMOVE STEERING SENSOR

Remove the two screws with the steering sensor.

2. REMOVE IGNITION KEY LIGHT

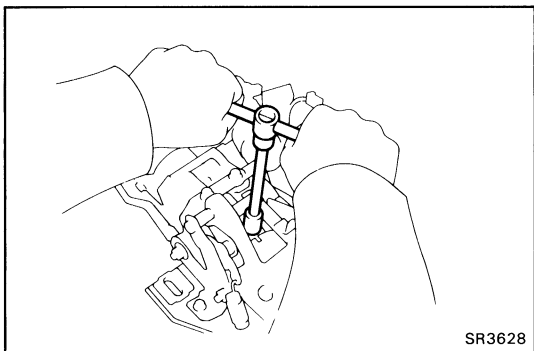
Remove the screw and ignition key light.



3. REMOVE COLUMN HOLE COVER

(a) Remove the two bolts and column hole cover.

(b) Remove the O-ring and cover plate.

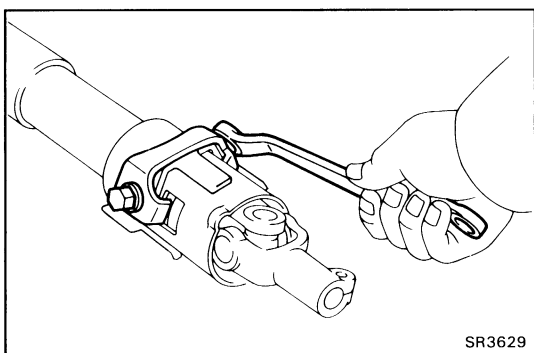


4. REMOVE INTERMEDIATE SHAFT

(a) Remove the bolt from the main shaft.

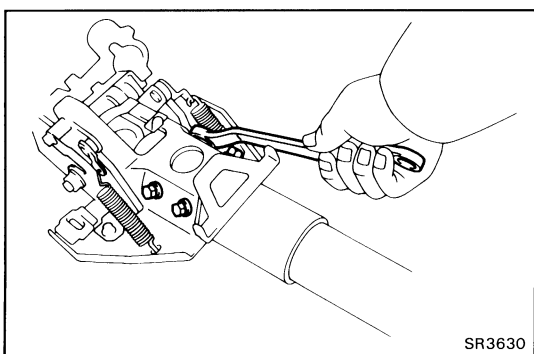
(b) Remove the two set bolts and retainer bracket.

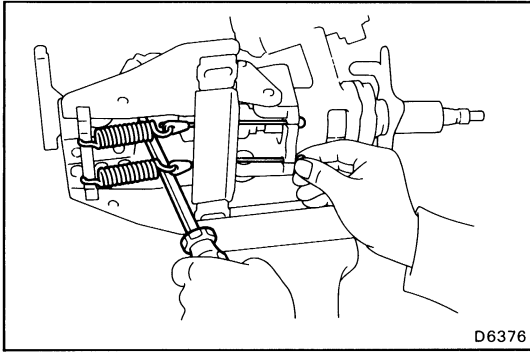
(c) Pull out the intermediate shaft from the column tube.



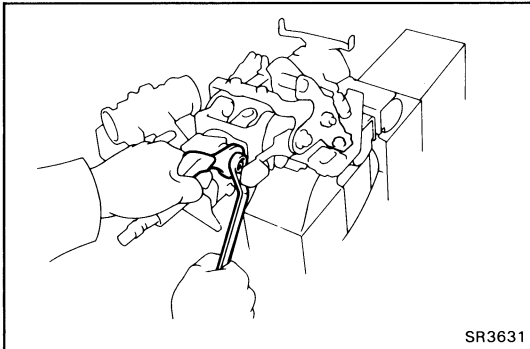
5. REMOVE COLUMN TUBE

Remove the four breakaway bracket bolts, and pull out the column tube.

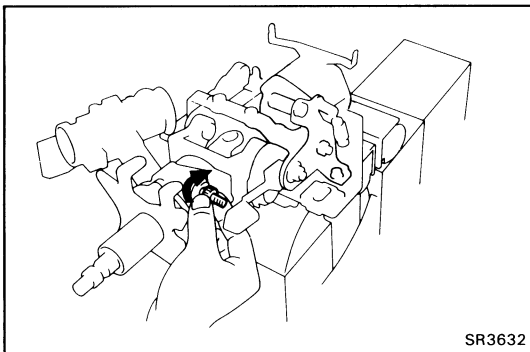
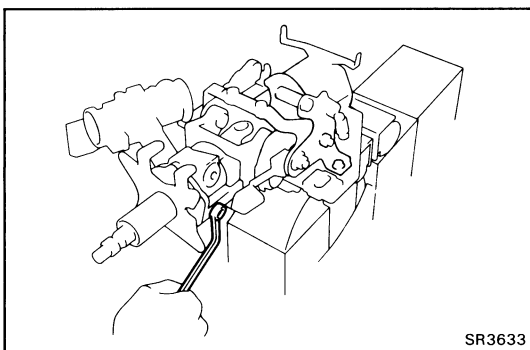


**6. REMOVE TENSION SPRINGS AND CORDS**

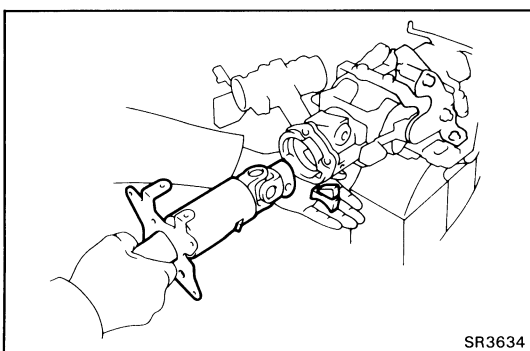
- (a) Fully tilt the main shaft upward.
- (b) Using a screwdriver, pry out the cord tip and remove the springs and cords.

**7. REMOVE TELESCOPIC LEVER**

Remove the nut and telescopic lever.

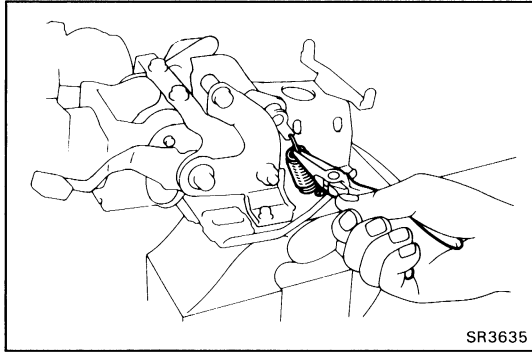
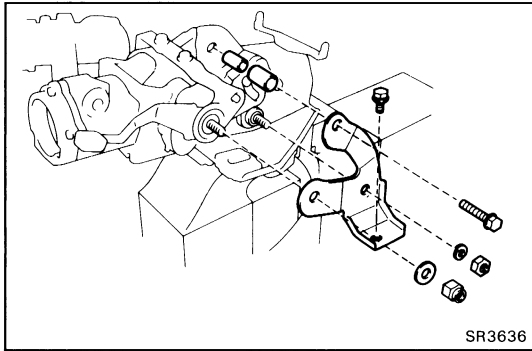
**8. REMOVE TELESCOPIC LEVER LOCK BOLT****9. REMOVE MAIN SHAFT ASSEMBLY**

- (a) Remove the column tube stopper.

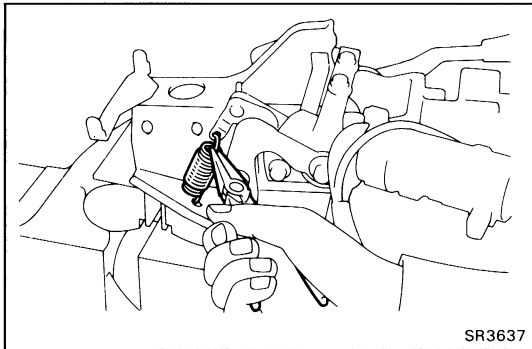
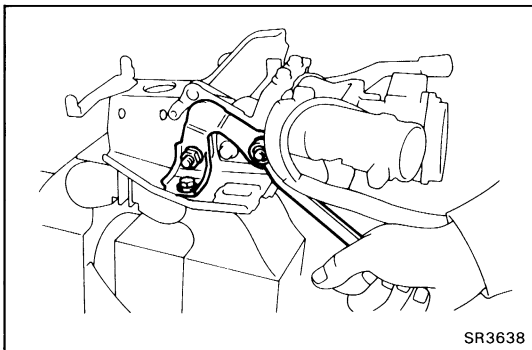


- (b) Pull out the main shaft assembly and then catch the two lock wedges by hand.

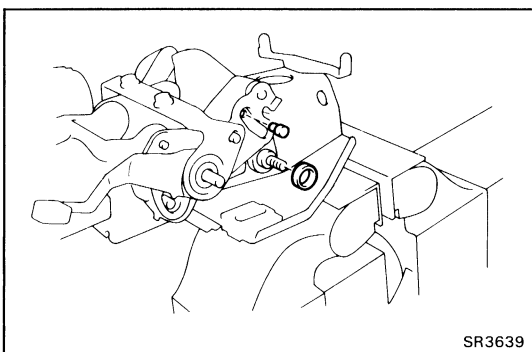
HINT: Be careful the spline part of the main shaft does not come loose.

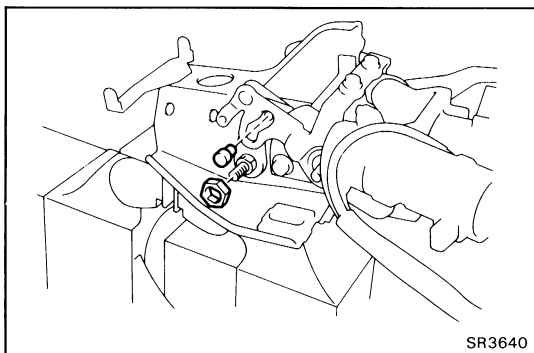
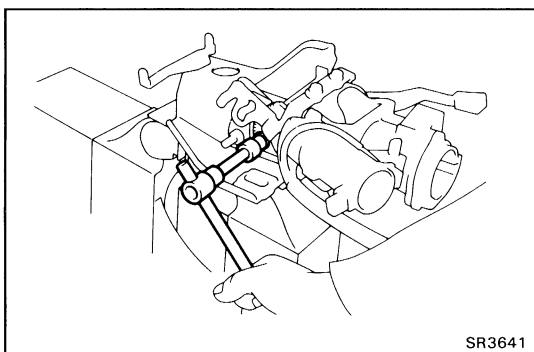
**10. REMOVE TENSION SPRING****11. REMOVE TILT LEVER RETAINER**

- (a) Remove the two bolts and two nuts.
- (b) Remove the tilt lever retainer, collar and cushion.

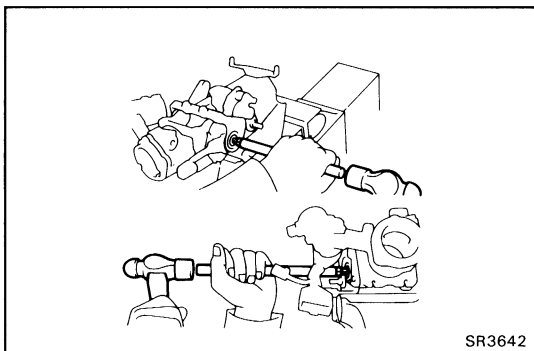
**12. REMOVE TENSION SPRING****13. REMOVE TILT LEVER RETAINER**

Remove the bolt, two nuts and tilt lever retainer.

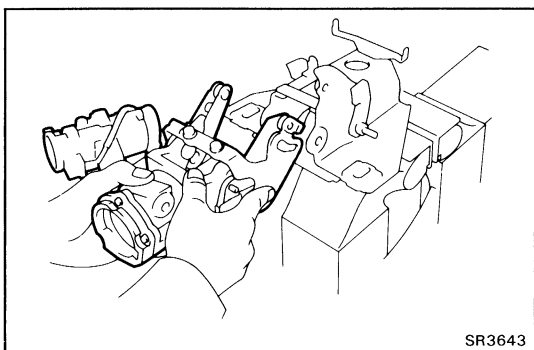
**14. REMOVE SPACER AND PIN**

**15. REMOVE TILT STEERING ADJUSTING NUT AND PIN****16. REMOVE TILT STEERING SUPPORT STOPPER BOLT**

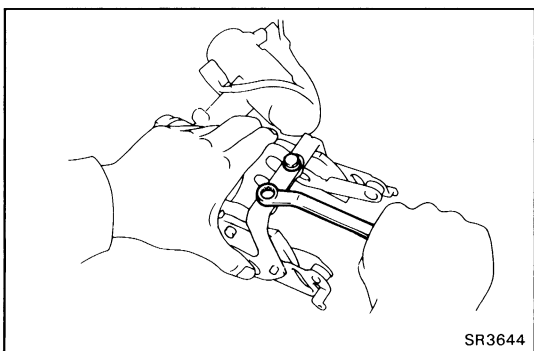
Remove the nut, support stopper bolt and cover.

**17. REMOVE SERRATION BOLTS**

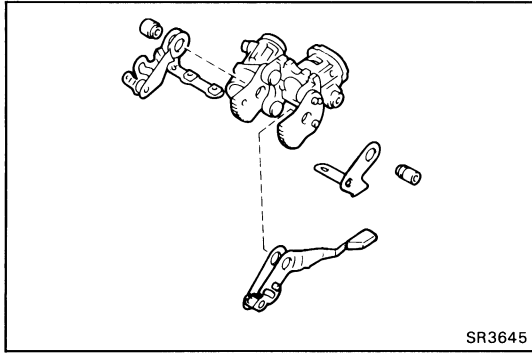
Temporarily install the two nuts to the two serration bolts end for protection, and tap out the two serration bolts from the upper bracket.

**18. REMOVE COLUMN UPPER BRACKET**

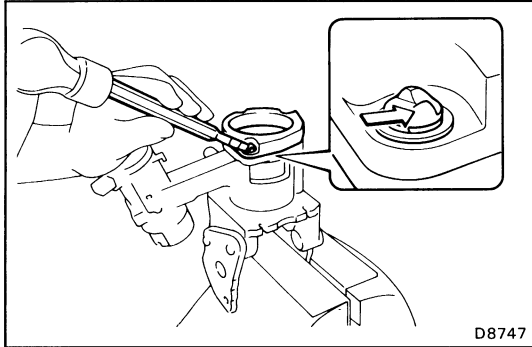
(a) Remove the column upper bracket from the breakaway bracket.



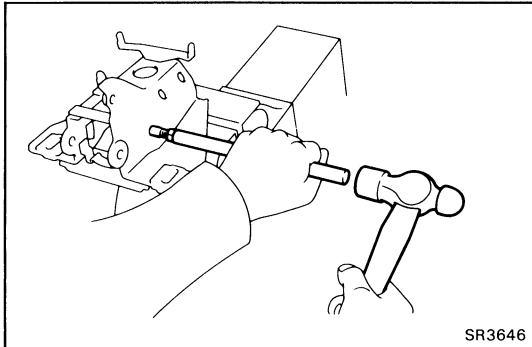
(b) Remove the two bolts.



- (c) Remove the following parts:
- Tilt steering No.1 support collar
 - Tilt lever
 - No.1 tilt sub lever
 - Tilt steering No.2 support collar
 - No.2 tilt sub lever
 - Support shim



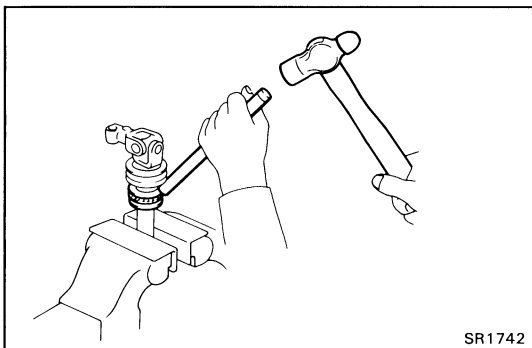
- (d) Using a chisel, remove the steering shaft thrust stopper with the three screws.



19. REMOVE TWO STEERING PAWLS

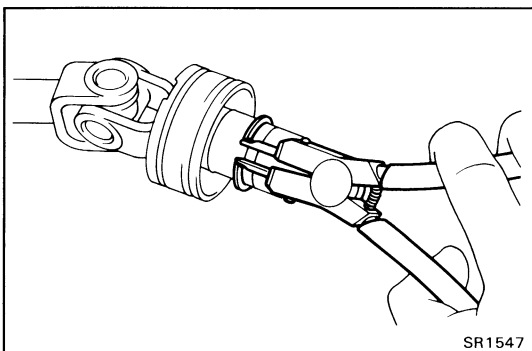
20. REMOVE TWO SERRATION BOLTS

Temporarily install the two nuts to the two serration bolts end for protection, and tap out the serration bolts from the breakaway bracket.

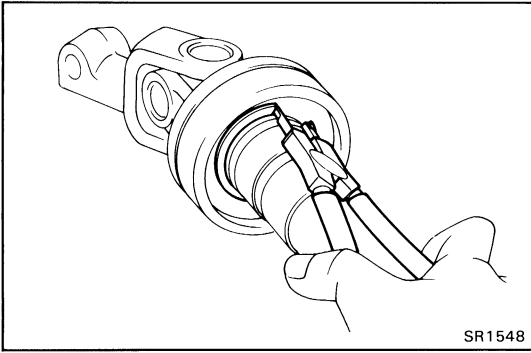


21. (w/ TEMS) REMOVE STEERING SENSOR DISC

- (a) Using a hammer and brass bar, drive out the steering sensor disc from the intermediate shaft.

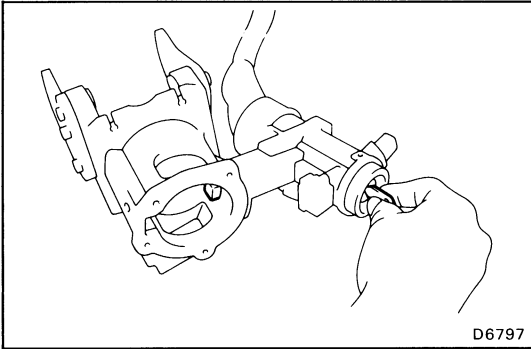


- (b) Using snap ring pliers, remove the snap ring.



22. REMOVE THRUST STOPPER

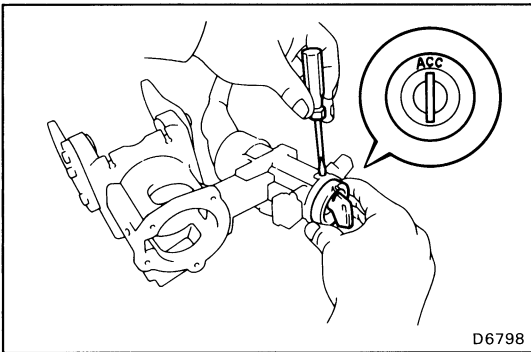
- (a) Using snap ring pliers, remove the snap ring.
- (b) Remove the thrust stopper.
- (c) Remove the O-ring from the thrust stopper.



INSPECTION AND REPAIR OF STEERING COLUMN

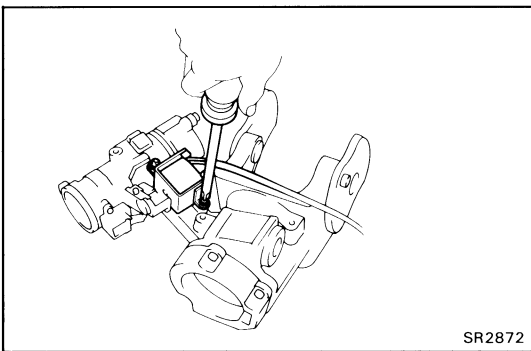
1. INSPECT STEERING LOCK OPERATION

Check that the steering lock mechanism operates properly.



2. IF NECESSARY, REPLACE KEY CYLINDER

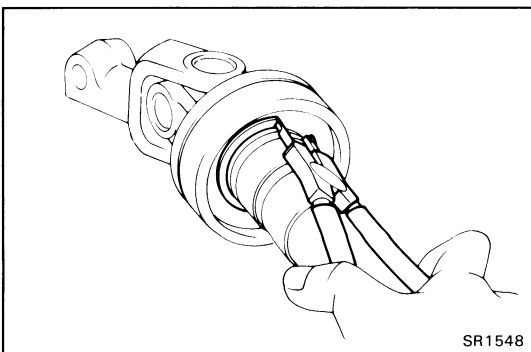
- (a) Place the ignition key at the ACC position.
- (b) Push down the stop key with a thin rod, and pull out the key cylinder.
- (c) Make sure that the ignition key is at the ACC position.
- (d) Install a new key cylinder.



3. (w/ AT)

IF NECESSARY, REPLACE KEY INTERLOCK SOLENOID

- (a) Remove the two screws and solenoid.
- (b) Install a new solenoid with the two screws.



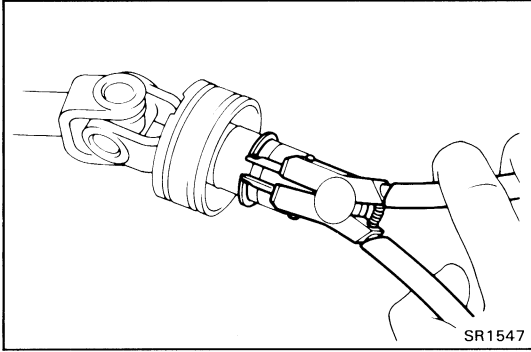
ASSEMBLY OF STEERING COLUMN

(See page SR-7)

1. COAT ALL RABBING PARTS WITH MP GREASE

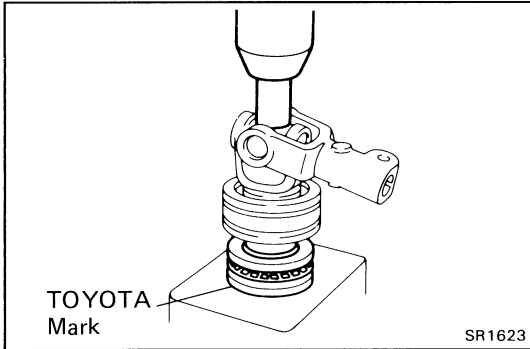
2. INSTALL THRUST STOPPER

- (a) Install a new O-ring to the thrust stopper.
- (b) Install the thrust stopper.
- (c) Using snap ring pliers, install the snap ring.

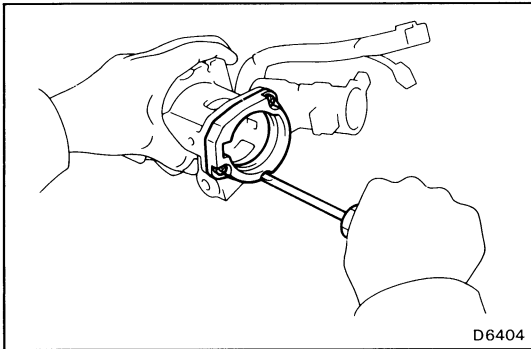


**3. (w/ TEMS)
INSTALL STEERING SENSOR DISC**

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

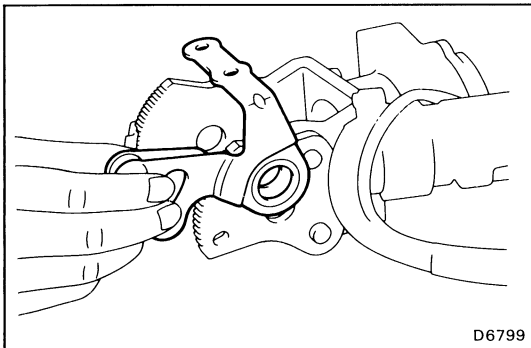


(b) Using a 14 mm socket wrench, press in a new steering sensor disc.



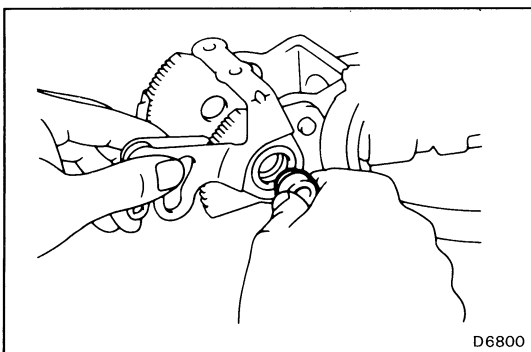
4. INSTALL STEERING SHAFT THRUST STOPPER

Install the steering shaft thrust stopper with three new screws.



5. INSTALL NO.2 TILT SUB LEVER

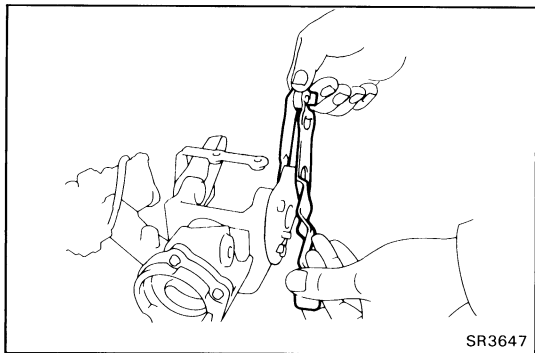
Install the No.2 tilt sub lever to the column upper bracket.



6. SELECT NO.2 SUPPORT COLLAR

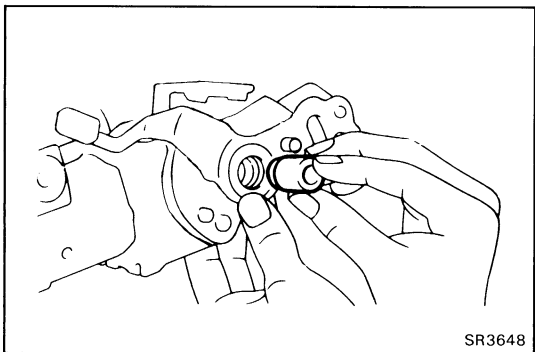
Select a No.2 collar which will eliminate all play.

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)



7. INSTALL TILT LEVER

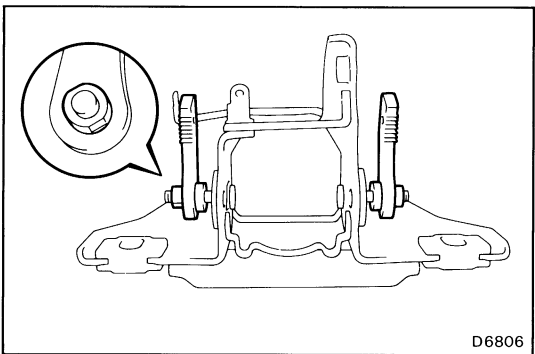
Install the tilt lever to the column upper bracket.



8. SELECT NO.1 SUPPORT COLLAR

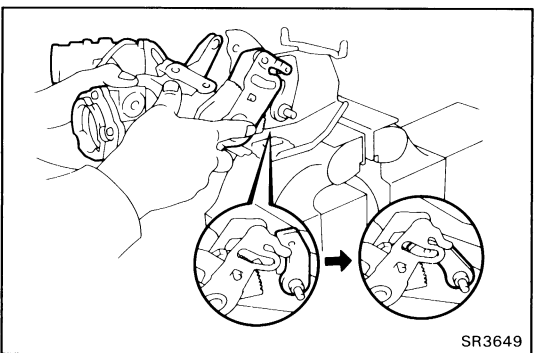
Select a No.1 collar which will eliminate all play.

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)



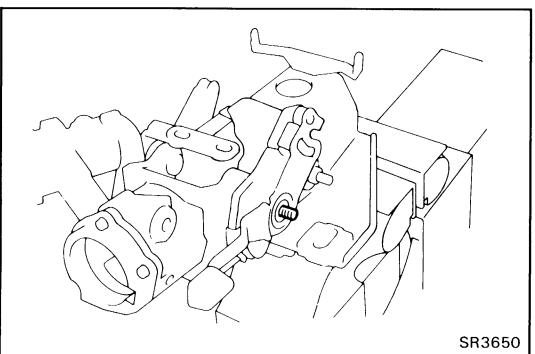
9. INSTALL TWO SERRATION BOLTS AND TWO TILT PAWLS

- (a) Install the two serration bolts to the breakaway bracket.
- (b) Install the two pawls and one of the bushing with cutout portion.

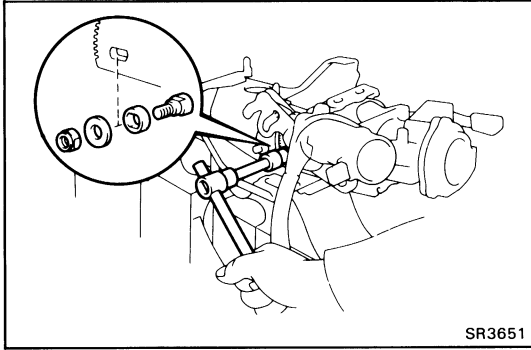


10. INSTALL COLUMN UPPER BRACKET

- (a) With the column upper bracket partially installed to the breakaway bracket, move the pawl toward the column upper bracket side and then completely install the column upper bracket.

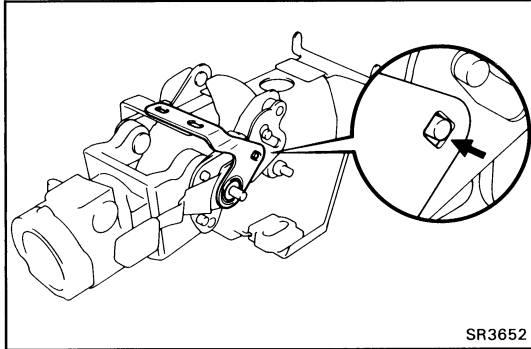


- (b) Insert the serration bolt of No.1 support collar side.

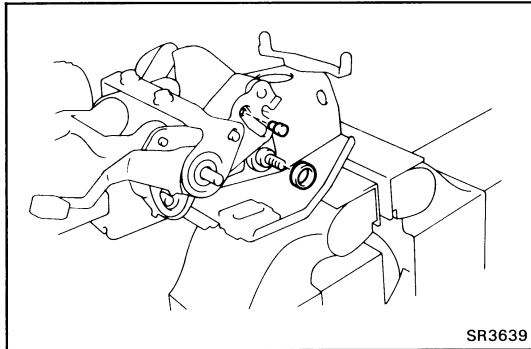
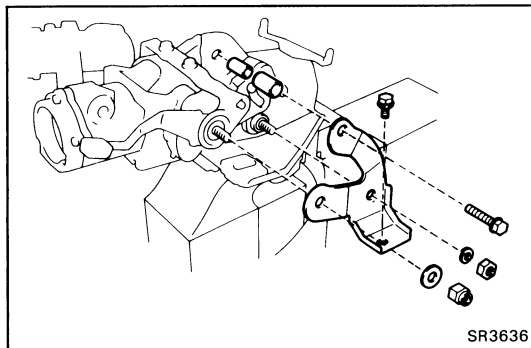
**11. INSTALL SUPPORT STOPPER BOLT**

Install the cover to the bolt, and align the cutout portion of the support stopper bolt and upper bracket, install it from inside of the column upper bracket.

Torque: 110 kg-cm (8 ft-lb, 11 N·m)

**12. INSTALL NO.1 TILT SUB LEVER**

Insert the tilt lever pin into the hole of the No.1 tilt sub lever.

**13. INSTALL SPACER AND PIN****14. INSTALL TILT LEVER RETAINER**

(a) Install the tilt lever retainer with the collar, cushion and bolt.

Torque: 195 kg-cm (14 ft-lb, 19 N·m)

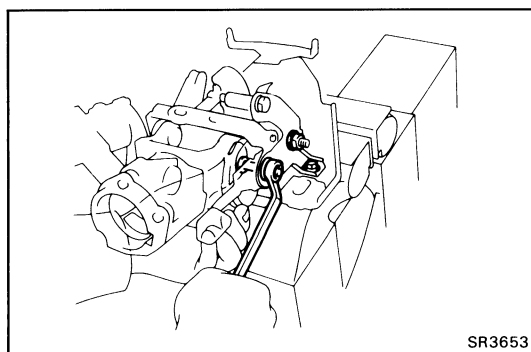
(b) Temporarily install the two nuts and washers.

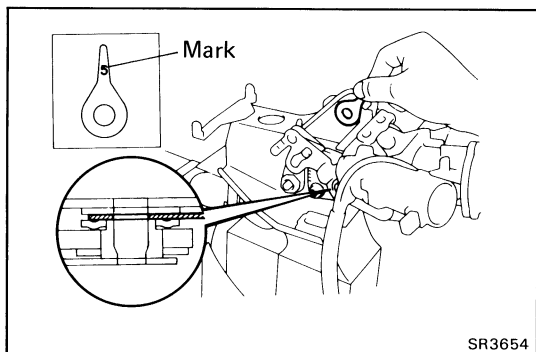
(c) Hold the serration bolt and tighten the two nuts.

Torque: 195 kg-cm (14 ft-lb, 19 N·m)

(d) Install and torque the bolt.

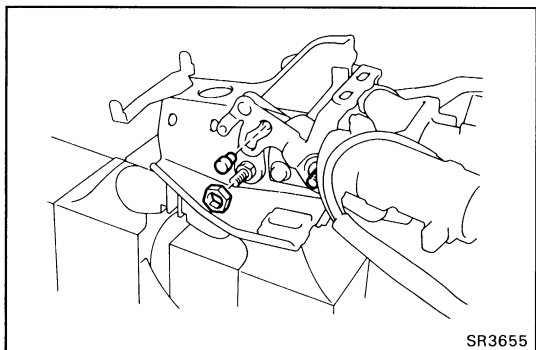
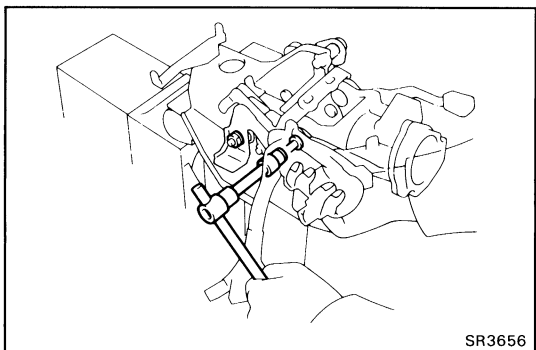
Torque: 80 kg-cm (69 in.-lb, 7.8 N·m)



**15. SELECT SUPPORT SHIM**

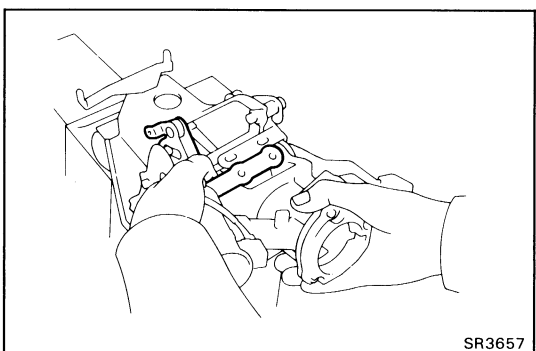
Select one or two shims which fit snugly when pressed in by hand.

Mark	Thickness mm (in.)	
None	0.197 – 0.203	(0.0078 – 0.0080)
5	0.495 – 0.505	(0.0195 – 0.0199)
8	0.795 – 0.805	(0.0313 – 0.0317)
14	1.395 – 1.405	(0.0549 – 0.0553)
18	1.795 – 1.805	(0.0707 – 0.0711)

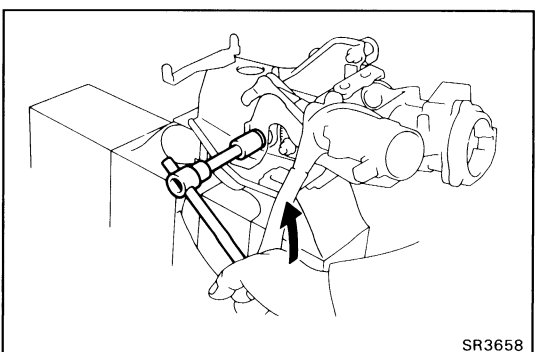
**16. INSTALL SERRATION BOLT, TILT STEERING ADJUSTING NUT AND PIN****17. INSTALL TILT LEVER RETAINER**

- Install the tilt lever retainer.
- Install the two nuts and washers.
- Holding the serration bolts and tighten the nuts.

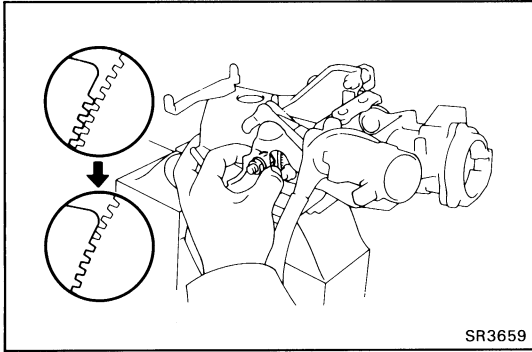
Torque: 195 kg-cm (14 ft-lb, 19 N·m)

**18. ADJUST ENGAGEMENT OF NO. 2 TILT SUB LEVER**

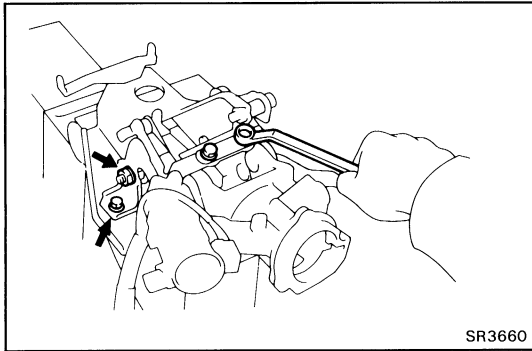
- Pulling the No. 2 tilt sub lever, disengage the pawl from the column upper bracket.
- Moving the column upper bracket up or down, engage the opposite pawl with the column upper bracket.



- Loosen the nut until the tilt steering adjusting nut turns smoothly.

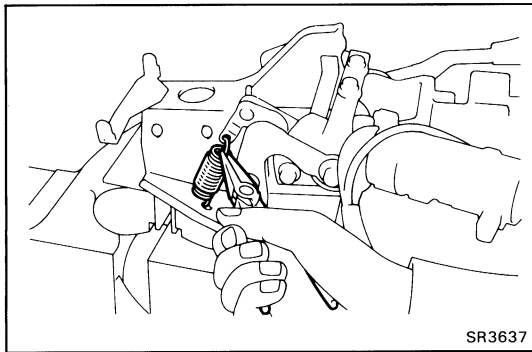


- (d) Pushing the pawl toward the column upper bracket, engage the pawl with the upper bracket by moving the adjusting nut.

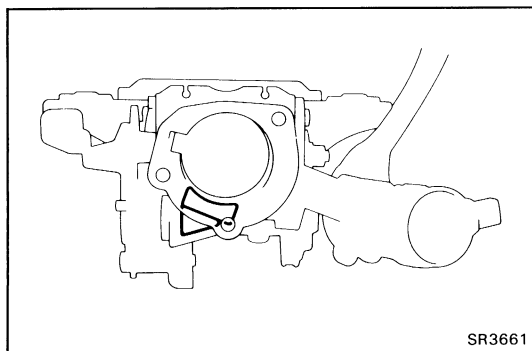
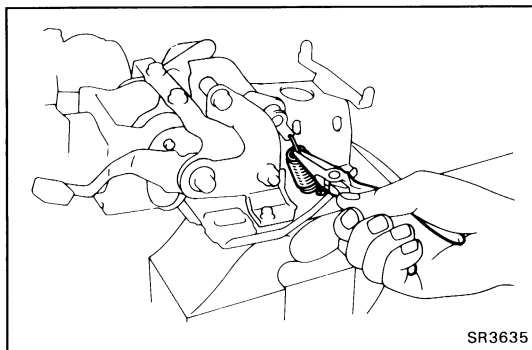


- (e) Tighten the nut and bolt as in figure and tighten the right and left bolts of the tilt lever.

Torque: Nut 195 kg-cm (14 ft-lb, 19 N·m)
Bolt 80 kg-cm (69 in.-lb, 7.8 N·m)

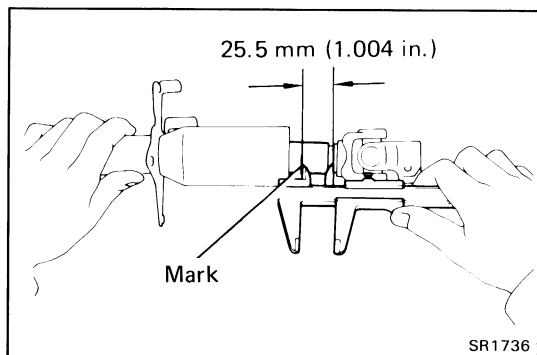


19. INSTALL TWO TENSION SPRINGS

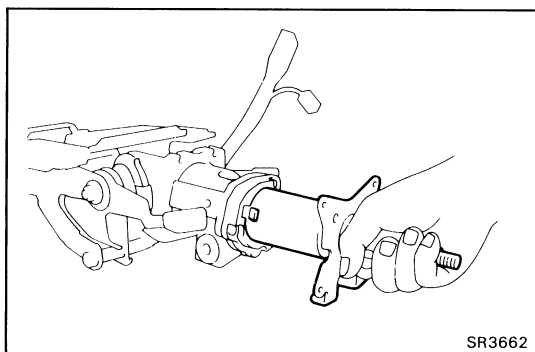


20. INSTALL MAIN SHAFT ASSEMBLY

- (a) Install the two lock wedges to the column upper bracket.

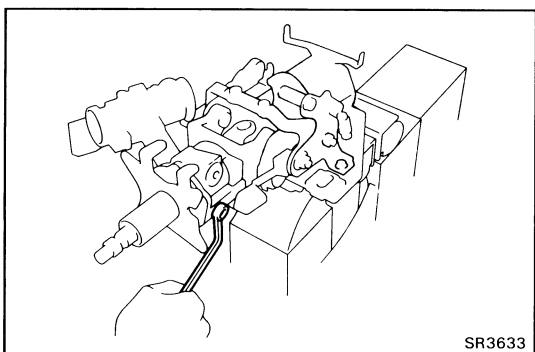


(b) Mark the main shaft as shown.



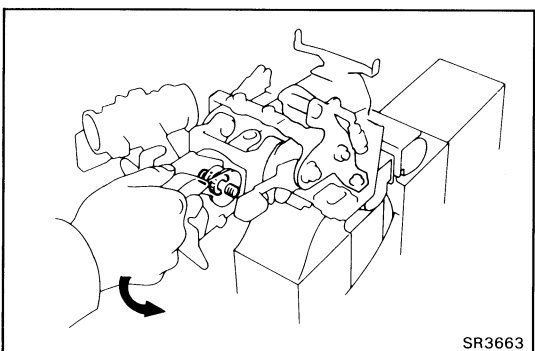
(c) Place the ignition key at the ACC position.

(d) Insert the main shaft assembly into the upper bracket.



(e) Install the column tube stopper.

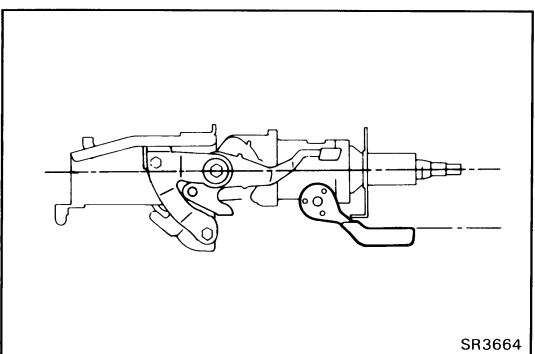
Torque: 80 kg-cm (69 in.-lb, 7.8 N·m)



21. INSTALL TELESCOPIC LEVER LOCK BOLT

Tighten the telescopic lever lock bolt with the telescopic lever.

HINT: The bolt has LH threads.

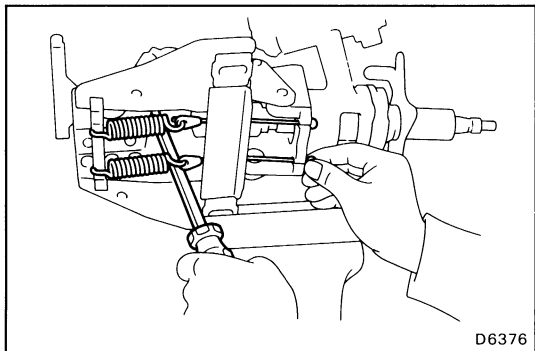


22. INSTALL TELESCOPIC LEVER

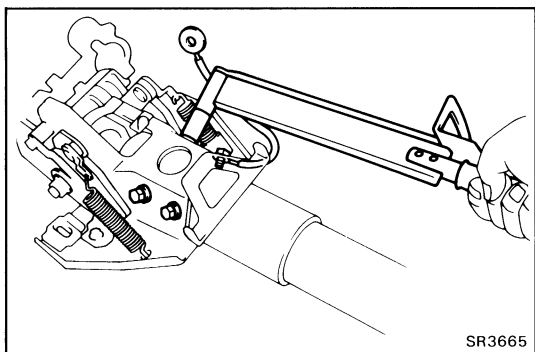
(a) Install the telescopic lever so it parallels the main shaft.

(b) Tighten the set nut.

Torque: 145 kg-cm (10 ft-lb, 14 N·m)

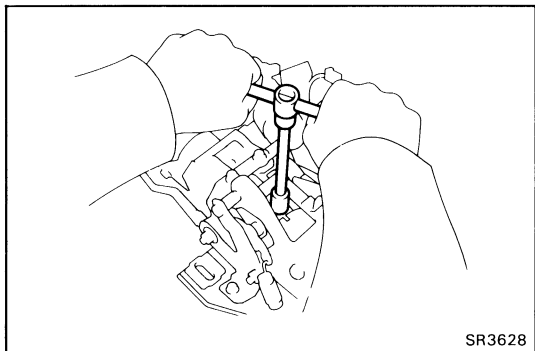
**23. INSTALL TENSION SPRINGS AND CORDS**

- (a) Fully tilt the main shaft upward.
- (b) Connect the spring and cord, and hook the spring to the hanger.
- (c) Using a screwdriver, hook the cord end to the column upper bracket.

**24. INSTALL COLUMN TUBE TO BREAKAWAY BRACKET**

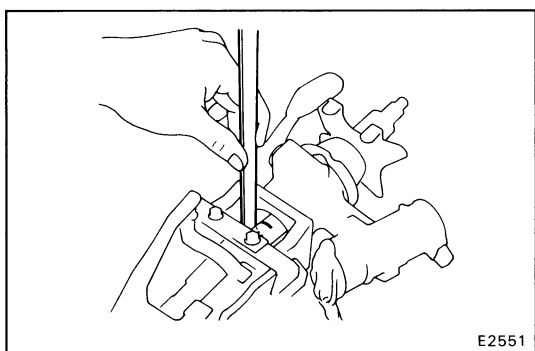
- (a) Install the column tube to the breakaway bracket.
- (b) Place the bond cable.
- (c) Install and torque the four bolts.

Torque: 195 kg-cm (14 ft-lb, 19 N·m)

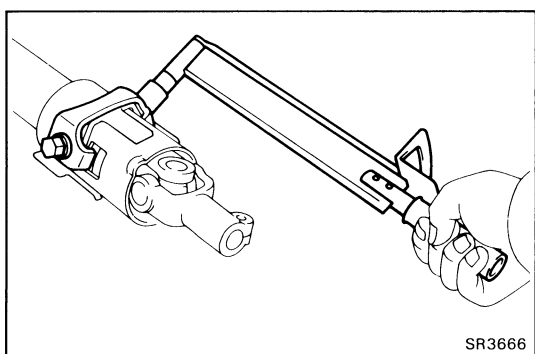
**25. INSTALL INTERMEDIATE SHAFT TO COLUMN TUBE**

- (a) Coat the O-ring of the thrust stopper with MP grease.
- (b) Install the intermediate shaft to the column tube.
- (c) Connect the universal joint of main shaft and intermediate shaft.

Torque: 260 kg-cm (19 ft-lb, 25 N·m)

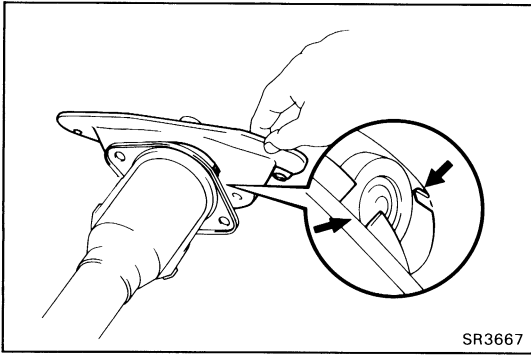


- (d) Match the mark on the shaft accords with the upper bracket surface, as shown.



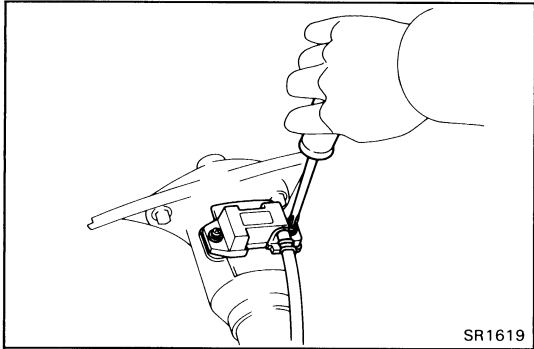
- (e) Install the retainer bracket and two bolts.
- (f) Torque the two bolts.

Torque: 280 kg-cm (20 ft-lb, 27 N·m)

**26. INSTALL COLUMN HOLE COVER**

- (a) Install a new O-ring and cover plate to the column tube.
- (b) Align the cutout portion of the column tube to the protrusion of the hole cover, and install with the two bolts.

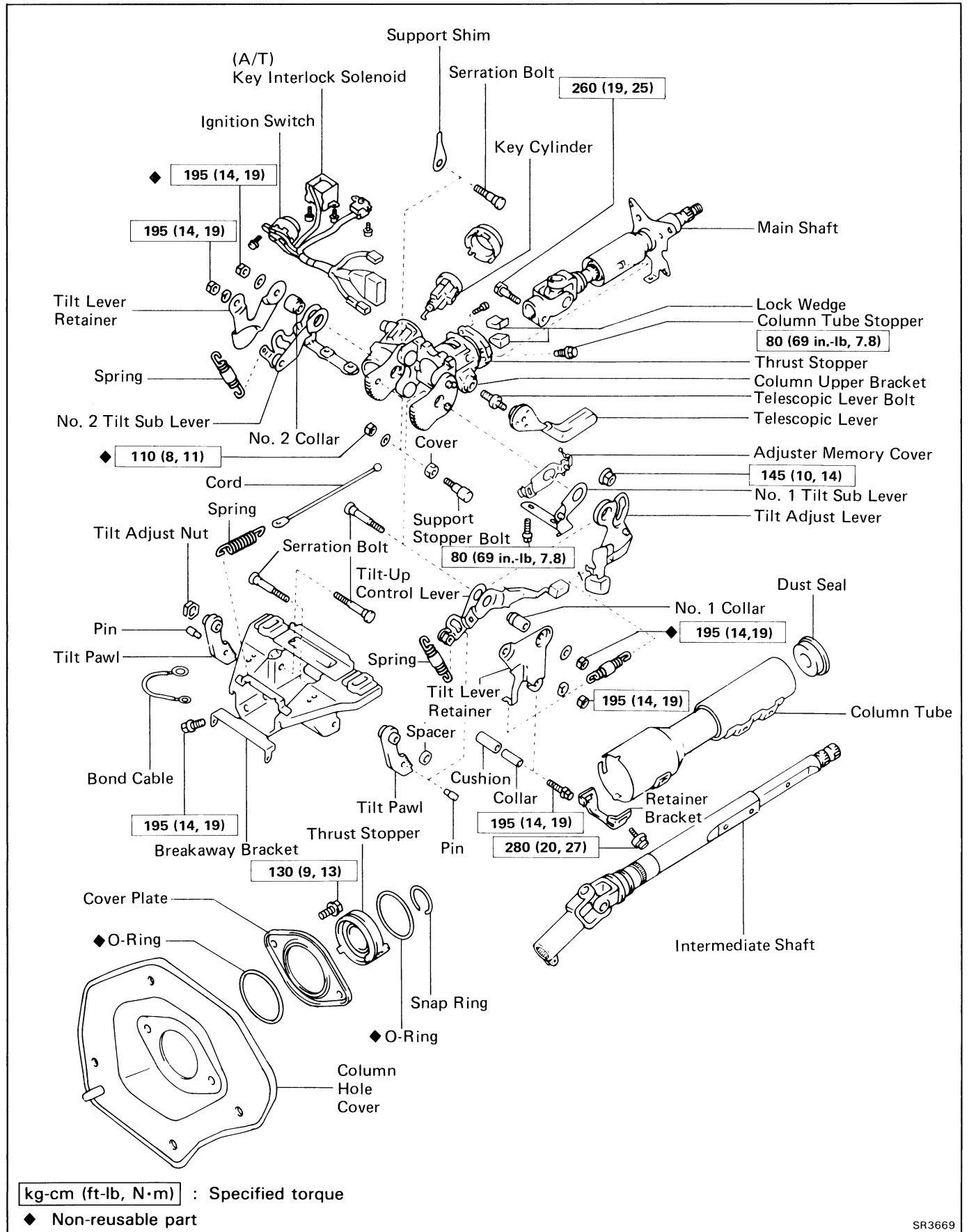
Torque: 130 kg-cm (9 ft-lb, 13 N·m)

**27. INSTALL IGNITION KEY LIGHT WITH SCREW****28. (w/ TEMS)
INSTALL STEERING SENSOR**

Install the steering sensor with the two screws.

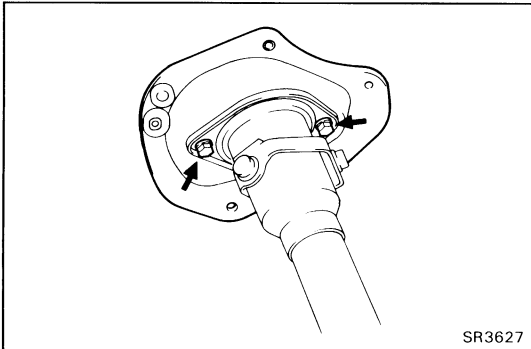
HINT: Check that there is no sound of contact between the sensor and sensor disc when the shaft is rotated.

CANADA COMPONENTS

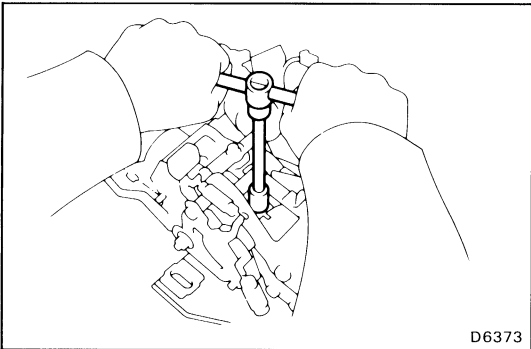


DISASSEMBLY OF STEERING COLUMN**1. REMOVE IGNITION KEY LIGHT**

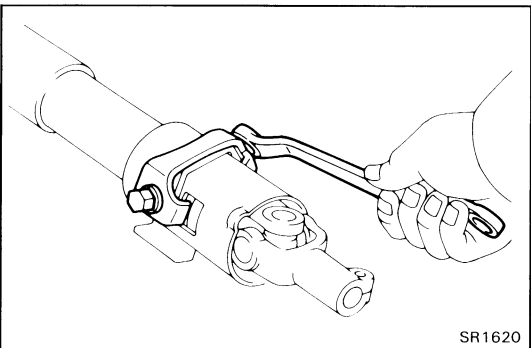
Remove the screw and ignition key light.

**2. REMOVE COLUMN HOLE COVER**

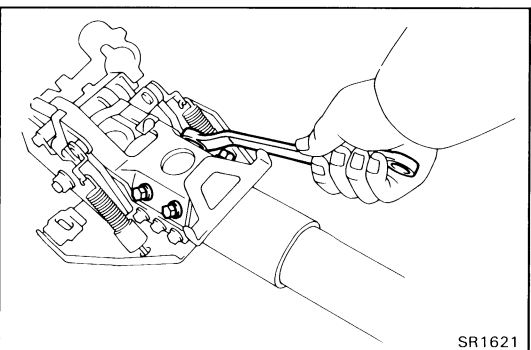
- (a) Remove the two bolts and column hole cover.
- (b) Remove the O-ring and cover plate.

**3. REMOVE INTERMEDIATE SHAFT**

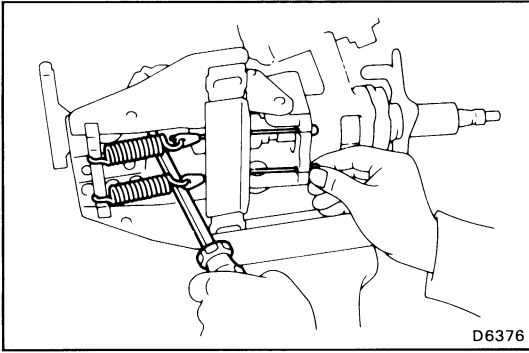
- (a) Remove the bolt from the main shaft.



- (b) Remove the two set bolts and retainer bracket.
- (c) Pull out the intermediate shaft from the column tube.

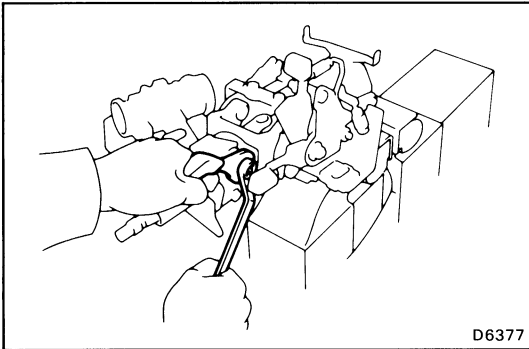
**4. REMOVE COLUMN TUBE**

Remove the four breakaway bracket bolts, and pull out the column tube.



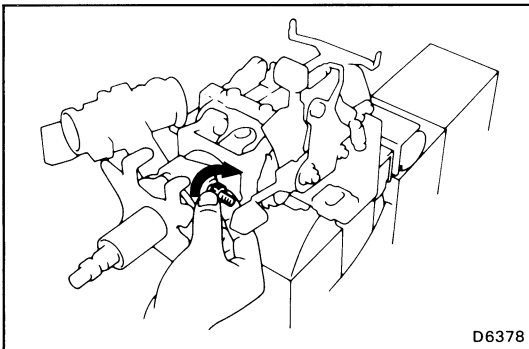
5. REMOVE TENSION SPRINGS AND CORDS

- (a) Fully tilt the main shaft upward.
- (b) Using a screwdriver, pry out the cord tip and remove the springs and cords.

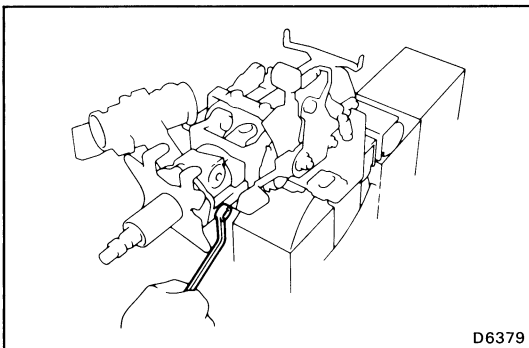


6. REMOVE TELESCOPIC LEVER

Remove the nut and telescopic lever.

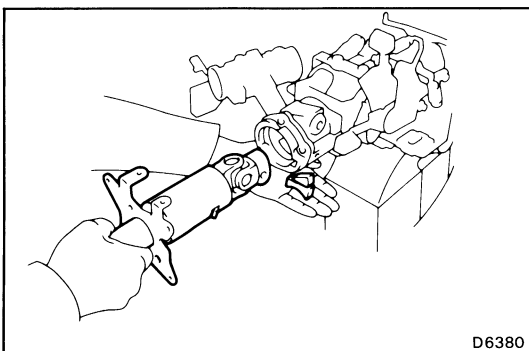


7. REMOVE TELESCOPIC LEVER LOCK BOLT



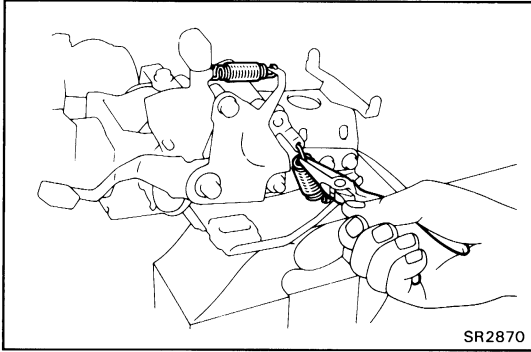
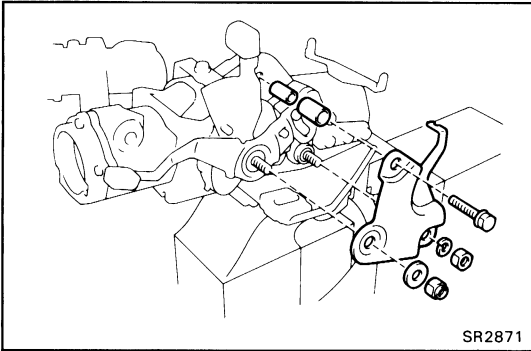
8. REMOVE MAIN SHAFT ASSEMBLY

- (a) Remove the column tube stopper.

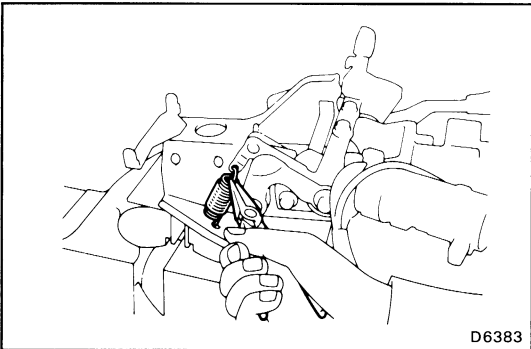
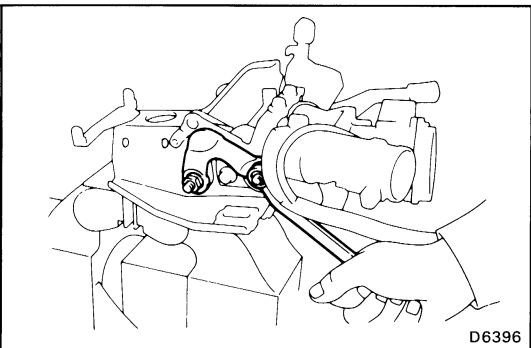


- (b) Pull out the main shaft assembly and then catch the two lock wedges by hand.

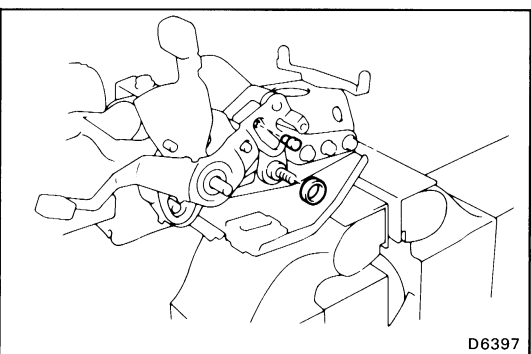
HINT: Be careful the spline part of the main shaft does not come loose.

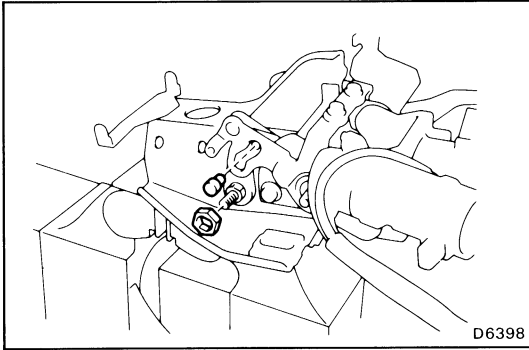
**9. REMOVE TWO TENSION SPRINGS****10. REMOVE TILT LEVER RETAINER**

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

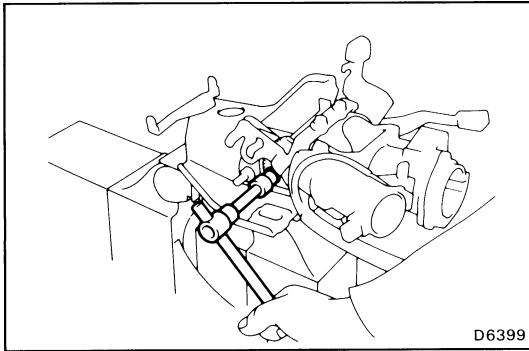
**11. REMOVE TENSION SPRING****12. REMOVE TILT LEVER RETAINER**

Remove the two nuts and tilt lever retainer.

**13. REMOVE SPACER AND PIN**

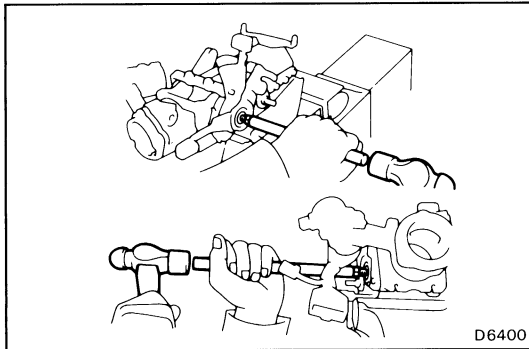


14. REMOVE TILT STEERING ADJUSTING NUT AND PIN



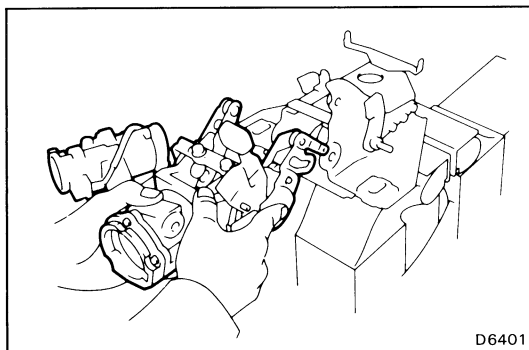
15. REMOVE TILT STEERING SUPPORT STOPPER BOLT

Remove the nut, support stopper bolt and cover.



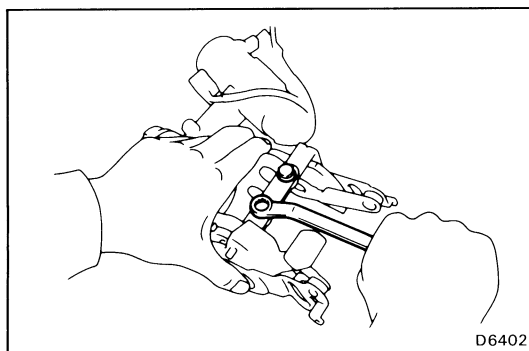
16. REMOVE SERRATION BOLTS

Temporarily install the two nuts to the two serration bolts end for protection, and tap out the two serration bolts from the upper bracket.

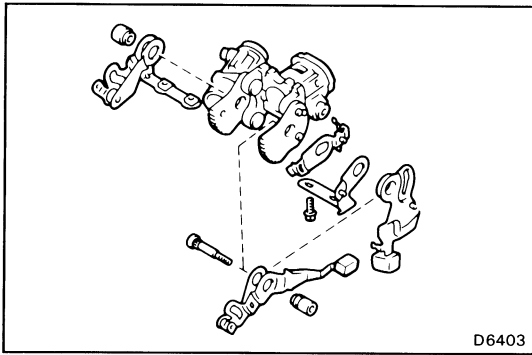


17. REMOVE COLUMN UPPER BRACKET

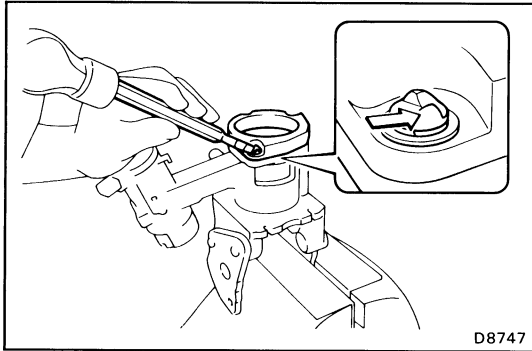
(a) Remove the column upper bracket from the breakaway bracket.



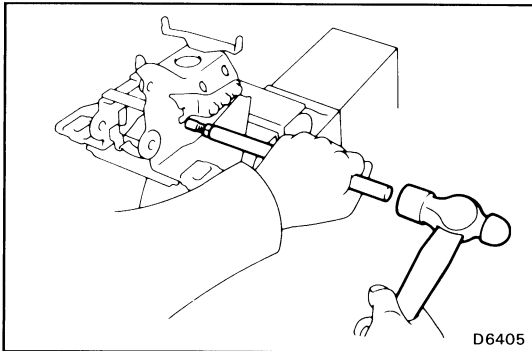
(b) Remove the two bolts.



- (c) Remove the following parts:
- Tilt steering No.1 support collar
 - Tilt-up control lever
 - Tilt adjust lever
 - No.1 tilt sub lever
 - Adjuster memory cover
 - Tilt steering No.2 support collar
 - No.2 tilt sub lever
 - Support shim



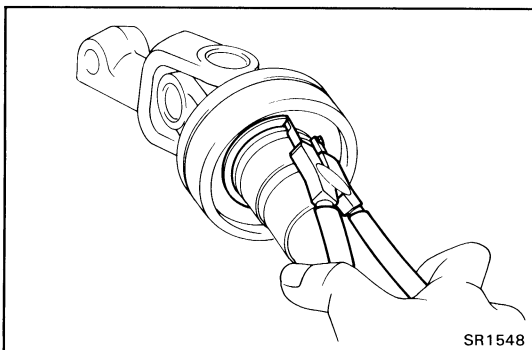
- (d) Using a chisel, remove the steering shaft thrust stopper with the three screws.



18. REMOVE TWO STEERING PAWLS

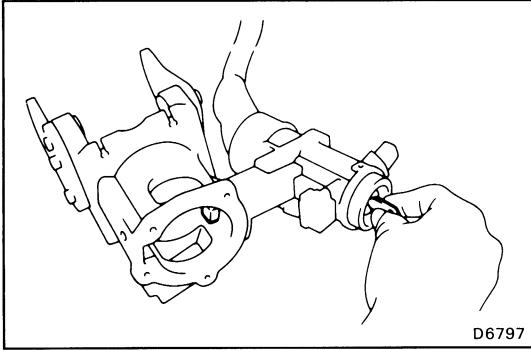
19. REMOVE TWO SERRATION BOLTS

Temporarily install the two nuts to the two serration bolts end for protection, and tap out the serration bolts from the breakaway bracket.



20. REMOVE THRUST STOPPER

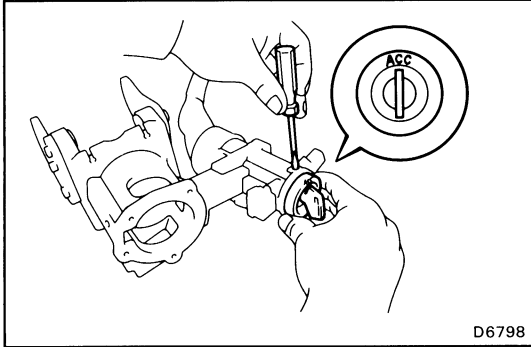
- (a) Using snap ring pliers, remove the snap ring.
- (b) Remove the thrust stopper.
- (c) Remove the O-ring from the thrust stopper.



INSPECTION AND REPAIR OF STEERING COLUMN

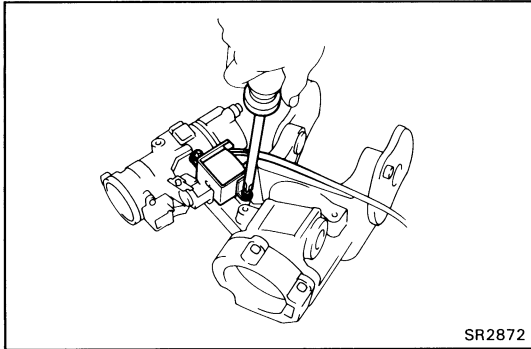
1. INSPECT STEERING LOCK OPERATION

Check that the steering lock mechanism operates properly.



2. IF NECESSARY, REPLACE KEY CYLINDER

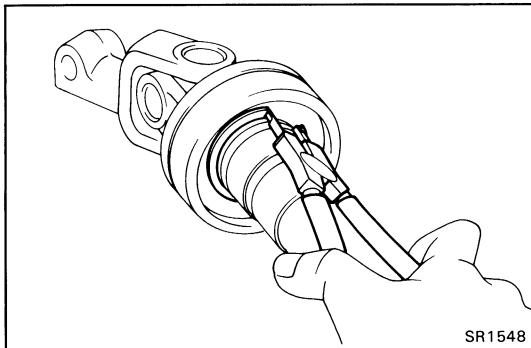
- Place the ignition key at the ACC position.
- Push down the stop key with a thin rod, and pull out the key cylinder.
- Make sure that the ignition key is at the ACC position.
- Install a new key cylinder.



3. (w/ AT)

IF NECESSARY, REPLACE KEY INTERLOCK SOLENOID

- Remove the two screws and solenoid.
- Install a new solenoid with the two screws.



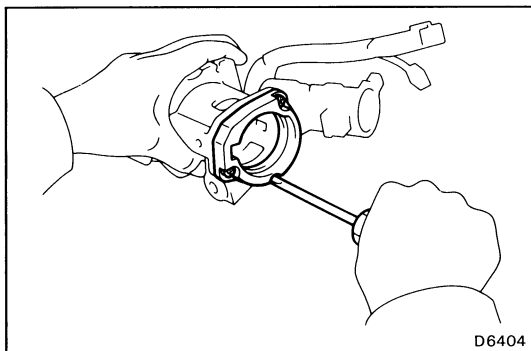
ASSEMBLY OF STEERING COLUMN

(See page SR-22)

1. COAT ALL RABBING PARTS WITH MP GREASE

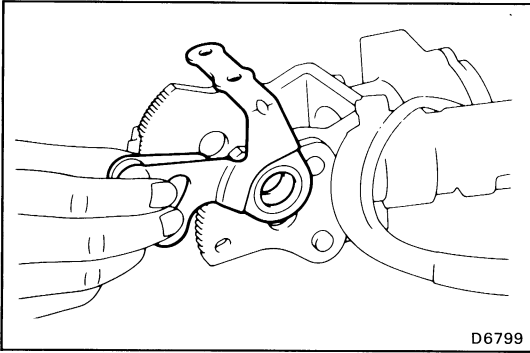
2. INSTALL THRUST STOPPER

- Install a new O-ring to the thrust stopper.
- Install the thrust stopper.
- Using snap ring pliers, install the snap ring.



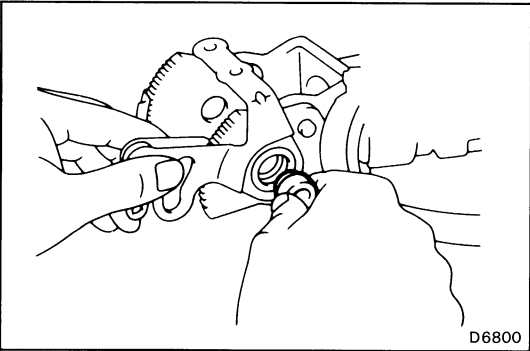
3. INSTALL STEERING SHAFT THRUST STOPPER

Install the steering shaft thrust stopper with three new screws.



4. INSTALL NO.2 TILT SUB LEVER

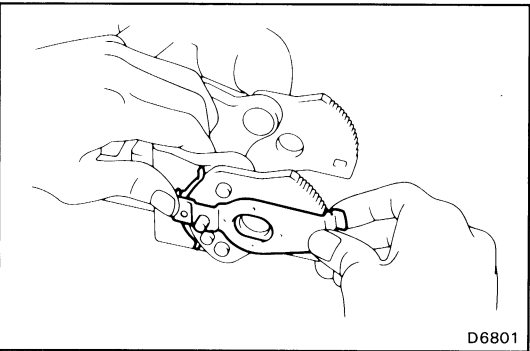
Install the No.2 tilt sub lever to the column upper bracket.



5. SELECT NO.2 SUPPORT COLLAR

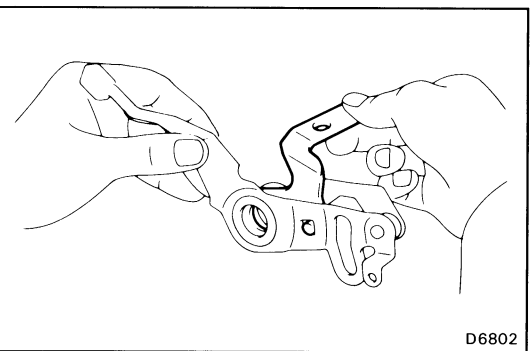
Select a No.2 collar which will eliminate all play.

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)



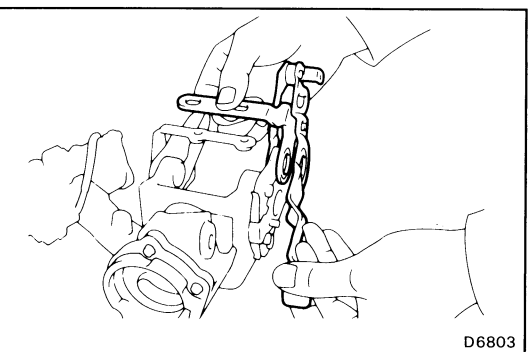
6. INSTALL ADJUSTER MEMORY COVER

Install the adjuster memory cover to the ratchet of the column upper bracket.

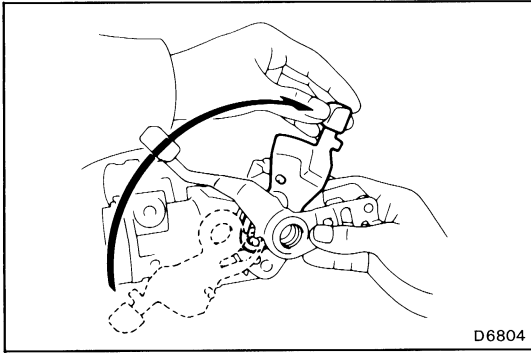


7. INSTALL TILT-UP CONTROL LEVER AND NO.1 TILT SUB LEVER

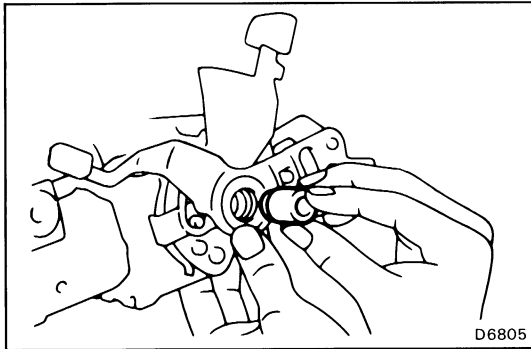
(a) Assemble the No.1 tilt sub lever to the tilt-up control lever.



(b) Install the tilt-up control lever to the column upper bracket.

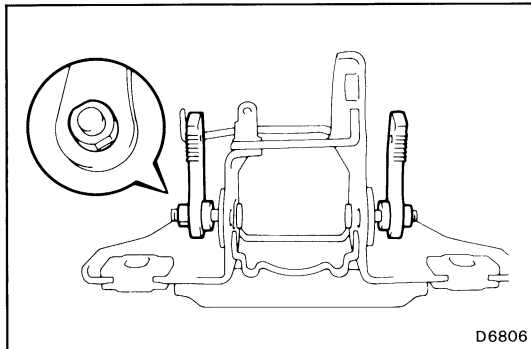
**8. INSTALL TILT ADJUST LEVER**

- (a) Align the tilt adjust lever hole to the adjuster memory cover pin.
- (b) Assemble the tilt adjust lever between the tilt-up control lever and No.1 tilt sub lever.

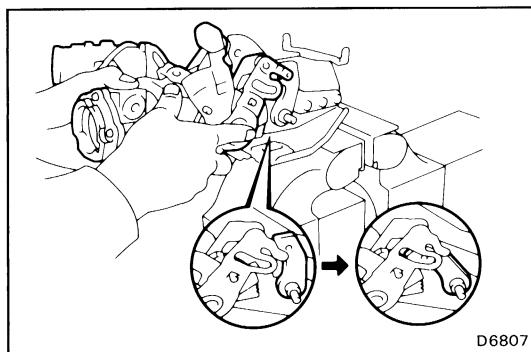
**9. SELECT NO.1 SUPPORT COLLAR**

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

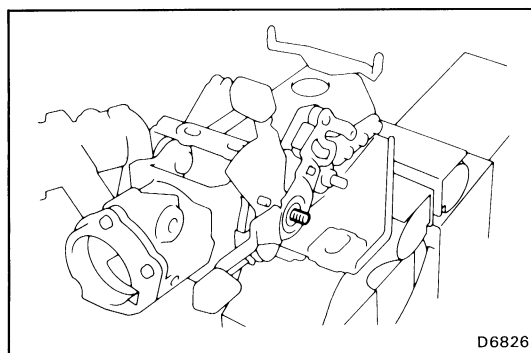
Outer diameter mm (in.)	
17.989 – 17.996	(0.7082 – 0.7085)
17.996 – 18.003	(0.7085 – 0.7088)
18.003 – 18.010	(0.7088 – 0.7091)
18.010 – 18.017	(0.7091 – 0.7093)
18.017 – 18.024	(0.7093 – 0.7096)

**10. INSTALL TWO SERRATION BOLTS AND TWO TILT PAWLS**

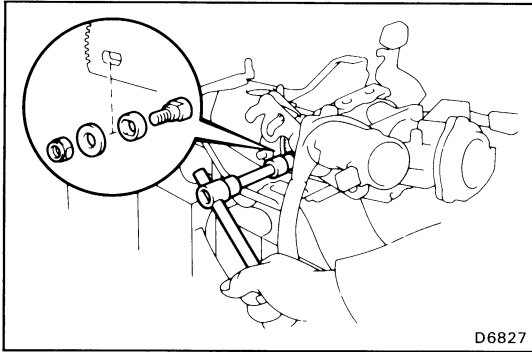
- (a) Install the two serration bolts to the breakaway bracket.
- (b) Install the two pawls and one of the bushing with cutout portion.

**11. INSTALL COLUMN UPPER BRACKET**

- (a) With the column upper bracket partially installed to the breakaway bracket, move the pawl toward the column upper bracket side and then completely install the column upper bracket.



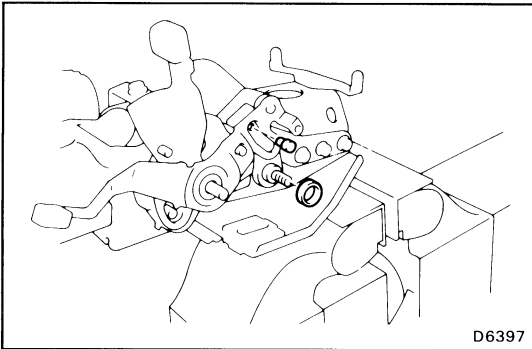
- (b) Insert the serration bolt of No.1 support collar side.



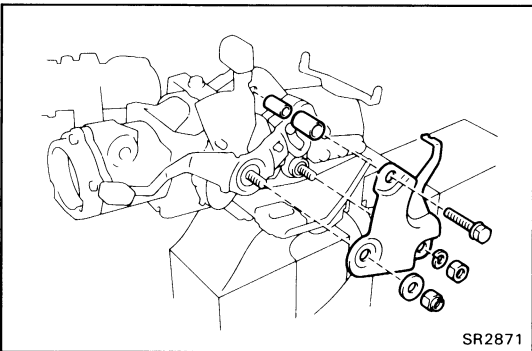
12. INSTALL SUPPORT STOPPER BOLT

Install the cover to the bolt, and align the cutout portion of the support stopper bolt and upper bracket, install it from inside of the column upper bracket.

Torque: 110 kg-cm (8 ft-lb, 11 N·m)



13. INSTALL SPACER AND PIN



14. INSTALL TILT LEVER RETAINER

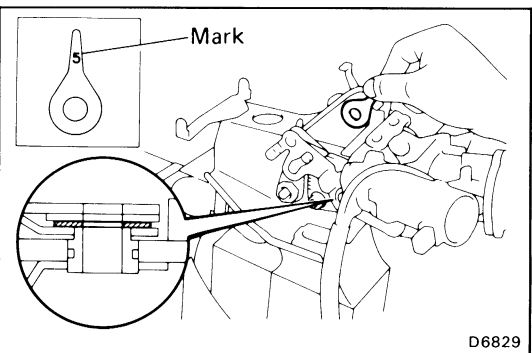
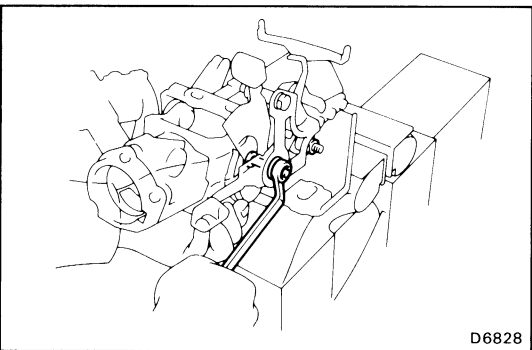
(a) Install the tilt lever retainer with the collar, cushion and bolt.

Torque: 195 kg-cm (14 ft-lb, 19 N·m)

(b) Temporarily install the two nuts and washers.

(c) Hold the serration bolt and tighten the two nuts.

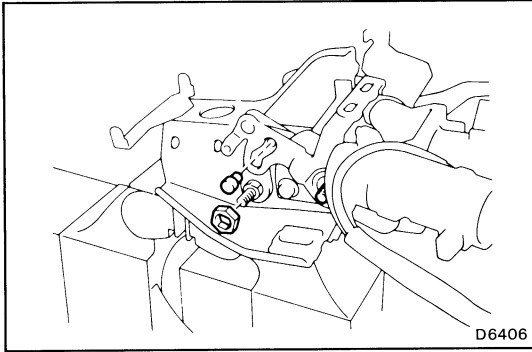
Torque: 195 kg-cm (14 ft-lb, 19 N·m)



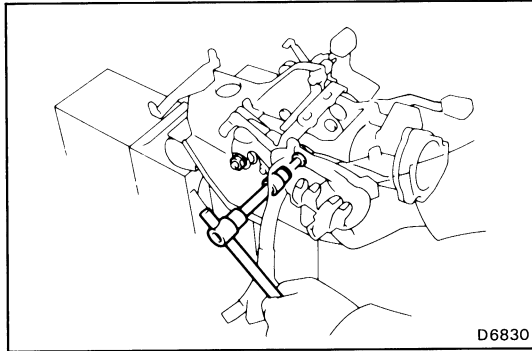
15. SELECT SUPPORT SHIM

Select one or two shims which fit snugly when pressed in by hand.

Mark	Thickness mm (in.)	
None	0.197 – 0.203	(0.0078 – 0.0080)
5	0.495 – 0.505	(0.0195 – 0.0199)
8	0.795 – 0.805	(0.0313 – 0.0317)
14	1.395 – 1.405	(0.0549 – 0.0553)
18	1.795 – 1.805	(0.0707 – 0.0711)



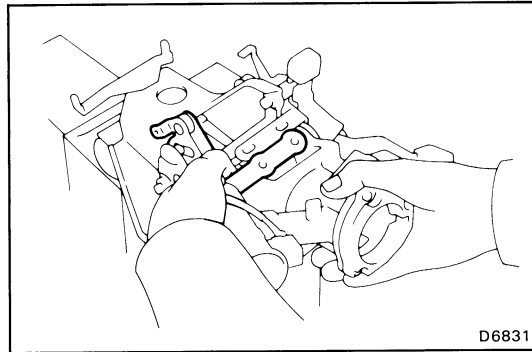
16. INSTALL SERRATION BOLT, TILT STEERING ADJUSTING NUT AND PIN



17. INSTALL TILT LEVER RETAINER

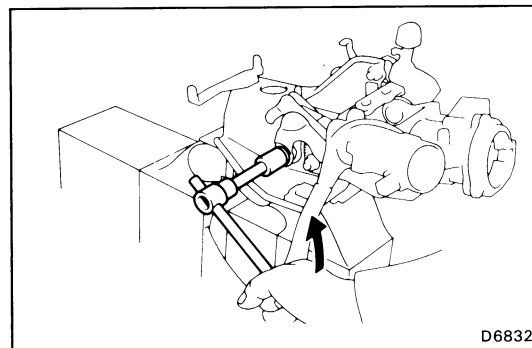
- (a) Install the tilt lever retainer.
- (b) Install the two nuts and washers.
- (c) Holding the serration bolts and tighten the nuts.

Torque: 195 kg-cm (14 ft-lb, 19 N·m)

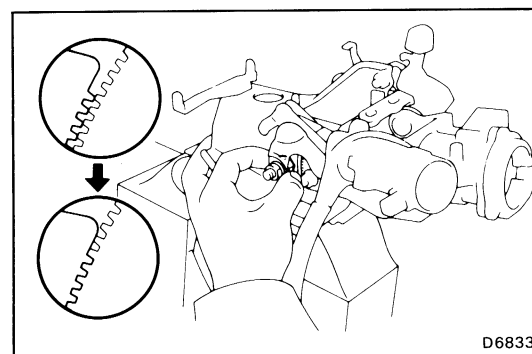


18. ADJUST ENGAGEMENT OF NO.2 TILT SUB LEVER

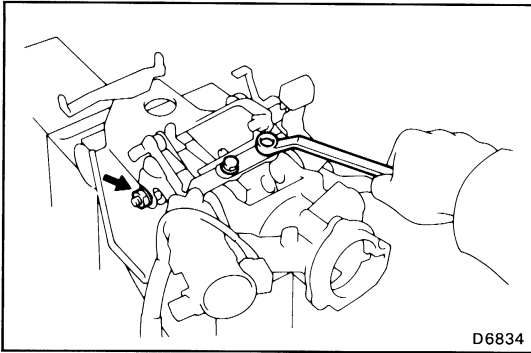
- (a) Pulling the No.2 tilt sub lever, disengage the pawl from the column upper bracket.
- (b) Moving the column upper bracket up or down, engage the opposite pawl with the column upper bracket.



- (c) Loosen the nut until the tilt steering adjusting nut turns smoothly.

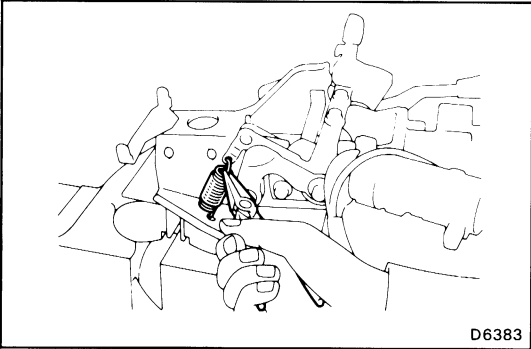


- (d) Pushing the pawl toward the column upper bracket, engage the pawl with the upper bracket by moving the adjusting nut.

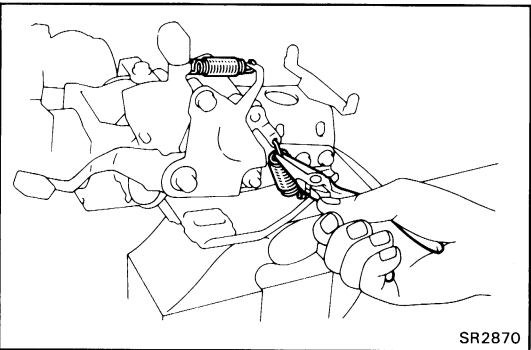


(e) Tighten the nut as in figure and tighten the right and left bolts of the tilt lever.

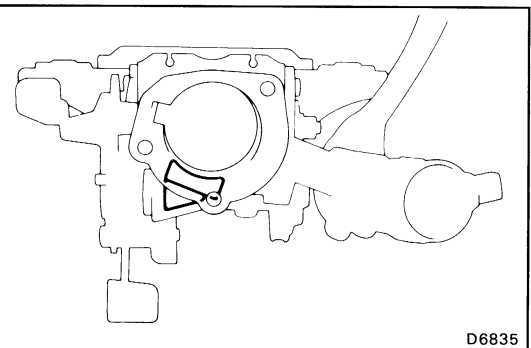
Torque: Nut 195 kg-cm (14 ft-lb, 19 N·m)
Bolt 80 kg-cm (69 in.-lb, 7.8 N·m)



19. INSTALL TENSION SPRING

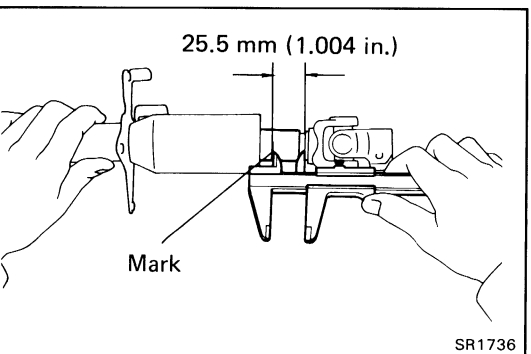


20. INSTALL TWO TENSION SPRINGS

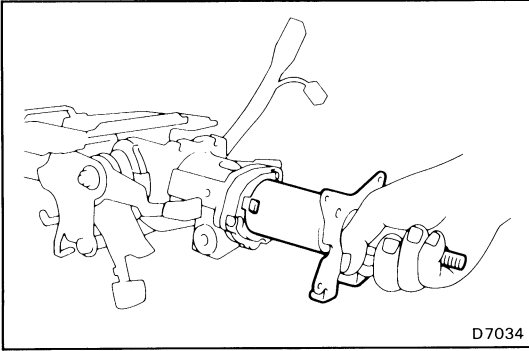


21. INSTALL MAIN SHAFT ASSEMBLY

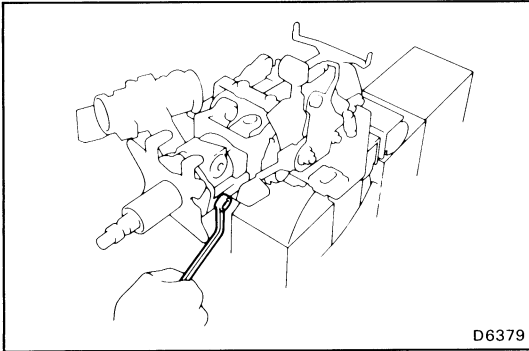
(a) Install the two lock wedges to the column upper bracket.



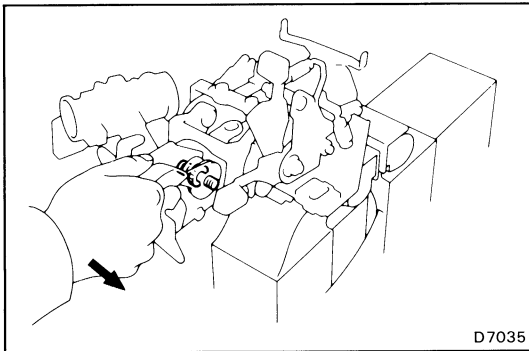
(b) Mark the main shaft as shown.



- (c) Place the ignition key at the ACC position.
- (d) Insert the main shaft assembly into the upper bracket.



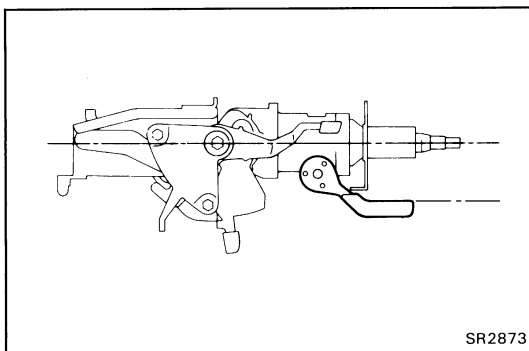
- (e) Install the column tube stopper.
- Torque: 80 kg-cm (69 in.-lb, 7.8 N·m)**



22. INSTALL TELESCOPIC LEVER LOCK BOLT

Tighten the telescopic lever lock bolt with the telescopic lever.

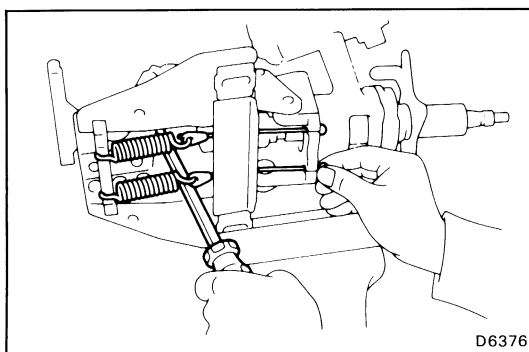
HINT: The bolt has LH threads.



23. INSTALL TELESCOPIC LEVER

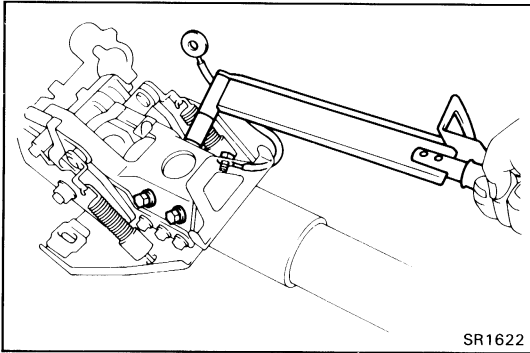
- (a) Install the telescopic lever so it parallels the main shaft.
- (b) Tighten the set nut.

Torque: 145 kg-cm (10 ft-lb, 14 N·m)

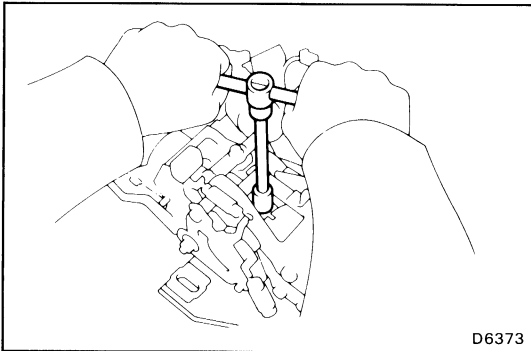


24. INSTALL TENSION SPRINGS AND CORDS

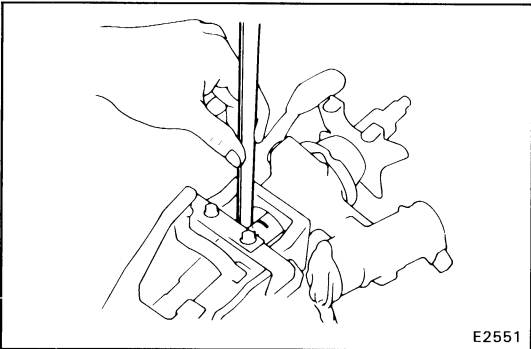
- (a) Fully tilt the main shaft upward.
- (b) Connect the spring and cord, and hook the spring to the hanger.
- (c) Using a screwdriver, hook the cord end to the column upper bracket.



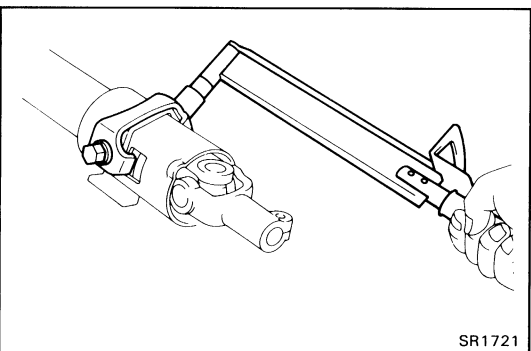
- 25. INSTALL COLUMN TUBE TO BREAKAWAY BRACKET**
- Install the column tube to the breakaway bracket.
 - Place the bond cable.
 - Install and torque the four bolts.
- Torque: 195 kg-cm (14 ft-lb, 19 N·m)**



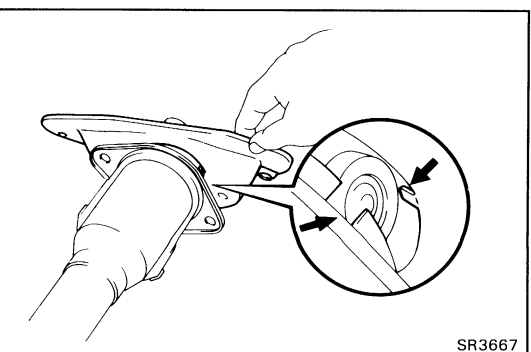
- 26. INSTALL INTERMEDIATE SHAFT TO COLUMN TUBE**
- Coat the O-ring of the thrust stopper with MP grease.
 - Install the intermediate shaft to the column tube.
 - Connect the universal joint of main shaft and intermediate shaft.
- Torque: 260 kg-cm (19 ft-lb, 25 N·m)**



- Match the mark on the shaft accords with the upper bracket surface, as shown.



- Install the retainer bracket and two bolts.
 - Torque the two bolts.
- Torque: 280 kg-cm (20 ft-lb, 27 N·m)**



- 27. INSTALL COLUMN HOLE COVER**
- Install a new O-ring and cover plate to the column tube.
 - Align the cutout portion of the column tube to the protrusion of the hole cover, and install with the two bolts.
- Torque: 130 kg-cm (9 ft-lb, 13 N·m)**

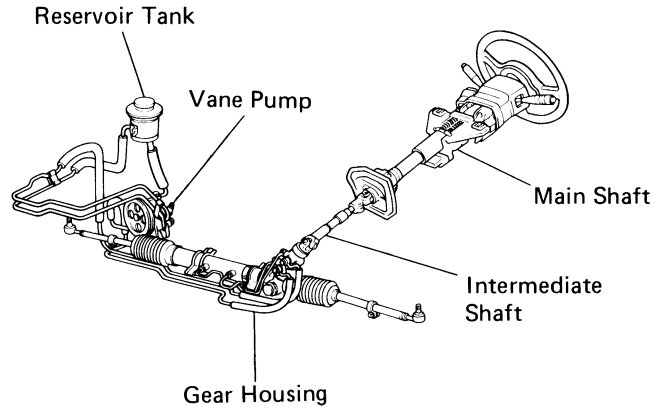
- 28. INSTALL IGNITION KEY LIGHT WITH SCREW**

POWER STEERING

Description

PRINCIPLES OF POWER STEERING

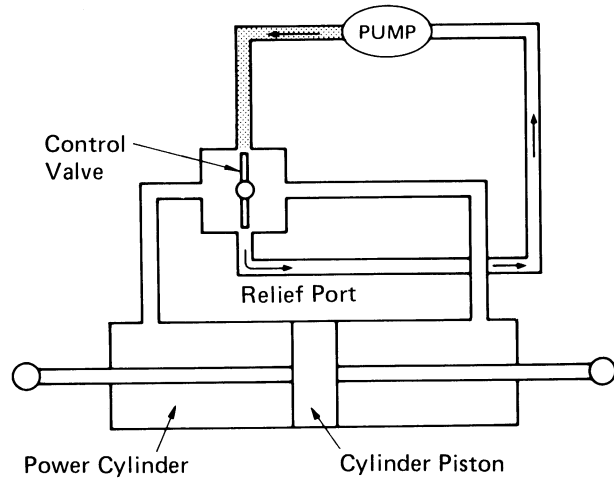
Power steering is one type of hydraulic device for utilizing engine power to reduce steering effort. Consequently, the engine is used to drive a pump to develop fluid pressure, and this pressure acts on a piston within the power cylinder so that the piston assists the rack effort. The amount of this assistance depends on the extent of pressure acting on the piston. Therefore, if more steering force is required, the pressure must be raised. The variation in the fluid pressure is accomplished by a control valve which is linked to the intermediate shaft and the steering main shaft.



SR3116

NEUTRAL (STRAIGHT-AHEAD) POSITION

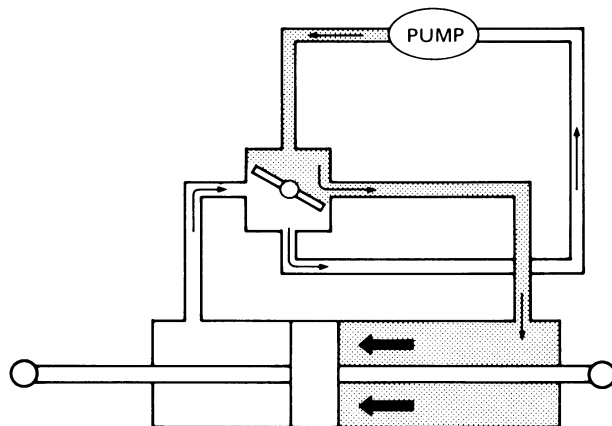
Fluid from the pump is sent to the control valve. If the control valve is in the neutral position, all the fluid will flow through the control valve into the relief port and back to the pump. At this time, hardly any pressure is created and because the pressure on the cylinder piston is equal on both sides, the piston will not move in either direction.



SR2390

WHEN TURNING

When the steering main shaft is turned in either direction, the control valve also moves, closing one of the fluid passages. The other passage then opens wider, causing a change in fluid flow volume and, at the same time, pressure is created. Consequently, a pressure difference occurs between both sides of the piston and the piston moves in the direction of the lower pressure so that the fluid in the cylinder is forced back to the pump through the control valve.



SR2391

SERVICE HINT

Troubles with the power steering system are usually concerned with hard steering due to the fact that there is no assist. In such cases, before attempting to make repairs, it is necessary to determine whether the trouble lies with the pump or with the gear housing. To do this, an on-vehicle inspection can be made by using a pressure gauge.

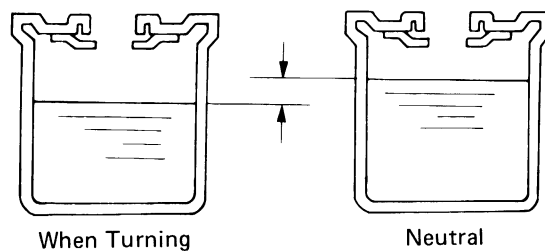
ON-VEHICLE INSPECTION

Power steering is a hydraulic device and problems are normally due to insufficient fluid pressure acting on the piston. This could be caused by either the pump not producing the specified fluid pressure or the control valve in the gear housing not functioning properly so that the proper fluid pressure can not be obtained.

If the fault lies with the pump, the same symptoms will generally occur whether the steering wheel is turned fully to the right or left. On the other hand, if the fault lies with the control valve, there will generally be a difference between the amount of assist when the steering wheel is turned to the left and right, causing harder steering. However, if the piston seal of the power cylinder is worn, there will be a loss of fluid pressure whether the steering wheel is turned to the right or left and the symptoms will be the same for both.

Before performing an on-vehicle inspection, a check must first be made to confirm that the power steering system is completely free of any air. If there is any air in the system, the volume of this air will change when the fluid pressure is raised, causing a fluctuation in the fluid pressure so that the power steering will not function properly. To determine if there is any air in the system, check to see if there is a change of fluid level in the reservoir tank when the steering wheel is turned fully to the right or left.

For example, if there is air in the system, it will be compressed to a smaller volume when the steering wheel is turned, causing a considerable drop in the fluid level. If the system is free of air, there will be very little change in the level even when the fluid pressure is raised. This is because the fluid, being a liquid, does not change volume when compressed. The little change in the fluid level is due to expansion of the hoses between the pump and gear housing when pressure rises.



SR2392

SR2393

Also, air in the system will sometimes result in an abnormal noise occurring from the pump or gear housing when the steering wheel is fully turned in either direction.

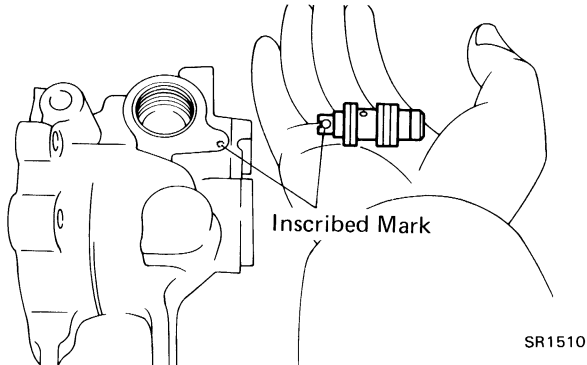
This on-vehicle inspection must be performed every time to ensure that the power steering system is working properly after overhauling or repairing the pump or gear housing.

VANE PUMP

The main component parts of the vane pump, such as the cam ring, rotor, vane plates and flow control valve are high precision parts and must be handled carefully. Also, because this pump produces a very high fluid pressure, O-rings are used for sealing each part. When reassembling the pump, always use new O-rings.

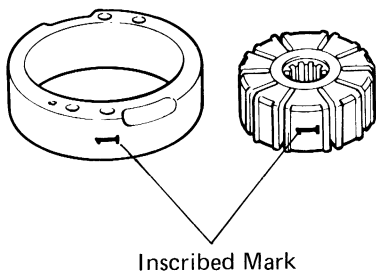
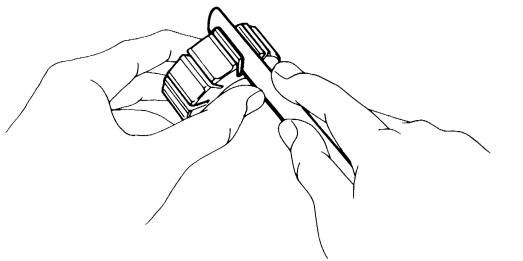
In the flow control valve, there is a relief valve which controls the maximum pressure of the pump. The amount of this maximum pressure is very important; if it is too low, there will be insufficient power steering assist and if too high, it will have an adverse effect on the pressure hoses, oil seals, etc.. If the maximum pressure is either too high or too low due to a faulty relief valve, do not disassemble or adjust the relief valve, but replace the flow control valve as an assembly.

The clearance between the flow control valve and pump body installation hole is very important. After manufacture, the factory measures the size of the installation hole and outer circumference of the flow control valve, and punches a mark accordingly. Therefore, when replacing the flow control valve, be sure to do so with one having the same mark in order to insure the proper clearance.



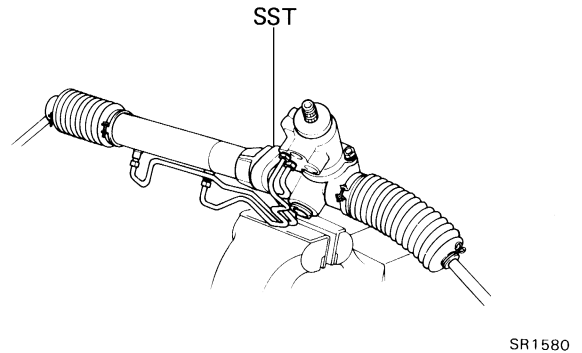
The functional parts of the pump which produce fluid pressure are the cam ring, rotor and vane plates, and these should be checked for wear. If the clearance between each is not within standard when reassembling, any worn parts should be replaced.

In this case, the replaced cam ring and rotor should be of the same length (have the same mark), and the vane plates should be replaced with those having a length corresponding to that mark, otherwise the proper thrust clearance cannot be obtained. If there is too much thrust clearance, there will be insufficient fluid pressure at low speeds. If there is too little thrust clearance, it may result in seizure of the vane plates.



GEAR HOUSING

If the gear housing is secured directly in a vise during overhaul, there is danger of deforming it, so always first secure it in the SST provided (rack and pinion steering rack housing stand) before placing it in the vise.

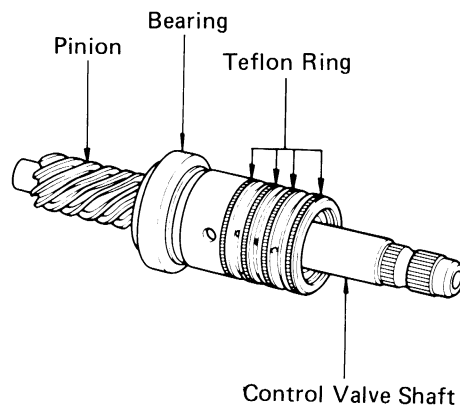


The oil seals on both sides of the power cylinder are for the prevention of leakage of the high pressure fluid which acts on the piston. Always use new oil seals when reassembling and be very careful not to scratch or damage them.

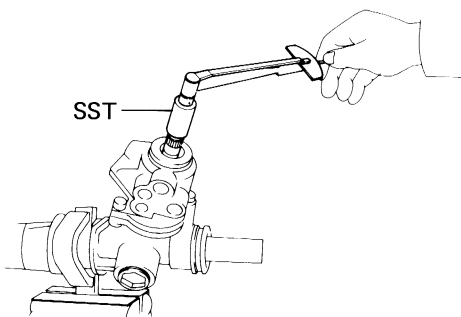
Because of the high pressure, even the slightest scratch will cause fluid leakage, resulting in an inoperative power steering system.

Also, be very careful not to scratch the sliding portion of the rack which makes contact with the oil seals. When removing the rack ends from the rack, it is very easy to cause a burr when holding the tip of the rack with a wrench. Therefore, before assembling the rack, first check the tip for burrs and remove any with an oil stone.

Teflon rings are used for the piston and control valve. These teflon rings are highly durable against wear, but if it is necessary to replace them, be careful not to stretch the new ones. After installing a teflon ring into its groove, snug it down into the groove before assembly of the cylinder or housing to prevent possible damage.



As with the rack and pinion type steering, preload is very important. If the preload is not correct, it could result in such trouble as steering wheel play or shimmy or lack of durability, so always make sure that it is correct.

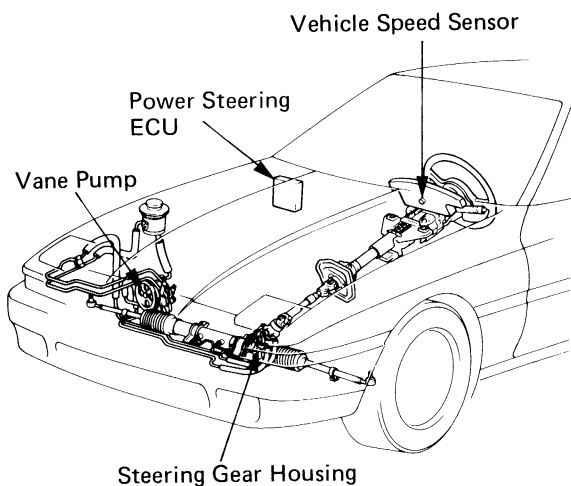


SR1605

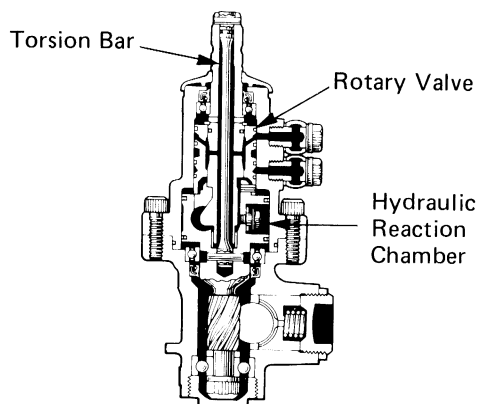
PPS (Progressive Power Steering)

In addition to the power steering functions, the PPS controls hydraulic pressure acting on the hydraulic reaction chamber located in the control valve of the gear box to change steering characteristics according to the vehicle speed.

As a result, the wheels can be turned more lightly at low speeds or when steering during the vehicle stopped, while a responsive steering feeling is assured at medium to high speeds.



SR2894

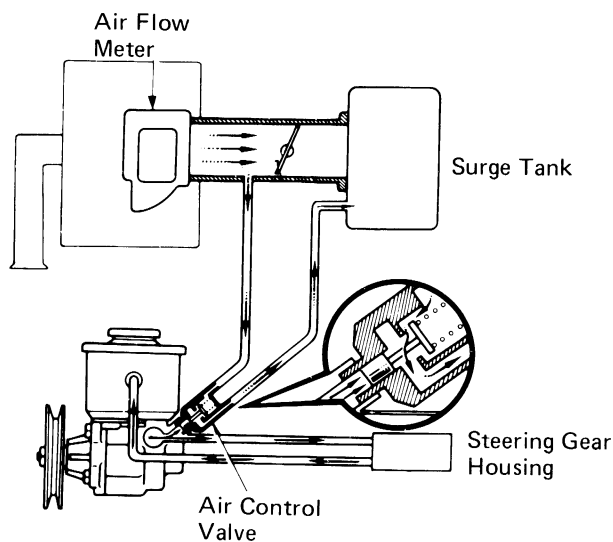


SR2895

IDLE-UP DEVICE

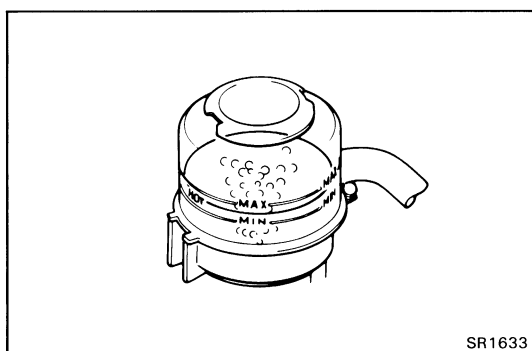
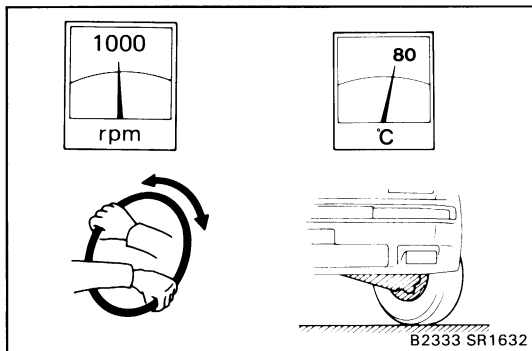
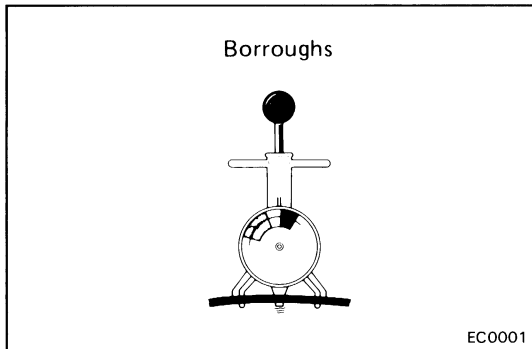
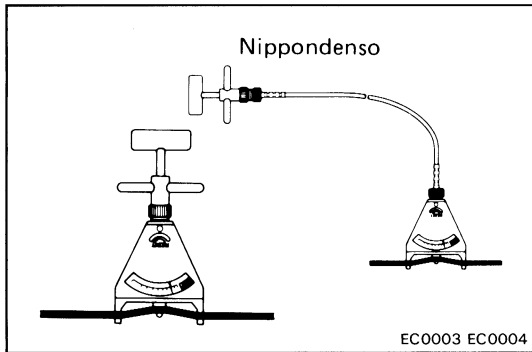
The pump produces the maximum fluid pressure when the steering wheel is turned fully to the right or left and, at this time, there is a maximum load on the pump which causes a decrease in engine idle rpm. To solve this problem, vehicles are equipped with an idle-up device which acts to raise the engine idle rpm whenever there is a heavy load on the pump.

On EFI engines, when the piston of the air control valve is pushed by fluid pressure, the air valve opens and the volume of air by-passing the throttle valve is increased to regulate engine rpm.



SR2402

The idle-up device functions to raise engine idle rpm when pump fluid pressure acts on the air control valve, installed to the pump body, to control the flow of air.



On-Vehicle Inspection

CHECK DRIVE BELT TENSION

Using a 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 160 ± 20 lb
Used belt 100 ± 20 lb

HINT:

- "New belt" refers to a belt which has been less than 5 minutes on a running engine.
- "Used belt" refers to a belt which has been used on a running engine for 5 minutes or more.
- After installing the drive belt, check that it fits properly in the ribbed grooves.

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°C (176°F)

3. CHECK FOR FOAMING OR EMULSIFICATION

HINT: Foaming and emulsification indicate either 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® II

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

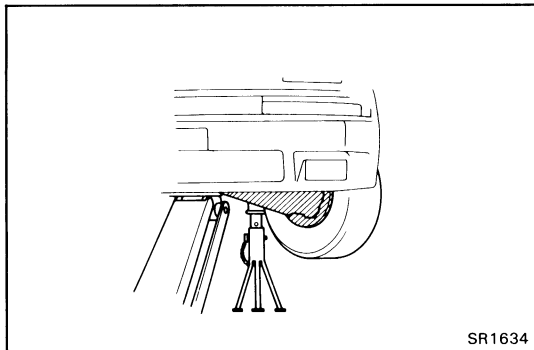
CHECK IDLE-UP

1. WARM UP ENGINE

2. TURN AIR CONDITIONER SWITCH OFF

3. CHECK IDLE-UP

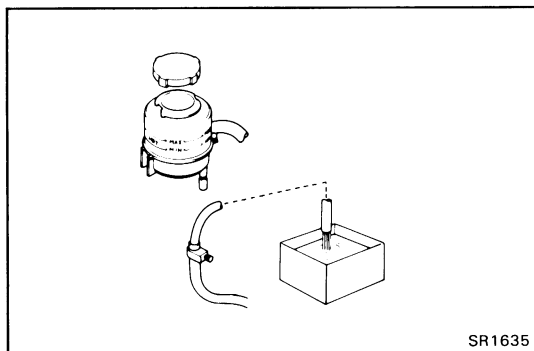
- Fully turn the steering wheel.
- Check that the engine rpm decreases when the air control valve hose is pinched.
- Check that the engine rpm increases when the air control valve hose is released.



SR1634

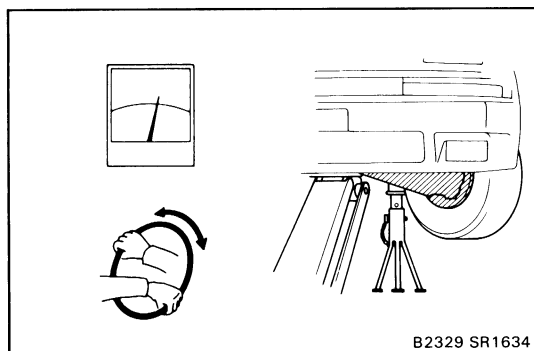
REPLACEMENT OF POWER STEERING FLUID

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



SR1635

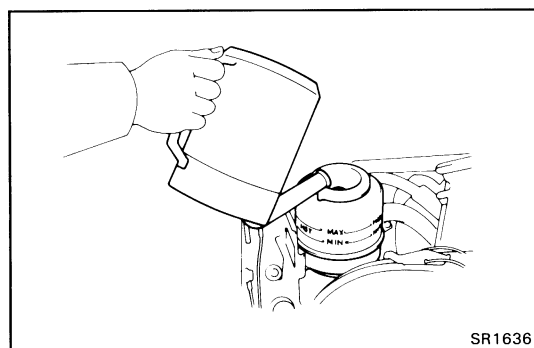
2. REMOVE FLUID RETURN HOSE FROM RESERVOIR TANK AND DRAIN FLUID INTO CONTAINER



B2329 SR1634

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

4. STOP ENGINE



SR1636

5. FILL RESERVOIR TANK WITH FRESH FLUID
Fluid type: ATF 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.

NOTICE: Take care that some fluid remains left in the reservoir tank.

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

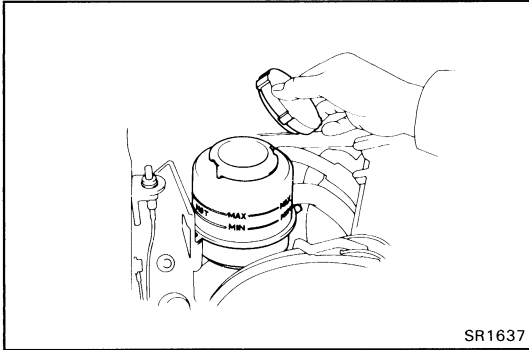
9. BLEED POWER STEERING SYSTEM

BLEEDING OF POWER STEERING SYSTEM**1. CHECK FLUID LEVEL IN RESERVOIR TANK**

Check the fluid level and add fluid if necessary.

Fluid: ATF DEXRON® II

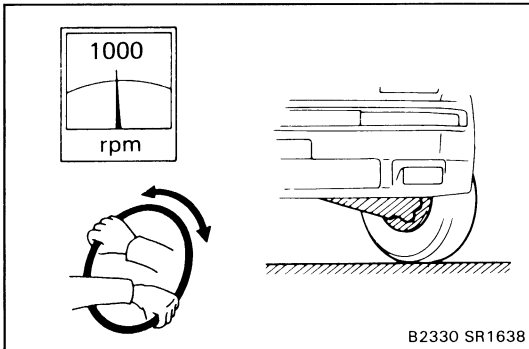
HINT: Check that the fluid level is within the **HOT LEVEL** of the tank. If the fluid is cold, check that it is within the **COLD LEVEL** of the tank.



SR1637

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

With the engine speed below 1,000 rpm, turn the steering wheel to left or right full lock and keep it there for 2 – 3 seconds, then turn the wheel to the reverse full lock and keep it there for 2 – 3 seconds.



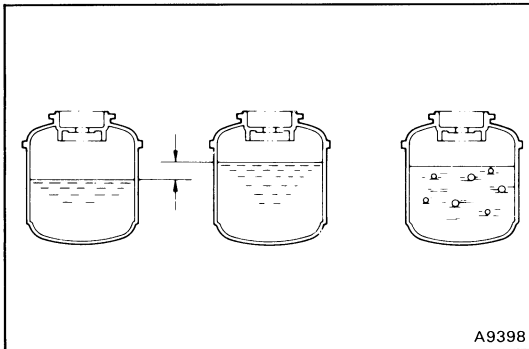
B2330 SR1638

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

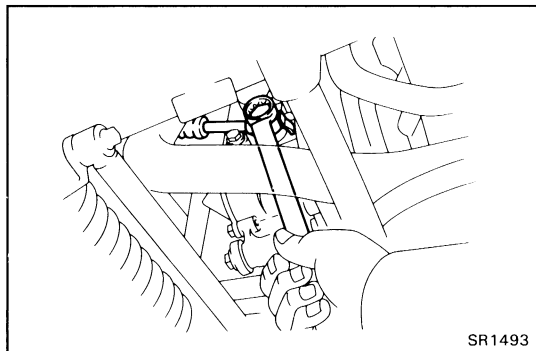
Measure the fluid level with the engine running. Stop the engine and measure the fluid level.

Maximum rise: 5 mm (0.20 in.)

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



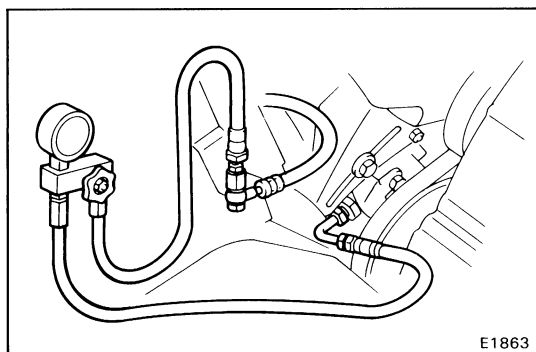
A9398



OIL PRESSURE CHECK

1. CONNECT PRESSURE GAUGE

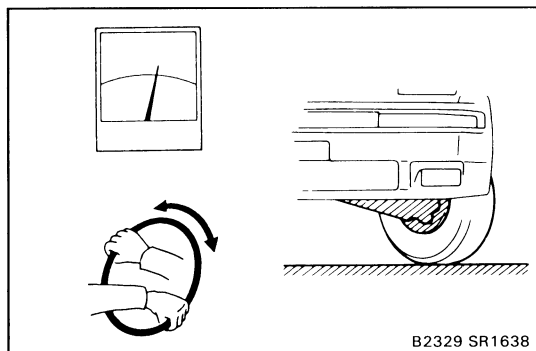
(a) Disconnect the pressure line from the PS pump.



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

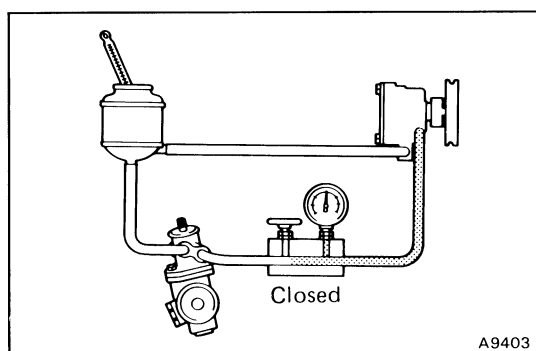
(c) Bleed the system. Start the engine and turn the steering wheel from lock to lock two or three times.

(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



4. CHECK FLUID PRESSURE READING WITH VALVE CLOSED

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

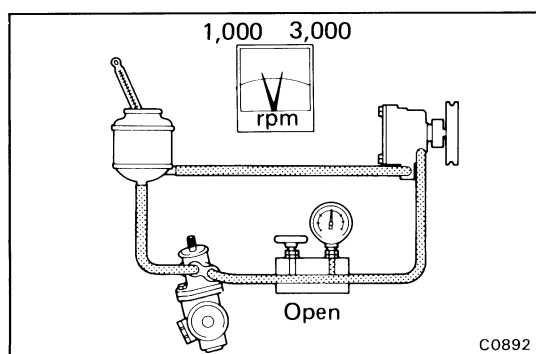
Minimum pressure: 75 kg/cm² (1,067 psi, 7,355 kPa)

NOTICE:

- Do not keep the valve closed for more than 10 seconds.
- Do not let the fluid temperature become too high.

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

5. OPEN VALVE FULLY

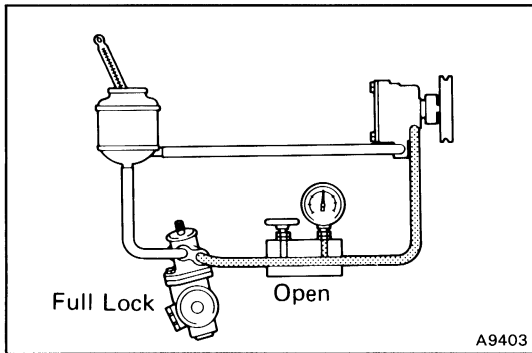


6. CHECK AND RECORD PRESSURE READING AT 1,000 RPM

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

Check that there is 5 kg/cm² (71 psi, 490 kPa) or less difference in pressure between the 1,000 rpm and 3,000 rpm checks.

If the difference is excessive, repair or replace the flow control valve of the PS pump.



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

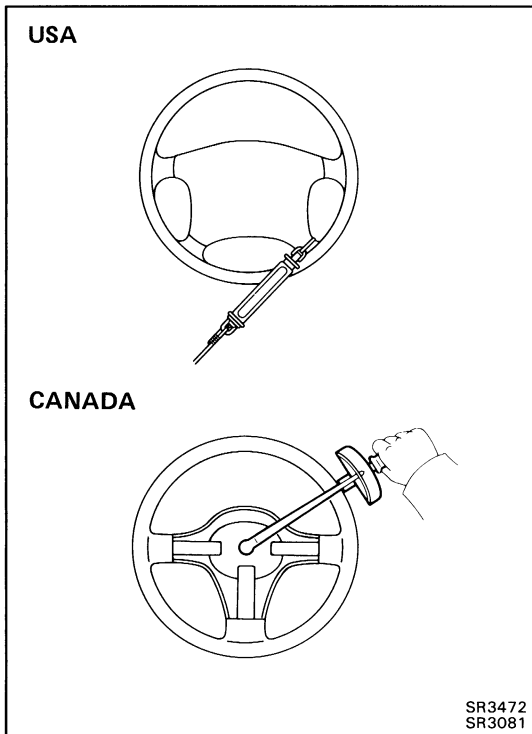
Be sure the pressure gauge valve is fully opened and the engine idling.

Minimum pressure: 75 kg/cm² (1,067 psi, 7,355 kPa)

NOTICE:

- Do not maintain lock position for more than 10 seconds.
- Do not let the fluid temperature become too high.

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



9. MEASURE STEERING EFFORT

(USA)

- Center the steering wheel and run the engine at idle.
- Using a spring balance, measure the steering effort in both directions.

Maximum steering effort:

w/o PPS 4.7 kg (10.36 lb, 46 N)

w/ PPS 2.7 kg (5.95 lb, 26 N)

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

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

(CANADA)

- Center the steering wheel and run the engine at idle.
- Using a torque meter, measure the steering effort in both directions.

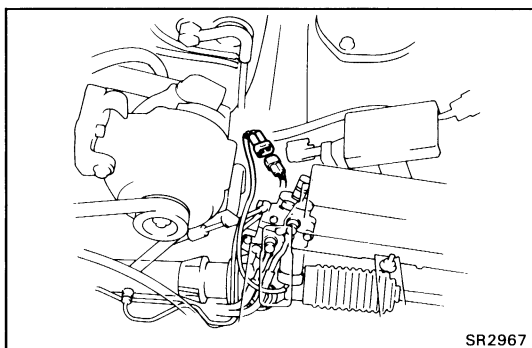
Maximum steering effort:

w/o PPS 70 kg-cm (61 in.-lb, 6.9 N·m)

w/ PPS 40 kg-cm (34 in.-lb, 3.9 N·m)

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

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



10. (w/ PPS) MEASURE STEERING EFFORT

- Disconnect the solenoid connector.
- Using a spring balance or torque meter, measure the steering effort in both directions.

(Reference)

Maximum steering effort:

USA 5.7 kg (12.57 lb, 56 N)

CANADA 85 kg-cm (74 in.-lb, 8.3 N·m)

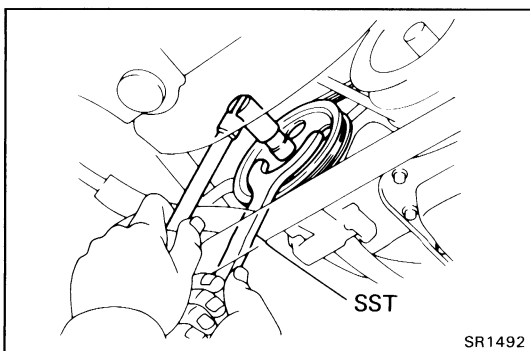
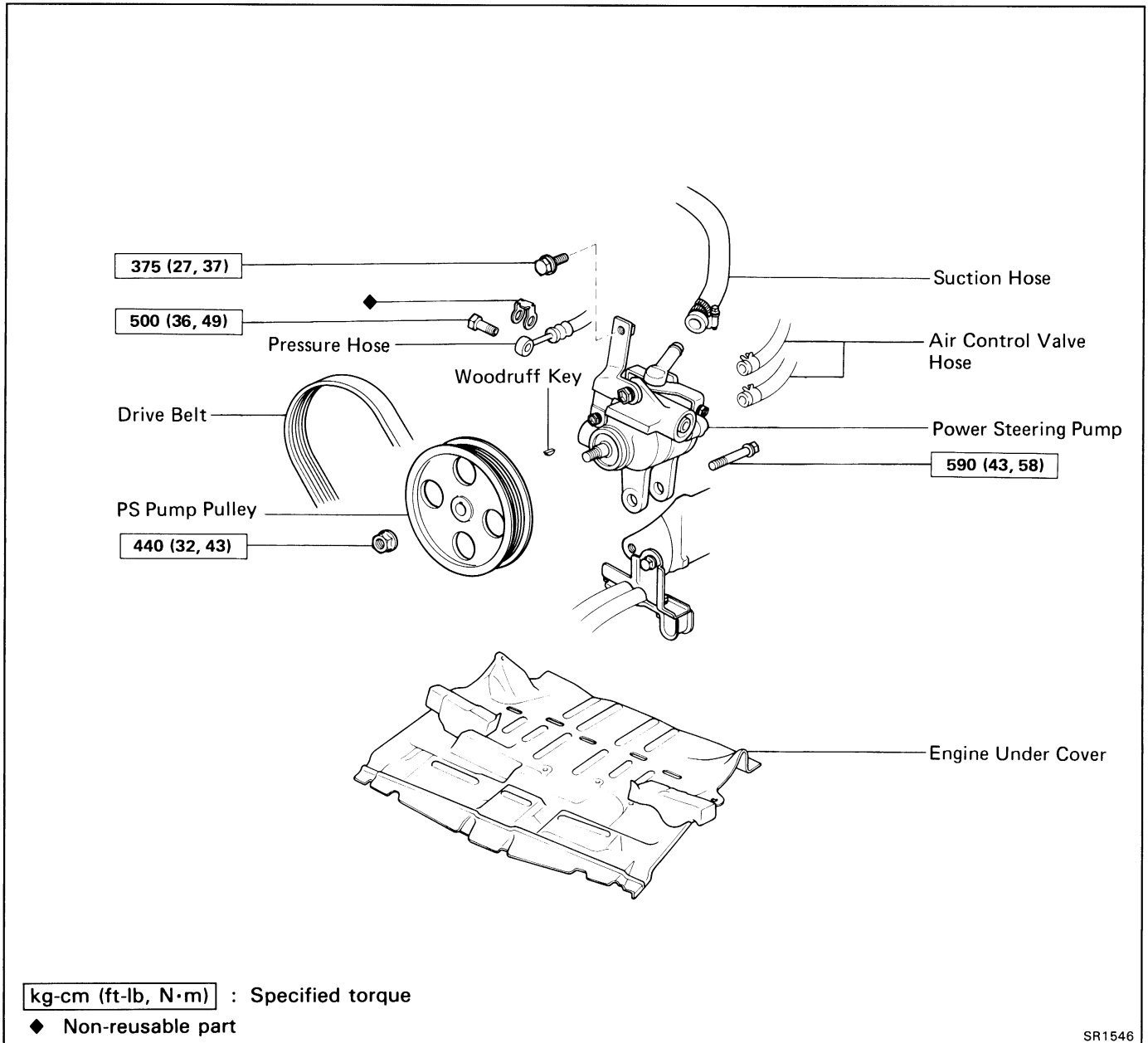
If steering effort is not heavier, check the solenoid.

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

Power Steering Pump

REMOVAL AND INSTALLATION OF POWER STEERING PUMP (7M-GE Engine)

Remove and install the parts as shown.



(MAIN POINTS OF REMOVAL AND INSTALLATION)

1. REMOVE DRIVE BELT AND PULLEY

Using SST, to hold the pulley, loosen the pulley set nut.
SST 09278-54012

2. ADJUST DRIVE BELT TENSION AFTER INSTALLING PS PUMP

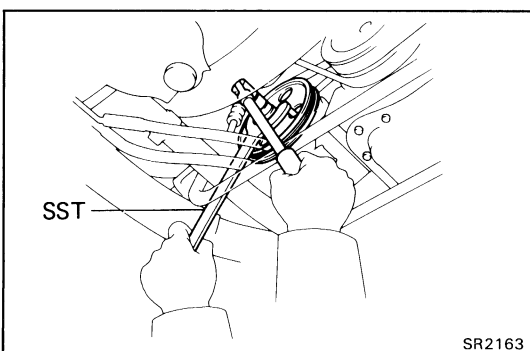
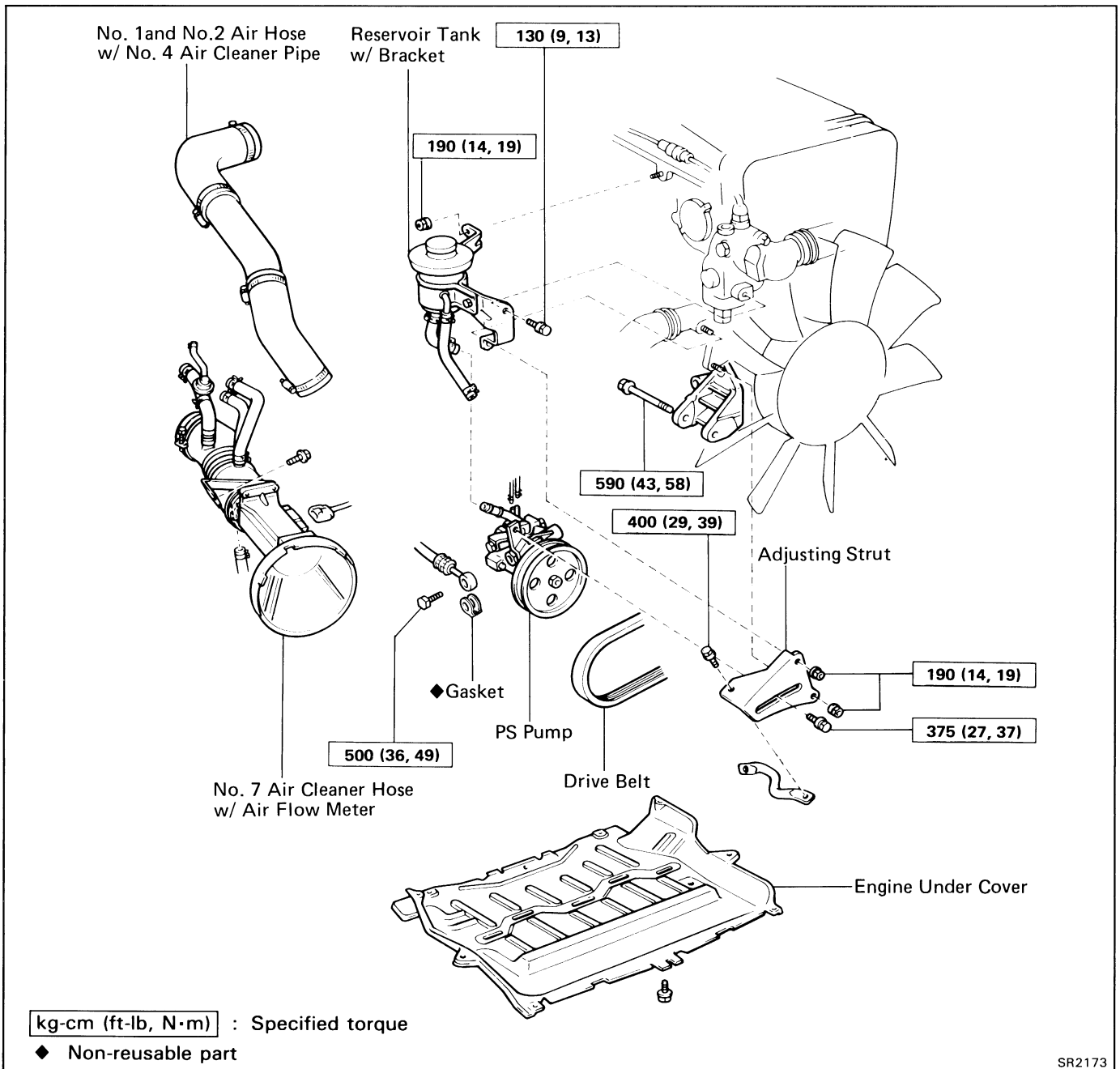
(See page SR-40)

3. BLEED POWER STEERING SYSTEM

(See page SR-42)

REMOVAL AND INSTALLATION OF POWER STEERING PUMP (7M-GTE Engine)

Remove and install the parts as shown.



(MAIN POINTS OF REMOVAL AND INSTALLATION)

1. REMOVE POWER STEERING PUMP PULLEY

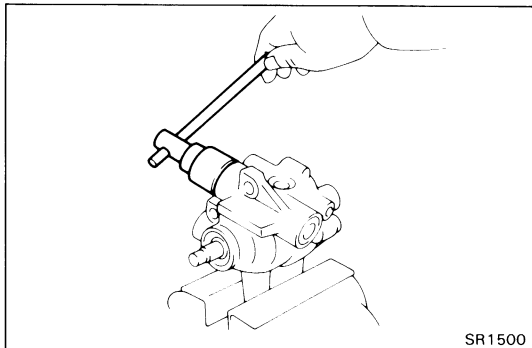
- (a) Using SST, hold the pulley, and loosen the nut until it can be turned by hand.

SST 09278-54012

- (b) Loosen the PS pump set bolt until it can be turned by hand.

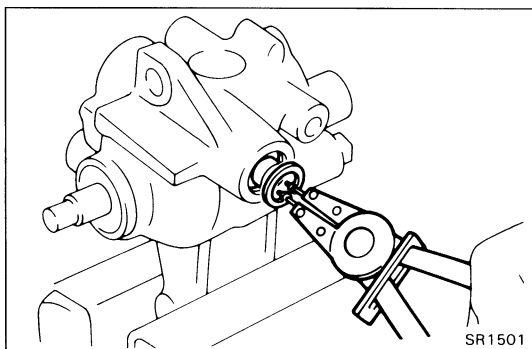
- (c) Remove the drive belt, pulley installation nut, pulley and woodruff key.

- 2. ADJUST DRIVE BELT TENSION AFTER INSTALLING PS PUMP**
(See page SR-40)
- 3. BLEED POWER STEERING SYSTEM**
(See page SR-42)



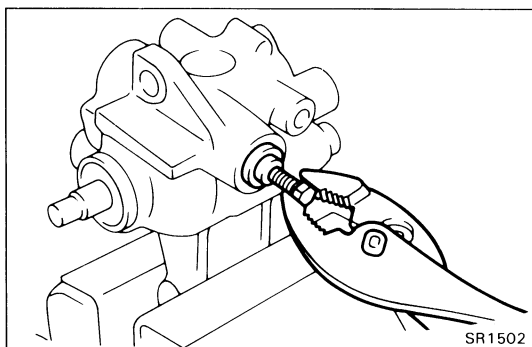
5. REMOVE FLOW CONTROL VALVE AND SPRING

Remove the pressure port union, and remove the valve and spring.

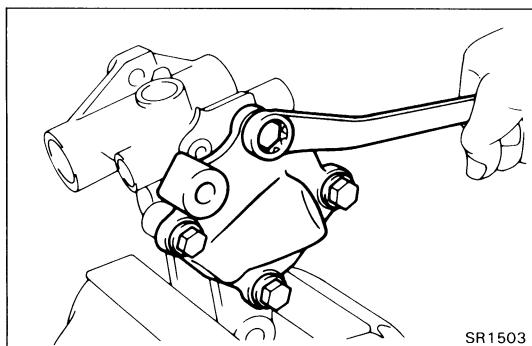


6. REMOVE FLOW CONTROL SPRING SEAT

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



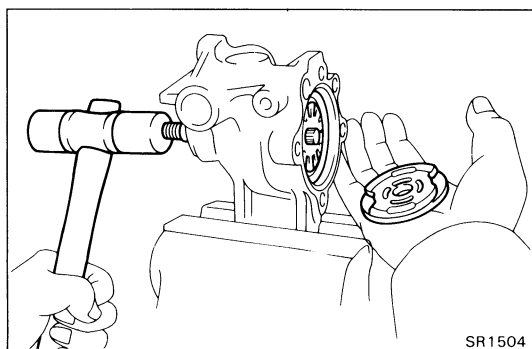
(b) Temporarily install a bolt and pull out the seat.



7. REMOVE REAR HOUSING

(a) Place matchmarks on the front and rear housings.

(b) Remove the four bolts and rear housing.

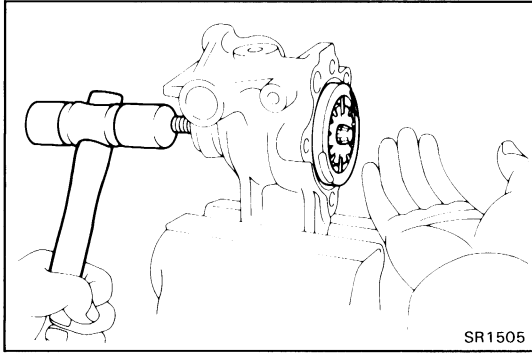


8. REMOVE REAR SIDE PLATE

(a) Using a plastic hammer, tap the rotor shaft.

(b) Remove the rear side plate.

(c) Remove the three O-rings.

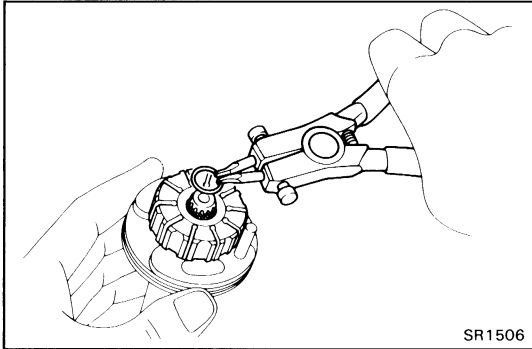


9. REMOVE ROTOR SHAFT WITH VANE PLATES, CAM RING AND ROTOR

- (a) Using a plastic hammer, tap out the rotor shaft assembly.

NOTICE: Be careful not to scratch the parts.

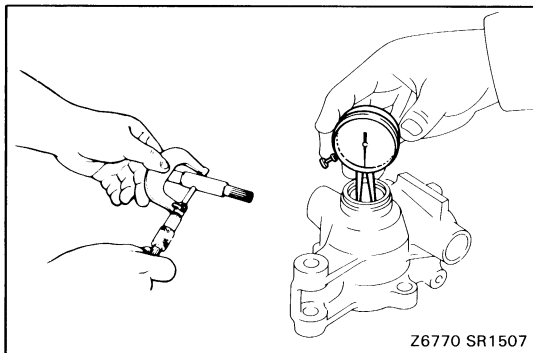
- (b) Remove the wave washer.



10. DISASSEMBLE ROTOR SHAFT ASSEMBLY

- (a) Remove the cam ring and vane plates.
- (b) Using snap ring pliers, remove the snap ring.
- (c) Remove the rotor and plate from the rotor shaft.

NOTICE: Be careful not to scratch the rotor.



INSPECTION AND REPAIR OF POWER STEERING PUMP

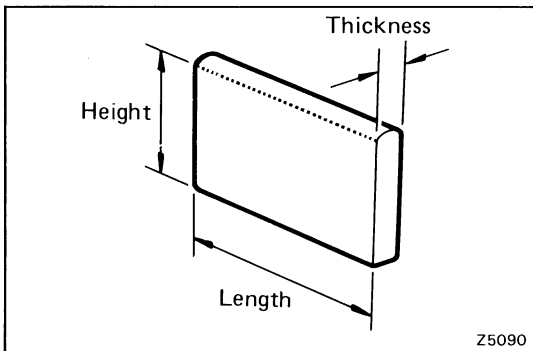
1. INSPECT OIL CLEARANCE BETWEEN ROTOR SHAFT AND BUSHING

Using a micrometer and calipers, measure the oil clearance.

Standard clearance: 0.01 — 0.03 mm
(0.0004 — 0.0012 in.)

Maximum clearance: 0.07 mm (0.0028 in.)

If the clearance is greater than maximum, replace the entire PS pump.



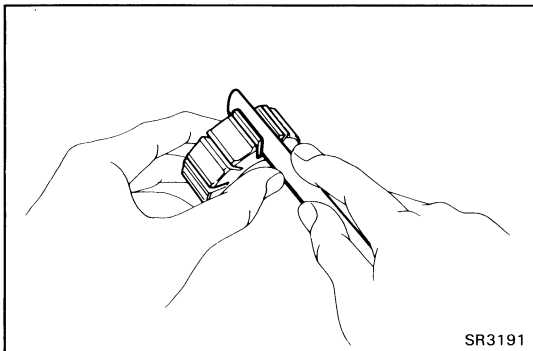
2. INSPECT ROTOR AND VANE PLATES

(a) Using a micrometer, measure the height, thickness and length of the vane plates.

Minimum height: 8.1 mm (0.319 in.)

Minimum thickness: 1.797 mm (0.0707 in.)

Minimum length: 14.988 mm (0.5901 in.)



(b) Using a feeler gauge, measure the clearance between the rotor groove and vane plate.

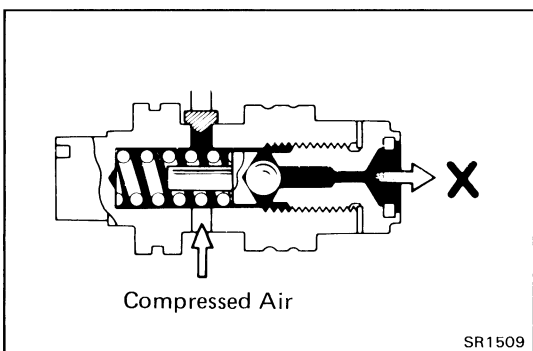
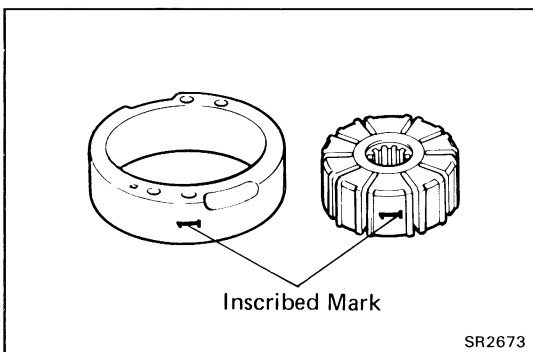
Maximum clearance: 0.03 mm (0.0012 in.)

If the clearance is greater than maximum, replace the vane plate and/or rotor with one stamped with the same mark of the cam ring.

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

HINT: There are five vane plate lengths with the following rotor and cam ring marks:

Rotor and cam ring mark	Vane plate 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	14.990 — 14.992	(0.59016 — 0.59024)
4	14.988 — 14.990	(0.5901 — 0.5902)

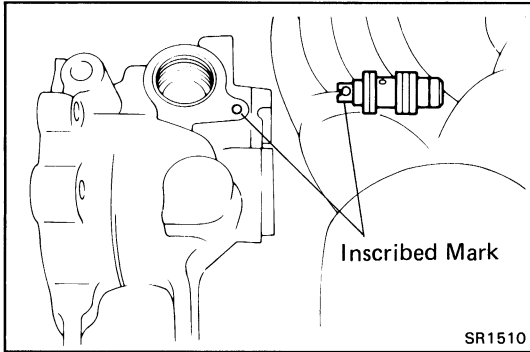


3. INSPECT FLOW CONTROL VALVE

(a) Coat fluid to the valve and check that it falls smoothly into the valve hole by its own weight.

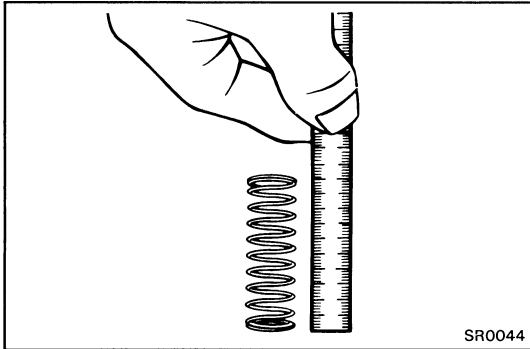
(b) Check the flow control valve for leakage.

Close one of the holes and apply compressed air [4 — 5 kg/cm² (57 — 71 psi, 392 — 490 kPa)] into the opposite side, and confirm that air does not come out of the end hole.



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

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

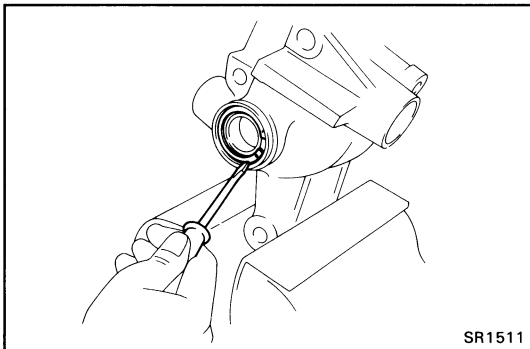


4. INSPECT FLOW CONTROL VALVE SPRING

Using a scale, measure the free length of the spring.

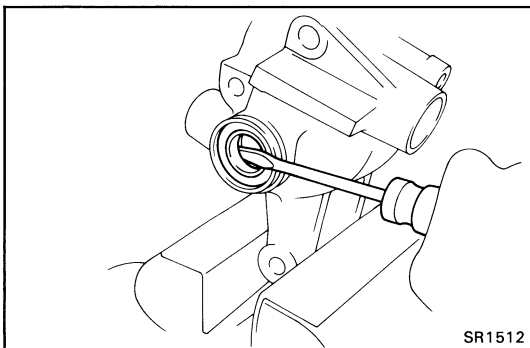
Free length: 37 – 39 mm (1.46 – 1.54 in.)

If the free length is not within specification, replace the spring.

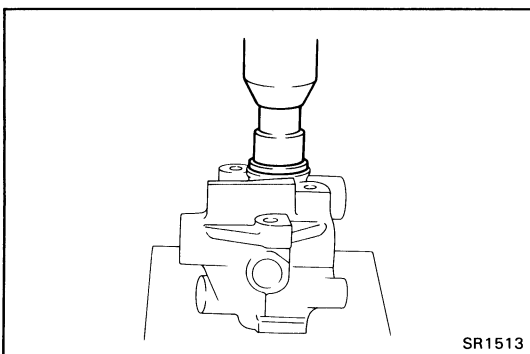


5. IF NECESSARY, REPLACE OIL SEAL

(a) Using a screwdriver, pry out the snap ring.

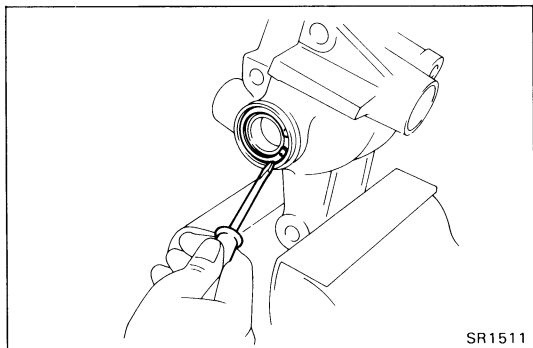


(b) Using a screwdriver, pry out the oil seal.



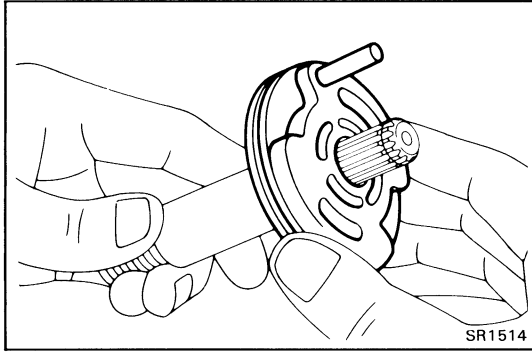
(c) Using a 22 mm socket wrench, press in a new oil seal.

(d) Coat the oil seal lip with MP grease.



(e) Using a screwdriver, install the snap ring.

SR1511



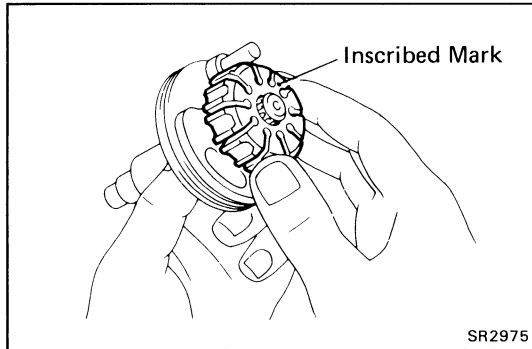
ASSEMBLY OF POWER STEERING PUMP

(See page SR-48)

HINT: Coat all sliding surfaces with fluid before assembling.

1. ASSEMBLE ROTOR, FRONT SIDE PLATE AND SHAFT

- (a) Install the straight pin to the plate.
- (b) Place the side plate on the shaft.
- (c) Place the rotor on the shaft with the inscribed mark facing upward, and secure them with the snap ring.

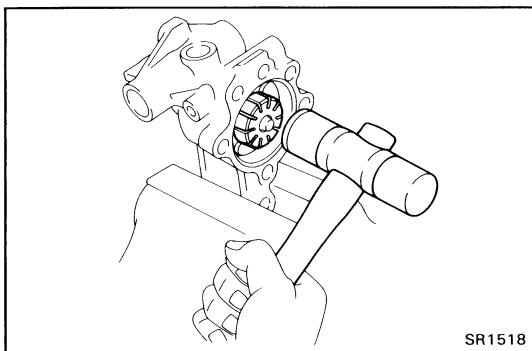


2. INSTALL ROTOR ASSEMBLY TO FRONT HOUSING

- (a) Install a new O-ring in the groove of the front side plate.
- (b) Install a new O-ring in the inside groove of the front housing.
- (c) Apply MP grease to the oil seal.
- (d) Install the wave washer and long straight pin in the front housing.

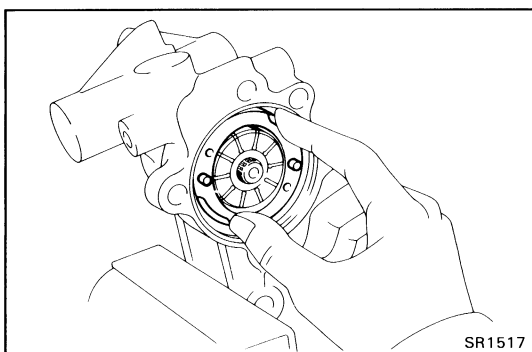
(e) Using a plastic hammer, tap in the rotor assembly.

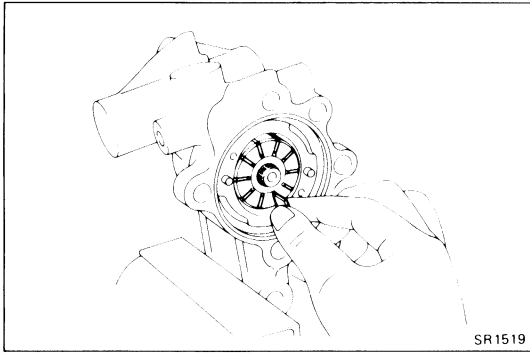
NOTICE: Be careful not to damage the oil seal and O-rings.



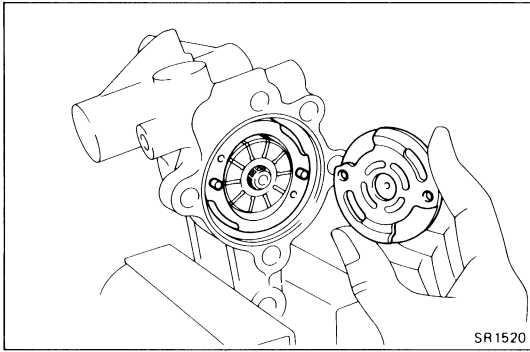
3. INSTALL CAM RING

Insert the cam ring, with the inscribed mark facing outward.

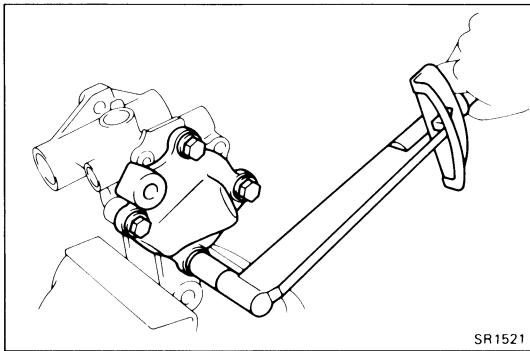


**4. INSTALL VANE PLATES**

Install the vane plates with the round end facing outward.

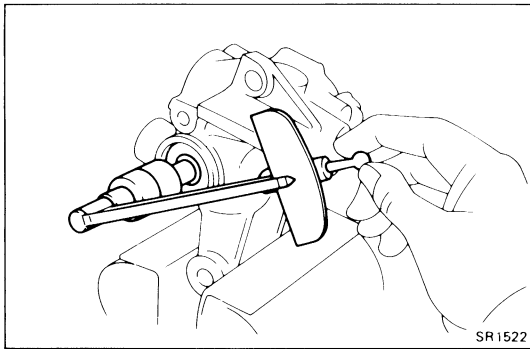
**5. INSTALL REAR SIDE PLATE**

- (a) Install two new O-rings into the groove of the side plate.
- (b) Align the holes of the side plate with the pins, and install the side plate.

**6. INSTALL REAR HOUSING**

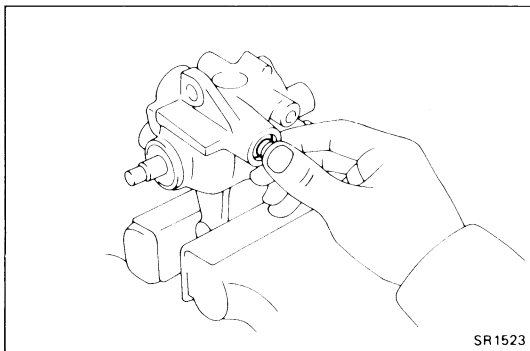
- (a) Align the matchmarks on the housings and install a new O-ring and the rear housing with the four bolts.
- (b) Torque the four bolts.

Torque: 470 kg-cm (34 ft-lb, 46 N·m)

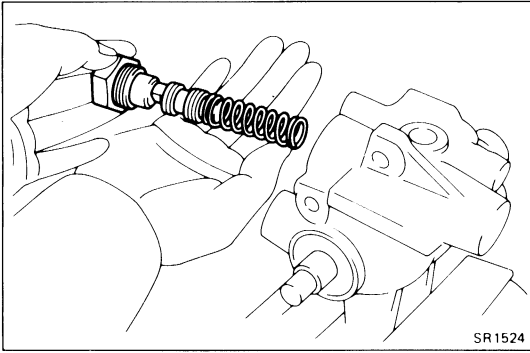
**7. CHECK ROTOR SHAFT ROTATION CONDITION**

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

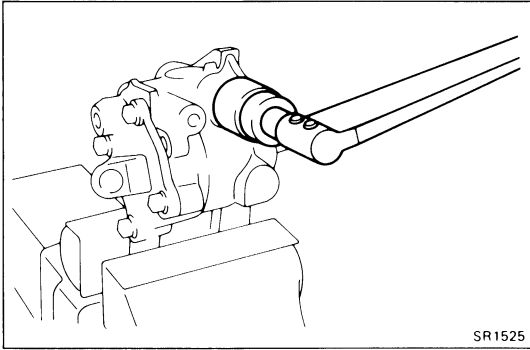
Rotating torque: 2.8 kg-cm (2.4 in.-lb, 0.3 N·m) or less

**8. INSTALL FLOW CONTROL SPRING SEAT**

- (a) Install a new O-ring in the spring seat.
- (b) Insert the spring seat and, using snap ring pliers, install the snap ring.

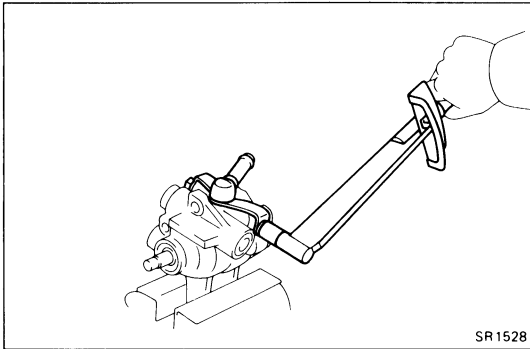
**9. INSTALL FLOW CONTROL VALVE AND SPRING**

Insert the spring and valve into the housing.

**10. INSTALL PRESSURE PORT UNION**

Install and torque the union.

Torque: 700 kg-cm (51 ft-lb, 69 N·m)

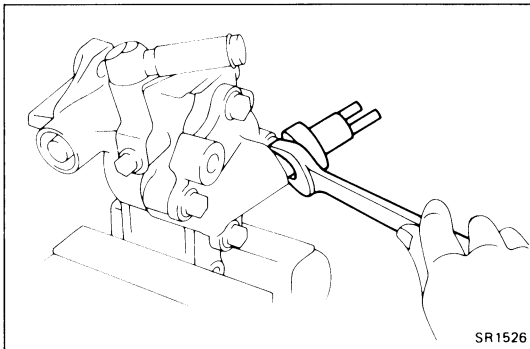
**11. INSTALL SUCTION PORT UNION**

(a) Install a new O-ring in the union.

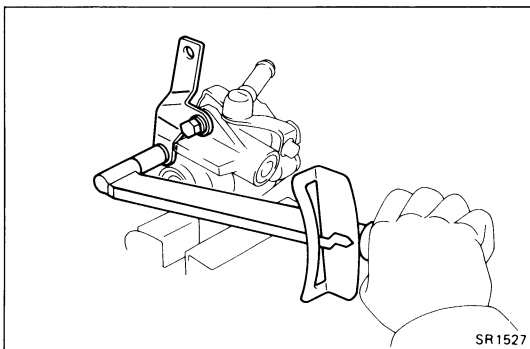
(b) Push in the union, and install the two bolts.

(c) Torque the two bolts.

Torque: 130 kg-cm (9 ft-lb, 13 N·m)

**12. INSTALL AIR CONTROL VALVE**

Torque: 370 kg-cm (27 ft-lb, 36 N·m)

**13. INSTALL DRIVE BELT ADJUST STAY**

Install and torque the two bolts.

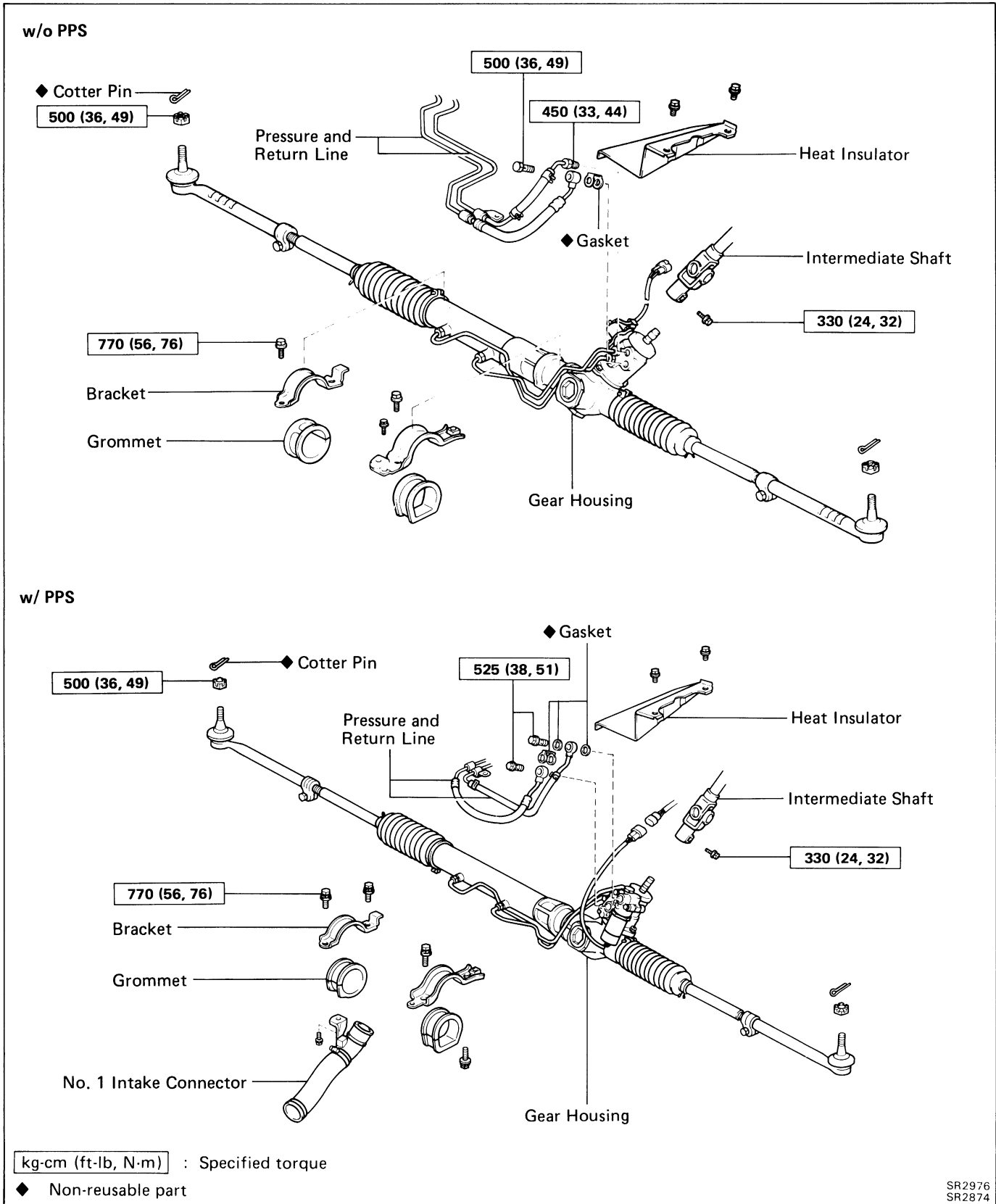
Torque: 12 mm bolt 185 kg-cm (13 ft-lb, 18 N·m)

14 mm bolt 420 kg-cm (30 ft-lb, 41 N·m)

Gear Housing

REMOVAL AND INSTALLATION OF STEERING GEAR HOUSING

Remove and install the parts as shown.

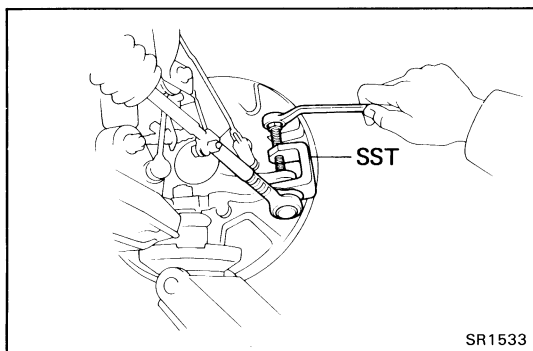
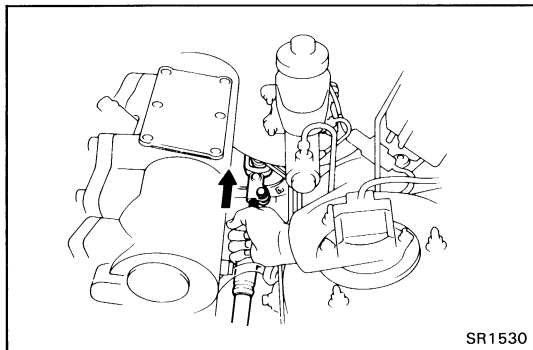
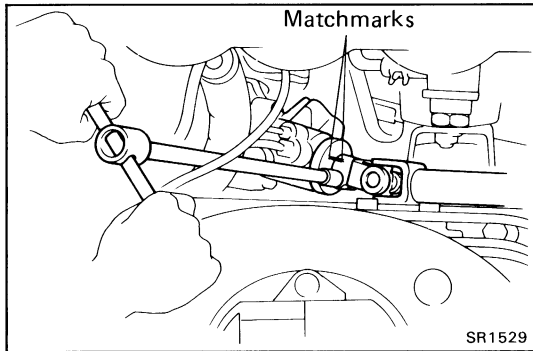
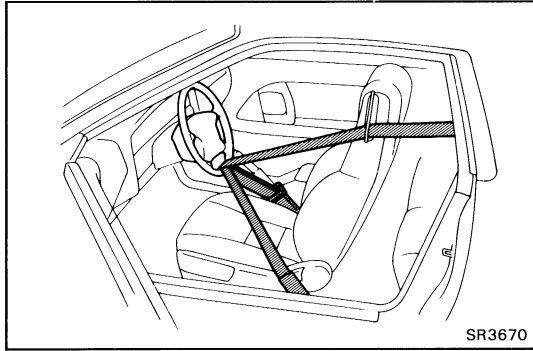


(MAIN POINTS OF REMOVAL AND INSTALLATION)

(USA)

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-15)

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.

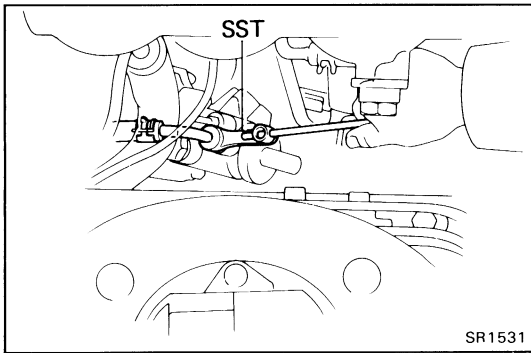


1. DISCONNECT UNIVERSAL JOINT

- (a) Position the front wheels facing straight ahead.
- (b) 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) Remove the universal joint bolt of the control valve shaft side.
- (e) Loosen the universal joint bolt of the main shaft side.
- (f) Pull out the universal joint from the control valve shaft.

2. DISCONNECT TIE ROD ENDS

- (a) Remove the two cotter pins and nuts.
 - (b) Jack up the lower arm and using SST, disconnect the two tie rod ends.
- SST 09611-12010



**3. (w/o PPS)
DISCONNECT AND CONNECT RETURN LINE**

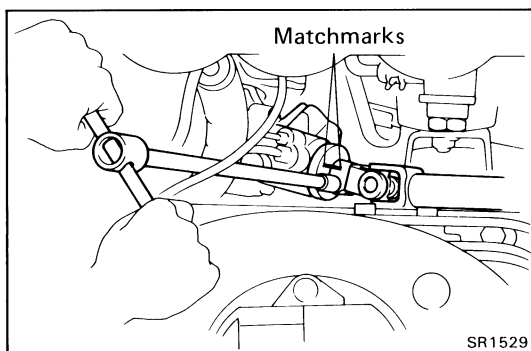
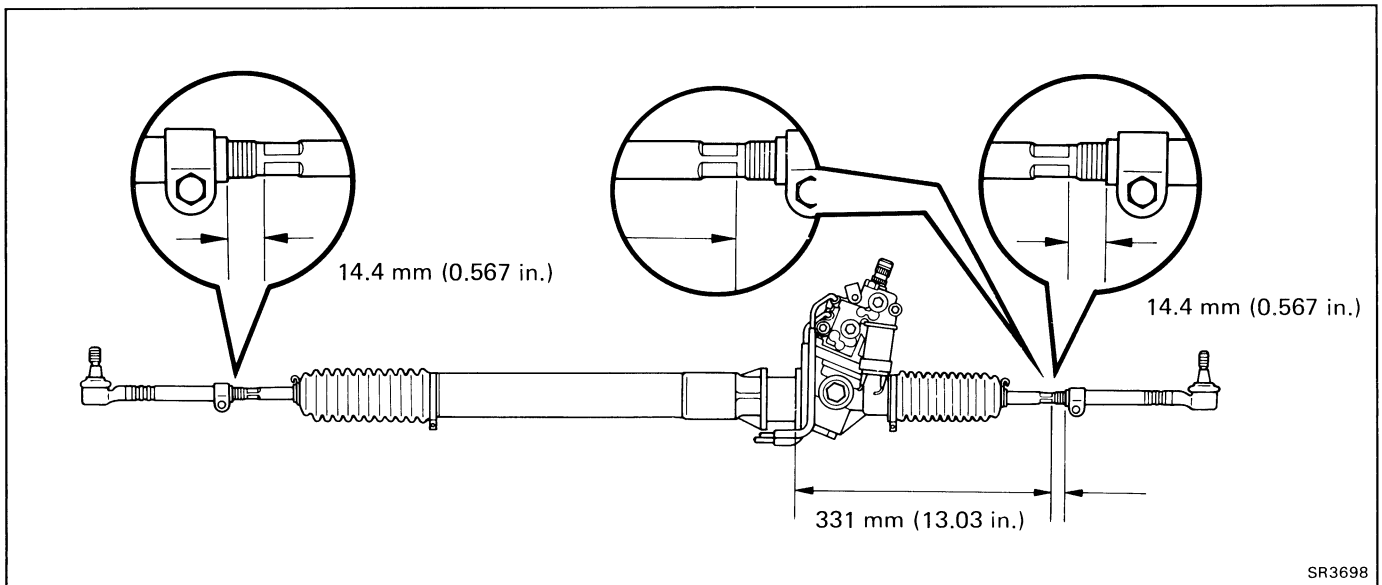
Using SST, disconnect and connect the return line.

SST 09631-22020

Torque: 450 kg-cm (33 ft-lb, 44 N·m)

4. CONNECT UNIVERSAL JOINT

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



HINT: The dimension of the tie rod end is a reference value, so always adjust the toe-in before tightening the lock nut.

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

5. CENTER SPIRAL CABLE

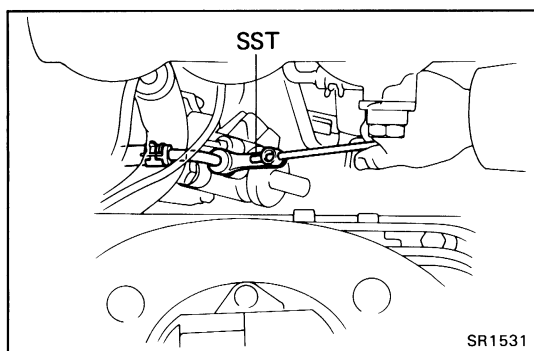
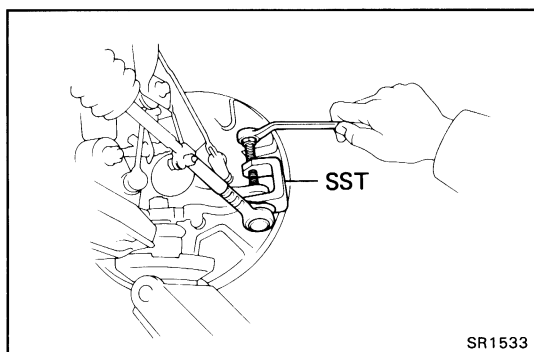
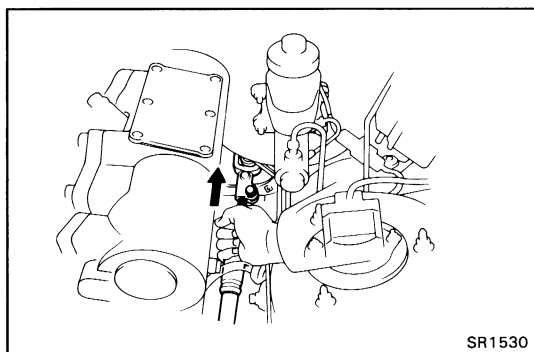
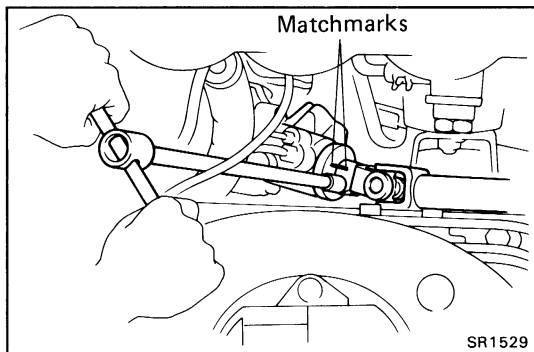
If the steering wheel has been removed, or the steering wheel may have moved during the operation, always perform centering of the spiral cable.

(See page AB-16)

6. CHECK STEERING WHEEL CENTER POINT

7. CHECK TOE-IN

(See page FA-6)

**(CANADA)****1. DISCONNECT UNIVERSAL JOINT**

- (a) Place matchmarks on the universal joint and control valve shaft.
- (b) Remove the universal joint bolt of the control valve shaft side.
- (c) Loosen the universal joint bolt of the main shaft side.
- (d) Pull out the universal joint from the control valve shaft.

2. DISCONNECT TIE ROD ENDS

- (a) Remove the two cotter pins and nuts.
- (b) Jack up the lower arm and using SST, disconnect the two tie rod ends.

SST 09611-12010

3. (w/o PPS)**DISCONNECT AND CONNECT RETURN LINE**

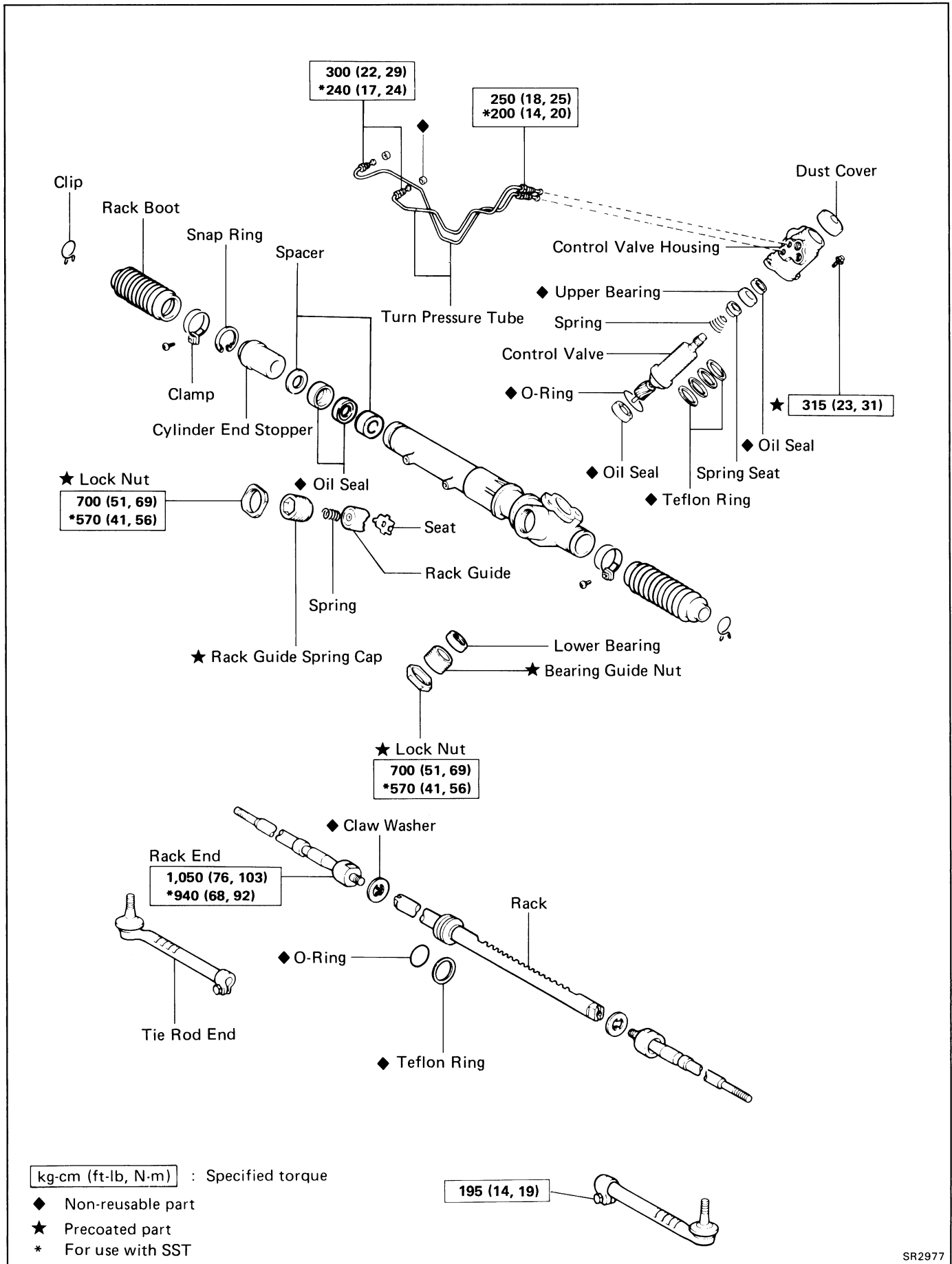
Using SST, disconnect and connect the return line.

SST 09631-22020

Torque: 450 kg-cm (33 ft-lb, 44 N·m)

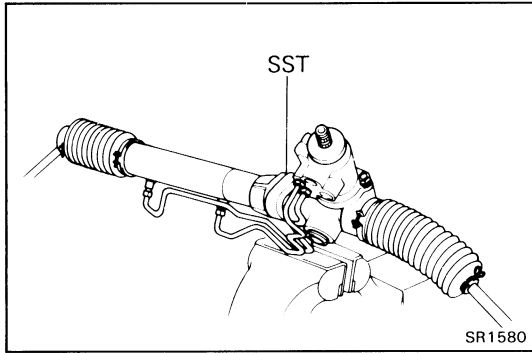
4. CHECK STEERING WHEEL CENTER POINT**5. CHECK TOE-IN**
(See page FA-6)

COMPONENTS (w/o PPS)



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

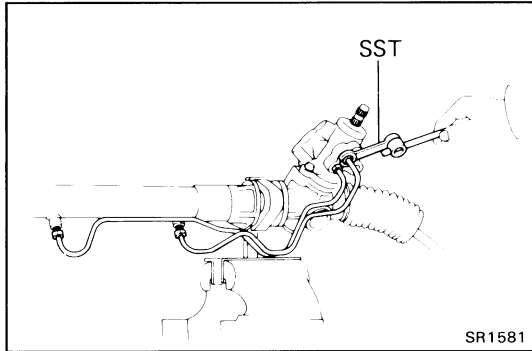
- ◆ Non-reusable part
- ★ Precoated part
- * For use with SST



DISASSEMBLY OF STEERING GEAR HOUSING

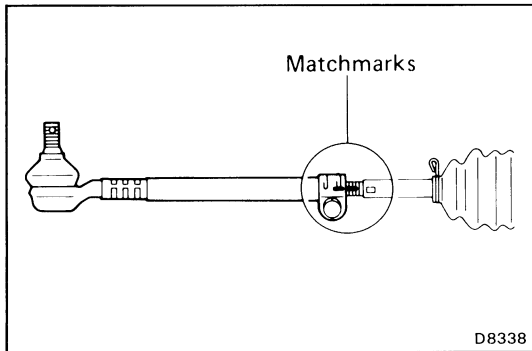
1. CLAMP GEAR HOUSING IN VISE

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



2. REMOVE RIGHT AND LEFT TURN PRESSURE TUBES

Using SST, remove the pressure tubes.
SST 09633-00020

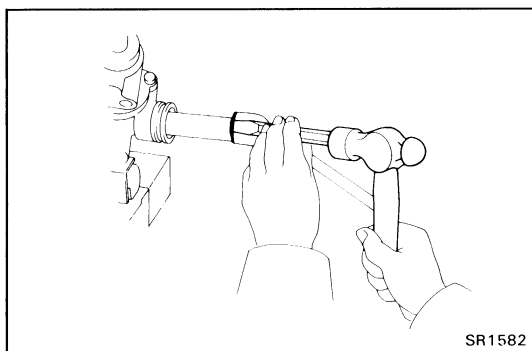


3. REMOVE TIE ROD ENDS

- (a) Loosen the clamp lock nut and place matchmarks on the tie rod tube and rack end.
- (b) Remove tie rod ends.

4. REMOVE RACK BOOTS

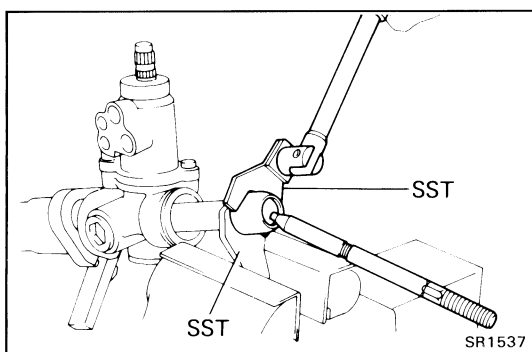
- (a) Remove the clips and clamps.
- (b) Remove the rack boots.



5. REMOVE RACK ENDS AND CLAW WASHERS

- (a) Unstake the claw washers.

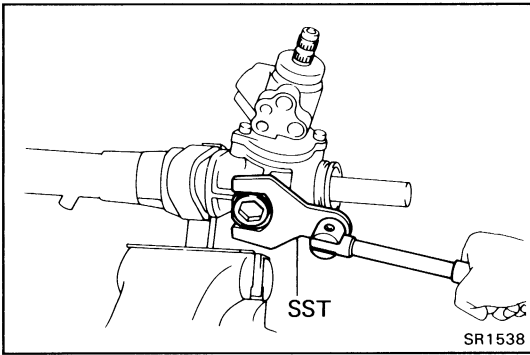
NOTICE: Avoid any impact to the rack.



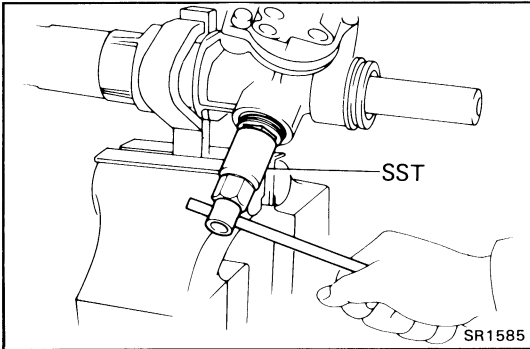
- (b) Using SST, remove the rack ends.

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

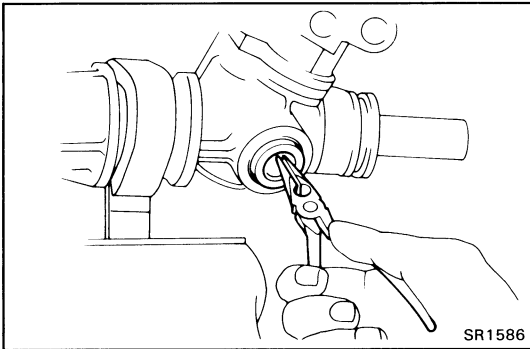
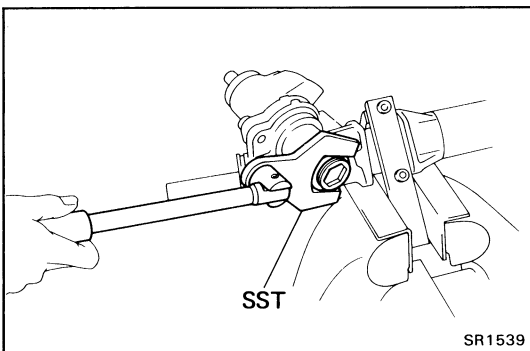
- (c) Remove the claw washers.

**6. REMOVE RACK GUIDE SPRING CAP LOCK NUT**

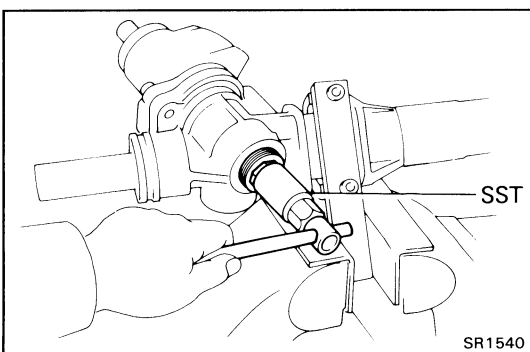
Using SST, remove the rack guide spring cap lock nut.
SST 09612-24014 (09617-24020)

**7. REMOVE RACK GUIDE SPRING CAP**

Using SST, remove the rack guide spring cap.
SST 09612-24014 (09612-10022)

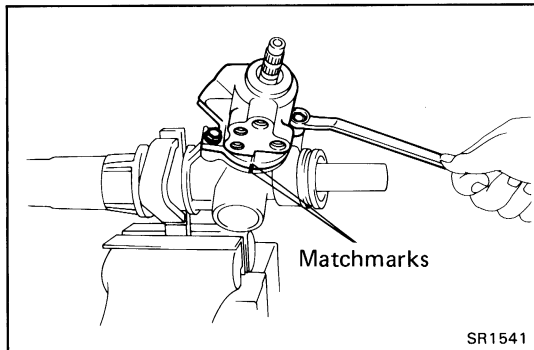
**8. REMOVE RACK GUIDE SPRING, RACK GUIDE AND SEAT****9. REMOVE BEARING GUIDE LOCK NUT**

Using SST, remove the lock nut.
SST 09612-24014 (09617-24020)

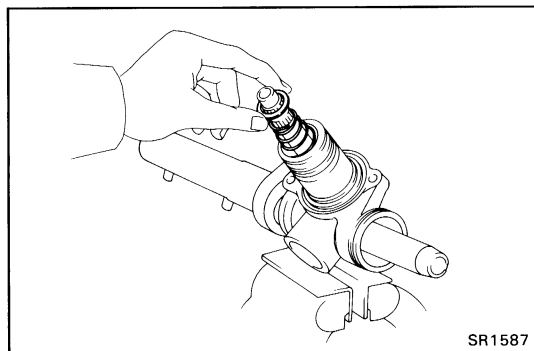
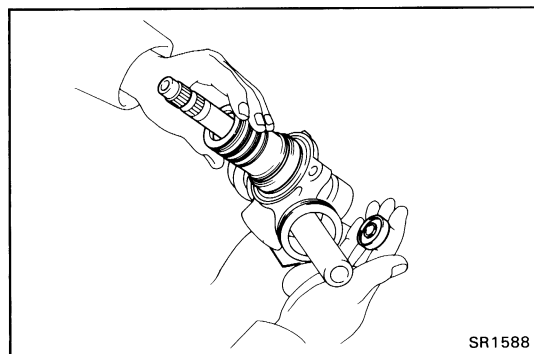
**10. REMOVE BEARING GUIDE NUT**

Using SST, remove the bearing guide nut.
SST 09612-24014 (09612-10022)

11. REMOVE DUST COVER

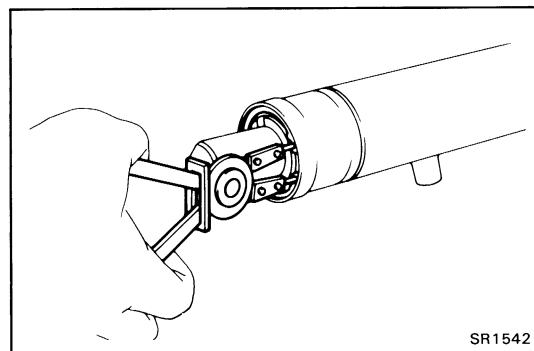
**12. REMOVE CONTROL VALVE HOUSING**

- (a) Place matchmarks on the valve housing and rack housing.
- (b) Remove the two bolts.
- (c) Pull out the valve housing.
- (d) Remove the O-ring from the rack housing.

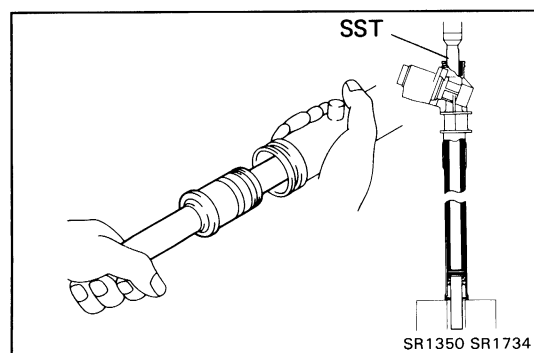
**13. REMOVE CONTROL VALVE SPRING SEAT AND SPRING****14. REMOVE CONTROL VALVE**

Remove the control valve and bearing.

HINT: Do not fall out the bearing.

**15. REMOVE CYLINDER END STOPPER, SPACER, OIL SEAL AND RACK**

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

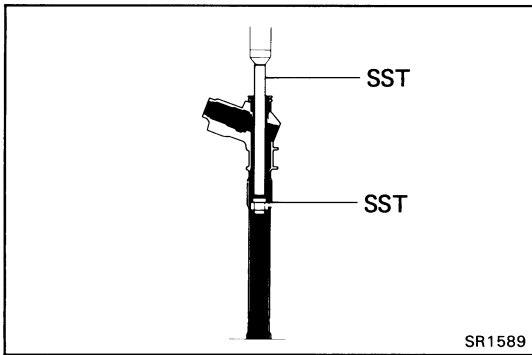


- (b) Using SST, press the rack until the end stopper slightly touches the press block.

SST 09612-24014 (09612-10061)

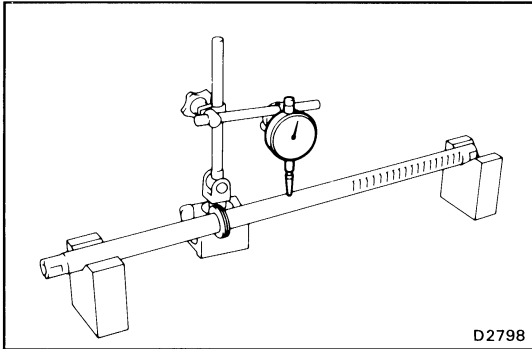
- (c) Pull out the rack with the cylinder end stopper, spacer and oil seal.

HINT: If necessary, slightly tap the rack end with a brass bar and hammer.

**16. REMOVE CYLINDER HOUSING OIL SEAL AND SPACER**

Using SST, press out the oil seal and spacer.

SST 09631-12020, 09631-20031

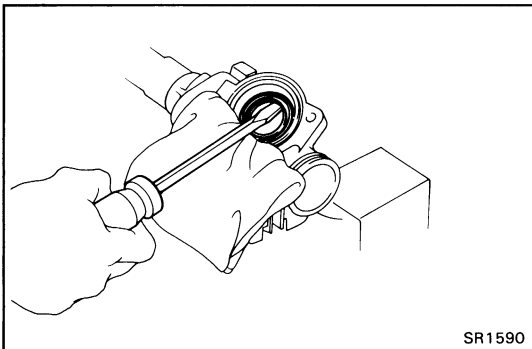
**INSPECTION AND REPAIR OF GEAR HOUSING COMPONENTS****1. INSPECT RACK**

(a) Check the rack for runout and for teeth wear or damage.

(b) Check the back surface for wear or damage.

If faulty, replace it.

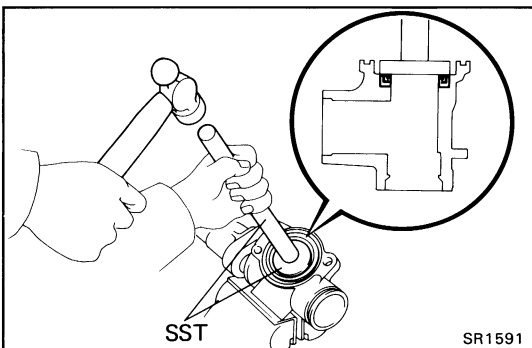
Maximum runout: 0.3 mm (0.012 in.)

**2. IF NECESSARY, REPLACE RACK HOUSING OIL SEAL**

(a) Using a screwdriver, pry out the oil seal.

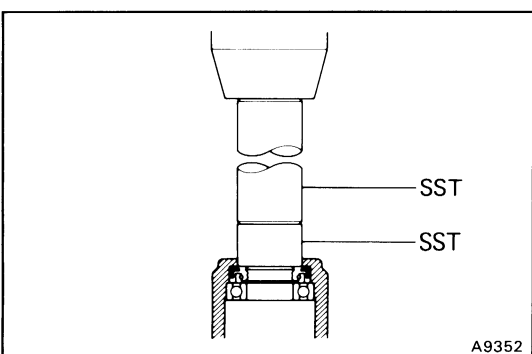
(b) Using SST, drive in a new oil seal.

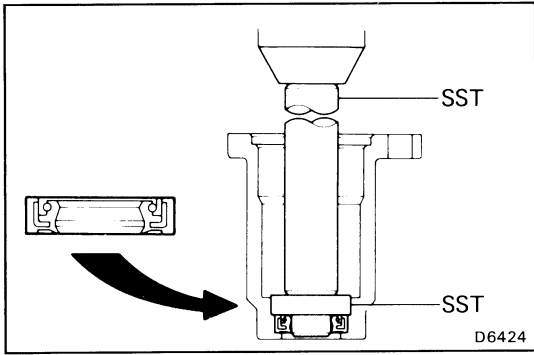
SST 09630-24013 (09631-24070), 09631-12020

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

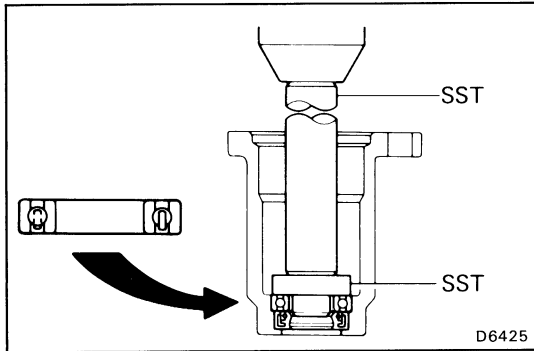
(a) Using SST, press out the oil seal with the bearing.

SST 09630-24013 (09620-24010), 09631-12020

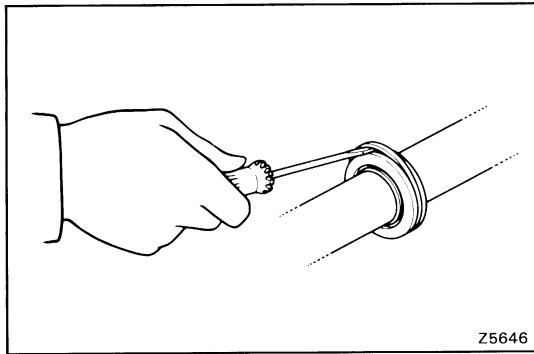




- (b) Using SST, press in a new oil seal.
SST 09630-24013 (09620-24020), 09631-12020

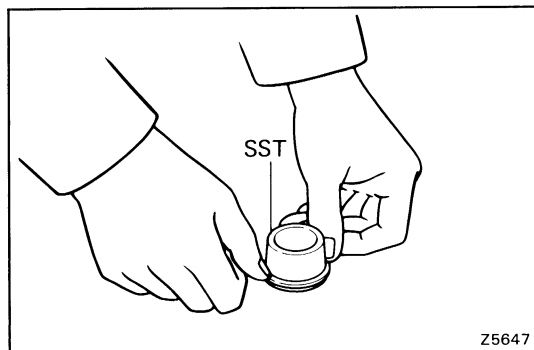


- (c) Using SST, press in a new bearing.
SST 09630-24013 (09620-24030), 09631-12020

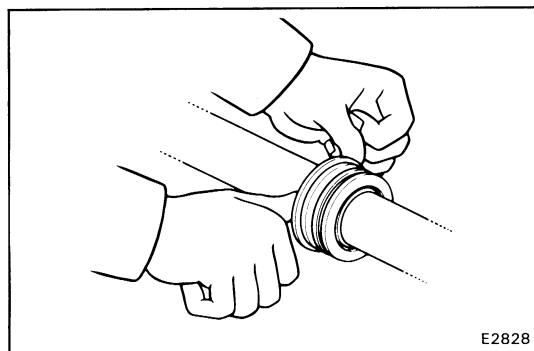


4. IF NECESSARY, REPLACE TEFLON RING AND O-RING

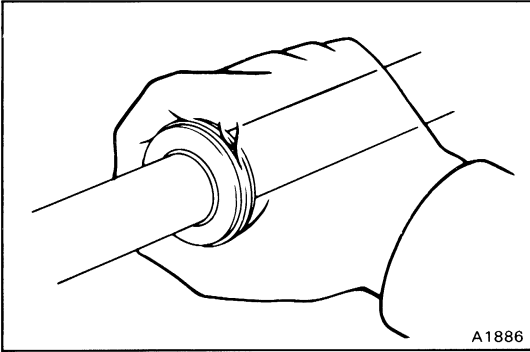
- (a) Remove the teflon ring and O-ring.
NOTICE: Be careful not to damage the steering rack.
(b) Install a new O-ring.



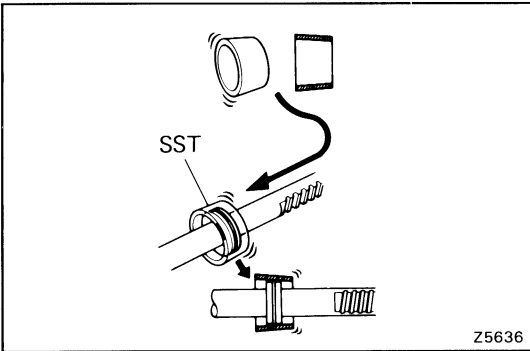
- (c) Install a new teflon ring to SST and expand it.
SST 09630-24013 (09631-24020)



- (d) Install the teflon ring to the piston.



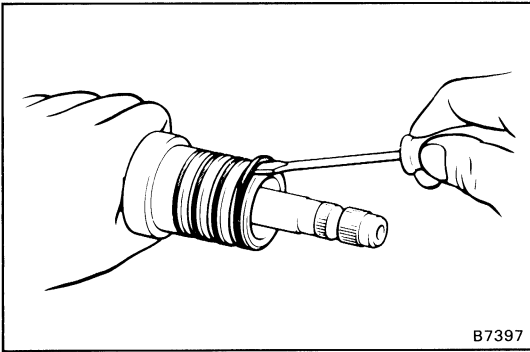
- (e) Coat the teflon ring with power steering fluid and snug it down with your fingers.



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

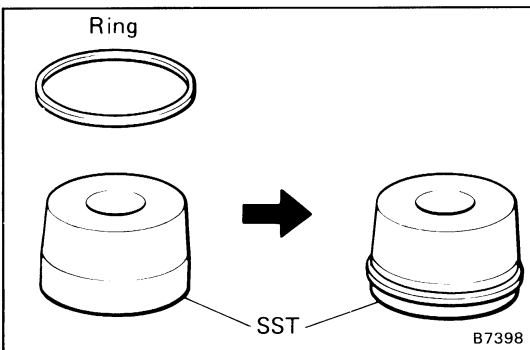
SST 09630-24013 (09631-24030)

5. IF NECESSARY, REPLACE CONTROL VALVE TEFLON RINGS



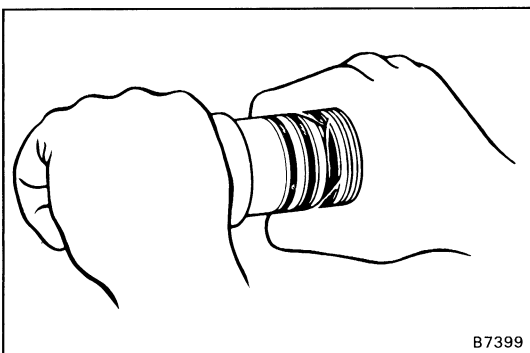
- (a) Using a screwdriver, remove the teflon rings.

NOTICE: Be careful not to damage the control valve.

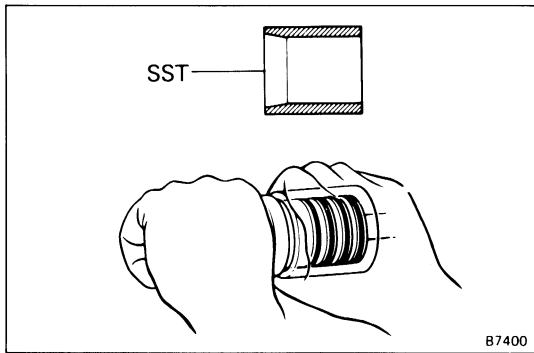


- (b) Install new teflon rings to SST and expand them.

SST 09630-24013 (09620-24040)

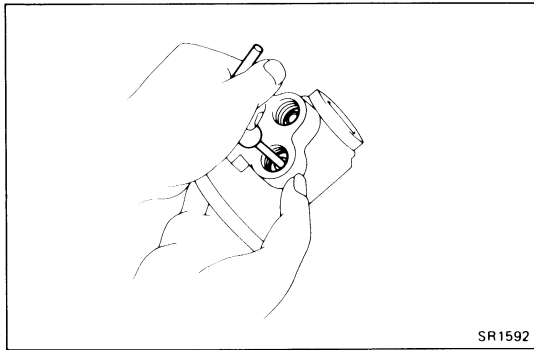


- (c) Install the expanded teflon rings to the control valve and snug them down with your fingers.



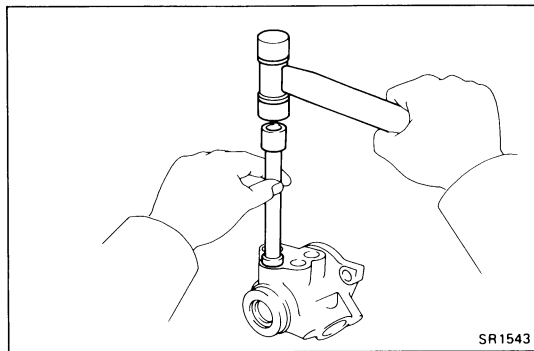
- (d) Coat the teflon rings with power steering fluid, and carefully slide the tapered end of SST over the teflon rings to seat the rings.

SST 09630-24013 (09620-24050)



6. IF NECESSARY, REPLACE UNION SEAT

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

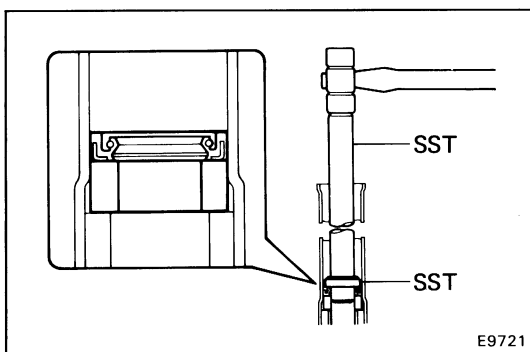
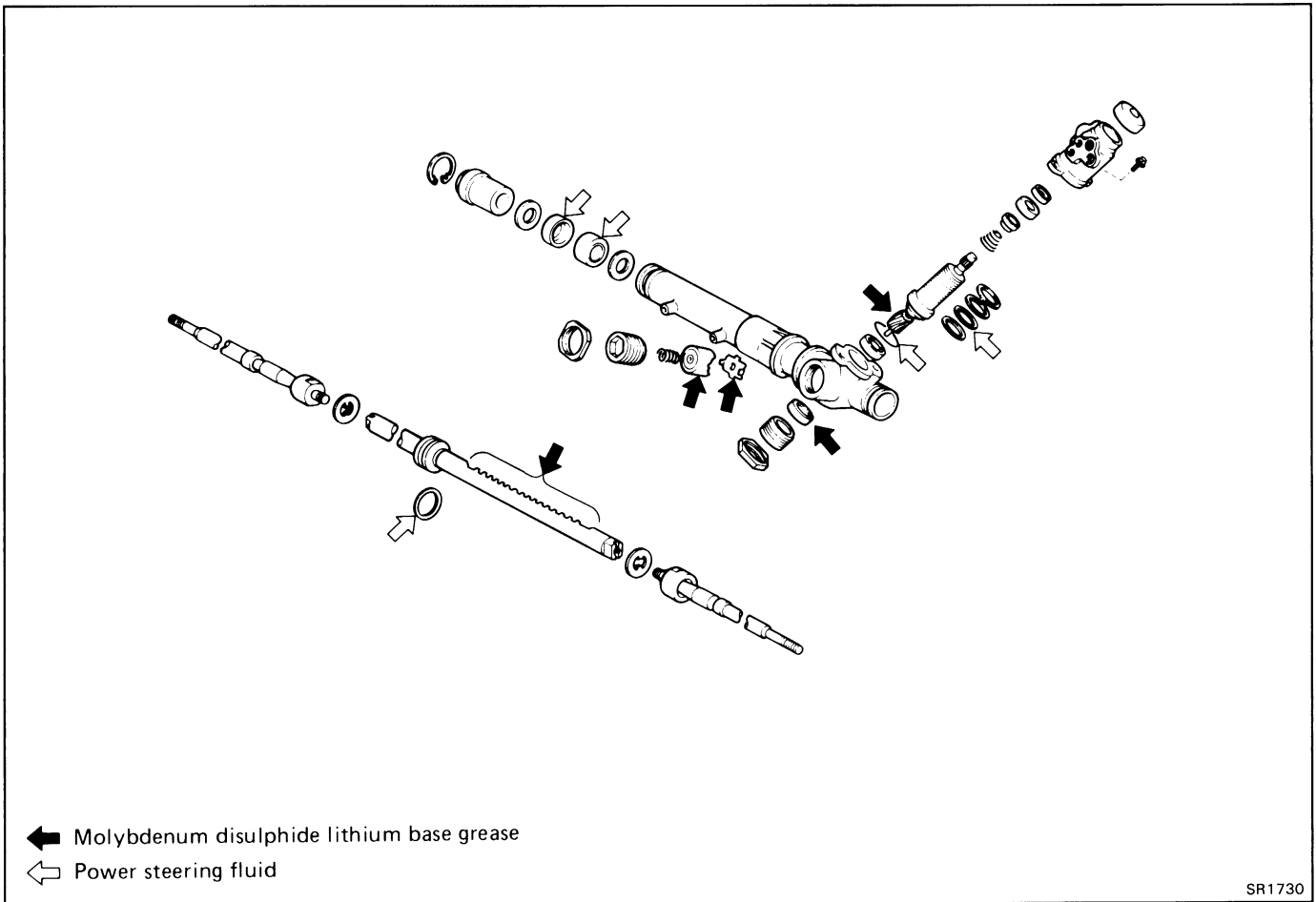


- (b) Using a plastic hammer and extension bar, tap in a new union seat.

ASSEMBLY OF GEAR HOUSING

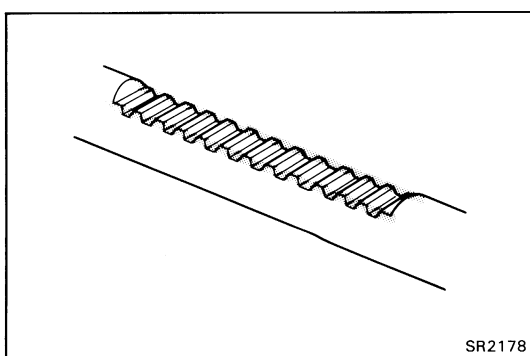
(See page SR-61)

1. COAT POWER STEERING FLUID OR GREASE ON FOLLOWING PARTS:



2. INSTALL CYLINDER 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, 09631-22070
- (c) Tap in the spacer and oil seal softly.

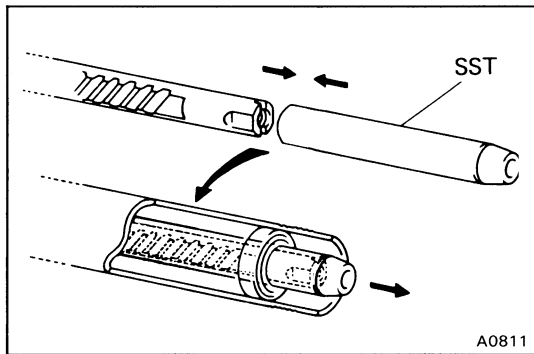


3. INSTALL RACK

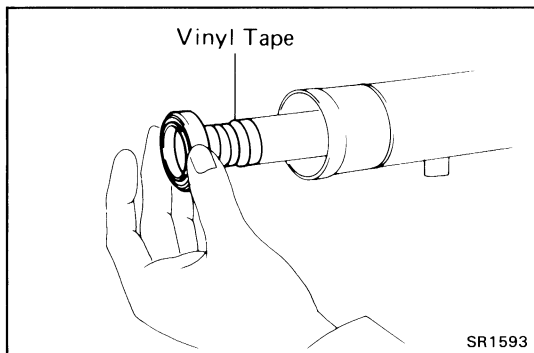
- (a) Install SST to the rack.

HINT: If necessary, scrape the burrs off the rack teeth end and burnish.

SST 09631-20102

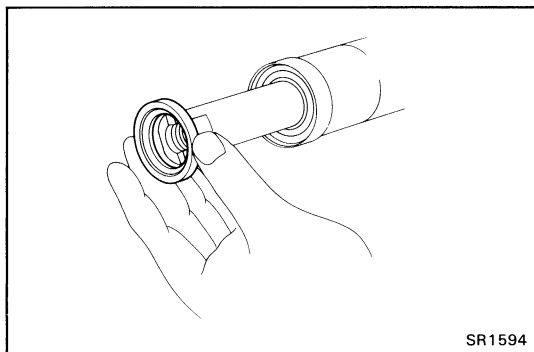


- (b) Coat SST with power steering fluid.
- (c) Insert the rack into the cylinder.
- (d) Remove SST.

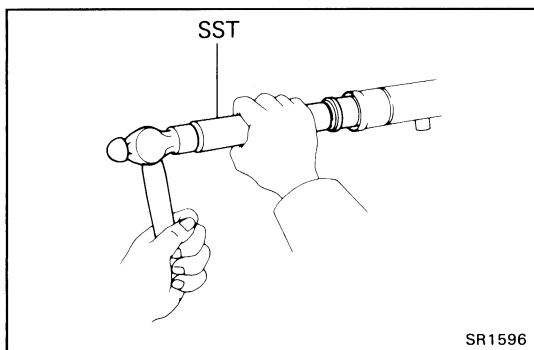


4. INSTALL CYLINDER END STOPPER, OIL SEAL AND SPACER

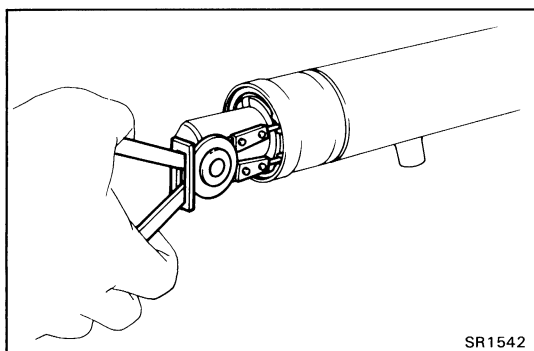
- (a) To prevent oil seal lip damage, wind vinyl tape on the steering rack end, and apply power steering fluid.
- (b) Install a new oil seal by pushing it into the cylinder in the direction shown in drawing, without tilting.



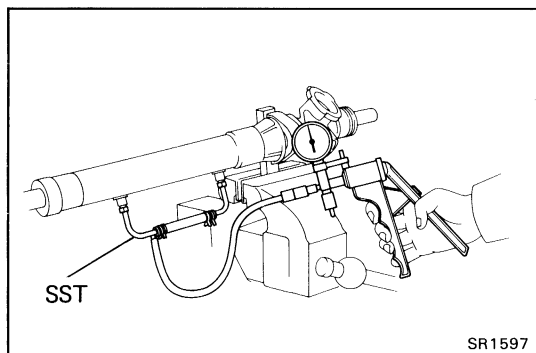
- (c) Install the spacer.



- (d) Using SST, drive in the cylinder end stopper.
SST 09612-22011

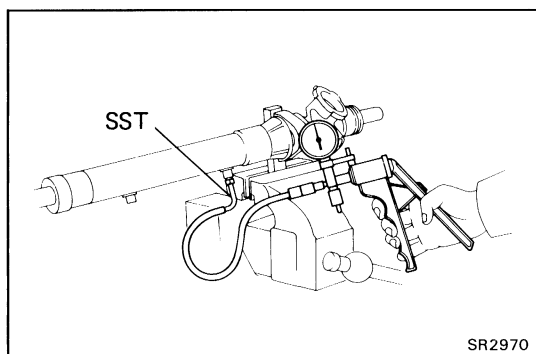


- (e) Using snap ring pliers, install the snap ring.



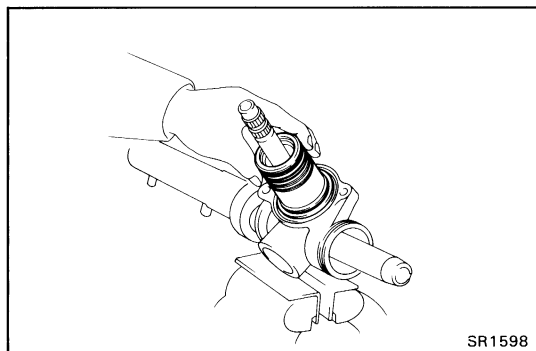
5. AIR TIGHTNESS TEST [TEST 1]

- (a) Install SST to the unions of the cylinder housing.
SST 09631-12070
 - (b) Apply 400 mmHg (15.75 in.Hg, 53.3 kPa) of vacuum for about 30 seconds.
 - (c) Check that there is no change in the vacuum.
- If there is change in the vacuum, check the oil seals installation.



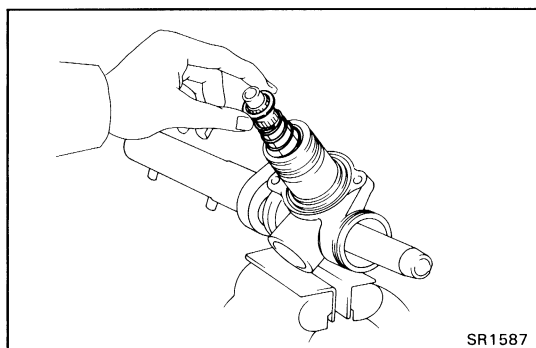
[TEST 2]

- (a) Remove the L joint from SST.
SST 09631-12070
 - (b) Install L joint to the union of the control valve side.
 - (c) Apply 400 mmHg (15.75 in.Hg, 53.3 kPa) of vacuum for about 30 seconds.
 - (d) Check that there is no change in the vacuum.
- If there is change in the vacuum, check the teflon ring and O-ring of the rack.



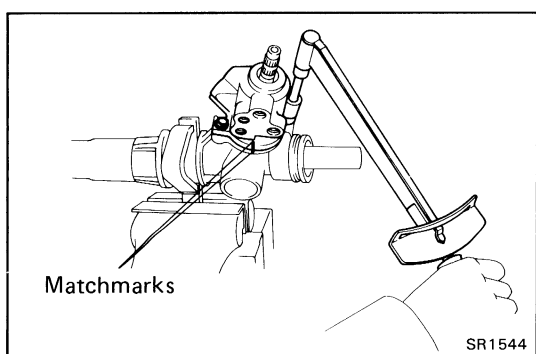
6. INSTALL CONTROL VALVE

- (a) Coat the teflon rings with power steering fluid.
- (b) Push the control valve into the housing.



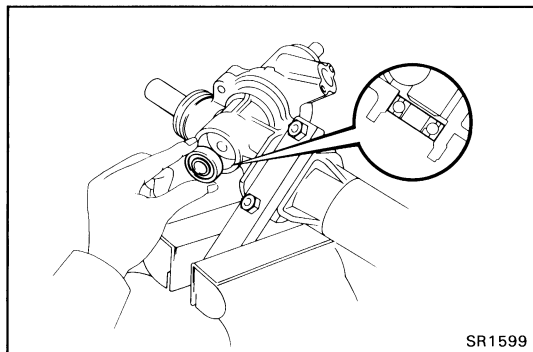
7. INSTALL O-RING, SPRING AND CONTROL VALVE SPRING SEAT

- (a) Coat a new O-ring with power steering fluid, and install it to the rack housing.
- (b) Install the spring and spring seat as shown.



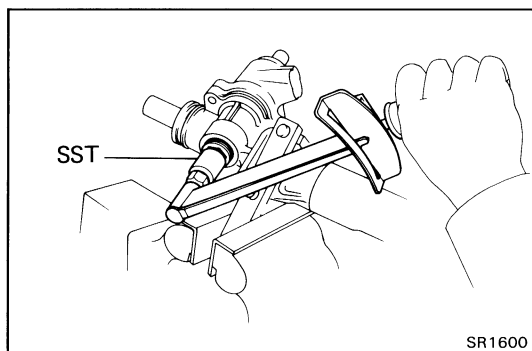
8. INSTALL CONTROL VALVE HOUSING

- (a) Apply sealant to 2 or 3 threads of the bolt end.
Sealant: Part No.08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent
 - (b) Align the matchmarks on the valve housing and rack housing.
 - (c) Install and torque the two bolts.
- Torque: 315 kg-cm (23 ft-lb, 31 N·m)**



SR1599

9. INSTALL CONTROL VALVE LOWER BEARING



SR1600

10. INSTALL BEARING GUIDE NUT

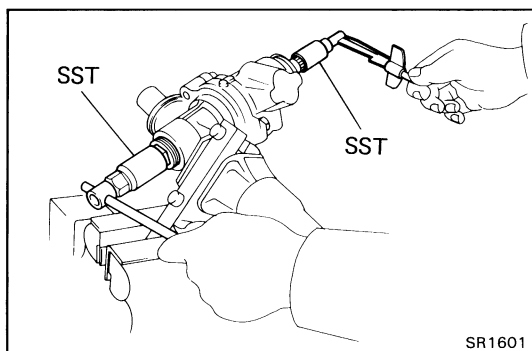
(a) Apply sealant to 2 or 3 threads of the guide nut.

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

(b) Using SST, torque the bearing guide nut.

SST 09612-24014 (09612-10022)

Torque: 150 kg-cm (11 ft-lb, 15 N·m)

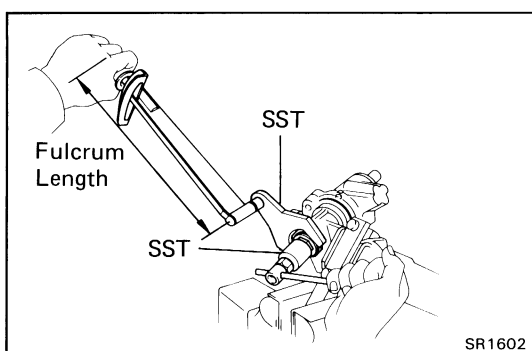


SR1601

(c) Using SST and torque meter, loosen the bearing guide nut until the preload is within specification.

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

**Preload (turning): 4.5 – 6.5 kg-cm
(3.9 – 5.6 in.-lb, 0.4 – 0.6 N·m)**



SR1602

11. INSTALL BEARING GUIDE 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.

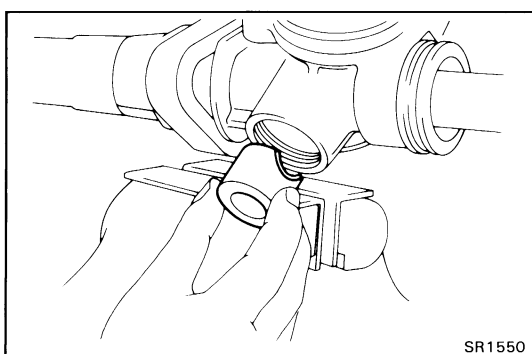
SST 09612-24014 (09612-10022, 09617-24020)

Torque: 570 kg-cm (41 ft-lb, 56 N·m)

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

(c) Recheck the preload.

**Preload (turning): 4.5 – 6.5 kg-cm
(3.9 – 5.6 in.-lb, 0.4 – 0.6 N·m)**

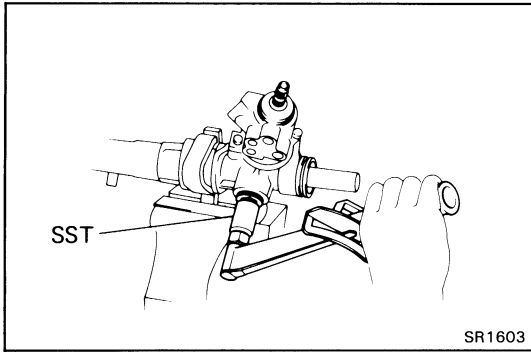


SR1550

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

(a) Install the rack guide with the seat.

(b) Install the spring.

**13. ADJUST TOTAL PRELOAD**

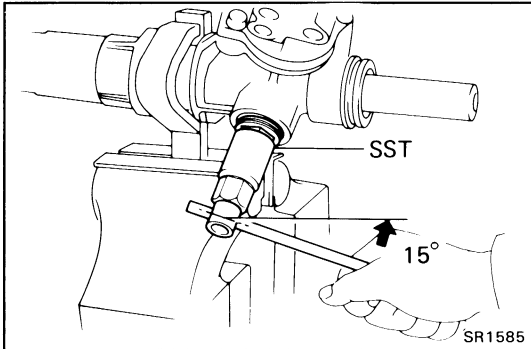
(a) Apply sealant to 2 or 3 threads of the spring cap.

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

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

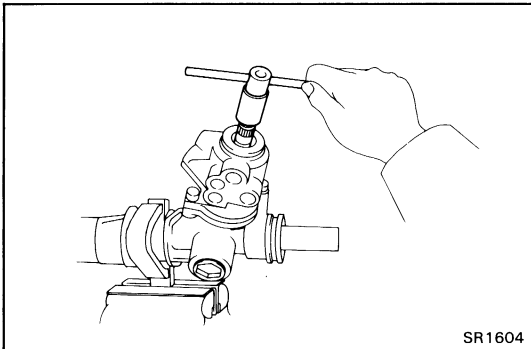
SST 09612-24014 (09612-10022)

Torque: 250 kg-cm (18 ft-lb, 25 N·m)

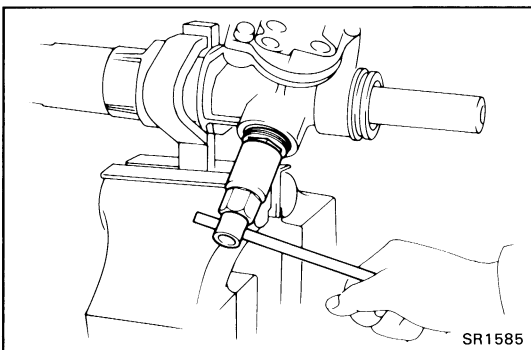


(c) Using SST, return the rack guide spring cap 15°.

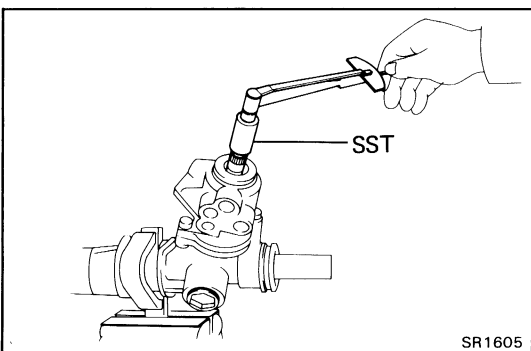
SST 09612-24014 (09612-10022)



(d) Turn the control valve shaft right and left one or two times.



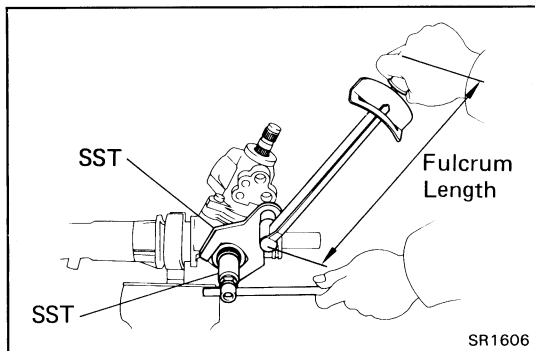
(e) Loosen the spring cap until the rack guide compression spring is not functioning.



(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): 9 – 12 kg-cm
(7.8 – 10.4 in.-lb, 0.9 – 1.2 N·m)**

**14. 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

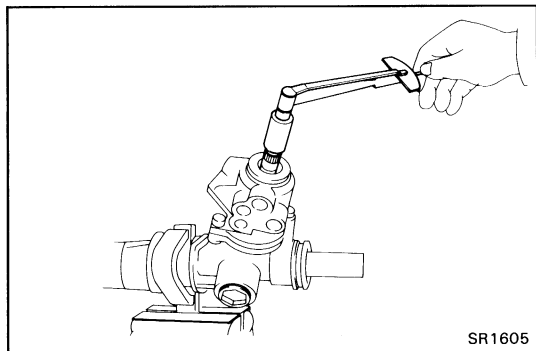
(b) Using SST, install and torque the lock nut.

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

Torque: 570 kg-cm (41 ft-lb, 56 N·m)

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

(c) Recheck the total preload.

15. INSTALL DUST COVER**16. INSTALL CLAW WASHERS AND RACK ENDS**

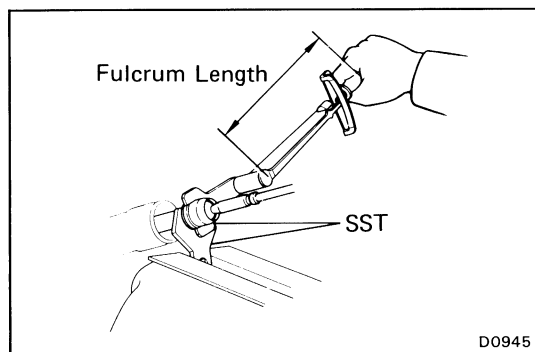
(a) Install new claw washers.

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

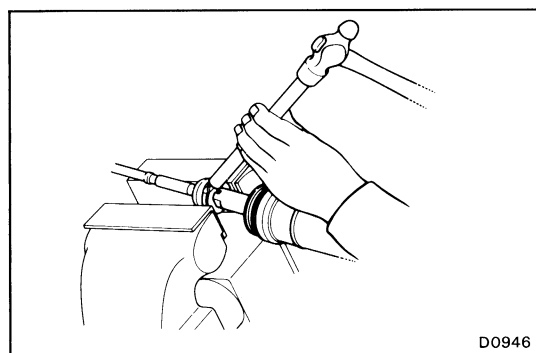
SST 09612-24014 (09617-24011)
09617-14010

Torque: 940 kg-cm (68 ft-lb, 92 N·m)

HINT: Use a torque wrench with a fulcrum length of 425 mm (16.73 in.).

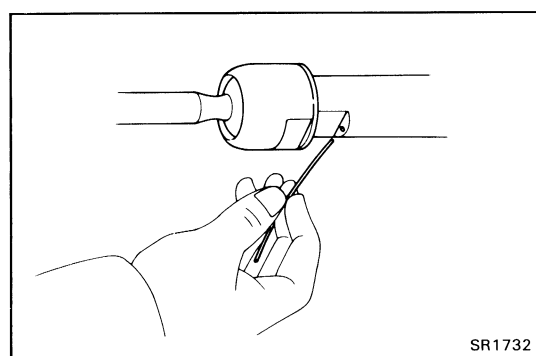
**17. STAKE CLAW WASHERS**

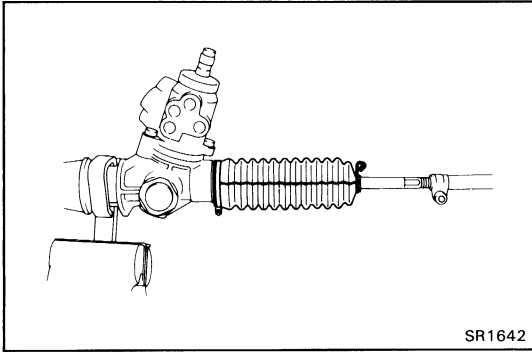
Using a brass bar and hammer, stake the two claw washers.

**18. INSTALL RACK BOOTS, CLAMPS AND CLIPS**

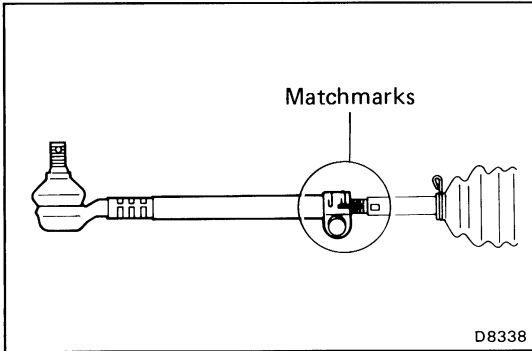
(a) Insure that the tube hole is not clogged with grease.

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



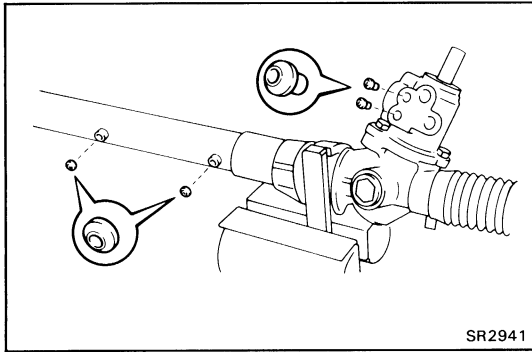


- (b) Install the boots.
- HINT: Be careful not to damage or twist the boots.
- (c) Install the clamps with the ends facing downward.
- (d) Install the clips with the ends facing outward.



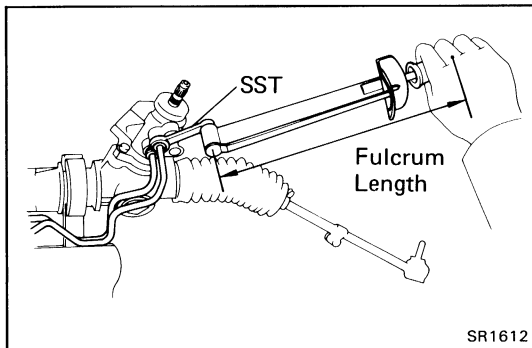
19. INSTALL TIE ROD ENDS

- (a) Screw the tie rod ends onto the rack ends until the matchmarks are aligned.
- (b) After adjusting toe-in, torque the clamp nuts.



20. INSTALL RIGHT AND LEFT TURN PRESSURE TUBES

- (a) Install new four union seats.



- (b) Using SST, install and torque the tubes.

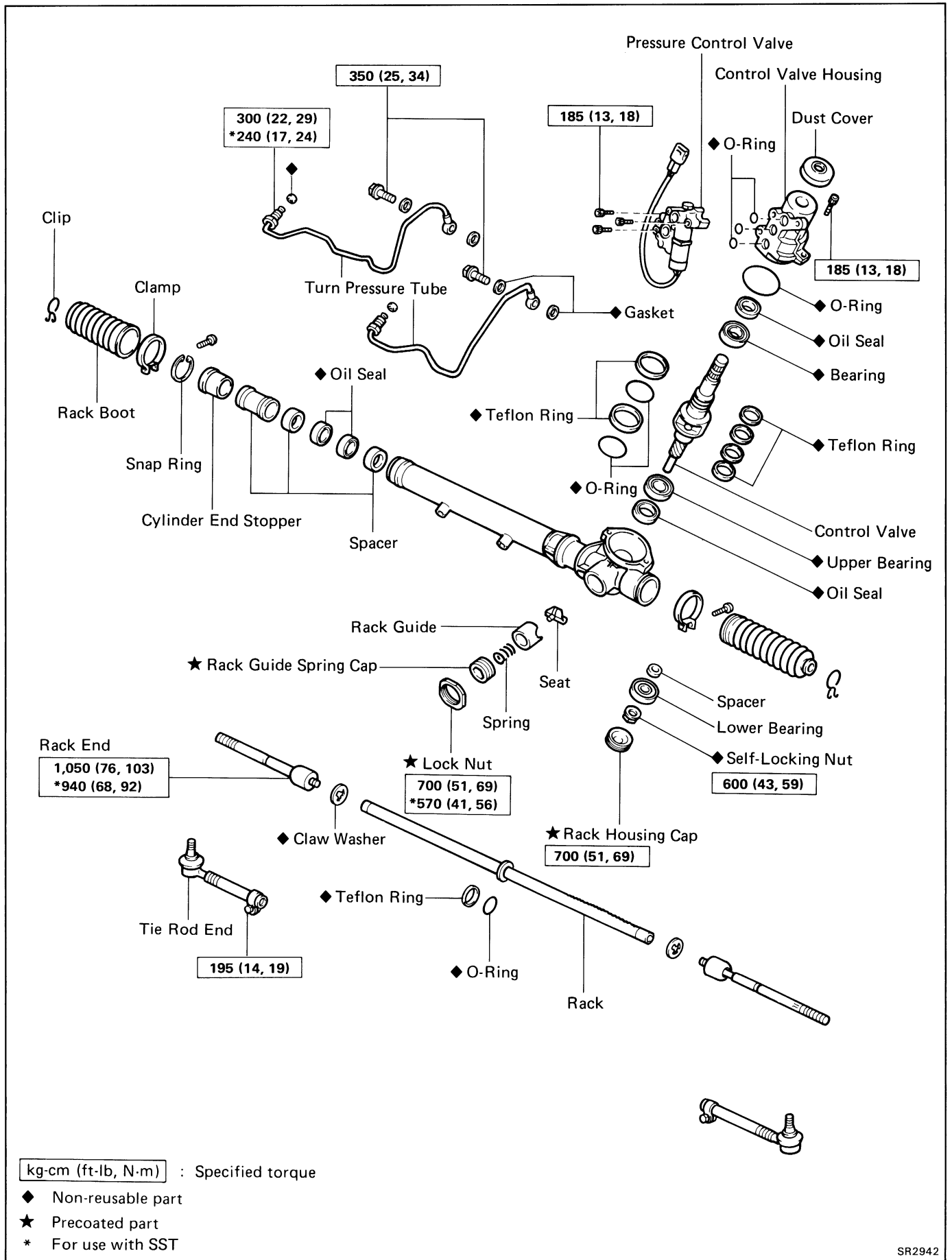
SST 09633-00020

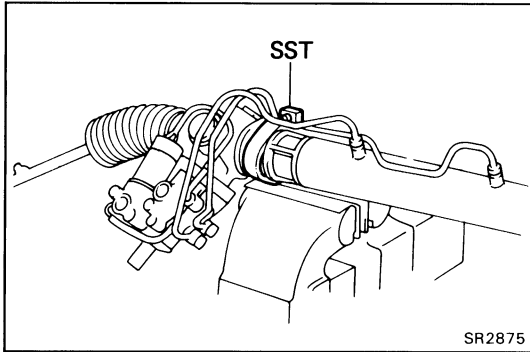
Torque:

Valve housing side 200 kg-cm (14 ft-lb, 20 N·m)
Rack housing side 240 kg-cm (17 ft-lb, 24 N·m)

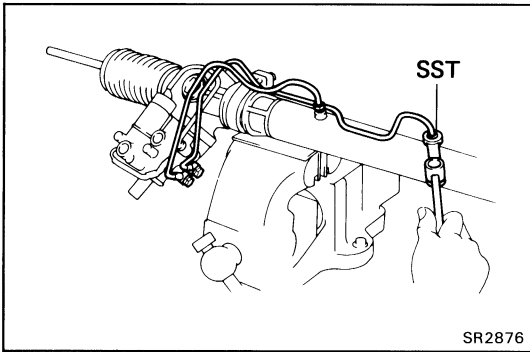
HINT: Use a torque wrench with a fulcrum length of 300 mm (11.81 in.).

COMPONENTS (w/ PPS)

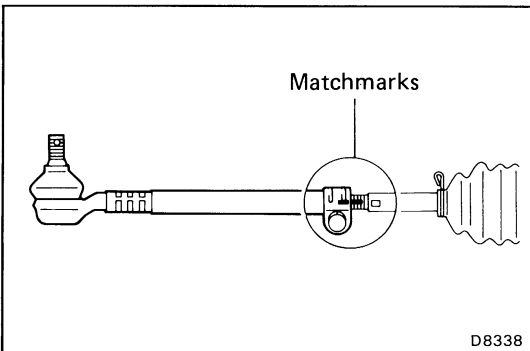


DISASSEMBLY OF STEERING GEAR HOUSING**1. CLAMP GEAR HOUSING IN VISE**

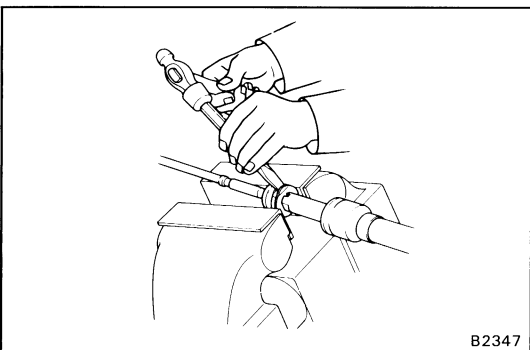
Using SST, secure the steering gear in a vise.
SST 09612-00012

**2. REMOVE RIGHT AND LEFT TURN PRESSURE TUBES**

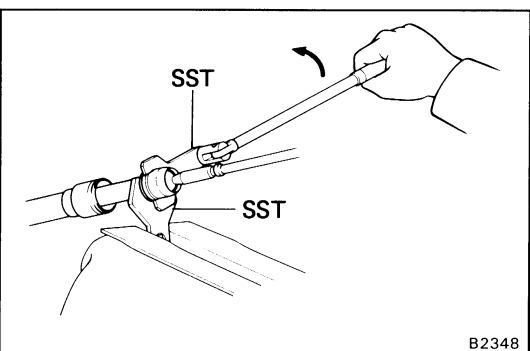
(a) Remove the two union bolts and four gaskets.
(b) Using SST, remove the pressure tubes.
SST 09633-00020

**3. REMOVE TIE ROD ENDS**

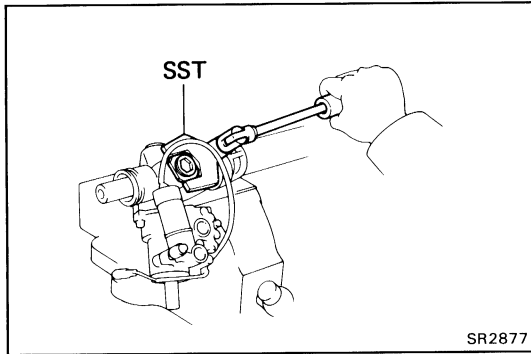
(a) Loosen the clamp lock nut and place matchmarks on the tie rod tube and rack end.
(b) Remove tie rod ends.

4. REMOVE RACK BOOTS, CLAMPS AND CLIPS**5. REMOVE RACK ENDS AND CLAW WASHERS**

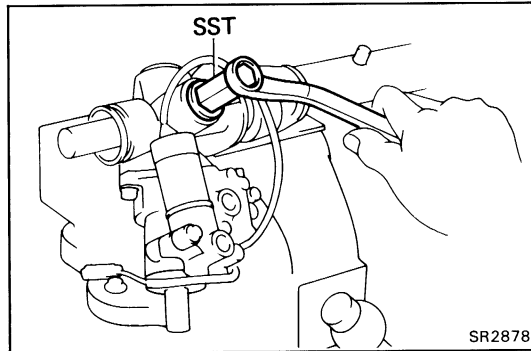
(a) Unstake the claw washers.
NOTICE: Avoid any impact to the rack.



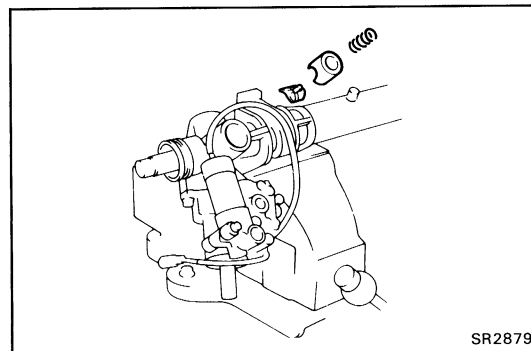
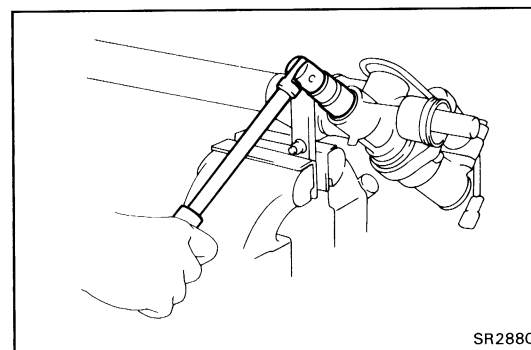
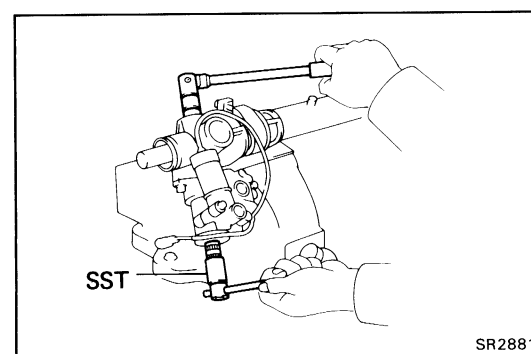
(b) Using SST, remove the rack ends.
SST 09612-24014 (09617-24011)
09617-14010
(c) Remove the claw washers.

**6. REMOVE RACK GUIDE SPRING CAP LOCK NUT**

Using SST, remove the rack guide spring cap lock nut.
SST 09612-24014 (09617-24020)

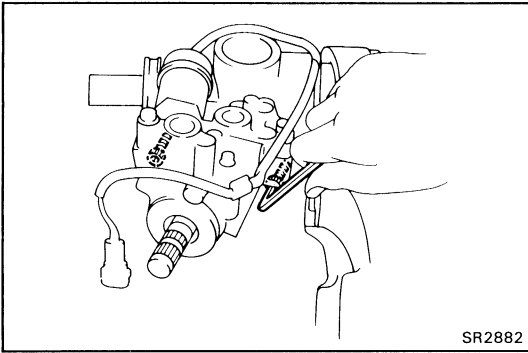
**7. REMOVE RACK GUIDE SPRING CAP**

Using SST, remove the rack guide spring cap.
SST 09612-24014 (09612-10022)

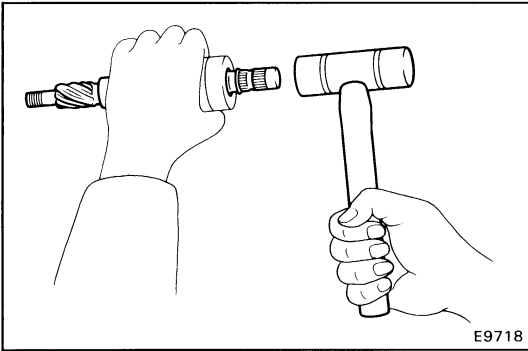
**8. REMOVE RACK GUIDE SPRING, RACK GUIDE AND SEAT****9. REMOVE RACK HOUSING CAP****10. REMOVE SELF-LOCKING NUT**

Using SST, remove the self-locking nut.
SST 09616-00010

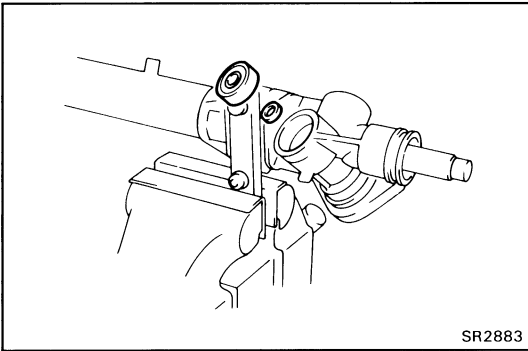
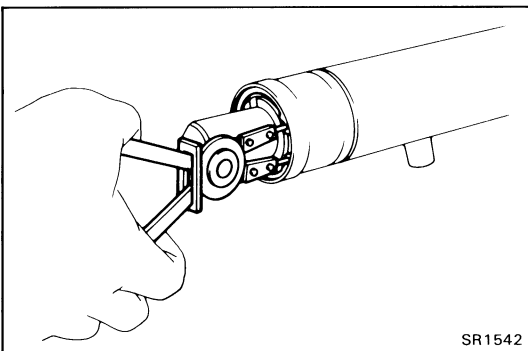
11. REMOVE DUST COVER

**12. REMOVE CONTROL VALVE HOUSING**

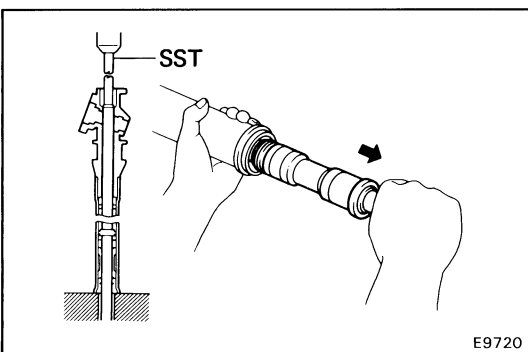
- (a) Place matchmarks on the valve housing and rack housing.
- (b) Using a hexagon wrench, remove the two bolts.
- (c) Pull out the valve with the valve housing.
- (d) Remove the O-ring from the rack housing.

**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.

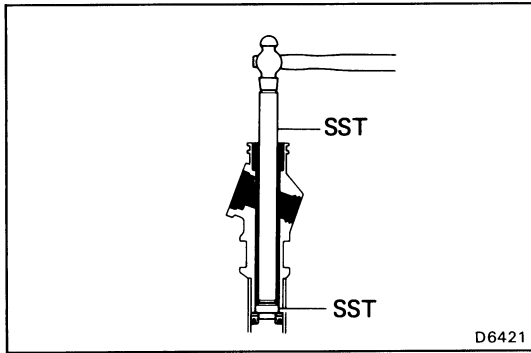


- (b) Using SST, press the rack until the end stopper slightly touches the press block.

SST 09612-24014 (09612-10061)

- (c) Pull out the rack with the cylinder end stopper, two spacers and oil seal.

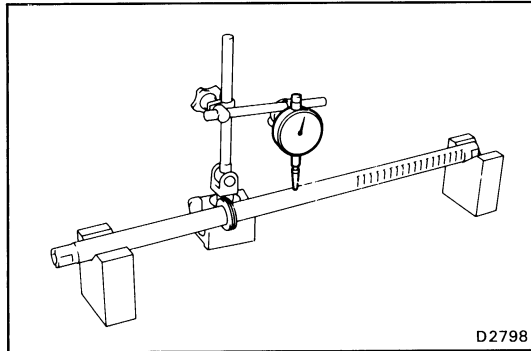
HINT: If necessary, slightly tap the rack end with a brass bar and hammer.



16. REMOVE CYLINDER 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

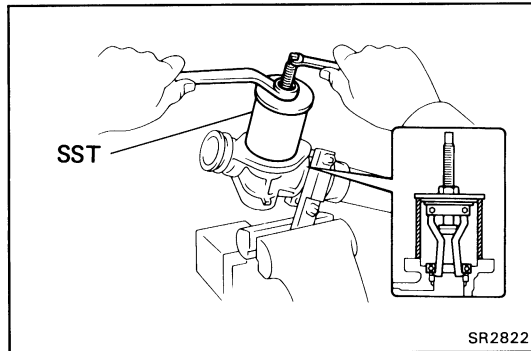
1. INSPECT RACK

(a) Check the rack for runout and for teeth wear or damage.

(b) Check the back surface for wear or damage.

If faulty, replace it.

Maximum runout: 0.3 mm (0.012 in.)

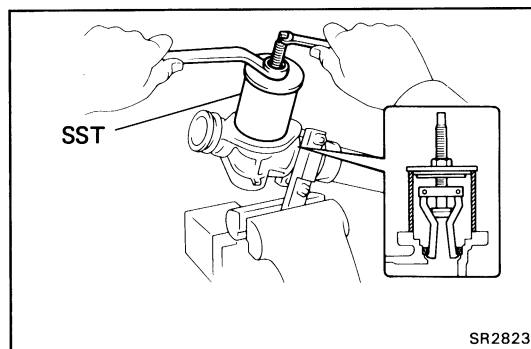


2. IF NECESSARY, REPLACE RACK HOUSING BEARING AND OIL SEAL

(a) Using SST, remove the bearing.

SST 09612-30012

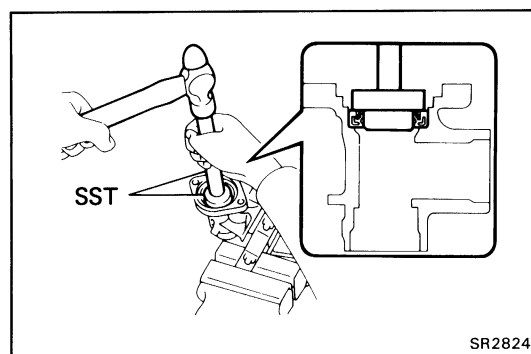
NOTICE: Be careful not to damage the rack housing.



(b) Using SST, remove the oil seal.

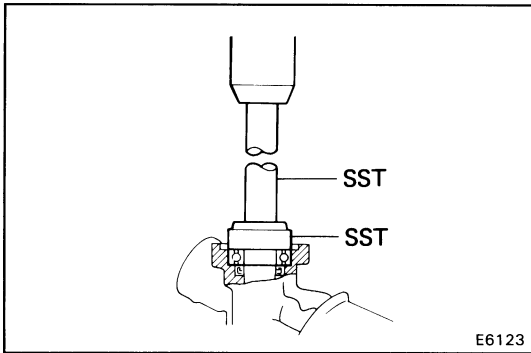
SST 09612-30012

NOTICE: Be careful not to damage the rack housing.

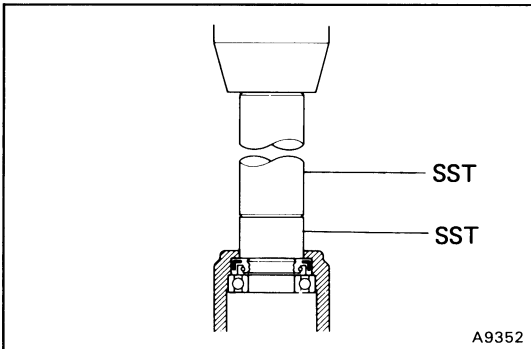


(c) Using SST, install a new oil seal.

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

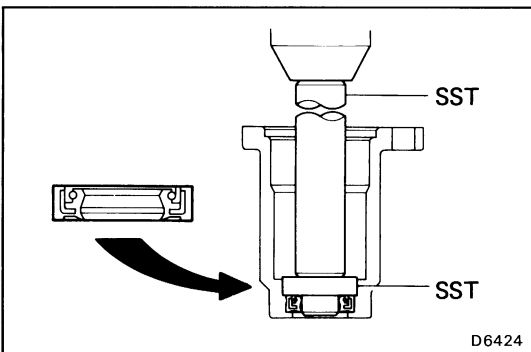


- (d) Using SST, press in a new bearing.
SST 09620-30010 (09626-30010, 09631-00020)

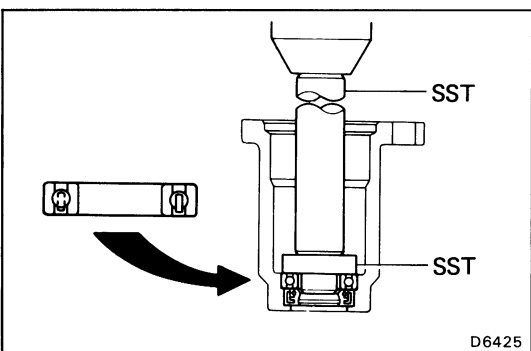


3. IF NECESSARY, REPLACE CONTROL VALVE HOUSING OIL SEAL AND BEARING

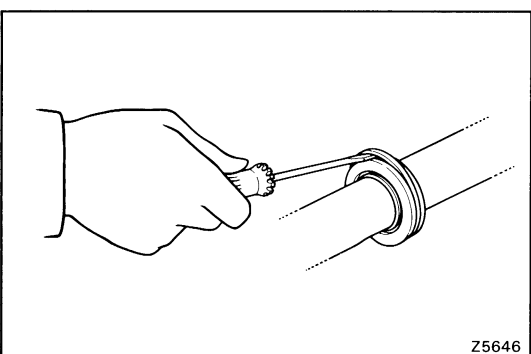
- (a) Using SST, press out the oil seal with the bearing.
SST 09630-24013 (09620-24010), 09631-12020



- (b) Using SST, press in a new oil seal.
SST 09630-24013 (09620-24020), 09631-12020



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



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

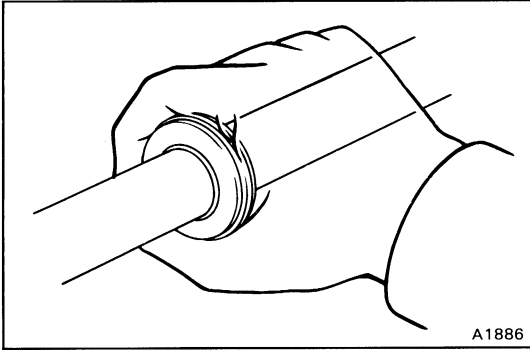
- (a) Remove the teflon ring and O-ring.

NOTICE: Be careful not to damage the steering rack.

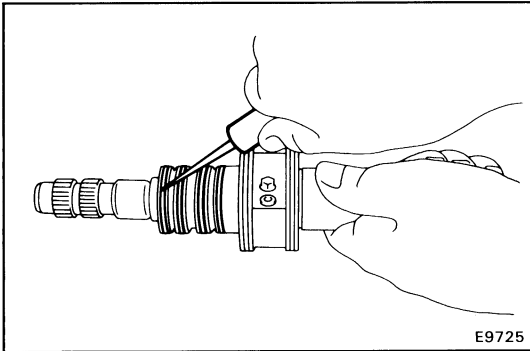
- (b) Install a new O-ring.

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

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



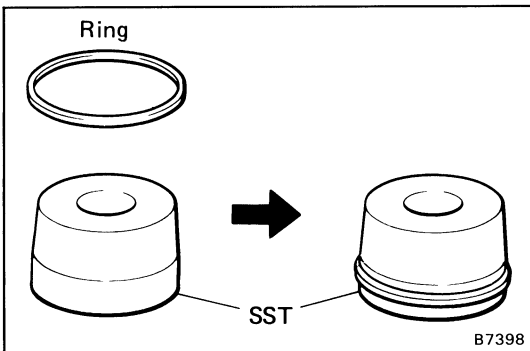
- (d) Install the teflon ring to the steering rack.
- (e) Coat the teflon ring with power steering fluid and snug it down with your fingers.



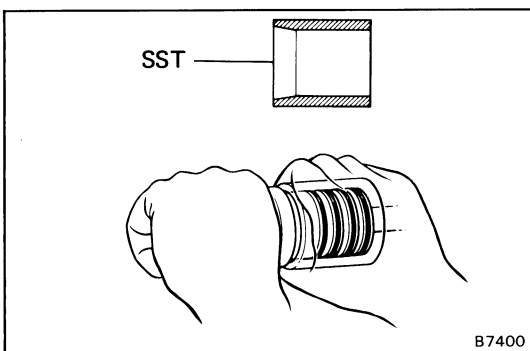
5. IF NECESSARY, REPLACE CONTROL VALVE TEFLON RINGS

- (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.

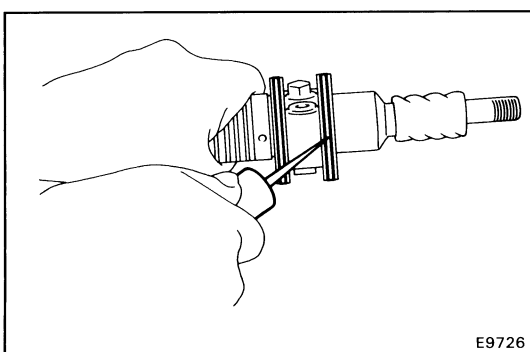


- (d) Coat the teflon rings with power steering fluid, and snug them down with your fingers.

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

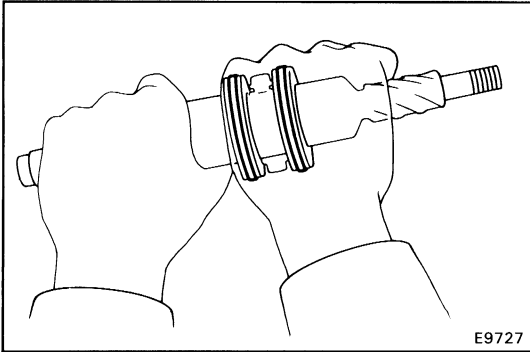
- (a) Remove the teflon rings and O-rings.

NOTICE: Be careful not to damage the control valve.

- (b) Install two new O-rings.

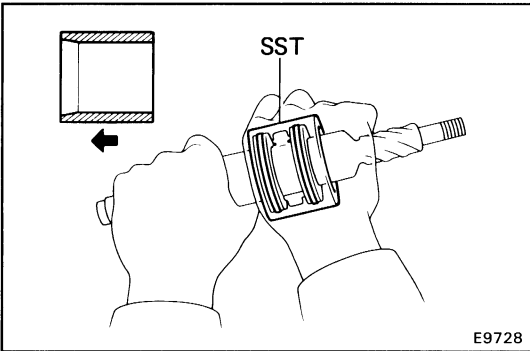
- (c) Expand new teflon rings with your fingers.

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



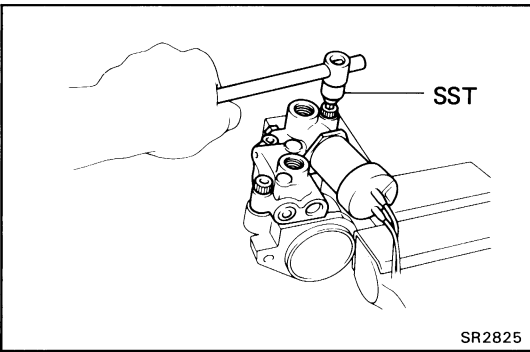
- (d) Install the expanded teflon rings to the control valve.
- (e) Coat the teflon rings with power steering fluid, and snug them down with your fingers.

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.

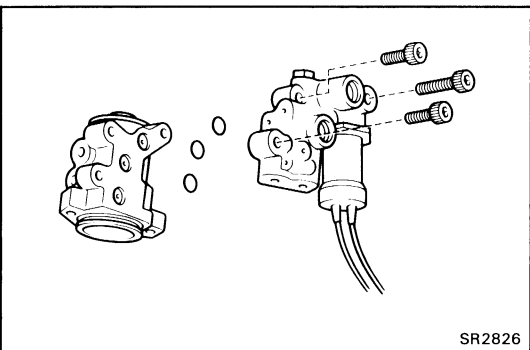
SST 09631-32020



7. IF NECESSARY, REPLACE PRESSURE CONTROL VALVE

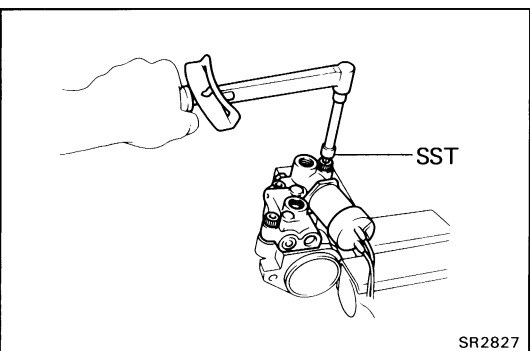
- (a) Using SST, remove the three bolts.

SST 09313-30021



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

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



- (d) Using SST, install a new pressure control valve.

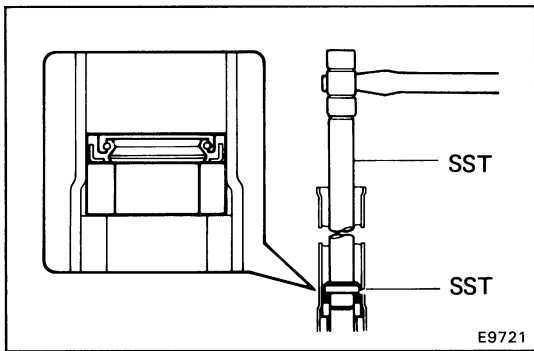
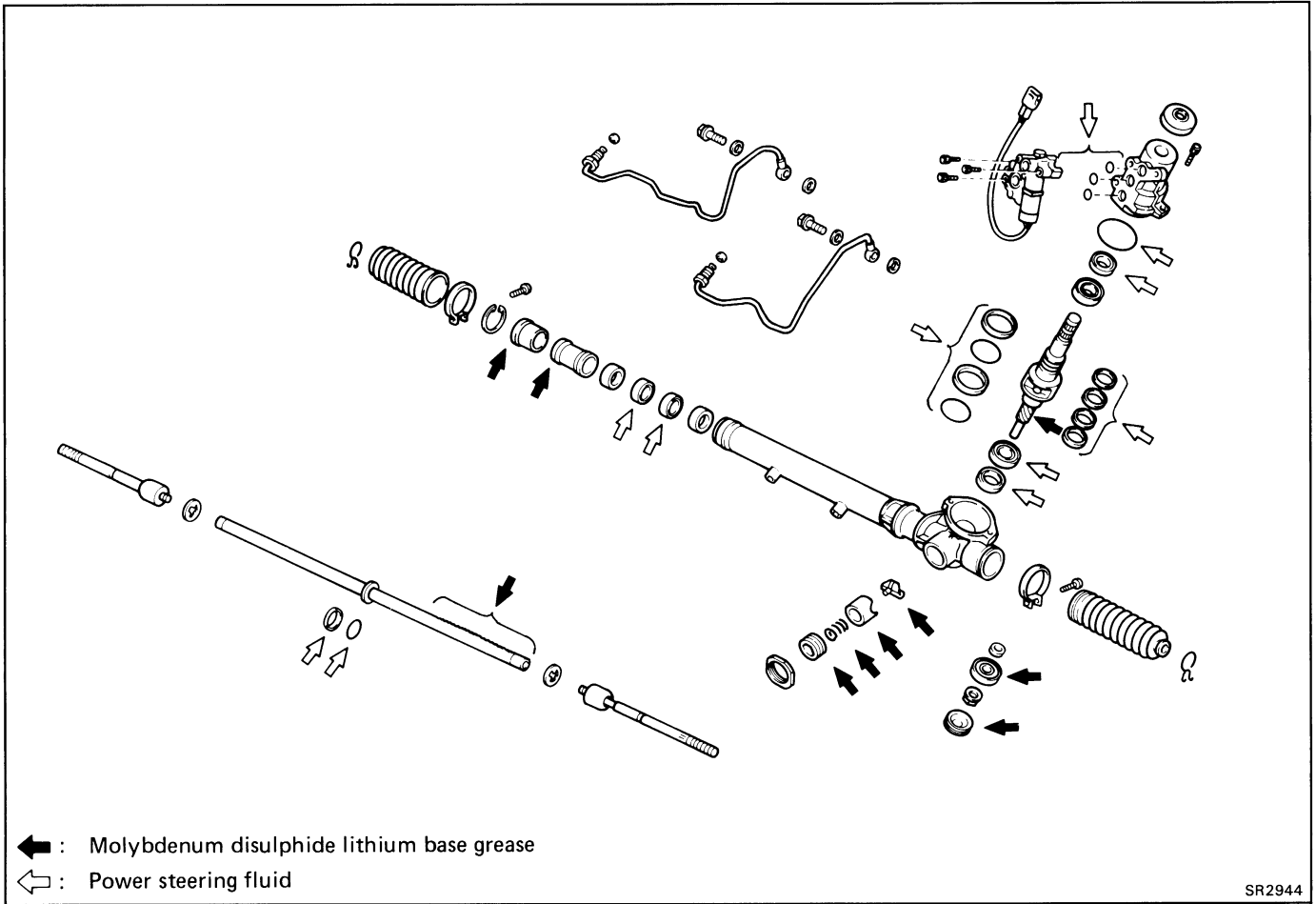
SST 09313-30021

Torque: 185 kg-cm (13 ft-lb, 18 N·m)

ASSEMBLY OF STEERING GEAR HOUSING

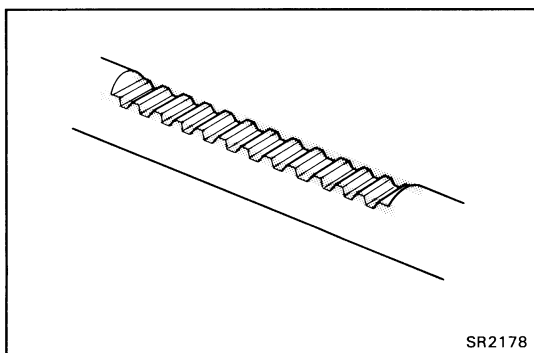
(See page SR-76)

1. COAT POWER STEERING FLUID OR GREASE ON FOLLOWING PARTS:



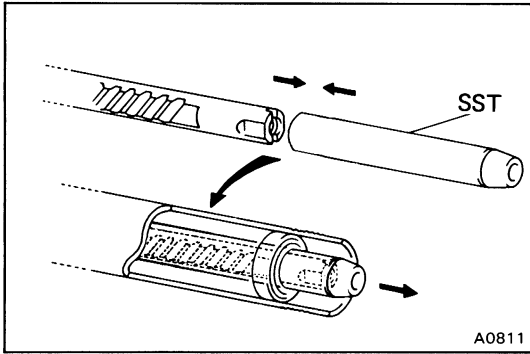
2. INSTALL CYLINDER HOUSING OIL SEAL AND SPACER

- (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) Tap in the spacer and oil seal softly.

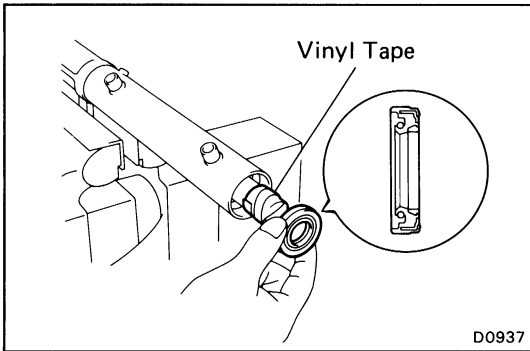


3. INSTALL RACK

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

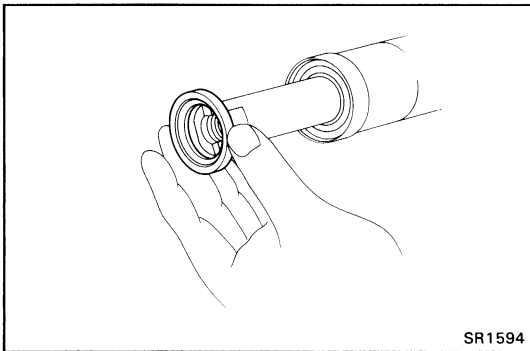


- (b) Coat SST with power steering fluid.
- (c) Insert the rack into the cylinder.
- (d) Remove SST.

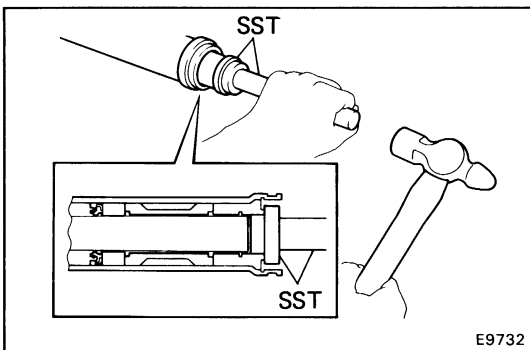


4. INSTALL CYLINDER END STOPPER, OIL SEAL AND SPACERS

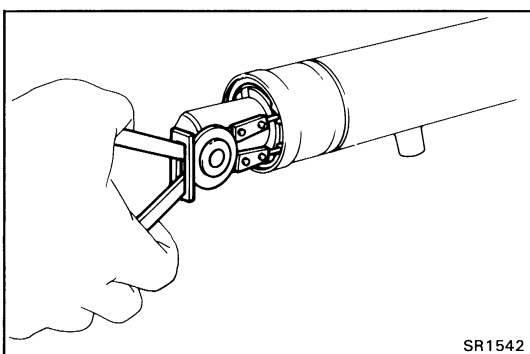
- (a) To prevent oil seal lip damage, wind vinyl tape on the steering rack end, and apply power steering fluid.
- (b) Install the oil seal by pushing it into the cylinder in the direction shown in drawing, without tilting.



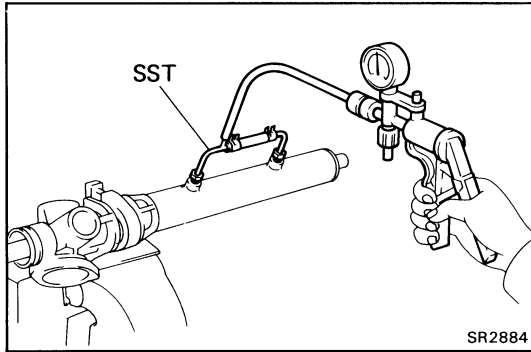
- (c) Install the two spacers.



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



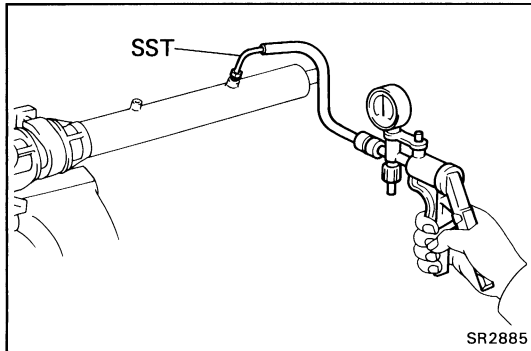
- (e) Using snap ring pliers, install the snap ring.



5. AIR TIGHTNESS TEST [TEST 1]

- (a) Install SST to the unions of the cylinder housing.
SST 09631-12070
- (b) Apply 400 mmHg (15.75 in.Hg, 53.3 kPa) of vacuum for about 30 seconds.
- (c) Check that there is no change in the vacuum.

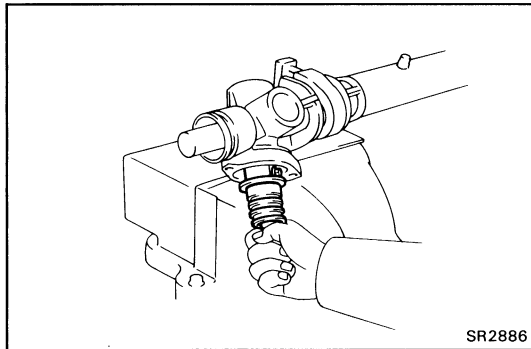
If there is change in the vacuum, check the oil seals installation.



[TEST 2]

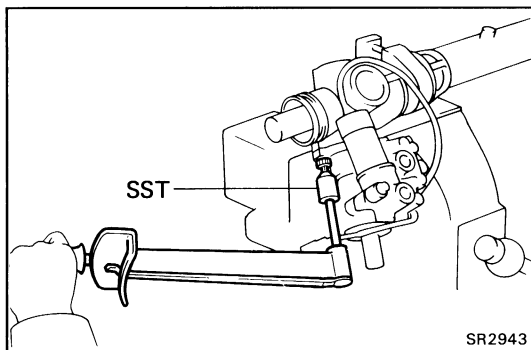
- (a) Remove the L joint from SST.
SST 09631-12070
- (b) Install L joint to the union of the cylinder end side.
- (c) Apply 400 mmHg (15.75 in.Hg, 53.3 kPa) of vacuum for about 30 seconds.
- (d) Check that there is no change in the vacuum.

If there is change in the vacuum, check the teflon ring and O-ring of the rack.



6. INSTALL CONTROL VALVE

- (a) Coat the teflon rings with power steering fluid.
- (b) Push the control valve into the housing.

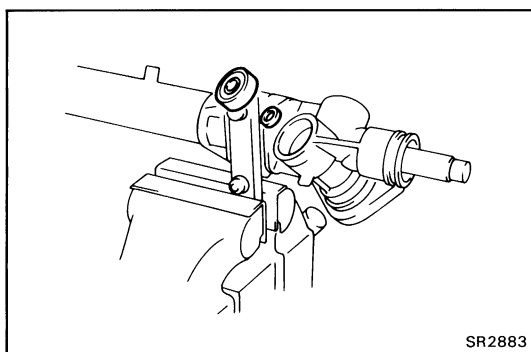


7. INSTALL CONTROL VALVE HOUSING

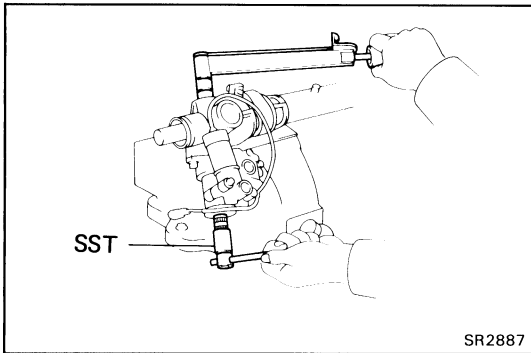
- (a) Coat a new O-ring with power steering fluid, and install it to the housing.
- (b) Align the matchmarks on the valve housing and rack housing.
- (c) Using a hexagon wrench, temporarily tighten the two bolts.
- (d) Using SST, tighten the two bolts.

SST 09313-30021

Torque: 185 kg-cm (13 ft-lb, 18 N·m)



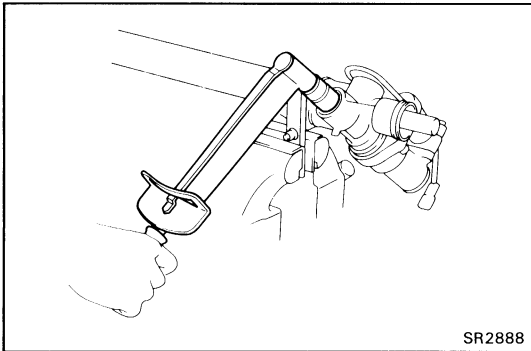
8. INSTALL LOWER BEARING AND SPACER

**9. INSTALL SELF-LOCKING NUT**

Using SST, install a new self-locking nut.

SST 09616-00010

Torque: 600 kg-cm (43 ft-lb, 59 N·m)

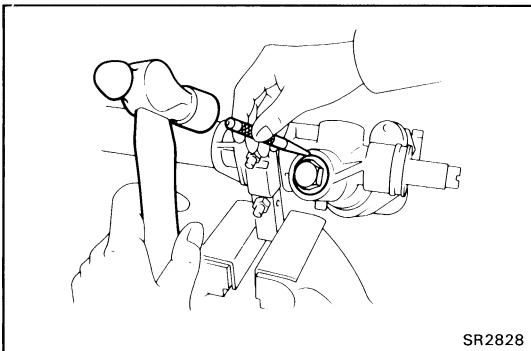
**10. INSTALL RACK HOUSING CAP**

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

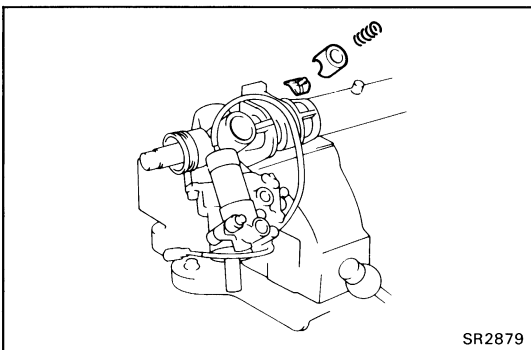
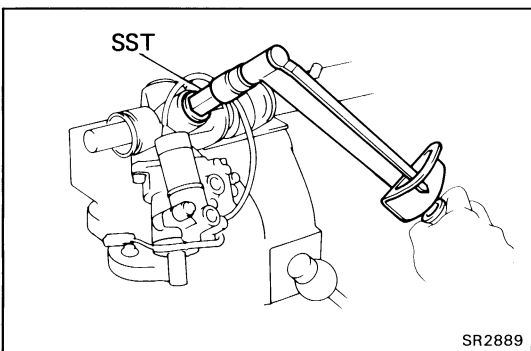
Sealant: Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent

(b) Install the cap.

Torque: 700 kg-cm (51 ft-lb, 69 N·m)



(c) Using a pin punch and hammer, stake the cap.

**11. INSTALL RACK GUIDE SEAT, RACK GUIDE AND RACK GUIDE SPRING****12. ADJUST TOTAL PRELOAD**

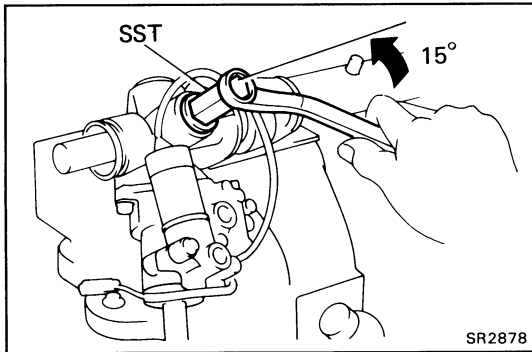
(a) Apply sealant to 2 or 3 threads of the spring cap.

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

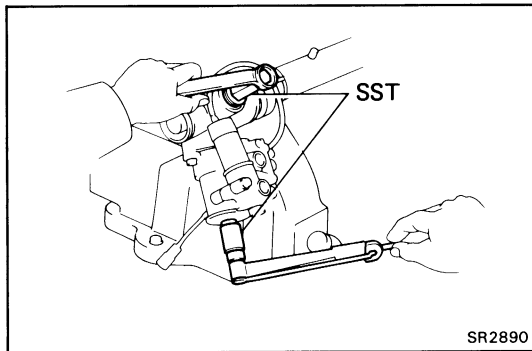
(b) Using SST, install and torque the spring cap.

SST 09612-24014 (09612-10022)

Torque: 250 kg-cm (18 ft-lb, 25 N·m)

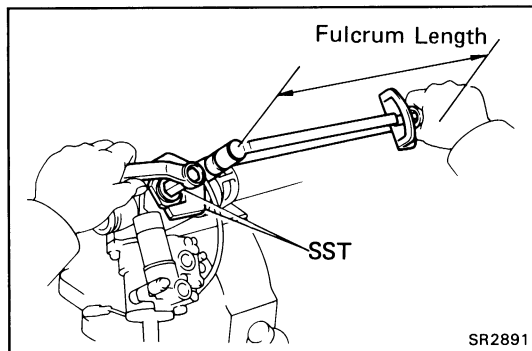


- (c) Using SST, return the rack guide spring cap 15°. SST 09612-24014 (09612-10022)
- (d) Turn the control valve shaft right and left one or two times.
- (e) Loosen the spring cap until the rack guide compression spring is not functioning.



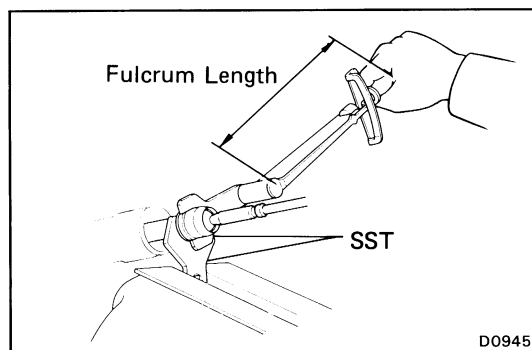
- (f) Using SST and a torque meter, tighten the rack guide spring cap until the preload is within specification. SST 09612-24014 (09612-10022), 09616-00010

**Preload (turning): 9 – 12 kg-cm
(7.8 – 10.4 in.-lb, 0.9 – 1.2 N·m)**



13. INSTALL RACK GUIDE SPRING CAP LOCK NUT

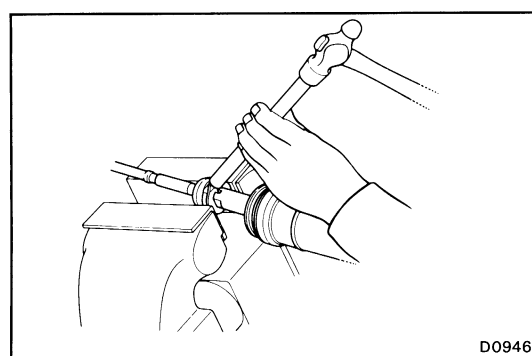
- (a) Apply sealant to 2 or 3 threads of the lock nut.
Sealant: Part No.08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent
- (b) Using SST, install and torque the lock nut. SST 09612-24014 (09612-10022, 09617-24020)
Torque: 570 kg-cm (41 ft-lb, 56 N·m)
HINT: Use a torque wrench with a fulcrum length of 340 mm (13.39 in.).
- (c) Recheck the total preload.

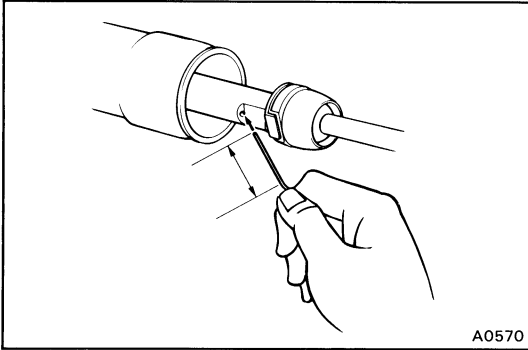


14. INSTALL DUST COVER

15. INSTALL CLAW WASHERS AND RACK ENDS

- (a) Install new claw washers.
- (b) Using SST, install and torque the rack ends. SST 09612-24014 (09617-24011), 09617-14010
Torque: 940 kg-cm (68 ft-lb, 92 N·m)
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.

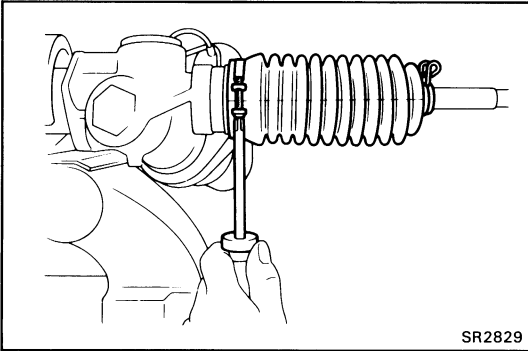




16. INSTALL RACK BOOTS, CLAMPS AND CLIPS

(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.

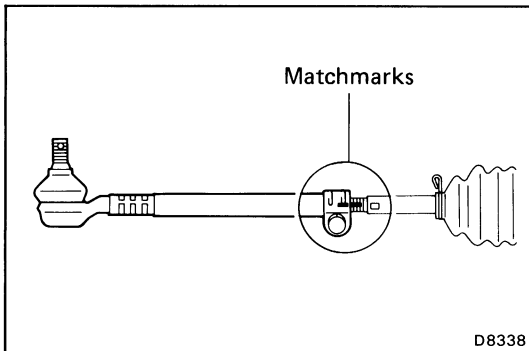


(b) Install the boots.

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

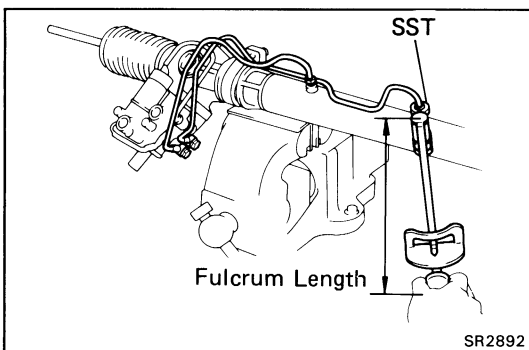
(c) Install the clamps.

(d) Install the clips with the ends facing outward.



17. INSTALL TIE ROD ENDS

Screw the tie rod ends onto the rack ends until the matchmarks are aligned.



18. INSTALL RIGHT AND LEFT TURN PRESSURE TUBES

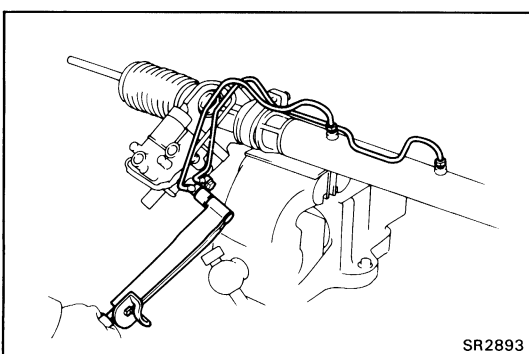
(a) Install two new union seats.

(b) Using SST, tighten the nuts.

SST 09633-00020

Torque: 240 kg-cm (17 ft-lb, 24 N·m)

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



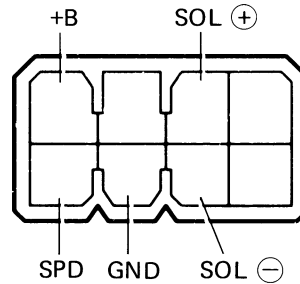
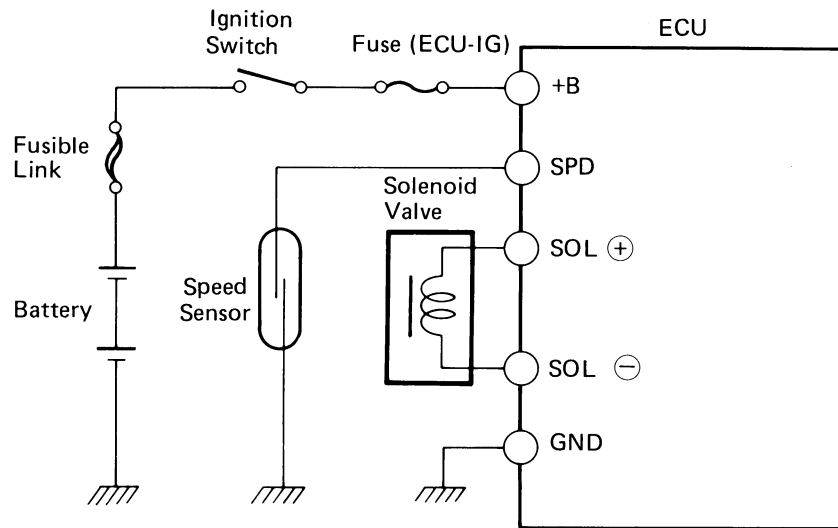
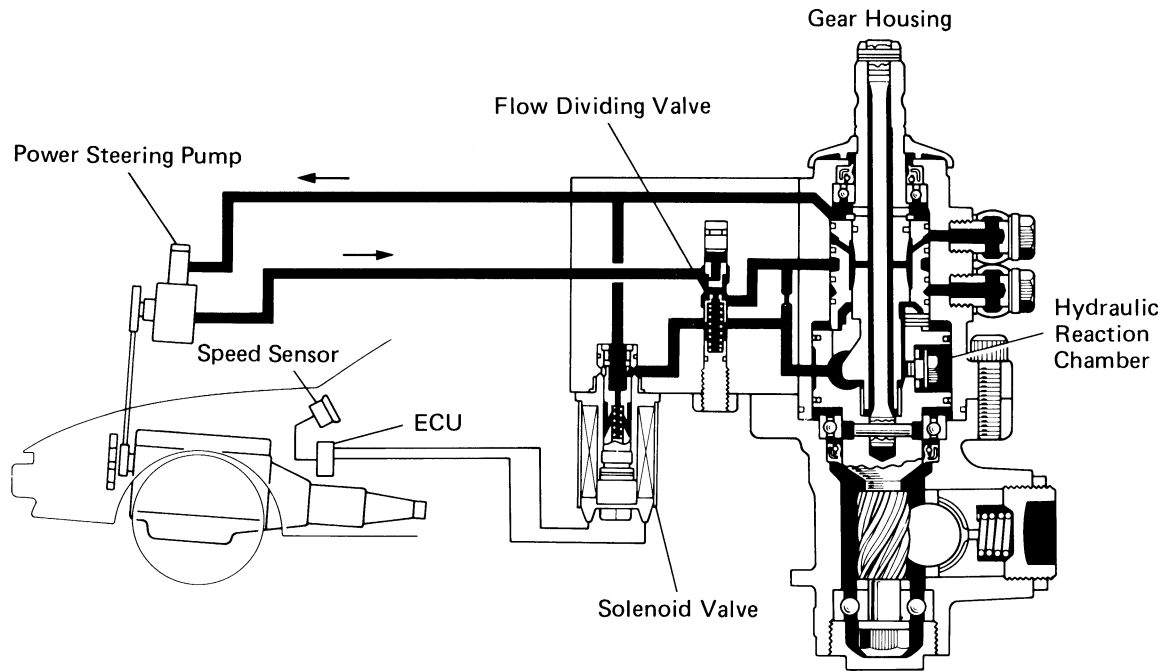
(c) Install the union bolts over the new gaskets and torque them.

Torque: 350 kg-cm (25 ft-lb, 34 N·m)

Progressive Power Steering (PPS)

ELECTRONIC CIRCUIT

Do not open the cover or the case of the ECU and various computer unless absolutely necessary. (If the IC terminals are touched, the IC may be destroyed by static electricity.)



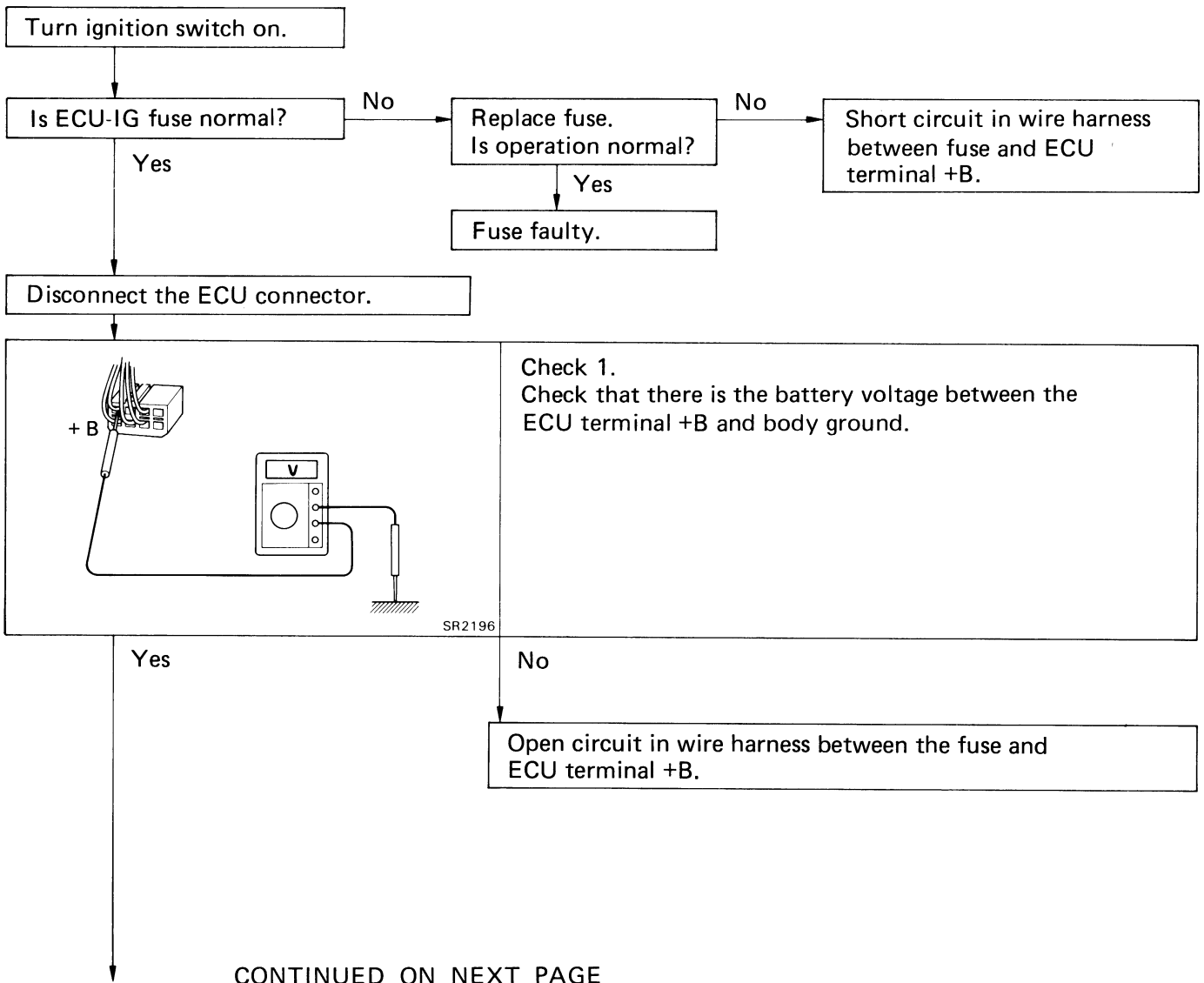
TROUBLESHOOTING

Trouble

- Hard steering at idle or low-speed driving.
- Steering too sensitive during high-speed driving.

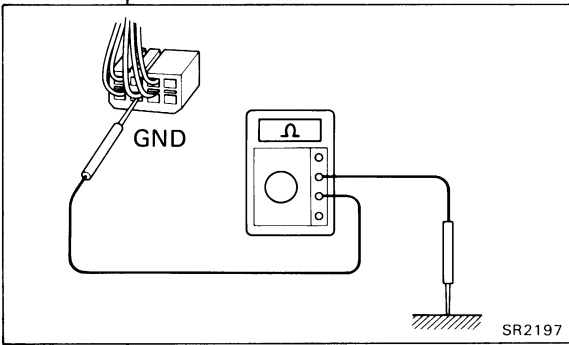
Preliminary Check

- Check tire pressure.
- Check lubrication of suspension and steering linkage.
- Check front wheel alignment.
- Check steering system joint and suspension arm ball joint.
- Check for bent steering column.
- Check that all connectors are secure.
- Check PS pump fluid pressure. (See page SR-43)



CONTINUED ON NEXT PAGE

Yes CONTINUED FROM PREVIOUS PAGE

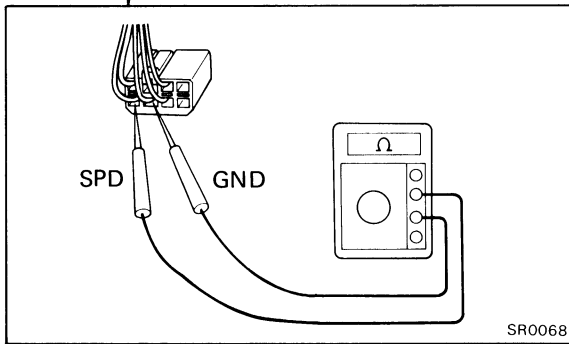


Check 2.
Check that there is continuity between the ECU terminal GND and body ground.

Yes

No

- Open circuit in wire harness between the ECU terminal GND and body ground.
- Body ground faulty.

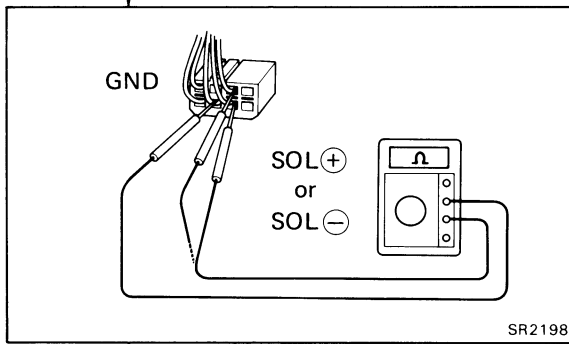


Check 3.
(a) Jack up the rear wheel on one side.
(b) Connect an ohmmeter between the ECU connector terminals SPD and GND.
(c) Spin the rear wheel and check that the meter needle deflects from 0 Ω to ∞ Ω.

Yes

No

- Open or short circuit in wire harness between the ECU terminal SPD and speed sensor.
- Speed sensor faulty (See page BE-84).



Check 4.
Check that there is no continuity between terminals SOL ⊕ or SOL ⊖ and GND.

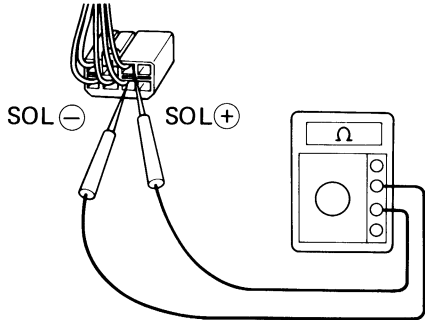
Yes

No

- Short circuit in wire harness between the terminals SOL ⊕ and SOL ⊖.
- Solenoid valve faulty.

CONTINUED ON NEXT PAGE

Yes CONTINUED FROM PREVIOUS PAGE

 <p style="text-align: right;">SR0069</p>	<p>Check 5. Measure the resistance between terminals SOL ⊕ and SOL ⊖. Standard resistance: 6.0 — 11.0 Ω</p>
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Yes

No

- Open circuit in wire harness between the terminals SOL ⊕ and SOL ⊖.
- Solenoid valve faulty.

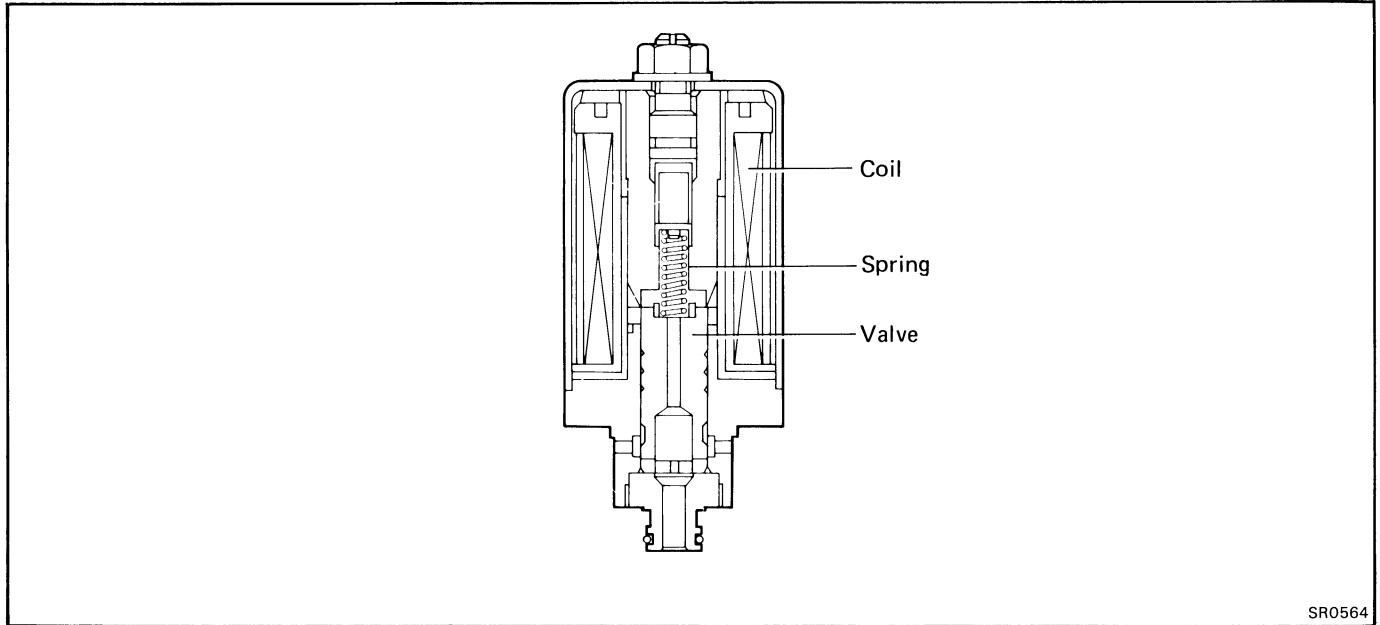
Check 6.
Inspect ECU.

Bad

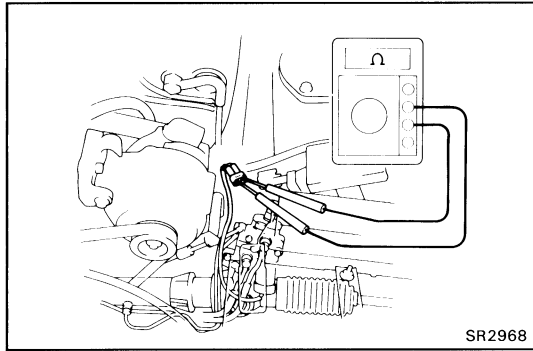
Replace ECU.

ELECTRONIC CONTROL SYSTEM

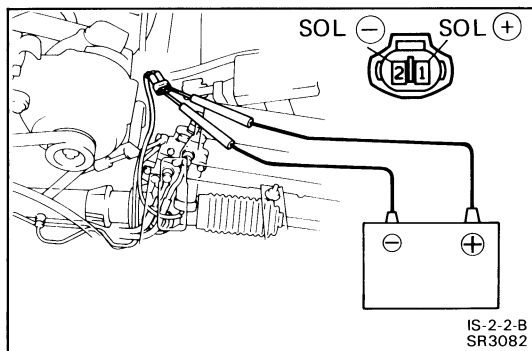
Solenoid Valve



SR0564



SR2968

IS-2-2-B
SR3082

ON-VEHICLE INSPECTION

1. DISCONNECT WIRING CONNECTOR

2. MEASURE RESISTANCE

Measure the resistance between SOL \oplus and SOL \ominus .

Resistance: 6.0 – 11.0 Ω

3. CHECK SOLENOID OPERATION

- Connect the battery positive terminal to the solenoid terminal SOL \oplus .
- Connect the battery negative terminal to the solenoid terminal SOL \ominus .
- Check that the solenoid is clicked.

If faulty, replace the pressure control valve with the solenoid valve.

NOTICE:

- Do not apply voltage for more than 30 seconds to avoid burning out the solenoid.
- If repeating this step, wait until the solenoid cools down enough that it can be touched by hand.

4. CONNECT WIRING CONNECTOR

Power Steering ECU

INSPECTION OF ECU

1. JACK UP VEHICLE AND SUPPORT IT ON STANDS

2. REMOVE GLOVE BOX

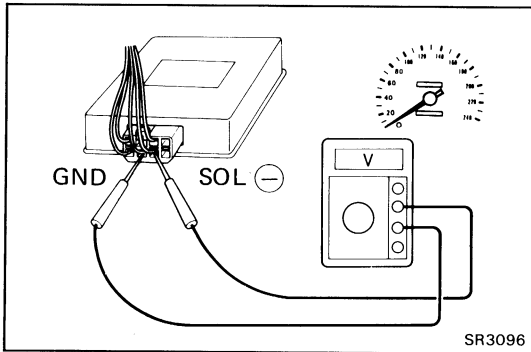
HINT: Do not disconnect the ECU connector.

3. START ENGINE

4. MEASURE VOLTAGE OF ECU

(a) Using a voltmeter, measure the voltage between ECU terminals SOL \ominus and GND while the engine is idling.

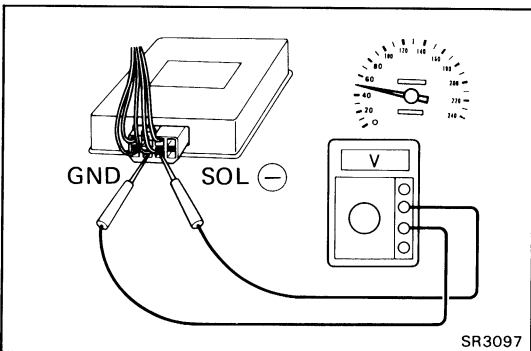
Standard voltage: 0.32 – 0.44 V



(b) Place the transmission in gear and while running at about 50 km/h (31 mph), measure the voltage between ECU terminals SOL \ominus and GND.

Standard voltage: Voltage measured in (a) above, minus 0.09 – 0.23 V

If no voltage, try another ECU.



5. INSTALL GLOVE BOX

6. LOWER VEHICLE

