

# STEERING SYSTEM

SR0DE-02

## PRECAUTION

- Care must be taken to replace parts properly because they could affect the performance of the steering system and result in a driving hazard.
- The LEXUS GS300 is equipped with SRS (Supplemental Restraint System) such as the driver airbag and front passenger airbag. Failure to carry out service operation in the correct sequence could cause the SRS to unexpectedly deployed during servicing, possibly leading to a serious accident. Before servicing (including removal or installation of parts, inspection or replacement), be sure to read the precautionary notices in the RS section.

# TROUBLESHOOTING

## PROBLEM SYMPTOMS TABLE

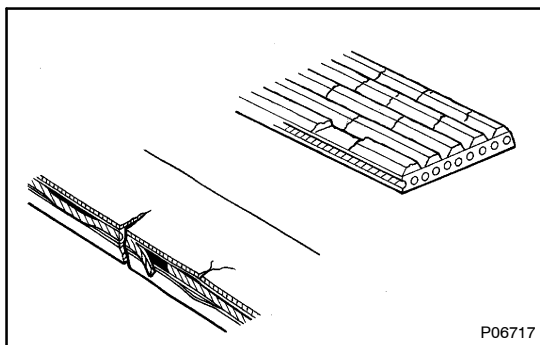
SR0DF-02

Use the table below to help you find the cause of the problem. The numbers indicate the priority of the likely cause of the problem. Check each part in the order shown. If necessary, repair or replace these parts.

| Symptom        | Suspect Area                                                                                                                                                                                                                                                                                  | See page                                                                                                                                                                                |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Hard steering  | 1. Tires (Improperly inflated)<br>2. Power steering fluid level (Low)<br>3. Drive belt (Loose)<br>4. Front wheel alignment (Incorrect)<br>5. Steering system joints (Worn)<br>6. Suspension arm ball joints (Worn)<br>7. Steering column (Binding)<br>8. Power steering gear<br>9. PPS system | <a href="#">SA-2</a><br><a href="#">SR-5</a><br>–<br><a href="#">SA-4</a><br>–<br><a href="#">SA-27</a><br><a href="#">SA-37</a><br>–<br><a href="#">SR-29</a><br><a href="#">SR-49</a> |
| Poor return    | 1. Tires (Improperly inflated)<br>2. Front wheel alignment (Incorrect)<br>3. Steering column (Binding)<br>4. Power steering gear                                                                                                                                                              | <a href="#">SA-2</a><br><a href="#">SA-4</a><br>–<br><a href="#">SR-29</a>                                                                                                              |
| Excessive play | 1. Steering system joints (Worn)<br>2. Suspension arm ball joints (Worn)<br>3. Intermediate shaft, Universal joint, Sliding yoke (Worn)<br>4. Front wheel bearing (Worn)<br>5. Power steering gear<br>6. PPS system                                                                           | –<br><a href="#">SA-27</a><br><a href="#">SA-37</a><br>–<br><a href="#">SA-10</a><br><a href="#">SR-29</a><br><a href="#">SR-49</a>                                                     |
| Abnormal noise | 1. Power steering fluid level (Low)<br>2. Steering system joints (Worn)<br>3. Power steering gear                                                                                                                                                                                             | <a href="#">SR-5</a><br>–<br><a href="#">SR-29</a>                                                                                                                                      |

### HINT:

When the problem occurs on the power tilt and telescopic steering system, refer to the DI section.  
 (See page [DI-352](#))



## DRIVE BELT INSPECTION

SR0G9-01

### INSPECT DRIVE BELT

Visually check the belt for excessive wear, frayed cords etc.  
If any defect has been found, replace the drive belt.

#### HINT:

Cracks on the rib side of a belt are considered acceptable. If the belt has chunks missing from the ribs, it should be replaced.

## POWER STEERING FLUID BLEEDING

### 1. CHECK FLUID LEVEL

(See page SR-5)

### 2. JACK UP FRONT OF VEHICLE AND SUPPORT IT WITH STANDS

### 3. TURN STEERING WHEEL

With the engine stopped, turn the wheel slowly from lock to lock several times.

### 4. LOWER VEHICLE

### 5. START ENGINE

Run the engine at idle for a few minutes.

### 6. TURN STEERING WHEEL

(a) With the engine idling, turn the wheel to left or right full lock position and keep it there for 2-3 seconds, then turn the wheel to the opposite full lock position and keep it there for 2-3 seconds.

(b) Repeat (a) several times.

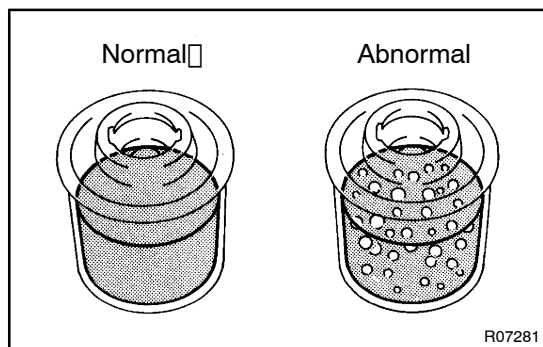
### 7. STOP ENGINE

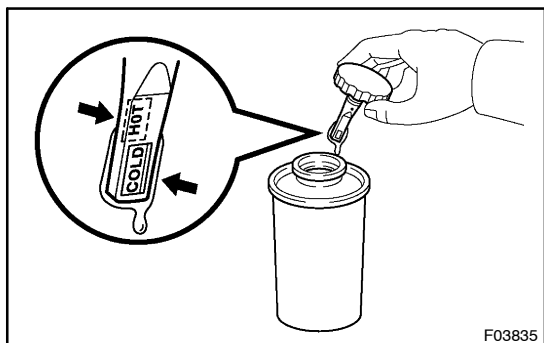
### 8. CHECK FOR FOAMING OR EMULSIFICATION

If the system has to be bled twice specifically because of foaming or emulsification, check for fluid leaks in the system.

### 9. CHECK FLUID LEVEL

(See page SR-5)





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## INSPECTION

### 1. CHECK FLUID LEVEL

- (a) Keep the vehicle level.
- (b) With the engine stopped, check the fluid level in the oil reservoir.

If necessary, add fluid.

**Fluid: ATF DEXRON® II or III**

#### HINT:

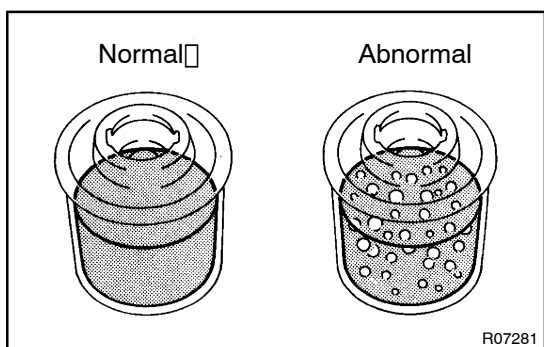
Check that the fluid level is within the HOT LEVEL range on the reservoir cap dipstick.

If the fluid is cold, check that it is within the COLD LEVEL range.

- (c) Start the engine and run it at idle.

- (d) Turn the steering wheel from lock to lock several times to boost fluid temperature.

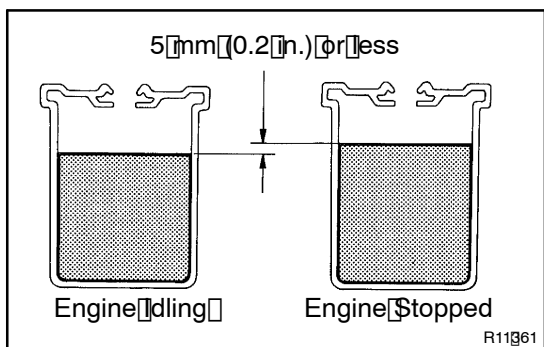
**Fluid temperature: 80°C (176°F)**



R07281

- (e) Check for foaming or emulsification.

If there is foaming or emulsification, bleed power steering system. (See page SR-4)



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- (f) With the engine idling, measure the fluid level in the oil reservoir.

- (g) Stop the engine.

- (h) Wait a few minutes and remeasure the fluid level in the oil reservoir.

**Maximum fluid level rise: 5 mm (0.20 in.)**

If a problem is found, bleed power steering system.

(See page SR-4)

- (i) Check the fluid level.

**2. CHECK STEERING FLUID PRESSURE**

- (a) Disconnect the pressure feed tube from the PS vane pump.

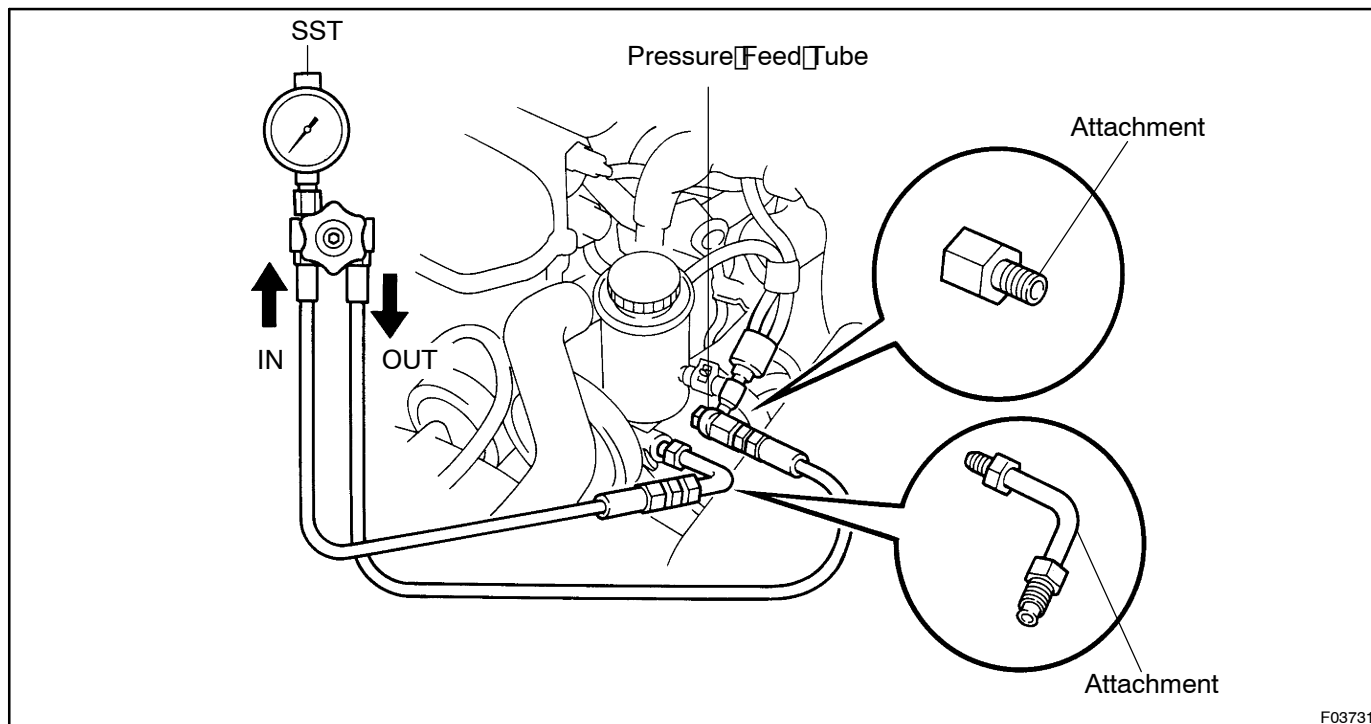
(See page SR-21)

- (b) Connect SST, as shown below.

SST 09640-10010, 09641-10101, 09641-1030, 09641-1060)

**NOTICE:**

Check that the valve of the SST is in the open position.



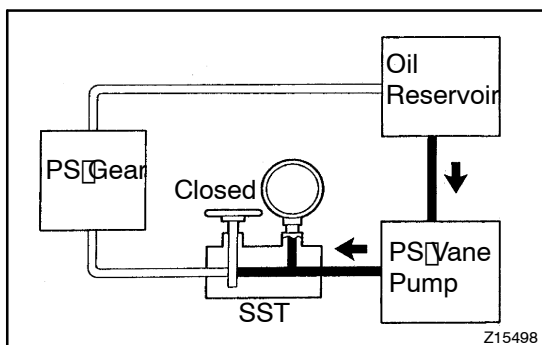
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- (c) Bleed the power steering system.

(See page SR-4)

- (d) Start the engine and run it at idle.  
 (e) Turn the steering wheel from lock to lock several times to boost fluid temperature.

**Fluid temperature: 80 °C (176 °F)**



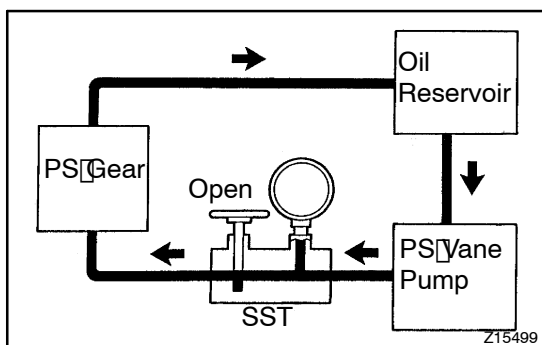
- (f) With the engine idling, close the valve of the SST and observe the reading on the SST.

**Minimum fluid pressure:**

**8,336 kPa (85 kgf/cm<sup>2</sup> 1,209 psi)**

**NOTICE:**

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



- (g) With the engine idling, open the valve fully.

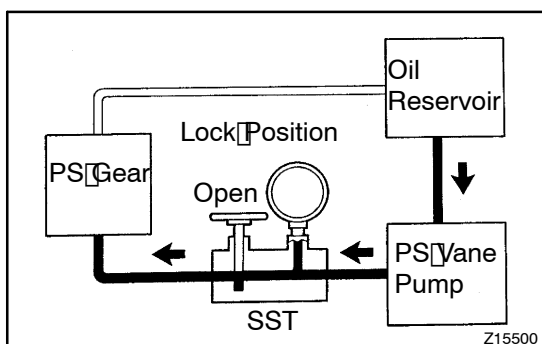
- (h) Measure the fluid pressure at engine speeds of 1,000 rpm and 3,000 rpm.

**Difference fluid pressure:**

**490 kPa (5 kgf/cm<sup>2</sup> 71 psi) or less**

**NOTICE:**

**Do not turn the steering wheel.**



- (i) With the engine idling and valve fully opened, turn the steering wheel to full lock.

**Minimum fluid pressure:**

**8,336 kPa (85 kgf/cm<sup>2</sup> 1,209 psi)**

**NOTICE:**

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

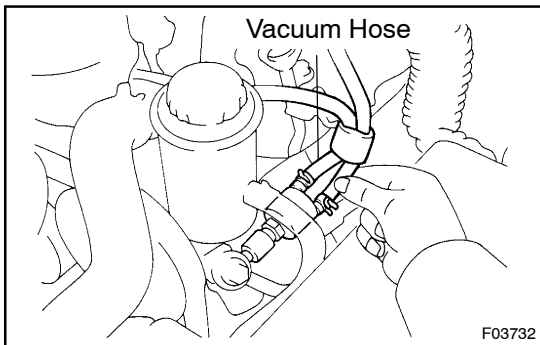
- (j) Disconnect the SST.

- (k) Connect the pressure feed tube.

(See page SR-28)

- (l) Bleed the power steering system.

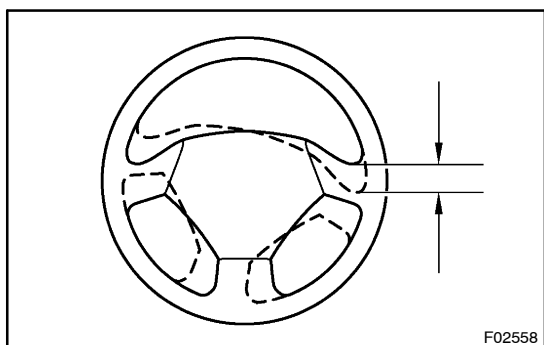
(See page SR-4)



SR0DI-02

## AIR CONTROL VALVE INSPECTION

1. **TURN AIR CONDITIONING SWITCH OFF**
2. **CHECK IDLE-UP**
  - (a) Start the engine and run it at idle.
  - (b) Fully turn the steering wheel.
  - (c) Check that the engine rpm decreases when the vacuum hose of the air control valve is pinched.
  - (d) Check that the engine rpm increases when the hose is released.



## STEERING WHEEL INSPECTION

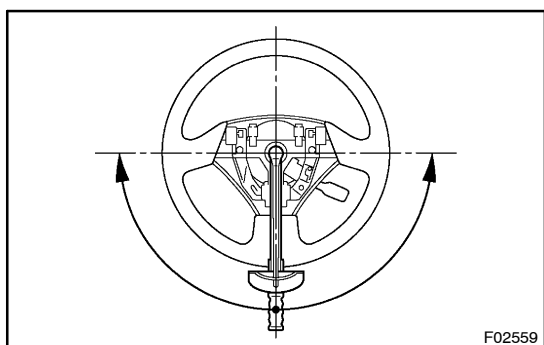
SR0DJ-02

### 1. CHECK STEERING WHEEL FREEPLAY

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.

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



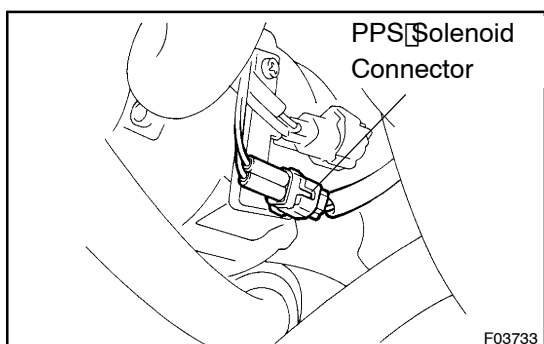
### 2. CHECK STEERING EFFORT

- Center the steering wheel.
- Remove the steering wheel pad. (See page SR-12)
- Start the engine and run it at idle.
- Measure the steering effort in both directions.

**Reference: 7 N·m (70 kgf·cm, 61 in·lbf)**

#### HINT:

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



- Disconnect the PPS solenoid connector.
- Measure the steering effort in both directions and check that the steering effort exceeds the reference value in (d), and that the power assist is operating. If steering effort is not heavier than (d), check the solenoid.

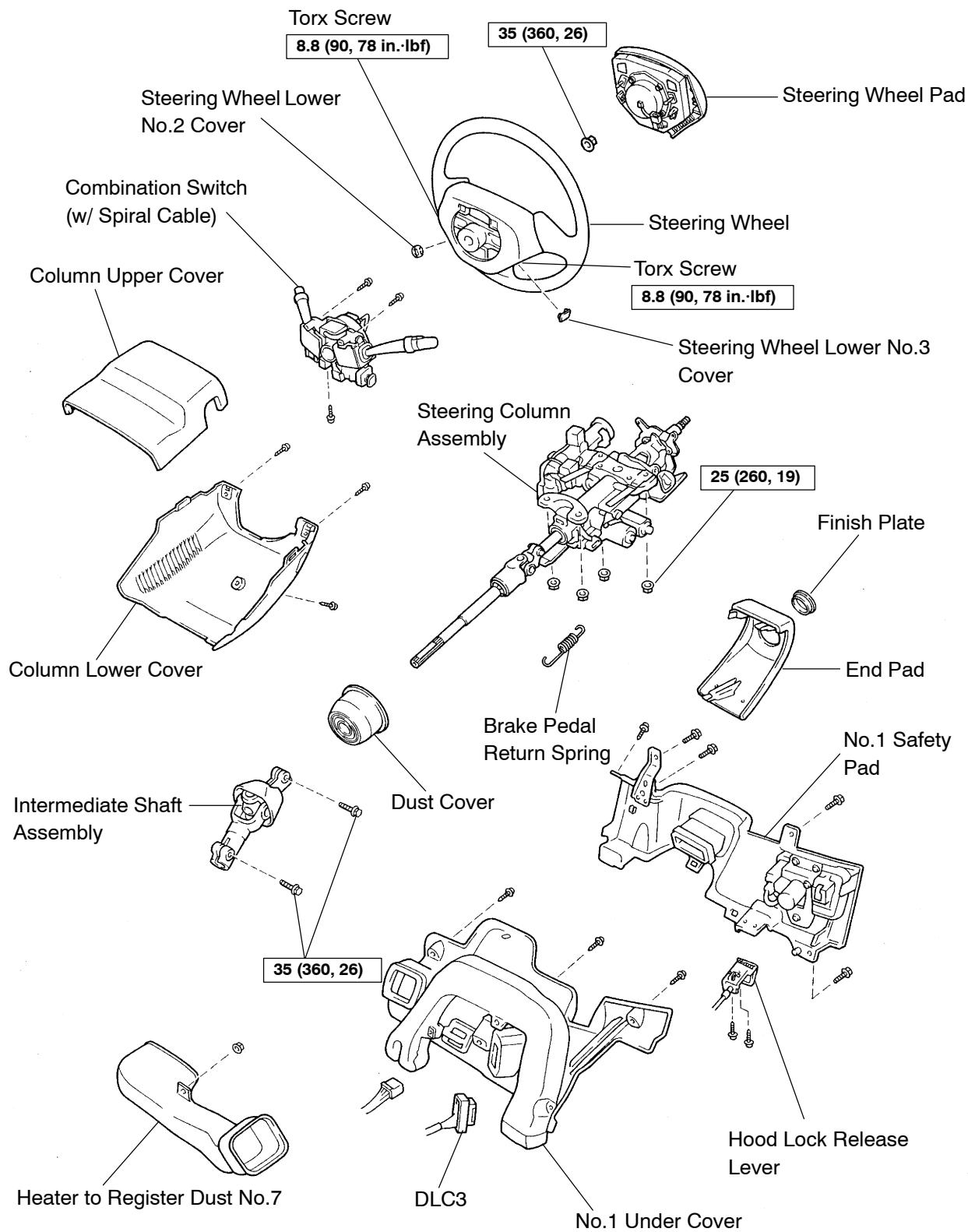
#### HINT:

Take the tire type, pressure and contact surface into consideration before making your diagnosis.

- Connect the connector.
- Torque the steering wheel set nut.  
**Torque: 35 N·m (360 kgf·cm, 26 ft·lbf)**
- Install the steering wheel pad.  
(See page SR-17)

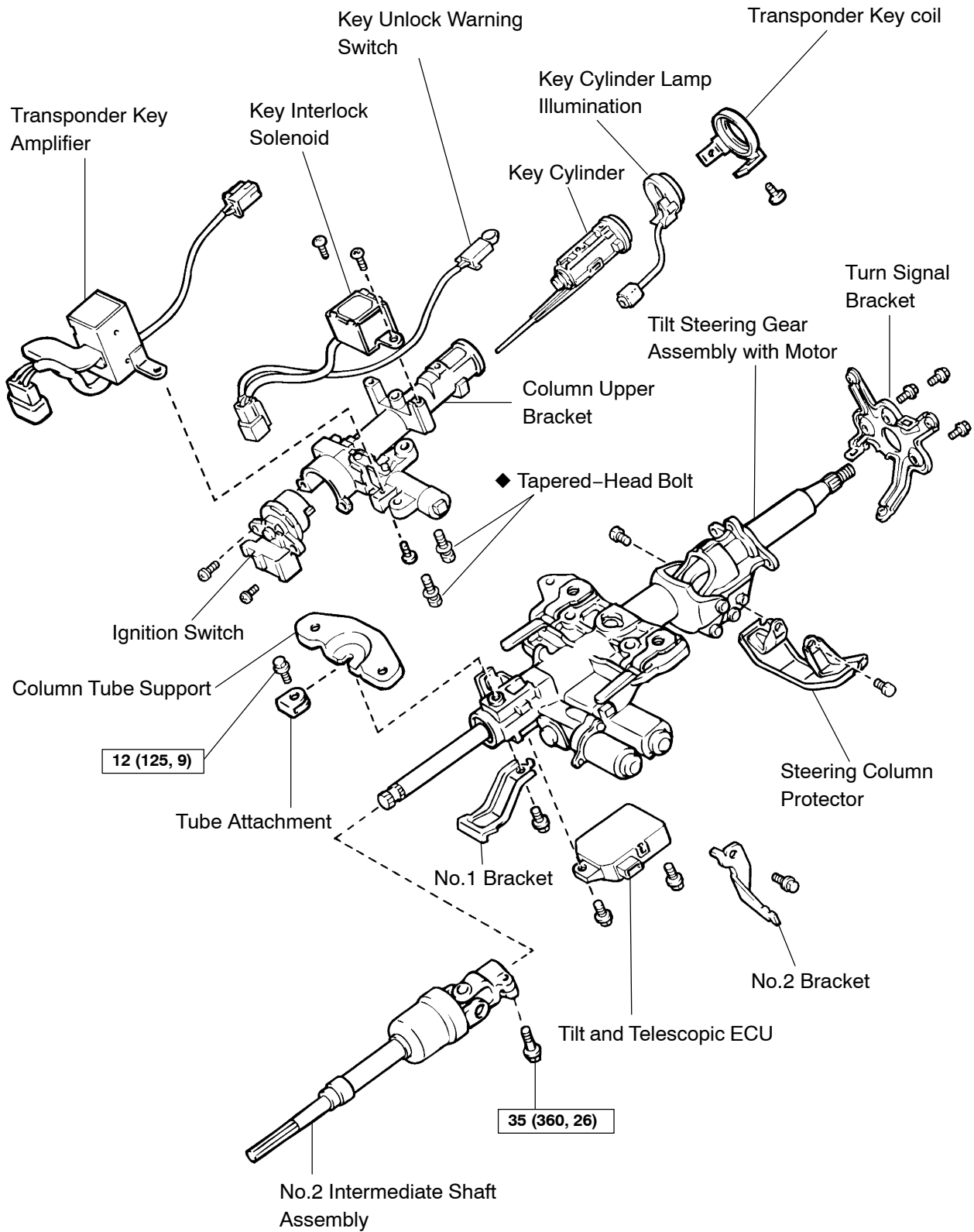
# POWER TILT AND POWER TELESCOPIC STEERING COLUMN COMPONENTS

SR00K-02



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

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

◆ Non-reusable part

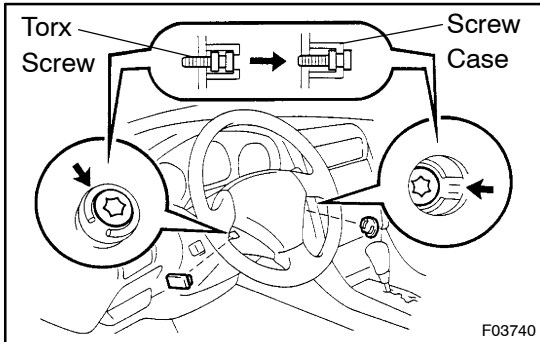
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## REMOVAL

### 1. REMOVE STEERING WHEEL PAD

#### NOTICE:

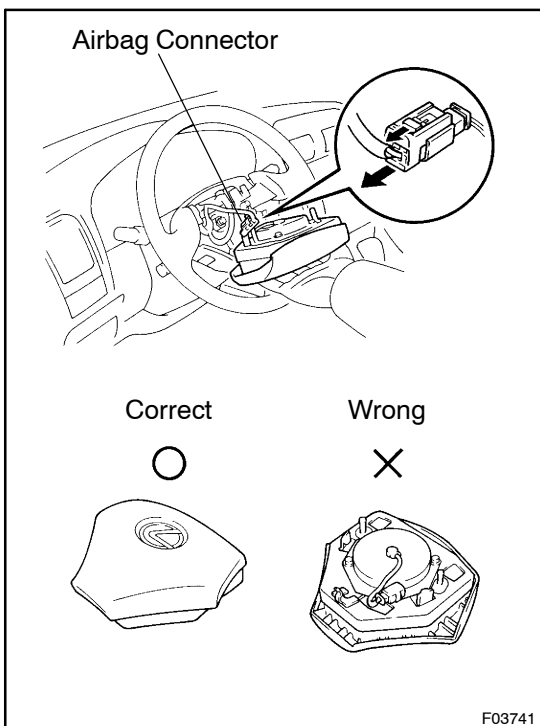
- If the airbag connector is disconnected with the ignition switch at ON or ACC, DTCs will be recorded.
- Never use airbag parts from another vehicle. When replacing parts, replace with new ones.



- Place the front wheels facing straight ahead.
- Remove the steering wheel lower No.2 and No.3 covers.
- Using a torx socket wrench, loosen the 2 torx screws.

#### HINT:

Loosen the 2 screws until the groove along the screw circumference catches on the screw case.



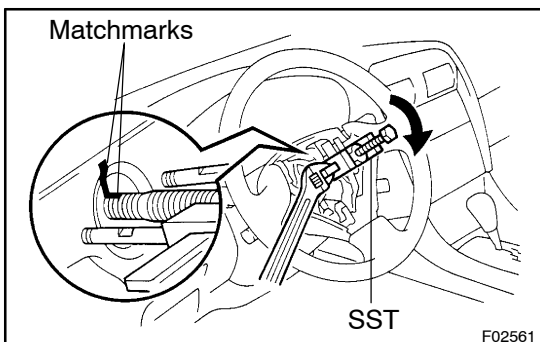
- Pull the pad out from the steering wheel and disconnect the airbag connector.

#### CAUTION:

- When storing the wheel pad, keep the upper surface of the pad facing upward.
- Never disassemble the wheel pad.

#### NOTICE:

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



### 2. REMOVE STEERING WHEEL

- Disconnect the connector.
- Remove the steering wheel set nut.
- Place matchmarks on the steering wheel and main shaft assembly.
- Using SST, remove the wheel.

SST 09950-50010 (09951-05010, 09952-05010, 09953-05020, 09954-05020)

**3. REMOVE UPPER AND LOWER COLUMN COVERS**

Remove the 3 screws.

**4. REMOVE COMBINATION SWITCH WITH SPIRAL CABLE**

- (a) Disconnect the 4 connectors.
- (b) Disconnect the airbag connector.
- (c) Remove the 3 screws.

**5. REMOVE SPIRAL CABLE**

(See page BE-35)

**NOTICE:**

Do not disassemble the cable or apply oil to it.

**6. REMOVE NO.1 UNDER COVER**

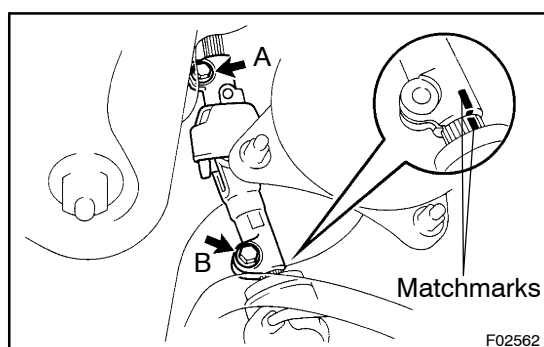
- (a) Remove the 3 screws.
- (b) Remove the DLC3.
- (c) Disconnect the connectors.

**7. REMOVE FINISH PLATE AND END PAD****8. REMOVE NO.1 SAFETY PAD**

- (a) Remove the 2 screws and disconnect the hood lock release lever from the panel.
- (b) Remove 4 pad set bolts and screw.

**9. REMOVE HEATER TO REGISTER DUCT NO.7**

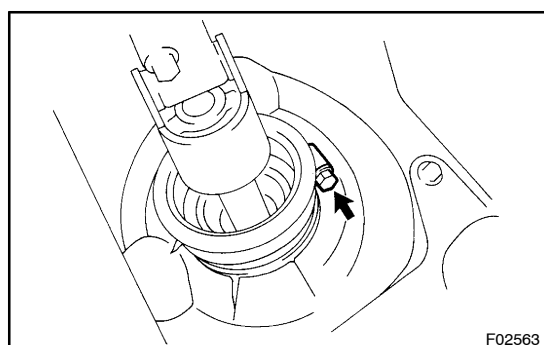
Remove the nut.

**10. DISCONNECT INTERMEDIATE SHAFT ASSEMBLY**

- (a) Place matchmarks on the intermediate shaft and control valve shaft.
- (b) Loosen the bolt A and remove the bolt B.

**11. REMOVE STEERING COLUMN ASSEMBLY**

- (a) Disconnect the connectors.
- (b) Remove the brake pedal return spring.



- (c) Loosen the hole cover clamp.
- (d) Remove the 4 column assembly set nuts.

**12. REMOVE INTERMEDIATE SHAFT ASSEMBLY**

Remove the bolt A.

**13. REMOVE DUST COVER**

## DISASSEMBLY

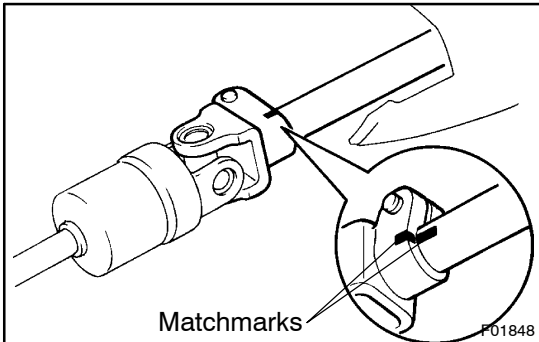
### NOTICE:

When using a vise, do not overtighten it.

#### 1. REMOVE TRANSPONDER KEY COIL

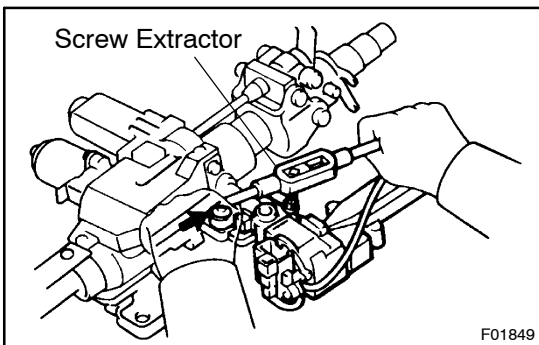
Remove the screw.

#### 2. REMOVE KEY CYLINDER LAMP ILLUMINATION



#### 3. REMOVE NO.2 INTERMEDIATE SHAFT ASSEMBLY

- Place matchmarks on the No.2 shaft and main shaft.
- Remove the bolt.



#### 4. REMOVE COLUMN UPPER BRACKET

- Using a centering punch, mark the center of the 2 tapered-head bolts.
- Using a 4–5 mm (0.16–0.20 in.) drill, drill into the 2 bolts.
- Using a screw extractor, remove the 2 bolts.

#### 5. REMOVE COLUMN TUBE SUPPORT

- Remove the bolt.
- Remove the tube support with tube attachment.
- Remove the tube attachment from the tube support.

#### 6. REMOVE TURN SIGNAL BRACKET

Remove the 3 bolts.

#### 7. REMOVE STEERING COLUMN PROTECTOR

Remove the 2 bolts.

#### 8. REMOVE NO.1 BRACKET

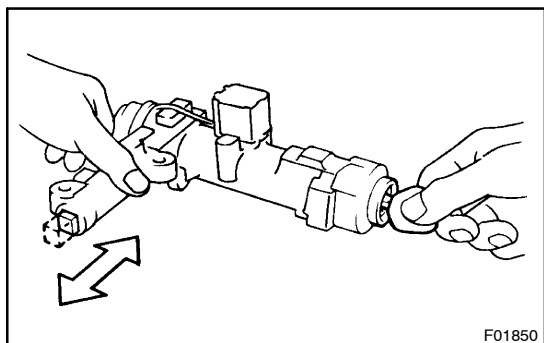
Remove the bolt.

#### 9. REMOVE NO.2 BRACKET

Remove the bolt.

#### 10. REMOVE TILT AND TELESCOPIC ECU

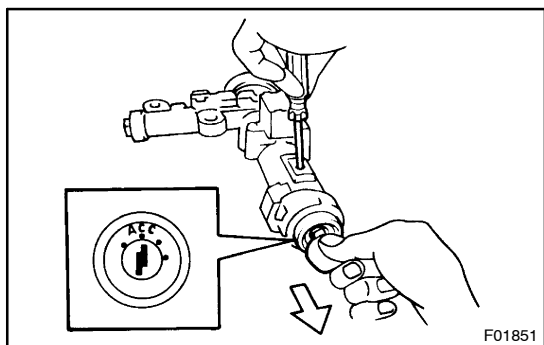
Remove the 2 bolts.



## INSPECTION

### 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 pin with a screwdriver, and pull out the cylinder.
- Install a new cylinder.

HINT:

Make sure the key is at the ACC position.

### 3. INSPECT IGNITION SWITCH

(See page BE-31)

### 4. IF NECESSARY, REPLACE IGNITION SWITCH

- remove the 2 screws.
- Install a new switch with the 2 screws.

### 5. INSPECT KEY UNLOCK WARNING SWITCH

(See page BE-31)

### 6. INSPECT KEY INTERLOCK SOLENOID

(See page AT-13)

### 7. IF NECESSARY, REPLACE KEY UNLOCK WARNING SWITCH WITH KEY INTERLOCK SOLENOID

- Remove the 2 screws.
- Install a new switch with solenoid with the 2 screws.

### 8. INSPECT TRANSPONDER KEY COIL

(See page BE-253)

### 9. IF NECESSARY, REPLACE TRANSPONDER KEY COIL

### 10. IF NECESSARY, REPLACE TRANSPONDER KEY AMPLIFIER

- Remove the screw.
- Install a new key amplifier with the screw.

## REASSEMBLY

### NOTICE:

When using a vise, do not overtighten it.

#### 1. INSTALL TILT AND TELESCOPIC ECU

Tighten the 2 bolts.

#### 2. INSTALL NO.2 BRACKET

Tighten the bolt.

#### 3. INSTALL NO.1 BRACKET

Tighten the bolt.

#### 4. INSTALL STEERING COLUMN PROTECTOR

Tighten the 2 bolts.

#### 5. INSTALL TURN SIGNAL BRACKET

Tighten the 3 bolts.

#### 6. INSTALL COLUMN TUBE SUPPORT

### NOTICE:

If the attachment or support is deformed, replace it with a new one.

(a) Install the tube attachment to the tube support.

(b) Install the support.

### NOTICE:

Make sure to install the support facing the correct direction.

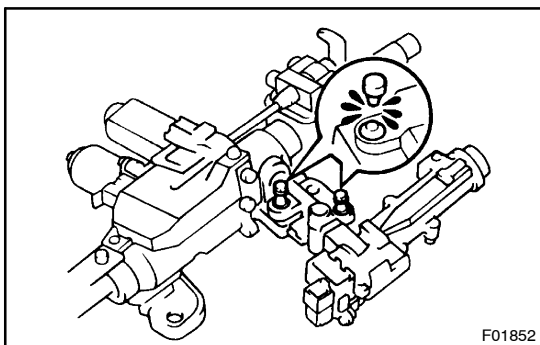
(See page SR-10)

(c) Torque the bolt.

**Torque: 12 N·m (125 kgf·cm, 9 ft·lbf)**

### NOTICE:

- Tighten the bolt while holding the support to prevent it turning too.
- Be sure to tighten the bolt with the specified torque.



#### 7. INSTALL COLUMN UPPER BRACKET

Tighten the 2 new tapered-head bolts until the bolt heads break off.

#### 8. INSTALL NO.2 INTERMEDIATE SHAFT ASSEMBLY

(a) Align the matchmarks on the No.2 shaft and main shaft.

(b) Torque the bolt.

**Torque: 35 N·m (360 kgf·cm, 26 ft·lbf)**

#### 9. INSTALL KEY CYLINDER LAMP ILLUMINATION

#### 10. INSTALL TRANSPONDER KEY COIL

Tighten the screw.

## INSTALLATION

### 1. INSTALL DUST COVER

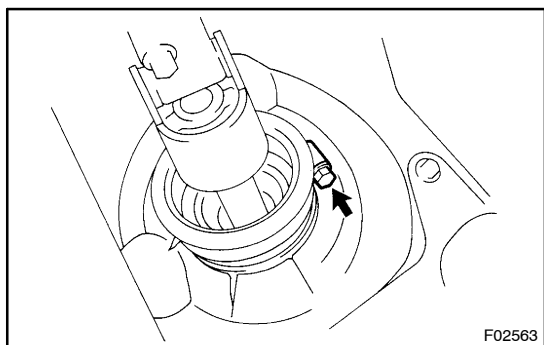
### 2. INSTALL INTERMEDIATE SHAFT ASSEMBLY

Temporarily tighten the bolt A.

### 3. INSTALL STEERING COLUMN ASSEMBLY

(a) Torque the 4 column assembly set nuts.

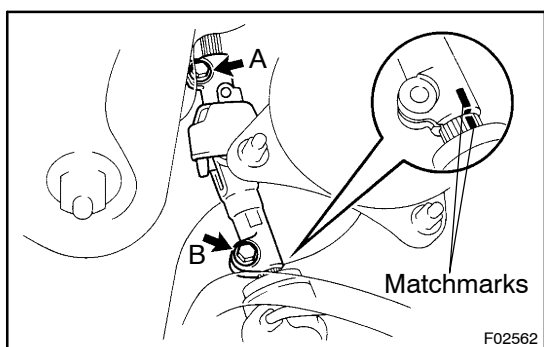
**Torque: 25 N·m (260 kgf·cm, 19 ft·lbf)**



(b) Tighten the hole cover clamp.

(c) Install the brake pedal return spring.

(d) Connect the connectors.



### 4. CONNECT INTERMEDIATE SHAFT ASSEMBLY

(a) Align the matchmarks on the intermediate shaft and control valve shaft.

(b) Torque the bolt B.

**Torque: 35 N·m (360 kgf·cm, 26 ft·lbf)**

(c) Torque the bolt A.

**Torque: 35 N·m (360 kgf·cm, 26 ft·lbf)**

### 5. INSTALL HEATER TO REGISTER DUCT NO.7

Tighten the nut.

### 6. INSTALL NO.1 SAFETY PAD

(a) Tighten the 4 pad set bolts and screw.

(b) Connect the hood lock release lever to the panel and tighten the 2 screws.

### 7. INSTALL FINISH PLATE AND END PAD

### 8. INSTALL NO.1 UNDER COVER

(a) Connect the connectors.

(b) Install the DLC3.

(c) Tighten the 3 screws.

### 9. INSTALL SPIRAL CABLE

(See page BE-35)

### 10. INSTALL COMBINATION SWITCH WITH SPIRAL CABLE

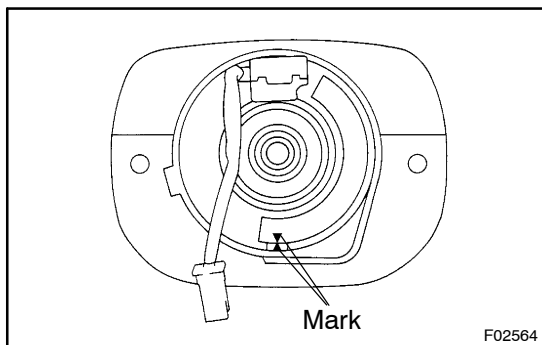
(a) Tighten the 3 screws.

(b) Connect the airbag connector.

(c) Connect the 4 connectors.

### 11. INSTALL UPPER AND LOWER COLUMN COVERS

Tighten the 3 screws.

**12. CENTER SPIRAL CABLE**

- (a) Check that the front wheels are facing straight ahead.
- (b) Turn the cable counterclockwise by hand until it becomes harder to turn the cable.
- (c) Then rotate the cable clockwise about 3 turns to align the mark.

**HINT:**

The cable will rotate about 3 turns to either left or right of the center.

**13. INSTALL STEERING WHEEL**

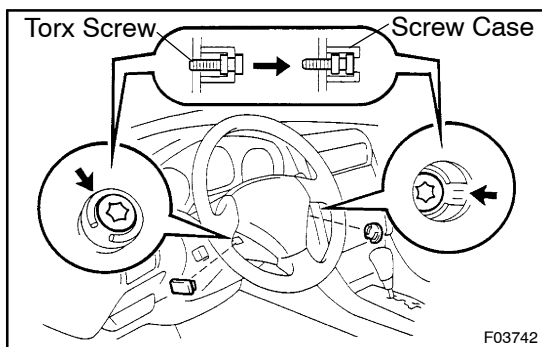
- (a) Align the matchmarks on the wheel and main shaft.
- (b) Torque the wheel set nut.

**Torque: 35 N·m (360 kgf·cm, 26 ft·lbf)**

- (c) Connect the connector.

**14. INSTALL STEERING WHEEL PAD****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.**



- (a) Connect the airbag connector.
- (b) Install the pad after confirming that the circumference groove of the torx screw is caught on the screw case.
- (c) Using a torx socket wrench, torque the 2 screws.

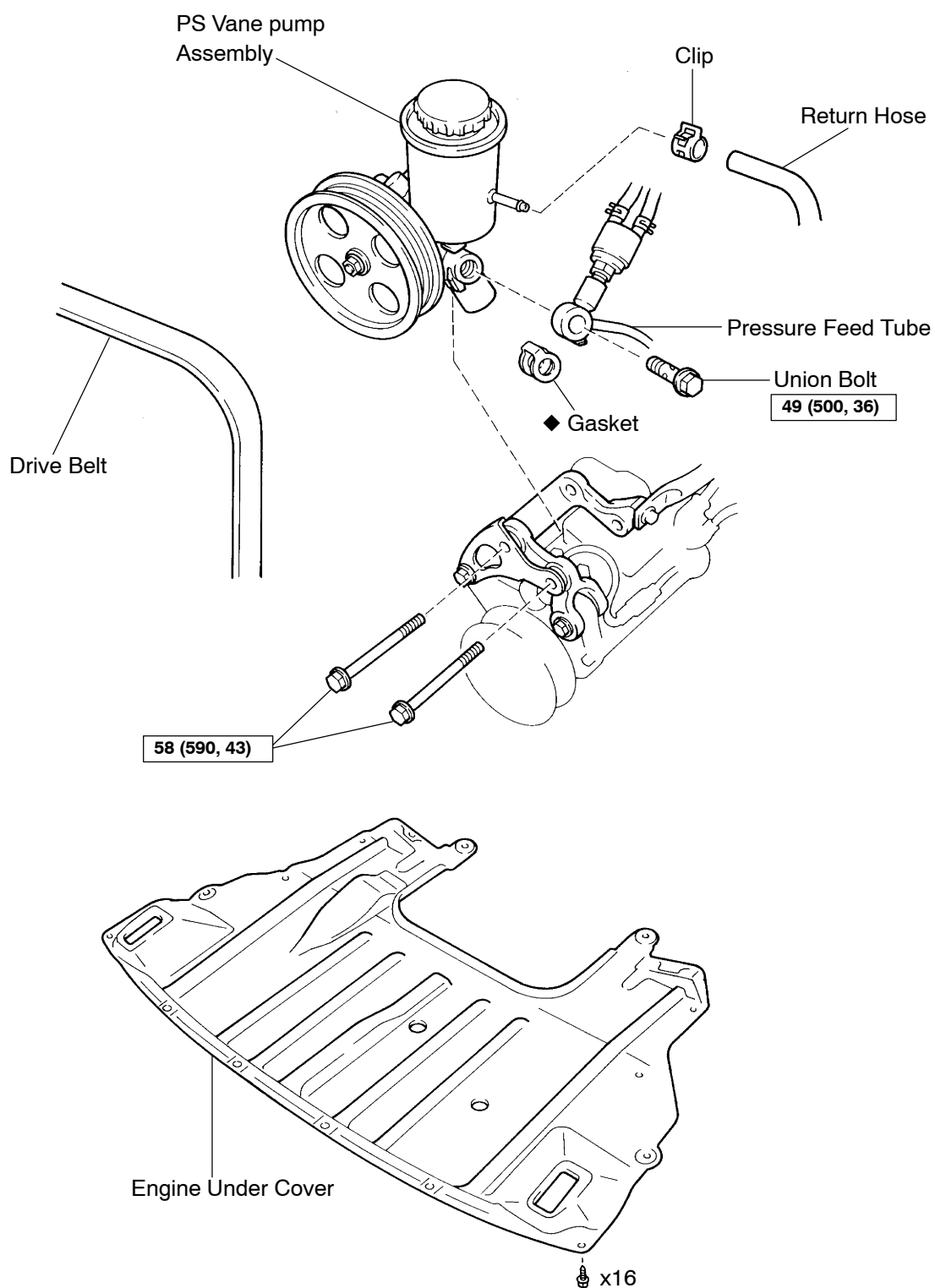
**Torque: 8.8 N·m (90 kgf·cm, 78 in·lbf)**

- (d) Install the steering wheel lower No.2 and No.3 covers.

**15. CHECK STEERING WHEEL CENTER POINT**

# POWER STEERING VANE PUMP COMPONENTS

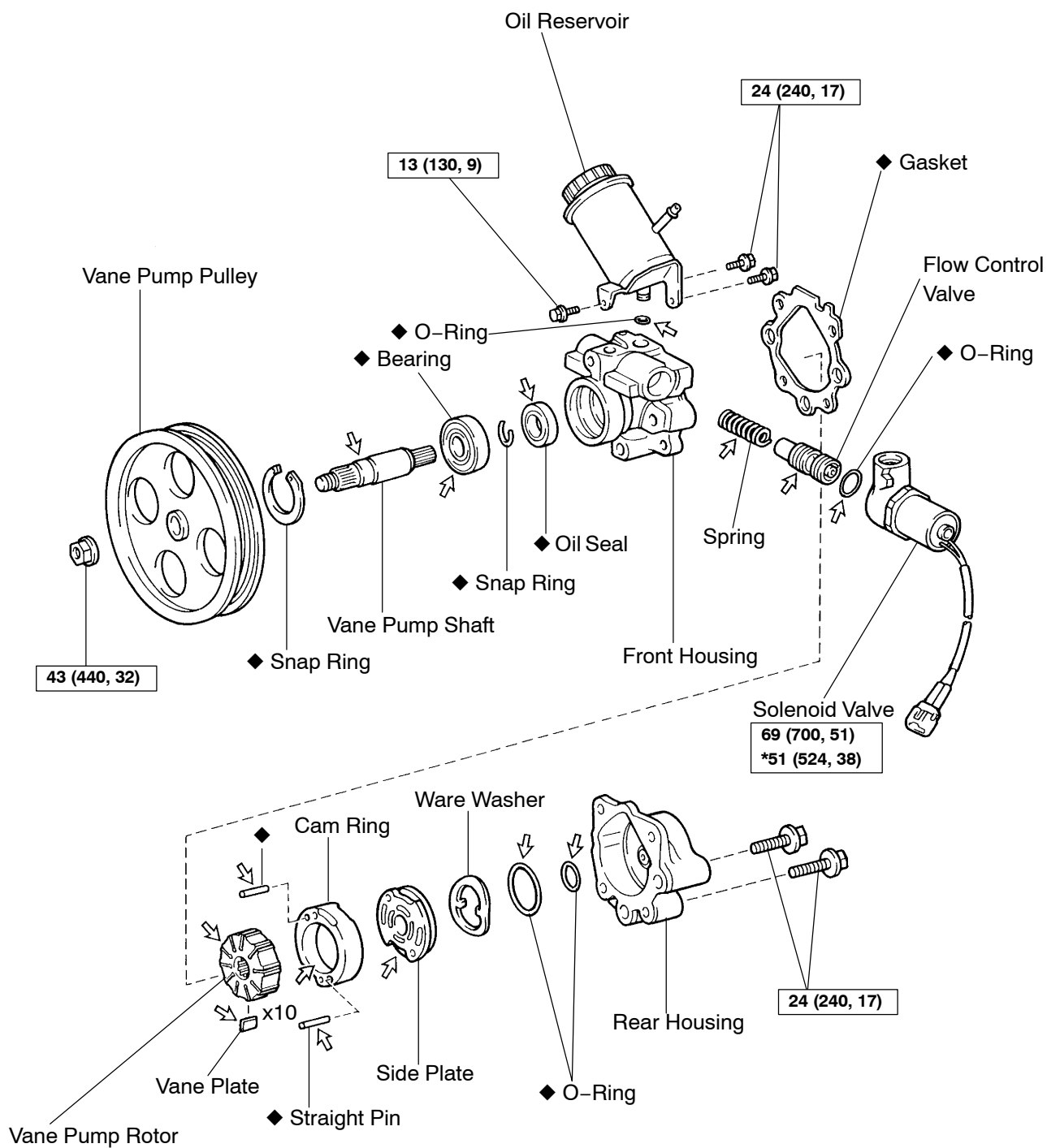
SR0GA-01



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

◆ Non-reusable part

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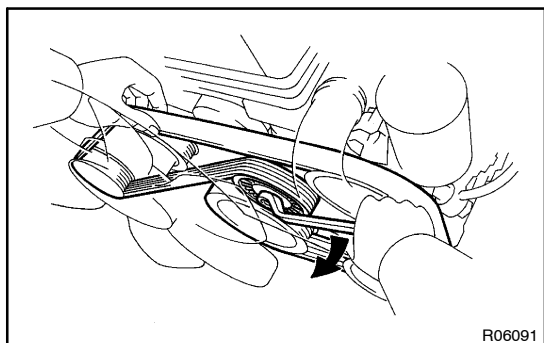


N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non-reusable part

⇨ Power steering fluid

\* For use with SST



## REMOVAL

### 1. REMOVE ENGINE UNDER COVER

Remove the 16 bolts.

### 2. REMOVE DRIVE BELT

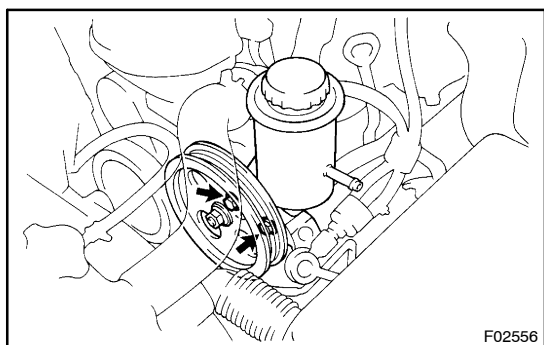
Loosen the drive belt tension by turning the drive belt tensioner clockwise, and remove the belt.

### 3. REMOVE RETURN HOSE

Remove the clip and disconnect the hose.

### 4. REMOVE PRESSURE FEED TUBE

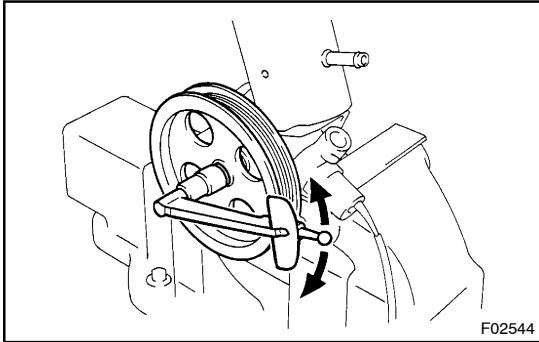
Remove the union bolt and gasket.



### 5. REMOVE PS VANE PUMP ASSEMBLY

(a) Disconnect the connector.

(b) Remove the 2 bolts.



## DISASSEMBLY

### NOTICE:

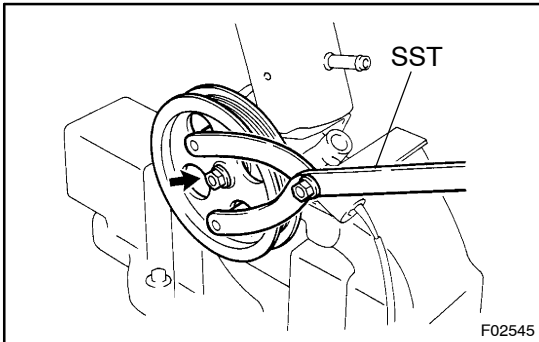
When using a vise, do not overtighten it.

#### 1. MEASURE PS VANE PUMP ROTATING TORQUE

- Check that the pump rotates smoothly without abnormal noise.
- Using a torque wrench, check the pump rotating torque.

**Rotating torque:**

**0.25 N·m (2.5 kgf·cm, 2.2 in.·lbf) or less**



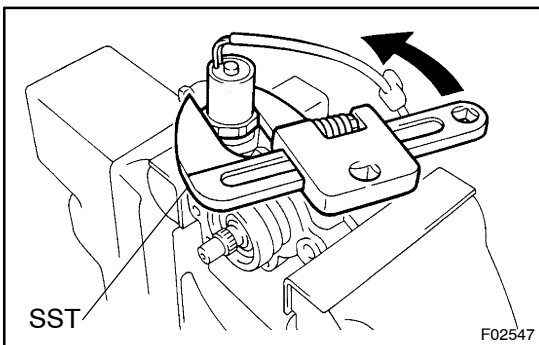
#### 2. REMOVE VANE PUMP PULLEY

Using SST to stop the pulley rotating, remove the pulley set nut.

SST 09960-10010 (09962-01000, 09963-01000)

#### 3. REMOVE OIL RESERVOIR

- Remove the 3 bolts and oil reservoir.
- Remove the O-ring from the oil reservoir.



#### 4. REMOVE SOLENOID VALVE

- Using SST, remove the valve

SST 09922-10010

### NOTICE:

Use SST 09922-10010 in the direction shown in the illustration.

- Remove the O-ring from the valve.

#### 5. REMOVE FLOW CONTROL VALVE AND SPRING

#### 6. REMOVE REAR HOUSING

- Remove the 2 bolts.
- Remove the 2 O-rings from the housing.

#### 7. REMOVE WAVE WASHER

#### 8. REMOVE SIDE PLATE

#### 9. REMOVE CAM RING, 10 VANE PLATES AND VANE PUMP ROTOR

### NOTICE:

Be careful not to drop the plate.

#### 10. REMOVE STRAIGHT PINS

Remove the 2 pins from the front housing.

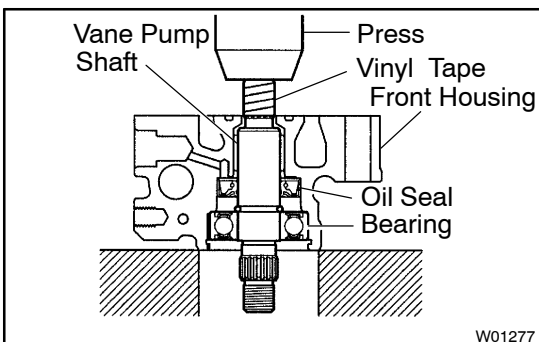
#### 11. REMOVE GASKET

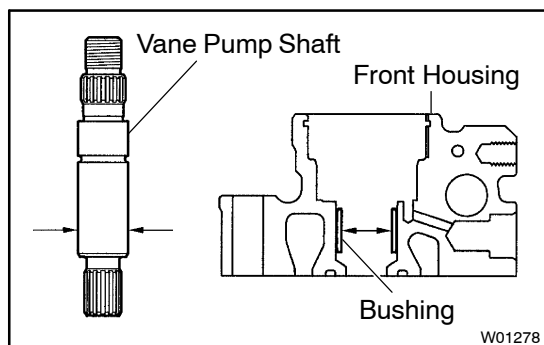
#### 12. REMOVE VANE PUMP SHAFT WITH BEARING

- Using snap ring pliers, remove the snap ring from the front housing.
- Wind vinyl tape on the serrated part of the vane pump shaft.
- Press out the shaft with the bearing.

### NOTICE:

Be careful not to damage the oil seal lip.





## INSPECTION

### NOTICE:

When using a vise, do not overtighten it.

### 1. CHECK OIL CLEARANCE BETWEEN VANE PUMP SHAFT AND BUSHING

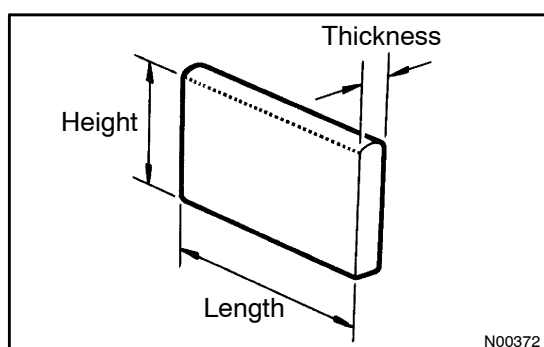
Using a micrometer and caliper gauge, measure the oil clearance.

**Standard clearance:**

**0.03 – 0.05 mm (0.0012 – 0.0020 in.)**

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

If it is more than the maximum, replace the shaft and front housing.



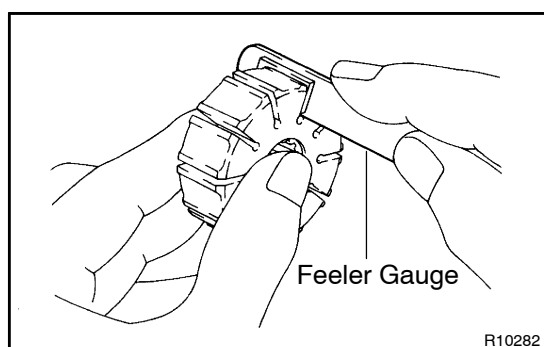
### 2. INSPECT VANE PUMP ROTOR AND VANE PLATES

- (a) Using a micrometer, measure the height, thickness and length of the 10 plates.

**Minimum height: 8.6 mm (0.339 in.)**

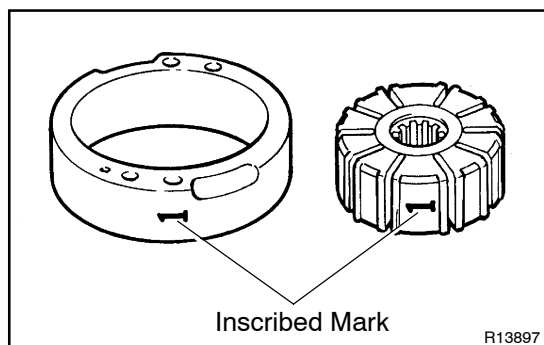
**Minimum thickness: 1.40 mm (0.0551 in.)**

**Minimum length: 14.99 mm (0.5902 in.)**



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

**Maximum clearance: 0.033 mm (0.0013 in.)**



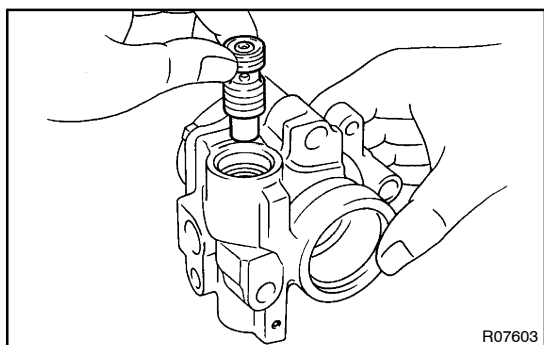
If it is more than the maximum, replace the plate and/or rotor with one having the same mark stamped on the cam ring.

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

**HINT:**

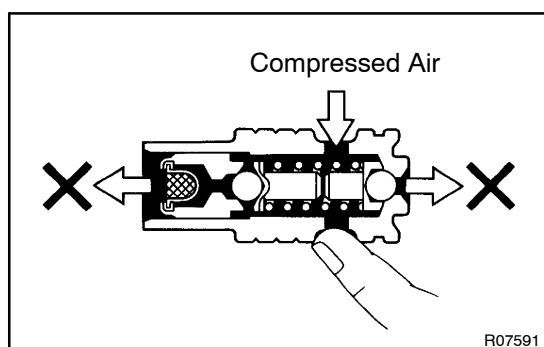
There are 5 vane plate lengths with the following rotor and cam ring marks:

| Rotor and cam ring mark | Vane plate part number | Vane plate length mm (in.)         |
|-------------------------|------------------------|------------------------------------|
| None                    | 44345-26010            | 14.999-15.001<br>(0.59051-0.59059) |
| 1                       | 44345-26020            | 14.997-14.999<br>(0.59043-0.59051) |
| 2                       | 44345-26030            | 14.995-14.997<br>(0.59035-0.59043) |
| 3                       | 44345-26040            | 14.993-14.995<br>(0.59027-0.59035) |
| 4                       | 44345-26050            | 14.991-14.993<br>(0.59020-0.59027) |

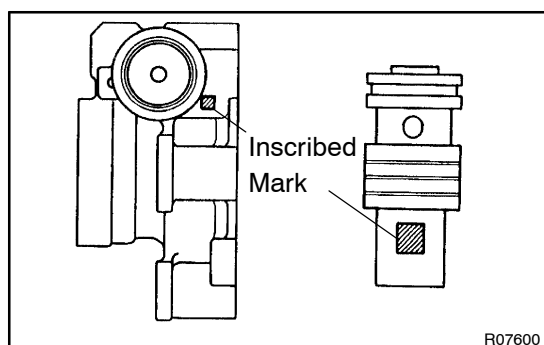


### 3. INSPECT FLOW CONTROL VALVE

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

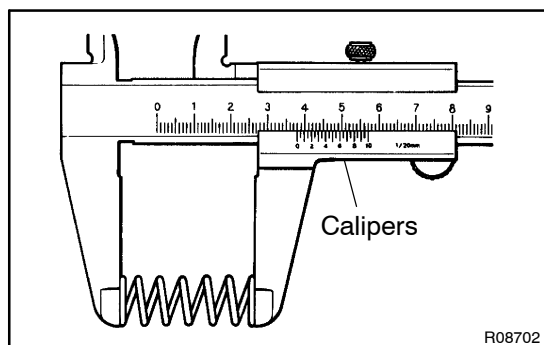


- (b) Check the flow control valve for leakage. Close one of the holes and apply compressed air 392-490 kPa (4-5 kgf/cm<sup>2</sup>, 57-71 psi) into the opposite side, and confirm that air does not come out from the end holes.



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

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

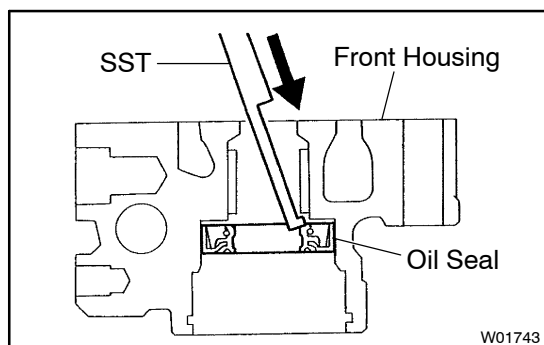


#### 4. INSPECT SPRING

Using calipers, measure the free length of the spring.

**Minimum free length: 33.2 mm (1.307 in.)**

If it is not within the specification, replace the spring.

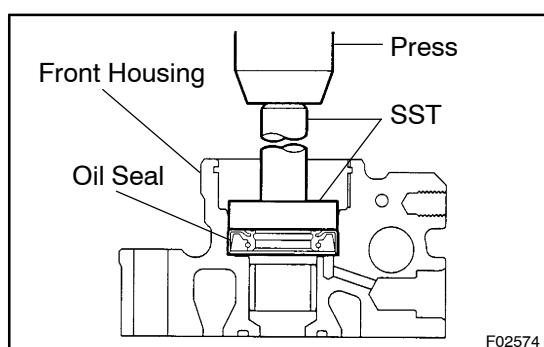


#### 5. IF NECESSARY, REPLACE OIL SEAL

- (a) Using SST, tap out the oil seal from the front housing.  
SST 09631-10030

**NOTICE:**

**Be careful not to damage the bushing of the front housing.**

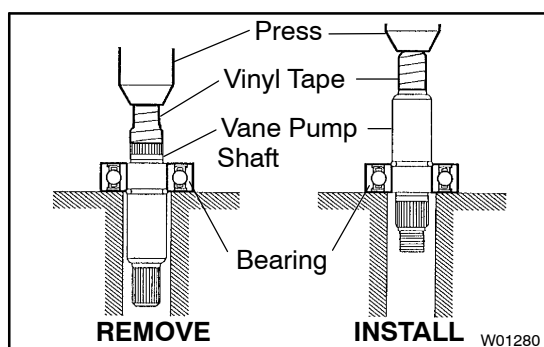


- (b) Coat a new oil seal lip with power steering fluid.

- (c) Using SST, press in the oil seal.  
SST 09950-60010 (09951-00330),  
09950-70010 (09951-07100)

**NOTICE:**

**Make sure to install the oil seal facing the correct direction.**



#### 6. IF NECESSARY, REPLACE BEARING

- (a) Press out the bearing from the vane pump shaft.  
(b) Using snap ring expander, replace the snap ring with new one.

**NOTICE:**

**Be careful not to damage the shaft.**

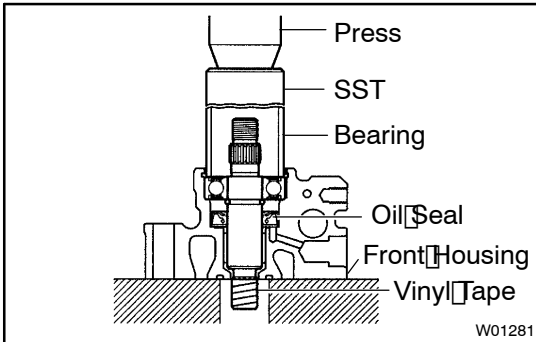
- (c) Coat a new bearing with power steering fluid.  
(d) Press in the bearing to the shaft.

## REASSEMBLY

### NOTICE:

When using a vise, do not overtighten it.

1. COAT WITH POWER STEERING FLUID  
(See page SR-19)



### 2. INSTALL VANE PUMP SHAFT WITH BEARING

- (a) Wind vinyl tape on the serrated part of the vane pump shaft.
- (b) Using SST, press in the shaft with the bearing.  
SST 09608-04031

### NOTICE:

Be careful not to damage the oil seal.

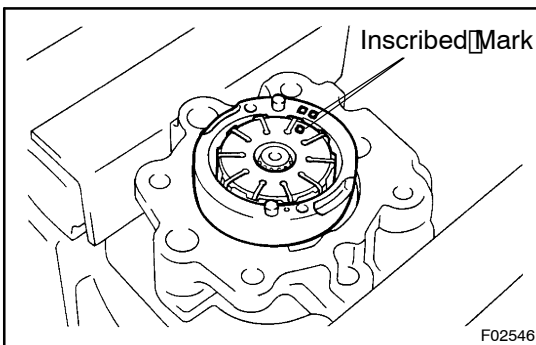
- (c) Using snap ring pliers, install a new snap ring to the front housing.

### 3. INSTALL STRAIGHT PINS

Using a plastic hammer, tap in 2 new pins to the front housing.

### NOTICE:

Be careful not to damage the pins.



### 4. INSTALL CAM RING

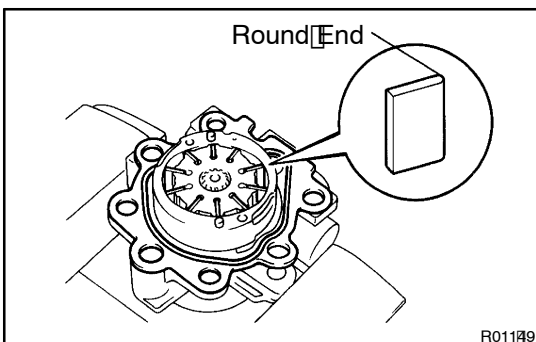
Install the ring with the inscribed mark facing outward.

### HINT:

Align the holes of the cam ring with the straight pins.

### 5. INSTALL VANE PUMP ROTOR

Install the rotor with the inscribed mark facing outward.



### 6. INSTALL VANE PLATES AND GASKET

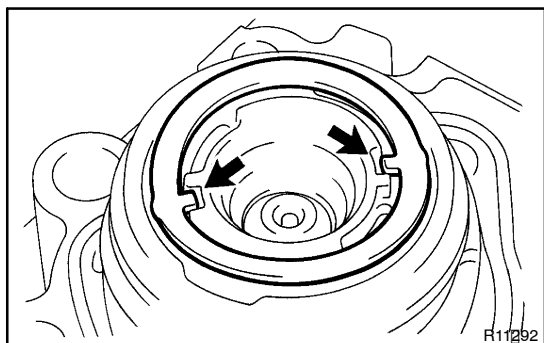
- (a) Install the 10 plates with the round end facing outward.
- (b) Install a new gasket on the front housing.

### NOTICE:

Be careful the direction of the gasket.

### 7. INSTALL SIDE PLATE

Align the holes of the plate and 2 straight pins.

**8. INSTALL WAVE WASHER**

Install the washer so that its protrusions fit into the slots in the side plate.

**9. INSTALL REAR HOUSING**

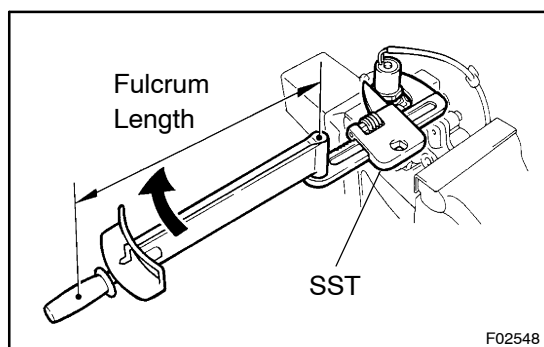
- (a) Coat 2 new O-rings with power steering fluid and install them to the housing.
- (b) Torque the 2 bolts.

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

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

Install the valve facing the correct direction.

(See page SR-19)

**11. INSTALL SOLENOID VALVE**

- (a) Install a new O-ring with power steering fluid and install it to the valve.
- (b) Using SST, install the valve.

SST 09922-10010

**Torque: 51 N·m (524 kgf·cm, 38 ft·lbf)**

**NOTICE:**

Use SST 09922-10010 in the direction shown in the illustration.

**HINT:**

Use a torque wrench with a fulcrum length of 345 mm (13.58 in.).

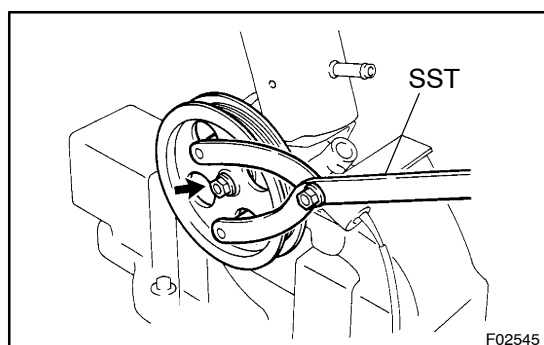
**12. INSTALL OIL RESERVOIR**

- (a) Coat a new O-ring with power steering fluid and install it to the oil reservoir.
- (b) Torque the 3 bolts.

**Torque:**

**Front side bolt: 13 N·m (130 kgf·cm, 9 ft·lbf)**

**Rear side bolts: 24 N·m (240 kgf·cm, 17 ft·lbf)**

**13. INSTALL VANE PUMP PULLEY**

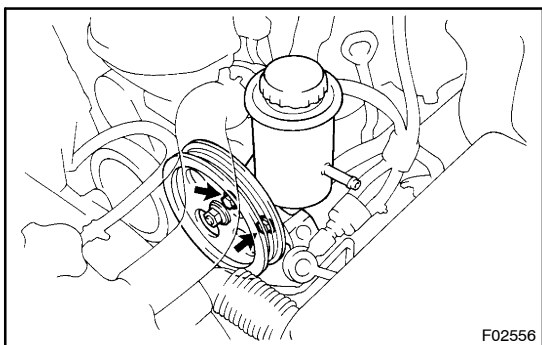
Using SST to stop the pulley rotating, torque the pulley set nut.

SST 09960-10010 (09962-01000, 09963-01000)

**Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)**

**14. MEASURE PS VANE PUMP ROTATING TORQUE**

(See page SR-22)



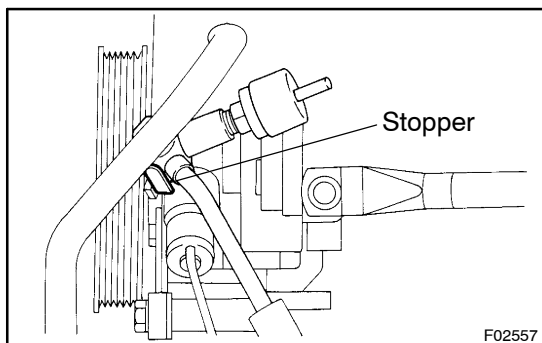
## INSTALLATION

### 1. INSTALL PS VANE PUMP ASSEMBLY

(a) Torque the 2 bolts.

**Torque: 58 N·m (590 kgf·cm, 43 ft·lbf)**

(b) Connect the connector.



### 2. CONNECT PRESSURE FEED TUBE

Torque the union bolt over a new gasket.

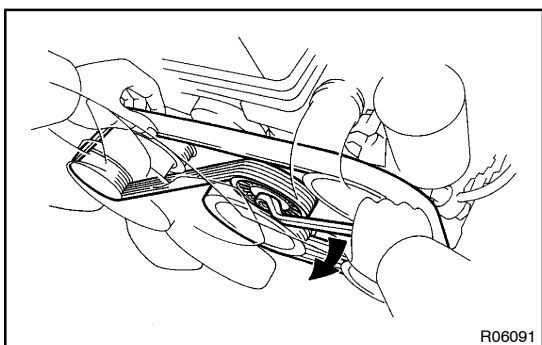
HINT:

Make sure that the stopper of the tube is touching the PS Vane pump body, as shown, before torquing the bolt.

**Torque: 49 N·m (500 kgf·cm, 36 ft·lbf)**

### 3. CONNECT RETURN HOSE

Connect the hose with the clip.



### 4. INSTALL DRIVE BELT

Loosen the drive belt tension by turning the drive belt tensioner clockwise, and install the belt.

### 5. INSTALL ENGINE UNDER COVER

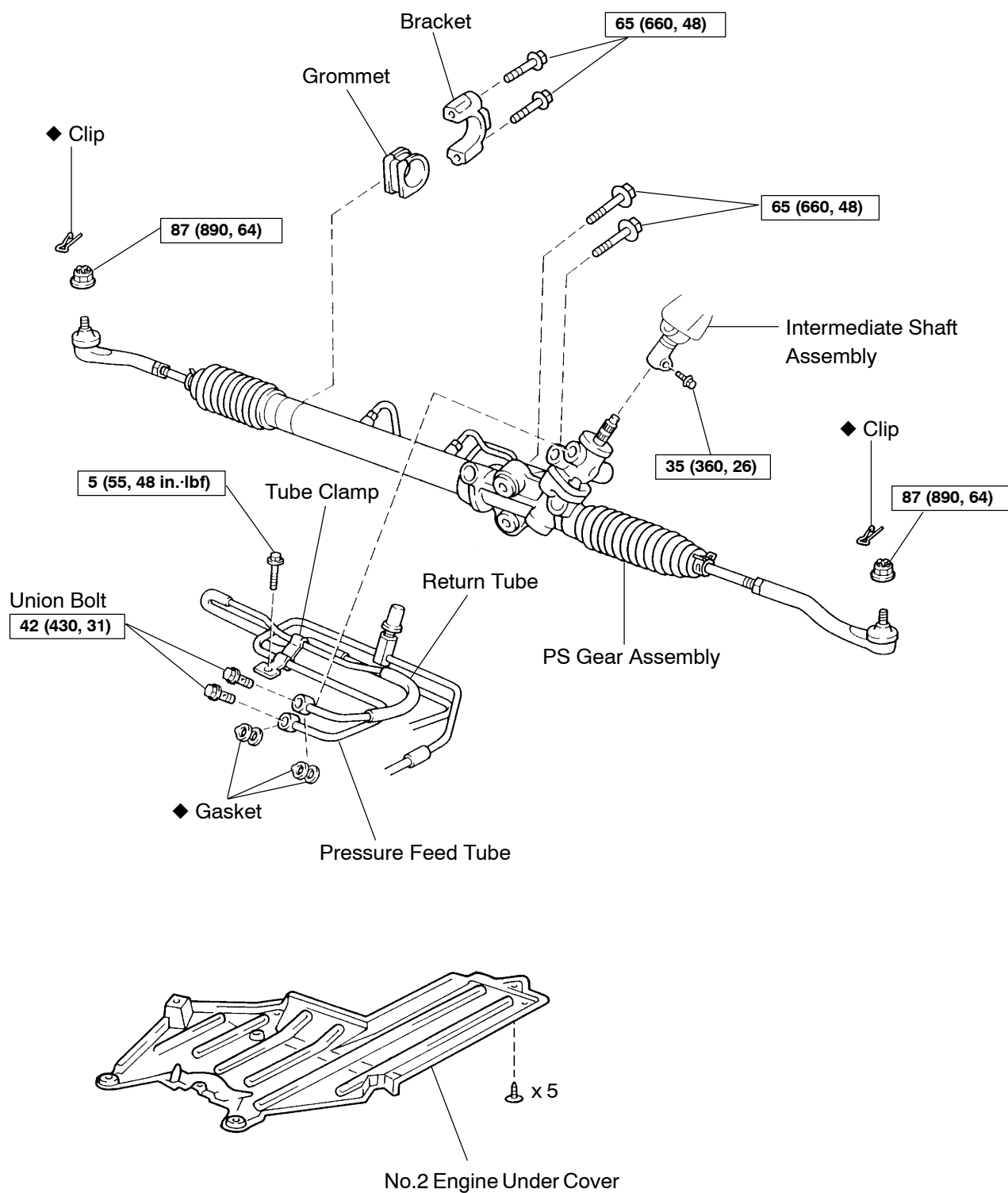
Tighten the 16 bolts.

### 6. BLEED POWER STEERING SYSTEM

(See page SR-4)

# POWER STEERING GEAR COMPONENTS

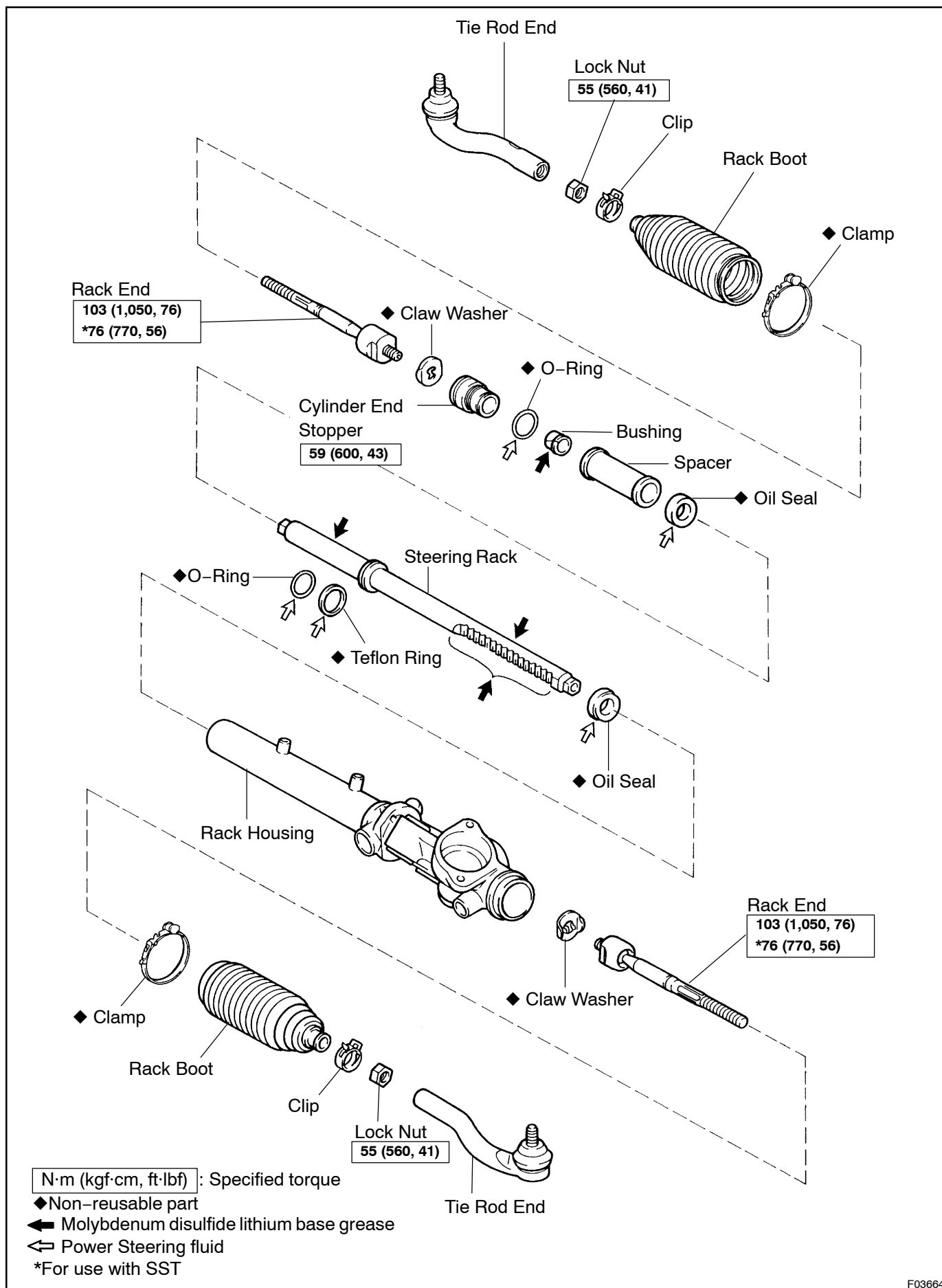
SR0E2-02

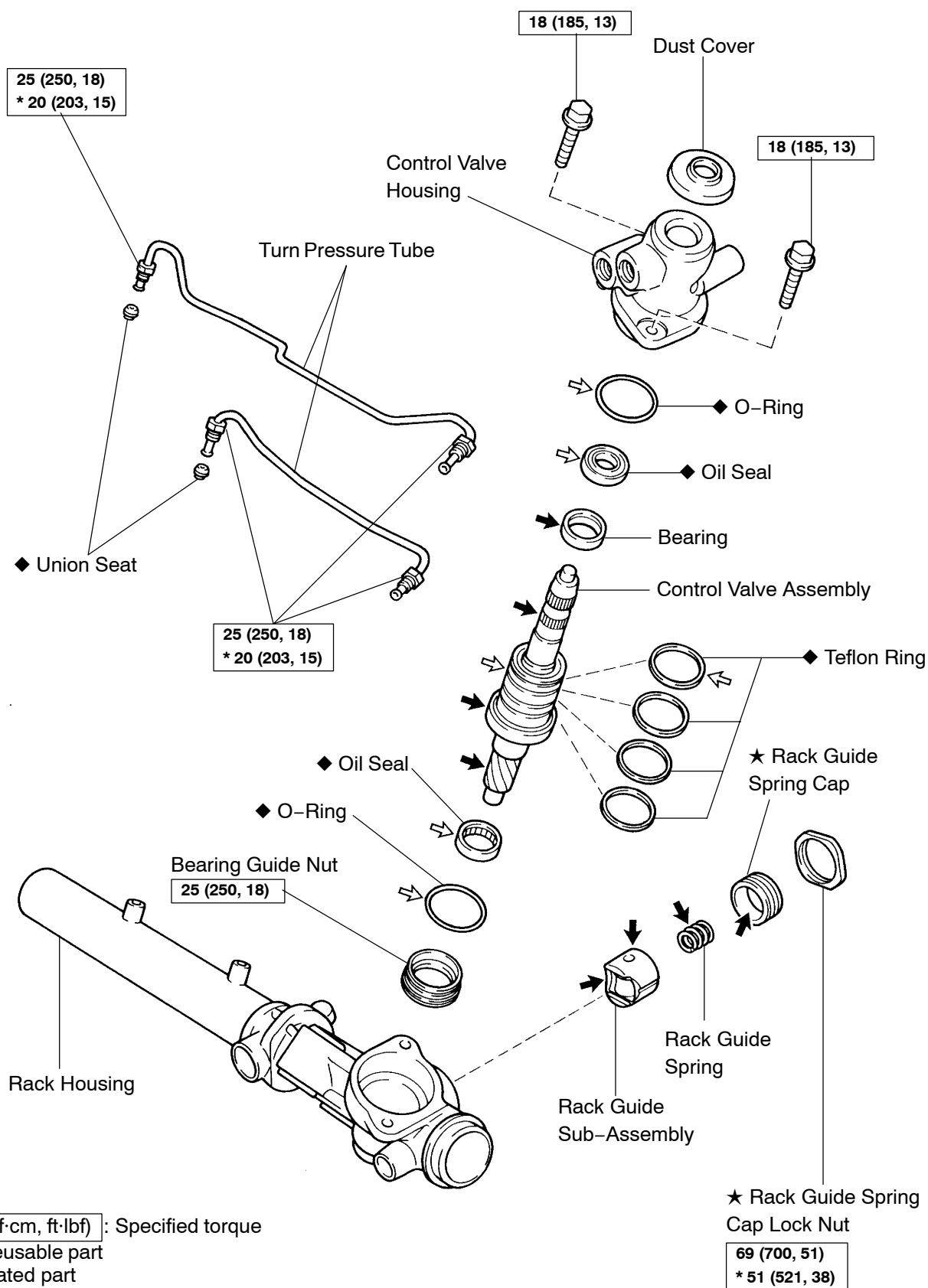


N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non-reusable part

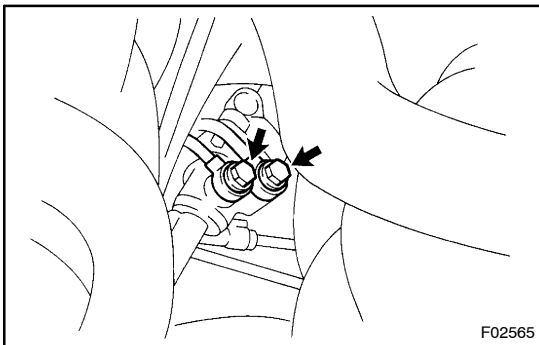
F03746



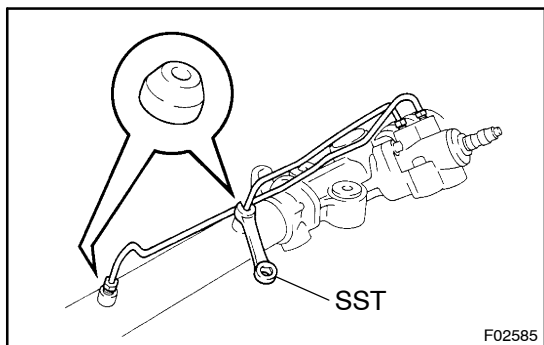


## REMOVAL

1. PLACE FRONT WHEELS FACING STRAIGHT AHEAD
2. REMOVE STEERING WHEEL PAD  
(See page SR-12)
3. REMOVE STEERING WHEEL  
(See page SR-12)
4. REMOVE No.2 ENGINE UNDER COVER  
Remove the 5 bolts.
5. DISCONNECT RH AND LH TIE ROD ENDS  
(See page SA-9)
6. DISCONNECT INTERMEDIATE SHAFT ASSEMBLY  
(See page SR-12)



7. DISCONNECT PRESSURE FEED AND RETURN TUBES
  - (a) Pressure feed tube:  
Remove the union bolt and gasket.
  - (b) Return tube:  
Remove the union bolt and 2 gaskets.
8. DISCONNECT TUBE CLAMP  
Remove the bolt.
9. REMOVE PS GEAR ASSEMBLY
  - (a) Disconnect the connector.
  - (b) Remove the 4 gear assembly set bolts.
10. REMOVE BRACKET AND GROMMET



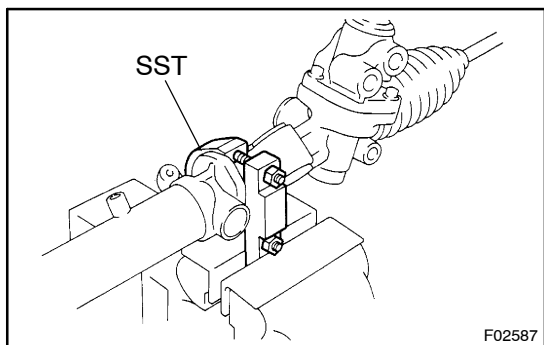
## DISASSEMBLY

### NOTICE:

When using a vise, do not overtighten it.

#### 1. REMOVE 2 TURN PRESSURE TUBES

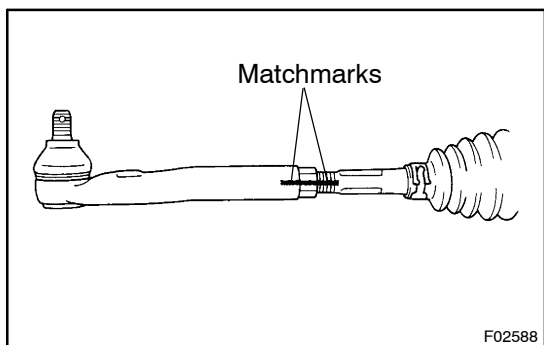
- (a) Using SST, remove the tube.  
SST 09633-00020
- (b) Remove the union seat from the rack housing.



#### 2. SECURE PS GEAR ASSEMBLY IN VISE

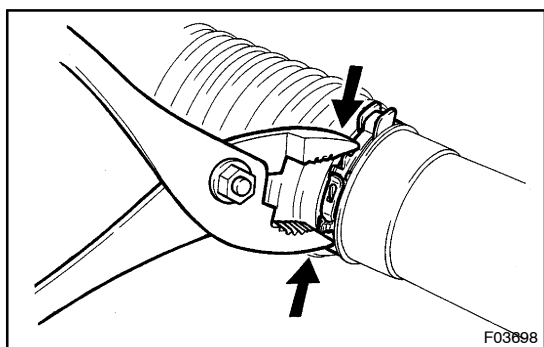
Using SST, secure the gear assembly in a vise, as shown in the illustration.

SST 09612-00012



#### 3. REMOVE RH AND LH TIE ROD ENDS AND LOCK NUTS

Place matchmarks on the tie rod end and rack end.

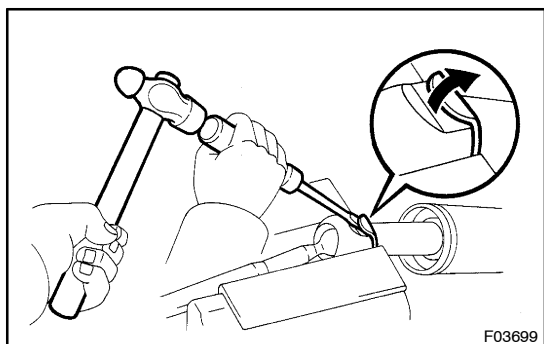


#### 4. REMOVE RH AND LH CLIPS, RACK BOOTS AND CLAMPS

Using pliers, loosen the clamp, as shown in the illustration.

### NOTICE:

- Be careful not to damage the boot.
- Mark the RH and LH boots.

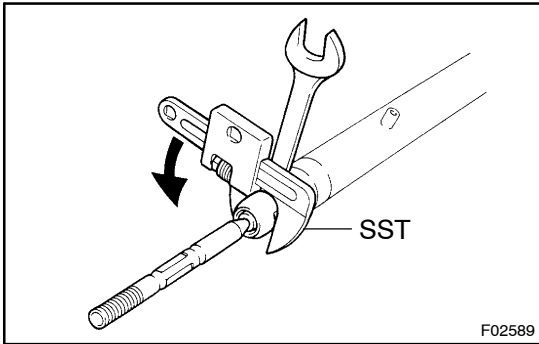


#### 5. REMOVE RH AND LH RACK ENDS AND CLAW WASHERS

- (a) Using a screwdriver and hammer, stake back the washer.

### NOTICE:

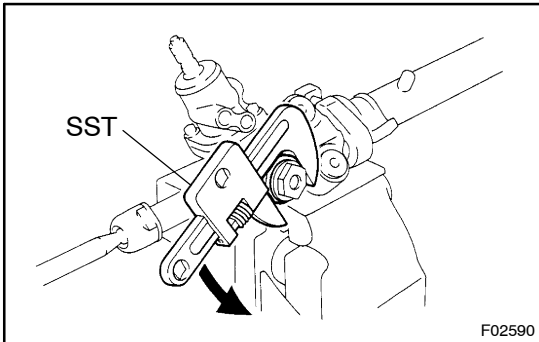
Avoid any impact to the steering rack.



- (b) Using a spanner to hold the steering rack steady, and using SST, remove the rack end.  
SST 09922-10010

**NOTICE:**

- Use SST 09922-10010 in the direction shown in the illustration.
- Mark the RH and LH rack ends.

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

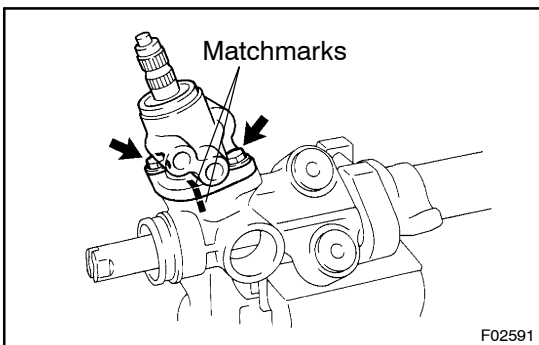
Using SST, remove the nut.

SST 09922-10010

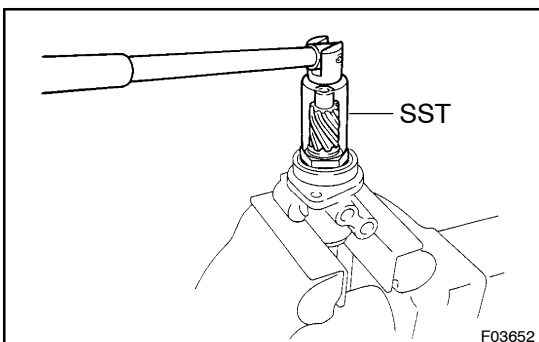
**NOTICE:**

Use SST 09922-10010 in the direction shown in the illustration.

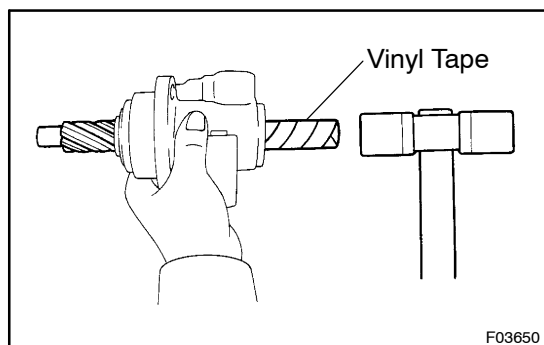
- 7. REMOVE RACK GUIDE SPRING CAP**
- 8. REMOVE RACK GUIDE SPRING AND RACK GUIDE SUB-ASSEMBLY**
- 9. REMOVE DUST COVER**

**10. REMOVE CONTROL VALVE HOUSING WITH CONTROL VALVE ASSEMBLY**

- (a) Place matchmarks on the valve housing and rack housing.
- (b) Remove the 2 bolts.
- (c) Pull out the control valve assembly with the valve housing.
- (d) Remove the O-ring from the rack housing.

**11. REMOVE CONTROL VALVE ASSEMBLY**

- (a) Using SST, loosen the bearing guide nut.  
SST 09631-20060



- (b) Wind vinyl tape to the control valve shaft.
- (c) Using a plastic hammer, tap out the valve assembly with the nut from the control valve housing.

**NOTICE:**

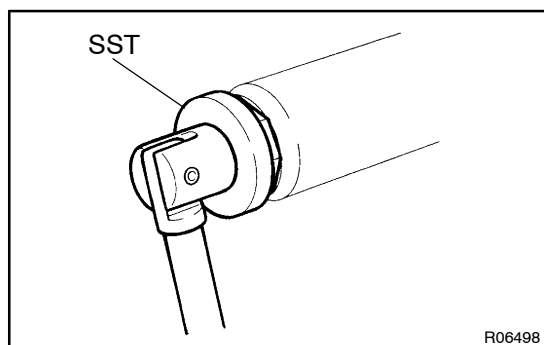
**Be careful not to damage the oil seal lip.**

- (d) Remove the nut from the valve assembly.

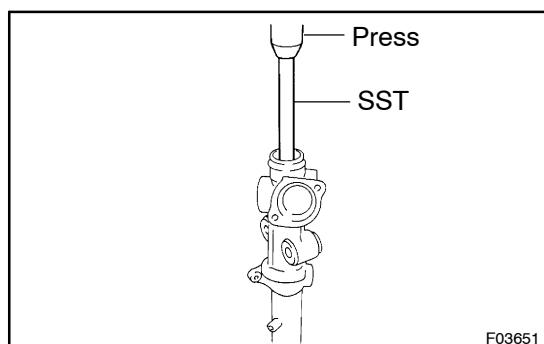
**NOTICE:**

**Be careful not to damage the oil seal lip.**

- (e) Remove the O-ring from the nut.

**12. REMOVE CYLINDER END STOPPER AND SPACER**

- (a) Using SST, remove the stopper.  
SST 09631-20090
- (b) Remove the O-ring from the stopper.

**13. REMOVE STEERING RACK AND OIL SEAL**

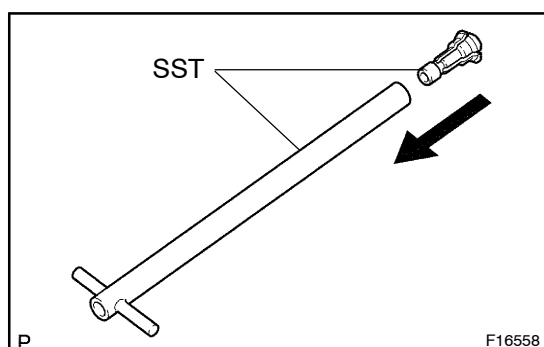
- (a) Using SST, press out the rack and oil seal.

**NOTICE:**

**Take care not to drop the rack.**

SST 09950-70010 (09951-07200)

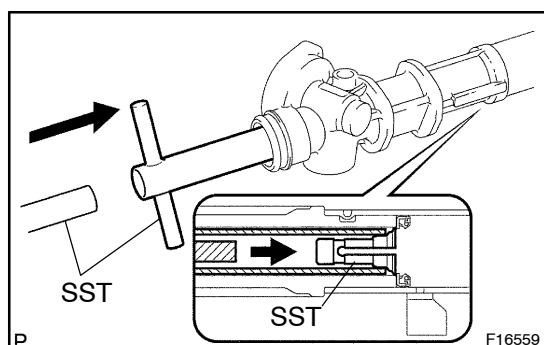
- (b) Remove the oil seal from the rack.

**14. REMOVE OIL SEAL**

- (a) Install SST (09612-07130) on SST (09612-07210).  
SST 09612-70100 (09612-07130, 09612-07210)

**NOTICE:**

- Before using them, apply a small dab of grease to the inside wall of SST (09612-07210, 09612-07130).
- To prevent the inside of the housing from being damaged securely install SST 09612-07130) on SST (09612-07210).

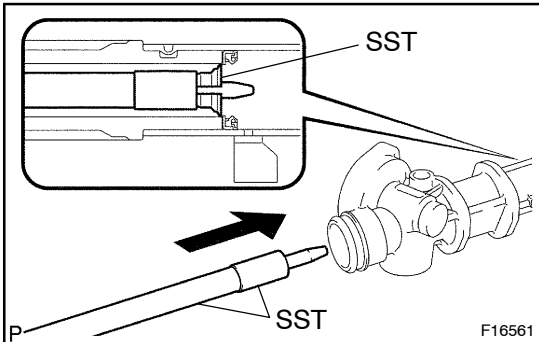
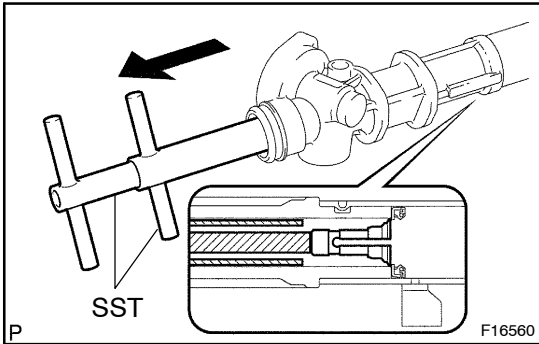


- (b) Diagonally insert SST (09612-07210) into the housing until it contacts with the oil seal, and then further insert the SST (09612-07210) until the tip of SST (09612-07220) contacts with SST (09612-07130).

SST 09612-70100 (09612-07130, 09612-07210, 09612-07220)

**NOTICE:**

**Do not damage the inside of the housing.**



- (c) Secure SST (09612-07220), and pull SST (09612-07210) to place SST (09612-07130) in the housing.  
SST 09612-70100 (09612-07130, 09612-07210, 09612-07220)

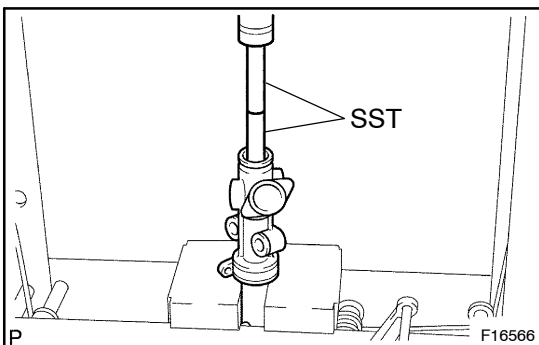
**HINT:**

Place SST on the chamfering position between the oil seal and rack housing.

- (d) Remove the SST (09612-07210, 09612-07220).  
SST 09612-70100 (09612-07210, 09612-07220)
- (e) After installing SST (09612-07240) on SST (09612-07210), insert the tip of SST (09612-07230) in the service hole of SST (09612-07130).  
SST 09612-70100 (09612-07130, 09612-07230, 09612-07240)

**NOTICE:**

- Before using them, apply a small dab of grease to the tip of SST (09612-07230).
- To prevent SST (09612-07130) from being damaged, be sure to install SST (09612-07240).
- Do not damage the inside of the rack housing.



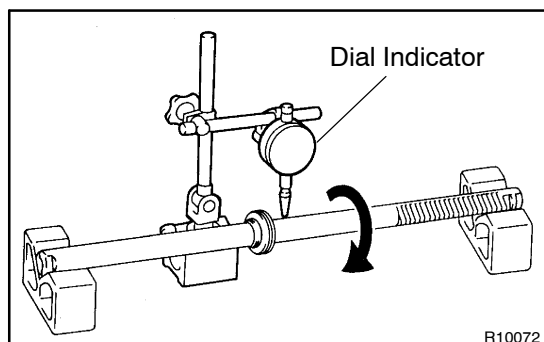
- (f) Install SST (09951-07100) on SST (09612-07230) and remove the oil seal using a press.  
SST 09612-70100 (09612-07130, 09612-07230, 09612-07240), 09950-70010 (09951-07100)

**NOTICE:**

**Do not damage the rack housing.**

**HINT:**

Replace SST (09951-07100) with SST that is different in length in the set, if necessary.



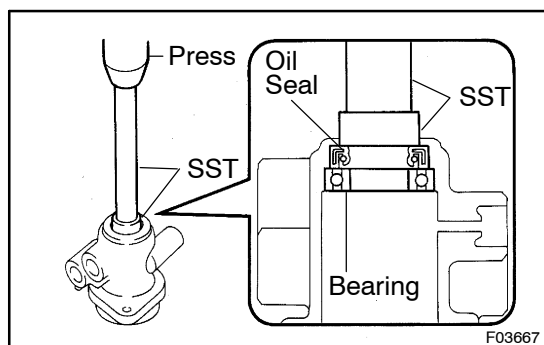
## INSPECTION

### 1. INSPECT STEERING RACK

- (a) Using a dial indicator, check the rack for runout and for teeth wear and damage.

**Maximum runout: 0.03 mm (0.0118 in.)**

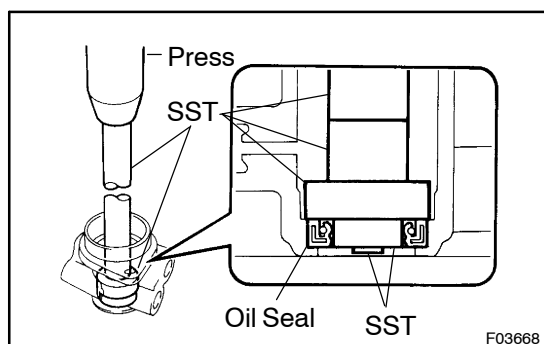
- (b) Check the back surface for wear and damage.



### 2. IF NECESSARY, REPLACE OIL SEAL AND BEARING

- (a) Using SST, press out the oil seal and bearing from the control valve housing.

SST 09950-60010 (09951-00260),  
09950-70010 (09951-07150)



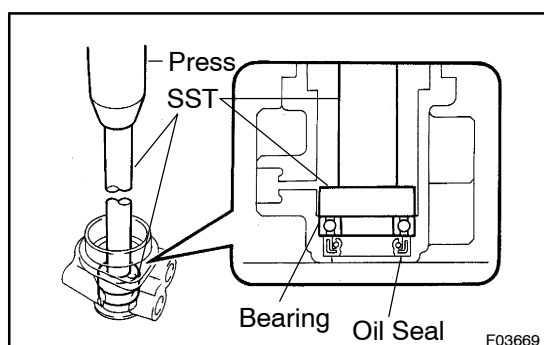
- (b) Coat a new oil seal lip with power steering fluid.

- (c) Using SST, press in the oil seal.

SST 09950-60010 (09951-00180, 09951-00330,  
09952-06010), 09950-70010 (09951-07150)

#### NOTICE:

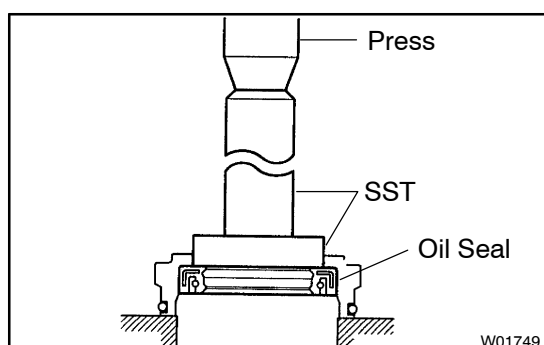
**Make sure to install the oil seal facing the correct direction.**



- (d) Coat a new bearing with molybdenum disulfide lithium base grease.

- (e) Using SST, press in the bearing.

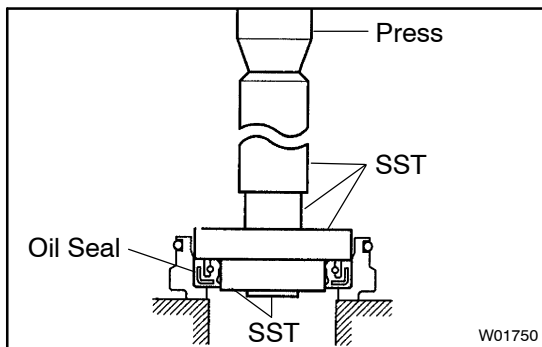
SST 09950-60010 (09951-00330),  
09950-70010 (09951-07150)



### 3. IF NECESSARY, REPLACE OIL SEAL

- (a) Using SST, press out the oil seal from the bearing guide nut.

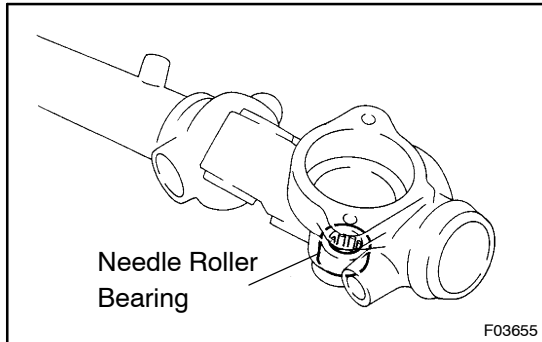
SST 09950-60010 (09951-00320),  
09950-70010 (09951-07100)



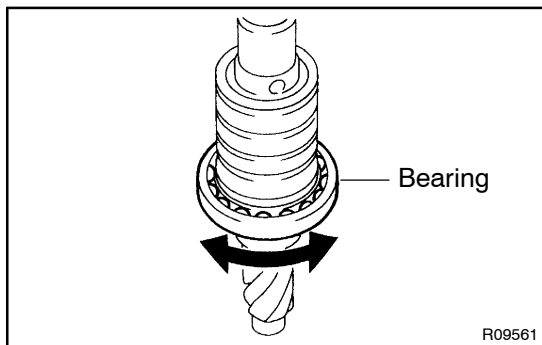
- (b) Coat a new oil seal lip with power steering fluid.
- (c) Using SST, press in the oil seal.  
SST 09950-60010 (09951-00280, 09951-00360, 09952-06010), 09950-70010 (09951-07100)

**NOTICE:**

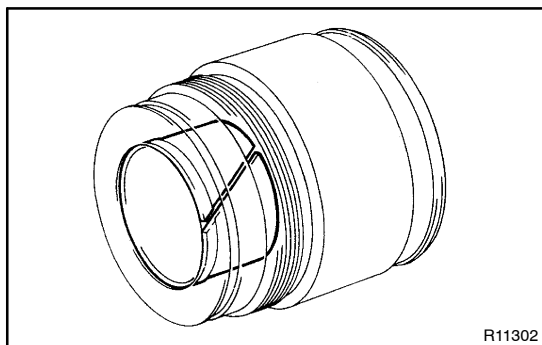
**Make sure to install the oil seal facing the correct direction.**

**4. INSPECT BEARING**

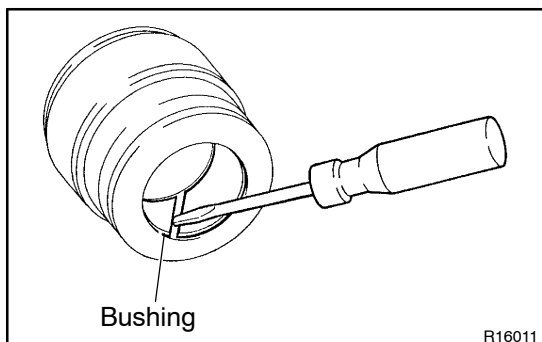
- (a) Check the needle roller bearing of the rack housing for pit-marks or damage.  
If faulty, replace the rack housing.
- (b) Coat the inside of the bearing with molybdenum disulfide lithium base grease.

**5. INSPECT BEARING**

- (a) Check the bearing rotation condition and check for abnormal noise.  
If the bearing is worn or damaged, replace the control valve assembly.
- (b) Coat the bearing with molybdenum disulfide lithium base grease.

**6. INSPECT BUSHING**

- (a) Check the inside of the bushing of the cylinder end stopper for cracks. If faulty, replace the bushing.
- (b) Apply molybdenum disulfide lithium base grease to the inside of the bushing.

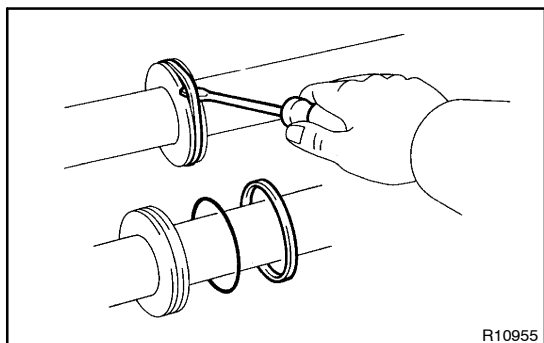
**7. IF NECESSARY, REPLACE BUSHING**

- (a) Using a screwdriver, remove the bushing from the cylinder end stopper.

**NOTICE:**

**Be careful not to damage the cylinder end stopper.**

- (b) Coat the inside of a new bushing with molybdenum disulfide lithium base grease.
- (c) Install the bushing.



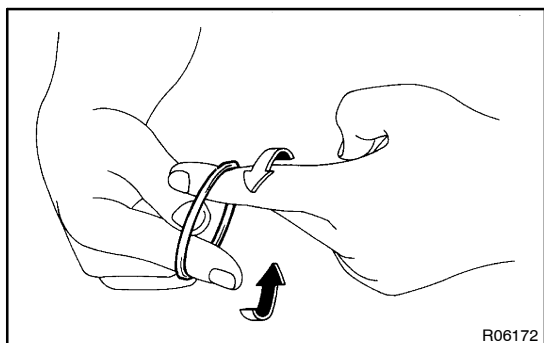
## 8. IF NECESSARY, REPLACE TEFLON RING AND O-RING

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

### NOTICE:

**Be careful not to damage the groove for the ring.**

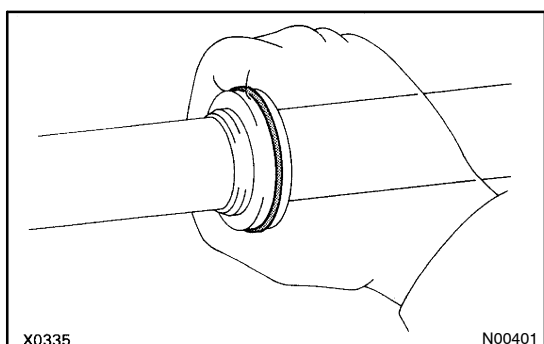
- (b) Coat a new O-ring with power steering fluid and install it.



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

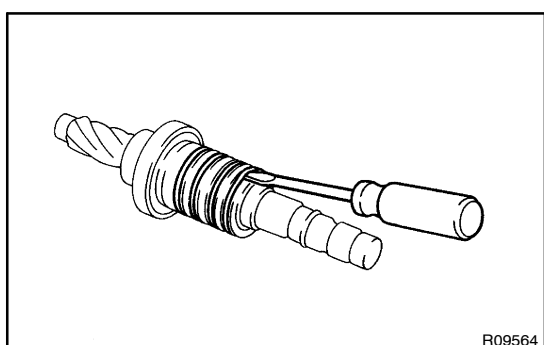
### NOTICE:

**Be careful not to overexpand the ring.**



- (d) Coat the ring with power steering fluid.

- (e) Install the ring to the rack, and settle it down with your fingers.



## 9. IF NECESSARY, REPLACE TEFLON RINGS

- (a) Using a screwdriver, remove the 4 rings from the control valve assembly.

### NOTICE:

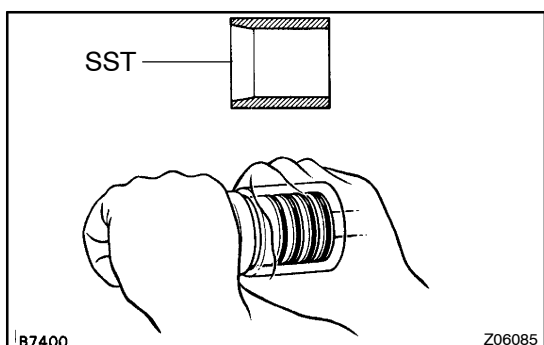
**Be careful not to damage the grooves for the ring.**

- (b) Expand 4 new rings with your fingers.

### NOTICE:

**Be careful not to overexpand the ring.**

- (c) Coat the rings with power steering fluid.



- (d) Install the rings to the control valve assembly, and settle them down with your fingers.

- (e) Carefully slide the tapered end of SST over the rings until the ring fits to the steering rack.

SST 09631-20081

### NOTICE:

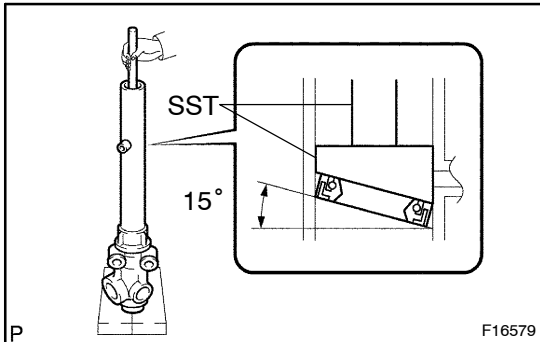
**Be careful not to damage the rings.**

## REASSEMBLY

### NOTICE:

When using a vise, do not overtighten it.

1. **COAT WITH POWER STEERING FLUID OR MOLYBDENUM DISULFIDE LITHIUM BASE GREASE**  
(See page SR-29)



### 2. INSTALL OIL SEAL

- (a) Apply power steering fluid to a new oil seal, and install the oil seal on the rack housing at an angle.

### NOTICE:

Install the oil seal in the correct direction.

### HINT:

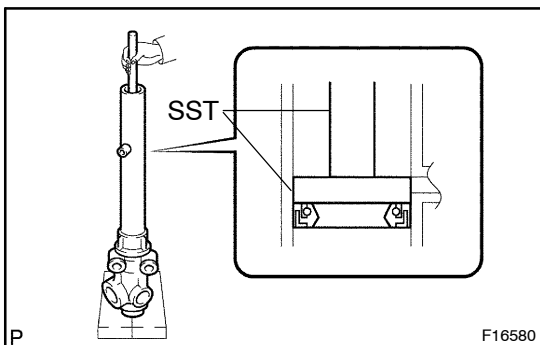
Install the oil seal so that the port faces downward with approx. 15 degrees.

- (b) Using SST, push in the oil seal by hand until it passes through the 2 ports.

SST 09631-00180, 09950-70010 (09951-07360)

### NOTICE:

Do not turn SST when inserting the oil seal.

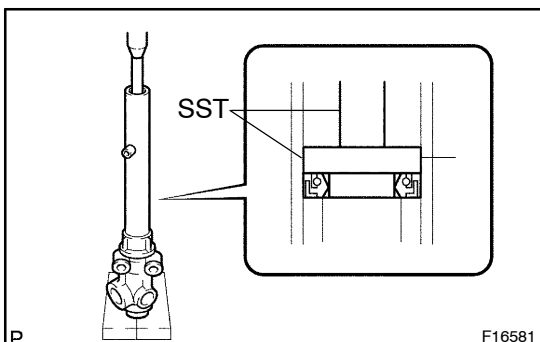


- (c) After the oil seal has passed through the ports, push in the oil seal by hand until it becomes level, using SST.

SST 09950-60010 (09951-00490), 09950-70010 (09951-07360)

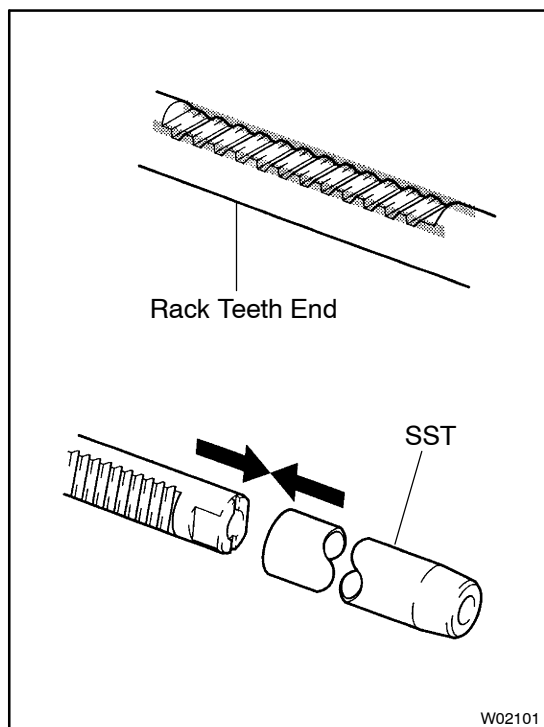
### NOTICE:

When SST is set, do not damage the inside surface of the rack housing.



- (d) After the oil seal has become level, using SST and press, install the oil seal.

SST 09950-60010 (09951-00490), 09950-70010 (09951-07360)



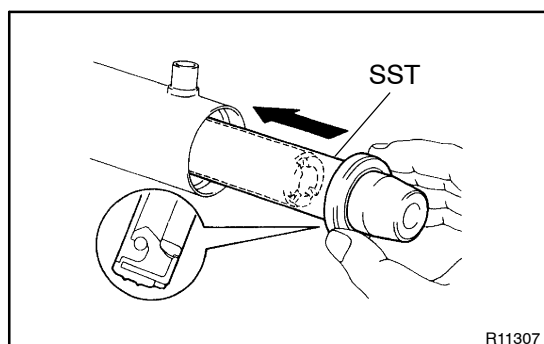
### 3. INSTALL STEERING RACK

- (a) Install SST to the rack.  
SST 09631-20102

#### HINT:

If necessary, scrape the burrs off the rack teeth end and bur-nish.

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

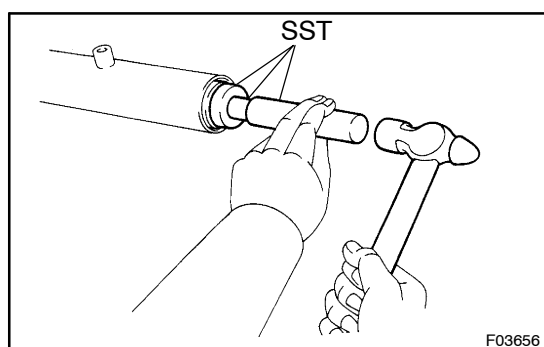


### 4. INSTALL OIL SEAL

- (a) Install SST to the steering rack opposite end.  
SST 09631-20102
- (b) Coat SST with power steering fluid.
- (c) Coat a new oil seal lip with power steering fluid.
- (d) Install the oil seal by pushing it onto the SST without tilt-ing.

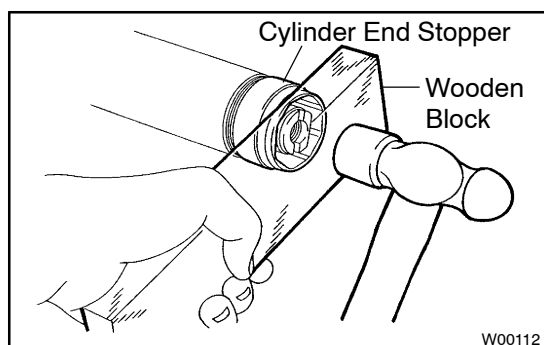
#### NOTICE:

**Make sure to install the oil seal facing the correct direction.**



### 5. INSTALL SPACER AND CYLINDER END STOPPER

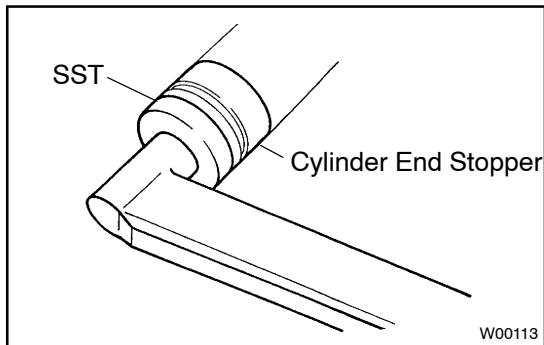
- (a) Using SST and a hammer, drive in the spacer.  
SST 09950-60010 (09951-00280, 09951-00420,  
09952-06010), 09950-70010 (09951-07200)



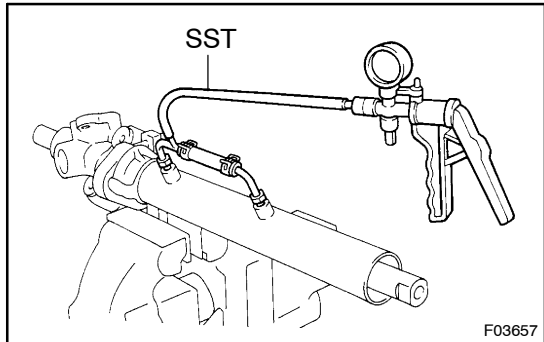
- (b) Coat a new O-ring with power steering fluid, and install it to the stopper.
- (c) Using a wooden block and hammer, drive in the stopper until it is tightly installed.

#### NOTICE:

**Be careful not to damage the O-ring.**

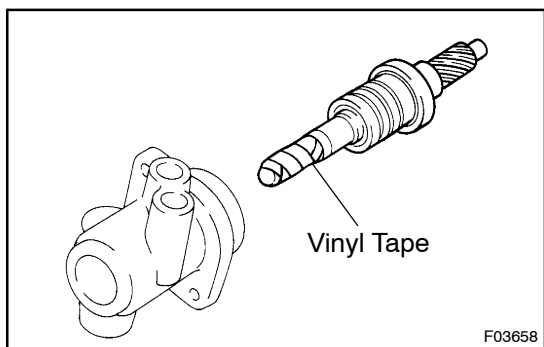


- (d) Using SST, torque the stopper.  
 SST 09631-20090  
**Torque: 59 N·m (600 kgf·cm, 43 ft·lbf)**



## 6. AIR TIGHTNESS TEST

- (a) Install SST to the unions of the rack housing.  
 SST 09631-12071  
 (b) Apply 53 kPa (400 mmHg, 15.75 in.Hg) 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 installation of the oil seals.

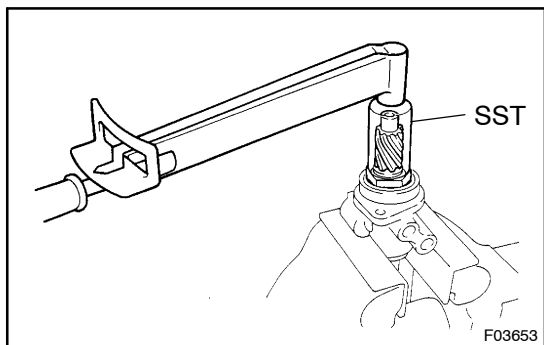


## 7. INSTALL CONTROL VALVE ASSEMBLY

- (a) Coat the teflon rings with power steering fluid.  
 (b) To prevent oil seal lip damage, wind vinyl tape on the serrated part of the control valve shaft.  
 (c) Push the valve assembly into the control valve housing.

### NOTICE:

**Be careful not to damage the teflon rings and oil seal lip.**

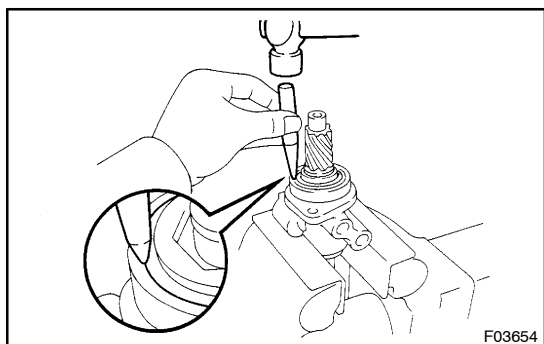


- (d) Coat a new O-ring with power steering fluid, and install it to the bearing guide nut.  
 (e) Using SST, torque the nut.  
 SST 09631-20060

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

### NOTICE:

**Be careful not to damage the oil seal lip.**



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

## 8. INSTALL CONTROL VALVE HOUSING WITH CONTROL VALVE ASSEMBLY

- (a) Coat a new O-ring with power steering fluid, and install it to the valve housing.  
 (b) Align the matchmarks on the valve housing and rack housing, and install the valve housing with the valve assembly to the rack housing.  
 (c) Torque the 2 bolts.

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

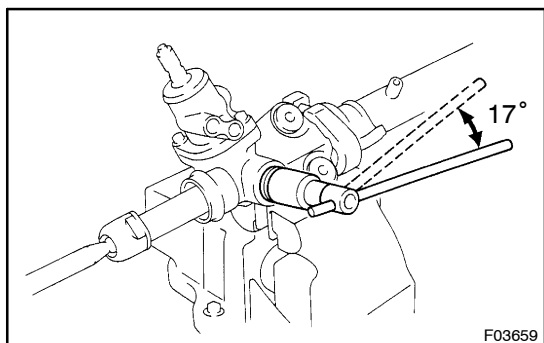
**9. INSTALL DUST COVER**  
**10. INSTALL RACK GUIDE SUB-ASSEMBLY, RACK GUIDE SPRING AND RACK GUIDE SPRING CAP**

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

**Sealant:**

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

- (b) Temporarily install the cap.



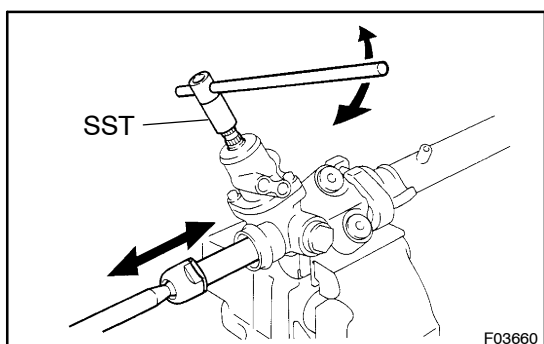
**11. ADJUST TOTAL PRELOAD**

- (a) To prevent the steering rack teeth from damaging the oil seal lip, temporarily install the RH and LH rack ends.

- (b) Torque the rack guide spring cap.

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

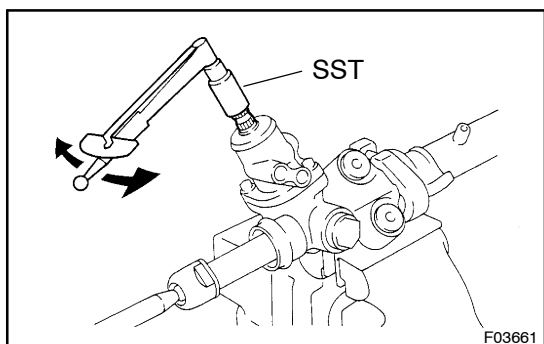
- (c) Return the cap 17°.



- (d) Using SST, turn the control valve shaft right and left 1 or 2 times.

SST 09616-00010

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

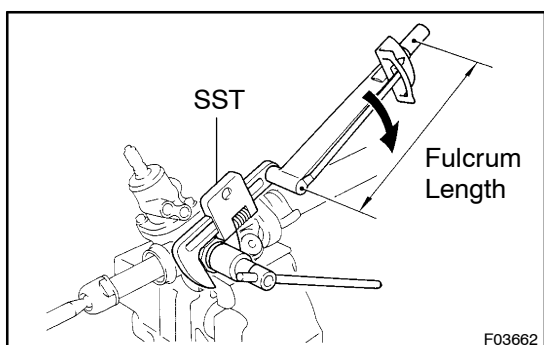


- (f) Using SST and a torque wrench, tighten the cap until the preload is within specification.

SST 09616-00010

**Preload (turning):**

**0.5 – 1.7 N·m (4.7–17.2 kgf·cm, 4.1–14.9 in·lbf)**



**12. INSTALL RACK GUIDE SPRING CAP LOCK NUT**

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

**Sealant:**

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

- (b) Holding the rack guide spring cap rotating, and using SST, torque the nut.

SST 09922-10010

**Torque: 51 N·m (521 kgf·cm, 38 ft·lbf)**

**NOTICE:**

Use SST 09922-10010 in the direction shown in the illustration.

**HINT:**

Use a torque wrench with a fulcrum length of 345 mm (13.58 in.).

- (c) Recheck the total preload.

**Preload (turning):**

**0.5 – 1.7 N·m (4.7–17.2 kgf·cm, 4.1–14.9 in.-lbf)**

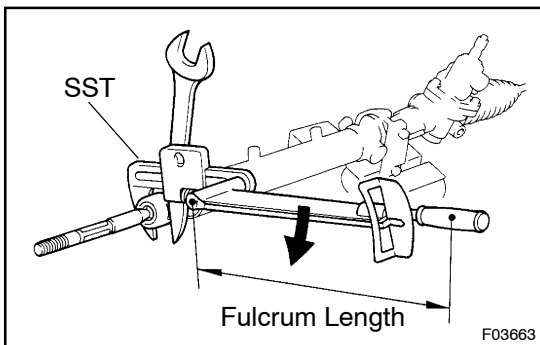
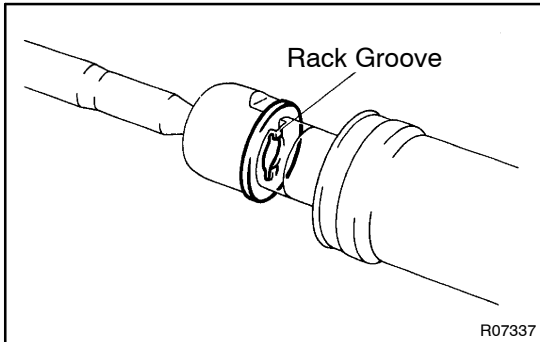
- (d) Remove the RH and LH rack ends.

### 13. INSTALL RH AND LH CLAW WASHERS AND RACK ENDS

- (a) Install a new washer, and temporarily tighten the rack end.

**HINT:**

Align the claws of the washer with the steering rack grooves.



- (b) Using a spanner to hold the steering rack steady, and using SST, torque the rack end.

SST 09922-10010

**Torque: 76 N·m (770 kgf·cm, 56 ft·lbf)**

**NOTICE:**

Use SST 09922-10010 in the direction shown in the illustration.

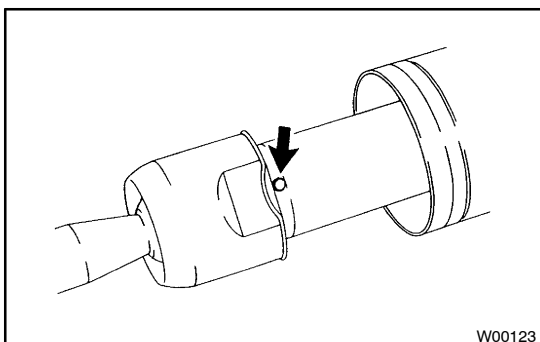
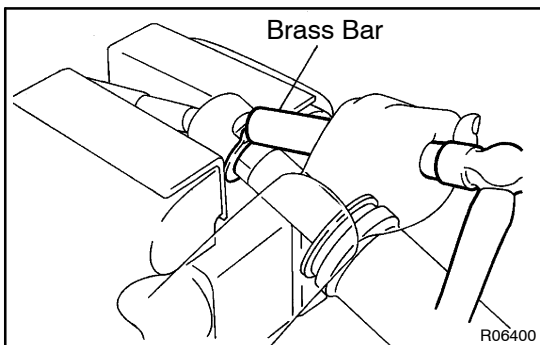
**HINT:**

Use a torque wrench with a fulcrum length of 345 mm (13.58 in.).

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

**NOTICE:**

**Avoid any impact to the rack.**

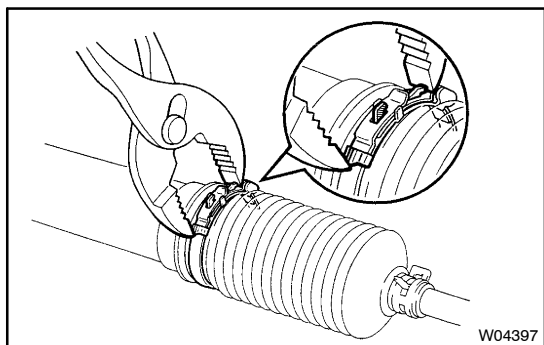


### 14. INSTALL RH AND LH RACK BOOTS, CLAMPS AND CLIPS

- (a) Ensure 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 is turned.



(b) Install the boot.

**NOTICE:**

**Be careful not to damage or twist the boot.**

(c) Using pliers tighten a new clamp, as shown in the illustration.

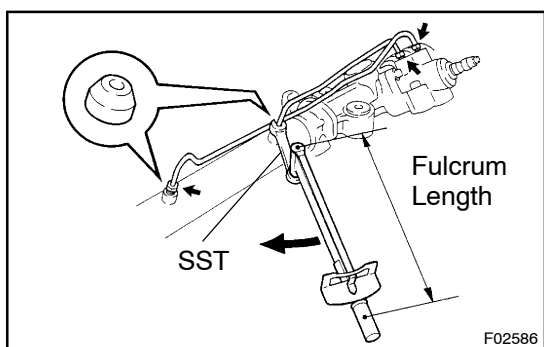
**15. INSTALL RH AND LH TIE ROD ENDS AND LOCK NUTS**

(a) Screw the lock nut and tie rod end onto the rack end until the matchmarks are aligned.

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

(See page SA-4)

**Torque: 55 N·m (560 kgf·cm, 41 ft·lbf)**



**16. INSTALL 2-TURN PRESSURE TUBES**

(a) Install a new union seat to the rack housing.

(b) Using SST, install the tube.

SST 09633-00020

**Torque: 20 N·m (203 kgf·cm, 15 ft·lbf)**

**HINT:**

- Use a torque wrench with a fulcrum length of 300 mm (11.81 in.).
- This torque value is effective in case that SST is parallel to a torque wrench.

## INSTALLATION

### 1. INSTALL GROMMET AND BRACKET

### 2. INSTALL PS GEAR ASSEMBLY

- (a) Torque the 4 gear assembly set bolts.

**Torque: 65 N·m (660 kgf·cm, 48 ft·lbf)**

- (b) Connect the connector.

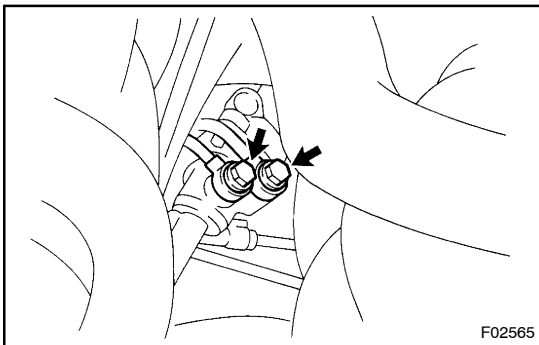
### 3. CONNECT TUBE CLAMP

Torque the bolt.

**Torque: 5 N·m (55 kgf·cm, 48 in·lbf)**

### 4. CONNECT INTERMEDIATE SHAFT ASSEMBLY

(See page SR-17)



F02565

### 5. CONNECT PRESSURE FEED AND RETURN TUBES

- (a) Pressure feed tube:

Torque the union bolt over a new gaskets.

**Torque: 42 N·m (430 kgf·cm, 31 ft·lbf)**

- (b) Return tube:

Torque the union bolt with a new gasket on each side of the tube.

**Torque: 42 N·m (430 kgf·cm, 31 ft·lbf)**

### 6. CONNECT RH AND LH TIE ROD ENDS

(See page SA-9)

### 7. INSTALL No.2 ENGINE UNDER COVER

Tighten the 5 bolts.

### 8. PLACE FRONT WHEELS FACING STRAIGHT AHEAD

HINT:

Do it with the front of the vehicle jacked up.

### 9. CENTER SPIRAL CABLE

(See page SR-17)

### 10. INSTALL STEERING WHEEL

- (a) Align the matchmarks on the wheel and steering column main shaft.

- (b) Temporarily tighten the wheel set nut.

- (c) Connect the connector.

### 11. BLEED POWER STEERING SYSTEM

(See page SR-4)

### 12. CHECK STEERING WHEEL CENTER POINT

### 13. TORQUE STEERING WHEEL SET NUT

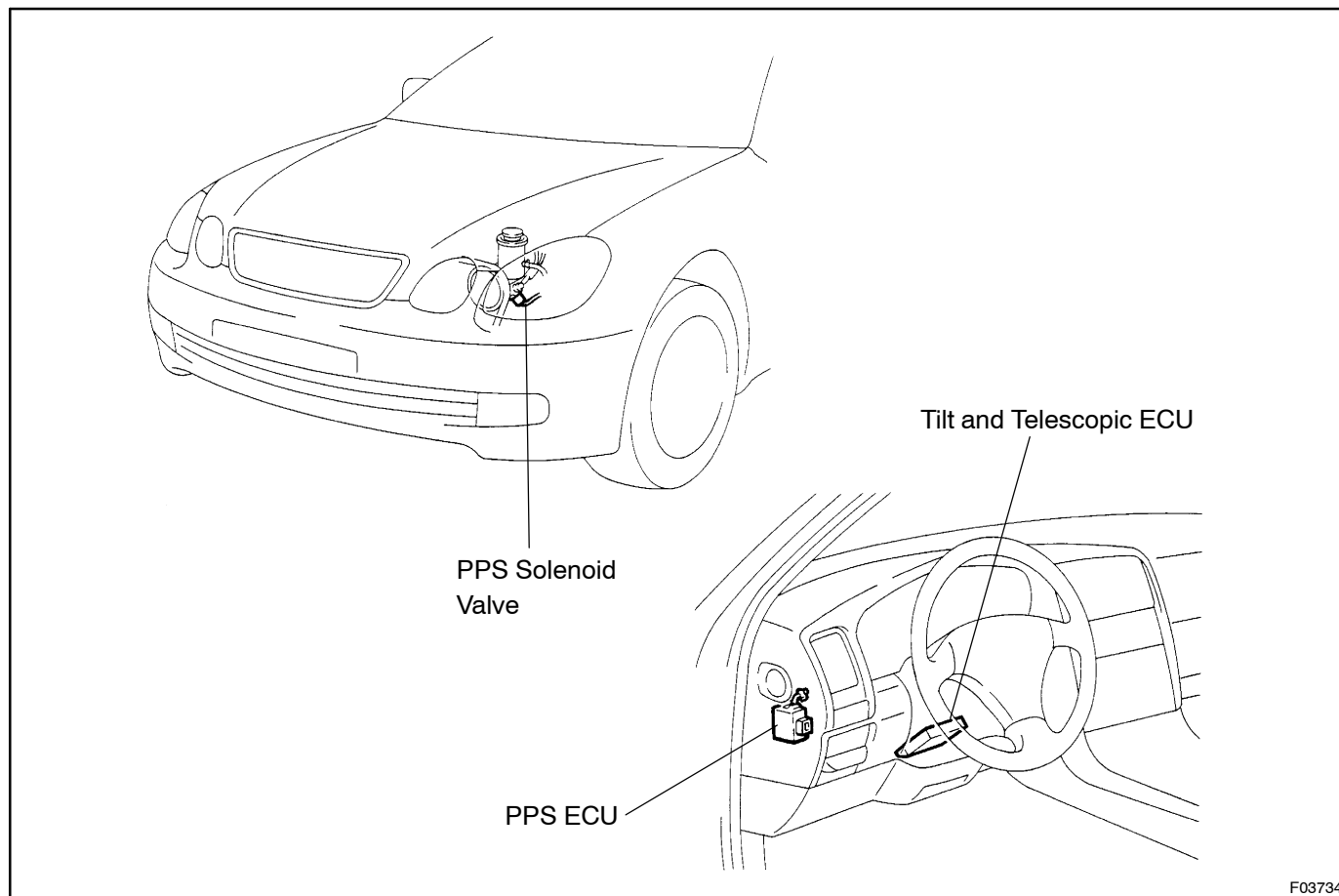
**Torque: 35 N·m (360 kgf·cm, 26 ft·lbf)**

14. INSTALL STEERING WHEEL PAD  
(See page SR-17)
15. CHECK FRONT WHEEL ALIGNMENT  
(See page SA-4)

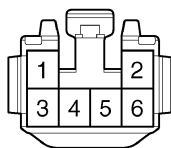
# PROGRESSIVE POWER STEERING (PPS)

## LOCATION

SR0E8-02



F03734

**Wire Harness Side:**

F03098

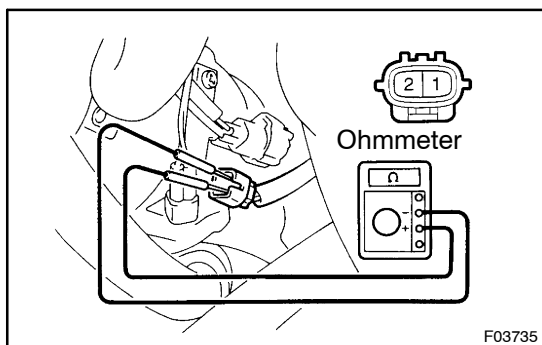
**INSPECTION**

1. **INSPECT ECU-IG FUSE (Engine room No.1 (R/B))**  
(See page BE-21)
2. **INSPECT PPS ECU CIRCUIT**
  - (a) Disconnect the PPS ECU connector.
  - (b) Inspect the connector on wire harness side, as shown in the illustration.

| Tester Connection | Condition                                                                          | Specified Condition                                                           |
|-------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|
| 4 - Body Ground   | Ignition switch ON                                                                 | Battery voltage                                                               |
| 6 - Body Ground   | Ignition switch ON                                                                 | Continuity                                                                    |
| *5 - 6            | Ignition switch ON.<br>Spin the rear wheel on one side with jacking or lifting UP. | 0 $\rightarrow$ $\infty$ $\rightarrow$ 0 $\rightarrow$ $\infty$ $\rightarrow$ |

If the circuit is not as specified, check and replace the wire harness.

\*If the circuit is not as specified, inspect the speed sensor.



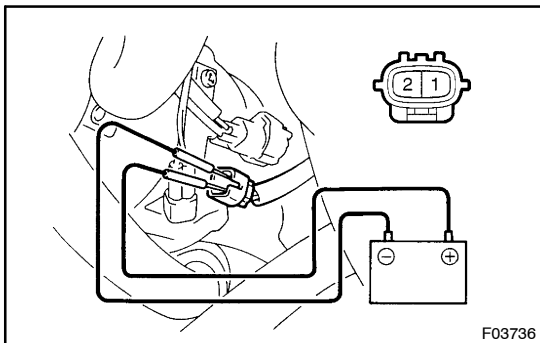
F03735

**3. INSPECT PPS SOLENOID VALVE**

- (a) Disconnect the PPS solenoid connector.
- (b) Measure the resistance between the terminals of the solenoid 1 and 2.

**Resistance: 6 – 11  $\Omega$**

If it is not as specified, replace the pressure control valve with the solenoid valve.



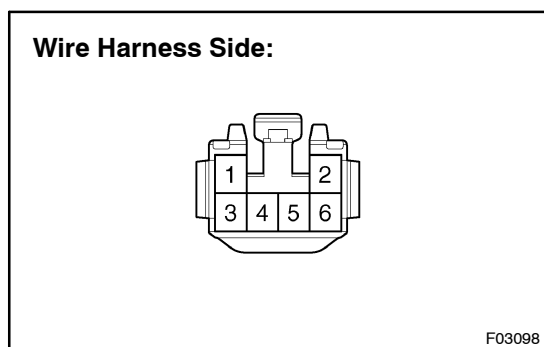
- (c) Check the PPS solenoid operation.
- (1) Connect the battery positive terminal to the solenoid terminal 1.
  - (2) Connect the battery negative terminal to the solenoid terminal 2.
  - (3) Check that the solenoid makes a "clicks" sound.

If it is 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.

- (d) Connect the PPS solenoid connector.

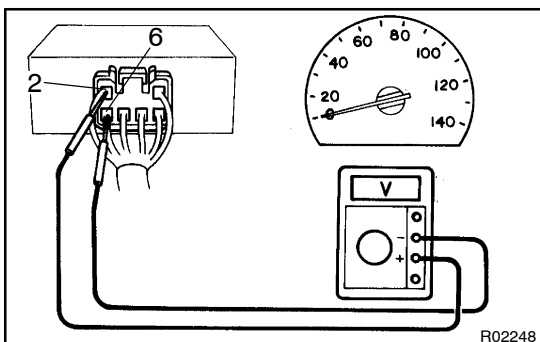


- (e) Inspect the PPS solenoid valve circuit.
- (1) Disconnect the PPS ECU connector.
  - (2) Check continuity between the terminals of the connector on wire harness side, as shown in the illustration.

| Tester connection | Specified condition |
|-------------------|---------------------|
| 1 – 6             | No continuity       |
| 2 – 6             | No continuity       |

If it is not as specified, repair or replace wire harness or connector.

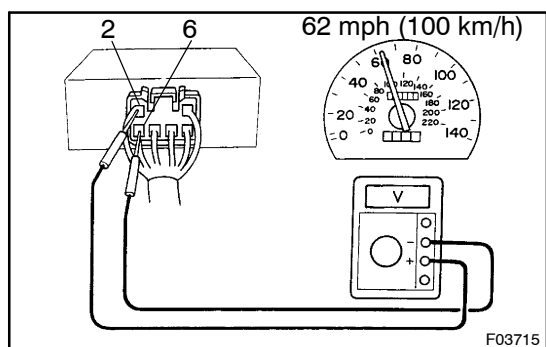
- (3) Connect the PPS ECU connector.



**4. INSPECT PPS ECU**

- (a) Jack up the vehicle and support it on stands.
- (b) Start the engine.
- (c) Measure the voltage of ECU.
  - (1) Using a voltmeter, measure the voltage between ECU terminals 2 and 6 while the engine is idling.

**Standard voltage: 0.19 – 0.24 V**



- (2) Place the transmission in gear and while running at about 62 mph (100 km/h), measure the voltage between ECU terminals 2 and 6.

**Standard voltage: 0.07 – 0.14 V**

If no voltage, try another ECU for LEXUS GS300.

- (d) Lower the vehicle.