

Last Modified: 7-13-2007		1.6 A
Service Category: Steering	Section: Power Assist Systems	
Model Year: 2008	Model: ES350	Doc ID: RM000001S2R00FX
Title: POWER STEERING: POWER STEERING LINK: REASSEMBLY (2008 ES350)		

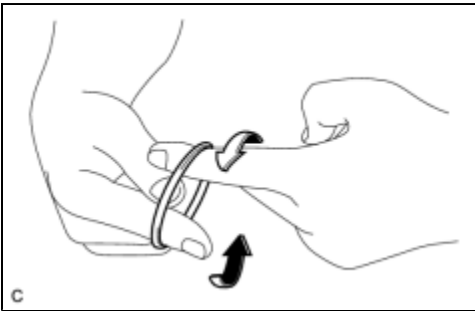
REASSEMBLY

NOTICE:

When installing parts, coat the parts indicated by arrows with power steering fluid, molybdenum disulfide lithium base grease, MP grease or silicon grease  .

1. INSTALL POWER PISTON OIL SEAL

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

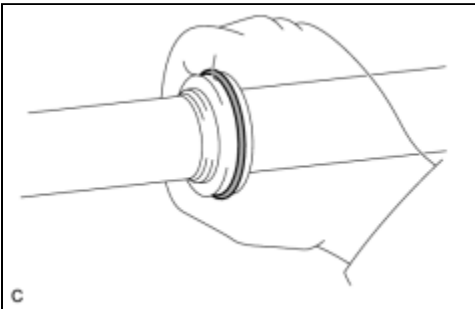


(b) Expand the new power piston oil seal with your fingers.

NOTICE:

Be careful not to expand the oil seal excessively.

(c) Coat the power piston oil seal with power steering fluid.



(d) Install the power piston oil seal to the steering rack, and adjust it with your fingers.

2. INSTALL POWER STEERING CYLINDER TUBE OIL SEAL

(a) Apply power steering fluid to the lip of a new power steering cylinder tube oil seal.

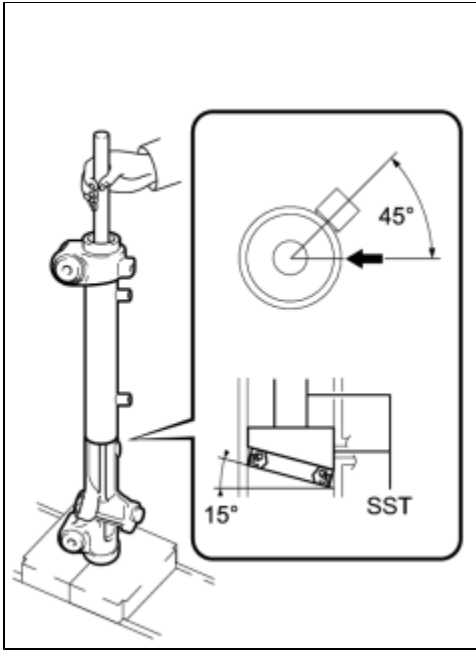
(b) Install the power steering cylinder tube oil seal to the rack housing at a slant.

(c) Using SST, insert the power steering cylinder tube oil seal by pushing the SST in by hand until the oil seal passes the 2 ports.

SST: 09950-70010

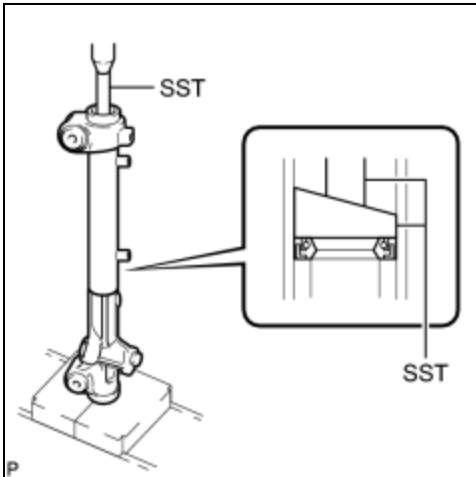
09951-07360

SST: 09631-00200

**NOTICE:**

- Ensure that the power steering cylinder tube oil seal is installed in the correct direction as shown in the illustration.
- Install the power steering cylinder tube oil seal at an angle of approximately 15° so that the lowermost part comes to the point, indicated by the arrow in the illustration, to prevent damage to the side of the oil seal when it passes the 2 ports.
- Do not turn the SST when inserting the oil seal.

(d) Install SST (09631-00200) to SST (09951-07360) upside down.



(e) Using SST, level the power steering cylinder tube oil seal by pushing the SST in by hand. Using SST and a press, install the oil seal.

SST: 09950-70010

09951-07360

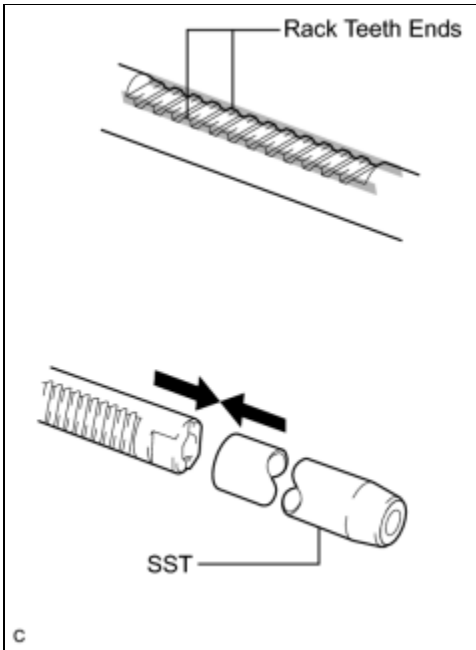
SST: 09631-00200

3. INSTALL POWER STEERING RACK SUB-ASSEMBLY

(a) Apply molybdenum disulfide lithium base grease to the rack teeth ends.

(b) Connect SST to the power steering rack sub-assembly.

SST: 09631-33010

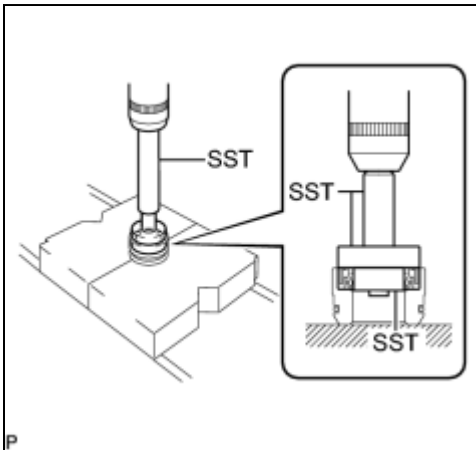


(c) Coat SST with power steering fluid.

(d) Install the power steering rack sub-assembly to the power steering rack housing.

(e) Remove SST.

4. INSTALL POWER STEERING RACK BUSHING



(a) Using SST and a press, install the rack bushing oil seal to the power steering rack bushing.

SST: 09950-70010

09951-07100

SST: 09950-60010

09951-00400

09951-00250

09952-06010

NOTICE:

Ensure that the rack bushing oil seal is installed in the correct direction as shown in the illustration.

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

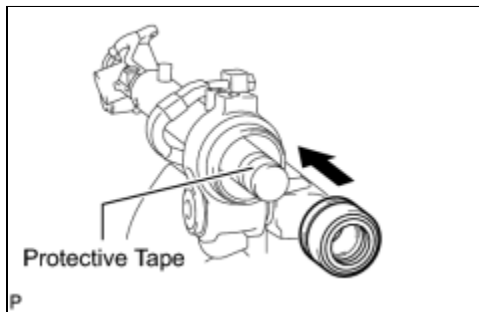
(c) Coat the rack bushing oil seal lip with power steering fluid.

(d) Install the power steering rack bushing to the power steering rack housing.

NOTICE:

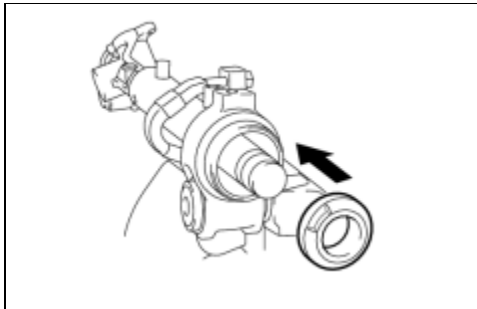
Do not damage the rack bushing oil seal.

HINT:



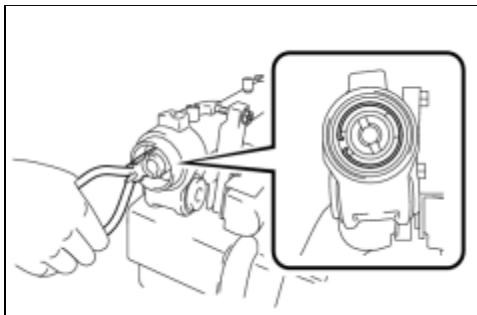
Wrap protective tape around the end of the steering rack in order to prevent damage to the rack bushing oil seal.

5. INSTALL CYLINDER END STOPPER



(a) Install the cylinder end stopper to the power steering rack housing.

6. INSTALL CYLINDER END STOPPER HOLE SNAP RING

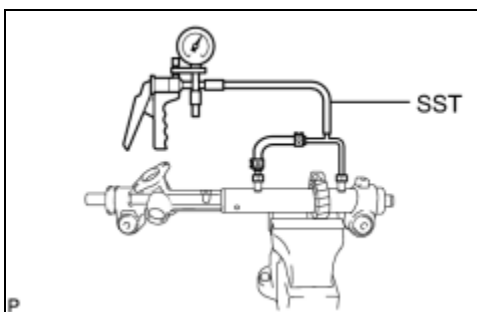


(a) Using needle nose pliers, install the cylinder end stopper hole snap ring to the power steering rack housing.

NOTICE:

- Make sure that the cylinder end stopper hole snap ring is securely installed in the power steering rack housing groove.
- Make sure that the cylinder end stopper hole snap ring claws are aligned with the cylinder end stopper notch.

7. AIR TIGHTNESS TEST



(a) Install SST to the power steering rack housing.

SST: 09631-12071

09633-00010

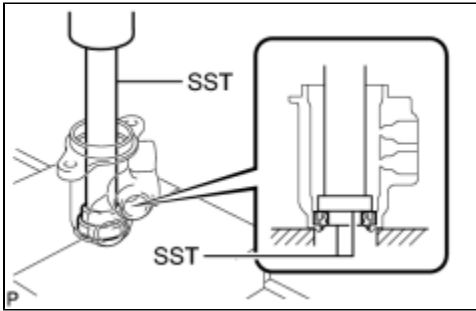
(b) Apply a vacuum of 53 kPa (398 mmHg, 15.65 in.Hg) for approximately 30 seconds.

(c) Check that there is no change in the vacuum pressure.

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

8. INSTALL POWER STEERING CONTROL VALVE UPPER OIL SEAL

(a) Coat a new power steering control valve upper oil seal lip with power steering fluid.



(b) Using SST and a press, press in the power steering control valve upper oil seal.

SST: 09950-70010

09951-07150

SST: 09950-60010

09951-00180

09952-06010

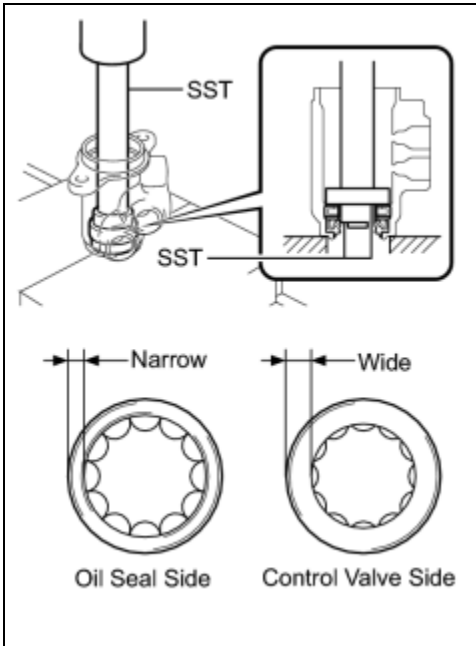
09951-00320

NOTICE:

Make sure that the power steering control valve upper oil seal is installed in the correct direction as shown in the illustration.

9. INSTALL POWER STEERING CONTROL VALVE UPPER BEARING

(a) Coat the power steering control valve upper bearing with molybdenum disulfide lithium base grease.



(b) Using SST and a press, press in the power steering control valve upper bearing.

SST: 09950-70010

09951-07150

SST: 09950-60010

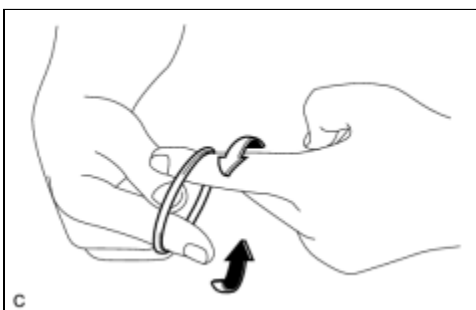
09951-00180

09951-00340

NOTICE:

Make sure that the power steering control valve upper bearing is installed in the correct direction as shown in the illustration.

10. INSTALL POWER STEERING CONTROL VALVE SPACER

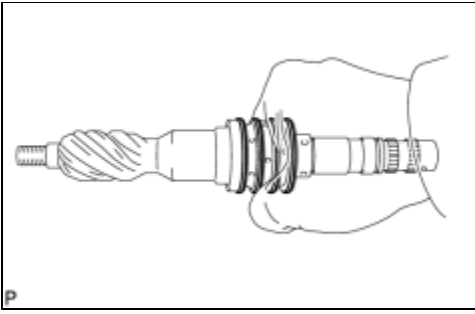


(a) Expand 4 new power steering control valve spacers with your fingers.

NOTICE:

Be careful not to expand the power steering control valve spacers excessively.

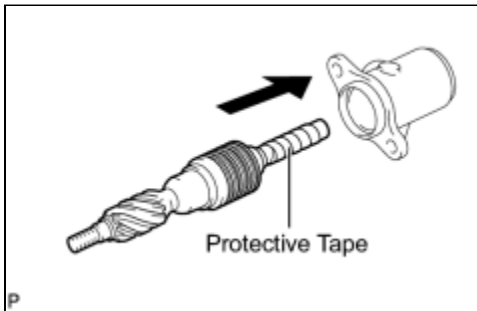
(b) Coat the 4 power steering control valve spacers with power steering fluid.



(c) Install the 4 power steering control valve spacers to the control valve, and adjust them with your fingers.

11. INSTALL POWER STEERING CONTROL VALVE SUB-ASSEMBLY

(a) Coat the power steering control valve sub-assembly with power steering fluid.



(b) Install the power steering control valve sub-assembly into the control valve housing sub-assembly.

NOTICE:

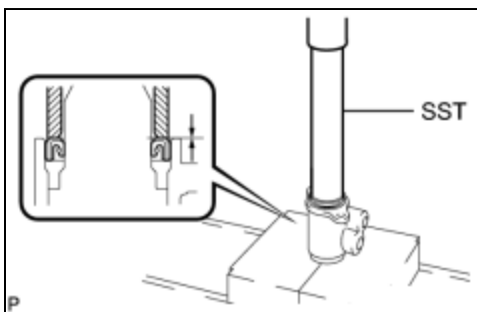
Be careful not to damage the power steering control valve spacers and power steering control valve upper oil seal lip.

HINT:

Wrap protective tape around the spline of the power steering control valve sub-assembly in order to prevent damage to the oil seal.

12. INSTALL POWER STEERING CONTROL VALVE LOWER OIL SEAL

(a) Coat a new power steering control valve lower oil seal lip with power steering fluid.



(b) Using SST and a press, install the power steering control valve lower oil seal to the control valve assembly.

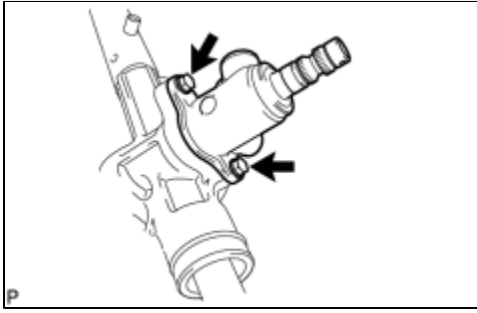
SST: 09612-22011

NOTICE:

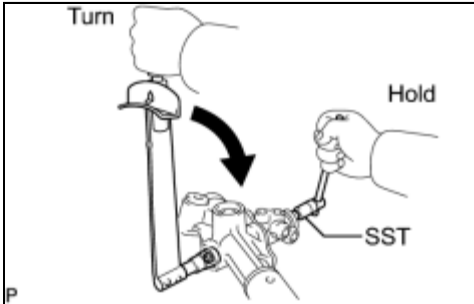
- Make sure that the power steering control valve lower oil seal is installed in the correct direction as shown in the illustration.
- Do not damage the power steering control valve lower oil seal.

13. INSTALL POWER STEERING CONTROL VALVE ASSEMBLY

(a) Install the power steering control valve assembly and a new gasket to the power steering rack housing with the 2 bolts.



Torque: 21 N·m (214 kgf·cm, 16 ft·lbf)



(b) Using SST, hold the control valve shaft and install a new nut.

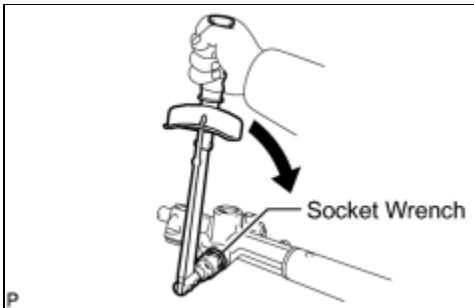
SST: 09616-00011

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

(c) Apply sealant to 2 or 3 threads of the rack housing cap.

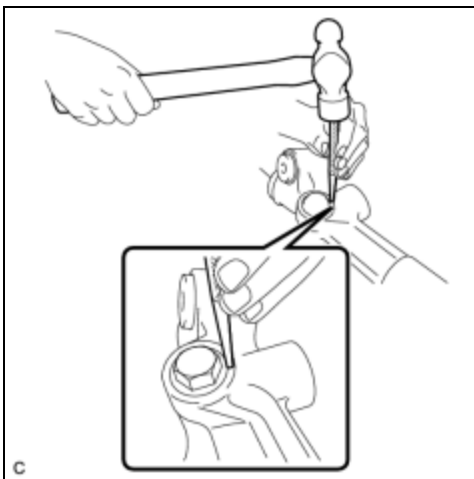
Sealant:

TOYOTA genuine adhesive 1344, THREE BOND 1344 or equivalent



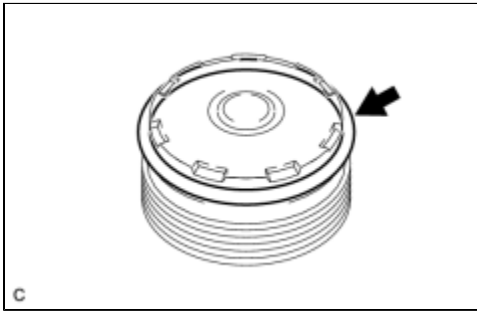
(d) Using a socket wrench (27 mm (1.06 in.)), install the rack housing cap.

Torque: 54 N·m (546 kgf·cm, 40 ft·lbf)



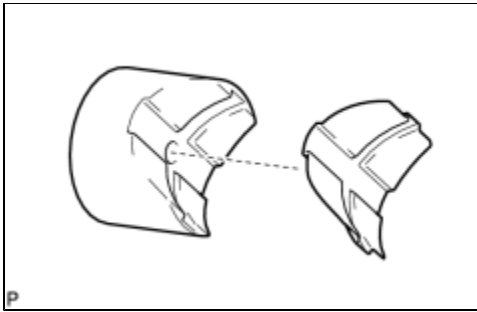
(e) Using a punch and a hammer, stake the rack housing cap and the power steering rack housing.

14. INSTALL RACK GUIDE



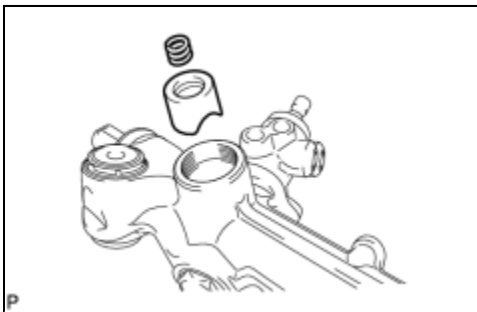
(a) Coat a new O-ring with molybdenum disulfide lithium base grease and install it to the rack guide spring cap.

(b) Apply molybdenum disulfide lithium base grease to the rack guide base and rack guide.

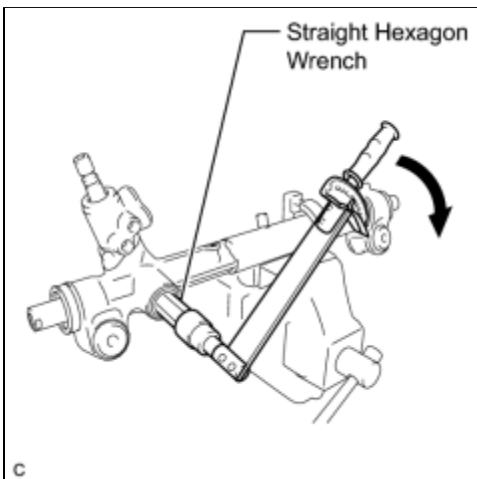


(c) Install the rack guide base to the rack guide.

(d) Apply molybdenum disulfide lithium base grease to the compression spring and the contact surface of the rack guide sub-assembly and the power steering rack.

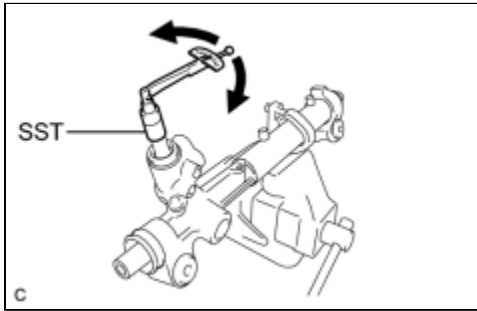


(e) Install the compression spring and rack guide sub-assembly to the power steering rack housing.



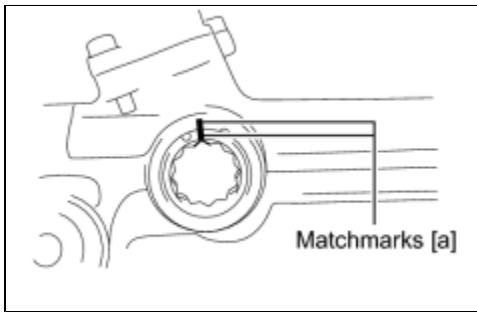
(f) Using a straight hexagon wrench (24 mm (0.94 in.)), install the rack guide spring cap to the power steering rack housing.

Torque: 50 to 70 N·m (514 to 714 kgf·cm, 37 to 52 ft·lbf)

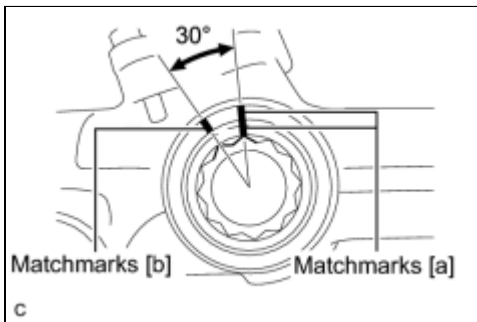


(g) Using SST, turn the control valve and measure the turning torque.

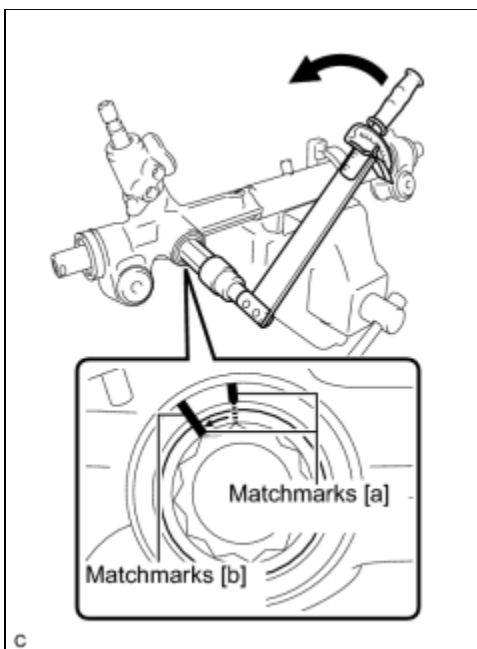
Torque: 6.0 N·m (61 kgf·cm, 54 in·lbf)



(h) Put matchmarks [a] on the power steering rack housing and the rack guide spring cap.



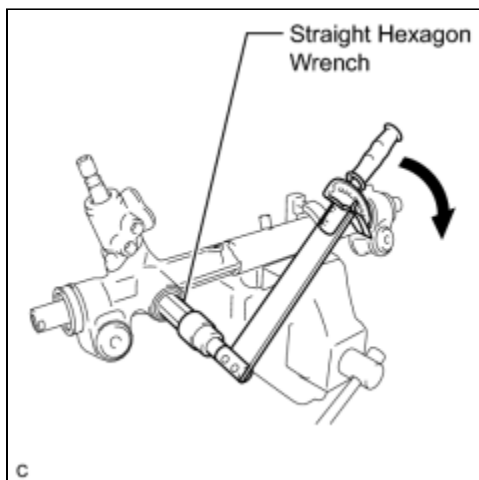
(i) Put matchmarks [b] 30° counterclockwise from matchmarks [a] on the power steering rack housing.



(j) Using a straight hexagon wrench (24 mm (0.94 in.)), loosen the rack guide spring cap until matchmarks [b] and matchmarks [a] on the rack guide spring cap are aligned. Measure the rotating torque required when loosening the rack guide spring cap.

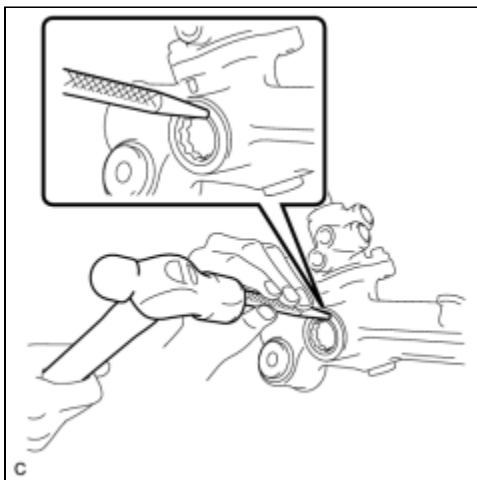
Torque: 10 N·m (102 kgf·cm, 7.4 ft·lbf)

- (k) If the rotating torque required when loosening is below the specified value, perform the following procedure to achieve the specified value.



- (1) Using a straight hexagon wrench (24 mm (0.94 in.)), re-tighten the rack guide spring cap.

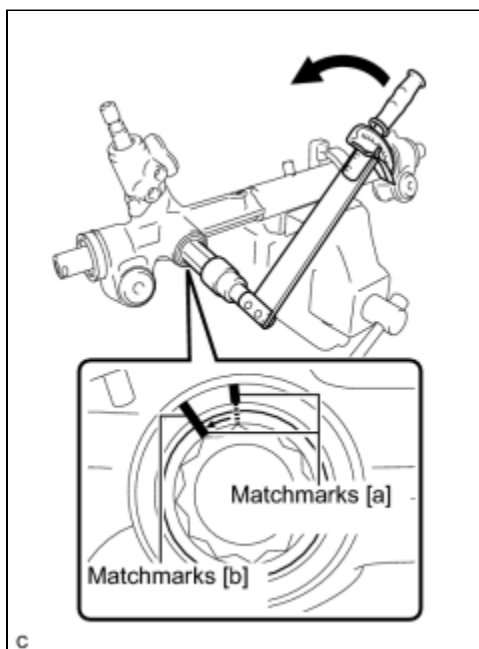
Torque: 50 to 70 N·m (510 to 714 kgf·cm, 37 to 52 ft·lbf)



- (2) Using a punch and hammer, stake the power steering rack housing and rack guide spring cap at 3 equally spaced positions.

HINT:

Tap the power steering rack housing and rack guide spring cap strongly and repeatedly to stake them securely.

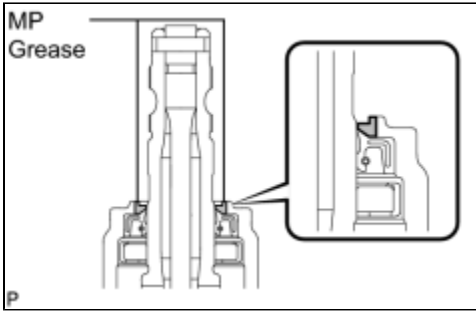


- (3) Using a straight hexagon wrench (24 mm (0.94 in.)), loosen the rack guide spring cap until matchmarks [b] and matchmarks [a] on the rack guide spring cap are aligned. Measure the rotating torque required when loosening the rack guide spring cap.

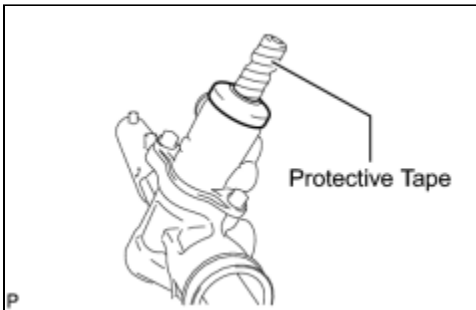
Torque: 10 N·m (102 kgf·cm, 7.4 ft·lbf)

15. INSPECT TOTAL PRELOAD

INFO

16. INSTALL DUST COVER

- (a) Apply MP grease around the control valve shaft as shown in the illustration.



- (b) Wrap electrical tape around the spline of the control valve.

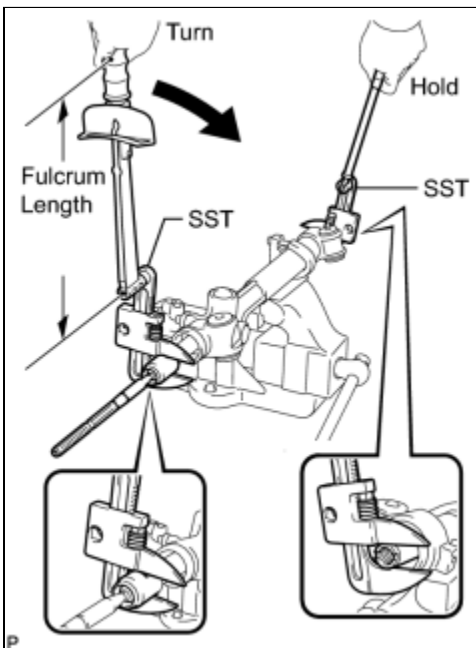
- (c) Install the dust cover to the control valve assembly.

17. INSTALL STEERING RACK END SUB-ASSEMBLY

- (a) Install 2 new claw washers.

HINT:

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



- (b) Using SST, install the steering rack end sub-assembly (LH side).

SST: 09922-10010

Torque: 84 N·m (852 kgf·cm, 62 ft·lbf)

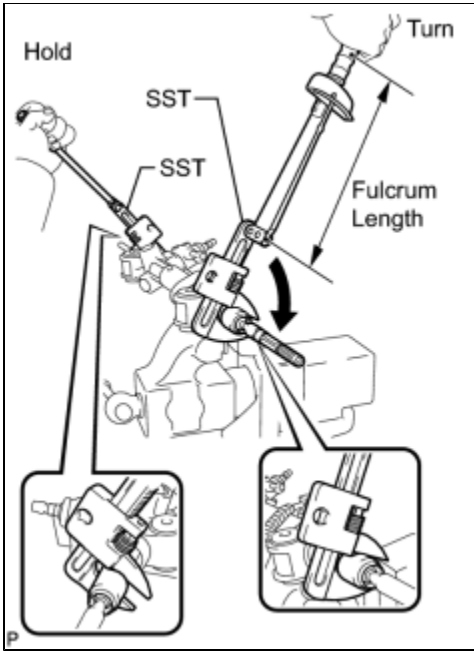
Torque: 60 N·m (613 kgf·cm, 44 ft·lbf)

NOTICE:

- Use SST 09922-10010 as shown in the illustration.
- Use a torque wrench with a fulcrum length of 345 mm (13.58 in.).
- This torque value is effective when SST is parallel to the torque wrench.

HINT:

Using SST, hold the steering rack and install the steering rack end sub-assembly (LH side).



(c) Using SST, install the steering rack end sub-assembly (RH side).

SST: 09922-10010

Torque: 84 N·m (852 kgf·cm, 62 ft·lbf)

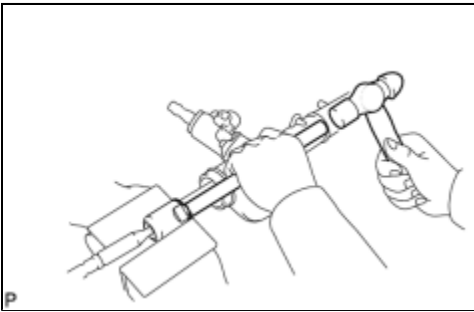
Torque: 60 N·m (613 kgf·cm, 44 ft·lbf)

NOTICE:

- Use SST 09922-10010 as shown in the illustration.
- Use a torque wrench with a fulcrum length of 345 mm (13.58 in.).
- This torque value is effective when SST is parallel to the torque wrench.

HINT:

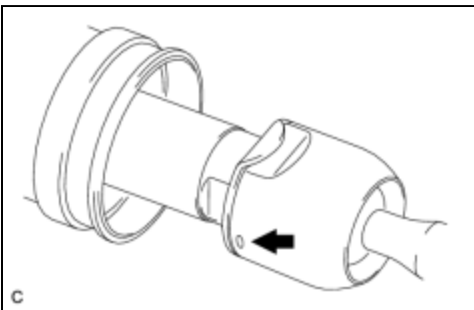
Using SST, hold the steering rack end sub-assembly (LH side) and install the steering rack end sub-assembly (RH side).



(d) Using a brass bar and a hammer, stake the 2 claw washers.

NOTICE:

Avoid any impact to the steering rack.



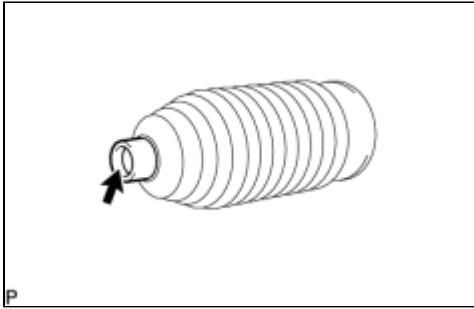
(e) Ensure that the holes of rack ends are not clogged with grease.

HINT:

If the holes are clogged, the pressure inside the boot will change after it is assembled and the steering wheel is turned.

18. INSTALL NO. 2 STEERING RACK BOOT

(a) Apply silicon grease to the inside of the small opening of the No. 2 steering rack boot.



(b) Install the No. 2 steering rack boot to the groove on the rack housing.

NOTICE:

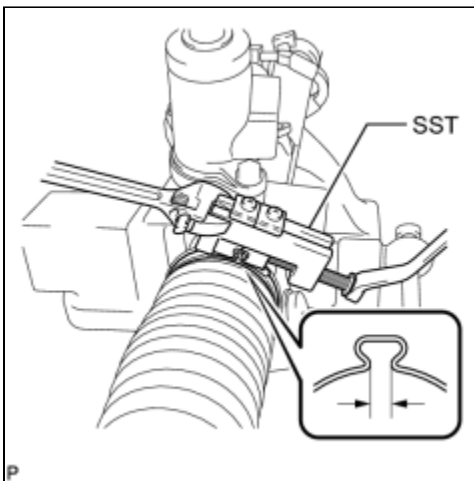
- Be careful not to damage or twist the No. 2 steering rack boot.
- Do not damage the No. 2 steering rack boot.

19. INSTALL NO. 1 STEERING RACK BOOT

HINT:

Perform the same procedure as for the No. 2 steering rack boot.

20. INSTALL NO. 2 STEERING RACK BOOT CLAMP



(a) Using SST, tighten the 2 No. 2 steering rack boot clamps as shown in the illustration.

SST: 09521-24010

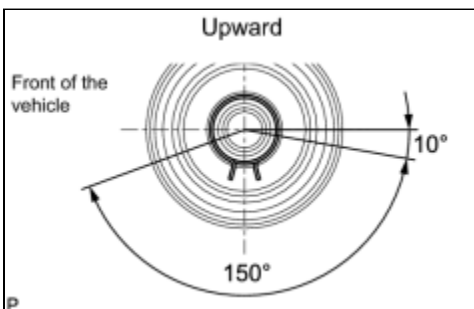
Clearance:

2.0 mm (0.079 in.) or less

NOTICE:

Be careful not to damage the No. 2 steering rack boot.

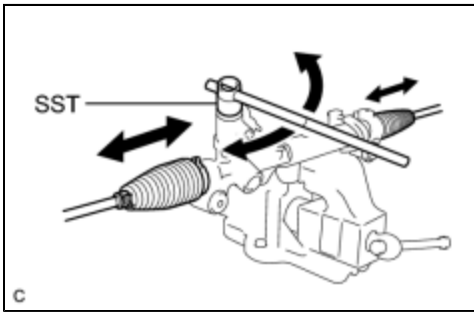
21. INSTALL STEERING RACK BOOT CLIP



(a) Using pliers, install the 2 steering rack boot clips.

NOTICE:

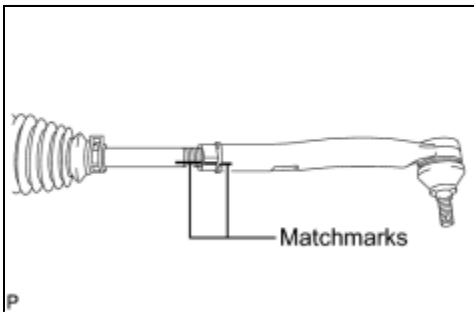
Make sure that the each clip claw is positioned within the area shown in the illustration.



- (b) Using SST, turn the pinion and check that the rack boots expand and contract smoothly.

SST: 09616-00011

22. INSTALL TIE ROD ASSEMBLY LH



- (a) Install the lock nut and the tie rod assembly LH to the steering rack end sub-assembly until the matchmarks are aligned.

HINT:

After adjusting toe-in, torque the lock nut.

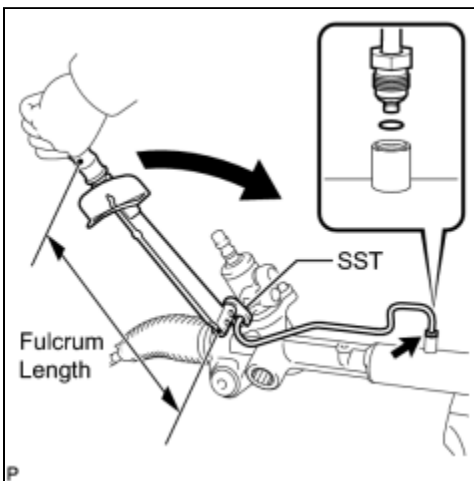
23. INSTALL TIE ROD ASSEMBLY RH

HINT:

Perform the same procedure as for the LH side.

24. INSTALL STEERING RIGHT TURN PRESSURE TUBE

- (a) Coat 2 new O-rings with power steering fluid and install them to the steering right turn pressure tube.



- (b) Using SST, install the right turn pressure tube to the power steering link assembly.

SST: 09023-38201

Torque: 13 N·m (128 kgf·cm, 9 ft·lbf)

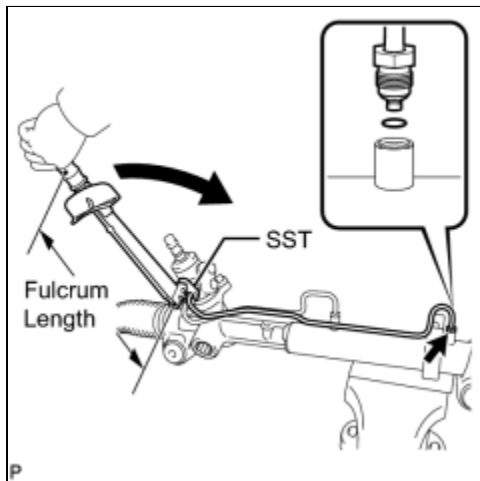
Torque: 11 N·m (114 kgf·cm, 8 ft·lbf)

NOTICE:

- Use a torque wrench with a fulcrum length of 250 mm (9.84 in.).
- This torque value is effective when SST is parallel to the torque wrench.

25. INSTALL STEERING LEFT TURN PRESSURE TUBE

- (a) Coat 2 new O-rings with power steering fluid and install them to the steering left turn pressure tube.



(b) Using SST, install the left turn pressure tube to the power steering link assembly.

SST: 09023-38201

Torque: 13 N·m (128 kgf·cm, 9 ft·lbf)

Torque: 11 N·m (114 kgf·cm, 8 ft·lbf)

NOTICE:

- Use a torque wrench with a fulcrum length of 250 mm (9.84 in.).
- This torque value is effective when SST is parallel to the torque wrench.

