

POWER STEERING SYSTEM

510AF-02

PRECAUTION

1. HANDLING PRECAUTIONS ON STEERING SYSTEM

- (a) Care must be taken to when replacing parts. Incorrect replacement could affect the performance of the steering system and result in a driving hazard.

2. HANDLING PRECAUTIONS ON SRS AIRBAG SYSTEM

- (a) The 4 RUNNER is equipped with SRS (Supplemental Restraint System) such as the driver airbag. Failure to carry out service operation in correct sequence could cause the SRS to unexpectedly deploy 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 notice for the supplemental restraint system (See page [60-1](#)).

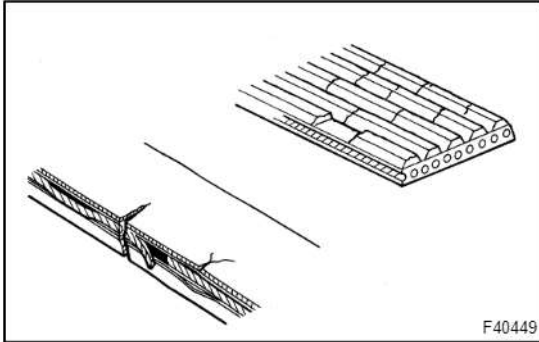
PROBLEM SYMPTOMS TABLE

HINT:

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)	28-1
	2. Power steering fluid level (Low)	51-3
	3. Front wheel alignment (Incorrect)	26-7
	4. Steering system joints (Worn)	–
	5. Suspension arm ball joints (Worn)	26-19
		26-22
	6. Steering column (Binding)	–
	7. Power steering vane pump	51-9
	8. Power steering gear	51-20
Poor return	1. Tires (Improperly inflated)	28-1
	2. Front wheel alignment (Incorrect)	26-7
	3. Steering column (Binding)	–
	4. Power steering gear	51-20
Excessive play	1. Steering system joints (Worn)	–
	2. Suspension arm ball joints (Worn)	26-19
		26-22
	3. Intermediate shaft, Sliding yoke (Worn)	–
	4. Front wheel bearing (Worn)	30-2
	5. Power steering gear	51-20
Abnormal noise	1. Power steering fluid level (Low)	51-3
	2. Steering system joints (Worn)	–
	3. Power steering vane pump	51-9
	4. Power steering gear	51-20

ON-VEHICLE INSPECTION



1. INSPECT DRIVE BELT

- (a) Visually check the belt for excessive wear, frayed cords, etc.

If any defect is found, replace the drive belt.

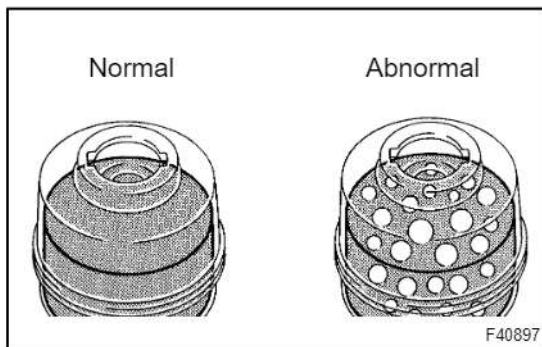
HINT:

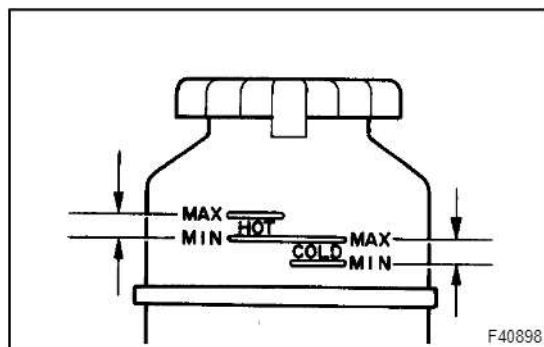
Cracks on the rib side of a belt are considered acceptable. If the missing chunks from the ribs are found on the belt, it should be replaced.

2. BLEED POWER STEERING SYSTEM

- (a) Check the fluid level.
- (b) Jack up the front of the vehicle and support it with the stands.
- (c) Turn the steering wheel.
 - (1) With the engine stopped, turn the wheel slowly from lock to lock several times.
- (d) Lower the vehicle.
- (e) Start the engine.
 - (1) Run the engine at idle for a few minutes.
- (f) Turn the steering wheel.
 - (1) 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.
 - (2) Repeat (1) several times.
- (g) Stop the engine.
- (h) Check for forming or emulsification.

Especially, if the system has to be bled twice because of foaming or emulsification, check for fluid leaks in the system.
- (i) Check the fluid level.





3. CHECK FLUID LEVEL

- Keep the vehicle level.
- With the engine stopped, check the fluid level in the oil reservoir.

If necessary, add fluid.

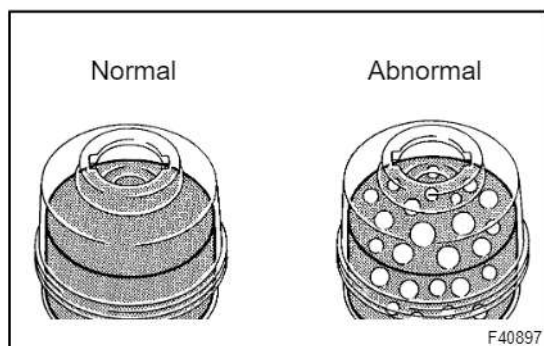
Fluid: ATF DEXRON® II or III

HINT:

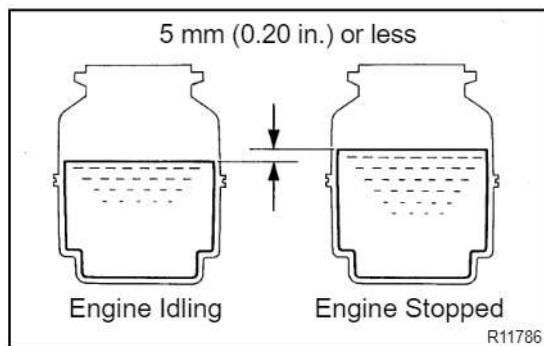
Check that the fluid level is within the HOT LEVEL range on the reservoir. If the fluid is cold, check that it is within the COLD LEVEL range.

- Start the engine and run it at idle.
- Turn the steering wheel from lock to lock several times to raise fluid temperature.

Fluid temperature: 75 – 80 °C (167 – 176 °F)



- Check for foaming or emulsification. If foaming or emulsification is identified, bleed the power steering system.



- With the engine idling, measure the fluid level in the oil reservoir.
- Stop the engine.
- 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 the power steering system.

- Check the fluid level.

4. CHECK STEERING FLUID PRESSURE

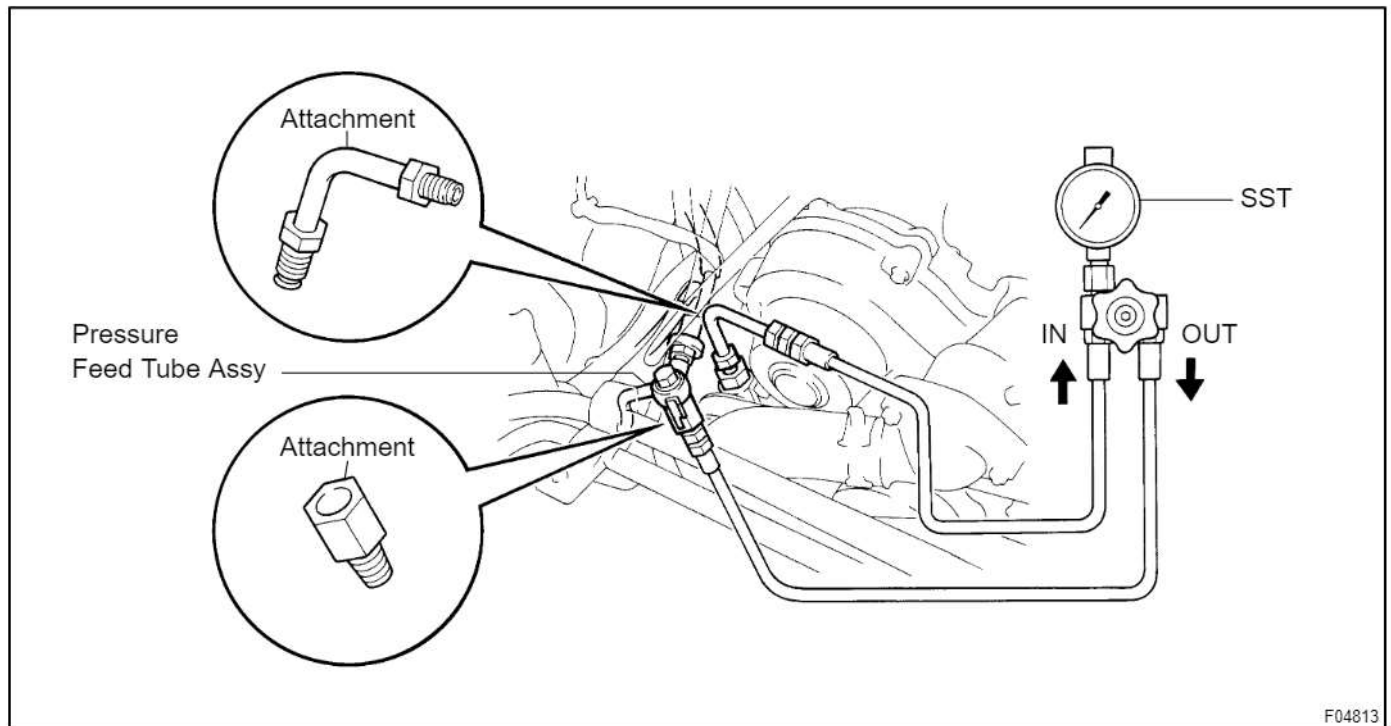
- Disconnect the pressure feed tube assy from the vane pump assy (See page 51-9).
- Connect SST, as shown in the illustration.
SST 09640-10010 (09641-01010, 09641-01030, 09641-01060)

NOTICE:

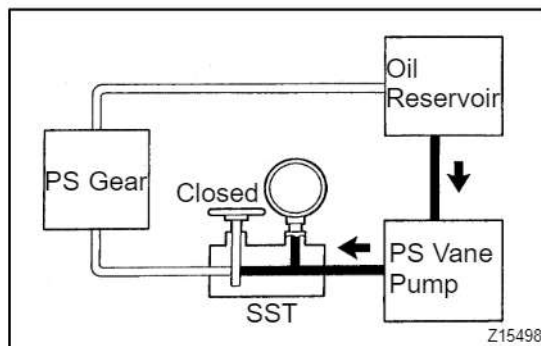
Check that the valve of the SST is in the open position.

- Bleed the power steering system.
- Start the engine and run it at idle.
- Turn the steering wheel from lock to lock several times to raise fluid temperature.

Fluid temperature: 75 – 80 °C (167 – 176 °F)



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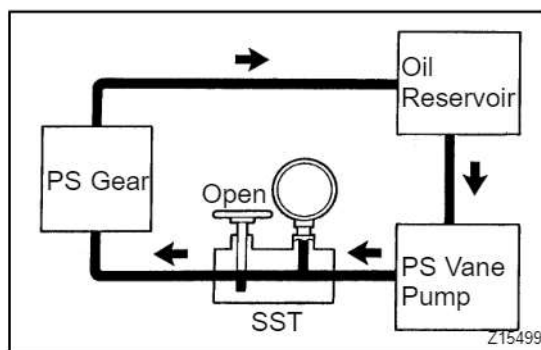
Z15498

- (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/cm², 1,209 psi)

NOTICE:

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



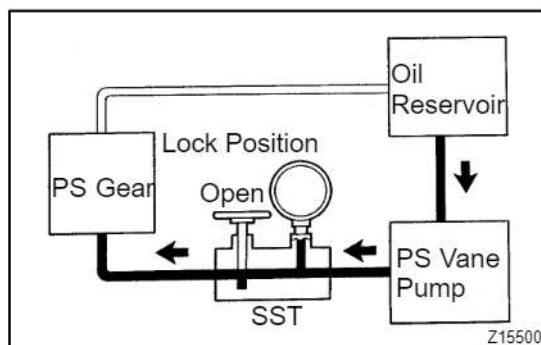
Z15499

- (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/cm², 71 psi) or less

NOTICE:

Do not turn the steering wheel.



Z15500

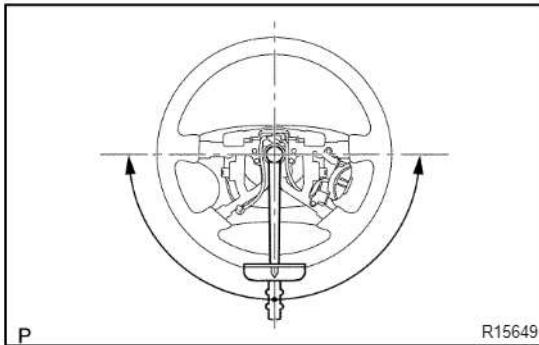
- (i) With the engine idling and valve fully opened, turn the steering wheel to full lock position.

Minimum fluid pressure:
8,336 kPa (85 kgf/cm², 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.
SST 09640-10010 (09641-01010, 09641-01030, 09641-01060)
- (k) Connect the pressure feed tube assy to the vane pump assy (See page 51-9).
- (l) Bleed the power steering system.



5. CHECK STEERING EFFORT

- (a) Center the steering wheel.
- (b) Remove the steering wheel pad (See page 50-8).
- (c) Start the engine and run it at idle.
- (d) Measure the steering effort in both directions.

Steering effort (Reference):

6 N·m (60 kgf·cm, 53 in.-lbf) or less

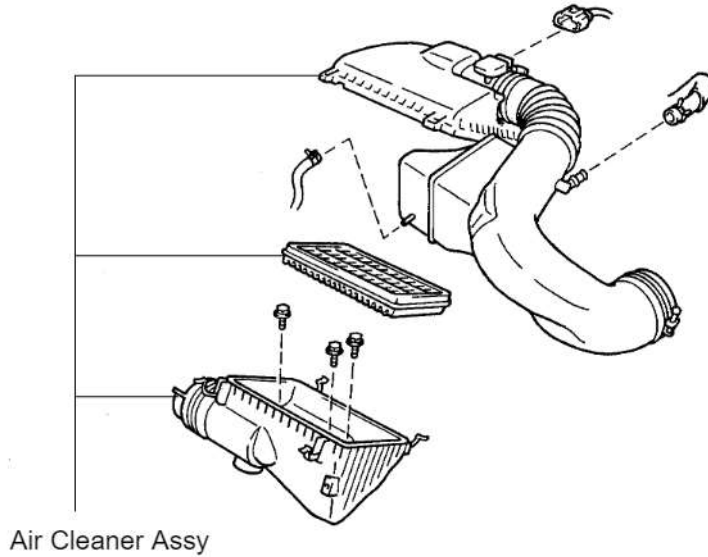
HINT:

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

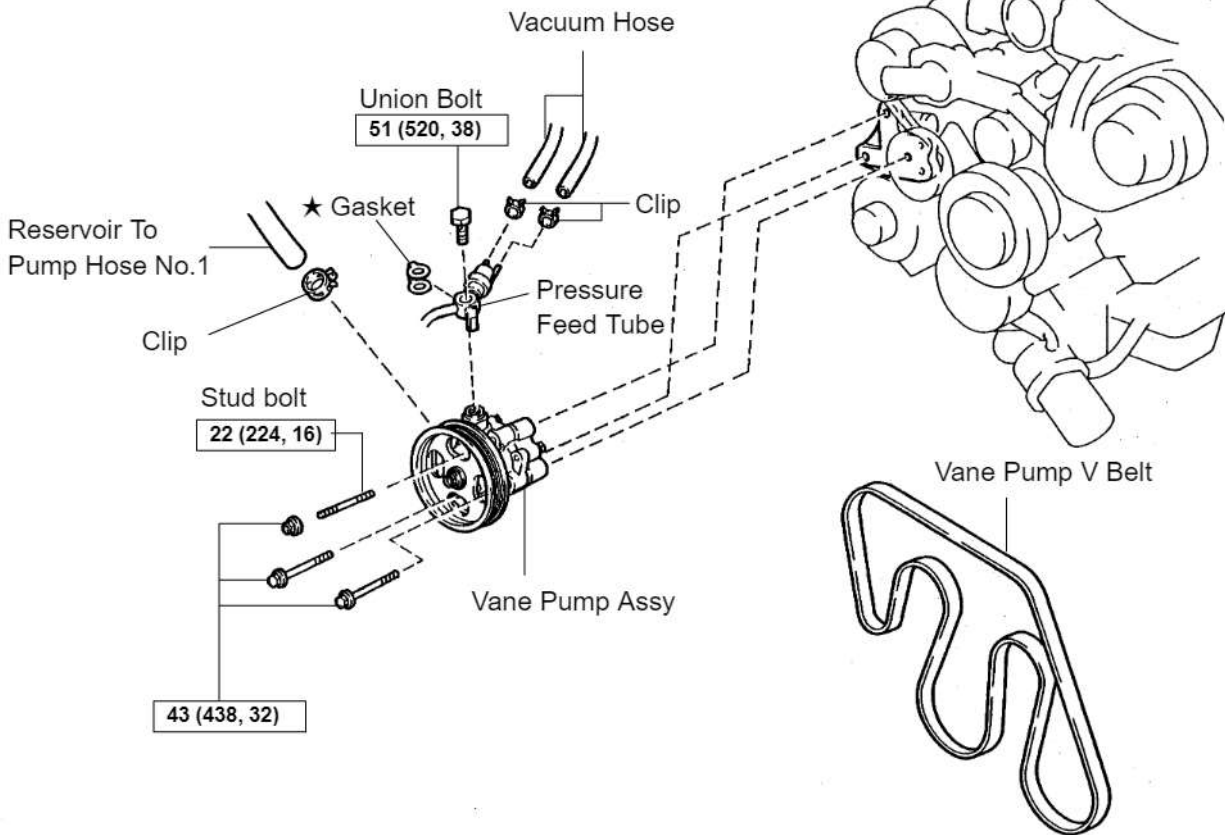
- (e) Torque the steering wheel set nut.
Torque: 50 N·m (510 kgf·cm, 37 ft-lbf)
- (f) Install the steering wheel pad (See page 50-8).

VANE PUMP ASSY COMPONENTS

510AD-03



Air Cleaner Assy

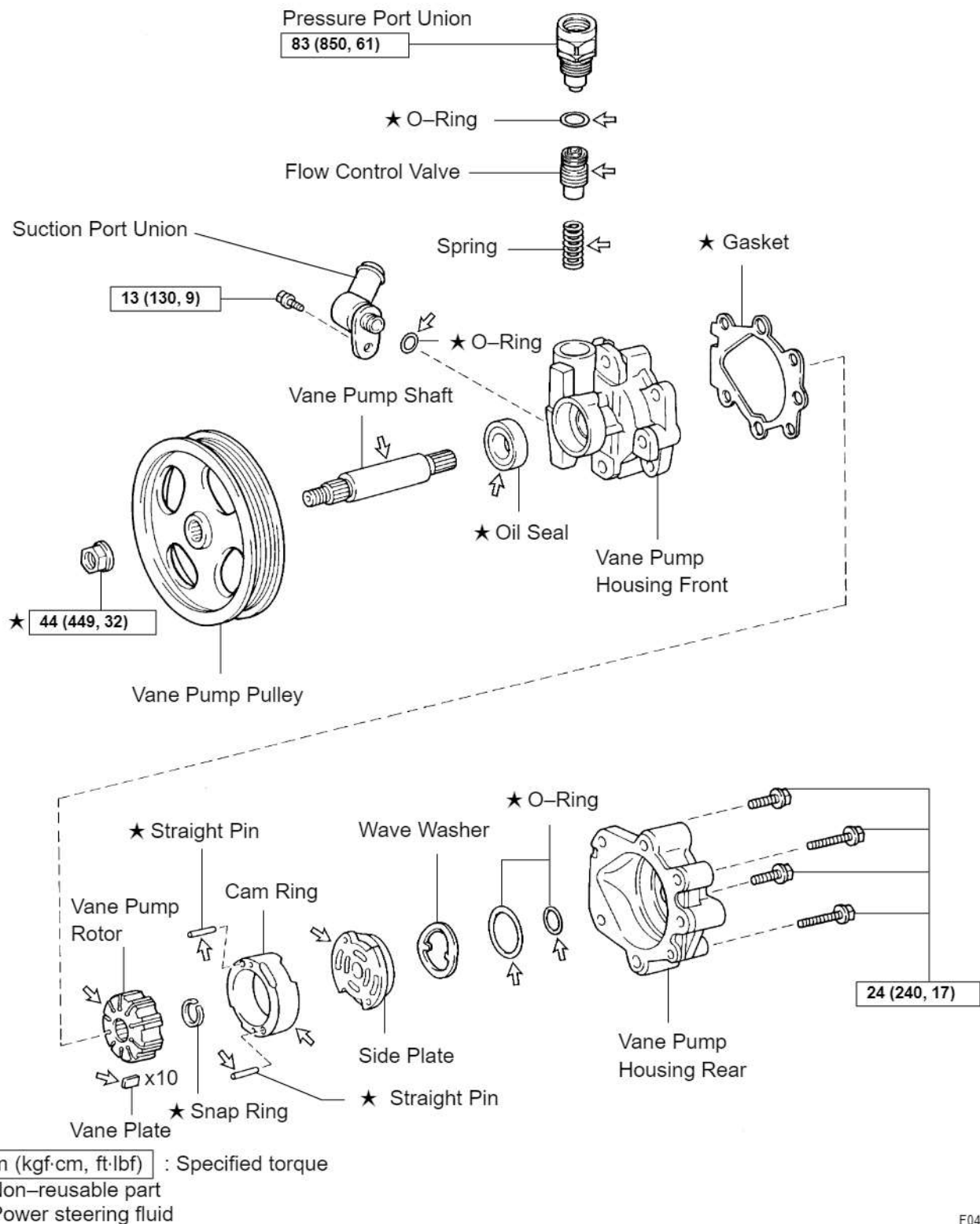


N·m (kgf·cm, ft·lbf) : Specified torque

★ Non-reusable part

N

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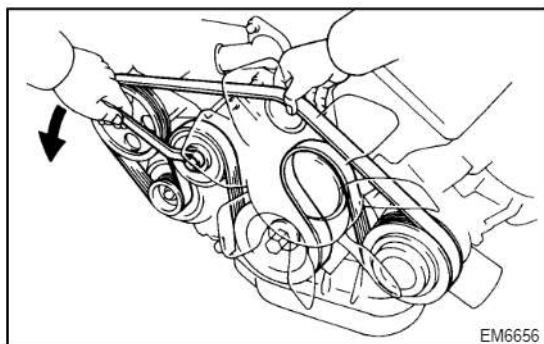
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OVERHAUL

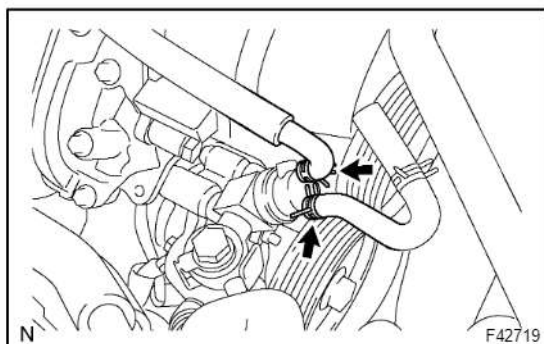
NOTICE:

- ★ When using a vice, do not overtighten.
 - ★ When installing, coat the parts indicated by the arrows with power steering fluid (See page 51-7).
1. DRAIN POWER STEERING FLUID (See page 51-3)
 2. REMOVE AIR CLEANER ASSY



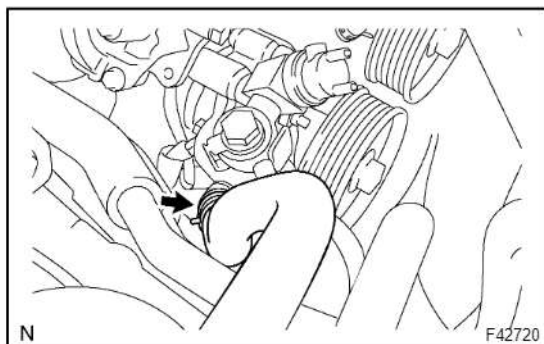
3. REMOVE VANE PUMP V BELT

- (a) Loosen the belt tension by turning the belt tensioner counterclockwise, and remove the belt.

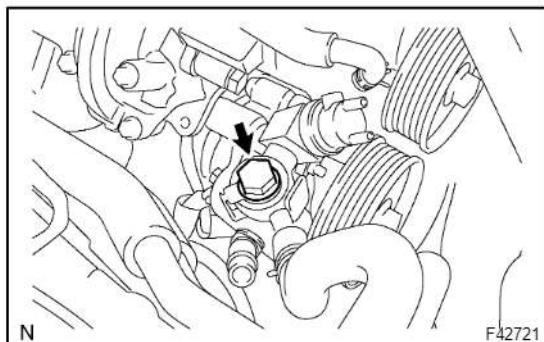


4. SEPARATE OIL RESERVOIR TO PUMP HOSE NO.1

- (a) Loosen the 2 clips and disconnect the 2 vacuum hoses.

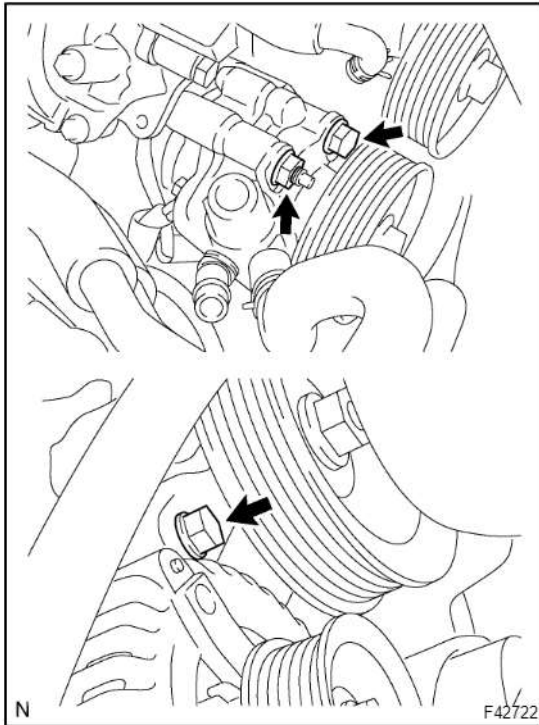


- (b) Loosen the clip and disconnect the hose.

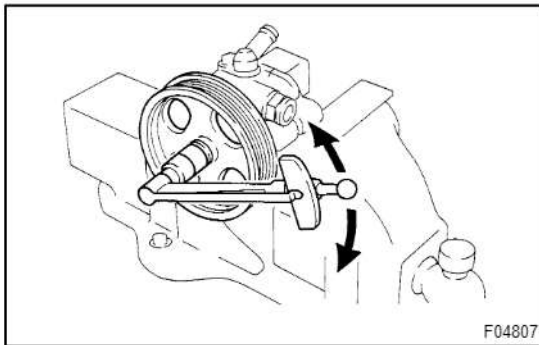


5. SEPARATE PRESSURE FEED TUBE ASSY

- (a) Remove the union bolt and a gasket, disconnect the pressure feed tube.

**6. REMOVE VANE PUMP ASSY**

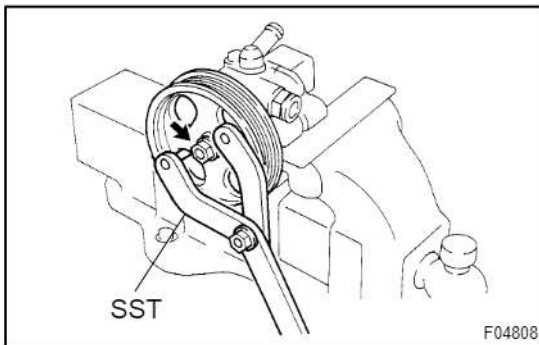
- (a) Remove the 2 bolts and nut.
- (b) Using a torx socket (E10), remove the stud bolt.

**7. MEASURE VANE PUMP ROTATION TORQUE**

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

Rotating torque:

0.28 N·m (2.8 kgf·cm, 2.4 in·lbf) or less

**8. REMOVE VANE PUMP PULLEY**

- (a) Using SST to stop the pulley rotating, loosen the nut. SST 09960-10010 (09962-01000, 09963-01000)
- (b) Remove the nut and vane pump pulley from the vane pump shaft.

9. REMOVE POWER STEERING SUCTION PORT UNION

- (a) Remove the bolt and suction port union.
- (b) Remove the O-ring from the suction port union.

10. REMOVE PRESSURE PORT UNION

- (a) Remove the pressure port union, flow control valve and spring.
- (b) Remove the O-ring from the pressure port union.

11. REMOVE VANE PUMP HOUSING REAR

- (a) Remove the 4 bolts and vane pump housing rear.

HINT:

If the wave washer and side plate are stuck to the vane pump housing rear, lightly tap the vane pump housing rear with a plastic hammer, and remove the wave washer and side plate.

- (b) Remove the 2 O-rings from the rear housing.

12. REMOVE SIDE PLATE AND WAVE WASHER**13. REMOVE VANE PUMP CAM RING**

- (a) Using a screwdriver, remove the snap ring from the vane pump shaft.
 (b) Remove the cam ring.

14. REMOVE VANE PUMP ROTOR

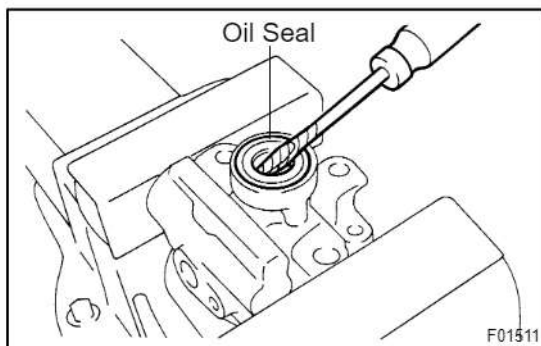
- (a) Remove the vane pump rotor with the 10 vane plates.

NOTICE:

Be careful not to drop the plate.

15. REMOVE VANE PUMP SHAFT**16. REMOVE STRAIGHT PIN**

- (a) Remove the 2 pins from the vane pump housing front.

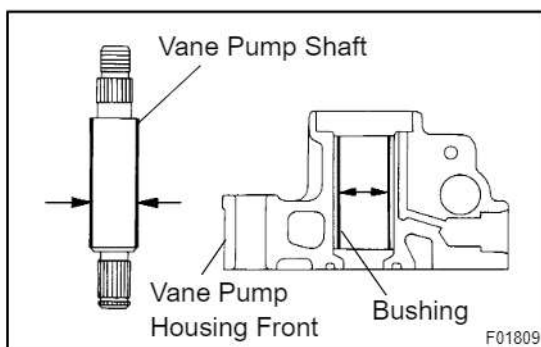
**17. REMOVE VANE PUMP HOUSING OIL SEAL****NOTICE:**

When using a vise, do not overtighten it.

- (a) Using a screwdriver with vinyl tape wound around its tip, remove the housing oil seal.

NOTICE:

Be careful not to damage the vane pump housing front.

**18. INSPECT OIL CLEARANCE**

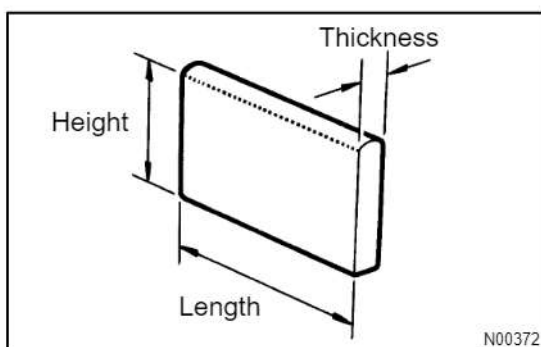
- (a) Using a micrometer and a caliper gauge, measure the oil clearance.

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 vane pump housing front.

**19. INSPECT VANE PUMP ROTOR AND VANE PUMP PLATES**

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

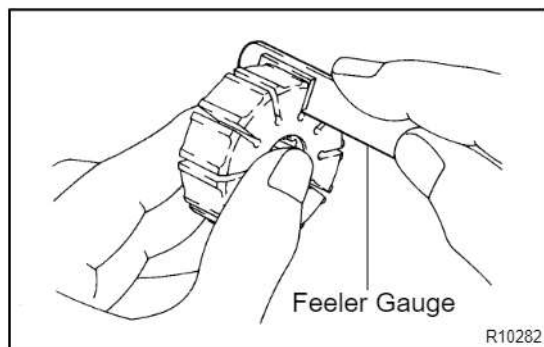
Minimum height: 8.6 mm (0.33858 in.)

Minimum thickness:

1.397 mm (0.05500 in.)

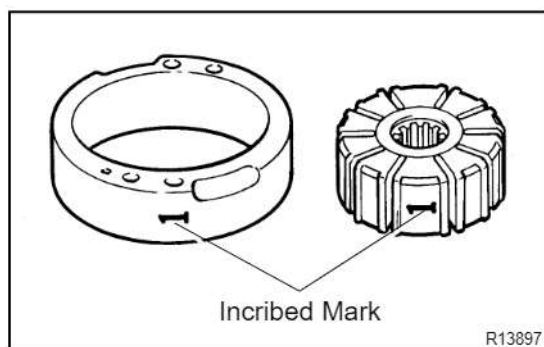
Minimum length:

14.991 mm (0.59020 in.)



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

Maximum clearance: 0.033 mm (0.00130 in.)



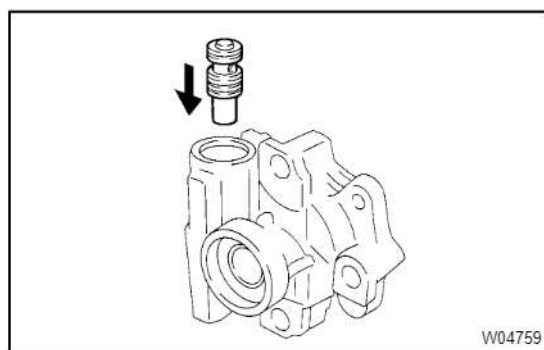
If it is more than the maximum, replace the plate and/or rotor with one having the same mark stamped on the cam ring.

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

HINT:

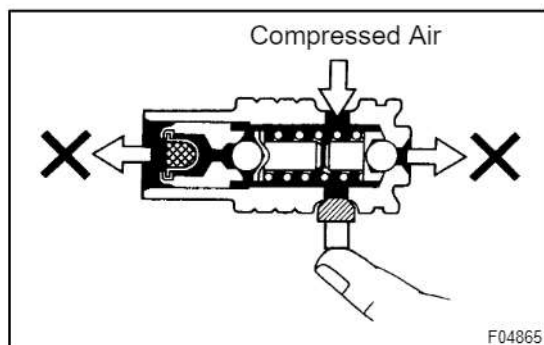
There are 5 vane plate lengths with the following rotor and cam ring marks:

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

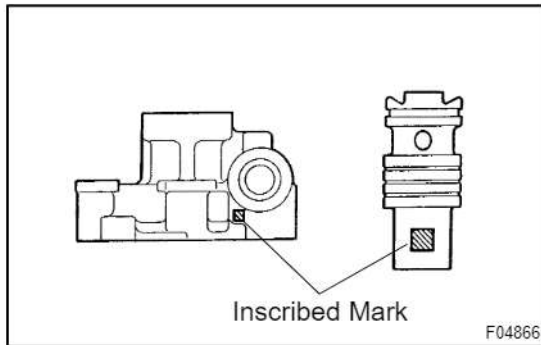


20. INSPECT FLOW CONTROL VALVE

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

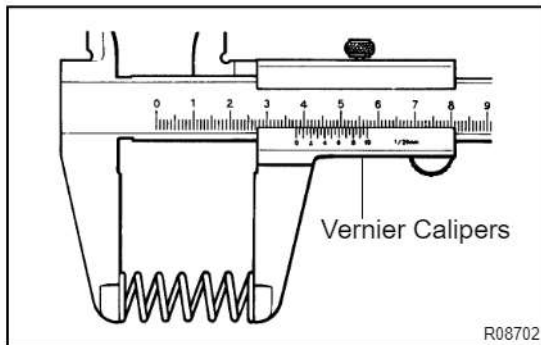


- (b) Check the flow control valve for leakage. Close one of the holes and apply compressed air of 392 – 490 kPa (4 – 5 kgf·cm², 57 – 71 psi) into the opposite side hole, and confirm that air does not come out from the end holes.



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



21. INSPECT FLOW CONTROL VALVE COMPRESSION SPRING

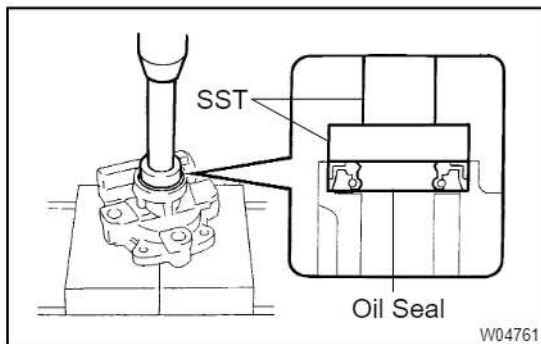
- (a) Using vernier calipers, measure the free length of the spring.

Minimum free length: 33.2 mm (1.307 in.)

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

22. INSPECT PRESSURE PORT UNION

If the pressure union seat in the pressure port union is remarkably damaged and it may cause fluid leakage, fluid leakage, replace the pressure port union.



23. INSTALL VANE PUMP HOUSING OIL SEAL

- (a) Coat a new oil seal lip with power steering fluid.
(b) Using SST, press in the oil seal.

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

NOTICE:

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

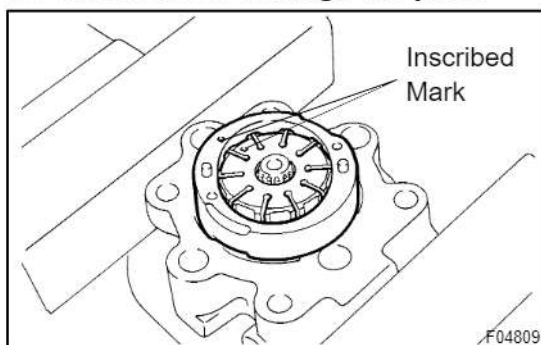
24. INSTALL VANE PUMP SHAFT

25. INSTALL STRAIGHT PIN

- (a) Using a plastic hammer, tap the 2 new pins to the vane pump housing front.

NOTICE:

Be careful no to damage the pins.



26. INSTALL VANE PUMP CAM RING

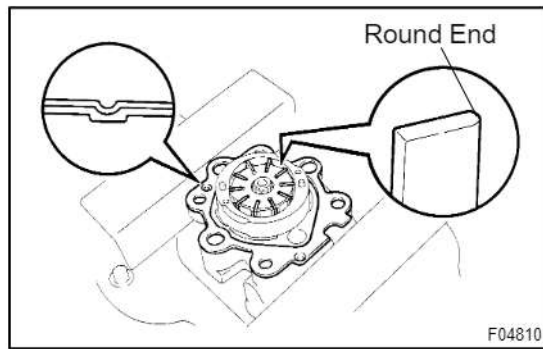
- (a) Install the cam ring with the inscribed mark facing outward.

HINT:

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

27. INSTALL VANE PUMP ROTOR

- (a) Install the vane pump rotor with the inscribed mark facing outward.
(b) Install a new snap ring to the vane pump shaft.



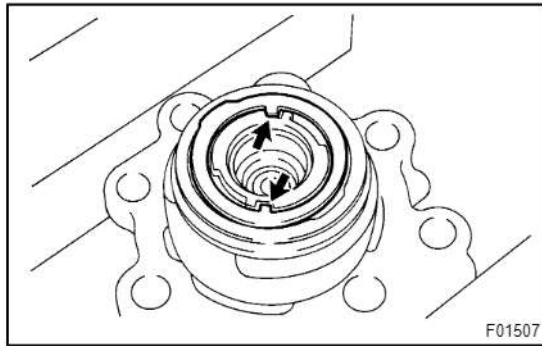
- (c) Install the 10 plates with the round end facing outward.
- (d) Install a new gasket on the front housing.

NOTICE:

Be careful of the direction of the gasket.

28. INSTALL VANE PUMP SIDE PLATE REAR

- (a) Align the holes of the plate and 2 straight pins.

**29. INSTALL VANE PUMP HOUSING REAR**

- (a) Install the wave washer so that its protrusions fit into the slots in the side plate.
- (b) Coat 2 new O-rings with power steering fluid and install them to the rear housing.
- (c) Install the rear housing with the 4 bolts.

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

30. INSTALL PRESSURE PORT UNION

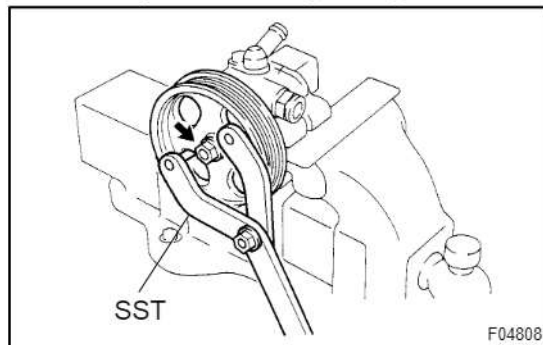
- (a) Install the spring to the vane pump housing front.
- (b) Install the flow control valve facing the correct direction (See page 51-7).
- (c) Coat a new O-ring with power steering fluid and install it to the pressure port union.
- (d) Install the pressure port union.

Torque: 83 N·m (850 kgf·cm, 61 ft·lbf)

31. INSTALL POWER STEERING SUCTION PORT UNION

- (a) Coat a new O-ring with power steering fluid and install it to the suction port union.
- (b) Install the suction port union with the bolt.

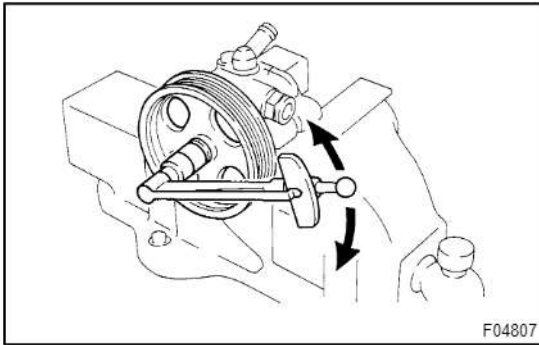
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

**32. INSTALL VANE PUMP PULLEY**

- (a) Install the vane pump pulley and nut to the vane pump shaft.
- (b) Using SST to stop the pulley rotating, torque a new pulley set nut.

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

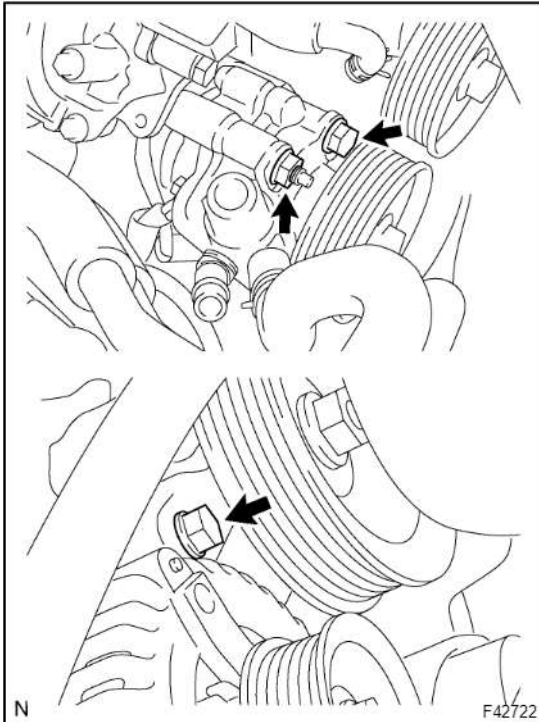
Torque: 44 N·m (449 kgf·cm, 32 ft·lbf)

**33. MEASURE VANE PUMP ROTATION TORQUE**

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

Rotating torque:

0.28 N·m (2.8 kgf·cm, 2.4 in·lbf) or less

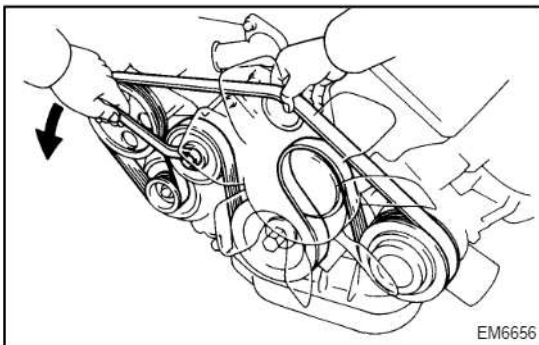
**34. INSTALL VANE PUMP ASSY**

- (a) Using a torx socket (E10), install the vane pump with the stud bolt.

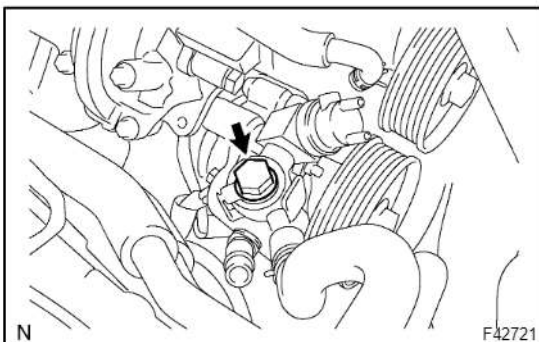
Torque: 22 N·m (224 kgf·cm, 16 ft·lbf)

- (b) Install the 2 bolts and nut.

Torque: 43 N·m (438 kgf·cm, 32 ft·lbf)

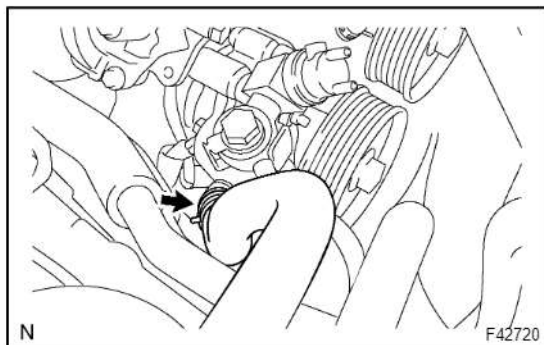
**35. INSTALL VANE PUMP V BELT**

- (a) Loosen the belt tension by turning the belt tensioner counterclockwise, and install the belt.

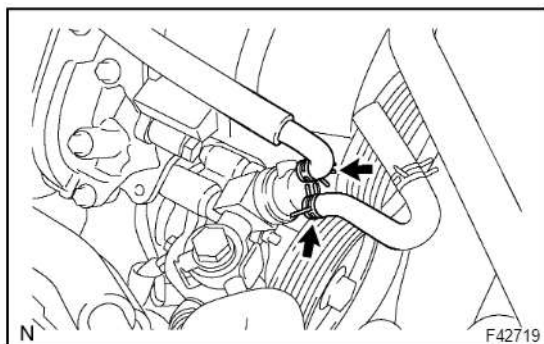
**36. CONNECT PRESSURE FEED TUBE ASSY**

- (a) Install the union bolt with a new gasket on each side of the tube.

Torque: 51 N·m (520 kgf·cm, 38 ft·lbf)

**37. CONNECT OIL RESERVOIR TO PUMP HOSE NO.1**

(a) Install the hose with the clip.

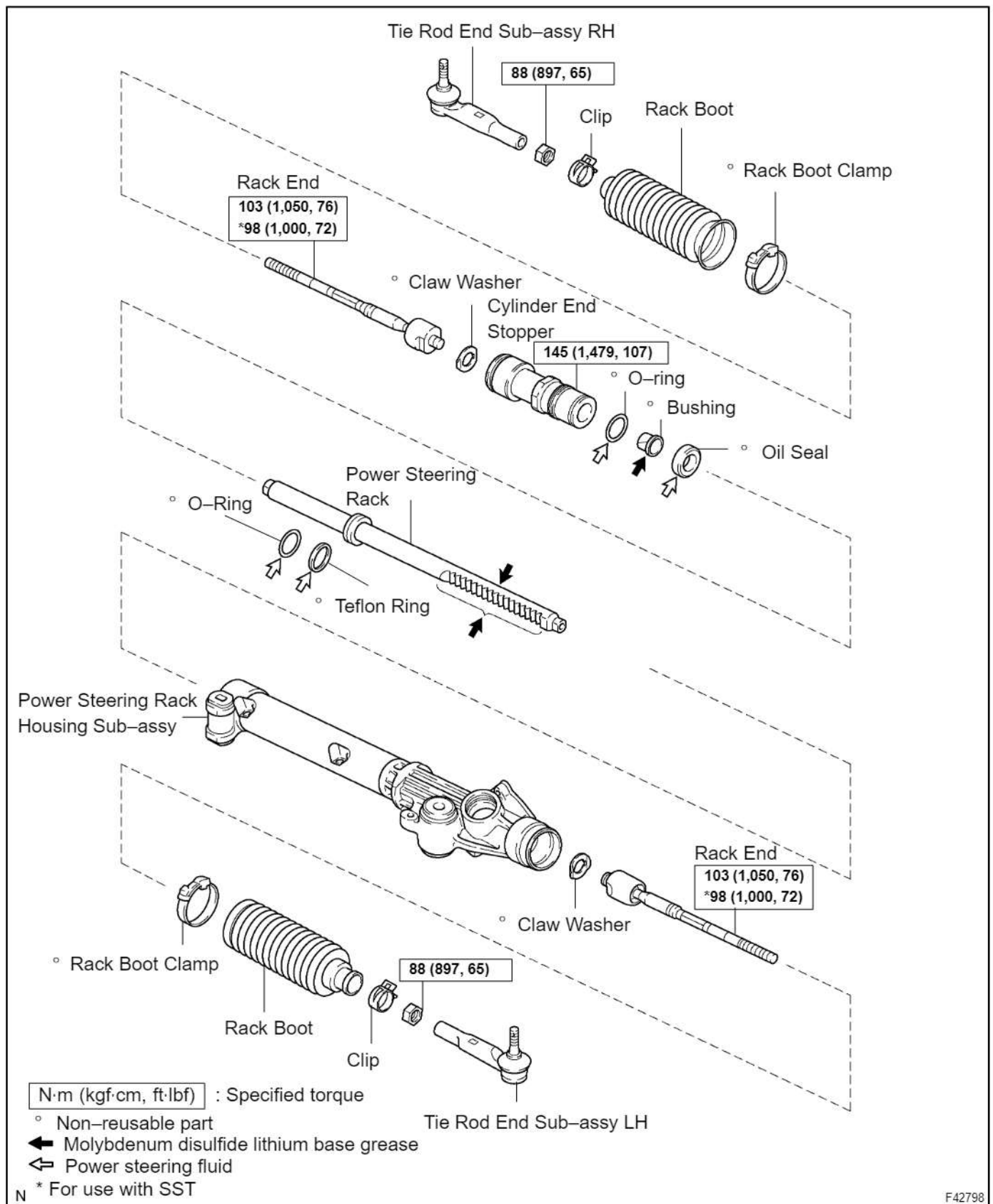


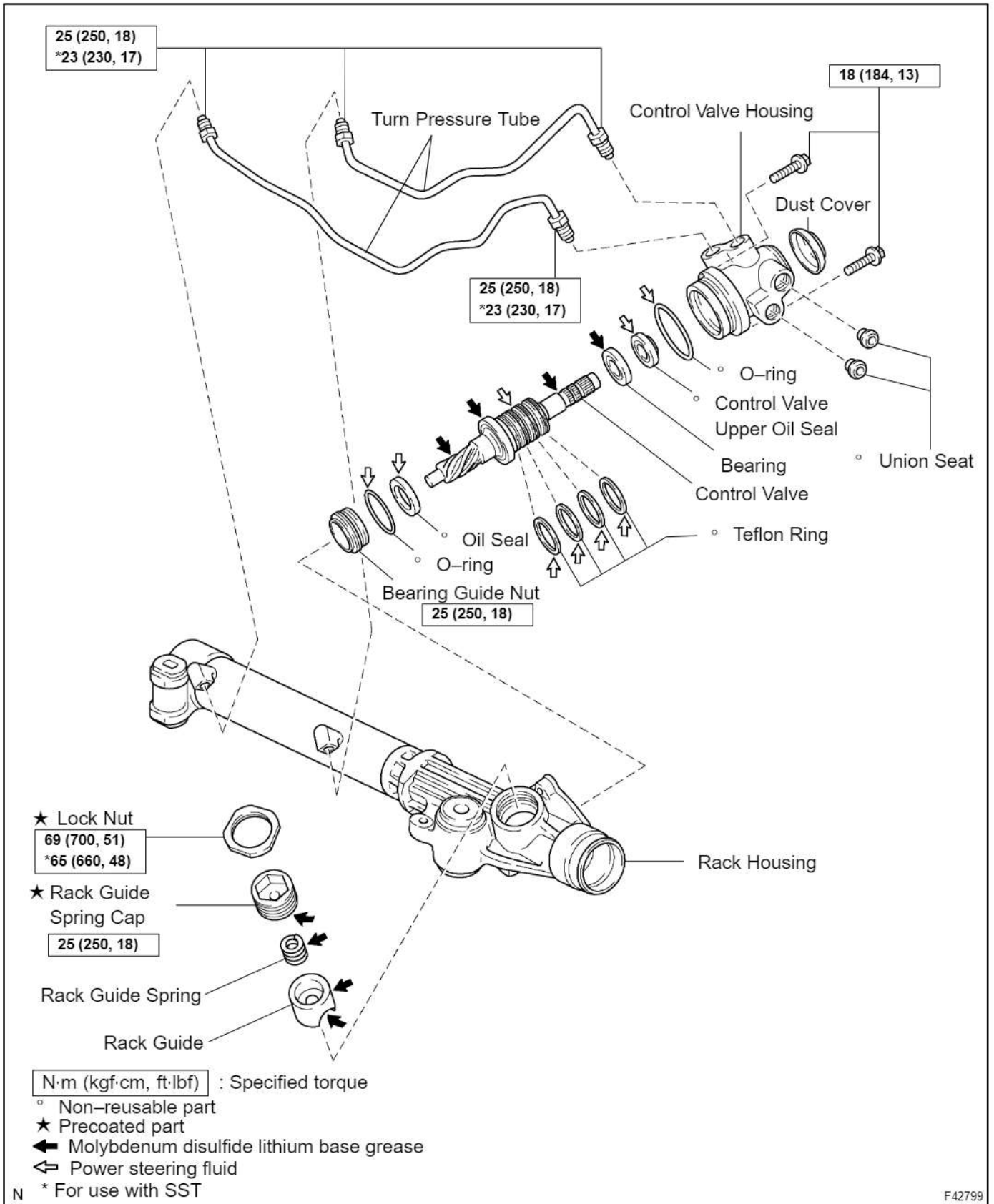
(b) Install the 2 hose with the 2 clip.

38. AIR CLEANER ASSY**39. ADD POWER STEERING FLUID (See page 51-3)****40. BLEED POWER STEERING FLUID (See page 51-3)****41. INSPECT FLUID LEAK (See page 51-3)**

510AI-02





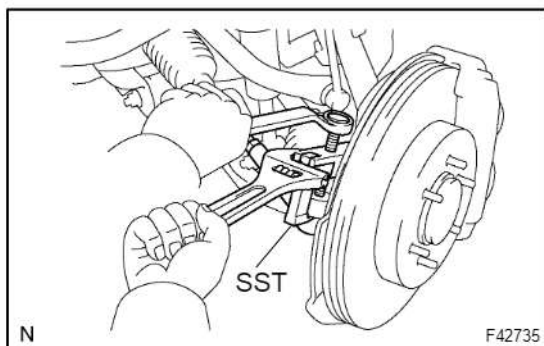


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OVERHAUL

1. **PRECAUTION** (See page 60-1)
2. **DISCONNECT BATTERY NEGATIVE TERMINAL**
3. **PLACE FRONT WHEELS FACING STRAIGHT AHEAD** (See page 50-8)
4. **REMOVE HORN BUTTON ASSY** (See page 50-8)
5. **REMOVE STEERING WHEEL ASSY** (See page 50-8)
SST 09950-50013 (09951-05010, 09952-05010, 09953-05020, 09954-05021)
6. **REMOVE STEERING COLUMN COVER LWR** (See page 50-8)
7. **REMOVE TURN SIGNAL SWITCH ASSY** (See page 50-8)
8. **REMOVE SPIRAL CABLE SUB-ASSY** (See page 50-8)
9. **REMOVE FRONT WHEEL**
10. **REMOVE ENGINE UNDER COVER ASSY REAR**
(a) Remove the 6 bolts and engine under cover assy rear.
11. **REMOVE ENGINE UNDER COVER SUB-ASSY NO.1**
(a) Remove the 4 bolts and engine under cover sub-assy No.1.
12. **REMOVE STABILIZER BAR FRONT** (See page 26-27)



13. SEPARATE TIE ROD END SUB-ASSY LH

- (a) Remove the cotter pin and nut.
- (b) Using SST, separate the tie rod end from the steering knuckle arm.
SST 09628-62011

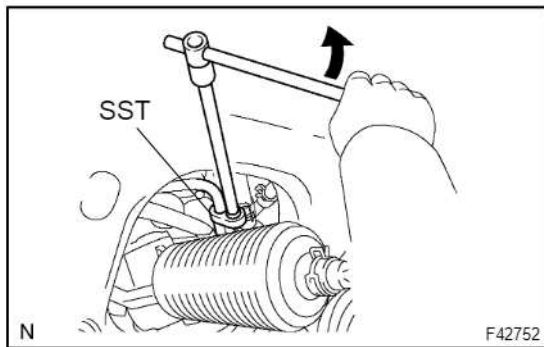
14. SEPARATE TIE ROD END SUB-ASSY RH

HINT:

Separate the RH side by the same procedures with the LH side.

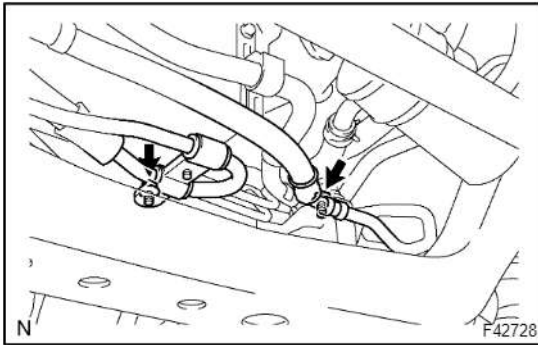
SST 09628-62011

15. REMOVE STEERING INTERMEDIATE SHAFT SUB-ASSY NO.2 (See page 50-8)

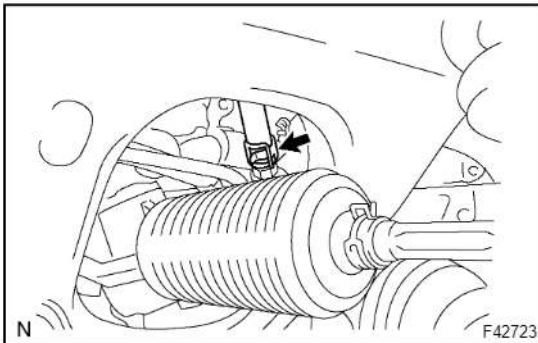


16. DISCONNECT PRESSURE FEED TUBE ASSY

- (a) Using SST, Loosen the flare nut and disconnect the pressure feed tube.
SST 09023-12700

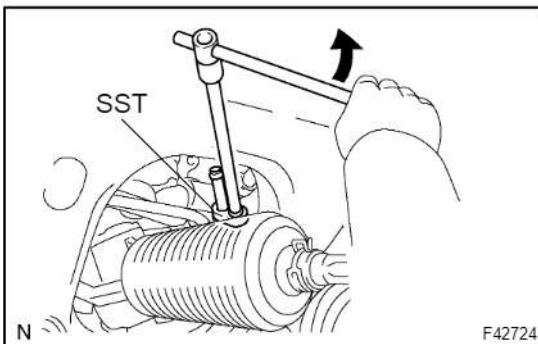


- (b) Remove the 2 bolts and separate the pressure feed tube assy from frame sub-assy.

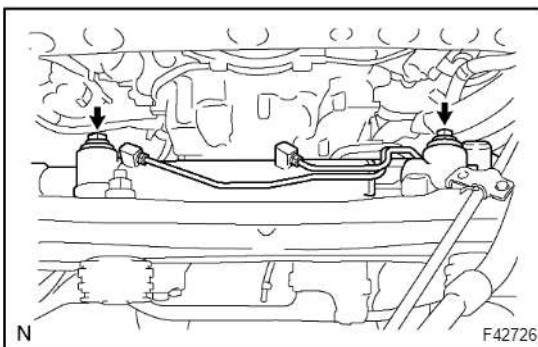


17. DISCONNECT STEERING GEAR OUTLET RETURN TUBE

- (a) Remove the clip and disconnect the return hose.



- (b) Using SST, remove the outlet return tube.
SST 09023-12700



18. REMOVE POWER STEERING LINK ASSY

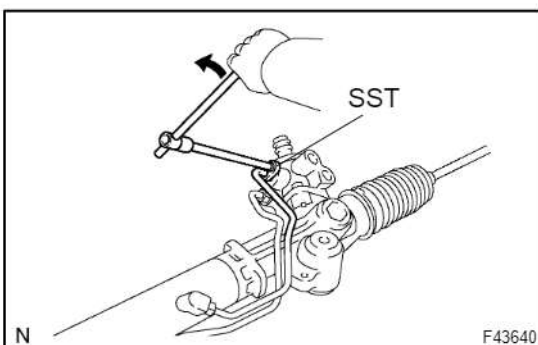
- (a) Remove the 2 bolts, 2 nuts and power steering link assy.

NOTICE:

The nut has a detent, so never turn the nut, be sure to turn the bolt.

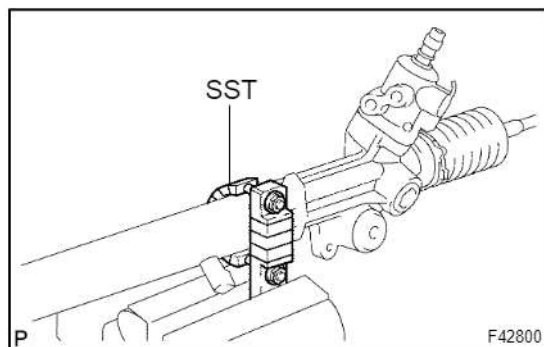
HINT:

After the 2 bolts, raise the bolt from the frame, and slide the gear assy and the bolt as a unit to the position where the bolt can be pulled out, and then remove the bolt.

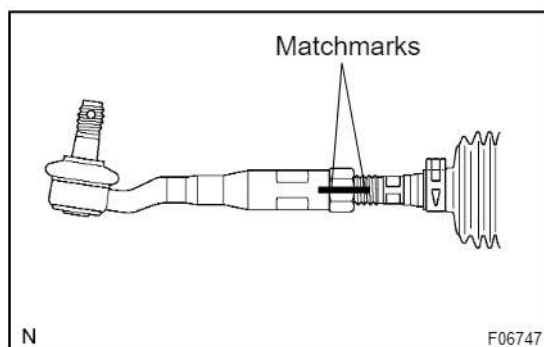


19. FIX POWER STEERING LINK ASSY

- (a) Using SST, remove the 2 turn pressure tubes.
SST 09023-38200



- (b) Using the SST, fix the gear assembly, between aluminum plates in a vise, as shown in the illustration.
SST 09612-00012



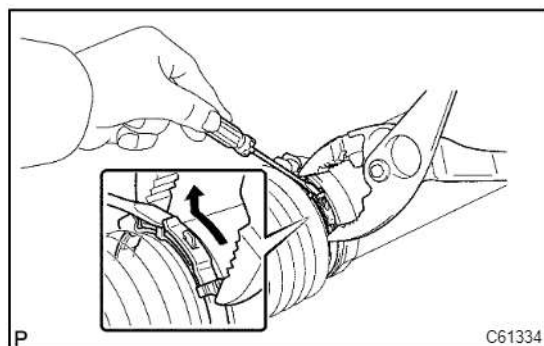
20. REMOVE TIE ROD END SUB-ASSY LH

- (a) Place matchmarks on the tie rod end, lock nut and rack end.
(b) Loosen the lock nut, remove the tie rod end and lock nut.

21. REMOVE TIE ROD END SUB-ASSY RH

HINT:

Remove the RH side by the same procedures with the LH side.



22. REMOVE STEERING RACK BOOT CLAMP LH

- (a) Using pliers and a screwdriver, loosen the clamp.

NOTICE:

Be careful not to damage the boot.

HINT:

Mark the RH and LH boots.

23. REMOVE STEERING RACK BOOT CLAMP RH

HINT:

Remove the RH side by the same procedures with the LH side.

24. REMOVE STEERING RACK BOOT CLIP LH

- (a) Using pliers, remove the clip.

NOTICE:

Be careful not to damage the boot.

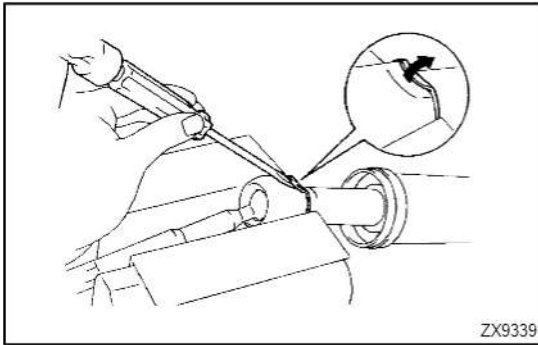
25. REMOVE STEERING RACK BOOT CLIP RH

HINT:

Remove the RH side by the same procedures with the LH side.

26. REMOVE STEERING RACK BOOT LH

27. REMOVE STEERING RACK BOOT RH

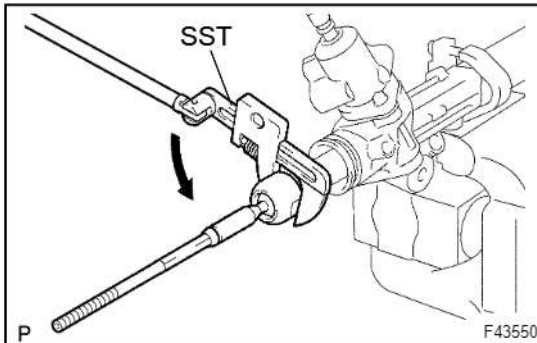


28. REMOVE STEERING RACK END SUB-ASSY

- (a) Using a screwdriver and a 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

- (c) Remove the crawl washer.

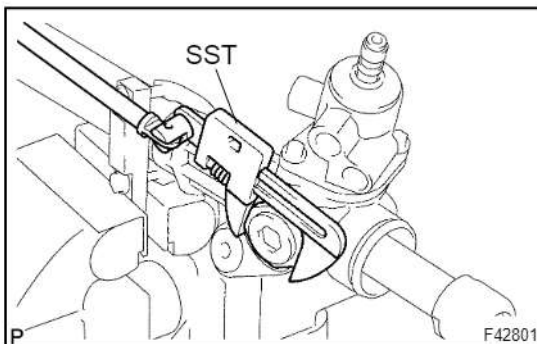
NOTICE:

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

- (d) Employ the same manner described above to the other side.

HINT:

Mark the RH and LH rack ends.



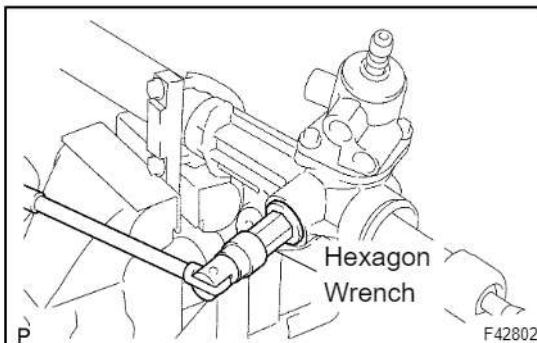
29. REMOVE RACK GUIDE

- (a) Using SST, remove the lock nut.

SST 09922-10010

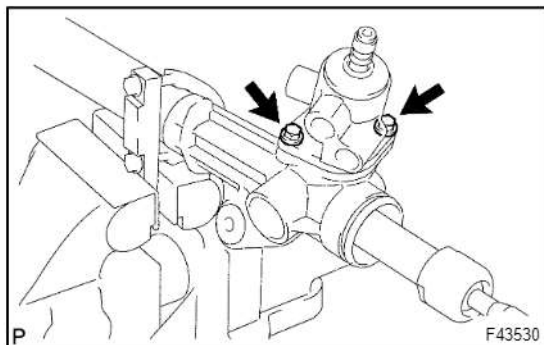
NOTICE:

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

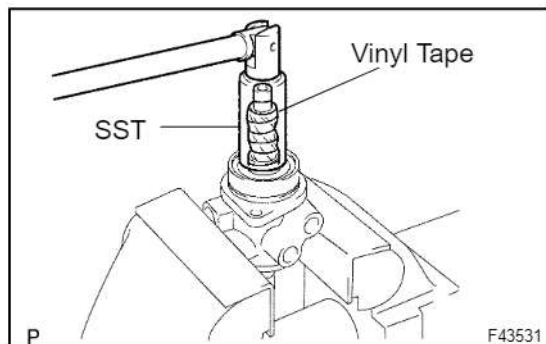


- (b) Using a hexagon wrench (24 mm), remove the rack guide spring cap.

- (c) Remove the spring and rack guide.

**30. REMOVE POWER STEERING CONTROL VALVE**

- (a) Remove the 2 bolts.
- (b) Pull out the control valve assembly with the control valve housing.
- (c) Remove the O-ring.
- (d) Carefully mount the control valve assembly in a soft jaw vise.

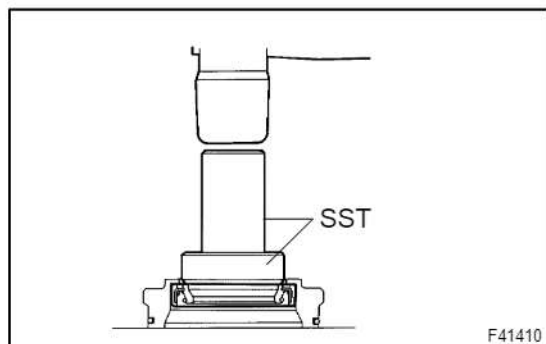


- (e) Using SST, remove the bearing guide nut.
SST 09631-20060

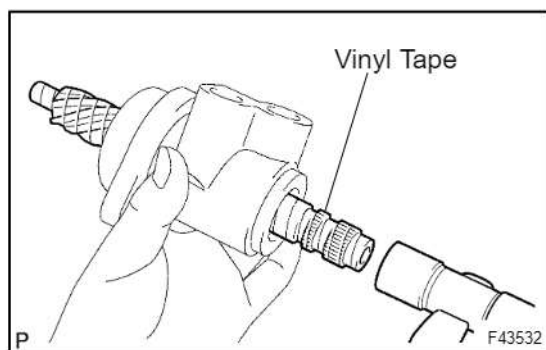
NOTICE:

Be careful not to damage the oil seal lip.

- (f) Remove the O-ring.
- (g) Remove the dust cover.



- (h) Using SST and a hammer, drive out the oil seal from the bearing guide nut.
SST 09950-60010 (09951-00300), 09950-70010 (09951-07100)
- (i) Wind vinyl tape to the control valve shaft.



- (j) Using a plastic hammer, tap out the valve assembly with the bearing guide nut from the control valve housing.

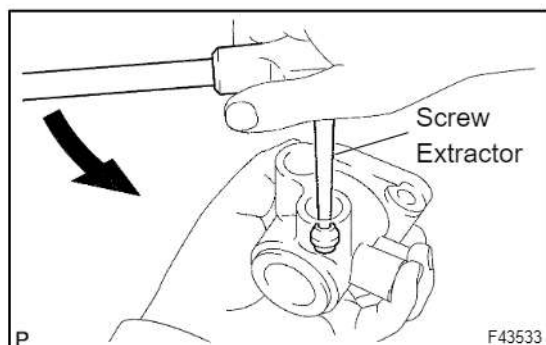
NOTICE:

Be careful not to damage the oil seal lip.

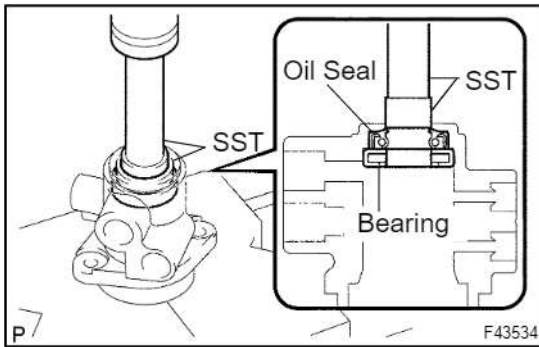
- (k) Using a screwdriver, remove the 4 teflon rings from the control valve assembly.

NOTICE:

Be careful not to damage the grooves for the ring.

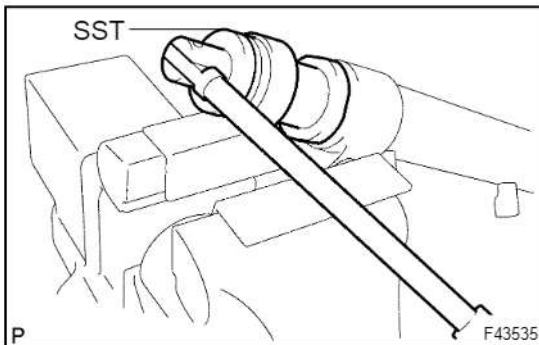


- (l) Using a screw extractor, remove the union seat from the control valve housing.



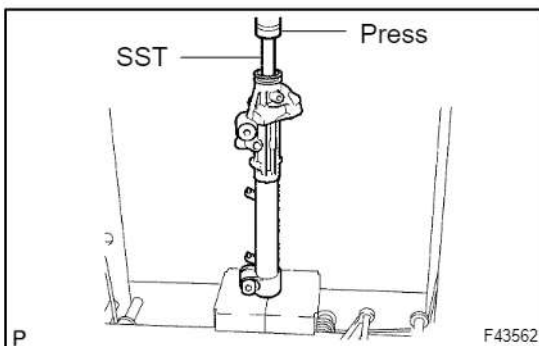
31. REMOVE POWER STEERING CONTROL VALVE UPPER OIL SEAL

- (a) Using SST, press out the bearing and oil seal from the control valve housing.
SST 09950-70010 (09951-07150), 09950-60010 (09951-00250)



32. REMOVE CYLINDER END STOPPER

- (a) Using SST, remove the stopper.
SST 09631-20120
(b) Remove the O-ring from the stopper.



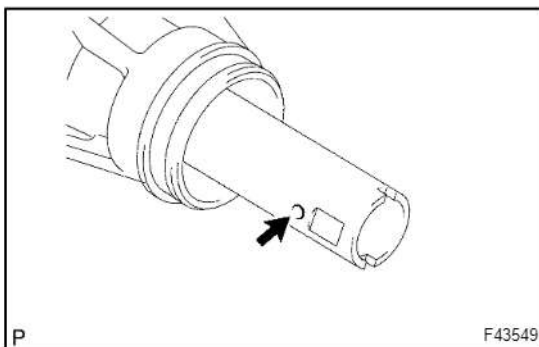
33. REMOVE STEERING RACK AND OIL SEAL

- (a) Using SST, press out the steering rack and oil seal.
SST 09950-70010 (09951-07200)

NOTICE:

Take care not to drop the steering rack.

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

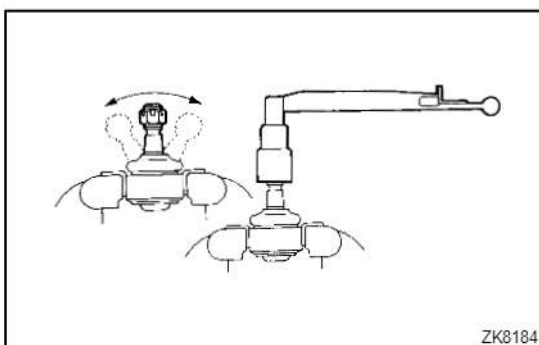


34. INSPECT POWER STEERING RACK

- (a) Insert a wire into the vent hole of the steering rack by 30 mm (1.18 in.), and ensure that the vent hole is not clogged with grease.

HINT:

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



35. INSPECT TIE ROD END SUB-ASSY LH

- (a) Flip the ball joint stud back and forth 5 times as shown in the figure, before installing the nut.
(b) Using a torque wrench, turn the nut continuously at a rate of 2 - 4 seconds per 1 turn and take the torque reading on the 5th turn.

Torque(Turning):

0.29 - 1.96 N·m (2.9 - 20.0 kgf·cm, 2.57 - 17.35 in.·lbf)

36. INSPECT TIE ROD END SUB-ASSY RH**HINT:**

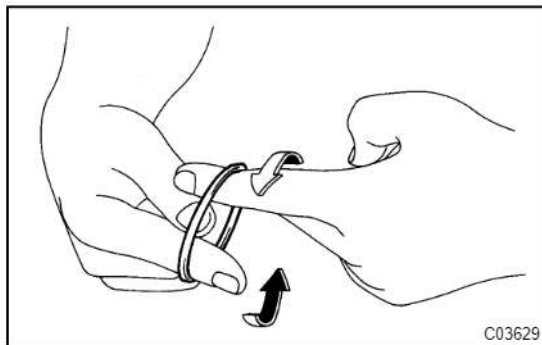
Inspect the RH side by the same procedures with LH side.

37. REMOVE STEERING RACK PISTON 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.

**38. INSTALL STEERING RACK PISTON RING**

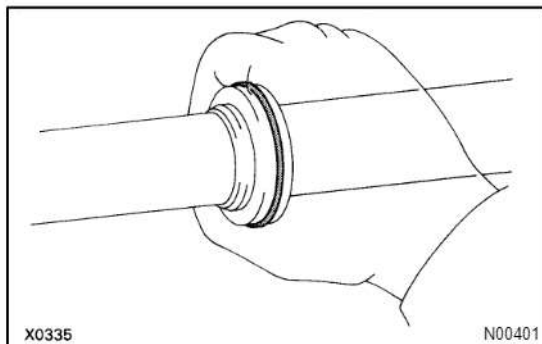
- (a) Coat a new O-ring with power steering fluid and install it on steering rack.

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

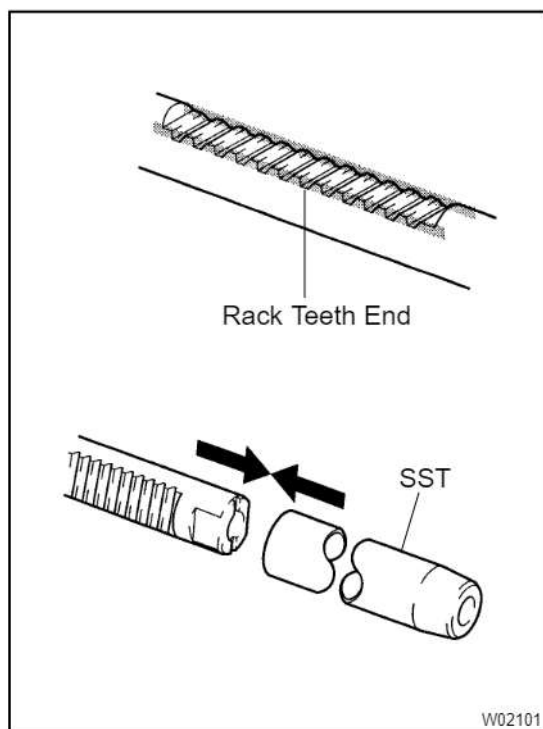
NOTICE:

Be careful no to overexpand the teflon ring.

- (c) Coat the teflon ring with power steering fluid.



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

**39. INSTALL POWER STEERING RACK**

- (a) Coat SST with power steering fluid.

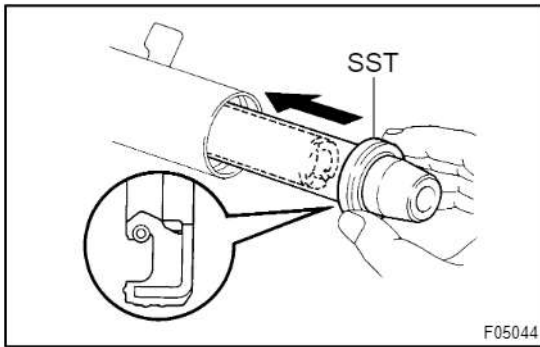
- (b) Install SST to the rack.

SST 09631-00350

HINT:

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

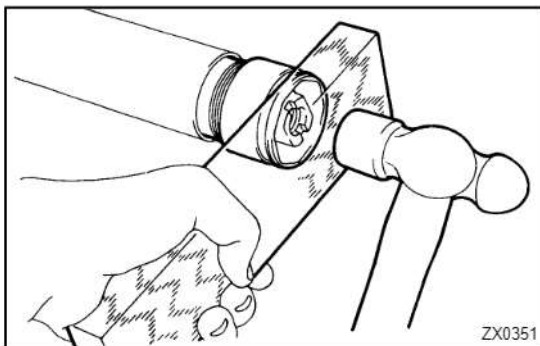
- (c) Install the rack into the rack housing.



- (d) Coat SST with power steering fluid.
SST 09631-00350
- (e) Install SST to the steering rack opposite end.
- (f) Coat a new oil seal lip with power steering fluid, and install the oil seal by pushing it without tilting.

NOTICE:

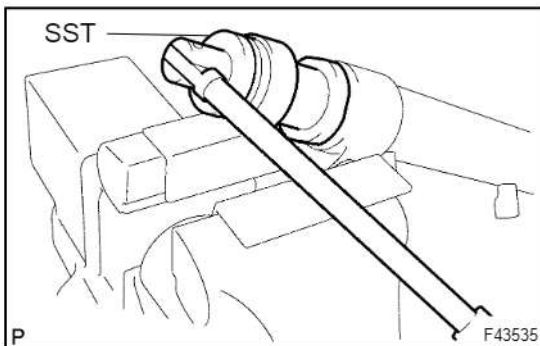
- ★ **Make sure to install the oil seal facing in the correct direction.**
 - ★ **Be careful not to damage the oil seal lip.**
- (g) Remove the SST.
SST 09631-00350

**40. INSTALL CYLINDER END STOPPER**

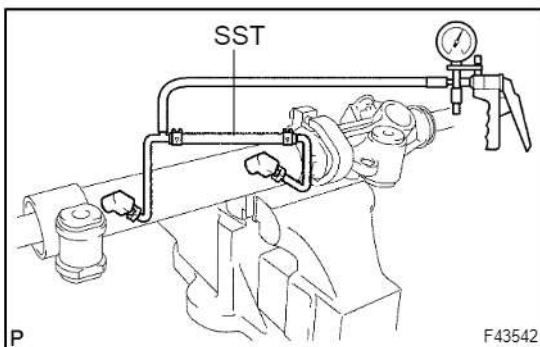
- (a) Coat a new O-ring with power steering fluid, and install it to the stopper.
- (b) Using a wooden block and a hammer, drive in the stopper until it is tightly installed.

NOTICE:

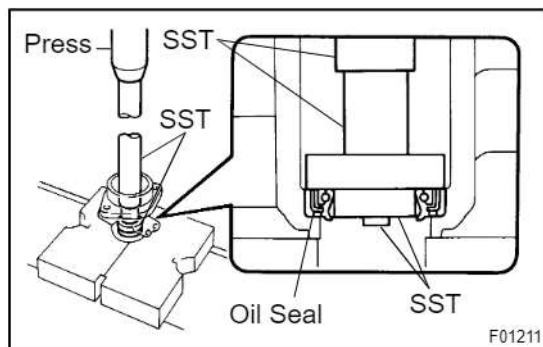
Be careful no to damage the O-ring.



- (c) Using SST, torque the stopper.
SST 09631-20120
Torque: 145 N·m (1,479 kgf·cm, 107 ft·lbf)

**41. AIR TIGHTNESS TEST**

- (a) Install SST to the unions of the rack housing.
SST 09631-12071 (09633-00010)
 - (b) Apply 53.33 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.

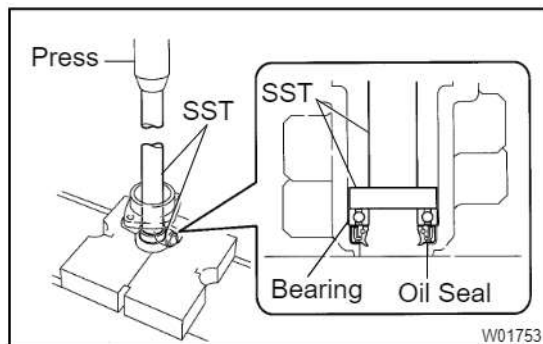


42. INSTALL POWER STEERING CONTROL VALVE UPPER OIL SEAL

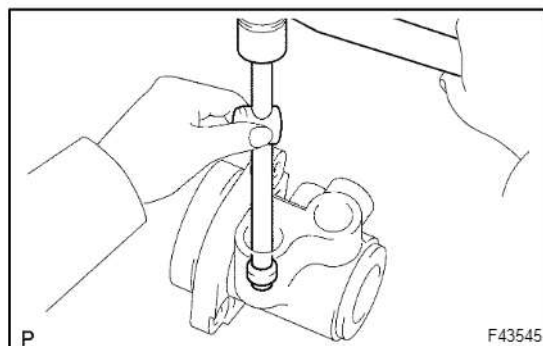
- Coat a new oil seal lip with power steering fluid.
- Using SST, press in the oil seal.
SST 09950-60010 (09951-00180, 09951-00320, 09952-06010), 09950-70010 (09951-07150)

NOTICE:

Make sure that the oil seal is installed facing in the correct direction.



- Coat a new bearing with molybdenum disulfide lithium base grease.
- Using SST, press in the bearing.
SST 09950-60010 (09951-00180, 09951-00340, 09952-06010), 09950-70010 (09951-07150)

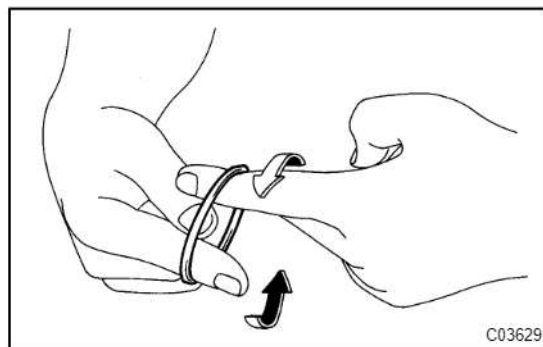


43. INSTALL POWER STEERING CONTROL VALVE

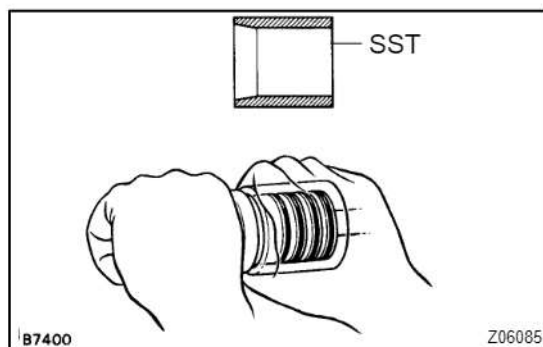
- Using a plastic hammer and a sliding handle, lightly tap in a new union seat.

NOTICE:

Before installing the union seat, remove dust sticking to the control valve housing.



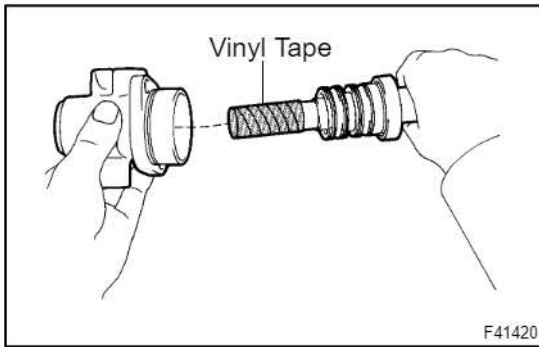
- Coat the rings with power steering fluid.
- Expand 4 new rings with your fingers.



- Install the rings to the control valve assembly, and settle them down with your fingers.
- 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 overexpand the ring.

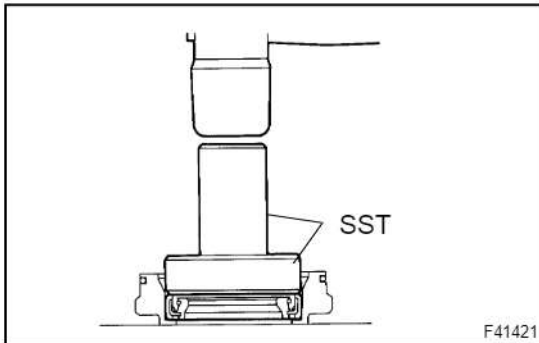


- (f) Coat the teflon rings with power steering fluid.
- (g) To prevent oil seal lip damage, wind vinyl tape on the serrated port of the control valve shaft.
- (h) Push the valve assembly into the control valve housing.

NOTICE:

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

- (i) Coat a new O-ring with power steering fluid, and install it to the bearing guide nut.
- (j) Coat a new oil seal lip with power steering fluid.



- (k) Using SST and a hammer, drive in the oil seal.
SST 09950-60010 (09951-00390), 09950-70010 (09951-07100)

NOTICE:

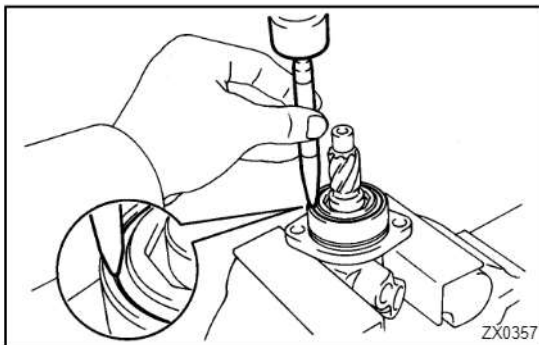
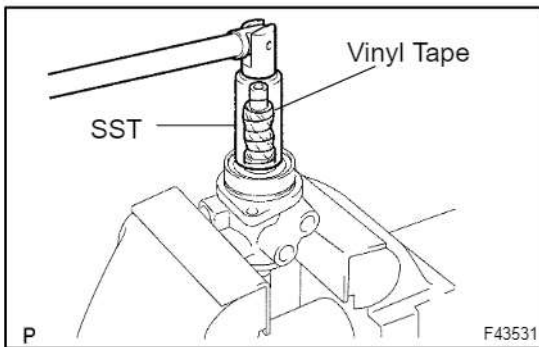
Make sure to install the oil seal facing in the correct direction.

- (l) Lightly mount the control valve assembly between aluminum plates in a vise.
- (m) To prevent oil seal lip damage, wind vinyl tape on the pinion part of the control valve shaft.
- (n) Using SST, torque the guide nut.
SST 09631-20060

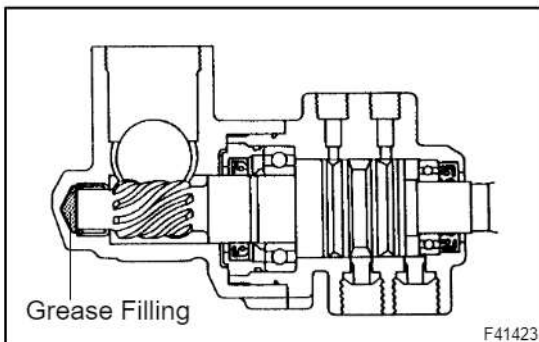
Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)

NOTICE:

Be careful not to damage the oil seal lip.



- (o) Using a punch and a hammer, stake the nut.
- (p) Coat a new O-ring with power steering fluid, and install it to the valve housing.

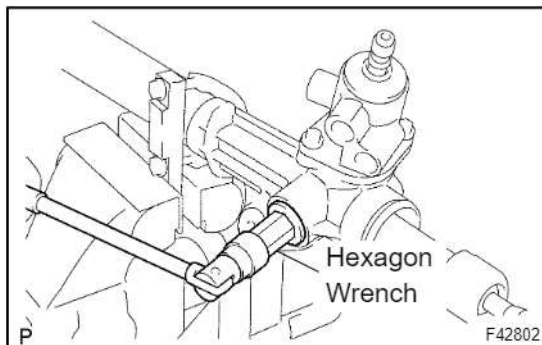


- (q) Apply molybdenum disulfide base grease for the needle roller bearing inside the rack housing in the illustrated portion.

Volume of grease applied: Approximately 2 g (0.07 oz)

- (r) Install the control valve assembly with the 2 bolts.

Torque: 18 N·m (184 kgf·cm, 13 ft·lbf)

**44. INSTALL RACK GUIDE**

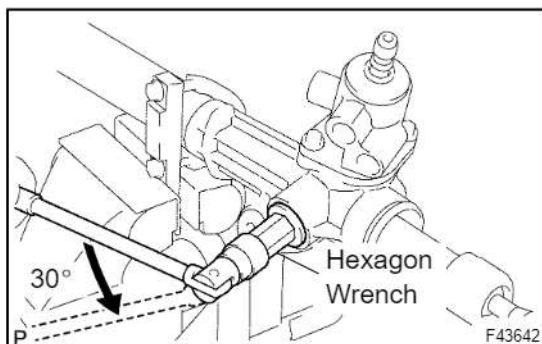
- (a) Install the rack guide and spring.
- (b) Apply sealant to 2 or 3 threads of the rack guide spring cap.

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

- (c) Using a hexagon wrench (24 mm), temporarily install the spring cap.

45. ADJUST TOTAL PRELOAD

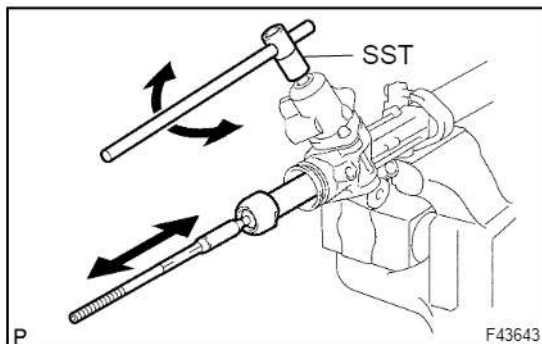
- (a) To prevent the steering rack teeth from damaging the oil seal lip, temporarily install the RH and LH rack ends.



- (b) Using a hexagon wrench (24 mm), tighten the rack guide spring cap.

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

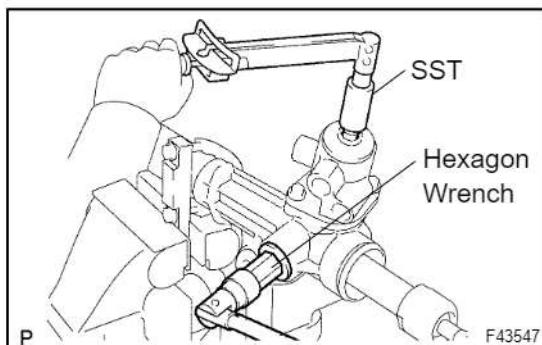
- (c) Return the cap 30°.



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

SST 09616-00011

- (e) Using a hexagon wrench (24 mm), loosen the cap until the rack guide spring is not functioning.



- (f) Using SST, a torque wrench and a hexagon wrench (24 mm), tighten the cap until the preload is within specification.

SST 09616-00011

Preload (turning):

0.7 - 1.5 N·m (7.1 - 15.1 kgf·cm, 6.2 - 13.3 in·lbf)

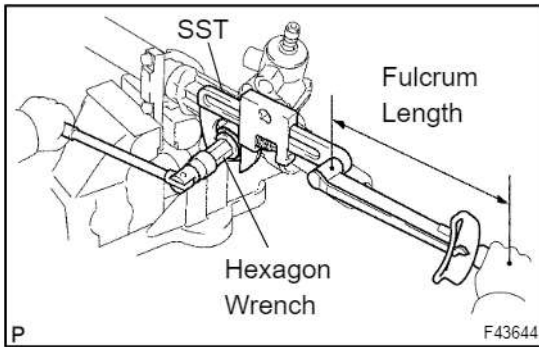
NOTICE:

Adjustment should be done in the tightening direction of the spring cap.

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

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

- (h) Temporarily install the lock nut.



- (i) Using a hexagon wrench (24 mm), holding the rack guide spring cap rotating, and using SST, torque the nut.
SST 09922-10010

Torque: 65 N·m (660 kgf·cm, 48 ft·lbf) for use with SST

NOTICE:

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

HINT:

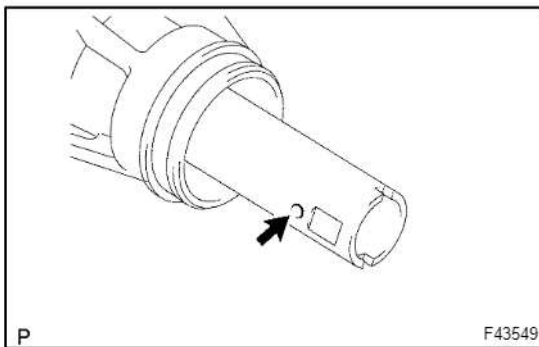
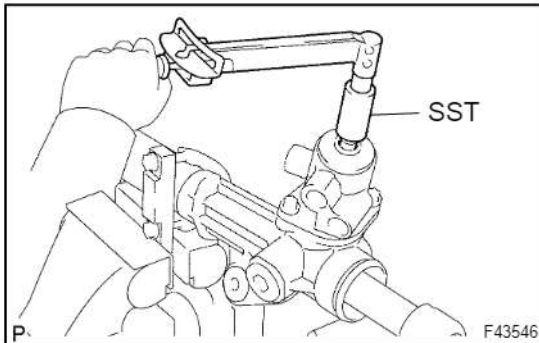
Use a torque wrench with a fulcrum length of 345 mm (13.58 in.).

- (j) Recheck the total preload.

Preload (turning):

0.7 – 1.5 N·m (7.1 – 15.1 kgf·cm, 6.2 – 13.3 in·lbf)

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



46. INSPECT POWER STEERING RACK

- (a) Insert a wire into the vent hole of the steering rack by 30 mm (1.18 in.), and ensure that the vent hole is not clogged with grease.

HINT:

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

47. INSTALL STEERING RACK END SUB-ASSY

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

HINT:

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

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

SST 09922-10010

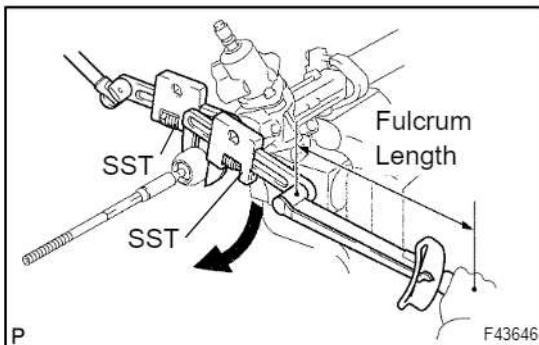
Torque: 98 N·m (1,000 kgf·cm, 72 ft·lbf) for use with SST

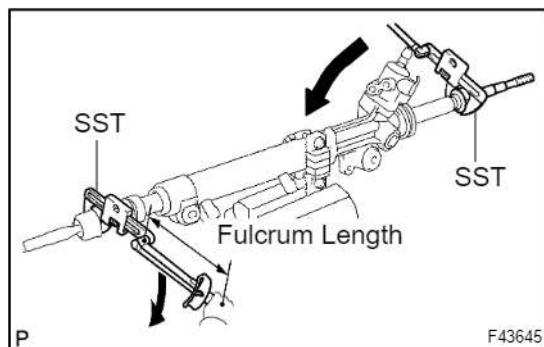
NOTICE:

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

HINT:

Use a torque wrench with a fulcrum length of 380 mm (14.9 in.).





- (c) Using SST to hold the rack end LH steady, and using another SST, torque the rack end RH.

SST 09922-10010

Torque: 98 N·m (1,000 kgf·cm, 72 ft·lbf) for use with SST

NOTICE:

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

HINT:

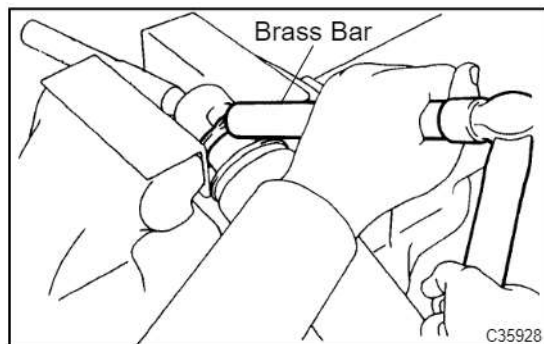
Use a torque wrench with a fulcrum length of 380 mm (14.9 in.).

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

NOTICE:

Avoid any impact to the rack.

- (e) Employ the same manner described above to the other side.



48. INSTALL STEERING RACK BOOT LH

- (a) Install the boot.

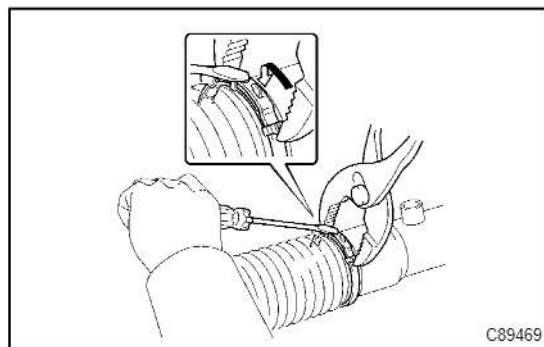
NOTICE:

Be careful not to damage or twist the boot.

49. INSTALL STEERING RACK BOOT RH

HINT:

Install the RH side by the same procedures with the LH side.



50. INSTALL STEERING RACK BOOT CLAMP LH

- (a) Using pliers and a screwdriver, install the clamp.

51. INSTALL STEERING RACK BOOT CLAMP RH

HINT:

Install the RH side by the same procedures with the LH side.

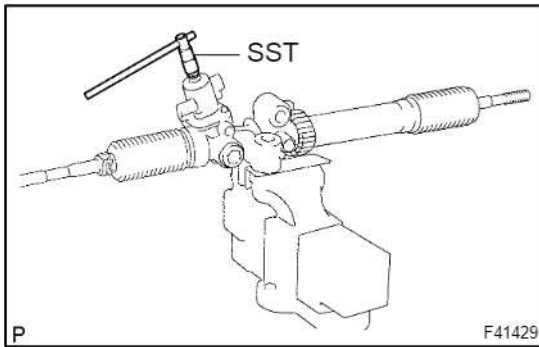
52. INSTALL STEERING RACK BOOT CLIP LH

- (a) Using pliers, install the clip.

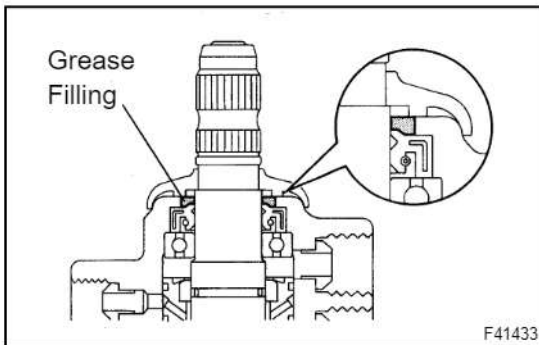
53. INSTALL STEERING RACK BOOT CLIP RH

HINT:

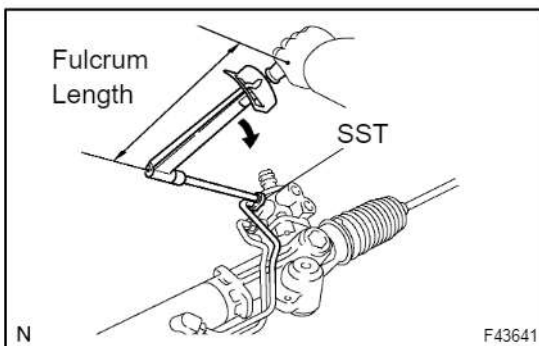
Install the RH side by the same procedures with the LH side.

**54. INSPECT POWER STEERING GEAR ASSY**

- (a) Using SST, check that the rack boot stretches smoothly when the control valve shaft is being rotated.
SST 09616-00011



- (b) Apply MP grease in the illustrated portion.
(c) Install the dust cover.

**55. INSTALL STEERING TURN PRESSURE TUBE**

- (a) Using SST, install the 2 turn pressure tubes.
SST 09023-38200

Torque: 23 N·m (230 kgf·cm, 17 ft·lbf) for use with SST

HINT:

- ★ Use a torque wrench with a fulcrum length of 345 mm (13.58 in.).
- ★ This torque value is effective in case that SST is parallel to a torque wrench.

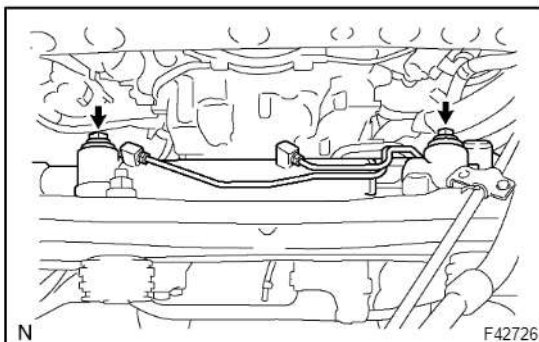
56. INSTALL TIE ROD END SUB-ASSY LH

- (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.

Torque: 88 N·m (897 kgf·cm, 65 ft·lbf)

57. INSTALL TIE ROD END SUB-ASSY RH**HINT:**

Install the RH side by the same procedures with the LH side.

**58. INSTALL POWER STEERING LINK ASSY**

- (a) Install the power steering link assy with the 2 bolts and 2 nuts.

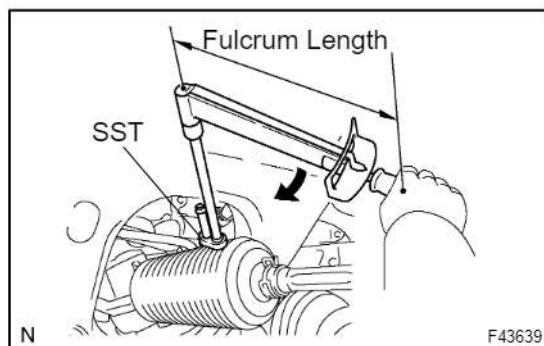
Torque: 100 N·m (1,020 kgf·cm, 74 ft·lbf)

NOTICE:

The nut has a detent, so never turn the nut, be sure to turn the bolt.

HINT:

Insert the bolt and slide it with the gear assy as a unit and then install the bolt on the frame.

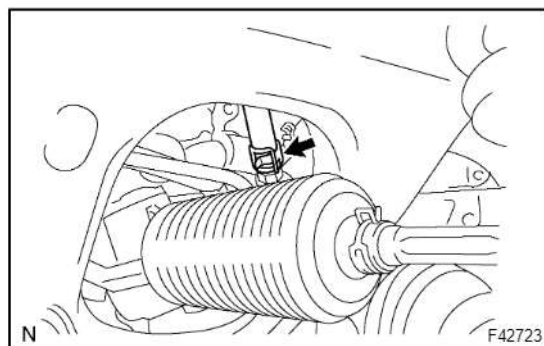
59. INSTALL STABILIZER BAR FRONT (See page 26-27)**60. STABILIZE SUSPENSION (See page 26-27)****61. CONNECT STEERING GEAR OUTLET RETURN TUBE**

- (a) Using SST, connect the outlet return tube.

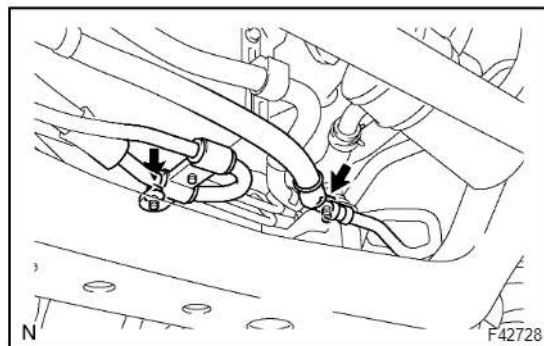
SST 09023-12700

Torque: 40 N·m (410 kgf·cm, 30 ft·lbf) for use with SST**HINT:**

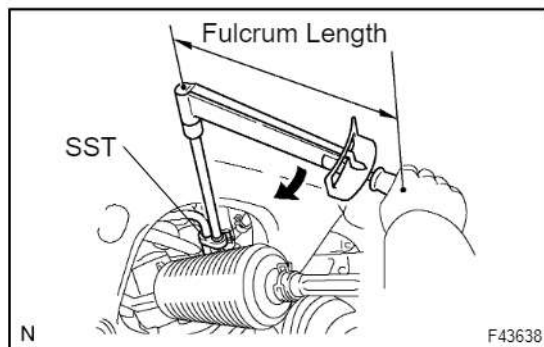
- ★ Use a torque wrench with a fulcrum length of 300 mm (11.81 in.).
- ★ This torque value is effective in case that SST is parallel to a torque wrench.



- (b) Install the hose with the clip.

**62. CONNECT PRESSURE FEED TUBE ASSY**

- (a) Install the pressure feed tube assy to the frame sub-assy with the 2 bolts.

Torque: 28 N·m (286 kgf·cm, 21 ft·lbf)

- (b) Using SST, tighten the flare nut and connect the pressure feed tube.

SST 09023-12700

Torque: 40 N·m (410 kgf·cm, 30 ft·lbf) for use with SST**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.

63. FULLY TIGHTEN STEERING INTERMEDIATE SHAFT SUB-ASSY NO.2 (See page 50-8)**64. CONNECT TIE ROD END SUB-ASSY LH**

- (a) Connect the tie rod end to the steering knuckle arm.
- (b) Install the nut and cotter pin.

Torque: 91 N·m (928 kgf·cm, 67 ft·lbf)

65. CONNECT TIE ROD END SUB-ASSY RH

HINT:

Install the RH side by the same procedures with the LH side.

66. INSTALL ENGINE UNDER COVER SUB-ASSY NO.1

- (a) Install the engine under cover sub-assy No.1 with the 4 bolts.

67. INSTALL ENGINE UNDER COVER ASSY REAR

- (a) Install the engine under cover assy rear with the 6 bolts.

68. INSTALL FRONT WHEEL

Torque: 110 N·m (1,122 kgf·cm, 81 ft·lbf)

69. PLACE FRONT WHEELS FACING STRAIGHT AHEAD (See page 50-8)**70. INSTALL TURN SIGNAL SWITCH ASSY (See page 50-8)****71. INSTALL SPIRAL CABLE SUB-ASSY (See page 50-8)****72. INSTALL STEERING COLUMN COVER LWR (See page 50-8)****73. CENTER SPIRAL CABLE (See page 50-8)****74. INSTALL STEERING WHEEL ASSY (See page 50-8)****75. INSPECT STEERING WHEEL CENTER POINT (See page 50-8)****76. INSTALL HORN BUTTON ASSY (See page 50-8)****77. INSPECT HORN BUTTON ASSY (See page 50-8)****78. INSPECT SRS WARNING LIGHT (See page 05-1238)****79. ADD POWER STEERING FLUID (See page 51-3)****80. BLEED POWER STEERING FLUID (See page 51-3)****81. CHECK POWER STEERING FLUID LEAKAGE (See page 51-3)****82. INSPECT AND ADJUST FRONT WHEEL ALIGNMENT (See page 26-7)**