

POWER STEERING SYSTEM

PRECAUTION

NOTICE:

When disconnecting the negative (-) battery terminal, initialize the following systems after the terminal is reconnected.

System Name	See procedure
Lighting System (Adaptive Front-Lighting System)	LI-17
Power Window Control System	WS-12
Power Back Door System	ED-33
Sliding Roof System	RF-4

PS**1. HANDLING PRECAUTIONS STEERING SYSTEM**

- (a) Care must be taken 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 Vehicle is equipped with SRS (Supplemental Restraint System) such as the airbags. If service operation is not carried out properly, in a step by step fashion, sudden deployment of the airbags may result in serious injury. 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 [RS-1](#)).

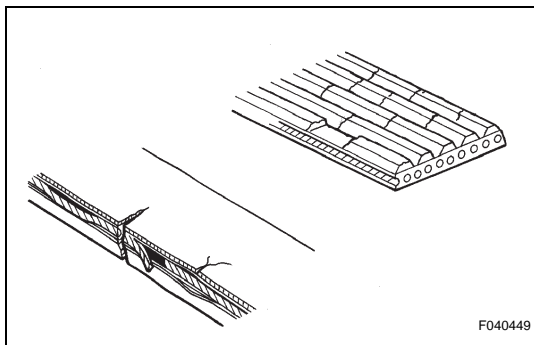
PROBLEM SYMPTOMS TABLE

HINT:

Using the table below to help determine the cause of the problem. The numbers indicate likely causes of the problem in descending order. Check each part in order. Repair or replace parts as necessary.

POWER STEERING SYSTEM

Symptom	Suspected area	See page
Hard steering	1. Tires (Improperly inflated)	TW-1
	2. Power steering fluid level (Low)	PS-3
	3. Drive belt (Loose)	PS-2
	4. Front wheel alignment (incorrect)	SP-2
	5. Steering system joints (Worn)	-
	6. Suspension arm ball joints (Worn)	SP-24
	7. Steering column (Binding)	-
	8. Power steering vane pump	PS-10
	9. Power steering gear	PS-26
Poor return	1. Tires (Improperly inflated)	TW-1
	2. Front wheel alignment (incorrect)	SP-2
	3. Steering column (Binding)	-
	4. Power steering gear	PS-34
Excessive play	1. Steering system joints (Worn)	-
	2. Suspension arm ball joints (Worn)	SP-24
	3. Intermediate shaft, Sliding yoke (Worn)	-
	4. Front wheel bearing (Worn)	AH-15
	5. Power steering gear	PS-26
Abnormal noise	1. Power steering fluid level (Low)	PS-3
	2. Steering system joints (Worn)	-
	3. Power steering vane pump	PS-10
	4. Power steering gear	PS-26



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:

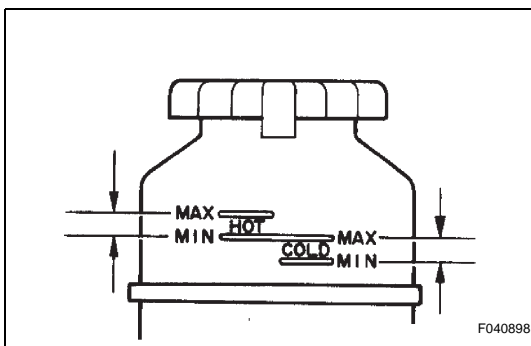
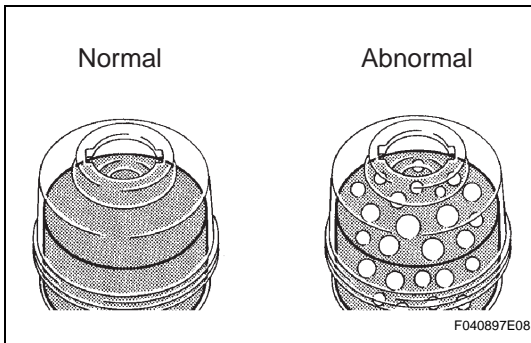
Cracks on the rib side of a belt are considered acceptable. Replace the belt if there are any missing ribs.

POWER STEERING FLUID

BLEEDING

1. 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 to 3 seconds, then turn the wheel to the opposite full lock position and keep it there for 2 to 3 seconds.
 - (2) Repeat above operation 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.



2. CHECK POWER STEERING 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

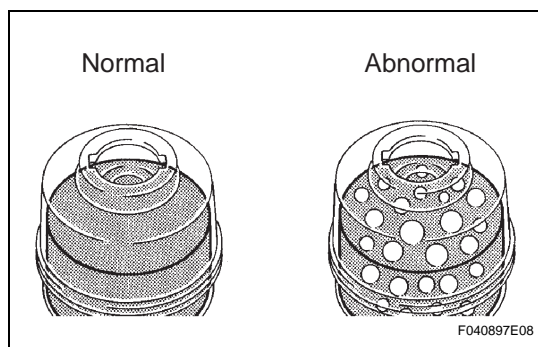
HINT:

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

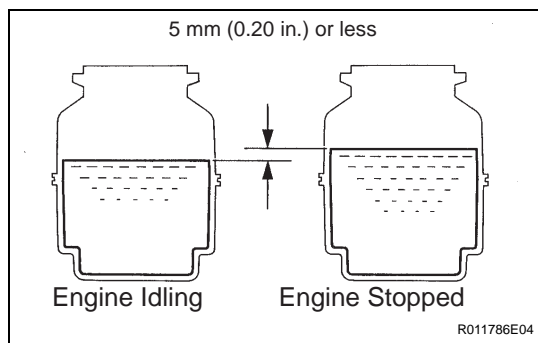
- (c) Start the engine and run at idle.
- (d) Turn the steering wheel from lock to lock several times to raise fluid temperature.

Fluid temperature:

75 to 80°C (167 to 176°F)



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



- (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 the power steering system.

- (i) Check the fluid level.

3. CHECK STEERING FLUID PRESSURE

- (a) Disconnect the pressure feed tube (See page [PS-20](#)).

- (b) Connect SST, as shown in the illustration on the next page.

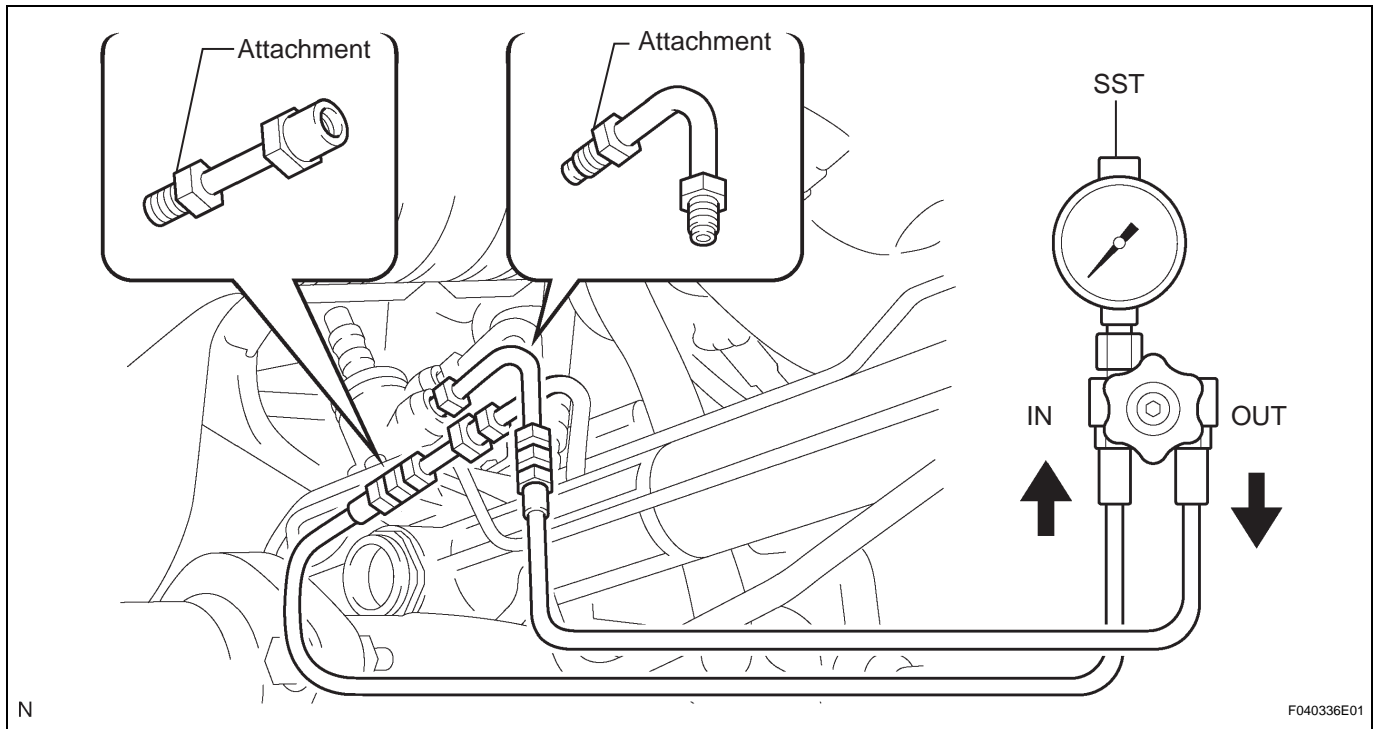
SST 09640-10010 (09641-01010, 09641-01020, 09641-01030)

NOTICE:

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

- (c) Bleed the power steering system.
 (d) Start the engine and run at idle.

- (e) Turn the steering wheel from lock to lock several times to raise fluid temperature.



Fluid temperature:

75 to 80°C (167 to 176°F)

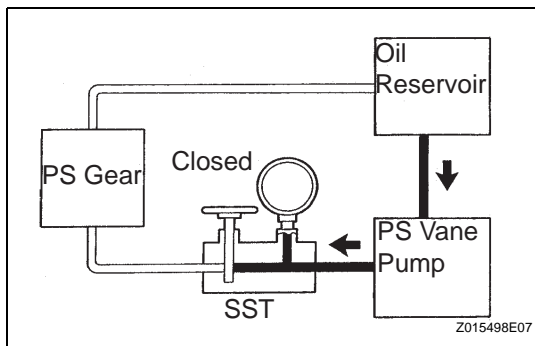
- (f) With the engine idling, close the valve of the SST and observe the reading on the SST.

Fluid pressure:

7,800 to 8,300 kPa (80 to 85 kgf/cm², 1,131 to 1,204 psi)

NOTICE:

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



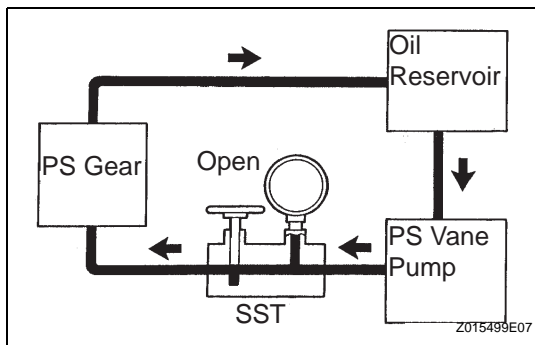
- (g) With the engine idling, open the valve fully.
(h) Measure the fluid pressure at engine speeds of 1,000 rpm and 3,000 rpm.

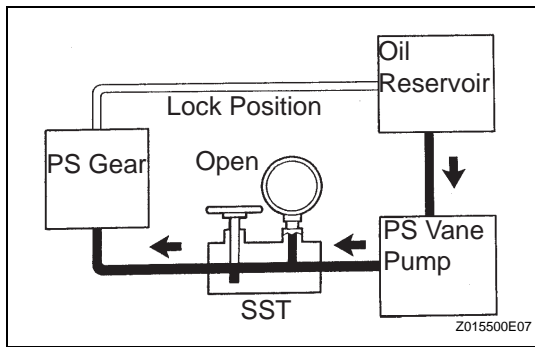
Difference in fluid pressure:

490 kPa (5 kgf/cm², 71 psi) or less

NOTICE:

Do not turn the steering wheel.





PS

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

Fluid pressure:

7,800 to 8,300 kPa (80 to 85 kgf/cm², 1,131 to 1,204 psi)

NOTICE:

- Do not keep the steering wheel in the full lock position for more than 10 seconds.
- Do not allow the fluid temperature become too high.

- (j) Disconnect the SST.

SST 09640-10010 (09641-01010, 09641-01020, 09641-01030)

- (k) Connect the pressure feed tube (See page [PS-34](#)).

- (l) Bleed the power steering system.

4. CHECK STEERING EFFORT

- Center the steering wheel.
- Remove the steering pad (See page [RS-388](#)).
- Start the engine and run it at idle.
- Measure the steering effort in both directions.

Torque: Steering effort (Reference)

6.0 N*m (60 kgf*cm, 53 in.*lbf) or less

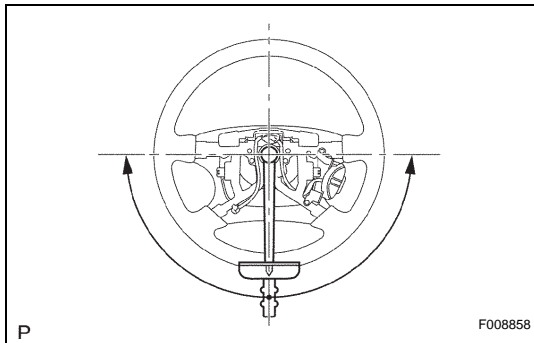
HINT:

Check tire type, pressure and road surface before making your diagnosis.

- (e) Torque the steering wheel set nut.

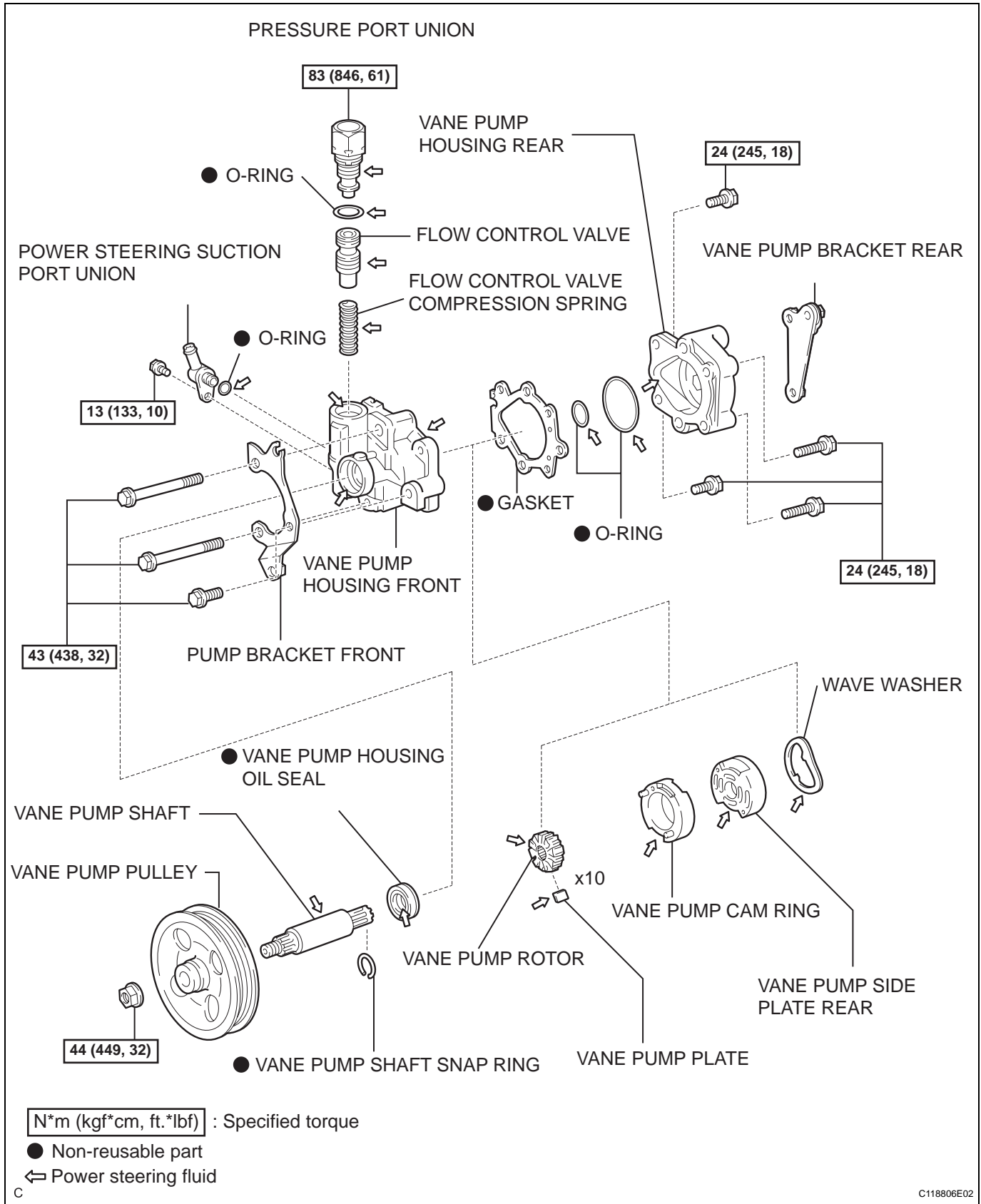
Torque: 50 N*m (510 kgf*cm, 37 ft.*lbf)

- (f) Install the steering wheel pad (See page [RS-389](#)).



VANE PUMP

COMPONENTS



REMOVAL

NOTICE:

- Do not overtighten when using a vise.
- When installing, coat the parts indicated by arrows with power steering fluid (See page PS-7).

1. REMOVE FRONT WHEEL RH
2. DRAIN POWER STEERING FLUID
3. REMOVE FRONT FENDER APRON SEAL RH
4. DISCONNECT OIL RESERVOIR TO PUMP HOSE NO.1

- (a) Remove the clip and disconnect the oil reservoir to pump hose No. 1.

NOTICE:

Take care not to spill fluid on the V belt.

5. REMOVE POWER STEERING OIL PRESSURE SWITCH

- (a) Disconnect the connector.
- (b) Remove the oil pressure switch from the union bolt.

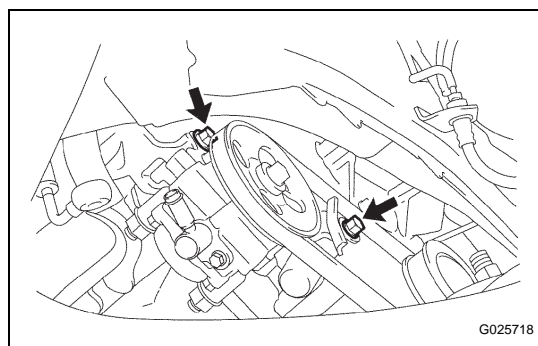
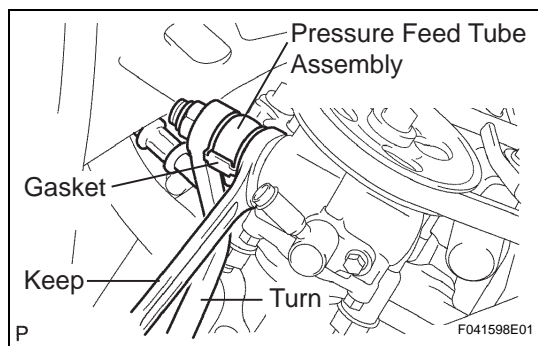
NOTICE:

Be careful not to drop the oil pressure switch.

If the oil pressure switch is dropped or severely damaged, replace it with a new one.

6. DISCONNECT PRESSURE FEED TUBE ASSEMBLY

- (a) Using a spanner (24mm) to keep the pressure port union, remove the union bolt and the gasket.
- (b) Disconnect the pressure feed tube assembly.

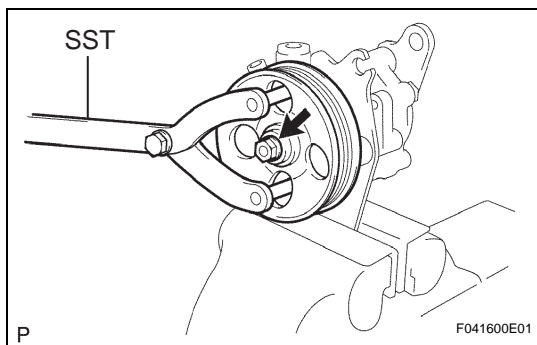


7. REMOVE VANE PUMP V BELT

- (a) Loosen the 2 bolts and remove the vane pump V belt.

8. REMOVE VANE PUMP ASSEMBLY

- (a) Remove the 2 bolts and the vane pump assembly.



DISASSEMBLY

1. REMOVE VANE PUMP PULLEY

- (a) Using SST, keep the vane pump pulley from rotating and loosen the nut.

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

- (b) Remove the nut and the vane pump pulley from the vane pump shaft.

2. REMOVE POWER STEERING SUCTION PORT UNION

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

PS

3. REMOVE FLOW CONTROL VALVE

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

4. REMOVE VANE PUMP BRACKET REAR

- (a) Remove the 2 bolts and the vane pump bracket rear from the vane pump assembly.

5. REMOVE VANE PUMP HOUSING REAR

- (a) Remove the 4 bolts and the vane pump housing rear from the vane pump housing front.
- (b) Remove the gasket.
- (c) Remove the 2 O-rings from the vane pump housing rear.

6. REMOVE VANE PUMP SIDE PLATE REAR

- (a) Remove the wave washer from the vane pump side plate rear.
- (b) Remove the vane pump side plate rear.

7. REMOVE VANE PUMP CAM RING

8. REMOVE VANE PUMP SHAFT SNAP RING

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

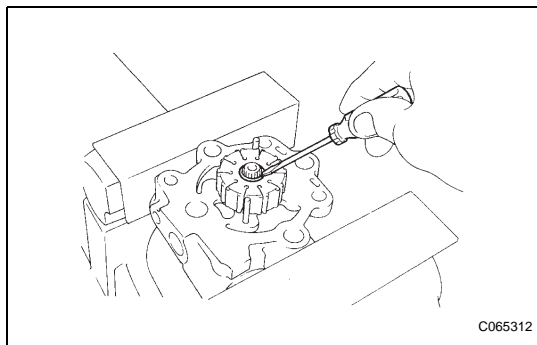
9. REMOVE VANE PUMP ROTOR

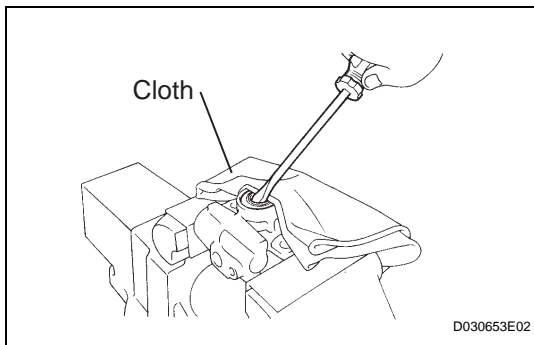
- (a) Remove the 10 vane pump plates from the vane pump rotor.
- (b) Remove the vane pump rotor.

10. REMOVE VANE PUMP SHAFT

11. REMOVE PUMP BRACKET FRONT

- (a) Remove the bolt and the pump bracket front from the vane pump housing front.





12. REMOVE VANE PUMP HOUSING OIL SEAL

- (a) Using a screwdriver, remove the vane pump housing oil seal from the vane pump housing front.

NOTICE:

Be careful not to damage the bushing of the vane pump housing front.

INSPECTION

1. INSPECT VANE PUMP SHAFT AND BUSH IN HOUSING FRONT

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

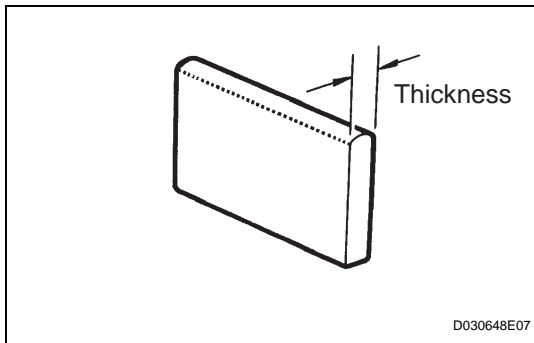
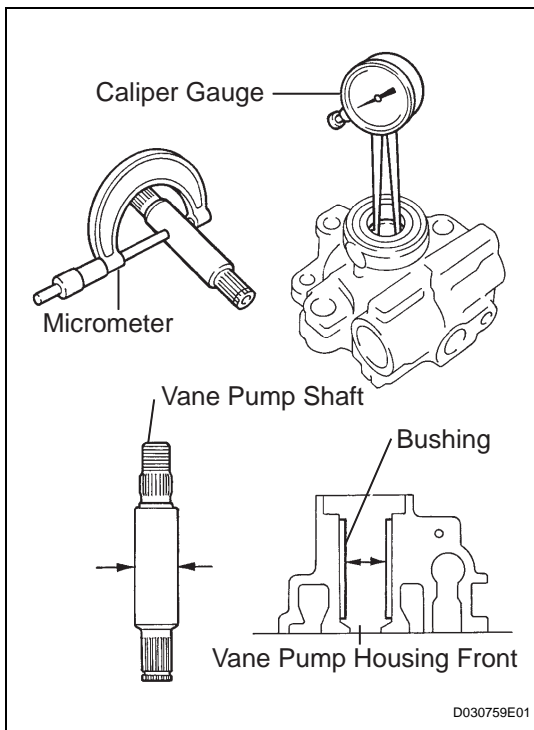
Maximum clearance:

0.07 mm (0.0028 in.)

If clearance exceeds maximum, replace the vane pump assembly.

- (b) Check for the strong damage or wear on the bushing of the vane pump housing front and the vane pump shaft.

If necessary, replace the vane pump assembly.



2. INSPECT VANE PUMP ROTOR AND VANE PUMP PLATES

- (a) Using a micrometer, measure the thickness of the vane pump plates.

Standard thickness:

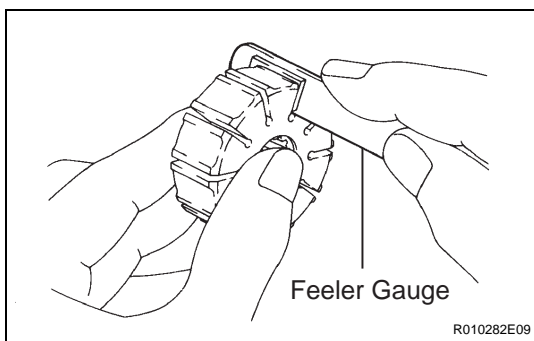
1.397 to 1.403 mm (0.0550 to 0.0552 in.)

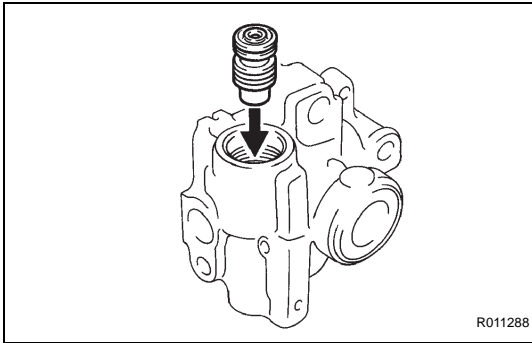
- (b) Using a feeler gauge, measure the clearance between the vane pump rotor groove and the vane pump plate.

Maximum clearance:

0.03 mm (0.0012 in.)

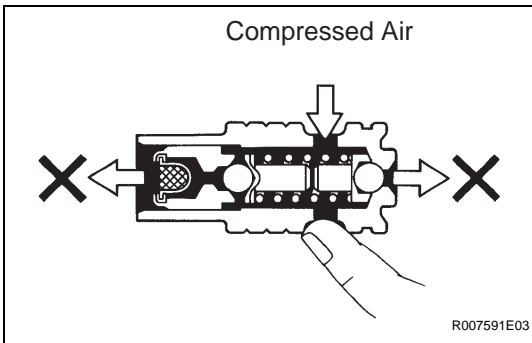
If clearance exceeds maximum, replace the vane pump assembly.



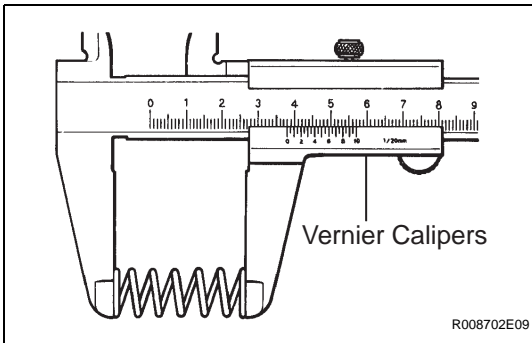


3. INSPECT FLOW CONTROL VALVE

- (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. If it lacks smoothness, replace the vane pump assembly.



- (b) Check the flow control valve for leakage. Close one of the holes and apply compressed air, 392 to 490 kPa (4 to 5 kgf/cm², 57 to 71 psi), into the opposite side hole, and confirm that air does not come out from the both end holes. If air leaks, replace the vane pump assembly.



4. INSPECT FLOW CONTROL VALVE COMPRESSION SPRING

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

Minimum free length:

32.24 mm (1.2693 in.)

If the length is less than minimum, replace the vane pump assembly.

REASSEMBLY

1. INSPECT PRESSURE PORT UNION

If the union seat in the pressure port union is severely damaged, it may cause fluid leakage. In that case, replace the vane pump assembly.

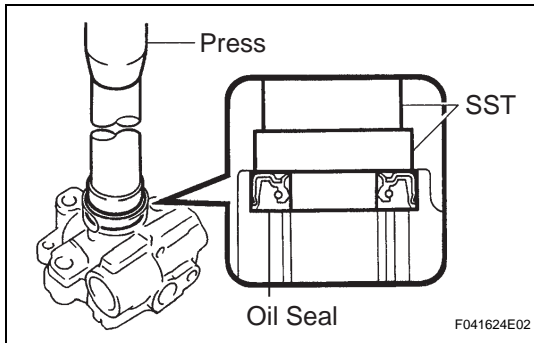
2. INSTALL VANE PUMP HOUSING OIL SEAL

- Coat a new vane pump housing oil seal lip with power steering fluid.
- Using SST and a press, install the vane pump housing oil seal.

SST 09950-60010 (09951-00330), 09950-70010 (09951-07100)

NOTICE:

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



3. INSTALL PUMP BRACKET FRONT

- Install the pump bracket front with the bolt.

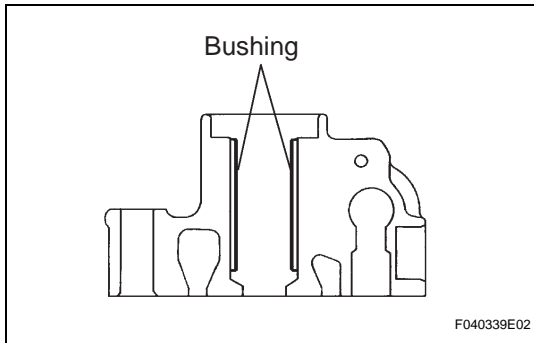
Torque: 43 N*m (438 kgf*cm, 32 ft.*lbf)

4. INSTALL VANE PUMP SHAFT

- Coat the busing surface of the vane pump housing front with power steering fluid.
- Gradually insert the vane pump shaft from the pulley side.

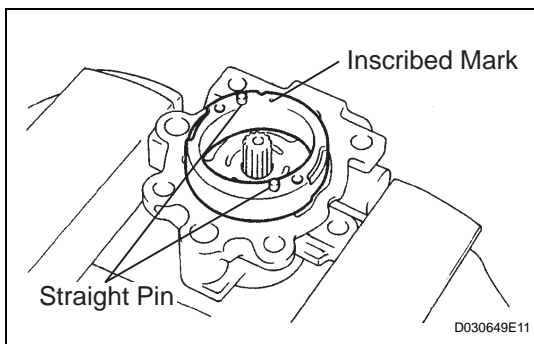
NOTICE:

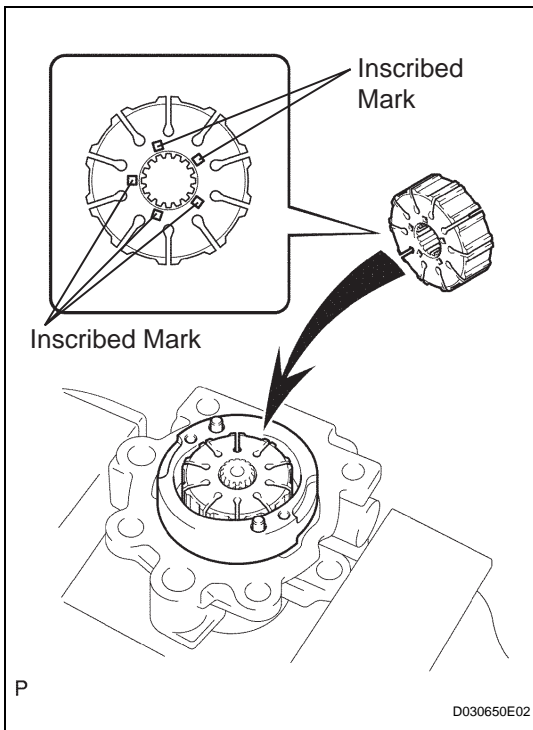
- Do not damage the vane pump housing oil seal lip in the vane pump housing front.
- After installation, check the vane pump housing oil seal lip.



5. INSTALL VANE PUMP CAM RING

- Align the holes of the vane pump cam ring with the 2 straight pins, and install the vane pump cam ring with the inscribed mark facing upward.



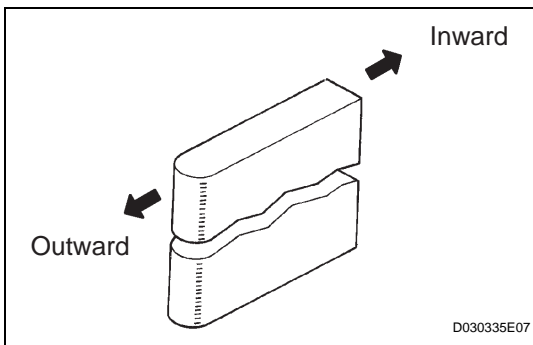


6. INSTALL VANE PUMP ROTOR

- (a) Install the vane pump rotor with the inscribed mark facing downward.

NOTICE:

Make sure that the vane pump rotor is installed in the correct direction.

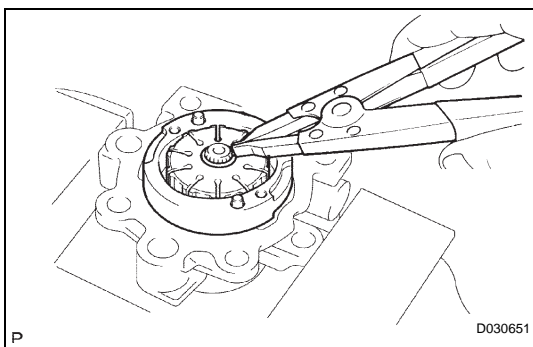


- (b) Coat all 10 vane pump plates with power steering fluid.

- (c) Install the vane pump plates with the round end facing outward.

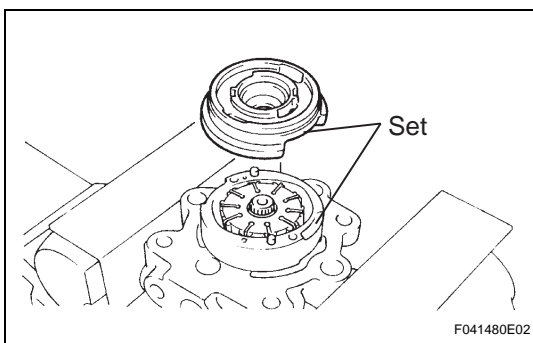
NOTICE:

Make sure that the vane pump plates are installed in the correct direction.



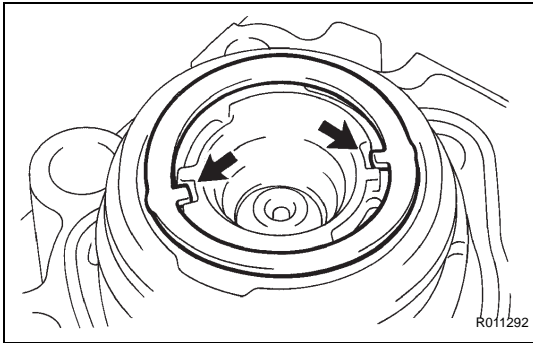
7. INSTALL VANE PUMP SHAFT SNAP RING

- (a) Using a snap ring expander, install a new vane pump shaft snap ring onto the vane pump shaft.



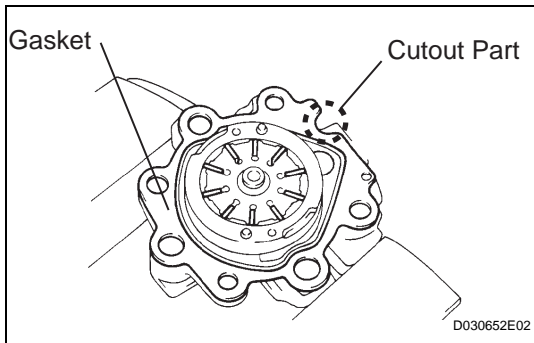
8. INSTALL VANE PUMP SIDE PLATE REAR

- (a) Align the groove of the vane pump cam ring with that of the vane pump side plate rear to install.



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

PS



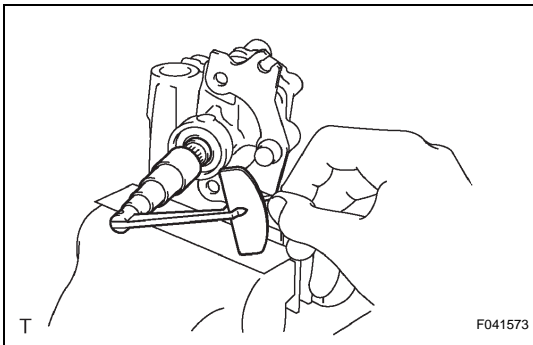
9. INSTALL VANE PUMP HOUSING REAR

- (a) Install a new gasket to the vane pump housing front.

NOTICE:

Make sure that the gasket is installed with the cutout in the correct position.

- (b) Install the vane pump housing rear with the 4 bolts.
Torque: 24 N*m (245 kgf*cm, 18 ft.*lbf)



10. MEASURE VANE PUMP ROTATION TORQUE

- (a) Check that the vane pump rotates smoothly without abnormal noise.
- (b) Temporarily install the nut to the vane pump shaft.
- (c) Using a torque wrench, check the vane pump rotating torque.

Torque: Rotating torque

0.27 N*m (2.8 kgf*cm, 2.4 in.*lbf) or less

11. INSTALL VANE PUMP BRACKET REAR

- (a) Install the vane pump bracket rear with the 2 bolts.
Torque: 43 N*m (438 kgf*cm, 32 ft.*lbf)

12. INSTALL FLOW CONTROL VALVE

- (a) Coat the compression spring with power steering fluid and install it to the vane pump housing front.
- (b) Coat the flow control valve with power steering fluid.
- (c) Install the flow control valve to the vane pump housing front.

NOTICE:

Make sure that the flow control valve is installed correctly.

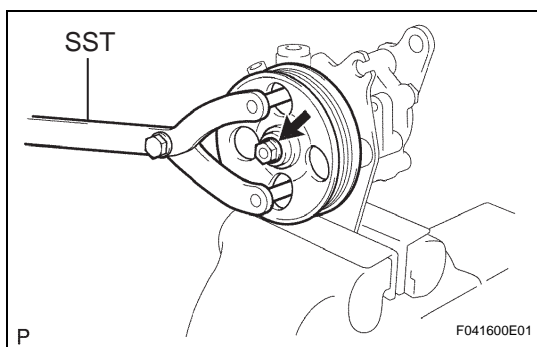
- (d) Coat a new O-ring with power steering fluid and install it to the pressure port union.
- (e) Install the pressure port union to the vane pump housing front.

Torque: 83 N*m (846 kgf*cm, 61 ft.*lbf)

13. 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 to the vane pump housing front.

Torque: 13 N*m (133 kgf*cm, 10 ft.*lbf)

**14. INSTALL VANE PUMP PULLEY**

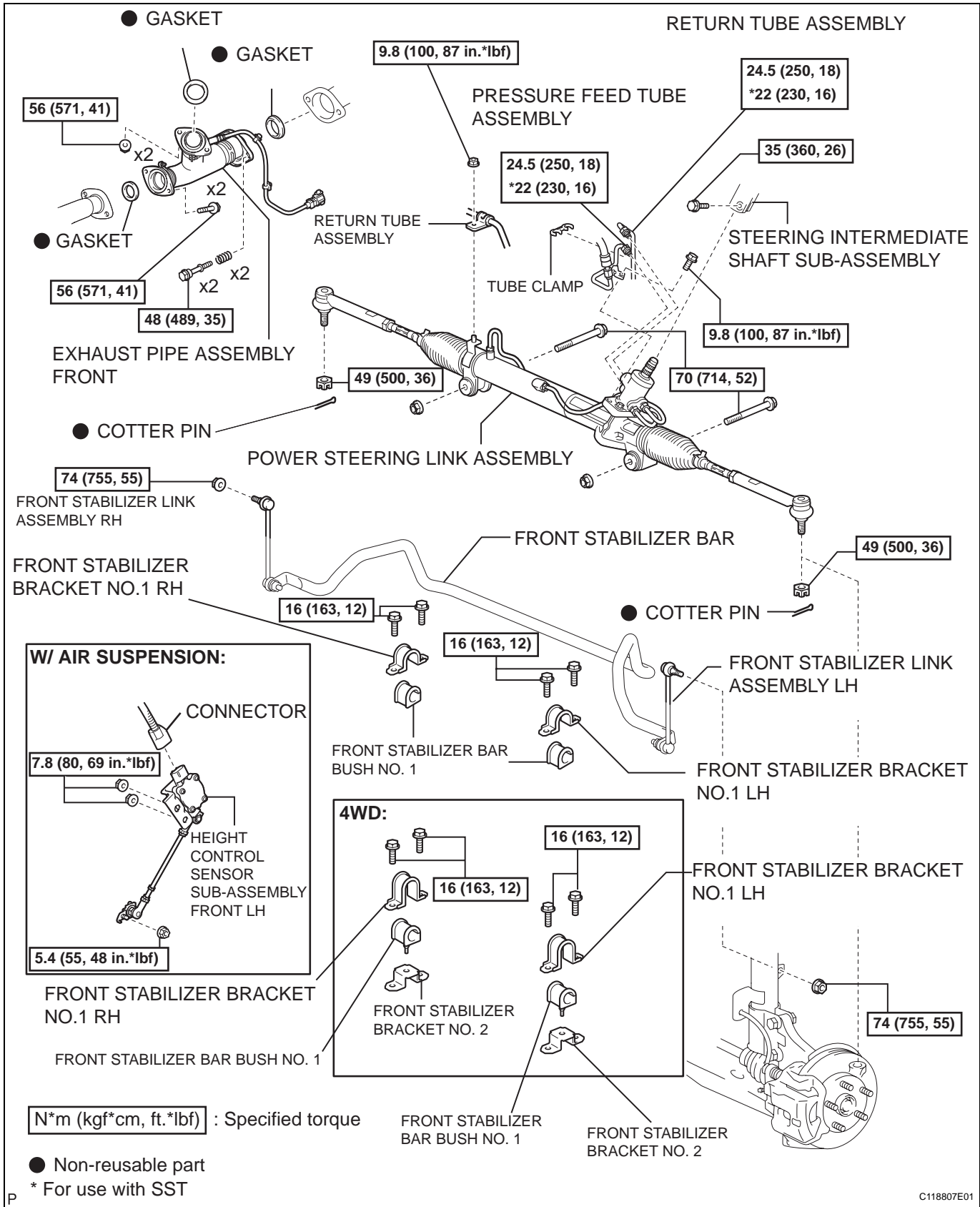
- (a) Install the vane pump pulley to the vane pump shaft.
- (b) Using SST, keep the vane pump pulley from rotating and install the nut.

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

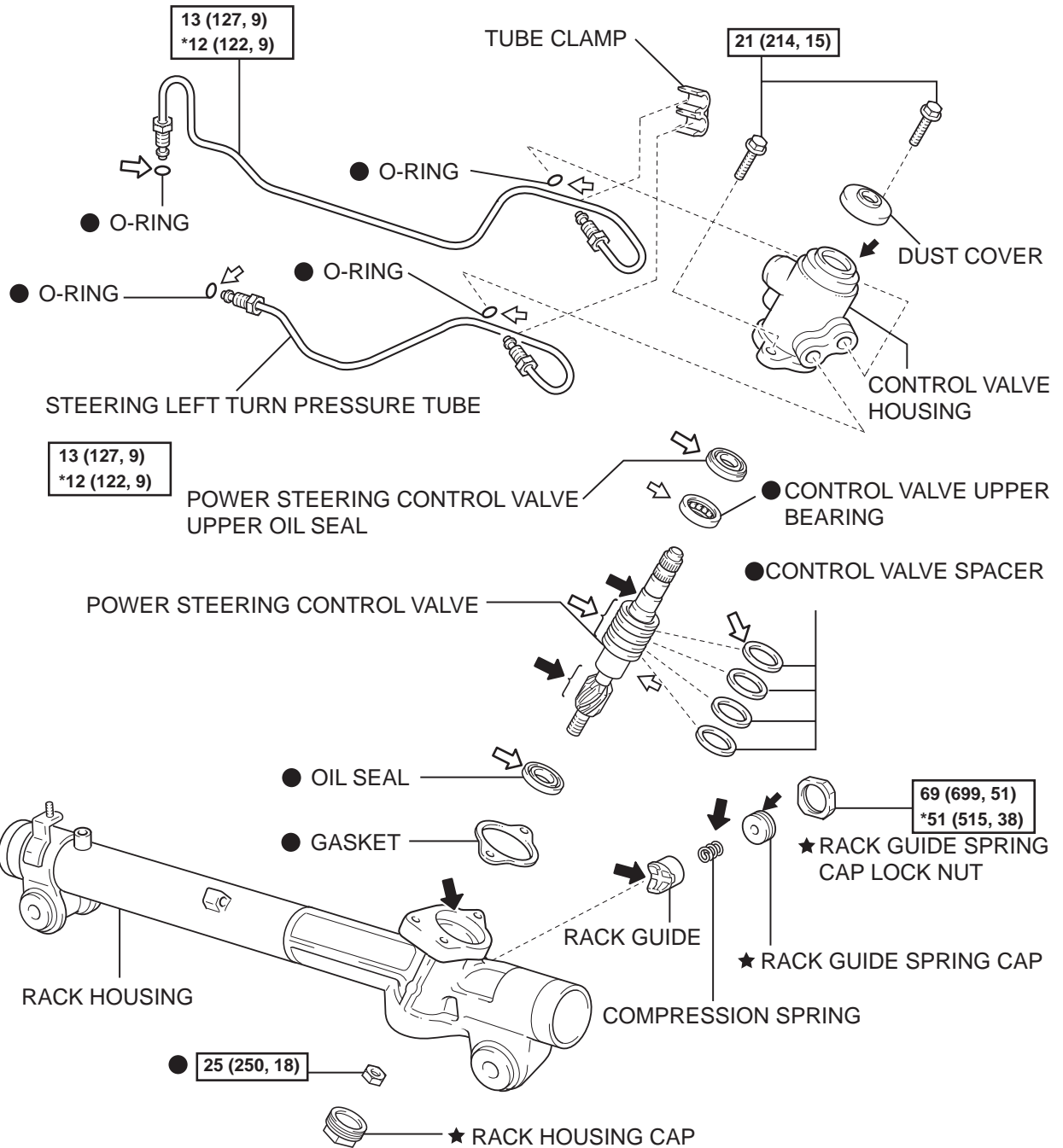
Torque: 44 N*m (449 kgf*cm, 32 ft.*lbf)

POWER STEERING LINK

COMPONENTS



STEERING RIGHT TURN PRESSURE TUBE



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

● Non-reusable part

★ Precoated part

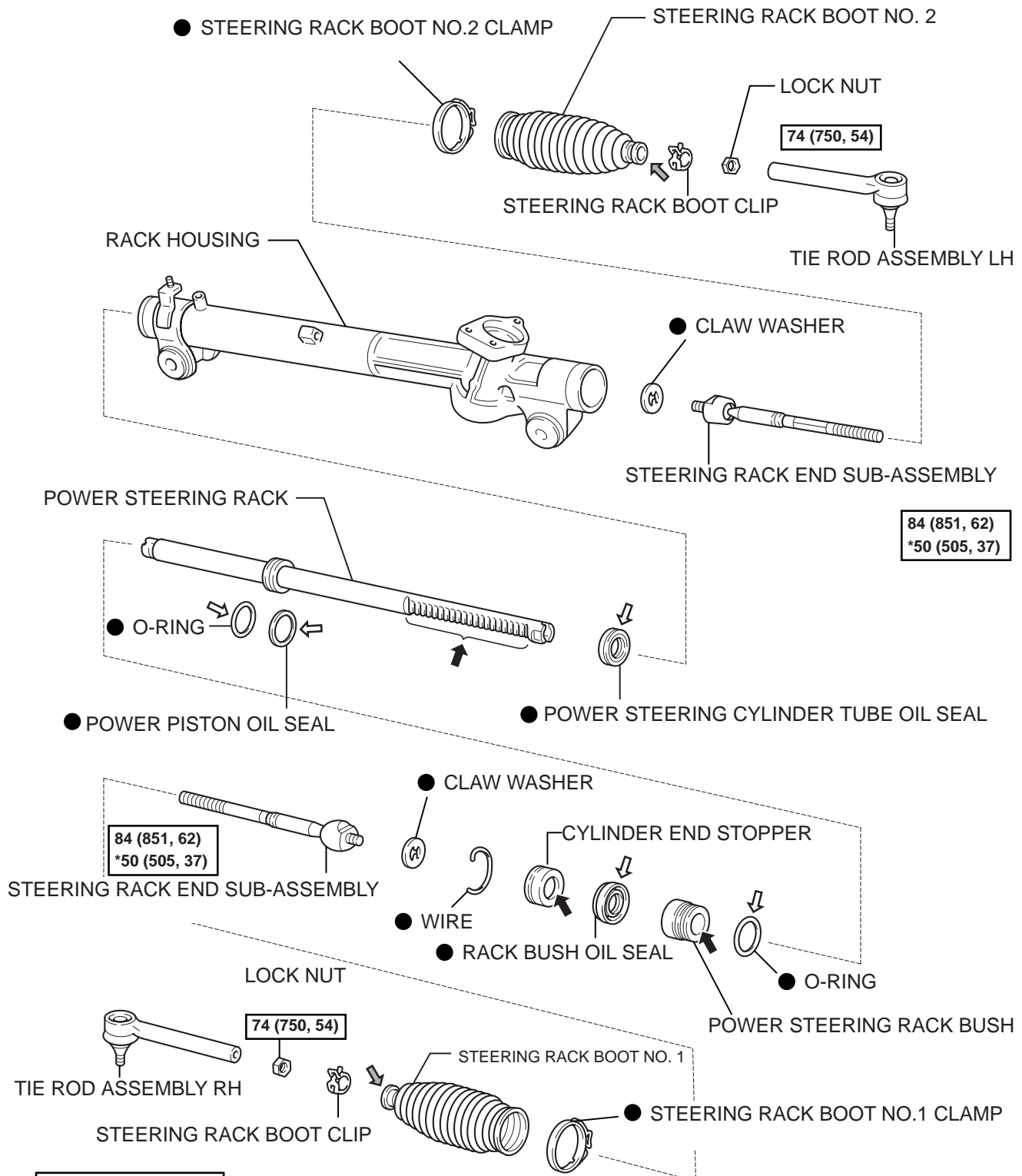
MP grease

← Molybdenum disulfide lithium base grease

↪ Power steering fluid

* For use with SST

PS



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

● Non-reusable part

⇐ Silicon grease

⇐ Molybdenum disulfide lithium base grease

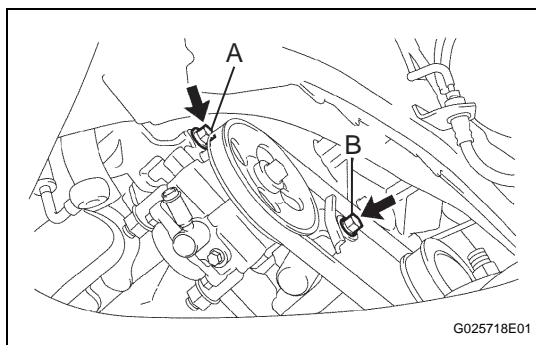
⇐ Power steering fluid

* For use with SST

INSTALLATION

1. INSTALL VANE PUMP ASSEMBLY

- Temporarily install the vane pump assembly with the 2 bolts.



2. INSTALL VANE PUMP V BELT

- Install the vane pump V belt and adjust the V belt tension (See page EM-6).

- Torque the bolt A.

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

- Torque the bolt B.

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

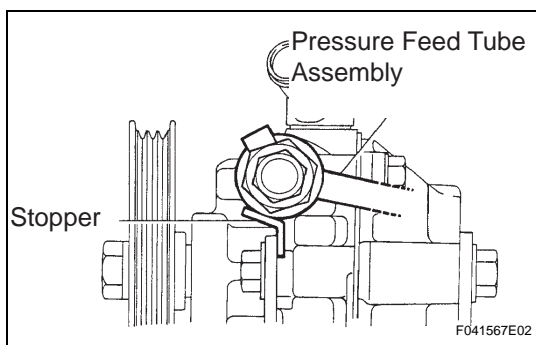
3. CONNECT PRESSURE FEED TUBE ASSEMBLY

- Using a spanner (24mm) to keep the pressure port union, connect the pressure feed tube assembly with the union bolt and a new gasket.

Torque: 52 N*m (525 kgf*cm, 38 ft.*lbf)

NOTICE:

Make sure that the stopper of the pressure feed tube assembly touches the pump bracket front as shown in the illustration, then tighten the union bolt.



4. INSTALL POWER STEERING OIL PRESSURE SWITCH

- Install the oil pressure switch to the union bolt.

Torque: 21 N*m (214 kgf*cm, 15 ft.*lbf)

NOTICE:

Be careful to keep oil away from the connector.

- Connect the connector.

5. CONNECT OIL RESERVOIR TO PUMP HOSE NO.1

- Connect the oil reservoir to pump hose No. 1.
- Install the clip.

6. INSTALL FRONT FENDER APRON SEAL RH

7. INSTALL FRONT WHEEL RH

Torque: 103 N*m (1,050 kgf*cm, 76 ft.*lbf)

8. BLEED POWER STEERING FLUID

9. INSPECT POWER STEERING FLUID LEAK

REMOVAL

NOTICE:

When installing, coat the parts indicated by arrows with power steering fluid or molybdenum disulfide lithium base grease (See page [PS-16](#)).

1. INSPECT CENTER FRONT WHEEL

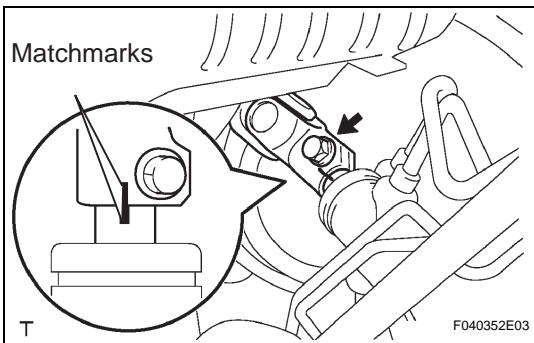
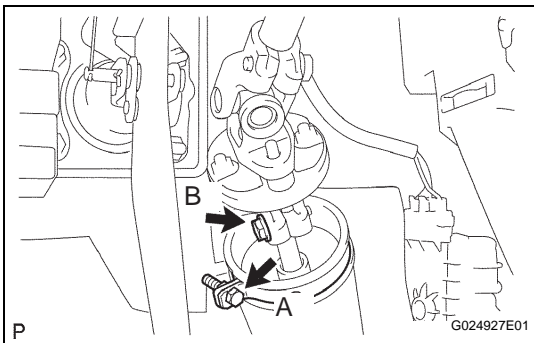
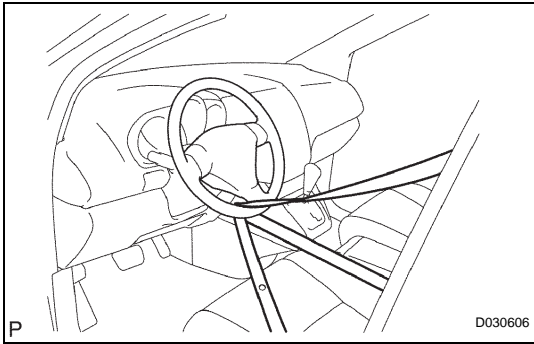
2. SEPARATE STEERING INTERMEDIATE SHAFT SUB-ASSEMBLY

- (a) Fix the steering wheel with the seat belt in order to prevent rotation.

HINT:

This operation is useful to prevent damaging of the spiral cable.

PS



- (b) Loosen bolt A and remove the clamp from the steering column hole cover No. 1.
 (c) Separate the steering column hole cover No. 2 from the steering column hole cover No. 1.
 (d) Loosen bolt B.

- (e) Put matchmarks on the steering intermediate shaft sub-assembly and the steering link assembly.
 (f) Remove the bolt and disengage the steering intermediate shaft sub-assembly.

3. REMOVE FRONT WHEEL

4. SEPARATE TIE ROD ASSEMBLY LH SST 09628-62011

5. SEPARATE TIE ROD ASSEMBLY RH SST 09628-62011

HINT:

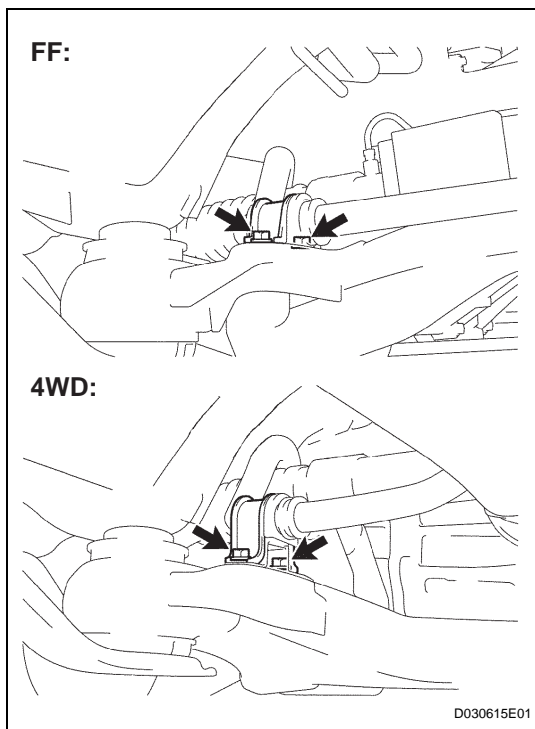
Perform the same procedure on the other side.

6. SEPARATE FRONT STABILIZER LINK ASSEMBLY LH (See page [SP-27](#))

7. SEPARATE FRONT STABILIZER LINK ASSEMBLY RH (See page [SP-27](#))

8. REMOVE EXHAUST PIPE ASSEMBLY FRONT (See page [EX-5](#))

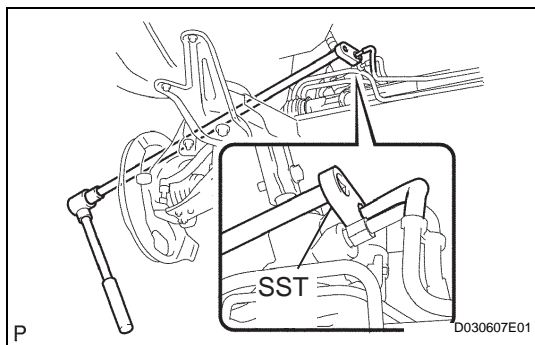
PS

**9. REMOVE FRONT STABILIZER BRACKET NO.1 LH**

- (a) FF:
Remove the 2 bolts and the stabilizer bracket No. 1 LH.
- (b) 4WD:
Remove the 2 bolts, the stabilizer bracket No. 1 LH and the stabilizer bracket No. 2.

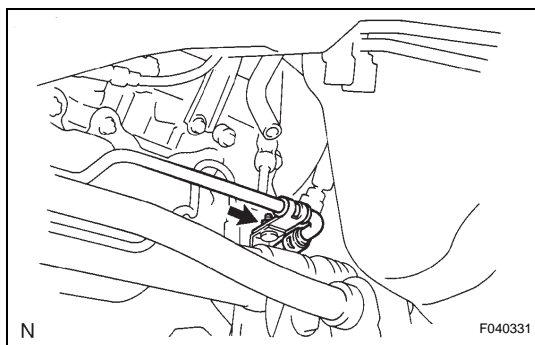
10. REMOVE FRONT STABILIZER BRACKET NO.1 RH

HINT:
Perform the same procedure on the other side.

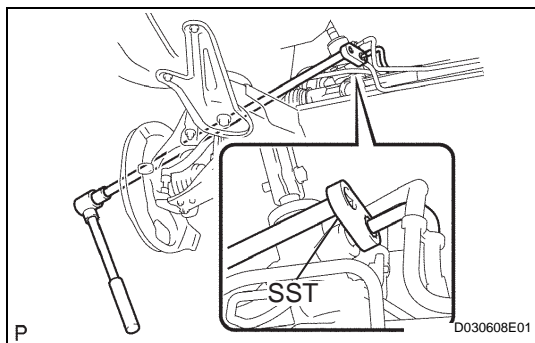
11. REMOVE HEIGHT CONTROL SENSOR SUB-ASSEMBLY FRONT LH (See page [SC-124](#))**12. DISCONNECT RETURN TUBE ASSEMBLY**

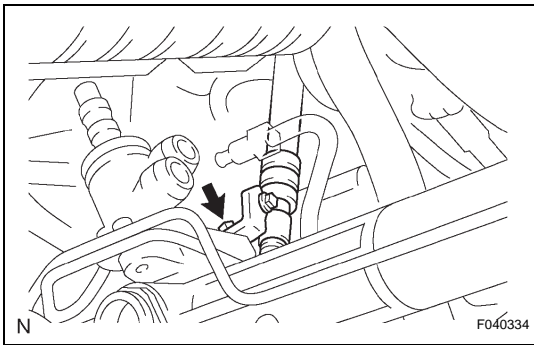
- (a) Remove the tube clamp from the pressure feed tube assembly.
- (b) Using SST, disconnect the return tube assembly from the steering link assembly.
SST 09023-12701

- (c) Remove the nut and the return tube clamp.

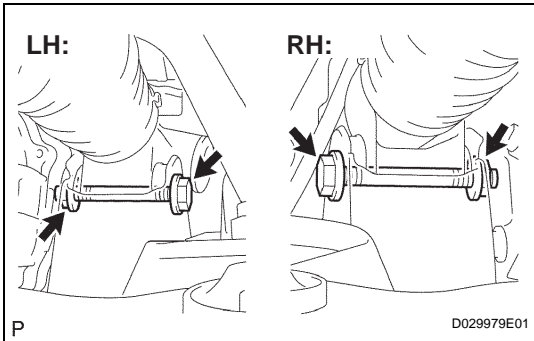
**13. DISCONNECT PRESSURE FEED TUBE ASSEMBLY**

- (a) Using SST, disconnect the pressure feed tube assembly from the steering link assembly.
SST 09023-12701



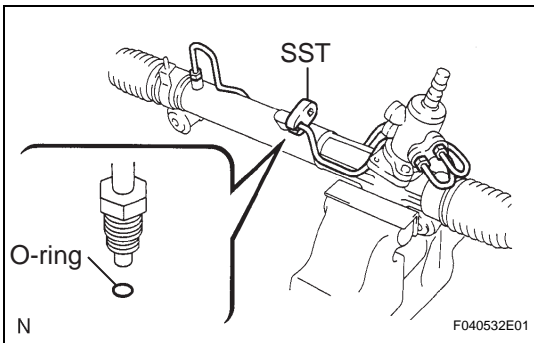


- (b) Remove the bolt and the pressure feed tube clamp.



14. REMOVE POWER STEERING LINK ASSEMBLY

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



DISASSEMBLY

1. REMOVE STEERING LEFT TURN PRESSURE TUBE

- (a) Remove the tube clamp from the turn pressure tubes.
 (b) Using SST, disconnect the left turn pressure tube.
SST 09023-38201
 (c) Remove the 2 O-rings from the left turn pressure tube.

2. REMOVE STEERING RIGHT TURN PRESSURE TUBE **SST 09023-38201**

HINT:

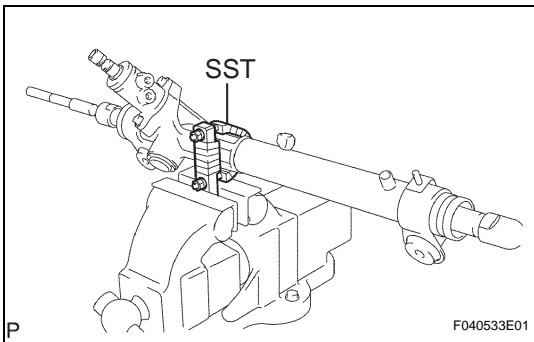
Perform the same procedure on the other side.

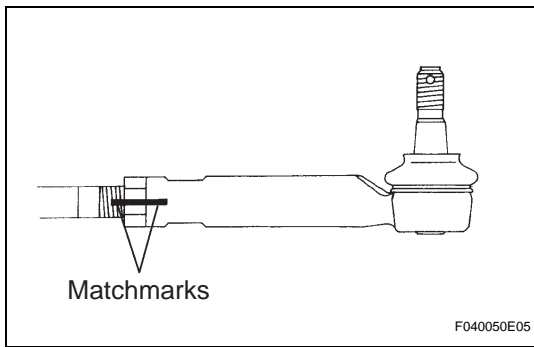
3. FIX POWER STEERING LINK ASSEMBLY

- (a) Using SST, secure the steering link assembly.
SST 09612-00012

HINT:

Wrap the SST with tape before use, in order to prevent damaging the steering link assembly.



**4. REMOVE TIE ROD ASSEMBLY LH**

- (a) Put matchmarks on the tie rod assembly LH and the rack end.
- (b) Loosen the lock nut and remove the tie rod assembly LH and the lock nut.

5. REMOVE TIE ROD ASSEMBLY RH

HINT:

Perform the same procedure on the other side.

6. REMOVE STEERING RACK BOOT CLIP

- (a) Remove the 2 boot clips.

7. REMOVE STEERING RACK BOOT NO.2 CLAMP

- (a) Using a pliers, remove the rack boot No. 2 clamp.

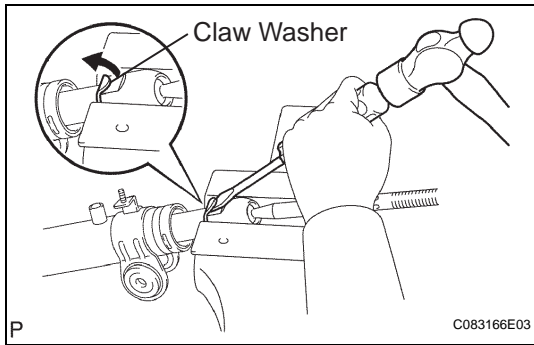
NOTICE:**Be careful not to damage the boot.****8. REMOVE STEERING RACK BOOT NO.1 CLAMP**

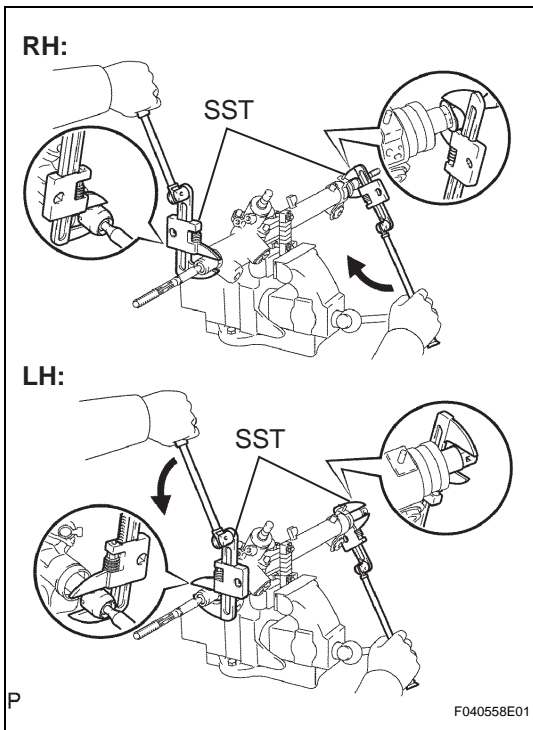
HINT:

Perform the same procedure on the other side.

NOTICE:**Be careful not to damage the boot.****9. REMOVE STEERING RACK BOOT NO. 2****10. REMOVE STEERING RACK BOOT NO. 1****11. REMOVE STEERING RACK END SUB-ASSEMBLY**

- (a) Using a screwdriver and a hammer, unstake the claw washer.

NOTICE:**Avoid any impact to the steering rack.**



- (b) Using SST, remove the rack end and the claw washer.

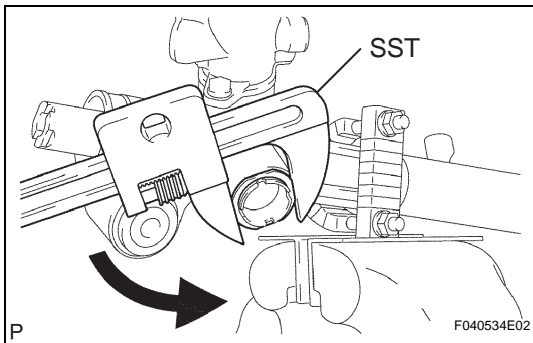
SST 09922-10010

NOTICE:

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

HINT:

- Mark the RH and LH rack ends.
- Perform the same procedure on the other side.



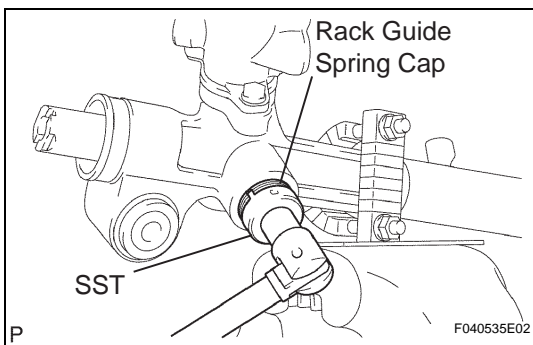
12. REMOVE RACK GUIDE

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

SST 09922-10010

NOTICE:

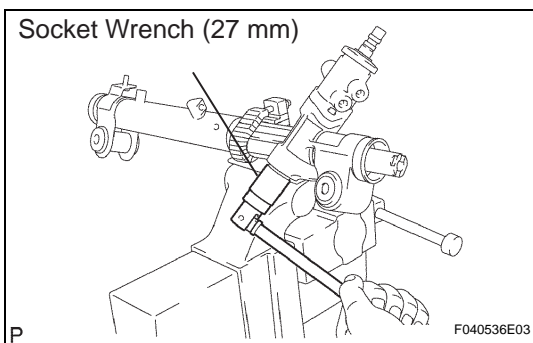
Use SST 09922-10010, following the direction shown in the illustration.



- (b) Using SST, remove the rack guide spring cap.

SST 09631-10021

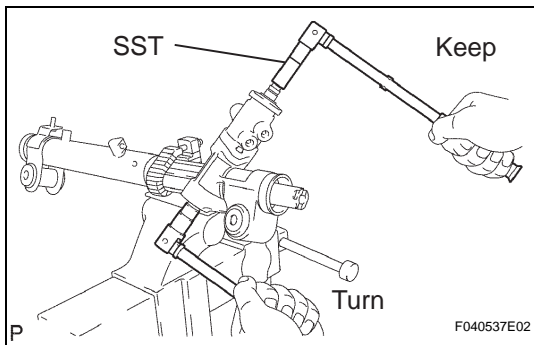
Remove the compression spring and the rack guide.



13. REMOVE POWER STEERING CONTROL VALVE

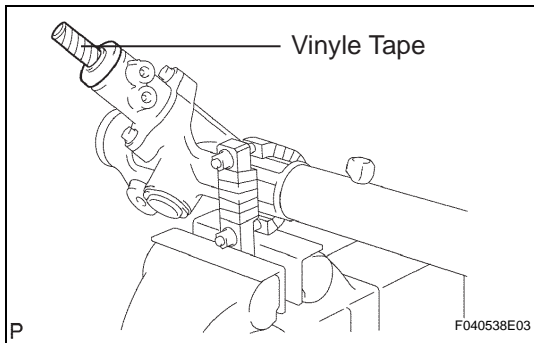
- (a) Using a socket wrench (27 mm), remove the rack housing cap.

PS



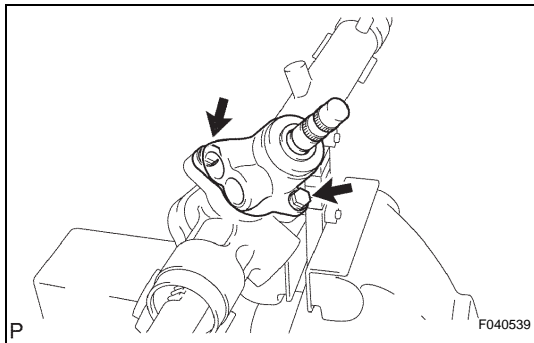
- (b) Using SST, keep the control valve shaft and remove the nut.

SST 09616-00011



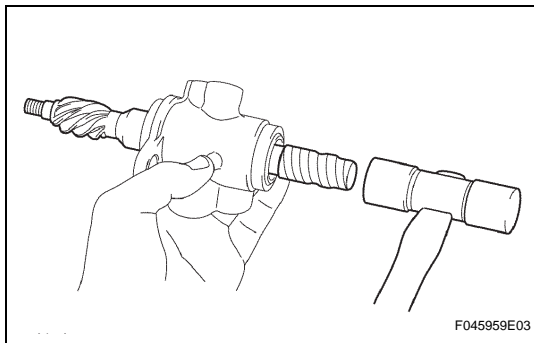
- (c) Wrap vinyl tape around the spline of the control valve in order to prevent damaging the oil seal.

- (d) Remove the dust cover from the control valve housing.



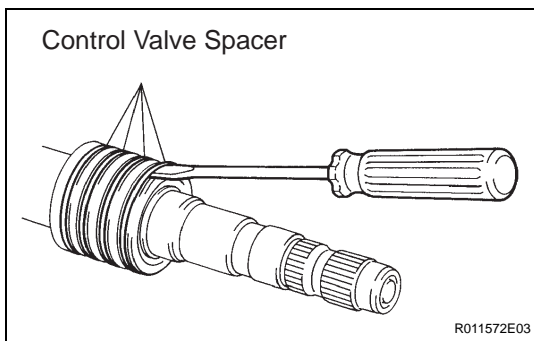
- (e) Remove the 2 bolts and the control valve housing with control valve.

- (f) Remove the gasket.



- (g) Using a plastic hammer, remove the control valve.

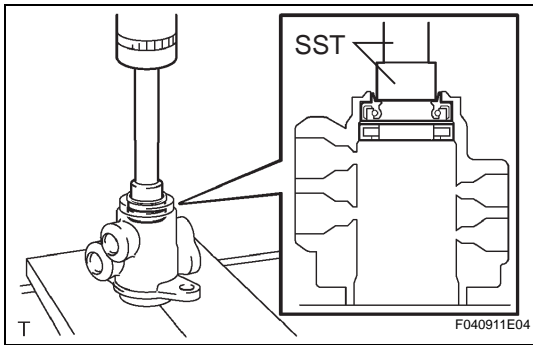
- (h) Remove the oil seal from the control valve.



- (i) Using a screwdriver, remove the 4 control valve spacers.

NOTICE:

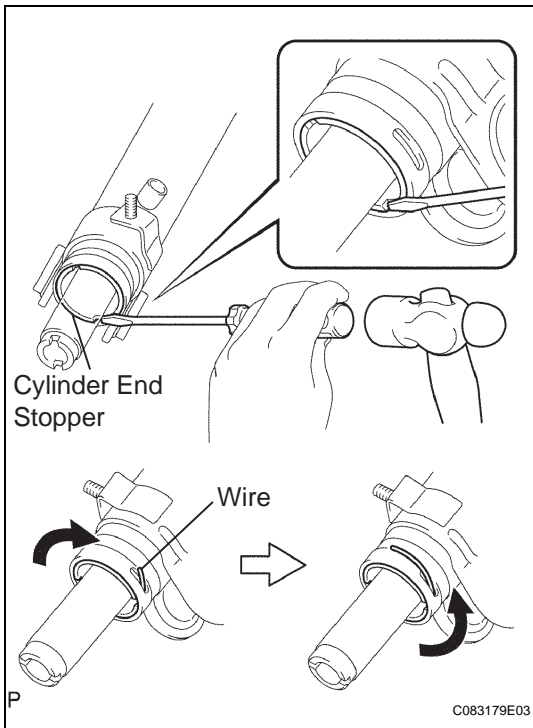
Be careful not to damage the spacer grooves.



14. REMOVE POWER STEERING CONTROL VALVE UPPER OIL SEAL

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

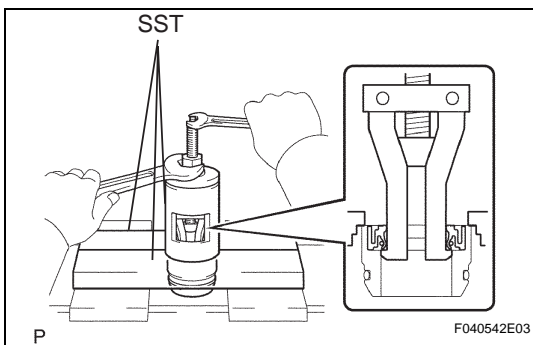
SST 09950-70010 (09951-07150), 09950-60010 (09951-00250)



15. REMOVE CYLINDER END STOPPER

- (a) Using a screwdriver and a hammer, turn the cylinder end stopper clockwise until the wire end is visible through the service hole.
- (b) Using a screwdriver and a hammer, turn the cylinder end stopper counterclockwise, and remove the wire and the cylinder end stopper.

16. REMOVE POWER STEERING RACK



17. REMOVE POWER STEERING RACK BUSH

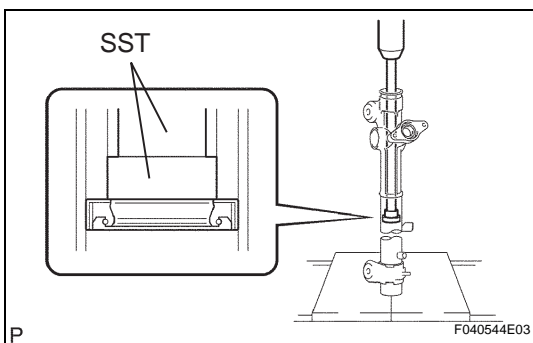
- (a) Remove the rack bush with the rack bush oil seal from the power steering rack.
- (b) Using SST, remove the rack bush oil seal from the rack bush.

SST 09527-21011, 09612-24014 (09613-22011)

NOTICE:

Be careful not to drop the rack bush.

- (c) Using a screwdriver, remove the O-ring from the rack bush.



18. REMOVE POWER STEERING CYLINDER TUBE OIL SEAL

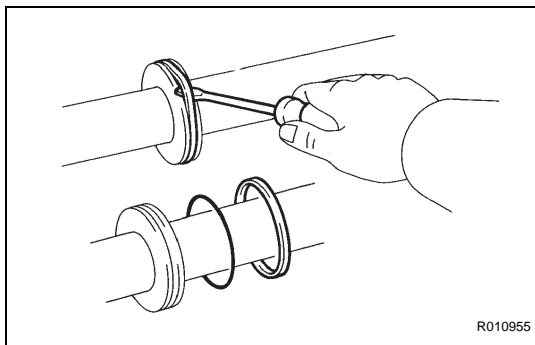
- (a) Using SST and a press, remove the cylinder tube oil seal.

SST 09950-70010 (09951-07360), 09950-60010 (09951-00290)

NOTICE:

Be careful not to damage the inside surface of the rack housing.

PS

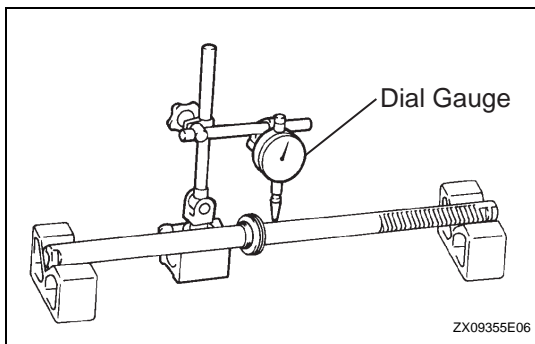


19. REMOVE POWER PISTON OIL SEAL

- (a) Using a screwdriver, remove the oil seal and the O-ring.

NOTICE:

Be careful not to damage the oil seal groove.



INSPECTION

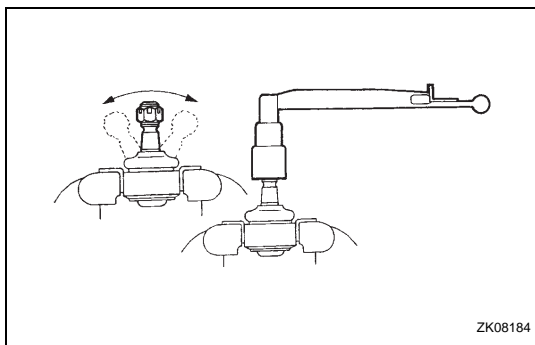
1. INSPECT POWER STEERING RACK

- (a) Using a dial gauge, check for runout of the steering rack and teeth wear.

Maximum runout:

0.3 mm (0.0118 in.)

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



2. INSPECT TIE ROD ASSEMBLY LH

- (a) Secure the tie rod assembly LH in a vise.
 (b) Install the nut to the stud bolt.
 (c) Flip the ball joint stud back and forth 5 times.
 (d) Using a torx wrench, turn the nut continuously at a rate of 2 to 4 seconds pre turn and take the torque reading on the 5th turn.

Torque: Turning torque

0.49 to 3.43 N*m (5.0 to 35.0 kgf*cm, 4.3 to 30.4 in.*lbf)

3. INSPECT TIE ROD ASSEMBLY RH

HINT:

Perform the same procedure on the other side.

REASSEMBLY

1. INSTALL POWER PISTON OIL SEAL

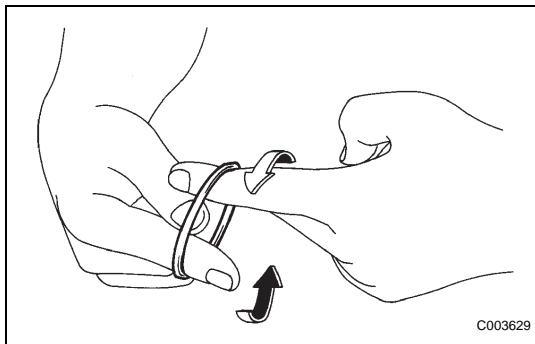
- (a) Coat a new O-ring with power steering fluid and install it to the steering rack.

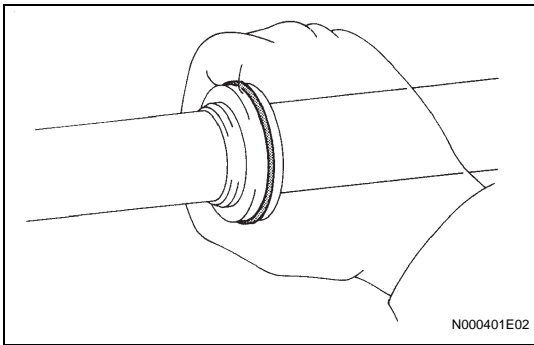
- (b) Expand the new oil seal with your fingers.

NOTICE:

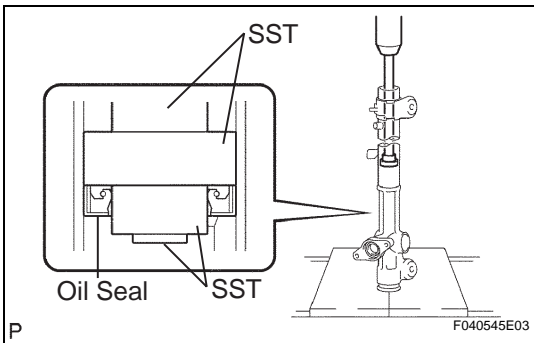
Be careful not to overly expand the oil seal.

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





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

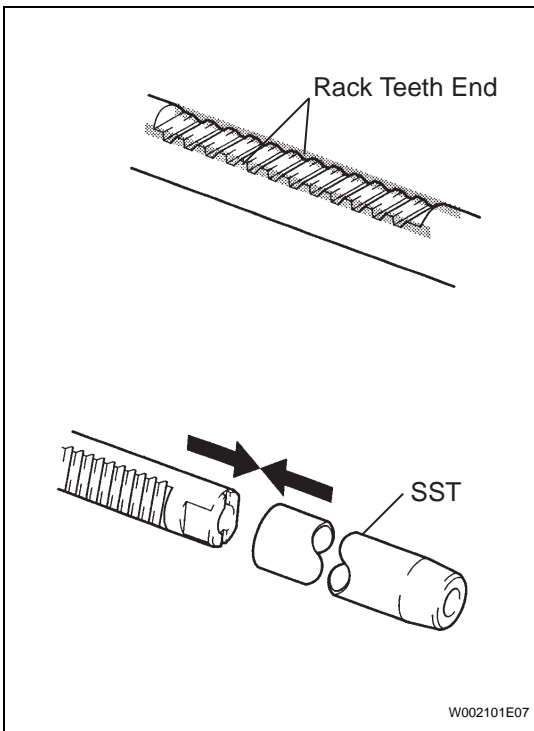


2. INSTALL POWER STEERING CYLINDER TUBE OIL SEAL

- (a) Coat a new oil seal lip with power steering fluid.
 (b) Using SST and a press, install the oil seal.
SST 09950-60010 (09951-00420, 09951-00250, 09952-06010), 09950-70010 (09951-07360)

NOTICE:

Make sure that the oil seal is installed correctly.



3. INSTALL POWER STEERING RACK

- (a) Apply grease to the rack teeth ends.
 (b) Affix SST to the steering rack.

SST 09631-33010

HINT:

If necessary, scrape the burrs off the rack teeth ends and burnish.

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

4. INSTALL POWER STEERING RACK BUSH

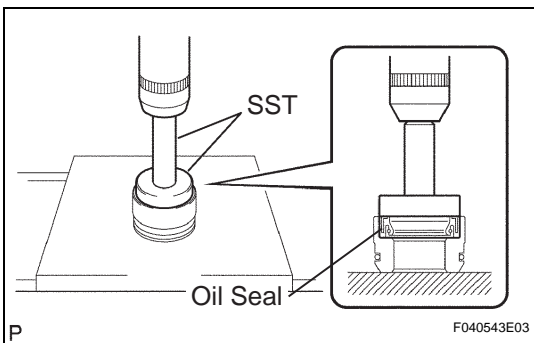
- (a) Coat a new rack bush oil seal lip with power steering fluid.
 (b) Using SST and a press, install the rack bush oil seal to the rack bush.

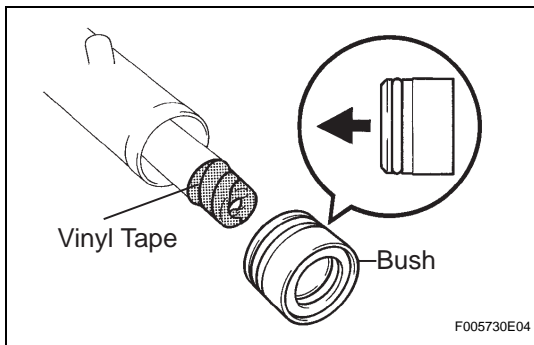
SST 09950-60010 (09951-00400), 09950-70010 (09951-07100)

NOTICE:

Make sure that the oil seal is installed correctly.

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



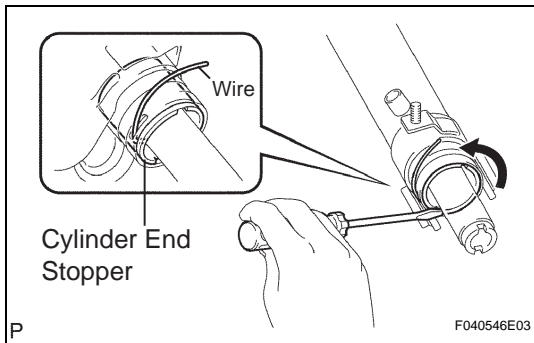


- (d) Coat rack bush oil seal lip with power steering fluid.
- (e) Install the rack bush to the rack housing.

HINT:

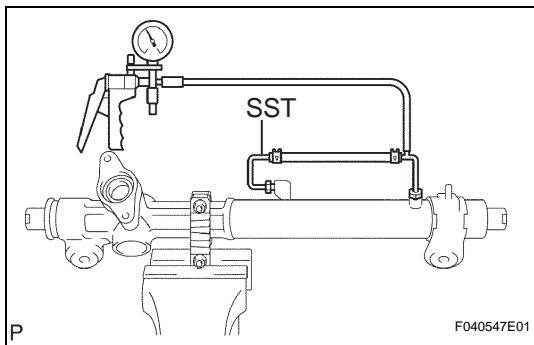
Wrap vinyl tape around the end of the steering rack in order to prevent damaging the rack bush oil seal.

PS



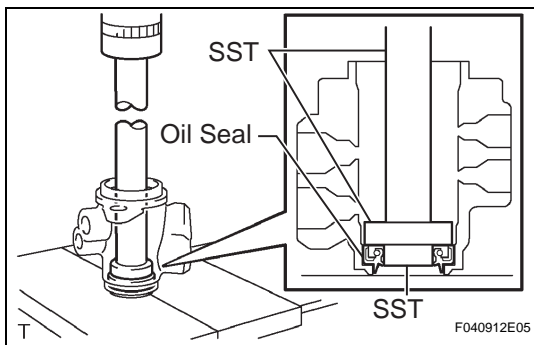
5. INSTALL CYLINDER END STOPPER

- (a) Align the installation hole for the wire of the cylinder end stopper with the slot of the rack housing.
- (b) Install a new wire into the cylinder end stopper.
- (c) Using a screwdriver, turn the cylinder end stopper counterclockwise by $450^\circ \pm 50^\circ$.



6. AIR TIGHTNESS TEST

- (a) Install SST to the rack housing.
SST 09631-12071 (09633-00010)
- (b) Apply a vacuum of 53 kPa (400 mmHg, 15.75 in.Hg) for about 30 seconds.
- (c) Check that there is no change in the vacuum.
If there is a change in the vacuum, check the installation of the oil seals.



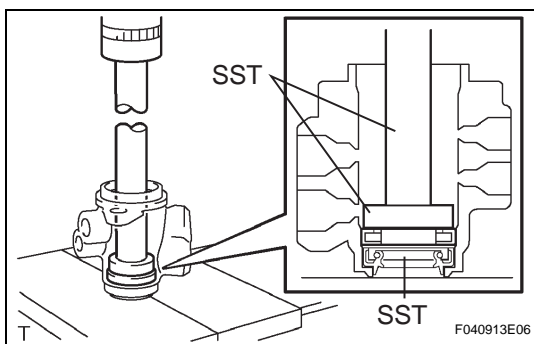
7. INSTALL POWER STEERING CONTROL VALVE UPPER OIL SEAL

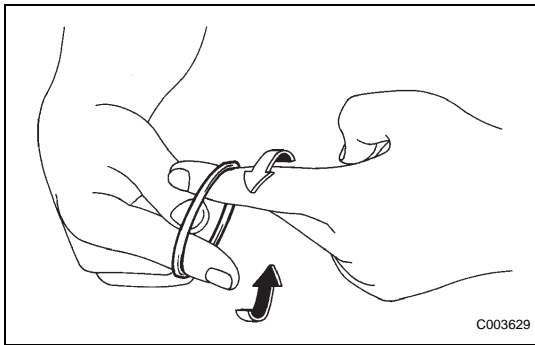
- (a) Coat the control valve upper bearing with grease, and a new control valve upper oil seal lip with power steering fluid.
- (b) Using SST and a press, install a new control valve upper oil seal.
SST 09950-70010 (09951-07150), 09950-60010 (09951-00180, 09952-06010, 09951-00320)

NOTICE:

Make sure that the oil seal is installed correctly.

- (c) Using SST and a press, install the control valve upper bearing.
SST 09950-70010 (09951-07150), 09950-60010 (09951-00180, 09952-06010, 09951-00340)





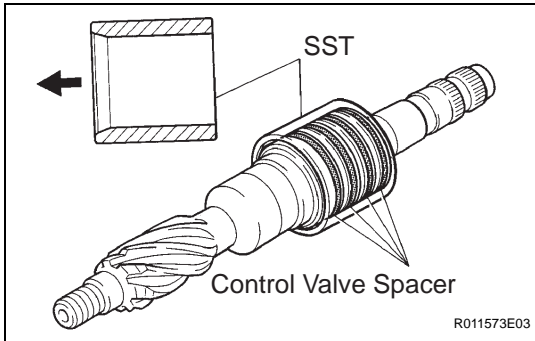
8. INSTALL POWER STEERING CONTROL VALVE

- (a) Expand 4 new valve spacers with your fingers.

NOTICE:

Be careful not to overly expand the valve spacers.

- (b) Coat the 4 valve spacers with power steering fluid.
(c) Install the 4 valve spacers to the control valve, and adjust with your fingers.

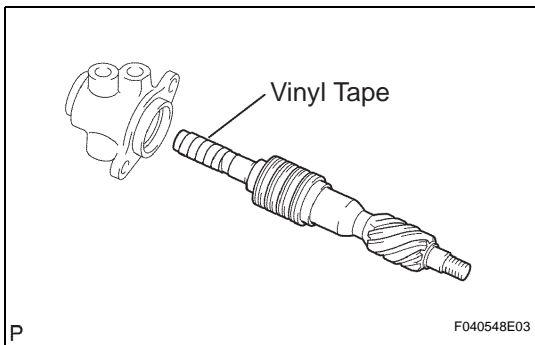


- (d) Carefully slide the tapered end of SST over the valve spacers until they fit to the control valve.

SST 09631-20081

NOTICE:

Be careful not to damage the valve spacers.



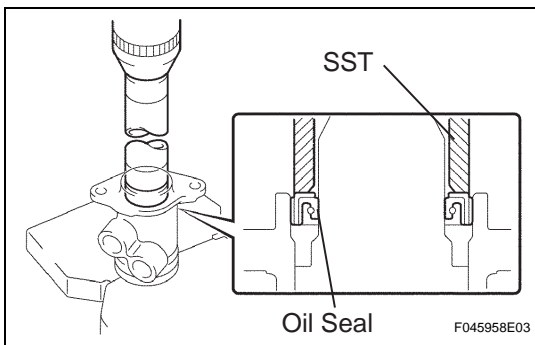
- (e) Coat the oil seal lip with power steering fluid.
(f) Install the control valve into the valve housing.

NOTICE:

Be careful not to damage the valve spacer and oil seal lip.

HINT:

Wrap vinyl tape around the end of the steering rack in order to prevent damaging the oil seal.



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

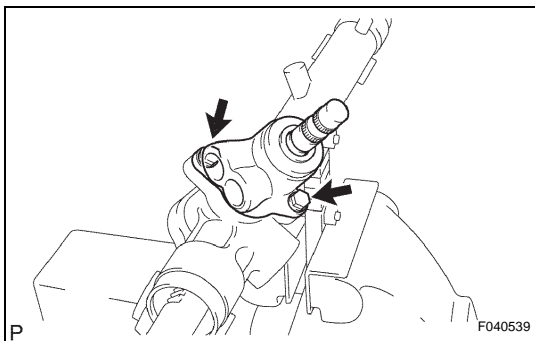
- (h) Using SST and a press, install the oil seal.

SST 09612-22011

NOTICE:

Make sure that the oil seal is installed correctly.

- (i) Apply grease to the needle roller bearing of the rack housing and the serrated part of the control valve.
(j) Install a new gasket to the valve housing.

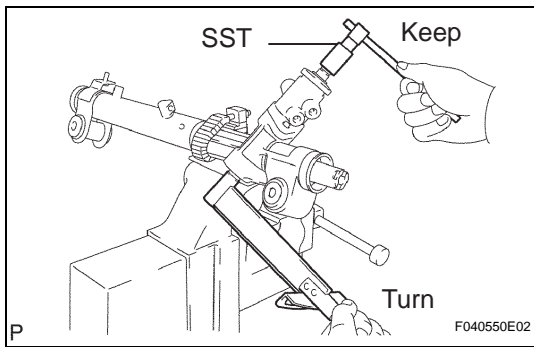


- (k) Install the control valve housing with control valve to the rack housing with the 2 bolts.

Torque: 21 N*m (214 kgf*cm, 15 ft.*lbf)

HINT:

Wrap vinyl tape around the lower spline of the control valve in order to prevent damaging the oil seal.



- (l) Using SST, keep the control valve from rotating and install a new lock nut.

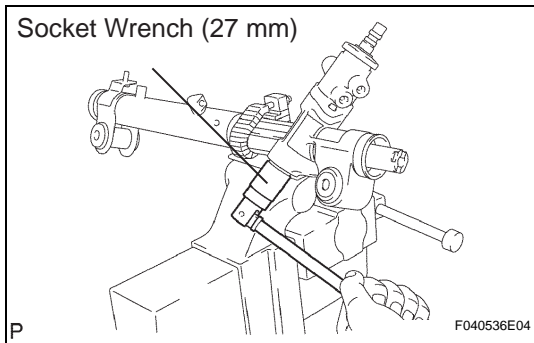
SST 09616-00011

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

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

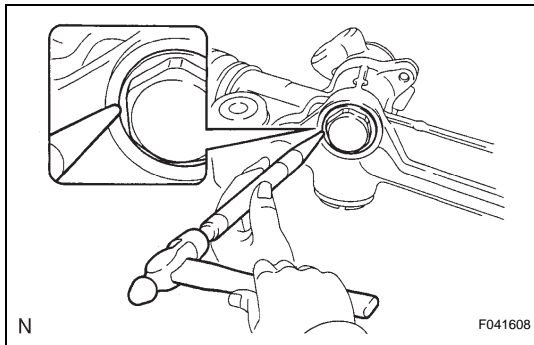
Sealant:

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



- (n) Using a socket wrench (27 mm), install the rack housing cap.

Torque: 59 N*m (597 kgf*cm, 43 ft.*lbf)



- (o) Using a punch and a hammer, stake the rack housing cap and the rack housing.

9. INSTALL RACK GUIDE

- (a) Apply grease to the compression spring and the contact surface of the rack guide.
(b) Install the rack guide and the compression spring.
(c) 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

- (d) Temporarily install the rack guide spring cap.

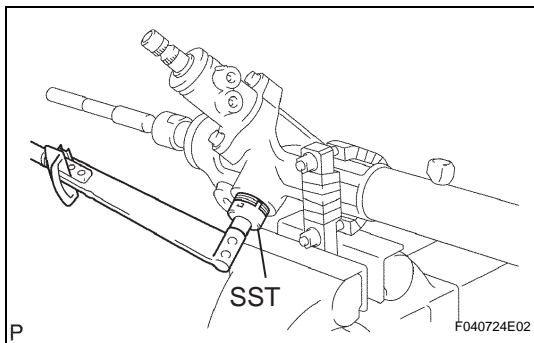
10. ADJUST TOTAL PRELOAD

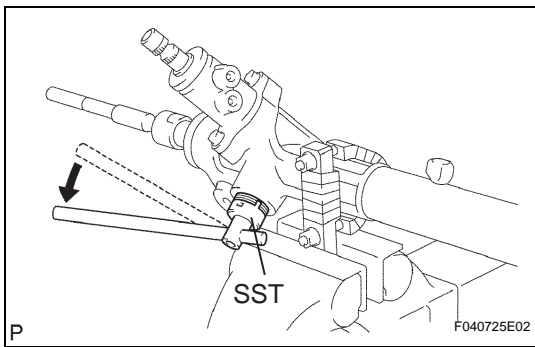
- (a) temporarily install the RH and LH rack ends sub-assembly, in order to prevent the oil seal damaging by the rack teeth.

- (b) Using SST, torque the rack guide spring cap.

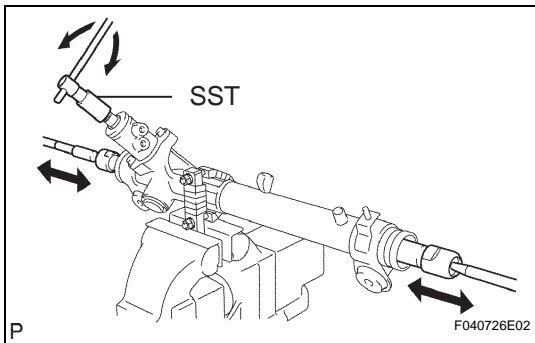
SST 09631-10021

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





- (c) Using SST, loosen the rack guide spring cap.
SST 09631-10021

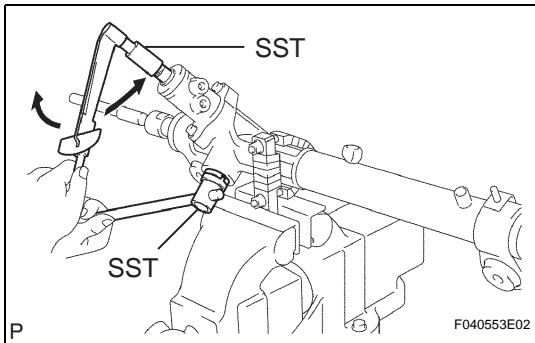


- (d) Using SST, turn the control valve to right and left 1 or 2 times.

SST 09616-00011

- (e) Using SST, loosen the rack guide spring cap until the compression spring stop functioning.

SST 09631-10021



- (f) Using SST and a torque wrench, tighten the rack guide spring cap until the preload falls within specifications.

SST 09616-00011, 09631-10021

Torque: Preload (turning)

1.2 to 1.5 N*m (12.2 to 15.3 kgf*cm, 10.6 to 13.3 in.*lbf)

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

Sealant:

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

- (h) Temporally install the rack guide spring cap lock nut.

- (i) Using SST, hold the rack guide spring cap and using another SST, torque the spring cap lock nut.

SST 09616-00011, 09922-10010

Torque: 51 N*m (515 kgf*cm, 38 ft.*lbf)

NOTICE:

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

HINT:

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

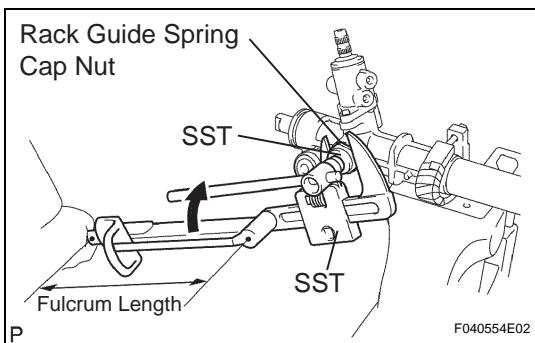
- (j) Precheck the total preload.

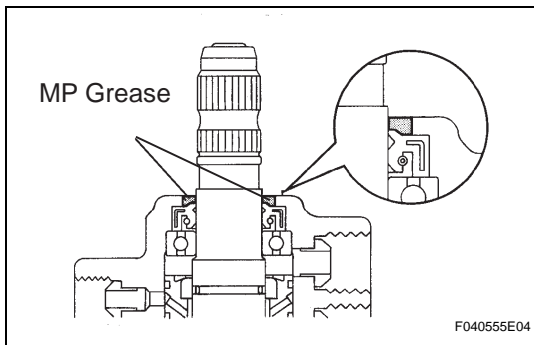
Torque: Preload (turning)

1.2 to 1.5 N*m (12.2 to 15.3 kgf*cm, 10.6 to 13.3 in.*lbf)

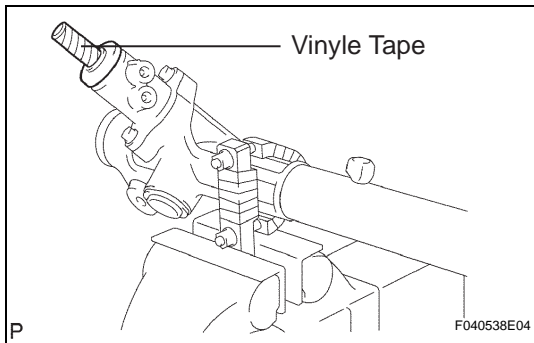
Torque: N*m (kgf*cm, in.*lbf)

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

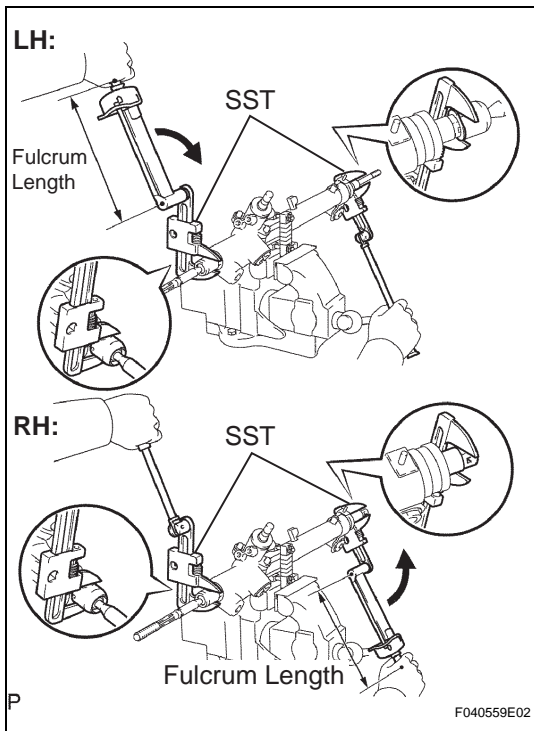




- (l) Apply MP grease around the control valve shaft, as shown in the illustration.

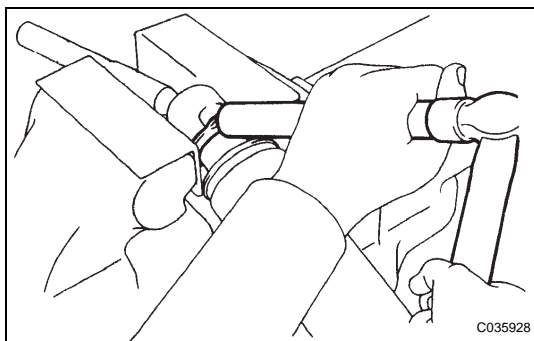


- (m) Wrap vinyl tape around the spline of the control valve.
(n) Install the dust cover to the control valve housing.

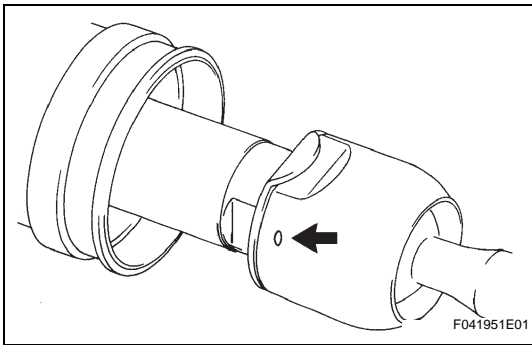


11. INSTALL STEERING RACK END SUB-ASSEMBLY

- (a) Install 2 new claw washers, and temporarily install the rack ends sub-assembly.
HINT:
Align the claws of the claw washer with the steering rack grooves.
- (b) Using SST, install the 2 rack end sub-assembly.
SST 09922-10010
Torque: 50 N*m (505 kgf*cm, 37 ft.*lbf)
NOTICE:
Use SST 09922-10010 following the direction shown in the illustration.
HINT:
- Using SST, hold the rack and install the rack end sub-assembly.
 - Use a torque wrench with a fulcrum length of 345 mm (13.58 in.).



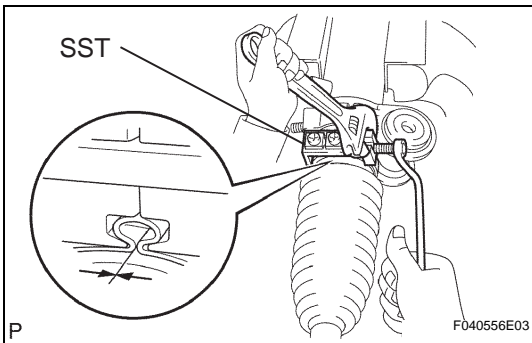
- (c) Using a brass bar and a hammer, stake the 2 claw washers.
NOTICE:
Avoid any impact to the steering rack.

**12. INSPECT POWER STEERING RACK**

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

HINT:

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

13. INSTALL STEERING RACK BOOT NO. 2**14. INSTALL STEERING RACK BOOT NO. 1****15. INSTALL STEERING RACK BOOT NO.2 CLAMP**

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

SST 09521-24010

Clearance:

3.0 mm (0.118 in.) or less

NOTICE:

Be careful not to damage the boot.

16. INSTALL STEERING RACK BOOT NO.1 CLAMP

SST 09521-24010

HINT:

Perform the same procedure on the other side.

17. INSTALL STEERING RACK BOOT CLIP

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

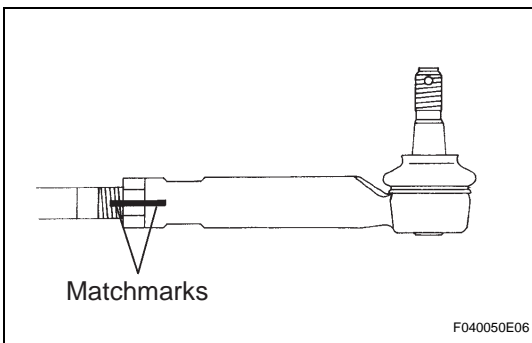
18. INSTALL TIE ROD ASSEMBLY LH

- (a) Screw the lock nut and tie rod assembly LH on the rack end until the matchmarks are aligned.

Torque: 74 N*m (750 kgf*cm, 54 ft.*lbf)

HINT:

After adjusting toe-in, torque the lock nut (See page [SP-2](#)).

**19. INSTALL TIE ROD ASSEMBLY RH**

HINT:

Perform the same procedure on the other side.

20. INSTALL STEERING LEFT TURN PRESSURE TUBE

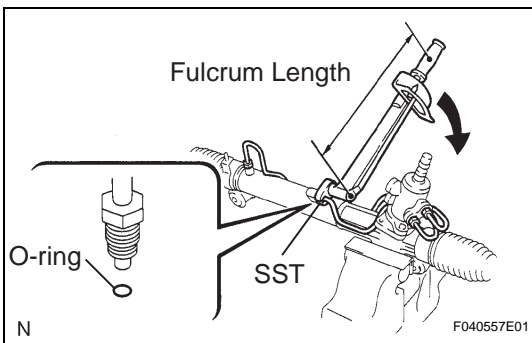
- (a) Coat 2 new O-rings with power steering fluid and install them to the left turn pressure tube.
(b) Using SST, install the left turn pressure tube to the steering link assembly.

SST 09023-38201

Torque: 12 N*m (122 kgf*cm, 9 ft.*lbf)

HINT:

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

**21. INSTALL STEERING RIGHT TURN PRESSURE TUBE**

- (a) Perform the same procedure on the other side.

SST 09023-38201

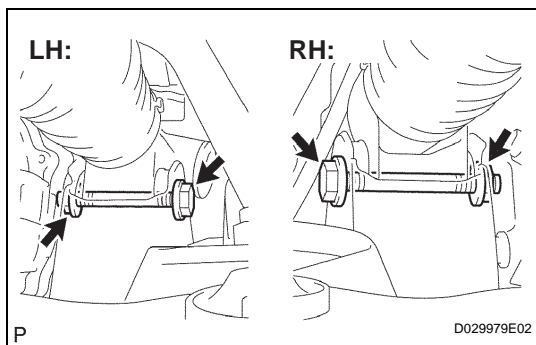
- (b) Install the tube clamp to the turn pressure tubes.

INSTALLATION

1. INSTALL POWER STEERING LINK ASSEMBLY

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

Torque: 70 N*m (714 kgf*cm, 52 ft.*lbf)



2. CONNECT PRESSURE FEED TUBE ASSEMBLY

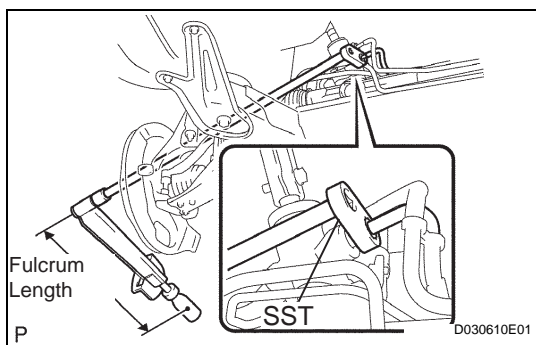
- (a) Using SST, connect the pressure feed tube assembly to the steering link assembly.

SST 09023-12701

Torque: 22 N*m (230 kgf*cm, 16 ft.*lbf)

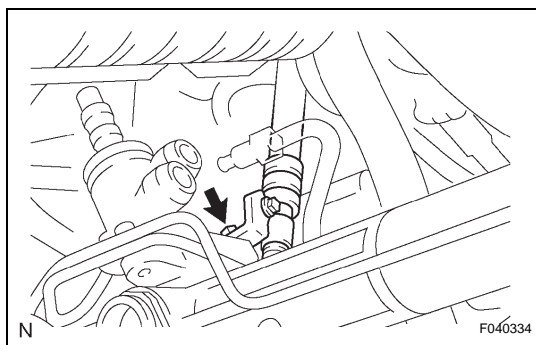
HINT:

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



- (b) Install the pressure feed tube assembly clamp with the bolt.

Torque: 9.8 N*m (100 kgf*cm, 87 in.*lbf)



3. CONNECT RETURN TUBE ASSEMBLY

- (a) Using SST, connect the return tube assembly to the steering link assembly.

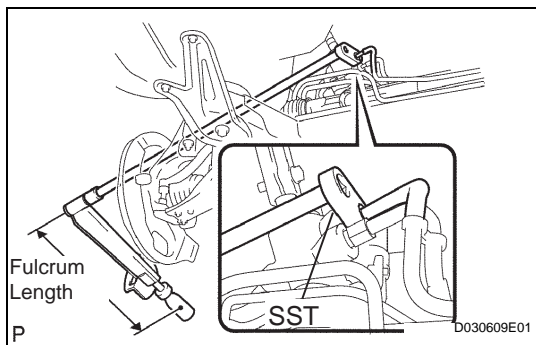
SST 09023-12701

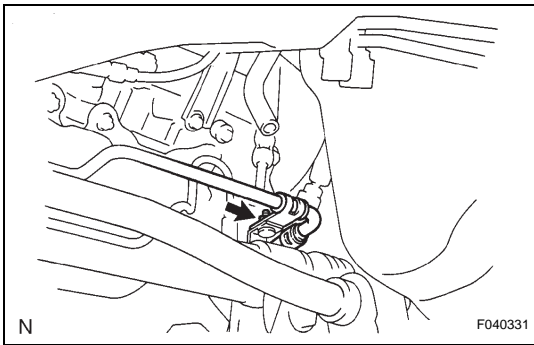
Torque: 22 N*m (230 kgf*cm, 16 ft.*lbf)

HINT:

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

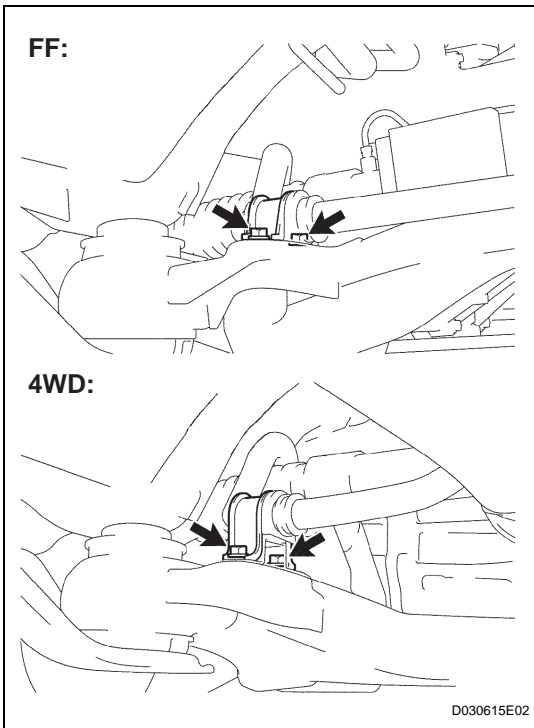
- (b) Install the tube clamp to the pressure feed tube assembly.





- (c) Install the pressure feed tube clamp with the nut.
Torque: 9.8 N*m (100 kgf*cm, 87 in.*lbf)

4. INSTALL HEIGHT CONTROL SENSOR SUB-ASSEMBLY FRONT LH (See page [SC-125](#))



5. INSTALL FRONT STABILIZER BRACKET NO.1 LH

- (a) FF:
 Install the stabilizer bracket No. 1 LH with the 2 bolts.
Torque: 16 N*m (163 kgf*cm, 12 ft.*lbf)
- (b) 4WD:
 Install the stabilizer bracket No. 1 LH and the stabilizer bracket No. 2 with the 2 bolts.
Torque: 16 N*m (163 kgf*cm, 12 ft.*lbf)

6. INSTALL FRONT STABILIZER BRACKET NO.1 RH

HINT:
 Perform the same procedure on the other side.

7. INSTALL EXHAUST PIPE ASSEMBLY FRONT (See page [EX-6](#))

8. CONNECT FRONT STABILIZER LINK ASSEMBLY LH (See page [SP-29](#))

9. CONNECT FRONT STABILIZER LINK ASSEMBLY RH
HINT:
 Perform the same procedure on the other side.

10. CONNECT TIE ROD ASSEMBLY LH

11. CONNECT TIE ROD ASSEMBLY RH

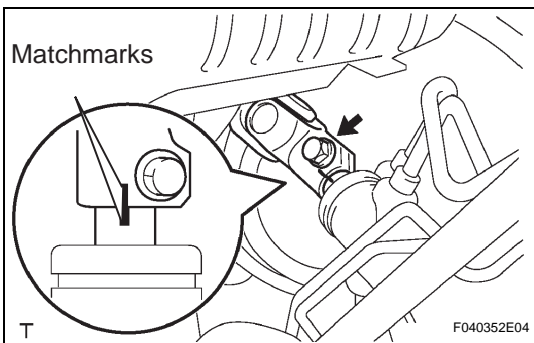
HINT:
 Perform the same procedure on the other side.

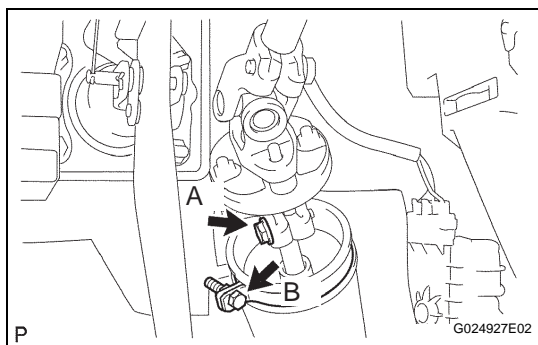
12. INSTALL FRONT WHEEL

Torque: 103 N*m (1,050 kgf*cm, 76 ft.*lbf)

13. CONNECT STEERING INTERMEDIATE SHAFT SUB-ASSEMBLY

- (a) Align the matchmarks on the intermediate shaft sub-assembly and the steering link assembly.
- (b) Install the bolt.
Torque: 35 N*m (360 kgf*cm, 26 ft.*lbf)





(c) Tighten the bolt A.

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

(d) Install the steering column hole cover No. 2 to the steering hole cover No. 1.

(e) Install the clamp to the steering column hole cover No. 1 and tighten the bolt B.

14. BLEED POWER STEERING FLUID (See page [PS-3](#))

15. CHECK POWER STEERING FLUID LEAKAGE

16. CHECK FOR EXHAUST GAS LEAKS

17. INSPECT STEERING WHEEL CENTER POINT