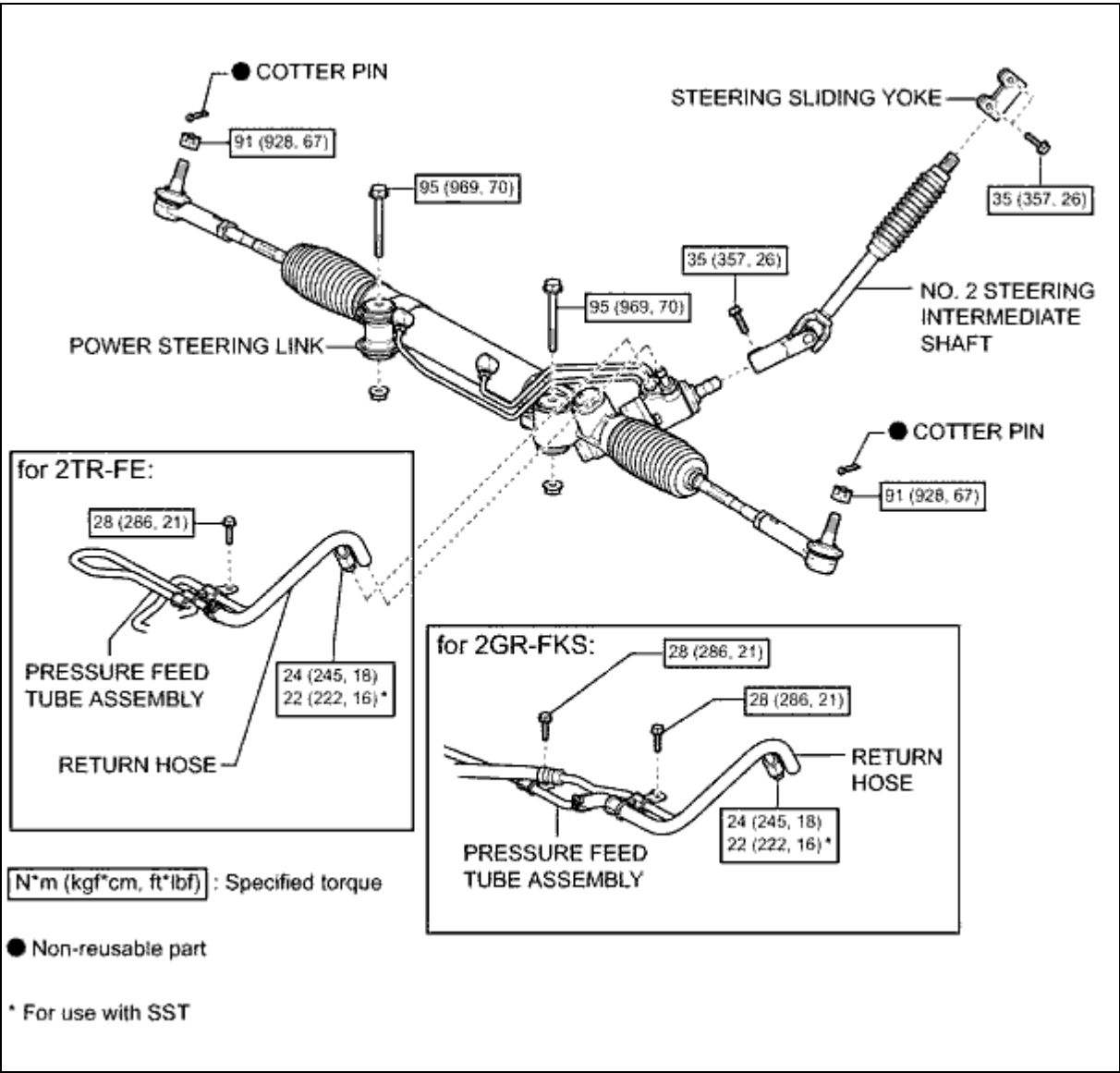


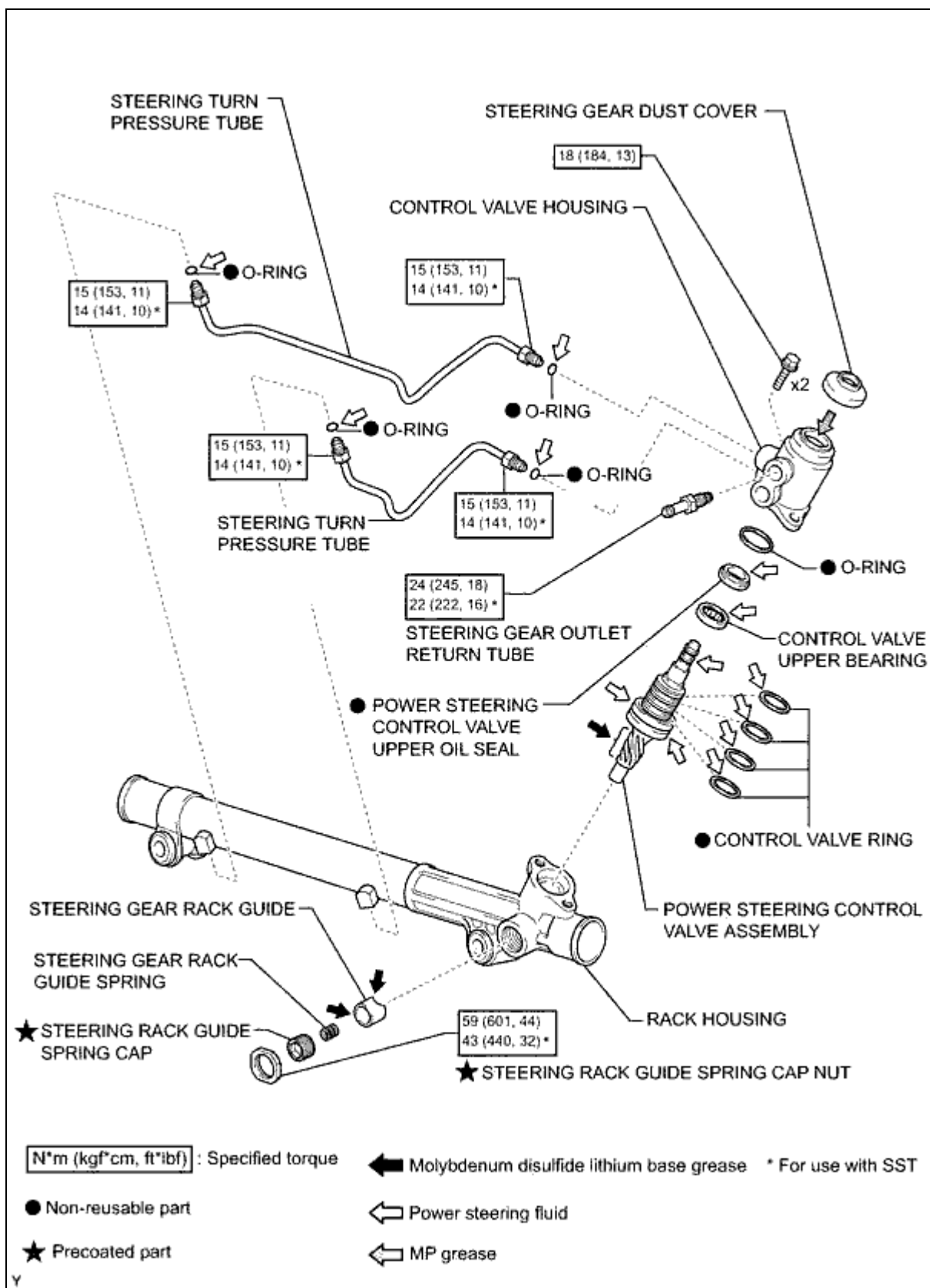
Last Modified: 11-13-2015	6.6 K	Doc ID: RM00000173500NX
Model Year Start: 2016	Model: Tacoma	Prod Date Range: [08/2015 -]
Title: POWER STEERING: POWER STEERING LINK: COMPONENTS; 2016 MY Tacoma [08/2015 -]		

COMPONENTS

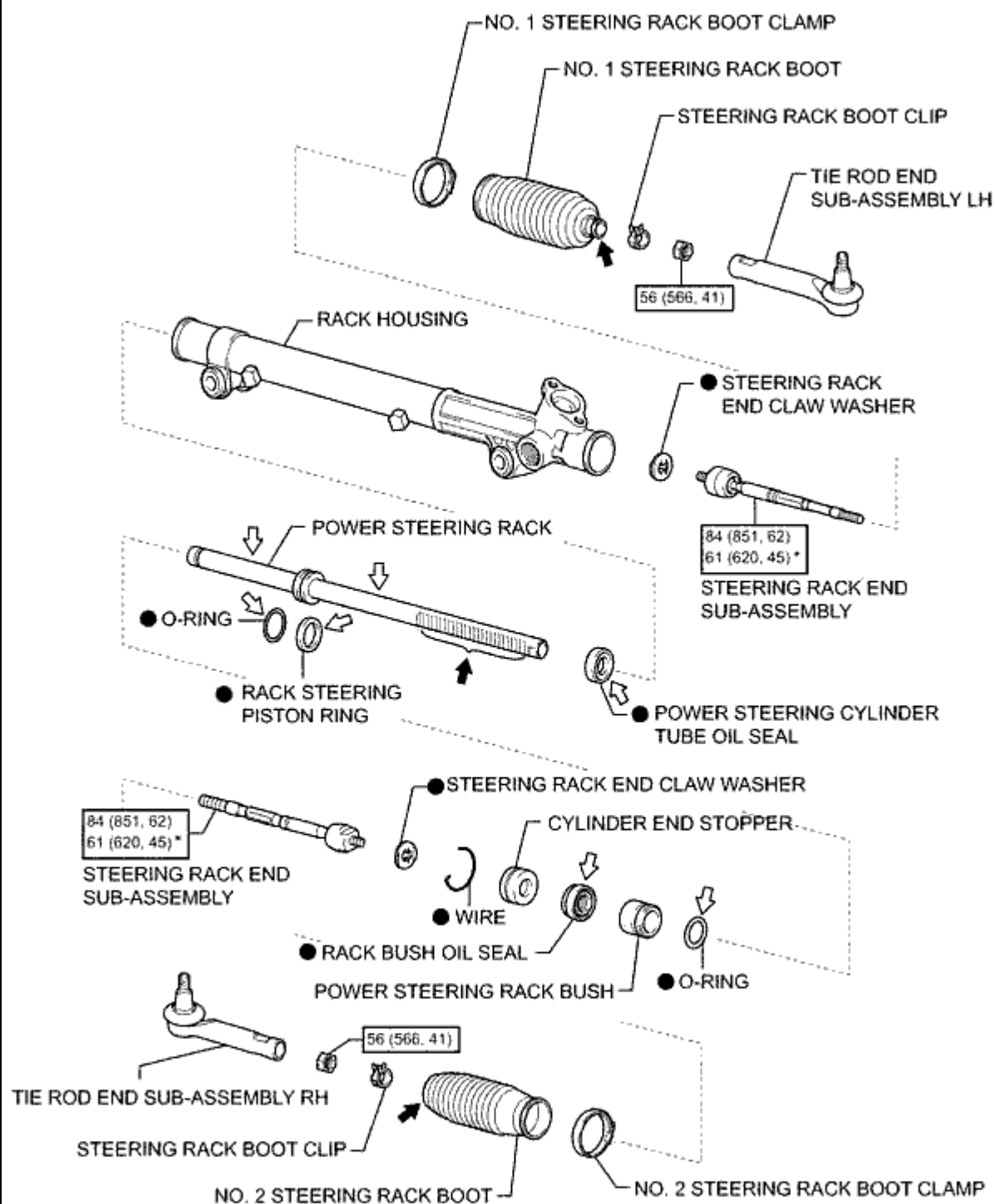
ILLUSTRATION



ILLUSTRATION



ILLUSTRATION



N*m (kgf*cm, ft*lb) : Specified torque Molybdenum disulfide lithium base grease * For use with SST

● Non-reusable part

Power steering fluid

Y

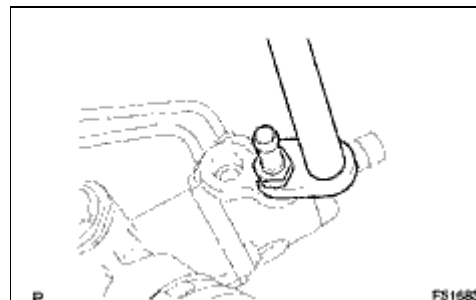


Last Modified: 11-13-2015	6.6 A	Doc ID: RM00000173700CX
Model Year Start: 2016	Model: Tacoma	Prod Date Range: [08/2015 -]
Title: POWER STEERING: POWER STEERING LINK: DISASSEMBLY; 2016 MY Tacoma [08/2015 -]		

DISASSEMBLY

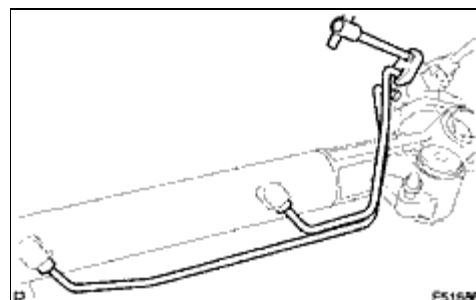
1. REMOVE STEERING GEAR OUTLET RETURN TUBE

- (a) Using a union nut wrench, remove the steering gear outlet return tube.



2. REMOVE STEERING TURN PRESSURE TUBE

- (a) Using a union nut wrench, remove the 2 pressure tubes.
(b) Remove the 4 O-rings from the pressure tubes.



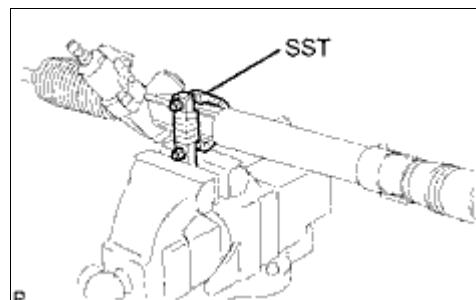
3. FIX POWER STEERING LINK

- (a) Using SST, fix the power steering link between aluminum plates in a vise, as shown in the illustration.

SST: 09612-00012

NOTICE:

When using a vise, do not overtighten it.

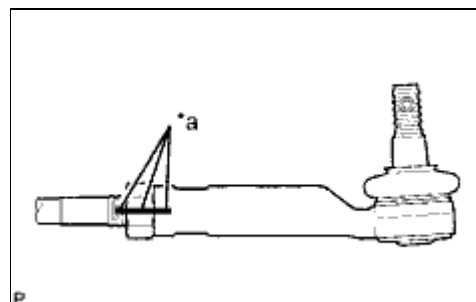


4. REMOVE TIE ROD END SUB-ASSEMBLY LH

- (a) Place matchmarks on the tie rod end sub-assembly LH, lock nut and rack end.

Text in Illustration

*a	Matchmark
----	-----------



- (b) Loosen the lock nut and remove the tie rod end sub-assembly LH and lock nut.

5. REMOVE TIE ROD END SUB-ASSEMBLY RH

HINT:

The removal procedure for the RH side is the same as that for the LH side.

6. REMOVE STEERING RACK BOOT CLIP

- (a) Remove the 2 steering rack boot clips.

7. REMOVE NO. 1 STEERING RACK BOOT CLAMP

- (a) Using pliers, remove the No. 1 steering rack boot clamp.

NOTICE:

Be careful not to damage the No. 1 steering rack boot.

8. REMOVE NO. 2 STEERING RACK BOOT CLAMP**HINT:**

The removal procedure for the No. 2 side is the same as that for the No. 1 side.

9. REMOVE NO. 1 STEERING RACK BOOT**10. REMOVE NO. 2 STEERING RACK BOOT****11. REMOVE STEERING RACK END SUB-ASSEMBLY**

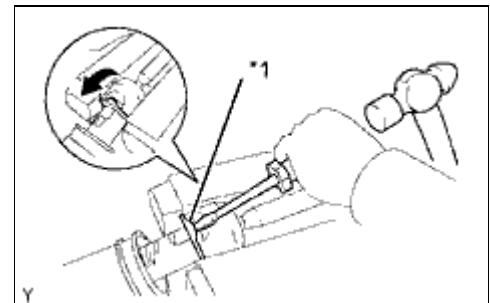
- (a) Using a screwdriver and hammer, unstake the claw washer.

Text in Illustration

*1	Claw Washer
----	-------------

NOTICE:

Avoid any impact to the power steering rack.



- (b) Using SST, remove the 2 steering rack ends and 2 claw washers.

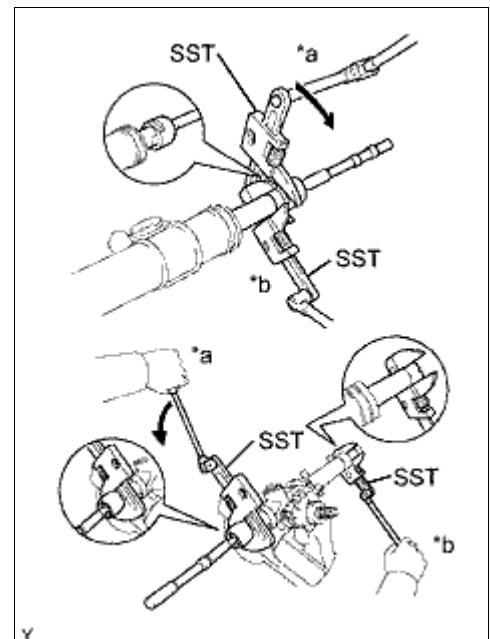
Text in Illustration

*a	Turn
*b	Hold

SST: 09922-10010

NOTICE:

- Turn SST 09922-10010 in the direction shown in the illustration.
- Securely hold the steering rack end with SST.

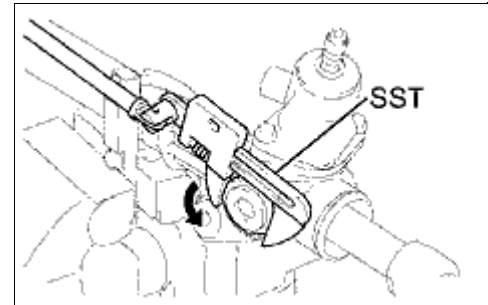
**12. REMOVE STEERING GEAR RACK GUIDE**

(a) Using SST, remove the steering rack guide spring cap nut.

SST: 09922-10010

NOTICE:

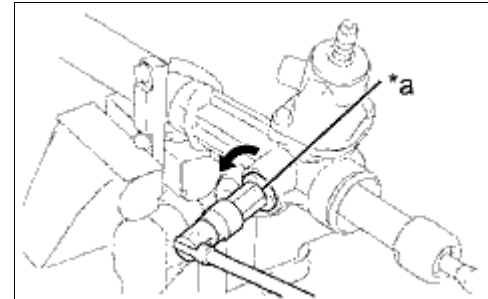
Turn SST 09922-10010 in the direction shown in the illustration.



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

Text in Illustration

*a	24 mm Hexagon Wrench
----	----------------------



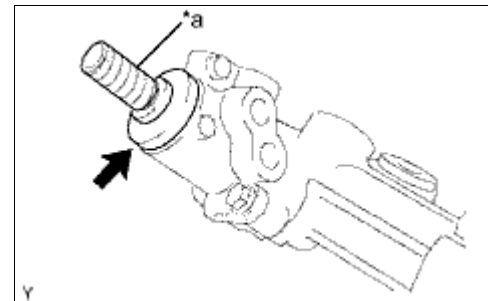
(c) Remove the steering gear rack guide spring and steering gear rack guide.

13. REMOVE POWER STEERING CONTROL VALVE ASSEMBLY

(a) Wind protective tape around the serrated portion of the power steering control valve assembly.

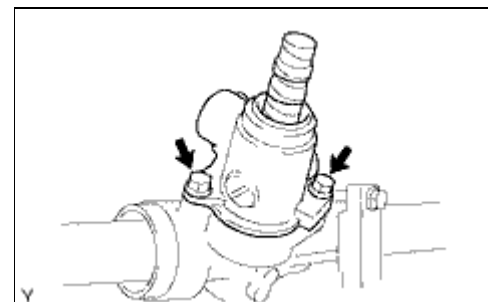
Text in Illustration

*a	Protective Tape
----	-----------------



(b) Remove the dust cover from the control valve housing.

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

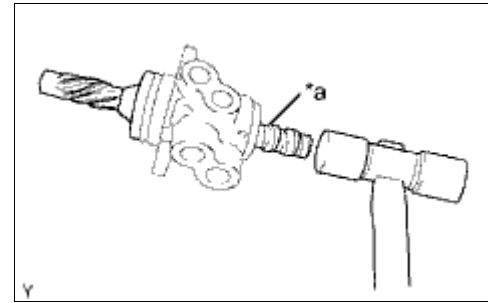


(d) Remove the O-ring from the control valve housing.

- (e) To prevent the oil seal lip from getting damaged, wind protective tape around the serrated portion of the power steering control valve assembly.

Text in Illustration

*a	Protective Tape
----	-----------------



- (f) Using a plastic hammer, remove the power steering control valve assembly from the control valve housing.

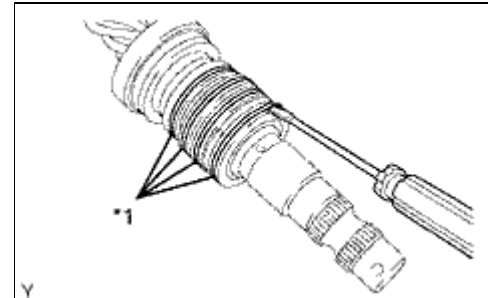
- (g) Using a screwdriver, remove the 4 control valve rings.

Text in Illustration

*1	Control Valve Rings
----	---------------------

NOTICE:

Be careful not to damage the grooves for the control valve rings.



14. REMOVE POWER STEERING CONTROL VALVE UPPER OIL SEAL

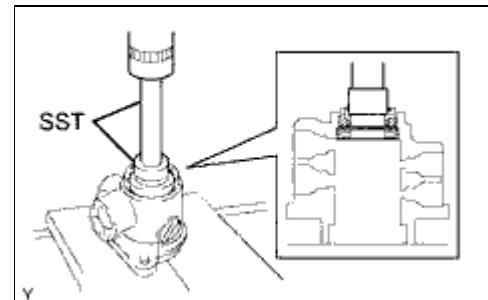
- (a) Using SST and a press, remove the control valve upper bearing and control valve upper oil seal from the control valve housing.

SST: 09950-60010

09951-00250

SST: 09950-70010

09951-07150

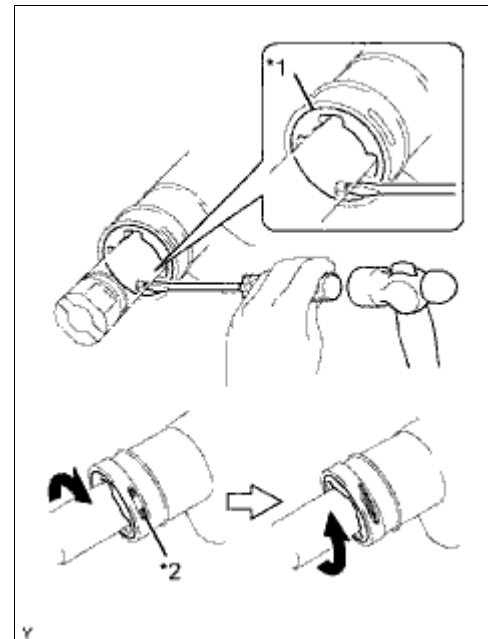


15. REMOVE CYLINDER END STOPPER

- (a) Using a screwdriver and hammer, turn the cylinder end stopper clockwise until the wire end can be seen through the service hole.

Text in Illustration

*1	Cylinder End Stopper
*2	Wire



- (b) Using a screwdriver and hammer, turn the cylinder end stopper counterclockwise, and remove the wire and cylinder end stopper.

16. REMOVE POWER STEERING RACK

17. REMOVE POWER STEERING RACK BUSH

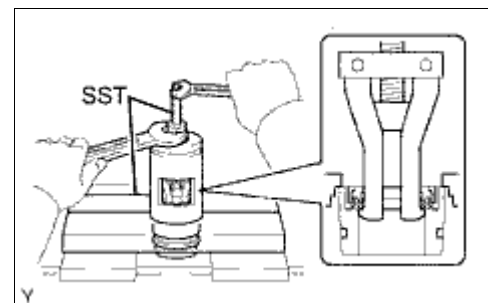
- (a) Remove the power steering rack bush from the power steering rack.
 (b) Using a screwdriver, remove the O-ring from the power steering rack bush.

- (c) Using SST, remove the power steering rack bush oil seal.

SST: 09527-21011

SST: 09612-24014

09613-22011



18. REMOVE POWER STEERING CYLINDER TUBE OIL SEAL

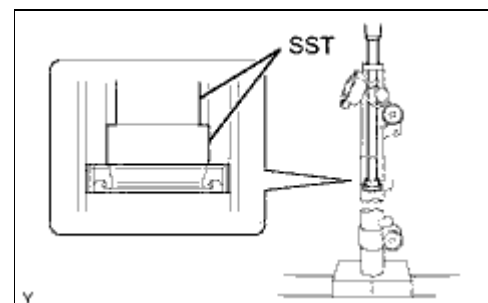
- (a) Using SST and a press, remove the power steering cylinder tube oil seal.

SST: 09950-60010

09951-00320

SST: 09950-70010

09951-07360

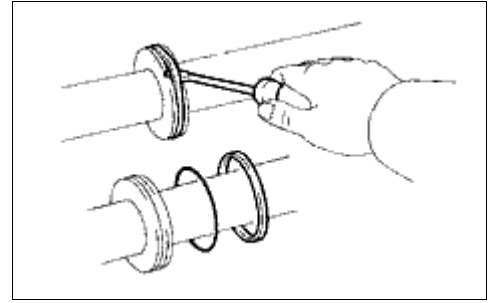


19. REMOVE RACK STEERING PISTON RING

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

NOTICE:

Be careful not to damage the groove for the rack steering piston ring.



Last Modified: 11-13-2015	6.6 G	Doc ID: RM0000017AF000X
Model Year Start: 2016	Model: Tacoma	Prod Date Range: [08/2015 -]
Title: POWER STEERING: POWER STEERING LINK: INSPECTION; 2016 MY Tacoma [08/2015 -]		

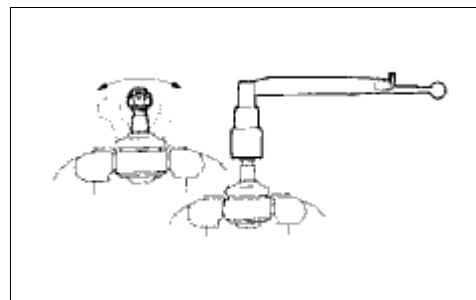
INSPECTION

1. INSPECT TIE ROD END SUB-ASSEMBLY

- Flip the ball joint stud back and forth 5 times as shown in the illustration before installing the nut.
- Using a torque wrench, turn the nut continuously at a rate of 2 to 4 seconds per turn and check the torque reading on the 5th turn.

Torque:

0.49 to 3.43 N·m {5.0 to 35.0 kgf·cm, 4.34 to 30.36in·lbf}



2. INSPECT POWER STEERING RACK

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

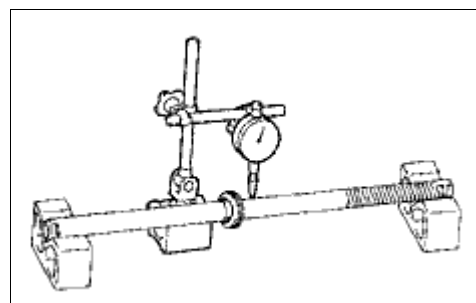
Maximum runout:

0.3 mm (0.012 in.)

If necessary, replace the power steering link assembly.

- Check the back surface for wear and damage.

If necessary, replace the power steering link assembly.



Last Modified: 11-13-2015	6.6 A	Doc ID: RM00000173400PX
Model Year Start: 2016	Model: Tacoma	Prod Date Range: [08/2015 -]
Title: POWER STEERING: POWER STEERING LINK: INSTALLATION; 2016 MY Tacoma [08/2015 -]		

INSTALLATION

1. INSTALL POWER STEERING LINK

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

Torque:

95 N·m {969 kgf·cm, 70ft·lbf}

NOTICE:

Never turn the nut since it has a detent. Be sure to turn only the bolt.

2. INSTALL PRESSURE FEED TUBE ASSEMBLY

- (a) Connect the return hose and slide the clip to secure it.
- (b) Using a union nut wrench, tighten the flare nut and connect the pressure feed tube.

Torque:

for use without union nut wrench -

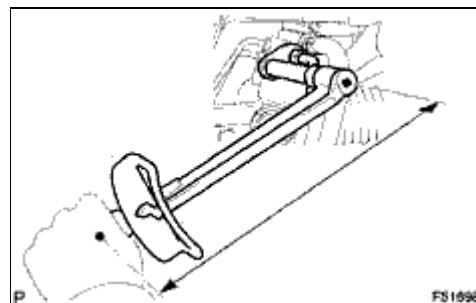
24 N·m {245 kgf·cm, 18ft·lbf}

for use with union nut wrench -

22 N·m {222 kgf·cm, 16ft·lbf}

HINT:

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



- (c) for 2TR-FE:

- (1) Install the tube support bracket with the bolt.

Torque:

28 N·m {286 kgf·cm, 21ft·lbf}

- (d) for 2GR-FKS:

- (1) Install the tube support brackets with the 2 bolts.

Torque:

28 N·m {286 kgf·cm, 21ft·lbf}

3. INSTALL TIE ROD END SUB-ASSEMBLY LH

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

Torque:

91 N·m {928 kgf·cm, 67ft·lbf}

- (c) Install a new cotter pin.

4. INSTALL TIE ROD END SUB-ASSEMBLY RH

HINT:

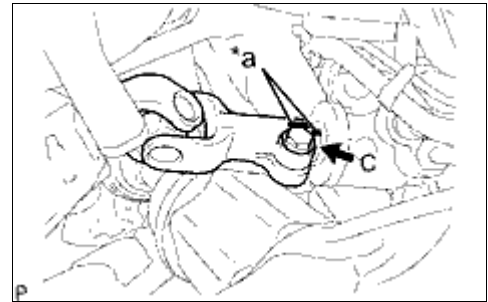
The installation procedure for the RH side is the same as that for the LH side.

5. INSTALL NO. 2 STEERING INTERMEDIATE SHAFT

- (a) Align the matchmarks on the No. 2 steering intermediate shaft and power steering link.

Text in Illustration

*a	Matchmark
----	-----------



- (b) Install the No. 2 steering intermediate shaft to the power steering link with bolt C.

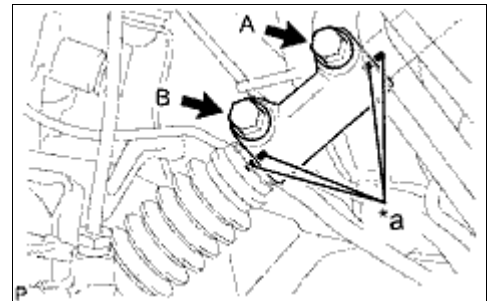
Torque:

35 N·m {357 kgf·cm, 26ft·lbf}

- (c) Align the matchmarks on the steering intermediate shaft and steering sliding yoke.

Text in Illustration

*a	Matchmark
----	-----------



- (d) Install the steering sliding yoke to the steering intermediate shaft and slide it upward.
(e) Align the matchmarks on the steering sliding yoke and No. 2 steering intermediate shaft.
(f) Install the steering sliding yoke with bolts A and B.

Torque:

35 N·m {357 kgf·cm, 26ft·lbf}

6. INSTALL ENGINE ASSEMBLY

- (a) for 2TR-FE:

Install the engine assembly [INFO](#) .

- (b) for 2GR-FKS:

Install the engine assembly [INFO](#) .

7. INSTALL FRONT WHEELS

Torque:

113 N·m {1152 kgf·cm, 83ft·lbf}

8. PLACE FRONT WHEELS FACING STRAIGHT AHEAD

9. INSPECT STEERING WHEEL CENTER POINT

10. ADD POWER STEERING FLUID

11. BLEED POWER STEERING FLUID 

12. INSPECT FOR POWER STEERING FLUID LEAK

13. INSPECT AND ADJUST FRONT WHEEL ALIGNMENT





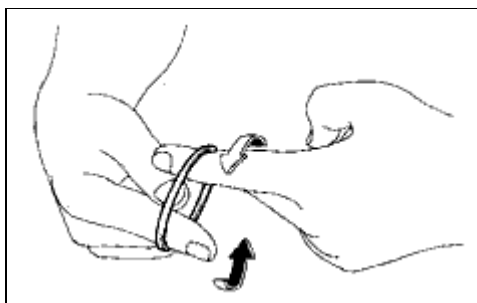
Last Modified: 11-13-2015	6.6 A	Doc ID: RM00000173800TX
Model Year Start: 2016	Model: Tacoma	Prod Date Range: [08/2015 -]
Title: POWER STEERING: POWER STEERING LINK: REASSEMBLY; 2016 MY Tacoma [08/2015 -]		

REASSEMBLY

NOTICE:

When installing, coat the parts indicated by the arrows with power steering fluid [INFO](#) .

1. INSTALL RACK STEERING PISTON RING



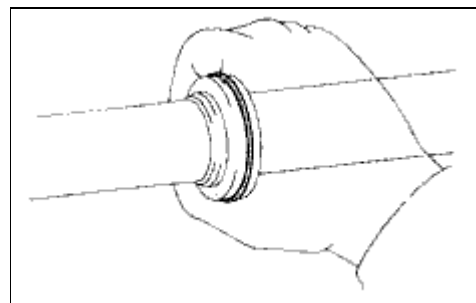
- (a) Coat a new O-ring with power steering fluid and install it onto the power steering rack.
- (b) Expand a new rack steering piston ring with your fingers.

NOTICE:

Be careful not to over expand the rack steering piston ring.

- (c) Coat a new piston ring with power steering fluid.

- (d) Install the rack steering piston ring onto the power steering rack, and position it with your fingers.



2. INSTALL POWER STEERING CYLINDER TUBE OIL SEAL

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

SST: 09950-60010

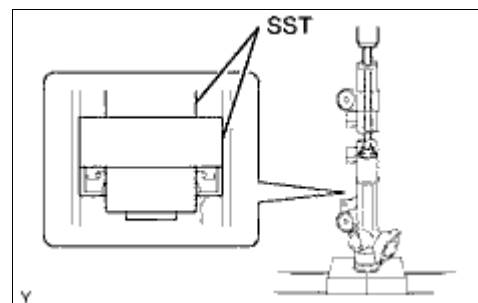
09951-00280

09951-00480

09952-06010

SST: 09950-70010

09951-07360



NOTICE:

- Make sure that the power steering cylinder tube oil seal is installed facing in the correct direction.
- Take care not to reverse the power steering cylinder tube oil seal direction when installing.

3. INSTALL POWER STEERING RACK

- (a) Install SST onto the power steering rack.

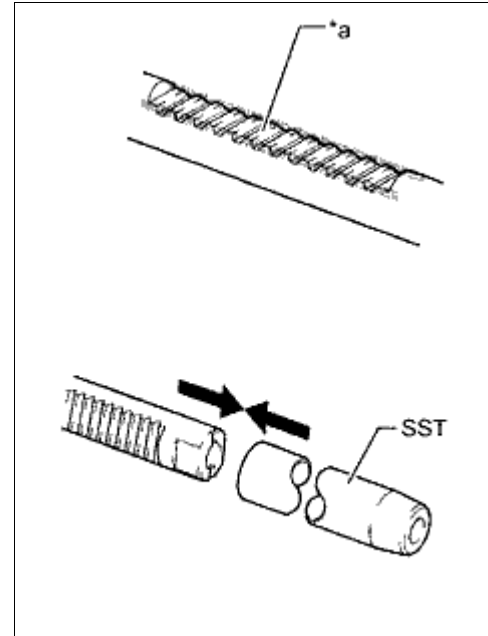
Text in Illustration

*a	Rack Teeth End
----	----------------

SST: 09631-20111

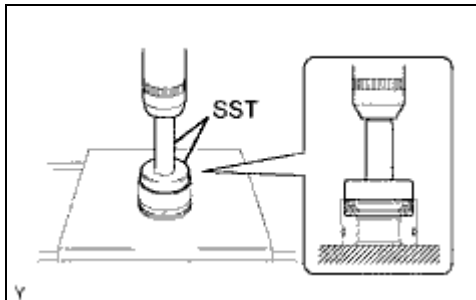
HINT:

If necessary, scrape the burrs off the power steering rack teeth end and burnish.



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

4. INSTALL POWER STEERING RACK BUSH



- (a) Using SST and a press, install a new power steering rack bush oil seal onto the rack bush.

SST: 09950-60010

09951-00440

SST: 09950-70010

09951-07100

NOTICE:

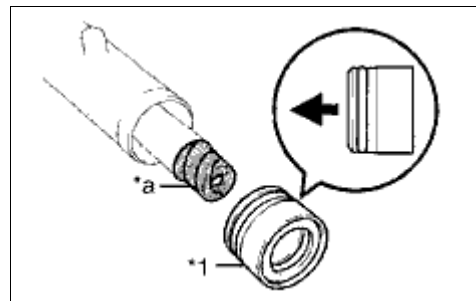
Make sure that the rack bush oil seal is installed facing the correct direction.

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

- (c) To prevent the power steering rack bush oil seal lip from being damaged, wind protective tape around the rack end and apply power steering fluid.

Text in Illustration

*1	Rack Bush
*a	Protective Tape



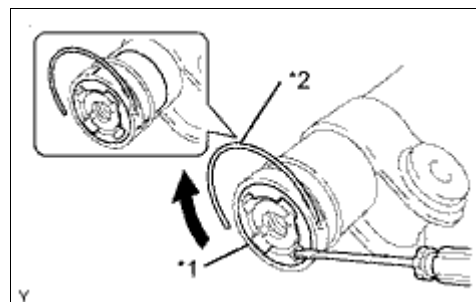
- (d) Install the power steering rack bush onto the power steering rack.

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.

Text in Illustration

*1	Cylinder End Stopper
*2	Wire



- (b) Install a new wire into the cylinder end stopper.
(c) Using a screwdriver, turn the cylinder end stopper clockwise by 400 to 500°.

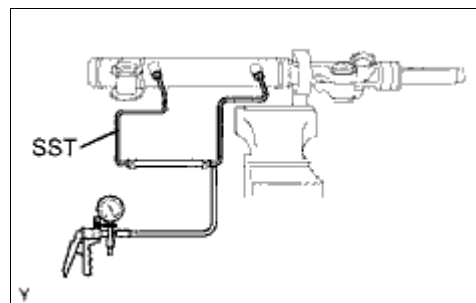
6. TEST AIRTIGHTNESS

- (a) Install SST onto the rack housing.

SST: 09631-12071

- (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 any change in the vacuum, check whether the oil seals are installed correctly.



7. INSTALL POWER STEERING CONTROL VALVE UPPER OIL SEAL

- (a) Coat the control valve upper bearing and a new power steering control valve upper oil seal with power steering fluid.
(b) Using SST and a press, install the power steering control valve upper oil seal.

SST: 09950-60010

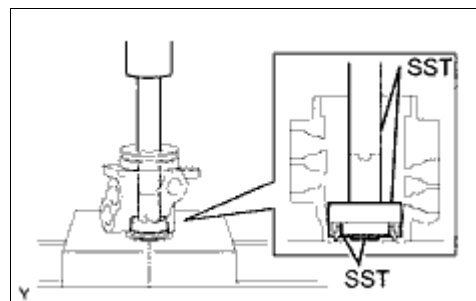
09951-00180

09951-00320

09952-06010

SST: 09950-70010

09951-07150



- (c) Using SST and a press, install the power steering control valve upper bearing.

SST: 09950-60010

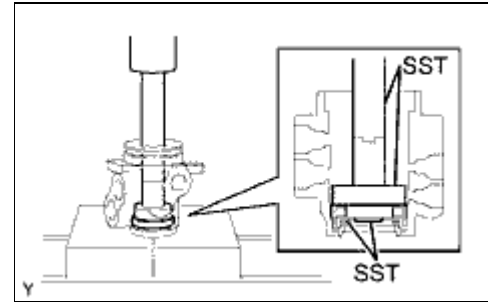
09951-00180

09951-00340

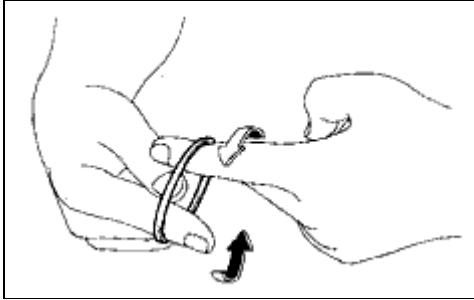
09952-06010

SST: 09950-70010

09951-07150



8. INSTALL POWER STEERING CONTROL VALVE ASSEMBLY



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

NOTICE:

Be careful not to over expand the control valve rings.

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

- (c) Install the 4 control valve rings onto the power steering control valve assembly, and position them with your fingers.

- (d) Carefully slide the tapered end of SST over the control valve rings until they fit to the power steering control valve assembly.

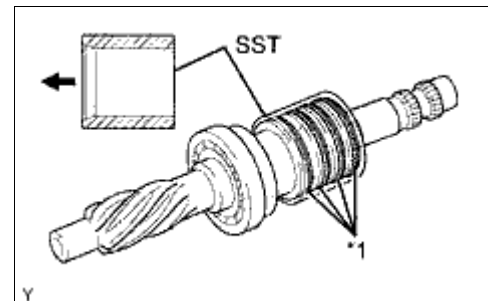
Text in Illustration

*1	Control Valve Rings
----	---------------------

SST: 09631-20081

NOTICE:

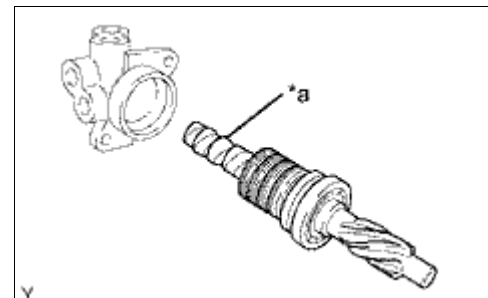
Be careful not to damage the control valve rings.



- (e) To prevent the control valve upper oil seal lip from getting damaged, wind protective tape around the serrated portion of the power steering control valve assembly.

Text in Illustration

*a	Protective Tape
----	-----------------



- (f) Coat the power steering control valve upper oil seal lip with power steering fluid.

(g) Install the power steering control valve assembly onto the control valve housing.

NOTICE:

Be careful not to damage the control valve ring and control valve upper oil seal lip.

(h) Apply grease to the needle roller bearing.

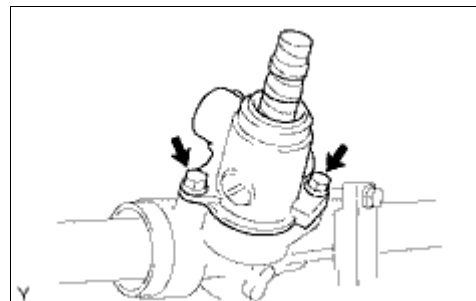
(i) Install a new O-ring onto the control valve housing.

(j) Wind protective tape around the serrated portion of the power steering control valve assembly.

(k) Install the power steering control valve assembly with control valve housing onto the rack housing with the 2 bolts.

Torque:

18 N·m {184 kgf·cm, 13ft·lbf}



9. INSTALL STEERING GEAR RACK GUIDE

(a) Install the steering gear rack guide.

(b) Install the steering gear rack guide spring.

(c) Apply adhesive to 2 or 3 threads of the steering rack guide spring cap.

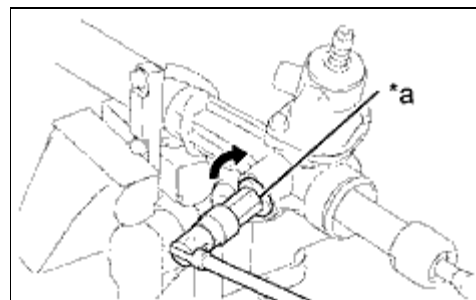
Adhesive:

Toyota Genuine Adhesive 1344, Three Bond 1344 or equivalent

(d) Using a 24 mm hexagon wrench, temporarily install the steering rack guide spring cap.

Text in Illustration

*a	24 mm Hexagon Wrench
----	----------------------



10. ADJUST TOTAL PRELOAD

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

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

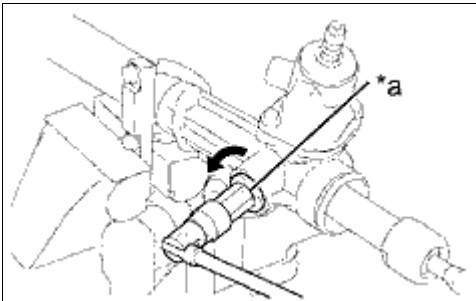
Torque:

25 N·m {254 kgf·cm, 18ft·lbf}

(c) Loosen the steering rack guide spring cap 30°

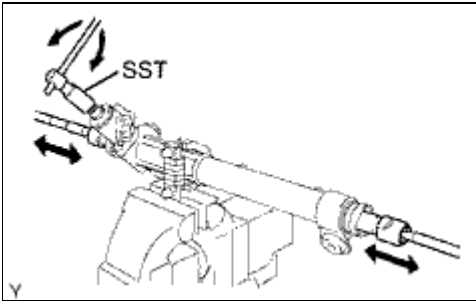
Text in Illustration

*a	24 mm Hexagon Wrench
----	----------------------



(d) Using SST, turn the power steering control valve assembly to the right and left once or twice.

SST: 09616-00011



(e) Using a 24 mm hexagon wrench, loosen the steering rack guide spring cap until the rack guide spring ceases to function.

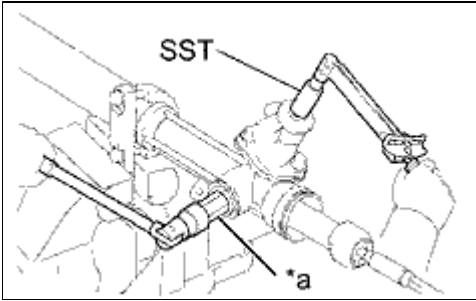
(f) Using SST, a torque wrench and a 24 mm hexagon wrench, tighten the spring cap until the preload is within the specification.

Text in Illustration

*a	24 mm Hexagon Wrench
----	----------------------

SST: 09616-00011

Preload (turning):
1.4 to 2.2 N*m (14.3 to 22.4 kgf*cm, 12.4 to 19.5 in.*lbf)



(g) Apply adhesive to 2 or 3 threads of the steering rack guide spring cap nut.

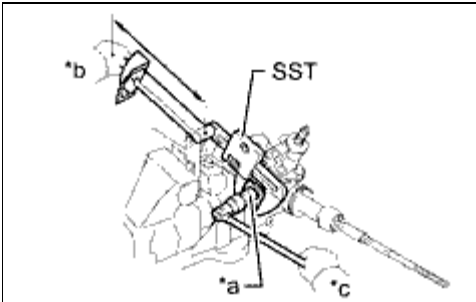
Adhesive:
Toyota Genuine Adhesive 1344, Three Bond 1344 or equivalent

(h) Provisionally install the steering rack guide spring cap nut.

(i) Using a 24 mm hexagon wrench, hold the steering rack guide spring cap and using SST, tighten the steering rack guide spring cap nut.

Text in Illustration

*a	24 mm Hexagon Wrench
*b	Turn
*c	Hold



SST: 09922-10010

Torque:

for use without SST -

59 N·m {601 kgf·cm, 44ft·lbf}

for use with SST -

43 N·m {440 kgf·cm, 32ft·lbf}

NOTICE:

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

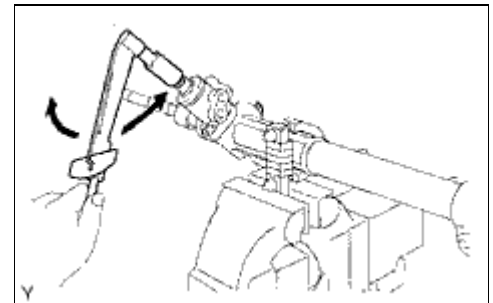
HINT:

- Use a torque wrench with a fulcrum length of 345 mm (13.58 in.).
- The torque value for use with SST is effective when SST is parallel to the torque wrench.

(j) Recheck the total preload.

Preload (turning):

1.4 to 2.2 N·m (14.3 to 22.4 kgf·cm, 12.4 to 19.5 in.·lbf)

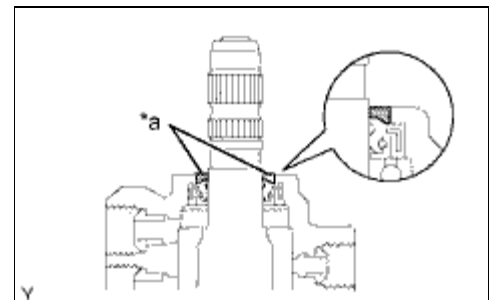


(k) Remove the RH and LH steering rack ends.

(l) Apply MP grease to the control valve as shown in the illustration.

Text in Illustration

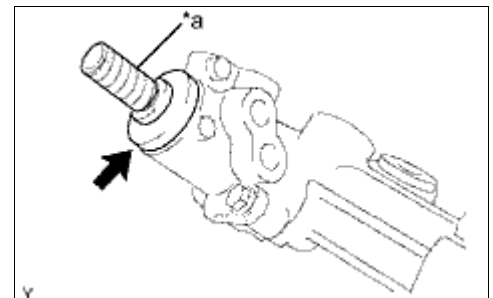
*a	MP Grease
----	-----------



(m) Wind protective tape around the serrated portion of the power steering control valve assembly.

Text in Illustration

*a	Protective Tape
----	-----------------



(n) Install the dust cover onto the control valve housing.

11. INSTALL STEERING RACK END SUB-ASSEMBLY

(a) Install 2 new claw washers, and provisionally install the 2 steering rack ends.

HINT:

Align the claws of the claw washers with the power steering rack grooves.

(b) Using SST, install the 2 steering rack ends.

Text in Illustration

*a	Turn
*b	Hold

SST: 09922-10010

Torque:

for use without SST -

84 N·m {851 kgf·cm, 62ft·lbf}

for use with SST -

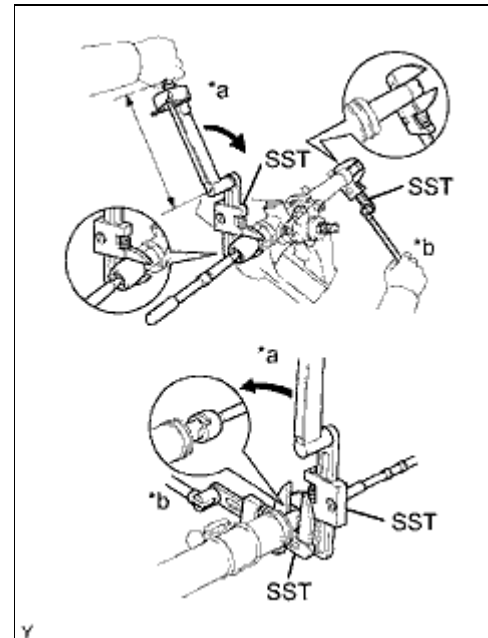
61 N·m {620 kgf·cm, 45ft·lbf}

NOTICE:

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

HINT:

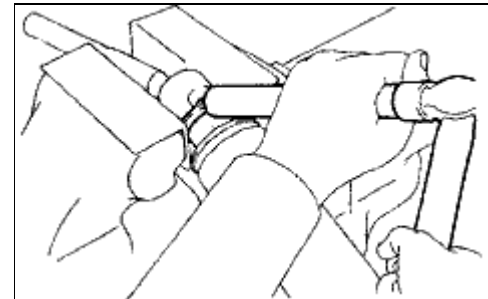
- Using SST, hold the power steering rack and install the rack end sub-assembly.
- Use a torque wrench with a fulcrum length of 345 mm (13.58 in.).



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

NOTICE:

Avoid any impact to the power steering rack.

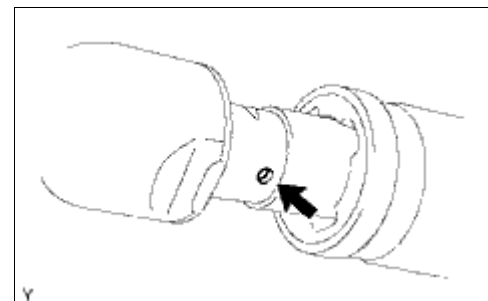


12. INSPECT STEERING RACK END SUB-ASSEMBLY

(a) Ensure that the steering rack end hole is not clogged with grease.

HINT:

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



13. INSTALL NO. 1 STEERING RACK BOOT

14. INSTALL NO. 2 STEERING RACK BOOT

15. INSTALL NO. 1 STEERING RACK BOOT CLAMP

- (a) Using SST, tighten the No. 1 steering rack boot clamp as shown in the illustration.

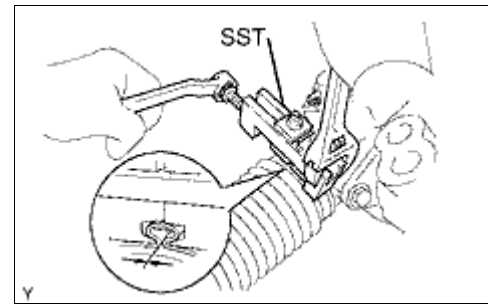
SST: 09521-24010

Clearance:

3.0 mm (0.118 in.) or less

NOTICE:

Be careful not to damage the No. 1 steering rack boot.



16. INSTALL NO. 2 STEERING RACK BOOT CLAMP

HINT:

The installation procedure for the No. 2 side is the same as that for the No. 1 side.

17. INSTALL STEERING RACK BOOT CLIP

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

18. INSTALL TIE ROD END SUB-ASSEMBLY 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:

56 N·m {566 kgf·cm, 41ft·lbf}

19. INSTALL TIE ROD END SUB-ASSEMBLY RH

HINT:

The installation procedure for the RH side is the same as that for the LH side.

20. INSTALL STEERING TURN PRESSURE TUBE

- (a) Coat 4 new O-rings with power steering fluid and install them onto the pressure tubes.
(b) Using a union nut wrench, install the 2 pressure tubes.

Torque:

for use without union nut wrench -

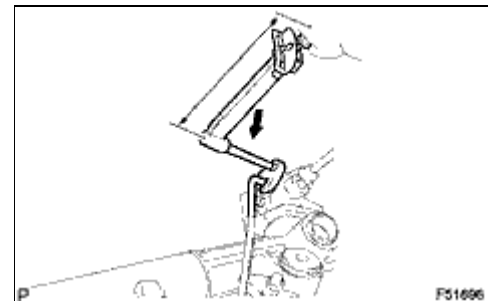
15 N·m {153 kgf·cm, 11ft·lbf}

for use with union nut wrench -

14 N·m {141 kgf·cm, 10ft·lbf}

HINT:

- Use a torque wrench with a fulcrum length of 345 mm (13.58 in.).
- This torque value is effective when union nut wrench is parallel to a torque wrench.



21. INSTALL STEERING GEAR OUTLET RETURN TUBE

- (a) Using a union nut wrench, install the steering gear outlet return tube.

Torque:

for use without union nut wrench -

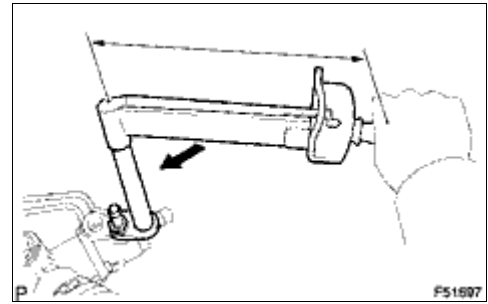
24 N·m {245 kgf·cm, 18ft·lbf}

for use with union nut wrench -

22 N·m {222 kgf·cm, 16ft·lbf}

HINT:

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



Last Modified: 11-13-2015	6.6 A	Doc ID: RM00000173600PX
Model Year Start: 2016	Model: Tacoma	Prod Date Range: [08/2015 -]
Title: POWER STEERING: POWER STEERING LINK: REMOVAL; 2016 MY Tacoma [08/2015 -]		

REMOVAL

1. PLACE FRONT WHEELS FACING STRAIGHT AHEAD

2. REMOVE FRONT WHEELS

3. REMOVE ENGINE ASSEMBLY

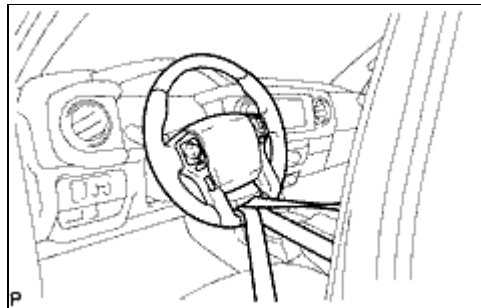
(a) for 2TR-FE:

Remove the engine assembly [INFO](#) .

(b) for 2GR-FKS:

Remove the engine assembly [INFO](#) .

4. REMOVE NO. 2 STEERING INTERMEDIATE SHAFT



(a) Fix the steering wheel with the seat belt in order to prevent it from rotating.

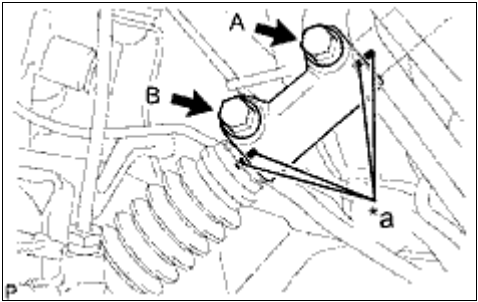
HINT:

The operation is effective for preventing any damage to the spiral cable.

(b) Place matchmarks on the steering sliding yoke, No. 2 steering intermediate shaft and steering intermediate shaft.

Text in Illustration

*a	Matchmark
----	-----------



(c) Remove bolts A and B from the steering sliding yoke.

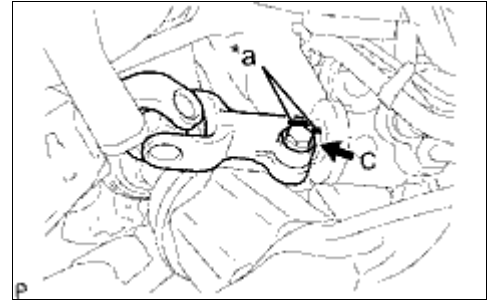
(d) Slide the steering sliding yoke up and separate it from the No. 2 steering intermediate shaft.

(e) Pull down the steering sliding yoke from the steering intermediate shaft to remove it.

- (f) Place matchmarks on the No. 2 steering intermediate shaft and power steering link.

Text in Illustration

*a	Matchmark
----	-----------



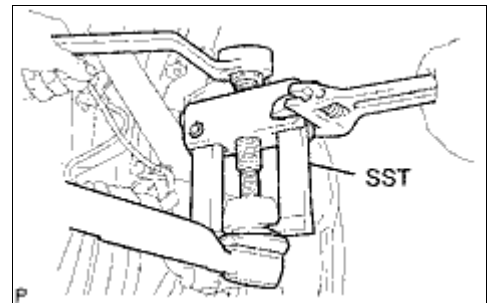
- (g) Remove bolt C from the No. 2 steering intermediate shaft.
- (h) Slide the No. 2 steering intermediate shaft up and remove it from the power steering link.

5. SEPARATE TIE ROD END SUB-ASSEMBLY LH

- (a) Remove the cotter pin and nut.

- (b) Using SST, separate the tie rod end sub-assembly from the steering knuckle LH.

SST: 09628-62011



6. SEPARATE TIE ROD END SUB-ASSEMBLY RH

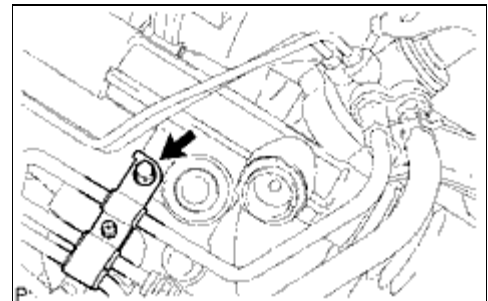
HINT:

The removal procedure for the RH side is the same as that for the LH side.

7. SEPARATE PRESSURE FEED TUBE ASSEMBLY

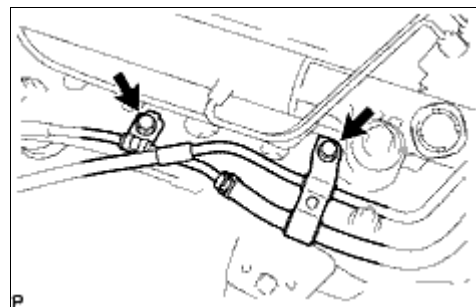
- (a) for 2TR-FE:

- (1) Remove the bolt to separate the tube support bracket.

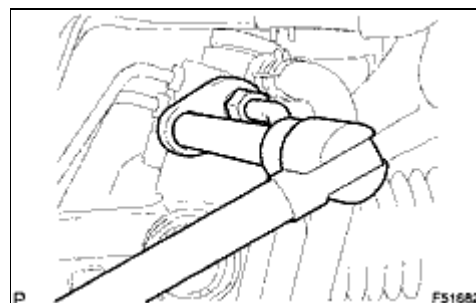


- (b) for 2GR-FKS:

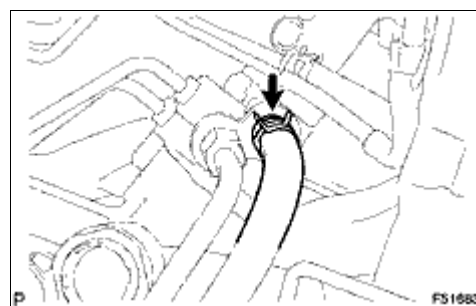
(1) Remove the 2 bolts to separate the tube support brackets.



(c) Using a union nut wrench, loosen the flare nut to disconnect the pressure feed tube.



(d) Slide the clip and disconnect the return hose.

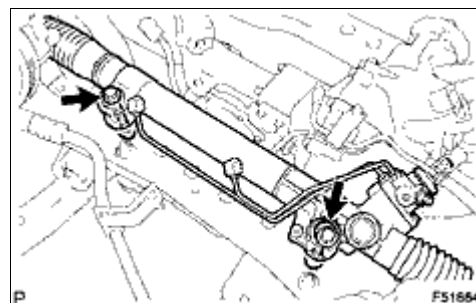


8. REMOVE POWER STEERING LINK

(a) Remove the 2 bolts and 2 nuts.

NOTICE:

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



(b) Remove the power steering link.



Last Modified: 11-13-2015	6.6 G	Doc ID: RM00000173B00XX
Model Year Start: 2016	Model: Tacoma	Prod Date Range: [08/2015 -]
Title: POWER STEERING: POWER STEERING SYSTEM: ON-VEHICLE INSPECTION; 2016 MY Tacoma [08/2015 -]		

ON-VEHICLE INSPECTION

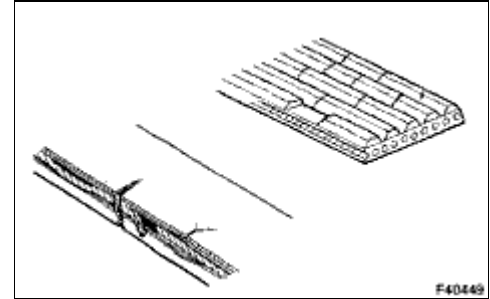
1. INSPECT DRIVE BELT

- (a) Visually check the belt for defects, such as excessive wear and frayed cords.

If any defects are found, replace the drive belt.

HINT:

Replace the belt if there are any missing ribs.



2. BLEED POWER STEERING SYSTEM

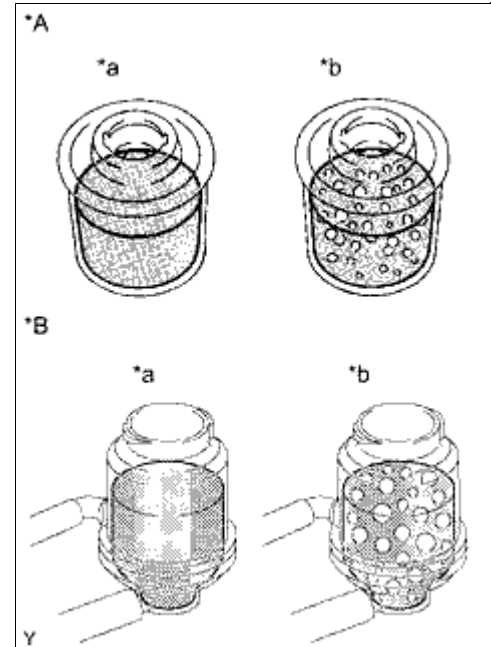
- (a) Check the fluid level.
- (b) Jack up the front of the vehicle and support it with stands.
- (c) Turn the steering wheel.
 - (1) With the engine stopped, turn the wheel slowly from lock to lock several times.
- (d) Lower the vehicle.
- (e) Start the engine.
 - (1) Run the engine at idle for a few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

(h) Check for foaming or emulsification.

Text in Illustration

*A	for 2TR-FE
*B	for 2GR-FKS
*a	Correct
*b	Incorrect

Especially, if the system has to be bled twice because of foaming or emulsification, check for fluid leakage in the system.



(i) Check the fluid level.

3. INSPECT FLUID LEVEL

(a) Keep the vehicle level.

(b) With the engine stopped, check the fluid level in the oil reservoir.

Text in Illustration

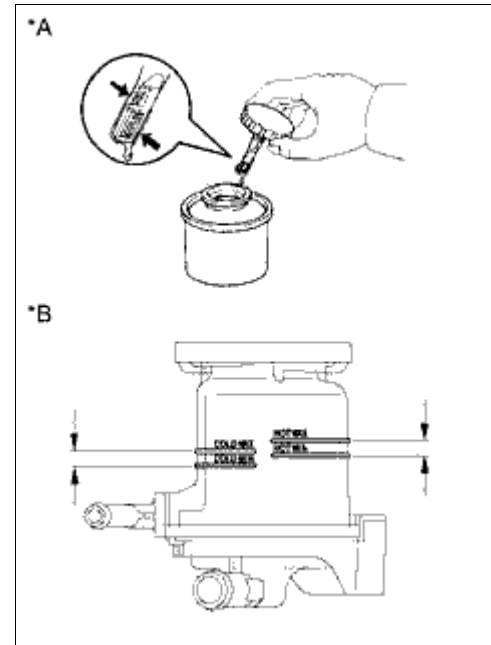
*A	for 2TR-FE
*B	for 2GR-FKS

Fluid:
ATF "DEXRON" II or III

HINT:

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

If necessary, add fluid.



(c) Start the engine and let it idle.

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

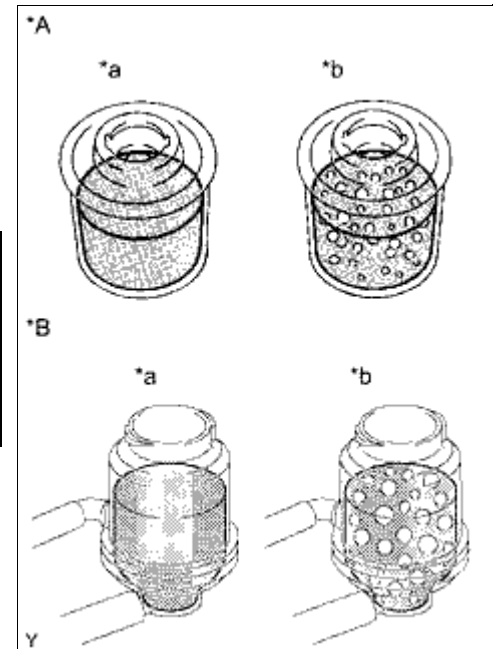
Fluid temperature:
75 to 80°C (167 to 176°F)

(e) Check for foaming or emulsification.

Text in Illustration

*A	for 2TR-FE
*B	for 2GR-FKS
*a	Correct
*b	Incorrect

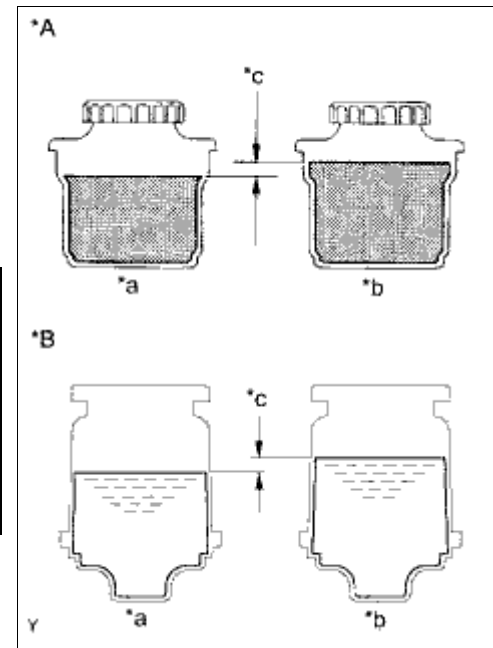
If any foaming or emulsification is identified, bleed the power steering system.



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

Text in Illustration

*A	for 2TR-FE
*B	for 2GR-FKS
*a	Engine Idling
*b	Engine Stopped
*c	5 mm (0.197 in.) or less



(g) Stop the engine.

(h) Wait a few minutes and measure the fluid level in the oil reservoir again.

Maximum fluid level rise:

5 mm (0.197 in.)

If any problems are found, bleed the power steering system.

(i) Check the fluid level.

4. INSPECT STEERING FLUID PRESSURE

(a) for 2TR-FE:

(1) Disconnect the pressure feed tube from the vane pump INFO.

(b) for 2GR-FKS:

(1) Disconnect the pressure feed tube from the vane pump INFO .

(c) for 2TR-FE:

(1) Connect SST as shown in the illustration.

SST: 09640-10010

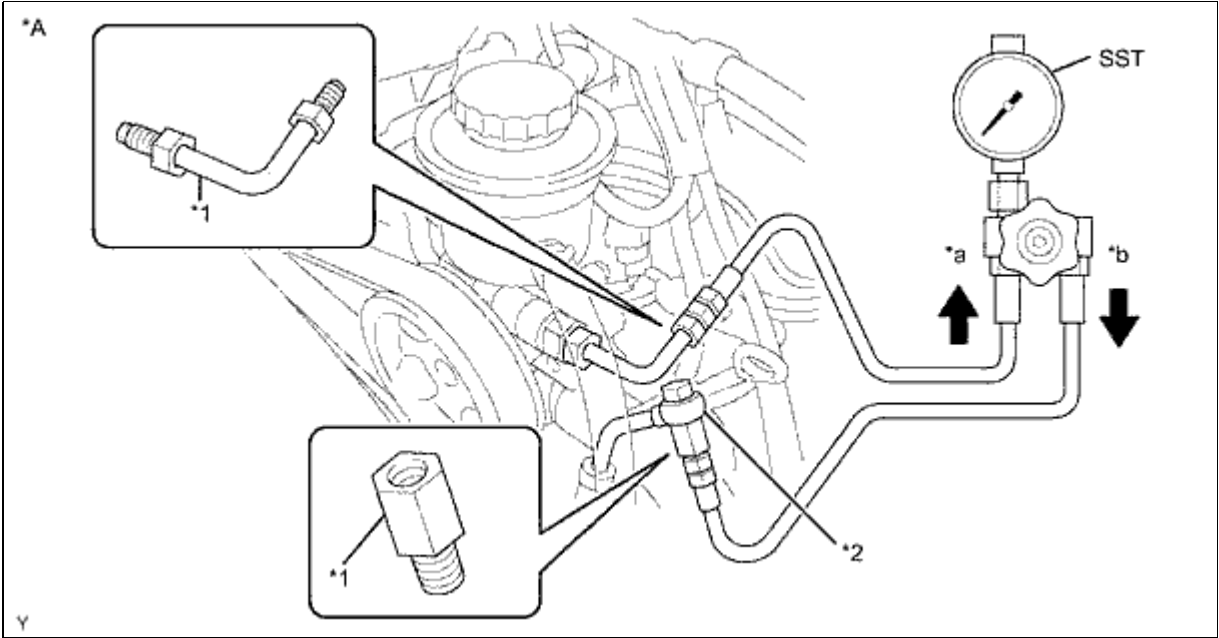
09641-01010

09641-01030

09641-01060

NOTICE:

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



*A	for 2TR-FE	-	-
*1	Attachment	*2	Pressure Feed Tube
*a	In	*b	Out

(d) for 2GR-FKS:

(1) Connect SST as shown in the illustration.

SST: 09640-10010

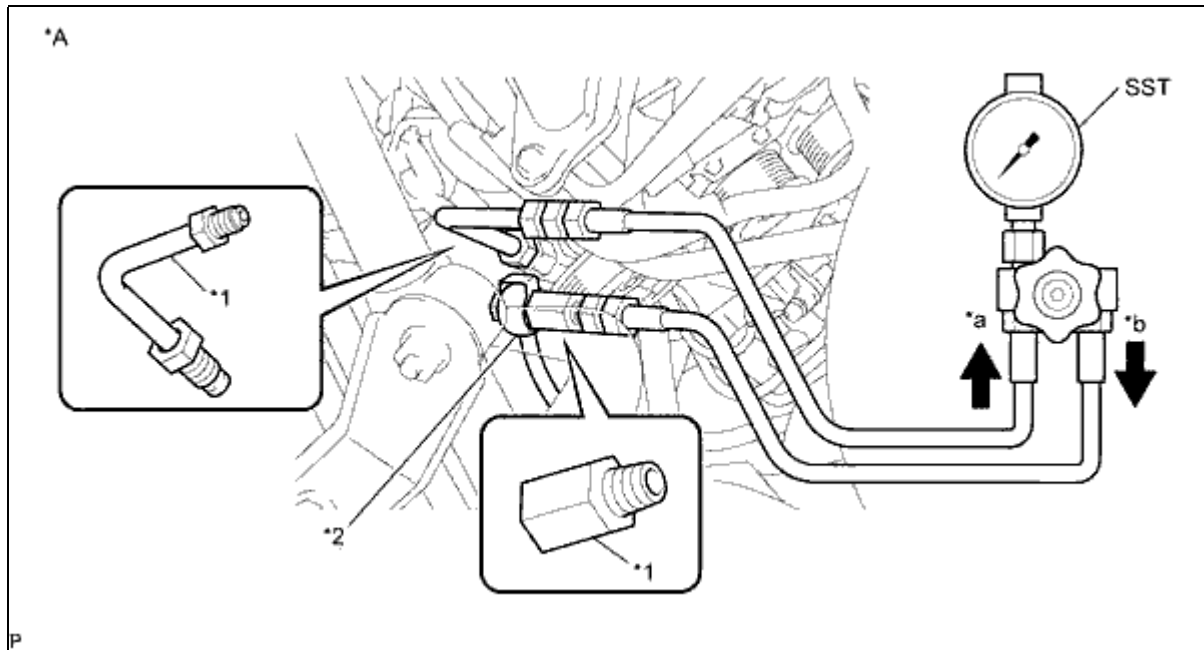
09641-01010

09641-01030

09641-01060

NOTICE:

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



*A	for 2GR-FKS	-	-
*1	Attachment	*2	Pressure Feed Tube
*a	In	*b	Out

(e) Bleed the power steering system.

(f) Start the engine and let it idle.

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

Fluid temperature:

75 to 80°C (167 to 176°F)

(h) With the engine idling, close the valve of SST and check the reading on SST.

Text in Illustration

*1	Power Steering Fluid Reservoir
*2	Power Steering Vane Pump
*3	Power Steering Gear
*a	Valve Closed

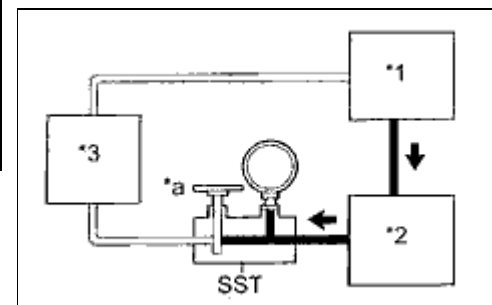
Fluid pressure:

for 2TR-FE

8300 to 8800 kPa (84.7 to 89.7 kgf/cm² , 1204 to 1276 psi)

for 2GR-FKS

8800 to 9300 kPa (89.8 to 94.8 kgf/cm² , 1276 to 1348 psi)



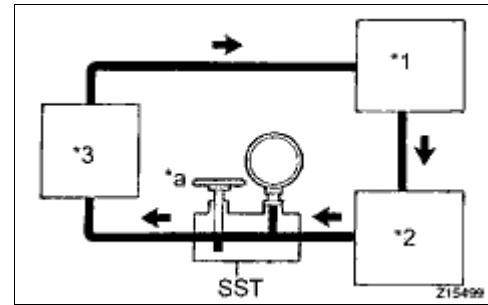
NOTICE:

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

(i) With the engine idling, fully open the valve.

Text in Illustration

*1	Power Steering Fluid Reservoir
*2	Power Steering Vane Pump
*3	Power Steering Gear
*a	Valve Open



(j) Measure the fluid pressure at the engine speeds of 1000 rpm and 3000 rpm.

Fluid pressure difference:

490 kPa (4.99 kgf/cm² , 71 psi) or less

NOTICE:

Do not turn the steering wheel.

(k) With the engine idling and valve fully open, turn the steering wheel to the full lock position.

Text in Illustration

*1	Power Steering Fluid Reservoir
*2	Power Steering Vane Pump
*3	Power Steering Gear
*a	Valve Open

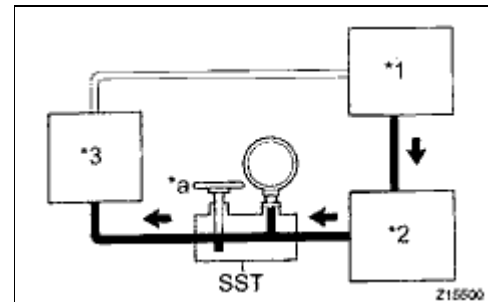
Fluid pressure:

for 2TR-FE

8300 to 8800 kPa (84.7 to 89.7 kgf/cm² , 1204 to 1276 psi)

for 2GR-FKS

8800 to 9300 kPa (89.8 to 94.8 kgf/cm² , 1276 to 1348 psi)



NOTICE:

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

(l) Disconnect SST.

(m) for 2TR-FE:

(1) Connect the pressure feed tube to the vane pump **INFO** .

(n) for 2GR-FKS:

(1) Connect the pressure feed tube to the vane pump **INFO** .

(o) Bleed the power steering system.

5. INSPECT STEERING EFFORT

- (a) Center the steering wheel assembly.
- (b) Remove the horn button assembly INFO .
- (c) Start the engine and let it idle.
- (d) Measure the steering effort in both directions.

Steering effort (Reference):

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

HINT:

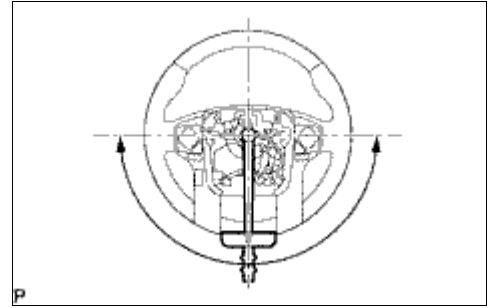
Check the tire type, pressure and contact surfaces before making a diagnosis.

- (e) Install the steering wheel assembly set nut.

Torque:

50 N·m {510 kgf·cm, 37ft·lbf}

- (f) Install the horn button assembly INFO .



Last Modified: 11-13-2015	6.6 L	Doc ID: RM00000173900XX
Model Year Start: 2016	Model: Tacoma	Prod Date Range: [08/2015 -]
Title: POWER STEERING: POWER STEERING SYSTEM: PRECAUTION; 2016 MY Tacoma [08/2015 -]		

PRECAUTION

1. HANDLING PRECAUTIONS FOR STEERING SYSTEM

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

2. HANDLING PRECAUTIONS FOR SRS AIRBAG SYSTEM

- (a) The vehicle is equipped with SRS (Supplemental Restraint System), such as airbags. If service operation is not carried out properly in the correct sequence, the airbag may suddenly deploy and this may result in serious injury. Before servicing (including inspection, replacement, removal and inspection of parts), be sure to read the precautionary notices for the supplemental restraint system  .



Last Modified: 11-13-2015	6.6 T	Doc ID: RM00000173A00XX
Model Year Start: 2016	Model: Tacoma	Prod Date Range: [08/2015 -]
Title: POWER STEERING: POWER STEERING SYSTEM: PROBLEM SYMPTOMS TABLE; 2016 MY Tacoma [08/2015 -]		

PROBLEM SYMPTOMS TABLE

HINT:

Use the table below to help determine the cause of problem symptoms. If multiple suspected areas are listed, the potential causes of the symptoms are listed in order of probability in the "Suspected Area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.

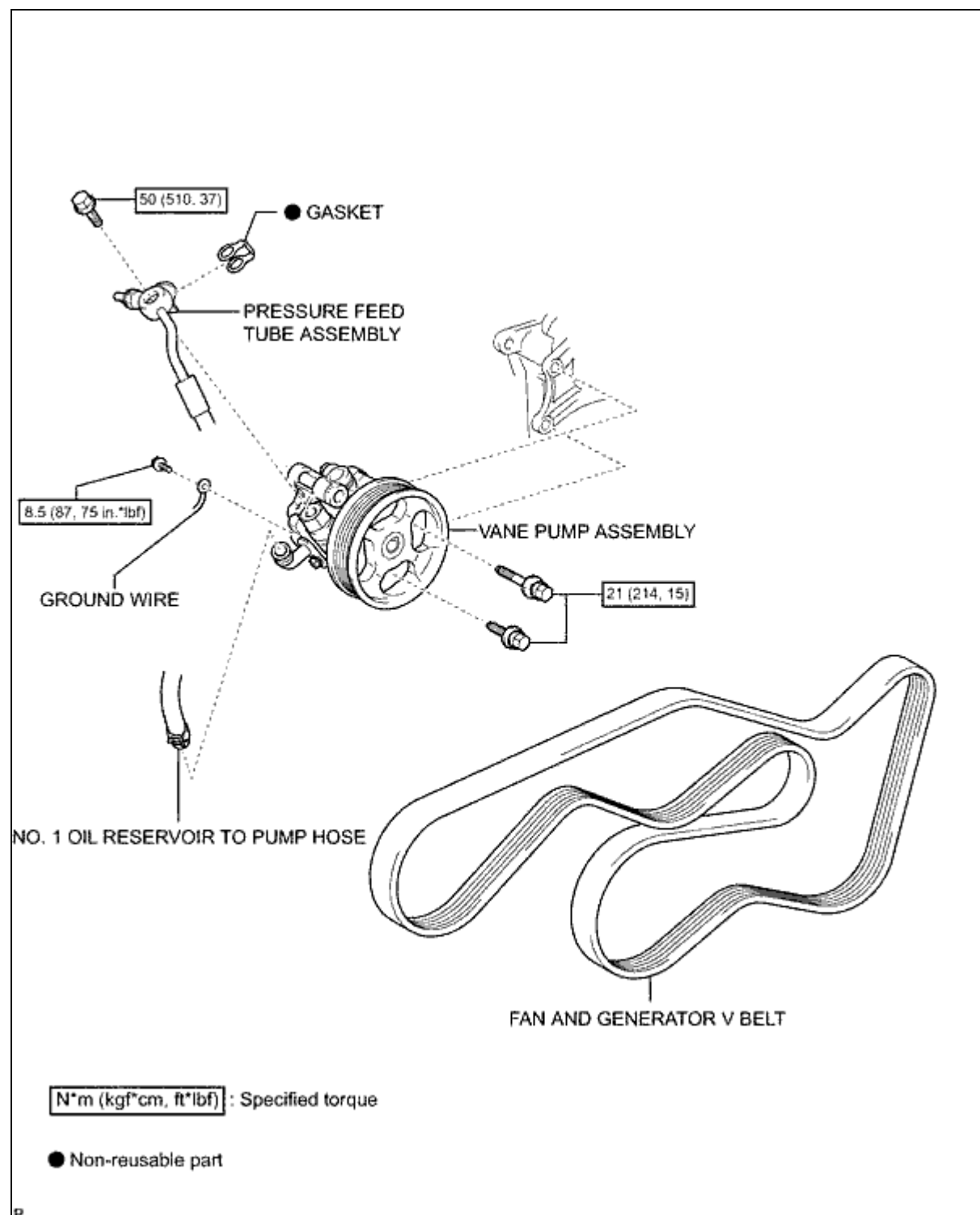
SYMPTOM	SUSPECTED AREA	SEE PAGE
Hard steering	1. Tires (Improperly inflated)	INFO
	2. Power steering fluid level (Low)	INFO
	3. Drive belt (Loose) (2TR-FE)	INFO
	4. Drive belt (Loose) (2GR-FKS)	INFO
	5. Front wheel alignment (Incorrect)	INFO
	6. Steering system joints (Worn)	-
	7. Suspension arm ball joints (Worn)	INFO
	8. Steering column (Binding)	-
	9. Vane pump (2TR-FE)	INFO
	10. Vane pump (2GR-FKS)	INFO
	14. Power steering link	INFO
Poor return	1. Tires (Improperly inflated)	INFO
	2. Front wheel alignment (Incorrect)	INFO
	3. Steering column (Binding)	-
	4. Power steering link	INFO
Excessive play	1. Steering system joints (Worn)	-
	2. Suspension arm ball joints (Worn)	INFO
	3. Intermediate shaft, Sliding yoke (Worn)	-
	4. Front wheel bearing (Worn)	INFO
	5. Power steering link	INFO
Abnormal noise	1. Power steering fluid level (Low)	INFO
	2. Steering system joints (Worn)	-
	3. Vane pump (2TR-FE)	INFO
	4. Vane pump (2GR-FKS)	INFO
	5. Power steering link	INFO



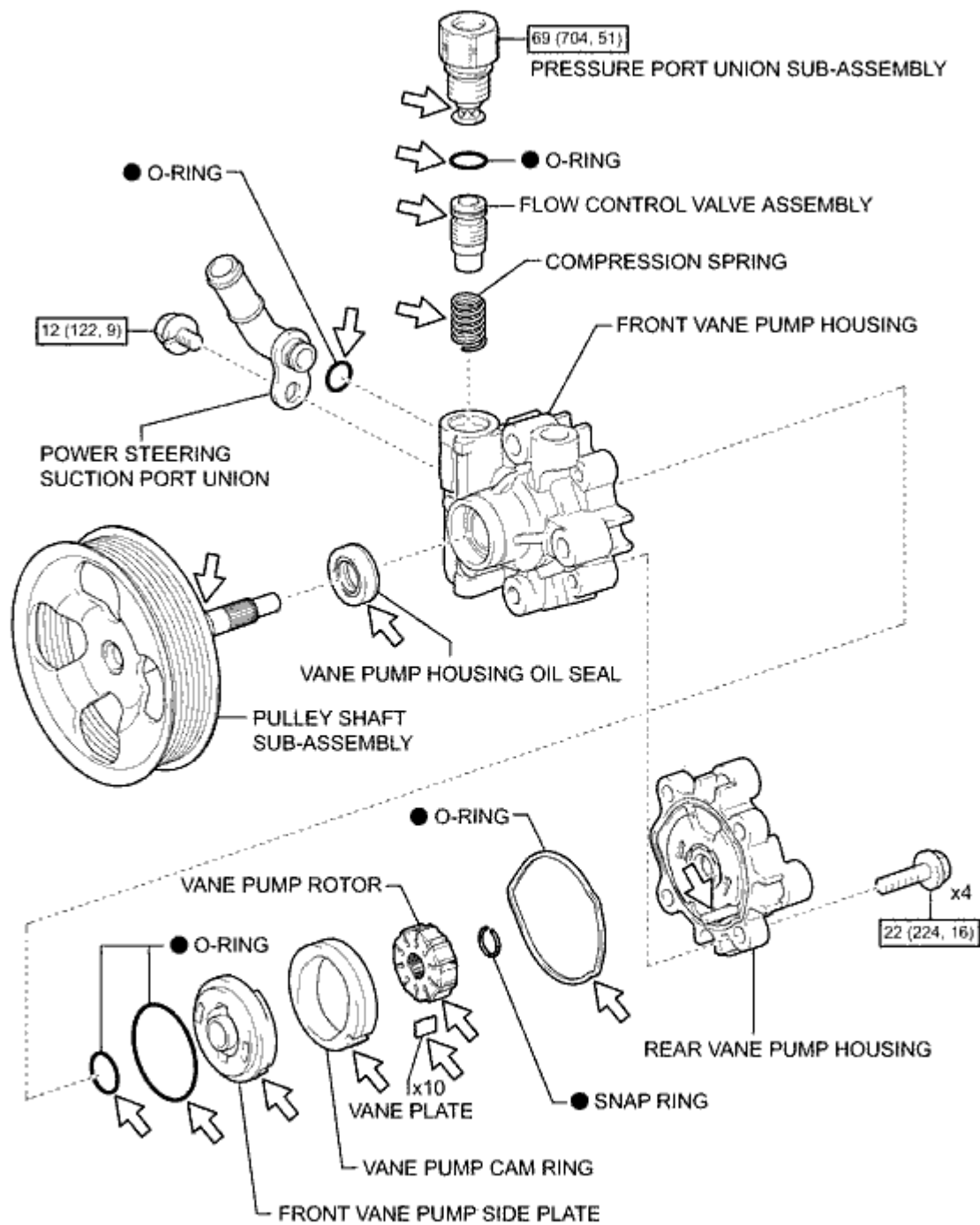
Last Modified: 11-13-2015	6.6 K	Doc ID: RM00000172V00KX
Model Year Start: 2016	Model: Tacoma	Prod Date Range: [08/2015 -]
Title: POWER STEERING: VANE PUMP (for 2GR-FKS): COMPONENTS; 2016 MY Tacoma [08/2015 -]		

COMPONENTS

ILLUSTRATION



ILLUSTRATION



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

● Non-reusable part ⇐ Power steering fluid

P

Last Modified: 11-13-2015	6.6 A	Doc ID: RM00000172X00MX
Model Year Start: 2016	Model: Tacoma	Prod Date Range: [08/2015 -]
Title: POWER STEERING: VANE PUMP (for 2GR-FKS): DISASSEMBLY; 2016 MY Tacoma [08/2015 -]		

DISASSEMBLY

1. FIX VANE PUMP ASSEMBLY

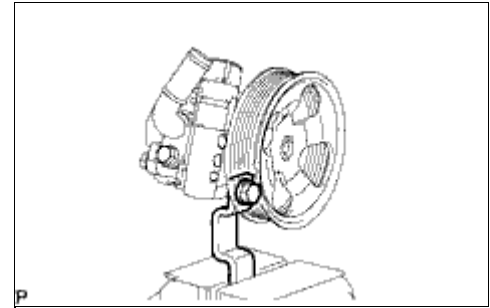
(a) Using SST, fix the vane pump assembly in a vise.

SST: 09630-00014

09631-00132

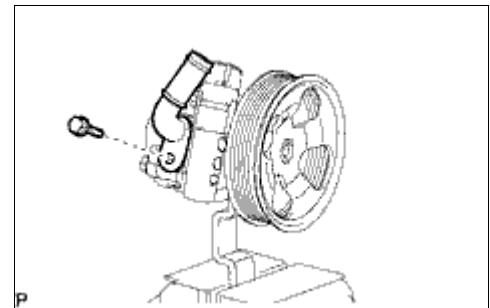
NOTICE:

When using a vise, do not overtighten it.



2. REMOVE POWER STEERING SUCTION PORT UNION

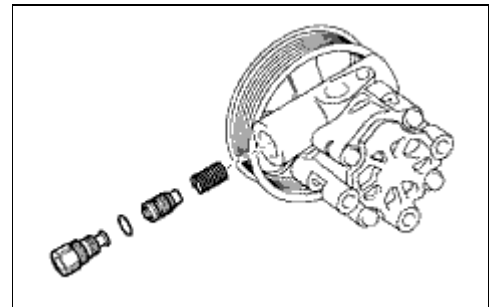
(a) Remove the bolt and suction port union.



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

3. REMOVE FLOW CONTROL VALVE ASSEMBLY

(a) Remove the pressure port union.

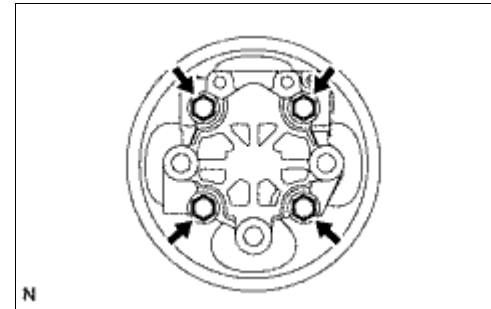


(b) Remove the O-ring from the pressure port union.

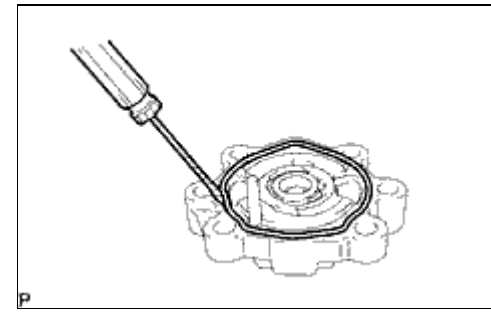
(c) Remove the flow control valve assembly and compression spring.

4. REMOVE REAR VANE PUMP HOUSING

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



- (b) Using a screwdriver, remove the O-ring from the rear vane pump housing.



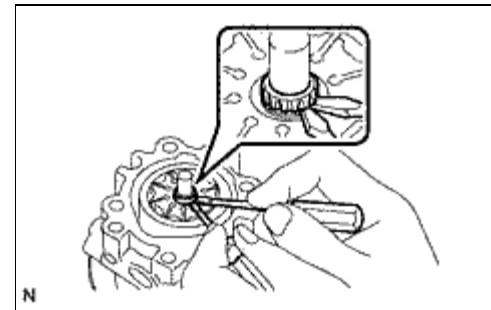
5. REMOVE PULLEY SHAFT SUB-ASSEMBLY

- (a) Using a screwdriver, remove the snap ring from the pulley shaft sub-assembly.

- (b) Remove the pulley shaft.

NOTICE:

Be careful not to drop or damage the pulley shaft. If damaged, replace it with a new one.

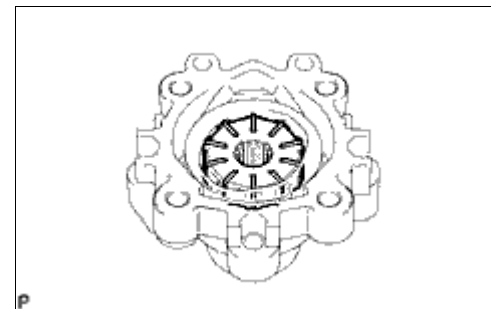


6. REMOVE VANE PUMP ROTOR

- (a) Remove the 10 vane pump plates.

NOTICE:

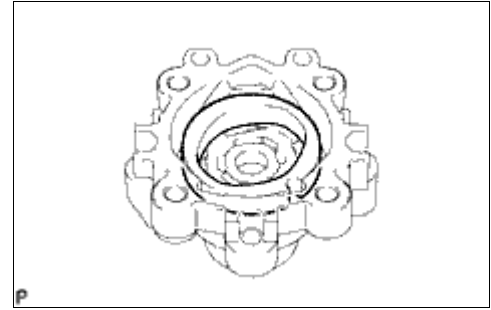
Take care not to drop the vane pump plates.



- (b) Remove the vane pump rotor from the front vane pump housing.

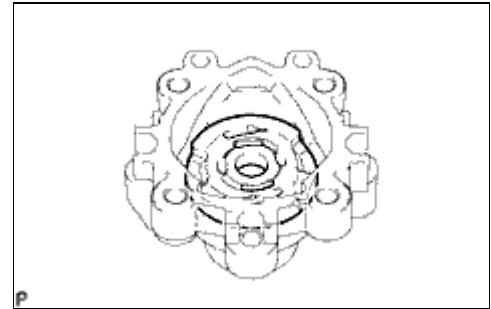
7. REMOVE VANE PUMP CAM RING

- (a) Remove the vane pump cam ring from the front vane pump housing.

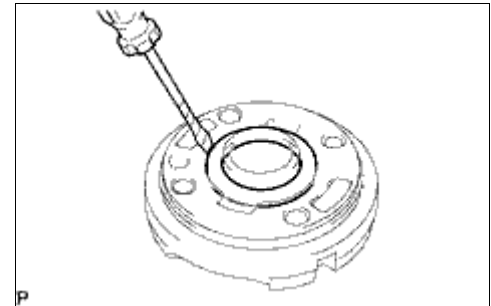


8. REMOVE FRONT VANE PUMP SIDE PLATE

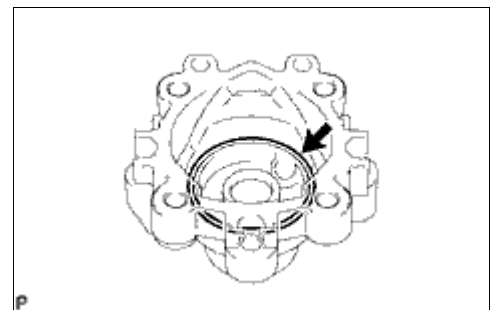
- (a) Remove the front vane pump side plate from the front vane pump housing.



- (b) Using a screwdriver, remove the O-ring from the front vane pump side plate.



- (c) Remove the O-ring from the front vane pump housing.



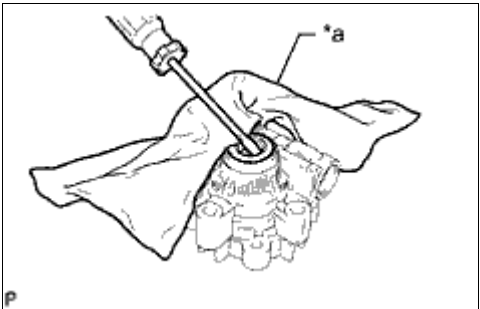
9. REMOVE VANE PUMP HOUSING OIL SEAL

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

Text in Illustration

*a	Cloth
----	-------

NOTICE:
Be careful not to damage the front vane pump housing.



Last Modified: 11-13-2015	6.6 G	Doc ID: RM00000174600NX
Model Year Start: 2016	Model: Tacoma	Prod Date Range: [08/2015 -]
Title: POWER STEERING: VANE PUMP (for 2GR-FKS): INSPECTION; 2016 MY Tacoma [08/2015 -]		

INSPECTION

1. INSPECT OIL CLEARANCE

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

Text in Illustration

*1	Pulley Shaft
*2	Front Vane Pump Housing
*a	Bushing

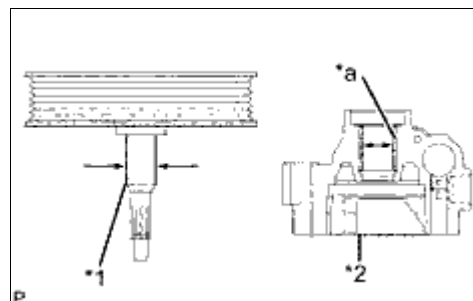
Standard clearance:

0.021 to 0.043 mm (0.0008 to 0.0017 in.)

Maximum clearance:

0.07 mm (0.0028 in.)

If it is greater than the maximum, replace the vane pump assembly.



2. INSPECT VANE PUMP ROTOR AND VANE PUMP PLATE

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

Text in Illustration

*a	Height
*b	Length
*c	Thickness

Minimum height:

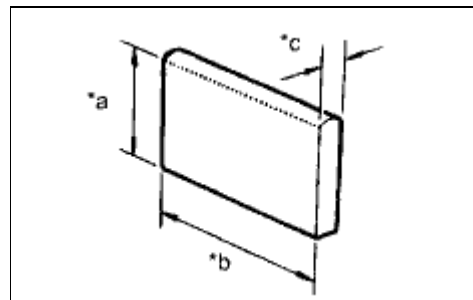
7.7 mm (0.303 in.)

Minimum thickness:

1.408 mm (0.0554 in.)

Minimum length:

11.993 mm (0.4722 in.)



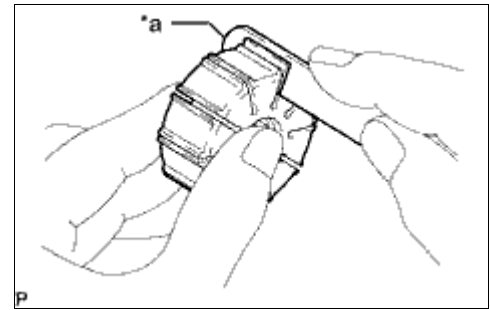
- (b) Using a feeler gauge, measure the clearance between a side face of the vane pump rotor groove and vane pump plate.

Text in Illustration

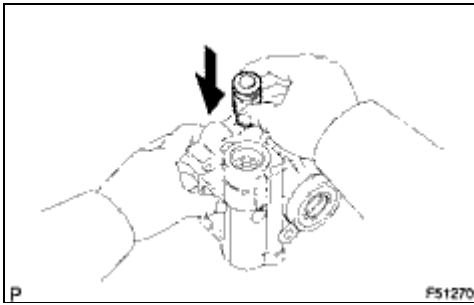
*a	Feeler Gauge
----	--------------

Maximum clearance:
0.025 mm (0.0012 in.)

If it is greater than the maximum, replace the vane pump assembly.



3. INSPECT FLOW CONTROL VALVE



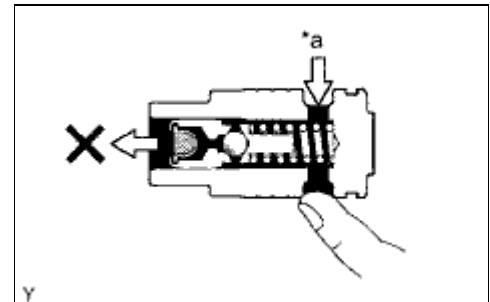
- (a) Coat the flow control valve with power steering fluid and check that it falls smoothly into the flow control valve hole under its own weight.

- (b) Check the flow control valve for leakage. Close one of the holes and apply compressed air of 392 to 490 kPa (4.0 to 5.0 kgf/cm², 57 to 71 psi) to the hole on the opposite side. Confirm that the air does not flow out of the end holes.

Text in Illustration

*a	Compressed Air
----	----------------

If necessary, replace the vane pump assembly.



4. INSPECT COMPRESSION SPRING

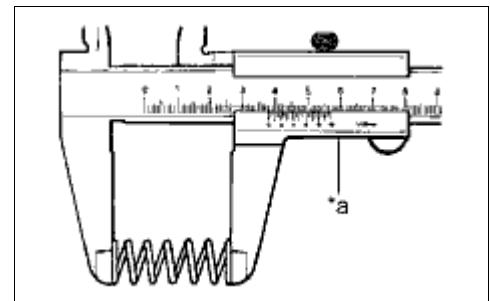
- (a) Using a vernier caliper, measure the free length of the spring.

Text in Illustration

*a	Vernier Caliper
----	-----------------

Minimum free length:
36.9 mm (1.453 in.)

If it is not within the specification, replace the vane pump assembly.



5. INSPECT PRESSURE PORT UNION SUB-ASSEMBLY

(a) If the union seat in the pressure port union sub-assembly is badly damaged, it could cause fluid leakage, so replace the vane pump assembly.



Last Modified: 11-13-2015	6.6 A	Doc ID: RM00000172U000X
Model Year Start: 2016	Model: Tacoma	Prod Date Range: [08/2015 -]
Title: POWER STEERING: VANE PUMP (for 2GR-FKS): INSTALLATION; 2016 MY Tacoma [08/2015 -]		

INSTALLATION

1. INSTALL VANE PUMP ASSEMBLY

- (a) Install the vane pump assembly with the 2 bolts.

Torque:

21 N·m {214 kgf·cm, 15ft·lbf}

- (b) Connect the ground wire with the bolt.

Torque:

8.5 N·m {87 kgf·cm, 75in·lbf}

2. CONNECT PRESSURE FEED TUBE ASSEMBLY

- (a) Install a new gasket to the pressure feed tube assembly.
(b) Connect the pressure feed tube assembly with the union bolt.

Torque:

50 N·m {510 kgf·cm, 37ft·lbf}

- (c) Connect the oil pressure switch connector.

NOTICE:

Make sure that no oil adheres to the connector.

3. CONNECT NO. 1 OIL RESERVOIR TO PUMP HOSE

- (a) Connect the No. 1 oil reservoir to pump hose and slide the clip to secure it.

4. INSTALL FRONT FENDER APRON UPPER SEAL RH INFO

5. INSTALL FAN AND GENERATOR V BELT INFO

6. ADD POWER STEERING FLUID

7. BLEED POWER STEERING FLUID INFO

8. INSPECT FOR POWER STEERING FLUID LEAK

9. INSTALL NO. 1 ENGINE UNDER COVER SUB-ASSEMBLY

Torque:

30 N·m {306 kgf·cm, 22ft·lbf}

10. INSTALL NO. 2 ENGINE UNDER COVER SUB-ASSEMBLY (w/ Off Road Package)

Torque:

30 N·m {306 kgf·cm, 22ft·lbf}



Last Modified: 11-13-2015	6.6 A	Doc ID: RM00000172Y00MX
Model Year Start: 2016	Model: Tacoma	Prod Date Range: [08/2015 -]
Title: POWER STEERING: VANE PUMP (for 2GR-FKS): REASSEMBLY; 2016 MY Tacoma [08/2015 -]		

REASSEMBLY

NOTICE:

When installing, coat the parts indicated by the arrows with power steering fluid [INFO](#) .

1. INSTALL VANE PUMP HOUSING OIL SEAL

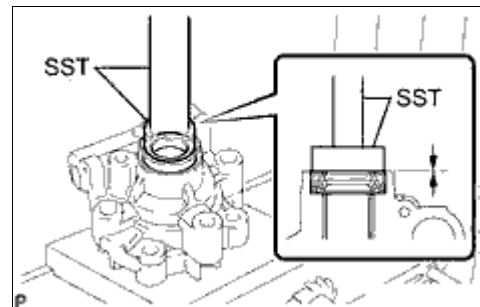
- Coat a new vane pump housing oil seal lip with power steering fluid.
- Using SST and a press, install a new oil seal.

SST: 09950-60010

09951-00280

SST: 09950-70010

09951-07100



NOTICE:

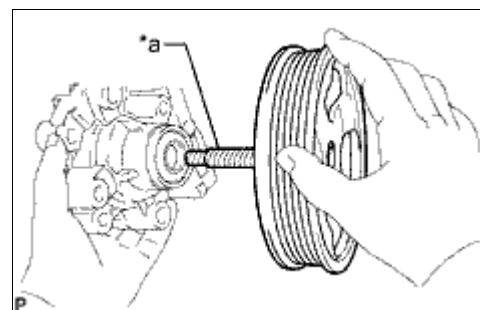
Make sure that the oil seal is installed facing in the correct direction.

2. INSTALL PULLEY SHAFT SUB-ASSEMBLY

- Coat the bushing inner surface of the front vane pump housing with power steering fluid.

Text in Illustration

*a	Protective Tape
----	-----------------



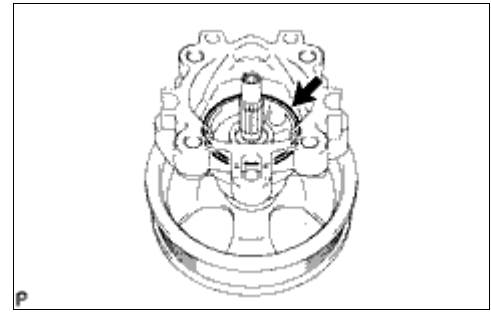
- Gradually insert the pulley shaft sub-assembly.

NOTICE:

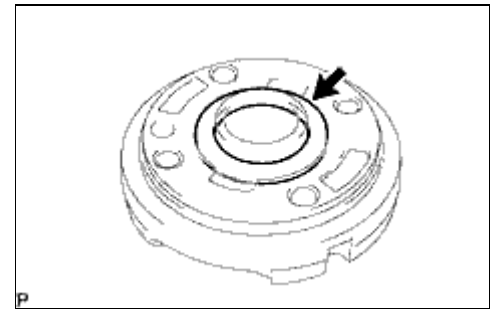
- Do not damage the vane pump housing oil seal lip in the front vane pump housing.
- Wrap protective tape around the spline of the pulley shaft sub-assembly in order to prevent damage to the oil seal.

3. INSTALL FRONT VANE PUMP SIDE PLATE

- (a) Coat a new O-ring with power steering fluid and install it onto the front vane pump housing.



- (b) Coat a new O-ring with power steering fluid and install it onto the front vane pump side plate.



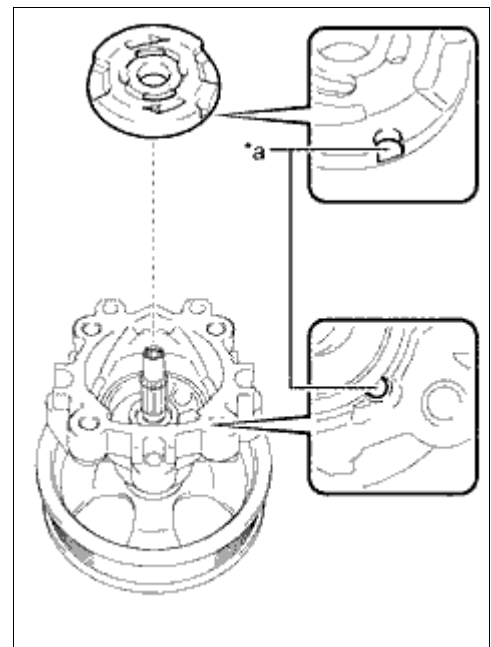
- (c) Align the notch of the front vane pump side plate with the notch of the front vane pump housing and install the vane pump side plate.

Text in Illustration

*a	Align
----	-------

NOTICE:

Make sure that the front vane pump side plate is installed facing the correct direction.

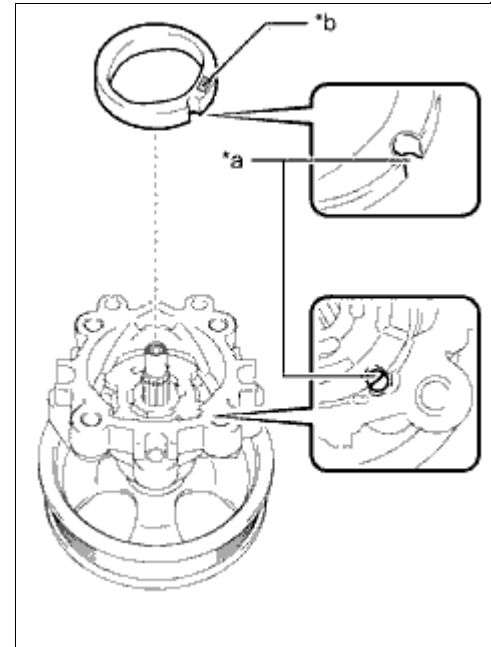


4. INSTALL VANE PUMP CAM RING

- (a) Align the notch of the vane pump cam ring with the notch of the vane pump side plate and install the vane pump cam ring with the inscribed mark facing upward.

Text in Illustration

*a	Align
*b	Inscribed Mark

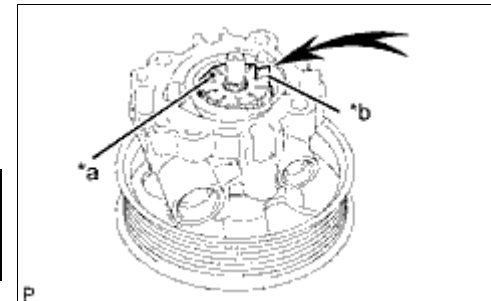


5. INSTALL VANE PUMP ROTOR

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

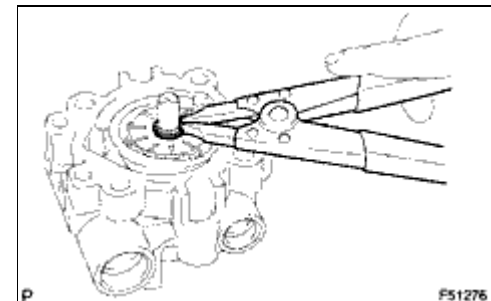
Text in Illustration

*a	Inscribed Mark
*b	Round End



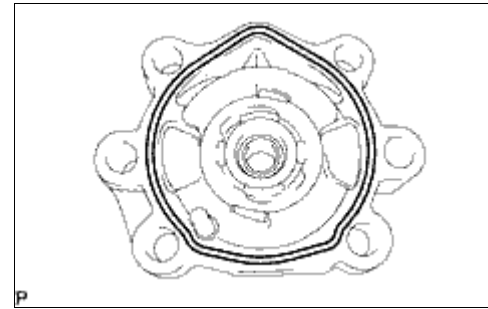
- (b) Coat the 10 vane plates with power steering fluid.
(c) Install the vane plates with the round ends facing outward.

- (d) Using a snap ring expander, install a new snap ring onto the pulley shaft.



6. INSTALL REAR VANE PUMP HOUSING

- (a) Coat a new O-ring with power steering fluid and install it onto the rear vane pump housing.



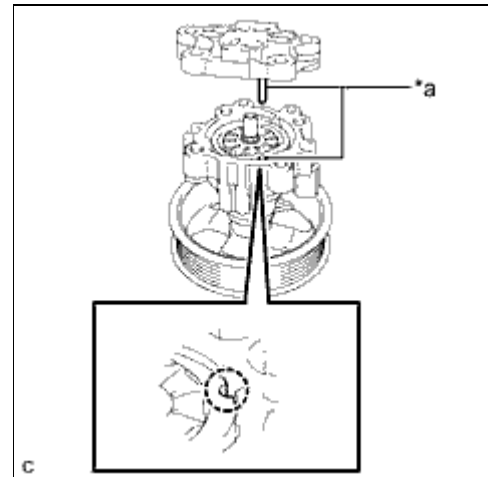
- (b) Align the straight pin of the rear vane pump housing with the notches of the vane pump cam ring, front vane pump side plate and front vane pump housing.

Text in Illustration

*a	Align
----	-------

NOTICE:

Make sure that the O-ring is not protruding from anywhere when installing the rear vane pump housing.



- (c) Install the rear vane pump housing with the 4 bolts.

Torque:

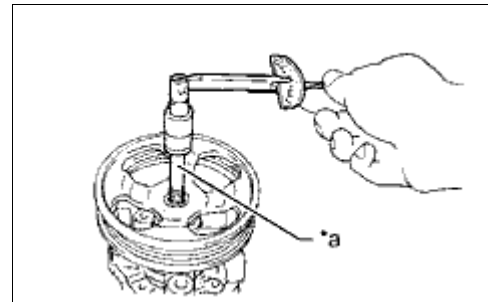
22 N·m {224 kgf·cm, 16ft·lbf}

7. INSPECT PRELOAD

- (a) Check that the pump rotates smoothly without making any abnormal noises.

Text in Illustration

*a	Service Bolt
----	--------------



- (b) Provisionally install the service bolt.

Recommended service bolt:

Thread diameter

10 mm (0.3937 in.)

Thread pitch

1.25 mm (0.0492 in.)

Bolt length

50 mm (1.9685 in.)

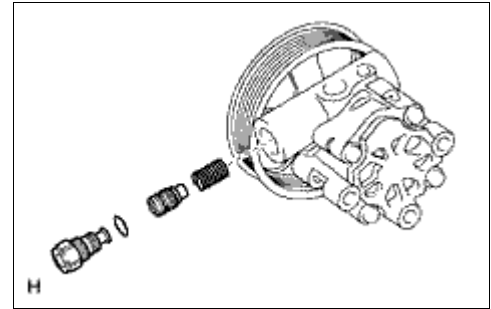
- (c) Using a torque wrench, check the pump rotating torque.

Torque:

0.27 N·m {2.8 kgf·cm, 2.4in·lbf}

8. INSTALL FLOW CONTROL VALVE ASSEMBLY

- (a) Coat the compression spring and flow control valve assembly with power steering fluid.



- (b) Install the compression spring and flow control valve assembly.
(c) Coat a new O-ring with power steering fluid and install it onto the pressure port union.
(d) Install the pressure port union.

Torque:

69 N·m {704 kgf·cm, 51ft·lbf}

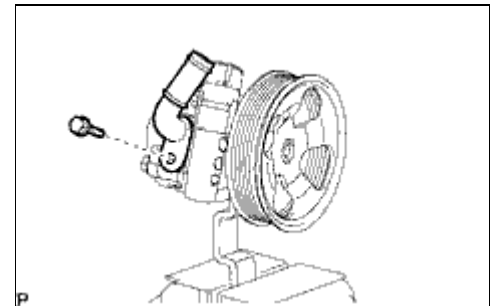
9. INSTALL POWER STEERING SUCTION PORT UNION

- (a) Coat a new O-ring with power steering fluid, and install it onto the suction port union.

- (b) Install the suction port union with the bolt.

Torque:

12 N·m {122 kgf·cm, 9ft·lbf}



Last Modified: 11-13-2015	6.6 A	Doc ID: RM00000172W000X
Model Year Start: 2016	Model: Tacoma	Prod Date Range: [08/2015 -]
Title: POWER STEERING: VANE PUMP (for 2GR-FKS): REMOVAL; 2016 MY Tacoma [08/2015 -]		

REMOVAL

1. REMOVE NO. 2 ENGINE UNDER COVER SUB-ASSEMBLY (w/ Off Road Package)

2. REMOVE NO. 1 ENGINE UNDER COVER SUB-ASSEMBLY

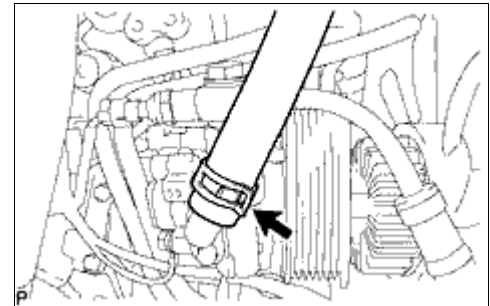
3. REMOVE FAN AND GENERATOR V BELT [INFO](#)

4. DRAIN POWER STEERING FLUID

5. REMOVE FRONT FENDER APRON UPPER SEAL RH [INFO](#)

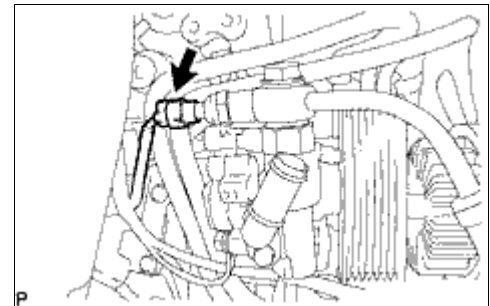
6. DISCONNECT NO. 1 OIL RESERVOIR TO PUMP HOSE

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

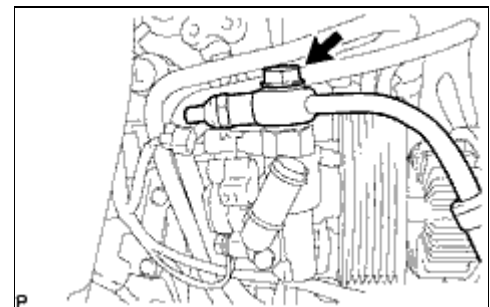


7. DISCONNECT PRESSURE FEED TUBE ASSEMBLY

- (a) Disconnect the oil pressure switch connector.



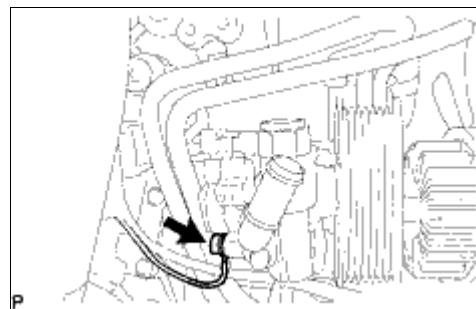
- (b) Remove the union bolt to disconnect the pressure feed tube assembly.



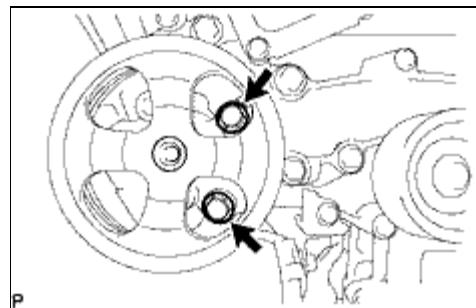
- (c) Remove the gasket from the pressure feed tube assembly.

8. REMOVE VANE PUMP ASSEMBLY

(a) Remove the bolt to disconnect the ground wire.



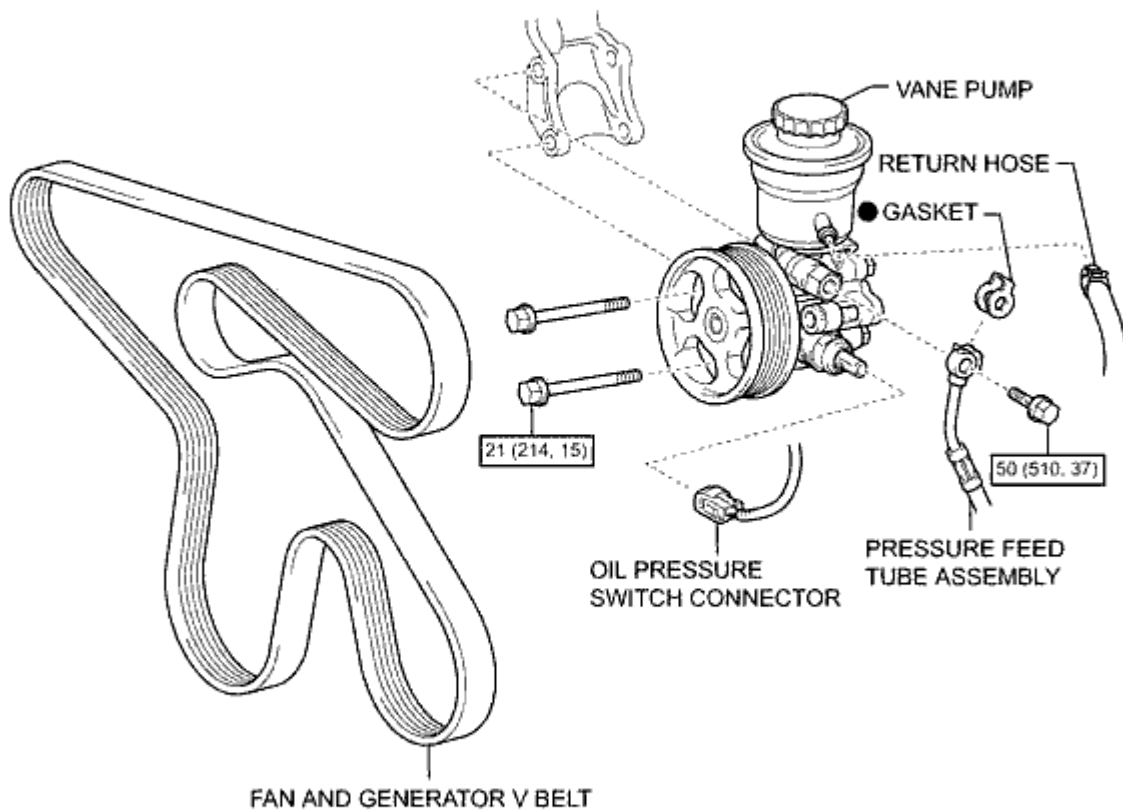
(b) Remove the 2 bolts and vane pump assembly.



Last Modified: 11-13-2015	6.6 K	Doc ID: RM00000172Q00AX
Model Year Start: 2016	Model: Tacoma	Prod Date Range: [08/2015 -]
Title: POWER STEERING: VANE PUMP (for 2TR-FE): COMPONENTS; 2016 MY Tacoma [08/2015 -]		

COMPONENTS

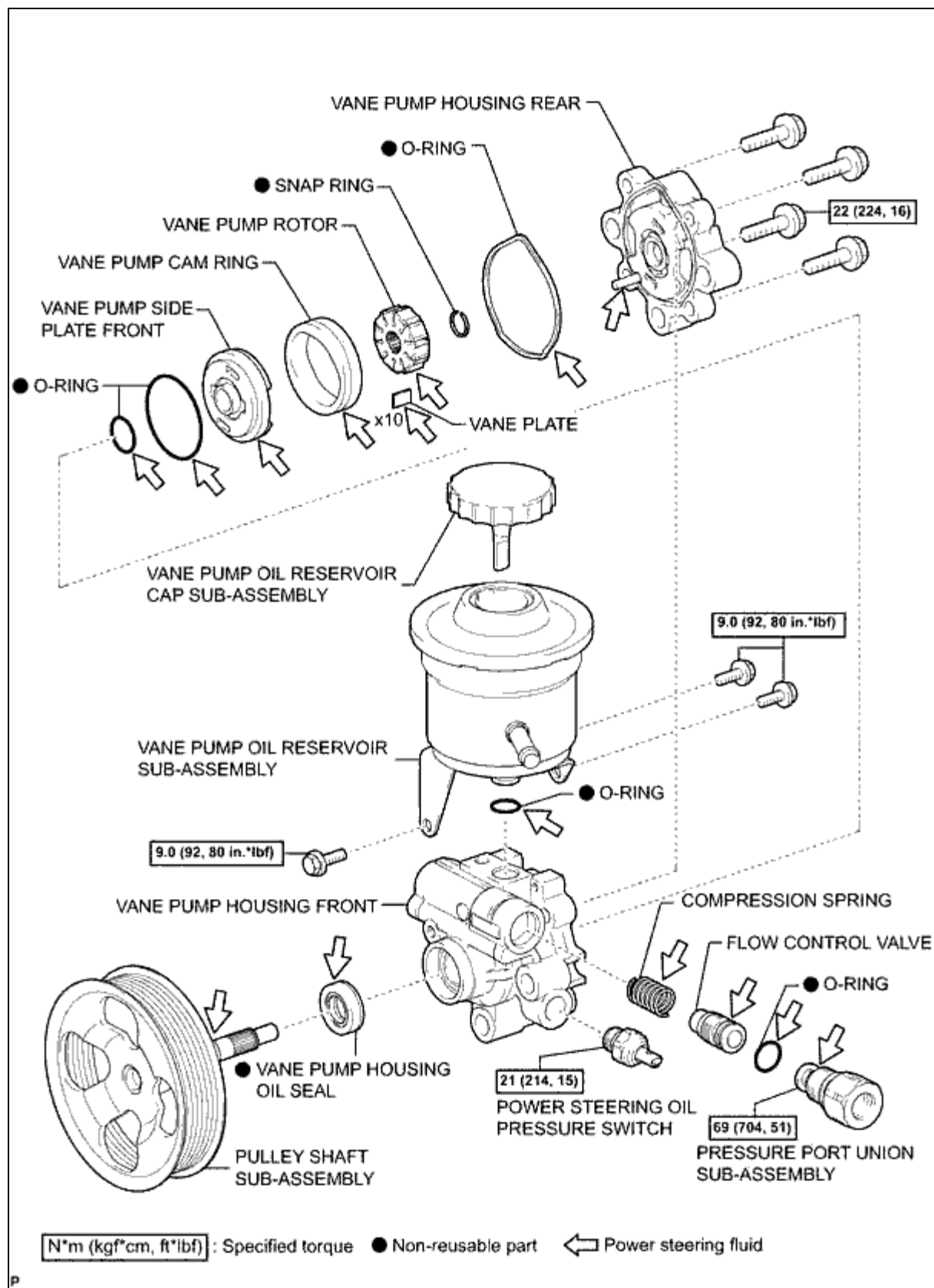
ILLUSTRATION



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

● Non-reusable part

ILLUSTRATION



Last Modified: 11-13-2015	6.6 A	Doc ID: RM00000172S00AX
Model Year Start: 2016	Model: Tacoma	Prod Date Range: [08/2015 -]
Title: POWER STEERING: VANE PUMP (for 2TR-FE): DISASSEMBLY; 2016 MY Tacoma [08/2015 -]		

DISASSEMBLY

1. FIX VANE PUMP

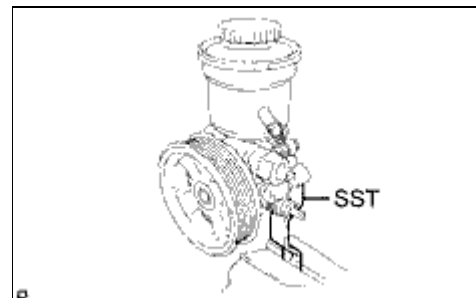
- (a) Using SST, fix the vane pump assembly in a vise.

SST: 09630-00014

09631-00132

NOTICE:

When using a vise, do not overtighten it.



2. REMOVE VANE PUMP OIL RESERVOIR SUB-ASSEMBLY

- (a) Remove the 3 bolts and vane pump oil reservoir.
 (b) Remove the O-ring from the vane pump oil reservoir.

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 compression spring.

4. REMOVE POWER STEERING OIL PRESSURE SWITCH

NOTICE:

Be careful not to drop or badly damage the oil pressure switch. If damaged, replace it with a new one.

5. REMOVE VANE PUMP HOUSING REAR

- (a) Remove the 4 bolts and vane pump housing rear from the vane pump housing front.
 (b) Remove the O-ring from the vane pump housing front.

6. REMOVE PULLEY SHAFT SUB-ASSEMBLY

NOTICE:

Be careful not to drop or badly damage the pulley shaft. If damaged, replace it with a new one.

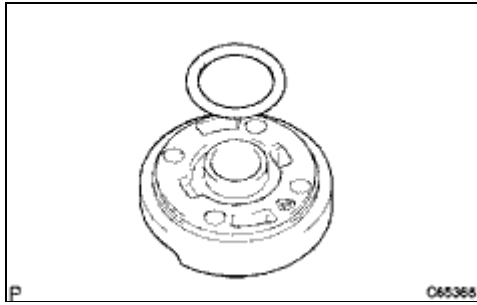
- (a) Using a screwdriver, remove the snap ring from the pulley shaft.
 (b) Remove the pulley shaft.

7. REMOVE VANE PUMP ROTOR

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

8. REMOVE VANE PUMP CAM RING

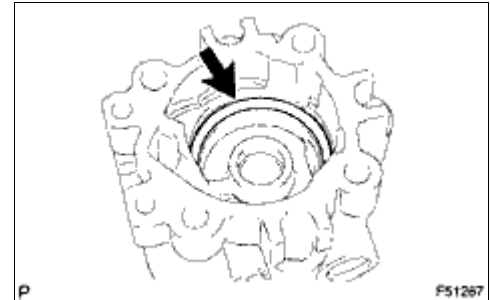
9. REMOVE VANE PUMP SIDE PLATE FRONT



(a) Remove the side plate from the vane pump housing front.

(b) Remove the O-ring from the side plate.

(c) Remove the O-ring from the vane pump housing front.

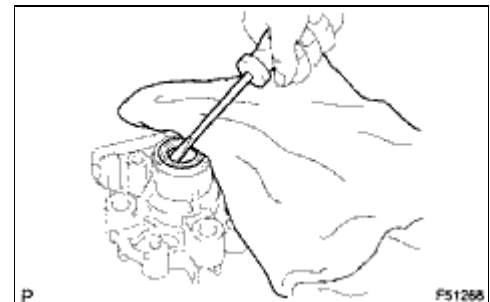


10. REMOVE VANE PUMP HOUSING OIL SEAL

(a) Using screwdriver, remove the oil seal.

NOTICE:

Be careful not to damage the vane pump housing front.



Last Modified: 11-13-2015	6.6 G	Doc ID: RM00000174500AX
Model Year Start: 2016	Model: Tacoma	Prod Date Range: [08/2015 -]
Title: POWER STEERING: VANE PUMP (for 2TR-FE): INSPECTION; 2016 MY Tacoma [08/2015 -]		

INSPECTION

1. INSPECT OIL CLEARANCE

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

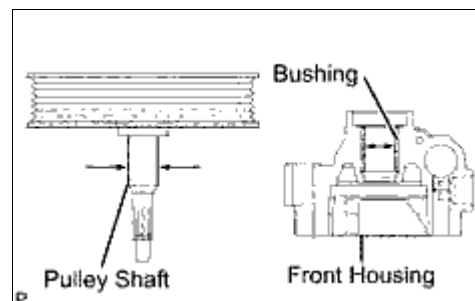
Standard clearance:

0.021 to 0.043 mm (0.0008 to 0.0017 in.)

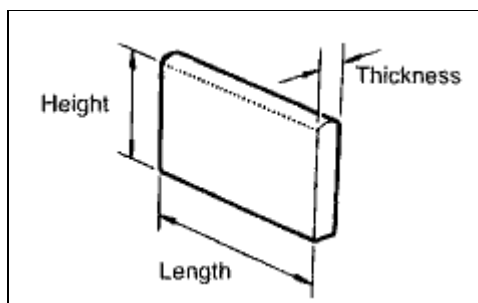
Maximum clearance:

0.07 mm (0.0028 in.)

If it is greater than the maximum, replace the vane pump assembly.



2. INSPECT VANE PUMP ROTOR AND VANE PUMP PLATE



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

Minimum height:

7.7 mm (0.303 in.)

Minimum thickness:

1.408 mm (0.0554 in.)

Minimum length:

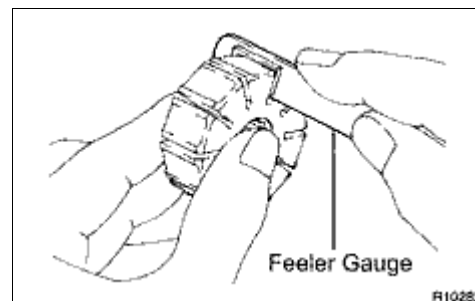
11.993 mm (0.4722 in.)

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

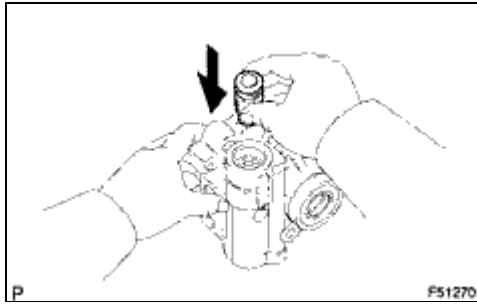
Maximum clearance:

0.025 mm (0.0012 in.)

If it is greater than the maximum, replace the vane pump assembly.



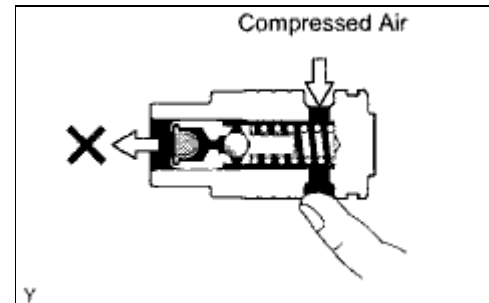
3. INSPECT FLOW CONTROL VALVE



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

- (b) Check the flow control valve for leakage. Close one of the holes and apply compressed air of 392 to 490 kPa (4 to 5 kgf/cm², 57 to 71 psi) to the hole on the opposite side. Confirm that the air does not flow out of the end hole.

If necessary, replace the vane pump assembly.

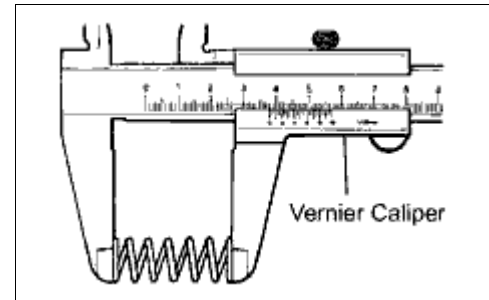


4. INSPECT COMPRESSION SPRING

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

Minimum free length:
36.9 mm (1.453 in.)

If it is not within the specification, replace the vane pump assembly.



5. INSPECT PRESSURE PORT UNION SUB-ASSEMBLY

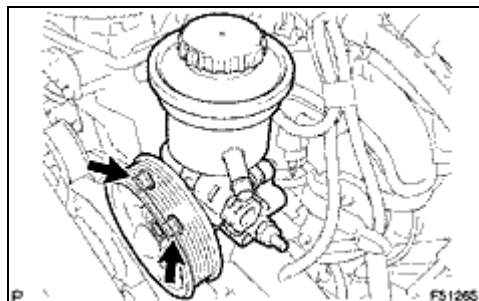
- (a) If the union seat in the pressure port union is badly damaged, it could cause fluid leakage, so replace the vane pump assembly.



Last Modified: 11-13-2015	6.6 A	Doc ID: RM00000172P00AX
Model Year Start: 2016	Model: Tacoma	Prod Date Range: [08/2015 -]
Title: POWER STEERING: VANE PUMP (for 2TR-FE): INSTALLATION; 2016 MY Tacoma [08/2015 -]		

INSTALLATION

1. INSTALL VANE PUMP



(a) Install the vane pump assembly with the 2 bolts.

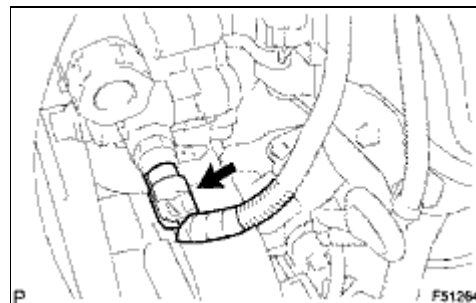
Torque:

21 N·m {214 kgf·cm, 15ft·lbf}

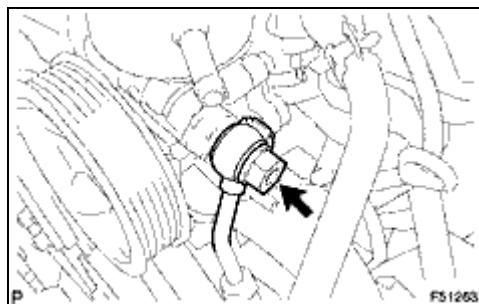
(b) Connect the oil pressure switch connector.

NOTICE:

Make sure that no oil adheres to the connector.



2. CONNECT PRESSURE FEED TUBE ASSEMBLY



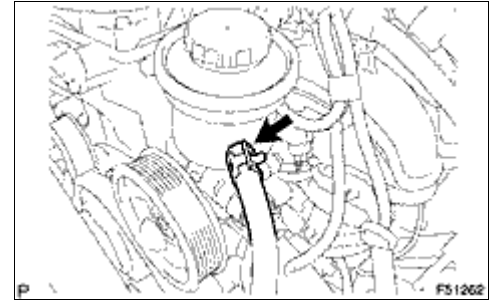
(a) Install a new gasket onto the pressure feed tube.

(b) Install the pressure feed tube with the union bolt.

Torque:

50 N·m {510 kgf·cm, 37ft·lbf}

(c) Connect the return hose with the clip.



3. INSTALL FAN AND GENERATOR V BELT INFO

4. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

Torque:

5.4 N·m {55 kgf·cm, 48in·lbf}

INFO

5. ADD POWER STEERING FLUID

6. BLEED POWER STEERING FLUID INFO

7. CHECK POWER STEERING FLUID LEAKAGE

8. INSTALL NO. 1 ENGINE UNDER COVER SUB-ASSEMBLY

Torque:

30 N·m {306 kgf·cm, 22ft·lbf}



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REASSEMBLY

NOTICE:

When installing, coat the parts indicated by the arrows with power steering fluid [INFO](#) .

1. INSTALL VANE PUMP HOUSING OIL SEAL

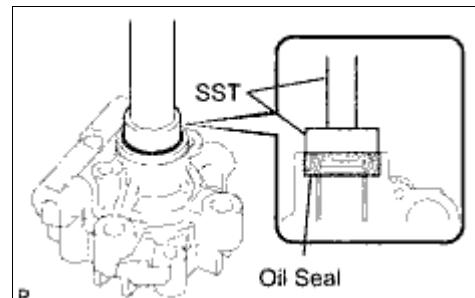
- Coat a new vane pump housing oil seal lip with power steering fluid.
- Using SST and a press, install a new oil seal.

SST: 09950-60010

09951-00280

SST: 09950-70010

09951-07100



NOTICE:

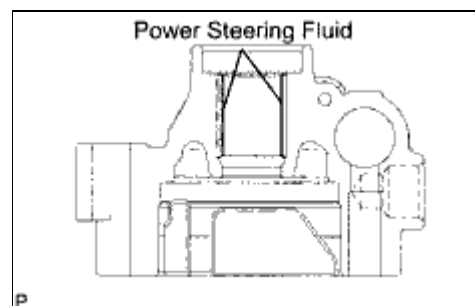
Make sure that the oil seal is installed facing in the correct direction.

2. INSTALL PULLEY SHAFT SUB-ASSEMBLY

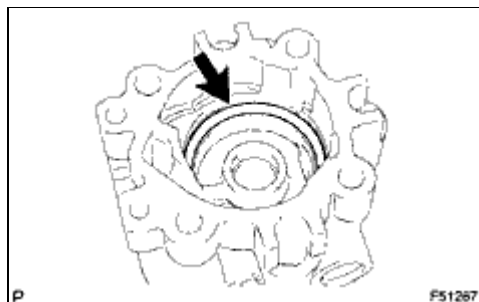
- Coat the bushing inner surface of the vane pump housing front with power steering fluid.
- Gradually insert the vane pump shaft.

NOTICE:

Do not damage the vane pump housing oil seal lip in the vane pump housing front.

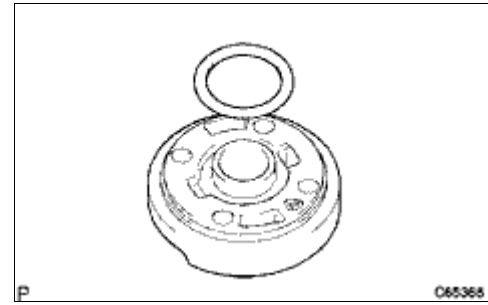


3. INSTALL VANE PUMP SIDE PLATE FRONT



- Coat a new O-ring with power steering fluid and install it onto the vane pump housing front.

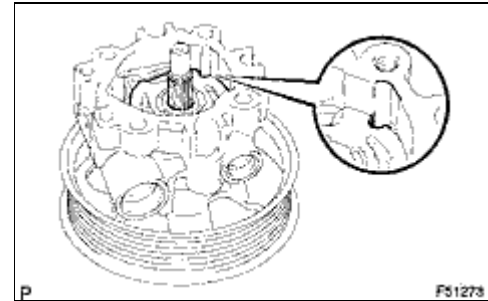
- (b) Coat a new O-ring with power steering fluid and install it onto the side plate.



- (c) Align the dent of the side plate with that of the vane pump housing front and install the side plate.

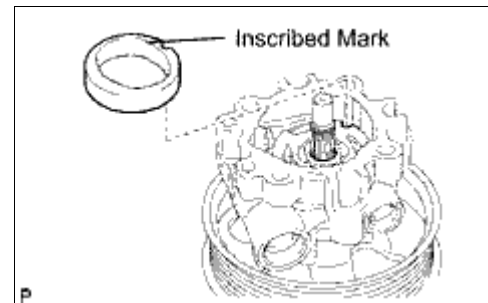
NOTICE:

Make sure that the side plate is installed facing the correct direction.

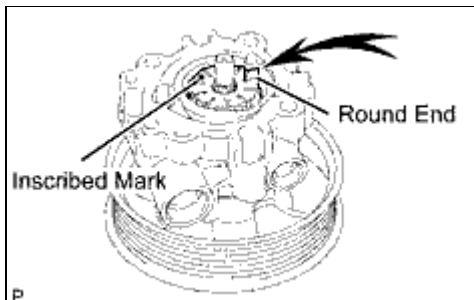


4. INSTALL VANE PUMP CAM RING

- (a) Align the dent of the cam ring with that of the side plate and install the cam ring with the inscribed mark facing outward.

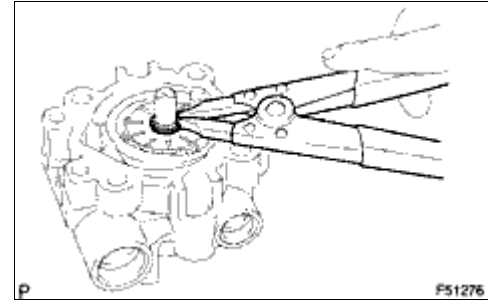


5. INSTALL VANE PUMP ROTOR



- (a) Install the vane pump rotor with the inscribed mark facing outward.
- (b) Coat the 10 vane plates with power steering fluid.
- (c) Install the vane plates with the round ends facing outward.

- (d) Using a snap ring expander, install a new snap ring onto the pulley shaft.



6. INSTALL VANE PUMP HOUSING REAR

- (a) Coat a new O-ring with power steering fluid and install it onto the vane pump housing rear.
- (b) Align the straight pin of the vane pump housing rear with the dents of the cam ring, side plate and vane pump housing front, and install the vane pump housing rear with the 4 bolts.

Torque:

22 N·m {224 kgf·cm, 16ft·lbf}

7. INSPECT PRELOAD

- (a) Check that the pump rotates smoothly without making any abnormal noises.
- (b) Provisionally install the service bolt.

Recommended service bolt:

Thread diameter

10 mm (0.3937 in.)

Thread pitch

1.25 mm (0.0492 in.)

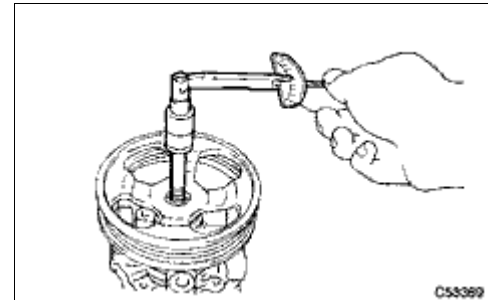
Bolt length

50 mm (1.9685 in.)

- (c) Using a torque wrench, check the pump rotating torque.

Torque:

0.27 N·m {2.8 kgf·cm, 2.4in·lbf} or less



8. INSTALL POWER STEERING OIL PRESSURE SWITCH

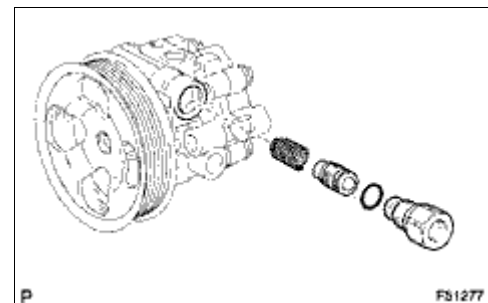
- (a) Coat the O-ring with power steering fluid and install it onto the power steering oil pressure switch.
- (b) Install the power steering oil pressure switch onto the vane pump assembly.

Torque:

21 N·m {214 kgf·cm, 15ft·lbf}

9. INSTALL FLOW CONTROL VALVE

- (a) Coat the compression spring and flow control valve with power steering fluid.
- (b) Install the compression spring and flow control valve.
- (c) Coat a new O-ring with power steering fluid and install it onto the pressure port union.
- (d) Install the pressure port union.



Torque:

69 N·m {704 kgf·cm, 51ft·lbf}

10. INSTALL VANE PUMP OIL RESERVOIR SUB-ASSEMBLY

- (a) Coat a new O-ring with power steering fluid, and install it onto the vane pump oil reservoir.
- (b) Install the vane pump oil reservoir with the 3 bolts.

Torque:

9.0 N·m {92 kgf·cm, 80in·lbf}



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Model Year Start: 2016	Model: Tacoma	Prod Date Range: [08/2015 -]
Title: POWER STEERING: VANE PUMP (for 2TR-FE): REMOVAL; 2016 MY Tacoma [08/2015 -]		

REMOVAL

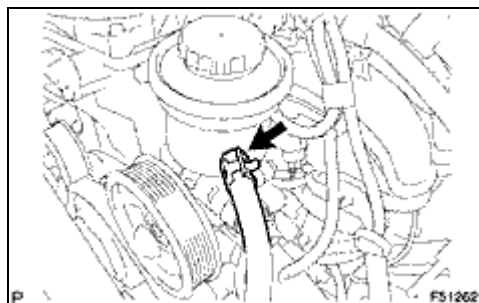
1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

2. REMOVE NO. 1 ENGINE UNDER COVER SUB-ASSEMBLY

3. REMOVE FAN AND GENERATOR V BELT [INFO](#)

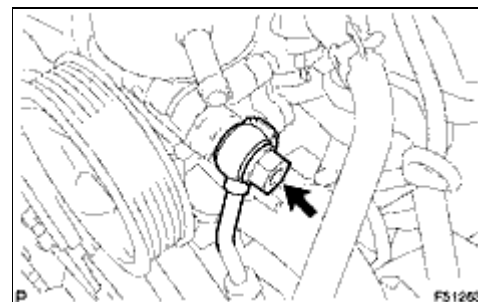
4. DRAIN POWER STEERING FLUID

5. DISCONNECT PRESSURE FEED TUBE ASSEMBLY



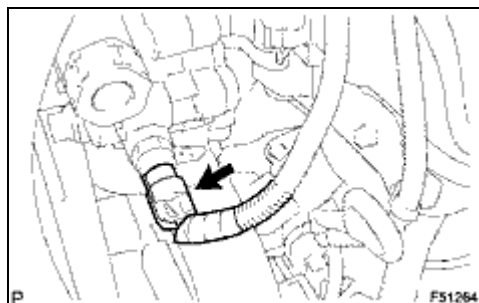
(a) Disengage the clip and disconnect the return hose.

(b) Remove the union bolt, then disconnect the pressure feed tube.



(c) Remove the gasket from the pressure feed tube.

6. REMOVE VANE PUMP



(a) Disconnect the oil pressure switch connector.

(b) Remove the 2 bolts and vane pump assembly.

