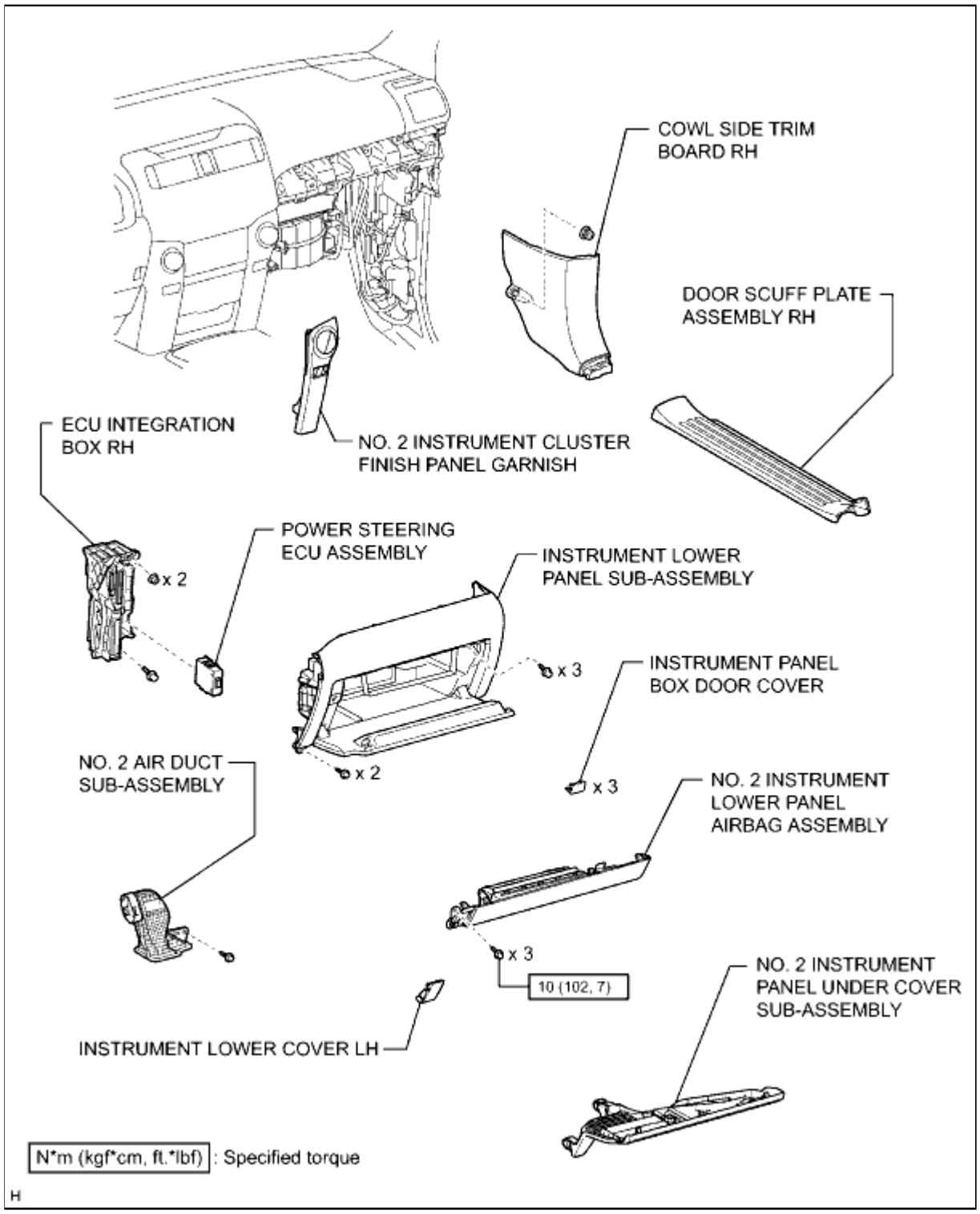
Last Modified: 5-10-2010	6.4 K	**From:** 200908
Model Year: 2010	**Model:** 4Runner	**Doc ID:** RM000003FBZ006X
Title: POWER ASSIST SYSTEMS: POWER STEERING ECU: COMPONENTS (2010 4Runner)		

COMPONENTS

ILLUSTRATION



Last Modified: 5-10-2010	6.4 A	**From:** 200908
Model Year: 2010	**Model:** 4Runner	**Doc ID:** RM000003FC0006X
Title: POWER ASSIST SYSTEMS: POWER STEERING ECU: REMOVAL (2010 4Runner)		

REMOVAL

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to disable the SRS system.

NOTICE:

When disconnecting the cable, some systems need to be initialized after the cable is reconnected INFO .

2. REMOVE DOOR SCUFF PLATE ASSEMBLY RH INFO

3. REMOVE COWL SIDE TRIM BOARD RH INFO

4. REMOVE NO. 2 INSTRUMENT CLUSTER FINISH PANEL GARNISH INFO

5. REMOVE NO. 2 INSTRUMENT PANEL UNDER COVER SUB-ASSEMBLY INFO

6. REMOVE INSTRUMENT LOWER COVER LH INFO

7. REMOVE INSTRUMENT NO. 2 LOWER PANEL AIRBAG ASSEMBLY INFO

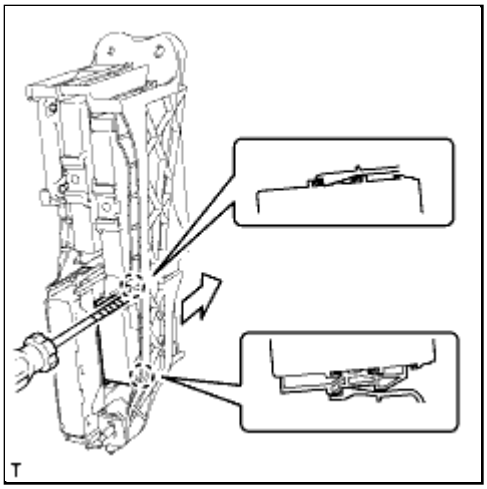
8. REMOVE INSTRUMENT PANEL BOX DOOR COVER INFO

9. REMOVE INSTRUMENT LOWER PANEL SUB-ASSEMBLY INFO

10. REMOVE NO. 2 AIR DUCT SUB-ASSEMBLY INFO

11. REMOVE ECU INTEGRATION BOX RH INFO

12. REMOVE POWER STEERING ECU ASSEMBLY



(a) Using a screwdriver, detach the 2 claws and remove the power steering ECU assembly.

HINT:

Tape the screwdriver tip before use.

Last Modified: 5-10-2010	6.4 A	**From:** 200908
Model Year: 2010	**Model:** 4Runner	**Doc ID:** RM000003FBY006X
Title: POWER ASSIST SYSTEMS: POWER STEERING ECU: INSTALLATION (2010 4Runner)		

INSTALLATION

HINT:

A bolt without a torque specification is shown in the standard bolt chart INFO .

1. INSTALL POWER STEERING ECU ASSEMBLY

(a) Attach the 2 claws to install the power steering ECU assembly.

2. INSTALL ECU INTEGRATION BOX RH INFO

3. INSTALL NO. 2 AIR DUCT SUB-ASSEMBLY INFO

4. INSTALL INSTRUMENT LOWER PANEL SUB-ASSEMBLY INFO

5. INSTALL INSTRUMENT PANEL BOX DOOR COVER INFO

6. INSTALL INSTRUMENT NO. 2 LOWER PANEL AIRBAG ASSEMBLY INFO

7. INSTALL INSTRUMENT LOWER COVER LH INFO

8. INSTALL NO. 2 INSTRUMENT PANEL UNDER COVER SUB-ASSEMBLY INFO

9. INSTALL NO. 2 INSTRUMENT CLUSTER FINISH PANEL GARNISH INFO

10. INSTALL COWL SIDE TRIM BOARD RH INFO

11. INSTALL DOOR SCUFF PLATE ASSEMBLY RH INFO

12. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

NOTICE:

When disconnecting the cable, some systems need to be initialized after the cable is reconnected INFO .

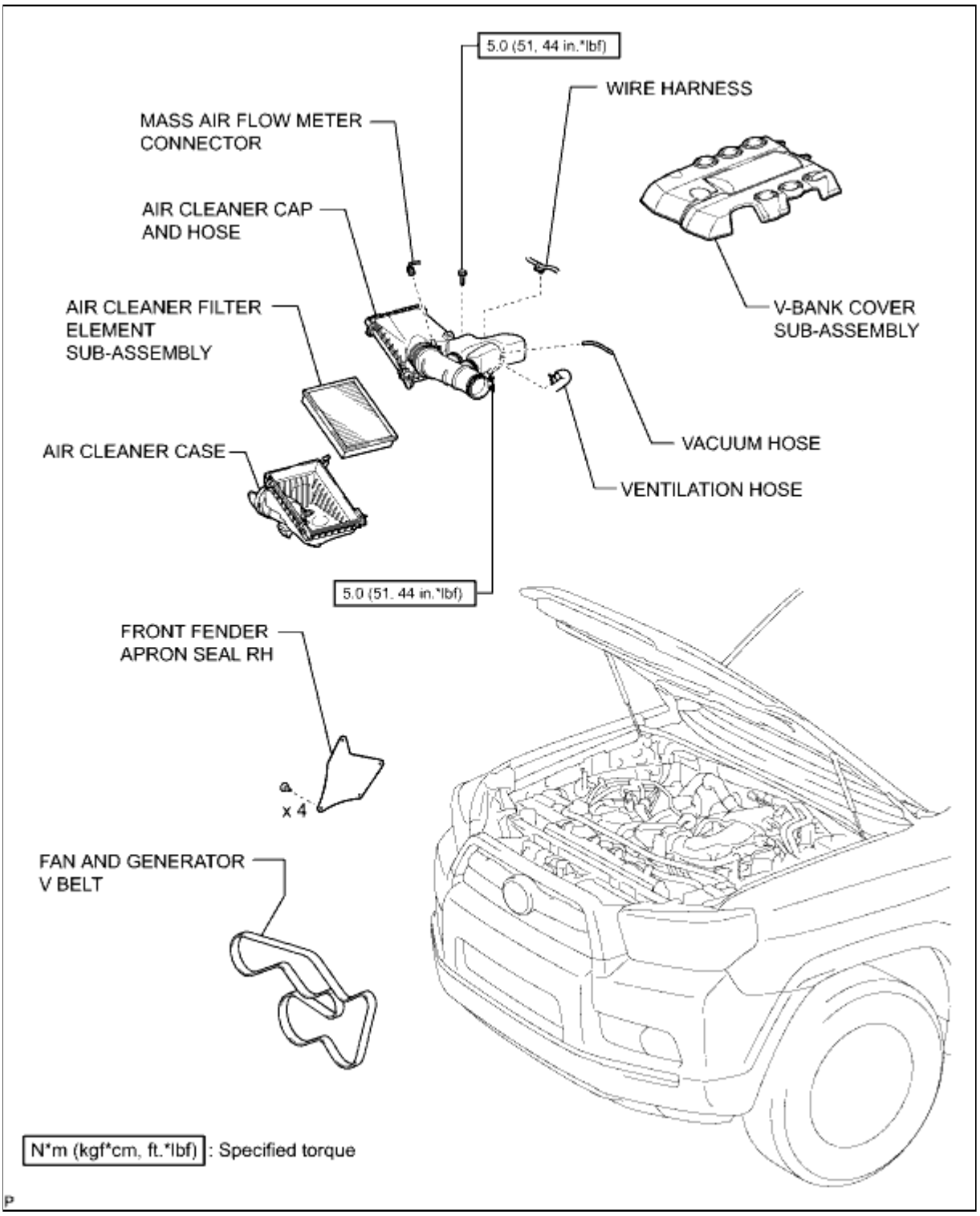
13. CHECK SRS WARNING LIGHT

(a) Check the SRS warning light INFO .

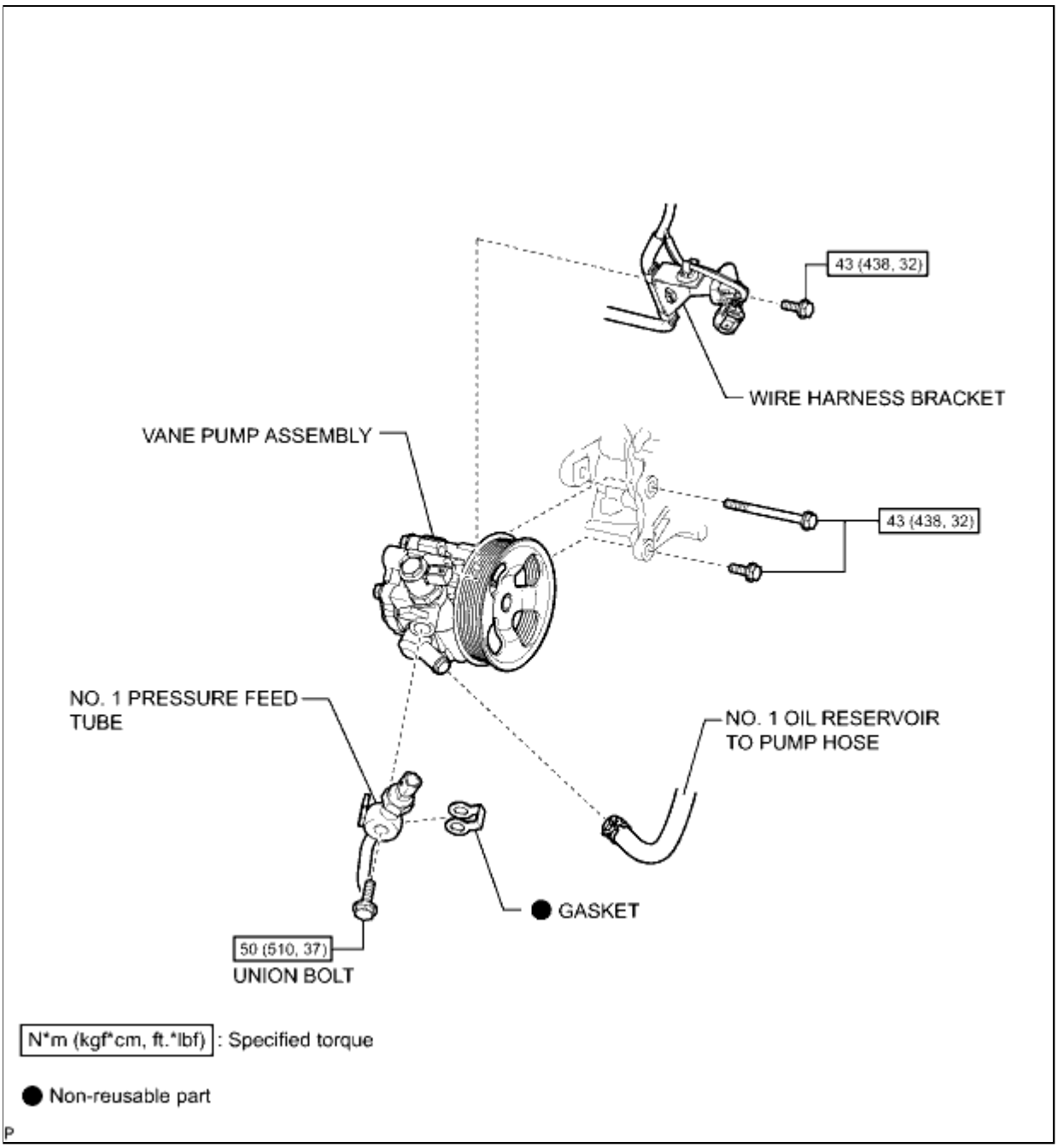
Last Modified: 5-10-2010	6.4 K	**From:** 200908
Model Year: 2010	**Model:** 4Runner	**Doc ID:** RM0000031M8016X
Title: POWER ASSIST SYSTEMS: VANE PUMP (for 1GR-FE): COMPONENTS (2010 4Runner)		

COMPONENTS

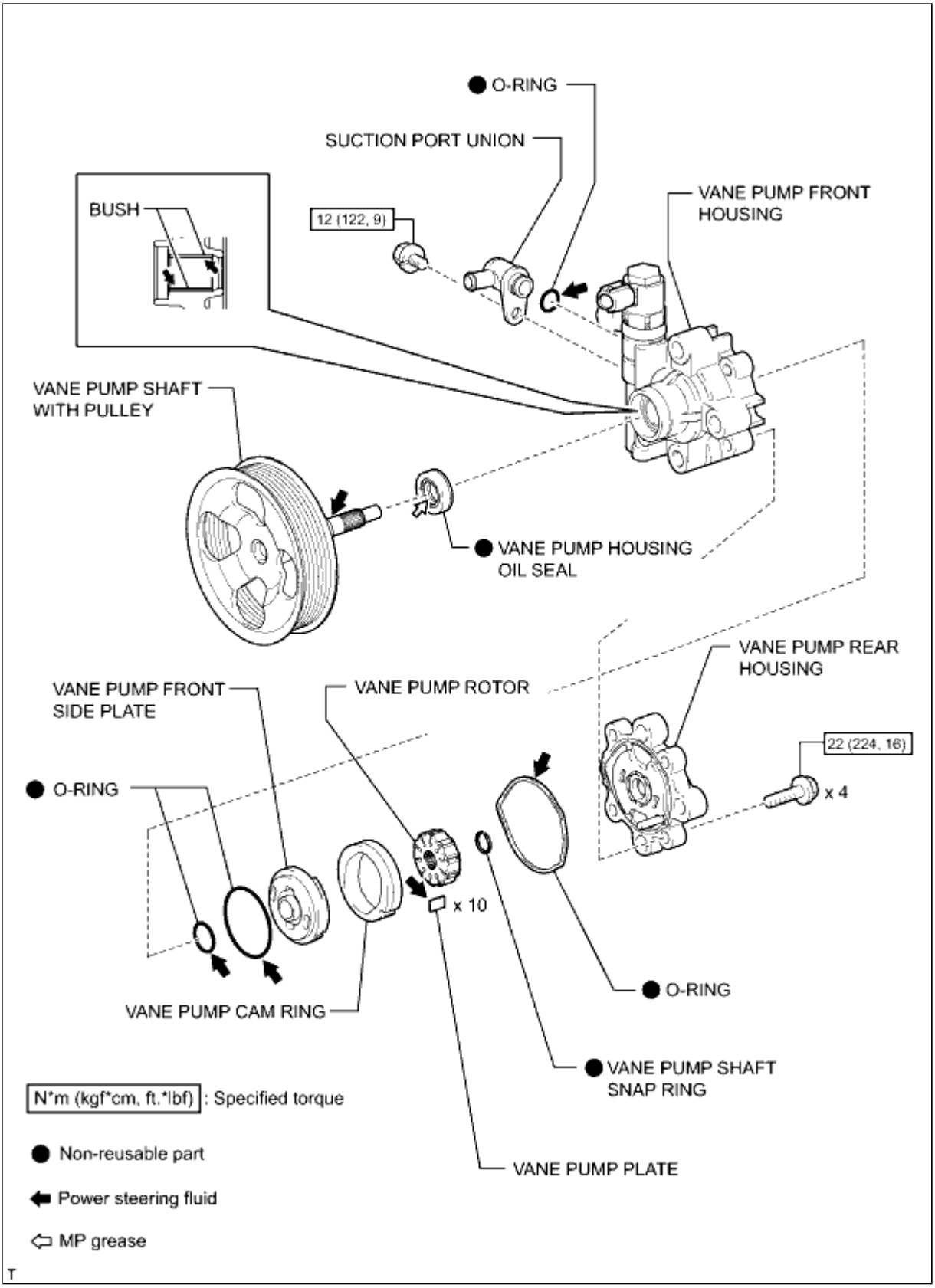
ILLUSTRATION



ILLUSTRATION



ILLUSTRATION



Last Modified: 5-10-2010	6.4 G	**From:** 200908
Model Year: 2010	**Model:** 4Runner	**Doc ID:** RM0000048QK000X
Title: POWER ASSIST SYSTEMS: VANE PUMP (for 1GR-FE): ON-VEHICLE INSPECTION (2010 4Runner)		

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.

2. BLEED AIR FROM 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.

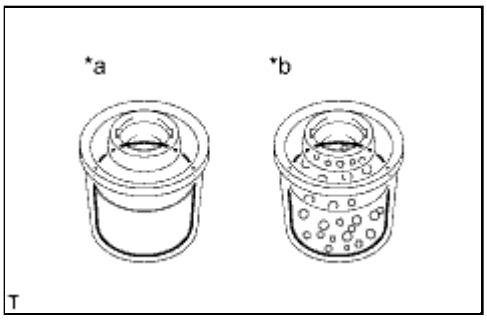
(f) Turn the steering wheel.

(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, and then turn the wheel to the opposite full lock position and keep it there for 2 to 3 seconds.*1

(2) Repeat *1 several times.

(g) Stop the engine.

(h) Check for foaming or emulsification.



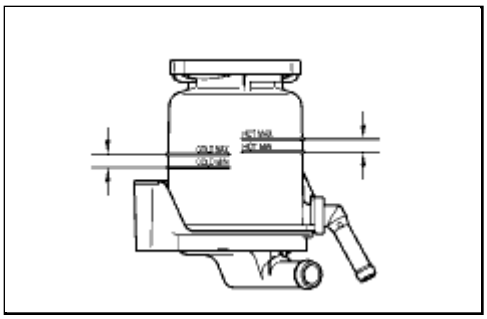
Text in Illustration

*a	Correct
*b	Incorrect

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

(i) Check the fluid level.

3. CHECK POWER STEERING FLUID LEVEL



(a) Keep the vehicle horizontal.

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

If necessary, add fluid.

Fluid:
ATF "DEXRON" II or III, or equivalent

HINT:

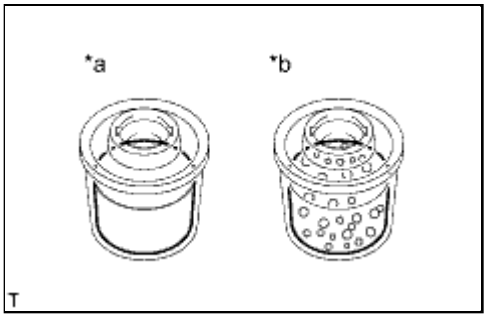
If the fluid is hot (over 40°C (104°F)), make sure that the fluid level is within the HOT range on the reservoir. If the fluid is cold, make sure that it is within the COLD range.

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

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

Fluid temperature:
80°C (176°F)

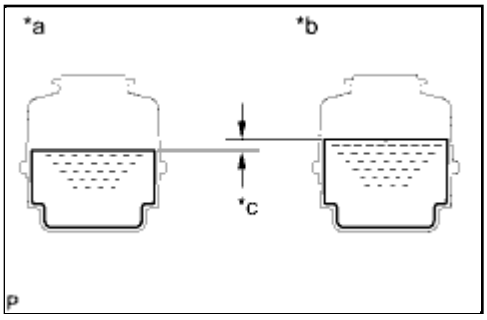
(e) Check for foaming or emulsification.



Text in Illustration

*a	Correct
*b	Incorrect

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



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

Text in Illustration

*a	Engine Idling
*b	Engine Stopped

*c	5 mm or less

(g) Stop the engine.

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

Maximum fluid level rise:
5.0 mm (0.197 in.)

If the fluid level rise is more than the maximum, bleed air from the power steering system.

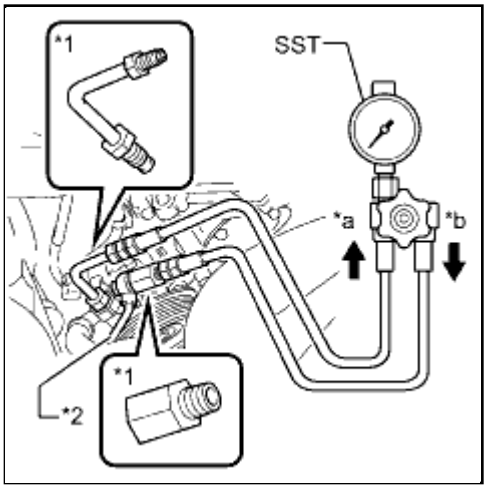
(i) Check the fluid level.

4. CHECK STEERING FLUID PRESSURE

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

(b) Connect SST as shown in the illustration below.

SST: 09950-60010
09951-00280
SST: 09950-70010
09951-07100



Text in Illustration

*1	Attachment
*2	Pressure Feed Tube
*a	In
*b	Out

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

(c) Bleed air from the power steering system.

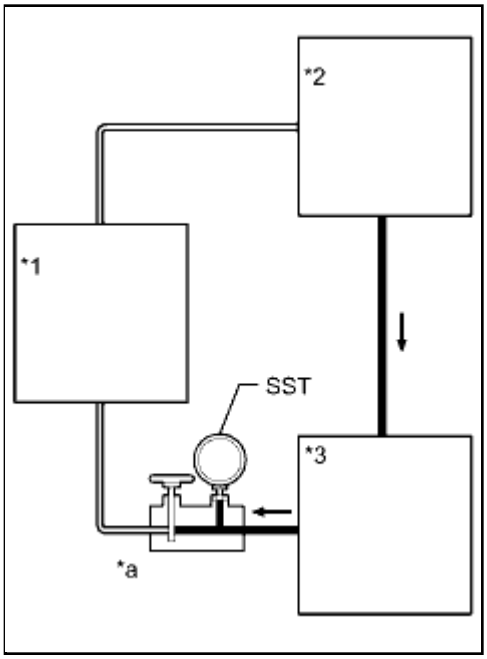
(d) Start the engine and run it at idle.

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

Fluid temperature:
80°C (176°F)

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

Standard fluid pressure:
8300 to 8800 kPa (84.7 to 89.7 kgf/cm^2, 1204 to 1276 psi)



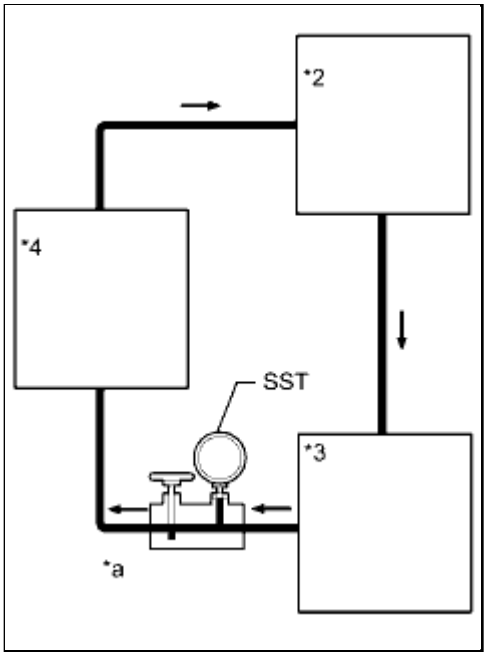
Text in Illustration

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

NOTICE:

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

If the pressure is not within the specified range, check for fluid leaks and replace parts as necessary.



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

Text in Illustration

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

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

Fluid pressure difference :
490 kPa (5.0 kgf/cm^2, 71 psi) or less

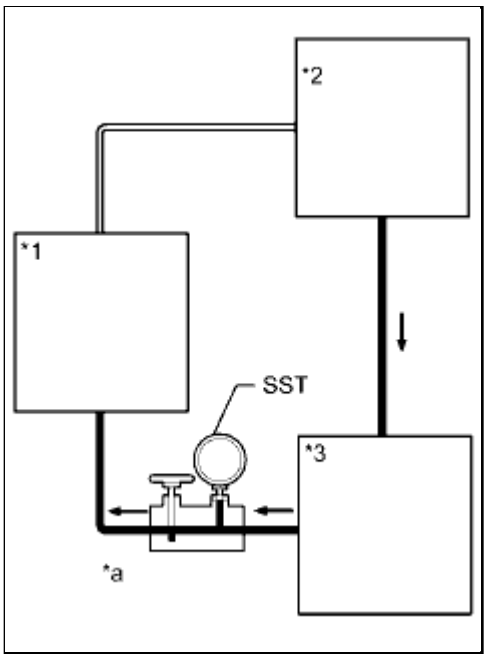
NOTICE:

Do not turn the steering wheel.

If the pressure difference is above the specified range, check for fluid leaks and replace parts as necessary.

(i) With the engine idling and the valve fully open, turn the steering wheel left or right to the full lock position. Observe the reading on SST.

Standard fluid pressure:
8300 to 8800 kPa (84.7 to 89.7 kgf/cm^2, 1204 to 1276 psi)



Text in Illustration

*1	Power Steering Gear (Lock Position)
*2	Power Steering Fluid Reservoir
*3	Power Steering Vane Pump
*a	Valve Open

NOTICE:

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

If the pressure is not within the specified range, check for fluid leaks and replace parts as necessary.

(j) Disconnect SST.

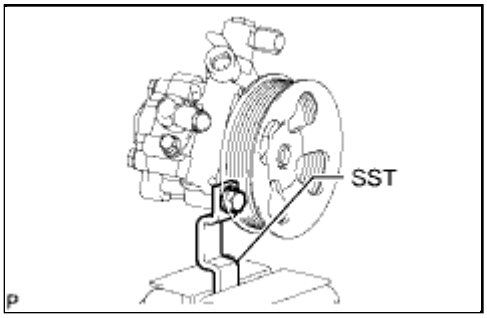
(k) Connect the pressure feed tube to the vane pump.

(l) Bleed air from the power steering system.

Last Modified: 5-10-2010	6.4 A	**From:** 200908
Model Year: 2010	**Model:** 4Runner	**Doc ID:** RM000002H5E018X
Title: POWER ASSIST SYSTEMS: VANE PUMP (for 1GR-FE): DISASSEMBLY (2010 4Runner)		

DISASSEMBLY

1. SECURE VANE PUMP ASSEMBLY

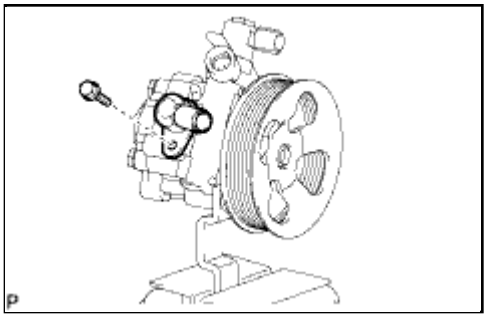


(a) Using SST, secure the vane pump in a vise.

SST: 09630-00014

09631-00132

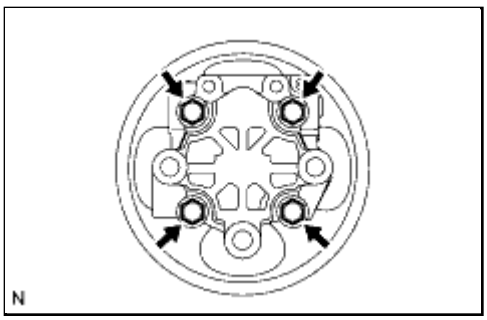
2. REMOVE SUCTION PORT UNION



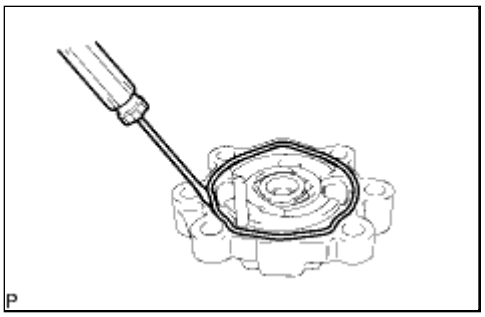
(a) Remove the bolt and suction port union from the vane pump.

(b) Using a screwdriver, remove the O-ring from the suction port union.

3. REMOVE VANE PUMP REAR HOUSING

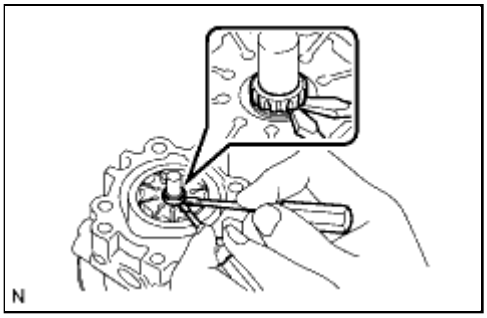


(a) Remove the 4 bolts and vane pump rear housing from the vane pump front housing.



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

4. REMOVE VANE PUMP SHAFT WITH PULLEY



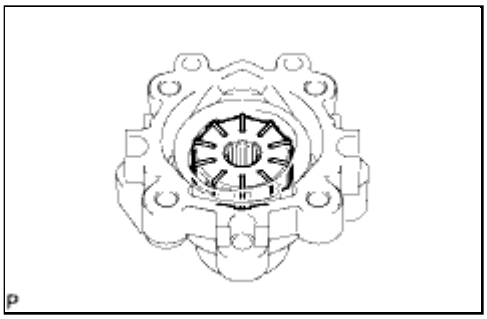
(a) Using 2 screwdrivers, remove the snap ring from the vane pump shaft.

(b) Remove the vane pump shaft with pulley.

NOTICE:

Be careful not to drop or damage the vane pump shaft with vane pump pulley.

If it is damaged, replace the vane pump assembly.



5. REMOVE VANE PUMP ROTOR

(a) Remove the 10 vane pump plates.

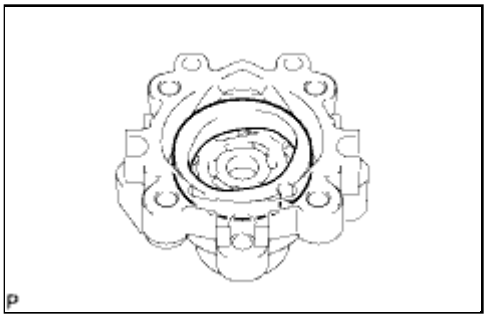
NOTICE:

Take care not to drop the vane pump plates.

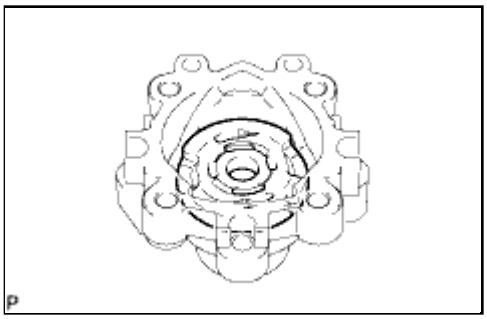
(b) Remove the vane pump rotor from the vane pump front housing.

6. REMOVE VANE PUMP CAM RING

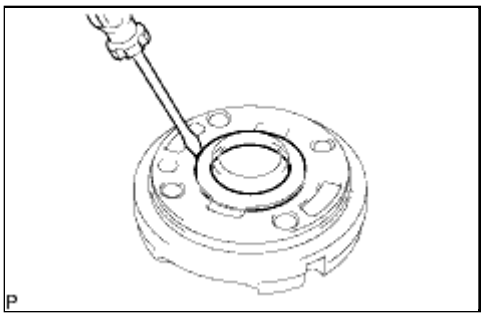
(a) Remove the cam ring from the vane pump front housing.



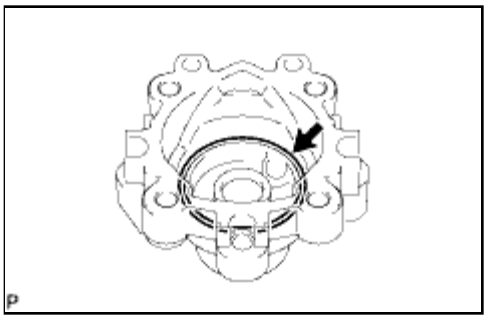
7. REMOVE VANE PUMP FRONT SIDE PLATE



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



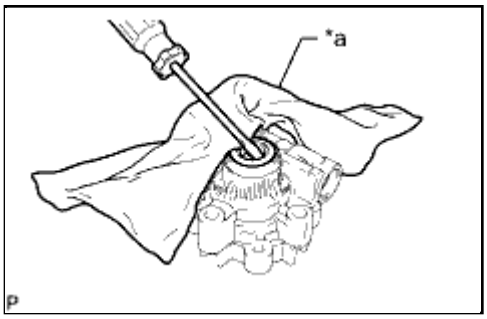
(b) Using a screwdriver, remove the O-ring from the front side plate.



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

8. REMOVE VANE PUMP HOUSING OIL SEAL

(a) Using a screwdriver and piece of cloth, pry out the oil seal.



Text in Illustration

*a	Cloth

NOTICE:

Be careful not to damage the vane pump front housing.

Last Modified: 5-10-2010	6.4 A	**From:** 200908
Model Year: 2010	**Model:** 4Runner	**Doc ID:** RM000002H5D01EX
Title: POWER ASSIST SYSTEMS: VANE PUMP (for 1GR-FE): REMOVAL (2010 4Runner)		

REMOVAL

NOTICE:

- When using a vise, do not overtighten it.
- When installing the parts indicated by arrows, coat them with power steering fluid INFO .

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

NOTICE:

When disconnecting the cable, some systems need to be initialized after the cable is reconnected INFO .

2. REMOVE FRONT WHEEL RH

3. REMOVE FRONT FENDER APRON SEAL RH INFO

4. REMOVE V-BANK COVER SUB-ASSEMBLY INFO

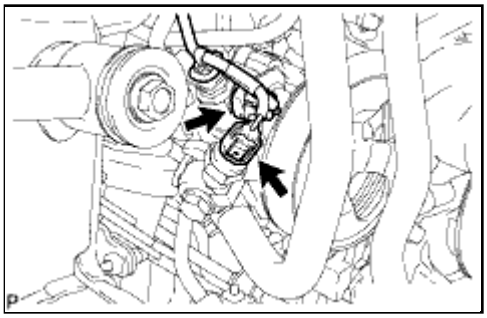
5. REMOVE AIR CLEANER CAP AND HOSE INFO

6. REMOVE AIR CLEANER FILTER ELEMENT SUB-ASSEMBLY

7. REMOVE AIR CLEANER CASE INFO

8. REMOVE FAN AND GENERATOR V BELT INFO

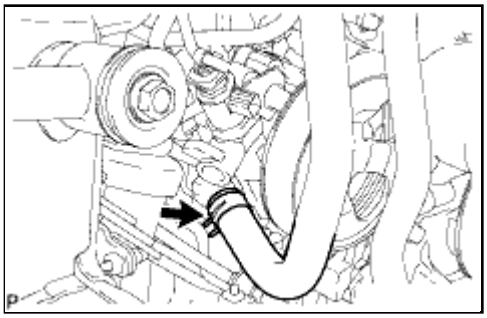
9. DISCONNECT POWER STEERING OIL PRESSURE SWITCH CONNECTOR



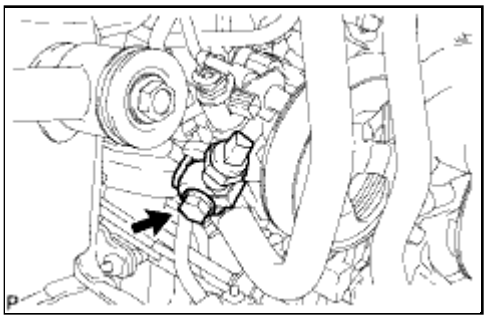
(a) Disconnect the 2 connectors.

10. DISCONNECT NO. 1 OIL RESERVOIR TO PUMP HOSE

(a) Slide the clip and disconnect the oil reservoir to pump hose from the vane pump.



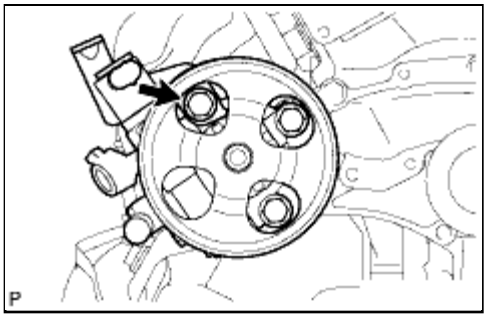
11. DISCONNECT NO. 1 PRESSURE FEED TUBE



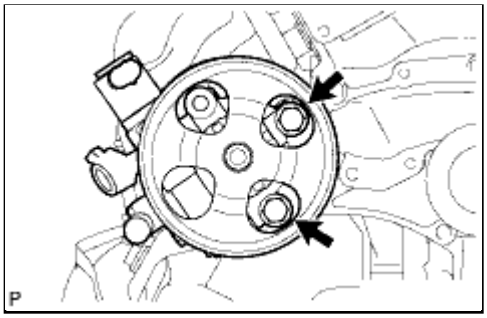
(a) Remove the union bolt and disconnect the pressure feed tube.

(b) Remove the gasket.

12. REMOVE VANE PUMP ASSEMBLY



(a) Remove the bolt and harness bracket.



(b) Remove the 2 bolts and vane pump.

Last Modified: 5-10-2010	6.4 A	**From:** 200908
Model Year: 2010	**Model:** 4Runner	**Doc ID:** RM000001A1U02AX
Title: POWER ASSIST SYSTEMS: VANE PUMP (for 1GR-FE): REASSEMBLY (2010 4Runner)		

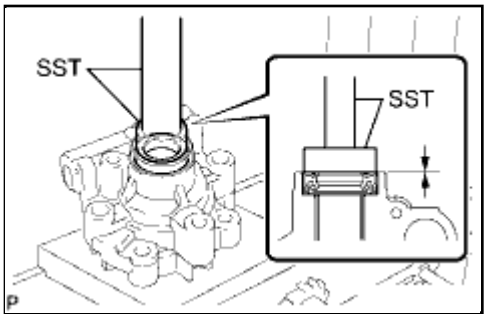
REASSEMBLY

NOTICE:

When installing parts, coat the parts indicated by arrows with power steering fluid INFO **.**

1. INSTALL VANE PUMP HOUSING OIL SEAL

(a) Coat the lip of a new vane pump housing oil seal with MP grease.



(b) Using SST and a press, press in the oil seal.

SST: 09950-60010

09951-00280

SST: 09950-70010

09951-07100

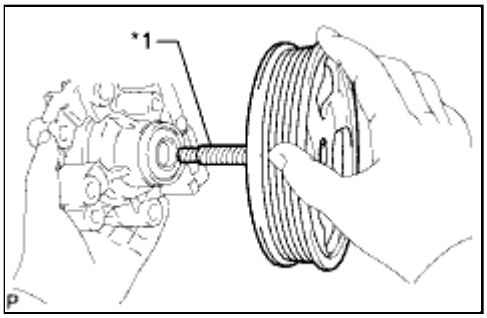
NOTICE:

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

2. INSTALL VANE PUMP SHAFT WITH VANE PUMP PULLEY

(a) Coat the inside surface of the bushing in the vane pump front housing with power steering fluid.

(b) Gradually insert the vane pump shaft with vane pump pulley.



Text in Illustration

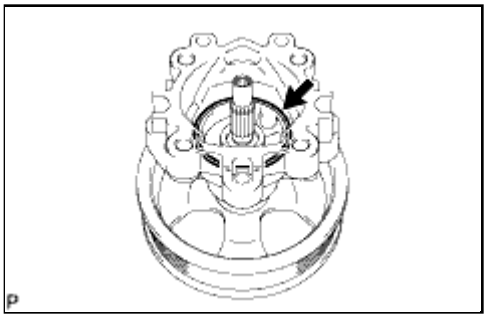
*1	Protective Tape

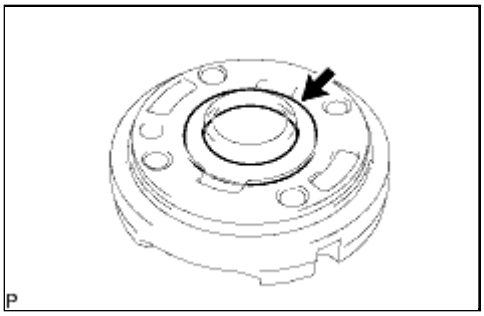
NOTICE:

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

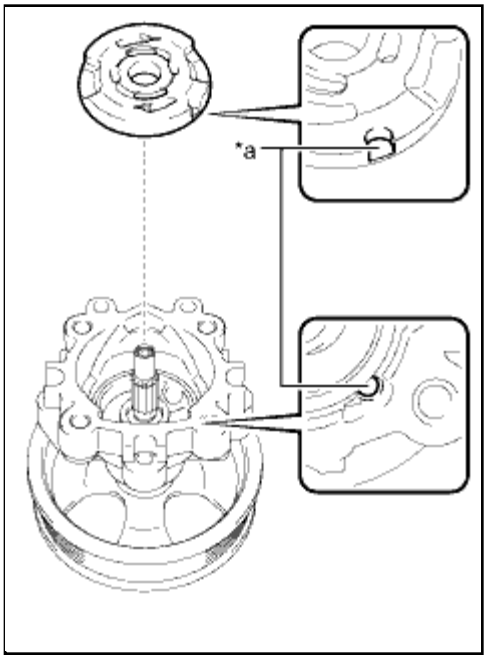
3. INSTALL VANE PUMP FRONT SIDE PLATE

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





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



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

Text in Illustration

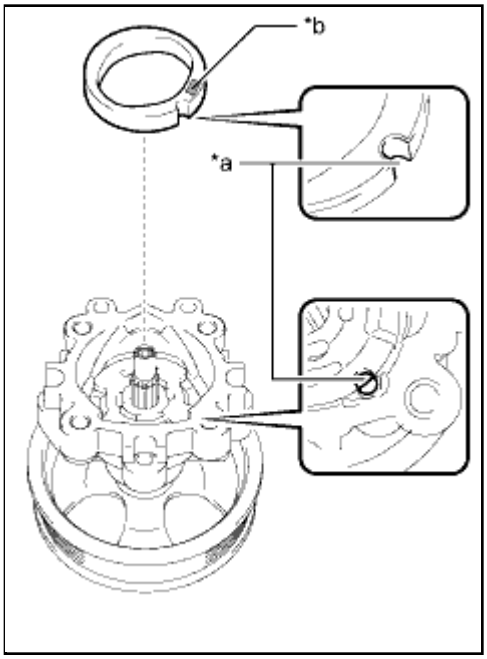
*a	Align

NOTICE:

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

4. INSTALL VANE PUMP CAM RING

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



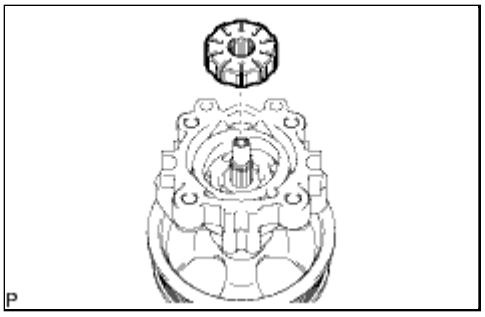
Text in Illustration

*a	Align
*b	Inscribed Mark

NOTICE:

Make sure that the cam ring is installed facing in the correct direction.

5. INSTALL VANE PUMP ROTOR



(a) Install the vane pump rotor.

HINT:

The vane pump rotor can be installed with either side facing up.

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

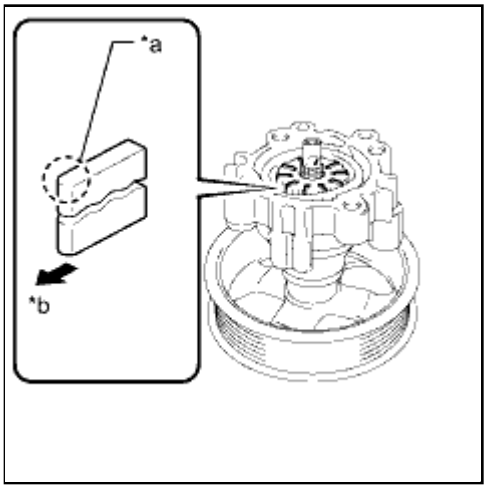
(c) Install the vane pump plates with the round end facing outward.

Text in Illustration

*a	Round End
*b	Outward

NOTICE:

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



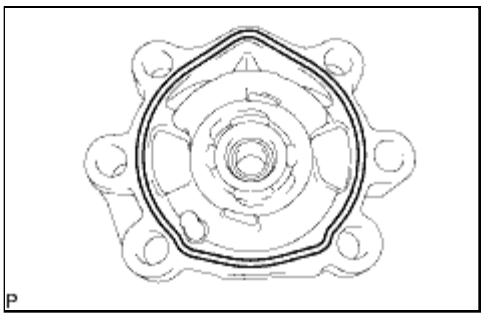
6. INSTALL VANE PUMP SHAFT SNAP RING

(a) Using a screwdriver and snap ring expander, install a new shaft snap ring to the vane pump shaft.

NOTICE:

- Do not expand the shaft snap ring any further than needed.
- Make sure that the shaft snap ring fits completely into the groove.
- Do not damage the vane pump rotor and shaft.

7. INSTALL VANE PUMP REAR HOUSING



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

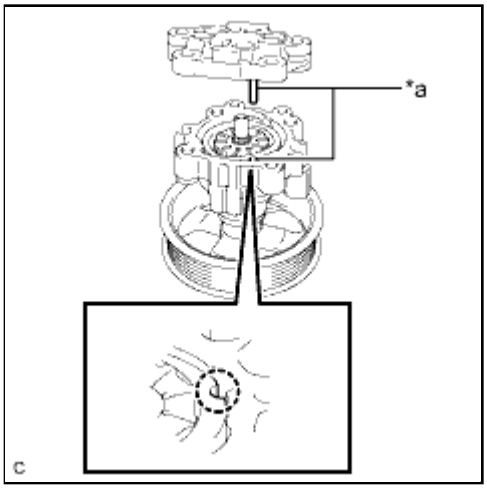
(b) Align the straight pin of the rear housing with the notches of the cam ring, front side plate and vane pump front housing.

Text in Illustration

*a	Align

NOTICE:

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



(c) Install the rear housing with the 4 bolts.

Torque: 22 N·m (224 kgf·cm, 16ft·lbf)

8. SECURE VANE PUMP ASSEMBLY

9. INSPECT TOTAL PRELOAD

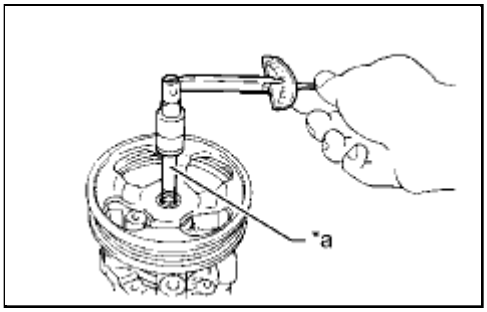
(a) Check that the pump rotates smoothly without abnormal noise.

(b) Temporarily install a service bolt.

Recommended Service Bolt:

ITEM	VALUE
Thread diameter	10 mm (0.394 in.)
Thread pitch	1.25 mm (0.0492 in.)
Bolt length	50 mm (1.97 in.)

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



Text in Illustration

*a	Service Bolt

Standard rotating torque:
0.3 N*m (3 kgf*cm, 2 in.*lbf) or less

If the rotating torque is not as specified, check the vane pump housing oil seal.

10. INSTALL SUCTION PORT UNION

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

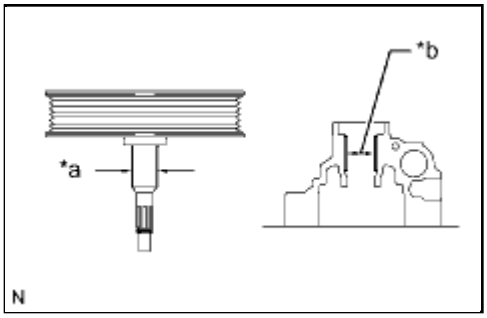
(b) Install the suction port union to the vane pump with the bolt.

Torque: 12 N·m (122 kgf·cm, 9ft·lbf)

Last Modified: 5-10-2010	6.4 G	**From:** 200908
Model Year: 2010	**Model:** 4Runner	**Doc ID:** RM000001A1Q02AX
Title: POWER ASSIST SYSTEMS: VANE PUMP (for 1GR-FE): INSPECTION (2010 4Runner)		

INSPECTION

1. INSPECT VANE PUMP SHAFT AND BUSH IN VANE PUMP FRONT HOUSING



(a) Using a micrometer, measure the outer diameter of the vane pump shaft.

Text in Illustration

*a	Outer Diameter
*b	Inner Diameter

(b) Using a vernier caliper, measure the inner diameter of the vane pump front housing bush.

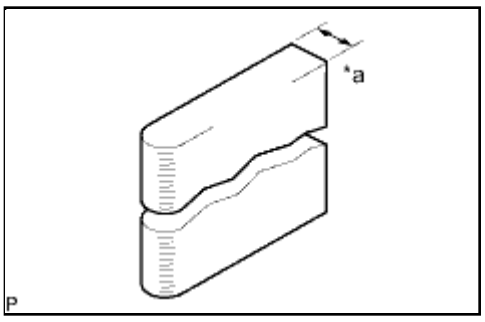
(c) Calculate the oil clearance.

Oil clearance = Inner diameter of the bush - Outer diameter of the shaft

Maximum oil clearance:
0.07 mm (0.00276 in.)

If the oil clearance is more than the maximum, replace the vane pump assembly.

2. INSPECT VANE PUMP ROTOR AND VANE PUMP PLATE



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

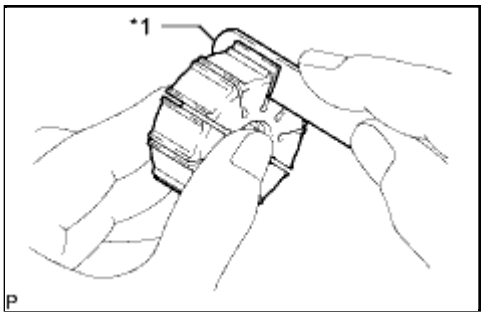
Standard thickness:
1.405 to 1.411 mm (0.0554 to 0.0555 in.)

Text in Illustration

*a	Thickness

If the thickness is not as specified, replace the vane pump assembly.

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



Maximum clearance:
0.025 mm (0.00098 in.)

Text in Illustration

*1	Feeler Gauge

If the clearance is more than the maximum, replace the vane pump assembly.

3. 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.

Last Modified: 5-10-2010	6.4 A	**From:** 200908
Model Year: 2010	**Model:** 4Runner	**Doc ID:** RM000002H5901EX
Title: POWER ASSIST SYSTEMS: VANE PUMP (for 1GR-FE): INSTALLATION (2010 4Runner)		

INSTALLATION

1. INSTALL VANE PUMP ASSEMBLY

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

Torque: 43 N·m (438 kgf·cm, 32ft·lbf)

(b) Install the wire harness bracket with the bolt.

Torque: 43 N·m (438 kgf·cm, 32ft·lbf)

2. CONNECT NO. 1 PRESSURE FEED TUBE

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

(b) Connect the pressure feed tube and install the union bolt.

Torque: 50 N·m (510 kgf·cm, 37ft·lbf)

3. CONNECT NO. 1 OIL RESERVOIR TO PUMP HOSE

(a) Connect the No. 1 oil reservoir to pump hose to the vane pump assembly with the clip.

4. CONNECT POWER STEERING OIL PRESSURE SWITCH CONNECTOR

(a) Connect the 2 connectors.

5. INSTALL FAN AND GENERATOR V BELT INFO

6. INSTALL AIR CLEANER CASE INFO

7. INSTALL AIR CLEANER FILTER ELEMENT SUB-ASSEMBLY

8. INSTALL AIR CLEANER CAP AND HOSE INFO

9. INSTALL V-BANK COVER SUB-ASSEMBLY INFO

10. INSTALL FRONT FENDER APRON SEAL RH INFO

11. INSTALL FRONT WHEEL RH

12. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

13. ADD POWER STEERING FLUID

14. BLEED AIR FROM POWER STEERING FLUID

(a) Bleed air from the power steering fluid INFO .

15. INSPECT FOR POWER STEERING FLUID LEAK

Last Modified: 5-10-2010	6.4 G	**From:** 200908
Model Year: 2010	**Model:** 4Runner	**Doc ID:** RM0000048OZ001X
Title: POWER ASSIST SYSTEMS: VANE PUMP (for 2TR-FE): ON-VEHICLE INSPECTION (2010 4Runner)		

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.

2. BLEED AIR FROM 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.

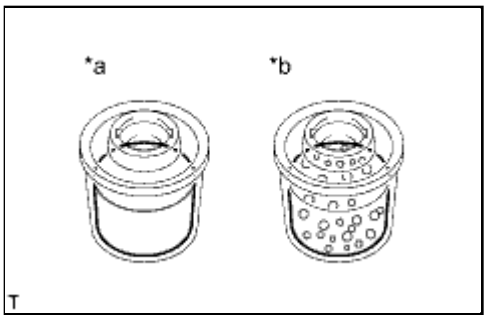
(f) Turn the steering wheel.

(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, and then turn the wheel to the opposite full lock position and keep it there for 2 to 3 seconds.*1

(2) Repeat *1 several times.

(g) Stop the engine.

(h) Check for foaming or emulsification.



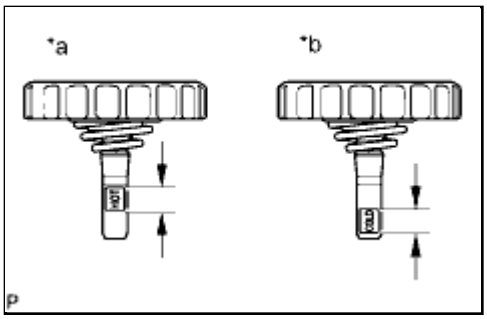
Text in Illustration

*a	CORRECT
*b	INCORRECT

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

(i) Check the fluid level.

3. CHECK POWER STEERING FLUID LEVEL



(a) Keep the vehicle horizontal.

Text in Illustration

*a	HOT Range
*b	COLD Range

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

If necessary, add fluid.

Fluid:
ATF "DEXRON" II or III, or equivalent.

HINT:

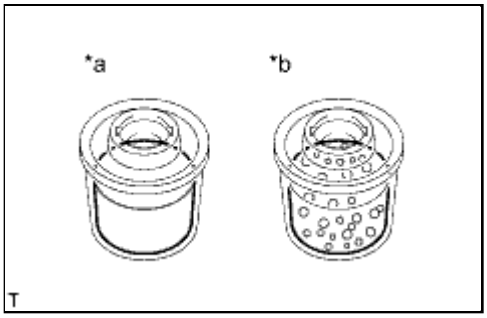
If the fluid is hot (over 40°C (104°F)), make sure that the fluid level is within the HOT range on the reservoir. If the fluid is cold, make sure that it is within the COLD range.

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

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

Fluid temperature:
80°C (176°F)

(e) Check for foaming or emulsification.

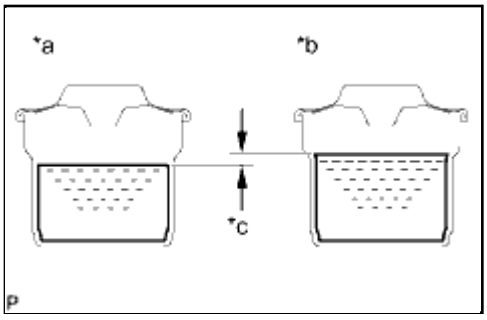


Text in Illustration

*a	CORRECT
*b	INCORRECT

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

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



Text in Illustration

*a	Engine Idling
*b	Engine Stopped

*c	5 mm or less

(g) Stop the engine.

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

Maximum increase in fluid level:
Approximately 5 mm (0.197 in.)

If the fluid level increase is more than the maximum, bleed air from the power steering system.

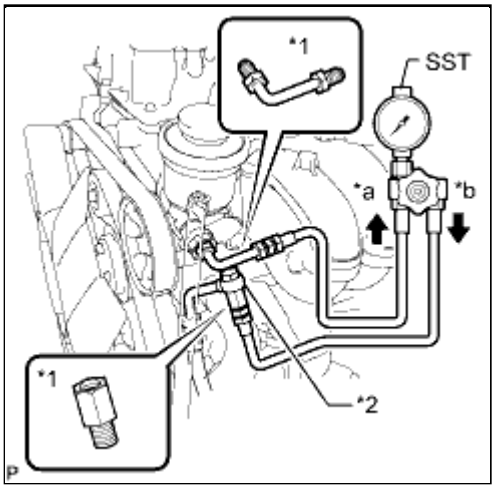
(i) Check the fluid level.

4. CHECK STEERING FLUID PRESSURE

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

(b) Connect SST as shown in the illustration below.

SST: 09640-10010
09641-01010
09641-01030
09641-01060



Text in Illustration

*1	Attachment
*2	Pressure Feed Tube
*a	In
*b	Out

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

(c) Bleed air from the power steering system.

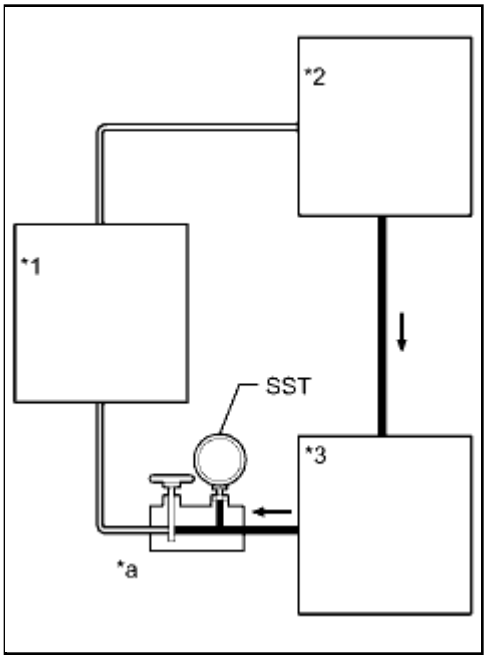
(d) Start the engine and run it at idle.

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

Fluid temperature:
80°C (176°F)

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

Standard fluid pressure:
8300 to 8800 kPa (84.7 to 89.7 kgf/cm^2, 1204 to 1276 psi)



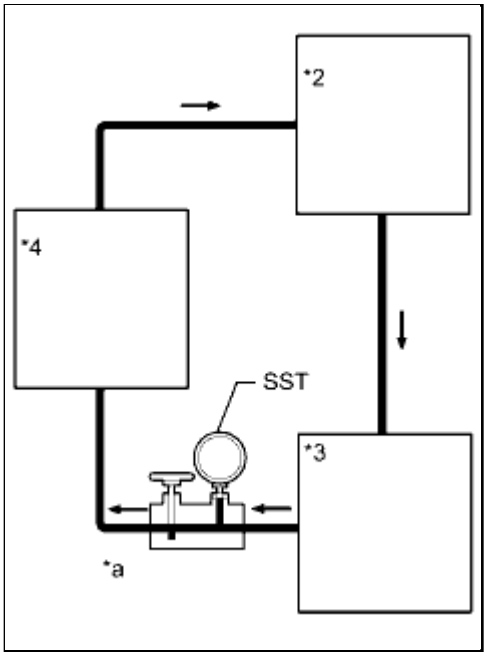
Text in Illustration

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

NOTICE:

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

If the pressure is not as specified, check for fluid leaks and replace parts as necessary.



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

Text in Illustration

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

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

Fluid pressure difference:
490 kPa (5.0 kgf/cm^2, 71 psi) or less

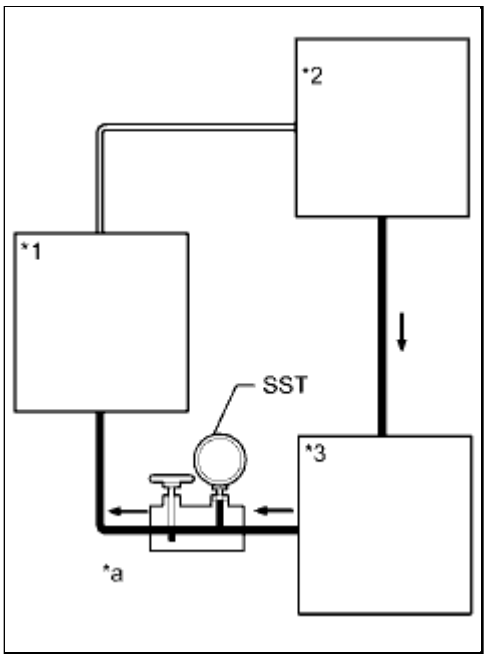
NOTICE:

Do not turn the steering wheel.

If the pressure difference is not within the specified range, check for fluid leaks and replace parts as necessary.

(i) With the engine idling and the valve fully open, turn the steering wheel left or right to the full lock position. Observe the reading on SST.

Standard fluid pressure:
8300 to 8800 kPa (84.7 to 89.7 kgf/cm^2, 1204 to 1276 psi)



Text in Illustration

*1	Power Steering Gear (Lock Position)
*2	Power Steering Fluid Reservoir
*3	Power Steering Vane Pump
*a	Valve Open

NOTICE:

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

If the pressure is not as specified, check for fluid leaks and replace parts as necessary.

(j) Disconnect SST.

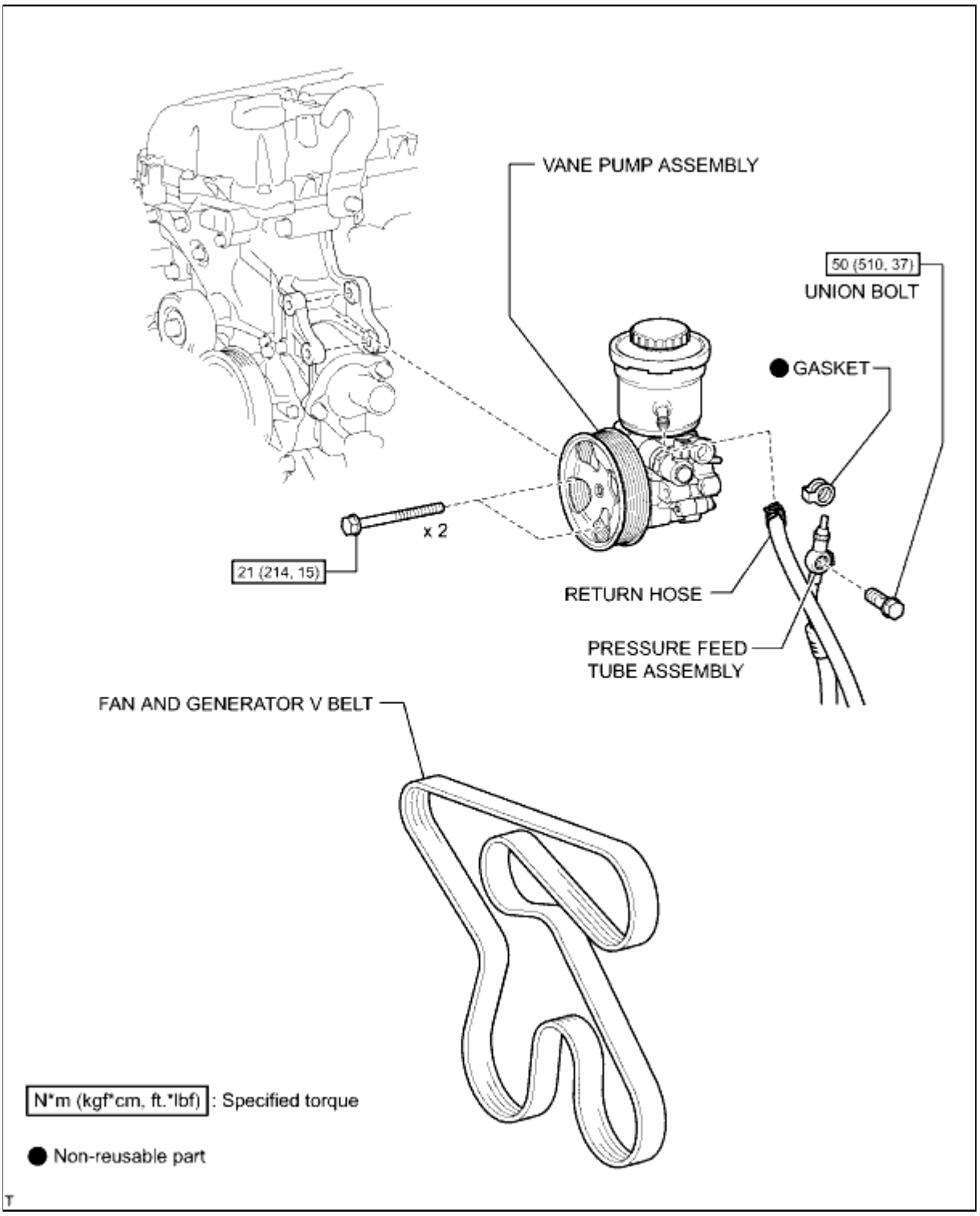
(k) Connect the pressure feed tube to the vane pump.

(l) Bleed air from the power steering system.

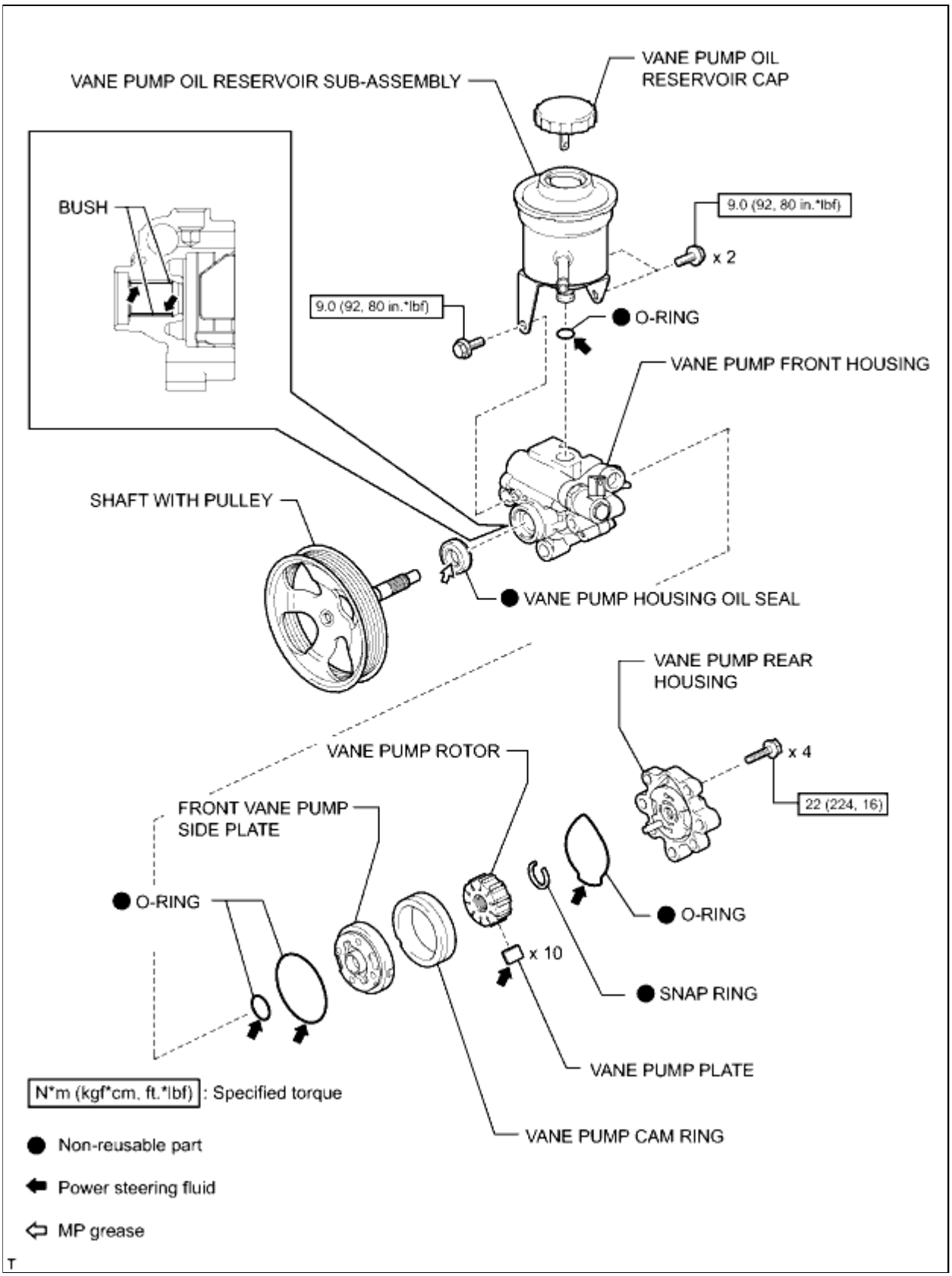
Last Modified: 5-10-2010	6.4 K	**From:** 200908
Model Year: 2010	**Model:** 4Runner	**Doc ID:** RM0000163T00GX
Title: POWER ASSIST SYSTEMS: VANE PUMP (for 2TR-FE): COMPONENTS (2010 4Runner)		

COMPONENTS

ILLUSTRATION



ILLUSTRATION



Last Modified: 5-10-2010	6.4 A	**From:** 200908
Model Year: 2010	**Model:** 4Runner	**Doc ID:** RM00000138D00JX
Title: POWER ASSIST SYSTEMS: VANE PUMP (for 2TR-FE): REMOVAL (2010 4Runner)		

REMOVAL

NOTICE:

- When using a vise, do not overtighten it.
- When installing the parts indicated by arrows, coat them with power steering fluid INFO .

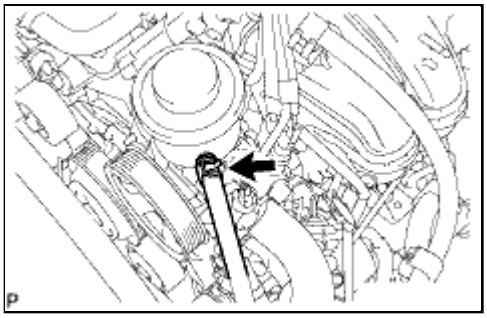
1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

NOTICE:

When disconnecting the cable, some systems need to be initialized after the cable is reconnected INFO .

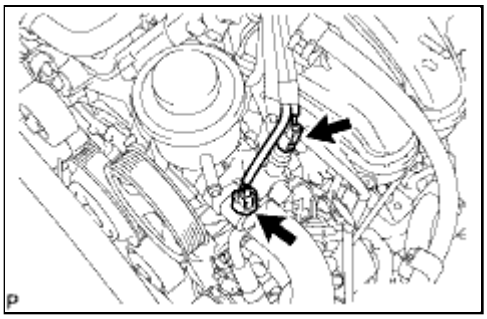
2. REMOVE FAN AND GENERATOR V BELT INFO

3. DISCONNECT RETURN HOSE



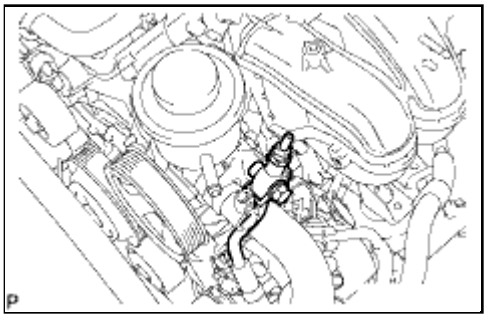
(a) Remove the clip and disconnect the hose.

4. DISCONNECT PRESSURE FEED TUBE ASSEMBLY



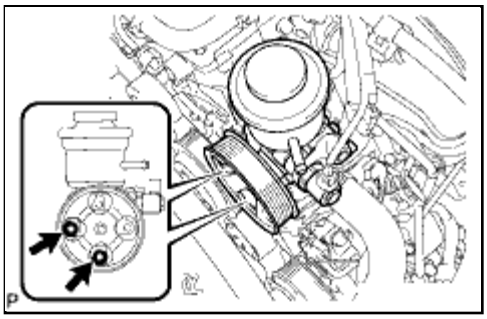
(a) Disconnect the 2 connectors.

(b) Remove the union bolt and disconnect the pressure feed tube from the vane pump.



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

5. REMOVE VANE PUMP ASSEMBLY



(a) Remove the 2 bolts and vane pump.

Last Modified: 5-10-2010	6.4 A	**From:** 200908
Model Year: 2010	**Model:** 4Runner	**Doc ID:** RM00000163P00GX
Title: POWER ASSIST SYSTEMS: VANE PUMP (for 2TR-FE): DISASSEMBLY (2010 4Runner)		

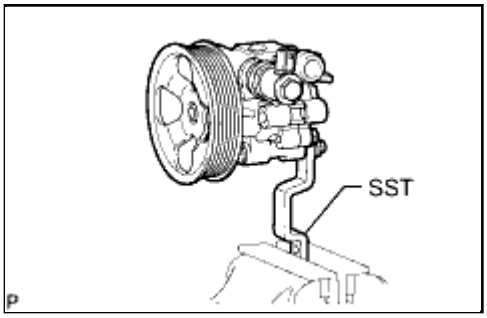
DISASSEMBLY

1. REMOVE VANE PUMP OIL RESERVOIR SUB-ASSEMBLY

(a) Remove the 3 bolts and oil reservoir from the front vane pump housing.

(b) Using a screwdriver, remove the O-ring from the oil reservoir.

2. SECURE VANE PUMP ASSEMBLY

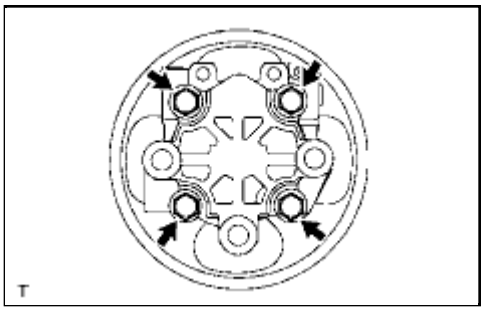


(a) Using SST, secure the vane pump between aluminum plates in a vise as shown in the illustration.

SST: 09630-00014

09631-00132

3. REMOVE VANE PUMP REAR HOUSING

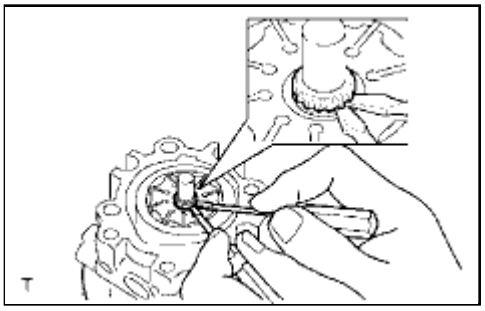


(a) Remove the 4 bolts and rear housing from the vane pump front housing.

(b) Remove the O-ring from the vane pump rear housing.

4. REMOVE SHAFT WITH PULLEY

(a) Using a screwdriver, remove the shaft snap ring from the shaft with pulley.



(b) Remove the shaft with pulley from the vane pump rear housing.

5. REMOVE VANE PUMP ROTOR

(a) Remove the vane pump rotor and 10 vane pump plates from the vane pump front housing.

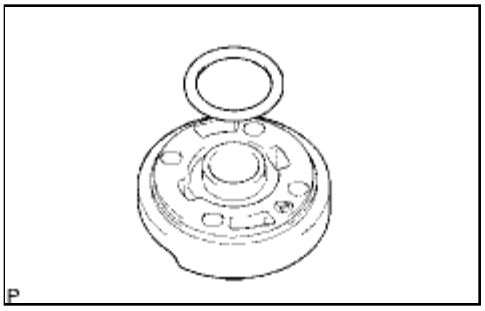
NOTICE:

Be careful not to drop the vane pump plates.

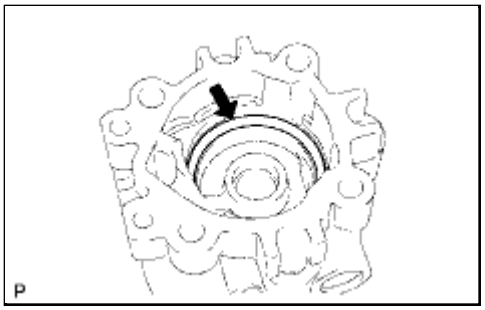
6. REMOVE VANE PUMP CAM RING

7. REMOVE FRONT VANE PUMP SIDE PLATE

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



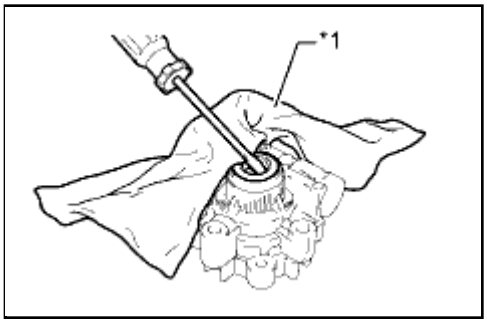
(b) Remove the No. 1 O-ring from the side plate.



(c) Remove the No. 2 O-ring from the vane pump front housing.

8. REMOVE VANE PUMP HOUSING OIL SEAL

(a) Using a screwdriver and piece of cloth, pry out the oil seal.



Text in Illustration

*1	Cloth

NOTICE:

Be careful not to damage the vane pump front housing.

Last Modified: 5-10-2010	6.4 A	**From:** 200908
Model Year: 2010	**Model:** 4Runner	**Doc ID:** RM00000163Q00IX
Title: POWER ASSIST SYSTEMS: VANE PUMP (for 2TR-FE): REASSEMBLY (2010 4Runner)		

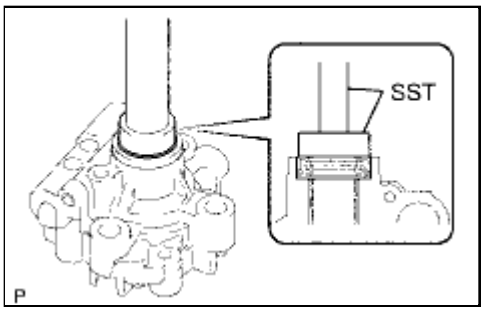
REASSEMBLY

NOTICE:

When installing the parts indicated by arrows, coat them with power steering fluid INFO **.**

1. INSTALL VANE PUMP HOUSING OIL SEAL

(a) Coat the lip of a new vane pump housing oil seal with MP grease.



(b) Using SST and a press, press in a new oil seal.

SST: 09950-60010

SST: 09950-70010

09951-00280

09951-07100

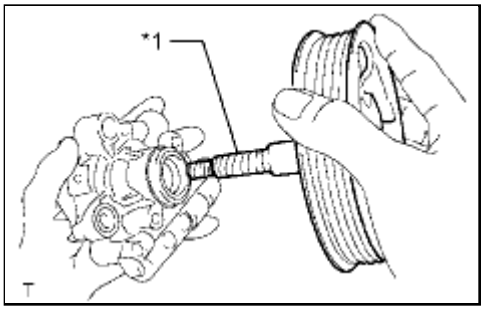
NOTICE:

- Make sure to install the oil seal so that it is facing in the correct direction.
- Be careful not to damage the oil seal.

2. INSTALL SHAFT WITH PULLEY

(a) Coat the shaft with power steering fluid.

(b) Gradually insert the vane pump shaft with vane pump pulley.



Text in Illustration

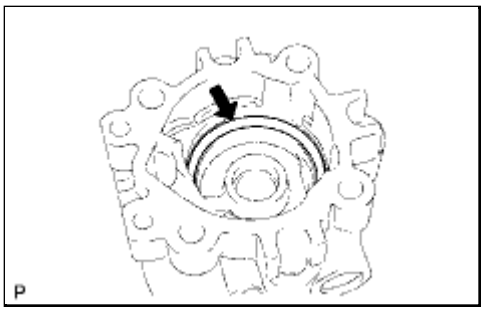
*1	Protective Tape

NOTICE:

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

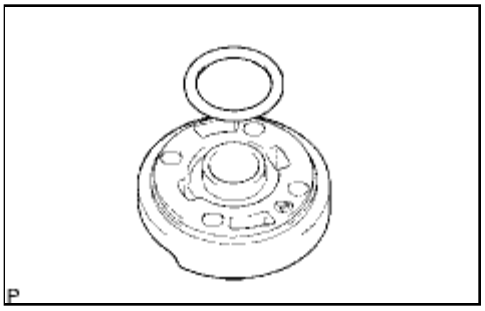
3. INSTALL FRONT VANE PUMP SIDE PLATE

(a) Coat a new No. 2 O-ring with power steering fluid.

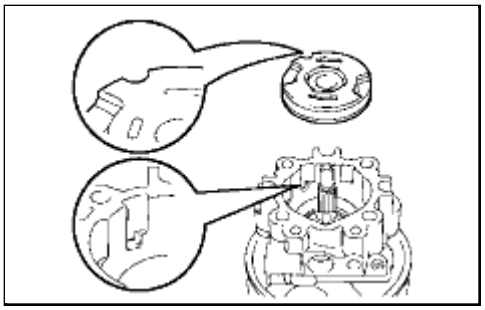


(b) Install the No. 2 O-ring to the front housing.

(c) Coat a new No. 1 O-ring with power steering fluid.



(d) Install the No. 1 O-ring to the front side plate.

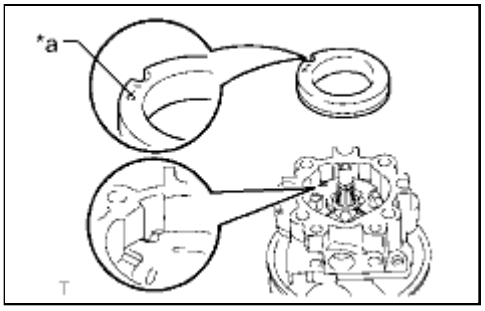


(e) Install the front side plate to the front housing while aligning the semicircle-shaped cutouts of both parts.

NOTICE:

Be sure to install the plate in the correct position and so that it is facing the correct direction.

4. INSTALL VANE PUMP CAM RING



(a) With the inscribed mark facing upward, install the vane pump cam ring to the vane pump front housing while aligning the semicircle-shaped cutouts of both parts.

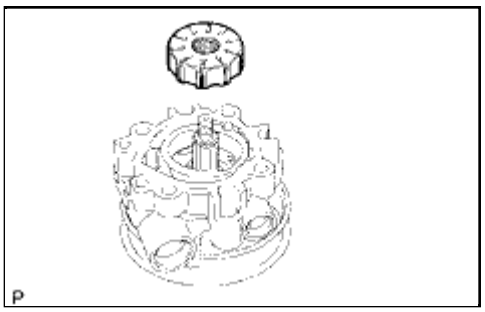
Text in Illustration

*a	Inscribed Mark

NOTICE:

Be sure to install the cam ring in the correct position and so that it is facing the correct direction.

5. INSTALL VANE PUMP ROTOR



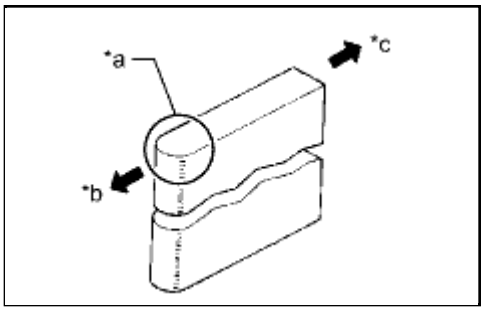
(a) Install the vane pump rotor to the front vane pump housing.

HINT:

The vane pump can be installed with either side facing up.

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

(c) Install the 10 vane pump plates.



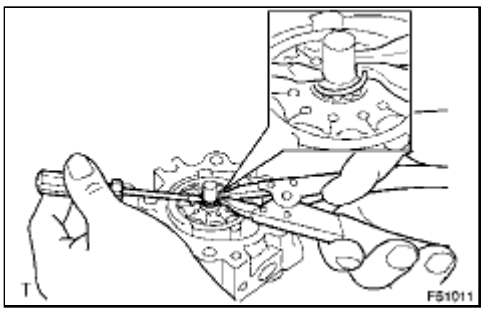
Text in Illustration

*a	Round End
*b	Outward
*c	Inward

NOTICE:

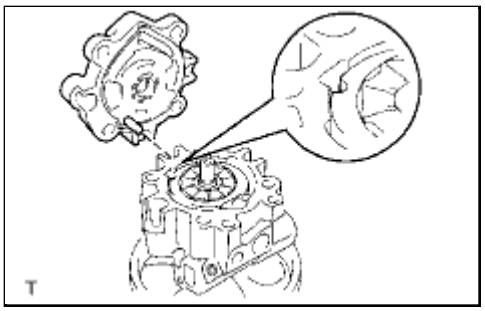
Make sure that the round ends of the vane pump plates are facing outward.

6. INSTALL VANE PUMP SHAFT SNAP RING



(a) Using a screwdriver and snap ring expander, install a new snap ring to the shaft with pulley.

7. INSTALL REAR VANE PUMP HOUSING



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

(b) Align the straight pin of the rear housing with the hole created by the semicircle-shaped cutouts of the cam ring, front side plate and front housing. Then install the rear housing with the 4 bolts.

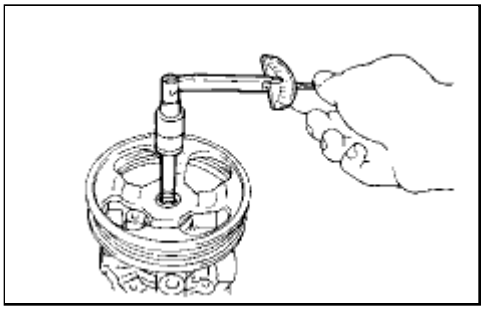
Torque: 22 N·m (224 kgf·cm, 16ft·lbf)

NOTICE:

Make sure that the O-ring is not out of position before installing the rear vane pump housing.

8. SECURE VANE PUMP ASSEMBLY INFO

9. INSPECT TOTAL PRELOAD



(a) Check that the pump rotates smoothly without abnormal noise.

(b) Temporarily install a service bolt.

Recommended Service Bolt:

ITEM	SPECIFIED CONDITION
Thread diameter	10 mm (0.394 in.)
Thread pitch	1.25 mm (0.0492 in.)
Bolt length	50 mm (1.97 in.)

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

Standard Rotating torque:
0.3 N*m (3 kgf*cm, 2 in.*lbf) or less

If the rotating torque is not as specified, check the installation of the housing oil seal.

10. INSTALL VANE PUMP OIL RESERVOIR SUB-ASSEMBLY

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

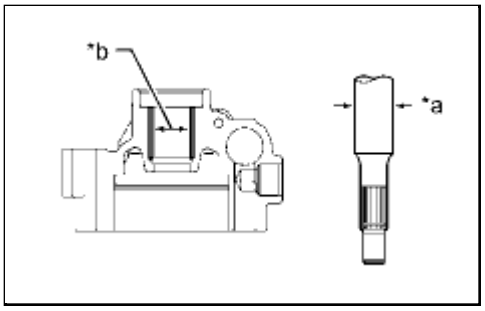
(b) Install the vane pump reservoir to the vane pump with the 3 bolts.

Torque: 9.0 N·m (92 kgf·cm, 80in·lbf)

Last Modified: 5-10-2010	6.4 G	**From:** 200908
Model Year: 2010	**Model:** 4Runner	**Doc ID:** RM0000016D600HX
Title: POWER ASSIST SYSTEMS: VANE PUMP (for 2TR-FE): INSPECTION (2010 4Runner)		

INSPECTION

1. INSPECT VANE PUMP SHAFT AND BUSH IN FRONT HOUSING



(a) Using a micrometer, measure the outer diameter of the vane pump shaft.

Text in Illustration

*a	Outer Diameter
*b	Inner Diameter

(b) Using a vernier caliper, measure the inner diameter of the vane pump front housing bush.

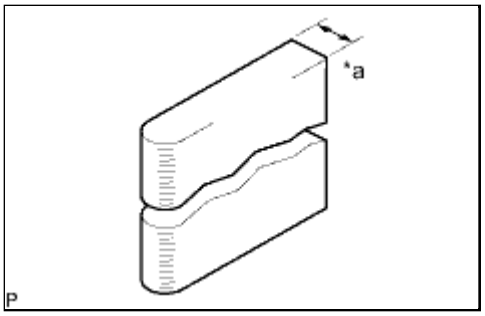
(c) Calculate the oil clearance.

Oil clearance = Inner diameter of the bush - Outer diameter of the shaft

Maximum oil clearance:
0.07 mm (0.00276 in.)

If the oil clearance is more than the maximum, replace the vane pump assembly.

2. INSPECT VANE PUMP ROTOR AND VANE PUMP PLATE



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

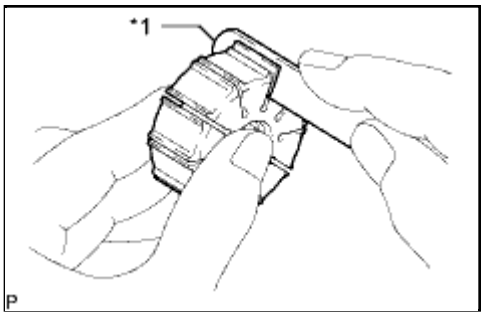
Standard thickness:
1.405 to 1.411 mm (0.0554 to 0.0555 in.)

Text in Illustration

*a	Thickness

If the thickness is not as specified, replace the vane pump assembly.

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



Maximum clearance:
0.025 mm (0.00098 in.)

Text in Illustration

*1	Feeler Gauge

If the clearance is more than the maximum, replace the vane pump assembly.

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Model Year: 2010	**Model:** 4Runner	**Doc ID:** RM00000138B00KX
Title: POWER ASSIST SYSTEMS: VANE PUMP (for 2TR-FE): INSTALLATION (2010 4Runner)		

INSTALLATION

1. INSTALL VANE PUMP ASSEMBLY

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

Torque: 21 N·m (214 kgf·cm, 15ft·lbf)

2. CONNECT PRESSURE FEED TUBE ASSEMBLY

(a) Install a new gasket and the pressure feed tube to the vane pump with the union bolt.

Torque: 50 N·m (510 kgf·cm, 37ft·lbf)

HINT:

Make sure the stopper of the pressure feed tube touches the vane pump.

(b) Connect the 2 connectors.

3. CONNECT RETURN HOSE

(a) Connect the hose with the clip.

4. INSTALL FAN AND GENERATOR V BELT INFO

5. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

6. ADD POWER STEERING FLUID

7. BLEED AIR FROM POWER STEERING SYSTEM INFO

8. INSPECT FOR POWER STEERING FLUID LEAK