POWER STEERING SYSTEM

5100F–06

PRECAUTION

1. HANDLING PRECAUTIONS ON STEERING SYSTEM

(a) Care must be taken to replace parts properly because they could affect the performance of the steering system and result in a driving hazard.

2. HANDLING PRECAUTIONS ON SRS AIRBAG SYSTEM

(a) The vehicle is equipped with SRS (Supplemental Restraint System) such as the driver airbag and front passenger airbag. Failure to carry out service operation in the correct sequence could cause the SRS to unexpectedly deploy during servicing, possibly leading to a serious accident. Before servicing (including removal or installation of parts, inspection or replacement), be sure to read the precautionary notices in the supplemental restraint system (See page 60–1).

5100G–06

PROBLEM SYMPTOMS TABLE

HINT:

Use the table below to help you find the cause of the problem. The numbers indicate the likelihood of the cause in the descending order. Check each part in the order shown. Replace parts if necessary.

Hydraulic Power Steering System:

Symptom	Suspect Area		See page
Hard steering	3. Tires (Improperly inflated)		28–1
	4. Power steering fluid level (Low)		51–4
	5. Drive belt (Loose)		
	6. Front wheel alignment (Incorrect)		26–6
	7. Steering system joints (Worn)		–
	8. Suspension arm ball joints (Worn)		26–24
	9. Steering column (Binding)		–
	10. Power steering vane pump	AZ Series:	51–9
		1CD–FTV:	51–19
	11. Power steering gear		51–4
			51–36
Poor return	1. Tires (Improperly inflated)		28–1
	2. Front wheel alignment (Incorrect)		26–6
	3. Steering column (Binding)		–
	4. Power steering gear		51–4
			51–36
Excessive play	1. Steering system joints (Worn)		–
	2. Suspension arm ball joints (Worn)		26–24
	3. Intermediate shaft, Sliding yoke (Worn)		–
	4. Front wheel bearing (Worn)		30–2
	5. Power steering gear		51–4
			51–36
Abnormal noise	1. Power steering fluid level (Low)		51–4
	2. Steering system joints (Worn)		–
	3. Power steering vane pump	AZ Series:	51–9
		1CD–FTV:	51–19
	4. Power steering gear		51–4
			51–36

Electronic Power Steering System:

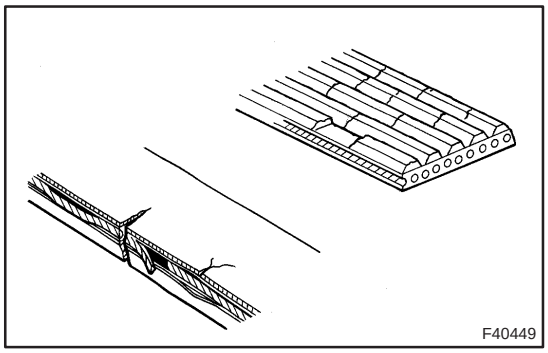
Symptom	Suspect Area	See page
Hard steering	1. Tires (Improperly inflated)	28–1
	2. Front wheel alignment (Incorrect)	26–6
	3. Steering system joints (Worn)	–
	4. Suspension arm ball joints (Worn)	26–24
	5. Steering column (Binding)	–
	6. Steering column (Electric power steering system)	50–9
	7. Steering gear (torque)	51–28
Poor return	1. Tires (Improperly inflated)	28–1
	2. Front wheel alignment (Incorrect)	26–6
	3. Steering column (Binding)	–
	4. Steering column (Electric power steering system)	50–9
	5. Steering gear (torque)	51–28
Excessive play	1. Steering system joints (Worn)	–
	2. Suspension arm ball joints (Worn)	26–24
	3. Intermediate shaft, Sliding yoke (Worn)	–
	4. Front wheel bearing (Worn)	30–2
	5. Steering column (Electric power steering system)	50–9
	6. Steering gear (torque)	51–28
Abnormal noise	1. Steering system joints (Worn)	–
	2. Steering column (Electric power steering system)	50–9
	3. Steering gear (torque)	51–28

HINT:

When the problem occurs on the Electric Power Steering system, refer to the DI section (See page 05–1042).

510DE–02

ON–VEHICLE INSPECTION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1. INSPECT DRIVE BELT

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

If any defect is found, replace the drive belt.

HINT:

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

2. BLEED POWER STEERING SYSTEM

(a) Check the fluid level.

(b) Jack up the front of the vehicle and support it with the stands.

(c) Turn the steering wheel.

(1) With the engine stopped, turn the wheel slowly from lock to lock several times.

(d) Lower the vehicle.

(e) Start the engine.

(1) Run the engine at idle for a few minutes.

(f) Turn the steering wheel.

(1) With the engine idling, turn the wheel to right full lock position and keep it there for 2 to 3 seconds, then turn the wheel to left full lock position and keep it there for 2 to 3 seconds.

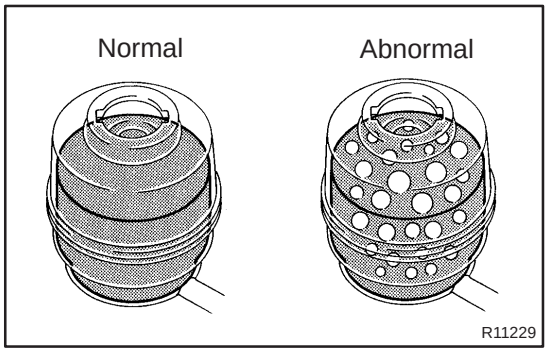
(2) Repeat (1) several times.

(g) Stop the engine.

(h) Check for foaming or emulsification.

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

(i) Recheck the fluid level.



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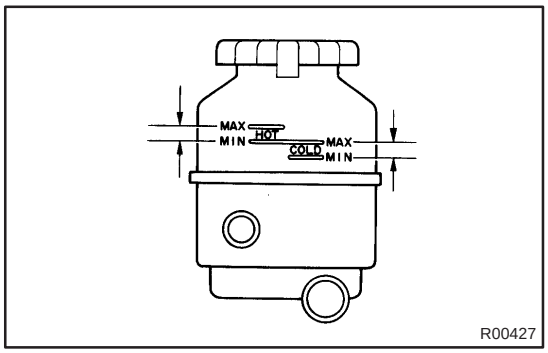


R00427

3. CHECK FLUID LEVEL

(a) Keep the vehicle level.

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

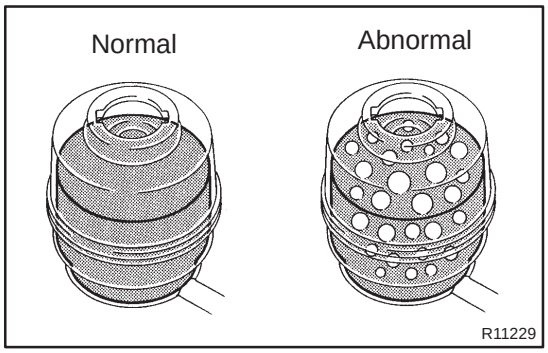
If necessary, add fluid.

Fluid: ATF DEXRON® II or III

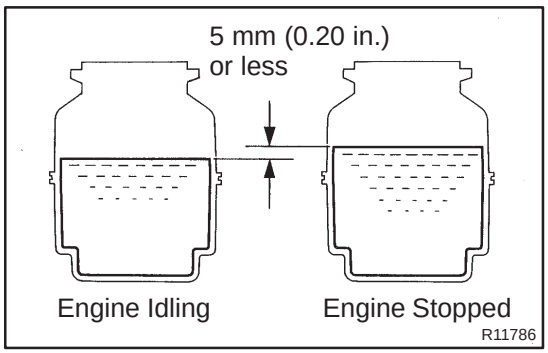
HINT:

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

(c) Start the engine and run it at idle.
(d) Turn the steering wheel from lock to lock several times to boost fluid temperature.
Fluid temperature: 80˚C (176˚F)



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



(f) With the engine idling, measure the fluid level in the oil reservoir.
(g) Stop the engine.
(h) Wait a few minutes and remeasure the fluid level in the oil reservoir.
Maximum fluid level rise: 5 mm (0.20 in.)
If a problem is found, bleed power steering system.
(i) Check the fluid level.

4. CHECK STEERING FLUID PRESSURE

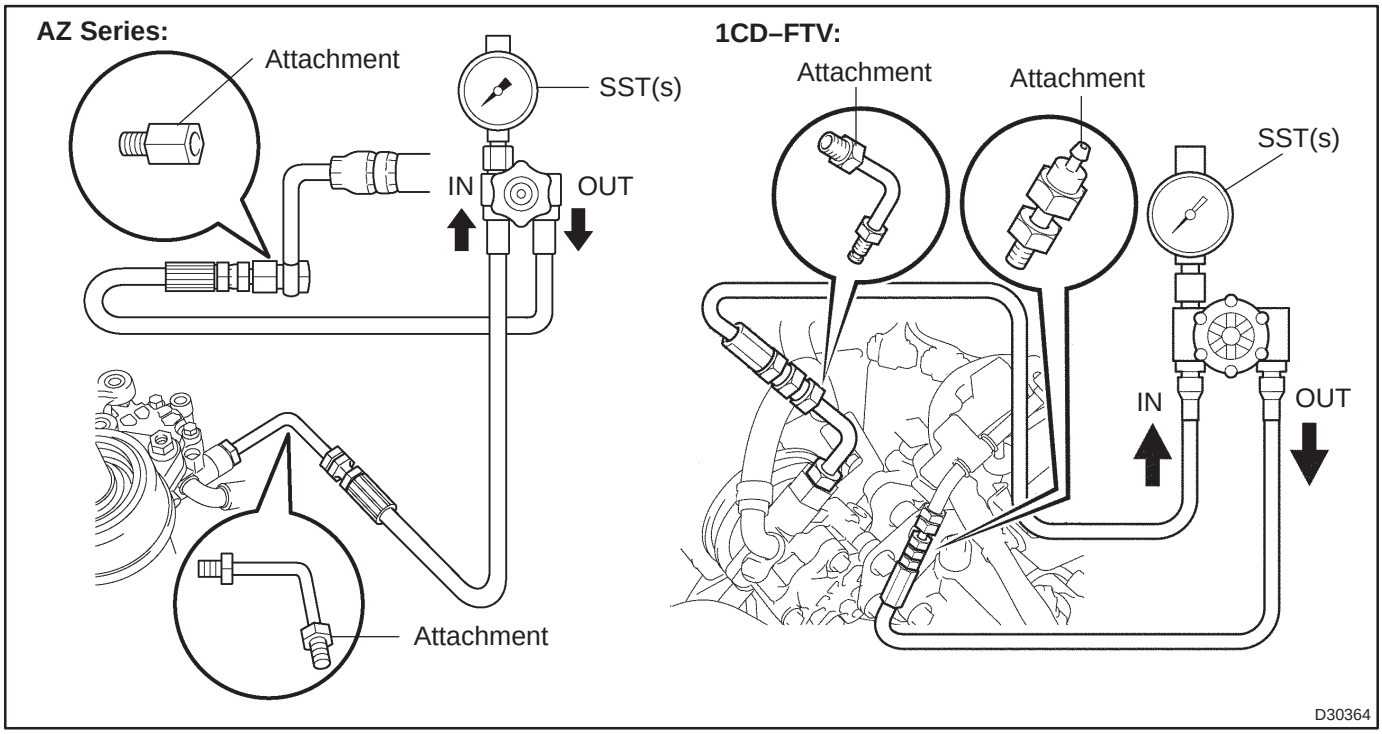
(a) AZ Series:
Disconnect the pressure feed tube assy from the vane pump assy (See page 51–9).
(b) 1CD–FTV:
Disconnect the pressure feed tube assy from the vane pump assy (See page 51–19).
(c) AZ Series:
Connect SST(s), as shown in the illustration on the next page.
SST 09640–10010 (09641–01010, 09641–01030, 09641–01060)

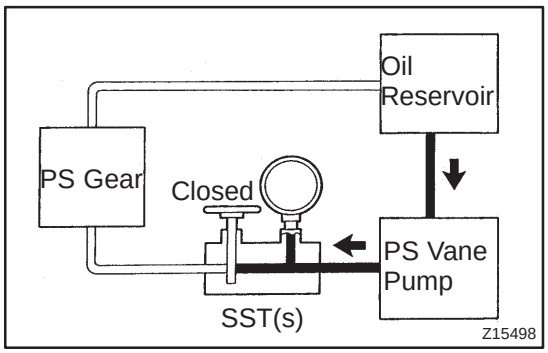
NOTICE:
Check that the valve of SST(s) is in the open position.

(d) 1CD–FTV:
Connect SST(s), as shown in the illustration on the next page.
SST 09640–10010 (09641–01010, 09641–01020, 09641–01030)

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

(e) Bleed the power steering system.
(f) Start the engine and run it at idle.
(g) Turn the steering wheel from lock to lock several times to boost fluid temperature.
Fluid temperature: 80 ˚C (176 ˚F)





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

Minimum fluid pressure:

AZ Series:

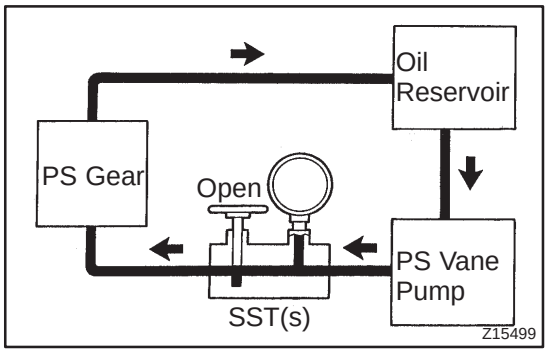
8,300 to 9,000 kPa (85 to 92 kgf/cm^2, 1,204 to 1,305 psi)

1CD–FTV:

8,800 to 9,500 kPa (90 to 97 kgf/cm^2, 1,276 to 1,378 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, open the valve fully.

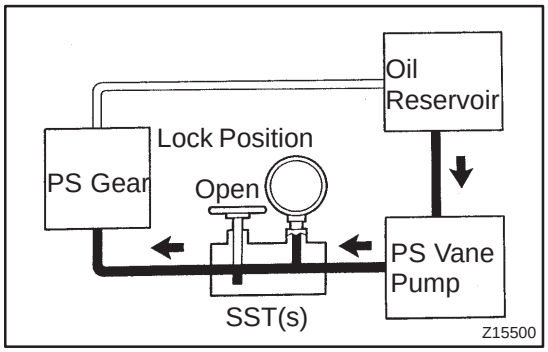
(j) Measure the fluid pressure at engine speeds of 1,000 rpm and 3,000 rpm.

Fluid pressure difference:

490 kPa (5 kgf/cm^2, 71 psi) or less

NOTICE:

Do not turn the steering wheel.

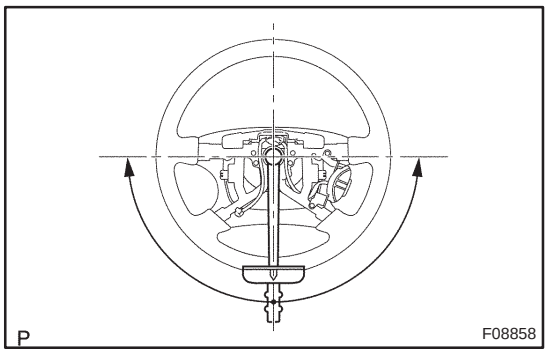


(k) With the engine idling and valve fully opened, turn the steering wheel to full lock position.
Minimum fluid pressure:
AZ Series:
8,300 to 9,000 kPa (85 to 92 kgf/cm^2, 1,204 to 1,305 psi)
1CD–FTV:
8,800 to 9,500 kPa (90 to 97 kgf/cm^2, 1,276 to 1,378 psi)

NOTICE:

- **Do not maintain lock position for more than 10 seconds.**
- **Do not let the fluid temperature become too high.**

(l) Remove SST(s).
(m) AZ Series:
Connect the pressure feed tube assy to the vane pump assy (See page 51–9).
(n) 1CD–FTV:
Connect the pressure feed tube assy to the vane pump assy (See page 51–19).
(o) Bleed the power steering system.



5. CHECK STEERING EFFORT
(a) Center the steering wheel.
(b) Remove the steering wheel pad (See page 60–17).
(c) Start the engine and run it at idle.
(d) Measure the steering effort in both directions.
Steering effort (Reference):
5.5 N·m (56 kgf·cm, 49 in.·lbf)

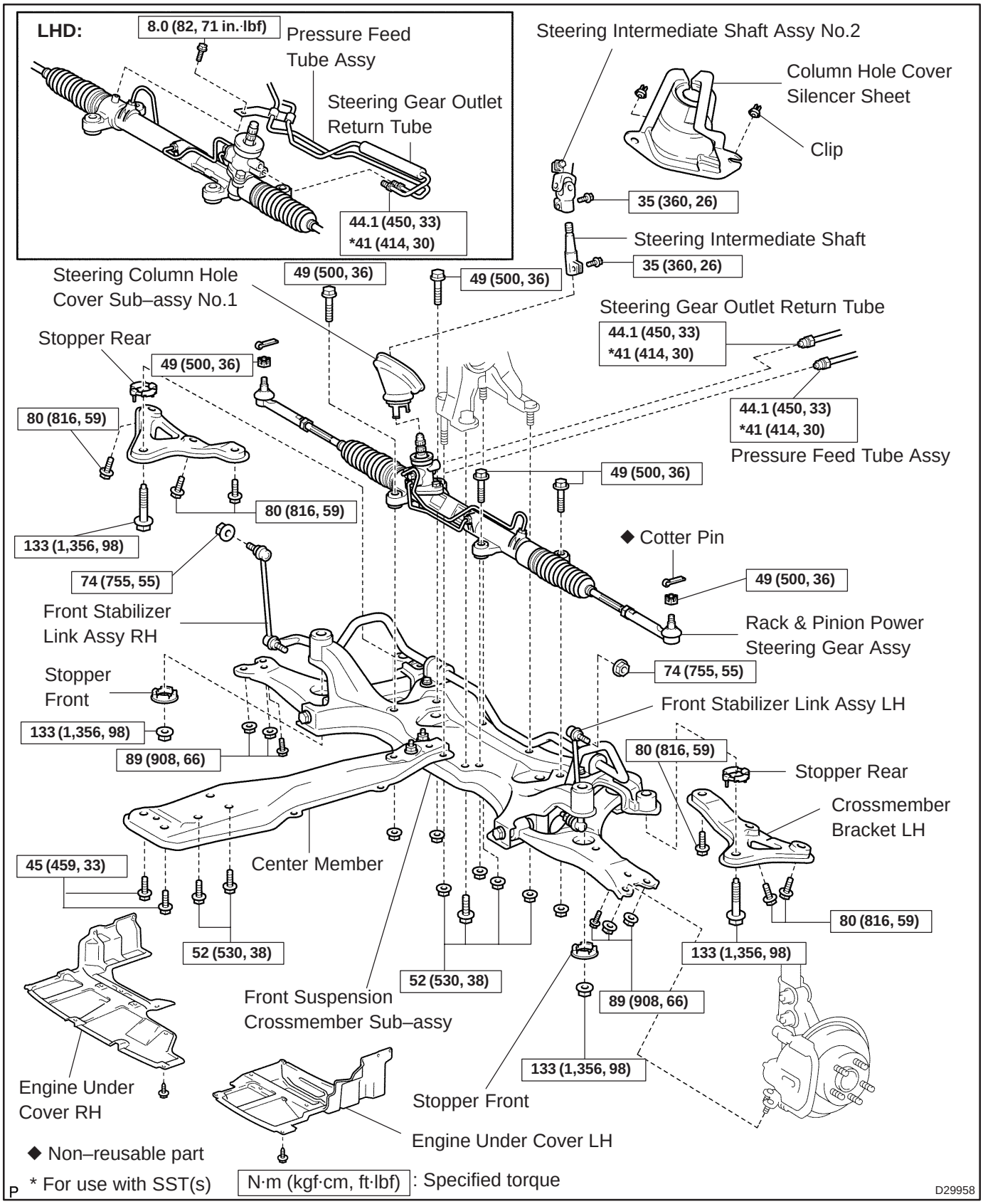
HINT:
Take the tire type, pressure and contact surface into consideration before making your diagnosis.

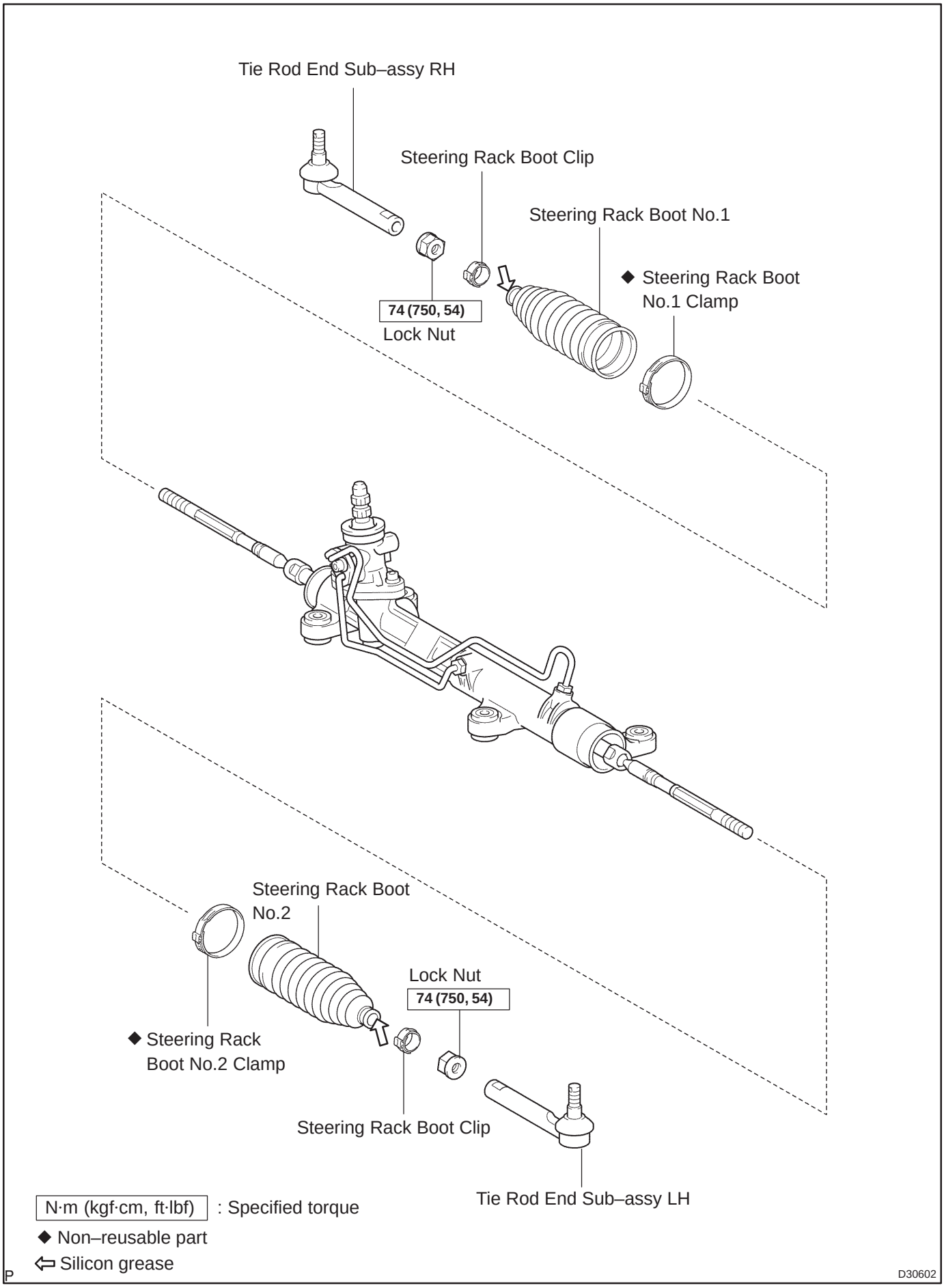
(e) Torque the steering wheel set nut.
Torque: 50 N·m (510 kgf·cm, 37 ft·lbf)
(f) Install the steering wheel pad (See page 60–17).

RACK & PINION POWER STEERING GEAR ASSY

COMPONENTS

510DK–02




Tie Rod End Sub–assy RH
Steering Rack Boot Clip
Steering Rack Boot No.1
◆ Steering Rack Boot No.1 Clamp
74 (750, 54)
Lock Nut
Steering Rack Boot No.2
Lock Nut
74 (750, 54)
◆ Steering Rack Boot No.2 Clamp
Steering Rack Boot Clip
Tie Rod End Sub–assy LH
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
⇦ Silicon grease
P
D30602

510DL–02

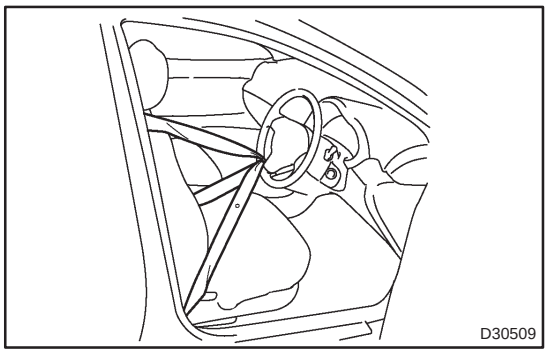
OVERHAUL

NOTICE:

When installing, coat the parts indicated by the arrows with power steering fluid or molybdenum disulfide lithium base grease (See page 51–34).

1. INSPECT CENTER FRONT WHEEL

2. REMOVE COLUMN HOLE COVER SILENCER SHEET (See page 50–9)

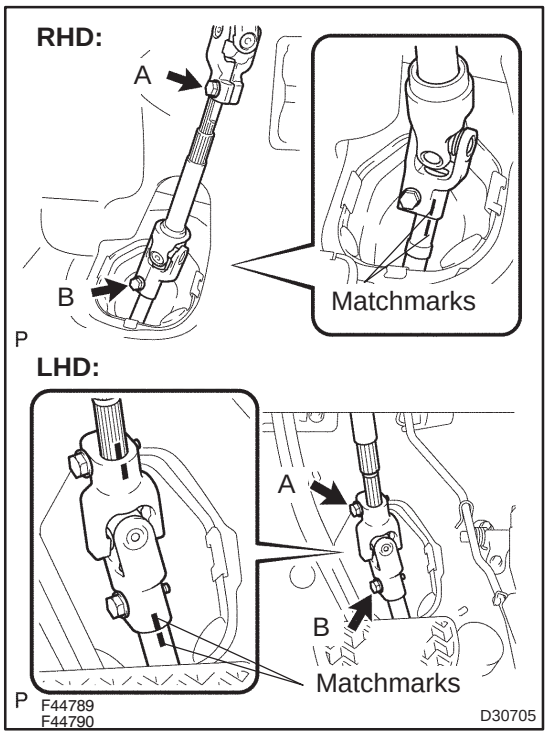


3. SEPARATE STEERING INTERMEDIATE SHAFT ASSY NO.2

(a) To prevent form rotating the steering wheel, fix the wheel with the seat belt.

HINT:

The operation is useful to prevent the damage of the spiral cable.



(b) Place matchmarks on the intermediate shaft assy No.2 and the intermediate shaft.

(c) Loosen the bolt A and remove the bolt B, then separate the intermediate shaft assy No.2.

4. SEPARATE STEERING COLUMN HOLE COVER SUB–ASSY NO.1

5. REMOVE FRONT WHEELS

6. REMOVE ENGINE UNDER COVER LH

7. REMOVE ENGINE UNDER COVER RH

8. SEPARATE TIE ROD END SUB–ASSY LH (See page 30–6)

SST 09628–62011

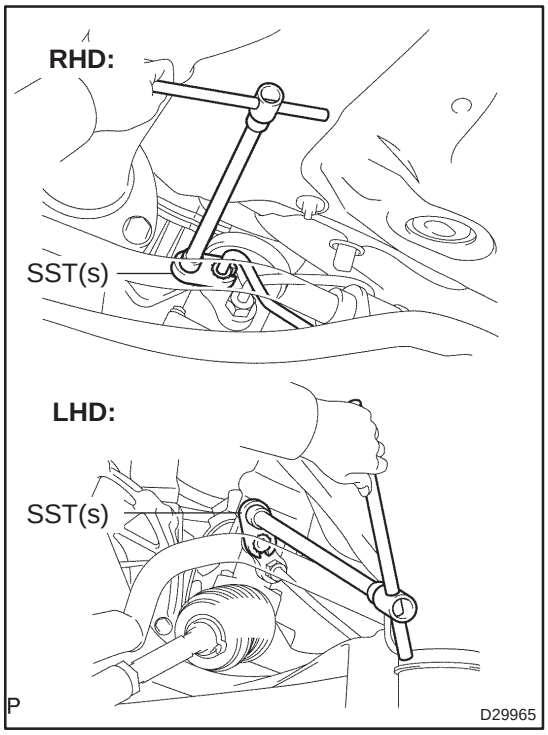
9. SEPARATE TIE ROD END SUB–ASSY RH

SST 09628–62011

HINT:

Perform the same procedure on the other side.

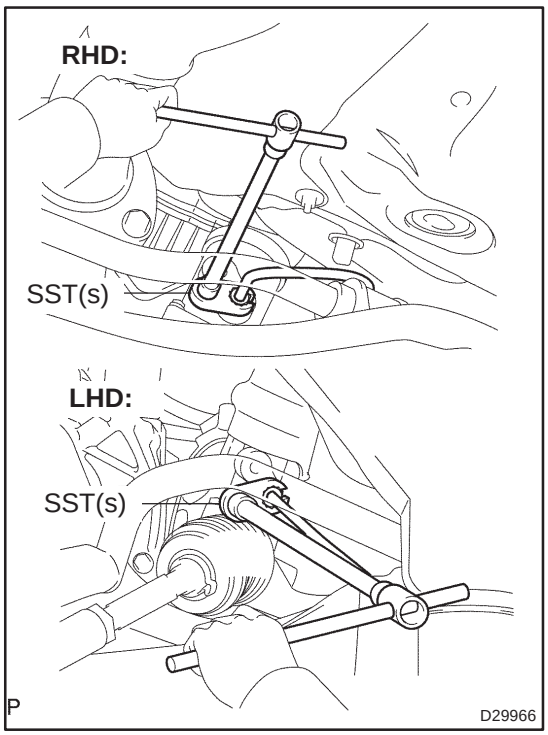
10. REMOVE HEIGHT CONTROL SENSOR SUB–ASSY FR RH (W/ DISCHARGE HEAD LAMP) (See page 65–28)



11. DISCONNECT STEERING GEAR OUTLET RETURN TUBE

(a) Using SST(s), disconnect the outlet return tube.
SST 09023–12700

(b) LHD:
Remove the bolt and separate the tube clamp from the power steering gear assy.



12. DISCONNECT PRESSURE FEED TUBE ASSY

(a) Using SST(s), disconnect the pressure feed tube assy.
SST 09023–12700

13. SEPARATE FRONT STABILIZER LINK ASSY LH (See page 30–6)

14. SEPARATE FRONT STABILIZER LINK ASSY RH

HINT:
Perform the same procedure on the other side.

15. SEPARATE FRONT SUSPENSION ARM SUB–ASSY LOWER NO.1 LH (See page 30–6)

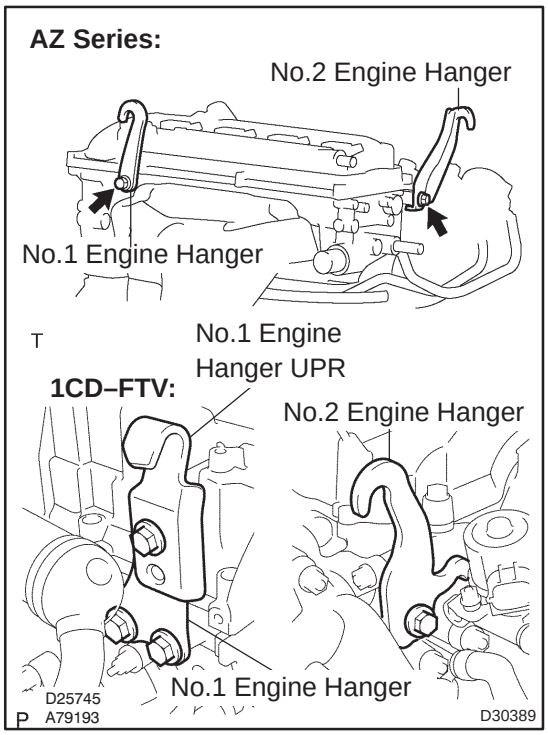
16. SEPARATE FRONT SUSPENSION ARM SUB–ASSY LOWER NO.1 RH

HINT:

Perform the same procedure on the other side.

17. REMOVE HOOD SUB–ASSY

18. REMOVE CYLINDER HEAD COVER SUB–ASSY



19. SUSPEND ENGINE ASSEMBLY

(a) Install the 2 or 3 engine hangers with the bolts in the correct direction.

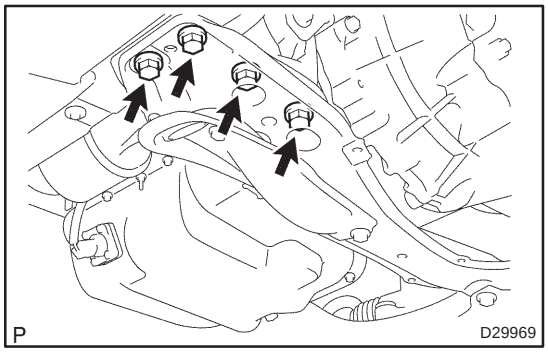
Parts No. :

	AZ Series:	1CD–FTV:
No.1 Engine Hanger	12281–28010	12281–27050
No.1 Engine Hanger UPR	–	Yellow:12284–27020 Black:12284–27030
No.2 Engine Hanger	12282–28010	Yellow:12282–27060 Black:12282–27070
Bolt	91512–61020	91642–81025

Torque:
AZ Series:
38 N·m (390 kgf·cm, 28 ft·lbf)
1CD–FTV:
37 N·m (375 kgf·cm, 27 ft·lbf)

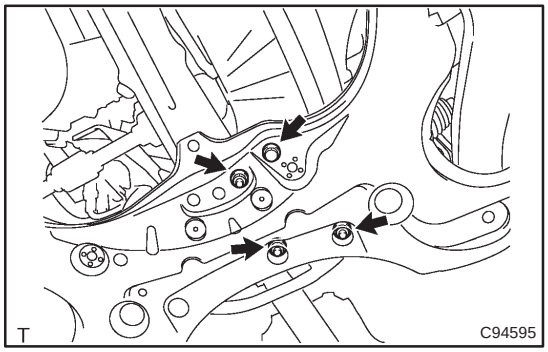
(b) Attach the engine chain hoist to the engine hangers.

CAUTION:
Do not attempt to hang the engine by hooking the chain to any other parts.



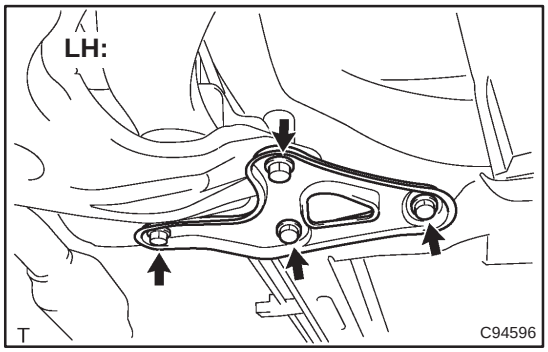
20. REMOVE FRONT SUSPENSION CROSSMEMBER SUB–ASSY

(a) Remove the 4 bolts and separate the center member.

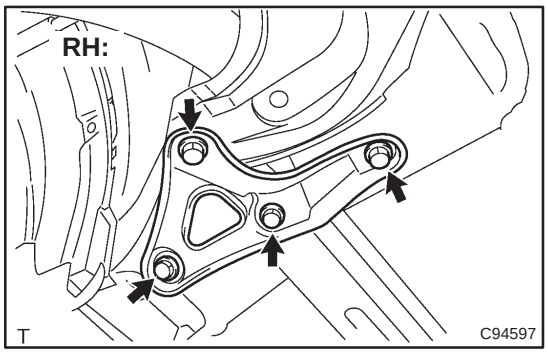


(b) Remove the bolt and the 3 nuts, separate the engine mounting insulator RR from the crossmember sub–assy.

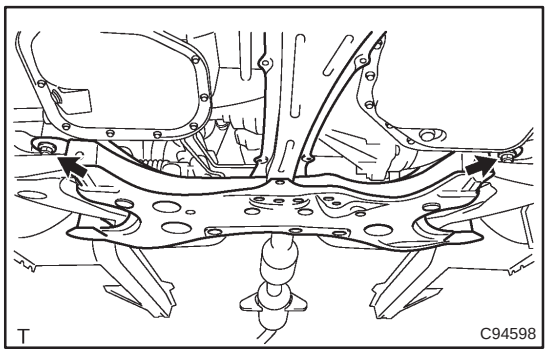
(c) Using a transmission jack, support the crossmember sub–assy.



(d) Remove the 4 bolts and the crossmember bracket LH.
(e) Remove the stopper rear from the crossmember bracket LH.

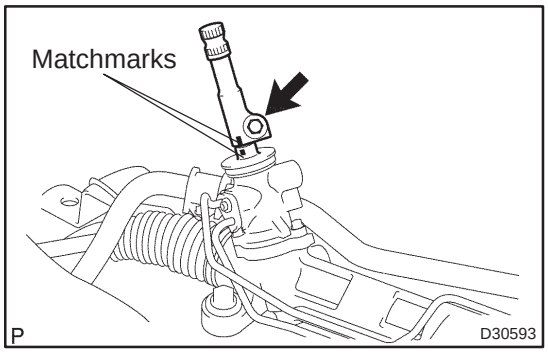


(f) Remove the 4 bolts and the crossmember bracket RH.
(g) Remove the stopper rear from the crossmember bracket RH.

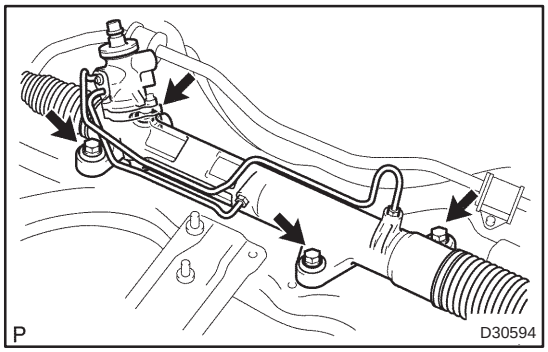


(h) Remove the 2 nuts and the crossmember sub–assy w/ power steering gear assy.
(i) Remove the 2 stopper front from the crossmember sub–assy.

21. REMOVE STEERING COLUMN HOLE COVER SUB–ASSY NO.1



22. REMOVE STEERING INTERMEDIATE SHAFT
(a) Place matchmarks on the intermediate shaft and the pinion shaft.
(b) Remove the bolt and the intermediate shaft.

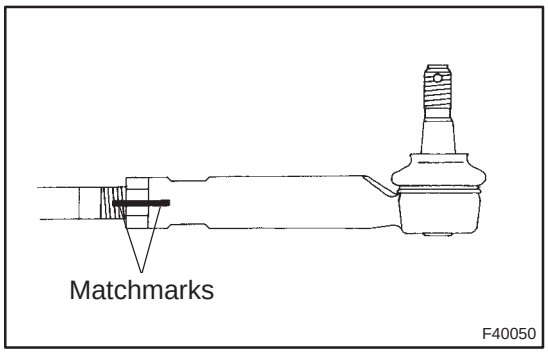


23. REMOVE RACK & PINION POWER STEERING GEAR ASSY

(a) Remove the 4 bolts, the nuts and the power steering gear assy from the crossmember sub–assy.

NOTICE:

Because the nut has its own stopper, do not turn the nut and torque the bolt with the nut fixed.



24. REMOVE TIE ROD END SUB–ASSY LH

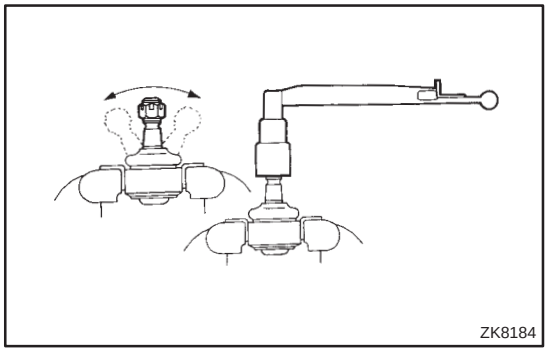
(a) Place matchmarks on the tie rod end sub–assy and the rack end.

(b) Loosen the lock nut, and remove the tie rod end sub–assy and the lock nut.

25. REMOVE TIE ROD END SUB–ASSY RH

HINT:

Perform the same procedure on the other side.



26. INSPECT TIE ROD END SUB–ASSY LH

(a) Secure the tie rod end sub–assy in a vise.

(b) Install the nut to the stud bolt.

(c) Flip the ball joint stud back and forth 5 times.

(d) Using a torx wrench, turn the nut continuously at a rate of 2 to 4 seconds per turn and take the torque reading on the 5th turn.

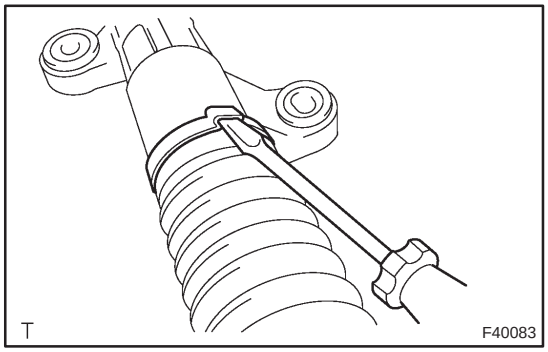
Turning torque:

0.49 to 3.43 N·m (5.0 to 35 kgf·cm, 4.34 to 30.38 in. lbf)

27. INSPECT TIE ROD END SUB–ASSY RH

HINT:

Perform the same procedure on the other side.



28. REMOVE STEERING RACK BOOT NO.2 CLAMP

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

NOTICE:

Be careful not to damage the boot.

29. REMOVE STEERING RACK BOOT NO.1 CLAMP

HINT:

Perform the same procedure on the other side.

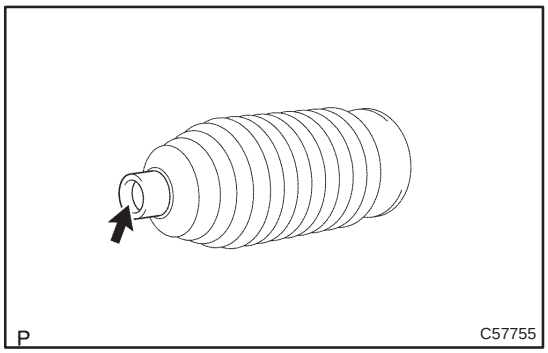
30. REMOVE STEERING RACK BOOT CLIP

HINT:

Perform the same procedure on the rack boot clamps.

31. REMOVE STEERING RACK BOOT NO.2

32. REMOVE STEERING RACK BOOT NO.1



33. INSTALL STEERING RACK BOOT NO.2

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

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

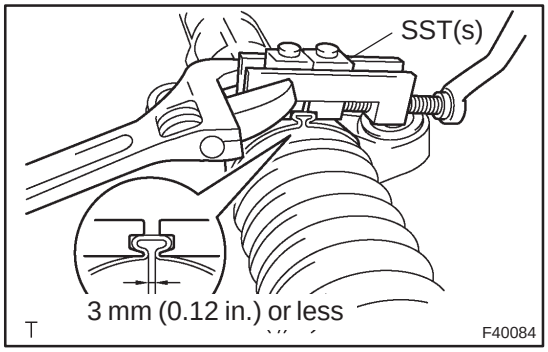
NOTICE:

Be careful not to damage or twist the boot.

34. INSTALL STEERING RACK BOOT NO.1

HINT:

Perform the same procedure on the other side.



35. INSTALL STEERING RACK BOOT NO.2 CLAMP

(a) Install a new rack boot No.2 clamp.

(b) Using SST(s), stake the rack boot No.2 clamp as shown in the illustration.

SST 09521–24010

36. INSTALL STEERING RACK BOOT NO.1 CLAMP

SST 09521–24010

HINT:

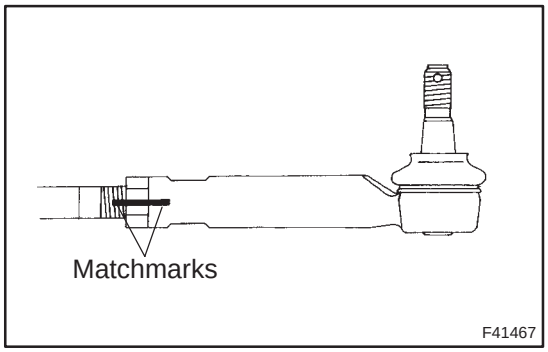
Perform the same procedure on the other side.

37. INSTALL STEERING RACK BOOT CLIP

SST 09521–24010

HINT:

Perform the same procedure on the rack boot clamps.



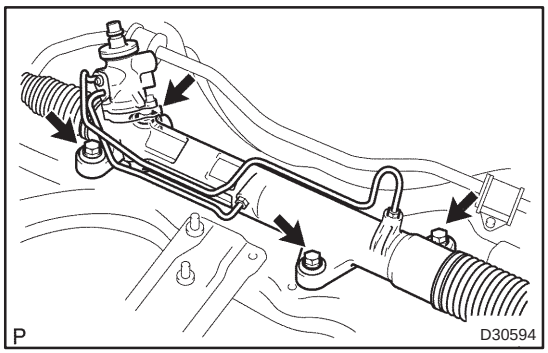
38. INSTALL TIE ROD END SUB–ASSY LH

(a) Screw the lock nut and the tie rod end sub–assy to the rack end until the matchmarks are aligned.
Torque: 74 N·m (750 kgf·cm, 54 ft·lbf)

HINT:
After adjusting toe–in, torque the lock nut
(See page 26–6).

39. INSTALL TIE ROD END SUB–ASSY RH

HINT:
Perform the same procedure on the other side.

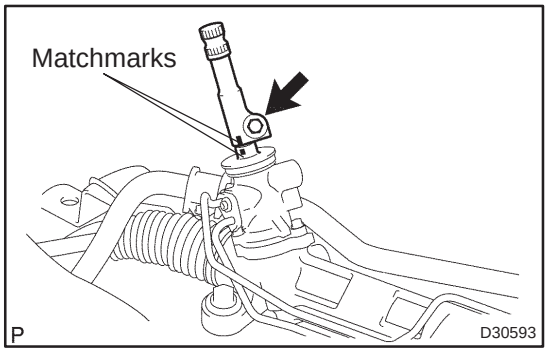


40. INSTALL RACK & PINION POWER STEERING GEAR ASSY

(a) Install the power steering gear assy with the 4 bolts and the nuts.
Torque: 49 N·m (500 kgf·cm, 36 ft·lbf)

NOTICE:

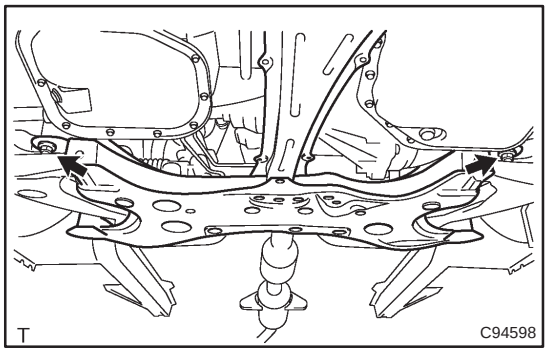
- **The 4 bushings must be securely installed to the power steering gear assy.**
- **When tightening the bolts for power steering gear, the bushings should not be bitten in.**
- **Because the nut has its own stopper, do not turn the nut and torque the bolt with the nut fixed.**



41. INSTALL STEERING INTERMEDIATE SHAFT

(a) Align the matchmarks on the intermediate shaft with the pinion shaft.
(b) Install the bolt.
Torque: 35 N·m (360 kgf·cm, 26 ft·lbf)

42. INSTALL STEERING COLUMN HOLE COVER SUB–ASSY NO.1

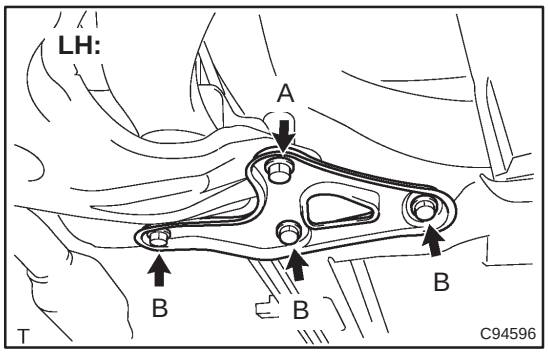


43. INSTALL FRONT SUSPENSION CROSSMEMBER SUB–ASSY

(a) Using a transmission jack, support the crossmember sub–assy w/power steering gear assy.

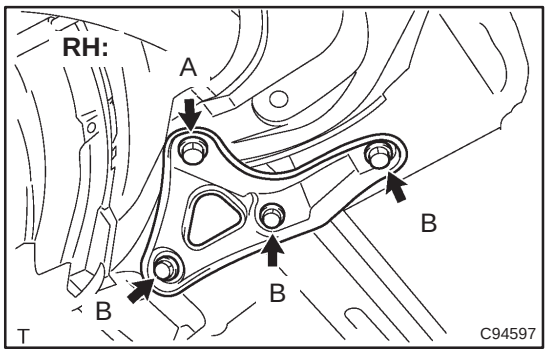
(b) Install the 2 stopper front onto the crossmember sub–assy.

(c) Install the crossmember sub–assy with the 2 nuts.
Torque: 133 N·m (1,356 kgf·cm, 98 ft·lbf)



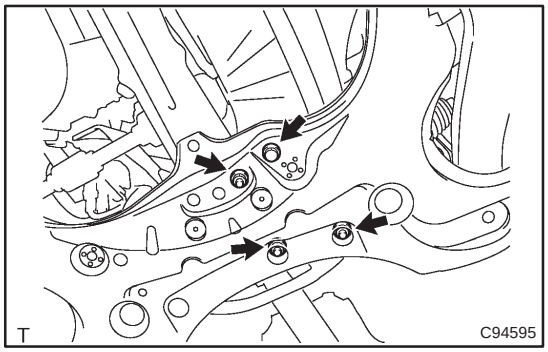
(d) Install the stopper rear onto the crossmember bracket LH.

(e) Install the crossmember bracket LH with the 4 bolts.
Torque:
Bolt A: 133 N·m (1,356 kgf·cm, 98 ft·lbf)
Bolt B: 80 N·m (816 kgf·cm, 59 ft·lbf)

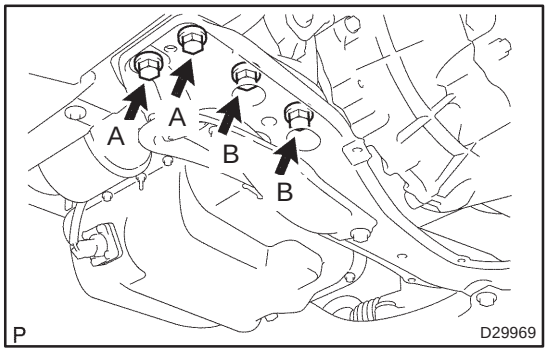


(f) Install the stopper rear onto the crossmember bracket RH.

(g) Install the crossmember bracket RH with the 4 bolts.
Torque:
Bolt A: 133 N·m (1,356 kgf·cm, 98 ft·lbf)
Bolt B: 80 N·m (816 kgf·cm, 59 ft·lbf)



(h) Install the engine mounting insulator RR to the crossmember sub–assy with the bolt and the 3 nuts.
Torque: 52 N·m (530 kgf·cm, 38 ft·lbf)



(i) Install the center member with the 4 bolts.
Torque:
Bolt A: 45 N·m (459 kgf·cm, 33 ft·lbf)
Bolt B: 52 N·m (530 kgf·cm, 38 ft·lbf)

44. INSTALL FRONT SUSPENSION ARM SUB–ASSY LOWER NO.1 LH (See page 30–6)

45. INSTALL FRONT SUSPENSION ARM SUB–ASSY LOWER NO.1 RH

HINT:

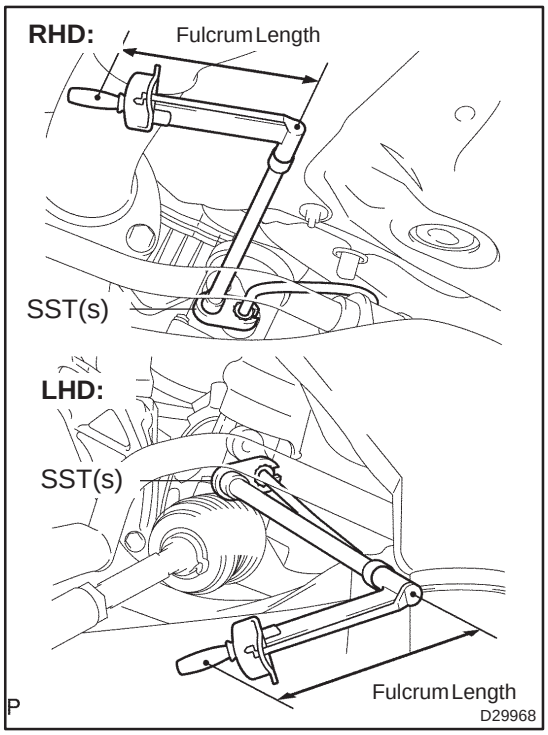
Perform the same procedure on the other side.

46. INSTALL FRONT STABILIZER LINK ASSY LH (See page 30–6)

47. INSTALL FRONT STABILIZER LINK ASSY RH

HINT:

Perform the same procedure on the other side.



48. CONNECT PRESSURE FEED TUBE ASSY

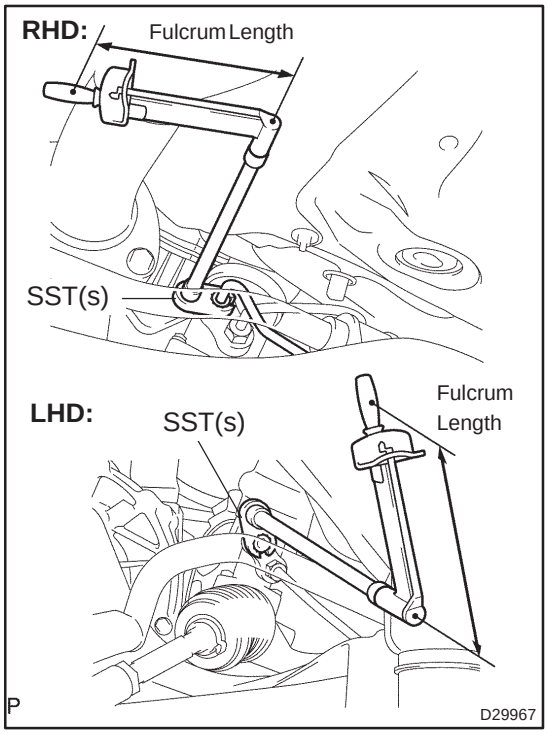
(a) Using SST(s), connect the pressure feed tube assy.

SST 09023–12700

Torque: 41 N·m (414 kgf·cm, 30 ft·lbf)

HINT:

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



49. CONNECT STEERING GEAR OUTLET RETURN TUBE

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

SST 09023–12700

Torque: 41 N·m (414 kgf·cm, 30 ft·lbf)

HINT:

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

(b) LHD:

Install the tube clamp with bolt to the power steering gear assy.

Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)

50. INSTALL HEIGHT CONTROL SENSOR SUB–ASSY FR RH (W/ DISCHARGE HEAD LAMP) (See page 65–28)

51. INSTALL TIE ROD END SUB–ASSY LH (See page 30–6)

52. INSTALL TIE ROD END SUB–ASSY RH

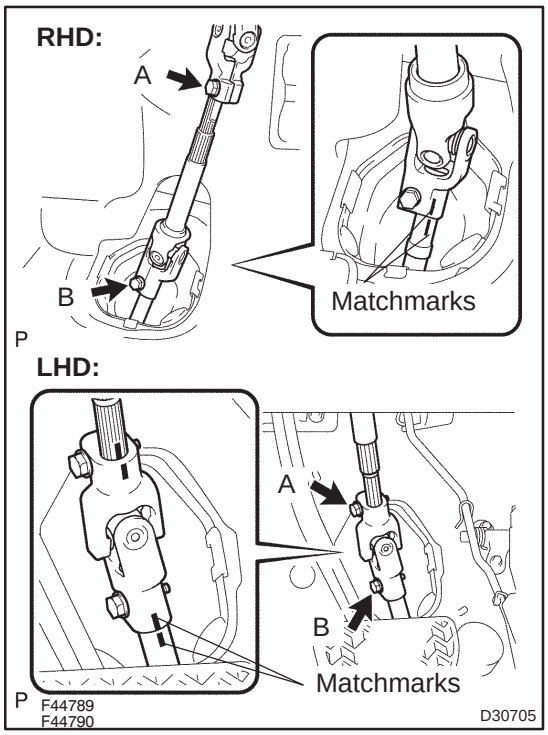
HINT:

Perform the same procedure on the other side.

53. INSTALL FRONT WHEELS

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

54. INSTALL STEERING COLUMN HOLE COVER SUB–ASSY NO.1



55. INSTALL STEERING INTERMEDIATE SHAFT ASSY NO.2

(a) Align the matchmarks on the intermediate shaft assy No.2 and the intermediate shaft.

(b) Install the bolt B and tighten the bolt A.

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

56. INSTALL COLUMN HOLE COVER SILENCER SHEET (See page 50–9)

57. INSTALL CYLINDER HEAD COVER SUB–ASSY

58. ADD POWER STEERING FLUID (See page 51–4)

59. BLEED POWER STEERING FLUID (See page 51–4)

60. CHECK POWER STEERING FULUID LEVEL IN RESERVER (See page 51–4)

61. INSPECT FLUID LEAK

62. INSPECT HOOD SUB–ASSY (See page 75–2)

63. ADJUST HOOD SUB–ASSY (See page 75–2)

64. INSPECT AND ADJUST FRONT WHEEL ALIGNMENT (See page 26–6)

65. INSTALL ENGINE UNDER COVER LH

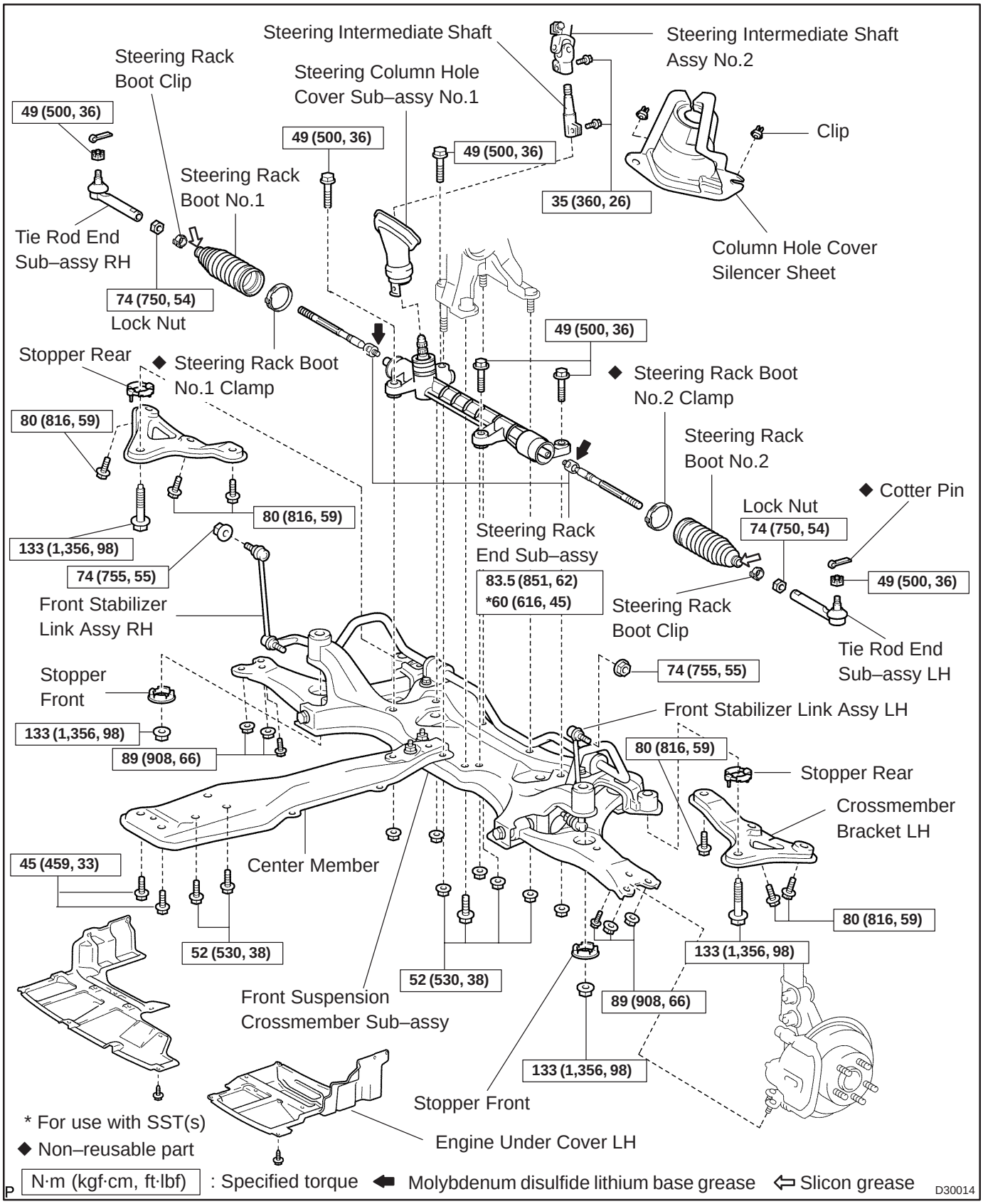
66. INSTALL ENGINE UNDER COVER RH

67. HEADLIGHT AIM ONLY (W/ DISCHARGE HEAD LAMP) (See page 65–19)

STEERING GEAR ASSY

COMPONENTS

510DI–02



510DJ–02

OVERHAUL

NOTICE:

When installing, coat the parts indicated by the arrows with power steering fluid or molybdenum disulfide lithium base grease (See page 51–27).

1. INSPECT CENTER FRONT WHEEL

2. REMOVE COLUMN HOLE COVER SILENCER SHEET (See page 50–9)

3. SEPARATE STEERING INTERMEDIATE SHAFT ASSY NO.2 (See page 51–36)

4. SEPARATE STEERING COLUMN HOLE COVER SUB–ASSY NO.1

5. REMOVE FRONT WHEELS

6. REMOVE ENGINE UNDER COVER LH

7. REMOVE ENGINE UNDER COVER RH

8. SEPARATE TIE ROD END SUB–ASSY LH (See page 30–6)

SST 09628–62011

9. SEPARATE TIE ROD END SUB–ASSY RH

SST 09628–62011

HINT:

Perform the same procedure on the other side.

10. REMOVE HEIGHT CONTROL SENSOR SUB–ASSY FR RH (W/ DISCHARGE HEAD LAMP) (See page 65–28)

11. SEPARATE FRONT STABILIZER LINK ASSY LH (See page 30–6)

12. SEPARATE FRONT STABILIZER LINK ASSY RH

HINT:

Perform the same procedure on the other side.

13. SEPARATE FRONT SUSPENSION ARM SUB–ASSY LOWER NO.1 LH (See page 30–6)

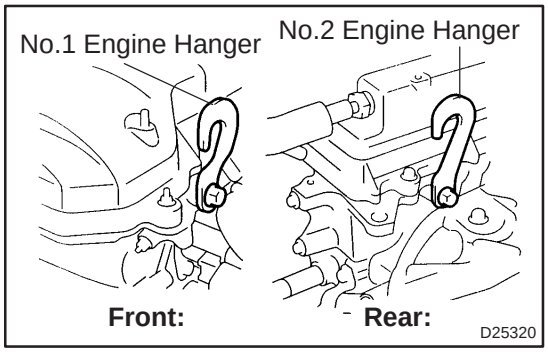
14. SEPARATE FRONT SUSPENSION ARM SUB–ASSY LOWER NO.1 RH

HINT:

Perform the same procedure on the other side.

15. REMOVE HOOD SUB–ASSY

16. REMOVE CYLINDER HEAD COVER SUB–ASSY



17. SUSPEND ENGINE ASSEMBLY

(a) Remove the 2 PCV hoses.

(b) Install the 2 engine hangers in the correct direction.

No.1 engine hanger: 12281–22021
No.2 engine hanger: 12281–15040
Bolt: 90512–B1016
Torque: 38 N·m (387 kgf·cm, 28 ft·lbf)

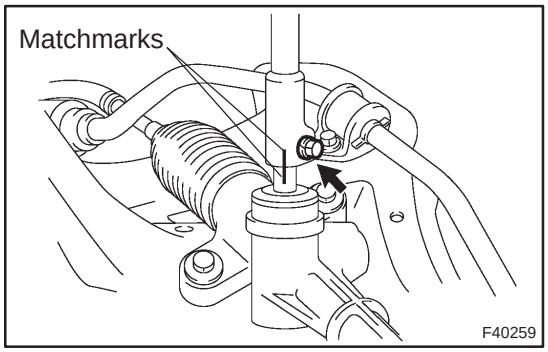
(c) Attach the engine chain hoist to the hangers.

CAUTION:

Do not attempt t hang the ingine by hooking the chain to any other part.

18. REMOVE FRONT SUSPENSION CROSSMEMBER SUB–ASSY (See page 51–36)

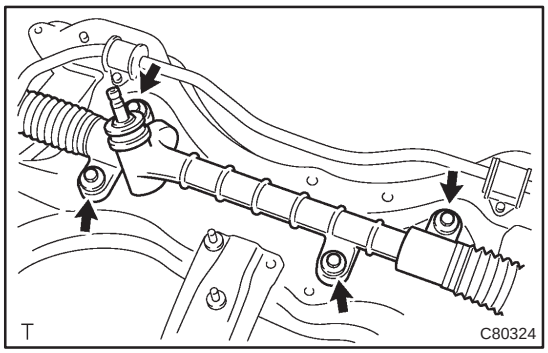
19. REMOVE STEERING COLUMN HOLE COVER SUB–ASSY NO.1



20. REMOVE STEERING INTERMEDIATE SHAFT

(a) Place matchmarks on the intermediate shaft and the pinion shaft.

(b) Remove the bolt and the steering intermediate shaft.

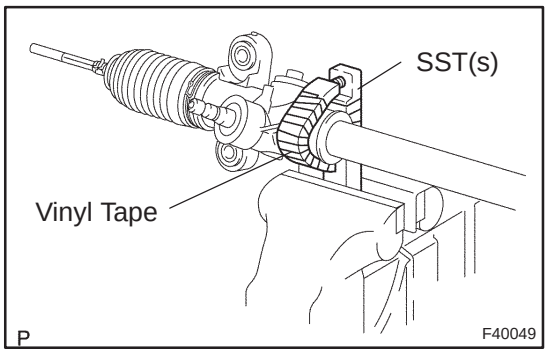


21. REMOVE STEERING GEAR ASSY

(a) Remove the 4 bolts, the 4 nuts and the steering gear assy from the crossmember sub–assy.

NOTICE:

Because the nut has its own stopper, do not turn the nut and torque the bolt with the nut fixed.

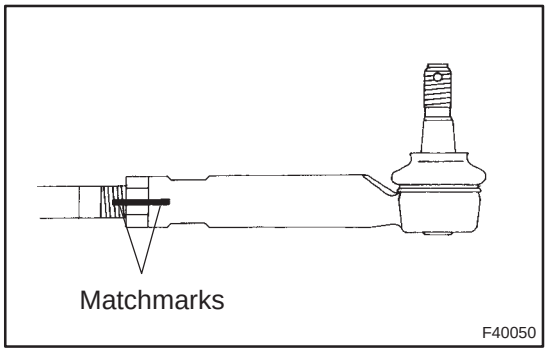


22. FIX STEERING GEAR ASSY

(a) Using SST(s), secure the steering gear assy in a vise.
SST 09612–00012

HINT:

Tape the SST(s) before use.



23. REMOVE TIE ROD END SUB–ASSY LH

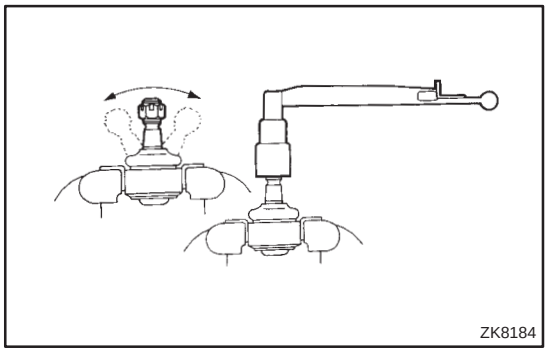
(a) Place matchmarks on the tie rod end sub–assy and the rack end sub–assy.

(b) Loosen the lock nut and remove the tie rod end sub–assy and the lock nut.

24. REMOVE TIE ROD END SUB–ASSY RH

HINT:

Perform the same procedure on the other side.



25. INSPECT TIE ROD END SUB–ASSY LH

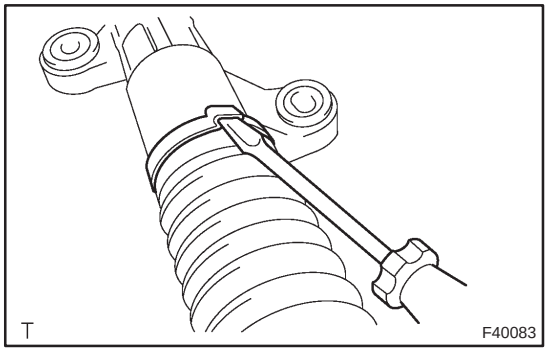
(a) Secure the tie rod end sub–assy in a vise.
(b) Install the nut to the stud bolt.
(c) Flip the ball joint stud back and forth 5 times.
(d) Using a torx wrench, turn the nut continuously at a rate of 2 to 4 seconds per turn and take the torque reading on the 5th turn.
Turning torque:
0.29 to 1.96 N·m (3 to 20 kgf·cm, 2.57 to 17.35 in.·lbf)

26. INSPECT TIE ROD END SUB–ASSY RH

HINT:
Perform the same procedure on the other side.

27. REMOVE STEERING RACK BOOT CLIP

(a) Using a pliers, remove the 2 boot clips from each rack boots.



28. REMOVE STEERING RACK BOOT NO.2 CLAMP

(a) Using a screwdriver, unstake the rack boot No.2 clamp.

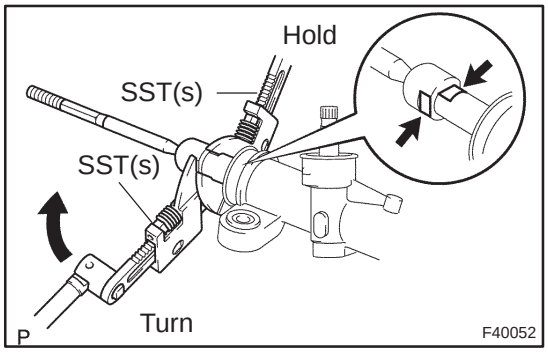
NOTICE:
Be careful not to damage the boot.

29. REMOVE STEERING RACK BOOT NO.1 CLAMP

HINT:
Perform the same procedure on the other side.

30. REMOVE STEERING RACK BOOT NO.2

31. REMOVE STEERING RACK BOOT NO.1

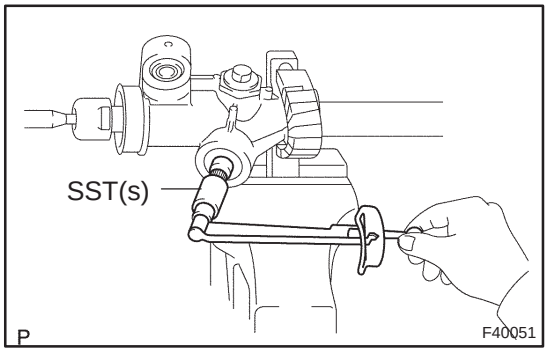


32. REMOVE STEERING RACK END SUB–ASSY

(a) Using SST(s), hold the steering rack steadily and using another SST(s), remove the rack end sub–assy.
SST 09922–10010

NOTICE:
Use SST(s) 09922–10010 in the direction shown in the illustration.

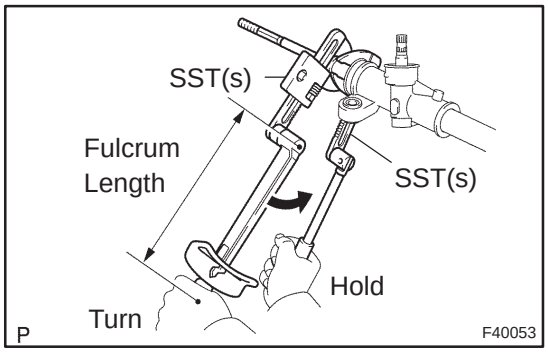
HINT:
Perform the same procedure on the other side.



33. INSPECT TOTAL PRELOAD

(a) Temporarily install the RH and LH rack end sub–assy.
(b) Using SST(s) and a torque wrench, check the preload.
SST 09616–00011
Preload (turning):
0.6 to 1.1 N·m (6 to 11 kgf·cm, 5.3 to 9.7 in.·lbf)

If it is not within specification, replace the steering gear assy.

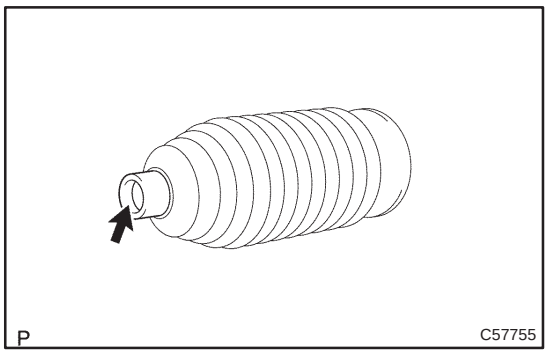


34. INSTALL STEERING RACK END SUB–ASSY

(a) Using SST(s), hold the steering rack steadily and using another SST(s), torque the rack end sub–assy.
SST 09922–10010
Torque: 60 N·m (616 kgf·cm, 45 ft·lbf)

NOTICE:
Use SST(s) 09922–10010 in the direction shown in the illustration.

HINT:
- Use a torque wrench with a fulcrum length of 345 mm (13.58 in.)
- Perform the same procedure on the other side.



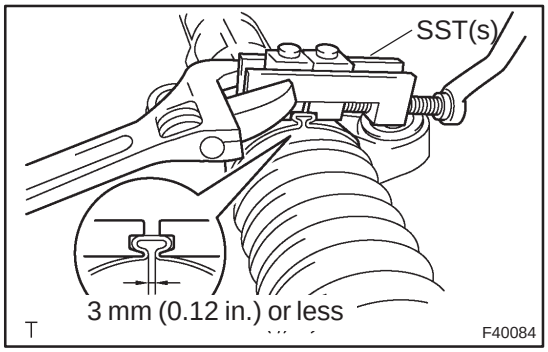
35. INSTALL STEERING RACK BOOT NO.2

(a) Apply silicon grease to the inside small caliber of rack boot No.2.
(b) Install the rack boot No.2 to the groove on the rack housing.

NOTICE:
Be careful not to damage or twist the boot.

36. INSTALL STEERING RACK BOOT NO.1

HINT:
Perform the same procedure on the other side.



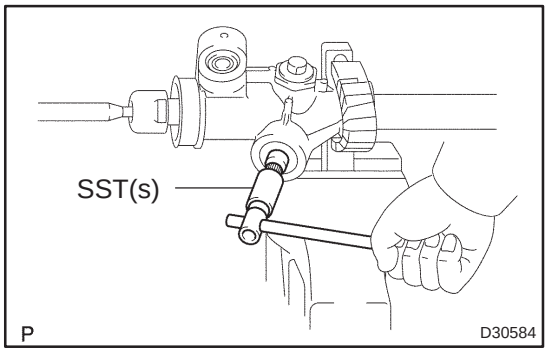
37. INSTALL STEERING RACK BOOT NO.2 CLAMP

(a) Install a new rack boot No.2 clamp to the rack boot No.2.
(b) Using SST(s), stake the rack boot No.2 clamp as shown in the illustration.
SST 09521–24010

38. INSTALL STEERING RACK BOOT NO.1 CLAMP

SST 09521–24010

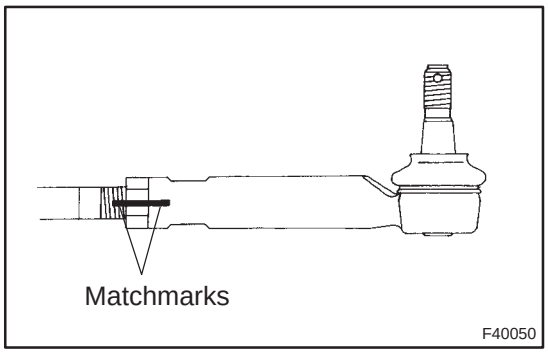
HINT:
Perform the same procedure on the other side.



39. INSTALL STEERING RACK BOOT CLIP

(a) Using a pliers, install the 2 rack boot clips to each rack boots.

(b) Using SST(s), check that the rack boot No.2 is strechy.
SST 09616–00011



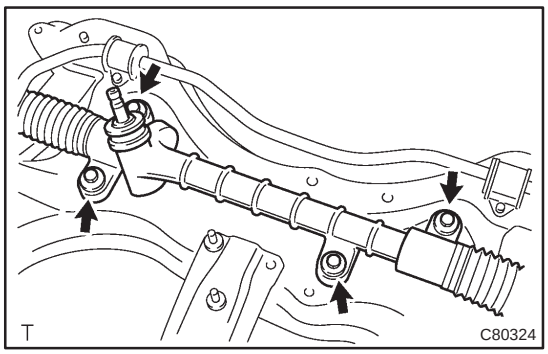
40. INSTALL TIE ROD END SUB–ASSY LH

(a) Screw the lock nut and the tie rod end sub–assy to the rack end sub–assy until the matchmarks are aligned.
Torque: 74 N·m (750 kgf·cm, 54 ft·lbf)

HINT:
After adjusting toe–in, torque the lock nut
(See page 26–6).

41. INSTALL TIE ROD END SUB–ASSY RH

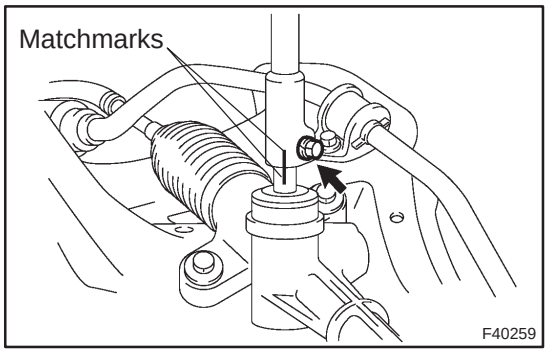
HINT:
Perform the same procedure on the other side.



42. INSTALL STEERING GEAR ASSY

(a) Install the steering gear assy onto the crossmember sub–assy with the 4 bolts and the nuts.
Torque: 49 N·m (500 kgf·cm, 36 ft·lbf)

NOTICE:
Because the nut has its own stopper, do not turn the nut and torque the bolt with the nut fixed.



43. INSTALL STEERING INTERMEDIATE SHAFT

(a) Align the matchmarks on the steering intermediate shaft and the steering pinion shaft.

(b) Install the bolt.
Torque: 35 N·m (360 kgf·cm, 26 ft·lbf)

44. INSTALL STEERING COLUMN HOLE COVER SUB–ASSY NO.1

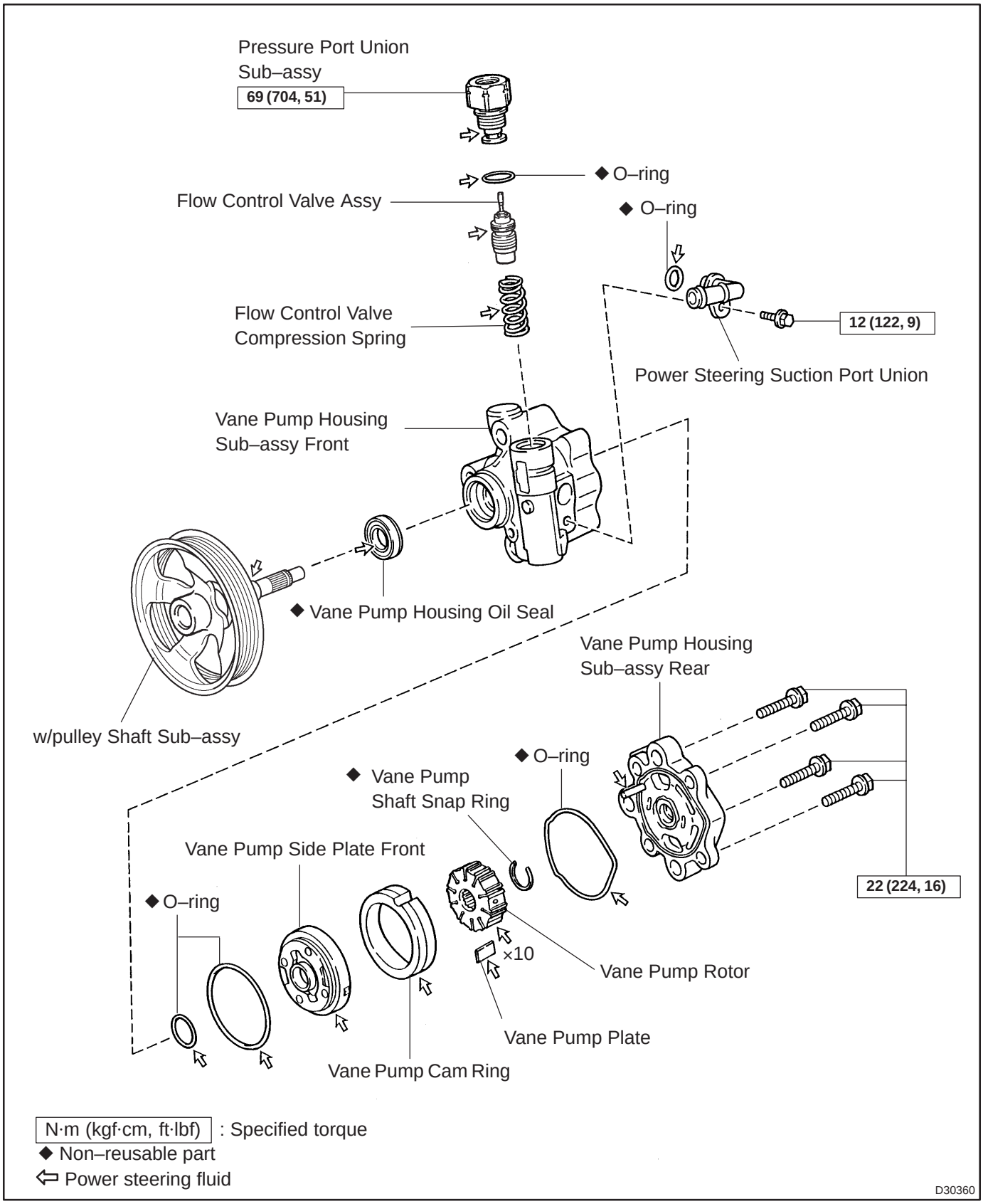
45. INSTALL FRONT SUSPENSION CROSSMEMBER SUB–ASSY (See page 51–36)

46. INSTALL FRONT SUSPENSION ARM SUB–ASSY LOWER NO.1 LH (See page 30–6)
47. INSTALL FRONT SUSPENSION ARM SUB–ASSY LOWER NO.1 RH
HINT:
Perform the same procedure on the other side.
48. INSTALL FRONT STABILIZER LINK ASSY LH (See page 30–6)
49. INSTALL FRONT STABILIZER LINK ASSY RH
HINT:
Perform the same procedure on the other side.
50. INSTALL HEIGHT CONTROL SENSOR SUB–ASSY FR RH (W/ DISCHARGE HEAD LAMP) (See page 65–28)
51. INSTALL TIE ROD END SUB–ASSY LH (See page 30–6)
52. INSTALL TIE ROD END SUB–ASSY RH
HINT:
Perform the same procedure on the other side.
53. INSTALL FRONT WHEELS
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)
54. INSTALL STEERING COLUMN HOLE COVER SUB–ASSY NO.1
55. INSTALL STEERING INTERMEDIATE SHAFT ASSY NO.2 (See page 51–36)
56. INSTALL COLUMN HOLE COVER SILENCER SHEET (See page 50–9)
57. INSTALL CYLINDER HEAD COVER SUB–ASSY
58. INSPECT HOOD SUB–ASSY (See page 75–2)
59. ADJUST HOOD SUB–ASSY (See page 75–2)
60. INSPECT AND ADJUST FRONT WHEEL ALIGNMENT (See page 26–6)
61. INSTALL ENGINE UNDER COVER LH
62. INSTALL ENGINE UNDER COVER RH
63. HEADLIGHT AIM ONLY (W/ DISCHARGE HEAD LAMP) (See page 65–19)

VANE PUMP ASSY (1CD–FTV)

COMPONENTS

5106Z–04



OVERHAUL

NOTICE:

- **When using a vise, do not overtighten.**
- **When installing, coat the parts indicated by the arrows with power steering fluid (See page 51–18).**

1. REMOVE V (COOLER COMPRESSOR TO CRANKSHAFT PULLEY) BELT NO.1 (See page 55–46)

2. REMOVE ENGINE COVER NO.1

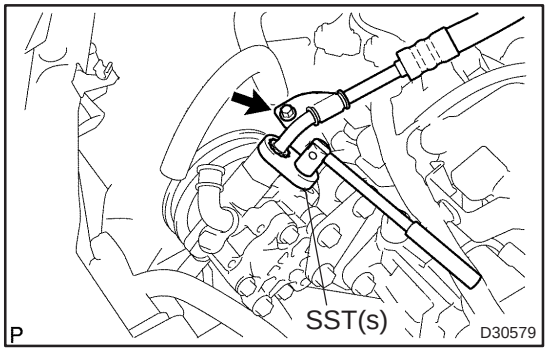
(a) Remove the bolt, 4 nuts and the engine cover No. 1.

3. DISCONNECT OIL RESERVOIR TO PUMP HOSE NO.1

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

NOTICE:

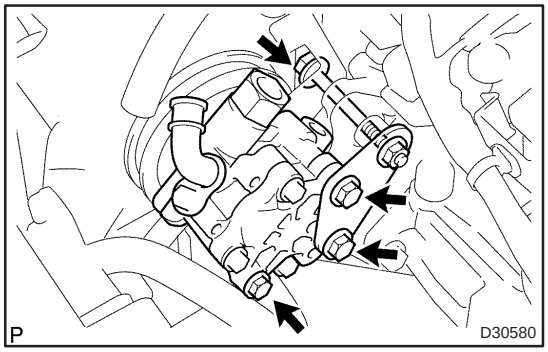
Take care not to spill fluid on the V belt.



4. DISCONNECT PRESSURE FEED TUBE ASSY

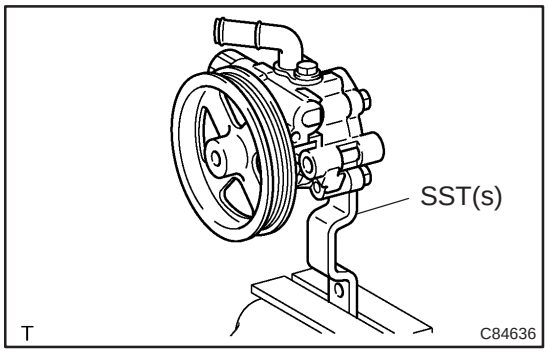
(a) Remove the bolt and sepatate the tube clamp.

(b) Using SST(s), disconnect the pressure feed tube assy from the vane pump assy.
SST 09023–12700



5. REMOVE VANE PUMP ASSY

(a) Remove the 4 bolts, the vane pump assy and the vane pump bracket rear.



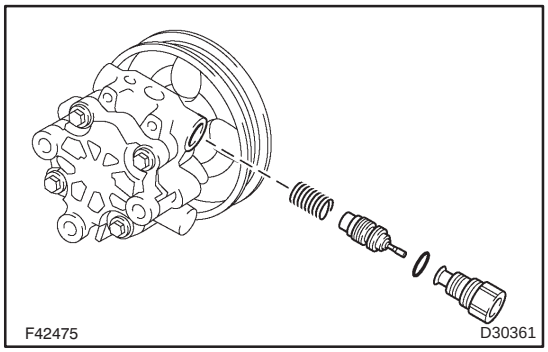
6. FIX VANE PUMP ASSY

(a) Using SST(s), hold the vane pump assy in a vise.
SST 09630–00014 (09631–00132)

7. REMOVE POWER STEERING SUCTION PORT UNION

(a) Remove the bolt and the suction port union.

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

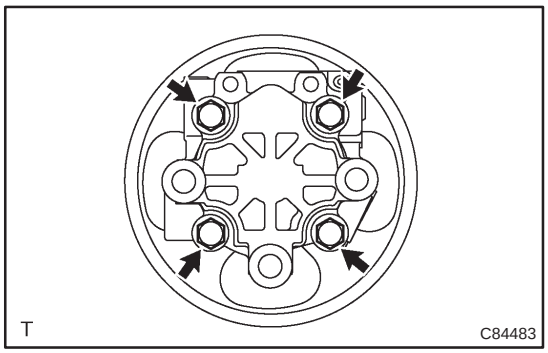


8. REMOVE FLOW CONTROL VALVE ASSY

(a) Remove the pressure port union sub–assy.

(b) Remove the O–ring from the pressure port union sub–assy.

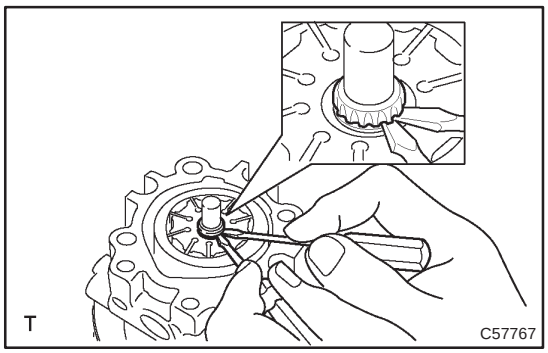
(c) Remove the flow control valve assy and the compression spring.



9. REMOVE VANE PUMP HOUSING SUB–ASSY REAR

(a) Remove the 4 bolts and housing sub–assy rear from the housing sub–assy front.

(b) Remove the O–ring from the housing sub–assy rear.



10. REMOVE W/PULLEY SHAFT SUB–ASSY

(a) Using 2 screwdrivers, remove the snap ring from the w/pulley shaft sub–assy.

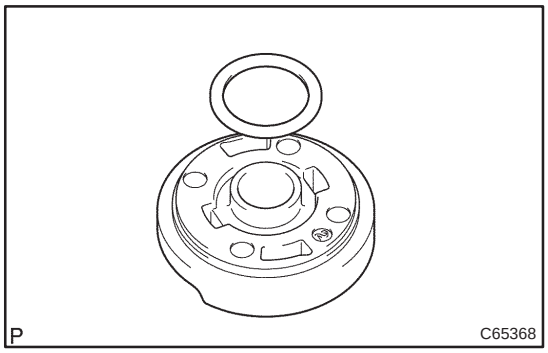
(b) Remove the w/pulley shaft sub–assy.

11. REMOVE VANE PUMP ROTOR

(a) Remove the 10 vane pump plates.

(b) Remove the vane pump rotor.

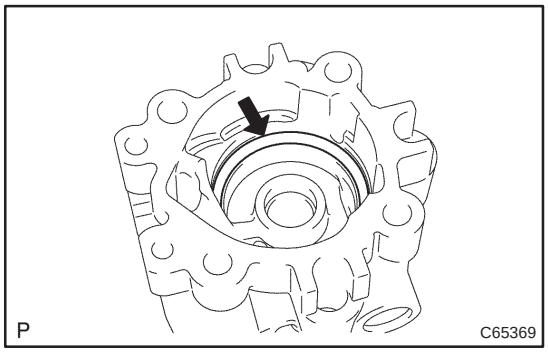
12. REMOVE VANE PUMP CAM RING



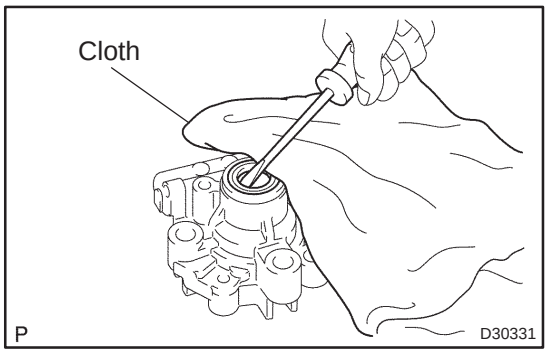
13. REMOVE VANE PUMP SIDE PLATE FRONT

(a) Remove the side plate front from the housing sub–assy front.

(b) Remove the O–ring from the side plate front.



(c) Remove the O–ring from the housing sub–assy front.

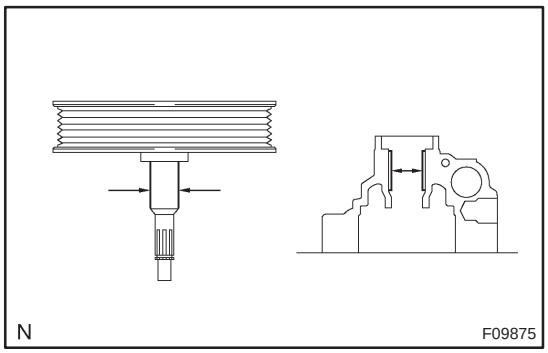


14. REMOVE VANE PUMP HOUSING OIL SEAL

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

NOTICE:

Be careful not to damage the pump housing.

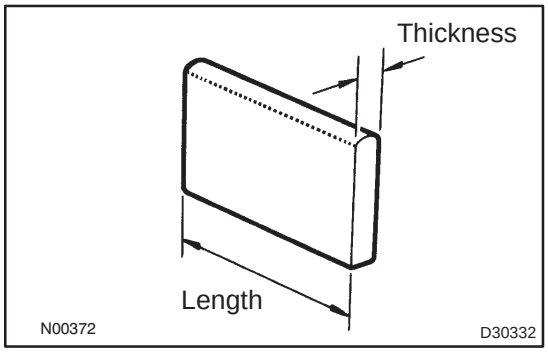


15. INSPECT VANE PUMP SHAFT AND BUSH IN HOUSING FRONT

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

Maximum clearance: 0.07 mm (0.0028 in.)

If it is more than the maximum, replace the vane pump assy.

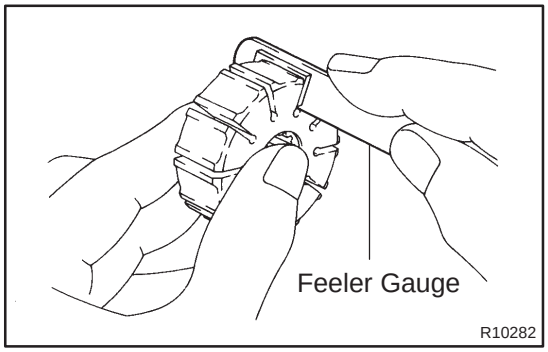


16. INSPECT VANE PUMP ROTOR AND VANE PUMP PLATES

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

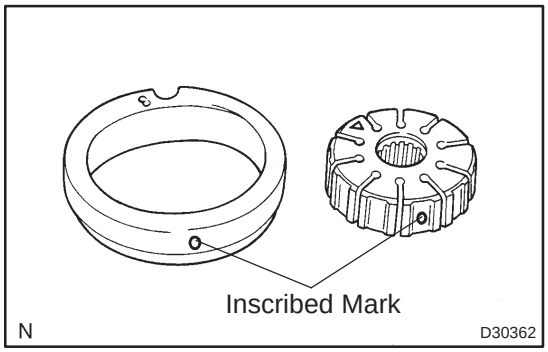
Minimum thickness:

1.405 to 1.411 mm (0.05531 to 0.05555 in.)



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

Maximum clearance: 0.03 mm (0.0012 in.)



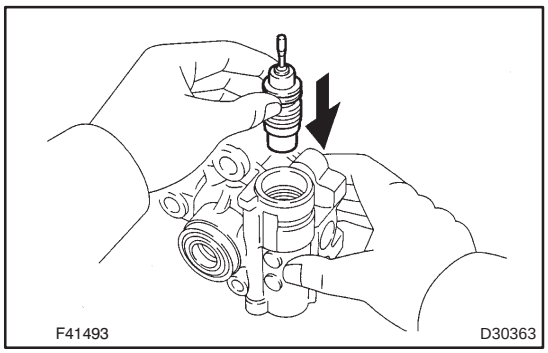
If it is more than the maximum, replace the vane pump plate and/or vane pump rotor with the one having the same mark as stamped on the cam ring.

Inscribed mark: 0, 1, 2, 3 or 4

HINT:

There are 5 different marks for vane pump plate.

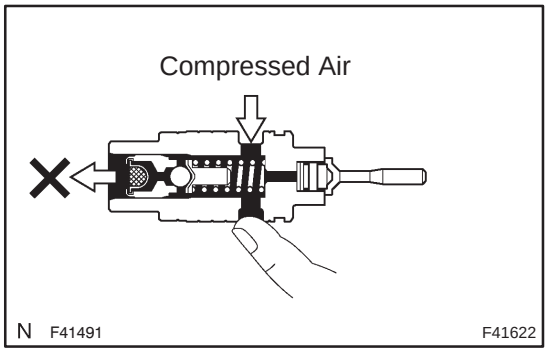
Mark	Part number	Length mm (in.)
0	44345–02110	12.001 to 12.003 (0.47247 to 0.47255)
1	44345–02120	11.999 to 12.000 (0.47240 to 0.47244)
2	44345–02130	11.997 to 11.998 (0.47232 to 0.47236)
3	44345–02140	11.995 to 11.996 (0.47224 to 0.47228)
4	44345–02150	11.993 to 11.994 (0.47216 to 0.47220)



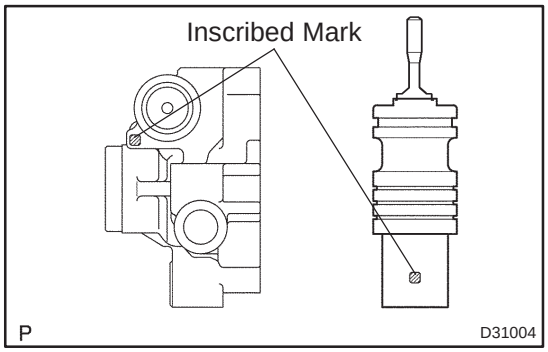
17. INSPECT FLOW CONTROL VALVE ASSY

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

If necessary, replace the vane pump assy.



(b) Check the flow control valve assy for leakage. Close one of the holes and apply compressed air of 392 to 490 kPa (4 to 5 kgf·cm^2, 57 to 71 psi) into the opposite side hole, and confirm that air does not come out from the end holes.



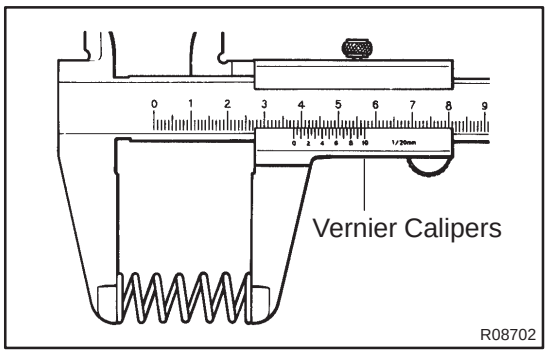
If necessary, replace the flow control valve assy with the one having the same letter as inscribed on the housing sub–assy front

Inscribed mark: A, B, C, D, E or F

HINT:

There are 6 different marks for flow control valve assy.

Mark	Part number
A	44330–05190
B	44330–05200
C	44330–05210
D	44330–05220
E	44330–05230
F	44330–05240



18. INSPECT FLOW CONTROL VALVE COMPRESSION SPRING

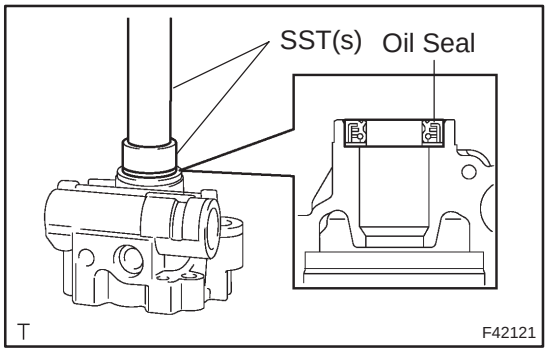
(a) Using vernier calipers, measure the free length of the compression spring.

Minimum free length: 36.9 mm (1.453 in.)

If it is less than the minimum, replace the compression spring.

19. INSPECT PRESSURE PORT UNION SUB–ASSY

(a) If the union seat in the pressure port union sub–assy is remarkably damaged, it may cause fluid leakage. Replace the pressure port union sub–assy.



20. INSTALL VANE PUMP HOUSING OIL SEAL

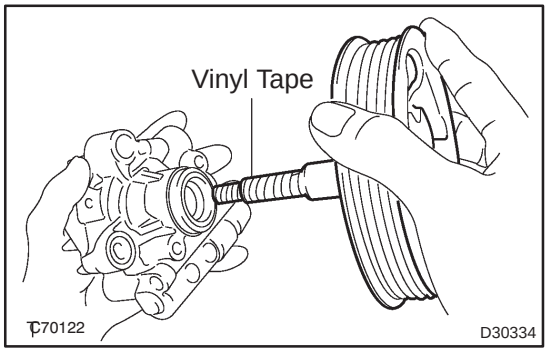
(a) Coat a new housing oil seal lip with power steering fluid.

(b) Using SST(s) and a press, install a new housing oil seal.

SST 09950–60010 (09951–00280), 09950–70010 (09951–07100)

NOTICE:

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



21. INSTALL W/PULLEY SHAFT SUB–ASSY

(a) Coat inside bushing surface of the housing sub–assy front with power steering fluid.

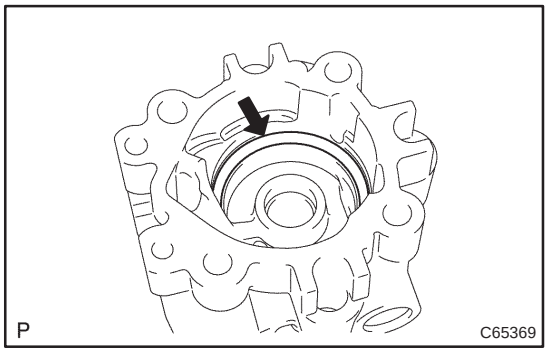
(b) Gradually insert the w/pulley shaft sub–assy.

NOTICE:

Do not damage the oil seal lip.

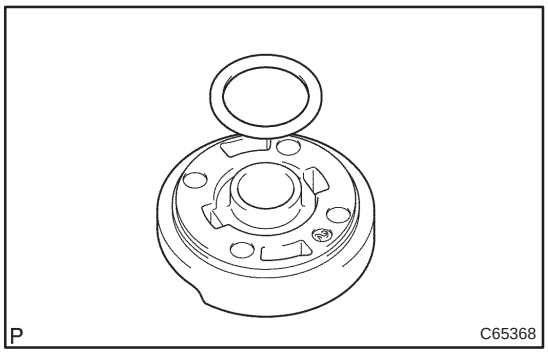
HINT:

Tape the shaft before inserting.

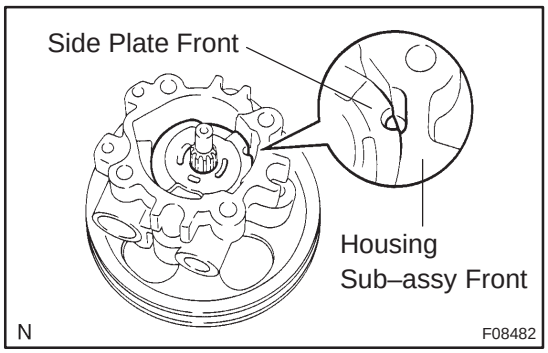


22. INSTALL VANE PUMP SIDE PLATE FRONT

(a) Coat a new O–ring with power steering fluid and install it inSto the housing sub–assy front.



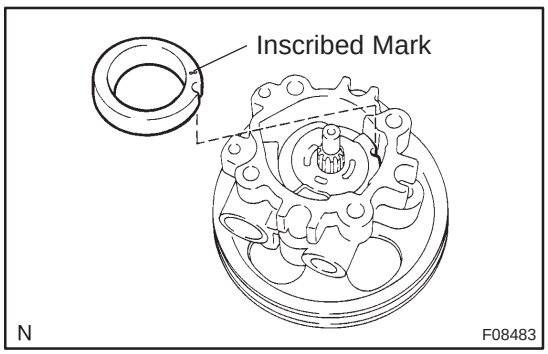
(b) Coat a new O–ring with power steering fluid and install it onto the side plate front.



(c) Align the dent of the side plate front with that of the housing sub–assy front, and install the side plate front.

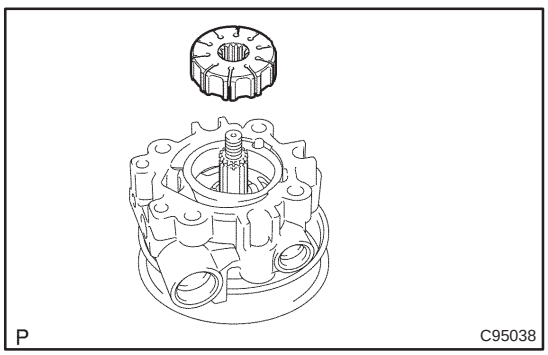
NOTICE:

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



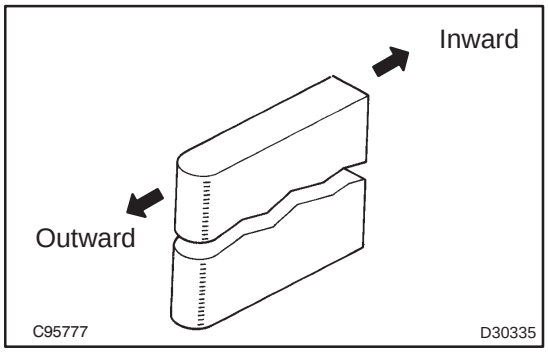
23. INSTALL VANE PUMP CAM RING

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

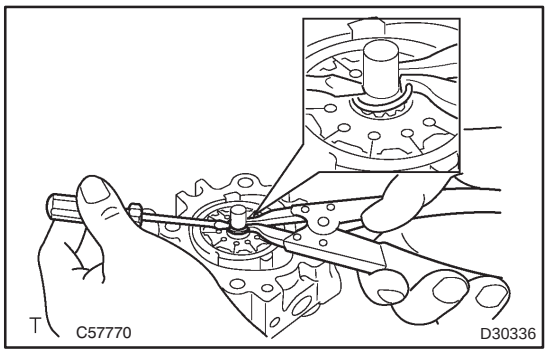


24. INSTALL VANE PUMP ROTOR

(a) Install the vane pump rotor.

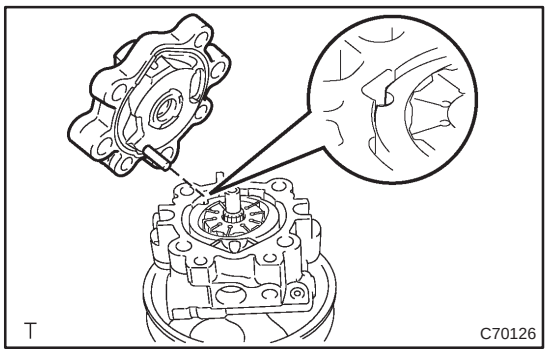


(b) Coat 10 vane pump plates with power steering fluid.
(c) Install the vane pump plates with the round end facing outward.



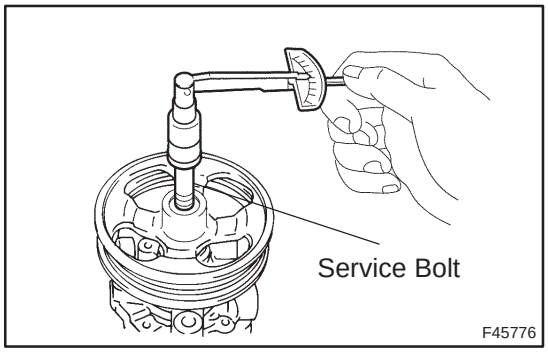
25. INSTALL VANE PUMP SHAFT SNAP RING

(a) Using a screwdriver and a snap ring expander, install a new snap ring to the w/pulley shaft sub–assy.



26. INSTALL VANE PUMP HOUSING SUB–ASSY REAR

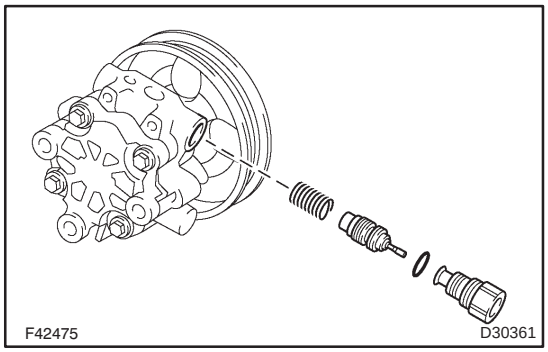
(a) Coat a new O–ring with power steering fluid and install it onto the housing sub–assy rear.
(b) Align the straight pin of the housing sub–assy rear with the dents of the cam ring, side plate front and housing sub–assy front, and install the vane pump housing sub–assy rear with the 4 bolts.
Torque: 22 N·m (224 kgf·cm, 16 ft·lbf)



27. INSPECT PRELOAD

(a) Check that the pump rotates smoothly without abnormal noise.
(b) Temporarily install the service bolt.
Recommended service bolt:
Thread diameter: 10 mm (0.39 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.
Rotating torque:
0.27 N·m (2.8 kgf·cm, 2.4 ft·lbf) or less

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



28. INSTALL FLOW CONTROL VALVE ASSY

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

(b) Install the compression spring and the flow control valve assy.

(c) Coat a new O–ring with power steering fluid and install it onto the pressure port union sub–assy.

(d) Install the pressure port union sub–assy.

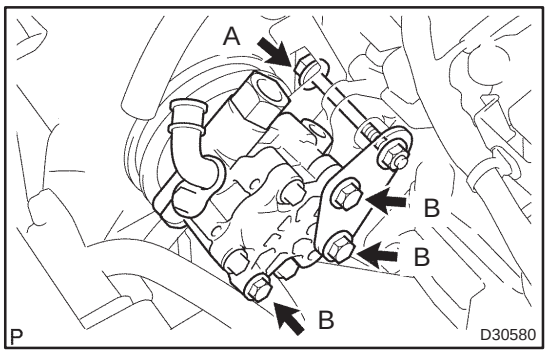
Torque: 69 N·m (704 kgf·cm, 51 ft·lbf)

29. INSTALL POWER STEERING SUCTION PORT UNION

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

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

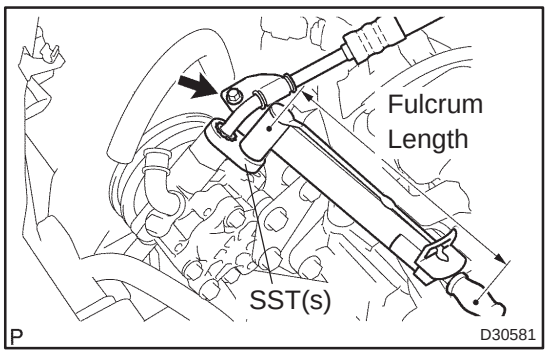
Torque: 12 N·m (122 kgf·cm, 9 ft·lbf)



30. INSTALL VANE PUMP ASSY

(a) Install the vane pump assy and vane pump bracket rear with the 4 bolts.

Torque:
Bolt A: 72 N·m (734 kgf·cm, 53 ft·lbf)
Bolt B: 39 N·m (398 kgf·cm, 29 ft·lbf)



31. CONNECT PRESSURE FEED TUBE ASSY

(a) Using SST(s), connect the pressure feed tube assy.

SST 09023–12700

Torque: 41 N·m (414 kgf·cm, 30 ft·lbf)

HINT:

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

(b) Install the tube clamp with the bolt.

Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)

32. CONNECT OIL RESERVOIR TO PUMP HOSE NO.1

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

NOTICE:

Take care not to spill fluid on the V belt.

33. INSTALL V (COOLER COMPRESSOR TO CRANKSHAFT PULLEY) BELT NO.1 (See page 55–46)

34. ADJUST V (COOLER COMPRESSOR TO CRANKSHAFT PULLEY) BELT NO.1 (See page 55–46)

35. ADD POWER STEERING FLUID (See page 51–4)

36. BLEED POWER STEERING FLUID (See page 51–4)

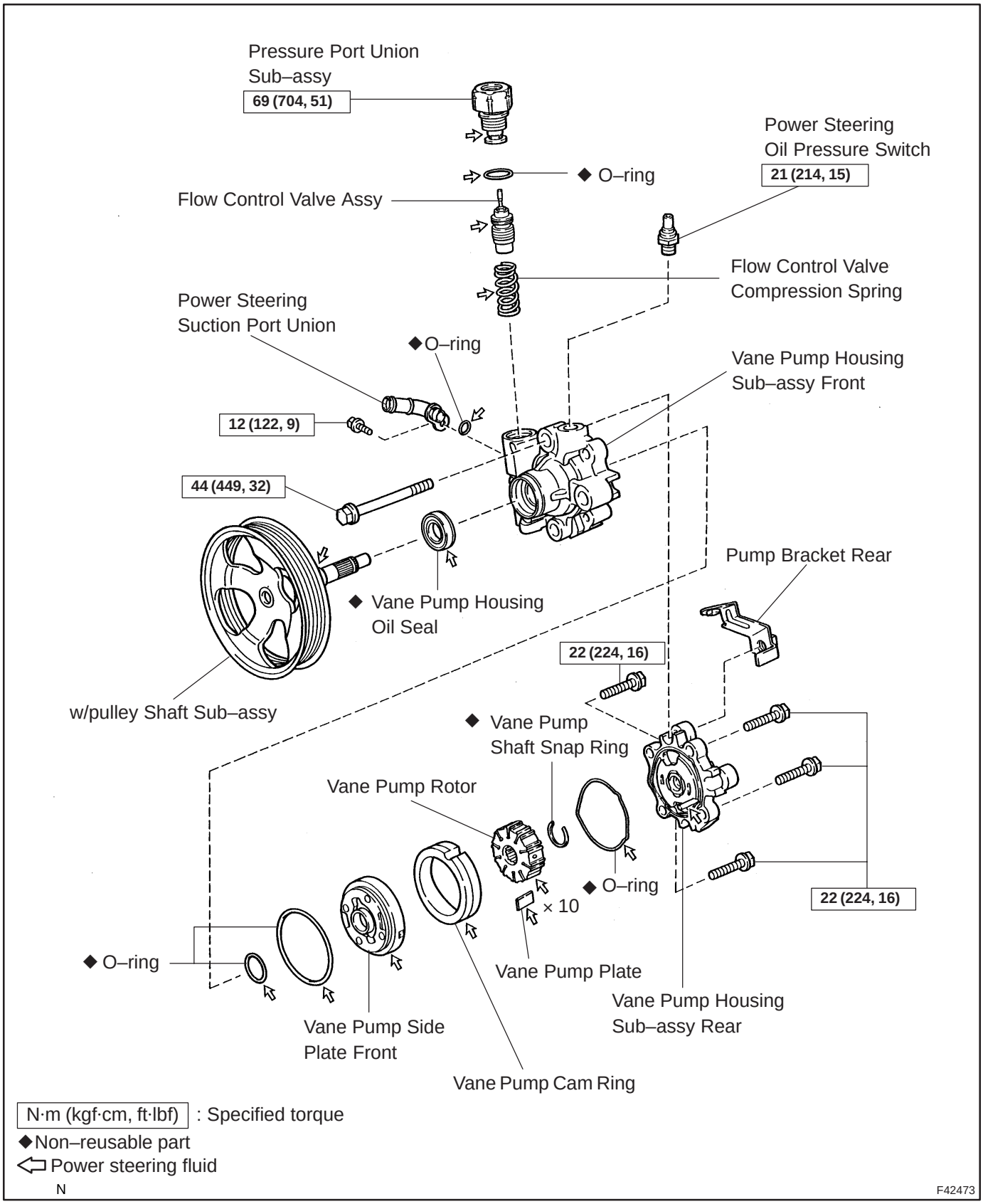
37. CHECK POWER STEERING FULUID LEVEL IN RESERVER (See page 51–4)

38. INSPECT FLUID LEAK

VANE PUMP ASSY (AZ Series)

COMPONENTS

510DF–02



N·m (kgf·cm, ft·lbf) : Specified torque
◆Non–reusable part
⇦ Power steering fluid

N

F42473

510DG–02

OVERHAUL

NOTICE:

- **When using a vise, do not over tighten.**
- **When installing, coat the parts indicated by the arrows with power steering fluid (See page 51–8).**

1. REMOVE FRONT WHEEL RH

2. REMOVE ENGINE UNDER COVER RH

3. REMOVE FAN AND GENERATOR V BELT

1AZ–FE: (See page 14–105)

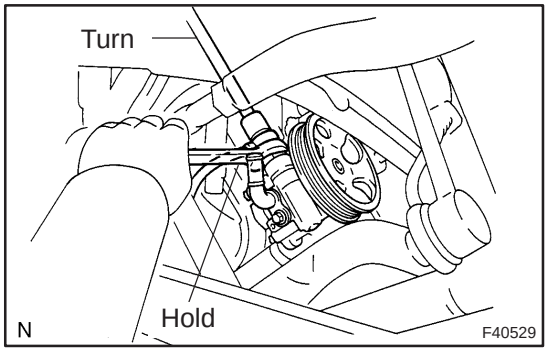
1AZ–FSE: (See page 14–185)

4. DISCONNECT OIL RESERVOIR TO PUMP HOSE NO.1

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

NOTICE:

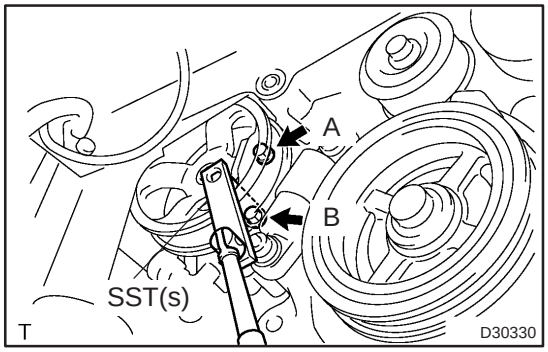
Take care not to spill fluid on the V belt.



5. DISCONNECT PRESSURE FEED TUBE ASSY

(a) Remove the bolt and separate the pressure feed tube assy from the pump bracket rear.

(b) Using a spanner (27 mm) to hold the pressure port union, remove the union bolt and gasket.



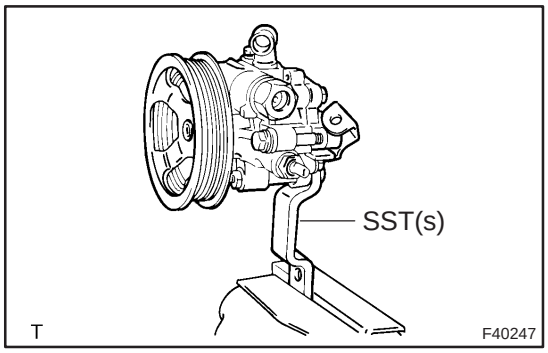
6. REMOVE VANE PUMP ASSY

(a) Disconnect the connector from the oil pressure switch.

(b) Using SST(s) and a deep socket (14 mm), loosen the bolt A.

SST 09249–63010

(c) Remove the bolt B and vane pump assy.



7. FIX VANE PUMP ASSY

(a) Using SST(s), hold the vane pump assy in a vise.

SST 09630–00014 (09631–00132)

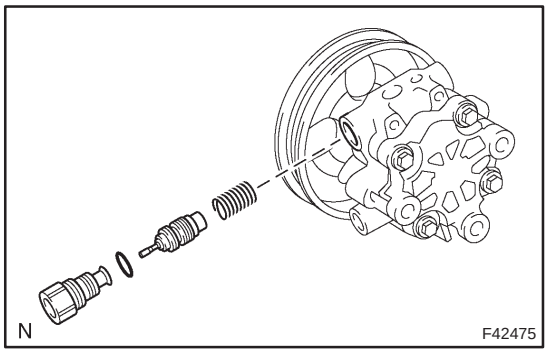
8. REMOVE PUMP BRACKET REAR

(a) Remove the bolt and vane pump bracket rear.

9. REMOVE POWER STEERING SUCTION PORT UNION

(a) Remove the bolt and the suction port union.

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



10. REMOVE FLOW CONTROL VALVE ASSY

(a) Remove the pressure port union sub–assy.

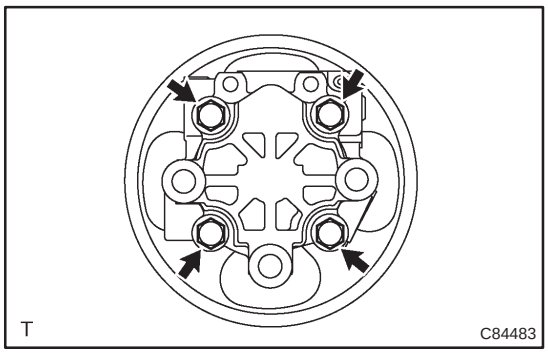
(b) Remove the O–ring from the pressure port union sub–assy.

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

11. REMOVE POWER STEERING OIL PRESSURE SWITCH

NOTICE:

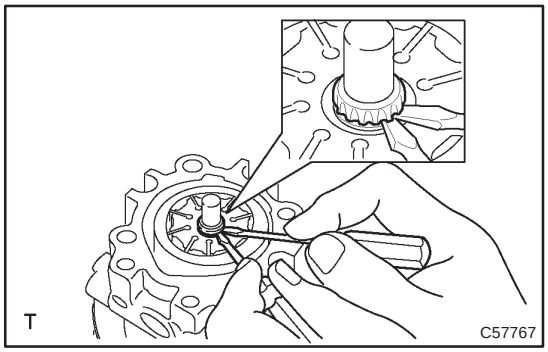
If the oil pressure switch is dropped or damaged, replace it with a new one.



12. REMOVE VANE PUMP HOUSING SUB–ASSY REAR

(a) Remove the 4 bolts and housing sub–assy rear from the housing sub–assy front.

(b) Remove the O–ring from the housing sub–assy rear.



13. REMOVE W/PULLEY SHAFT SUB–ASSY

(a) Using 2 screwdrivers, remove the snap ring from the w/ pulley shaft sub–assy.

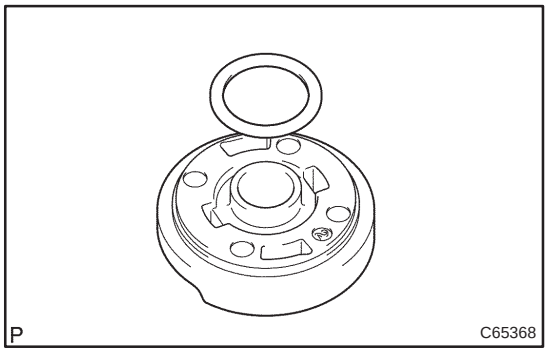
(b) Remove the w/pulley shaft sub–assy.

14. REMOVE VANE PUMP ROTOR

(a) Remove the 10 vane pump plates.

(b) Remove the vane pump rotor.

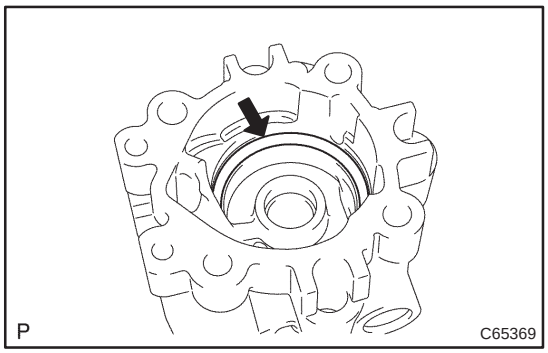
15. REMOVE VANE PUMP CAM RING



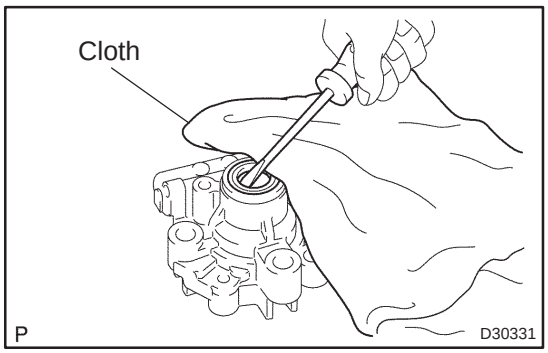
16. REMOVE VANE PUMP SIDE PLATE FRONT

(a) Remove the side plate front from the housing sub–assy front.

(b) Remove the O–ring from the side plate front.



(c) Remove the O–ring from the housing sub–assy front.

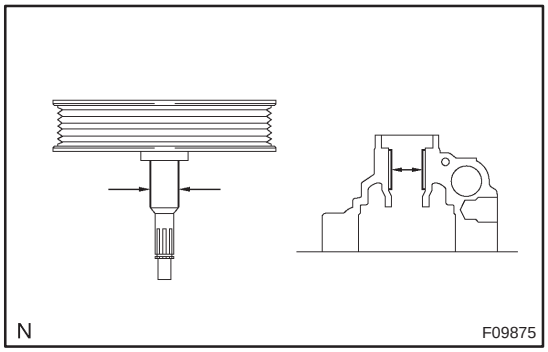


17. REMOVE VANE PUMP HOUSING OIL SEAL

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

NOTICE:

Be careful not to damage the pump housing.

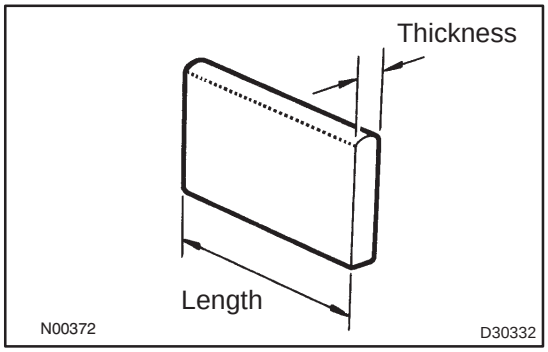


18. INSPECT VANE PUMP SHAFT AND BUSH IN HOUSING FRONT

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

Maximum clearance: 0.07 mm (0.0028 in.)

If it is more than the maximum, replace the vane pump assy.

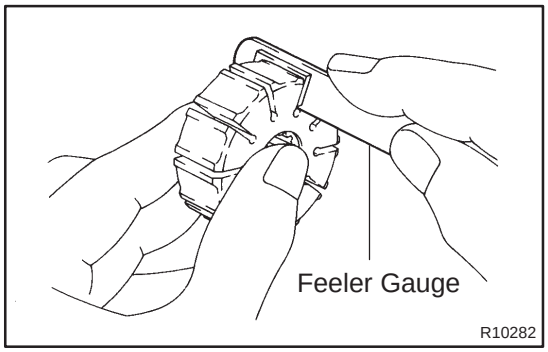


19. INSPECT VANE PUMP ROTOR AND VANE PUMP PLATES

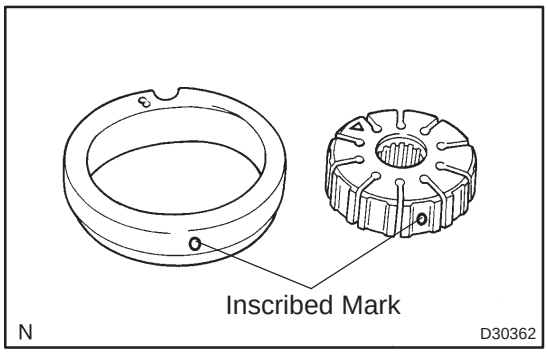
(a) Using a micrometer, measure the thickness of the vane pump plates.

Minimum thickness:

1.405 to 1.411 mm (0.05531 to 0.05555 in.)



(b) Using a feeler gauge, measure the clearance between a side face of the vane pump rotor groove and vane plate.
Maximum clearance: 0.03 mm (0.0012 in.)



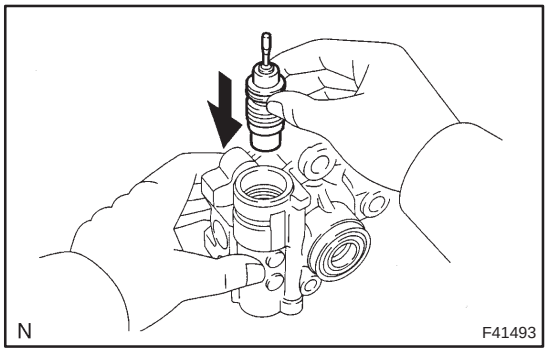
If it is more than the maximum, replace the vane pump plate and/or vane pump rotor with the one having the same mark as stamped on the cam ring.

Inscribed mark: 0, 1, 2, 3 or 4

HINT:

There are 5 different marks for vane pump plate.

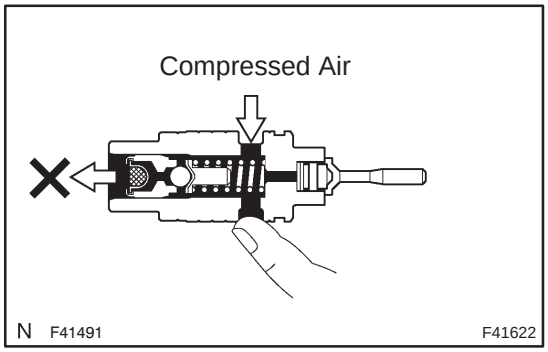
Mark	Part number	Length mm (in.)
0	44345–02110	12.001 to 12.003 (0.47247 to 0.47255)
1	44345–02120	11.999 to 12.000 (0.47240 to 0.47244)
2	44345–02130	11.997 to 11.998 (0.47232 to 0.47236)
3	44345–02140	11.995 to 11.996 (0.47224 to 0.47228)
4	44345–02150	11.993 to 11.994 (0.47216 to 0.47220)



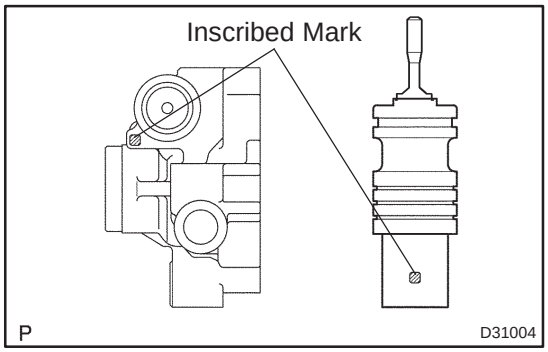
20. INSPECT FLOW CONTROL VALVE ASSY

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

If necessary, replace the vane pump assy.



(b) Check the flow control valve assy for leakage. Close one of the holes and apply compressed air of 392 to 490 kPa (4 to 5 kgf·cm^2, 57 to 71 psi) into the opposite side hole, and confirm that air does not come out from the end holes.



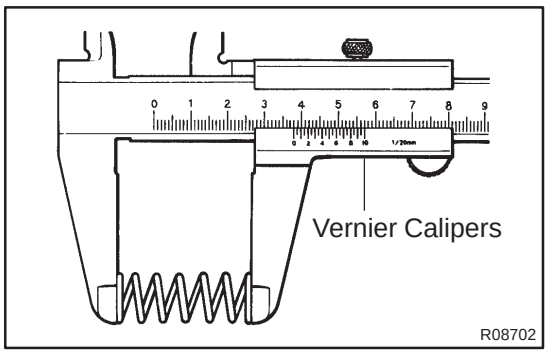
If necessary, replace the flow control valve assy with the one having the same letter as inscribed on the housing sub–assy front.

Inscribed mark: A, B, C, D, E or F

HINT:

There are 6 different marks for flow control valve assy.

Mark	Part number
A	44330–05130
B	44330–05140
C	44330–05150
D	44330–05160
E	44330–05170
F	44330–05180



21. INSPECT FLOW CONTROL VALVE COMPRESSION SPRING

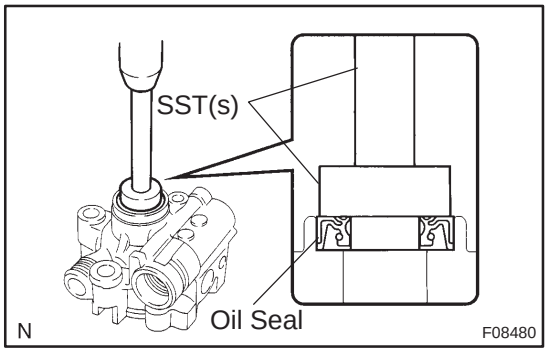
(a) Using vernier calipers, measure the free length of the compression spring.

Minimum free length: 36.9 mm (1.453 in.)

If it is less than the minimum, replace the compression spring.

22. INSPECT PRESSURE PORT UNION SUB–ASSY

(a) If the union seat in the pressure port union sub–assy is remarkably damaged, it may cause fluid leakage. Replace the pressure port union sub–assy.



23. INSTALL VANE PUMP HOUSING OIL SEAL

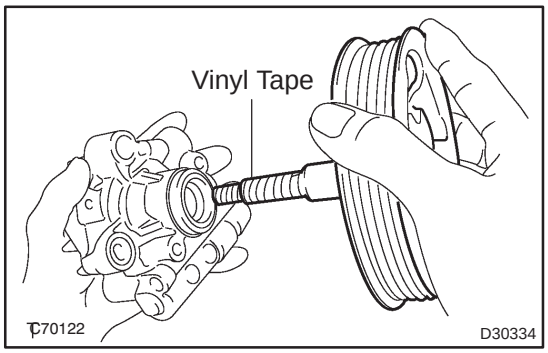
(a) Coat a new housing oil seal lip with power steering fluid.

(b) Using SST(s) and a press, install a new housing oil seal.

SST 09950–60010 (09951–00280), 09950–70010 (09951–07100)

NOTICE:

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



24. INSTALL W/PULLEY SHAFT SUB–ASSY

(a) Coat inside bushing surface of the housing sub–assy front with power steering fluid.

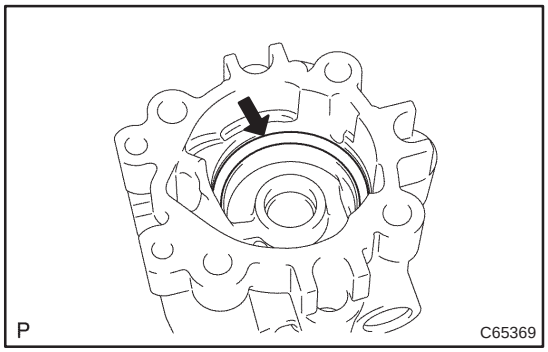
(b) Gradually insert the w/pulley shaft sub–assy.

NOTICE:

Do not damage the oil seal lip.

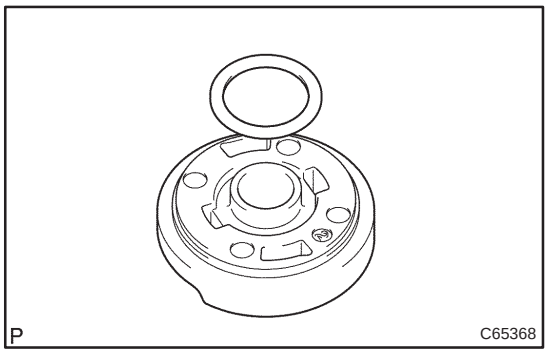
HINT:

Tape the shaft before inserting.

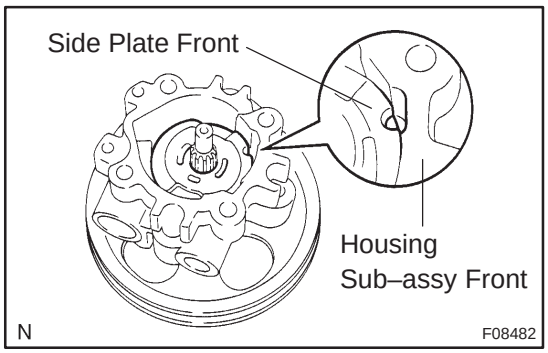


25. INSTALL VANE PUMP SIDE PLATE FRONT

(a) Coat a new O–ring with power steering fluid and install it into the housing sub–assy front.



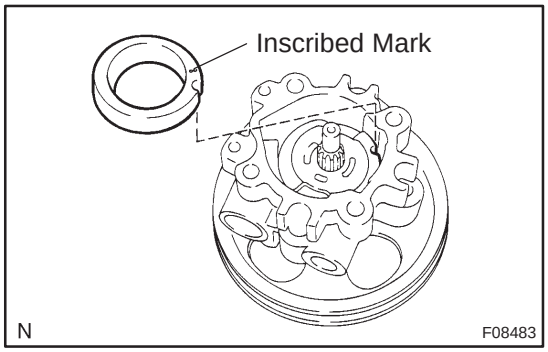
(b) Coat a new O–ring with power steering fluid and install it onto the side plate front.



(c) Align the dent of the side plate front with that of the housing sub–assy front, and install the side plate front.

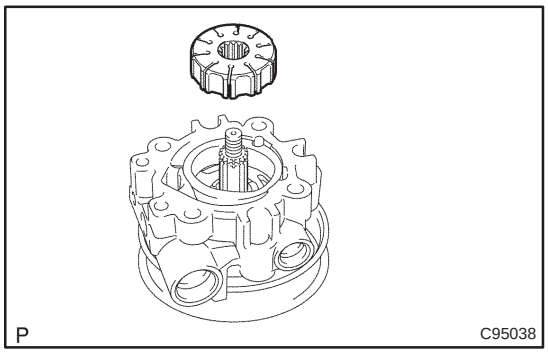
NOTICE:

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



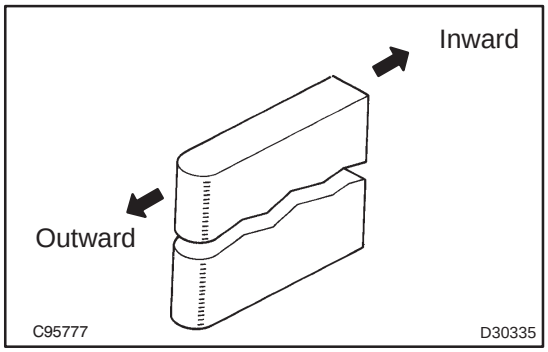
26. INSTALL VANE PUMP CAM RING

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

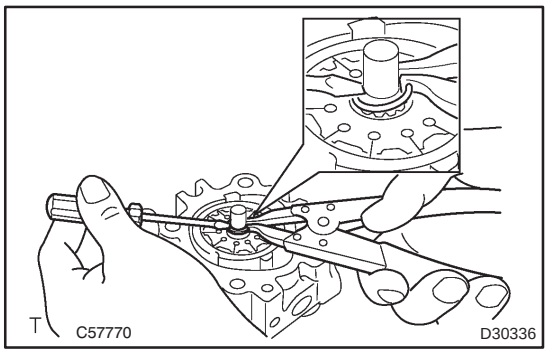


27. INSTALL VANE PUMP ROTOR

(a) Install the vane pump rotor.

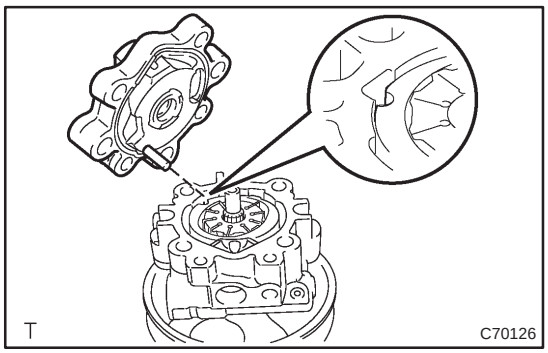


(b) Coat 10 vane pump plates with power steering fluid.
(c) Install the vane pump plates with the round end facing outward.



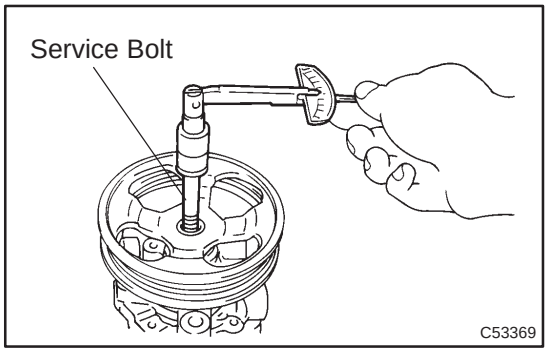
28. INSTALL VANE PUMP SHAFT SNAP RING

(a) Using a screwdriver and a snap ring expander, install a new snap ring to the w/pulley shaft sub–assy.



29. INSTALL VANE PUMP HOUSING SUB–ASSY REAR

(a) Coat a new O–ring with power steering fluid and install it onto the housing sub–assy rear.
(b) Align the straight pin of the housing sub–assy rear with the dents of the cam ring, side plate front and housing sub–assy front, and install the vane pump housing sub–assy rear with the 4 bolts.
Torque: 22 N·m (224 kgf·cm, 16 ft·lbf)



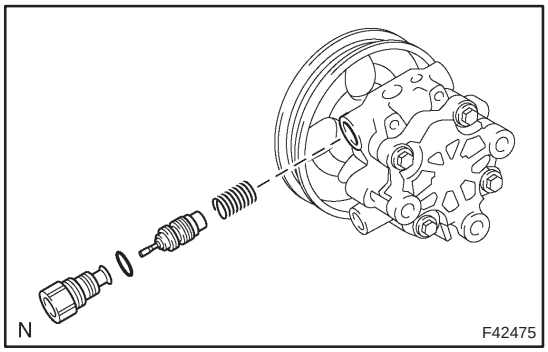
30. INSPECT PRELOAD

(a) Check that the pump rotates smoothly without abnormal noise.
(b) Temporarily install the service bolt.
Recommended service bolt:
Thread diameter: 10 mm (0.39 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.
Rotating torque:
0.27 N·m (2.8 kgf·cm, 2.4 ft·lbf) or less

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

31. INSTALL POWER STEERING OIL PRESSURE SWITCH

(a) Coat a new O–ring with power steering fluid and install it to the oil pressure switch.
(b) Install the oil pressure switch onto the vane pump assy.
Torque: 21 N·m (214 kgf·cm, 15 ft·lbf)



32. INSTALL FLOW CONTROL VALVE ASSY

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

(b) Install the compression spring and the flow control valve assy.

(c) Coat a new O–ring with power steering fluid and install it onto the pressure port union sub–assy.

(d) Install the pressure port union sub–assy.

Torque: 69 N·m (704 kgf·cm, 51 ft·lbf)

33. INSTALL POWER STEERING SUCTION PORT UNION

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

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

Torque: 12 N·m (122 kgf·cm, 9 ft·lbf)

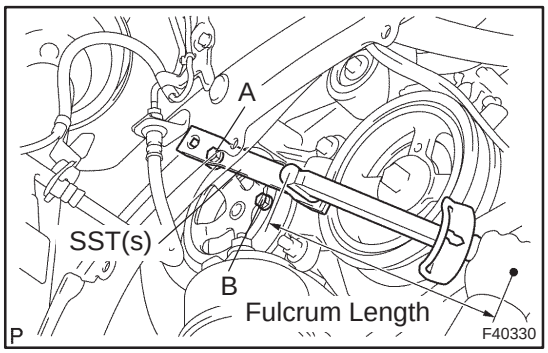
34. INSTALL PUMP BRACKET REAR

(a) Install the vane pump bracket rear with the bolt.

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

HINT:

Make sure that the stopper of the bracket touches the vane pump body, then torque the bolt.



35. INSTALL VANE PUMP ASSY

(a) Temporarily tighten the bolt A to the vane pump assy.

(b) Install the vane pump assy and the bolt B.

Torque: 37 N·m (377 kgf·cm, 27 ft·lbf)

(c) Using SST(s) and a deep socket (14 mm), tighten the bolt A.

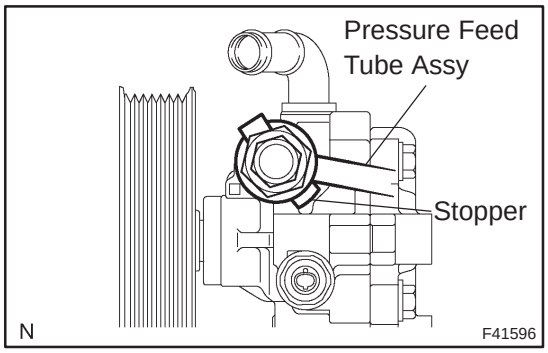
SST 09249–63010

Torque: 26 N·m (264 kgf·cm, 19 ft·lbf)

HINT:

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

(d) Connect the connector to the oil pressure switch.



36. CONNECT PRESSURE FEED TUBE ASSY

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

HINT:

Make sure the stopper of the pressure feed tube assy touches the pump housing front as shown in the illustration.

(b) Using a spanner (27 mm) to hold the pressure port union, torque the union bolt.

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

(c) Install the pressure feed tube assy with bolt to the pump bracket rear.

Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)

37. CONNECT OIL RESERVOIR TO PUMP HOSE NO.1

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

NOTICE:

Take care not to spill fluid on the V belt.

38. INSTALL FAN AND GENERATOR V BELT
1AZ–FE: (See page 14–105)
1AZ–FSE: (See page 14–185)

39. INSTALL ENGINE UNDER COVER RH

40. INSTALL FRONT WHEEL RH
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

41. ADD POWER STEERING FLUID (See page 51–4)

42. BLEED POWER STEERING FLUID (See page 51–4)

43. CHECK POWER STEERING FULUID LEVEL IN RESERVER (See page 51–4)

44. INSPECT FLUID LEAK