

CLUTCH SYSTEM (From July, 2003)

4202B-05

PROBLEM SYMPTOMS TABLE

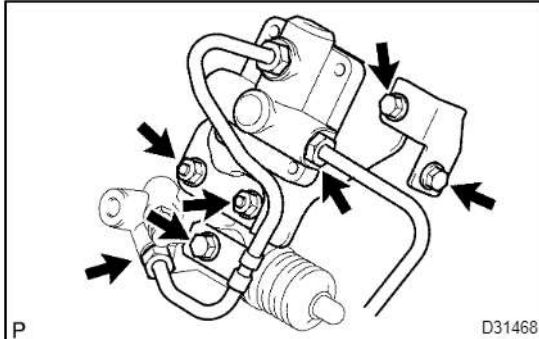
HINT:

Use the table below to help you find the cause of the problem. The numbers indicate the priority of the likely causes of the problem. Check each part in order. If necessary, replace these parts.

Symptom	Suspected Area	See page
Clutch grabs/chatters	1. Engine mounting (Loosen)	–
	2. Clutch disc (Runout is excessive)	42-15
	3. Clutch disc (Oily)	42-15
	4. Clutch disc (Worn out)	42-15
	5. Clutch disc torsion rubber (Damaged)	42-15
	6. Clutch disc (Glazed)	42-15
	7. Diaphragm spring (Out of tip alignment)	42-15
Clutch pedal is spongy	1. Clutch line (Air in line)	–
	2. Master cylinder cup (Damaged)	42-9
	3. Release cylinder rubber (Damaged)	30-2
Clutch is noisy	1. Release bearing (Worn, dirty, or damaged)	42-15
	2. Clutch disc torsion rubber (Damaged)	42-15
Clutch slips	1. Clutch pedal (Free play is out of adjustment)	42-7
	2. Clutch disc (Oily)	42-15
	3. Clutch disc (Worn out)	42-15
	4. Diaphragm spring (Damaged)	42-15
	5. Pressure plate (Distortion)	42-15
	6. Flywheel (Distortion)	–
Clutch does not disengage	1. Clutch pedal (Free play is out of adjustment)	42-7
	2. Clutch line (Air in line)	–
	3. Master cylinder cup (Damaged)	42-9
	4. Release cylinder cup (Damaged)	30-2
	5. Clutch disc (Out of true)	42-15
	6. Clutch disc (Runout is excessive)	42-15
	7. Clutch disc (Lining broken)	42-15
	8. Clutch disc (Dirty or burned)	42-15
	9. Clutch disc (Oily)	42-15
	10. Clutch disc (Lack of spline grease)	42-15

CLUTCH RELEASE CYLINDER ASSY (From July, 2003) OVERHAUL

42027-05



1. DISCONNECT CLUTCH RELEASE CYLINDER TO FLEXIBLE HOSE TUBE

- Remove the bolt and separate the tube clamp bracket.
- Using SST, disconnect the 2 flexible hose tubes.
SST 09023-00101

HINT:

Use a container to catch the fluid.

2. REMOVE CLUTCH ACCUMULATOR ASSY

- Remove the 2 bolts and flexible hose bracket No.2.
- Remove the 2 nuts and the clutch accumulator assy.

3. REMOVE CLUTCH RELEASE CYLINDER ASSY

- Remove the 2 bolts and clutch release cylinder assy.

4. REMOVE CLUTCH RELEASE CYLINDER KIT

- Remove the boot from the cylinder body.
- Remove the push rod from the cylinder body.
- Remove the piston from the cylinder body.

NOTICE:

Be careful not to damage the inside of the cylinder body.

- Remove the spring from the cylinder body.
- Remove the bleeder plug cap from the bleeder plug.

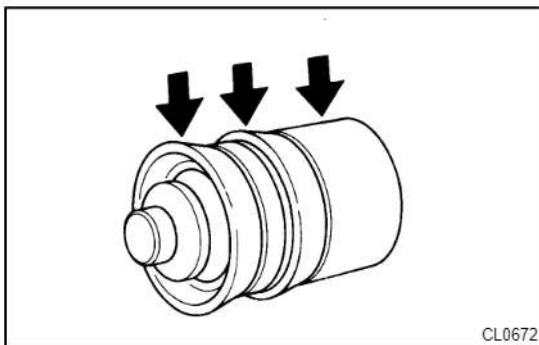
5. REMOVE RELEASE CYLINDER BLEEDER PLUG

6. INSTALL RELEASE CYLINDER BLEEDER PLUG

Torque: 8.3 N·m (85 kgf·cm, 73 in.·lbf)

7. INSTALL CLUTCH RELEASE CYLINDER KIT

- Install the bleeder plug cap to the bleeder plug.
- Install a new spring to the cylinder body.



- Coat the piston with lithium soap base glycol grease, as shown in the illustration.
- Install the piston to the cylinder body.

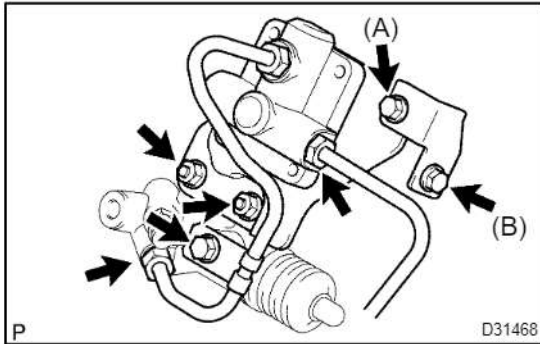
NOTICE:

Be careful not to damage the inside of the cylinder body.

- Install the push rod to the cylinder body.
- Install the boot to the cylinder body.

8. INSTALL CLUTCH RELEASE CYLINDER ASSY

- (a) Install the clutch release cylinder assy with the 2 bolts.
Torque: 12 N·m (120 kgf·cm, 9 ft·lbf)

**9. INSTALL CLUTCH ACCUMULATOR ASSY**

- (a) Install the clutch accumulator assy with the 2 nuts and the bolt.

Torque: 12 N·m (120 kgf·cm, 9 ft·lbf)

- (b) Install the flexible hose bracket No.2 with the 2 bolts.

Torque:

Bolt A: 12 N·m (120 kgf·cm, 9 ft·lbf)

Bolt B: 39 N·m (398 kgf·cm, 29 ft·lbf)

10. CONNECT CLUTCH RELEASE CYLINDER TO FLEXIBLE HOSE TUBE

- (a) Using SST, connect the 2 flexible hose tubes.
SST 09023-00101

Torque: 15 N·m (155 kgf·cm, 11 ft·lbf)

- (b) Install the tube clamp bracket with the bolt.

Torque: 12 N·m (120 kgf·cm, 9 ft·lbf)

11. BLEED CLUTCH PIPE LINE

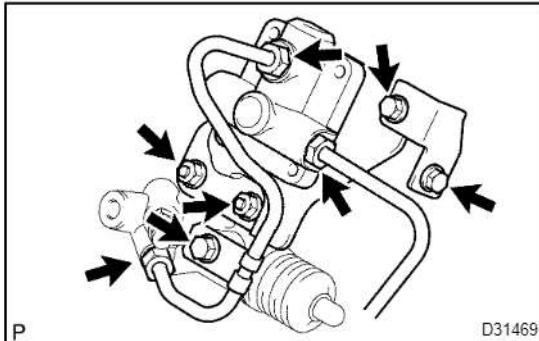
- (a) Fill the brake reservoir tank with clutch fluid and bleed the clutch system.
Torque: 8.3 N·m (85 kgf·cm, 73 in·lbf)

12. CHECK CLUTCH FLUID LEAKAGE**13. CHECK FLUID LEVEL IN RESERVOIR**

CLUTCH ACCUMULATOR ASSY (From July, 2003)

REPLACEMENT

4207K-02



1. DISCONNECT CLUTCH RELEASE CYLINDER TO FLEXIBLE HOSE TUBE

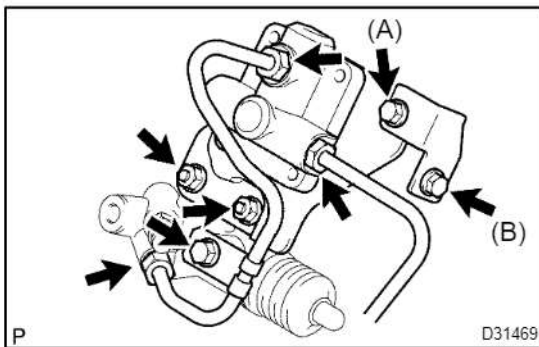
- Remove the bolt and separate the tube clamp bracket.
- Using SST, disconnect the 3 flexible hose tubes.
SST 09023-00101

HINT:

Use a container to catch the fluid.

2. REMOVE CLUTCH ACCUMULATOR ASSY

- Remove the 2 bolts and flexible hose bracket No.2.
- Remove the 2 nuts and clutch accumulator assy.



3. INSTALL CLUTCH ACCUMULATOR ASSY

- Install the clutch accumulator assy with the 2 nuts.
Torque: 12 N·m (120 kgf·cm, 9 ft·lbf)
- Install the flexible hose bracket No.2 with the 2 bolts.
Torque:
Bolt A: 12 N·m (120 kgf·cm, 9 ft·lbf)
Bolt B: 39 N·m (398 kgf·cm, 29 ft·lbf)

4. CONNECT CLUTCH RELEASE CYLINDER TO FLEXIBLE HOSE TUBE

- Using SST, connect the 3 flexible hose tubes to the clutch accumulator assy.
SST 09023-00101
Torque: 15 N·m (155 kgf·cm, 11 ft·lbf)
- Install the tube clamp bracket with the bolt.
Torque: 12 N·m (120 kgf·cm, 9 ft·lbf)

5. BLEED CLUTCH PIPE LINE

- Fill the brake reservoir tank with brake fluid and bleed the clutch system.
Torque: 8.3 N·m (85 kgf·cm, 73 ft·lbf)

6. CHECK CLUTCH FLUID LEAKAGE

7. CHECK FLUID LEVEL IN RESERVOIR

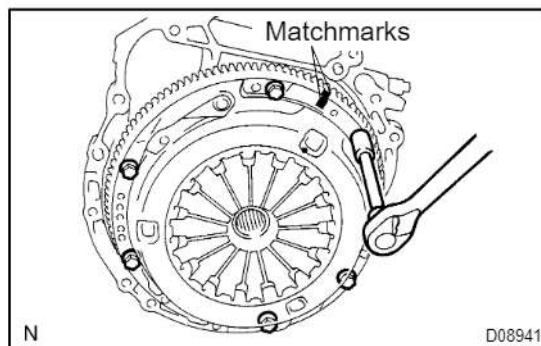
CLUTCH UNIT

OVERHAUL

4202F-03

1. REMOVE MANUAL TRANSAXLE ASSY
(SEE PAGE 41-11)
2. REMOVE CLUTCH RELEASE FORK BOOT
3. REMOVE CLUTCH RELEASE BEARING ASSY
4. REMOVE CLUTCH RELEASE FORK SUB-ASSY
5. REMOVE RELEASE BEARING HUB CLIP
6. REMOVE RELEASE FORK SUPPORT

- (a) Remove the release fork support from the manual transaxle assy.



7. REMOVE CLUTCH COVER ASSY

- (a) Place the matchmarks on the clutch cover assy with the one on the flywheel sub-assy.
- (b) Loosen each set bolt one turn at a time until spring tension is released.
- (c) Remove the set bolts and pull off the clutch cover assy.

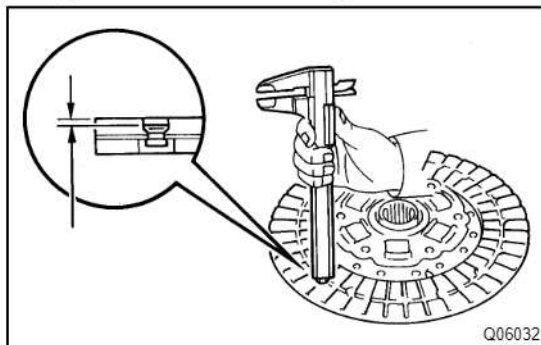
NOTICE:

Do not drop the clutch disc assy.

8. REMOVE CLUTCH DISC ASSY

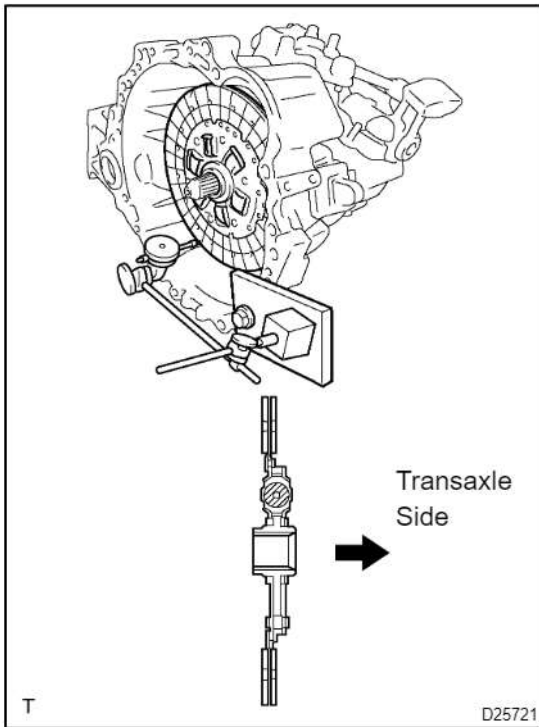
NOTICE:

Keep the lining part of the clutch disc assy, the pressure plate and surface of the flywheel sub-assy away from oil and foreign attachment.



9. INSPECT CLUTCH DISC ASSY

- (a) Using vernier calipers, measure the rivet head depth.
Maximum rivet depth: 0.3 mm (0.012 in.)
If necessary, replace the clutch disc assy.



(b) Install the clutch disc assy to the transaxle assy.

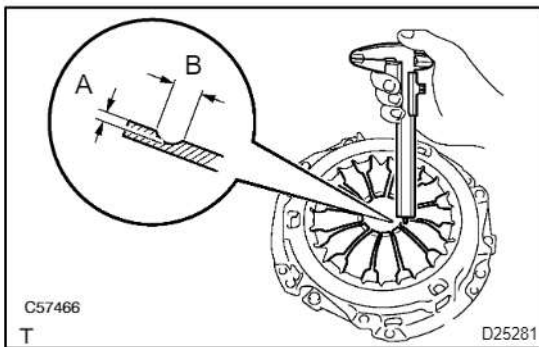
NOTICE:

Take care not to insert the clutch disc assy in the wrong direction

(c) Using a dial indicator, check the clutch disc assy runout.

Minimum runout: 0.8 mm (0.031 in.)

If necessary, replace the clutch disc assy.



10. INSPECT CLUTCH COVER ASSY

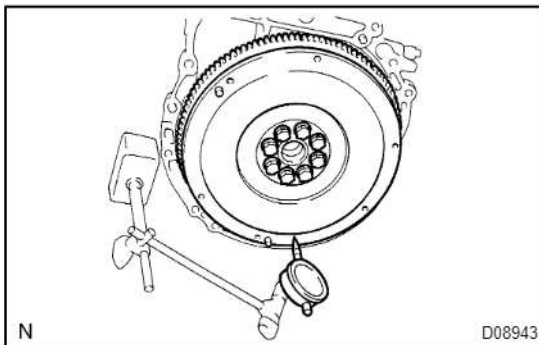
(a) Using vernier calipers, inspect the diaphragm spring for depth and width of wear.

Maximum:

A (Depth): 0.5 mm (0.020 in.)

B (Width): 6.0 mm (0.236 in.)

If necessary, replace clutch cover assy.

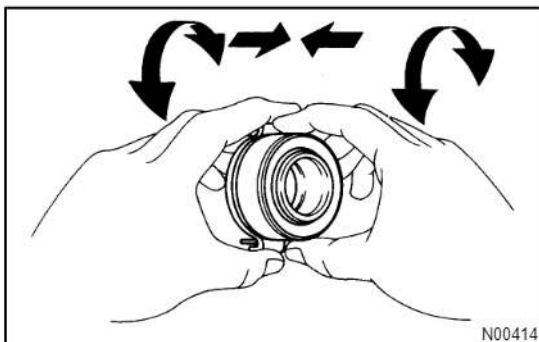


11. INSPECT FLYWHEEL SUB-ASSY

(a) Using a dial indicator, inspect the flywheel sub-assy runout.

Maximum runout: 0.1 mm (0.004 in.)

If necessary, replace the flywheel sub-assy.



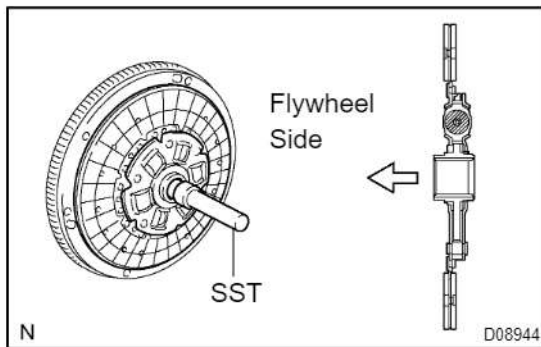
12. INSPECT CLUTCH RELEASE BEARING ASSY

(a) Turn the release bearing assy by hand while applying force in the axial direction.

HINT:

The bearing is permanently lubricated and required no cleaning or lubrication.

If necessary, replace the release bearing assy.



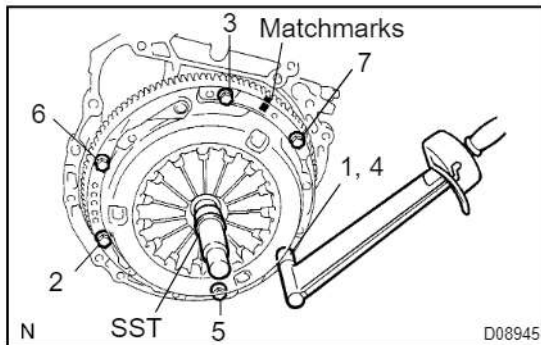
13. INSTALL CLUTCH DISC ASSY

- (a) Insert SST in the clutch disc assy, then insert them in the flywheel sub-assy.

SST 09301-00220

NOTICE:

Take care not to insert clutch disc assy in the wrong direction.



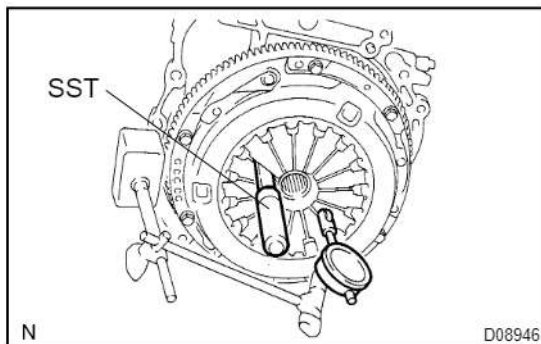
14. INSTALL CLUTCH COVER ASSY

- (a) Align the matchmarks on the clutch cover assy and flywheel sub-assy.
- (b) Following the procedures shown in the illustration, tighten the 6 bolts, in the order starting the bolt locating near the knock pin on the top.

Torque: 19 N·m (195 kgf·cm, 14 ft·lbf)

HINT:

- Following the order in the illustration, tighten the bolts at a time evenly.
- Move SST up and down, right and left lightly, after checking that the disc is in the center, tighten the bolts.



15. INSPECT AND ADJUST CLUTCH COVER ASSY

- (a) Using a dial indicator with roller instrument, check the diaphragm spring tip alignment.

Maximum non-alignment: 0.5 mm (0.020 in.)

If alignment is not as specified, using SST, adjust the diaphragm spring tip alignment.

SST 09333-00013

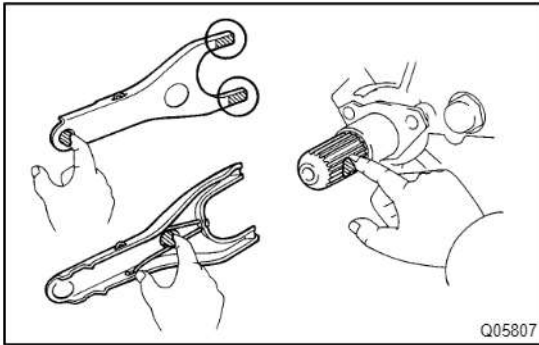
16. INSTALL RELEASE FORK SUPPORT

- (a) Install the release fork support to the manual transaxle assy.

Torque: 47 N·m (480 kgf·cm, 35 ft·lbf)

17. INSTALL RELEASE BEARING HUB CLIP

- (a) Install the release bearing hub clip to the release bearing assy.

**18. INSTALL CLUTCH RELEASE FORK SUB-ASSY**

- (a) Apply release hub grease to the release fork and release bearing assy contact, release fork and push rod contact and release fork pivot points.

Sealant:

Part No. 08887-01806, RELEASE HUB GREASE or equivalent

- (b) Install the release fork to the release bearing assy.

19. INSTALL CLUTCH RELEASE BEARING ASSY

- (a) Apply the clutch spline grease to the input shaft spline.

Sealant:

Part No. 08887-01706, CLUTCH SPLINE GREASE or equivalent

- (b) Install the release fork with release bearing assy to the manual transaxle assy.

NOTICE:

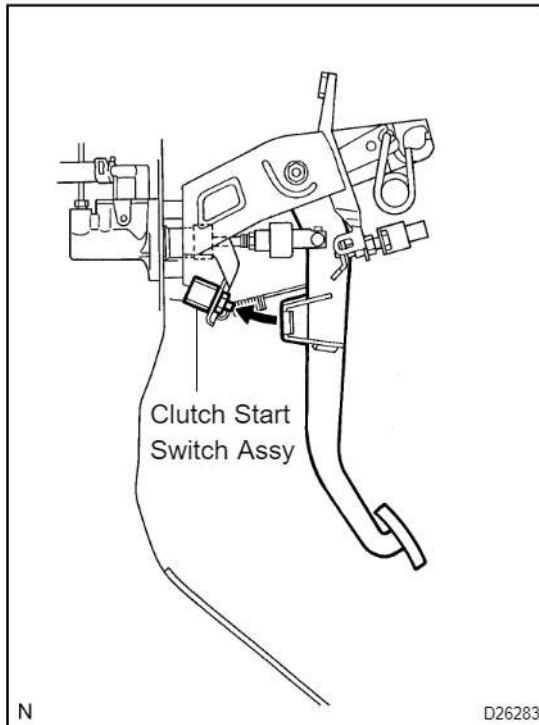
After the installation, move the fork forward and backward to check that the release bearing slides smoothly.

20. INSTALL CLUTCH RELEASE FORK BOOT**21. INSTALL MANUAL TRANSAXLE ASSY
(SEE PAGE 41-11)**

CLUTCH START SWITCH ASSY

ON-VEHICLE INSPECTION

42028-05



1. CHECK CLUTCH START SYSTEM

- (a) Check that the engine does not start when the clutch pedal is released.
- (b) Check that the engine starts when the clutch pedal is fully depressed.

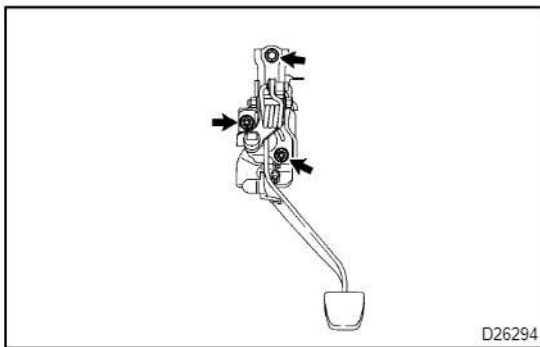
If necessary, replace the clutch start switch assy.

CLUTCH PEDAL SUB-ASSY REPLACEMENT

4202C-03

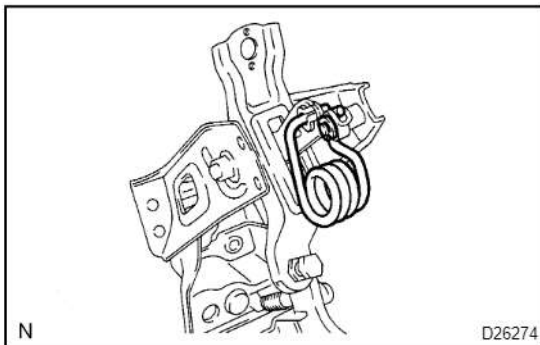
1. REMOVE INSTRUMENT CLUSTER FINISH PANEL
(SEE PAGE 71-16)
2. REMOVE COMBINATION METER ASSEMBLY
(SEE PAGE 71-29)
3. REMOVE INSTRUMENT PANEL SUB-ASSY UPPER
(SEE PAGE 71-16)
4. REMOVE INSTRUMENT PNL INSERT SUB-ASSY LWR LH
(SEE PAGE 71-16)
5. REMOVE CLUTCH MASTER CYLINDER PUSH ROD CLEVIS W/HOLE PIN

(a) Remove the clip and hole pin.



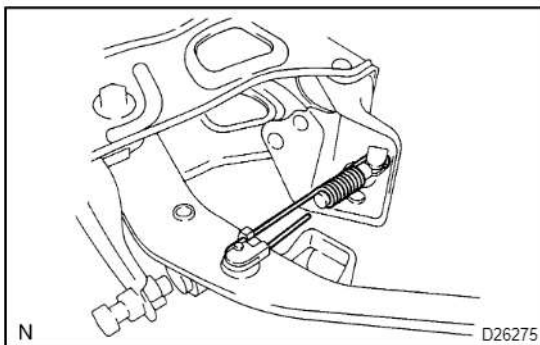
6. REMOVE CLUTCH PEDAL ASSY

- (a) Disconnect the clutch start switch clamp and connector.
- (b) Remove the bolt, 2 nuts and clutch pedal assy.



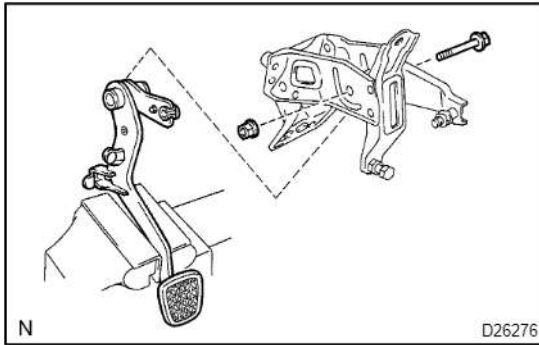
7. REMOVE TURN OVER SPRING SEAT COMPRESSION SPRING

- (a) Using a small screwdriver, remove the E-ring.
- (b) Remove the compression spring.

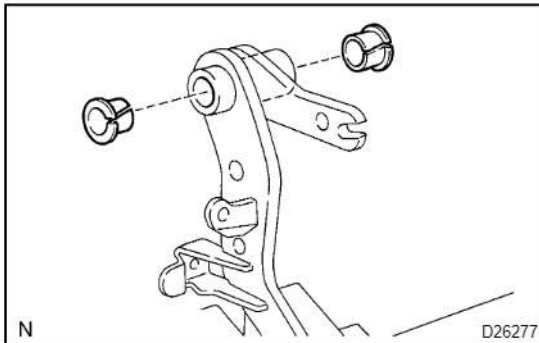


8. REMOVE CLUTCH PEDAL SUB-ASSY

- (a) Remove the clutch pedal spring.
- (b) Mount the clutch pedal assy in a soft jaw vise.

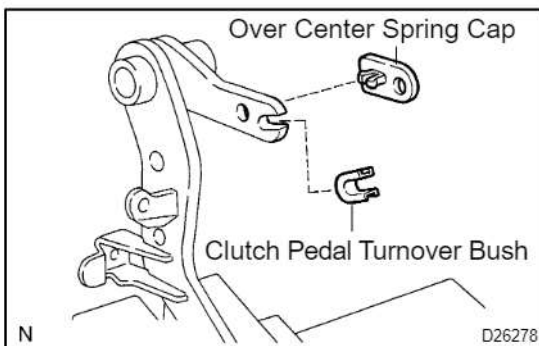


- (c) Remove the bolt, nut and clutch pedal sub-assy from clutch pedal support.



9. REMOVE CLUTCH PEDAL BUSH

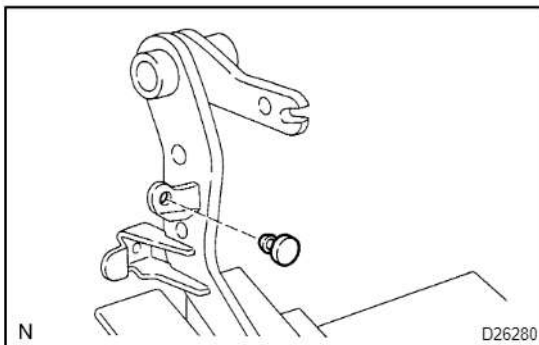
- (a) Remove the 2 bushes from the clutch pedal sub-assy.



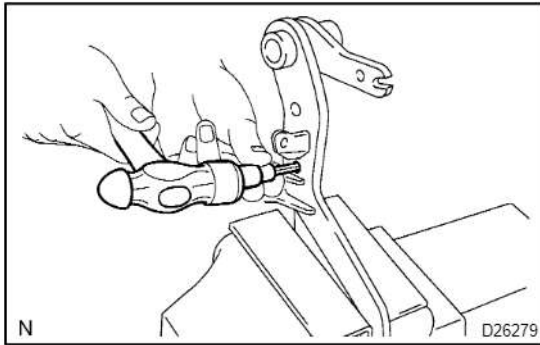
10. REMOVE CLUTCH PEDAL TURNOVER BUSH

11. REMOVE OVER CENTER SPRING CAP

12. REMOVE CLUTCH PEDAL PAD

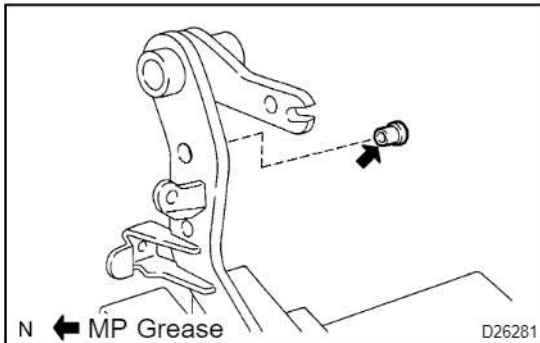


13. REMOVE CLUTCH PEDAL NO.1 CUSHION



14. REMOVE CLUTCH MASTER CYLINDER PUSH ROD CLEVIS BUSH

- (a) Using a hexagon wrench (8 mm) and hammer, remove the clevis bush from the clutch pedal sub-assy.



15. INSTALL CLUTCH MASTER CYLINDER PUSH ROD CLEVIS BUSH

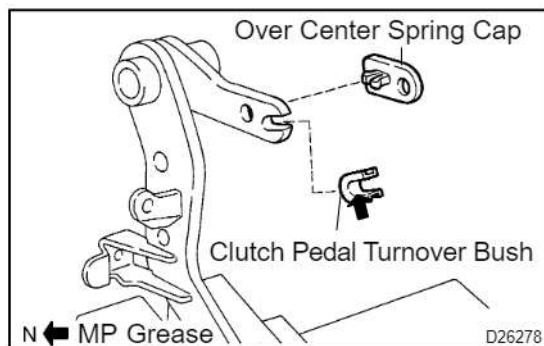
- (a) Apply MP grease to inside of a new bush.
- (b) Install the clevis bush to the clutch pedal sub-assy.

HINT:

Install the clevis bush from the right side of the vehicle.

16. INSTALL CLUTCH PEDAL NO.1 CUSHION

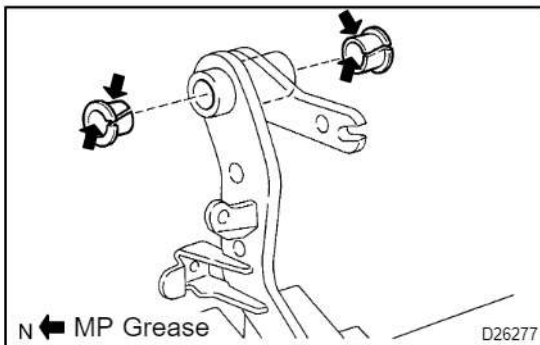
17. INSTALL CLUTCH PEDAL PAD



18. INSTALL OVER CENTER SPRING CAP

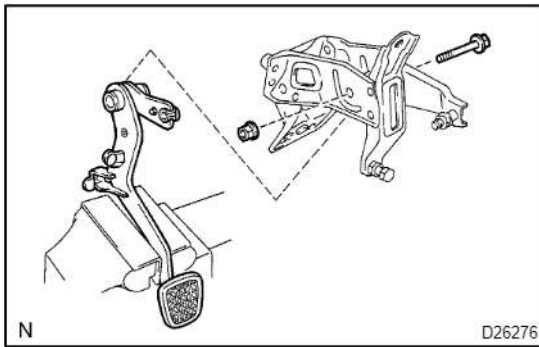
19. INSTALL CLUTCH PEDAL TURNOVER BUSH

- (a) Apply MP grease to inside of a new bush.
- (b) Install the bush to the clutch pedal sub-assy.



20. INSTALL CLUTCH PEDAL BUSH

- (a) Apply MP grease to both side of 2 new bushes.
- (b) Install the 2 bushes to the clutch pedal sub-assy.



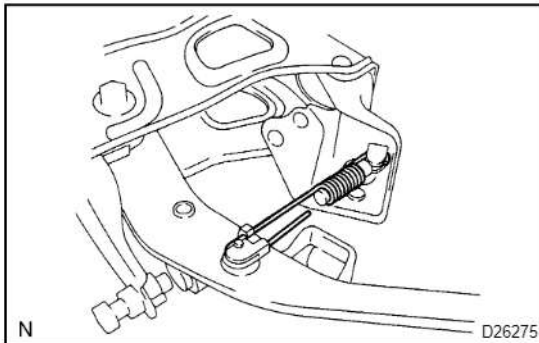
21. INSTALL CLUTCH PEDAL SUB-ASSY

- (a) Install the clutch pedal sub-assy to the clutch pedal support with the bolt and nut.

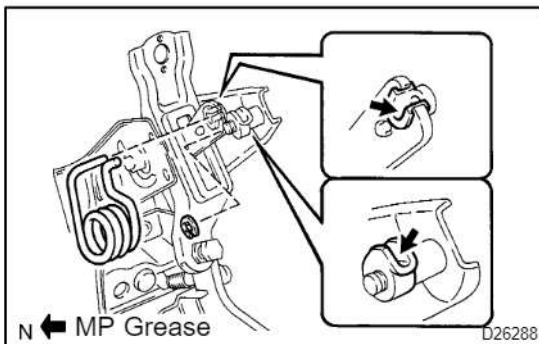
Torque: 37 N·m (375 kgf·cm, 27 ft·lbf)

HINT:

Install the bolt from the right side of the vehicle.



- (b) Install the clutch pedal spring.



22. INSTALL TURN OVER SPRING SEAT COMPRESSION SPRING

- (a) Apply MP grease to the contact surface of the bush and spring.
- (b) Install the compression spring.
- (c) Using needle nose pliers, install the E-ring.

23. INSTALL CLUTCH PEDAL ASSY

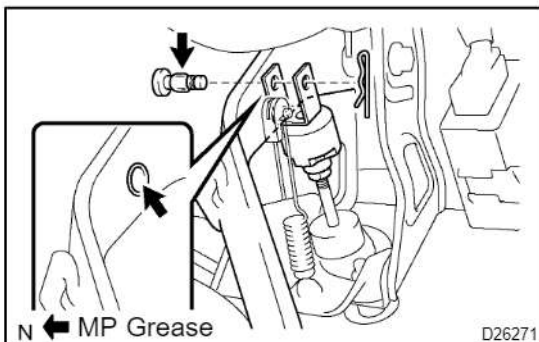
- (a) Install the clutch pedal assy with the bolt and 2 nuts.

Torque:

Bolt: 19 N·m (195 kgf·cm, 14 ft·lbf)

Nut: 12 N·m (120 kgf·cm, 9 ft·lbf)

- (b) Connect the clutch start switch clamp and connector.



24. INSTALL CLUTCH MASTER CYLINDER PUSH ROD CLEVIS W/HOLE PIN

- (a) Apply MP grease to the contact surface of the hole pin and bush.
- (b) Connect the clevis to the clutch pedal assy with the hole pin.

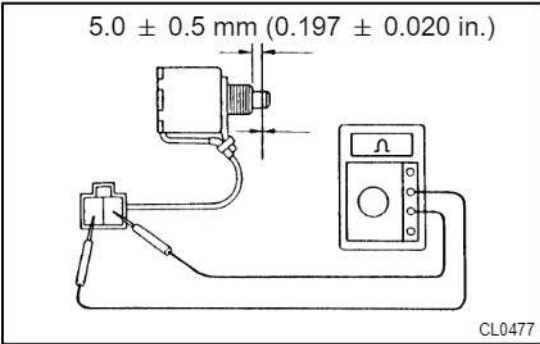
HINT:

Install the hole pin from the left side of the vehicle.

- (c) Install the clip to the hole pin.

25. INSTALL INSTRUMENT PNL INSERT SUB-ASSY LWR LH
26. INSTALL INSTRUMENT PANEL SUB-ASSY UPPER
27. INSTALL COMBINATION METER ASSEMBLY
(SEE PAGE [71-29](#))
28. INSTALL INSTRUMENT CLUSTER FINISH PANEL
(SEE PAGE [71-16](#))
29. INSPECT AND ADJUST CLUTCH PEDAL SUB-ASSY
(SEE PAGE [42-7](#))
30. INSPECT CLUTCH START SWITCH ASSY
(SEE PAGE [42-19](#))

INSPECTION

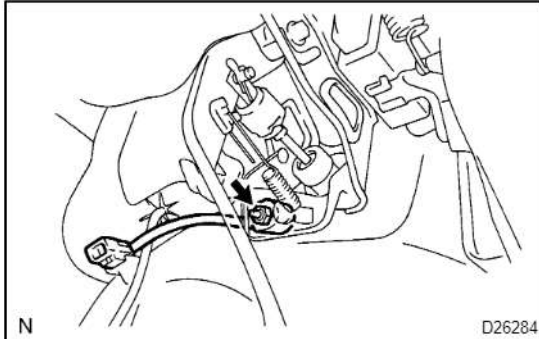


1. INSPECT CLUTCH START SWITCH ASSY

- (a) Check the continuity between terminals when the switch is ON and OFF.

Switch position	Condition
ON (pushed)	Continuity
OFF (free)	No continuity

REPLACEMENT



1. REMOVE CLUTCH START SWITCH ASSY

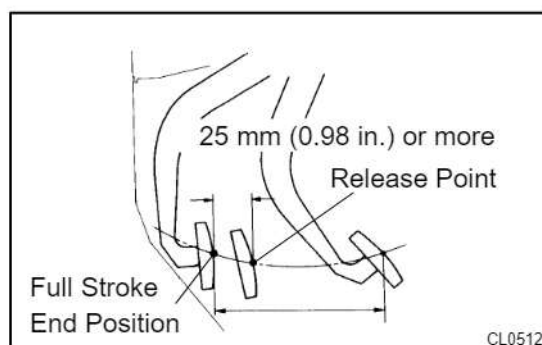
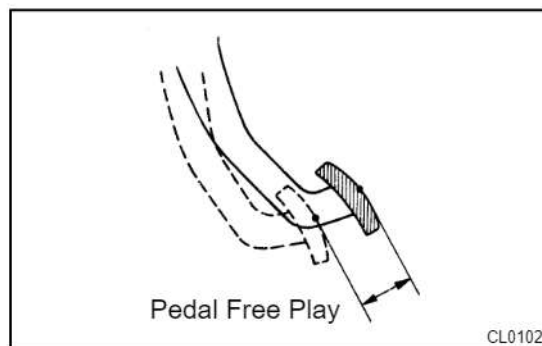
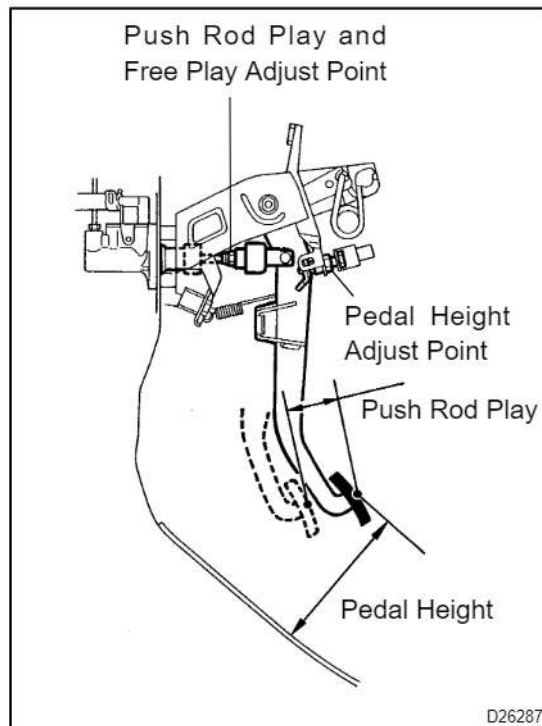
- (a) Disconnect the clutch start switch assy connector.
- (b) Remove the nut and clutch start switch assy from the clutch pedal support.

2. INSTALL CLUTCH START SWITCH ASSY

- (a) Install the clutch start switch assy with the nut.
Torque: 16 N·m (160 kgf·cm, 12 ft·lbf)
- (b) Connect the clutch start switch assy connector.

3. INSPECT CLUTCH START SWITCH ASSY (SEE PAGE 42-19)

ADJUSTMENT



1. INSPECT AND ADJUST CLUTCH PEDAL SUB-ASSY

- (a) Turn over the floor carpet.
- (b) Check that the pedal height is correct.
Pedal height from asphalt sheet:
159.0 to 169.0 mm (6.260 - 6.654 in.)
- (c) Adjust the pedal height.
(1) Loosen the lock nut and turn the stopper bolt until the height is correct. Tighten the lock nut.
Torque: 26 N·m (260 kgf·cm, 19 ft·lbf)
- (d) Check that the pedal free play and push rod play are correct.
(1) Depress the pedal until the clutch resistance begin to be felt.
Pedal free play: 5.0 to 15.0 mm (0.197 - 0.591 in.)
(2) Gently depress the pedal until the resistance begins to increase a little.
Push rod play at pedal top:
1.0 - 5.0 mm (0.039 - 0.197 in.)
- (e) Adjust the pedal free play and push rod play.
(1) Remove the instrument panel sub-assy upper.
(2) Remove the instrument panel insert sub-assy lower LH.
(3) Disconnect the air duct.
(4) Loosen the lock nut and turn the push rod until the free play and push rod play are correct.
(5) Tighten the lock nut.
(6) After adjusting the pedal free play, check the pedal height.
(7) Connect the air duct.
(8) Install the instrument panel insert sub-assy lower LH.
(9) Install the instrument panel sub-assy upper.
- (f) Check the clutch release point.
(1) Pull the parking brake lever and install wheel stopper.
(2) Start the engine and idle the engine.
(3) Without depressing the clutch pedal, slowly shift the shift lever into reverse position until the gears contact.

- (4) Gradually depress the clutch pedal and measure the stroke distance from the point that the gear noise stops (release point) up to the full stroke end position.

Standard distance: 25 mm (0.98 in.) or more

(From pedal stroke end position to release point)

If the distance is not as specified, perform the following operations.

- Check pedal height.
- Check push rod play and pedal free play.
- Bleed the clutch line.
- Check the clutch cover assy and disc assy.

CLUTCH MASTER CYLINDER ASSY OVERHAUL

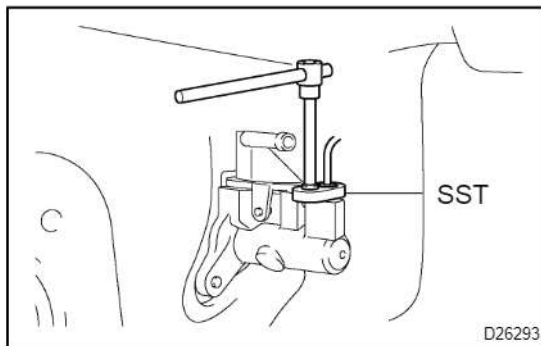
4202E-07

1. DRAIN CLUTCH FLUID
2. REMOVE BRAKE MASTER CYLINDER SUB-ASSY
(SEE PAGE 27-4)
3. REMOVE BRAKE BOOSTER ASSY
(SEE PAGE 26-19)
4. DISCONNECT CLUTCH RESERVOIR TUBE

(a) Loosen the clip and disconnect the clutch reservoir tube from the clutch master cylinder assy.

HINT:

Use a container to catch the fluid.



5. DISCONNECT CLUTCH MASTER CYLINDER TO FLEXIBLE HOSE TUBE

(a) Using SST, disconnect the flexible hose tube.

HINT:

Use a container to catch the fluid.

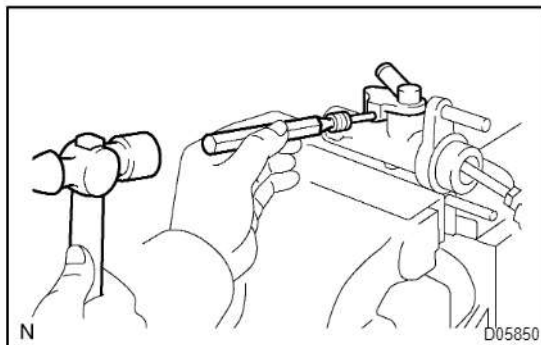
SST 09023-00101

6. REMOVE CLUTCH MASTER CYLINDER PUSH ROD CLEVIS W/HOLE PIN

(a) Remove the clip and hole pin.

7. REMOVE CLUTCH MASTER CYLINDER ASSY

(a) Remove the 2 nuts and clutch master cylinder assy.



8. REMOVE CLUTCH MASTER CYLINDER KIT

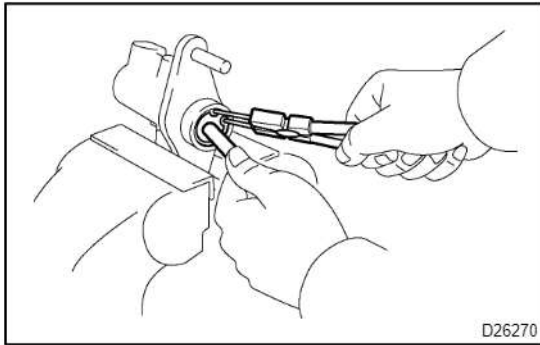
(a) Using a pin punch (ϕ 5 mm) and hammer, drive out the slotted spring pin.

(b) Remove the inlet union and grommet.

(c) Loosen the lock nut, and remove the push rod clevis.

(d) Remove the lock nut from the push rod.

(e) Remove the boot from the cylinder body.



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- (f) While pushing the piston rod, using snap ring pliers, remove the snap ring.
- (g) Remove the push rod from the cylinder body.

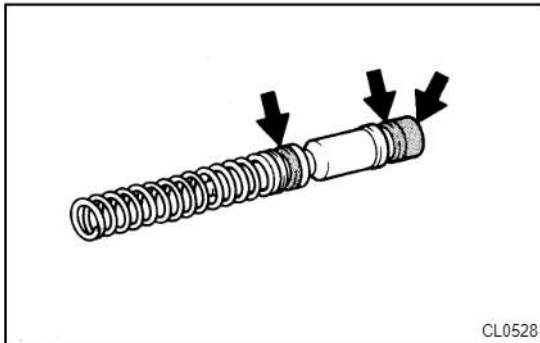
NOTICE:

The piston may pop up out of the cylinder body. Therefore, slowly remove the push rod from the cylinder body.

- (h) Remove the stop plate from the push rod.
- (i) Remove the piston with spring from the cylinder.

NOTICE:

Be careful not to damage the inside of the cylinder body.

9. INSTALL CLUTCH MASTER CYLINDER KIT

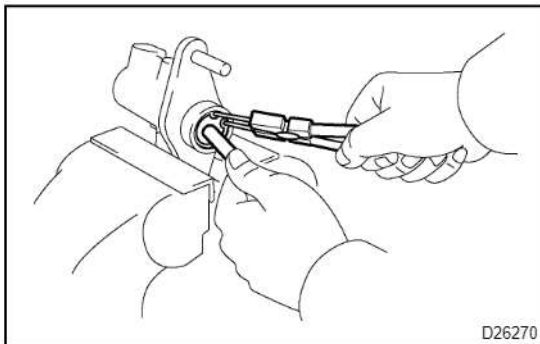
CL0528

- (a) Coat parts with lithium soap base glycol grease, shown in the illustration.
- (b) Install the piston with spring into the cylinder.

NOTICE:

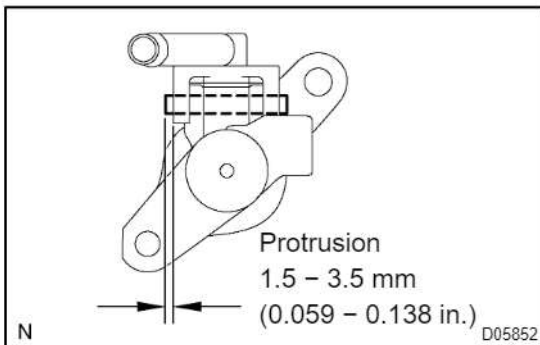
Be careful not to damage the inside of the cylinder body.

- (c) Install the stop plate to the push rod.
- (d) Install the push rod to the cylinder body.



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- (e) While pushing the piston rod, using snap ring pliers, install the snap ring.
- (f) Install the boot to the cylinder body.
- (g) Install the lock nut to the push rod.
- (h) Temporarily install the push rod clevis with the lock nut to the push rod.
- (i) Install the inlet union and a new grommet.

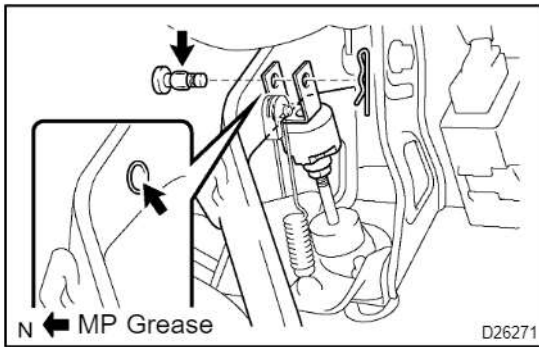


D05852

- (j) Using a pin punch ($\varnothing$ 5 mm) and hammer, drive in the slotted spring pin.

10. INSTALL CLUTCH MASTER CYLINDER ASSY

- (a) Install the clutch master cylinder assy with the 2 nuts.
Torque: 12 N·m (120 kgf·cm, 9 ft·lbf)



11. INSTALL CLUTCH MASTER CYLINDER PUSH ROD CLEVIS W/HOLE PIN

- (a) Apply MP grease to the contact surface of the hole pin and bush.
- (b) Connect the clevis to the clutch pedal assy with the hole pin.

HINT:

Install the hole pin from the left side of the vehicle.

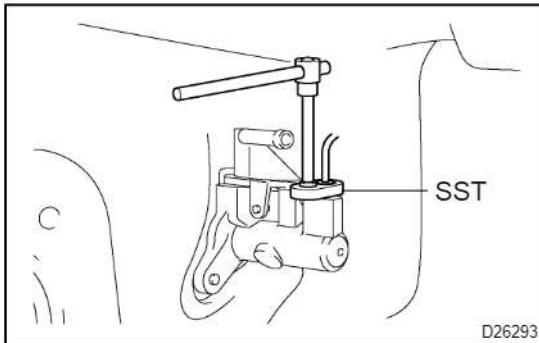
- (c) Install the clip to the hole pin.

12. CONNECT CLUTCH MASTER CYLINDER TO FLEXIBLE HOSE TUBE

- (a) Using SST, connect the flexible hose tube.

Torque: 15 N·m (155 kgf·cm, 11 ft·lbf)

SST 09023-00101



13. CONNECT CLUTCH RESERVOIR TUBE

- (a) Connect the clutch reservoir tube with the clip to the clutch master cylinder assy.

NOTICE:

Connect the clutch reservoir tube so that it will not be twisted.

14. INSTALL BRAKE BOOSTER ASSY

(SEE PAGE 26-19)

15. INSTALL BRAKE MASTER CYLINDER SUB-ASSY

(SEE PAGE 27-4)

16. BLEED MASTER CYLINDER

SST 09023-00100

17. BLEED BRAKE LINE

(SEE PAGE 30-8)

18. BLEED CLUTCH PIPE LINE

- (a) Fill the brake reservoir tank with clutch fluid and bleed clutch system.

Torque: 8.3 N·m (85 kgf·cm, 73 in·lbf)

19. CHECK AND ADJUST BRAKE PEDAL HEIGHT

(SEE PAGE 30-29)

20. INSPECT AND ADJUST CLUTCH PEDAL SUB-ASSY

(SEE PAGE 42-7)

21. CHECK BRAKE FLUID LEAKAGE

22. CHECK CLUTCH FLUID LEAKAGE

23. CHECK FLUID LEVEL IN RESERVOIR