

CLUTCH SYSTEM

CL

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General Description

CLUTCH SYSTEM

1. General Description

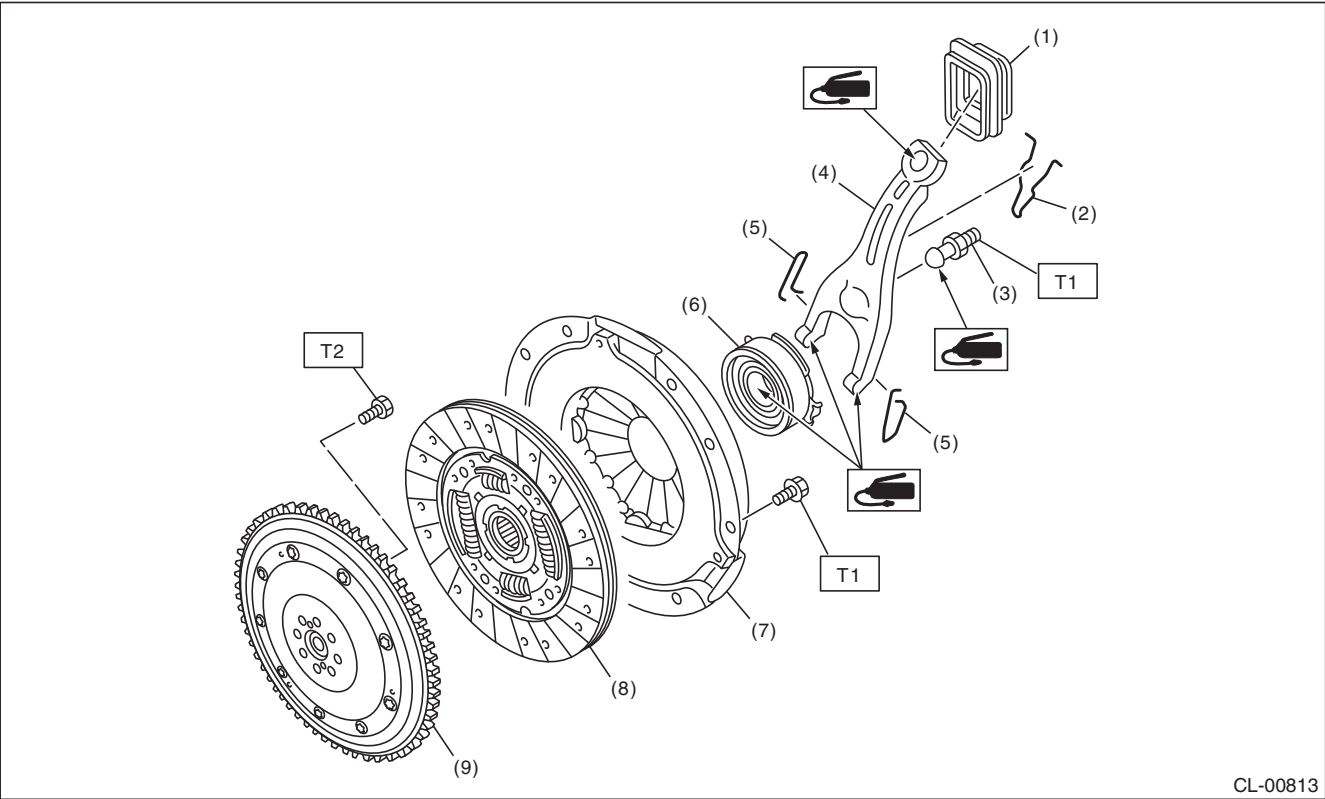
A: SPECIFICATION

Model			2.5 L		
Transmission type			6MT		
Clutch cover	Type		Push type		
	Diaphragm set load N (kgf, lbf)		5,688 (580, 1,279)		
Clutch disc	Facing material		Woven (non-asbestos)		
	O.D. × I.D. × Thickness mm (in)	Flywheel side	230 × 155 × 3.2 (9.06 × 6.10 × 0.126)		
		Clutch cover side	230 × 155 × 3.5 (9.06 × 6.10 × 0.138)		
	Spline outer diameter mm (in)		25.2 (0.992), (number of teeth: 24)		
	Depth of rivet head mm (in)	Flywheel side	1.35 — 1.95 (0.053 — 0.077)		
		Clutch cover side	1.65 — 2.25 (0.065 — 0.089)		
		Limit of sinking	0.8 (0.031)		
	Deflection limit mm (in)		0.7 (0.028) at R = 110 (4.33)		
Clutch release lever ratio			1.6		
Release bearing			Grease-packed self-aligning		
Clutch pedal	Full stroke mm (in)		130 — 135 (5.12 — 5.31)		
	Free play mm (in)		4 — 11 (0.16 — 0.43)		
Flywheel	Type		Flexible		



B: COMPONENT

1. CLUTCH ASSEMBLY



CL-00813

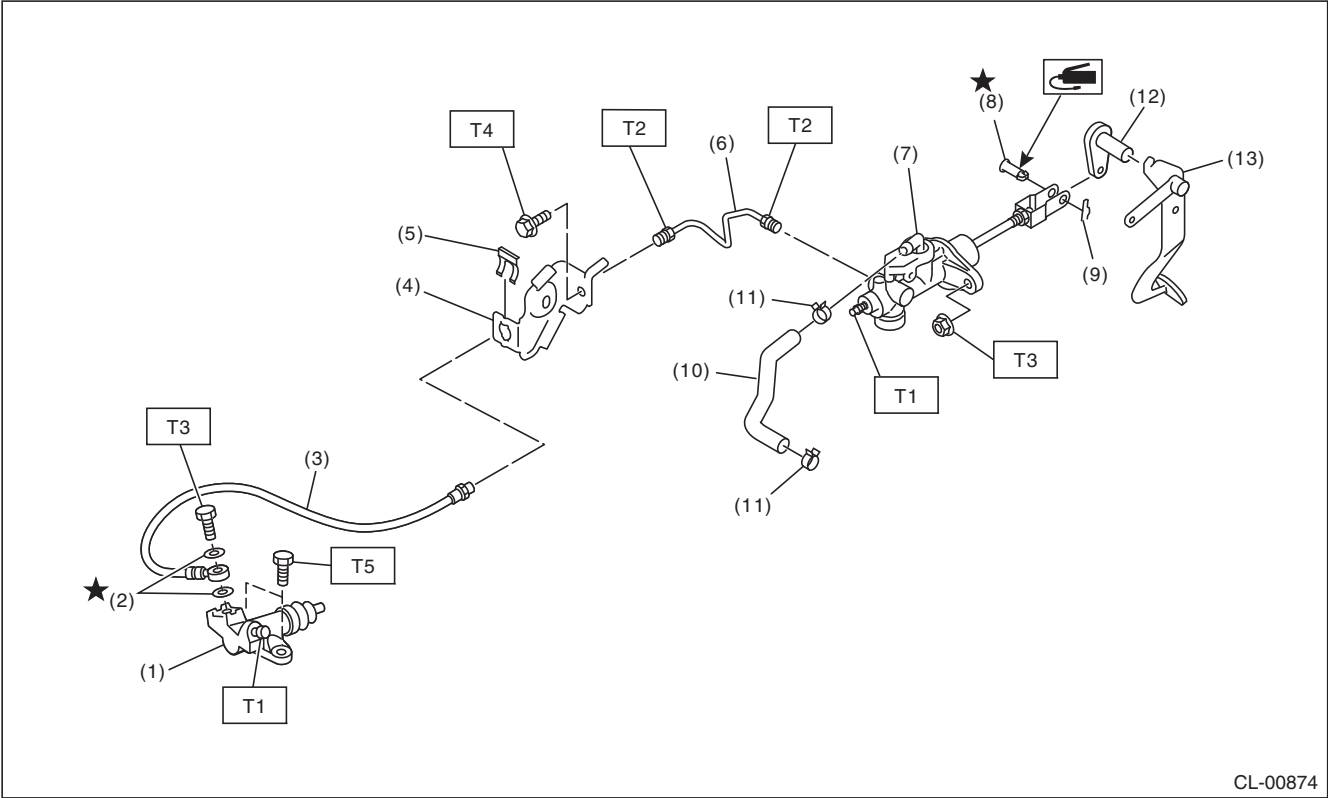
- | | |
|-------------------|-----------------------|
| (1) Dust cover | (6) Release bearing |
| (2) Lever spring | (7) Clutch cover |
| (3) Pivot | (8) Clutch disc |
| (4) Release lever | (9) Flexible flywheel |
| (5) Clip | |

Tightening torque: N·m (kgf-m, ft-lb)
T1: 16 (1.6, 11.8)
T2: <Ref. to CL-13, INSTALLATION, Flywheel.>

General Description

CLUTCH SYSTEM

2. CLUTCH PIPE AND HOSE



CL-00874

- (1) Operating cylinder
- (2) Gasket
- (3) Clutch hose
- (4) Bracket
- (5) Clamp
- (6) Clutch pipe
- (7) Master cylinder ASSY

- (8) Clevis pin
- (9) Snap pin
- (10) Tank hose
- (11) Clamp
- (12) Lever
- (13) Pedal

Tightening torque: N-m (kgf-m, ft-lb)

T1: 7.8 (0.8, 5.8)

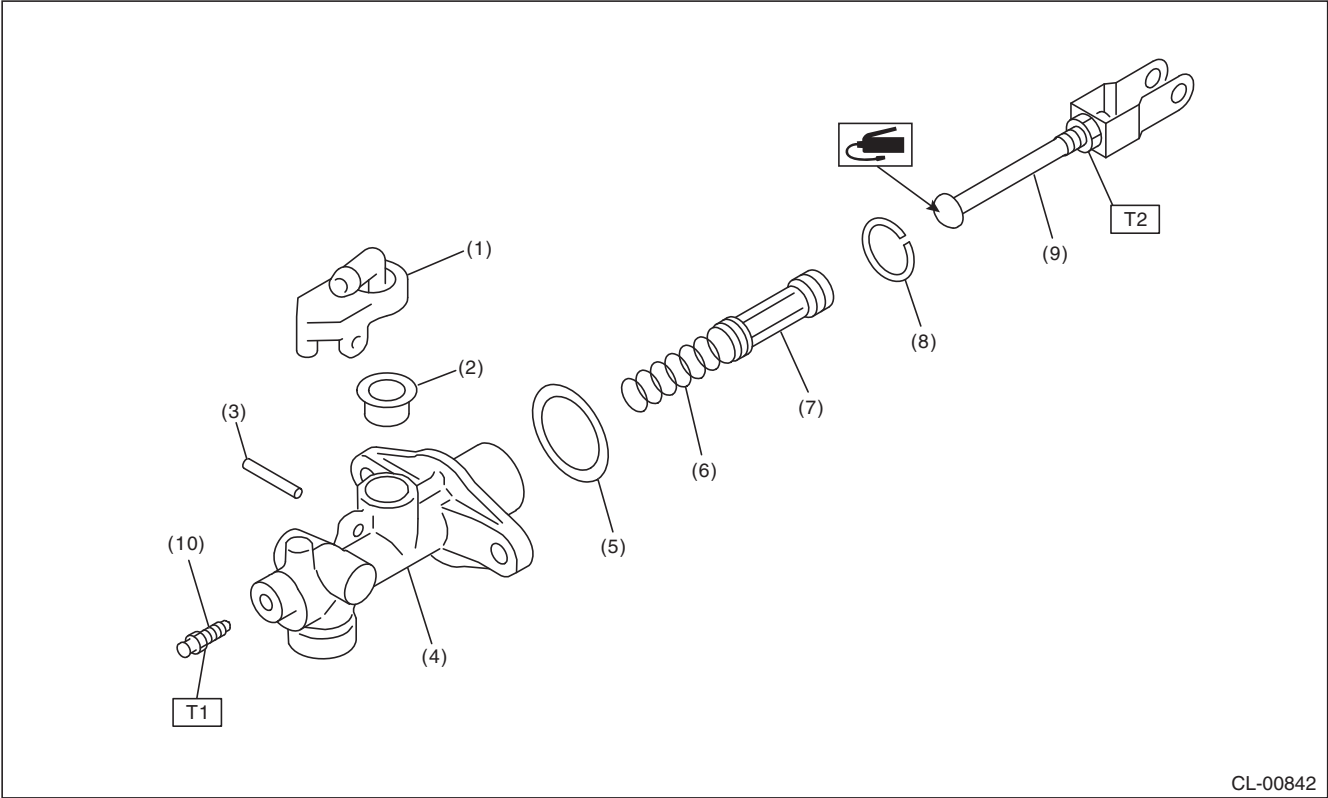
T2: 15 (1.5, 11.1)

T3: 18 (1.8, 13.3)

T4: 25 (2.5, 18.4)

T5: 37 (3.8, 27.3)

3. MASTER CYLINDER



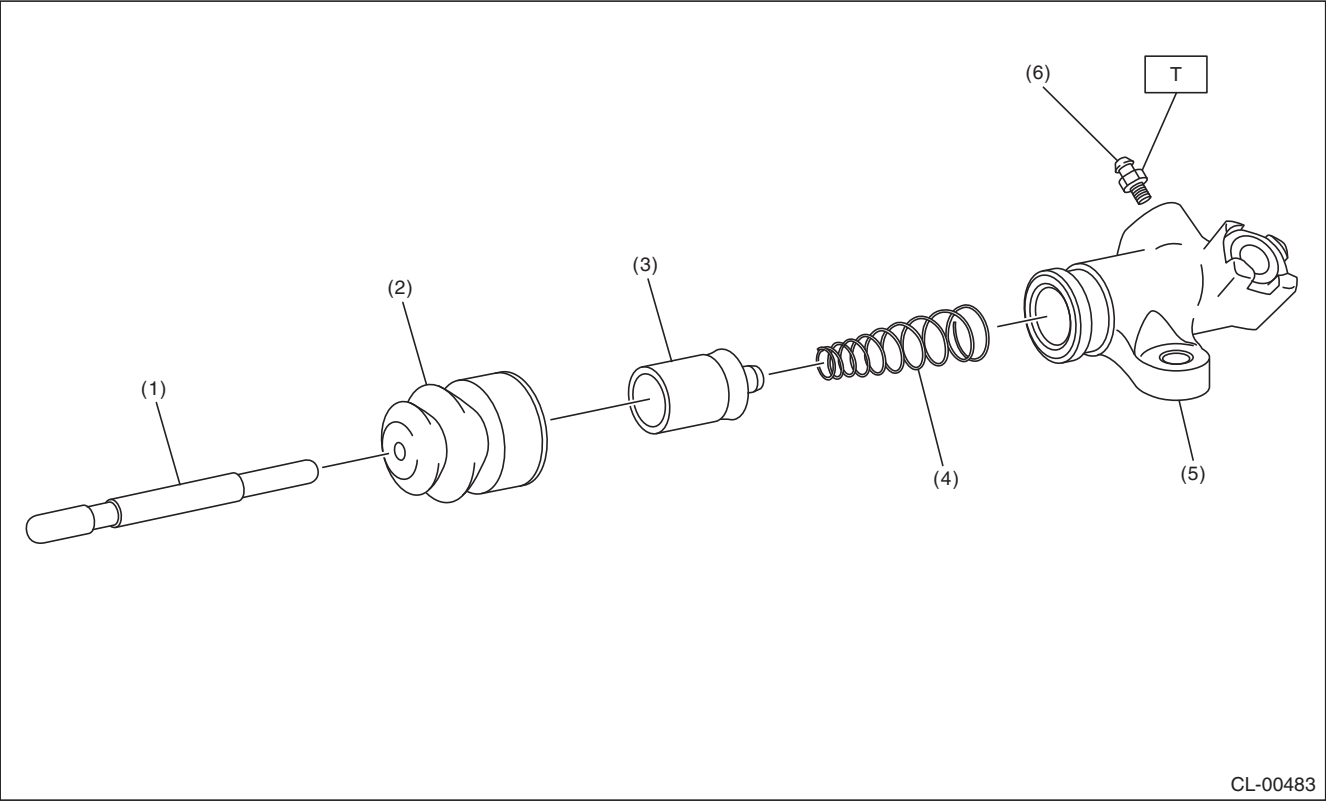
- | | |
|---------------------|----------------------|
| (1) Nipple | (6) Return spring |
| (2) Oil seal | (7) Piston |
| (3) Straight pin | (8) Piston stop ring |
| (4) Master cylinder | (9) Push rod ASSY |
| (5) Seat | (10) Breather screw |

Tightening torque: N-m (kgf-m, ft-lb)
T1: 7.8 (0.8, 5.8)
T2: 10 (1.0, 7.4)

General Description

CLUTCH SYSTEM

4. OPERATING CYLINDER



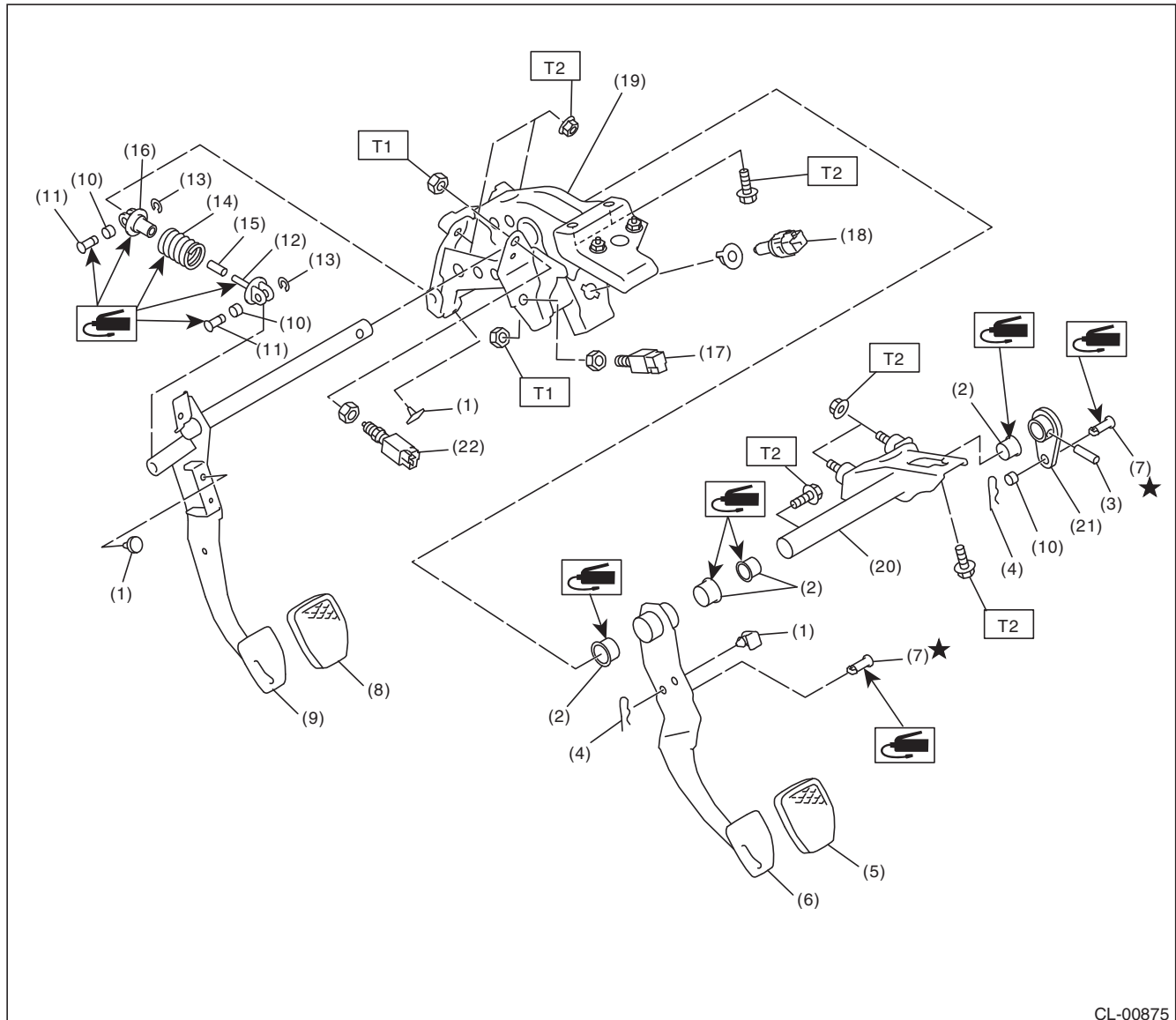
- | | |
|--------------|------------------------|
| (1) Push rod | (4) Piston spring |
| (2) Boot | (5) Operating cylinder |
| (3) Piston | (6) Breather screw |

Tightening torque: N-m (kgf-m, ft-lb)
T: 7.8 (0.8, 5.8)

General Description

CLUTCH SYSTEM

5. CLUTCH PEDAL



CL-00875

- | | | |
|----------------------|------------------------|---|
| (1) Stopper | (10) Bushing C | (19) Pedal bracket |
| (2) Bushing | (11) Clutch clevis pin | (20) Clutch master cylinder bracket |
| (3) Spring pin | (12) Assist rod A | (21) Lever |
| (4) Snap pin | (13) Clip | (22) Clutch start switch (model with push button start) |
| (5) Brake pedal pad | (14) Assist spring | |
| (6) Brake pedal | (15) Assist bushing | |
| (7) Clevis pin | (16) Assist rod B | |
| (8) Clutch pedal pad | (17) Clutch switch | |
| (9) Clutch pedal | (18) Stop light switch | |

Tightening torque: N·m (kgf-m, ft-lb)

T1: 8 (0.8, 5.9)

T2: 18 (1.8, 13.3)

General Description

CLUTCH SYSTEM

C: CAUTION

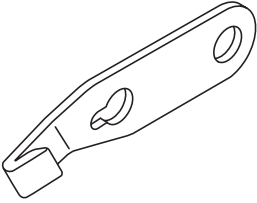
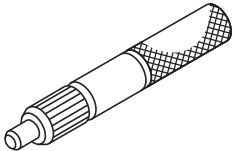
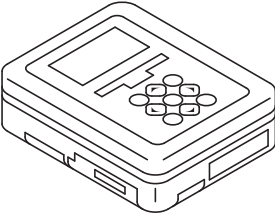
- Wear appropriate work clothing, including a cap, protective goggles and protective shoes when performing any work.
- Remove contamination including dirt and corrosion before removal, installation or disassembly.
- Keep the disassembled parts in order and protect them from dust and dirt.
- Before removal, installation or disassembly, be sure to clarify the failure. Avoid unnecessary removal, installation, disassembly and replacement.
- Vehicle components are extremely hot after driving. Be wary of receiving burns from heated parts.
- Use SUBARU genuine fluid, grease etc. or equivalent. Do not mix fluid, grease, etc. of different grades or manufacturers.
- Be sure to tighten fasteners including bolts and nuts to the specified torque.
- Place shop jacks or rigid racks at the specified points.
- Apply grease onto sliding or revolving surfaces before installation.
- Before installing O-rings or snap rings, apply sufficient amount of fluid to avoid damage and deformation.
- Before securing a part in a vise, place cushioning material such as wood blocks, aluminum plate or cloth between the part and the vise.
- Keep fluid away from the vehicle body. If any fluid contacts the vehicle body, immediately flush the area with water.

General Description

CLUTCH SYSTEM

D: PREPARATION TOOL

1. SPECIAL TOOL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498497100	498497100	CRANKSHAFT STOPPER	- Used for stopping rotation of the flywheel. - Used for flexible flywheel model.
 ST-499747100	499747100	CLUTCH DISC GUIDE	Used for installing the clutch disc to the flywheel.
 ST1B022XU0	1B022XU0	SUBARU SELECT MONITOR III KIT	Used for installing and adjusting the clutch start switch.

2. GENERAL TOOL

TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance, voltage and current.
Dial gauge	Used for measuring clutch disc run-out.
Depth gauge	Used for measuring clutch disc wear.
Angle gauge	Used for tightening the flywheel.

Clutch Disc and Cover

CLUTCH SYSTEM

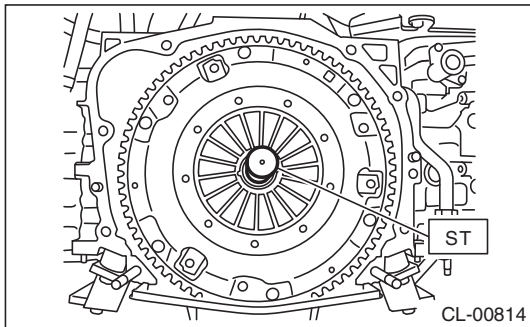
2. Clutch Disc and Cover

A: REMOVAL

1) Remove the transmission assembly from the vehicle. <Ref. to 6MT-26, REMOVAL, Manual Transmission Assembly.>

2) Attach the ST on the flywheel.

ST 499747100 CLUTCH DISC GUIDE



3) Remove the clutch cover and clutch disc.

NOTE:

- Take care not to allow oil to touch the clutch disc face.
- Do not disassemble the clutch cover or clutch disc.

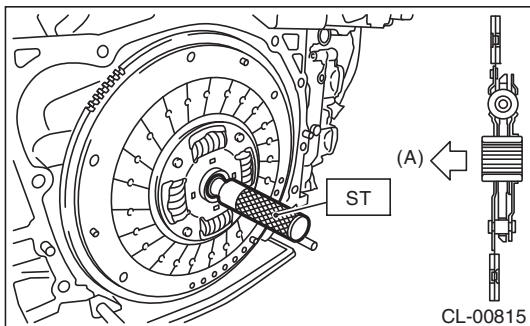
B: INSTALLATION

1) Insert the ST into the clutch disc and attach to the flywheel by inserting the ST end into pilot bearing.

NOTE:

When installing the clutch disc, be careful to attach in the correct direction.

ST 499747100 CLUTCH DISC GUIDE



(A) Flywheel side

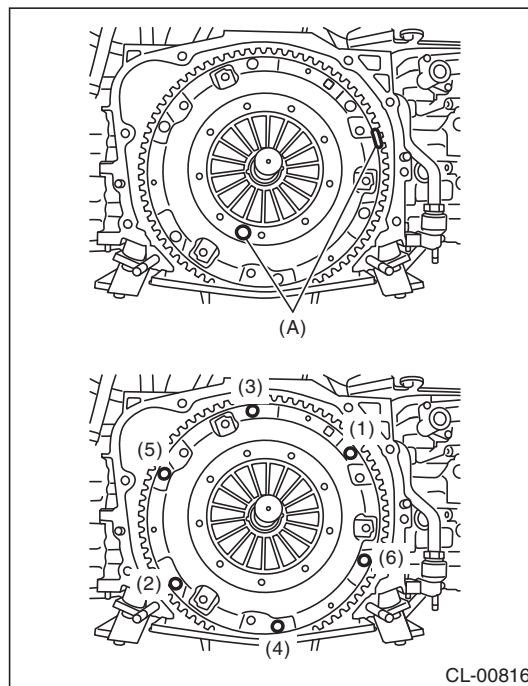
2) Install the clutch cover to the flywheel and tighten the bolts to the specified torque.

NOTE:

- When installing a clutch cover to the flywheel, position the clutch cover so that the spacing between the unbalance marks (paint mark) on the flywheel and clutch cover is 120° or more apart. (The unbalance mark indicates the direction of residual unbalance.)
- Temporarily tighten the bolts by hand. Each bolt should be tightened to the specified torque in a crisscross order.

Tightening torque:

16 N·m (1.6 kgf-m, 11.8 ft-lb)



(A) Unbalance mark (paint)

3) Remove the ST.

ST 499747100 CLUTCH DISC GUIDE

4) Install the transmission assembly. <Ref. to 6MT-29, INSTALLATION, Manual Transmission Assembly.>

C: INSPECTION

1. CLUTCH DISC

1) Facing wear

Measure the depth from the facing surface to the rivet head. Replace if the face is worn locally or worn down to less than the specified value.

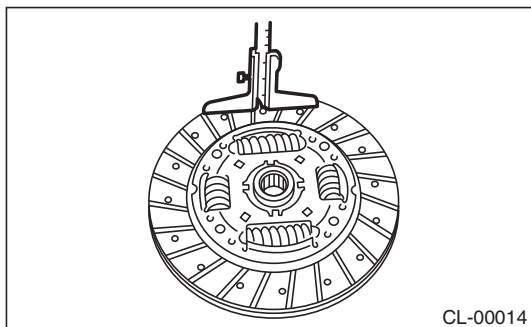
Depth to rivet head:

Limit of sinking

0.8 mm (0.031 in)

NOTE:

Do not wash the clutch disc with any type of cleaning fluid.

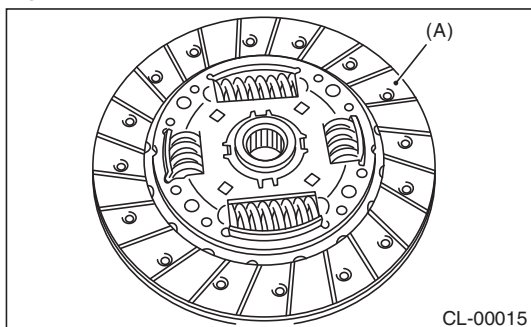


2) Hardened facing

Replace the clutch disc.

3) Oil soakage on facing

Replace the clutch disc and inspect the transmission front oil seal, transmission case mating surface, engine rear oil seal and other locations for oil leakage.



(A) Clutch facing

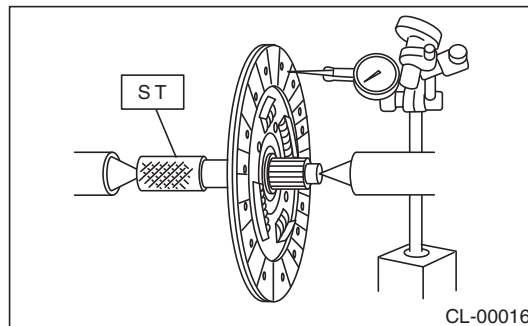
4) Deflection on facing

If deflection exceeds the specified value at the outer circumference of the facing, replace the clutch disc.

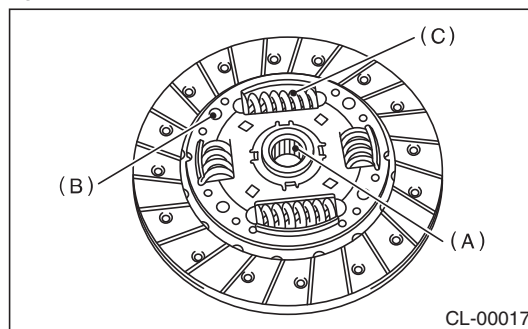
ST 499747100 CLUTCH DISC GUIDE

Limit for deflection:

0.7 mm (0.028 in) at R = 110 mm (4.33 in)



5) If there is spline wear, loose rivets, failed damper springs, etc., replace the clutch disc.



- (A) Spline
- (B) Rivet
- (C) Damper spring

Clutch Disc and Cover

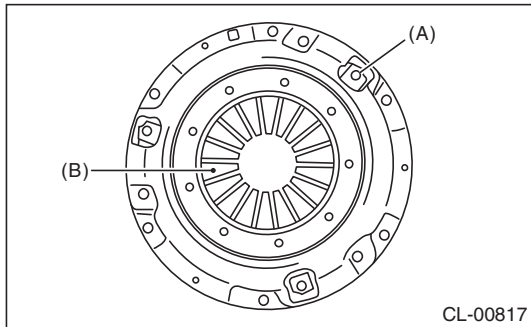
CLUTCH SYSTEM

2. CLUTCH COVER

NOTE:

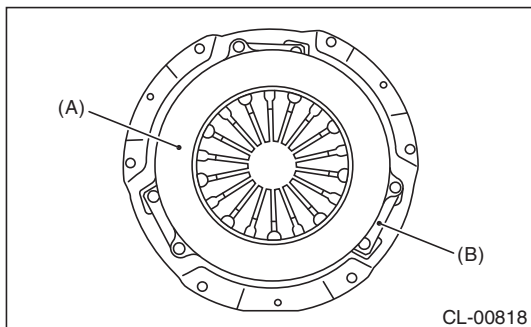
Visually check the following items without disassembling, and replace or repair if defective.

- 1) Loose thrust rivet
- 2) Damaged or worn bearing contact area at the center of diaphragm spring



- (A) Thrust rivet
(B) Diaphragm spring

- 3) Damaged or worn disc contact surface of the pressure plate
- 4) Loose strap plate installation area
- 5) Worn diaphragm sliding area

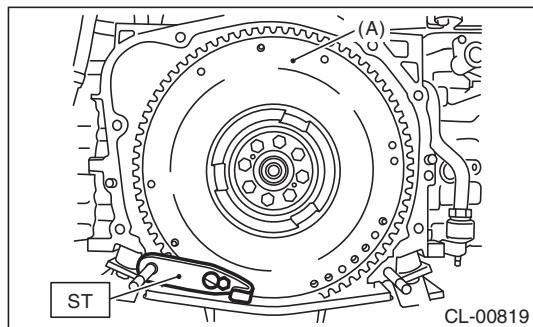


- (A) Pressure plate
(B) Strap plate

3. Flywheel

A: REMOVAL

- 1) Remove the transmission assembly. <Ref. to 6MT-26, REMOVAL, Manual Transmission Assembly.>
 - 2) Remove the clutch cover and clutch disc. <Ref. to CL-10, REMOVAL, Clutch Disc and Cover.>
 - 3) Attach the ST.
- ST 498497100 CRANKSHAFT STOPPER



(A) Flywheel

- 4) Remove the flywheel and crankshaft position sensor plate.

B: INSTALLATION

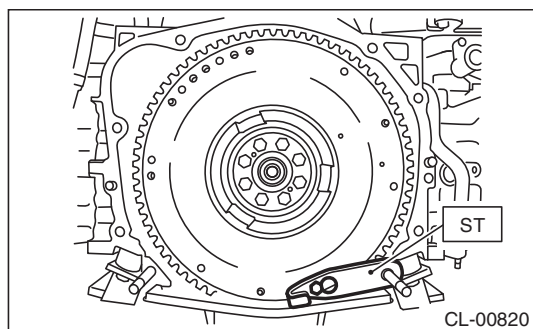
- 1) Temporarily tighten the crankshaft position sensor plate and flywheel.

NOTE:

Align the knock pin hole of the crankshaft position sensor plate to the knock pin of the crankshaft to secure the knock pin.

- 2) Attach the ST.

ST 498497100 CRANKSHAFT STOPPER

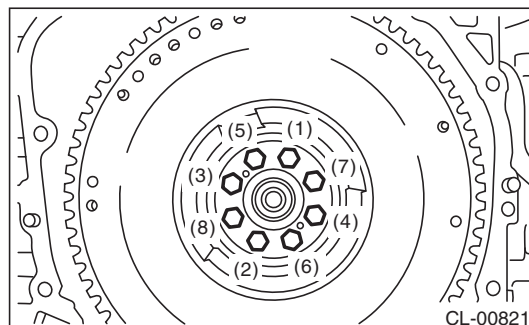


- 3) Tighten the flywheel mounting bolts in two stages.

- (1) Tighten the flywheel attachment bolts.

Tightening torque:

30 N·m (3.1 kgf-m, 22.1 ft-lb)



- (2) While checking the tightening angle with the angle gauge, further tighten the flywheel mounting bolts.

Tightening angle:

30° — 35°

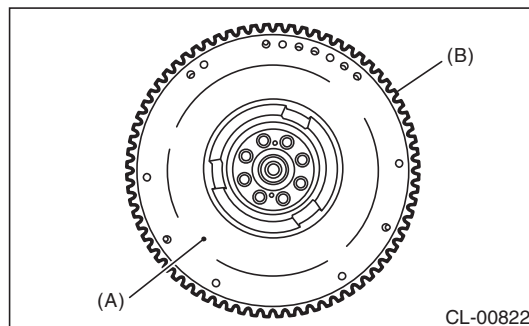
- 4) Install the clutch disc and cover. <Ref. to CL-10, INSTALLATION, Clutch Disc and Cover.>
- 5) Install the transmission assembly. <Ref. to 6MT-29, INSTALLATION, Manual Transmission Assembly.>

C: INSPECTION

CAUTION:

Because the center bearing is grease-sealed and is a non-lubrication type, do not wash with gasoline or solvents.

- 1) If there is damage or defectiveness in the facing sliding surface or ring gear, replace the flywheel.



(A) Flywheel

(B) Ring gear

- 2) Smoothness of rotation

Rotate the ball bearing while applying pressure in the thrust direction.

- 3) If noise or excessive play is noted, replace the flywheel.

Release Bearing and Lever

CLUTCH SYSTEM

4. Release Bearing and Lever

A: REMOVAL

1) Remove the transmission assembly from the vehicle.

<Ref. to 6MT-26, REMOVAL, Manual Transmission Assembly.>

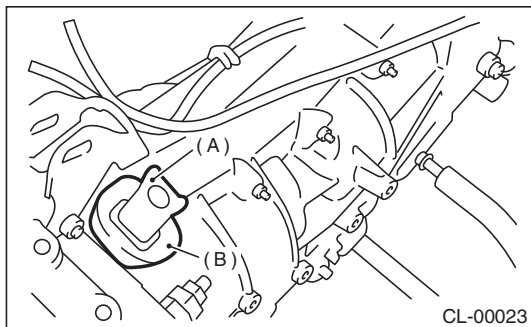
2) Remove the two clips from the release lever.

CAUTION:

Be careful not to deform the clips.

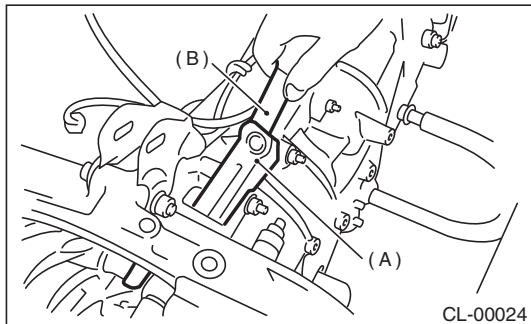
3) Remove the release bearing.

4) Remove the dust cover.



(A) Release lever
(B) Dust cover

5) Remove the lever spring from the pivot with a screwdriver by accessing it through the clutch housing release lever hole. Then remove the release lever.



(A) Release lever
(B) Screwdriver

B: INSTALLATION

NOTE:

Apply the specified grease to lubricate to the following points before installation.

- Contact surface of lever and pivot
- Contact surface of lever and bearing
- Transmission main shaft spline
- Contact surface of release bearing and transmission case

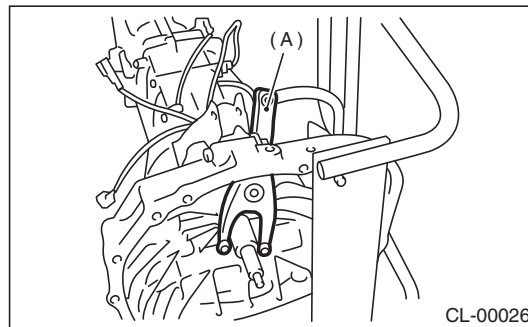
Grease

NICHIMOLY N-130 or equivalent

1) While pushing the release lever to the pivot and twisting it to both sides, fit the lever spring onto the raised portion of the pivot.

NOTE:

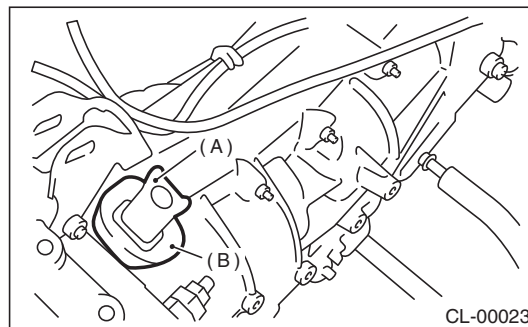
Observing from the main case hole, check that the lever spring is installed securely.



(A) Release lever

2) Install the release bearing and fasten it with two clips.

3) Install the dust cover.



(A) Release lever
(B) Dust cover

4) Check the bearing for smooth movement by operating the release lever.

5) Apply grease to the contact point of the release lever and operating cylinder.

Grease

NICHIMOLY N-130 or equivalent

Release Bearing and Lever

CLUTCH SYSTEM

6) Install the transmission assembly. <Ref. to 6MT-29, INSTALLATION, Manual Transmission Assembly.>

C: INSPECTION

1. RELEASE BEARING

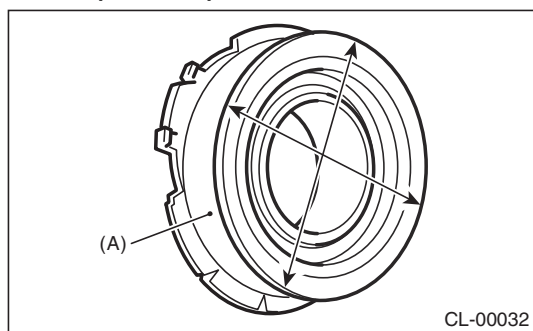
CAUTION:

Since this bearing is grease-sealed and is a non-lubrication type, do not wash with gasoline or any other solvent when servicing the clutch.

1) Check the bearing for smooth movement by applying force to the bearing in the radial direction.

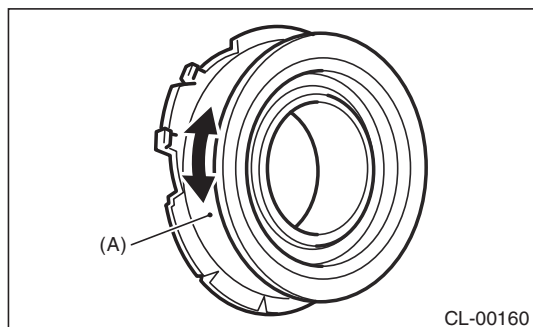
Radial direction stroke:

1.6 mm (0.063 in)



(A) Bearing case

2) While applying force to the bearing in the rotational direction, check the bearing for smooth rotation.

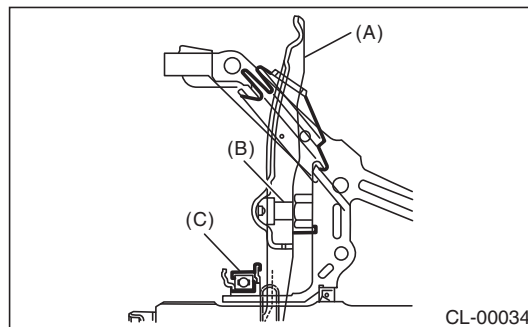


(A) Bearing case

3) Check for wear and damage at the bearing case surface in contact with the lever.

2. RELEASE LEVER

Check the pivot portion of the lever and the contact area with the release bearing case for wear.



- (A) Release lever
- (B) Pivot
- (C) Release bearing

Operating Cylinder

CLUTCH SYSTEM

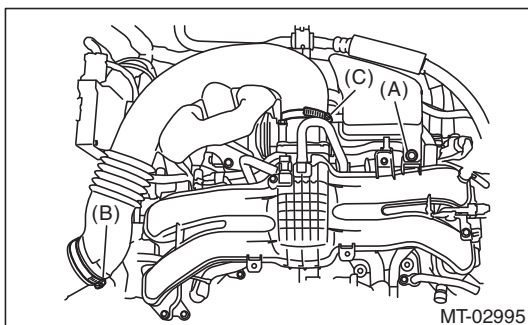
5. Operating Cylinder

A: REMOVAL

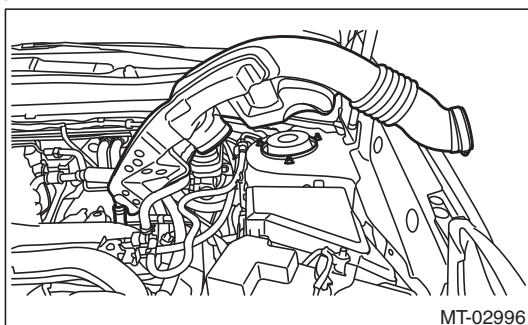
CAUTION:

Clutch fluid spilled on the vehicle body will harm the paint surface; wash it off with water and wipe clean quickly if spilled.

- 1) Remove the clip (A) from the air intake boot.
- 2) Loosen the clamp (B) connecting the air intake boot and air cleaner case (rear).
- 3) Loosen the clamp (C) which connects the air intake boot and throttle body.



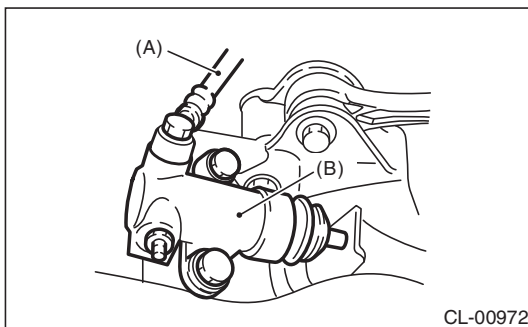
- 4) Remove the air intake boot from the throttle body, and move it to the left side wheel apron.



- 5) Disconnect the clutch hose from the operating cylinder.

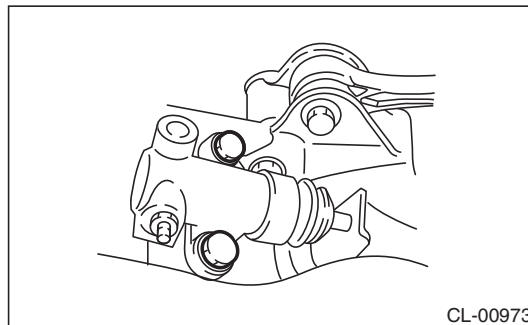
CAUTION:

Cover the hose joint to prevent the clutch fluid from flowing out.



- (A) Clutch hose
(B) Operating cylinder

- 6) Remove the operating cylinder from the transmission.



B: INSTALLATION

- 1) Install in the reverse order of removal.

NOTE:

- Before installing the operating cylinder, apply grease to the contact point of the release lever and operating cylinder.

Grease:

NICHIMOLY N-130 or equivalent

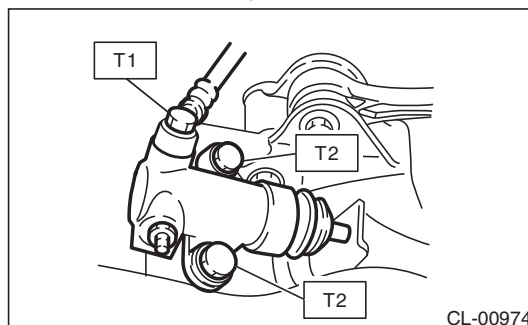
- Be sure to install the clutch hose with the mark side facing upward.
- Be careful not to twist the clutch hose during installation.
- Use a new gasket.

Tightening torque:

Operating cylinder

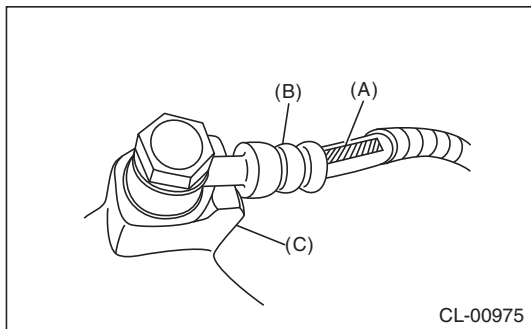
T1: 18 N·m (1.8 kgf-m, 13.3 ft-lb)

T2: 37 N·m (3.8 kgf-m, 27.3 ft-lb)



Operating Cylinder

CLUTCH SYSTEM



- (A) Mark
- (B) Clutch hose
- (C) Operating cylinder

Tightening torque:

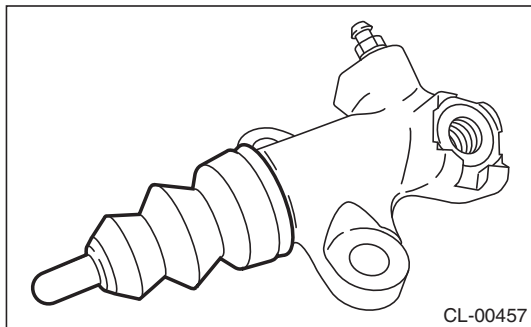
Air intake boot

3 N·m (0.3 kgf-m, 2.2 ft-lb)

2) After bleeding air from the operating cylinder, ensure that the clutch operates properly. <Ref. to CL-24, Clutch Fluid Air Bleeding.>

C: DISASSEMBLY

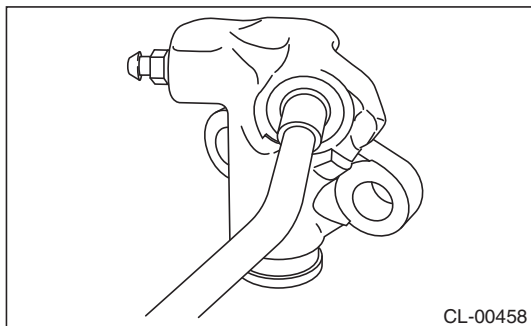
- 1) Remove the boot and push rod.



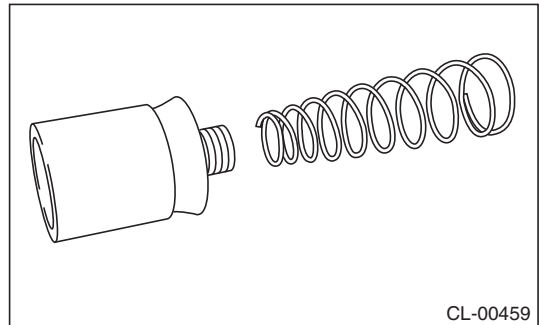
2) Apply compressed air through clutch hose attachment hole.

NOTE:

Face the piston hole down and place a piece of wood underneath to prevent the piston from popping out.



- 3) Separate the piston and piston spring.



D: ASSEMBLY

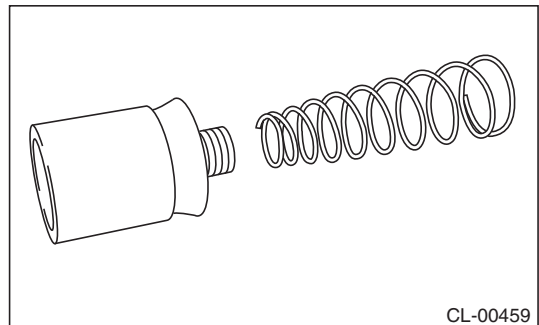
NOTE:

During assembly, apply hydraulic oil to all parts.

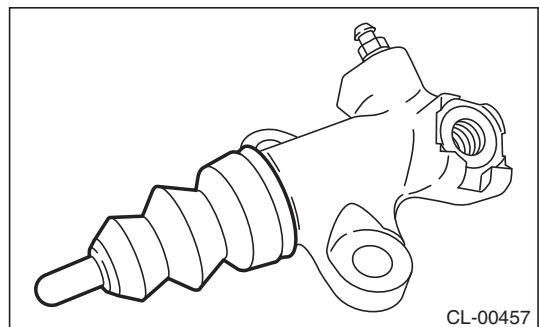
Recommended clutch fluid:

New FMVSS No. 116 DOT3 or DOT4

- 1) Install the piston spring onto the piston.



- 2) Insert piston into the operating cylinder.
- 3) Install push rod to the boot.
- 4) Install boot and push rod to the operating cylinder.



E: INSPECTION

- 1) Check that the operating cylinder is not damaged. Replace the operating cylinder if it is damaged.
- 2) Check the clutch fluid leakage on the operating cylinder or the boot for damage. Replace the operating cylinder if leaks or damages are noted.

Master Cylinder

CLUTCH SYSTEM

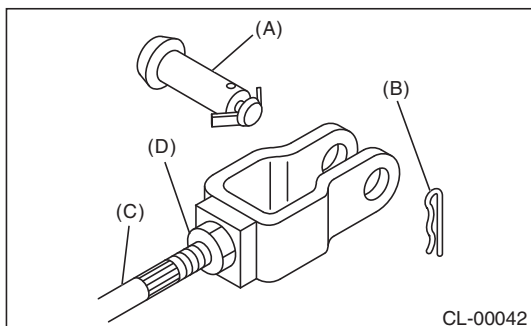
6. Master Cylinder

A: REMOVAL

CAUTION:

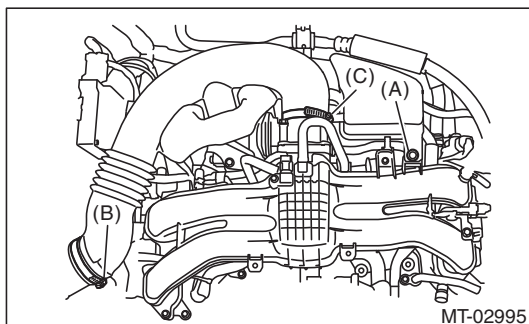
Be careful not to spill the brake fluid. Brake fluid spilled on the vehicle body will harm the paint surface; wash it off with water and wipe clean quickly if spilled.

- 1) Drain the clutch fluid. <Ref. to CL-23, Clutch Fluid.>
- 2) Remove the cover assembly - instrument panel LWR driver. <Ref. to EI-59, REMOVAL, Instrument Panel Lower Cover.>
- 3) Remove the snap pin and clevis pin, and then separate the push rod of the master cylinder from clutch pedal.

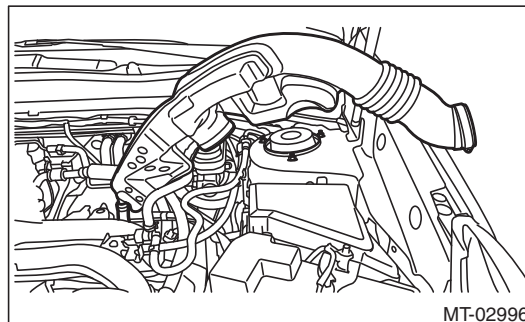


- (A) Clevis pin
- (B) Snap pin
- (C) Push rod
- (D) Lock nut

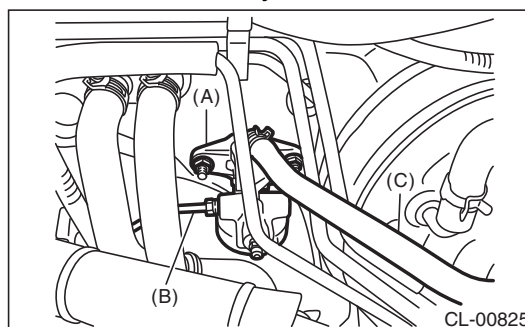
- 4) Remove the clip (A) from the air intake boot.
- 5) Loosen the clamp (B) connecting the air intake boot and air cleaner case (rear).
- 6) Loosen the clamp (C) which connects the air intake boot and throttle body.



- 7) Remove the air intake boot from the throttle body, and move it to the left side wheel apron.



- 8) Disconnect the clutch pipe and tank hose from the master cylinder.
- 9) Remove the master cylinder.



- (A) Master cylinder
- (B) Clutch pipe
- (C) Tank hose

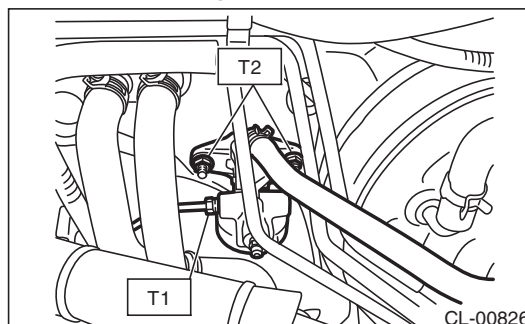
B: INSTALLATION

- 1) Install the master cylinder to the vehicle body, and connect the clutch pipe and tank hose to the master cylinder.

Tightening torque:

T1: 15 N·m (1.5 kgf-m, 11.1 ft-lb)

T2: 18 N·m (1.8 kgf-m, 13.3 ft-lb)



Master Cylinder

CLUTCH SYSTEM

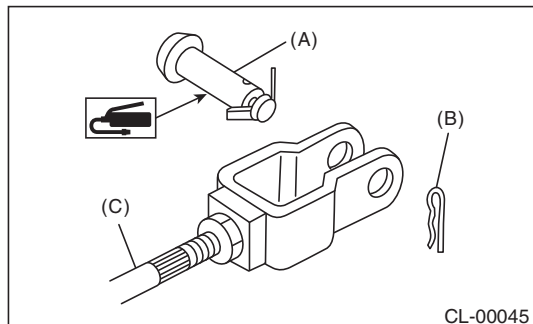
2) Connect the push rod of the master cylinder to the clutch pedal, and install the clevis pin and snap pin.

CAUTION:

Always use a new clevis pin.

NOTE:

Apply grease to the clevis pin.



- (A) Clevis pin
- (B) Snap pin
- (C) Push rod

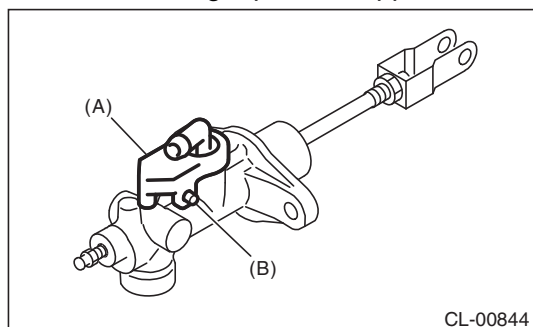
3) Install the cover assembly - instrument panel LWR driver. <Ref. to EI-60, INSTALLATION, Instrument Panel Lower Cover.>

4) After bleeding air from the clutch system, ensure that the clutch operates properly. <Ref. to CL-24, Clutch Fluid Air Bleeding.>

5) Install the air intake boot assembly. <Ref. to IN(H4DO)-11, INSTALLATION, Air Intake Boot.>

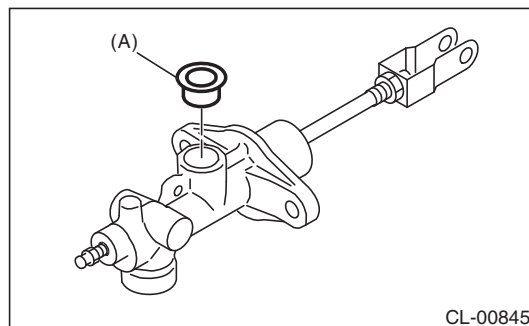
C: DISASSEMBLY

1) Remove the straight pin and nipple.



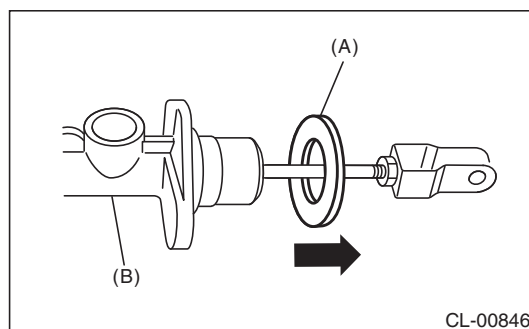
- (A) Nipple
- (B) Straight pin

2) Remove the oil seal.



- (A) Oil seal

3) Move the seat towards the rear.



- (A) Seat
- (B) Master cylinder

4) Remove the piston stop ring.

CAUTION:

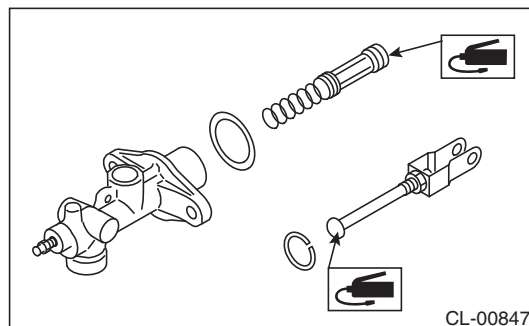
When removing the piston stop ring, be careful to prevent the rod, washer, piston and return spring from popping out.

D: ASSEMBLY

1) Apply a coat of grease to the contact surfaces of the push rod and piston before installation.

Grease:

SILICONE GREASE G-40M or equivalent



2) Assemble in the reverse order of disassembly.

Tightening torque:

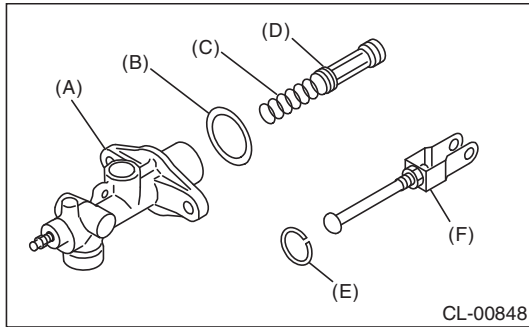
10 N·m (1.0 kgf-m, 7.4 ft-lb)

Master Cylinder

CLUTCH SYSTEM

E: INSPECTION

If any damage, deformation, wear, swelling, rust or other faults are found on the cylinder, piston, push rod, nipple, return spring, breather screw, seat or hose, replace the faulty part.



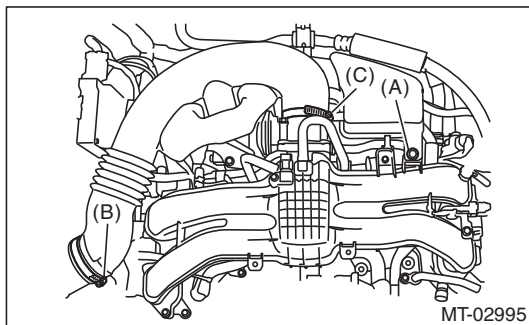
- (A) Master cylinder body
- (B) Seat
- (C) Return spring
- (D) Piston
- (E) Piston stop ring
- (F) Push rod ASSY



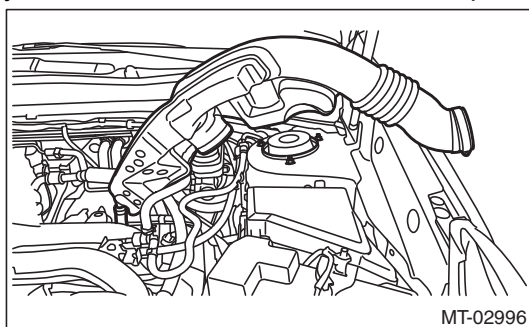
7. Clutch Pipe and Hose

A: REMOVAL

- 1) Remove the clip (A) from the air intake boot.
- 2) Loosen the clamp (B) connecting the air intake boot and air cleaner case (rear).
- 3) Loosen the clamp (C) which connects the air intake boot and throttle body.

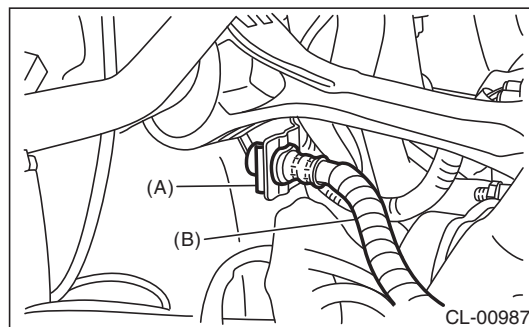


- 4) Remove the air intake boot from the throttle body, and move it to the left side wheel apron.



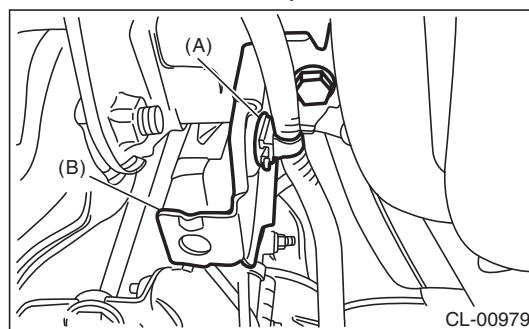
- 5) Drain the clutch fluid. <Ref. to CL-23, Clutch Fluid.>
- 6) Disconnect the clutch pipe from the clutch hose and master cylinder.

- 7) Pull out the clamp, then remove the clutch hose from the bracket.



- (A) Clamp
- (B) Clutch hose

- 8) Disconnect the hose from operating cylinder.
- 9) Remove the harness clip from the bracket.



- (A) Harness clip
- (B) Bracket

- 10) Remove the bracket.

Clutch Pipe and Hose

CLUTCH SYSTEM

B: INSTALLATION

Install in the reverse order of removal.

NOTE:

Bleed air from the clutch fluid. <Ref. to CL-24, Clutch Fluid Air Bleeding.>

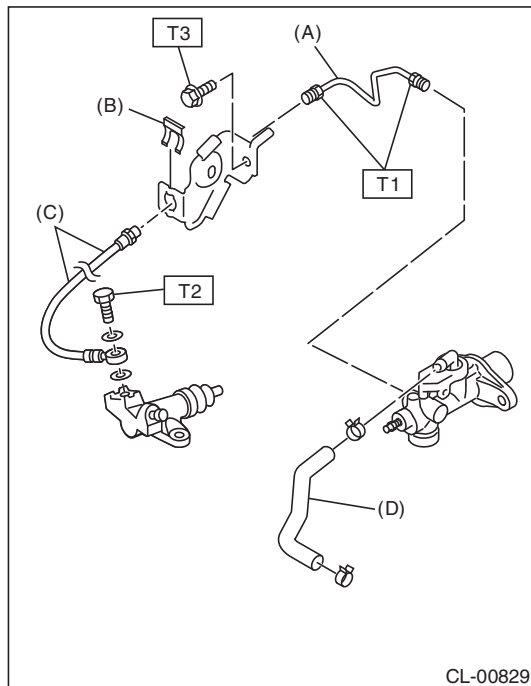
Tightening torque:

Clutch

T1: 15 N·m (1.5 kgf-m, 11.1 ft-lb)

T2: 18 N·m (1.8 kgf-m, 13.3 ft-lb)

T3: 25 N·m (2.5 kgf-m, 18.4 ft-lb)



- (A) Clutch pipe
- (B) Clamp
- (C) Clutch hose
- (D) Tank hose

Tightening torque:

Air intake boot

3 N·m (0.3 kgf-m, 2.2 ft-lb)

C: INSPECTION

Check the pipes and hoses for breaks and damage. Check joints for fluid leakage. If crack, breakage or damage is found, repair or replace the faulty pipe or hose.

8. Clutch Fluid

A: INSPECTION

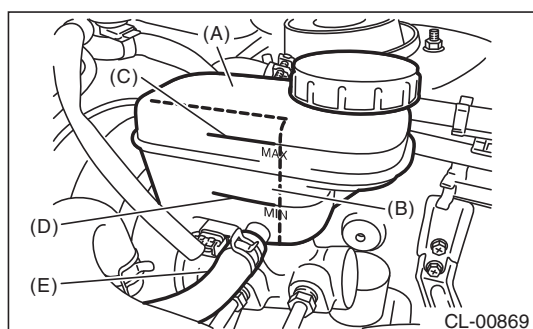
CAUTION:

Be careful not to spill the brake fluid. Brake fluid spilled on the vehicle body will harm the paint surface; wash it off with water and wipe clean quickly if spilled.

- 1) Park the vehicle on a level surface.
- 2) Inspect the fluid level using the scale on the outside of the reservoir tank. If the level is below "MIN", add fluid to bring it up to "MAX", and also inspect for leakage.

Recommended brake fluid:

New FMVSS No. 116 DOT3 or DOT4



- (A) Reservoir tank
- (B) Clutch fluid chamber
- (C) MAX. level
- (D) MIN. level
- (E) Tank hose

CAUTION:

This reservoir tank has the brake fluid chamber and the clutch fluid chamber. When checking the fluid level, always check the fluid from the clutch fluid chamber side where the tank hose is connected.

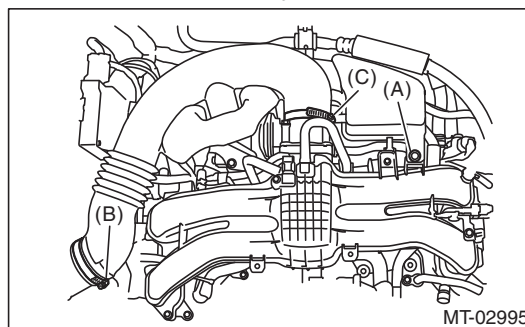
B: REPLACEMENT

CAUTION:

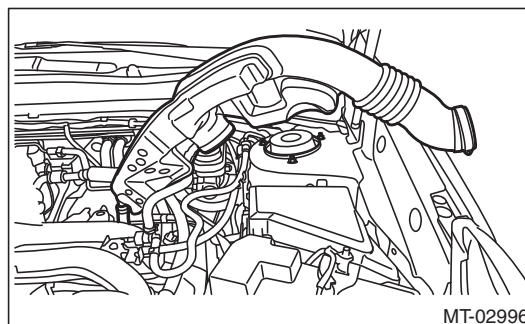
- Be careful not to spill the brake fluid. Brake fluid spilled on the vehicle body will harm the paint surface; wash it off with water and wipe clean quickly if spilled.
- Use new FMVSS No. 116 DOT3 or DOT4.
- Cover the air breather with cloth to prevent clutch fluid from being splashed on surrounding parts when loosening the breather.
- Avoid mixing clutch fluid of different brands to prevent fluid performance from degrading.
- Be careful not to allow dirt or dust to enter the reservoir tank.

NOTE:

- During bleeding operation, keep the clutch reservoir tank filled with clutch fluid to prevent entry of air.
- Clutch pedal must be operated very slowly.
- Bleed air from the oil line with help of a co-worker.
- The required amount of clutch fluid is approximately 150 mL (5.1 US fl oz, 5.3 Imp fl oz) for total clutch system.
- 1) Remove the clip (A) from the air intake boot.
- 2) Loosen the clamp (B) connecting the air intake boot and air cleaner case (rear).
- 3) Loosen the clamp (C) which connects the air intake boot and throttle body.



- 4) Remove the air intake boot from the throttle body, and move it to the left side wheel apron.



- 5) Drain the clutch fluid from the air breather of the operating cylinder.
- 6) Refill the reservoir tank with recommended clutch fluid.

Recommended clutch fluid:

New FMVSS No. 116 DOT3 or DOT4

- 7) If necessary, bleed air from the clutch fluid. <Ref. to CL-24, Clutch Fluid Air Bleeding.>
- 8) Install the air intake boot assembly. <Ref. to IN(H4DO)-11, INSTALLATION, Air Intake Boot.>

Clutch Fluid Air Bleeding

CLUTCH SYSTEM

9. Clutch Fluid Air Bleeding

A: PROCEDURE

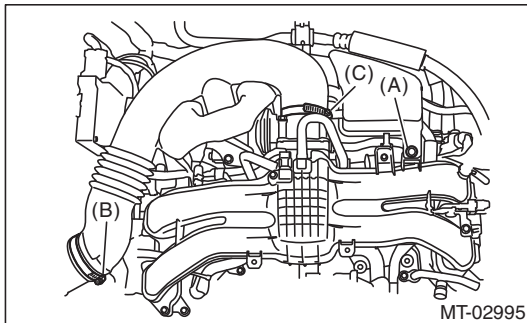
CAUTION:

Be careful not to spill the brake fluid. Brake fluid spilled on the vehicle body will harm the paint surface; wash it off with water and wipe clean quickly if spilled.

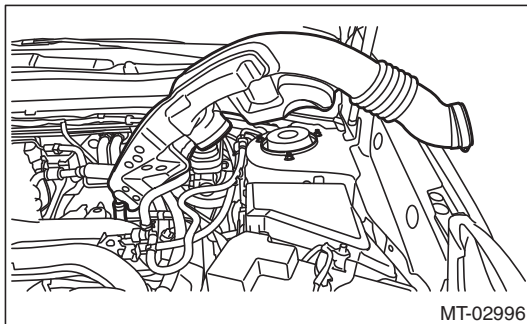
NOTE:

Bleed air from the oil line with help of a co-worker.

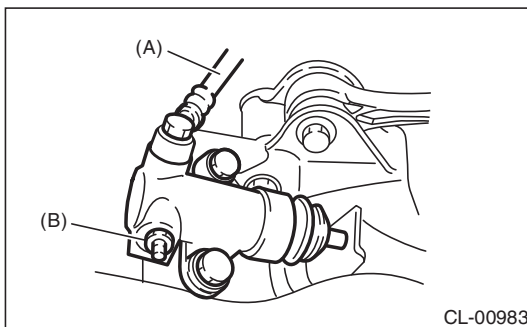
- 1) Remove the clip (A) from the air intake boot.
- 2) Loosen the clamp (B) connecting the air intake boot and air cleaner case (rear).
- 3) Loosen the clamp (C) which connects the air intake boot and throttle body.



- 4) Remove the air intake boot from the throttle body, and move it to the left side wheel apron.



- 5) Fit one end of a vinyl tube into the air breather of the operating cylinder, and put the other end into a container.



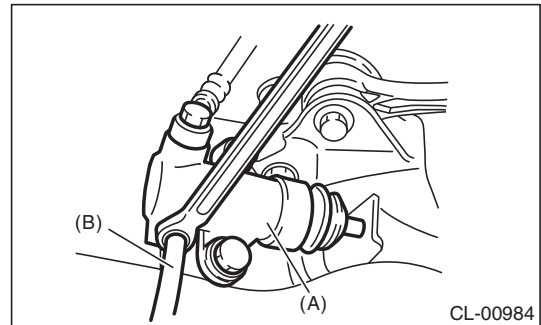
- (A) Clutch hose
(B) Air breather

- 6) Slowly depress the clutch pedal and keep it depressed. Open the air breather to discharge air together with the clutch fluid.

Release the air breather for 1 or 2 seconds. Next, close the air breather, and slowly release the clutch pedal.

CAUTION:

Cover the air breather with cloth to prevent clutch fluid from being splashed on surrounding parts when loosening the breather.



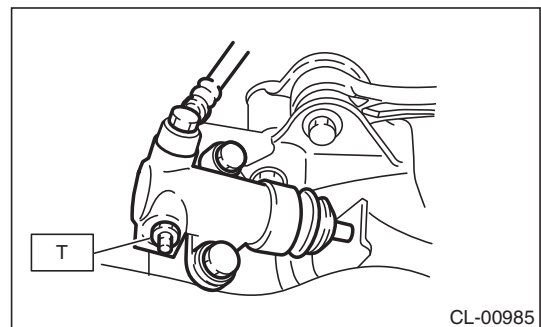
- (A) Operating cylinder
(B) Vinyl tube

- 7) Repeat procedure 4), until there are no more air bubbles appearing from the air breather.

- 8) Tighten the air breather.

Tightening torque:

T: 7.8 N·m (0.8 kgf·m, 5.8 ft·lb)



- 9) After stepping on the clutch pedal, make sure that there are no leaks evident in the entire clutch system.

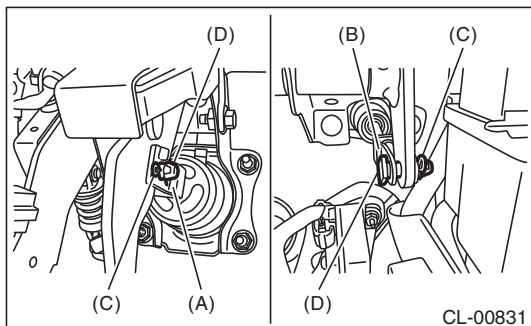
- 10) After bleeding the air from clutch system, ensure that the clutch operates properly.

- 11) Install the air intake boot assembly. <Ref. to IN(H4DO)-11, INSTALLATION, Air Intake Boot.>

10. Clutch Pedal

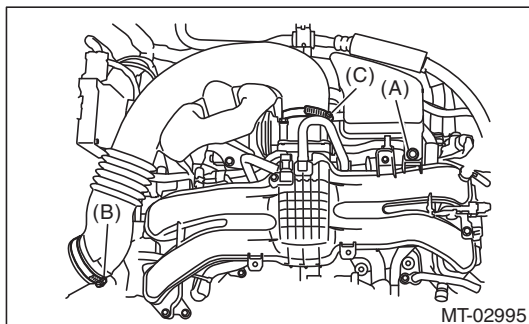
A: REMOVAL

- 1) Disconnect the ground cable from battery.
- 2) Remove the steering column. <Ref. to PS-18, REMOVAL, Steering Column.>
- 3) Disconnect the connector from the stop light switch and clutch switch.
- 4) Remove the snap pins from clevis pins which secure the lever to the push rod and operating rod.
- 5) Pull out the clevis pins which secures the lever to the push rod and operating rod.

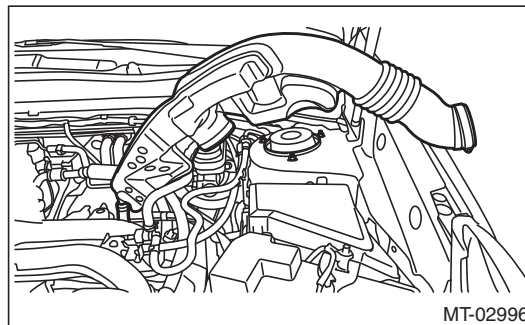


- (A) Operating rod
- (B) Push rod
- (C) Snap pin
- (D) Clevis pin

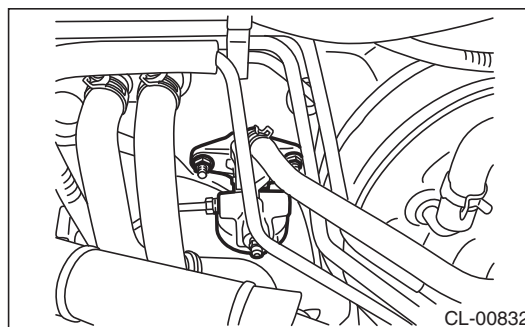
- 6) Remove the clip (A) from the air intake boot.
- 7) Loosen the clamp (B) connecting the air intake boot and air cleaner case (rear).
- 8) Loosen the clamp (C) which connects the air intake boot and throttle body.



- 9) Remove the air intake boot from the throttle body, and move it to the left side wheel apron.



- 10) Remove the nut which secures the clutch master cylinder.



- 11) Remove the bolts and nuts which secure the brake pedal and clutch pedal, and remove the pedal assembly.

NOTE:

Hold the clutch master cylinder with a wire or a string onto the vehicle body to avoid the clutch pipe from bending.

B: INSTALLATION

- 1) Install in the reverse order of removal.

Tightening torque:

Clutch pedal

18 N·m (1.8 kgf-m, 13.3 ft-lb)

Air intake boot

3 N·m (0.3 kgf-m, 2.2 ft-lb)

CAUTION:

Always use a new clevis pin.

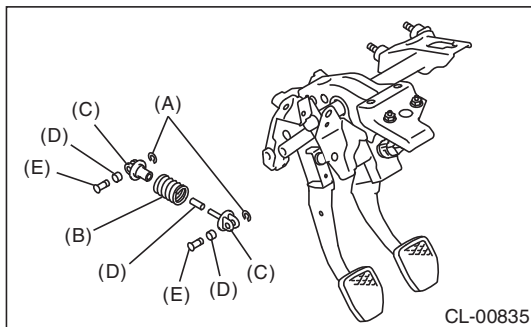
- 2) Adjust the clutch pedal after installation. <Ref. to CL-27, ADJUSTMENT, Clutch Pedal.>

Clutch Pedal

CLUTCH SYSTEM

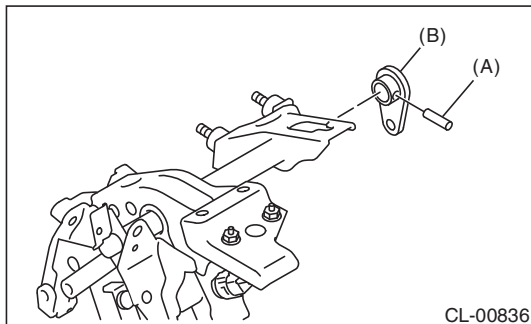
C: DISASSEMBLY

- 1) Remove the clutch switches.
- 2) Remove the clip, assist spring, rod and bushing.



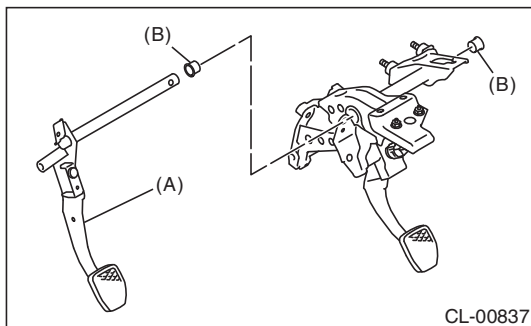
- (A) Clip
- (B) Assist spring
- (C) Assist rod
- (D) Bushing
- (E) Clevis pin

- 3) Remove the spring pin and lever.



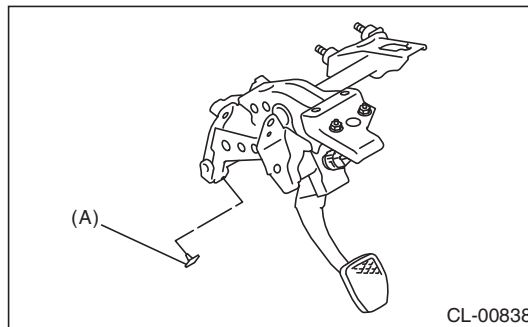
- (A) Spring pin
- (B) Lever

- 4) Remove the clutch pedal and bushings.



- (A) Clutch pedal
- (B) Bushing

- 5) Remove the stopper from the pedal bracket.



- (A) Stopper

- 6) Remove the clutch pedal pad.

D: ASSEMBLY

- 1) Install the stopper and pedal pad to the clutch pedal.
- 2) Install the clutch switch to the pedal bracket.
- 3) Clean the pedal bushing holes of the clutch pedal and the brake pedal, apply grease, and install the pedal bushings.
- 4) Install the clutch pedal, brake pedal and lever to the pedal bracket, and fix with a spring pin.
- 5) Install the assist rod A, assist rod B, assist bushing and assist spring to the clutch pedal and pedal bracket.

E: INSPECTION

1. CLUTCH PEDAL

Move the clutch pedal in the lateral direction with a force of approximately 10 N (1 kgf, 2 lbf) to check that the clutch pedal deflection is within the service limit.

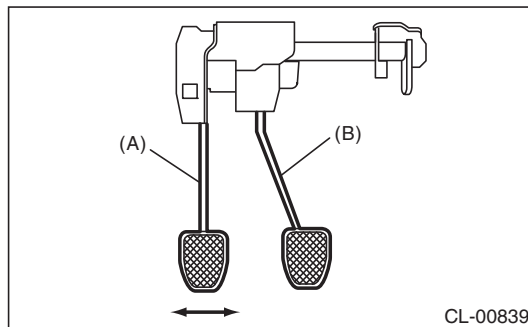
CAUTION:

If it exceeds the service limit, replace the clutch pedal assembly with a new part.

Deflection of the clutch pedal:

Service limit

4.0 mm (0.157 in) or less



- (A) Clutch pedal
- (B) Brake pedal

F: ADJUSTMENT

1) Turn the lock nut until the full stroke of clutch pedal becomes within the specification.

CAUTION:

When adjusting the full stroke of clutch pedal, do not turn the clutch switch.

NOTE:

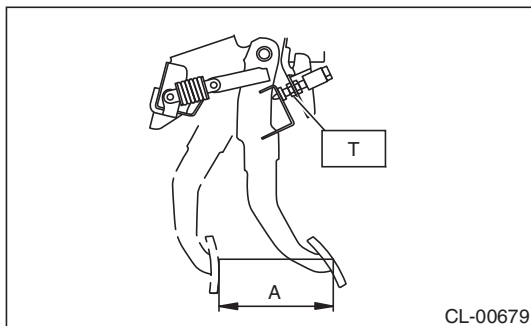
If the lock nut cannot adjust the full stroke of clutch pedal to the specified value, adjust it by turning the master cylinder push rod.

Clutch pedal full stroke A:

130 — 135 mm (5.12 — 5.31 in)

Tightening torque (clutch switch lock nut):

T: 8 N·m (0.8 kgf-m, 5.9 ft-lb)

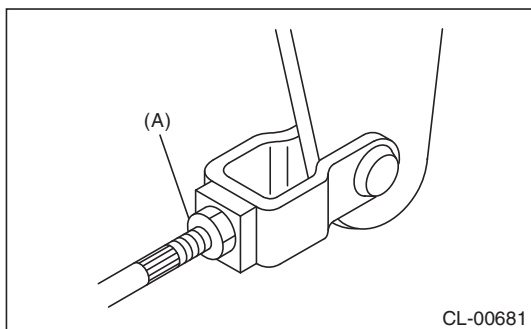


2) If the full stroke is not within the specified value, loosen the clutch switch lock nut to adjust.

Tightening torque:

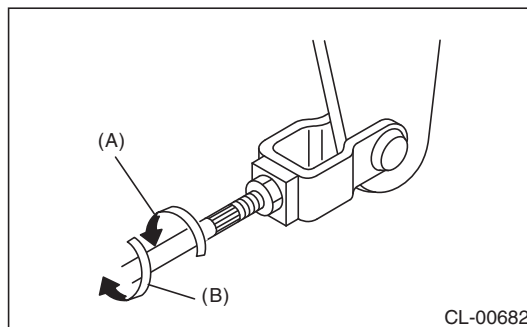
8 N·m (0.8 kgf-m, 5.9 ft-lb)

3) Loosen the push rod lock nuts.



(A) Push rod lock nut

4) Make sure that the clutch pedal contacts the clutch pedal bracket stopper when the clutch pedal is at the maximum stroke position.

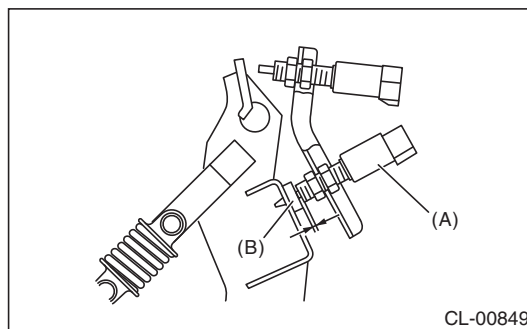


(A) In the longer direction

(B) In the shorter direction

5) Make sure that the clutch pedal contacts the clutch switch side when the pedal is released.

6) Turn the push rod to shorten until a clearance is gained on the clutch switch side.

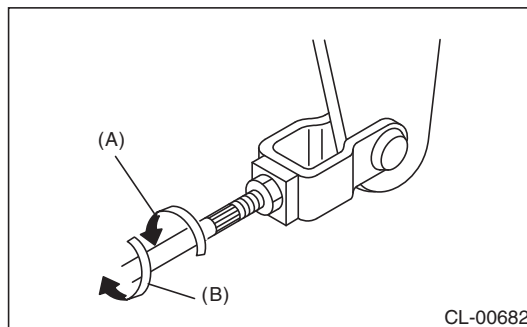


(A) Clutch switch

(B) Stopper

7) Turn the push rod to lengthen until clutch pedal contacts the clutch switch.

8) Turn further in the direction that will shorten the push rod by 270°.



(A) In the longer direction

(B) In the shorter direction

9) Check that the clevis pin moves smoothly by moving it in the left and right directions.

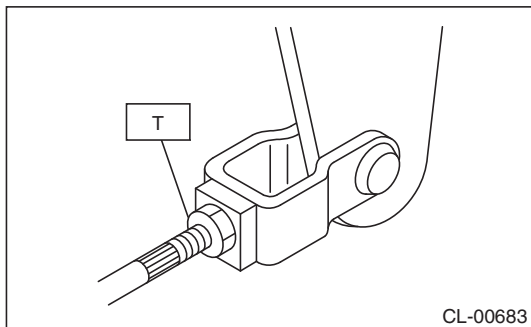
Clutch Pedal

CLUTCH SYSTEM

10) Tighten the push rod lock nut.

Tightening torque (push rod lock nut):

T: 10 N·m (1.0 kgf-m, 7.4 ft-lb)



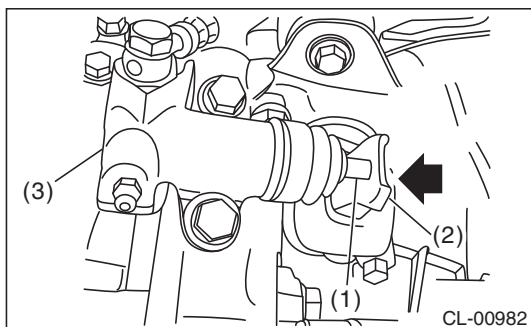
11) Depress and release the clutch pedal two or three times to ensure that the clutch pedal and release lever operate smoothly. If the clutch pedal and release lever do not operate smoothly, bleed air from the clutch hydraulic system. <Ref. to CL-24, Clutch Fluid Air Bleeding.>

12) Measure the clutch pedal full stroke length again to ensure that it is within specifications. If it is not within specifications, repeat adjustment procedures again from the beginning.

Clutch pedal full stroke:

130 — 135 mm (5.12 — 5.31 in)

13) Push the release lever until the operating cylinder push rod retracts. Check that the clutch fluid level in the reservoir tank increases.



- (1) Push rod
- (2) Release lever
- (3) Operating cylinder

14) If the clutch fluid level increases, hydraulic clutch play is correct.

15) If the clutch fluid level does not increase or push rod does not retract, readjust the clutch pedal.

16) Check the fluid level using the scale on the reservoir tank. <Ref. to CL-23, INSPECTION, Clutch Fluid.>

11.Clutch Switch

A: REMOVAL

- 1) Disconnect the ground cable from battery.
- 2) Remove the cover assembly - instrument panel LWR driver. <Ref. to EI-59, REMOVAL, Instrument Panel Lower Cover.>
- 3) Disconnect the connector from the clutch switch.
- 4) Remove the clutch switches.

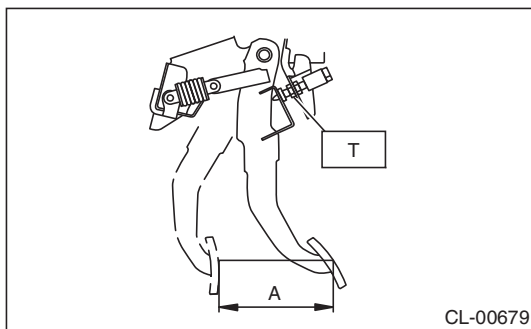
B: INSTALLATION

1. CLUTCH SWITCH

- 1) Move the clevis pin of push rod to left and right, retain it at the position where it moves smoothly, and measure the clutch pedal stroke.

Clutch pedal full stroke A:
130 — 135 mm (5.12 — 5.31 in)

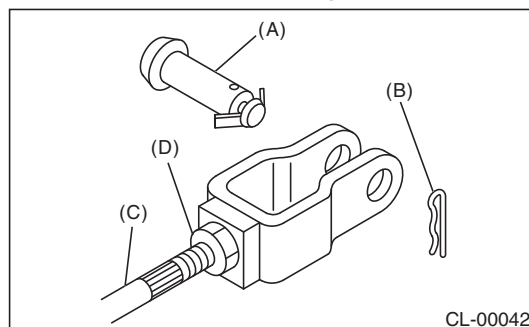
Tightening torque:
T: 8 N·m (0.8 kgf-m, 5.9 ft-lb)



- 2) If the clutch pedal stroke is out of specification, adjust the stroke. <Ref. to CL-27, ADJUSTMENT, Clutch Pedal.>
- 3) Connect the clutch switch connector.

2. CLUTCH START SWITCH

- 1) Remove the snap pin and clevis pin connecting the clutch pedal and operating rod.

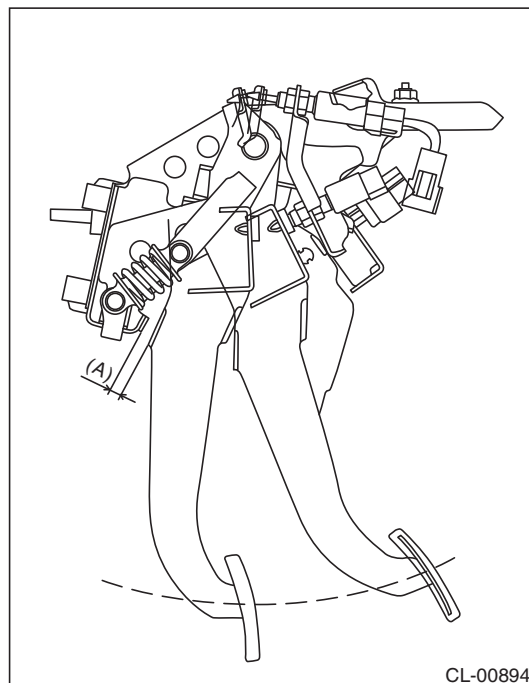


- (A) Clevis pin
- (B) Snap pin
- (C) Push rod
- (D) Lock nut

- 2) Install the clutch start switch so that the clutch switch turns on when the clearance between clutch pedal stopper and clutch pedal is within the specification described below.

Clearance A:
6.3 — 8.6 mm (0.25 — 0.34 in)

Tightening torque:
8 N·m (0.8 kgf-m, 5.9 ft-lb)

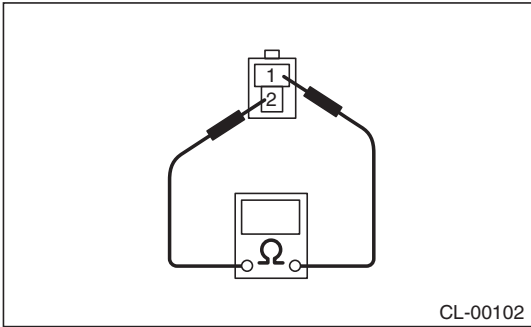


Clutch Switch

CLUTCH SYSTEM

NOTE:

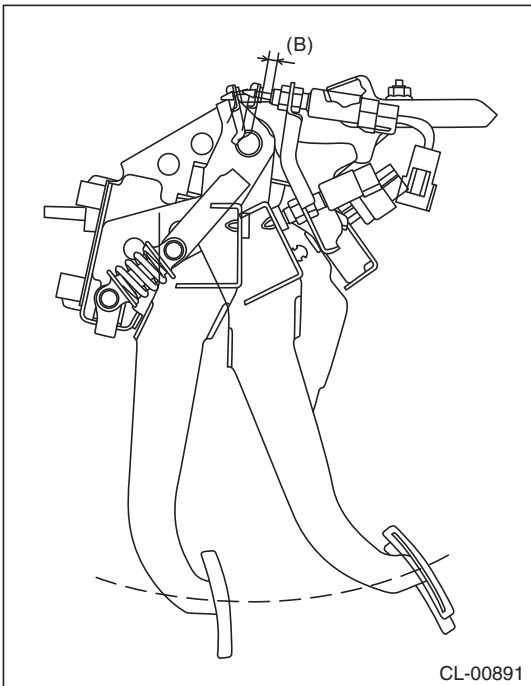
- Using a plate of the same thickness for the clearance facilitates the adjustment operation.
 - Using the Subaru Select Monitor or a tester, check the position where the switch turns on.
- Check the following figure for the terminal layout of the harness connector.



- When performing adjustment by the clearance between clutch start switch and clutch pedal plate, perform installation according to the following gap.

Clearance B:

8.6 — 9.0 mm (0.34 — 0.35 in)



- 3) Connect the clutch start switch connector.
- 4) Make sure that engine does not start with clutch pedal not depressed.
- 5) Make sure that engine starts with clutch pedal depressed.

C: INSPECTION

1. CLUTCH START SWITCH

1) Perform the following inspections. If the clutch start switch does not operate normally, adjust the switch, and check it again. <Ref. to CL-31, ADJUSTMENT, Clutch Switch.>

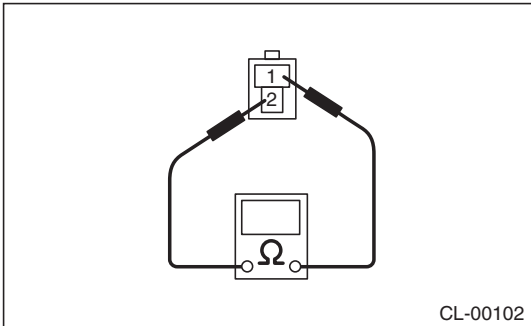
- Make sure that engine does not start with clutch pedal not depressed.
- Make sure that engine starts with clutch pedal fully depressed.

2) When the clutch start switch does not operate normally even if it is adjusted, check the clutch start switch for continuity.

(1) Remove the clutch start switch. <Ref. to CL-29, REMOVAL, Clutch Switch.>

(2) Measure the resistance between terminal 1 and 2 of the switch. If the resistance is not at the standard value, replace the switch.

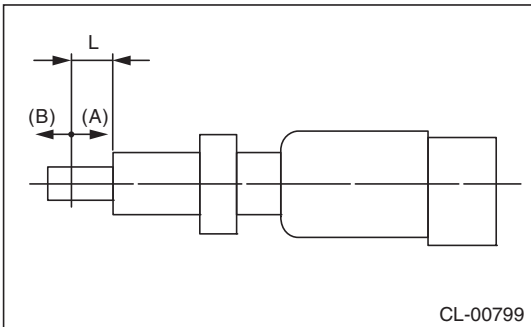
Condition	Terminal No.	Specified resistance
ON	No. 1 — No. 2	Less than 1 Ω
OFF	No. 1 — No. 2	1 MΩ or more



(3) Check that the switch is turned on and off in dimension L.

Dimension L:

9 — 10 mm (0.35 — 0.39 in)



(A) ON

(B) OFF

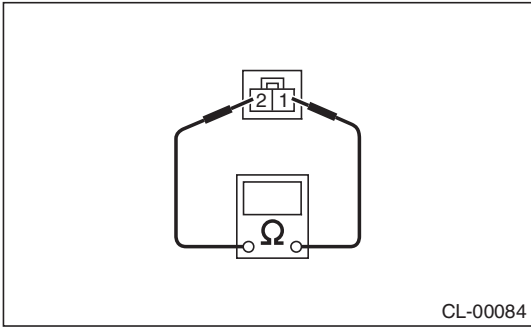
Clutch Switch

CLUTCH SYSTEM

2. CLUTCH SWITCH

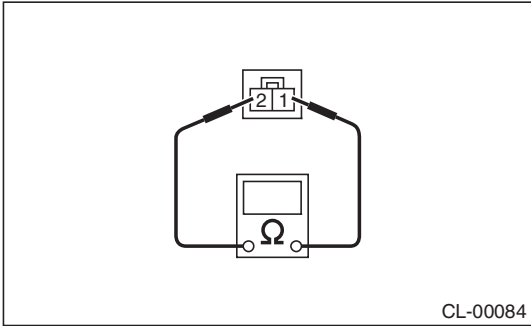
- 1) Check the clutch switch for continuity.
- (1) Disconnect the connector of clutch switch.
- (2) Measure the resistance between terminal 1 and 2 of the switch. If the resistance is not within the specification, check the clutch stroke and installation condition, and check the clutch switch again.

Condition	Terminal No.	Specified resistance
When clutch pedal is depressed	No. 1 — No. 2	1 MΩ or more
When the clutch pedal is not depressed	No. 1 — No. 2	Less than 1 Ω



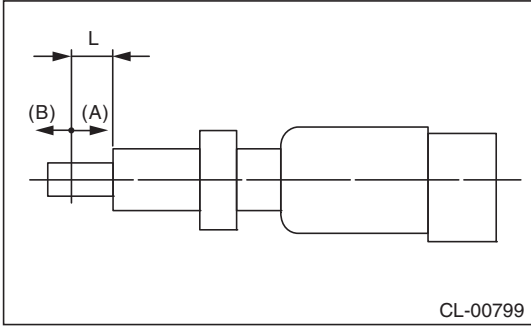
- 2) When the clutch switch does not operate normally even if the clutch stroke and installation condition are normal, check the clutch switch for continuity.
- (1) Remove the clutch switches. <Ref. to CL-29, REMOVAL, Clutch Switch.>
- (2) Measure the resistance between terminal 1 and 2 of the switch. If the resistance is not at the standard value, replace the switch.

Condition	Terminal No.	Specified resistance
ON	No. 1 — No. 2	Less than 1 Ω
OFF	No. 1 — No. 2	1 MΩ or more



- (3) Check that the switch is turned on and off in Dimension L.

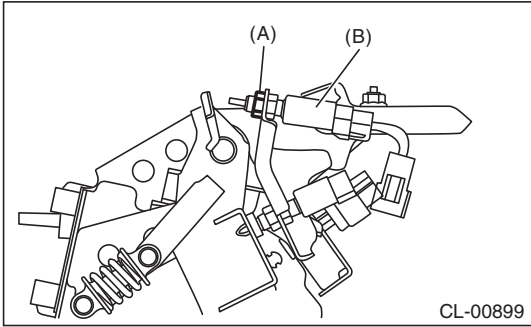
Dimension L:
5 — 6.5 mm (0.2 — 0.26 in)



- (A) ON
(B) OFF

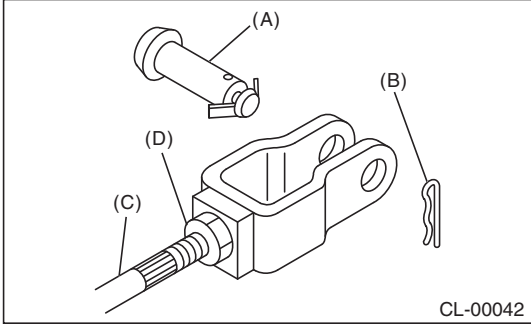
D: ADJUSTMENT

- 1) Loosen the lock nut of the clutch start switch.



- (A) Lock nut
(B) Clutch start switch

- 2) Disconnect the harness connector of the clutch start switch.
- 3) Remove the snap pin and clevis pin connecting the clutch pedal and operating rod.



- (A) Clevis pin
(B) Snap pin
(C) Push rod
(D) Lock nut

Clutch Switch

CLUTCH SYSTEM

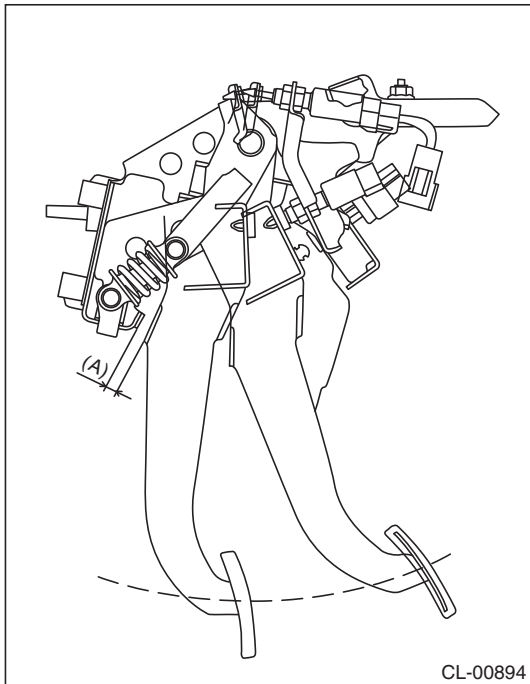
4) Adjust the clutch start switch so that the switch turns on when the clearance between clutch pedal stopper and clutch pedal is within the specification described below, and then tighten the lock nut.

Clearance A:

6.3 — 8.6 mm (0.25 — 0.34 in)

Tightening torque:

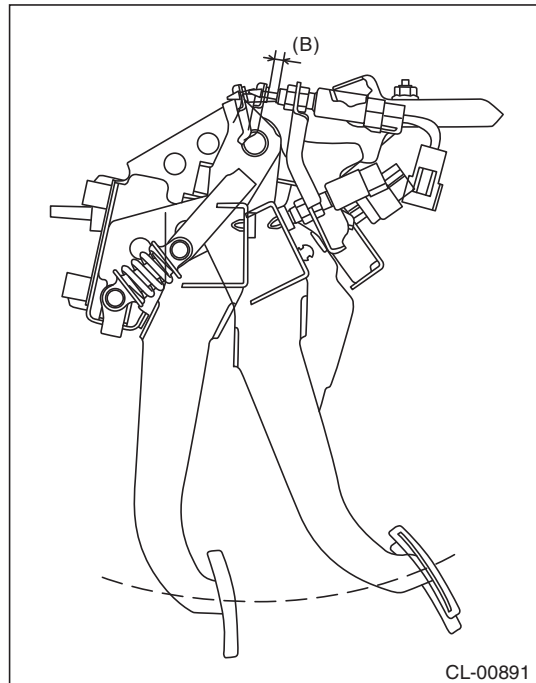
8 N·m (0.8 kgf-m, 5.9 ft-lb)



- When performing adjustment by the clearance between clutch start switch and clutch pedal plate, perform installation according to the following gap.

Clearance B:

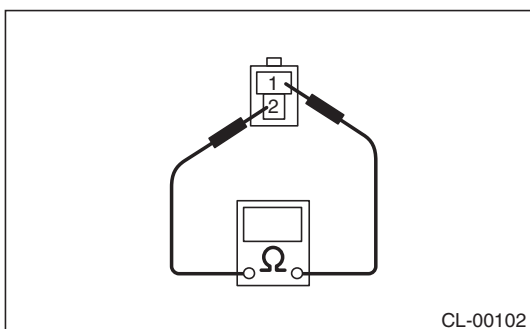
8.6 — 9.0 mm (0.34 — 0.35 in)



5) Connect the clutch start switch connector.

NOTE:

- Using a plate of the same thickness for the clearance facilitates the adjustment operation.
- Using the Subaru Select Monitor or a tester, check the position where the switch turns on. Check the following figure for the terminal layout of the harness connector.



12. General Diagnostic Table

A: INSPECTION

1. CLUTCH

Symptoms	Possible cause	Corrective action
1. Clutch slippage. It is hard to perceive clutch slippage in the early stage, but pay attention to the following symptoms. • Engine speeds up when shifting. • High-speed driving is not possible; especially rapid acceleration is not possible and vehicle speed does not increase in proportion to the increase in engine speed. • Power drops particularly when ascending a slope, and there is a burning smell of the clutch plate. • Method of testing: Park the vehicle and fully apply the parking brake. Disengage the clutch and shift the transmission gear into the 1st. Gradually increase the engine speed while gradually allowing the clutch to engage. The clutch function is satisfactory if the engine stalls. However, the clutch is slipping if the vehicle does not move forward and the engine does not stall.	(a) Oil on the clutch face	Replace.
	(b) Worn clutch face	Replace.
	(c) Deteriorated diaphragm spring	Replace.
	(d) Warped pressure plate or flywheel	Repair or replace.
	(e) Defective release bearing holder	Repair or replace.
2. Clutch drags. As a symptom of this trouble, a harsh scratching noise occurs and control becomes difficult when shifting gears. The symptom becomes more apparent when shifting into the 1st gear. However, because most trouble of this sort is due to a defective synchronization mechanism, perform the following tests. • Method of testing: <Ref. to CL-34, DIAGNOSTIC DIAGRAM OF CLUTCH DRAG, INSPECTION, General Diagnostic Table.> The problem is caused by insufficient disengagement of the clutch if an abnormal noise occurs during this test.	(a) Worn or rusty clutch disc hub spline	Replace the clutch disc.
	(b) Excessive deflection of clutch disc face	Repair or replace.
	(c) Crankshaft pilot needle bearing sticking	Replace.
	(d) Cracked clutch disc face	Replace.
	(e) Stuck clutch disc (smeared by oil or water)	Replace.
3. Clutch chatters. Clutch chattering is an unpleasant vibration to the whole vehicle when the vehicle is just started with clutch partially engaged.	(a) Adhesion of oil on the clutch face	Replace the clutch disc.
	(b) Weak or broken damper spring	Replace the clutch disc.
	(c) Poor contact of the disc surface or excessively worn disc	Replace the faulty clutch disc.
	(d) Warped pressure plate or flywheel	Repair or replace.
	(e) Loose disc rivets	Replace the clutch disc.
	(f) Loose engine mounting	Retighten or replace mounting.
	(g) Loose pitching stopper	Retighten or replace the pitching stopper.

General Diagnostic Table

CLUTCH SYSTEM

Symptoms	Possible cause	Corrective action
4. Noisy clutch Examine whether the noise is generated when the clutch is disengaged, engaged, or partially engaged.	(a) Broken, worn or insufficiently lubricated release bearing	Replace the release bearing.
	(b) Insufficient lubrication of the pilot bearing	Replace the pilot bearing.
	(c) Loose clutch disc hub	Replace the clutch disc.
	(d) Loose damper spring retainer	Replace the clutch disc.
	(e) Deteriorated or broken damper spring	Replace the clutch disc.
5. Clutch grabs suddenly. When starting the vehicle with the clutch partially engaged, the clutch engages suddenly and the vehicle jumps instead of making a smooth start.	(a) Grease or oil on facing	Replace the clutch disc.
	(b) Deteriorated cushioning spring	Replace the clutch disc.
	(c) Worn or rusted spline of clutch disc or main shaft	Take off rust, apply grease or replace clutch disc or main shaft.
	(d) Deteriorated or broken damper spring	Replace the clutch disc.
	(e) Loose engine mounting	Retighten or replace mounting.
	(f) Deteriorated diaphragm spring	Replace.

2. CLUTCH PEDAL

Symptoms	Corrective action
Insufficient clutch pedal free play	Adjust the free play of the pedal.
Excessively worn and damaged pedal shaft and/or bushing	Replace the bushing or shaft with a new part.

3. DIAGNOSTIC DIAGRAM OF CLUTCH DRAG

Step	Check	Yes	No
1 CHECK GEAR NOISE. 1) Start the engine. 2) While idling the engine, step on the clutch pedal and quickly shift from neutral to reverse.	Is there any abnormal noise from the transmission gear?	Go to step 2.	Clutch is normal.
2 CHECK GEAR NOISE. Depress the clutch pedal at idle and shift from neutral to reverse within 0.5 — 1.0 second.	Is there any abnormal noise from the transmission gear?	Go to step 3.	Defective transmission or excessive clutch drag torque. Inspect pilot bearing, clutch disc, transmission and clutch disc hub spline.
3 CHECK GEAR NOISE. 1) Depress the clutch pedal at idle and shift from neutral to reverse within 0.5 — 1.0 second. 2) While stepping on the clutch pedal, shift from neutral to reverse, reverse to neutral several times.	Is there any abnormal noise from the transmission gear?	Inadequate clutch disengage. Inspect the clutch disc, clutch cover, clutch release, and clutch pedal free play.	Clutch and fly-wheel seizure. Inspect the clutch disc and the spline of the clutch disc hub.