

# General Description

## CLUTCH SYSTEM

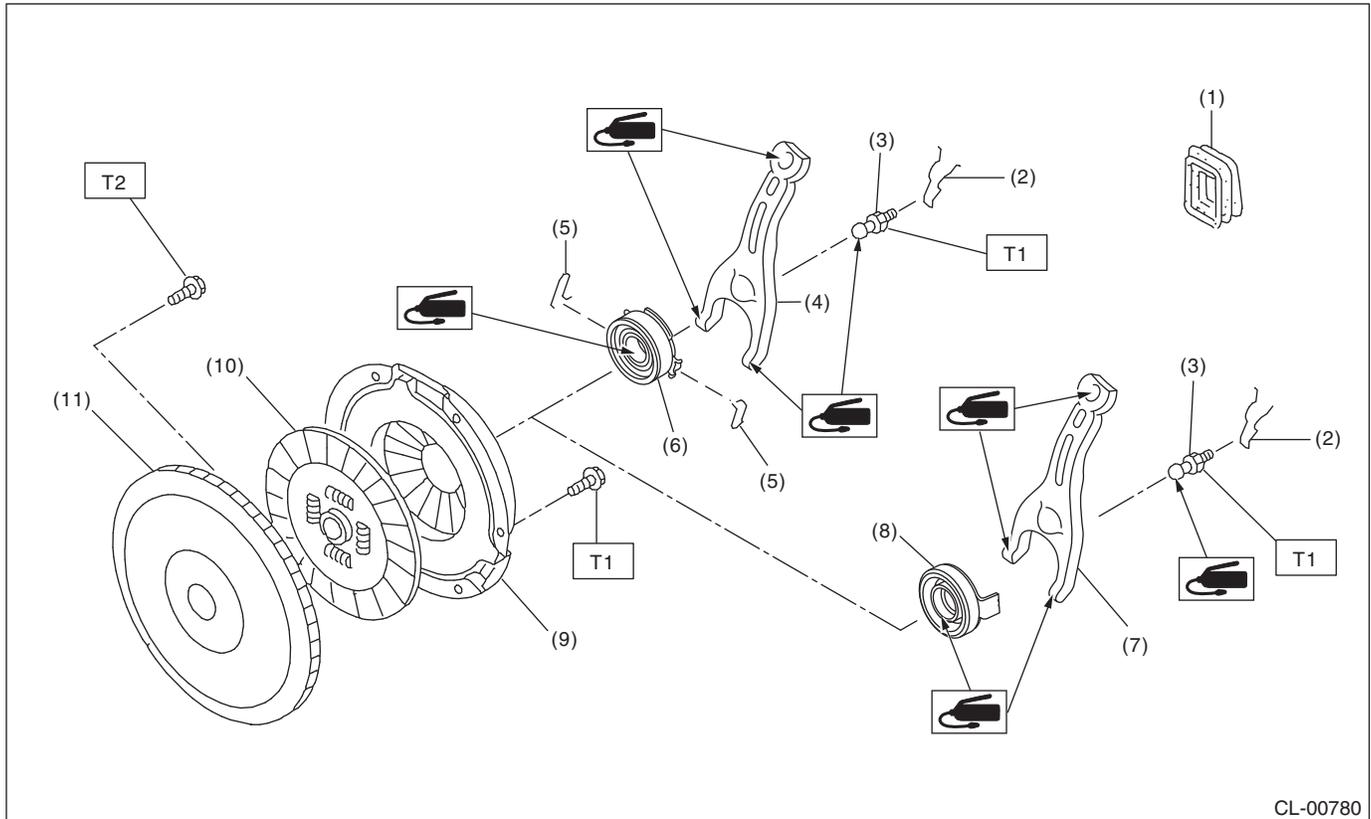
### 1. General Description

#### A: SPECIFICATION

Model		2.5 L non-turbo	2.5 L turbo
Transmission type		6MT	
Clutch cover	Type	Push type	
	Diaphragm set load N (kgf, lbf)	5,688 (580, 1,279)	7,450 (760, 1,675)
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	0.3 (0.012)
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)	135 — 140 (5.31 — 5.51)
	Free play mm (in)	4 — 11 (0.16 — 0.43)	
Flywheel	Type	Flexible	

### B: COMPONENT

#### 1. CLUTCH ASSEMBLY



CL-00780

- |                                     |                                       |                        |
|-------------------------------------|---------------------------------------|------------------------|
| (1) Dust cover                      | (6) Release bearing (non-turbo model) | (11) Flexible flywheel |
| (2) Lever spring                    | (7) Release lever (turbo model)       |                        |
| (3) Pivot                           | (8) Release bearing (turbo model)     |                        |
| (4) Release lever (non-turbo model) | (9) Clutch cover                      |                        |
| (5) Clip (non-turbo model)          | (10) Clutch disc                      |                        |

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

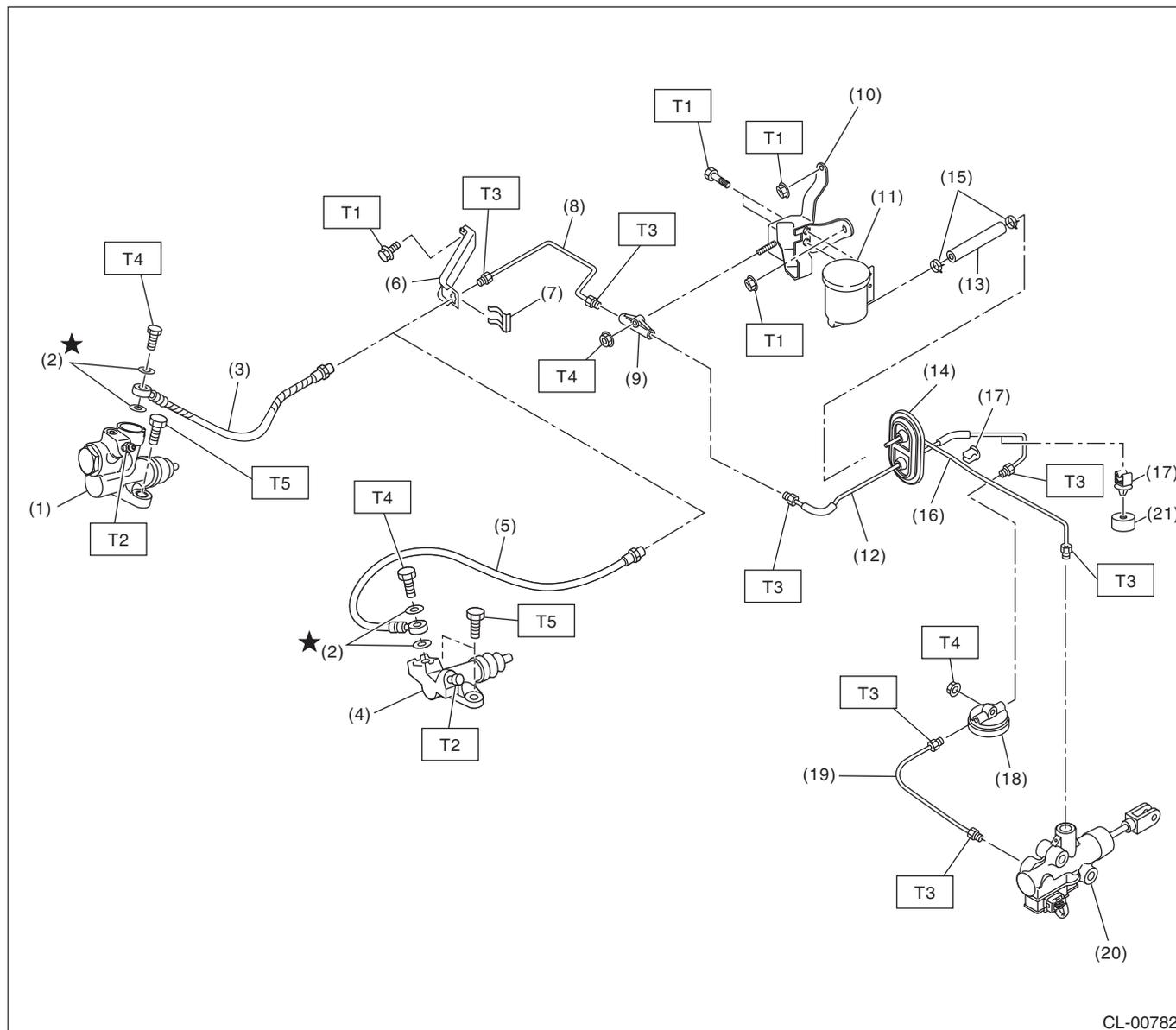
**T1: 16 (1.6, 11.8)**

**T2: 75 (7.6, 55.3)**

# General Description

## CLUTCH SYSTEM

### 2. CLUTCH PIPE AND HOSE



CL-00782

- |  |                           |
|--|---------------------------|
| (1) Operating cylinder (turbo model)     | (11) Reservoir tank       |
| (2) Washer                               | (12) Clutch pipe          |
| (3) Clutch hose (turbo model)            | (13) Reservoir tank hose  |
| (4) Operating cylinder (non-turbo model) | (14) Clutch pipe grommet  |
| (5) Clutch hose (non-turbo model)        | (15) Clamp                |
| (6) Clutch hose bracket                  | (16) Clutch pipe          |
| (7) Clamp                                | (17) Clamp                |
| (8) Clutch pipe                          | (18) Clutch damper        |
| (9) Connector                            | (19) Clutch pipe          |
| (10) Reservoir tank bracket              | (20) Master cylinder ASSY |

- (21) Mass damper

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

**T1: 7.5 (0.8, 5.5)**

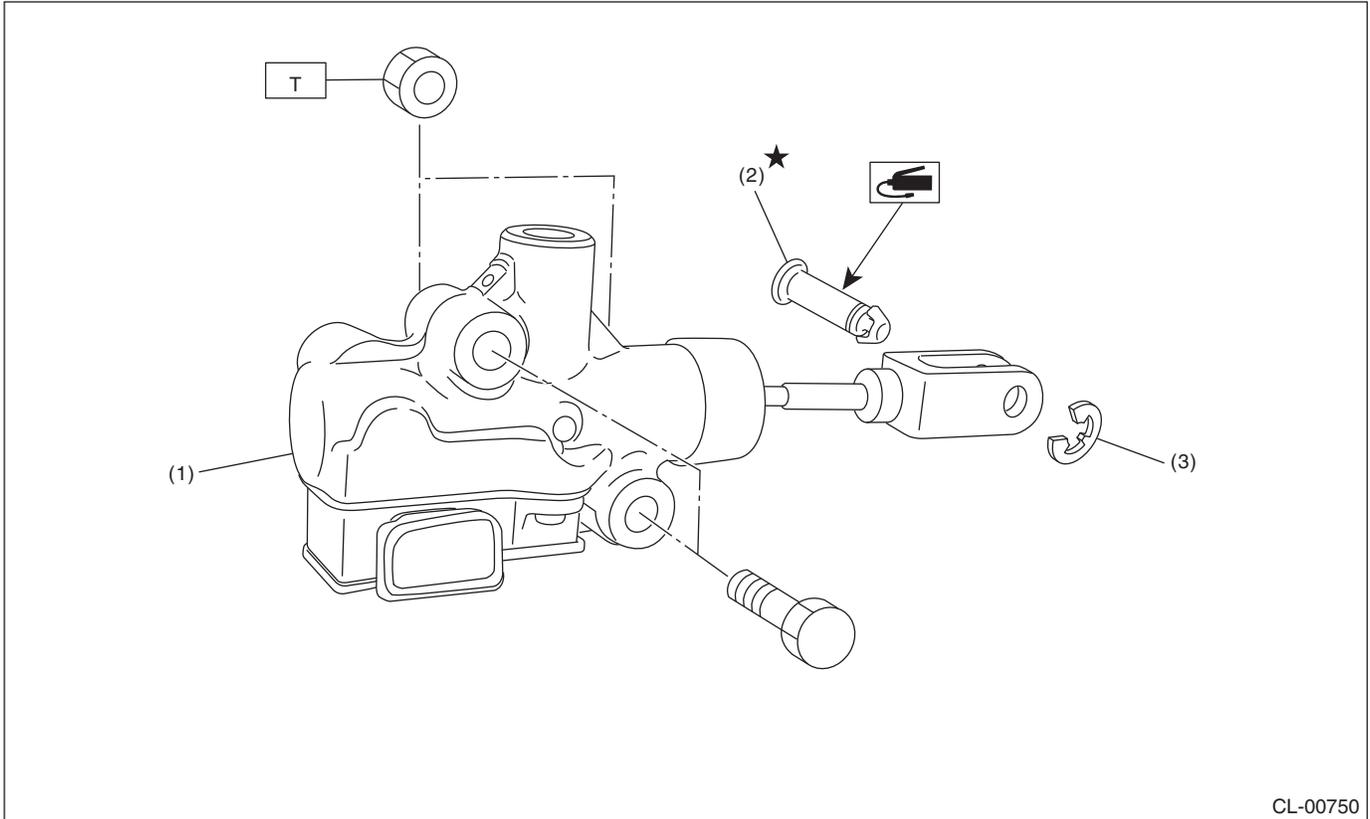
**T2: 7.8 (0.8, 5.8)**

**T3: 15 (1.5, 11.1)**

**T4: 18 (1.8, 13.3)**

**T5: 37 (3.8, 27.3)**

## 3. MASTER CYLINDER



- (1) Master cylinder ASSY
- (2) Clevis pin

- (3) Clip

**Tightening torque: N·m (kgf·m, ft·lb)**  
**T: 18 (1.8, 13.3)**

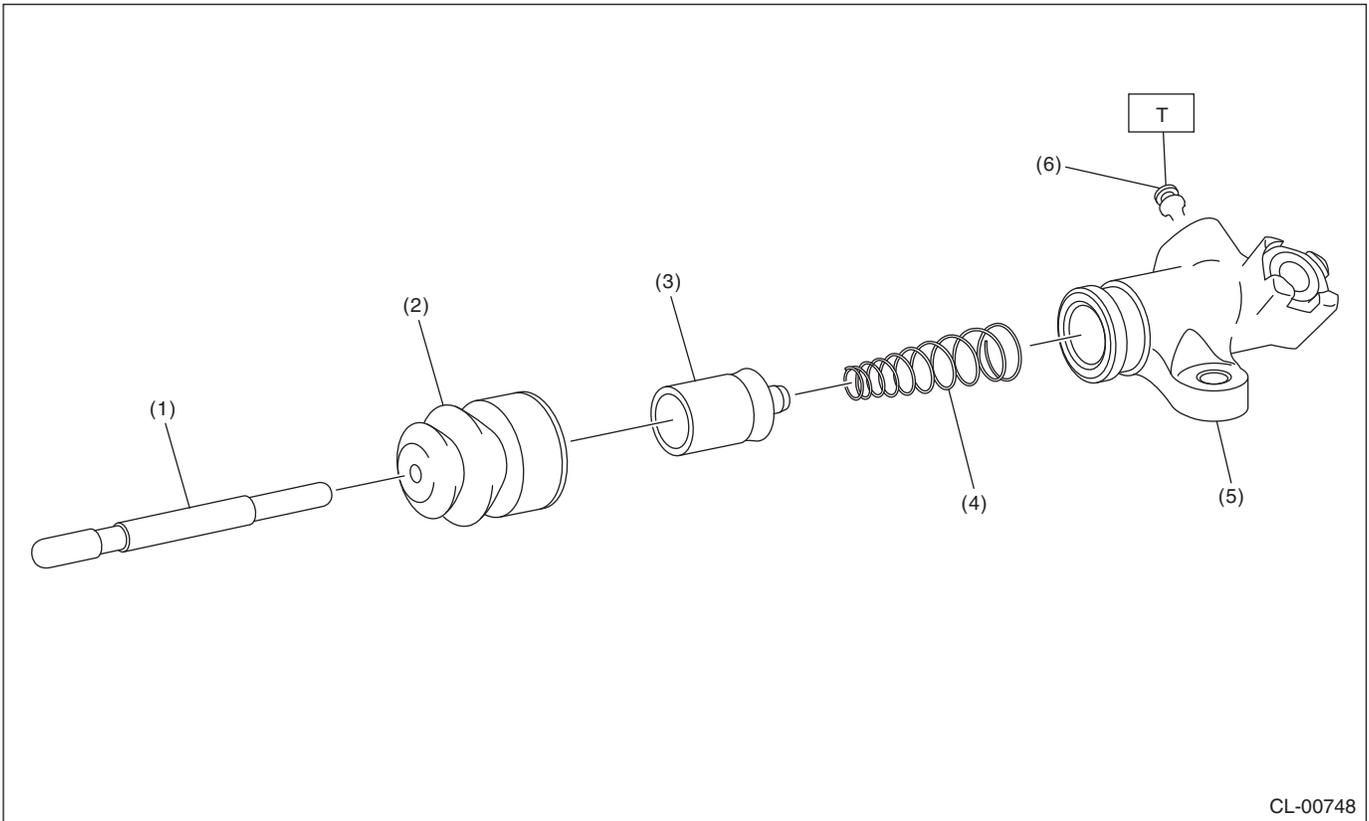
cardiagn.com

# General Description

## CLUTCH SYSTEM

### 4. OPERATING CYLINDER

- Non-turbo model



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

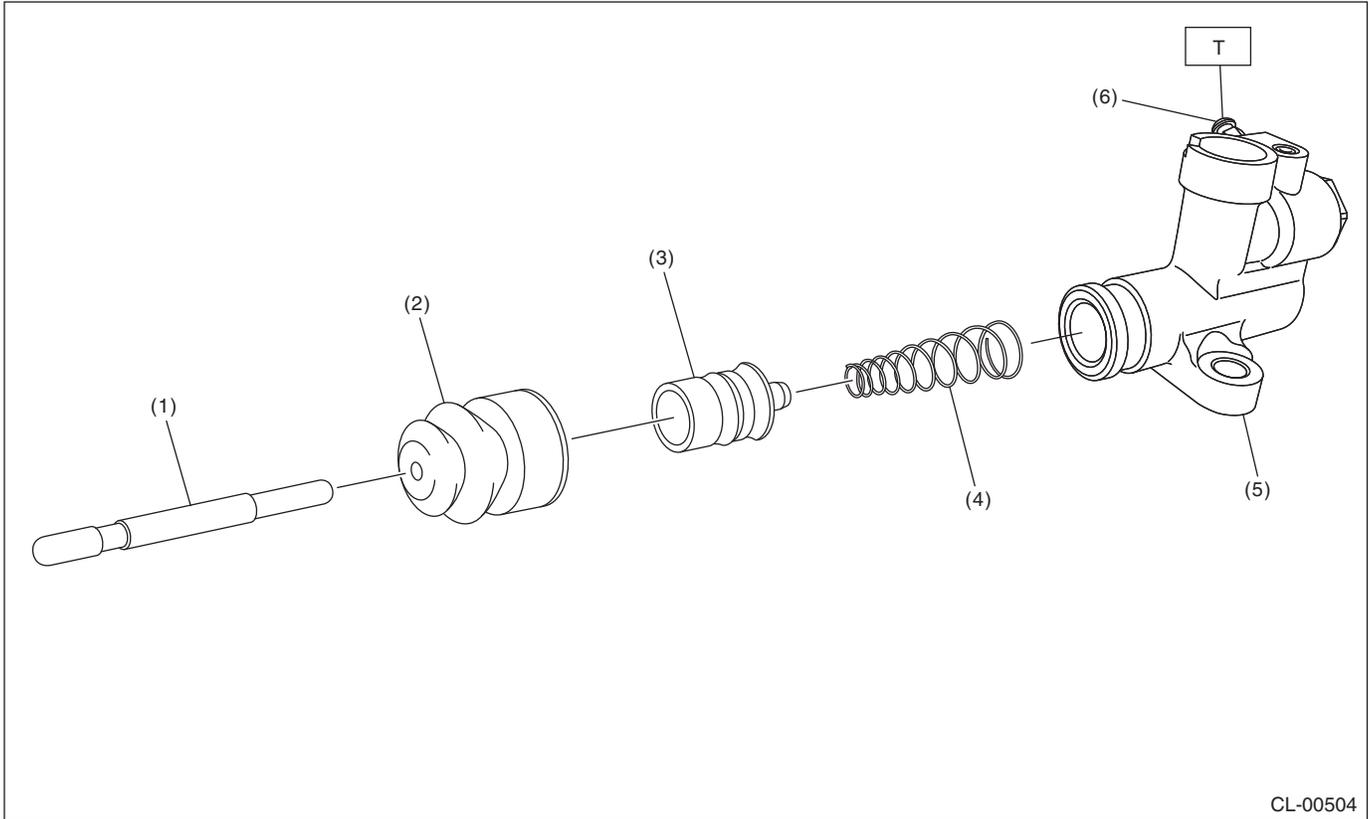
**Tightening torque: N·m (kgf·m, ft·lb)**  
**T: 7.8 (0.8, 5.8)**

cardiagn.com

# General Description

CLUTCH SYSTEM

- Turbo model



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

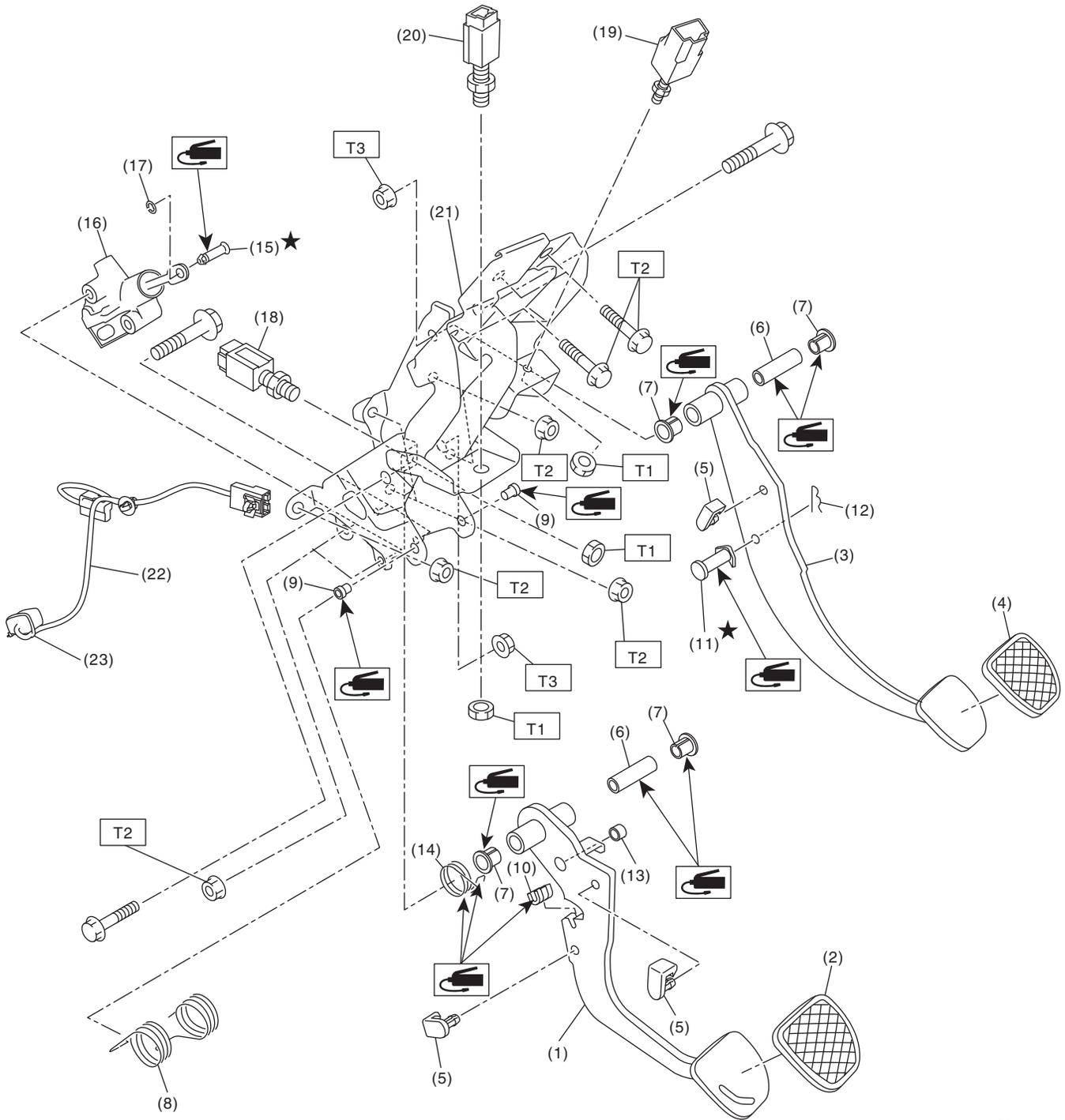
**Tightening torque: N·m (kgf·m, ft·lb)**  
**T: 7.8 (0.8, 5.8)**

cardiagn.com

# General Description

## CLUTCH SYSTEM

### 5. CLUTCH PEDAL



cardiagn.com

CL-00760

(1) Clutch pedal	(11) Clevis pin	(21) Pedal bracket
(2) Clutch pedal pad	(12) Snap pin	(22) Sensor harness
(3) Brake pedal	(13) Bushing A	(23) Band
(4) Brake pedal pad	(14) Assist spring (turbo model)	
(5) STOPPER	(15) Clevis pin	
(6) SPACER	(16) Master cylinder ASSY	
(7) Bushing	(17) Clip	
(8) Torsion spring	(18) Clutch start switch	
(9) Assist bushing	(19) Stop & brake switch	
(10) Torsion spring bushing	(20) Clutch switch	

---

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

**T1: 8 (0.8, 5.9)**

**T2: 18 (1.8, 13.3)**

**T3: 30 (3.1, 22.1)**

---

## C: CAUTION

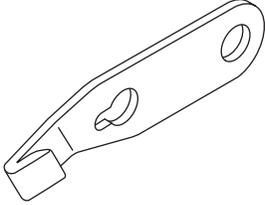
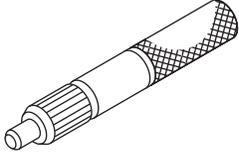
- Wear appropriate work clothing, including a cap, protective goggles and protective shoes when performing any work.
- Remove contamination including dirt and corrosion before removal, installation or disassembly.
- Keep the disassembled parts in order and protect them from dust and dirt.
- Before removal, 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 fluids 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.
 ST-499747100	499747100	CLUTCH DISC GUIDE	Used for installing the clutch disc to the flywheel.

#### 2. GENERAL TOOL

TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance, voltage and ampere.
Dial gauge	Used for measuring clutch disc run-out.
DEPTH GAUGE	Used for measuring clutch disc wear.

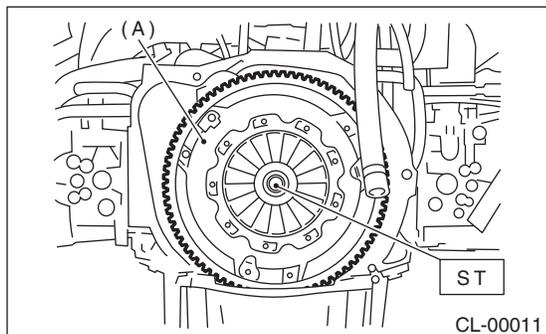
## 2. Clutch Disc and Cover

### A: REMOVAL

1) Remove the transmission assembly from vehicle body. <Ref. to 6MT-24, REMOVAL, Manual Transmission Assembly.>

2) Attach the ST to the flywheel.

ST 499747100 CLUTCH DISC GUIDE



(A) Clutch cover

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.

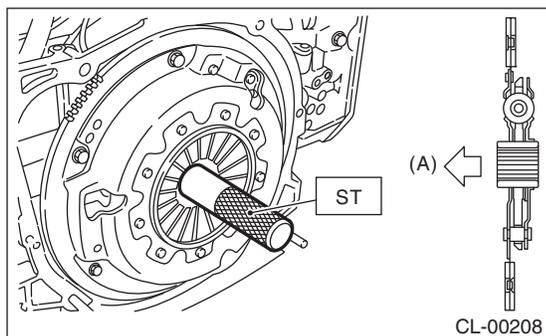
### B: INSTALLATION

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

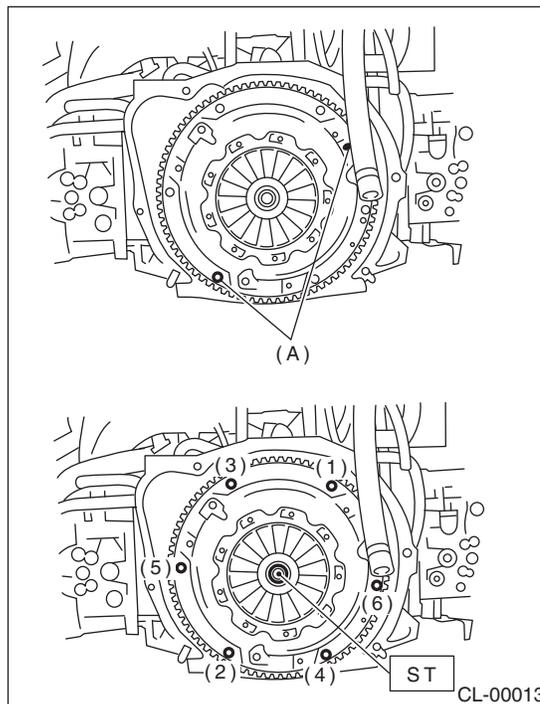
2) Install the clutch cover to the flywheel and tighten the bolts to the specified torque.

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.)
- Note the front and rear of the clutch disc when installing.
- 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.

4) Install the transmission assembly. <Ref. to 6MT-28, INSTALLATION, Manual Transmission Assembly.>

5) When the clutch disc has been replaced, perform the clutch sensor calibration mode. <Ref. to PB(diag)-19, CLUTCH SENSOR CALIBRATION MODE, OPERATION, Subaru Select Monitor.>

NOTE:

If necessary, perform the clutch meet position setting. <Ref. to PB(diag)-19, CLUTCH ENGAGEMENT POSITION SETTING, OPERATION, Subaru Select Monitor.>

# Clutch Disc and Cover

## CLUTCH SYSTEM

### 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.

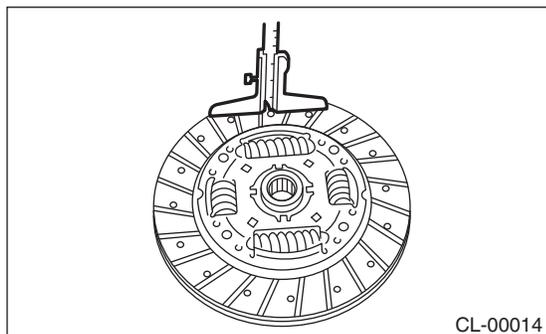
**Depth to rivet head:**

**Limit of sinking**

**0.3 mm (0.012 in)**

NOTE:

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



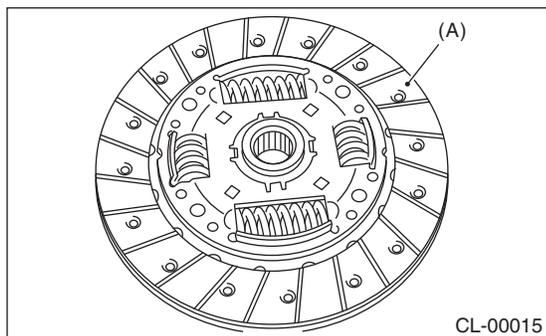
CL-00014

##### 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.



CL-00015

(A) Clutch facing

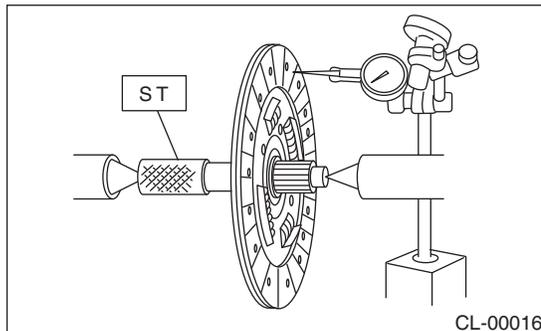
##### 4) Deflection on facing

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

**Limit for deflection:**

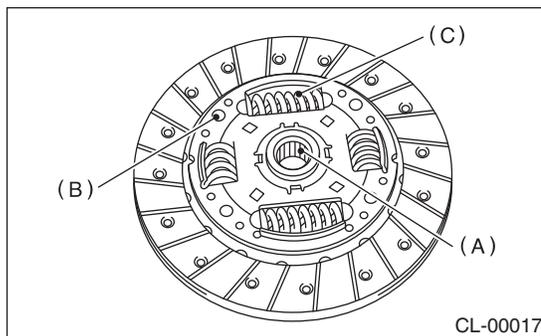
**0.7 mm (0.028 in) at R = 110 mm (4.33 in)**

ST 499747100 CLUTCH DISC GUIDE



CL-00016

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



CL-00017

(A) Spline

(B) Rivet

(C) Damper spring

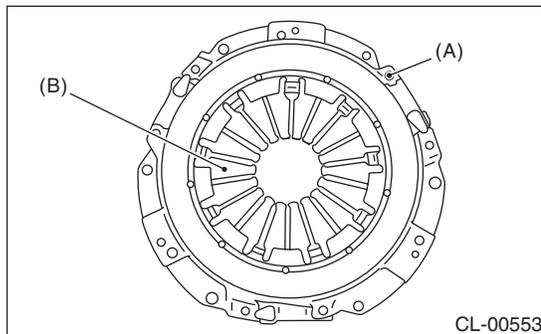
#### 2. CLUTCH COVER

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



CL-00553

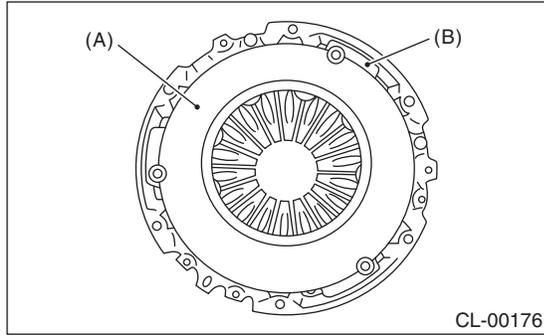
(A) Thrust rivet

(B) Diaphragm spring

3) Damaged and worn disc contact surface of the pressure plate

4) Loose strap plate installation area

## 5) Worn sliding area of diaphragm spring

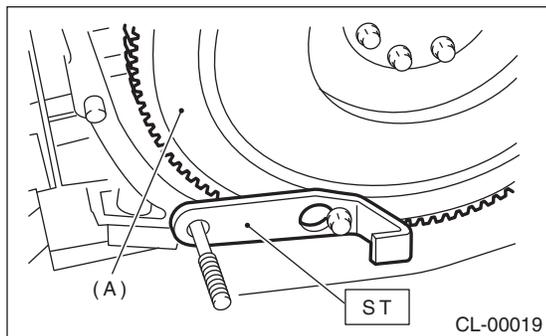


- (A) Pressure plate
- (B) Strap plate

### 3. Flywheel

#### A: REMOVAL

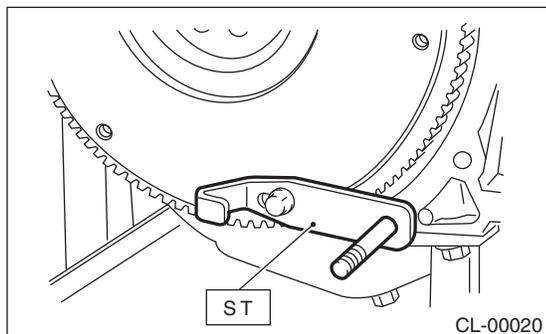
- 1) Remove the transmission assembly. <Ref. to 6MT-24, REMOVAL, Manual Transmission Assembly.>
- 2) Remove the clutch cover and clutch disc. <Ref. to CL-11, REMOVAL, Clutch Disc and Cover.>
- 3) Using the ST, remove the flywheel.  
ST 498497100 CRANKSHAFT STOPPER



(A) Flywheel

#### B: INSTALLATION

- 1) Temporarily tighten the flywheel, and attach the ST.  
ST 498497100 CRANKSHAFT STOPPER

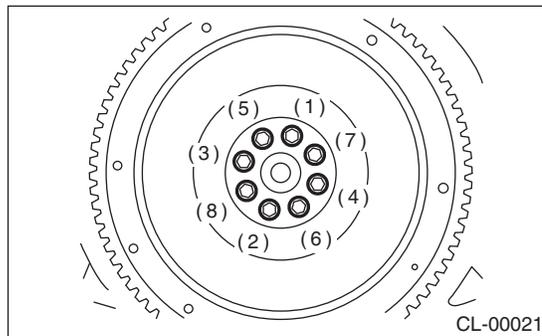


- 2) Tighten the flywheel mounting bolts to the specified torque.

#### NOTE:

Tighten the flywheel attachment bolts gradually. Each bolt should be tightened to the specified torque in crisscross order.

**Tightening torque:**  
**75 N·m (7.6 kgf-m, 55.3 ft-lb)**



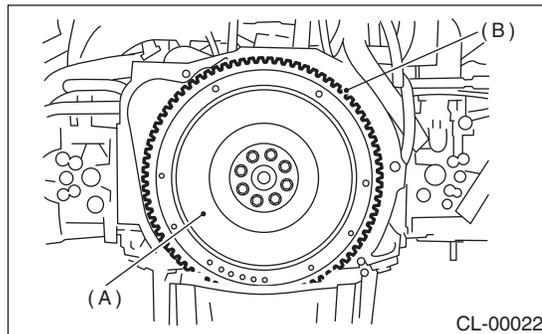
- 3) Install the clutch disc and cover. <Ref. to CL-11, INSTALLATION, Clutch Disc and Cover.>
- 4) Install the transmission assembly. <Ref. to 6MT-28, INSTALLATION, Manual Transmission Assembly.>

#### C: INSPECTION

##### CAUTION:

**Because this 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.

## 4. Release Bearing and Lever

### A: REMOVAL

1) Remove the transmission assembly from vehicle body. <Ref. to 6MT-24, REMOVAL, Manual Transmission Assembly.>

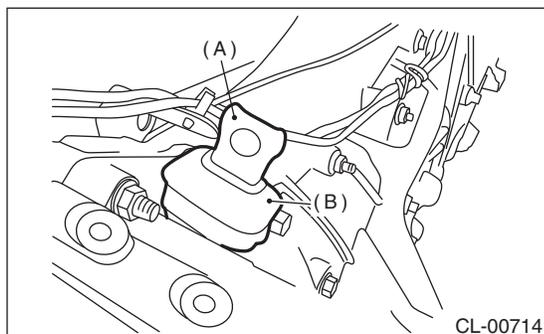
2) Remove the two clips from the clutch release lever. (non-turbo model)

#### CAUTION:

**Be careful not to deform the clips.**

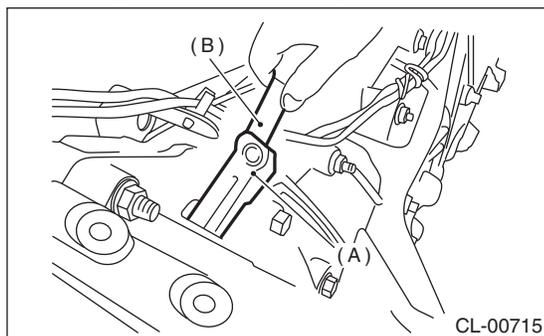
3) Remove the release bearing. (non-turbo model)

4) Remove the dust cover.



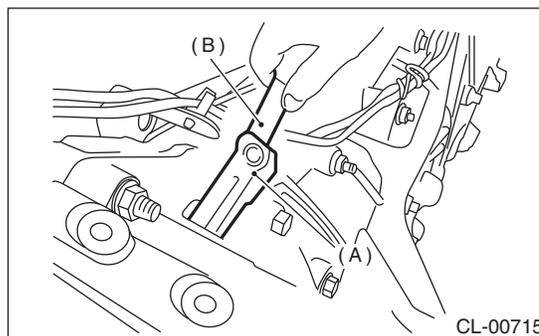
(A) Release lever  
(B) Dust cover

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. (non-turbo model)



(A) Release lever  
(B) Screwdriver

6) 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 and release bearing as a unit. (turbo model)



(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 (NICHIMOLY N-130)

1) Temporarily assemble the release bearing to the release lever. (turbo model)

2) 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. (non-turbo model)

#### NOTE:

- Apply grease (NICHIMOLY N-130) to the contact point of the release lever and operating cylinder.
- Observing from the main case hole, check that the lever spring is installed securely.

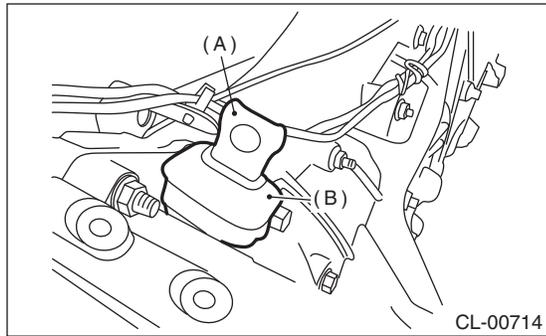
3) Install the release bearing by inserting the release lever into the clutch housing release lever hole. Then, fit the lever spring onto the raised portion of the pivot by pushing the release lever to the pivot and twisting it to both sides. (turbo model)

4) Install the release bearing and fasten it with two clips. (non-turbo model)

# Release Bearing and Lever

## CLUTCH SYSTEM

5) Install the dust cover.



- (A) Release lever
- (B) Dust cover

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

7) Install the transmission assembly. <Ref. to 6MT-28, INSTALLATION, Manual Transmission Assembly.>

## C: INSPECTION

### 1. RELEASE BEARING

#### CAUTION:

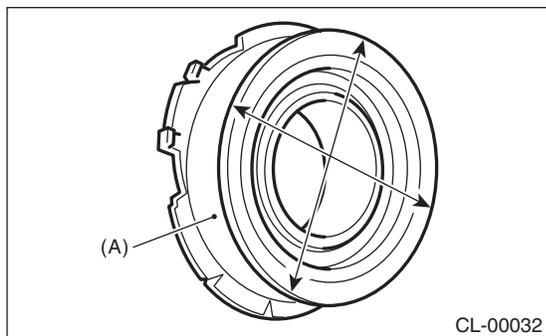
**Because this bearing is grease-sealed and is a non-lubrication type, do not wash with gasoline or solvents when servicing the clutch.**

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

#### Radial direction stroke:

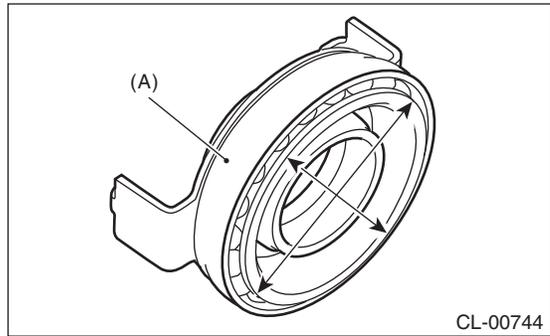
**1.6 mm (0.063 in)**

- Non-turbo model



- (A) Bearing case

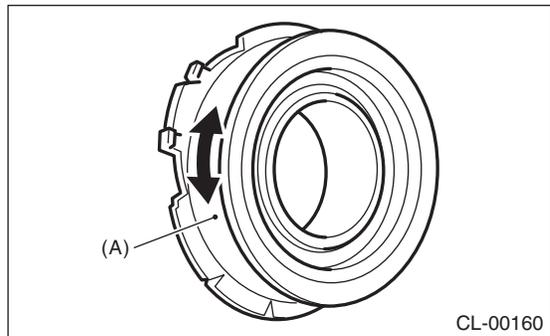
- Turbo model



- (A) Bearing case

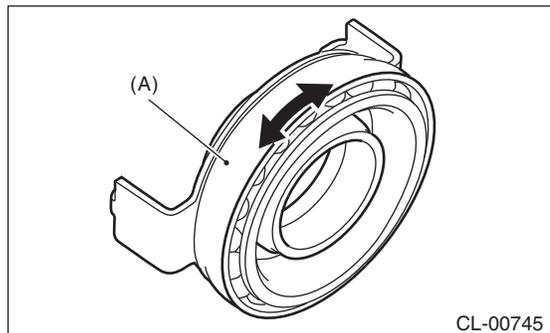
2) While applying force to the bearing in the rotational direction, check the bearing for smooth rotation.

- Non-turbo model



- (A) Bearing case

- Turbo model



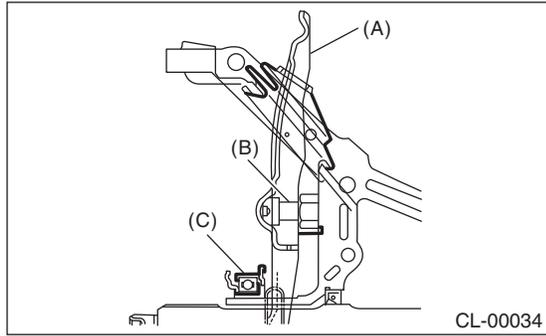
- (A) Bearing case

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

## 2. RELEASE LEVER

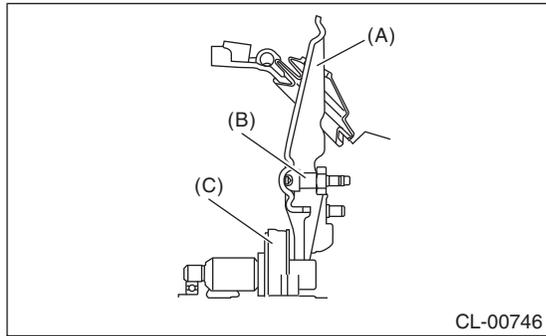
Check the pivot portion of the lever and the contact area with the release bearing case for wear.

- Non-turbo model



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

- Turbo model



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

## 5. Operating Cylinder

### A: REMOVAL

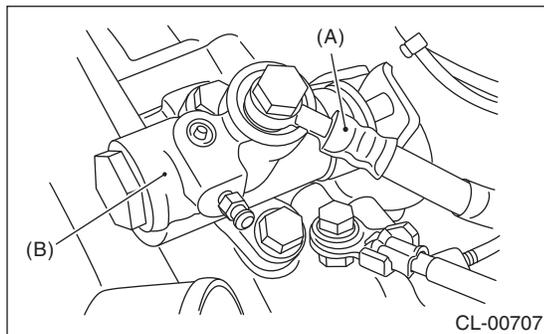
**NOTE:**

The illustration shows a representing model. Perform the same procedures for the other models.

- 1) Remove the collector cover.
- 2) Remove the air intake boot assembly. (non-turbo model) <Ref. to IN(H4SO)-8, REMOVAL, Air Intake Boot.>
- 3) Remove the intercooler. (turbo model) <Ref. to IN(H4DOTC)-17, REMOVAL, Intercooler.>
- 4) Disconnect the clutch hose from the operating cylinder.

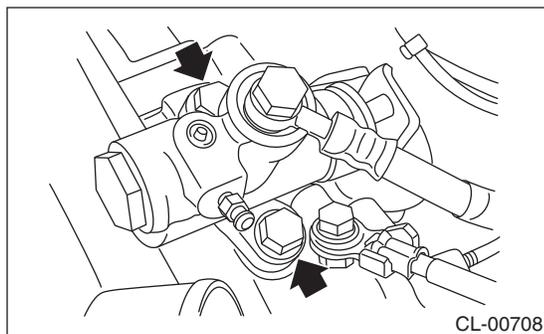
**CAUTION:**

- Cover the hose joint to prevent the clutch fluid from flowing out.
- Do not loosen or remove the cap bolts.



- (A) Clutch hose  
(B) Operating cylinder

- 5) Remove the operating cylinder from the transmission.



CL-00708

### B: INSTALLATION

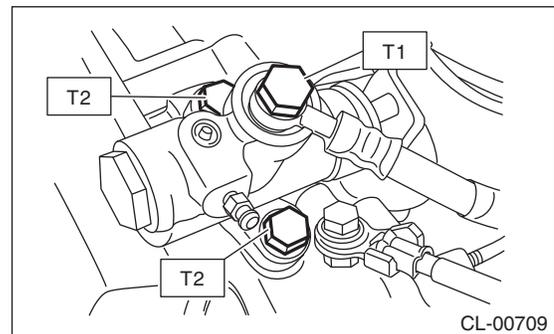
**NOTE:**

- The illustration shows a representing model. Perform the same procedures for the other models.
  - Be sure to install the clutch hose with the mark side facing upward.
  - Be careful not to twist the clutch hose during installation.
  - Before installing the operating cylinder, apply grease (NICHIMOLY N-130) to the contact point of the release lever and operating cylinder.
- 1) Install in the reverse order of removal.

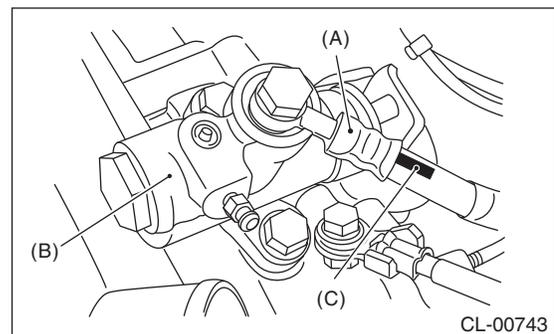
**Tightening torque:**

**T1: 18 N·m (1.8 kgf-m, 13.3 ft-lb)**

**T2: 37 N·m (3.8 kgf-m, 27.3 ft-lb)**



CL-00709



CL-00743

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

- 2) After bleeding air from the operating cylinder, ensure that the clutch operates properly. <Ref. to CL-25, PROCEDURE, Clutch Fluid Air Bleeding.>
- 3) When the operating cylinder has been replaced or removed, perform the clutch sensor calibration mode. <Ref. to PB(diag)-19, CLUTCH SENSOR CALIBRATION MODE, OPERATION, Subaru Select Monitor.>

**NOTE:**

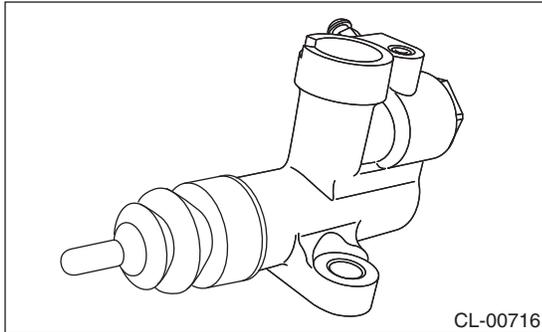
If necessary, perform the clutch meet position setting. <Ref. to PB(diag)-19, CLUTCH ENGAGEMENT POSITION SETTING, OPERATION, Subaru Select Monitor.>

## C: DISASSEMBLY

**NOTE:**

The illustration shows a representing model. Perform the same procedures for the other models.

1) Remove the boot and push rod.

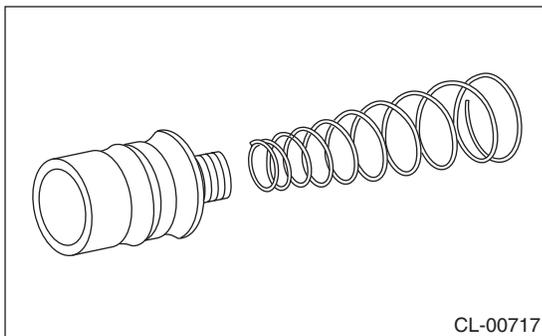


2) Apply compressed air through clutch hose attachment hole.

**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

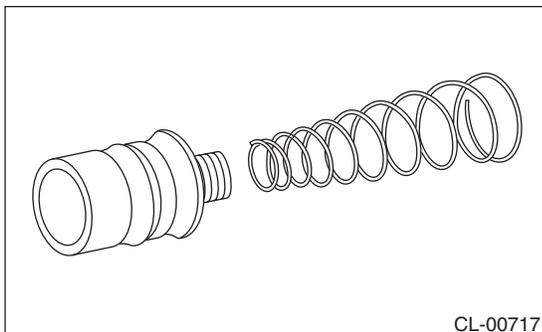
**NOTE:**

- The illustration shows a representing model. Perform the same procedures for the other models.
- During assembly, apply hydraulic oil to all parts.

**Recommended clutch fluid:**

**New FMVSS No. 116 DOT3**

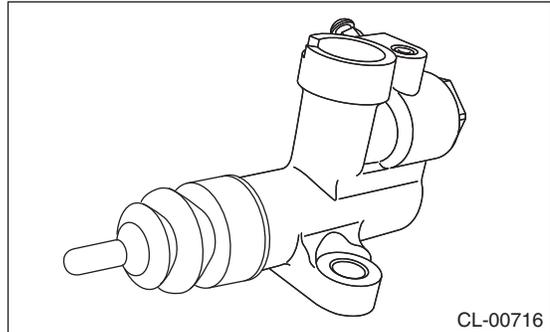
1) Install the piston spring onto the piston.



2) Insert piston to the operating cylinder.

3) Install push rod to the boot.

4) Install boot and push rod to the operating cylinder.



## E: INSPECTION

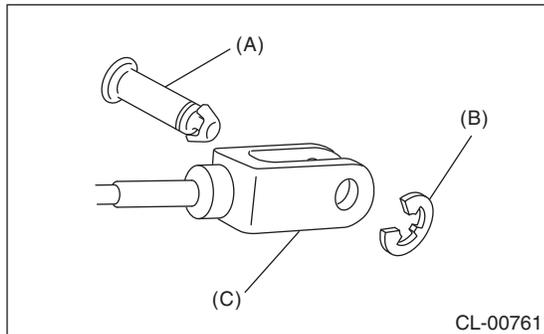
1) Check that the operating cylinder is not damaged. Replace the operating cylinder if it is damaged.

2) Check the clutch fluid leakage on the operating cylinder or the boot for damage. Replace the operating cylinder if clutch fluid leaks or boot damages are noted.

### 6. Master Cylinder

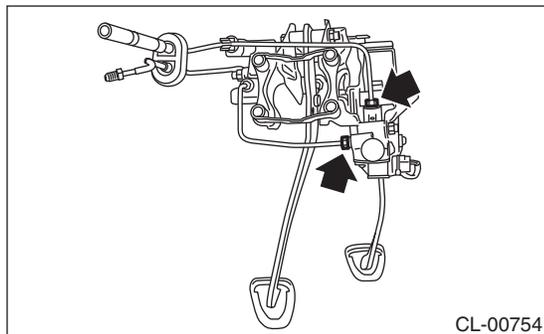
#### A: REMOVAL

- 1) Disconnect the ground cable from battery.
- 2) Remove the collector cover.
- 3) Drain clutch fluid from reservoir tank completely.
- 4) Remove the instrument panel lower cover. <Ref. to EI-63, REMOVAL, Instrument Panel Lower Cover.>
- 5) Remove the pedal assembly. <Ref. to CL-26, REMOVAL, Clutch Pedal.>
- 6) Remove the clip and clevis pin, and then separate the push rod of the master cylinder from clutch pedal.

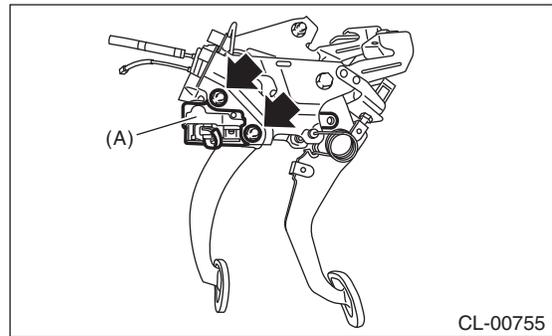


- (A) Clevis pin
- (B) Clip
- (C) Push rod

- 7) Disconnect the clutch stroke sensor connector.
- 8) Remove the clutch pipe from the master cylinder.



- 9) Remove the master cylinder from the pedal bracket.



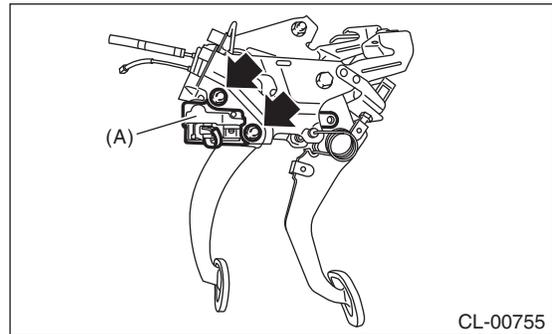
(A) Master cylinder

#### B: INSTALLATION

- 1) Install the master cylinder to the pedal assembly.

##### **Tightening torque:**

**18 N·m (1.8 kgf-m, 13.3 ft-lb)**

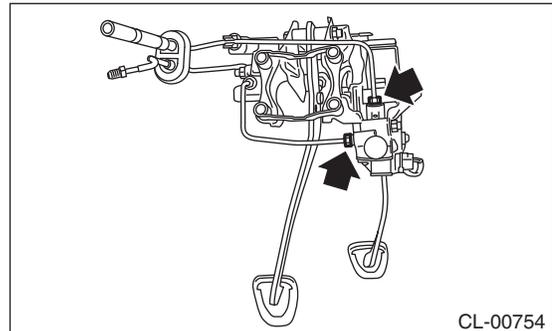


(A) Master cylinder

- 2) Connect the clutch pipes to the master cylinder.

##### **Tightening torque:**

**15 N·m (1.5 kgf-m, 11.1 ft-lb)**



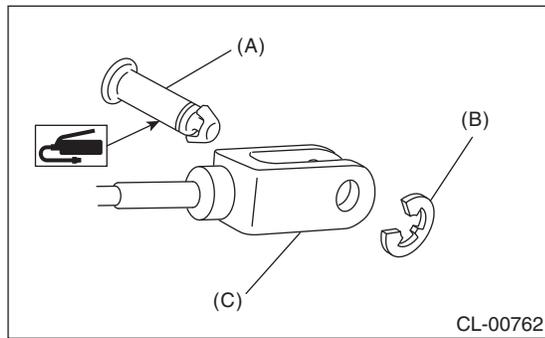
- 3) Connect the clutch stroke sensor connector.
- 4) Connect the push rod of the master cylinder to the clutch pedal, and install the clevis pin and clip.

##### **CAUTION:**

**Always use a new clevis pin.**

## NOTE:

Apply grease to the clevis pin.



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

5) Install the pedal assembly. <Ref. to CL-26, INSTALLATION, Clutch Pedal.>

6) Install the instrument panel lower cover. <Ref. to EI-64, INSTALLATION, Instrument Panel Lower Cover.>

7) Connect the ground cable to battery.

8) Fill the recommended clutch fluid. <Ref. to CL-24, Clutch Fluid.>

9) After bleeding air from the clutch system, ensure that the clutch operates properly. <Ref. to CL-25, Clutch Fluid Air Bleeding.>

10) Install the collector cover.

11) When the clutch master cylinder assembly has been replaced, perform the clutch sensor calibration mode. <Ref. to PB(diag)-19, CLUTCH SENSOR CALIBRATION MODE, OPERATION, Subaru Select Monitor.>

## NOTE:

If necessary, perform the clutch meet position setting. <Ref. to PB(diag)-19, CLUTCH ENGAGEMENT POSITION SETTING, OPERATION, Subaru Select Monitor.>

**C: INSPECTION**

If any damage, deformation, wear, swelling, rust or other faults are found on the master cylinder assembly, reservoir tank, clutch damper, clutch pipe and clutch hose, replace the faulty part.

# Clutch Pipe and Hose

## CLUTCH SYSTEM

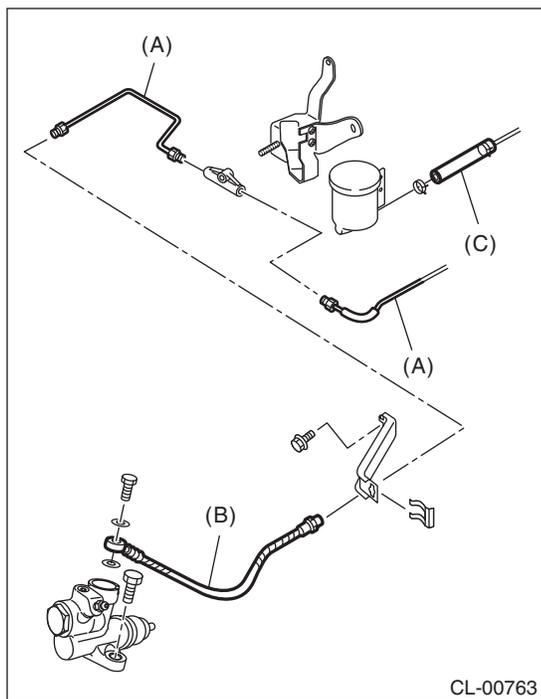
### 7. Clutch Pipe and Hose

#### A: REMOVAL

- 1) Disconnect the ground cable from battery.
- 2) Remove the collector cover.
- 3) Remove the air intake boot assembly. (non-turbo model) <Ref. to IN(H4SO)-8, REMOVAL, Air Intake Boot.>
- 4) Remove the intercooler. (turbo model) <Ref. to IN(H4DOTC)-17, REMOVAL, Intercooler.>
- 5) Drain clutch fluid from reservoir tank completely.
- 6) Disconnect the clutch pipe from the clutch hose and connector. Disconnect the reservoir tank hose from the reservoir tank.

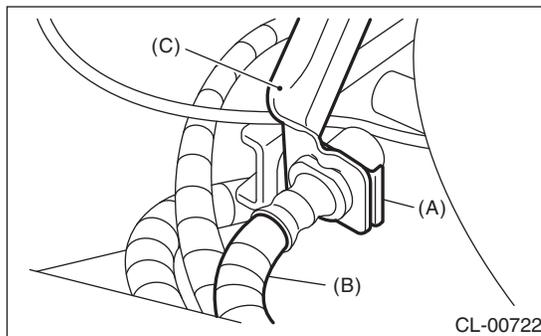
#### CAUTION:

**Be careful not to spill the clutch fluid. Clutch fluid spilled on the vehicle body will harm the paint surface; if spilled, wash off with water immediately and wipe off.**



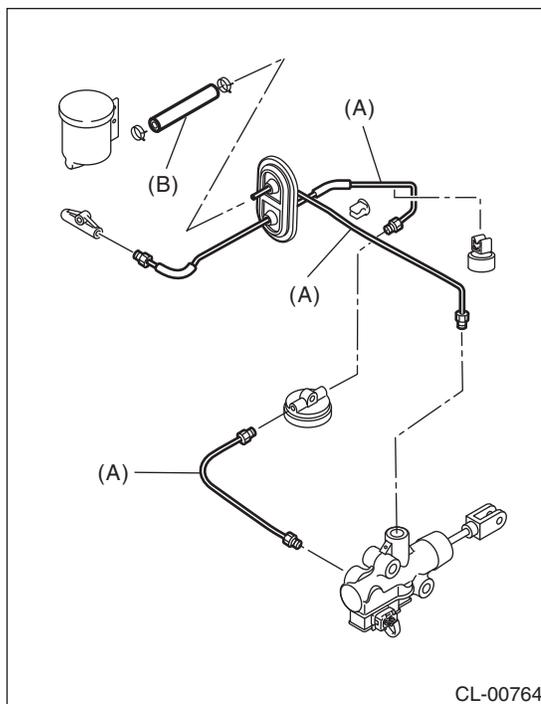
- (A) Clutch pipe
- (B) Clutch hose
- (C) Reservoir tank hose

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



- (A) Clamp
- (B) Clutch hose
- (C) Clutch bracket

- 8) Disconnect the clutch hose from operating cylinder.
- 9) Remove the clutch bracket.
- 10) Remove the instrument panel lower cover. <Ref. to EI-63, REMOVAL, Instrument Panel Lower Cover.>
- 11) Remove the pedal assembly. <Ref. to CL-26, REMOVAL, Clutch Pedal.>
- 12) Remove the clutch pipe from the reservoir tank hose, mass damper, clutch damper, master cylinder and clutch pipe grommet.



- (A) Clutch pipe
- (B) Reservoir tank hose

## B: INSTALLATION

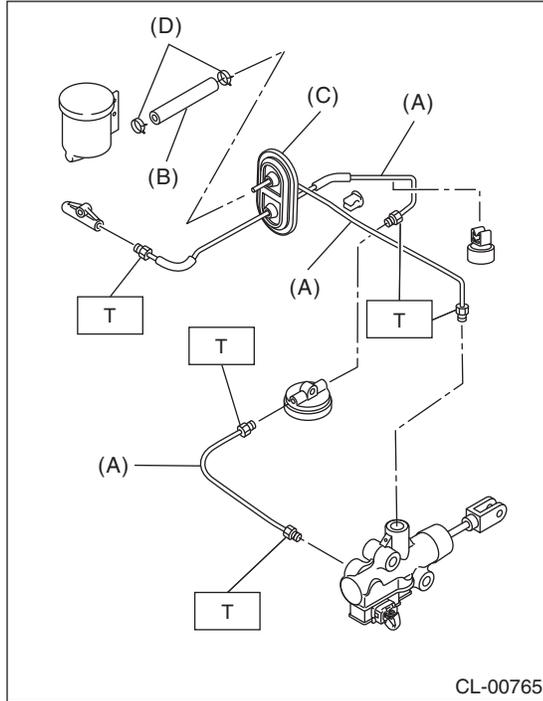
Install in the reverse order of removal.

### NOTE:

After bleeding air from the clutch fluid, ensure that the clutch operates properly. <Ref. to CL-25, Clutch Fluid Air Bleeding.>

### Tightening torque:

**T: 15 N·m (1.5 kgf-m, 11.1 ft-lb)**



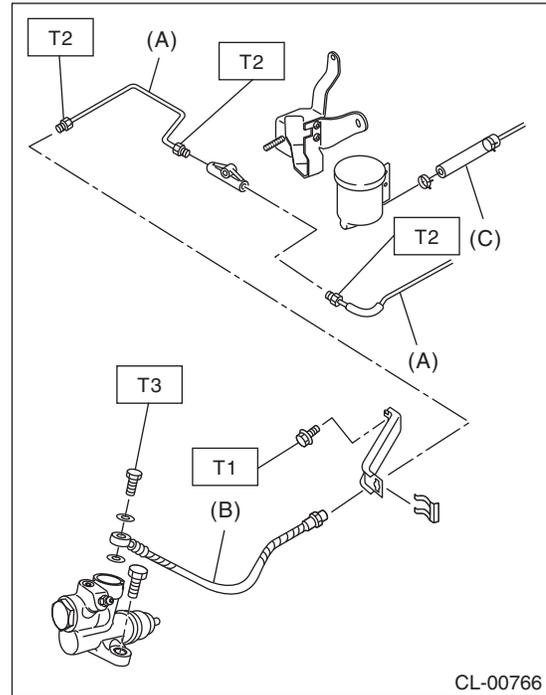
- (A) Clutch pipe
- (B) Reservoir tank hose
- (C) Clutch pipe grommet
- (D) Clamp

### Tightening torque:

**T1: 7.5 N·m (0.8 kgf-m, 5.5 ft-lb)**

**T2: 15 N·m (1.5 kgf-m, 11.1 ft-lb)**

**T3: 18 N·m (1.8 kgf-m, 13.3 ft-lb)**



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

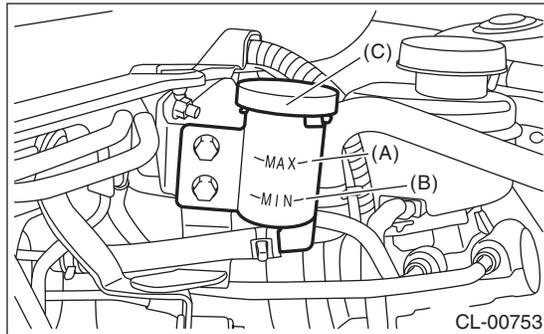
## C: INSPECTION

Check the clutch pipe, reservoir tank hose and clutch hose for crack, breaks or damage. Check the joint for clutch fluid leakage. If crack, breakage, damage or leakage is found, repair or replace the faulty clutch pipe, reservoir tank hose or clutch hose.

### 8. Clutch Fluid

#### A: INSPECTION

- 1) Park the vehicle on a level surface.
- 2) Check the clutch fluid level using the scale on the outside of the reservoir tank. If the clutch fluid level is below "MIN", fill the clutch fluid up to "MAX" level, and make sure that there is no leakage.



- (A) MAX. level
- (B) MIN. level
- (C) Reservoir tank

#### B: REPLACEMENT

##### CAUTION:

- Use new FMVSS No. 116 DOT3.
- Cover the air bleeder with cloth to prevent clutch fluid from being splashed on surrounding parts when loosening the bleeder.
- 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 amount of clutch fluid required is approximately 70 mℓ (2.4 US fl oz, 2.5 Imp fl oz) for total clutch system.
- 1) Remove the collector cover.
  - 2) Remove the air intake boot assembly. (non-turbo model) <Ref. to IN(H4SO)-8, REMOVAL, Air Intake Boot.>
  - 3) Remove the intercooler. (turbo model) <Ref. to IN(H4DOTC)-17, REMOVAL, Intercooler.>
  - 4) Drain clutch fluid from reservoir tank completely.
  - 5) Refill the reservoir tank with recommended clutch fluid.

**Recommended clutch fluid:**  
**New FMVSS No. 116 DOT3**

- 6) Bleed air from the clutch fluid. <Ref. to CL-25, Clutch Fluid Air Bleeding.>
- 7) Install the air intake boot assembly. (non-turbo model) <Ref. to IN(H4SO)-8, INSTALLATION, Air Intake Boot.>
- 8) Install the intercooler. (turbo model) <Ref. to IN(H4DOTC)-18, INSTALLATION, Intercooler.>
- 9) Install the collector cover.

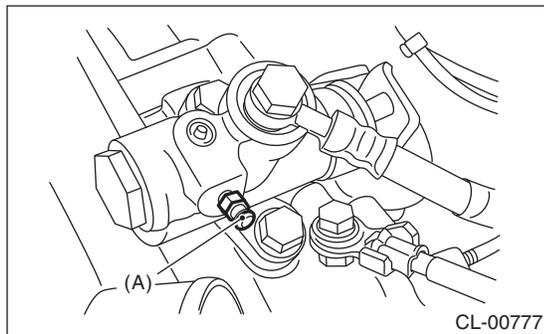
## 9. Clutch Fluid Air Bleeding

### A: PROCEDURE

#### NOTE:

- The illustration shows a representing model. Perform the same procedures for the other models.
- Bleed air from the oil line with help of a co-worker.

- 1) Remove the collector cover.
- 2) Remove the air intake boot assembly. (non-turbo model) <Ref. to IN(H4SO)-8, REMOVAL, Air Intake Boot.>
- 3) Remove the intercooler. (turbo model) <Ref. to IN(H4DOTC)-17, REMOVAL, Intercooler.>
- 4) Fit one end of a vinyl tube into the air bleeder of the operating cylinder, and put the other end into a clutch fluid container.

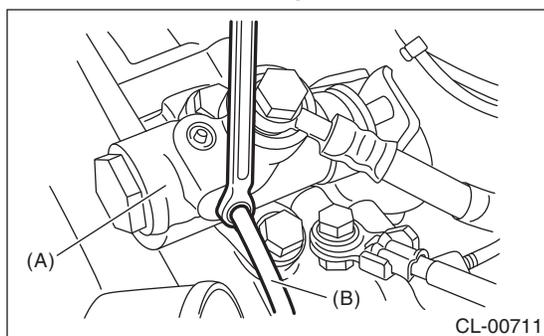


(A) Air bleeder

- 5) Slowly depress the clutch pedal several times and keep it depressed. Then open the air bleeder to discharge air together with the clutch fluid. Release the air bleeder for 1 or 2 seconds. Next, close the air bleeder, and slowly release the clutch pedal.

#### CAUTION:

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



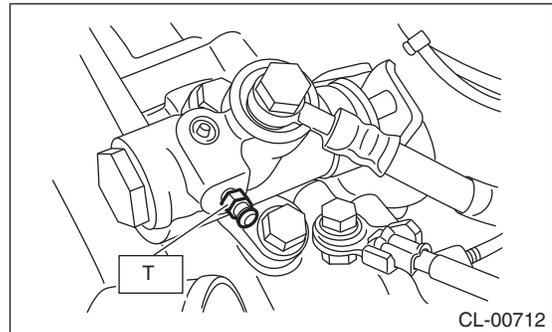
(A) Operating cylinder  
(B) Vinyl tube

- 6) Repeat step 3) until there are no more air bubbles from the air bleeder.

- 7) Tighten the air bleeder.

#### Tightening torque:

**T: 7.8 N·m (0.8 kgf·m, 5.8 ft·lb)**



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

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

- 10) Install the air intake boot assembly. (non-turbo model) <Ref. to IN(H4SO)-8, INSTALLATION, Air Intake Boot.>

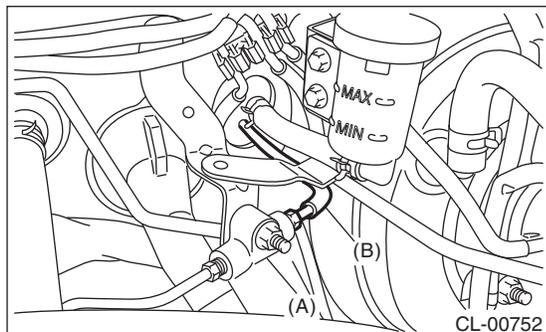
- 11) Install the intercooler. (turbo model) <Ref. to IN(H4DOTC)-18, INSTALLATION, Intercooler.>

- 12) Install the collector cover.

### 10. Clutch Pedal

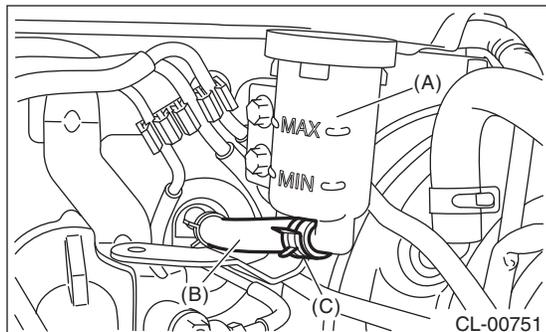
#### A: REMOVAL

- 1) Disconnect the ground cable from battery.
- 2) Remove the collector cover.
- 3) Drain the clutch fluid from the reservoir tank.
- 4) Disconnect the clutch pipe from the connector.



- (A) Connector  
(B) Clutch pipe

- 5) Disconnect the reservoir tank hose from the reservoir tank.

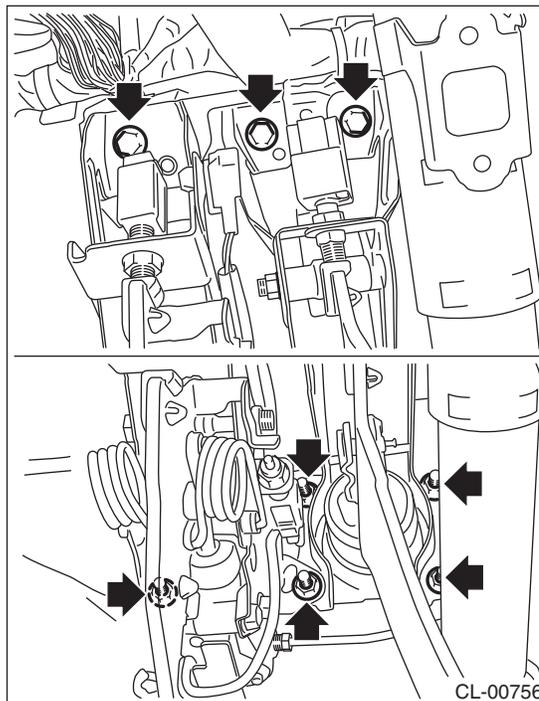


- (A) Reservoir tank  
(B) Reservoir tank hose  
(C) Clamp

- 6) Remove the instrument panel lower cover. <Ref. to EI-63, REMOVAL, Instrument Panel Lower Cover.>
- 7) Remove the body integrated unit. <Ref. to SL-72, REMOVAL, Body Integrated Unit.>
- 8) Disconnect the connector from clutch switch.
- 9) Disconnect the connector from the brake switch.
- 10) Remove the snap pin and clevis pin connecting the operating rod and brake pedal.
- 11) Remove the pedal assembly.

#### NOTE:

Place vinyl, etc. not to drop the clutch fluid to the floor carpet.



#### B: INSTALLATION

- 1) Install in the reverse order of removal.

#### CAUTION:

Always use a new clevis pin.

#### Tightening torque:

**T: 18 N·m (1.8 kgf-m, 13.3 ft-lb)**

- 2) Fill the recommended clutch fluid. <Ref. to CL-24, Clutch Fluid.>
- 3) Bleed air from the clutch system. <Ref. to CL-25, PROCEDURE, Clutch Fluid Air Bleeding.>
- 4) Adjust the clutch pedal. <Ref. to CL-29, ADJUSTMENT, Clutch Pedal.>
- 5) When the clutch pedal has been replaced, perform the clutch sensor calibration mode. <Ref. to PB(diag)-19, CLUTCH SENSOR CALIBRATION MODE, OPERATION, Subaru Select Monitor.>

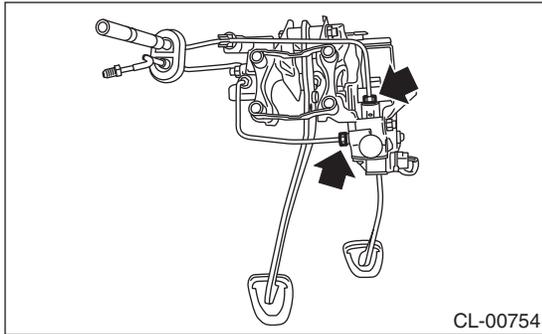
#### NOTE:

If necessary, perform the clutch meet position setting. <Ref. to PB(diag)-19, CLUTCH ENGAGEMENT POSITION SETTING, OPERATION, Subaru Select Monitor.>

- 6) Install the collector cover.

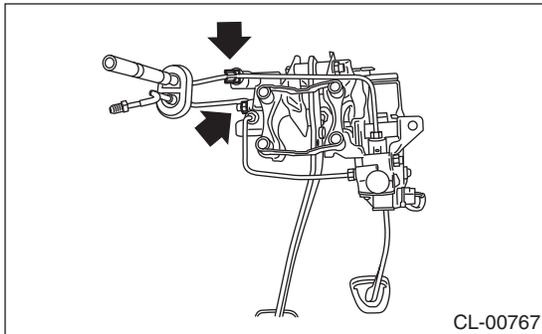
## C: DISASSEMBLY

1) Disconnect the clutch pipe from the master cylinder.



CL-00754

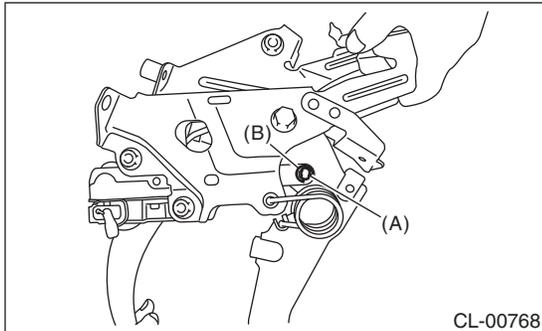
2) Remove the clutch damper mounting nut from the pedal assembly, and disconnect the clutch pipe from the clamp.



CL-00767

3) Remove the clutch switches.

4) Remove the clip and pull out the clevis pin.



CL-00768

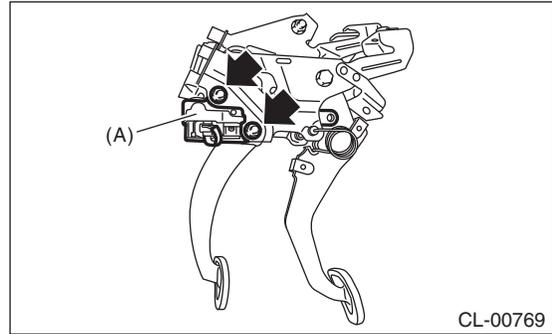
- (A) Clevis pin
- (B) Clip

5) Disconnect the connector from the clutch stroke sensor, and then remove the sensor harness.

6) Remove the master cylinder from the pedal assembly.

### NOTE:

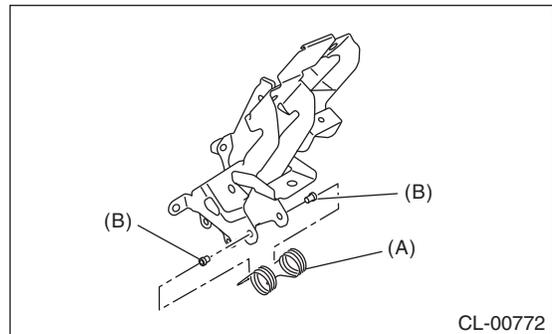
Secure the push rod with a tape, etc. to prevent it from falling off.



CL-00769

- (A) Master cylinder

7) Remove the torsion spring and assist bushing from the pedal assembly.



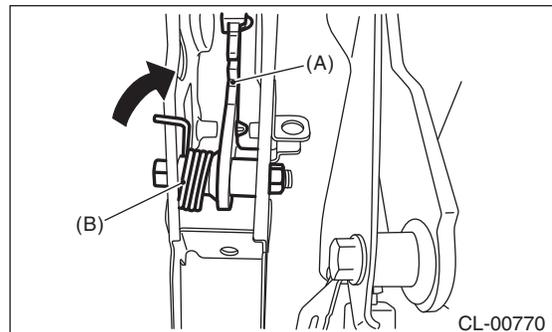
CL-00772

- (A) Torsion spring
- (B) Assist bushing

8) Remove the clutch pedal from the pedal bracket.

### NOTE:

Before removing the clutch pedal mounting bolt, remove the hook of the assist spring from the pedal bracket. (turbo model)



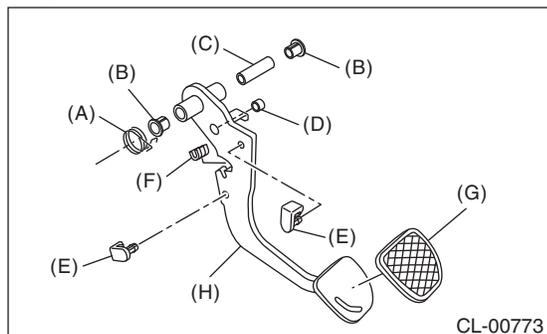
CL-00770

- (A) Clutch pedal
- (B) Assist spring (turbo model)

# Clutch Pedal

## CLUTCH SYSTEM

9) Remove the assist spring (turbo model), bushing, spacer, bushing A, stopper, torsion spring bushing and clutch pedal pad from the clutch pedal.



- (A) Assist spring (turbo model)
- (B) Bushing
- (C) SPACER
- (D) Bushing A
- (E) STOPPER
- (F) Torsion spring bushing
- (G) Clutch pedal pad
- (H) Clutch pedal

## D: ASSEMBLY

1) Clean the holes in the sliding surface between the clutch pedal and pedal bushing, and apply grease.

2) Attach the pedal pad, stopper, assist spring (turbo model), bushing A, torsion spring bushing, spacer and bushing to the clutch pedal.

### NOTE:

Before installing the spacer, clean the inside of the pedal bushings and apply grease.

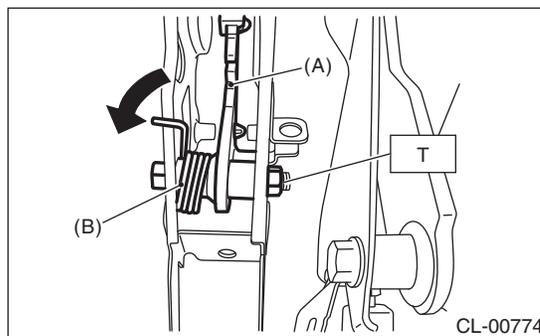
3) Attach the clutch pedal to the pedal bracket.

### NOTE:

- Before installing the assist spring, apply grease to the coil part of the assist spring. (turbo model)
- Hang hook of the assist spring on the pedal bracket. (turbo model)

### Tightening torque:

**T: 30 N·m (3.1 kgf-m, 22.1 ft-lb)**



- (A) Clutch pedal
- (B) Assist spring (turbo model)

4) Install the assist bushing and torsion spring to the pedal assembly.

### NOTE:

Before installing the torsion spring, apply grease to the assist bushing and torsion spring bushing.

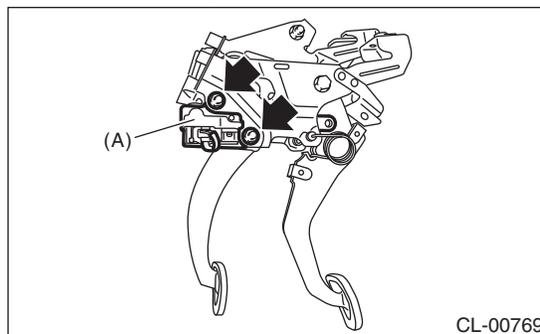
5) Install the master cylinder to the pedal assembly.

### NOTE:

Secure the push rod with a tape, etc. to prevent it from falling off.

### Tightening torque:

**T: 18 N·m (1.8 kgf-m, 13.3 ft-lb)**



- (A) Master cylinder

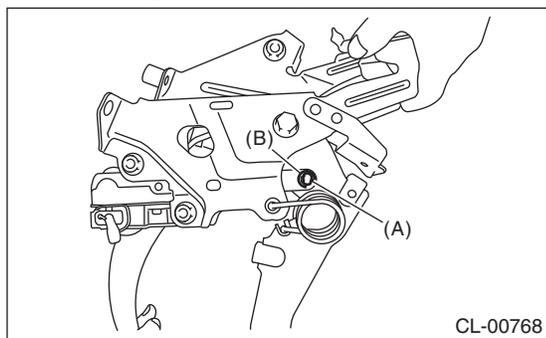
6) Secure the clevis pin with mounting clip.

### CAUTION:

**Always use a new clevis pin.**

**NOTE:**

Before installing the clevis pin, apply grease.



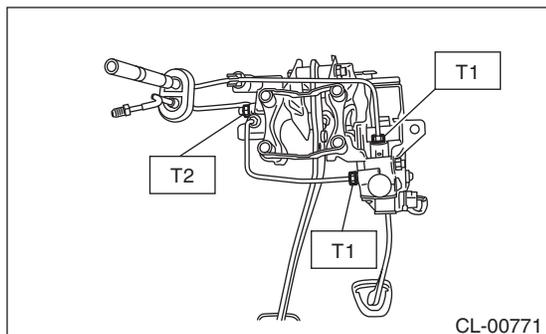
- (A) Clevis pin
- (B) Clip

- 7) Attach the sensor harness, and connect the connector to the clutch stroke sensor.
- 8) Install the clutch switch.
- 9) Install the clutch damper to the pedal assembly, and connect the clutch pipe 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)**



## 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.

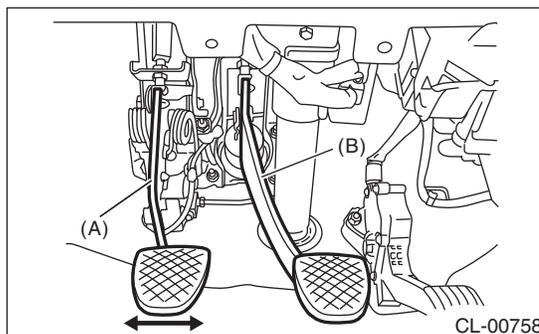
**CAUTION:**

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

**Deflection of the clutch pedal:**

**Service limit**

**4.0 mm (0.157 in) or less**



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

## F: ADJUSTMENT

1) If the full stroke of the clutch pedal is not within the specified value, loosen the lock nuts of the clutch switch and adjust the full stroke of the clutch pedal with the clutch switch.

**CAUTION:**

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

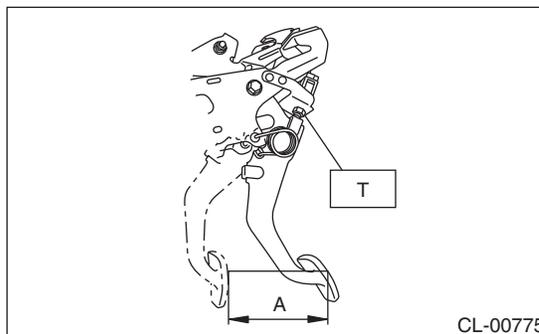
**Clutch pedal full stroke A:**

**130 — 135 mm (5.12 — 5.31 in) (non-turbo model)**

**135 — 140 mm (5.31 — 5.51 in) (turbo model)**

**Tightening torque:**

**T: 8 N·m (0.8 kgf-m, 5.9 ft-lb)**



# Clutch Pedal

## CLUTCH SYSTEM

2) 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-25, Clutch Fluid Air Bleeding.>

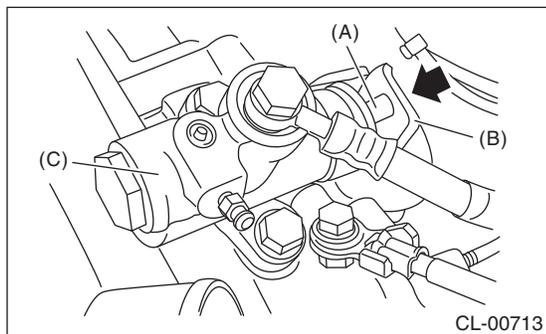
3) Measure the clutch pedal full stroke length again to ensure that it is within specifications. If it is not within specifications, repeat adjustment procedures again from the beginning.

### Clutch pedal full stroke:

**130 — 135 mm (5.12 — 5.31 in) (non-turbo model)**

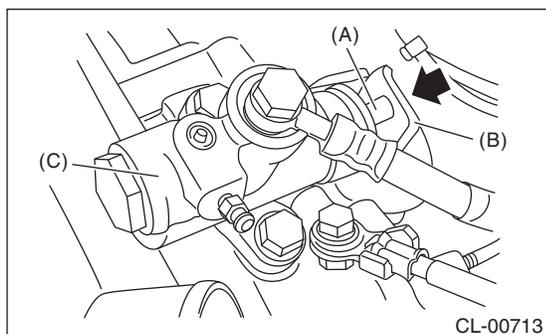
**135 — 140 mm (5.31 — 5.51 in) (turbo model)**

4) Push the release lever until the operating cylinder push rod retracts. Make sure that the clutch fluid level in the reservoir tank increases. If the clutch fluid level increases, the hydraulic clutch is properly adjusted; if the clutch fluid level does not increase or the push rod does not retract, replace the master cylinder with a new part. <Ref. to CL-20, Master Cylinder.>



- (A) Push rod
- (B) Release lever
- (C) Operating cylinder

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



- (A) Push rod
- (B) Release lever
- (C) Operating cylinder

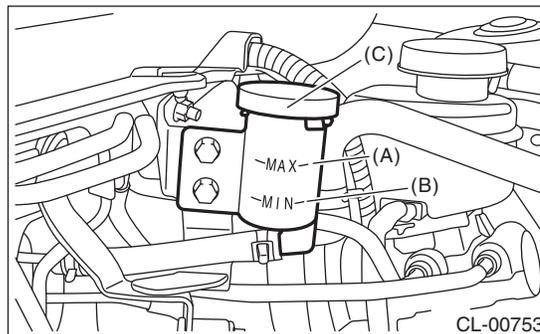
6) If the clutch fluid level increases, hydraulic clutch play is correct.

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

8) Check the clutch fluid level using the scale on the outside of the reservoir tank. If the clutch fluid level is below "MIN", fill the clutch fluid up to "MAX" level.

### Recommended clutch fluid:

**New FMVSS No. 116 DOT3**



- (A) MAX. level
- (B) MIN. level
- (C) Reservoir tank

## 11. Clutch Switch

### A: REMOVAL

- 1) Disconnect the ground cable from battery.
- 2) Remove the instrument panel lower cover. <Ref. to EI-63, REMOVAL, Instrument Panel Lower Cover.>
- 3) Disconnect the connector from 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.

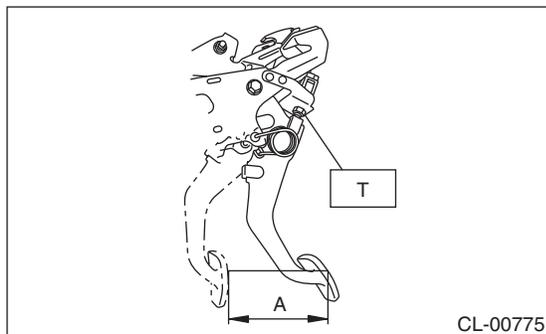
#### Clutch pedal full stroke A:

130 — 135 mm (5.12 — 5.31 in) (non-turbo model)

135 — 140 mm (5.31 — 5.51 in) (turbo model)

#### Tightening torque:

T: 8 N·m (0.8 kgf·m, 5.9 ft·lb)



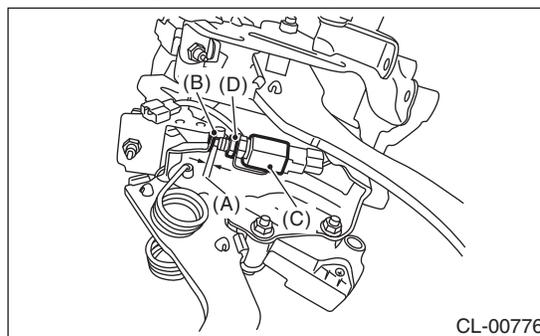
- 2) If the clutch pedal stroke is out of specification, adjust the stroke. <Ref. to CL-29, ADJUSTMENT, Clutch Pedal.>
- 3) Connect the connector to the clutch switch.

#### 2. CLUTCH START SWITCH

- 1) Fully depress the clutch pedal and hold it.
- 2) Install so that gap (A) of the clutch pedal plate and clutch start switch is 2.9 mm (0.11 in), and tighten the lock nut.

#### Tightening torque:

8 N·m (0.8 kgf·m, 5.9 ft·lb)



- (A) 2.9 mm (0.11 in)
- (B) Clutch pedal plate
- (C) Clutch start switch
- (D) Lock nut

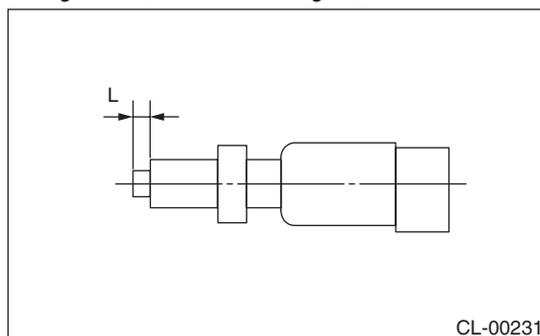
- 3) Connect the connector to the clutch start switch.
- 4) Make sure that engine does not start with clutch pedal not depressed.
- 5) Make sure that engine starts with clutch pedal fully depressed.

### C: INSPECTION

- 1) If the clutch start switch does not operate properly (or it does not stop at the specified position), replace it with a new part.

#### Specified position L:

$4^{+1.5}/_0$  mm ( $0.157^{+0.059}/_0$  in)



- 2) Check the clutch switch for continuity. If the continuity is not at the standard value, replace the switch.

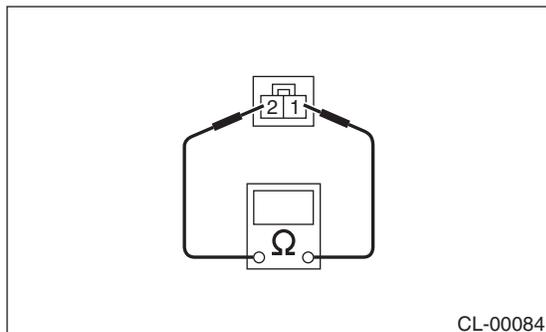
- (1) Disconnect the connector from clutch switch.
- (2) Measure the resistance between terminal 1 and 2 of the switch.

# Clutch Switch

## CLUTCH SYSTEM

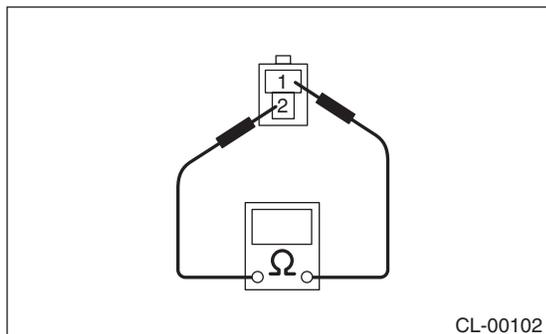
### • Clutch switch

Condition	Terminal No.	Specified resistance
When clutch pedal is depressed	No. 1 — No. 2	1 M $\Omega$ or more
Except when clutch pedal is depressed	No. 1 — No. 2	Less than 1 $\Omega$



### • Clutch start switch

Condition	Terminal No.	Specified resistance
When clutch pedal is depressed	No. 1 — No. 2	Less than 1 $\Omega$
Except when clutch pedal is depressed	No. 1 — No. 2	1 M $\Omega$ or more



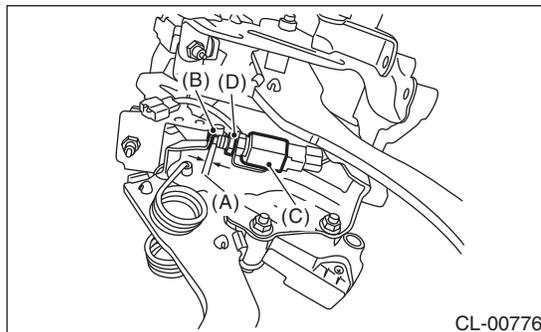
(3) Connect the connector to the clutch switch.

3) Make sure that engine does not start with clutch pedal not depressed. If the engine starts, adjust the clutch switch and inspect the clutch start circuit.

4) Make sure that engine starts with clutch pedal fully depressed. If the engine does not start, adjust the clutch switch and inspect the clutch start circuit.

## D: ADJUSTMENT

- 1) Loosen the lock nut of the clutch start switch.
- 2) Fully depress the clutch pedal and hold it.
- 3) Adjust the gap (A) of the clutch pedal plate and the clutch start switch to be 2.9 mm (0.11 in).



- (A) 2.9 mm (0.11 in)
- (B) Clutch pedal plate
- (C) Clutch start switch
- (D) Lock nut

- 4) Tighten the lock nut.

### **Tightening torque:**

**8 N·m (0.8 kgf-m, 5.9 ft-lb)**

## 12. General Diagnostic Table

### A: INSPECTION

#### 1. CLUTCH

Symptoms	Possible cause	Corrective action
<p>1. Clutch slippage. It is hard to perceive clutch slippage in the early stage, but pay attention to the following symptoms.</p> <ul style="list-style-type: none"> <li>• Engine speeds up when shifting.</li> <li>• 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.</li> <li>• Power drops particularly when ascending a slope, and there is a burning smell of the clutch plate.</li> <li>• 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.</li> </ul>	(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.
<p>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.</p> <ul style="list-style-type: none"> <li>• Method of testing:&lt;Ref. to CL-34, DIAGNOSTIC DIAGRAM OF CLUTCH DRAG, INSPECTION, General Diagnostic Table.&gt;</li> </ul> <p>The problem is caused by insufficient disengagement of the clutch if an abnormal noise occurs during this test.</p>	(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.
<p>3. Clutch chatters. Clutch chattering is an unpleasant vibration to the whole vehicle when the vehicle is just started with clutch partially engaged.</p>	(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.
<p>4. Noisy clutch Examine whether the noise is generated when the clutch is disengaged, engaged, or partially engaged.</p>	(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.

cardiagn.com

# General Diagnostic Table

## CLUTCH SYSTEM

Symptoms	Possible cause	Corrective action
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 play	Adjust the pedal play.
Excessive wear and damage of pedal shaft or busing	Replace the busing or shaft with a new part.

## 3. DIAGNOSTIC DIAGRAM OF CLUTCH DRAG

Step	Check	Yes	No
<b>1 CHECK GEAR NOISE.</b> 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.
<b>2 CHECK GEAR NOISE.</b> Step on 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.
<b>3 CHECK GEAR NOISE.</b> 1) Step on 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.