

**TRANSMISSION SECTION**

This service manual has been prepared to provide SUBARU service personnel with the necessary information and data for the correct maintenance and repair of SUBARU vehicles.

This manual includes the procedures for maintenance, disassembling, reassembling, inspection and adjustment of components and diagnostics for guidance of experienced mechanics.

Please peruse and utilize this manual fully to ensure complete repair work for satisfying our customers by keeping their vehicle in optimum condition. When replacement of parts during repair work is needed, be sure to use SUBARU genuine parts.

All information, illustration and specifications contained in this manual are based on the latest product information available at the time of publication approval.

<b>CONTROL SYSTEMS</b>	<b>CS</b>
<b>AUTOMATIC TRANSMISSION</b>	<b>4AT</b>
<b>AUTOMATIC TRANSMISSION (DIAGNOSTICS)</b>	<b>4AT(diag)</b>
<b>AUTOMATIC TRANSMISSION</b>	<b>5AT</b>
<b>AUTOMATIC TRANSMISSION (DIAGNOSTICS)</b>	<b>5AT(diag)</b>
<b>MANUAL TRANSMISSION AND DIFFERENTIAL</b>	<b>5MT</b>
<b>CLUTCH SYSTEM</b>	<b>CL</b>

# CLUTCH SYSTEM

# CL

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# General Description

CLUTCH SYSTEM

## 1. General Description

### A: SPECIFICATION

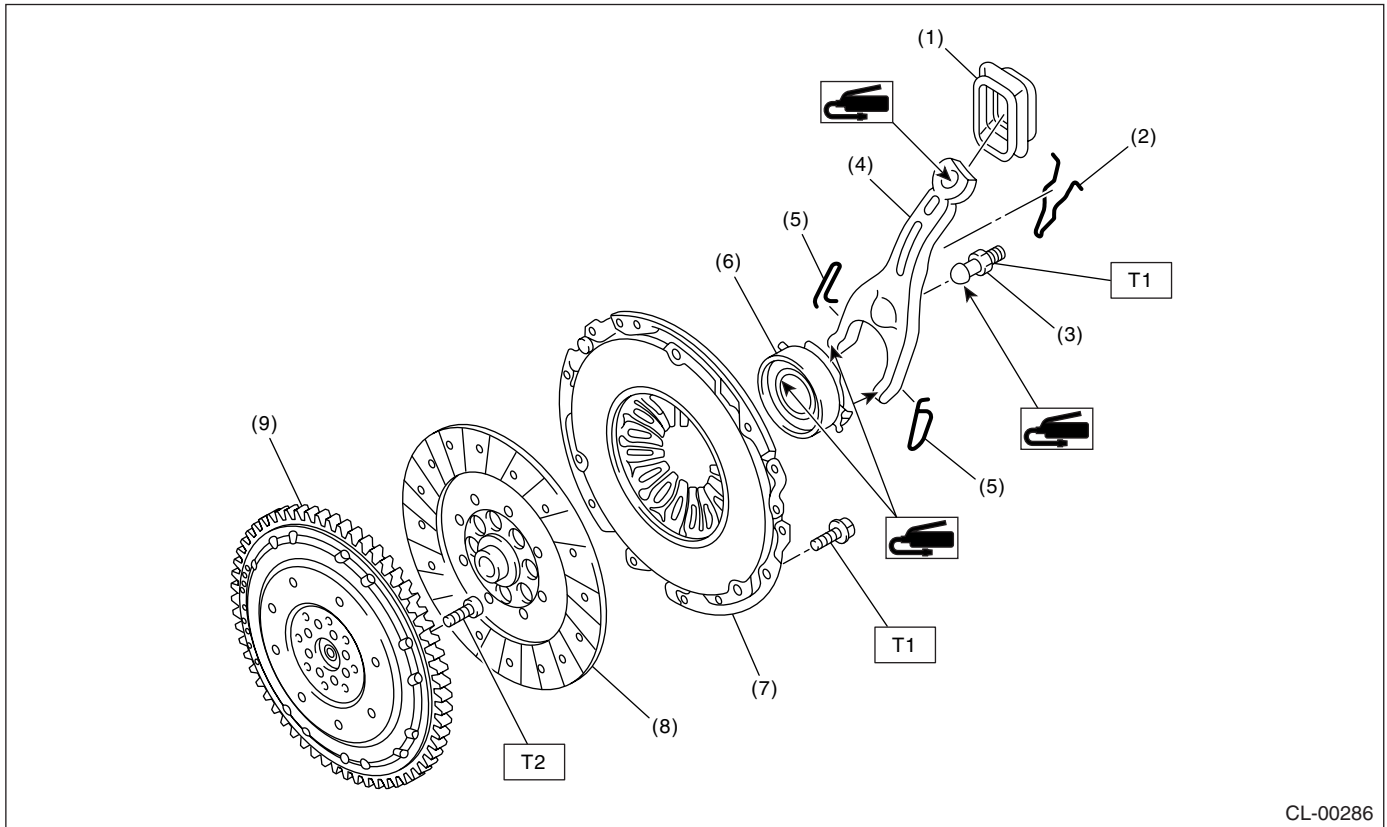
Option code <sup>★1</sup>		EC, EK, KA		KS, K4		
Model		2.0 L	2.5 L	2.0 L	2.5 L	
Clutch cover	Diaphragm set load      kgf (lb)	550 (1,213)		450 (992)	580 (1,279)	
Clutch disc	Facing material	Woven				
	Outer diameter × Inner diameter × Thickness      mm (in)	228.6 × 155 × 2.95 (9.00 × 6.10 × 0.1161)		225 × 150 × 3.5 (8.86 × 5.91 × 0.138)		
	Spline outer diameter      mm (in)	25.2 (0.992)				
	Depth of rivet head      mm (in)	Standard	1.3 — 1.9 (0.051 — 0.075)			
		Limit of sinking	0.3 (0.012)			
Limit for deflection      mm (in)	1.0 (0.039) 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 — 13 (0.16 — 0.51)				
Flywheel	Type	Dual mass		Flexible		

★1: For option code, refer to "ID" section. <Ref. to ID-5, MODEL NUMBER PLATE, IDENTIFICATION, Identification.>

## B: COMPONENT

### 1. CLUTCH ASSEMBLY

- EC, EK and KA model



CL-00286

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

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

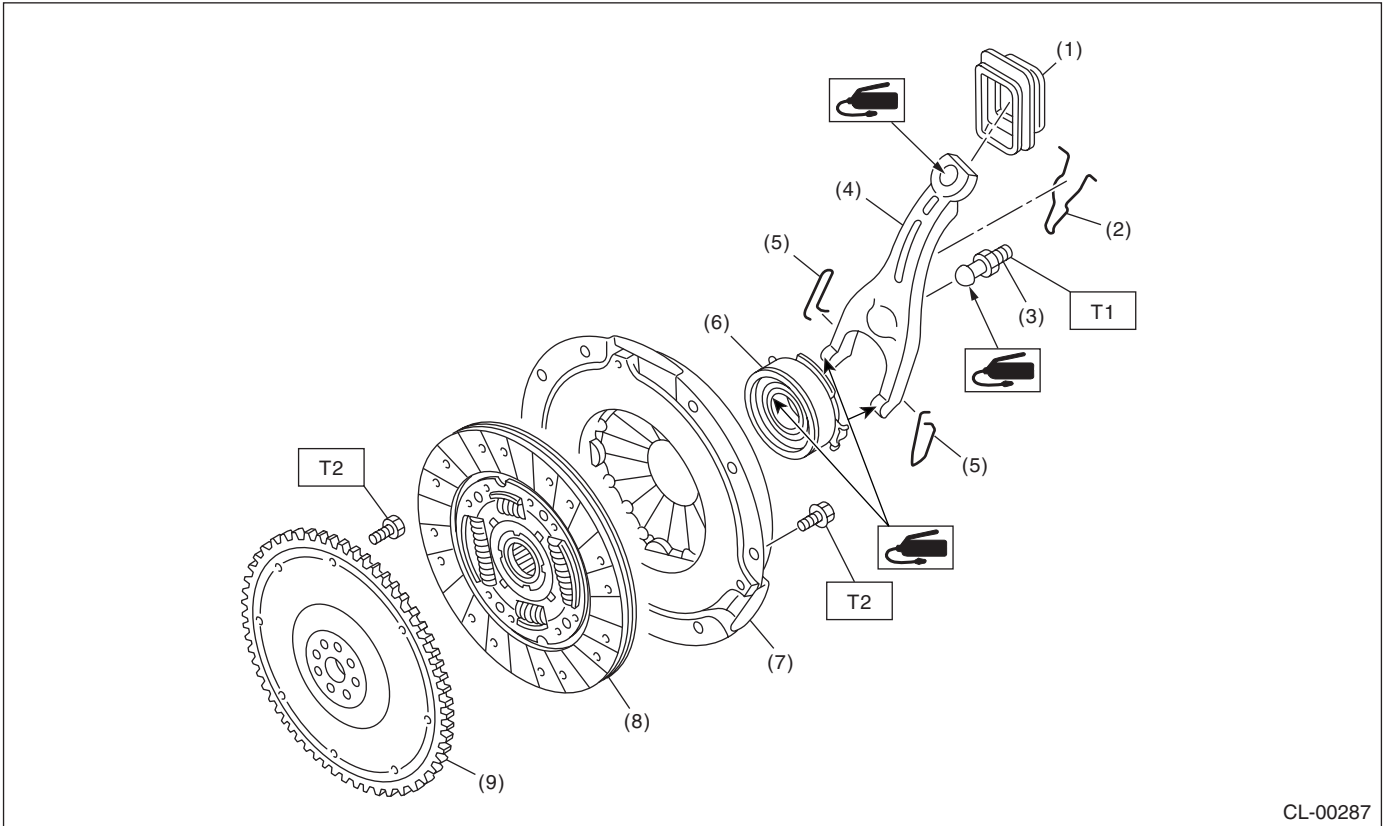
**T1: 16 (1.6, 11.8)**

**T2: 72 (7.3, 52.8)**

# General Description

## CLUTCH SYSTEM

- KS and K4 model



- |                   |                       |
|-------------------|-----------------------|
| (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          |                       |

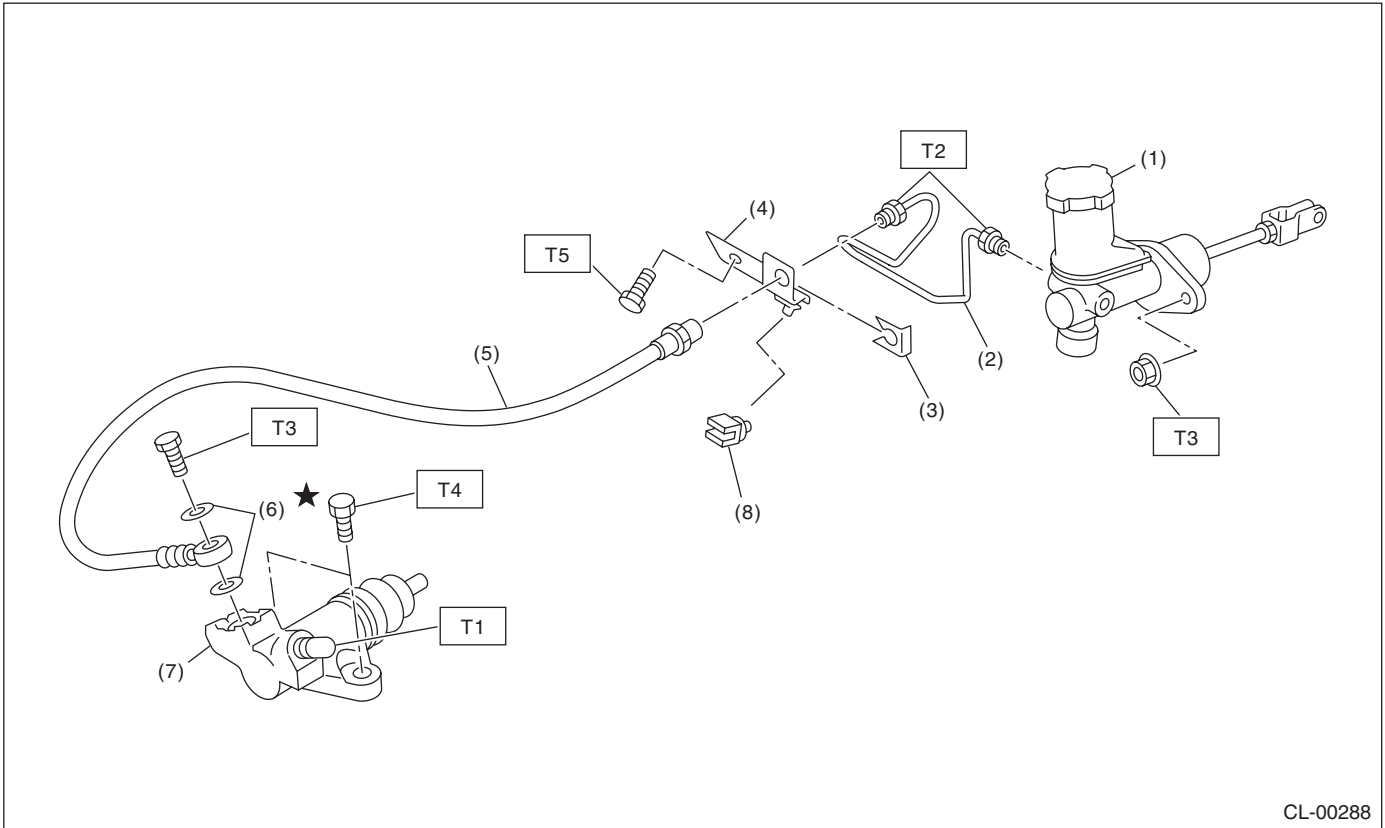
**Tightening torque: N·m (kgf·m, ft·lb)**

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

**T2: 72 (7.3, 52.8)**

## 2. CLUTCH PIPE AND HOSE

- LHD model



CL-00288

- |                          |                        |
|--------------------------|------------------------|
| (1) Master cylinder ASSY | (7) Operating cylinder |
| (2) Clutch pipe          | (8) Clip               |
| (3) Clamp                |                        |
| (4) Bracket              |                        |
| (5) Clutch hose          |                        |
| (6) Washer               |                        |

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

**T1: 8 (0.8, 5.8)**

**T2: 15 (1.5, 10.8)**

**T3: 18 (1.8, 13.0)**

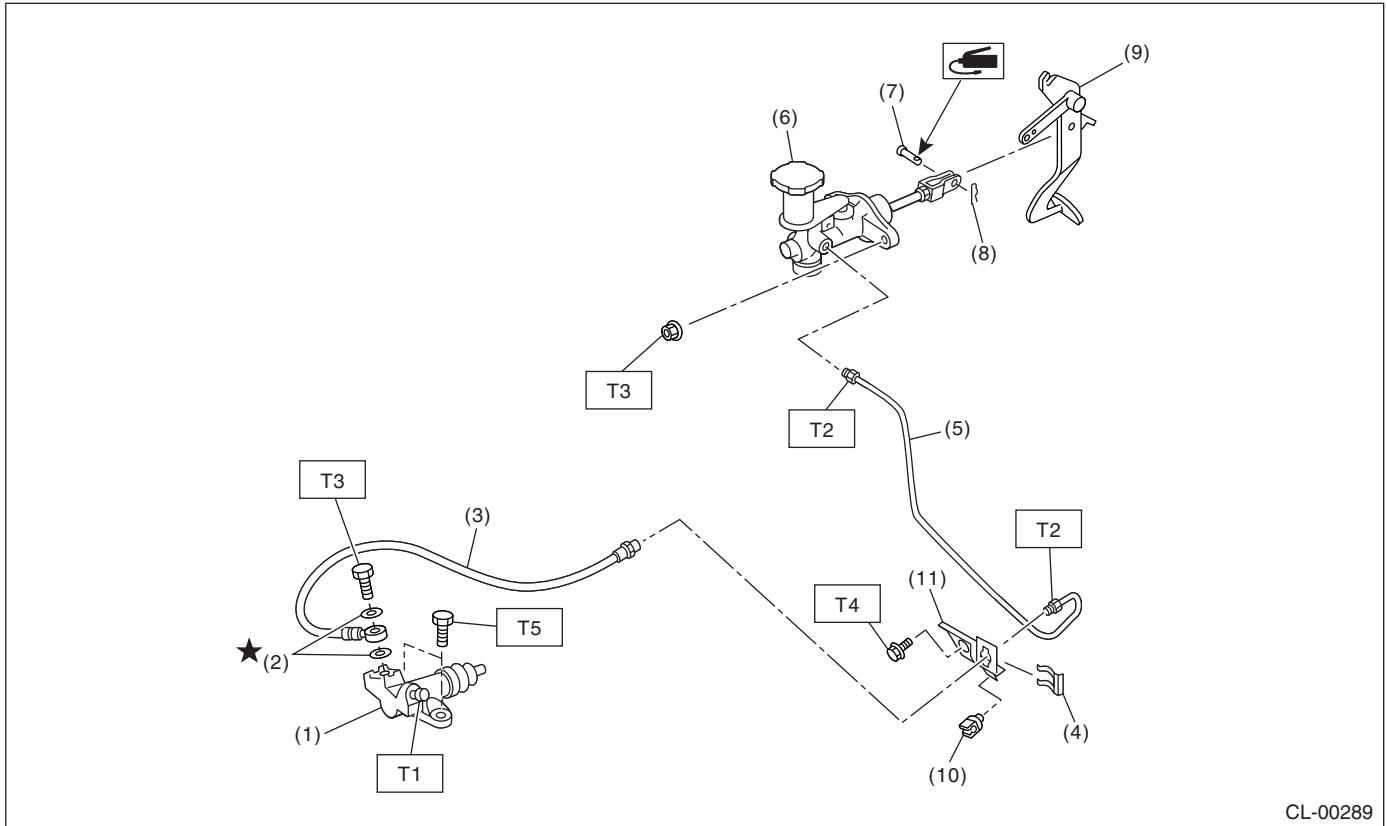
**T4: 37 (3.8, 27.5)**

**T5: 25 (2.5, 18.4)**

# General Description

## CLUTCH SYSTEM

- RHD model



CL-00289

- |                          |                |
|--------------------------|----------------|
| (1) Operating cylinder   | (7) Clevis pin |
| (2) Washer               | (8) Snap pin   |
| (3) Clutch hose          | (9) Pedal      |
| (4) Clamp                | (10) Clip      |
| (5) Clutch pipe          | (11) Bracket   |
| (6) Master cylinder ASSY |                |

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

**T1: 8 (0.8, 5.8)**

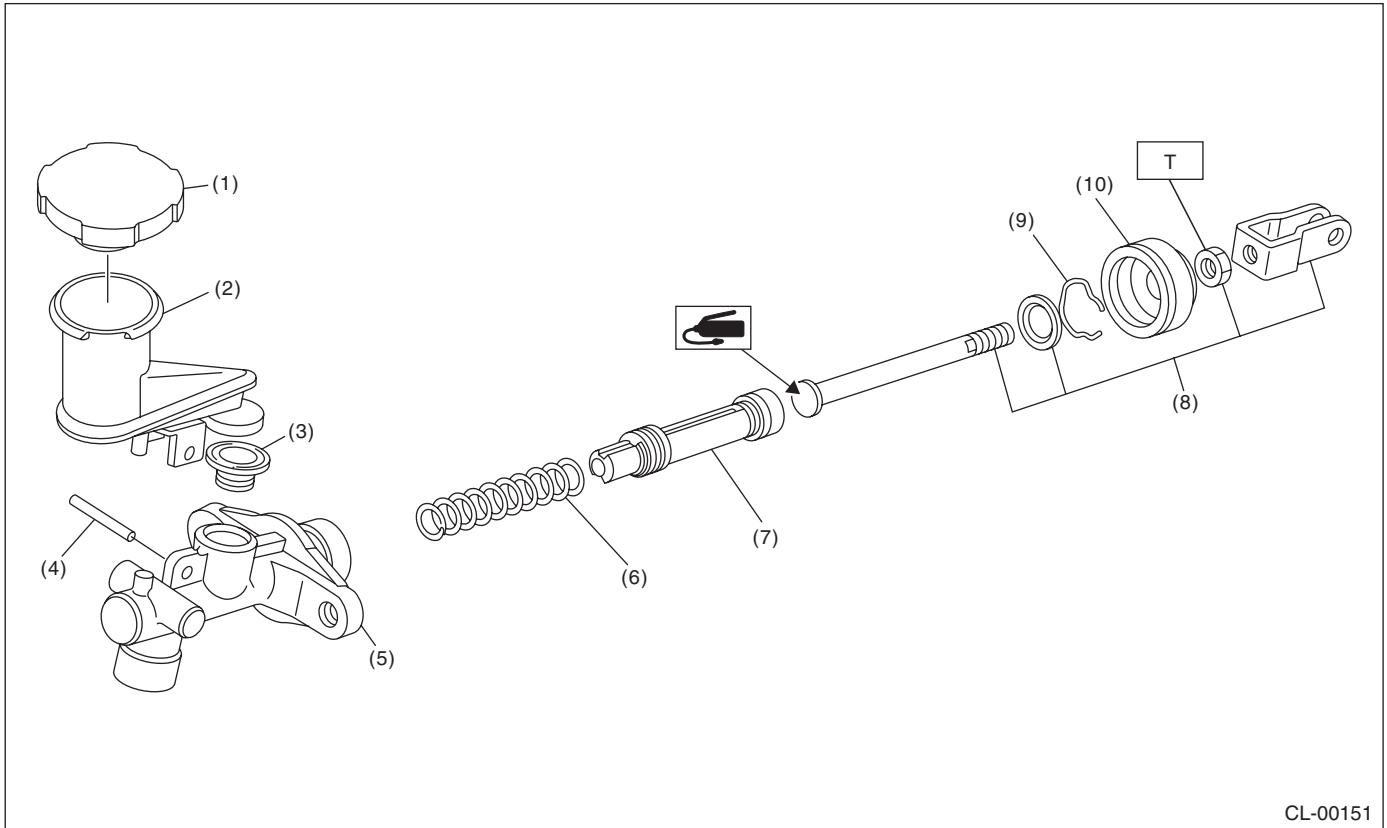
**T2: 15 (1.5, 10.8)**

**T3: 18 (1.8, 13.0)**

**T4: 25 (2.5, 18.4)**

**T5: 37 (3.8, 27.5)**

## 3. MASTER CYLINDER



CL-00151

- |                     |                      |
|---------------------|----------------------|
| (1) Reservoir cap   | (6) Return spring    |
| (2) Reservoir tank  | (7) Piston           |
| (3) Oil seal        | (8) Push rod ASSY    |
| (4) Straight pin    | (9) Piston stop ring |
| (5) Master cylinder | (10) Cylinder boot   |

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

**T: 10 (1.0, 7)**

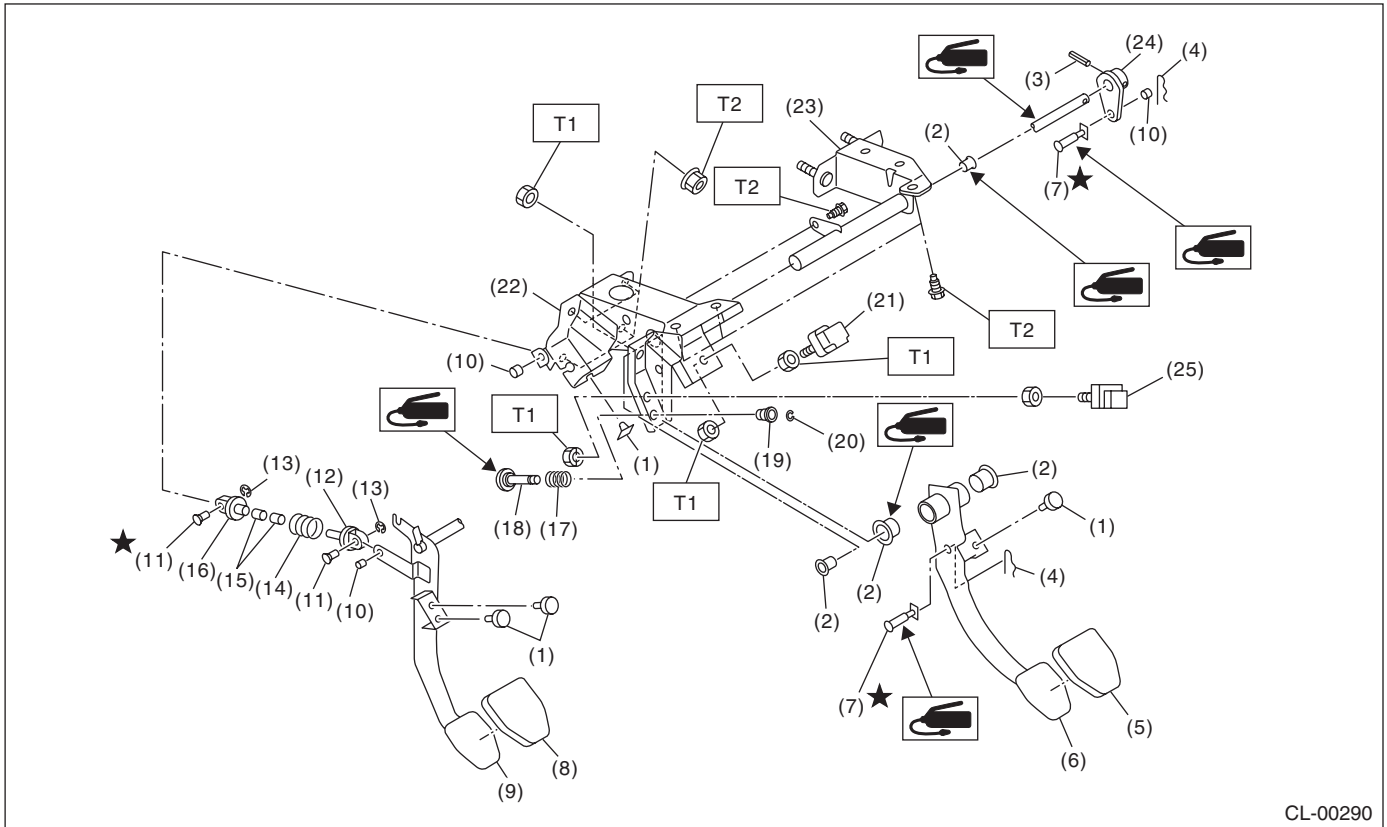


# General Description

## CLUTCH SYSTEM

### 4. CLUTCH PEDAL

- LHD model



CL-00290

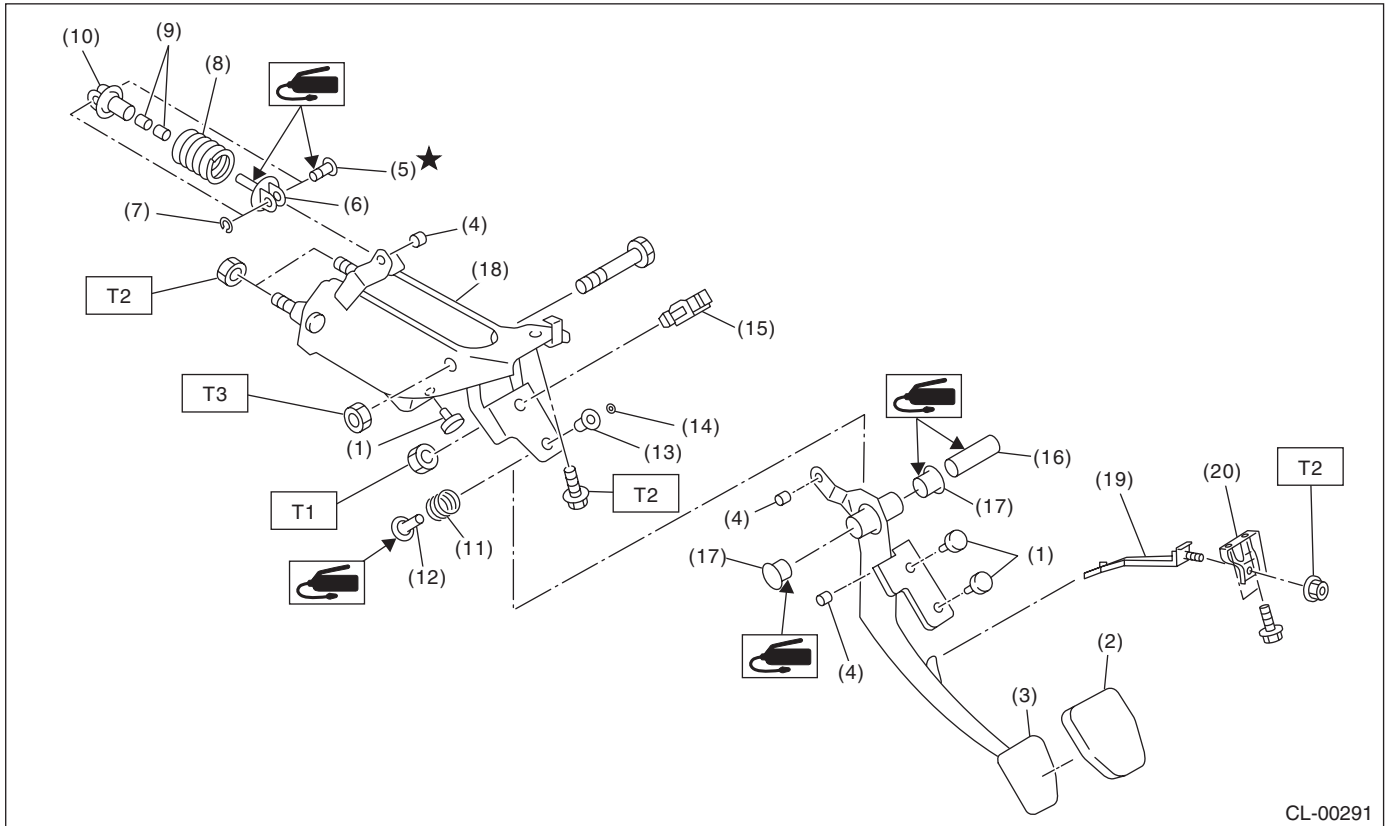
- |                      |                                     |                                     |
|----------------------|-------------------------------------|-------------------------------------|
| (1) Stopper          | (11) Clutch clevis pin              | (21) Stop light switch              |
| (2) Bushing          | (12) Assist rod A                   | (22) Pedal bracket                  |
| (3) Spring pin       | (13) Clip                           | (23) Clutch master cylinder bracket |
| (4) Snap pin         | (14) Assist spring                  | (24) Lever                          |
| (5) Brake pedal pad  | (15) Assist bushing                 | (25) Clutch switch                  |
| (6) Brake pedal      | (16) Assist rod B                   |                                     |
| (7) Clevis pin       | (17) Spring A (EC and 2.5 L model)  |                                     |
| (8) Clutch pedal pad | (18) Rod (EC and 2.5 L model)       |                                     |
| (9) Clutch pedal     | (19) Bushing B (EC and 2.5 L model) |                                     |
| (10) Bushing C       | (20) Clip (EC and 2.5 L model)      |                                     |

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

**T1: 8 (0.8, 5.8)**

**T2: 18 (1.8, 13.0)**

- RHD model



- |                       |                           |
|-----------------------|---------------------------|
| (1) Stopper           | (10) Assist rod B         |
| (2) Clutch pedal pad  | (11) Spring A             |
| (3) Clutch pedal      | (12) Rod S                |
| (4) Bushing C         | (13) Bushing B            |
| (5) Clutch clevis pin | (14) Clip                 |
| (6) Assist rod A      | (15) Clutch switch        |
| (7) Clip              | (16) Spacer               |
| (8) Assist spring     | (17) Bushing              |
| (9) Assist bushing    | (18) Clutch pedal bracket |

- |                                     |
|-------------------------------------|
| (19) Clutch pedal catcher           |
| (20) Bracket (Clutch pedal catcher) |

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

**T1: 8 (0.8, 5.8)**

**T2: 18 (1.8, 13.0)**

**T3: 30 (3.1, 22.4)**

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## General Description

### CLUTCH SYSTEM

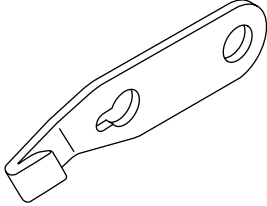
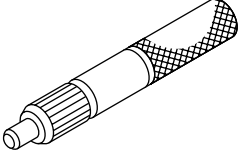
#### C: CAUTION

- Wear work clothing, including a cap, protective goggles and protective shoes during operation.
- 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.
- Be careful not to burn yourself, because each part on the vehicle is hot after running.
- Use SUBARU genuine fluid, grease etc. or equivalent. Do not mix fluid, grease, etc. with that of another grade or from other 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 revolution surfaces before installation.
- Before installing O-rings or snap rings, apply sufficient amount of fluid to avoid damage and deformation.
- Before securing a part on a vice, place cushioning material such as wood blocks, aluminum plate or cloth between the part and the vice.
- Keep fluid away from the vehicle body. If any fluid contacts the vehicle body, immediately flush the area with water.

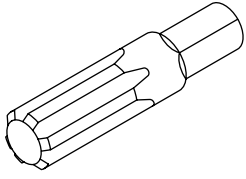
#### D: PREPARATION TOOL

##### 1. SPECIAL TOOL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-498497100	498497100	CRANKSHAFT STOPPER	Used for stopping rotation of flywheel when loosening/tightening bolt, etc.
 ST-499747100	499747100	CLUTCH DISC GUIDE	Used for installing clutch disc to flywheel.

# General Description

CLUTCH SYSTEM

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-499057000	499057000	TORX® PLUS	Used for removing flywheel (dual mass flywheel type).

## 2. GENERAL TOOL

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

# Clutch Disc and Cover

## CLUTCH SYSTEM

### 2. Clutch Disc and Cover

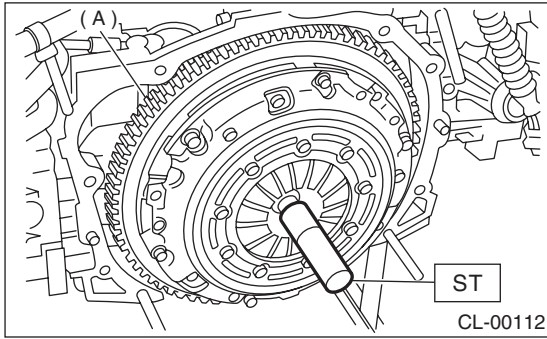
#### A: REMOVAL

##### 1. EC, EK AND KA MODEL

1) Remove the transmission assembly from vehicle. <Ref. to 5MT-31, REMOVAL, Manual Transmission Assembly.>

2) Insert the ST on flywheel.

ST 499747100 CLUTCH DISC GUIDE

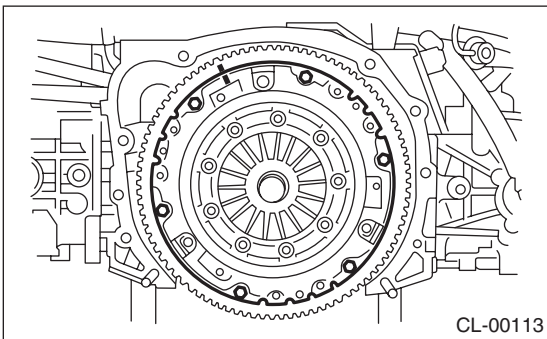


(A) Dual mass flywheel

3) Remove the clutch cover and clutch disc.

#### NOTE:

- Take care not to allow oil on the clutch disc surface.
- Do not disassemble the clutch cover or clutch disc.
- Be sure to mark alignment marks on the flywheel and clutch cover before removing the clutch cover.

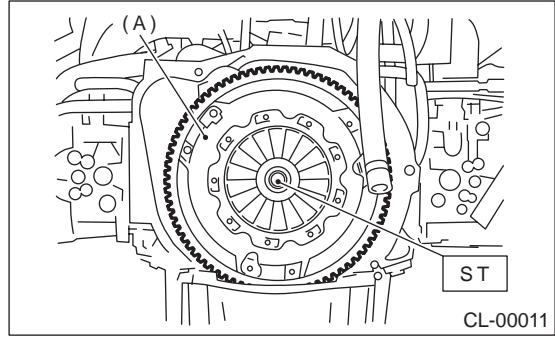


##### 2. KS AND K4 MODEL

1) Remove the transmission assembly from vehicle body. <Ref. to 5MT-33, INSTALLATION, Manual Transmission Assembly.>

2) Install the ST on flywheel.

ST 499747100 CRANKSHAFT STOPPER



(A) Clutch cover

3) Remove the clutch cover and clutch disc.

#### NOTE:

- Take care not to allow oil on the clutch disc facing.
- Do not disassemble the clutch cover or clutch disc.

#### B: INSTALLATION

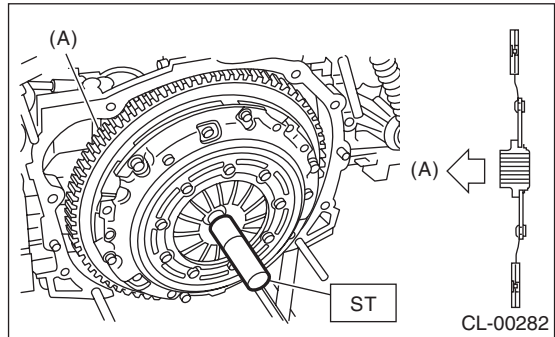
##### 1. EC, EK AND KA MODEL

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

#### NOTE:

When installing the clutch disc, be careful of its direction.

ST 499747100 CLUTCH DISC GUIDE



(A) Flywheel side

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

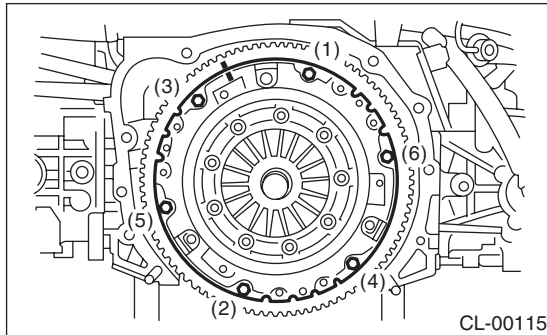
#### NOTE:

- When reinstalling, align the alignment marks.
- When installing a new clutch cover and flywheel, position the clutch cover in order to make the gap between "0" marks of flywheel and clutch cover 120° or more.
- Note the front and rear of the clutch disc when installing.

- Tighten the clutch cover installing bolts gradually. 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)**



3) Remove the ST.

ST 499747100 CLUTCH DISC GUIDE

4) Install the transmission assembly. <Ref. to 5MT-33, INSTALLATION, Manual Transmission Assembly.>

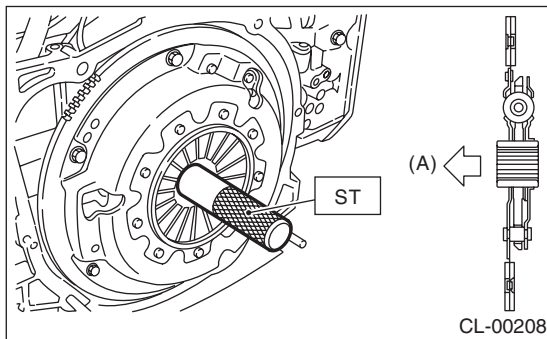
## 2. KS AND K4 MODEL

1) Insert the ST into clutch disc and install them on the flywheel by inserting the ST end into pilot bearing.

**NOTE:**

When installing the clutch disc, be careful to its direction.

ST 499747100 CLUTCH DISC GUIDE



(A) Flywheel side

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

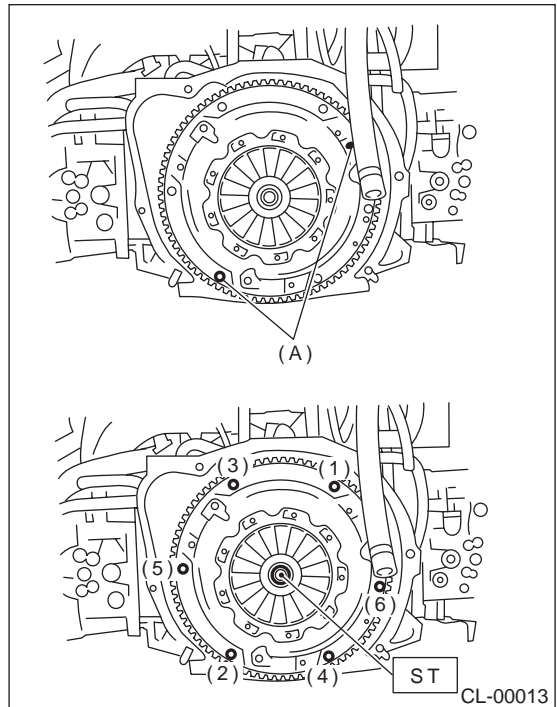
**NOTE:**

- When installing the clutch cover on flywheel, position the clutch cover so that there is a gap of 120° or more between "0" marks on the flywheel and clutch cover. ("0" marks indicate the directions 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) "0" marks

3) Remove the ST.

ST 499747100 CLUTCH DISC GUIDE

4) Install the transmission assembly. <Ref. to 5MT-33, INSTALLATION, Manual Transmission Assembly.>

## C: INSPECTION

### 1. CLUTCH DISC

1) Facing wear:

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

**Depth of rivet head:**

**Limit of sinking**

**0.3 mm (0.012 in)**

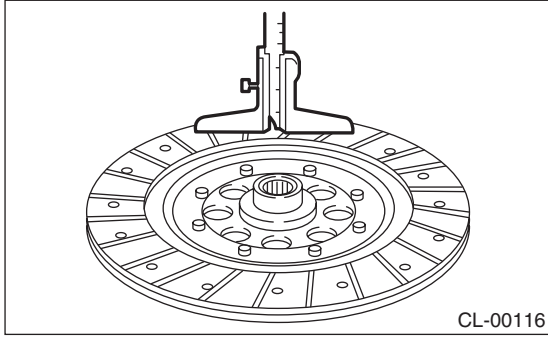
**NOTE:**

Do not wash the clutch disc with any cleaning fluid.

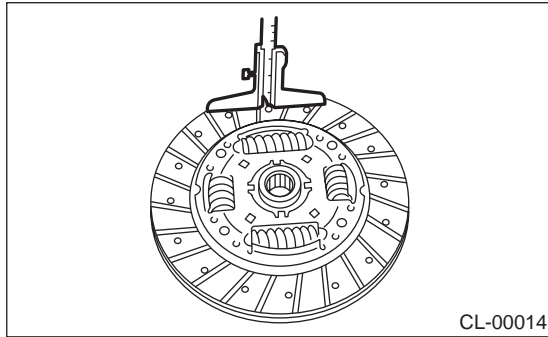
# Clutch Disc and Cover

## CLUTCH SYSTEM

- EC, EK and KA model



- KS and K4 model



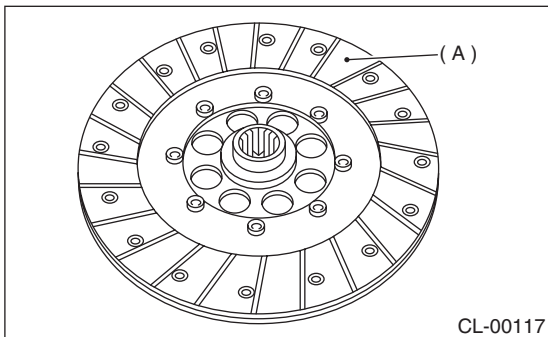
2) Hardened facing:

Replace the clutch disc.

3) Oil leakage on facing:

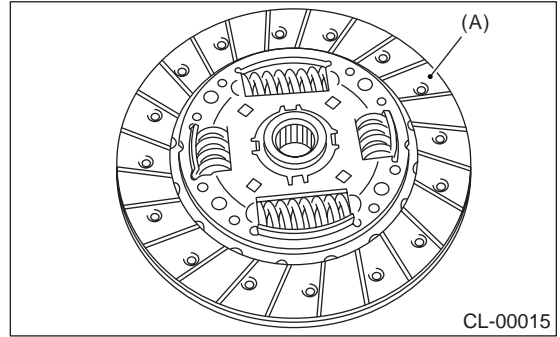
Replace the clutch disc and inspect the transmission front oil seal, transmission case mating surface, engine rear oil seal and other points for oil leakage.

- EC, EK and KA model



(A) Clutch facing

- KS and K4 model



(A) Clutch facing

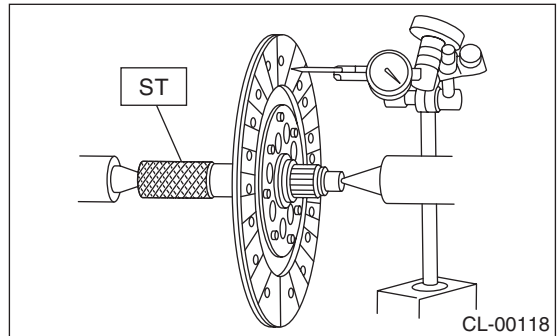
4) Deflection on facing:

If deflection exceeds the specified value at the outer circumference of facing, replace the clutch disc.  
ST 499747100 CLUTCH DISC GUIDE

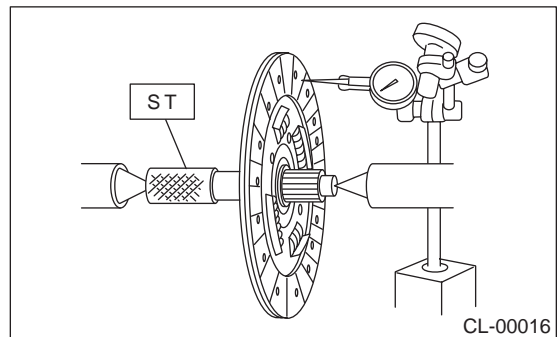
**Limit for deflection:**

**1.0 mm (0.039 in) at R = 110 mm (4.33 in)**

- EC, EK and KA model

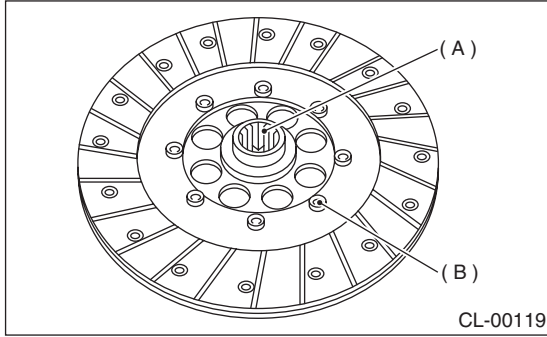


- KS and K4 model



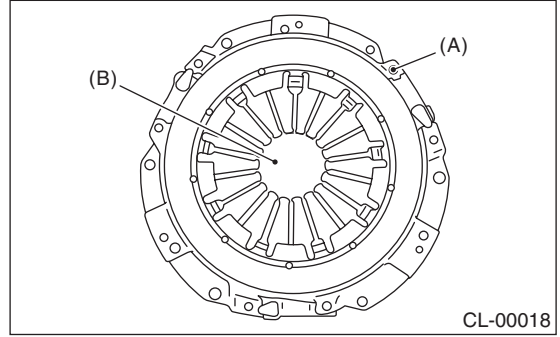
5) If the spline wears, rivets loosen and damper spring is failure, replace the clutch disc.

- EC, EK and KA model



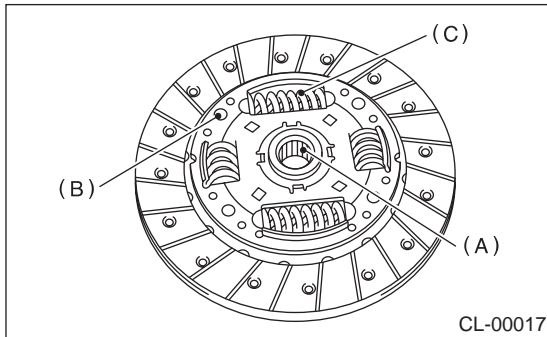
- (A) Spline
- (B) Rivet

- KS and K4 model



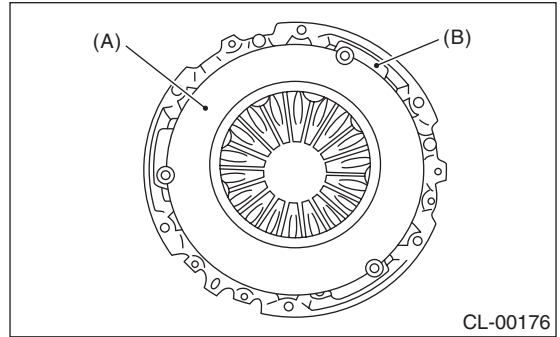
- (A) Thrust rivet
- (B) Diaphragm spring

- KS and K4 model



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

- 3) Damaged or worn disc contact surface of pressure plate
  - 4) Loose strap plate installation area
  - 5) Worn diaphragm sliding area
- EC, EK and KA model



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

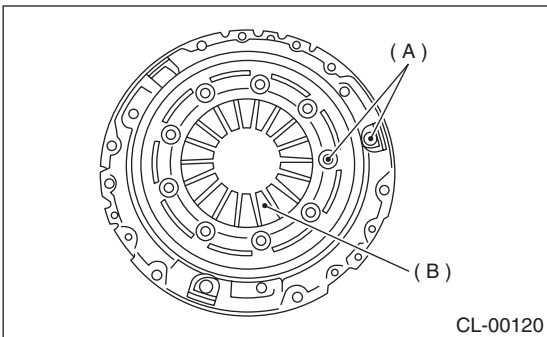
## 2. CLUTCH COVER

**NOTE:**

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

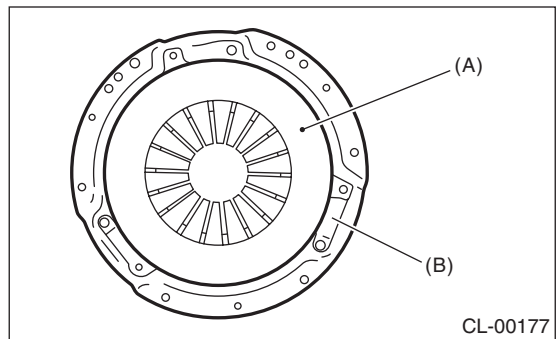
- 1) Loose thrust rivet
- 2) Damaged or worn bearing contact area at the center of diaphragm spring

- EC, EK and KA model



- (A) Thrust rivet
- (B) Diaphragm spring

- KS and K4 model



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



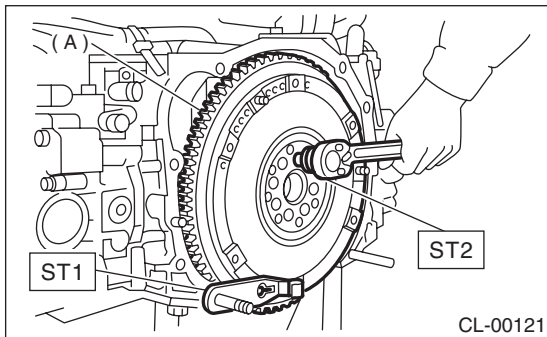
## 3. Flywheel

### A: REMOVAL

#### 1. EC, EK AND KA MODEL

- 1) Remove the transmission assembly. <Ref. to 5MT-31, REMOVAL, Manual Transmission Assembly.>
- 2) Remove the clutch cover and clutch disc. <Ref. to CL-12, REMOVAL, Clutch Disc and Cover.>
- 3) Using ST1 and ST2, remove the flywheel.

ST1 498497100 CRANKSHAFT STOPPER  
ST2 499057000 TORX® PLUS

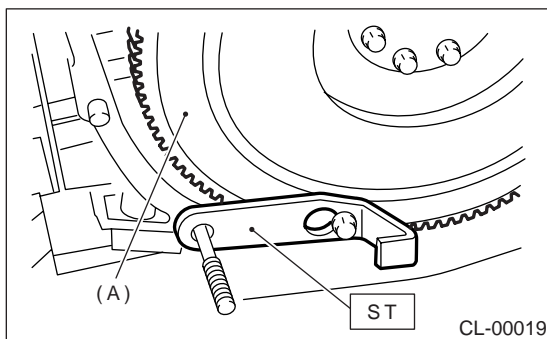


(A) Flywheel

#### 2. KS AND K4 MODEL

- 1) Remove the transmission assembly. <Ref. to 5MT-31, REMOVAL, Manual Transmission Assembly.>
- 2) Remove the clutch cover and clutch disc. <Ref. to CL-12, REMOVAL, Clutch Disc and Cover.>
- 3) Using the ST, remove the flywheel.

ST 498497100 CRANKSHAFT STOPPER



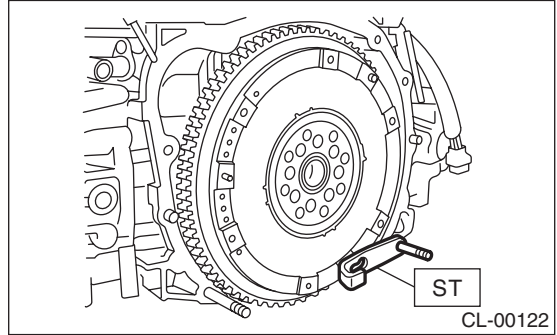
(A) Flywheel

### B: INSTALLATION

#### 1. EC, EK AND KA MODEL

- 1) Set the flywheel and ST.

ST 498497100 CRANKSHAFT STOPPER



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

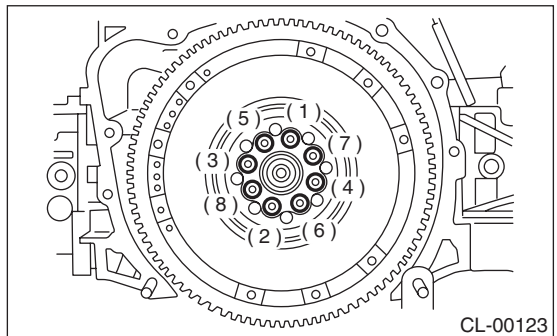
ST 499057000 TORX® PLUS

#### NOTE:

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

#### Tightening torque:

**72 N·m (7.3 kgf-m, 52.8 ft-lb)**



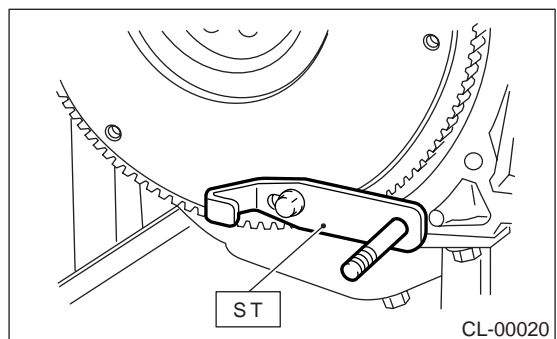
- 3) Install the clutch disc and cover. <Ref. to CL-12, INSTALLATION, Clutch Disc and Cover.>

- 4) Install the transmission assembly. <Ref. to 5MT-33, INSTALLATION, Manual Transmission Assembly.>

#### 2. KS AND K4 MODEL

- 1) Install the flywheel and ST.

ST 498497100 CRANKSHAFT STOPPER



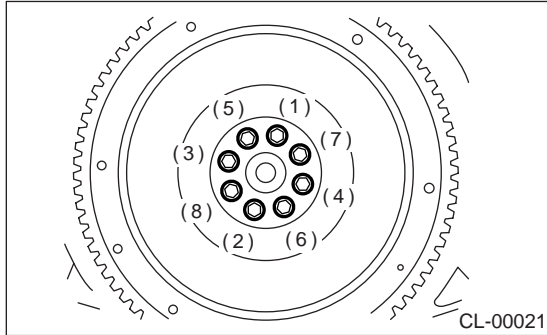
- 2) Tighten the flywheel attaching bolts to specified torque.

**NOTE:**

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

**Tightening torque:**

**72 N·m (7.3 kgf·m, 52.8 ft·lb)**



3) Install the clutch disc and cover. <Ref. to **CL-13, KS AND K4 MODEL, INSTALLATION, Clutch Disc and Cover.**>

4) Install the transmission assembly. <Ref. to 5MT-33, INSTALLATION, Manual Transmission Assembly.>

### C: INSPECTION

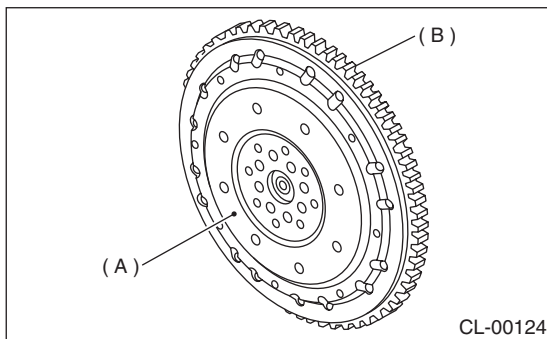
**CAUTION:**

**Since this bearing is grease-sealed and non-lubrication type, do not wash it with gasoline or any solvent.**

1) Damage on sliding surface of facing and ring gear:

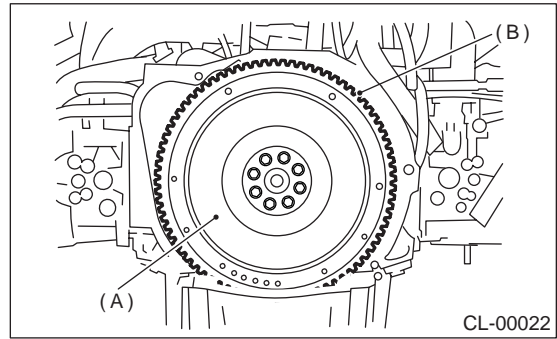
If defective, replace the flywheel.

- EC, EK and KA model



(A) Flywheel  
(B) Ring gear

- KS and K4 model



(A) Flywheel  
(B) Ring gear

2) Smoothness of rotation

Rotate the ball bearing while applying pressure in 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 vehicle body.

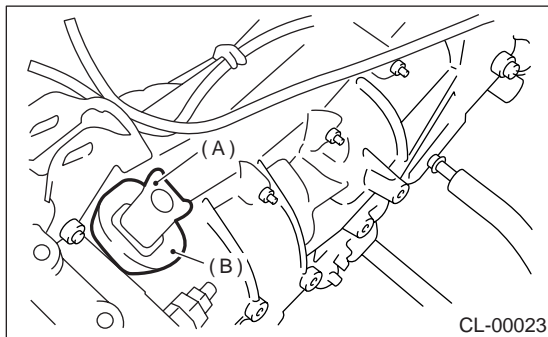
<Ref. to 5MT-31, REMOVAL, Manual Transmission Assembly.>

2) Remove the two clips from clutch release lever and remove the release bearing.

#### CAUTION:

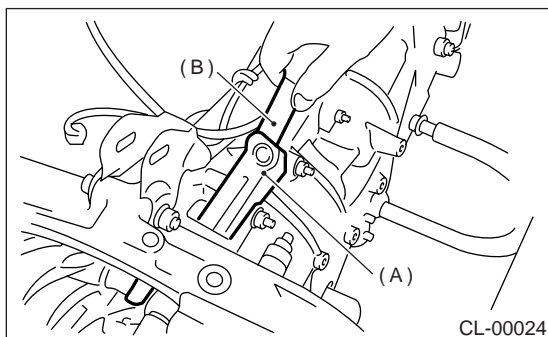
**Be careful not to deform the clips.**

3) Remove the dust cover.



(A) Clutch release lever  
(B) Dust cover

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



(A) Clutch release lever  
(B) Screwdriver

#### B: INSTALLATION

##### NOTE:

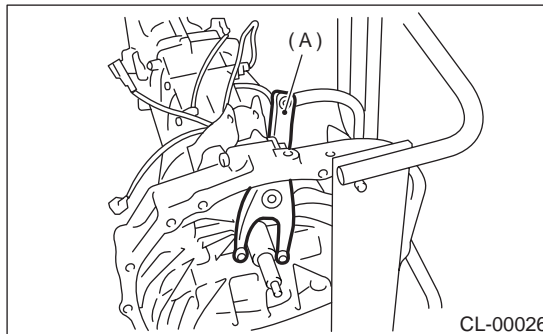
Before or during installation, lubricate the following points with a light coat of grease.

- Contact surface of lever and pivot
- Contact surface of lever and bearing
- Transmission main shaft spline (Use grease containing molybdenum disulphide.)

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

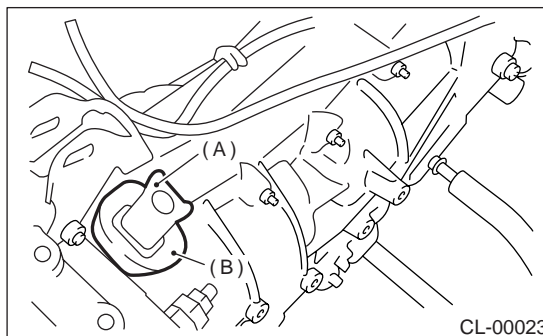
##### NOTE:

- Apply grease (SUNLIGHT 2: Part No. 003602010) to the contact point of release lever and operating cylinder.
- Observing from main case hole, check that the lever spring is installed securely.



(A) Release lever

- 2) Place the release bearing and fasten it with two clips.
- 3) Install the dust cover.



(A) Release lever  
(B) Dust cover

4) Check smooth movement of bearing with operating release lever.

5) Install the transmission assembly.

<Ref. to 5MT-33, INSTALLATION, Manual Transmission Assembly.>

#### C: INSPECTION

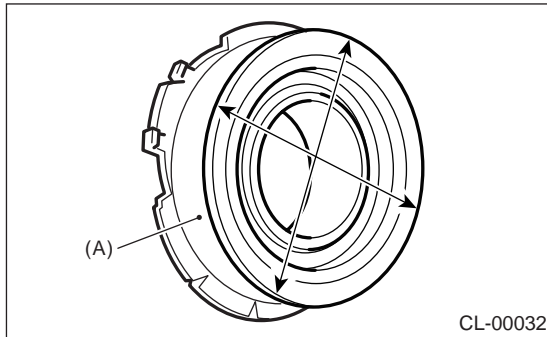
##### 1. RELEASE BEARING

##### NOTE:

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

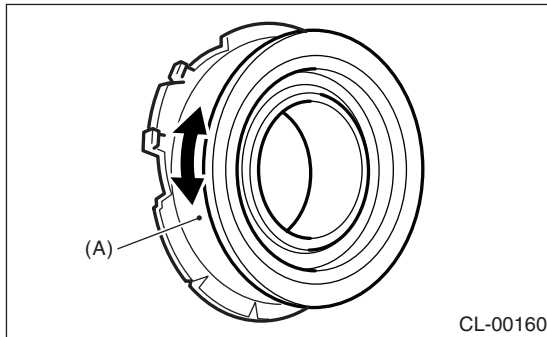
1) Check the bearing for smooth movement by applying force to the bearing in radial direction.

**Radial direction stroke:**  
**1.6 mm (0.063 in)**



(A) Bearing case

2) Check the bearing for smooth rotation by applying force to the bearing in thrust direction.

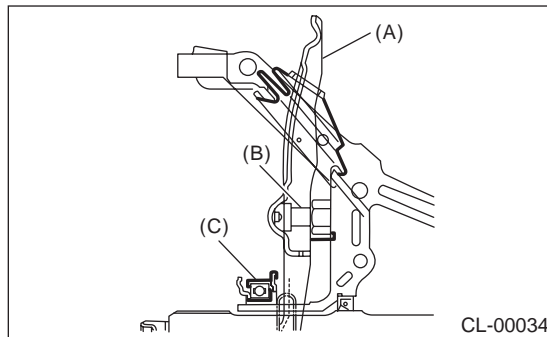


(A) Bearing case

3) Check wear and damage of bearing case surface contacting with lever.

## 2. RELEASE LEVER

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



- (A) Clutch release lever
- (B) Pivot
- (C) Clutch release bearing

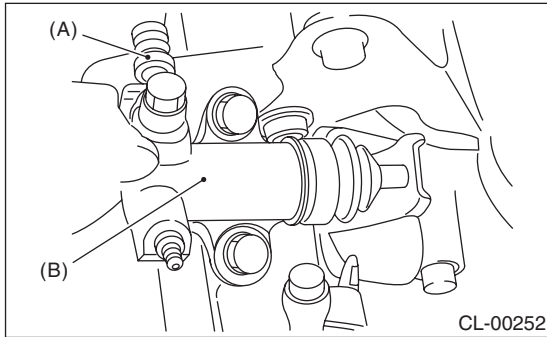
## 5. Operating Cylinder

### A: REMOVAL

- 1) Remove the air intake chamber. <Ref. to IN(H4SO 2.0)-8, REMOVAL, Air Intake Chamber.>
- 2) Disconnect the clutch hose from operating cylinder.

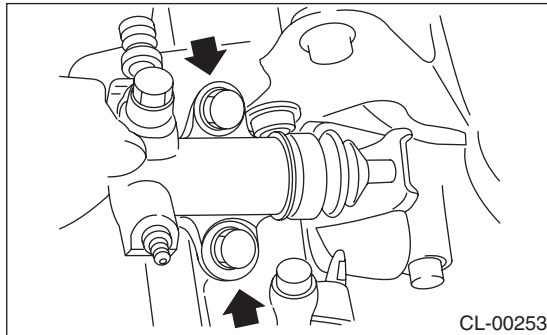
**CAUTION:**

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



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

- 3) Remove the operating cylinder from transmission.



### B: INSTALLATION

- 1) Install in the reverse order of removal.

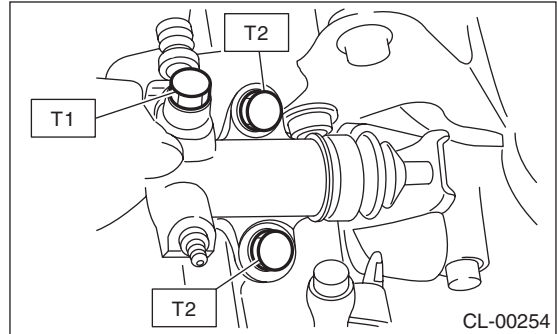
**NOTE:**

Before installing the operating cylinder, apply grease (SUNLIGHT 2: Part No. 003602010) to the contact point of the release lever and operating cylinder.

**Tightening torque:**

**T1: 18 N·m (1.8 kgf-m, 13.0 ft-lb)**

**T2: 37 N·m (3.8 kgf-m, 27.5 ft-lb)**



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

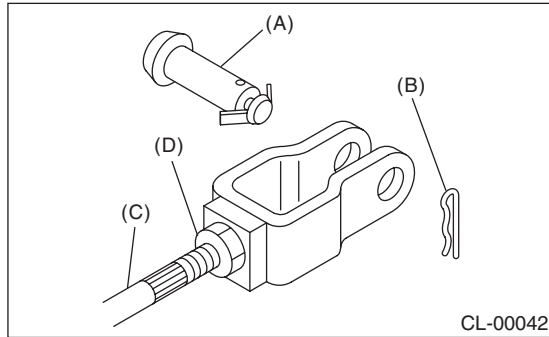
### C: INSPECTION

- 1) Check the operating cylinder for damage. If operating cylinder is damaged, replace it.
- 2) Check the operating cylinder for fluid leakage or damage on boot. If any leakage or damage is found, replace the operating cylinder.

## 6. Master Cylinder

### A: REMOVAL

- 1) Thoroughly drain the brake fluid from reservoir tank.
- 2) Remove the snap pin and clevis pin, and then separate the push rod of master cylinder from clutch pedal.

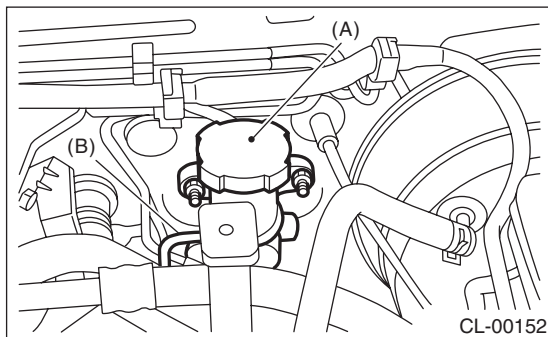


- (A) Clevis pin
- (B) Snap pin
- (C) Push rod
- (D) Lock nut

- 3) Remove the air intake chamber. <Ref. to IN(H4SO 2.0)-8, REMOVAL, Air Intake Chamber.>
- 4) Disconnect the clutch pipes from master cylinder.
- 5) Remove the master cylinder and reservoir tank as a unit.

### CAUTION:

**Be careful not to spill the brake fluid. Brake fluid spilt on the vehicle body will harm the paint surface; wipe it off quickly if spilt.**



- (A) Master cylinder ASSY
- (B) Clutch pipe

### B: INSTALLATION

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

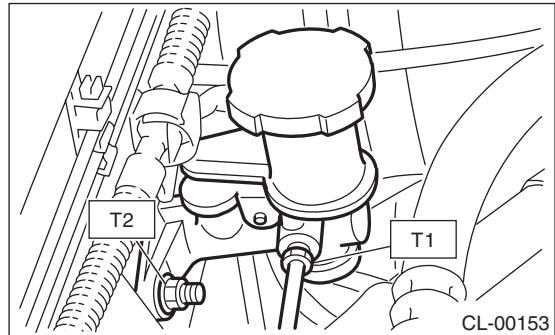
### NOTE:

Check that the pipe is routed properly.

### Tightening torque:

**T1: 15 N·m (1.5 kgf·m, 10.8 ft-lb)**

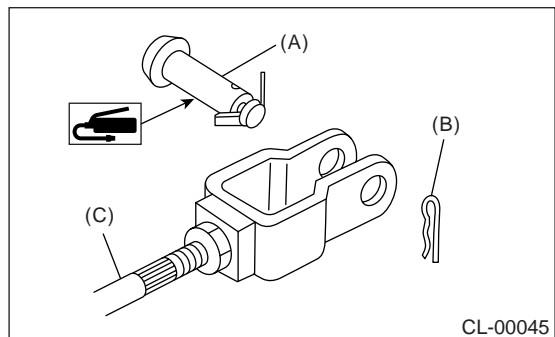
**T2: 18 N·m (1.8 kgf·m, 13.0 ft-lb)**



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

### NOTE:

Apply grease to the clevis pin.



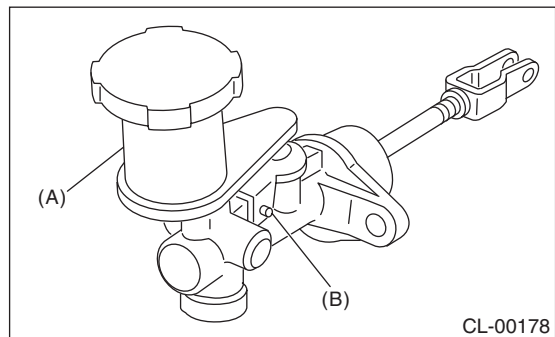
- (A) Clevis pin
- (B) Snap pin
- (C) Push rod

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

- 4) Install the air intake chamber. <Ref. to IN(H4SO 2.0)-8, INSTALLATION, Air Intake Chamber.>

### C: DISASSEMBLY

- 1) Remove the straight pin and reservoir tank.

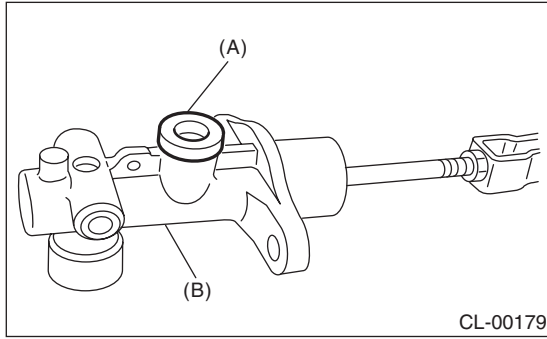


- (A) Reservoir tank
- (B) Straight pin

# Master Cylinder

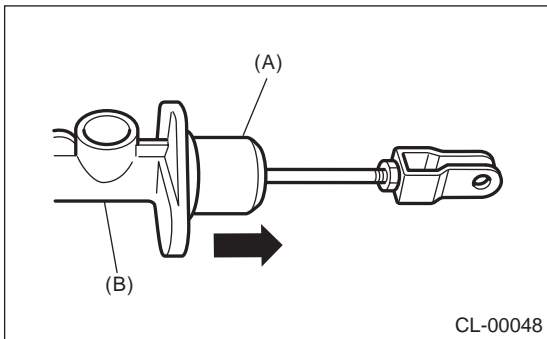
## CLUTCH SYSTEM

2) Remove the oil seal.



- (A) Oil seal
- (B) Master cylinder

3) Pull the cylinder boot backward.



- (A) Cylinder boot
- (B) Master cylinder

4) Remove the snap ring.

### CAUTION:

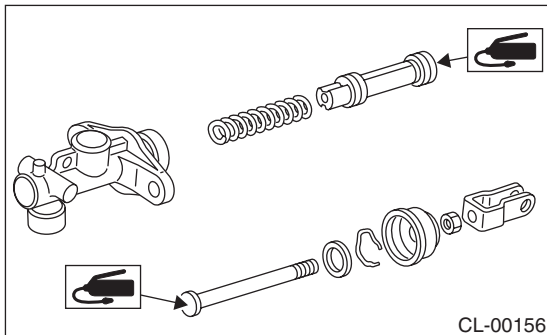
Be careful to prevent the rod, washer, piston and return spring from flying out when removing the snap ring.

### D: ASSEMBLY

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

#### Grease:

**SILICONE GREASE G40M (Part No. 004404003)**



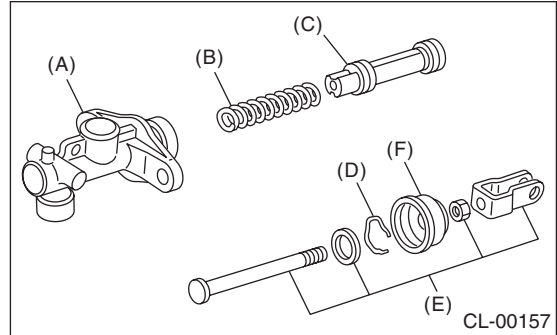
2) Assemble in the reverse order of disassembly.

### Tightening torque:

**10 N·m (1.0 kgf-m, 7 ft-lb)**

### E: INSPECTION

If any damage, deformation, wear, swelling, rust or other faults are found on the cylinder, piston, push rod, fluid reservoir, return spring, gasket, clutch damper cylinder boot or hose, replace the faulty part.

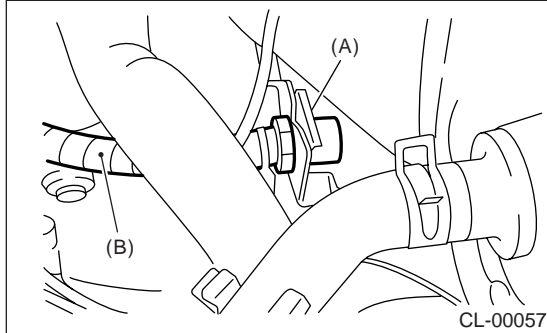


- (A) Master cylinder body
- (B) Return spring
- (C) Piston
- (D) Stop ring
- (E) Push rod ASSY
- (F) Cylinder boot

## 7. Clutch Pipe and Hose

### A: REMOVAL

- 1) Remove the air intake chamber. <Ref. to IN(H4SO 2.0)-8, REMOVAL, Air Intake Chamber.>
- 2) Drain the clutch fluid. <Ref. to CL-24, Clutch Fluid.>
- 3) Disconnect the clutch pipe from the clutch hose and master cylinder.
- 4) Pull out the clamp, then remove the clutch hose from bracket.



- (A) Clamp
- (B) Clutch hose

- 5) Disconnect the hose from operating cylinder.
- 6) Remove the bracket.

### B: INSTALLATION

Install in the reverse order of removal.

#### NOTE:

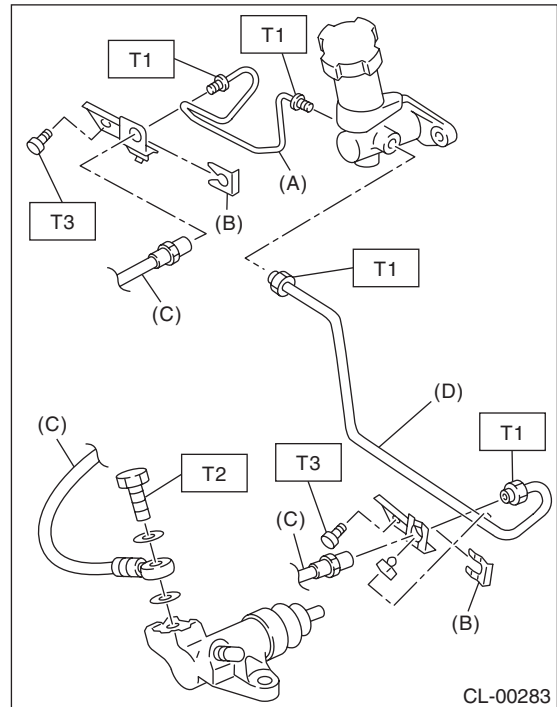
Bleed the air of clutch fluid. <Ref. to CL-25, Clutch Fluid Air Bleeding.>

#### Tightening torque:

**T1: 15 N·m (1.5 kgf-m, 10.8 ft-lb)**

**T2: 18 N·m (1.8 kgf-m, 13.0 ft-lb)**

**T3: 25 N·m (2.5 kgf-m, 18.4 ft-lb)**



- (A) Clutch pipe (LHD model)
- (B) Clip
- (C) Clutch hose
- (D) Clutch pipe (RHD model)

### C: INSPECTION

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



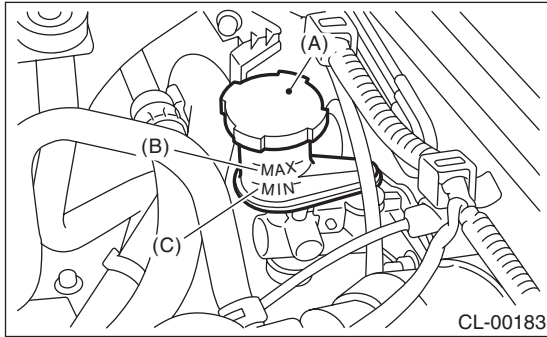
### 8. Clutch Fluid

#### A: INSPECTION

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

#### NOTE:

Refill the brake fluid before reservoir tank becomes empty.



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

#### B: REPLACEMENT

##### CAUTION:

- The FMVSS No. 116, fresh DOT3 or 4 brake fluid must be used.
- When loosening bleeder screw, cover the bleeder with cloth to prevent brake fluid from being splashed over surrounding parts.
- Avoid mixing different brands of brake fluid to prevent the quality of fluid from degrading.
- Be careful not to allow dirt or dust to get into the reservoir tank.

##### NOTE:

- During bleeding operation, keep the clutch reservoir tank filled with brake fluid to eliminate the entry of air.
- Clutch pedal operating must be very slow.
- For convenience and safety, it is advisable to have two people working.
- The amount of brake fluid required is approx. 70 ml (2.4 US fl oz, 2.5 Imp fl oz) for total clutch system.

- 1) Remove the air intake chamber. <Ref. to IN(H4SO 2.0)-8, REMOVAL, Air Intake Chamber.>
- 2) Drain the brake fluid from reservoir tank.
- 3) Refill the reservoir tank with recommended brake fluid.

##### **Recommended brake fluid:**

**FMVSS No. 116, fresh DOT3 or 4 brake fluid**

- 4) Drain all contaminated fluid in the same method as air bleeding.

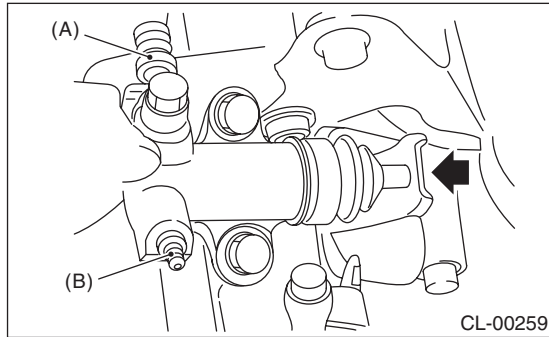
## 9. Clutch Fluid Air Bleeding

### A: PROCEDURE

**NOTE:**

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

- 1) Remove the air intake chamber. <Ref. to IN(H4SO 2.0)-8, REMOVAL, Air Intake Chamber.>
- 2) Fit one end of a vinyl tube into the air bleeder of operating cylinder and put the other end into a brake fluid container.

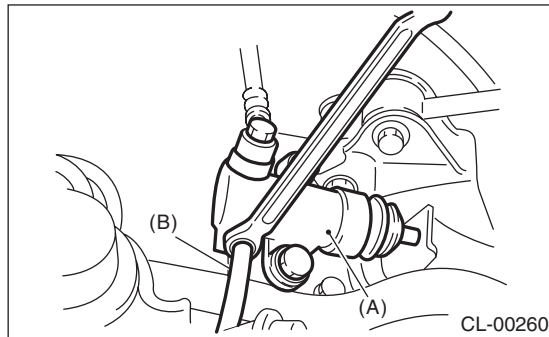


- (A) Clutch hose
- (B) Air bleeder

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

**CAUTION:**

**When loosening bleeder screw, cover the bleeder with cloth to prevent brake fluid from being splashed over surrounding parts.**

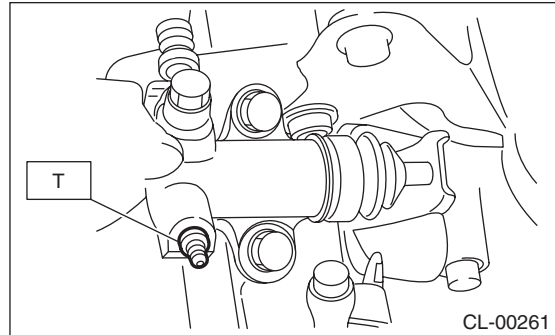


- (A) Operating cylinder
- (B) Vinyl tube

- 4) Repeat the procedure 3), until there are no more air bubbles in the vinyl tube.
- 5) Tighten the air bleeder.

**Tightening torque:**

**T: 8 N·m (0.8 kgf·m, 5.8 ft·lb)**



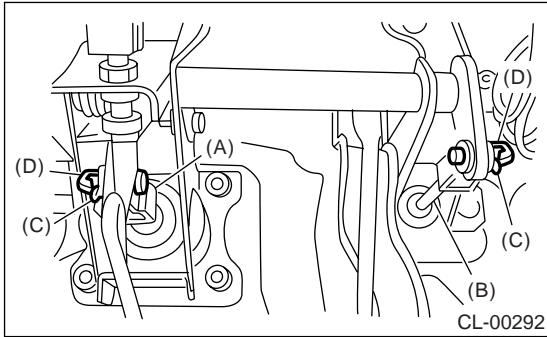
- 6) After depressing the clutch pedal, make sure that there are no leaks evident in the entire clutch system.
- 7) After bleeding air from the clutch system, ensure that clutch operates properly.

## 10. Clutch Pedal

### A: REMOVAL

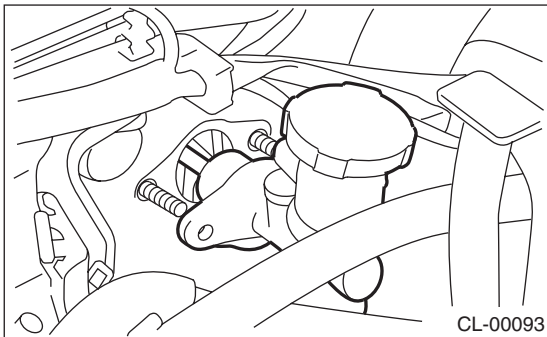
#### 1. LHD MODEL

- 1) Disconnect the ground cable from battery.
- 2) Remove the steering column. <Ref. to PS-23, REMOVAL, Tilt Steering Column.>
- 3) Disconnect the connectors from the stop light and clutch switches.
- 4) Remove the snap pins which secure lever to push rod and operating rod.
- 5) Remove the clevis pins which secure lever to push rod and operating rod.



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

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

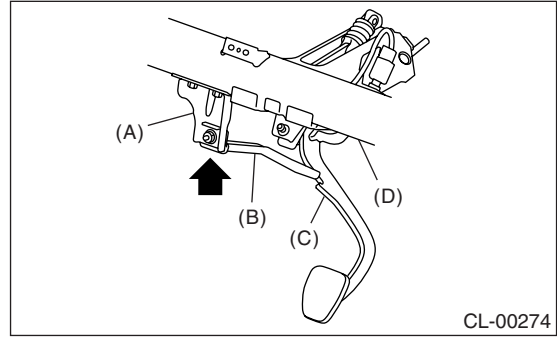


- 7) Remove the bolts and nuts which secure brake pedal and clutch pedal, and remove the pedal assembly.

#### 2. RHD MODEL

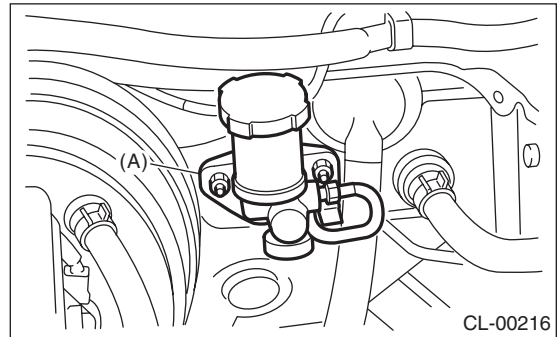
- 1) Disconnect the ground cable from battery.
- 2) Remove the instrument panel lower cover.

- 3) Remove the clutch pedal catcher from bracket (clutch pedal catcher).



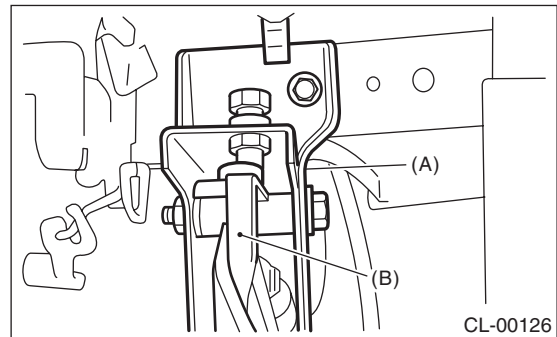
- (A) Bracket (Clutch pedal catcher)
- (B) Clutch pedal catcher
- (C) Clutch pedal
- (D) Steering support beam

- 4) Remove the clutch switch connector from clutch pedal.
- 5) Remove the snap pin and clevis pin which join the push rod and clutch pedal.
- 6) Remove the master cylinder mounting nuts.



- (A) Master cylinder

- 7) Remove the clutch pedal and bracket as a unit.



- (A) Clutch pedal bracket
- (B) Clutch pedal

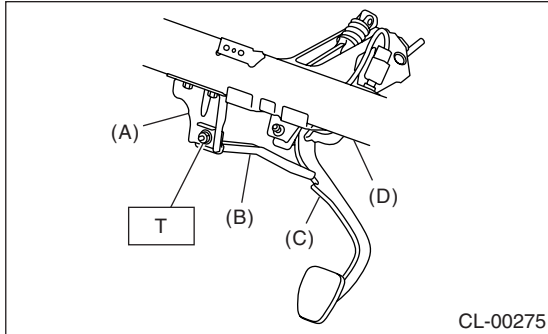
## B: INSTALLATION

1) Install in the reverse order of removal.

### Tightening torque:

**T: 18 N·m (1.8 kgf-m, 13.0 ft-lb)**

- Clutch pedal catcher



- (A) Bracket (Clutch pedal catcher)
- (B) Clutch pedal catcher
- (C) Clutch pedal
- (D) Steering support beam

### CAUTION:

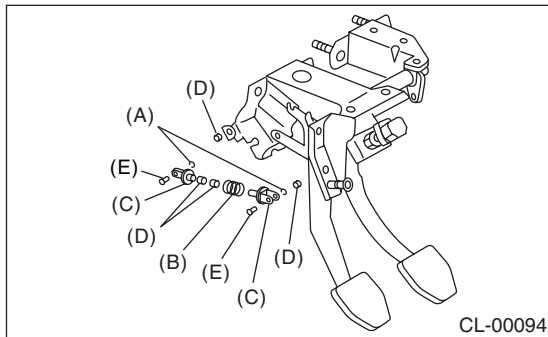
**Always use a new clevis pin.**

2) Adjust the clutch pedal after installation. <Ref. to CL-29, ADJUSTMENT, Clutch Pedal.>

## C: DISASSEMBLY

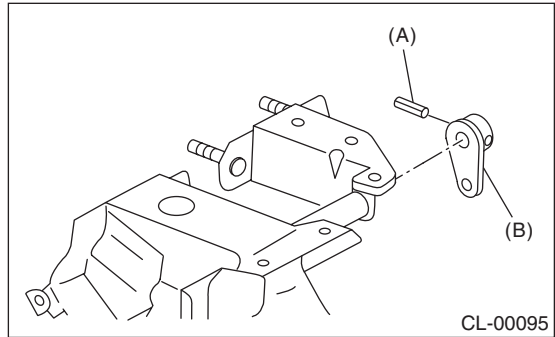
### 1. LHD MODEL

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



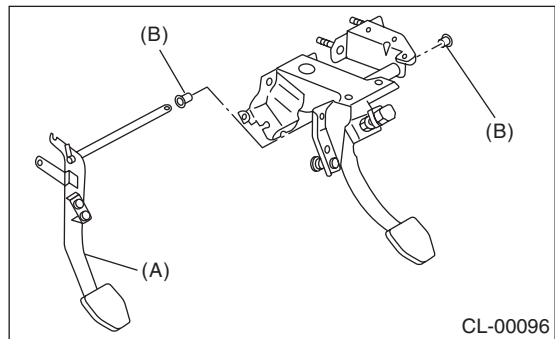
- (A) Clip
- (B) Assist spring
- (C) Assist rod
- (D) Bushing
- (E) Clevis pin

3) Remove the spring pin and lever.



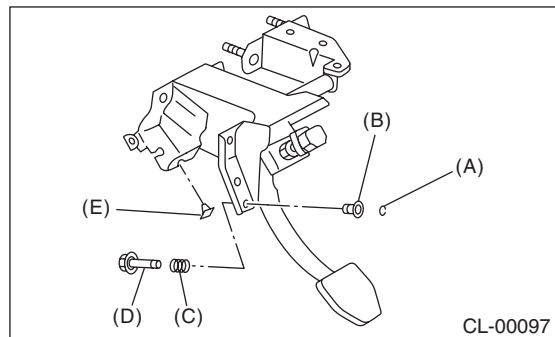
- (A) Pin
- (B) Lever

4) Remove the clutch pedal and bushings.



- (A) Clutch pedal
- (B) Bushing

5) Remove the stopper, clip and rod S, and then remove the spring and bushing S.



- (A) Clip
- (B) Bushing S
- (C) Spring S
- (D) Rod S
- (E) Stopper

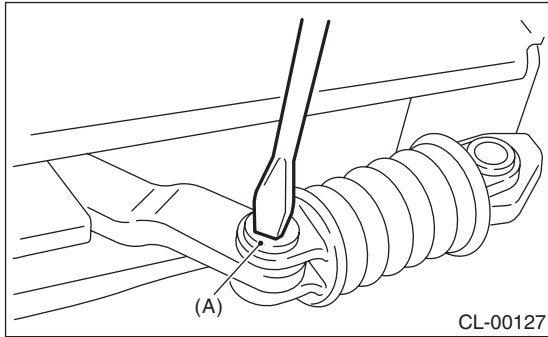
- 6) Remove the stoppers from clutch pedal.
- 7) Remove the clutch pedal pad.

# Clutch Pedal

## CLUTCH SYSTEM

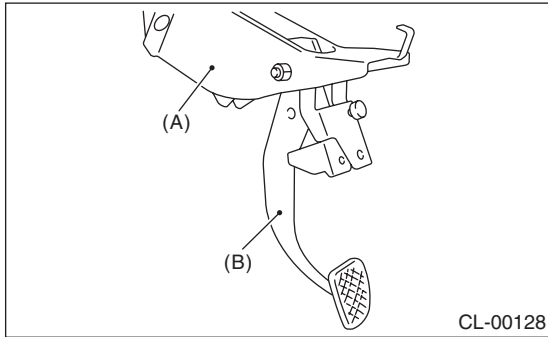
### 2. RHD MODEL

- 1) Remove the clutch switch.
- 2) Remove the clip, and then pull out the clevis pin.



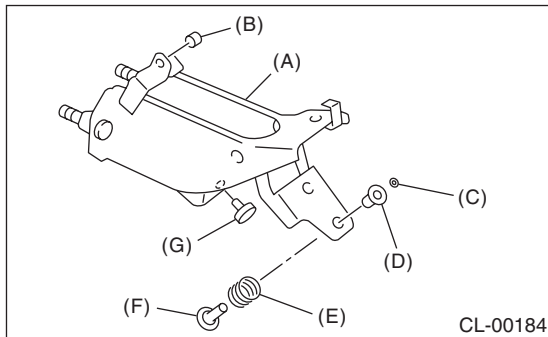
(A) Clevis pin

- 3) Remove the assist rod, spring and bushing.
- 4) Remove the clutch pedal from clutch pedal bracket.



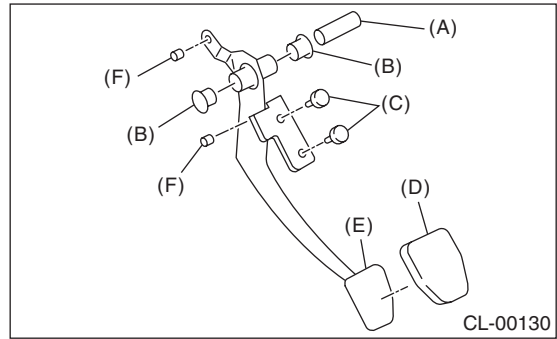
(A) Clutch pedal bracket  
(B) Clutch pedal

- 5) Remove the following parts (B to G) from clutch pedal bracket (A) as shown in the figure.



(A) Clutch pedal bracket  
(B) Bushing C  
(C) Clip  
(D) Bushing S  
(E) Spring S  
(F) Rod S  
(G) Bushing

- 6) Remove the spacer, bushing and pedal pad from clutch pedal.



(A) Spacer  
(B) Bushing  
(C) Bushing  
(D) Pedal pad  
(E) Clutch pedal  
(F) Bushing C

### D: ASSEMBLY

#### 1. LHD MODEL

- 1) Attach the clutch switch, etc. to pedal bracket temporarily.
- 2) Clean the inside of bores of clutch pedal and brake pedal, and apply grease, and set bushings into bores.
- 3) Align the bores of pedal bracket, clutch pedal and brake pedal, and then attach the brake pedal return spring, assist rods, spring and bushing.

#### NOTE:

Clean up the inside of bushings and apply grease before installing spacer.

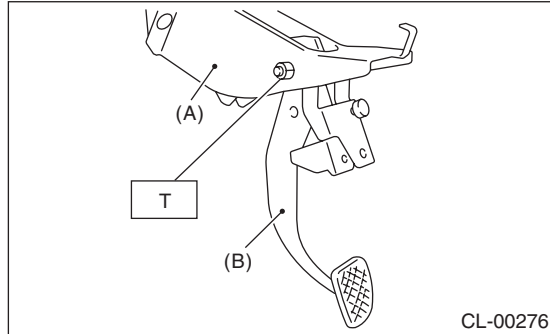
#### 2. RHD MODEL

- 1) Clean and apply grease to the hole of sliding portion between clutch pedal and bushing.
- 2) Install the pad, stopper, bushing C, spacer and bushing to clutch pedal.
- 3) Install the rod S, spring S, bushing S, clip, bushing, clutch switch and bushing C to clutch pedal bracket.

4) Install the clutch pedal assembly, stopper, adjusting rod, bushing and spring to clutch pedal bracket.

**Tightening torque:**

**T: 30 N·m (3.1 kgf·m, 22.4 ft·lb)**



(A) Clutch pedal bracket  
(B) Clutch pedal

5) Install the assist rod, bushing and assist spring to clutch pedal and pedal bracket.

**E: INSPECTION**

**1. CLUTCH PEDAL**

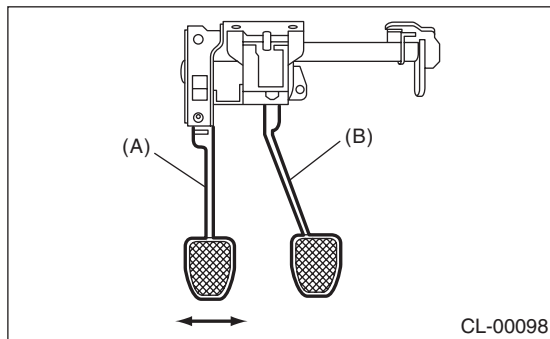
Move the clutch pedal pads in the lateral direction with a force of approximately 10 N (1 kgf, 2 lb) to ensure the pedal deflection is in specified range. If excessive deflection is noted, replace the bushings with new ones.

**Deflection of clutch pedal:**

**Service limit**

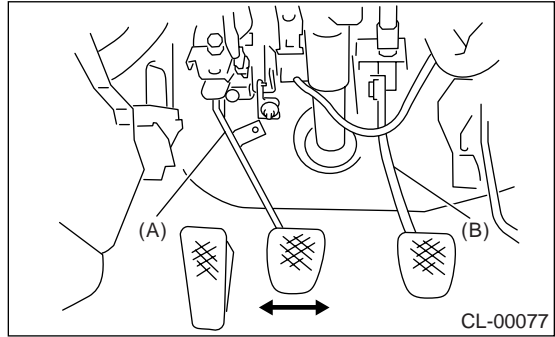
**5.0 mm (0.197 in) or less**

- LHD model



(A) Clutch pedal  
(B) Brake pedal

- RHD model



(A) Clutch pedal  
(B) Brake pedal

**F: ADJUSTMENT**

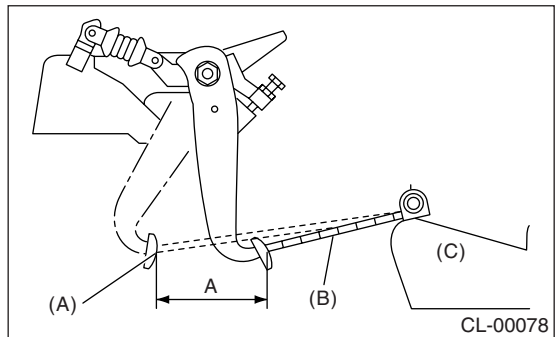
1) Measure the full stroke amount of clutch pedal.

**NOTE:**

- Measure the length between the seat cushion front end and center portion of clutch pedal.
- Slide the seat at seventh notch from first notch.

**Specified clutch pedal full stroke A:**

**130 — 135 mm (5.12 — 5.31 in)**



(A) Clutch pedal (Full stroke condition)  
(B) Scale  
(C) Seat

2) If the clutch pedal stroke is out of specification, loosen the clutch stopper nut and adjust it.

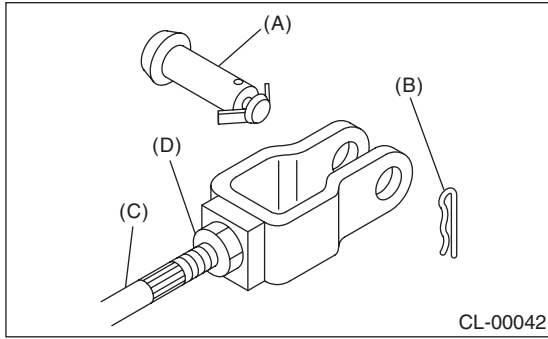
**Tightening torque (Clutch stopper nut):**

**8 N·m (0.8 kgf·m, 5.8 ft·lb)**

# Clutch Pedal

## CLUTCH SYSTEM

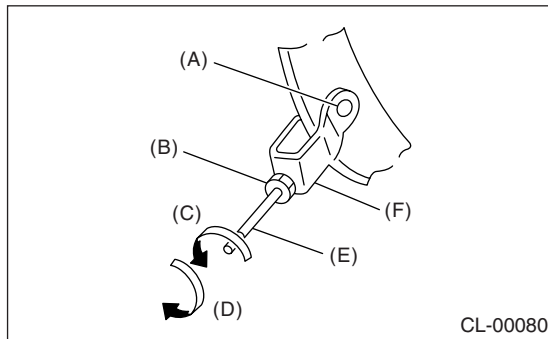
3) Loosen the push rod lock nut.



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

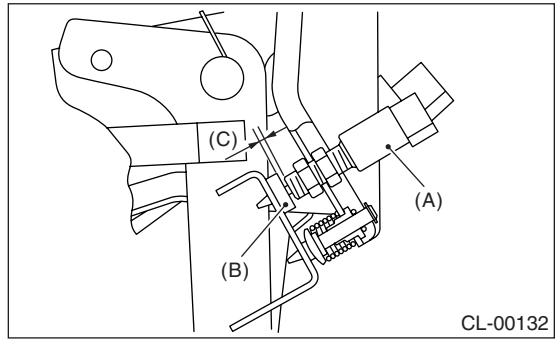
4) Turn the push rod to adjust.

- (1) Ensure that the clutch pedal contacts clutch switch, when releasing the clutch pedal.
- (2) Ensure that the clutch pedal contacts clutch pedal bracket stopper, when fully depressing the clutch pedal.



- (A) Clevis hole
- (B) Push rod lock nut
- (C) Shortening direction
- (D) Lengthening direction
- (E) Push rod
- (F) U shaped bracket

5) Turn the push rod counterclockwise to shorten until clearance is made at clutch switch.

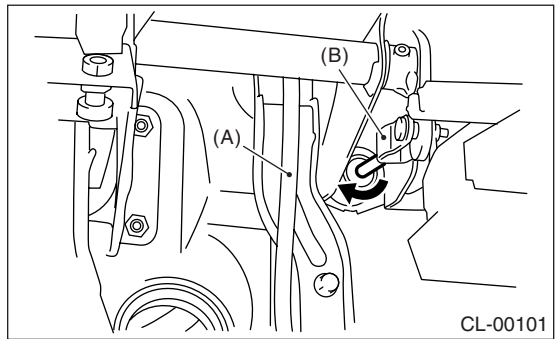


- (A) Clutch switch
- (B) Stopper
- (C) Clearance

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

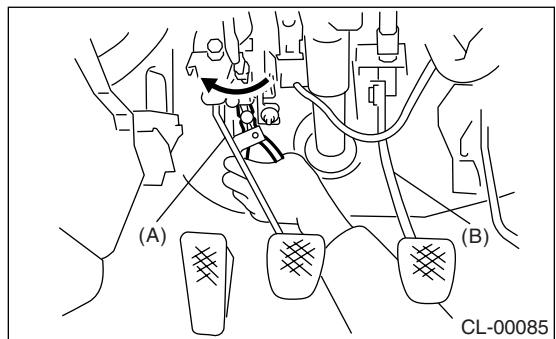
7) Turn the push rod further 270° counterclockwise to shorten (arrow direction as shown in the figure).

- LHD model



- (A) Accelerator pedal
- (B) Clevis

- RHD model



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

8) Move the clevis pin in lateral direction to ensure it moves smoothly.

9) Tighten the push rod lock nut.

**Tightening torque:**

**10 N·m (1.0 kgf·m, 7.2 ft-lb)**

10) Depress and release the clutch pedal two or three times to ensure that clutch pedal and release fork operates smoothly. If the clutch pedal and release fork do not operate smoothly, bleed air from the clutch hydraulic system. <Ref. to CL-25, Clutch Fluid Air Bleeding.>

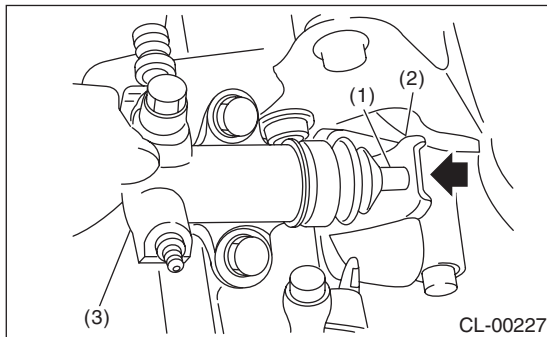
11) Measure the clutch pedal full stroke length again to ensure that it is within specifications. If it is not, repeat adjustment procedures again from the beginning.

**Specified clutch pedal full stroke:**

**130 — 135 mm (5.12 — 5.31 in)**

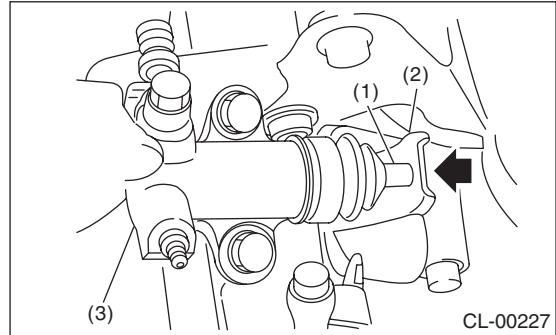
12) Move the clevis pin to the left and then to the right. It should move without resistance while it is rattling. If resistance is felt, repeat adjustment procedures again from the beginning.

13) Push the release lever until operating cylinder push rod retracts. Ensure that clutch fluid level in reservoir tank increases. If the clutch fluid level increases, hydraulic clutch is properly adjusted; if fluid level does not increase or push rod does not retract, replace the master cylinder with a new one. <Ref. to CL-21, Master Cylinder.>



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

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



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

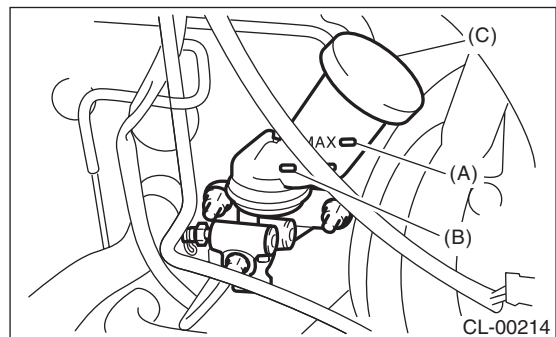
15) If the clutch fluid level increases, hydraulic clutch play is correct.

16) If the clutch fluid level does not increase or push rod does not retract, clutch pedal must be re-adjusted.

17) Check the fluid level on the outside of the reservoir tank. If the level is below "MIN", add clutch fluid to bring it up to "MAX".

**Recommended clutch fluid:**

**FMVSS No. 116, fresh DOT 3 or DOT 4 brake fluid**



- (A) Max. level
- (B) Min. level
- (C) Reservoir tank



## 11. Clutch Switch

### A: REMOVAL

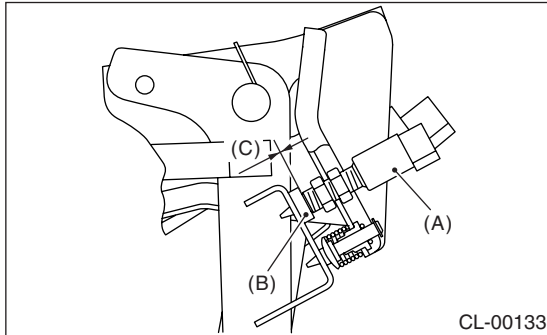
- 1) Disconnect the ground cable from battery.
- 2) Remove the instrument panel lower cover.
- 3) Disconnect the connector from clutch switch.
- 4) Remove the clutch switch.

### B: INSTALLATION

- 1) Install the clutch switch and clutch pedal stopper so that the gap between them is 0 mm (0 in).

#### Tightening torque:

**8 N·m (0.8 kgf-m, 5.8 ft-lb)**

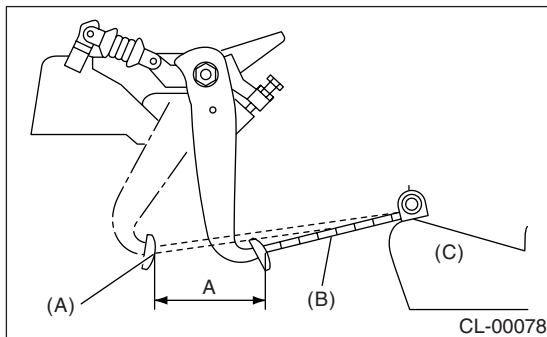


- (A) Clutch switch
- (B) Stopper
- (C) 0 mm (0 in)

- 2) Measure the stroke of clutch pedal.

#### Specified clutch pedal full stroke A:

**130 — 135 mm (5.12 — 5.31 in)**



- (A) Clutch pedal (Full stroke condition)
- (B) Scale
- (C) Seat

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

- 4) Connect the clutch switch connector.

### C: INSPECTION

Check the clutch switch continuity. If continuity is not as specified, replace the switch.

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

#### Terminal / Specified resistance

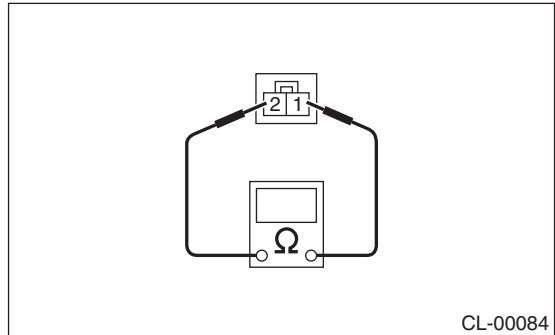
**When clutch pedal depressed:**

**1 — 2/More than 1 MΩ**

#### Terminal / Specified resistance

**When clutch pedal not depressed:**

**1 — 2/Less than 1Ω**



### D: ADJUSTMENT

Refer to “ADJUSTMENT” for clutch pedal. <Ref. to CL-29, ADJUSTMENT, Clutch Pedal.>

## 12. General Diagnostic Table

### A: INSPECTION

#### 1. CLUTCH

Symptom	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 impossible; especially rapid acceleration is impossible and vehicle speed does not increase in proportion to the increase in engine speed.</li> <li>• Power falls, particularly when ascending a slope, and there is a smell of burning of the clutch facing.</li> <li>• Method of testing: Put the vehicle in a stationary condition with parking brake fully applied. Disengage the clutch and shift the transmission gear into the 1st. Gradually allow the clutch to engage while gradually increasing the engine speed. The clutch function is satisfactory if the engine stalls. However, the clutch is slipping if the vehicle does not start off and the engine does not stall.</li> </ul>	(a) Clutch facing smeared by oil	Replace.
	(b) Worn clutch facing	Replace.
	(c) Deteriorated diaphragm spring	Replace.
	(d) Distorted pressure plate or flywheel	Rectify or replace.
	(e) Defective release bearing holder	Rectify or replace.
<p>2. Clutch drags. As a symptom of this trouble, a harsh scratching noise develops and control becomes quite difficult when shifting gears. The symptom becomes more apparent when shifting into the 1st gear. However, because much trouble of this sort is due to defective synchronization mechanism, carry out 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>It may be judged as insufficient disengagement of clutch if any noise occurs during this test.</p>	(a) Worn or rusty clutch disc hub spline	Replace clutch disc.
	(b) Excessive deflection of clutch disc facing	Rectify or replace.
	(c) Stick of crankshaft pilot needle bearing	Replace.
	(d) Cracked clutch disc facing	Replace.
	(e) Stuck clutch disc (smeared by oil or water)	Replace.
<p>3. Clutch chatters. Clutch chattering is an unpleasant vibration to the whole body when the vehicle is just started with clutch partially engaged.</p>	(a) Adhesion of oil on the facing	Replace clutch disc.
	(b) Weak or broken damper spring	Replace clutch disc.
	(c) Defective facing contact or excessive disc	Replace the defective clutch disc.
	(d) Warped pressure plate or flywheel	Rectify or replace.
	(e) Loose disc rivets	Replace clutch disc.
	(f) Loose engine mounting	Retighten or replace mounting.
	(g) Improper adjustment of pitching stopper	Adjustment.
<p>4. Noisy clutch Examine whether the noise is generated when the clutch is disengaged, engaged, or partially engaged.</p>	(a) Broken, worn or unlubricated release bearing	Replace the release bearing.
	(b) Insufficient lubrication of pilot bearing	Replace the pilot bearing.
	(c) Loose clutch disc hub	Replace clutch disc.
	(d) Loose damper spring retainer	Replace clutch disc.
	(e) Deteriorated or broken damper spring	Replace clutch disc.

## General Diagnostic Table

### CLUTCH SYSTEM

Symptom	Possible cause	Corrective action
5. Clutch grabs. When starting the vehicle with the clutch partially engaged, the clutch grabs suddenly and the vehicle jumps instead of making a smooth start.	(a) Grease or oil on facing	Replace clutch disc.
	(b) Deteriorated cushioning spring	Replace 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 clutch disc.
	(e) Loose engine mounting	Retighten or replace mounting.
	(f) Deteriorated diaphragm spring	Replace.

### 2. CLUTCH PEDAL

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

### 3. DIAGNOSTIC DIAGRAM OF CLUTCH DRAG

Step	Check	Yes	No
<b>1 CHECK GEAR NOISE.</b> 1) Start the engine. 2) Disengage the clutch and shift quickly from neutral to reverse in idling condition.	Is there any abnormal noise from the transmission gear?	Go to step 2.	Clutch is normal.
<b>2 CHECK GEAR NOISE.</b> Disengage the clutch at idle and shift from neutral to reverse within 0.5 — 1.0 seconds.	Is there any abnormal noise from the transmission gear?	Go to step 3.	For defective transmission or excessive clutch drag torque; inspect the pilot bearing, clutch disc, transmission and clutch disc hub spline.
<b>3 CHECK GEAR NOISE.</b> 1) Disengage the clutch at idle and shift from neutral to reverse within 0.5 — 1.0 seconds. 2) With the clutch disengaged, shift from neutral to reverse, reverse to neutral several times.	Is there any abnormal noise from the transmission gear?	Defect in clutch disengaging. Inspect clutch disc, clutch cover, clutch release, and clutch pedal free play.	Clutch and fly-wheel seizure. Inspect clutch disc, spline of clutch disc hub.