

**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.

**CONTROL SYSTEMS****CS****AUTOMATIC TRANSMISSION****AT****AUTOMATIC TRANSMISSION  
(DIAGNOSTICS)****AT****MANUAL TRANSMISSION AND  
DIFFERENTIAL****MT****CLUTCH SYSTEM****CL**

# CLUTCH SYSTEM

# CL

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	<b>Page</b>
1. General Description .....	2
2. Clutch Disc and Cover .....	15
3. Flywheel .....	18
4. Release Bearing and Lever.....	19
5. Operating Cylinder .....	22
6. Master Cylinder .....	24
7. Clutch Pipe and Hose .....	27
8. Clutch Fluid .....	29
9. Clutch Fluid Air Bleeding.....	30
10. Clutch Pedal.....	32
11. Clutch Cable.....	39
12. Clutch Switch .....	40
13. General Diagnostic Table.....	41

# GENERAL DESCRIPTION

## CLUTCH SYSTEM

### 1. General Description

#### A: SPECIFICATIONS

Model		1.6L	2.0L NON-TURBO	2.0L TURBO
Clutch cover	Type	Push type		Pull type
	Diaphragm set load      kg (lb)	450 (992)		800 (1,764)
Clutch disk	Facing material	Woven (Non asbestos)		
	O.D. x I.D. x thickness      mm (in)	225 x 150 x 3.5 (8.86 x 5.91 x 0.138)		230 x 150 x 3.5 (9.06 x 5.91 x 0.138)
	Spline O.D.      mm (in)	25.2 (0.992), (No. of teeth: 24)		
Clutch release lever ratio		3.0	1.6	1.7
Release bearing		Grease-packed self-aligning		
Clutch pedal	Full stroke      mm (in)	130 — 135 (5.12 — 5.31)		
	Free play      mm (in)	10 — 20 (0.39 — 0.79)		3 — 13 (0.12 — 0.51)
Clutch disk	Stroke      mm (in)	24 — 26 (0.94 — 1.02)		13.3 — 14.7 (0.524 — 0.579)
	Play at release lever center      mm (in)	3 — 4 (0.12 — 0.16)		—
Clutch disk	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)	0.8 (0.031) at R = 107 (4.21)	0.8 (0.031) at R = 110 (4.33)	

**I.D.:** Inner diameter

**O.D.:** Outer diameter

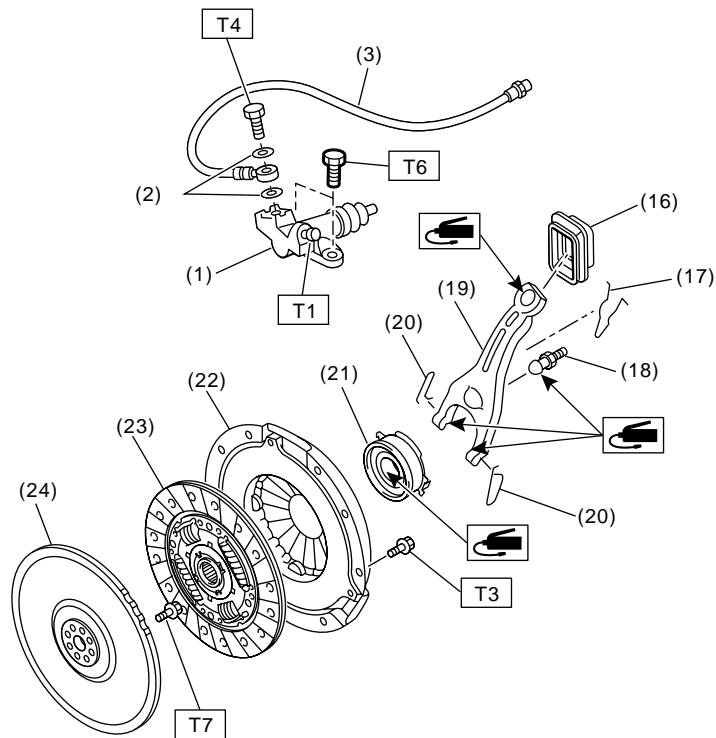
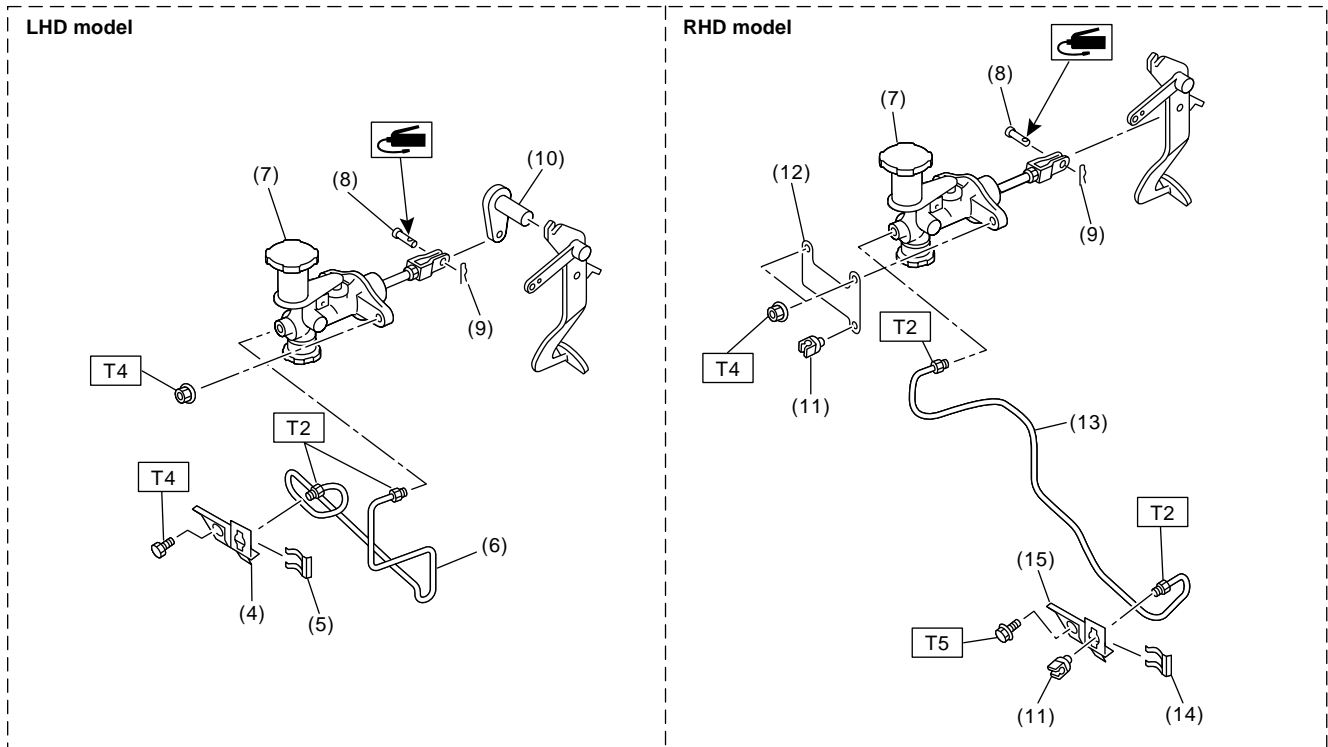
**B: COMPONENT**

**1. CLUTCH SYSTEM**

# GENERAL DESCRIPTION

## CLUTCH SYSTEM

### • 2.0L NON-TURBO MODEL



# GENERAL DESCRIPTION

CLUTCH SYSTEM

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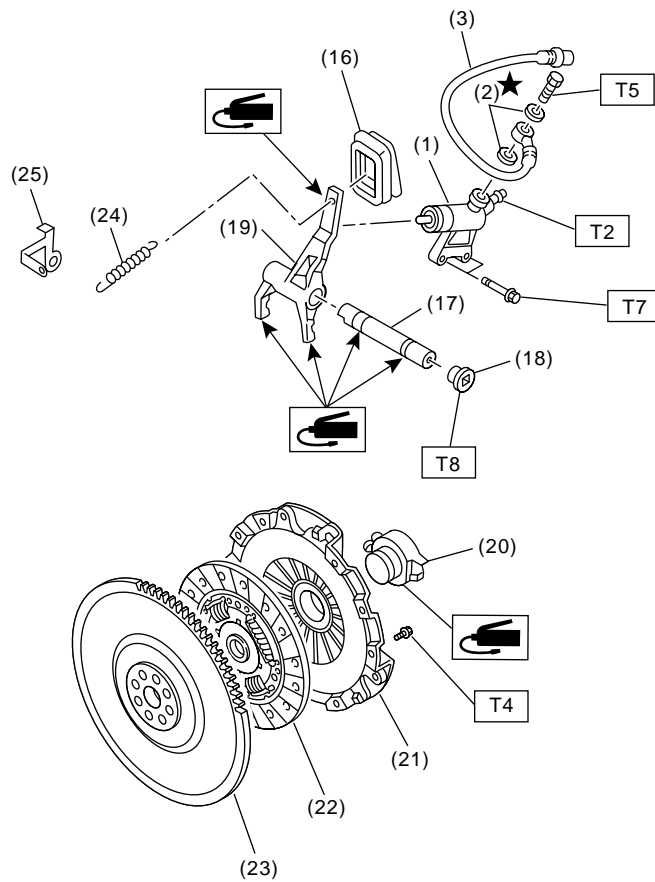
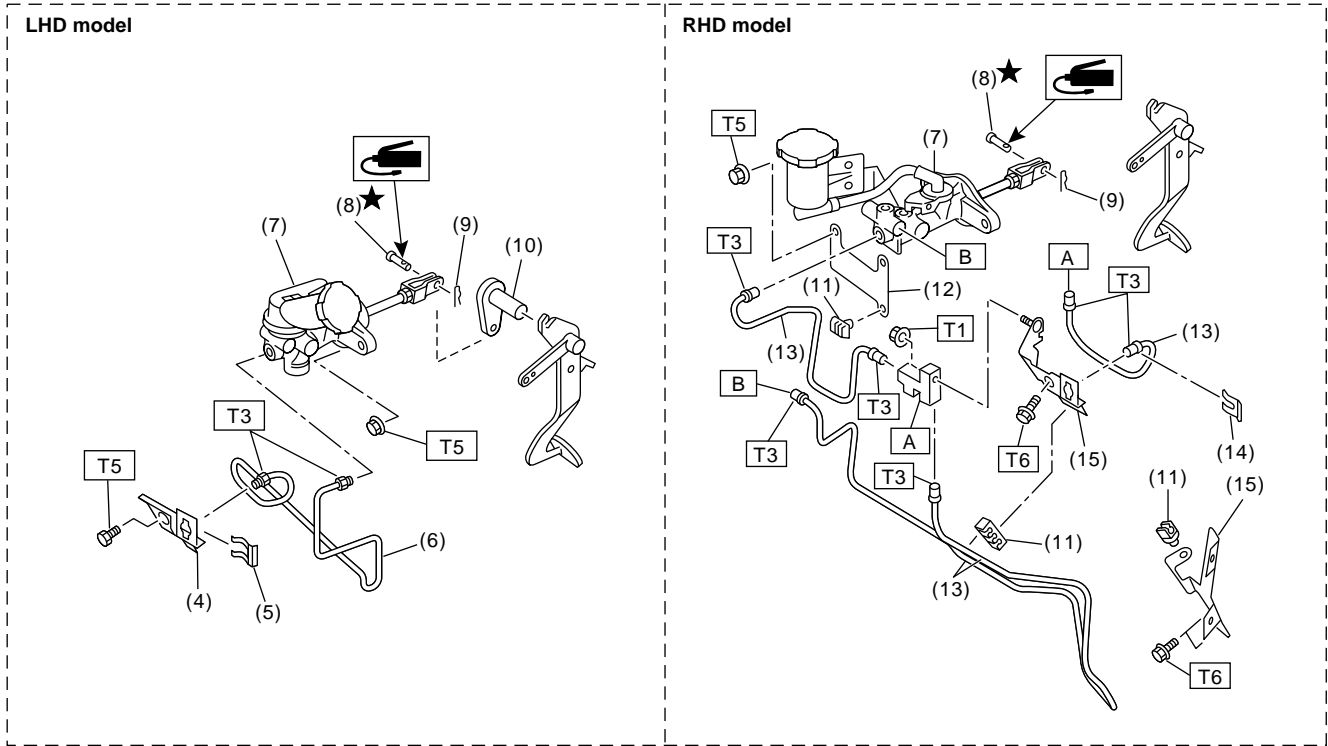
(1) Operating cylinder	(13) Clutch pipe	<b><i>Tightening torque: N·m (kgf-m, ft-lb)</i></b>
(2) Washer	(14) Clamp	<b><i>T1: 8 (0.8, 5.8)</i></b>
(3) Clutch hose	(15) Bracket	<b><i>T2: 15 (1.5, 11)</i></b>
(4) Bracket	(16) Clutch release lever sealing	<b><i>T3: 15.7 (1.6, 11.6)</i></b>
(5) Clip	(17) Retainer spring	<b><i>T4: 18 (1.8, 13.0)</i></b>
(6) Pipe	(18) Pivot	<b><i>T5: 25 (2.5, 18.1)</i></b>
(7) Master cylinder ASSY	(19) Release lever	<b><i>T6: 37 (3.8, 27.5)</i></b>
(8) Clevis pin	(20) Clip	<b><i>T7: 72 (7.3, 52.8)</i></b>
(9) Snap pin	(21) Release bearing	
(10) Lever	(22) Clutch cover	
(11) Clamp	(23) Clutch disc	
(12) Bracket	(24) Flywheel	

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# GENERAL DESCRIPTION

## CLUTCH SYSTEM

### • 2.0L TURBO MODEL



TR0429

# GENERAL DESCRIPTION

## CLUTCH SYSTEM

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(1) Operating cylinder	(14) Clamp	<b><i>Tightening torque: N-m (kgf-m, ft-lb)</i></b>
(2) Washer	(15) Bracket	<b><i>T1: 7.5 (0.76, 5.53)</i></b>
(3) Clutch hose	(16) Clutch release lever sealing	<b><i>T2: 8 (0.8, 5.8)</i></b>
(4) Bracket	(17) Release lever shaft	<b><i>T3: 15 (1.5, 11)</i></b>
(5) Clip	(18) Plug	<b><i>T4: 15.7 (1.6, 11.6)</i></b>
(6) Pipe	(19) Release lever	<b><i>T5: 18 (1.8, 13.0)</i></b>
(7) Master cylinder ASSY	(20) Release bearing	<b><i>T6: 25 (2.5, 18.1)</i></b>
(8) Clevis pin	(21) Clutch cover	<b><i>T7: 37 (3.8, 27.5)</i></b>
(9) Snap pin	(22) Clutch disc	<b><i>T8: 44 (4.5, 32.5)</i></b>
(10) Lever	(23) Flywheel	
(11) Clamp	(24) Spring	
(12) Bracket	(25) Bracket	
(13) Clutch pipe		

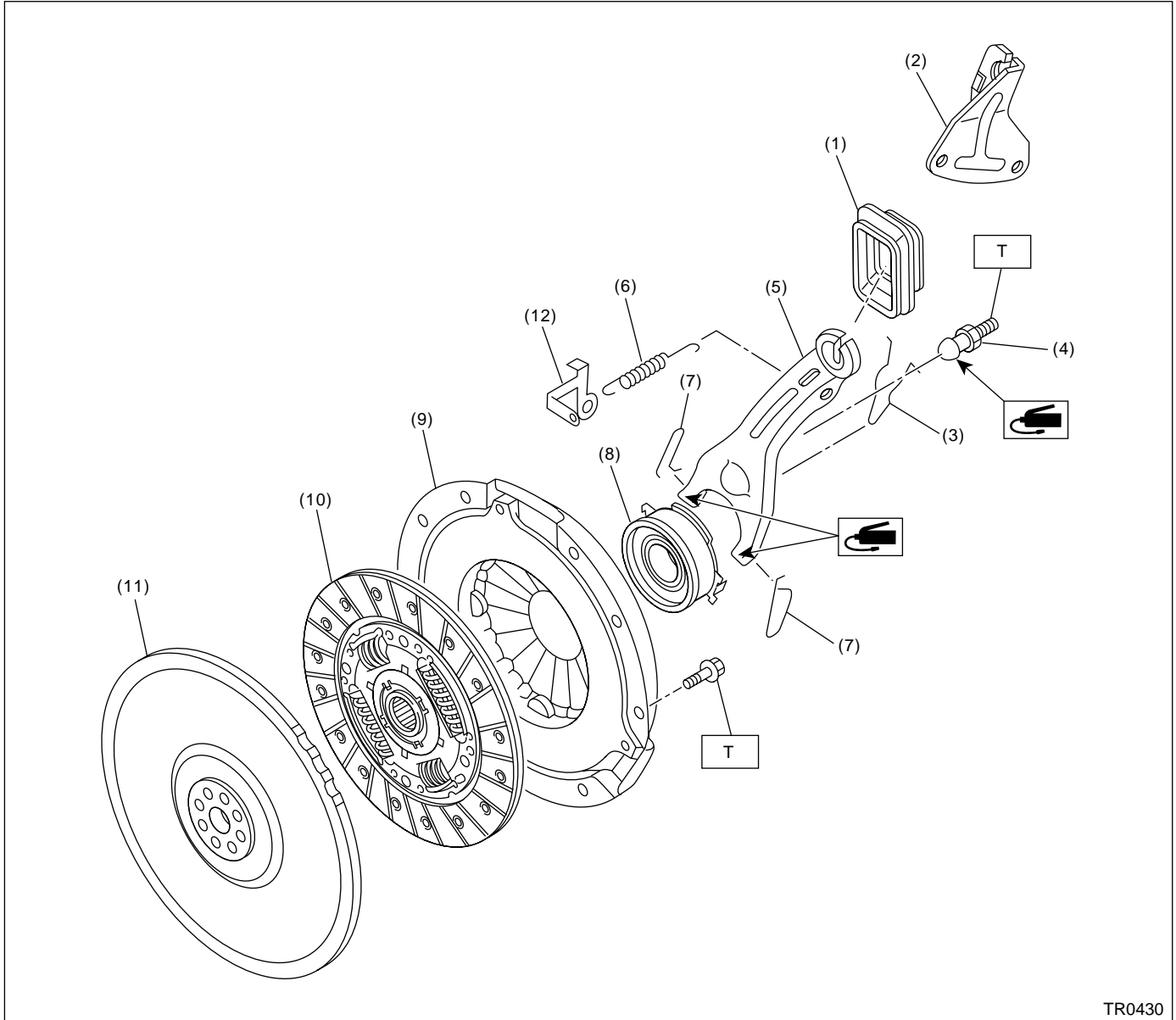
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# GENERAL DESCRIPTION

## CLUTCH SYSTEM

### • 1.6L MODEL



- (1) Clutch release lever sealing
- (2) Clutch cable bracket
- (3) Retainer spring
- (4) Pivot
- (5) Clutch release lever
- (6) Return spring
- (7) Clip
- (8) Clutch release bearing

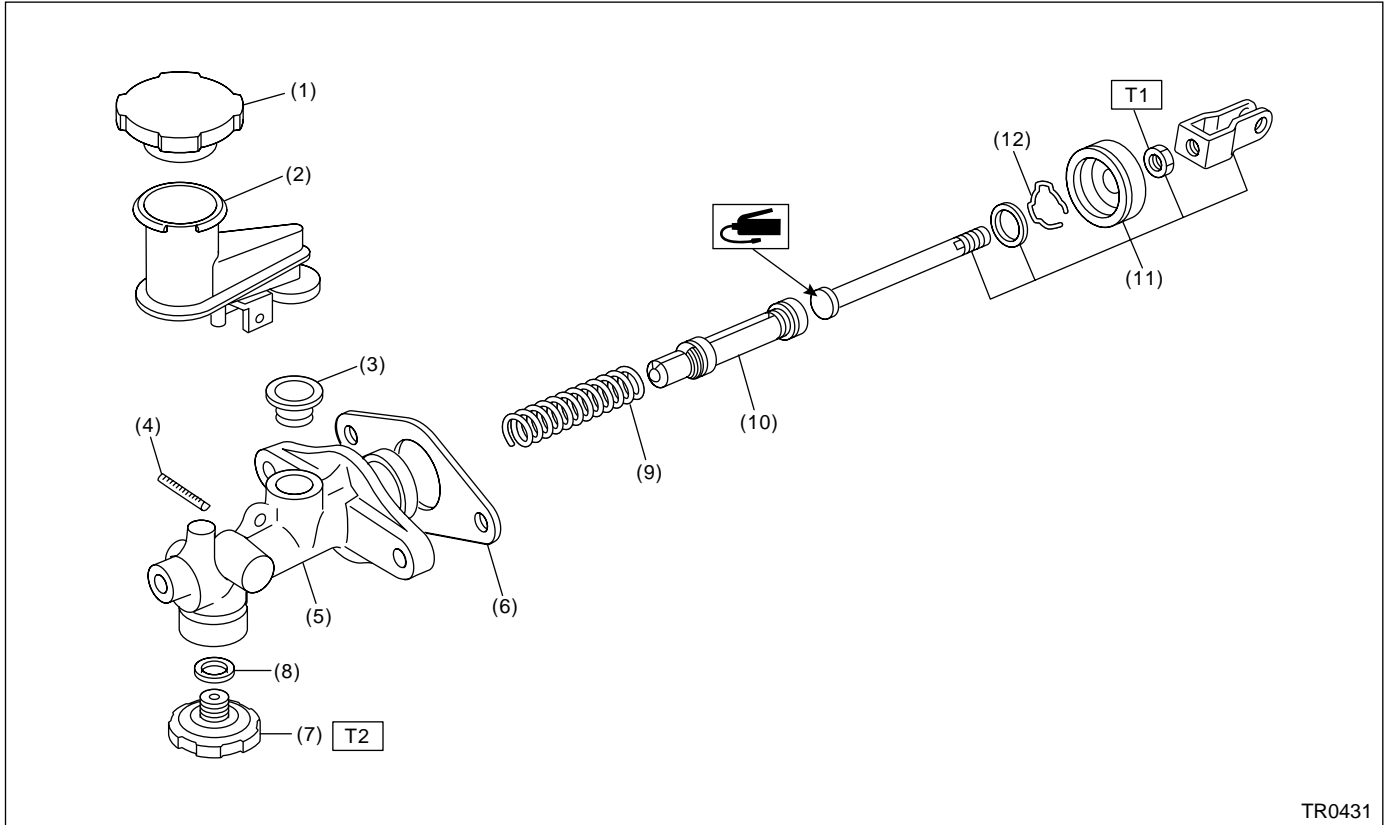
- (9) Clutch cover
- (10) Clutch disk
- (11) Flywheel
- (12) Clutch return spring bracket

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

**T: 15.7 (1.6, 11.6)**

### 2. MASTER CYLINDER

#### • 2.0L NON-TURBO MODEL



TR0431

- |                     |                       |
|---------------------|-----------------------|
| (1) Reservoir cap   | (7) Diaphragm spring  |
| (2) Reservoir tank  | (8) Gasket            |
| (3) Oil seal        | (9) Return spring     |
| (4) Straight pin    | (10) Piston           |
| (5) Master cylinder | (11) Push rod         |
| (6) Seat            | (12) Piston stop ring |

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

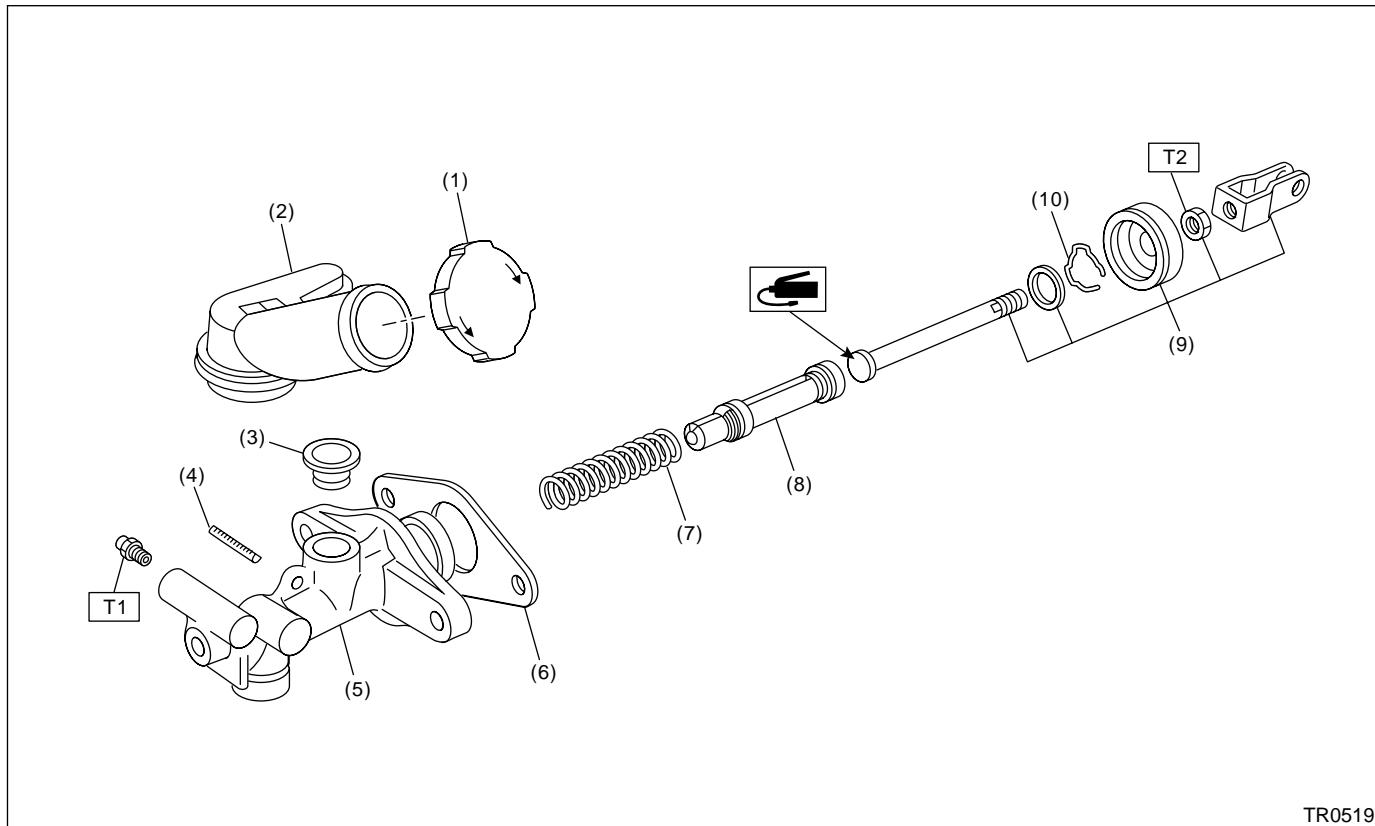
**T1: 10 (1.0, 7)**

**T2: 46.6 (4.75, 34.4)**

# GENERAL DESCRIPTION

## CLUTCH SYSTEM

### • LHD TURBO MODEL



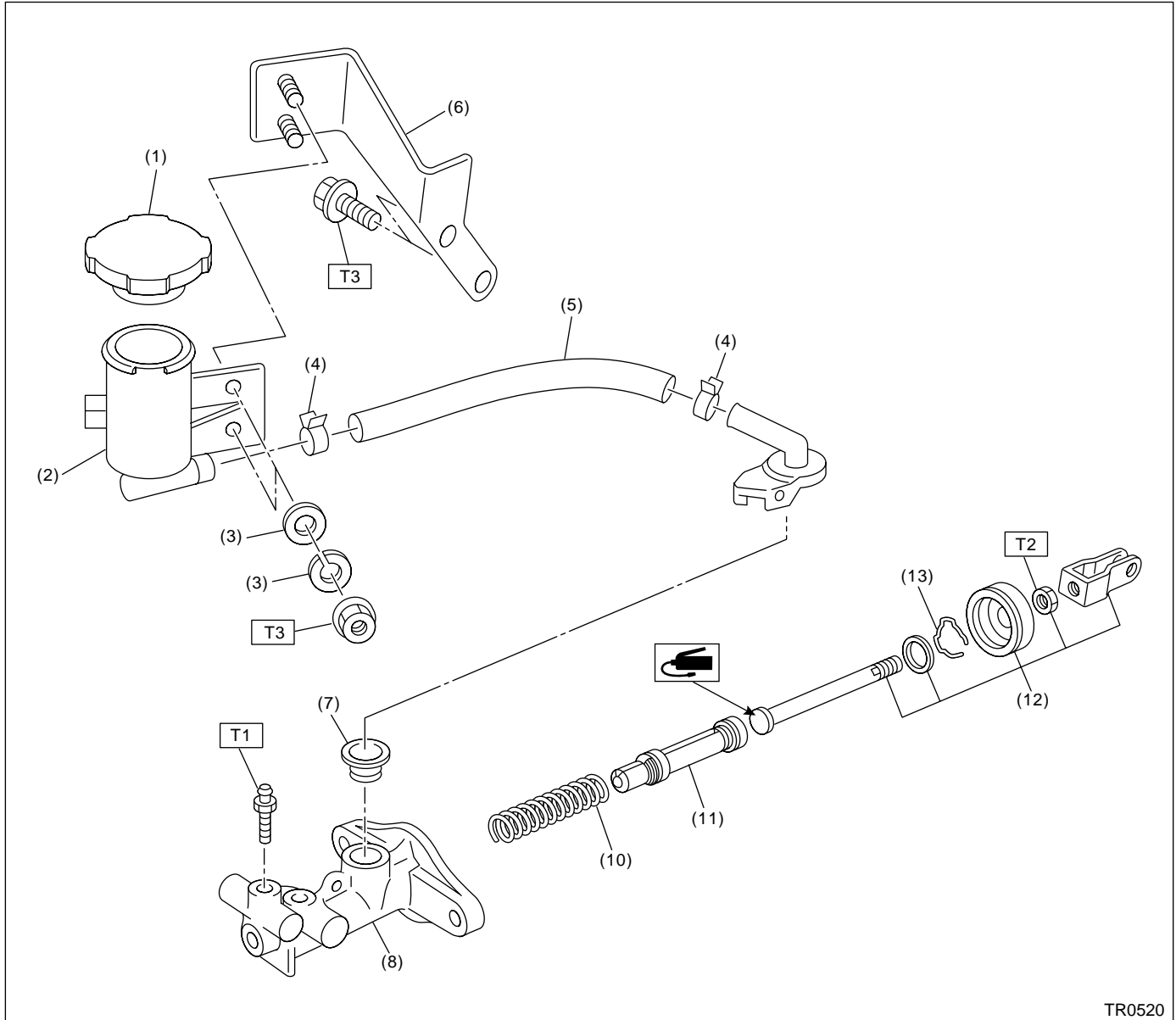
- |                     |                       |
|---------------------|-----------------------|
| (1) Reservoir cap   | (6) Seat              |
| (2) Reservoir tank  | (7) Return spring     |
| (3) Oil seal        | (8) Piston            |
| (4) Straight pin    | (9) Push rod          |
| (5) Master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

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

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

**T2: 10 (1.0, 7)**

### • RHD TURBO MODEL



TR0520

- (1) Reservoir cap
- (2) Reservoir tank
- (3) Washer
- (4) Clip
- (5) Hose
- (6) Reservoir tank bracket

- (7) Oil seal
- (8) Master cylinder
- (9) Seat
- (10) Return spring
- (11) Piston
- (12) Push rod

- (13) Piston stop ring

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

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

**T2: 10 (1.0, 7)**

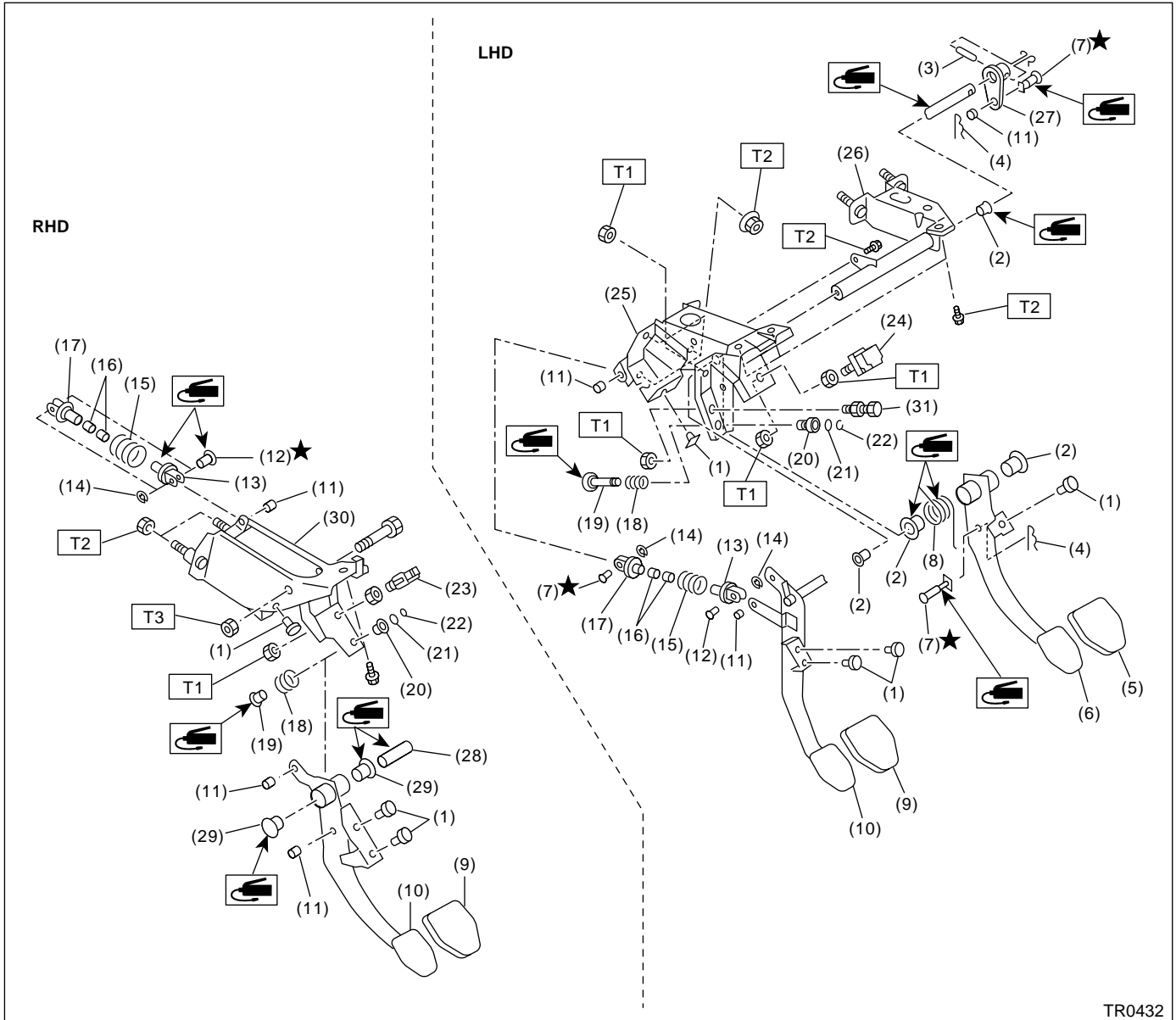
**T3: 18 (1.8, 13.3)**

# GENERAL DESCRIPTION

## CLUTCH SYSTEM

### 3. CLUTCH PEDAL

#### • 2.0L MODEL



TR0432

- |                        |  |                                     |
|------------------------|--|-------------------------------------|
| (1) Stopper            | (13) Assist rod A                        | (25) Pedal bracket                  |
| (2) Bushing            | (14) Clip                                | (26) Clutch master cylinder bracket |
| (3) Spring pin         | (15) Assist spring                       | (27) Lever                          |
| (4) Snap pin           | (16) Assist bushing                      | (28) Spacer                         |
| (5) Brake pedal pad    | (17) Assist rod B                        | (29) Bushing                        |
| (6) Brake pedal        | (18) Spring S                            | (30) Clutch pedal bracket           |
| (7) Clevis pin         | (19) Rod S                               | (31) Adjust bolt                    |
| (8) Brake pedal spring | (20) Bushing S                           |                                     |
| (9) Clutch pedal pad   | (21) O-ring                              |                                     |
| (10) Clutch pedal      | (22) Clip                                |                                     |
| (11) Bushing C         | (23) Clutch switch (With cruise control) |                                     |
| (12) Clutch clevis pin | (24) Stop light switch                   |                                     |

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

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

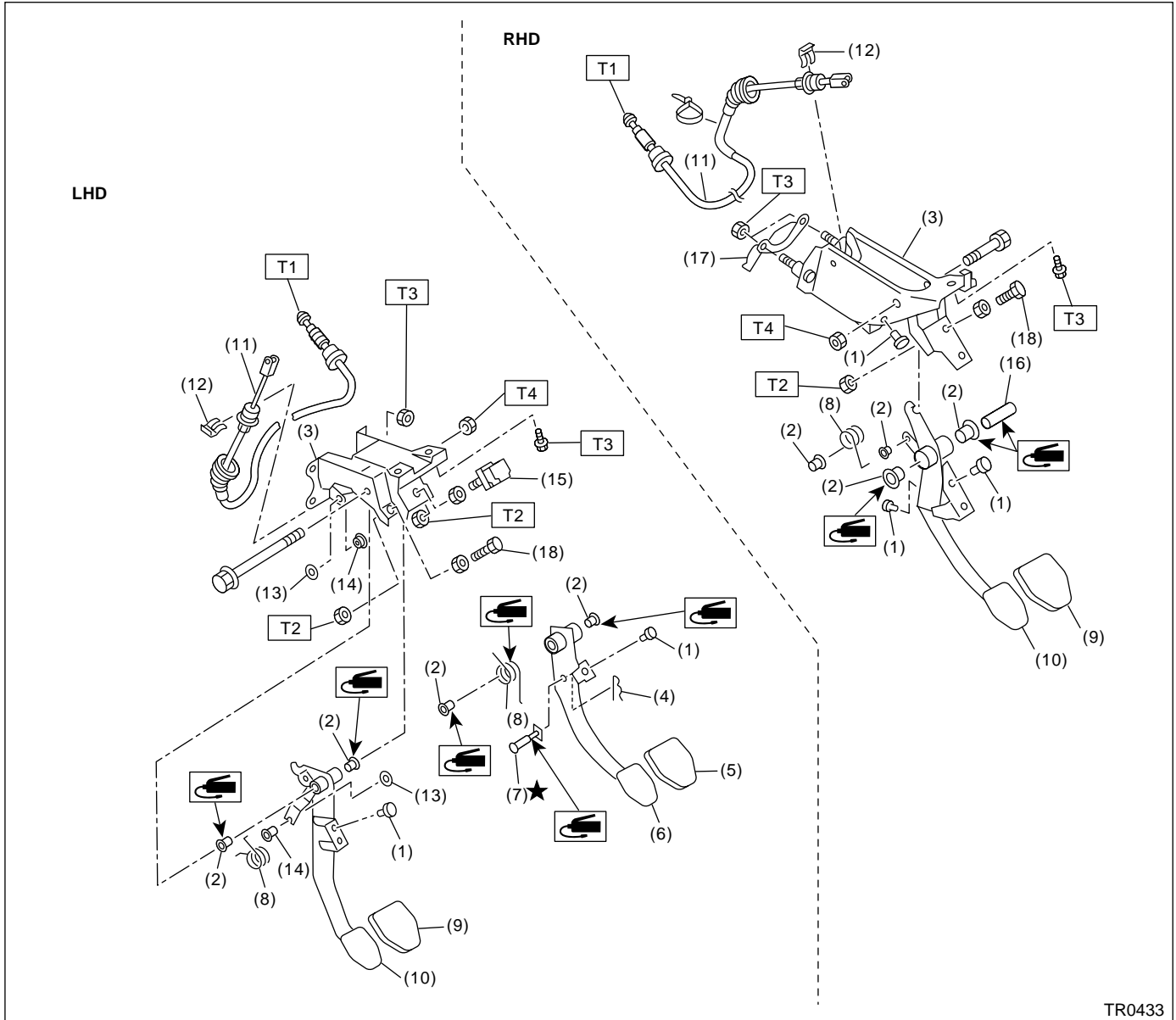
**T2: 18 (1.8, 13.0)**

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

# GENERAL DESCRIPTION

## CLUTCH SYSTEM

### • 1.6L MODEL



TR0433

- |                          |                         |
|--------------------------|-------------------------|
| (1) Stopper              | (9) Clutch pedal pad    |
| (2) Bushing              | (10) Clutch pedal       |
| (3) Clutch pedal bracket | (11) Clutch cable       |
| (4) Snap pin             | (12) Clutch cable clamp |
| (5) Brake pedal pad      | (13) Clip               |
| (6) Brake pedal          | (14) Spring assist      |
| (7) Clevis pin           | (15) Stop light switch  |
| (8) Spring               | (16) Spacer             |

- |                  |
|------------------|
| (17) Bracket     |
| (18) Adjust bolt |

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

**T1: 5.9 (0.6, 4.3)**

**T2: 8 (0.8, 5.8)**

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

**T4: 29 (3.0, 21.7)**

## GENERAL DESCRIPTION

### CLUTCH SYSTEM

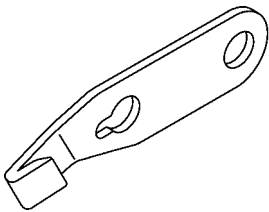
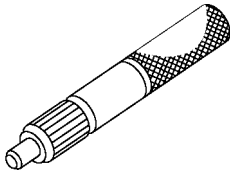
#### C: CAUTION

- Wear working 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 or dirt.
- Before removal, installation or disassembly, be sure to clarify the failure. Avoid unnecessary removal, installation, disassembly, and replacement.
- Be careful not to burn your hands, because each part on the vehicle is hot after running.
- Use SUBARU genuine fluid, grease etc. or the 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 safety stands 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 shop 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 TOOLS

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
  B2M3853	498497100	CRANKSHAFT STOPPER	Used for stopping rotation of flywheel when loosening tightening bolt, etc.
  B2M4112	499747100	CLUTCH DISC GUIDE	Used when installing clutch disc to flywheel.

##### 2. GENERAL PURPOSE TOOLS

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

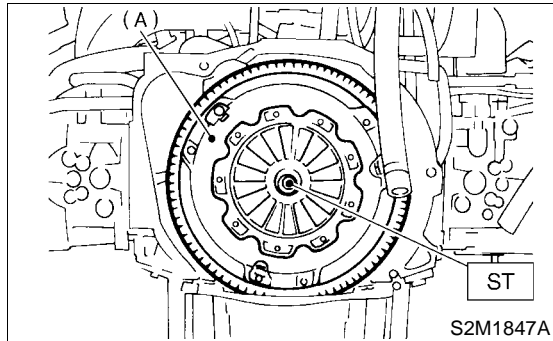
## 2. Clutch Disc and Cover

### A: REMOVAL

1) Remove transmission assembly from vehicle body. <Ref. to MT-37, REMOVAL, Manual Transmission Assembly.>

2) Install ST on flywheel.

ST 499747100 CLUTCH DISC GUIDE



(A) Clutch cover

3) Remove clutch cover and clutch disc.

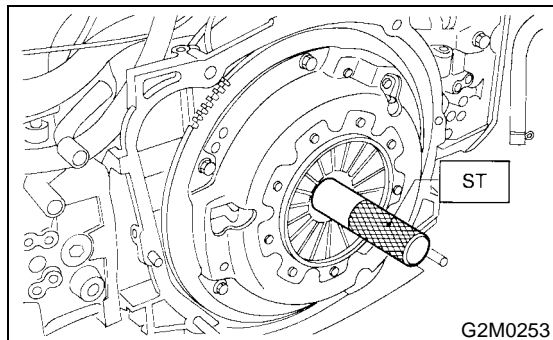
### CAUTION:

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

### B: INSTALLATION

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

ST 499747100 CLUTCH DISC GUIDE



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

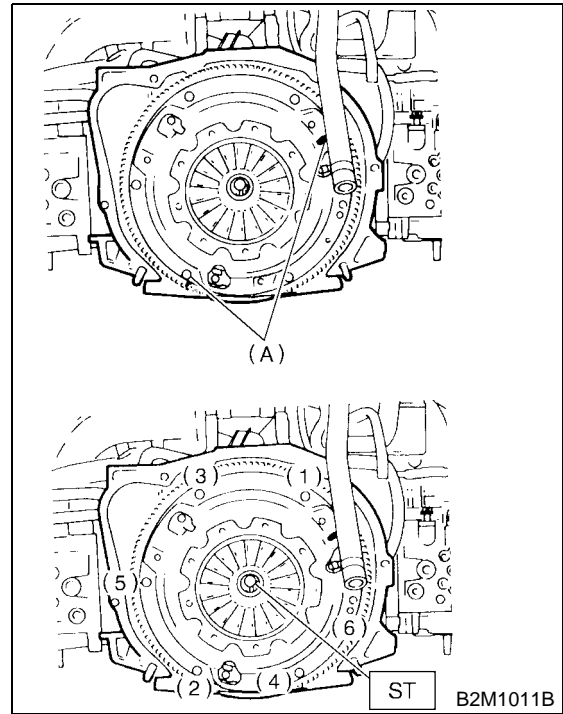
### NOTE:

- When installing the clutch cover on the 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 bolts by hand. Each bolt should be tightened to the specified torque in a crisscross fashion.

### Tightening torque:

**15.7 N·m (1.6 kgf-m, 11.6 ft-lb)**



(A) "0" marks

3) Remove ST.

ST 499747100 CLUTCH DISC GUIDE

4) Install transmission assembly. <Ref. to MT-40, INSTALLATION, Manual Transmission Assembly.>



# CLUTCH DISC AND COVER

## CLUTCH SYSTEM

### C: INSPECTION

#### 1. CLUTCH DISC

##### 1) Facing wear

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

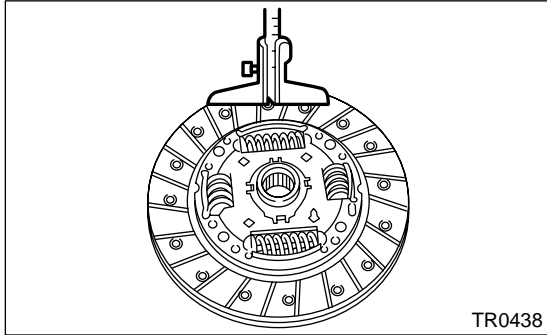
##### Depth of rivet head:

##### Limit of sinking

0.3 mm (0.012 in)

##### CAUTION:

Do not wash clutch disc with any cleaning fluid.

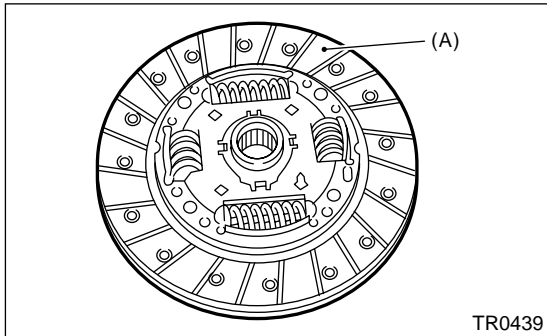


##### 2) Hardened facing

Correct by using emery paper or replace.

##### 3) Oil soakage on facing

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



(A) Facing

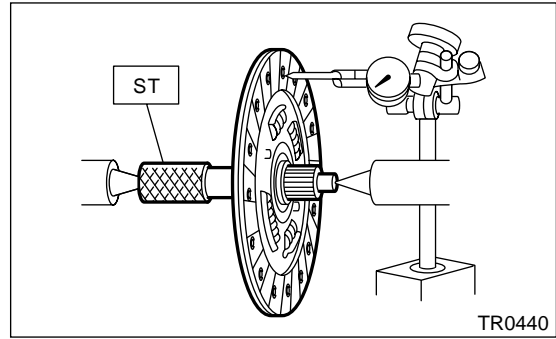
##### 4) Deflection on facing

If deflection exceeds the specified value at the outer circumference of facing, repair or replace.

ST 499747100 CLUTCH DISC GUIDE

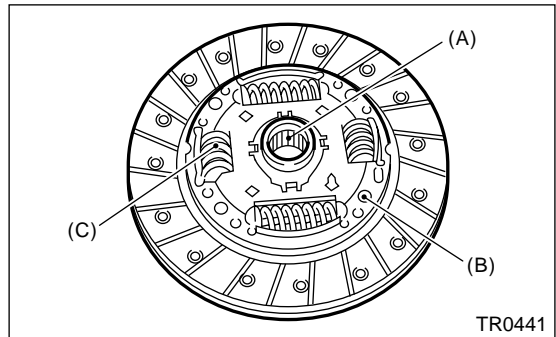
##### Limit for deflection:

1.0 mm (0.039 in) at R = 107 mm (4.21 in)



##### 5) Worn spline, loose rivets and torsion spring failure

Replace defective parts.



(A) Spline

(B) Rivet

(C) Torsion spring

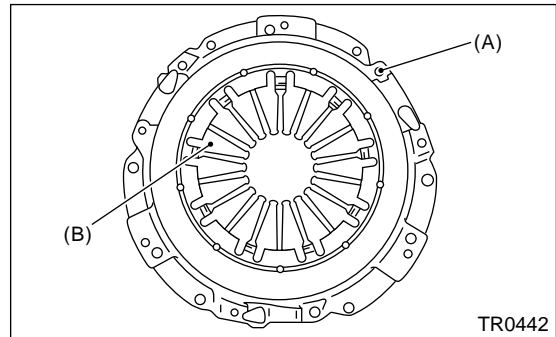
#### 2. CLUTCH COVER

##### NOTE:

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

##### 1) Loose thrust rivet.

##### 2) Damaged or worn bearing contact area at center of diaphragm spring.



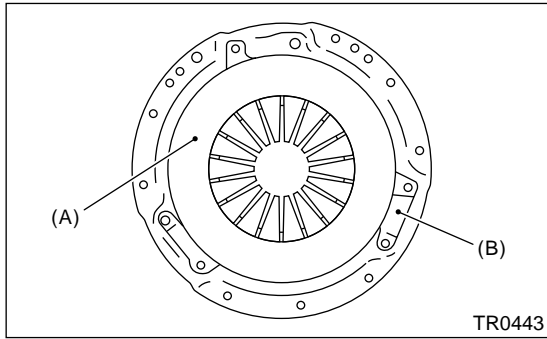
(A) Thrust rivet

(B) Diaphragm spring

##### 3) Damaged or worn disc contact surface of pressure plate.

##### 4) Loose strap plate setting bolt.

5) Worn diaphragm sliding surface.



(A) Pressure plate

(B) Strap plate

# FLYWHEEL

## CLUTCH SYSTEM

### 3. Flywheel

#### A: REMOVAL

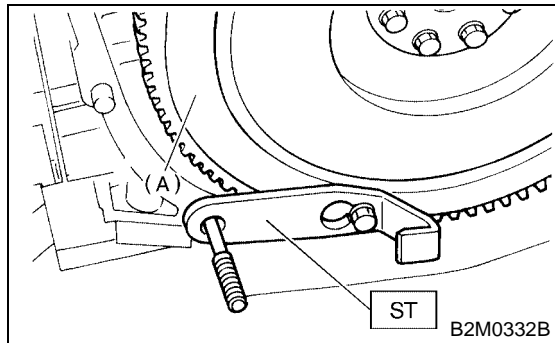
- 1) Remove transmission assembly. <Ref. to MT-37, REMOVAL, Manual Transmission Assembly.>
- 2) Remove clutch cover and clutch disc. <Ref. to CL-15, REMOVAL, Clutch Disc and Cover.>

#### CAUTION:

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

- 3) Using ST, remove flywheel.

ST 498497100 CRANKSHAFT STOPPER

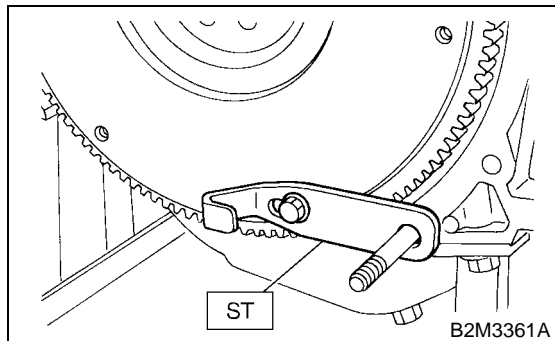


(A) Flywheel

#### B: INSTALLATION

- 1) Install flywheel and ST.

ST 498497100 CRANKSHAFT STOPPER



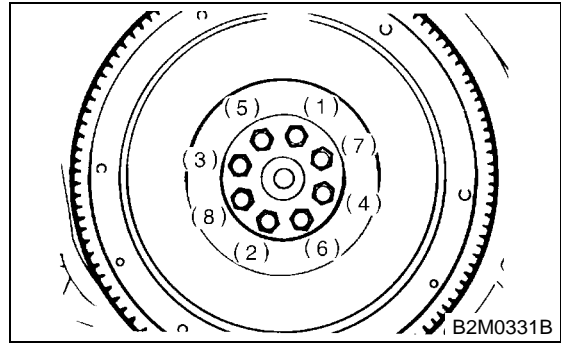
- 2) Tighten the flywheel attaching bolts to the specified torque.

#### NOTE:

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

#### Tightening torque:

72 N·m (7.3 kgf·m, 52.8 ft·lb)



- 3) Install clutch disc and cover. <Ref. to CL-15, INSTALLATION, INSTALLATION, Clutch Disc and Cover.>

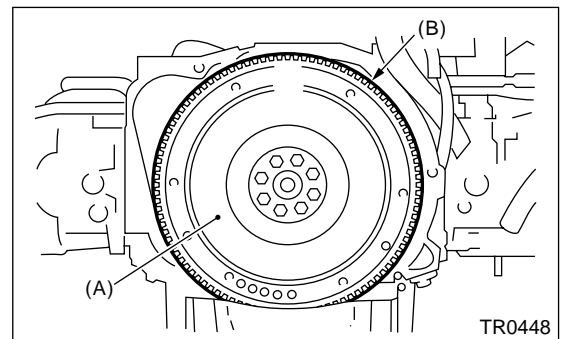
- 4) Install transmission assembly. <Ref. to MT-40, INSTALLATION, Manual Transmission Assembly.>

#### C: INSPECTION

#### CAUTION:

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

- 1) Damage of facing and ring gear  
If defective, replace flywheel.



(A) Flywheel  
(B) Ring gear

- 2) Smoothness of rotation

Rotate ball bearing applying pressure in thrust direction.

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

## 4. Release Bearing and Lever

### A: REMOVAL

#### 1. NON-TURBO MODEL

1) Remove transmission assembly from vehicle body.

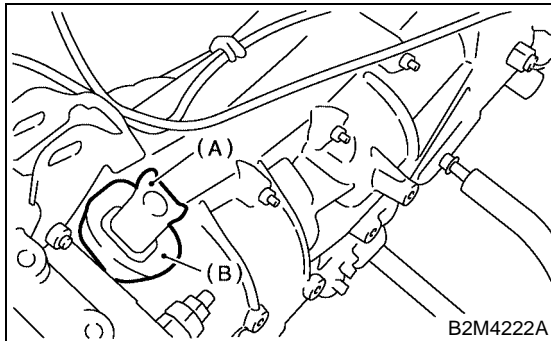
<Ref. to MT-37, REMOVAL, Manual Transmission Assembly.>

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

**CAUTION:**

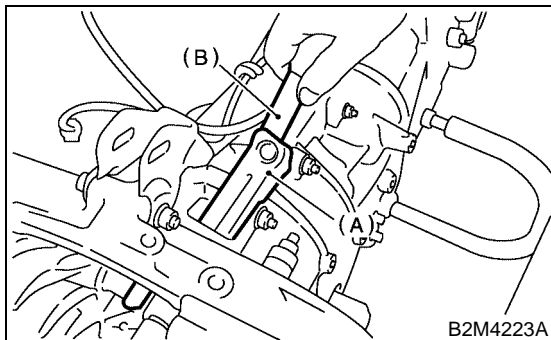
**Be careful not to deform clips.**

3) Remove release lever seal.



(A) Clutch release lever  
(B) Release lever seal

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



(A) Clutch release lever  
(B) Screwdriver

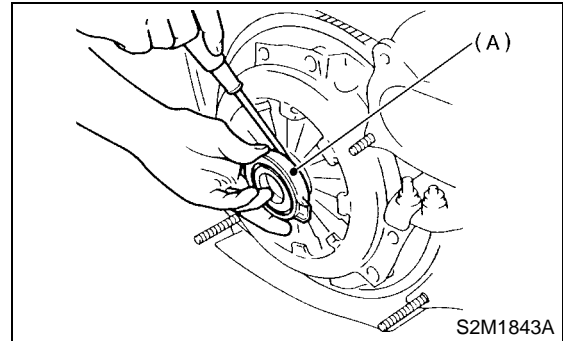
#### 2. TURBO MODEL

1) Remove transmission assembly from vehicle body. <Ref. to MT-37, REMOVAL, Manual Transmission Assembly.>

2) Remove clutch release lever from transmission.

3) Put clutch release bearing in engine side.

4) Remove clutch release bearing from clutch cover using flat-type screwdriver.



(A) Clutch release bearing

### B: INSTALLATION

#### 1. NON-TURBO MODEL

**CAUTION:**

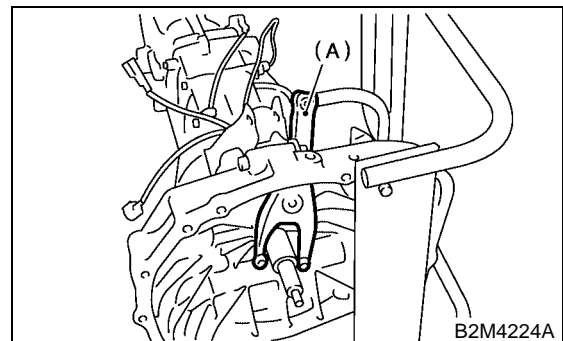
Before or during assembling, lubricate the following points with a light coat of grease.

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

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

**NOTE:**

- Apply grease (SUNLIGHT 2: P/N 003602010) to contact point of release lever and operating cylinder.
- Confirm that retainer spring is securely fitted by observing it through the main case hole.



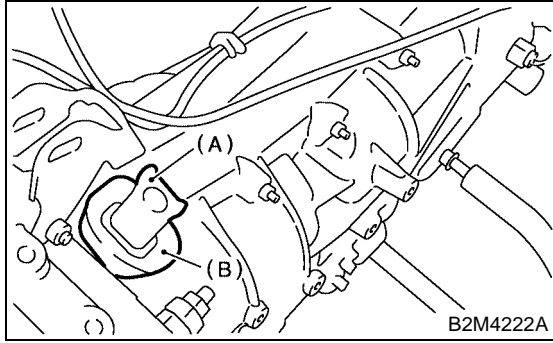
(A) Release lever

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

# RELEASE BEARING AND LEVER

## CLUTCH SYSTEM

3) Install release lever seal.

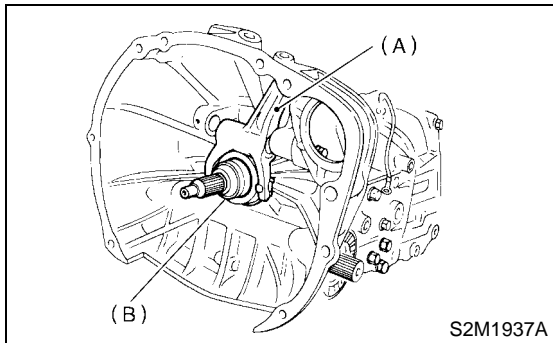


- (A) Release lever
- (B) Release lever seal

4) Install transmission assembly.  
<Ref. to MT-40, INSTALLATION, Manual Transmission Assembly.>

## 2. TURBO MODEL

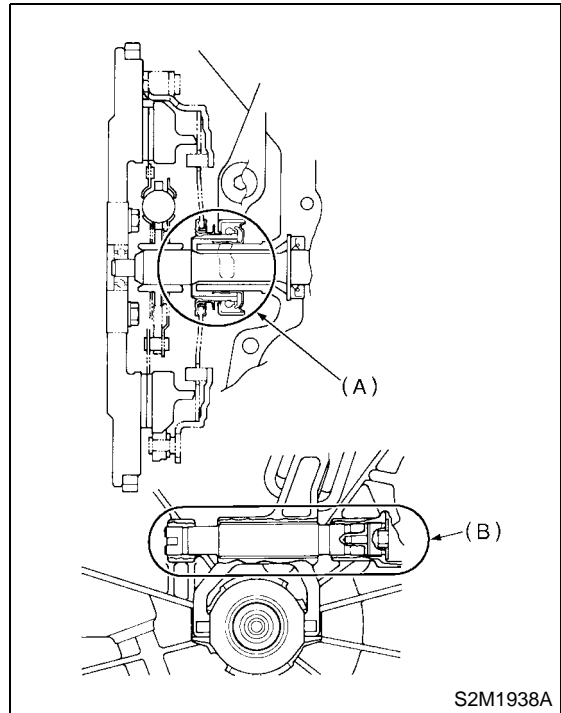
- 1) Install release bearing on transmission.
- 2) Insert release fork into release bearing tab.



- (A) Release fork
- (B) Release bearing

3) Apply grease to specified points:

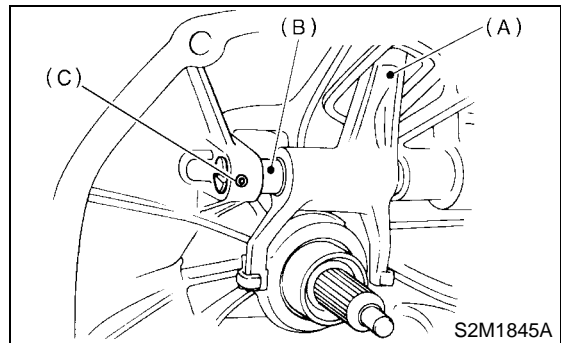
- Spline FX2200
- Shaft SUNLIGHT 2



- (A) Spline (FX2200)
- (B) Shaft (SUNLIGHT 2)

4) Insert release fork shaft into release fork.

**CAUTION:**  
Make sure the cutout portion of release fork shaft contacts spring pin.

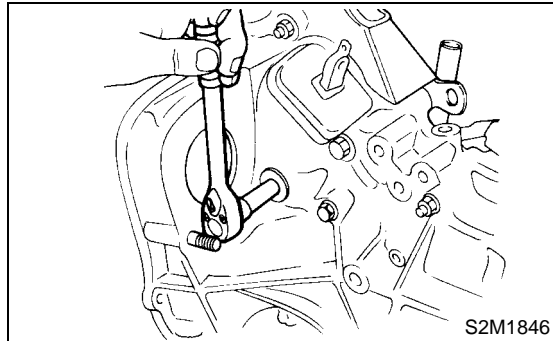


- (A) Release fork
- (B) Release shaft
- (C) Spring pin

5) Tighten plug.

**Tightening torque:**

**44 N·m (4.5 kgf-m, 32.5 ft-lb)**



S2M1846

6) Install transmission assembly. <Ref. to MT-40, INSTALLATION, Manual Transmission Assembly.>

## C: INSPECTION

### 1. RELEASE BEARING

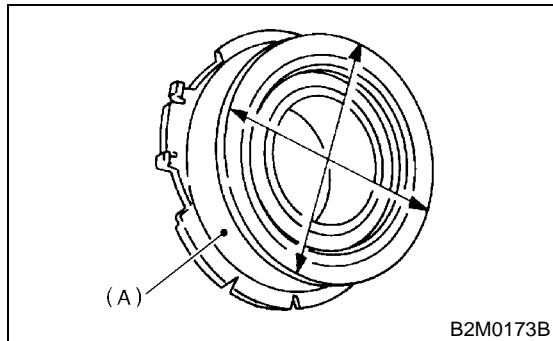
**CAUTION:**

Since this bearing is grease sealed and is of a 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 in the radial direction.

**Radial direction stroke:**

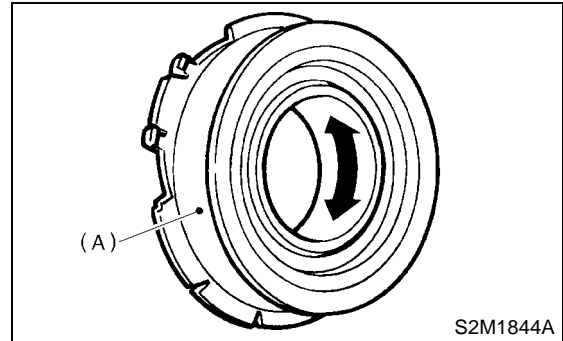
**1.4 mm (0.055 in)**



B2M0173B

(A) Bearing case

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



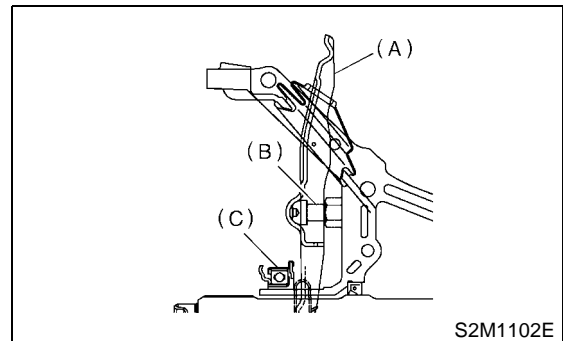
S2M1844A

(A) Bearing case

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

### 2. RELEASE LEVER

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



S2M1102E

(A) Clutch release lever

(B) Pivot

(C) Clutch release bearing

# OPERATING CYLINDER

## CLUTCH SYSTEM

### 5. Operating Cylinder

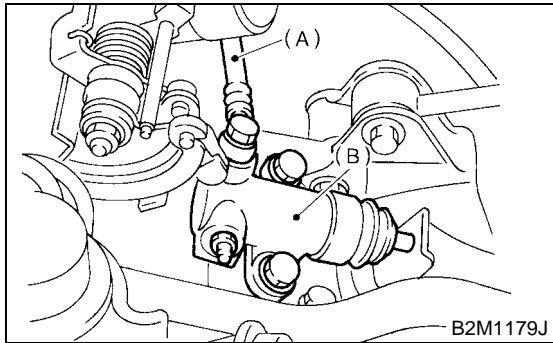
#### A: REMOVAL

- 1) Remove air cleaner case and air intake duct (Non-turbo model). <Ref. to IN(SOHC)-6, REMOVAL, Air Cleaner Case.> and <Ref. to IN(SOHC)-7, REMOVAL, Air Intake Duct.>
- 2) Remove intercooler (Turbo model). <Ref. to IN(DOHC TURBO)-10, REMOVAL, Intercooler.>
- 3) Remove clutch hose from operating cylinder.

#### CAUTION:

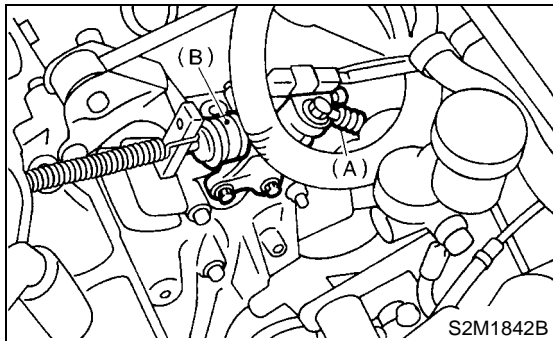
Cover hose joint to prevent clutch fluid from flowing out.

Non-turbo model



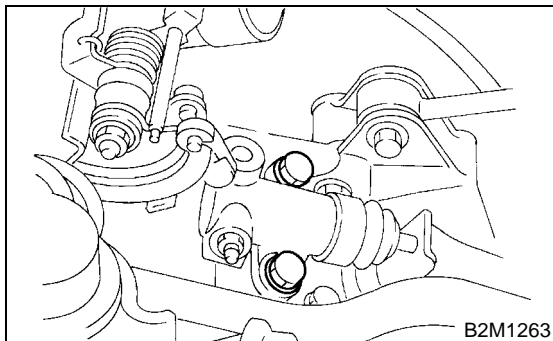
- (A) Clutch hose
- (B) Operating cylinder

Turbo model

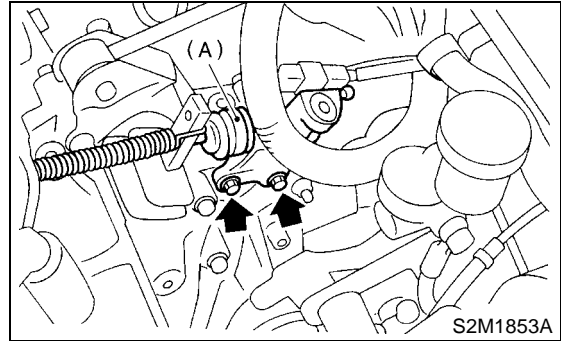


- (A) Clutch hose
- (B) Operating cylinder

- 4) Remove operating cylinder from transmission.
- Non-turbo model



Turbo model



#### B: INSTALLATION

- 1) Install in the reverse order of removal.

#### NOTE:

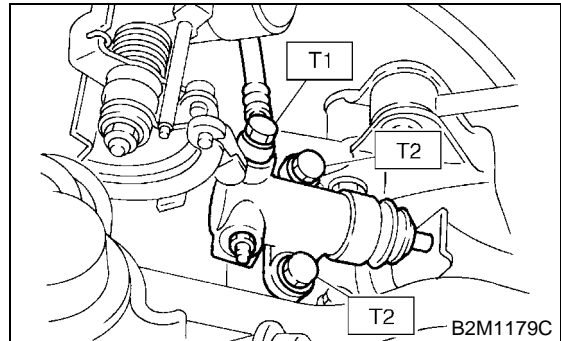
Before installing operating cylinder, apply grease (SUNLIGHT 2: P/N 003602010) to contact point of release lever and operating cylinder.

#### Tightening torque:

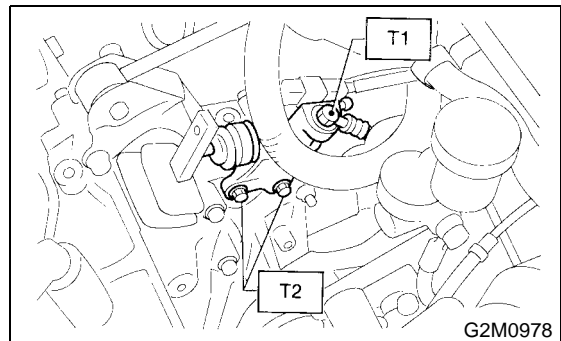
**T1: 18 N·m (1.8 kgf-m, 13.0 ft-lb)**

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

Non-turbo model

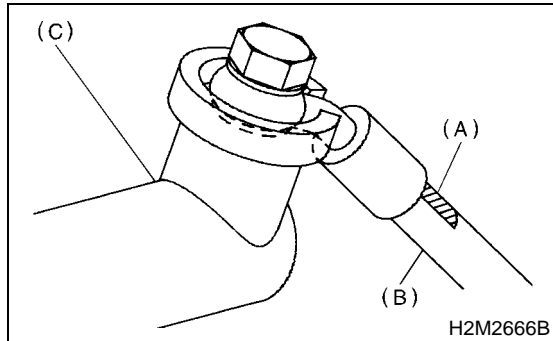


Turbo model



**NOTE:**

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



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

2) After bleeding air from operating cylinder, ensure that clutch operates properly.  
<Ref. to CL-30, Clutch Fluid Air Bleeding.>

## **C: INSPECTION**

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



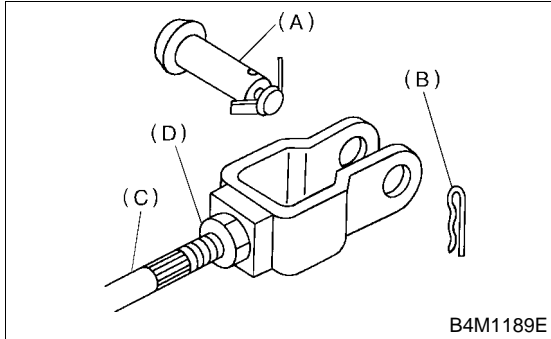
# MASTER CYLINDER

## CLUTCH SYSTEM

### 6. Master Cylinder

#### A: REMOVAL

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

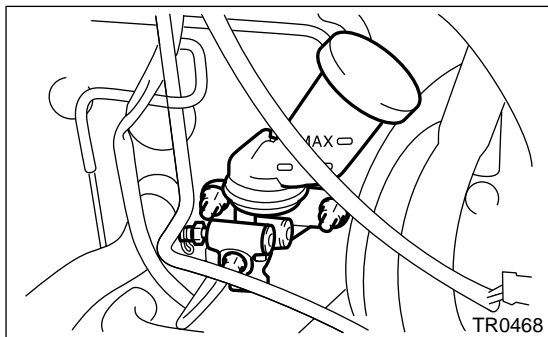


- (A) Clevis pin
- (B) Snap pin
- (C) Push rod
- (D) Lock nut

- 3) Remove air cleaner case and air intake duct (Non-turbo model). <Ref. to IN(SOHC)-6, REMOVAL, Air Cleaner Case.> and <Ref. to IN(SOHC)-7, REMOVAL, Air Intake Duct.>
- 4) Remove intercooler (Turbo model). <Ref. to IN(DOHC TURBO)-10, REMOVAL, Intercooler.>
- 5) Remove clutch pipe from master cylinder.
- 6) Remove master cylinder with reservoir tank.

#### CAUTION:

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



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

#### B: INSTALLATION

- 1) Install master cylinder to body, and install clutch pipe to master cylinder.

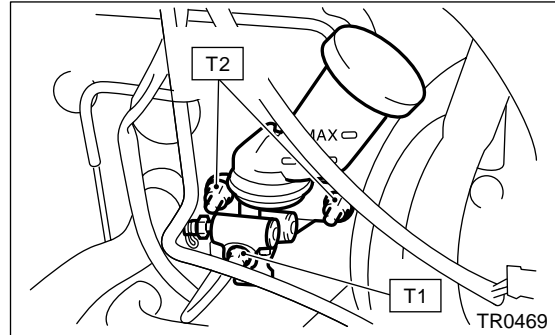
#### CAUTION:

Check that pipe is routed properly.

#### Tightening torque:

T1: 15 N·m (1.5 kgf-m, 10.8 ft-lb)

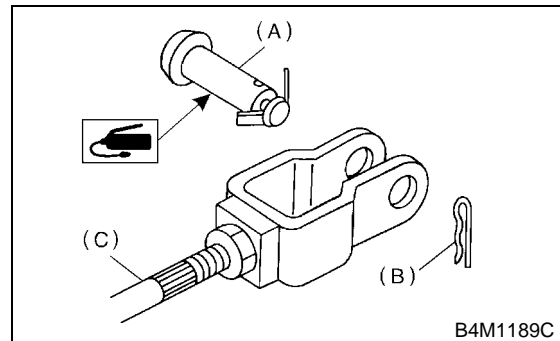
T2: 18 N·m (1.8 kgf-m, 13.0 ft-lb)



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

#### NOTE:

Apply grease to clevis pin.



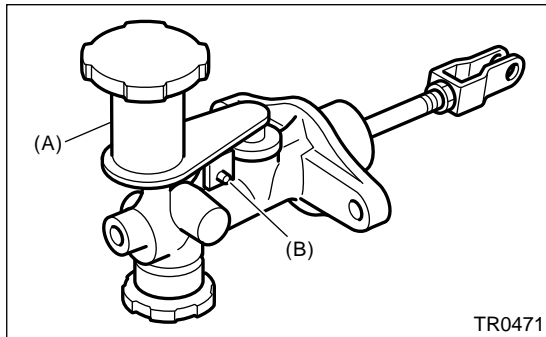
- (A) Clevis pin
- (B) Snap pin
- (C) Push rod

- 3) After bleeding air from system, ensure that clutch operates properly. <Ref. to CL-30, Clutch Fluid Air Bleeding.>
- 4) Install air cleaner case and air intake duct (Non-turbo model). <Ref. to IN(SOHC)-6, INSTALLATION, Air Cleaner Case.> and <Ref. to IN(SOHC)-7, INSTALLATION, Air Intake Duct.>
- 5) Install intercooler (Turbo model). <Ref. to IN(DOHC TURBO)-11, INSTALLATION, Intercooler.>

### C: DISASSEMBLY

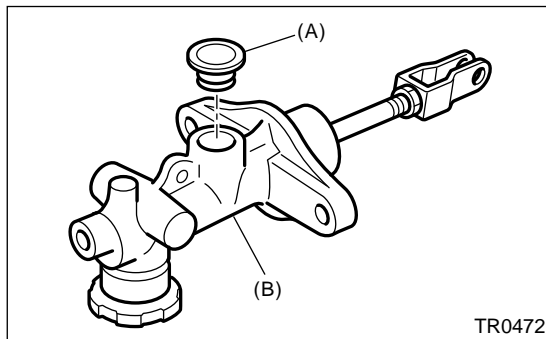
#### 1. EXCEPT RHD TURBO MODEL

1) Remove straight pin and reservoir tank.



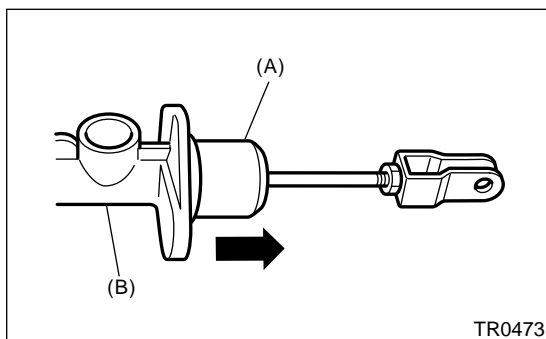
- (A) Reservoir tank
- (B) Straight pin

2) Remove oil seal.



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

3) Move the cylinder boot backward.



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

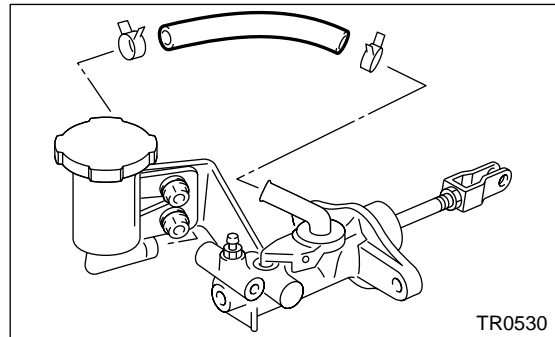
4) Remove stop ring.

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

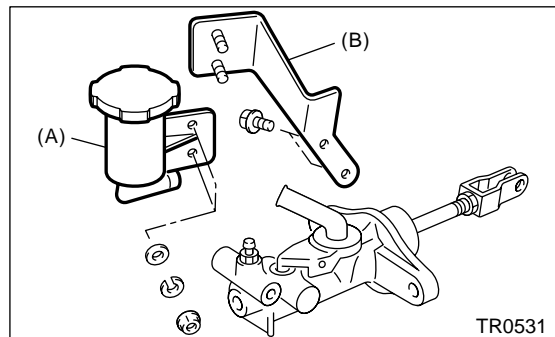
- 5) Remove clutch damper. (2.0L Non-turbo model)
- 6) Remove air bleeder. (Turbo model)

#### 2. RHD TURBO MODEL

1) Remove hose.

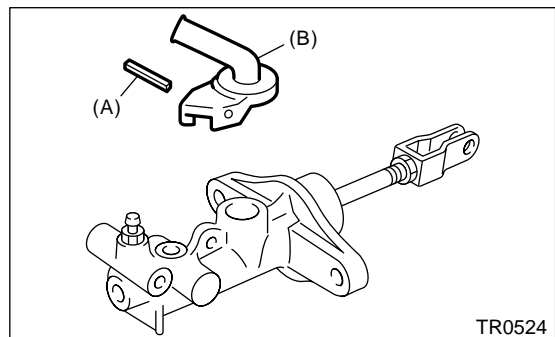


2) Remove reservoir tank and bracket.



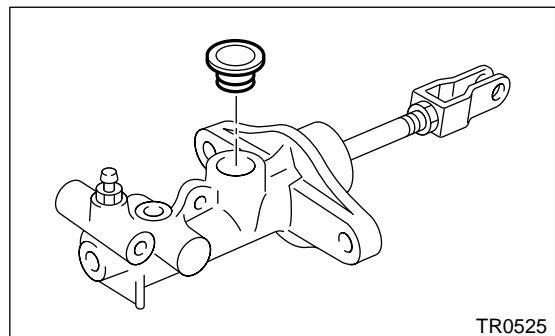
- (A) Reservoir tank
- (B) Bracket

3) Remove straight pin and adapter.



- (A) Straight pin
- (B) Adapter

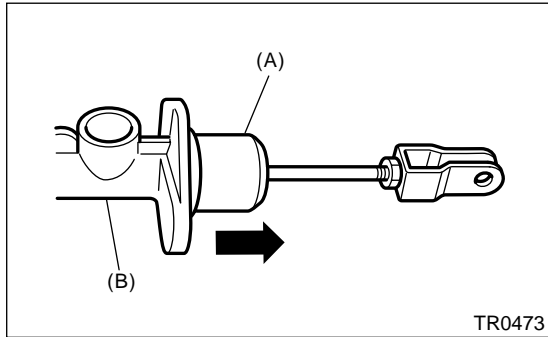
4) Remove oil seal.



# MASTER CYLINDER

## CLUTCH SYSTEM

5) Move the cylinder boot backward.



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

6) Remove the stop ring.

### CAUTION:

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

7) Remove air bleeder.

## D: ASSEMBLY

### 1. EXCEPT RHD TURBO MODEL

1) Install clutch damper. (2.0L Non-turbo model)

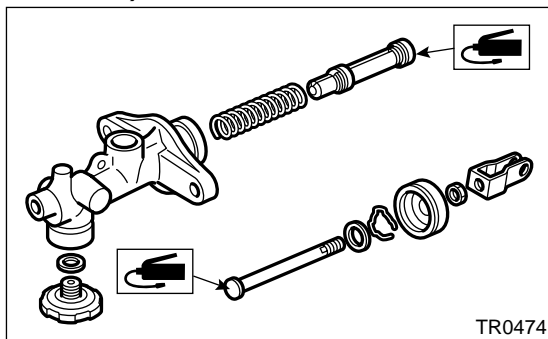
#### Tightening torque:

**46.6 N·m (4.75 kgf-m, 34.4 ft-lb)**

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

#### Grease:

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



3) To assemble the master cylinder reverse the sequence of disassembly procedure.

#### Tightening torque:

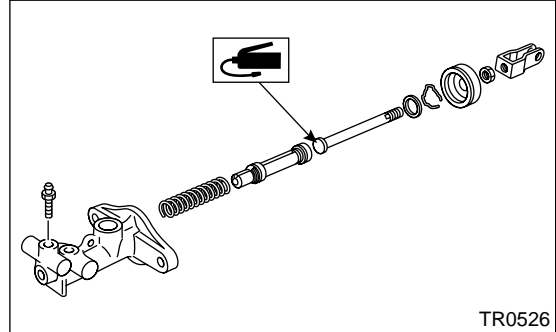
**10 N·m (1.0 kgf-m, 7 ft-lb)**

### 2. RHD TURBO MODEL

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

#### Grease:

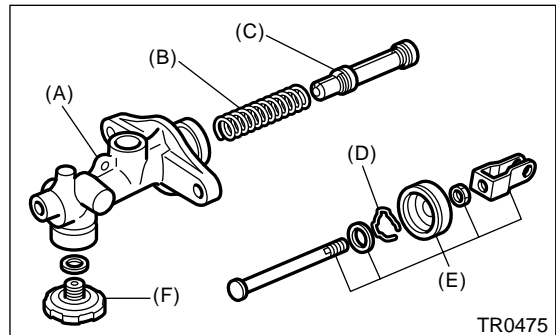
**SILICONE GREASE G40M (Part No. 004404003)**



2) Assemble in the reverse order of disassembly.

## 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 and hose replace the faulty part.



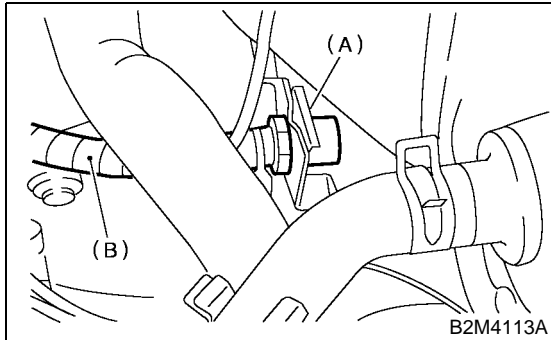
- (A) Master cylinder body
- (B) Return spring
- (C) Piston
- (D) Stop ring
- (E) Rod ASSY
- (F) Clutch damper

## 7. Clutch Pipe and Hose

### A: REMOVAL

#### 1. EXCEPT RHD TURBO MODEL

- 1) Remove air cleaner case and air intake duct.
- 2) Drain clutch fluid. <Ref. to CL-29, Clutch Fluid.>
- 3) Remove clutch pipe from the clutch hose and master cylinder.
- 4) Pull out clamp, then remove clutch hose from bracket.

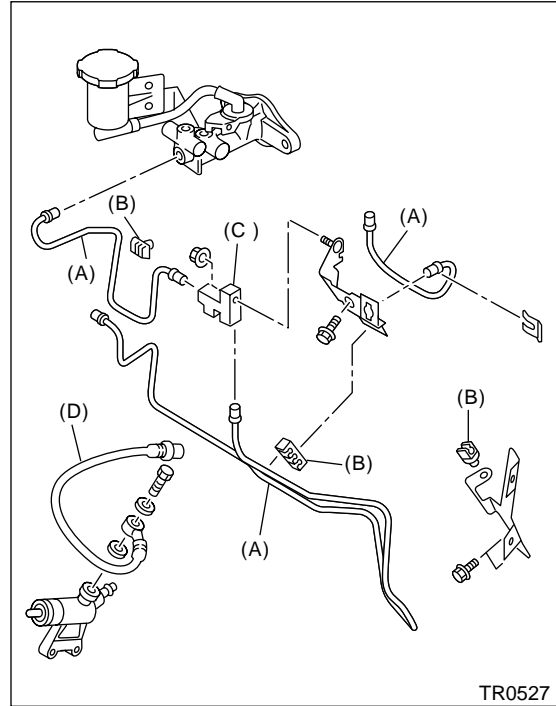


- (A) Clamp
- (B) Clutch hose

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

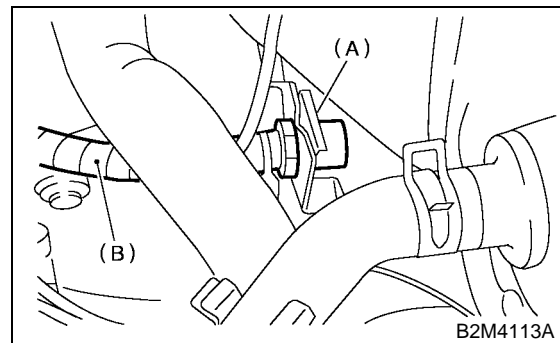
#### 2. RHD TURBO MODEL

- 1) Remove intercooler. <Ref. to IN(DOHC TURBO)-10, REMOVAL, Intercooler.>
- 2) Drain clutch fluid. <Ref. to CL-29, Clutch Fluid.>
- 3) Remove clutch pipe from master cylinder, connector and clutch hose.



- (A) Clutch pipe
- (B) Clip
- (C) Connector
- (D) Clutch hose

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



- (A) Clamp
- (B) Clutch hose

- 5) Remove connector.
- 6) Remove bracket.

# CLUTCH PIPE AND HOSE

## CLUTCH SYSTEM

### B: INSTALLATION

#### 1. EXCEPT RHD TURBO MODEL

Install in the reverse order of removal.

NOTE:

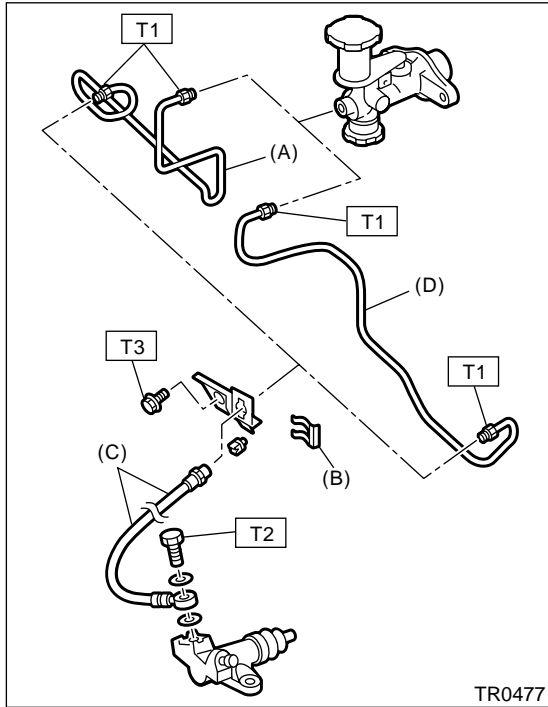
Bleed clutch fluid. <Ref. to CL-30, Clutch Fluid Air Bleeding.>

**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, 18.1 ft-lb)**



TR0477

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

#### 2. RHD TURBO MODEL

Install in the reverse order of removal.

NOTE:

Bleed clutch fluid. <Ref. to CL-30, Clutch Fluid Air Bleeding.>

**Tightening torque:**

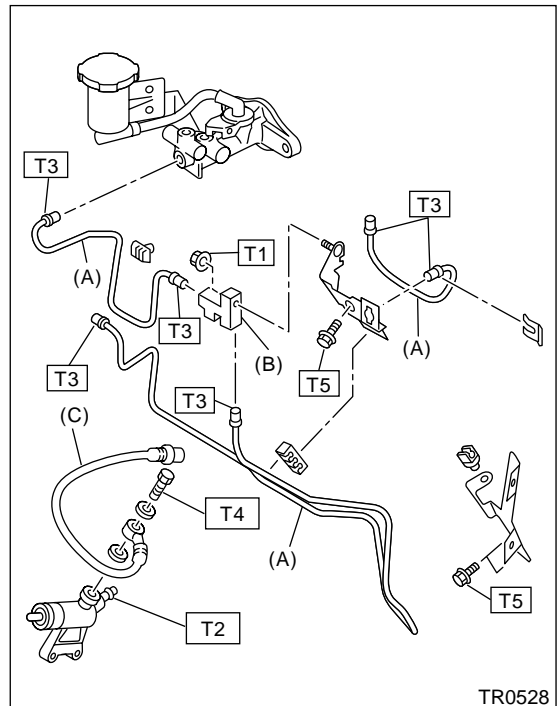
**T1: 7.5 N·m (0.76 kgf-m, 5.53 ft-lb)**

**T2: 8 N·m (0.8 kgf-m, 5.8 ft-lb)**

**T3: 15 N·m (1.5 kgf-m, 10.8 ft-lb)**

**T4: 18 N·m (1.8 kgf-m, 13.0 ft-lb)**

**T5: 25 N·m (2.5 kgf-m, 18.1 ft-lb)**



TR0528

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

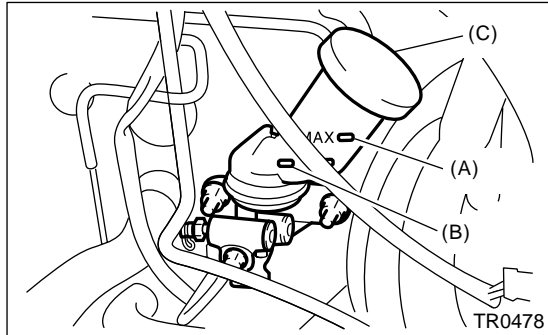
### C: INSPECTION

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

## 8. Clutch Fluid

### A: INSPECTION

- 1) Park vehicle on a level surface.
- 2) Inspect the fluid level using scale on the outside of the reservoir tank. If the level is below "M2N", add fluid to bring it up to "MAX", and also inspect for leakage.



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

- 5) Drain fluid in the same method as the air bleeding.
- 6) Refill brake fluid before reservoir tank becomes empty, and drain contaminated fluid again.
- 7) Repeat the above procedure until the contaminated fluid is completely drained.

### B: REPLACEMENT

#### CAUTION:

- The FMVSS No. 116, fresh DOT3 or 4 brake fluid must be used.
- Cover bleeder with waste cloth, when loosening it, to prevent brake fluid from being splashed over surrounding parts.
- Avoid mixing different brands of brake fluid to prevent degrading the quality of the fluid.
- 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 entry of air.
  - Clutch pedal operating must be very slow.
  - For convenience and safety, it is advisable to have two men working.
  - The amount of brake fluid required is approximately 70 mℓ (2.4 US fl oz, 2.5 Imp fl oz) for total clutch system.
- 1) Remove air cleaner case and air duct.
  - 2) Either jack-up vehicle and place a safety stand under it, or lift-up vehicle.
  - 3) Draw out the brake fluid from reservoir tank with syringe.
  - 4) Refill reservoir tank with recommended brake fluid.

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

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

# CLUTCH FLUID AIR BLEEDING

## CLUTCH SYSTEM

### 9. Clutch Fluid Air Bleeding

#### A: PROCEDURE

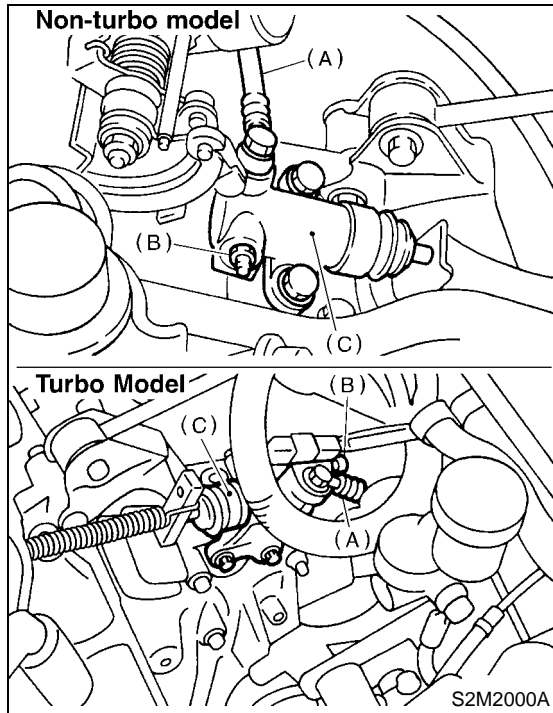
##### NOTE:

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

1) Remove air cleaner case and air intake duct. (Non-turbo model) <Ref. to IN(SOHC)-6, REMOVAL, Air Cleaner Case.> and <Ref. to IN(SOHC)-7, REMOVAL, Air Intake Duct.>

2) Remove intercooler. (Turbo model) <Ref. to IN(DOHC TURBO)-10, REMOVAL, Intercooler.>

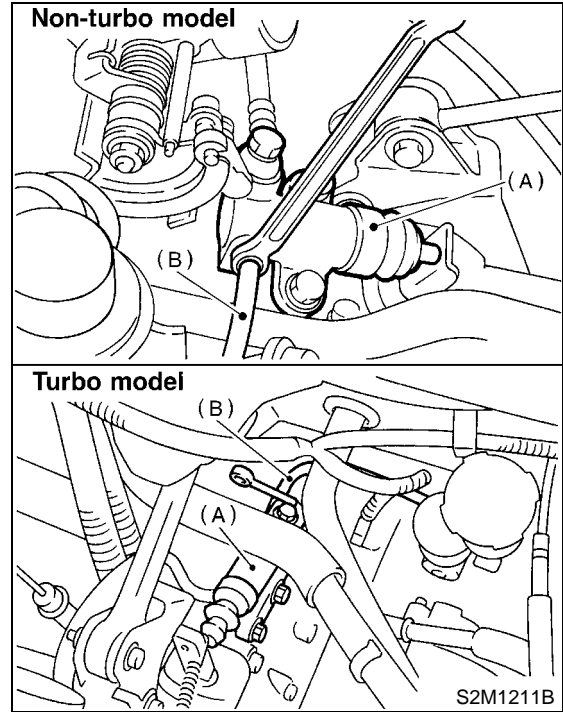
3) Fit one end of a vinyl tube into the air bleeder of operating cylinder and put the other end into a brake fluid container.



- (A) Clutch hose
- (B) Air bleeder
- (C) Operating cylinder

4) 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.



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

5) Repeat these steps until there are no more air bubbles in the vinyl tube.

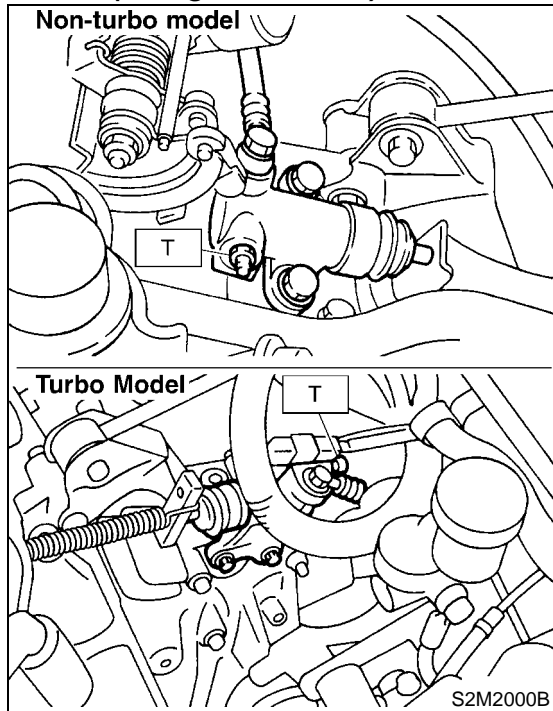
##### CAUTION:

**Cover bleeder with waste cloth when loosening it, to prevent brake fluid from being splashed over surrounding parts.**

6) Tighten air bleeder.

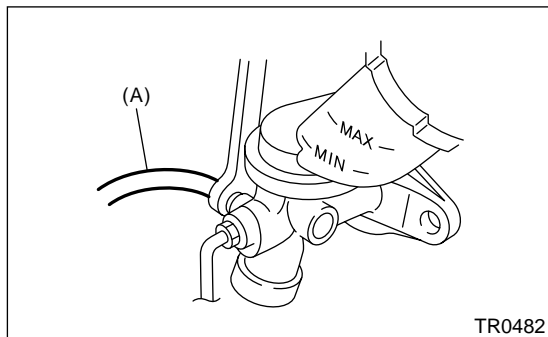
**Tightening torque:**

**T: 8 N·m (0.8 kgf·m, 5.8 ft·lb)**



7) Repeat 2) through 4) using air bleeder on operating cylinder. (Non-turbo model)

8) Repeat steps 2) through 4) using air bleeder on master cylinder operating cylinder. (Turbo model)



(A) Vinyl tube

9) Tighten air bleeder.

**Tightening torque:**

**8 N·m (0.8 kgf·m, 5.8 ft·lb)**

10) After depressing the clutch pedal, make sure that there are no leaks evident in the entire system.

11) After bleeding air from system, ensure that clutch operates properly.



# CLUTCH PEDAL

## CLUTCH SYSTEM

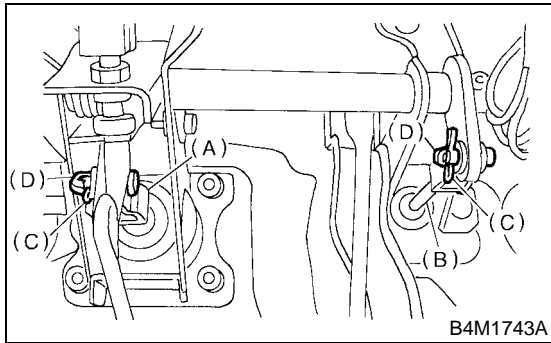
### 10. Clutch Pedal

#### A: REMOVAL

##### 1. LHD MODEL

###### • 2.0L model

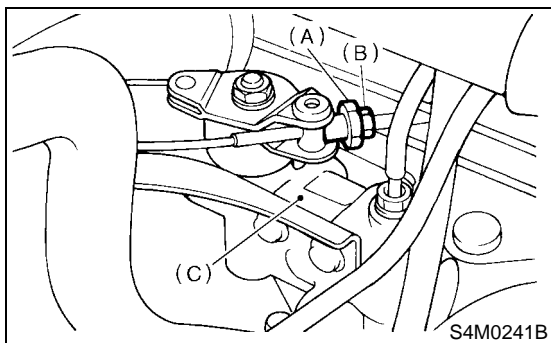
- 1) Remove steering column. <Ref. to PS-30, REMOVAL, Tilt Steering Column.>
- 2) Disconnect connectors from stop light and clutch switches.
- 3) Remove snap pins which secure lever to push rod and operating rod.
- 4) Remove clevis pins which secure lever to push rod and operating rod.



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

- 5) Remove air cleaner case and intake duct. <Ref. to IN(SOHC)-6, REMOVAL, Air Cleaner Case.> and <Ref. to IN(SOHC)-7, REMOVAL, Air Intake Duct.>

- 6) Remove PHV adjusting nut and lock nut. (with hill holder)

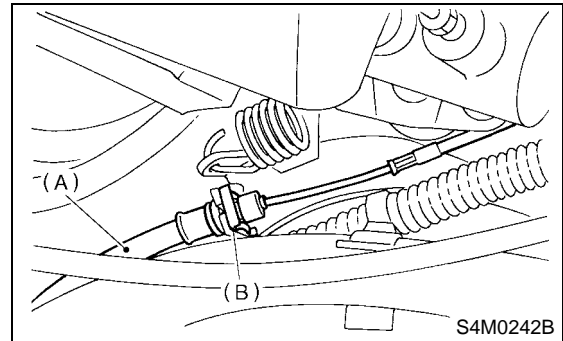


- (A) Adjusting nut
- (B) Lock nut
- (C) PHV

- 7) Remove cable clamp, and disconnect PHV cable from PHV. (with hill holder)

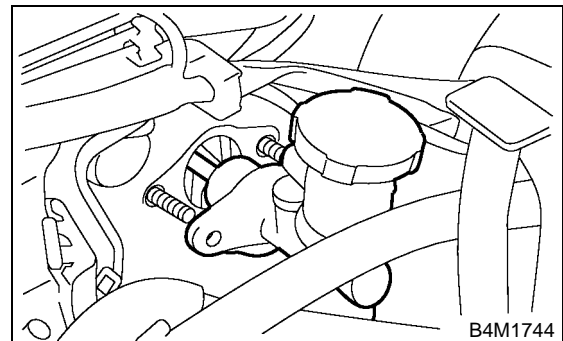
#### CAUTION:

Carefully protect boot and inner cable from damage when disconnecting PHV cable.



- (A) PHV cable
- (B) Clamp

- 8) Remove nut which secures clutch master cylinder.

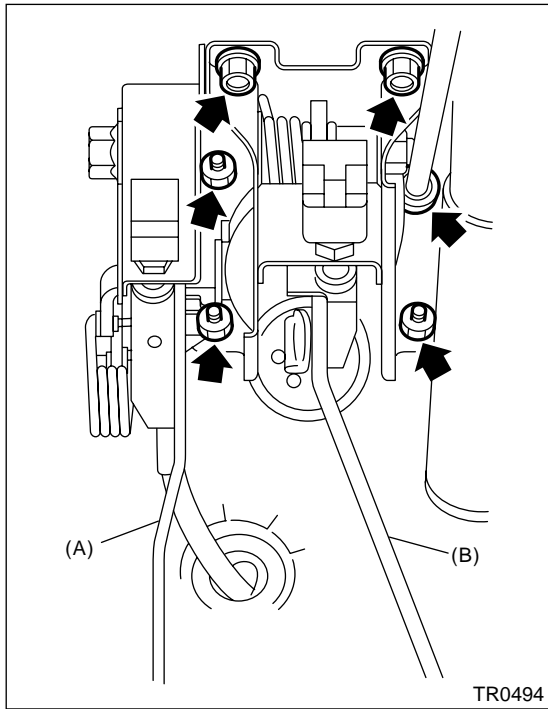


- 9) Remove bolts and nuts which secure brake and clutch pedals, and remove pedal assembly.

###### • 1.6L model

- 1) Remove battery ground terminal.
- 2) Remove air cleaner case and intake duct. <Ref. to IN(SOHC)-6, REMOVAL, Air Cleaner Case.> and <Ref. to IN(SOHC)-7, REMOVAL, Air Intake Duct.>
- 3) Disconnect clutch cable from release lever.
- 4) Remove instrument panel lower cover.
- 5) Disconnect operating rod of brake pedal.
- 6) Remove electrical connectors (for stop light switch, etc.)

7) Remove bolts and nuts which secure brake and clutch pedals, and remove pedal bracket and clutch cable as a unit.



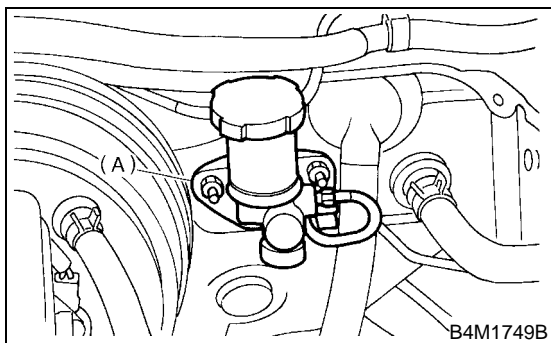
(A) Clutch pedal  
(B) Brake pedal

8) Depress clutch pedal, disconnect clutch cable from clutch pedal.

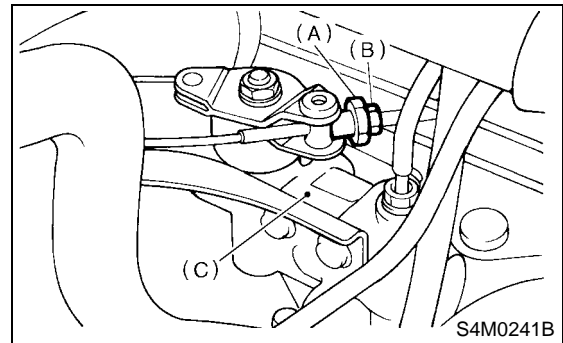
## 2. RHD MODEL

### • 2.0L model

- 1) Disconnect ground terminal from battery.
- 2) Disconnect connector from clutch. (With cruise control)
- 3) Remove snap pin and clevis pin that join push rod and clutch pedal.
- 4) Remove master cylinder mounting nuts.



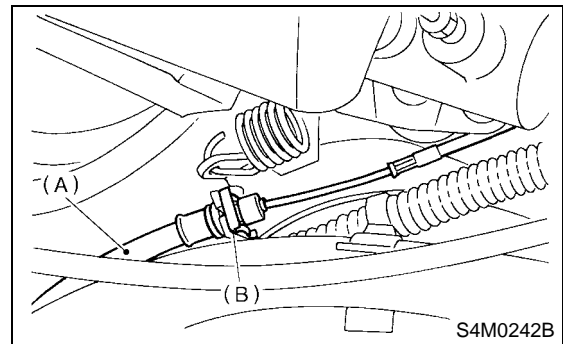
5) Remove PHV adjusting nut and lock nut. (with hill holder)



(A) Adjusting nut  
(B) Lock nut  
(C) PHV

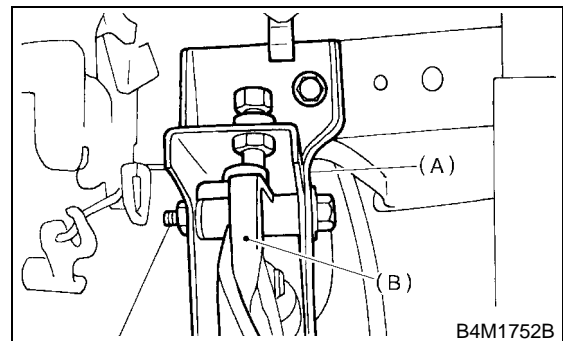
6) Remove cable clamp and disconnect PHV cable from PHV. (with hill holder)

**CAUTION:**  
Carefully protect boot and inner cable from damage when disconnecting PHV cable.



(A) PHV cable  
(B) Clamp

7) Remove clutch pedal and bracket as a unit.



(A) Clutch pedal bracket  
(B) Clutch pedal

# CLUTCH PEDAL

## CLUTCH SYSTEM

### B: INSTALLATION

1) Install in the reverse order of removal.

#### CAUTION:

- If cable clamp is damaged, replace it with a new one.
- Never fail to cover outer cable end with boot.
- Be careful not to kink accelerator cable.
- Always use new clevis pins.

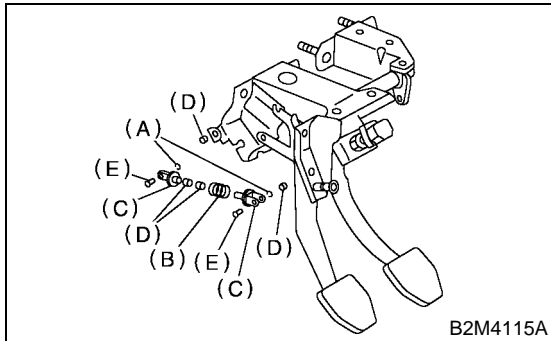
2) Adjustment of clutch pedal and adjustment after pedal installation.<Ref. to CL-36, ADJUSTMENT, Clutch Pedal.>

### C: DISASSEMBLY

#### 1. LHD MODEL

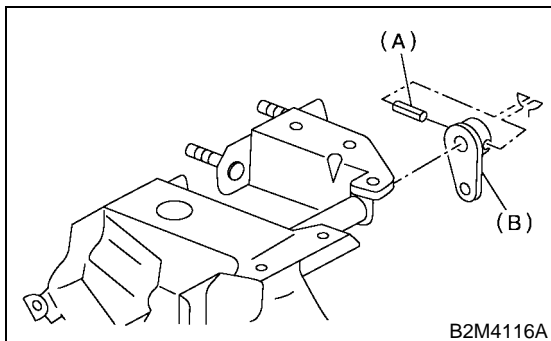
##### • 2.0L model

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



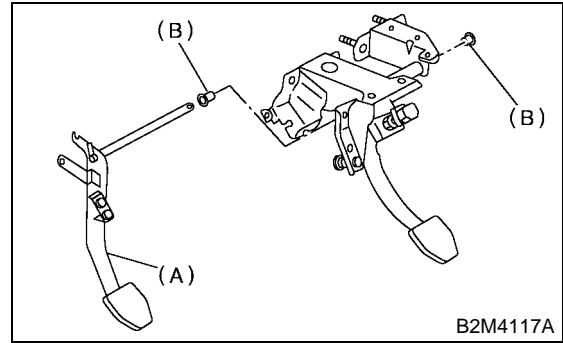
- (A) Clip
- (B) Assist spring
- (C) Assist rod
- (D) Bushing
- (E) Clevis pin

3) Remove spring pin and lever.



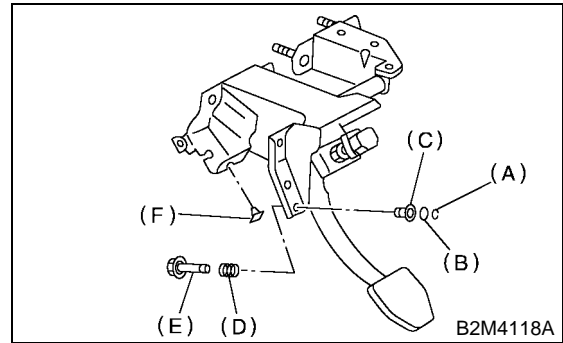
- (A) Pin
- (B) Lever

4) Remove clutch pedal and bushings.



- (A) Clutch pedal
- (B) Bushing

5) Remove stopper, clip, O-ring, rod S, and then remove spring and bushing S.



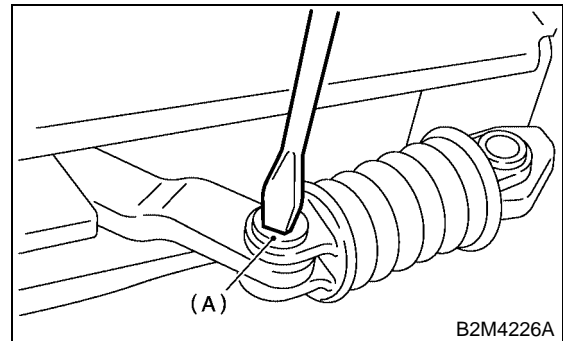
- (A) Clip
- (B) O-ring
- (C) Bushing S
- (D) Spring S
- (E) Rod S
- (F) Stopper

6) Remove stoppers from clutch pedal.

7) Remove clutch pedal pad. (Non-turbo model)

#### 2. RHD MODEL

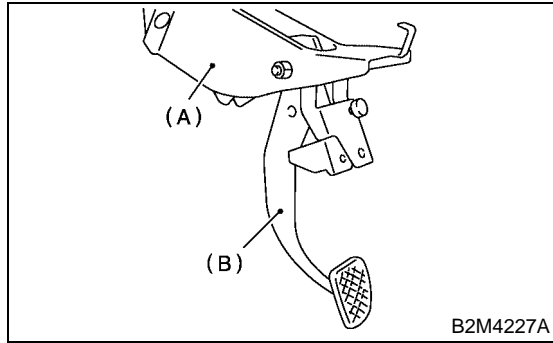
- 1) Remove clutch switch.
- 2) Remove clip, pull out clevis pin.



- (A) Clevis pin

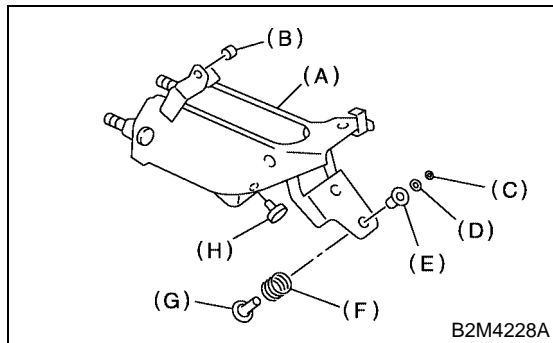
3) Remove assist rod, spring and bushing.

4) Remove clutch pedal from clutch pedal bracket.



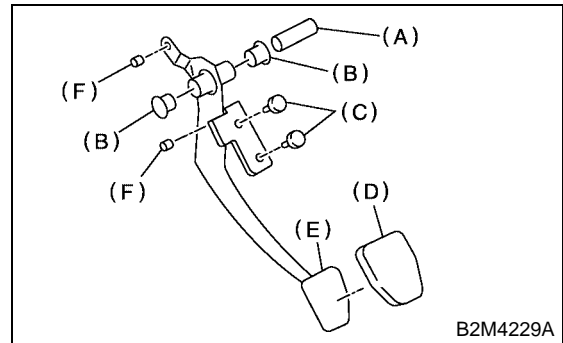
- (A) Clutch pedal bracket
- (B) Clutch pedal

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



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

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

#### NOTE:

- Clean up inside of bushings and apply grease before installing spacer.
- 4) Install hill holder cable to the clutch pedal. (Vehicle with hill holder)

### 2. RHD MODEL

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

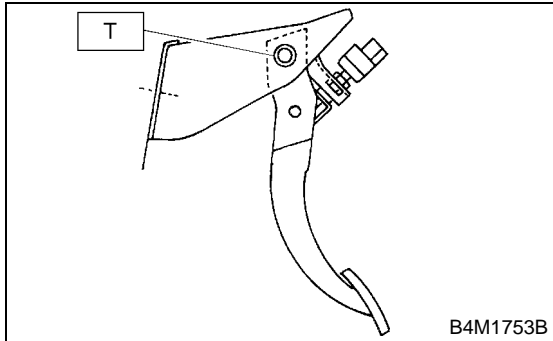
# CLUTCH PEDAL

## CLUTCH SYSTEM

4) Install clutch pedal to pedal bracket.

### Tightening torque:

**T: 29 N·m (3.0 kgf·m, 21.7 ft·lb)**



5) Install assist rod, bushing and assist spring to clutch pedal and pedal bracket.  
6) Install PHV cable to clutch pedal. (Vehicle with hill holder).

## E: INSPECTION

### 1. CLUTCH PEDAL

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

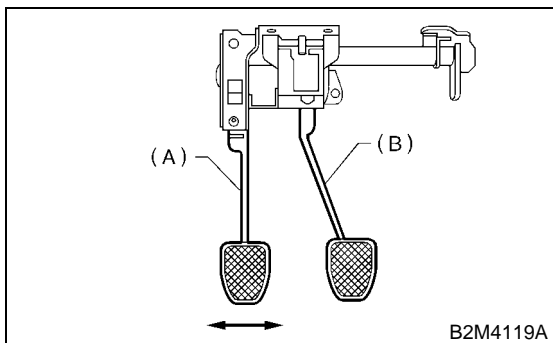
#### CAUTION:

If excessive deflection is noted, replace bushings with new ones.

#### Deflection of clutch pedal:

##### Service limit

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



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

## F: ADJUSTMENT

### 1. CLUTCH PEDAL

#### • 2.0L model

1) Turn lock nuts until clutch pedal full stroke length is within specifications.

#### CAUTION:

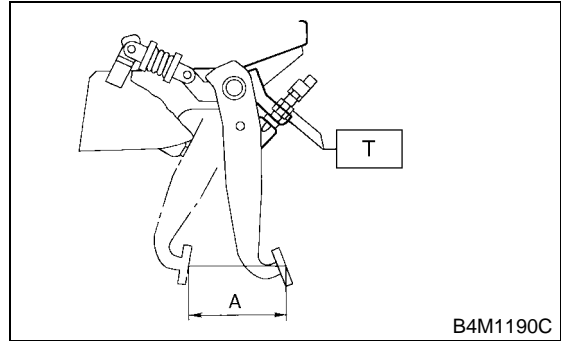
Do not attempt to turn clutch switch to adjust clutch pedal full stroke length.

#### NOTE:

If lock nuts cannot adjust clutch pedal full stroke length to specifications, turn master cylinder push rod to adjust it.

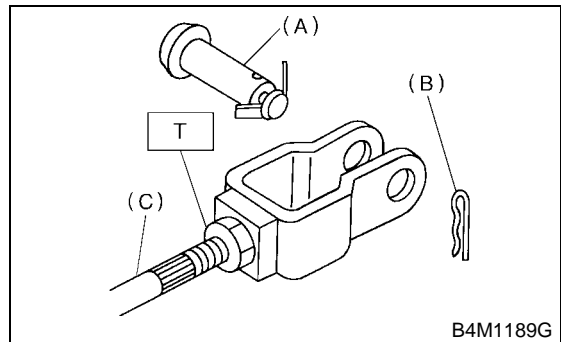
**Specified clutch pedal full stroke: A**  
**130 — 135 mm (5.12 — 5.31 in)**

**Tightening torque (Clutch switch lock nut):**  
**T: 8 N·m (0.8 kgf·m, 5.8 ft·lb)**



2) Turn master cylinder push rod so that clevis pin moves to the left and then to the right. Clevis pin must move without resistance while it is rattling.

**Tightening torque (Push rod lock nut):**  
**T: 10 N·m (1.0 kgf·m, 7 ft·lb)**



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

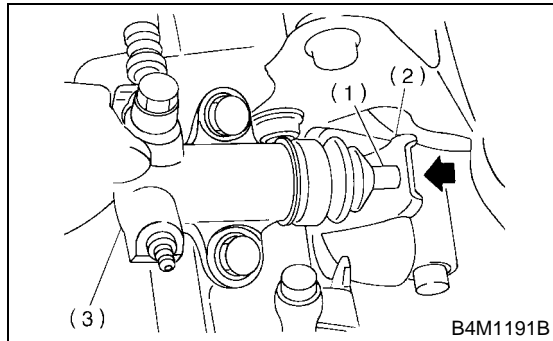
3) Depress and release clutch pedal 2 to 3 times to ensure that clutch pedal and release fork operate smoothly. If clutch pedal and release fork do not operate smoothly, bleed air from clutch hydraulic system. <Ref. to CL-30, Clutch Fluid Air Bleeding.>

4) Measure 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)**

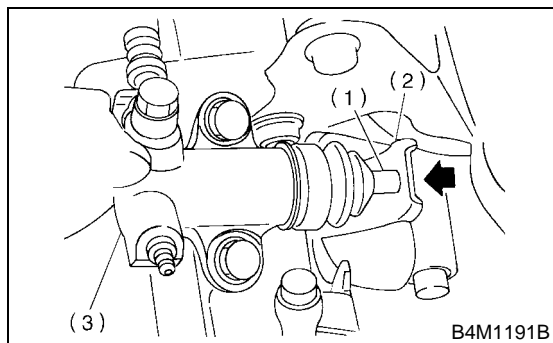
5) Move clevis pin to the left and then to the right. It should move without resistance while it is rattling. If resistance is felt, repeat adjustment procedures again from the beginning.

6) Push release lever until operating cylinder push rod retracts. Ensure that clutch fluid level in reservoir tank increases. If clutch fluid level increases, hydraulic clutch is properly adjusted; if fluid level does not increase or push rod does not retract, replace master cylinder with new one. <Ref. to CL-24, Master Cylinder.>



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

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



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

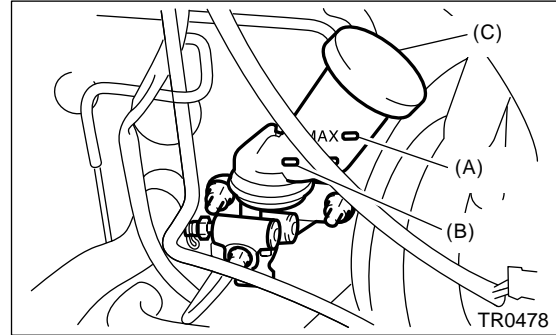
8) If clutch fluid level increases, hydraulic clutch play is correct.

9) If clutch fluid level does not increase or push rod does not retract, clutch pedal must be readjusted.

10) 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

**• 1.6L model**

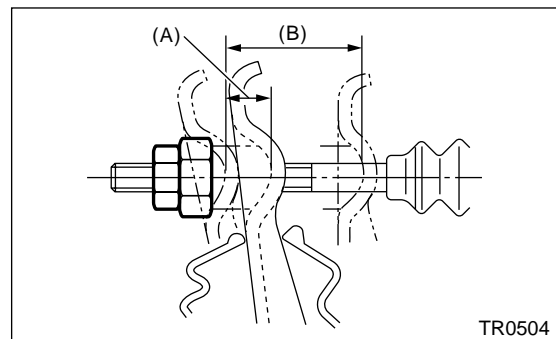
- 1) Remove battery ground terminal.
- 2) Remove air cleaner case and intake duct. <Ref. to IN(SOHC)-6, REMOVAL, Air Cleaner Case.> and <Ref. to IN(SOHC)-7, REMOVAL, Air Intake Duct.>
- 3) Remove release lever return spring from lever.
- 4) Loosen the lock nut.
- 5) Adjust spherical nut so that the play is within the specified value the lever end (center of spherical nut).

**CAUTION:**

**Take care not to twist the cable during adjustment.**

**Play: 3 — 4 mm (0.12 — 0.16 in)**

**Full stroke: 24 — 26 mm (0.94 — 1.02 in)**



- (A) Play
- (B) Full stroke

# CLUTCH PEDAL

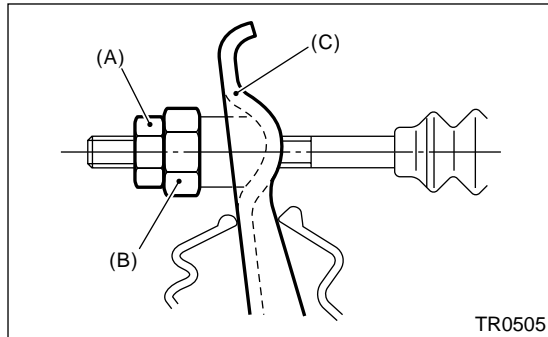
## CLUTCH SYSTEM

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6) Upon completion of adjustment, securely lock spherical nut with lock nut.

**Tightening torque:**

**5.9 N·m (0.60 kgf-m, 4.3 ft-lb)**



- (A) Lock nut
- (B) Spherical nut
- (C) Clutch release lever

7) Install return spring on lever.

**NOTE:**

Hook the long hook side of the return spring with the lever.

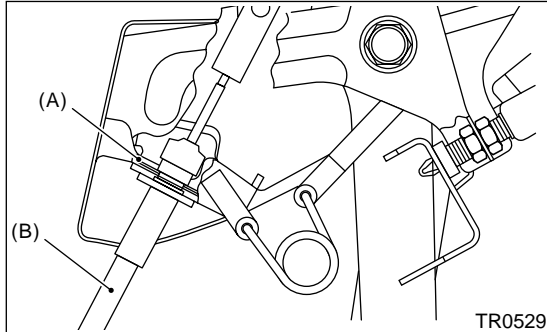
8) Depress clutch pedal to assure there is no abnormality in the clutch system.

9) Install air cleaner case and intake duct. <Ref. to IN(SOHC)-6, INSTALLATION, Air Cleaner Case.> and <Ref. to IN(SOHC)-7, INSTALLATION, Air Intake Duct.>

## 11. Clutch Cable

### A: REMOVAL

- 1) Remove battery ground terminal.
- 2) Remove air cleaner case and intake duct. <Ref. to IN(SOHC)-6, REMOVAL, Air Cleaner Case.> and <Ref. to IN(SOHC)-7, REMOVAL, Air Intake Duct.>
- 3) Disconnect clutch cable from release lever.
- 4) Depress clutch pedal to the floor.
- 5) Remove clutch cable clamp from pedal bracket.



- (A) Clamp  
(B) Clutch cable

- 6) Remove clutch cable from body.

### B: INSTALLATION

- 1) Clean clutch pedal fitting hole, and apply grease. Connect clutch to clutch pedal.
- 2) Fit clutch pedal to pedal bolt, and connect clutch cable to bracket with clamp.
- 3) Connect clutch cable end to pedal end.
- 4) Connect clutch cable to release lever.
- 5) Install grommet to toe board.
- 6) Adjustment after cable installation. <Ref. to CL-36, ADJUSTMENT, Clutch Pedal.>
- 7) Install air cleaner case and intake duct. <Ref. to IN(SOHC)-6, INSTALLATION, Air Cleaner Case.> and <Ref. to IN(SOHC)-7, INSTALLATION, Air Intake Duct.>

### C: INSPECTION

Check the removed cable and replace if damaged, rusty, or malfunctioning.

- 1) Check for smooth operation of the cable.
- 2) Check the inner cable for damage and rust.
- 3) Check the outer cable for damage, bends, and cracks.
- 4) Check the boot for damage, cracks, and deterioration.



# CLUTCH SWITCH

## CLUTCH SYSTEM

### 12. Clutch Switch

#### A: REMOVAL

- 1) Remove battery ground terminal.
- 2) Disconnect connector from clutch switch.
- 3) Remove clutch switch.

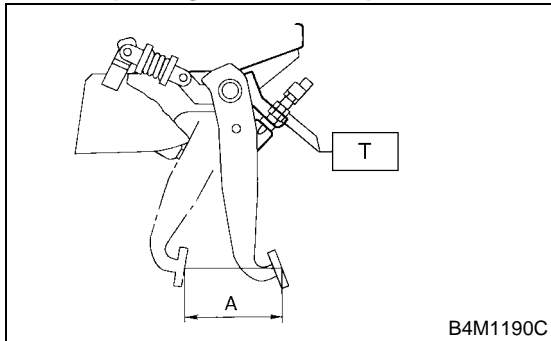
#### B: INSTALLATION

- 1) Move clevis pin of the push rod right and left and hold where it moves smoothly, then measure stroke of clutch pedal.

**Specified clutch pedal full stroke:A**  
**130 — 135 mm (5.12 — 5.31 in)**

**Tightening torque:**

**T: 8 N·m (0.8 kgf·m, 5.8 ft·lb)**



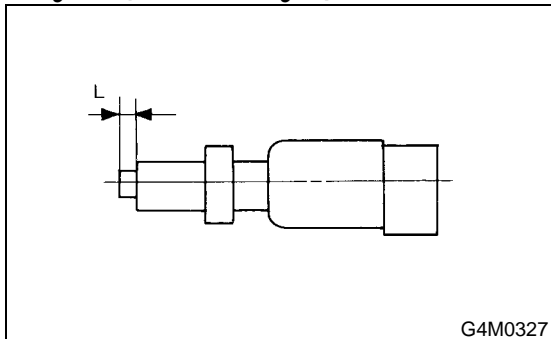
- 2) If clutch pedal stroke is out of specification, adjust the stroke. <Ref. to CL-36, ADJUSTMENT, Clutch Pedal.>
- 3) Connect clutch switch connector.

#### C: INSPECTION

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

**Specified position: L**

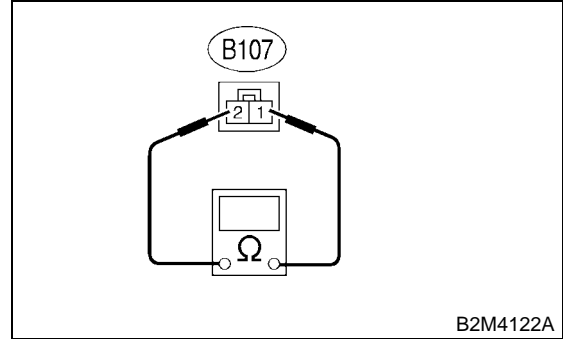
**$2^{+1.5}/_0$  mm ( $0.079^{+0.059}/_0$  in)**



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

Switch position	Tester connection	Specified condition
Switch pin free	1 — 2	Continuity
Switch pin pushed in		No continuity

Clutch switch (With cruise control)



### 13. General Diagnostic Table

#### A: INSPECTION

##### 1. CLUTCH

Symptom	Possible cause	Corrective
<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 speed up when shifting.</li> <li>• High speed driving is impossible; especially rapid acceleration impossible and vehicle speed does not increase in proportion to an 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 stationary condition with parking brake fully applied. Disengage the clutch and shift the transmission gear into the first. 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	Correct or replace.
	(e) Defective release bearing holder	Correct 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 first gear. However, because much trouble of this sort is due to defective synchronization mechanism, carry out the test as described after.</p> <ul style="list-style-type: none"> <li>• Method of testing: &lt;Ref. to CL-42, 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	Correct or replace.
	(c) Seized crankshaft pilot needle bearing	Replace.
	(d) Cracked clutch disc facing	Replace.
	(e) Sticked 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 torsion spring	Replace clutch disc.
	(c) Defective facing contact or excessive disc	Replace clutch disc deflection.
	(d) Warped pressure plate or flywheel	Correct or replace.
	(e) Loose disc rivets	Replace clutch disc.
	(f) Loose engine mounting	Retighten or replace mounting.
	(g) Improper adjustment of pitching stopper	Adjustment.

# GENERAL DIAGNOSTIC TABLE

## CLUTCH SYSTEM

Symptom	Possible cause	Corrective
4. Noisy clutch Examine whether the noise is generated when the clutch is disengaged, engaged, or partially engaged.	(a) Broken, worn or unlubricated release bearing	Replace release bearing.
	(b) Insufficient lubrication of pilot bearing	Apply grease.
	(c) Loose clutch disc hub	Replace clutch disc.
	(d) Loose torsion spring retainer	Replace clutch disc.
	(e) Deteriorated or broken torsion spring	Replace clutch disc.
5. Clutch grabs. 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 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 torsion 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 play.
Clutch pedal free play insufficient	Adjust pedal free play.
Excessively worn and damaged pedal shaft and/or bushing	Replace bushing and/or shaft with new one.

## 3. DIAGNOSTIC DIAGRAM OF CLUTCH DRAG

Step	Check	Yes	No
<b>1</b> <b>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</b> <b>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.	Defective transmission or excessive clutch drag torque. Inspect Pilot bearing, clutch disc, transmission and clutch disc hub spline.
<b>3</b> <b>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 N to R, R to N 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.