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.

FUJI HEAVY INDUSTRIES LTD.

G8050GE4

CLUTCH SYSTEM

CL

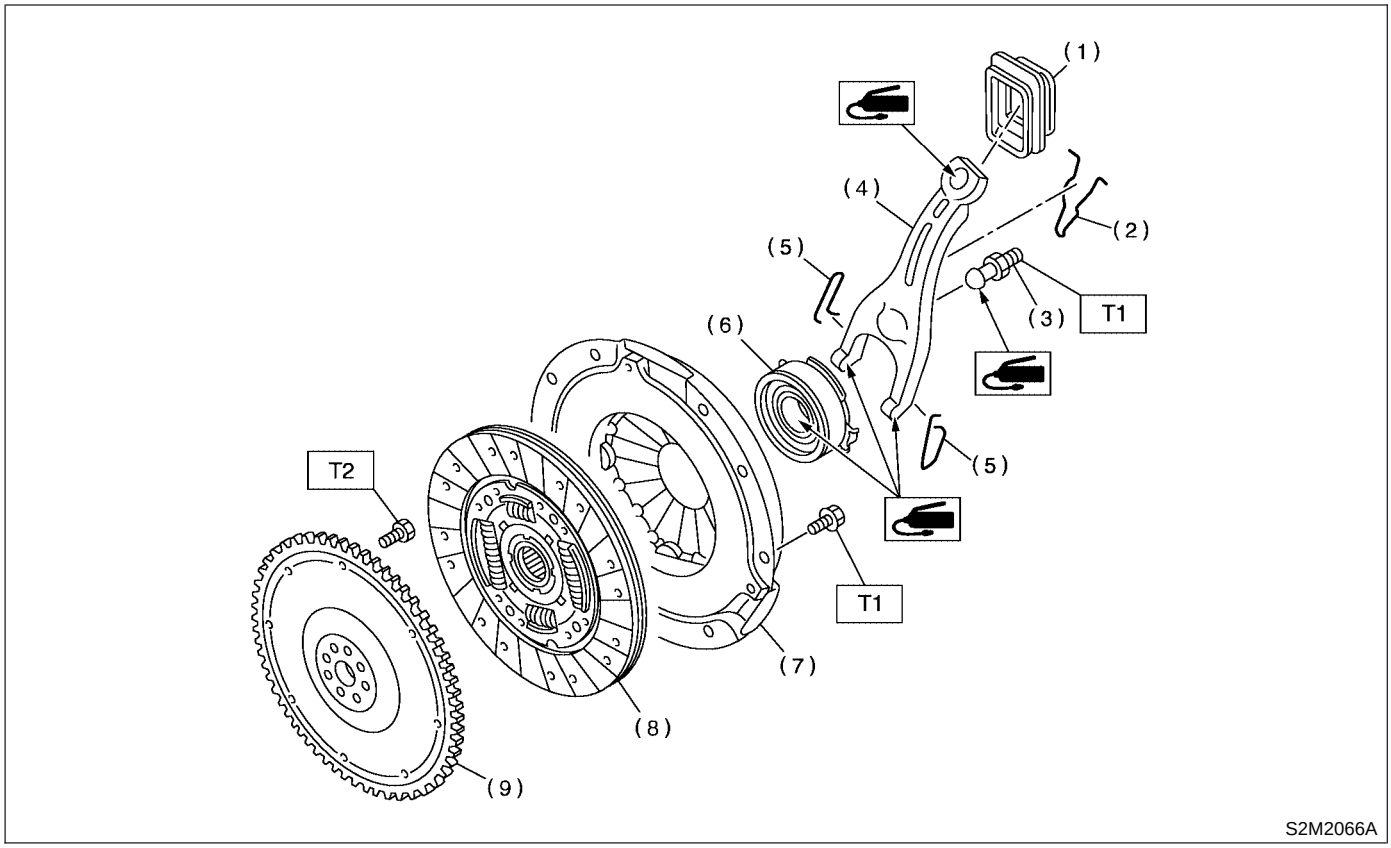
1. General Description S504001

A: SPECIFICATIONS S504001E49

Model				Non-turbo	Turbo
Clutch cover	Type			Push type	Pull type
	Diaphragm set load		kg (lb)	580 (1,279)	700 (1,544)
Clutch disc	Facing material			Woven (Non asbestos)	
	O.D. × I.D. × thickness		mm (in)	225 × 150 × 3.5 (8.86 × 5.91 × 0.138)	230 × 150 × 3.5 (9.06 × 5.91 × 0.138)
	Spline O.D.		mm (in)	25.2 (0.992), (No. of teeth: 24)	
	Depth of rivet head	Standard	mm (in)	1.65 — 2.25 (0.0650 — 0.0886)	
		Limit of sinking	mm (in)	0.3 (0.012)	
	Limit for deflection		mm (in)	1.0 (0.039) at R = 107 (4.21)	
Clutch release lever ratio				1.6	1.7
Clutch release bearing				Grease-packed self-aligning	
Clutch pedal	Full stroke		mm (in)	130 — 135 (5.12 — 5.31)	
Clutch release lever	Stroke		mm (in)	12 — 13.6 (0.472 — 0.535)	13.3 — 14.7 (0.524 — 0.579)

B: COMPONENT S504001A05

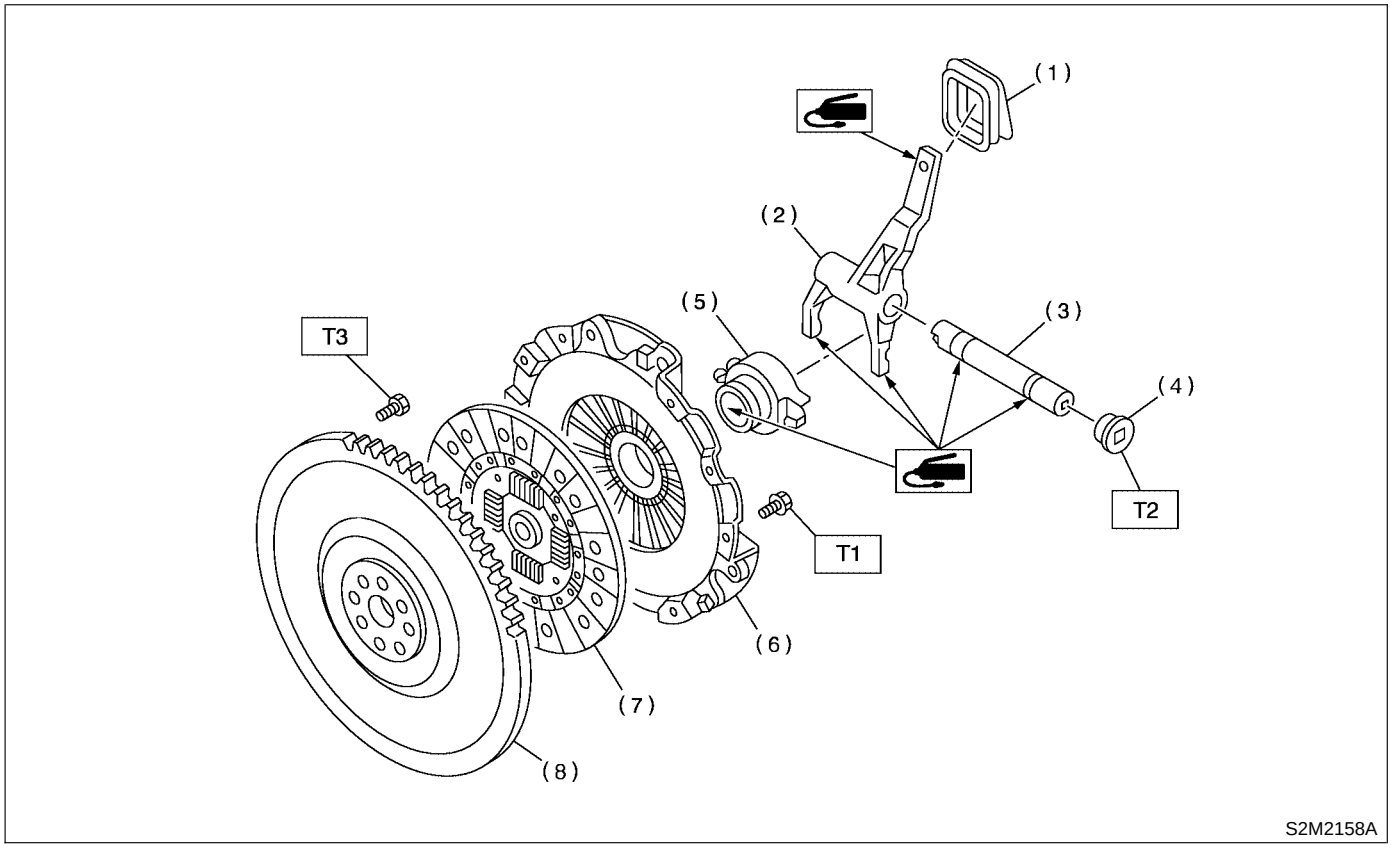
1. CLUTCH ASSEMBLY FOR NON-TURBO MODEL S504001A0504



(1) Clutch release lever sealing
(2) Retainer spring
(3) Pivot
(4) Clutch release lever
(5) Clip
(6) Clutch release bearing
(7) Clutch cover
(8) Clutch disc
(9) Flywheel

Tightening torque: N·m (kgf-m, ft-lb)
T1: 15.7 (1.6, 11.6)
T2: 72 (7.3, 52.8)

2. CLUTCH ASSEMBLY FOR TURBO MODEL S504001A0505

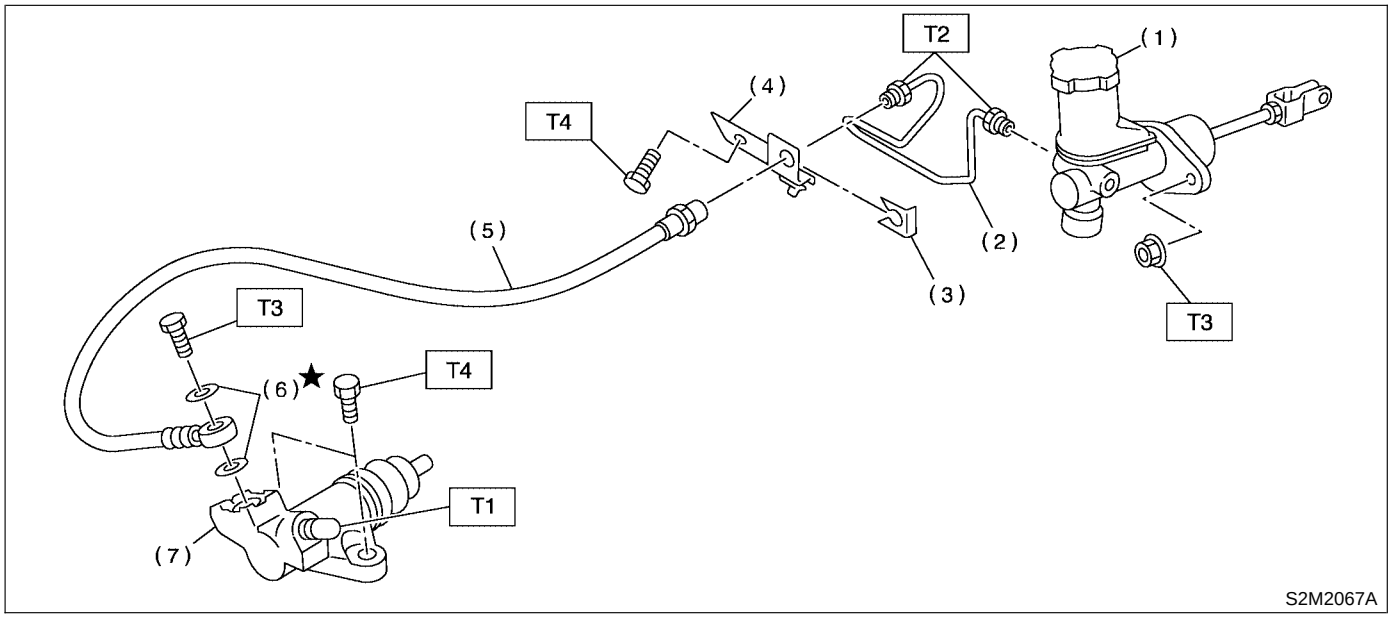


(1) Clutch release lever sealing
(2) Clutch release lever
(3) Clutch release lever shaft
(4) Plug
(5) Clutch release bearing
(6) Clutch cover
(7) Clutch disc
(8) Flywheel

Tightening torque: N·m (kgf-m, ft-lb)
T1: 15.7 (1.6, 11.6)
T2: 44 (4.5, 32.5)
T3: 72 (7.3, 52.8)

3. CLUTCH PIPE AND HOSE FOR NON-TURBO MODEL S504001A0506

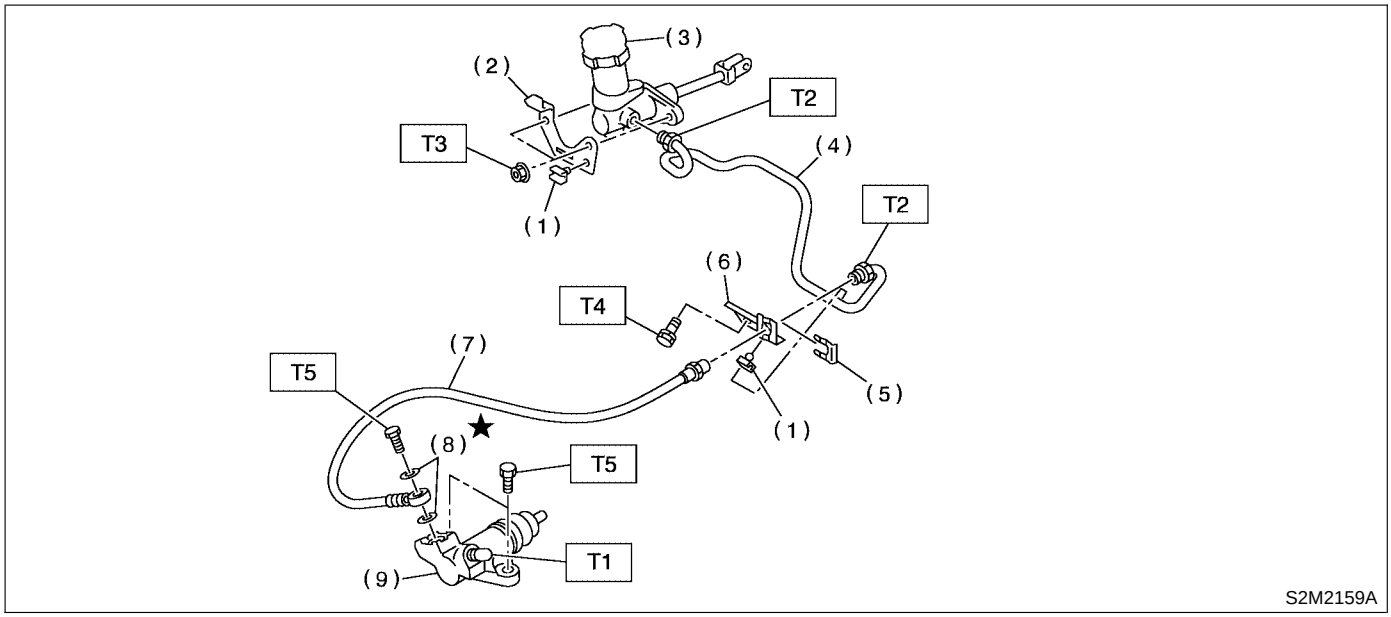
● LHD Model S504001A050601



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

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)

● RHD Model S504001A050602

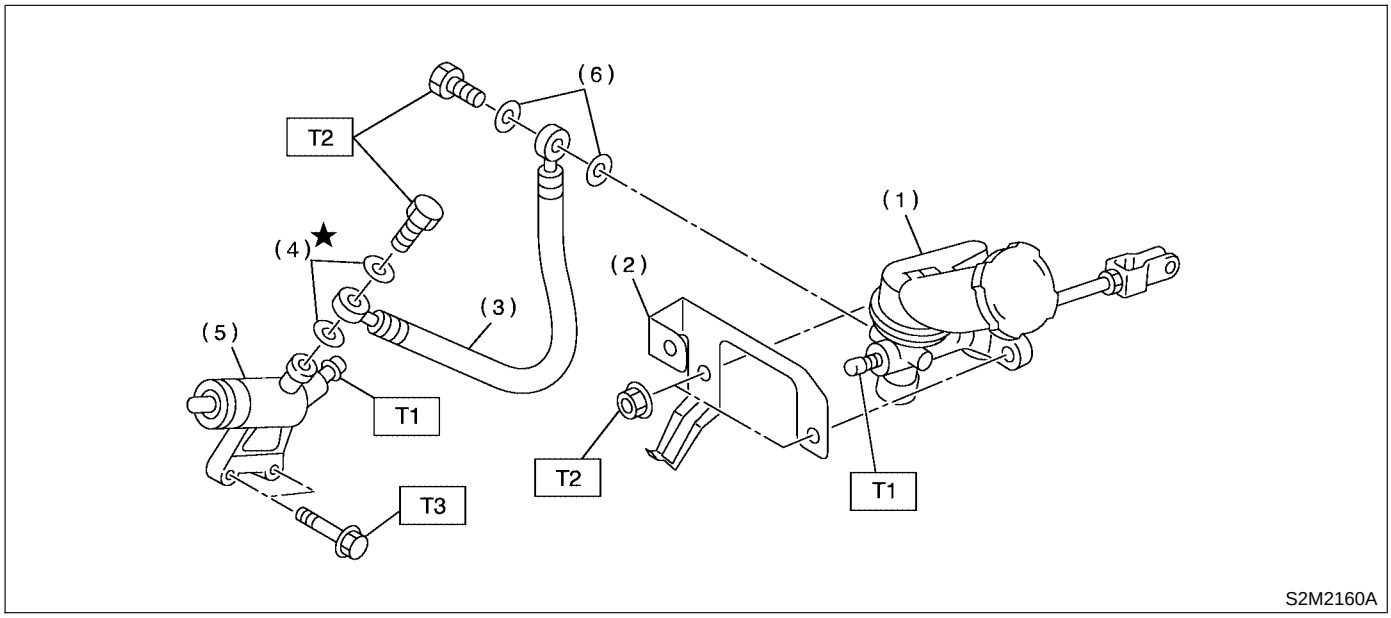


(1) Clamp A
(2) Bracket A
(3) Master cylinder ASSY
(4) Clutch pipe
(5) Clamp B
(6) Bracket B
(7) Clutch hose
(8) Washer
(9) Operating cylinder

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, 18.1)
T5: 37 (3.8, 27.5)

4. CLUTCH PIPE AND HOSE FOR TURBO MODEL S504001A0507

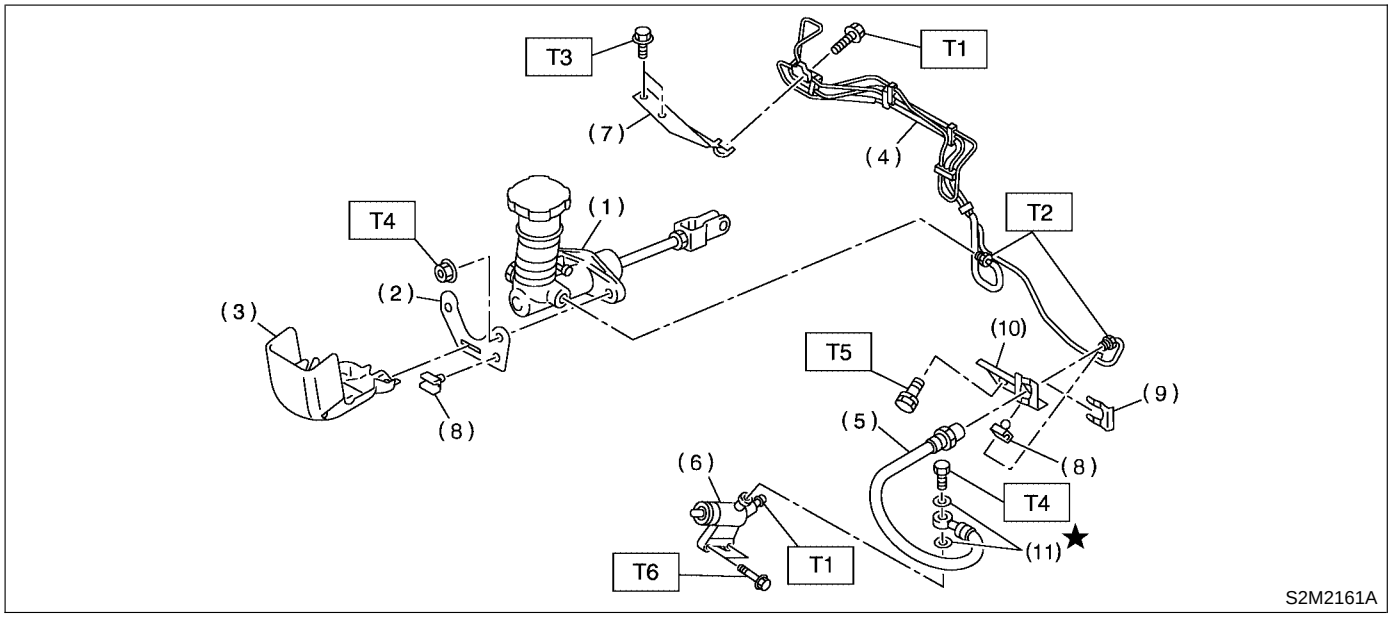
● LHD Model S504001A050701



(1) Master cylinder ASSY
(2) Bracket
(3) Clutch hose
(4) Washer
(5) Operating cylinder

Tightening torque: N·m (kgf-m, ft-lb)
T1: 8 (0.8, 5.8)
T2: 18 (1.8, 13.0)
T3: 37 (3.8, 27.5)

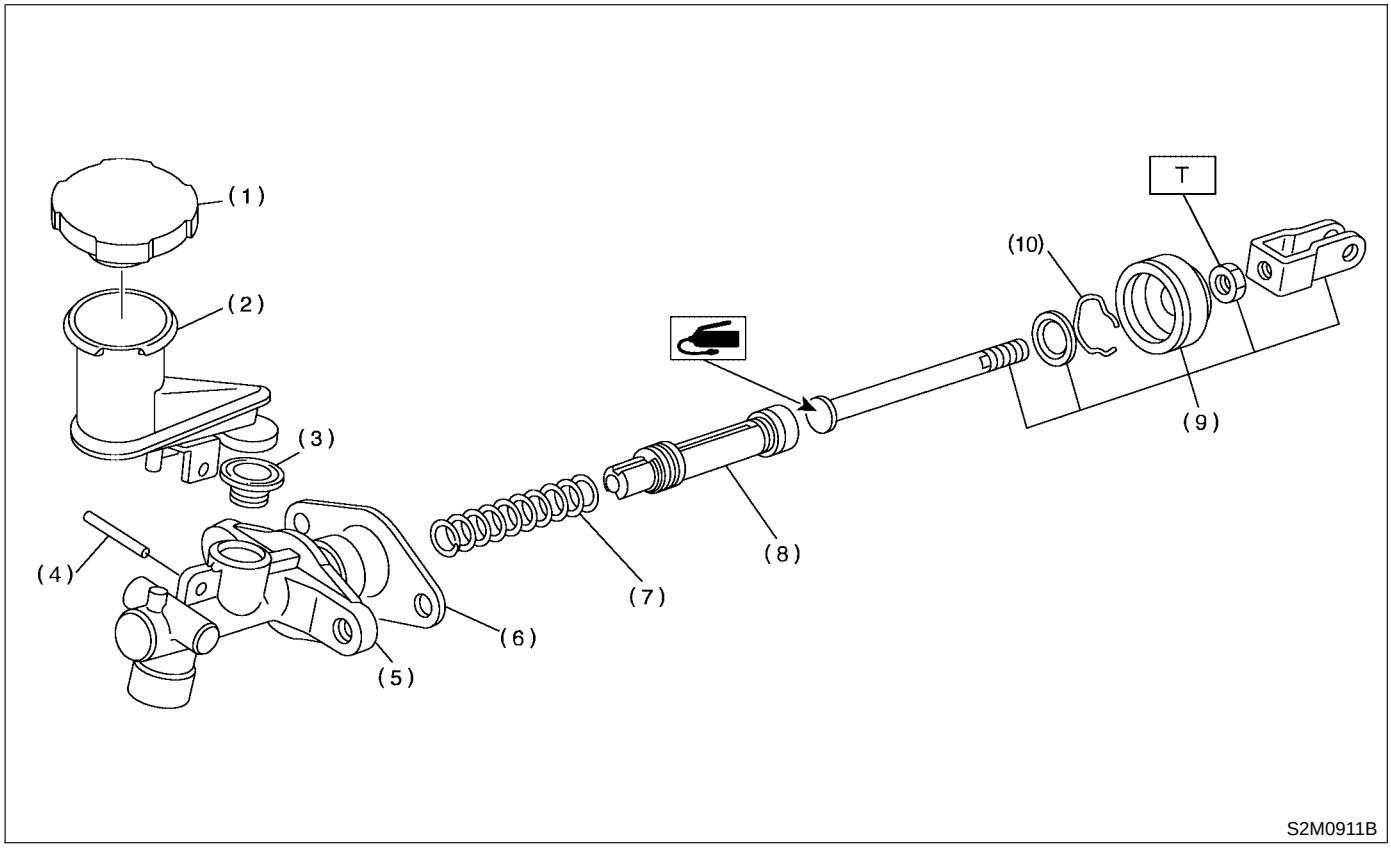
● RHD Model S504001A050702



(1) Master cylinder ASSY
(2) Bracket
(3) Sealed cover
(4) Clutch pipe and connector ASSY
(5) Clutch hose
(6) Operating cylinder
(7) Connector bracket
(8) Clip A
(9) Clip B
(10) Bracket
(11) Washer

Tightening torque: N·m (kgf-m, ft-lb)
T1: 8 (0.8, 5.8)
T2: 15 (1.5, 10.8)
T3: 15.7 (1.6, 11.6)
T4: 18 (1.8, 13.0)
T5: 25 (2.5, 18.1)
T6: 37 (3.8, 27.5)

5. MASTER CYLINDER FOR NON-TURBO MODEL S504001A0508

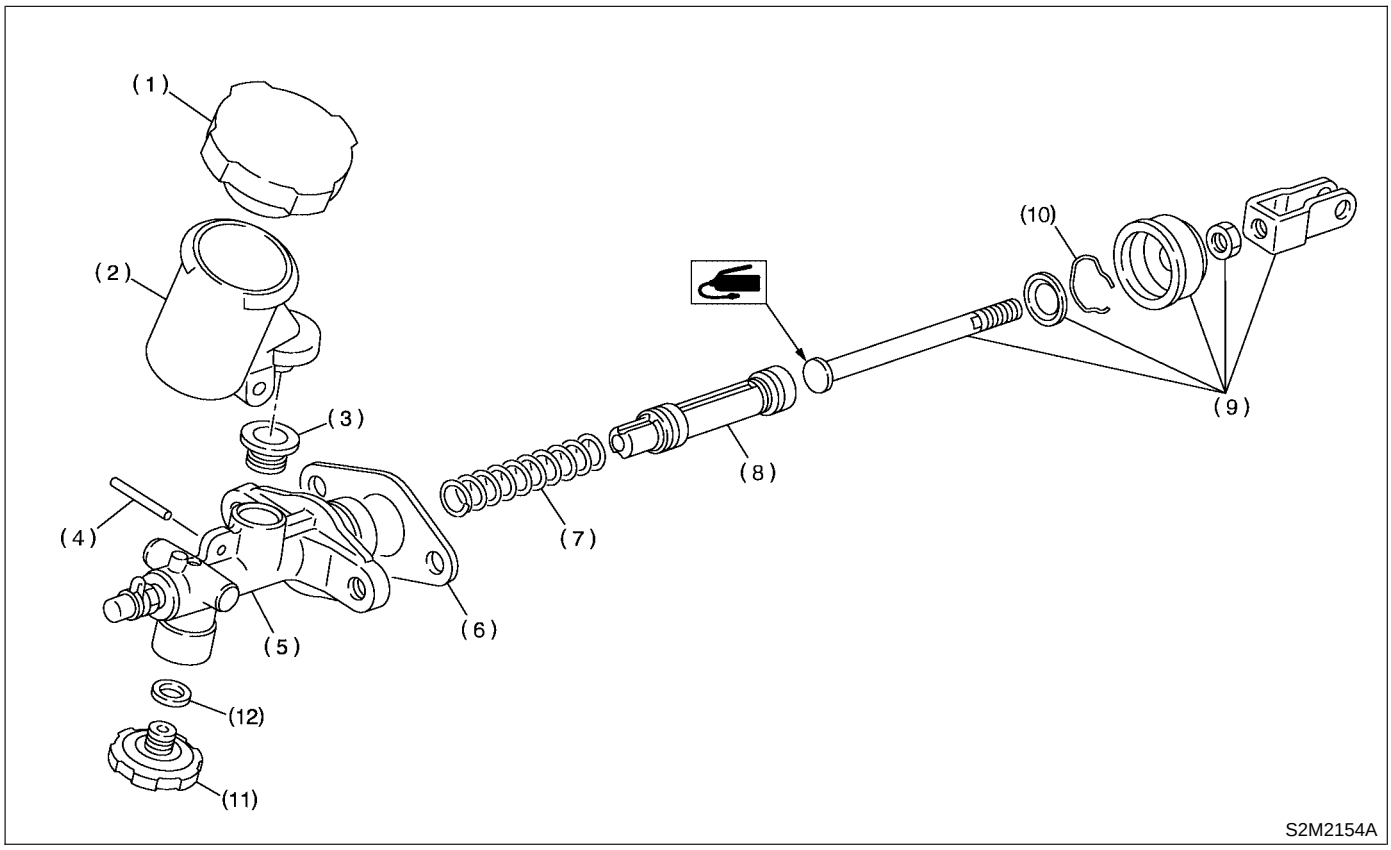


(1) Reservoir cap
(2) Reservoir tank
(3) Oil seal
(4) Straight pin
(5) Master cylinder
(6) Seat
(7) Return spring
(8) Piston
(9) Push rod
(10) Piston stop ring

Tightening torque: N·m (kgf-m, ft-lb)
T: 10 (1.0, 7)

6. MASTER CYLINDER FOR TURBO MODEL S504001A0509

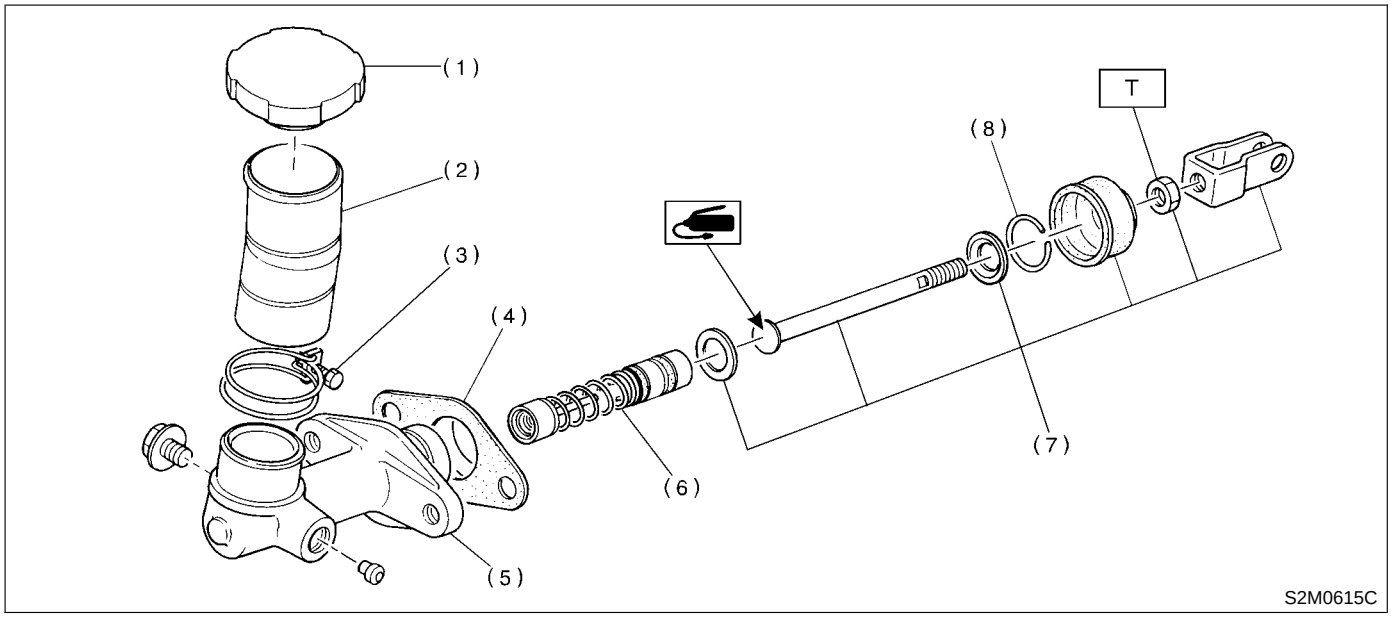
● LHD Model S504001A050901



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

Tightening torque: N·m (kgf-m, ft-lb)
T1: 10 (1.0, 7)
T2: 46.6 (4.75, 34.4)

● RHD Model S504001A050902

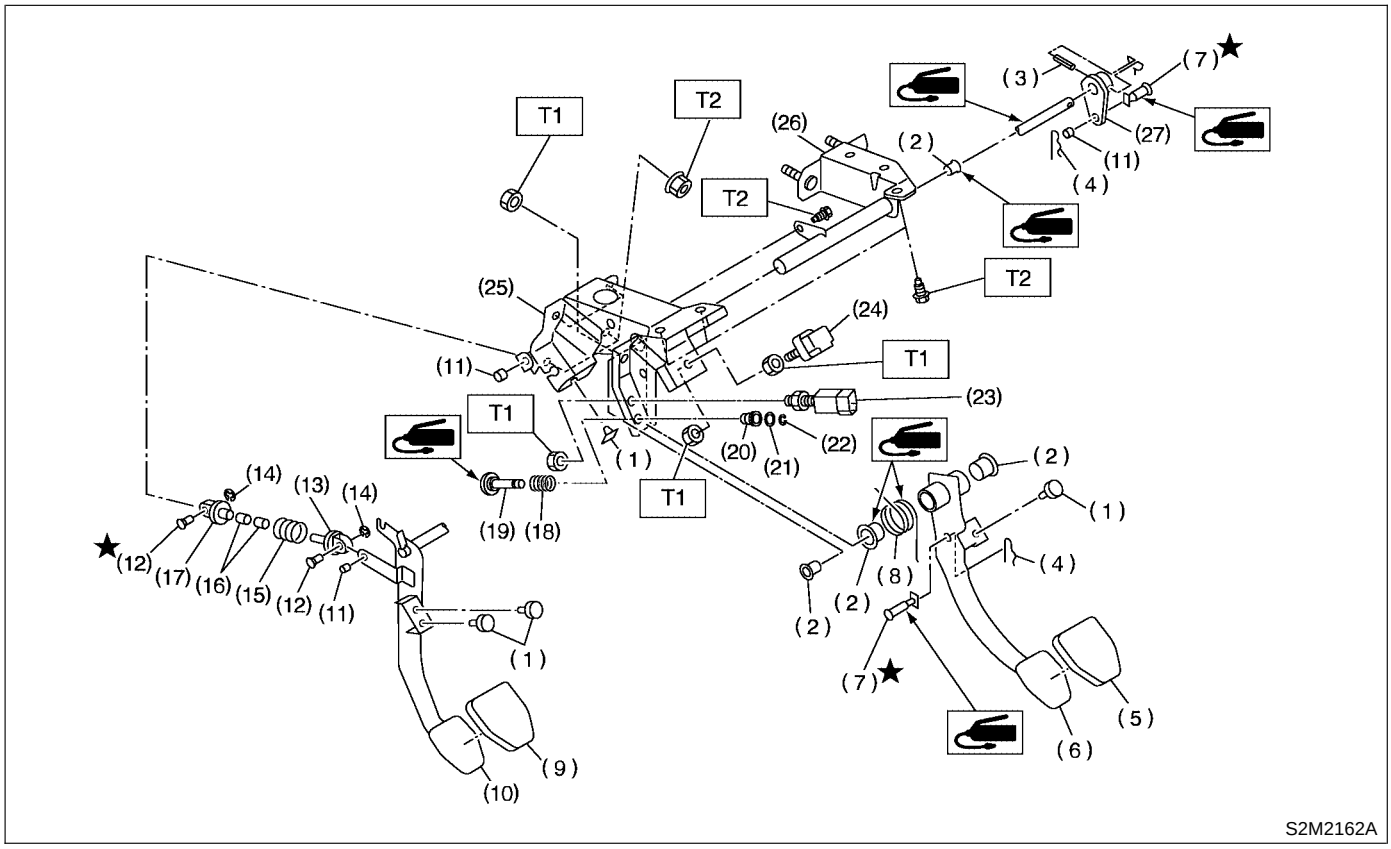


(1) Reservoir cap
(2) Reservoir tank
(3) Reservoir band
(4) Seat
(5) Master cylinder
(6) Piston
(7) Push rod
(8) Piston stop ring

Tightening torque: N·m (kgf-m, ft-lb)
T: 10 (1.0, 7)

7. CLUTCH PEDAL S504001A0503

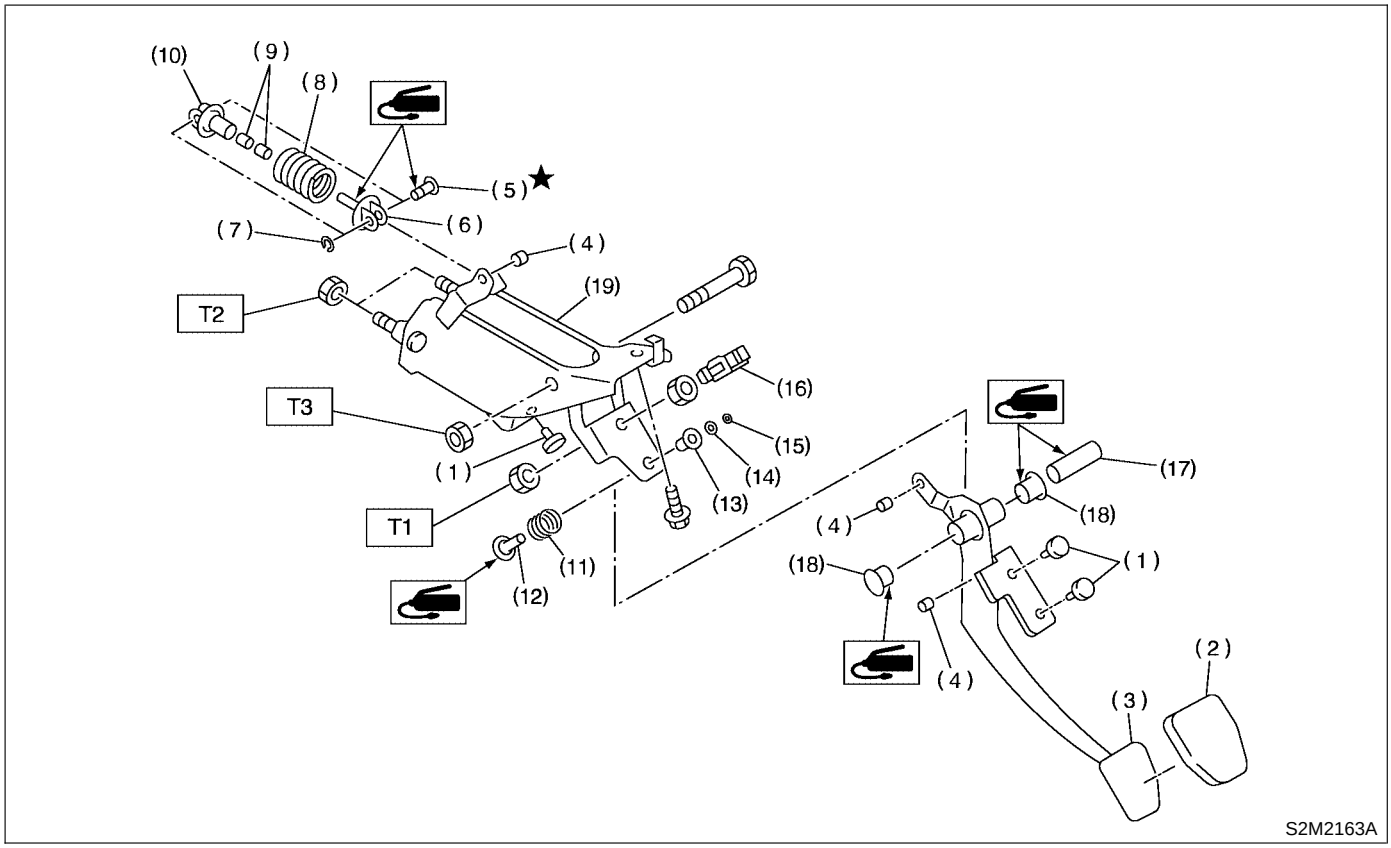
● LHD Model S504001A050301



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

Tightening torque: N·m (kgf-m, ft-lb)
T1: 8 (0.8, 5.8)
T2: 18 (1.8, 13.0)

● RHD Model S504001A050302



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

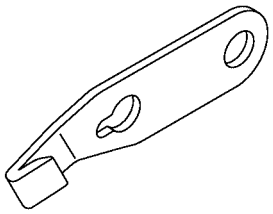
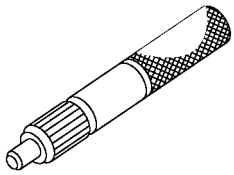
Tightening torque: N·m (kgf-m, ft-lb)
T1: 8 (0.8, 5.8)
T2: 18 (1.8, 13.0)
T3: 30 (3.1, 22.4)

C: CAUTION S504001A03

- 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 vise, place cushioning material such as wood blocks, aluminum plate, or shop cloth between the part and the vise.
- Keep fluid away from the vehicle body. If any fluid contacts the vehicle body, immediately flush the area with water.

D: PREPARATION TOOL S504001A17

1. SPECIAL TOOLS S504001A1701

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.

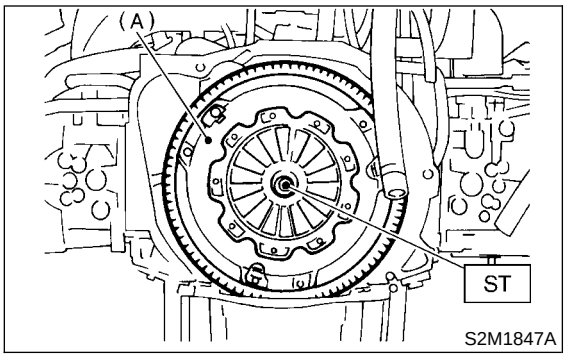
2. GENERAL PURPOSE TOOLS S504001A1702

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 S504252

A: REMOVAL S504252A18

1) Remove transmission assembly from vehicle body. <Ref. to MT-32, REMOVAL, Manual Transmission Assembly.>
2) Install ST on flywheel.
ST 498497100 CRANKSHAFT STOPPER



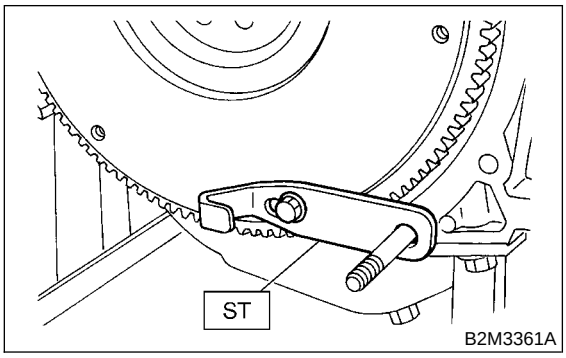
(A) Clutch cover

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.

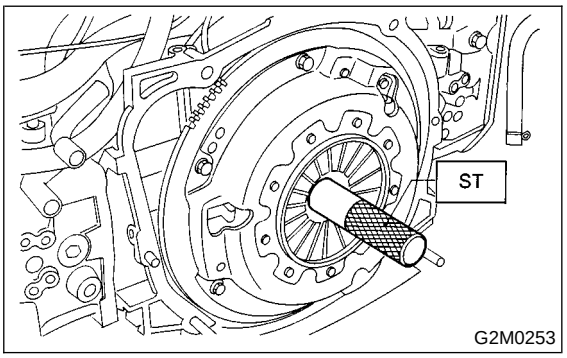
B: INSTALLATION S504252A11

1) Install flywheel and ST.
ST 498497100 CRANKSHAFT STOPPER



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

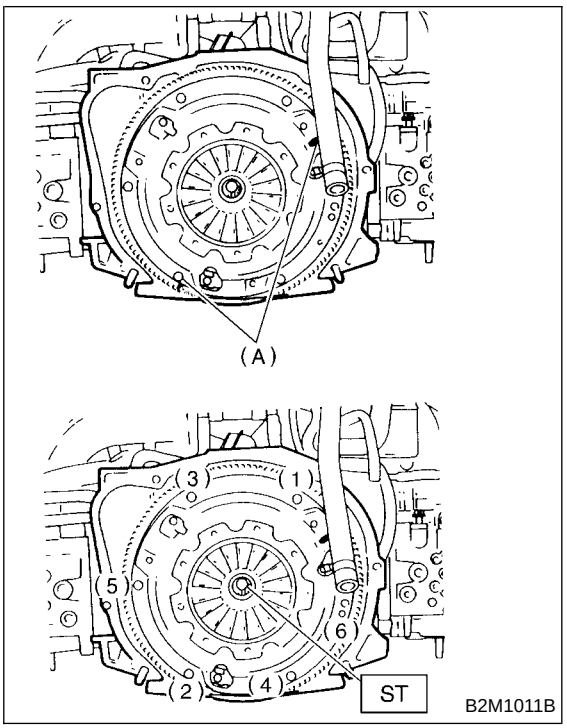
ST 499747100 CLUTCH DISC GUIDE



3) 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

4) Remove ST.
ST 499747100 CLUTCH DISC GUIDE
5) Install transmission assembly. <Ref. to MT-35, INSTALLATION, Manual Transmission.>

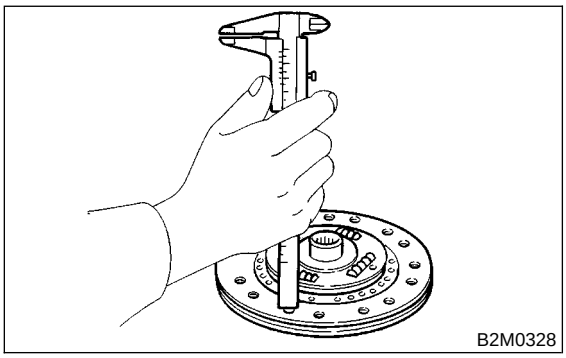
C: INSPECTION S504252A10

1. CLUTCH DISC S504252A1001

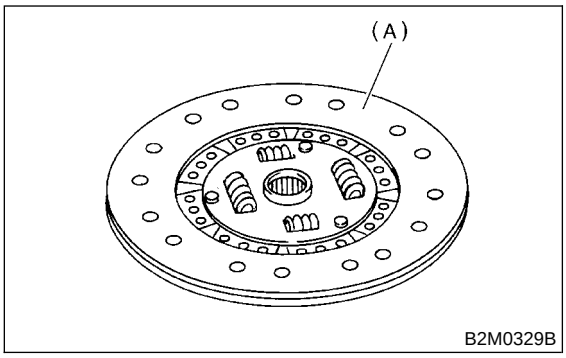
1) Facing wear
Measure the depth of rivet head from the surface of facing. Replace if facings are worn locally or worn down to less than the specified value.

Depth of rivet head:
Limit of sinking
0.3 mm (0.012 in)

CAUTION:
Do not wash clutch disc with any cleaning fluid.


B2M0328

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.



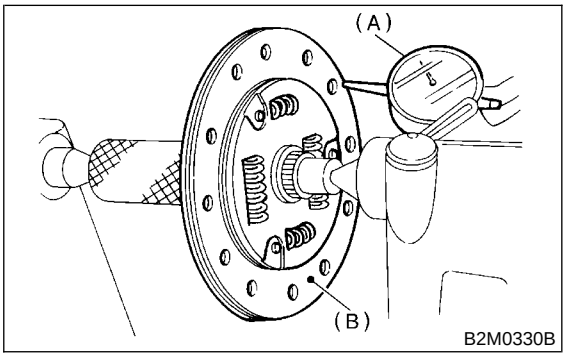
B2M0329B

(A) Facing

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

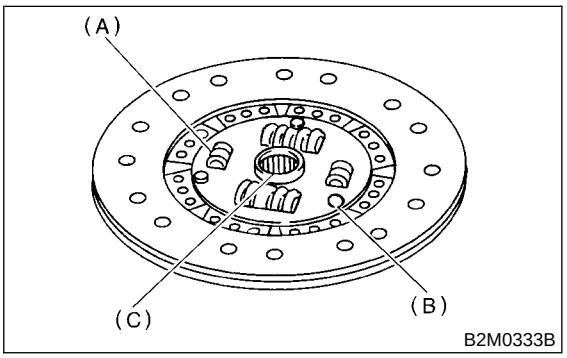
ST 499747100 CLUTCH DISC GUIDE

Limit for deflection:
1.0 mm (0.039 in) at R = 107 mm (4.21 in)



B2M0330B

5) Worn spline, loose rivets and torsion spring failure
Replace defective parts.



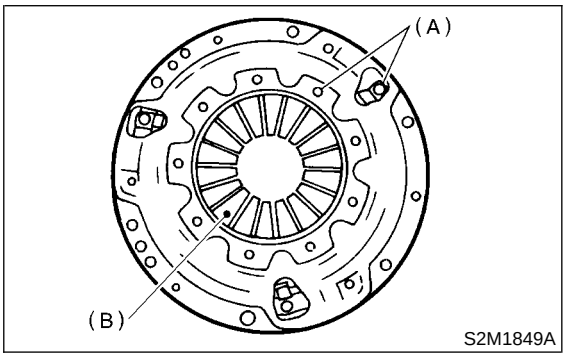
B2M0333B

(A) Spline
(B) Rivet
(C) Torsion spring

2. CLUTCH COVER S504252A1002

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

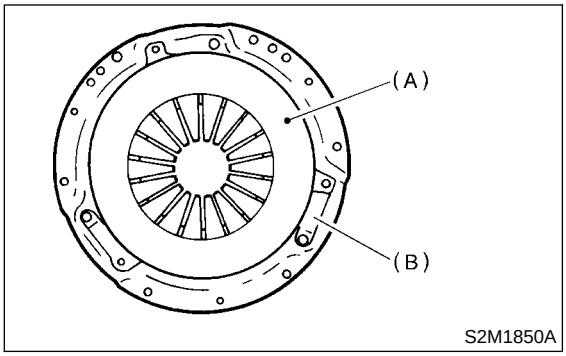
1) Loose thrust rivet.
2) Damaged or worn bearing contact area at center of diaphragm spring.



S2M1849A

(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.

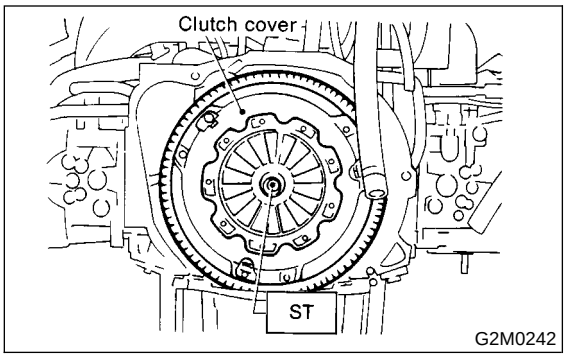


(A) Pressure plate
(B) Strap plate

3. Flywheel S504250

A: REMOVAL S504250A18

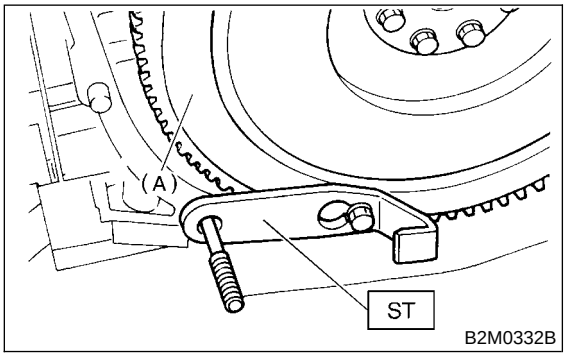
1) Remove transmission assembly. <Ref. to MT-32, REMOVAL, Manual Transmission Assembly.>
2) Install ST on flywheel.
ST 498497100 CRANKSHAFT STOPPER



3) 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.

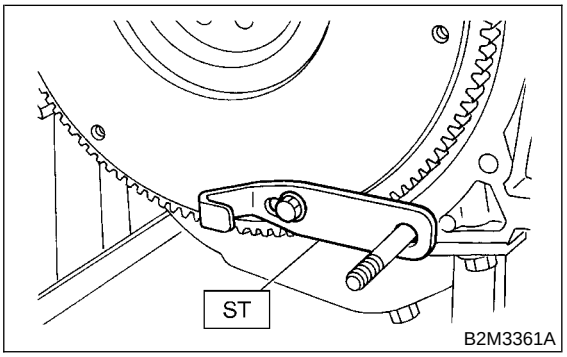
4) Using ST, remove flywheel.
ST 498497100 CRANKSHAFT STOPPER



(A) Flywheel

B: INSTALLATION S504250A11

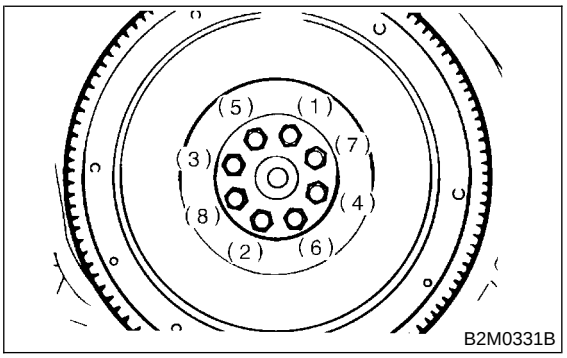
1) Install flywheel and ST.
ST 498497100 CRANKSHAFT STOPPER



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)

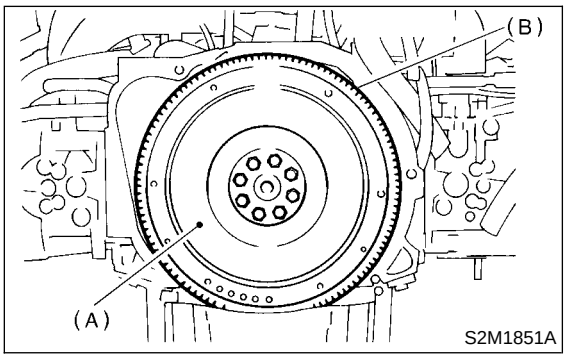


3) Install clutch disc and cover. <Ref. to CL-15, INSTALLATION, Clutch Disc and Cover.>
4) Install transmission assembly. <Ref. to MT-35 INSTALLATION, Manual Transmission Assembly.>

C: INSPECTION S504250A10

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

S504251

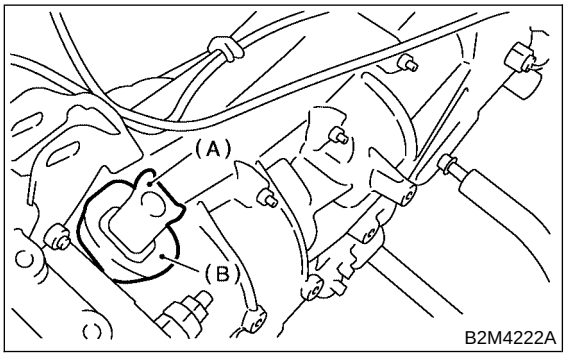
A: REMOVAL S504251A18

1. NON-TURBO MODEL S504251A1803

1) Remove transmission assembly from vehicle body.
<Ref. to MT-32 REMOVAL, Manual Transmission Assembly.>
2) Remove the two clips from clutch release lever and remove release bearing.

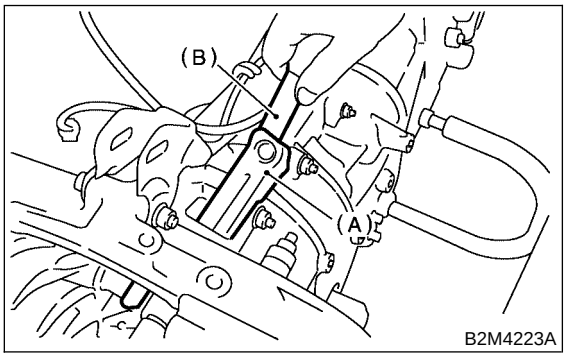
CAUTION:
Be careful not to deform clips.

3) Remove release lever seal.



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

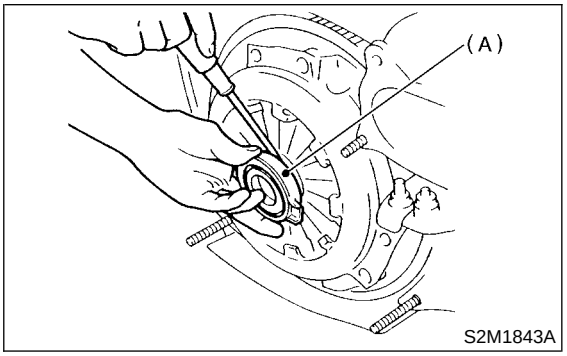
4) Remove release lever retainer spring from release lever pivot with a screwdriver by accessing it through clutch housing release lever hole. Then remove release lever.



(A) Clutch release lever
(B) Screwdriver

2. TURBO MODEL S504251A1804

1) Remove transmission assembly from vehicle body. <Ref. to MT-32, 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

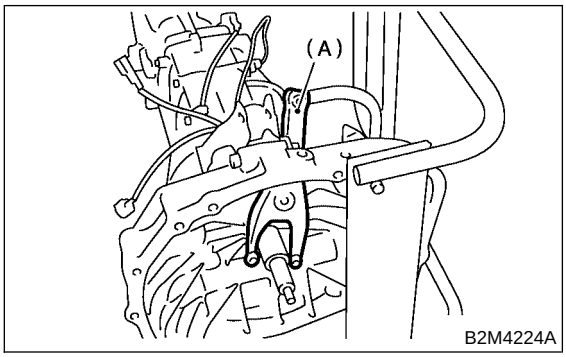
B: INSTALLATION S504251A11

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 disulfide.)**
- **Contact surface of lever and operating cylinder**

1. NON-TURBO MODEL S504251A1103

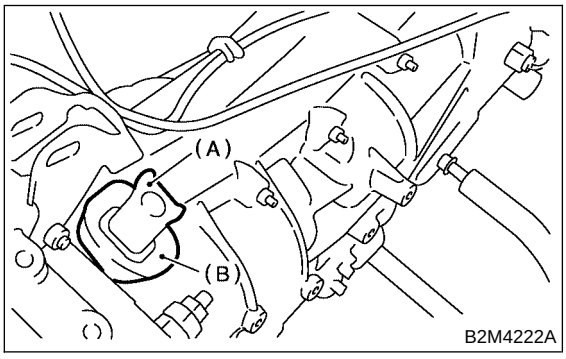
1) While pushing release lever to pivot and twisting it to both sides, fit retainer spring onto the constricted portion of pivot.

NOTE:
- Apply grease (SUNLIGHT 2: P/N 003602010) to contact point of release lever and operating cylinder. <Ref. to CL-3, COMPONENT, General Description.>
- 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.
3) Install release lever seal.



(A) Release lever
(B) Release lever seal

4) Install transmission assembly.
<Ref. to MT-35, INSTALLATION, Manual Transmission Assembly.>

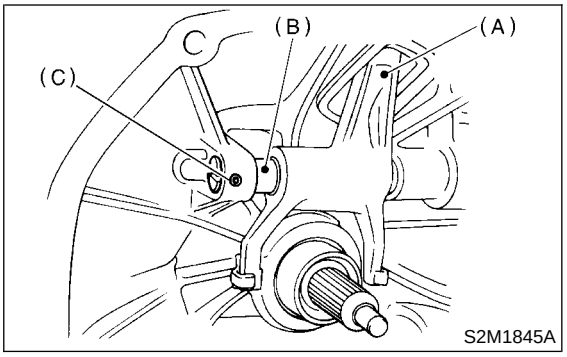
2. TURBO MODEL S504251A1104

1) Apply grease to each parts. <Ref. CL-3, COMPONENT, General Description.>

Grease:
SUNLIGHT2 (P/N 003602010)

2) Position both clutch release lever and bearing on transmission.
3) Install clutch release lever shaft.

CAUTION:
Be sure to fit groove on clutch release lever shaft into pin located at through-hole.



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

4) With clutch release lever held in that position, connect engine and transmission. <Ref. to MT-35, INSTALLATION, Manual Transmission Assembly.>

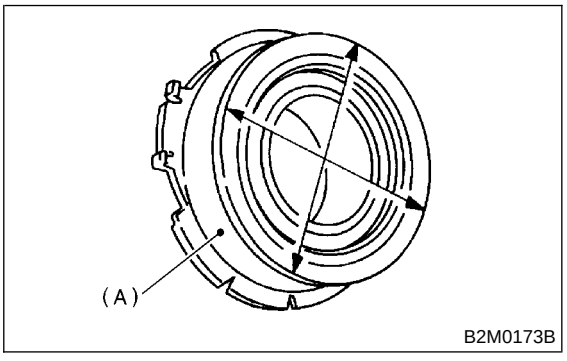
C: INSPECTION S504251A10

1. RELEASE BEARING S504251A1001

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.

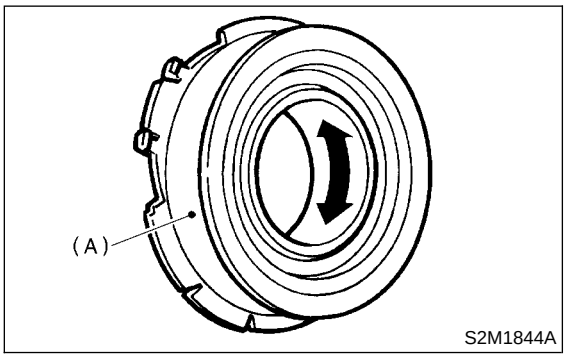
1) Check the bearing for smooth movement by applying force in the radial direction.

Radial direction stroke:
1.4 mm (0.055 in)



(A) Bearing case

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

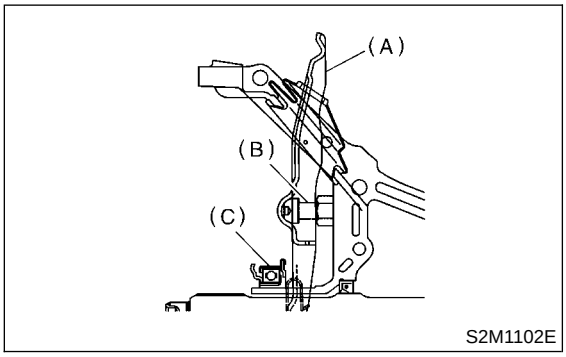


(A) Bearing case

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

2. RELEASE LEVER *S504251A1002*

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



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

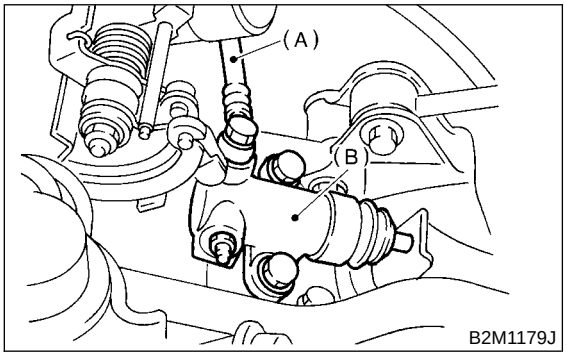
5. Operating Cylinder S504253

A: REMOVAL S504253A18

1. NON-TURBO MODEL S504253A1801

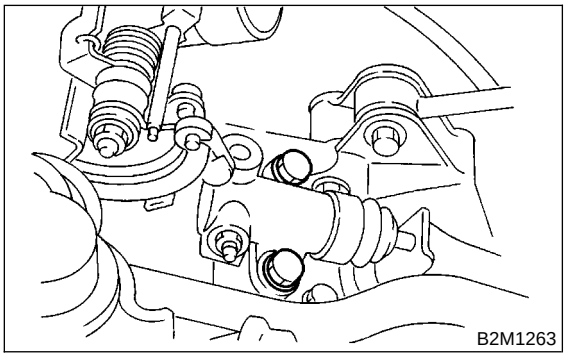
1) Remove air cleaner case. <Ref. to IN(SOHC)-7, REMOVAL, Air Cleaner Case.>
2) Remove clutch hose from operating cylinder.

CAUTION:
Cover hose joint to prevent clutch fluid from flowing out.



(A) Clutch hose
(B) Operating cylinder

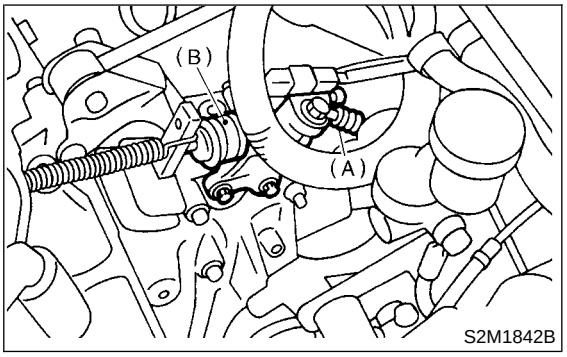
3) Remove operating cylinder from transmission.



2. TURBO MODEL S504253A1802

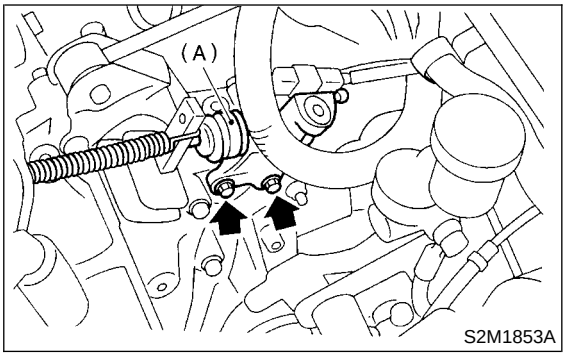
1) Remove intercooler. <Ref. to IN(DOHC TURBO)-10, REMOVAL, Intercooler.>
2) Remove clutch hose from operating cylinder.

CAUTION:
Cover hose joint to prevent clutch fluid from flowing out.



(A) Clutch hose
(B) Operating cylinder

3) Remove operating cylinder from transmission.



(A) Operating cylinder

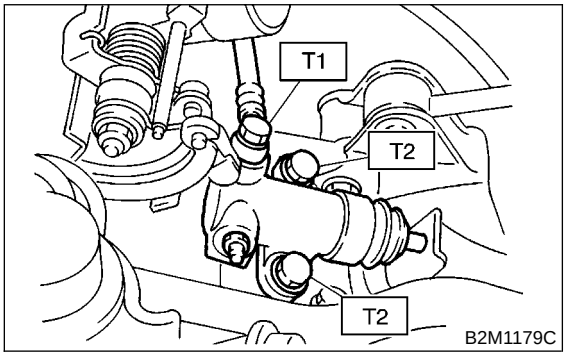
B: INSTALLATION S504253A11

1. NON-TURBO MODEL S504253A1101

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)

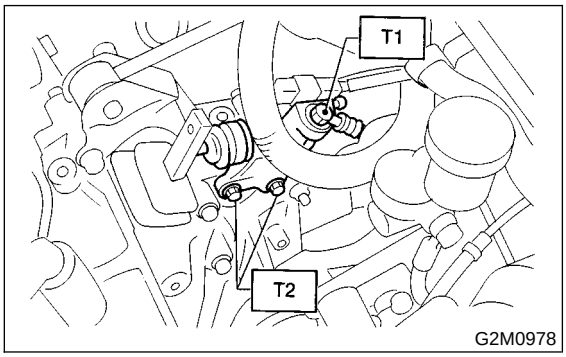


2) After bleeding air from operating cylinder, ensure that clutch operates properly.
<Ref. to CL-34 Clutch Fluid Air Bleeding.>

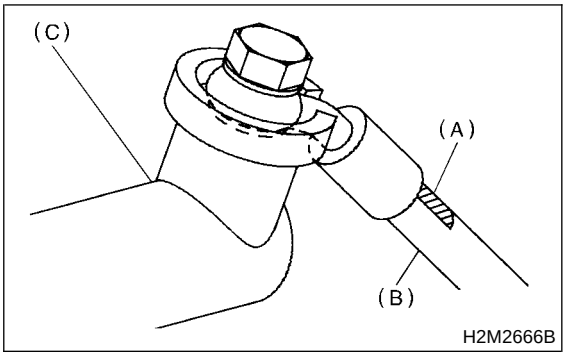
2. TURBO MODEL S504253A1102

1) Install in the reverse order of removal.

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)



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-34, Clutch Fluid Air Bleeding.>

C: INSPECTION S504253A10

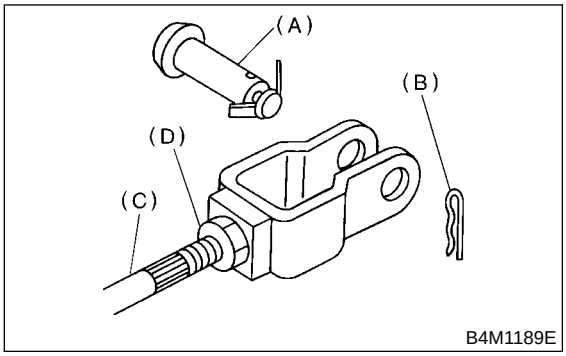
1) Check operating cylinder for damage. If operating cylinder is damaged, replace it.
2) Check operating cylinder for fluid leakage or damage on boot. If any leakage or damage is found, replace operating cylinder.

6. Master Cylinder S504168

A: REMOVAL S504168A18

1. NON-TURBO MODEL S504168A1801

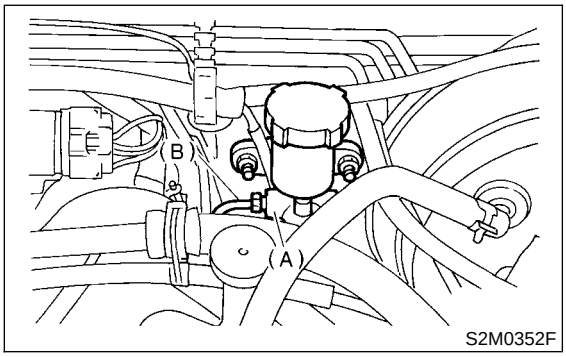
1) Thoroughly drain brake fluid from reservoir tank.
2) Remove snap pin, clevis pin and separate push rod of master cylinder from clutch pedal.



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

3) Remove air cleaner case and air intake duct.
4) Remove clutch pipe from master cylinder.
5) Remove master cylinder with reservoir tank.

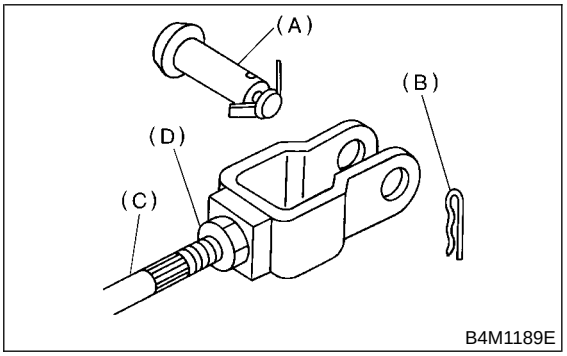
CAUTION:
Be extremely careful not to spill brake fluid. Brake fluid spilt on the vehicle body will harm the paint surface; wipe it off quickly if spilt.



(A) Master cylinder
(B) Clutch pipe

2. TURBO LHD MODEL S504168A1802

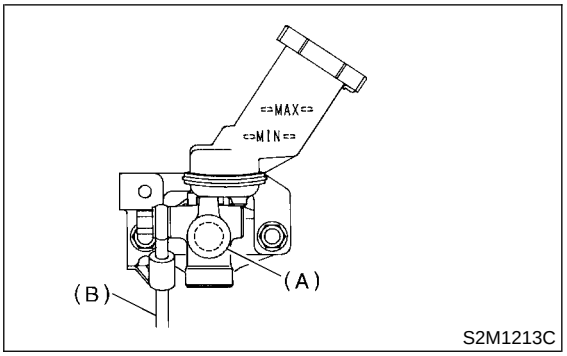
1) Thoroughly drain brake fluid from reservoir tank.
2) Remove snap pin, clevis pin and separate push rod of master cylinder from clutch pedal.



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

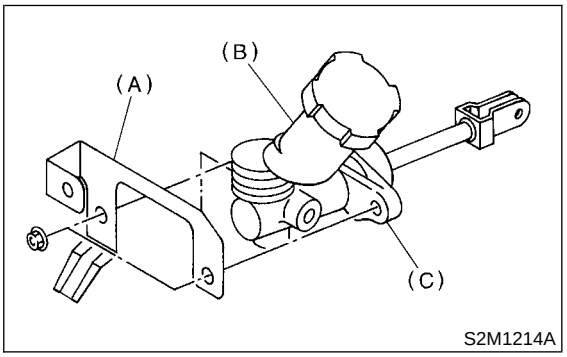
3) Remove intercooler. <Ref. to IN(DOHC TURBO)-10, REMOVAL, Intercooler.>
4) Remove clutch hose from master cylinder.

CAUTION:
Plug up hose connection to prevent clutch fluid from spilling out.



(A) Master cylinder
(B) Clutch hose

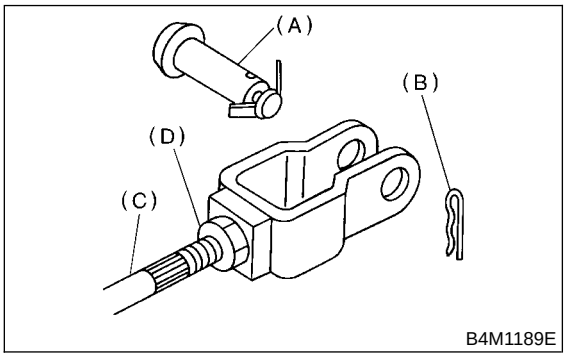
5) Remove master cylinder with reservoir tank.



(A) Bracket
(B) Reservoir tank
(C) Master cylinder

3. TURBO RHD MODEL S504168A1803

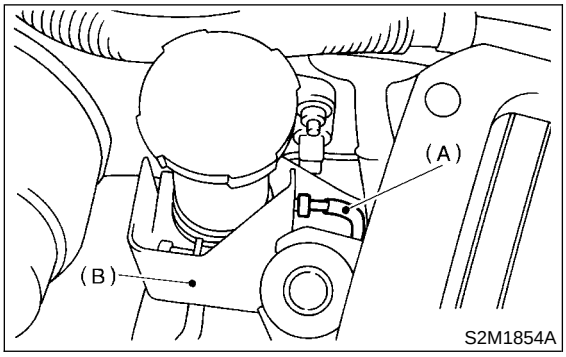
1) Thoroughly drain brake fluid from reservoir tank.
2) Remove snap pin, clevis pin and separate push rod of master cylinder from clutch pedal.



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

3) Remove intercooler. <Ref. to IN(DOHC TURBO)-10, REMOVAL, Intercooler.>
4) Remove clutch pipe and sealed cover from master cylinder.

CAUTION:
Plug up pipe connection to prevent clutch fluid from spilling out.

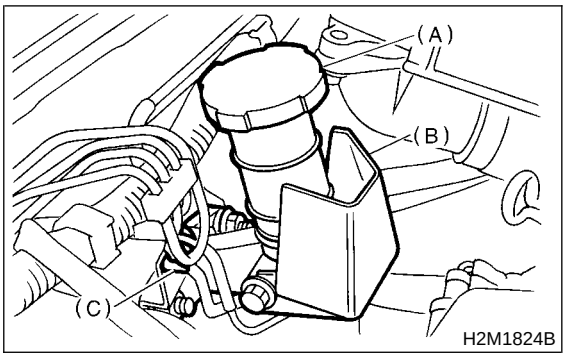


(A) Clutch pipe
(B) Sealed cover

5) Remove clutch pipe from master cylinder bracket clamp.

6) Slightly lift clutch pipe on master cylinder, then remove master cylinder and reservoir tank as a single unit.

CAUTION:
Be careful not to bend or twist clutch pipe.



(A) Reservoir tank
(B) Sealed cover
(C) Clamp

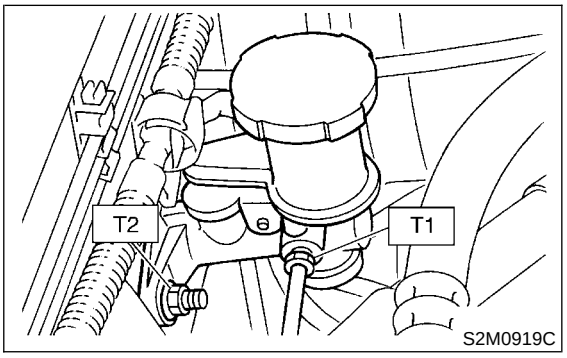
B: INSTALLATION S504168A11

1. NON-TURBO MODEL S504168A1101

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

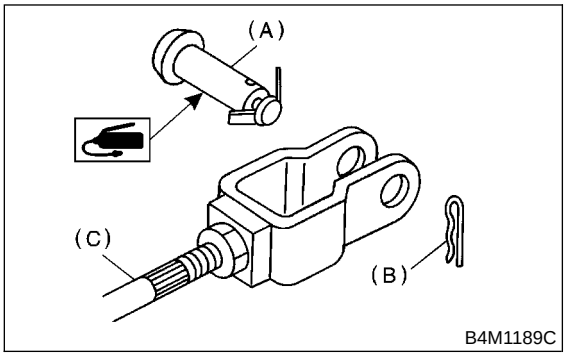
CAUTION:
Check that pipe is routed properly.

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

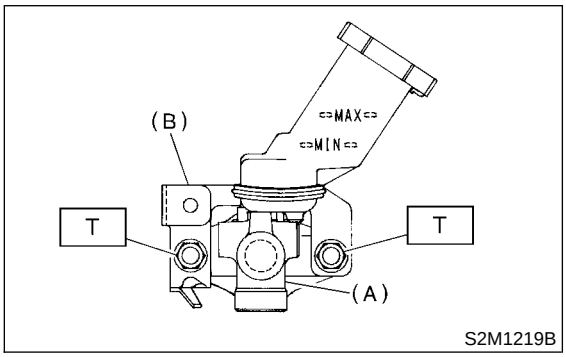
3) After bleeding air from system, ensure that clutch operates properly.
<Ref. to CL-34 Clutch Fluid Air Bleeding.>
4) Install air cleaner case and air intake duct.

2. TURBO LHD MODEL *S504168A1102*

1) Install master cylinder to body.

CAUTION:
Always use a new gasket.

Tightening torque:
T: 18 N·m (1.8 kgf-m, 13.0 ft-lb)

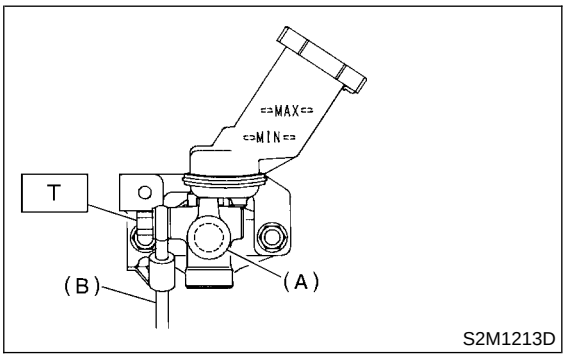


(A) Master cylinder
(B) Bracket

2) Install clutch hose to master cylinder.

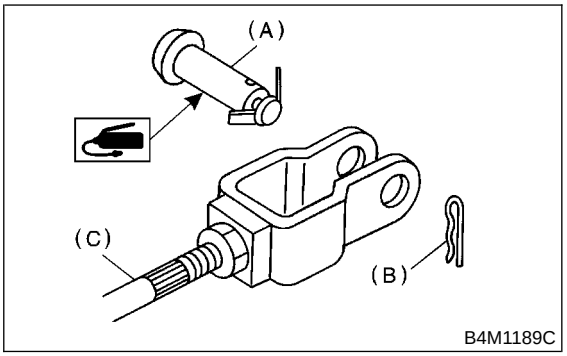
CAUTION:
Check that hose is routed properly.

Tightening torque:
T: 18 N·m (1.8 kgf-m, 13.0 ft-lb)



(A) Master cylinder
(B) Clutch hose

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



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

4) After installing master cylinder assembly, bleeding air from clutch system. <Ref. to CL-34, Clutch Fluid Air Bleeding.>
5) After bleeding air from system, ensure that clutch operates properly.
6) Install inter coder. <Ref. to IN(DOHC TURBO)-10, INSTALLATION, Intercooler.>

3. TURBO RHD MODEL S504168A1103

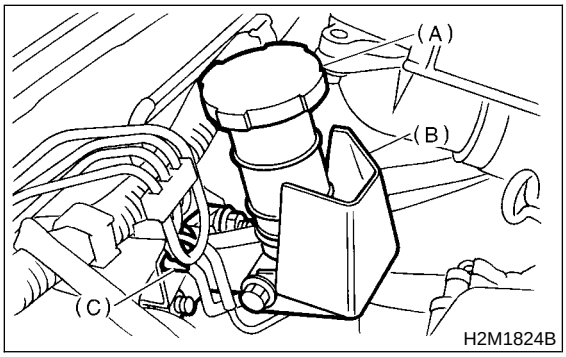
1) Slightly lift clutch pipe on master cylinder, then install master cylinder to body.

CAUTION:
Always use a new gasket.

NOTE:
Be careful not to bend clutch pipe when installing master cylinder.

Tightening torque:
18 N·m (1.8 kgf-m, 13.0 ft-lb)

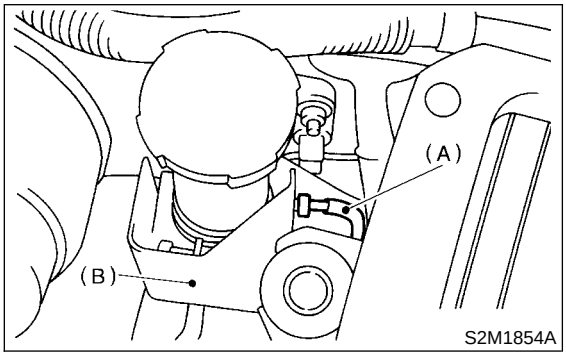
2) Insert clutch pipe into pipe bracket clamp.



(A) Reservoir tank
(B) Sealed cover
(C) Clamp

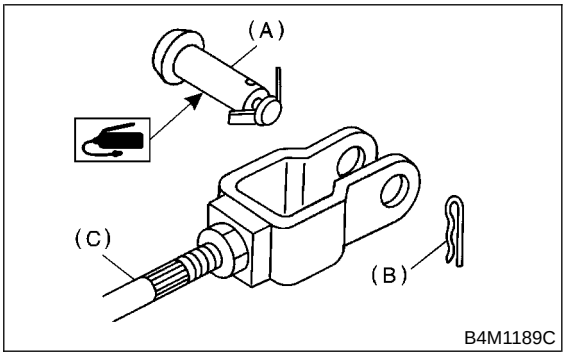
3) Install clutch pipe to master cylinder.

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



(A) Clutch pipe
(B) Sealed cover

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



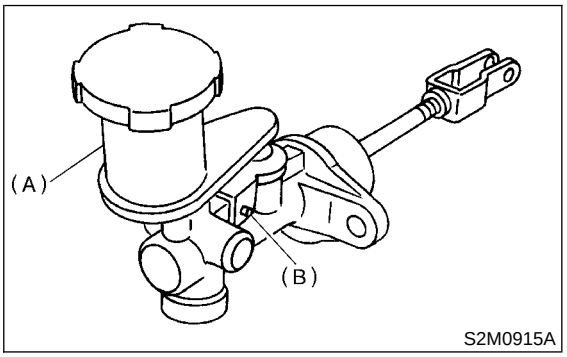
(A) Clevis pin
(B) Snap pin
(C) Push rod

5) After installing master cylinder assembly, bleeding air from clutch system. <Ref. to CL-34, Clutch Fluid Air Bleeding.>
6) After bleeding air from system, ensure that clutch operates properly.
7) Install intercooler. <Ref. to IN(DOHC TURBO)-10, INSTALLATION, Intercooler.>

C: DISASSEMBLY S504168A06

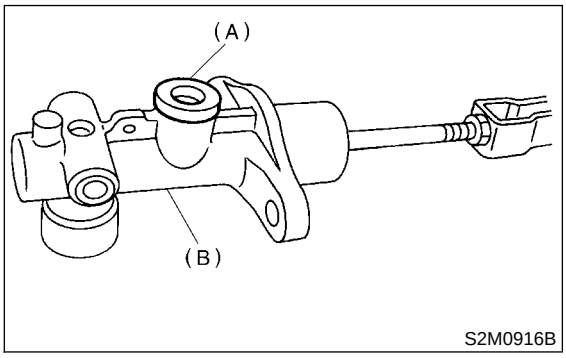
1. NON-TURBO MODEL S504168A0601

1) Remove straight pin and reservoir tank.



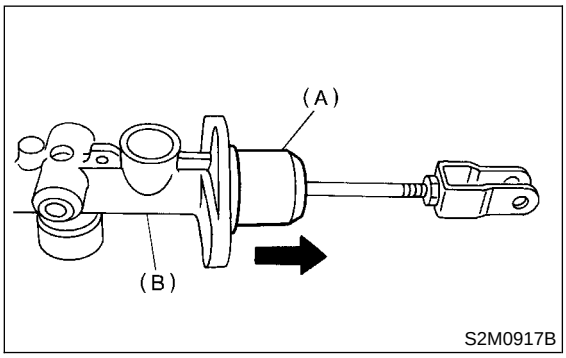
(A) Reservoir tank
(B) Straight pin

2) Remove oil seal.



(A) Oil seal
(B) Master cylinder

3) Move the cylinder boot backward.



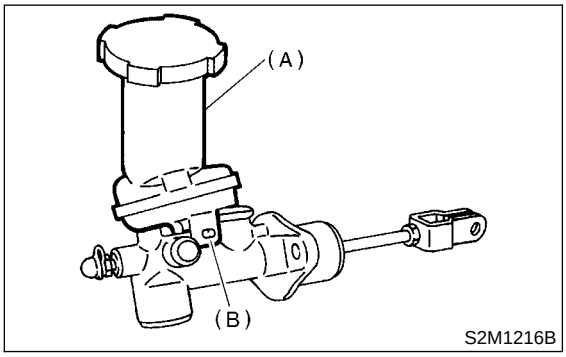
(A) Cylinder boot
(B) Master cylinder

4) Remove snap ring.

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

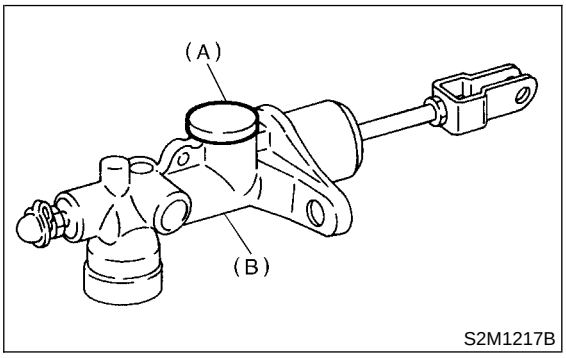
2. TURBO LHD MODEL S504168A0602

1) Remove diaphragm spring and gasket.
2) Remove straight pin and reservoir tank.



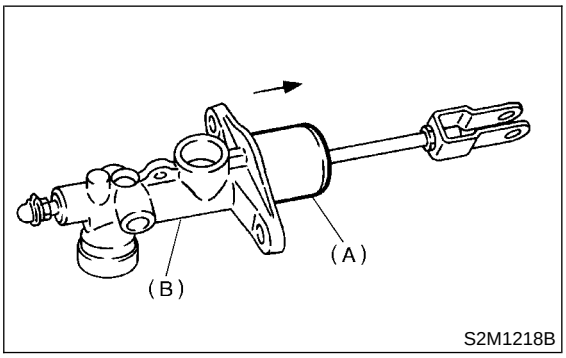
(A) Reservoir tank
(B) Straight pin

3) Remove oil seal.



(A) Oil seal
(B) Master cylinder

4) Move the cylinder boot backward.



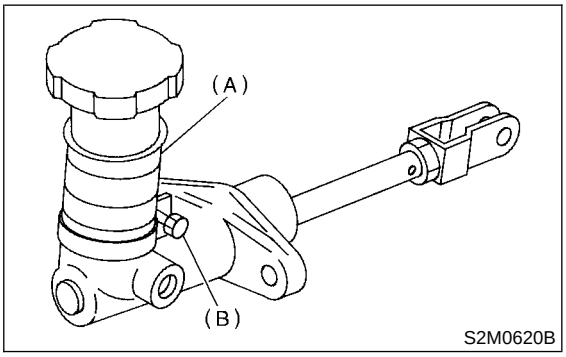
(A) Cylinder boot
(B) Master cylinder

5) Remove snap ring.

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

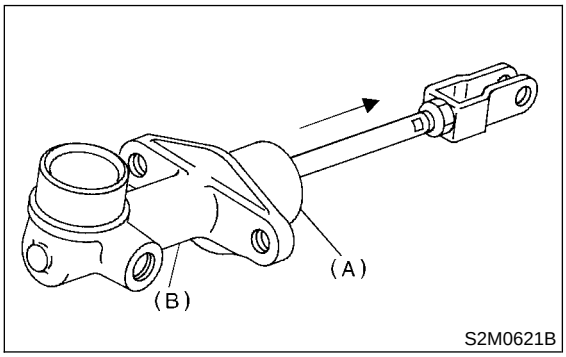
3. TURBO RHD MODEL S504168A0603

1) Loose reservoir band, and remove reservoir tank and band.



(A) Reservoir tank
(B) Reservoir band

2) Move the cylinder boot backward.



(A) Master cylinder boot
(B) Master cylinder

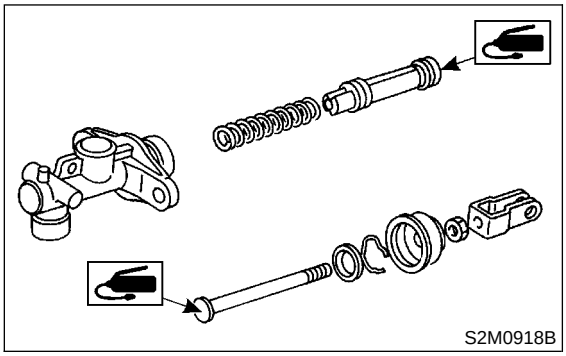
3) Remove snap ring.

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

D: ASSEMBLY S504168A02

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)



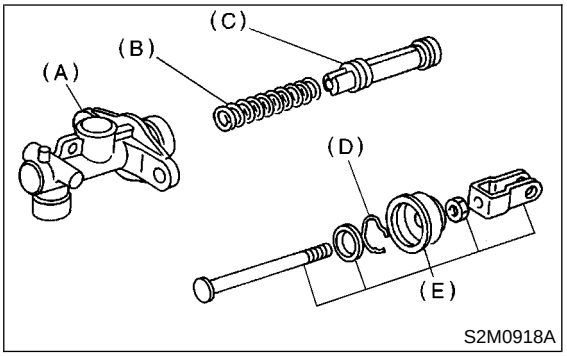
2) Assemble in the reverse order of disassembly.

E: INSPECTION S504168A10

1. LHD AND NON-TURBO RHD MODEL

S504168A1001

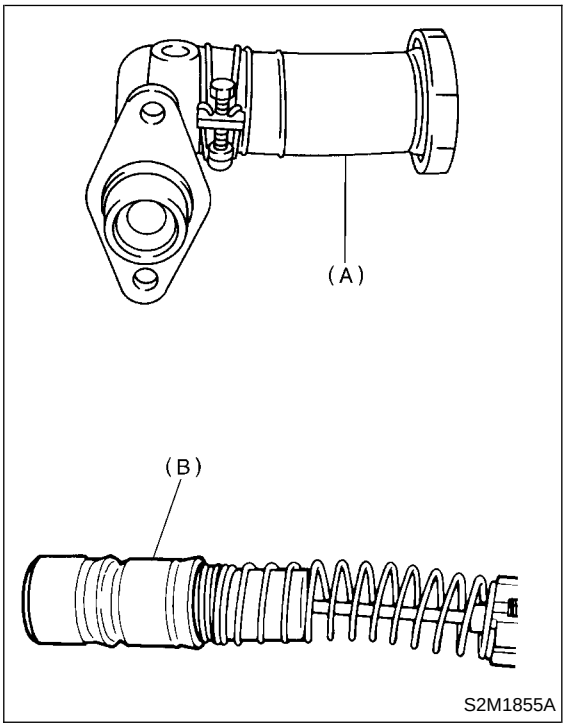
If any damage, deformation, wear, swelling, rust or other faults are found on the cylinder, piston, push rod, fluid reservoir, return spring and seat, replace the faulty part.



(A) Master cylinder body
(B) Return spring
(C) Piston
(D) Snap ring
(E) Rod ASSY

2. TURBO RHD MODEL S504168A1002

If any damage, deformation, wear, swelling, rust or other faults are found on the cylinder, piston, push rod, fluid reservoir, return spring and seat, replace the faulty part.



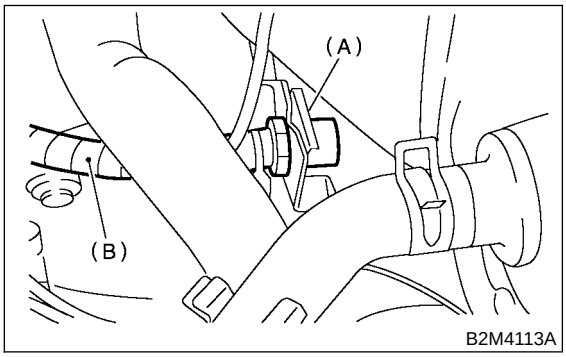
(A) Reservoir tank
(B) Piston

7. Clutch Pipe and Hose S504262

A: REMOVAL S504262A18

1. EXCEPT RHD TURBO MODEL S504262A1801

1) Remove air cleaner case or intercooler.
2) Drain clutch fluid. <Ref. to CL-33 Clutch Fluid.>
3) Remove clutch pipe from the clutch hose and master cylinder.
4) Pull out clamp, then remove clutch hose from bracket.

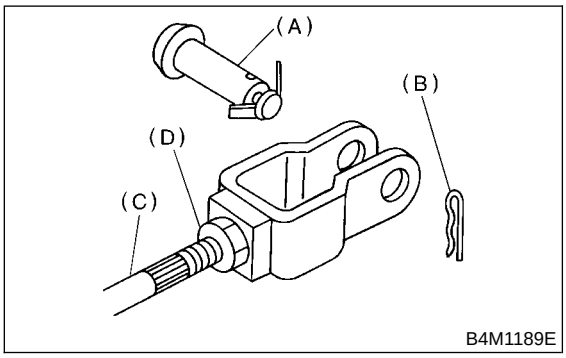


(A) Clamp
(B) Clutch hose

5) Remove hose from operating cylinder.

2. RHD TURBO MODEL S504262A1802

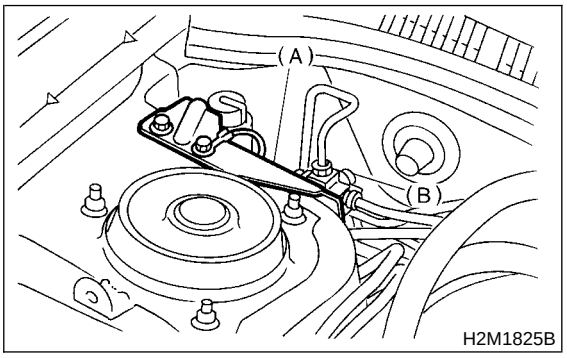
1) Remove snap pin, clevis pin and separate push rod of master cylinder from clutch pedal.



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

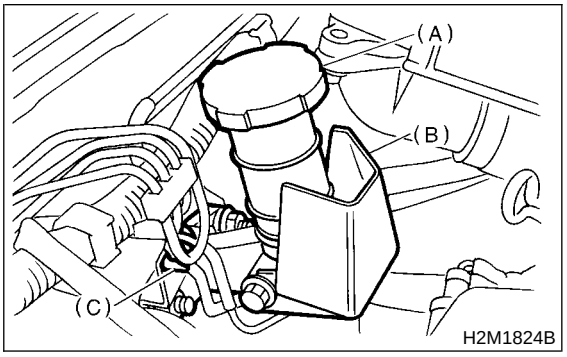
2) Remove intercooler. <Ref. to IN(DOHC TURBO)-10, INSTALLATION, Intercooler.>

3) Remove connector bracket.



(A) Connector bracket
(B) Connector ASSY

4) Remove master cylinder. <Ref. to CL-28, TURBO RHD MODEL, INSTALLATION, Master Cylinder.>



(A) Reservoir tank
(B) Sealed cover
(C) Clamp

5) Remove clutch pipe bracket from body.
6) Remove clutch pipe from clutch pipe bracket.
7) Separate master cylinder and clutch pipe and connector assembly.

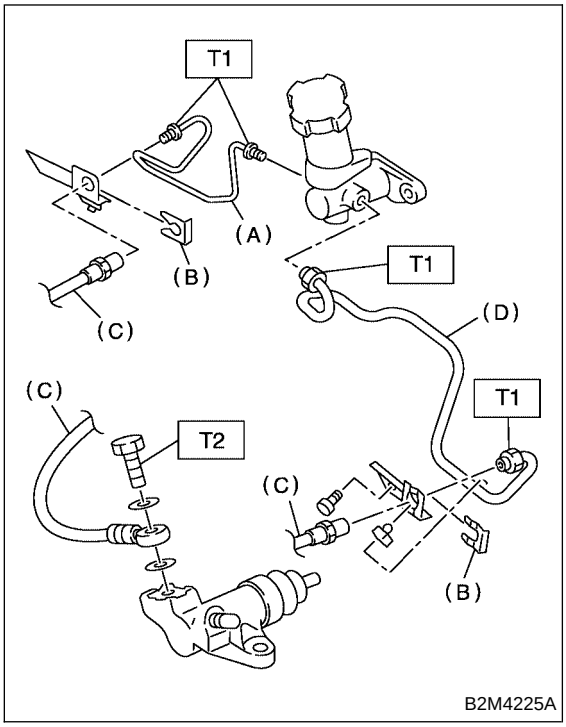
B: INSTALLATION S504262A11

1. EXCEPT RHD TURBO MODEL S504262A1101

Install in the reverse order of removal.

NOTE:
Bleed clutch fluid. <Ref. to CL-34 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)



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

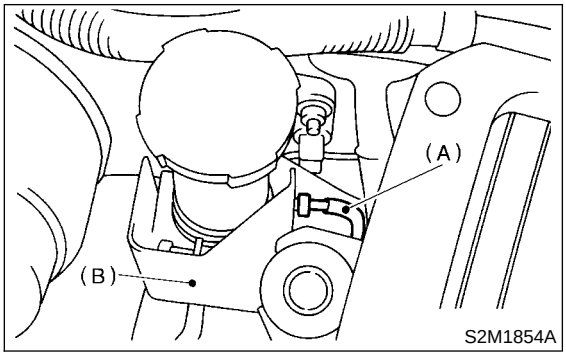
2. RHD TURBO MODEL S504262A1102

1) Install clutch pipe to clutch pipe bracket.

Tightening torque:
18 N·m (1.8 kgf-m, 13.0 ft-lb)

2) Install clutch pipe to master cylinder.

Tightening torque:
15 N·m (1.5 kgf-m, 10.8 ft-lb)



(A) Clutch pipe
(B) Sealed cover

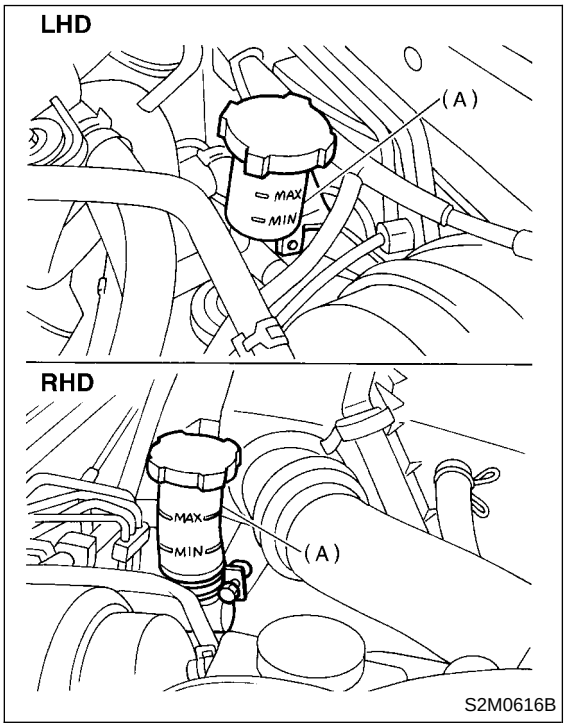
C: INSPECTION S504262A10

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 S504261

A: INSPECTION S504261A10

1) Park vehicle on a level surface.
2) Check the clutch fluid for significant deterioration. If it is deteriorated, replace it.
3) Inspect the fluid level using the scale on the outside of the clutch master cylinder tank. If the level is below “MIN”, add clutch fluid to bring it up to “MAX”.



(A) Reservoir tank

B: REPLACEMENT S504261A20

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

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.

9. Clutch Fluid Air Bleeding S504260

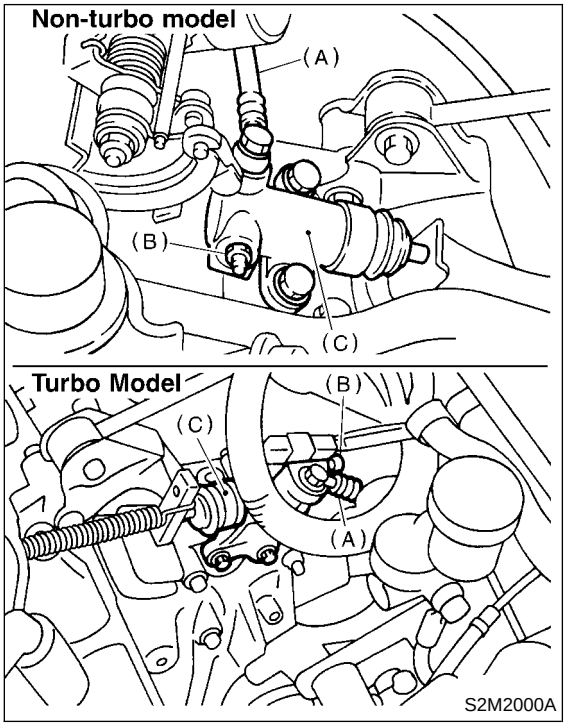
A: PROCEDURE S504260E45

1. LHD AND NON-TURBO RHD MODEL

S504260E4501

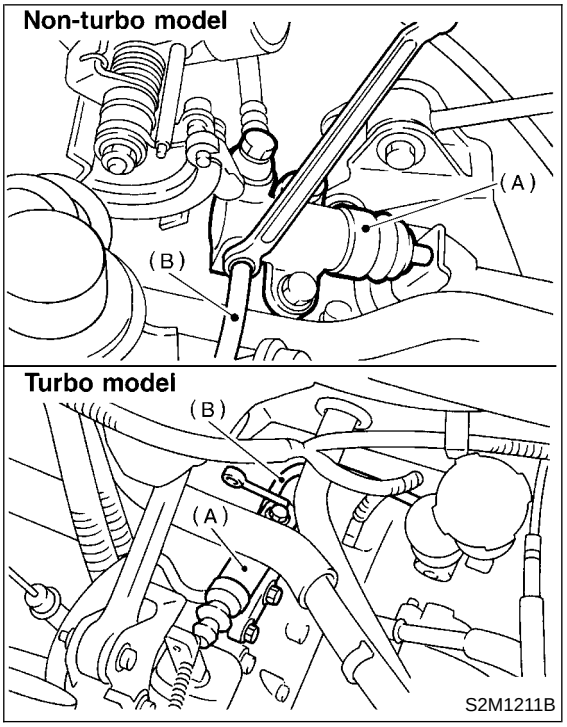
NOTE:
Bleed air from oil line with the help of a co-worker.

1) Remove air cleaner case or intercooler.
Non-turbo model:
<Ref. to IN(SOHC)-7, REMOVAL, Air Cleaner Case.>
Turbo model:
<Ref. to IN(DOHC TURBO)-10, REMOVAL, Intercooler.>
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
(C) Operating cylinder

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.



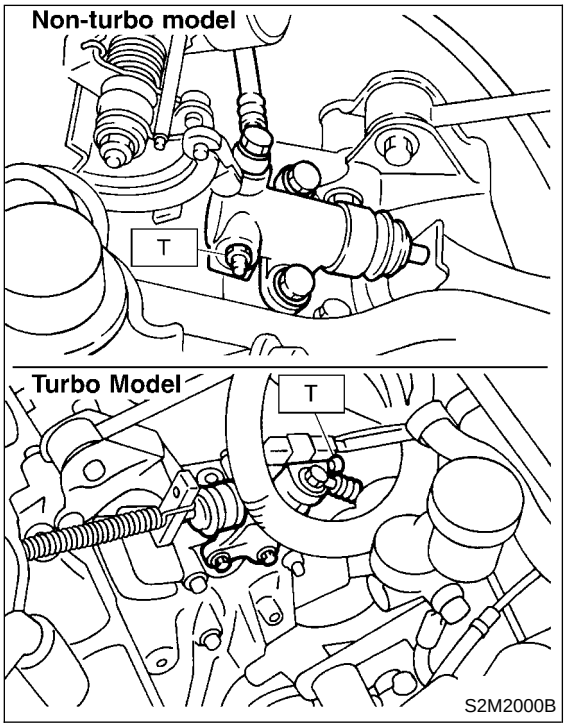
(A) Operating cylinder
(B) Vinyl tube

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

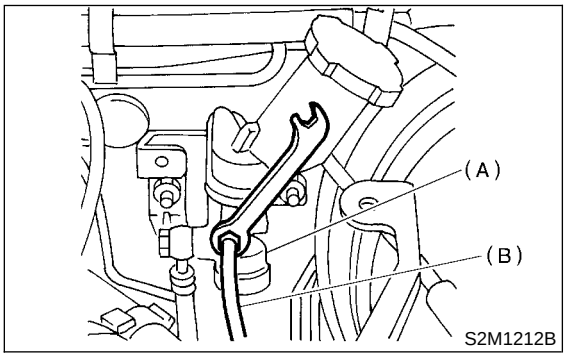
CAUTION:
Cover bleeder with waste cloth when loosening it, to prevent brake fluid from being splashed over surrounding parts.

5) Tighten air bleeder.

Tightening torque:
T: 8 N·m (0.8 kgf-m, 5.8 ft-lb)



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



(A) Master cylinder
(B) Vinyl tube

7) Tighten air bleeder. (Turbo LHD model)

Tightening torque:
8 N·m (0.8 kgf-m, 5.8 ft-lb)

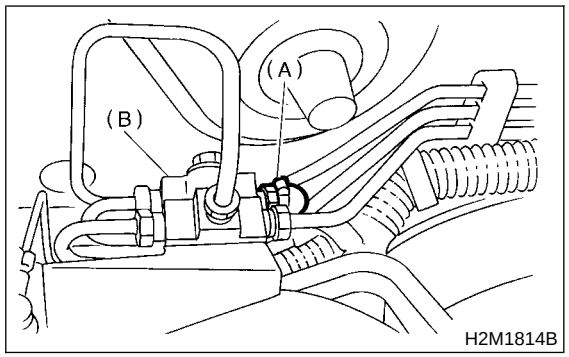
8) After depressing the clutch pedal, make sure that there are no evident leaks in the entire system.

2. TURBO RHD MODEL *S504260E4502*

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

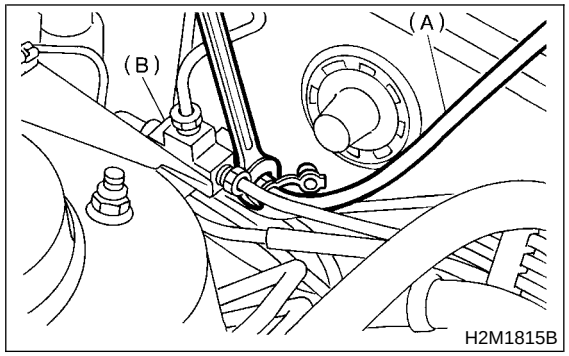
1) Remove intercooler. <Ref. to IN(DOHC TURBO)-10, REMOVAL, Intercooler.>

2) Fit one end of a vinyl tube into the air bleeder of clutch pipe and connector assembly and put the other end into a clutch fluid container.



(A) Air bleeder
(B) Connector ASSY

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.



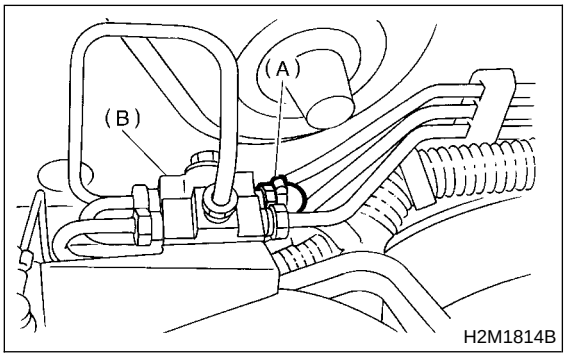
(A) Vinyl tube
(B) Connector ASSY

4) 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.

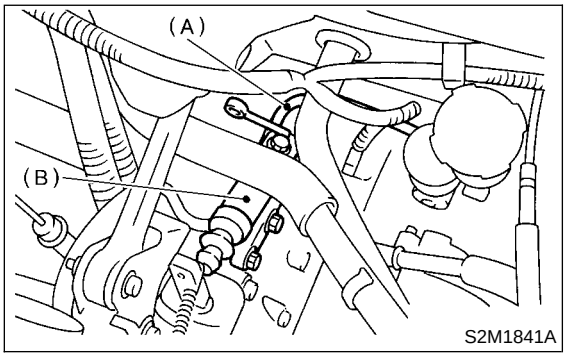
5) Tighten air bleeder.

Tightening torque:
8 N·m (0.8 kgf-m, 5.8 ft-lb)



(A) Air bleeder
(B) Connector ASSY

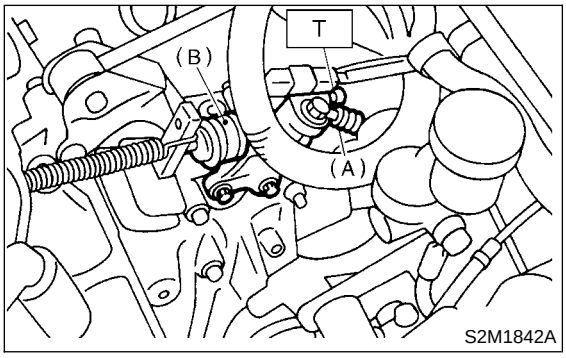
6) Repeat steps 2) through 4) using air bleeder on operating cylinder.



(A) Vinyl tube
(B) Operating cylinder

7) Tighten air bleeder.

Tightening torque:
T: 8 N·m (0.8 kgf-m, 5.8 ft-lb)



(A) Clutch hose
(B) Operating cylinder

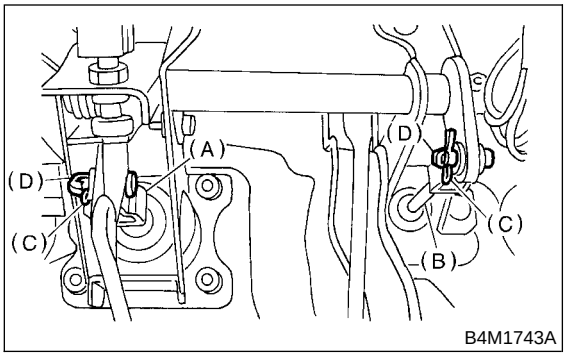
8) After depressing the clutch pedal, make sure that there are no leaks evident in the entire system.

10. Clutch Pedal S504256

A: REMOVAL S504256A18

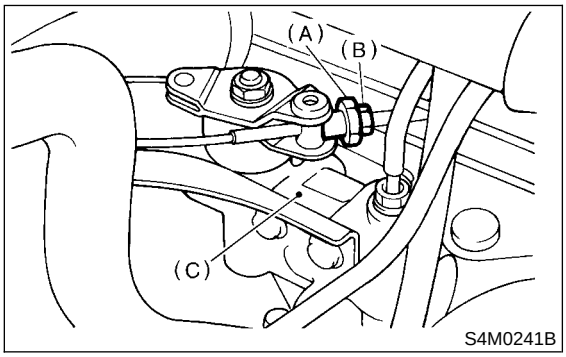
1. LHD MODEL S504256A1803

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

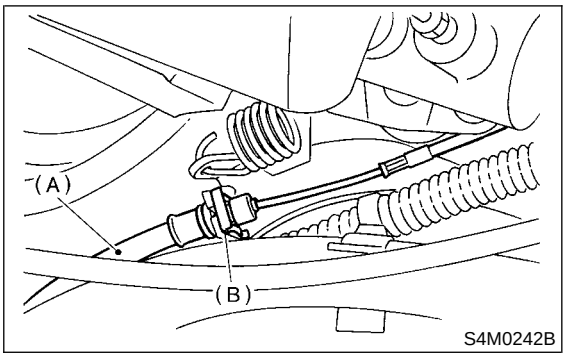
5) Remove PHV adjusting nut and lock nut.



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

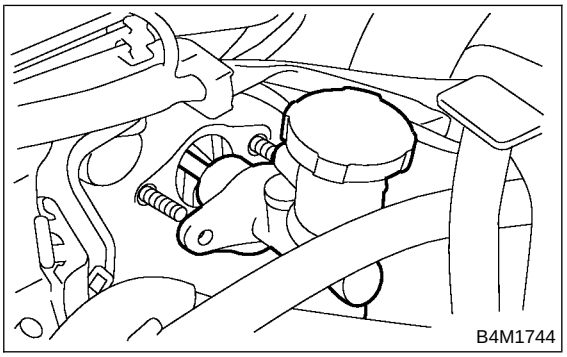
6) Remove cable clamp, and disconnect PHV cable from PHV.

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



(A) PHV cable
(B) Clamp

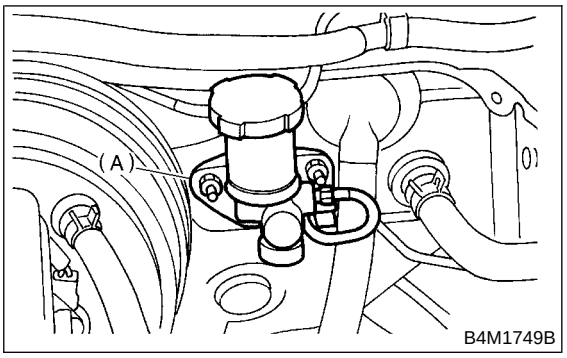
7) Remove nut which secures clutch master cylinder.



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

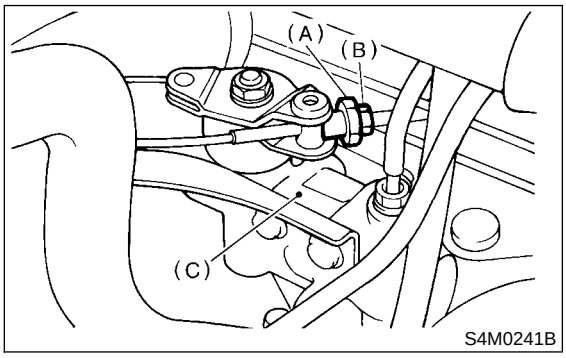
2. RHD MODEL S504256A1804

1) Disconnect ground cable 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.



(A) Master cylinder

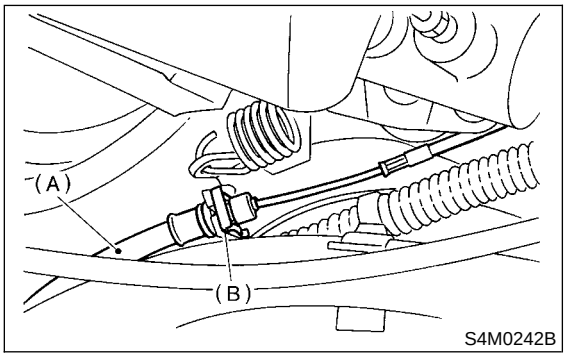
5) Remove PHV adjusting nut and lock nut.



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

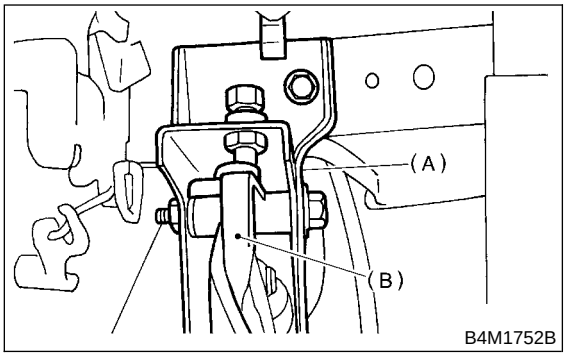
6) Remove cable clamp and disconnect PHV cable from PHV.

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

B: INSTALLATION S504256A11

1) Install in the reverse order of removal.

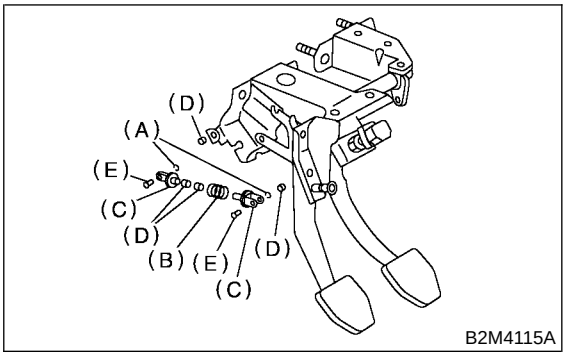
CAUTION:
- **If cable clamp is damaged, replace it with a new one.**
- **Never fail to cover outer cable end with boot.**
- **Be careful not to kink accelerator cable.**
- **Always use new clevis pins.**

2) Adjustment of clutch pedal and adjustment after pedal installation. <Ref. to CL-41 ADJUSTMENT, Clutch Pedal.>

C: DISASSEMBLY S504256A06

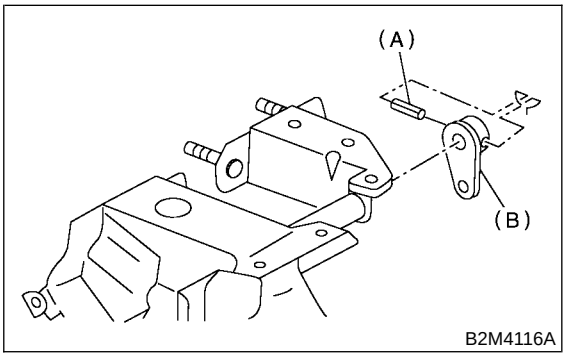
1. LHD MODEL S504256A0601

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



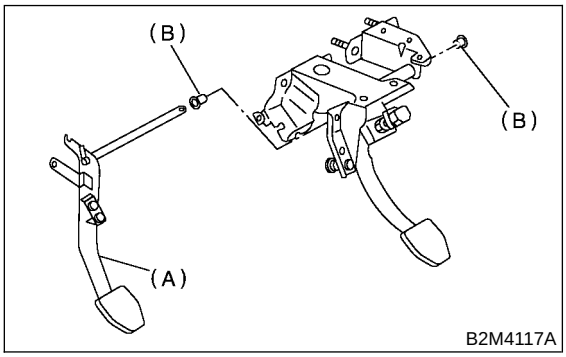
(A) Clip
(B) Assist spring
(C) Assist rod
(D) Bushing
(E) Clevis pin

3) Remove spring pin and lever.



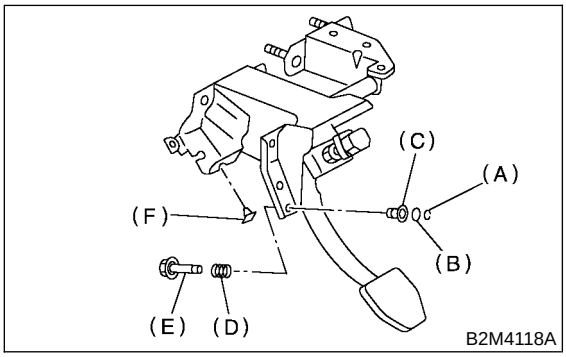
(A) Pin
(B) Lever

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.

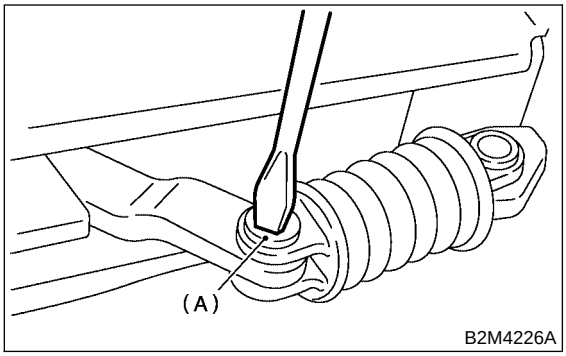


(A) Clip
(B) O-ring
(C) Bushing S
(D) Spring S
(E) Rod S
(F) Stopper

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

2. RHD MODEL S504256A0602

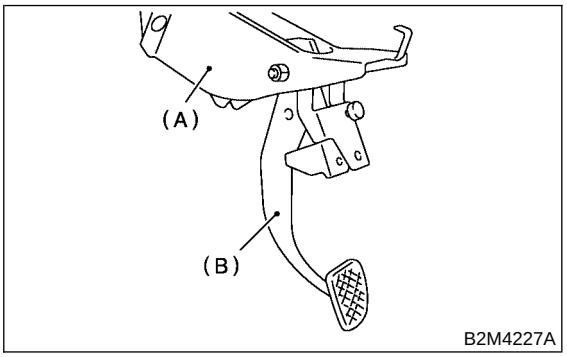
1) Remove clutch switch.
2) Remove clip, pull out clevis pin.



(A) Clevis pin

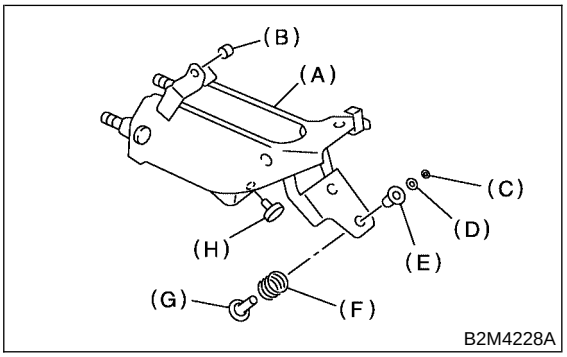
3) Remove assist rod, spring and bushing.

4) Remove clutch pedal from clutch pedal bracket.



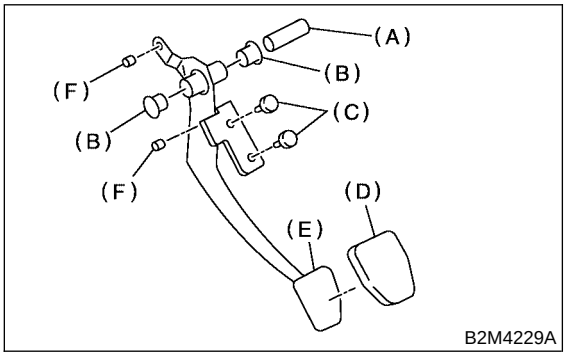
(A) Clutch pedal bracket
(B) Clutch pedal

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 S504256A02

1. LHD MODEL S504256A0201

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.

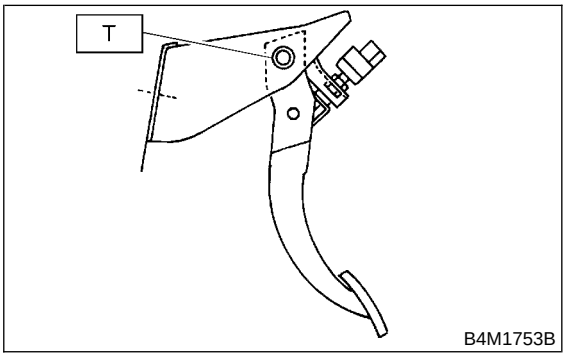
NOTE:
Clean up inside of bushings and apply grease before installing spacer.

4) Install hill holder cable to the clutch pedal. (Vehicle with hill holder)

2. RHD MODEL S504256A0202

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.
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).

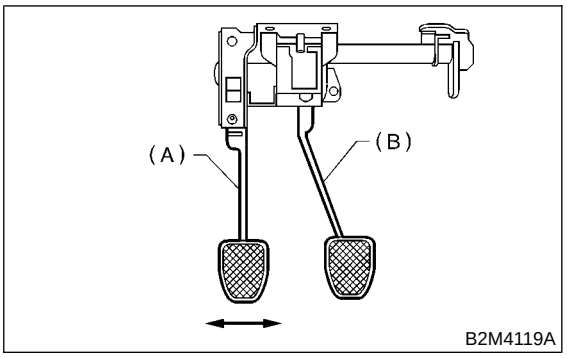
E: INSPECTION S504256A10

1. CLUTCH PEDAL S504256A1001

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 S504256A01

1. CLUTCH PEDAL S504256A0101

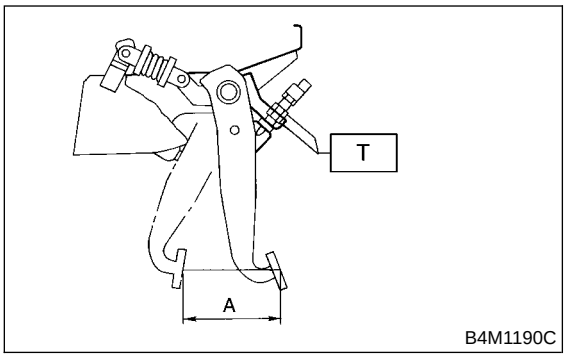
1) Turn clutch switch lock nuts until clutch pedal full stroke length is within specifications.

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.

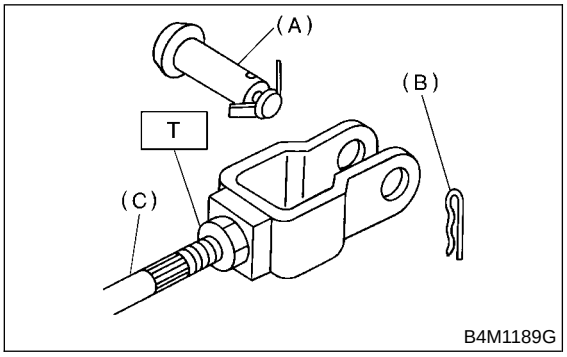
Specified clutch pedal full stroke: A
130 — 135 mm (5.12 — 5.31 in)

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)



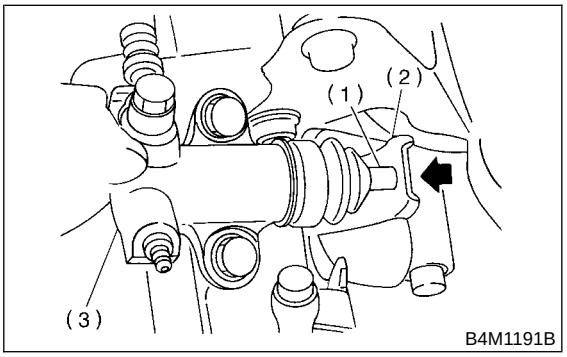
(A) Clevis pin
(B) Snap pin
(C) Push rod
(D) Lock nut

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-34 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.

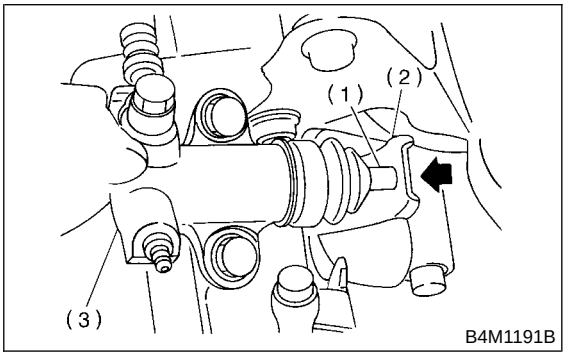
Specified clutch pedal full stroke:
130 — 135 mm (5.12 — 5.31 in)

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-25 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) Inspect the fluid level. <Ref. to CL-33, Clutch Fluid.>

11. Clutch Switch S504258

A: REMOVAL S504258A18

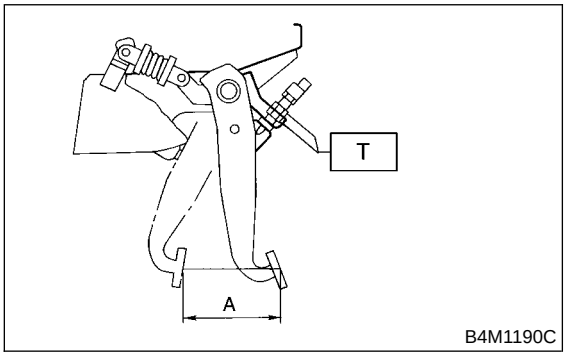
1) Remove battery ground terminal.
2) Disconnect connector from clutch switch.
3) Remove clutch switch.

B: INSTALLATION S504258A11

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)

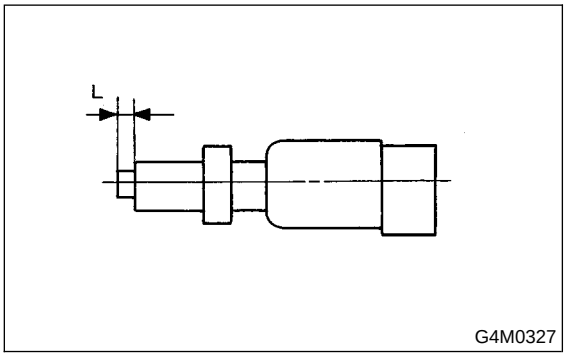


2) If clutch pedal stroke is out of specification, adjust the stroke. <Ref. to CL-41, ADJUSTMENT, Clutch Pedal.>
3) Connect clutch switch connector.

C: INSPECTION S504258A10

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

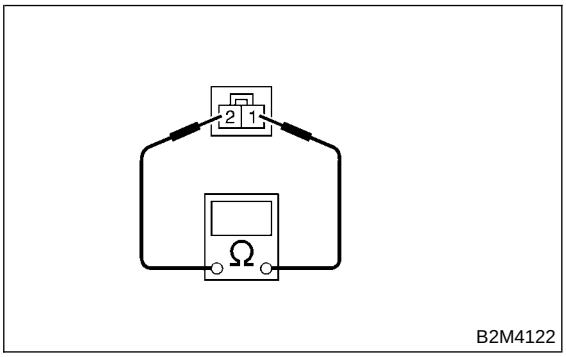
Specified position: L
$2^{+1.5}_{0}$mm ($0.079^{+0.059}_{0}$ in)



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)



12. General Diagnostic Table

S504257

A: INSPECTION S504257A10

1. CLUTCH S504257A1002

Symptom	Possible cause	Corrective
1. Clutch slippage. It is hard to perceive clutch slippage in the early stage, but pay attention to the following symptoms ● Engine speed up when shifting. ● High speed driving is impossible; especially rapid acceleration impossible and vehicle speed does not increase in proportion to an increase in engine speed. ● Power falls, particularly when ascending a slope, and there is a smell of burning of the clutch facing. ● 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.	(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.
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. ● Method of testing: <Ref. to CL-45 DIAGNOSTIC DIAGRAM OF CLUTCH DRAG, INSPECTION, General Diagnostic Table.> It may be judged as insufficient disengagement of clutch if any noise occurs during this test.	(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.
3. Clutch chatters. Clutch chattering is an unpleasant vibration to the whole body when the vehicle is just started with clutch partially engaged.	(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 defection.
	(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.

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 S504257A1003

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 S504257A1001

No.	Step	Check	Yes	No
1	**CHECK GEAR NOISE.** 1) Start the engine. 2) Disengage the clutch and shift quickly from neutral to reverse in idling condition.	Is an abnormal noise heard from the transmission gears?	Go to step **2**.	Clutch is normal.
2	**CHECK GEAR NOISE.** With the engine idling, disengage the clutch and shift quickly (between 0.5 to 1.0 s) from neutral to reverse.	Is an abnormal noise heard from the transmission gears?	Go to step **3**.	Defective transmission or excessive clutch drag torque. Inspect pilot bearing, clutch disc, transmission and clutch disc hub spline.
3	**CHECK GEAR NOISE.** With the engine idling, disengage the clutch and shift quickly (between 0.5 to 1.0 s) from neutral to reverse shift repeatedly between neutral and reverse with clutch disengaged.	Is an abnormal noise heard from the transmission gears?	Clutch is not disengaged properly. Inspect clutch disc, clutch cover, clutch release system, and clutch pedal free play.	Clutch disc and flywheel are locked together. Inspect clutch disc and clutch disc hub spline.

MEMO: