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. G8070GE4

CONTROL SYSTEMS

CS

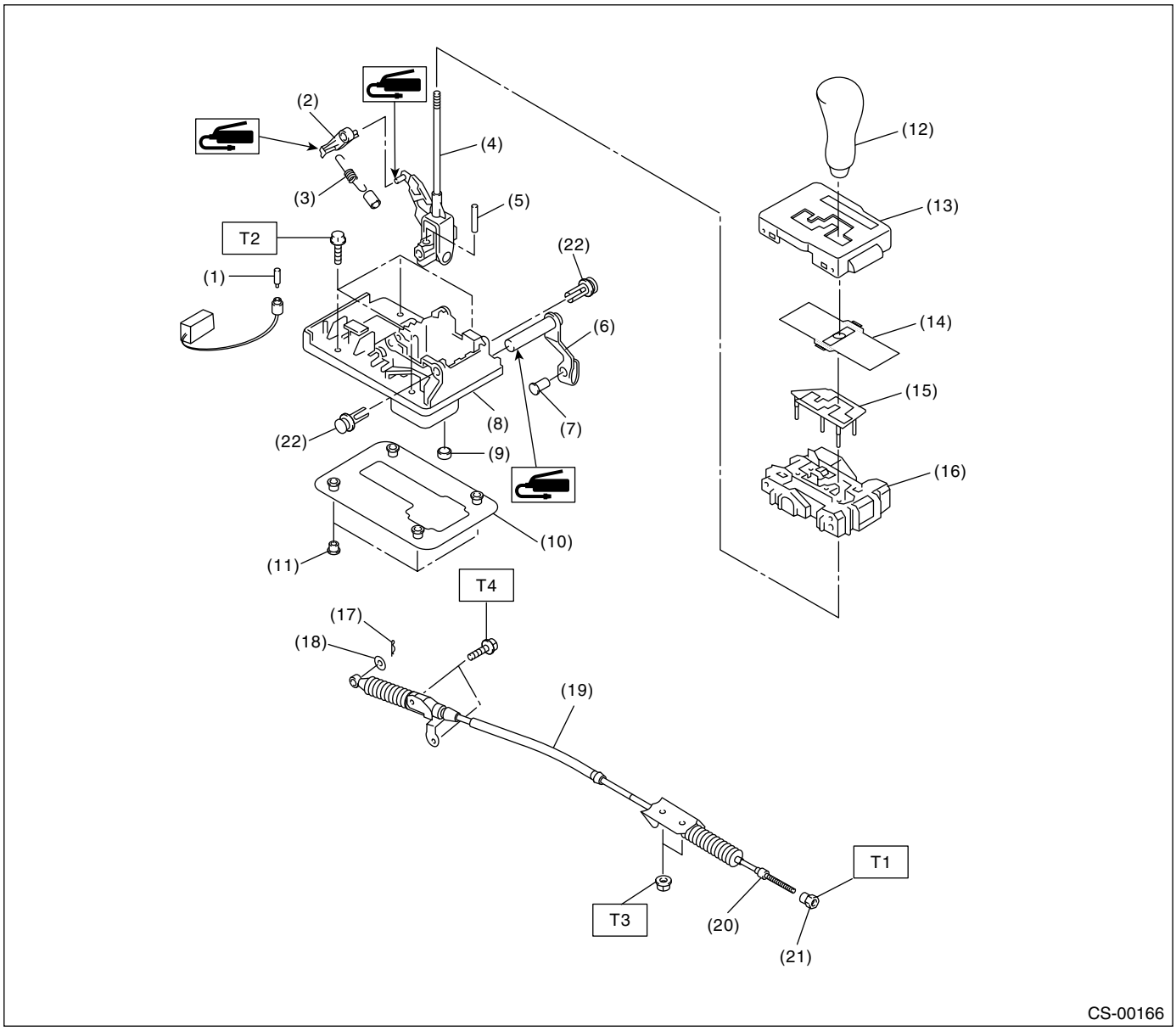
1. General Description

A: SPECIFICATIONS

Item		Specification
Vibration torque of rod against lever	N (kgf, lb)	3.7 (0.38, 0.83) or less

B: COMPONENT

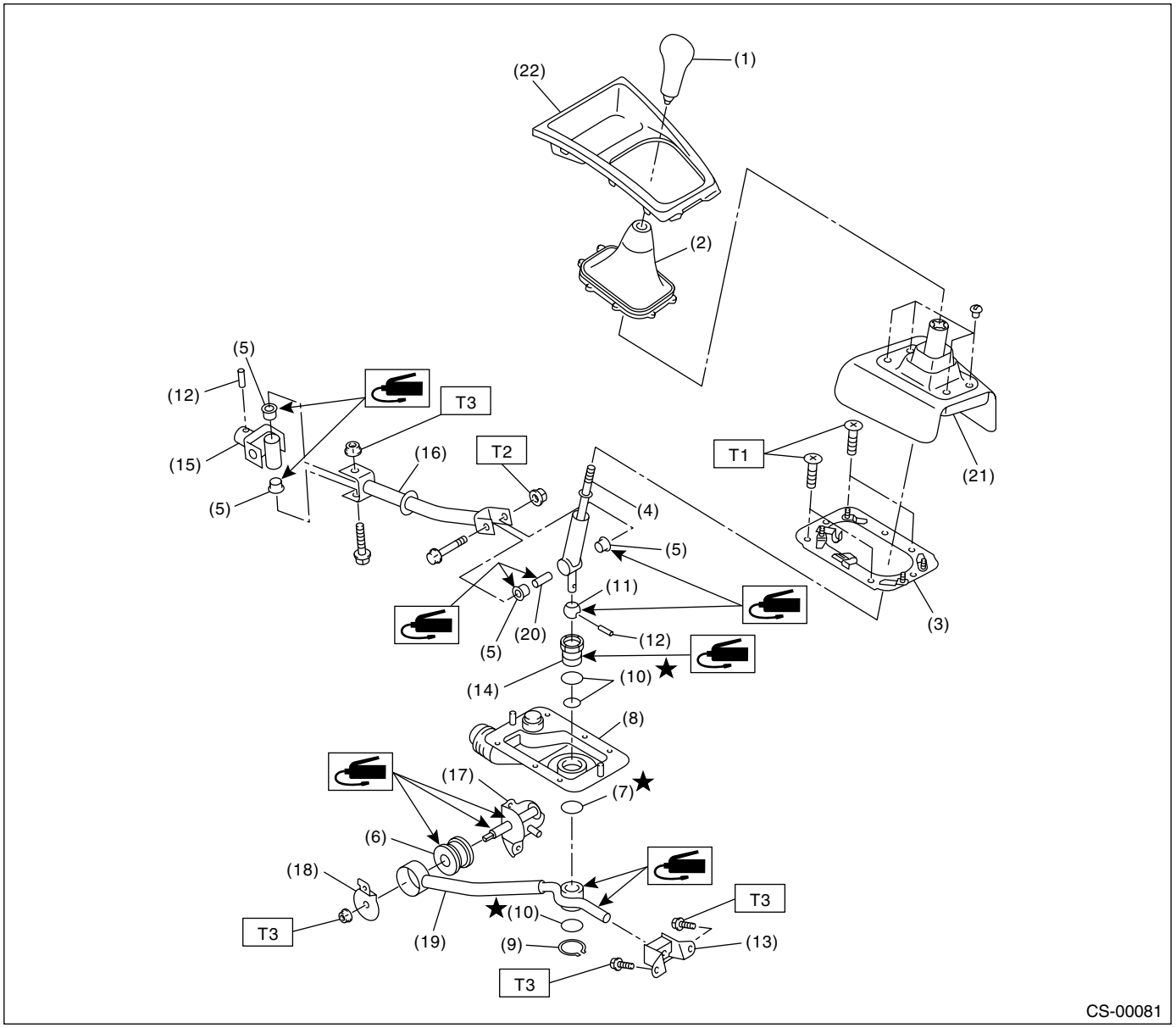
1. AT SELECT LEVER



(1) Bulb
(2) Detent arm
(3) Detent spring
(4) Lever
(5) Spring pin
(6) Arm COMPL
(7) Bush COMPL
(8) Base plate
(9) Grommet
(10) Packing
(11) Spacer
(12) Grip
(13) Indicator cover
(14) Blind
(15) Cushion plate
(16) Guide plate
(17) Snap pin
(18) Washer
(19) Select cable
(20) Nut B
(21) Nut A
(22) Clip

Tightening torque: N·m (kgf-m, ft-lb)
T1: 7.5 (0.76, 5.5)
T2: 13 (1.3, 9.4)
T3: 18 (1.8, 13.0)
T4: 18 (1.8, 13.0)

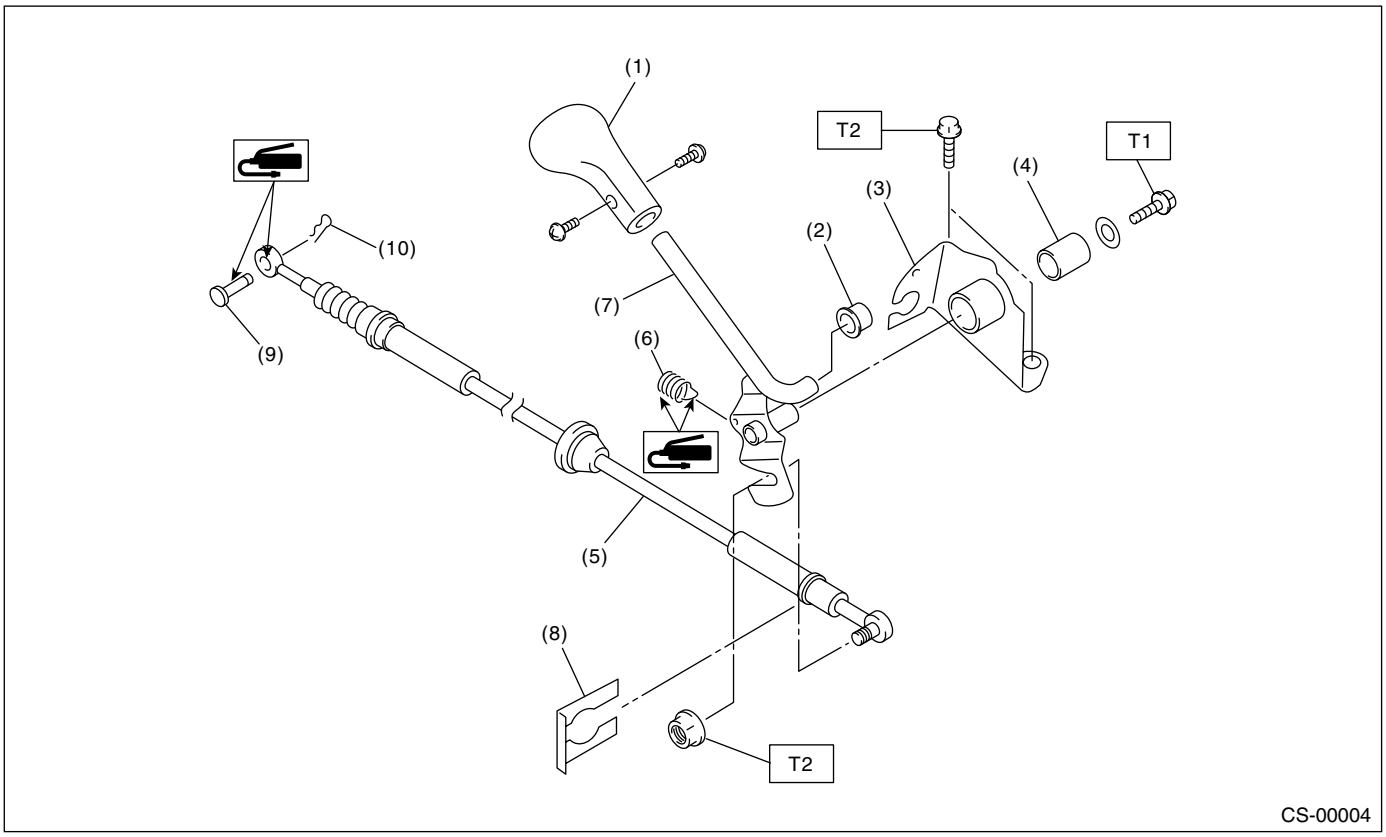
2. MT GEAR SHIFT LEVER



(1)	Gear shift knob	(10)	O-ring	(19)	Stay
(2)	Console boot	(11)	Bush A	(20)	Spacer
(3)	Plate COMPL	(12)	Spring pin	(21)	Boot and insulator ASSY
(4)	Lever	(13)	Cushion rubber	(22)	Front cover
(5)	Bush	(14)	Bush B		
(6)	Bush	(15)	Joint		
(7)	Lock wire	(16)	Rod		
(8)	Boot	(17)	Bracket		
(9)	Snap ring	(18)	Washer		

Tightening torque: N·m (kgf-m, ft-lb)
T1: 7.5 (0.76, 5.5)
T2: 12 (1.2, 8.7)
T3: 18 (1.8, 13.0)

3. DRIVE SELECT LEVER



(1) Knob
(2) Cushion
(3) Plate COMPL
(4) Bush
(5) Cable
(6) Spring
(7) Lever COMPL
(8) Clip
(9) Clevis pin
(10) Snap pin

Tightening torque: N·m (kgf-m, ft-lb)
T1: 1.6 (0.16, 1.2)
T2: 18 (1.8, 13.0)

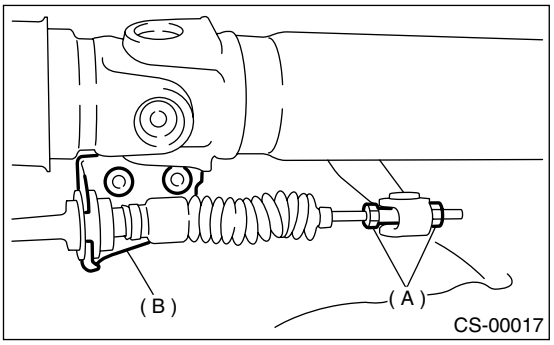
C: CAUTION

• 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.
• Use SUBARU genuine grease etc. or the equivalent. Do not mix 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 grease 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.
• Before disconnecting electrical connectors, be sure to disconnect the ground cable from battery.

2. Select Lever

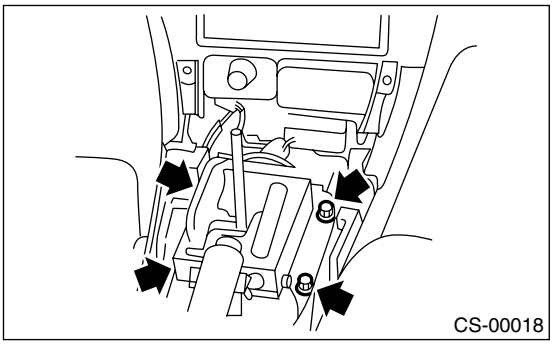
A: REMOVAL

1) Set the vehicle on a lift.
2) Disconnect the ground cable from battery.
3) Move the select lever to “N” position.
4) Lift-up the vehicle.
5) Remove the rear exhaust pipe and muffler.
Non-turbo model
<Ref. to EX(SOHC)-11, REMOVAL, Rear Exhaust Pipe.>, <Ref. to EX(SOHC)-13, REMOVAL, Muffler.>
Turbo model
<Ref. to EX(TURBO)-12, REMOVAL, Rear Exhaust Pipe.>, <Ref. to EX(TURBO)-14, REMOVAL, Muffler.>
6) Remove the heat shield cover. (If equipped)
7) Disconnect the cable from select lever, and then remove the cable bracket.



(A) Adjusting nuts
(B) Cable bracket

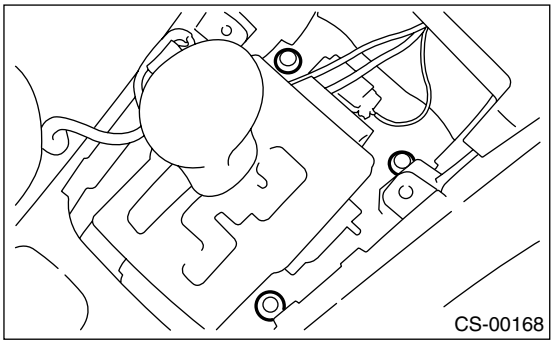
8) Lower the vehicle.
9) Remove the console box. <Ref. to EI-39, REMOVAL, Console Box.>
10) Disconnect the connectors, then remove the four bolts to take out the select lever assembly from body.



B: INSTALLATION

1) Mount the select lever onto the vehicle body.
2) Tighten the four select lever mounting bolts to the specified torque, then connect the connector.

Tightening torque:
13 N·m (1.3 kgf-m, 9.4 ft-lb)



3) Install the console box. <Ref. to EI-39, INSTALLATION, Console Box.>
4) Set the location of select lever at “N” position.
5) Lift-up the vehicle.
6) Set the location of range select lever to “N” position.
7) Insert the thread portion of the other inner cable and into connector hole of the select lever, and fix the other outer cable end to bracket.

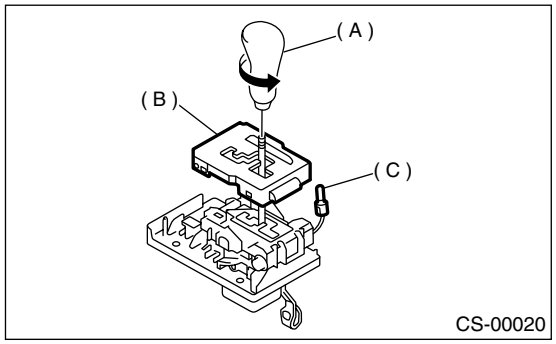
Tightening torque:
18 N·m (1.8kgf-m, 13.0 ft-lb)

8) Adjust the select cable position. <Ref. to CS-10, ADJUSTMENT, Select Cable.>
9) After completion of fitting, make sure that the select lever operates smoothly all across the operating range.
10) Install the heat shield cover. (If equipped)
11) Install the rear exhaust pipe and muffler.
Non-turbo model
<Ref. to EX(SOHC)-11, INSTALLATION, Rear Exhaust Pipe.>, <Ref. to EX(SOHC)-13, INSTALLATION, Muffler.>
Turbo model
<Ref. to EX(TURBO)-12, INSTALLATION, Rear Exhaust Pipe.>, <Ref. to EX(TURBO)-14, INSTALLATION, Muffler.>
12) Inspect the following items. If the following inspection reveals problems, adjust the select cable and inhibitor switch. <Ref. to CS-10, ADJUSTMENT, Select Cable.> and <Ref. to AT-48, ADJUSTMENT, Inhibitor Switch.>
(1) The engine starts operating when select lever is in position “P”, but not in other positions.
(2) The back-up light is lit when the select lever is in position “R”, but not in other positions.
(3) Select lever and indicator positions displayed are matched.

C: DISASSEMBLY

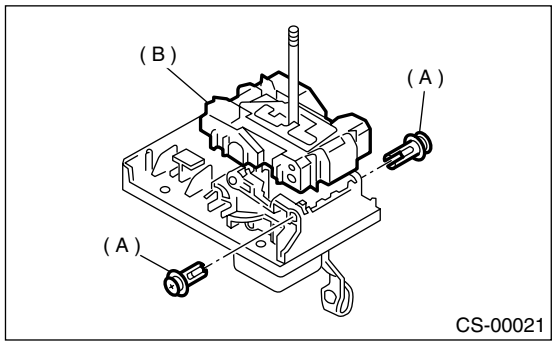
1) Remove the grip.
2) Remove the indicator light, and then remove the indicator cover.

NOTE:
Be careful not to break the indicator light during removal.



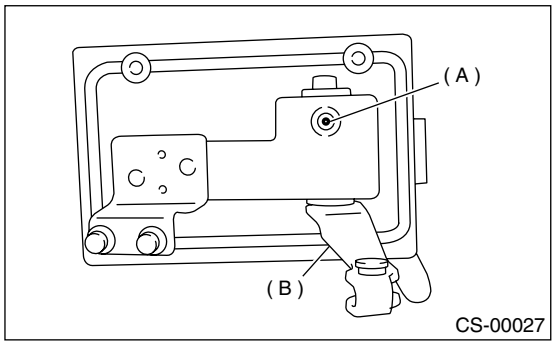
(A) Grip
(B) Indicator cover
(C) Indicator light

3) Remove the blind.
4) Remove the clips, and then remove the guide plate.



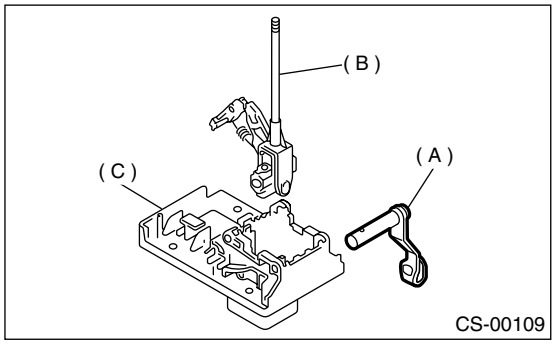
(A) Clips
(B) Guide plate

5) Remove the grommet, and then extract the spring pin.



(A) Spring pin
(B) Arm COMPL

6) Remove the arm COMPL, and then take away the select lever COMPL from base plate.



(A) Arm COMPL
(B) Select lever COMPL
(C) Base plate

D: ASSEMBLY

1) Clean all parts before assembly.
2) Apply grease [SUNLIGHT No. 2 (Part No. 003602010) or equivalent] to each parts. <Ref. to CS-3, AT Select Lever.>
3) Assembly is in the reverse order of disassembly.
4) After completion of fitting, transfer the select lever to range “P” — “1”, then check whether the indicator and select lever agree, whether the pointer and position mark agree and what the operating force is.

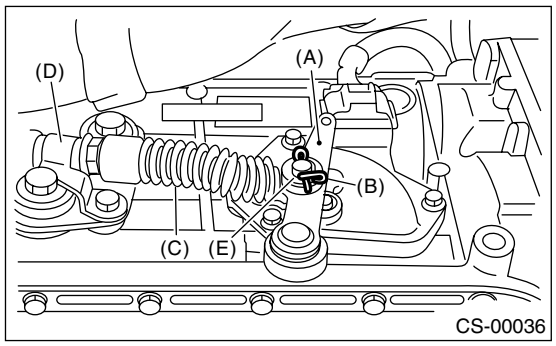
E: INSPECTION

1) Inspect the removed parts by comparing with new ones for deformation, damage and wear. Correct or replace if defective.
2) Confirm select lever COMPL for operating condition before assembly. It is operating normally if it moves smoothly.

3. Select Cable

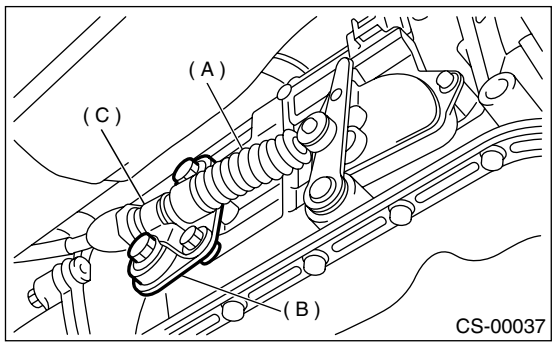
A: REMOVAL

1) Set the vehicle on a lift.
2) Disconnect the ground cable from battery.
3) Prior to removal, set the lever to “N” position.
4) Lift-up the vehicle.
5) Remove the front and center exhaust pipe.
Non-turbo model
<Ref. to EX(SOHC)-7, REMOVAL, Front Exhaust Pipe.>
Turbo model
<Ref. to EX(TURBO)-7, REMOVAL, Center Exhaust Pipe.>
6) Remove the heat shield cover. (If equipped)
7) Remove the snap pin from range select lever.



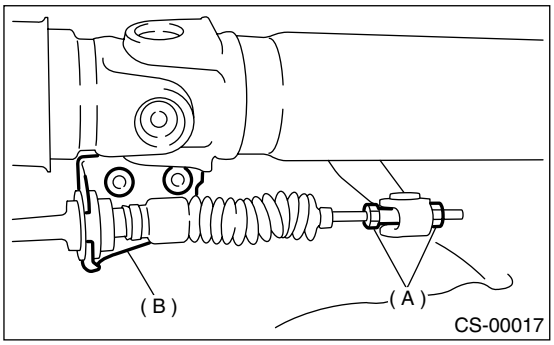
(A) Range select lever
(B) Snap pin
(C) Select cable
(D) Clamp
(E) Washer

8) Remove the plate assembly from transmission case.



(A) Select cable
(B) Plate ASSY
(C) Clamp

9) Disconnect the cable from select lever, and then remove the cable bracket.



(A) Adjusting nuts
(B) Cable bracket

10) Remove the select cable from plate assembly.

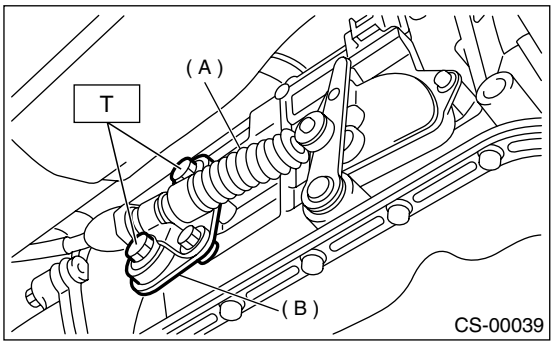
B: INSTALLATION

1) Install the select cable to plate assembly.

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

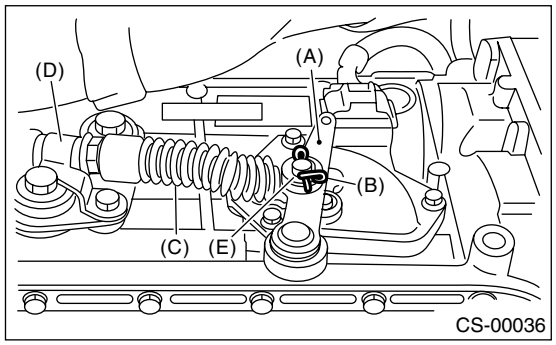
2) Install the select cable to range select lever.
3) Install the plate assembly to transmission.

Tightening torque:
T: 24.5 N·m (2.5 kgf-m, 18.1 ft-lb)



(A) Select cable
(B) Plate ASSY

4) Install the snap pin to range select lever.



(A) Range select lever
(B) Snap pin
(C) Select cable
(D) Clamp
(E) Washer

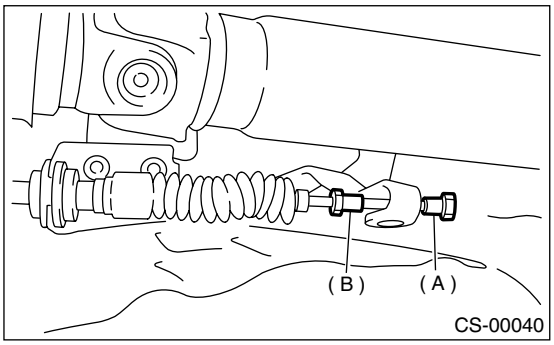
5) Move the select lever to “N” position, then adjust the select cable position. <Ref. to CS-10, ADJUSTMENT, Select Cable.>
6) Install the heat shield cover. (If equipped)
7) Install the front and center exhaust pipe.
Non-turbo model
<Ref. to EX(SOHC)-8, INSTALLATION, Front Exhaust Pipe.>
Turbo model
<Ref. to EX(TURBO)-8, INSTALLATION, Center Exhaust Pipe.>

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.
5) Move the select lever from “P” position to “1” position. You should be able to feel the detentes in each position. If the detentes cannot be felt or the position pointer is improperly aligned, adjust the cable.

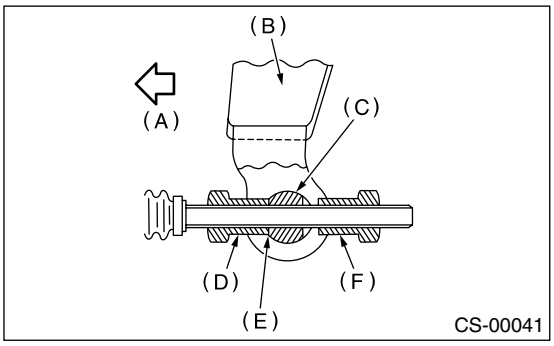
D: ADJUSTMENT

1) Set the vehicle on a lift.
2) Set the lever to “N” position.
3) Lift-up the vehicle.
4) Remove the rear exhaust pipe and muffler.
5) Remove the heat shield cover. (If equipped)
6) Loosen the adjusting nut on each side.



(A) Adjusting nut A
(B) Adjusting nut B

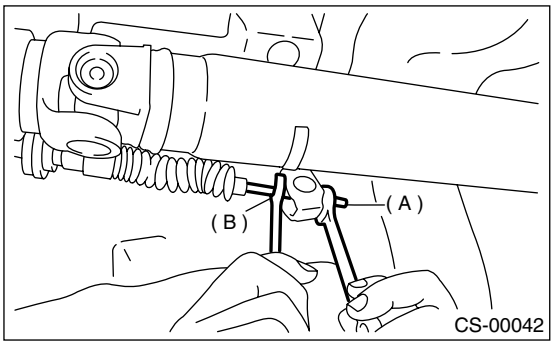
7) Turn the adjusting nut B until it lightly touches the connector.



(A) Front side
(B) Select lever
(C) Connector
(D) Adjusting nut B
(E) Contact point
(F) Adjusting nut A

8) While preventing the adjusting nut B from moving with a wrench, tighten the adjusting nut A.

Tightening torque:
7.5 N·m (0.76 kgf-m, 5.5 ft-lb)



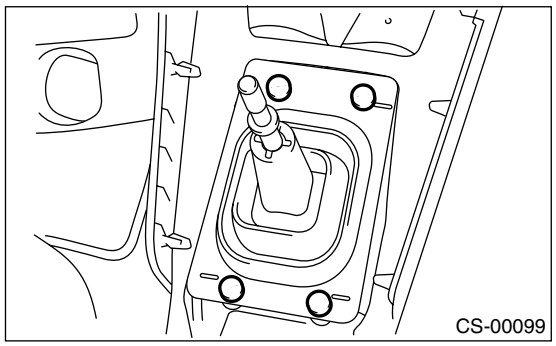
(A) Adjusting nut A
(B) Adjusting nut B

9) After completion of fitting, make sure that the select lever operates smoothly all across the operating range.
10) Install the removed parts in the reverse order of removal.

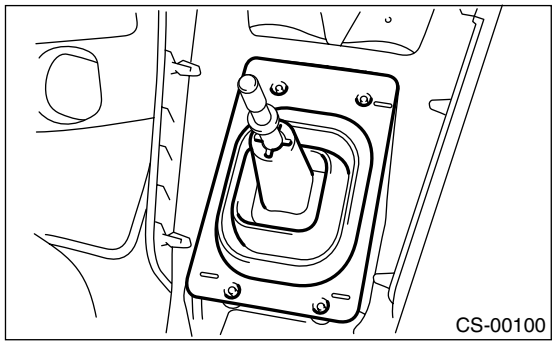
4. MT Gear Shift Lever

A: REMOVAL

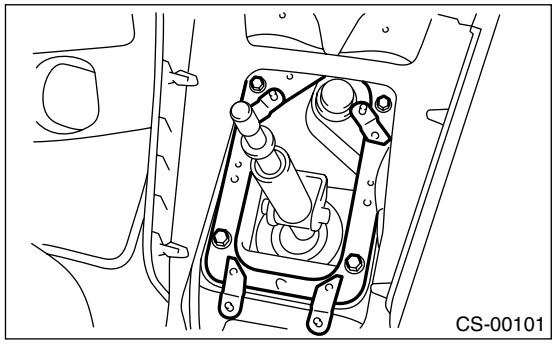
1) Set the vehicle on a lift.
2) Remove the gear shift knob.
3) Disconnect the ground cable from battery.
4) Remove the console box. <Ref. to EI-39, REMOVAL, Console Box.>
5) Remove the drive select cable. <Ref. to CS-20, REMOVAL, Drive Select Cable.>
6) Remove the clamp.



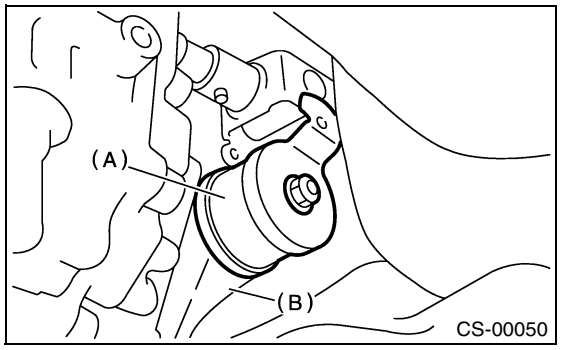
7) Remove the boot and insulator assembly.



8) Remove the drive select cable. <Ref. to CS-20, REMOVAL, Drive Select Cable.>
9) Remove the plate COMPL from body.

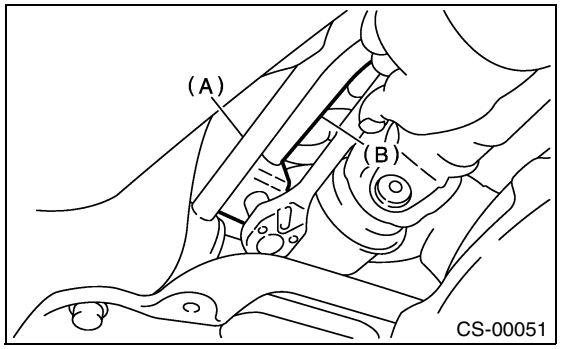


10) Lift-up the vehicle.
11) Remove the rear exhaust pipe and muffler.
Non-turbo model
<Ref. to EX(SOHC)-11, REMOVAL, Rear Exhaust Pipe.>, <Ref. to EX(SOHC)-13, REMOVAL, Muffler.>
Turbo model
<Ref. to EX(TURBO)-12, REMOVAL, Rear Exhaust Pipe.>, <Ref. to EX(TURBO)-14, REMOVAL, Muffler.>
12) Remove the heat shield cover.
13) Remove the stay from transmission bracket.



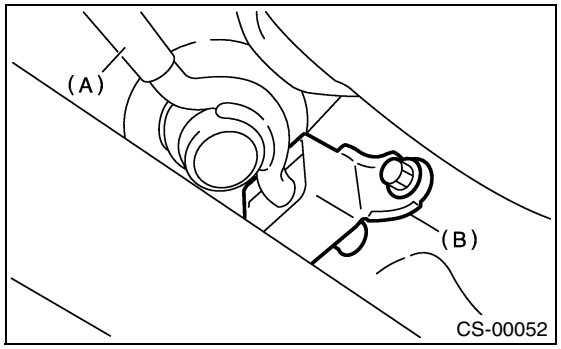
(A) Stay
(B) Transmission bracket

14) Remove the rod from joint.



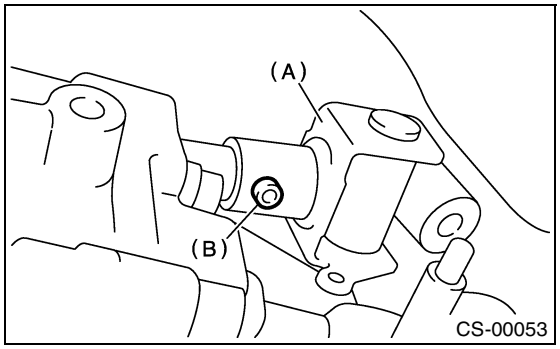
(A) Stay
(B) Rod

15) Remove the cushion rubber from body.



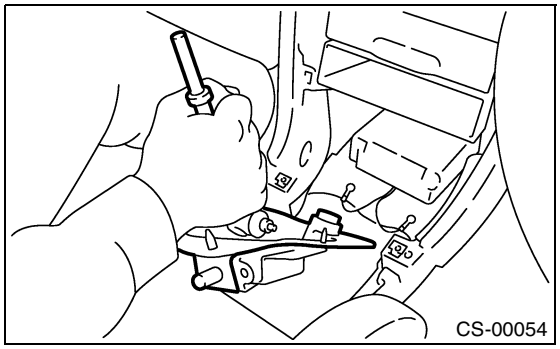
(A) Stay
(B) Cushion rubber

16) Remove the spring pin, and then extract the joint.



(A) Joint
(B) Spring pin

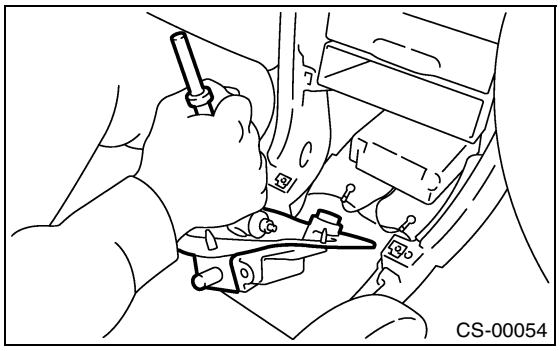
17) Lower the vehicle.
18) Remove the gear shift lever.



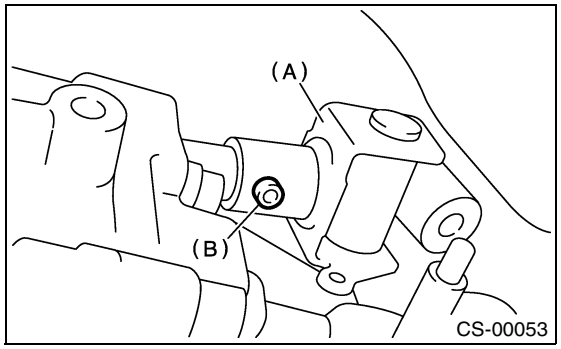
B: INSTALLATION

1) Insert the gear shift lever from room side.

NOTE:
After inserting the rod and stay, temporarily put them onto transmission mount.



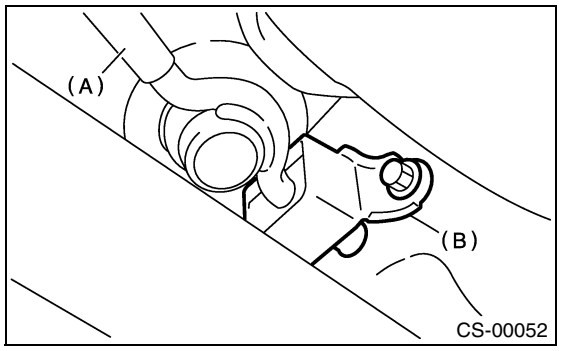
2) Install the joint to transmission and secure with the spring pin.



(A) Joint
(B) Spring pin

3) Lift-up the vehicle.
4) Install the joint to shifter arm.
5) Mount the cushion rubber on the body.

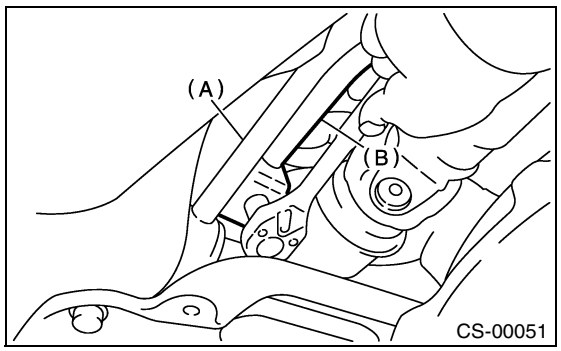
Tightening torque:
18 N·m (1.8 kgf-m, 13.0 ft-lb)



(A) Stay
(B) Cushion rubber

6) Connect the rod to the joint.

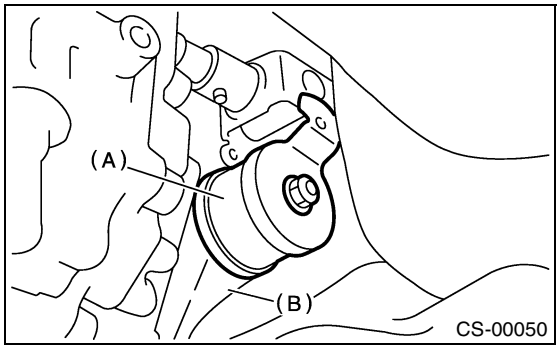
Tightening torque:
18 N·m (1.8 kgf-m, 13.0 ft-lb)



(A) Stay
(B) Rod

7) Connect the stay to transmission bracket.

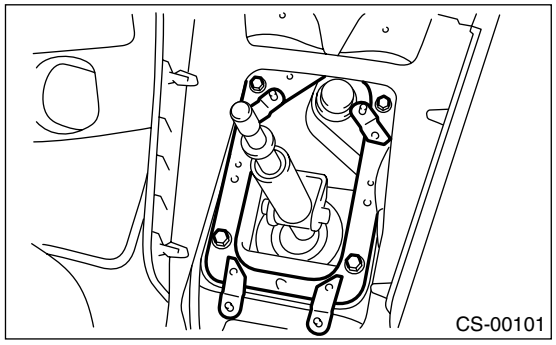
Tightening torque:
18 N·m (1.8 kgf-m, 13.0 ft-lb)



(A) Stay
(B) Transmission bracket

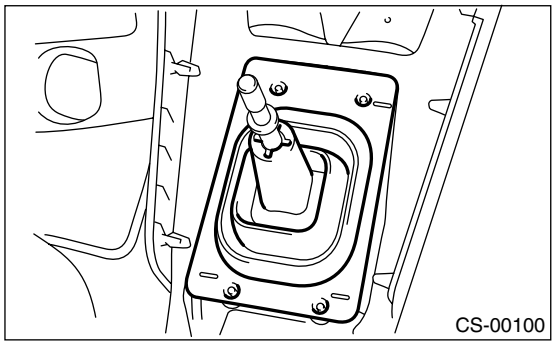
8) Install the heat shield cover. (If equipped)
9) Install the rear exhaust pipe and muffler.
Non-turbo model
<Ref. to EX(SOHC)-11, REMOVAL, Rear Exhaust Pipe.>, <Ref. to EX(SOHC)-13, INSTALLATION, Muffler.>
Turbo model
<Ref. to EX(TURBO)-12, INSTALLATION, Rear Exhaust Pipe.>, <Ref. to EX(TURBO)-14, INSTALLATION, Muffler.>
10) Lower the vehicle.
11) Install the plate COMPL to body.

Tightening torque:
7.5 N·m (0.76 kgf-m, 5.5 ft-lb)



12) Install the drive select cable. <Ref. to CS-20, INSTALLATION, Drive Select Cable.>

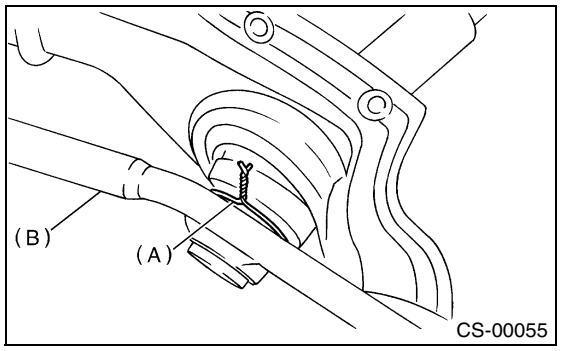
13) Install the boot and insulator assembly to vehicle in proper direction.



14) Install the clamp.
15) Install the drive select cable. (Dual-range model) <Ref. to CS-20, INSTALLATION, Drive Select Cable.>
16) Install the console box. <Ref. to EI-39, INSTALLATION, Console Box.>

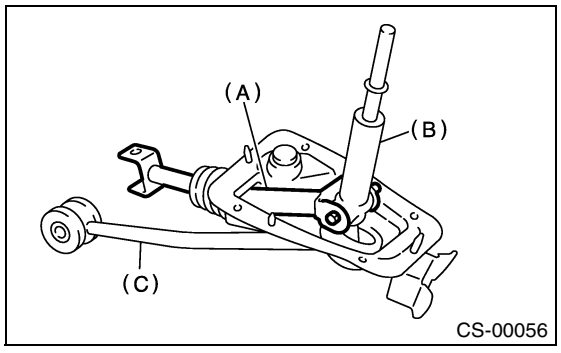
C: DISASSEMBLY

1) Disassemble the lock wire.



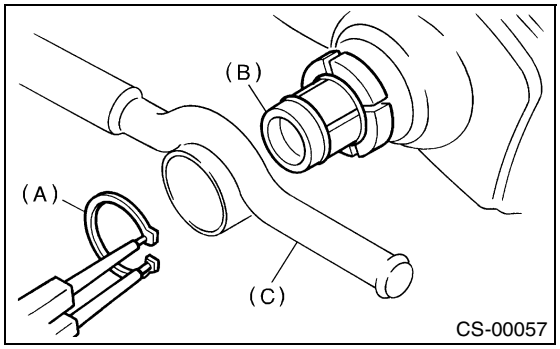
(A) Lock wire
(B) Stay

2) Remove the rod from lever.



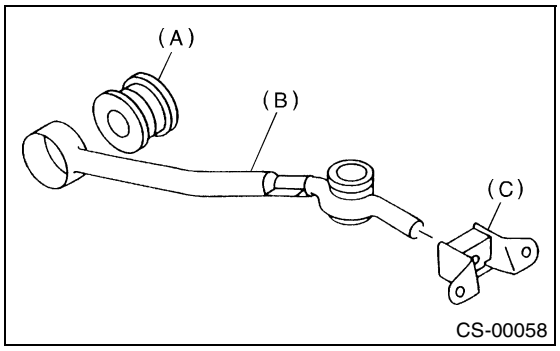
(A) Rod
(B) Lever
(C) Stay

3) Remove the snap ring from bush B, and then disconnect the stay.



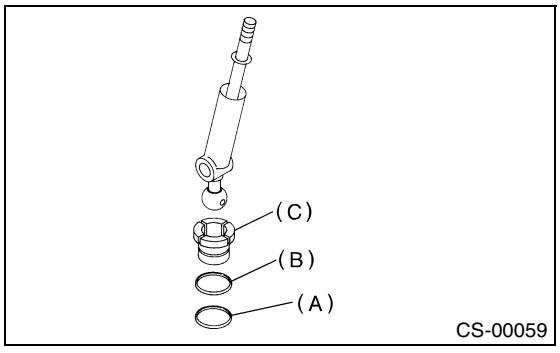
(A) Snap ring
(B) Bush B
(C) Stay

4) Remove the boot from gear shift lever.
5) Remove the bush and cushion rubber from stay.



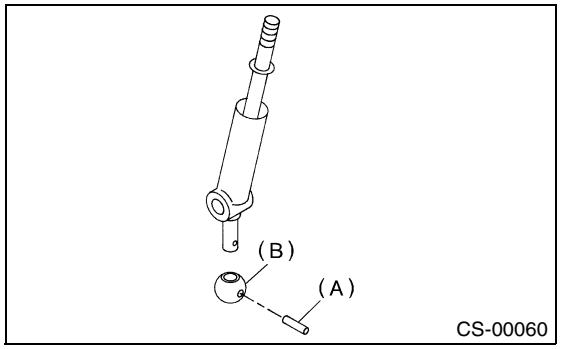
(A) Bush
(B) Stay
(C) Cushion rubber

6) Remove the O-ring, and then disconnect the bush B.



(A) O-ring
(B) O-ring
(C) Bush B

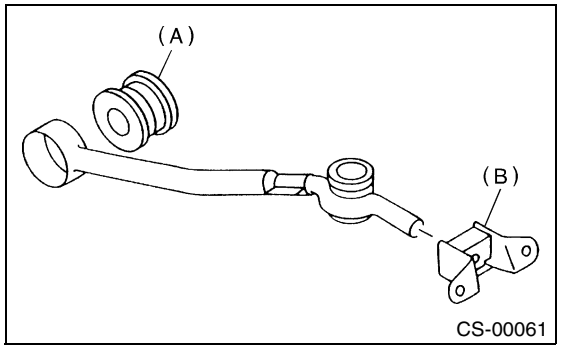
7) Draw out the spring pin, and then remove the bush A from gear shift lever.



(A) Spring pin
(B) Bush A

D: ASSEMBLY

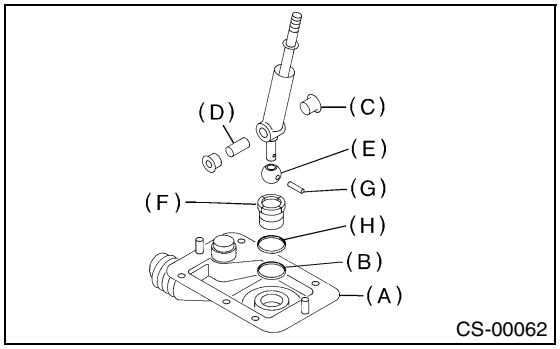
1) Clean all parts before assembly.
2) Mount the bush and cushion rubber on the stay.



(A) Bush
(B) Cushion rubber

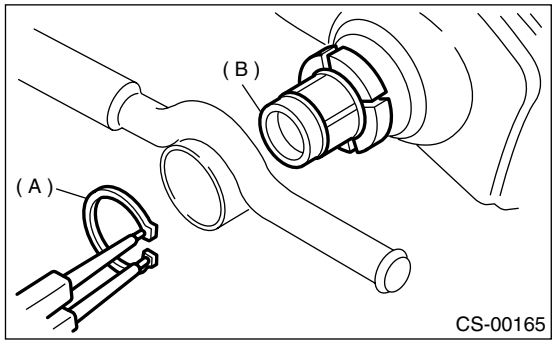
3) Mount each part; boot, O-ring, bush A, spacer, bush B, bush and spring pin on the gear shift lever.

NOTE:
• Always use new O-rings.
• Apply grease [SUNLIGHT No. 2 part (No. 003602010) or equivalent] to the inner and side surfaces of the bush when installing the spacer.



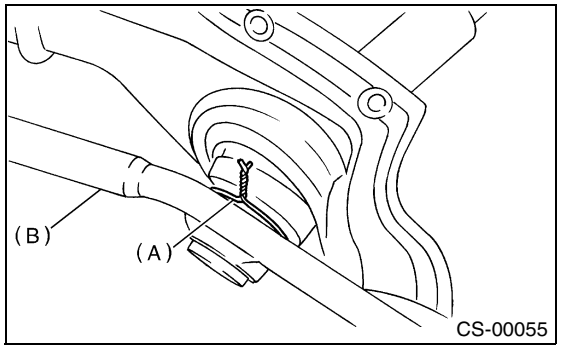
(A) Boot
(B) O-ring
(C) Bush
(D) Spacer
(E) Bush A
(F) Bush B
(G) Spring pin
(H) O-ring

4) Insert the gear shift lever into boot hole.
5) Install the stay to bush B and secure it with snap ring.



(A) Snap ring
(B) Bush B

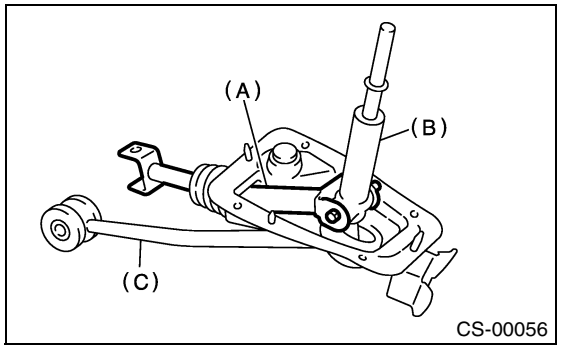
6) Tighten with a new lock wire to the extent that the boot will not come off.



(A) Lock wire
(B) Stay

7) Insert the rod into boot hole.
8) Connect the rod to gear shift lever.

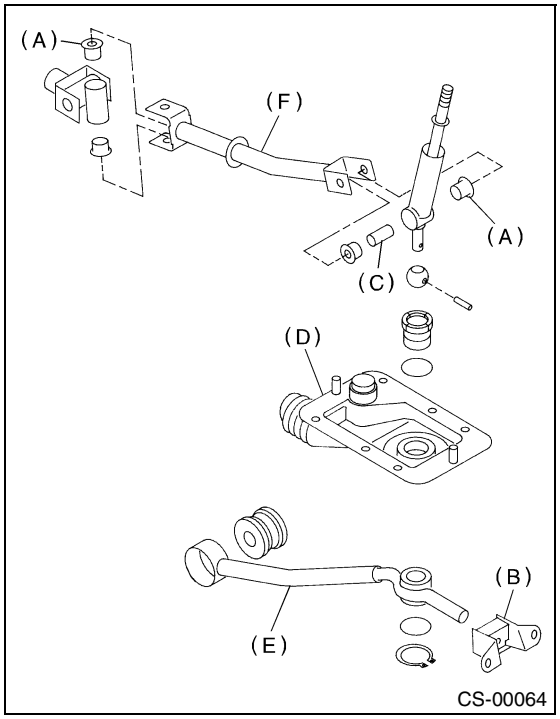
Tightening torque:
11.8 N·m (1.2 kgf-m, 8.7 ft-lb)



(A) Rod
(B) Lever
(C) Stay

E: INSPECTION

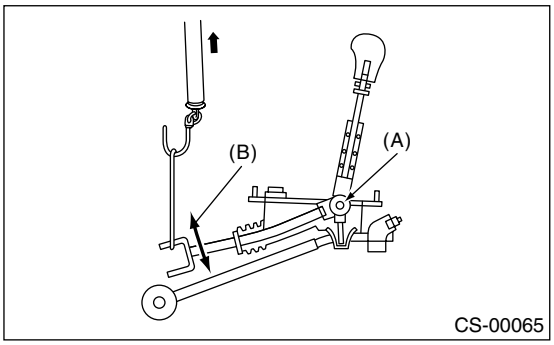
1) Check each part (bush, cushion rubber, spacer, boot, stay and rod, etc.) for deformation, damage and wear. Repair or replace any defective part. Determine defective parts by comparing with new parts.



(A) Bush
(B) Cushion rubber
(C) Spacer
(D) Boot
(E) Stay
(F) Rod

2) Check the swing torque of the rod in relation of gear shift lever.
If the torque exceeds specification, replace the bush or retighten nuts.

Swing torque:
3.7 N (0.38 kgf, 0.83 lb) or less



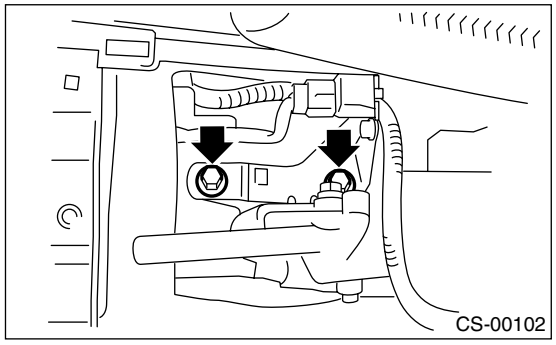
(A) Center of rotation
(B) Swing torque

3) Check that there is no excessive play and that parts move smoothly.

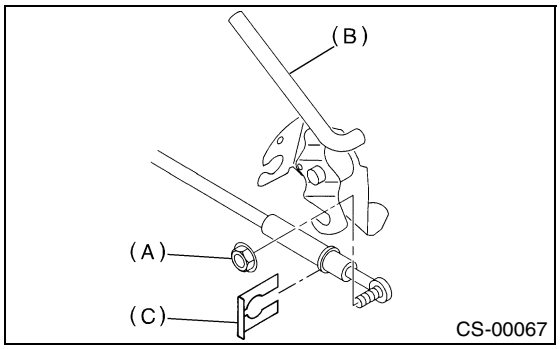
5. MT Drive Select Lever

A: REMOVAL

1) Apply parking brake and place chocks to hold the wheels.
2) Disconnect the ground cable from battery.
3) Set the drive select lever to HI position.
4) Remove the knob.
5) Remove the console box. <Ref. to EI-39, Console Box.>
6) Remove the bolt installing drive select lever assembly on body.



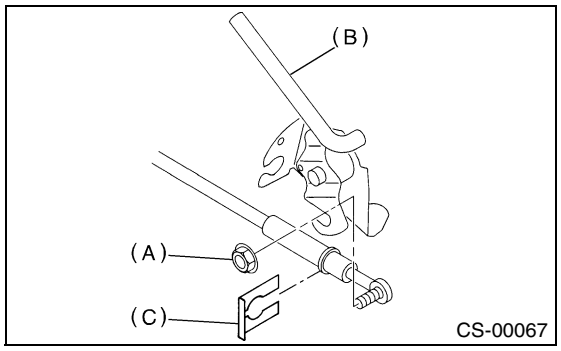
7) Remove the flange nut, clip and then disconnect the cable from lever assembly.



(A) Flange nut
(B) Lever COMPL
(C) Clip

B: INSTALLATION

1) Install the drive select cable to lever COMPL, and then fasten it with a clip.

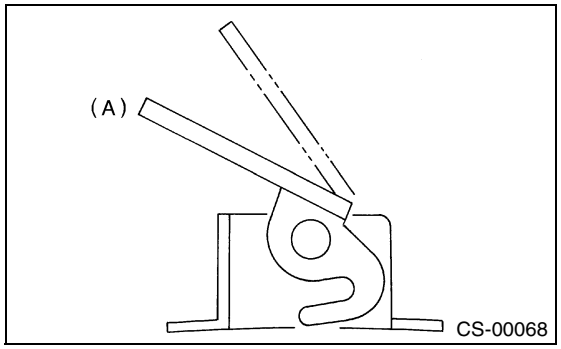


(A) Flange nut
(B) Lever COMPL
(C) Clip

2) Install the drive select lever.

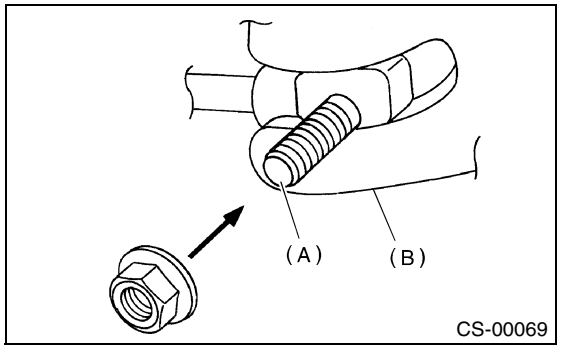
Tightening torque:
18 N·m (1.8 kgf-m, 13.0 ft-lb)

3) Set the drive select lever to HI position.



(A) HI position

4) Be sure to insert the cable eye end bolt into lever arm slit.



(A) Cable eye end bolt
(B) Lever arm

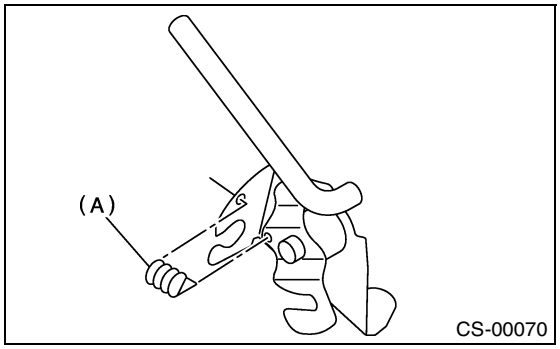
5) Tighten the nut where cable eye end bolt comes to a stop.

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

6) Install in the reverse order of removal.

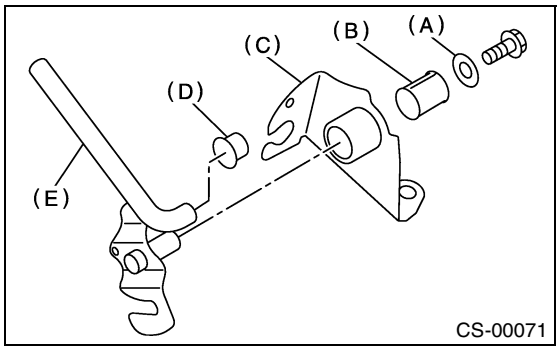
C: DISASSEMBLY

1) Remove the spring.



(A) Spring

2) Remove the lever, cushion and bush.



(A) Washer
(B) Bush
(C) Plate COMPL
(D) Cushion
(E) Lever COMPL

D: ASSEMBLY

1) Assemble in the reverse order of disassembly.

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

2) Make sure the select lever moves smoothly.

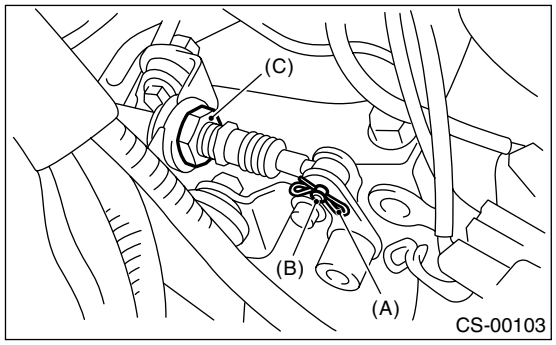
E: INSPECTION

1) Make sure the select lever moves smoothly. If it does not move smoothly, repair or replace it.
2) Make sure the drive select lever is not damaged. If it is damaged, repair or replace it.

6. Drive Select Cable

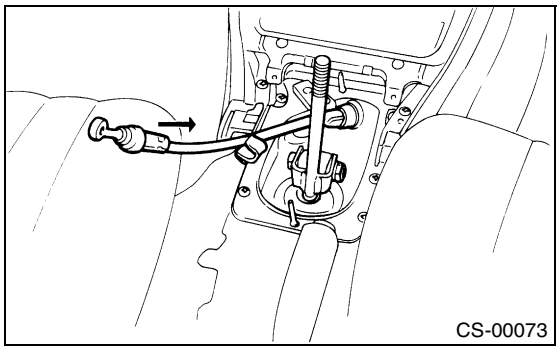
A: REMOVAL

1) Remove the drive select lever. <Ref. to CS-18, REMOVAL, MT Drive Select Lever.>
2) Remove the intake duct. <Ref. to IN(SOHC)-7, Air Intake Duct.>
3) Remove the air cleaner case. <Ref. to IN(SOHC)-6, Air Cleaner Case.>
4) Remove the snap pin and clevis pin.
5) Loosen the nut and disconnect the cable from cable bracket.



(A) Snap pin
(B) Clevis pin
(C) Nut

6) Disconnect the cable from transmission clamp.
7) Remove the cable from the under side of vehicle.



B: INSTALLATION

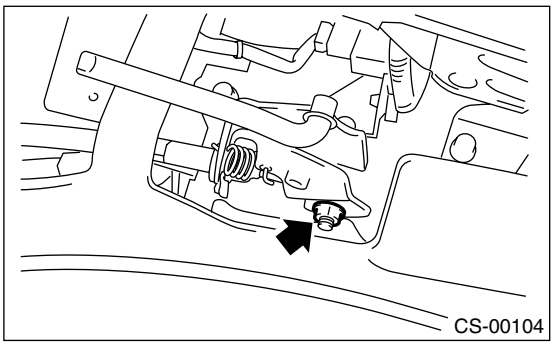
1) Install in the reverse order of removal.
2) Make sure the drive select lever operates properly.

C: INSPECTION

1) Make sure to shift the transmission to HI or LO position by moving the drive select lever. If it does not move, adjust the cable.<Ref. to CS-20, ADJUSTMENT, Drive Select Cable.>
2) Make sure the cable operates smoothly. If it catches or fails to work properly, repair or replace it.
3) Check the cable for damage.

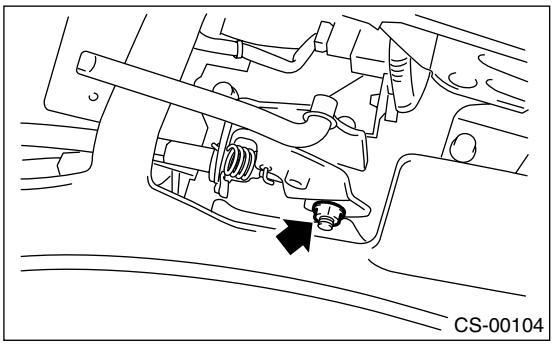
D: ADJUSTMENT

1) Set the drive select lever to HI position.
2) Remove the drive select lever knob.
3) Remove the console box. <Ref. to EI-39, Console Box.>
4) Loosen the nut.



5) Make sure the transmission is in HI position. If is not, pull on the cable to put transmission in HI position.
6) Tighten the nut in the location where cable end bolt stops naturally.

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



7) Make sure to shift the transmission to HI or LO position by moving the drive select lever. If it does not move, readjust the cable.

7. General Diagnostic

A: INSPECTION

Symptom	Possible cause	Remedy
1. Select lever	(1) Starter does not run.	Adjust the select cable and inhibitor switch, or inspect circuit.
	(2) Back-up light does not light up.	Adjust the select cable and inhibitor switch, or inspect circuit.