

BRAKE

BR

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General Description

BRAKE

1. General Description

A: SPECIFICATION

Front disc brake	Size	16-inch type	17-inch type
	Type	Disc (floating type, ventilated)	
	Effective disc diameter mm (in)	244 (9.61)	261 (10.28)
	Disc thickness × Diameter mm (in)	24 × 294 (0.94 × 11.57)	30 × 316 (1.18 × 12.44)
	Effective cylinder diameter mm (in)	42.8 (1.685) × 2	
	Pad dimensions (Length × Width × Thickness) mm (in)	117.8 × 50.5 × 11.0 (4.638 × 1.988 × 0.433)	130.0 × 53.5 × 11.0 (5.118 × 2.106 × 0.433)
	Clearance adjustment	Automatic adjustment	
Rear disc brake	Size	15-inch type	16-inch type
	Type	Disc (floating type, solid)	Disc (floating type, ventilated)
	Effective disc diameter mm (in)	238 (9.37)	243 (9.57)
	Disc thickness × Diameter mm (in)	10 × 274 (0.39 × 10.79)	18 × 278 (0.71 × 10.94)
	Effective cylinder diameter mm (in)	38.1 (1.500)	40.4 (1.591)
	Pad dimensions (Length × Width × Thickness) mm (in)	92.0 × 33.0 × 9.0 (3.622 × 1.299 × 0.354)	95.5 × 34.8 × 11.0 (3.759 × 1.370 × 0.433)
	Clearance adjustment	Automatic adjustment	
Master cylinder	Type	Tandem	
	Effective diameter mm (in)	23.8 (15/16)	
	Reservoir type	Sealed type	
	Brake fluid reservoir capacity cm ³ (cu in)	240 (12.51)	
Brake booster	Type	Vacuum suspended	
	Effective diameter mm (in)	208 + 229 (8.19 + 9.02)	
Brake line		Dual circuit system	
Brake fluid		FMVSS No. 116, DOT3 or DOT4 CAUTION: • Avoid mixing brake fluid of different brands to prevent fluid performance from degrading. • When filling with brake fluid, be careful not to allow any dust to enter the reservoir. • Use new SUBARU genuine brake fluid when replacing or refilling the fluid.	

General Description

BRAKE

NOTE:

Refer to "PARKING BRAKE" for parking brake specifications. <Ref. to PB-2, SPECIFICATION, General Description.>

Item			Standard	Limit
Front brake	Pad thickness mm (in)	All models	11 (0.43)	1.5 (0.059)
	Disc thickness mm (in)	16-inch	24 (0.94)	22 (0.87)
		17-inch	30 (1.18)	28 (1.10)
	Disc runout mm (in)	All models	—	0.05 (0.0020)
Rear brake (disc type)	Pad thickness mm (in)	Solid disc	9.0 (0.354)	1.5 (0.059)
	Pad thickness mm (in)	Ventilated disc	11 (0.43)	1.5 (0.059)
	Disc thickness mm (in)	Solid disc	10 (0.39)	8.5 (0.335)
	Disc thickness mm (in)	Ventilated disc	18 (0.71)	16 (0.63)
	Disc runout mm (in)		—	0.05 (0.0020)
Parking brake	Inside diameter mm (in)		170 (6.69)	171 (6.73)
	Lining thickness mm (in)		3.5 (0.14)	1.5 (0.059)

		Brake pedal force N (kgf, lbf)	Fluid pressure kPa (kgf/cm ² , psi)
Brake booster	Brake fluid pressure with engine stopped	147 (15, 33)	553 (5, 77)
		294 (30, 66)	1,551 (16, 225)
	Brake fluid pressure with engine running and vacuum pressure at 66.7 kPa (500 mmHg, 19.69 inHg)	147 (15, 33)	6,177 (63, 896)
		294 (30, 66)	11,273 (115, 1,635)

Brake pedal	Free play	mm (in)	0.5 — 2 (0.020 — 0.079) [When pulling the brake pedal upward with a force of less than 10 N (1 kgf, 2 lbf)]
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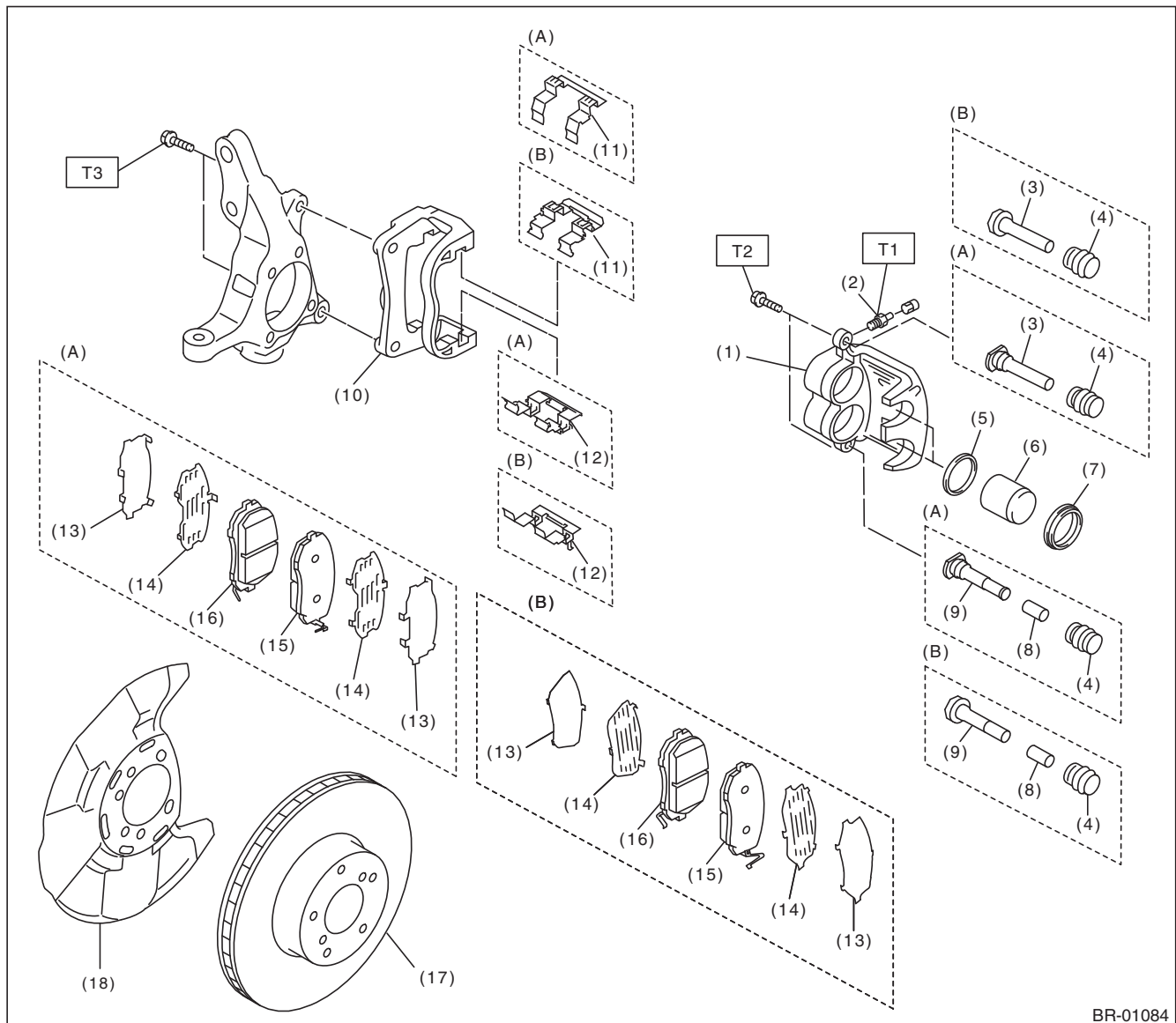


General Description

BRAKE

B: COMPONENT

1. FRONT DISC BRAKE



BR-01084

(A) 16-inch type

(B) 17-inch type

(1) Caliper body

(2) Bleeder - screw

(3) Guide pin - front brake (black)

(4) Pin boot

(5) Piston seal

(6) Piston - disc brake

(7) Piston boot

(8) Lock pin - sleeve

(9) Lock pin - front brake (silver)

(10) Support - front disc brake

(11) Pad clip - upper

(12) Pad clip - lower

(13) Shim - disc brake front outer

(14) Shim - disc brake front inner

(15) Pad - disc brake front outer

(16) Pad - disc brake front inner

(17) Disc rotor

(18) Back plate - front brake

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

T1: 8 (0.82, 5.9)

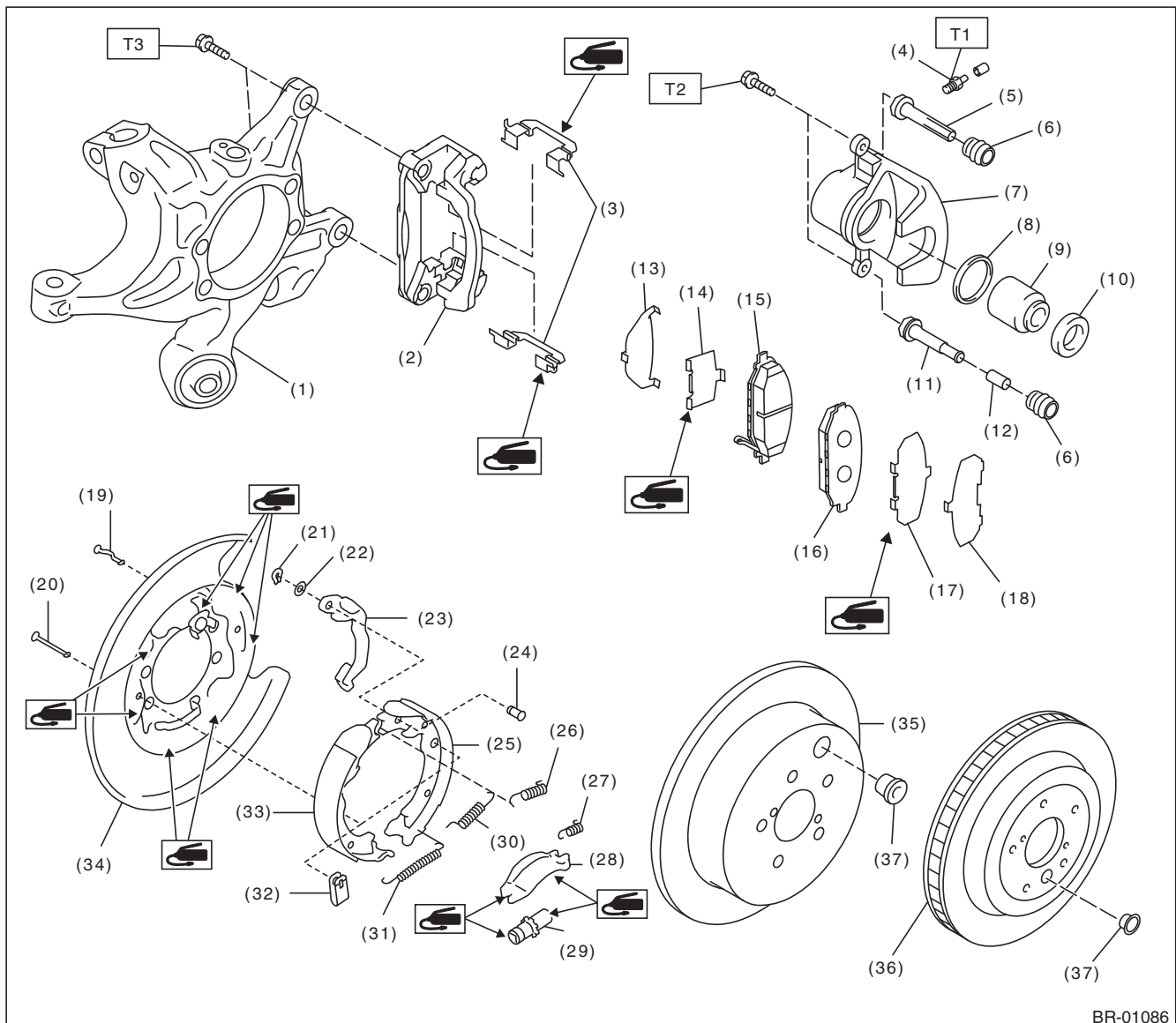
T2: 27 (2.75, 19.9)

T3: 80 (8.16, 59.0)

General Description

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2. REAR DISC BRAKE



BR-01086

- | | | |
|-------------------------------------|-------------------------------------|-----------------------------------|
| (1) Housing ASSY - rear axle | (15) Pad - disc brake rear inner | (29) Adjuster ASSY - rear brake |
| (2) Support - rear disc brake | (16) Pad - disc brake rear outer | (30) Spring - primary shoe return |
| (3) Pad clip - rear brake | (17) Shim - disc brake rear inner | (31) Spring - adjuster |
| (4) Bleeder - screw | (18) Shim - disc brake rear outer | (32) Cup - shoe hold-down |
| (5) Guide pin - rear brake (black) | (19) Pin - secondary shoe hold-down | (33) Parking brake shoe (primary) |
| (6) Pin boot | (20) Pin - primary shoe hold-down | (34) Back plate - rear brake |
| (7) Caliper body | (21) Retainer - rear brake | (35) Disc rotor (solid type) |
| (8) Piston seal | (22) Spring washer - rear brake | (36) Disc rotor (ventilated type) |
| (9) Piston - disc brake | (23) Parking lever - rear | (37) Adjusting hole cover |
| (10) Piston boot | (24) Pin - parking lever | |
| (11) Lock pin - rear brake (silver) | (25) Parking brake shoe (secondary) | |
| (12) Lock pin - sleeve | (26) Spring - secondary shoe return | |
| (13) Shim - disc brake rear outer | (27) Spring - strut | |
| (14) Shim - disc brake rear inner | (28) Strut - brake | |

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

T1: 8 (0.82, 5.9)

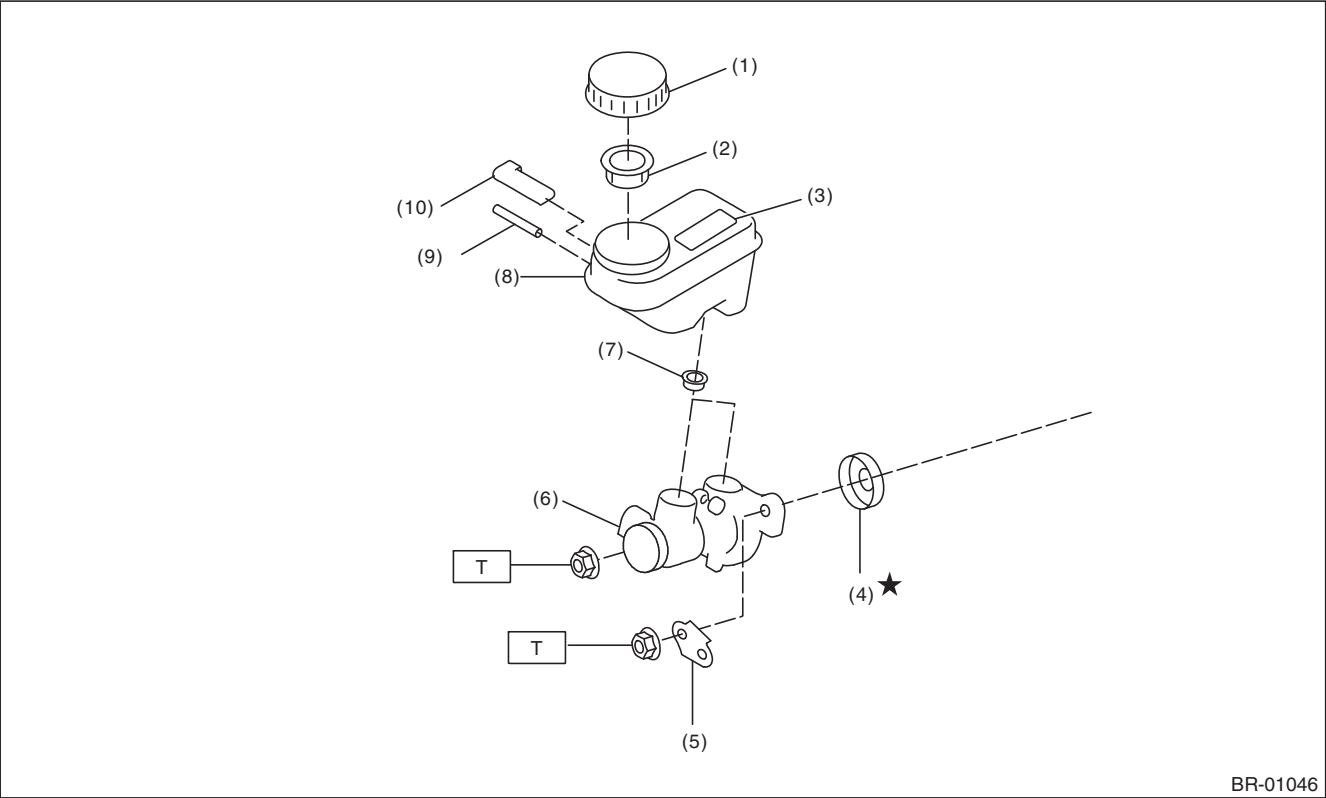
T2: 27 (2.75, 19.9)

T3: 66 (6.73, 48.7)

General Description

BRAKE

3. MASTER CYLINDER

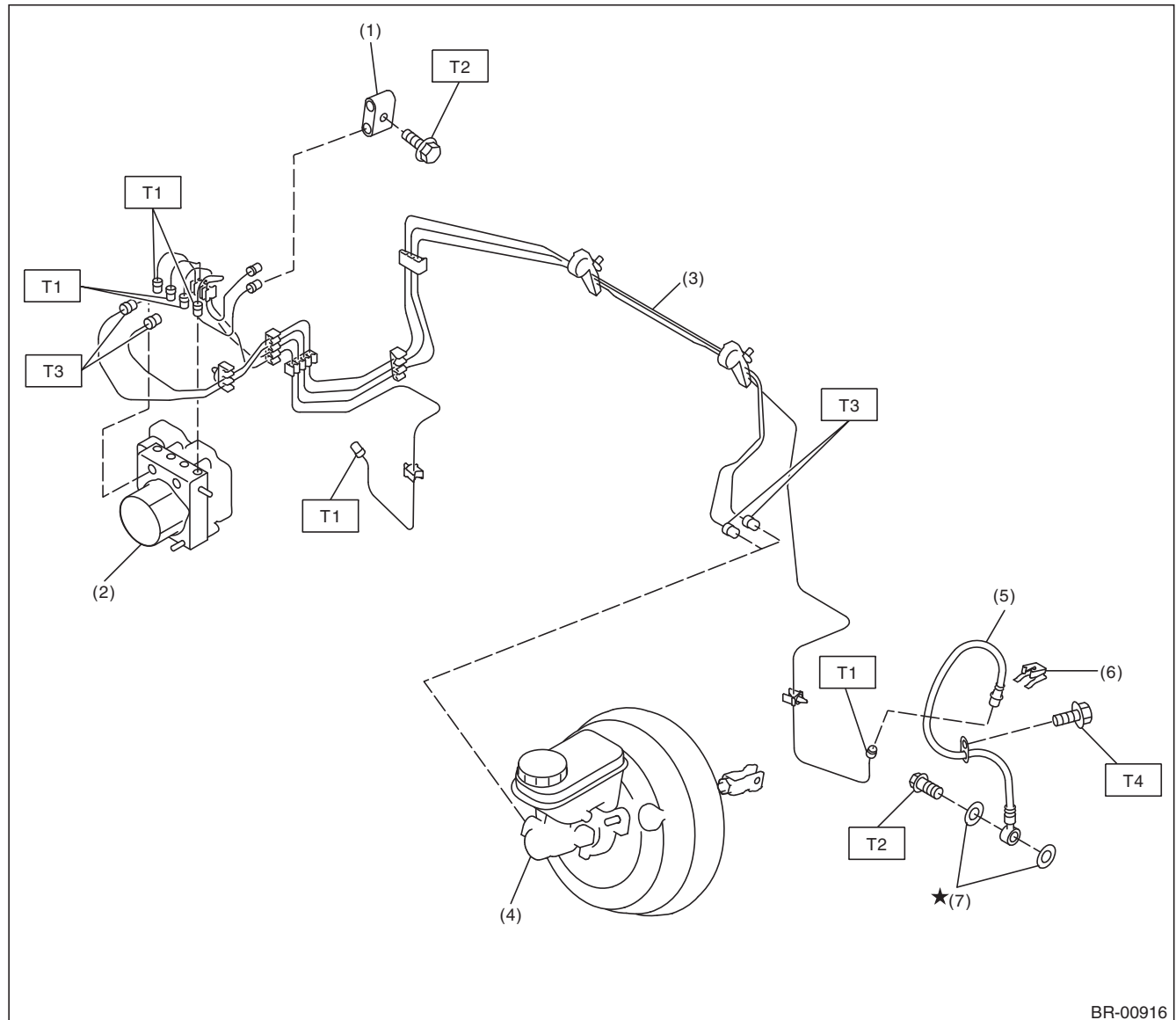


- | | |
|--|------------------------|
| (1) Cap - reservoir tank | (6) Cylinder body ASSY |
| (2) Filter - master cylinder | (7) Seal |
| (3) Caution label (model with caution label) | (8) Reservoir tank |
| (4) Seal sub ASSY | (9) Pin |
| (5) Bracket - master cylinder | (10) Level - indicator |

Tightening torque: N-m (kgf-m, ft-lb)
T: 13 (1.33, 9.6)

4. FRONT BRAKE PIPES AND HOSES

- Models without EyeSight



BR-00916

- | | |
|---|----------------------------|
| (1) Connector - two-way | (5) Front brake hose RH/LH |
| (2) VDC control module and hydraulic control unit (VDCCM&H/U) | (6) Clamp |
| (3) Front brake pipe ASSY | (7) Gasket |
| (4) Master cylinder ASSY | |

Tightening torque: N·m (kgf-m, ft-lb)

T1: 15 (1.53, 11.1)

T2: 18 (1.84, 13.3)

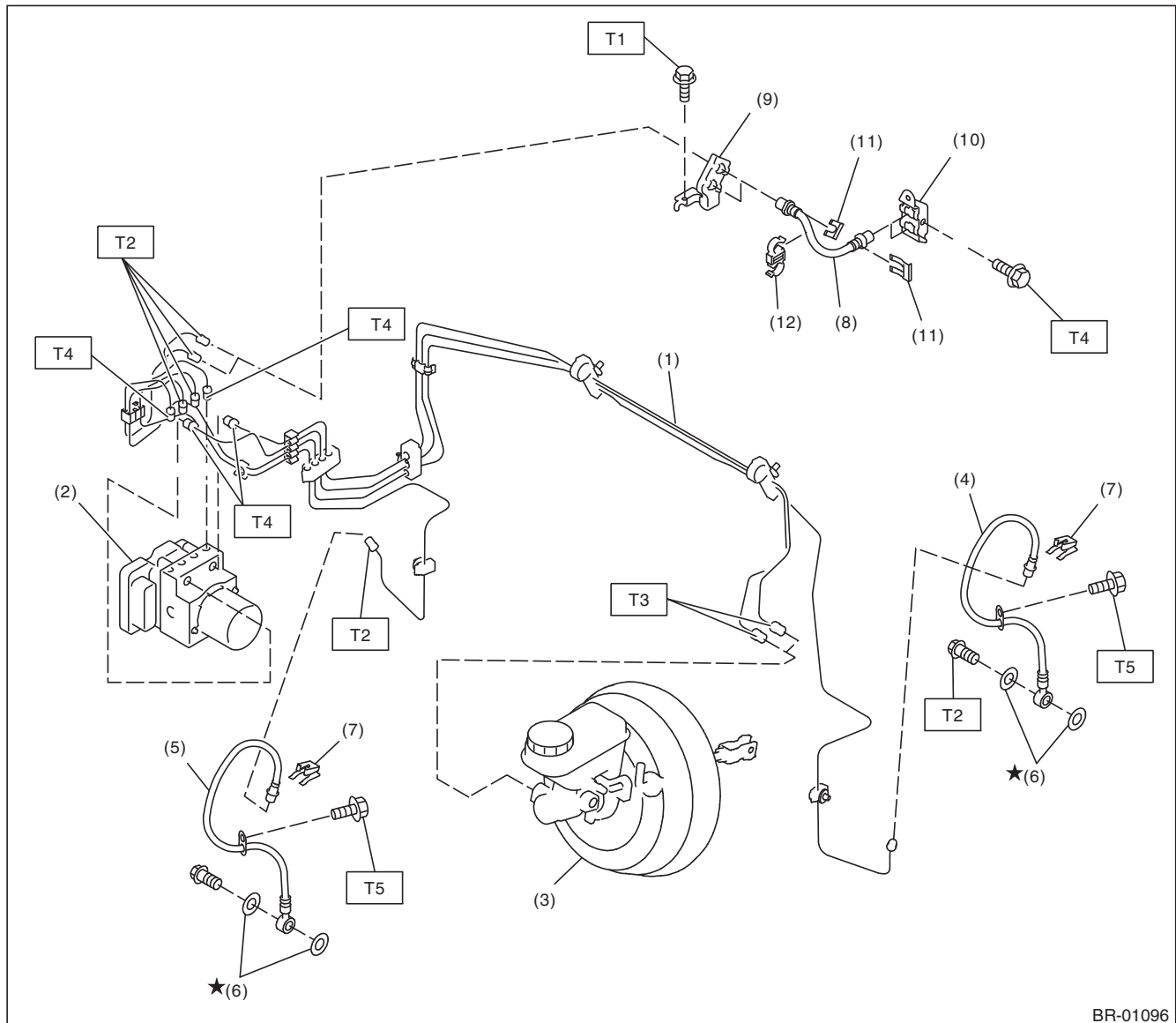
T3: 19 (1.94, 14.0)

T4: 33 (3.36, 24.3)

General Description

BRAKE

- Models with EyeSight



BR-01096

- | | |
|---|---------------------|
| (1) Front brake pipe ASSY | (7) Clamp |
| (2) VDC control module and hydraulic control unit (VDCCM&H/U) | (8) Brake hose ASSY |
| (3) Master cylinder ASSY | (9) Bracket |
| (4) Front brake hose RH | (10) Bracket |
| (5) Front brake hose LH | (11) Clip |
| (6) Gasket | (12) Clamp |

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

T1: 7.5 (0.76, 5.5)

T2: 15 (1.53, 11.1)

T3: 18 (1.84, 13.3)

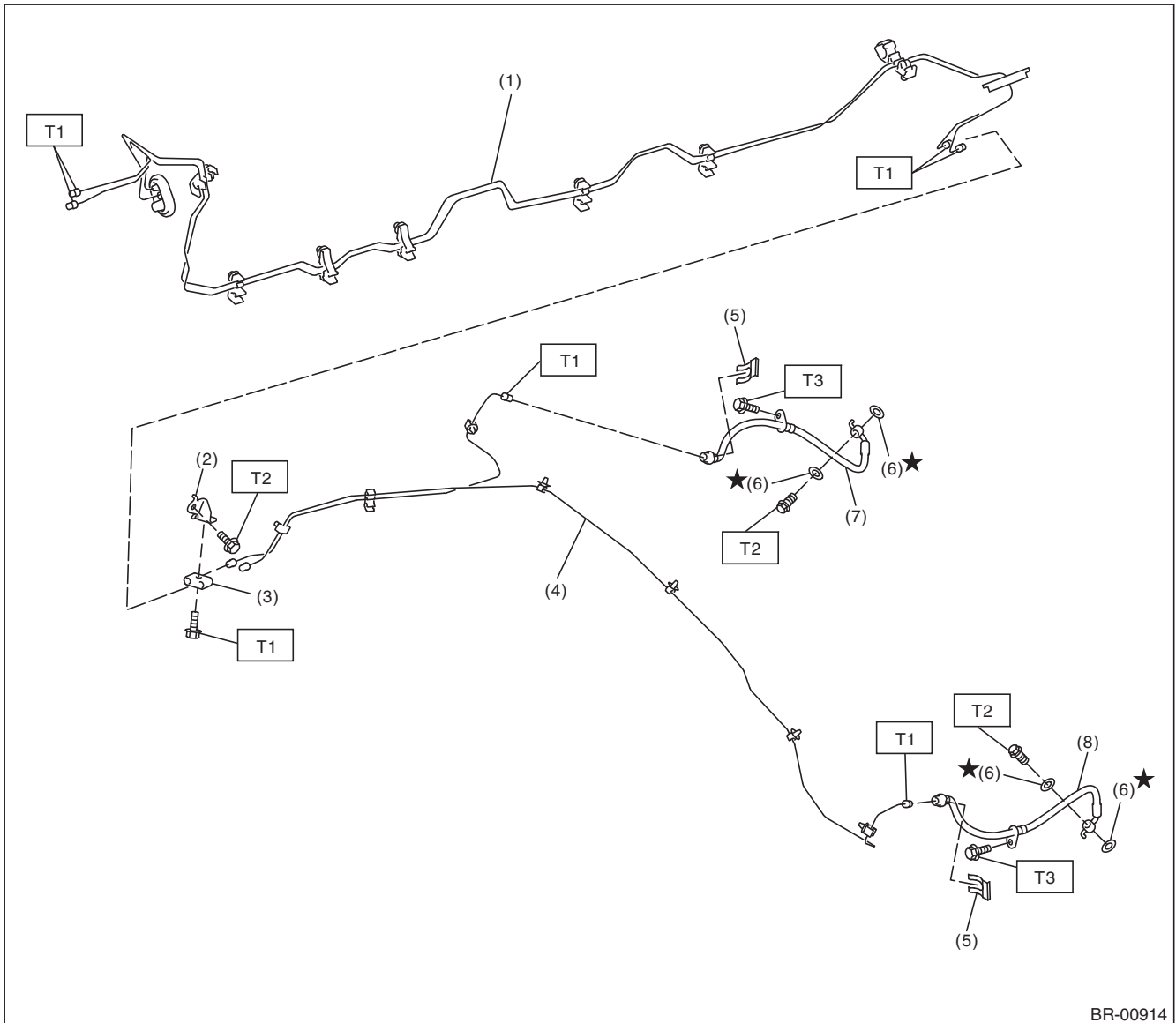
T4: 19 (1.94, 14.0)

T5: 33 (3.36, 24.3)

General Description

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5. CENTER AND REAR BRAKE PIPES AND HOSES



- | | |
|----------------------------|------------------------|
| (1) Center brake pipe ASSY | (5) Clamp |
| (2) Bracket | (6) Gasket |
| (3) Connector | (7) Rear brake hose RH |
| (4) Rear brake pipe ASSY | (8) Rear brake hose LH |

Tightening torque: N·m (kgf-m, ft-lb)

T1: 15 (1.53, 11.1)

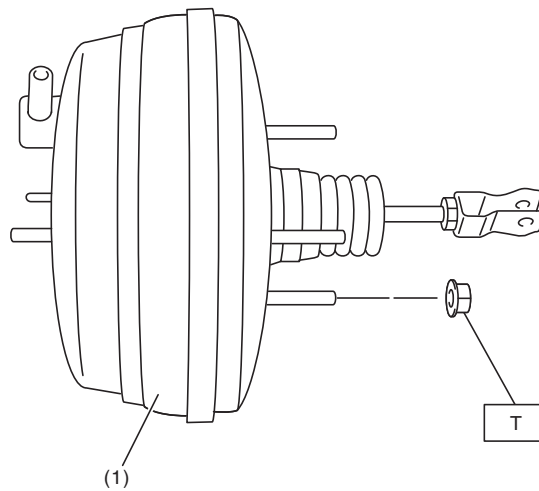
T2: 18 (1.84, 13.3)

T3: 33 (3.36, 24.3)

General Description

BRAKE

6. BRAKE BOOSTER



BR-00870

- (1) Vacuum booster ASSY

Tightening torque: N·m (kgf-m, ft-lb)

T: 18 (1.84, 13.3)

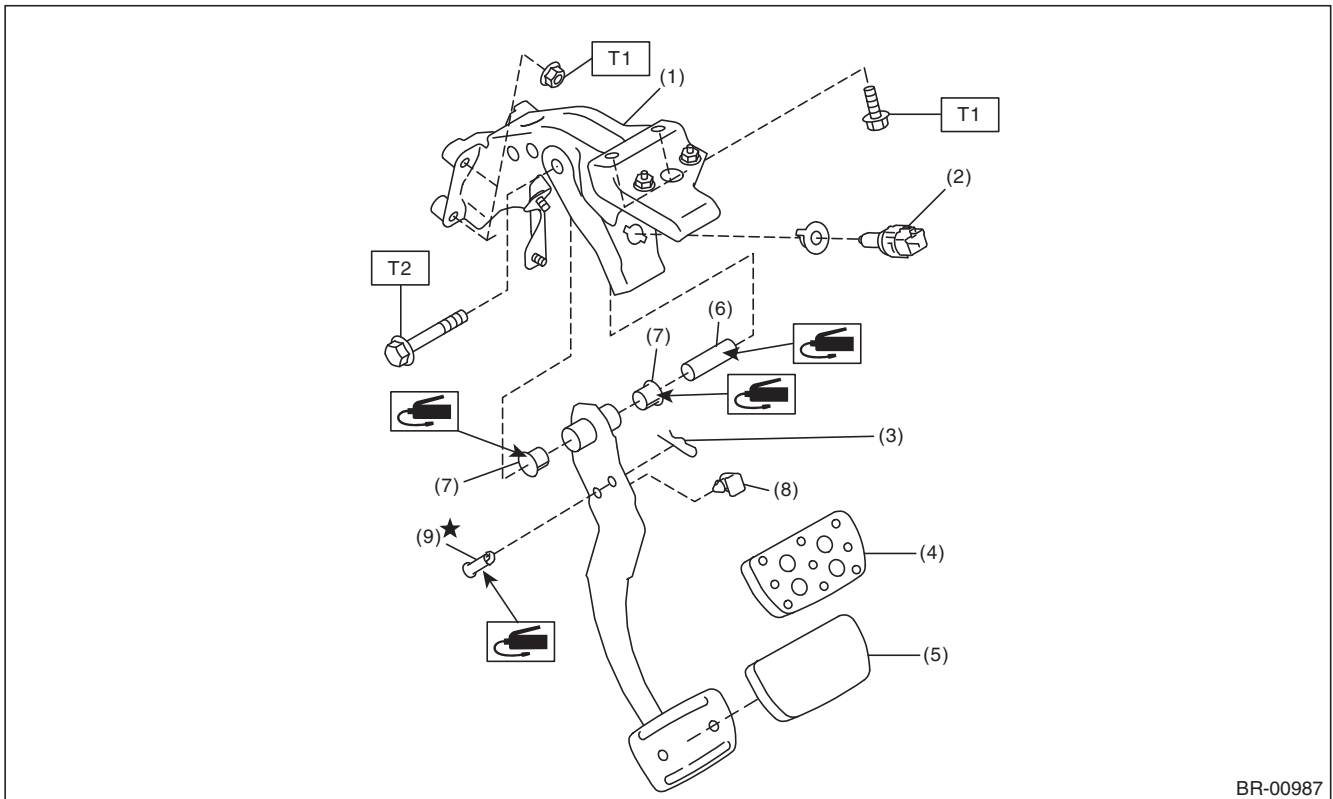


General Description

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7. BRAKE PEDAL

- CVT model



BR-00987

- | | |
|-------------------------------------|---------------------|
| (1) Brake pedal ASSY | (6) Spacer - pedal |
| (2) Switch - stop light | (7) Bushing - pedal |
| (3) Snap pin | (8) Stopper - pedal |
| (4) Pad - brake pedal (sport type) | (9) Clevis pin |
| (5) Pad - brake pedal (normal type) | |

Tightening torque: N·m (kgf-m, ft-lb)

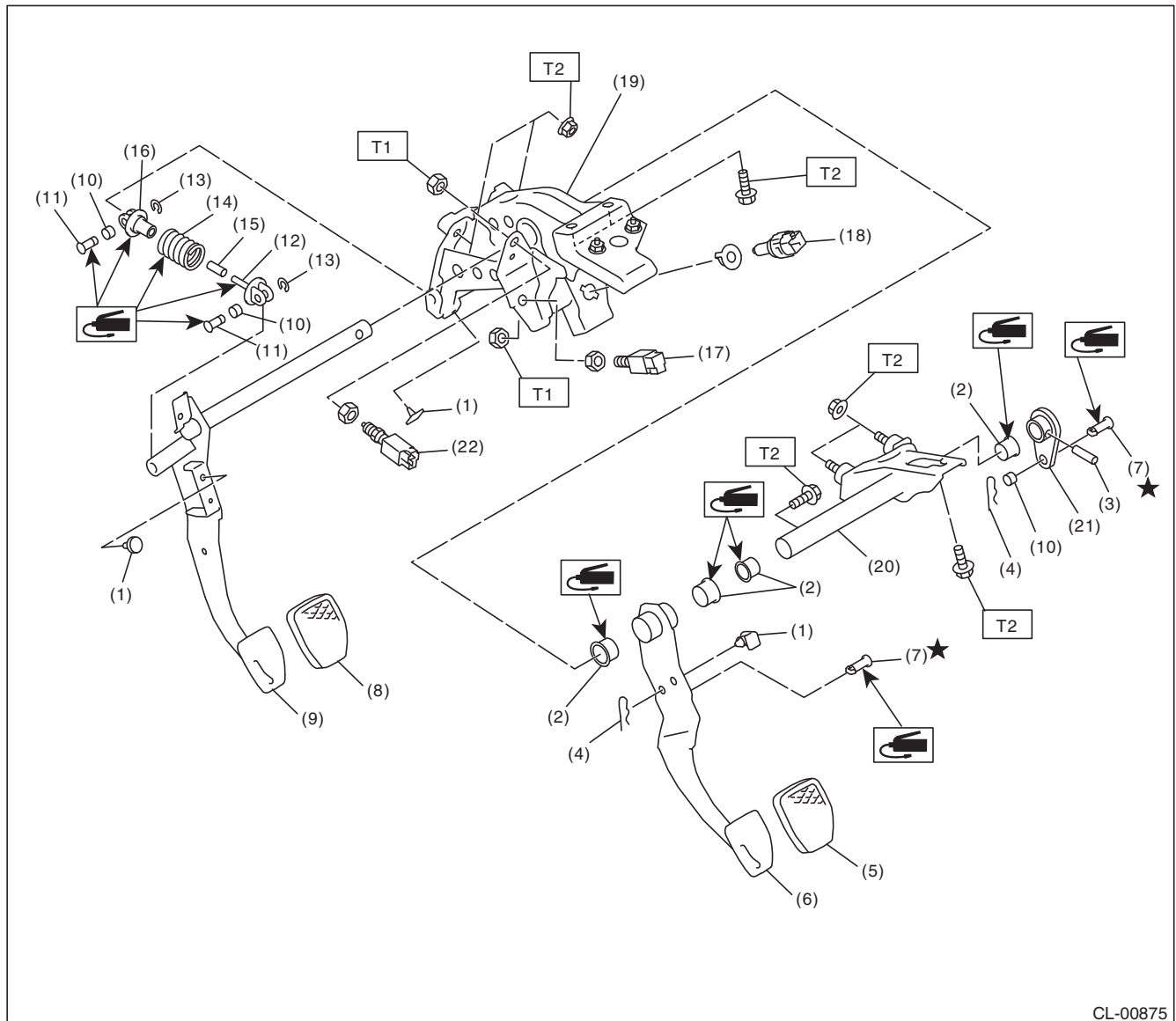
T1: 18 (1.84, 13.3)

T2: 30 (3.06, 22.1)

General Description

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• MT model



CL-00875

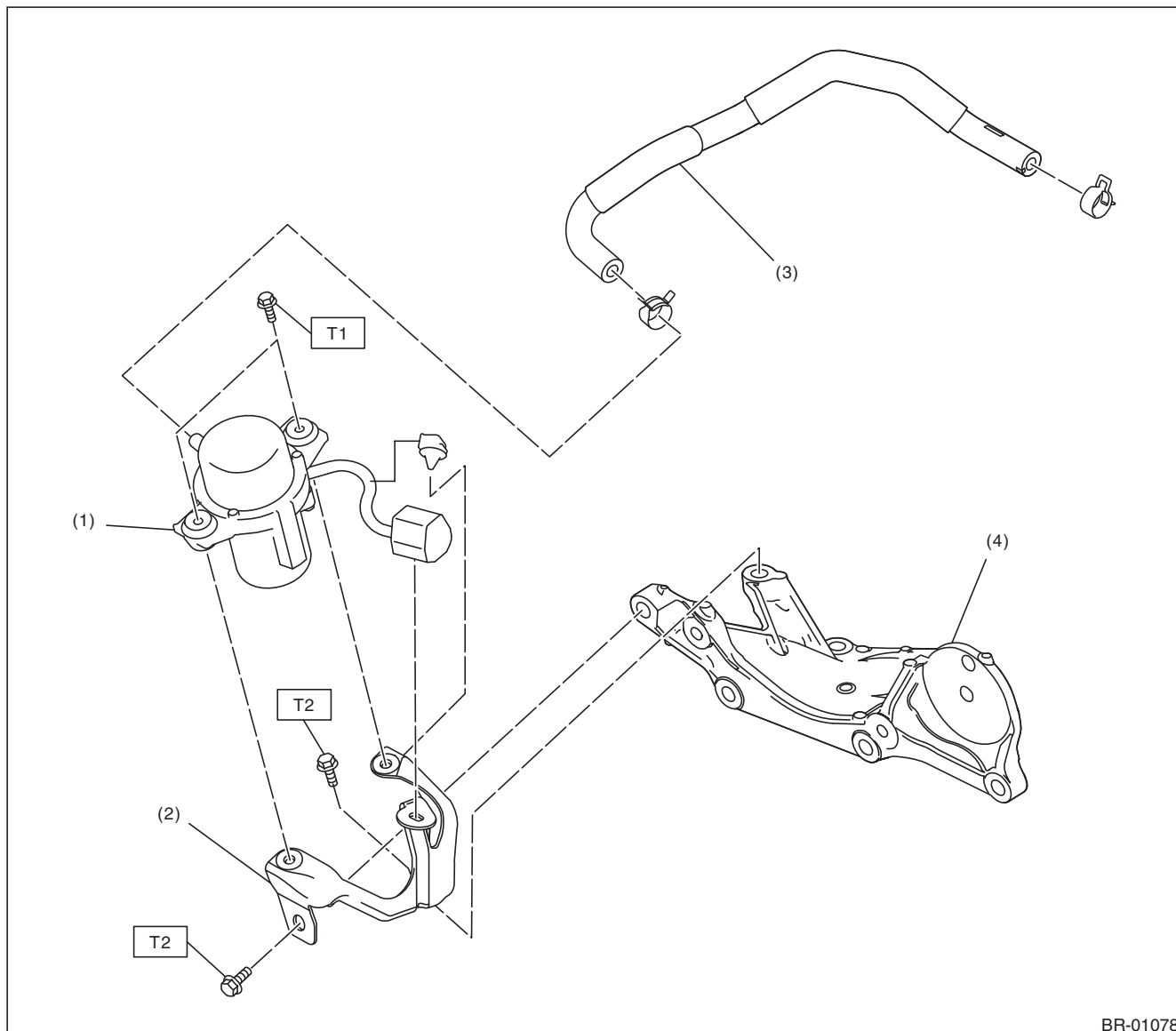
- | | | |
|-----------------------|--------------------------|-------------------------------------|
| (1) Stopper | (10) Bushing C | (19) Pedal bracket |
| (2) Bushing | (11) Clutch clevis pin | (20) Clutch master cylinder bracket |
| (3) Spring pin | (12) Assist rod A | (21) Lever |
| (4) Snap pin | (13) Clip | (22) Clutch start switch |
| (5) Pad - brake pedal | (14) Assist spring | |
| (6) Brake pedal | (15) Assist bushing | |
| (7) Clevis pin | (16) Assist rod B | |
| (8) Clutch pedal pad | (17) Clutch switch | |
| (9) Clutch pedal | (18) Switch - stop light | |

Tightening torque: N·m (kgf·m, ft·lb)

T1: 8 (0.82, 5.9)

T2: 18 (1.84, 13.3)

8. BRAKE VACUUM PUMP



BR-01078

- | | |
|---------------------------------|-------------------------|
| (1) Vacuum pump ASSY | (3) Vacuum hose COMPL |
| (2) Bracket COMPL - vacuum pump | (4) Bracket - generator |

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

T1: 7.5 (0.76, 5.5)

T2: 19 (1.9, 14.0)

General Description

BRAKE

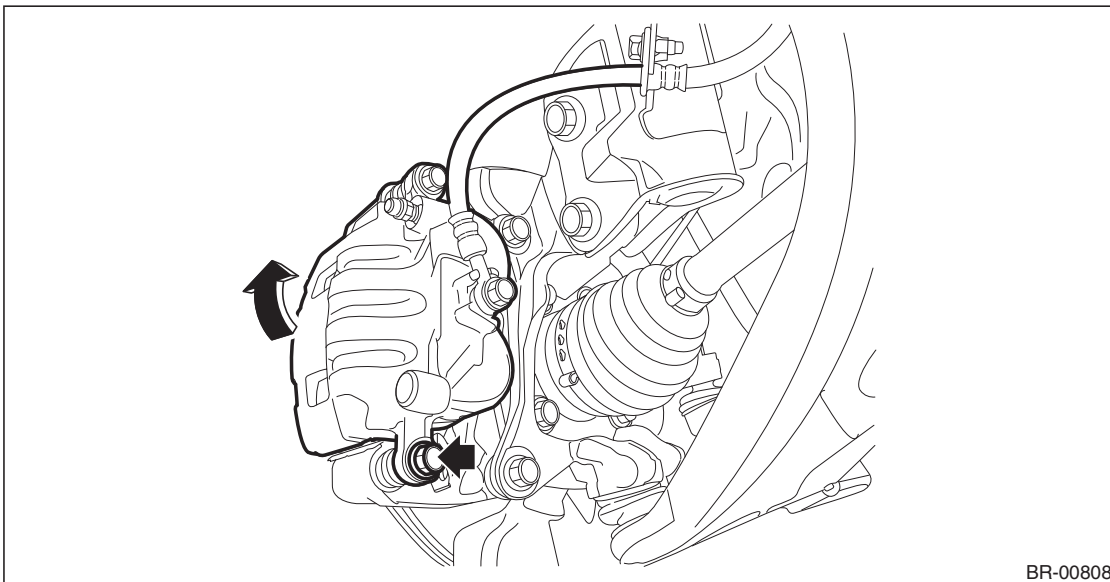
C: CAUTION

- Wear appropriate work clothing, including a helmet, protective goggles and protective shoes when performing any work.
- Before removal, installation or disassembly, be sure to clarify the failure. Avoid unnecessary removal, installation, disassembly and replacement.
- Use SUBARU genuine grease etc. or equivalent. Do not mix grease etc. of different grades or manufacturers.
- Before securing a part on a vise, place cushioning material such as wood blocks, aluminum plate, or cloth between the part and the vise.
- Be sure to tighten fasteners including bolts and nuts to the specified torque.
- Place shop jacks or rigid racks at the specified points.

2. Front Brake Pad

A: REMOVAL

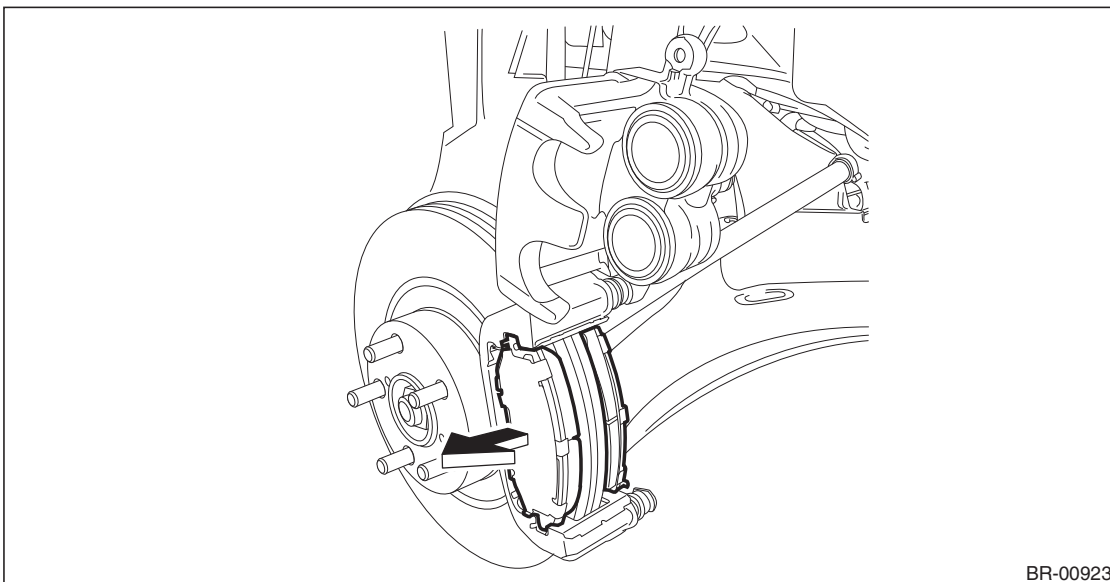
- 1) Lift up the vehicle, and then remove the front wheels.
- 2) Remove the front brake pad.
 - (1) Remove the caliper bolt on the lower side.
 - (2) Raise the caliper body assembly and support it.



NOTE:

Do not disconnect the brake hose from the caliper body assembly.

- (3) Remove the brake pad from support - front disc brake.



Front Brake Pad

BRAKE

B: INSTALLATION

NOTE:

Before installation, remove mud and foreign matter from the caliper body assembly and support - front disc brake.

- 1) Check the brake pad. <Ref. to BR-18, INSPECTION, Front Brake Pad.>
- 2) Apply a thin coat of grease to the pad clip. (A)

Grease:

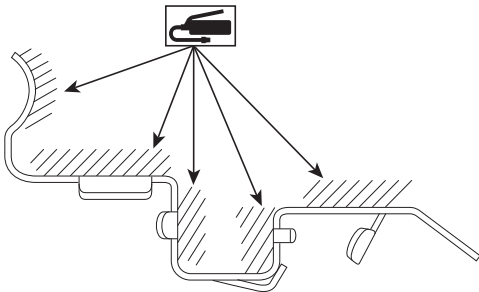
Molykote M7439 (Part No. 003602001) or an item contained in the pad kit

- 3) Apply a thin coat of grease to the pad and both sides of the shim - disc brake front inner (a). (B)

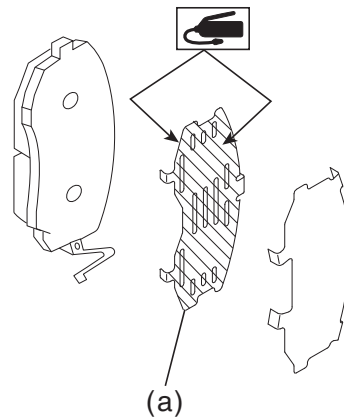
Grease:

Molykote AS880N (Part No. K0777YA010) or an item contained in the pad kit

(A)



(B)



BR-00929

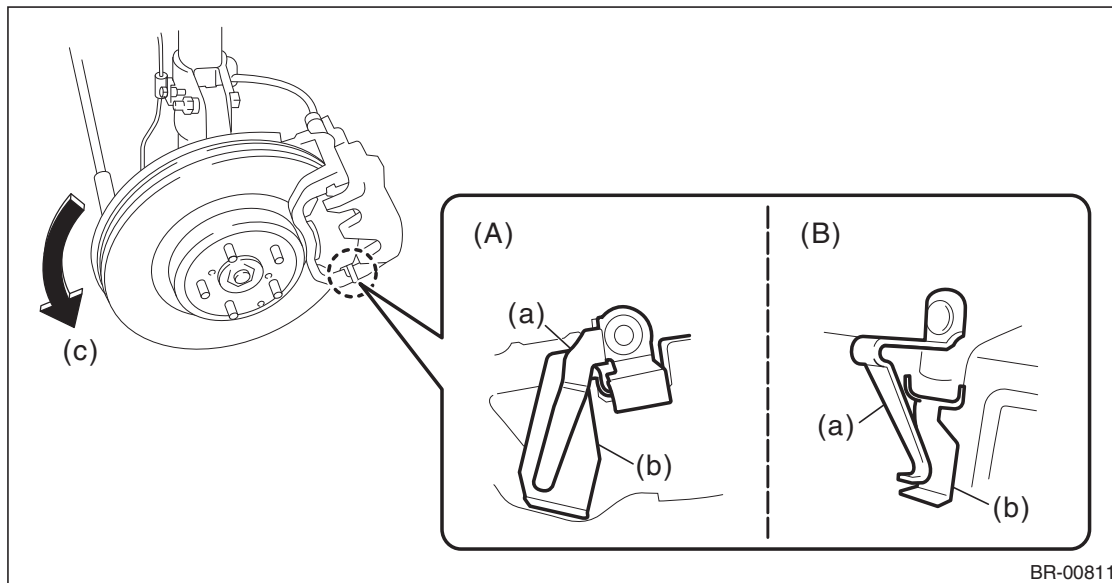
Front Brake Pad

BRAKE

4) Install the brake pad to the support - front disc brake.

CAUTION:

- Be sure to install so that the pad return spring faces the input side of the direction of brake rotor rotation, as shown in the figure.
- Correctly install the pad return spring to the supporting surface of the pad clip as shown in the figure.
- If the pad return spring is deformed or damaged, replace the brake pad with a new part.



BR-00811

(A) 16-inch

(B) 17-inch

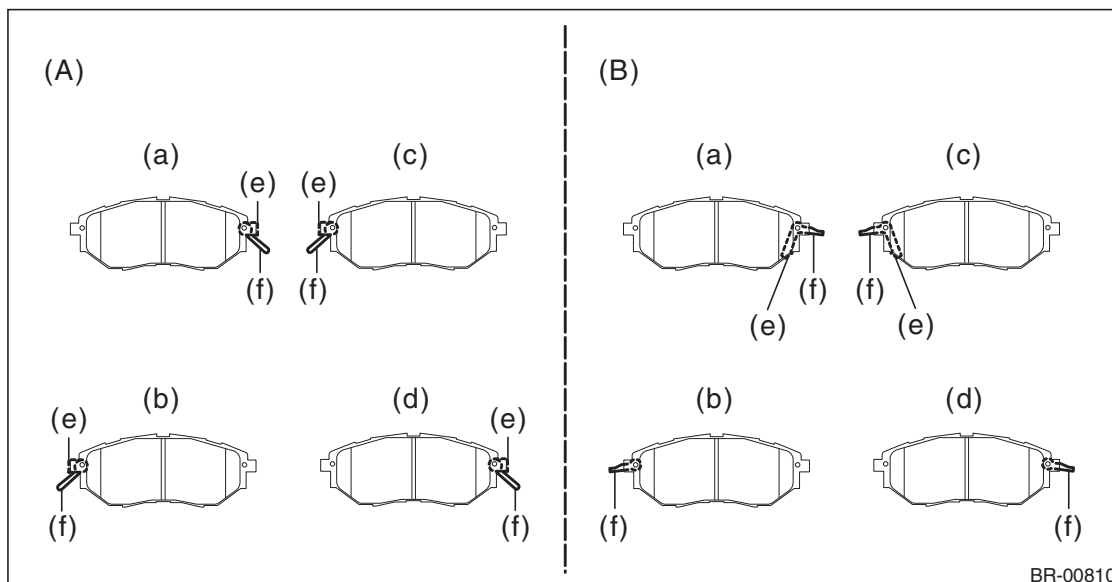
(a) Pad return spring

(b) Supporting surface of pad clip

(c) Direction of brake rotor rotation

NOTE:

Install the brake pad indicator in proper direction.



BR-00810

(A) 16-inch

(B) 17-inch

(a) LH — IN

(c) RH — IN

(e) Pad indicator

(b) LH — OUT

(d) RH — OUT

(f) Pad return spring

BR-17

Front Brake Pad

BRAKE

5) Install the caliper body assembly to the support - front disc brake.

Tightening torque:

Caliper bolt: 27 N·m (2.75 kgf-m, 19.9 ft-lb)

6) Install the front wheels.

Tightening torque:

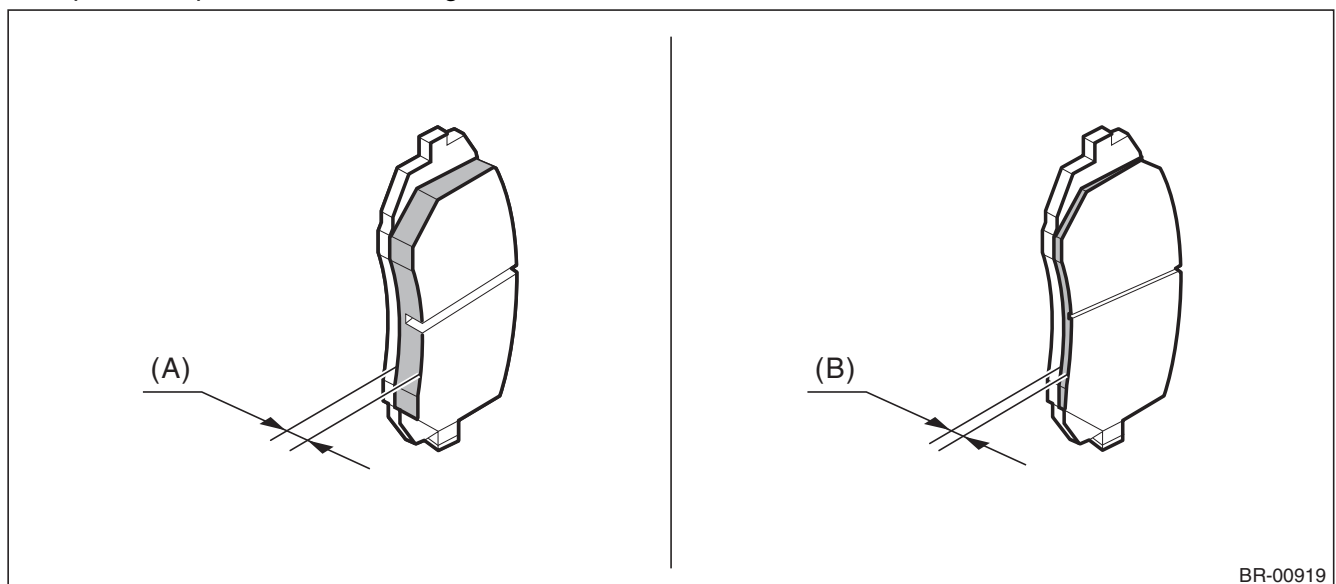
120 N·m (12.24 kgf-m, 88.5 ft-lb)

C: INSPECTION

1) Check the pad thickness (A).

NOTE:

- Always replace the pads of both wheels and both sides as a set.
- Replace pad clips if they are twisted or worn.
- Replace the pad if there is oil or grease on it.



	Standard (A)	Wear limit (B)
Pad thickness	11 mm (0.43 in)	1.5 mm (0.059 in)

NOTE:

- Always replace the pads of both wheels and both sides as a set.
- Replace pad clips if they are twisted or worn.
- Wear indicators are installed on the inner and outer disc brake pads.

If the pad is worn to the limit, the end of wear indicator contacts disc rotor, and a squeaking sound is heard as the wheel rotates. If the sound is heard, replace the pad.

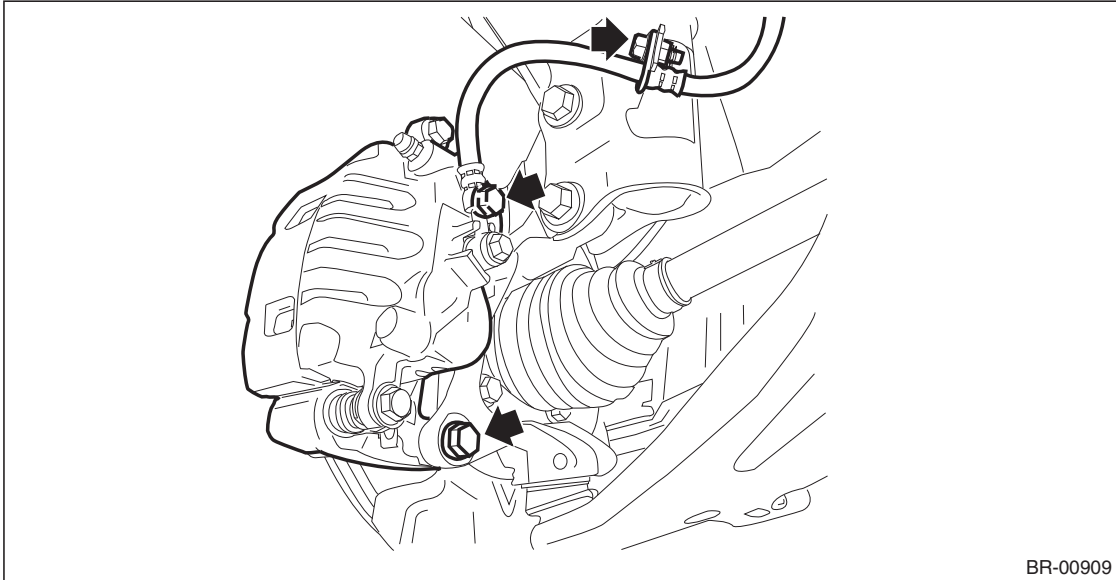
- Replace the pad if there is oil or grease on it.

2) If the wear limit is exceeded in the inspection, replace the brake pad.

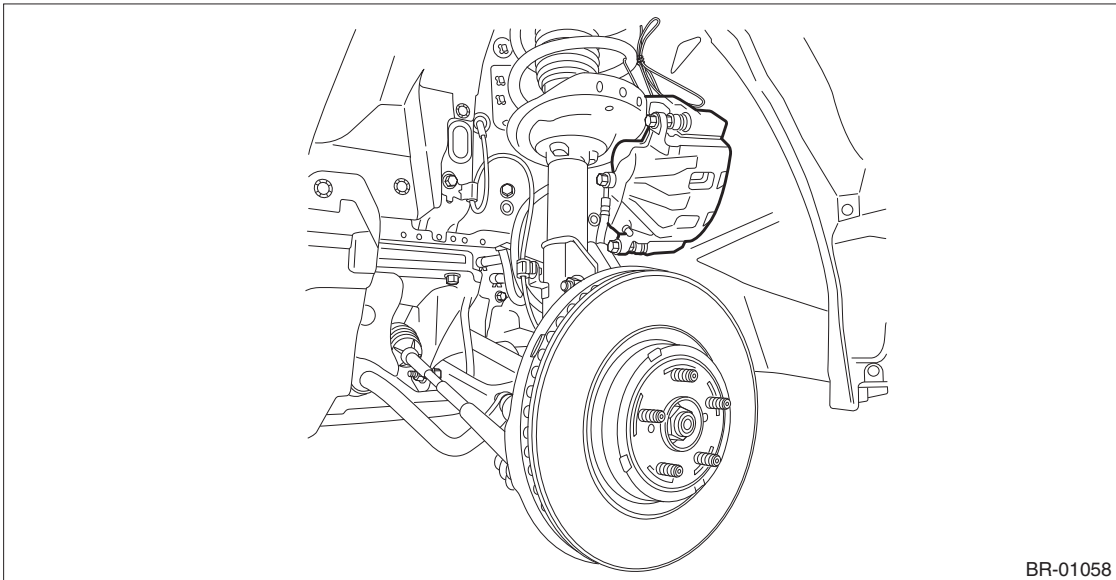
3. Front Disc Rotor

A: REMOVAL

- 1) Lift up the vehicle, and then remove the front wheels.
- 2) Remove the caliper body assembly from the housing assembly - front axle.
 - (1) Remove the bolt from the brake hose bracket.
 - (2) Remove the mounting bolt, and remove the caliper body assembly.



- (3) Prepare wiring harnesses etc. to be discarded, and suspend the caliper body assembly from the strut assembly.



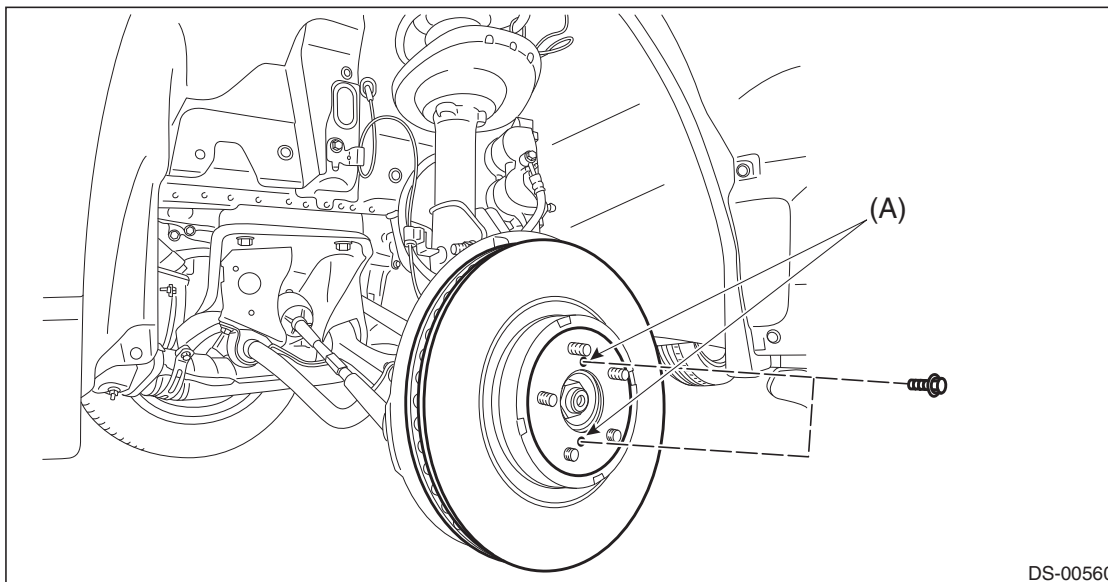
Front Disc Rotor

BRAKE

3) Remove the front disc rotor.

NOTE:

When the disc rotor is difficult to be removed from the hub unit COMPL - front axle, screw in 8 mm (0.31 in) bolt to the threaded part of the disc rotor (A), and remove the disc rotor.



B: INSTALLATION

NOTE:

Before installation, remove mud and foreign matter from the caliper body assembly.

- 1) Before installation, check the front disc rotor. <Ref. to BR-20, INSPECTION, Front Disc Rotor.>
- 2) Install each part in the reverse order of removal.

Tightening torque:

Brake hose bracket: 33 N·m (3.36 kgf-m, 24.3 ft-lb)

Mounting bolt: 80 N·m (8.16 kgf-m, 59.0 ft-lb)

Front wheel: 120 N·m (12.24 kgf-m, 88.5 ft-lb)

C: INSPECTION

1. DISC ROTOR RUNOUT CHECK

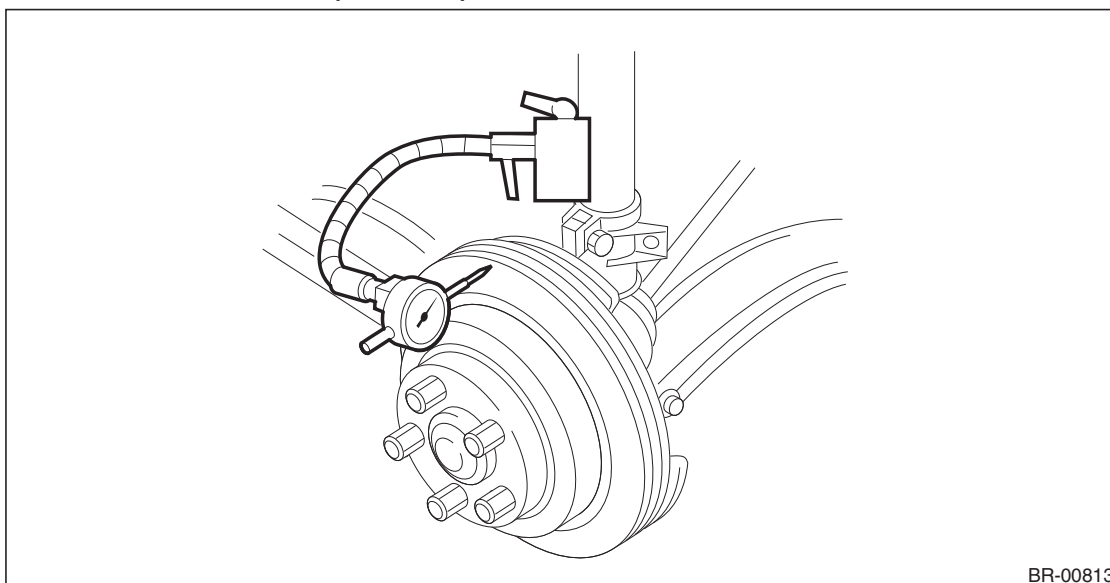
- 1) Check the hub unit COMPL - front axle for free play and runout before the inspection of disc rotor runout limit. <Ref. to DS-33, INSPECTION, Front Hub Unit Bearing.>
- 2) Tighten the wheel nuts to secure disc rotor.

Front Disc Rotor

BRAKE

3) Set a dial gauge 10 mm (0.39 in) inward from the disc rotor outer circumference, and check the disc rotor runout while rotating the disc rotor.

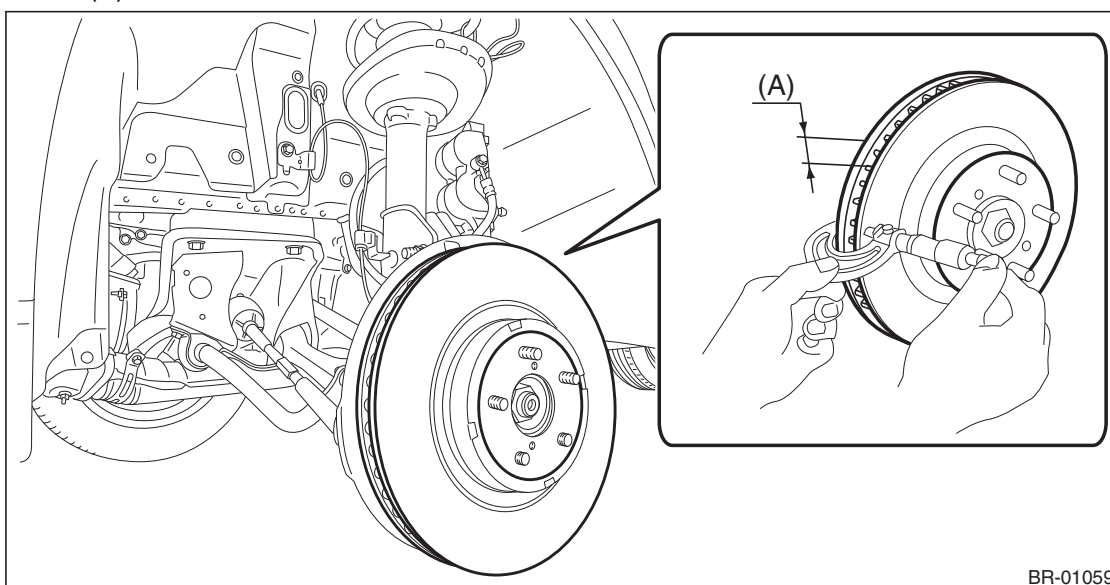
Disc rotor runout limit: 0.05 mm (0.0020 in)



4) If the runout limit is exceeded in the inspection, replace the disc rotor.

2. DISC ROTOR THICKNESS CHECK

1) Set a micrometer 10 mm (0.39 in) inward from the disc rotor outer perimeter, and then measure the disc rotor thickness (A).



	Size	Standard	Wear limit	Disc rotor outer diameter
Disc rotor thickness (A)	16-inch	24 mm (0.94 in)	22 mm (0.87 in)	260 mm (10.24 in)
	17-inch	30 mm (1.18 in)	28 mm (1.10 in)	316 mm (12.44 in)

2) If the wear limit is exceeded in the inspection, replace the disc rotor.

Front Disc Brake Assembly

BRAKE

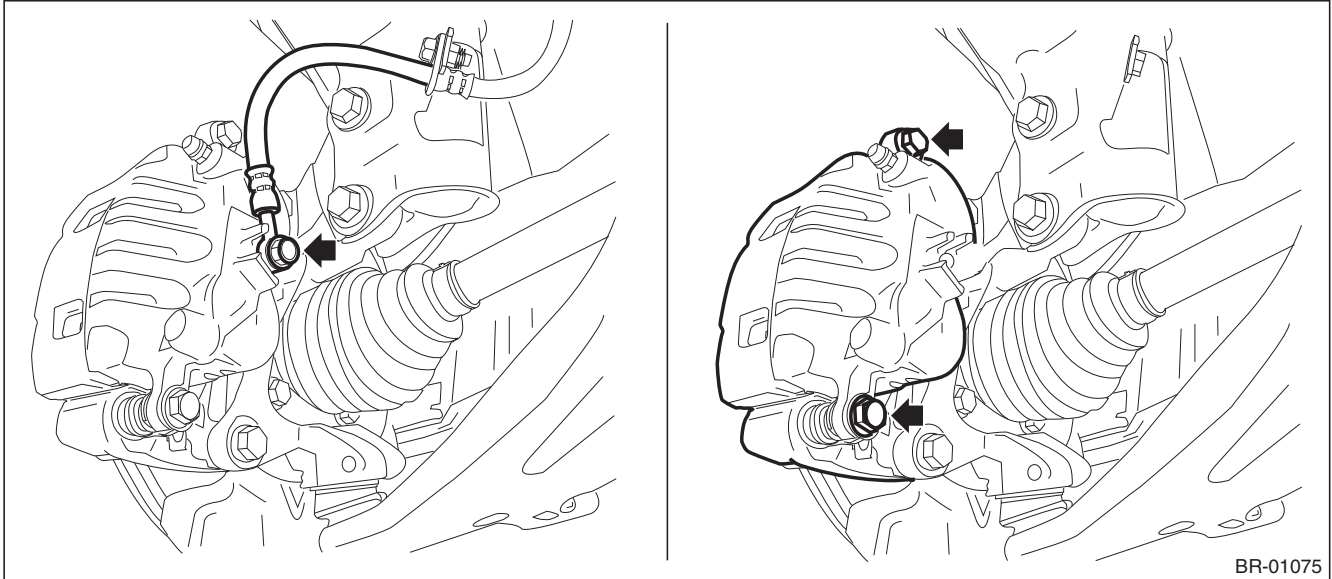
4. Front Disc Brake Assembly

A: REMOVAL

CAUTION:

Do not allow brake fluid to come in contact with the painted surface of the vehicle body. If it does, wash off with water and wipe away completely.

- 1) Lift up the vehicle, and then remove the front wheels.
- 2) Remove the caliper body assembly.
 - (1) Remove the union bolt and caliper bolt, and remove the caliper body assembly from the support - front disc brake.

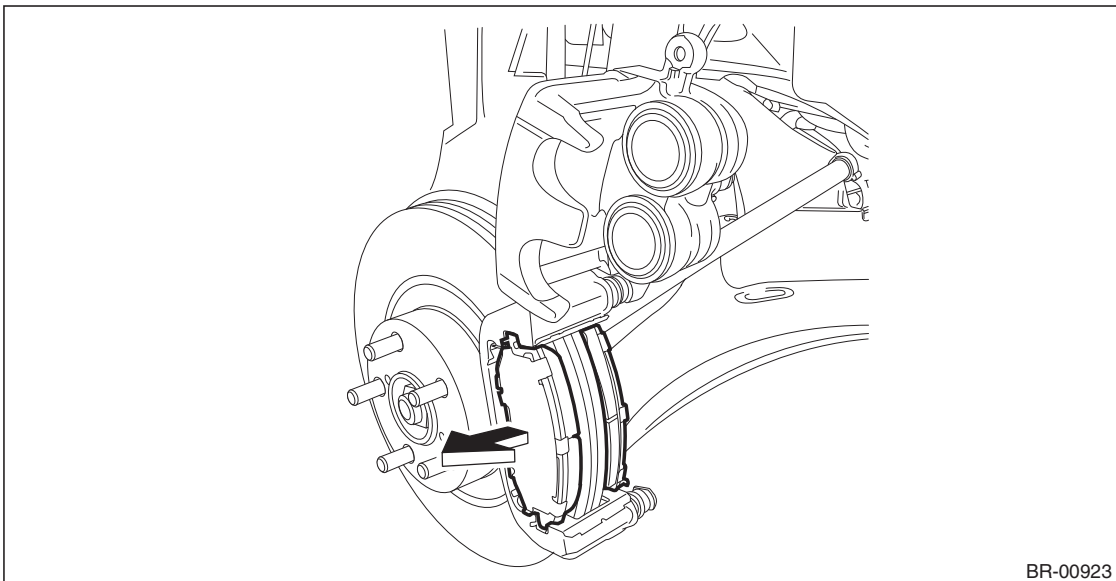


- 3) Remove the support - front disc brake.

NOTE:

Remove the support - front disc brake only when replacing the disc rotor or the support - front disc brake. It is not necessary to remove it when servicing the caliper body assembly.

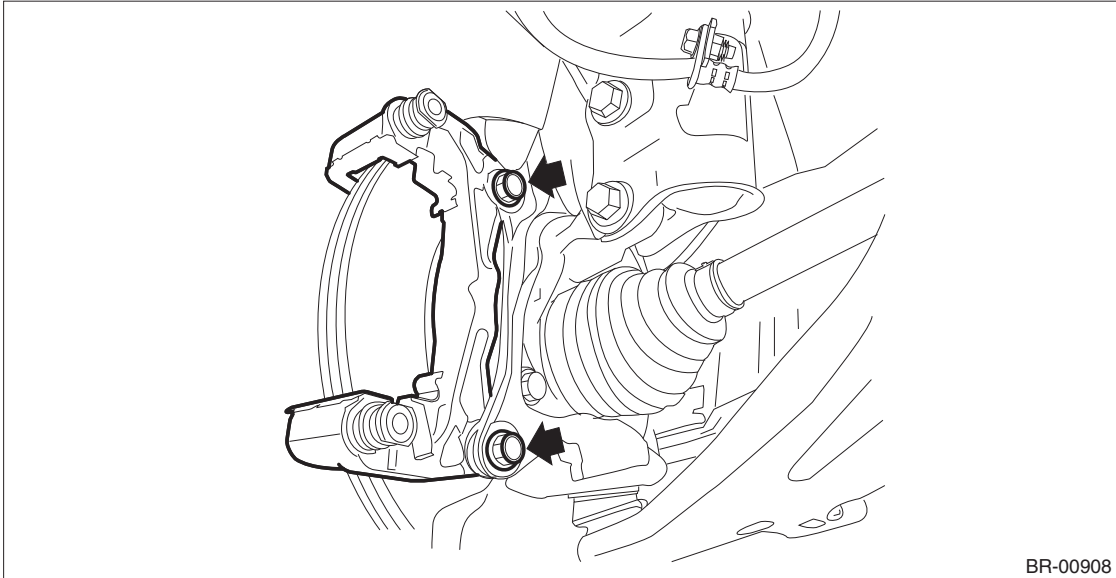
- (1) Remove the brake pad from support - front disc brake.



Front Disc Brake Assembly

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- (2) Remove the mounting bolts, and then remove the support - front disc brake from the housing assembly - front axle.



BR-00908

B: INSTALLATION

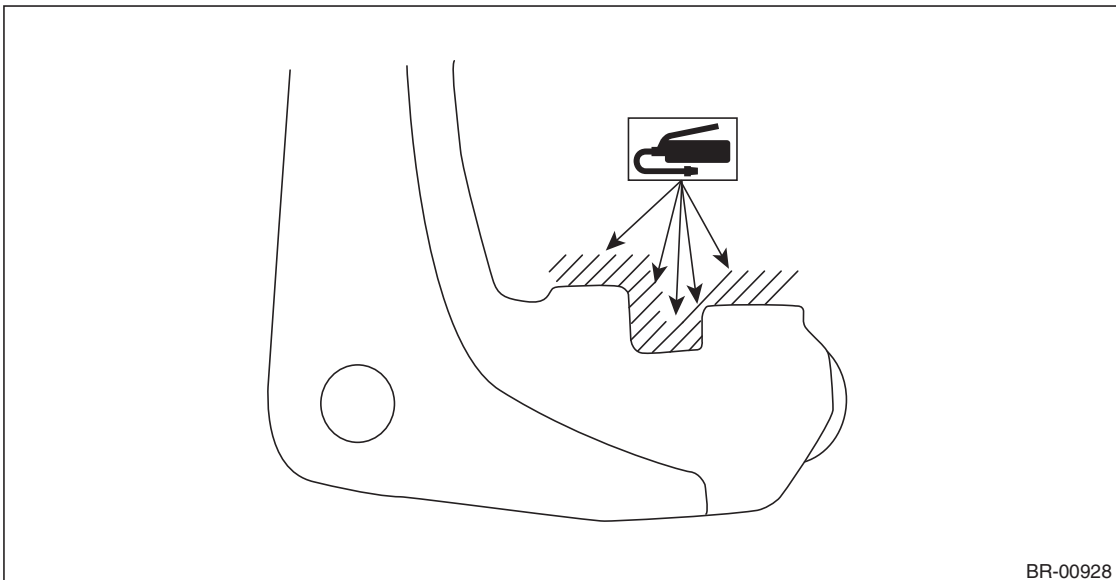
NOTE:

Before installation, remove mud and foreign matter from the caliper body assembly and support - front disc brake.

- 1) Check each part. <Ref. to BR-29, INSPECTION, Front Disc Brake Assembly.>
- 2) Apply a thin coat of grease to the support - front disc brake.

Grease:

Molykote M7439 (Part No. 003602001)



BR-00928

- 3) Install the support - front disc brake to the housing assembly - front axle.

Tightening torque:

Mounting bolt: 80 N·m (8.16 kgf-m, 59.0 ft-lb)

- 4) Apply a thin coat of grease to the pad clip. (A)

Grease:

Molykote M7439 (Part No. 003602001) or an item contained in the pad kit

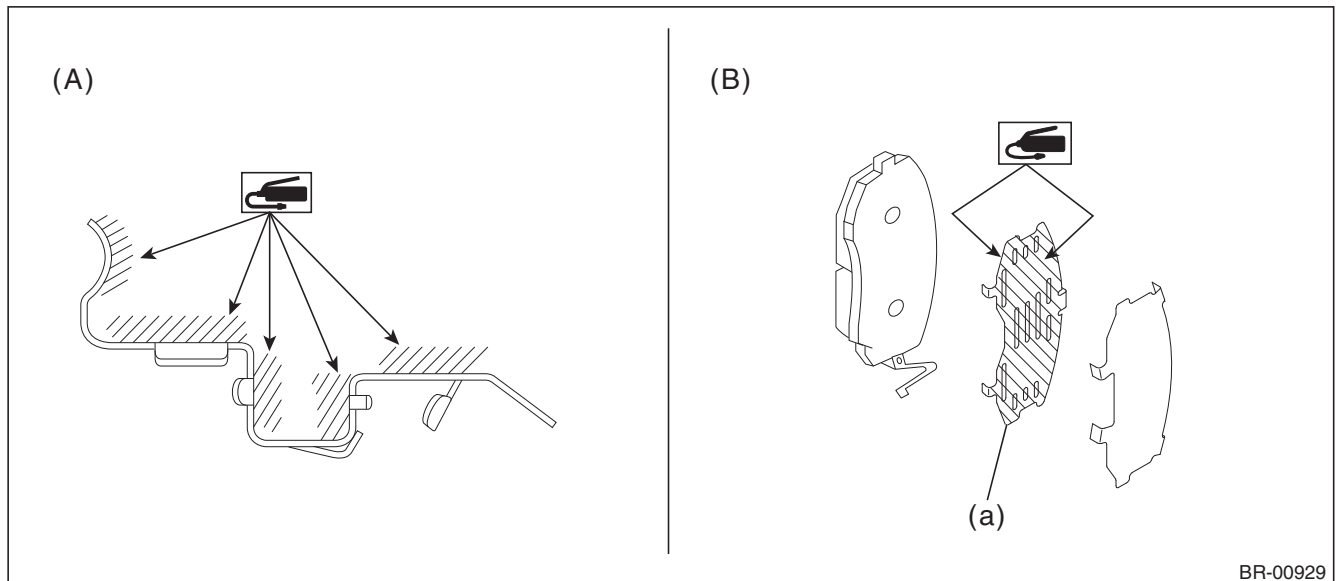
Front Disc Brake Assembly

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5) Apply a thin coat of grease to the pad and both sides of the shim - disc brake front inner (a). (B)

Grease:

Molykote AS880N (Part No. K0777YA010) or an item contained in the pad kit

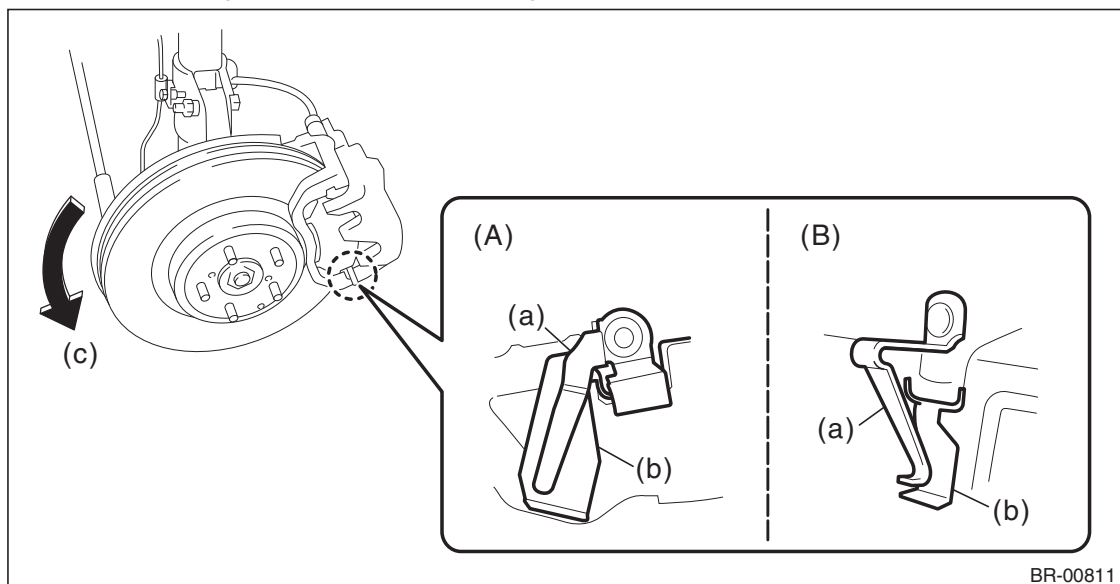


BR-00929

6) Install the brake pad to the support - front disc brake.

CAUTION:

- Be sure to install so that the pad return spring faces the input side of the direction of brake rotor rotation, as shown in the figure.
- Correctly install the pad return spring to the supporting surface of the pad clip as shown in the figure.
- If the pad return spring is deformed or damaged, replace the brake pad with a new part.



BR-00811

(A) 16-inch

(B) 17-inch

(a) Pad return spring

(b) Supporting surface of pad clip

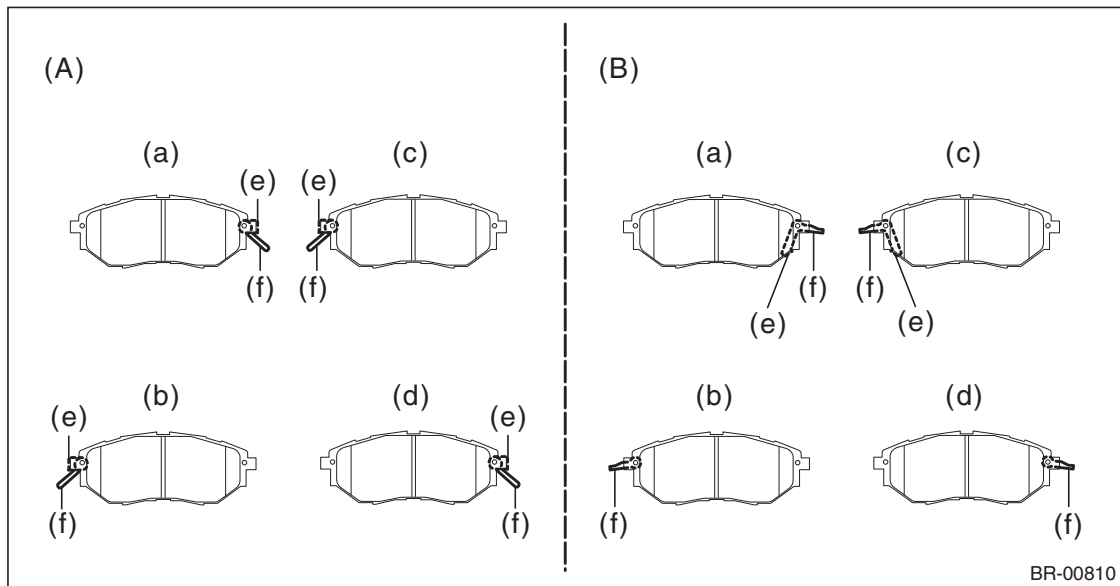
(c) Direction of brake rotor rotation

Front Disc Brake Assembly

BRAKE

NOTE:

Install the brake pad indicator in proper direction.



(A) 16-inch

(B) 17-inch

(a) LH — IN

(c) RH — IN

(e) Pad indicator

(b) LH — OUT

(d) RH — OUT

(f) Pad return spring

7) Install the caliper body assembly to the support - front disc brake.

Tightening torque:

Caliper bolt: 27 N·m (2.75 kgf-m, 19.9 ft-lb)

8) Connect the brake hose using a new brake hose gasket.

Tightening torque:

Union bolt: 18 N·m (1.84 kgf-m, 13.3 ft-lb)

9) Bleed air from the brake system. <Ref. to BR-63, BRAKE LINE, PROCEDURE, Air Bleeding.>

10) Install the front wheels.

Tightening torque:

120 N·m (12.24 kgf-m, 88.5 ft-lb)

Front Disc Brake Assembly

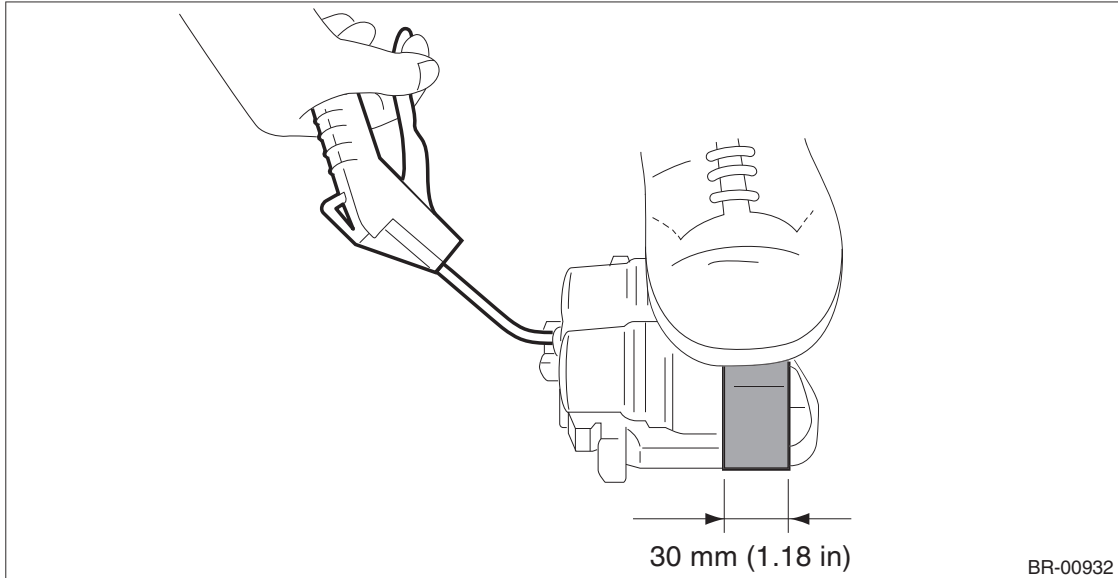
BRAKE

C: DISASSEMBLY

CAUTION:

Be careful not to allow foreign matter to enter the brake hose connector.

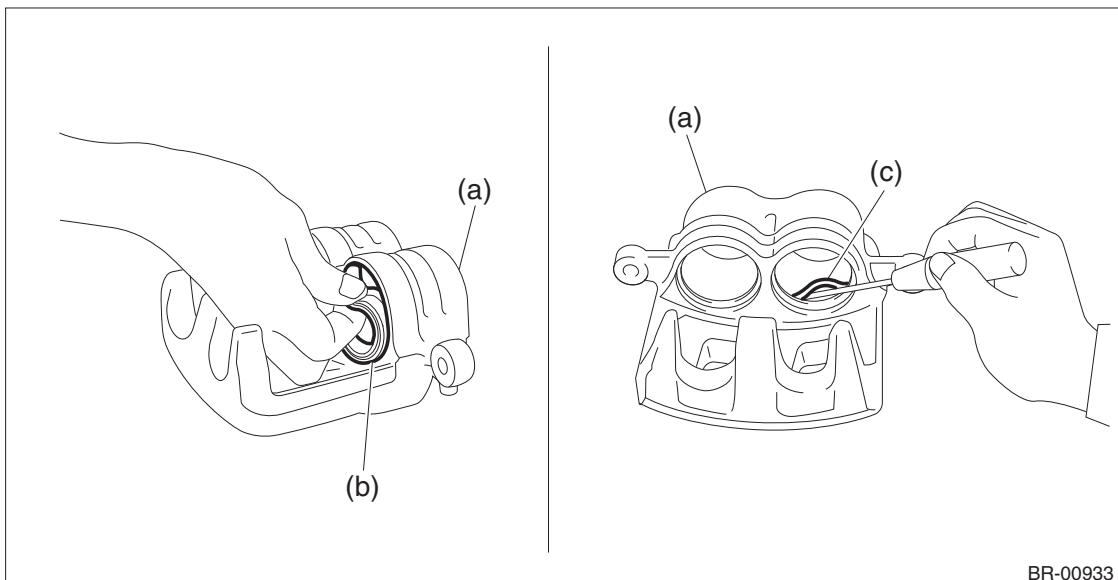
- 1) Remove mud and foreign matter from the caliper body.
- 2) Remove the piston - disc brake.
 - (1) Place a wooden block in the caliper body as shown in the figure to prevent the piston - disc brake from jumping out and being damaged.
 - (2) Using an air gun, gradually apply compressed air via the brake hose installation hole to push out the piston - disc brake.



- 3) Remove the piston boot (b) and piston seal (c) from the caliper body cylinder (a).

CAUTION:

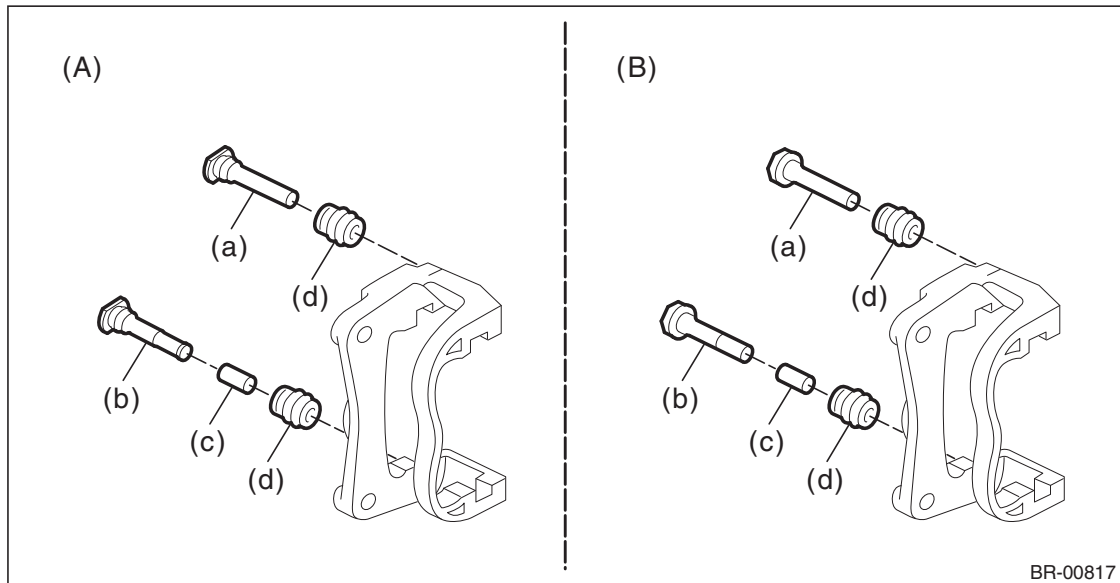
Do not damage the cylinder and piston seal groove.



Front Disc Brake Assembly

BRAKE

4) Remove the guide pin - front brake, lock pin - front brake, lock pin - sleeve, and pin boot from the support - front disc brake.



(A) 16-inch

(B) 17-inch

(a) Guide pin (black)

(c) Bushing

(d) Pin boot

(b) Lock pin (silver)

D: ASSEMBLY

- 1) Before assembly, check each part. <Ref. to BR-29, INSPECTION, Front Disc Brake Assembly.>
- 2) Clean the inside of the caliper body cylinder using brake fluid.
- 3) Apply a coat of brake fluid to piston seal and install the piston seal to the caliper body cylinder groove.
- 4) Apply a coat of brake fluid to the inner surface of caliper body cylinder and the entire outer surface of the piston - disc brake.
- 5) Apply grease contained in the piston seal kit to the piston boot, and install it to the groove at the end of the cylinder.
- 6) Insert the piston - disc brake into the caliper body cylinder.



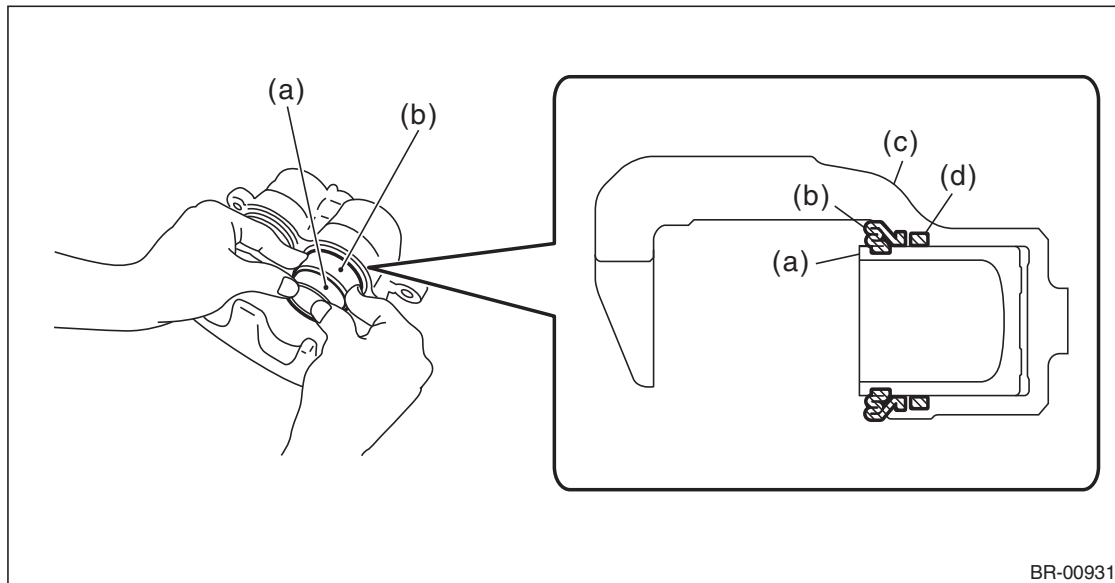
Front Disc Brake Assembly

BRAKE

7) Position the piston boot in the grooves on the piston - disc brake and the caliper body cylinder.

CAUTION:

Do not force the piston - disc brake into the caliper body cylinder.



(a) Piston - disc brake

(c) Caliper body assembly

(d) Piston seal

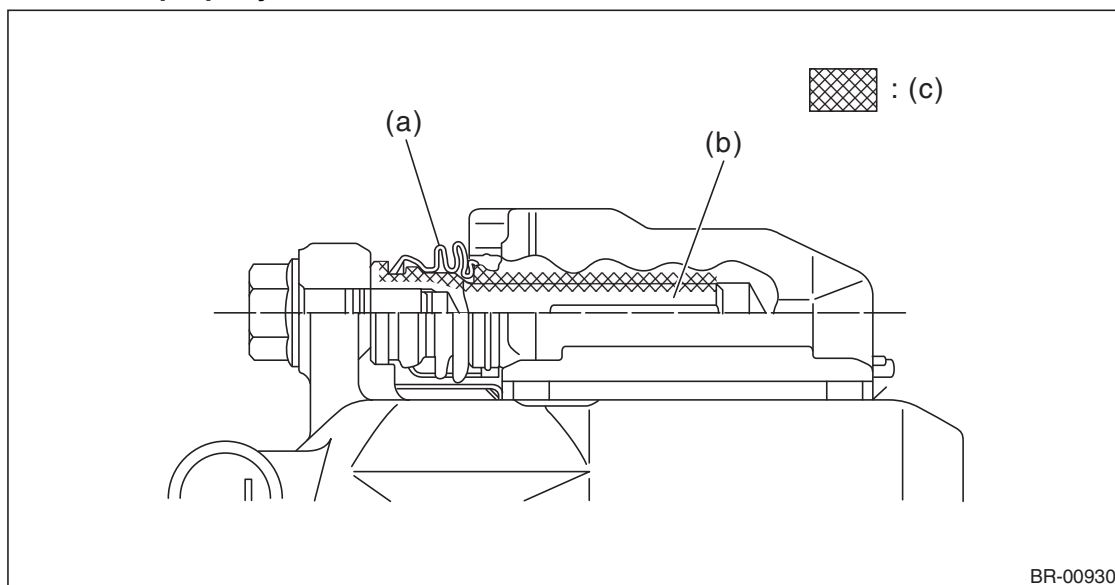
(b) Piston boot

8) Apply grease contained in the piston seal kit to the lock pin - front brake, the outer surface of guide pin - front brake, the inner surface of support cylinder, and the grooves of pin boot.

9) Install the pin boot to the lock pin - front brake and guide pin - front brake, and insert them into the support cylinder.

CAUTION:

Insert the lock pin - front brake and guide pin - front brake into specified position, and make sure that they slide and seat properly.



(a) Pin boot

(b) Lock pin - front brake or guide pin - front brake

(c) Grease applied area

E: INSPECTION

- 1) Check the caliper body cylinder and piston for uneven wear, damage or rust.
- 2) Check the rubber parts for damage or deterioration.
- 3) If faulty is found in the inspection, replace the relevant part.

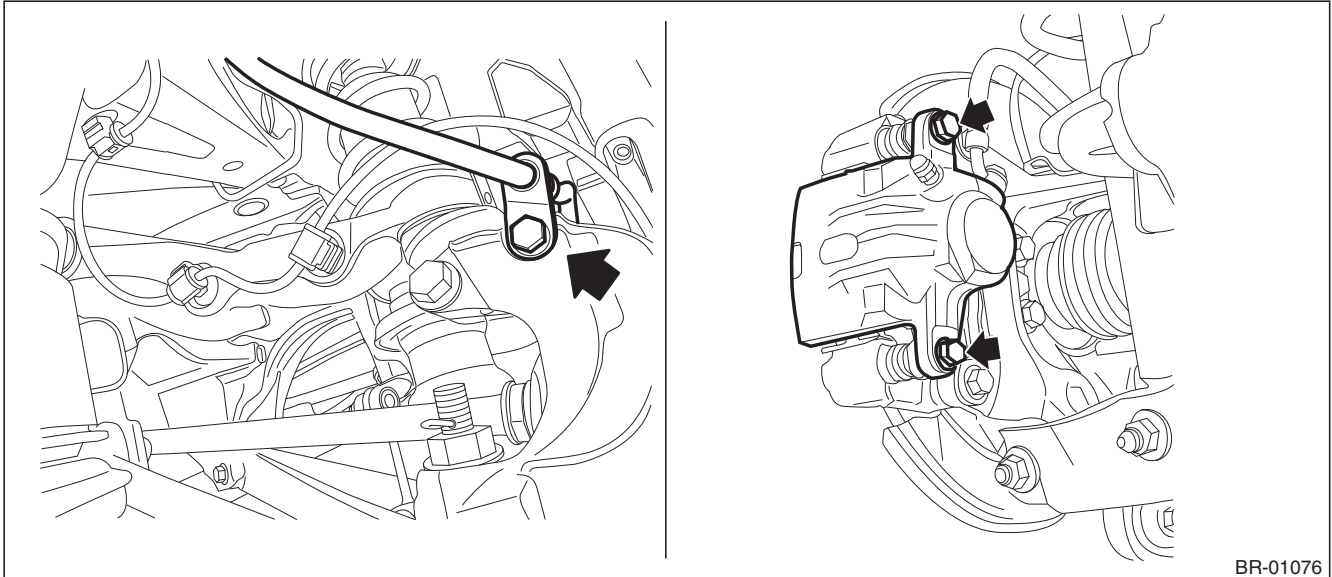
Rear Brake Pad

BRAKE

5. Rear Brake Pad

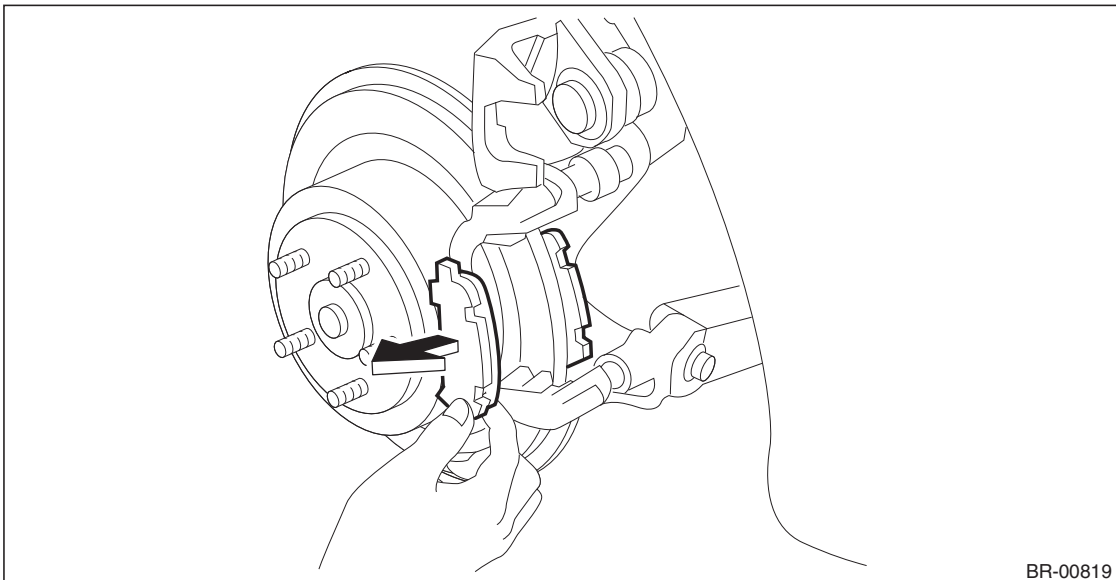
A: REMOVAL

- 1) Lift up the vehicle, and then remove the rear wheels.
- 2) Remove the rear brake pad.
 - (1) Remove the bolts and remove the brake hose bracket.
 - (2) Remove the caliper bolt, and raise and hold the caliper body assembly.



NOTE:

- Do not disconnect the brake hose from the caliper body assembly.
- (3) Remove the brake pad from support - rear disc brake.



B: INSTALLATION

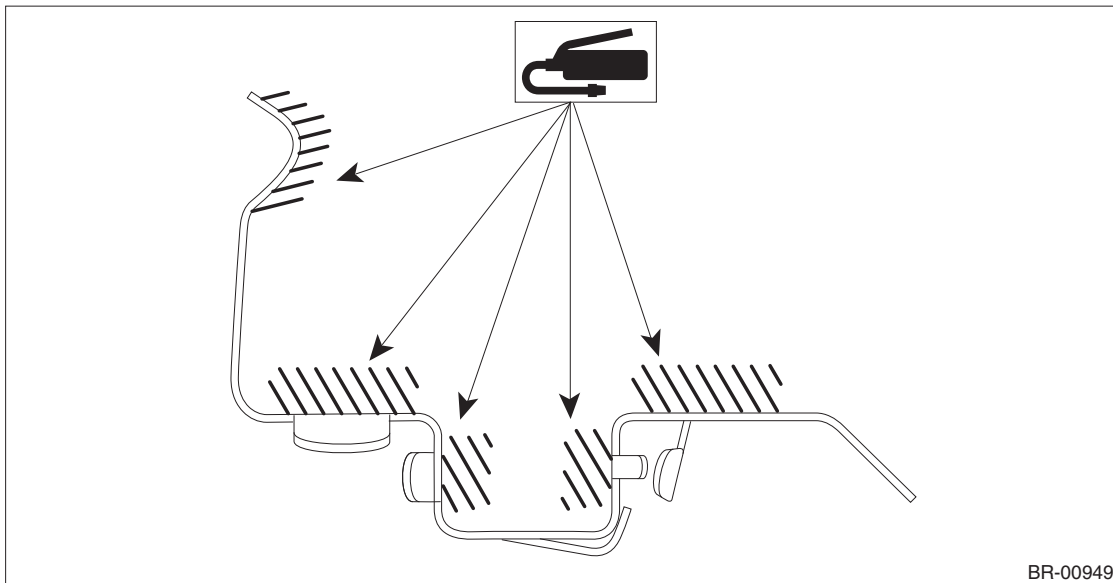
NOTE:

Before installation, remove mud and foreign matter from the caliper body assembly and support - rear disc brake.

- 1) Before installation, check the brake pad. <Ref. to BR-32, INSPECTION, Rear Brake Pad.>
- 2) Apply a thin coat of grease to the pad clip.

Grease:

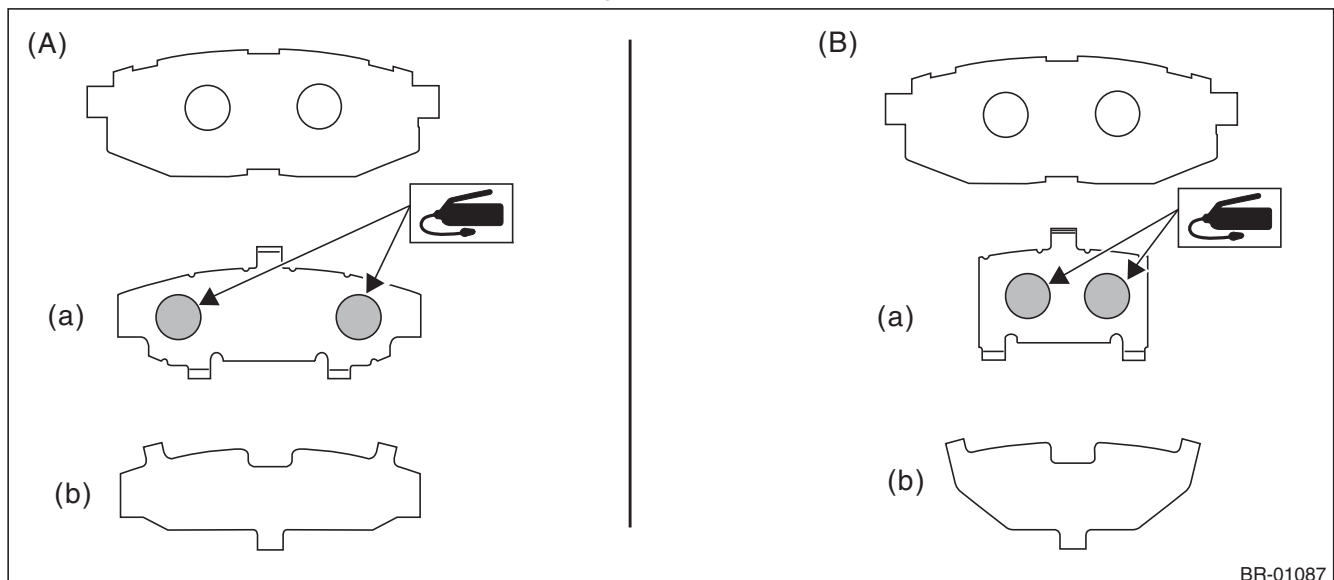
Molykote M7439 (Part No. 003602001) or an item contained in the pad kit



- 3) Apply a thin coat of grease to the shim - disc brake rear inner (a) and the shim - disc brake rear outer (b).

Grease:

Grease contained in the pad kit or WAKO grease V160



(A) Pad - disc brake rear outer

(B) Pad - disc brake rear inner

- 4) Install the brake pad to the support - rear disc brake.

Rear Brake Pad

BRAKE

5) Install the caliper body assembly to the support - rear disc brake.

Tightening torque:

Caliper bolt: 27 N·m (2.75 kgf-m, 19.9 ft-lb)

6) Install the brake hose bracket.

Tightening torque:

Brake hose bracket: 33 N·m (3.36 kgf-m, 24.3 ft-lb)

7) Install the rear wheels.

Tightening torque:

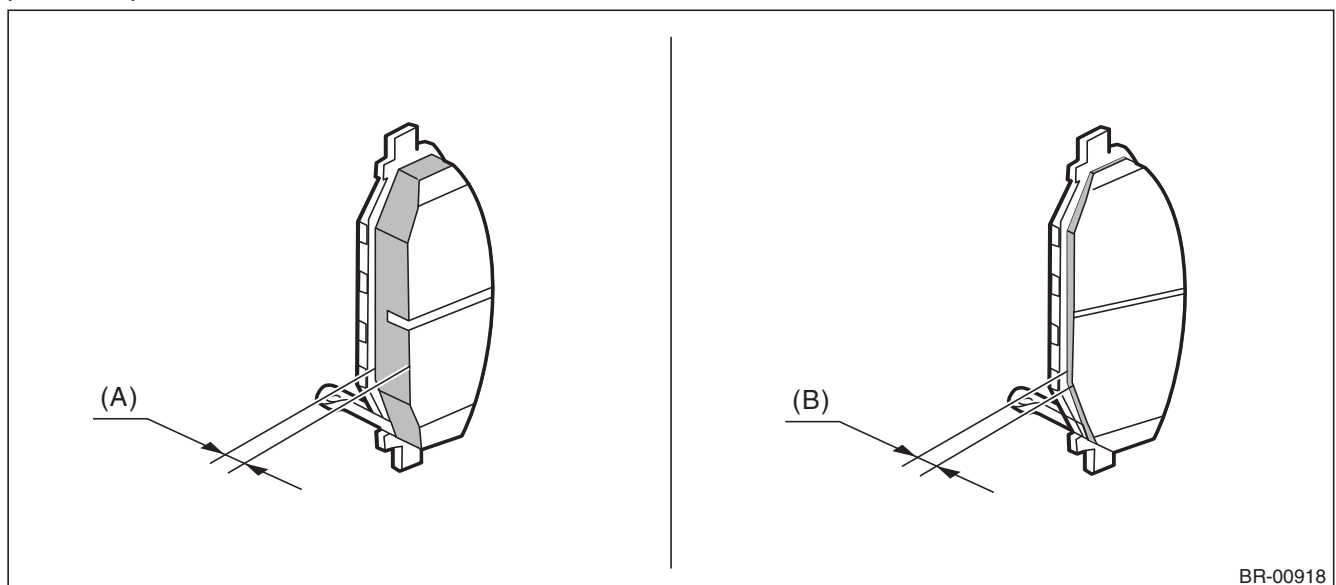
120 N·m (12.24 kgf-m, 88.5 ft-lb)

C: INSPECTION

1) Check the pad thickness.

NOTE:

- Always replace the pads of both wheels and both sides as a set.
- Replace pad clips if they are twisted or worn.
- Replace the pad if there is oil or grease on it.
- A wear indicator is installed on the pad - disc brake rear inner. If the pad is worn to the limit, the end of wear indicator contacts disc rotor, and a squeaking sound is heard as the wheel rotates. If the sound is heard, replace the pad.



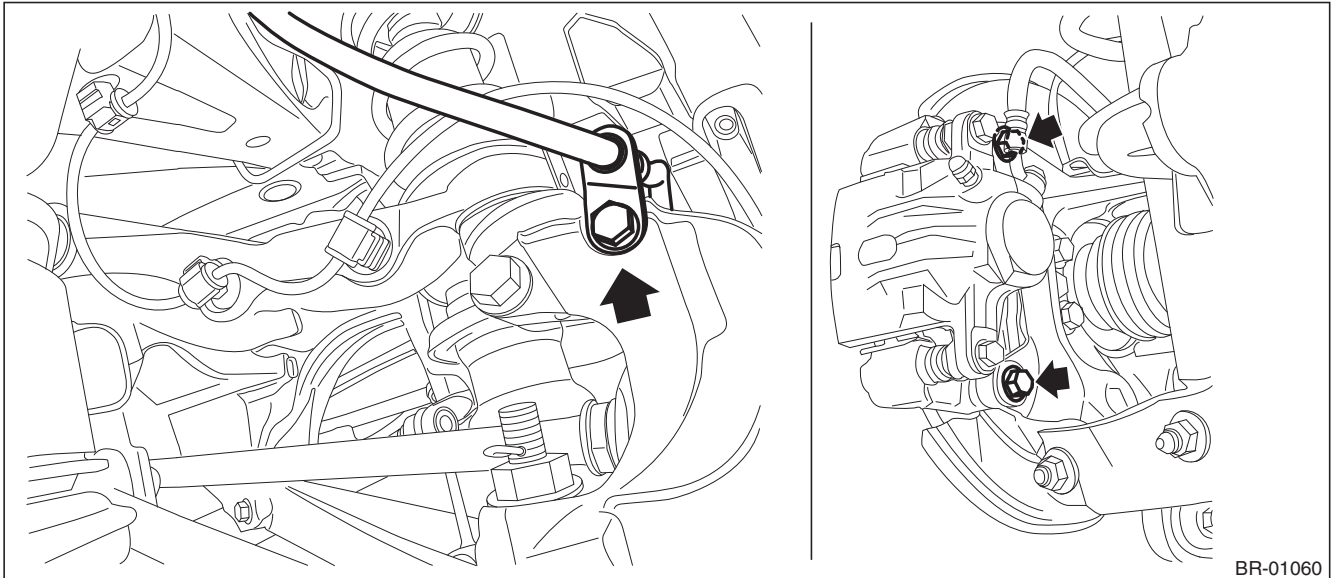
	Disc rotor type	Standard (A)	Wear limit (B)
Pad thickness	Solid disc	9 mm (0.35 in)	1.5 mm (0.059 in)
	Ventilated disc	11 mm (0.43 in)	

2) If the wear limit is exceeded in the inspection, replace the brake pad.

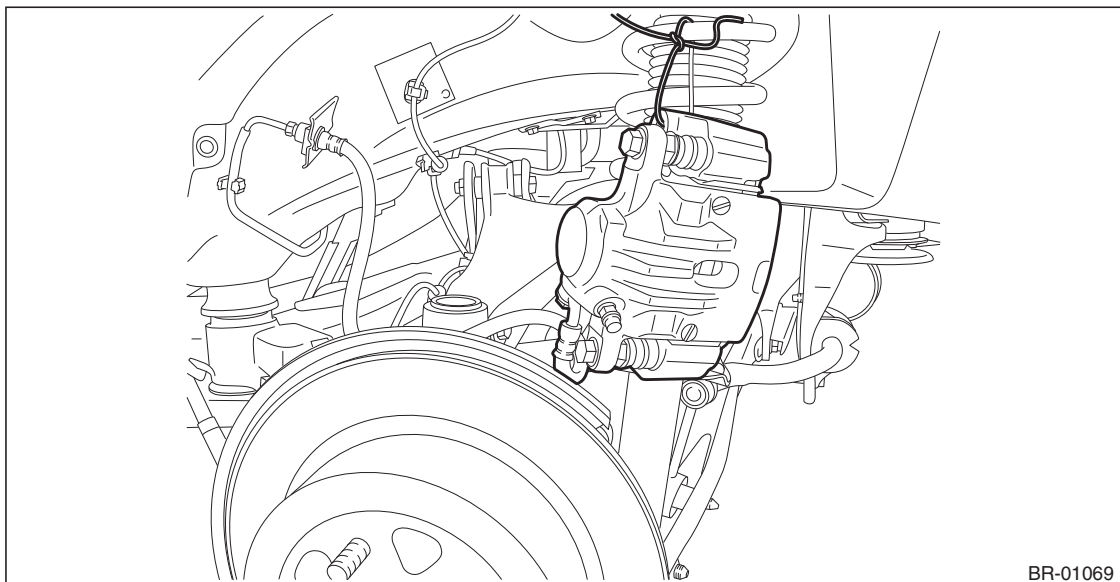
6. Rear Disc Rotor

A: REMOVAL

- 1) Lift up the vehicle, and then remove the rear wheels.
- 2) Release the lever assembly - hand brake.
- 3) Remove the caliper body assembly from the housing assembly - rear axle.
 - (1) Remove the bolt from the brake hose bracket.
 - (2) Remove the mounting bolt, and remove the caliper body assembly.



- (3) Prepare wiring harnesses etc. to be discarded, and suspend the caliper body assembly from the strut assembly.



Rear Disc Rotor

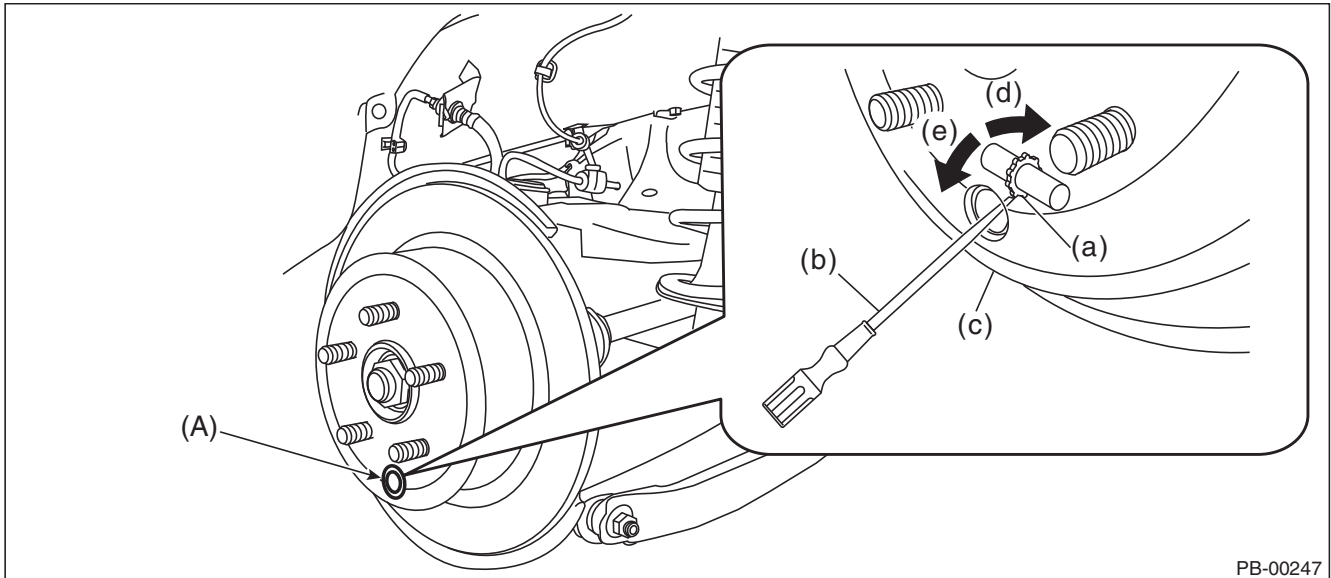
BRAKE

4) Remove the rear disc rotor.

NOTE:

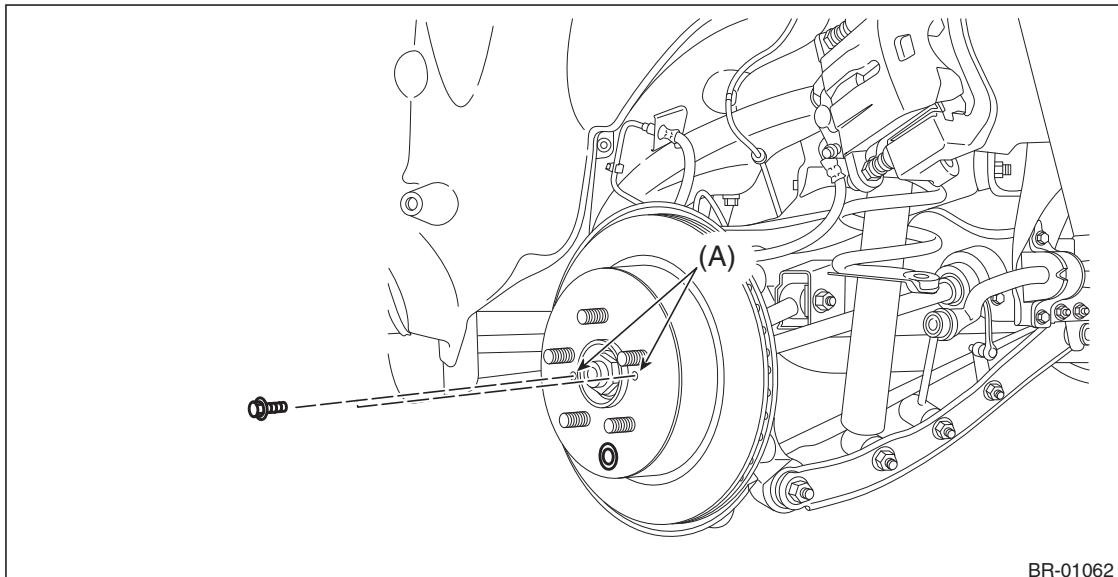
If it is difficult to remove the disc rotor, perform the following two methods in order.

1. Remove the adjusting hole cover (A), insert the flat tip screwdriver, and rotate the adjuster assembly - rear brake until the brake shoe moves far enough to remove the disc rotor.



- | | | |
|--------------------------------|---|--|
| (a) Adjuster ASSY - rear brake | (c) Disc rotor | (e) Shorten the adjuster ASSY - rear brake |
| (b) Flat tip screwdriver | (d) Extend the adjuster ASSY - rear brake | |

2. If the disc rotor is not removed after performing above step, screw in an 8 mm (0.31 in) bolt to the threaded part (A) of the disc rotor, and remove the disc rotor.



B: INSTALLATION

NOTE:

Before installation, remove mud and foreign matter from the caliper body assembly.

- 1) Before installation, check the rear disc rotor. <Ref. to BR-35, INSPECTION, Rear Disc Rotor.>
- 2) Install each part in the reverse order of removal.
- 3) Adjust the parking brake. <Ref. to PB-23, ADJUSTMENT, Parking Brake Assembly (Rear Disc Brake).>

Tightening torque:

Brake hose bracket: 33 N·m (3.36 kgf-m, 24.3 ft-lb)

Mounting bolt: 66 N·m (6.73 kgf-m, 48.7 ft-lb)

Rear wheel: 120 N·m (12.24 kgf-m, 88.5 ft-lb)

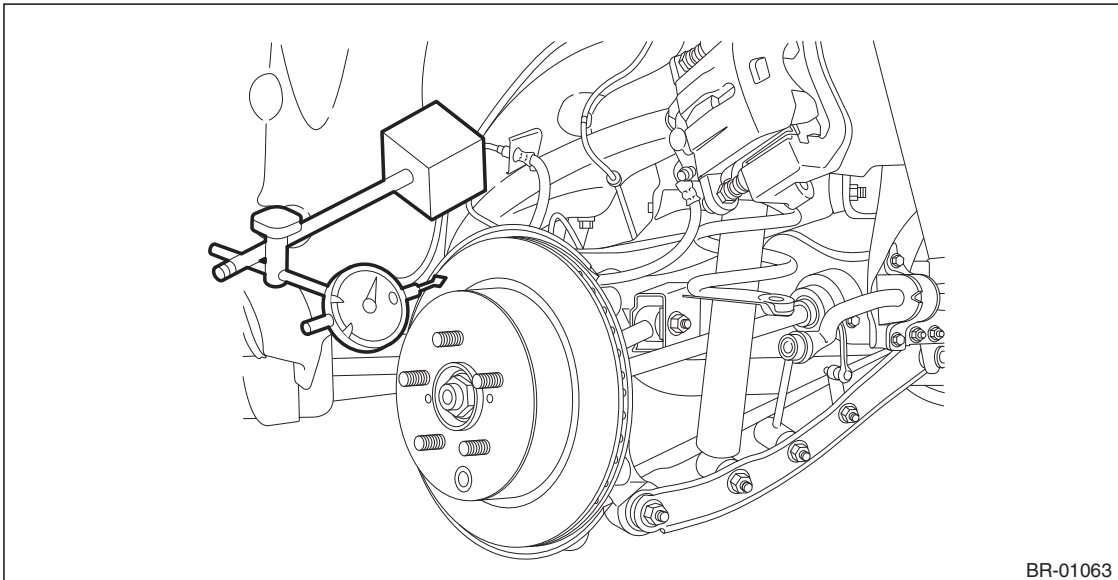
C: INSPECTION

1. DISC ROTOR RUNOUT CHECK

- 1) Check the hub unit COMPL - rear axle for free play and runout before the inspection of disc rotor runout limit. <Ref. to DS-54, INSPECTION, Rear Hub Unit Bearing.>
- 2) Secure the disc rotor by tightening the five wheel nuts.
- 3) Set a dial gauge 10 mm (0.39 in) inward from the disc rotor outer circumference, and check the disc rotor runout while rotating the disc rotor.

Disc rotor runout limit:

0.05 mm (0.0020 in)



BR-01063

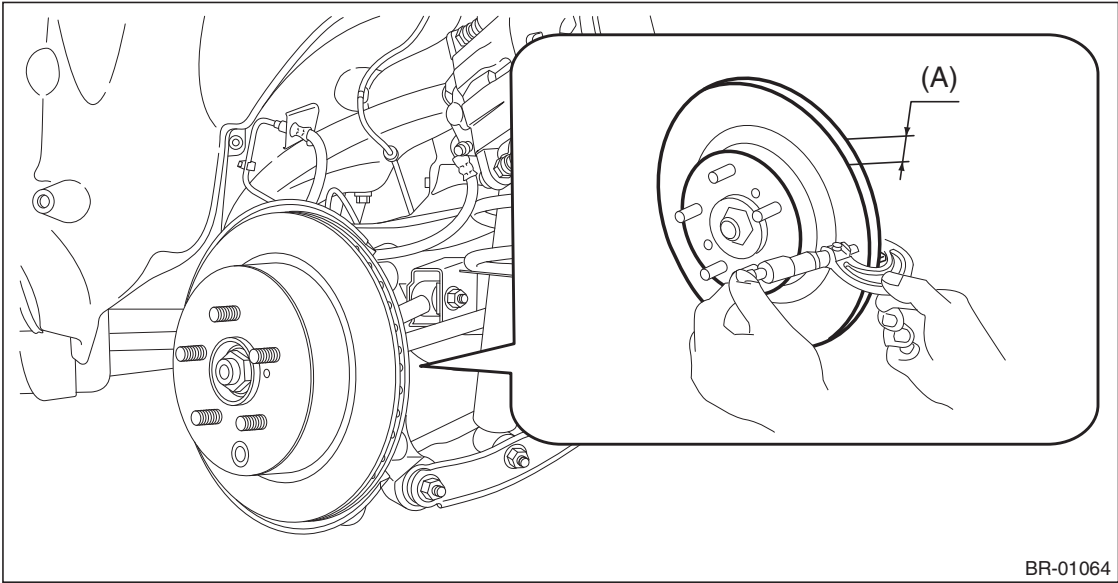
- 4) If the runout limit is exceeded in the inspection, replace the disc rotor.

Rear Disc Rotor

BRAKE

2. DISC ROTOR THICKNESS CHECK

1) Set a micrometer 10 mm (0.39 in) inward from the disc rotor outer perimeter, and then measure the disc rotor thickness (A).



	Disc rotor type	Standard	Wear limit	Disc rotor outer diameter
Disc rotor thickness (A)	Solid disc	10 mm (0.39 in)	8.5 mm (0.33 in)	274 mm (10.79 in)
	Ventilated disc	18 mm (0.71 in)	16 mm (0.63 in)	278 mm (10.94 in)

2) If the wear limit is exceeded in the inspection, replace the disc rotor.

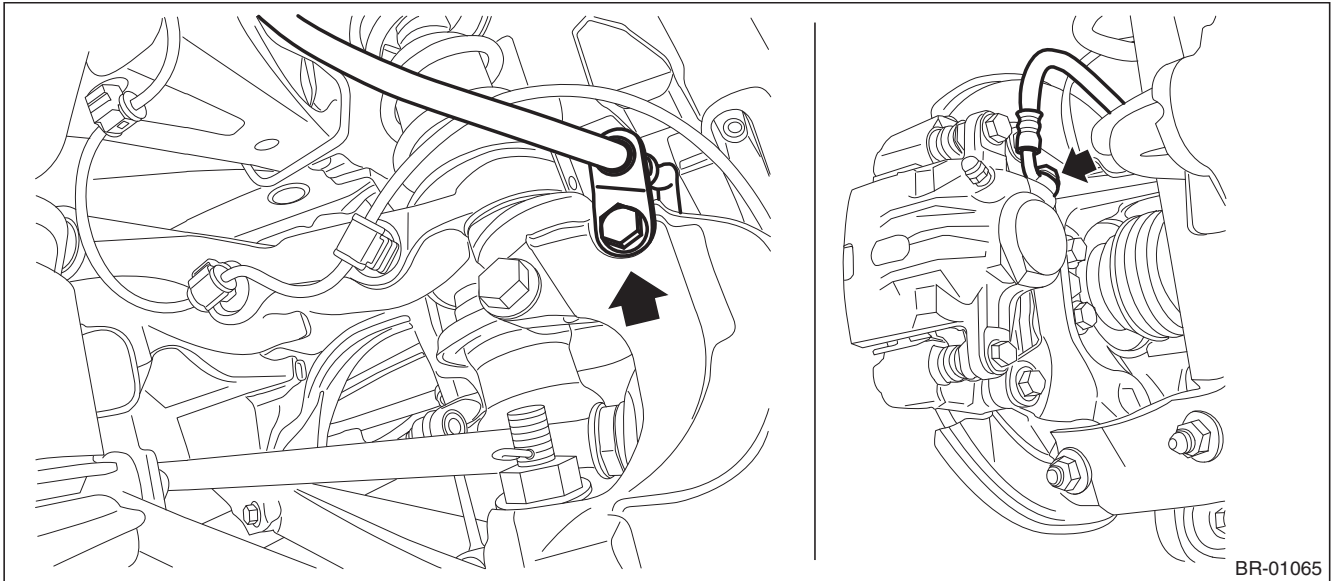
7. Rear Disc Brake Assembly

A: REMOVAL

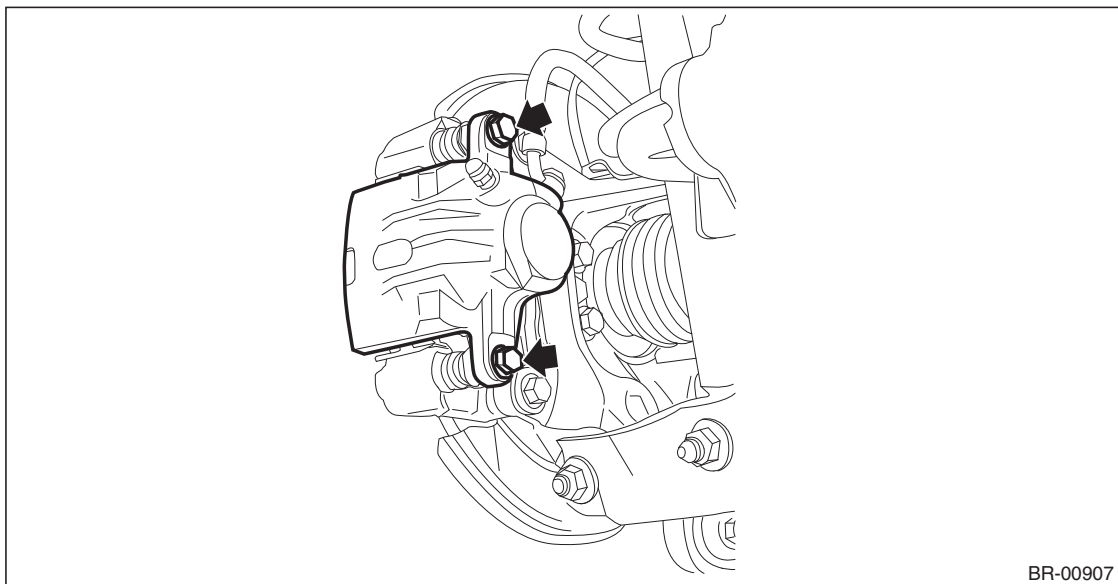
CAUTION:

Do not allow brake fluid to come in contact with the painted surface of the vehicle body. If it does, wash off with water and wipe away completely.

- 1) Lift up the vehicle, and then remove the rear wheels.
- 2) Remove the caliper body assembly from the support - rear disc brake.
 - (1) Remove the brake hose bracket and union bolt.



- (2) Remove the caliper bolt, and remove the caliper body assembly.



- 3) Remove the support - rear disc brake.

NOTE:

Remove the support - rear disc brake only when replacing the disc rotor or the support - rear disc brake. It is not necessary to remove it when servicing the caliper body assembly.

- (1) Remove the brake pad from support - rear disc brake.
- (2) Remove the mounting bolts, and then remove the support - rear disc brake from the housing assembly - rear axle.

Rear Disc Brake Assembly

BRAKE

B: INSTALLATION

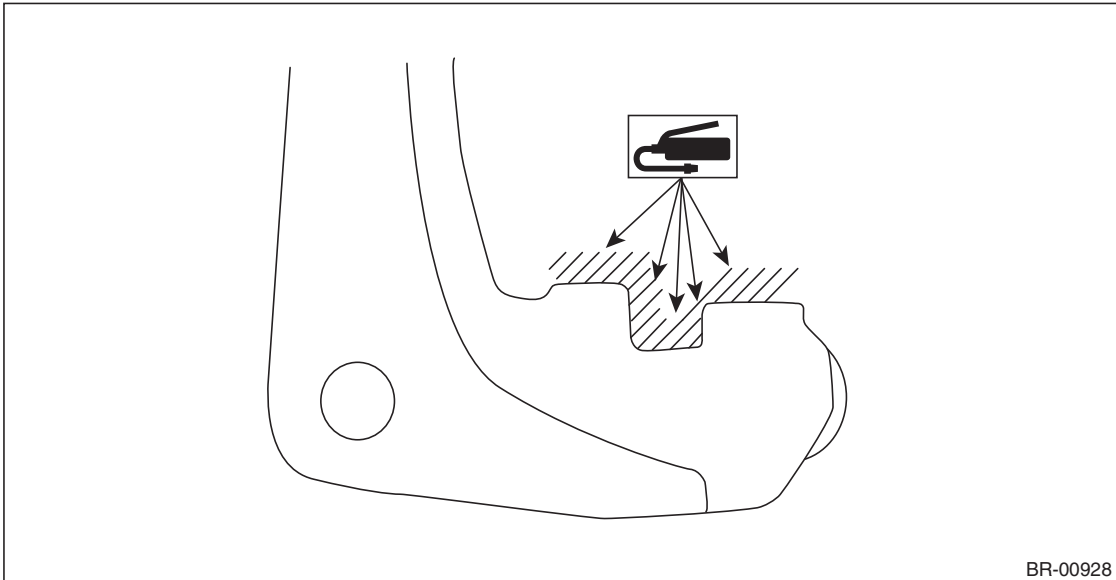
NOTE:

Before installation, remove mud and foreign matter from the caliper body assembly and support - rear disc brake.

- 1) Before installation, check each part. <Ref. to BR-43, INSPECTION, Rear Disc Brake Assembly.>
- 2) Apply a thin coat of grease contained in the pad kit to the support - rear disc brake.

Grease:

Molykote M7439 (Part No. 003602001) or an item contained in the pad kit



- 3) Install the support - rear disc brake to the housing assembly - rear axle.

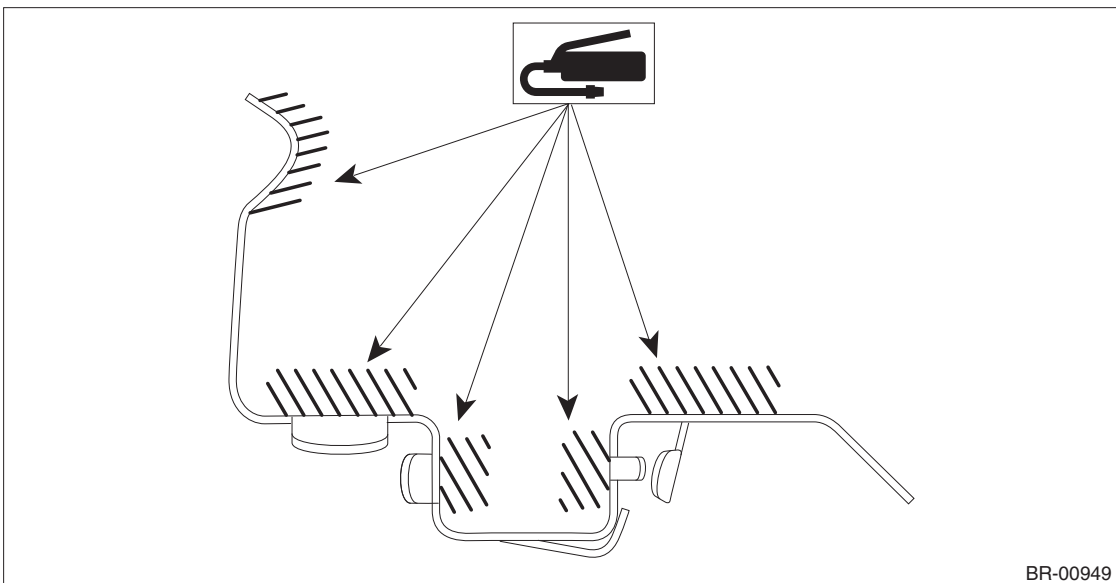
Tightening torque:

Mounting bolt: 66 N·m (6.73 kgf-m, 48.7 ft-lb)

- 4) Apply a thin coat of grease to the pad clip.

Grease:

Molykote M7439 (Part No. 003602001) or an item contained in the pad kit



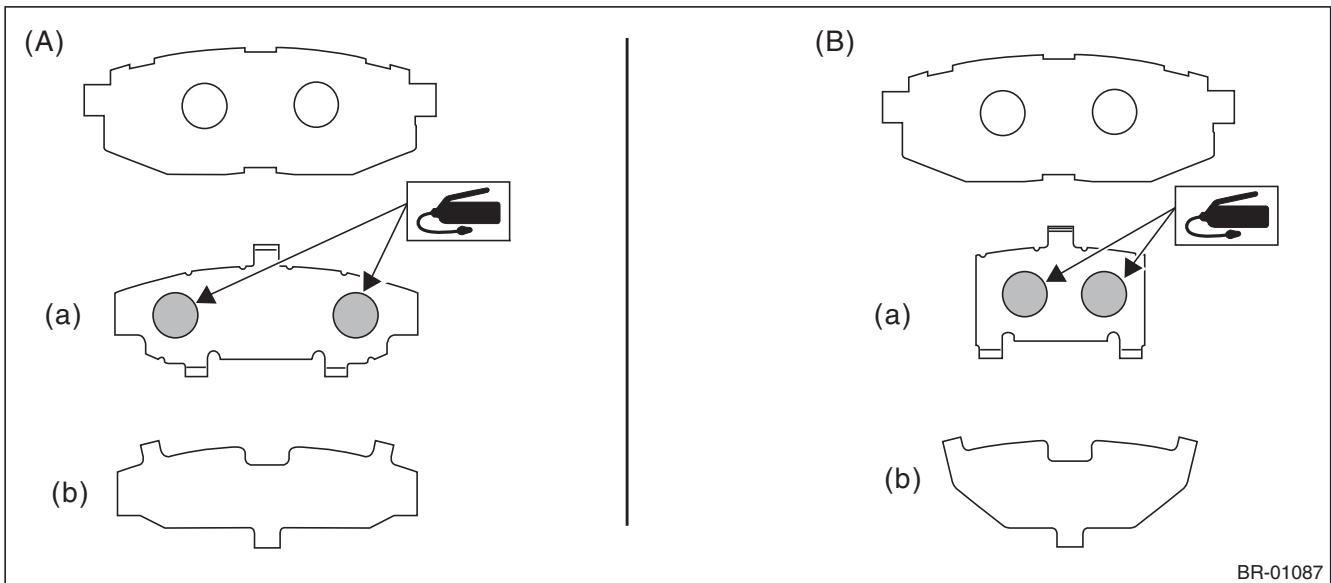
Rear Disc Brake Assembly

BRAKE

5) Apply a thin coat of grease to the shim - disc brake rear inner (a) and the shim - disc brake rear outer (b).

Grease:

Grease contained in the pad kit or WAKO grease V160



(A) Pad - disc brake rear outer

(B) Pad - disc brake rear inner

6) Install the brake pad to the support - rear disc brake.

7) Install the caliper body assembly to the support - rear disc brake.

Tightening torque:

Caliper bolt: 27 N·m (2.75 kgf-m, 19.9 ft-lb)

8) Install the brake hose bracket.

Tightening torque:

Brake hose bracket: 33 N·m (3.36 kgf-m, 14.3 ft-lb)

9) Connect the brake hose using a new brake hose gasket.

Tightening torque:

Union bolt: 18 N·m (1.84 kgf-m, 13.3 ft-lb)

10) Bleed air from the brake system. <Ref. to BR-63, BRAKE LINE, PROCEDURE, Air Bleeding.>

11) Install the rear wheels.

Tightening torque:

120 N·m (12.24 kgf-m, 88.5 ft-lb)

Rear Disc Brake Assembly

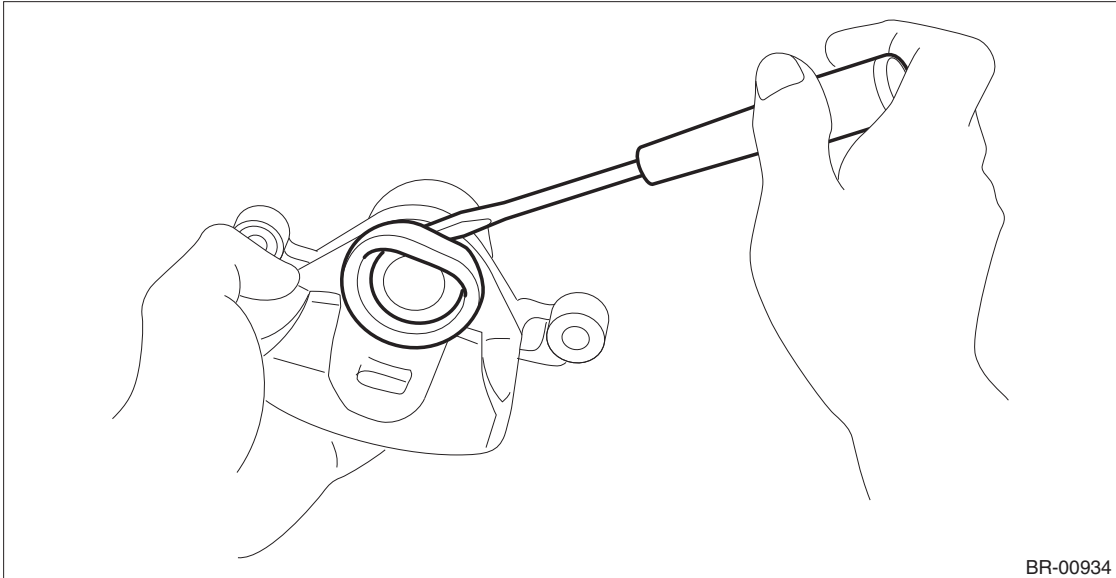
BRAKE

C: DISASSEMBLY

CAUTION:

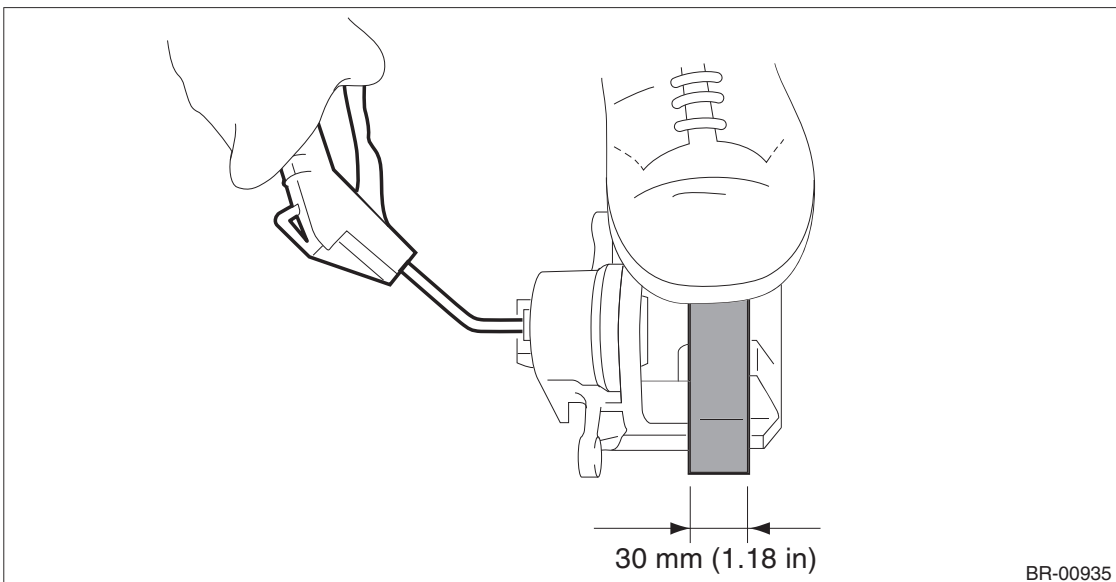
Be careful not to allow foreign matter to enter the brake hose connector.

- 1) Remove mud and foreign matter from the caliper body assembly.
- 2) Remove the piston boot from caliper body cylinder.



- 3) Remove the piston - disc brake.

- (1) Place a wooden block in the caliper body assembly as shown in the figure to prevent the piston - disc brake from jumping out and being damaged.
- (2) Using an air gun, gradually apply compressed air via the brake hose installation hole to push out the piston - disc brake.



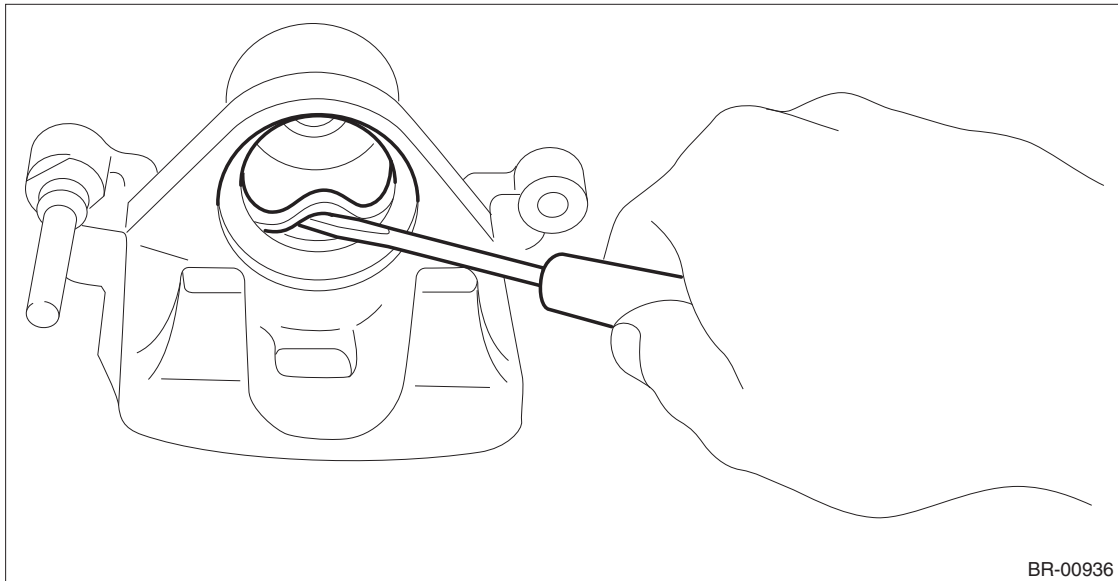
Rear Disc Brake Assembly

BRAKE

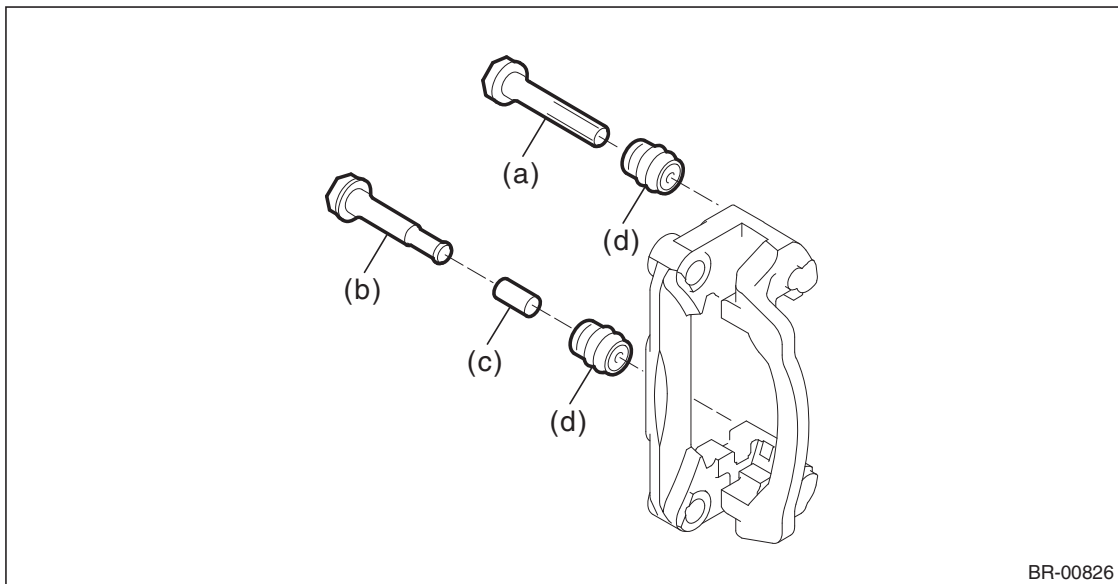
4) Remove the piston seal from caliper body cylinder.

CAUTION:

Do not damage the cylinder and piston seal groove.



5) Remove the guide pin - rear brake, lock pin - rear brake, lock pin - sleeve, and pin boot from the support - rear disc brake.



(a) Guide pin - rear brake (black)

(c) Lock pin - sleeve

(d) Pin boot

(b) Lock pin - rear brake (silver)

D: ASSEMBLY

1) Before installation, check each part. <Ref. to BR-43, INSPECTION, Rear Disc Brake Assembly.>

2) Clean the inside of the caliper body cylinder using brake fluid.

3) Apply a coat of brake fluid to piston seal and install the piston seal to the caliper body cylinder groove.

4) Apply a coat of brake fluid to the inner surface of caliper body cylinder and the entire outer surface of the piston - disc brake.

5) Apply grease contained in the piston seal kit to the piston boot, and install it to the groove at the end of the cylinder.

Rear Disc Brake Assembly

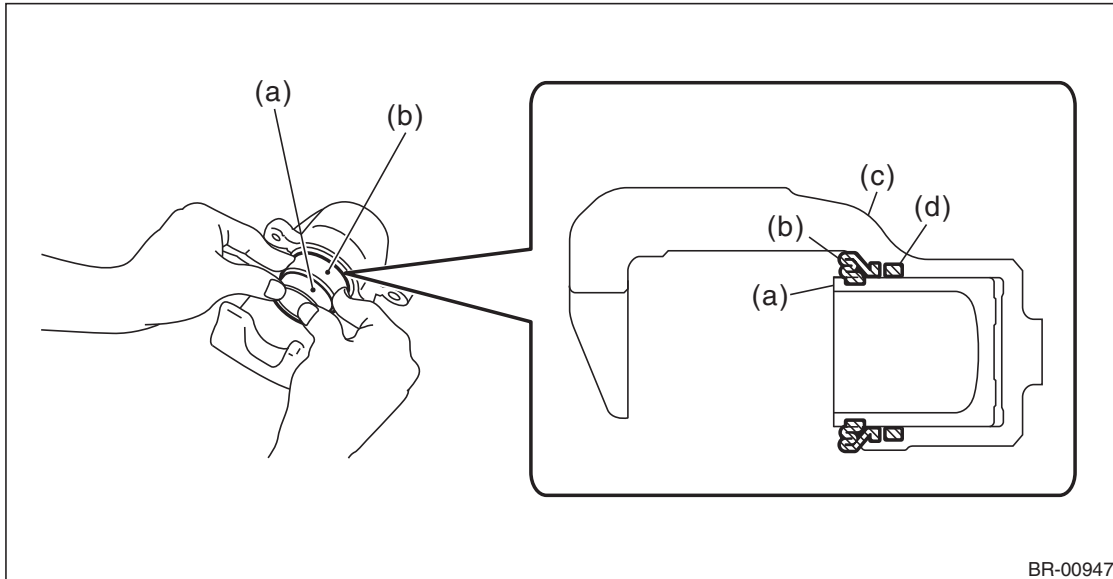
BRAKE

6) Insert the piston - disc brake into the caliper body cylinder.

CAUTION:

Do not force the piston - disc brake into the caliper body cylinder.

7) Position the piston boot in the grooves on the piston - disc brake and the caliper body cylinder.



(a) Piston - disc brake
(b) Piston boot

(c) Caliper body

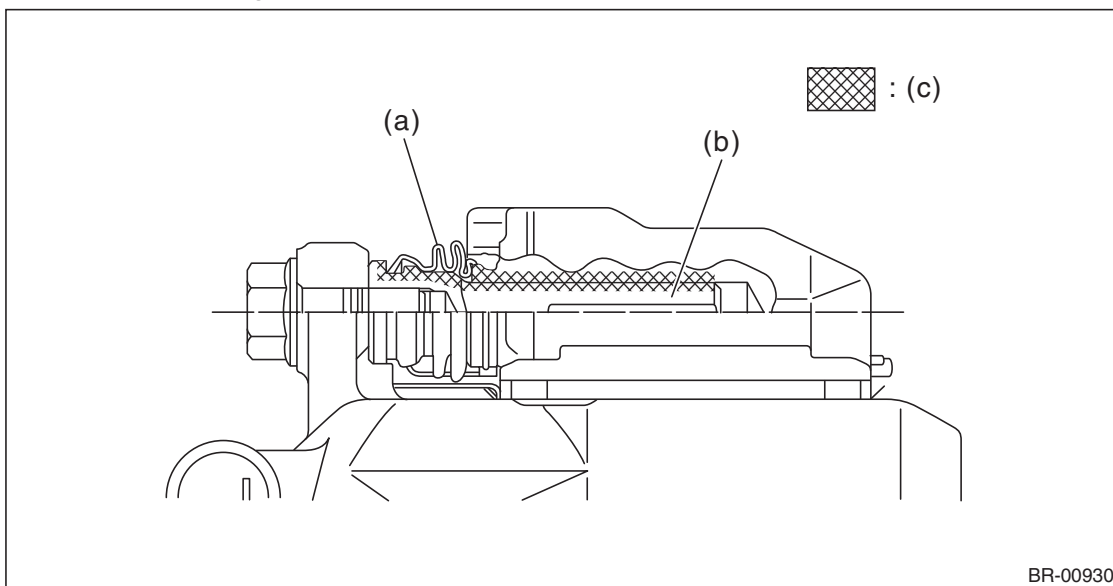
(d) Piston seal

8) Apply grease contained in the piston seal kit to the lock pin - rear brake, the outer surface of guide pin - rear brake, the inner surface of support cylinder, and the grooves of pin boot.

9) Install the pin boot to the lock pin - rear brake and guide pin - rear brake, and insert them into the support cylinder.

CAUTION:

Insert the lock pin - rear brake and guide pin - rear brake into specified position, and make sure that they slide and seat properly.



(a) Pin boot

(b) Lock pin - rear brake or guide pin - rear brake

(c) Grease applied area

E: INSPECTION

- 1) Check the caliper body cylinder and piston - disc brake for uneven wear, damage or rust.
- 2) Check the rubber parts for damage or deterioration.
- 3) If faulty is found in the inspection, replace the relevant part.

Master Cylinder

BRAKE

8. Master Cylinder

A: REMOVAL

CAUTION:

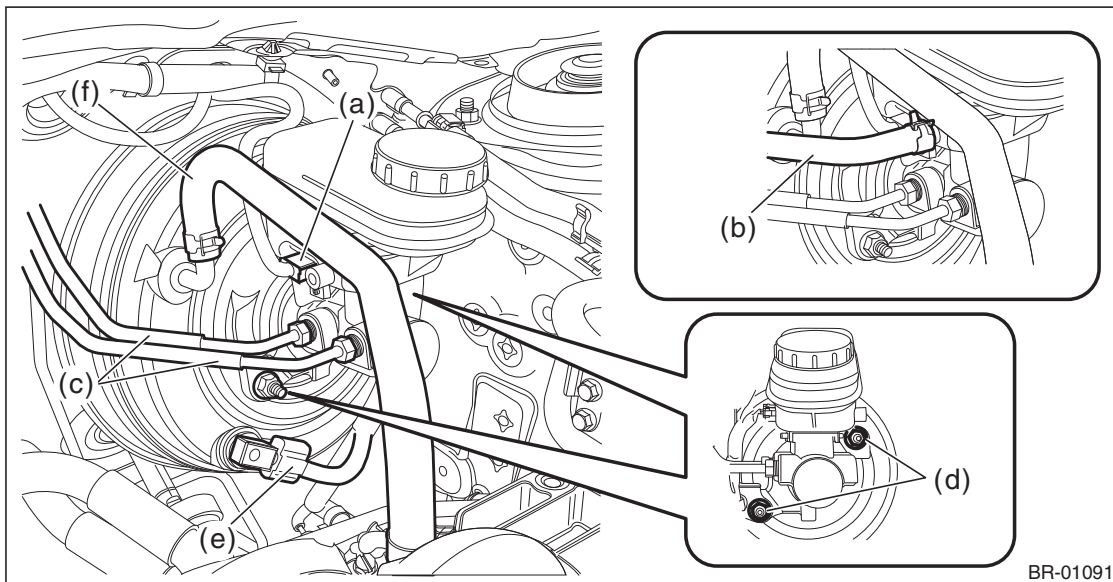
Do not allow brake fluid to come in contact with the painted surface of the vehicle body. If it does, wash off with water and wipe away completely.

- 1) Disconnect the ground cable from battery.
- 2) Drain brake fluid from the reservoir tank completely.
- 3) Remove the master cylinder assembly.

CAUTION:

- **Do not remove the vacuum sensor (e). If removed, replace the vacuum booster assembly with a new part. (Turbo model)**
- **Do not allow the vacuum sensor (e) to turn. Otherwise the gasket on the mounting location of the vacuum sensor may be damaged. (Turbo model)**

- (1) Disconnect the fluid level gauge connector (a).
- (2) Disconnect the clutch hose (b). (MT model)
- (3) Turn the flare nuts while pressing the brake pipes toward the master cylinder assembly side and disconnect the brake pipes (c).
- (4) Remove the nut (d), and slowly remove the master cylinder assembly from the vacuum booster assembly.



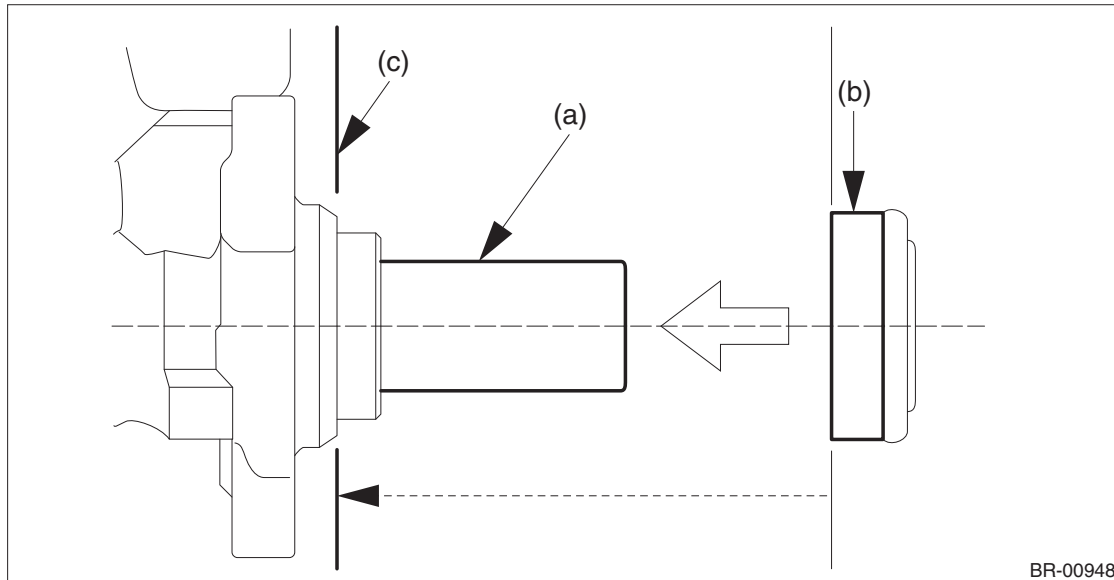
BR-01091

B: INSTALLATION

1) Replace the seal sub assembly for the master cylinder assembly with a new part.

CAUTION:

Be careful not to install the seal sub assembly in the wrong location.



(a) Primary piston

(b) Seal sub ASSY

(c) Install the seal sub ASSY to this surface.

2) Install each part in the reverse order of removal.

Tightening torque:

Master cylinder assembly: 13 N·m (1.33 kgf-m, 9.6 ft-lb)

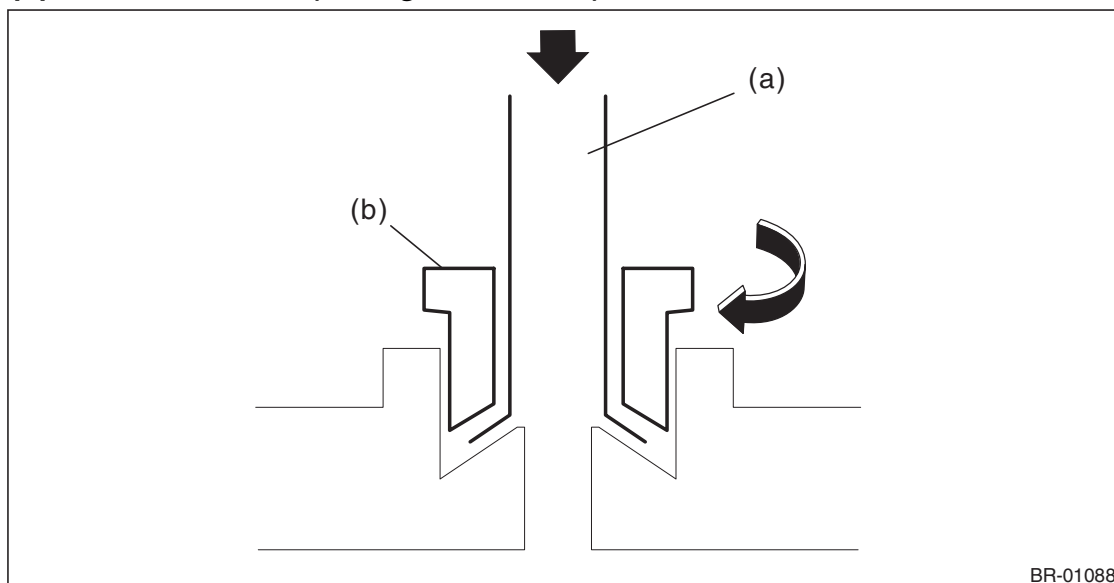
3) Turn and tighten the flare nut (b) by hand while pressing the brake pipe (a) toward the master cylinder assembly side.

CAUTION:

Be careful not to make scratches or other damage to the inside surface of the brake pipe flare.

Tightening torque:

Brake pipe flare nut: 19 N·m (1.94 kgf-m, 14.0 ft-lb)



Master Cylinder

BRAKE

4) Bleed air from the brake system and clutch system (MT model). <Ref. to BR-61, PROCEDURE, Air Bleeding.>

C: REPLACEMENT

CAUTION:

Since the master cylinder assembly cannot be disassembled, disassembly and cleaning are prohibited. When replacing, replace the master cylinder assembly.

9. Brake Booster

A: REMOVAL

CAUTION:

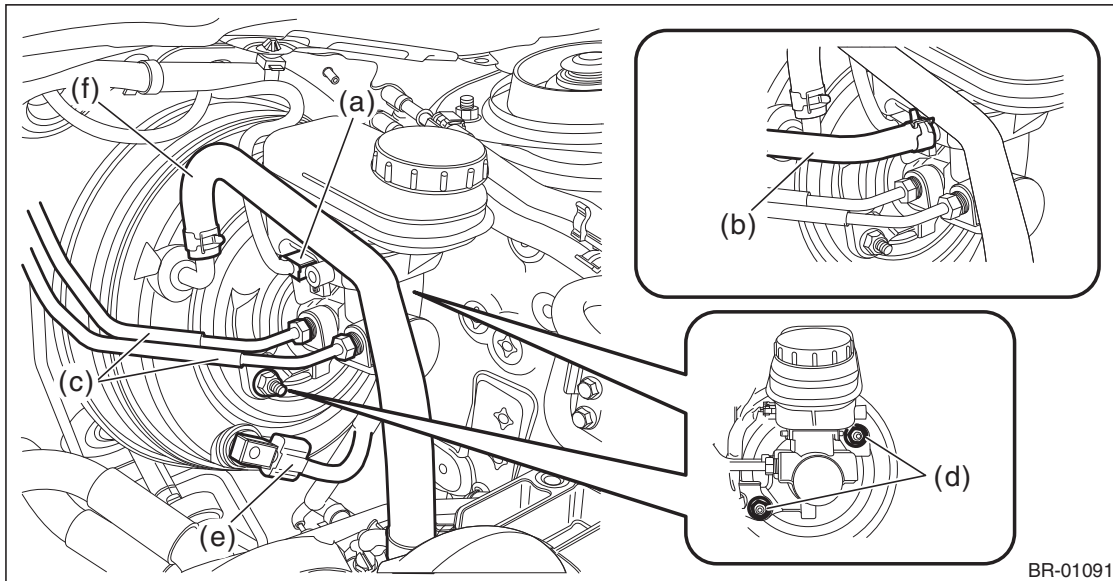
Do not allow brake fluid to come in contact with the painted surface of the vehicle body. If it does, wash off with water and wipe away completely.

- 1) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work.
- 2) Drain brake fluid from the reservoir tank completely.
- 3) Disconnect the air conditioner pipe. <Ref. to AC-70, REMOVAL, Hose and Pipe.>
- 4) Remove the power steering control module. <Ref. to PS-41, REMOVAL, Power Steering Control Module.>
- 5) Remove the master cylinder assembly.

CAUTION:

- **Do not remove the vacuum sensor (e). If removed, replace the vacuum booster assembly with a new part. (Turbo model)**
- **Do not rotate the vacuum sensor when disconnecting the connector of vacuum sensor (e). Otherwise the gasket on the mounting location of the vacuum sensor may be damaged. (Turbo model)**

- (1) Disconnect the fluid level gauge connector (a).
- (2) Disconnect the clutch hose (b). (MT model)
- (3) Turn the flare nuts while pressing the brake pipes toward the master cylinder assembly side and disconnect the brake pipes (c).
- (4) Disconnect the vacuum sensor connector (e). (Turbo model)
- (5) Remove the nut (d), and slowly remove the master cylinder assembly from the vacuum booster assembly.

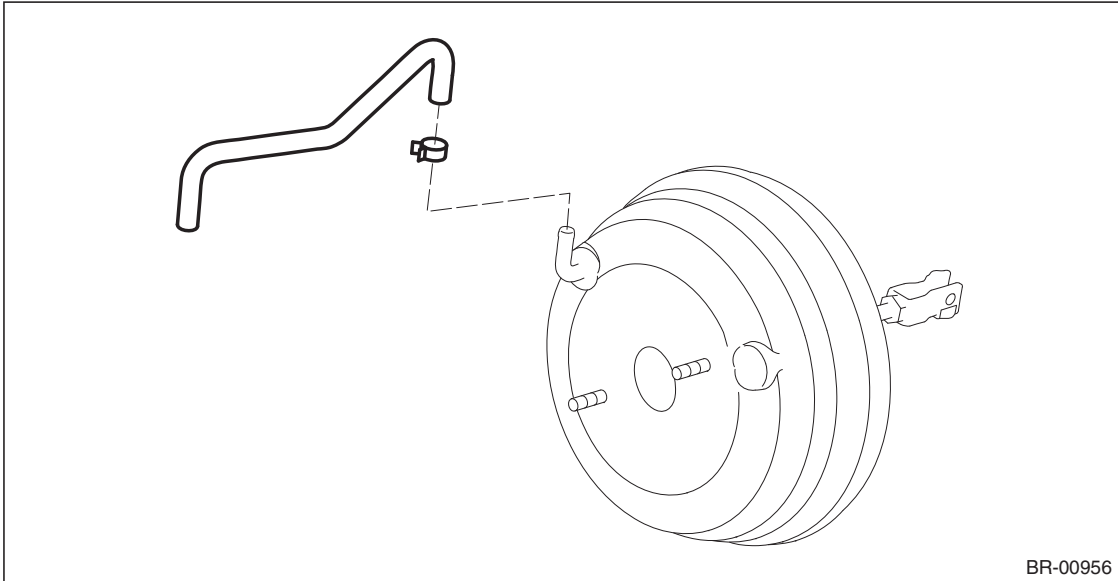


BR-01091

Brake Booster

BRAKE

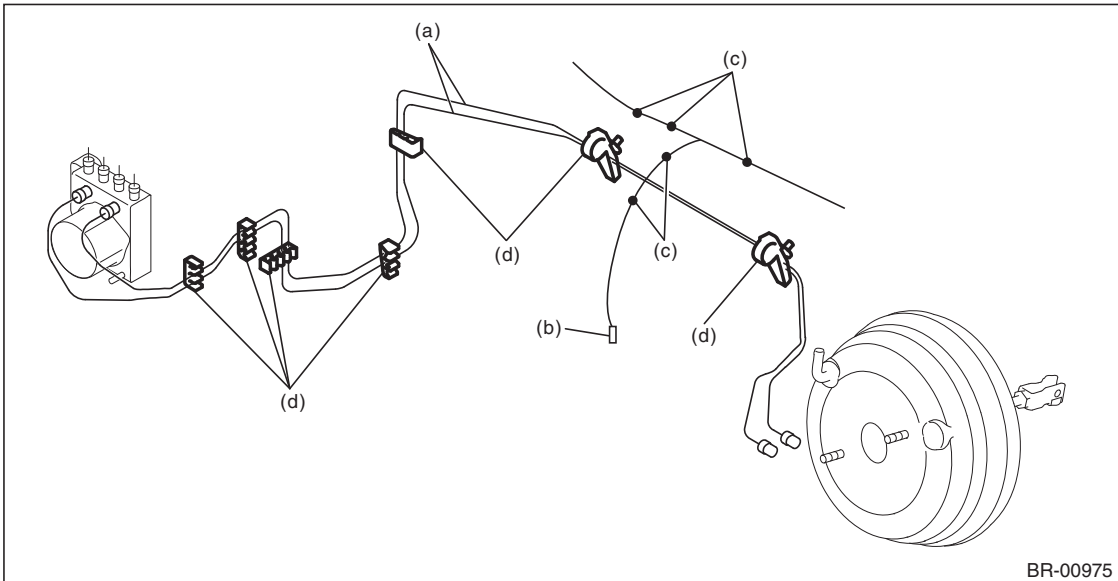
6) Remove the clamp and remove the vacuum hose.



7) Remove the brake pipe assembly (a).

(1) Disconnect the starter connector (b) and harness clip (c).

(2) Remove the brake pipe assembly (a) from the pipe clip (d).



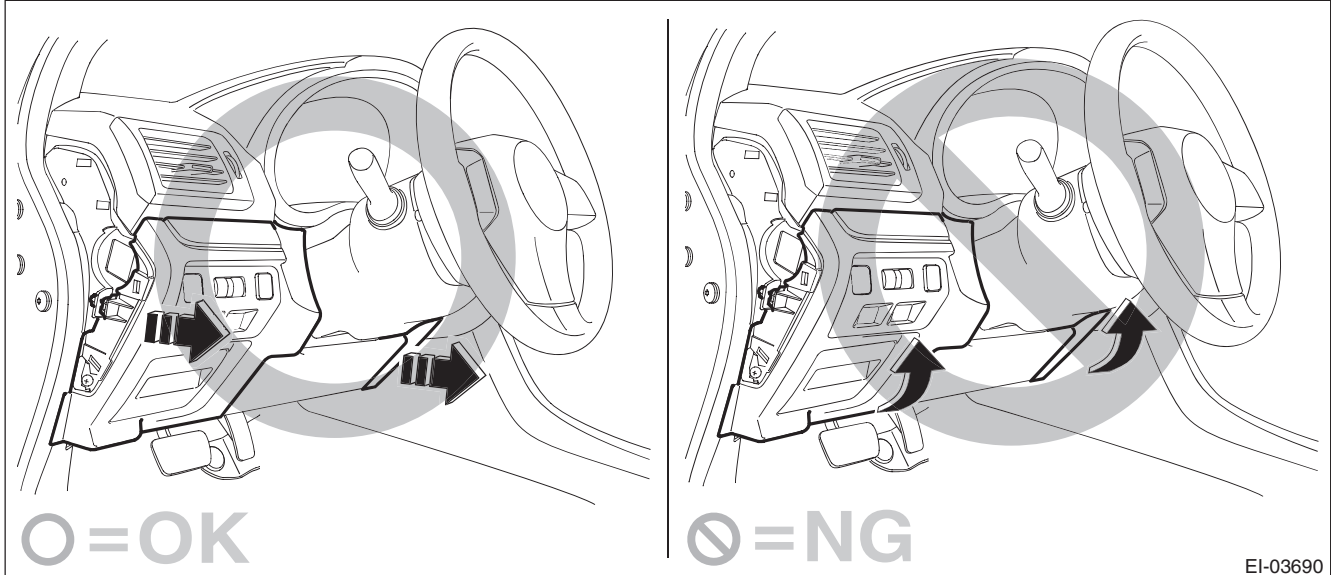
Brake Booster

BRAKE

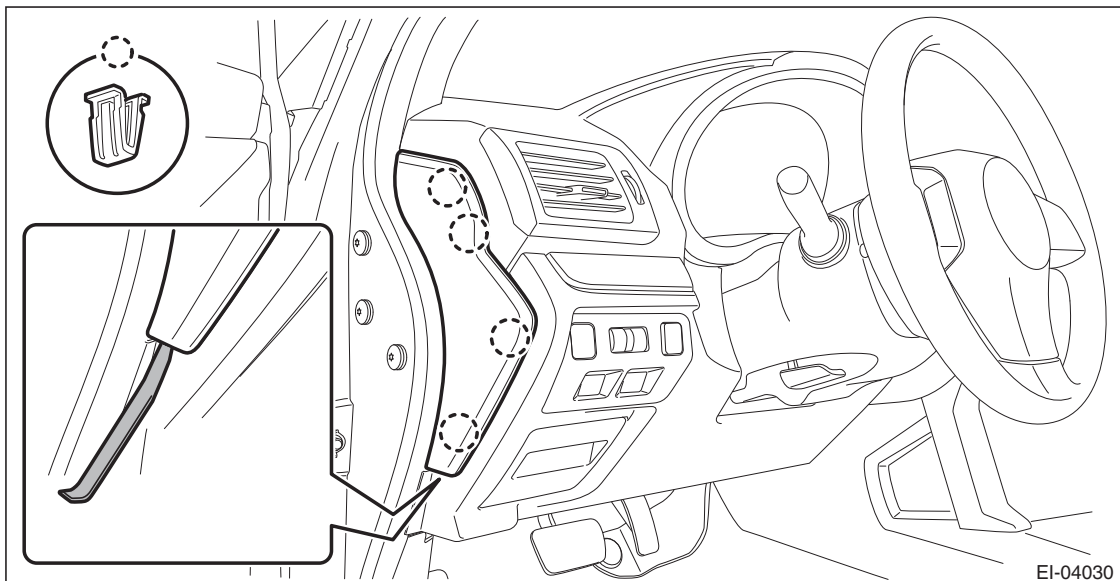
8) Remove the cover assembly - instrument panel LWR driver.

CAUTION:

When removing the cover assembly - instrument panel LWR driver, be sure to pull it toward you. If attempting to remove by turning it upward, the claws may be damaged.



(1) Remove the clips, and remove the cover - instrument panel side LH.



NOTE:

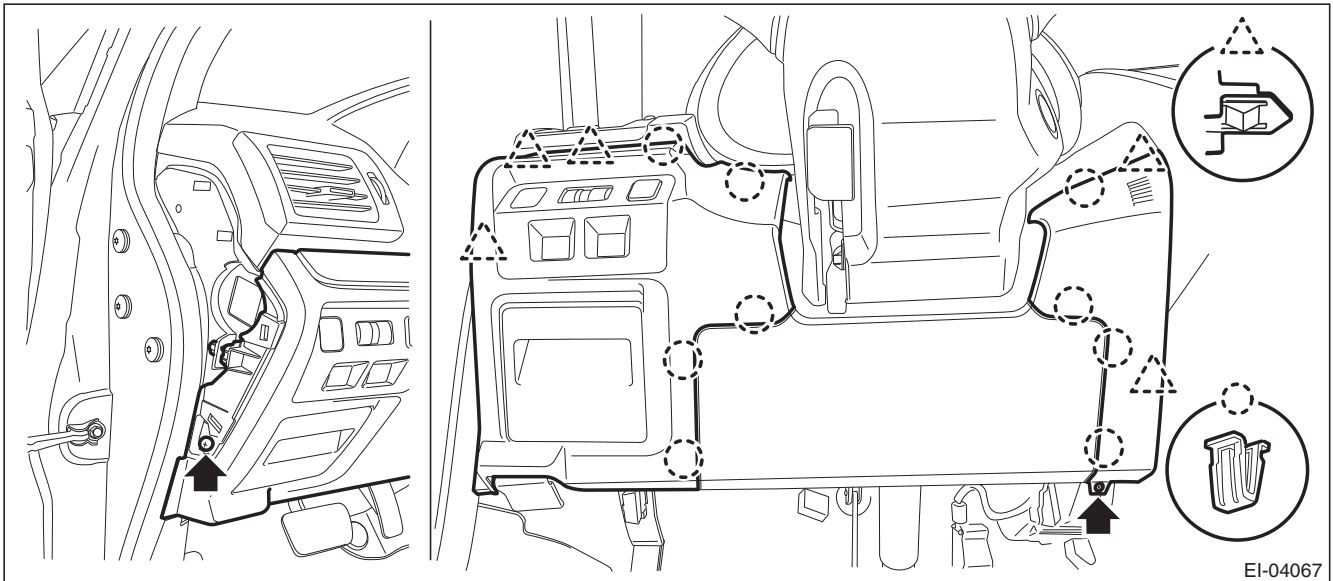
Using a plastic remover, open the cover - instrument panel side LH.

(2) Remove the screws and release the clips and claws.

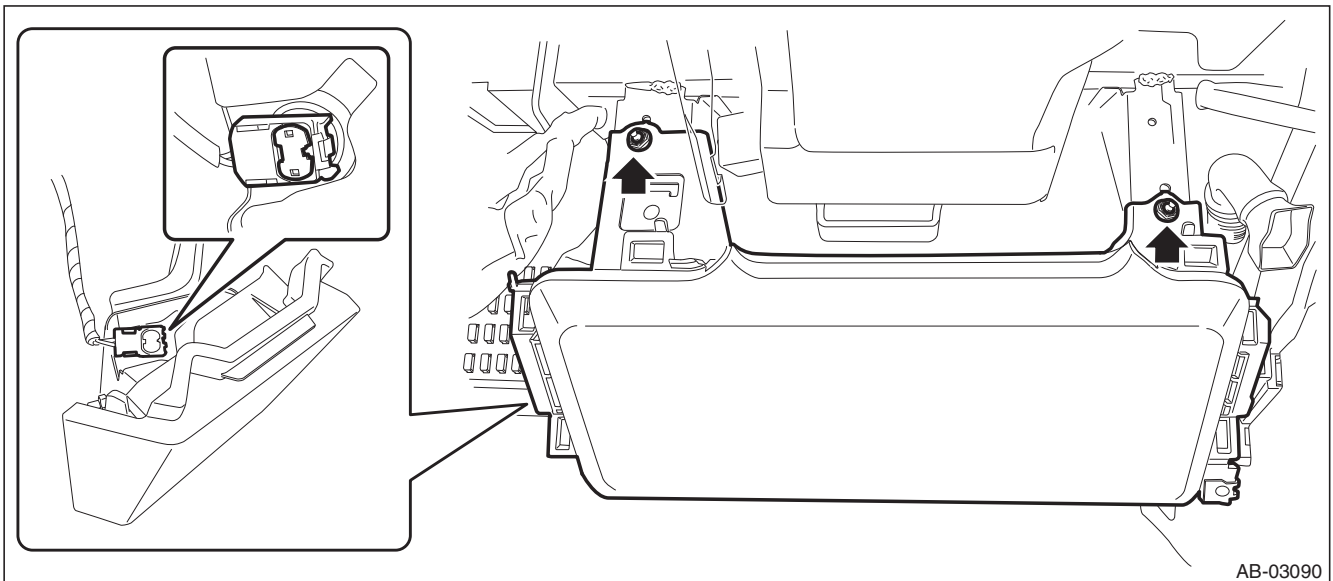
Brake Booster

BRAKE

- (3) Disconnect the harness connectors, and remove the cover assembly - instrument panel LWR driver INN and OUT.



- 9) Remove the nuts to remove the knee airbag module and disconnect the harness connector. <Ref. to AB-21, DRIVER'S AIRBAG MODULE, KNEE AIRBAG MODULE, CURTAIN AIRBAG MODULE AND PRETENSIONER, PROCEDURE, Airbag Connector.>



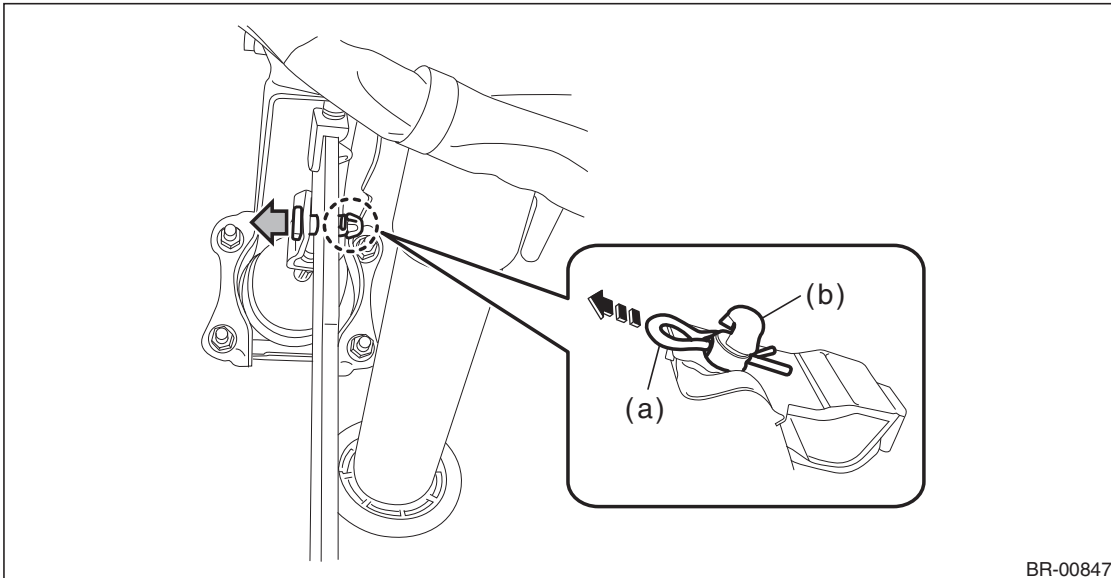
Brake Booster

BRAKE

10) Remove the snap pin (a) and clevis pin (b), and remove the operating rod from the brake pedal.

CAUTION:

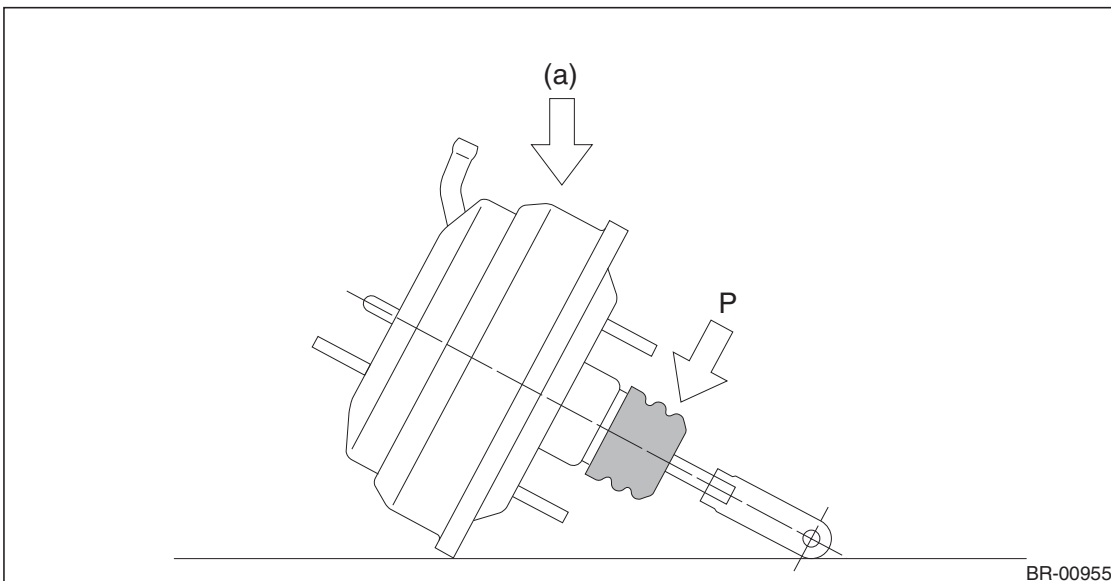
- Be careful not to apply excessive force to the operating rod when handling the operating rod. The angle may change by $\pm 3^\circ$, and it may result in damage to power piston cylinder.
- Do not change the push rod length.



11) Remove the vacuum booster assembly.

CAUTION:

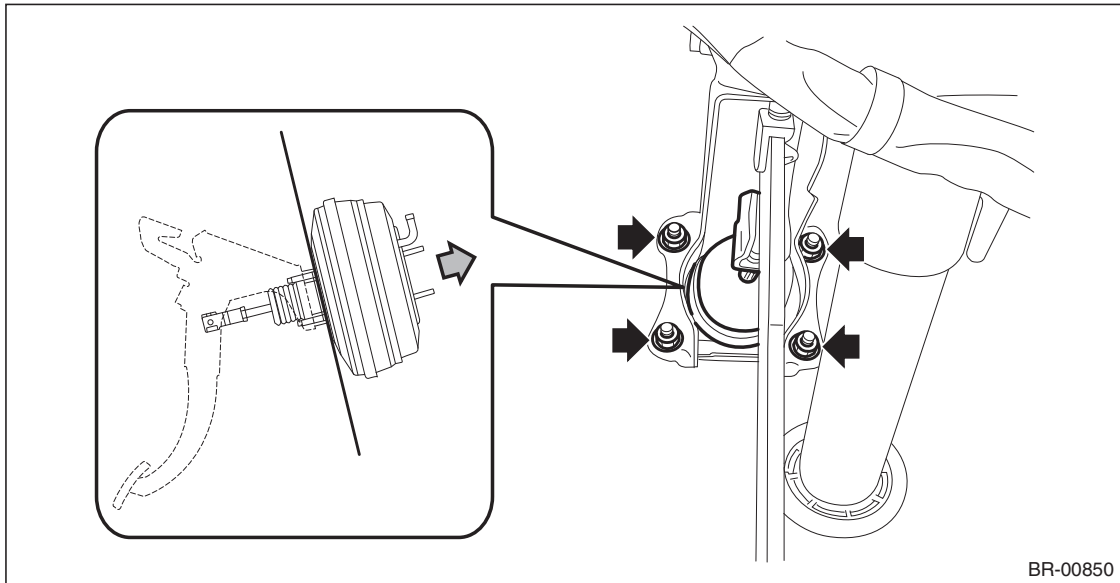
- Do not disassemble the vacuum booster assembly.
- Make sure that the booster shell and vacuum pipe are not subject to strong impacts.
- Be careful not to drop the vacuum booster assembly. If the vacuum booster assembly is dropped accidentally, replace it.
- Be careful when placing the vacuum booster assembly on floor.
- If external force (a) is applied from above when the vacuum booster assembly is placed in this position, the resin portion as indicated by "P" may become damaged.



Brake Booster

BRAKE

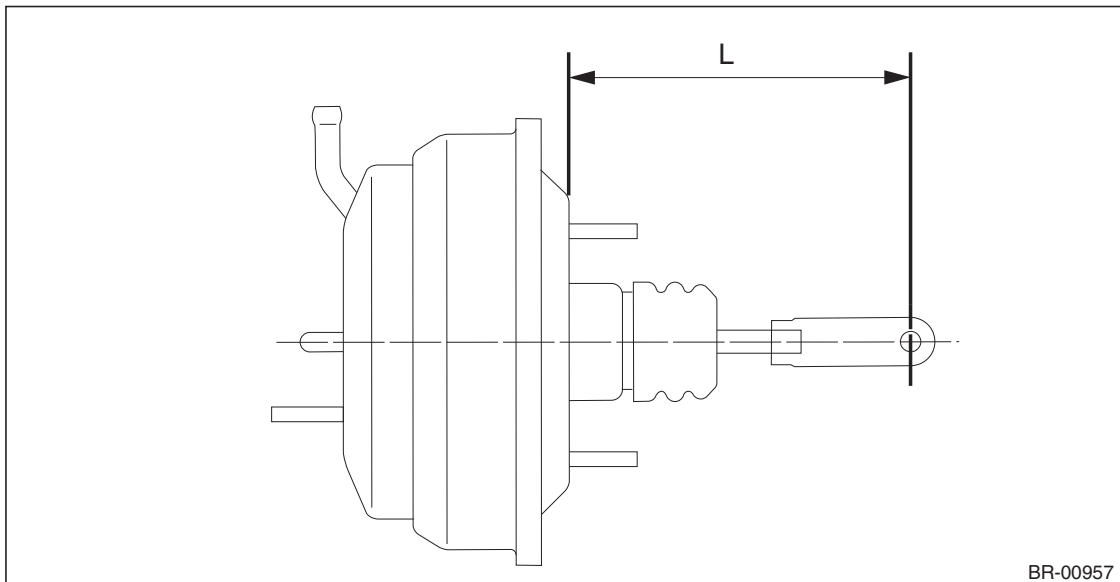
- (1) Remove the nuts, and then remove the vacuum booster assembly.



B: INSTALLATION

- 1) Check and adjust the operating rod of the vacuum booster assembly.
 - (1) Measure the length between the vacuum booster assembly mounting surface and clevis pin hole.
 - (2) If it is not within the specification, loosen the lock nut, rotate the vacuum booster assembly operating rod to adjust the rod length.

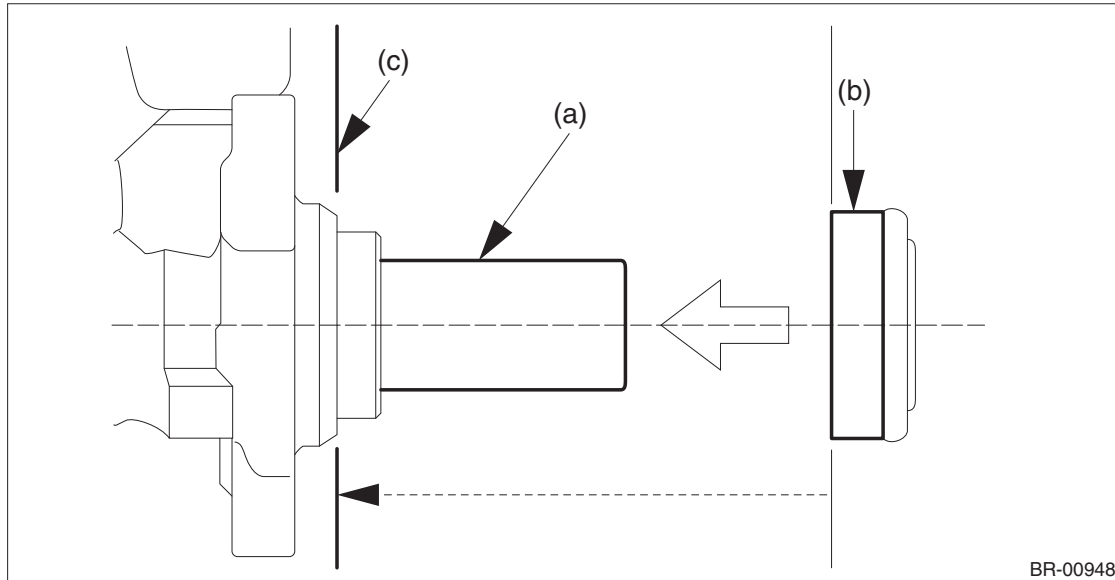
Specification L:
136.3 mm (5.37 in)



2) Install each part in the reverse order of removal.

CAUTION:

- Apply grease to the snap pin to prevent the operating rod from wear.
- Replace the clevis pin with new parts, and apply thin coat of NIGTIGHT LYW No. 2 grease to the clevis pin.
- When installing the master cylinder assembly, replace the seal sub assembly with a new part, and install it to the vacuum booster assembly.



(a) Primary piston

(b) Seal sub ASSY

(c) Install the seal sub ASSY to this surface.

Tightening torque:

Vacuum booster assembly: 18 N·m (1.84 kgf-m, 13.3 ft-lb)

Master cylinder assembly: 13 N·m (1.33 kgf-m, 9.6 ft-lb)

Operating lock nut: 22 N·m (2.24 kgf-m, 16.2 ft-lb)

Knee airbag module: 7.5 N·m (0.76 kgf-m, 5.5 ft-lb)

Brake Booster

BRAKE

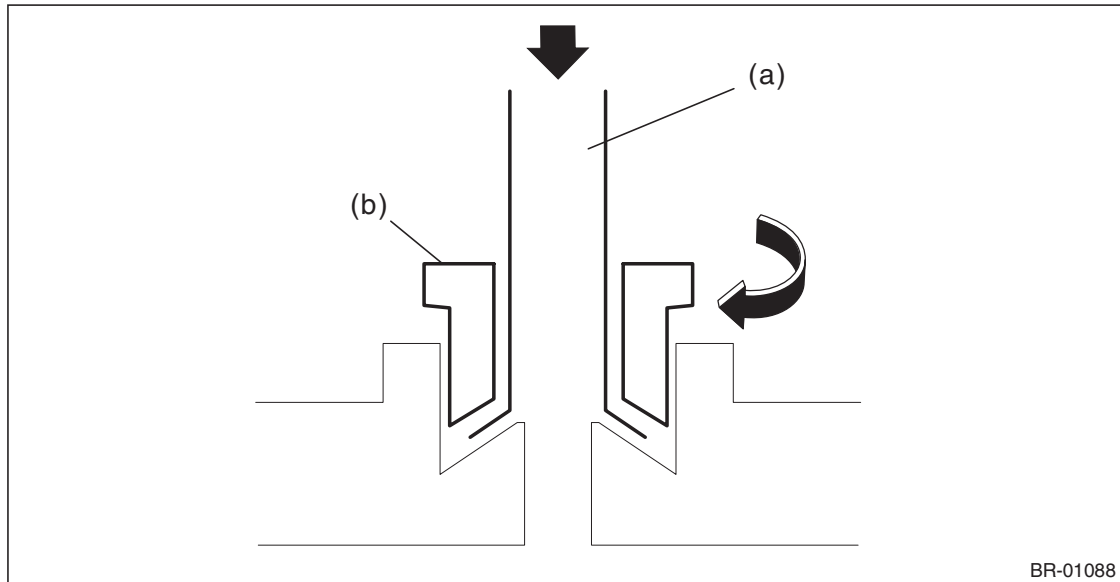
3) Turn and tighten the flare nut (b) by hand while pressing the brake pipe (a) toward the master cylinder assembly side.

CAUTION:

Be careful not to make scratches or other damage to the inside surface of the brake pipe flare.

Tightening torque:

Brake pipe flare nut: 19 N·m (1.94 kgf-m, 14.0 ft-lb)



4) Install the air conditioner pipe. <Ref. to AC-12, AIR CONDITIONING UNIT, COMPONENT, General Description.>

5) Bleed air from the brake system. <Ref. to BR-61, PROCEDURE, Air Bleeding.>

6) Perform a road test to make sure the brakes do not drag.

C: INSPECTION

1. OPERATION CHECK WHEN NOT USING MEASURING DEVICES

CAUTION:

When checking operation, be sure to apply the parking brake securely.

When an operation check is performed with no measuring devices, a faulty part cannot be identified correctly. But it is possible to identify the outline of the defect by performing the check according to the following procedures.

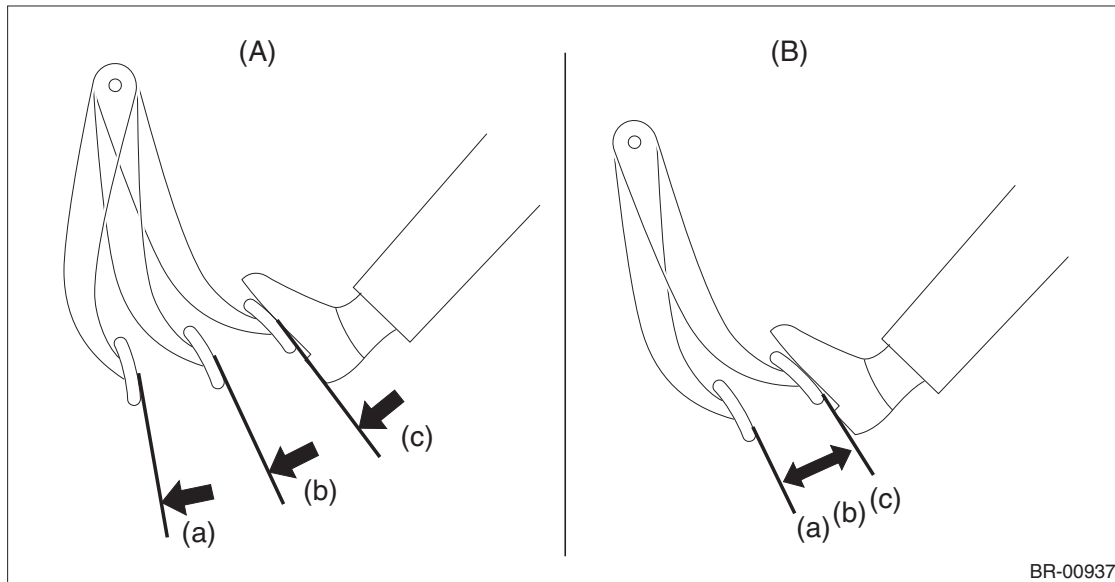
• Air tightness check

- 1) Start the engine, and idle it for 1 to 2 minutes, then turn it OFF.
- 2) Depress the brake pedal several times applying the normal pedal force.

NOTE:

The pedal stroke should be the longest at the 1st depression, and it should become shorter at each successive depression.

- 3) If no change occurs in the pedal height when pressed, the vacuum booster assembly is faulty.



(A) Normal

(B) Not OK

(a) 1st

(b) 2nd

(c) 3rd

NOTE:

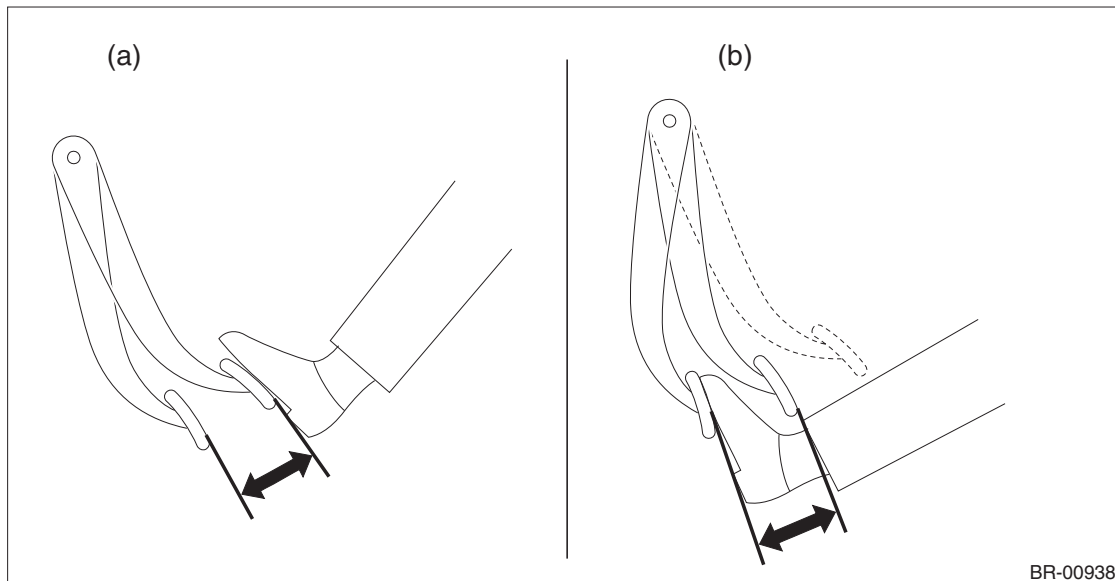
- In case of defective operation, inspect the condition of the check valve and vacuum hose as well.
- Replace them if faulty, and perform the test again.
- If no improvement is observed, check precisely with gauges.

Brake Booster

BRAKE

• Check operation

1) While the engine is OFF, depress the brake pedal several times applying the same pedal force, to check for a change in pedal height.



(a) When engine is stopped

(b) When engine is started

2) With the brake pedal depressed, start the engine.

3) As the engine starts, the brake pedal should move slowly toward the floor. If the pedal height does not change, the vacuum booster assembly is faulty.

NOTE:

If a faulty part is detected after inspection, check precisely with measuring devices.

• Loaded air tightness check

Depress the brake pedal while the engine is running, and turn the engine to OFF while the pedal is depressed.

Keep the pedal depressed for 30 seconds. If the pedal height does not change, the function of vacuum booster assembly is normal. If the pedal height increases, it is faulty.

NOTE:

If a faulty part is detected after inspection, check precisely with measuring devices.

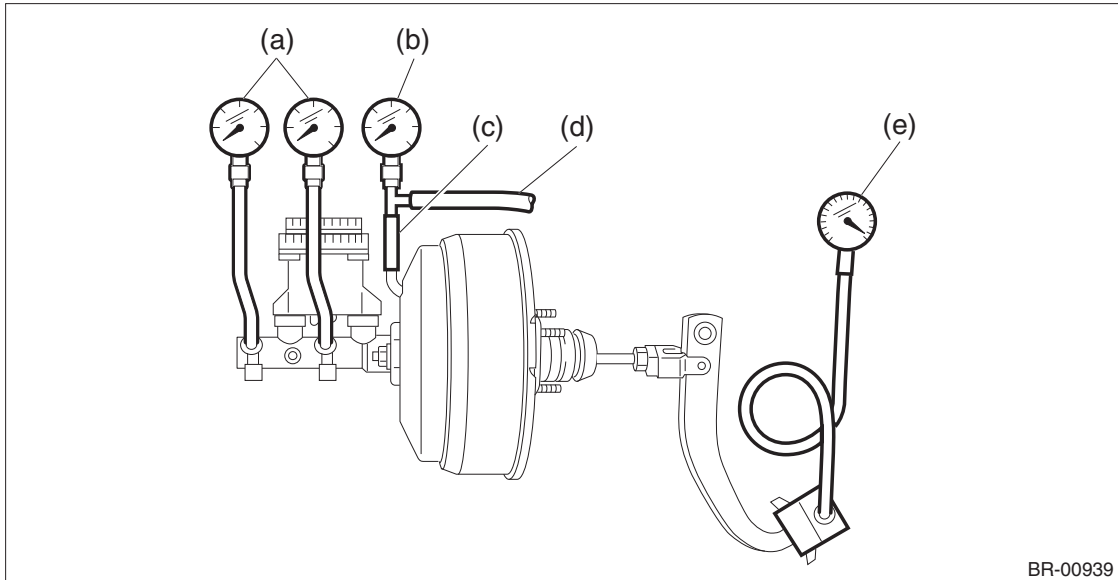
2. OPERATION CHECK WHEN USING MEASURING DEVICES

CAUTION:

When checking operation, be sure to apply the parking brake securely.

• Check with measuring devices

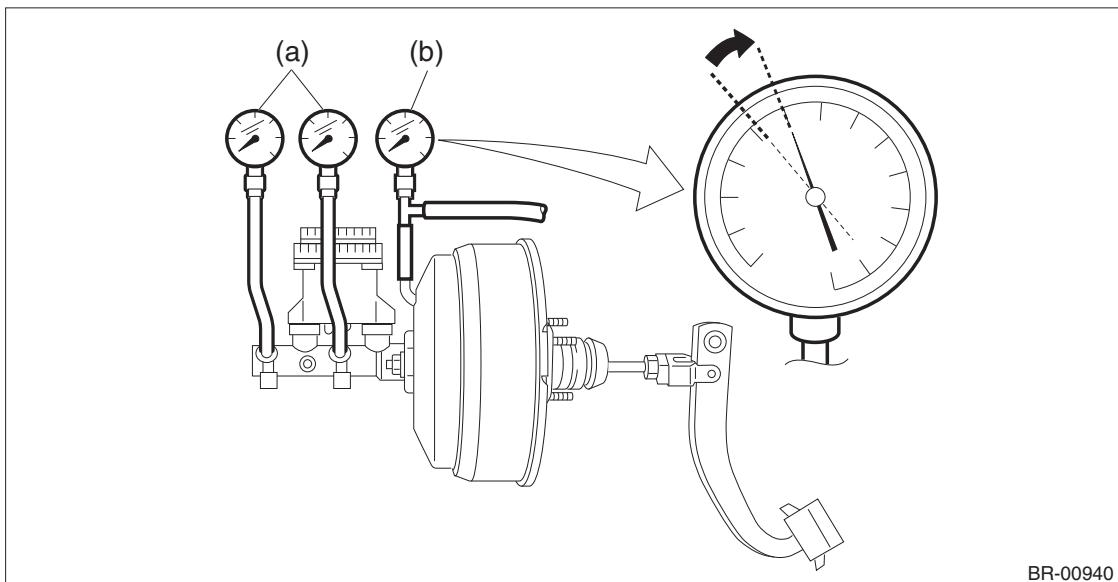
Connect a measuring device as shown in the figure. After bleeding air from the pressure gauge, perform each check.



- | | | |
|--------------------|------------------|-----------------------|
| (a) Pressure gauge | (c) Adapter hose | (e) Pedal force gauge |
| (b) Vacuum gauge | (d) Vacuum hose | |

• Air tightness check

1) Start the engine and keep it running at idle until vacuum pressure indicates 66.7 kPa (500 mmHg, 19.69 inHg) while the brake pedal is not depressed.



- | | |
|--------------------|------------------|
| (a) Pressure gauge | (b) Vacuum gauge |
|--------------------|------------------|

BRAKE

2) Stop the engine and check the vacuum pressure.

If the value matches the following standard, the vacuum booster assembly function is normal.

Vacuum pressure: standard

The range of vacuum pressure drop within 15 seconds after stopping the engine is 3.3 kPa (25 mmHg, 0.98 inHg) or less.

If a faulty part is detected after inspection, it may results from one of the following causes.

Brake Booster

BRAKE

3) Stop the engine and check the vacuum gauge.

If the value matches the following standard, the vacuum booster function is normal.

Vacuum pressure: standard

The range of vacuum pressure drop within 15 seconds after stopping the engine is 3.3 kPa (25 mmHg, 0.98 inHg) or less.

If a faulty part is detected after inspection, refer to "AIR TIGHTNESS CHECK".

<Ref. to BR-55, INSPECTION, Brake Booster.>

4) If the vacuum booster assembly is faulty, replace it with a new part.

• Lack of boost action check

1) Turn the engine OFF, and set the value of the vacuum gauge to "0".

2) Check the fluid pressure when the brake pedal is depressed. The pressure must be greater than the specification listed.

Brake pedal force: N (kgf, lbf)	147 (15, 33)	294 (30, 66)
Fluid pressure: kPa (kgf/cm ² , psi)	533 (5, 77)	1,551 (16, 225)

• Boosting action check

1) Set the vacuum gauge reading to 66.7 kPa (500 mmHg, 19.69 inHg) with the engine running.

2) Check the fluid pressure when the brake pedal is depressed. The pressure must be greater than the specification listed.

Brake pedal force: N (kgf, lbf)	147 (15, 33)	294 (30, 66)
Fluid pressure: kPa (kgf/cm ² , psi)	6,177 (63, 896)	11,273 (115, 1,635)



Brake Fluid

BRAKE

10.Brake Fluid

A: INSPECTION

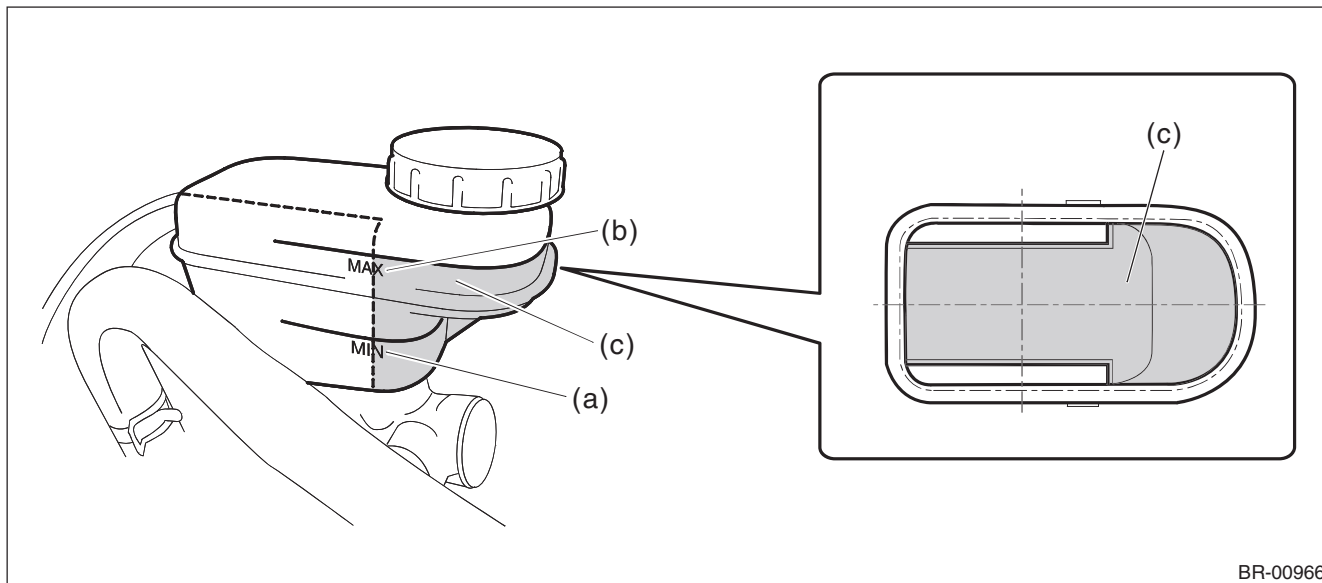
1) Check that the amount of brake fluid is between the lines of "MIN" (a) and "MAX" (b) from a straight view or within 90° to the right and left forward.

If out of the specified range, refill with brake fluid (c) or drain it.

If the brake fluid level is close to "MIN", check the brake pad for wear and refill with brake fluid.

CAUTION:

Always check the level using the specified direction because there is a partition in the reservoir tank.



BR-00966

2) Check the fluid for discoloration. If the fluid is extremely discolored, replace with the new fluid.

B: REPLACEMENT

CAUTION:

- Do not let brake fluid come into contact with the painted surface of the vehicle body. Wash away with water immediately and wipe off if it is spilled by accident.
- Avoid mixing brake fluid of different brands to prevent fluid performance from degrading.
- Be careful not to allow dirt or dust to enter the reservoir tank.

NOTE:

- During the operation, keep the reservoir tank filled with brake fluid to prevent entry of air.
- Operate the brake pedal slowly.
- For convenience and safety, perform the work with 2 people.
- The required amount of brake fluid is approximately 500 mL (16.9 US fl oz, 17.6 Imp fl oz) for the entire brake system.

1) Lift up the vehicle and set rigid racks at the specified locations, or keep the vehicle lifted.

2) Remove both the front and rear wheels.

3) Drain brake fluid from the reservoir tank.

4) Refill the reservoir tank with recommended brake fluid.

Recommended brake fluid:

FMVSS No. 116, DOT3 or DOT4

Perform the same procedure as for bleeding the brake line, until new brake fluid comes out from vinyl tube.

<Ref. to BR-61, PROCEDURE, Air Bleeding.>

11. Air Bleeding

A: PROCEDURE

CAUTION:

- Do not let brake fluid come into contact with the painted surface of the vehicle body. Wash away with water immediately and wipe off if it is spilled by accident.
- Avoid mixing brake fluid of different brands to prevent fluid performance from degrading.
- Be careful not to allow dirt or dust to enter the reservoir tank.
- The engine must not be running when bleeding the brake lines.
- For models with EyeSight, bleeding the brake lines while the engine is running may cause the EyeSight warning light to illuminate. If the EyeSight warning light illuminates, refer to "Basic Diagnostic Procedure" of "EyeSight (DIAGNOSTICS)" and check DTCs. <Ref. to ES(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>

1. MASTER CYLINDER

NOTE:

- When the master cylinder assembly is replaced or the reservoir tank is empty, bleed the brake master cylinder and the clutch master cylinder (MT model).
- If bleeding of the master cylinder assembly is not necessary, omit the following procedures, and perform bleeding of the brake line. <Ref. to BR-63, BRAKE LINE, PROCEDURE, Air Bleeding.>

1) Add the brake fluid to the reservoir tank of the master cylinder assembly.

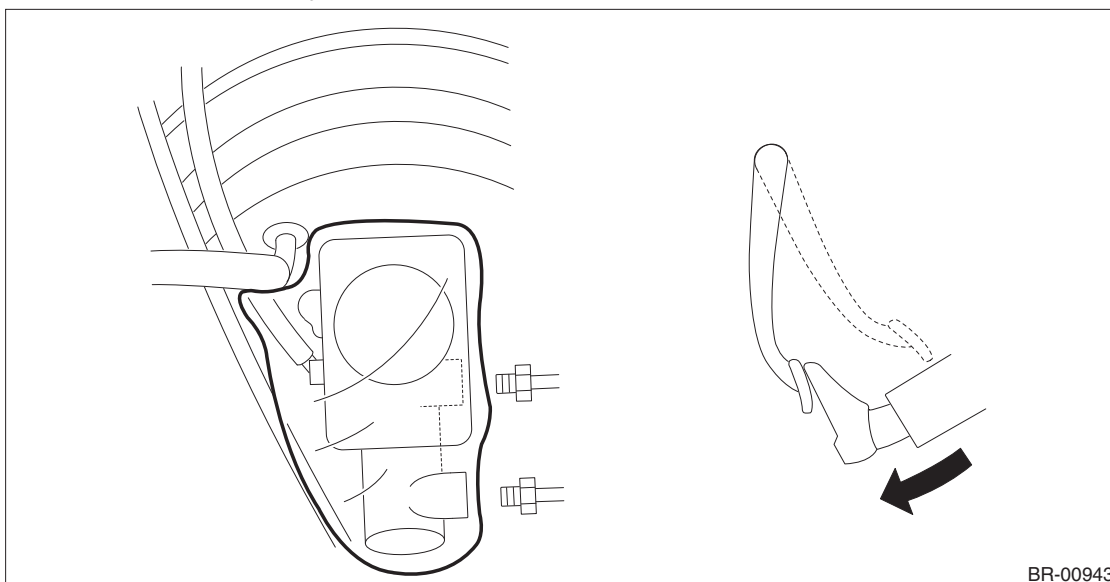
NOTE:

- MT model: Add the brake fluid until it flows out from the clutch hose nipple.
- Except for MT model: Add the brake fluid up to the "MAX" level.
- While bleeding air, keep the reservoir tank filled with brake fluid at MIN level or higher to prevent entry of air.

2) Disconnect the brake line at primary and secondary sides.

3) Wrap the master cylinder assembly with a plastic bag.

4) Depress the brake pedal slowly and hold it.

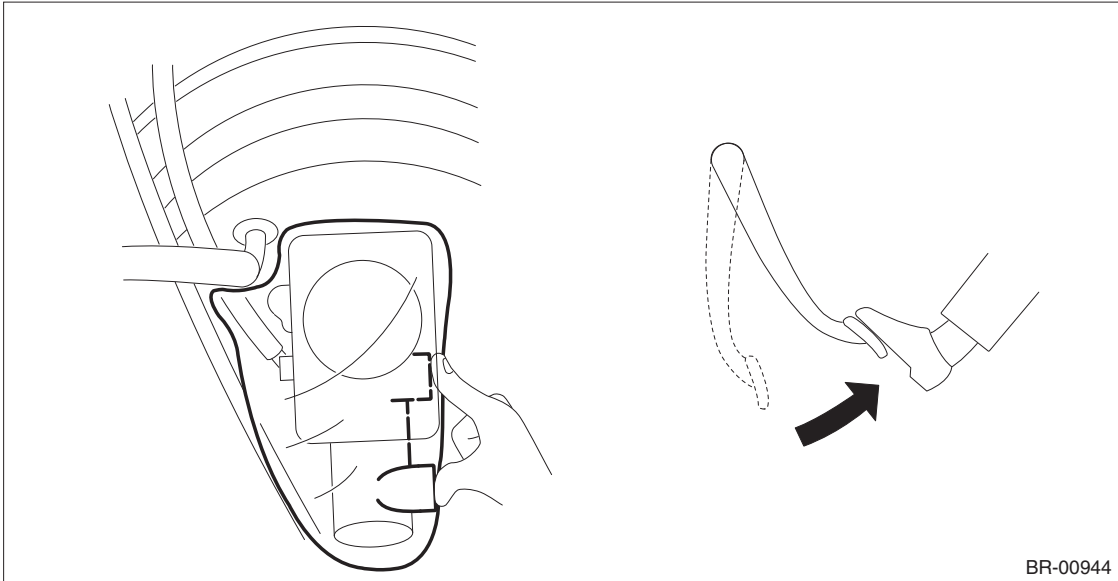


BR-00943

Air Bleeding

BRAKE

- 5) Plug the outlet plug with your finger, and then release the brake pedal.



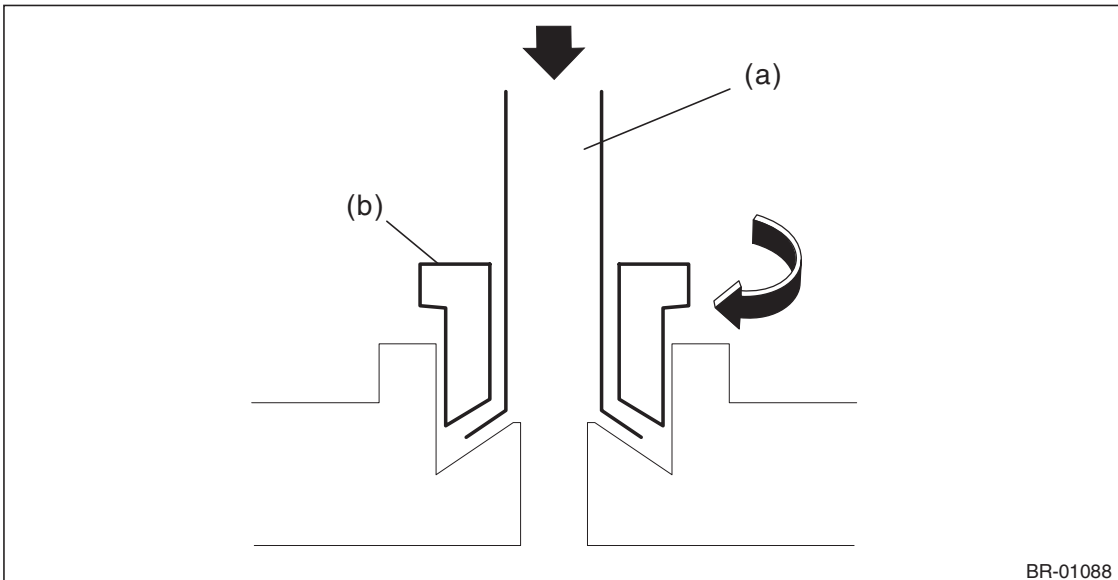
- 6) Repeat the step 4) and 5) several times.
7) Remove the plastic bag.
8) Turn and tighten the flare nut (b) by hand while pressing the brake pipe (a) toward the master cylinder assembly side.

CAUTION:

Be careful not to make scratches or other damage to the inside surface of the brake pipe flare.

Tightening torque:

Brake pipe flare nut: 19 N·m (1.94 kgf-m, 14.0 ft-lb)



- 9) Bleed air from the brake line. <Ref. to BR-63, BRAKE LINE, PROCEDURE, Air Bleeding.>

2. BRAKE LINE

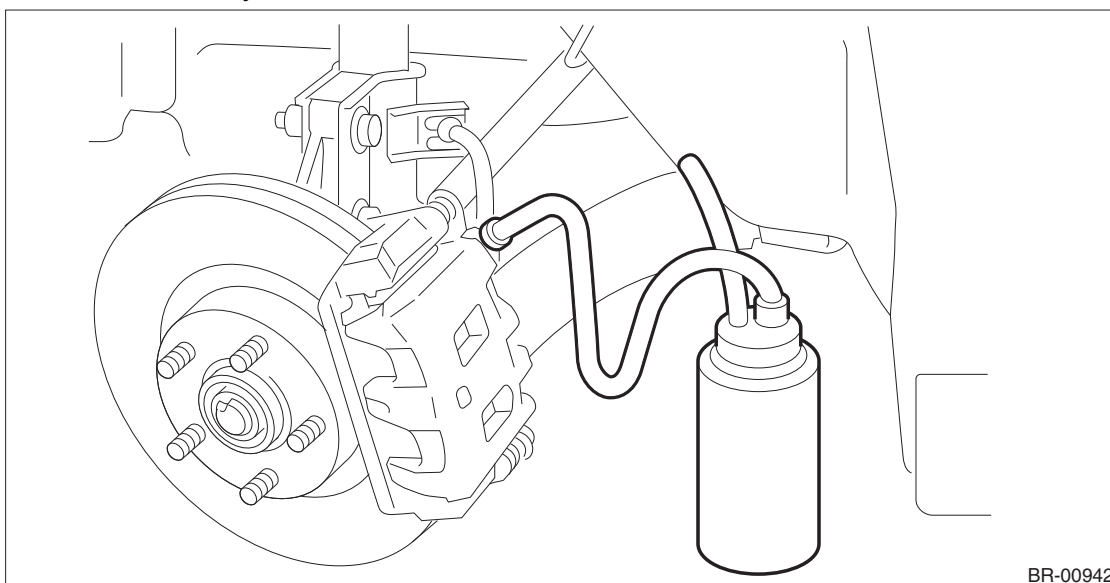
1) When the master cylinder assembly is replaced or the reservoir tank is empty, bleed the master cylinder assembly before bleeding the brake line. <Ref. to BR-61, MASTER CYLINDER, PROCEDURE, Air Bleeding.>

2) Fill the reservoir tank of the master cylinder assembly with brake fluid.

NOTE:

While bleeding air, keep the reservoir tank filled with brake fluid to prevent entry of air.

3) Attach one end of the vinyl tube to the bleeder - screw and the other end to the brake fluid container.



4) Depress the brake pedal several times, and hold it.

5) Loosen the bleeder - screw to drain brake fluid. Tighten the bleeder - screw quickly, and release the brake pedal.

6) Repeat the steps 4) to 5) until there are no more air bubbles in the vinyl tube.

7) Repeat the steps from 2) to 6) above to bleed air from each wheel.

NOTE:

Perform air bleed starting in the order from the farthest wheel cylinder from the master cylinder assembly.

8) Securely tighten the bleeder - screw.

Tightening torque:

Bleeder - screw: 8 N·m (0.82 kgf-m, 5.9 ft-lb)

9) Check that there are no brake fluid leaks in the entire brake system.

10) Check the pedal stroke.

(1) Warm up the engine until the engine speed stabilizes.

(2) Depress and hold the brake pedal with a force of 500 N (51 kgf, 112 lbf).

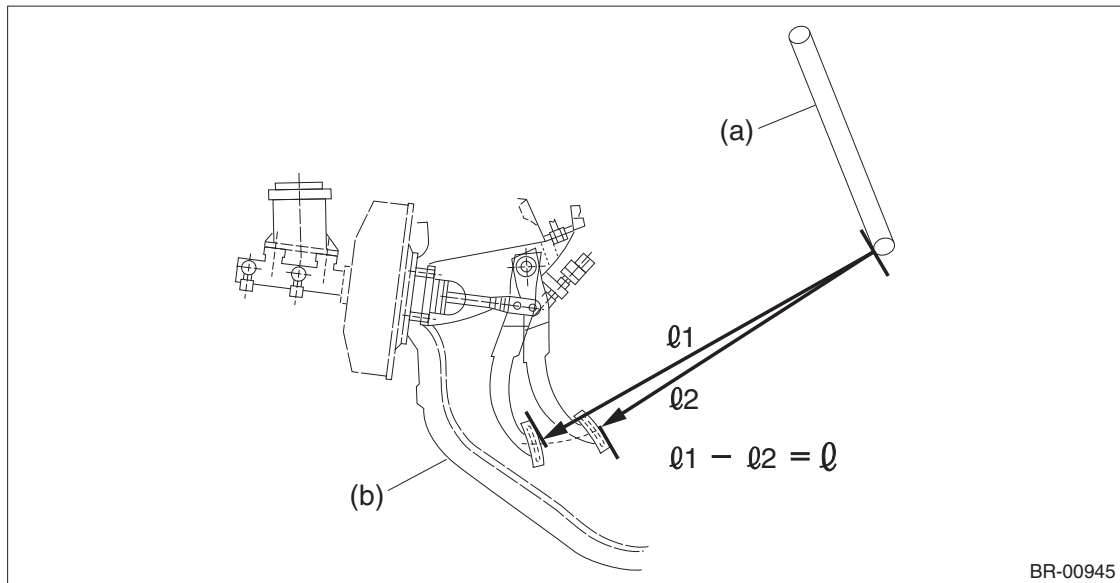
(3) Adjust the tilt position of the steering wheel to the lowest position.

(4) Measure the distance between brake pedal and steering wheel.

Air Bleeding

BRAKE

- (5) Release the pedal, and measure the distance between pedal and steering wheel again.



(a) Steering wheel

(b) Toe board

Specification of pedal stroke:

110 mm (4.33 in) or less when depressing the pedal with a force of 500 N (51 kgf, 112 lbf)

11) If the distance is more than specification, there is a possibility of air being caught in the brake line. Bleed the brake line of all air until the pedal stroke meets the specification.

12) Operate the hydraulic control unit in the sequence control mode. <Ref. to VDC-24, ABS Sequence Control.>

13) Check the pedal stroke again.

14) If the distance is more than specification, there is a possibility of air being caught in the hydraulic unit. Repeat above steps 2) to 9) until the pedal stroke meets the specification.

15) Fill the reservoir tank with brake fluid up to the "MAX" level.

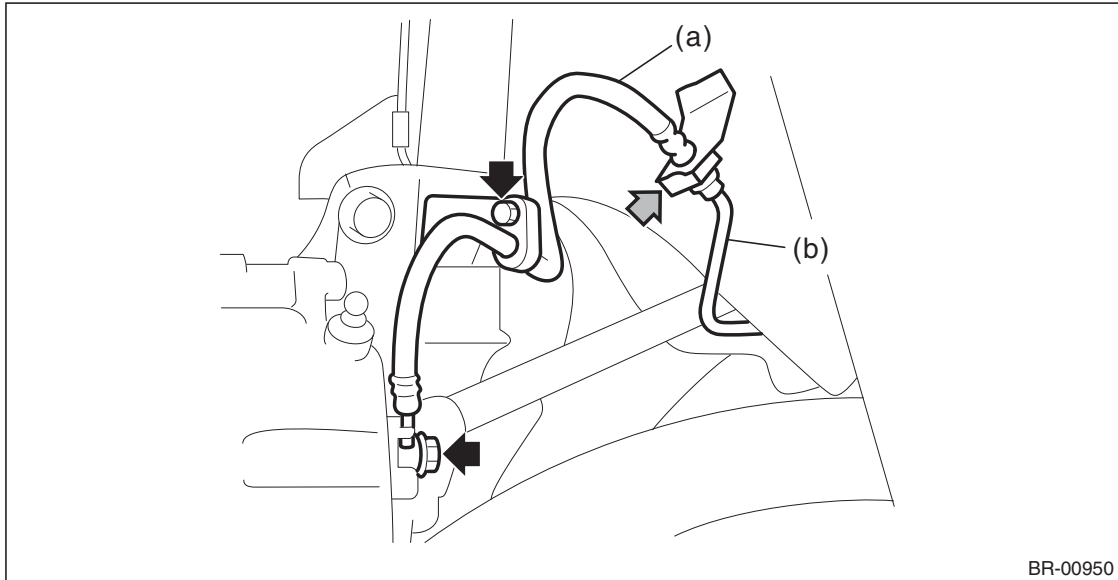
16) Perform a road test and ensure that the brakes operate normally.

12.Brake Hose

A: REMOVAL

1. FRONT BRAKE HOSE

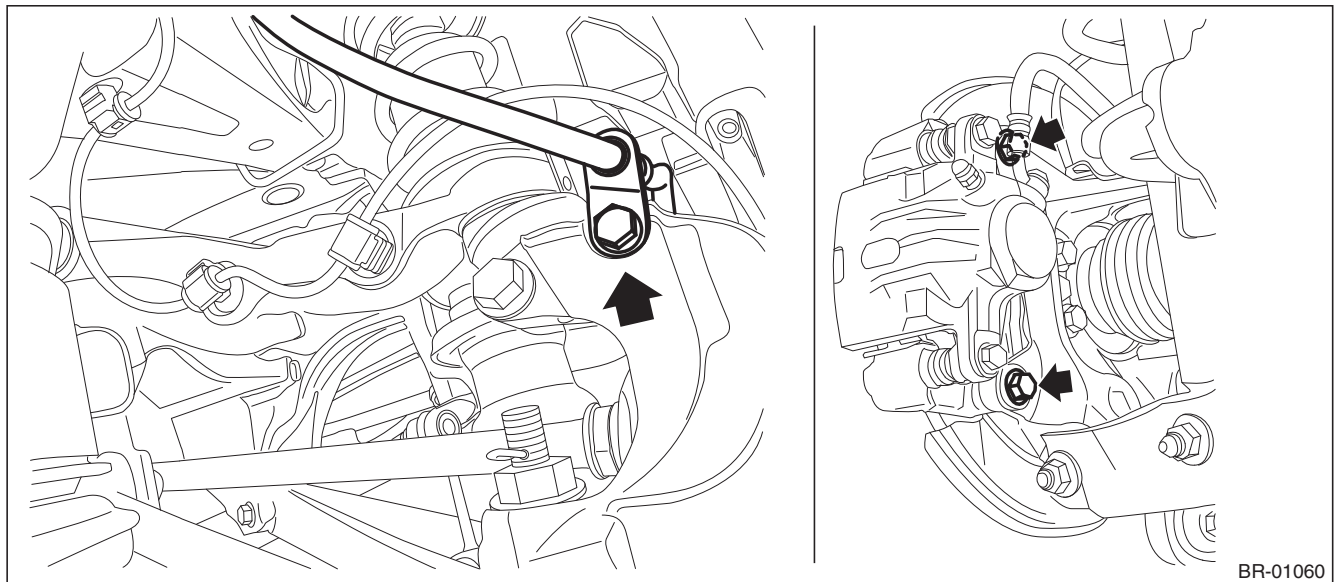
- 1) Separate the brake pipe (b) from brake hose (a) using a flare nut wrench.
- 2) Remove the clamp, strut mounting bolt and union bolt, and remove the front brake hose.



BR-00950

2. REAR BRAKE HOSE

- 1) Remove the brake hose bracket bolt and union bolt.



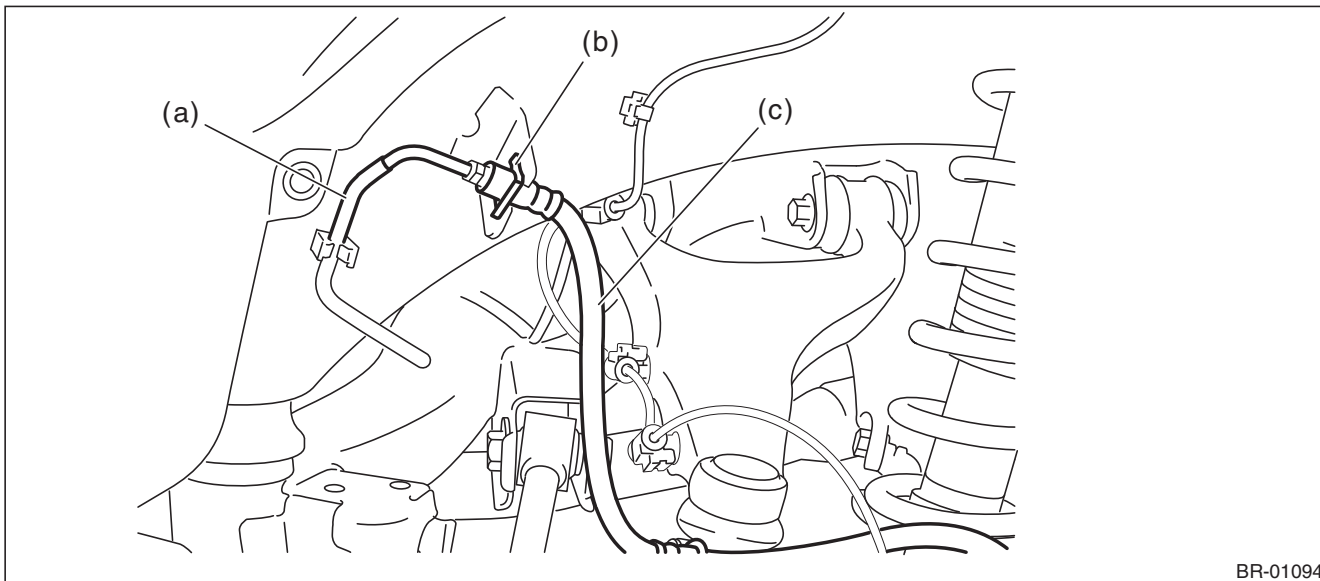
BR-01060

- 2) Press and separate the brake pipe (a) using a flare nut wrench.

Brake Hose

BRAKE

3) Remove the brake hose clamp (b), and remove the rear brake hose (c).



B: INSTALLATION

1. FRONT BRAKE HOSE

1) Secure the brake hose to strut mount.

Tightening torque:

Brake hose: 33 N·m (3.36 kgf-m, 24.3 ft-lb)

2) Connect the brake hose to the front caliper body assembly using a new gasket.

Tightening torque:

Union bolt: 18 N·m (1.84 kgf-m, 13.3 ft-lb)

3) Position the disc in straight position and route the brake hose through the hole in the bracket on the wheel apron side.

CAUTION:

Do not twist the brake hose.

4) Temporarily tighten the flare nut which connects brake pipe and hose.

5) Secure the brake hose to wheel apron bracket with clamp.

Brake Hose

BRAKE

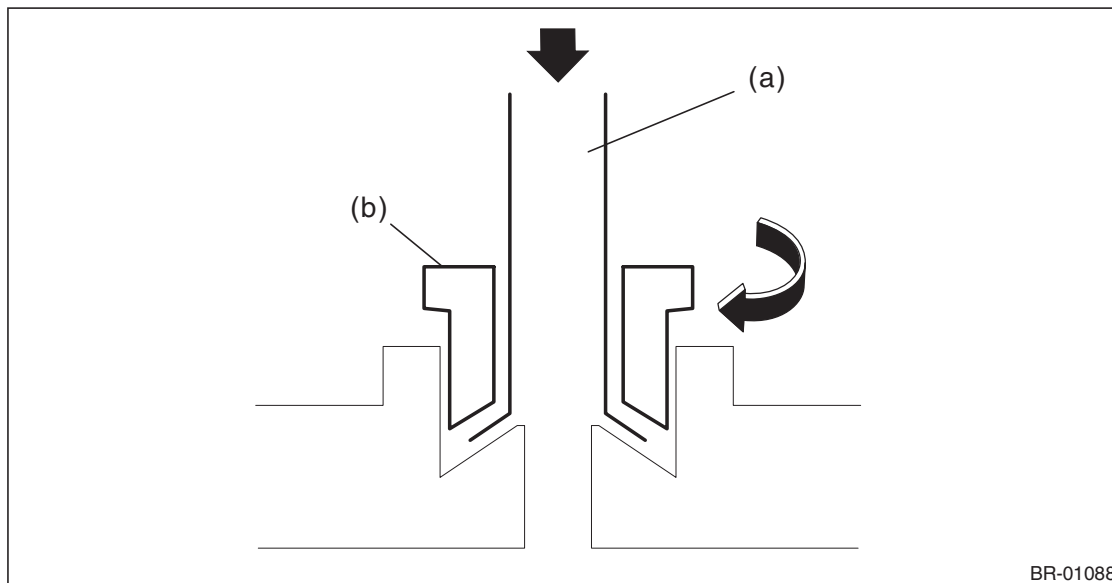
6) Turn and tighten the flare nut (b) by hand while pressing the brake pipe (a) toward the master cylinder assembly side.

CAUTION:

Be careful not to make scratches or other damage to the inside surface of the brake pipe flare.

Tightening torque:

Brake pipe flare nut: 19 N·m (1.94 kgf-m, 14.0 ft-lb)



7) Bleed air from the brake system. <Ref. to BR-61, PROCEDURE, Air Bleeding.>

2. REAR BRAKE HOSE

- 1) Route the brake hose through the hole of bracket, and lightly tighten the flare nut to connect brake pipe.
- 2) Insert the clamp to secure brake hose.

Tightening torque:

Brake hose bracket: 33 N·m (3.36 kgf-m, 24.3 ft-lb)

- 3) Install the brake hose to rear caliper body using a new gasket.

Tightening torque:

Union bolt: 18 N·m (1.84 kgf-m, 13.3 ft-lb)

- 4) Tighten the flare nut to the specified torque.

Tightening torque:

Brake pipe flare nut: 15 N·m (1.53 kgf-m, 11.1 ft-lb)

- 5) Bleed air from the brake system. <Ref. to BR-61, PROCEDURE, Air Bleeding.>

C: INSPECTION

Check the hose for crack, interference with other parts, damage, and fluid leakage on connecting sections. If any faulty is found, repair or replace the relevant part.

Brake Pipe

BRAKE

13.Brake Pipe

A: REMOVAL

CAUTION:

- Yellow connectors and harnesses with yellow tapes around them are the connectors and harnesses for the airbag system. Using a tester above such circuits may cause malfunction of airbag system. Follow the cautions for "AIRBAG SYSTEM" in this case. <Ref. to AB-9, CAUTION, General Description.>
- Be careful not to damage the airbag system wiring harness when servicing the center brake pipe.
- When removing the brake pipe, do not bend.

NOTE:

The airbag system wiring harness is routed near the center brake pipe.

B: INSTALLATION

CAUTION:

- Yellow connectors and harnesses with yellow tapes around them are the connectors and harnesses for the airbag system. Using a tester above such circuits may cause malfunction of airbag system. Follow the cautions for "AIRBAG SYSTEM" in this case. <Ref. to AB-9, CAUTION, General Description.>
- Be careful not to damage the airbag system wiring harness when servicing the center brake pipe.
- When installing the brake pipe, do not bend.
- After installing the brake pipe and hose, perform air bleed.
- After installing the brake hoses, make sure that they do not contact the tires or suspension assembly, etc.

NOTE:

The airbag system wiring harness is routed near the center brake pipe.

Tightening torque:

Front brake pipes & hoses: <Ref. to BR-7, FRONT BRAKE PIPES AND HOSES, COMPONENT, General Description.>

Center & rear brake pipes and hoses: <Ref. to BR-9, CENTER AND REAR BRAKE PIPES AND HOSES, COMPONENT, General Description.>

C: INSPECTION

Check the pipe for crack and damage, and also check the connection for fluid leakage. If any faulty is found, repair or replace the relevant part.

NOTE:

Use a mirror when inspecting back sides and other locations which are hard to see.

14.Brake Pedal

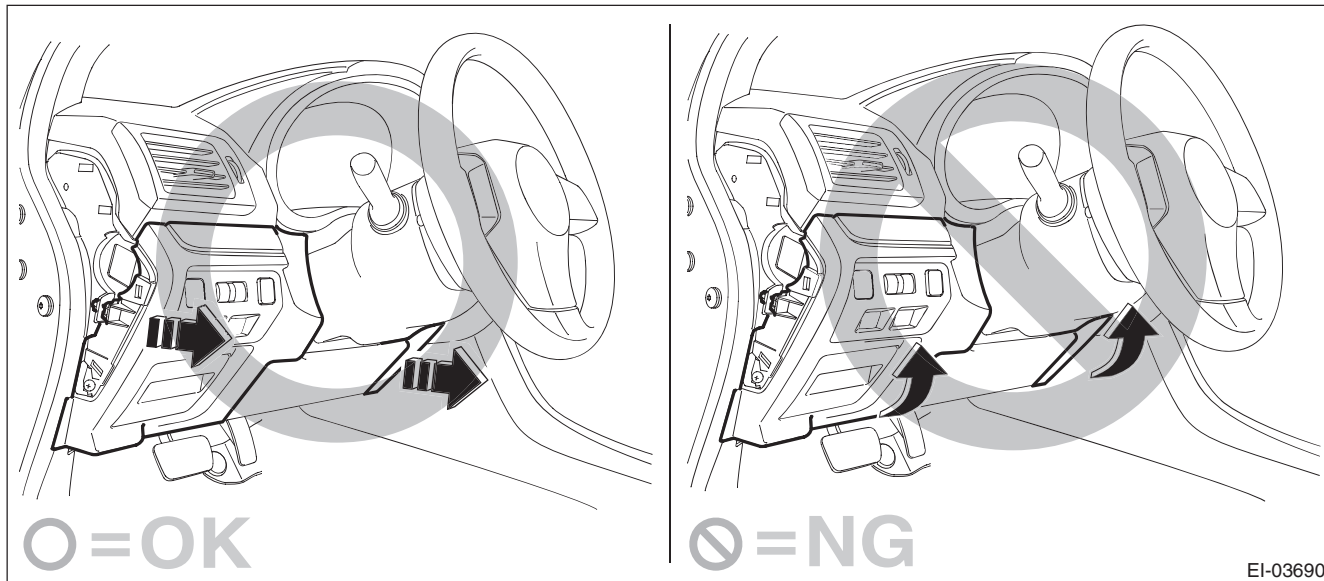
A: REMOVAL

1. CVT MODEL

- 1) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work.
- 2) Remove the cover assembly - instrument panel LWR driver.

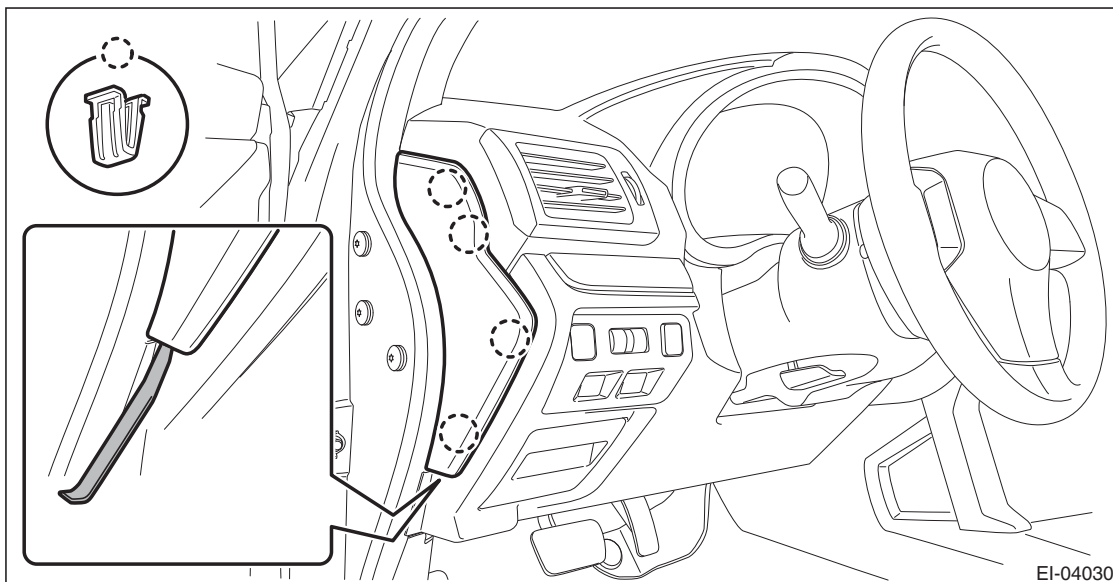
CAUTION:

When removing the cover assembly - instrument panel LWR driver, be sure to pull it toward you. If attempting to remove by turning it upward, the claws may be damaged.



EI-03690

- (1) Remove the clips, and remove the cover - instrument panel side LH.



EI-04030

NOTE:

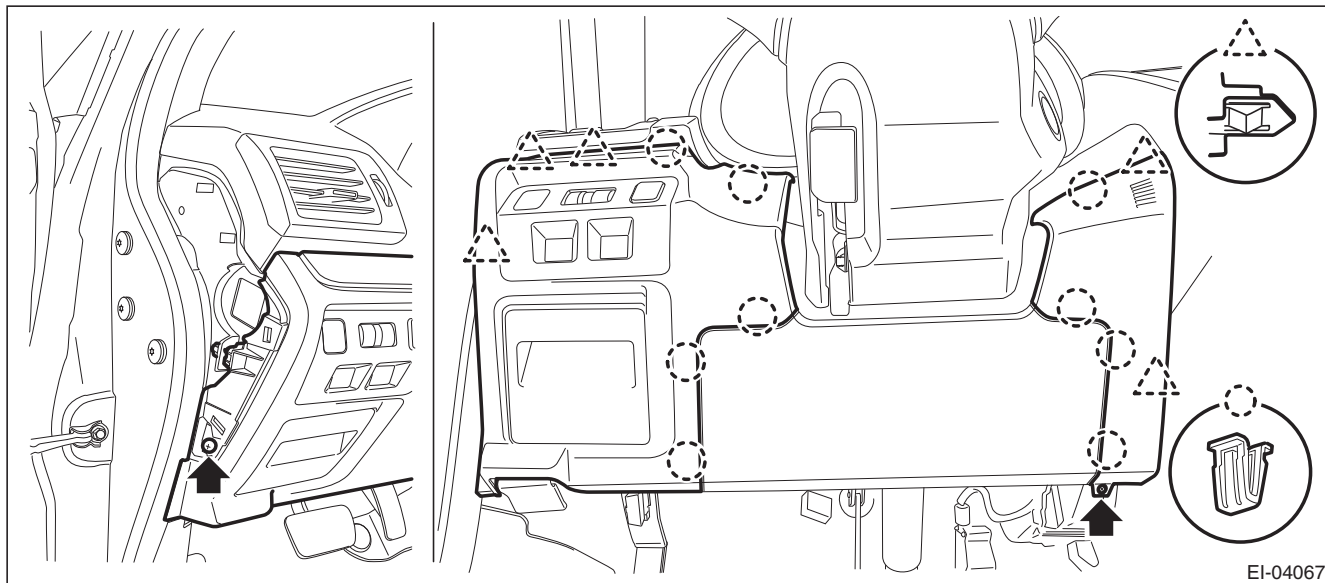
Using a plastic remover, open the cover - instrument panel side LH.

- (2) Remove the screws and release the clips and claws.

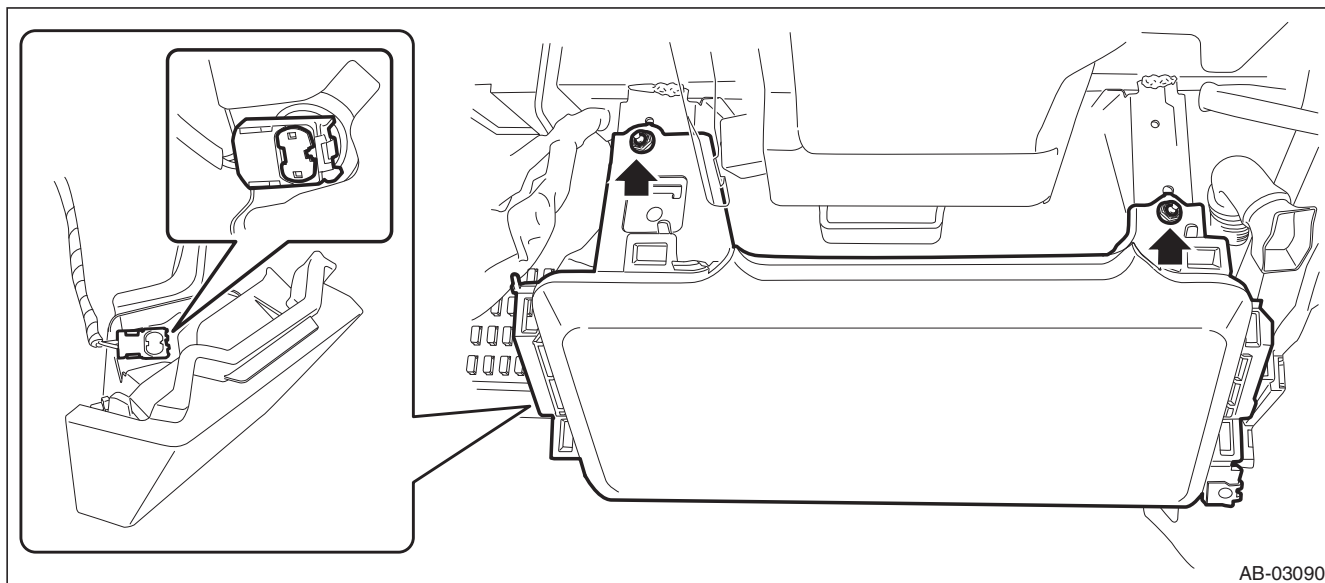
Brake Pedal

BRAKE

- (3) Disconnect the harness connectors, and remove the cover assembly - instrument panel LWR driver INN and OUT.



- 3) Remove the nuts to remove the knee airbag module and disconnect the harness connector. <Ref. to AB-21, DRIVER'S AIRBAG MODULE, KNEE AIRBAG MODULE, CURTAIN AIRBAG MODULE AND PRETENSIONER, PROCEDURE, Airbag Connector.>



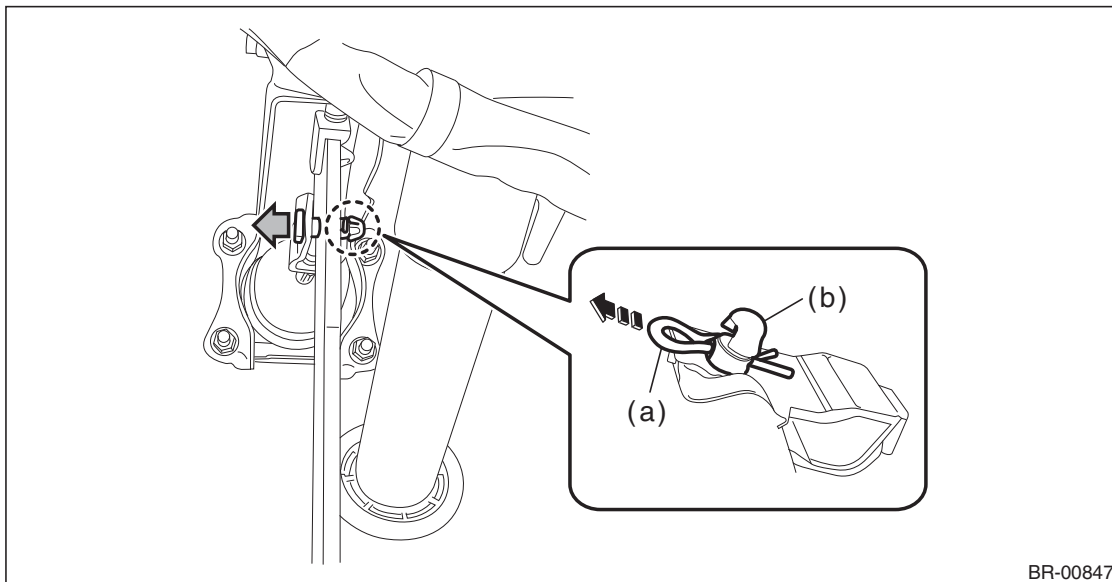
Brake Pedal

BRAKE

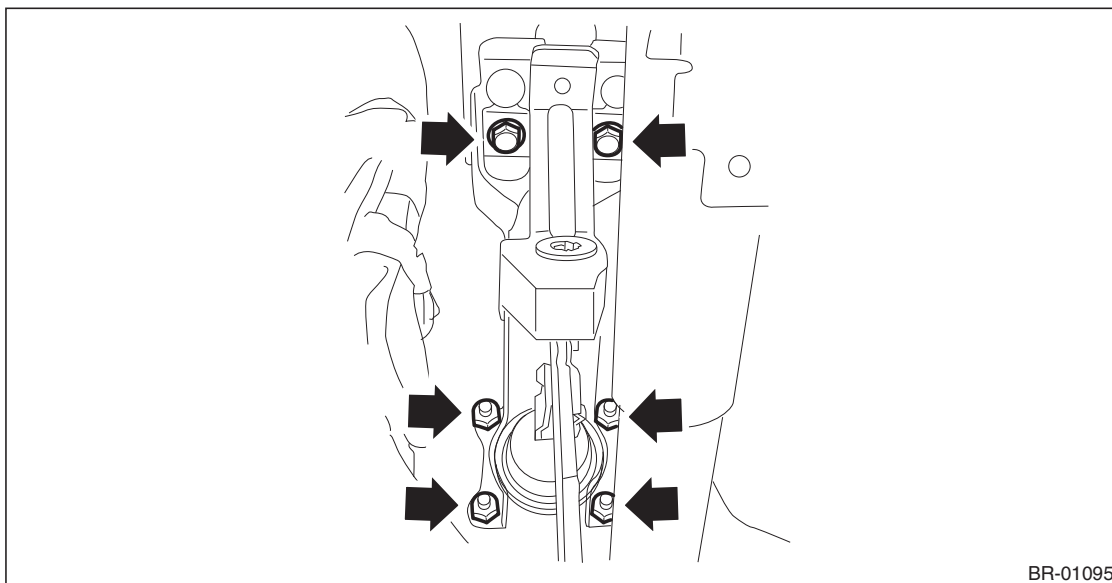
- 4) Remove the brake pedal assembly.
 - (1) Disconnect the switch - stop light connector.
 - (2) Remove the snap pin (a) and clevis pin (b), and remove the operating rod from the brake pedal.

CAUTION:

- Be careful not to apply excessive force to the operating rod when handling the operating rod. The angle may change by $\pm 3^\circ$, and it may result in damage to power piston cylinder.
- Do not change the push rod length.



- (3) Remove the bolt and nut, and then detach the brake pedal assembly.



2. MT MODEL

NOTE:

Brake pedal is integrated with the clutch pedal.

For removal procedures of the brake pedal, refer to Clutch section. <Ref. to CL-25, REMOVAL, Clutch Pedal.>

Brake Pedal

BRAKE

B: INSTALLATION

1) Install each part in the reverse order of removal.

CAUTION:

- Apply grease to the snap pin to prevent the operating rod from wear.
- Replace the clevis pin with new parts, and apply thin coat of NIGTIGHT LYW No. 2 grease to the clevis pin.

Tightening torque:

Brake pedal: 18 N·m (1.84 kgf-m, 13.3 ft-lb)

Knee airbag module: 7.5 N·m (0.76 kgf-m, 5.5 ft-lb)

2) Check that the brake light operate properly.

3) Check the brake pedal after installation. <Ref. to BR-72, INSPECTION, Brake Pedal.>

C: INSPECTION

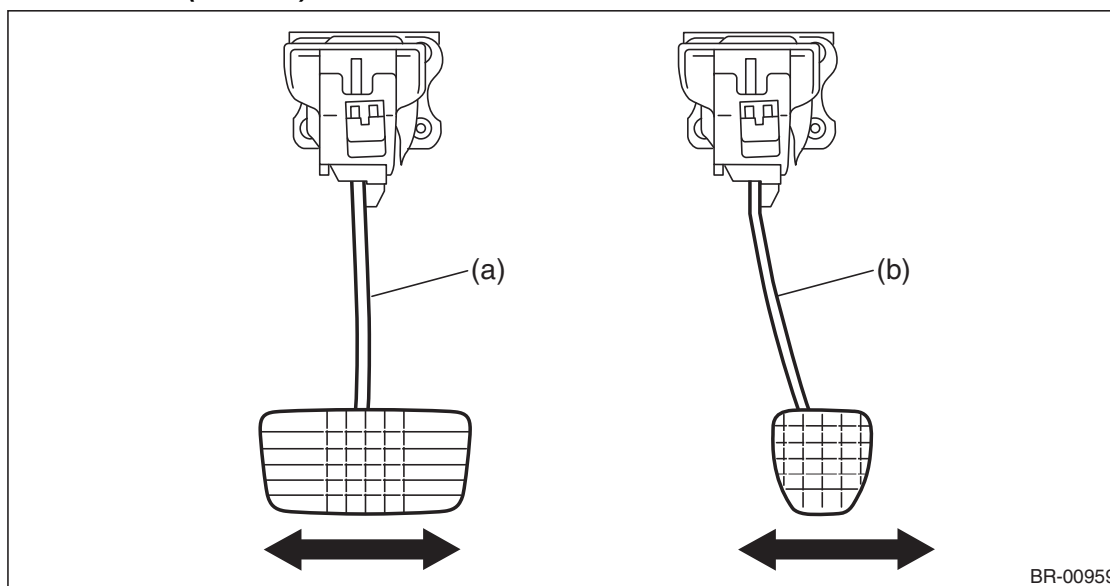
1) Move the pad - brake pedal in a horizontal direction with a force of approx. 10 N (1 kgf, 2 lbf), and check that the pedal deflection is in the range of specifications.

CAUTION:

If excessive deflection is noted, replace with a new bushing.

Deflection of brake pedal:

Wear limit: 5.0 mm (0.197 in) or less



(a) Brake pedal (except for MT model) (b) Brake pedal (MT model)

Brake Pedal

BRAKE

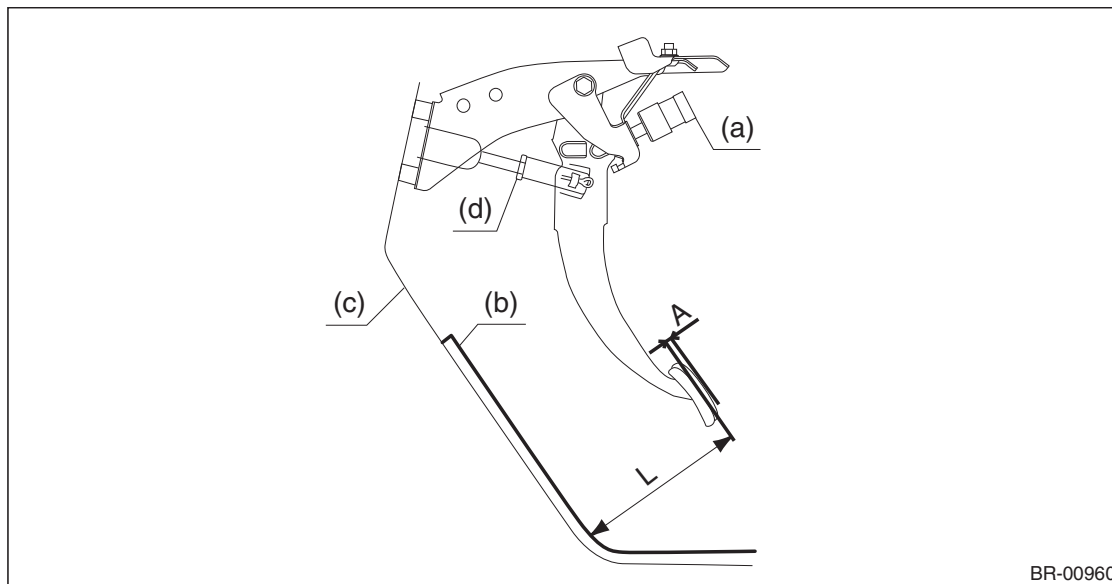
2) Check the position of the pedal pad.

Pedal height L:

140 — 150 mm (5.51 — 5.91 in)

Brake pedal free play A:

0.5 — 2 mm (0.020 — 0.079 in) [When pulling the brake pedal upward with a force of less than 10 N (1 kgf, 2 lbf).]



(a) Switch - stop light

(c) Toe board

(d) Brake booster operating rod

(b) Mat

3) If it is not within the specification, loosen the lock nuts of vacuum booster operating rod, and rotate the rod to adjust the pedal height L within the specification.

4) Tighten the lock nut.

Tightening torque:

Operating lock nut: 22 N·m (2.24 kgf-m, 16.2 ft-lb)

NOTE:

Check the brake pedal height. When adjusting, also adjust the switch - stop light.

Stop Light Switch

BRAKE

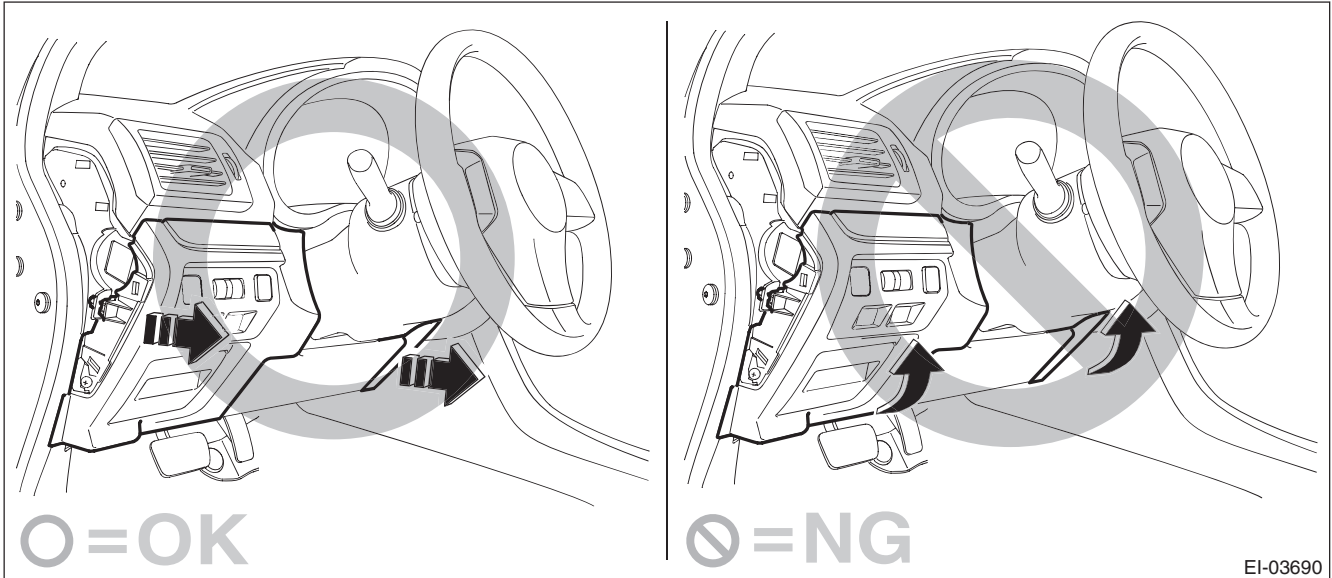
15. Stop Light Switch

A: REMOVAL

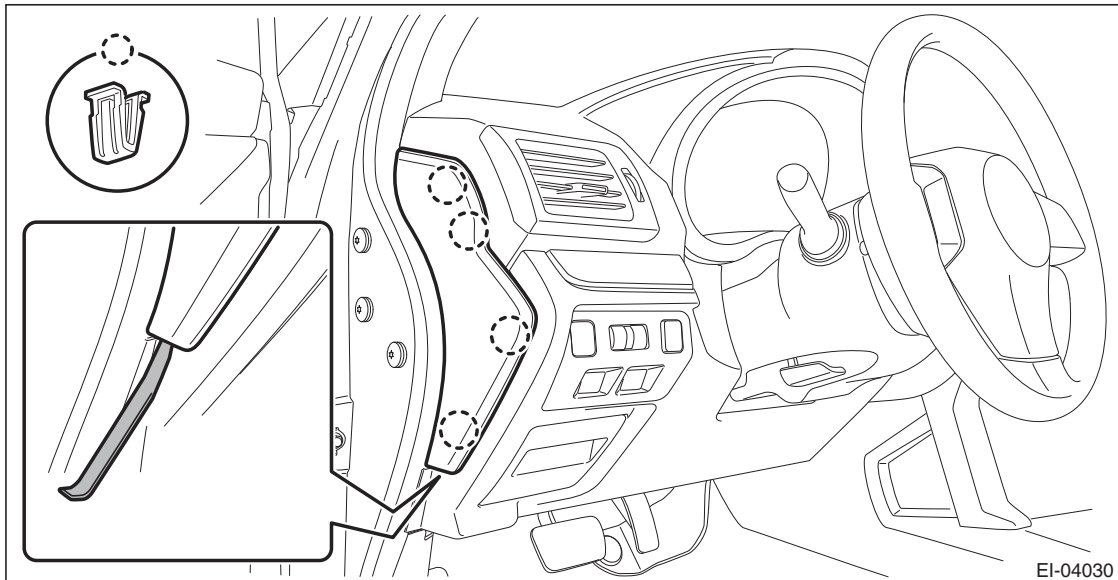
- 1) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work.
- 2) Remove the cover assembly - instrument panel LWR driver.

CAUTION:

When removing the cover assembly - instrument panel LWR driver, be sure to pull it toward you. If attempting to remove by turning it upward, the claws may be damaged.



- (1) Remove the clips, and remove the cover - instrument panel side LH.



NOTE:

Using a plastic remover, open the cover - instrument panel side LH.

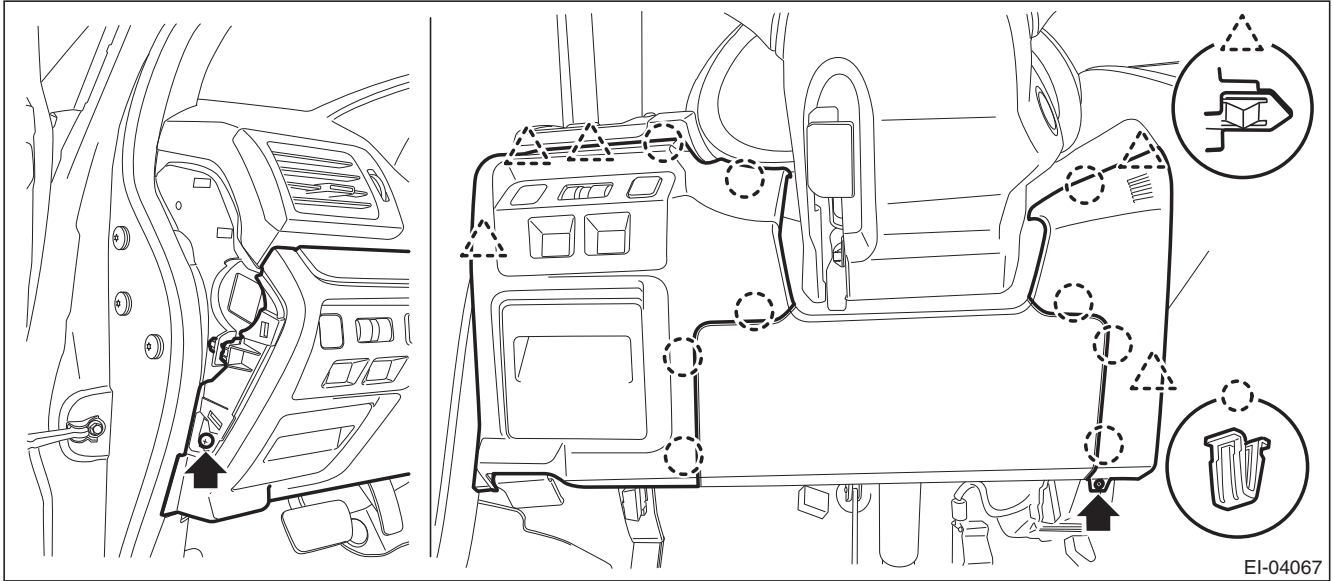
- (2) Remove the screws and release the clips and claws.



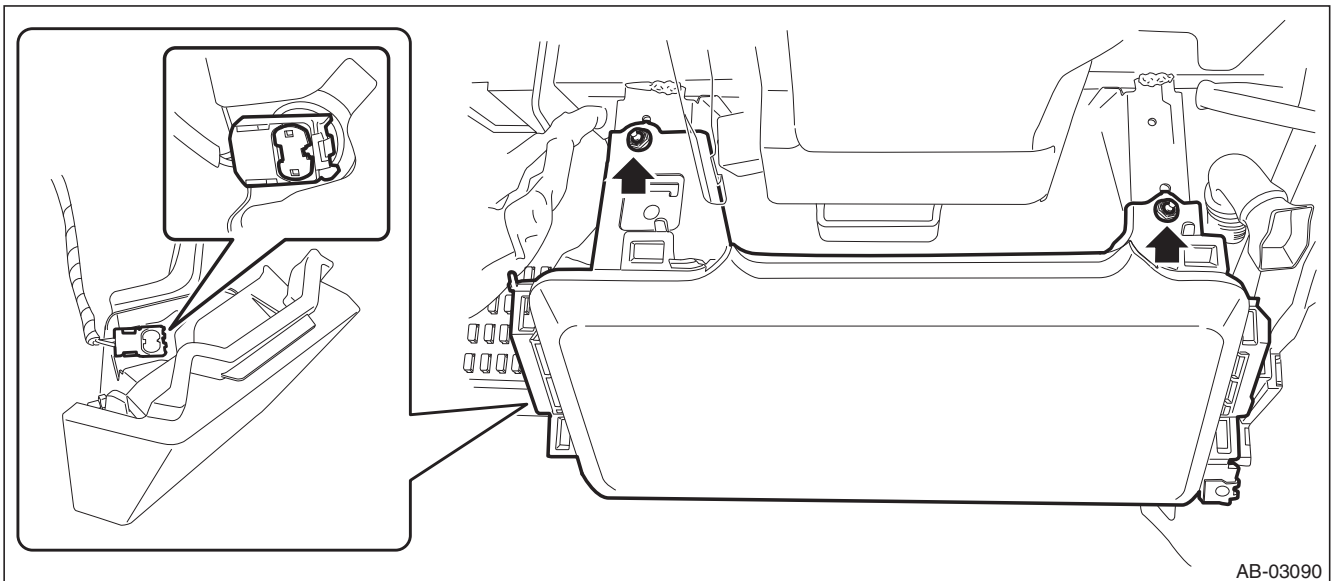
Stop Light Switch

BRAKE

(3) Disconnect the harness connectors, and remove the cover assembly - instrument panel LWR driver INN and OUT.



3) Remove the nuts to remove the knee airbag module and disconnect the harness connector. <Ref. to AB-21, DRIVER'S AIRBAG MODULE, KNEE AIRBAG MODULE, CURTAIN AIRBAG MODULE AND PRETENSIONER, PROCEDURE, Airbag Connector.>

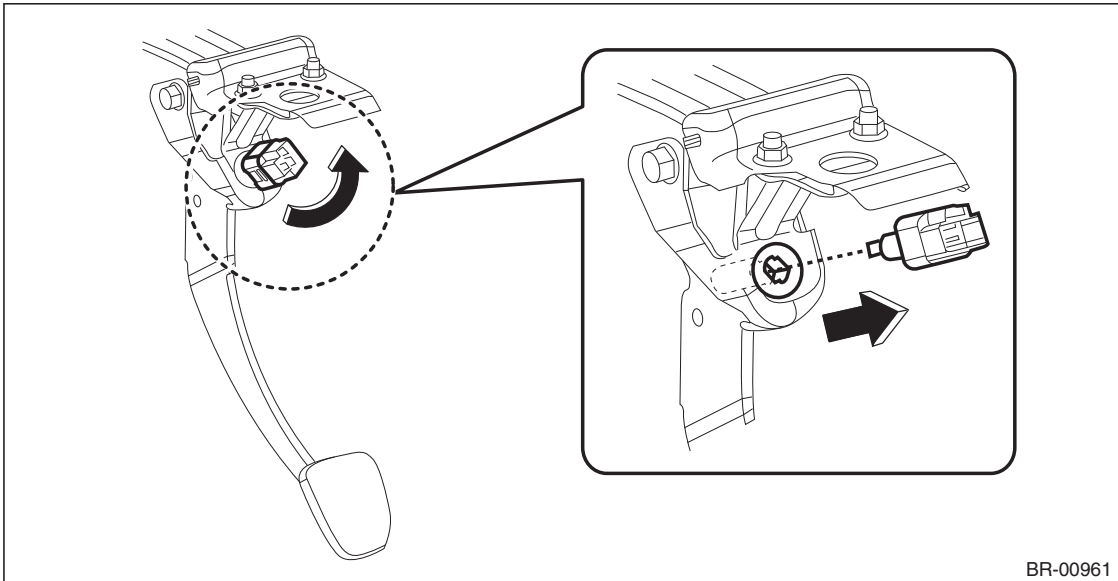


Stop Light Switch

BRAKE

4) Remove the switch - stop light.

- (1) Disconnect the switch - stop light connector.
- (2) Remove the switch - stop light by turning it counterclockwise.



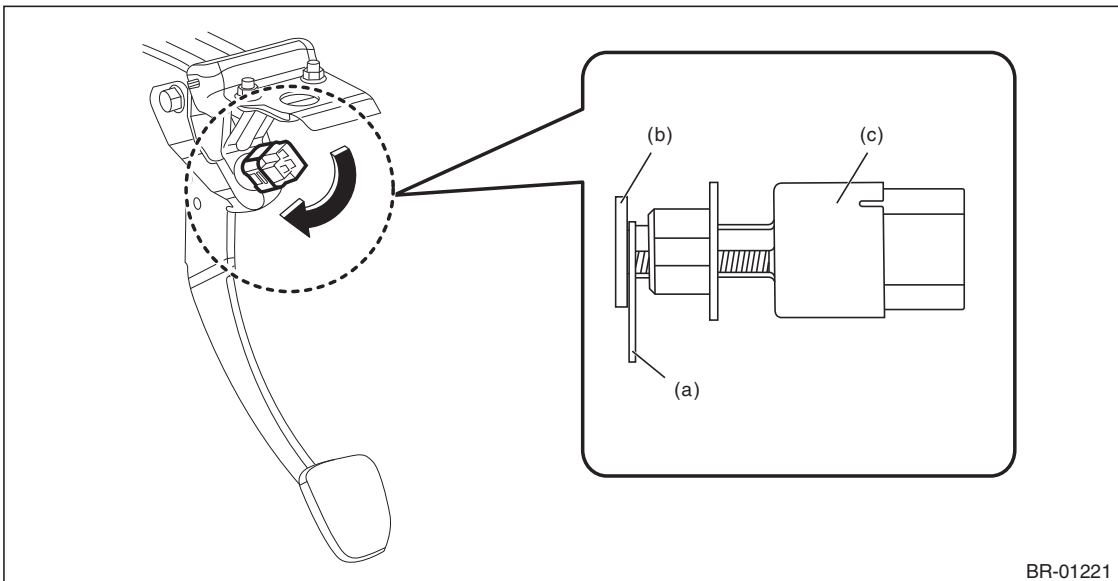
B: INSTALLATION

1) Install the switch - stop light.

CAUTION:

- When pushing the switch - stop light against the spacer, do not apply excessive force.
- Tighten the switch - stop light with a turning torque of 3.0 N·m (0.31 kgf·m, 2.2 ft·lb) or less.

- (1) Prepare the spacer (a) with approx. 0.5 mm (0.020 in) in thickness.
- (2) Align the groove of the holder - stop light switch with the cutout portion of push rod for the switch - stop light.
- (3) While pulling up the brake pedal toward you, set the spacer (a) between the stopper (b) and the switch - stop light (c).
- (4) Insert the switch - stop light (c) and turn it clockwise by 45° to secure.



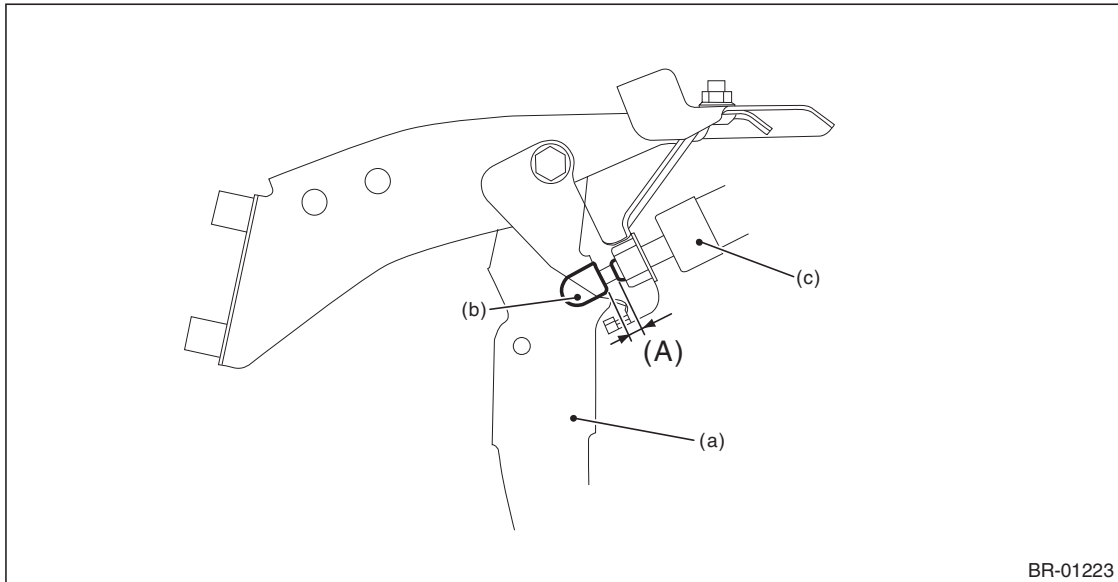
Stop Light Switch

BRAKE

- 2) Remove the spacer (a).
- 3) Pull up the brake pedal and make sure that the clearance (A) between the switch - stop light end part and the stopper is 1.5 — 2.5 mm (0.06 — 0.1 in).

Specification:

Clearance (A) of the switch - stop light: 1.5 — 2.5 mm (0.06 — 0.1 in)



(a) Brake pedal

(b) Stopper

(c) Switch - stop light

- 4) Connect the switch - stop light connector.
- 5) Install the knee airbag module and the cover assembly - instrument panel LWR driver. <Ref. to AB-41, INSTALLATION, Knee Airbag Module.>
- 6) Connect the battery ground terminal.
- 7) Check that the brake light operate properly.

NOTE:

Operate the brake pedal by 5 mm (0.2 in) or more, and check that the stop light illuminates.

- 8) Check the operation of switch - stop light.

- (1) Turn to IG OFF and connect the Subaru Select Monitor.
- (2) Turn to IG ON and display the data of the "Brake Switch" and "Pressure Sensor Output" according to the Subaru Select Monitor display.
- (3) Check that the switch - stop light is OFF with the brake pedal not depressed.
- (4) Quickly depress the brake pedal 5 times.
- (5) Slowly release the brake pedal depressed at the fifth time and check that the master cylinder pressure is within the standard value when the switch - stop light changes from OFF to ON.

Specification:

Less than 1 Mpa (10 bar)

Stop Light Switch

BRAKE

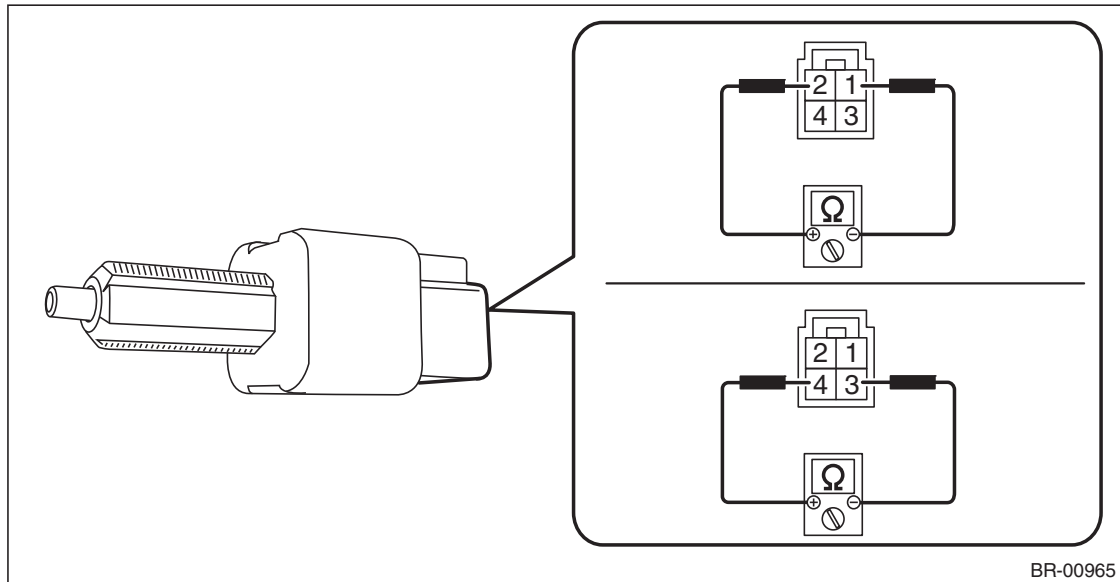
C: INSPECTION

1. INSPECT THE RESISTANCE

- 1) Disconnect the switch - stop light connector.
- 2) Check the resistance between the terminals of switch - stop light.

Preparation tool:

Circuit tester



Terminal No.	Inspection conditions	Standard
1 — 2	When brake pedal is depressed	1 MΩ or more
	When brake pedal is released	Less than 1 Ω
3 — 4	When brake pedal is depressed	Less than 1 Ω
	When brake pedal is released	1 MΩ or more

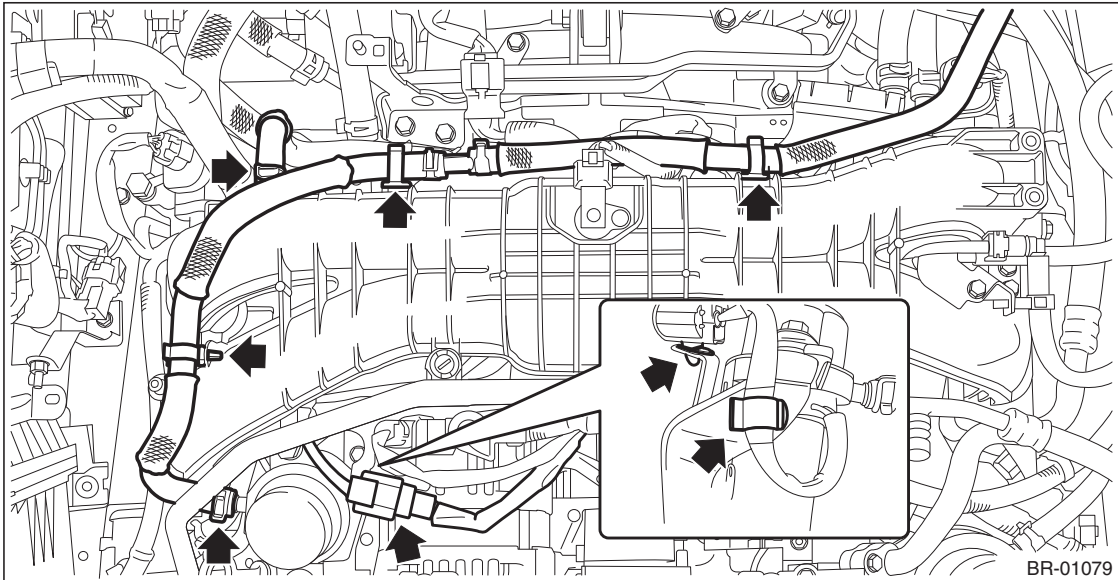
- 3) Replace the switch - stop light if the inspection result is not within the standard value.

16.Brake Vacuum Pump

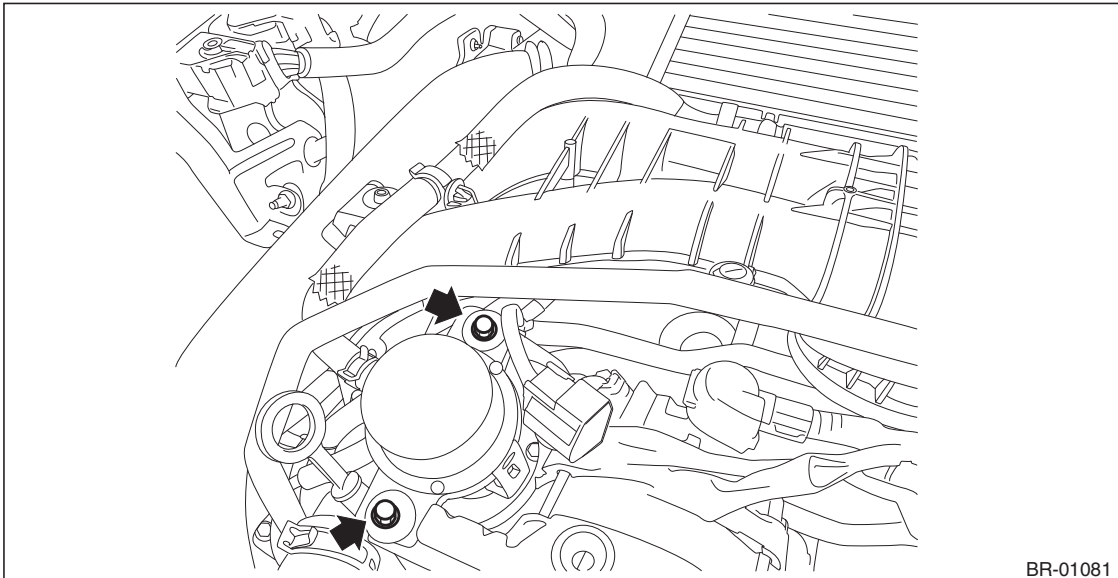
A: REMOVAL

1. BRAKE VACUUM PUMP

- 1) Disconnect the ground cable from battery.
- 2) Remove the vacuum pump assembly.
 - (1) Disconnect the connectors of the vacuum pump assembly.
 - (2) Remove the vacuum hose COMPL.



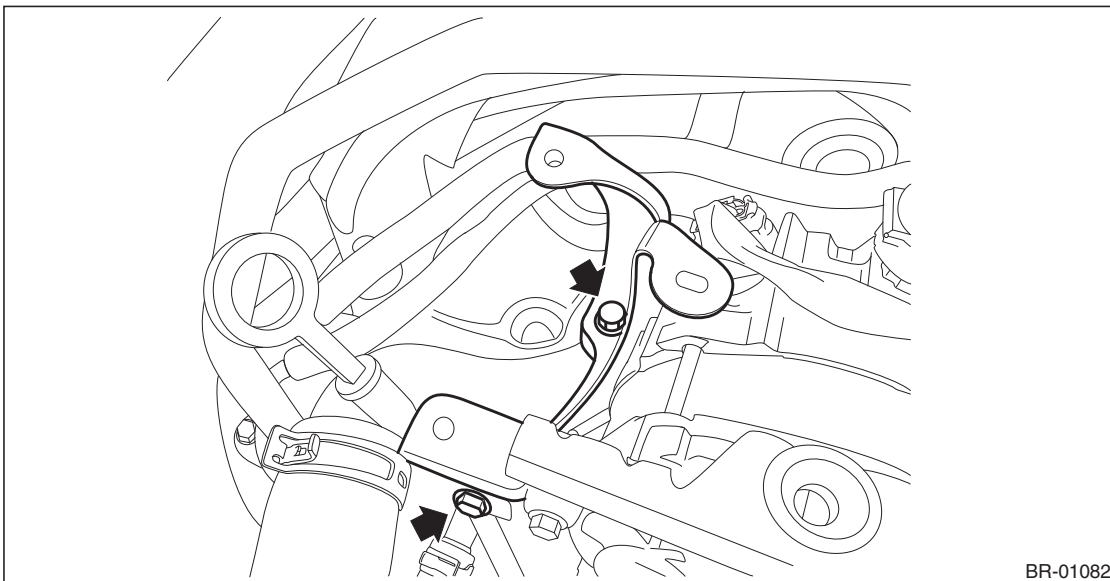
- (3) Remove the bolts, then remove the vacuum pump assembly.



Brake Vacuum Pump

BRAKE

3) Remove the bolts, and then remove the bracket - generator.



B: INSTALLATION

1. BRAKE VACUUM PUMP

Install in the reverse order of removal.

Tightening torque:

Bracket - generator: 19 N·m (1.9 kgf-m, 14.0 ft-lb)

Vacuum pump assembly: 7.5 N·m (0.76 kgf-m, 5.5 ft-lb)

C: INSPECTION

1. BRAKE VACUUM PUMP

Refer to "Read Diagnostic Trouble Code (DTC)" of "BRAKE VACUUM CONTROL". <Ref. to BVC(diag)-10, OPERATION, Read Diagnostic Trouble Code (DTC).>

2. VACUUM HOSE

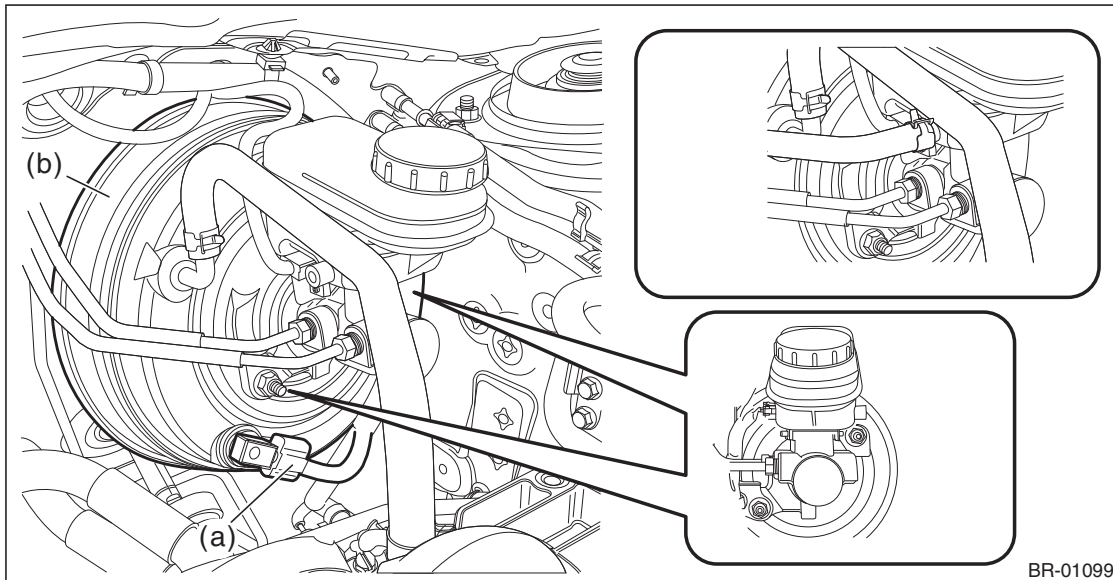
Check to see that air only flows in one direction, when air is blown into or sucked from the hose.

17.Brake Vacuum Sensor

A: NOTE

CAUTION:

- Do not remove the vacuum sensor (a). If removed, replace the vacuum booster assembly (b) with a new part.
- Do not rotate the vacuum sensor (a) when disconnecting the connector of vacuum sensor (a). Otherwise the grommet on the mounting location of the vacuum sensor (a) may be damaged.



BR-01099

General Diagnostic Table

BRAKE

18. General Diagnostic Table

A: INSPECTION

	Trouble and possible cause	Corrective action
1. Insufficient braking	(1) Fluid leakage from the hydraulic mechanism	Repair or replace. (cup, piston seal, piston boot, master cylinder piston kit, pipe or hose)
	(2) Entry of air into the hydraulic mechanism	Bleed air.
	(3) Wear, deteriorated surface material, water or fluid on lining	Replace, grind or clean.
	(4) Improper operation of master cylinder assembly, disc caliper, vacuum booster assembly or check valve	Repair or replace.
2. Unstable or uneven braking	(1) Fluid on lining or rotor	Correct the cause of fluid leakage, and clean or replace.
	(2) Rotor defective	Repair or replace the rotor.
	(3) Improper lining contact, deteriorated surface, deteriorated or worn lining material	Repair by grinding, or replace.
	(4) Deformed back plate	Repair or replace.
	(5) Overinflation of tires	Adjust the air pressure.
	(6) Defective wheel alignment	Adjust alignment.
	(7) Loose back plate or support installation bolt	Tighten to the specified torque.
	(8) Defective hub unit COMPL	Replace.
	(9) Defective hydraulic system	Replace the cylinder, brake pipe or hose.
	(10) Unstable performance of the parking brake	Check, adjust or replace the rear brake and cable system.
3. Excessive pedal stroke	(1) Entry of air into the hydraulic mechanism	Bleed air.
	(2) Excessive play in the master cylinder push rod	Adjust.
	(3) Fluid leakage from the hydraulic mechanism	Repair or replace. (cup, piston seal, piston boot, master cylinder piston kit, pipe or hose)
	(4) Improper lining contact or worn lining	Repair or replace.
4. Brake dragging or improper brake return	(1) Insufficient pedal play	Adjust play.
	(2) Improper master cylinder return	Clean or replace the cylinder.
	(3) Clogged hydraulic system	Replace.
	(4) Improper return or adjustment of parking brake	Repair or adjust.
	(5) Weakened spring tension or breakage of shoe return spring	Replace the spring.
	(6) Improper disc caliper operation	Repair or replace.
	(7) Faulty wheel bearing	Replace.
5. Brake noise (1) (creaking sound)	(1) Hardened or deteriorated brake pad	Replace the pad.
	(2) Worn brake pad	Replace the pad.
	(3) Loose back plate or support installation bolt	Tighten to the specified torque.
	(4) Loose hub unit COMPL	Tighten to the specified torque.
	(5) Dirty rotor	Clean the rotor, or clean and replace brake assembly.
6. Brake noise (2) (hissing sound)	(1) Worn brake pad	Replace the pad.
	(2) Improperly installed pad	Correct or replace the pad.
	(3) Loose or bent rotor	Retighten or replace.
7. Brake noise (3) (click sound)	Excessively worn pad or support	Replace the pad or the support.



BRAKE VACUUM CONTROL (BVC) (DIAGNOSTICS)

BVC(diag)

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2. Check List for Interview	3
3. General Description	5
4. Electrical Component Location	6
5. Engine Control Module (ECM) I/O Signal	8
6. Subaru Select Monitor	9
7. Read Diagnostic Trouble Code (DTC)	10
8. Inspection Mode	11
9. Clear Memory Mode	12
10. List of Diagnostic Trouble Code (DTC)	13
11. Diagnostic Procedure with Diagnostic Trouble Code (DTC)	14
12. General Diagnostic Table	30



Basic Diagnostic Procedure

BRAKE VACUUM CONTROL (BVC) (DIAGNOSTICS)

1. Basic Diagnostic Procedure

A: PROCEDURE

CAUTION:

- Subaru Select Monitor is required for reading DTC, reading the current data and clearing the memory.
- Remove foreign matter (dust, water, oil, etc.) from the engine control module (ECM) connector when removing or installing.

NOTE:

- To check the harness for open or short circuits, shake problem spot or connector.
- Refer to "Check List for Interview". <Ref. to BVC(diag)-3, Check List for Interview.>

Step	Check	Yes	No
1 CHECK PRE-INSPECTION. 1) Ask the customer when and how the trouble occurred using the interview check list. <Ref. to BVC(diag)-3, Check List for Interview.> 2) Check the brake vacuum pump warning light.	Does the brake vacuum pump warning light illuminate?	Go to step 3.	Go to step 2.
2 BASIC INSPECTION. Check the components which might affect the brake vacuum control. <Ref. to BVC(diag)-5, INSPECTION, General Description.>	Is the component that might affect the brake vacuum control normal?	Go to step 3.	Repair or replace each component.
3 CHECK INDICATION OF DTC. 1) Turn the ignition switch to OFF. 2) Connect the Subaru Select Monitor to data link connector. 3) Turn the ignition switch to ON and run the Subaru Select Monitor. 4) Read the DTC. <Ref. to BVC(diag)-10, OPERATION, Read Diagnostic Trouble Code (DTC).> 5) Record all DTC.	Is DTC displayed?	Record the DTC, time stamp and freeze frame data. Go to step 5. NOTE: • For the time stamp, refer to LAN section. <Ref. to LAN(diag)-6, TIME STAMP, CAUTION, General Description.> • Depending on DTCs, time stamp may not be stored.	Go to step 4.
4 PERFORM GENERAL DIAGNOSTICS. Perform the inspection by referring to "General Diagnostic Table". <Ref. to BVC(diag)-30, INSPECTION, General Diagnostic Table.>	Is result of inspection OK?	Finish the diagnosis.	Go to step 5.
5 PERFORM DIAGNOSIS. 1) Correct the cause of trouble according to the DTC. <Ref. to BVC(diag)-13, LIST, List of Diagnostic Trouble Code (DTC).> 2) Perform the Clear Memory Mode. <Ref. to BVC(diag)-12, OPERATION, Clear Memory Mode.> 3) Perform the Inspection Mode. <Ref. to BVC(diag)-11, PROCEDURE, Inspection Mode.> 4) Read the DTC. <Ref. to BVC(diag)-10, OPERATION, Read Diagnostic Trouble Code (DTC).>	Is DTC displayed?	Repeat step 5 until DTC is not shown.	Finish the diagnosis.

Check List for Interview

BRAKE VACUUM CONTROL (BVC) (DIAGNOSTICS)

2. Check List for Interview

A: CHECK

Check the following items about the vehicle's state.

1. STATE OF BRAKE VACUUM PUMP WARNING LIGHT

The brake vacuum pump warning light illuminates.	☐ Always ☐ Sometimes ☐ Only once ☐ Does not illuminate • When/How long does it illuminate?		
Ignition key position	☐ LOCK ☐ ACC ☐ ON (before starting engine) ☐ START ☐ ON (after starting engine, engine is running) ☐ ON (after starting engine, engine is at a standstill)		
Timing	☐ Immediately after turning the ignition switch to ON ☐ Immediately after turning the ignition switch to START		
	☐ While accelerating	—	km/h
		—	MPH
	☐ While driving at a constant speed	km/h	MPH
	☐ While decelerating	—	km/h
		—	MPH



Check List for Interview

BRAKE VACUUM CONTROL (BVC) (DIAGNOSTICS)

2. CONDITIONS UNDER WHICH TROUBLE OCCURS

Environment	a) Weather	☐ Fine ☐ Cloudy ☐ Rainy ☐ Snowy ☐ Others:	
	b) Ambient temperature	°C (°F)	
	c) Altitude	m (ft)	
	d) Road	☐ Inner city ☐ Suburbs ☐ Highway ☐ General road ☐ Uphill ☐ Downhill ☐ Paved road ☐ Gravel road ☐ Muddy road ☐ Sandy place ☐ Straight road ☐ Sharp curve ☐ Gentle road ☐ S-curve ☐ Road with a slope on both sides ☐ Others:	
Condition	a) Brakes	Deceleration: G	
		☐ continuous / ☐ Intermittent	
	b) Accelerator	Acceleration: G	
		☐ continuous / ☐ Intermittent	
	c) Vehicle speed	km/h	MPH
	☐ Advancing ☐ Accelerating ☐ Decelerating ☐ Low speed ☐ Turning ☐ Others:	☐ Immediately after starting the engine ☐ Idling, etc.	

General Description

BRAKE VACUUM CONTROL (BVC) (DIAGNOSTICS)

3. General Description

A: CAUTION

1. SRS AIRBAG SYSTEM

The airbag system wiring harness is routed near the main relay and ECM.

CAUTION:

- Do not use electrical test equipment on wiring harness and connector circuits of the airbag system.
- Be careful not to damage the airbag system wiring harness.

B: INSPECTION

Before performing diagnosis, check the following items which might affect the brake vacuum control.

1. BATTERY

Measure the battery voltage and check electrolyte.

Standard voltage: 12 V or more

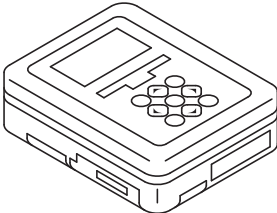
Specific gravity: 1.260 or more

2. BRAKE VACUUM HOSE

Make sure that the brake vacuum hose is not cracked or loose.

C: PREPARATION TOOL

1. SPECIAL TOOL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST1B022XU0	1B022XU0	SUBARU SELECT MONITOR III KIT	Used for troubleshooting the electrical system.

2. GENERAL TOOL

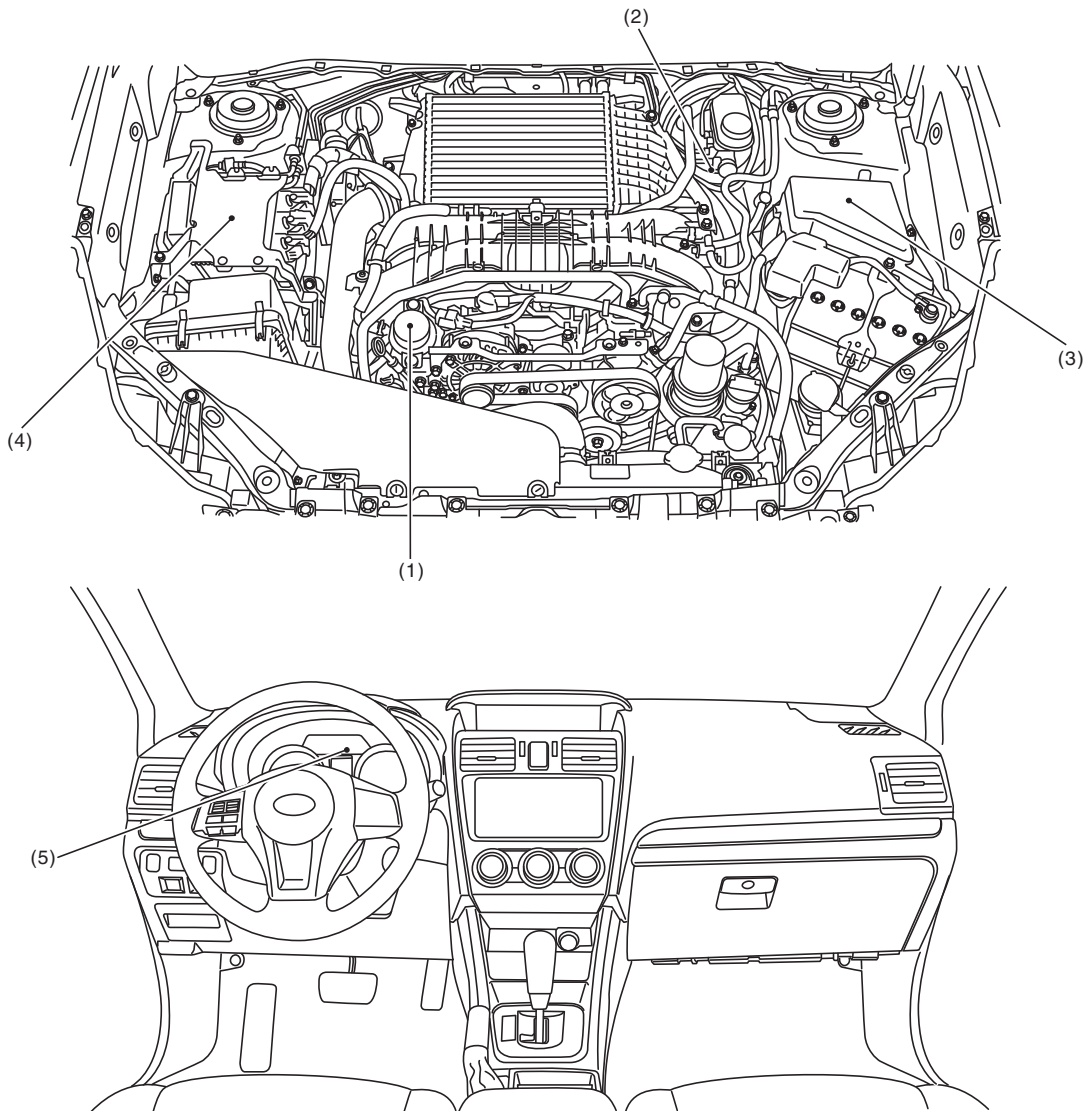
TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance, voltage and current.
Oscilloscope	Used for measuring the sensor.

Electrical Component Location

BRAKE VACUUM CONTROL (BVC) (DIAGNOSTICS)

4. Electrical Component Location

A: LOCATION

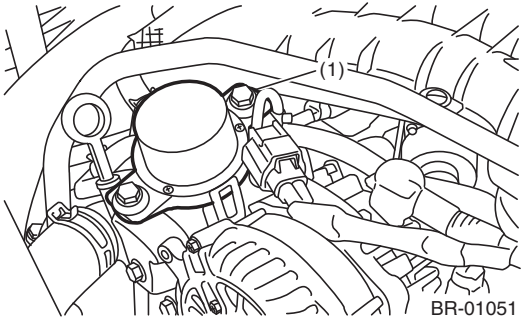
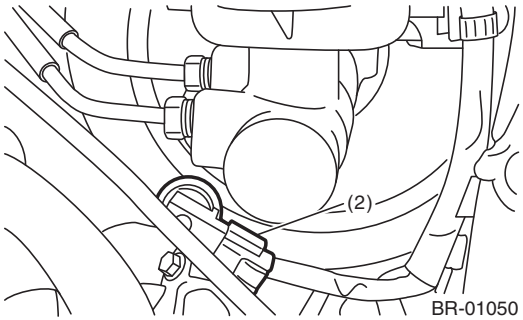
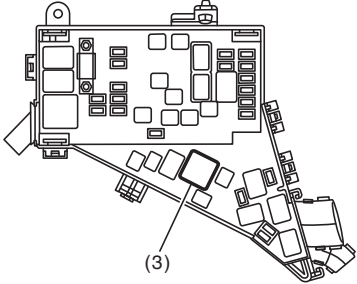
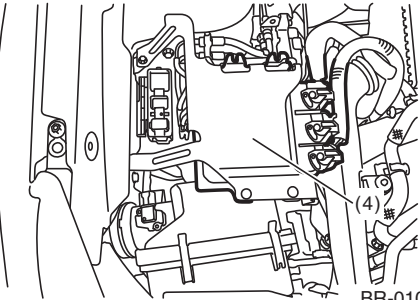
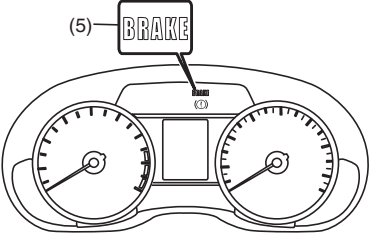


BR-01054

- | | | |
|-----------------------------------|---------------------------------|-------------------------------------|
| (1) Brake pump | (3) Brake pump relay | (5) Brake vacuum pump warning light |
| (2) Brake booster pressure sensor | (4) Engine control module (ECM) | |

Electrical Component Location

BRAKE VACUUM CONTROL (BVC) (DIAGNOSTICS)

 BR-01051	 BR-01050
 BR-01052	 BR-01072
 BR-01090	

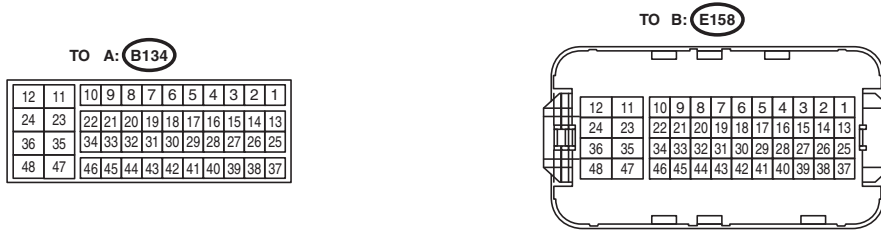


Engine Control Module (ECM) I/O Signal

BRAKE VACUUM CONTROL (BVC) (DIAGNOSTICS)

5. Engine Control Module (ECM) I/O Signal

A: ELECTRICAL SPECIFICATION



BR-01073

Description		Connector No.	Terminal No.	Signal (V)		Note
				Ignition SW ON (engine OFF)	Engine ON (idling)	
Brake vacuum sensor	Signal	E158	13	1 — 3.8	1 — 3.8	—
	Power supply	B134	18	5	5	—
	Ground	B134	19	0	0	—
Self-shutoff control		B134	38	0	0	—
Brake vacuum pump	Relay drive	E158	37	10 — 13 (When pump is OFF)	12 — 14 (When pump is ON)	—
				0 (When pump is ON)	0 (When pump is ON)	
	Electric load	E158	1	0 (When pump is OFF)	0 (When pump is OFF)	—
				10 — 13 (When pump is ON)	12 — 14 (When pump is ON)	

Subaru Select Monitor

BRAKE VACUUM CONTROL (BVC) (DIAGNOSTICS)

6. Subaru Select Monitor

A: OPERATION

1. HOW TO USE THE SUBARU SELECT MONITOR

For detailed operation procedures, refer to "PC application help for Subaru Select Monitor".

2. READ CURRENT DATA

For detailed operation procedures, refer to "PC application help for Subaru Select Monitor".

A list of the support data is shown in the following table.

Display	Contents to be displayed	Unit of measure
Atmospheric pressure	Atmospheric pressure is displayed.	kPa
Brake Booster Pressure	Brake booster pressure is displayed.	kPa

3. SEQUENCE CONTROL MODE

- 1) Turn the ignition switch to ON (engine OFF) and run the Subaru Select Monitor.
- 2) On «Main Menu» display, select {Each System Check}.
- 3) On «System Selection Menu» display, select {Brake Vacuum Pump System}.
- 4) On the «Brake Vacuum Pump System» display, select {Function Check Sequence}.
- 5) When «Sequence Control Mode will be started» is shown on the screen, click the [OK] button.
- 6) When «Depress Brake Pedal Five Times» is shown on the screen, depress the brake pedal 5 times, and click the [OK] button while the brake pedal is not depressed.
- 7) Click the [OK] button after the «OK» is displayed.



Read Diagnostic Trouble Code (DTC)

BRAKE VACUUM CONTROL (BVC) (DIAGNOSTICS)

7. Read Diagnostic Trouble Code (DTC)

A: OPERATION

- For detailed operation procedures, refer to “PC application help for Subaru Select Monitor”.
- For details concerning DTCs, refer to “List of Diagnostic Trouble Code (DTC)”. <Ref. to BVC(diag)-13, List of Diagnostic Trouble Code (DTC).>

Inspection Mode

BRAKE VACUUM CONTROL (BVC) (DIAGNOSTICS)

8. Inspection Mode

A: PROCEDURE

Reproduce the malfunction occurrence condition as much as possible.

Drive the vehicle at least ten minutes.

Clear Memory Mode

BRAKE VACUUM CONTROL (BVC) (DIAGNOSTICS)

9. Clear Memory Mode

A: OPERATION

For detailed operation procedures, refer to "PC application help for Subaru Select Monitor".

List of Diagnostic Trouble Code (DTC)

BRAKE VACUUM CONTROL (BVC) (DIAGNOSTICS)

10.List of Diagnostic Trouble Code (DTC)

A: LIST

DTC	Item	Content of diagnosis	Reference
11	Sensor Output Out of Range	Brake vacuum sensor output error	<Ref. to BVC(diag)-14, DTC 11 SENSOR OUTPUT OUT OF RANGE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
12	Compare Error in Other Sensor	Brake booster relative pressure comparison error	<Ref. to BVC(diag)-16, DTC 12 COMPARE ERROR IN OTHER SENSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
13	Pressure Sensor Signal Freeze	Brake vacuum sensor stuck error	<Ref. to BVC(diag)-19, DTC 13 PRESSURE SENSOR SIGNAL FREEZE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
21	Discrepancy in Relays (On)	Unmatched drive of brake vacuum pump relay and brake vacuum pump	<Ref. to BVC(diag)-22, DTC 21 DISCREPANCY IN RELAYS (ON), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
22	Discrepancy in Relays (Off)	Unmatched drive of brake vacuum pump relay and brake vacuum pump	<Ref. to BVC(diag)-25, DTC 22 DISCREPANCY IN RELAYS (OFF), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
23	Pump Continuous Work	Continuous drive error of brake vacuum pump	<Ref. to BVC(diag)-28, DTC 23 PUMP CONTINUOUS WORK, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

BRAKE VACUUM CONTROL (BVC) (DIAGNOSTICS)

11. Diagnostic Procedure with Diagnostic Trouble Code (DTC)

A: DTC 11 SENSOR OUTPUT OUT OF RANGE

DTC DETECTING CONDITION:

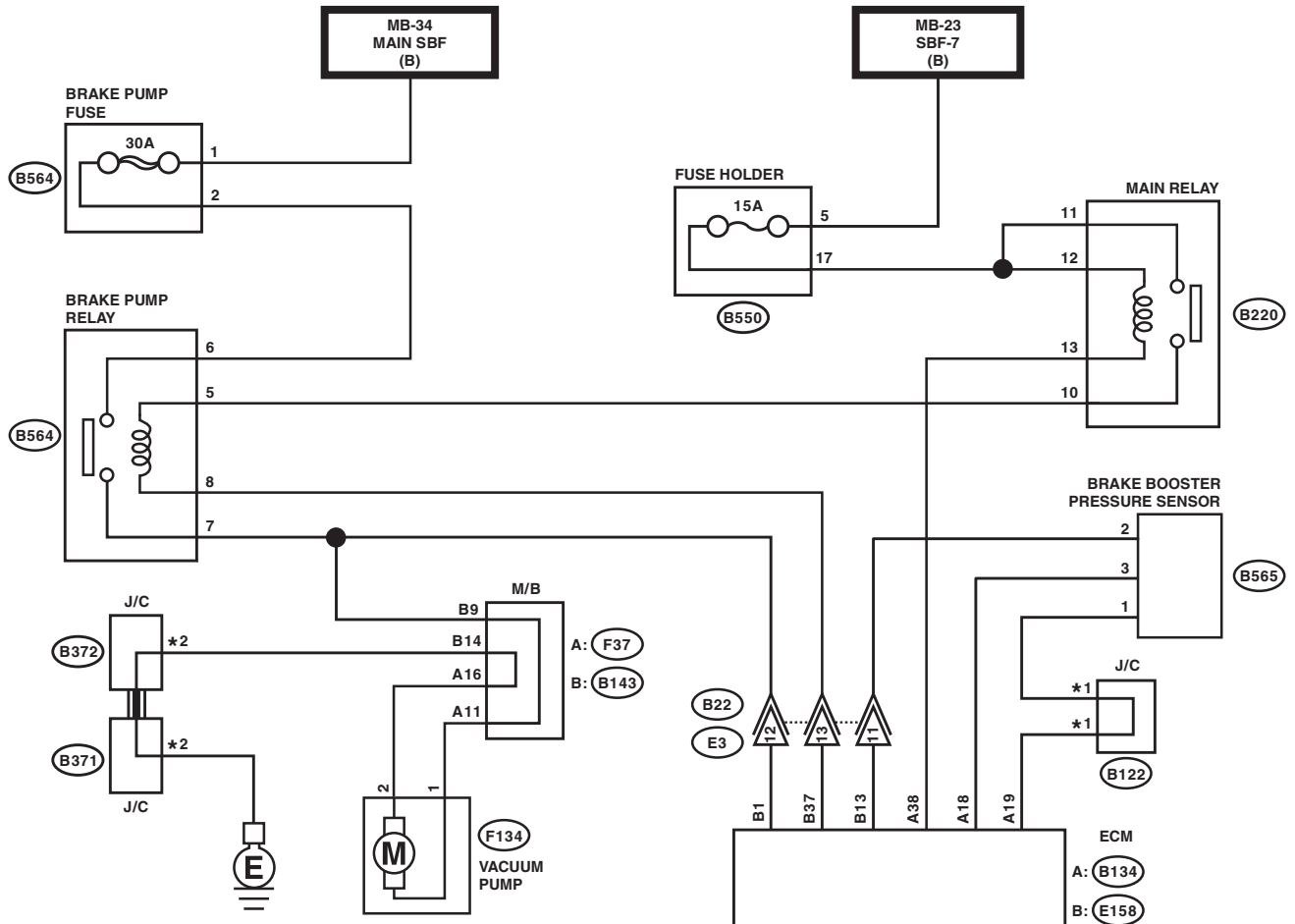
Brake vacuum sensor output error

TROUBLE SYMPTOM:

Brake vacuum pump does not operate.

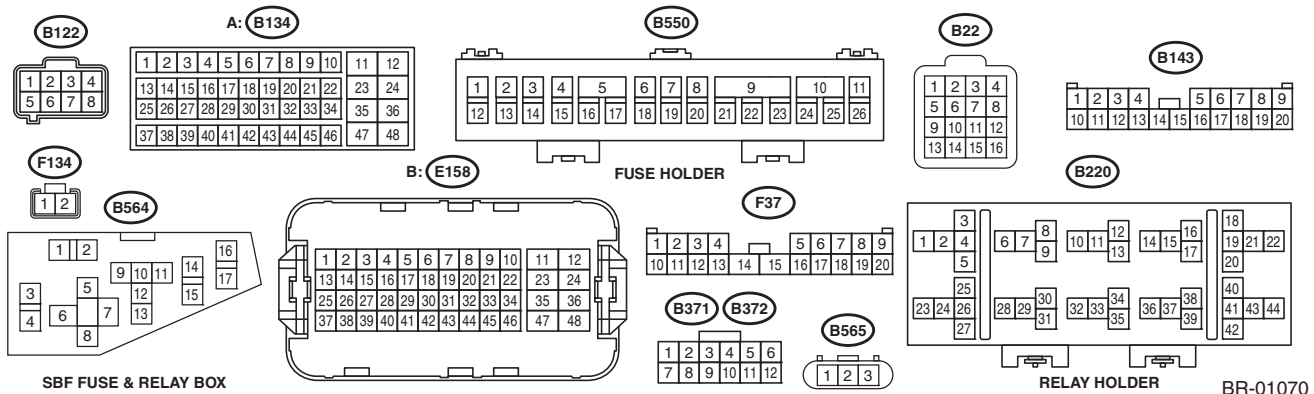
WIRING DIAGRAM:

Vacuum pump control system <Ref. to WI-415, WIRING DIAGRAM, Vacuum Pump Control System.>



*1 : TERMINAL No. OPTIONAL ARRANGEMENT

*2 : TERMINAL No. OPTIONAL ARRANGEMENT AMONG 7, 8, 9, 10, 11 AND 12



BR-01070

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

BRAKE VACUUM CONTROL (BVC) (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK BRAKE VACUUM SENSOR. 1) Turn the ignition switch to OFF. 2) Disconnect the brake vacuum sensor connector. 3) Measure the resistance between brake vacuum sensor connector terminals. Terminals No. 1 — No. 3: No. 2 — No. 3:	Is the resistance 15 kΩ or less?	Go to step 2.	Replace the brake booster. <Ref. to BR-47, Brake Booster.>
2 CHECK HARNESS BETWEEN ECM AND BRAKE VACUUM SENSOR CONNECTOR. 1) Disconnect the connector from ECM. 2) Measure the resistance of harness between ECM and brake vacuum sensor connector terminal. Connector & terminal (B134) No. 18 — (B565) No. 3: (B134) No. 19 — (B565) No. 1: (E158) No. 13 — (B565) No. 2:	Is the resistance less than 1 Ω?	Go to step 3.	Repair the open circuit of harness between ECM and brake vacuum sensor connector terminal.
3 CHECK HARNESS BETWEEN ECM AND BRAKE VACUUM SENSOR CONNECTOR. Measure the resistance of harness between ECM and chassis ground. Connector & terminal (B134) No. 18 — Chassis ground: (B134) No. 19 — Chassis ground: (E158) No. 13 — Chassis ground:	Is the resistance 1 MΩ or more?	Go to step 4.	Repair the ground short circuit of harness between ECM and brake vacuum sensor connector terminal.
4 CHECK HARNESS BETWEEN ECM AND BRAKE VACUUM SENSOR CONNECTOR. Measure the voltage between ECM connector and chassis ground. Connector & terminal (B134) No. 18 (+) — Chassis ground (-): (B134) No. 19 (+) — Chassis ground (-): (E158) No. 13 (+) — Chassis ground (-):	Is the voltage 0.5 V or less?	Go to step 5.	Repair the short circuit to power supply between the ECM and brake vacuum sensor connector terminal.
5 CHECK BRAKE VACUUM SENSOR POWER SUPPLY. 1) Connect the connectors to ECM and brake vacuum sensor. 2) Turn the ignition switch to ON. 3) Measure the voltage between ECM connector terminals. Connector & terminal (B134) No. 18 (+) — (B134) No. 19 (-):	Is the voltage 4.75 — 5.25 V?	Go to step 6.	Replace the ECM. <Ref. to FU(H4DOTC)-134, Engine Control Module (ECM).>
6 CHECK CURRENT DATA. 1) Turn the ignition switch to ON. 2) Depress the brake pedal several times, until the pedal becomes firm. 3) Read the current data of the brake vacuum pressure pump system using the Subaru Select Monitor. <Ref. to BVC(diag)-9, Subaru Select Monitor.>	Is the barometric pressure — brake booster pressure —1 — +1 kPa?	Temporary poor contact occurs.	Replace the ECM. <Ref. to FU(H4DOTC)-134, Engine Control Module (ECM).>

BRAKE VACUUM CONTROL (BVC) (DIAGNOSTICS)

DTC DETECTING CONDITION:

TROUBLE SYMPTOM:

WIRING DIAGRAM:

MB-34 MAIN SBF (B)

BRAKE PUMP FUSE
30A
1
2

BRAKE PUMP RELAY
6
5
8
7

J/C
*2
*2
J/C

MB-23 SBF-7 (B)

FUSE HOLDER
15A
5
17
(B550)

MAIN RELAY
11
12
13
10

BRAKE BOOSTER PRESSURE SENSOR
2
3
1

J/C
*1
*1
(B122)

VACUUM PUMP
F134
2
1
M

ECM
A: (B134)
B: (E158)

Legend:
A: (F37)
B: (B143)

Other Labels:
B564, B22, E3, B37, B13, A38, A18, A19, B1, B14, A16, A11, B9, M/B, B220, B565

***2 : TERMINAL No. OPTIONAL ARRANGEMENT AMONG 7, 8, 9, 10, 11 AND 12**



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

BRAKE VACUUM CONTROL (BVC) (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK BRAKE VACUUM HOSE. 1) Turn the ignition switch to OFF. 2) Check the status of the brake vacuum hose connection.	Is the brake vacuum hose connected firmly?	Go to step 2.	Connect the brake vacuum hose.
2 CHECK BRAKE VACUUM HOSE. 1) Turn the ignition switch to ON and start engine. 2) Check for leakage from the brake vacuum hose.	Is there a leak from the brake vacuum hose?	Replace the brake vacuum hose.	Go to step 3.
3 CHECK BRAKE VACUUM SENSOR. 1) Turn the ignition switch to OFF. 2) Disconnect the brake vacuum sensor connector. 3) Measure the resistance between brake vacuum sensor connector terminals. Terminals No. 1 — No. 3: No. 2 — No. 3:	Is the resistance 15 k Ω or less?	Go to step 4.	Replace the brake booster. <Ref. to BR-47, Brake Booster.>
4 CHECK HARNESS BETWEEN ECM AND BRAKE VACUUM SENSOR CONNECTOR. 1) Disconnect the connector from ECM. 2) Measure the resistance of harness between ECM and brake vacuum sensor connector terminal. Connector & terminal (B134) No. 18 — (B565) No. 3: (B134) No. 19 — (B565) No. 1: (E158) No. 13 — (B565) No. 2:	Is the resistance less than 1 Ω ?	Go to step 5.	Repair the open circuit of harness between ECM and brake vacuum sensor connector terminal.
5 CHECK HARNESS BETWEEN ECM AND BRAKE VACUUM SENSOR CONNECTOR. Measure the resistance of harness between ECM and chassis ground. Connector & terminal (B134) No. 18 — Chassis ground: (B134) No. 19 — Chassis ground: (E158) No. 13 — Chassis ground:	Is the resistance 1 M Ω or more?	Go to step 6.	Repair the ground short circuit between the ECM and brake vacuum sensor connector terminal.
6 CHECK HARNESS BETWEEN ECM AND BRAKE VACUUM SENSOR CONNECTOR. Measure the voltage between ECM and chassis ground. Connector & terminal (B134) No. 18 (+) — Chassis ground (-): (B134) No. 19 (+) — Chassis ground (-): (E158) No. 13 (+) — Chassis ground (-):	Is the voltage 0.5 V or less?	Go to step 7.	Repair the short circuit to power supply in harness between the ECM and brake vacuum sensor connector terminal.
7 CHECK BRAKE VACUUM SENSOR POWER SUPPLY. 1) Connect the connectors to ECM and brake vacuum sensor. 2) Turn the ignition switch to ON. 3) Measure the voltage between ECM connector terminals. Connector & terminal (B134) No. 18 (+) — (B134) No. 19 (-):	Is the voltage 4.75 — 5.25 V?	Go to step 8.	Replace the ECM. <Ref. to FU(H4DOTC)-134, Engine Control Module (ECM).>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

BRAKE VACUUM CONTROL (BVC) (DIAGNOSTICS)

	Step	Check	Yes	No
8	CHECK CURRENT DATA. 1) Turn the ignition switch to ON. 2) Depress the brake pedal several times, until the pedal becomes firm. 3) Read the current data of the brake vacuum pressure pump system using the Subaru Select Monitor. <Ref. to BVC(diag)-9, Subaru Select Monitor.>	Is the barometric pressure — brake booster pressure —1 — +1 kPa?	Temporary poor contact occurs.	Replace the ECM. <Ref. to FU(H4DOTC)-134, Engine Control Module (ECM).>

BRAKE VACUUM CONTROL (BVC) (DIAGNOSTICS)

C: DTC 13 PRESSURE SENSOR SIGNAL FREEZE

DTC DETECTING CONDITION:

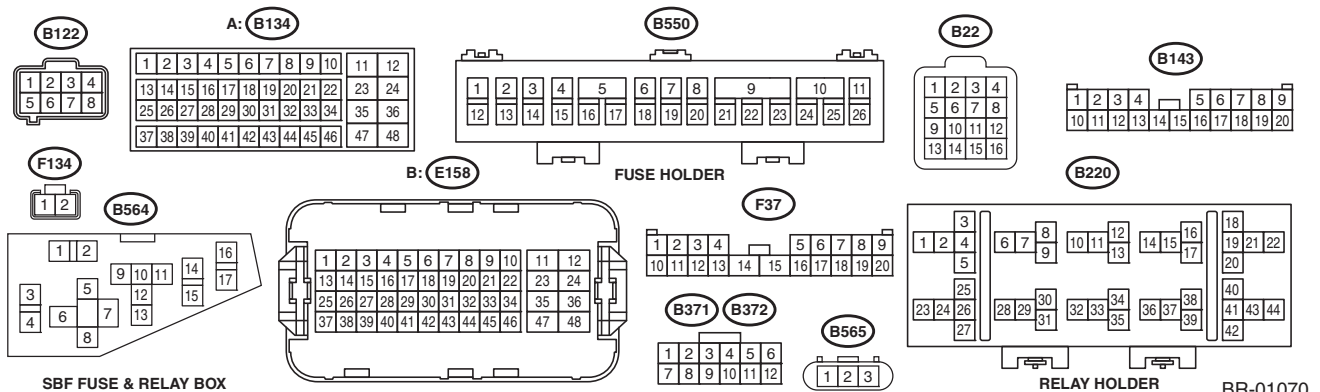
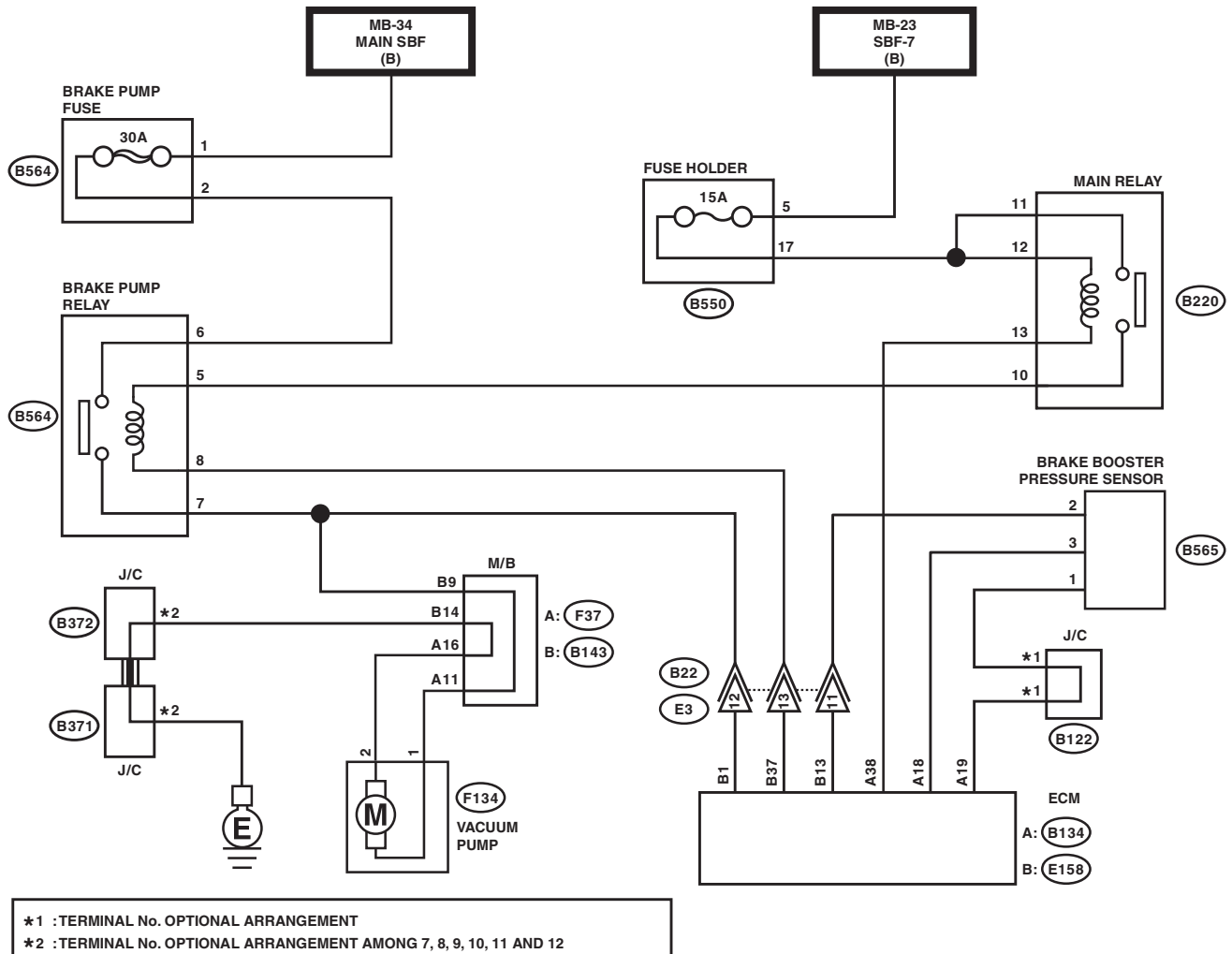
Brake vacuum sensor seizure malfunction

TROUBLE SYMPTOM:

Brake vacuum pump does not operate.

WIRING DIAGRAM:

Vacuum pump control system <Ref. to WI-415, WIRING DIAGRAM, Vacuum Pump Control System.>



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

BRAKE VACUUM CONTROL (BVC) (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK BRAKE VACUUM HOSE. 1) Turn the ignition switch to OFF. 2) Check the status of the brake vacuum hose connection.	Is the brake vacuum hose connected firmly?	Go to step 2.	Connect the brake vacuum hose.
2 CHECK BRAKE VACUUM HOSE. 1) Turn the ignition switch to ON and start engine. 2) Check for leakage from the brake vacuum hose.	Is there a leak from the brake vacuum hose?	Replace the brake vacuum hose.	Go to step 3.
3 CHECK BRAKE VACUUM SENSOR CONNECTOR. Check the status of the brake vacuum sensor connector connection.	Is the brake vacuum sensor connector connected firmly?	Go to step 4.	Connect the brake vacuum sensor connector.
4 CHECK BRAKE VACUUM SENSOR. 1) Turn the ignition switch to OFF. 2) Disconnect the brake vacuum sensor connector. 3) Measure the resistance between brake vacuum sensor connector terminals. Connector & terminal No. 1 — No. 3: No. 2 — No. 3:	Is the resistance 15 kΩ or less?	Go to step 5.	Replace the brake booster. <Ref. to BR-47, Brake Booster.>
5 CHECK HARNESS BETWEEN ECM AND BRAKE VACUUM SENSOR CONNECTOR. 1) Disconnect the connector from ECM. 2) Measure the resistance of harness between ECM and brake vacuum sensor connector terminal. Connector & terminal (B134) No. 18 — (B565) No. 3: (B134) No. 19 — (B565) No. 1: (E158) No. 13 — (B565) No. 2:	Is the resistance less than 1 Ω?	Go to step 6.	Repair the open circuit of harness between ECM and brake vacuum sensor connector terminal.
6 CHECK HARNESS BETWEEN ECM AND BRAKE VACUUM SENSOR CONNECTOR. Measure the resistance of harness between ECM and chassis ground. Connector & terminal (B134) No. 18 — Chassis ground: (B134) No. 19 — Chassis ground: (E158) No. 13 — Chassis ground:	Is the resistance 1 MΩ or more?	Go to step 7.	Repair the ground short circuit of harness between ECM and brake vacuum sensor connector terminal.
7 CHECK HARNESS BETWEEN ECM AND BRAKE VACUUM SENSOR CONNECTOR. Measure the voltage between ECM and chassis ground. Connector & terminal (B134) No. 18 (+) — Chassis ground (-): (B134) No. 19 (+) — Chassis ground (-): (E158) No. 13 (+) — Chassis ground (-):	Is the voltage 0.5 V or less?	Go to step 8.	Repair the short circuit to power supply in harness between the ECM and brake vacuum sensor connector terminal.
8 CHECK BRAKE VACUUM SENSOR POWER SUPPLY. 1) Connect the connectors to ECM and brake vacuum sensor. 2) Turn the ignition switch to ON. 3) Measure the voltage between ECM connector terminals. Connector & terminal (B134) No. 18 (+) — (B134) No. 19 (-):	Is the voltage 4.75 — 5.25 V?	Go to step 9.	Replace the ECM. <Ref. to FU(H4DOTC)-134, Engine Control Module (ECM).>



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

BRAKE VACUUM CONTROL (BVC) (DIAGNOSTICS)

	Step	Check	Yes	No
9	CHECK CURRENT DATA. 1) Turn the ignition switch to ON. 2) Depress the brake pedal several times, until the pedal becomes firm. 3) Read the current data of the brake vacuum pressure pump system using the Subaru Select Monitor. <Ref. to BVC(diag)-9, Subaru Select Monitor.>	Is the barometric pressure — brake booster pressure -1 — +1 kPa?	Temporary poor contact occurs.	Replace the ECM. <Ref. to FU(H4DOTC)-134, Engine Control Module (ECM).>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

BRAKE VACUUM CONTROL (BVC) (DIAGNOSTICS)

D: DTC 21 DISCREPANCY IN RELAYS (ON)

DTC DETECTING CONDITION:

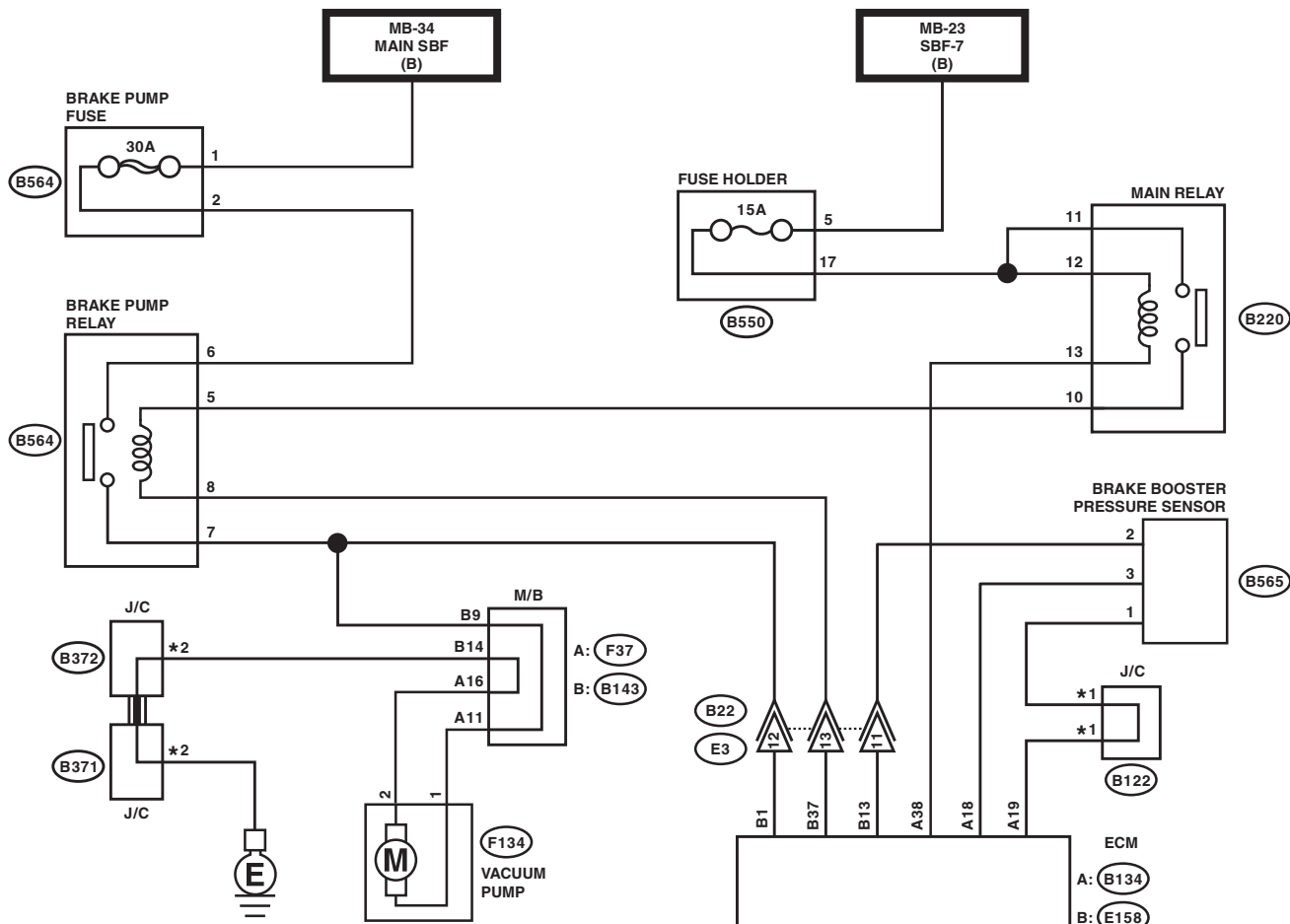
Drive does not match between brake vacuum pump relay and brake vacuum pump.

TROUBLE SYMPTOM:

Brake vacuum pump does not operate.

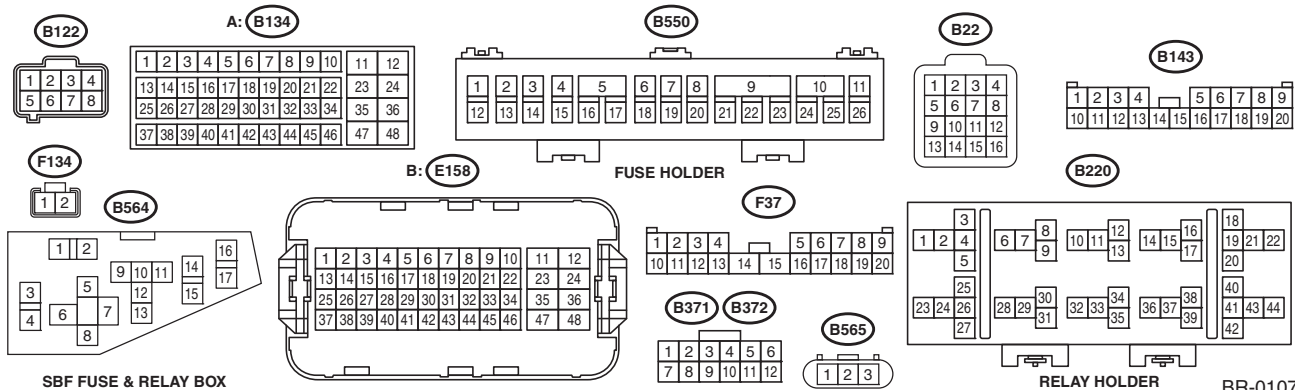
WIRING DIAGRAM:

Vacuum pump control system <Ref. to WI-415, WIRING DIAGRAM, Vacuum Pump Control System.>



*1 : TERMINAL No. OPTIONAL ARRANGEMENT

*2 : TERMINAL No. OPTIONAL ARRANGEMENT AMONG 7, 8, 9, 10, 11 AND 12



BR-01070

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

BRAKE VACUUM CONTROL (BVC) (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK CONNECTOR. Check the status of the brake vacuum sensor and brake vacuum pump connection.	Are the brake vacuum sensor and brake vacuum pump connected firmly?	Go to step 2.	Connect the connector.
2 CHECK FUSE. 1) Turn the ignition switch to OFF. 2) Remove the brake vacuum pump fuse. 3) Check the condition of fuse.	Is the fuse blown out?	Replace the fuse.	Go to step 3.
3 CHECK BRAKE VACUUM PUMP RELAY. 1) Turn the ignition switch to OFF. 2) Remove the brake vacuum pump relay from relay box. 3) Connect the battery to the brake vacuum pump relay terminals No. 5 and No. 8. 4) Measure the resistance between brake vacuum pump relay terminals. Terminals No. 6 — No. 7:	Is the resistance less than 1 Ω ?	Go to step 4.	Replace the brake vacuum pump relay.
4 CHECK BRAKE VACUUM PUMP RELAY POWER SUPPLY. 1) Turn the ignition switch to ON. 2) Measure the voltage between brake vacuum pump relay connector and chassis ground. Connector & terminal (B564) No. 5 (+) — Chassis ground (–): (B564) No. 6 (+) — Chassis ground (–):	Is the voltage 10 V or more?	Go to step 5.	Repair the open or ground shortcircuit of power supply circuit.
5 CHECK HARNESS BETWEEN ECM AND BRAKE VACUUM PUMP RELAY CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the ECM connector. 3) Measure the resistance of harness between ECM and brake vacuum pump relay connector terminal. Connector & terminal (E158) No. 37 — (B564) No. 8:	Is the resistance less than 1 Ω ?	Go to step 6.	Repair the open circuit of harness between ECM and the brake vacuum pump relay connector terminal.
6 CHECK HARNESS BETWEEN THE BRAKE VACUUM PUMP AND BRAKE VACUUM PUMP RELAY CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the brake vacuum pump connector. 3) Measure the resistance of harness between brake vacuum pump and brake vacuum pump relay connector terminal. Connector & terminal (B564) No. 7 — (F134) No. 1:	Is the resistance less than 1 Ω ?	Go to step 7.	Repair the open circuit of harness between brake vacuum pump and brake vacuum pump relay connector terminal.
7 CHECK HARNESS BETWEEN ECM AND BRAKE VACUUM PUMP CONNECTOR. Measure the resistance of harness between brake vacuum pump connector and chassis ground. Connector & terminal (F134) No. 1 — Chassis ground:	Is the resistance 1 M Ω or more?	Go to step 8.	Repair the ground short circuit of harness between ECM and brake vacuum pump connector terminal.

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

BRAKE VACUUM CONTROL (BVC) (DIAGNOSTICS)

Step	Check	Yes	No
8 CHECK HARNESS BETWEEN ECM AND BRAKE VACUUM PUMP CONNECTOR. Measure the voltage between brake vacuum pump connector and chassis ground. <i>Connector & terminal</i> <i>(F134) No. 1 (+) — Chassis ground (—):</i>	Is the voltage 0.5 V or less?	Go to step 9.	Repair the short circuit to power supply in harness between the ECM and brake vacuum pump connector terminal.
9 CHECK BRAKE VACUUM PUMP. 1) Turn the ignition switch to OFF. 2) Remove the brake vacuum pump. <Ref. to BR-79, REMOVAL, Brake Vacuum Pump.> 3) Connect the battery positive terminal to the brake vacuum pump terminal No. 1, and the negative terminal to terminal No. 2.	Does the brake vacuum pump operate?	Go to step 10.	Replace the brake vacuum pump. <Ref. to BR-79, Brake Vacuum Pump.>
10 CHECK BRAKE VACUUM PUMP. 1) Connect the brake vacuum pump relay. 2) Connect the connectors to the brake vacuum pump and ECM. 3) Turn the ignition switch to ON. 4) Execute the Function Check Mode of the brake vacuum pressure pump system using the Subaru Select Monitor. <Ref. to BVC(diag)-9, Subaru Select Monitor.>	Does the brake vacuum pump operate?	Temporary poor contact occurs.	Replace the ECM. <Ref. to FU(H4DOTC)-134, Engine Control Module (ECM).>



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

BRAKE VACUUM CONTROL (BVC) (DIAGNOSTICS)

E: DTC 22 DISCREPANCY IN RELAYS (OFF)

DTC DETECTING CONDITION:

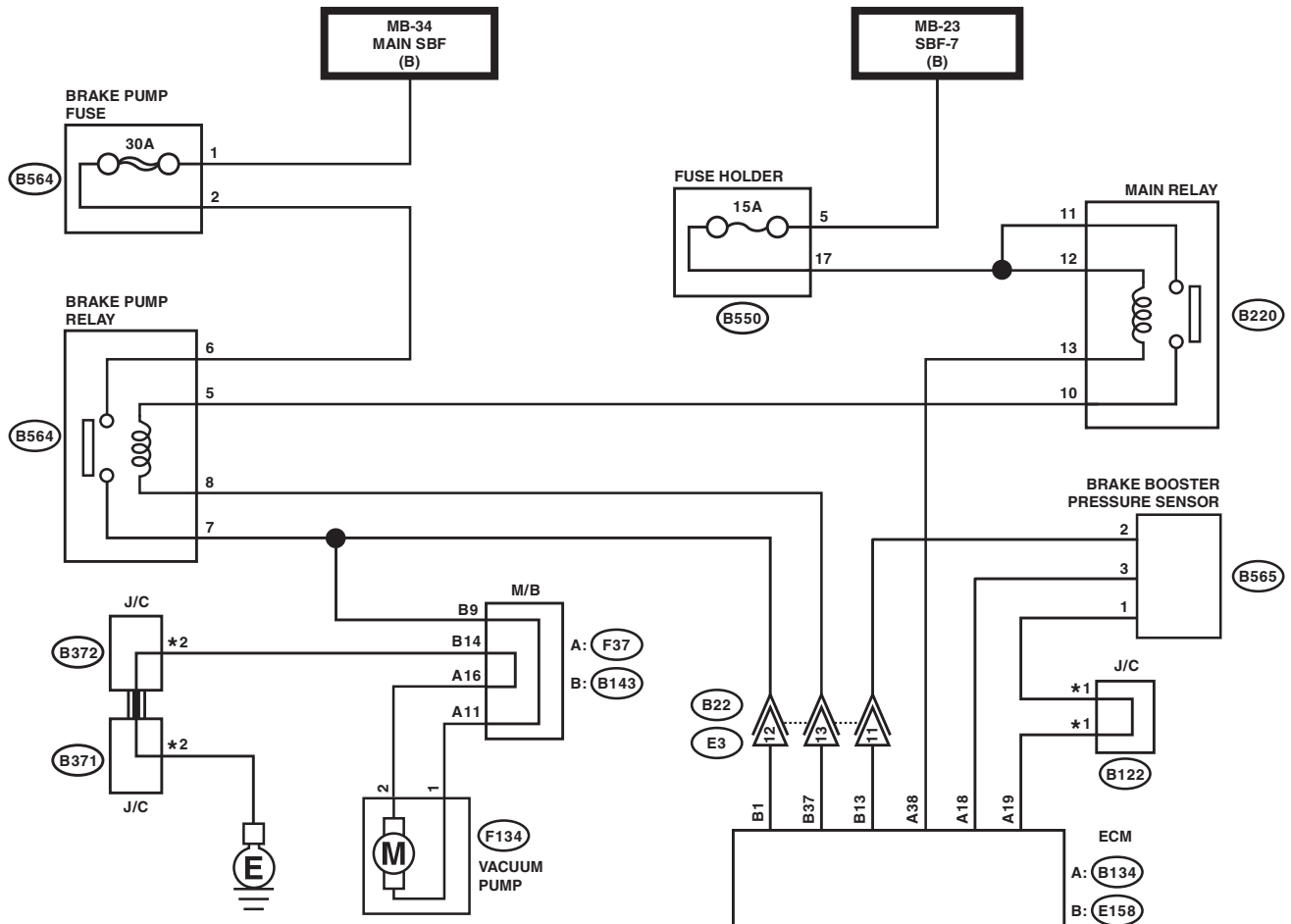
Drive does not match between brake vacuum pump relay and brake vacuum pump.

TROUBLE SYMPTOM:

Vacuum pump does not operate properly.

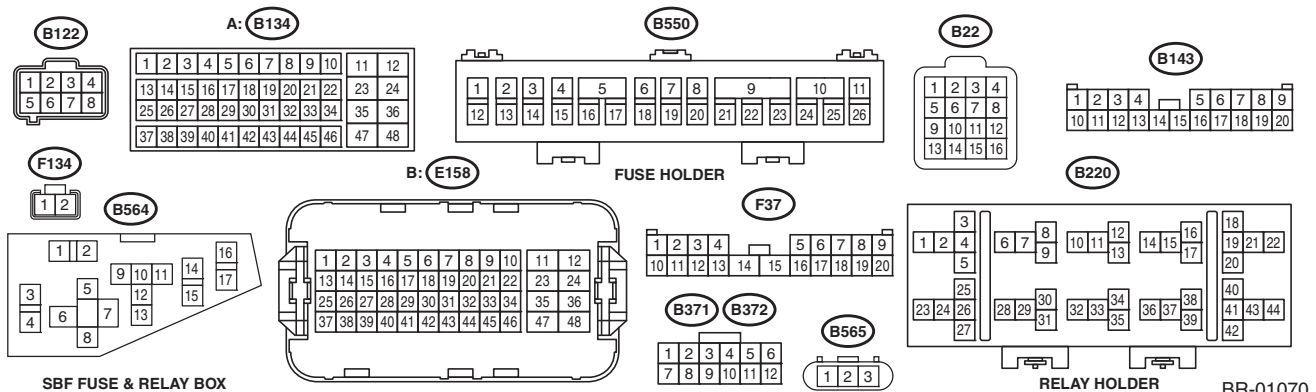
WIRING DIAGRAM:

Vacuum pump control system <Ref. to WI-415, WIRING DIAGRAM, Vacuum Pump Control System.>



*1 : TERMINAL No. OPTIONAL ARRANGEMENT

*2 : TERMINAL No. OPTIONAL ARRANGEMENT AMONG 7, 8, 9, 10, 11 AND 12



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

BRAKE VACUUM CONTROL (BVC) (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK BRAKE VACUUM PUMP RELAY. 1) Turn the ignition switch to OFF. 2) Remove the brake vacuum pump relay from relay box. 3) Connect the battery to the brake vacuum pump relay terminals No. 5 and No. 8. 4) Measure the resistance between brake vacuum pump relay terminals. Terminals No. 6 — No. 7:	Is the resistance less than 1 Ω ?	Go to step 2.	Replace the brake vacuum pump relay.
2 CHECK BRAKE VACUUM PUMP RELAY POWER SUPPLY. 1) Turn the ignition switch to ON. 2) Measure the voltage between brake vacuum pump relay connector and chassis ground. Connector & terminal (B564) No. 5 (+) — Chassis ground (–): (B564) No. 6 (+) — Chassis ground (–):	Is the voltage 10 V or more?	Go to step 3.	Repair the open or ground shortcircuit of power supply circuit.
3 CHECK HARNESS BETWEEN ECM AND BRAKE VACUUM PUMP RELAY CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the ECM connector. 3) Measure the resistance of harness between ECM and brake vacuum pump relay connector terminal. Connector & terminal (E158) No. 1 — (B564) No. 7: (E158) No. 37 — (B564) No. 8:	Is the resistance less than 1 Ω ?	Go to step 4.	Repair the open circuit of harness between ECM and the brake vacuum pump relay connector terminal.
4 CHECK HARNESS BETWEEN THE BRAKE VACUUM PUMP AND BRAKE VACUUM PUMP RELAY CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the brake vacuum pump connector. 3) Measure the resistance of harness between brake vacuum pump and brake vacuum pump relay connector terminal. Connector & terminal (B564) No. 7 — (F134) No. 1:	Is the resistance less than 1 Ω ?	Go to step 5.	Repair the open circuit of harness between brake vacuum pump and brake vacuum pump relay connector terminal.
5 CHECK MOTOR GROUND. 1) Turn the ignition switch to OFF. 2) Disconnect the brake vacuum pump connector. 3) Measure the resistance between brake vacuum pump connector and chassis ground. Connector & terminal (F134) No. 2 — Chassis ground:	Is the resistance less than 1 Ω ?	Go to step 6.	Repair the ground circuit.
6 CHECK BRAKE VACUUM PUMP. 1) Turn the ignition switch to OFF. 2) Remove the brake vacuum pump. <Ref. to BR-79, REMOVAL, Brake Vacuum Pump.> 3) Connect the battery to the brake vacuum pump terminals No. 1 (+) and No. 2 (–).	Does the brake vacuum pump operate?	Go to step 7.	Replace the brake vacuum pump. <Ref. to BR-79, Brake Vacuum Pump.>

Diagnostic Procedure with Diagnostic Trouble Code (DTC)

BRAKE VACUUM CONTROL (BVC) (DIAGNOSTICS)

Step	Check	Yes	No
7 CHECK ECM. 1) Connect the brake vacuum pump, brake vacuum pump relay, and connector. 2) Perform the Sequence Control Mode. <Ref. to BVC(diag)-9, SEQUENCE CONTROL MODE, OPERATION, Subaru Select Monitor.>	Does the brake vacuum pump operate?	Temporary poor contact occurs.	Replace the ECM. <Ref. to FU(H4DOTC)-134, Engine Control Module (ECM).>

BRAKE VACUUM CONTROL (BVC) (DIAGNOSTICS)

F: DTC 23 PUMP CONTINUOUS WORK

DTC DETECTING CONDITION:

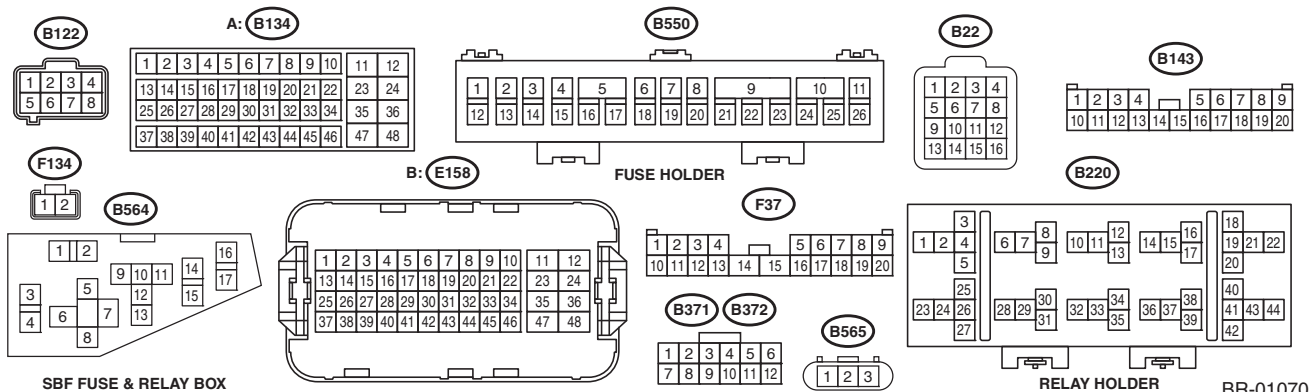
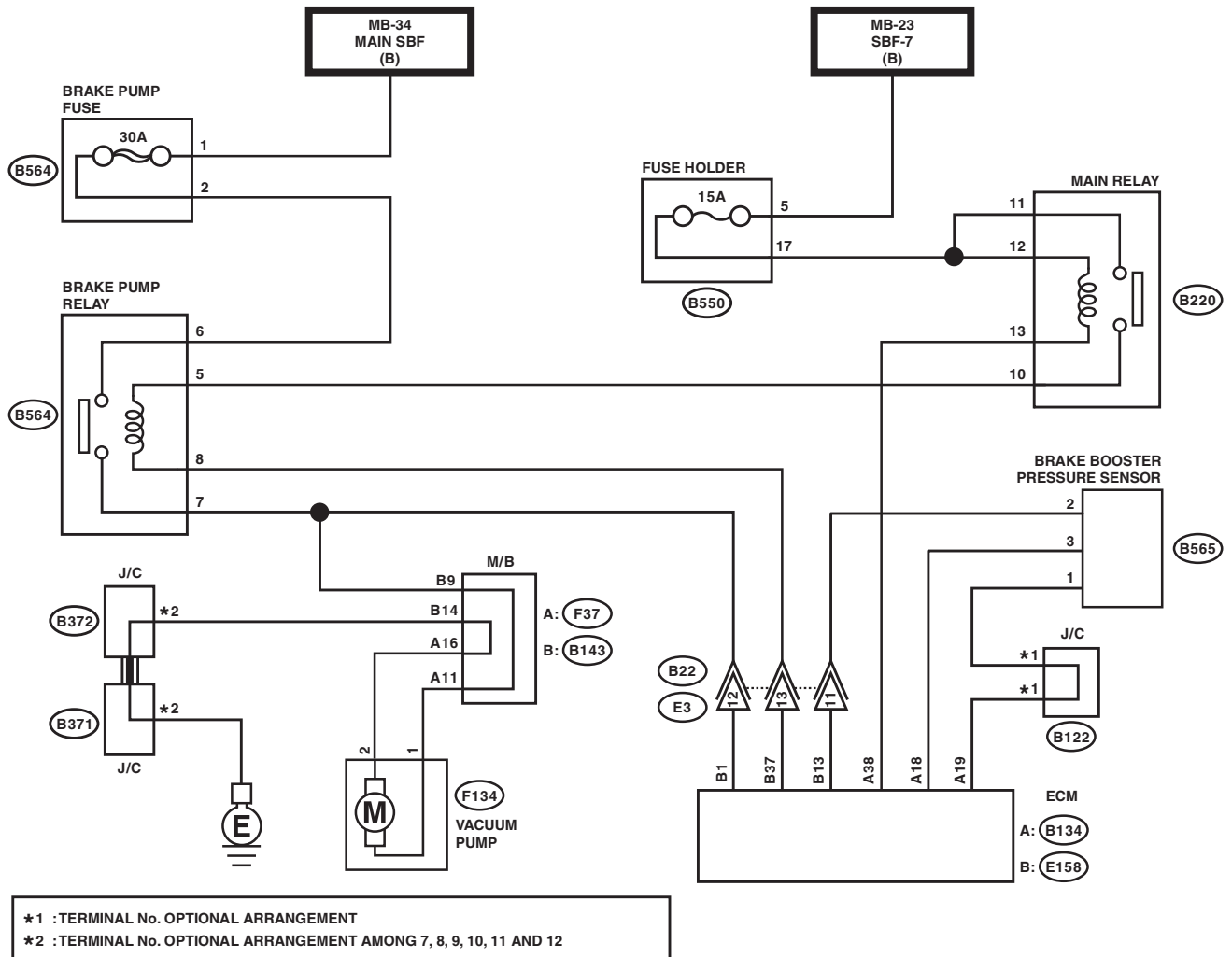
Malfunction in brake vacuum pump continuous drive error

TROUBLE SYMPTOM:

Brake vacuum pump operates continuously.

WIRING DIAGRAM:

Vacuum pump control system <Ref. to WI-415, WIRING DIAGRAM, Vacuum Pump Control System.>



Diagnostic Procedure with Diagnostic Trouble Code (DTC)

BRAKE VACUUM CONTROL (BVC) (DIAGNOSTICS)

Step	Check	Yes	No
1 CHECK BRAKE VACUUM HOSE. 1) Turn the ignition switch to OFF. 2) Check the status of the brake vacuum hose connection.	Is the brake vacuum hose connected firmly?	Go to step 2.	Connect the brake vacuum hose.
2 CHECK BRAKE VACUUM HOSE. 1) Turn the ignition switch to ON and start engine. 2) Check for leakage from the brake vacuum hose.	Is there a leak from the brake vacuum hose?	Replace the brake vacuum hose.	Go to step 3.
3 CHECK BRAKE VACUUM PUMP RELAY. 1) Turn the ignition switch to OFF. 2) Remove the brake vacuum pump relay from relay box. 3) Connect the battery to the brake vacuum pump relay terminals No. 5 and No. 8. 4) Measure the resistance between brake vacuum pump relay terminals. Terminals No. 6 — No. 7:	Is the resistance less than 1 Ω ?	Go to step 4.	Replace the brake vacuum pump relay.
4 CHECK BRAKE VACUUM PUMP RELAY POWER SUPPLY. 1) Turn the ignition switch to ON. 2) Measure the voltage between brake vacuum pump relay connector and chassis ground. Connector & terminal (B564) No. 5 (+) — Chassis ground (—): (B564) No. 6 (+) — Chassis ground (—):	Is the voltage 10 V or more?	Go to step 5.	Repair the open or ground shortcircuit of power supply circuit.
5 CHECK HARNESS BETWEEN ECM AND BRAKE VACUUM PUMP RELAY CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the ECM connector. 3) Measure the resistance of harness between ECM and brake vacuum pump relay connector terminal. Connector & terminal (E158) No. 1 — (B564) No. 7: (E158) No. 37 — (B564) No. 8:	Is the resistance less than 1 Ω ?	Go to step 6.	Repair the open circuit of harness between ECM and the brake vacuum pump relay connector terminal.
6 CHECK HARNESS BETWEEN THE BRAKE VACUUM PUMP AND BRAKE VACUUM PUMP RELAY CONNECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the brake vacuum pump connector. 3) Measure the resistance of harness between brake vacuum pump and brake vacuum pump relay connector terminal. Connector & terminal (B564) No. 7 — (F134) No. 1:	Is the resistance less than 1 Ω ?	Go to step 7.	Repair the open circuit of harness between brake vacuum pump and brake vacuum pump relay connector terminal.
7 CHECK ECM. 1) Connect the brake vacuum pump, brake vacuum pump relay, and connector. 2) Perform the Sequence Control Mode. <Ref. to BVC(diag)-9, SEQUENCE CONTROL MODE, OPERATION, Subaru Select Monitor.>	Does the brake vacuum pump operate?	Temporary poor contact occurs.	Replace the ECM. <Ref. to FU(H4DOTC)-134, Engine Control Module (ECM).>

General Diagnostic Table

BRAKE VACUUM CONTROL (BVC) (DIAGNOSTICS)

12.General Diagnostic Table

A: INSPECTION

Symptoms		Main probable cause	Other probable cause
Poor brake performance	Long braking/stopping distance	• Brake pad • Aeration to brake line • Tire specifications, tire wear and air pressures • Incorrect wiring or piping connections	• Master cylinder • Brake caliper • Disc rotor • Brake pipe • Brake booster
	Long brake pedal stroke	• Aeration to brake line • Brake pedal play	• Master cylinder • Brake caliper • Brake pad • Brake pipe • Brake booster
	Short brake pedal stroke	• Brake vacuum pump • Brake vacuum sensor • Brake vacuum hose	• Master cylinder • Brake caliper • Brake pad • Brake pipe • Brake booster



PARKING BRAKE

PB

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1. General Description	2
2. Parking Brake Lever	4
3. Parking Brake Cable	10
4. Parking Brake Assembly (Rear Disc Brake)	16
5. General Diagnostic Table	25



General Description

PARKING BRAKE

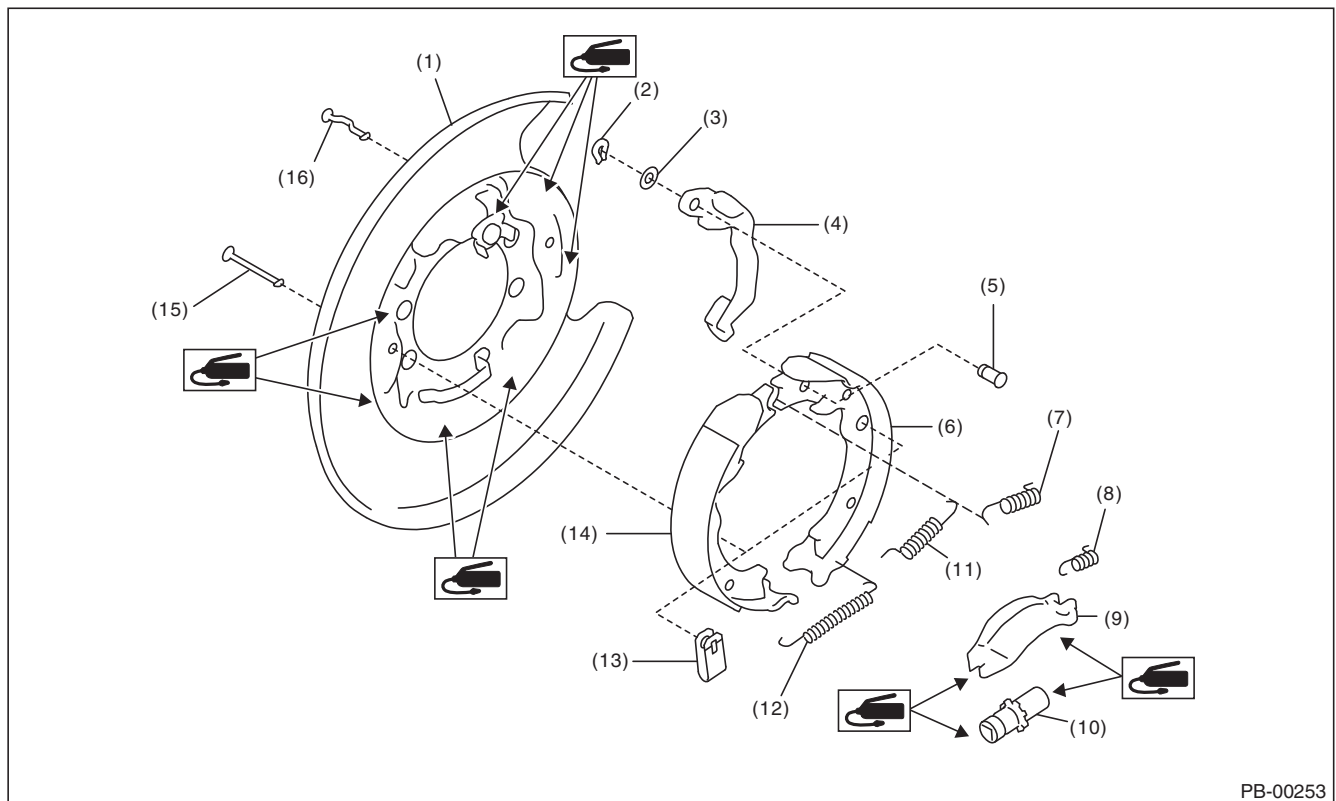
1. General Description

A: SPECIFICATION

Model		Rear disc brake
Type		Mechanical, drum in disc rear brakes
Effective drum diameter	mm (in)	170 (6.69)
Lining dimensions (Length × Width × Thickness)	mm (in)	147.7 × 30.0 × 3.5 (5.81 × 1.181 × 0.14)
Clearance adjustment		Manual adjustment
Lever stroke	Notches/N (kgf, lbf)	7 — 8/200 (20.4, 45)

B: COMPONENT

1. PARKING BRAKE (REAR DISC BRAKE)

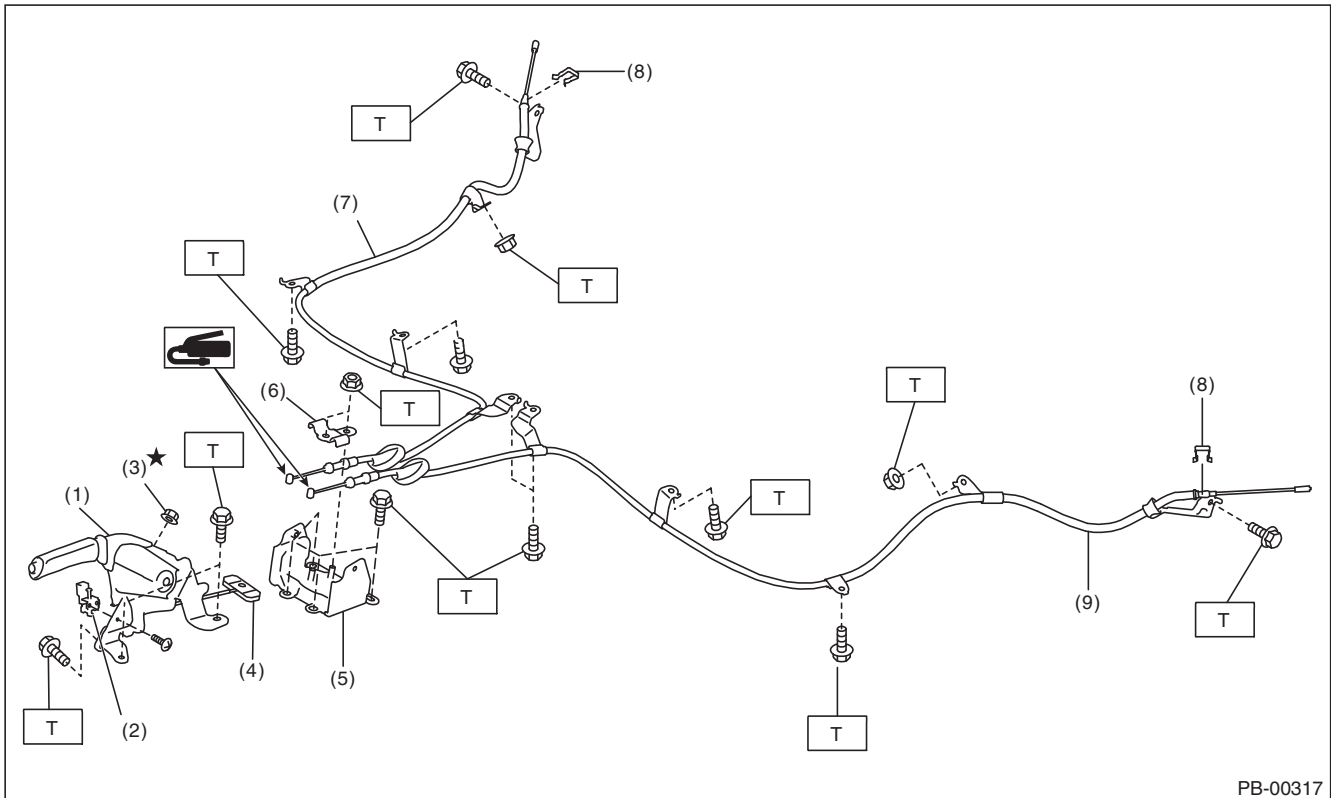


- | | | |
|------------------------------------|------------------------------------|-------------------------------------|
| (1) Back plate - rear brake | (7) Spring - secondary shoe return | (13) Cup - shoe hold-down |
| (2) Retainer - rear brake | (8) Spring - strut | (14) Parking brake shoe (primary) |
| (3) Spring washer - rear brake | (9) Strut - brake | (15) Pin - primary shoe hold-down |
| (4) Parking lever - rear | (10) Adjuster ASSY - rear brake | (16) Pin - secondary shoe hold-down |
| (5) Pin - parking lever | (11) Spring - primary shoe return | |
| (6) Parking brake shoe (secondary) | (12) Spring - adjuster | |

General Description

PARKING BRAKE

2. PARKING BRAKE LEVER & CABLE



- | | | |
|--------------------------------------|-----------------------------------|--|
| (1) Lever ASSY - hand brake | (5) Bracket | (9) Cable ASSY - parking brake LH |
| (2) Switch ASSY - hand brake | (6) Clamp A - hand brake cable | |
| (3) Adjusting nut (self-locking nut) | (7) Cable ASSY - parking brake RH | Tightening torque: N·m (kgf-m, ft-lb) |
| (4) Equalizer | (8) Clamp B - hand brake cable | T: 18 (1.84, 13.3) |

C: CAUTION

- Wear appropriate work clothing, including a helmet, protective goggles and protective shoes when performing any work.
- Before removal, installation or disassembly, be sure to clarify the failure. Avoid unnecessary removal, installation, disassembly and replacement.
- Vehicle components are extremely hot after driving. Be wary of receiving burns from heated parts.
- Use SUBARU genuine grease etc. or equivalent. Do not mix grease etc. of different grades or manufacturers.
- Be sure to tighten fasteners including bolts and nuts to the specified torque.
- Place shop jacks or rigid racks at the specified points.
- Make sure grease does not come into contact with the parking shoes.

D: PREPARATION TOOL

1. GENERAL TOOL

TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance and voltage.

Parking Brake Lever

PARKING BRAKE

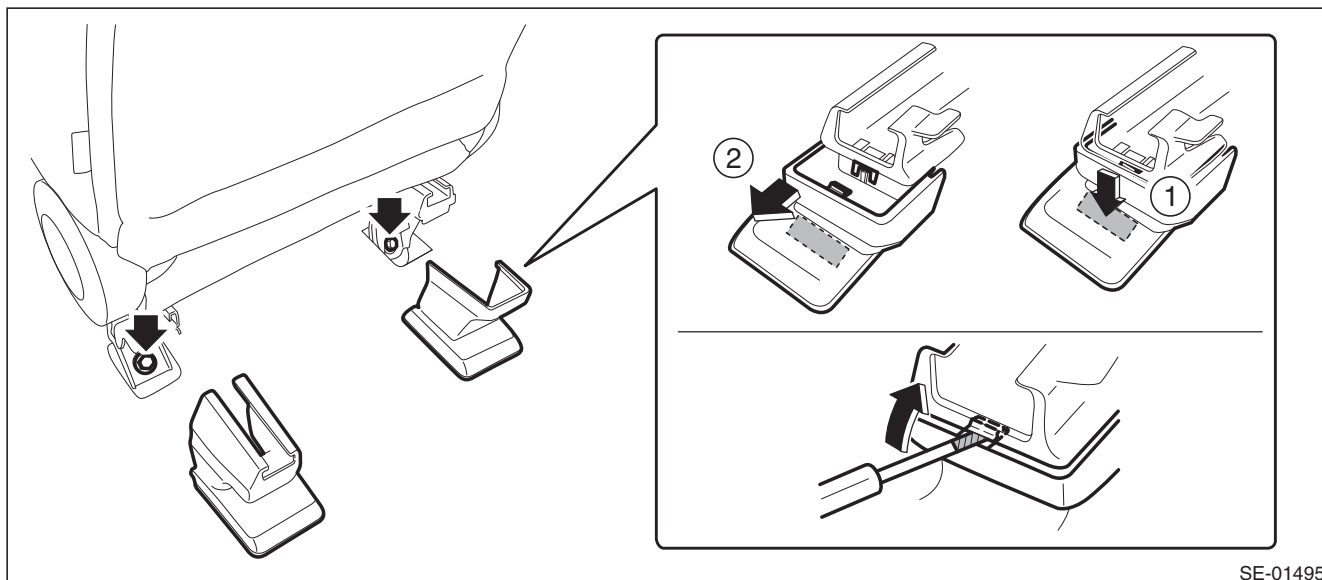
2. Parking Brake Lever

A: REMOVAL

- 1) Set the wheel stoppers to tires.
- 2) Move the passenger's seat towards the front.
- 3) Remove the driver's seat.
 - (1) Tilt the backrest assembly forward and move the front seat to the mid point on the slide rail.
 - (2) Remove the bolts on the front side of the front seat.
 - (3) Remove the cover - bolt rear.
 1. While spreading the tip of the cover - bolt rear OUT side to side, pull it out toward you to remove.
 2. Remove the cover - bolt rear INN.

NOTE:

- Firmly push in the cover - bolt rear INN at the point shown in the figure until a clicking sound is heard and remove it.
- If it is difficult to remove, release the claw using a flat tip screwdriver wrapped with protection tape while pushing the point shown in the figure to remove.
- (4) Remove the bolts on the rear side of the front seat.



- 4) Disconnect the ground cable from battery and wait for at least 60 seconds before starting work.

CAUTION:

The airbag system is fitted with a backup power supply. After disconnecting the battery ground cable, the airbag may operate if you do not wait for 60 seconds before starting the service of airbag system.

NOTE:

On CVT models, shift the select lever into "N" before disconnecting the battery ground cable.

- 5) Disconnect the connector under the front seat.

CAUTION:

For the power seat, check that the battery ground cable is disconnected. If not, disconnect the battery ground cable and wait for 60 seconds or more.

- Seat belt warning light connector
 - Side airbag connector <Ref. to AB-26, SIDE AIRBAG MODULE, PROCEDURE, Airbag Connector.>
 - Seat heater connector (model with seat heater)
- 6) Take out the front seat from the vehicle.

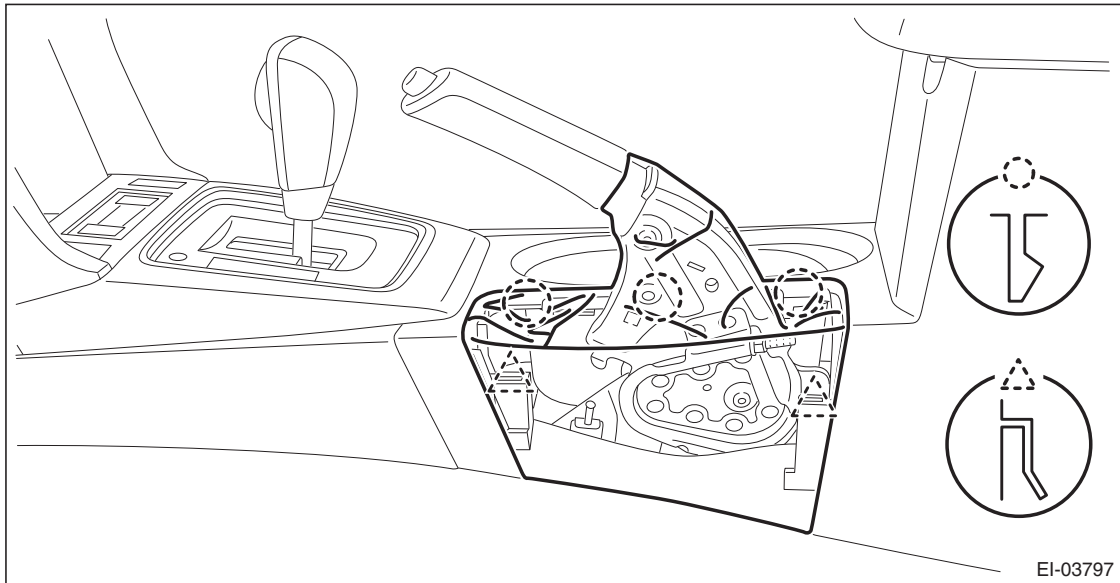
CAUTION:

Be careful not to damage the body.

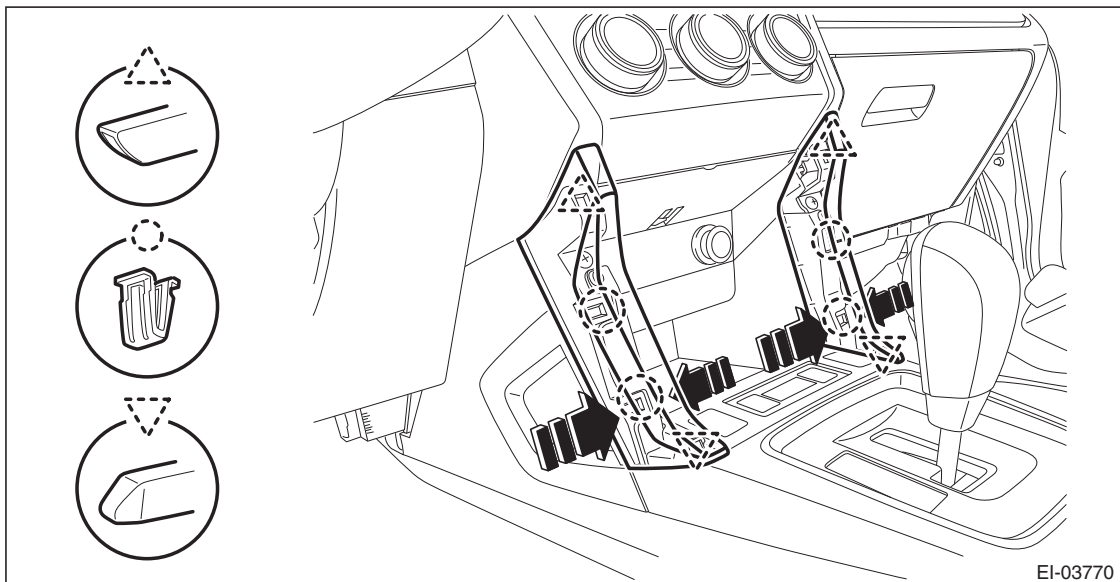
Parking Brake Lever

PARKING BRAKE

7) Release the claws, and then remove the boot - hand brake.



8) Release the clips, and remove the ornament panel - console.



NOTE:

Removal is easier if you grab the arrow sections from right and left and pull them at the same time.

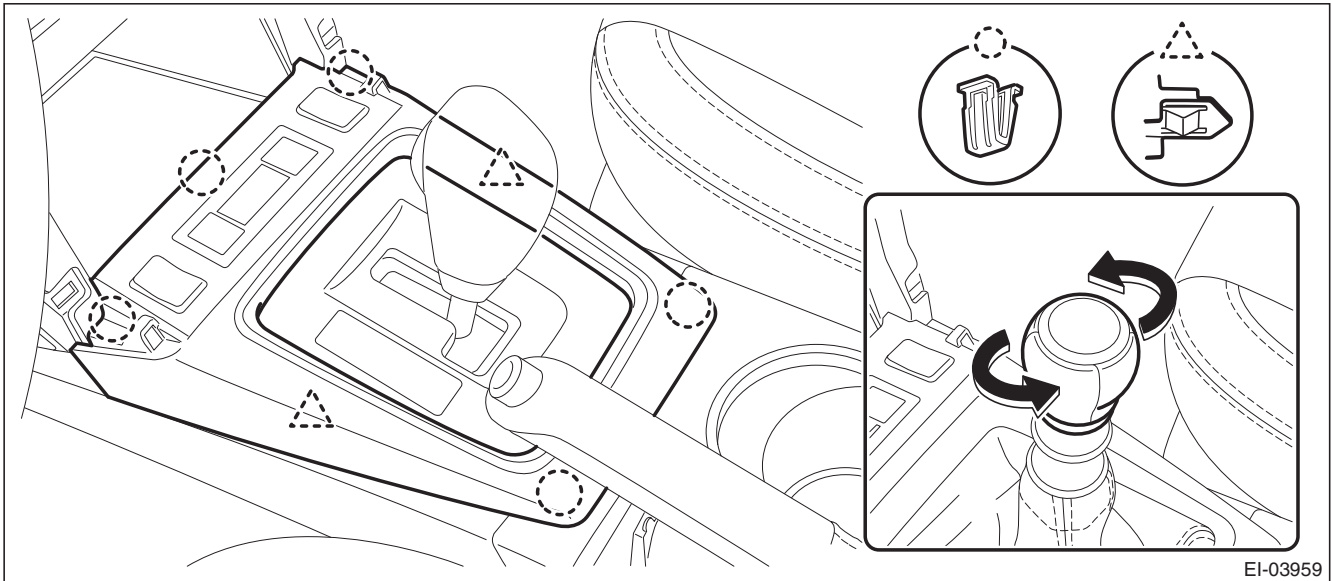
Parking Brake Lever

PARKING BRAKE

9) Remove the cover - shift lever.

(1) Remove the shift knob. (MT model)

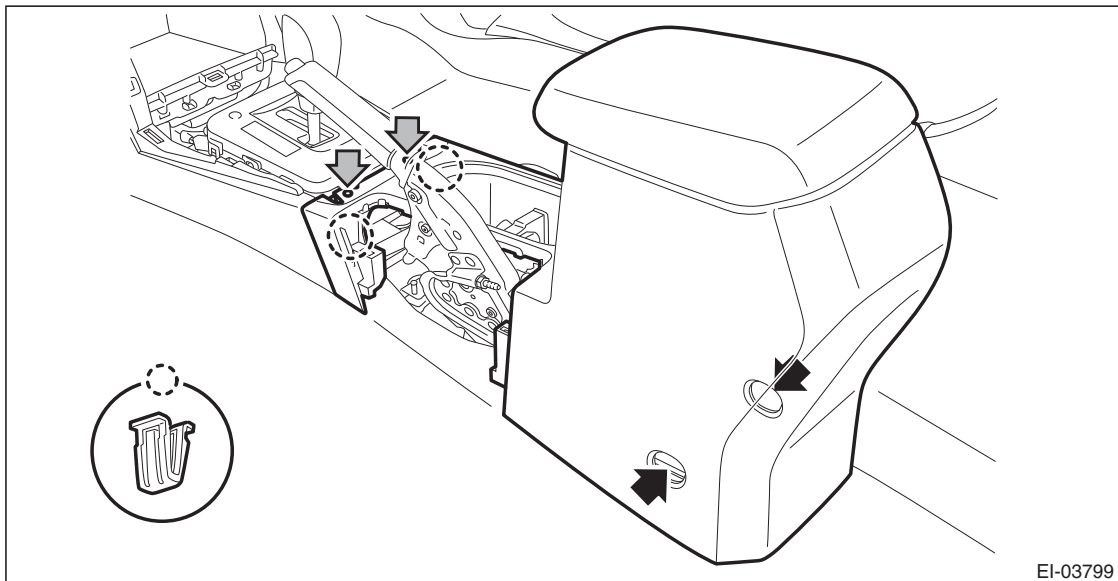
(2) Release the clips and claws, then pull up the cover - shift lever.



10) Remove the console box assembly.

(1) Move the seat forward, and remove the bolts after detaching the left and right caps.

(2) Remove the screws and clips, disconnect the harness connector and remove the console box assembly.



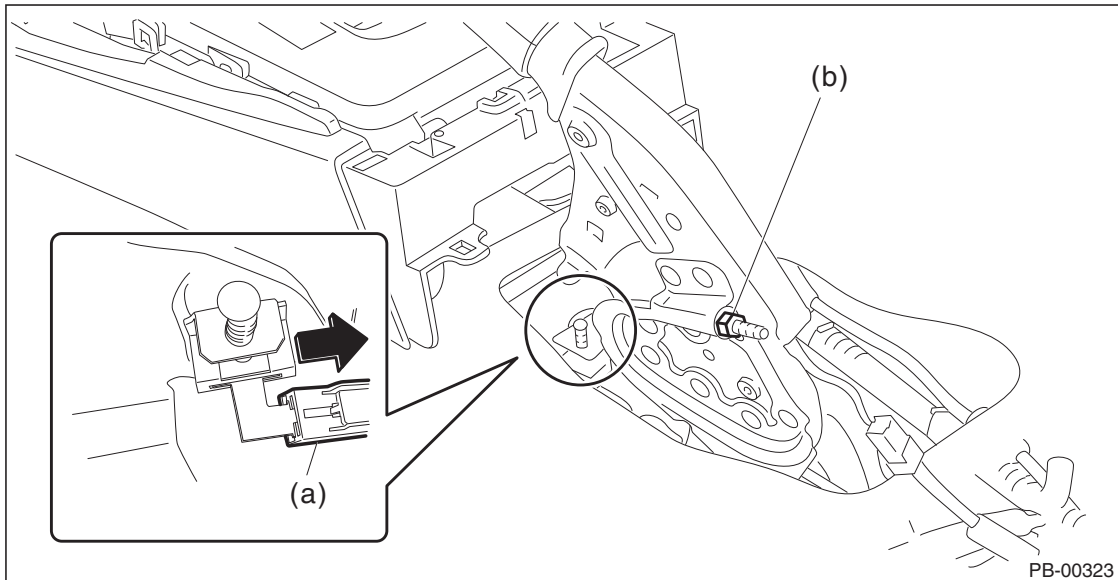
Parking Brake Lever

PARKING BRAKE

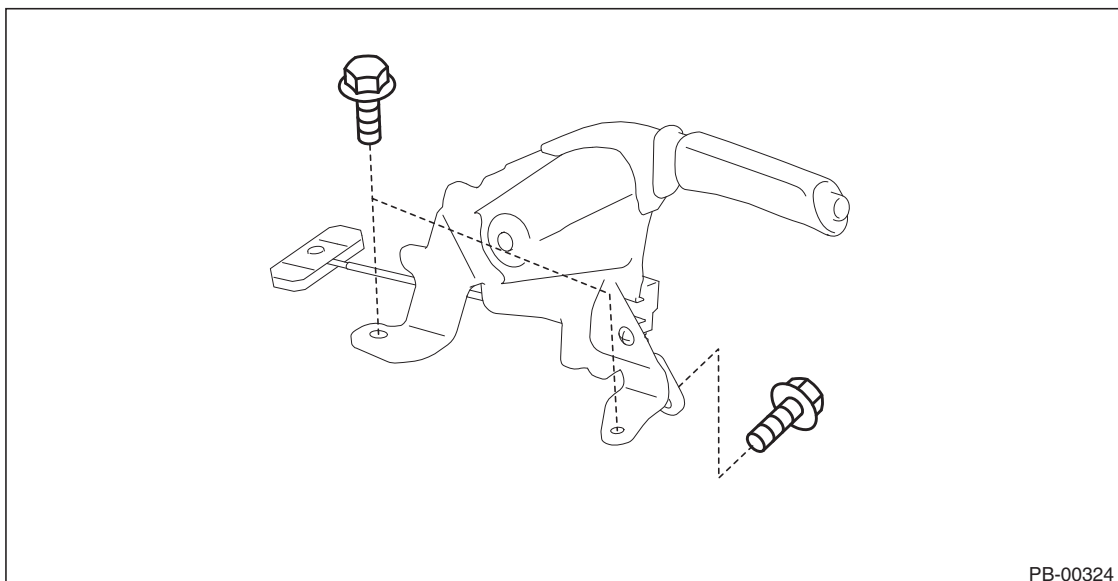
- 11) Remove the lever assembly - hand brake.
 - (1) Disconnect the connector (a) of the switch assembly - hand brake.
 - (2) Remove the adjusting nut (b).

CAUTION:

A self-locking nut is used for the adjusting nut of parking cable. Therefore, replace the self-locking nut with a new one when disassembling.



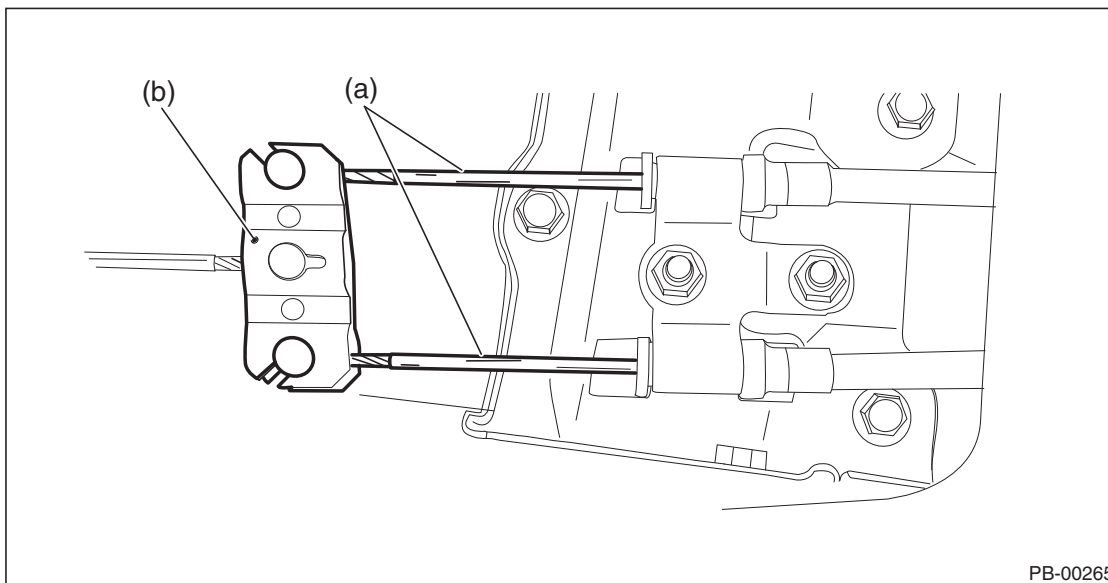
- (3) Remove the bolt, and then remove the lever assembly - hand brake.



Parking Brake Lever

PARKING BRAKE

12) Remove the inner cable end (a) from the equalizer (b).



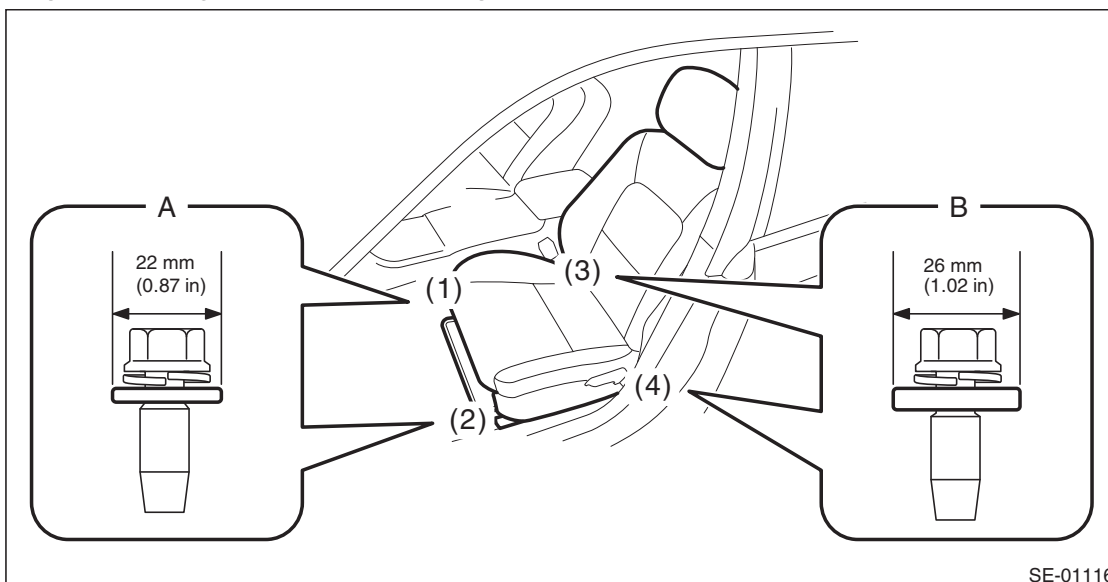
PB-00265

B: INSTALLATION

1) Install each part in the reverse order of removal.

CAUTION:

- The front seat mounting bolts differ between the front mounting points and the rear mounting points. When installing the front seat, make sure that you are using correct bolts at correct positions.
- Tighten the slide rail assembly installing bolts in the order as shown in the figure, in several steps by gradually increasing the torque until they reach the specified torque.



SE-01116

- Front (bolt A): Washer diameter 22 mm (0.87 in)
- Rear (bolt B): Washer diameter 26 mm (1.02 in)

Tightening torque:

Front seat assembly: 53 N·m (5.40 kgf·m, 39.1 ft·lb)

Tightening torque:

Lever assembly - hand brake: 18 N·m (1.84 kgf·m, 13.3 ft·lb)

Console box assembly: 6.5 N·m (0.66 kgf·m, 4.8 ft·lb)

2) Install a new adjusting nut (self-locking nut).

Parking Brake Lever

PARKING BRAKE

3) Be sure to adjust the lever stroke. <Ref. to PB-9, ADJUSTMENT, Parking Brake Lever.>

C: INSPECTION

1. LEVER ASSY

- 1) Operate the lever assembly - hand brake 3 to 4 times and fully return the lever assembly - hand brake.
- 2) While slowly pulling up the lever assembly - hand brake, count the notches.

Lever stroke:

7 to 8 notches when pulled with a force of 200 N (20.4 kgf, 45 lbf)

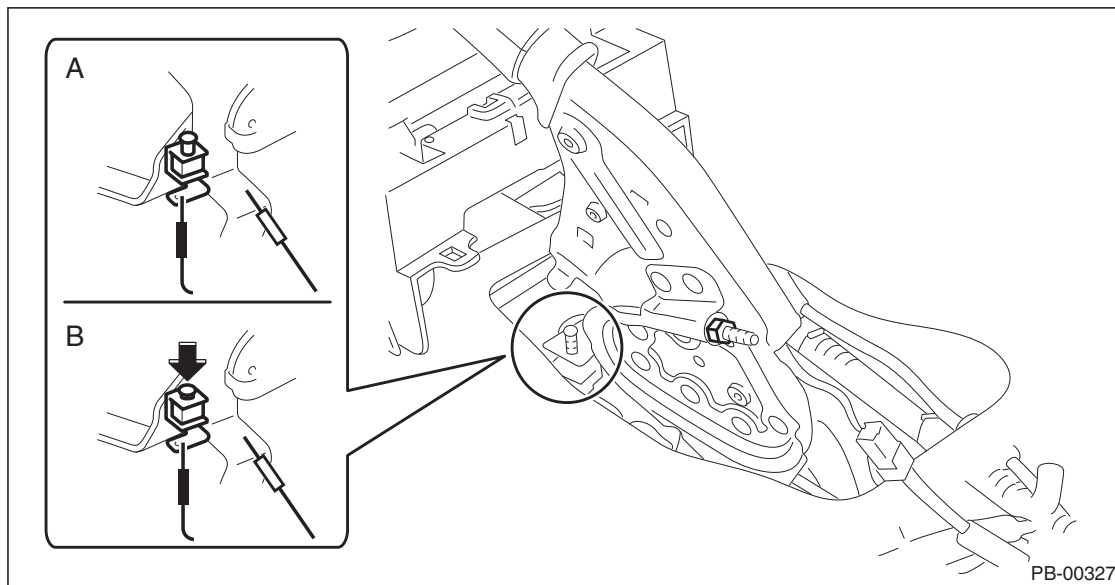
If it is not within the specified value, adjust the parking brake. <Ref. to PB-23, ADJUSTMENT, Parking Brake Assembly (Rear Disc Brake).>

2. SWITCH ASSEMBLY

- 1) Measure the resistance between the switch assembly - hand brake and chassis ground.

Preparation tool:

Circuit tester



	Switch position	Standard
A	When shaft is free (ON)	Less than 1 Ω
B	When shaft is pressed in (OFF)	10 k Ω or more

If it is not within the specified value, replace the switch assembly - hand brake.

D: ADJUSTMENT

Adjust the parking lever stroke. <Ref. to PB-24, LEVER STROKE, ADJUSTMENT, Parking Brake Assembly (Rear Disc Brake).>

Parking Brake Cable

PARKING BRAKE

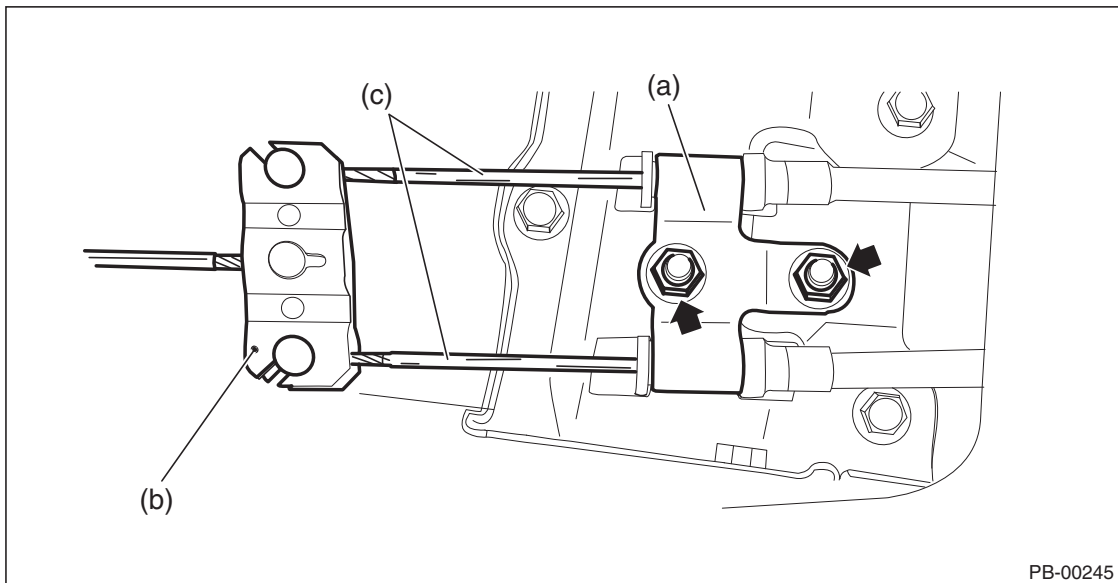
3. Parking Brake Cable

A: REMOVAL

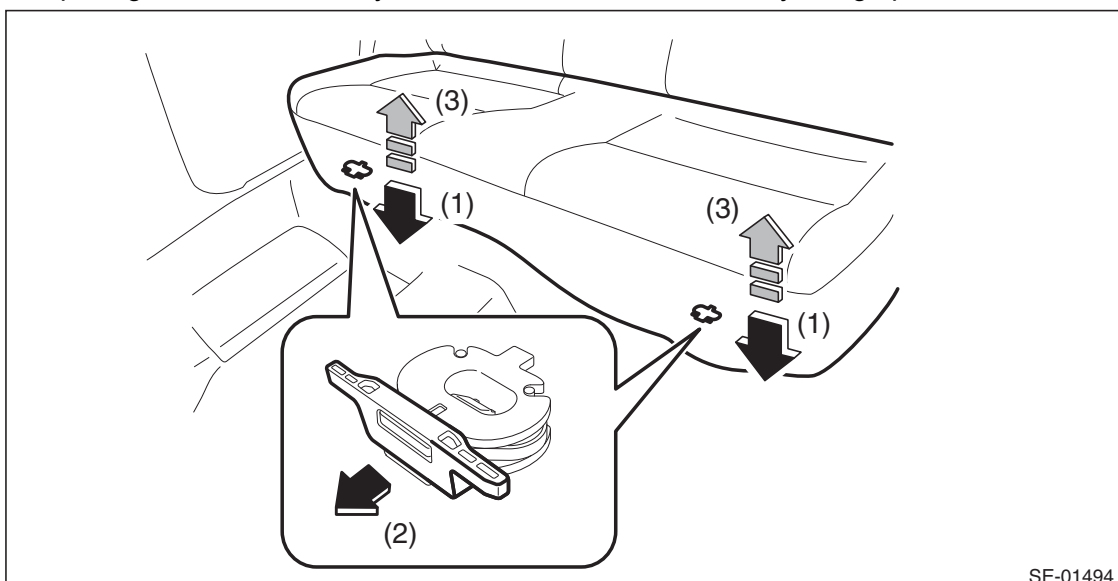
CAUTION:

- Airbag system satellite safing sensor is located in the lower of the rear seat cushion center. Before removing the rear seat, refer to "CAUTION" of "General Description" in "AIRBAG SYSTEM" section. <Ref. to AB-9, CAUTION, General Description.>
- The airbag system is fitted with a backup power supply. After disconnecting the battery ground cable, the airbag may operate if you do not wait for 60 seconds before starting the service of airbag system.

- 1) Remove the lever assembly - hand brake. <Ref. to PB-4, REMOVAL, Parking Brake Lever.>
- 2) Remove the nut and remove the clamp A - hand brake cable (a).
- 3) Remove the inner cable end (c) from the equalizer (b).



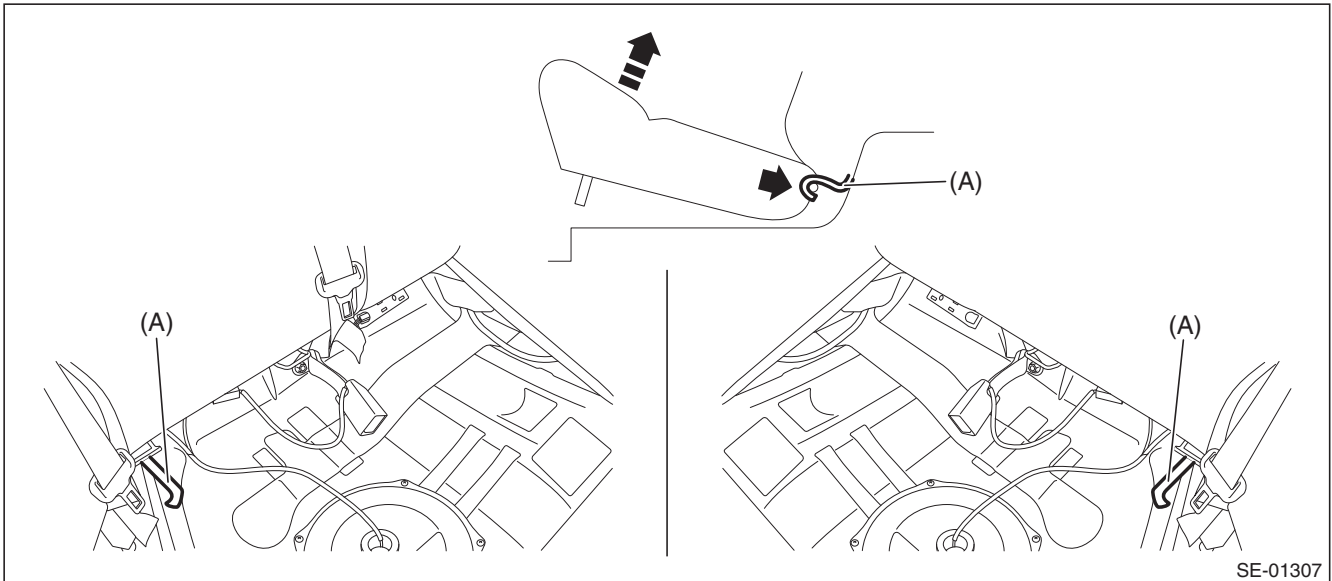
- 4) Remove the rear seat cushion assembly.
 - (1) Push the corners of the rear seat cushion from above.
 - (2) While pushing the corners of the rear seat cushion from above, pull the knob of the hook - seat cushion rear towards yourself.
 - (3) While pulling the knob towards yourself, disconnect the hooks by lifting up the rear seat cushion.



Parking Brake Cable

PARKING BRAKE

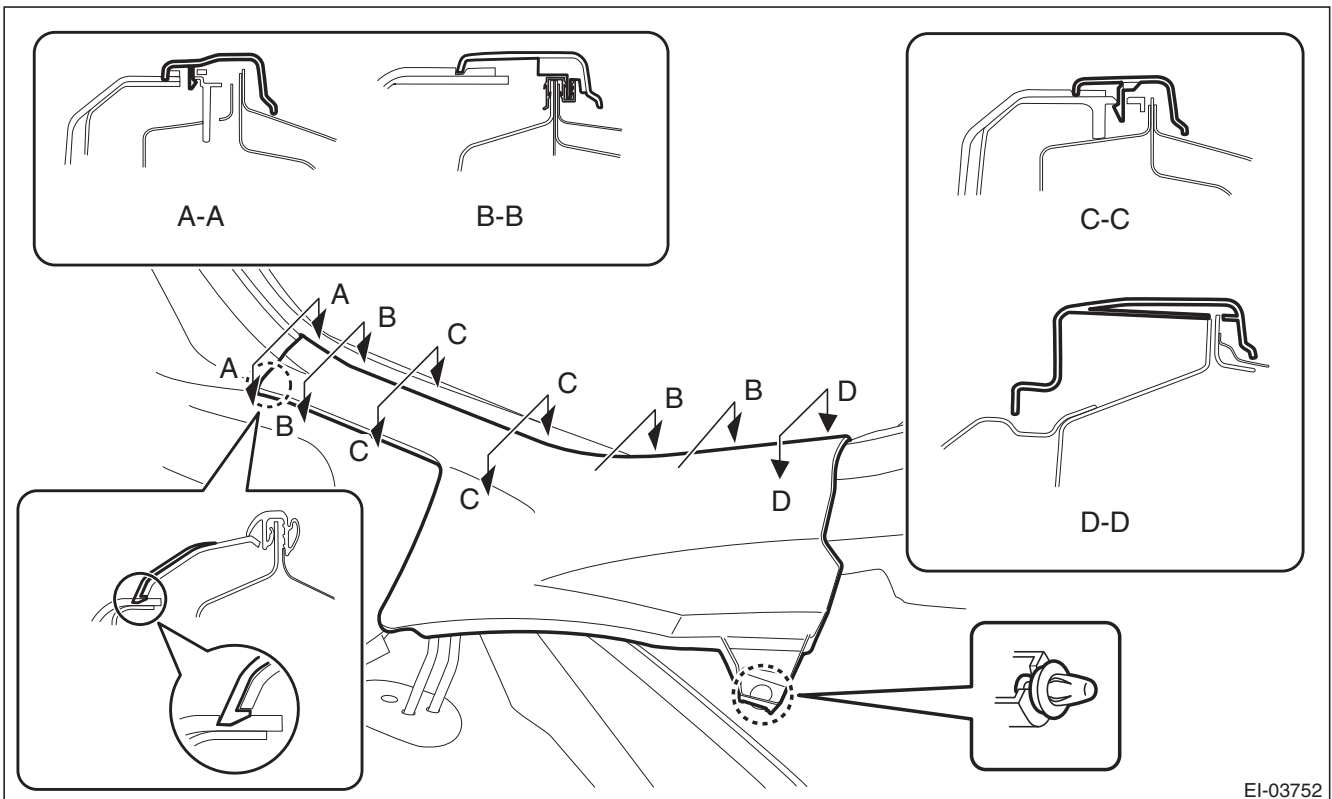
- (4) Remove the hook (A) by pushing it back while lifting the front side of the rear seat cushion, and remove the rear seat cushion.



- 5) Release the clips and claws, and remove the side sill covers - rear INN on the left and right sides.

CAUTION:

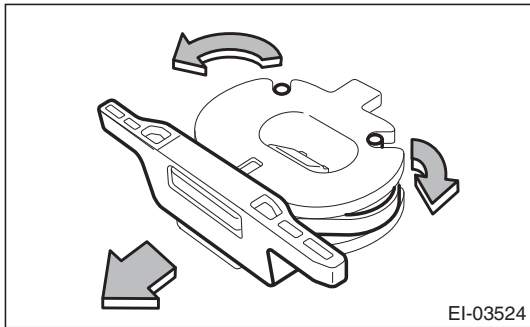
Do not pull with excessive force. Doing so may damage the claws of the side sill cover - rear INN.



Parking Brake Cable

PARKING BRAKE

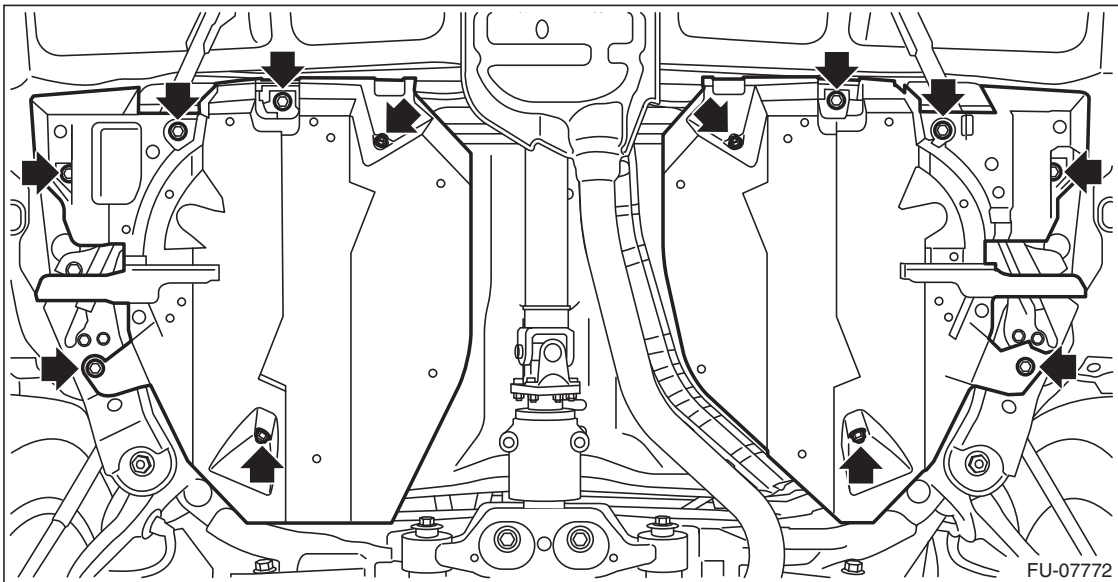
6) Remove the clips and knobs of the hook - seat cushion rear.



7) Turn over the floor carpet and remove the grommet of the cable assembly - parking brake from the rear floor.

8) Lift up the vehicle, and then remove the rear wheels.

9) Remove the bolt and nuts and remove the fuel tank protector.



10) Remove the cable assembly - parking brake from the lever section of parking brake shoe. <Ref. to PB-16, REMOVAL, Parking Brake Assembly (Rear Disc Brake).>

11) Remove the exhaust pipe and muffler.

- Center exhaust pipe

Turbo model: <Ref. to EX(H4DOTC)-30, REMOVAL, Center Exhaust Pipe.>

Non-turbo model: <Ref. to EX(H4DO)-14, REMOVAL, Center Exhaust Pipe.>

- Rear exhaust pipe

Turbo model: <Ref. to EX(H4DOTC)-45, REMOVAL, Rear Exhaust Pipe.>

Non-turbo model: <Ref. to EX(H4DO)-18, REMOVAL, Rear Exhaust Pipe.>

- Muffler

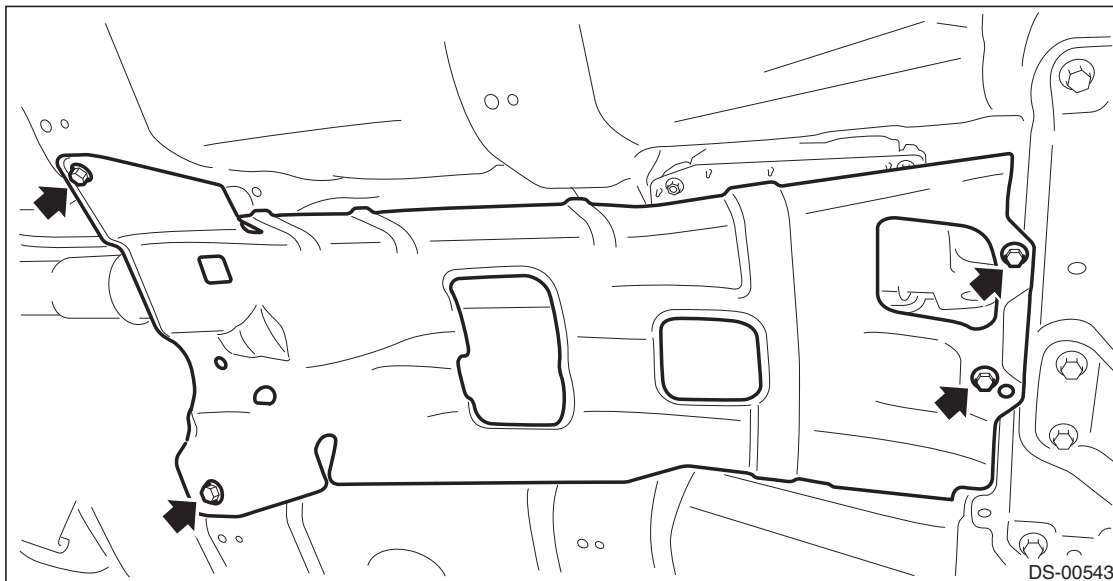
Turbo model: <Ref. to EX(H4DOTC)-48, REMOVAL, Muffler.>

Non-turbo model: <Ref. to EX(H4DO)-21, REMOVAL, Muffler.>

Parking Brake Cable

PARKING BRAKE

12) Remove the bolts to remove the front heat shield cover.

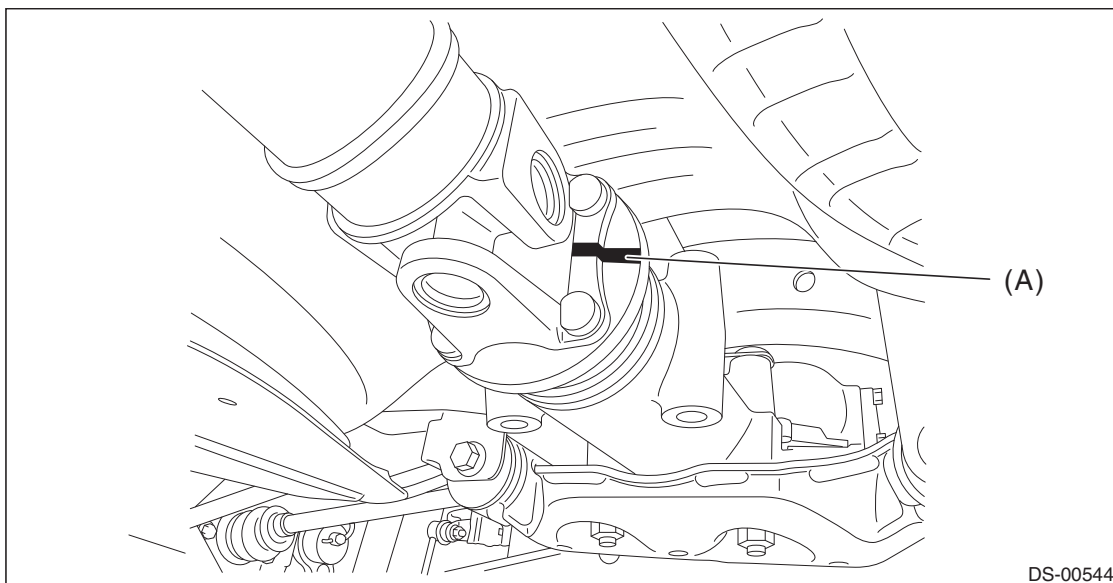


13) Remove the propeller shaft assembly.

CAUTION:

Do not disassemble the propeller shaft.

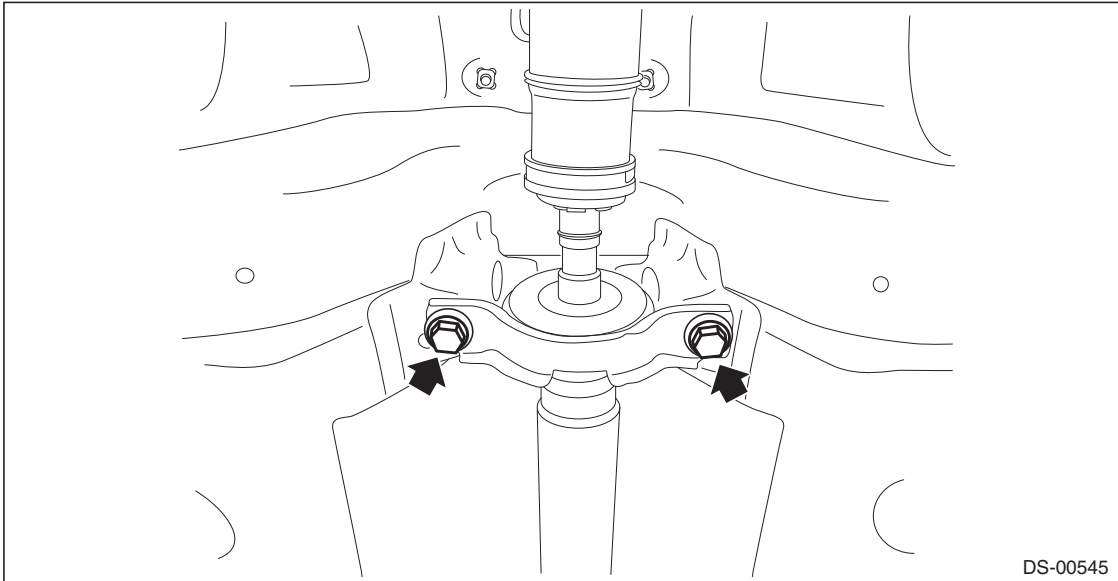
- (1) Place alignment marks (A) on the flange yoke and rear differential.
- (2) Remove four bolts holding the propeller shaft to the rear differential.



Parking Brake Cable

PARKING BRAKE

- (3) Remove the center bearing.



- (4) Remove the propeller shaft from transmission.

CAUTION:

Be careful not to damage oil seals and contact surface of the sleeve yoke.

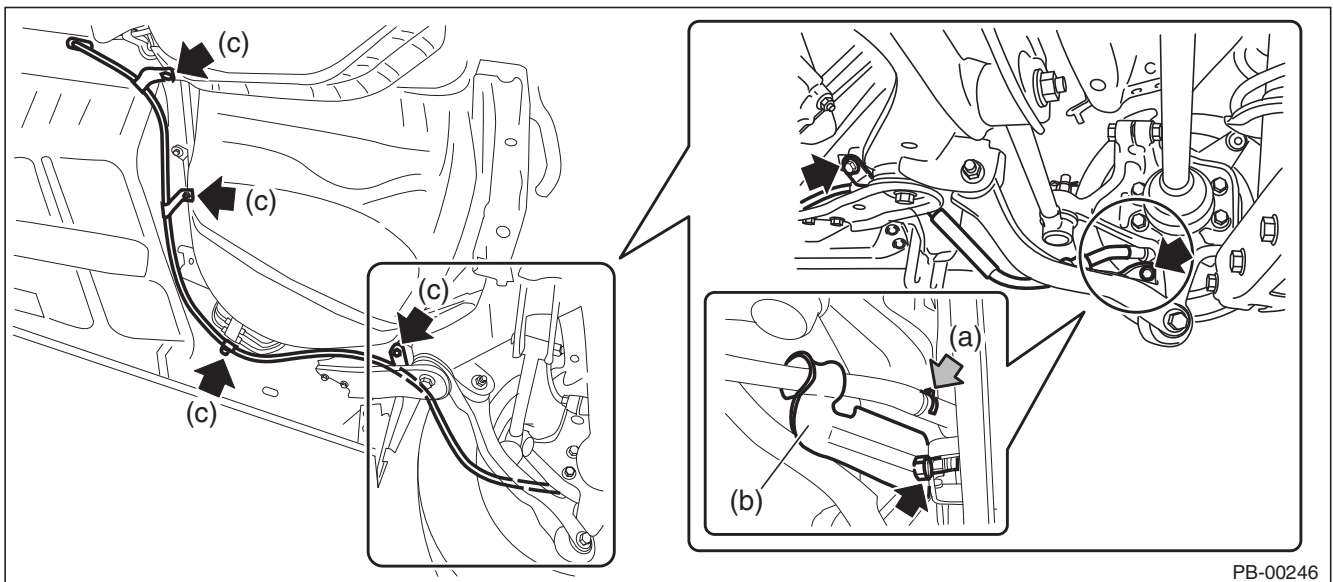
NOTE:

- Use a container to catch ATF or oil flowing from propeller shaft.
- To prevent ATF from leaking, install extension cap etc. to the transmission.

- 14) Remove the clamp B - hand brake cable (a) from the rear brake.

- 15) Remove the cable clamp (b) from the back plate - rear brake.

- 16) Remove the cable clamp (c) from the rear floor, and remove the cable assembly - parking brake.



B: INSTALLATION

1) Install each part in the reverse order of removal.

CAUTION:

Do not reuse the nut (self locking nut). Always replace with a new part.

Tightening torque:

Protector - fuel tank nut: 9 N·m (0.92 kgf-m, 6.6 ft-lb)

Protector - fuel tank bolt: 18 N·m (1.84 kgf-m, 13.3 ft-lb)

Cable clamp: 18 N·m (1.84 kgf-m, 13.3 ft-lb)

Rear wheel: 120 N·m (12.24 kgf-m, 88.5 ft-lb)

NOTE:

- Apply grease to the cable guide inside the tunnel, and pass the cable through.
 - After installing the backrest assembly, make sure that each seat belt operates normally.
 - Make sure that they are properly secured on each hook on the vehicle side.
- 2) Be sure to adjust the lever stroke. <Ref. to PB-9, ADJUSTMENT, Parking Brake Lever.>

C: INSPECTION

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

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



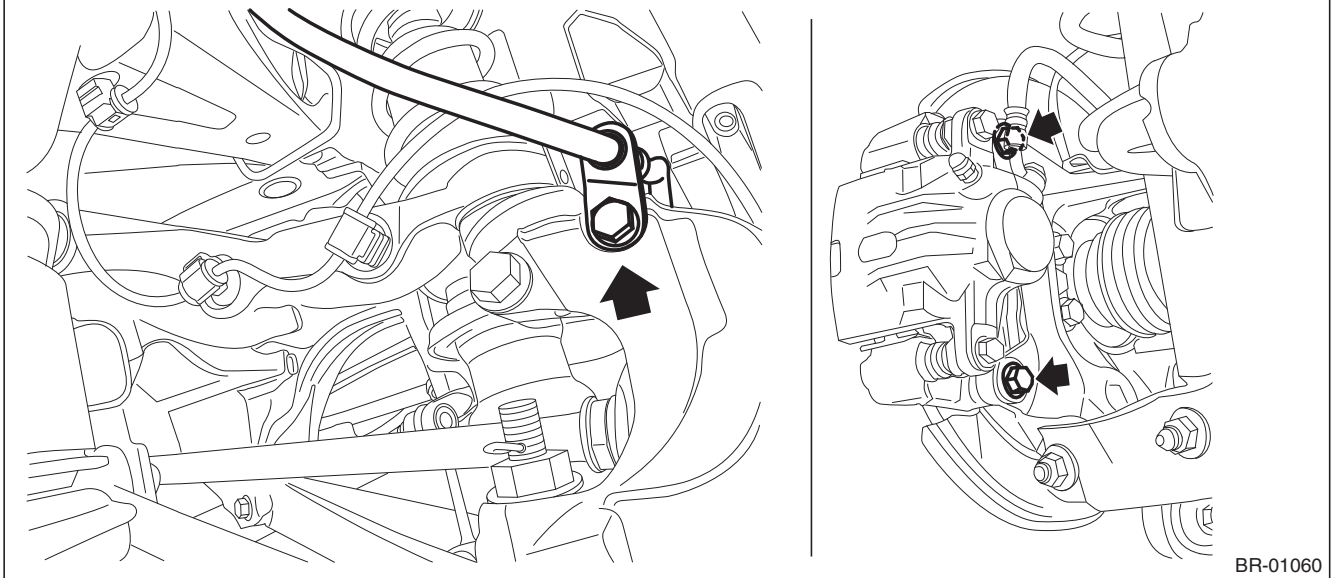
Parking Brake Assembly (Rear Disc Brake)

PARKING BRAKE

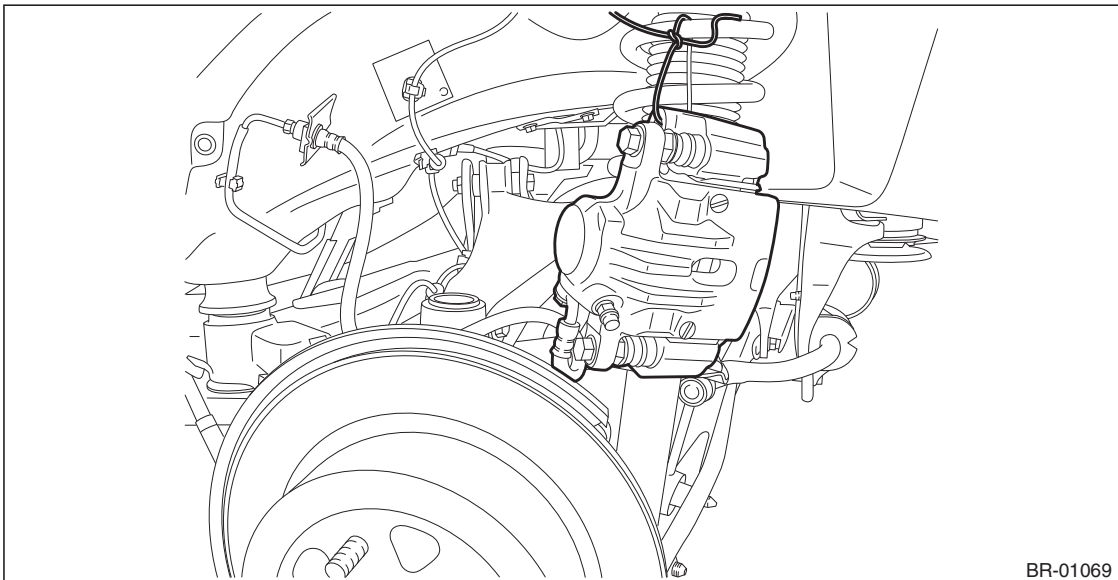
4. Parking Brake Assembly (Rear Disc Brake)

A: REMOVAL

- 1) Release the parking brake.
- 2) Lift up the vehicle, and then remove the rear wheels.
- 3) Remove the brake hose bracket.
- 4) Remove the attachment bolts and remove the rear disc brake caliper assembly.



- 5) Suspend the rear disc brake caliper assembly so that the brake hose is not stretched.



Parking Brake Assembly (Rear Disc Brake)

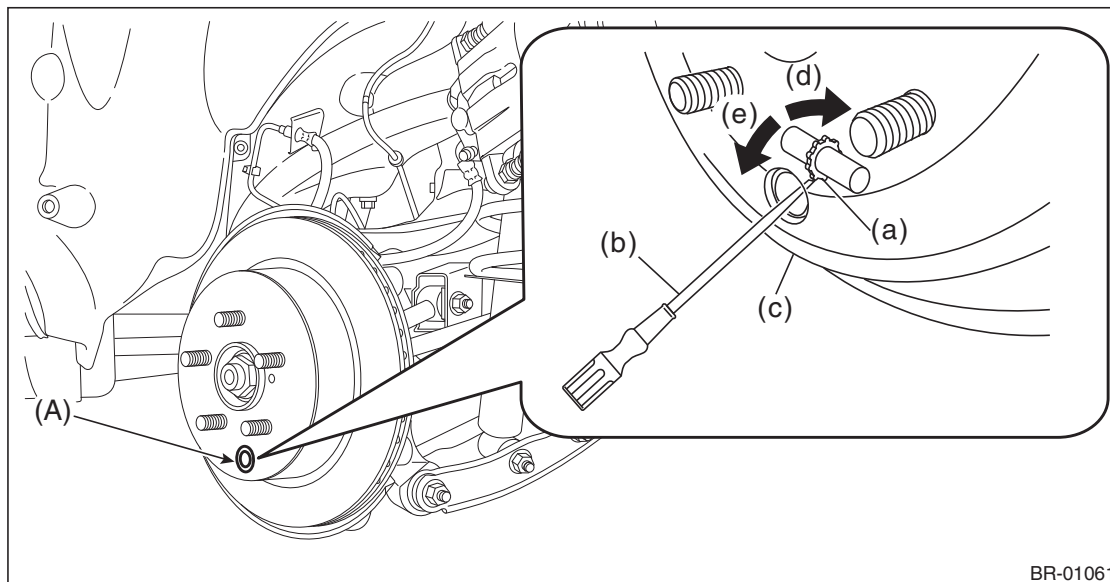
PARKING BRAKE

6) Mark an alignment mark on the rear disc brake rotor and the hub unit COMPL - rear axle, and then remove the rear disc rotor.

NOTE:

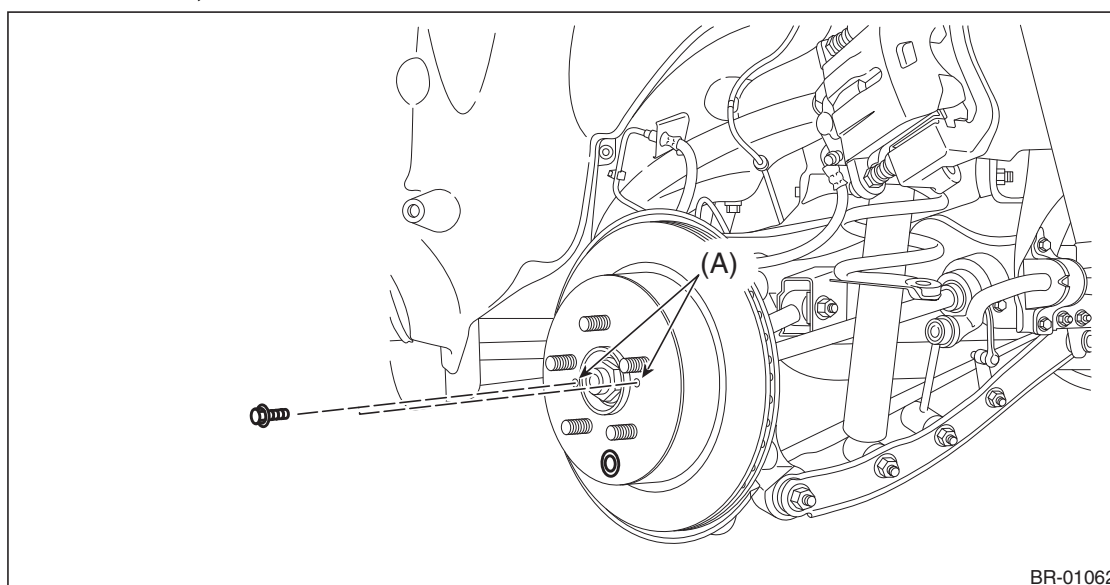
If it is difficult to remove the rear disc rotor, perform the following two methods in order.

1. Remove the adjusting hole cover (A), insert the flat tip screwdriver, and rotate the adjuster assembly - rear brake until the brake shoe moves far enough to remove the disc rotor.



- | | | |
|--------------------------------|---|--|
| (a) Adjuster ASSY - rear brake | (c) Disc rotor | (e) Shorten the adjuster ASSY - rear brake |
| (b) Flat tip screwdriver | (d) Extend the adjuster ASSY - rear brake | |

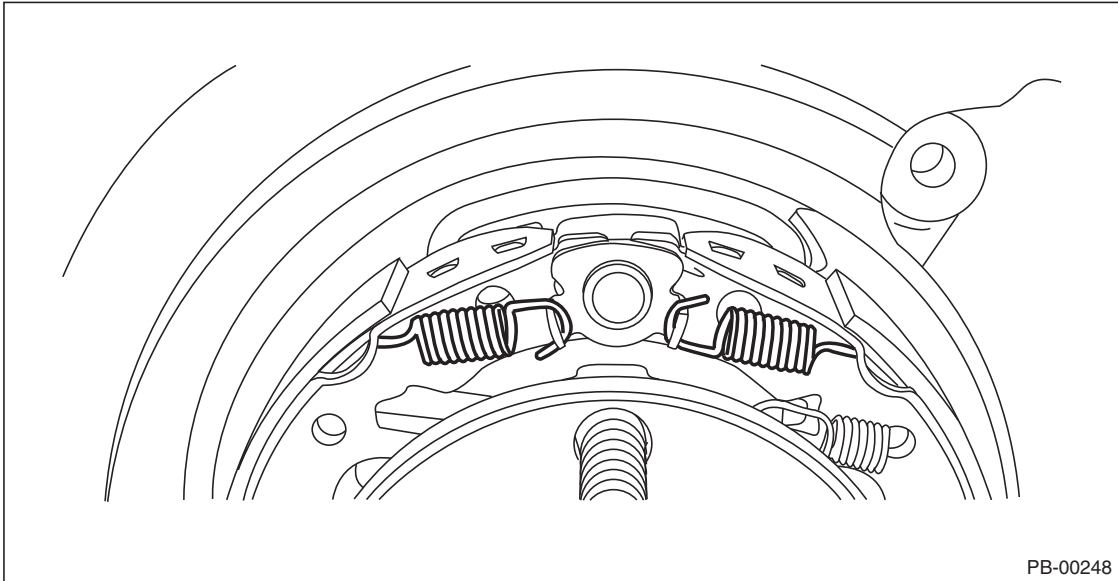
2. If the disc rotor is not removed after performing above step, screw in an 8 mm (0.31 in) bolt to the threaded part (A) of the disc rotor, and remove the disc rotor.



Parking Brake Assembly (Rear Disc Brake)

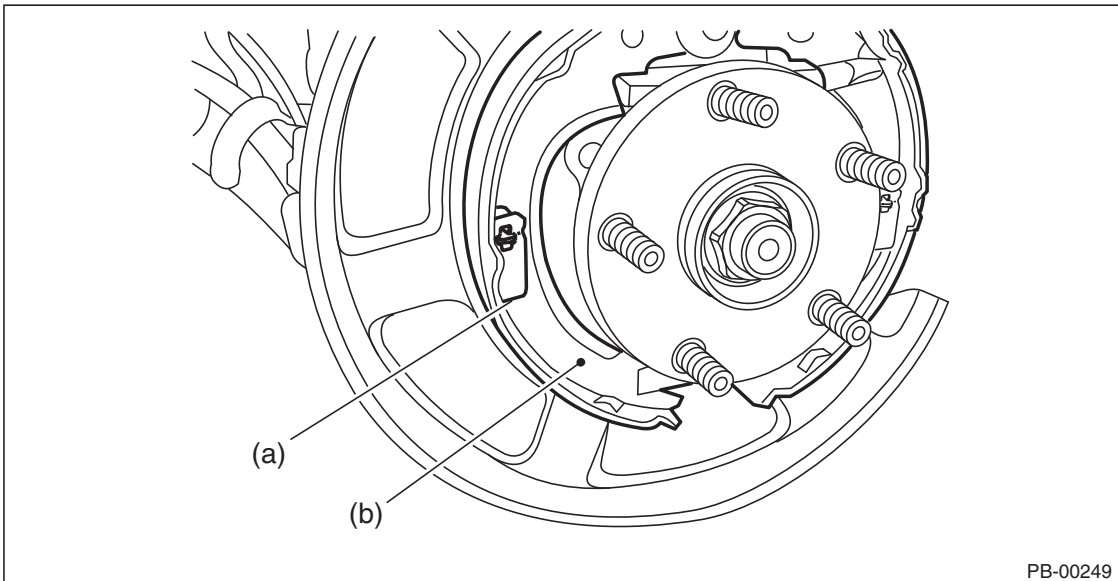
PARKING BRAKE

- 7) Remove the spring - primary shoe return and the spring - secondary shoe return.



- 8) Remove the parking brake shoe on the primary side.

- (1) Remove the cup - shoe hold-down (a) and the spring - adjuster, and remove the parking brake shoe (b).



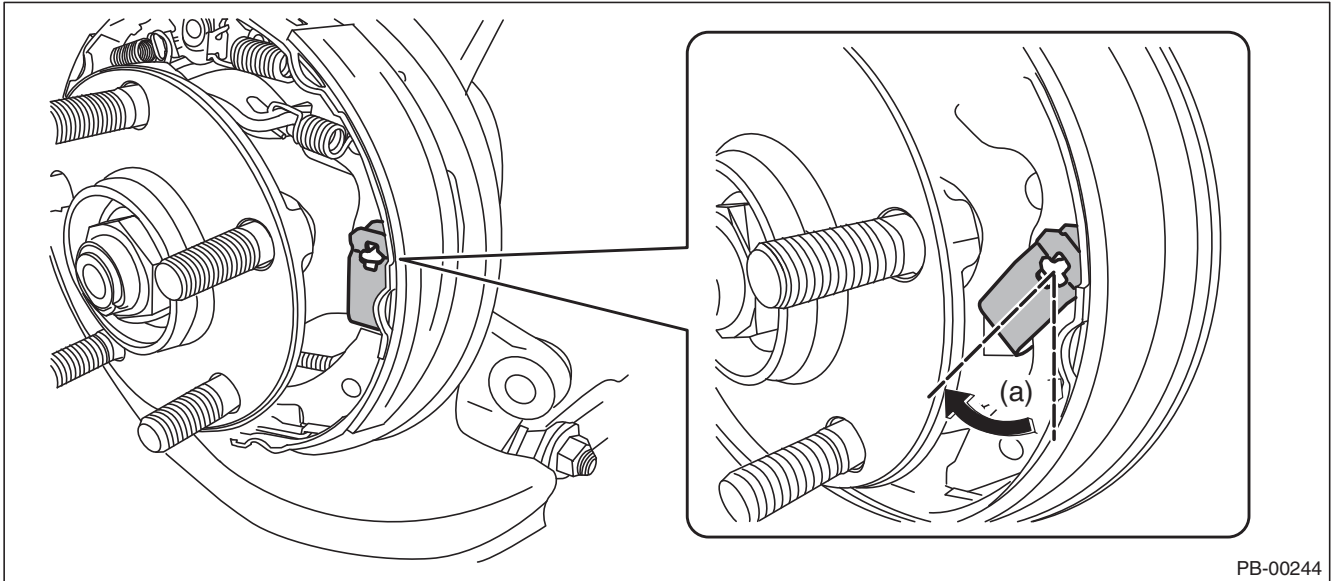
- (2) Remove the strut - brake and the spring - strut.
(3) Remove the adjuster assembly - rear brake.

Parking Brake Assembly (Rear Disc Brake)

PARKING BRAKE

9) Remove the parking brake shoe on the secondary side.

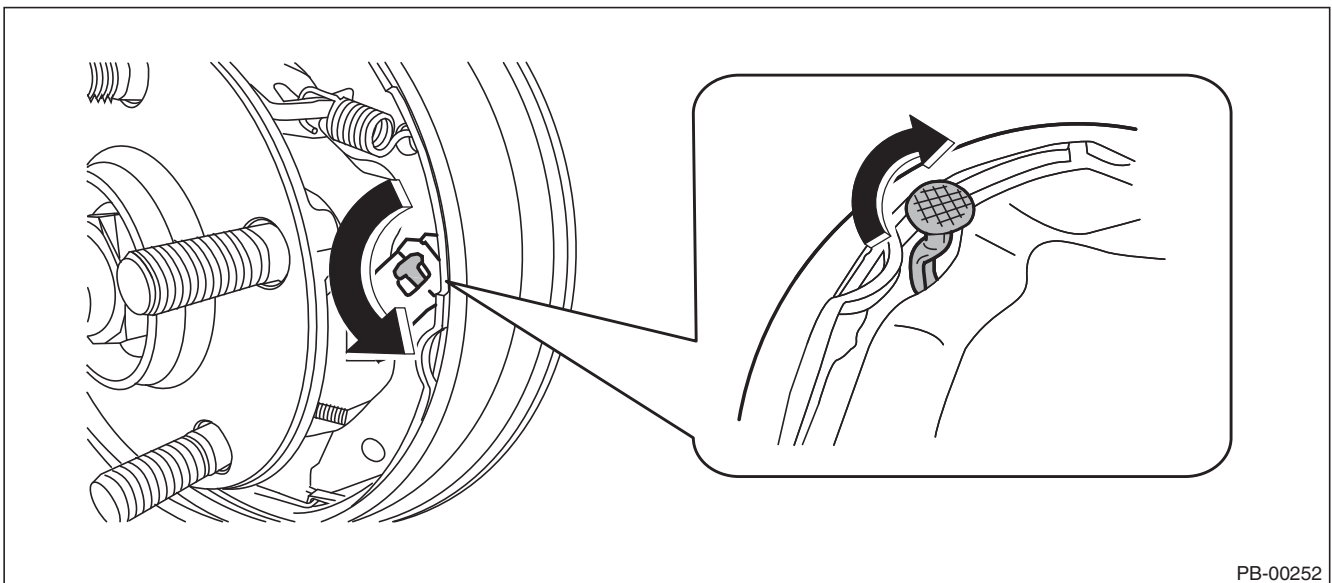
(1) Rotate the cup - shoe hold-down in the direction of the front side of the vehicle.



(a) Approx. 45°

(2) Press and shorten the cup - shoe hold-down.

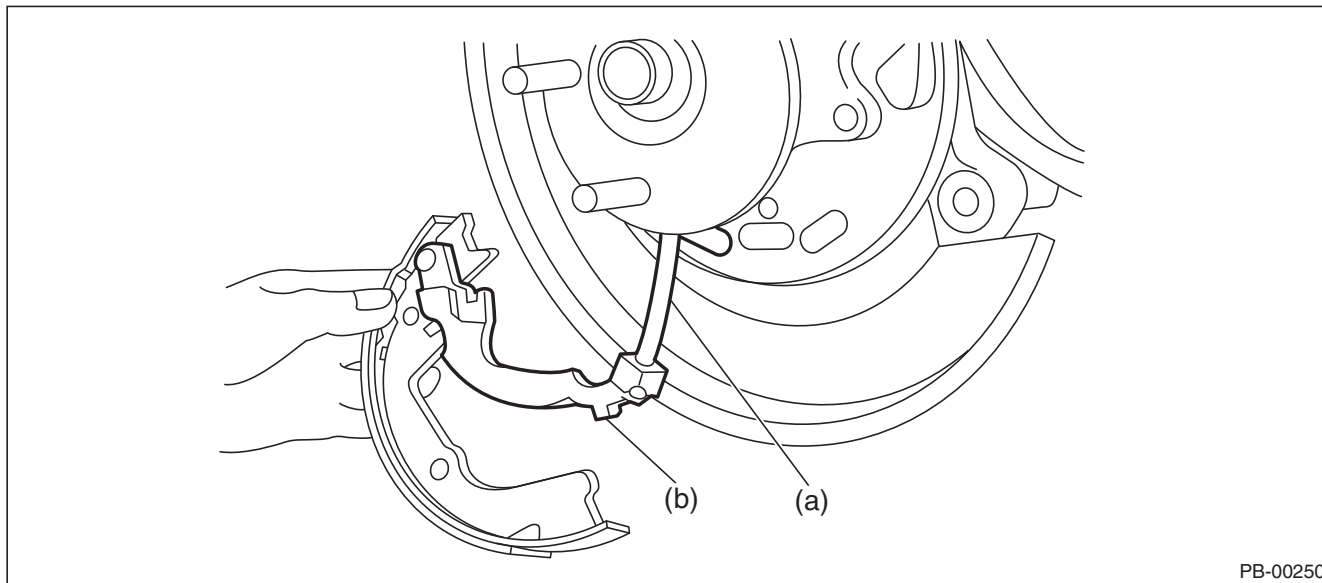
(3) Rotate the pin - secondary shoe hold-down in the opposite direction, and pull out the pin - shoe hold-down.



Parking Brake Assembly (Rear Disc Brake)

PARKING BRAKE

10) Remove the cable assembly - hand brake cable (a) from the parking lever - rear (b).



PB-00250

11) Remove the retainer - rear brake from the secondary side parking brake shoe. Remove the parking lever - rear from the brake shoe.

B: INSTALLATION

CAUTION:

Be sure the lining surface is free from brake fluid and grease.

1) Apply brake grease to the following locations.

Brake grease:

Molykote 44MA (Part No. 26648FJ000)

- Six contact surfaces of the parking brake shoe rim and back plate - rear brake
- Contact surface of the parking brake shoe and the anchor pin
- Contact surface of the parking lever assembly - rear and the strut - brake
- Contact surface of the parking brake shoe and the adjuster assembly - rear brake
- Contact surface of the parking brake shoe and the strut - brake
- Contact surface of the parking lever - rear and the parking brake shoe

2) Install the spring washer - rear brake and the lever to the secondary side parking brake shoe pin, and lock the retainer - rear brake securely.

3) Install the cable assembly - parking brake to the lever.

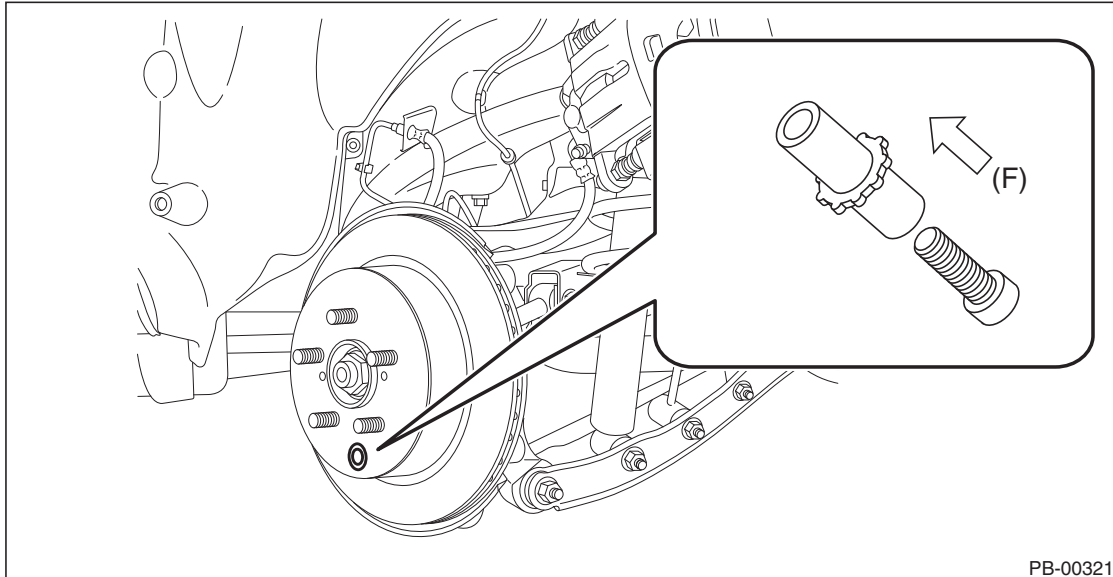
Parking Brake Assembly (Rear Disc Brake)

PARKING BRAKE

4) Attach the adjuster assembly - rear brake and the spring - adjuster to the parking brake shoe.

NOTE:

Install the adjuster assembly - rear brake with the screw section facing to the direction shown in the figure below.



PB-00321

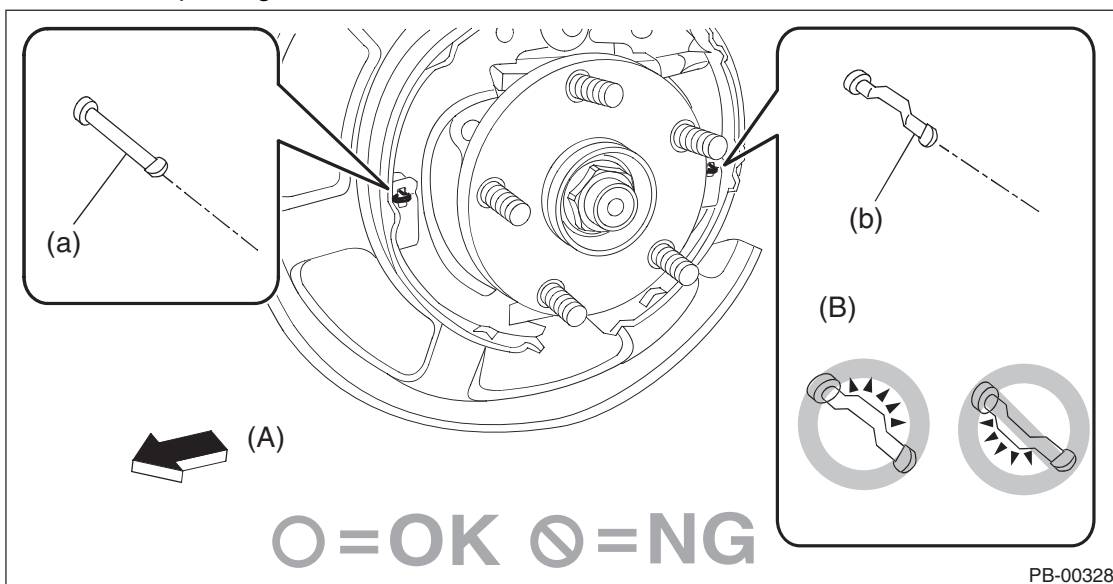
(F) Left wheel: front side of vehicle,
right wheel: rear side of vehicle

5) Check that the cable assembly - parking brake does not fall from the cable guide.

6) Install the parking brake shoes to the back plate - rear brake with the pins - shoe hold-down and the cups - shoe hold-down.

NOTE:

- Do not reversely install the pin - primary shoe hold-down (a) and the pin - secondary shoe hold-down (b).
- When installing the pin - secondary shoe hold-down (b), face the convex portion to the rear of the vehicle not to contact with the parking lever - rear.



PB-00328

(A) Front side of vehicle

(B) Orientation of pin - shoe hold-down relative to the front of the vehicle

Parking Brake Assembly (Rear Disc Brake)

PARKING BRAKE

7) Install the strut - brake and the spring - strut to the parking brake shoes.

NOTE:

Install the spring - strut so that it comes towards the front side of the vehicle.

8) Install the return springs on the primary side first, and then the secondary side.

9) Install the brake disc rotor and the brake caliper assembly.

10) Install the brake hose bracket.

Tightening torque:

Refer to "COMPONENT" of "General Description". <Ref. to BR-4, COMPONENT, General Description.>

11) Adjust the parking brake. <Ref. to PB-23, ADJUSTMENT, Parking Brake Assembly (Rear Disc Brake).>

12) Install the rear wheels.

Tightening torque:

120 N·m (12.24 kgf-m, 88.5 ft-lb)

13) If new parking brake shoes are replaced, drive the vehicle to break-in the parking brake lining.

(1) Drive the vehicle at approximately 35 km/h (22 MPH) or more.

(2) While pressing the button of lever assembly - hand brake, pull the lever assembly - hand brake with a force of 150 N (15.3 kgf, 33.7 lbf).

(3) Drive the vehicle for about 200 m (0.12 mile) in this condition.

(4) Wait 5 to 10 minutes for the parking brake to cool down. Repeat steps (1) through (3) again.

(5) After breaking-in, re-adjust the parking brakes.

C: INSPECTION

1) Measure the inner diameter of the rear disc rotor. If scoring or worn is found on the disc, replace the rear disc rotor.

Disc rotor inner diameter:

Specification: 170 mm (6.69 in)

Service limit: 171 mm (6.73 in)

2) Measure the lining thickness. If it exceeds the limit, replace the brake shoe.

Lining thickness:

Specification: 3.5 mm (0.14 in)

Service limit: 1.5 mm (0.059 in)

NOTE:

Replace the right and left parking brake shoe as a set.

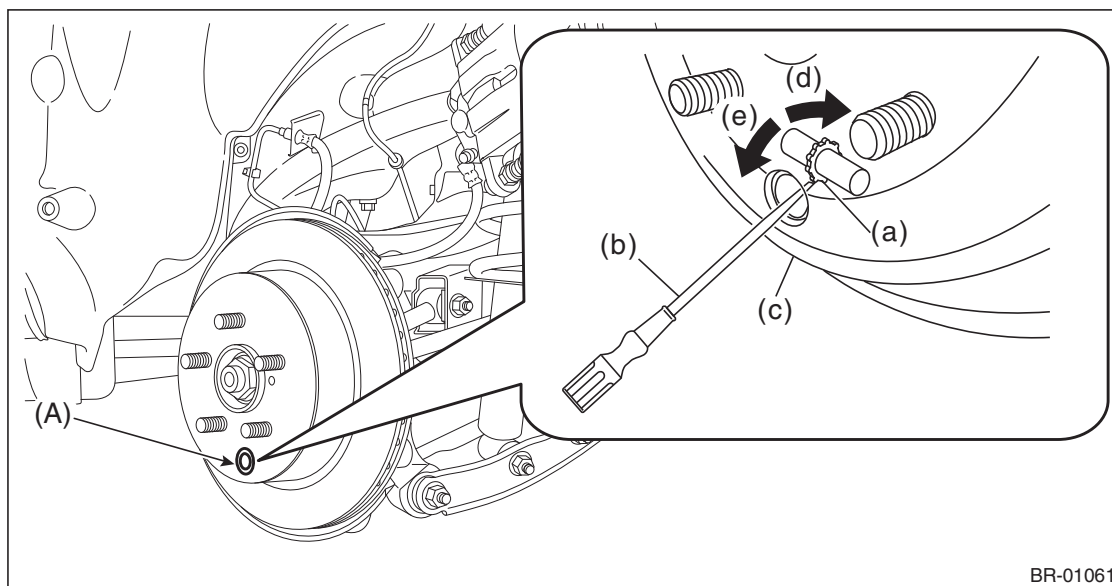
Parking Brake Assembly (Rear Disc Brake)

PARKING BRAKE

D: ADJUSTMENT

1. SHOE CLEARANCE

- 1) Return the lever assembly - hand brake completely.
- 2) Loosen the adjusting nut, and make the cable free.
- 3) Remove the adjusting hole cover (A) from the rear disc rotor.
- 4) Insert the flat tip screwdriver (b) into the brake adjustment hole (A), and rotate the adjuster assembly - rear brake (a) until the parking brake shoe contacts the rear disc rotor (until the disc rotor cannot be rotated by hand).



- | | | |
|--------------------------------|---|--|
| (a) Adjuster ASSY - rear brake | (c) Disc rotor | (e) Shorten the adjuster ASSY - rear brake |
| (b) Flat tip screwdriver | (d) Extend the adjuster ASSY - rear brake | |

- 5) Loosen the adjuster assembly - rear brake by 8 notches in the direction of the arrow (e).

CAUTION:

- Check there is no brake drag.
- Make sure that the adjuster assembly - rear brake is loosened by 8 notches. If it is not loosened sufficiently, dragging may occur.

- 6) Install the adjusting hole cover to the disc rotor.

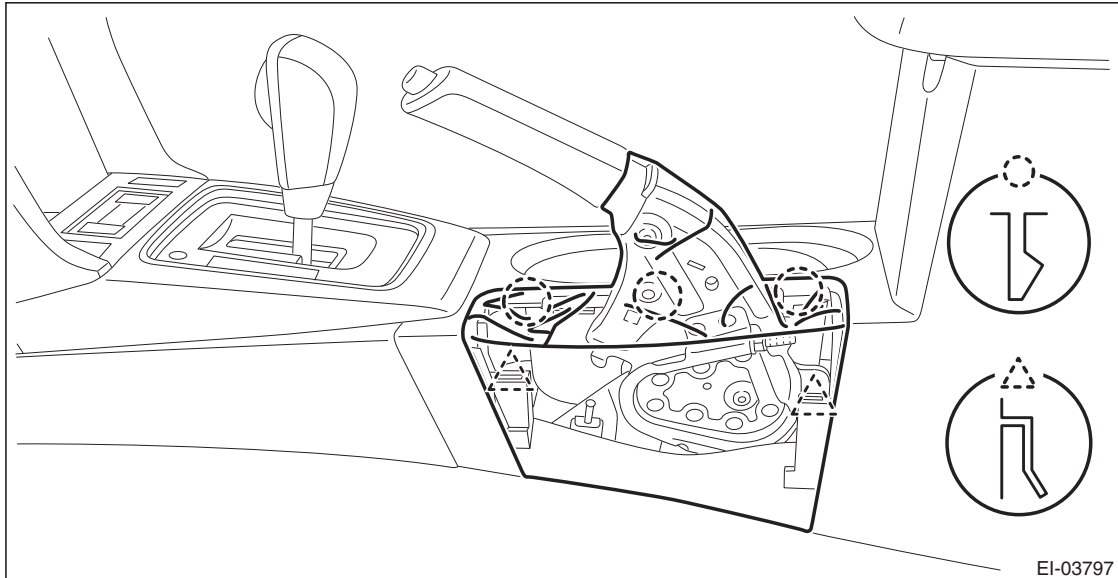
- 7) Adjust the parking lever stroke. <Ref. to PB-24, LEVER STROKE, ADJUSTMENT, Parking Brake Assembly (Rear Disc Brake).>

Parking Brake Assembly (Rear Disc Brake)

PARKING BRAKE

2. LEVER STROKE

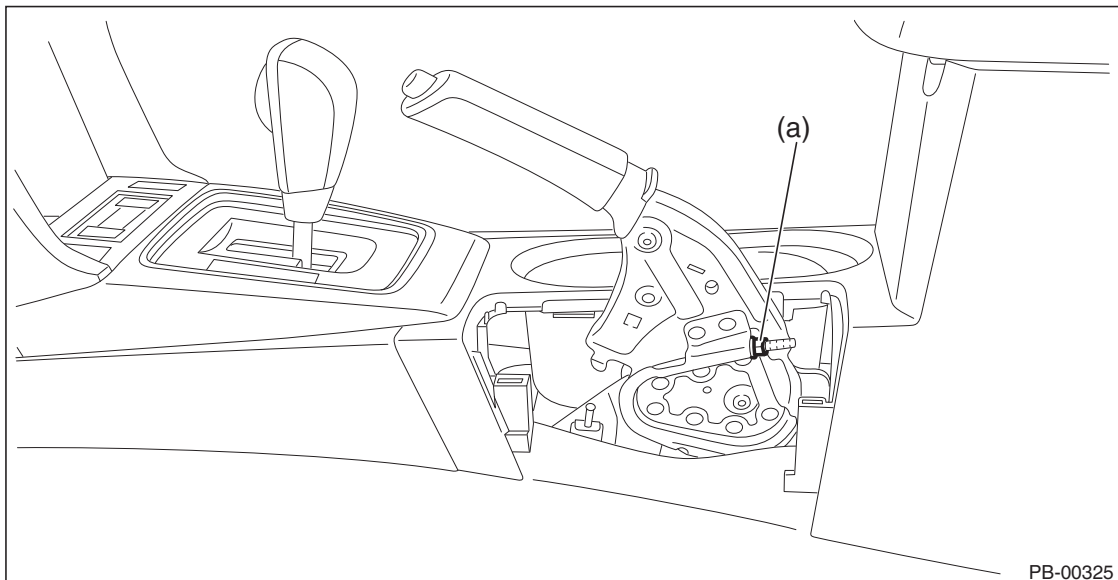
- 1) Adjust the shoe clearance before adjusting lever stroke. <Ref. to PB-23, SHOE CLEARANCE, ADJUSTMENT, Parking Brake Assembly (Rear Disc Brake).>
- 2) Release the claws, and then remove the boot - parking brake.



- 3) Pull the lever assembly - hand brake hard 3 to 5 times.
- 4) Turn the adjusting nut (a) until the lever stroke is at the specified value.

Lever stroke:

7 to 8 notches when pulled with a force of 200 N (20.4 kgf, 45 lbf)



- 5) Check there is no brake drag.
- 6) Check that the brake warning light illuminates when the lever assembly - hand brake is operated.

NOTE:

The light must illuminate when the first notch is reached after pulling the lever.

- 7) Install the boot - parking brake.

General Diagnostic Table

PARKING BRAKE

5. General Diagnostic Table

A: INSPECTION

Symptoms	Possible cause	Corrective action
Brake dragging	Lever assembly - hand brake is maladjusted.	Adjust.
	Parking brake cable does not move.	Repair or replace.
	Parking brake shoe clearance is maladjusted.	Adjust.
	Spring - shoe return is faulty.	Replace.
Noise from brake	Spring - shoe return is faulty.	Replace.
	Cup - shoe hold-down is faulty.	Replace.

General Diagnostic Table

PARKING BRAKE

