

# BRAKES 4-4

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## PRECAUTION FOR SUPPLEMENTAL RESTRAINT SYSTEM “AIRBAG”

The Supplemental Restraint System “Airbag” helps to reduce the risk or severity of injury to the driver in a frontal collision.

The Supplemental Restraint System consists of an airbag module (located in the center of the steering wheel), sensors, a control module, warning light, wiring harness and roll connector.

Information necessary to service the safety is included in the “5-5. SUPPLEMENTAL RESTRAINT SYSTEM” of this Service Manual.

### WARNING:

- To avoid rendering the Airbag system inoperative, which could lead to personal injury or death in the event of a severe frontal collision, all maintenance must be performed by an authorized SUBARU dealer.
- Improper maintenance, including incorrect removal and installation of the Airbag system, can lead to personal injury caused by unintentional activation of the Airbag system.
- All Airbag system electrical wiring harnesses and connectors are covered with yellow outer insulation. Do not use electrical test equipment on any circuit related to the Supplemental Restraint System “Airbag”.

## 1. Brakes

## A: SPECIFICATIONS

## 1. SEDAN

	Engine (cc)	1800				2200
	Driving system	FWD		AWD		AWD
		Base	L	Base	L	LX
Front brake	Type	Disc (Floating type, ventilated)				
	Effective disc diameter mm (in)	194 (7.64)	194 (7.64) [210 (8.27)]	210 (8.27)		
	Disc thickness x outer diameter mm (in)	18 x 242 (0.71 x 9.53)	18 x 242 (0.71 x 9.53) [24 x 260 (0.94 x 10.24)]	24 x 260 (0.94 x 10.24)		
	Effective cylinder diameter mm (in)	53.97 (2.1248)				
	Pad dimensions (length x width x thickness) mm (in)	112.4 x 44.3 x 11.0 (4.43 x 1.744 x 0.433)				
	Clearance adjustment	Automatic adjustment				
Rear brake	Type	Drum (Leading-trailing type)	Drum (Leading-trailing type) [Disc (Floating type)]	Drum (Leading-trailing type)	Drum (Leading-trailing type) [Disc (Floating type)]	Disc (Floating type)
	Effective drum or disc diameter mm (in)	228.6 (9)	228.6 (9) [230 (9.06)]	228.6 (9)	228.6 (9) [230 (9.06)]	230 (9.06)
	Disc thickness x outer diameter mm (in)	—	— [10 x 266 (0.39 x 10.47)]	—	— [10 x 266 (0.39 x 10.47)]	10 x 266 (0.39 x 10.47)
	Effective cylinder diameter mm (in)	17.46 (0.6874)	17.46 (0.6874) [34.93 (1.3752)]	19.05 (0.7500)	19.05 (0.7500) [34.93 (1.3752)]	34.93 (1.3752)
	Lining or pad dimensions (length x width x thickness) mm (in)	218.8 x 35.0 x 4.1 (8.61 x 1.378 x 0.161)	218.8 x 35.0 x 4.1 (8.61 x 1.378 x 0.161) [92.4 x 33.7 x 10.0 (3.638 x 1.327 x 0.394)]	218.8 x 35.0 x 4.1 (8.61 x 1.378 x 0.161)	218.8 x 35.0 x 4.1 (8.61 x 1.378 x 0.161) [92.4 x 33.7 x 10.0 (3.638 x 1.327 x 0.394)]	92.4 x 33.7 x 10.0 (3.638 x 1.327 x 0.394)
	Clearance adjustment	Automatic adjustment				
Parking brake	Type	Mechanical on rear brake drums				
	Effective drum diameter mm (in)	228.6 (9)	228.6 (9) [170 (6.69)]	228.6 (9)	228.6 (9) [170 (6.69)]	170 (6.69)
	Lining or pad dimensions (length x width x thickness) mm (in)	218.8 x 35.0 x 4.1 (8.61 x 1.378 x 0.161)	218.8 x 35.0 x 4.1 (8.61 x 1.378 x 0.161) [162.6 x 30.0 x 3.2 (6.40 x 1.181 x 0.126)]	218.8 x 35.0 x 4.1 (8.61 x 1.378 x 0.161)	218.8 x 35.0 x 4.1 (8.61 x 1.378 x 0.161) [162.6 x 30.0 x 3.2 (6.40 x 1.181 x 0.126)]	162.6 x 30.0 x 3.2 (6.40 x 1.181 x 0.126)
	Clearance adjustment	Automatic adjustment	Automatic adjustment [Manual adjustment]	Automatic adjustment	Automatic adjustment [Manual adjustment]	Manual adjustment
Master cylinder	Type	Tandem				
	Effective diameter mm (in)	23.81 (0.9374)	23.81 (0.9374) [25.40 (1)]	23.81 (0.9374)	23.81 (0.9374) [25.40 (1)]	25.40 (1)
	Reservoir type	Sealed type				
	Brake fluid reservoir capacity cm <sup>3</sup> (cu in)	190 (11.59)				
Brake booster	Type	Vacuum suspended				
	Effective diameter mm (in)	230 (9.06)	230 (9.06) [180 + 205 (7.09 + 8.07)]	230 (9.06)	230 (9.06) [180 + 205 (7.09 + 8.07)]	180 + 205 (7.09 + 8.07)
Proportioning valve	Split point kPa (kg/cm <sup>2</sup> , psi)	2,942 (30.0, 427)	2,942 (30.0, 427) [1,961 (20.0, 284)]	2,942 (30.0, 427)	2,942 (30.0, 427) [1,961 (20.0, 284)]	1,961 (20.0, 284)
	Reducing ratio	0.4				
Brake line		Dual circuit system				
A.B.S.		—	OP	—	OP	STD

[ ]: A.B.S. equipped vehicle.

**2. WAGON**

	Engine (cc)	1800			2200	
	Driving system	FWD		AWD	AWD	
		Base	L	L	Outback	LX
Front brake	Type	Disc (Floating type, ventilated)				
	Effective disc diameter mm (in)	194 (7.64)	194 (7.64) [210 (8.27)]	210 (8.27)		
	Disc thickness x outer diameter mm (in)	18 x 242 (0.71 x 9.53)	18 x 242 (0.71 x 9.53) [24 x 260 (0.94 x 10.24)]	24 x 260 (0.94 x 10.24)		
	Effective cylinder diameter mm (in)	53.97 (2.1248)				
	Pad dimensions (length x width x thickness) mm (in)	112.4 x 44.3 x 11.0 (4.43 x 1.744 x 0.433)				
	Clearance adjustment	Automatic adjustment				
Rear brake	Type	Drum (Leading-trailing type)	Drum (Leading-trailing type) [Disc (Floating type)]	Drum (Leading-trailing type) [Disc (Floating type)]	Drum (Leading-trailing type)	Disc (Floating type)
	Effective drum or disc diameter mm (in)	228.6 (9)	228.6 (9) [230 (9.06)]	228.6 (9) [230 (9.06)]	228.6 (9)	230 (9.06)
	Disc thickness x outer diameter mm (in)	—	— [10 x 266 (0.39 x 10.47)]	— [10 x 266 (0.39 x 10.47)]	—	10 x 266 (0.39 x 10.47)
	Effective cylinder diameter mm (in)	19.05 (0.7500)	19.05 (0.7500) [34.93 (1.3752)]	19.05 (0.7500) [38.1 (1.500)]	19.05 (0.7500)	38.1 (1.500)
	Lining or pad dimensions (length x width x thickness) mm (in)	218.8 x 35.0 x 4.1 (8.61 x 1.378 x 0.161)	218.8 x 35.0 x 4.1 (8.61 x 1.378 x 0.161) [92.4 x 33.7 x 10.0 (3.638 x 1.327 x 0.394)]	218.8 x 35.0 x 4.1 (8.61 x 1.378 x 0.161) [92.4 x 33.7 x 10.0 (3.638 x 1.327 x 0.394)]	218.8 x 35.0 x 4.1 (8.61 x 1.378 x 0.161)	92.4 x 33.7 x 10.0 (3.638 x 1.327 x 0.394)
	Clearance adjustment	Automatic adjustment				
Parking brake	Type	Mechanical on rear brake drums				
	Effective drum diameter mm (in)	228.6 (9)	228.6 (9) [170 (6.69)]	228.6 (9) [170 (6.69)]	228.6 (9)	170 (6.69)
	Lining or pad dimensions (length x width x thickness) mm (in)	218.8 x 35.0 x 4.1 (8.61 x 1.378 x 0.161)	218.8 x 35.0 x 4.1 (8.61 x 1.378 x 0.161) [162.6 x 30.0 x 3.2 (6.40 x 1.181 x 0.126)]	218.8 x 35.0 x 4.1 (8.61 x 1.378 x 0.161) [162.6 x 30.0 x 3.2 (6.40 x 1.181 x 0.126)]	218.8 x 35.0 x 4.1 (8.61 x 1.378 x 0.161)	162.6 x 30.0 x 3.2 (6.40 x 1.181 x 0.126)
	Clearance adjustment	Automatic adjustment	Automatic adjustment [Manual adjustment]	Automatic adjustment [Manual adjustment]	Automatic adjustment	Manual adjustment
Master cylinder	Type	Tandem				
	Effective diameter mm (in)	23.81 (0.9374)	23.81 (0.9374) [25.40 (1)]	23.81 (0.9374) [25.40 (1)]	23.81 (0.9374)	25.40 (1)
	Reservoir type	Sealed type				
	Brake fluid reservoir capacity cm <sup>3</sup> (cu in)	190 (11.59)				
Brake booster	Type	Vacuum suspended				
	Effective diameter mm (in)	230 (9.06)	230 (9.06) [180 + 205 (7.09 + 8.07)]	230 (9.06) [180 + 205 (7.09 + 8.07)]	230 (9.06)	180 + 205 (7.09 + 8.07)
Proportioning valve	Split point kPa (kg/cm <sup>2</sup> , psi)	2,942 (30.0, 427)	2,942 (30.0, 427) [1,961 (20.0, 284)]	2,942 (30.0, 427) [1,961 (20.0, 284)]	2,942 (30.0, 427)	1,961 (20.0, 284)
	Reducing ratio	0.4				
	Brake line	Dual circuit system				
	A.B.S.	—	OP	OP	—	STD

[ ]: A.B.S. equipped vehicle.

## 3. COUPE

	Engine (cc)	1800				2200
	Driving system	FWD		AWD		AWD
		Base	L	Base	L	LX
Front brake	Type	Disc (Floating type, ventilated)				
	Effective disc diameter mm (in)	194 (7.64)	210 (8.27)			
	Disc thickness x outer diameter mm (in)	18 x 242 (0.71 x 9.53)	24 x 260 (0.94 x 10.24)			
	Effective cylinder diameter mm (in)	53.97 (2.1248)				
	Pad dimensions (length x width x thickness) mm (in)	112.4 x 44.3 x 11.0 (4.43 x 1.744 x 0.433)				
	Clearance adjustment	Automatic adjustment				
Rear brake	Type	Drum (Leading-trailing type)	Drum (Leading-trailing type) [Disc (Floating type)]	Drum (Leading-trailing type)	Drum (Leading-trailing type) [Disc (Floating type)]	Disc (Floating type)
	Effective drum or disc diameter mm (in)	228.6 (9)	228.6 (9) [230 (9.06)]	228.6 (9)	228.6 (9) [230 (9.06)]	230 (9.06)
	Disc thickness x outer diameter mm (in)	—	— [10 x 266 (0.39 x 10.47)]	—	— [10 x 266 (0.39 x 10.47)]	10 x 266 (0.39 x 10.47)
	Effective cylinder diameter mm (in)	17.46 (0.6874)	17.46 (0.6874) [34.93 (1.3752)]	19.05 (0.7500)	19.05 (0.7500) [34.93 (1.3752)]	34.93 (1.3752)
	Lining or pad dimensions (length x width x thickness) mm (in)	218.8 x 35.0 x 4.1 (8.61 x 1.378 x 0.161)	218.8 x 35.0 x 4.1 (8.61 x 1.378 x 0.161) [92.4 x 33.7 x 10.0 (3.638 x 1.327 x 0.394)]	218.8 x 35.0 x 4.1 (8.61 x 1.378 x 0.161)	218.8 x 35.0 x 4.1 (8.61 x 1.378 x 0.161) [92.4 x 33.7 x 10.0 (3.638 x 1.327 x 0.394)]	92.4 x 33.7 x 10.0 (3.638 x 1.327 x 0.394)
	Clearance adjustment	Automatic adjustment				
Parking brake	Type	Mechanical on rear brake drums				
	Effective drum diameter mm (in)	228.6 (9)	228.6 (9) [170 (6.69)]	228.6 (9)	228.6 (9) [170 (6.69)]	170 (6.69)
	Lining or pad dimensions (length x width x thickness) mm (in)	218.8 x 35.0 x 4.1 (8.61 x 1.378 x 0.161)	218.8 x 35.0 x 4.1 (8.61 x 1.378 x 0.161) [162.6 x 30.0 x 3.2 (6.40 x 1.181 x 0.126)]	218.8 x 35.0 x 4.1 (8.61 x 1.378 x 0.161)	218.8 x 35.0 x 4.1 (8.61 x 1.378 x 0.161) [162.6 x 30.0 x 3.2 (6.40 x 1.181 x 0.126)]	162.6 x 30.0 x 3.2 (6.40 x 1.181 x 0.126)
	Clearance adjustment	Automatic adjustment	Automatic adjustment [Manual adjustment]	Automatic adjustment	Automatic adjustment [Manual adjustment]	Manual adjustment
Master cylinder	Type	Tandem				
	Effective diameter mm (in)	23.81 (0.9374)	23.81 (0.9374) [25.40 (1)]	23.81 (0.9374)	23.81 (0.9374) [25.40 (1)]	25.40 (1)
	Reservoir type	Sealed type				
	Brake fluid reservoir capacity cm <sup>3</sup> (cu in)	190 (11.59)				
Brake booster	Type	Vacuum suspended				
	Effective diameter mm (in)	230 (9.06)	230 (9.06) [180 + 205 (7.09 + 8.07)]	230 (9.06)	230 (9.06) [180 + 205 (7.09 + 8.07)]	180 + 205 (7.09 + 8.07)
Proportioning valve	Split point kPa(kg/cm <sup>2</sup> , psi)	2,942 (30.0, 427)	2,942 (30.0, 427) [1,961 (20.0, 284)]	2,942 (30.0, 427)	2,942 (30.0, 427) [1,961 (20.0, 284)]	1,961 (20.0, 284)
	Reducing ratio	0.4				
	Brake line	Dual circuit system				
	A.B.S.	—	OP	—	OP	STD

[ ]: A.B.S. equipped vehicle.

**B: SERVICE DATA**

ITEM		STANDARD	SERVICE LIMIT
Front brake	Pad thickness (including back metal)	17 mm (0.67 in)	7.5 mm (0.295 in)
	Disc thickness	13-inch type: 18 mm (0.71 in) 14-inch type: 24 mm (0.94 in)	13-inch type: 16 mm (0.63 in) 14-inch type: 22 mm (0.87 in)
	Disc run-out	—	0.075 mm (0.0030 in)
Rear brake (Disc type)	Pad thickness (including back metal)	15 mm (0.59 in)	6.5 mm (0.256 in)
	Disc thickness	10 mm (0.39 in)	8.5 mm (0.335 in)
	Disc run-out	—	0.10 mm (0.0039 in)
Rear brake (Drum type)	Inside diameter	228.6 mm (9 in)	230.6 mm (9.079 in)
	Lining thickness	4.1 mm (0.161 in)	1.5 mm (0.059 in)
Rear brake (Disc type Parking)	Inside diameter	170 mm (6.69 in)	171 mm (6.73 in)
	Lining thickness	3.2 mm (0.126 in)	1.5 mm (0.059 in)
Parking brake	Lever stroke	7 to 8 notches/196N (20 kg,44 lb)	

			Models without A.B.S.	Models with A.B.S.
Brake booster		Brake pedal force	Fluid pressure	
		147 N (15 kg, 33 lb)	785 kPa (8 kg/cm <sup>2</sup> , 114 psi)	588 kPa (6 kg/cm <sup>2</sup> , 85 psi)
	Brake fluid pressure without engine running	294 N (30 kg, 66 lb)	2,158 kPa (22 kg/cm <sup>2</sup> , 313 psi)	1,863 kPa (19 kg/cm <sup>2</sup> , 270 psi)
		147 N (15 kg, 33 lb)	5,492 kPa (56 kg/cm <sup>2</sup> , 796 psi)	5,394 kPa (55 kg/cm <sup>2</sup> , 782 psi)
	Brake fluid pressure with engine running and vacuum at 66.7 kPa (500 mmHg, 19.69 inHg)	294 N (30 kg, 66 lb)	8,434 kPa (86 kg/cm <sup>2</sup> , 1,223 psi)	9,219 kPa (94 kg/cm <sup>2</sup> , 1,337 psi)

**C: RECOMMENDED BRAKE FLUID**

FMVSS No. 116, fresh DOT3 or 4 brake fluid

**CAUTION:**

- Avoid mixing brake fluid of different brands to prevent the fluid performance from degrading.
- When brake fluid is supplemented, be careful not to allow any dust into the reservoir.
- Use fresh DOT3 or 4 brake fluid when replacing or refilling the fluid.

**D: BRAKE FLUID LEVEL INDICATOR**

*Reserve tank with level indicator:*

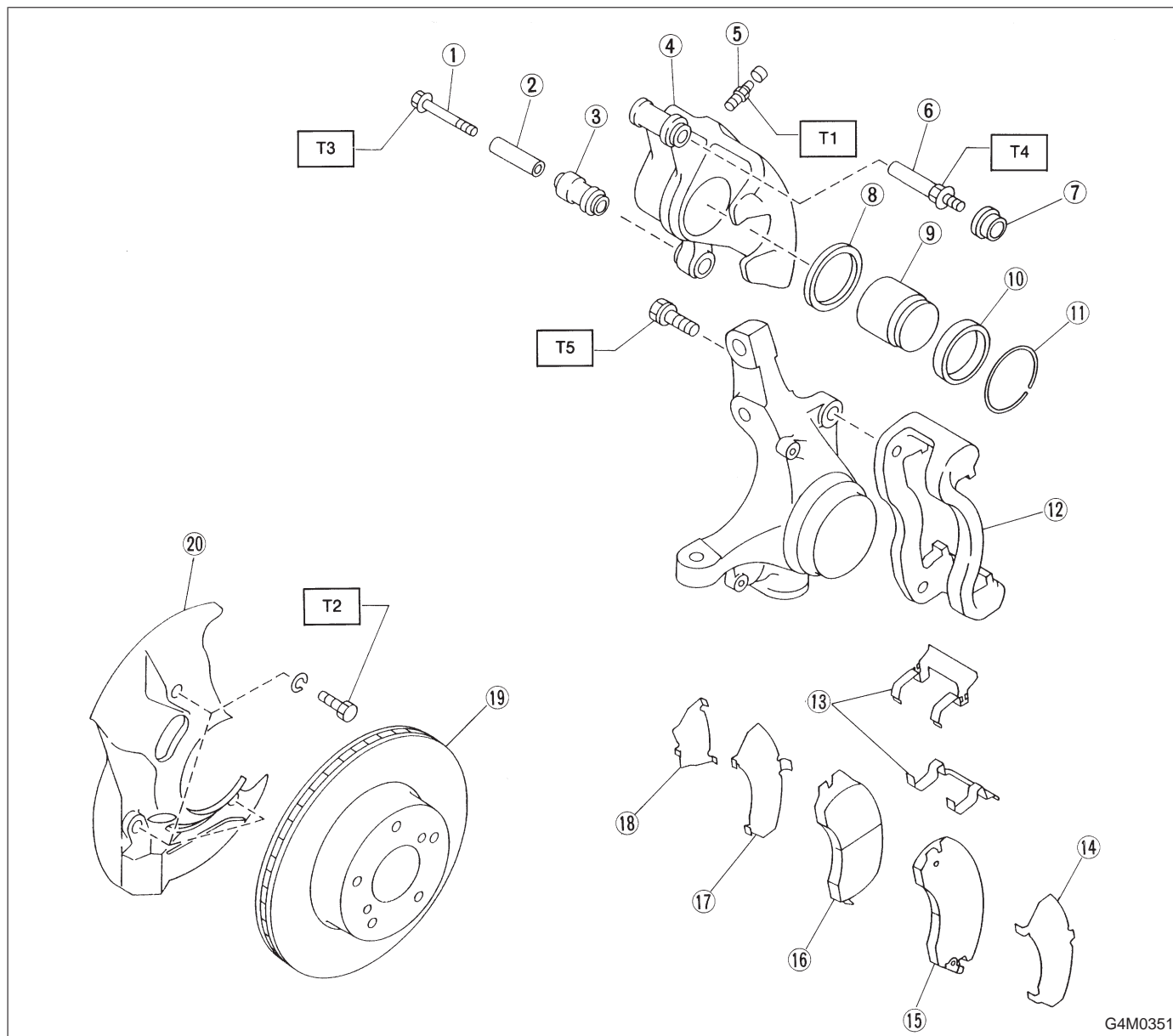
*Residual fluid quantity at light ON*

*Approx. 80 cm<sup>3</sup> (80cc, 4.88 cu in)*

*Tank capacity*

*190 cm<sup>3</sup> (190cc, 11.59 cu in)*

## 1. Front Disc Brake



G4M0351

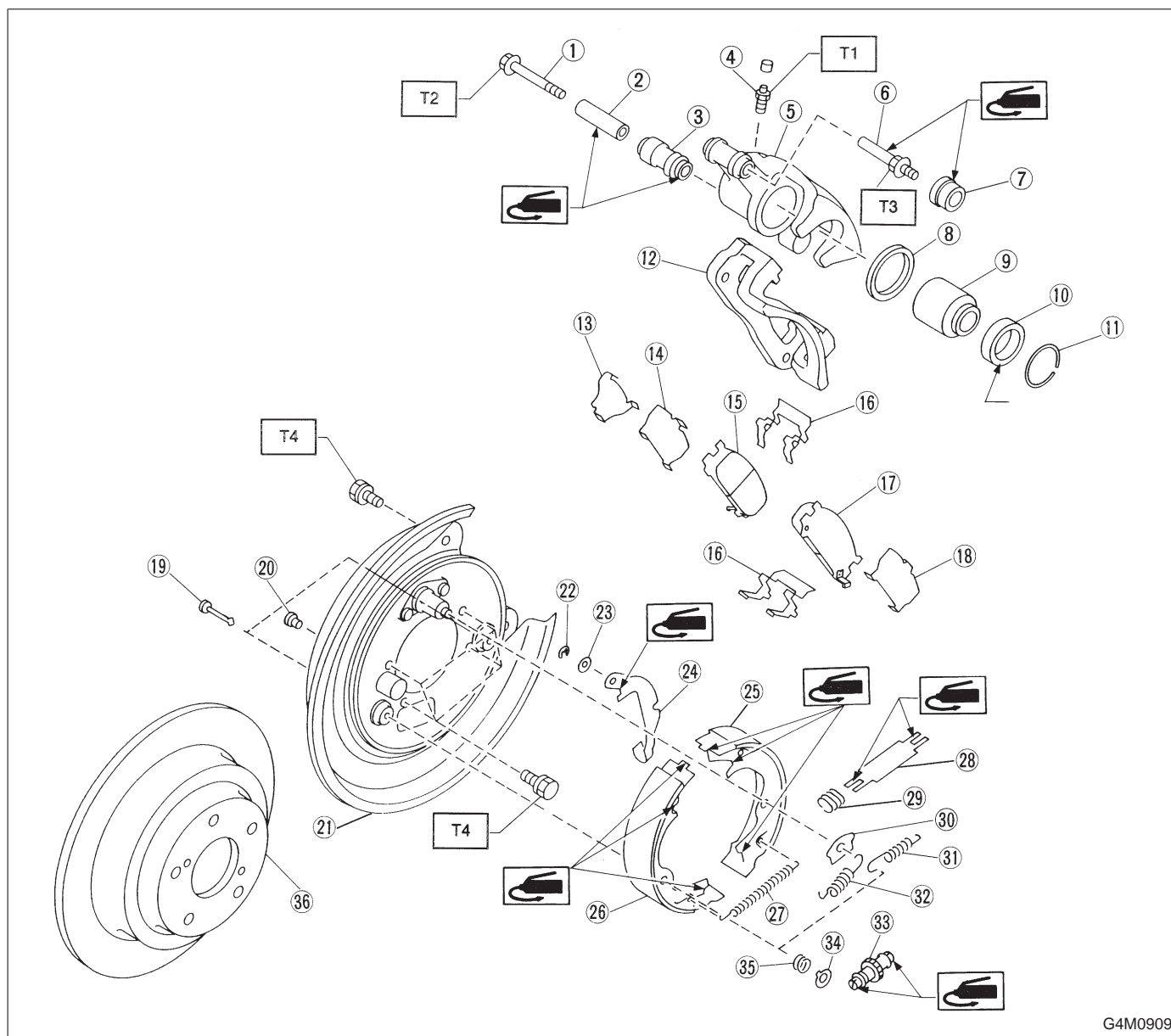
- ① Lock pin
- ② Lock pin sleeve
- ③ Lock pin boot
- ④ Caliper body
- ⑤ Air bleeder screw
- ⑥ Guide pin
- ⑦ Guide pin boot
- ⑧ Piston seal
- ⑨ Piston

- ⑩ Piston boot
- ⑪ Boot ring
- ⑫ Support
- ⑬ Pad clip
- ⑭ Outer shim
- ⑮ Pad (Outside)
- ⑯ Pad (Inside)
- ⑰ Inner shim
- ⑱ Shim

- ⑰ Disc rotor
- ⑱ Disc cover

**Tightening torque: N·m (kg·m, ft·lb)****T1: 8±1 (0.8±0.1, 5.8±0.7)****T2: 14±4 (1.4±0.4, 10.1±2.9)****T3: 36±5 (3.7±0.5, 26.8±3.6)****T4: 49±5 (5.0±0.5, 36.2±3.6)****T5: 78±10 (8.0±1.0, 58±7)**

## 2. Rear Disc Brake



G4M0909

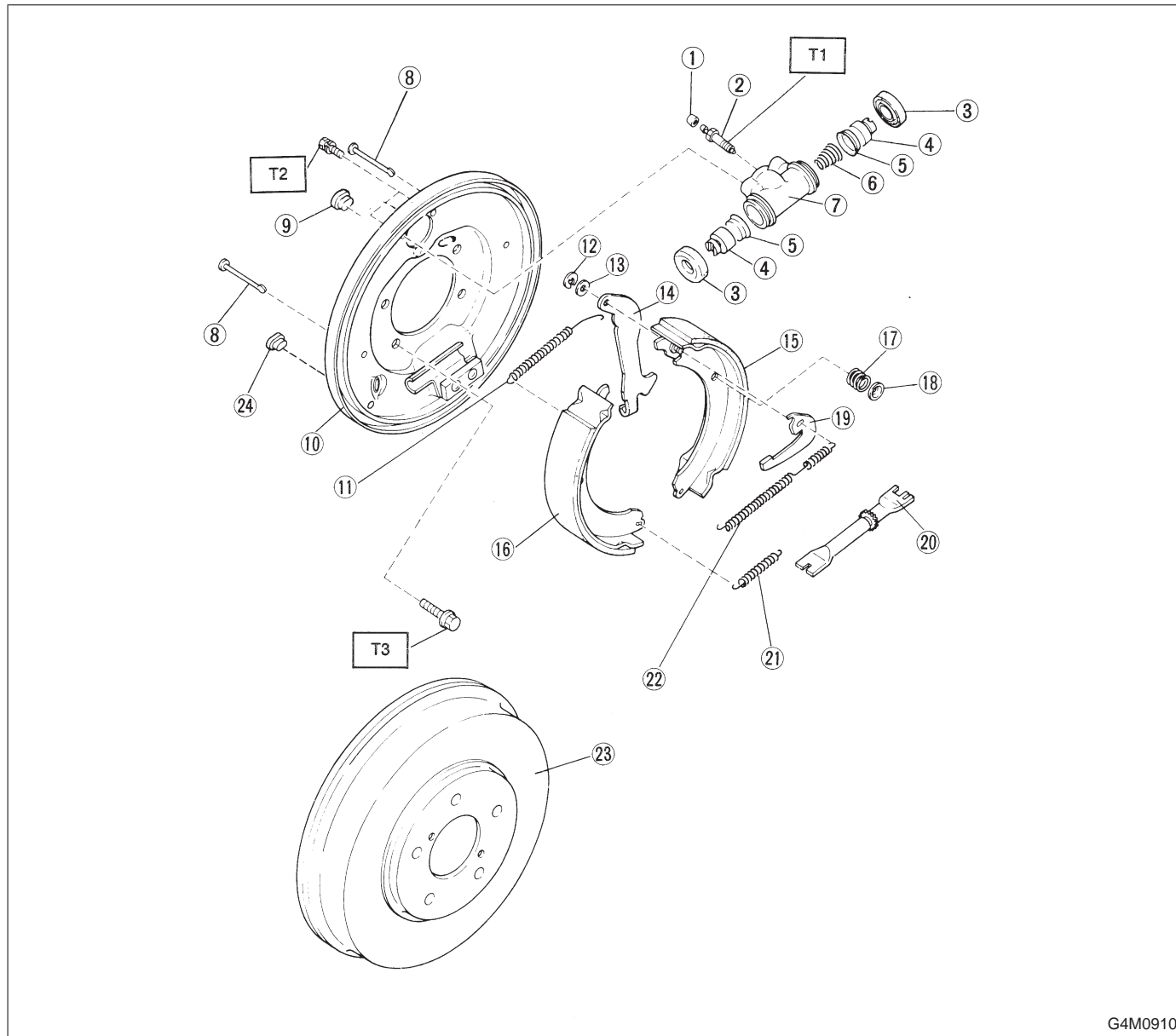
- ① Lock pin
- ② Lock pin sleeve
- ③ Lock pin boot
- ④ Air bleeder screw
- ⑤ Caliper body
- ⑥ Guide pin
- ⑦ Guide pin boot
- ⑧ Piston seal
- ⑨ Piston
- ⑩ Piston boot
- ⑪ Boot ring
- ⑫ Support
- ⑬ Shim
- ⑭ Inner shim
- ⑮ Inner pad

- ⑯ Pad clip
- ⑰ Outer pad
- ⑱ Outer shim
- ⑲ Shoe hold-down pin
- ⑳ Cover
- ㉑ Back plate
- ㉒ Retainer
- ㉓ Spring washer
- ㉔ Parking brake lever
- ㉕ Parking brake shoe (Secondary)
- ㉖ Parking brake shoe (Primary)
- ㉗ Adjusting spring
- ㉘ Strut

- ㉙ Strut shoe spring
- ㉚ Shoe guide plate
- ㉛ Secondary shoe return spring
- ㉜ Primary shoe return spring
- ㉝ Adjuster
- ㉞ Shoe hold-down cup
- ㉟ Shoe hold-down spring
- ㊱ Disc rotor

**Tightening torque: N·m (kg-m, ft-lb)****T1: 8±1 (0.8±0.1, 5.8±0.7)****T2: 20±4 (2.0±0.4, 14.5±2.9)****T3: 26±5 (2.7±0.5, 19.5±3.6)****T4: 52±6 (5.3±0.6, 38.3±4.3)**

## 3. Rear Drum Brake



G4M0910

- ① Air bleeder cap
- ② Air bleeder screw
- ③ Boot
- ④ Piston
- ⑤ Cup
- ⑥ Spring
- ⑦ Wheel cylinder body
- ⑧ Pin
- ⑨ Plug
- ⑩ Back plate

- ⑪ Upper shoe return spring
- ⑫ Retainer
- ⑬ Washer
- ⑭ Parking brake lever
- ⑮ Brake shoe (Trailing)
- ⑯ Brake shoe (Leading)
- ⑰ Shoe hold-down spring
- ⑱ Cup
- ⑲ Adjusting lever
- ⑳ Adjuster

- ㉑ Lower shoe return spring
- ㉒ Adjusting spring
- ㉓ Drum
- ㉔ Plug

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

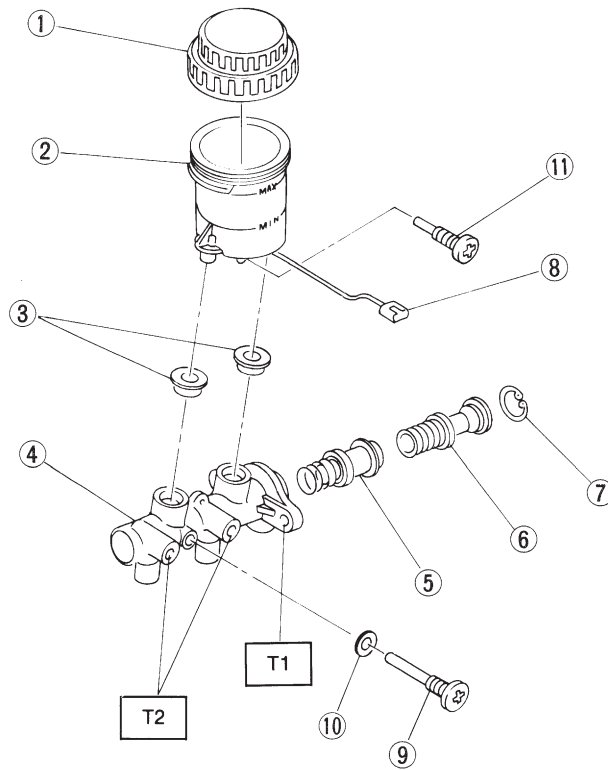
**T1: 8±1 (0.8±0.1, 5.8±0.7)**

**T2: 10±2 (1.0±0.2, 7.2±1.4)**

**T3: 52±6 (5.3±0.6, 38.3±4.3)**



## 4. Master Cylinder



G4M0354

- ① Cap
- ② Reserve tank
- ③ Seal
- ④ Cylinder body
- ⑤ Secondary piston
- ⑥ Primary piston

- ⑦ C-ring
- ⑧ Level indicator ASSY
- ⑨ Supply valve stopper  
(With A.B.S.)
- ⑩ Gasket (With A.B.S.)
- ⑪ Reservoir stopper bolt

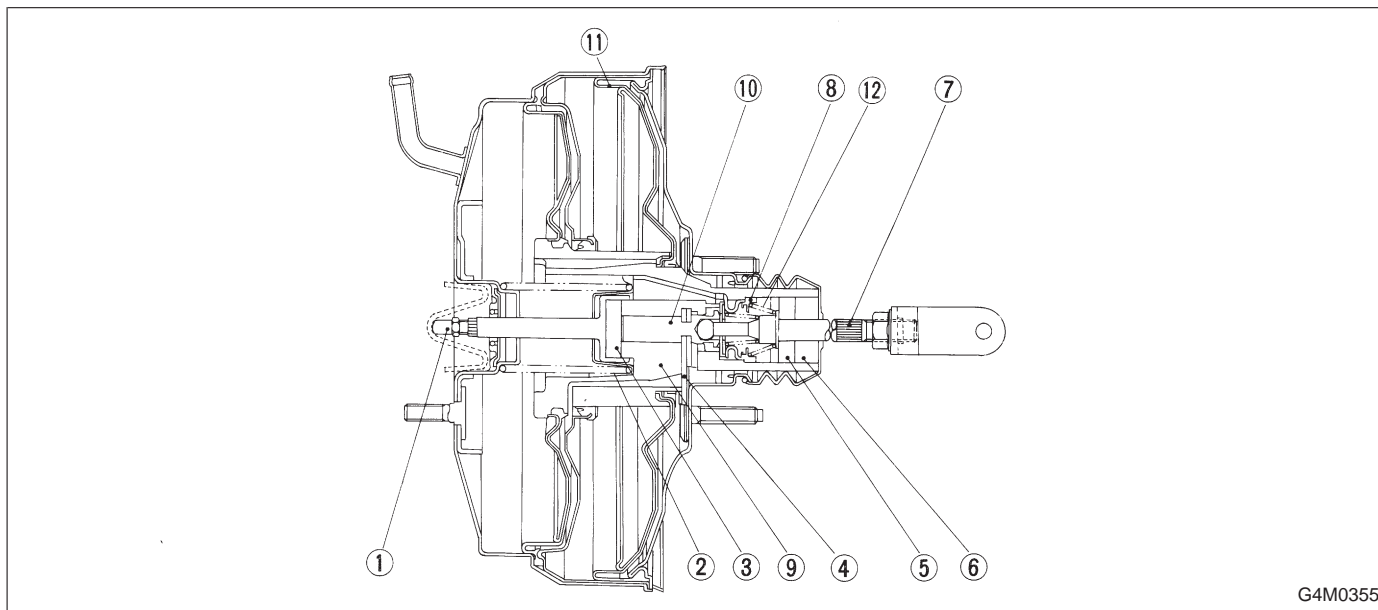
**Tightening torque: N·m (kg-m, ft-lb)**

**T1:  $14 \pm 4$  ( $1.4 \pm 0.4$ ,  $10.1 \pm 2.9$ )**

**T2:  $14.7^{+3}_{-2}$   
( $1.5^{+0.3}_{-0.2}$ ,  $10.8^{+2.2}_{-1.4}$ )**

## 5. Brake Booster

### 1. MODELS WITH A.B.S.

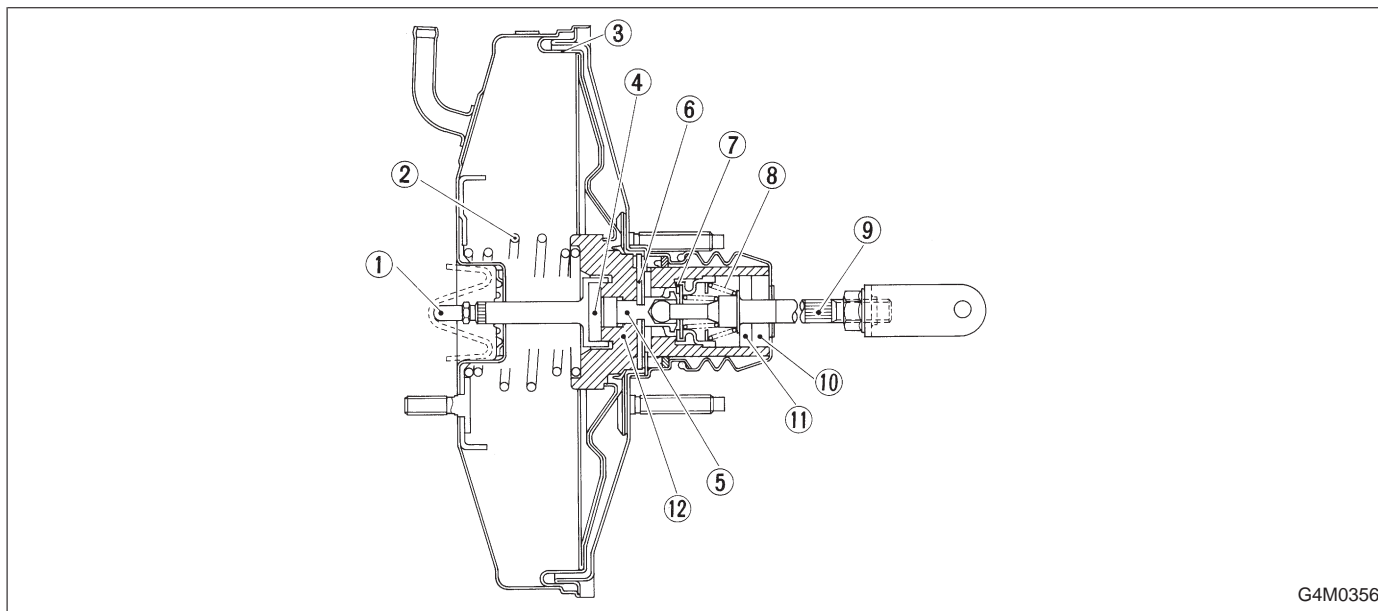


- ① Push rod
- ② Return spring
- ③ Reaction disc
- ④ Key

- ⑤ Filter
- ⑥ Silencer
- ⑦ Operating rod
- ⑧ Poppet valve

- ⑨ Valve body
- ⑩ Plunger valve
- ⑪ Diaphragm plate
- ⑫ Valve return spring

### 2. MODELS WITHOUT A.B.S.



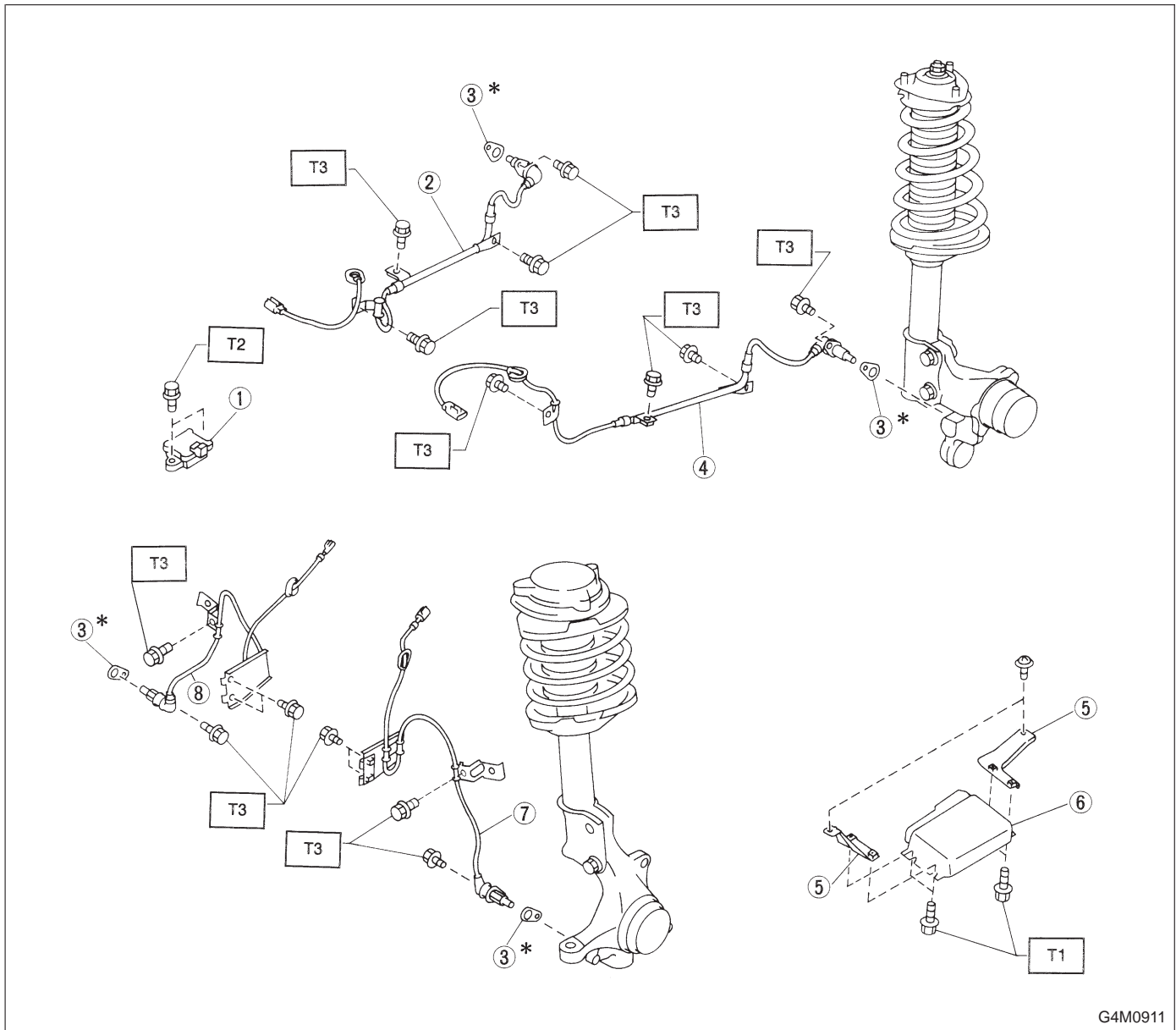
- ① Push rod
- ② Return spring
- ③ Diaphragm plate
- ④ Reaction disc

- ⑤ Plunger valve
- ⑥ Key
- ⑦ Poppet valve
- ⑧ Valve return spring

- ⑨ Operating rod
- ⑩ Silencer
- ⑪ Filter
- ⑫ Valve body

## 6. A.B.S. System

## 1. SENSOR AND CONTROL MODULE

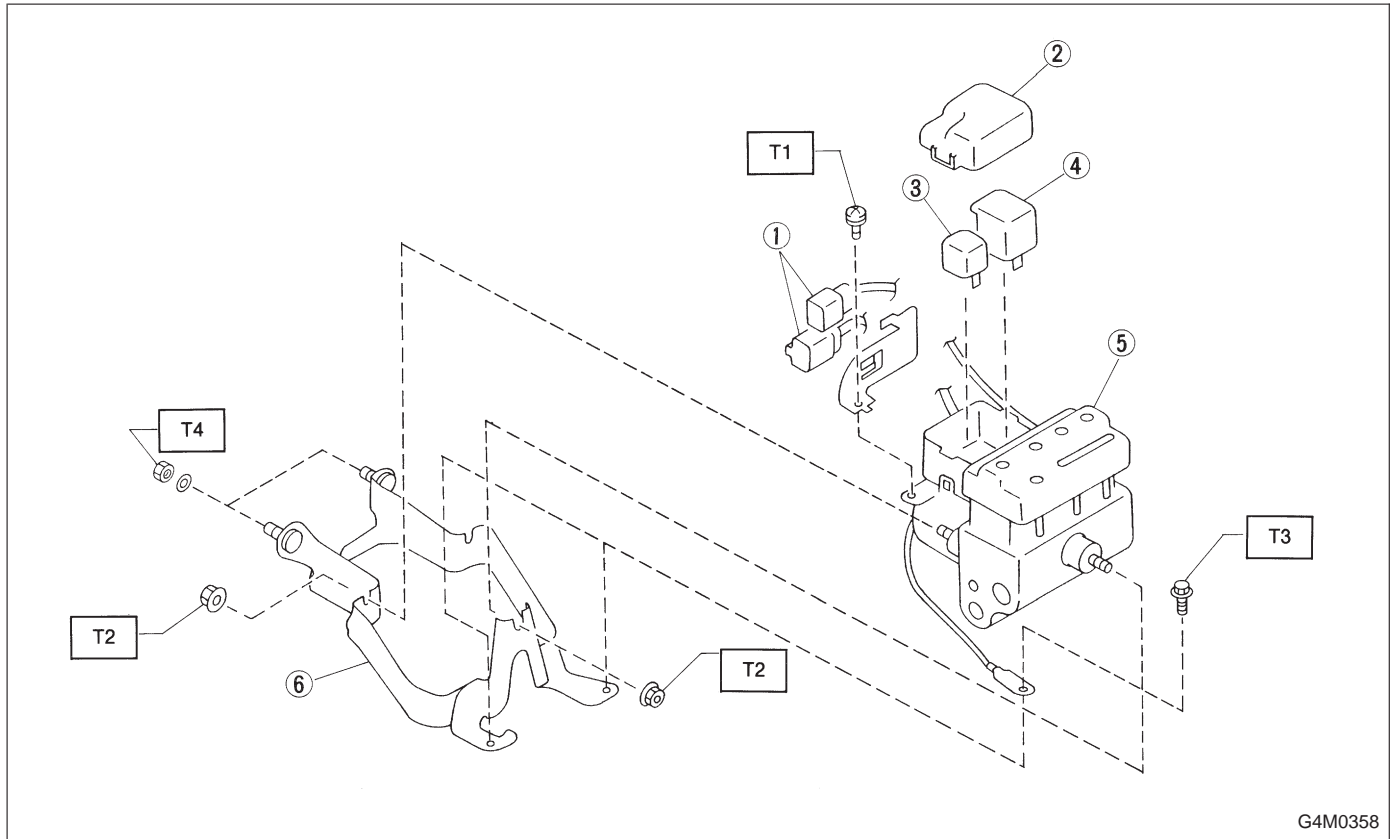


- ① G sensor (AWD MT only)
- ② Rear A.B.S. sensor RH
- ③ A.B.S. spacer
- ④ Rear A.B.S. sensor LH
- ⑤ Bracket

- ⑥ A.B.S. control module
- ⑦ Front A.B.S. sensor LH
- ⑧ Front A.B.S. sensor RH

**Tightening torque: N·m (kg-m, ft-lb)****T1: 5.9±1.5 (0.60±0.15, 4.3±1.1)****T2: 7.4±2.0 (0.75±0.2, 5.4±1.4)****T3: 32±10 (3.3±1.0, 24±7)**

## 2. HYDRAULIC UNIT

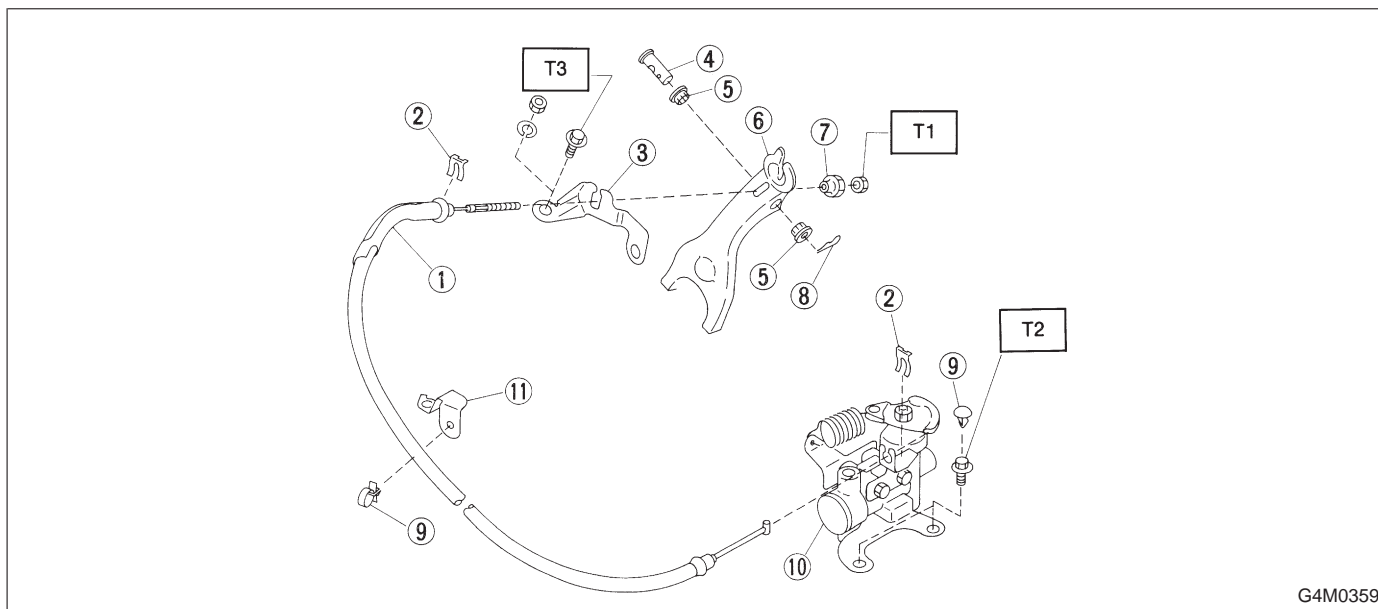


G4M0358

- ① Connector
- ② Cap
- ③ Motor relay
- ④ Valve relay
- ⑤ Hydraulic control unit
- ⑥ Bracket

**Tightening torque: N·m (kg·m, ft·lb)**  
**T1:  $1.2 \pm 0.2$  ( $0.125 \pm 0.025$ ,  $0.9 \pm 0.2$ )**  
**T2:  $18 \pm 5$  ( $1.8 \pm 0.5$ ,  $13.0 \pm 3.6$ )**  
**T3:  $32 \pm 10$  ( $3.3 \pm 1.0$ ,  $24 \pm 7$ )**  
**T4:  $52 \pm 15$  ( $5.3 \pm 1.5$ ,  $38 \pm 11$ )**

## 7. Hill Holder

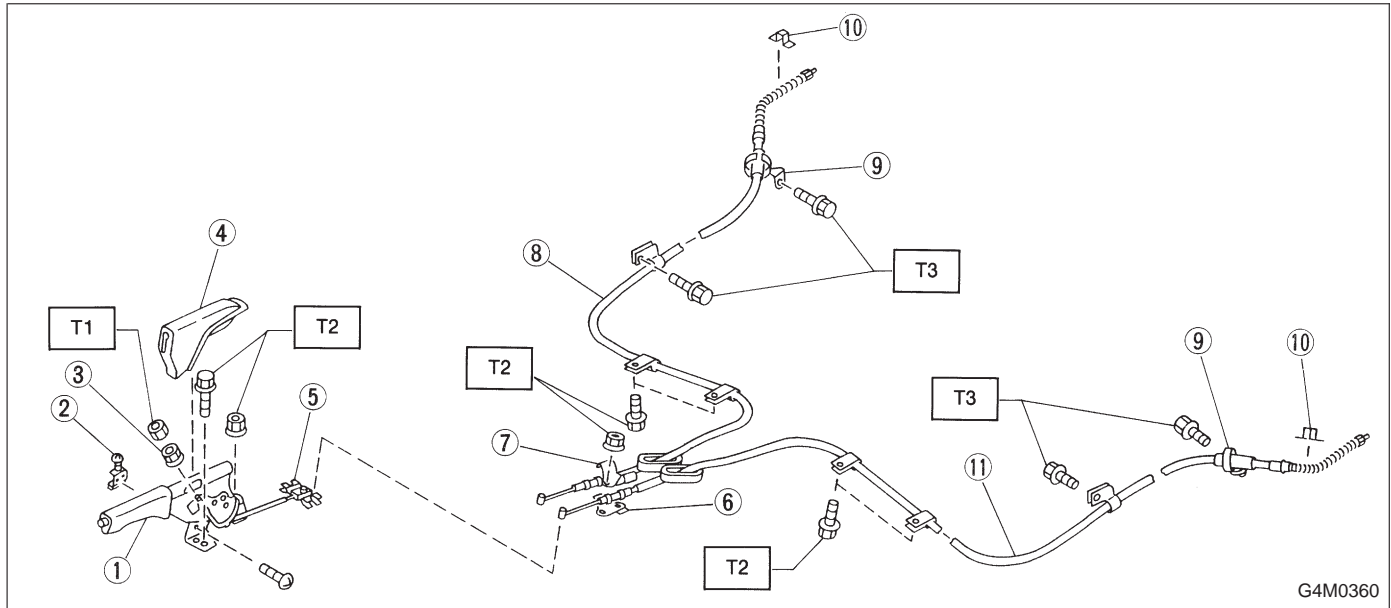


G4M0359

- |                |                             |
|----------------|-----------------------------|
| ① PHV cable    | ⑦ Adjusting nut             |
| ② Clamp        | ⑧ Snap pin                  |
| ③ Bracket A    | ⑨ Clip                      |
| ④ Pin          | ⑩ PHV (Pressure hold valve) |
| ⑤ Bushing      | ⑪ Bracket                   |
| ⑥ Release fork |                             |

**Tightening torque: N·m (kg·m, ft·lb)**  
**T1: 3.4±1.0 (0.35±0.10, 2.5±0.7)**  
**T2: 18±5 (1.8±0.5, 13.0±3.6)**  
**T3: 33±3 (3.4±0.3, 24.6±2.2)**

## 8. Parking (Hand) Brake

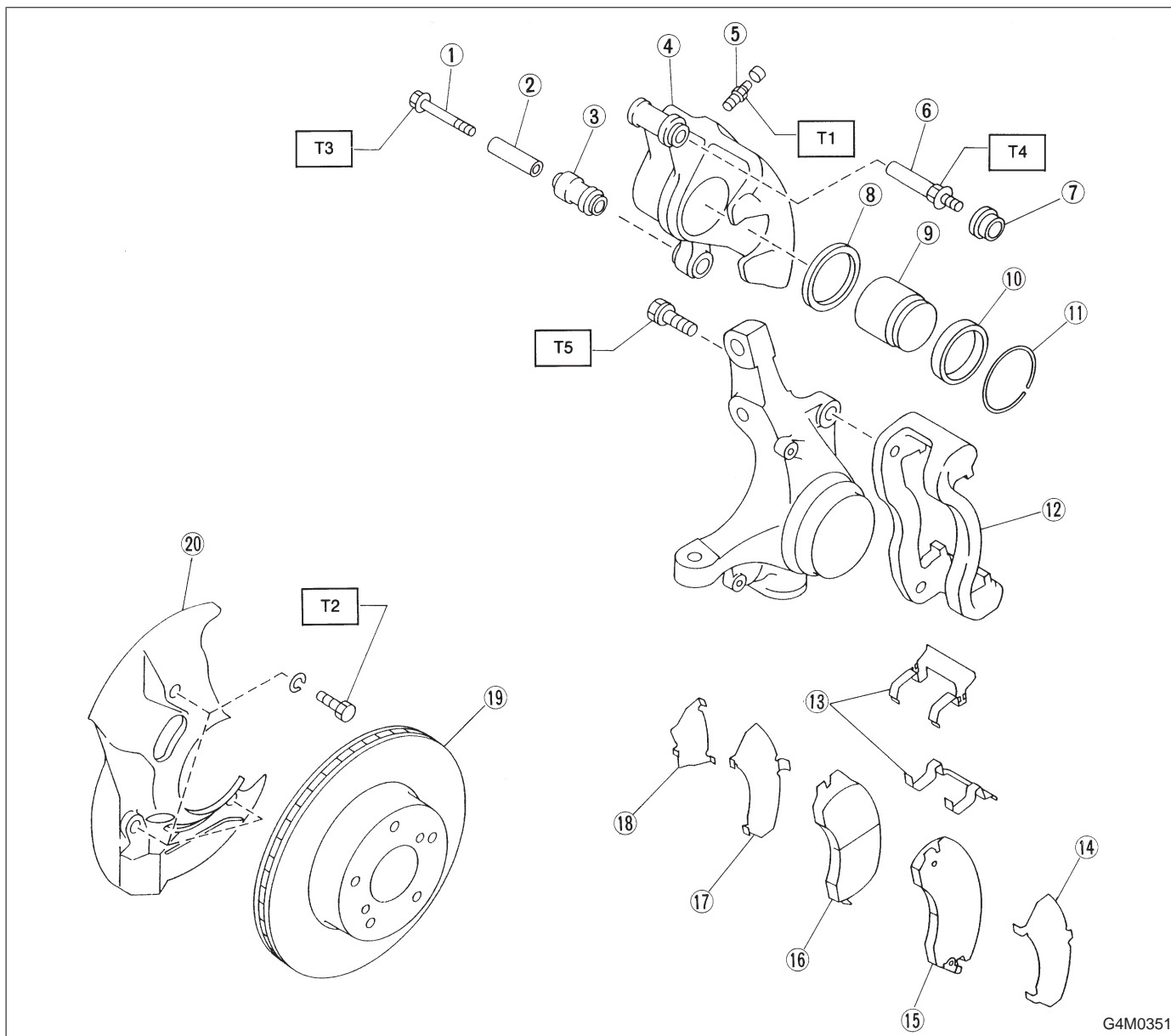


- ① Parking brake lever
- ② Parking brake switch
- ③ Adjusting nut
- ④ Cover
- ⑤ Equalizer
- ⑥ Bracket

- ⑦ Clamp
- ⑧ Parking brake cable RH
- ⑨ Cable guide
- ⑩ Clamp
- (Rear disc brake model only)
- ⑪ Parking brake cable LH

**Tightening torque: N·m (kg-m, ft-lb)**  
**T1:  $5.9 \pm 1.5$  ( $0.60 \pm 0.15$ ,  $4.3 \pm 1.1$ )**  
**T2:  $18 \pm 5$  ( $1.8 \pm 0.5$ ,  $13.0 \pm 3.6$ )**  
**T3:  $32 \pm 10$  ( $3.3 \pm 1.0$ ,  $24 \pm 7$ )**

### 1. Front Disc Brake



- ① Lock pin
- ② Lock pin sleeve
- ③ Lock pin boot
- ④ Caliper body
- ⑤ Air bleeder screw
- ⑥ Guide pin
- ⑦ Guide pin boot
- ⑧ Piston seal
- ⑨ Piston

- ⑩ Piston boot
- ⑪ Boot ring
- ⑫ Support
- ⑬ Pad clip
- ⑭ Outer shim
- ⑮ Pad (Outside)
- ⑯ Pad (Inside)
- ⑰ Inner shim
- ⑱ Shim

- ⑲ Disc rotor
- ⑳ Disc cover

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

**T1: 8±1 (0.8±0.1, 5.8±0.7)**

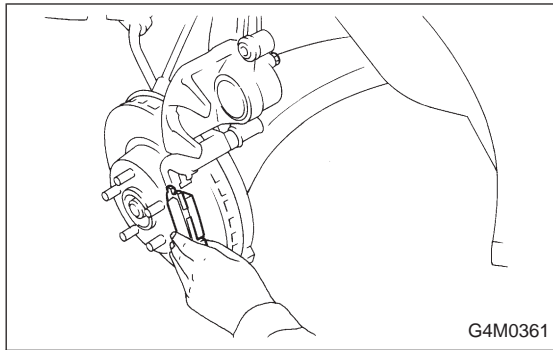
**T2: 14±4 (1.4±0.4, 10.1±2.9)**

**T3: 36±5 (3.7±0.5, 26.8±3.6)**

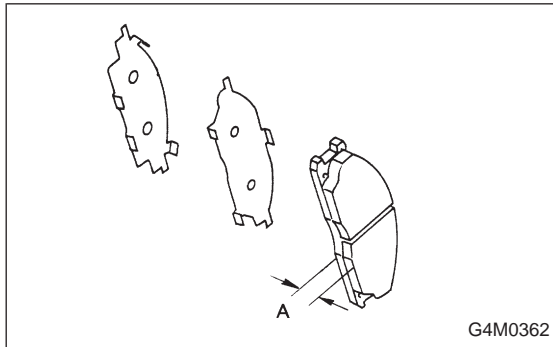
**T4: 49±5 (5.0±0.5, 36.2±3.6)**

**T5: 78±10 (8.0±1.0, 58±7)**

## 1. Front Disc Brake

**A: ON-CAR SERVICE****1. PAD**

- 1) Remove lock pin.
- 2) Raise caliper body.
- 3) Remove pad.

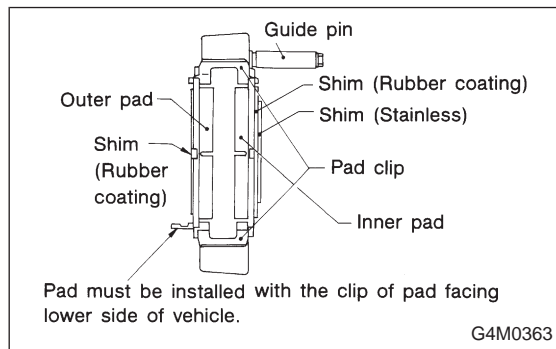


## 4) Check pad thickness A.

Pad thickness (including back metal) mm (in)	Standard value	17 (0.67)
	Wear limit	7.5 (0.295)

**CAUTION:**

- Always replace the pads for both the left and right wheels at the same time. Also replace pad clips if they are twisted or worn.
- A wear indicator is provided on the inner disc brake pad. If the pad wears down to such an extent that the end of the wear indicator contacts the disc rotor, a squeaking sound is produced as the wheel rotates. If this sound is heard, replace the pad.
- Replace pad if there is oil or grease on it.



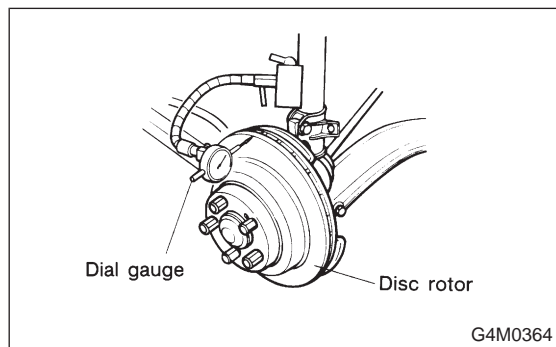
5) Apply thin coat of PBC GREASE (Part No. 003607000) to the frictional portion between pad and pad clip.

6) Install pads on support.

7) Install caliper body on support.

**NOTE:**

If it is difficult to push piston during pad replacement, loosen air bleeder to facilitate work.

**2. DISC ROTOR**

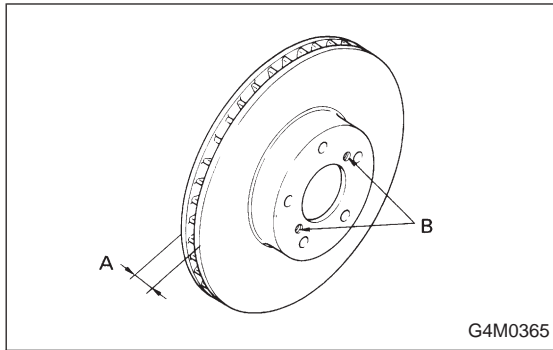
- 1) Install disc rotor by tightening the five wheel nuts.
- 2) Set a dial gauge on the disc rotor. Turn disc rotor to check runout.

**NOTE:**

Make sure that dial gauge is set 5 mm (0.20 in) inward of rotor outer perimeter.

**Disc rotor runout limit:**  
**0.075 mm (0.003 in)**





3) Measure disc rotor thickness.

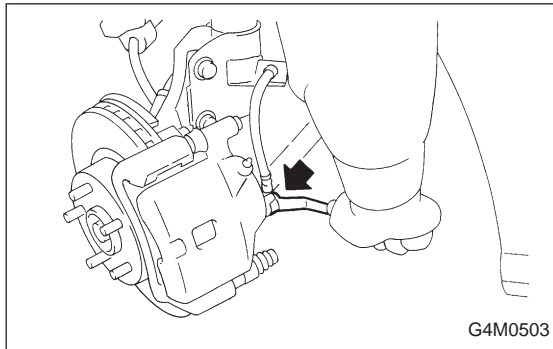
### NOTE:

Make sure that micrometer is set 5 mm (0.20 in) inward of rotor outer perimeter.

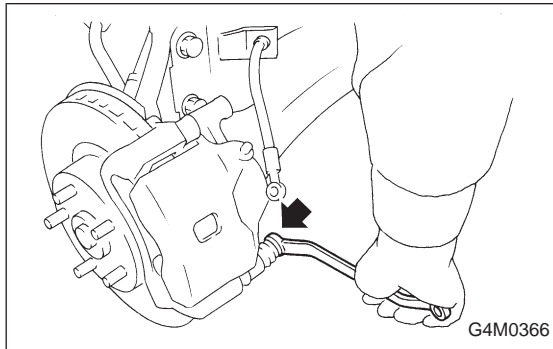
	Tire dia.	Standard value	Service limit	Disc outside dia.
Disc rotor thickness A mm (in)	13"	18.0 (0.709)	16.0 (0.630)	242 (9.53)
	14"	24.0 (0.945)	22.0 (0.866)	260 (10.24)

## B: REMOVAL

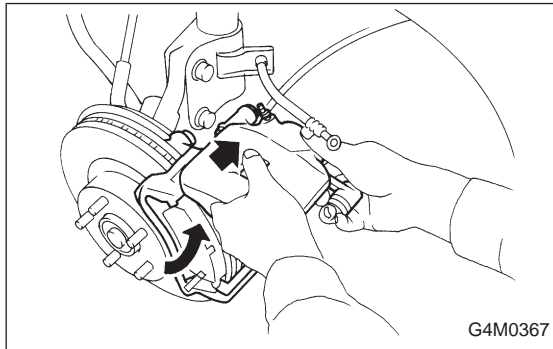
1) Remove union bolt and disconnect brake hose from caliper body assembly.



2) Loosen lock pin.



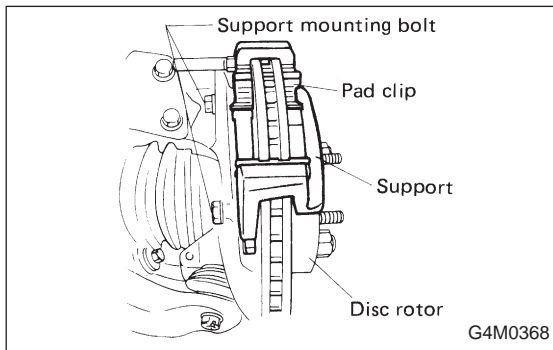
3) Raise caliper body and move it toward vehicle center to separate it from support.

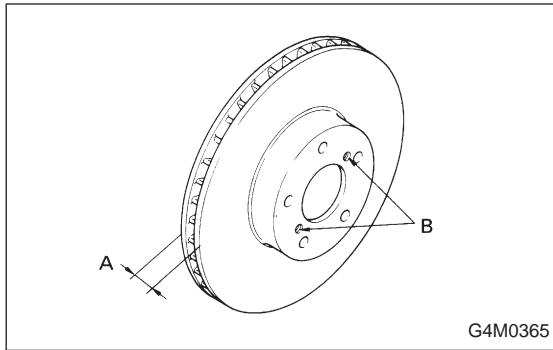


4) Remove support from housing.

### NOTE:

Remove support only when replacing it or the rotor. It need not be removed when servicing caliper body assembly.





5) Remove disc rotor from hub.

**NOTE:**

If disc rotor seizes up within hub, drive disc rotor out by installing an 8-mm bolt in holes B on the rotor.

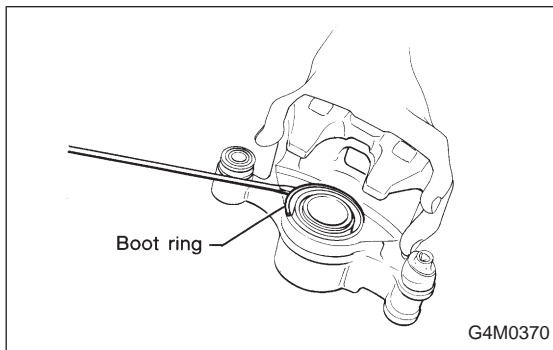
6) Clean mud and foreign particles from caliper body assembly and support.

## C: DISASSEMBLY

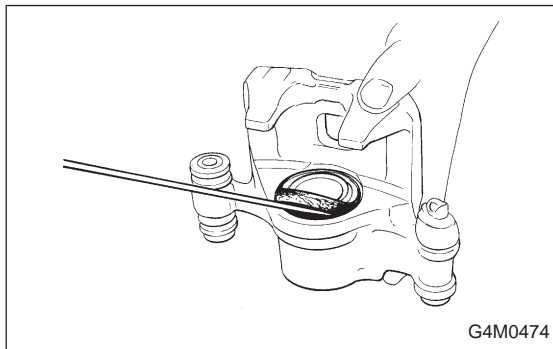
1) Clean mud and foreign particles from caliper body assembly and support.

**CAUTION:**

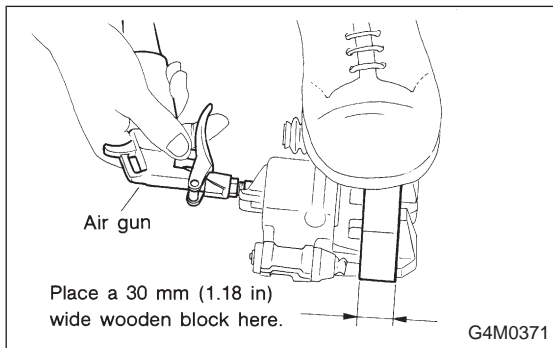
**Be careful not to allow foreign particles to enter inlet (at brake hose connector).**



2) Using a standard screwdriver, remove boot ring from piston.



3) Remove boot from piston end.



4) Gradually supply compressed air via caliper body brake hose to force piston out.

**CAUTION:**

**Place a wooden block as shown in Figure to prevent damage to piston.**

5) Remove piston seal from caliper body cylinder.

6) Remove lock pin sleeve and boot from caliper body.

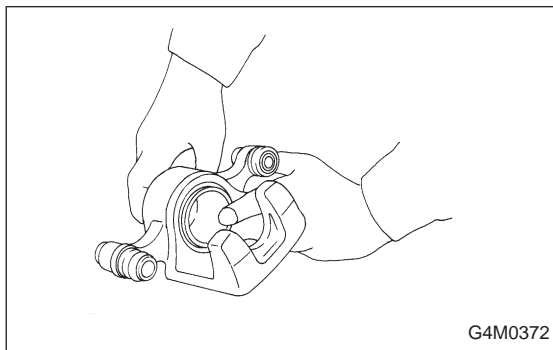
7) Remove guide pin boot.

**D: INSPECTION**

- 1) Repair or replace faulty parts.
- 2) Check caliper body and piston for uneven wear, damage or rust.
- 3) Check rubber parts for damage or deterioration.

**E: ASSEMBLY**

- 1) Clean caliper body interior using brake fluid.
- 2) Apply a coat of brake fluid to piston seal and fit piston seal in groove on caliper body.
- 3) Apply a coat of brake fluid to the entire inner surface of cylinder and outer surface of piston.

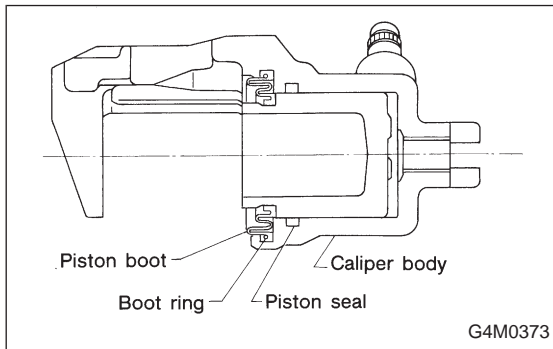


G4M0372

- 4) Insert piston into cylinder.

**CAUTION:**

**Do not force piston into cylinder.**



G4M0373

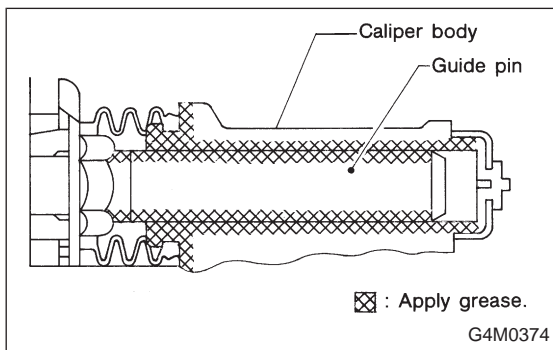
- 5) Apply a coat of specified grease to boot and fit in groove on ends of cylinder and piston.

**Grease:**

**NIGLUBE RX-2 (Part No. 003606000)**

To facilitate installation, fit boot starting with piston end.

- 6) Install boot ring. Be careful not scratch boot.



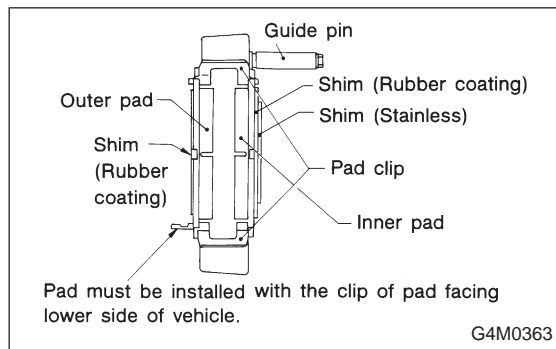
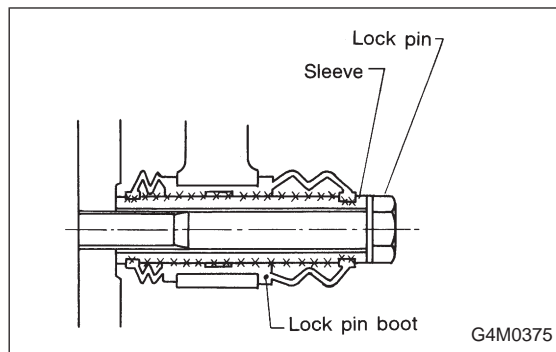
G4M0374

- 7) Apply a coat of specified grease to guide pin, outer surface, sleeve outer surface, cylinder inner surface, and boot grooves.

**Grease:**

**NIGLUBE RX-2 (Part No. 003606000)**

- 8) Install guide pin boots on caliper body.
- 9) Install lock pin boots on caliper body and insert lock pin sleeve into place.



## F: INSTALLATION

- 1) Install disc rotor on hub.
- 2) Install support on housing.

### **Tightening torque:**

**$78 \pm 10 \text{ N}\cdot\text{m}$  ( $8 \pm 1 \text{ kg}\cdot\text{m}$ ,  $58 \pm 7 \text{ ft}\cdot\text{lb}$ )**

### **CAUTION:**

- Always replace the pads for both the left and right wheels at the same time. Also replace pad clips if they are twisted or worn.

- A wear indicator is provided on the inner disc brake pad. If the pad wears down to such an extent that the end of the wear indicator contacts the disc rotor, a squeaking sound is produced as the wheel rotates. If this sound is heard, replace the pad.

- When replacing the pad, replace pads of the right and left wheels at the same time.

- 3) Apply thin coat of PBC GREASE (Part No. 003607000) to the frictional portion between pad and pad clip.

- 4) Install pads, rubber coated shim and stainless shim on support.

- 5) Install caliper body on support.

### **Tightening torque:**

**$36 \pm 5 \text{ N}\cdot\text{m}$  ( $3.7 \pm 0.5 \text{ kg}\cdot\text{m}$ ,  $27 \pm 3.6 \text{ ft}\cdot\text{lb}$ )**

- 6) Connect brake hose.

### **Tightening torque:**

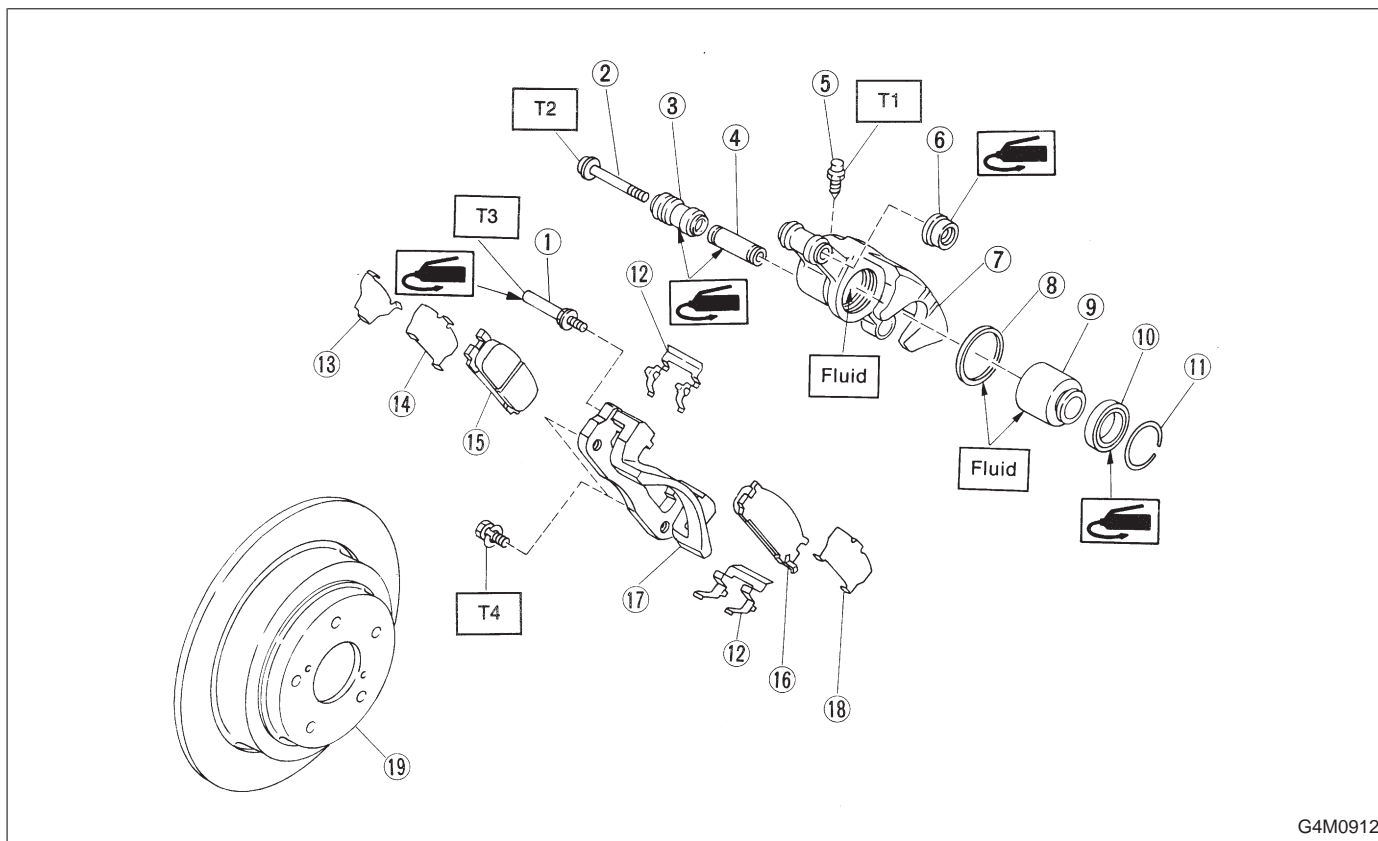
**$18 \pm 3 \text{ N}\cdot\text{m}$  ( $1.8 \pm 0.3 \text{ kg}\cdot\text{m}$ ,  $13.0 \pm 2.2 \text{ ft}\cdot\text{lb}$ )**

### **CAUTION:**

Replace brake hose gaskets with new ones.

- 7) Bleed air from brake system.

## 2. Rear Disc Brake



G4M0912

- ① Guide pin
- ② Lock pin
- ③ Lock pin boot
- ④ Lock pin sleeve
- ⑤ Air bleeder screw
- ⑥ Guide pin boot
- ⑦ Caliper body
- ⑧ Piston seal
- ⑨ Piston

- ⑩ Piston boot
- ⑪ Boot ring
- ⑫ Pad clip
- ⑬ Shim
- ⑭ Inner shim
- ⑮ Inner pad
- ⑯ Outer pad
- ⑰ Support
- ⑱ Outer shim

- ⑲ Disc rotor

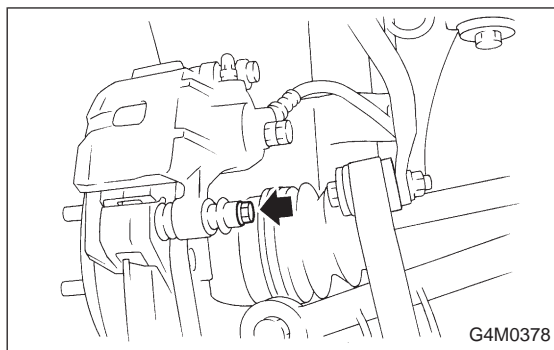
### Tightening torque: N·m (kg-m, ft-lb)

T1:  $8 \pm 1$  ( $0.8 \pm 0.1$ ,  $5.8 \pm 0.7$ )

T2:  $20 \pm 4$  ( $2.0 \pm 0.4$ ,  $14.5 \pm 2.9$ )

T3:  $26 \pm 5$  ( $2.7 \pm 0.5$ ,  $19.5 \pm 3.6$ )

T4:  $52 \pm 6$  ( $5.3 \pm 0.6$ ,  $38.3 \pm 4.3$ )

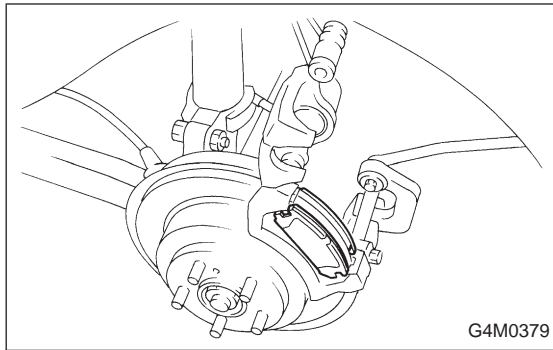


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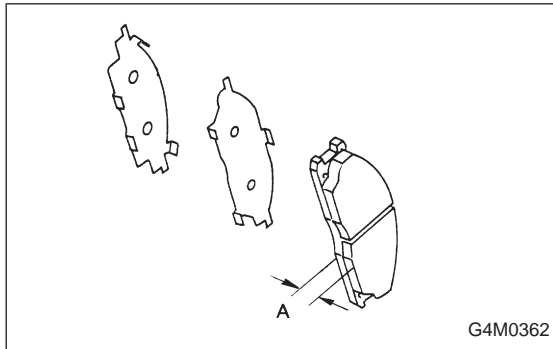
## A: ON-CAR SERVICE

### 1. PAD

- 1) Remove lock pin.



- 2) Raise caliper body.
- 3) Remove pad from support.



- 4) Check pad thickness (including back metal).

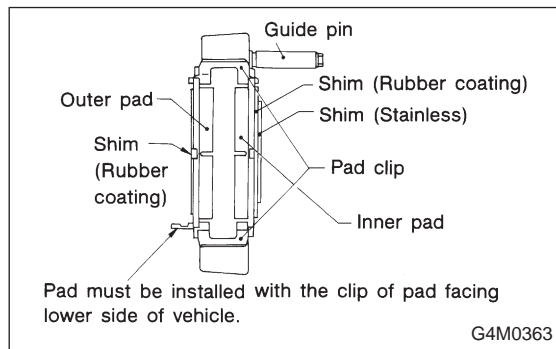
**Pad thickness: A**

**Standard value 15.0 mm (0.591 in)**

**Wear limit 6.5 mm (0.256 in)**

**CAUTION:**

- Always replace the pads for both the left and right wheels at the same time. Also replace pad clips if they are twisted or worn.
- A wear indicator is provided on the inner disc brake pad. If the pad wears down to such an extent that the end of the wear indicator contacts the disc rotor, a squeaking sound is produced as the wheel rotates. If this sound is heard, replace the pad.
- Replace pad if there is oil or grease on it.



- 5) Apply thin coat of PBC GREASE (Part No. 03607000) to the frictional portion between pad and pad clip.
- 6) Install pad on support.

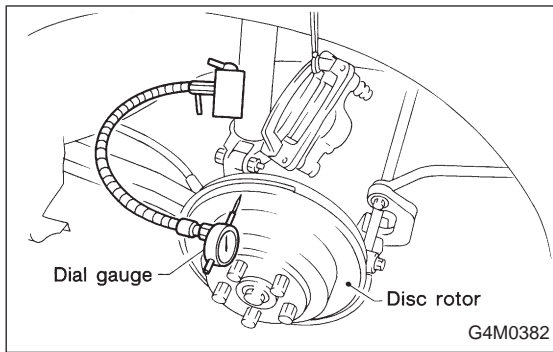
- 7) Install caliper body on support.

**Tightening torque:**

**$20 \pm 4$  N·m ( $2.0 \pm 0.4$  kg·m,  $14.5 \pm 2.9$  ft·lb)**

**NOTE:**

If it is difficult to push piston during pad replacement, loosen air bleeder to facilitate work.



### 2. DISC ROTOR

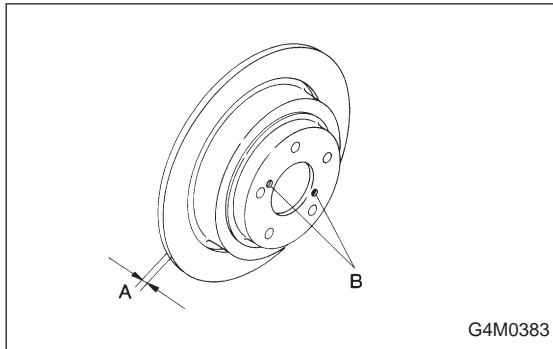
- 1) Install disc rotor by tightening the five wheel nuts.
- 2) Set a dial gauge on the disc rotor. Turn disc rotor to check runout.

#### NOTE:

Make sure that dial gauge is set 5 mm (0.20 in) inward of rotor outer perimeter.

#### **Disc rotor runout limit:**

**0.1 mm (0.004 in)**



- 3) Measure disc rotor thickness.

#### NOTE:

Make sure that micrometer is set 5 mm (0.20 in) inward of rotor outer perimeter.

#### **Disc rotor thickness: A**

**Standard value 10 mm (0.39 in)**

**Service limit 8.5 mm (0.335 in)**

#### NOTE:

When removing disc rotor, refer to instructions under Parking Brake 4-4 [W4A0].

### B: REMOVAL

- 1) Lift up vehicle and remove wheels.
- 2) Disconnect brake hose from caliper body assembly.

#### CAUTION:

**Do not allow brake fluid to come in contact with vehicle body; wipe off completely if spilled.**

- 3) Remove lock pin.
- 4) Raise caliper body and move it toward vehicle center to separate it from support.
- 5) Remove support from back plate.

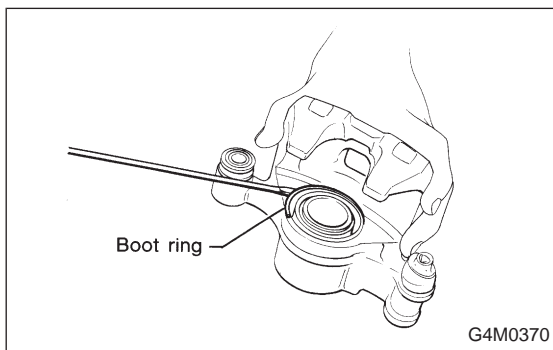
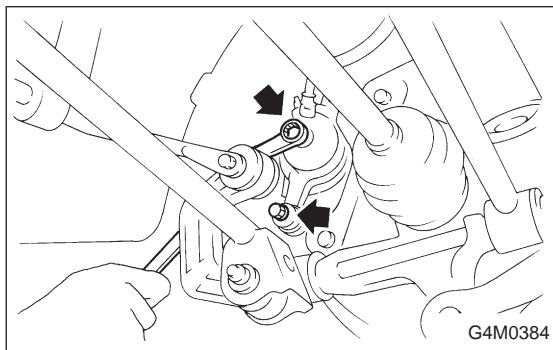
#### NOTE:

Remove support only when replacing it or the rotor. It need not be removed when servicing caliper body assembly.

- 6) Clean mud and foreign particles from caliper body assembly and support.

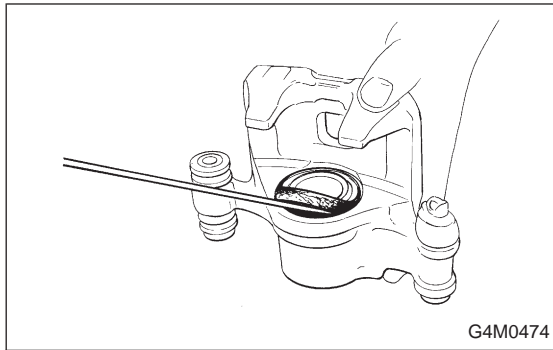
#### CAUTION:

**Be careful not to allow foreign particles to enter inlet (at brake hose connector).**

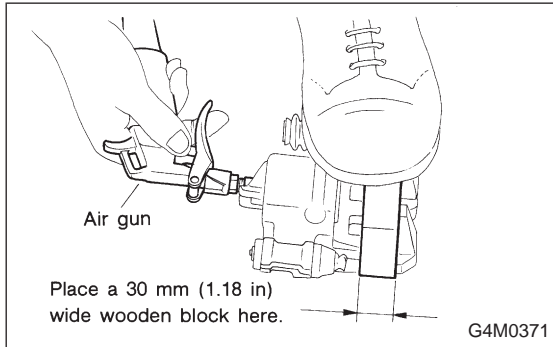


### C: DISASSEMBLY

- 1) Remove the boot ring.



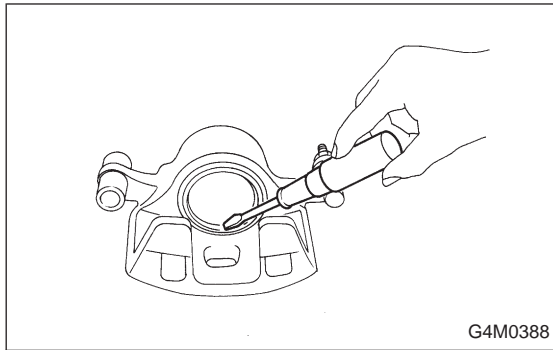
2) Remove the piston boot.



3) Gradually supply compressed air via inlet of caliper body to force piston out.

**CAUTION:**

- Place a wooden block as shown in Figure to prevent damage to piston.
- Do not apply excessively high pressure.



4) Remove piston seal from caliper body cylinder.

5) Remove lock pin sleeve and boot from caliper body.

6) Remove guide pin boot.

## D: INSPECTION

- 1) Repair or replace faulty parts.
- 2) Check caliper body and piston for uneven wear, damage or rust.
- 3) Check rubber parts for damage or deterioration.

## E: ASSEMBLY

- 1) Clean caliper body interior using brake fluid.
- 2) Apply a coat of brake fluid to piston seal and fit piston seal in groove on caliper body.
- 3) Apply a coat of brake fluid to the entire inner surface of cylinder and outer surface of piston.
- 4) Insert piston into cylinder.

**CAUTION:**

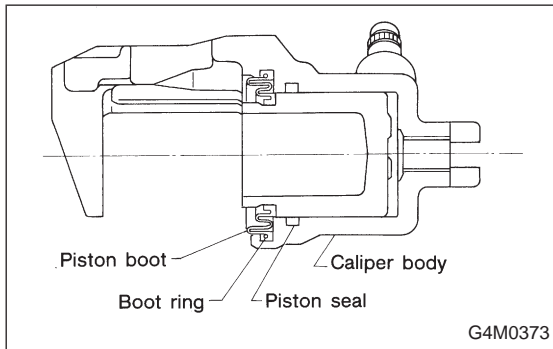
**Do not force piston into cylinder.**



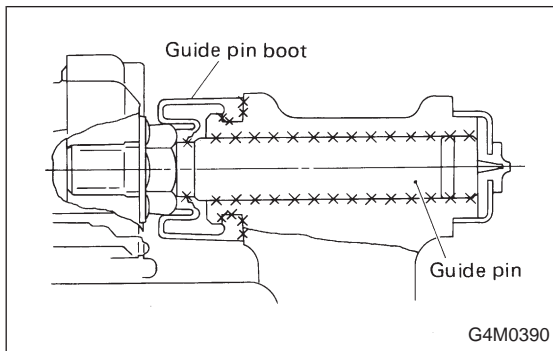
- 5) Apply a coat of specified grease to boot and fit in groove on ends of cylinder and piston.

**Grease:**

**NIGLUBE RX-2 (Part No. 003606000)**



- 6) Install the piston boot to the caliper body, and attach boot ring.

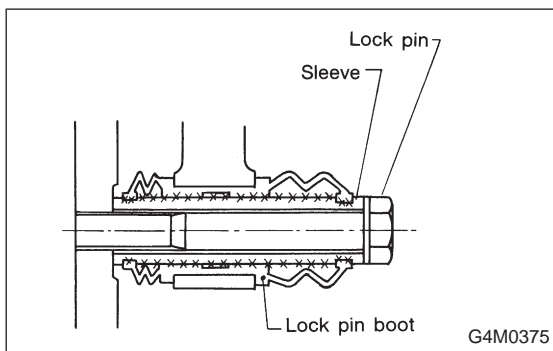


- 7) Apply a coat of specified grease to guide pin, outer surface, sleeve outer surface, cylinder inner surface, and boot grooves.

**Grease:**

**NIGLUBE RX-2 (Part No. 003606000)**

- 8) Install guide pin boots on caliper body.
- 9) Install lock pin boots on caliper body and insert lock pin sleeve into place.



## F: INSTALLATION

- 1) Install disc rotor on hub.
- 2) Install support on back plate.

**Tightening torque:**

**52±6 N·m (5.3±0.6 kg-m, 38.3±4.3 ft-lb)**

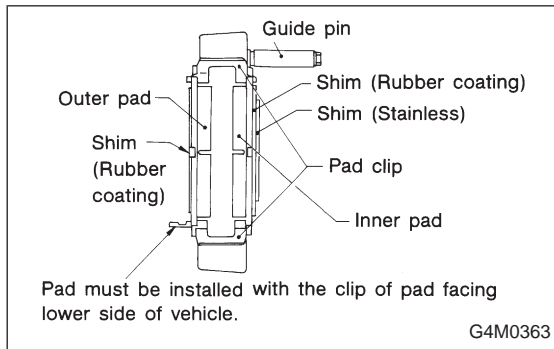
**CAUTION:**

- Always replace the pads for both the left and right wheels at the same time. Also replace pad clips if they are twisted or worn.

- A wear indicator is provided on the inner disc brake pad. If the pad wears down to such an extent that the end of the wear indicator contacts the disc rotor, a squeaking sound is produced as the wheel rotates. If this sound is heard, replace the pad.

- Replace pads if there is oil or grease on them.

3) Apply thin coat of PBC GREASE (Part No. 003607000) to the frictional portion between pad and pad clip.



4) Install pads on support.

5) Install caliper body on support.

**Tightening torque:**

**$20 \pm 4 \text{ N}\cdot\text{m}$  ( $2.0 \pm 0.4 \text{ kg}\cdot\text{m}$ ,  $14.5 \pm 2.9 \text{ ft}\cdot\text{lb}$ )**

6) Connect brake hose.

**Tightening torque:**

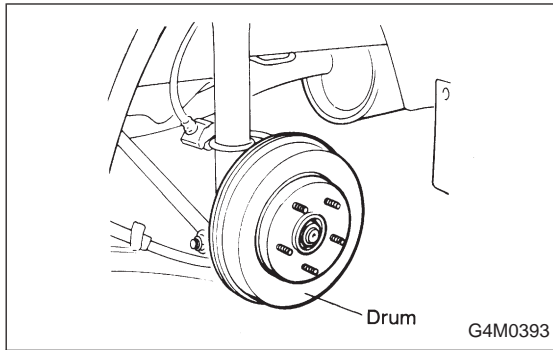
**$18 \pm 3 \text{ N}\cdot\text{m}$  ( $1.8 \pm 0.3 \text{ kg}\cdot\text{m}$ ,  $13.0 \pm 2.2 \text{ ft}\cdot\text{lb}$ )**

**CAUTION:**

- The brake hose must be connected without any twist.

- Replace brake hose gaskets with new ones.

7) Bleed air from brake system.

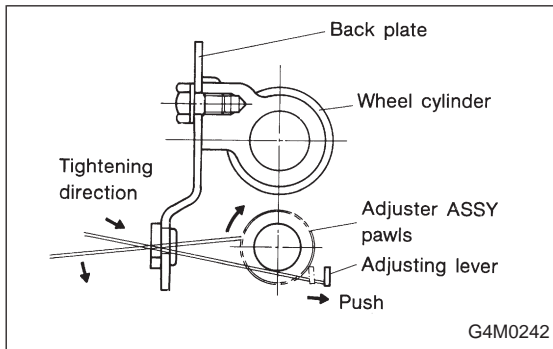


### 3. Rear Drum Brake

#### A: REMOVAL

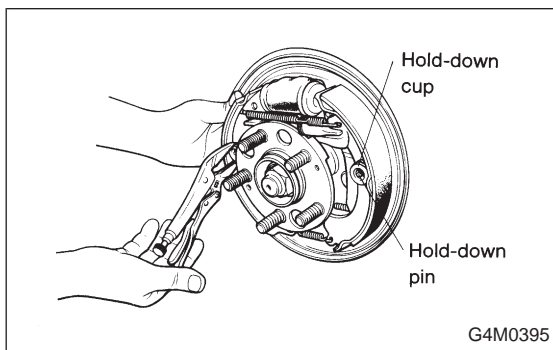
##### 1. BRAKE DRUM AND SHOE

- 1) Loosen wheel nuts, jack-up vehicle, support it with rigid racks, and remove wheel.
- 2) Release parking brake.
- 3) Remove brake drum from brake assembly.

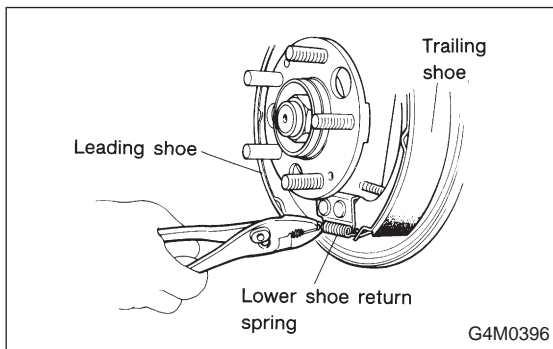


#### NOTE:

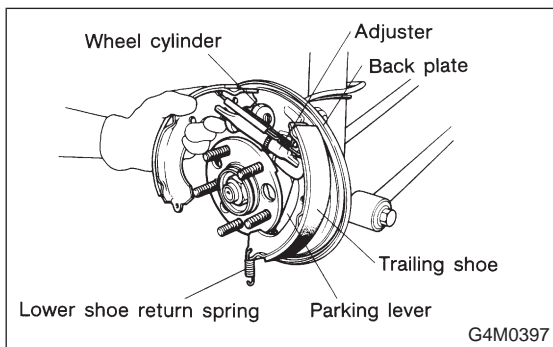
If it is difficult to remove brake drum, remove adjusting hole cover from back plate, and then, turn adjusting screw using a slot-type screwdriver until brake shoe separates from the drum.



- 4) Hold hold-down pin by securing rear of back plate with your hand.
- 5) Disconnect hold-down cup from hold-down pin by rotating hold-down cup.



- 6) Disconnect lower shoe return spring from shoes.



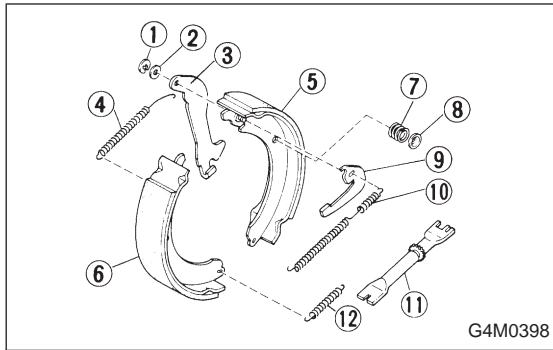
- 7) Remove shoes one by one from back plate with adjuster.

#### CAUTION:

**Be careful not to bend parking brake cable excessively when removing brake shoes.**

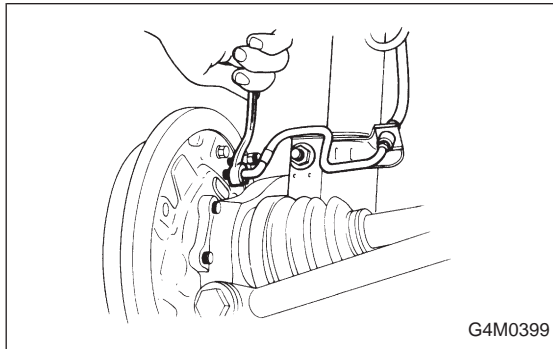
- 8) Disconnect parking brake cable from parking lever.

## 3. Rear Drum Brake

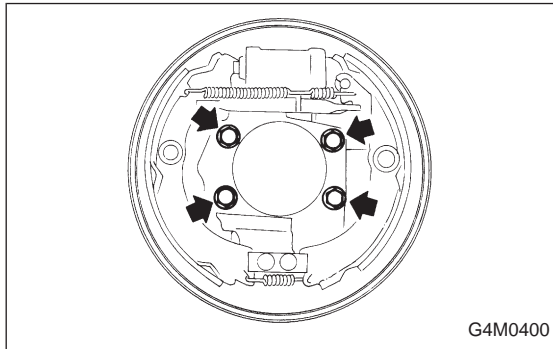


9) Remove the following.

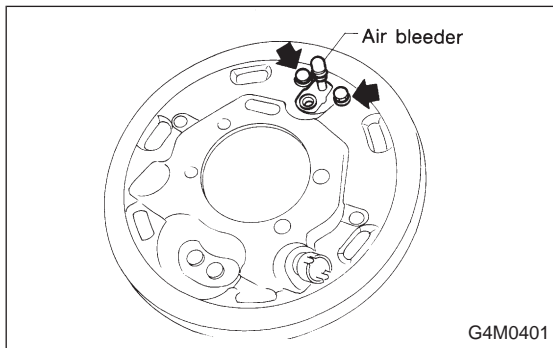
- ① Retainer
- ② Washer
- ③ Parking lever
- ④ Upper shoe return spring
- ⑤ Trailing shoe
- ⑥ Leading shoe
- ⑦ Shoe hold-down spring
- ⑧ Shoe hold-down cup
- ⑨ Adjusting lever
- ⑩ Adjuster spring
- ⑪ Adjuster
- ⑫ Lower shoe return spring

**2. BRAKE ASSEMBLY**

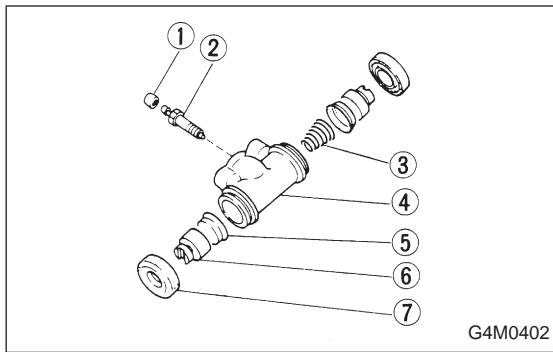
- 1) Remove wheel.
- 2) Remove axle nut.
- 3) Remove brake drum
- 4) Unscrew the brake pipe flare nut and disconnect brake pipe.
- 5) Remove hub. <Ref. to 4-2 [W2A0], [W3A0].>



6) Remove the bolts installing back plate, and then, remove brake assembly.

**3. WHEEL CYLINDER**

- 1) Remove brake drum and shoes.
- 2) Unscrew brake pipe flare nut; and disconnect brake pipe.
- 3) Remove the bolts installing wheel cylinder on back plate, and remove it.

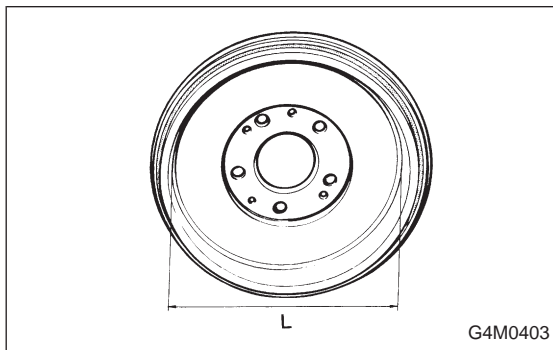


## B: DISASSEMBLY

### 1. WHEEL CYLINDER

- 1) Remove right and left dust boots from wheel cylinder.
- 2) Remove piston, cup, spring and air bleeder screw and cap.

- ① Bleeder cap
- ② Bleeder screw
- ③ Spring
- ④ Cylinder
- ⑤ Cup
- ⑥ Piston
- ⑦ Boot



## C: INSPECTION

- 1) If the inside surface of brake drum is streaked, correct the surface. And, if it is unevenly worn, taperingly streaked, or the outside surface of brake drum is damaged, correct or replace it.
- 2) Measure the drum inner diameter.

**Drum inner diameter: "L"**

**Standard: 228.6 mm (9 in)**

**Service limit: 230.6 mm (9.08 in)**

- 3) Measure the lining thickness.

**Lining thickness:**

**Standard: 4.1 mm (0.161 in)**

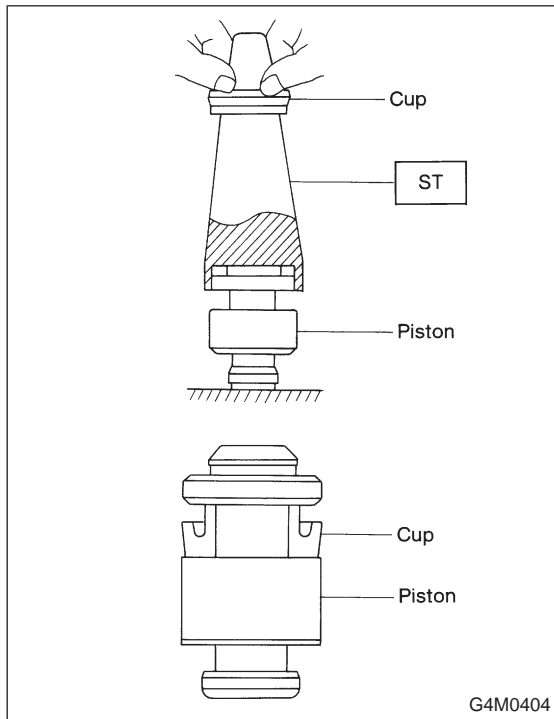
**Service limit: 1.5 mm (0.059 in)**

- 4) If the deformation or wear of back plate, shoe, etc. are notable, replace them.
- 5) When the shoe return spring tension is excessively weakened, replace it, taking care to identify upper and lower springs.

**D: ASSEMBLY****1. WHEEL CYLINDER**

Clean all parts in brake fluid. Check and replace faulty parts.

- Cup and boot for damage or fatigue
  - Cylinder, piston and spring or damage or rust formation
- 1) Assembly is the reverse order of disassembly.



(1) When installing the cup, use ST, apply brake fluid to the frictional surface for smooth installation and pay attention to cup direction.

(2) STs are available in different sizes.

**CAUTION:**

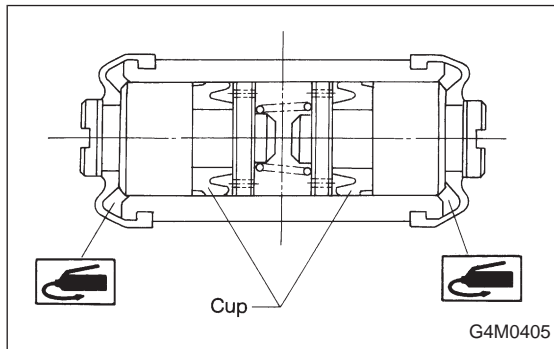
● When replacing the repair kit, make sure that the sizes of cylinder and cup are the same as those which were replaced.

● Use only the tool of the correct size.

ST: ADAPTER	
Applicable size	Part No.
17.46 mm (11/16 in)	925460000
19.05 mm (3/4 in)	926460000

**CAUTION:**

While assembling, be careful to prevent any metal chip, dust or dirt from entering the wheel cylinder.



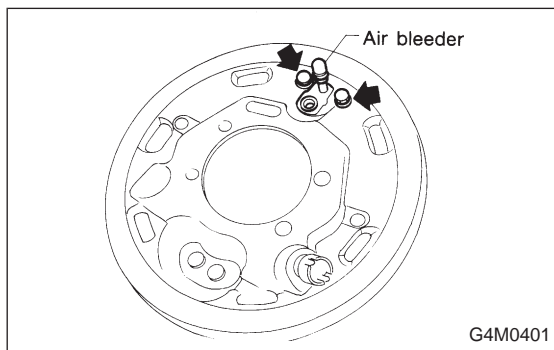
2) Apply rubber grease to the boot inside as shown in Figure.

**Grease:**

**NIGLUBE RX-2 (Part No. 003606000)**

**CAUTION:**

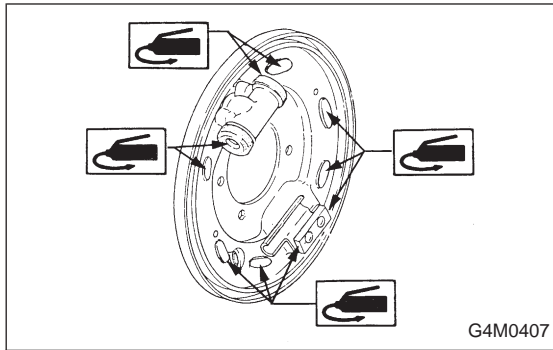
Never use brake grease.

**E: INSTALLATION****1. WHEEL CYLINDER**

Install wheel cylinder on back plate, and tighten bolts.

**Tightening torque:**

**10±2 N·m (1.0±0.2 kg-m, 7.2±1.4 ft-lb)**

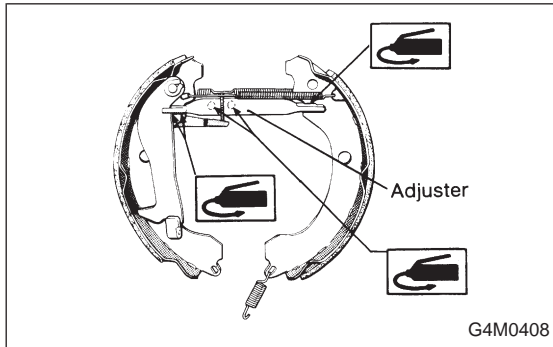


### 2. BRAKE DRUM AND SHOE

- 1) Clean back plate and wheel cylinder.
- 2) Apply grease to portions indicated by arrows in Figure.

#### Brake grease:

**Dow Corning Molykote No. 7439 (Part No. 725191460)**

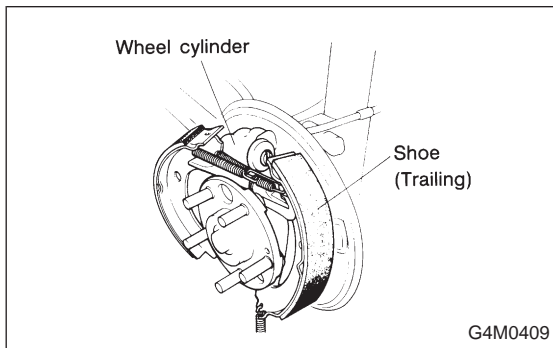


- 3) Apply grease to adjusting screw and both ends of adjuster.

#### Brake grease:

**Dow Corning Molykote No. 7439 (Part No. 725191460)**

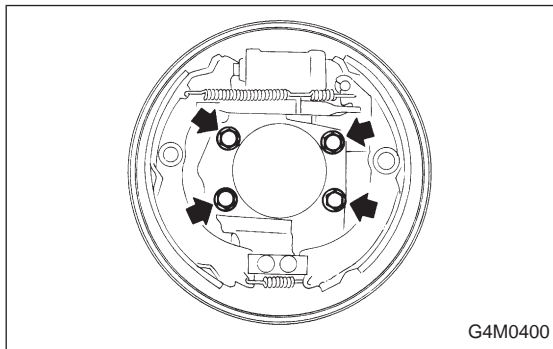
- 4) Connect upper shoe return spring to shoes.



- 5) While positioning shoes (one at a time) in groove on wheel cylinder, secure shoes.

- 6) Connect lower shoe return spring.

- 7) Fix shoes by connecting hold-down cup to hold-down pin.



### 3. BRAKE ASSEMBLY

- 1) Install brake assembly on housing, and tighten bolts to install back plate.

#### Tightening torque:

**$52 \pm 6 \text{ N-m}$  ( $5.3 \pm 0.6 \text{ kg-m}$ ,  $38.3 \pm 4.3 \text{ ft-lb}$ )**

- 2) Install hub. <Ref. to 4-2 [W2D0], [W3D0].>

- 3) Connect brake pipe, and tighten brake pipe flange nut.

#### Tightening torque:

**$14.7^{+3}_{-2} \text{ N-m}$  ( $1.5^{+0.3}_{-0.2} \text{ kg-m}$ ,  $10.8^{+2.2}_{-1.4} \text{ ft-lb}$ )**

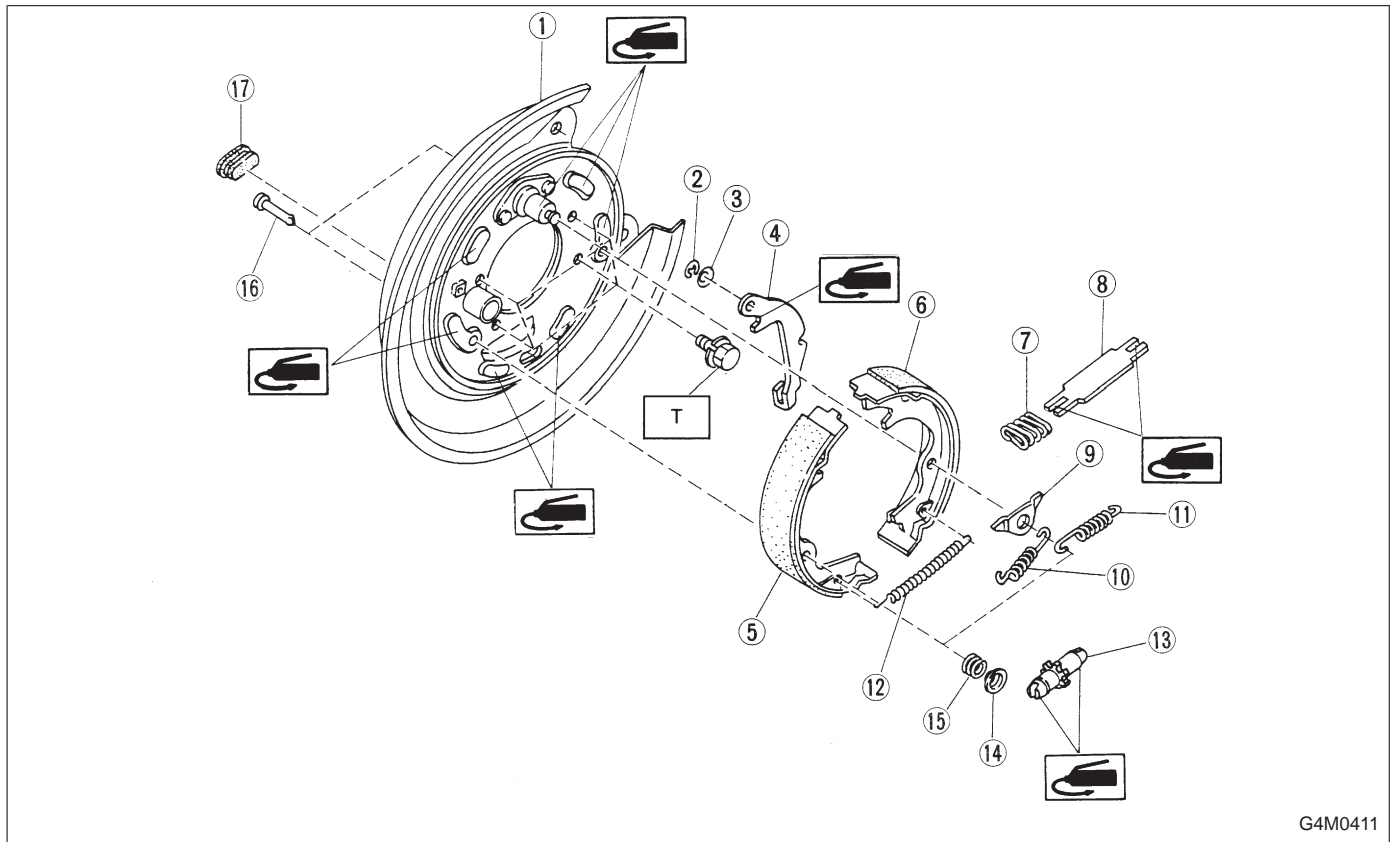
- 4) Set the outside diameter of brake shoes less than 0.5 — 0.8 mm (0.020 — 0.031 in) in comparison with the inside diameter of brake drum.

- 5) Install brake drum.

- 6) After installing brake assembly, bleed air from brake line.

## 4. Parking Brake (Rear Disc Brake)

## A: REMOVAL

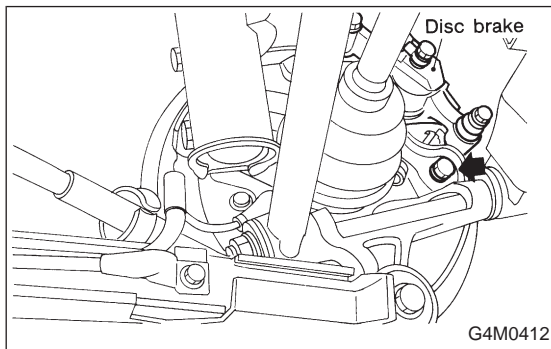


G4M0411

- |                                  |                           |
|----------------------------------|---------------------------|
| ① Back plate                     | ⑧ Strut                   |
| ② Retainer                       | ⑨ Shoe guide plate        |
| ③ Spring washer                  | ⑩ Primary return spring   |
| ④ Lever                          | ⑪ Secondary return spring |
| ⑤ Parking brake shoe (Primary)   | ⑫ Adjusting spring        |
| ⑥ Parking brake shoe (Secondary) | ⑬ Adjuster                |
| ⑦ Strut spring                   | ⑭ Shoe hold down cup      |

- |                         |
|-------------------------|
| ⑮ Shoe hold down spring |
| ⑯ Shoe hold down pin    |
| ⑰ Adjusting hole cover  |

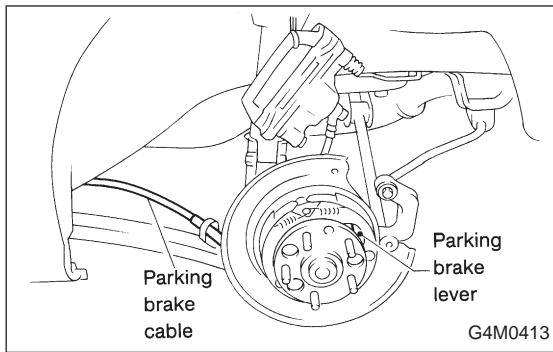
**Tightening torque: N·m (kg-m, ft-lb)**  
**T: 52±6 (5.3±0.6, 38.3±4.3)**



G4M0412

- 1) Remove the two mounting bolts and remove the disc brake assembly.
- 2) Suspend the disc brake assembly so that the hose is not stretched.
- 3) Remove the disc rotor.
- 4) Remove shoe return spring from parking brake assembly.
- 5) Remove front shoe hold down spring and pin with pliers.
- 6) Remove strut and strut spring.
- 7) Remove adjuster assembly from parking brake assembly.
- 8) Remove brake shoe.
- 9) Remove rear shoe hold-down spring and pin with pliers.





10) Remove parking cable from parking lever.

11) Using a standard screwdriver, raise retainer. Remove parking lever and washer from brake shoe.

## B: INSPECTION

1) Measure brake disc inside diameter. If the disc is scored or worn, replace the brake disc.

### ***Disc inside diameter:***

#### ***Standard***

***170 mm (6.69 in)***

#### ***Service limit***

***171 mm (6.73 in)***

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

### ***Lining thickness:***

#### ***Standard***

***3.2 mm (0.126 in)***

#### ***Service limit***

***1.5 mm (0.059 in)***

## CAUTION:

Replace the brake shoes on the right and left brake assembly at the same time.

## C: INSTALLATION

## CAUTION:

Be sure lining surface is free from oil contamination.

### ***Brake grease:***

***Dow Corning Molykote No 7439 (Part No. 725191460)***

1) Apply brake grease to the following places.

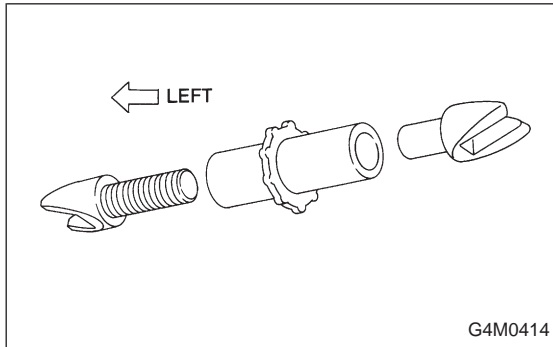
- (1) Six contact surfaces of shoe rim and back plate packing.
- (2) Contact surface of shoe wave and anchor pin
- (3) Contact surface of lever and strut
- (4) Contact surface of shoe wave and adjuster assembly
- (5) Contact surface of shoe wave and strut
- (6) Contact surface of lever and shoe wave

## 4. Parking Brake (Rear Disc Brake)

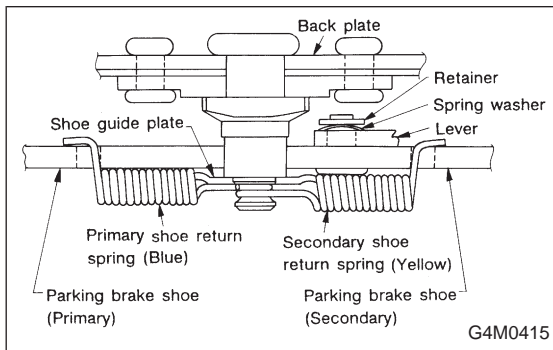
2) Installation is in reverse order of removal.

**CAUTION:**

- Use new retainers and clinch them when installing brake shoes to levers.
- Ensure that parking lever moves smoothly.
- Do not confuse left parking lever with right one.
- Do not confuse left strut with right one.

**NOTE:**

Ensure that adjuster assembly is securely installed with screw in the left side, facing vehicle front.

**NOTE:**

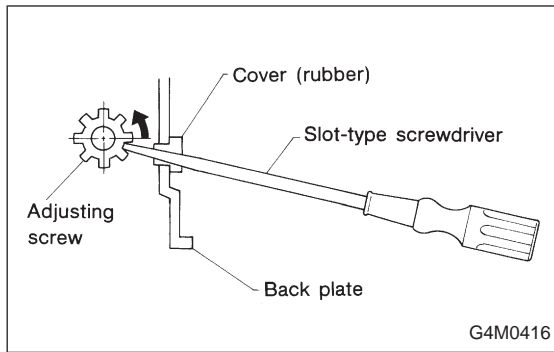
Ensure that shoe return spring is installed as shown in Figure.

3) Adjust parking brakes. <Ref. to 4-4 [W4D1].>

**CAUTION:**

After replacing parking brake lining, be sure to drive vehicle for “break-in” purposes.

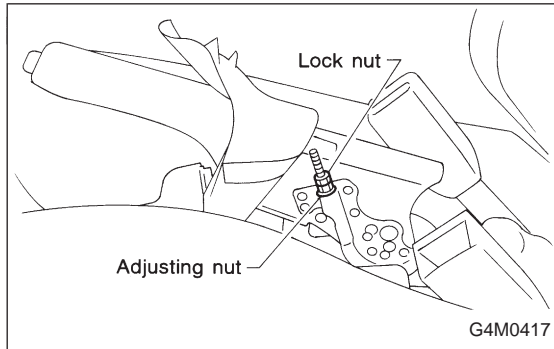
- (1) Drive the vehicle about 35 km/h (22 MPH).
- (2) With the parking brake release button pushed in, pull the parking brake lever gently.
- (3) Drive the vehicle for about 200 meter (0.12 mile) in this condition.
- (4) Wait 5 to 10 minutes for the parking brake to cool down. Repeat this procedure once more.
- (5) After breaking-in, re-adjust parking brakes.



## D: PARKING BRAKE ADJUSTMENT

### 1. SHOE CLEARANCE ADJUSTMENT

- 1) Remove adjusting hole cover from back plate.
- 2) Turn adjusting screw using a slot-type screwdriver until brake shoe is in close contact with disc rotor.
- 3) Turn back (downward) adjusting screw 3 or 4 notches.
- 4) Install adjusting hole cover to back plate.



### 2. LEVER STROKE ADJUSTMENT

- 1) Remove console box lid.
- 2) Forcibly pull parking brake lever 3 to 5 times.
- 3) Adjust parking brake lever by turning adjuster until parking brake lever stroke is set at 6 notches with operating force of 196 N (20 kg, 44 lb).
- 4) Tighten lock nut.
- 5) Install console box lid.

#### **Lever stroke:**

**7 to 8 notches when pulled  
with a force of 196 N (20 kg, 44 lb)**

#### **Torque (Adjuster lock nut):**

**5.9±1.5 N·m (0.60±0.15 kg·m, 4.3±1.1 ft-lb)**

## 5. Master Cylinder

### A: REMOVAL

- 1) Thoroughly drain brake fluid from reservoir tank.
- 2) Disconnect fluid level indicator harness connector.
- 3) Remove brake pipes from master cylinder.
- 4) Remove master cylinder mounting nuts, and take out master cylinder from brake booster.

#### **CAUTION:**

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

**B: DISASSEMBLY****1. PRECAUTIONS FOR DISASSEMBLING**

- 1) Remove mud and dirt from the surface of brake master cylinder.
- 2) Prepare tools necessary for disassembly operation, and arrange them neatly on work bench.
- 3) Clean work bench.
- 4) Tools for disassembly operation:
  - 1 Phillips screwdriver
  - 1 C-ring pliers

**2. DISASSEMBLING PROCEDURE**

- 1) Remove supply valve stopper. (only vehicle equipped with A.B.S.)
- 2) Remove C-ring with C-ring pliers pushing in primary piston slightly.

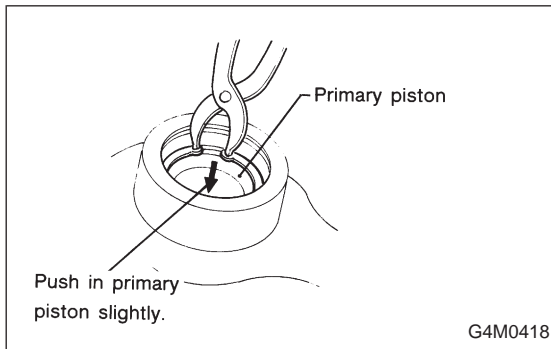
**NOTE:**

Piston may jump out from master cylinder.

- 3) Extract primary piston assembly and secondary piston assembly.

**CAUTION:**

- Do not disassemble the piston assembly; otherwise, the spring set value may be changed.
- Use brake fluid or methanol to wash inside wall of cylinder, pistons and piston cups. Be careful not to damage parts when washing. If methanol is used for washing, do not dip rubber parts, such as piston cups, in it for more than 30 seconds; otherwise, they may become swelled.

**C: INSPECTION**

If any damage, deformation, wear, swelling, rust, and other faults are found on the primary piston assembly, secondary piston assembly, supply valve stopper, or gasket, replace the faulty part.

**CAUTION:**

- The primary and secondary pistons must be replaced as complete assemblies.
- The service limit of the clearance between each piston and the master cylinder inner dia. is 0.11 mm (0.0043 in).
- When handling parts, be extremely careful not to damage or scratch the parts, or let any foreign matter get on them.

**D: ASSEMBLY****1. PRECAUTIONS FOR ASSEMBLING**

- 1) When assembling, be sure to use recommended brake fluid.
- 2) Ensure that the inside wall of cylinder, pistons, and piston cups are free from dirt when assembling.
- 3) Be extremely careful not to damage, scratch, or dent cylinder inside wall, pistons, and piston cups.
- 4) Do not drop parts. Never attempt to use any part that has been dropped accidentally.

**2. ASSEMBLING OPERATION**

- 1) Assembling piston assembly:  
Apply recommended brake fluid to inside wall of cylinder, and to outer surface of piston assembly, and install piston assemblies carefully into cylinder.
- 2) Assembling supply valve stopper:  
After installing piston into cylinder, push primary piston in about 10 mm (0.39 in), using a rod, such as push rod then assemble gasket and supply valve stopper.

***Tightening torque:***

***2.2±0.7 N·m (0.225±0.075 kg-m, 1.6±0.5 ft-lb)***

**CAUTION:**

If the gasket and supply valve stopper are assembled without pushing in the primary piston, scratches may be caused on the secondary piston, and no pressure may be built up in the secondary side. To avoid such an error, be sure to push in the primary piston before assembling these parts.

- 3) Assembling C-ring:  
With primary piston pushed in slightly, attach C-ring by using C-ring pliers.

**NOTE:**

After assembling, ensure that the C-ring is fitted securely in the ring groove.

**E: INSTALLATION**

To install the master cylinder to the body, reverse the sequence of removal procedure.

***Tightening torque:***

***Master cylinder mounting nut***

***14±4 N·m (1.4±0.4 kg-m, 10.1±2.9 ft-lb)***

***Piping flare nut***

***14.7<sup>+3</sup><sub>-2</sub> N·m (1.5<sup>+0.3</sup><sub>-0.2</sub> kg-m, 10.8<sup>+2.2</sup><sub>-1.4</sub> ft-lb)***

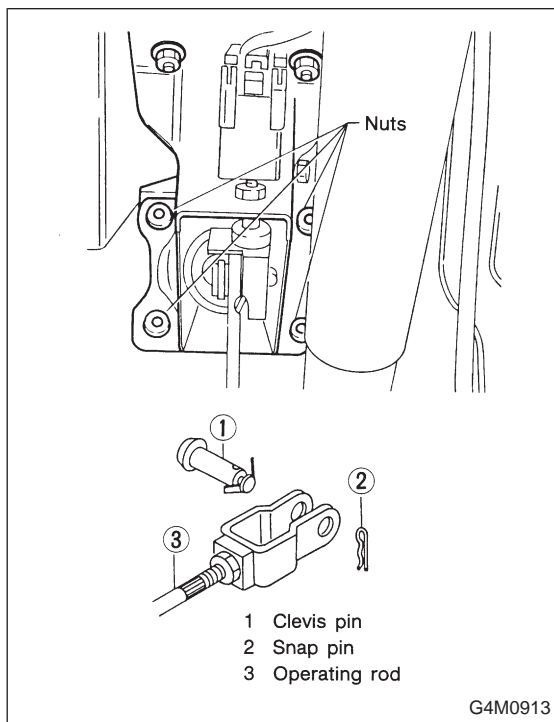
**CAUTION:**

Be sure to use recommended brake fluid.

## 6. Brake Booster

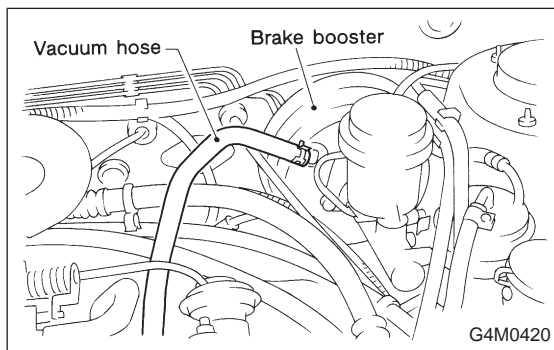
### A: REMOVAL

- 1) Remove the following parts at engine compartment.
  - (1) Disconnect connector for brake fluid level indicator.
  - (2) Remove brake pipes from master cylinder.
  - (3) Remove master cylinder installing nuts.
  - (4) Disconnect vacuum hose from brake booster.
- 2) Remove the following parts from the pedal bracket.
  - (1) Snap pin and clevis pin.
  - (2) Four brake booster installing nuts.
- 3) Remove brake booster while shunning brake pipes.

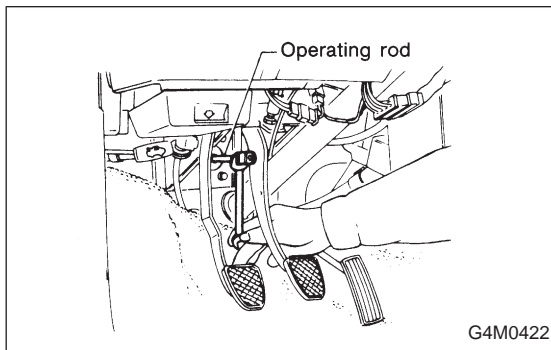
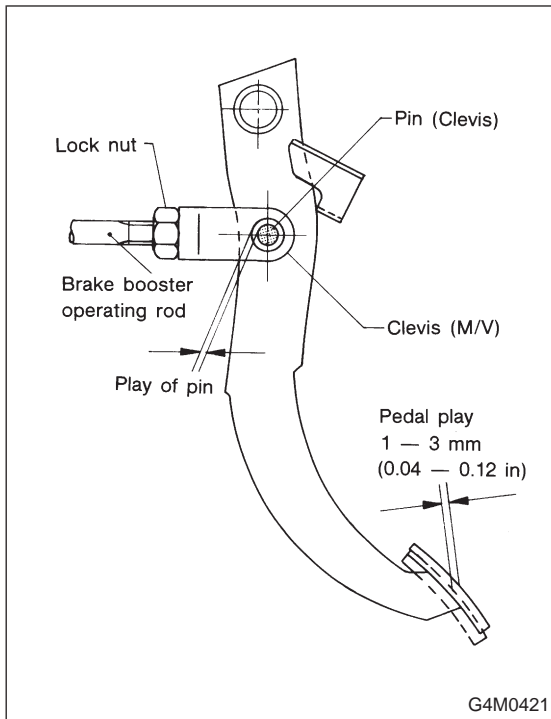


### B: INSTALLATION

- 1) Mount brake booster in position.
- 2) Connect operating rod to brake pedal with clevis pin and snap pin.



- 3) Connect vacuum hose to brake booster.
- 4) Mount master cylinder onto brake booster.
- 5) Connect brake pipes to master cylinder.
- 6) Connect electric connector for brake fluid level indicator.



### 7) Adjust operating rod of brake booster as follows:

- (1) Be sure engine is off. (No vacuum is applied to brake booster.)
- (2) There should be play between brake booster clevis and pin at brake pedal installing portion.  
(Depress brake pedal pad with a force of less than 10 N [1 kg, 2 lb] to a stroke of 1 to 3 mm [0.04 to 0.12 in].)

### (3) Depress the surface of brake pad by hand.

- (4) If there is no free play between clevis pin and clevis, loosen lock nut for operating rod and adjust operating rod by turning in the direction that shortens it.

### 8) Bleed air from brake system.

#### **Torque (Air bleeder screw):**

**$8 \pm 1 \text{ N}\cdot\text{m}$  ( $0.8 \pm 0.1 \text{ kg}\cdot\text{m}$ ,  $5.8 \pm 0.7 \text{ ft}\cdot\text{lb}$ )**

### 9) Conduct road tests to ensure brakes do not drag.

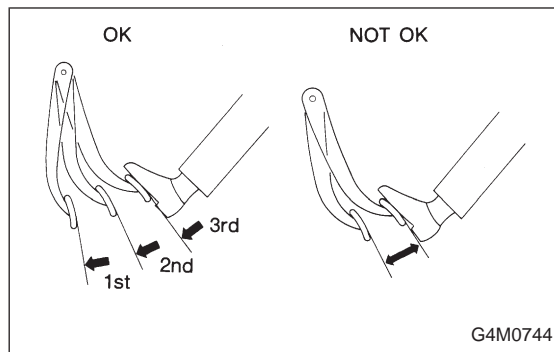
## C: OPERATION CHECK

### CAUTION:

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

### 1. CHECKING WITHOUT USING GAUGES

This method cannot determine the exact portion which has failed, but it can provide a rough understanding of the nature of the failure if checking is conducted in accordance with the following procedure.

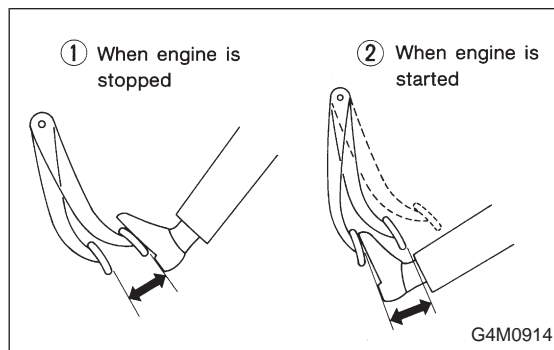


## 2. AIR TIGHTNESS CHECK

Start engine, and run it for 1 to 2 minutes, then turn it off. Depress brake pedal several times applying the same pedal force as that used in ordinary braking operations. The pedal stroke should be greatest on the 1st depression, and it should become smaller with each successive depression. If no change occurs in the pedal height while in a depressed state, brake booster is faulty.

### NOTE:

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



## 3. OPERATION CHECK

- 1) With engine off, depress brake pedal several times applying the same pedal force and make sure that the pedal height does not vary with each depression of the pedal.
- 2) With brake pedal depressed, start engine.
- 3) As engine starts, brake pedal should move slightly toward the floor. If no change occurs in the pedal height, brake booster is faulty.

### NOTE:

If faulty, check precisely with gauges.

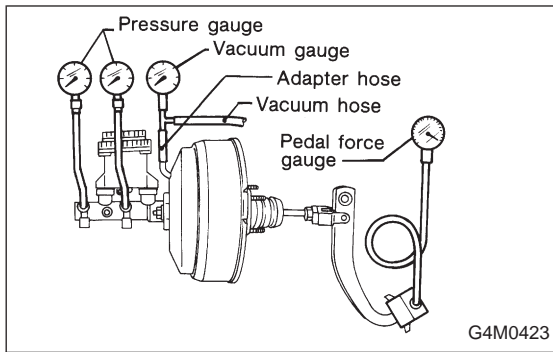
## 4. LOADED AIR TIGHTNESS CHECK

Depress brake pedal while engine is running, and turn off engine while the pedal is still depressed. Keep the pedal depressed for 30 seconds; if no change occurs in the pedal height, brake booster is functioning normally; if the pedal height increases, it is faulty.

### NOTE:

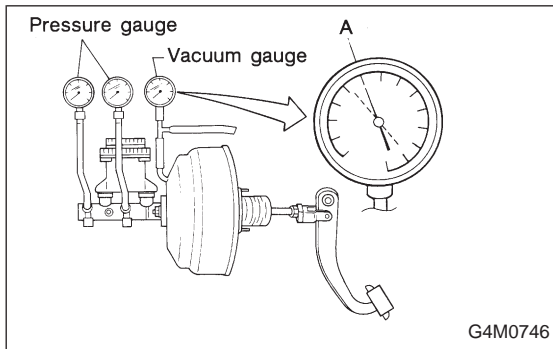
If faulty, check precisely with gauges.





## 5. CHECKING WITH GAUGES

Connect gauges as shown in Figure. After bleeding air from pressure gauges, proceed to each check.



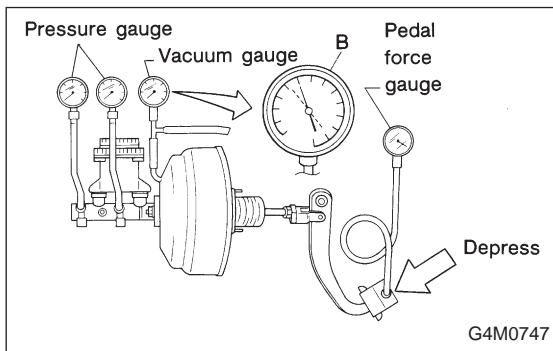
## 6. AIR TIGHTNESS CHECK

1) Start engine and keep it running until a vacuum of 66.7 kPa (500 mmHg, 19.69 inHg) = point A is indicated on vacuum gauge. Do not depress brake pedal.

2) Stop engine and watch the gauge. If the vacuum drop range is less than 3.3 kPa (25 mmHg, 0.98 inHg) within 15 seconds after stopping engine, brake booster is functioning properly.

If defective, the cause may be one of those listed below.

- Check valve malfunction
- Leak from vacuum hose
- Leak from the shell jointed portion or stud bolt welded portion
- Damaged diaphragm
- Leak from valve body seal and bearing portion
- Leak from plate and seal assembly portion
- Leak from poppet valve assembly portion



## 7. LOADED AIR TIGHTNESS CHECK

1) Start engine and depress brake pedal with pedal force of 196 N (20 kg, 44 lb). Keep engine running until a vacuum of 66.7 kPa (500 mmHg, 19.69 inHg) = point B is indicated on vacuum gauge while the pedal is still depressed.

2) Stop engine and watch vacuum gauge.

If the vacuum drop range is less than 3.3 kPa (25 mmHg, 0.98 inHg) within 15 seconds after stopping engine, brake booster is functioning properly.

If defective, refer to "AIR TIGHTNESS CHECK" described above.

**8. LACK OF BOOSTING ACTION CHECK**

Turn off engine, and set the vacuum gauge reading at "0". Then, check the fluid pressure when brake pedal is depressed. The pressure must be greater than the standard value listed below.

Brake pedal force	147 N (15 kg, 33 lb)	294 N (30kg, 66 lb)
Models without A.B.S.	785 kPa (8 kg/cm <sup>2</sup> , 114 psi)	2,158 kPa (22 kg/cm <sup>2</sup> , 313 psi)
Models with A.B.S.	588 kPa (6 kg/cm <sup>2</sup> , 85 psi)	1,863 kPa (19 kg/cm <sup>2</sup> , 270 psi)

**9. BOOSTING ACTION CHECK**

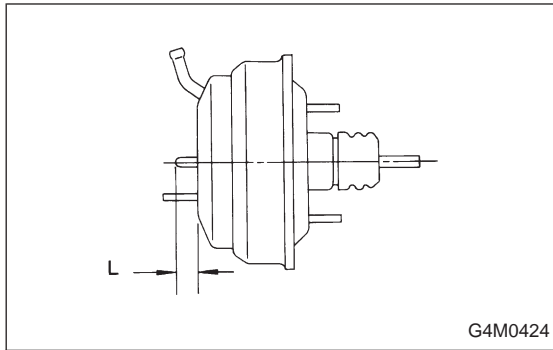
Set the vacuum gauge reading at 66.7 kPa (500 mmHg, 19.69 inHg) by running engine. Then, check the fluid pressure when brake pedal is depressed. The pressure must be greater than the standard value listed below.

Brake pedal force	147 N (15 kg, 33 lb)	294 N (30kg, 66 lb)
Models without A.B.S.	5,492 kPa (56 kg/cm <sup>2</sup> , 796 psi)	8,434 kPa (86 kg/cm <sup>2</sup> , 1,223 psi)
Models with A.B.S.	5,394 kPa (55 kg/cm <sup>2</sup> , 782 psi)	9,219 kPa (94 kg/cm <sup>2</sup> , 1,337 psi)

**D: HANDLING PRECAUTIONS**

1) After protector has been removed from push rod, do not turn the master cylinder side of brake booster downwards.

(1) If the master cylinder side is turned downwards, push rod may come loose by virtue of its own weight, and reaction disc may drop into brake booster.



(2) Whether or not reaction disc has dropped can be determined by measuring the dimension "L". The projected amount "L" of pushrod should be as follows:

**Standard (Correct):**

**$L = 10.4 \text{ mm (0.409 in)}$**

**Incorrect:**

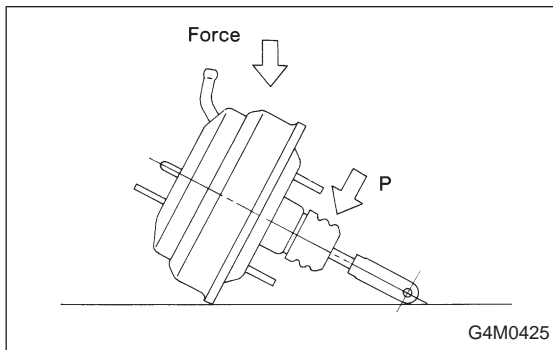
**$L = 4.4 \text{ mm (0.173 in)}$**

(3) If protector is fitted correctly, reaction disc will not fall out.

2) Be careful not to drop brake booster. Brake booster should be discarded if it has been dropped.

3) Use special care when handling operating rod.

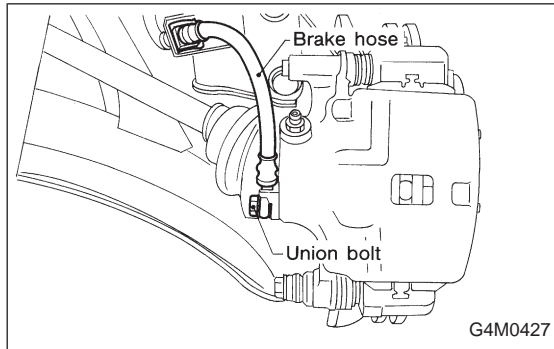
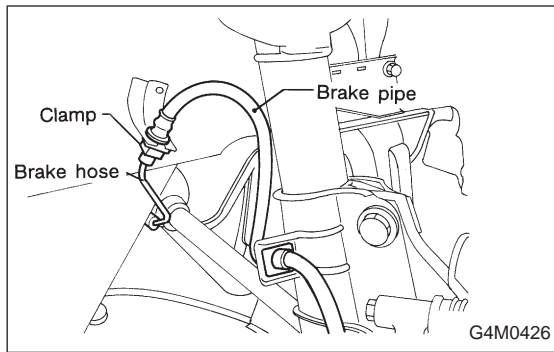
If excessive force is applied to operating rod, sufficient to cause a change in the angle in excess of  $\pm 3^\circ$ , it may result in damage to the power piston cylinder.



4) Use care when placing brake booster on the floor.

**CAUTION:**

**If external force is applied from above when brake booster is placed in this position, the resin portion as indicated by "P", may be damaged.**



## 7. Brake Hose

### A: REMOVAL

- 1) Separate brake pipe from brake hose.  
(Always use flare nut wrench and be careful not to deform flare nut.)
- 2) Pull out clamp to remove brake hose.
- 3) Remove clamp at strut and union bolt.

### B: INSTALLATION

#### 1. FRONT BRAKE HOSE

- 1) Route end of brake hose (on caliper side) through hole in brake hose bracket at strut location.
- 2) Tighten end of brake hose at caliper using a union bolt.

**Torque (Union bolt):**

**$18 \pm 3 \text{ N}\cdot\text{m}$  ( $1.8 \pm 0.3 \text{ kg}\cdot\text{m}$ ,  $13.0 \pm 2.2 \text{ ft}\cdot\text{lb}$ )**

- 3) Secure middle fitting of brake hose to bracket at strut location using a clamp.
- 4) Position disc in straight-forward direction and route brake hose through hole in bracket on wheel apron side.

#### CAUTION:

**Be sure brake hose is not twisted.**

- 5) Temporarily tighten flare nut to connect brake pipe and hose.
- 6) Fix brake hose with clamp at wheel apron bracket.
- 7) While holding hexagonal part of brake hose fitting with a wrench, tighten flare nut to the specified torque.

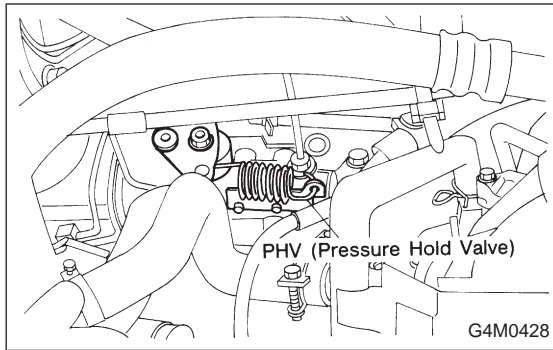
**Torque (Brake pipe flare nut):**

**$14.7^{+3}_{-2} \text{ N}\cdot\text{m}$  ( $1.5^{+0.3}_{-0.2} \text{ kg}\cdot\text{m}$ ,  $10.8^{+2.2}_{-1.4} \text{ ft}\cdot\text{lb}$ )**

- 8) Bleed air from the brake system.

#### 2. REAR BRAKE HOSE

- 1) Pass brake hose through the hole of bracket, and lightly tighten flare nut to connect brake pipe.
- 2) Insert clamp upward to fix brake hose.
- 3) Perform the same procedures as before mentioned in steps 7) and 8).



## 8. Hill Holder

### A: REMOVAL

- 1) Drain brake fluid from reservoir of master cylinder.
- 2) Remove adjusting nut and cable clamp, and disconnect PHV cable from cable bracket on engine.
- 3) Detach PHV cable from clips.
- 4) Remove cable clamp, and disconnect PHV cable from PHV stay.

#### CAUTION:

**Carefully protect boots and inner cable from damage when disconnecting PHV cable.**

- 5) Disconnect brake pipes from PHV.

#### CAUTION:

- Pay attention not to drop brake fluid onto body painting since it may dissolve paint.
- Pay attention not to damage hexagonal head of flare nut by using pipe wrench without fail.

- 6) Detach PHV along with support from side frame.

#### CAUTION:

**Exercise utmost care to prevent foreign matter from entering into PHV when removing it.**

### B: INSPECTION

Check up removed parts as follows, and replace defective ones.

- 1) Check if boots of PHV cable are damaged or degraded, and if inner cable is damaged or corroded.
- 2) Check if return spring is worn out, damaged or corroded.
- 3) Confirm that rolling sound of ball is heard with PHV inclined and lever rotates smoothly.

#### CAUTION:

**Never disassemble PHV. Replace entire PHV assembly if necessary.**

**C: INSTALLATION**

- 1) Install PHV onto side frame.

**Torque:**

**$18 \pm 5 \text{ N}\cdot\text{m}$  ( $1.8 \pm 0.5 \text{ kg}\cdot\text{m}$ ,  $13.0 \pm 3.6 \text{ ft}\cdot\text{lb}$ )**

- 2) Connect brake pipes to PHV.

**Torque:**

**$14.7^{+3}_{-2} \text{ N}\cdot\text{m}$  ( $1.5^{+0.3}_{-0.2} \text{ kg}\cdot\text{m}$ ,  $10.8^{+2.2}_{-1.4} \text{ ft}\cdot\text{lb}$ )**

**CAUTION:**

**Confirm that brake pipes are not deformed and/or damaged. Replace them with new ones if necessary.**

- 3) Install PHV cable to PHV stay.

**CAUTION:**

**If cable clamp (and clips) is damaged, replace it with a new one.**

- 4) Connect PHV cable with clips.

**NOTE:**

Avoid sharp bending of PHV cable as it may cause breakage.

- 5) Install PHV cable onto cable bracket on engine.

- 6) Apply grease to the following points.

- Hook portion of return spring
- Cable end portion of lever

**Grease:**

***SUNLIGHT 2 (Part No. 003602010)***

- 7) Be sure to bleed air from the system.

**CAUTION:**

**After replacing PHV cable or clutch cable with new one, operate clutch pedal about 30 times as a running-in operation prior to adjustment.**

**D: ADJUSTMENTS**

- 1) Confirm stopping and starting performances by activating hill holder on an uphill road of 3° or higher inclination.

- (1) If vehicle does not stop;

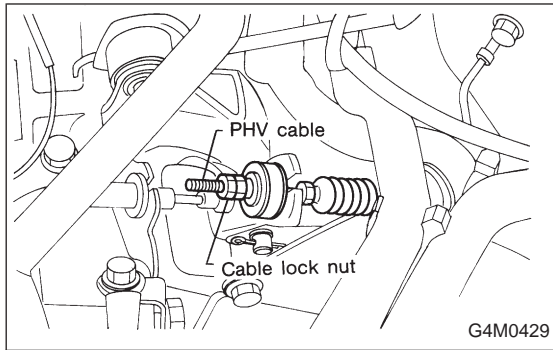
Tighten adjust nut of PHV cable.

- (2) If vehicle does not start properly;

- Case A — When hill holder is released later than engagement of clutch pedal (Engine tends to stall.): Loosen adjust nut gradually until smooth starting is enabled.

- Case B — When hill holder is released earlier than engagement of clutch pedal (Vehicle slips down slightly.):

Tighten adjusting nut so that hill holder is released later than engagement of clutch pedal (status in Case A). Then make adjustment the same as in Case A.

**NOTE:**

Whenever turning adjust nut, prevent PHV cable from revolving as shown in Figure.

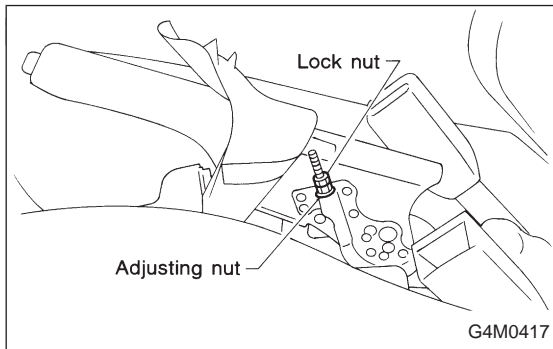
## 9. Parking Brake Lever

### A: REPLACEMENT

- 1) Remove console box from front floor.
- 2) Disconnect electric connector for parking brake switch.
- 3) Loosen parking brake adjuster, and remove inner cable end from equalizer.
- 4) Remove parking brake lever.
- 5) Install parking brake lever in the reverse order of removal.

***Torque (Lever installing bolt):***

***18±5 N·m (1.8±0.5 kg-m, 13.0±3.6 ft-lb)***



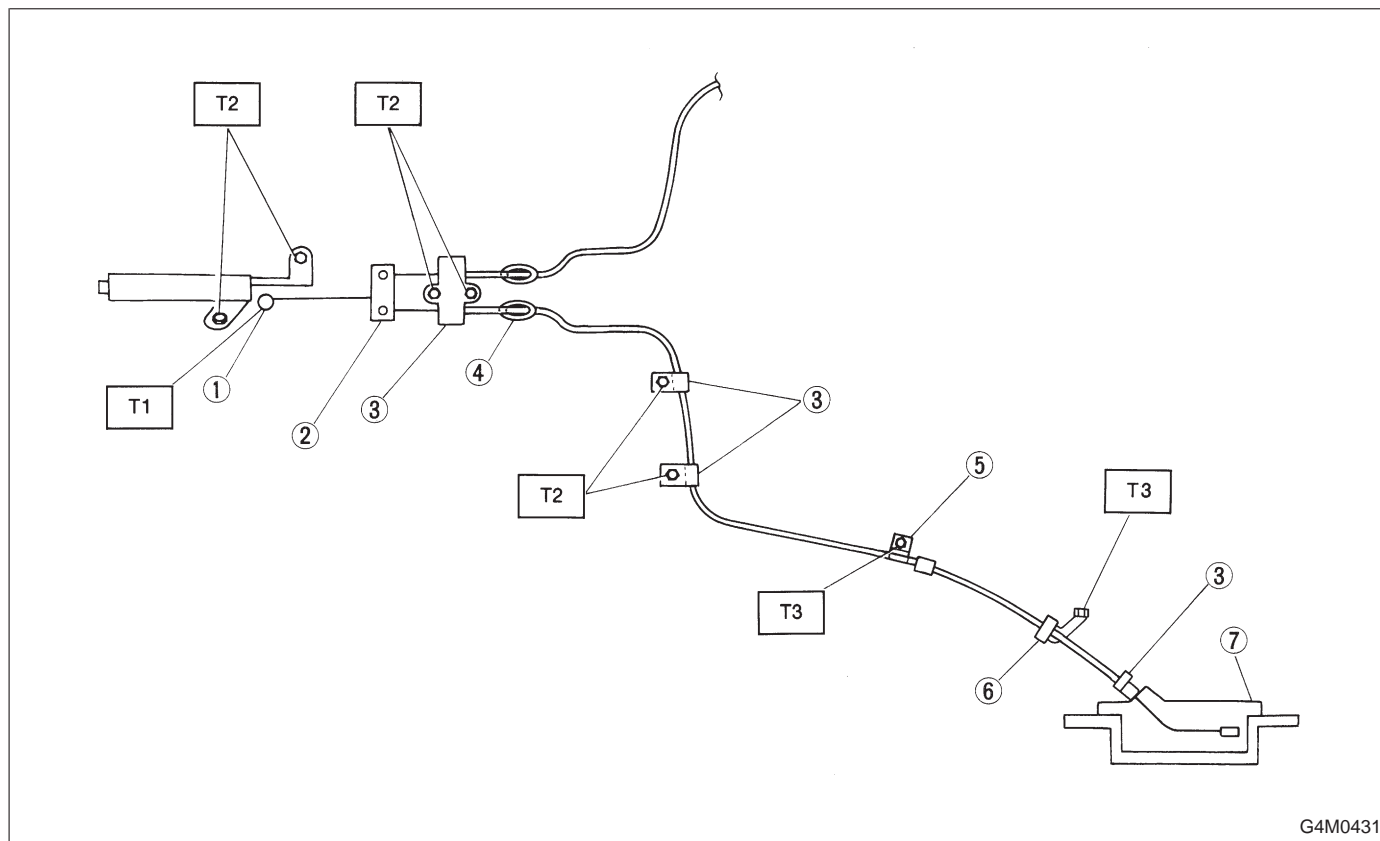
- 6) Adjust parking brake lever by turning adjuster until parking brake lever stroke is set at 7 to 8 notches with operating force of 196 N (20 kg, 44 lb).

- 7) Tighten lock nut.

***Torque (Adjuster lock nut):***

***5.9±1.5 N·m (0.60±0.15 kg-m, 4.3±1.1 ft-lb)***

## 10. Parking Brake Cable



- ① Adjuster
- ② Equalizer
- ③ Clamp
- ④ Grommet
- ⑤ Bracket

- ⑥ Cable guide (Trailing link)
- ⑦ Parking brake ASSY

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

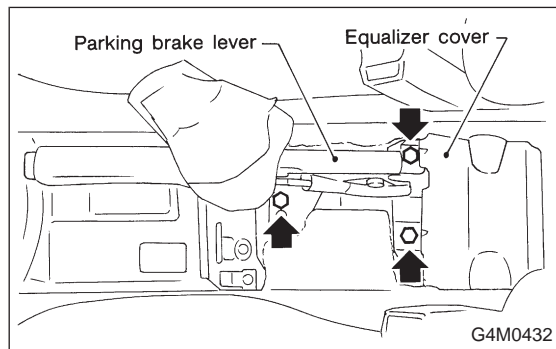
**T1: 5.9±1.5 (0.60±0.15, 4.3±1.1)**

**T2: 18±5 (1.8±0.5, 13.0±3.6)**

**T3: 32±10 (3.3±1.0, 24±7)**

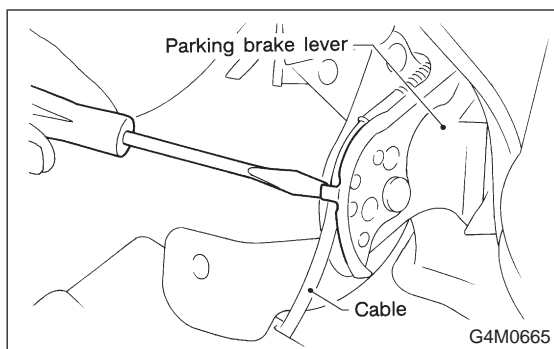
### A: REPLACEMENT

- 1) Remove rear tires and wheels.
- 2) Remove rear cushion.
- 3) Remove console box from front floor.
- 4) Loosen parking cable adjuster, then remove inner cable end from equalizer, and detach clamps.

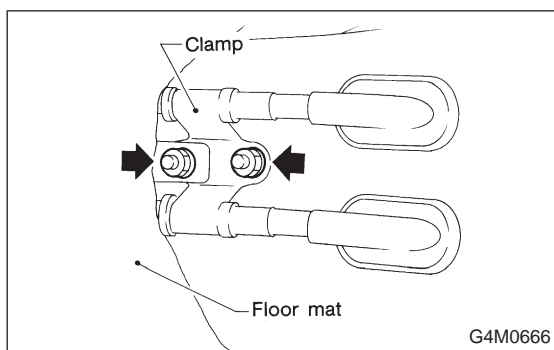


- 5) Remove parking brake lever.



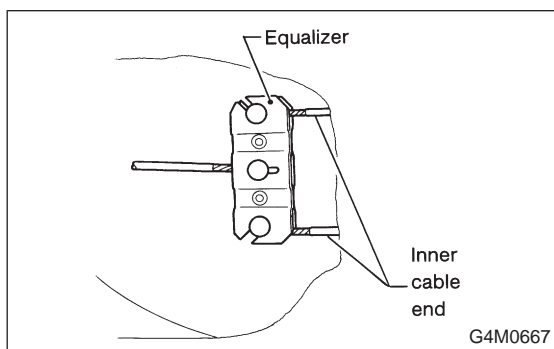


6) Unbend parking brake lever pawls and remove cable.



7) Roll up floor mat and remove clamps.

8) Remove equalizer cover.

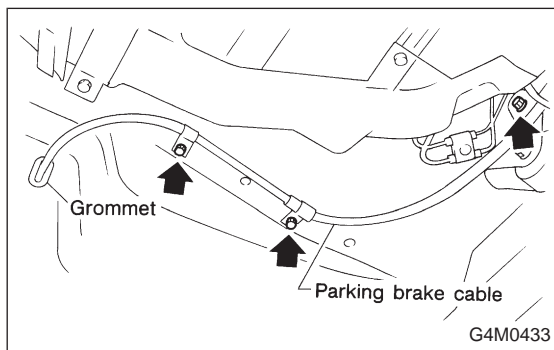


9) Remove inner cable end from equalizer.

10) Pull out parking brake cable from parking brake assembly. <Ref. to 4-4 [W4A0].>

11) Pull out clamp from parking brake assembly.

12) Remove bolt and bracket from trailing link bracket.



13) Remove bolt and clamp from rear floor.

14) Detach grommet from rear floor.

15) Remove cable assembly from cabin by forcibly pulling it backward.

16) Detach parking brake cable from cable guide at rear trailing link.

17) Install (new) parking brake assembly in the reverse order of removal.

NOTE:

- Be sure to pass cable through cable guide inside the tunnel.
- Be sure to adjust the lever stroke. <Refer to 4-4 [W4D2].>

## **11. Air Bleeding**

### **A: GENERAL RULES FOR EFFECTIVE BLEEDING**

1) Start with the brakes (wheels) connecting to the secondary chamber of the master cylinder.

2) The time interval between two brake pedal operations (from the time when the pedal is released to the time when it is depressed another time) shall be approximately 3 seconds.

3) The air bleeder on each brake shall be released for 1 to 2 seconds.

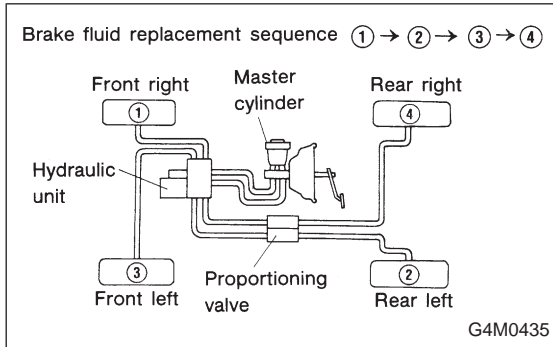
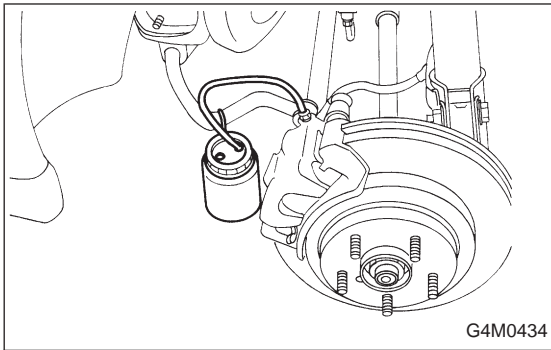
### **B: BLEEDING PROCEDURE**

CAUTION:

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

NOTE:

- During bleeding operation, keep the brake reserve tank filled with brake fluid to eliminate entry of air.
- Brake pedal operating must be very slow.
- For convenience and safety, it is advisable to have two man working.



- 1) Make sure that there is no leak from joints and connections of the brake system.
- 2) Fit one end of vinyl tube into the air bleeder and put the other end into a brake fluid container.

3) Slowly depress the brake pedal and keep it depressed. Then, open the air bleeder to discharge air together with the fluid.

Release air bleeder for 1 to 2 seconds.

Next, with the bleeder closed, slowly release the brake pedal.

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

Allow 3 to 4 seconds between two brake pedal operations.

#### CAUTION:

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

#### NOTE:

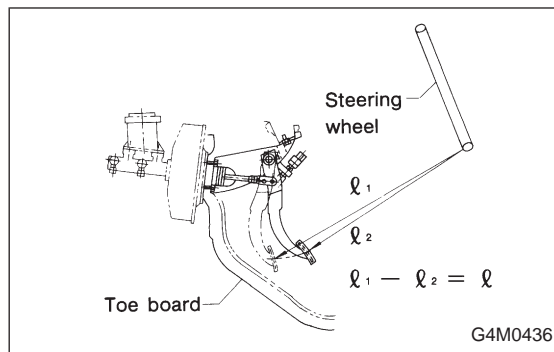
Brake pedal operating must be very slow.

- 4) Tighten air bleeder securely when no air bubbles are visible.

#### **Air bleeder tightening torque:**

**$8 \pm 1 \text{ N}\cdot\text{m}$  ( $0.8 \pm 0.1 \text{ kg}\cdot\text{m}$ ,  $5.8 \pm 0.7 \text{ ft}\cdot\text{lb}$ )**

- 5) Perform these steps for the brakes connecting to the secondary chamber of master cylinder, first, and then for the ones connecting to primary chamber. With all procedures completed, fully depress the brake pedal and keep it in that position for approximately 20 seconds to make sure that there is no leak evident in the entire system.



6) Check the pedal stroke.

While the engine is idling, depress the brake pedal with a 490 N (50 kg, 110 lb) load and measure the distance between the brake pedal and steering wheel. With the brake pedal released, measure the distance between the pedal and steering wheel again. The difference between the two measurements must be more than specified.

**Specified pedal stroke:**

**Without A.B.S.**

**90 mm (3.54 in)**

**With A.B.S.**

**95 mm (3.74 in)**

**When depressing brake pedal with a 490 N (50 kg, 110 lb) load.**

(1) Models without A.B.S.

If the distance is more than specifications, there is a possibility that air is in the brake line. Bleed air from the brake line.

(2) Models with A.B.S.

If the distance is more than specifications, there is a possibility air is in the inside of the hydraulic unit. Therefore, air must be bled from the inside of the hydraulic unit to the brake pipes in accordance with the bleeding sequence control. <Ref. to 4-4 [W15C0].>

7) Add brake fluid to the required level (MAX level) of reserve tank.

8) As a final step, test run the vehicle at low speed and apply brakes relatively hard 2 to 3 times to ensure that brakes provide normal braking action on all four wheels without dragging and uneven braking.

## 12. Brake Fluid Replacement

### NOTE:

To always maintain the brake fluid characteristics, replace the brake fluid according to maintenance schedule or earlier than that when used in severe condition.

### A: REPLACEMENT

#### CAUTION:

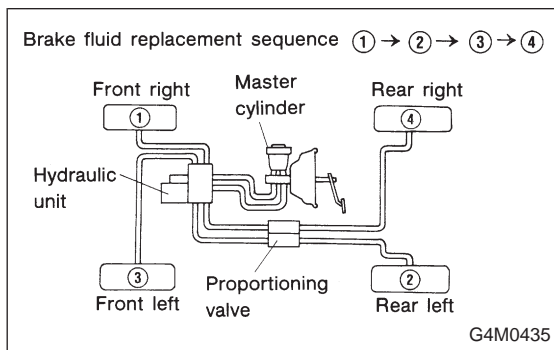
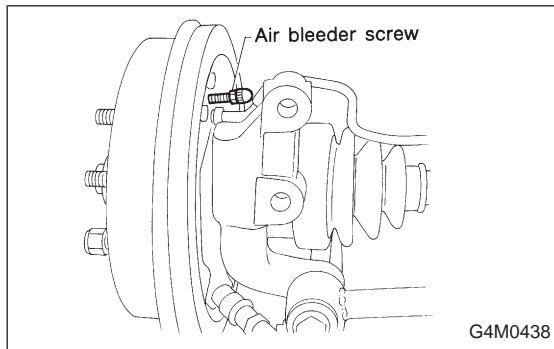
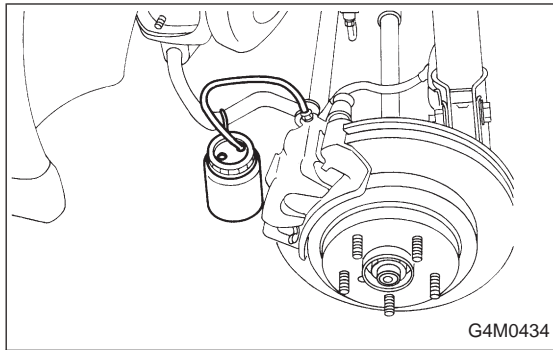
- The FMVSS No. 116, fresh DOT3 or 4 brake fluid must be used.
- Cover bleeder with waste cloth, when loosening it, to prevent brake fluid from being splashed over surrounding parts.
- Avoid mixing different brands of brake fluid to prevent degrading the quality of the fluid.
- Be careful not to allow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

#### NOTE:

- During bleeding operation, keep the brake reserve tank filled with brake fluid to eliminate entry of air.
- Brake pedal operating must be very slow.
- For convenience and safety, it is advisable to have two man working.
- The amount of brake fluid required is approximately 300 ml (10.1 US fl oz, 10.6 Imp fl oz) for total brake system.
  - 1) Either jack-up vehicle and place a safety stand under it, or left up vehicle.
  - 2) Remove both front and rear wheels.
  - 3) Draw out the brake fluid from master cylinder with syringe.
  - 4) Refill reservoir tank with recommended brake fluid.

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

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



5) Install one end of a vinyl tube onto the air bleeder of and insert the other end of the tube into a container to collect the brake fluid.

6) Instruct your co-worker to depress the brake pedal slowly two or three times and then hold it depressed.

7) Loosen bleeder screw approximately 1/4 turn until a small amount of brake fluid drains into container, and then quickly tighten screw.

8) Repeat steps 6) and 7) above until there are no air bubbles in drained brake fluid and new fluid flows through vinyl tube.

#### NOTE:

Add brake fluid as necessary while performing the air bleed operation, in order to prevent the tank from running short of brake fluid.

9) After completing the bleeding operation, hold brake pedal depressed and tighten screw and install bleeder cap.

#### **Tightening torque (Bleeder screw):**

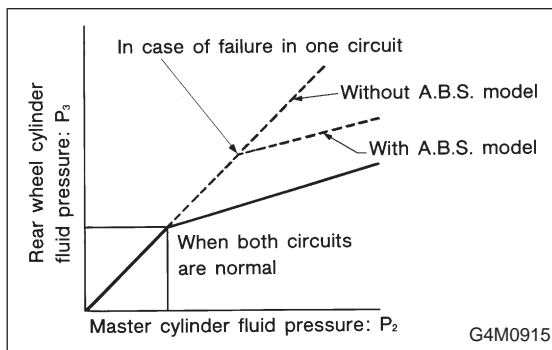
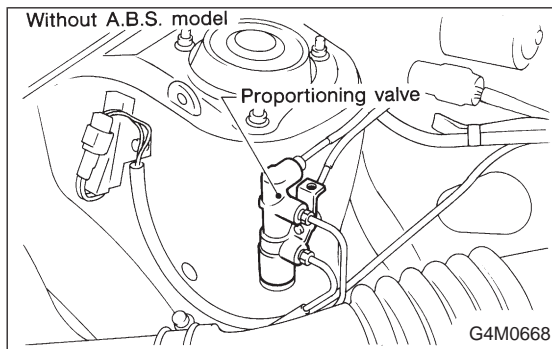
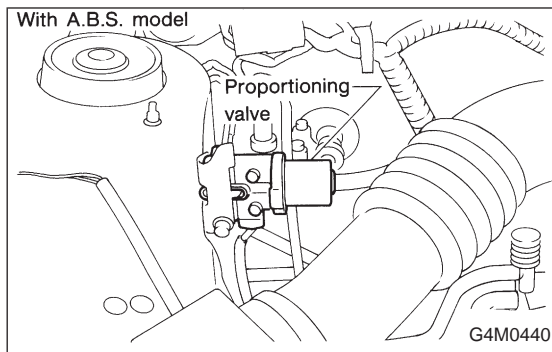
**$8 \pm 1 \text{ N}\cdot\text{m}$  ( $0.8 \pm 0.1 \text{ kg}\cdot\text{m}$ ,  $5.8 \pm 0.7 \text{ ft}\cdot\text{lb}$ )**

10) Bleed air from each wheel cylinder using the same procedures as described in steps 6) through 7) above.

11) Depress brake pedal with a force of approximately 294 N (30 kg, 66 lb) and hold it there for approximately 20 seconds. At this time check pedal to see if it shows any unusual movement.

Visually inspect bleeder screws and brake pipe joints to make sure that there is no fluid leakage.

12) Install wheels, and drive car for a short distance between 2 to 3 km (1 to 2 miles) to make sure that brakes are operating properly.



## 13. Proportioning Valve

### A: INSPECTION

- 1) Install the oil pressure gauges to measure the master cylinder fluid pressure (front wheel brake fluid pressure) and rear wheel cylinder fluid pressure.
- 2) Bleed air from the oil pressure gauges.
- 3) Check the master cylinder fluid pressure and rear wheel cylinder fluid pressure.

The standard values are shown in Figure.

- 4) For the oil pressure in case of split point, refer to A: SPECIFICATIONS <Refer to 4-4 [S1A0].>

### B: REMOVAL

- 1) Remove brake pipe from proportioning valve at four places.
- 2) Remove proportioning valve from its bracket.

#### CAUTION:

**Do not disassemble or adjust the proportioning valve. (The proportioning valve must be replaced as an assembly.)**

### C: INSTALLATION

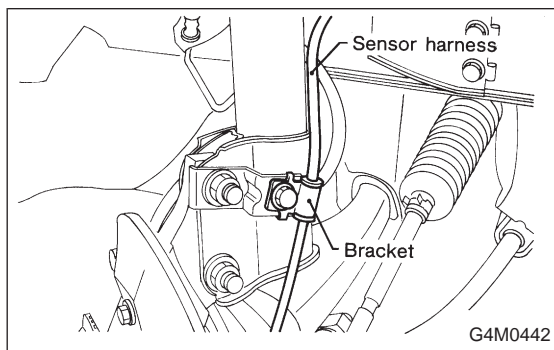
- 1) Install proportioning valve to bracket.
- 2) Connect brake pipes correctly to proportioning valve.
- 3) Bleed air, then check each joint of brake pipe for oil leaks.

#### Tightening torque:

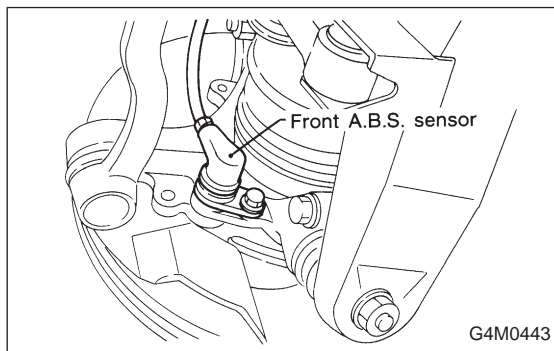
**Proportioning valve to brake pipe flare nut**  
 $14.7_{-2}^{+3} \text{ N}\cdot\text{m}$  ( $1.5_{-0.2}^{+0.3} \text{ kg}\cdot\text{m}$ ,  $10.8_{-1.4}^{+2.2} \text{ ft}\cdot\text{lb}$ )

**Proportioning valve to bracket****Normal brake vehicle:** **$22 \pm 4.4 \text{ N}\cdot\text{m}$  ( $2.25 \pm 0.45 \text{ kg}\cdot\text{m}$ ,  $16.3 \pm 3.3 \text{ ft}\cdot\text{lb}$ )****A.B.S. equipped vehicle:** **$18 \pm 5 \text{ N}\cdot\text{m}$  ( $1.8 \pm 0.5 \text{ kg}\cdot\text{m}$ ,  $13.0 \pm 3.6 \text{ ft}\cdot\text{lb}$ )****14. A.B.S. Sensor****A: REMOVAL****1. FRONT A.B.S. SENSOR**

1) Disconnect front A.B.S. sensor located in engine compartment.



2) Remove bolts which secure sensor harness to bracket.



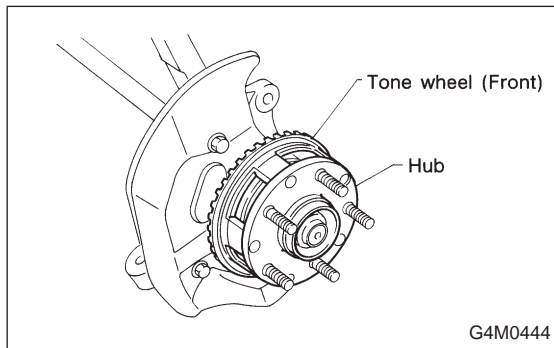
3) Remove bolts which secure front A.B.S. sensor to housing, and remove front A.B.S. sensor.

**CAUTION:**

**Be careful not to damage pole piece located at tip of the sensor during removal.**

4) Remove front disc brake caliper and disc rotor from housing after removing front tire.

5) Remove front drive shaft and housing and hub assembly. <Ref. to 4-2 [W1A0].>



6) Remove tone wheel while removing hub from housing and hub assembly. <Ref. to 4-2 [W1B0].>

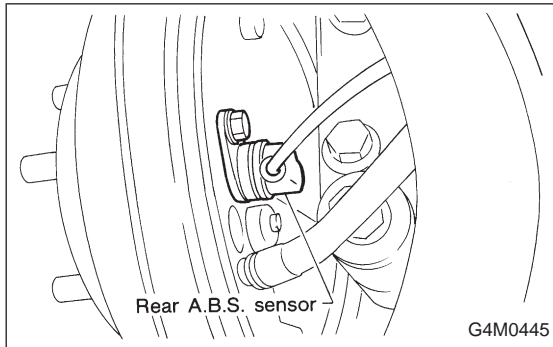
**CAUTION:**

**Be careful not to damage teeth faces of tone wheel during removal.**



**2. REAR A.B.S. SENSOR**

- 1) Remove rear seat and disconnect rear A.B.S. sensor connector.
- 2) Remove rear sensor harness bracket from rear trailing link.



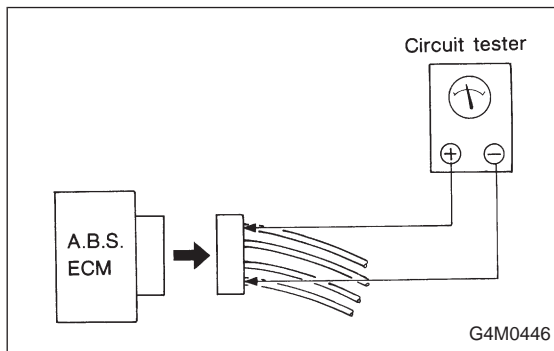
- 3) Remove rear A.B.S. sensor from rear back plate.
- 4) Remove rear tone wheel while removing hub from housing and hub assembly. <Ref. to 4-2 [W2A0].>

**CAUTION:**

- Be careful not to damage pole piece of sensor and teeth faces.
- Do not pull sensor harness during removal.

**B: INSPECTION****1. A.B.S. SENSOR**

- 1) Check pole piece of A.B.S. sensor for foreign particles or damage. If necessary, clean pole piece or replace A.B.S. sensor.



- 2) Measure resistance between A.B.S. ECM terminals.

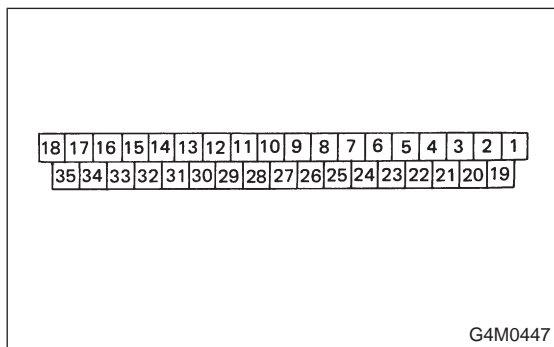
A.B.S. sensor	Model	Terminal No.	Standard
Front - LH	AWD	22 and 4	1.0±0.2 kΩ
	FWD	5 and 4	
Front - RH	ALL	23 and 21	
Rear - LH	ALL	8 and 9	
Rear - RH	ALL	24 and 26	
Front - LH	AWD	22 and 10, 20, 34	More than 1 x 10 <sup>3</sup> kΩ (Insulation resistance)
	FWD	5 and 10, 20, 34	
Front - RH	ALL	23 and 10, 20, 34	
Rear - LH	ALL	8 and 10, 20, 34	
Rear - RH	ALL	24 and 10, 20, 34	

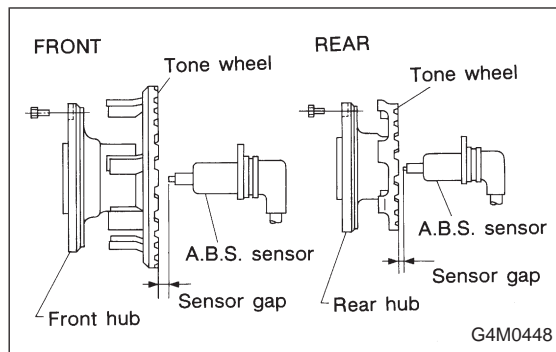
**CAUTION:**

If resistance is outside the standard value, replace wheel A.B.S. sensor with new one or adjust sensor gap between A.B.S. sensor and tone wheel.

**NOTE:**

Check A.B.S. sensor cable for discontinuity. If necessary, replace with a new one.





## 2. TONE WHEEL

- 1) Check tone wheel's teeth (44 pieces) for cracks or dents. If necessary, replace tone wheel with a new one.
- 2) Clearances (sensor gaps) should be measured one by one to ensure tone wheel and speed sensor are installed correctly.

### A.B.S. sensor clearance:

#### Front

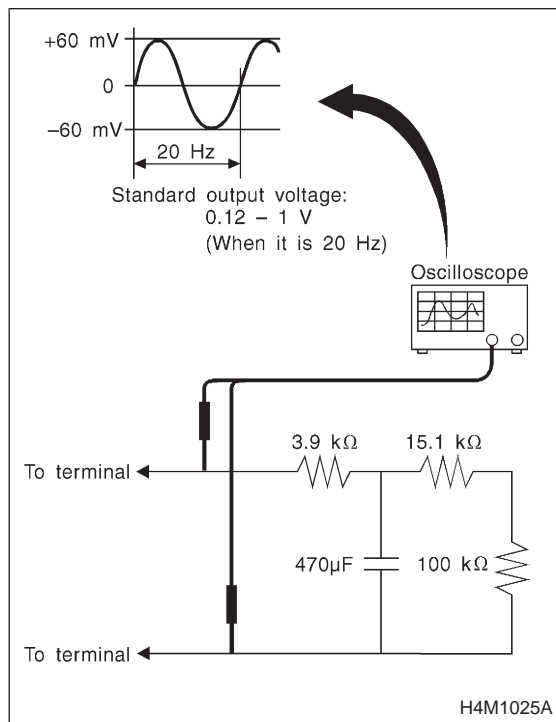
0.9 — 1.4 mm (0.035 — 0.055 in)

#### Rear

0.7 — 1.2 mm (0.028 — 0.047 in)

### NOTE:

- If clearance is narrow, adjust by using spacer (Part No. 26755AA000)
- If clearance is wide, check the outputted voltage then replace A.B.S. sensor or tone wheel if the outputted voltage is outside the specification.



## 3. OUTPUT VOLTAGE

- 1) Output voltage can be checked by the following method. Install resistor and condenser as follows, then rotate wheel about 2.75 km/h (1.7 MPH) or equivalent.

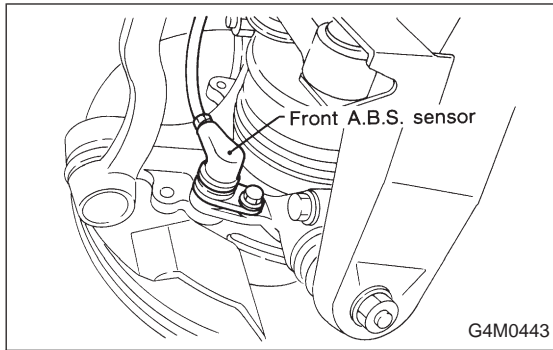
### NOTE:

Regarding terminal No., please refer to item A.B.S. SENSOR.

## C: INSTALLATION

### 1. FRONT A.B.S. SENSOR

- 1) Install tone wheel on hub, then install housing on hub assembly. <Ref. to 4-2 [W1D0].>

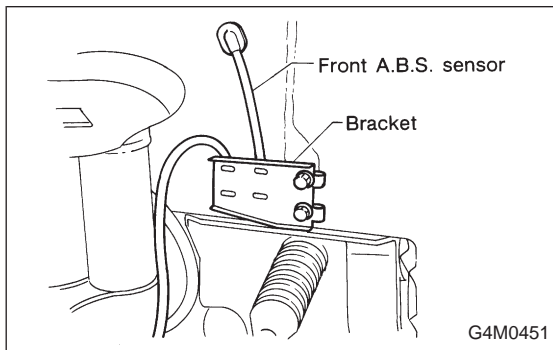


2) Temporarily install front A.B.S. sensor on housing.

**CAUTION:**

**Be careful not to strike A.B.S. sensor's pole piece and tone wheel's teeth against adjacent metal parts during installation.**

3) Install front drive shaft to hub spline. <Ref. to 4-2 [W1E0].>



4) Install front A.B.S. sensor on strut and wheel apron bracket.

**Tightening torque:**

**$32 \pm 10 \text{ N}\cdot\text{m}$  ( $3.3 \pm 1.0 \text{ kg}\cdot\text{m}$ ,  $24 \pm 7 \text{ ft}\cdot\text{lb}$ )**

5) Place a thickness gauge between A.B.S. sensor's pole piece and tone wheel's tooth face. After standard clearance is obtained over the entire perimeter, tighten A.B.S. sensor on housing to specified torque.

**A.B.S. sensor standard clearance:**

**$0.9 - 1.4 \text{ mm}$  ( $0.035 - 0.055 \text{ in}$ )**

**Tightening torque:**

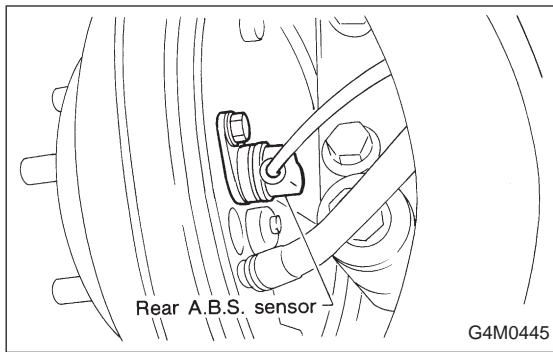
**$32 \pm 10 \text{ N}\cdot\text{m}$  ( $3.3 \pm 1.0 \text{ kg}\cdot\text{m}$ ,  $24 \pm 7 \text{ ft}\cdot\text{lb}$ )**

**NOTE:**

If the clearance is outside specifications, readjust.

**2. REAR A.B.S. SENSOR**

1) Install rear tone wheel on hub, then rear housing on hub. <Ref. to 4-2 [W2D0].>

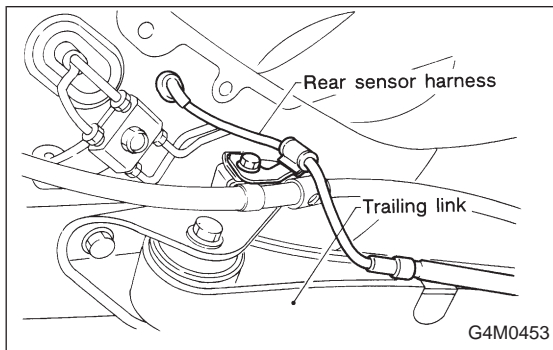


2) Temporarily install rear A.B.S. sensor on back plate.

**CAUTION:**

**Be careful not to strike A.B.S. sensor's pole piece and tone wheel's teeth against adjacent metal parts.**

3) Install rear drive shaft to rear housing and rear differential spindle. <Ref. to 4-2 [W2E0].>



4) Install rear sensor harness on rear trailing link.

**Tightening torque:**

**$32 \pm 10 \text{ N}\cdot\text{m}$  ( $3.3 \pm 1.0 \text{ kg}\cdot\text{m}$ ,  $24 \pm 7 \text{ ft}\cdot\text{lb}$ )**

5) Place a thickness gauge between A.B.S. sensor's pole piece and tone wheel's tooth face. After standard clearance is obtained over the entire perimeter, tighten A.B.S. sensor on back plate to specified torque.

**A.B.S. sensor standard clearance:**

**$0.7 - 1.2 \text{ mm}$  ( $0.028 - 0.047 \text{ in}$ )**

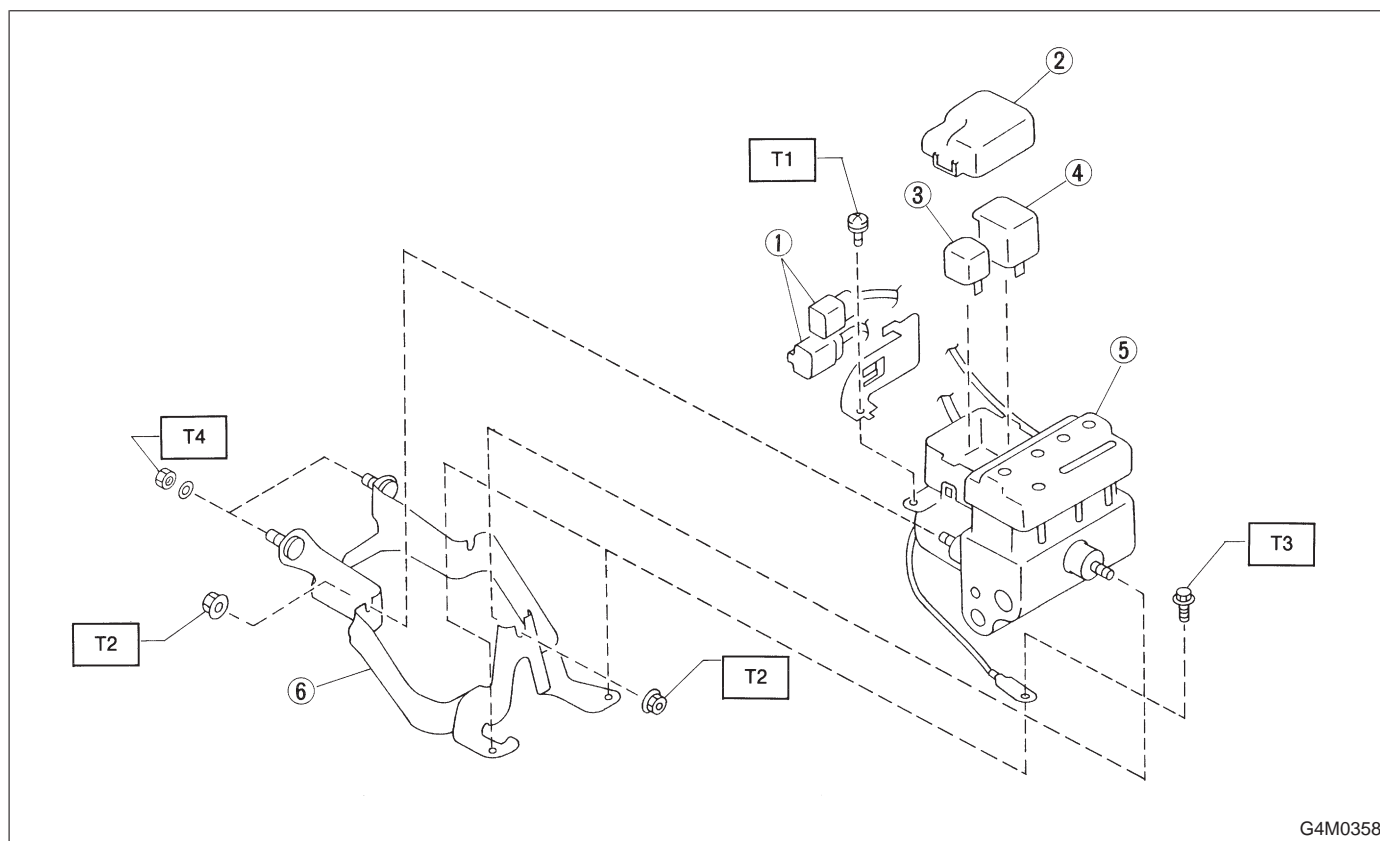
**Tightening torque:**

**$32 \pm 10 \text{ N}\cdot\text{m}$  ( $3.3 \pm 1.0 \text{ kg}\cdot\text{m}$ ,  $24 \pm 7 \text{ ft}\cdot\text{lb}$ )**

**NOTE:**

If the clearance is outside specifications, readjust.

## 15. Hydraulic Unit for A.B.S. System

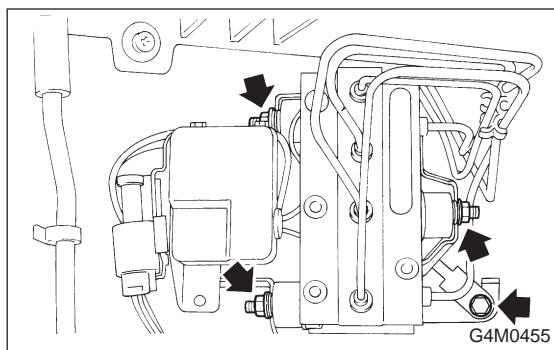


- ① Connector
- ② Cap
- ③ Motor relay
- ④ Valve relay
- ⑤ Hydraulic control unit
- ⑥ Bracket

**Tightening torque: N·m (kg-m, ft-lb)**  
**T1:**  $1.2 \pm 0.2$  ( $0.125 \pm 0.025$ ,  $0.9 \pm 0.2$ )  
**T2:**  $18 \pm 5$  ( $1.8 \pm 0.5$ ,  $13.0 \pm 3.6$ )  
**T3:**  $32 \pm 10$  ( $3.3 \pm 1.0$ ,  $24 \pm 7$ )  
**T4:**  $52 \pm 15$  ( $5.3 \pm 1.5$ ,  $38 \pm 11$ )

### A: REMOVAL

- 1) Remove canister from engine compartment to facilitate removal of hydraulic unit.
- 2) Disconnect brake pipes from hydraulic unit and plug open joints to prevent entry of foreign particles.



- 3) Remove nuts and bolt which secure hydraulic unit, and remove hydraulic unit from engine compartment.

#### CAUTION:

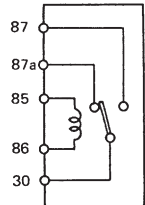
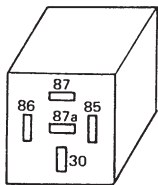
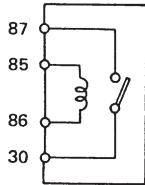
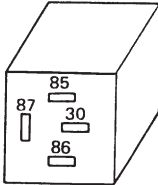
- Hydraulic unit cannot be disassembled. Do not attempt to loosen bolts and nuts.
- Do not drop or bump hydraulic unit.
- Do not turn the hydraulic unit upside down or place it on its side.
- Be careful to prevent foreign particles from getting into hydraulic unit.

- When a new hydraulic unit is installed, apply a coat of rust-preventive wax (Nippeco LT or GB) to bracket attaching bolts after tightening.
- Do not pull harness disconnecting harness connector.

## B: INSPECTION

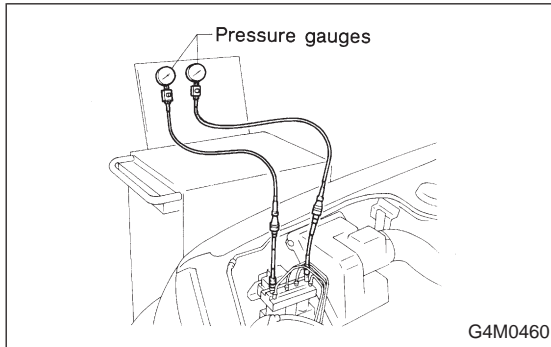
### 1. CHECKING HYDRAULIC UNIT

- 1) Check connected and fixed condition of connector.
- 2) Open hydraulic unit relay box and check for discontinuity or short circuits.

	Condition	Terminal number	Standard	Diagram	Terminal location
Valve relay	Turning off electricity.	85 — 86	93 — 113 $\Omega$	 G4M0456	 G4M0457
		30 — 87a	0 $\Omega$		
		30 — 87	■		
	Turning on electricity between 85 and 86. (DC 12 V)	30 — 87a	■		
		30 — 87	0 $\Omega$		
Motor relay	Turning off electricity.	85 — 86	72 — 88 $\Omega$	 G4M0458	 G4M0459
		30 — 87	■		
	Turning on electricity between 85 and 86. (DC 12 V)	30 — 87	0 $\Omega$		

**2. CHECKING THE HYDRAULIC UNIT OPERATION BY PRESSURE GAUGE**

1) Remove the FL and FR pipes from the hydraulic unit.



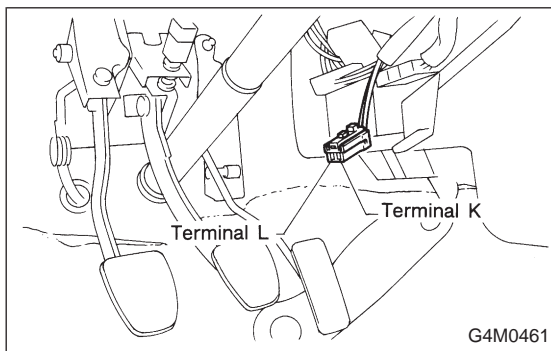
2) Connect a pressure gauge to the end of the removed FL and FR pipes.

**CAUTION:**

- Pressure gauges used exclusively for brake fluid must be used.
- Do not employ pressure gauge previously used for transmission since the piston seal is expanded which may lead to malfunction of the brake.

3) Bleed air from the pressure gauges.

4) Perform sequence control. <Ref. to 4-4 [W15C0].>



(1) Ground check connector body K and L terminals which are accessible after removing A.B.S. check connector from lower side of steering column.

(2) Turn ignition switch ON.

(3) The A.B.S. warning light comes on.

(4) Depress the brake pedal within 0.5 seconds after the warning light goes out so that the pressure gauge registers a pressure equal to the initial value.

**CAUTION:**

**Do not depress the clutch pedal.**

**NOTE:**

The engine must not be operating.

5) When the hydraulic unit begins to work, and first the FL side performs decompression, holding, and compression, and then the FR side performs decompression, holding, and compression.

6) Read values indicated on the pressure gauge and check if the fluctuation of the values between decompression and compression meets the standard values. Also check if any irregular brake pedal tightness is felt.

	Initial value	When decompressed	When compressed
Front wheel	3,432 kPa (35 kg/cm <sup>2</sup> , 498 psi)	490 kPa (5 kg/cm <sup>2</sup> , 71 psi)	3,432 kPa (35 kg/cm <sup>2</sup> , 498 psi)
Rear wheel	3,432 kPa (35 kg/cm <sup>2</sup> , 498 psi)	490 kPa (5 kg/cm <sup>2</sup> , 71psi)	3,432 kPa (35 kg/cm <sup>2</sup> , 498 psi)

● In case of hydraulic unit plunger piston malfunction

	Initial value	When decompressed	When compressed
Rear right wheel	3,432 kPa (35 kg/cm <sup>2</sup> , 498 psi)	490 kPa (5 kg/cm <sup>2</sup> , 71 psi)	3,432 kPa (35 kg/cm <sup>2</sup> , 498 psi)
Rear left wheel	3,432 kPa (35 kg/cm <sup>2</sup> , 498 psi)	3,432 kPa (35 kg/cm <sup>2</sup> , 498 psi)	3,432 kPa (35 kg/cm <sup>2</sup> , 498 psi)

7) Connect the same pressure gauges to the end of the removed RL and RR pipes of the hydraulic unit.

8) Connect the FL and FR pipes to the hydraulic unit.

9) Bleed air from the pressure gauges and the FL and FR wheel cylinders.

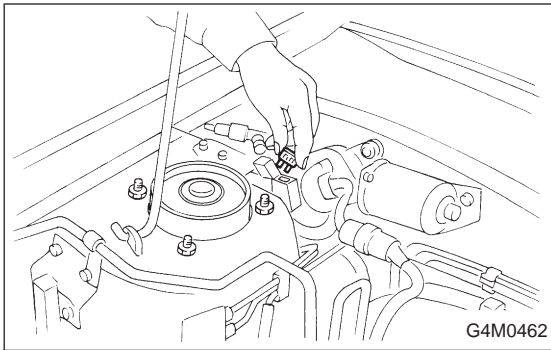
10) Repeat step 4) procedures.

11) The hydraulic unit begins to work, and simultaneously the RL and RR wheel cylinders perform decompression, holding, and compression.

12) Read values indicated on the pressure gauges and check if they meet the standard value.

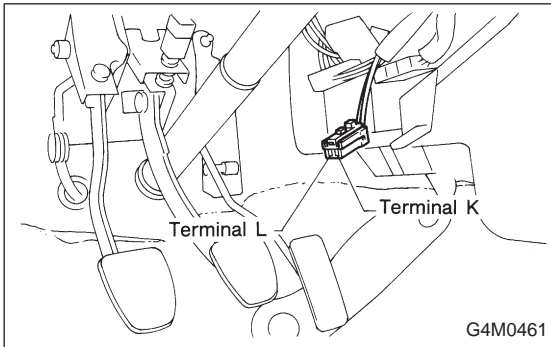
13) After checking, remove the pressure gauges from the RL and RR pipes and connect the RL and RR pipes to the hydraulic unit, and bleed air.



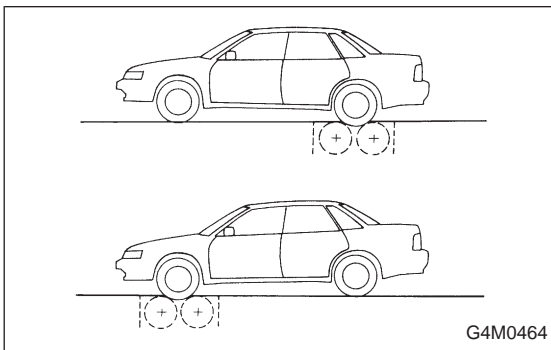


### 3. CHECKING THE HYDRAULIC UNIT WITH BRAKE TESTER

1) In the case of AWD AT vehicles, install a spare fuse with the FWD connector in the engine compartment to simulate FWD vehicles.



2) Ground check connector body K and L terminals which are accessible after removing A.B.S. check connector from lower side of steering column.



3) Set the front wheels or rear wheels on the brake tester and set the select lever's position at "neutral".

4) Operate the brake tester.

5) Perform sequence control.

(1) Turn ignition switch ON.

(2) The A.B.S. warning light comes on.

(3) Depress the brake pedal within 0.5 seconds after the warning light goes out so that the brake tester registers a pressure equal to the initial value.

#### CAUTION:

**Do not depress the clutch pedal.**

#### NOTE:

The engine must not be operating.

6) Hydraulic unit begins to work; and check the following working sequence.

(1) The right front wheel performs decompression, holding, and compression in sequence, and subsequently the left front wheel repeats the cycle.

(2) Simultaneously both right and left rear wheel perform decompression, holding, and compression in sequence.

7) Read values indicated on the brake tester and check if the fluctuation of values, when decompressed and compressed, meet the standard values.

	Initial value	When decompressed	When compressed
Front wheel	1,961 N (200 kg, 441 lb)	245 N (25 kg, 55 lb)	1,961 N (200 kg, 441 lb)
Rear wheel	686 N (70 kg, 154 lb)	245 N (25 kg, 55 lb)	686 N (70 kg, 154 lb)

● In case of hydraulic unit plunger piston malfunction

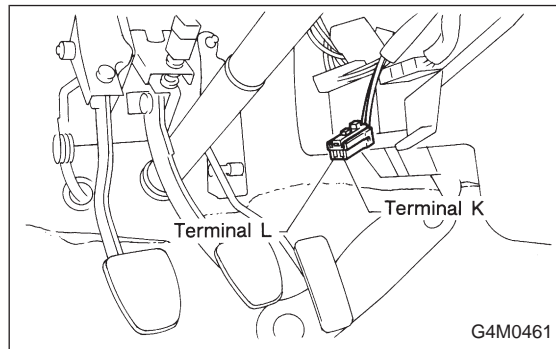
	Initial value	When decompressed	When compressed
Rear right wheel	686 N (70 kg, 154 lb)	245 N (25 kg, 55 lb)	686 N (70 kg, 154 lb)
Rear left wheel	686 N (70 kg, 154 lb)	686 N (70 kg, 154 lb)	686 N (70 kg, 154 lb)

8) After checking, also check if any irregular brake pedal tightness is felt.

9) In case of AWD AT vehicles, remove the spare fuse from the FWD connector in the engine compartment to return to the original AWD state.

## C: SEQUENCE CONTROL

Under the sequence control, after the hydraulic unit solenoid valve is driven, the operation of the hydraulic unit can be checked by means of the brake tester or pressure gauge.



### 1. OPERATIONAL GUIDELINES OF THE SEQUENCE CONTROL

- 1) Ground the body K and L terminals.
- 2) Remove A.B.S. check connector from lower side of steering column.
- 3) Set the speed of all wheels at 4 km/h (2 MPH) or less.
- 4) Within 0.5 seconds after the A.B.S. warning lamp goes out, immediately after the ignition switch is turned to on, depress the brake pedal and hold.

#### CAUTION:

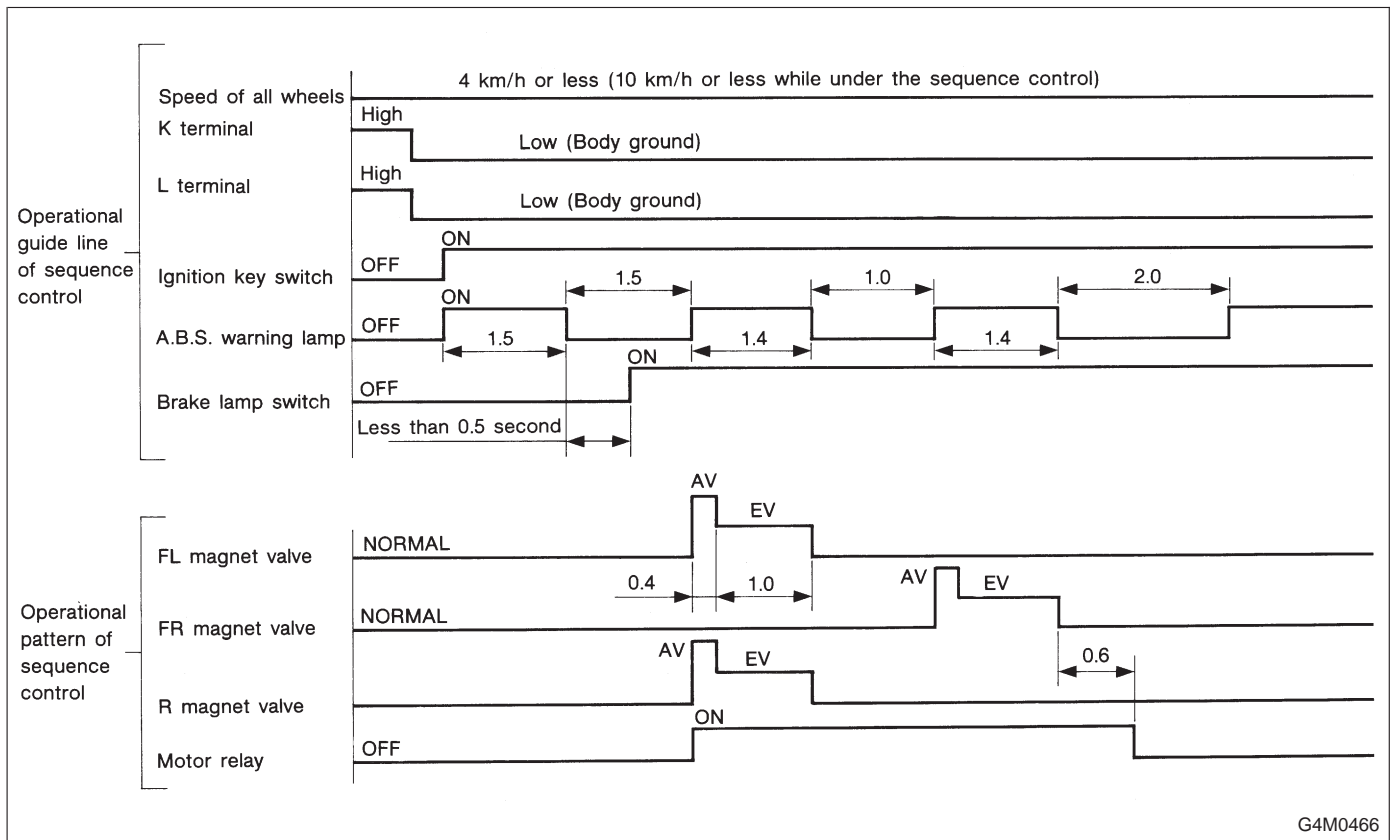
**Do not depress the clutch pedal.**

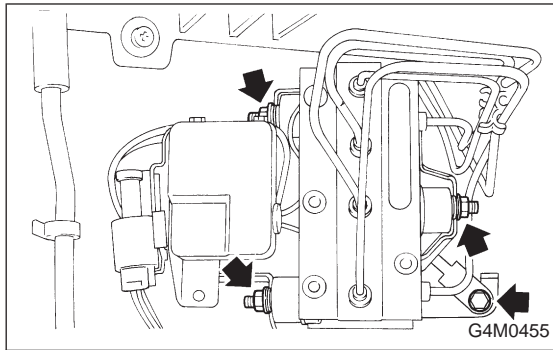
#### NOTE:

- When the ignition switch is set to on, the brake pedal must not be depressed.
- Engine must not operate.

## 2. CONDITIONS FOR COMPLETION OF SEQUENCE CONTROL

- 1) When the speed of at least one wheel reaches 10 km/h (6 MPH), the operation is returned to the normal control mode.
- 2) When L terminal is separated from ground, the operation is returned to the normal control mode.
- 3) When K terminal is no longer ground with the body, the operation is returned to the normal control mode.
- 4) When the brake pedal is released during sequence control and the braking lamp switch is set to off, the operation is returned to the normal control mode.
- 5) After completion of the sequence control, the operation is returned to the normal control mode.



**D: INSTALLATION**

- 1) Install relay box cover on hydraulic unit.
- 2) Install hydraulic unit to bracket.

**Tightening torque:**

**$18 \pm 5 \text{ N}\cdot\text{m}$  ( $1.8 \pm 0.5 \text{ kg}\cdot\text{m}$ ,  $13.0 \pm 3.6 \text{ ft}\cdot\text{lb}$ )**

- 3) Tighten bracket and motor ground lead as a unit.

**Tightening torque:**

**$32 \pm 10 \text{ N}\cdot\text{m}$  ( $3.3 \pm 1.0 \text{ kg}\cdot\text{m}$ ,  $24 \pm 7 \text{ ft}\cdot\text{lb}$ )**

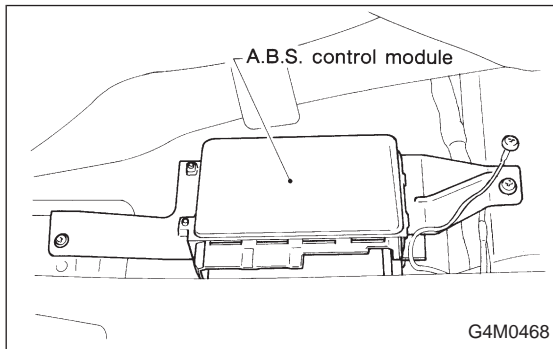
- 4) Connect brake pipes to their correct hydraulic unit connections.

**Tightening torque:**

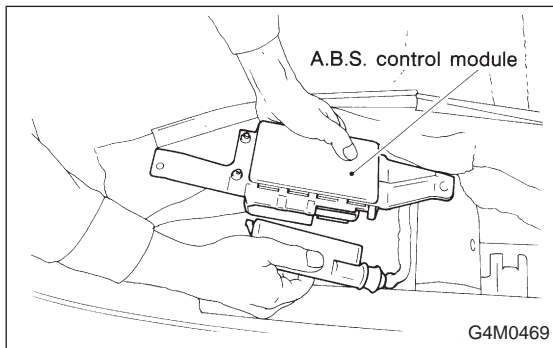
**$14.7^{+3}_{-2} \text{ N}\cdot\text{m}$  ( $1.5^{+0.3}_{-0.2} \text{ kg}\cdot\text{m}$ ,  $10.8^{+2.2}_{-1.4} \text{ ft}\cdot\text{lb}$ )**

**16. A.B.S. Control Module****A: REMOVAL**

- 1) Remove floor mat located under lower right side of front seat.



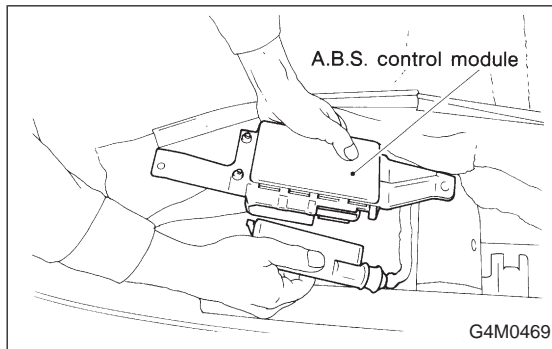
- 2) Remove screw which secure A.B.S. control module from body.



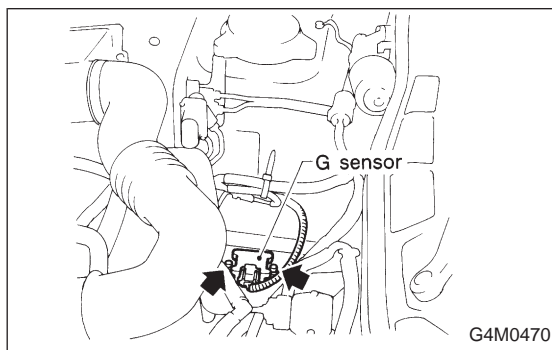
- 3) Disconnect connector from A.B.S. control module.

**B: INSPECTION**

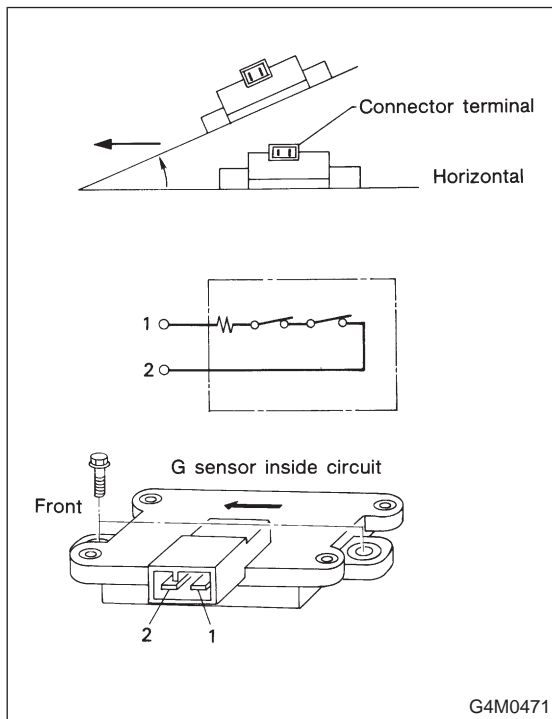
Check that connector is connected correctly and that connector terminal sliding resistance is correct.

**C: INSTALLATION**

- 1) Connect connector to A.B.S. control module.
- 2) Install A.B.S. control module on body.

**17. G Sensor for A.B.S. System****A: REMOVAL AND INSTALLATION**

The G sensor is located on the right front wheel apron.

**B: INSPECTION**

- 1) Check to ensure that G sensor is securely installed on front wheel apron, and that connector is properly installed.
- 2) Disconnect connector from G sensor and measure contact resistance between terminals.

Condition of G sensor	Standard
On flat surface	610±60 Ω
* When slanting about 14° — 21.3° (θ)	610±60 Ω → More than 100 kΩ

**NOTE:**

- Tilt G sensor forward as shown in Figure. If it is tilted backward, it will not operate.
- Hysteresis occurs during ON-OFF operation of sensor. Sensor should turn OFF from ON (610 Ω → More than 100 kΩ) when it is tilted in a range from 14° to 21.3°.

**Tightening torque:**

**7.4±2.0 N·m (0.75±0.2 kg-m, 5.4±1.4 ft-lb)**

## 18. Brake Hose and Pipe AIRBAG

### SUPPLEMENTAL RESTRAINT SYSTEM "AIRBAG"

Airbag system wiring harness is routed near the center brake pipe.

#### CAUTION:

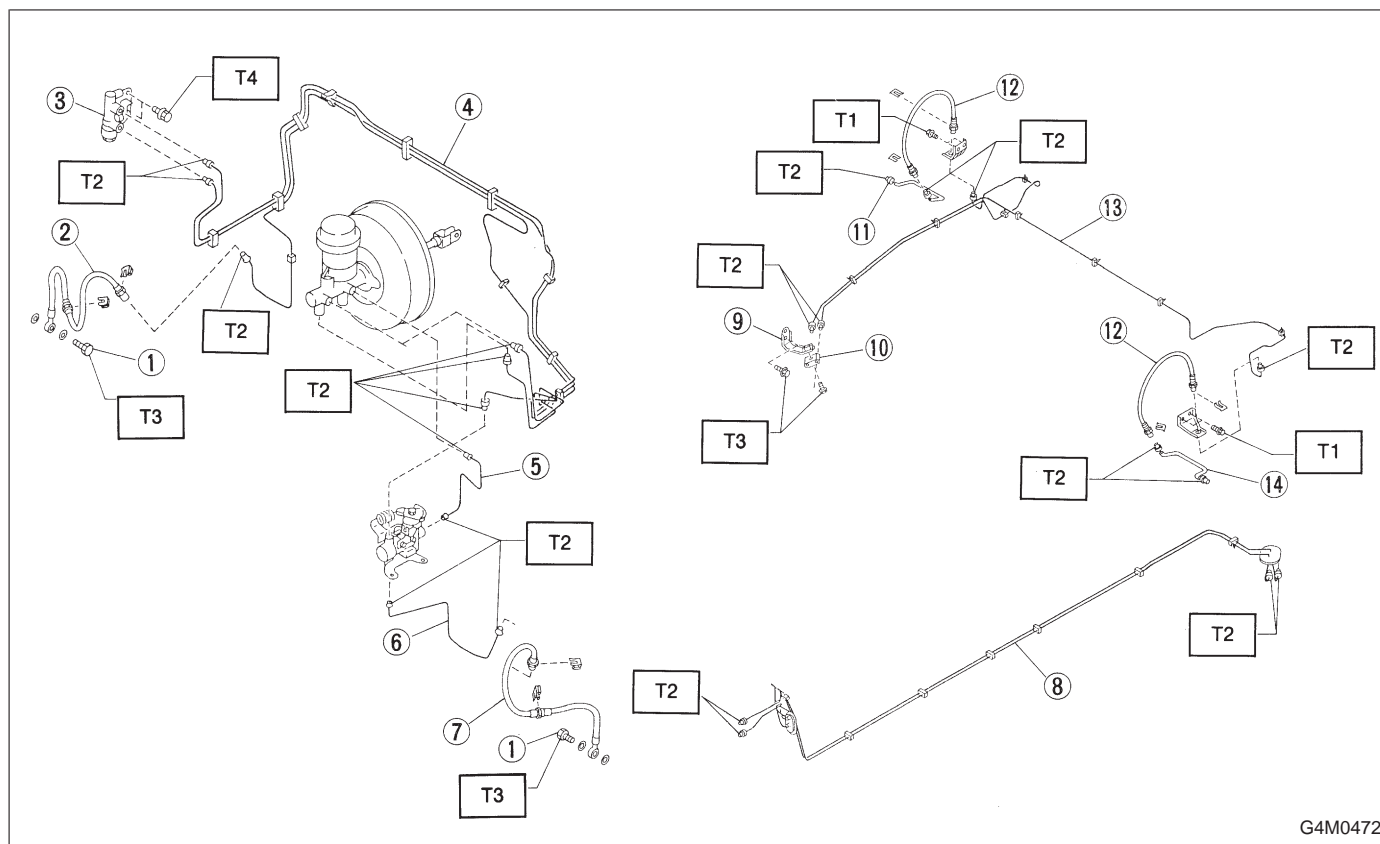
- All Airbag system wiring harness and connectors are colored yellow. Do not use electrical test equipment on these circuit.
- Be careful not to damage Airbag system wiring harness when servicing the center brake pipe.

### A: REMOVAL AND INSTALLATION

#### CAUTION:

- When removing and installing the brake pipe, make sure that it is not bent.
- After installing the brake pipe and hose, bleed the air.
- After installing the brake hose, make sure that it does not touch the tire or suspension assembly, etc.

#### 1. MODELS WITHOUT A.B.S.



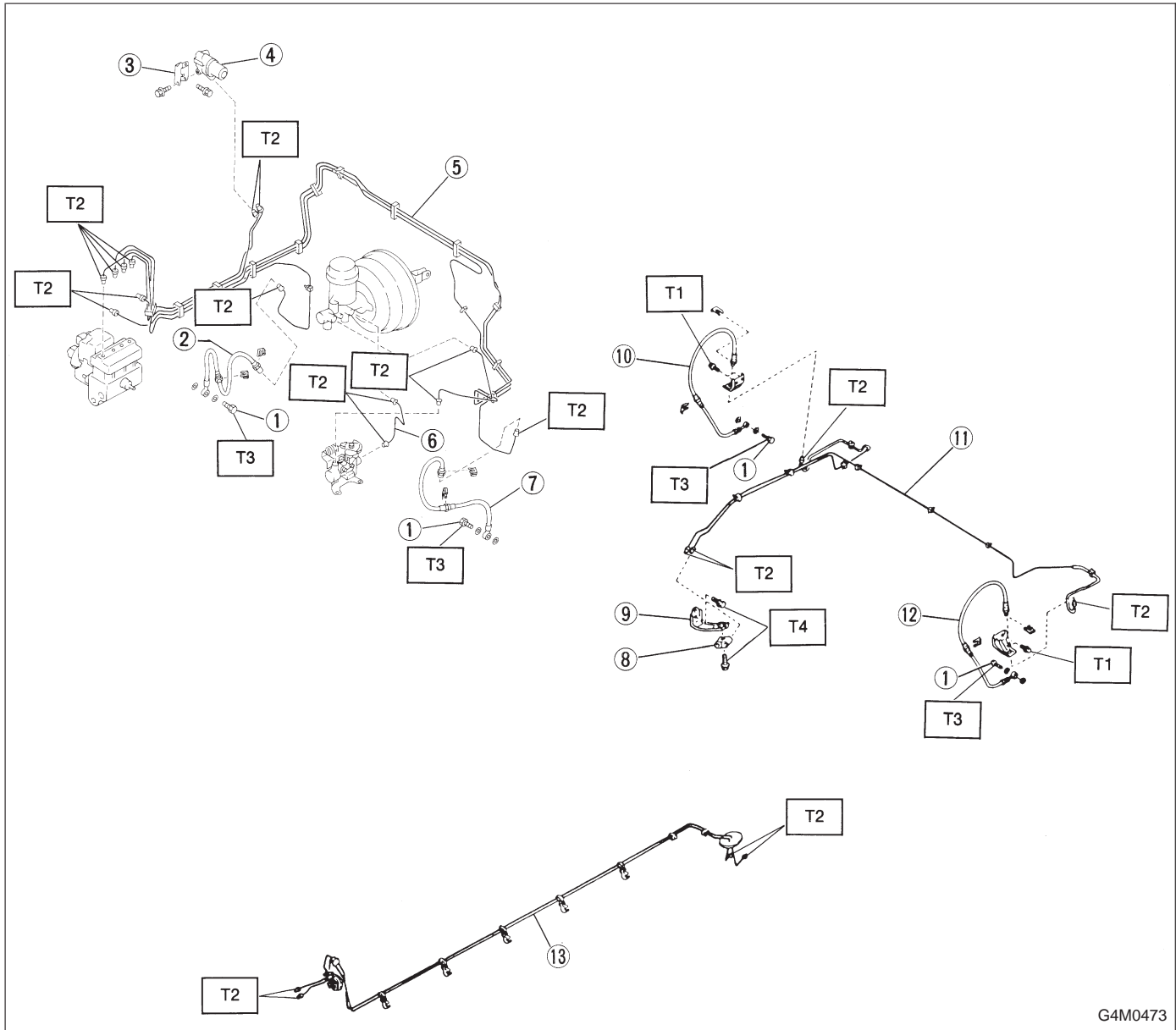
G4M0472

- |                              |                          |
|------------------------------|--------------------------|
| ① Union bolt                 | ⑧ Center brake pipe ASSY |
| ② Front brake hose RH        | ⑨ Connector bracket      |
| ③ Proportioning valve        | ⑩ Two-way connector      |
| ④ Front brake pipe           | ⑪ Rear brake pipe RH     |
| ⑤ Front adapter pipe (UPPER) | ⑫ Rear brake hose drum   |
| ⑥ Front adapter pipe (LOWER) | ⑬ Rear brake pipe ASSY   |
| ⑦ Front brake hose LH        | ⑭ Rear brake pipe LH     |

#### Tightening torque: N·m (kg·m, ft·lb)

- T1:  $13 \pm 3$  ( $1.3 \pm 0.3$ ,  $9.4 \pm 2.2$ )  
 T2:  $14.7^{+3}_{-2}$  ( $1.5^{+0.3}_{-0.2}$ ,  $10.8^{+2.2}_{-1.4}$ )  
 T3:  $18 \pm 3$  ( $1.8 \pm 0.3$ ,  $13.0 \pm 2.2$ )  
 T4:  $18 \pm 5$  ( $1.8 \pm 0.5$ ,  $13.0 \pm 3.6$ )

### 2. MODELS WITH A.B.S.



G4M0473

- |                         |                          |
|-------------------------|--------------------------|
| ① Union bolt            | ⑧ Two-way connector      |
| ② Front brake hose RH   | ⑨ Connector bolt         |
| ③ Valve bracket         | ⑩ Rear brake hose RH     |
| ④ Proportioning valve   | ⑪ Rear brake pipe ASSY   |
| ⑤ Front brake pipe ASSY | ⑫ Rear brake hose LH     |
| ⑥ Front adapter pipe    | ⑬ Center brake pipe ASSY |
| ⑦ Front brake hose LH   |                          |

#### Tightening torque: N·m (kg·m, ft·lb)

T1:  $13 \pm 3$  ( $1.3 \pm 0.3$ ,  $9.4 \pm 2.2$ )

T2:  $14.7_2^{+3}$   
( $1.5_{-0.2}^{+0.3}$ ,  $10.8_{-1.4}^{+2.2}$ )

T3:  $18 \pm 3$  ( $1.8 \pm 0.3$ ,  $13.0 \pm 2.2$ )

T4:  $18 \pm 5$  ( $1.8 \pm 0.5$ ,  $13.0 \pm 3.6$ )

## 1. Entire Brake System

Trouble and possible cause	Corrective action
<b>1. Insufficient braking</b>	
(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 the air.
(3) Excessively wide shoe clearance	Adjust the clearance.
(4) Wear, deteriorated surface material, adhering water or fluid on the lining	Replace, grind or clean.
(5) Improper operation of master cylinder, disc caliper, brake booster or check valve	Correct or replace.
<b>2. Unstable or uneven braking</b>	
(1) Fluid on the lining, drum or rotor	Eliminate cause of fluid leakage, clean, or replace.
(2) Drum or rotor eccentricity	Correct or replace the drum or rotor.
(3) Worn brake drum, or damage to the drum caused by sand	Correct by grinding, or replace.
(4) Improper lining contact, deteriorated surface material, improper inferior material, or wear	Correct by grinding, or replace.
(5) Deformed back plate	Correct or replace.
(6) Improper tire inflation	Inflate to correct pressure.
(7) Disordered wheel alignment	Adjust alignment.
(8) Loosened back plate or the support installing bolts	Retighten.
(9) Loosened wheel bearing	Retighten to normal tightening torque or replace.
(10) Trouble in the hydraulic system	Replace the cylinder, brake pipe or hose.
(11) Uneven effect of the parking brake	Check, adjust, or replace the rear brake and cable system.
<b>3. Excessive pedal stroke</b>	
(1) Entry of air into the hydraulic mechanism	Bleed the 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) Improperly adjusted shoe clearance	Adjust.
(5) Improper lining contact or worn lining	Correct or replace.



Trouble and possible cause	Corrective action
<b>4. Brake dragging or improper brake return</b>	
(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	Correct or adjust.
(5) Weakened spring tension or breakage of shoe return spring	Replace the spring.
(6) Excessively narrow shoe clearance	Adjust the clearance.
(7) Improper disc caliper operation	Correct or replace.
(8) Improper adjusted wheel bearing	Adjust or replace.
<b>5. Brake noise (1) (creak sound)</b>	
(1) Hardened or deteriorated lining	Replace the shoe assembly or pad.
(2) Worn lining	Replace the shoe assembly or pad.
(3) Loosened back plate or the support installing bolts	Retighten.
(4) Loose wheel bearing	Retighten to normal tightening torque.
(5) Dirty drum or rotor	Clean the drum or rotor, or clean and replace the brake assembly.
<b>6. Brake noise (2) (hissing sound)</b>	
(1) Worn lining	Replace the shoe assembly or pad.
(2) Improper installed shoe or pad	Correct or replace the shoe assembly or pad.
(3) Loose or bent drum or rotor	Retighten or replace.
<b>7. Brake noise (3) (click sound)</b>	
In the case of the disc brake:	
(1) Excessively worn pad or the support	Replace the pad or the support.
In the case of the drum brake:	
(1) Excessively worn shoe ridge	Replace the back plate.
(2) Lack of oil on the shoe ridge surface and anchor	Add more grease.

## 2. Hill Holder

Trouble and possible cause	Corrective action
<b>1. Counterforce of clutch pedal is too strong.</b>	
(1) PHV cable is damaged or does not operate properly.	Repair or replace.
(2) Lever of PHV is defective.	Replace entire PHV assembly.
(3) Clutch system is anomalous.	Refer to "Clutch and pedal cable system".
<b>2. Vehicle does not stop on uphill road of 3° or higher inclination.</b>	
(1) Front side of vehicle is lowered.	Refer to "Suspension".
(2) PHV cable is broken.	Replace.
(3) Play of clutch is excessive.	Adjust.
(4) PHV cable is elongated.	Adjust.
(5) Sealing of PHV is poor.	Replace entire PHV assembly.
<b>3. Shock is felt when starting.</b>	
(1) Poor adjustment of starting performance.	Adjust.
(2) When depressing the brake pedal strongly:	(The stronger brake pedal depressing force, the later hill holder releasing.)
(3) When starting on flat road after stopping reverse movement:	(Because hill holder is activated.)
<b>4. Vehicle slips down when starting.</b>	
(1) PHV cable is elongated.	Adjust.
(2) Clutch facing is worn out.	Adjust or replace.
(3) Bracket (cable) or stay (PHV) is deformed.	Repair or replace.
<b>5. Vehicle cannot start after stoppage.</b>	
(1) Return spring is fatigued or broken.	Replace.
(2) PHV lever won't return.	Replace entire PHV assembly.
(3) When intentionally depressing brake pedal strongly:	[When the brake pedal is depressed by a force of 1,177 N (120 kg, 265 lb) or more.]
<b>6. Abnormal sound is generated upon releasing brake pedal when stopping.</b>	
(1) Rotor and pad matched with each other due to inadequate depressing force to brake pedal.	(Abnormal sound is not generated when depressing brake pedal a little stronger.)
<b>7. Abnormal sound is generated when operating clutch pedal.</b>	
(1) Grease is inadequate for the hook of return spring and sliding portion of PHV cable end.	Apply grease.
(2) When releasing after maintaining high fluid pressure:	(Flowing sound of fluid when releasing high fluid pressure.)
(3) Clutch system is anomalous.	Refer to "Clutch and pedal cable system".

**CAUTION:**

- Description in parentheses is a characteristic of hill holder and does not indicate abnormality. Depressing force required for clutch pedal equipped to hill holder specifications is 20 to 29 N (2 to 3 kg, 4 to 7 lb) larger than the conventional specifications, which does not constitute abnormality.
- When vehicle cannot travel (brake cannot be released) because return spring is broken, remove adjust nut, disconnect clutch and PHV, and then return PHV lever to release the brake. (Be sure to apply the parking brake before starting this operation.)
- The hill holder may not be activated on a slope of an extremely small inclination.