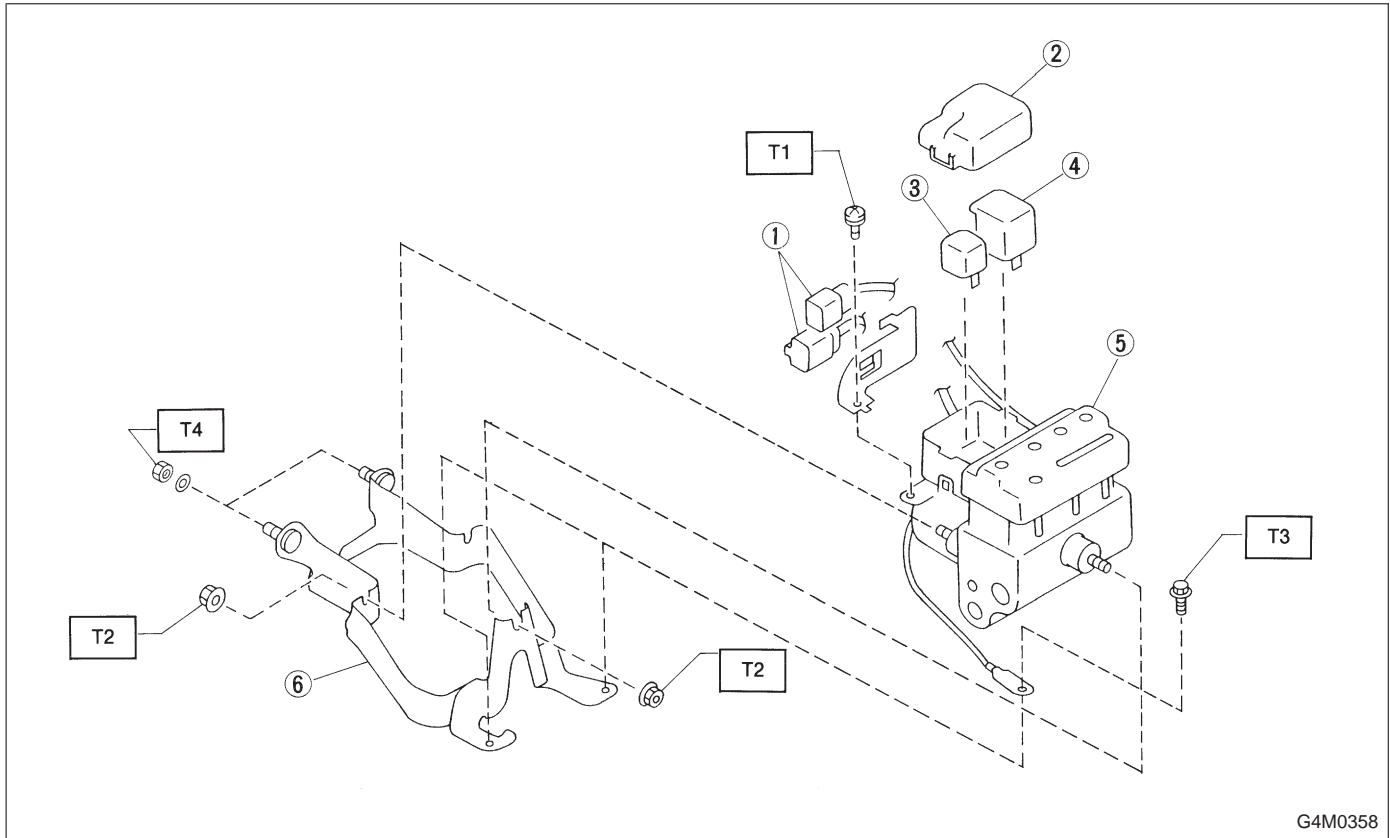


15. Hydraulic Unit for A.B.S. System



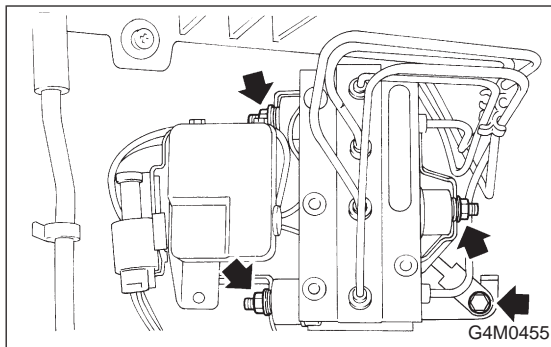
G4M0358

- 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±0.2 (0.125±0.025, 0.9±0.2)
T2: 18±5 (1.8±0.5, 13.0±3.6)
T3: 32±10 (3.3±1.0, 24±7)
T4: 52±15 (5.3±1.5, 38±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.



G4M0455

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

CAUTION:

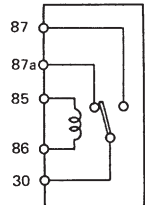
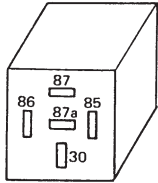
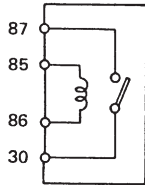
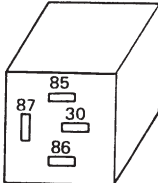
- Hydraulic unit cannot be disassembled. Do not attempt to loosen bolts and nuts.
- Do not drop or bump hydraulic unit.
- Do not turn the hydraulic unit upside down or place it on its side.
- Be careful to prevent foreign particles from getting into hydraulic unit.

- 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

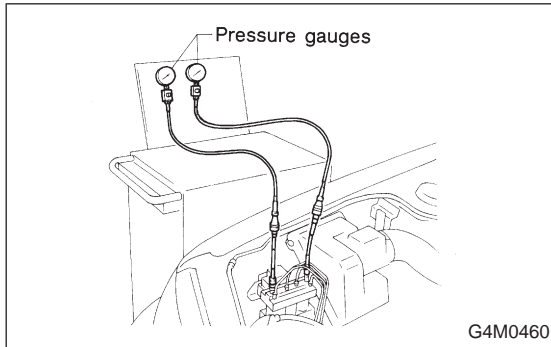
1. CHECKING HYDRAULIC UNIT

- 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 Ω	 <p style="text-align: center;">G4M0456</p>	 <p style="text-align: center;">G4M0457</p>
		30 — 87a	0 Ω		
		30 — 87	■		
	Turning on electricity between 85 and 86. (DC 12 V)	30 — 87a	■		
		30 — 87	0 Ω		
Motor relay	Turning off electricity.	85 — 86	72 — 88 Ω	 <p style="text-align: center;">G4M0458</p>	 <p style="text-align: center;">G4M0459</p>
		30 — 87	■		
	Turning on electricity between 85 and 86. (DC 12 V)	30 — 87	0 Ω		

2. CHECKING THE HYDRAULIC UNIT OPERATION BY PRESSURE GAUGE

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



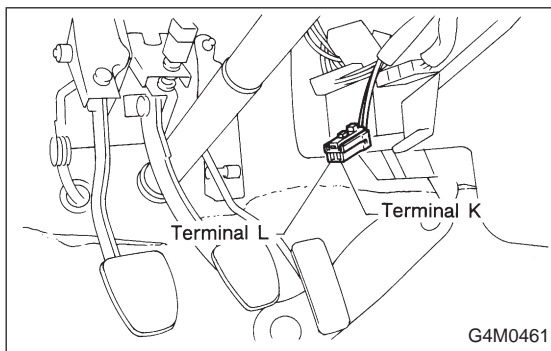
2) Connect a pressure gauge to the end of the removed FL and FR pipes.

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 ² , 498 psi)	490 kPa (5 kg/cm ² , 71 psi)	3,432 kPa (35 kg/cm ² , 498 psi)
Rear wheel	3,432 kPa (35 kg/cm ² , 498 psi)	490 kPa (5 kg/cm ² , 71psi)	3,432 kPa (35 kg/cm ² , 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 ² , 498 psi)	490 kPa (5 kg/cm ² , 71 psi)	3,432 kPa (35 kg/cm ² , 498 psi)
Rear left wheel	3,432 kPa (35 kg/cm ² , 498 psi)	3,432 kPa (35 kg/cm ² , 498 psi)	3,432 kPa (35 kg/cm ² , 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.

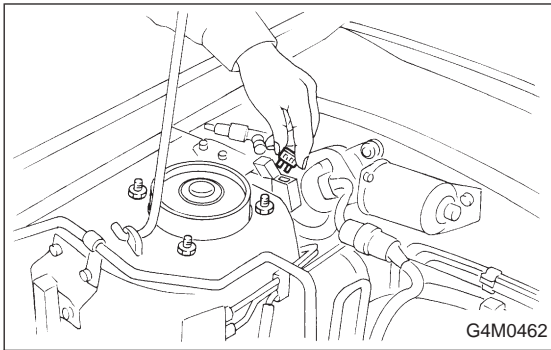
9) Bleed air from the pressure gauges and the FL and FR wheel cylinders.

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.

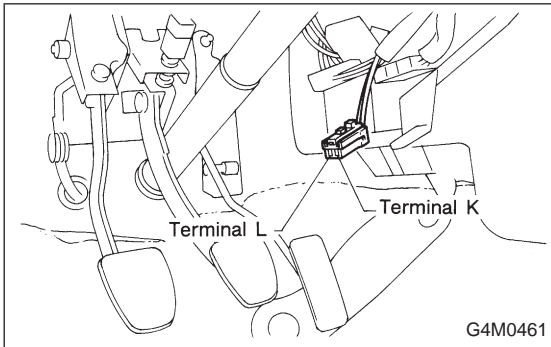
12) Read values indicated on the pressure gauges and check if they meet the standard value.

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.

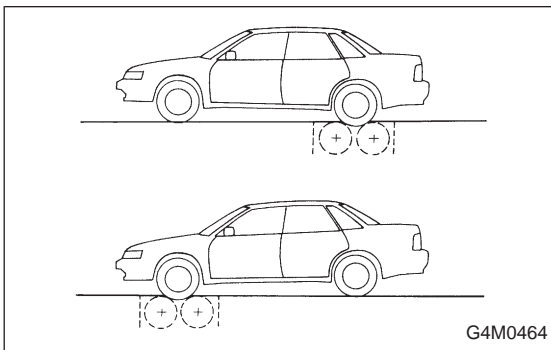


3. CHECKING THE HYDRAULIC UNIT WITH BRAKE TESTER

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

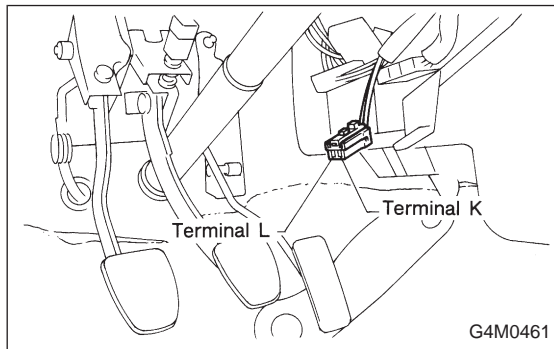
	Initial value	When decompressed	When compressed
Rear right wheel	686 N (70 kg, 154 lb)	245 N (25 kg, 55 lb)	686 N (70 kg, 154 lb)
Rear left wheel	686 N (70 kg, 154 lb)	686 N (70 kg, 154 lb)	686 N (70 kg, 154 lb)

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:

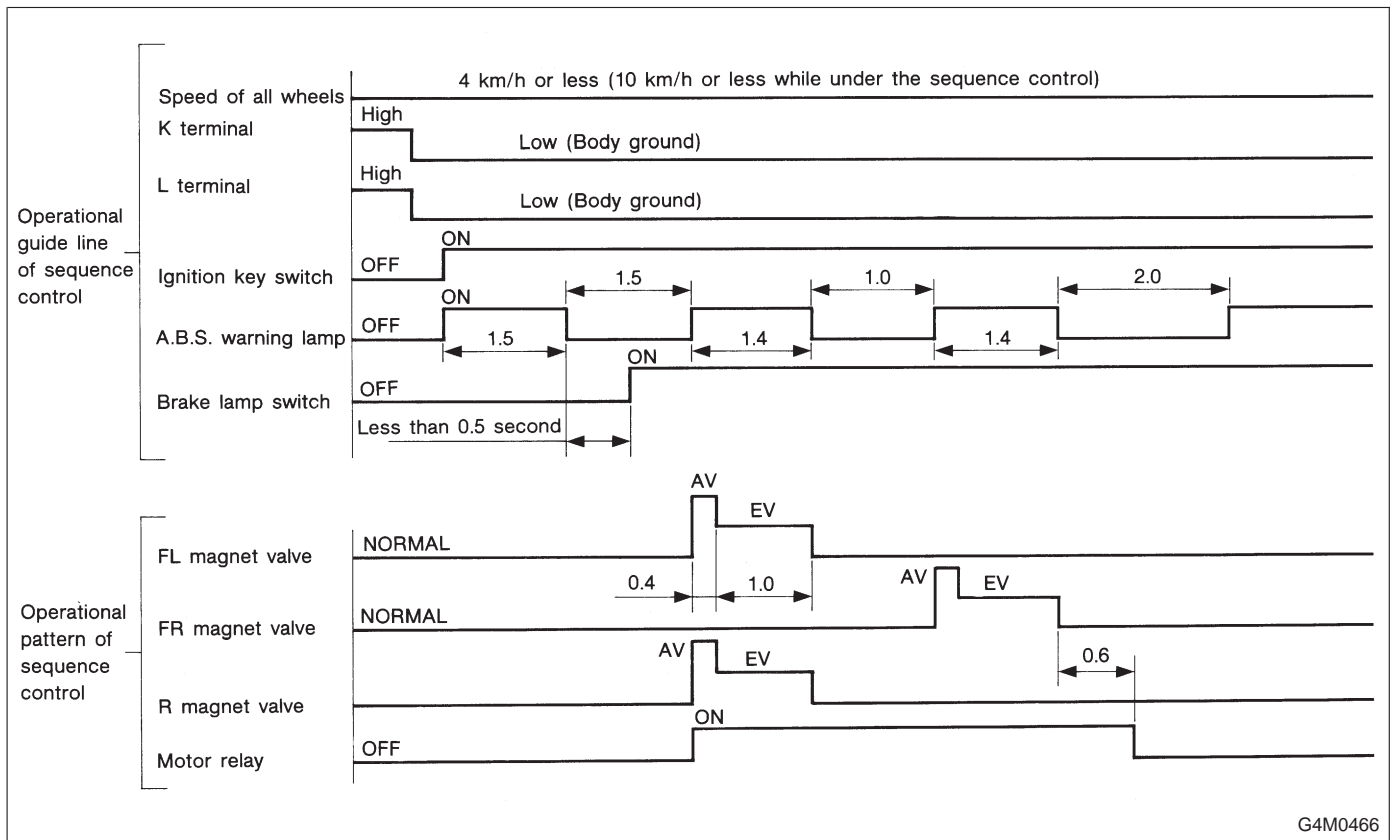
Do not depress the clutch pedal.

NOTE:

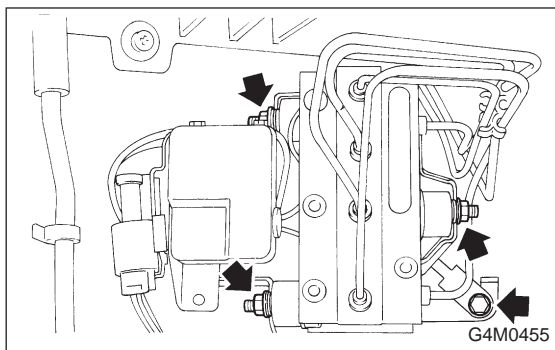
- When the ignition switch is set to on, the brake pedal must not be depressed.
- Engine must not operate.

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.



G4M0466

**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:

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

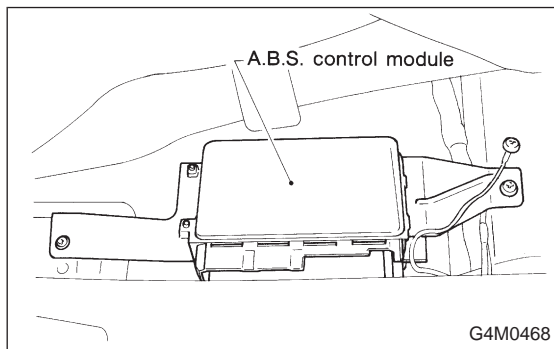
- 4) Connect brake pipes to their correct hydraulic unit connections.

Tightening torque:

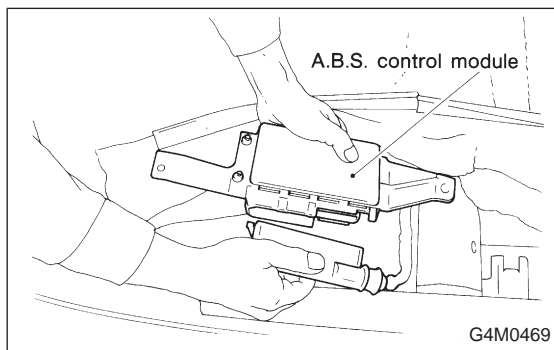
$14.7^{+3}_{-2} \text{ N}\cdot\text{m}$ ($1.5^{+0.3}_{-0.2} \text{ kg}\cdot\text{m}$, $10.8^{+2.2}_{-1.4} \text{ ft}\cdot\text{lb}$)

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.