VDC

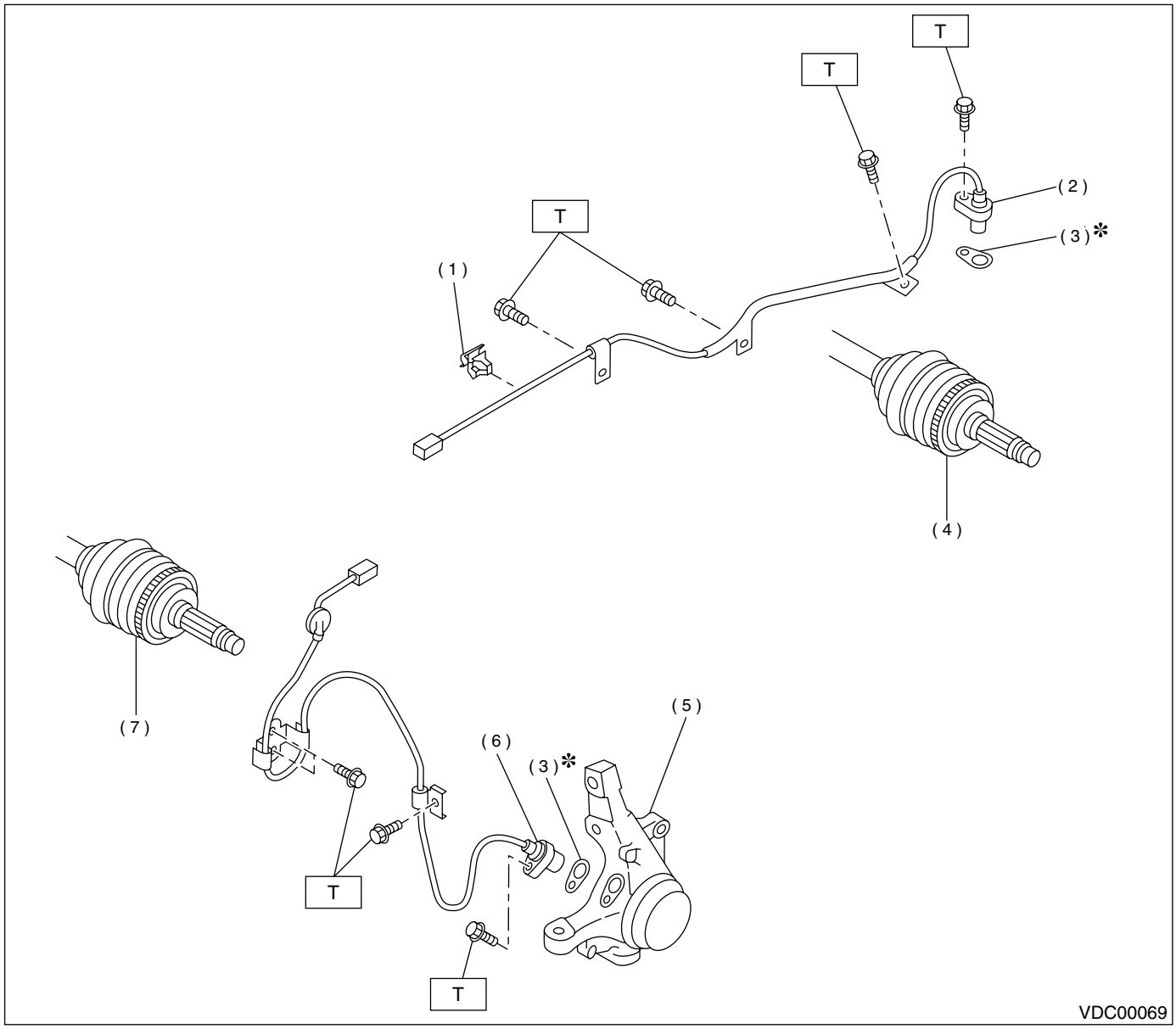
1. General Description

A: SPECIFICATIONS

Item			Standard or remarks
ABS sensor	ABS sensor gap	Front	0.3 — 0.8 mm (0.012 — 0.031 in)
		Rear	0.44 — 0.94 mm (0.0173 — 0.0370 in)
	ABS sensor resistance		1.25±0.25 kΩ
	Marks of the harness	Front LH	Brown
		Front RH	Light blue
		Rear LH	Yellow
		Rear RH	White
Yaw rate and lateral G sensor	Lateral G sensor voltage		2.5±0.2 V
VDC hydraulic control unit marks			D2
VDC control module marks			P

B: COMPONENT

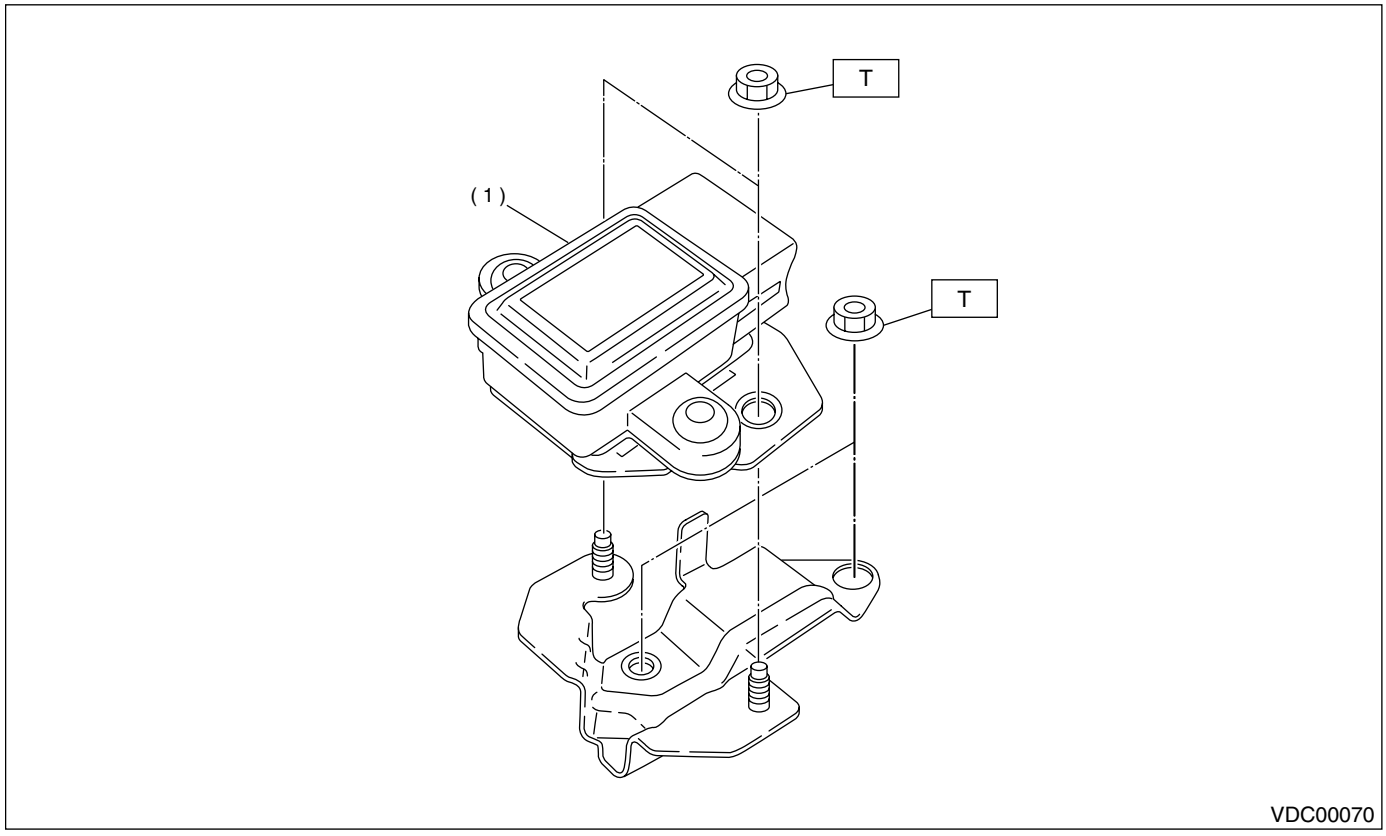
1. ABS SENSOR



(1) Clip
(2) Rear ABS sensor
(3) ABS spacer
(4) Tone wheel (Rear)
(5) Housing
(6) Front ABS sensor
(7) Tone wheel (Front)

Tightening torque: N·m (kgf-m, ft-lb)
T: 33 (3.4, 24)

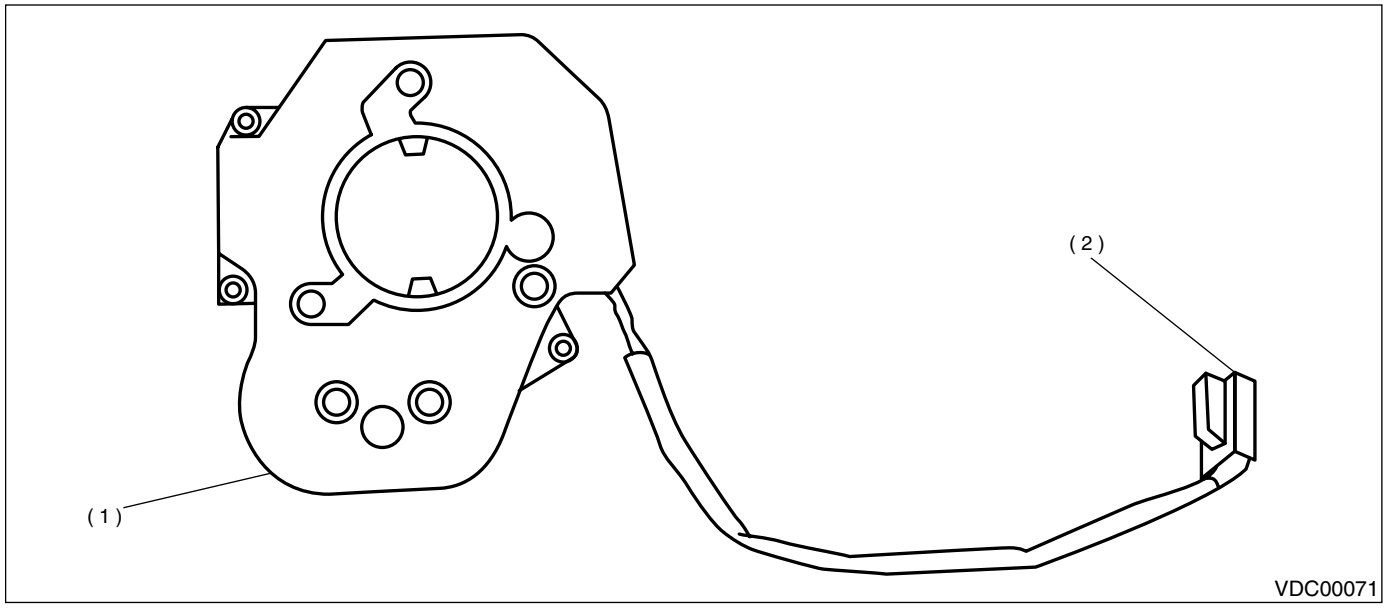
2. YAW RATE AND LATERAL G SENSOR



(1) Yaw rate and lateral G sensor

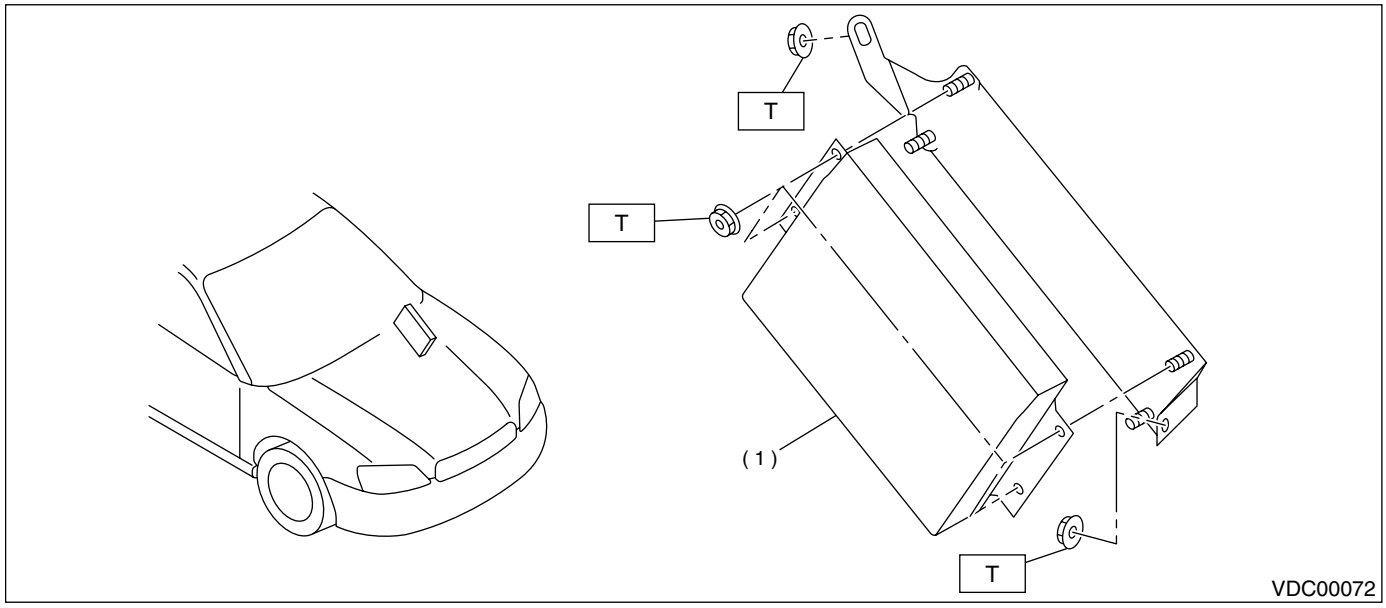
Tightening torque: N·m (kgf-m, ft-lb)
T: 7.5 (0.76, 5.5)

3. STEERING ANGLE SENSOR



(1) Steering angle sensor (2) Connector

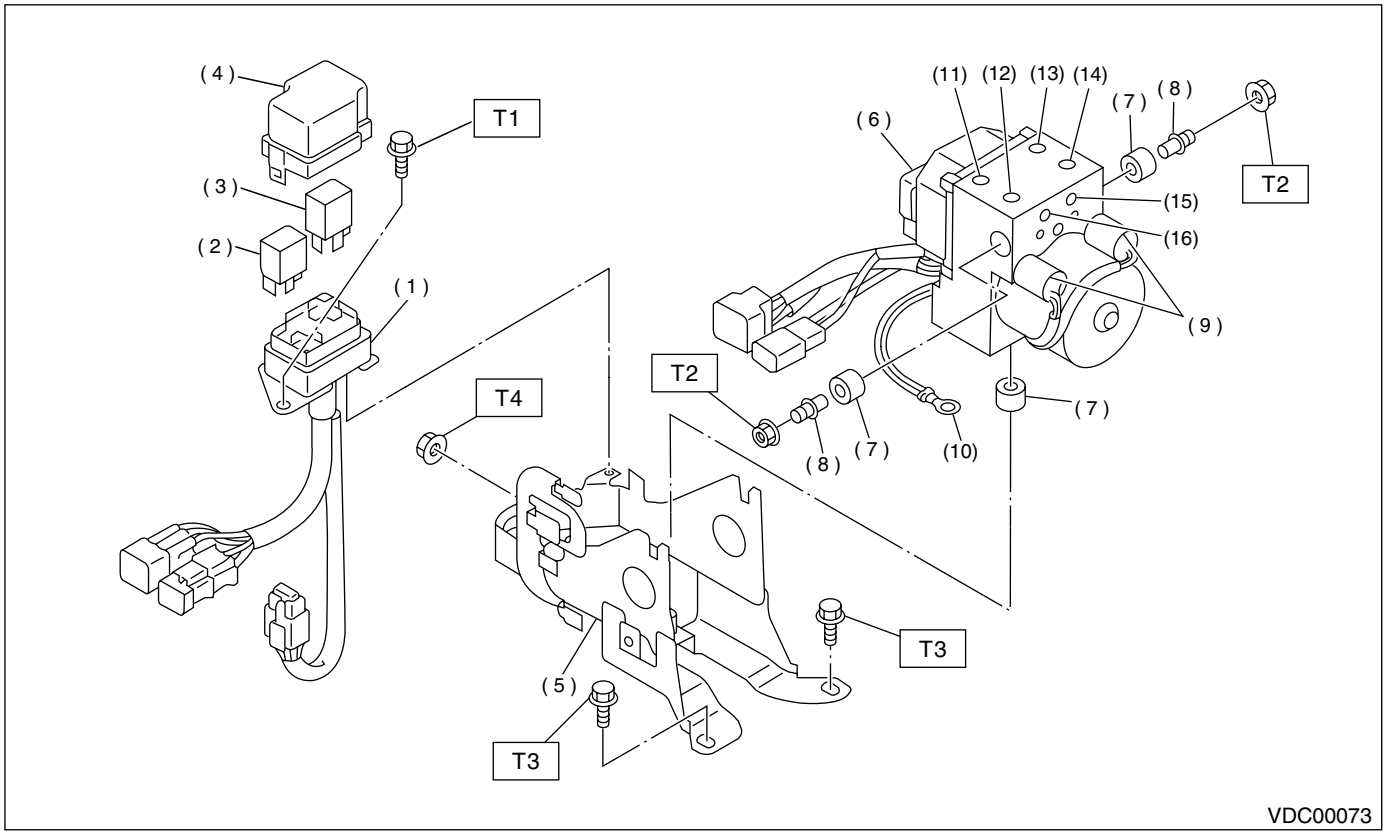
4. VDC CONTROL MODULE (VDCCM)



(1) VDC control module

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

5. HYDRAULIC CONTROL UNIT (H/U)



(1) Relay box
(2) Motor relay
(3) Valve relay
(4) Cap
(5) Bracket
(6) Hydraulic control unit
(7) Damper
(8) Stud bolt
(9) Pressure sensor
(10) Ground terminal
(11) Front-LH outlet
(12) Secondary inlet
(13) Front-RH outlet
(14) Primary inlet
(15) Rear-LH outlet
(16) Rear-RH outlet

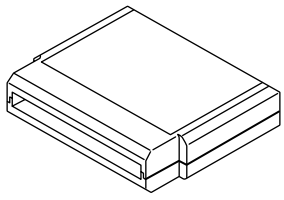
Tightening torque: N·m (kgf-m, ft-lb)
T1: 13 (1.3, 9.4)
T2: 18 (1.8, 13.0)
T3: 33 (3.4, 24.6)
T4: 38 (3.9, 28)

C: CAUTION

• Wear working clothing, including, a cap, protective goggles, and protective shoes during operation.
• Remove contamination including dirt and corrosion before removal, installation or disassembly.
• Keep the disassembled parts in order and protect them from dust or dirt.
• Before removal, installation or disassembly, be sure to clarify the failure. Avoid unnecessary removal, installation, disassembly, and replacement.
• Be careful not to burn your hands, because each part on the vehicle is hot after running.
• Be sure to tighten fasteners including bolts and nuts to the specified torque.
• Place shop jacks or safety stands at the specified points.
• Before disconnecting harness connectors of sensors or units, be sure to disconnect ground cable from battery.

D: PREPARATION TOOL

1. SPECIAL TOOLS

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST24082AA230	24082AA230	CARTRIDGE	Troubleshooting for electrical systems.
 ST22771AA030	22771AA030	SELECT MONITOR KIT	Troubleshooting for electrical systems.

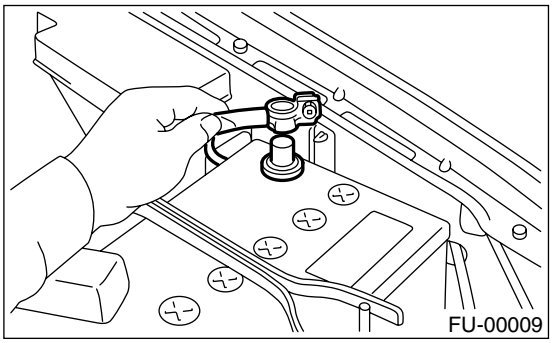
2. GENERAL PURPOSE TOOLS

TOOL NAME	REMARKS
Circuit Tester	Used for measuring resistance, voltage and ampere.
Pressure Gauge	Used for measuring oil pressure.
Oscilloscope	Used for measuring sensor.

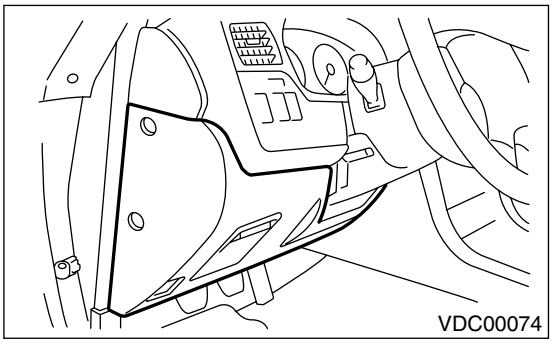
2. VDC Control Module (VDC-CM)

A: REMOVAL

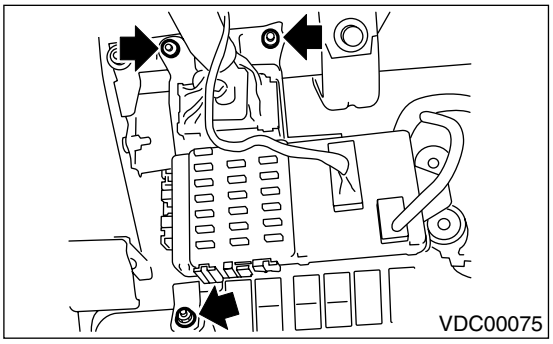
1) Disconnect ground cable from battery.



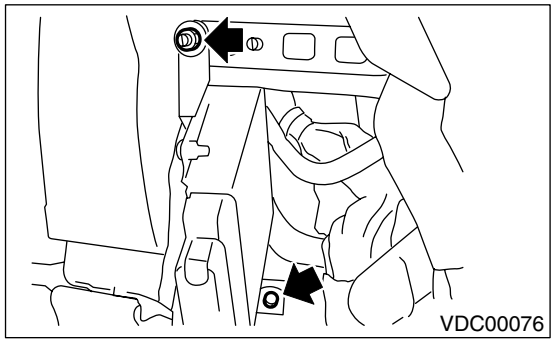
2) Remove lower cover of instrument panel and disconnect connectors on the back side of the cover.



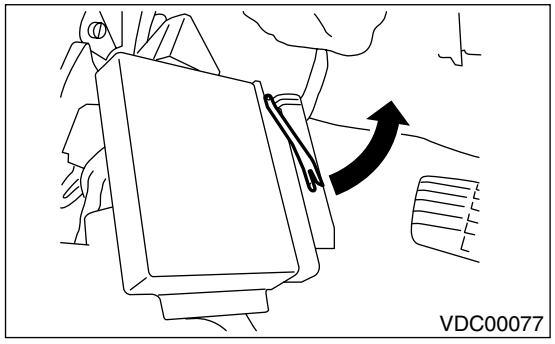
3) Remove three bolts which secure the fuse box onto body side, then move the fuse box aside.



4) Remove two bolts which install VDCCM onto body side bracket.



5) Disconnect connector from VDCCM by pulling up the securing holder.



6) Remove VDCCM.

B: INSTALLATION

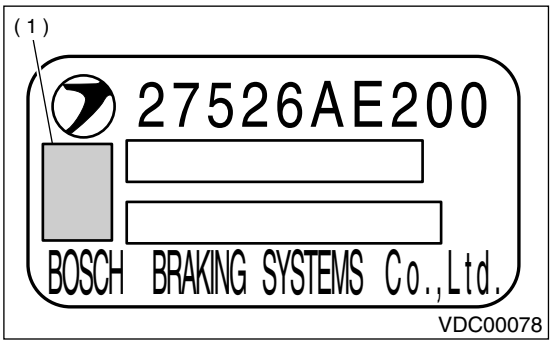
Install in the reverse order of removal.

CAUTION:
After completion of installation procedure, the following two position settings must be made.
- **Steering angle sensor center positioning**
- **Yaw rate and lateral G sensor 0 positioning**

These procedures are necessary for VDCCM to later recognize what position the vehicle is in. For procedures for the above two settings, <Ref. to VDC-9, ADJUSTMENT, VDC Control Module (VDCCM).>.

C: INSPECTION

Check the VDCCM identification mark.



(1) Specification mark

Vehicle specifications	VDCCM identification mark
Six cylinder engine	P

D: ADJUSTMENT

Always conduct steering angle sensor center positioning and yaw rate and lateral G sensor 0 positioning whenever you have replaced, removed or installed the following items.

- VDCCM
- Steering angle sensor
- Yaw rate and lateral G sensor
- Steering wheel parts (including airbag)
- Suspension parts
- Adjustment of wheel alignment

1. WITHOUT SUBARU SELECT MONITOR

1) Park the vehicle in a straight ahead position on a horizontal surface.
2) Confirm the steering wheel center position. (If the center position is not accurate, adjust wheel alignment.)
3) Drive the vehicle approx. 10 km (6 MPH) preferably on a straight road, then turn ignition switch OFF. Then drive the vehicle approx. 10 km (6 MPH) again confirming that ABS and VDC warning lights do not go ON while vehicle is being driven. Also make sure there are no abnormalities of the VDC function or steering operation.

NOTE:
If it is not possible to drive the vehicle, use SUBARU SELECT MONITOR.
<Ref. to VDC-9, WITH SUBARU SELECT MONITOR, ADJUSTMENT, VDC Control Module (VDCCM).>

4) If there are any abnormalities found, conduct the procedure over again.

2. WITH SUBARU SELECT MONITOR

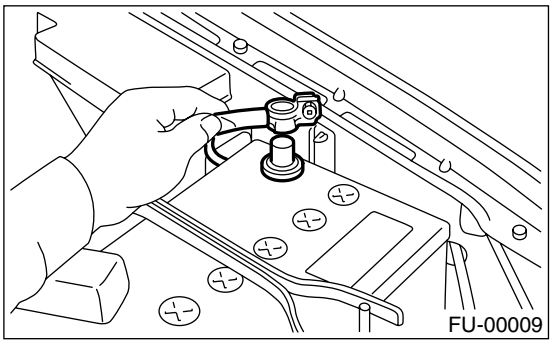
1) Park the vehicle in a straight ahead position on a horizontal surface. (Engine running in gear position of P or N)
2) Confirm the steering wheel center position. (If the center position is not accurate, adjust wheel alignment.)
3) Set the SUBARU SELECT MONITOR on the vehicle and select “Set Mode Str.A.Sen.N & Lat.Gsen.0p” in “Function Check Sequence” display menu. (Follow the instructions in the display.)
4) Select “Current Data display & Save” in {Brake Control System} display menu and confirm if the steering angle sensor is indicated as “0 deg”.
5) If the display does not indicate {0 deg}, conduct the procedure over again and make sure it indicates “0 deg”.
6) Drive the vehicle approx. 10 minutes and confirm that ABS and VDC warning lights do not go ON while vehicle is being driven.
7) If there are any abnormalities in VDC function or steering operation found while vehicle is being driven, conduct the procedure over again.

3. Hydraulic Control Unit (H/U)

A: REMOVAL

1. HYDRAULIC UNIT (H/U)

1) Disconnect ground cable from battery.



2) Remove air intake duct from engine compartment to facilitate removal of hydraulic unit.
3) Disconnect connector from hydraulic unit.

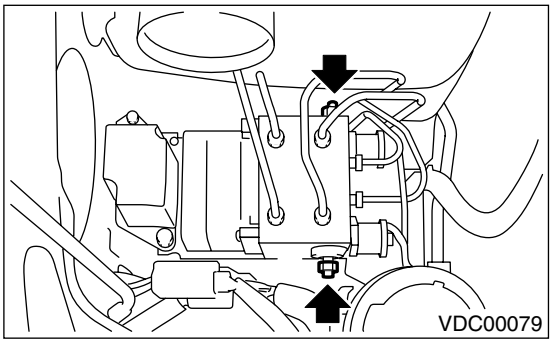
CAUTION:
Be careful not to let water or other foreign matter contact the H/U terminal.

4) Unlock cable clip.
5) Disconnect brake pipes from hydraulic unit.

CAUTION:
Wrap brake pipes with vinyl bag to avoid spilling brake fluid on vehicle body.

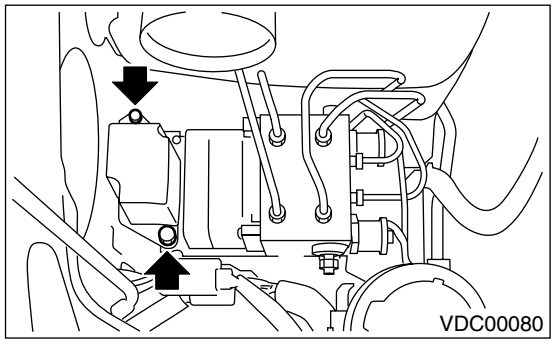
6) Remove nuts and bolt which secure hydraulic unit bracket, and remove hydraulic unit from engine compartment.

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 bolt after tightening.
• Do not pull harness disconnecting harness connector.



2. RELAY BOX

1) Disconnect ground cable from battery.
2) Remove air intake duct from engine compartment to facilitate removal of relay box.
3) Disconnect connector from relay box.
4) Unlock cable clip.
5) Remove nuts which secure relay box, and remove relay box and connector bracket.

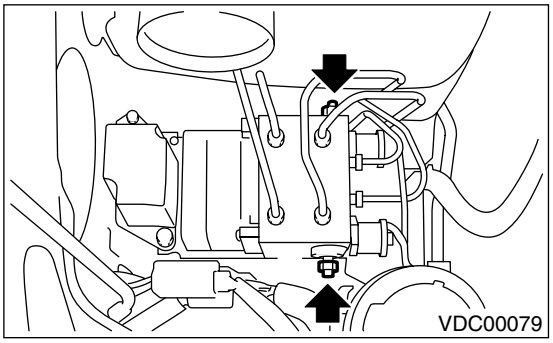


CAUTION:
Do not drop or bump relay box.

B: INSTALLATION

1. HYDRAULIC UNIT (H/U)

1) Install hydraulic unit.



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

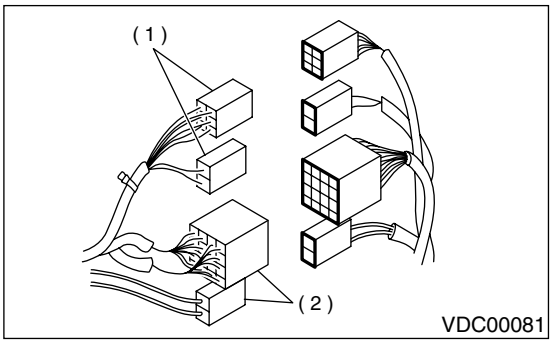
2) Connect hydraulic unit ground cable to body.

Tightening torque:
33 N·m (3.4 kgf-m, 25 ft-lb)

3) Connect brake pipes to their correct hydraulic unit connections.
4) Secure hydraulic unit connector to connector bracket.

CAUTION:
Align connector with mating receptacle.

5) Connect connector to hydraulic unit.



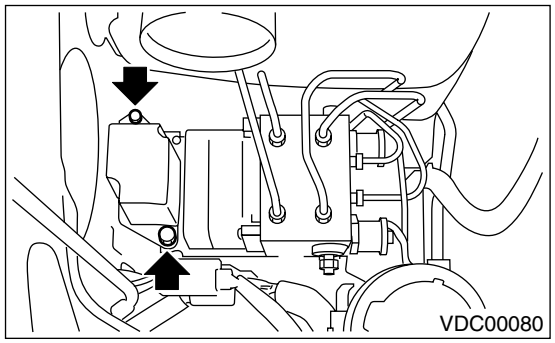
(1) Relay box connector
(2) Hydraulic unit connector

6) Install air intake duct.
7) Connect ground cable to battery.
8) Bleed air from the brake system.

2. RELAY BOX

1) Install relay box and connector bracket.

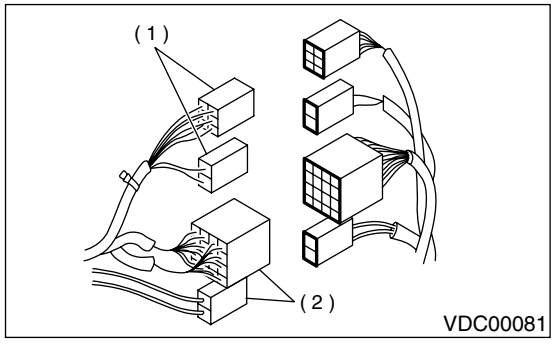
Tightening torque:
13 N·m (1.3 kgf-m, 9.4 ft-lb)



2) Secure relay box connector to connector bracket.

CAUTION:
Align connector with mating receptacle.

3) Connect connector to relay box.

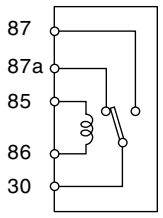
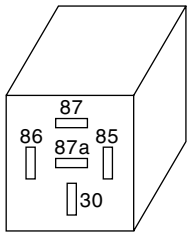
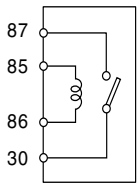
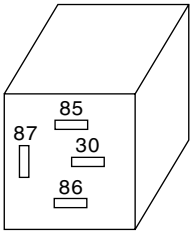


(1) Relay box connector
(2) Hydraulic unit connector

4) Install air intake duct.
5) Connect ground cable to battery.

C: INSPECTION

1) Check connected and fixed condition of connector.
2) Check valve relay and motor relay for discontinuity or short circuits.

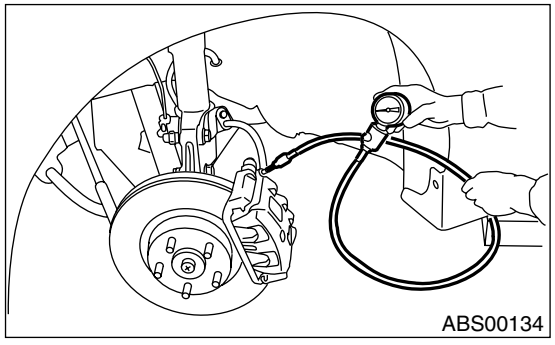
	Condition	Terminal number	Standard	Diagram	Terminal location
Valve relay	Turning off electricity.	85 — 86	103±10 Ω	 VDC00082	 VDC00083
		30 — 87a	Less than 0.5 Ω		
		30 — 87	More than 1 MΩ		
	Turning on electricity between 85 and 86. (DC 12 V)	30 — 87a	More than 1 MΩ		
		30 — 87	Less than 0.5 Ω		
Motor relay	Turning off electricity.	85 — 86	80±10 Ω	 VDC00084	 VDC00085
		30 — 87	More than 1 MΩ		
	Turning on electricity between 85 and 86. (DC 12 V)	30 — 87	Less than 0.5 Ω		

1. CHECKING THE HYDRAULIC UNIT ABS OPERATION BY PRESSURE GAUGE

1) Lift-up vehicle and remove wheels.
2) Disconnect the air bleeder screws from the FL and FR caliper bodies.
3) Connect two pressure gauges to the FL and FR caliper bodies.

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.

NOTE:
Wrap sealing tape around the pressure gauge.


ABS00134

4) Bleed air from the pressure gauges.
5) Perform ABS sequence control.
<Ref. to VDC-16, ABS Sequence Control.>
6) 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.

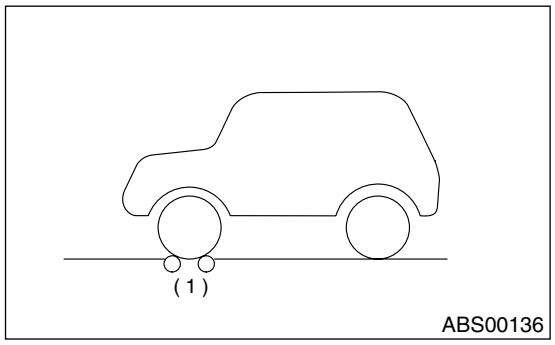
7) Read values indicated on the pressure gauge and check if the fluctuation of the values between decompression and compression meets the standard values. Also check if any irregular brake pedal tightness is felt.

	Front wheel	Rear wheel
Initial value	3,432 kPa (35 kg/cm^2, 498 psi)	3,432 kPa (35 kg/cm^2, 498 psi)
When decompressed	490 kPa (5 kg/cm^2, 71 psi) or less	490 kPa (5 kg/cm^2, 71 psi) or less
When compressed	3,432 kPa (35 kg/cm^2, 498 psi) or more	3,432 kPa (35 kg/cm^2, 498 psi) or more

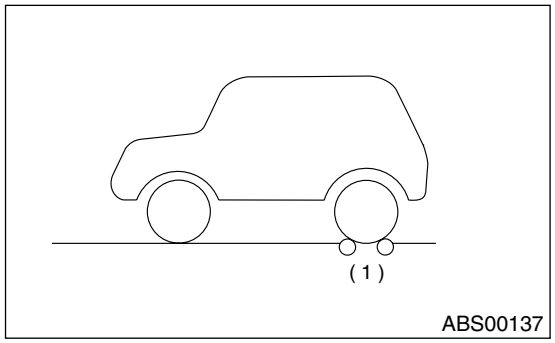
8) Remove pressure gauges from FL and FR caliper bodies.
9) Remove air bleeder screws from the RL and RR caliper bodies.
10) Connect the air bleeder screws to the FL and FR caliper bodies.
11) Connect two pressure gauges to the RL and RR caliper bodies.
12) Bleed air from the pressure gauges and the FL and FR caliper bodies.
13) Perform ABS sequence control.
<Ref. to VDC-16, ABS Sequence Control.>
14) When the hydraulic unit begins to work, at first the RR side performs decompression, holding, and compression, and then the RL side performs decompression, holding, and compression.
15) Read values indicated on the pressure gauges and check if they meet the standard values.
16) After checking, remove the pressure gauges from caliper bodies.
17) Connect the air bleeder screws to RL and RR caliper bodies.
18) Bleed air from brake line.

2. CHECKING THE HYDRAULIC UNIT ABS OPERATION WITH BRAKE TESTER

1) Prepare for operating ABS sequence control.
<Ref. to VDC-16, ABS Sequence Control.>
2) Set the front wheels or rear wheels on the brake tester and set the select lever's position at “neutral”.



(1) Brake tester



(1) Brake tester

3) Operate the brake tester.
4) Perform ABS sequence control.
<Ref. to VDC-16, ABS Sequence Control.>
5) When the hydraulic unit begins to work, check the following working sequence.
(1) The FL wheel performs decompression, holding, and compression in sequence, and subsequently the FR wheel repeats the cycle.
(2) The RR wheel performs decompression, holding, and compression in sequence, and subsequently the RL wheel repeats the cycle.

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

	Front wheel	Rear wheel
Initial value	981 N (100 kgf, 221 lb)	981 N (100 kgf, 221 lb)
When decompressed	490 N (50 kgf, 110 lb) or less	490 N (50 kgf, 110 lb) or less
When compressed	981 N (100 kgf, 221 lb) or more	981 N (100 kgf, 221 lb) or more

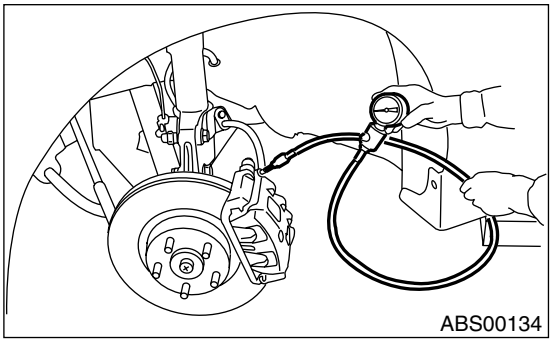
7) After checking, also check if any irregular brake pedal tightness is felt.

3. CHECKING THE HYDRAULIC UNIT VDC OPERATION BY PRESSURE GAUGE

1) Lift-up vehicle and remove wheels.
2) Disconnect the air bleeder screws from the FL and FR caliper bodies.
3) Connect two pressure gauges to the FL and FR caliper bodies.

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.

NOTE:
Wrap sealing tape around the pressure gauge.



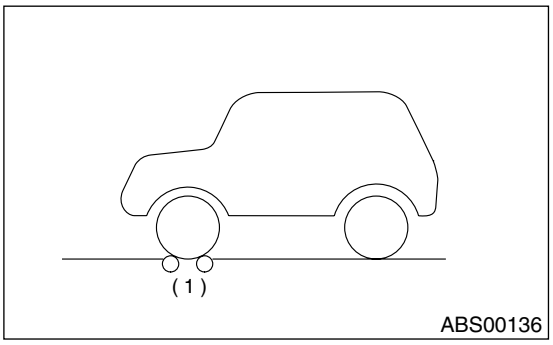
4) Bleed air from the pressure gauges.
5) Perform VDC sequence control.
<Ref. to VDC-19, VDC Sequence Control.>
6) When the hydraulic unit begins to work, and first the FL side performs decompression, holding, and compression, and then the FR side performs decompression, holding, and compression.
7) 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.

	Front wheel	Rear wheel
When compressed	2,942 kPa (30 kg/cm^2, 427 psi) or more	1,961 kPa (20 kg/cm^2, 284 psi) or more
When decompressed	490 kPa (5 kg/cm^2, 71 psi) or less	490 kPa (5 kg/cm^2, 71 psi) or less

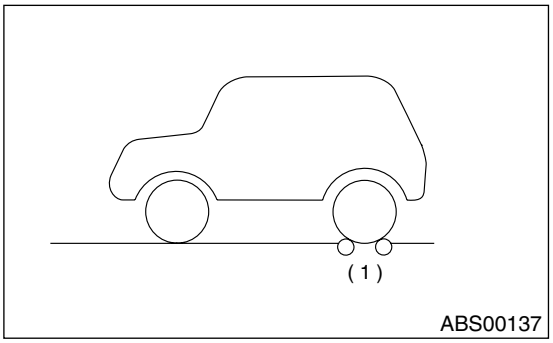
8) Remove pressure gauges from FL and FR caliper bodies.
9) Remove air bleeder screws from the RL and RR caliper bodies.
10) Connect the air bleeder screws to the FL and FR caliper bodies.
11) Connect two pressure gauges to the RL and RR caliper bodies.
12) Bleed air from the pressure gauges and the FL and FR caliper bodies.
13) Perform VDC sequence control.
<Ref. to VDC-19, VDC Sequence Control.>
14) When the hydraulic unit begins to work, at first the RR side performs decompression, holding, and compression, and then the RL side performs decompression, holding, and compression.
15) Read values indicated on the pressure gauges and check if they meet the standard value.
16) After checking, remove the pressure gauges from caliper bodies.
17) Connect the air bleeder screws to RL and RR caliper bodies.
18) Bleed air from brake line.

4. CHECKING THE HYDRAULIC UNIT VDC OPERATION WITH BRAKE TESTER

1) Prepare for operating VDC sequence control.
<Ref. to VDC-19, VDC Sequence Control.>
2) Set the front wheels or rear wheels on the brake tester and set the select lever's position at “neutral”.



(1) Brake tester



(1) Brake tester

3) Operate the brake tester.
4) Perform ABS sequence control.
<Ref. to VDC-16, ABS Sequence Control.>
5) When the hydraulic unit begins to work, check the following working sequence.
(1) The FL wheel performs decompression, holding, and compression in sequence, and subsequently the FR wheel repeats the cycle.
(2) The RR wheel performs decompression, holding, and compression in sequence, and subsequently the RL wheel repeats the cycle.
6) Read values indicated on the brake tester and check if the fluctuation of values, when decompressed and compressed, meet the standard values.

	Front wheel	Rear wheel
When compressed	1,961 N (200 kgf, 441 lb) or more	981 N (100 kgf, 221 lb) or more
When decompressed	490 N (50 kgf, 110 lb) or less	490 N (50 kgf, 110 lb) or less

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

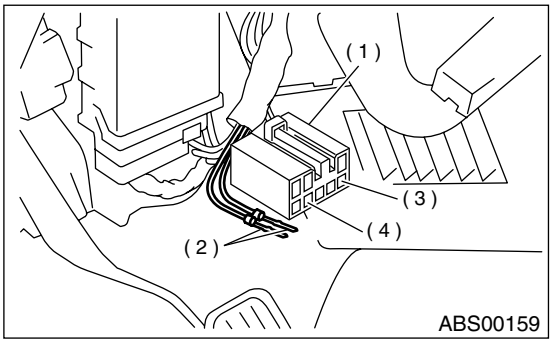
4. ABS Sequence Control

A: OPERATION

1) Under the ABS 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.
2) ABS sequence control can be started by diagnosis connector or select monitor.

1. ABS SEQUENCE CONTROL WITH DIAGNOSIS CONNECTOR

1) Connect diagnosis terminals to terminals No. 5 and No. 8 of the diagnosis connector beside driver's seat heater unit.



(1) Diagnosis connector
(2) Diagnosis terminal
(3) 8 terminal
(4) 5 terminal

2) Set the speed of all wheels at 2.75 km/h (2 MPH) or less.
3) Turn ignition switch OFF.
4) After ignition switch is turned ON, depress the brake pedal within 0.5 seconds after VDC warning light goes out, and then hold it.

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.

5) After completion of ABS sequence control, turn ignition switch OFF.

2. ABS SEQUENCE CONTROL WITH SELECT MONITOR

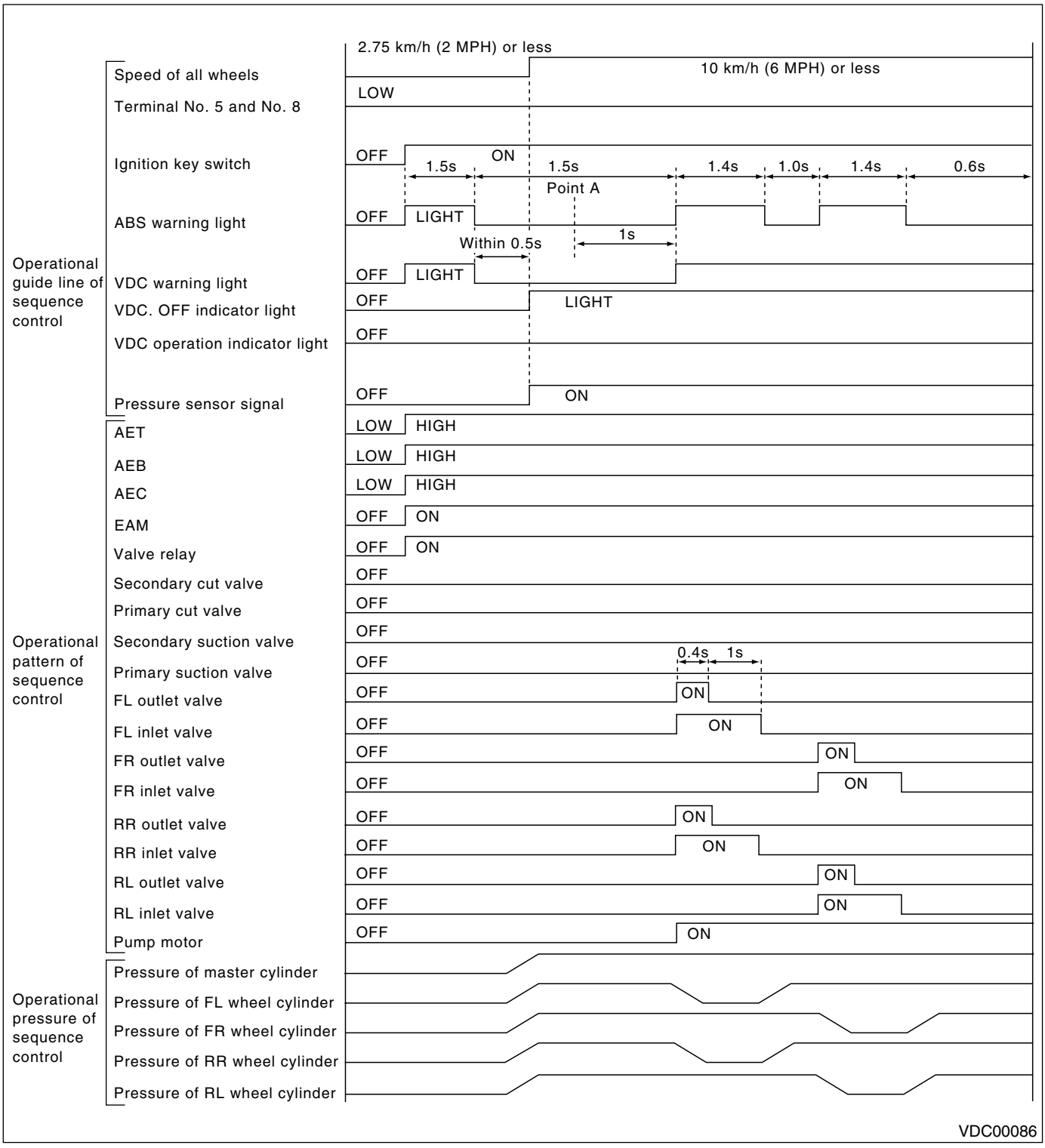
NOTE:
• In the event of any trouble, the sequence control may not be operative. In such a case, activate the sequence control, referring to “ABS SEQUENCE CONTROL WITH DIAGNOSIS CONNECTOR”.
<Ref. to VDC-16, ABS SEQUENCE CONTROL WITH DIAGNOSIS CONNECTOR, OPERATION, ABS Sequence Control.>
• When the diagnosis terminal is connected to the diagnosis connector, the sequence control will not operate.

1) Connect select monitor to data link connector beside driver's seat instrument panel lower cover.
2) Turn ignition switch ON.
3) Turn select monitor switch ON.
4) Put select monitor to “BRAKE CONTROL” mode.
5) When “Function check sequence” is selected, `ABS sequence control' will start.
6) The message `Press Brake Pedal Firmly' is displayed as follows:
(1) When using the brake tester, depress brake pedal with braking force of 981 N (100 kgf, 221 lb).
(2) When using the pressure gauge, depress brake pedal so as to make the pressure gauge indicate 3,432 kPa (35 kg/cm^2, 498 psi).

CAUTION:
Do not depress the clutch pedal.

7) When the message “Press YES” is displayed, press «YES» key.
8) Operation points will be displayed on select monitor.

3. CONDITIONS FOR ABS SEQUENCE CONTROL



NOTE:
- When select monitor is used, control operation starts at point A. The patterns from IGN key ON to the point A show that operation is started by diagnosis connector.
- HIGH means high voltage.
- LOW means low voltage.

B: SPECIFICATION

1. CONDITIONS FOR COMPLETION OF ABS SEQUENCE CONTROL

When the following conditions develop, the ABS sequence control stops and ABS operation is returned to the normal control mode.
1) When the speed of at least one wheel reaches 10 km/h (6 MPH).
2) When terminal No. 5 or No. 8 are separated from diagnosis terminals. (When select monitor is not used.)
3) When the brake pedal is released during sequence control and the braking lamp switch is set to off.
4) When brake pedal is depressed after ignition key is turned to ON, and before ABS warning light goes out. (When select monitor is not used.)
5) When brake pedal is not depressed after ignition key is turned to ON, and within 0.5 seconds after ABS warning light goes out. (When select monitor is not used.)
6) After completion of the sequence control.
7) When malfunction is detected. (When select monitor is used.)

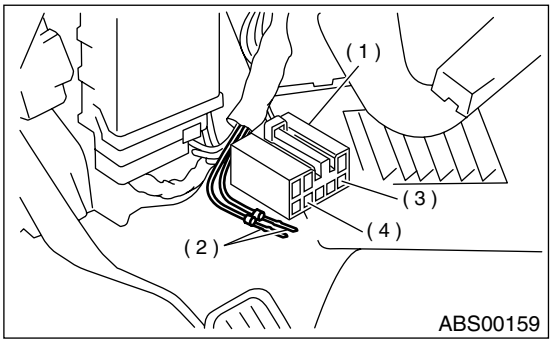
5. VDC Sequence Control

A: OPERATION

1) Under the VDC 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.
2) VDC sequence control can be started by diagnosis connector or select monitor.

1. VDC SEQUENCE CONTROL WITH DIAGNOSIS CONNECTOR

1) Connect diagnosis terminals to terminals No. 5 and No. 8 of the diagnosis connector beside driver's seat heater unit.



(1) Diagnosis connector
(2) Diagnosis terminal
(3) 8 terminal
(4) 5 terminal

2) Set the speed of all wheels at 2.75 km/h (2 MPH) or less.
3) Turn ignition switch OFF.
4) Turn ignition switch ON and start engine immediately, confirming that ABS and VDC warning light goes ON and then OFF. After ABS and VDC warning light goes OFF, within 0.5 seconds depress the brake pedal once, then within 3 second depress the brake pedal twice more and release it.

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 operate.
• If the VDC sequence control does not start, do the procedure over again.

5) After completion of VDC sequence control, turn ignition switch OFF.

2. VDC SEQUENCE CONTROL WITH SELECT MONITOR

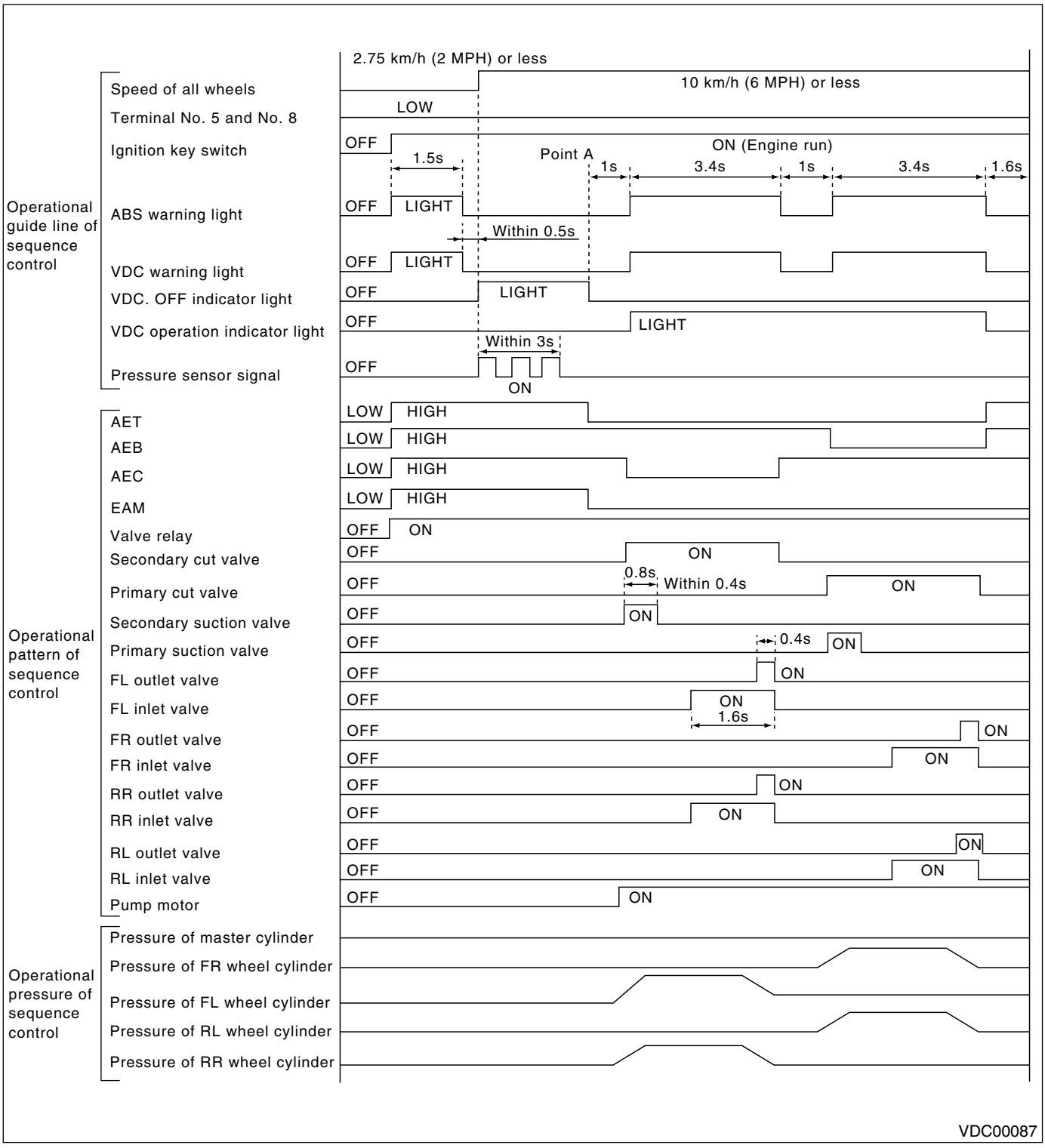
NOTE:
• In the event of any trouble, the sequence control may not be operative. In such a case, activate the sequence control, referring to “VDC SEQUENCE CONTROL WITH DIAGNOSIS CONNECTOR”.
<Ref. to VDC-19, VDC SEQUENCE CONTROL WITH DIAGNOSIS CONNECTOR, OPERATION, VDC Sequence Control.>
• When the diagnosis terminal is connected to the diagnosis connector, the sequence control will not operate.

1) Connect select monitor to data link connector beside driver's seat instrument panel lower cover.
2) Turn ignition switch ON.
3) Turn select monitor switch ON.
4) Put select monitor to “BRAKE CONTROL” mode.
5) Select “VDC Check Mode” in {Function check sequence} menu to start `VDC sequence control'.

CAUTION:
Do not depress the clutch pedal.

6) When the message “Press YES” is displayed, press «YES» key.
7) Operation points will be displayed on select monitor.

3. CONDITIONS FOR VDC SEQUENCE CONTROL



NOTE:
- When select monitor is used, control operation starts at point A. The patterns from IGN key ON to the point A show that operation is started by diagnosis connector.
- HIGH means high voltage.
- LOW means low voltage.

B: SPECIFICATION

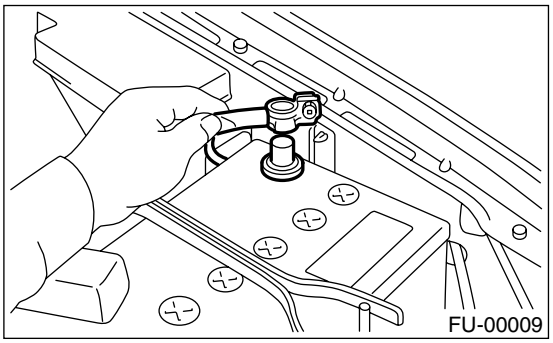
1. CONDITIONS FOR COMPLETION OF VDC SEQUENCE CONTROL

When the following conditions develop, the VDC sequence control stops and VDC operation is returned to the normal control mode.
1) When the speed of at least one wheel reaches 10 km/h (6 MPH).
2) When terminal No. 5 or No. 8 are separated from diagnosis terminals. (When select monitor is not used.)
3) When the brake pedal is depressed during sequence control and the braking lamp switch is set to ON.
4) When brake pedal is depressed after ignition key is turned to ON, and before VDC warning light goes out. (When select monitor is not used.)
5) When brake pedal is not depressed after ignition key is turned to ON, and within 0.5 seconds after VDC warning light goes out. (When select monitor is not used.)
6) After completion of the sequence control.
7) When malfunction is detected. (When select monitor is used.)

6. Yaw Rate and Lateral G Sensor

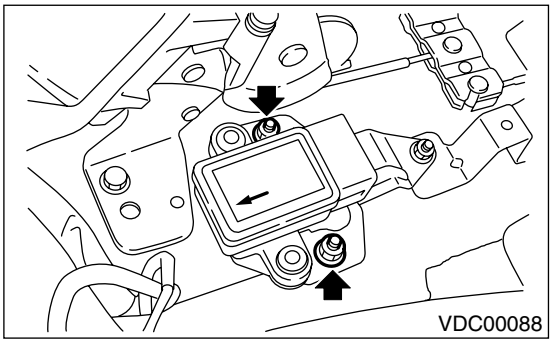
A: REMOVAL

1) Disconnect ground cable from battery.

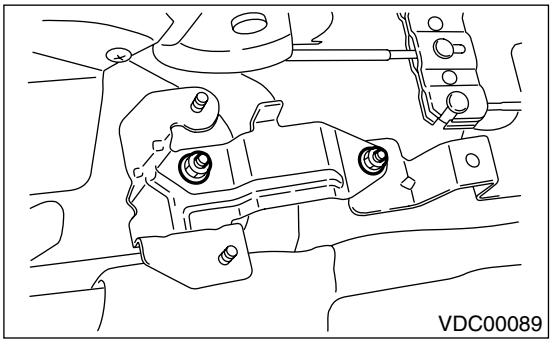


2) Remove console cover.
<Ref. to EI-45, Console Box.>
3) Disconnect connector from yaw rate and lateral G sensor.
4) Remove yaw rate and lateral G sensor.

CAUTION:
Do not drop or bump yaw rate and lateral G sensor.



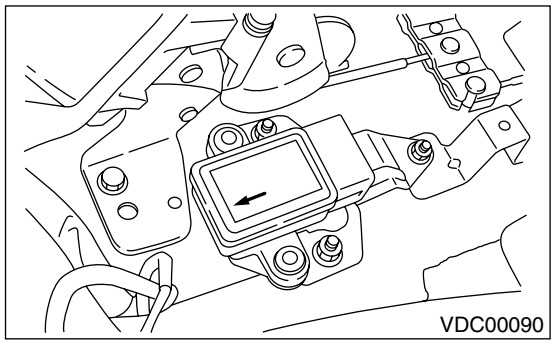
5) Remove bracket from body.



B: INSTALLATION

Install in the reverse order of removal.

NOTE:
Do not install yaw rate and lateral G sensor in the wrong direction. There is an arrow on the sensor showing which side faces the front of the vehicle.



CAUTION:
After completion of installation procedure, the following two position settings must be made.
- **Steering angle sensor center positioning**
- **Yaw rate and lateral G sensor 0 positioning**

These procedures are necessary for VDCCM to later recognize what position the vehicle is in. For procedures for the above two settings, <Ref. to VDC-9, ADJUSTMENT, VDC Control Module (VDCCM).>.

C: INSPECTION

1. LATERAL G SENSOR SIGNAL

	Step	Check	Yes	No
1	**CHECK SUBARU SELECT MONITOR.**	Do you have SUBARU select Monitor?	Go to step **5.**	Go to step **2.**
2	**CHECK YAW RATE AND LATERAL G SENSOR.** 1) Move the vehicle to a flat location. 2) Turn ignition switch to OFF. 3) Connect connector to yaw rate and lateral G sensor. 4) Turn ignition switch to ON. 5) Measure voltage between yaw rate and lateral G sensor connector terminals. ***Connector & terminal*** ***(R100) No. 5 (+) — No. 6 (–)***	Is the measured value within 2.3 — 2.7 V when yaw rate and lateral G sensor is horizontal?	Go to step **3.**	Replace yaw rate and lateral G sensor.
3	**CHECK YAW RATE AND LATERAL G SENSOR.** 1) Remove yaw rate and lateral G sensor from vehicle. 2) Measure voltage between yaw rate and lateral G sensor connector terminals. ***Connector & terminal*** ***(R100) No. 5 (+) — No. 6 (–)*** NOTE: If the yaw rate and lateral G sensor is moved, the VDC (Yaw rate sensor) may be stored into the memory.	Is the measured value within 3.3 — 3.7 V when yaw rate and lateral G sensor is inclined right to 90°?	Go to step **4.**	Replace yaw rate and lateral G sensor.
4	**CHECK YAW RATE AND LATERAL G SENSOR.** Measure voltage between yaw rate and lateral G sensor connector terminals. ***Connector & terminal*** ***(R100) No. 5 (+) — No. 6 (–)*** NOTE: If the yaw rate and lateral G sensor is moved, the VDC (Yaw rate sensor) may be stored into the memory.	Is the measured value within 1.3 — 1.7 V when yaw rate and lateral G sensor is inclined left to 90°?	Go to step **5.**	Replace yaw rate and lateral G sensor.
5	**CHECK YAW RATE AND LATERAL G SENSOR.** 1) Turn ignition switch to OFF. 2) Connect select monitor connector to data link connector. 3) Turn ignition switch to ON. 4) Turn select monitor into {BRAKE CONTROL} mode. 5) Set the display in the {Current Data Display & Save} mode. 6) Read the yaw rate and lateral G sensor output voltage. NOTE: If the yaw rate and lateral G sensor is moved, the VDC (Yaw rate sensor) may be stored into the memory.	Is the indicated reading within 2.3 — 2.7 V when the vehicle is in horizontal position?	Go to step **6.**	Replace yaw rate and lateral G sensor.

	Step	Check	Yes	No
6	**CHECK YAW RATE AND LATERAL G SENSOR.** 1) Remove console box. 2) Remove yaw rate and lateral G sensor from vehicle. (Do not disconnect connector.) 3) Read the select monitor display. NOTE: If the yaw rate and lateral G sensor is moved, the VDC (Yaw rate sensor) may be stored into the memory.	Is the measured value within 3.3 — 3.7 V when yaw rate and lateral G sensor is inclined right to 90°?	Go to step **7.**	Replace yaw rate and lateral G sensor.
7	**CHECK YAW RATE AND LATERAL G SENSOR.** Read the select monitor display. NOTE: If the yaw rate and lateral G sensor is moved, the VDC (Yaw rate sensor) may be stored into the memory.	Is the measured value within 1.3 — 1.7 V when yaw rate and lateral G sensor is inclined left to 90°?	Yaw rate and lateral G sensor is normal.	Replace yaw rate and lateral G sensor.

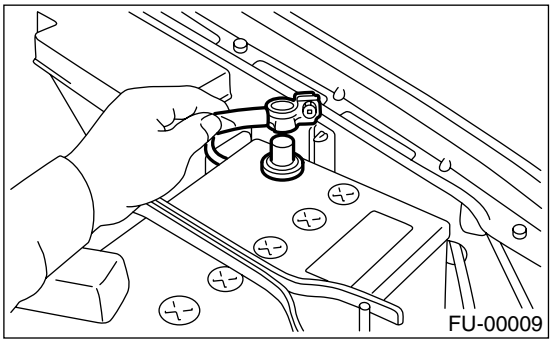
2. YAW RATE SENSOR SIGNAL

	Step	Check	Yes	No
1	**CHECK YAW RATE AND LATERAL G SENSOR USING OSCILLOSCOPE.** 1) Connect all connectors. 2) Set oscilloscope to yaw rate sensor connector terminals. Positive probe; (R100) No. 4 Earth lead; (R100) No. 6 3) Start the engine. 4) Measure signal voltage indicated on oscilloscope. <Ref. to VDC-19, WAVEFORM, MEASUREMENT, Control Module I/O Signal.>	Is the measured value within 2.1 — 2.9 V?	Go to step **2.**	Replace yaw rate and lateral G sensor is normal.
2	**CHECK YAW USING OSCILLOSCOPE.** 1) Turn ignition switch to OFF. 2) Set oscilloscope to yaw rate sensor connector terminals. Positive probe; (R100) No. 2 Earth lead; (R100) No. 6 3) Start the engine. 4) Measure signal voltage indicated on oscilloscope. <Ref. to VDC-19, WAVEFORM, MEASUREMENT, Control Module I/O Signal.>	Is the measured value within 1 — 5 V?	Yaw rate and lateral G sensor is normal.	Replace yaw rate and lateral G sensor.

7. Steering Angle Sensor

A: REMOVAL

1) Disconnect ground cable from battery.

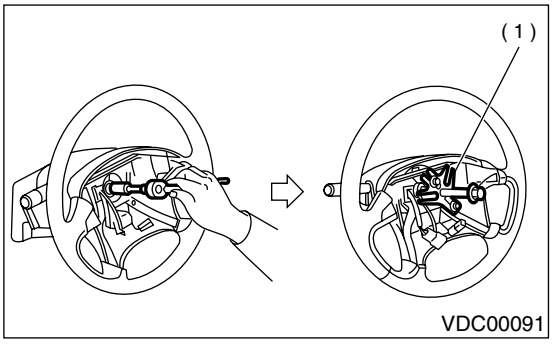


2) Remove airbag module.
<Ref. to AB-13, REMOVAL, Driver's Airbag Module.>

WARNING:
Always refer to "Airbag System" before performing airbag module service (if so equipped).
<Ref. to AB-3, CAUTION, General Description.>

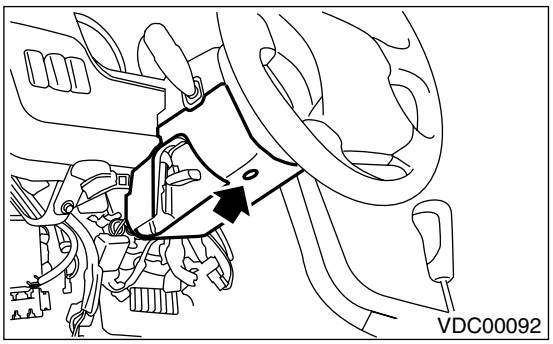
3) Remove steering wheel nut, then draw out steering wheel from shaft using steering puller.

NOTE:
Steering wheel must be removed at the straight ahead position.

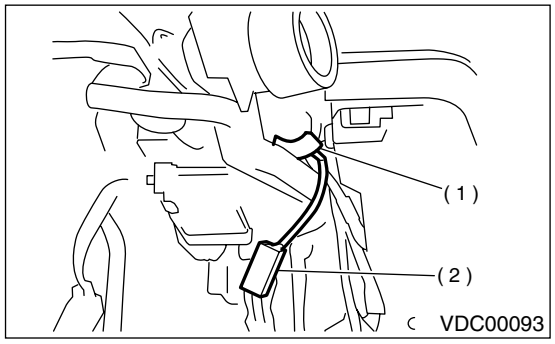


(1) Steering puller

4) Remove the screw securing lower steering column cover.

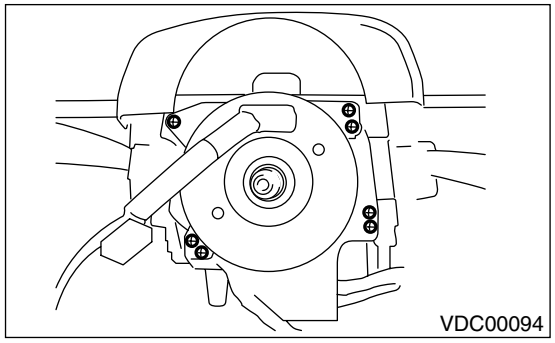


5) Remove two screws securing upper steering column cover.
6) Release the lock of harness band and disconnect connector of steering angle sensor.

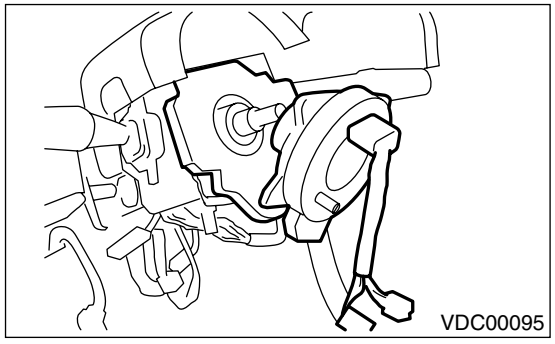


(1) Harness band
(2) Connector

7) Remove bolts which hold roll connector and steering angle sensor onto steering column.



8) Remove roll connector and steering angle sensor.

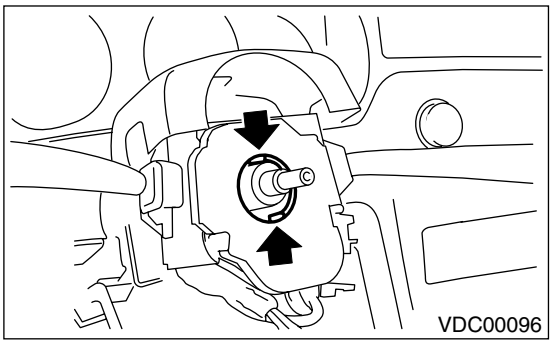


NOTE:
Do not turn steering angle sensor as it's center position has been recognized by VDCCM.

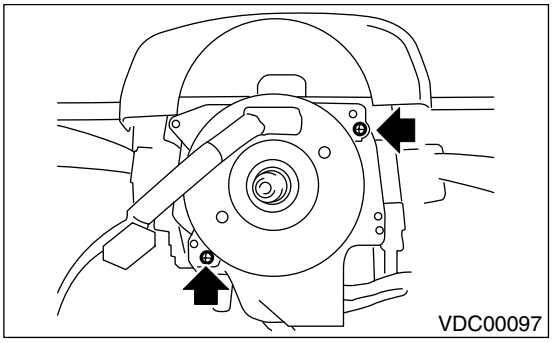
B: INSTALLATION

CAUTION:
Ensure that front wheels are set in straight forward direction.

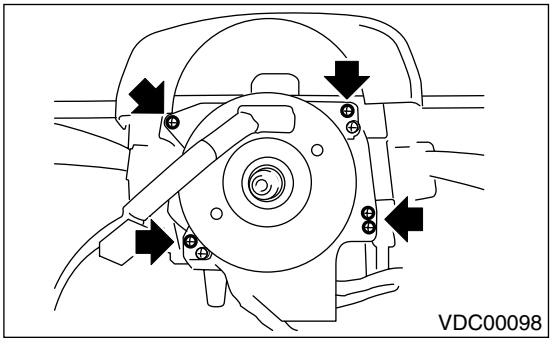
1) Place steering angle sensor on steering column, confirming that the sensor is positioned as in the figure.



2) Conduct centering of roll connector.
<Ref. to AB-20, INSTALLATION, Roll Connector.>
3) Place roll connector over steering angle sensor and tighten bolts which secure roll connector and steering angle sensor.



4) Tighten bolts which install roll connector and steering angle sensor onto steering column.



5) Set steering wheel to neutral and install it onto steering shaft.

Tightening torque:
44 N·m (4.5 kgf-m, 32.5 ft-lb)

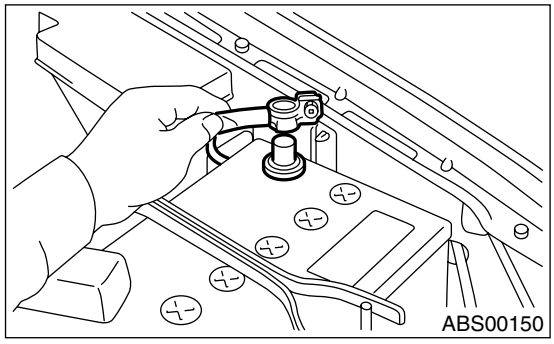
Column cover-to-steering wheel clearance:
2 — 4 mm (0.08 — 0.16 in)

CAUTION:
Insert roll connector guide pin into guide hole on lower end of surface of steering wheel to prevent damage. Draw out airbag system connector, horn connector and cruise control connectors from guide hole of steering wheel lower end.

6) Install airbag module to steering wheel.
<Ref. to AB-13, INSTALLATION, Driver's Airbag Module.>

WARNING:
Always refer to "Airbag System" before performing the service operation.
<Ref. to AB-3, CAUTION, General Description.>

7) Connect battery ground cable.



CAUTION:
After completion of installation procedure, the following two position settings must be made.
- **Steering angle sensor center positioning**
- **Yaw rate and lateral G sensor 0 positioning**

These procedures are necessary for VDCCM to later recognize what position the vehicle is in. For procedures for the above two settings, <Ref. to VDC-9, ADJUSTMENT, VDC Control Module (VDCCM).>.

C: INSPECTION

Refer to "VDC section" for inspection procedures of steering angle sensor.
<Ref. to VDC-106, DTC 71 ABNORMAL STEERING ANGLE SENSOR, Diagnostics Chart with Diagnosis Connector.>

8. Front ABS Sensor

A: NOTE

The ABS sensor installed on VDC equipped vehicles is the same as the one on ABS equipped vehicles; therefore, for removal, inspection and installation, refer to “ABS” section.
<Ref. to ABS-12, Front ABS Sensor.>

9. Rear ABS Sensor

A: NOTE

The ABS sensor installed on VDC equipped vehicles is the same as the one on ABS equipped vehicles; therefore, for removal, inspection and installation, refer to “ABS” section.
<Ref. to ABS-15, Rear ABS Sensor.>

10.Front Tone Wheel

A: NOTE

As front tone wheel is integrated with front drive shaft, refer to “DS section” for removal, installation, and inspection procedures.
<Ref. to DS-29, Front Drive Shaft.>

11.Rear Tone Wheel

A: NOTE

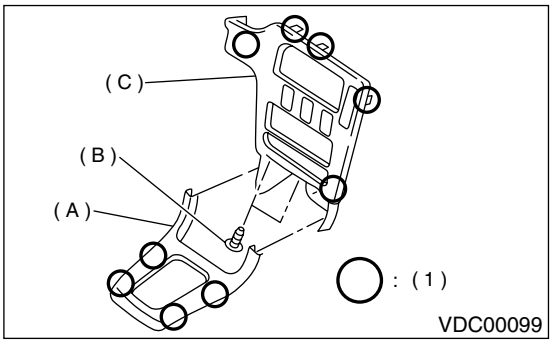
As rear tone wheel is integrated with rear drive shaft, refer to “DS section” for removal, installation, and inspection procedures.
<Ref. to DS-37, Rear Drive Shaft.>

12.VDC Off Switch

A: REMOVAL

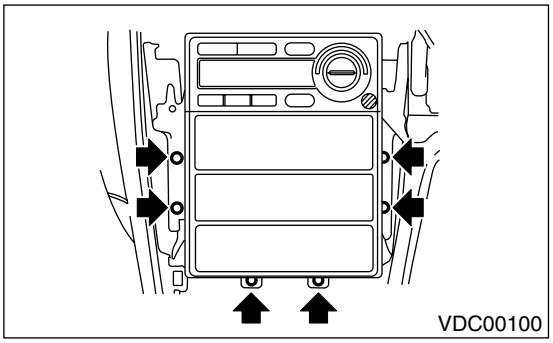
1. LHD MODEL

1) Remove screws and clip from instrument panel lower cover.
2) Remove front cover (A) while disconnecting connector.
3) Remove two screws (B) and then remove center panel (C) while disconnecting harness connector.

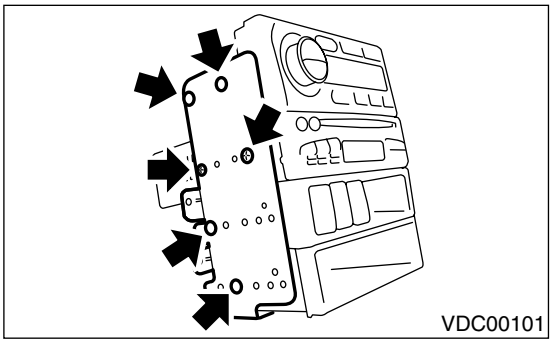


(1) Hook pawl

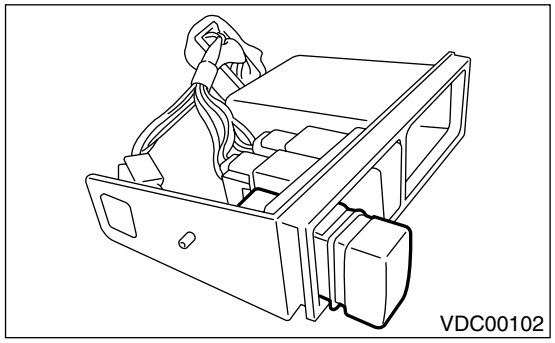
4) Remove fitting screws, and slightly pull radio and switch assembly out from center console.



5) Disconnect harness connectors and antenna feeder cord and then disconnect heater control unit.
6) Remove screw and detach the bracket and then remove switch panel.



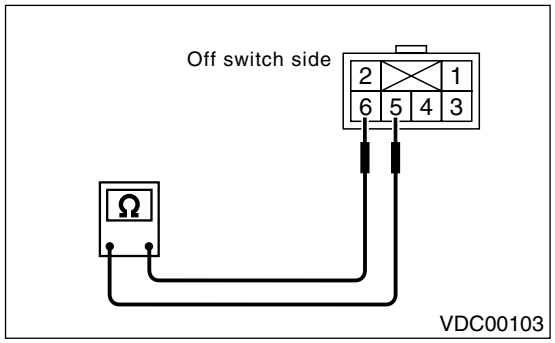
7) Remove VDC off switch by pushing it outward.



B: INSTALLATION

Install is in the reverse order of removal.

C: INSPECTION



Check continuity between VDC off switch terminals.

Switch position	Tester connection	Specified condition
OFF	6 — 5	More than 1 MΩ
ON	6 — 5	Less than 1 Ω

If NG, replace VDC off switch.