ABS

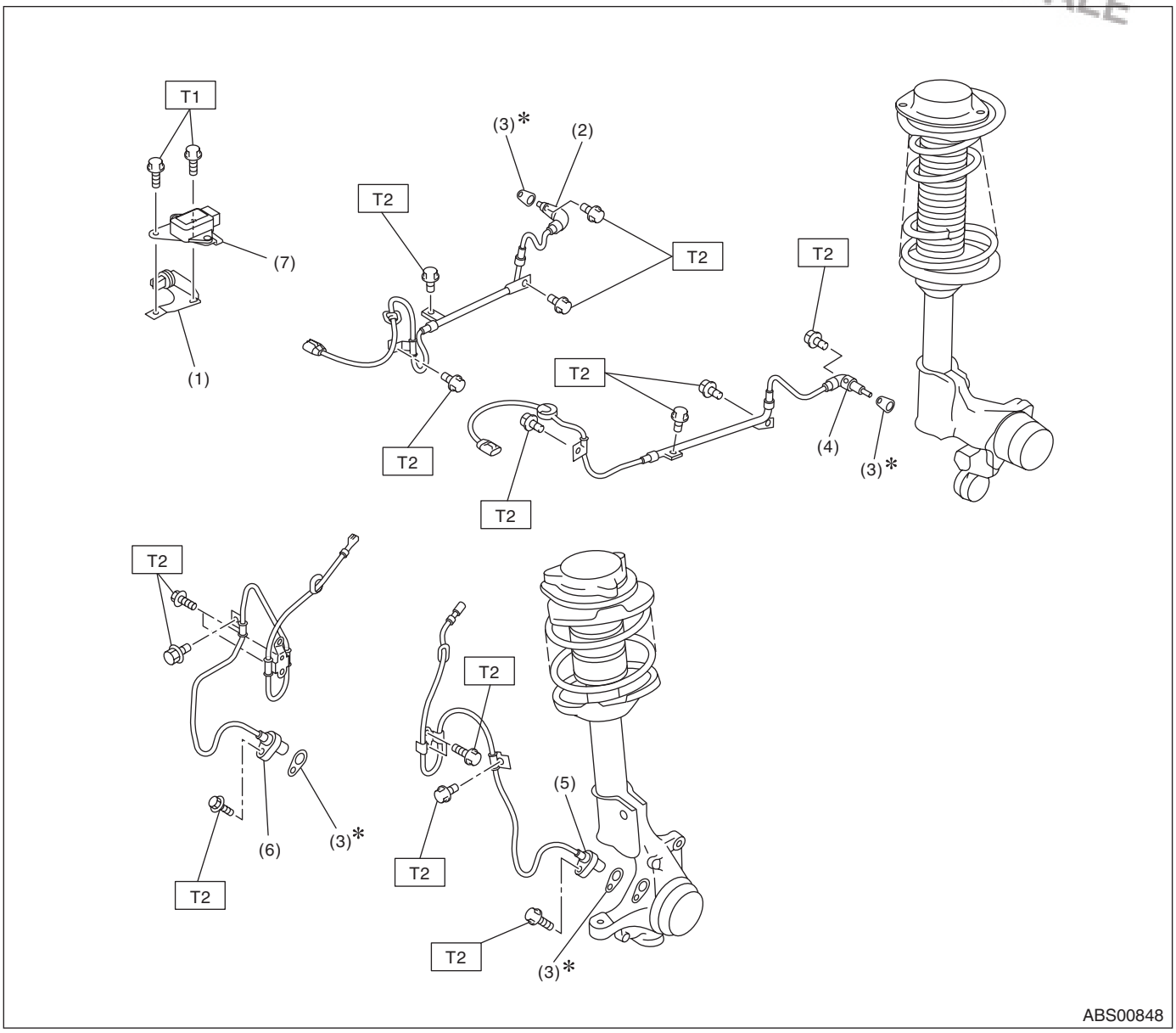
1. General Description

A: SPECIFICATION

Item				Specification or identification
ABS wheel speed sensor	ABS wheel speed sensor gap		Front	0.3 — 0.8 mm (0.012 — 0.031 in)
			Rear	0.7 — 1.2 mm (0.028 — 0.047 in)
	ABS wheel speed sensor resistance		Front	1.25±0.25 kΩ
			Rear	1.15±0.115 kΩ
	Harness identification (marking)	Front	RH	Yellow green
			LH	Pink
		Rear	RH	Light blue
			LH	Brown
G sensor	G sensor voltage			2.3±0.2 V
Lateral G sensor (STI)	Lateral G sensor voltage			2.5±0.2 V
ABSCM & H/U identification	AT			PK
	MT (Except for STI model)			PL
	MT (STI model)			MJ

B: COMPONENT

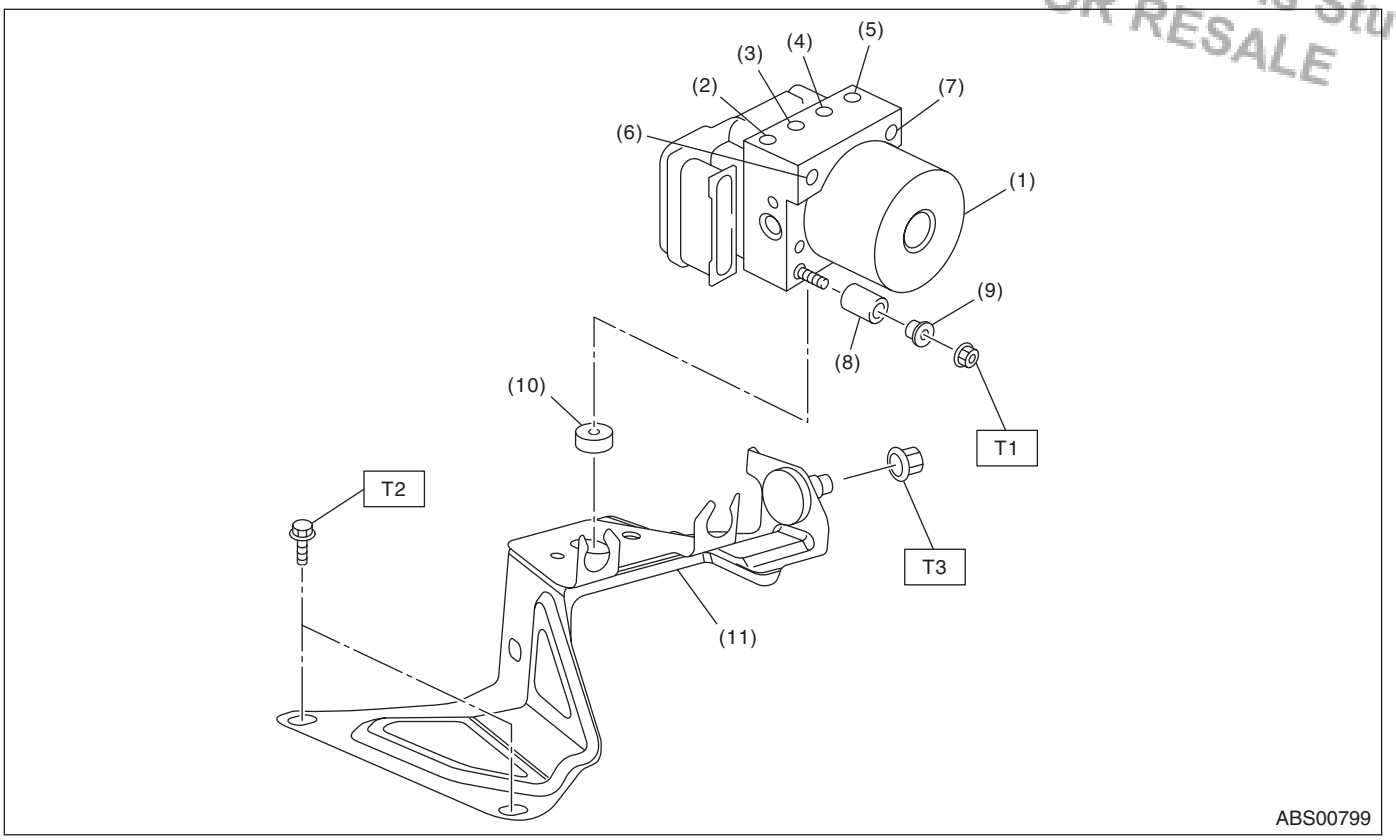
1. SENSOR



(1) G sensor
(2) Rear ABS wheel speed sensor RH
(3) Adjusting spacer
(4) Rear ABS wheel speed sensor LH
(5) Front ABS wheel speed sensor LH
(6) Front ABS wheel speed sensor RH
(7) Yaw rate & lateral G sensor (STI model)

Tightening torque:N·m (kgf-m, ft-lb)
T1: 18 (1.8, 13.0)
T2: 33 (3.3, 24)

2. ABS CONTROL MODULE AND HYDRAULIC CONTROL UNIT (ABSCM&H/U)



(1)	ABS control module and hydraulic control unit (ABSCM&H/U)	(6)	Primary inlet
		(7)	Secondary inlet
(2)	Front outlet RH	(8)	Damper
(3)	Rear outlet LH	(9)	Spacer
(4)	Rear outlet RH	(10)	Damper
(5)	Front outlet LH	(11)	Bracket

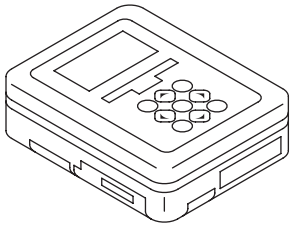
Tightening torque:N·m (kgf-m, ft-lb)
T1: 7.5 (0.76, 5.5)
T2: 33 (3.3, 24)
T3: 38 (3.8, 27.5)

C: CAUTION

- Wear appropriate work clothing, including a cap, protective goggles and protective shoes when performing any work.
- Before disconnecting connectors of sensors or units, be sure to disconnect the ground cable from the battery.
- Before removal, installation or disassembly, be sure to clarify the failure. Avoid unnecessary removal, installation, disassembly and replacement.
- Vehicle components are extremely hot after driving. Be wary of receiving burns from heated parts.
- Be sure to tighten fasteners including bolts and nuts to the specified torque.
- Place shop jacks or rigid racks at the specified points.

D: PREPARATION TOOL

1. SPECIAL TOOL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST1B020XU0	1B020XU0	SUBARU SELECT MONITOR KIT	Troubleshooting for electrical system

2. GENERAL TOOL

TOOL NAME	REMARKS
Circuit tester	Used for measuring resistance, voltage and current.
Pressure gauge	Used for measuring oil pressure.
Oscilloscope	Used for measuring the sensor.
TORX® bit E5	Used for removing the ABSCM.

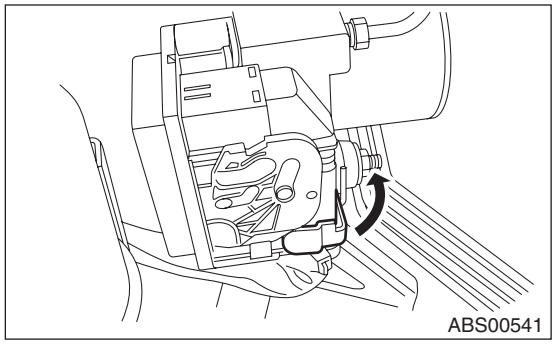
2. ABS Control Module and Hydraulic Control Unit (ABSCM&H/U)

A: REMOVAL

1) Disconnect the ground cable from the battery.
2) Remove the air intake duct and air cleaner case from the engine room to make it easier to remove the ABSCM&H/U. <Ref. to IN(H4SO)-5, REMOVAL, Air Cleaner Case.> <Ref. to IN(H4SO)-7, REMOVAL, Air Intake Duct.> <Ref. to IN(H4DOTC)-10, REMOVAL, Air Cleaner Case.> <Ref. to IN(H4DOTC)-11, REMOVAL, Air Intake Duct.>
3) Use compressed air to blow off any water around the ABSCM&H/U.

NOTE:
A contact fault may occur if the terminal is wet.
4) Lift the lock lever and disconnect the ABSCM&H/U connector.

CAUTION:
Do not pull on the harness when disconnecting the connector.

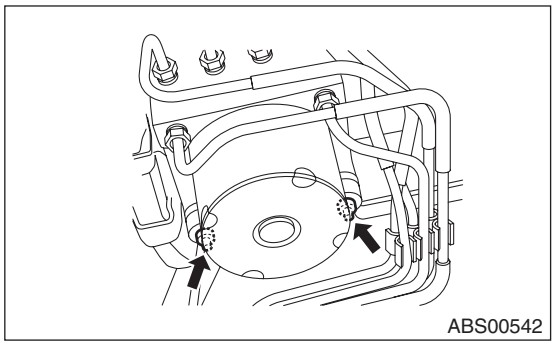

ABS00541

5) Remove the harness clip.
6) Disconnect the brake pipes from the ABSCM&H/U.
7) Wrap the brake pipe with a vinyl bag so as not to spill the brake fluid on the vehicle body.

CAUTION:
If brake fluid is spilled on the vehicle body, wash it off immediately with water and wipe clean.

8) Remove the nuts and remove the ABSCM&H/U.

CAUTION:
- **Do not drop or bump the ABSCM&H/U.**
- **Do not turn the ABSCM&H/U upside down or place it sideways for storage.**
- **Be careful not to let foreign matter enter into ABSCM&H/U.**
- **Be careful that no water enters the connectors.**


ABS00542

9) Remove the ABSCM&H/U bracket.

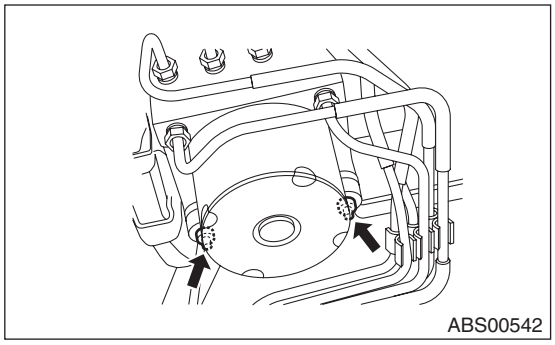
B: INSTALLATION

1) Install the ABSCM&H/U bracket.

Tightening torque:
33 N·m (3.4 kgf-m, 24 ft-lb)
2) Align the damper groove of the ABSCM&H/U to the bracket side claw, and install the ABSCM&H/U with new nuts (023506000).

NOTE:
Check the identification marks of the ABSCM&H/U.

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


ABS00542

3) Connect the brake pipes to their correct positions on the ABSCM&H/U.

Tightening torque:
15 N·m (1.5 kgf-m, 10.8 ft-lb)
4) Using cable clip, secure the ABSCM&H/U harness to the bracket.

5) Connect the connector to the ABSCM&H/U.

NOTE:
• Be sure to remove all foreign matter from inside the connector before connecting.
• Make sure the ABSCU&H/U connector is securely locked.

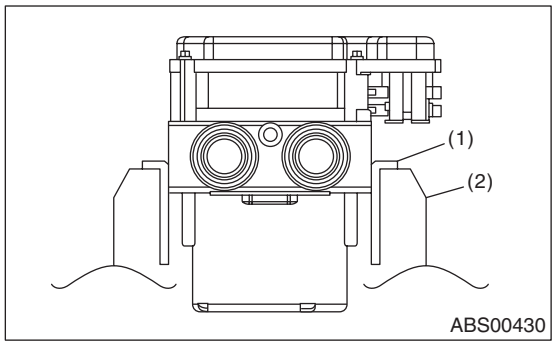
6) Connect the grounding wire of the ABSCM&H/U and apply rust-prevention wax.
7) Install the air cleaner case and air intake duct. <Ref. to IN(H4SO)-5, INSTALLATION, Air Cleaner Case.> <Ref. to IN(H4SO)-7, INSTALLATION, Air Intake Duct.> <Ref. to IN(H4DOTC)-10, INSTALLATION, Air Cleaner Case.> <Ref. to IN(H4DOTC)-11, INSTALLATION, Air Intake Duct.>
8) Bleed air from the brake system.

C: REPLACEMENT

CAUTION:
• Because the seal of the ABSCM cannot be replaced, do not pull or peel it by lifting it up.
• Because the screw of the H/U will become slightly worn in every replacement procedure, 5 times is the maximum number of times for replacement. If a problem is found such as not being able to torque the screw to specifications even before 5 replacement operations are performed, replace the H/U body.
• When installing the ABSCM, always use new screws.
• When the sealing surface of the ABSCM or H/U is dirty or damaged and it cannot be removed or repaired, replace with a new part.

1) Remove the ABSCM&H/U bracket. <Ref. to ABS-6, REMOVAL, ABS Control Module and Hydraulic Control Unit (ABSCM&H/U).>
2) To prevent entry of foreign objects and brake fluid leakage, plug the oil pressure port of the ABSCM&H/U using a screw plug, etc.
3) Set the pump motor section of the removed ABSCM&H/U face down on a vise.

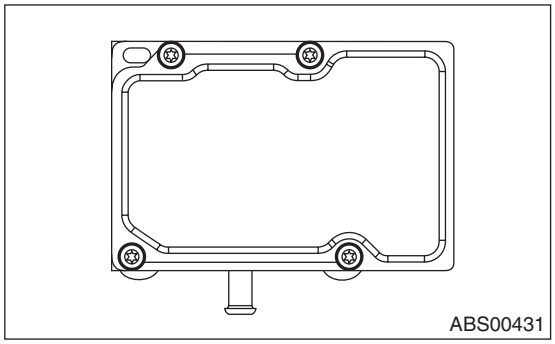
NOTE:
Before securing a part in a vise, place cushioning material such as wood blocks, aluminum plate or cloth between the part and the vise.



(1) Aluminum plate, etc.
(2) Vise

4) Using TORX® bit E5, remove the four screws of ABSCM.

NOTE:
These screws cannot be reused.



5) Slowly pull out the ABSCM upward from the H/U.

NOTE:
To prevent damaging of coil section, remove the ABSCM straight up from H/U without twisting.

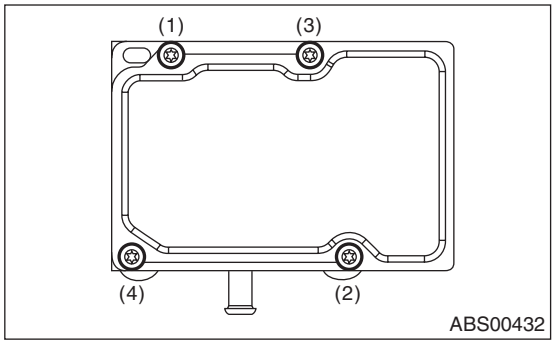
6) Make sure there is no dirt or damage on the sealing surface of the H/U.

CAUTION:
• Do not clean the ABSCM & H/U by applying compressed air.
• Even if damage is found on the H/U seal, do not attempt repair by filing or with a metal scraper. To remove the seal residue, always use a plastic scraper. Do not use chemical such as paint thinner, etc., to clean.

7) Position the coil of the new ABSCM to align with the H/U valve.
8) To prevent deformation of the ABSCM housing cover, hold the corner of ABSCM and install it to the H/U without tilting.
9) Using a TORX® bit E5, attach/tighten new screws in the order of (1) through (4).

CAUTION:
Always use new screws.

Tightening torque:
1.5 N·m (0.15 kgf-m, 1.1 ft-lb)



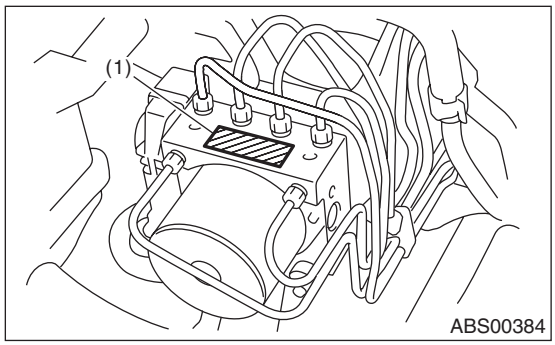
10) Check that there is no foreign matter in mating surface between the ABSCM & H/U.
11) Using a TORX® bit E5, tighten the screws in the order of (1) through (4) again.

Tightening torque:
3 N·m (0.3 kgf-m, 2.2 ft-lb)
12) Check that there is no gap in the mating surface between ABSCM & H/U.
13) Install the ABSCM&H/U to the vehicle. <Ref. to ABS-6, INSTALLATION, ABS Control Module and Hydraulic Control Unit (ABSCM&H/U).>

D: INSPECTION

1) Check the condition of connection and settlement of connector.
2) Check the mark used for ABSCM&H/U identification.

Identification mark	Model
PK	AT
PL	MT (except for STI)
MJ	STI



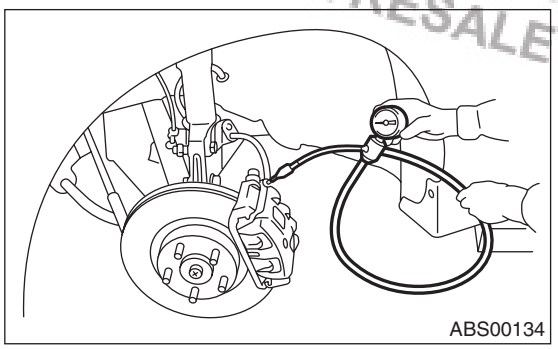
(1) Identification mark

1. CHECKING THE HYDRAULIC UNIT ABS OPERATION BY PRESSURE GAUGE

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

CAUTION:
• Use a pressure gauge used exclusively for brake fluid measurement.
• Do not use a pressure gauge used previously for measurement of transmission oil pressure, as the piston seal may expand and deform.

NOTE:
Wrap sealing tape around the pressure gauge.



4) Bleed air from the pressure gauge.
5) Perform ABS sequence control. <Ref. to ABS-10, ABS Sequence Control.>
6) When the hydraulic unit begins to work, first the FL side performs decompression, hold and compression, and then the FR side performs decompression, hold 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 whether any irregular tightness of the brake pedal can be felt.

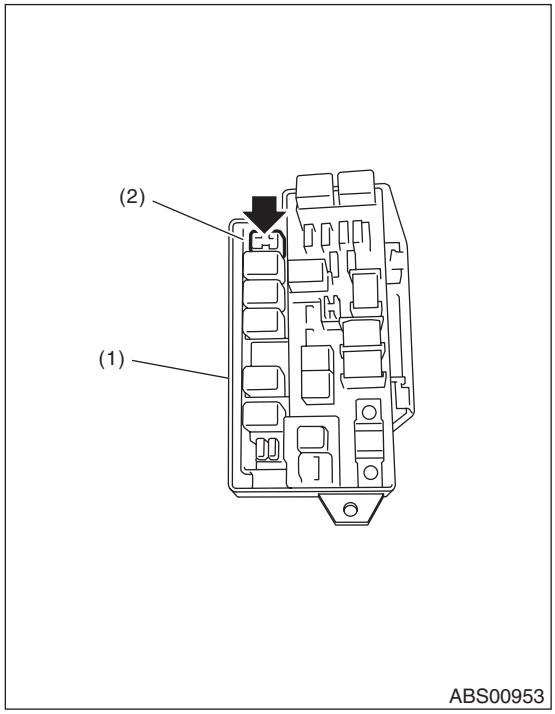
	Front wheel	Rear wheel
Initial value	3,500 kPa (35 kgf/cm^2, 498 psi)	3,500 kPa (35 kgf/cm^2, 498 psi)
When depressurized	500 kPa (5 kgf/cm^2, 71 psi) or less	500 kPa (5 kgf/cm^2, 71 psi) or less
When pressurized	3,500 kPa (35 kgf/cm^2, 498 psi) or more	3,500 kPa (35 kgf/cm^2, 498 psi) or more

8) Disconnect the pressure gauges from FL and FR caliper bodies.
9) Remove the air bleeder screws from RL and RR caliper bodies.
10) Install the air bleeder screws of FL and FR caliper bodies.
11) Connect two pressure gauges to RL and RR caliper bodies.
12) Bleed air from the FL and FR caliper bodies.
13) Bleed air from the pressure gauge.
14) Perform ABS sequence control. <Ref. to ABS-10, ABS Sequence Control.>
15) When the hydraulic unit begins to work, first the RR side performs decompression, hold and compression, and then the RL side performs decompression, hold and compression.
16) Read the values indicated on the pressure gauges and check if it is within specification.
17) After checking, remove the pressure gauges from the caliper bodies.

18) Install the air bleeder screws of RL and RR caliper bodies.
19) Bleed air from the brake system.

2. CHECKING THE HYDRAULIC UNIT ABS OPERATION WITH THE BRAKE TESTER

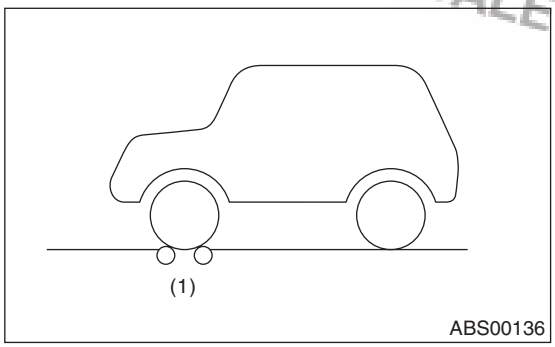
1) In the case of non-turbo AT models, install a spare fuse to the FWD connector in the main fuse box to simulate a FWD vehicle for the inspection.

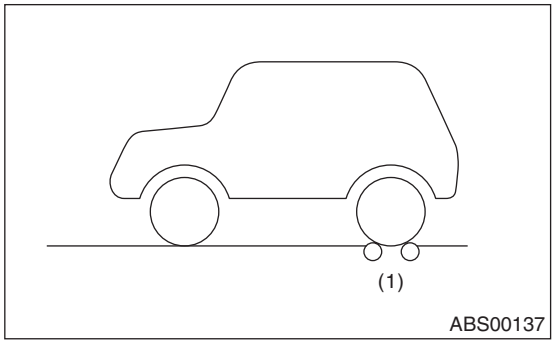


(1) Main fuse box
(2) FWD connector

NOTE:
For MT and turbo AT models, the AWD circuit cannot be cut off.
2) Prepare for the ABS sequence control operation. <Ref. to ABS-10, ABS Sequence Control.>

3) Set the front wheels or rear wheels on the brake tester and set the select lever position to the "N" range.





(1) Brake tester

4) Operate the brake tester.
5) Perform ABS sequence control. <Ref. to ABS-10, ABS Sequence Control.>
6) When the hydraulic unit begins to work, check the following work sequence.
(1) The FL side performs decompression, hold, and compression operations in sequence, and subsequently the FR side repeats the same cycle.
(2) The RR side performs decompression, hold, and compression operations in sequence, and subsequently the RL side repeats the same cycle.
7) Read values indicated on the brake tester and check if the fluctuation of the values between decompression and compression meets the standard values.

	Front wheel	Rear wheel
Initial value	1,000 N (100 kgf, 221 lbf)	1,000 N (100 kgf, 221 lbf)
When depressurized	500 N (50 kgf, 110 lbf) or less	500 N (50 kgf, 110 lbf) or less
When pressurized	1,000 N (100 kgf, 221 lbf) or more	1,000 N (100 kgf, 221 lbf) or more

8) After checking, press the brake pedal and check whether any irregular tightness of the brake pedal can be felt.

3. ABS Sequence Control

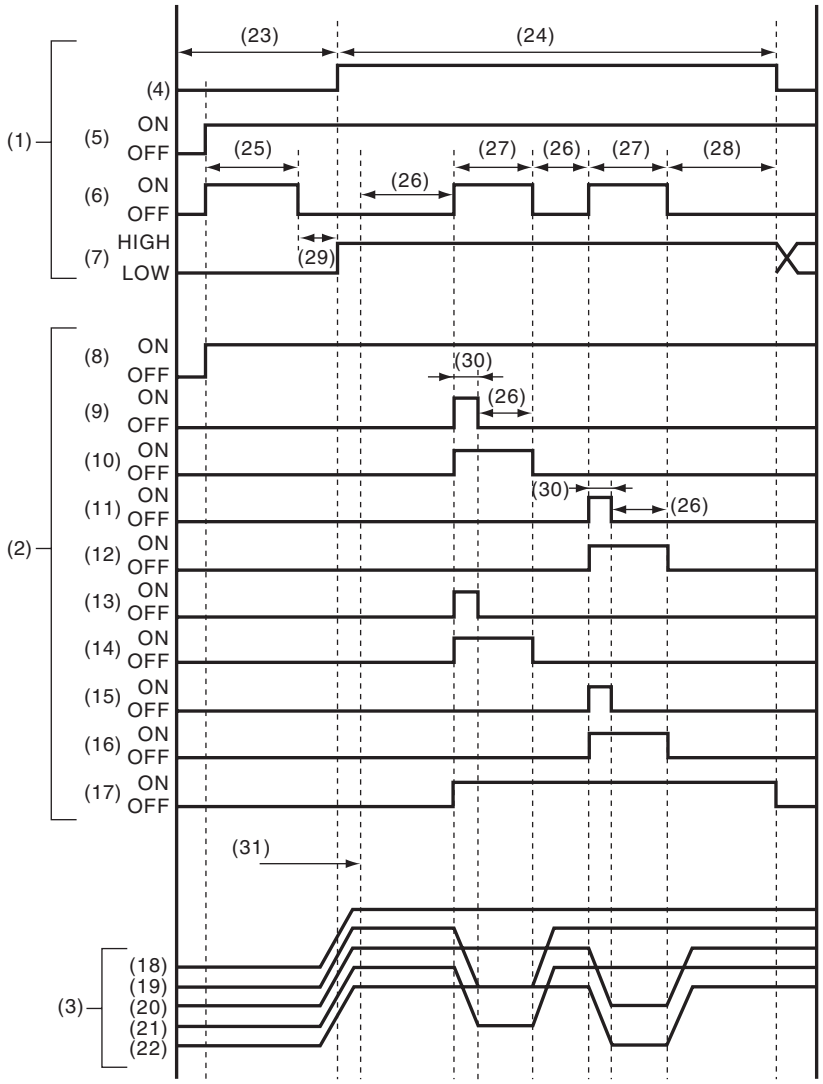
A: OPERATION

1) While the ABS sequence control is being performed, the operation of the hydraulic unit can be checked using the brake tester or pressure gauge after the hydraulic unit solenoid valve operation.
2) ABS sequence control can be started by the Subaru Select Monitor.

1. ABS SEQUENCE CONTROL WITH SUBARU SELECT MONITOR

NOTE:
In the event of any trouble, sequence control will not operate. In this case, diagnose the failure. <Ref. to ABS(diag)-2, PROCEDURE, Basic Diagnostic Procedure.>
1) Connect the Subaru Select Monitor to data link connector under the driver's side instrument panel lower cover.
2) Turn the ignition switch to ON.
3) Run the Subaru Select Monitor.
4) Set the Subaru Select Monitor to {Brake Control} mode.
5) When the {Function check sequence} is selected, the ABS sequence control will start.
6) Execute the following operations when the message {Press the brake pedal so that the brake pedal force is between 100 and 150 kgf} is displayed.
   (1) When using a brake tester, press the brake pedal pad with a force of 981 N (100 kgf, 221 lbf).
   (2) When using a pressure gauge, press the brake pedal so that the pressure gauge indicates 3,432 kPa (35 kgf/cm^2, 498 psi).
7) {Press the "YES" key} will be displayed. Press the [YES] key.
8) The brake system being operated is displayed on the Subaru Select Monitor.

2. CONDITIONS FOR ABS SEQUENCE CONTROL



(1)	Operation guide line of the sequence control	(10)	FL compression valve	(21)	RR wheel cylinder pressure
		(11)	FR decompression valve	(22)	RL wheel cylinder pressure
(2)	Operation pattern of sequence control	(12)	FR compression valve	(23)	4 km/h (2 MPH) or less
(3)	Operating pressure of sequence control.	(13)	RR decompression valve	(24)	10 km/h (6 MPH) or less
		(14)	RR compression valve	(25)	Approx. 2.0 seconds
(4)	All wheel speed	(15)	RL decompression valve	(26)	1.0 second
(5)	Ignition key	(16)	RL compression valve	(27)	1.4 seconds
(6)	ABS warning light	(17)	Pump motor	(28)	0.6 seconds
(7)	Stop light switch	(18)	Master cylinder pressure	(29)	Within 0.5 seconds
(8)	Valve relay	(19)	FL wheel cylinder pressure	(30)	0.4 seconds
(9)	FL decompression valve	(20)	FR wheel cylinder pressure	(31)	Point A

NOTE:
- When using the Subaru Select Monitor, the control operation starts from point A. (However it is necessary to turn the stop light switch to ON before point A.)
- HIGH indicates high voltage.
- LOW indicates low voltage.

B: SPECIFICATION

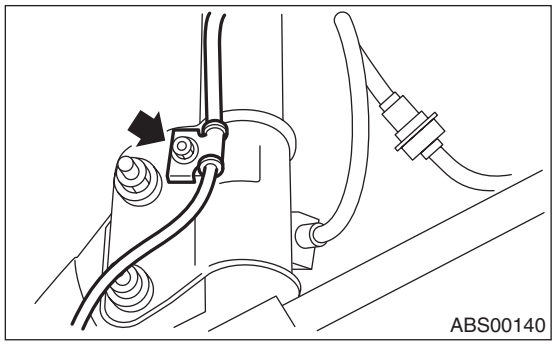
1. CONDITIONS FOR COMPLETION OF ABS SEQUENCE CONTROL

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 the brake pedal is released during sequence control and the stop light switch is OFF.
3) After completion of the sequence control.
4) When a malfunction is detected.

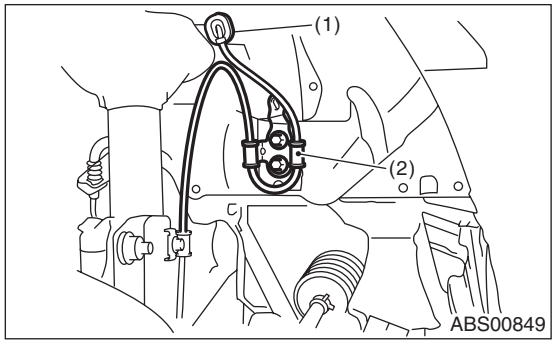
4. Front ABS Wheel Speed Sensor

A: REMOVAL

1) Disconnect the ground cable from the battery.
2) Disconnect the ABS wheel speed sensor connector located next to the front strut mounting house in the engine compartment. Pull out the connector to the tire side from grommet hole.
3) Remove the bolts which secure the sensor harness to the strut.



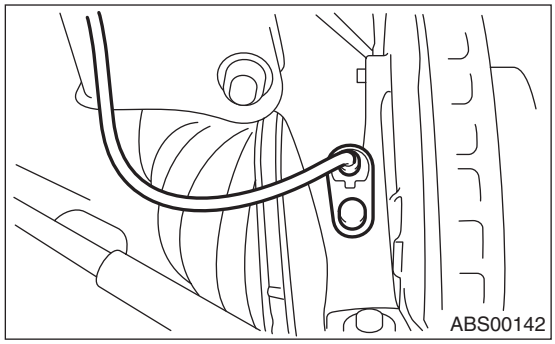
4) Remove the bolts which secure the sensor harness to the body.



(1) To the front ABS wheel speed sensor connector
(2) Bracket

5) Remove the bolts which secure front ABS wheel speed sensor to the housing, and remove the front ABS wheel speed sensor.

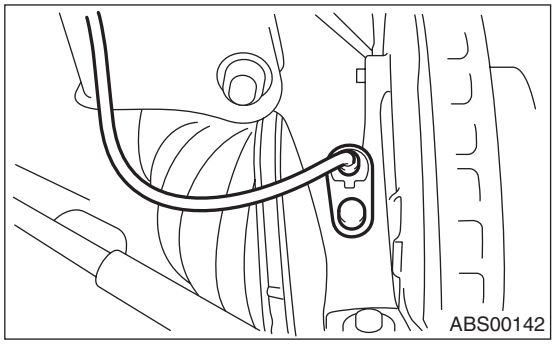
CAUTION:
• Be careful not to damage the pole piece and the face of the teeth located at the end of the sensor during removal.
• Do not pull sensor harness during removal.



B: INSTALLATION

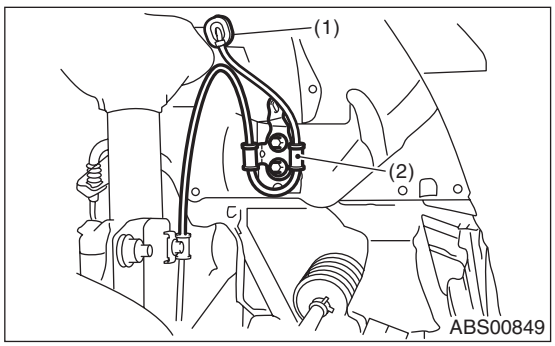
1) Temporarily attach the front ABS wheel speed sensor on the housing.

CAUTION:
Be careful not to hit the ABS wheel speed sensor pole piece and tone wheel against adjacent metal parts during installation.



2) Install the front ABS wheel speed sensor on the strut and the wheel apron.

Tightening torque:
33 N·m (3.3 kgf-m, 24 ft-lb)

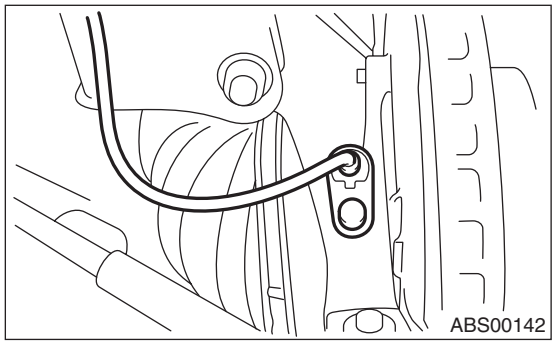


(1) To the front ABS wheel speed sensor connector
(2) Bracket

3) Check the clearance of the sensor. <Ref. to ABS-14, SENSOR GAP, INSPECTION, Front ABS Wheel Speed Sensor.>
If clearance is out of the standard value, readjust by using spacer (Part No. 26755AA000).

ABS wheel speed sensor gap standard value:
0.3 — 0.8 mm (0.012 — 0.031 in)

Tightening torque:
33 N·m (3.3 kgf-m, 24 ft-lb)

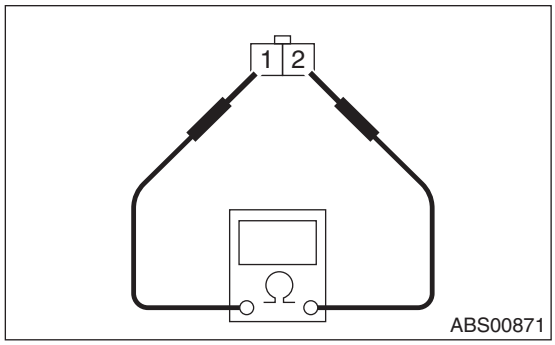


NOTE:
• Check the identification (mark) on the harness to make sure there is no warpage. (RH: Yellow green, LH: Pink)
• Check if the harness is not pulled and does not come in contact with the suspension or body during steering wheel effort.
4) After confirmation of the ABS wheel speed sensor clearance, connect the connector to the ABS wheel speed sensor.
5) Connect the ground cable to the battery.

C: INSPECTION

1. ABS WHEEL SPEED SENSOR

1) Check the pole piece of the ABS wheel speed sensor for foreign particles or damage. If necessary, clean the pole piece or replace the ABS wheel speed sensor.
2) Measure the ABS wheel speed sensor resistance.
If resistance is out of the standard value, replace with a new ABS wheel speed sensor.

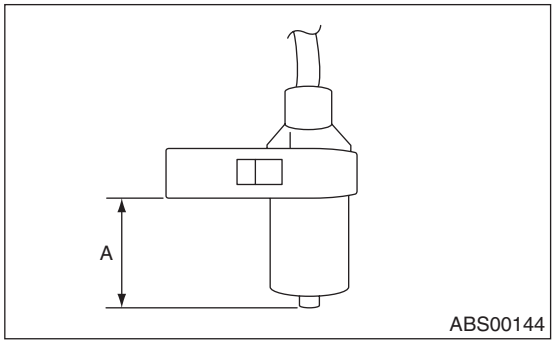


Terminal No.	Standard
1 and 2	1.25±0.25 kΩ

NOTE:
Check the ABS wheel speed sensor cable for discontinuity. If necessary, replace with a new part.

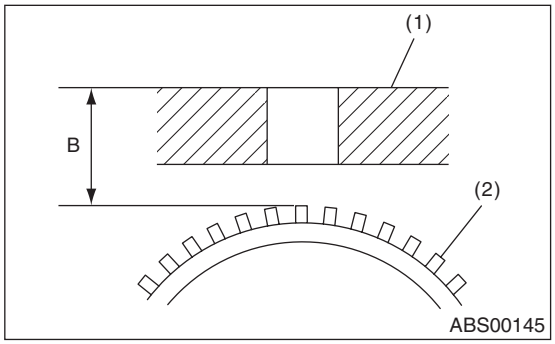
2. SENSOR GAP

1) Measure the distance “A” between the ABS wheel speed sensor surface and sensor pole face.



2) Measure the distance “B” between the surface where the front axle housing meets the ABS wheel speed sensor, and the tone wheel.

NOTE:
Measure so that the gauge touches the apex of the tone wheel teeth.



(1) Axle housing
(2) Tone wheel

3) Find the gap between the ABS wheel speed sensor pole face and the surface of the tone wheel teeth by entering and calculating the measured values in the formula below.
ABS wheel speed sensor gap = B – A

ABS wheel speed sensor gap standard value:
0.3 — 0.8 mm (0.012 — 0.031 in)

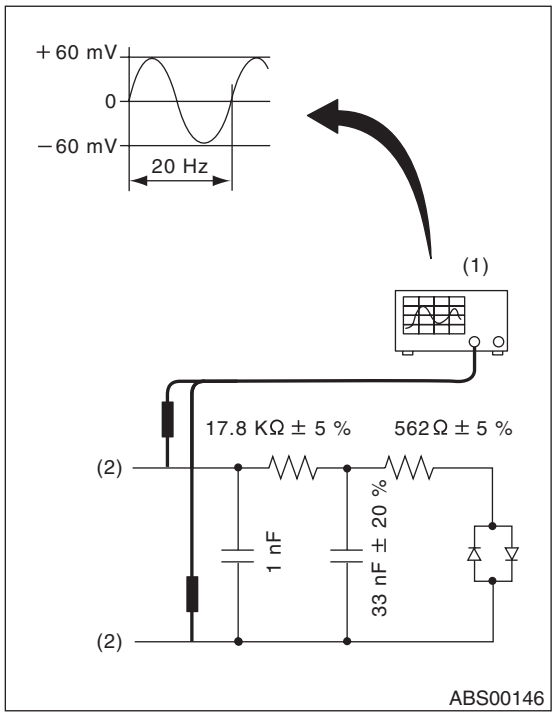
NOTE:
If clearance is out of the standard value, readjust by using spacer (Part No. 26755AA000).

3. OUTPUT VOLTAGE

Output voltage can be checked by the following method. Install a resistor and condenser, then rotate the wheel about 2.75 km/h (2 MPH) or equivalent.

Standard value of output voltage:
0.12 — 1 V (at 20 Hz)

NOTE:
Regarding terminal numbers, please refer to item 1. ABS WHEEL SPEED SENSOR. <Ref. to ABS-14, ABS WHEEL SPEED SENSOR, INSPECTION, Front ABS Wheel Speed Sensor.>



(1) Oscilloscope
(2) Terminals

D: ADJUSTMENT

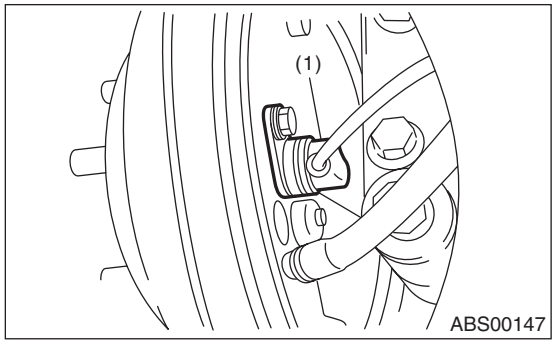
Adjust the gap using spacer (Part No. 26755AA000).

5. Rear ABS Wheel Speed Sensor

A: REMOVAL

1) Disconnect the ground cable from the battery.
2) Lift up the vehicle.
3) Remove the rear seat and disconnect the rear ABS wheel speed sensor connector. Pull the connector through the grommet hole to the bottom side of the floor.
4) Remove the rear sensor harness bracket from rear trailing link and bracket.
5) Remove the rear ABS wheel speed sensor from the back plate.

CAUTION:
• Be careful not to damage the pole piece and the face of the teeth located at the end of the sensor during removal.
• Do not pull sensor harness during removal.



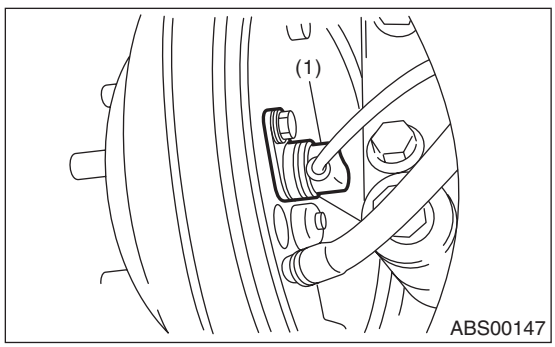
(1) Rear ABS wheel speed sensor

6) Remove the rear tone wheel when removing the hub from the housing and hub assembly. <Ref. to DS-26, REMOVAL, Rear Axle.>

B: INSTALLATION

1) Attach the rear tone wheel to the hub, and attach the rear housing. <Ref. to DS-29, ASSEMBLY, Rear Axle.>
2) Temporarily attach the rear ABS wheel speed sensor to the back plate.

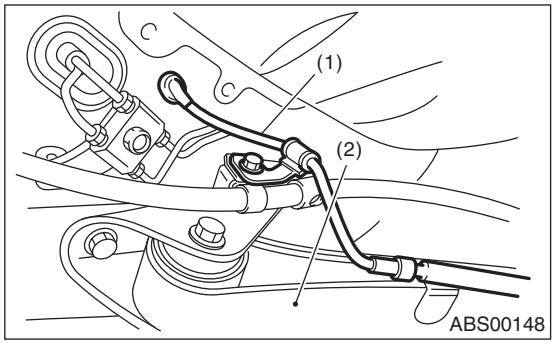
CAUTION:
Be careful not to hit the ABS wheel speed sensor pole piece and tone wheel against adjacent metal parts during installation.



(1) Rear ABS wheel speed sensor

3) Install the rear drive shaft to the rear housing and rear differential spindle. <Ref. to DS-27, INSTALLATION, Rear Axle.>
4) Attach the rear sensor harness to the rear trailing link.

Tightening torque:
33 N·m (3.3 kgf-m, 24 ft-lb)



(1) Rear sensor harness
(2) Trailing link

5) Check the clearance of the sensor. <Ref. to ABS-17, SENSOR GAP, INSPECTION, Rear ABS Wheel Speed Sensor.>When the clearance is within standard values, tighten the ABS wheel speed sensor to the back plate at the specified torque.
If clearance is out of the standard value, readjust by using spacer (Part No. 26755AA000).

ABS wheel speed sensor gap standard value:
0.7 — 1.2 mm (0.028 — 0.047 in)

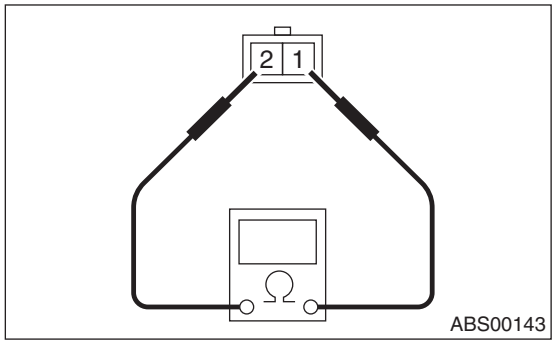
Tightening torque:
33 N·m (3.3 kgf-m, 24 ft-lb)

NOTE:
Check the identification (mark) on the harness to make sure there is no warpage. (RH: Light blue, LH: Brown)
6) After confirmation of the ABS wheel speed sensor clearance, connect the connector to the ABS wheel speed sensor.
7) Connect the ground cable to the battery.

C: INSPECTION

1. ABS WHEEL SPEED SENSOR

1) Check the pole piece of the ABS wheel speed sensor for foreign particles or damage. If necessary, clean the pole piece or replace the ABS wheel speed sensor.
2) Measure the ABS wheel speed sensor resistance.
If resistance is out of the standard value, replace with a new ABS wheel speed sensor.



Terminal No.	Standard
1 and 2	1.15±0.115 kΩ

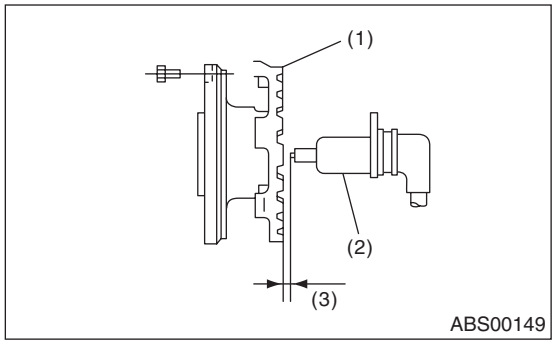
NOTE:
Check the ABS wheel speed sensor cable for discontinuity. If necessary, replace with a new part.

2. SENSOR GAP

1) Check the gap between the tone wheel and the ABS wheel speed sensor around the entire circumference.

NOTE:
If clearance is narrow, adjust by using the spacer (Part No. 26755AA000).
If clearance is wide, check the output voltage and replace the ABS wheel speed sensor or tone wheel if the output voltage is out of the specification.

ABS wheel speed sensor gap standard value:
0.7 — 1.2 mm (0.028 — 0.047 in)



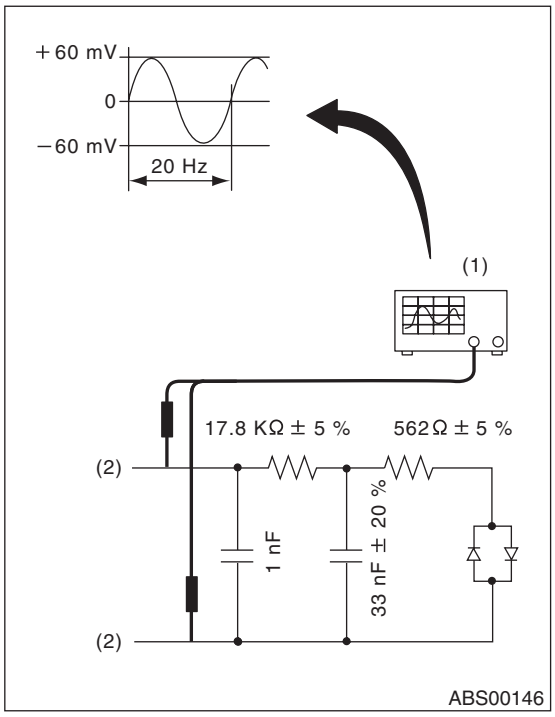
(1) Tone wheel
(2) ABS wheel speed sensor
(3) Sensor gap

3. OUTPUT VOLTAGE

Output voltage can be checked by the following method. Install a resistor and condenser, then rotate the wheel about 2.75 km/h (2 MPH) or equivalent.

Standard value of output voltage:
0.12 — 1 V (at 20 Hz)

NOTE:
Regarding terminal numbers, refer to item 1. ABS WHEEL SPEED SENSOR. <Ref. to ABS-17, ABS WHEEL SPEED SENSOR, INSPECTION, Rear ABS Wheel Speed Sensor.>



(1) Oscilloscope
(2) Terminals

D: ADJUSTMENT

Adjust the gap using spacer (Part No. 26755AA000).

6. Front Tone Wheel

A: REMOVAL

The front tone wheel is integrated with the front drive shaft. Refer to Front Drive Shaft section.
<Ref. to DS-31, REMOVAL, Front Drive Shaft.>

B: INSTALLATION

The front tone wheel is integrated with the front drive shaft. Refer to Front Drive Shaft section.
<Ref. to DS-31, INSTALLATION, Front Drive Shaft.>

C: INSPECTION

Visually check the tone wheel's teeth (44 pieces) for cracks or dents. If necessary, replace with a new tone wheel.

NOTE:
Replace the BJ assembly with a new part if there is any defect found on the tone wheel, since it is unitized with the BJ assembly of the drive shaft.

7. Rear Tone Wheel

A: REMOVAL

The rear tone wheel is attached to the rear hub. Refer to Rear Axle.
<Ref. to DS-26, REMOVAL, Rear Axle.>

B: INSTALLATION

The rear tone wheel is attached to the rear hub. Refer to Rear Axle.
<Ref. to DS-27, INSTALLATION, Rear Axle.>

C: INSPECTION

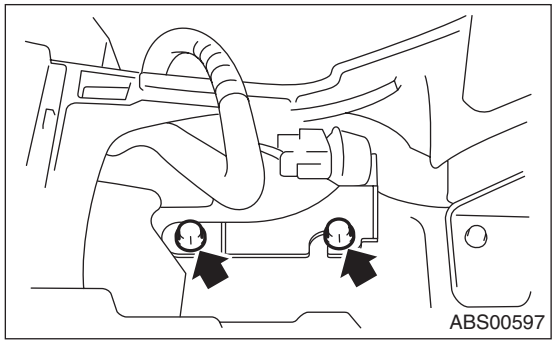
Visually check the tone wheel's teeth (44 pieces) for cracks or dents. If necessary, replace with a new tone wheel.

8. G Sensor

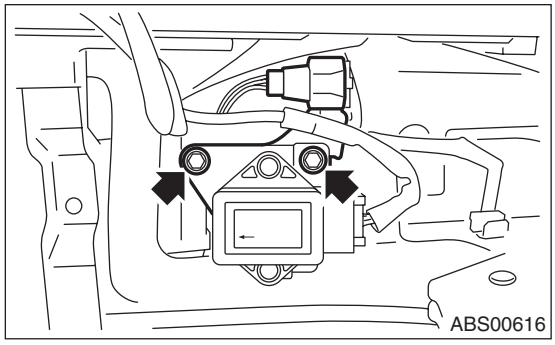
A: REMOVAL

1) Disconnect the ground cable from the battery.
2) Remove the console cover.
<Ref. to EI-46, REMOVAL, Console Box.>
3) Disconnect the connector from G sensor.
4) Remove the G sensor from the body.

CAUTION:
- **Do not drop or bump the G sensor.**
- **The G sensor integrated with the bracket. Do not disassemble.**
  - **Except for STI model**



  - **STI model**



B: INSTALLATION

Install in the reverse order of removal.

CAUTION:
Do not drop or bump the G sensor.

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

C: INSPECTION

	Step	Check	Yes	No
1	**CHECK SUBARU SELECT MONITOR.**	Is a Subaru Select Monitor available?	Go to step **5**.	Go to step **2**.
2	**CHECK G SENSOR.** 1) Turn the ignition switch to OFF. 2) Remove the G sensor from vehicle. 3) Connect the connector to G sensor. 4) Turn the ignition switch to ON. 5) Measure the voltage between G sensor connector terminals. ***Connector & terminal*** ***(B292) No. 2 (+) — No. 3 (–):***	Is the voltage 2.3±0.2 V when G sensor is in a horizontal position?	Go to step **3**.	Replace the G sensor.
3	**CHECK G SENSOR.** Measure the voltage between G sensor connector terminals. ***Connector & terminal*** ***(B292) No. 2 (+) — No. 3 (–):***	Is the voltage 3.9±0.2 V when the G sensor is inclined forward by 90°?	Go to step **4**.	Replace the G sensor.
4	**CHECK G SENSOR.** Measure the voltage between G sensor connector terminals. ***Connector & terminal*** ***(B292) No. 2 (+) — No. 3 (–):***	Is the voltage 0.7±0.2 V when the G sensor is inclined backward by 90°?	G sensor is normal.	Replace the G sensor.
5	**CHECK G SENSOR.** 1) Turn the ignition switch to OFF. 2) Connect the Subaru Select Monitor to the data link connector. 3) Set the Subaru Select Monitor to the {Brake Control} mode. 4) Set the display in the {Current Data Display & Save} mode. 5) Read the G sensor output.	Is the value –1.2 — 1.2 m/s when the vehicle is in a horizontal position?	Go to step **6**.	Replace the G sensor.
6	**CHECK G SENSOR.** 1) Remove the console box. 2) Remove the G sensor from vehicle. (Do not disconnect the connector.) 3) Read the Subaru Select Monitor display.	Is the value 8.1 — 11.2 m/s when G sensor is inclined forward to 90°?	Go to step **7**.	Replace the G sensor.
7	**CHECK G SENSOR.** Read the Subaru Select Monitor display.	Is the value –8.1 — –11.2 m/s when G sensor is inclined backward 90°?	G sensor is normal.	Replace the G sensor.

9. Yaw Rate and Lateral G Sensor

A: REMOVAL

For removal procedures of the yaw rate & lateral G sensor, refer to the “6M” section. <Ref. to 6MT-121, REMOVAL, Yaw Rate and Lateral G Sensor.>

B: INSTALLATION

For installation procedures of the yaw rate & lateral G sensor, refer to the “6M” section. <Ref. to 6MT-121, INSTALLATION, Yaw Rate and Lateral G Sensor.>