

# **AIRBAG SYSTEM**

## AIRBAG SYSTEM

### AIRBAG SYSTEM

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## 1. Airbag System

### A: GENERAL

#### 1. SRS AIRBAG

The SRS airbags supplement the seat belts which restrain the body if the driver or passenger is endangered by a severe impact to the front of the vehicle.

If an impact whose magnitude exceeding the preset value is applied to the vehicle, the airbags inflate immediately to prevent the driver and front seat passenger being hit against the steering wheel, instrument panel or windshield.

A two-staged inflator whose airbag inflation speed is changed according to the magnitude of the impact is used.

#### 2. SRS SIDE AIRBAG

The SRS side airbag supplements the seat belts which restrain the body if the driver or passenger is endangered by a severe impact to the side of the vehicle.

If an impact whose magnitude exceeding the preset value is applied to the side of the vehicle, the side airbags inflate immediately to soften the impact to the driver or front seat passenger especially at their chest area.

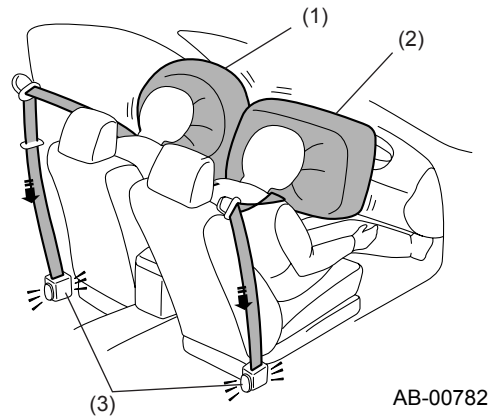
#### 3. SRS CURTAIN AIRBAG

The SRS curtain airbag supplements the seat belts which restrain the body if the driver or passenger is endangered by a severe impact to the side of the vehicle.

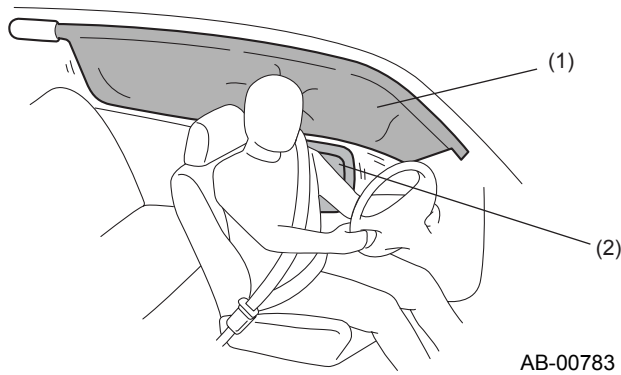
If an impact whose magnitude exceeding the preset value is applied to the side of the vehicle, the curtain airbag inflates immediately to soften the impact to the passengers especially at their head area.

4. SEAT BELT PRETENSIONER

The seat belt pretensioner improves efficiency of body restraint by retracting the seat belt immediately if the driver or passenger is endangered by a severe impact to the front of the vehicle.



- (1) Driver's seat SRS airbag
- (2) Passenger's seat SRS airbag
- (3) Retractor with pretensioner



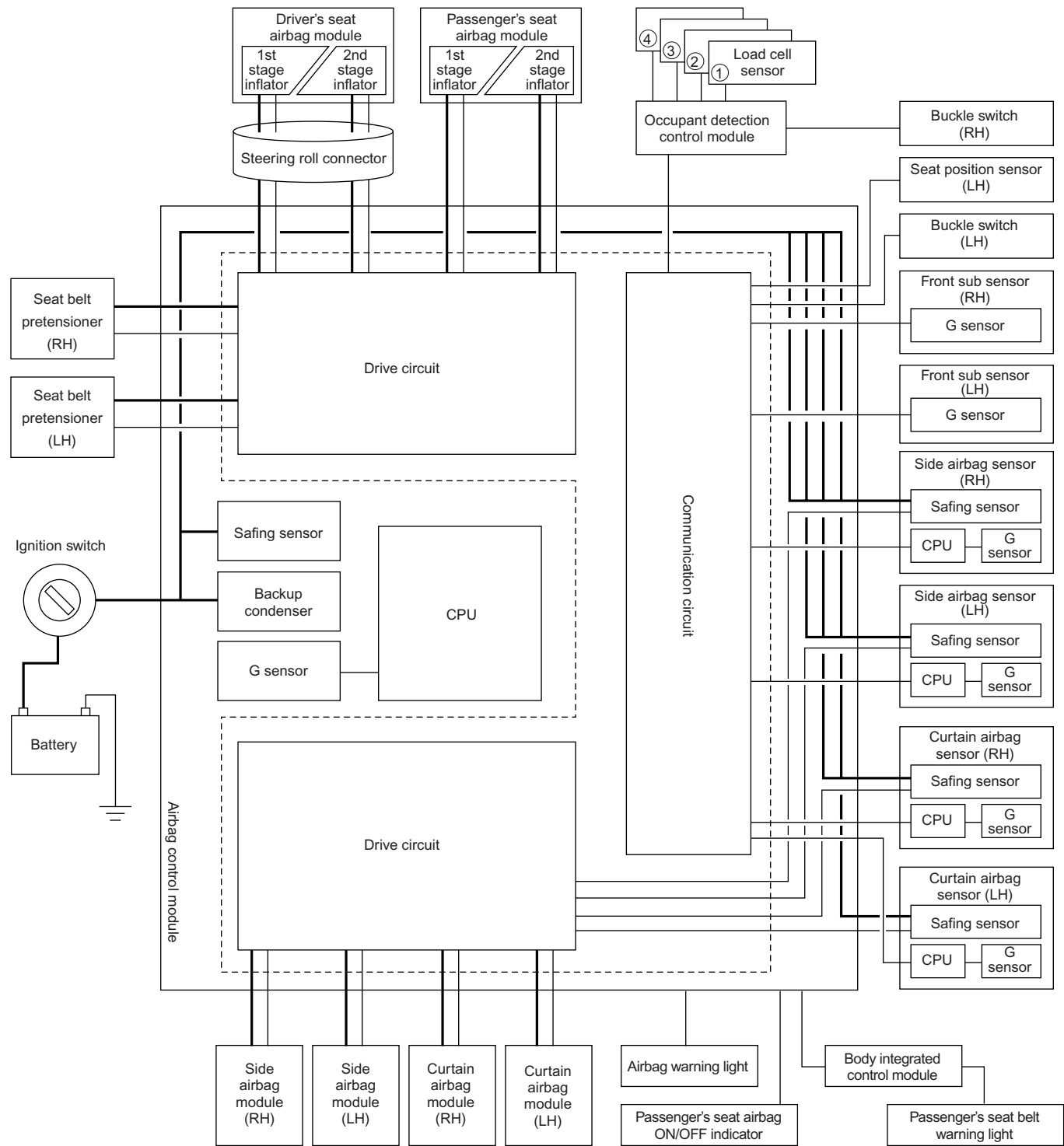
- (1) SRS curtain airbag
- (2) SRS side airbag

## SYSTEM COMPONENTS AND OPERATION

### AIRBAG SYSTEM

## 2. System Components and Operation

### A: SYSTEM COMPONENTS



AB-00919

## SYSTEM COMPONENTS AND OPERATION

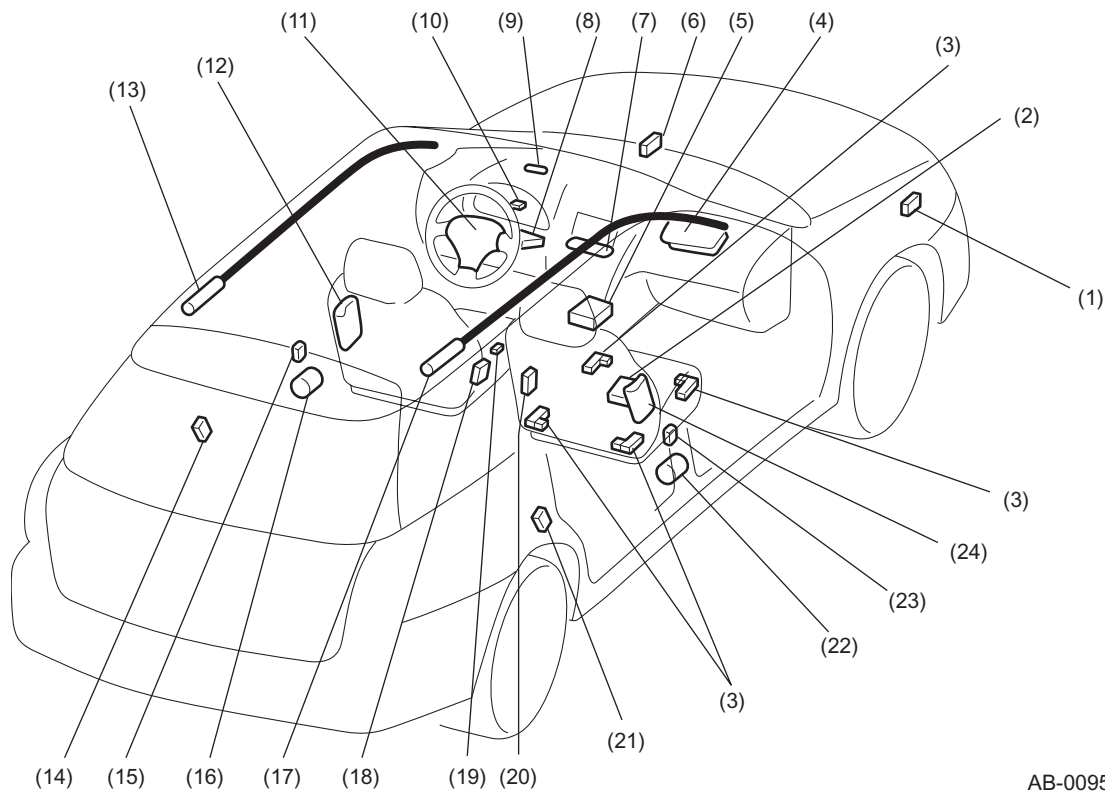
### AIRBAG SYSTEM

#### B: COMPONENTS

Name	Major function	Location
Airbag control module	<ul style="list-style-type: none"><li>• Senses impact and judges its magnitude by means of a safety sensor and G sensor built inside.</li><li>• Serves as supplementary power supply if the battery voltage is lowered for some reason.</li><li>• Directs airbags to inflate.</li><li>• Performs self diagnosis of the airbag system.</li></ul>	Inside center console.
Driver's seat air-bag module	Protects the driver's head and upper body to minimize injury in an event of frontal collision.	Stowed inside the pad at the center of the steering wheel.
Passenger's seat airbag module	Protects the passenger's head and upper body to minimize injury in an event of frontal collision.	Stowed inside the instrument panel at the front passenger's side.
Driver's seat side airbag module	Protects the driver's upper body to minimize injury in an event of side collision.	Stowed inside the driver's seat backrest.
Passenger's seat side airbag module	Protects the front passenger's upper body to minimize injury in an event of side collision.	Stowed inside the front passenger's seat backrest.
Curtain airbag module	Deploys together with the side airbag to protect the driver's or passenger's head and minimize injury in an event of side collision.	Stowed inside at left and right sides from the A pillars through the upper part of C pillars.
Steering roll connector	Provides electrical connection between the vehicle side airbag harness and steering wheel.	Between the combination switch and steering wheel.
Seat belt pretensioner	Retracts the seat belt immediately to restrain the body of front seat passengers in an event of a frontal collision.	Lower part of left and right B pillars.
Front sub sensor	Detects the impact in an event of a frontal collision and outputs a deceleration signal to the control module.	In front of left and right front frames.
Side airbag sensor	<ul style="list-style-type: none"><li>• Senses impact and judges its magnitude in an event of a side collision by means of a safety sensor and G sensor built inside.</li><li>• Performs self diagnosis of the airbag system.</li></ul>	Inside the left and right B pillars.
Curtain airbag sensor	<ul style="list-style-type: none"><li>• Senses impact and judges its magnitude in an event of a side collision by means of a safety sensor and G sensor built inside.</li><li>• Performs self diagnosis of the airbag system.</li></ul>	In front of rear left and right wheel arches.
Airbag warning light	<ul style="list-style-type: none"><li>• Indicates whether the system is normal or abnormal.</li><li>• Displays diagnostic trouble codes.</li></ul>	Inside the combination meter.
Occupant detection control module	<ul style="list-style-type: none"><li>• Decides whether an adult, child, or is nobody is sitting in the seat, based on the occupant detection sensor output.</li><li>• Performs self diagnosis of the occupant detection system.</li></ul>	Beneath the passenger's seat cushion.
Loadcell sensor	Detects the load on the seat applied by the passenger.	On the passenger's seat slide rail.
Passenger's seat airbag ON/OFF indicator	Indicates whether the deployment of the passenger's seat airbag is allowed or not, based on the decision of the occupant detection system.	Center of the instrument panel at the clock area.
Buckle switch	Detects whether the seat belt is fastened or not.	At the seat belt buckle.
Seat position sensor (LH)	Detects the fore-aft position of the driver's seat and distinguishes the passenger.	On the driver's seat slide rail.

## SYSTEM COMPONENTS AND OPERATION

### AIRBAG SYSTEM



AB-00952

- |                                               |                                   |
|-----------------------------------------------|-----------------------------------|
| (1) Front sub sensor RH                       | (13) Curtain airbag module LH     |
| (2) Occupant detection control module         | (14) Curtain airbag sensor LH     |
| (3) Load cell sensors                         | (15) Side inside airbag sensor LH |
| (4) Passenger's seat airbag module            | (16) Pretensioner LH              |
| (5) Airbag control module                     | (17) Curtain airbag module RH     |
| (6) Front sub sensor LH                       | (18) Buckle switch LH             |
| (7) Passenger's airbag ON/OFF indicator light | (19) Seat position sensor LH      |
| (8) Body integrated control module            | (20) Buckle switch RH             |
| (9) Passenger's seat belt warning light       | (21) Curtain airbag sensor RH     |
| (10) Airbag warning light                     | (22) Pretensioner RH              |
| (11) Driver's seat airbag module              | (23) Side airbag sensor RH        |
| (12) Side airbag module LH                    | (24) Side airbag module RH        |

## SYSTEM COMPONENTS AND OPERATION

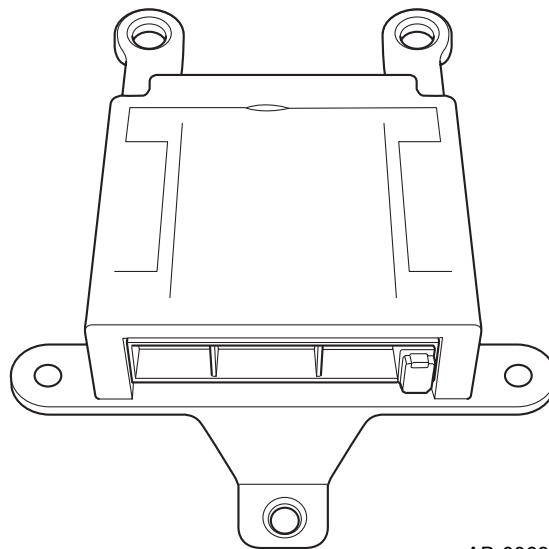
AIRBAG SYSTEM

### 1. AIRBAG CONTROL MODULE

The airbag control module is installed inside the center console and contains a safety sensor, G sensor, ignition judgment circuit, and a backup power supply, etc.

The control module receives electric signals from the safety sensor and electric sensor inside the module and also from the front sub sensor to detect the deceleration of the vehicle and judge whether the airbag and pretensioners should be ignited or not. It also has a self diagnosis function which lights up the airbag warning light in the combination meter if a fault occurs in the system. Diagnostic trouble codes generated by the self diagnosis function are stored in the memory in the module.

To prepare for battery voltage fall in an event of an accident, the control module is provided with a backup power supply.



AB-00689

- **Safety sensor**

Inside of the sensor there is a mass weight, which works as a pendulum; if the sensor detects an impact acceleration exceeding a certain limit, the mass weight in the sensor moves to close the contacts and turn the switch ON.

- **G sensor**

Inside of the sensor there are comb-teeth shaped electrodes; in case of a collision the distance between the electrodes varies by the impact to enable detection of the impact acceleration.

## SYSTEM COMPONENTS AND OPERATION

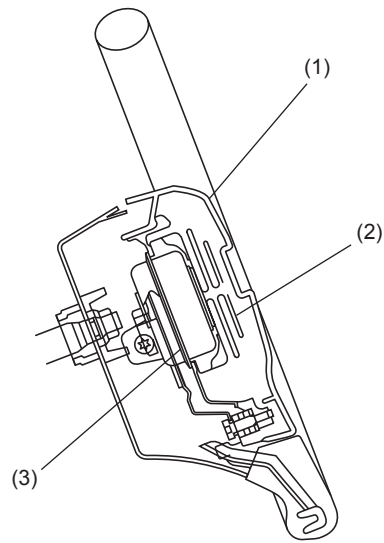
### AIRBAG SYSTEM

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#### 2. DRIVER'S SEAT AIRBAG MODULE

The driver's seat airbag module is built in the steering wheel pad.

The SRS airbag module assembly cannot be disassembled. The driver's seat airbag module assembly consists of an inflator and airbag, and a steering wheel pad.



AB-00692

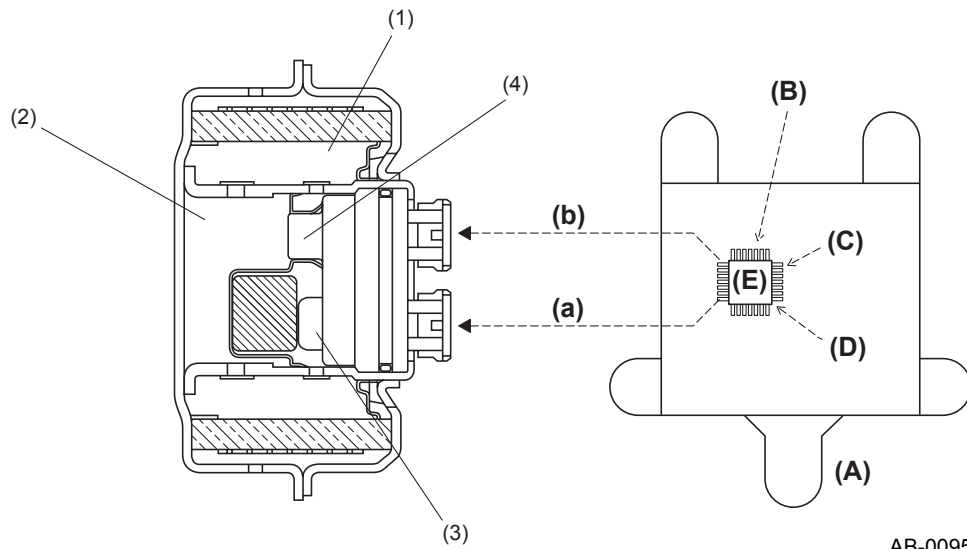
- (1) Steering wheel pad
- (2) Airbag

- (3) Inflator

## SYSTEM COMPONENTS AND OPERATION

### AIRBAG SYSTEM

The inflator houses igniters and gas generating agents in a metal container. Igniters and gas generating agents are placed at two locations, and a 2-stage inflator which controls the airbag inflating speed according to the magnitude of impact at a collision is used. If the impact detected by the airbag sensor is equivalent to the level detected at a high speed, sudden collision, the two gas heating agents are ignited simultaneously. If the event of a collision at low or mid speed, the ignition of the 2nd stage gas generating agent is delayed to reduce the output of the inflator. Thus the inflator outputs power suitable for the severity of collision and relieves the impact to the passenger's head or upper body.



AB-00953

- |                                    |                               |                           |
|------------------------------------|-------------------------------|---------------------------|
| (1) 1st stage gas generating agent | (a) 1st stage ignition signal | (A) Airbag control module |
| (2) 2nd stage gas generating agent | (b) 2nd stage ignition signal | (B) Front sub sensor      |
| (3) 1st stage igniter              |                               | (C) Safety sensor         |
| (4) 2nd stage igniter              |                               | (D) G sensor              |
|                                    |                               | (E) CPU                   |

## SYSTEM COMPONENTS AND OPERATION

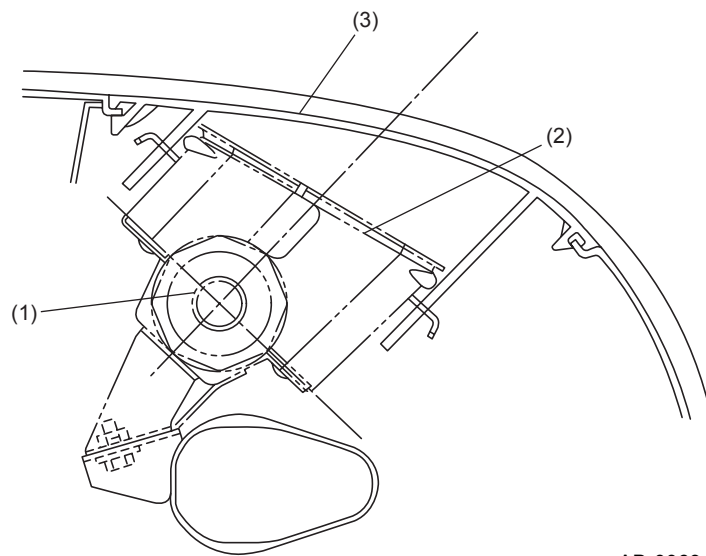
### AIRBAG SYSTEM

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#### 3. PASSENGER'S SEAT AIRBAG MODULE

The front passenger's seat SRS airbag module assembly is built in the instrument panel at the front passenger's side.

The SRS airbag module assembly cannot be disassembled. The front passenger's seat airbag module is fixed to the steering support beam, and consists of an inflator and an airbag.



AB-00694

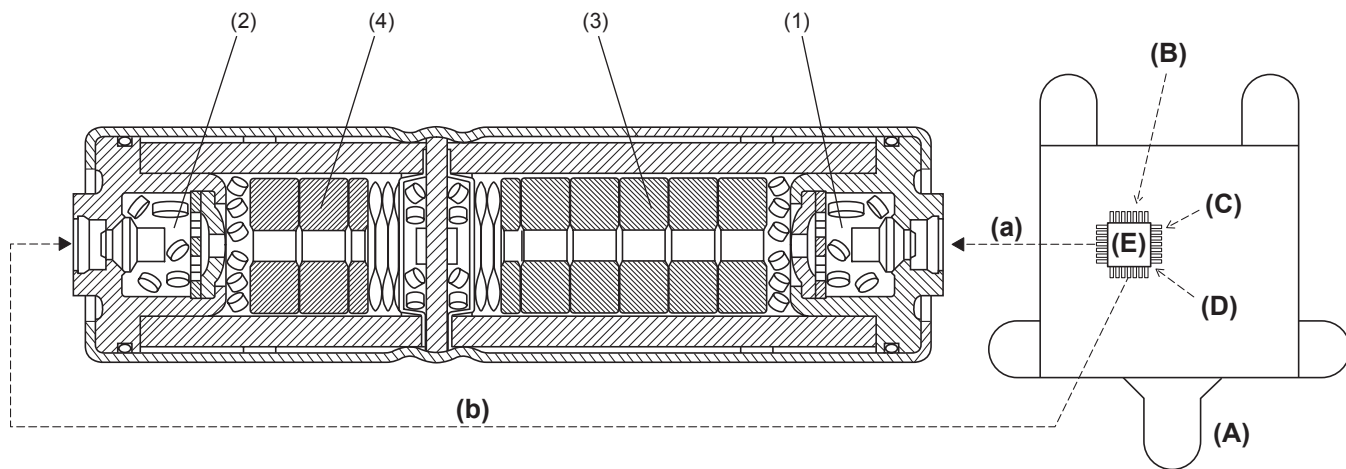
- (1) Inflator
- (2) Airbag

- (3) Lid

## SYSTEM COMPONENTS AND OPERATION

AIRBAG SYSTEM

The inflator houses igniters and gas generating agents with a metal container. Igniters and gas generating agents are placed at two locations, and a 2-stage inflator which controls the airbag inflating speed according to the magnitude of impact at a collision is used. If the impact detected by the airbag sensor is equivalent to the level detected at a high speed, sudden collision, the two gas generating agents are ignited simultaneously. If the event of a collision at low or mid speed, the ignition of the 2nd stage gas generating agent is delayed to reduce the output of the inflator. Thus the inflator outputs power suitable for the severity of collision and relieves the impact to the passenger's head or upper body.



AB-00954

- (1) 1st stage igniter
- (2) 2nd stage igniter
- (3) 1st stage gas generating agent
- (4) 2nd stage gas generating agent

- (a) 1st stage ignition signal
- (b) 2nd stage ignition signal

- (A) Airbag control module
- (B) Front sub sensor
- (C) Safety sensor
- (D) G sensor
- (E) CPU

## SYSTEM COMPONENTS AND OPERATION

### AIRBAG SYSTEM

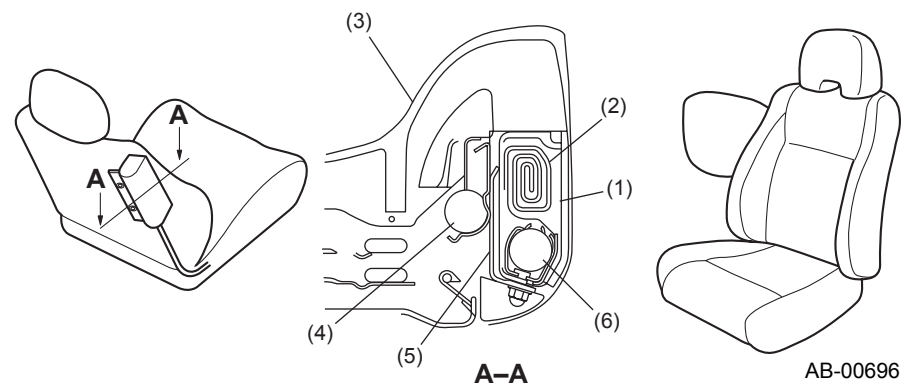
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#### 4. SIDE AIRBAG MODULE

The side airbag modules are built in the backrest of left and right front seats (at the door side).

The SRS side airbag module assembly cannot be disassembled. The side airbag module is fixed to the seat frame with a bracket, and consists of an inflator, airbag, and a case.

If a side-on collision occurs, the inflator produces a certain amount of gas to inflate the airbag in a very short time in response to the ignition signal from the side impact sensor.



- (1) Case
- (2) Airbag
- (3) Seat upholstery

- (4) Seat frame
- (5) Bracket
- (6) Inflator

## SYSTEM COMPONENTS AND OPERATION

AIRBAG SYSTEM

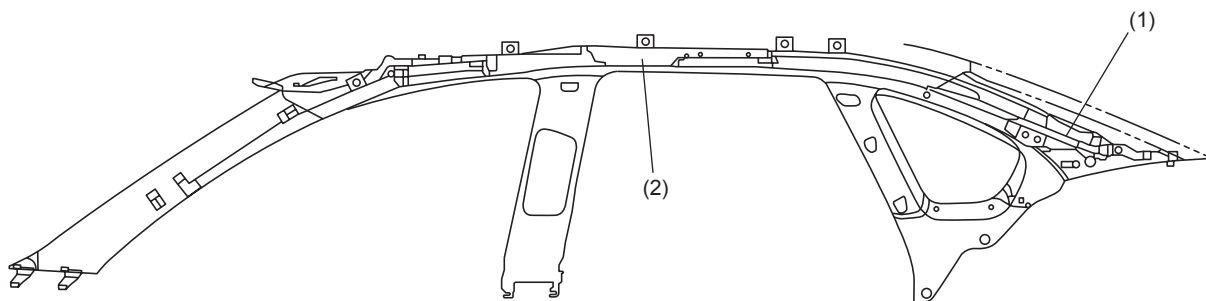
### 5. CURTAIN AIRBAG MODULE

The curtain airbag modules are placed at the front pillars, roof sides, and the rear pillars.

The SRS curtain airbag module cannot be disassembled. The curtain airbag modules are fixed to the vehicle body with a bracket and clips, and consists of an inflator and an airbag.

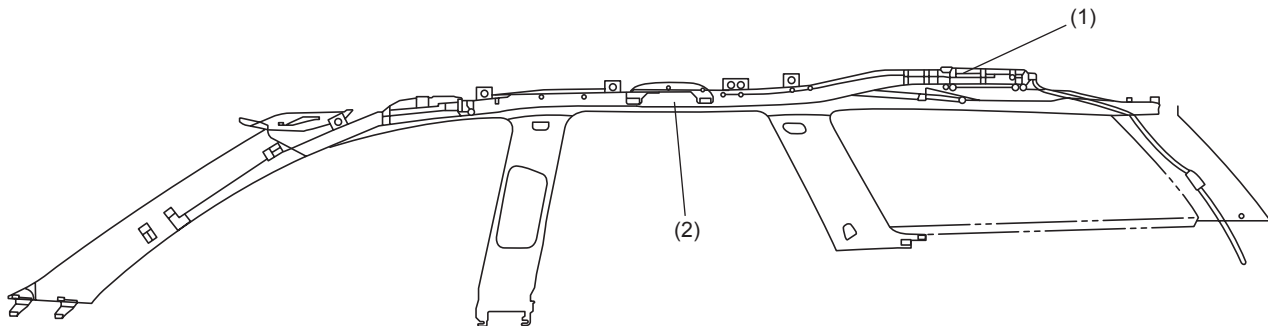
If a side-on collision occurs, the inflator produces a certain amount of gas to inflate the airbag in a very short time in response to the ignition signal from the side airbag sensor and curtain airbag sensor.

Sedan models



AB-00697

Wagon models



AB-00698

(1) Inflator

(2) Airbag

## SYSTEM COMPONENTS AND OPERATION

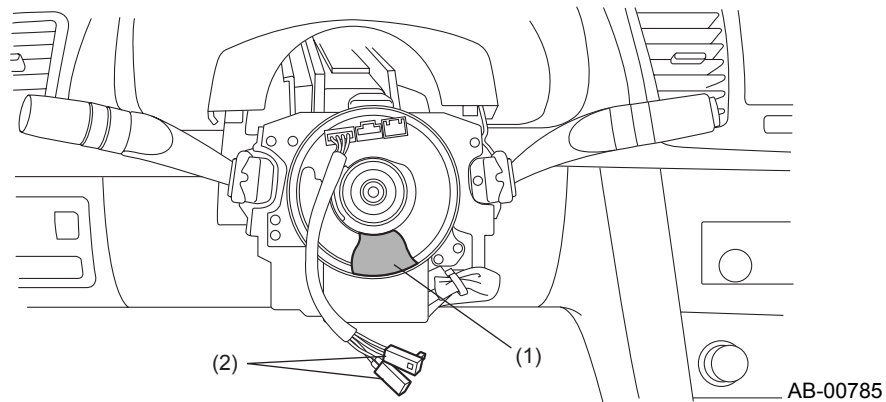
### AIRBAG SYSTEM

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#### 6. STEERING ROLL CONNECTOR

The steering roll connector is in between the steering column and the steering wheel, and contains a spirally wound flat cable.

The flat cable maintains connection between the airbag module on the steering wheel and the airbag harness even when the steering wheel is turned. Ignition signal from the airbag control module is sent through the roll connector to the driver's seat airbag module.



(1) Flat cable

(2) Airbag module connector

## SYSTEM COMPONENTS AND OPERATION

AIRBAG SYSTEM

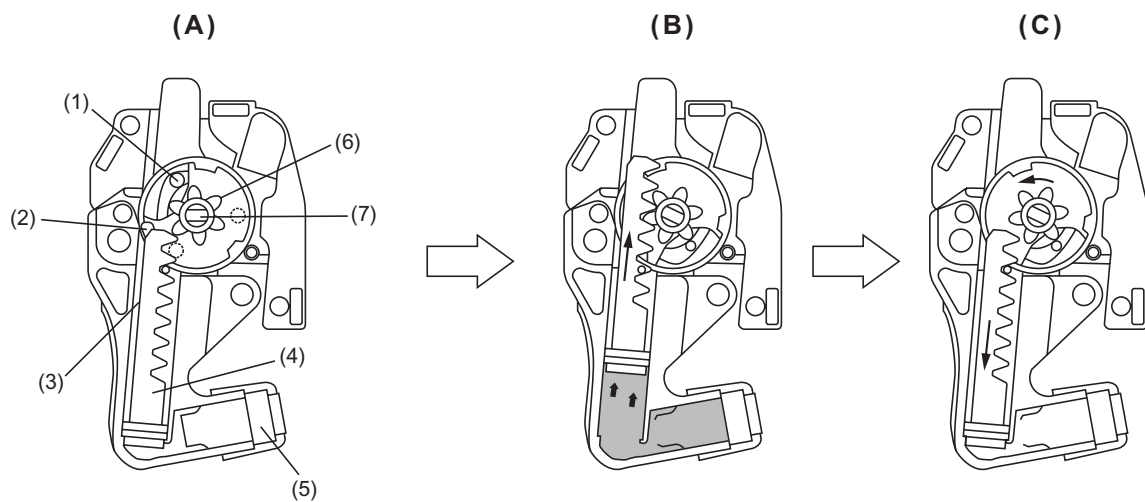
### 7. SEAT BELT PRETENSIONER

The driver's and front passenger's seat belt retractors contain a seat belt pretensioner.

The airbag control module controls the operation of the seat belt pretensioner. If the front sub sensor and the sensors inside the airbag control module detect an impact exceeding a specified level, the driver's seat and front passenger's seat airbags are deployed almost simultaneously. Upon receiving signals from the airbag control module the gas generator inside the pretensioners are ignited and the gas pressure retracts the seat belts in a very short time to improve the passenger restraint effect.

If the load placed on a seat belt exceeds the predetermined level, the torsion bar is twisted to allow the seat belt to be pulled out, thus lessening the load imposed on the belt wearer's chest.

Once the seat belt pretensioner has been activated, the seat belt retractor remains locked.



SB-00058

**(A)** Initial state

(1) Roller

(2) Shear rib

(3) Shear pin

**(B)** Pretensioner operates

(4) Piston

(5) Gas generator

(6) Pinion

**(C)** Load limiter

(7) Sleeve

## SYSTEM COMPONENTS AND OPERATION

### AIRBAG SYSTEM

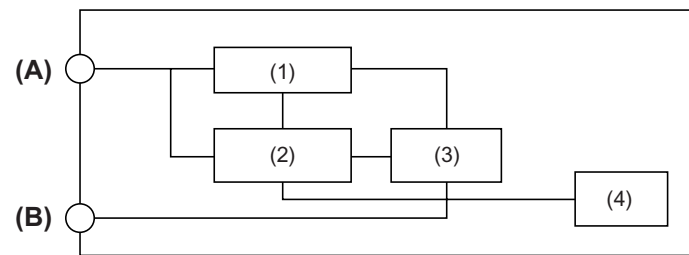
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#### 8. FRONT SUB SENSOR

The front sub sensor is installed to the tip of the front side frame.

If it detects an impact exceeding the specified level from the front, it sends a signal which is used for airbag system deployment judgment to the airbag control module.

To judge the impact to the front of the vehicle more precisely, the sensor is changed from the conventional pendulum type mechanical sensor to an electronic sensor.



AB-00700

(A) Power supply/communication terminal

(B) GND

(1) 5 V power

(2) Current communication circuit

(3) G sensor

(4) Oscillator

## SYSTEM COMPONENTS AND OPERATION

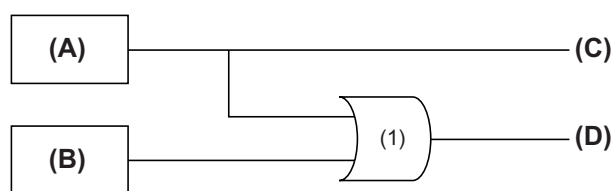
AIRBAG SYSTEM

### 9. SIDE IMPACT SENSOR

The side impact sensors (side airbag sensor, curtain airbag sensor) are installed at the bottom of the center pillars and the rear quarter pillars.

If the sensor in the side impact sensor detects an impact exceeding the specified level from the side, it sends a signal which is used for airbag system deployment judgment to the airbag control module.

Signals from the side airbag sensors are effective for both the side airbags and curtain airbags, while signals from the curtain airbag sensors detect impact to the rear seat sides and let only the curtain airbags deploy.



AB-00702

(A) Side airbag sensor

(B) Curtain airbag sensor

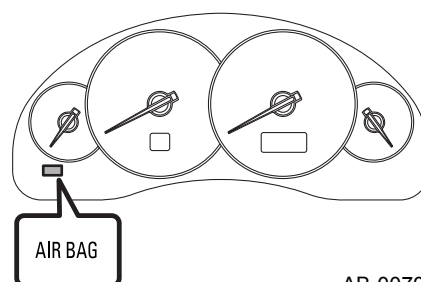
(C) Side airbag

(D) Curtain airbag

(1) OR

### 10. AIRBAG WARNING LIGHT

The airbag warning light is located inside the combination meter. It illuminates if a poor connection in the airbag circuit occurs, or if the airbag control module detects an abnormal condition. When the airbag system is normal, this light comes on when the ignition switch is turned ON and then goes out about 6 seconds later.



AB-00704

### 11. WIRING HARNESS

The airbag harnesses are integrated into the body harness as follows:

- Front sub sensor harness: integrated into the front harness.
- Airbag main harness: integrated into the bulkhead harness.
- Pretensioner and side airbag harnesses: integrated into the rear harness.

## AIRBAG CONNECTORS

### AIRBAG SYSTEM

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## 3. Airbag Connectors

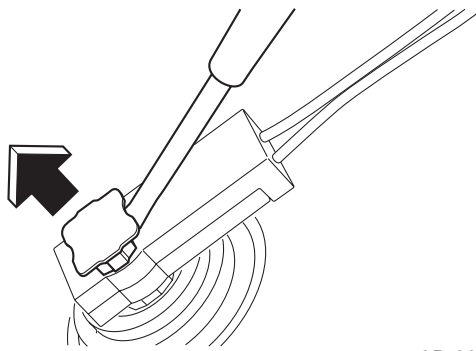
### A: GENERAL

The airbag system uses connectors with a double lock mechanism and an incomplete-coupling-detection mechanism for enhanced reliability. If coupling is incomplete, the airbag warning light comes on in the combination meter.

#### 1. DRIVER'S SEAT AIRBAG MODULE-TO-SEAT BELT PRETENSIONER CONNECTOR

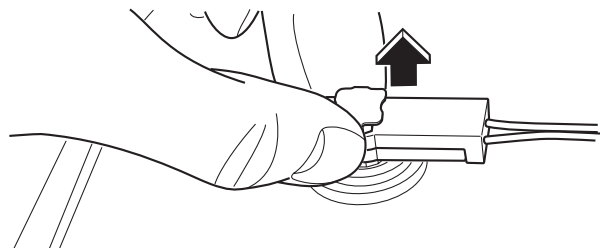
##### Disconnection:

- 1) Lift the lock button using a thin tipped tool like a miniature screwdriver.



AB-00529

- 2) Pull the connector out from the airbag module.



AB-00528

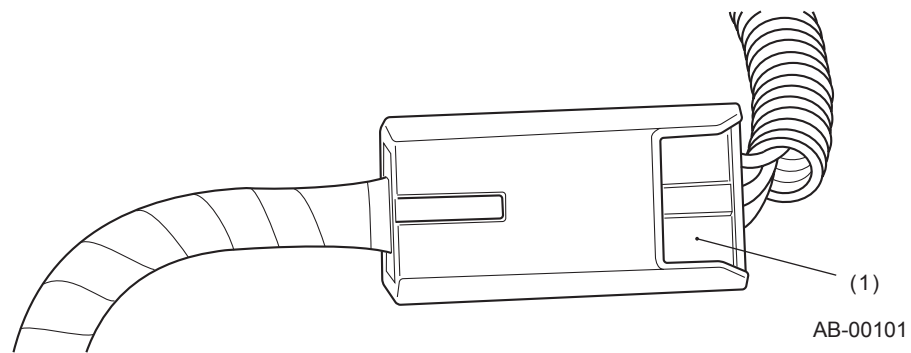
##### Connection:

Carefully insert the connector into the airbag module. Push the connector until a “click” is heard from the lock button.

## AIRBAG CONNECTORS

AIRBAG SYSTEM

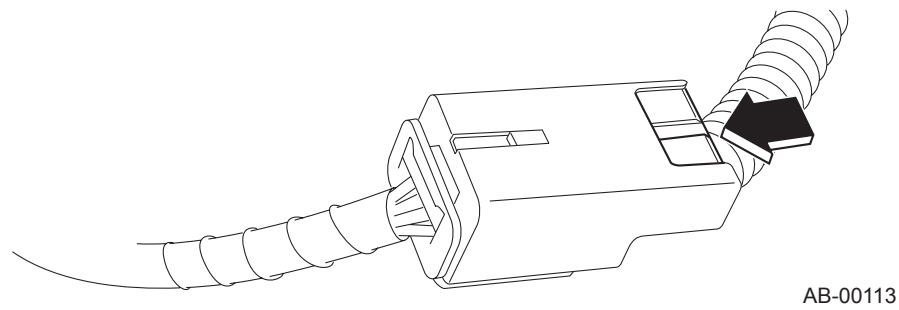
### 2. AIRBAG MAIN HARNESS-TO-ROLL CONNECTOR, AND PASSENGER'S SEAR AIRBAG MODULE CONNECTOR



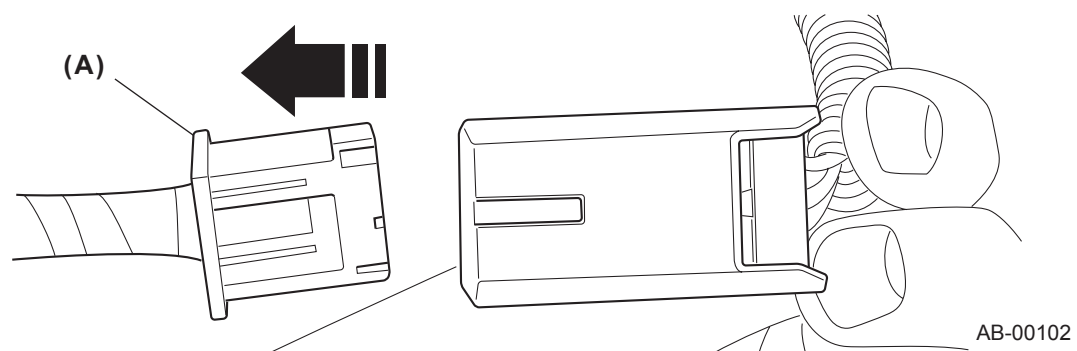
(1) Slide lock

#### Disconnection:

- 1) Press the slide lock inwards.



- 2) While the slide lock pressed in, disconnect the connector (A).



#### Connection:

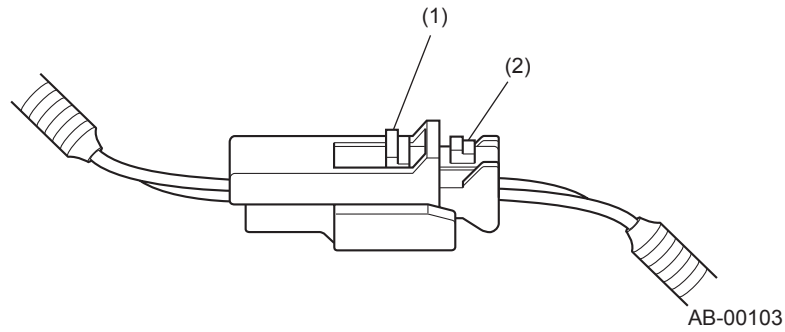
Insert the female side connector half into the other until a “click” is heard.

## AIRBAG CONNECTORS

### AIRBAG SYSTEM

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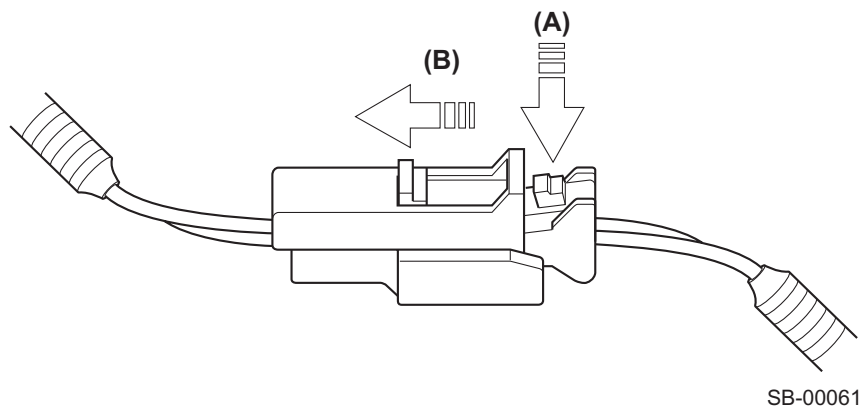
#### 3. SIDE AIRBAG MODULE AND CURTAIN AIRBAG MODULE CONNECTORS



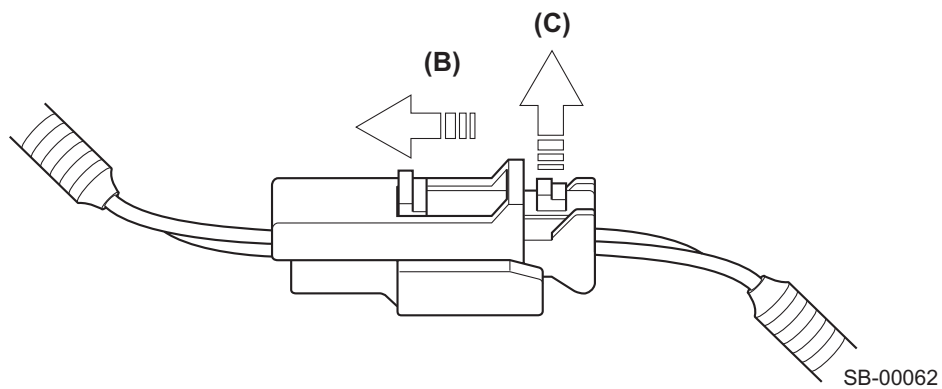
- (1) Slide lock
- (2) Lock arm

#### Disconnection:

- 1) Push in and hold the lock arm (A), then pull the slide lock (B).



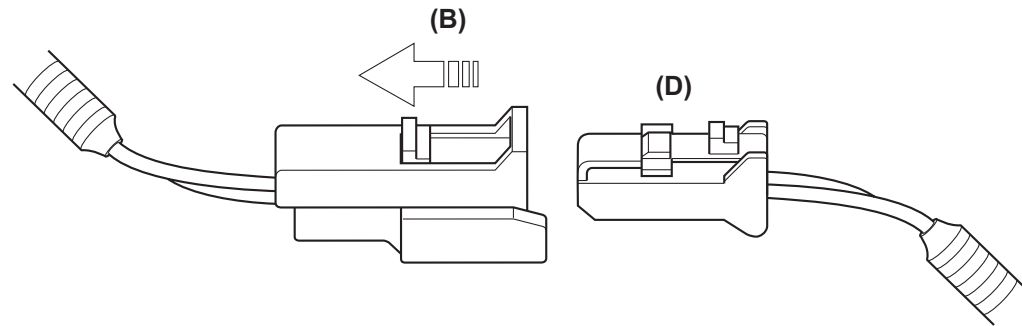
- 2) While the slide lock pulled and held (B), release the lock arm (C).



## AIRBAG CONNECTORS

AIRBAG SYSTEM

3) While the slide lock pulled and held (B), disconnect the connector (D).



SB-00063

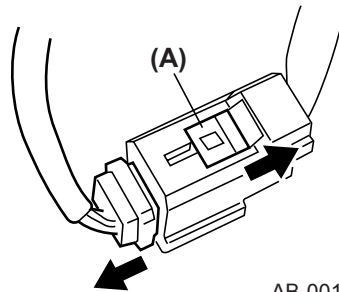
### Connection:

Insert the female side connector half into the other until a “click” is heard.

## 4. AIRBAG HARNESS-TO-BODY HARNESS, OCCUPANT DETECTION CONTROL MODULE-TO-BODY HARNESS, AND SEAT BELT BUCKLE SWITCH CONNECTORS

### Disconnection:

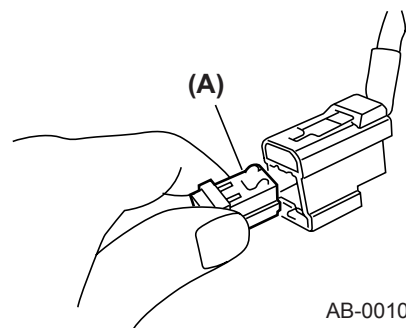
Hold slide lock (A) moved in the direction of the arrow, then pull the female connector in the direction of the arrow.



AB-00105

### Connection:

Push the connector (A) into the male connector carefully until a “click” is heard.



AB-00106

## AIRBAG CONNECTORS

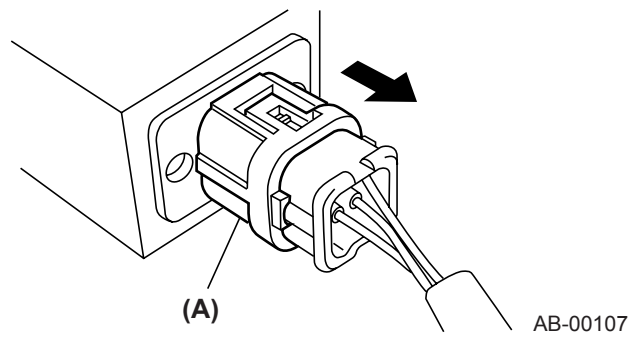
### AIRBAG SYSTEM

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#### 5. FRONT SUB SENSOR, SIDE AIRBAG SENSOR, CURTAIN AIRBAG SENSOR, AND SEAT POSITION SENSOR (LH) CONNECTORS

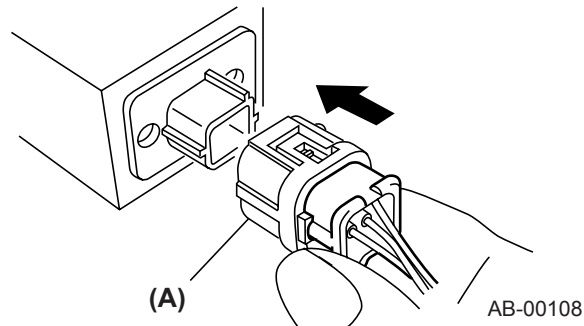
##### Disconnection:

Holding the outer part (A), pull the connector in the direction of the arrow.



##### Connection:

Holding the inner part, push the connector into the socket carefully until a “click” is heard. Do not hold the outer part (A) as it moves back during connection of the connector.

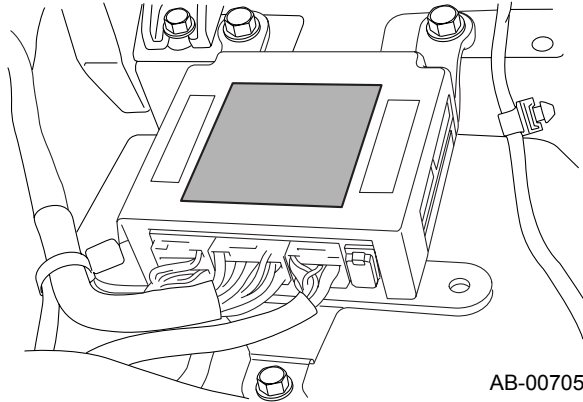


## LOCATIONS OF WARNING AND CAUTION LABELS

AIRBAG SYSTEM

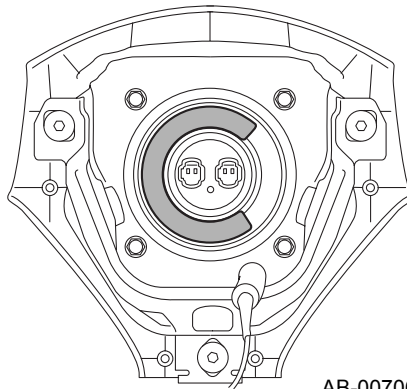
### 4. Locations of Warning and Caution Labels

#### 1. AIRBAG CONTROL MODULE



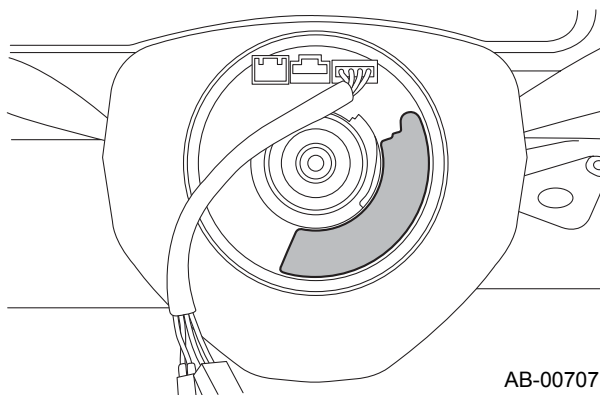
AB-00705

#### 2. DRIVER'S SEAT AIRBAG MODULE



AB-00706

#### 3. STEERING ROLL CONNECTOR



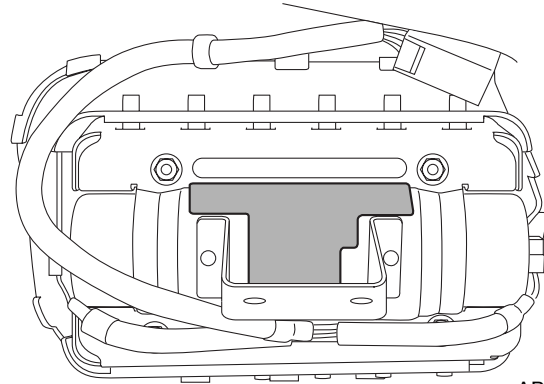
AB-00707

## LOCATIONS OF WARNING AND CAUTION LABELS

### AIRBAG SYSTEM

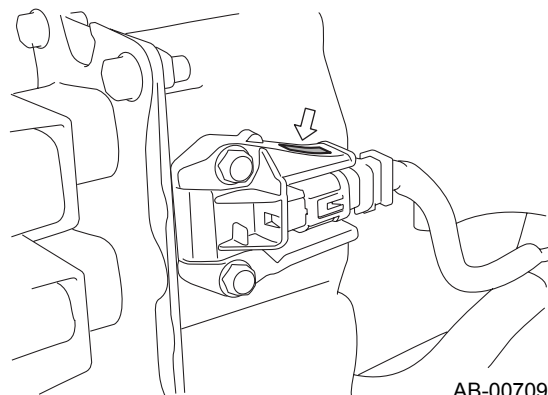
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#### 4. PASSENGER'S SEAT AIRBAG MODULE



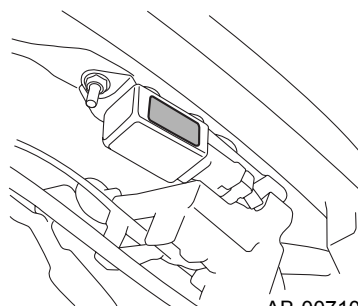
AB-00708

#### 5. FRONT SUB SENSOR



AB-00709

#### 6. SIDE IMPACT SENSOR

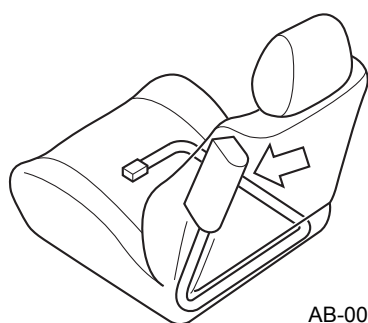


AB-00710

## LOCATIONS OF WARNING AND CAUTION LABELS

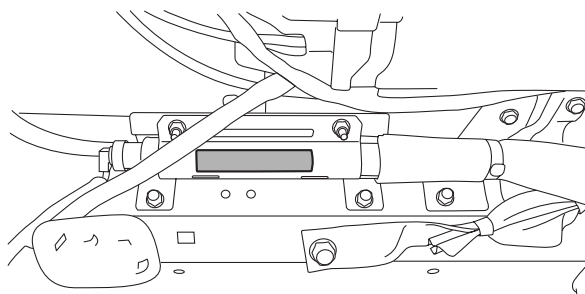
AIRBAG SYSTEM

### 7. SIDE AIRBAG MODULE



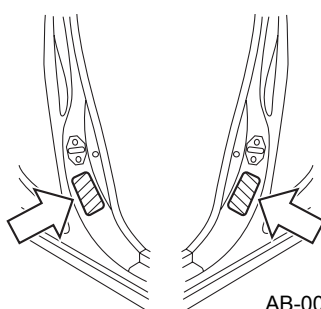
AB-00711

### 8. CURTAIN AIRBAG MODULE



AB-00712

### 9. CENTER PILLAR LOWER AREA



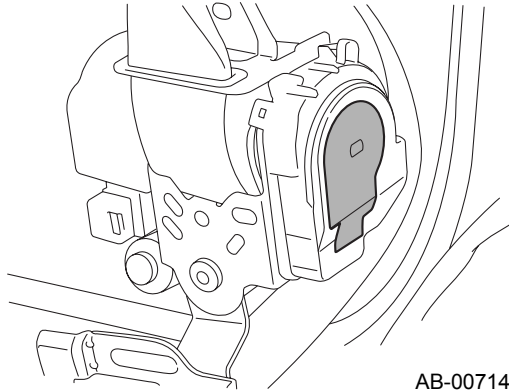
AB-00713

## LOCATIONS OF WARNING AND CAUTION LABELS

### AIRBAG SYSTEM

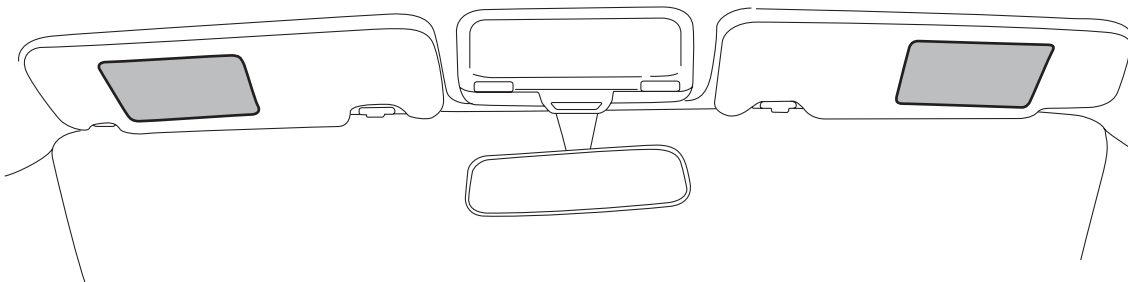
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#### 10. SEAT BELT PRETENSIONER



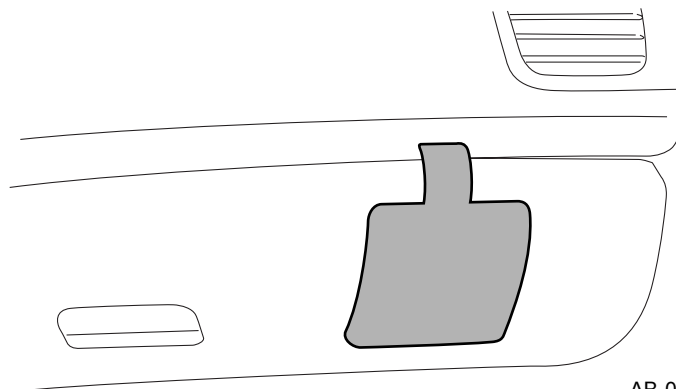
AB-00714

#### 11. SUN VISOR



AB-00950

#### 12. INSTRUMENT PANEL



AB-00951