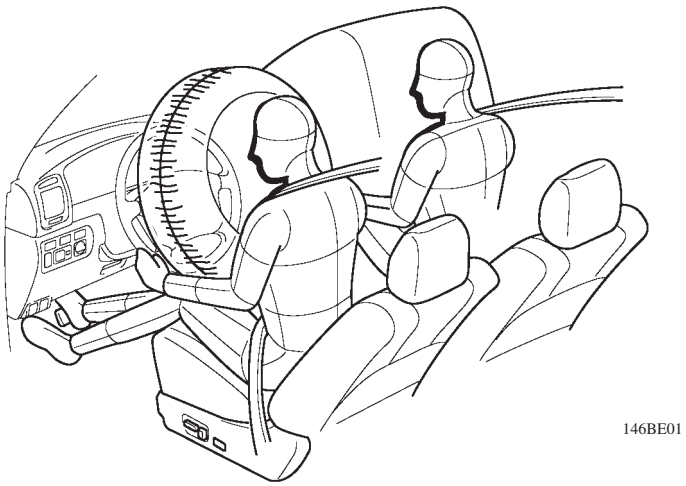
■ SRS AIRBAG

1. General

- The SRS (Supplemental Restraint System) airbag is designed to help lessen the shock to the driver and front passenger as a supplement to the seat belt.
  In a collision, the airbag sensor detects the shock and if the front-to-rear shock is greater than a specified value, the airbags stored in the steering wheel pad for the driver and above the glove box for the front passenger inflate instantly to help reduce the likelihood of the driver's or front passenger's head and chest directly hitting the steering wheel or instrument panel.
- A 3-sensor type airbag system is used, in which the detection of deceleration during a collision is accomplished by the front airbag sensor and airbag sensor enclosed in the airbag sensor assembly.



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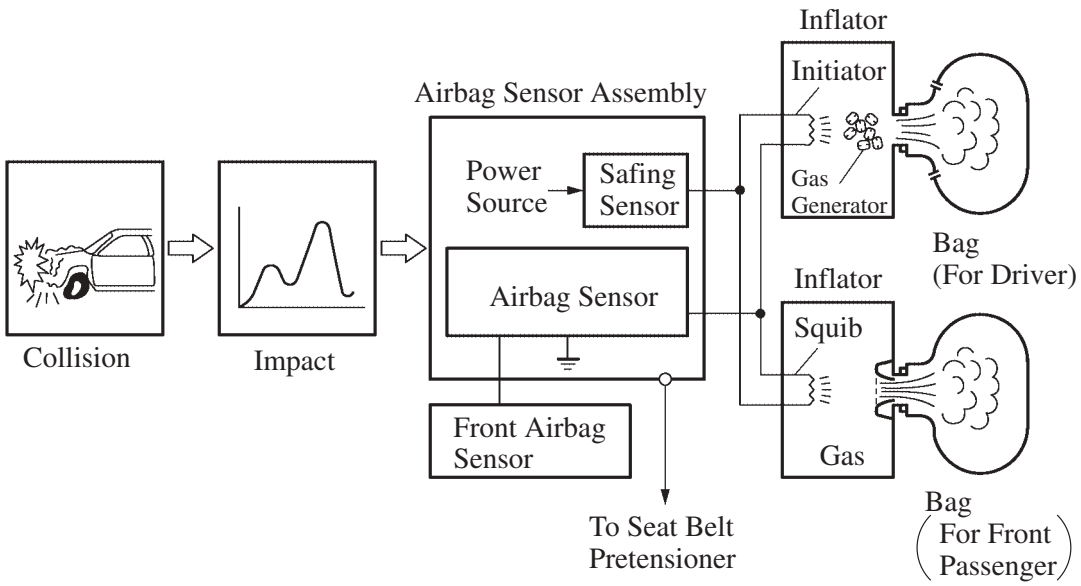
▶ System Diagram ◀

The activation processes of the SRS airbag is as illustrated below.



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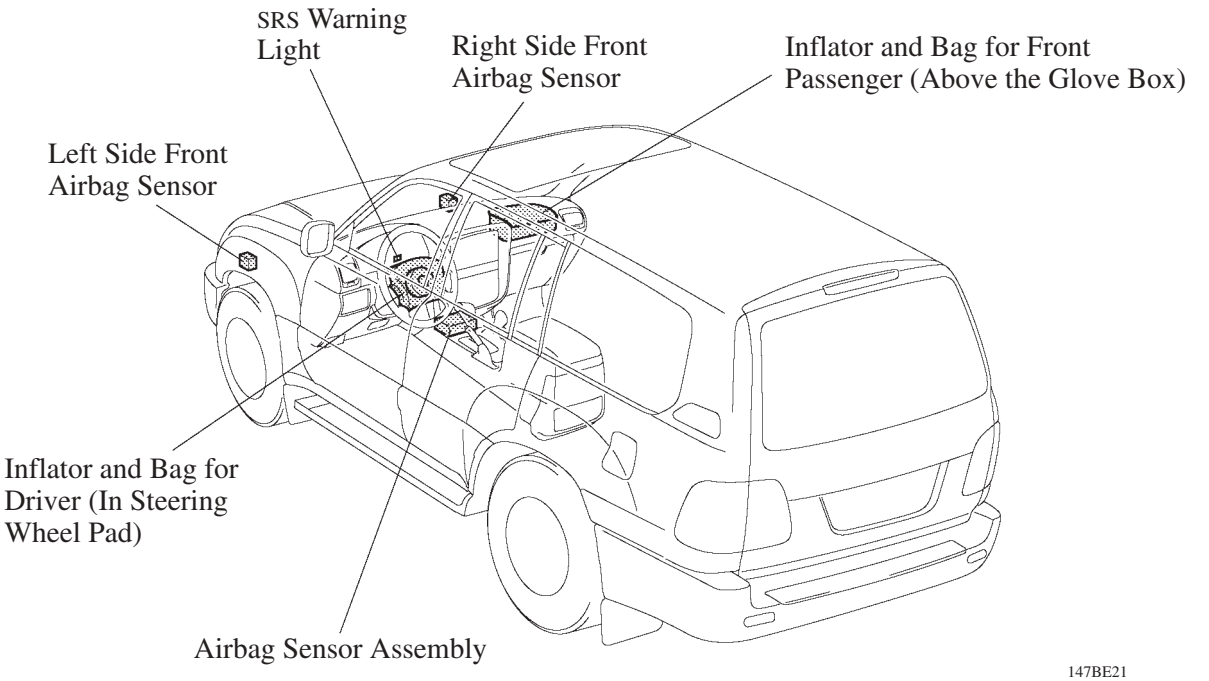
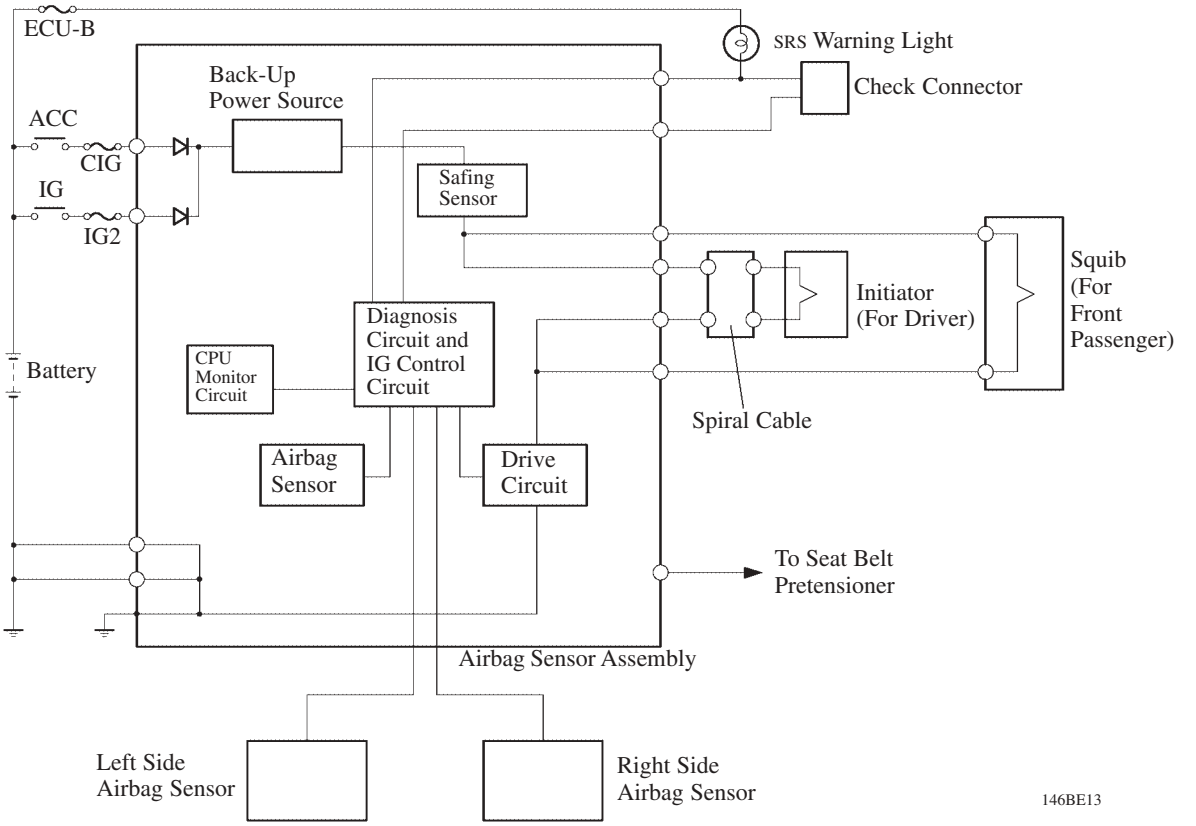
2. Layout of Components

The major function parts of the airbag system are shown below.



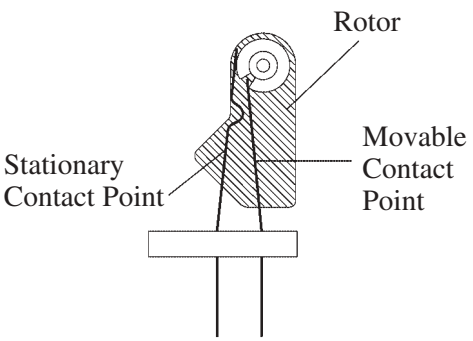
3. Wiring Diagram



4. Construction and Operation

Front Airbag Sensor

The front airbag sensor consists of rotor, movable contact point and a stationary contact point.
The rotor is fixed by the initial set load of the movable contact point. At the same time, the movable contact point restrains the movement of the rotor which is generated during vehicle deceleration, thus preventing the unintended activation of the system.
If a sudden deceleration that exceeds a predetermined value occurs due to a collision of the vehicle, the rotor will rotate. The rotational movement of the rotor pushes the movable contact point and causes the movable and stationary contact points to come into contact. As a result, an ON signal is generated and transmitted to the airbag sensor assembly.



Normal Condition

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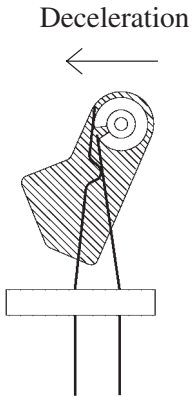

Activated Condition

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Airbag Sensor Assembly

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1) Description

The airbag sensor assembly is mounted on the center floor under the instrument panel. It receives signals from the airbag sensor enclosed in the airbag sensor assembly and front airbag sensor and judges whether the airbag and seat belt pretensioner must be activated or not, and then diagnoses system malfunctions.

2) Construction and Operation

The airbag sensor assembly consists of airbag sensor, safing sensor, ignition control circuit, diagnosis circuit, etc.

a. Airbag Sensor, Ignition Control Circuit

- The airbag sensor is enclosed in the airbag sensor assembly. Based on the deceleration of the vehicle that occurs during a collision, the distortion that is created in the sensor is converted into an electric signal. This signal is a linear representation of the deceleration rate.
- The ignition control circuit performs a prescribed calculation based on the signal output by the airbag sensor and the front airbag sensor. If these calculated values are larger than a predetermined value, it activates the ignition operation.

b. Safing Sensor

The safing sensor is enclosed in the airbag sensor assembly. The sensor turns ON and outputs an ON signal to the airbag sensor assembly if a deceleration force that is higher than a predetermined value is applied to the safing sensor as a result of a frontal collision.

c. Back-Up Power Source

The back-up power source consists of a power supply capacitor and a DC-DC converter. In case of a power system failure during a collision, the power supply capacitor discharges and supplies electric power to the system. The DC-DC converter is a boosting transformer when the battery voltage drops below a certain level.

d. Diagnosis Circuit

This circuit constantly diagnoses the system for any malfunction. When a malfunction is detected, it lights up the SRS warning light on the combination meter to alert the driver.

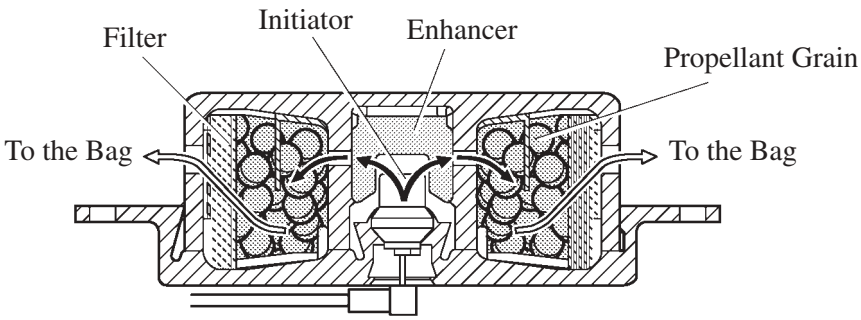
e. Memory Circuit

When a malfunction is detected by the diagnosis circuit, it is coded and stored in this memory circuit. However, if the power supply is cut off by turning the ignition switch OFF or by disconnecting the battery terminal, the diagnosis code will be deleted from the memory circuit.

Inflator

1) For Driver

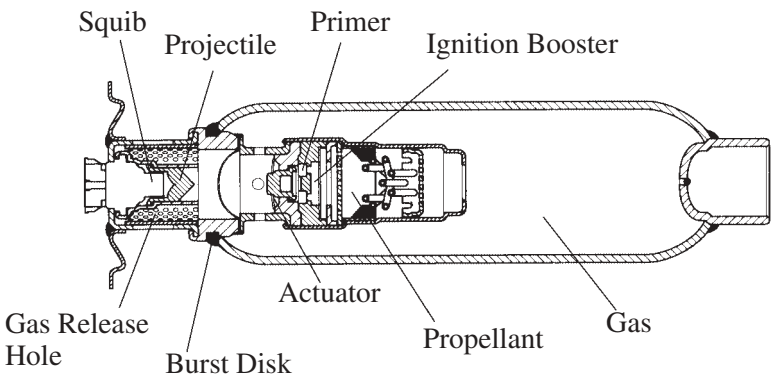
The inflator for driver is compraised of an initiator, enhancer, propellant grain, etc.
If the airbag sensor is activated by deceleration due to frontal collision, electric current then ignites the initiator located in the inflator. The flame spreads instantaneously to the propellant grain, and a large amount of nitrogen gas is generated from the propellant grain. The gas flows through the filter where cinders are removed and the gas is cooled before filling the bag. Then, as it expands, the driver's bag tears open the wheel pad outer layer to expand further and to help to restrain the impact applied to the head and chest of the driver.



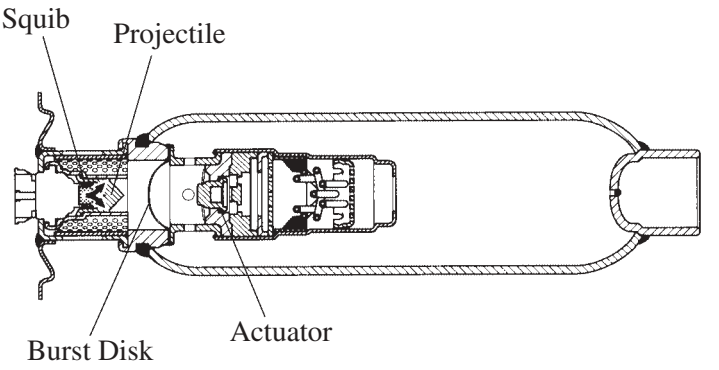
2) For Front Passenger

The inflator for front passenger is comprised of a squib, projectile, burst disk, propellant, high pressure argon gas and etc.
If the airbag sensor is turned on by deceleration due to frontal collision, electric current then ignites the squib located in the inflator. The projectile which fired by the ignition of the squib pierces through the burst disk and collides with the actuator, which causes the primer to ignite. The flame of the primer spreads instantaneously to the ignition booster and to the propellant. The gas which expanded by the heat of the ignition of the propellant flows into the airbag via the gas release hole, thus inflating the airbag.

▶ Construction ◀



▶ Operation ◀



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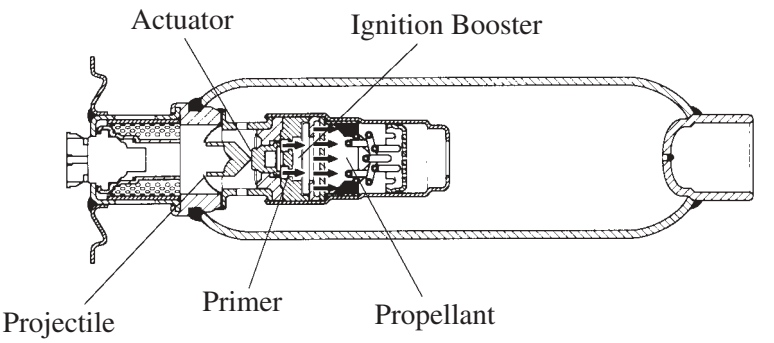

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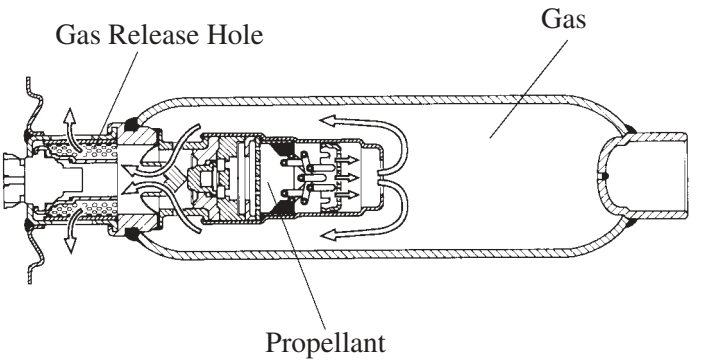

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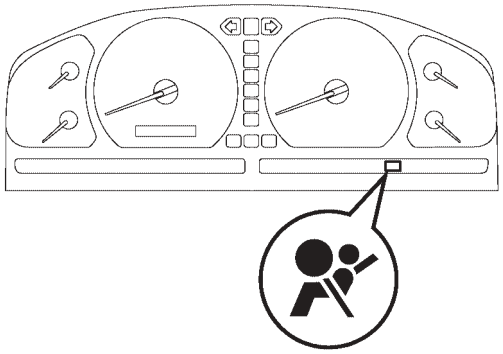
→ : Propagation of Fire
⇨ : Flow of Argon Gas

SRS Warning Light

The SRS warning light is located on the combination meter.
It comes on to alert the driver about the system trouble when a malfunction is detected in self-diagnosis of the airbag sensor assembly and side airbag sensor assembly. In normal operating conditions when the ignition switch is turned to the ACC or ON position, the light comes on for about 6 seconds and then goes off.



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Ignition Judgement and Condition

- When the vehicle collides in the hatched are (Fig. 1) and the shock is larger than a predetermined level, the airbag and the seat belt pretensioner are activated automatically. The airbag sensor is characteristically turned in such a way that can judge the need for ignition in collisions within the hatched area.
- The safing sensor is designed to be activated by a smaller deceleration rate than that of the airbag sensor. As illustrated in Fig. 2 below, ignition is operated when current flows to the squib. This happens when a safing sensor and the airbag sensor go on simultaneously.
- Airbag sensor assembly judges whether or not to inflate the airbag in accordance with ON/OFF of the front airbag sensor and the deceleration detected by the airbag sensor.

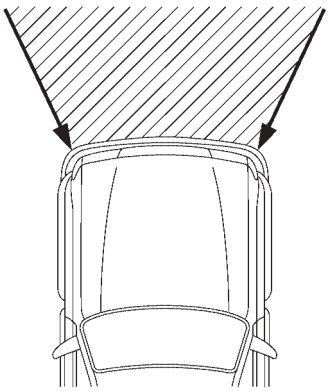

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Fig. 1

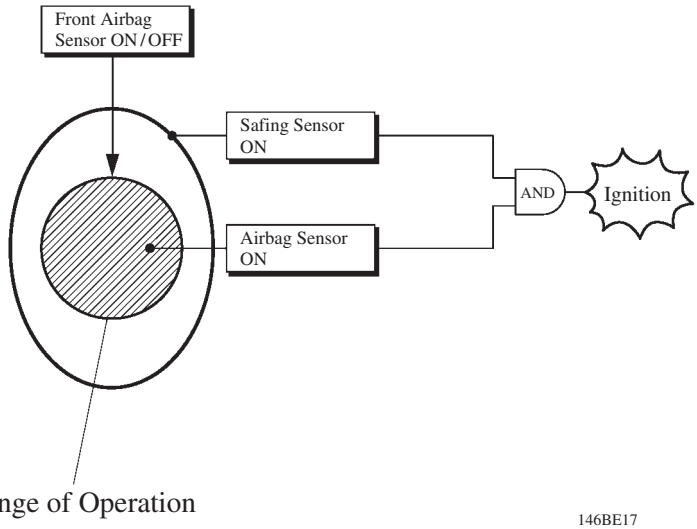

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Fig. 2

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