05I1H–01

SYSTEM DESCRIPTION

1. GENERAL

(a) In conjunction with impact absorbing structure for a frontal collision, the SRS (Supplemental Restraint System) driver and front passenger airbags were designed to supplement seat belts in the event of a frontal collision in order to help reduce shock to the head and chest of the driver and front passenger. This system is a 3–sensor type airbag system to detect the impact during a frontal collision using the airbag sensor assy center and front airbag sensors. It also operates the airbag system and seat belt pretensioner.

(b) In order to detect the extent of the collision during the initial stages of the collision in further detail, the front airbag sensors have been changed from mechanical type to electrical type deceleration sensors. Accordingly, the deployment of the driver and front passenger airbags is controlled in two stages according to the severity of the impact.

(c) In conjunction with impact absorbing structure for a side collision, the front seat and curtain shield airbags were designed to help reduce shock to the driver, front passenger, and rear outer passengers in the event of a side collision.

(d) The curtain shield airbag system that helps reduce shock to the front and rear seat occupants with a single curtain shield airbag has been adopted. In conjunction with this system, the side airbag sensor assy's have been installed at the bottom of the center pillars and the airbag sensor rear has been installed at the bottom of the rear pillars respectively.

(e) In this system, a front side collision is detected by the side airbag sensor assy in order to simultaneously deploy the side airbags. A rear side collision is detected by the airbag sensor rear and the airbag sensor assy center in order to deploy only the curtain shield airbag.

(f) A function that detects whether or not the front passenger seat is occupied with the occupant detection sensor and seat belt buckle switch and prohibits the operation of the front passenger airbags (front and side) and front passenger seat belt pretensioner has been adopted in the SRS airbag system.

(g) The airbag sensor assy center sends the airbag deployment signal to each ECU (Theft Deterrent ECU and ECM) through BEAN (Body Electronics Area Network) to operate each system (Collision door lock release control and fuel pump control).

2. CONSTRUCTION AND OPERATION

(a) AIRBAG SENSOR FRONT

(1) The front airbag sensor assy's are installed on the right and left front side members.

(2) The deceleration sensor is built into the front airbag sensor and the distortion that is created in the sensor is converted into an electric signal based on the vehicle deceleration rate during a frontal collision. Accordingly, the extent of the initial collision can be detected in detail.

(b) SIDE AIRBAG SENSOR ASSY

(1) The side airbag sensor assy's are installed on the bottom of the right and left center pillars. They receive signals from the deceleration sensor and determine whether the front seat airbag assy and curtain shield airbag assy should be activated, and diagnoses system malfunctions simultaneously.

(2) The side airbag sensor assy consists of the deceleration sensor, safing sensor, ignition control circuit, and diagnosis circuit.

(c) AIRBAG SENSOR REAR

(1) The airbag sensor rear is installed on the bottom of the right and left rear pillars respectively. This sensor uses a deceleration sensor for detecting the deceleration rate during a rear side collision.

(2) The deceleration sensor is built into the airbag sensor rear and the distortion that is created in the sensor is converted into an electric signal based on the vehicle deceleration rate during a rear side collision.

(d) OCCUPANT DETECTION SENSOR

(1) The occupant detection sensor, installed in the seat cushion of the front passenger seat, detects whether or not the front passenger seat is occupied.

(e) AIRBAG SENSOR ASSY CENTER

(1) General

- The airbag sensor assy center is installed on the center floor under the instrument panel.
- The airbag sensor assy center consists of the deceleration sensor, safing sensor, electronic safing sensor, ignition control circuit and diagnostic circuit.
- The airbag sensor assy center receives signals from the deceleration sensor and safing sensor built into the airbag sensor assy center and airbag sensor front. Then the airbag sensor assy center determines whether or not the driver and front passenger airbags and seat belt pretensioner should be activated, and diagnoses system malfunctions.
- The airbag sensor assy center causes the front seat airbag assy and the curtain shield airbag assy to deploy when receiving signals from the side airbag sensor assy.
- The airbag sensor assy center receives signals from the deceleration sensor and the electronic safing sensor built into the airbag sensor assy center and the airbag sensor rear, and determines whether or not the curtain shield airbag assy should be activated, and diagnoses system malfunctions.
- The airbag sensor assy center sends the airbag deployment signal to each ECU (Theft Deterrent ECU and ECM) through BEAN (Body Electronics Area Network) to operate each system (collision door lock release control and fuel pump control).

(2) Deceleration sensor and ignition control circuit

- The deceleration sensor is built into the airbag sensor assy center. The deceleration sensor is built into the airbag sensor front and the distortion that is created in the sensor is converted into an electric signal based on the vehicle deceleration rate during a front side or rear side collision. This signal is a linear representation of the deceleration rate.
- The ignition control circuit performs calculations based on the signal output from the deceleration sensors of the airbag sensor assy center and airbag sensor front. If the calculated values are greater than the specified values, it activates ignition operation.

(3) Safing sensor

- The safing sensor is built into the airbag sensor assy center. During a frontal collision, the sensor turns on and outputs an ON signal to the airbag sensor assy center if a deceleration rate greater than the specified value is applied to the safing sensor.

(4) Electronic safing sensor

- The electronic safing sensor is built into the airbag sensor assy center. During a rear side collision, the sensor turns on and outputs an ON signal to the airbag sensor assy center if a deceleration rate greater than the specified value is applied to the electronic safing sensor.

(5) Back–up power source

- The back–up power source consists of a power supply capacitor and a DC–DC converter. When the power system does not function during a collision, the power supply capacitor discharges and supplies electric power to the system. The DC–DC converter operates as a boosting transformer when the battery voltage falls below a predetermined level.

(6) Diagnostic circuit

- This circuit constantly diagnoses system malfunctions. When a malfunction is detected, it lights up the SRS warning light on the combination meter assy to inform the driver.

(7) Memory circuit

- When a malfunction is detected in the diagnostic circuit, it is coded and stored in the memory circuit.

(f) SRS WARNING LIGHT

(1) The SRS warning light is located on the combination meter assy. It comes on to inform the driver of system trouble when a malfunction is detected in self–diagnosis of the airbag sensor assy center and side airbag sensor assy. Under normal operating conditions when the ignition switch is turned to the ON position, it comes on for approximately 6 seconds and then goes off.

3. IGNITION DETERMINATION AND CONDITION

(a) FRONTAL COLLISION

(1) When the vehicle collides in the hatched are (Fig.1) and the shock is greater than the specified value, the airbags (driver and front passenger) are activated automatically. The deceleration sensor of the airbag sensor assy center determines whether or not ignition is necessary based on signals from the deceleration sensor of the airbag sensor front.

(2) The safing sensor of the airbag sensor assy center was designed to be turned on at a smaller deceleration rate than the deceleration sensor. If the safing sensor and the deceleration sensor turn on simultaneously, current flows to the squib and deploys the driver and front passenger airbags as shown in illustration Fig.2.

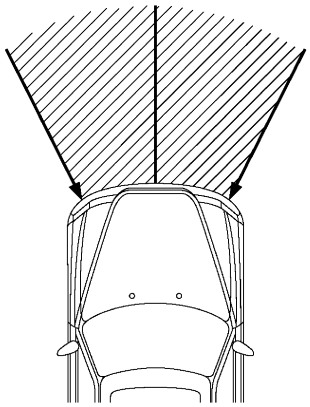
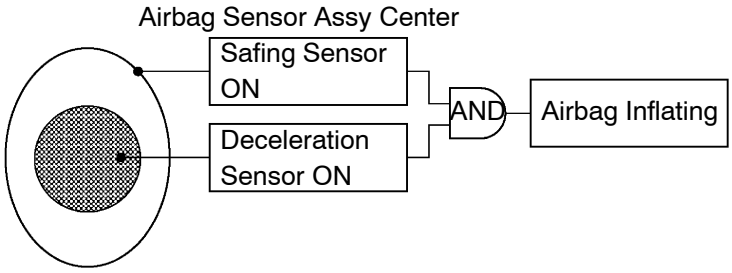


Fig.1



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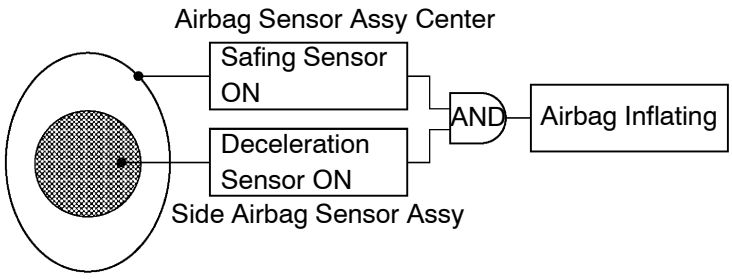
(b) FRONT SIDE COLLISION

(1) The safing sensor of the side airbag sensor assy was designed to be turned on at a smaller deceleration rate than the deceleration sensor of the side airbag sensor assy. As illustrated below, when both the safing sensor and the deceleration sensor go on simultaneously, current flows to the initiator and ignition occurs.



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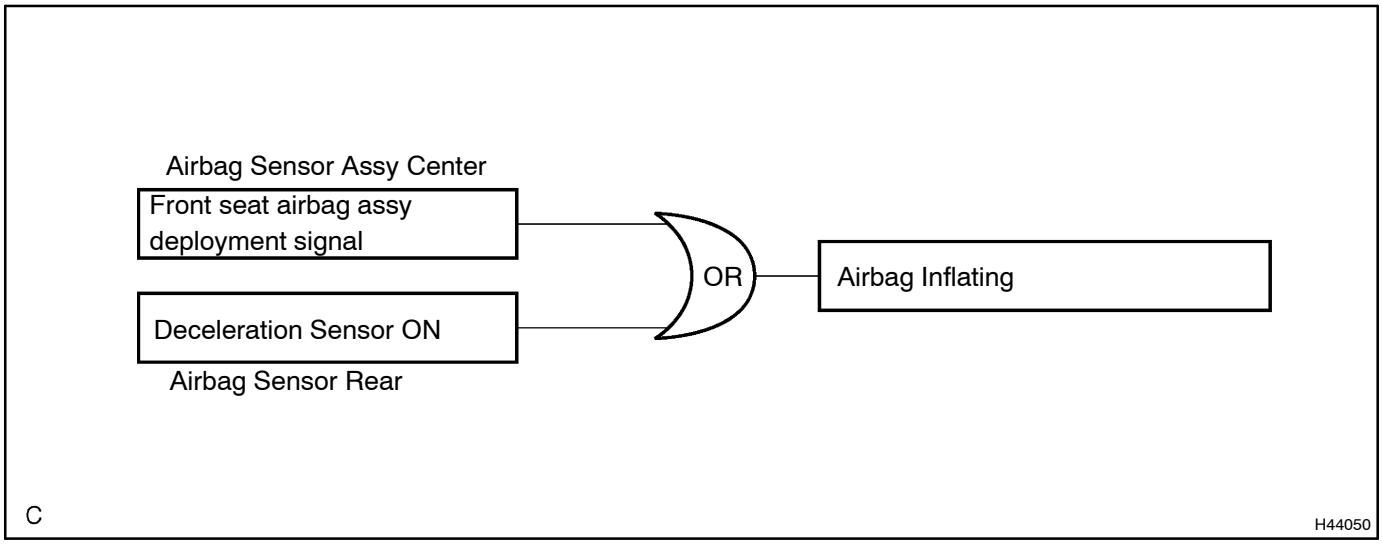
(c) REAR SIDE COLLISION

(1) The electronic safing sensor of the airbag sensor assy center was designed to be turned on at a smaller deceleration rate than the deceleration sensor of the airbag sensor rear. As illustrated below, when both the safing sensor and the deceleration sensor go on simultaneously, current flows to the initiator and ignition occurs.



4. AIRBAG DEPLOYMENT PROHIBITION FUNCTION

(a) This function uses the occupant detection sensor and front passenger seat belt buckle switch to detect whether or not the front passenger seat is occupied. If the airbag sensor assy center determines that the front passenger seat is unoccupied, it prohibits the deployment of the front passenger airbags (front and side) and front passenger seat belt pretensioner.