

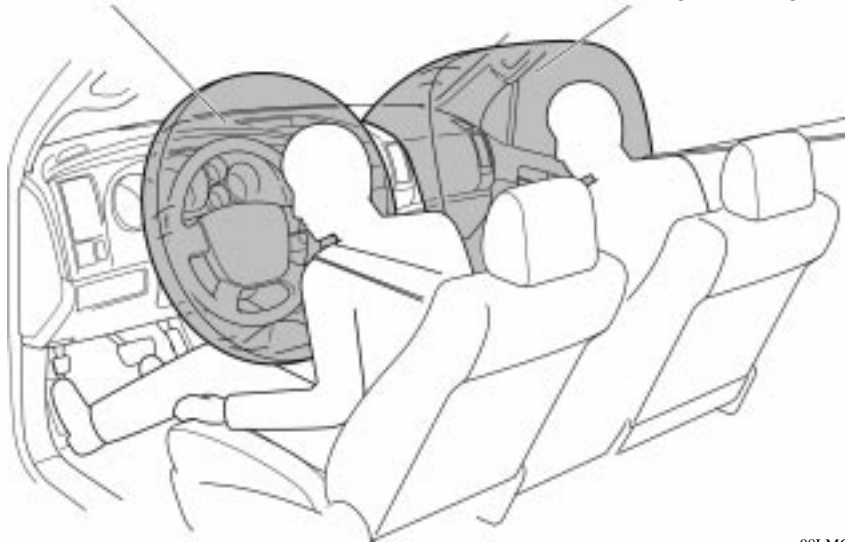
## SRS AIRBAG SYSTEM

### ■ DESCRIPTION

- An SRS airbag system is standard equipment on all models.
- The driver and front passenger dual-stage SRS (Supplemental Restraint System) airbags supplement the seat belts to help to reduce the shocks to the heads and chests of the driver and front passenger in the event of a frontal collision.
- The SRS side airbags are used in the event of a side impact collision to help to reduce the shocks to the chests of the driver or front passenger.
- The SRS curtain shield airbags are used in the event of a side or rear side impact collision to help to reduce the shocks to the heads of the driver, front passenger, rear No. 1 seat outer passengers or rear No. 2 seat outer passengers.

SRS Driver Airbag

SRS Front Passenger Airbag



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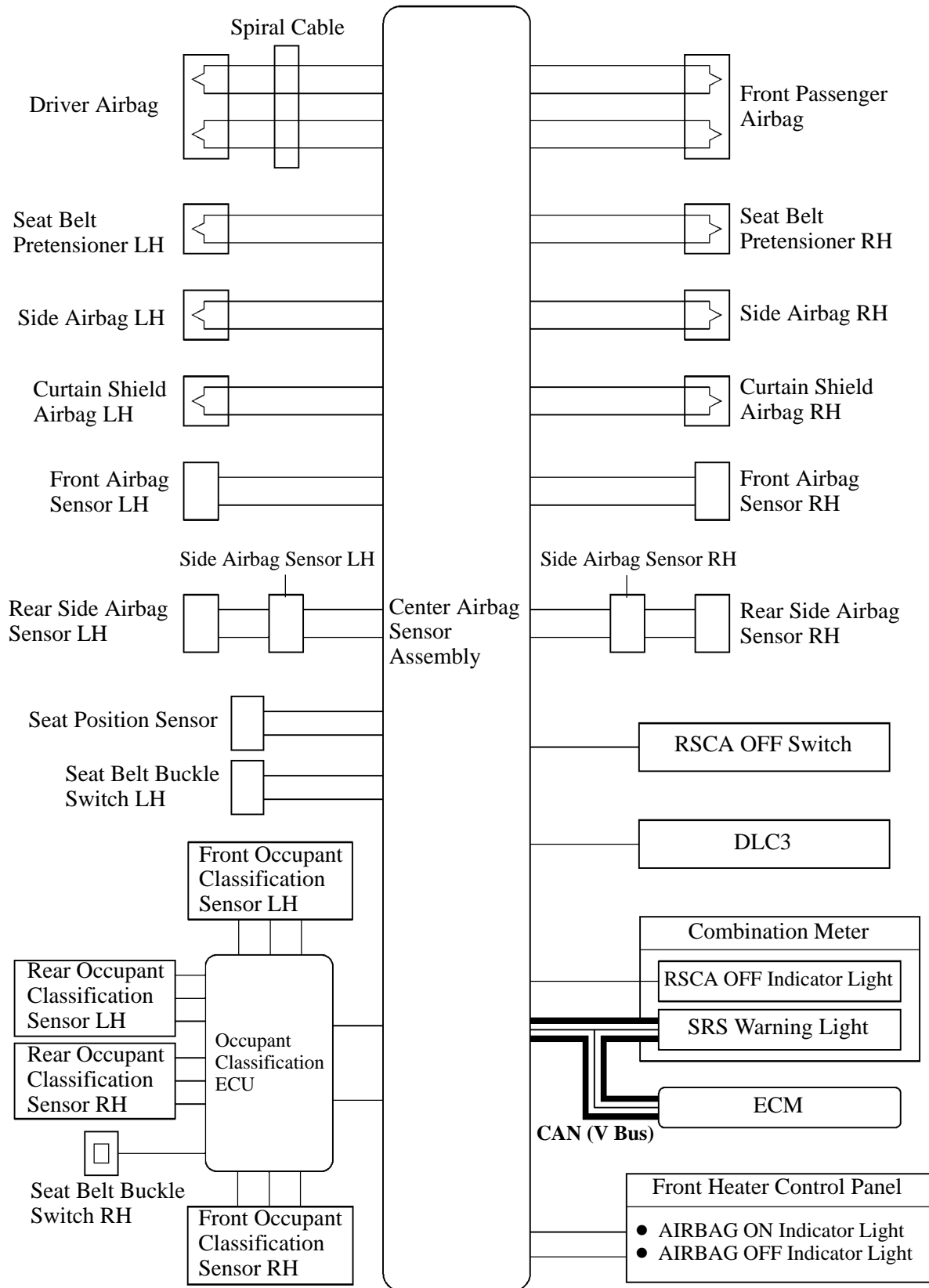
SRS Curtain Shield Airbag

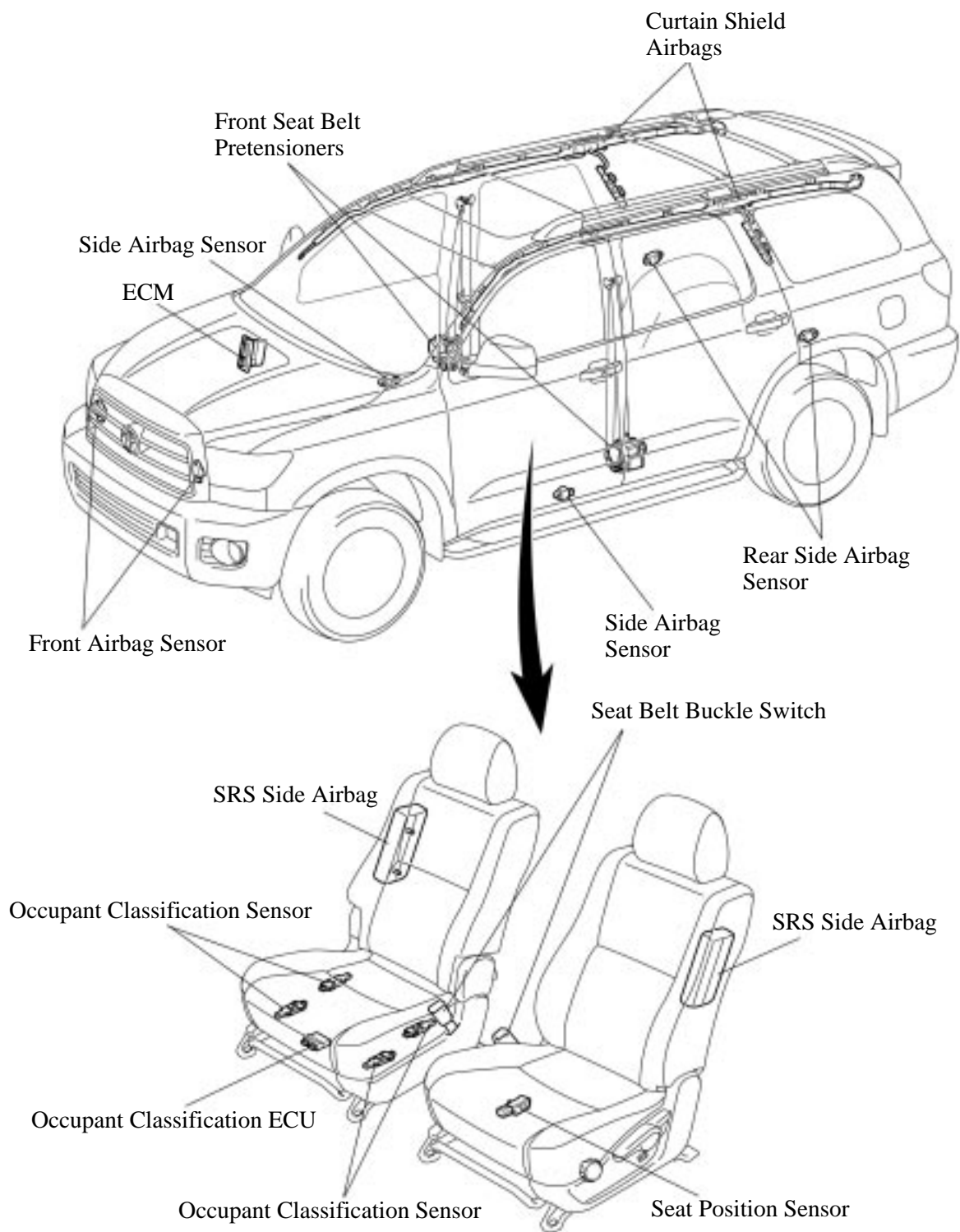
SRS Side Airbag

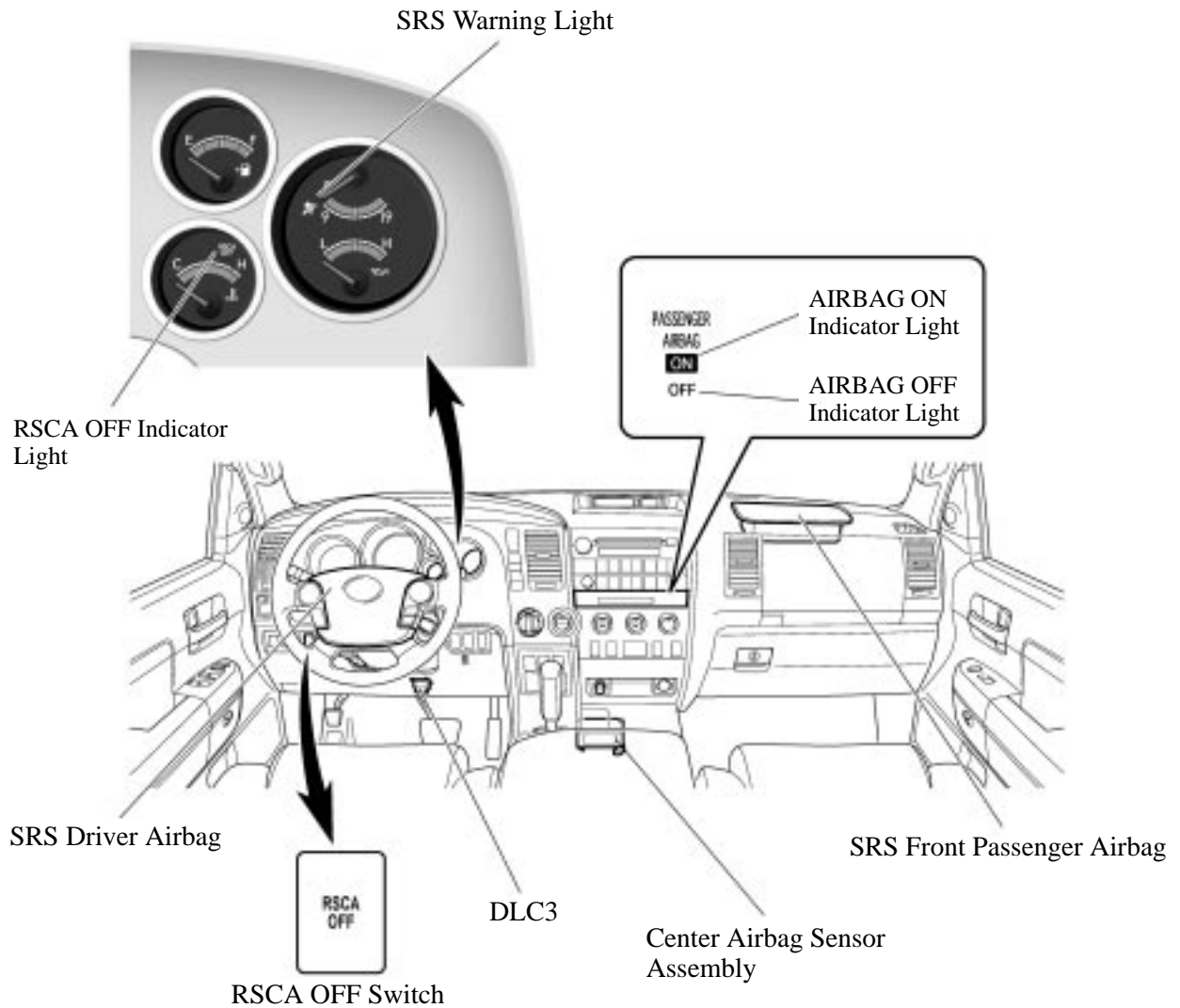


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# **SYSTEM DIAGRAM**



**■ LAYOUT OF MAIN COMPONENTS**



## ■ AIRBAG FOR FRONTAL COLLISION

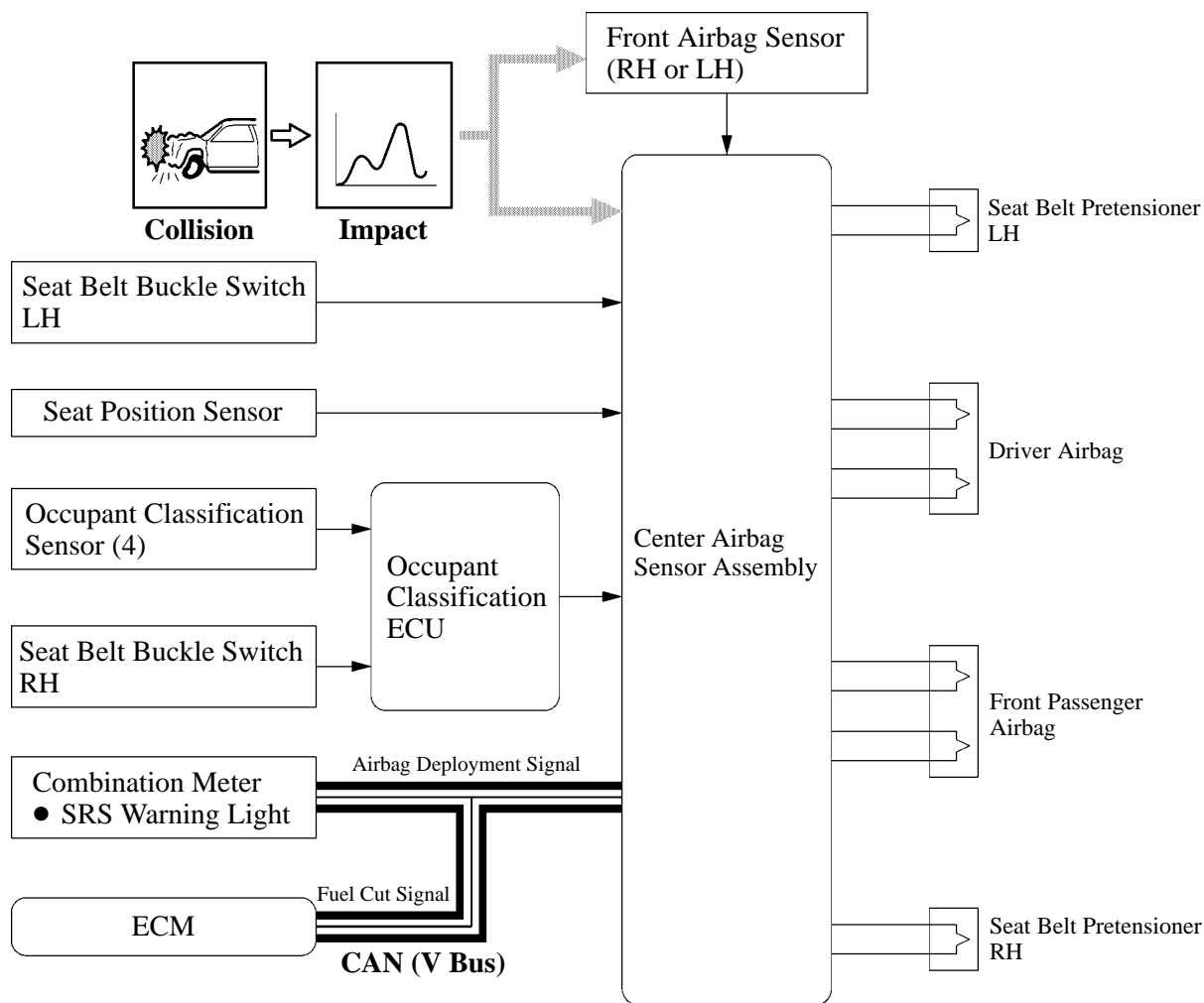
### 1. General

There are two airbags for frontal collisions: driver and front passenger. These airbags deploy simultaneously. The SRS driver and front passenger airbags use a dual-stage control.

- The center airbag sensor assembly detects the information indicated below from various sources in order to activate the dual-stage control.

Airbag	Information	Source
Driver	Extent of Impact	<ul style="list-style-type: none"> <li>• Front Airbag Sensor RH or LH</li> <li>• Center Airbag Sensor Assembly</li> </ul>
	Driver Seat Position	Seat Position Sensor
	Seat Belt Condition	Seat Belt Buckle Switch (Non-contact Type)
Front Passenger	Extent of Impact	<ul style="list-style-type: none"> <li>• Front Airbag Sensor (RH or LH)</li> <li>• Center Airbag Sensor Assembly</li> </ul>
	Occupant Classification	Occupant Classification Sensors (4) (Through the Occupant Classification ECU)
	Seat Belt Condition	Seat Belt Buckle Switch (Non-contact Type) (Through the Occupant Classification ECU)

### 2. System Diagram



### 3. SRS Driver and Front Passenger Airbags

The SRS driver and front passenger airbags each contain a set of two initiators and propellants. The center airbag sensor assembly helps optimize the airbag inflation output by controlling the inflation timing of these initiators.

### 4. Front Airbag Sensor

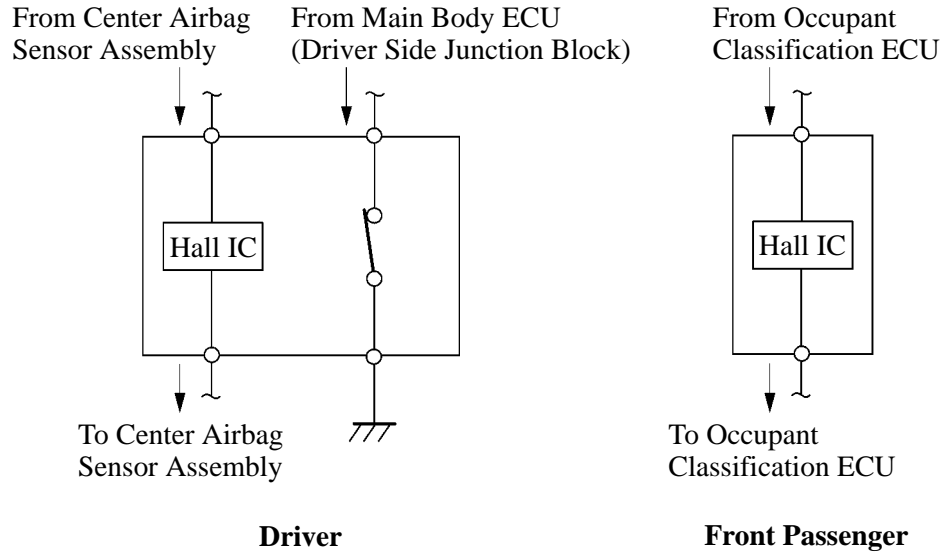
The front airbag sensor uses an electrical type deceleration sensor. Based on the deceleration of the vehicle during a front collision, a distortion is created in the sensor and converted into an electrical signal. Accordingly, the extent of the initial collision can be detected in detail.

### 5. Seat Belt Buckle Switch

The seat belt buckle switch detects that the seat belt is fastened.

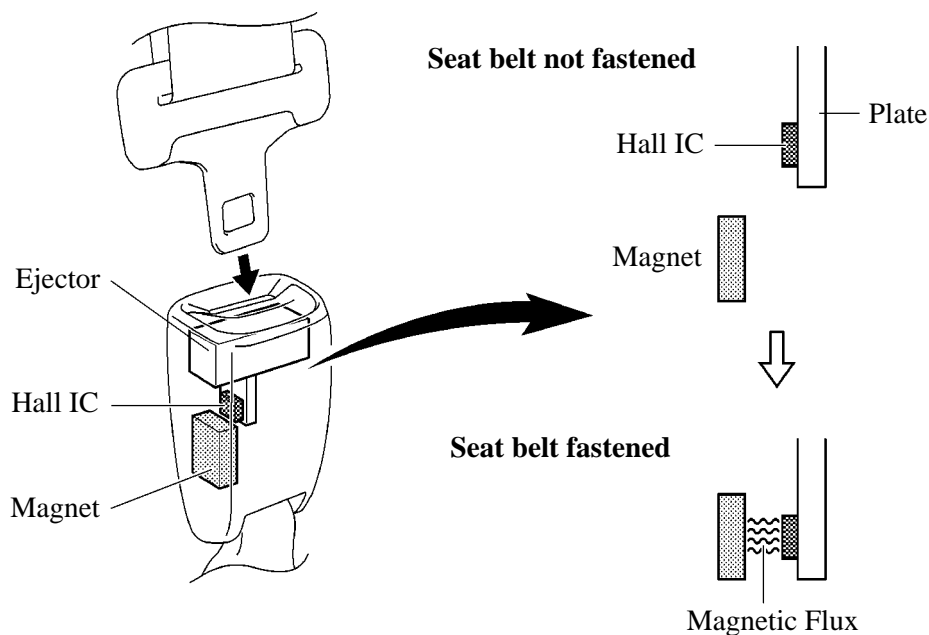
- A contact type switch and a non-contact type switch are built into the seat belt buckle on the driver side. The contact type switch is for the seat belt reminder system and the non-contact type switch is for the SRS airbag system.
- A non-contact type switch is built into the seat belt buckle on the front passenger side.
- The non-contact type switch contains a Hall IC and two magnets, installed into the front seat inner belt assembly.

#### ► Electrical Circuit ◀



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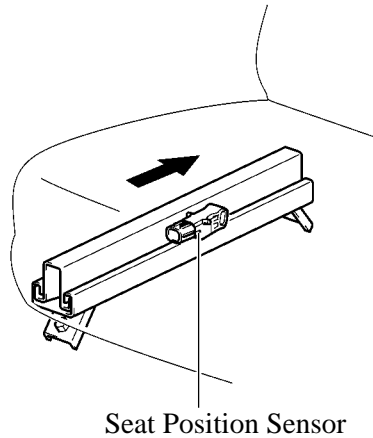
- The ejector inside the front seat inner belt assembly and the plate installed to the ejector move when the seat belt is removed or inserted. The movement of the plate changes the magnetic flux density of the magnet.
- The Hall IC detects changes in the magnetic flux density. These changes indicate that the seat belt is either fastened or unfastened, and the Hall IC outputs a signal to the center airbag sensor assembly (for driver) or occupant classification ECU (for front passenger).



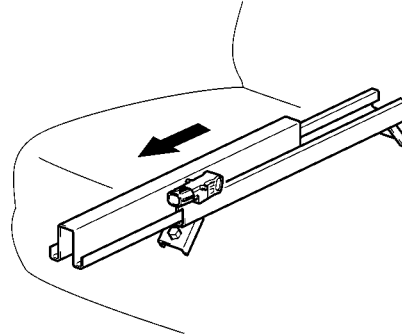
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## 6. Seat Position Sensor

The seat position sensor detects the slide position of the driver seat. This sensor, which uses a Hall IC, detects changes in the magnetic flux that occur due to the movement of the upper rail.



**Seat position is rearward**



**Seat position is frontward**

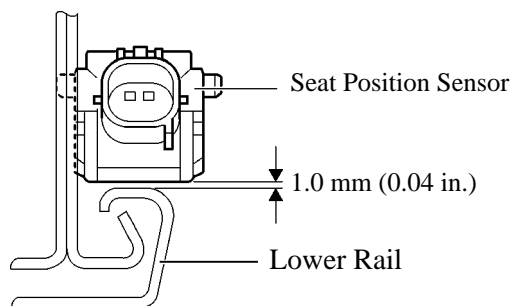
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### Service Tip

Follow the procedure indicated below to install the seat position sensor.

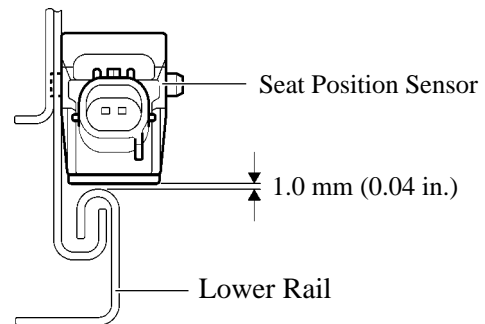
- 1) Insert a 1.0 mm (0.04 in.) feeler gauge between the seat position sensor and the lower rail portion.
- 2) Tighten the mounting bolt to the specified torque with the seat position sensor pushed down as shown.

For details, see the 2008 Sequoia Repair Manual (Pub. No. RM08L0U).



**For Manual Seat**

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**For Power Seat**

04E0BE80C



## ■ AIRBAG FOR SIDE/REAR SIDE COLLISION

### 1. General

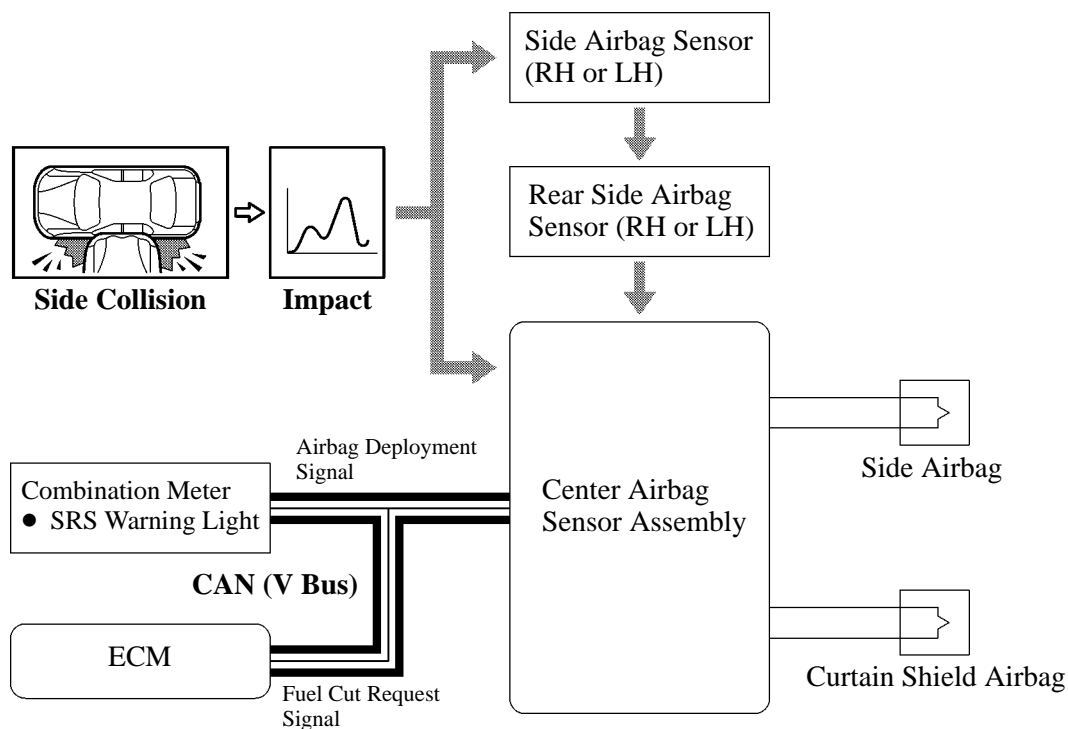
For severe side collisions there are two airbags: side airbag and curtain shield airbag. These airbags deploy simultaneously.

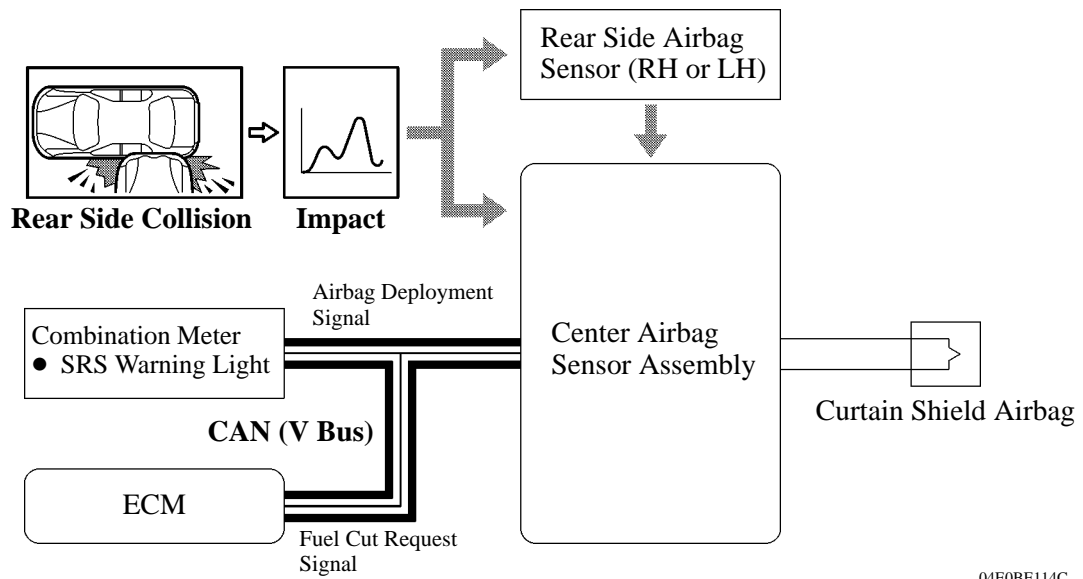
For severe rear side collisions, only the curtain shield airbag will deploy.

- For a side collision, if the side and rear side airbag sensors detect an impact, they send that information to the center airbag sensor assembly via the rear side airbag sensor, and the center airbag sensor assembly causes the side and curtain shield airbags to be deployed simultaneously.
- For a rear side collision, if the rear side airbag sensor detects an impact, it sends that information to the center airbag sensor assembly, and the center airbag sensor assembly causes the curtain shield airbag to be deployed.

### 2. System Diagram

#### For Side Collision



**For Rear Side Collision****3. SRS Side Airbag**

SRS side airbags are installed in the seatbacks of the driver seat and the front passenger seat. Each SRS side airbag is a one-piece design, consisting of an inflator, a bag, and a cover.

**4. SRS Curtain Shield Airbag**

SRS curtain shield airbags are installed in the area close to the sides of the headliner. Each SRS curtain shield airbag is a one-piece design, consisting of an inflator, a bag, and a cover.

**5. Side/Rear Side Airbag Sensors**

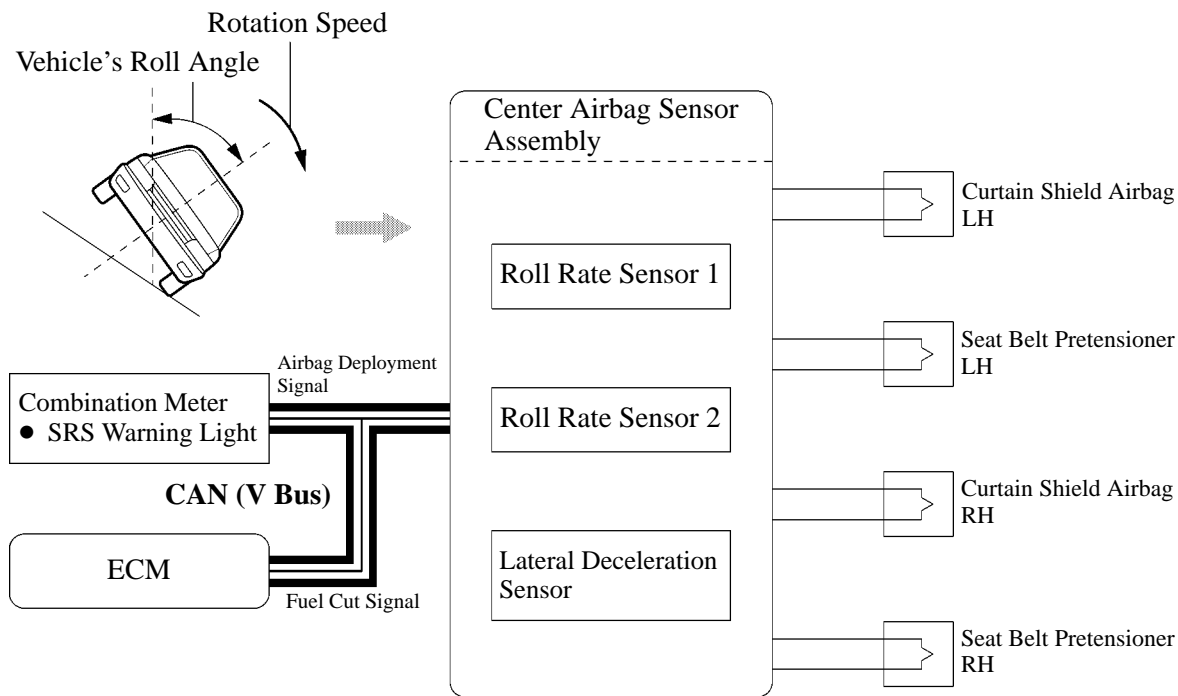
A deceleration sensor is enclosed in the side and rear side airbag sensors. Based on the deceleration of the vehicle during a side or rear side collision, a distortion is created in the sensor and converted into an electrical signal.

## ■ AIRBAG FOR ROLLOVER

### 1. General

When the vehicle is rolling sideways, the RSCA (Roll Sensing Curtain Shield Airbag) helps to reduce the impact that is applied to the occupants by operating the left and right curtain shield airbags and the seat belt pretensioners for the driver and front passenger.

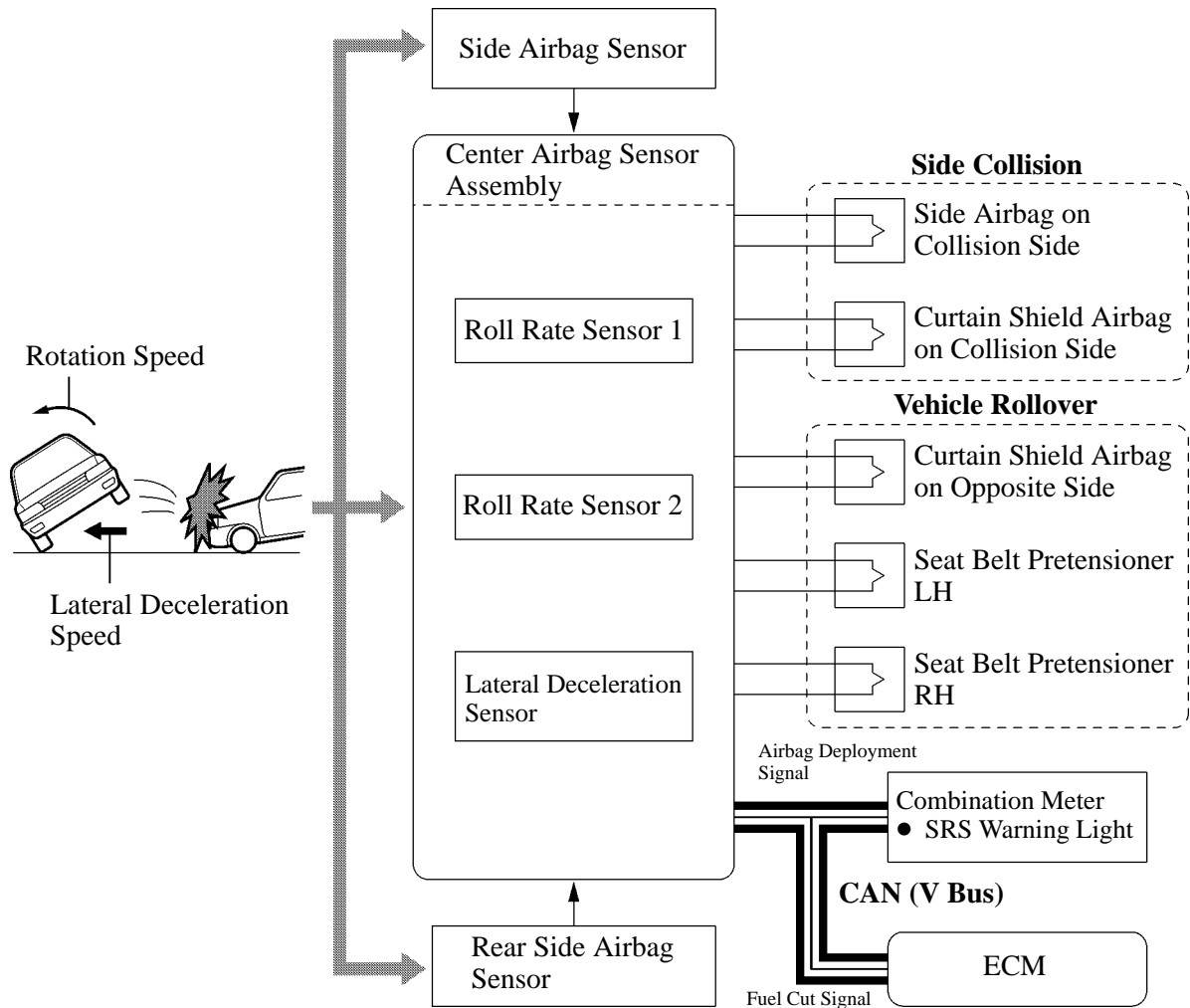
- If the vehicle rolls over due to an incline, the two roll rate sensors and one lateral deceleration sensor that are built into the center airbag sensor assembly detect the vehicle's roll angle, rotation speed and lateral deceleration speed.



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**Rollover due to Incline**

- If the vehicle has rolled over due to a side collision, the side airbag sensor detects the impact of the collision and deploys the side and curtain shield airbags on the side which experienced the collision. By detecting the rollover using the two roll rate sensors and one lateral deceleration sensor, the center airbag sensor assembly deploys the curtain shield airbag on the opposite side of the collision and activates the seat belt pretensioners for the driver and front passenger.



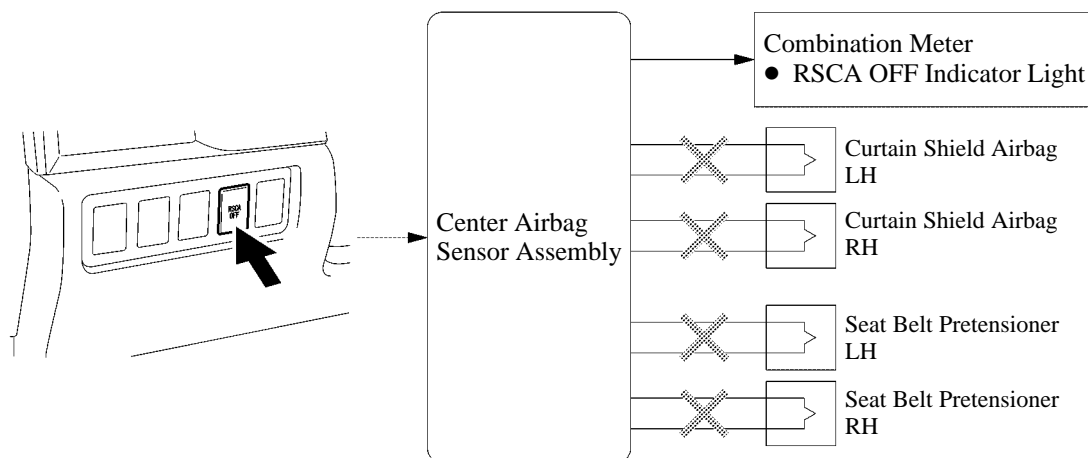
Rollover due to Side Collision

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## 2. RSCA OFF Switch

In consideration of offroad driving, an RSCA OFF switch is used to enable the driver to cut off the RSCA control at will.

- If the RSCA OFF switch remains pressed for 2 seconds or more, the center airbag sensor assembly cuts off the operation of the RSCA.
- In the case of a side collision, the center airbag sensor assembly will operate the curtain shield airbags regardless of whether the RSCA OFF switch is ON or OFF.



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## FRONT PASSENGER OCCUPANT CLASSIFICATION SYSTEM

### 1. General

The front passenger occupant classification system judges whether the front passenger seat is occupied by an adult or child (with child seat) or is unoccupied, in accordance with the load that is applied to the front passenger seat and whether the seat belt is buckled. Thus, it restricts the deployment of the front passenger airbag, the front passenger side airbag, and the front passenger seat belt pretensioner. In addition, the system informs the driver of the result of the judgment through the use of the AIRBAG ON/OFF indicator lights.

- This system consists of the occupant classification ECU, four occupant classification sensors, AIRBAG ON/OFF indicator lights, seat belt buckle switch, and center airbag sensor assembly.
- The front passenger SRS items and indicator lights operate as follows according to the occupant classification:

●: Deploys —: Does Not Deploy

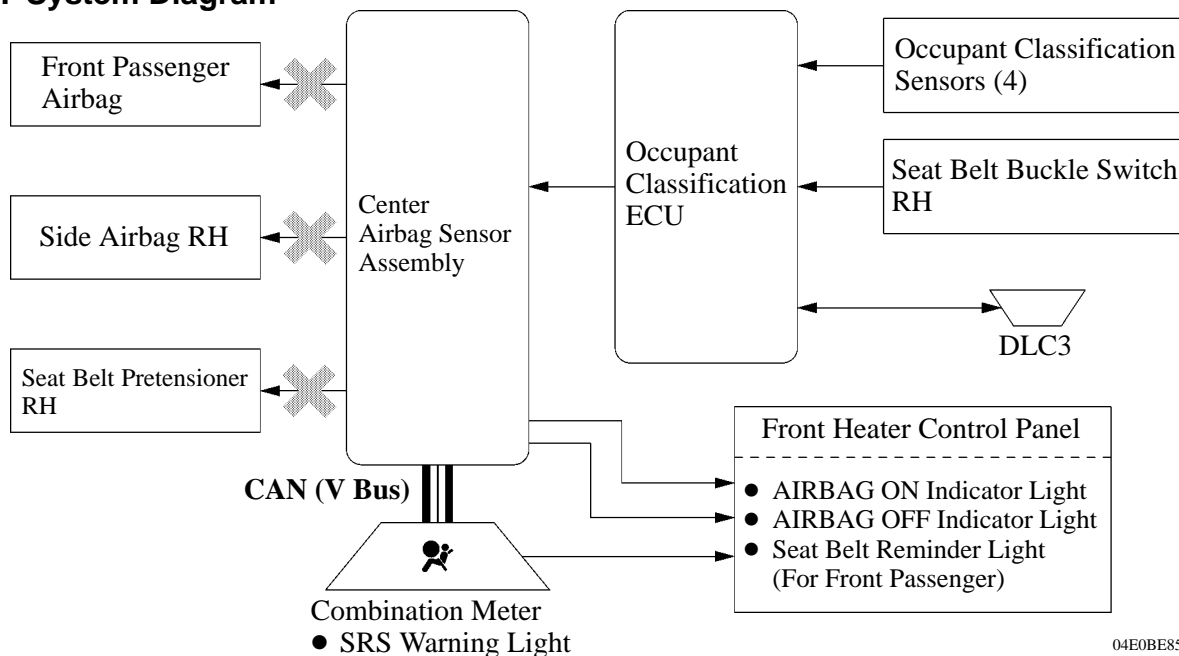
Items		Occupant Classification				
		Adult	Child	Child Seat	Un-occupied	Mal-function
Front Passenger SRS Items	Front Airbag	●	—	—	—	—
	Side Airbag	●	—	—	—	—
	Curtain Shield Airbag	●	●	●	●	●
	Seat Belt Pretensioner	●	●	●	—	●
Indicator Light	AIRBAG ON Indicator Light	ON	OFF	OFF	OFF	OFF
	AIRBAG OFF Indicator Light	OFF	ON	ON	OFF	ON

#### Service Tip

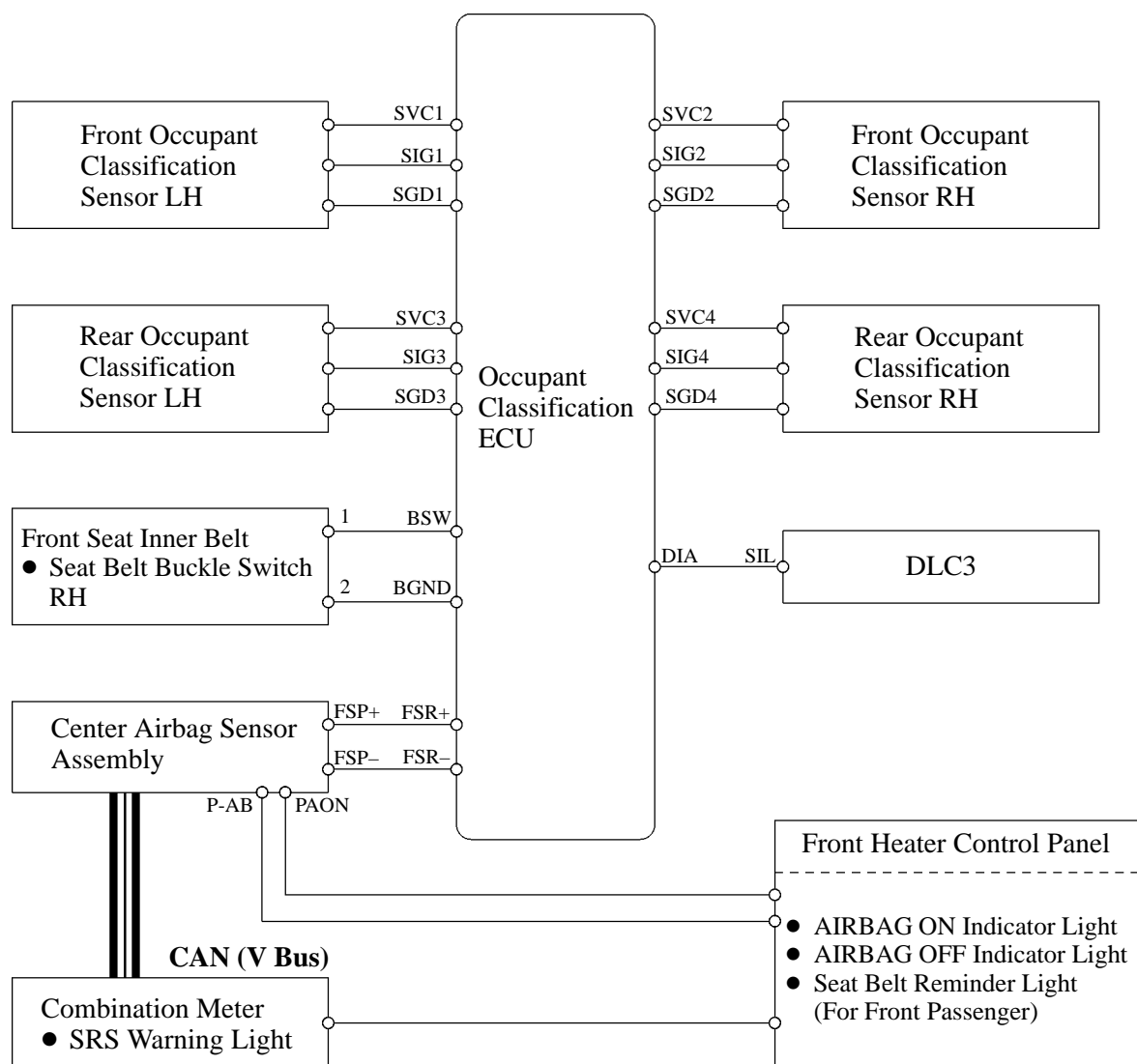
- When installing items to the front passenger seat or removing/installing the front passenger seat, connect the Techstream and perform a system check and a zero-point calibration of the sensor load value.
- If performing maintenance due to the SRS warning light being on constantly or due to a collision, in addition to the above item, check that the Techstream display value indicates within the range of 30 kg (66 lb)  $\pm$  3 kg (6.6 lb) when a 30 kg (66 lb) weight is placed on the front passenger seat.

For details, see the 2008 Sequoia Repair Manual (Pub. No. RM08L0U).

### 2. System Diagram

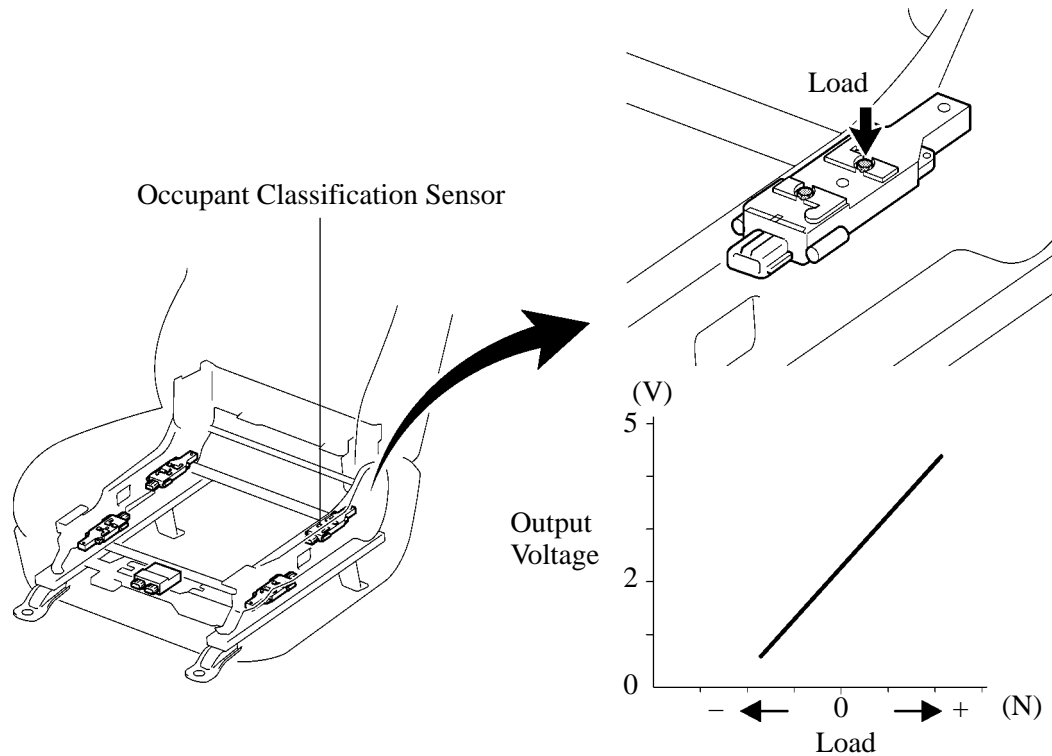


### 3. Wiring Diagram



#### 4. Occupant Classification Sensor

The occupant classification sensors are installed on four brackets connecting the seat rail and the seat frame. The resistance values of these sensors, which vary in accordance with the distortion that acts on the brackets, are output to the occupant classification ECU.



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## 5. System Operation

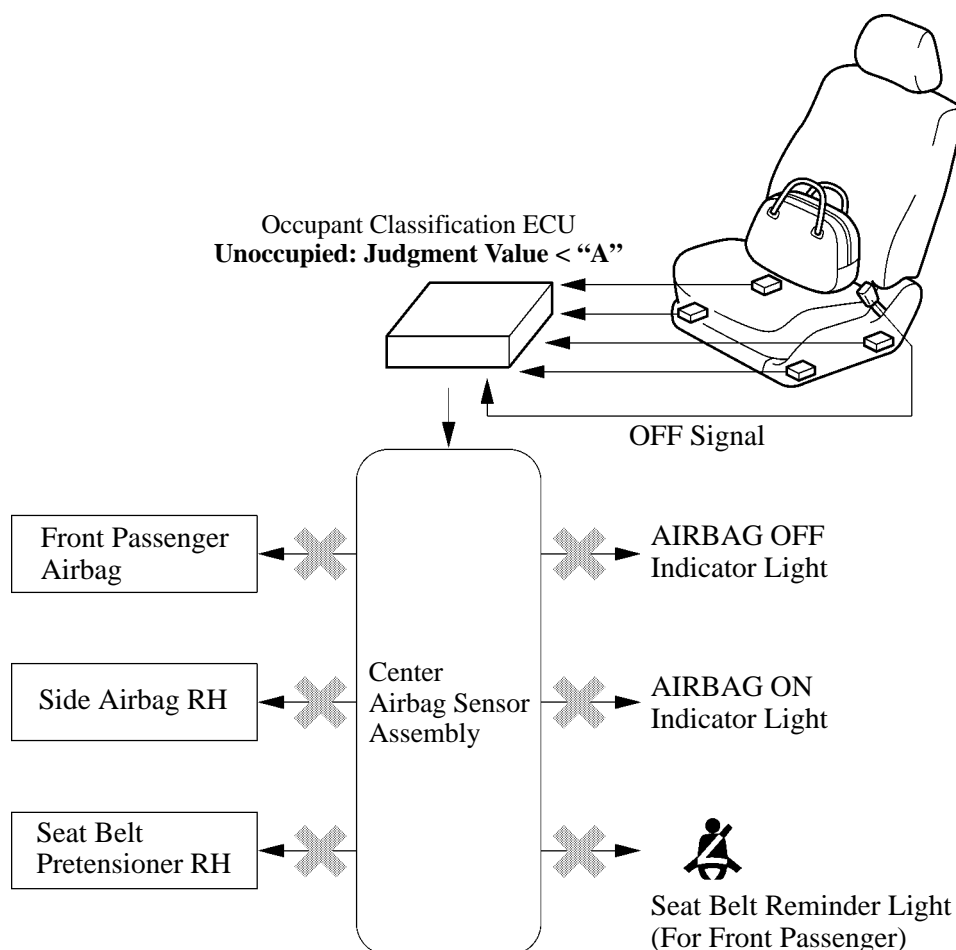
### General

This system makes the following judgments: unoccupied judgment, child seat judgment, child judgment, and adult judgment. In addition, it performs an initial check to check the circuit of the AIRBAG ON/OFF indicator lights when the ignition switch is ON.

- The occupant classification ECU constantly monitors the weight on the front passenger seat, and makes a judgment in accordance with the signals from the occupant classification sensor and the state of the seat belt buckle switch.
- The occupant classification ECU contains criteria value “A” to judge whether the seat is being occupied by a child or a child seat in accordance with the signals from the four occupant classification sensors and seat belt buckle switch, and criteria value “B” to judge whether the occupant is an adult or child (with child seat).
- The occupant classification ECU makes an occupied or unoccupied judgment in accordance with the signals from the seat belt buckle switch.

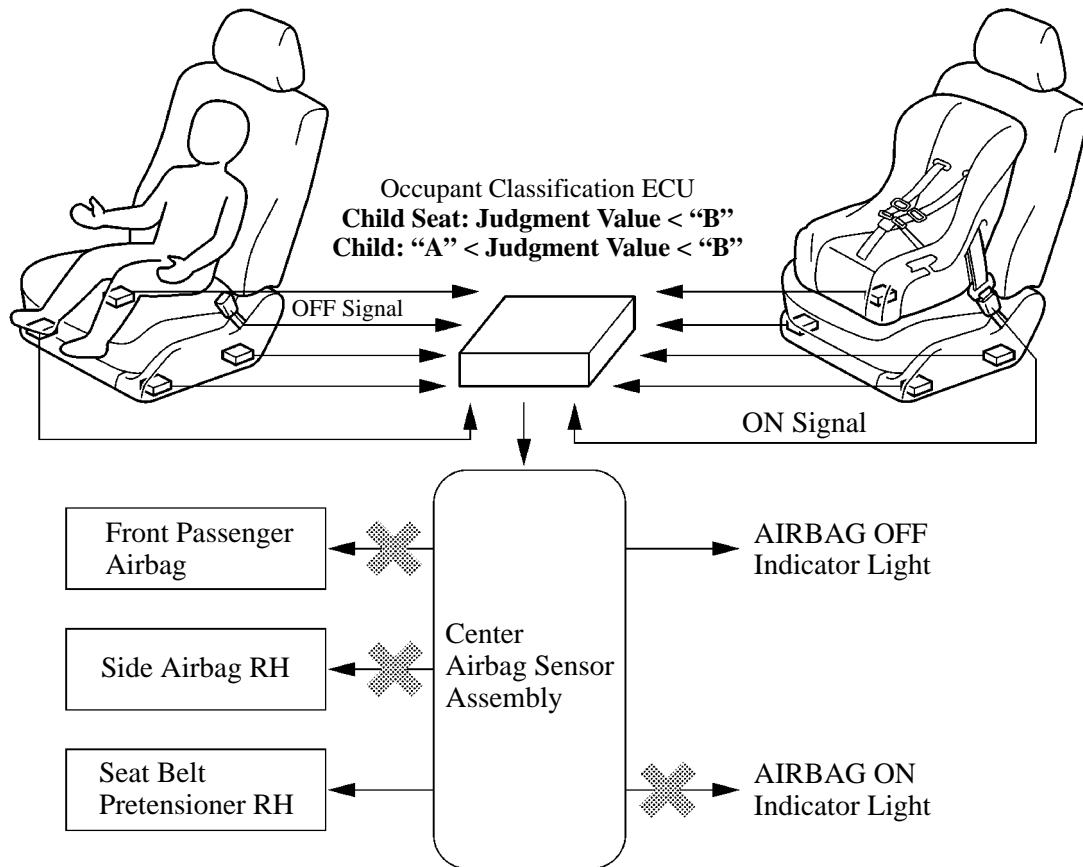
### Unoccupied Judgment

- The occupant classification ECU makes an unoccupied judgment when the judgment value is lower than criteria value “A” and the seat belt buckle switch RH is OFF.
- If the ignition switch is turned ON in this state, the system performs an initial check, and does not illuminate the AIRBAG ON/OFF indicator lights. Then, the system prohibits the deployment of the front passenger airbag, side airbag RH, and the seat belt pretensioner RH, and does not blink the seat belt reminder light.



### Child Seat or Child Judgment

- If the judgment value is lower than criteria value “B” and the seat belt buckle switch RH is ON, the occupant classification ECU judges that a child seat is installed.
- If the judgment value is higher than criteria value “A”, but lower than criteria value “B”, and the seat belt buckle switch is OFF, the occupant classification ECU judges that the seat is being occupied by a child.
- When the ignition switch is turned ON under these conditions, the system performs an initial check and illuminates the AIRBAG OFF indicator light to indicate that the front passenger airbag and the side airbag RH have been deactivated.

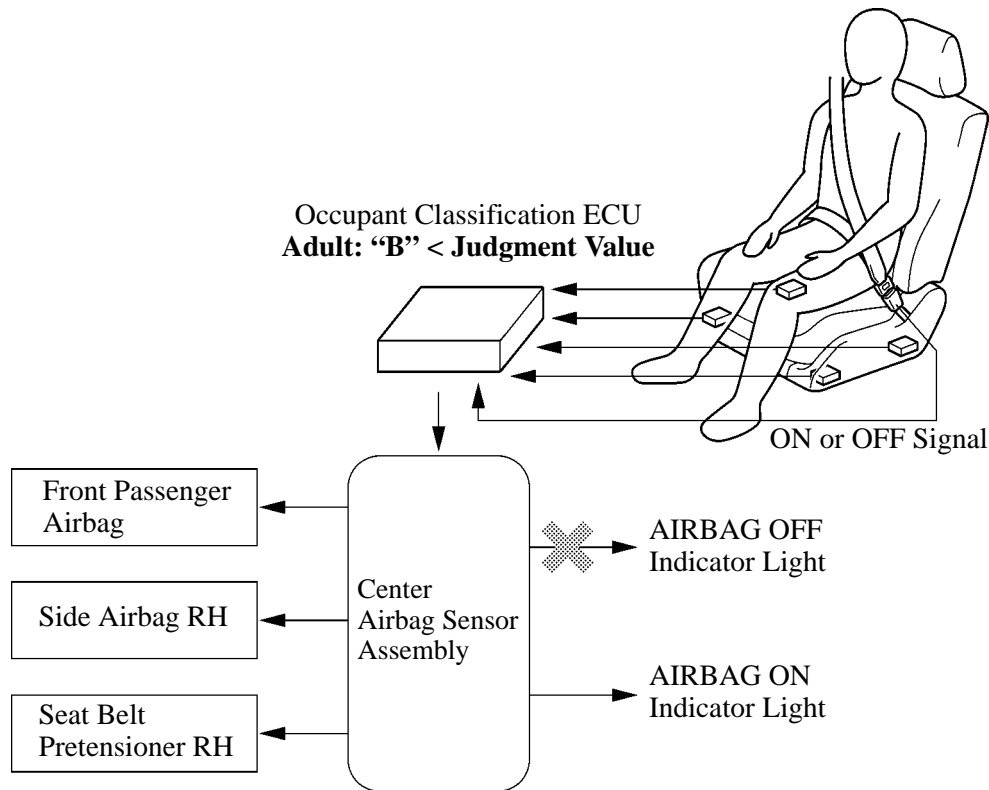


D13N56

- After the occupant classification ECU judges that a child seat is installed, the AIRBAG OFF indicator light does not go off unless the seat belt buckle switch is turned OFF.

## Adult Judgment

- When the judgment value is higher than criteria value “B”, the occupant classification ECU judges that the seat is being occupied by an adult.
- If the ignition switch is turned ON in this state, the system performs an initial check and illuminates the AIRBAG ON indicator light, indicating that the front passenger airbag and the side airbag RH are active.

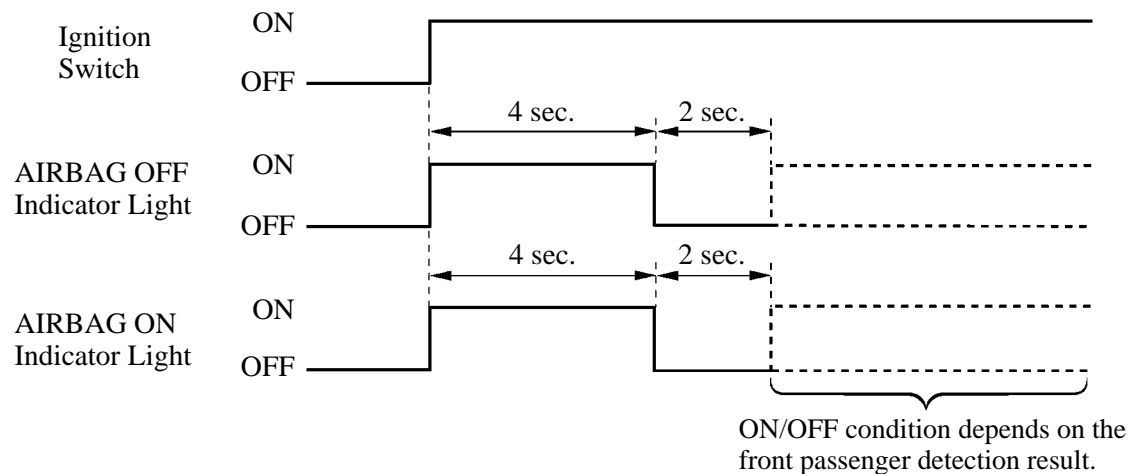


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- After the occupant classification ECU judges that the occupant is an adult, if the judgment value is criteria value “B” or less according to occupant load movement, the ECU continues adult judgment for approximately ten seconds before switching the child judgment.

## Initial Check

After the ignition switch is turned ON, the occupant classification ECU lights up the AIRBAG ON/OFF indicator lights via center airbag sensor assembly based on the timing chart below in order to check the indicator light circuits.



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## 6. Precautions for Front Passenger Occupant Classification System Operation

To avoid potential death or serious injury when the front passenger occupant classification system does not detect the conditions correctly, observe the following.

- Wear the seat belt properly.
- Make sure that the front passenger's seat belt tab is not inserted into the buckle before someone sits in the front passenger seat.
- Make sure the AIRBAG ON indicator light is illuminated when using a seat belt extender for the front passenger seat. If the AIRBAG OFF indicator light is illuminated, disconnect the extender tongue from the seat belt buckle, then reconnect the seat belt. Reconnect the seat belt extender after making sure the AIRBAG ON indicator light is illuminated. If you use the seat belt extender while the AIRBAG OFF indicator light is illuminated, the front passenger airbag and side airbag RH may not activate correctly, which could cause death or serious injury in the event of collision (the seat belt extender always needs to be connected to the seat mounted buckle after the occupant sits in the seat).
- Do not put a heavy load in the front passenger seatback pocket or attach a seatback table to the front passenger seatback.
- Do not put weight on the front passenger seat by putting your hands or feet on the front passenger seatback from the rear passenger seat.
- Do not let a rear passenger lift the front passenger seat with their feet or press on the seatback with their legs.
- Do not put objects under the front passenger seat.
- Do not recline the front passenger seat seatback so far that it touches a rear seat. This may cause the AIRBAG OFF indicator light to be illuminated, which indicates that the passenger's airbags will not deploy in the event of a severe accident. If the seatback touches the rear seat, return the seatback to a position where it does not touch the rear seat.

Keep the front passenger seatback as upright as possible when the vehicle is moving. Reclining the seatback excessively may lessen the effectiveness of the seat belt system.

- Make sure the AIRBAG ON indicator light is illuminated when an adult sits in the front passenger seat. If the AIRBAG OFF indicator light is illuminated, ask the passenger to sit properly with back upright and against the seat, with legs comfortably extended and wear the seat belt correctly. Nonetheless, if the AIRBAG OFF indicator light remains illuminated, let the passenger sit in the rear seat. When it is unavoidable to sit in the front passenger seat, ask the passenger to move the seat as far back as possible, and remain properly seated.
- When installation of a forward facing child restraint system on the front seat is unavoidable, install the child restraint system on the front passenger seat in the proper sequence.
- Do not kick the front passenger seat or subject it to severe impact. Otherwise, the SRS warning light may come on to indicate a malfunction of the front passenger occupant classification system.
- Child restraint systems installed on the rear seat should not contact the front seatbacks.

**■ EDR (EVENT DATA RECORDER)**

This vehicle has ECUs that monitor and control vehicle operation. These ECUs assist in driving and maintaining optimal vehicle performance. Besides storing data useful for troubleshooting, there is a system to record data in a crash or near crash event. This is called an EDR (Event Data Recorder). The center airbag sensor assembly contains the EDR.

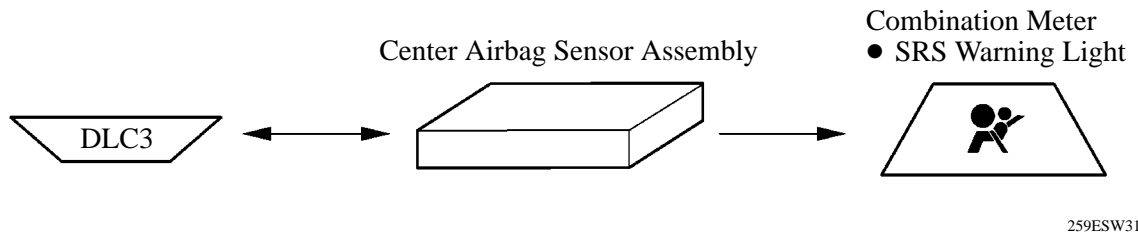
- In a crash or a near car crash event, this device may record some or all of the following information:
  - Whether the driver and front passenger wore the seat belts or not
  - Driver's seat position
  - SRS airbag deployment data
  - SRS airbag system diagnostic data
- The information above is intended to be used for the purpose of improving vehicle safety performance. Unlike general data recorders, the EDR does not record sound data such as conversation between passengers.
- Toyota will not disclose the data recorded in an EDR to a third party except when:
  - An agreement from the vehicle's owner (or the leasing company for a leased vehicle) is obtained
  - Officially requested by the police or other authorities
  - Used as a defense for Toyota in a law suit
  - Ordered by the court
- However, if necessary, Toyota will:
  - Use the data for research on Toyota vehicle safety performance
  - Disclose the data to a third party for research purposes without disclosing details of the vehicle owner, and only when it is deemed necessary
  - Disclose summarized data cleared of vehicle identification information to a non-Toyota organization for research purposes

## ■ DIAGNOSIS

### 1. General

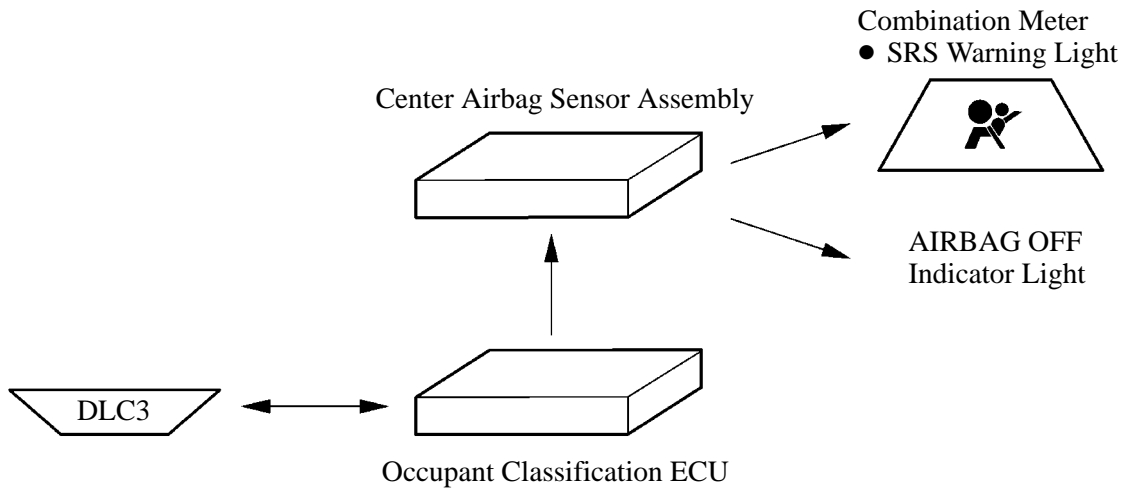
If the center airbag sensor assembly detects a malfunction in the SRS airbag system, the center airbag sensor assembly stores the malfunction data in memory, in addition to illuminating the SRS warning light.

- The center airbag sensor assembly outputs the malfunction data, 5-digit DTCs (Diagnostic Trouble Codes), to the Techstream or the SRS warning light.



If the occupant classification ECU detects a malfunction in the front passenger occupant classification system, the occupant classification ECU stores the malfunction data in memory. If the center airbag sensor assembly detects a malfunction in the occupant classification ECU, the center airbag sensor assembly illuminates the SRS warning light and AIRBAG OFF indicator light.

- The occupant classification ECU outputs 5-digit DTCs to the Techstream.



## **2. SRS Airbag System DTCs**

- The 5-digit DTCs can be read after connecting a Techstream to DLC3.
- If the SRS airbag deploys, the center airbag sensor assembly will turn ON the SRS warning light. However, different from the ordinary diagnosis function, a DTC will not be stored. The SRS warning light cannot be turned OFF. It is necessary to replace the center airbag sensor assembly with a new one.

## **3. Front Passenger Occupant Classification System DTCs**

There are 5-digit DTCs for the front passenger occupant classification system.

- The 5-digit DTCs can be read after connecting a Techstream to DLC3.

For details, see the 2008 Sequoia Repair Manual (Pub. No. RM08L0U).