■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 assembly, front seat side airbag assembly RH, and the front seat outer belt assembly RH (front passenger side pretensioner squib). 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, 4 occupant classification sensors, AIRBAG ON/OFF indicator lights, front seat inner belt assembly (front passenger side 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	Unoccupied	Malfunction
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

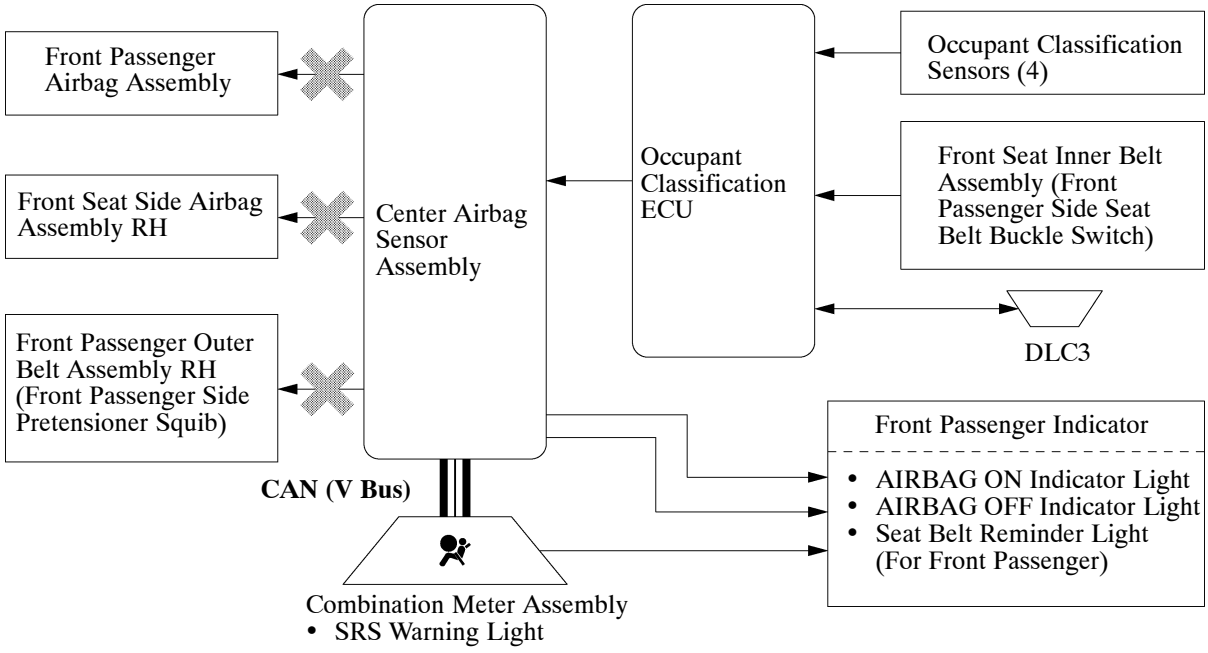
Service Tip

- When installing items to the front passenger seat or removing/installing the front passenger seat, connect the intelligent tester or Techstream*, perform a system check and perform 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 intelligent tester or Techstream* display value indicates within the range of 30 kg (66 lb) +/– 3 kg (6.6 lb) when a 30 kg (66 lb) weight is placed on the front passenger seat.

For details, see the 2008 HIGHLANDER Repair Manual (Pub. No. RM06J0U).

*: Techstream is the name for the diagnostic tester in North America, but other countries will continue to use the intelligent tester.

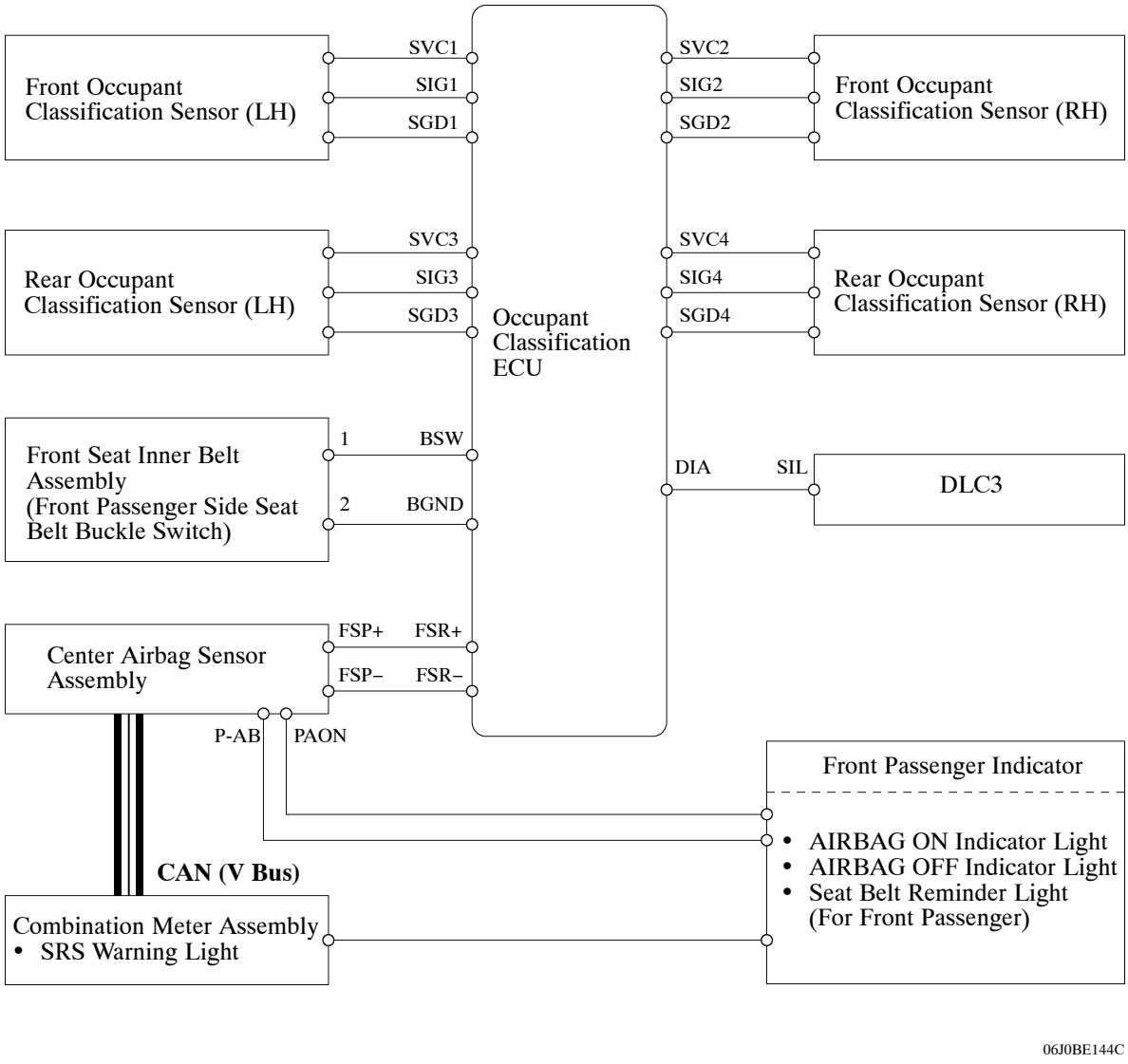
2. System Diagram



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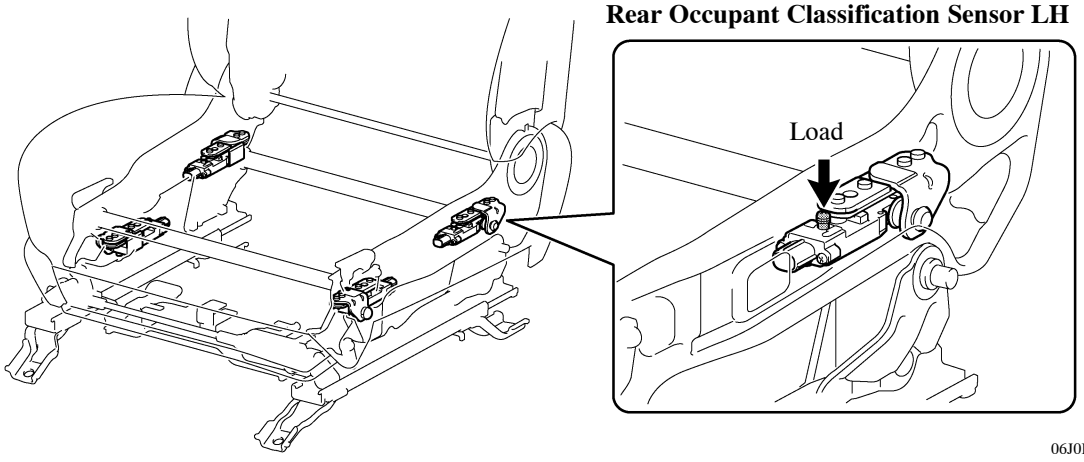
3. Wiring Diagram

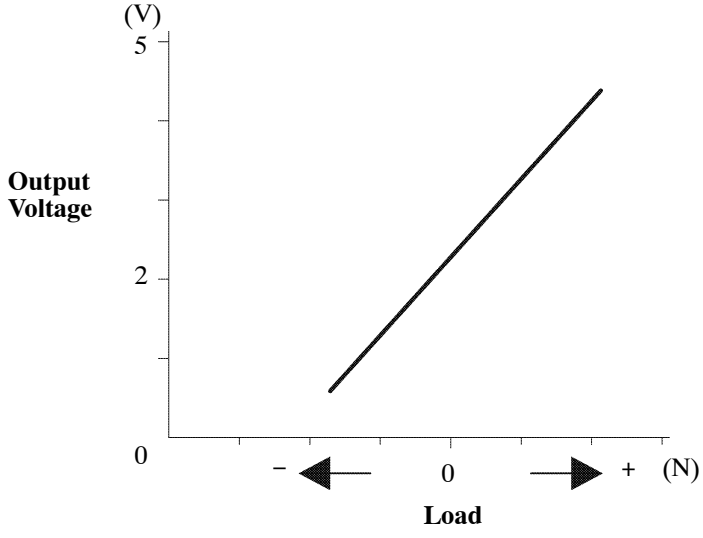


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4. Occupant Classification Sensor

The occupant classification sensors are installed on 4 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.





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*1/engine switch*2 is ON.

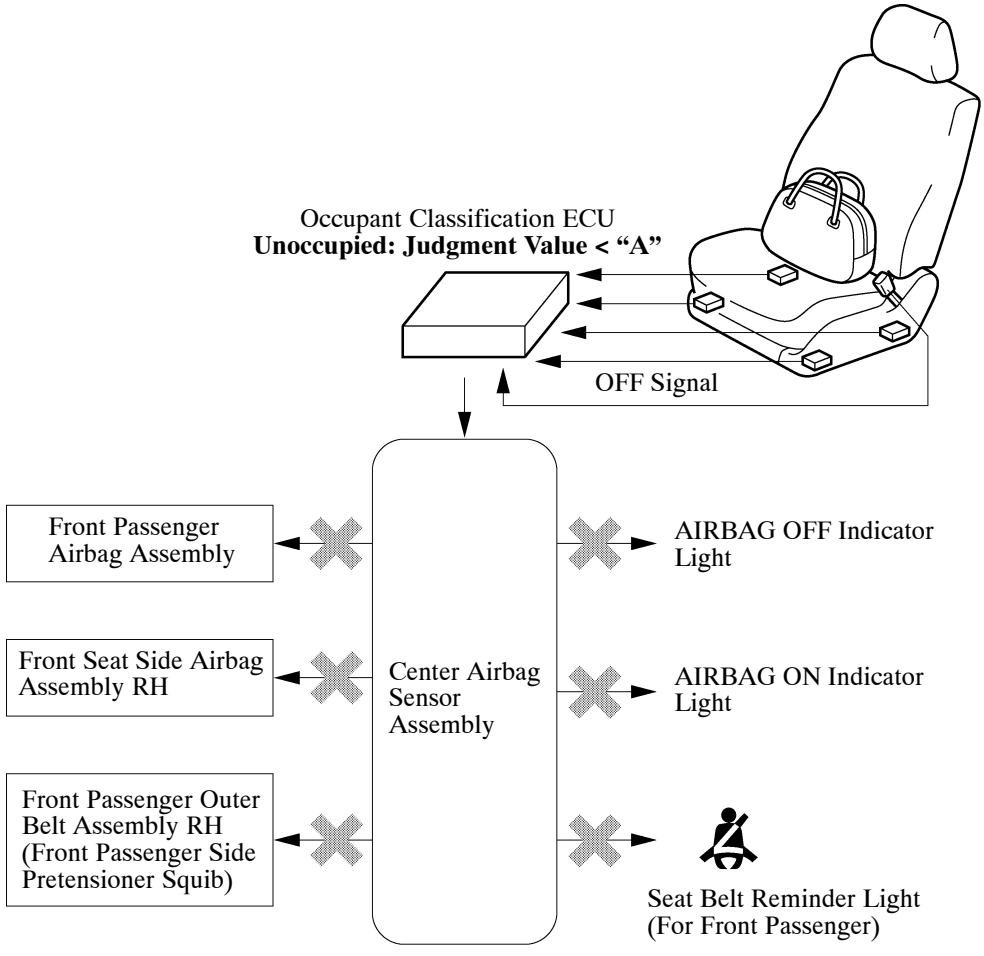
- The Occupant Classification ECU constantly monitors the weight on the front passenger seat, and makes a judgment in accordance with the signals from the occupant classification sensor and the state of the front seat inner belt assembly (front passenger side seat belt buckle switch).
- The Occupant 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 4 occupant classification sensors and front seat inner belt assembly (front passenger side 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 front seat inner belt assembly (front passenger side seat belt buckle switch).

*1: Without Smart Key System *2: With Smart Key System

Unoccupied Judgment

- The Occupant Classification ECU makes an unoccupied judgment when the judgment value is lower than criteria value “A” and the front seat inner belt assembly (front passenger side seat belt buckle switch) is OFF.
- If the ignition switch*1/engine switch*2 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 assembly, front seat side airbag assembly RH, and the front seat outer belt assembly RH (front passenger side pretensioner squib), and does not blink the seat belt reminder light.

*1: Without Smart Key System *2: With Smart Key System

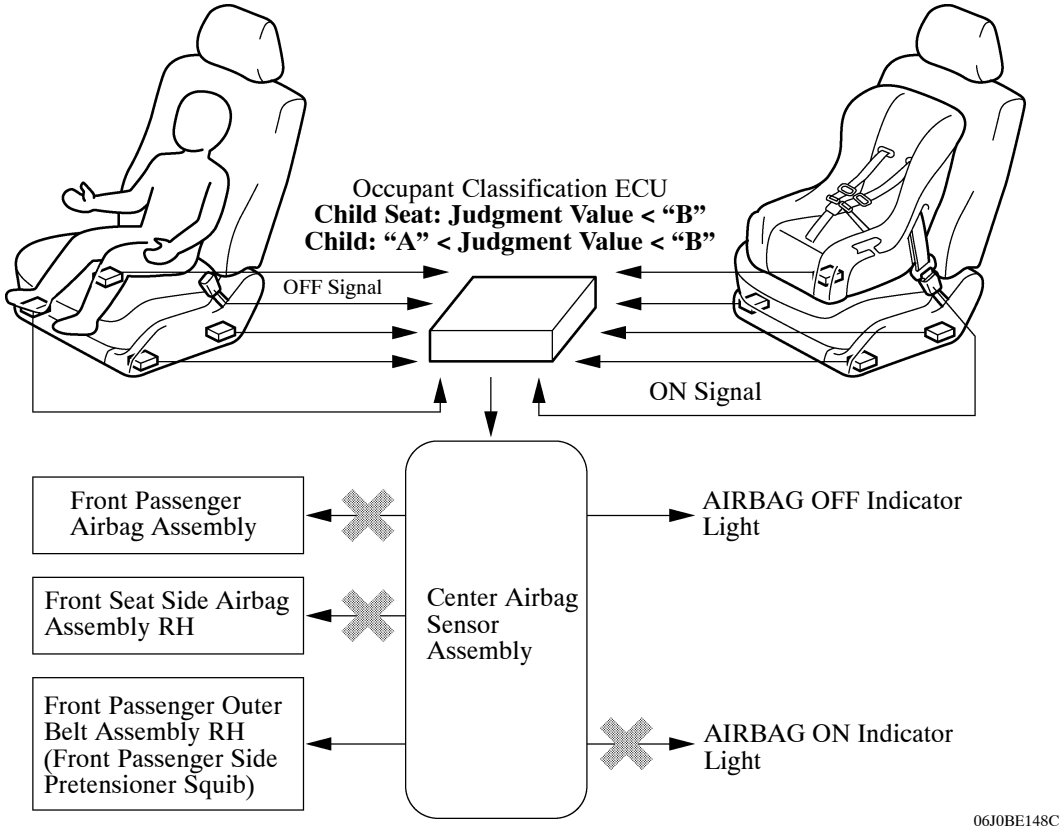


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Child Seat or Child Judgment

- If the judgment value is lower than criteria value “B” and the front seat inner belt assembly (front passenger side seat belt buckle switch) 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 front seat inner belt assembly (front passenger side seat belt buckle switch) is OFF, the Occupant Classification ECU judges that the seat is being occupied by a child.
- When the ignition switch*1/engine switch*2 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 assembly and the front seat side airbag assembly RH have been deactivated.

*1: Without Smart Key System *2: With Smart Key System

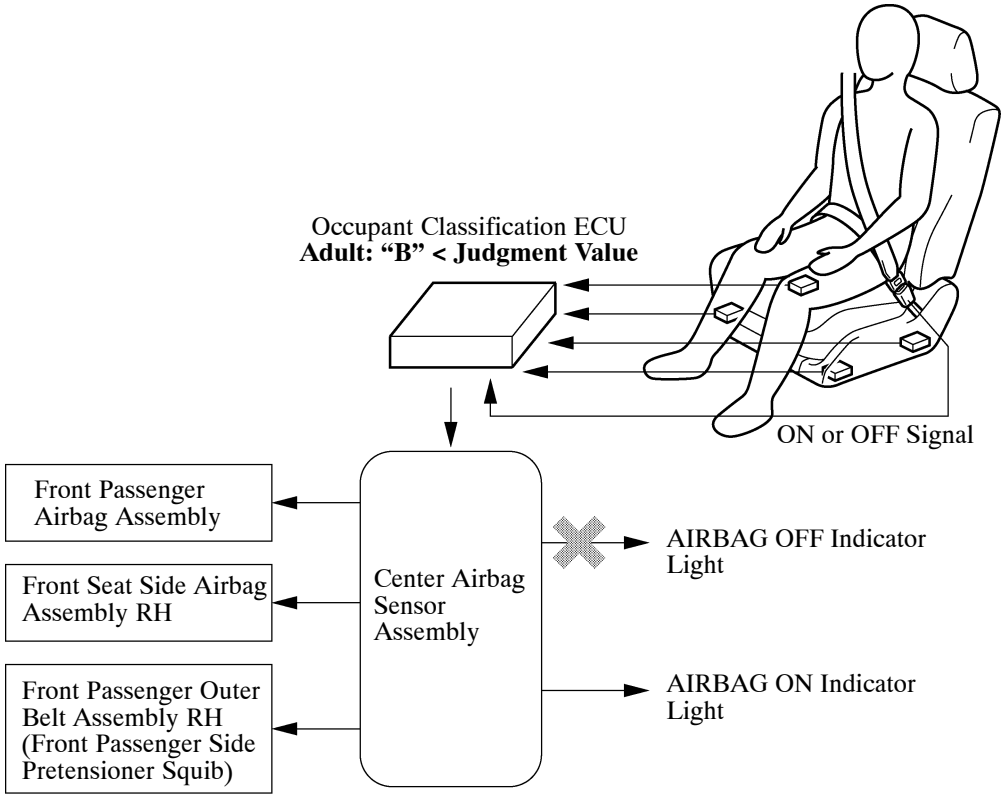


- After the Occupant Classification ECU judges that a child seat is installed, the AIRBAG OFF indicator light does not go off unless the front seat inner belt assembly (front passenger side seat belt buckle switch) is turned OFF.

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*1/engine switch*2 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 assembly and the front seat side airbag assembly RH are active.

*1: Without Smart Key System *2: With Smart Key System



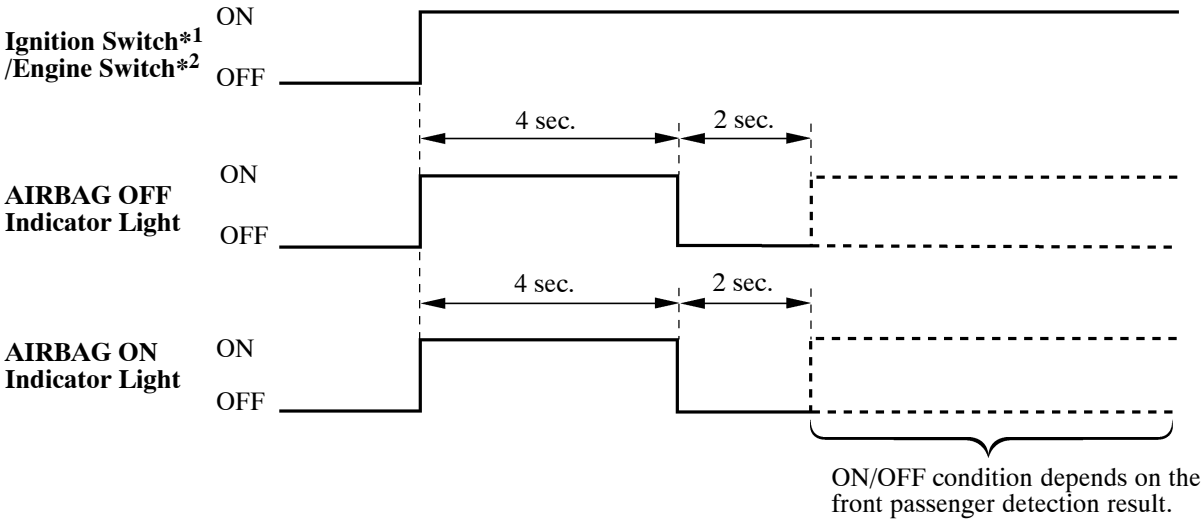
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- After the Occupant Classification ECU judges that the occupant is an adult, and if the judgment value is determined as criteria value “B” or less according to occupant load movement, the ECU continues adult judgment for approximately ten seconds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

Initial Check

After the ignition switch*1/engine switch*2 is tuned 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.

*1: Without Smart Key System *2: With Smart Key System



*1: Without Smart Key System *2: With Smart Key System

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6. Precaution for Occupant Classification System Operation

To avoid potential death or serious injury due to the front passenger occupant classification system not detecting the conditions correctly, observe the following.

- Wear the seat belt properly.
- Make sure the front passenger's seat belt tab has not been left inserted into the buckle before someone sits in the front passenger seat.
- Make sure the AIRBAG ON indicator light is illuminated when using the 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 assembly and front seat side airbag assembly RH may not activate correctly, which could cause death or serious injury in the event of collision.
- Do not put a heavy load in the front passenger seatback pocket or attach a seatback table to the front passenger seat seatback.
- Do not put weight on the front passenger seat by putting your hands or feet on the front passenger seat 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 their back upright and against the seat, with legs comfortably extended and to wear the seat belt correctly. If the AIRBAG OFF indicator light remains illuminated nonetheless, 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 it is unavoidable to install a forward-facing child restraint system on the front passenger seat, install the child restraint system on the front passenger seat in the proper order.
- 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 detection system.
- Child restraint systems installed on the rear seat should not come into contact with the front seatbacks.