

GROUP 52B

SUPPLEMENTAL RESTRAINT SYSTEM (SRS)

CONTENTS

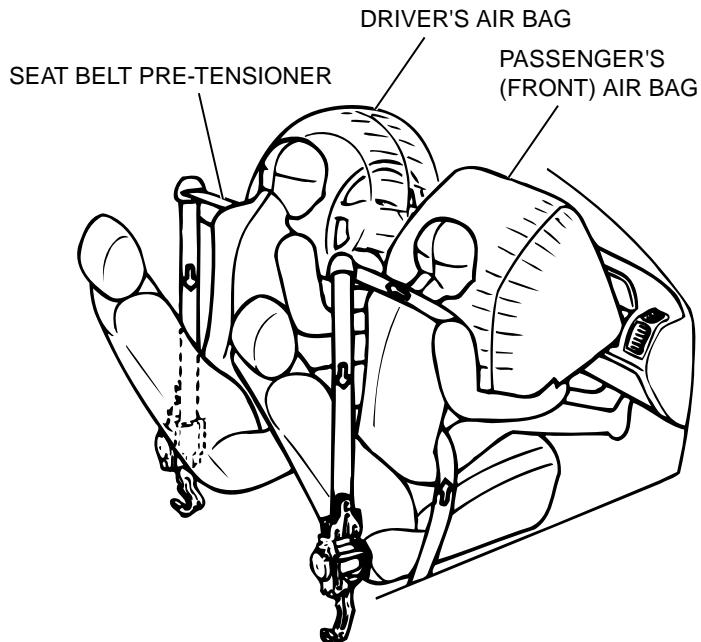
GENERAL DESCRIPTION	52B-2	SRS-ECU	52B-10
SYSTEM OPERATION	52B-7		

GENERAL DESCRIPTION

M2521000100132

⚠ CAUTION

- Driver and front passenger air bags and seat belt pre-tensioners deploy and operate in all head-on collisions that exceed the threshold to activate the SRS system.
- The specific value is the equivalent impact when a vehicle collides against a concrete (fixed) wall at approximately 25 km/h (16 mph) or more.
- The SRS and pre-tensioner may not work under the following conditions:
 - A head-on collision is less than the specific value.
 - A vehicle collides on its rear end.
 - A vehicle rolls over or is in a similar position.



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Driver's and front passenger's air bags and seat belts with pre-tensioner are standard, increasing the passive safety level.

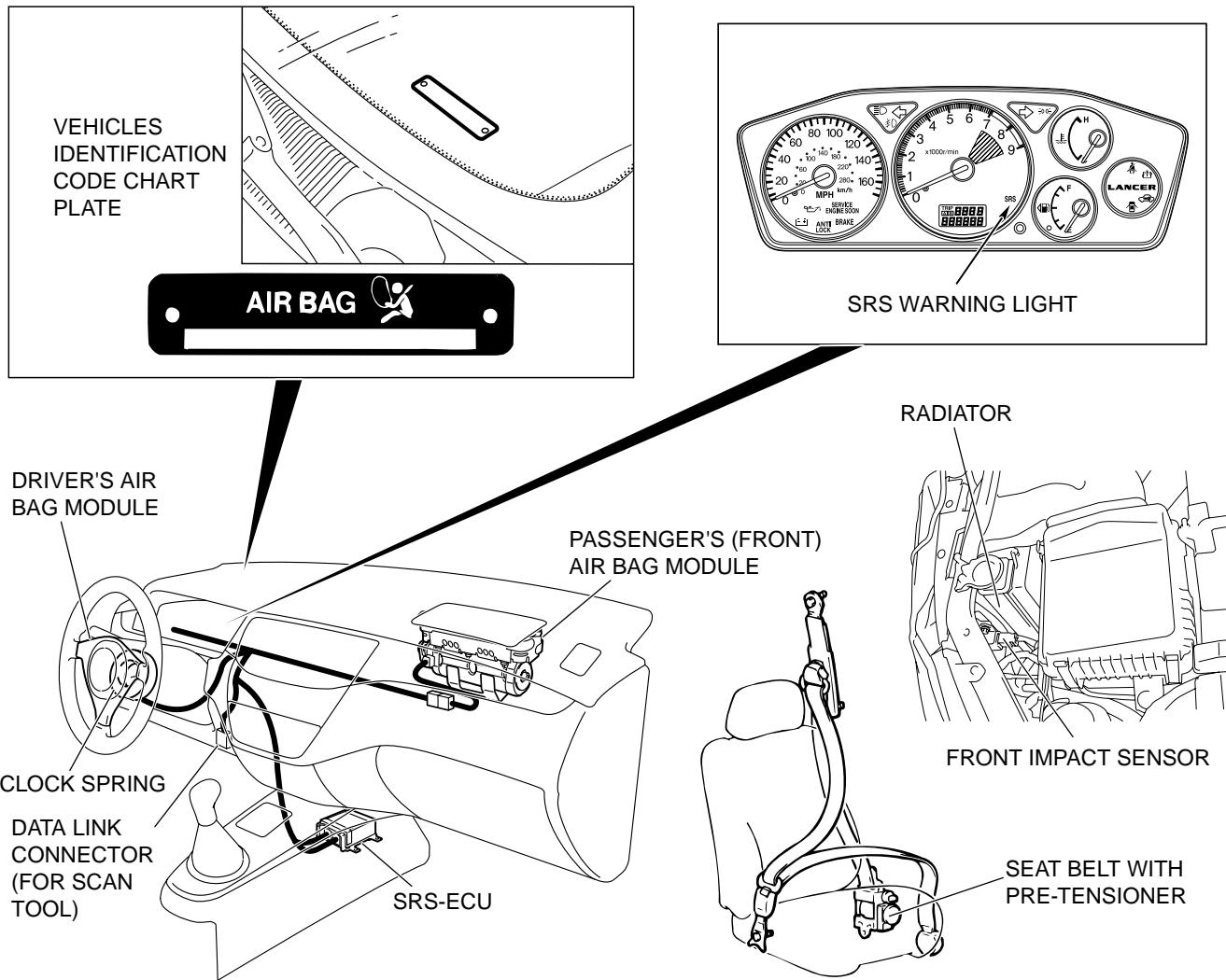
SUPPLEMENTAL RESTRAINT SYSTEM (SRS)

The SRS is designed to supplement the front seat belts. It eliminates or reduces injury to the front passenger(s) by deploying air bag(s) in case of a head-on collision.

SEAT BELT WITH PRE-TENSIONER

The seat belts with pre-tensioner work simultaneously with the SRS. The pre-tensioner takes up seat belt slack immediately when a collision takes place by that restraining the front passengers sooner than the SRS. This prevents the passengers from moving forwards.

CONSTRUCTION DIAGRAM



The SRS and seat belt tightening systems consist of driver's/passenger air bag modules, SRS-ECU, two front impact sensors, SRS warning light, clock spring, and seat belt pre-tensioner. Air bags are located in the center of the steering wheel and above the glove box. Each air bag has a safing folded air bag and an inflators the system and has a safing G sensor and an analogue G sensor. On all air bag modules, the inflator does not contain sodium azide. The front impact sensor is assembled on the headlight support panel to monitor collision upon frontal impact. The warning light on the instrument panel indicates the operational status of the SRS. A clock spring is installed in the steering column.

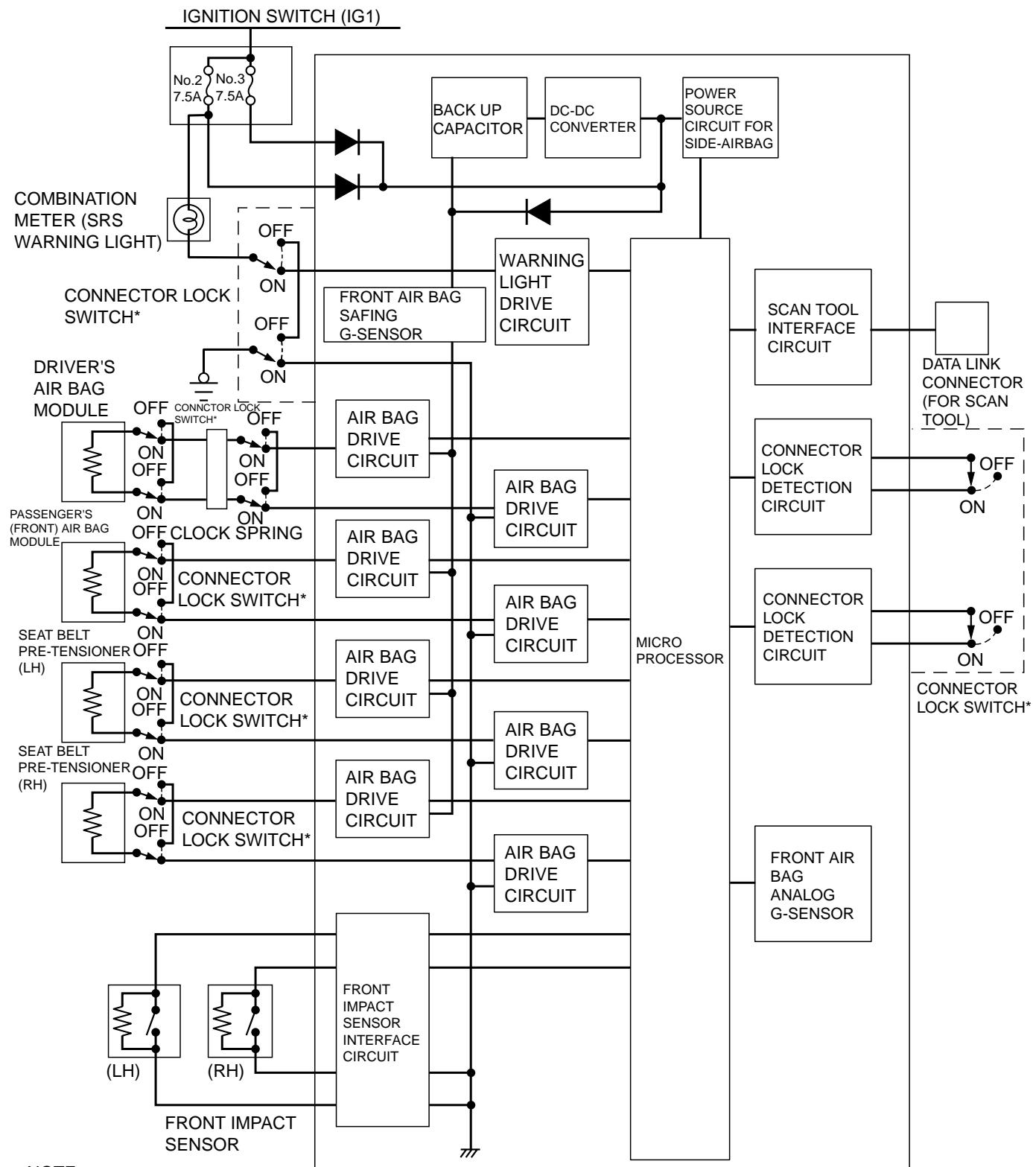
The SRS-ECU detects the impact produced at the time of a collision from the safing and analog G sensors and supplies squib ignition current to the air bag modules.

The SRS-ECU has the following functions:
This triggers the air bag modules.

- Power supply backup function (backup condenser) that deploys or operates the air bag module and seat belt pretensioner within specific period, in case of power failure upon impact.
- Voltage raising function (DC-DC converter circuit).
- Diagnostic test mode to improve safety and reliability.

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SRS SYSTEM CIRCUIT DIAGRAM



NOTE

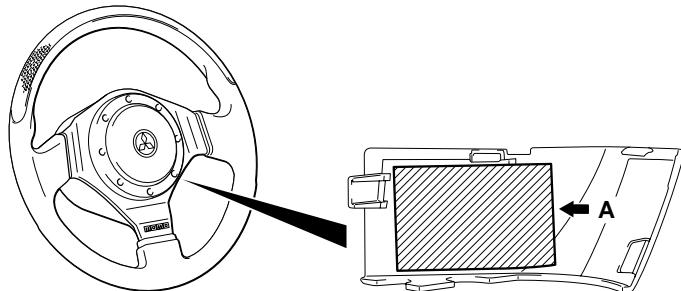
*: CONNECTOR LOCKED: ON
CONNECTOR UNLOCKED: OFF

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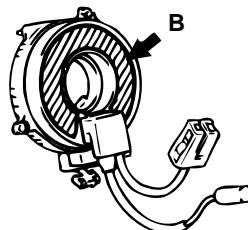
CAUTION LABELS

Labels to indicate cautions regarding the handling and the services of SRS air bag air attached on the position shown in the following illustration.

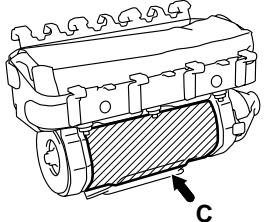
COVER



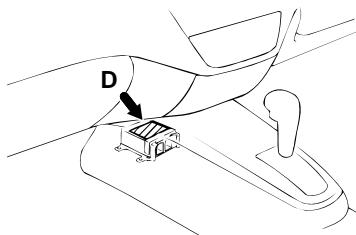
CLOCK SPRING



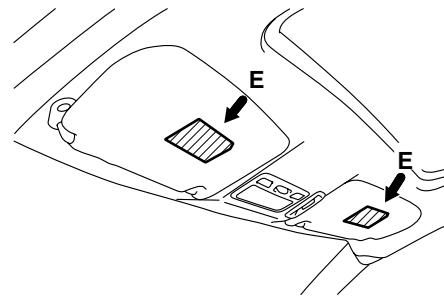
PASSENGER'S (FRONT)
AIR BAG MODULE



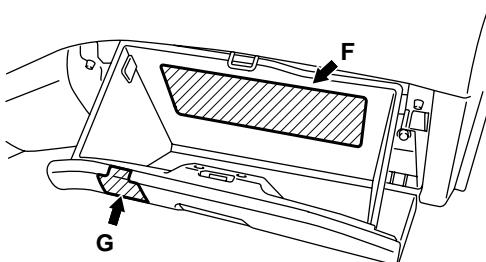
SRS-ECU



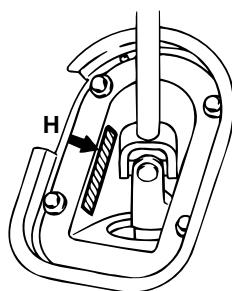
SUN VISOR



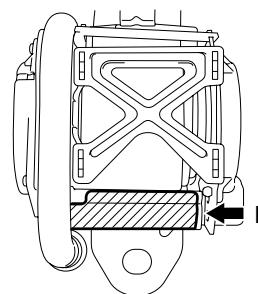
GLOVE BOX



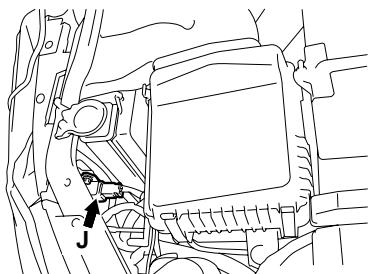
STEERING JOINT COVER



SEAT BELT WITH
PRE-TENSIONER
(DRIVER'S AND FRONT
PASSENGER'S SEATBELT)



FRONT IMPACT SENSOR



LABEL CONTENTS	
A	WARNING: SRS BEFORE REPLACING STEERING WHEEL, READ SERVICE MANUAL. THIS AIR BAG MODULE CANNOT BE REPAIRED. DO NOT DISASSEMBLE OR TAMPER.
B	CAUTION: SRS CLOCK SPRING THIS IS NOT A REPAIRABLE PART. IF DEFECTIVE, REPLACE ENTIRE UNIT ACCORDING TO THE SERVICE MANUAL INSTRUCTIONS. TO RE-CENTER: ROTATE CLOCKWISE UNTIL TIGHT. THEN ROTATE IN OPPOSITE DIRECTION ROUGHLY 3 TURNS AND ALIGN ARROWS >><<.
C	WARNING FLAMMABLE/EXPLOSIVE SRS AIR BAG MODULE TO AVOID SERIOUS INJURY: <ul style="list-style-type: none">• DO NOT REPAIR, DISASSEMBLE OR TAMPER.• AVOID CONTACT WITH FLAME OR ELECTRICITY.• DO NOT DIAGNOSIS/USE NO TEST EQUIPMENT OR PROBES.• STORE BELOW 200°F (93°C).• BEFORE DOING ANY WORK INVOLVING MODULE, READ SERVICE MANUAL FOR IMPORTANT FURTHER DATA.
D	CAUTION: DO NOT DISASSEMBLE OR DROP. IF DEFECT REFER TO SERVICE MANUAL.
E	WARNING DEATH or SERIOUS INJURY can occur <ul style="list-style-type: none">• Children 12 and under can be killed by the air bag.• The BACK SEAT is the SAFEST place for children.• NEVER put a rear-facing child seat in the front.• Sit as far back as possible from the air bag.• ALWAYS use SEAT BELTS and CHILD RESTRAINTS.  V0037AA
F	AIR BAG SYSTEM INFORMATION THIS VEHICLE HAS AN AIR BAG SYSTEM WHICH WILL SUPPLEMENT THE SEAT BELT IN CERTAIN FRONTAL COLLISIONS. THE AIR BAG IS NOT A SUBSTITUTE FOR THE SEAT BELT IN ANY TYPE OF COLLISION. THE DRIVER AND ALL OTHER OCCUPANTS SHOULD WEAR SEAT BELTS AT ALL TIME. WARNING! IF THE "SRS" WARNING LIGHT DOES NOT ILLUMINATE FOR SEVERAL SECONDS WHEN IGNITION KEY IS TURNED TO "ON" OR THE ENGINE IS STARTED, OR IF THE WARNING LIGHT STAYS ON WHILE DRIVING, TAKE THE VEHICLE TO YOUR NEAREST AUTHORIZED DEALER IMMEDIATELY. ALSO, IF VEHICLE'S FRONT END IS DAMAGED OR IF THE AIR BAG HAS DEPLOYED, TAKE THE VEHICLE FOR SERVICE IMMEDIATELY. THE AIR BAG SYSTEM MUST BE INSPECTED BY AN AUTHORIZED DEALER TEN YEARS AFTER THE VEHICLE MANUFACTURE DATE SHOWN ON THE CERTIFICATION LABEL LOCATED ON THE LEFT FRONT DOOR-LATCH POST OR DOOR FRAME. READ THE "SRS" SECTION OF YOUR OWNER'S MANUAL BEFORE DRIVING FOR IMPORTANT INFORMATION ABOUT OPERATION AND SERVICE OF THE AIR BAG SYSTEM. WHEN YOU ARE GOING TO DISCARD YOUR GAS GENERATOR OR VEHICLE, PLEASE SEE YOUR DEALER.

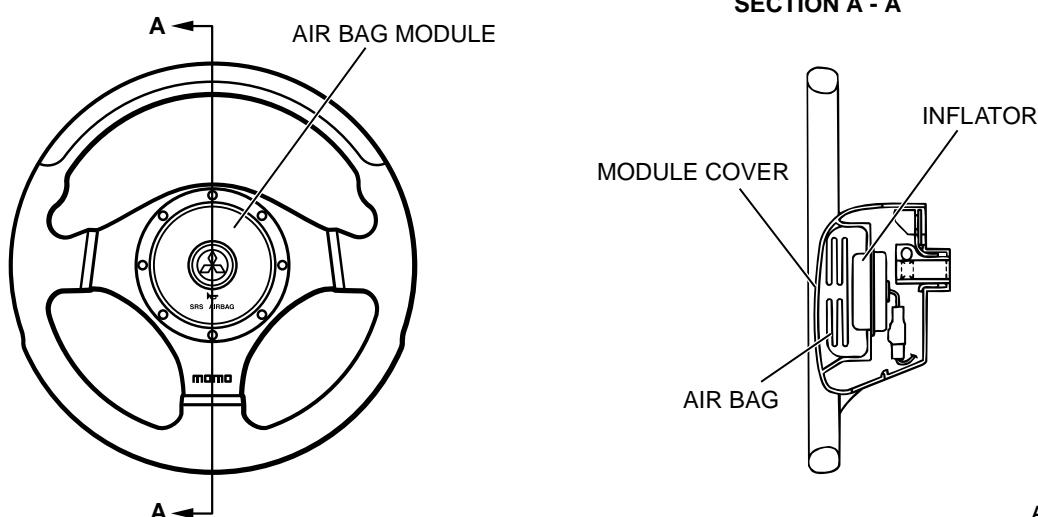
LABEL CONTENTS	
G	WARNING CHILDREN CAN BE KILLED OR INJURED BY PASSENGER AIR BAG. THE BACK SEAT IS THE SAFEST PLACE FOR CHILDREN 12 AND UNDER. MAKE SURE ALL CHILDREN USE SEAT BELTS OR CHILD SEAT. NOT TO BE REMOVED EXCEPT BY OWNER.
H	CAUTION: SRS FIX STRG. WHEEL AT TIRES STRAIGHT AHEAD BEFORE GEARBOX REMOVAL. OTHERWISE, MAY DAMAGE SRS CLOCK SPRING MAKING SRS SYSTEM INOPERATIVE. RISKING SERIOUS DRIVER INJURY.
I	DANGER SEAT BELT PRETENSIONER CAUTION THIS ASSEMBLY CONTAINS AN EXPLOSIVE INITIATOR FLAMMABLE MATERIAL TO PREVENT PERSONAL INJURY • DO NOT IMPACT, DISMANTLE OR INSTALL IT INTO ANOTHER VEHICLE. • SERVICE OR DISPOSE OF IT AS DIRECTED IN THE REPAIR MANUAL.
J	CAUTION: DO NOT DISASSEMBLE OR DROP.

SYSTEM OPERATION

M2521001000116

A passenger's (front) air bag module and clock spring are the same as OUTLANDER.

DRIVER'S AIR BAG MODULE



AC211615AB

CAUTION

Never disassemble the air bag module.

The driver's air bag module is incorporated into the 3-spoke steering wheel. The driver's air bag module is an assembly part consisting of air bag, module cover, inflator, and its their fasteners. It is installed into the steering wheel. The air bag is made from

nylon and inflates by the gas generating from the inflator. As a driver is being pressed to the air bag, it deflates discharging gas from two vents at the rear of the air bag to reduce the shock from the impact. An inflator that does not contain sodium azide is used.

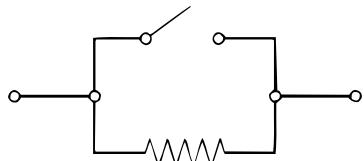
FRONT IMPACT SENSOR

CAUTION

Never disassemble the front impact sensor.

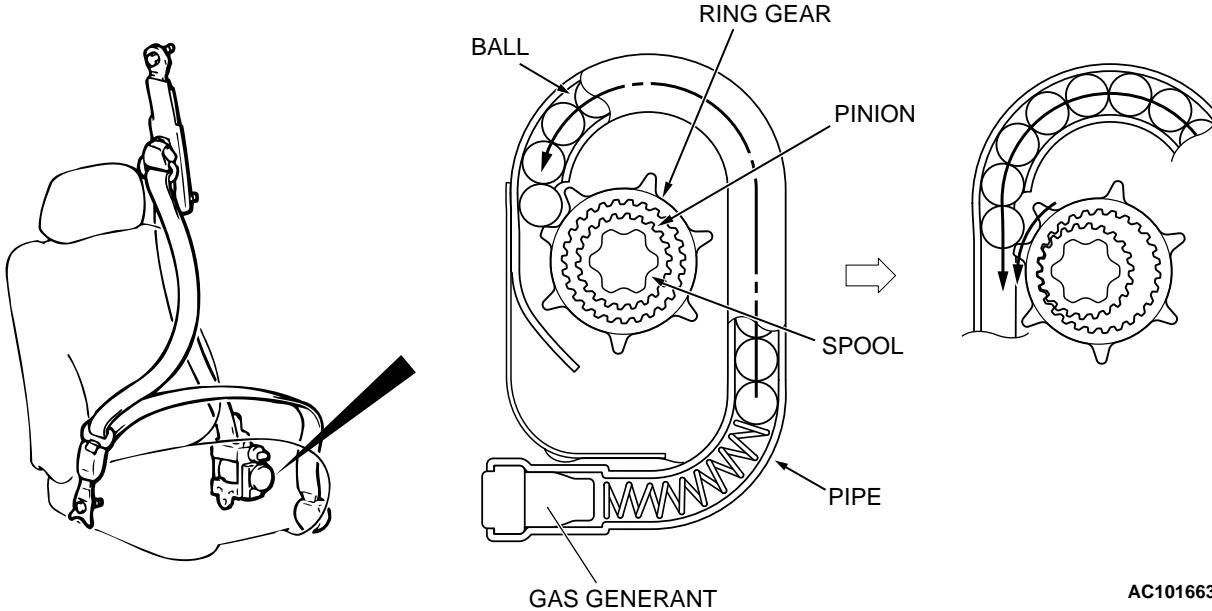
The front impact sensor is installed in the radiator support panel. In a collision, the contact in the front impact sensor turns ON and an output signal is sent to the SRS-ECU. A resistor is connected to the front impact sensor in parallel with the contact for fault diagnosis.

SENSOR INTERNAL CIRCUIT



AC206958AC

SEAT BELT WITH PRE-TENSIONER



AC101663AE

CAUTION

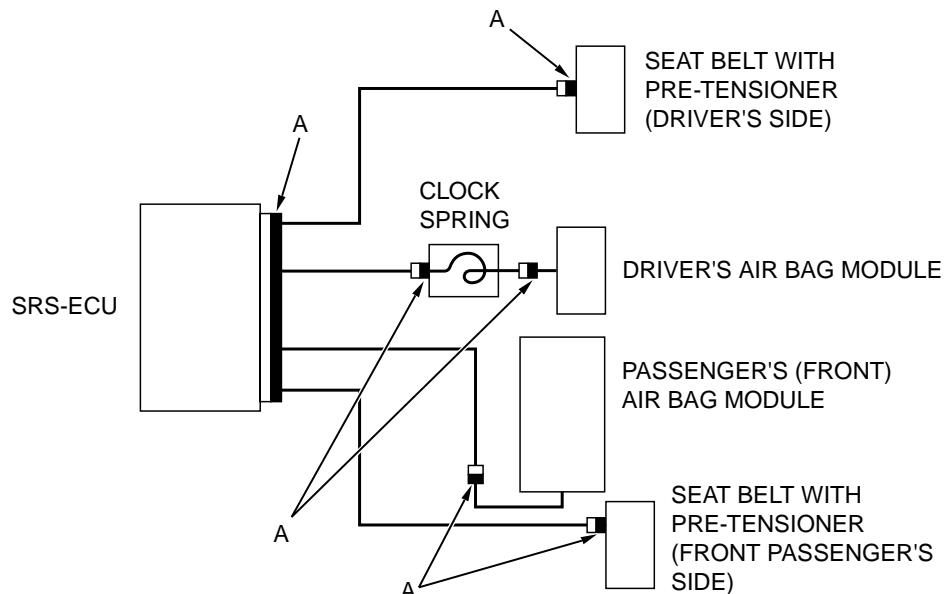
Never disassemble the seat belt with pre-tensioner.

The seatbelt incorporating the pretensioner automatically winds the seatbelt upon front impact to reduce forward shifting of the passenger.

The seat belt pre-tensioner is built into the driver's and passenger's front seat belt retractor.

Upon front impact the pretensioner ignites the gas generator and emits gas with the SRS-ECU signal when the front impact sensor, attached to the front of the body, detects an impact that exceeds the permissible limit. The gas pressure shifts the ball in the pipe and the ball comes in contact with the protrusion of the ring gear. The ball is inserted in the ring gear and then interlocked with the pinion. The ring gear rotation forces the pinion to turn the spool toward the belt wind direction to wind the webbing.

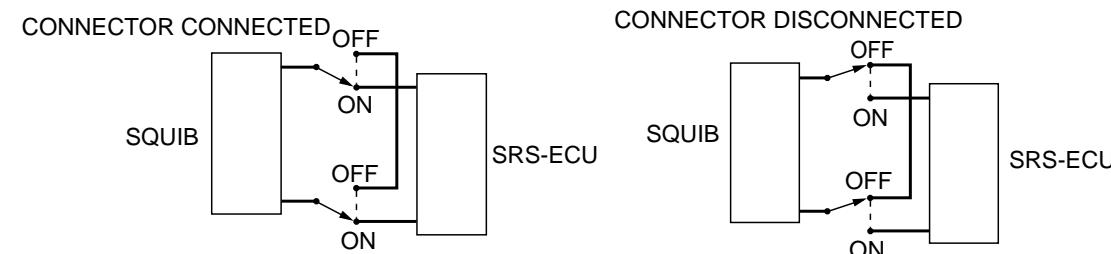
SRS AIR BAG SPECIAL CONNECTOR



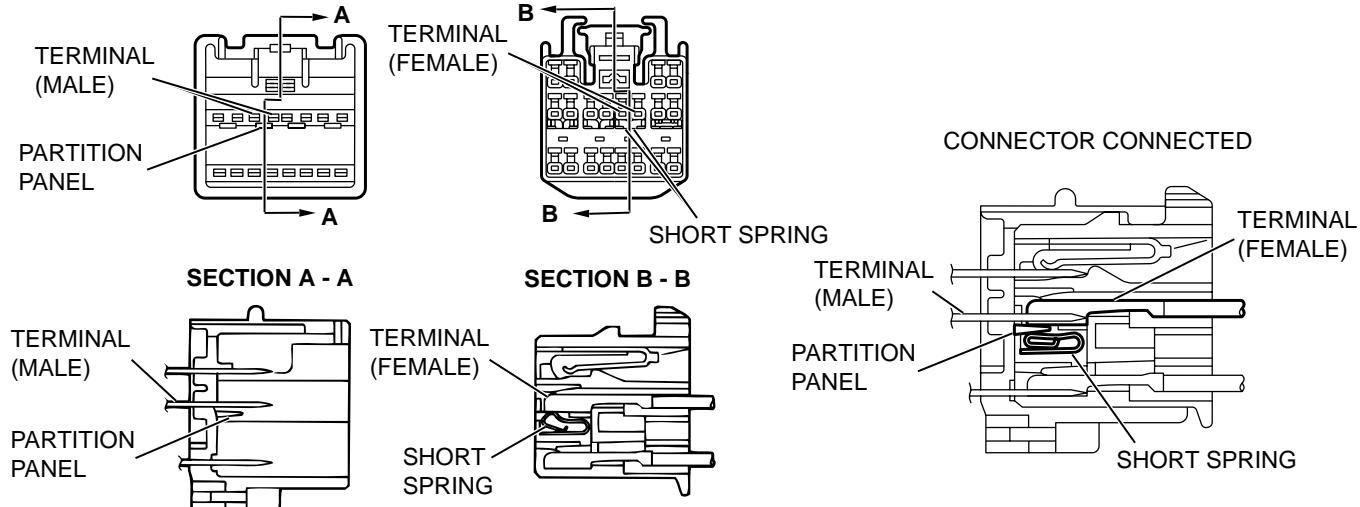
AC103223AF

To enhance the System's reliability, a connector lock switch is integrated into the SRS-ECU connector, the air bag module connectors, the clock spring connector, the seat belt pretensioner connectors (black connector "A" shown in the illustration above).

SQUIB CIRCUIT CONNECTOR LOCK SWITCH



<CONNECTOR SHORTING MECHANISM (E.G. SRS-ECU CONNECTOR)>
ECU-SIDE CONNECTOR WIRING HARNESS-SIDE CONNECTOR

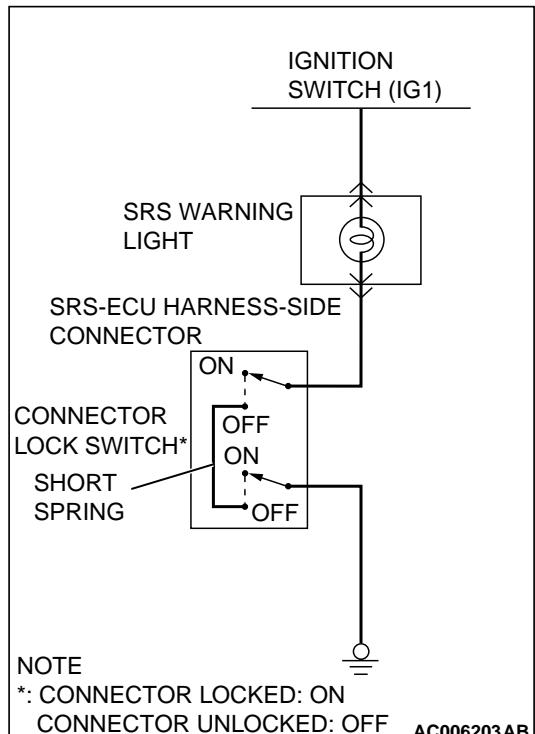


AC006197AH

CAUTION

When the connector is disconnected, there will be short circuit between the terminals. This is not a fault.

The switch is a mechanism that shorts the power supply terminal to the ground terminal automatically in the air bag squib circuit when the connector is disconnected. A "short" spring is integrated inside the connector. This spring prevents static electricity from flowing to the squib by shorting the power supply terminal to the ground terminal (i.e. there is no potential difference between the two terminals).

**WARNING LIGHT CIRCUIT CONNECTOR LOCK SWITCH**

The switch is a mechanism that shorts the power supply terminal to the ground terminal automatically in the warning light circuit, when the connector is disconnected. Its structure is similar to the squib circuit connector shorting mechanism.

SRS-ECU

M2521007000095

CAUTION

Never disassemble the SRS-ECU.

The SRS-ECU incorporates an analog G-sensor and safing G-sensor for frontal collisions and a safing G-sensor for side collisions. In frontal collisions, the driver's and passenger's (front) air bags deploy and the seat belt pre-tensioners are activated only when both the analog and safing G-sensors detect simultaneously a collision-induced G of a level exceeding the threshold as in the case with the conventional system. In the case of side collisions, the side-airbag on the side subjected to an impact deploys if the side impact sensor and the SRS-ECU's safing G-sensor detect simultaneously a lateral G of forces above the predetermined level.

The SRS-ECU is provided with the following capabilities:

- Backup power supply in case of power failure in collisions
- Boosting function in case of battery voltage drop
- Self-diagnosis function to avoid system's operation errors and improve its reliability

DIAGNOSTIC FUNCTION

The SRS-ECU has the following functions to make system checking using the scan tool easy.

- Diagnostic trouble code output
- Service data output

DIAGNOSTIC TROUBLE CODE OUTPUT

The SRS-ECU diagnoses the following items and stores a diagnostic trouble code in the non-volatile memory (EEPROM^{*1}) when a problem is detected. Therefore, the memory is not deleted after a battery terminal is disconnected. (The diagnostic trouble code memory can be deleted by the scan tool.)

CODE NO.	MAJOR CONTENTS OF DIAGNOSTICS
1A	Front impact sensor (LH) short-circuited
1B	Front impact sensor (LH) open-circuited
1C	Front impact sensor (LH) short-circuited to power supply
1D	Front impact sensor (LH) short-circuited to ground
2A	Front impact sensor (RH) short-circuited
2B	Front impact sensor (RH) open-circuited
2C	Front impact sensor (RH) short-circuited to power supply
2D	Front impact sensor (RH) short-circuited to ground
14	Analog G-sensor malfunction
15	Safing G-sensor short-circuited (for frontal collision)
16	Safing G-sensor open-circuited (for frontal collision)
21 ^{*3}	Driver's air bag squib short-circuited
22 ^{*3}	Driver's air bag squib open-circuited
24 ^{*3}	Passenger's (front) air bag squib short-circuited
25 ^{*3}	Passenger's (front) air bag squib open-circuited
26 ^{*3}	Driver's pre-tensioner squib short-circuited
27 ^{*3}	Driver's pre-tensioner squib open-circuited
28 ^{*3}	Passenger's (front) pre-tensioner squib short-circuited
29 ^{*3}	Passenger's (front) pre-tensioner squib open-circuited
31	SRS-ECU capacitor circuit voltage too high
32	SRS-ECU capacitor circuit voltage too low
34 ^{*2}	SRS-ECU connector lock out of order
35	Ignition of the air bag completed
39	Air bag deployed simultaneously
41 ^{*2}	Power supply voltage (IG1 (A) voltage) drops abnormally.
42 ^{*2}	Power supply voltage (IG1 (B) voltage) drops abnormally.
43 ^{*2}	SRS warning light circuit open-circuited
44 ^{*2}	SRS warning light circuit malfunction
45	SRS-ECU non-volatile memory (EEPROM) and A/D converter system
46 ^{*2}	Incorrect SRS-ECU
51	Driver's air bag squib activating circuit short-circuited
52	Driver's air bag squib activating circuit open-circuited

CODE NO.	MAJOR CONTENTS OF DIAGNOSTICS
54	Passenger's (front) air bag squib activating circuit short-circuited
55	Passenger's (front) air bag squib activating circuit open-circuited
56	Driver's seat belt pre-tensioner (squib ignition drive circuit) system detected short
57	Driver's seat belt pre-tensioner (squib ignition drive circuit) system detected open
58	Passenger's seat belt pre-tensioner (squib ignition drive circuit) system detected short
59	Passenger's seat belt pre-tensioner (squib ignition drive circuit) system detected open
61	Driver's air bag squib drive circuit (power supply side) short-circuited
62	Driver's air bag squib drive circuit (ground side) short-circuited
64	Passenger's (front) air bag squib drive circuit (power supply side) short-circuited
65	Passenger's (front) air bag squib drive circuit (ground side) short-circuited
66	Driver's pre-tensioner squib (power supply side) short-circuited
67	Driver's pre-tensioner squib (ground side) short-circuited
68	Passenger's (front) pre-tensioner squib drive circuit (power supply side) short-circuited
69	Passenger's (front) pre-tensioner squib drive circuit (ground side) short-circuited

NOTE: ¹: Electrically Erasable Programmable ROM

²: This diagnostic trouble code memory will be automatically cleared from the memory and the SRS warning light will be switched off when the system returns to normal condition.

³: The diagnostic trouble codes will remain in memory and the SRS warning light will be switched off if the system returns to normal condition.

DATA LIST OUTPUT

When the SRS-ECU detects a problem, it stores a diagnostic trouble code and the duration that the problem has lasted in the non-volatile memory. In addition, how often a diagnostic trouble code and duration are cleared by the scan tool are stored in the non-volatile memory as a reference for service work. This data can be read by the scan tool.

No.	DATA LIST ITEM	APPLICABILITY
92	Number indicating how often the memory is cleared	Maximum time to be stored: 250 days
93	How long a problem has lasted (How long from the occurrence of the problem until the first air bag squib ignition signal)	Maximum time to be stored: 9999 minutes (approximately seven days)
94	How long a problem has lasted (How long from the first air bag squib igniting signal until now)	