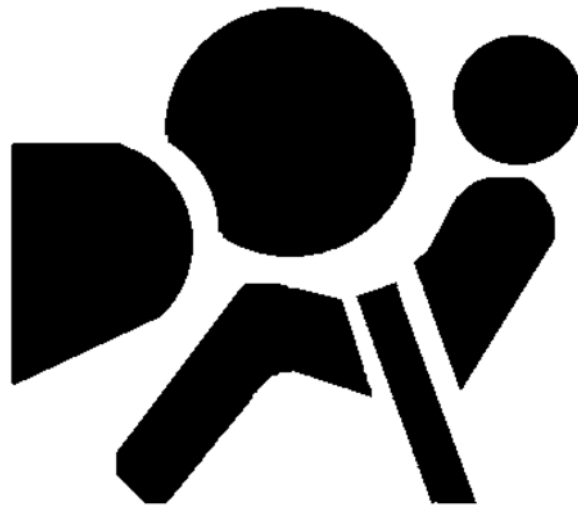




# TRAINING MANUAL

CT-L1003

## Supplemental Restraint System



ZOOM-ZOOM

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**Training Services**



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## Introduction

- With the introduction of seatbelts as an occupant restraint system for all passenger cars the number of people subjected to serious injury or death has been dramatically reduced. As a further result, the customers and the authorities asked for more safety systems and the car manufacturers developed them accordingly to provide more safety to the customers. One of those systems is the so-called **SRS (Supplemental Restraint System)** that assists the seatbelts in restraining the occupants in case of an accident.
- Mazda's SRS features one or more of the following additional restraint systems:
  - Front airbags
  - Side airbags
  - Curtain airbags
  - Pretensioners
- All Mazda vehicles that are currently sold in Europe are equipped with a SRS consisting of at least front airbags on the driver and passenger side. Some vehicles are equipped with up to six airbags in total.
- The skills needed to diagnose and repair SRS related concerns require comprehensive system knowledge, because any mistake can lead to serious injury or death of the occupants, or even of the technician who works on the system. This course is a theoretical and practical guide to gain general and Mazda specific knowledge about the various SRS, i.e. their components, function and diagnosis.
- Any person associated with the diagnosis and repair of SRSs **must** have the knowledge to deliver a "Fix it right first time" repair. Therefore, the Mazda Masters Development and Qualification path provides the following training course required for the service on SRSs:
  - Supplemental Restraint System CT-L1003
- The ranking of this course within the Mazda Masters educational system is Level 1 – 'Mazda Technician'. It is focused on technicians that have already experience in maintaining and repairing Mazda vehicles and have previously attended the courses "New-To-Mazda" CT-L1001 and "Basic Electrics" CT-L1004.

- The training manual “Supplemental Restraint System” is divided into the following main chapters:
  - Overview
  - Components
  - Operation
  - Diagnosis and Repair

**NOTE:** The data, tables and procedures represented in this training manual serve only as examples. They are taken from the service literature and subjected to major or minor changes in the course of time. To prevent any mis-diagnosis refer always to the current service literature while working on SRSs.

## Overview

### Fundamentals

- Nowadays all vehicles are equipped with a SRS in order to ensure optimum protection of the occupants in case of an accident.
- An airbag achieves the best possible effect in conjunction with the seatbelt and is triggered only in case of a serious accident, in which the safety of the occupants cannot be guaranteed by the seatbelts alone. Therefore, it is designed to reduce the occupant's forward movement in a controlled manner in order to reduce force applied to the body and organs.
- This training manual explains SRS components and systems used on the current Mazda vehicles (European specification only) and their predecessors, as well as the appropriate diagnostic and installation procedures.

**NOTE:** Before starting the diagnosis or repair of the SRS, always check whether any service information relevant to the malfunction has been published.

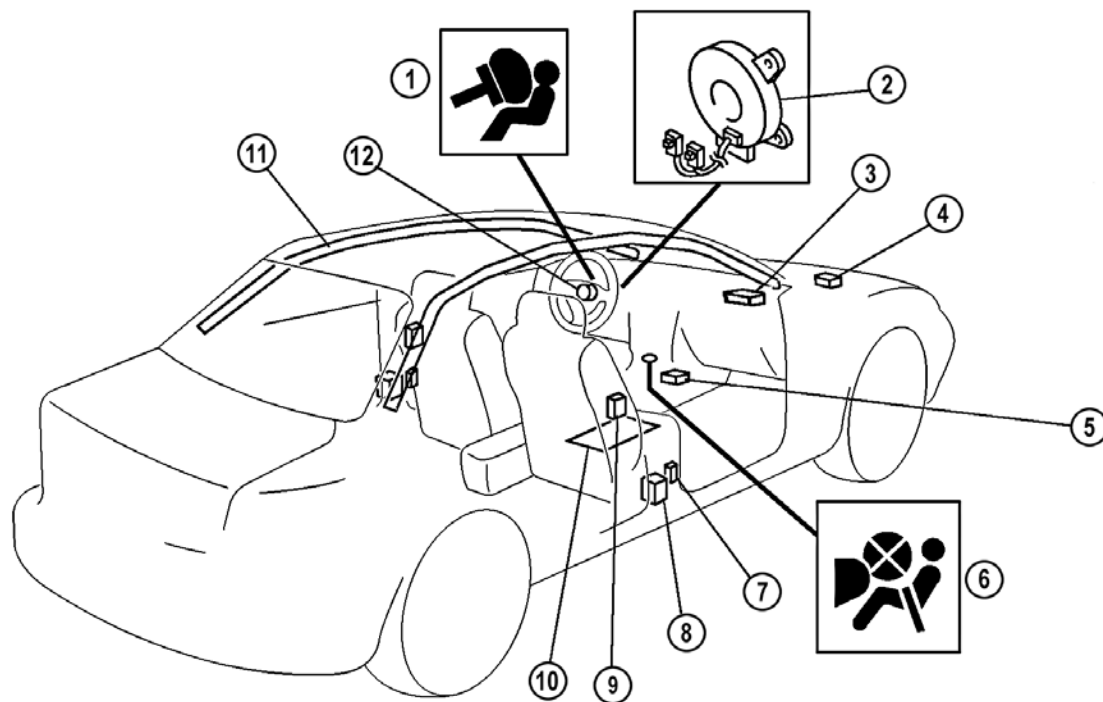
- Additional information about the current SRS can be found in the following sections of the respective W/M:
  - Section "T" in the W/M with former layout.
  - Section "Restraints" in the W/M on the CD-ESI.
  - Section 5: "Body and Paint" → "Supplemental Restraint System" – on the service manual CD for Mazda2.
  - Respective **W/D (Wiring Diagram)**

### Parts Location

- The picture on the next page is an example and shows the SRS components of the Mazda6. The SRS can consist of the following components (not all vehicles are equipped with all components):
  - Seat track position sensor
  - Buckle switches
  - Passenger airbag deactivation system or occupant classification system
  - Crash zone sensor
  - Side airbag sensors
  - **SAS (Sophisticated Airbag Sensor) module**
  - Passenger airbag cut-off indicator light
  - SRS warning light
  - Clock spring
  - Driver and passenger front airbags
  - Side airbags
  - Curtain airbags
  - Pretensioners

**NOTE:** Each gas generator features a sticker with barcode, order number and serial number. Thus it is possible to track the component throughout its production, installation and service life.





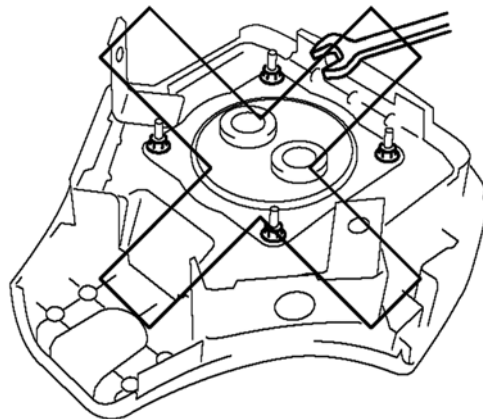
1003\_106

- |   |   |    |                     |
|---|---|----|---------------------|
| 1 | SRS warning light                             | 7  | Side airbag sensor  |
| 2 | Clock spring                                  | 8  | Belt pretensioner   |
| 3 | Passenger front airbag                        | 9  | Side airbag         |
| 4 | Crash zone sensor                             | 10 | Occupancy sensor    |
| 5 | SAS module                                    | 11 | Curtain airbag      |
| 6 | Passenger airbag deactivation indicator light | 12 | Driver front airbag |

## Directives for Working on SRS

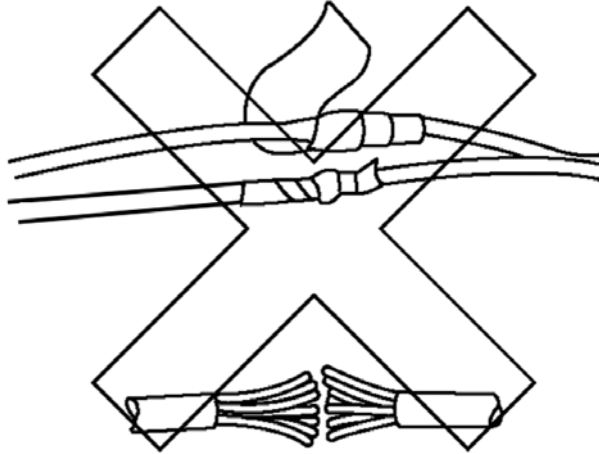
- When working on the SRS always follow carefully the directives and warnings stated in the W/M and in this training manual. It is also mandatory to comply with the specific national requirements concerning explosive material handling.
- The work on SRS must be carried out by skilled professional personnel, who are familiar with the safety regulations and who take special measures to ensure that these are followed. The relevant rules and directives must be observed, especially regarding:
  - Directives of the responsible authorities
  - Accident prevention
  - Environment protection
  - Storage of the components

- When handling SRS components the following points should be observed:
  - SRS components can accidentally deploy during related work or bodywork (such as welding, dent repair etc.). Never disconnect components before the system is secured against unintentional triggering. Therefore, depower the SRS according to the related W/M to avoid serious injury or death.
  - Always disconnect the battery before welding to avoid unintentional triggering of SRS components.
  - Non-triggered SRS components must not be littered. They must be shipped back to the manufacturer in the original component packaging. The sender has to inform the shipping company of the explosive content and the components must not be shipped by postal service.
  - If pyrotechnic residue from SRS components contacts the eyes, immediately wash the eyes thoroughly with clean water and seek medical assistance.
  - If a large amount of pyrotechnic residue is inhaled, seek medical assistance.
  - When handling deployed SRS components, wear safety gloves and glasses to protect your skin and eyes from being irritated due to pyrotechnic residue.
  - The propellant inside of the SRS components is self-ignited at an ambient temperature of about 175° C.
  - Single components of the SRS must not be disassembled, because the system may be inoperative after reassembling, which may result in serious injury or death in case of an accident. The components must always be replaced as complete units.



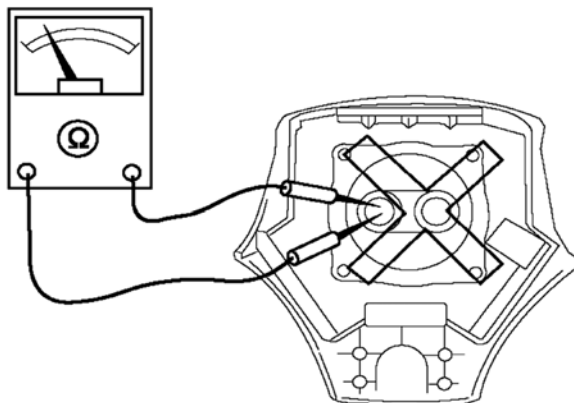
1003\_101

- If a problem is found in the SRS wiring, always follow the procedures of the corresponding W/M for the repair sequence. A wiring harness that is incorrectly repaired may result in an airbag or pretensioner not being deployed or being deployed accidentally, leading to serious injury or death.



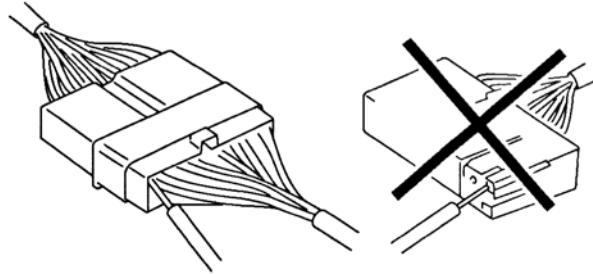
1003\_102

- An ohmmeter must not be used to inspect an airbag or pretensioner, because it can deploy the component, what may result in serious injury or death. Always use the on-board diagnostic function to diagnose an airbag or pretensioner for malfunctions.



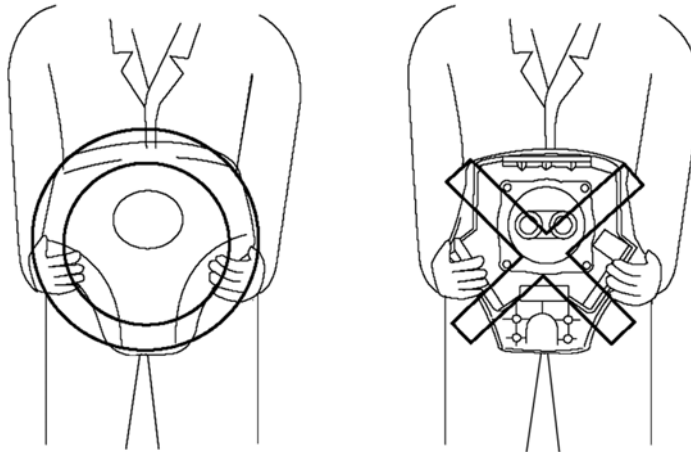
1003\_103

- Measuring probes must be inserted only from the wiring harness side, when inspecting the wiring according to the W/M. Otherwise the terminal can be widened causing a poor connection and a malfunction of the SRS.



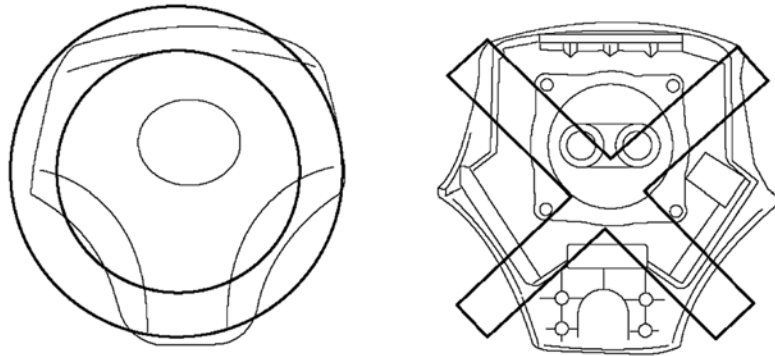
1003\_158

- When carrying an undeployed airbag, point the front surface away from your body to reduce the risk of injury in case it accidentally deploys.



1003\_104

- An undeployed airbag must not be placed face down on its surface. Because if it deploys, the motion of the airbag may result in serious injury or death. Therefore, always face the front surface up to reduce the motion of the airbag in case it accidentally deploys.
- Do not store anything on top of an undeployed airbag.



1003\_105

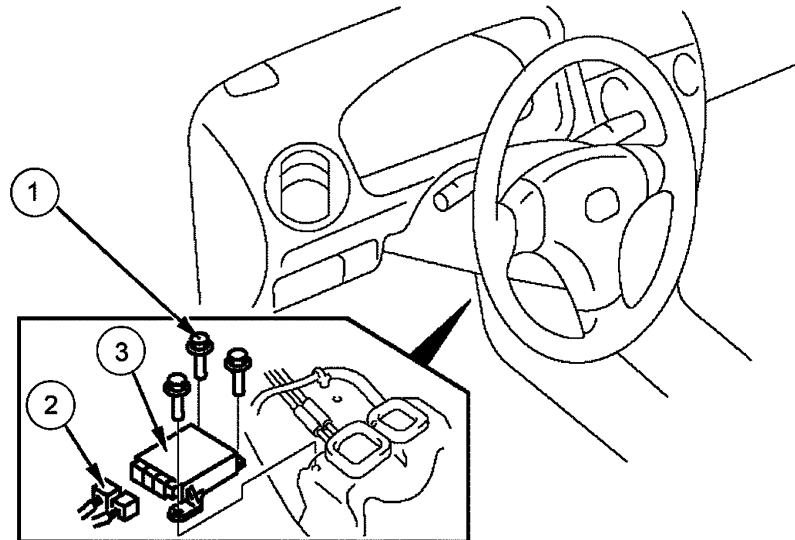
Notes:

## Components

### SAS Module

- The **SAS (Sophisticated Airbag Sensor)** module is located in the center console area and is the core component of the SRS. As the name states, it features at least one sensor that is engineered to detect situations requiring SRS activation. Furthermore, it incorporates the control module for the SRS.
- The sensor itself is an accelerometer built into a microchip (or a similar type). Modern modules incorporate a crash sensor and a saving sensor. The saving sensor may operate both mechanically or electronically and is used to prevent unintended triggering of the airbag e.g. due to electromagnetic interference.
- The SAS module is connected to all SRS related components and is programmed with vehicle-specific parameters. It decides whether or not it is necessary to trigger components of the SRS. The decision is based on the input signals, its own sensor measurements and stored reference values. Furthermore it decides which of the components must be triggered.
- If the crash sensor and the corresponding saving sensor detect a crash event, the SAS module decides within a few milliseconds whether and which component has to be triggered. Depending on crash severity and other values the front airbags and seat belt pretensioners are triggered about 10 ms after a front impact, while the curtain airbag and side airbag are triggered about 3 ms after a side impact.
- The SAS features an integrated back-up power supply to provide the system with power even if the vehicle power supply should fail (e.g. if the vehicle battery should be disconnected in an accident). This back-up power supply ensures the SRS operation for at least 150 ms after the vehicle power supply is interrupted.
- If the SAS module decides to trigger SRS components, it sends a corresponding **AC (Alternating Current)** or **DC (Direct Current)** signal (depending on the vehicle type) to the respective component.
- The SAS module is equipped with a **DTC (Diagnostic Trouble Code)** memory, and features the possibility to diagnose the system with the aid of the **WDS (Worldwide Diagnostic System)** via the **DLC 2 (Data Link Connector)** or via the **DLC 1** (depending on the vehicle type) and the SRS warning light.

**NOTE:** The mounting bolts of the SAS module must always be tightened to the specified torque in the compulsory sequence (refer to W/M). Ensure that the module is correctly aligned, otherwise the measurement results for the acceleration might be affected, causing a malfunction of the SRS.



1003\_107

1 Bolt  
2 Connector

3 SAS module

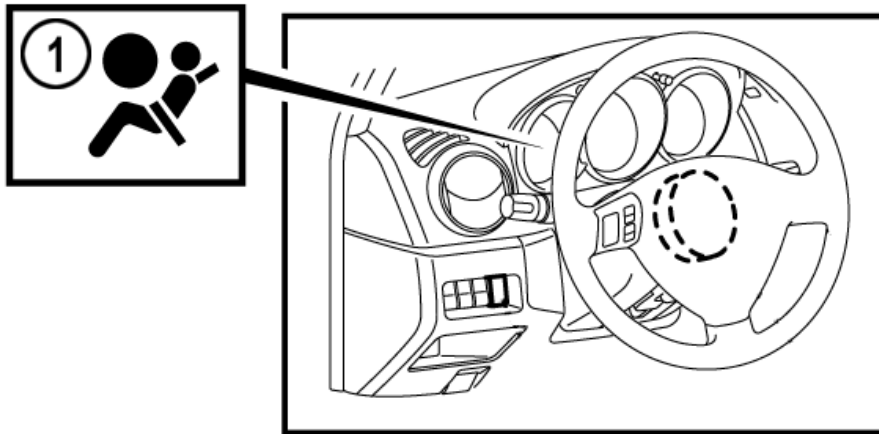


## SRS Warning Light

- The SRS warning light is located in the instrument cluster. If the SAS module detects a fault, the SRS warning light flashes or illuminates.
- If an open circuit exists in the cable connection between the SRS warning light and the SAS module, the warning light will be automatically illuminated by the internal control circuit of the instrument cluster.

**NOTE:** The overall SRS or some of its components may remain operational even when the SRS warning light flashes or is illuminated.

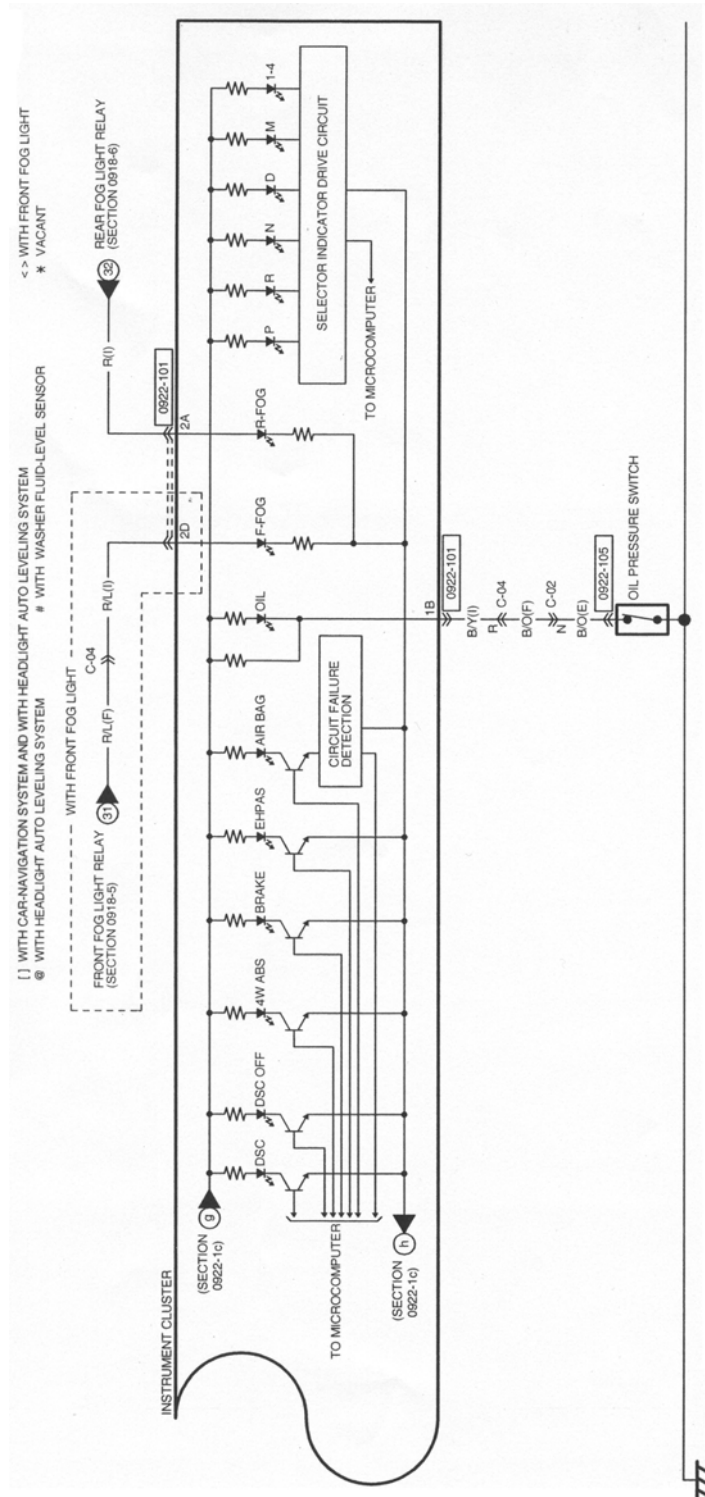
- Depending on the vehicle, a malfunction of the SRS warning light is indicated by a warning buzzer.



1003\_162

- 1 SRS warning light

- The picture below is an excerpt from the Mazda3 W/D and shows the SRS warning light in the instrument cluster.

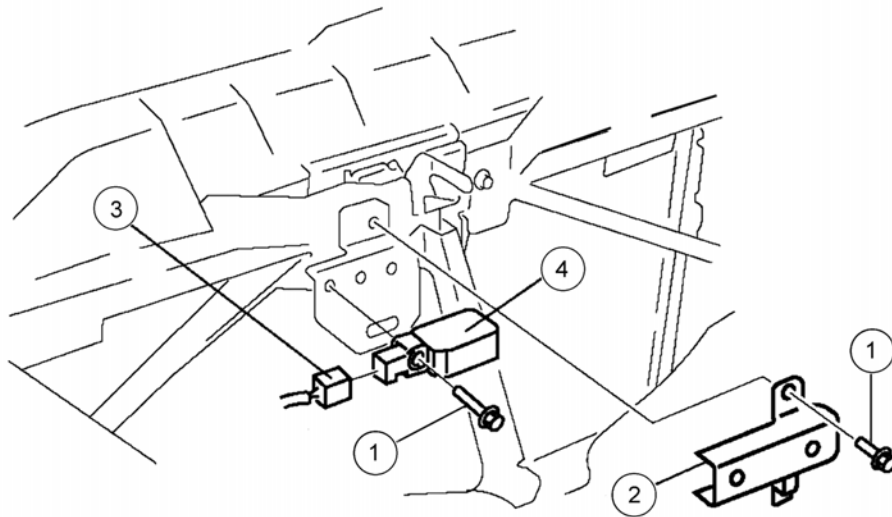


1003\_176

## Crash Zone Sensor

- Not all vehicles are equipped with a crash zone sensor, but it is mandatory if the vehicle is equipped with dual stage airbags. It is mounted at the front of the vehicle to determine type (direction) and severity of a frontal impact as early as possible. Furthermore its signal helps the SAS module to distinguish between crash and non-crash events. Thus it prevents the SRS components from being triggered when the vehicle touches bumps, curbs etc. while driving.
- It incorporates an accelerometer and is connected to the SAS module.

**NOTE:** The bolt(s) of the crash zone sensor must always be tightened to the specified torque (refer to W/M). Ensure that the sensor is correctly aligned, otherwise the measurement results for the acceleration might be affected, causing a malfunction of the SRS.

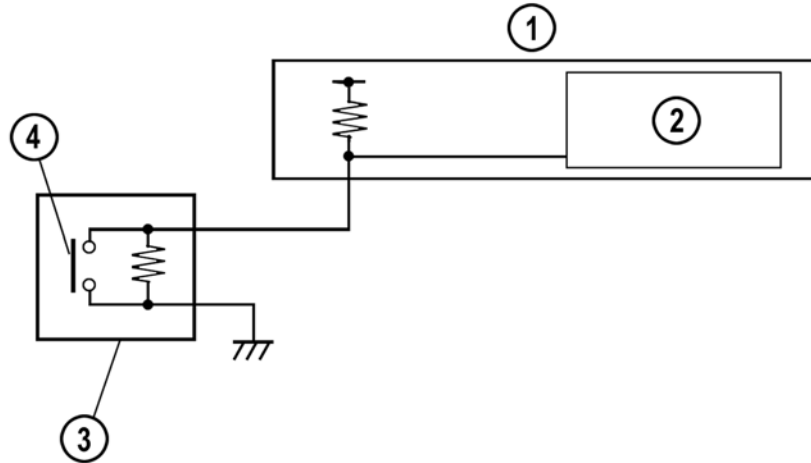


1003\_108

1 Bolt  
2 Cover

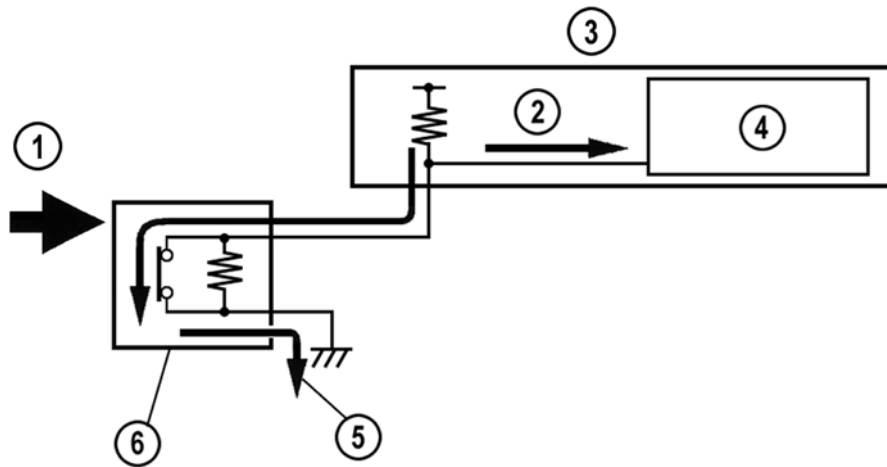
3 Connector  
4 Crash zone sensor

- The pictures below, shows a functional overview of a crash zone sensor used on MX-5 (NB).



1003\_163

- |   |                    |   |                                   |
|---|--------------------|---|-----------------------------------|
| 1 | SAS module         | 3 | Crash zone sensor (not activated) |
| 2 | Evaluation circuit | 4 | Accelerometer                     |



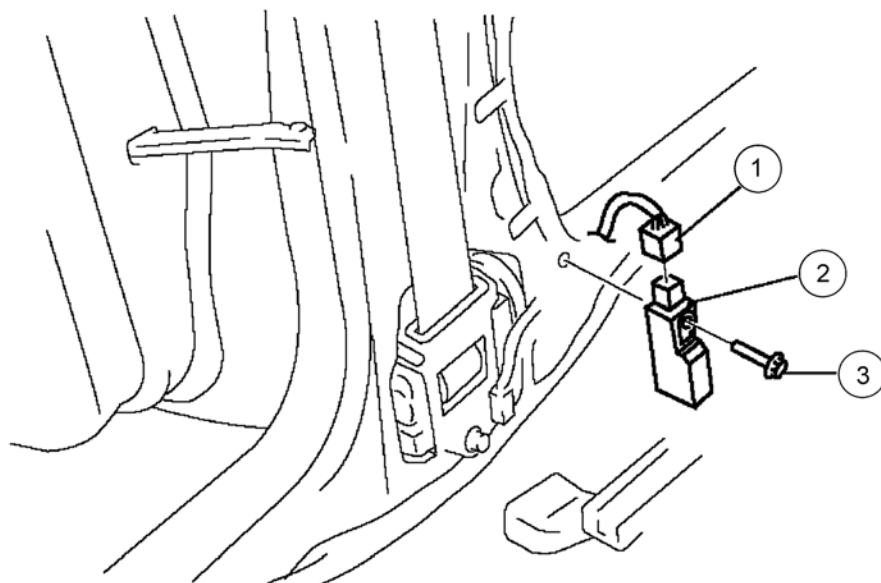
1003\_164

- |   |                   |   |                               |
|---|-------------------|---|-------------------------------|
| 1 | Impact force      | 4 | Evaluation circuit            |
| 2 | Activation signal | 5 | Current flow                  |
| 3 | SAS module        | 6 | Crash zone sensor (activated) |

## Side Airbag Sensors

- Side airbag sensors are only used in vehicles with side airbags and/or curtain airbags. They are mounted close to each B-pillar in order to determine severity of a side impact. The Tribute (EP) FL (Face Lift) is equipped with an additional side airbag sensor at each C-pillar to ensure optimum protection for the occupants even if a side impact occurs at the rear of the vehicle. The additional sensor is necessary, because of rotation of the vehicle about the vertical axis an impact in the rearward area of the vehicle would not be recognized by the front side sensors.
- It incorporates an accelerometer and is connected to the SAS module.
- Mazda uses two different types of side airbag sensors. One type features an integrated sensing sensor and triggers the corresponding side airbag directly via the SAS module. The other sensor type detects the impact severity and sends a corresponding signal to the SAS module where then the decision is made whether or not the corresponding side/curtain airbag have to be triggered.

**NOTE:** The bolt of the side airbag sensor must always be tightened to the specified torque (refer to W/M). Ensure that the sensor is correctly aligned, otherwise the measurement results for the acceleration might be affected, causing a malfunction of the SRS.

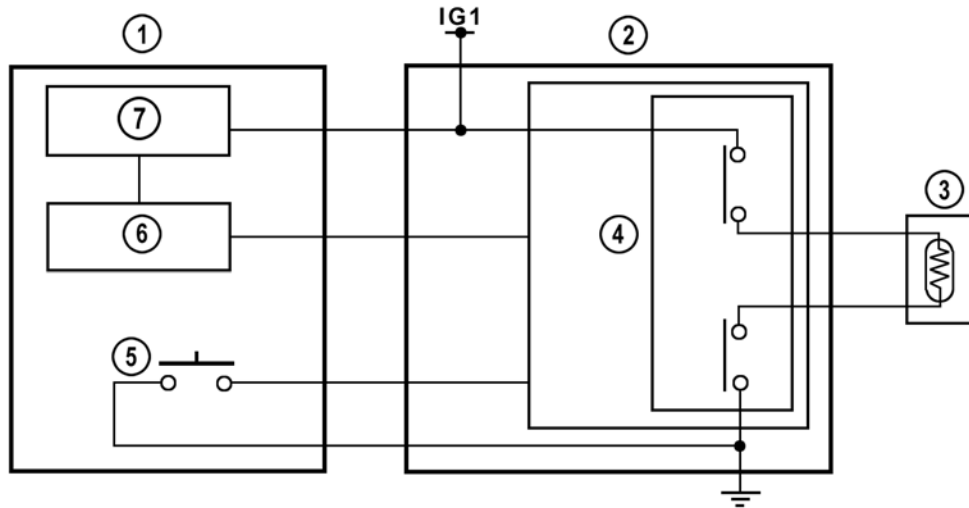


1003\_109

- 1 Connector
- 2 Side airbag sensor

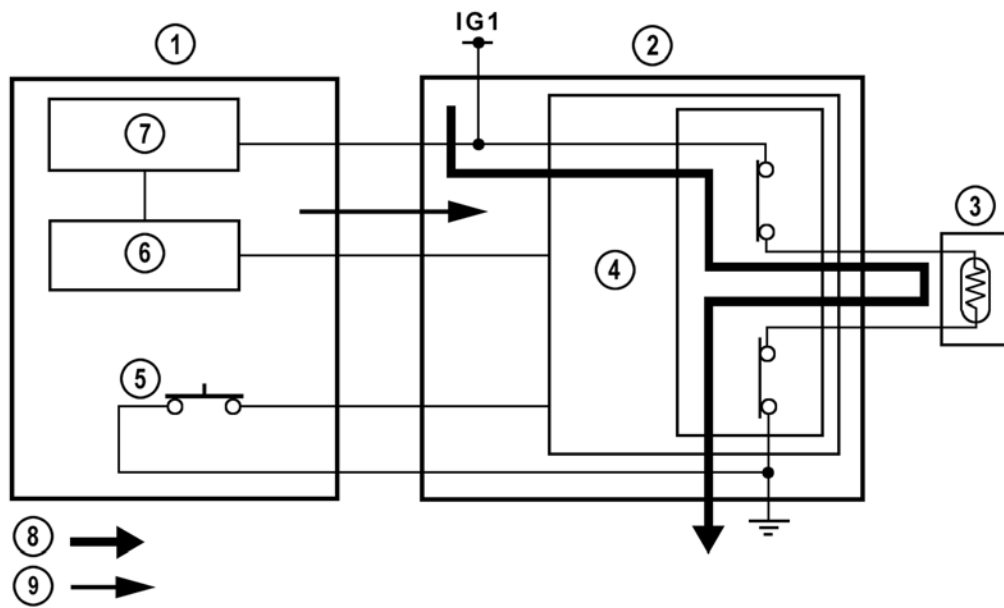
- 3 Bolt

- The picture below shows a functional overview of a side airbag sensor with integrated saving sensor used on 323 (BJ).



1003\_165a

- |   |                               |   |                        |
|---|-------------------------------|---|------------------------|
| 1 | Side airbag sensor (no crash) | 5 | Saving sensor          |
| 2 | SAS module (not triggering)   | 6 | Signal control circuit |
| 3 | Side airbag                   | 7 | Accelerometer          |
| 4 | Side airbag control circuit   |   |                        |

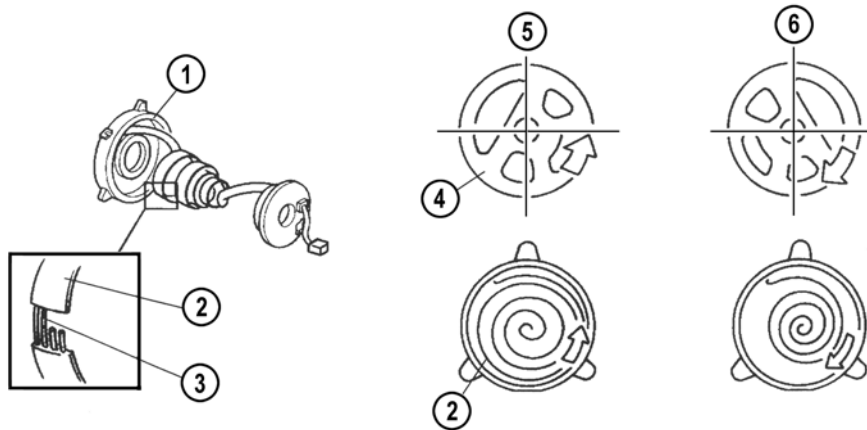


1003\_165b

- |   |   |   |   |
|---|---|---|---|
| 1 | Side airbag sensor (during side impact) | 6 | Signal control circuit                    |
| 2 | SAS module (triggering the side airbag) | 7 | Accelerometer                             |
| 3 | Side airbag                             | 8 | Current flow (triggering the side airbag) |
| 4 | Side airbag control circuit             | 9 | Side impact signal                        |
| 5 | Saving sensor (closed)                  |   |   |

## Clock Spring

- The clock spring is a spiral ribbon cable, located inside a housing between the steering wheel and steering column. It serves as electrical connection between the driver front airbag and the vehicle wiring harness.
- When the steering wheel is turned, the clock spring can “wind up” and “unwind”, so that electrical contact constantly exists between the airbag and the SAS module.

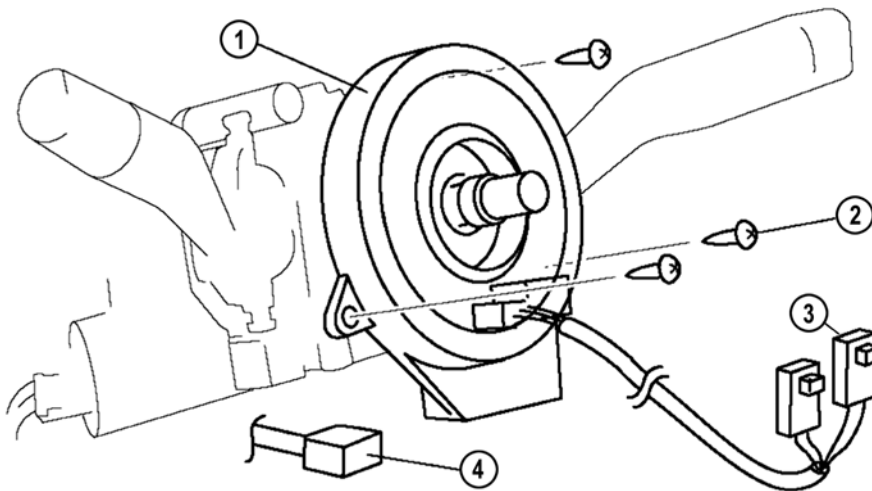


1003\_149

- 1 Clock spring
- 2 Spring wire
- 3 Wiring harness

- 4 Steering wheel
- 5 Steering wheel turned to the left
- 6 Steering wheel turned to the right

**NOTE:** The clock spring must be properly aligned when servicing (refer to W/M). Otherwise it can be easily damaged, causing a malfunction of the SRS.



1003\_109a

- 1 Clock spring
- 2 Screw

- 3 Airbag connectors
- 4 Wiring harness connector

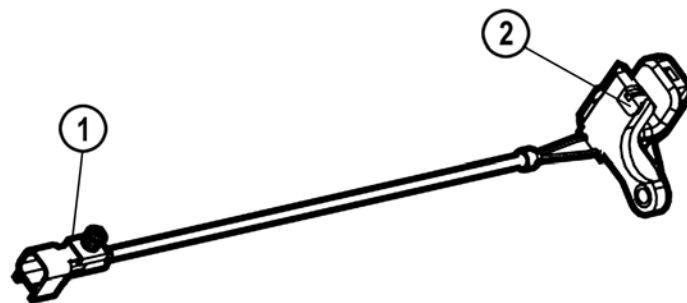


## Buckle Switch

- Some vehicles are equipped with buckle switches for either one or both front seat belts. They are connected either to the instrument cluster or to the SAS module and serve to remind the driver/passenger to fasten the seatbelt.
- On Mazda vehicles with buckle switches connected to the SAS module the module transmits the status of the buckle switch via **CAN (Controller Area Network)** to the instrument cluster.

## Seat Track Position Sensor

- The Tribute (EP) FL is equipped with a driver's seat track position sensor. It is a hall-element type sensor, which is located under the driver's seat beside the right-hand seat track, and informs the SAS module how far away the driver's seat is from the steering wheel.
- If the distance between the driver's seat and the steering wheel is less than a preset value, only the first stage of the driver's front airbag will be deployed. This reduces the risk of injury caused by airbag deployment due to reduced force to the driver's body.

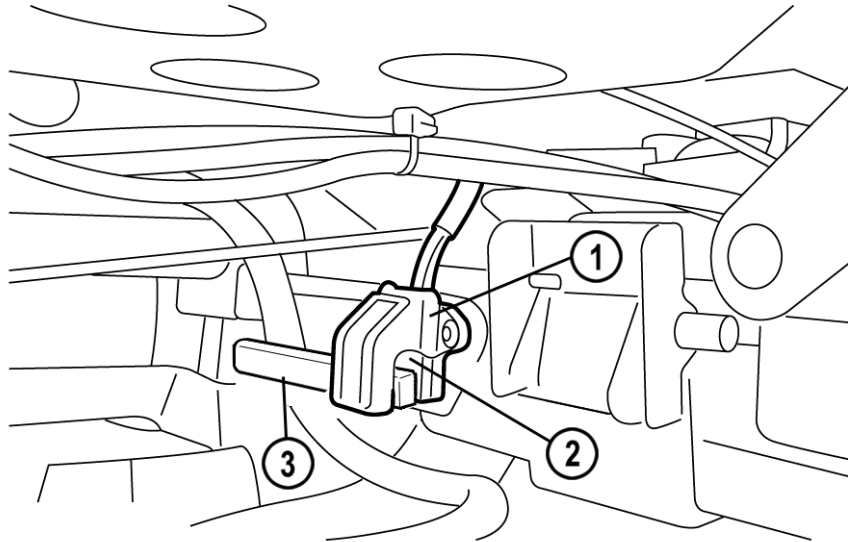


1003\_109b

1 Connector

2 Hall-element type sensor

- The seat track position sensor consists of a Hall sensor attached to the driver seat and a metal bar attached to the floor panel. When the seat is moved forwards, the metal bar moves into the gap of the sensor. The Hall sensor detects the change of the magnetic field and sends a corresponding signal to the SAS module.
- If the seat, is moved forward the metal rod acts as a blind in the gap of the sensor and the sensor signals a corresponding signal to the SAS module.



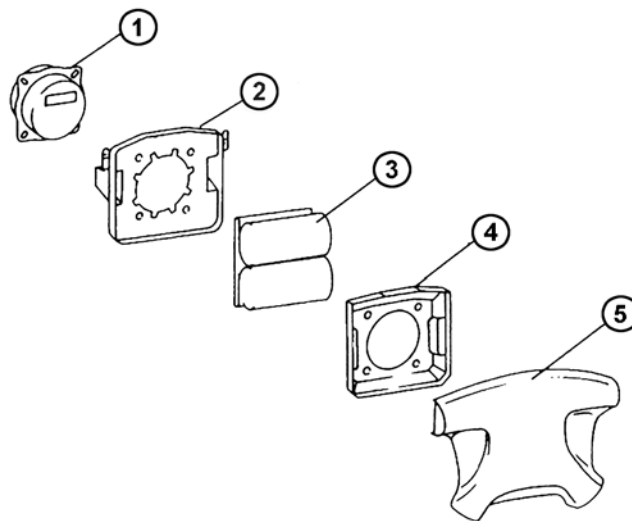
1003\_167

1 Hall-element type sensor  
2 Gap

3 Blind

## Driver Front Airbag

- The driver front airbag is designed to slow down the driver's speed to zero in case of an accident. Therefore, gas inflates a cushion between the driver and the steering wheel to reduce the driver's forward movement in a controlled manner and prevent the driver from crashing onto the steering wheel.
- The cushion itself, which is made of thin nylon fabric, is folded and stored behind the center cover of the steering wheel. The cover has "tear lines" molded in its surface, allowing the airbag to easily exit through the cover when it is triggered.
- The airbag incorporates an inflator that is connected to the SAS module. If triggered, gas is generated within the inflator and inflates the airbag, to protect the driver.
- The driver airbag has a volume of about 45 liters and is inflated within 40...60 ms after a frontal collision. The noise generated by the airbag deployment is approx. 130 dB(A). However, because of the short duration of approx. 3 ms, a hearing defect is unlikely.
- Mazda uses two different types of driver front airbags:
  - Single-stage airbag
  - Dual-stage airbag
- The following description explains the construction and operation of the single-stage airbag used on B-Series (UN) vehicles. Similar systems are used on other vehicles.

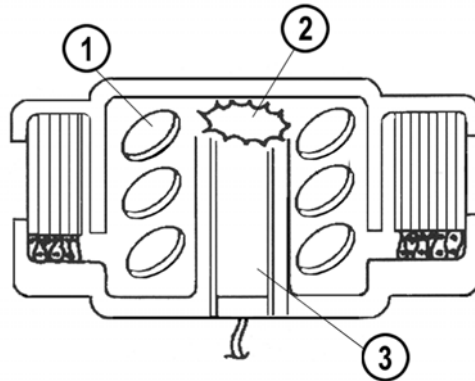


1003\_110

1 Inflator  
2 Outer retainer  
3 Airbag

4 Inner retainer  
5 Center cover

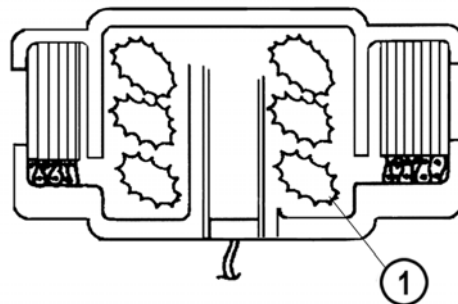
- The igniter, built into the inflator, begins to build up heat when the triggering signal is sent from the SAS module. This heat ignites the inflammation agent.



1003\_111

- 1 Propellant
- 2 Ignition of inflammation agent
- 3 Igniter

- The ignition of the inflammation agent causes the combustion of a propellant that produces nitrogen gas.



1003\_112

- 1 Combustion of propellant

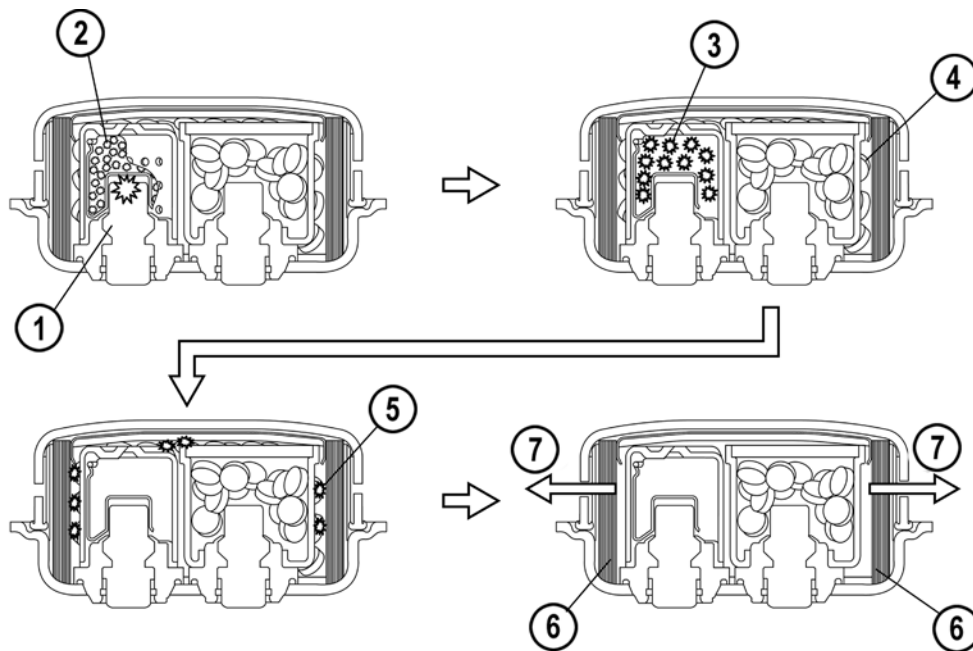


### Dual-Stage Airbag

- The construction and operation of a dual stage airbag is similar to a conventional airbag, except for the fact that it features two inflators as described on the following pages.
- A dual-stage airbag provides the ability to customize the inflation depending on the severity of the accident. This feature reduces the risk of serious injury caused by the deploying force of the airbag in case of an accident. Therefore, the SAS module varies the timing for triggering both stages, thus varying the deployment energy of the airbag. If it is necessary that the airbag must be fully inflated, the second stage is triggered simultaneously with or immediately after the first stage. If the SAS module decides that a fully inflated airbag could cause more injury than protection it delays the triggering of the second stage.
- The deployment energy for both stages depends on the vehicle. As an example, the energy distribution on Mazda6 vehicles is 60 % for the first stage and 40 % for the second stage.

**NOTE:** If it is necessary to deploy only the first stage of the dual-stage airbag the second stage is always triggered with time delay (approx. 0.1 seconds) after the first stage. This is done for safety reasons to ensure that the second stage cannot accidentally deploy during subsequent rescue work.

- The following description explains the construction and operation of the dual-stage airbag used on Mazda3 (BK) vehicles. Similar systems are used on other vehicles.
- When the first stage is triggered by a signal from the SAS module, the igniter built into inflator no.1 builds up heat and ignites the inflammation agent.
- The ignition of the inflammation agent causes the combustion of the propellant, which releases nitrogen gas.
- The gas, generated in the inflator, is filtered and cooled by the metal filter and then output to the airbag.

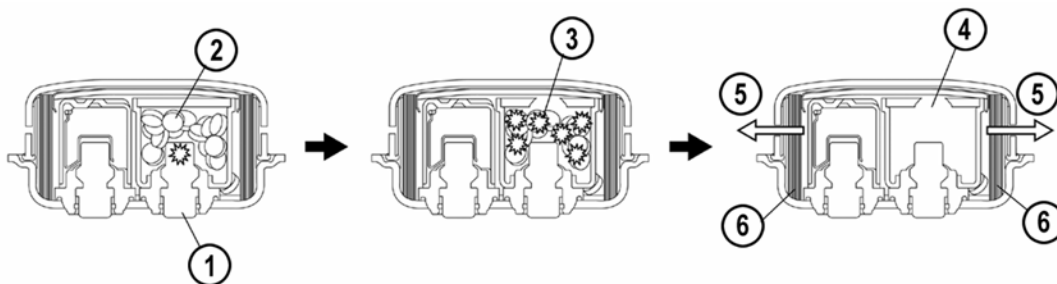


1003\_115

- 1 Igniter (inflator no.1) during triggering
- 2 Inflammation agent
- 3 Ignition of inflammation agent
- 4 Propellant

- 5 Combustion of propellant
- 6 Filter
- 7 To airbag

- When the second stage is triggered by a signal from the SAS module, the igniter built into inflator no.2 builds up heat and ignites the inflammation agent.
- The ignition of the inflammation agent causes the combustion of a propellant, which releases nitrogen gas.
- The gas, generated in the inflator, is filtered and cooled by the metal filter and then output to the airbag.



1003\_116

- |   |   |   |               |
|---|---|---|---------------|
| 1 | Igniter (inflator no.2) igniting inflammation agent | 4 | Generated gas |
| 2 | Propellant  | 5 | To airbag     |
| 3 | Combustion of propellant                            | 6 | Filter        |

## Passenger Front Airbag

- The passenger front airbag is folded and stored in the dashboard, behind a cover with split lines. It can be either a single-stage or a dual-stage airbag.
- The passenger airbag has a volume of approx. 100...110 liters and is inflated within 50...80 ms after a frontal collision.

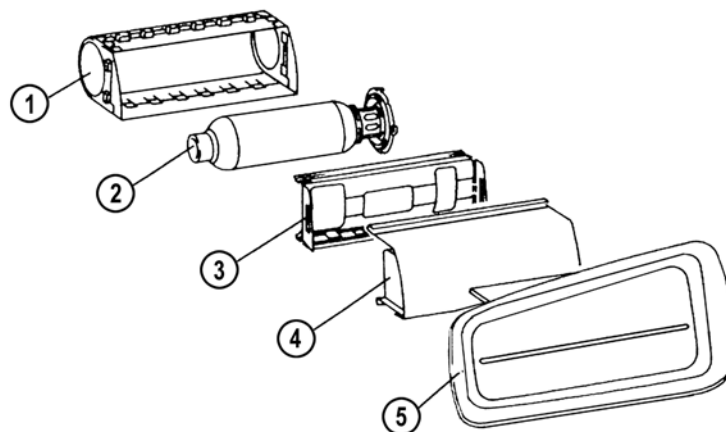
**NOTE:** In all vehicles equipped with a passenger airbag a warning sticker is factory-fitted to the dashboard. This sticker informs the occupants that the use of rearward facing child or baby restraint seats is prohibited. On some vehicles, the passenger airbag can be switched off to enable the customer to place a rearward facing child or baby restraint seat on the passenger seat. Those systems are explained in the sections “Passenger Airbag Deactivation System” and “Occupant Classification Systems”.



- Mazda uses three different types of passenger front airbags.
  - One system operates similar to the single-stage driver airbag.
  - One system operates similar to the dual-stage driver airbag.
  - One system is inflated using highly compressed gas, which is stored in a pressure chamber.

## System Using Highly Compressed Gas

- The following description explains the construction and operation of the single-stage passenger front airbag used on B-Series (UN) vehicles.
- The so called “hybrid airbags” have two advantages:
  - The temperatures generated during airbag deployment are in the range below 60° C.
  - The lower expansion energy acts less aggressively on the occupants.

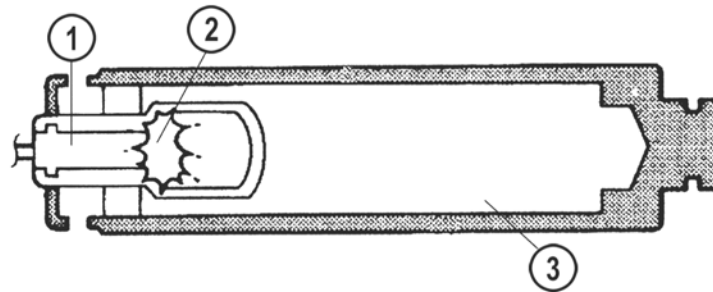


1003\_118

1 Retainer  
2 Inflator  
3 Mid plate

4 Airbag  
5 Airbag cover

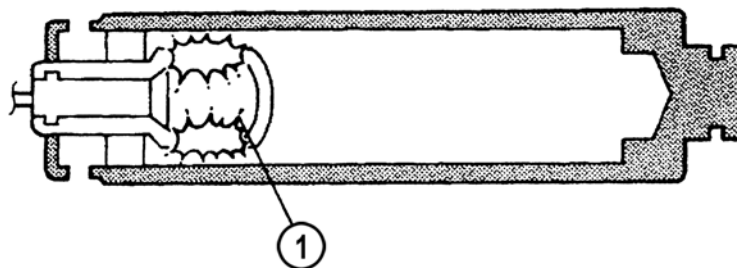
- The igniter, built into the inflator, begins to build up heat when the triggering signal is sent from the SAS module. This heat ignites the inflammation agent.



1003\_119

- 1 Igniter
- 2 Ignition of inflammation agent
- 3 Highly compressed inert gas

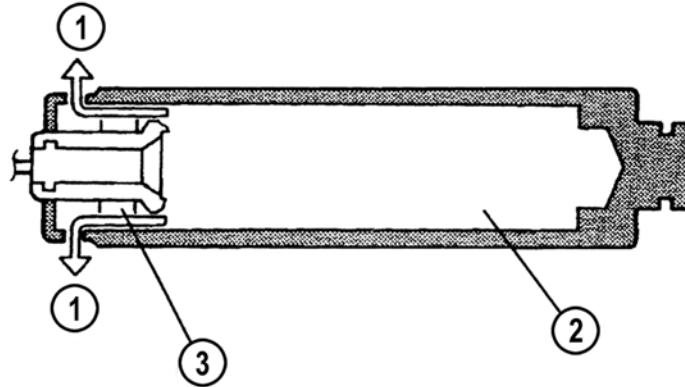
- As the pressure increases due to the combustion of the inflammation agent, it breaks the wall between the inflammation agent and the inert gas.



1003\_120

- 1 Combustion of inflammation agent

- Therefore, the inert gas expands in reaction to the heat created by the combustion of the inflammation agent, breaks through the wall of the discharge section and inflates the airbag.



1003\_121

1 To airbag  
2 Inert gas

3 Discharge section wall

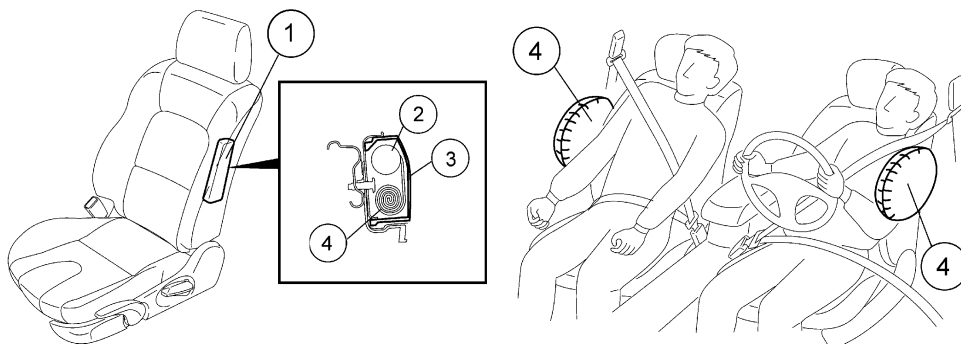
**NOTE:** Inside the pressure chamber the gas is stored with a pressure of 300 bar. Thus all damages to the housing are very dangerous. Furthermore, the high pressure requires additional accident prevention directives to be followed in some countries when servicing.

## Side Airbag

- The side airbag protects the chest area of the front seat occupant during a side impact. Therefore, it uses the space between the occupant and the door trim. If triggered from the SAS module, it is inflated within 20 ms from the outer edge of the front seats, where it is stored behind the trim.
- The side airbag has a volume of approx. 8 liters. Its layout depends on the vehicle type and specification. The side airbag can either protect only the chest area or in addition the shoulder / head of the occupant.
- The following description explains the construction and operation of the side airbag used on Mazda3 (BK) vehicles. Similar systems are used on other vehicles.

**NOTE:** A seat with a side airbag can be identified either by a patch “SRS” or by the letters “SRS” on the seat cover. In both cases the information can be found on the outboard side of the seat.

**NOTE:** If a seat is equipped with a side airbag, it is prohibited to install a conventional seat cover or seat protector, because this may change the direction of deployment. Failure to follow this instruction can cause serious injury or death in case of airbag deployment. Always use original or Mazda approved seat covers and seat protectors.

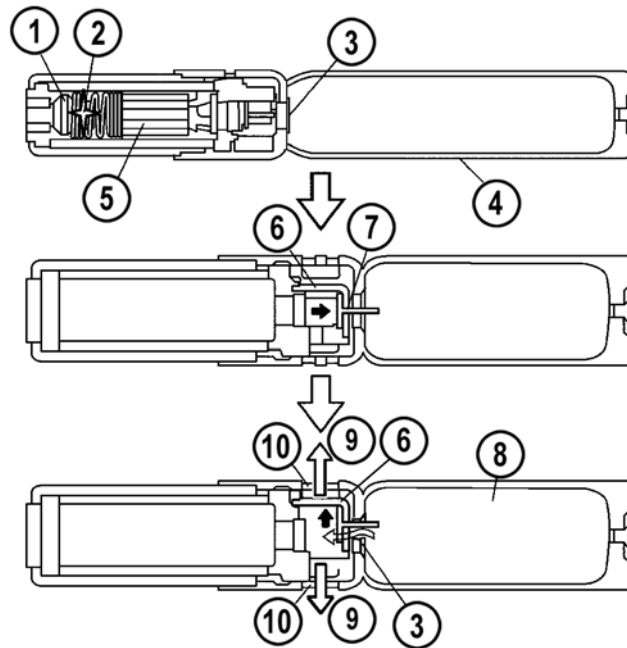


1 Side airbag module  
2 Inflator

3 Module cover  
4 Airbag

1003\_123

- The igniter, build into the inflator, begins to build up heat when the triggering signal is sent from the SAS module. This ignites the inflammation agent, causing the combustion of the propellant that releases nitrogen gas.
- As the pressure increases, it shifts the nail into the break washer, thus the L-steel lock is released and the L-steel moves destroying the break washer with the aid of the nail. As a result, the inert gas out of the pressure chamber is mixed with combustion gas and inflates the side airbag via the inner tube.
- The side airbag begins to deflate about 100 ms after being inflated.



1003\_124

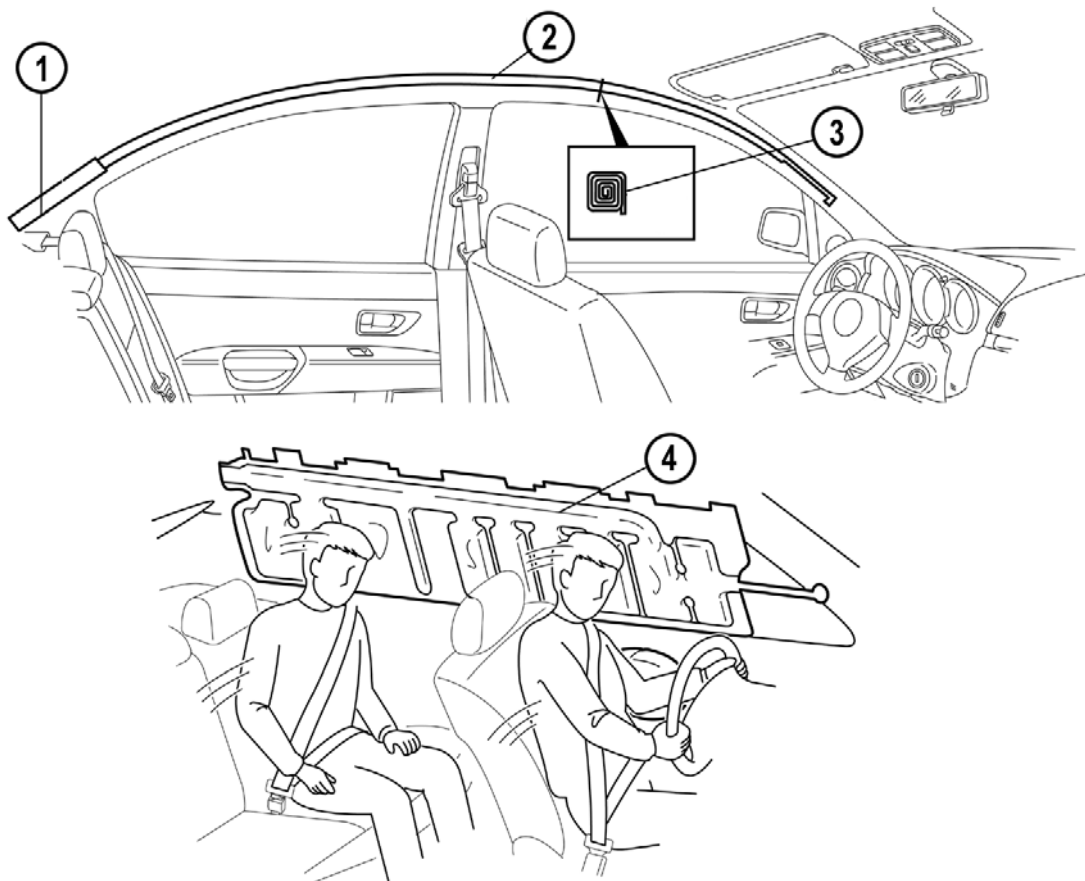
1	Igniter	6	L-Steel
2	Combustion of inflammation agent	7	Nail
3	Break washer	8	Inert gas
4	Pressure chamber	9	To airbag
5	Propellant	10	Inner tube

**NOTE:** Inside the pressure chamber the gas is stored with a pressure of 300 bar. Thus all damages to the housing are very dangerous. Furthermore, the high pressure requires additional accident prevention directives to be followed in some countries when servicing.

## Curtain Airbag

- The curtain airbag increases the head and shoulder protection of the front and rear seat occupants in the event of a side impact. Therefore, it uses the space between the occupants and the doors. If triggered from the SAS module, it is inflated along the roof between the A and C pillars, where it is stored behind the trim.
- The curtain airbag has a volume of approx. 12...19 liters and inflates within 15...30 ms after a side collision. It stays inflated for up to a few minutes, in order to protect the occupants even in case of a lateral rollover.
- The following description explains the construction and operation of the curtain airbag used on Mazda3 (BK) vehicles. Similar systems are used on other vehicles.

**NOTE:** A vehicle with curtain airbags can be identified by the letters “SRS” on the trim of the A and C pillar.

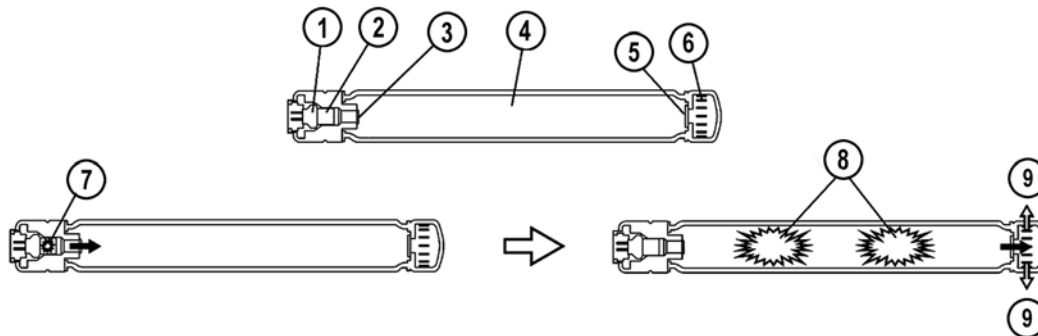


1003\_125

1 Inflator  
2 Curtain airbag

3 Airbag cover  
4 Airbag

- When the curtain airbag is triggered by a signal from the SAS module, the igniter builds up heat and ignites the inflammation agent. Thus combustion gas is generated and the increased pressure breaks the sealing disc.
- The inert gas out of the pressure chamber expands and destroys the burst disc inflating the airbag via the diffusor orifice. Thus the trims spread apart and the airbag is inflated between the head and shoulder area of the outboard occupants and the doors.



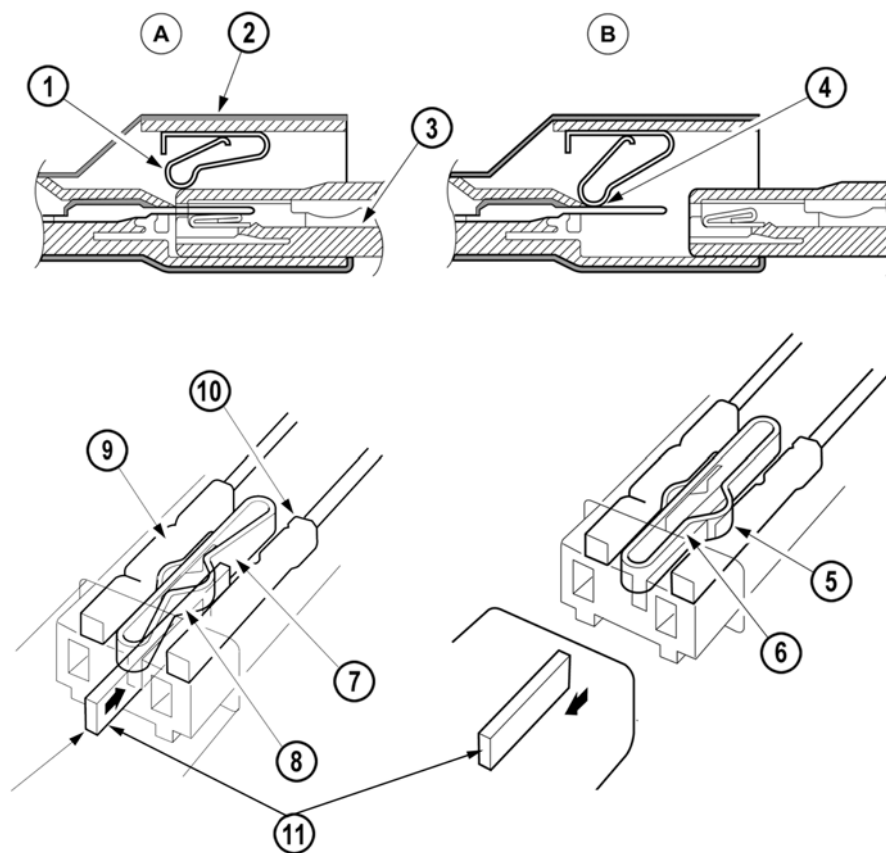
1003\_126

- |   |                    |   |                                  |
|---|--------------------|---|----------------------------------|
| 1 | Igniter            | 6 | Diffusor                         |
| 2 | Inflammation agent | 7 | Combustion of inflammation agent |
| 3 | Sealing disc       | 8 | Inert gas expansion              |
| 4 | Combined gas       | 9 | To airbag                        |
| 5 | Burst disc         |   |                                  |

**NOTE:** Inside the pressure chamber the gas is stored with a pressure of 300 bar. Thus all damages to the housing are very dangerous. Furthermore, the high pressure requires additional accident prevention directives to be followed in some countries when servicing.

## Connectors in Trigger Circuit

- Usually, all component-side connectors and components in the airbag trigger circuit are equipped with a short-circuit contact to avoid unintentional deployment of SRS components.
- When the connector is disconnected, a short circuit contact is closed inside the connector between both pins to ensure that no current can flow through the disconnected component and deploy it, even if the connector is accidentally supplied with electrical current.
- When the connectors are reconnected, the short-circuit contact is mechanically opened and the component can be triggered again.



1003\_150

- |   |  |    |                       |
|---|--|----|-----------------------|
| A | Connector connected                    | 6  | Short circuit contact |
| B | Connector disconnected                 | 7  | No contact            |
| 1 | Short circuit contact                  | 8  | Short circuit contact |
| 2 | Housing (connector)                    | 9  | Power supply terminal |
| 3 | Contact (socket)                       | 10 | Ground terminal       |
| 4 | Short-circuit contact touches terminal | 11 | Isolator bar          |
| 5 | Contact touches terminal               |    |                       |

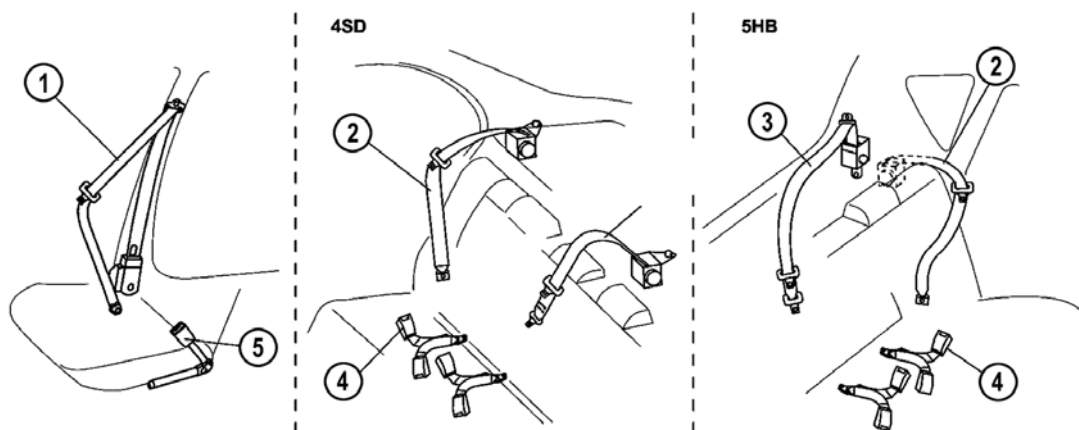


## Seatbelt

- The whole SRS is not able to protect an occupant if he does not properly wear the seatbelt. Most seats are equipped with three-point seatbelts, which hold the occupant in his seat and reduces uncontrolled movement of the occupant's body in case of an accident.
- The seatbelts that are used on Mazda vehicles feature an Emergency Locking Retractor function. In addition they can be equipped with an Automatic Locking Retractor, a belt pretensioner and a belt load limiter.

**NOTE:** The seatbelts have to be inspected after each accident. Depending on the vehicle type, they have to be replaced even when the pretensioners are not triggered and there is no wear. Therefore, always refer to the W/M when inspecting the seatbelts.

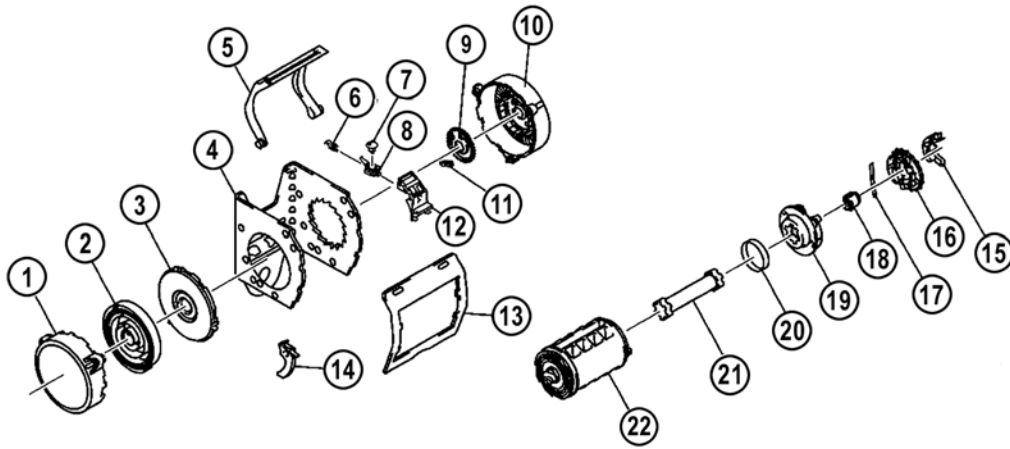
- The picture below shows an overview of the seatbelts used on the Mazda3 (BK).



1003\_127

- |   |                       |   |              |
|---|-----------------------|---|--------------|
| 1 | Front seatbelt        | 4 | Rear buckle  |
| 2 | Rear outer seatbelt   | 5 | Front buckle |
| 3 | Rear center seat belt |   |              |

- The picture below shows the construction of a belt retractor used on the Mazad3 (BK)

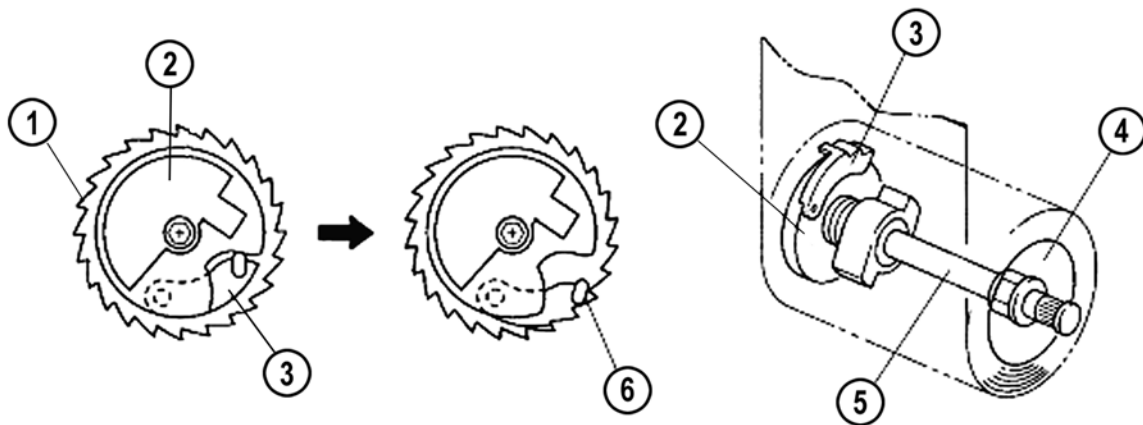


1003\_169

- |    |                  |    |                      |
|----|------------------|----|----------------------|
| 1  | Spring cover     | 12 | Tie Bar              |
| 2  | Retractor spring | 13 | Adapter              |
| 3  | Spring plate     | 14 | Lever C              |
| 4  | Housing          | 15 | Lever A              |
| 5  | Webbing guide    | 16 | Steering disc        |
| 6  | Lever B          | 17 | Steering disc spring |
| 7  | Weight           | 18 | Bushing              |
| 8  | Bearing          | 19 | Steering head        |
| 9  | Wobble gear      | 20 | Ring                 |
| 10 | Cover            | 21 | Torsion bar          |
| 11 | Pawl             | 22 | Guide drum           |

## Emergency Locking Retractor

- The **ELR (Emergency Locking Retractor)** function allows the belt to be freely extracted or retracted, thus allowing free movement of the belted occupant. It only locks up when either the vehicle decelerates, changes direction, is tilted, stops suddenly or when the webbing is accelerated rapidly.
- The ELR against rapid acceleration of the webbing used on the MPV (LW) is described below. Other vehicles are equipped with similar systems.
- The ELR mechanism is activated by the extraction of the belt. When the extraction speed is above a specified level, the pawl engages into the housing gear. This locks up the locking base as well as the torsion bar and guide drum integrated to the locking base. Thus the belt cannot be more extracted until the tension is released from it.

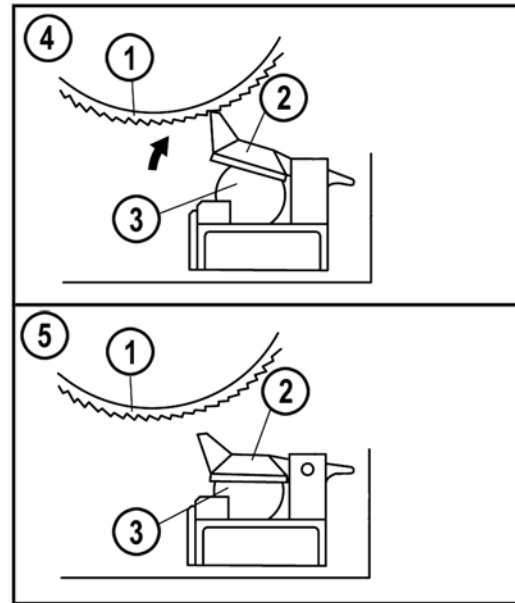
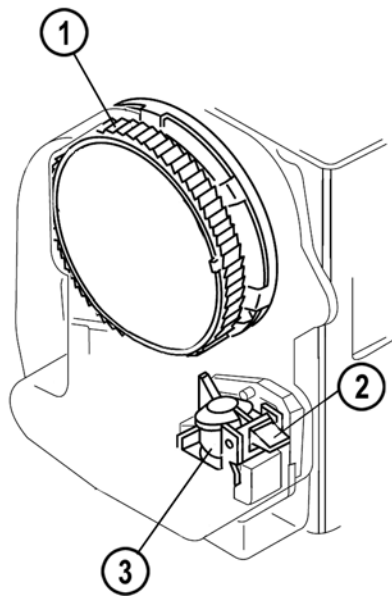


1003\_128

1 Housing gear  
2 Locking base  
3 Pawl

4 Guide drum  
5 Torsion bar  
6 Pawl engages the housing gear

- The ELR mechanism locking in case of deceleration, changes of direction, tilted vehicle and sudden stop is described below. The pictures serve only as an example.
- The ELR consists of a ball, a lever and a lock gear attached to the guide drum.
- The ball is free to move. When the vehicle is not on level ground or a sudden shock is applied to the vehicle, the ball moves to push the lever upward, so that it engages with the lock gear and stops the rotation of the guide drum.
- The guide drum will be unlocked when the ball is moved back to its initial position and no tension is applied to the seatbelt.



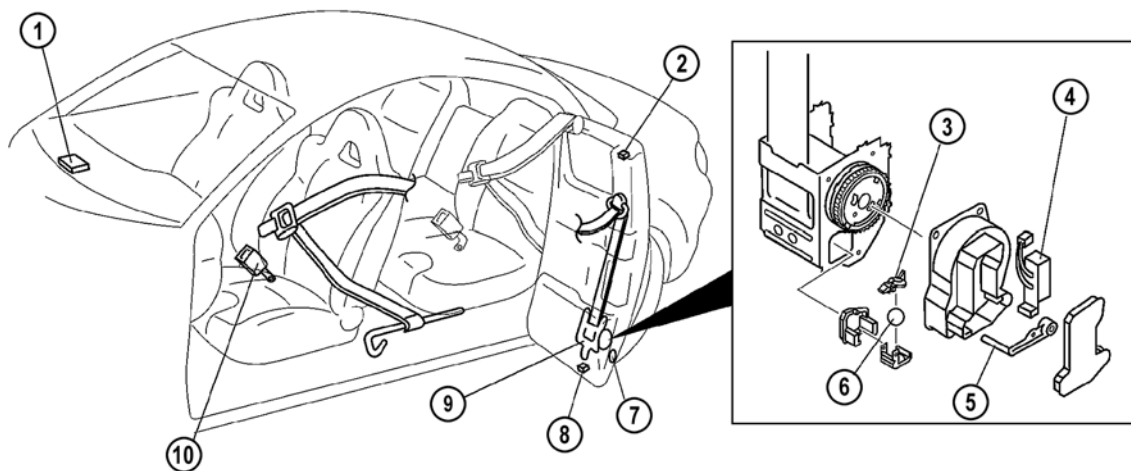
1003\_173

- 1 Lock gear attached to the guide drum
- 2 Actuator
- 3 Ball

- 4 ELR release function not operated
- 5 ELR release function operated

## ELR Release Function

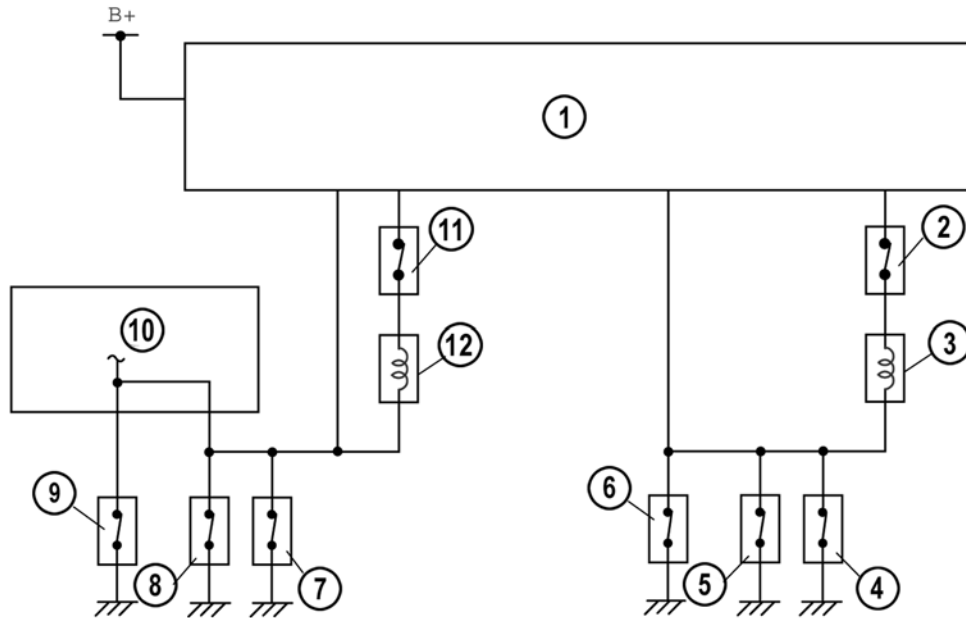
- The RX-8 (SE) features an ELR release function. This is necessary due to the fact that on the RX-8 the seatbelt retractors for the front seatbelts are installed in the rear doors. In order to open the rear doors completely, the seat belt webbing has to unwind from the guide drum even when the vehicle is tilted.
- The ELR release function is controlled by the **RKE (Remote Keyless Entry)** module and only inhibits the locking of the guide drum due to a tilted position of the vehicle. The seatbelt will always lock when the webbing is quickly unwound from the reel.
- The picture below shows an overview of the components.



1003\_168

- |   |                              |    |                                  |
|---|------------------------------|----|----------------------------------|
| 1 | Remote Keyless Entry module  | 6  | Ball                             |
| 2 | Rear door upper latch switch | 7  | Front door switch (in rear door) |
| 3 | Actuator                     | 8  | Rear door lower latch switch     |
| 4 | Lock release solenoid        | 9  | Front seatbelt retractor         |
| 5 | Cancel lever                 | 10 | Front buckle switch              |

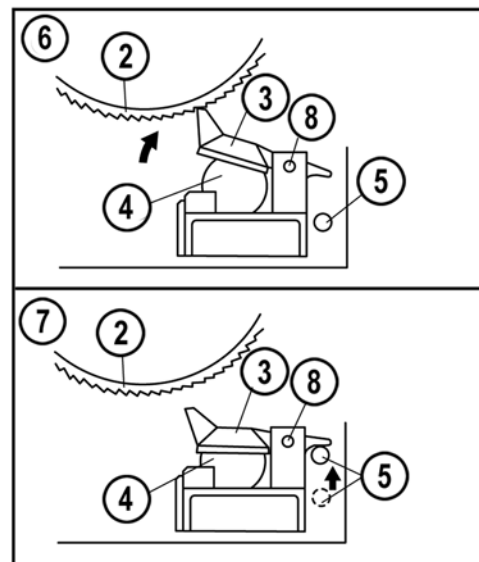
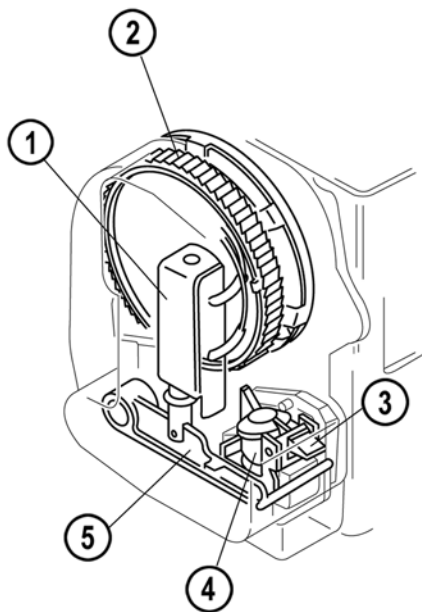
- The wiring diagram below shows the condition with all doors open and seat belts not buckled. The lock release solenoids are actuated in this condition by current flowing from the RKE module via the respective switches to ground.



1003\_175

- |   |   |    |  |
|---|---|----|--|
| 1 | Keyless unit                              | 7  | Rear door lower latch switch (left side) |
| 2 | Front buckle switch (right side)          | 8  | Rear door upper latch switch (left side) |
| 3 | Lock release solenoid (right side)        | 9  | Front door switch (left side)            |
| 4 | Rear door lower latch switch (right side) | 10 | Instrument cluster                       |
| 5 | Rear door upper latch switch (right side) | 11 | Front buckle switch (left side)          |
| 6 | Front door switch (right side)            | 12 | Lock release solenoid (left side)        |

- When the ELR release function is not operated (normal condition, e.g. when driving), the ball lock release solenoid is not activated, thus the ball is free to move. When the vehicle is not on level ground or a sudden shock is applied to the vehicle, the ball moves to push the actuator upward so that it engages with the lock gear and stops the rotation of the guide drum.
- When a rear door is opened and the corresponding front seatbelt is not buckled, the respective lock release solenoid is actuated from the RKE module via the switches and pushes the cancel lever upward. As a result, the actuator and ball are fixed in their positions. Due to this, the front seat belt unwinds smoothly when the rear door is opened.
- The ELR release function does not operate under the following conditions:
  - When the corresponding rear door is closed.
  - When the corresponding front seatbelt is buckled.
  - When one hour has elapsed with a door open (battery saver function).
  - When the battery is disconnected or the ROOM fuse is removed.



1003\_174

- 1 Lock release solenoid
- 2 Lock gear
- 3 Actuator
- 4 Ball

- 5 Cancel lever
- 6 ELR release function not operated
- 7 ELR release function operated
- 8 Actuator fulcrum

### Automatic Locking Retractor

- The **ALR (Automatic Locking Retractor)** function enables the customer to fix a child-restraint seat securely onto a seat. The seatbelt retractor automatically locks and remains locked when it is buckled, and does not allow any freedom of movement.
- To enable the ALR function, the seatbelt has to be pulled out completely. A ratcheting noise can be heard when the belt is pulled then back onto the guide drum. Then the belt length can only be decreased but not increased. The ALR function is disabled automatically when the seatbelt is pulled back onto the guide drum completely.

**NOTE:** Depending on the vehicle, all seats except for the driver seat can be equipped with this special feature. Most seatbelts with ALR function can be identified by a special patch as shown below.



Sample patch for ALR

1003\_129



### Belt Pretensioner

- Most front seatbelts are equipped with a belt pretensioner system that serves to remove excess slack from the seatbelt in case of an accident. Mazda uses pyrotechnic belt pretensioners.
- If triggered from the SAS module, the belt pretensioner needs approx. 15 ms to remove up to approx. 6...12 cm slack from the seatbelt.

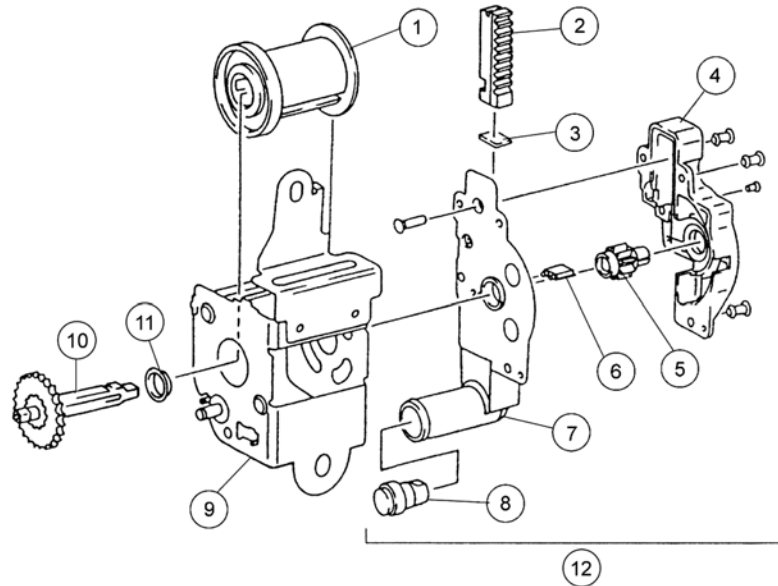
**NOTE:** If the belt pretensioners are triggered, the seatbelts have to be replaced as a unit. If the belt pretensioner is not integrated in the retractor, it has to be replaced in addition to the seatbelt.

**NOTE:** If the front airbags are triggered, the belt pretensioners are triggered as well.

- Mazda uses four different types of belt pretensioners:
  - Rack-operated belt pretensioner
  - Ball-operated belt pretensioner
  - Rotor-operated belt pretensioner
  - Cable-operated belt pretensioner
- The different types of the belt pretensioners that are explained on the following pages serve only as an example. The layout of the systems can vary but the construction and operation is similar to those that are explained.

## Rack-Operated Belt Pretensioner

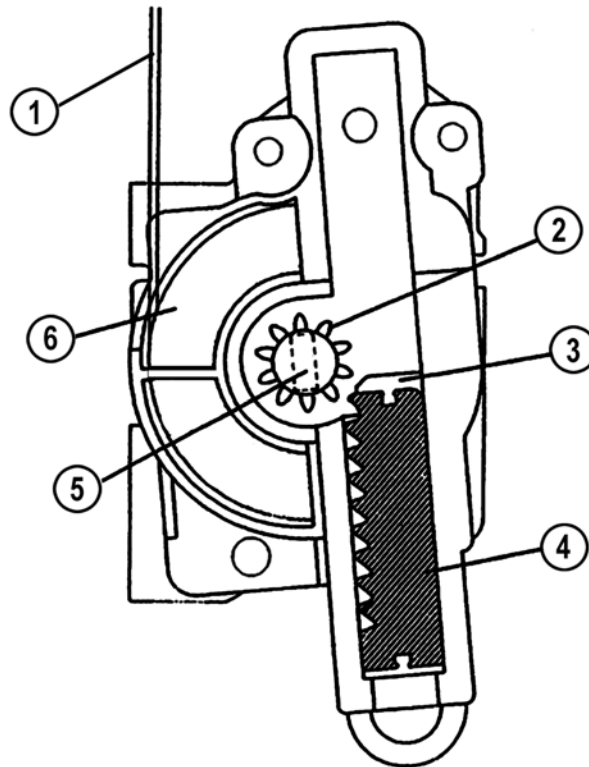
- The belt pretensioner with rack and pinion design is integrated in the belt retractor.



1003\_130

- |   |                  |    |                        |
|---|------------------|----|------------------------|
| 1 | Guide drum       | 7  | Housing                |
| 2 | Piston with rack | 8  | Gas generator          |
| 3 | Rubber plate     | 9  | Housing                |
| 4 | Cover            | 10 | Spindle                |
| 5 | Pinion           | 11 | Bearing                |
| 6 | Piston stopper   | 12 | Pretensioner mechanism |

- The piston is usually fixed by the piston stopper, and is therefore completely separated from the movement of the pinion. The pinion is connected to the spindle running through the center of the guide drum and rotates freely according to the movement of the belt.

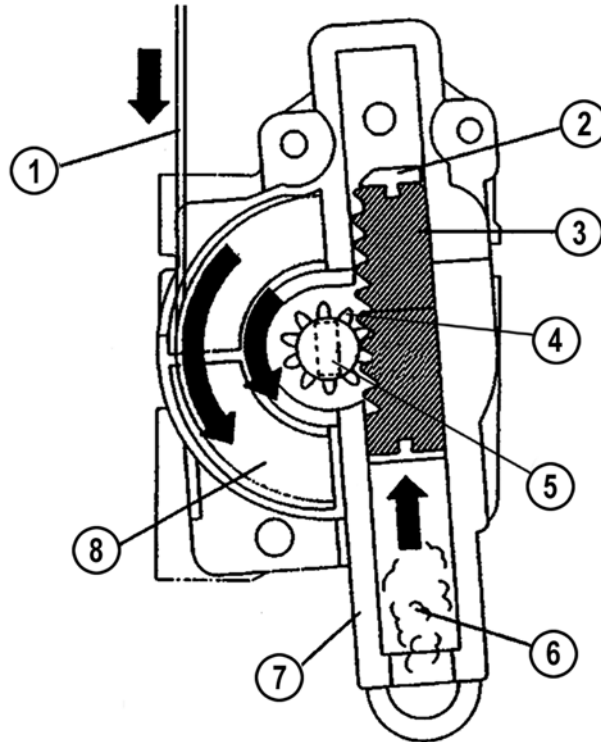


1003\_131

1 Belt  
2 Pinion  
3 Piston stopper

4 Piston with rack  
5 Spindle  
6 Guide drum

- When the pretensioner is triggered by a signal from the SAS module, the gas generator produces combustion gas.
- As the pressure in the housing increases due to the expanding gas, the piston is pushed up, shears off the piston stopper, engages the gear and causes the pinion to rotate. As a result, the spindle rotates the guide drum and retracts the seatbelt.

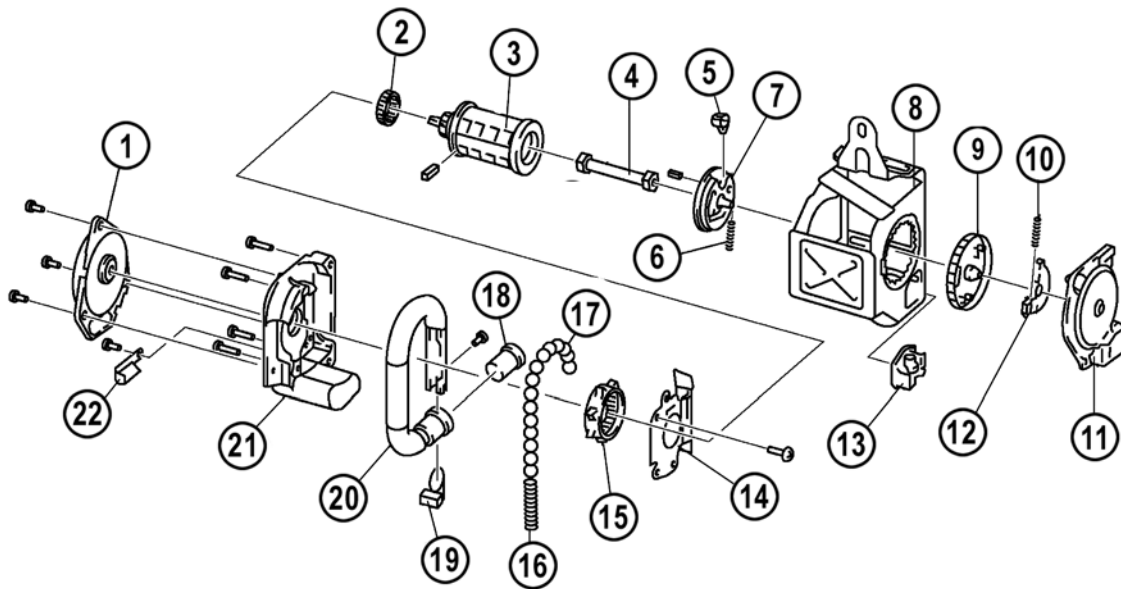


1003\_132

- |   |                  |   |              |
|---|------------------|---|--------------|
| 1 | Belt             | 5 | Spindle      |
| 2 | Piston stopper   | 6 | Gas pressure |
| 3 | Piston with rack | 7 | Housing      |
| 4 | Pinion           | 8 | Guide drum   |

## Ball-Operated Belt Pretensioner

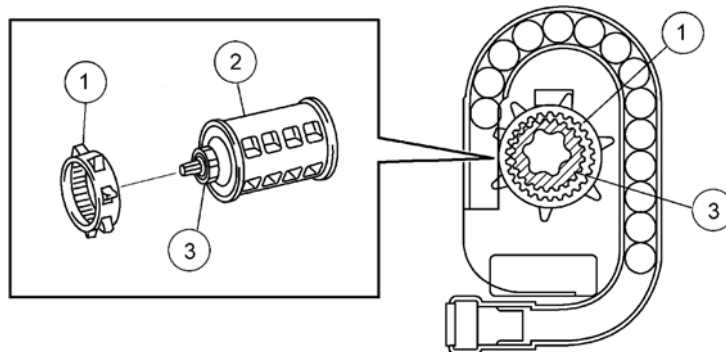
- The ball-operated belt pretensioner is integrated in the belt retractor.



1003\_133

- |    |              |    |                    |
|----|--------------|----|--------------------|
| 1  | Spring unit  | 12 | Fly wheel          |
| 2  | Pinion       | 13 | Sensor unit        |
| 3  | Guide drum   | 14 | Pretensioner plate |
| 4  | Torsion bar  | 15 | Ring gear          |
| 5  | Pawl         | 16 | Stopper spring     |
| 6  | Pawl spring  | 17 | Balls              |
| 7  | Locking base | 18 | Gas generator      |
| 8  | Housing      | 19 | Guide block        |
| 9  | Lock gear    | 20 | Pipe               |
| 10 | Hook spring  | 21 | Pretensioner cover |
| 11 | Retainer     | 22 | Guide plate        |

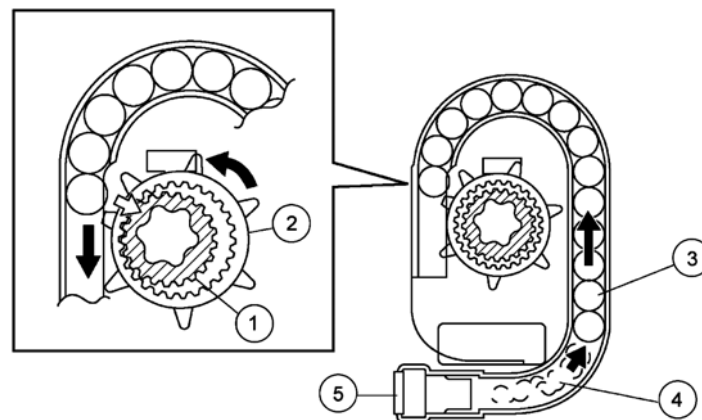
- The guide drum has a pinion on its end, which rotates with the guide drum according to the movement of the belt. The ring gear does not engage with the pinion during normal operation, thus it does not rotate even when the belt is retracted or withdrawn.



1003\_134

- |   |            |   |        |
|---|------------|---|--------|
| 1 | Ring gear  | 3 | Pinion |
| 2 | Guide drum |   |        |

- If the belt pretensioner is triggered by a signal from the SAS module, the gas generator produces combustion gas.
- The balls are forced up in the pipe as the pressure in the housing increases due to the expanding gas. The balls movement engages the ring gear with the pinion and transfers rotational movement via the torsion bar to the guide drum. Thus the guide drum rotates and retracts the seatbelt.

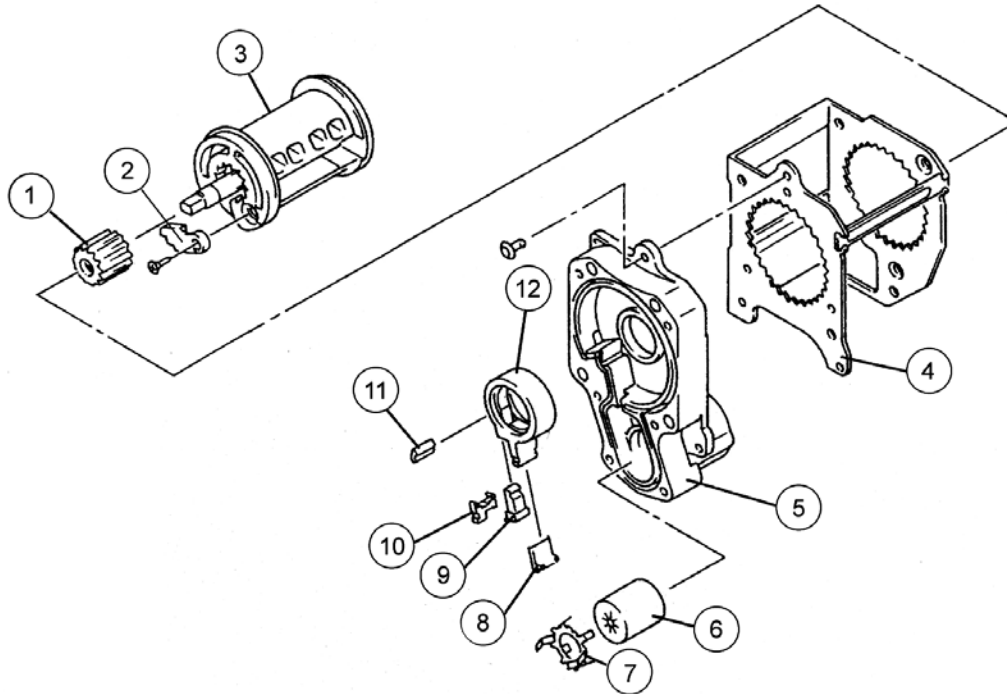


1003\_135

- |   |           |   |               |
|---|-----------|---|---------------|
| 1 | Pinion    | 4 | Gas pressure  |
| 2 | Ring gear | 5 | Gas generator |
| 3 | Ball      |   |               |

## Rotor-Operated Belt Pretensioner

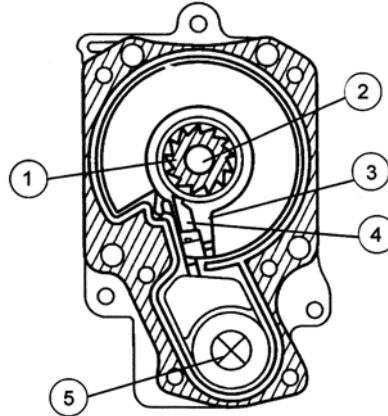
- The rotor-operated belt pretensioner is integrated in the belt retractor.



1003\_136

- |   |               |    |                |
|---|---------------|----|----------------|
| 1 | Clutch gear   | 7  | Retainer       |
| 2 | Pawl          | 8  | Sealed piece A |
| 3 | Guide drum    | 9  | Clutch key     |
| 4 | Housing       | 10 | Fitting key    |
| 5 | Rotor housing | 11 | Sealed piece B |
| 6 | Gas generator | 12 | Rotor          |

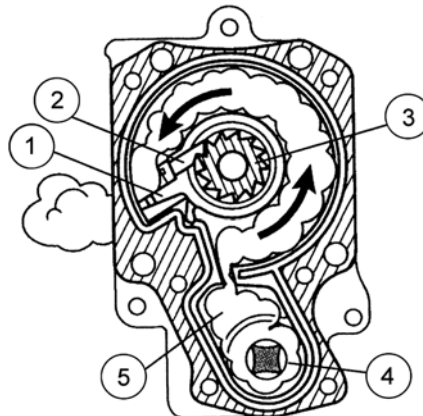
- The guide drum has a clutch gear on its end, which rotates with the guide drum according to the movement of the belt. The rotor around the gear is not engaged with the gear during normal operation, thus it does not rotate even when the belt is retracted or withdrawn.



1003\_137

- |   |             |   |               |
|---|-------------|---|---------------|
| 1 | Clutch gear | 4 | Clutch key    |
| 2 | Guide drum  | 5 | Gas generator |
| 3 | Rotor       |   |               |

- When the pretensioner is triggered by a signal from the SAS module, the gas generator generates combustion gas.
- The expanding gas increases the pressure in the housing, pushes up the clutch key and engages the rotor and clutch gear. As a result, the rotor rotates together with the guide drum and retracts the seatbelt.



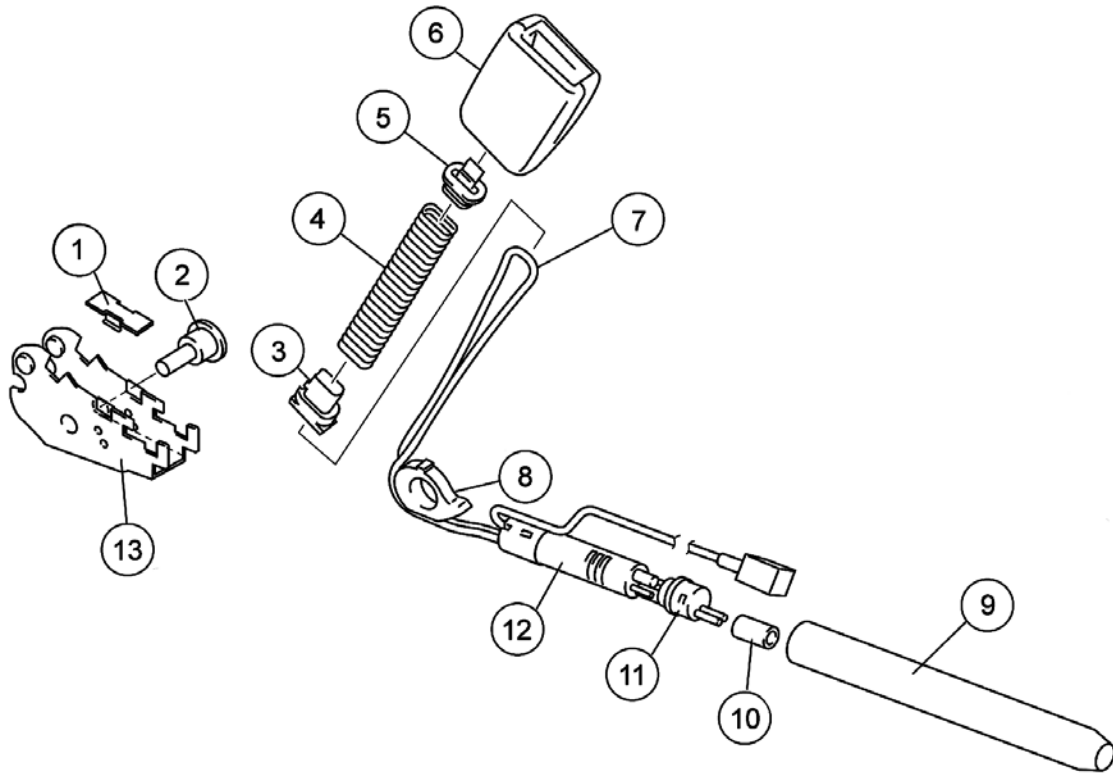
1003\_138

- |   |             |   |               |
|---|-------------|---|---------------|
| 1 | Rotor       | 4 | Gas generator |
| 2 | Clutch key  | 5 | Gas pressure  |
| 3 | Clutch gear |   |               |



## Buckle-Operated Belt Pretensioner

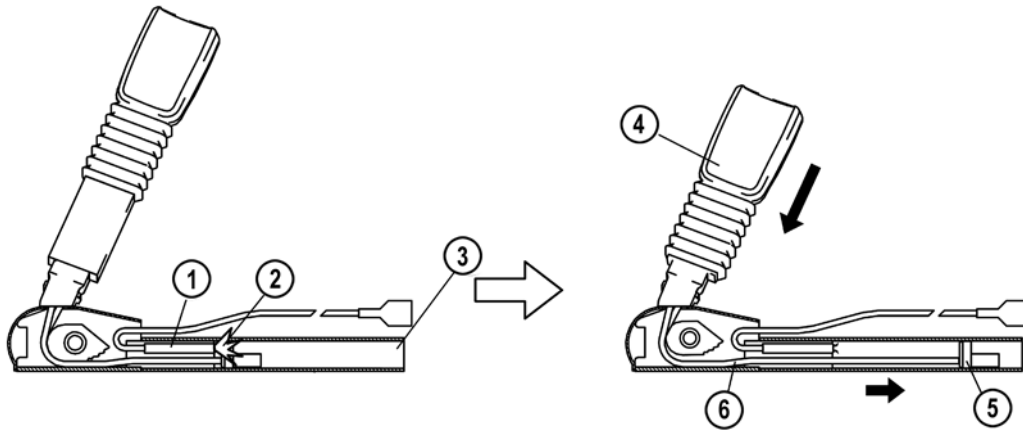
- The cable-operated belt pretensioner is integrated in the belt buckle.



1003\_139

- |   |                            |    |               |
|---|----------------------------|----|---------------|
| 1 | Cover                      | 8  | Cam           |
| 2 | Collar screw               | 9  | Tube          |
| 3 | Cable guide of the bracket | 10 | Press sleeve  |
| 4 | Corrugated tube            | 11 | Piston        |
| 5 | Cable guide of the buckle  | 12 | Gas generator |
| 6 | Belt buckle                | 13 | Bracket       |
| 7 | Steel cable                |    |               |

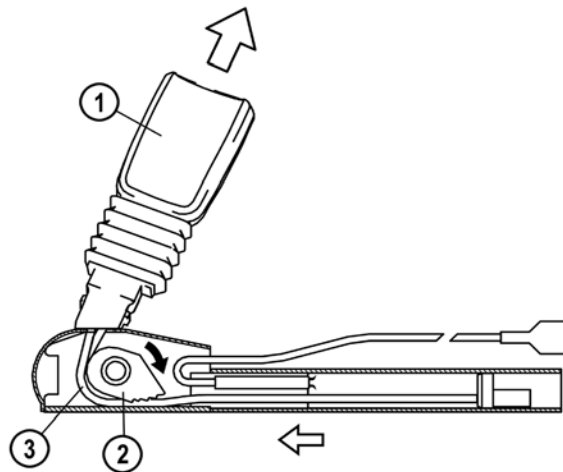
- When the pretensioner is triggered by a signal from the SAS module, the gas generator produces combustion gas.
- The expanding gas pushes the piston inside the tube, pulling the steel cable. Thus the buckle attached to the cable is also pulled and removes any slack from the seatbelt.



1003\_140

- |   |                |   |             |
|---|----------------|---|-------------|
| 1 | Gas generator  | 4 | Belt buckle |
| 2 | Combustion gas | 5 | Piston      |
| 3 | Tube           | 6 | Steel cable |

- In order to restraint the occupant after the belt pretensioner has been triggered, the steel cable is clinched by the cam to lock the buckle in this position.



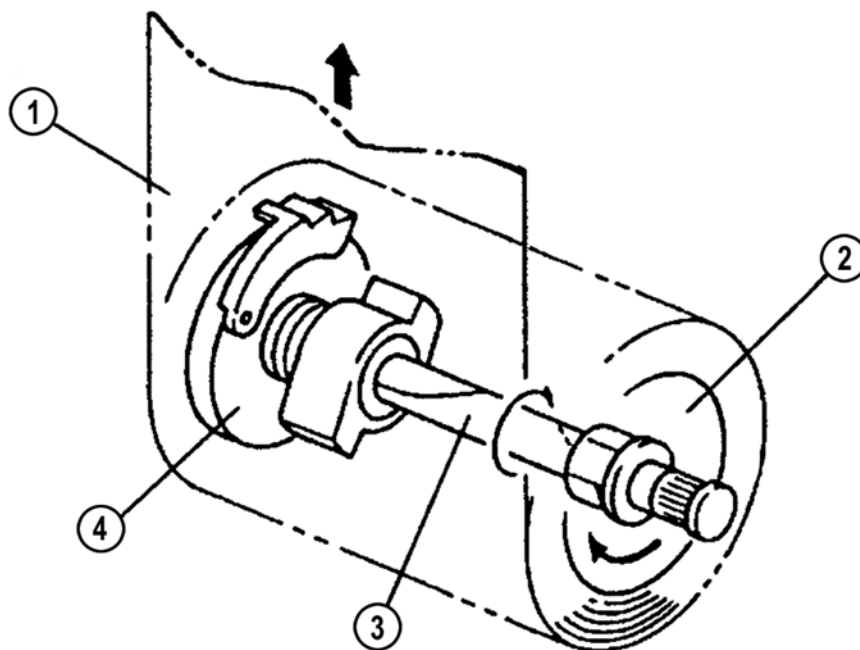
1003\_141

- |   |             |   |             |
|---|-------------|---|-------------|
| 1 | Belt buckle | 3 | Steel cable |
| 2 | Cam         |   |             |

## Belt Force Limiter

- Seatbelts that feature a belt pretensioner are usually equipped with a belt force limiter mechanism in order to reduce the risk of chest injuries in case of an accident.
- The belt force limiter is integrated in the belt retractor and consists of a torsion bar, which connects the guide drum to the locking base.
- When the locking base is locked (due to the operation of the ELR) and a significant force that could cause further injury to the chest area is applied to the belt, the torsion bar twists and absorbs the overload against the chest.

**NOTE:** The seatbelt has to be replaced after activation of the belt pretensioner (even in case of a buckle-operated type) or after operation of the belt force limiter.



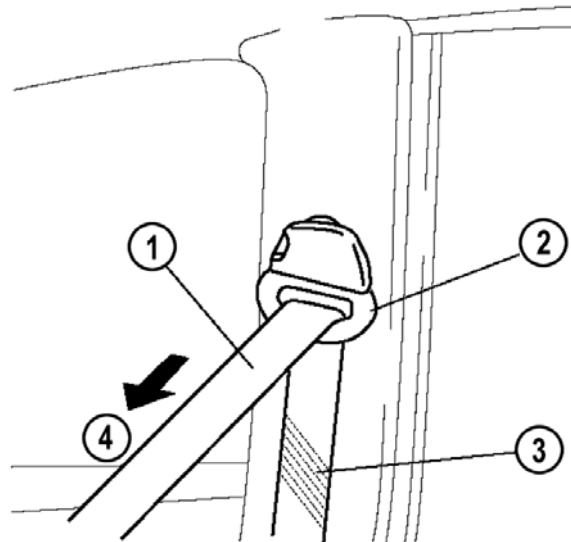
1003\_142

1 Belt  
2 Guide drum

3 Torsion bar  
4 Locking base

## Seatbelt Inspection

- If the vehicle has been involved in an accident with operation of the belt force limiter, the belt and anchor rub strongly against each other leaving a trace of wear.
- To check the seatbelt, it has to be pulled out from the retractor and inspected for trace of wear. If any trace of wear can be seen or felt, the seatbelt has to be replaced as a complete unit.



1003\_170

1 Belt  
2 Anchor

3 Trace of wear  
4 Pull out

## Passenger Airbag Deactivation System

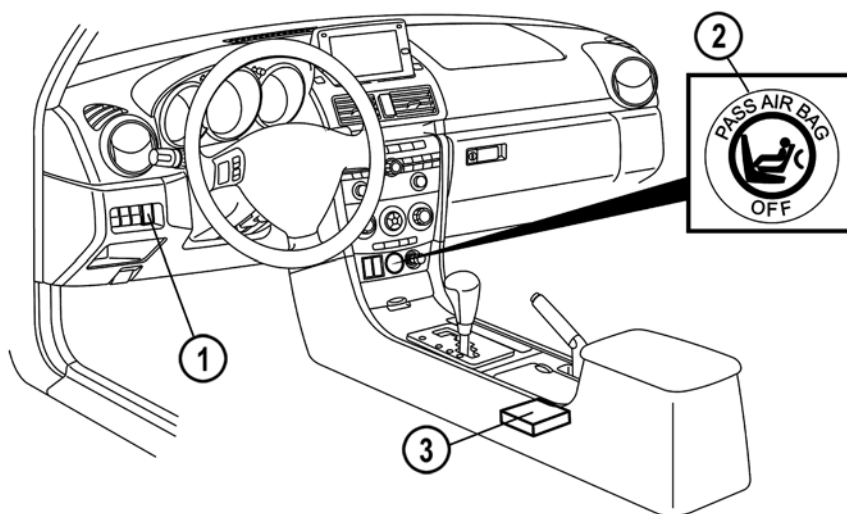
- The **PAD (Passenger Airbag Deactivation)** system is manually operated by the driver. It deactivates the front airbag, belt pretensioner and side airbag on the front passenger-side.

**NOTE:** Curtain airbags cannot be deactivated, because they also protect the rear passengers.

- The system is factory installed on the RX-8 (SE) and can be retrofitted on Mazda2 (DY) and Mazda3 (BK) vehicles. The system consists of the PAD switch and the PAD indicator light.

**NOTE:** Unnecessary deactivation of the SRS components on the passenger side is dangerous. If these are turned off, the front passenger will not be protected by the SRS anymore. Serious injuries or even death can be the consequence. With the exception of installing a child-restraint seat on the front passenger seat, do **NOT** turn the airbag deactivation switch to the OFF position. The driver will be held responsible for the intended use of the PAD switch.

- The following description explains the PAD system on Mazda3 (BK) vehicles.

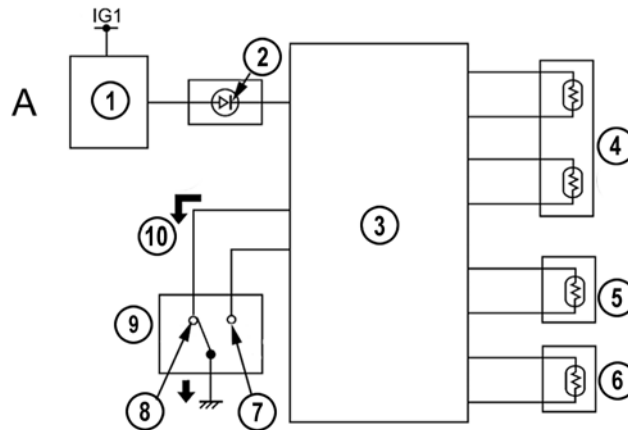


1003\_143

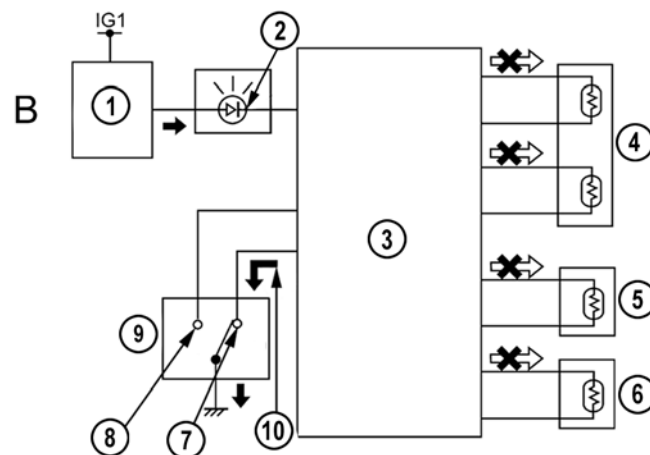
- 1 PAD switch
- 2 PAD indicator light

- 3 SAS module

- The PAD switch can be operated with the aid of the ignition key. Depending on the switch setting different terminals of the SAS module are connected to ground. Based on this information the SAS module then decides whether the passenger side SRS components have to be switched off or on. When the switch is at "Passenger Airbag Off" position, the PAD indicator light will be illuminated and the SAS module will not trigger the accompanying components, even if the vehicle is involved in a serious accident.



1003\_144-A



1003\_144-B

- |   |   |    |                                    |
|---|---|----|------------------------------------|
| A | PAD switch is at "PASS AIRBAG ON" position  | 5  | Side airbag (passenger side)       |
| B | PAD switch is at „PASS AIRBAG OFF“ position | 6  | Belt pretensioner (passenger side) |
| 1 | Passenger Junction Box                      | 7  | PASS AIRBAG OFF position           |
| 2 | PAD indicator light                         | 8  | PASS AIRBAG ON position            |
| 3 | SAS module                                  | 9  | PAD switch                         |
| 4 | Front airbag (passenger side)               | 10 | Current to ground                  |

### PAD Retrofitting

- If a customer wants to have a PAD switch installed, it is possible to retrofit the switch. The necessary parts can be ordered for the Mazda2 (as a kit) and for the Mazda3 (separate components).

**NOTE:** Always observe your national legal requirements when retrofitting a PAD switch.

- When retrofitting a PAD switch on the Mazda2 work according to **SI (Service Information) L004/03**.
  - Install the PAD switch
  - Install the PAD indicator light
  - Install the wiring harness (only Mazda2)
  - Perform the SAS module configuration using WDS
  - Explain the operation of the PAD system to the customer.
  - Have the customer sign a declaration that he agrees to the installation of the PAD switch and that the operation of the PAD system has been fully explained.
  - Hand over one copy of the declaration to the customer and deposit the original copy in a safe place.

**NOTE:** According to EU consumer protection legislation the dealership must retain the signed declaration for 10 years.

**NOTE:** After installation of a PAD switch the relevant information should be added to the service log of the vehicle.

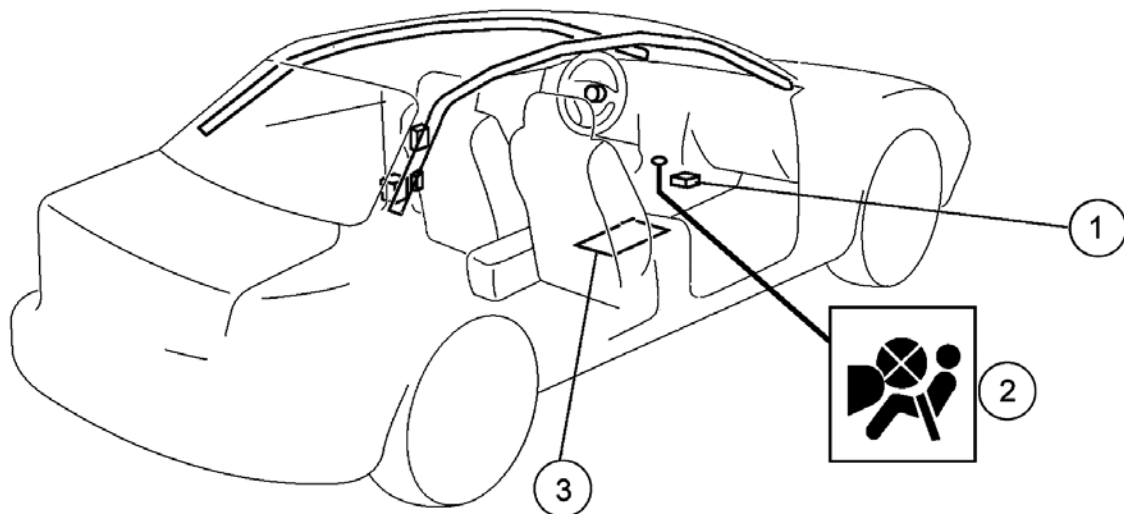
## Occupant Classification Systems

### Passenger Occupancy Detection System

- The **PODS (Passenger Occupancy Detection System)** is automatically controlled by the SAS module. It deactivates the front airbag, belt pretensioner and side airbag on the front passenger-side, when the seat is occupied with a load below a specified limit (approx. 12 kg) or with a special Mazda child restraint seat with integrated transponder.

**NOTE:** Curtain airbags cannot be deactivated, because they also protect the rear passengers.

- The system consists of sensor mat with control module (incorporated into the seat cushion) and the PAD indicator light.



1003\_145

- 1 SAS module
- 2 PAD indicator light

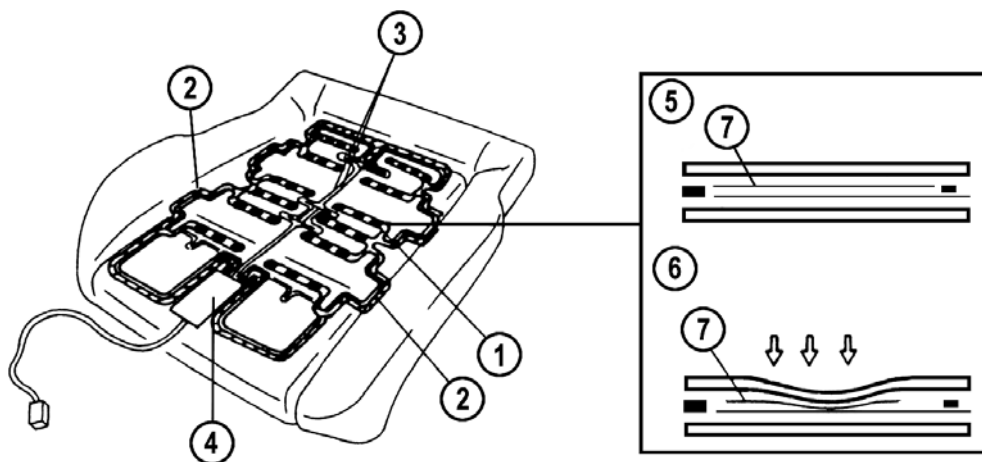
- 3 Occupancy sensor



- The sensor mat incorporates a large number of pressure sensitive resistors. These are connected to the control module, which processes the individual signals and transfers them to the SAS module. Furthermore one transmitting and two receiving antennas are also incorporated into the sensor mat and connected to the sensor module.

**NOTE:** The sensor mat can only be replaced as a unit together with the seat cushion.

- The control module detects the load on the seat via the resistance of the sensor mat and sends a corresponding signal to the SAS module.
- When the passenger seat is either not occupied or the load is below the specified limit, the SAS module uses this information to deactivate the passenger airbag, belt pretensioner and side airbag. Thus they will not be triggered even in case of a serious accident.



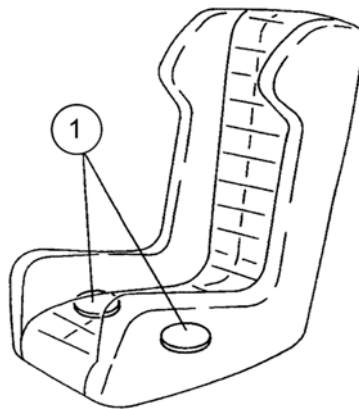
1003\_171

- |   |                        |   |                                    |
|---|------------------------|---|------------------------------------|
| 1 | Occupancy sensor       | 5 | Seat not occupied, high resistance |
| 2 | One sending antenna    | 6 | Seat occupied, low resistance      |
| 3 | Two receiving antennas | 7 | Resistance mat                     |
| 4 | Sensor module          |   |                                    |

- Furthermore, the occupancy sensor is able to detect a child restraint seat with transponders. Therefore, it generates an electric field using the sending antenna. In case a Mazda child restraint seat with integrated transponders is used, the transponders are excited by the electric field so that they impose a code on the sending field by means of modulation. This electric field is detected via the two receiving antennas and evaluated by the control module.

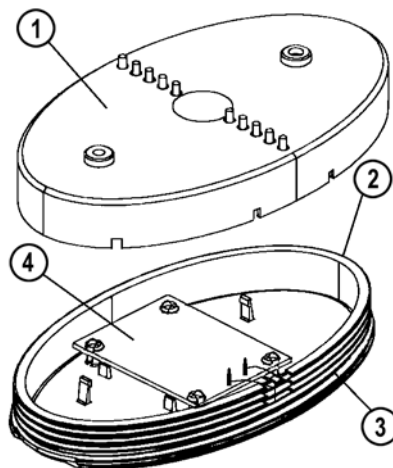
- As a result, the control module sends a corresponding signal to the SAS module to inform it about the installation of a child restraint seat. Because of that, the SAS module will activate the PAD indicator light and will not trigger the accompanying components even if the vehicle is involved in a serious accident.
- The child restraint seat will be detected by the PODS within a maximum of 40 seconds after it has been installed.

**NOTE:** Metal parts or magnetic cards must not be positioned on the seat, as they might cause unintentional activation/deactivation of the passenger airbag system, resulting in serious injury or death in case of an accident.



1003\_146

- 1 Transponder



1003\_172

- 1 Plastic housing
- 2 Coil carrier
- 3 Wire wound coil
- 4 Integrated circuit

- The table below gives an overview of the PODS functionality.

Condition Item	No load	Low load		High load	
		Child restraint seat without transponder on passenger front seat	Child restraint seat with transponder on passenger front seat	Child restraint seat without transponder on passenger front seat	Child restraint seat with transponder on passenger front seat
Passenger front airbag, side airbag and belt pretensioner will not be triggered	<b>X</b>	<b>X</b>	<b>X</b>		<b>X</b>
Passenger front airbag, side airbag and belt pretensioner will be triggered if necessary				<b>X</b>	
PAD indicator light illuminated			<b>X</b>		<b>X</b>

### Occupant Classification System Used on Mazda Tribute Facelift

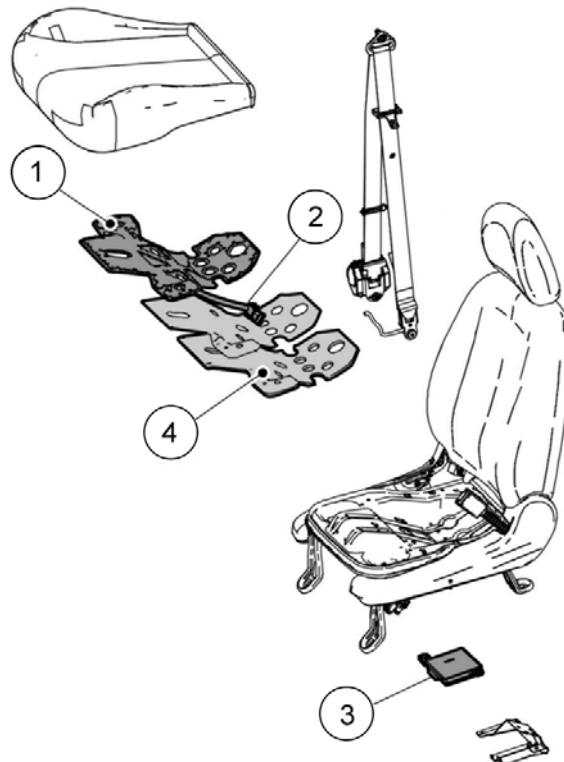
- The PODS of the Mazda Tribute Facelift consists of a seat weight sensor, seat weight sensor control module, belt tension sensor and a PAD light. The system provides information regarding the passenger's weight and the belt tension to the SAS module, which can have an influence on the triggering strategy of the passenger airbag.

**NOTE:** It is prohibited to use a child restraint seat on the passenger front seat (refer to the owners manual).

- The seat weight sensor incorporates a silicone-filled cushion, which is connected to the sensor via a hose. The silicon varies the pressure acting on the seat weight sensor according to the load on the seat. Thus the sensor is able to send a load signal to the seat weight sensor control module, from where it is transmitted via a separate **HS-CAN** (**H**igh **S**peed – **C**ontroller **A**rea **N**etwork) bus to the SAS module. The module can then use this information to influence the triggering strategy of the passenger airbag.

**NOTE:** The seat weight sensor and the seat weight sensor control module are calibrated to each other and may only be replaced as a unit.

**NOTE:** The seat weight sensor must be reset with the aid of the WDS after it has been replaced or the seat trim/cushion has been removed. Therefore, connect the WDS and select “Toolbox→Body→Restraints→Seat Weight Sensor ReZero” to reset the seat weight sensor.

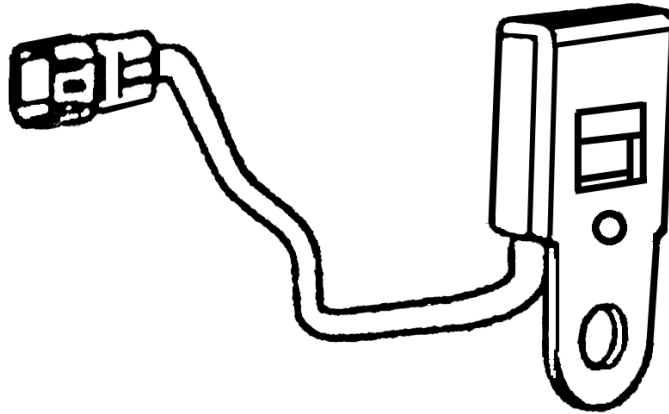


1003\_147

1 Silicon filled cushion  
2 Seat weight sensor

3 Seat weight sensor control module  
4 Underlay for silicone-filled cushion

- The system also features a belt tension sensor, which is integrated in the lower belt anchor point. It detects the belt tension and sends an equivalent signal via the seat weight sensor control module to the SAS module. When a load is properly belted using the ALR function a “belt tension high” signal is transmitted to the SAS control module.



1003\_148

- The SAS module uses the signals from the seat weight sensor and the belt tension sensor to determine whether and whereby the front passenger seat is occupied. The table below is an overview of the PODS functionality.

Condition Item	No load	Low load	Between low and high load		High load
			Buckled without ALR function / belt is not tensioned	Buckled with ALR function / belt is tensioned	
Passenger front airbag and belt pretensioner will not be triggered	<b>X</b>	<b>X</b>		<b>X</b>	
Passenger front airbag and belt pretensioner will be triggered if necessary			<b>X</b>		<b>X</b>
PAD indicator light illuminated		<b>X</b>		<b>X</b>	

## Mazda Vehicles and their SRS Components

- The tables on the following pages show which SRS component may be installed in which vehicle. Not all vehicles are equipped with all components.

Vehicle Component		Mazda2 (DY)	Mazda3 (BK)	Mazda6 (GG GY)	RX-8 (SE)	Tribute (EP)	Tribute FL (EP) *1
Driver front airbag	Single stage					X	
	Dual stage	X	X	X	X		X
Passenger front airbag	Single stage					X	
	Dual stage	X	X	X	X		X
Side airbag		X	X	X	X	X	
Curtain airbag		X	X	X	X		X
Belt pretensioner	Integrated in belt retractor	X		X	X		
	Integrated in belt buckle		X			X	X
Crash zone sensor		X	X	X	X		X
Buckle switch	Driver side	X	X	X	X		X
	Passenger side				X		X
Seat track position sensor							X
PAD system		X	X		X		
PODS				X			X

\*1: from model year 2005 onwards

# Suppl. Restraint System

# Components

Vehicle Component		MPV FL1 (LW) *1	MPV FL2 (LW) *2	Premacy (CP)	MX-5 (NB)	MX-5 FL (NB) *3	B-Series (UN)
Driver front airbag	Single stage	X	X	X	X	X	X
	Dual stage						
Passenger front airbag	Single stage	X	X	X	X	X	X
	Dual stage						
Side airbag		X	X	X			
Curtain airbag							
Belt pretensioner	Integrated in belt retractor	X	X	X	X	X	
	Integrated in belt buckle						
Crash zone sensor						X	
Buckle switch	Driver side						
	Passenger side						
Seat track position sensor							
PAD system							
PODS		X	X	X		X	

\*1: above VIN (Vehicle Identification Number) 200.000

\*2: above VIN 300.000

\*3: above VIN 200.000

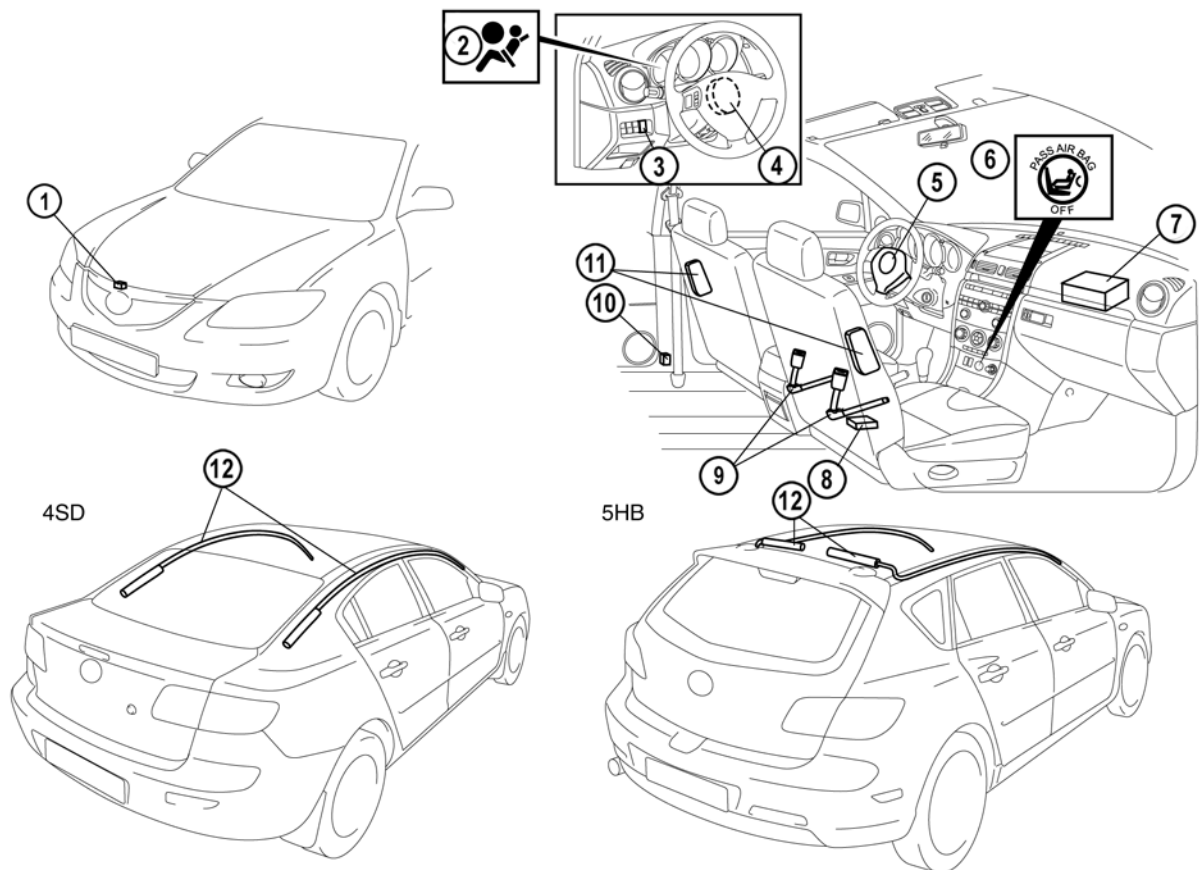
Notes:



## Operation

- The operation of the SRS is described on the following pages. All explanations are based on the Mazda3. Other vehicles are equipped with similar systems.

## Parts Location

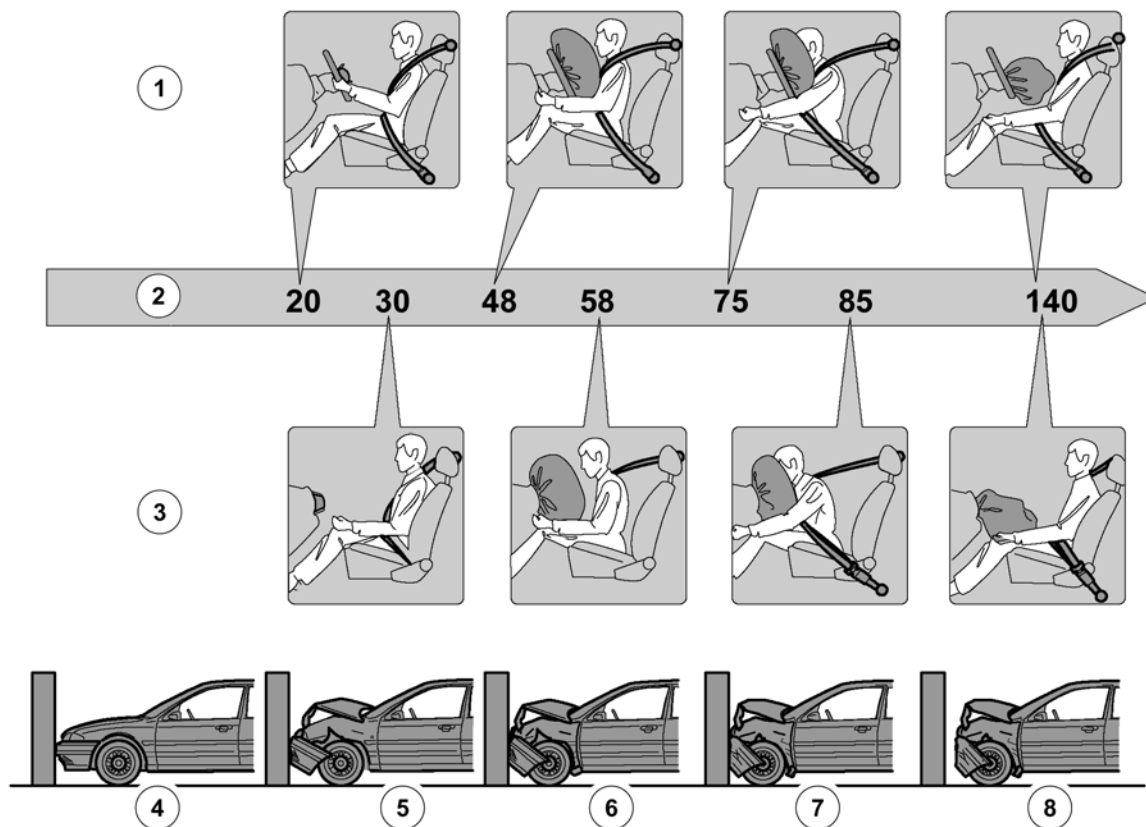


1003\_151

- |   |                     |    |                           |
|---|---------------------|----|---------------------------|
| 1 | Crash zone sensor   | 7  | Passenger front airbag    |
| 2 | SRS warning light   | 8  | SAS module                |
| 3 | PAD switch          | 9  | Pretensioner front buckle |
| 4 | Clock spring        | 10 | Side airbag sensor        |
| 5 | Driver front airbag | 11 | Side airbag               |
| 6 | PAD indicator       | 12 | Curtain airbag            |

### Frontal Collision

- If a vehicle is involved in such a serious frontal collision, that the measured values of the accelerometers exceed the triggering threshold of the SAS module, the relevant SRS components will be triggered by a signal from the module.
- The pretensioners and the first stage of the front airbags are triggered simultaneously. The pretensioner reaches full effectiveness within the first 20 ms following the impact, and serves as a supplement to the airbag, which will be fully inflated after about 50 ms.
- The deployment energy is controlled by the SAS module. Therefore, it varies the time delay for triggering the second stage, depending on the input signals and stored map values.
- If the SAS module decides that the best occupant protection is achieved when triggering only the first stage, the second stage is nonetheless triggered for safety reasons with a delay of approximately 100 ms, thus the rescue personnel is not endangered by an untriggered inflator.
- The picture on the next page shows a possible sequence of the SRS operation during a frontal collision. All values stated serve purely as an example.



1003\_152

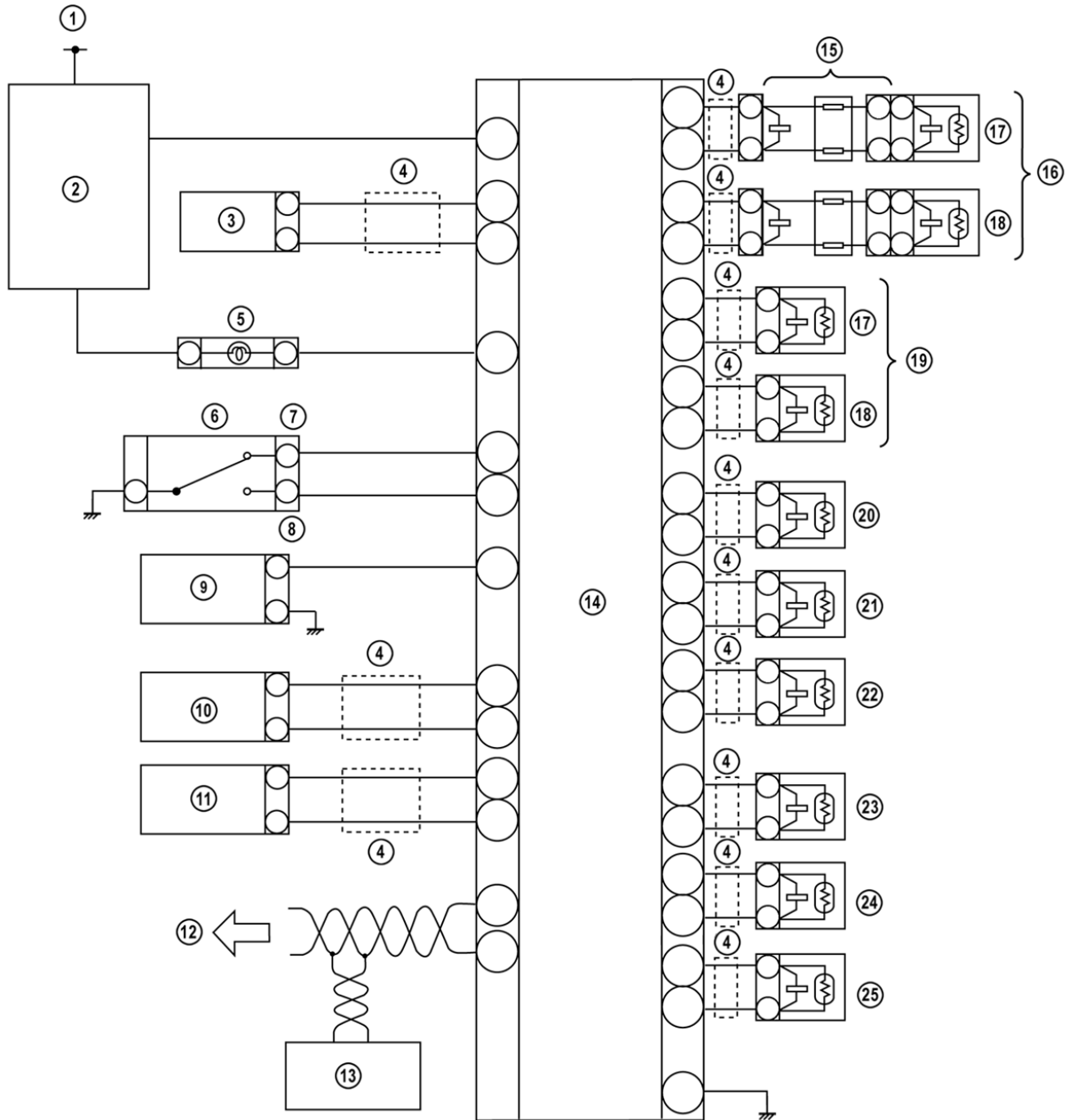
- |   |                      |   |  |
|---|----------------------|---|--|
| 1 | Driver               | 5 | Airbags and pretensioners triggered, seatbelt pretensioned |
| 2 | Time in milliseconds | 6 | Airbag inflated  |
| 3 | Front passenger      | 7 | Immersion phase  |
| 4 | Start of accident    | 8 | End of accident  |

**Note:** 100 ms = 0,1 second = one blink of an eye

## Side Impact

- If a vehicle is involved in such a serious side collision, or a lateral rollover, that the measured values of the accelerometers exceed the triggering threshold of the SAS module, the relevant SRS components will be triggered by a signal from the module.
- The relevant side airbag and curtain airbag are triggered simultaneously within 5...20 ms. Thus they can be fully inflated after approx. 15 ms following the impact.
- The side airbag stays inflated for approx. 100 ms, while the curtain airbag stays inflated for up to a few minutes. Thus it can protect the occupants head and shoulder even in case of a rollover.

Wiring Diagram



1003\_154

1	IG1	14	SAS module
2	PJB	15	Clock spring
3	Crash zone sensor	16	Driver front airbag
4	Twisted pair	17	Inflator No.1
5	PAD indicator	18	Inflator No.2
6	PAD switch	19	Passenger front airbag
7	PASS AIRBAG ON	20	Driver pretensioner
8	PASS AIRBAG OFF	21	Driver-side curtain airbag
9	Driver buckle switch	22	Driver side airbag
10	Driver side airbag sensor	23	Passenger pretensioner
11	Passenger side airbag sensor	24	Passenger curtain airbag
12	CAN bus	25	Passenger side airbag
13	Instrument cluster		

Notes:

## Diagnosis and Repair

### On Board Diagnostic System

- All Mazda SRS are equipped with an **OBD (On-Board Diagnostic)** system that is integrated in the SAS module. The OBD system monitors the different SRS components for electrical faults. If a fault has been detected this is displayed via the SRS warning light.
- Each malfunction is stored in a non-volatile memory of the SAS module and may result in a deactivation of deployable SRS components. In this case the driver is strongly requested to bring the vehicle to the workshop to have the system be repaired.
- The OBD system starts operating automatically when the ignition switch is turned to the ON position.
- Mazda currently uses three basically different OBD systems:
  - OBD system of the 1<sup>st</sup> SRS generation
  - OBD system of the 2<sup>nd</sup> SRS generation
  - OBD system of the 3<sup>rd</sup> SRS generation

**NOTE:** The OBD system of the 1<sup>st</sup> SRS generation has no memory function for past DTCs, i.e. the SRS warning light only indicates present malfunctions. The only Mazda model that still features this system is the B-Series (UN). Since the introduction of the Mazda 323 (BJ) in 1998 each other SAS module is equipped with a memory function for past DTCs.

**NOTE:** Always follow carefully the safety warnings and instructions stated in this training manual and in the respective W/M, while working on the SRS.

**NOTE:** Each SAS module has a back-up power supply to ensure the operation of the SRS system for a certain time in case the battery power supply is cut during an accident. Condensers provide the back-up power supply. It is very important to deplete the back-up power before you start disconnecting or measuring on any circuit. Follow the specific instructions stated in the W/M regarding the depletion of the back-up power. Failure to follow those instructions may result in personal injury or even death.

### OBD System of the 2<sup>nd</sup> SRS Generation

- The OBD system of the 2<sup>nd</sup> SRS generation comprises the following features:
  - Malfunction detection function.
  - Display function to indicate present and past malfunctions as two-digit DTCs via the SRS warning light.
  - DTC memory function for present and past malfunctions.
  - Diagnosis via DLC-1.
  - Fail-safe function to prevent the accidental activation of SRS components in case of a malfunction.
- The OBD system of the 2<sup>nd</sup> SRS generation is used in the following vehicles:
  - MX-5 (NB), MPV (LW) and Premacy (CP).

### Present Malfunctions

- When the SRS warning light flashes or illuminates, the OBD system has detected a present malfunction and thus outputs a corresponding DTC. This DTC is also stored in the SAS module and will not be deleted when the battery is disconnected.
- To read out present DTCs, the ignition must be switched on. Then the SRS warning light will illuminate for 4...8 s, before it starts to display the two-digit DTCs as a corresponding flashing pattern.
- If the OBD system has detected more than one malfunction the stored DTCs are displayed consecutively beginning with the lowest code.

**NOTE:** The description of the DTCs and the recommended diagnostic procedures can be found in the respective W/M.



- The picture below shows an example of the flashing pattern for DTC 26 (Malfunction of side-airbag system on driver side). It consists of two long and six short flashes.



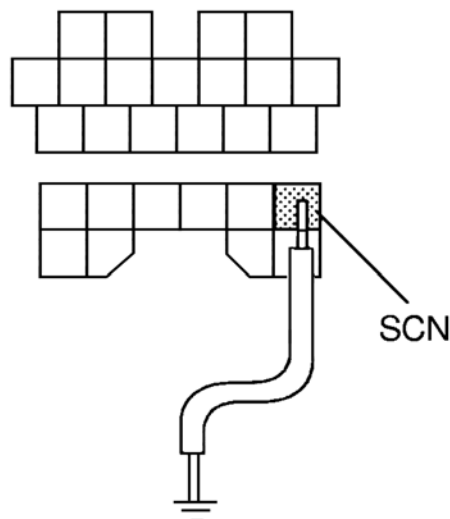
1003\_160

1 ON

2 OFF

### Past Malfunctions

- If a customer complains about a SRS warning light that has recently flashed but the fault is currently not present on the vehicle, a past DTC might be stored in the SAS module. To read out past DTCs, connect terminal **SCN (SCAN)** in the DLC-1 to ground before the ignition is switched on. The SRS warning light will illuminate for 4...8 s and then starts to display the two-digit DTC as a corresponding flashing pattern.



1003\_161

SCN Terminal in DLC-1

- Delete the stored DTCs from the memory of the SAS module after the repair is completed. Therefore:
  1. Turn the ignition switch to the ON position.
  2. Wait until the SRS warning light illuminates approx. 6 seconds and goes off.
  3. Perform both the following steps alternately three times each at 0.5...1.0 seconds intervals.
    - Use a jumper wire to short the DLC terminal SCN to ground.
    - Disconnect the jumper wire from ground.
  4. If the DTCs are displayed, wait until they disappear.
  5. Repeat the past malfunction inspection procedure to ensure that all past malfunctions are deleted.
  6. Turn the ignition switch to LOCK position.
  7. Disconnect the jumper wire from the DLC.

**NOTE:** If the SRS warning light does not illuminate or remains illuminated when the ignition switch is turned to the ON position, inspect the control circuit of the SRS warning light.

### OBD of the 3<sup>rd</sup> SRS Generation

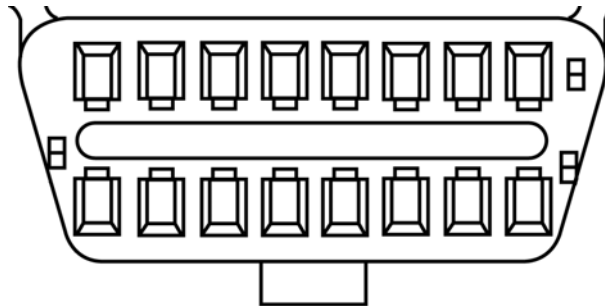
- The OBD system of the 3<sup>rd</sup> SRS generation comprises the following features:
  - Malfunction detection function.
  - Display function to indicate present malfunctions as two-digit DTCs via the SRS warning light.
  - DTC memory function for present and past malfunctions.
  - Diagnosis via DLC-2 and WDS.
  - PID monitor function to access certain data such as input signals, calculated values and system status information.
  - Fail-safe function to prevent the accidental activation of SRS components in case of an air bag system malfunction.
- The OBD system is used for the SRS installed in the following vehicles:
  - Mazda2 (DY), Mazda3 (BK), Mazda6 (GG/GY), Tribute (EP) and RX-8 (SE)

## Present and Past Malfunctions

- When the OBD system has detected a malfunction and the ignition is switched on, the SRS warning light outputs the present malfunction as a two digit DTC by a corresponding flashing pattern for a certain period of time and then illuminates permanently.
- To read out or delete present or past DTCs hook up the WDS to the DLC-2 and perform a self-test of the SAS module (select "Self test→Modules→RCM"). The description of the DTCs and the recommended diagnostic procedure can be found in the respective W/M.

**NOTE:** Present DTCs displayed by the SRS warning light serve only as a reference. Always use WDS to verify the more specific five-digit DTCs.

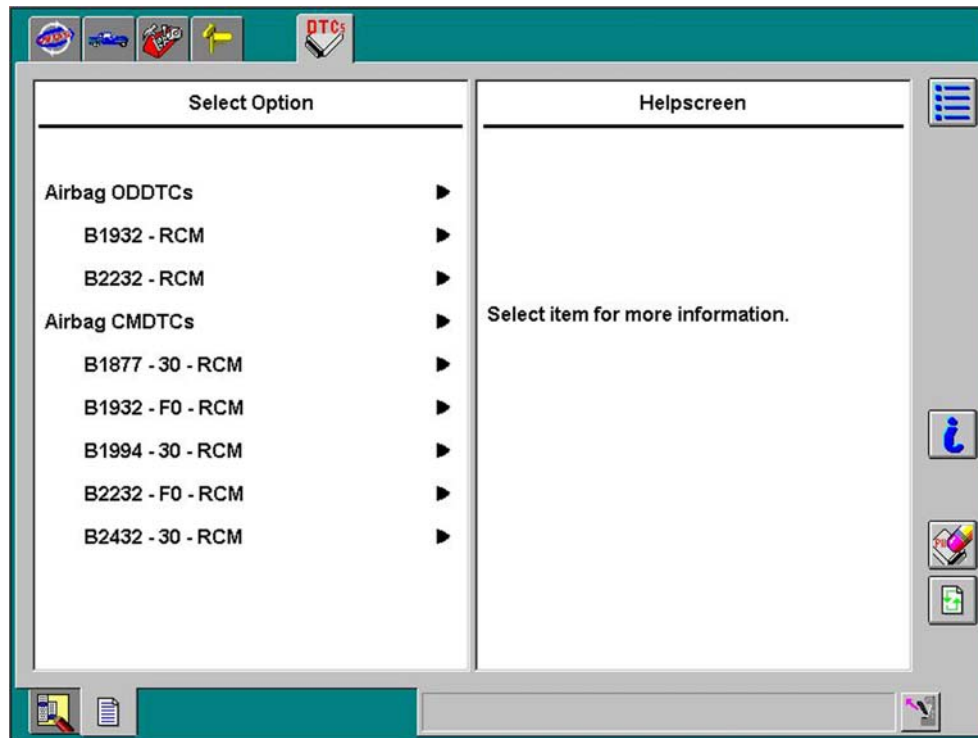
**NOTE:** The OBD systems of the 2<sup>nd</sup> and of the 3<sup>rd</sup> SRS generation display different DTCs for identical malfunctions.



DLC2

1003\_159

- Present DTCs are displayed as **ODDTCs (On-Demand DTC)** and **CMDTCs (Continuous Memory DTC)** on WDS, while past DTCs are only displayed as CMDTCs.
- In the example below the DTCs B1932 and B2232 are present and are therefore displayed as ODDTCs, as well as CMDTCs. The other CMDTCs have been stored in the past but are no longer present on the vehicle. These DTCs remain in the memory of the SAS module until they are deleted with WDS.



1003\_S001

**NOTE:** Delete the stored DTCs from the memory of the SAS module after the repair is completed.

## PID Monitor Function

- The **PID (Parameter IDentification)** monitor function allows to display the status of system parameters using the Datalogger of WDS.

PID Name (definition)	Unit / Condition	Condition/specification	SAS pin
CONT_RCM (Number of continuous DTC)	—	DTC is detected: 1- 255 DTC is not detected: 0	
DS1_STAT (Driver airbag (inflator No.1) circuit state)	NORMAL	Related wiring harness normal: NORMAL	1S, 1V
	OPEN	Related wiring harness circuit open: OPEN	
	SHRT GND	Related wiring harness short to ground: SHRT GND	
	SHRT B+	Related wiring harness short to power supply: SHRT B+	
PS1_STAT (Passenger airbag (inflator No.1) circuit state)	NORMAL	Related wiring harness normal: NORMAL	1M, 1P
	OPEN	Related wiring harness circuit open: OPEN	
	SHRT GND	Related wiring harness short to ground: SHRT GND	
	SHRT B+	Related wiring harness short to power supply: SHRT B+	
DABAGR (Driver airbag module (inflator No.1) resistance)	ohm	Under any condition: 1.5—3.7 ohm	1S, 1V
PABAGR (Passenger airbag module (inflator No.1) resistance)	ohm	Under any condition: 1.4—2.9 ohm	1M, 1P

1003\_T001

### Excerpt of PID table for Mazda6

**NOTE:** Depending on the vehicle various PIDs are available. The SRS use different PID names for identical parameters. Refer to the respective W/M and WDS for the corresponding name / description.

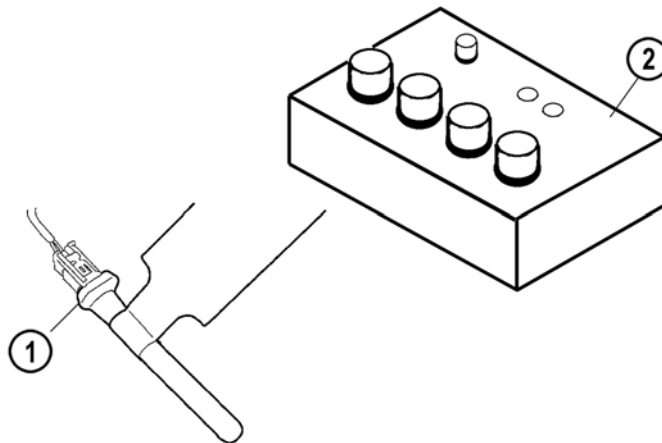
## Simulation Test Function

- The simulation test function (also termed as Active Command Mode) allows to activate certain SRS components using the **OSC (Output State Control)** function of the WDS.

**NOTE:** The SRS warning light and the warning chime of the Tribute (EP before F/L) are currently the only components of the SRS variants that can be activated via the simulation test function.

## Additional Diagnostic Items

- Most diagnostic procedures of the SRS require a system deactivation before the start of measuring, disconnecting and / or replacing of components. These procedures require the deployable SRS components to be disconnected from the SAS module, thereby minimizing the risk of deployment while diagnosis is carried out.
- When performing diagnosis on deployable SRS components, a **SST (Special Service Tool)** has to be connected to the wiring harness instead of the component in question. This SST, either the “fuel and thermometer checker” or a “simulator” (depending on the vehicle), simulates the resistance of the corresponding component. This helps to determine whether the component, wiring or SAS module is defective.
- It is not possible to short-circuit any SRS component connector with a jumper wire since the SAS module would detect this as a malfunction.
- The picture below shows one of the simulators and the fuel and thermometer checker, which has to be connected and set according to the instructions in the respective W/M.



1 Simulator

2 Fuel and thermometer checker

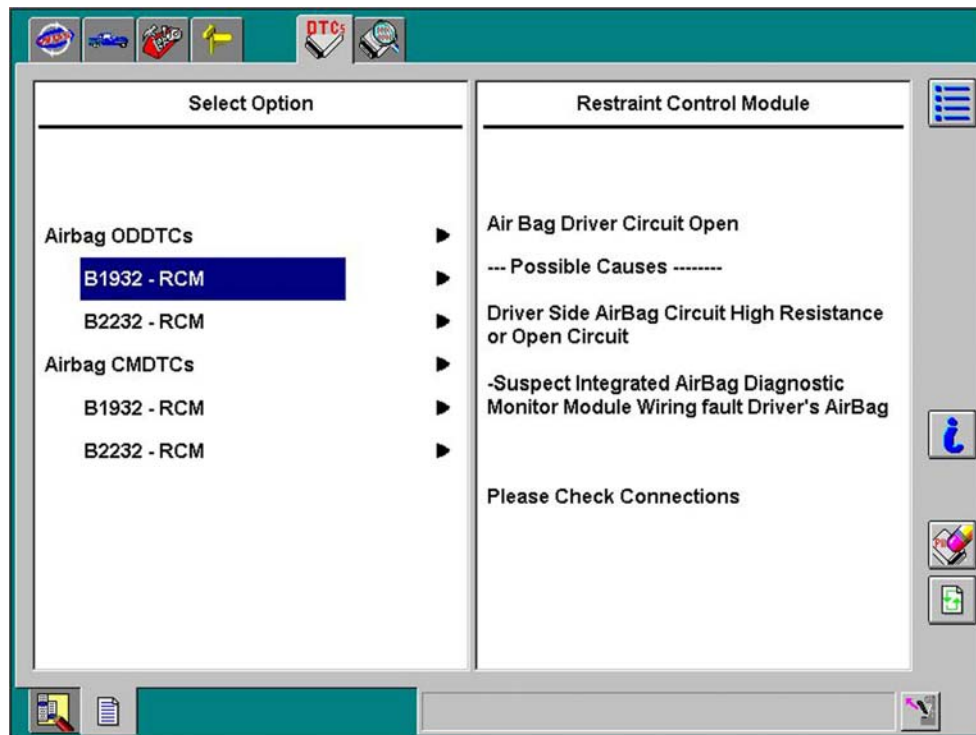
1003\_156

**NOTE:** Remove the SST from vehicle prior to road use. Failure to follow this instruction could result in serious injury and possible violation of type approval and vehicle safety standards.

## Troubleshooting Example

- A customer brings his Mazda6 in the workshop with the complaint, that the SRS warning light is illuminated permanently after it has flashed for a short period.
- Switch on ignition to reproduce the concern. The light flashes DTC 19 for five times and then illuminates.
- Read out the DTCs of the SAS module. Connect WDS to DLC-2 and after the vehicle identification select “Toolbox→Self test→Modules→RCM”.
- DTC B1932 (Driver airbag (inflator no.1) circuit resistance high) and DTC B2232 (Driver airbag module (inflator no.2) circuit resistance high) are displayed as ODDTCs and CMDTCs (see picture below).

**NOTE:** To simulate this concern both connectors S1-06 between driver-side airbag and clock spring cable have been disconnected.

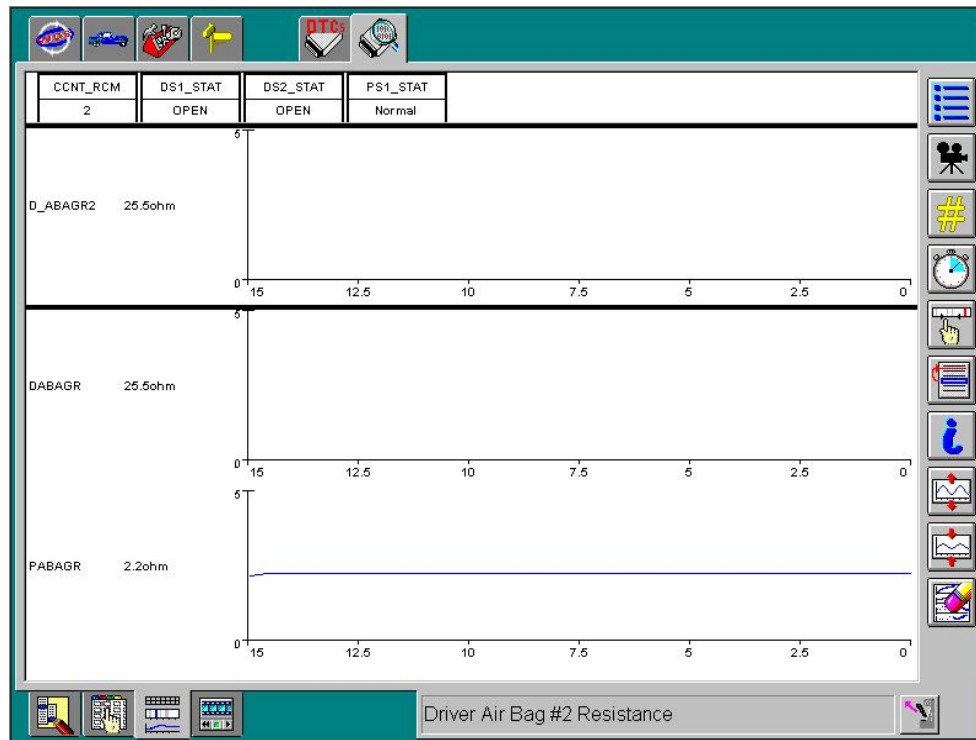


1003\_S004

- The next step is to find the description of the stored DTCs in the W/M and to carry out the respective troubleshooting procedure.
- The troubleshooting procedures for DTC B1932 and B2232 describe the detection condition for the faults and the following possible causes for the malfunction:
  - Open or short circuit in the wiring between clock spring and SAS module.
  - Clock spring malfunction.
  - Driver air bag (inflator no.1 respectively inflator no.2) malfunction.
  - SAS module malfunction.
- Check the resistance value of the driver airbag circuit via the PIDs **“DABGR”** and **“D\_ABGR2”**. Monitor the PIDs of the SRS with WDS Datalogger. Select **“Toolbox→Datalogger→Modules→RCM”**.
- Select the following PIDs from the PID selection menu:
  - **“DABGR”** (Resistance of the driver airbag (inflator no.1))
  - **“D\_ABGR2”** (Resistance of the driver airbag (inflator no.2))
  - **“PABGR”** (Resistance of the passenger airbag (inflator no.1))
  - **“CCNT\_RCM”** (Number of continuous DTCs)
  - **“DS1\_STAT”** (Driver airbag inflator no.1 circuit state)
  - **“DS2\_STAT”** (Driver airbag inflator no.2 circuit state)
  - **“PS1\_STAT”** (Passenger airbag inflator no.1 circuit state)



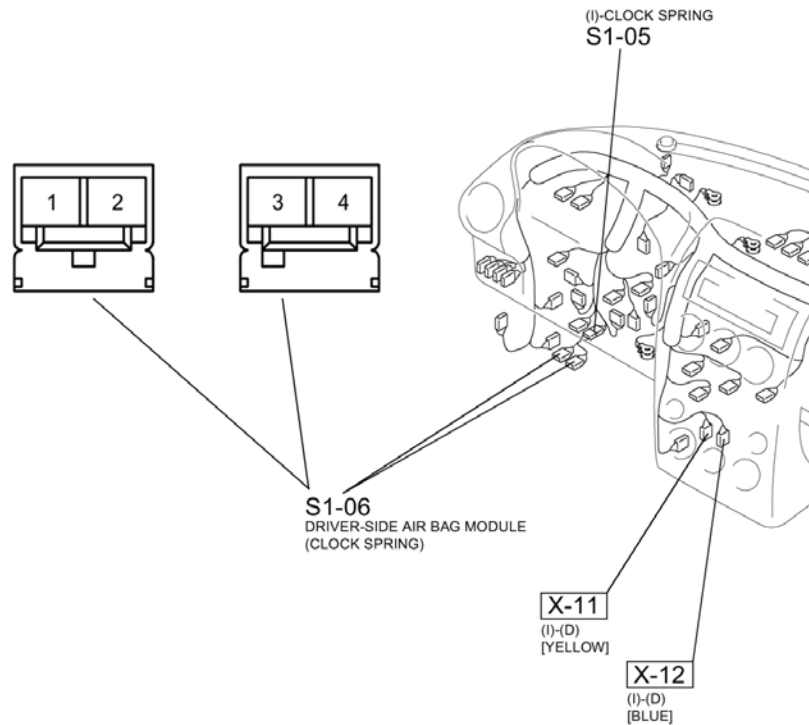
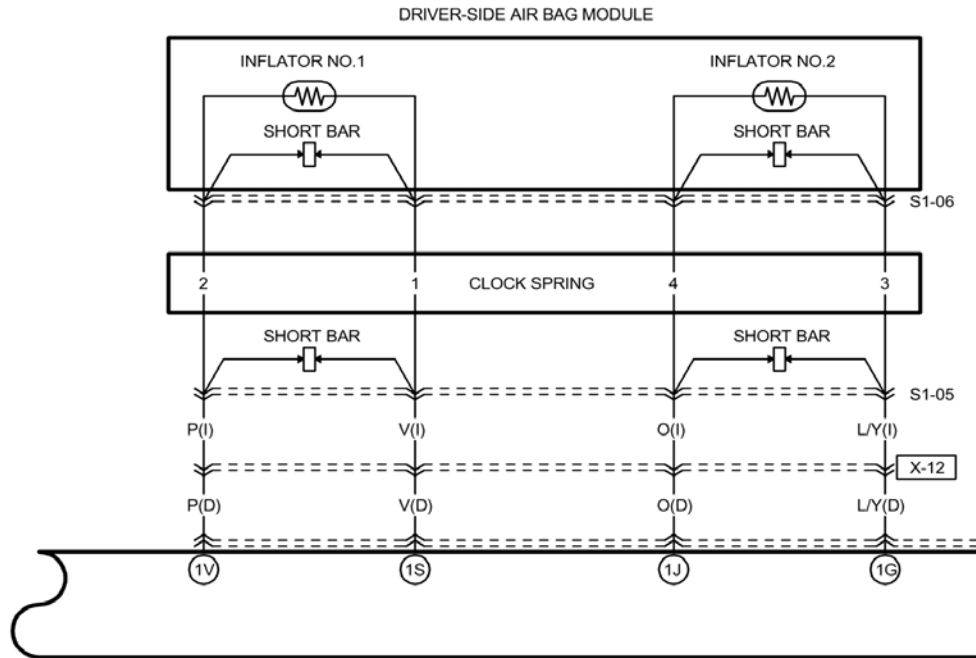
- The PIDs “DABAGR” and “D\_ABAGR2” indicate a too high resistance of the driver airbag (inflator no.1 and inflator no.2) circuit. The value of 25.5 ohm is calculated by WDS and means that an open circuit exists. The PIDs “DS1\_STAT” and “DS2\_STAT” displaying “OPEN” also indicate this open circuit in the driver airbag circuit.
- The PID “PABAGR” indicates a resistance of 2.1 ohm for the passenger airbag (inflator no.1) circuit and the PID “PS1\_STAT” displays “Normal” circuit status. These PIDs have been selected to demonstrate the difference between a faulty and an intact circuit.
- The PID “CCNT\_RCM” indicates the number of DTCs stored in the SAS module.



1003\_S003

**NOTE:** Never measure the resistance of any airbag with an ohmmeter to reproduce the measurement results above. Measuring with an ohmmeter can trigger the airbag which may result in serious injury or even death.

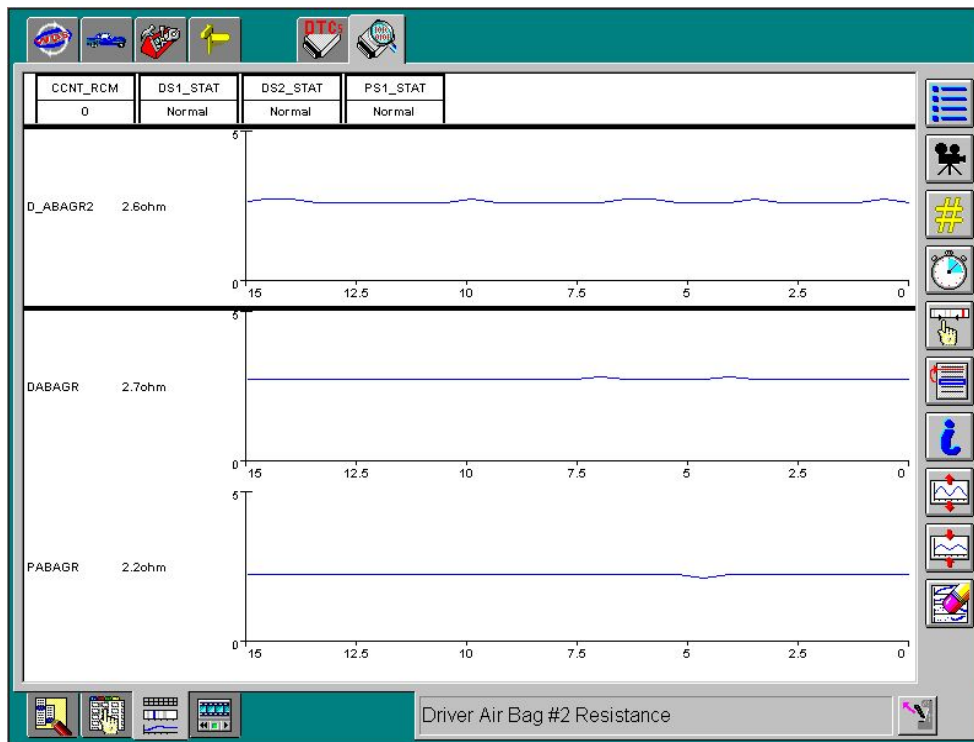
- The next step is to inspect the connectors between SAS module and driver airbag starting from the airbag side. Find the location of these connectors with the aid of the W/D.



Excerpts from Mazda6 W/D

1003\_155

- After both connectors S1-06 of the driver airbag are re-connected the corresponding PIDs display the normal condition.



1003\_S005

- To complete the repair, delete the logged DTCs from the SAS module. Then the DTC "CCNT\_RCM" will display "0" DTCs.

### SRS Component Replacement

- Depending on the vehicle and the components that have been triggered during an accident the SAS module, crash zone sensor and side airbag sensor have to be checked or replaced.

**NOTE:** For the replacement of SRS components always refer to the procedures and service warnings in the W/M. The following description of the SRS component replacement only serves as additional information.

### Side Airbag Sensor Replacement on the Mazda3 / RX-8

- The side airbag sensors on Mazda3 (BK) and RX-8 (SE) vehicles have to be programmed by the SAS module after replacement. If the programming procedure is canceled accidentally, the sensor has to be replaced again.
- The following procedure explains how to replace a side airbag sensor on the Mazda3:
  1. Replace the side airbag sensor according to the safety instructions stated in the respective W/M.
  2. Turn the ignition switch to the ON position for 5 s or more.

**NOTE:** The programming procedure will be canceled accidentally, if:

- The ignition switch is not held in the ON position for 5 s or more.
  - The engine is started.
3. Verify that the SRS warning light illuminates for approx. 6 s and goes out.
  4. If the airbag system warning light does not operate normally, refer to the OBD system and perform inspection of the system as described in the W/M.

### SAS Module

- For the replacement of the SAS module of the 2<sup>nd</sup> and 3<sup>rd</sup> SRS generation different procedures are required.

### SAS Module Replacement (2<sup>nd</sup> SRS Generation)

1. Replace the SAS module according to the safety instructions stated in the respective W/M.
2. Turn the ignition switch to the ON position and verify that the SRS warning light flashes continuously. If it does not flash, the OBD system has detected a malfunction.
3. Turn the ignition switch to the OFF position for more than 1 s and switch it back to the ON position (=Deployment Authorization Procedure).
4. Verify that the SRS warning light illuminates for approximately 6 s and then goes off. If the light stays on repeat the Deployment Authorization Procedure.
5. Verify that no DTC is logged in the SAS module. If necessary perform the applicable DTC troubleshooting procedure.

### SAS Module Replacement with WDS (3<sup>rd</sup> SRS Generation)

- The installation of a new SAS module requires configuration data to be transferred from the old module. Therefore, the WDS function “Programmable Module Installation” must be used for the replacement of the SAS module as described in the following:
  1. Connect the WDS to the DLC2 and start the vehicle identification process. During that process the WDS retrieves the configuration data from all programmable modules.
  2. Select “Module programming→Programmable module installation→RCM” from the WDS Toolbox menu.
  3. WDS will request you to replace the module. Replace the SAS module according to the safety instructions stated in the respective W/M.
  4. Follow the instructions of WDS to finish the configuration of the SAS module.
  5. Verify that no DTC is logged in the SAS module. If necessary perform the applicable DTC troubleshooting procedure.

**NOTE:** Always perform the vehicle identification with WDS **before** the replacement of the SAS module.

**NOTE:** Save a session of the vehicle before starting the programming procedure. Therefore establish and end the session with the option “Hold (saves recordings)”. Then establish communication again without reactivating the held session and conduct the desired programming function. If the upload process fails and a module is left blank, the held session can be used to program this module.

**NOTE:** If accidentally the ignition is turned off or the 16-pin DLC cable is disconnected during the upload process, an error message asking “Do you wish to retry?” will appear. Press YES as this will allow WDS to recover the error, that was encountered during the programming function. Pressing NO may result in the module being left blank.

## Manual Module Configuration

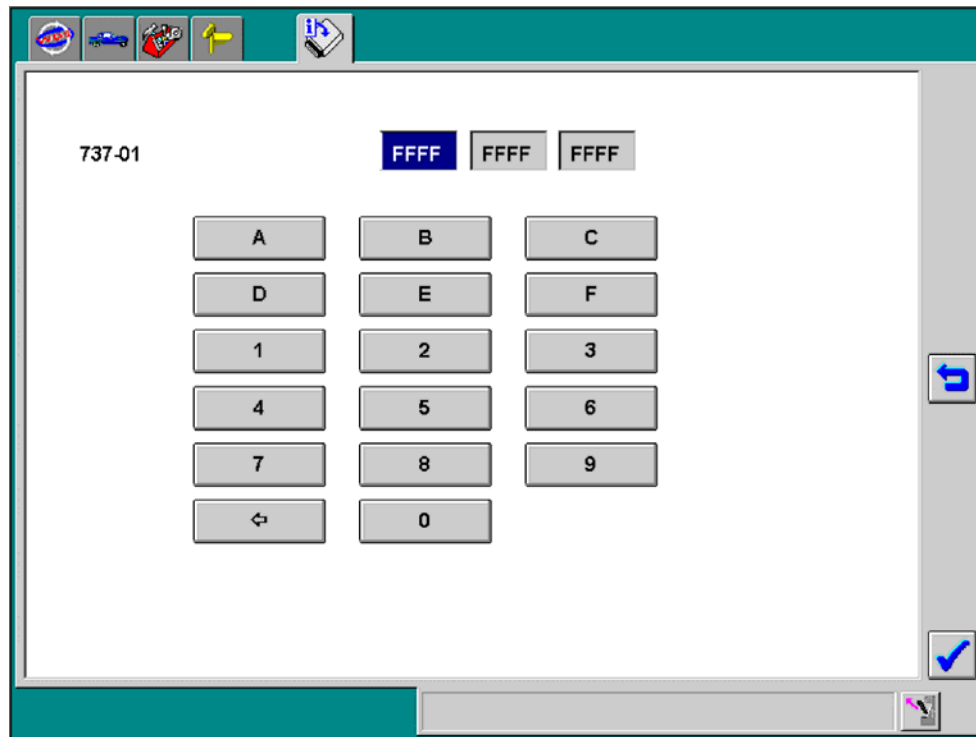
- If WDS was unable to retrieve configuration data because of either a non-functioning module or a module which was removed and discarded before WDS was allowed to retrieve the data, the SAS module must be configured manually with the so called “As-built” data. These data are the records of the applicable module configurations stored in each module as the vehicle left the factory. The As-built data contain information about the specific functions of a certain vehicle variant in the form of hexadecimal numbers.
- The following picture shows a sample of an As-built data sheet. It contains the As-built data for the **PCM (Powertrain Control Module)** and the **BCE (Body/Chassis/Electrical)** modules of a certain vehicle variant (identified by the VIN). The data are only applicable for this specific vehicle and therefore must not be used for any other vehicle.
- The data highlighted in the data sheet below, are required to manually configure the SAS module of this vehicle.

Module Reprogramming							
VIN: JMZBK14F241101114							
Vehicle Data: 1CCD FFFF FFE6							
PCM Module				BCE Modules			
PCM 1	FFFF	FFFF	0310	720-01	2100	8100	OOCA
PCM 2	35FF	FFFF	FF43	726-01	8CDO	C480	400E
PCM 3	FF41	FFFF	FF50	730-01	0000	004A	4DCf
PCM 4	FFFF	FFFF	FF0F	730-02	5A42	4631	3485
PCM 5	FFFF	FFFF	FF10	730-03	4632	3431	3148
PCM 6	FFFF	FFFF	FF11	730-04	3031	3131	3432
PCM 7	FFFF	FFFF	FF12	730-05	0200	0000	003E
PCM 8	FFFF	FFFF	FF13	737-01	66EE	0088	001B
PCM 9	FFFF	FFFF	FF14	751-01	FFFF	FFFF	FF54
PCM 10	FFFF	FFFF	FF15	751-02	FFFF	FFFF	FF55
PCM 11	FFFF	FFFF	FF16	751-03	FFFF	FFFF	FF56
PCM 12	FFFF	FFFF	FF17	751-04	FFFF	FFFF	FF57
PCM 13	FFFF	FFFF	FF18	751-05	FFFF	FFFF	FF58
				751-06	FFFF	FFFF	FF59
				751-07	FFFF	FFFF	FF5A
				751-08	FFFF	FFFF	FF5B
End of As Built information							

1003\_157

**NOTE:** The As-built data can be obtained via the Technical Hotline or the Technical Service Department.

- If As-built data are required for module configuration, the WDS displays a screen with the module identification code and three boxes for the hexadecimal numbers. After matching the module identification code (in this example 737-01) with the identical code on the As-built data sheet the corresponding hexadecimal numbers (in this example: 66EE 0088 001B) can be entered into the three boxes.



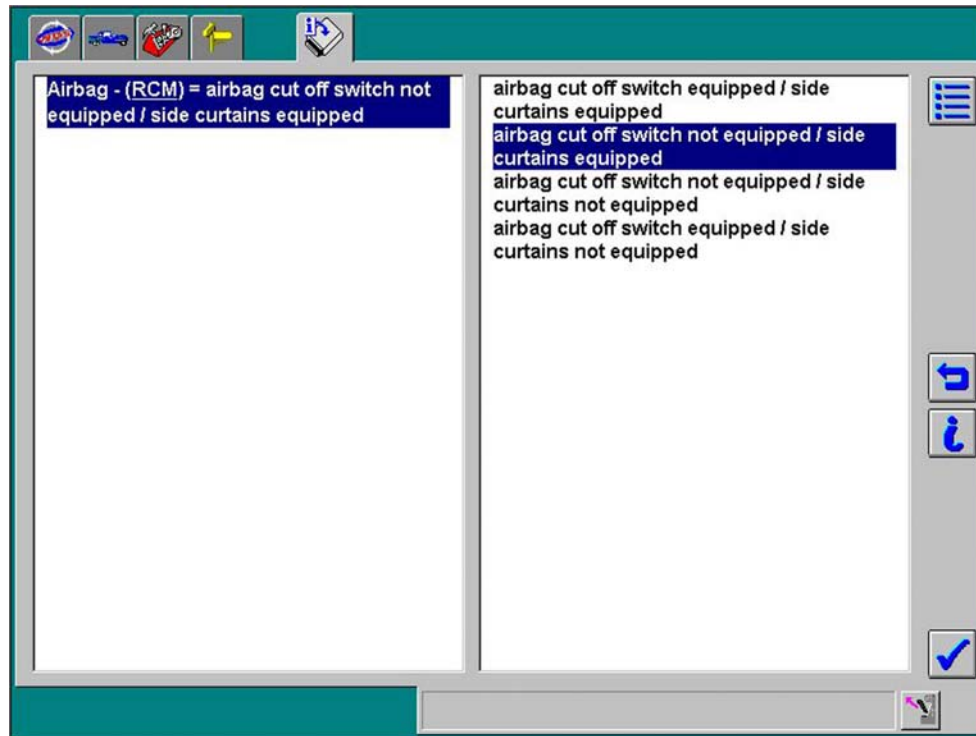
1003\_S007

- After pressing the Tick button the programming process begins automatically and a bargraph appears indicating the progress.

**NOTE:** Do not configure a module by downloading configuration data from another vehicle of similar build and uploading it into the vehicle concerned. This may create problems as configurable modules are only working properly if they are configured according to the appropriate data specified by each VIN. In addition, this procedure may also transfer the VIN logged in the module from one vehicle to another.



- The configuration of the SAS module of the Mazda2 is different from the procedure described above. Here the configuration data must be selected from a pick list displayed by WDS. The pick list contains parameters to be selected on the left-hand side of the screen. After highlighting a certain item the possible settings appear on the right-hand side of the screen. Now the user can select the configuration data by highlighting the desired settings.



1003\_S006

- After pressing the Tick button the programming process begins automatically and a bargraph appears indicating the progress.

Notes:

## **Suppl. Restraint System**

## **List of Abbreviations**

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<b>ALR</b>	<b>Automatic Locking Retractor</b>	<b>SCN</b>	<b>SCAN</b>
<b>AC</b>	<b>Alternating Current</b>	<b>SST</b>	<b>Special Service Tool</b>
<b>CAN</b>	<b>Controller Area Network</b>	<b>VIN</b>	<b>Vehicle Identification Number</b>
<b>DC</b>	<b>Direct Current</b>	<b>W/D</b>	<b>Wiring Diagram</b>
<b>DLC</b>	<b>Data Link Connector</b>	<b>WDS</b>	<b>Worldwide Diagnostic System</b>
<b>DTC</b>	<b>Diagnostic Trouble Code</b>	<b>W/M</b>	<b>Workshop Manual</b>
<b>ELR</b>	<b>Emergency Locking Retractor</b>		
<b>HS-CAN</b>	<b>High Speed – Controller Area Network</b>		
<b>OBD</b>	<b>On-Board-Diagnostics</b>		
<b>PID</b>	<b>Parameter IDentification</b>		
<b>RKE</b>	<b>Remote Keyless Entry</b>		
<b>SAS</b>	<b>Sophisticated Airbag Sensor</b>		
<b>SI</b>	<b>Service Information</b>		
<b>SRS</b>	<b>Supplemental Restraint System</b>		