

721 Airbag System (SRS)

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GENERAL

This repair group covers airbag systems and airbag system component replacement. Airbag system problems can only be diagnosed using BMW scan tool or equivalent.

One of two systems is installed in the E60 / E61 cars covered by this manual, depending on model year.

Passive restraint system application	
Year	Restraint system
2004 - 2005	Advanced Safety Electronics (ASE)
2006 - 2010	Advanced Crash and Safety Management (ACSM)

See also:

- **121 Battery, Starter, Alternator** for battery safety terminal
- **411 Doors** for door panel removal
- **513 Interior Trim** for center console and glove compartment removal
- **520 Seats** for seat removal
- **612 Switches** for steering column switch cluster
- **720 Seat Belts**
- **ECL Electrical Component Locations**

721-2 Airbag System (SRS)

Warnings and Cautions

Warnings and Cautions

WARNING—

- The airbag is inflated by an explosive device. Handled improperly or without adequate safeguards, it can be very dangerous. Observe special precautions prior to any work at or near airbags.
- Serious injury may result if system service is attempted by persons unfamiliar with the BMW airbag system and its approved service procedures. BMW advises that airbag system inspection and service be performed by an authorized BMW dealer.
- Special test equipment is required to retrieve airbag fault codes, diagnose system faults and switch the airbag warning light OFF. The warning light remains ON until problems are corrected and fault memory cleared.
- If the airbag warning light is ON, there is a risk that airbags will not trigger in case of an accident. Be sure to have the system inspected and repaired immediately.
- Disconnect the battery and cover the negative (-) battery terminal with an insulator before starting diagnostic, troubleshooting or service work associated with the airbags, and before doing any welding on the car.
- After disconnecting the battery, wait 1 minute before beginning work on airbag components.
- If an airbag deploys due to an accident, BMW specifies that airbag and airbag related components be replaced. For more information on post-collision airbag service, contact an authorized BMW dealer.
- Do not fire an airbag unit prior to disposal. It must be fired by a special disposal company or shipped back to BMW in the packaging of the new components.
- Wear gloves and avoid skin contact when removing a deployed airbag unit. In case of skin contact, wash with water.
- Do not allow airbag system components to come in contact with cleaning solutions or grease. Do not subject airbag components to temperatures above 75°C (167°F). When reconnecting the battery, make sure no person is inside the vehicle.
- Place a removed airbag unit with the padded side facing upward. Do not leave an airbag unit unattended.
- If the airbag unit or airbag control module is dropped from a height of ½ meter (1½ feet) or more, do not use it.

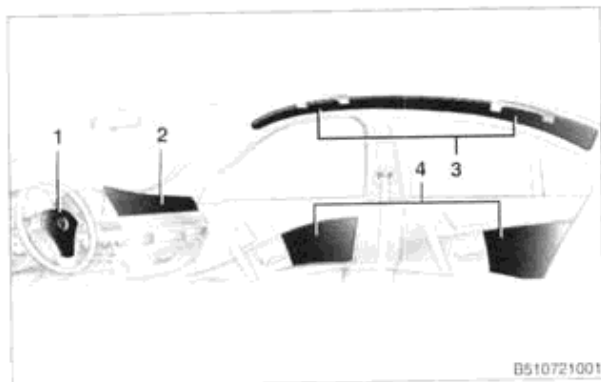
CAUTION—

- To avoid damaging plastic interior trim, use a plastic prying tool or a screwdriver with the tip wrapped with masking tape.

ADVANCED SAFETY ELECTRONICS (ASE)

On 2004 and 2005 models, the BMW airbag system is called the Advanced Safety Electronics system (ASE). (The industry name is supplemental restraint system or SRS.)

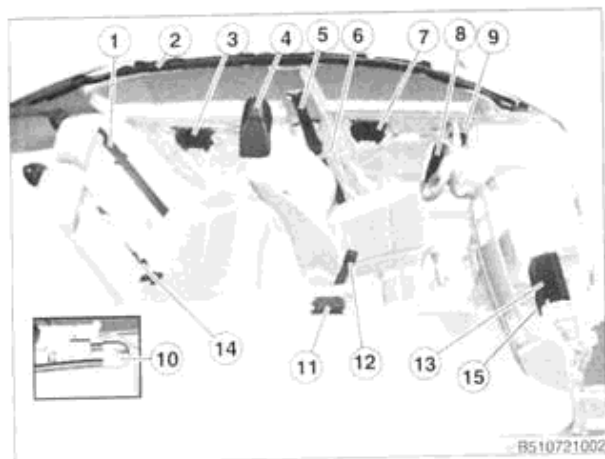
1. Driver airbag
2. Passenger airbag
3. Curtain side airbag
4. Door-mounted side airbag (rear optional)



ASE components

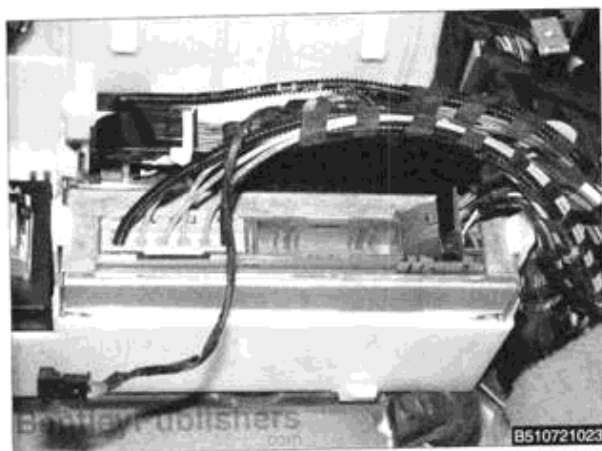
➤ The ASE system consists of the following components:

1. Rear seat belt
2. Curtain side airbag
3. Rear side airbag (optional)
4. Active headrest
5. Front seat belt
6. B-pillar satellite
7. Front side airbag
8. Driver airbag
9. Front door module
10. Battery safety terminal (BST)
11. Vehicle center satellite
12. Front seat belt pyrotechnic tensioner
13. Front passenger airbag
14. Rear seat belt pyrotechnic tensioner
15. Safety and gateway module (SGM)



Safety and gateway module (SGM)

➤ The ASE system is controlled by the safety and gateway module (SGM), located in the module carrier behind the glove compartment. The SGM contains a separate transmitter/receiver for each satellite and connects to the satellites via a fiber optic star bus (byteflight). Data communication is bidirectional, achieved at a rate of 10 Mbit/s.



721-4 Airbag System (SRS)

Vehicle center satellite



Vehicle center satellite

- ▶ The vehicle center satellite is located under the center console. It connects to other ASE system components and vehicle electronics. The module contains two crash sensors.

Communication with other control modules in the vehicle network takes place via byteflight.

For a description of vehicle bus systems, see **600 Electrical System-General**.



- ▶ The red ASE warning LED in the instrument cluster is illuminated for a short period after switching the ignition ON.

If a fault is stored in the SGM, the LED illuminates and remains ON until the ignition is switched OFF. A check control icon also appears in either yellow or red depending on the system fault along with a brief text message.

With the warning LED illuminated, ASE may not operate in case of a collision.

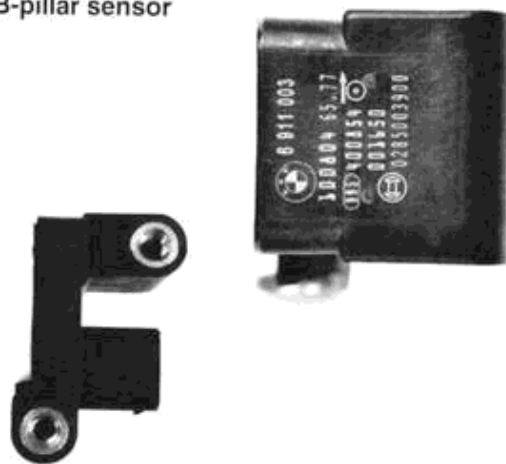
Crash sensors

Satellite sensors are installed in the B-pillars, frame rails, doors and center console. The longitudinal and transverse acceleration sensors and door pressure sensors serve the purpose of detecting side crashes.

The longitudinal acceleration sensors detect front end and rear end crashes. Acceleration sensor data is converted to digital signals and transmitted to the SGM via byteflight through the star coupler as data telegrams every 250 microseconds (μ s).

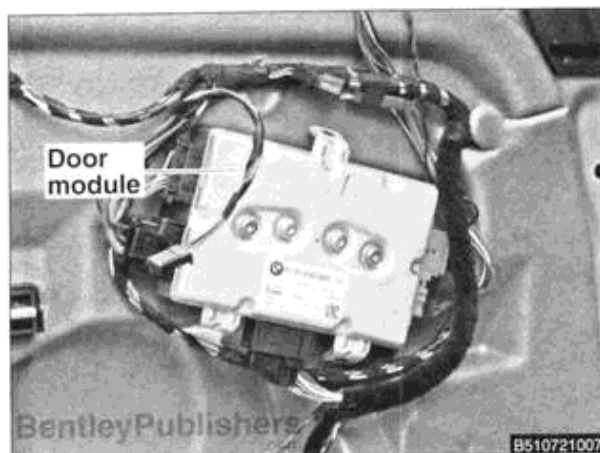
- ▶ **B-pillar satellite**, a combined longitudinal and transverse acceleration sensor, detects frontal, side and rear end crashes. The left and right sensors are identical and are mechanically coded to side during installation.

B-pillar sensor

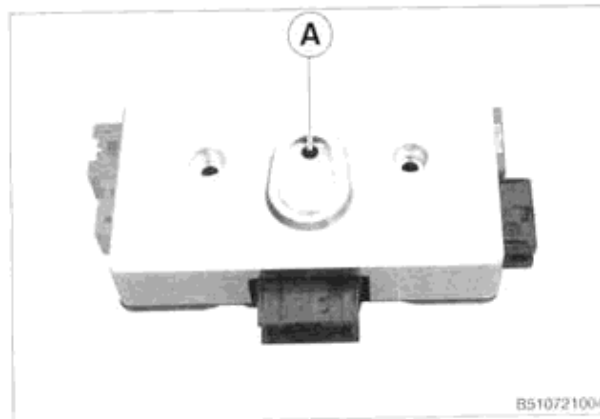


Airbag System (SRS) 721-5

Driver airbag and horn contact spring

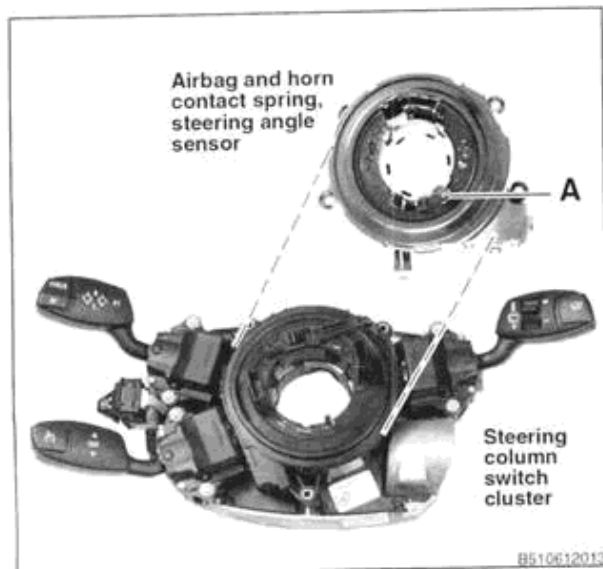


- **Door pressure sensor** is integrated into the front door module and measures the pressure inside the door, providing supplementary side impact detection. In case of a side crash, the outer door panel is pushed inward, thus compressing the space inside the door and increasing the pressure, detected by the door pressure sensor.



- The front door module contains a pressure sensor (A) and an electronic module which digitizes and transmits data cyclically to the SGM. At the same time, side impact is detected by the B-pillar satellite sensor. The SGM processes the two signals and triggers the restraint system on the basis of the information provided.

Driver airbag and horn contact spring

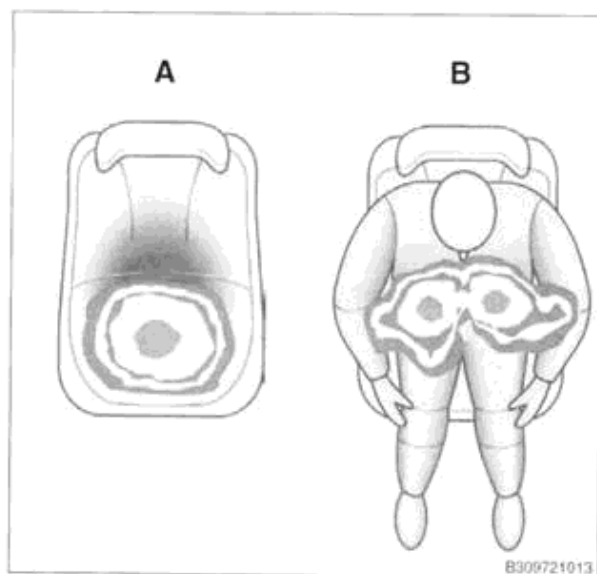


- The contact spring on the steering column switch cluster (SZL) behind the steering wheel provides the electrical interface between the fixed wiring harness and the moveable driver airbag. SZL service is covered in **612 Switches**.

The contact spring cassette consists of outer and inner housings with integral connectors and contains a ribbon type flexible cable.

721-6 Airbag System (SRS)

Passenger seat occupancy sensor (OC3 mat)



Passenger seat occupancy sensor (OC3 mat)

- The passenger seat occupancy sensor (occupant classifier or OC3 mat) is integrated into the seat area of the passenger seat. The sensor consists of conductors with pressure-dependent resistor (force sensitive resistance or FSR) elements connected to an electronic analyzer.

The FSR elements are wired in such a way that they can be sampled individually. When the mechanical load on a sensor element increases, its electrical resistance decreases and the current changes accordingly. By analyzing the signals from different sections of the mat, the analyzer maps the occupancy of the seat surface and can identify local concentrations of weight.

The purpose of the OC3 mat is to monitor the presence of a person or object placed on the front passenger seat and determine whether to deactivate passenger side airbags. The mat is capable of detecting a child seat that conforms to the NHTSA FMVSS 208 standard by the weight pattern on the seat. If detected, passenger airbags are deactivated.

- The OC3 mat is capable of distinguishing between a one-year-old child in a child's seat (A) and a light person (B). The distances between the areas where pressure is applied and the concentrations of pressure reveal who occupies the seat.

The OC3 mat analyzer transmits a message to the right B-pillar satellite which in turn transmits a message to the SGM. If the system detects that the seat is unoccupied or that a child seat for a child up to one year old is fitted, the airbags on the passenger side are deactivated. If a child seat is detected, the passenger airbag status light illuminates, indicating that passenger side airbags are deactivated.

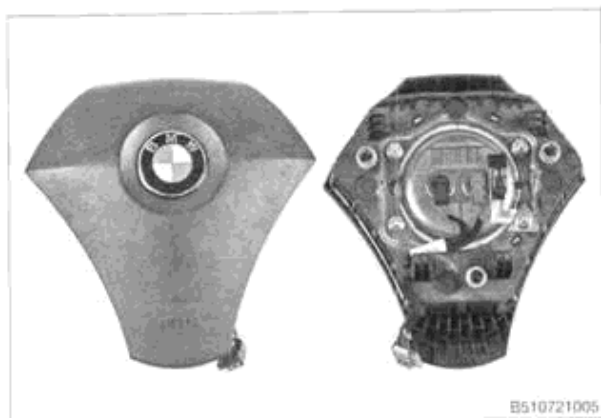
Airbag status light

- The airbag status light in the dome light housing glows yellow when the front passenger airbag and the side passenger airbag are deactivated.

Pyrotechnic devices

- **Driver airbag**, of two-stage design, is attached to the steering wheel by spring clips. Electrical connection to the SGM is provided via the driver airbag and horn contact spring in the steering column.

Once the airbag is fully inflated, vents in the airbag prevent further pressure build-up, so that progressive deceleration is provided as the driver contacts the cushion and injury due to sudden impact forces is prevented.

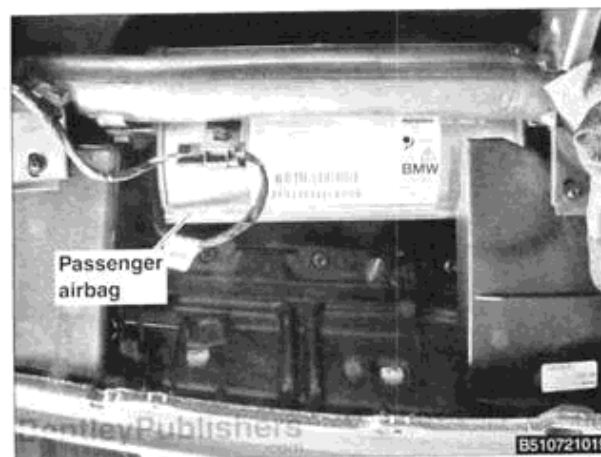


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- **Passenger airbag**, of two-stage design, is above the glove compartment, directly in front of the passenger seat, mounted to the body crossbeam.

Upon deployment, the airbag tears the dashboard cover through several predetermined shear points. Once free of the housing and fascia, the airbag inflates to its full extent to provide a protective cushion between the front seat passenger and the windshield.

Vents in the airbag prevent excess pressure bursting the bag and, as soon as the material in the gas generator is exhausted, the airbag deflates.



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- **Thorax (side) airbag**, mounted to the front doors behind door trim panel (rear side airbag is optional), is designed to protect the front seat occupant during a side impact. Side airbags are activated by a signal from the SGM in case of a side impact or a front angled impact of sufficient severity to cause both front and side airbag deployment.

The side airbag module consists of an aluminum housing with a plastic cover, a folded nylon fabric bag, gas generating capsules and an igniter.

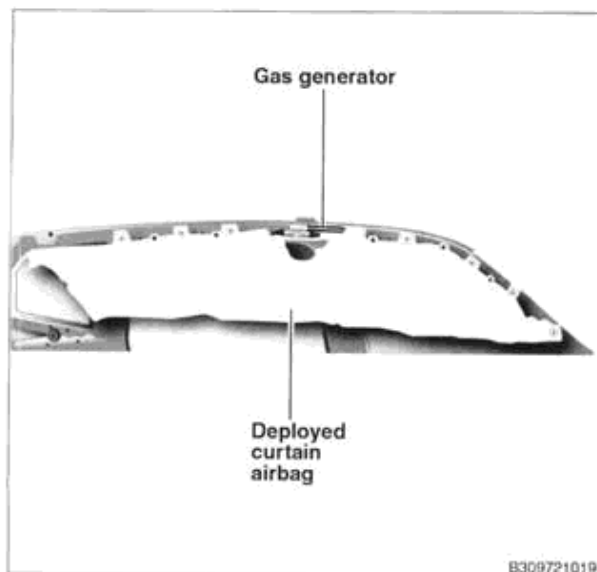
The side airbag module is marked either "VORNE / FRONT" or "HINTEN / REAR".



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721-8 Airbag System (SRS)

Pyrotechnic devices



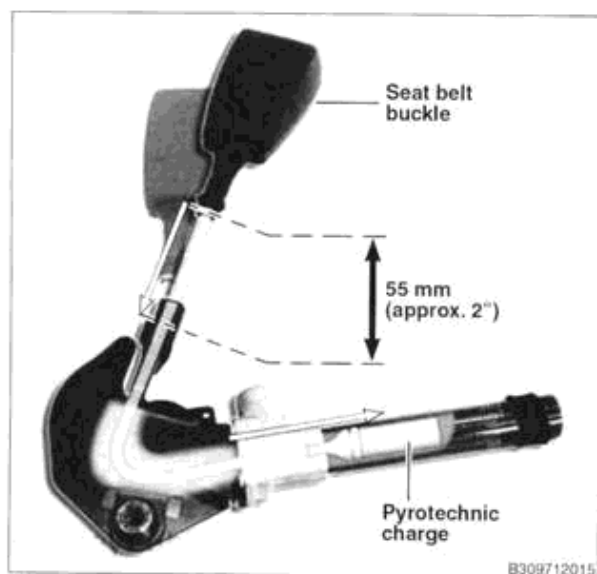
➤ **Curtain airbag**, extending all the way from the A-pillar to the C-pillar, covering the entire side-window area, inflates between the vehicle occupants and the side windows and pillar trims.

The curtain airbag reduces the risk of occupant's head or other extremities protruding through the windows in a sideways collision. Advantages of the system are:

- Extended covered area for side windows, front and rear.
- Protection against glass splinters and penetrating objects.
- Optimized protective area offering protection for occupants of differing sizes.

The curtain airbag is positioned along the line of the roof side member, folded up. It consists of a gas generator, two gas nozzles and curtain. In the event of a severe enough side collision, the generator is detonated and the gas flows through the two gas nozzles into the curtain. Simultaneous inflation of the curtain at the front and back achieves more even deployment.

Because the curtain generators and curtain are a sealed system, the curtain airbag retains its shape and strength for several seconds.



➤ **Seat belt tensioner**. Each seat belt buckle is equipped with a pyrotechnic (explosive charge) tensioner capable of cinching the belt an additional 55 mm (approx. 2 inches) in case of an accident. The belt buckle is attached via steel cable to a tube containing explosive propellant and a piston. An igniter in the base of the tube provides an ignition source when triggered by a signal from the SGM. A 2-pin connector located on a bracket underneath the seat frame links the igniter to SGM wiring.

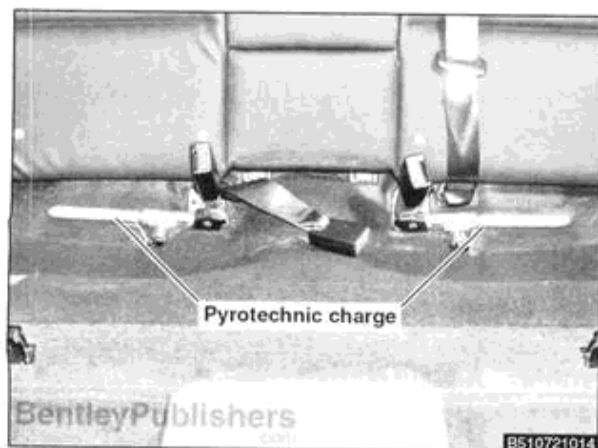
The SGM deploys the pyrotechnic seat belt tensioners at a slightly lower impact threshold level than the front airbags.

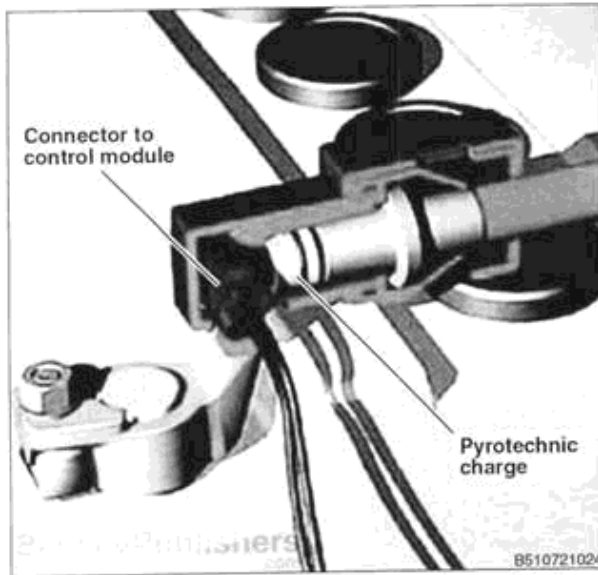
Belt buckle Hall microswitch in the front seat belt buckle is used to detect whether the seat belt is fastened or not. The detection signal is used by the SGM as a criterion for selective triggering of airbags and seat belt tensioners in case of a crash.

The switch is supplied current by the SGM via a current-signal interface. The current draw of the switch is the signal for switch position. The belt buckle switch is monitored while the ignition is ON.

➤ **Rear belt tensioners** are also equipped with pyrotechnic devices in vehicles equipped with rear side airbags.

Seat belt tensioner replacement is covered in **720 Seat Belts**.





➤ **Battery safety terminal (BST)** is used to minimize the possibility of a short circuit at the heavy gauge B+ wire that runs the length of the vehicle in case of an accident.

The BST consists of a conventional clamp that is screwed to the battery positive terminal from above and connected with a hollow cylinder. A propellant charge is stored in this hollow cylinder. As with airbags and seat belt tensioners, this pyrotechnic device is controlled and ignited by the SGM. The unit is enclosed in a plastic shell that captures the cable if it is forced out via BST deployment and locks it so that a renewed contact is no longer possible.

See also **121 Battery, Starter, Alternator**.

Principles of operation

The SGM performs the following functions:

- Crash detection and determining triggering point.
- Triggering ignition output stages.
- Documentation of crash data.
- Cyclic monitoring.
- Display of system standby status.
- Fault indication and fault code storage.
- Fault output (diagnosis).
- Output of a crash telegram for other users in communication system network.
- Activation of airbag indicator light when passenger airbag is deactivated.

Crash detection

The SGM determines whether a crash has occurred based on the values detected by crash sensors and calculated by a triggering algorithm.

Signals from different sensors help determine crash severity and direction. Based on this information, the stored algorithm determines the triggering (ignition) points of the restraint systems to be activated.

Documentation of actuator triggering

The triggering (ignition) commands are recorded in case of a crash where one or several actuators are triggered. The most important crash event data are stored in the form of a crash telegram in the non-volatile memory of the SGM. This data is only available to the manufacturer.

721-10 Airbag System (SRS)

Principles of operation

Cyclic monitoring

Once system self-test is successfully concluded and the system is ready for operation, cyclic fault monitoring is performed as long as ignition is ON.

Indication of system operability

System operability is indicated by the airbag warning light switching OFF in the instrument cluster.

Fault code storage

A fault in the system is indicated by the airbag warning light and stored in nonvolatile control module memory. A distinction is made between internal and external faults.

Fault output (diagnosis)

Using BMW scan tool or equivalent, fault codes can be read out via the diagnosis interface. After rectifying faults, the fault codes can be cleared by means of "clear fault code memory" diagnosis command.

Crash telegram output

In case of a crash which triggers restraint system components, the SGM sends a crash telegram via bus system. The control module then activates or deactivates various components depending on crash severity.

Deactivation of passenger airbags

The SGM utilizes the OC-3 mat signal to deactivate the front and side passenger airbags when a child seat is mounted on the passenger side. Airbag deactivation is indicated by a yellow airbag indicator light.

Seat belt reminder

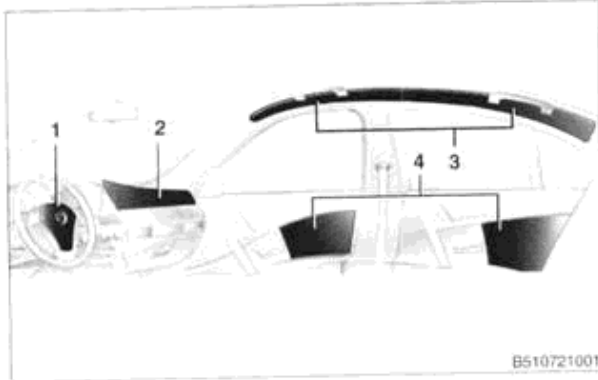
The seat belt reminder (SBR) function monitors whether the driver or passenger has fastened his or her seat belt. If the seat belt is not worn or is unbuckled while driving a distance of approx. 100 meters (328 feet), a reminder is illuminated and a chime is sounded for up to 90 seconds unless belt is buckled in the meantime.

Left and right front seat belt buckle microswitches are monitored separately.

ADVANCED CRASH AND SAFETY MANAGEMENT (ACSM)

On models produced in 2006 and later, the BMW airbag system is called the advanced crash and safety management system (ACSM). (The industry name is supplemental restraint system or SRS.)

1. Driver airbag
2. Passenger airbag
3. Curtain side airbag
4. Side airbag (rear optional)

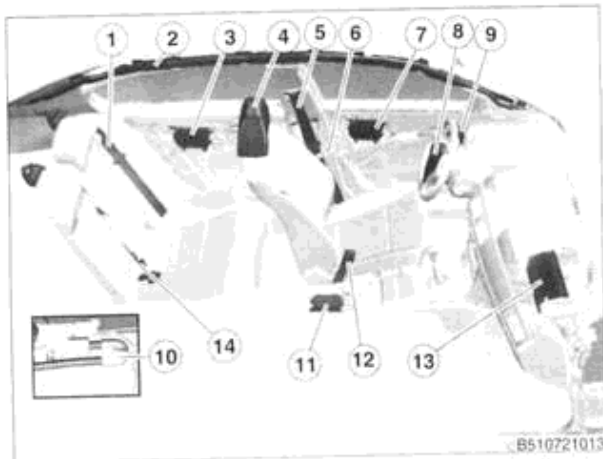


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ACSM components

The ACSM system consists of the following components:

1. Rear seat belt
2. Curtain side airbag
3. Rear side airbag (optional)
4. Active headrest
5. Front seat belt
6. B-pillar satellite
7. Front side airbag
8. Driver airbag
9. Door pressure sensor
10. Battery safety terminal (BST)
11. Crash safety (airbag) module
12. Front seat belt pyrotechnic tensioner
13. Front passenger airbag
14. Rear seat belt pyrotechnic tensioner



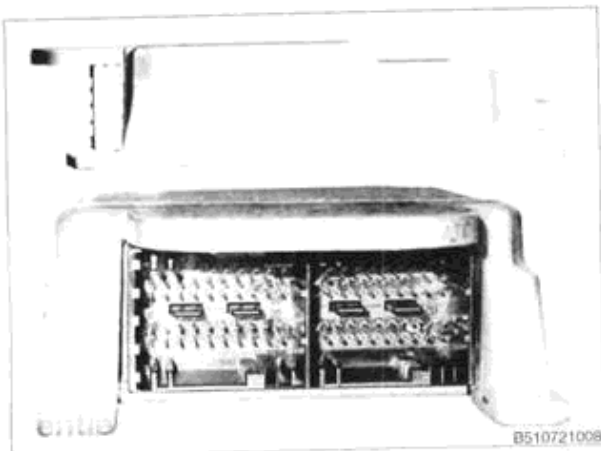
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Crash safety module (airbag control module)

The crash safety (airbag) module is located under the center console. It connects to other ACSM system components and vehicle electronics. The module contains two crash sensors.

Communication with other control modules in the vehicle network takes place via K-CAN.

For a description of vehicle bus systems, see **600 Electrical System-General**.



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721-12 Airbag System (SRS)

Crash sensors



- The red ACSM warning LED in the instrument cluster is illuminated for a short period after switching the ignition ON.

If a fault is stored in the crash safety module, the LED illuminates and remains ON until the ignition is switched OFF. A check control icon also appears in either yellow or red depending on the system fault along with a brief text message.

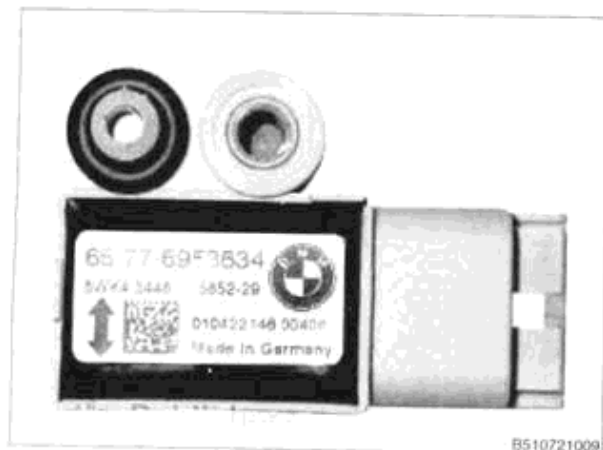
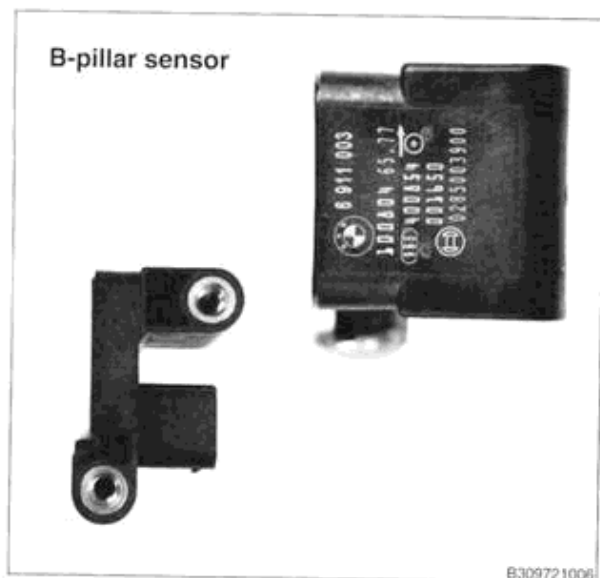
With the warning LED illuminated, ACSM may not operate in case of a collision.

Crash sensors

Satellite sensors are installed in the B-pillars, frame rails, doors and center console. The longitudinal and transverse acceleration sensors and door pressure sensors serve the purpose of detecting side crashes.

The longitudinal acceleration sensors detect front end and rear end crashes. Acceleration sensor data is converted to digital signals in an ASIC (Application Specific Integrated Circuit) and transmitted to the crash safety module.

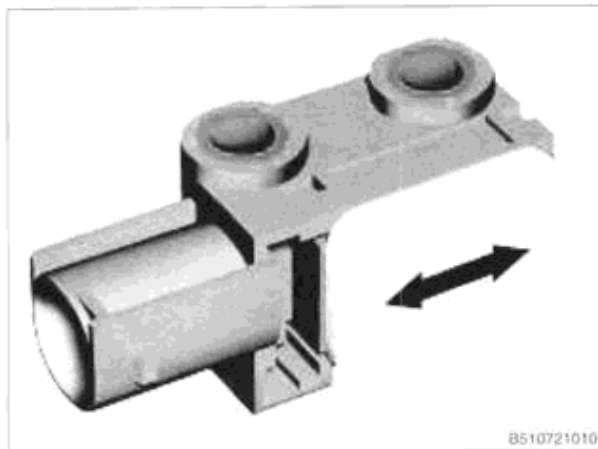
- **B-pillar satellite**, a combined longitudinal and transverse acceleration sensor, detects frontal, side and rear end crashes. The left and right sensors are identical and are mechanically coded to side during installation.



- **Door pressure sensor** is located in the front door, providing supplementary side impact detection. In case of a side crash, the outer door panel is pushed inward, thus compressing the space inside the door and increasing the pressure, detected by the door pressure sensor.

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Driver airbag and horn contact spring

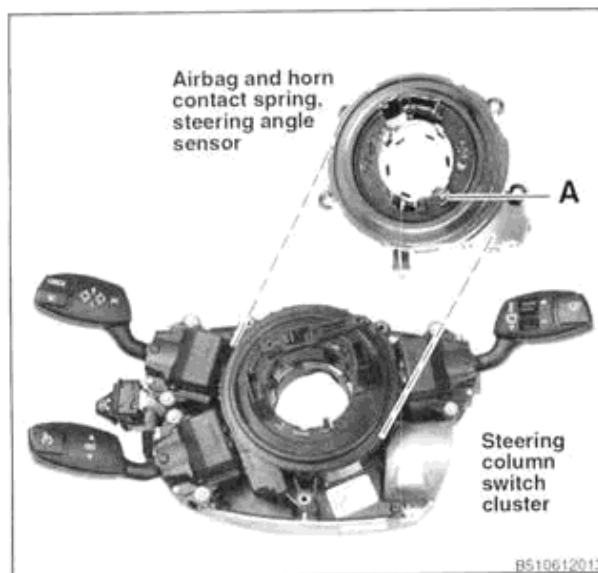


- Up-front sensors are located on the left and right sides of the front end. Each sensor contains an acceleration sensor, a signal conditioner, and an ASIC for data transmission. Information is sent via a data telegram to the crash safety module.

Driver airbag and horn contact spring

- The contact spring on the steering column switch cluster (SZL) behind the steering wheel provides the electrical interface between the fixed wiring harness and the moveable driver airbag. SZL service is covered in **612 Switches**.

The contact spring cassette consists of outer and inner housings with integral connectors and contains a ribbon type flexible cable.



Passenger seat occupancy sensor (OC3 mat)

- The passenger seat occupancy sensor (occupant classifier or OC3 mat) is integrated into the seat area of the passenger seat. The sensor consists of conductors with pressure-dependent resistor (force sensitive resistance or FSR) elements connected to an electronic analyzer.

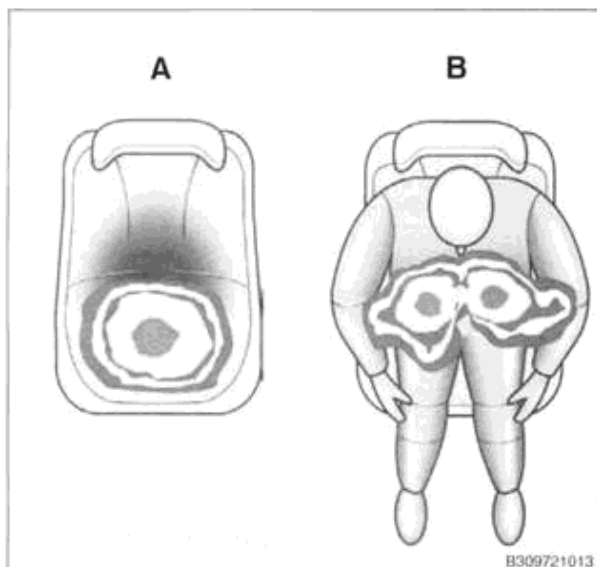
The FSR elements are wired in such a way that they can be sampled individually. When the mechanical load on a sensor element increases, its electrical resistance decreases and the current changes accordingly. By analyzing the signals from different sections of the mat, the analyzer maps the occupancy of the seat surface and can identify local concentrations of weight.

The purpose of the OC3 mat is to monitor the presence of a person or object placed on the front passenger seat and determine whether to deactivate passenger side airbags. The mat is capable of detecting a child seat that conforms to the NHTSA FMVSS 208 standard by the weight pattern on the seat. If detected, passenger airbags are deactivated.



721-14 Airbag System (SRS)

Airbag status light



- The OC3 mat is capable of distinguishing between a one-year-old child in a child's seat (A) and a light person (B). The distances between the areas where pressure is applied and the concentrations of pressure reveal who occupies the seat.

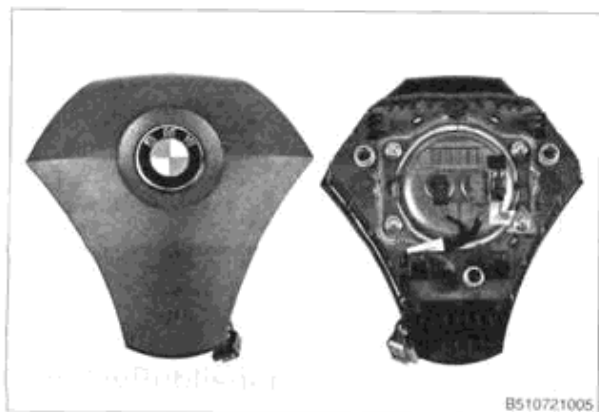
The OC3 mat analyzer transmits a message to the right B-pillar satellite which in turn transmits a message to the crash safety module. If the system detects that the seat is unoccupied or that a child seat for a child up to one year old is fitted, the airbags on the passenger side are deactivated. If a child seat is detected, the passenger airbag status light illuminates, indicating that passenger side airbags are deactivated.

Airbag status light



- The airbag status light in the dome light housing glows yellow when the front passenger airbag and the side passenger airbag are deactivated.

Pyrotechnic devices

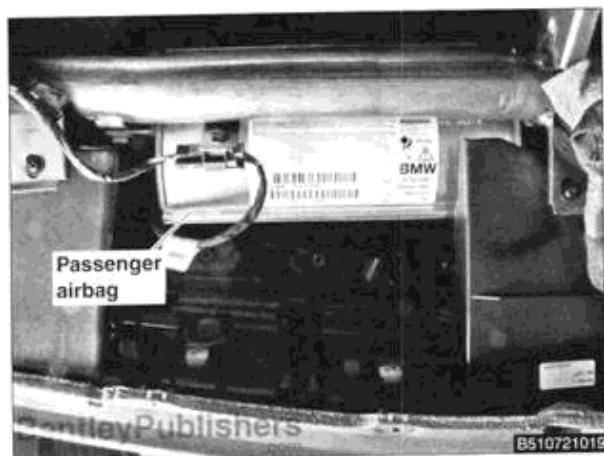


- **Driver airbag**, of two-stage design, is attached to the steering wheel by spring clips. Electrical connection to the crash safety module is provided via the driver airbag and horn contact spring in the steering column.

Once the airbag is fully inflated, vents in the airbag prevent further pressure build-up, so that progressive deceleration is provided as the driver contacts the cushion and injury due to sudden impact forces is prevented.

Airbag System (SRS) 721-15

Pyrotechnic devices



- **Passenger airbag**, of two-stage design, is above the glove compartment, directly in front of the passenger seat, mounted to the body crossbeam.

Upon deployment, the airbag tears the dashboard cover through several predetermined shear points. Once free of the housing and fascia, the airbag inflates to its full extent to provide a protective cushion between the front seat passenger and the windshield.

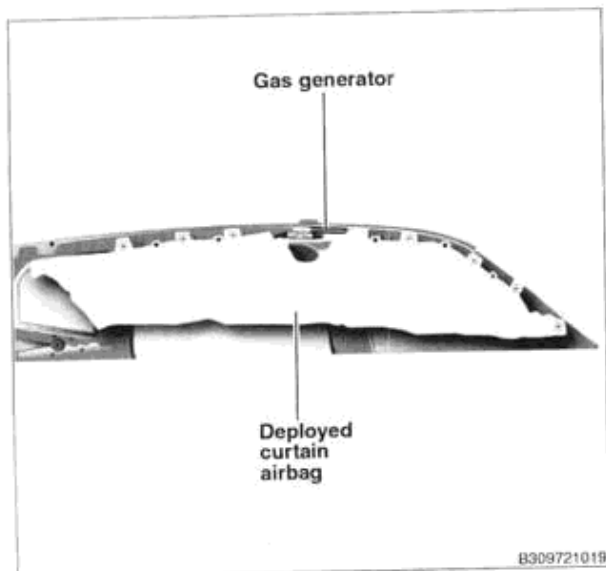
Vents in the airbag prevent excess pressure bursting the bag and, as soon as the material in the gas generator is exhausted, the airbag deflates.



- **Thorax (side) airbag**, mounted to the front doors behind door trim panel (rear side airbag is optional), is designed to protect the front seat occupant during a side impact. Side airbags are activated by a signal from the crash safety module in case of a side impact or a front angled impact of sufficient severity to cause both front and side airbag deployment.

The side airbag module consists of an aluminum housing with a plastic cover, a folded nylon fabric bag, gas generating capsules and an igniter.

The side airbag module is marked either "VORNE / FRONT" or "HINTEN / REAR".



- **Curtain airbag**, extending all the way from the A-pillar to the C-pillar, covering the entire side-window area, inflates between the vehicle occupants and the side windows and pillar trims.

The curtain airbag reduces the risk of occupant's head or other extremities protruding through the windows in a sideways collision. Advantages of the system are:

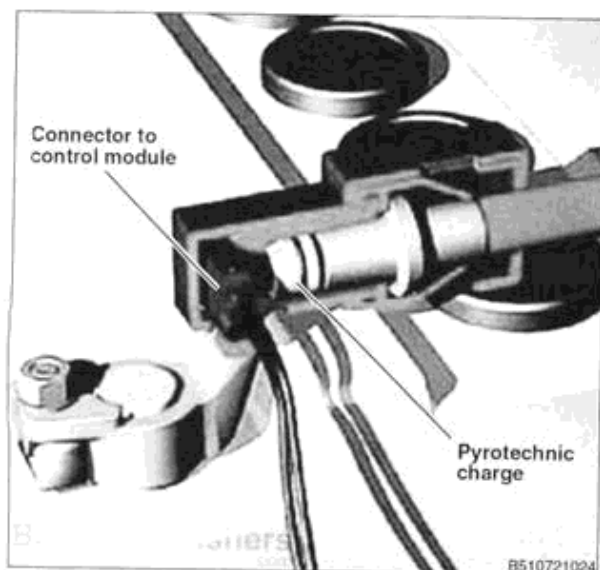
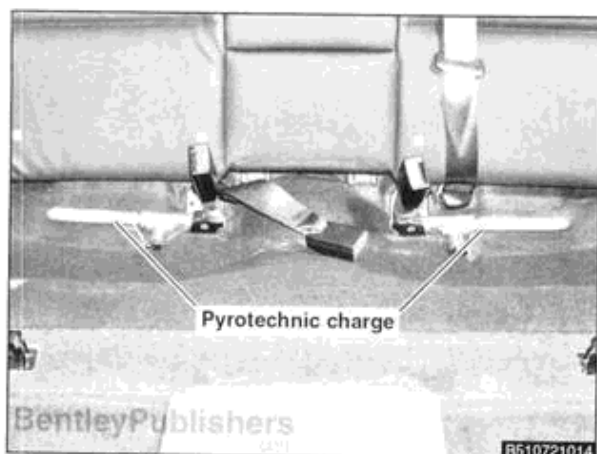
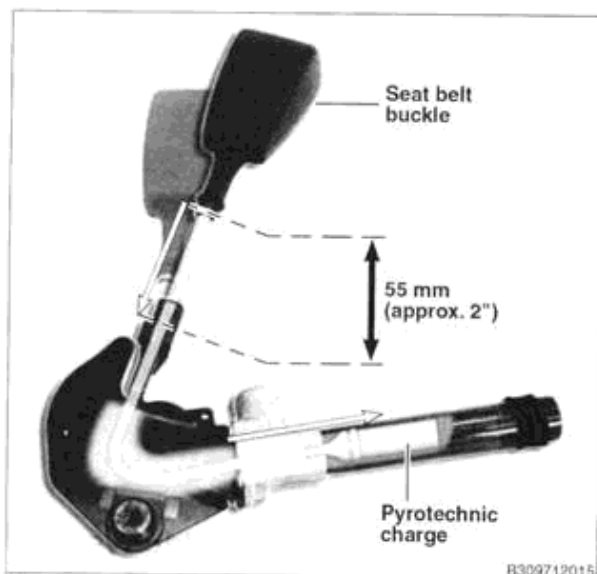
- Extended covered area for side windows, front and rear.
- Protection against glass splinters and penetrating objects.
- Optimized protective area offering protection for occupants of differing sizes.

The curtain airbag is positioned along the line of the roof side member, folded up. It consists of a gas generator, two gas nozzles and curtain. In the event of a severe enough side collision, the generator is detonated and the gas flows through the two gas nozzles into the curtain. Simultaneous inflation of the curtain at the front and back achieves more even deployment.

Because the curtain generators and curtain are a sealed system, the curtain airbag retains its shape and strength for several seconds.

721-16 Airbag System (SRS)

Pyrotechnic devices



- **Seat belt tensioner.** Each seat belt buckle is equipped with a pyrotechnic (explosive charge) tensioner capable of cinching the belt an additional 55 mm (approx. 2 inches) in case of an accident. The belt buckle is attached via steel cable to a tube containing explosive propellant and a piston. An igniter in the base of the tube provides an ignition source when triggered by a signal from the crash safety module. A 2-pin connector located on a bracket underneath the seat frame links the igniter to crash safety module wiring.

The crash safety module deploys the pyrotechnic seat belt tensioners at a slightly lower impact threshold level than the front airbags.

Belt buckle Hall microswitch in the front seat belt buckle is used to detect whether the seat belt is fastened or not. The detection signal is used by the crash safety module as a criterion for selective triggering of airbags and seat belt tensioners in case of a crash.

The switch is supplied current by the crash safety module via a current-signal interface. The current draw of the switch is the signal for switch position. The belt buckle switch is monitored while the ignition is ON.

- **Rear belt tensioners** are also equipped with pyrotechnic devices in vehicles equipped with rear side airbags.

Seat belt tensioner replacement is covered in **720 Seat Belts**.

- **Battery safety terminal (BST)** is used to minimize the possibility of a short circuit at the heavy gauge B+ wire that runs the length of the vehicle in case of an accident.

The BST consists of a conventional clamp that is screwed to the battery positive terminal from above and connected with a hollow cylinder. A propellant charge is stored in this hollow cylinder. As with airbags and seat belt tensioners, this pyrotechnic device is controlled and ignited by the crash safety module. The unit is enclosed in a plastic shell that captures the cable if it is forced out via BST deployment and locks it so that a renewed contact is no longer possible.

See also **121 Battery, Starter, Alternator**.

Principles of operation

The crash safety (airbag) module performs the following functions:

- Crash detection and determining triggering point.
- Triggering ignition output stages.
- Documentation of crash data.
- System self-test.
- Cyclic monitoring.
- Display of system standby status.
- Fault indication and fault code storage.
- Fault output (diagnosis).
- Output of a crash telegram for other users in communication system network.
- Activation of airbag indicator light when passenger airbag is deactivated.

Crash detection

The crash safety module determines whether a crash has occurred based on the values detected by crash sensors and calculated by a triggering algorithm. Deceleration signals from two independent sensors are needed to indicate a crash. In the case of a frontal crash for example, the acceleration values from the B-pillar satellite and from the longitudinal acceleration sensor (in the control module) are needed.

Signals from different sensors help determine crash severity and direction. Based on this information, the stored algorithm determines the triggering (ignition) points of the restraint systems to be activated.

Triggering output stages

Signals from two different sensors, B-pillar satellite and crash safety module sensor, triggers airbag ignition output stages.

With ignition ON, voltage is supplied to the crash safety module, which becomes operational once it completes a system self-test. In case of a crash, a capacitor provides the energy reserve for airbag ignition even if electrical power is interrupted.

Documentation of actuator triggering

The triggering (ignition) commands are recorded in case of a crash where one or several actuators are triggered. The most important crash event data are stored in the form of a crash telegram in the non-volatile memory of the crash safety module. This data is only available to the manufacturer.

A maximum of 3 crash telegrams can be stored, after which the control module needs to be replaced.

System self-test

The control module performs a system self-test when the ignition is switched ON. The airbag warning light is illuminated for 3 - 5 seconds during system self-test.

721-18 Airbag System (SRS)

Principles of operation

If system self-test finds no faults, the airbag warning light switches OFF and the system is ready for operation.

Cyclic monitoring

Once system self-test is successfully concluded and the system is ready for operation, cyclic fault monitoring is performed as long as ignition is ON.

Indication of system operability

System operability is indicated by the airbag warning light switching OFF in the instrument cluster.

Fault code storage

A fault in the system is indicated by the airbag warning light and stored in nonvolatile control module memory. A distinction is made between internal and external faults.

Fault output (diagnosis)

Using BMW scan tool or equivalent, fault codes can be read out via the diagnosis interface. After rectifying faults, the fault codes can be cleared by means of "clear fault code memory" diagnosis command.

Crash telegram output

In case of a crash which triggers restraint system components, the crash safety module sends a crash telegram via bus system. The following control modules then perform the following functions depending on crash severity:

Crash telegram responses	
Fuel pump control module (EKP)	Switches fuel pump OFF
Engine control module (ECM)	Switches alternator OFF
Body gateway module (KGM)	Releases central locking
Light module (LM)	Activates hazard warning lights
Light module (LM)	Activates interior lights
Telematic control module (TCU)	Places emergency call

Deactivation of passenger airbags

The crash safety module utilizes the OC-3 mat signal to deactivate the front and side passenger airbags when a child seat is mounted on the passenger side. Airbag deactivation is indicated by a yellow airbag indicator light.

Seat belt reminder

The seat belt reminder (SBR) function monitors whether the driver or passenger has fastened his or her seat belt. If the seat belt is not worn or is unbuckled a reminder is illuminated and a chime is sounded.

Left and right front seat belt buckle microswitches are monitored separately.

Airbag System (SRS) 721-19

Vehicle center satellite (ASE), replacing

COMPONENT REPLACEMENT

Vehicle center satellite (ASE), replacing

- Disconnect negative (–) cable from battery and cover negative terminal with insulating material.

CAUTION—

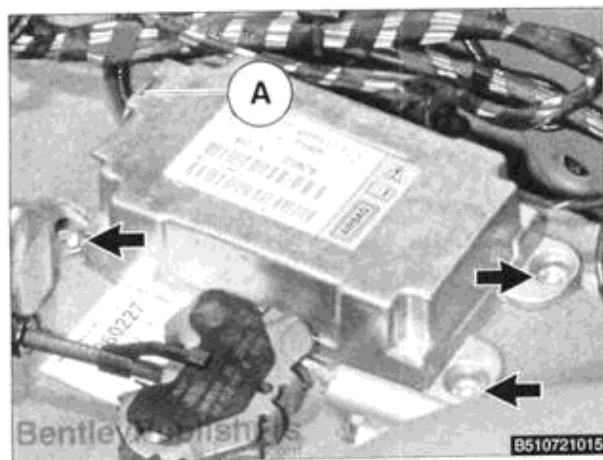
- Prior to disconnecting the battery, read the battery disconnection cautions given in **001 Warnings and Cautions**.

- Remove center console between front seats. See **513 Interior Trim**.
- ◀ Disconnect electrical harness connector (A). Remove vehicle center satellite mounting fasteners (arrows) and lift up module.
- Installation is reverse of removal.

Tightening torque

Vehicle center satellite to center tunnel	8 Nm (6 ft-lb)
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- Use BMW scan tool or equivalent to code new module.



Crash safety (airbag) module (ACSM), replacing

- Disconnect negative (–) cable from battery and cover negative terminal with insulating material.

CAUTION—

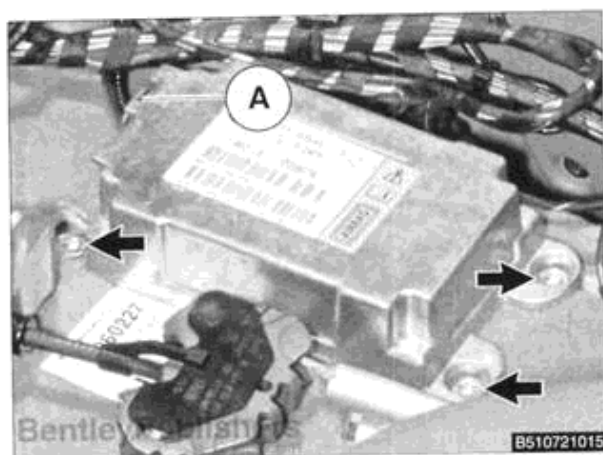
- Prior to disconnecting the battery, read the battery disconnection cautions given in **001 Warnings and Cautions**.

- Remove center console between front seats. See **513 Interior Trim**.
- ◀ Disconnect electrical harness connector (A). Remove vehicle center satellite mounting fasteners (arrows) and lift up module.
- Installation is reverse of removal.

Tightening torque

Vehicle center satellite to center tunnel	8 Nm (6 ft-lb)
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- Use BMW scan tool or equivalent to code new module.



721-20 Airbag System (SRS)

Driver airbag, removing and installing

Driver airbag, removing and installing

Vehicles covered by this manual are equipped with either a multifunction steering wheel or a sport steering wheel. Follow applicable procedure below to remove airbag.

- Disconnect negative (–) cable from battery and cover negative terminal with insulating material.

WARNING—

- After disconnecting the battery, wait 1 minute before beginning work on airbag components.

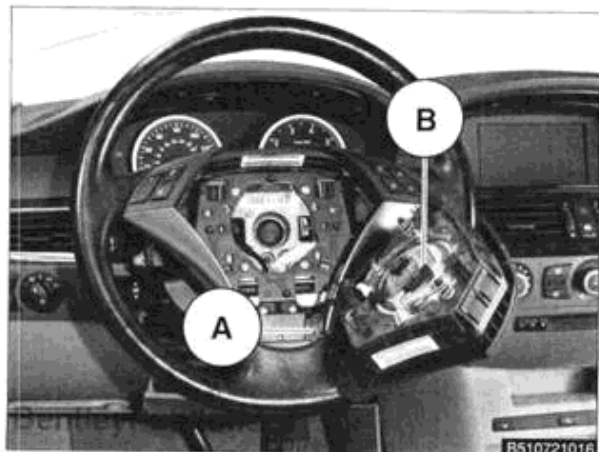
CAUTION—

- Prior to disconnecting the battery, read the battery disconnection cautions given in **001 Warnings and Cautions**.



- ◀ Insert Torx screwdriver (T25 or T27) into concealed opening on back side of steering wheel until spring resistance is felt. Increase pressure on spring until airbag unit is unlocked.

- Tilt back airbag.



- ◀ Disconnect electrical connector (A) and remove airbag unit (B).

WARNING—

- Place a removed airbag unit with the padded side facing upward. Do not leave an airbag unit unattended.
- Do not pinch airbag harness in center of steering wheel when removing or installing airbag.

- Installation is reverse of removal:
 - Make sure electrical lead is positioned correctly.
 - Press airbag directly down on steering wheel until it snaps in place.

Airbag System (SRS) 721-21

Passenger airbag, removing and installing

Passenger airbag, removing and installing

If the passenger airbag deploys, it tears a hole through the dashboard surface. Be prepared to replace the dashboard.

- Disconnect negative (–) cable from battery and cover negative terminal with insulating material.

WARNING—

- After disconnecting the battery, wait 1 minute before beginning work on airbag components.

CAUTION—

- Prior to disconnecting the battery, read the battery disconnection cautions given in 001 Warnings and Cautions.

- Remove glove compartment. See 513 Interior Trim.
- **Vehicle with front cupholders:** Remove front outer cupholder carrier and release front inner cupholder carrier.

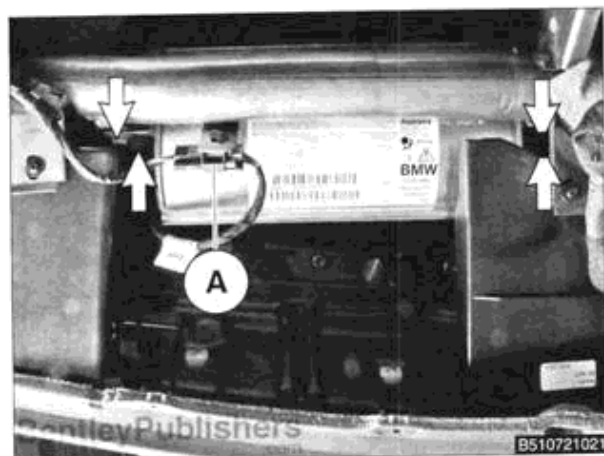


Working from below right side of dashboard:

- Detach electrical connector (A).
- Move front inner cupholder carrier to side if applicable.
- While supporting airbag unit, remove mounting fasteners (arrows), then lower airbag.

WARNING—

- Place a removed airbag unit with the padded side facing upward. Do not leave an airbag unit unattended.



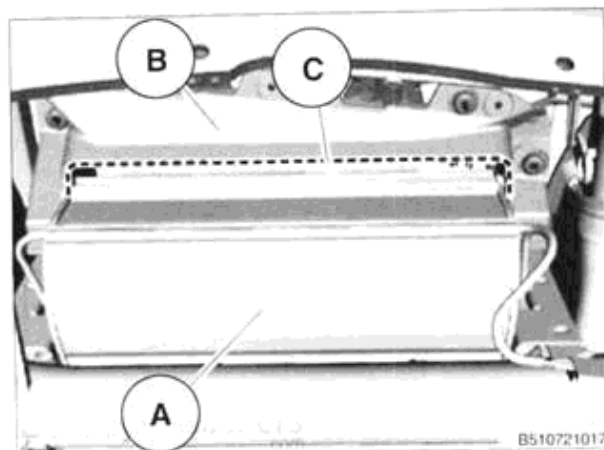
Install airbag (A) in channel (B), making sure channel surrounds airbag module. Pull channel apart at sides if necessary.

- Remainder of installation is reverse of removal.

Tightening torque

Passenger airbag to body crossbeam

8 Nm (6 ft-lb)



721-22 Airbag System (SRS)

Side airbag (front or rear), removing and installing

Side airbag (front or rear), removing and installing

- Disconnect negative (–) cable from battery and cover negative terminal with insulating material.

WARNING—

- After disconnecting the battery, wait 1 minute before beginning work on airbag components.

CAUTION—

- Prior to disconnecting the battery, read the battery disconnection cautions given in **001 Warnings and Cautions**.
- Front and rear side airbags are not interchangeable. The side airbag module is marked either "VORNE / FRONT" or "HINTEN / REAR"

- Remove door trim panel. See **411 Doors**.

- Remove fasteners (**arrows**) and remove airbag module.

- Prior to installation, be sure to remove all foreign objects (fasteners, etc.) from airbag installation recess in door panel.
- Remainder of installation is reverse of removal.

