

Technical training.
Product information.

I01 Passive Safety System



BMW Service

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Technical Training

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General information

Symbols used

The following symbol is used in this document to facilitate better comprehension or to draw attention to very important information:



Contains important safety information and information that needs to be observed strictly in order to guarantee the smooth operation of the system.

Information status and national-market versions

BMW Group vehicles meet the requirements of the highest safety and quality standards. Changes in requirements for environmental protection, customer benefits and design render necessary continuous development of systems and components. Consequently, there may be discrepancies between the contents of this document and the vehicles available in the training course.

This document basically relates to the European version of left-hand drive vehicles. Some operating elements or components are arranged differently in right-hand drive vehicles than shown in the graphics in this document. Further differences may arise as the result of the equipment specification in specific markets or countries.

Additional sources of information

Further information on the individual topics can be found in the following:

- Owner's Handbook
- Integrated Service Technical Application.

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The information contained in this document forms an integral part of the technical training of the BMW Group and is intended for the trainer and participants in the seminar. Refer to the latest relevant information systems of the BMW Group for any changes/additions to the technical data.

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1. Introduction

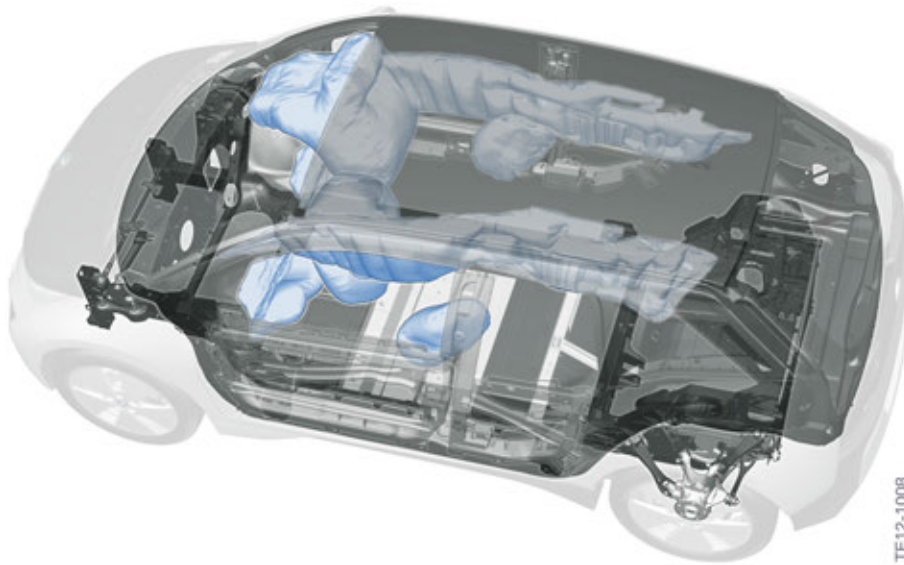
1.1. The hidden protector

The passive safety system of the I01 is based on the objectives and characteristics of current BMW models. The passive safety system fulfills all worldwide legislative requirements.

The restraint systems ensure that the risk of injury to the occupants of the vehicle in a collision is reduced.

The 4th generation Advanced Crash Safety Module (ACSM) is used as the central airbag control unit for the passive safety system in the I01. In comparison to other current series, with the passive safety system of the I01 the central sensor system is integrated inside the ACSM control unit and not in the Integrated Chassis Management (ICM). This is possible with the I01 as the ACSM is located in the center of vehicle.

The ACSM 4 of the I01 is for the first time installed on the FlexRay bus instead of the PT-CAN as in previous vehicles. The sensor data of the central sensor system which was previously provided by the ICM can be transmitted directly by the ACSM via FlexRay to the DSC. The DSC processes the sensor data and makes it available to other bus users.



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2. System Overview

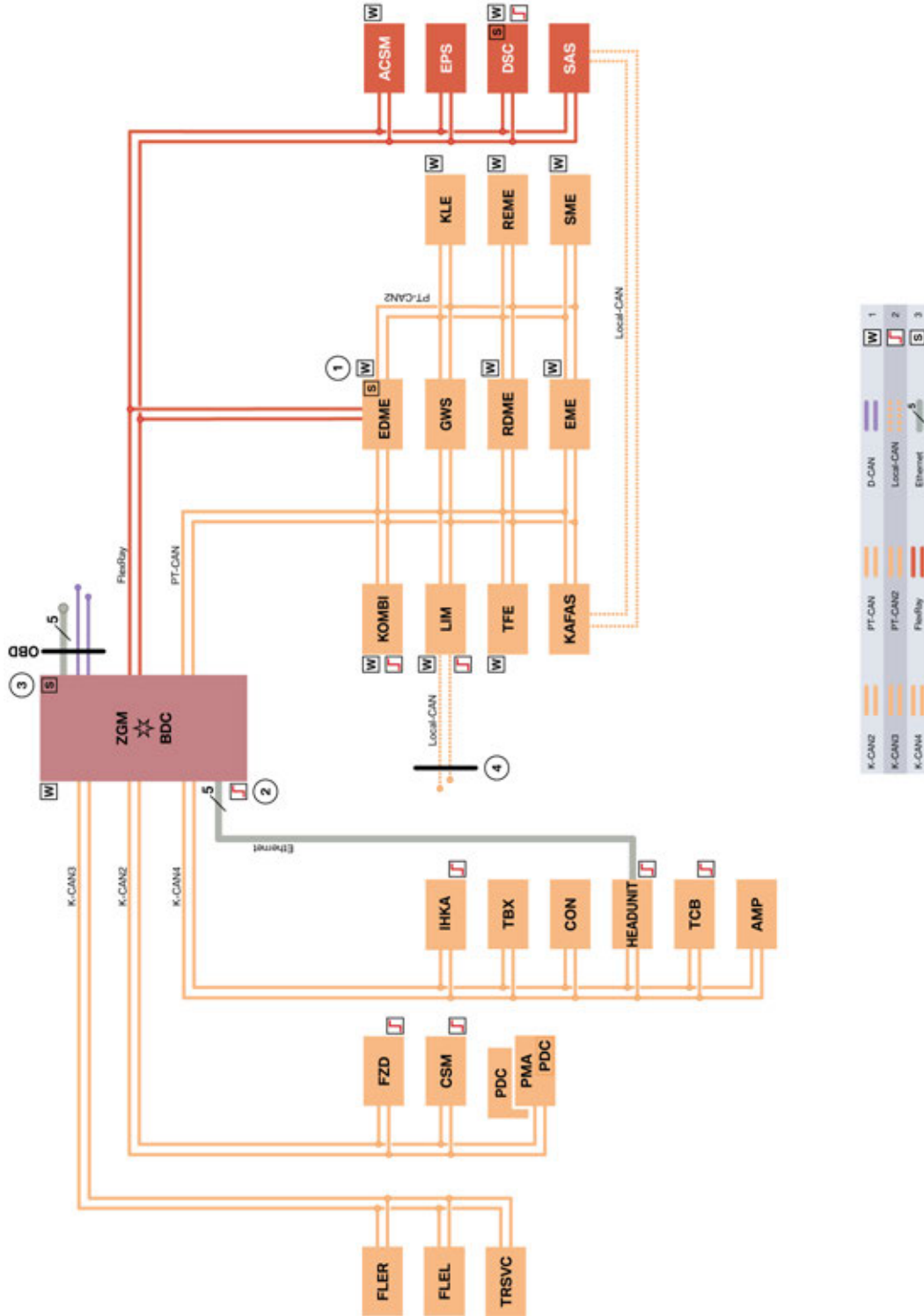
2.1. System wiring diagrams

The following bus overview shows an overview of the vehicle circuit structure of the I01 and incorporation of the ACSM 4 in the FlexRay.

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2. System Overview

2.1.1. Bus overview



I01 bus overview

I01 Passive Safety System

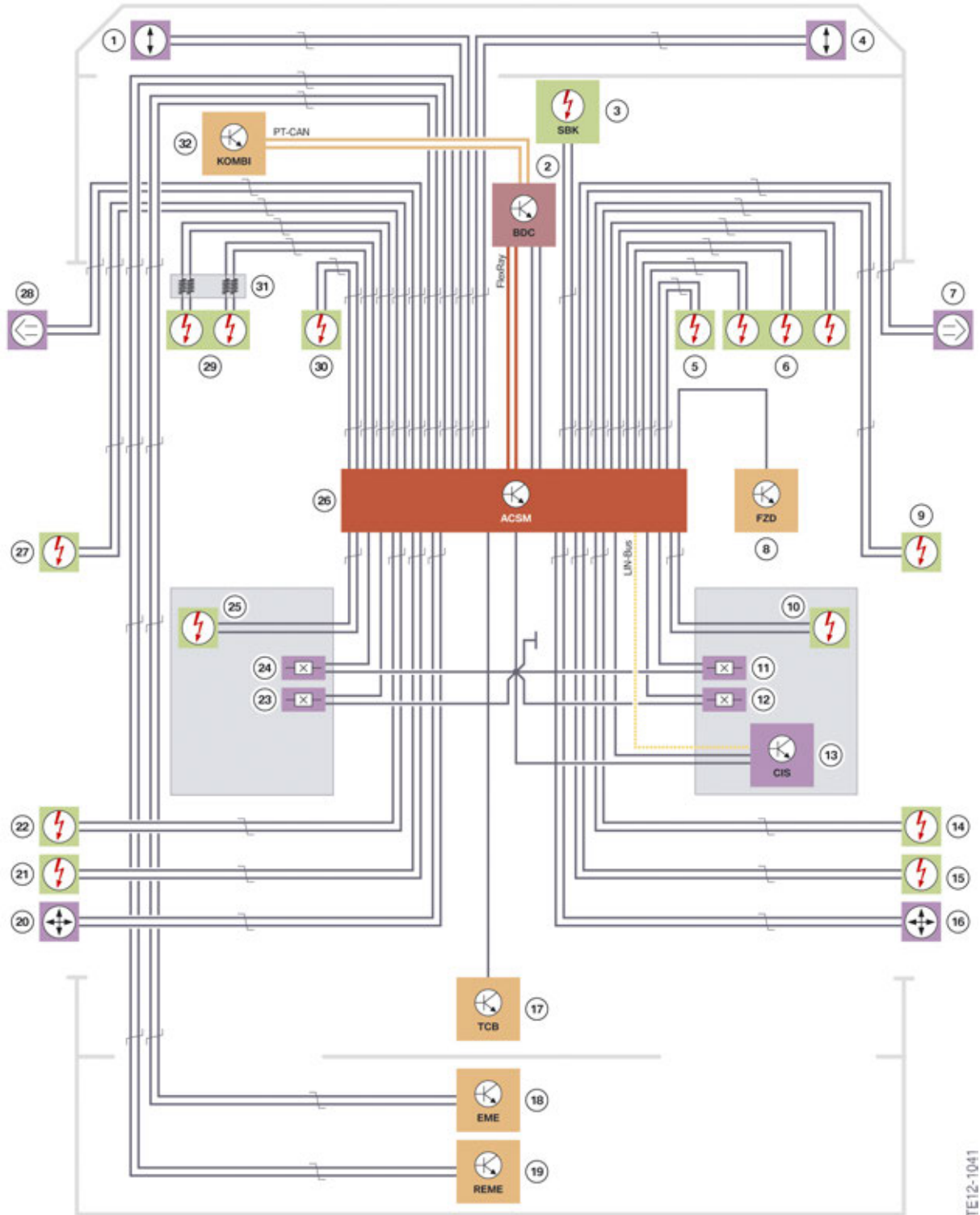
2. System Overview

Index	Explanation
1	Control units with wake-up authorization
2	Start-up node control units for starting and synchronizing the FlexRay bus system
3	Wake-up line
4	Power socket
ACSM	Advanced Crash Safety Module (ACSM 4)
AMP	Amplifier
BDC	Body Domain Controller
CON	Controller
CSM	Car Sharing Module
DSC	Dynamic Stability Control
EDME	Electrical Digital Motor Electronics
EME	Electric Motor Electronics
EPS	Electromechanical Power Steering
FLEL	Frontal Light Electronics Left
FLER	Front Light Electronics Right
FZD	Roof function center
GWS	Gear selector
Head unit	Headunit (Headunit Basis or Headunit High)
IHKA	Integrated automatic heating / air-conditioning
KAFAS	Camera-based driver support systems
KLE	Convenience charging electronics
KOMBI	Instrument panel
LIM	Charging interface module
PDC	Park Distance Control
PMA	Parking Maneuvering Assistant
RDME	Range Extender Digital Engine Electronics
REME	Range Extender Electrical Machine Electronics
SAS	Optional equipment system
SME	Battery management electronics
TBX	Touchbox
TCB	Telematic Communication Box
TFE	Hybrid pressure refuelling electronic control unit
TRSVC	Control unit for reversing camera, Top View and SideView
ZGM	Central Gateway Module

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2. System Overview

2.1.2. System wiring diagram



I01 System wiring diagram for US version of vehicles

I01 Passive Safety System

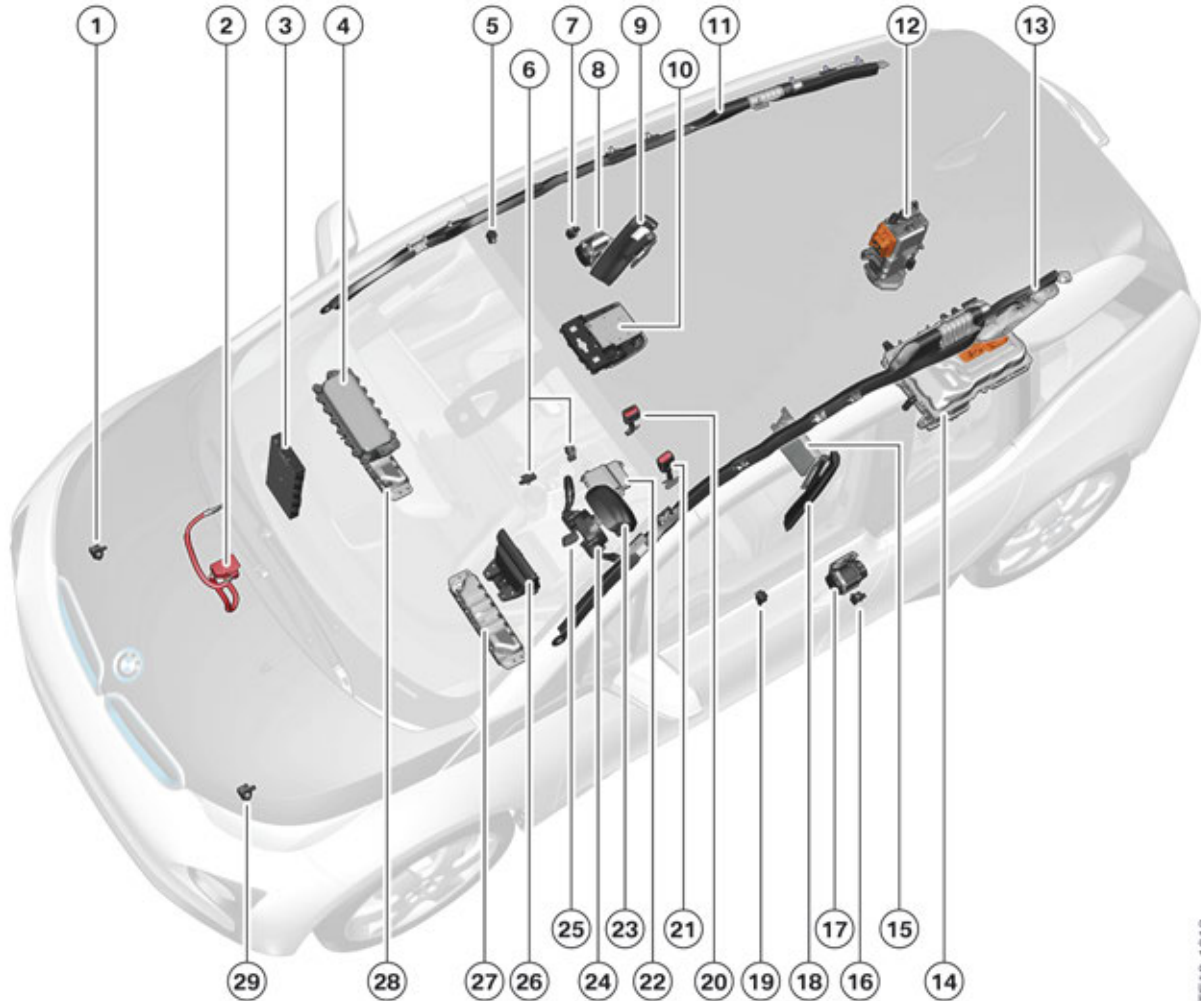
2. System Overview

Index	Explanation
1	Airbag front sensor, left
2	Body Domain Controller (BDC)
3	Safety battery terminal
4	Airbag front sensor, right
5	Knee airbag, front passenger
6	Front passenger airbag, two-stage with active vent valve
7	Airbag sensor, door, right (pressure)
8	Indicator lamp for front passenger airbag deactivation in roof function center
9	Head airbag, front passenger
10	Side airbag, front passenger
11	Seat belt buckle contact, front passenger
12	Seat-position sensor, front passenger
13	CIS mat
14	Automatic tensioner, front passenger
15	Adaptive belt force limiter, front passenger
16	Acceleration sensor, right rear door
17	Telematic Communication Box (TCB)
18	Electric motor electronics (EME)
19	Range Extender Electrical Machine Electronics (REME)
20	Acceleration sensor, left rear door
21	Adaptive belt force limiter, driver's side
22	Automatic tensioner, driver
23	Seat-position sensor, driver
24	Seat belt buckle contact, driver
25	Side airbag, driver's side
26	Advanced Crash Safety Module (ACSM 4)
27	Head airbag, driver
28	Airbag sensor, door, left (pressure)
29	Driver's airbag, two-stage
30	Knee airbag, driver
31	Clock spring
32	Instrument panel (KOMBI)

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2. System Overview

2.2. System overview



TE12-1018

System overview for US market vehicles

Index	Explanation
1	Airbag front sensor, right
2	Safety battery terminal
3	Body Domain Controller (BDC)
4	Front passenger airbag, two-stage with active vent valve
5	Airbag sensor, door, right (pressure)
6	Seat-position sensor, front passenger
7	Acceleration sensor, right rear door
8	Adaptive belt force limiter, front passenger
9	Side airbag, front passenger
10	Indicator lamp for front passenger airbag deactivation in roof function center

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2. System Overview

Index	Explanation
11	Head airbag, front passenger
12	Range Extender Electrical Machine Electronics (REME)
13	Head airbag, driver
14	Electric motor electronics (EME)
15	Telematic Communication Box (TCB)
16	Acceleration sensor, left rear door
17	Adaptive belt force limiter, driver's side
18	Side airbag, driver's side
19	Airbag sensor, door, left (pressure)
20	Seat belt buckle contact, front passenger
21	Seat belt buckle contact, driver
22	Advanced Crash Safety Module (ACSM 4)
23	Driver's airbag, two-stage
24	Clock spring in the steering column switch cluster
25	Seat-position sensor, driver
26	Instrument panel (KOMBI)
27	Knee airbag, driver
28	Knee airbag, front passenger
29	Airbag front sensor, left

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3. Functions

3.1. Functions of Advanced Crash Safety Module

The function of the Advanced Crash Safety Module is to permanently evaluate all sensor signals in order to identify a crash situation. As a result of the sensor signals and their evaluation, the ACSM identifies the direction of the crash and the severity of the impact.

The ACSM evaluates the information from the sensors then forwards corresponding measures for selective activation of the necessary restraint systems.

The ACSM also monitors the system itself and indicates when it is ready for operation by switching off the airbag indicator light.

If a fault occurs during operation this is stored in a fault memory and can be read out for diagnosis purposes.

If a collision is detected, a crash message is sent to the other bus users in the data bus network as notification. The relevant control units respond to this signal by executing their own activities according to the severity of the crash.

The activities include:

- Unlocking of the door locks
- Activating the hazard warning flasher
- Switching on the interior light
- Making an emergency call
- Switching off the high-voltage system
- Switching off the electrical machine of the range extender.

An additional function of the ACSM is the acoustic seat belt warning that reminds the driver and front passenger using visual and acoustic signals to fasten their seat belts. Seat belt buckle switches are used to identify whether the driver and/or the front passenger have their seat belts fastened. Information on occupancy of the front passenger seat is also included for the acoustic seat belt warning. In US market vehicles, the position of the driver and the front passenger seat is also monitored.

The functions of the ACSM generally belong to one of the following areas:

- Crash-relevant functions
- System monitoring functions
- Additional convenience functions.

3.2. Crash-relevant functions

The ACSM must fulfill the following crash-relevant functions:

- Evaluating the sensor signals
- Impact detection
- Determining actuators to be activated

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3. Functions

- Specifying the trigger time and trigger sequence
- Activation of the ignition circuit output stages
- Sending the crash message to all bus users
- Crash documentation
- Emergency call function.

3.2.1. Evaluating the sensor signals

The sensors serve to identify and verify front-end, side-on and rear-end crashes and also as roll-over detection.

The sensors are either located inside the ACSM or are directly connected to the module where their signals are evaluated and processed.

3.2.2. Impact detection

The vehicle is equipped with the following sensors:

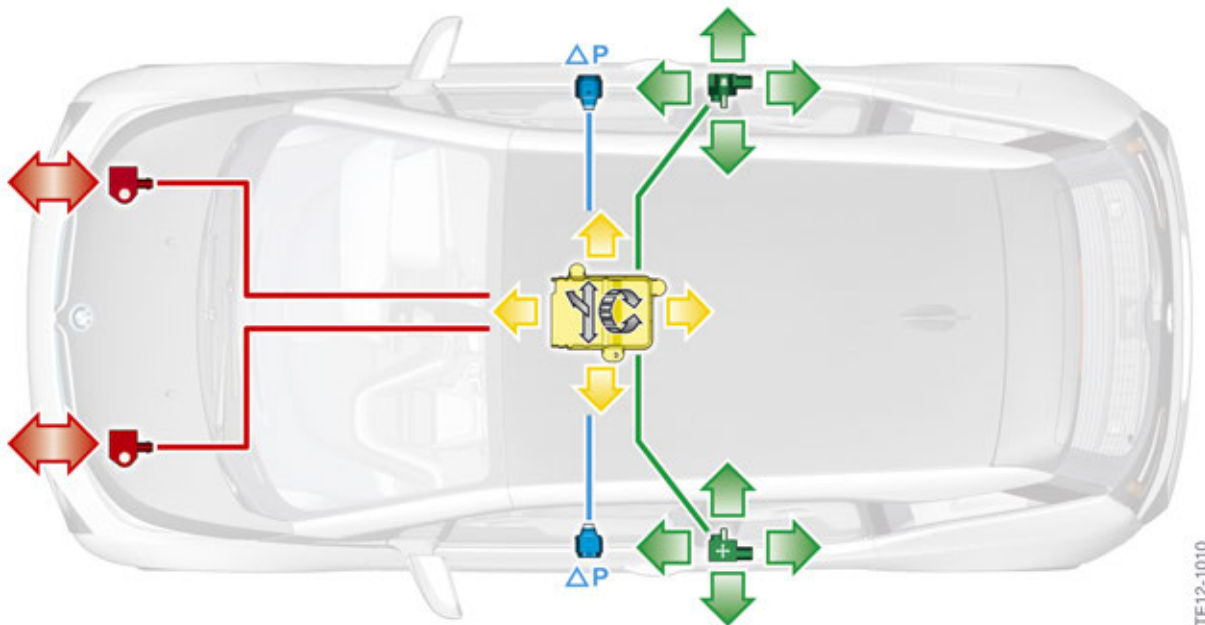
- one lateral and one longitudinal acceleration sensor in the rear doors (green)
- one airbag sensor to monitor the pressure in each of the front doors (blue)
- one lateral and one longitudinal acceleration sensor in the ACSM (yellow)
- one yaw rate sensor in the ACSM (yellow)
- one vertical acceleration sensor in the ACSM (yellow)
- one airbag front sensor beside each headlight (red).

The airbag sensors in the car doors assist with the identification of a side-on crash.

The airbag front sensors assist with the identification of a head-on crash and the corresponding severity.

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3. Functions



I01 Sensors in US version of vehicles

3.2.3. Trigger time and trigger sequence

The ACSM uses the values transmitted by the sensors to determine the direction and severity of the crash.

In the case of a head-on crash, corresponding high acceleration values from the longitudinal acceleration sensors in the rear doors and ACSM respectively must be detected for example. An algorithm determines the severity and direction of the crash based on the accelerations. This information is used to assist calculation of the trigger times and sequence in which the restraint systems are activated.

A possible imminent rollover is also detected and the appropriate protection systems are energized.

3.2.4. Activation of the ignition circuit output stages

The ACSM is supplied in the BDC with terminal 30B. The ACSM is in offline mode with terminal 30B. This means that it is active on the data bus and can perform all diagnostic functions. Triggering of the ignition circuits is blocked and is only enabled as of terminal 15 once the system self-test is complete. The ACSM is also ready for ignition, even with the logical terminal R.

The ignition capacitors are recharged via a switching controller. These ignition capacitors make the firing energy available in the event of a crash. If the voltage supply is interrupted during a crash, the ignition capacitors serve briefly as an energy reserve.

The ignition circuit output stages consist of a high-side and a low-side power switch. The high-side power switch connects the ignition voltage, while the low-side power switch connects to the ground. The ignition circuit output stages are controlled by a microcontroller.

The high-side and low-side power switches also serve to check the ignition circuits during the system self-test.

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3. Functions

3.2.5. Sending the crash message

In the event of a collision involving activation of the restraint systems, the ACSM sends a crash message to the bus users in the data bus network.

The activation of the Telematic Communication Box (TCB) is effected parallel via a direct single-wire connection.

The activation of the range extender electrical machine electronics (REME) and the electrical machine electronics (EME) is effected by an additional direct two-wire connection.

As a result, the respective control units perform the following functions depending on the crash severity:

Function	Control unit
Unlock central locking system	Body Domain Controller
Switch on hazard warning flashers	Body Domain Controller
Switch on interior light	Body Domain Controller
Transmit emergency call	Telematic Communication Box
Switch off high-voltage system	Electric motor electronics
Switch off electrical machine of the range extender	Range extender electrical machine electronics

3.2.6. Crash documentation

In the event of a collision where one or more actuators are activated, a crash entry is stored in a non-erasable memory. After five crash entries, a non-erasable fault entry is stored in the fault code entry together with the information that the five crash messages have been saved. The airbag indicator light also lights up continuously.



The five crash entries could also be stored during the course of an accident. Each crash entry is assigned a system time. The control unit remains ignitable even after five crash entries. The crash entries cannot be erased and serve the purpose of subsequent device diagnosis. After the fifth crash entree, the control unit must be replaced.

3.2.7. Emergency call function

The emergency call functions are available with ConnectedDrive Services. This means an appropriate service provider with a call center must be available. A telephone network must also be available in order to be able to make an emergency call.

Manual emergency call

Drivers who are not directly involved in the accident can use the manual emergency call to request assistance.

The emergency call button is located in the roof function center and is connected to the TCB directly.

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3. Functions

Voice contact with the relevant service provider for the country is established by pressing the emergency call button. The voice contact is indicated by a flashing LED in the switch.

Automatic emergency call

The ACSM sends a message to the TCB in the event of an accident with corresponding crash severity. The TCB sends an emergency call, and also the location of the vehicle if available.

Attempts are made at the same time to establish a voice contact with the occupants of the vehicle in order to obtain more detailed verbal information about the accident (e.g. condition of occupants). Further rescue operations can be initiated accordingly.

3.3. System monitoring functions

The ACSM has the following system monitoring functions:

- System self-test (pre-drive check)
- Display of system operability
- Cyclic monitoring
- Fault display and fault storage
- Output of faults (diagnosis)
- Acoustic and visual seat belt warning
- Deactivation of the front passenger airbag and side airbag and knee airbag .

3.3.1. System self test

The ACSM performs a system self test from terminal 15. The airbag indicator light is energized for roughly five seconds during the system self test.

Once the system self test is complete and no faults have been identified, the airbag indicator light goes out and the system is ready to operate.

3.3.2. Display of system operability

The airbag indicator light in the instrument cluster goes out to indicate that the ACSM is ready for operation.

3.3.3. Cyclic monitoring

Once the system self-test has been successfully concluded and the system is ready for operation, a cyclic monitoring procedure is performed for fault monitoring purposes. This monitoring serves the internal diagnosis of the control unit and overall airbag system. Monitoring takes place continuously from terminal 15. It is also continued when the logical terminal R is reached.

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3. Functions

3.3.4. Fault display and fault storage

The ACSM has a non-volatile fault memory. The airbag indicator light lights up to indicate a fault entry. Events, such as the activation of an airbag or automatic tensioner, are also stored in the fault memory.



If the fault memory contains the entry that the restraint system has been activated, this only means the ignited restraint system is not available for further activation and not that it malfunctioned during the crash.

3.3.5. Output of faults (diagnosis)

The fault memory can be read out via the diagnostic interface with the assistance of the Integrated Service Technical Application (ISTA) in the BMW diagnosis system. After repairing the faults or after renewing activated components, the fault memory can be cleared with the diagnosis command "Clear fault memory".

3.3.6. Acoustic and visual seat belt warning

An acoustic and visual seat belt warning is a standard feature of all vehicles equipped with the ACSM. The ACSM records whether or not the driver or front passenger have fastened their seat belts. If they have not, an acoustic and visual warning is output to remind them to fasten their seat belts. Both seat belt buckle switches are monitored separately.

I01 Passive Safety System

3. Functions

3.3.7. Deactivating the airbag

CIS seat mat

The airbag is deactivated automatically in order to satisfy the regulations of the National Highway Traffic Safety Administration (NHTSA). When the child seats listed in the regulation are occupied by a child this must lead to deactivation of the airbag.

A seat occupancy mat is used on the front passenger seat for the purpose of occupancy detection and classification of occupants in the front passenger seat. In the I01 a capacitive interior sensing floor mat (CIS floor mat) is used.

The CIS mat is made up of two elements: A sensor wire, which runs parallel to the seat heating in the seat cushion and an evaluation unit. The CIS mat measures the capacity and ohmic resistance between the sensor wire (anode) and the vehicle ground (cathode) at a frequency of 120 kHz. The CIS mat determines from the change in capacity and resistance whether the front passenger seat is occupied by an adult or a child in a child seat.

The deactivation of the front passenger airbag, the side airbag and knee airbag on the front passenger side is signalled by the indicator lamp for front passenger airbag deactivation.

The indicator lamp for front passenger airbag deactivation in the roof function center lights up if a child seat with child for e.g. a child restraint system that has been tested in accordance with the NHTSA regulations and is holding a small child was detected on the front passenger seat or if the front passenger seat is unoccupied.

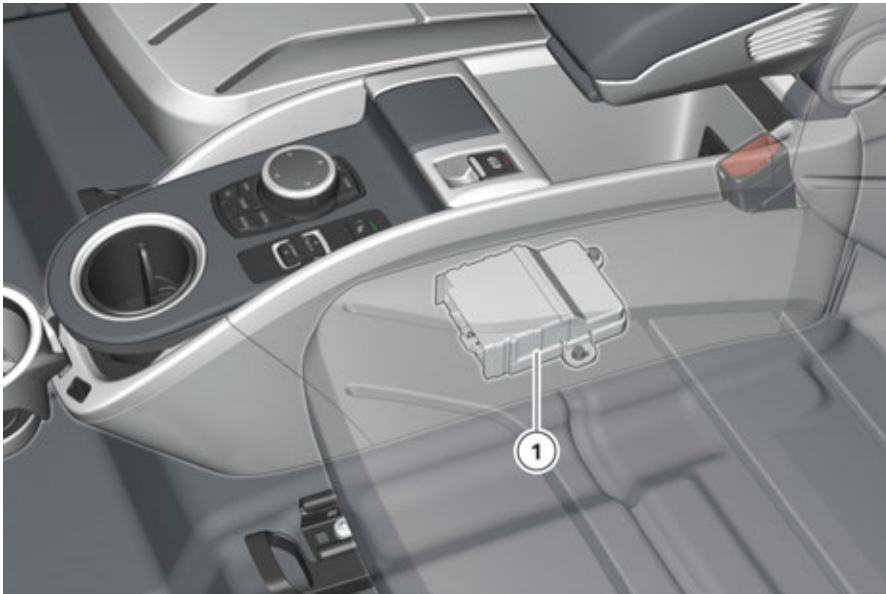
The display brightness is controlled by automatic regulation of the display illumination.

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4. System Components

4.1. Advanced Crash Safety Module

The ACSM is located in the center console.



I01 ACSM location

Index	Explanation
1	ACSM control unit

Thanks to the central location of the ACSM the central sensor system which was previously housed in the ICM was able to be integrated in the ACSM.

4.2. Sensors and switches

The following sensors and switches are installed:

- Lateral and longitudinal acceleration sensors in ACSM
- Yaw rate sensor in the ACSM
- Vertical acceleration sensor in the ACSM
- Sensors for lateral and longitudinal acceleration in the rear doors
- One airbag sensor in each of the front doors for pressure
- One upfront sensor beside both headlights
- CIS mat with occupant classification
- Seat belt buckle switch
- Seat-position sensor, driver's side
- Seat-position sensor, front passenger
- Emergency call button

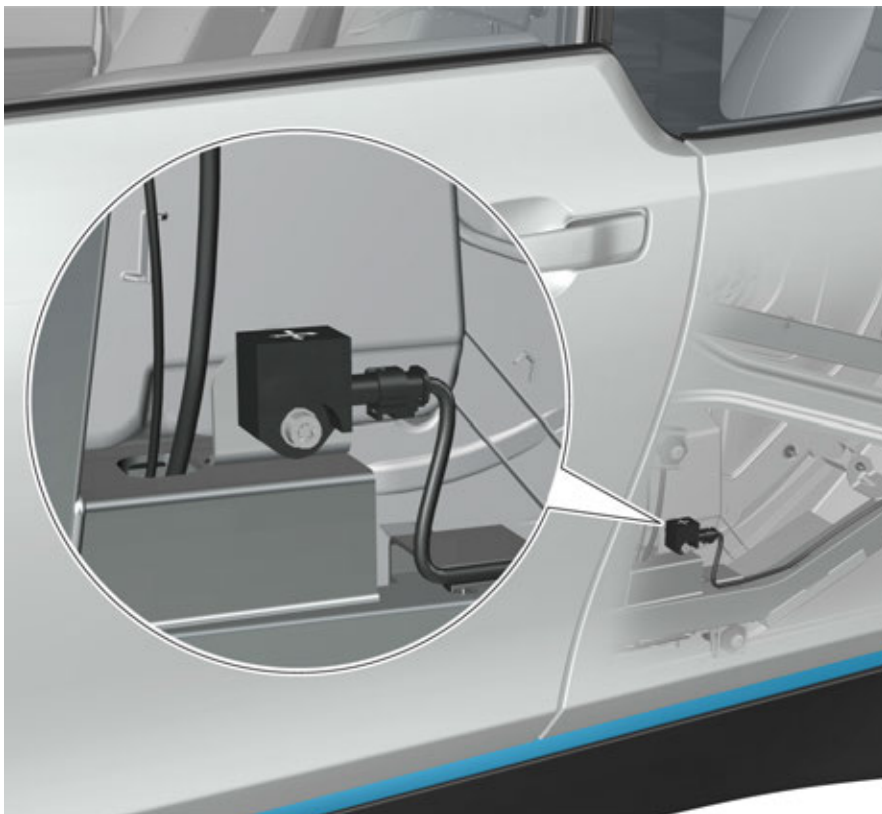
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4. System Components

4.2.1. Lateral and longitudinal acceleration sensors, rear door

The lateral and longitudinal acceleration sensors in the rear doors assist with the identification of head-on crashes, side-on crashes and rear-end crashes.

The rear door airbag sensor consists of a longitudinal acceleration sensor and a lateral acceleration sensor. The acceleration sensors measure both the acceleration and the deceleration in the X and Y directions. The resultant from the X and Y signals is decisive in identifying the direction of the crash. The airbag sensors in the rear doors assist with the identification of head-on, side-on and rear-end crashes. The rear door airbag sensors on the left and right are of identical design and are allocated by way of mechanical coding during installation.



I01 lateral and longitudinal acceleration sensors in the rear door

4.2.2. Door airbag sensor (pressure)

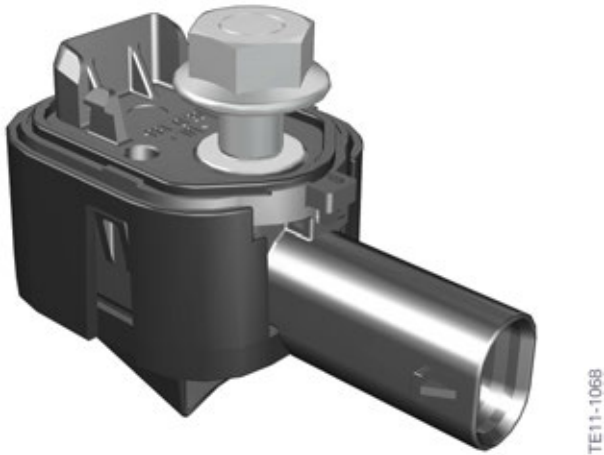
Pressure sensors are installed in the driver and front passenger doors. Side crashes are identified with the assistance of the airbag sensors. In addition to the lateral acceleration values that are present, the pressure in the door cavity also increases in the event of a side-on crash.

The airbag sensors in the doors serve to verify the plausibility of the acceleration signals from the rear door airbag sensors and the ACSM when a side crash is detected. The airbag sensors are situated in the inner panel of the doors and measure the increase in pressure in the event of a side collision. In the event of a side collision with the door, the outer skin is pressed inward, thus reducing the door interior and increasing the inner pressure. This pressure change is measured by the airbag sensors. The

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4. System Components

airbag sensor also includes electronics, in addition to the pressure sensor, that digitize the pressure readings and transmit them to the ACSM. The data transfer is effected analogue to the airbag sensors in the rear doors. The pressure readings are evaluated in the ACSM.



I01 Door airbag sensor (pressure)

4.2.3. Front sensor

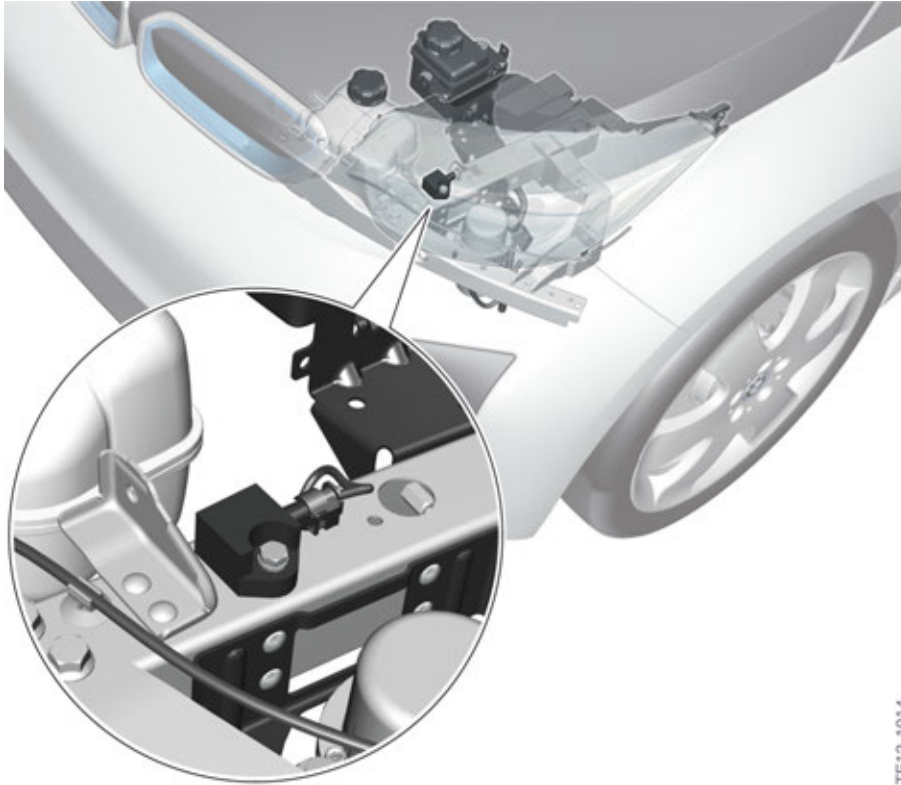
Two airbag front sensors are installed beside the headlights. The measured values are forwarded to the ACSM where they are evaluated.

The airbag front sensors on the left and right assist with the identification of a head-on crash.

They deliver additional information to the ACSM on the characteristics and severity of the collision. Each sensor contains an acceleration sensor for recording the deceleration, signal processing technology and electronics for data transfer. The measured values are sent in the form of a message to the ACSM and are used in the calculation of the algorithm.

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4. System Components



I01 Front sensor

4.2.4. Sensors in the ACSM

In the I01 the central sensor system is integrated in the ACSM control unit. The ACSM contains a longitudinal and lateral acceleration sensor, a vertical acceleration sensor and a yaw rate sensor for impact detection. The ACSM also includes a longitudinal and lateral acceleration sensor and a yaw sensor for the driving dynamics control.

The sensor data for impact detection are evaluated in the ACSM and helps identify side-on, rear-end or head-on crashes and assists with roll-over detection. The sensor data not yet evaluated for the driving dynamics control is sent to the DSC control unit via FlexRay, where it is processed.

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4. System Components



I01 ACSM

Index	Explanation
1	ACSM control unit

4.2.5. CIS mat

The capacitive interior sensing mat (CIS mat) is fitted in the front passenger seat instead of the seat occupancy mat. The CIS mat can detect whether the front passenger seat is occupied by an adult or a child in a child seat. The deactivation of the front passenger airbag and side airbag and knee airbag on the front passenger side is signalled by the indicator lamp for front passenger airbag deactivation.

4.2.6. Seat belt buckle switch

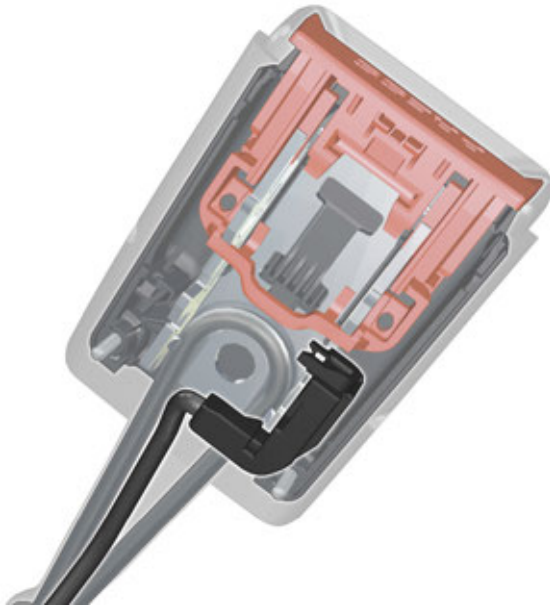
The seat belt buckle switches are located in the seat belt buckles of the driver and front passenger seat.

The seat belt buckle switch detects whether the seat belt buckle tongue is in the seat belt buckle. The ACSM supplies power to the sensors and performs the evaluation.

From terminal 15, the seat belt buckle switch is permanently monitored and used for the visual and acoustic seat belt warning and also to determine which restraint systems are triggered.

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4. System Components



TE13-0282

I01 Seat belt buckle switch

4.2.7. Emergency call button

The emergency call button is located in the roof function center.



TE12-1049

I01 Roof function center with emergency call button

4.2.8. Seat-position sensors

The job of the seat-position detector is to distinguish between a relatively small person and a person of normal height within the lengthways adjustment range of the seat. This detection is another technical feature aimed at increasing the safety of the occupants. The deployment of the three airbag stages is then adjusted to the driver's/front passenger's seat position.

The seat-position detector takes the form of a 2-wire hall effect sensor and is supplied with power via the ACSM control unit. The current level of the seat-position sensor changes depending on the seat position.

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4. System Components

4.3. Actuators

4.3.1. Overview

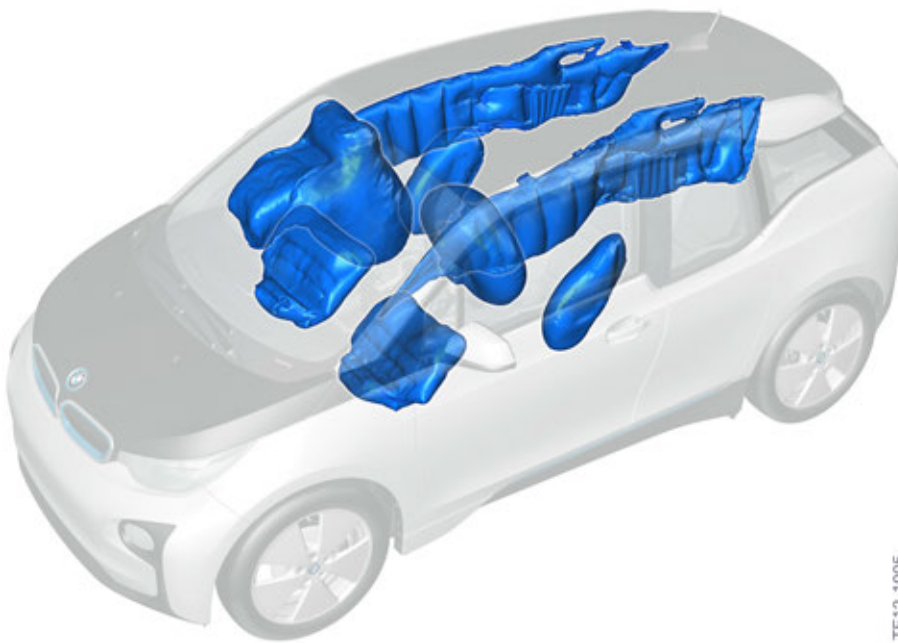
The following actuators are installed in the I01:

- Two-stage driver's airbag
- Two-stage driver's airbag with active vent valve
- Knee airbag on front left and right
- Head airbag on left and right
- Side airbag on front left and right
- Automatic tensioner with adaptive force limiter
- Safety battery terminal.

In addition, the following indicator lights inform the vehicle occupants about the condition of the safety systems:

- Airbag indicator light
- Seat belt warning light
- Indicator lamp for front passenger airbag deactivation.

The following graphic shows the airbags in the activated state. Depending on the type of crash, only certain airbags are activated.



TE12-1005

I01 Airbags

The familiar three-point seat belts are used as the seat belt systems for all seats in the I01.

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4. System Components



I01 Seat belt

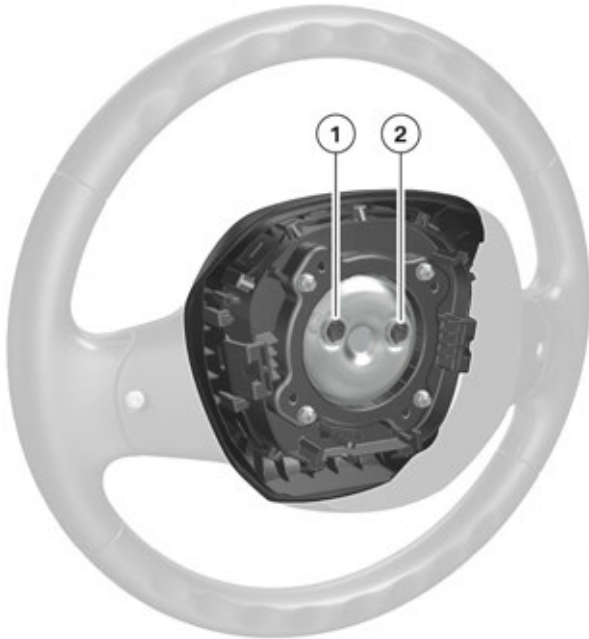
Index	Explanation
1	Seat belt buckle
2	Automatic tensioner

4.3.2. Driver's airbag

A two-stage generator is used to activate the stages at short or long time differences, depending on the severity of the crash detected and taking into consideration the seat position.

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4. System Components



I01 Driver's airbag

Index	Explanation
1	Ignition circuit, stage 1
2	Ignition circuit, stage 2

4.3.3. Front passenger airbag

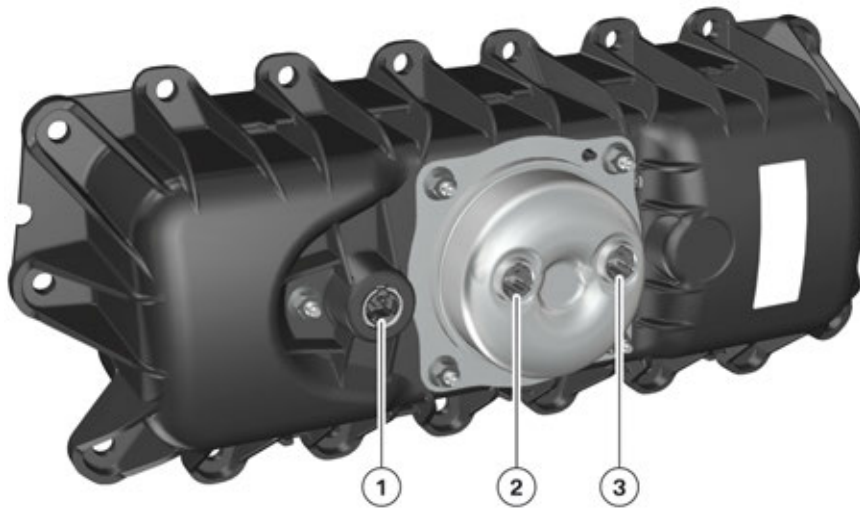
The purpose of the front passenger airbag is to reduce the risk of accident to the front passenger in the event of a front-end crash. The front passenger airbag is located in the dashboard. When the front passenger airbag expands, the dashboard tears open at defined points. The front passenger airbag of the I01 is not supported at the windshield like in other BMW vehicles, but only at the dashboard.

A two-stage generator is used to activate the stages at short or long time differences, depending on the severity of the crash detected and taking into consideration the seat position.

The front passenger airbag features an active vent valve.

I01 Passive Safety System

4. System Components



I01 Front passenger airbag

Index	Explanation
1	Ignition circuit for active vent valve
2	Ignition circuit, stage 1
3	Ignition circuit, stage 2

4.3.4. Knee airbag

A knee airbag is also required on the driver's side and front passenger side to control the forwards displacement of the occupant(s) in the event of a front-end crash.



I01 Knee airbag

I01 Passive Safety System

4. System Components

4.3.5. Head airbag

Head airbags are installed in the I01 to protect the occupants' heads in the event of a side collision.

The head airbag extends from the A-pillar to the C-pillar and covers the entire area of the side windows. It expands between the occupants and side structure.

System features:

- Extended covered area across all front and rear side windows
- Protection of occupants from glass splinters
- Covered area for different-sized occupants optimized.



I01 Head airbag

4.3.6. Side airbag

As with all current models, the side airbag at the front ignites out of the front seat backrest.

The side airbags and gas generators are in a plastic housing, the airbag module. This is installed in the front seat backrest and is concealed by the seat cover.

If activated, the side airbag emerges outwards from the backrest frame and spreads between the side structure and occupant.



It is important to ensure that no additional seat covers are fitted as they would greatly impair the function of the side airbag, or even immobilize it altogether.

I01 Passive Safety System

4. System Components



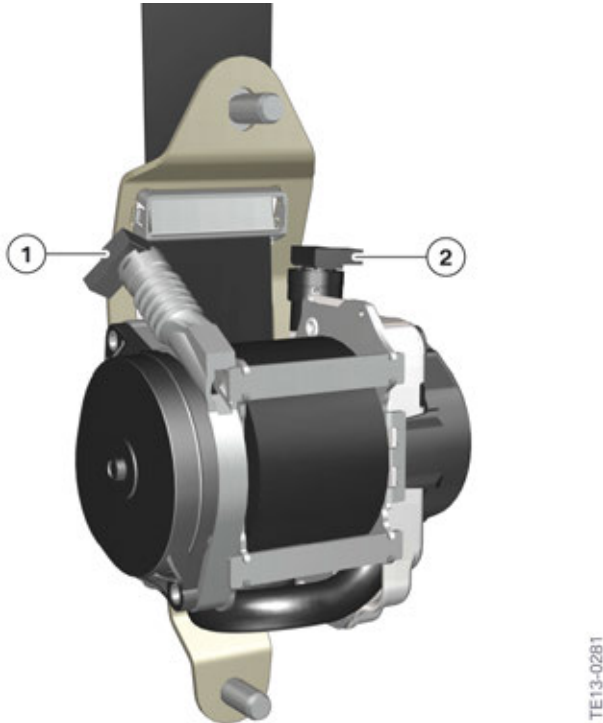
I01 Seat with side airbag

Index	Explanation
1	Side airbag

I01 Passive Safety System

4. System Components

4.3.7. Automatic tensioner with adaptive force limiter



I01 Automatic tensioner with adaptive force limiter

Index	Explanation
1	Connection of ignition circuit, automatic tensioner
2	Connection of ignition circuit, adaptive force limiter

An automatic tensioner with adaptive force limiter for the driver and front passenger is used. The gas generator-assisted automatic tensioner ensures that the seat belt strap is reeled in to reduce belt slack prior to forwards displacement of the occupants.

The adaptive force limiter switches from a high level force to a low level force depending on the position of the seat with the assistance of a gas generator in order to reduce the retaining force of the seat belt during the crash depending on the size of the occupant. The further forward the seat is, the earlier the changeover takes place.

When properly timed with the airbag, it ensures the kinetic energy acting on the occupants is more evenly dissipated for the duration of the head-on collision.

4.3.8. Safety battery terminal

The safety battery terminal is triggered at different thresholds when the ACSM detects a front-end, side-on or rear-end crash of sufficient severity. The following lines are separated pyrotechnically:

I01 Passive Safety System

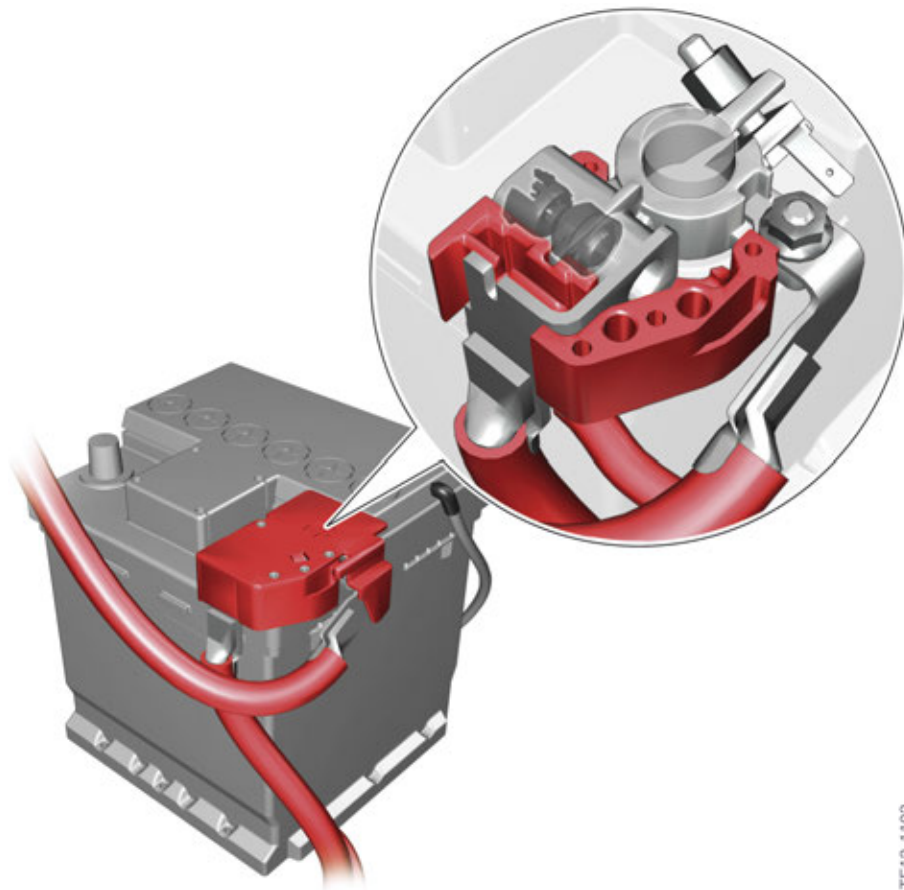
4. System Components

- Battery positive wire for the electrical machine electronics (EME)
- Battery positive wire for the integrated supply module (in vehicles with range extender)
- Terminal 30C for battery management electronics (SME).

In the event of a missing signal from terminal 30C, the SME performs a quick shut-down of the high-voltage system.

The safety battery terminal is located directly at the positive terminal of the battery. The safety battery terminal is encased completely in plastic so that in the event of separation no sparks get outside the case.

Even though the safety battery terminal has been disconnected, a voltage supply to all safety-relevant consumers such as hazard warning flashers, interior light, airbag and telephone (including emergency call) is ensured.



I01 Safety battery terminal

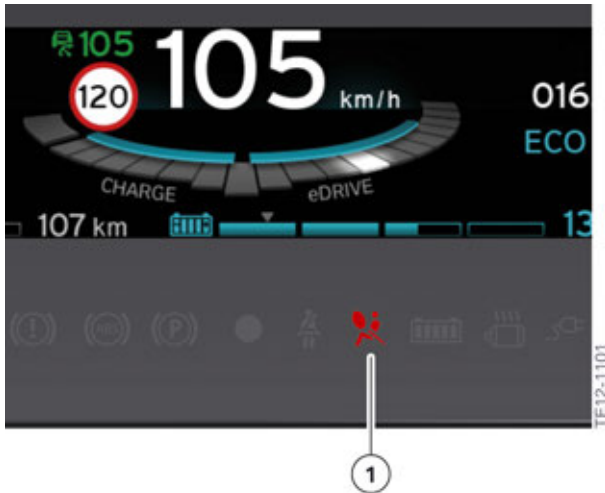
TE12-1102

I01 Passive Safety System

4. System Components

4.3.9. Airbag indicator light

The airbag indicator light is located on the instrument panel. The airbag indicator light lights up then goes out during the pre-drive check to signal readiness of the ACSM and passive safety systems. The airbag indicator light is controlled by a message on the FlexRay from the ACSM via the BDC to the instrument cluster. The instrument panel receives a message cyclically. If the message remains off, the airbag indicator light is activated.

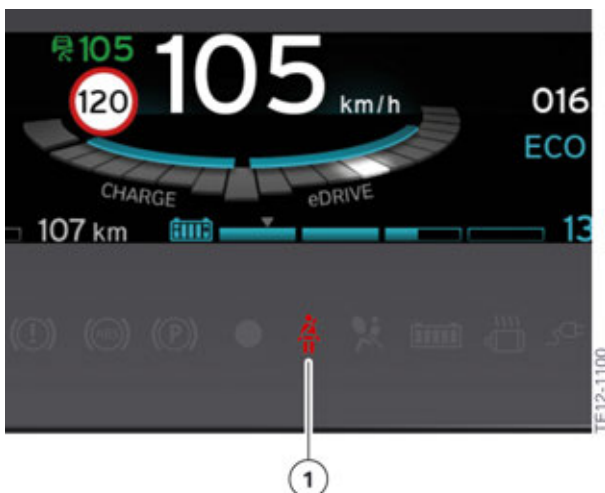


I01 Airbag indicator light

Index	Explanation
1	Airbag indicator light

4.3.10. Seat belt warning light

A visual and audible warning is issued if the seat belt is not fastened or is unbuckled during the journey.



I01 Seat belt warning light

I01 Passive Safety System

4. System Components

Index	Explanation
1	Seat belt warning light

4.3.11. Indicator lamp for front passenger airbag deactivation

The indicator lamp for front passenger airbag deactivation in the I01 is in the roof function center. The indicator lamp for front passenger airbag deactivation is automatically activated if the CIS mat detects a small child in a child seat or if the front passenger seat is unoccupied.

The brightness of the indicator lamp for front passenger airbag deactivation is controlled via the automatic brightness control of the display illumination.



I01 Roof function center with indicator lamp for front passenger airbag deactivation



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