



# Guidelines for Rescue Services Passenger Cars

Mercedes-Benz • Maybach • smart

Mercedes-Benz



# Guidelines for Rescue Services Passenger Cars

Mercedes-Benz • Maybach • McLaren • smart

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Changes compared to 10/2007 issue

**!** Observe modification notes

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### Dear Reader,

One of Daimler's main priorities has traditionally been to guarantee the highest possible standards of safety.

For this reason our vehicles always represent the state of the art. And this is especially true for vehicle safety.

Our safety concept is as comprehensive as possible and also extends to providing rescue crews with specific information about our vehicles and their safety systems.

The top priority of the rescue crew is to save lives. The rescue team must be able to gain access to the accident victims as quickly as possible without exposing them or themselves to additional danger.

In order to do this, the rescue services must be properly trained. In addition, knowledge of vehicle-specific accessibility options and of the function and operation of the safety systems is absolutely essential.

Mercedes-Benz has been providing this information in its "Guidelines for Rescue Services" since March 1994. The guidelines have been revised regularly ever since.

The constant development of our vehicles, particularly in the field of vehicle safety, and the expansion of our product range have necessitated another update.

These guidelines contain several methods for rescuing accident victims from a vehicle. We must emphasize, however, that these guidelines cannot claim to be exhaustive and on no account should they, nor are they intended to, act as a substitute for proper specialist training and the relevant specialized literature.

The new passenger car vehicle models have been added to these guidelines, which also include up-to-date information on occupant restraint systems, passive and active safety systems and new materials.

For their helpful cooperation we should like to extend our warmest gratitude to our company fire brigades at the Untertürkheim and Mettingen plants, to the Stuttgart Fire Service, to our accident research department, to our development department, to our company medical services at Sindelfingen, Mettingen and Untertürkheim, and to everybody else involved.

The photographs were taken while performing cutting tests on vehicles of various model series as well as during an exercise series "Technical assistance for passenger cars, patient-suitable rescue" of the plant firefighting department at Daimler Sindelfingen, Germany.

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## Proper casualty rescue

Whereas formerly priority was given to quickly rescuing the trapped accident victims from their predicament, the primary concern nowadays is medical and psychological assistance. The aim of this is to prepare the casualty as well as possible for the rescue work.

The medical and rescue personnel can then work in concert to free the casualty from the vehicle.

### The most important immediate measures at the scene of accident are:

- Maintaining or restoring the vital functions (respiration/circulation)
- Keeping the respiratory passages clear and rectifying any breathing difficulties
- Assessing shock and initiating measures to stabilize the casualty
- Rendering psychological support to the casualty
- Treating life-threatening injuries
- Stopping major bleeding
- Immobilizing certain body parts

### Immobilizing the neck

As the head often experiences extreme movements in traffic accidents, there is an increased risk of spinal injury in the neck region. To prevent further damage to the cervical vertebrae, it is essential to immobilize the neck before any further rescue action is undertaken. A cervical collar ("Stifnek") is usually used for this purpose. It consists of a piece of plastic which is placed around the neck and fastened in place with a Velcro fastener.

If access to the casualty is difficult, the head restraint can be removed first before fitting the cervical collar.

**i** The main priority is to render medical and psychological aid to the casualty!

**i** However, the safety of the medical and rescue crews themselves should not be neglected!

- Wear protective clothing
- Wear eye protection
- Wear protective mouth mask
- Secure the accident vehicle

**i** Head restraints should only be removed by cutting them off in exceptional cases and in consultation with the emergency physician.

- Cutting off the head restraints exposes the casualty to additional movements
- The head restraint can no longer be used to stabilize the casualty's head
- Cutting off the head restraints can cause sharp edges

**Extinguish fires in accordance with the guidelines of the professional fire services.**

### Body:

Magnesium is increasingly being used in safety-relevant reinforcement structures in the body. Thus, e.g. the inner door panels on the S-Class Coupé (model 215) and SL-Class roadster (model 230) are made of magnesium.

**i** Magnesium is a Class D flammable material according to the European "Flammable materials of various kinds" EN2 standard!

### Vehicles with fuel-cell drive:

Vehicles with a fuel-cell drive (A-Class, F-cell) are equipped with hydrogen tanks. On these vehicles the guidelines on extinguishing gas fires, in particular, must be observed.

**i** Hydrogen (H<sub>2</sub>) is a Class C flammable material according to the European "Flammable materials of various kinds" EN2 standard.

### Vehicles with gasoline and natural gas drives:

In the E-Class sedan (model 211) E 200 NGT and in the B-Class (model 245) B170 NGT BlueEFFICIENCY, engines are used that can be operated with either gasoline or natural gas.

A comprehensive series of tests have shown that the high-strength tanks, lines, threaded connections and other equipment also provide the greatest possible safety in the event of an accident.

The location of the components ensures that the natural gas does not enter the vehicle interior.

The danger of fire is no greater in natural gas vehicles than in gasoline or diesel-powered vehicles.

**i** Natural gas is a Class C flammable material according to the European "Flammable materials of various kinds" EN2 standard!

## Extinguishing vehicle fires

### Restraint systems:

In the event of a fire breaking out in the vehicle interior, the front, side and head/thorax sidebag gas generators or pyrotechnical emergency tensioning retractors may be triggered.

Gas generators are designed to ignite as soon as the temperature inside the gas generator reaches 160-180 °C. In such cases the ignition squib and the solid fuel burn without destroying the gas generator. During combustion a specific volume of gas is released at a specific pressure.

**i** If the front, side and head/thorax sidebags as well as the emergency tensioning retractors are triggered the corresponding component will burn in a controlled manner and not explode.

### Windowbags

The gas generators of the windowbags are filled not with solid fuel, but with compressed gas.

**!** The compressed gas generators of the windowbags must not be cut, as otherwise the compressed gas may suddenly escape!

**!** Before cutting the corresponding body panels the inner paneling of the A, B or C-pillars must be removed using a suitable tool and the exact installation location of the gas generators determined!

⚠ Risk of injury	Measures
<p><b>Electrolyte fluid</b> may escape if the <b>mirror glass is broken</b>. This fluid acts as an <b>irritant</b> and must not be allowed to come into contact with the <b>skin, eyes or respiratory organs</b>.</p>	<p>If it comes into contact with the skin or eyes, <b>immediately rinse off the fluid with generous amount of clean water</b>. Seek medical attention if necessary.</p>

### Automatic dimming mirror:

The inside rearview mirrors and outside mirrors of the following vehicles contain an electrolyte fluid for automatic dimming: C-Class (model 204), CLK-Class (model 209), E-Class (model 211), CLS-Class (model 219) S-Class (model 221) CL-Class (model 216), SL-Class (model 230) and Maybach (model 240).

Vehicles of other model series may also be fitted with automatic dimming mirrors as special equipment (SA).



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## Body

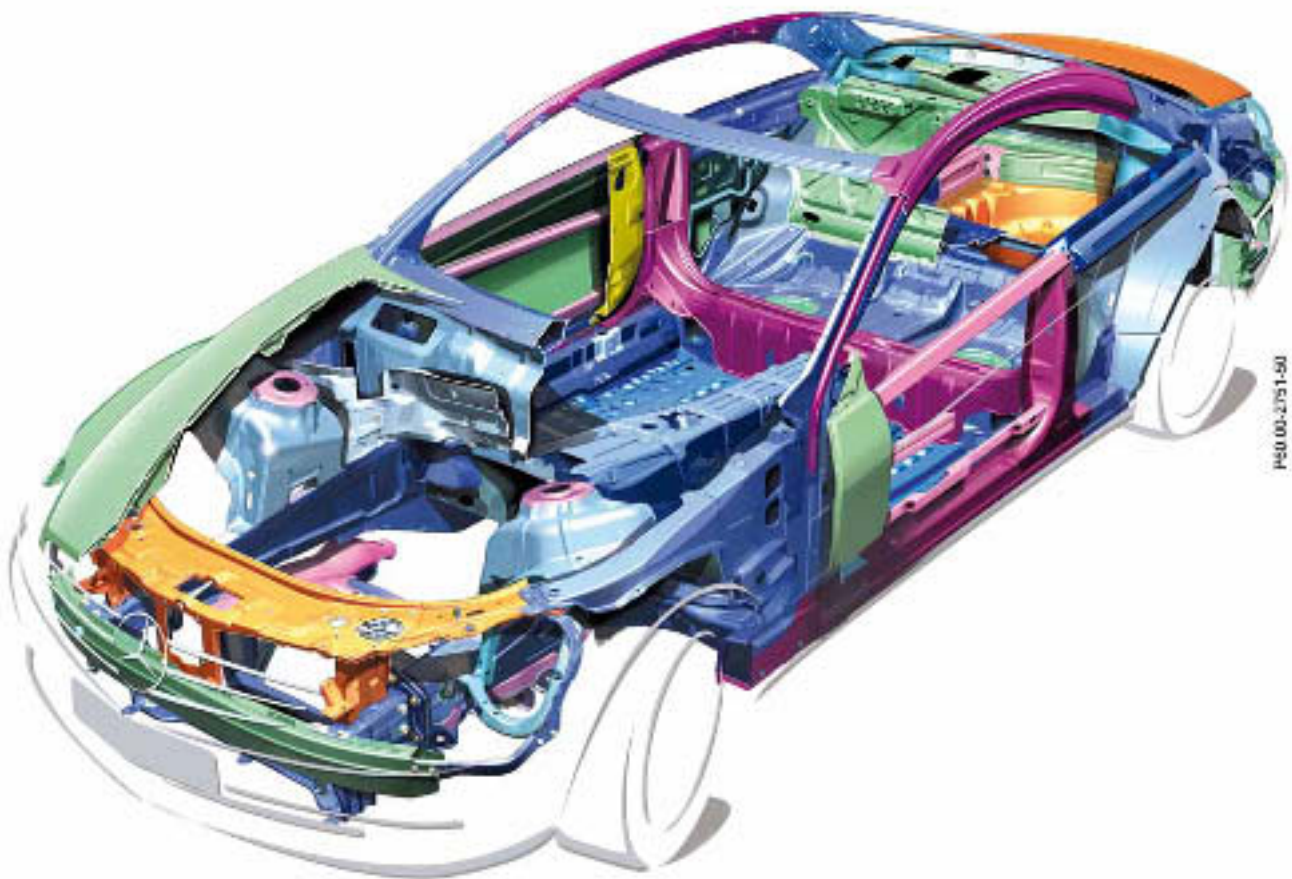
### Mercedes-Benz bodyshell

Materials overview, example shows CL-Class (model 216):

- A Low-carbon steels
- B High-strength steels
- C Modern high-strength steels
- D Ultrahigh-strength steel, hot worked (e.g. Usibor)
- E Aluminum
- F Plastic
- G Die-cast magnesium

The type and percentage content of the respective materials in a particular vehicle depends on the model series.

Structural reinforcements in the A-pillars and B-pillars are predominantly installed in coupés, convertibles and roadsters because these parts must be particularly strong on these types of vehicles.



CL-Class bodyshell (model 216)

### Maybach bodyshell

The Maybach is a large vehicle which is designed to be very comfortable. The bodyshell of the Maybach must therefore fulfill particularly tough requirements in terms of rigidity, strength, acoustics and vibrational characteristics. For this reason, the bodyshell technology used in the Maybach is different to that used in the current Mercedes-Benz passenger car model series in a number of aspects e.g. more increased-strength steel is used.

The following bodyshell components are made of aluminum to reduce the weight of the vehicle:

- Roof
- Front fenders
- Engine hood
- Doors

The spare tire well and trunk lid are made of plastic.

The proportions of the materials used are listed below:

Bodyshell material	Proportion %
Normal deep-drawn panel	39.5
Increased-strength sheet steel	37.8
Aluminum and aluminum alloys	17.0
Plastics	13.2
Other materials	12.5



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*Bodyshell of Maybach 62 with partition wall (model 240)*



## Body

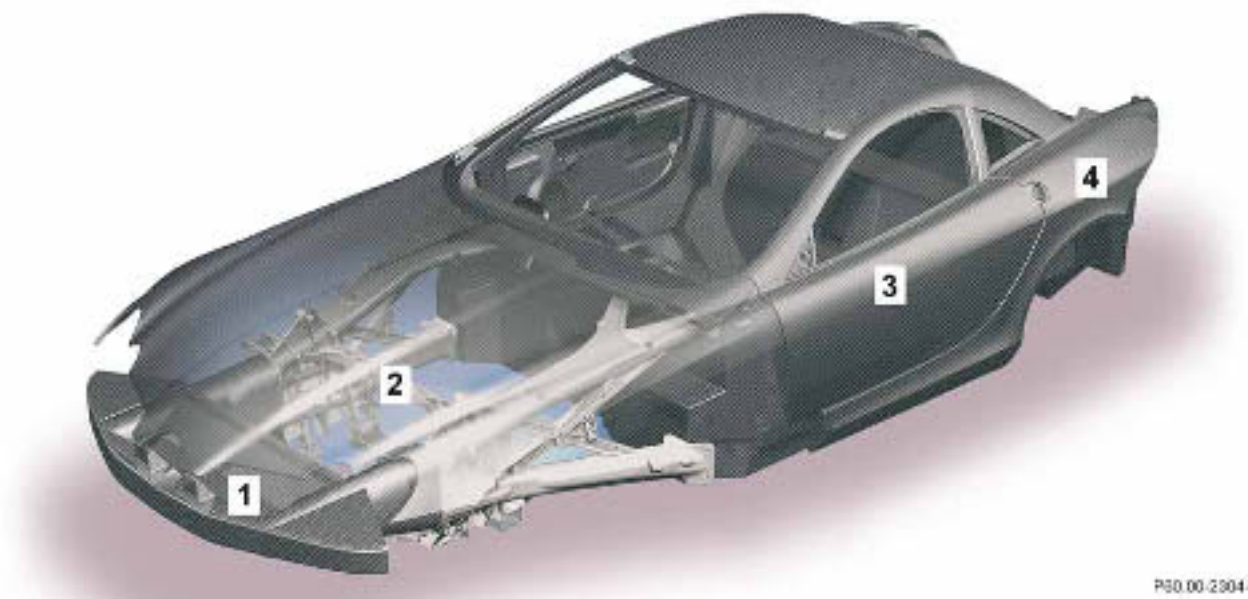
### Bodyshell SLR McLaren and SLR McLaren Body

The SLR's vehicle structure consists of four main sections:

- Front crash structure (1)
- Front frame (2)
- Monocoque (3)
- Luggage compartment cell (4)

The body-in-white, with the exception of the front frame, doors and hoods on the SLR are made of corrosion-resistant **carbon fiber composite material**.

In the SLR McLaren roadster, the A-pillars are reinforced with a pipe made of high-strength steel.



Vehicle structure for SLR McLaren (model 199)



Vehicle structure for SLR McLaren roadster (model

## Front crash structure

The front crash structure made of carbon fiber composite material is bolted to the front frame using the two tubular energy absorption elements.

The crash absorbers are designed such that they convert impact energy through the continuous breakdown of the fiber composite structure from the front to the rear into smaller particulate matter, thereby causing a controlled, mostly constant deceleration.

## Monocoque

The passenger compartment and the fuel tank are surrounded by a safety cell (monocoque). This safety cell is made of carbon fiber composite material. The monocoque consist of several components:

- Hull with integrated engine-transmission-tunnel
- Differential supporting frame
- Door sill
- Single-piece soft top frame with roll-over protection

## Front frame

The front frame is made of two separate high-strength aluminum box sections, bolted at the left and right to the monocoque, to which the engine is mounted.

The following components are also mounted onto the front frame next along with the engine:

- Radiator
- Front suspension
- Stabilizer
- Exhaust muffler
- Steering
- Front crash structure

## Luggage compartment cell

As with the front frame, the luggage compartment cell is also bolted to the monocoque. The rear area contains the following components:

- Battery mounting
- Interior ventilation
- Cooler for differential
- Trunk
- Rear suspension

The luggage compartment cell has been designed such that in the event of any rear end collision, the acting energy is then mainly absorbed.

### Note

On the strength of past experience, vehicle structures made of carbon fiber composite material can be separated or deformed using the usual rescue equipment. The pendulum jigsaw is ideally suited for cutting carbon fiber parts.

## Body

### smart bodyshell

Materials overview, example shows smart fortwo (model 451)

The bodyshell structure of the new model series 451 exhibits the following features:

- Tridion safety cell with high-strength steels
- Light alloy detachable parts
- Front CMS (Crash Management System)
- Rear CMS
- Pedestrian protection

#### **Silver areas:**

The silver areas consist of soft deep-drawing steel of normal strength.

#### **Red areas:**

The red areas consist of micro-alloyed high-strength steels.



*smart fortwo coupé (model 451)*

## smart bodyshell

### Green areas (cabriolet only):

The green area consists of a martensite-phase steel, which is particularly high-strength and torsionally stiff.

This steel is only installed on the cabriolet in the window columns of the A-pillars.



*smart fortwo cabrio (model 451)*

## Securing and supporting



### Risk of injury

**Unintended movements** of the bodywork during rescue operations may cause further **injury** to the accident victims.

### Measures

**To prevent dangerous movements from occurring while rescuing the victims, the vehicles involved should first be secured.**

On arrival at the scene of the accident, the first priority of the rescue crew should be to ascertain and assess the condition of the casualties.

If possible, proper rescue of the occupants should only be undertaken when the vehicle has been sufficiently secured and, if possible, in consultation with the emergency physician (does not apply to emergency crash rescue!)

Trapped casualties are in direct physical contact with the accident vehicle. Therefore the supports must guarantee that the vehicle cannot move during the subsequent rescue operations. The vehicle can be lifted using a spreader to create sufficient space for underfloor sliding blocks or wooden blocks.

The support must remain secure throughout the entire duration of the rescue operation and must be able to withstand the use of hydraulic equipment.

The tires should not be punctured nor should the air be let out through the valves to preserve evidence that the police may need to investigate the accident.



P00.60-2067-00

*Lifting vehicle with spreader*



P0060-2068-00

*Supporting vehicle on wooden blocks*

**i** The actions performed to secure the vehicle (supporting it on wooden blocks, underfloor sliding blocks or similar objects, securing it with ropes, STAB FAST or endless slings) must enable the casualties to be rescued smoothly and safely.

When positioning the underfloor sliding blocks, care must be taken to ensure that the following rescue measures are not impaired.



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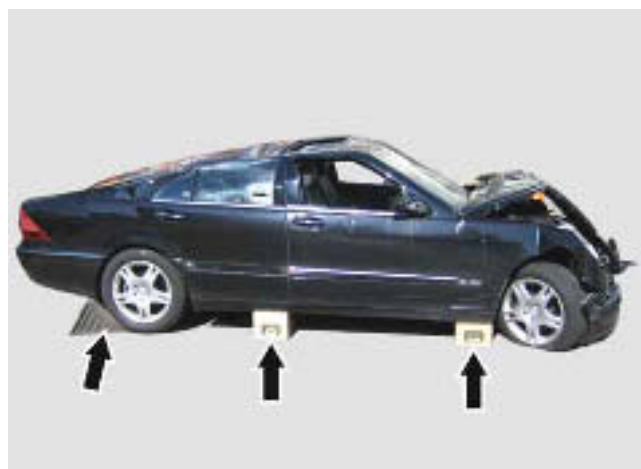
*Supporting vehicle with underfloor sliding blocks*

Vehicles lying on their side must be secured to prevent them from sliding and tipping over e.g. using sectional ladders, wheel chocks, ropes and straps.

- Secure vehicle using sectional ladders
- Attach straps by looping them around vehicle parts, such as axles or other securely bolted or welded parts on the vehicle.
- Attach steel cable to strap and tighten using pulling unit (grip puller) or cable winch
- Secure opposite vehicle side using wheel chocks



P00.60-2048-00



P00.60-2086-00

*Securing and supporting*

## Securing and supporting

As an alternative, passenger car support systems (e.g. STAB FAST) are available for stabilizing vehicles safely even if they are positioned awkwardly.



P00.60-2081-00

**STAB FAST passenger car support system**

### Endless sling

If the vehicle is on sloping ground, an endless sling is useful for securing the vehicle. It can also be used for recovering the vehicle.


The endless sling should be attached in one of the following ways:


- Guide it through window openings (including when windows have been removed)
- Wrap it around vehicle parts such as axles or firmly bolted/welded vehicle parts

Care should be taken to pass the sling around a number of components if possible, in order to distribute the forces evenly.



P00.60-2008-00

 Risk of injury	Measures
<p>Work on <b>windows</b> and <b>glass roofs</b> may produce <b>glass splinters</b> which can cause <b>injuries</b> to the occupants and rescuers.</p>	<p><b>Cover the occupants before commencing work, preferably with a transparent sheet.</b></p> <p><b>Wear protective clothing and gloves and safety glasses.</b></p>

 Risk of injury	Measures
<p>Always remove the <b>windows</b> when working on adjacent components.</p> <p><b>Windows</b> may <b>shatter</b> resulting in tiny, sharp <b>glass particles flying around</b> which may cause <b>injury</b> to the occupants and rescuers.</p>	<p><b>Cover the occupants before commencing work, preferably with a transparent sheet.</b></p> <p><b>Wear protective clothing and gloves and safety glasses.</b></p>

Windows in parts adjacent to those being worked on must always be removed before using hydraulic tools. This applies above all to the windows in the doors. If the windows are not removed, then when opening the doors using the spreader together with the corresponding body panels, they can be subjected to enormous pressure.

At a certain compressive force the windows will be unable to withstand the pressure and will burst suddenly and violently. The ejected fragments can inflict injuries.

Vehicles in the Mercedes-Benz passenger car model series and smart model series are generally equipped with two types of safety glass.

The windshield and door windows are made of laminated safety glass (VSG), the rear and side windows on almost all vehicles are made of single-pane safety glass (ESG).

All of the windows on the Maybach (model 240) are made of laminated safety glass (VSG).





## Removing the windows

### Removing windows using a glass saw

The glass saw is usually chosen to remove windows made of **laminated safety glass** (VSG).

- First knock a hole in the bottom of the window
- Then saw out the window at the bottom along the door

With a glass saw, the actual cutting occurs on the pull stroke and not on the push stroke as with conventional saws. The advantage of this is that the casualty inside the vehicle is less exposed to the glass particles produced.



P67.00-2036-00

- Press the window outwards and pull out of the guide rails



P67.30-2244-00

A **pendulum jigsaw** can be used as an alternative for removing laminated safety glass windows.

Here one should note that when sawing, fine-grained **glass dust** is created. For this reason before commencing the sawing process safety precautions must be taken:

- The occupants should be covered preferably with a **transparent sheet**
- The rescue personnel should also wear a **mask and safety glasses** in addition to the helmet visor



P67.00-2041-00

### Removing windows using a spring punch

The side windows on almost all vehicles (except Maybach) are made of single-pane safety glass (ESG) and can be removed using a spring center punch:

- Stick adhesive foil or tape over the window
- Position the spring center punch in one of the bottom corners
- Punch the window with the spring center punch



P67.30-2241-00

- The window shatters into small shards which stick to the film or adhesive tape.
- Remove the window outwards
- Remove remaining fragments of glass from the window frame (remove the rubber edge strip)



P67.30-2242-00

### Glass roof on smart forfour (model 454)

- Stick adhesive foil or tape over the window
- Knock a hole in one of the corners of the glass roof
- Cut out the window along the edge of the opening in the roof using a glass saw
- Remove the window outwards

Both the glass roof and the plastic roof are adhesive-bonded to the body structure.



P65.10-3215-00

## Removing the windows

### Side window on smart fortwo (model 450)

The panes of the quarter windows behind the B-pillars on the smart fortwo (model 450) are manufactured from breakproof plastic (polycarbonate) and are held in place by clips. They can be pried out using a suitable tool, such as a crowbar or Halligan tool.



P67.00-2040-00

### Removing windows with a Halligan tool:

Laminated glass windows can be quickly and easily removed using a Halligan tool:

- First knock a hole in the window
- Then rip out the window using the tool.



P67.00-2046-00

**i** Before windows are sawn or opened with special removal tools, the occupants must be covered, preferably with a transparent sheet, to prevent any potential risk of injury. Rescue personnel must wear protective clothing, safety glasses and protective mouth masks in addition to their helmet visor!



P67.00-2047-00

*Halligan tool*

### Switching off the engine on vehicles with automatic transmission

Switch off engine by turning the ignition key counter-clockwise to the "0" position and then remove the ignition key.

**i** On vehicles with automatic transmission, the ignition key can only be removed if the selector lever is in position "P".

### Switching off the engine on vehicles with KEYLESS-GO

KEYLESS-GO is a keyless access and drive authorization system.

In some accident situations the engine may continue to operate after a crash. If the vehicle key is not in the ignition switch in vehicles with KEYLESS GO, the engine can be switched off as follows:

- Move the selector lever to position "P" or "N"
- Press **START/STOP button** (1) on selector lever once



P80.61-2033-00



## Central locking emergency opening

### Automatic unlocking of the central locking in the event of an accident

Mercedes-Benz and Maybach vehicles are equipped with the "**Central locking emergency opening**" function in the event of a crash.

Installed in a separate control unit is an additional crash sensor. At a defined vehicle acceleration the signal for emergency opening is transmitted after a specific waiting time to the door control units. The doors are then unlocked by the respective door control unit.

### Hazard warning system

In the event of a crash, the hazard warning system is automatically switched on, depending on the vehicle model.

It can be switched off again at any time using the hazard warning flasher switch.

Generally, the hazard warning system is used to show the rescue team that the vehicle voltage supply is operational.

The hazard warning system is not deactivated until the battery/batteries is/are disconnected. This shows that the vehicle is free of electric current.



P54.25-4401-00

**C-Class hazard warning flasher switch (model 204)**

## Removing the vehicle doors • Mercedes-Benz passenger cars

First check whether the door catch can be opened **in spite of the deformed door**.

It may be possible to open the door enough to allow the spreader to be pushed into the resulting gap. If the lock cannot be opened, the following procedure is recommended:

**i** Do not use excessive force to ram the spreader into the door gap, to avoid any unintended body movement. Proceed carefully with the patient in mind.

### Opening on the lock side:

- Remove side windows made of single-pane safety glass
- Push one tip of the spreader into the door gap (at about the height of the door lock) on the B-pillar
- Grip the door fold with the spreader and bend outwards
- Press both tips of the spreader into the opening produced, in order to expand the opening in a number of small spreading operations. During this process slide the ends of the spreader toward the door lock, continuing until the door pops open.



P72.00-2176-00

### Alternative procedure

- Remove side window made of single-pane safety glass
- Insert spreader between door and upper window frame
- Open spreader
- Bend upper window frame outwards using spreader



P72.00-2132-00



## Removing the vehicle doors • Mercedes-Benz passenger cars

- Enlarge the resulting opening from above using the spreader until the door pops open



P72.10-3485-00

The inside door handle for the door lock release mechanism can be held open using a wooden wedge to facilitate opening.



P72.10-3486-00

- Open the door all the way
- Spread open and rip off the hinges using the spreader



P72.10-3487-00

## Removing the vehicle doors • Mercedes-Benz passenger cars

- Cut the electrical lines
- Remove the door



P72.10-3488-00

### Opening on the hinge side:

- Squeeze the front fender with the spreader to enlarge the door gap on the hinge side. Ensure that the spreader does not touch the suspension strut.

This procedure **cannot** be used on fenders made of plastic.



P72.00-2058-00

Where plastic fenders are involved or where the accident has closed off access proceed as follows:

- Remove side window
- Insert spreader between door and upper door frame
- Expand spreader until a sufficient gap forms at the hinge side of the door





## Removing the vehicle doors • Mercedes-Benz passenger cars

### Opening on the hinge side:

The following procedure can also be used:

- Remove side window
- Apply spreader at an incline from above
- Squeeze door using spreader until a sufficient gap forms at the hinge side of the door



P72.00-2133-00

- Further enlarge the door gap at the height of the door lock using a spreader
- Spread open and rip off the hinges using the spreader
- Cut the electrical lines
- Remove the door



P72.00-2054-00

**i** The hinge pins are hardened. Hardened parts cannot be cut. There is a risk that the cutting blade on the hydraulic cutting gear may be damaged or destroyed.

### Opening on the hinge side:

- Remove the side windows
- To create the required gap, squeeze/remove the fender with the spreader or
- create the required gap using a Halligan tool
- Spread open and rip off the hinges using the spreader. The hinges break at the pins.
- Cut the electrical lines
- Remove the door



P72.00-2164-00



P72.00-2165-00

*Opening the front door*



P72.00-2166-00

*Opening the rear door*



## Removing the vehicle doors • Maybach

### Opening the front doors at the lock side

- Remove side window
- Apply spreader vertically from above
- Squeeze door until a sufficient gap has formed at the hinge side



P72.00-2167-00

- Alternatively, insert spreader between door and upper door frame
- Expand spreader until a sufficient gap forms at the lock side of the door



P72.10-3489-00

- Press both tips of the spreader into the opening produced, in order to expand the opening in a number of small spreading operations. During this process slide the ends of the spreader toward the door lock, continuing until the door pops open.
- Spread open and rip off the hinges using the spreader
- Cut the electrical lines
- Remove the door



P72.00-2168-00

### Opening the rear doors at the lock side

- Remove the side windows
- Insert spreader in window frame at an angle

**i** Note

With any other procedure, only the aluminum door paneling is stripped off without a sufficiently large opening being created in the area of the door lock.



P72.00-2169-00

- Expand spreader until a sufficient gap has formed
- Press both tips of the spreader into the opening produced from above in order to expand the opening in a number of small spreading operations. During this process slide the ends of the spreader toward the door lock, continuing until the door pops open.
- Cut off the hinges using the rescue shears or spread them with the spreader until they break off
- Cut the electrical lines
- Remove the door



P72.00-2170-00

**i** The hinge pins are hardened. Hardened parts cannot be cut. There is a risk that the cutting blade on the hydraulic cutting gear may be damaged or destroyed.



P72.00-2171-00



## Removing the vehicle doors • smart

smart fortwo (model 450, model 451) and smart roadster (model 452)

### Opening on the lock side

- Secure vehicle and support on blocks
- The plastic door paneling can be removed to provide a better overview of the location of the hinges and door lock



P72.00-2116-00

- Use a crowbar to create a gap large enough to insert the rescue shears
- Insert the rescue shears and cut through the striker of the door lock



P72.00-2115-00



P72.00-2114-00

*Striker after being cut off*

### smart fortwo (model 450, model 451) and smart roadster (model 452)

- Open the door all the way
- Insert spreader at upper hinge
- Spread open and rip off the hinge using the spreader



P72.10-3501-00

- Insert spreader at lower hinge
- Spread open and rip off the hinge using the spreader
- Cut the electrical lines
- Remove the door



P72.00-3500-00



## Removing the vehicle doors • smart

### smart fortwo (model 450, model 451) and smart roadster (model 452)

Because the hinges are made of forged steel, and thus extremely strong, the recommended procedure on the smart fortwo (model 450) is to open the door on the lock side, where the spreader can act against the more pliant aluminum of the door structure.

Should it be absolutely necessary to open the door on the hinge side, apply the spreader at the upper hinge, inserting it from above. Hold the spreader vertically and rip off the hinge

### Opening on the hinge side

On the new smart fortwo (model 451), the door structure is made of steel. In addition, high-strength sheet steel and steel profile is used for the diagonal strut and the strips for the side window channels. This makes opening at the hinge side easier on this vehicle.

- The plastic door paneling can be removed to provide a better overview of the location of the hinges and door lock
- Remove plastic fender
- Insert spreader at hinge



P72.00-2179-00

- Spread open and rip off the hinges using the spreader
- Cut the electrical lines
- Remove the door



P72.00-2180-00

## smart forfour (model 454)

### Opening on the hinge side

- Remove plastic door paneling
- Position the spreader between the hinge and the A-pillar or fender
- Spread the hinge until it breaks off



P72.00-2156-00

The following procedure can also be used:

- Remove plastic door paneling
- Cut through door frame (1) above hinges using the rescue shears (cut A)
- Cut through door frame (1) below hinges using the rescue shears (cut B)



P72.00-2157-00

1 Door frame

- Cut through the window frame (2)



P72.00-2158-00

2 Window frame





## Removing the vehicle doors • smart

### smart forfour (model 454)

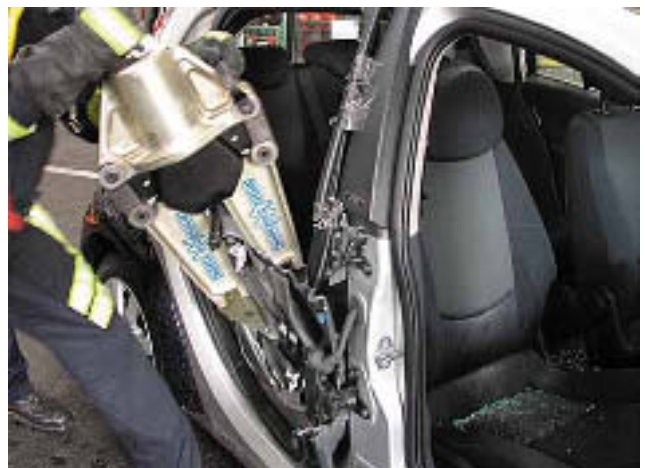
- Cut through the crossmember (3) (cut C)



3 Crossmember

P72.00-2159-00

- Cut the electrical lines
- Insert the spreader from above and pull the door outwards



P72.00-2160-00

- Carefully cover sharp-edged parts using a set of protective covers



P72.00-2161-00

## Removing the vehicle roof • Mercedes-Benz passenger cars



### Risk of injury

When vehicle parts are **cut open** or **cut off the vehicle**, this produces **sharp interfaces** with the potential to cause **injury** to both **rescue personnel** and the **accident victims** within the vehicle.

### Measures

**Cover the appropriate parts with protective covers or pillar protection.**



### Risk of injury

The **gas generators** for the **windowbags** are filled with compressed gas and therefore they **should not be cut, if possible**. Suitable safety precautions for patients and the rescue team should be implemented, if required.

The bursting of a gas generator may lead to **sharp-edge parts** being ejected at high speeds. The loud noise may result in the victims experiencing a **blast trauma**.

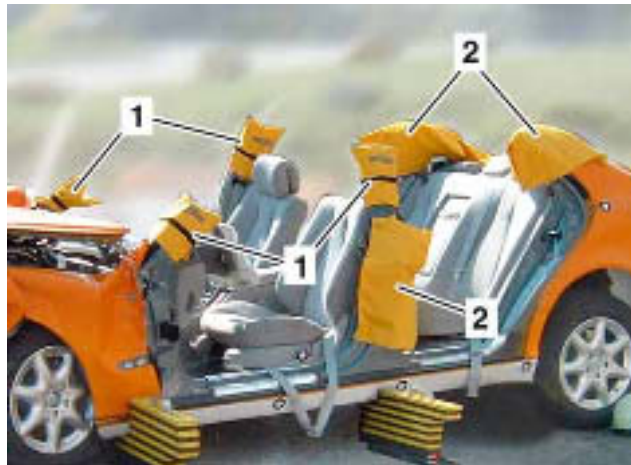
### Measures

**Remove inner paneling of A, B and C-pillars using a suitable tool and check whether any gas generators are installed in the area of the planned cuts. Mark the position of the cuts on the outside of the vehicle.**

The roof plays a major role in lending rigidity to the body. When cutting away the roof, it is absolutely essential to ensure that the vehicle is adequately and safely supported so as to prevent the body from collapsing and causing further injury to the occupants. Furthermore, important fixed points on the bodywork, which may be necessary later in the rescue of the victims, could be destabilized or destroyed by cutting away the roof.

Removing the vehicle roof must therefore be considered a critically important event and should be planned with the emergency physician. If removing the roof is the only possible way of gaining access to the victim or of initiating other essential action, carefully consider whether partial removal of the roof might be sufficient.

Depending on the accident situation, the corresponding pillar can be folded forward or backwards after being cut.



P62.00-2097-00

### Protective cover set from Weber Hydraulik company

- 1 Pillar padding with Velcro fastener
- 2 Protective covers with round magnets



## Removing the vehicle roof • Mercedes-Benz passenger cars

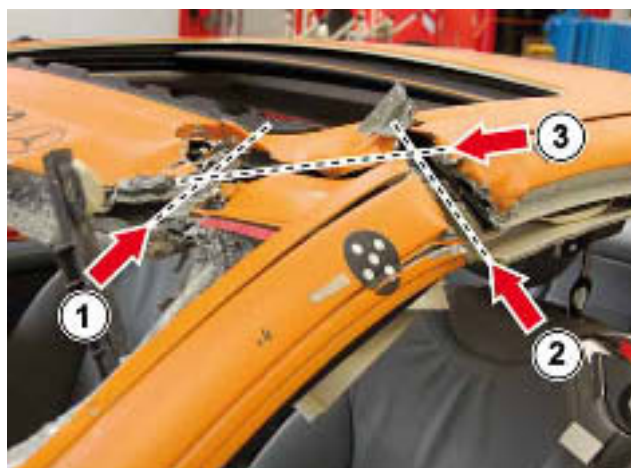
### Partial removal of roof

- Saw out windshield at edges (see chapter: Removing the windows)
- **Remove inner paneling of A-pillar and check whether a gas generator has been installed in the A-pillar for the windowbag.** Mark cutting position on outside of vehicle
- Cut through the A-pillar as close to the bottom as possible but **do not cut the gas generator!**



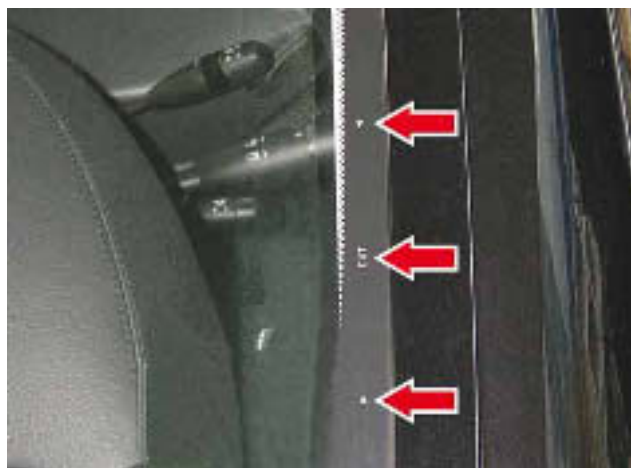
P62.00-2085-00

- On the CL-Class (model 216) the A-pillars are reinforced with a tube made of high-strength steel. These internal reinforcement tubes can only be cut using high-powered rescue shears and they must be exposed first.
- It is easier to cut the A-pillar free in the area of the roof frame on this vehicle.



P63.20-7238-00

- On the S-Class (model 221) the cutting points are marked (> CUT <) in the windshield



P67.10-2308-00

*Cutting marks on S-Class (model 221)*

### Partial removal of roof

- **Remove inner paneling of B-pillars** and determine location of seat belt height adjuster or any structural reinforcements present
- Check whether a **gas generator for the windowbag is installed above the B-pillar** in the roof frame. Mark cutting position on outside of vehicle
- Cut through B-pillar above the seat belt height adjuster



P62.00-2086-00

- On vehicles with a structurally reinforced B-pillar, e.g. E-Class (model 211); C-Class (model 204) and CLK-Class coupés (model 209), cut off the B-pillar by making a v-shaped cut through the roof at the sides but **do not cut the gas generator!**



P62.00-2075-00

- Saw open the rear window at the top between the C-pillars
- **Remove inner paneling of C-pillar and check whether a gas generator has been installed in the C-pillar for the windowbag.** Mark cutting position on outside of vehicle
- Make a v-shaped cut at the top of the C-pillar but **do not cut the gas generator!**

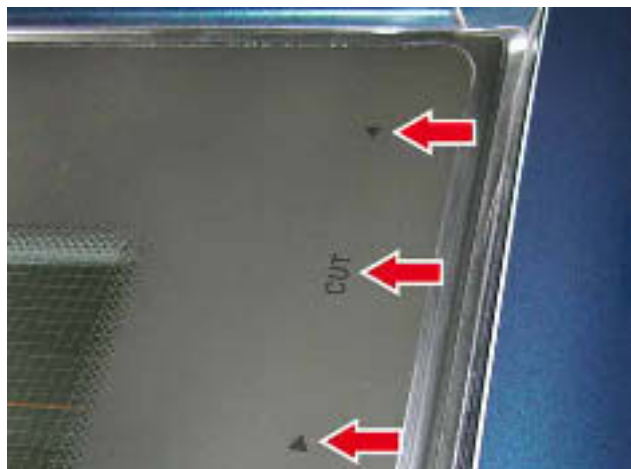


P63.20-5674-00

## Removing the vehicle roof • Mercedes-Benz passenger cars

### Partial removal of roof

- In the S-Class (model 221) and CL-Class (model 216), certain areas of the C-pillar are particularly well-suited for cutting through. Such areas are clearly designated with "CUT" marks in the rear window



P67.20-2287-00

"CUT" marking on S-Class (model 221)

- Make a v-shaped relief cut at rear in center of roof



P65.20-2101-00

- Fold the roof back towards the rear taking into account wind strength and direction and secure roof with fire brigade safety lines to prevent it from springing back



P65.20-2102-00

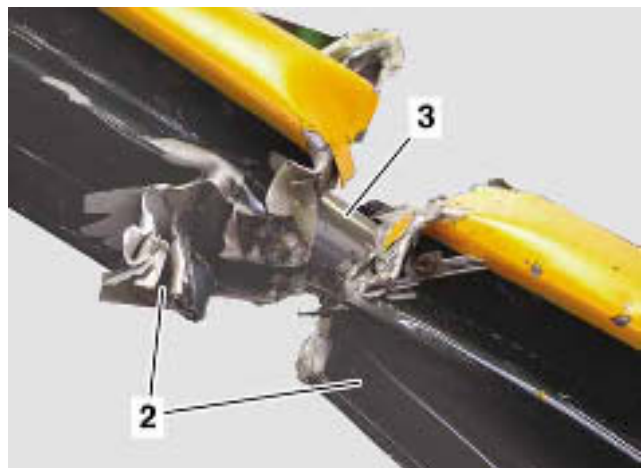
## Complete removal of the roof

- Remove inner paneling of A-pillar and check whether a gas generator has been installed in the A-pillar for the windowbag. Mark cutting position on outside of vehicle
- Cut through the A-pillar as close to the bottom as possible but **do not cut the gas generator!**
- Leave the windshield (bonded) in its frame and saw open across its entire width at the height of the cuts in the A-pillars The windshield can be removed together with the roof.



P63.20-5675-00

- On the CL-Class (model 216) the A-pillars are reinforced with a tube made of high-strength steel. These internal reinforcement tubes can only be cut using high-powered rescue shears and they must be exposed first using the rescue shears.



P63.20-7004-00

- 2 A-pillar
- 3 Reinforcement tube

- Alternatively, it is easier to cut the A-pillar free in the area of the roof frame on this vehicle.



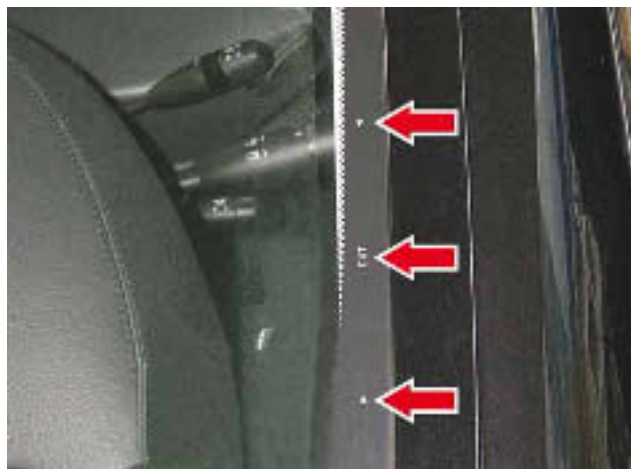
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## Removing the vehicle roof • Mercedes-Benz passenger cars

### Complete removal of the roof

- In the S-Class (model 221), certain areas of the A-pillar are particularly well-suited to being cut through. Such areas are clearly designated with "CUT" marks in the windshield



P67.10-2308-00

"CUT" marking on S-Class (model 221)

- **Remove inner paneling of B-pillars** and determine location of seat belt height adjuster or any structural reinforcements present
- Check whether **a gas generator for the windowbag is installed above the B-pillar** in the roof frame. Mark cutting position on outside of vehicle
- Cut through B-pillar above the seat belt height adjuster
- On vehicles with a structurally reinforced B-pillar (e.g. E-Class, model 211 and CLK-Class coupés, model 209), cut off the B-pillar by making a v-shaped cut through the roof at the side but **do not cut the gas generator!**



P62.00-2086-00

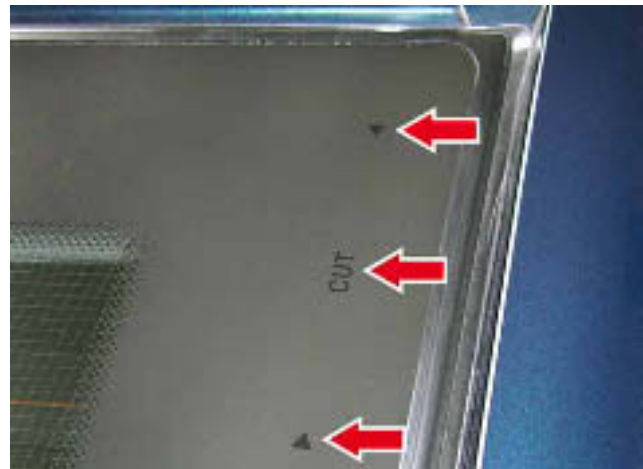
- Saw out rear window at edges
- **Remove inner paneling of C-pillar and check whether a gas generator has been installed in the C-pillar for the windowbag.** Mark cutting position on outside of vehicle
- Cut through the C-pillar as close to the top as possible but **do not cut the gas generator!**



P63.20-5676-00

### Complete removal of the roof

- In the S-Class (model 221) and CL-Class (model 216), certain areas of the C-pillar are particularly well-suited for cutting through. Such areas are clearly designated with "CUT" marks in the rear window



P67.20-2287-00

*"CUT" marking on S-Class (model 221)*

- Raise roof together with windshield and, depending on the accident situation, move away to front or rear



P65.00-2103-00

- With regard to partial or complete removal of vehicle roof, all cutting edges on the A, B and C-pillars should be covered with protective covers or pillar protection



P60.00-2659-00





## Removing the vehicle roof • Mercedes-Benz passenger cars

### Rescuing occupants from a vehicle with a closed soft top, coupé roof or Vario roof

**i** Before and while opening the roof, always ensure that the victims' freedom of movement is not restricted and that nobody will be injured by the moving parts (roll bar, soft top, soft top compartment lid, soft top linkage).

**i** If the coupé roof (SL-Class, model 129) can no longer be removed it can then be cut as for a normal roof.

For vehicles with a glass roof version, proceed as for removal of the windshield (see chapter: Removing the windows).

### SLK-Class (model 171)

The SLK-Class is equipped with a Vario roof, which looks identical to a coupé roof, but which can be opened and closed electrohydraulically like a convertible soft top.

The control switch is located in the center console.



P77.30-2295-00

**i** The Vario roof on the SLK-Class (model 171) is operated electrohydraulically and must be cut away as for a normal roof if the electrical system has failed or if the battery has been disconnected!

### SL-Class (model 230)

The SL-Class is equipped with a Vario roof, which looks identical to a coupé roof, but which can be opened and closed electrohydraulically like a convertible soft top.

The control switch is located in the center console.



P77.39-2068-00

**i** The Vario roof on the SLK-Class (model 230) is operated electrohydraulically and must be cut away as for a normal roof if the electrical system has failed or if the battery has been disconnected!

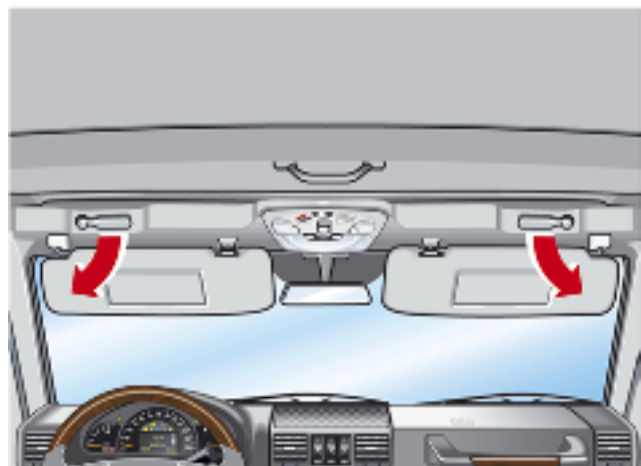
### G-Class convertible (model 463)

The convertible in the G-Class has two independent of each other locking hooks at the left and right on the windshield panel that have to be opened.

The control switch for the electric power soft top is located in the center console.

#### Emergency opening:

To open in an emergency, fold the locking lever all the way down and push the soft top towards the rear by hand until mechanically locks up.



P77.33-2045-00



## Removing the vehicle roof • Mercedes-Benz passenger cars

### CLK-Class convertible (model 209)

On the convertible of the CLK-Class (model 209) the soft top is locked or unlocked electrically.

The control switch for the electric power soft top is located in the center console.

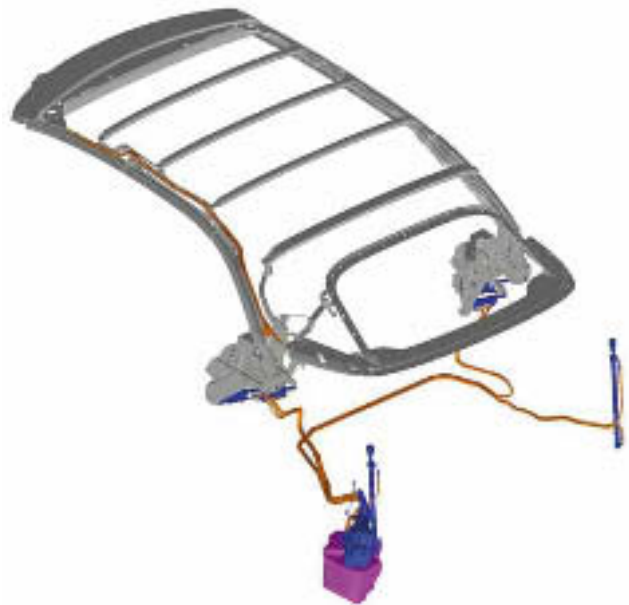


P77.30-2296-00


### Soft top frame

The soft top frame is a combined steel/aluminum structure. The header bow and retaining bracket are made of die-cast aluminum. The corner bows and cross bows consist of extruded aluminum profiles. In combination with the steel struts these parts are given bending and profile strength.

The rear-wall window is made of single-pane safety glass (ESG) and bonded into a frame compound.



P77.33-2105-00

 Risk of injury	Measures
<p>When <b>cutting open</b> or <b>cutting through</b> vehicle parts using a cutting disk or rescue saw, there is a risk of fire caused by the sparks generated.</p>	<p><b>Protect vehicle against fire; have fire extinguishing equipment ready.</b></p> <p><b>Cover the occupants before commencing work, preferably with a transparent sheet.</b></p> <p><b>Wear protective clothing and gloves and safety glasses.</b></p>

## Notes on roof removal

It is difficult to completely remove the roof of the Maybach because of the tubular frame in the A-pillars and B-pillars.

The B-pillar with internal steel tube can be cut through in the upper area with the rescue shears after it is worked on for an extended period of time.

The reinforced A-pillar cannot be cut using standard rescue shears. The reinforcement tube can only be cut using a cutting disk or a dual direction rescue saw ("Twinsaw"). Ensure that sufficient distance to the gas generators is maintained during the cutting operations due to the heat produced.

## Removing the roof of the Maybach 57

- Leave the windshield (bonded) in its frame and saw open across its entire width at the height of the cuts in the A-pillars. The windshield can be removed together with the roof (see chapter: Removing the windows)
- **Remove the A-pillar trim and check where the gas generators for the front windowbags are installed in the A-pillars.** Mark cutting position on outside of vehicle



P91.60-3284-00

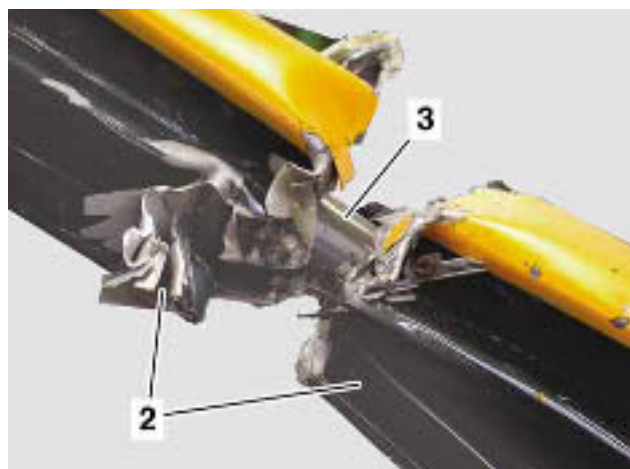
1 Right front windowbag gas generator



## Removing the vehicle roof • Maybach

### Removing the roof of the Maybach 57

- Expose the reinforcement tube using the tip of the rescue shears
- Cut through the reinforcement tube using an offset grinding machine or dual direction saw (Twinsaw) but **do not cut the gas generator!**



P63.20-7004-00

- 2 A-pillar  
3 Reinforcement tube

- Cut through the B-pillar above the seat belt height adjuster using the rescue shears



P63.20-7006-00

- **Remove the C-pillar trim and check where the gas generators for the rear windowbags are installed in the C-pillars.** Mark cutting position on outside of vehicle



P91.60-3285-00

- 4 Right rear windowbag gas generator

### Removing the roof of the Maybach 57

- Saw open the rear window across its entire width at the level of the planned cuts through the C-pillars
- Cut through the C-pillar but **do not cut the gas generator!**



P63.20-7007-00

- Raise roof together with windshield and, depending on the accident situation, move away to front or rear.



P65.00-2111-00



## Removing the vehicle roof • Maybach

### Partial removal of the roof of the Maybach 62

Under certain circumstances, it may be sufficient to partially remove the roof to rescue the rear passengers in the Maybach 62. The rear part of the roof is then folded forwards.

- Cut through the roof frame and, if installed, the frame of the glass roof approx. 15 cm behind the B-pillar



P65.20-2523-00

- Saw open the glass roof between the cuts in the roof frame



P65.10-3217-00

- Remove the C-pillar trim and check where the gas generators for the rear windowbags are installed in the C-pillars. Mark cutting position on outside of vehicle
- Cut through the C-pillar but **do not cut the gas generator!**



P65.00-2112-00

### Partial removal of the roof of the Maybach 62

- Saw open the rear window across its entire width at the level of the cuts through the C-pillars



P65.00-2113-00

- Fold roof forwards and secure against springing back using fire brigade safety lines



P65.00-2114-00





## Removing the vehicle roof • Maybach

### Large side opening

If it is not possible or advisable to partially or completely remove the roof due to the circumstances, it is possible to create a "large side opening" to allow the occupants to be rescued quickly.

This involves removing the entire side area consisting of front door, B-pillar and rear door.



P63.10-4344-00

### Procedure

- Remove windows/make windows safe as required
- Open rear door at lock side
- Cut through B-pillar at top using rescue shears



P63.20-7247-00

- Cut through seat belt using belt knife
- Cut into B-pillar at bottom using rescue shears
- Position the spreader between the rear seat and B-pillar



P63.20-7248-00

### Large side opening

- Use spreader to press B-pillar outwards and rip it off



P63.20-7249-00

- Spread open and rip off the hinges of the front door using the spreader
- Remove the entire side wall



P63.10-4345-00



## Removing the vehicle roof • smart

### smart fortwo coupé (model 450)

The smart fortwo coupé (model 450) has two roof variants:

- Plastic roof
- Glass roof made of single-pane safety glass (ESG)

The respective roof modules are bonded to the body structure. Regardless of the variant installed, we recommend cutting off the entire roof structure using the procedure described below.

- Cut through the A-pillars
- Saw open the windshield between the cuts in the A-pillars across its entire length.

### smart fortwo coupé (model 451)

Two roof variants are available for model series 451:

- Full roof made of glass fiber reinforced polyurethane (PU)
- Panoramic sunroof made of polycarbonate (PC)



P62.00-2083-00

### smart fortwo coupé (model 450)

- Cut through the B-pillars about 10 cm above the seat belt anchor point



P63.00-2052-00

## smart fortwo coupé (model 450)

- Cut through the C-pillars below the gas-filled spring struts of the folding rear window.

**i** When the C-pillars are cut, the frameless single-pane safety glass rear window will probably break. Remove windows/make windows safe as required.



P63.00-2053-00

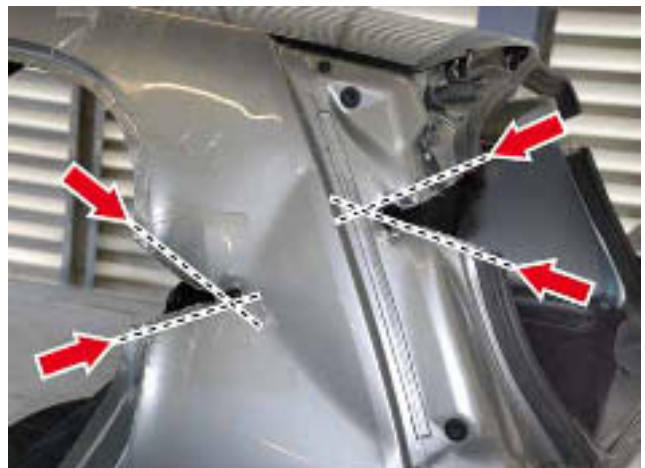
## smart fortwo (model 451)

- Use a spring center punch to punch the tailgate made of single-pane safety glass in the area of the lock
- Press the tailgate outwards in the area of the lock and open
- Cut off the tailgate hinges using the rescue shears



P72.20-2671-00

- Remove rear plastic trim on B-pillar
- Make a v-shaped cut at the front and at the back of the B-pillar using the rescue shears



P63.20-7250-00

## Removing the vehicle roof • smart

### smart fortwo (model 45 1)

- Cut through the B-pillar between the v-shaped cuts using the rescue shears



P63.20-7251-00

### smart fortwo (model 45 1)

- Lift the roof and carry it off to the rear, front or side depending on the situation



P65.00-2118-00

### smart forfour (model 454)

#### Folding back the roof

- Cut through the A-pillars
- Saw open the windshield between the cuts in the A-pillars across its entire length



P62.00-2088-00

### smart forfour (model 454)

- Cut through the B-pillars above (A) or below (B) the seat belt height adjuster



P65.00-2107-00

- Cut through the C-pillars as far as the roof frame



P65.00-2108-00

- Cut through the roof frame



P65.00-2109-00



## Removing the vehicle roof • smart

### smart forfour (model 454)

- Fold roof to rear and secure against springing back using fire brigade safety lines



P65.00-2110-00

### Soft top on smart fortwo cabrio

The smart fortwo cabrio (model 450) is equipped with a folding top/rear soft top. It is locked and released automatically when the switch is pressed.

The control switch is located on the center console to the right of the gearshift lever.



P77.39-2070-00

*smart fortwo (model 450)*

The smart fortwo cabrio (model 451) is equipped with a Tritop textile soft top with a heated rear window made of single-pane safety glass (ESG). It is locked and released automatically when the switch is pressed.

The control switch is located on the center console in front of the gearshift lever.



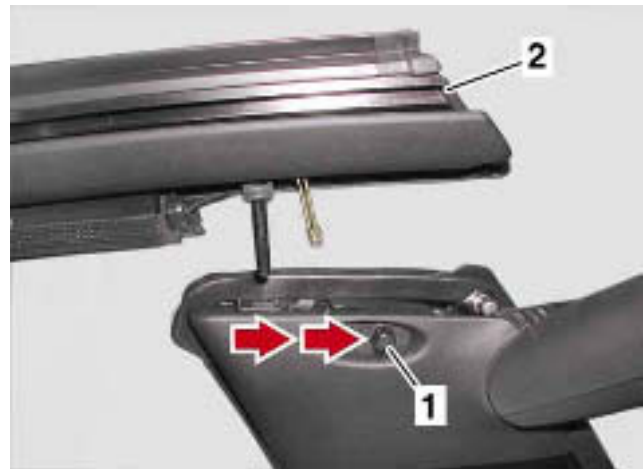
P77.00-2301-00

*smart fortwo (model 451)*

## Soft top on smart fortwo cabrio

When the folding top/rear soft top is open, the two side supports can be removed. The release levers for the side supports are located at the top of the B-pillars.

- Press the release button (1): The side supports lift up at the rear but remain secured in place
- Press the release button again
- Extract the side supports (2)



P77.33-2078-00

- 1 Release button
- 2 Side support

## Convertible top on smart roadster

The smart roadster and roadster coupé are equipped with a soft top or a coupé roof as standard equipment.

### Soft top:

The locking and release mechanisms for the soft top are attached to the windshield frame and are operated automatically when the switch is pressed.

The control switch is located in the center console in front of the gearshift lever.

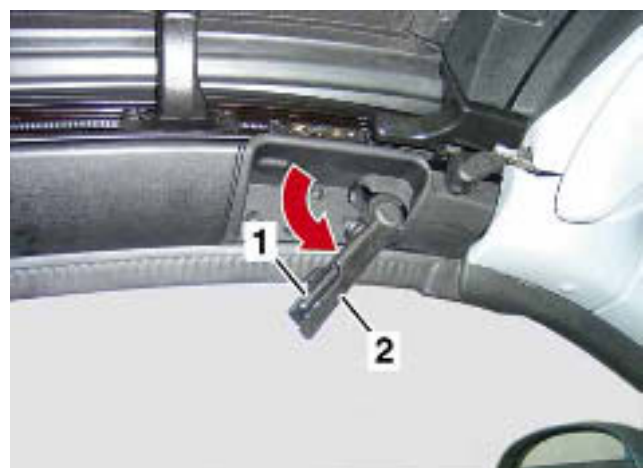
The soft top can only be opened completely if the voltage supply is present and the ignition is switched on.



P77.39-2146-00

When the folding top is open, the two side supports can be removed.

- Press the integrated safety switch (1)
- Fold the release lever (2) down
- Remove the side support



P77.33-2075-00





## Removing the vehicle roof • smart

### Coupé roof on smart roadster



The coupé roof installed on the smart roadster and smart roadster coupé consists of two roof panels with side supports, joined longitudinally at the center of the vehicle.

- Press the integrated safety switch (3)
- Fold the release lever (4) down
- Release side supports (see soft top)
- Pull the two side sections of the roof upward to remove



P77.50-2119-00

## Pushing away the instrument panel • Mercedes-Benz passenger cars

 Risk of injury	Measures
<p>When vehicle parts are <b>cut open</b> or <b>cut off the vehicle</b>, this produces <b>sharp interfaces</b> with the potential to cause <b>injury</b> to both <b>rescue personnel</b> and the <b>accident victims</b> within the vehicle.</p>	<p><b>Cover the appropriate parts with protective covers or pillar protection.</b></p>
 Risk of injury	Measures
<p><b>The gas generators of windowbags</b> are filled with compressed gas and <b>they must not be cut!</b></p> <p>The bursting of a gas generator may lead to <b>sharp-edge parts</b> being ejected at high speeds. The loud noise may result in the victims experiencing a <b>blast trauma</b>.</p>	<p><b>Remove inner paneling of A, B and C-pillars using a suitable tool and check whether any gas generators are installed in the area of the planned cuts. Mark installation location on outside of vehicle.</b></p>

The following procedure can be used to push away the instrument panel:

- Carefully support and stabilize the vehicle
  - **Remove inner paneling of A-pillars**
  - **Locate the position of any windowbag gas generators present** and mark position of cut on outside of vehicle.
  - Cut through the A-pillars above the instrument panel. The cut should be as high up as possible to ensure that sufficient stability is given for the use of the rescue ram.
- Gas generators must not be cut!**



P62.00-2010-00



## Pushing away the instrument panel • Mercedes-Benz passenger cars

- Make a relief cut at the bottom of the A-pillar using the rescue shears
- Remove the perimeter door seal to allow use of the telescopic rescue ram



P62.00-2011-00

An additional relief cut can be made in the area of the fender

- Remove fender paneling
- Make relief cut



P62.10-2163-00

- Position the rescue ram between the A-pillar and the B-pillar To prevent the base of the ram from penetrating through the vehicle, ensure it is positioned on **stable support points**. The **door sill attachments (1)** available with rescue rams are particularly well suited for stabilizing purposes.
- Extend the rescue ram as far as necessary
- To prevent vehicle parts from springing back, the rescue ram should be left under pressure until the casualty or casualties have been rescued from the vehicle.

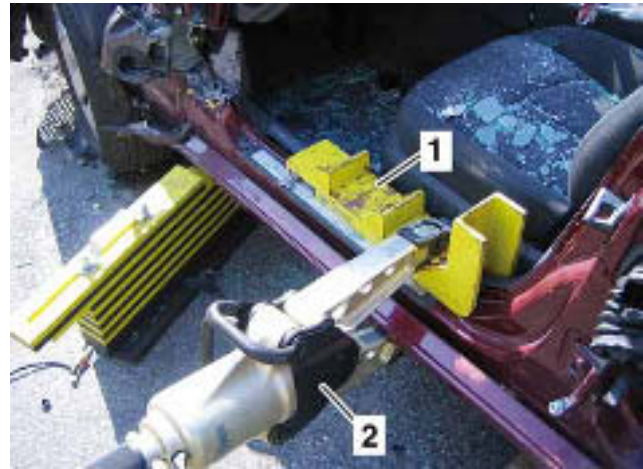


P62.00-2012-00

## Pushing away the instrument panel • Mercedes-Benz passenger cars

If the B-pillar has been removed (e.g. to create a large side opening) or damaged and no longer provides a sufficient degree of stability for the rescue ram, then the rocker panel attachment (1) can be fastened in place using a spreader (2).

**Disadvantage:** This means that the spreader is tied up and is no longer available for any additional rescue measures!



P62.00-2087-00

### Pressing the steering column away using a spreader

Alternatively, the steering column can be pressed upwards using a spreader

- Make a relief cut at the bottom of the A-pillar using the rescue shears
- Insert the spreader between steering column and rocker panel
- Press steering column upwards



P46.10-2900-00

*From the driver side*

or:

- Insert the spreader between center tunnel and steering column
- Press steering column upwards



P66.10-2901-00

*From the passenger side*



## Pushing away the instrument panel • Maybach

### Maybach 57 and Maybach 62

- Carefully support and stabilize the vehicle
- **Remove inner paneling of A-pillars**
- **Locate the position of any windowbag gas generators present and mark the cutting positions on the outside of the vehicle**
- Cut through the A-pillars above the instrument panel. The cut should be as high up as possible to ensure that sufficient stability is given for the use of the rescue ram.

**Gas generators must not be cut!**

(see chapter "Removing the vehicle roof")



P62.00-2093-00

- Leave the windshield (bonded) in its frame and saw open across its entire width at the height of the cuts in the A-pillars
- Make a relief cut at the front on the lower A-pillar



P62.00-2094-00

- Position the rescue ram between the A-pillar and the B-pillar. To prevent the base of the rescue ram from breaking through, make sure that the **supporting point is a stable one**. The **door sill attachments (1)** available with rescue rams are particularly well suited for stabilizing purposes.
- Extend the rescue ram as far as necessary
- To prevent vehicle parts from springing back, the rescue ram should be left under pressure until the casualty or casualties have been rescued from the vehicle.



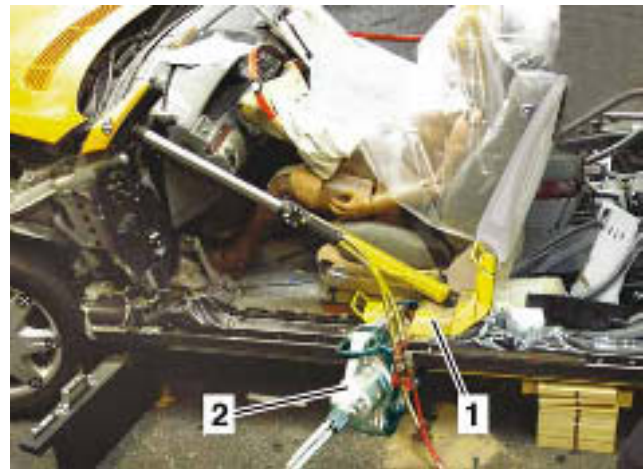
P62.00-2095-00

*Sill attachment*

### Maybach 57 and Maybach 62

If the B-pillar has been removed (e.g. to create a large side opening) or damaged and no longer provides a sufficient degree of stability for the rescue ram, then the rocker panel attachment (1) can be fastened in place using a spreader (2).

**Disadvantage:** This means that the spreader is tied up and is no longer available for any additional rescue measures!



P62.00-2096-00

- 1 *Rocker panel attachment*
- 2 *Spreader*

## Pushing away the instrument panel • smart

### smart fortwo coupé (model 450 and model 451)

- Carefully support and stabilize the vehicle
- Cut through the A-pillars on the smart fortwo coupé above the instrument panel



P62.00-2079-00

- Make a relief cut on the A-pillar below the lower door hinge using the rescue shears
- Make a relief cut on the A-pillar above the lower door hinge



P63.00-2049-00

- Remove plastic fender
- Make a relief cut on the longitudinal member



P63.00-2050-00

### smart fortwo coupé (model 450 and model 451)

- Fix the rocker panel attachment in place using the spreader



P63.10-4346-00

- Insert the telescopic rescue ram between the A-pillar and rocker panel attachment  
**Ensure that it is positioned securely on the A-pillar!**
- Extend the rescue ram as far as necessary
- To prevent vehicle parts from springing back, the rescue ram should be left under pressure until the casualty or casualties have been rescued from the vehicle.



P63.10-4347-00

### Alternative procedures:

#### Variant 1:

- Bend the area of the A-pillar between the relief cuts outwards using the spreader
- Insert the spreader in the space created and press the instrument panel upwards



P63.20-7252-00





## Pushing away the instrument panel • smart

### smart fortwo coupé (model 450 and model 451)

#### Variant 2:

- Insert the spreader between the rocker panel and steering column and press the steering column upwards

or

- From the passenger side, insert the spreader between center tunnel and steering column and press the steering column upwards



P46.10-2902-00

### smart forfour (model 454)

- Carefully support and stabilize the vehicle
- Cut through the A-pillar above the instrument panel



P62.00-2088-00

- Make a relief cut at the bottom of the A-pillar



P62.00-2089-00

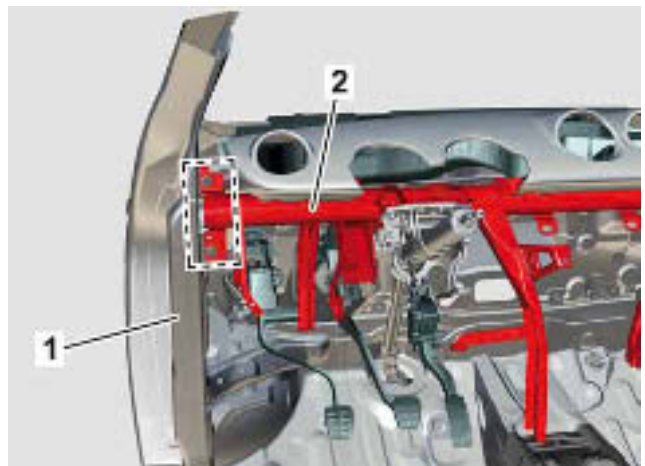
### smart forfour (model 454)

- Position a rescue ram in the area of the joint (arrow) between the instrument panel crossmember and the A-pillar.



P62.00-2091-00

**i** Due to its construction, the A-pillar is not strong enough to allow the use of a rescue ram. The ram deforms the A-pillar and fender without pushing the instrument panel forward out of the way.



P62.00-2099-00

- 1 A-pillar
- 2 Instrument panel crossmember

- Position the rescue ram on the B-pillar. To prevent the cylinder base from penetrating, ensure it is provided at stable jacking points. The rocker panel attachments (1) available with the rescue ram are particularly well suited for stabilizing purposes.
- Extend the rescue ram as far as necessary
- To prevent vehicle parts from springing back, the rescue ram should be left under pressure until the casualty or casualties have been rescued from the vehicle.



P62.00-2090-00

- 3 Rocker panel attachment



## Seat adjustment • Mercedes-Benz passenger cars



### Risk of injury

When vehicle parts are **cut open** or **cut off the vehicle**, this produces **sharp interfaces** with the potential to cause **injury** to both **rescue personnel** and the **accident victims** within the vehicle.

### Measures

**Cover the appropriate parts with protective covers or pillar protection.**

If the battery has not yet been disconnected, then for vehicles with power seats the "seat adjustment" switch can be used to try and adjust the seats electrically.

Due to deformation of the seat rails, seats with manual or electric seat adjustment can frequently no longer be moved forward or back after an accident.

**Electric seat adjustment is - at the latest - no longer functional after disconnecting the battery.**

In these cases, the **instrument panel** can be pushed away from the victim using a hydraulic rescue ram. This is described in more detail in the chapter entitled "Pushing away the instrument panel".



## Seat adjustment • Mercedes-Benz passenger cars

### Partially electric seat adjustment (TSV)

The seat elements depicted by the differently shaped segments of the switch can be moved in the desired direction by pressing the appropriate switch (cf. illustration).

The switch group is located on the bottom of the seat on the door side.



P91.29-2200-00

**i** When operating the partially electric seat adjustment make sure that no-one can be jammed in between the moving parts.

### Fully electric seat adjustment

The seat elements depicted by the differently shaped segments of the switch can be moved in the desired direction by pressing the appropriate switch (cf. illustration).

The switch group is located at the top on the relevant door.



P91.29-2201-00

**i** When operating the fully electric seat adjustment make sure that no-one can be jammed in between the moving parts.

## Seat adjustment • Maybach

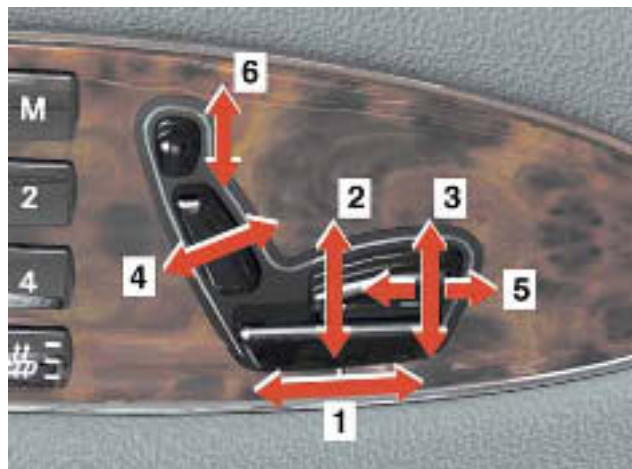
### Fully electric seat adjustment

The Maybach is equipped with fully electric seat adjustment on all seats as standard.

The seat elements depicted by the differently shaped segments of the switch can be moved in the desired direction by pressing the appropriate switch (cf. illustration).

The switch group is located at the top on the relevant door.

**i** The seats can be adjusted with the ignition key removed and the door open.



P54.25-5371-00

**Left front door switch group**

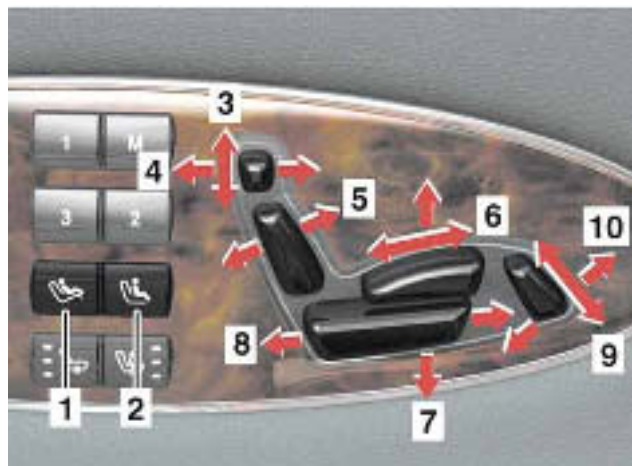
- 1 Seat fore/aft adjustment
- 2 Seat height
- 3 Seat inclination
- 4 Backrest angle
- 5 Seat cushion depth
- 6 Head restraint height

### Adjusting the rear seats (Maybach 62)

The reclining seats at the rear of the Maybach 62 are equipped with additional functions and adjustment options:

- Upright position or reclined position adjustment
- Seat cushion fore/aft adjustment
- Lower leg rests which can be swiveled and adjusted in length
- Folding and adjustable padded footrest

**i** When operating the fully electric seat adjustment make sure that no-one can be jammed in between the moving parts.



P54.25-5372-00

**Left rear door switch group (Maybach 62)**

- 1 Reclined position
- 2 Upright position
- 3 Head restraint height
- 4 Head restraint inclination
- 5 Backrest angle
- 6 Seat depth
- 7 Seat inclination
- 8 Seat fore/aft adjustment
- 9 Leg rest length
- 10 Leg rest inclination

### smart fortwo (model 450), smart roadster (model 452) and smart forfour (model 454)

Vehicles in the smart model series feature manual seat adjustment as standard. The release levers for fore/aft adjustment (1) are located at the fronts of the seats, with backrest adjustment (2) - for the driver seat only - on the outside of the seat.

Deformation of the seat rails often means that the seats can no longer be pushed back after an accident.

In these cases, the instrument panel can be pushed away from the casualty using a hydraulic rescue ram. This is described in more detail in the chapter entitled "Pushing away the instrument panel" (p. 17).



P91.10-2646-00

- 1 Fore/aft adjustment release
- 2 Backrest adjustment


### smart fortwo (model 451)



P91.10-3108-00

- 1 Fore/aft adjustment release
- 2 Backrest adjustment

## Removing the head restraints • Mercedes-Benz passenger cars

 Risk of injury	Measures
<p>Since the casualty is exposed to <b>additional risk of injury when the head restraints are removed</b> because the head restraint is no longer able to provide support, head restraints should only be removed <b>in exceptional cases</b> and in <b>consultation with the emergency physician</b>.</p>	<p><b>As a rule you should first try to move the backrest as far back as possible to create the required space for the casualty (see chapter: "Seat adjustment").</b></p> <p><b>The head restraint may be useful for stabilizing the victim.</b></p>

Following an accident it is occasionally useful to remove the head restraints **after consultation with the emergency physician**:

- to provide access to the rear passengers in two-door vehicles
- to provide the rescue personnel with more space to fit the cervical collar ("stiff neck") to the victim

## Removing the head restraints • Mercedes-Benz passenger cars

### Manual head restraint adjustment

In most mechanical head restraint systems, the head restraint is moved to the top position simply by pulling on it. Pressing the release button (1) and then pulling upwards allows the head restraint to be removed from its guides. The release button is usually located on the receptacle for the head restraint bracket.

#### NECK-PRO head restraints

On NECK-PRO head restraints, the electrical line for the triggering mechanism is located in the right-hand guide tube.



1 Release

P91.16-2139-00

### Electric head restraint adjustment

The switch for electric head restraint adjustment is integrated into the switch group for fully electric seat adjustment.

The head restraint is moved to the top position by pressing the switch. Then the head restraint can be pulled out of its guide by pushing it beyond the resistance of the end locking device.

#### NECK-PRO head restraints

On NECK-PRO head restraints, the electrical line for the triggering mechanism is located in the right-hand guide tube.



P91.16-2206-00



## Removing the head restraints • Maybach

### Electric head restraint adjustment

Maybach vehicles are equipped with electric head restraint adjustment.

The switch for electric head restraint adjustment is integrated into the switch group for fully electric seat adjustment.

The head restraint is moved to the top position by pressing the switch. Then the head restraint can be pulled out of its guide by pushing it beyond the resistance of the end locking device.



1 Head restraint switch

P54.25-5374-00

### smart fortwo (model 450 and 451) and smart roadster (model 452)

On the following model series, the head restraints are integrated in the backrests:

- smart fortwo coupé and cabrio (model 450)
- smart fortwo coupé and cabrio (model 451)
- smart roadster and roadster coupé (model 452)



P91.10-3109-00

On the smart forfour (model 454), all seats feature manually adjustable head restraints.

To remove the head restraint, just pull it upwards.



P91.10-3110-00

## Easy entry/exit feature • Mercedes-Benz passenger cars

### Risk of injury

If **easy entry/exit** is switched on, then when the **driver door is opened**, the ignition is switched off or the electronic transmitter **key is removed**, the steering column is moved upwards and the driver seat is moved to the rear. It is absolutely essential that care is taken to ensure that no-one is jammed by **moving parts**.

### Measures

**Where possible, disconnect all batteries.**

**If the easy entry/exit feature is activated, stop the adjustment procedure immediately.**

For Mercedes-Benz vehicles an electronic easy entry/exit is available as special equipment.

When the driver door is opened (ignition off) or when the electronic key is removed, the steering column is moved all the way up. The driver seat may be moved to the rear at the same time. When closing the driver door, the steering column and driver seat are automatically reset to the last adopted position.

The rotary switch (1) for the easy entry/exit is located on the adjuster lever for the electronic steering column adjustment below the combination switch (lights and windshield wipers) on the steering wheel.

On the latest-generation Mercedes-Benz vehicles the easy entry/exit feature can be switched on or off in the "COMFORT" sub-menu of the control system using the buttons on the multifunction steering wheel (2).



P46.15-2079-00

1 Rotary switch



P46.15-2163-00

2 Multifunction steering wheel buttons

### Deactivation of easy entry/exit

Care must be taken to ensure that no-one gets caught in moving parts when the easy entry/exit feature is operated.

The procedure must be stopped immediately if there is any risk of someone being caught in between moving parts.

This can be done either:

- By actuating the steering column adjustment switch (1) on the steering wheel

The seat and steering column immediately stop.



P46.15-2165-00

1 Steering column adjustment switch

or

- By pressing the steering column adjustment switch (2) on the control panel on the driver door

The seat and steering column immediately stop.



P46.15-2164-00

2 Steering column adjustment switch

or

- By actuating the switch for seat adjustment (3) on the control panel on the driver door
- By pressing the position key of the memory function (4)

The seat and steering column immediately stop.



P91.29-2380-00

3 Seat adjustment switch group  
4 Memory function buttons

## Easy entry/exit feature • Maybach

### Deactivation of easy entry/exit

The electronic easy entry/exit feature is installed in the Maybach as standard.

When the driver's door is opened (ignition off) or when the electronic key is removed, the steering column is moved in the direction of the instrument panel and raised. At the same time, if preset, the driver seat is moved to the rear. When closing the driver door, the steering column and driver seat are automatically reset to the last adopted position.

The easy entry/exit feature is switched on and off in the "COMFORT" sub-menu of the control system using the buttons on the multifunction steering wheel (1).



P54.25-5375-00

1 Multifunction steering wheel buttons

### Aborting the adjustment procedure

Care must be taken to ensure that no-one gets caught in moving parts when the easy entry/exit feature is operated.

The procedure must be stopped immediately if there is any risk of someone being caught in between moving parts.

This can be done either:

- By actuating the steering column adjustment switch (2) on the steering wheel

The seat and steering column immediately stop.



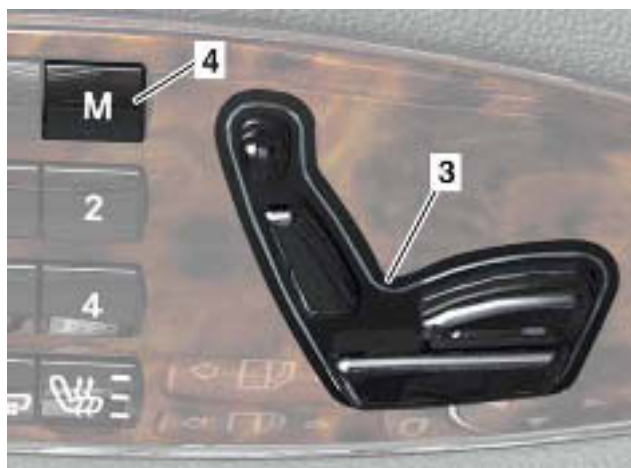
P54.25-5376-00

2 Steering column adjustment switch

or

- By actuating the switch for seat adjustment (3) on the control panel on one of the doors
- By pressing the memory button (4) on the control panel of one of the doors

The seat and steering column immediately stop.



P54.25-5377-00

2 Seat adjustment switch  
4 Memory button

 Risk of injury

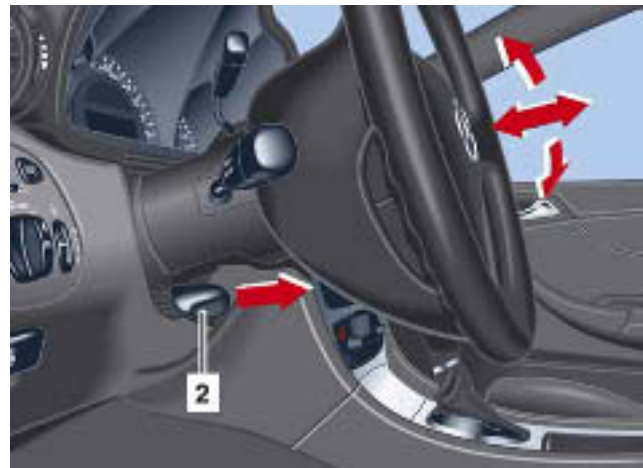
Measures

When the electronic steering column adjustment switch is pressed, make sure that no-one gets jammed by the moving parts.

**Stop the adjustment immediately if there is a danger of anybody being trapped.**

Depending on the equipment specification Mercedes-Benz vehicles have a manual or electronic steering column adjustment.

The lever for manual steering column adjustment is located underneath the steering column.



2 Steering column adjustment lever

P46.15-2080-00

The switch for electronic steering column adjustment is located underneath the combination switch (lights and windshield wiper) on the steering wheel or on the control panel on the driver door.



3 Steering column adjustment switch

P46.15-2081-00



## Adjusting the steering column • Maybach

### Maybach 57 and Maybach 62

The switch for electronic steering column adjustment is located below the combination switch (lights and windshield wipers) on the steering wheel.



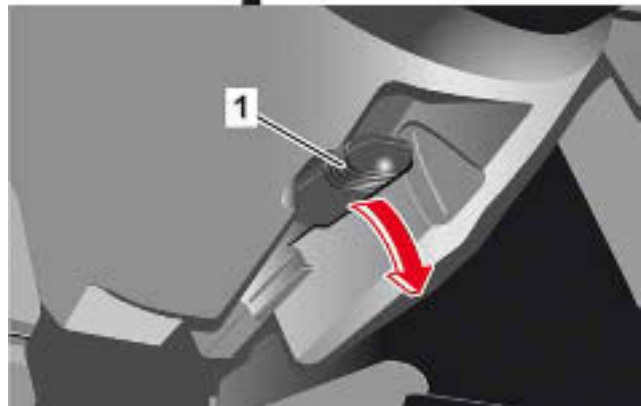
P54.25-5376-00

2 Steering column adjustment switch

### smart forfour (model 454)

The height of the steering wheel can be adjusted according to requirements.

- Press the lock (1) downwards
- Adjust the steering wheel
- Press the lock (1) upwards




P46.15-2242-00


1 Locking mechanism





## Roll bar • Mercedes-Benz passenger cars

 Risk of injury	Measures
<p>When <b>disconnecting the batteries</b> or when <b>cutting electrical lines</b>, the <b>ground lines must always</b> be disconnected or cut through first, as otherwise <b>there is a risk of short-circuiting</b>.</p>	<p><b>If this is not possible, insulated tools must be used to disconnect or cut the cables.</b></p>

 Risk of injury	Measures
<p>There is a <b>risk of injury</b> through an untriggered <b>roll bar</b> in its <b>deployment area</b>.</p> <p>If, in the course of <b>rescue work</b>, where <b>the battery has not been disconnected</b>, parts of the vehicle <b>undergo significant movement</b> or <b>electrical lines are cut</b>, a <b>deployment of the roll bar</b> cannot be ruled out. This can cause <b>injury</b> if there is anyone within the <b>deployment area</b> of the roll bar.</p>	<p><b>Disconnect all batteries. If this is not possible, the occupants must be protected before raising the roll bar.</b></p> <p><b>Assistants should not be located in the deployment area, if the roll bar has not been deployed, unless it is absolutely necessary.</b></p> <p><b>Do not place any objects in the area of a roll bar that has not been deployed.</b></p>

### Observe roll bar

In cases where the rescue or treatment of victims has to be carried out within the movement radius of an untriggered roll bar (e.g. where persons are trapped), the following points must be observed before commencing rescue operations:

- Switch off the ignition
- Disconnect or cut both battery lines (positive and negative cables) (for vehicles with two batteries at both batteries)
- Do not place tools, rescue equipment or other objects on the roll bar when it has not been extended



P91.50-2058-00

**Extendable roll bar**



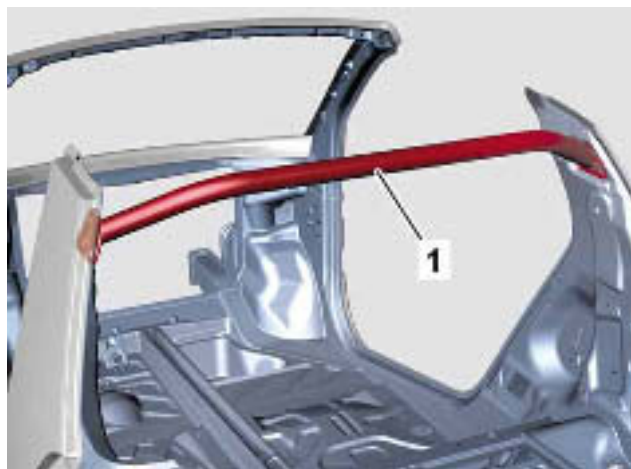
P91.50-2050-00

**Retractable roll bar**

## Roll bar • smart

### Roll bar of smart fortwo cabrio and smart roadster

On the smart fortwo cabrio (model 450 and 451), smart roadster and roadster coupé (model 452), the roll bar is integrated in the body structure.




P91.50-2073-00


1 Roll bar of smart fortwo cabrio




P91.50-2074-00

2 Roll bar of smart roadster

 Risk of injury	Measures
When <b>disconnecting</b> the <b>batteries</b> or when <b>cutting electrical lines</b> , the <b>ground lines must always</b> be disconnected or cut through first, as otherwise <b>there is a risk of short-circuiting</b> .	If this is not possible, <b>insulated tools must be used to disconnect or cut the cables</b> .

 Risk of injury	Measures
There is a <b>risk of injury</b> within the <b>deployment range</b> of <b>airbags</b> that have not been triggered or have only been partially triggered. If, during <b>rescue work</b> , where the <b>battery has not been disconnected</b> , parts of the vehicle <b>undergo significant movement</b> or <b>electrical lines are cut</b> , then <b>an airbag</b> (front airbag, sidebag or windowbag) may be deployed. In this case, <b>both the airbag and any loose objects</b> or <b>glass splinters</b> , which could be projected towards the accident victims or assistants, <b>may cause injuries</b> .	<p><b>Cover occupants before commencing any work, preferably with a transparent sheet. Wear protective clothing/safety glasses.</b></p> <p><b>Disconnect all batteries. If this is not possible, or only partially possible, keep away from airbags that have not been triggered or have only been partially triggered.</b></p> <p><b>Do not perform any cutting operations in the vicinity of airbags that have not been triggered or have only been partially triggered.</b></p> <p><b>Keep heat away from airbags that have not been triggered or have only been partially triggered.</b></p> <p><b>Do not place any objects in the vicinity of airbags that have not been triggered or have only been partially triggered.</b></p>

 Note	
<p><b>In the following vehicles both batteries must be disconnected:</b></p> <ul style="list-style-type: none"> <li>• E-Class (model 211)</li> <li>• CL-Class (model 216)</li> <li>• CLS-Class (model 219)</li> <li>• S-Class (model 221)</li> <li>• SL-Class (model 230)</li> </ul> <p><b>If only one battery is disconnected, the other battery supplies the airbag system so that it remains active!</b></p>	



## Occupant restraint systems • Mercedes-Benz passenger cars

### Occupant restraint systems (SRS - Supplemental Restraint System)

All Mercedes-Benz vehicles are equipped with seat belts and a supplemental occupant restraint system (SRS). The system encompasses:

- Indicator lamp **SRS** in instrument cluster
- Emergency tensioning retractor
- Belt force limiter
- Airbags

The approximate position of an airbag in the vehicle can be ascertained by the "**SRS AIRBAG**" or "**AIRBAG**" badge at the installation location or in its immediate vicinity, depending on the model series.

The following airbags may be available in the vehicle if equipped:

- Driver airbag in steering wheel housing
- Front passenger airbag above or in place of glove box
- Sidebags at front in doors or in outer sides of front seat backrests
- Rear sidebags in doors, side trim or wheel wells
- Head/thorax sidebags in doors or in outer sides of front seat backrests
- Windowbags in roof frame between A, C and/or D-pillars
- Knee airbag in instrument panel positioned level with the knees of driver and front passenger



P91.60-2419-00

**Driver airbag**



P91.60-2420-00

**Front passenger airbag**



P91.60-2425-00

**Sidebag or head/thorax sidebag**

**i** Note

Various safety devices are available on the market which are intended to protect the victims and the rescue teams from airbag deployments.

The Mercedes-Benz vehicle airbag systems, however, are designed so that they can no longer be triggered by the airbag sensor systems after the battery has been disconnected. Such protection devices are therefore no longer required.



P91.60-2638-00

Sidebag or head/thorax sidebag

**!** Risk of injury

Measures

When **protection devices** are used, whose purpose is to protect against **airbag deployment** after an accident, there is a **risk** that these protection devices may be **catapulted out of position** by the airbag deployment and thus present an **additional hazard potential** to both victim and rescue personnel.

We advise against using such "**protection devices**", which could **penetrate** the airbag fabric and thus prevent any pressure buildup, **because** in the event of an airbag deployment **the hot burn-off gas** can escape unhindered and cause **burn injuries**.

**Cover occupants before commencing any work, preferably with a transparent sheet.**  
**Wear protective clothing/safety glasses.**

**Disconnect all batteries. If this is not possible keep away from airbags that have not been triggered or have only been partially triggered.**

**Do not perform any cutting operations in the vicinity of airbags that have not been triggered or have only been partially triggered.**

**Keep heat away from airbags that have not been triggered or have only been partially triggered.**

**Do not place any objects in the vicinity of airbags that have not been triggered or have only been partially triggered.**



## Occupant restraint systems • Mercedes-Benz passenger cars

### Sidebags and windowbags

Windowbags (1) and sidebags (2) or head/thorax sidebags are triggered:

- Whenever a high vehicle deceleration or acceleration acts in the transverse direction in the early stages of a collision
- Whenever additional protection can possibly be provided
- Always on the side of the collision
- Independently of the front airbags
- Irrespective of any activation of the emergency tensioning retractors
- When the vehicle overturns, only if a high vehicle deceleration in the transverse direction is detected and additional protection can be provided as a precaution



P91.60-2857-00

#### CLS-Class (model 219)

- 1 Windowbags
- 2 Sidebags
- 3 Windowbag gas generators

Neither the front nor the side airbags usually deploy in the case of rear-end collisions or rollovers.

On vehicles in the following model series both windowbags may be triggered following certain rollovers around the vehicle's longitudinal axis:

- E-Class (model 211)
- CLS-Class (model 219)
- S-Class (model 220, as of model refinement 10/2002)
- S-Class Coupé (model 215, as of model refinement 10/2002)

The head/thorax sidebags could be triggered on the passenger side and, depending on the seat occupation, on the following model series:

- SLK-Class (model 171)
- SL-Class (model 230)
- CLK-Class convertible, (model 209)

On vehicles in the other model series, windowbags are generally not triggered in the event of a rollover.


#### **i** Note

**By contrast to other airbag units the gas generators in the windowbags do not contain any solid fuel, but rather they are filled with highly-compressed gas and must not be cut!**

**Depending on the vehicle model the gas generators for windowbags are located in the A or C-pillars or in the roof frame. For technical reasons the installation locations deviate somewhat in the various model series.**

**For this reason, we urgently recommend that before commencing any cutting operations on A or C-pillars or on the roof frame, the corresponding inner paneling should be removed and the installation positions of the gas generators for windowbags should be ascertained.**

## Two-stage front airbag units

 Risk of injury	Measures
<p>If on two-stage front airbag units, <b>only the first ignition stage</b> has been activated, then this <b>cannot be seen from the outside!</b> Despite a <b>triggered airbag</b> the same <b>safety precautions</b> must be met as for an airbag that has not yet triggered. A <b>triggering of the second ignition stage</b> during rescue work cannot always be ruled out.</p>	<p><b>Cover occupants before commencing any work, preferably with a transparent sheet.</b>  <b>Wear protective clothing/safety glasses.</b></p> <p><b>Disconnect all batteries. If this is not possible keep away from airbags that have not been triggered or have only been partially triggered.</b></p> <p><b>Do not perform any cutting operations in the vicinity of airbags that have not been triggered or have only been partially triggered.</b></p> <p><b>Keep heat away from airbags that have not been triggered or have only been partially triggered.</b></p> <p><b>Do not place any objects in the vicinity of airbags that have not been triggered or have only been partially triggered.</b></p>

Two-stage front airbag units are equipped with two ignition stages which are triggered independently depending on the deceleration values in the longitudinal direction.

The following vehicles are fitted with two-stage front passenger airbags as standard:

- S-Class (model 220)
- S-Class coupé (model 215)

Two-stage driver and front passenger airbags are included in standard equipment for the following vehicles:

- A-Class (model 169)
- C-Class (model 203 and 204)
- E-Class (model 211)
- CLK-Class (model 209)
- CLS-Class (model 219)
- SLK-Class (model 171)
- SL-Class (model 230)
- S-Class (model 221)
- CL-Class (model 216)
- SLR McLaren (model 199)
- M-Class (model 163 as of 09/2000 and 164)
- GL-Class (model 164)
- R-Class (model 251)

On vehicles with two-stage front airbag units, only one ignition stage may be activated, depending on the severity of the accident


It is not **externally apparent**, whether only **one** or **both ignition stages** have been activated. For this reason, the safety precautions for vehicles with two-stage front airbag units are to be observed (just like for airbags that have not been deployed) despite a triggered front airbag.

**i** The triggering strategies for the supplemental restraint systems are subject to modification if necessary, e.g. due to new findings in accident research.





## Occupant restraint systems • Mercedes-Benz passenger cars

 Risk of injury	Measures
<p>From <b>contact with the airbag</b> during deployment, occupants may suffer slight <b>reddening of the skin</b> and <b>abrasions</b>, e.g. on the insides of the forearms or in the face. Slight <b>irritation of the respiratory passages</b> cannot be ruled out.</p>	<p><b>The state of the accident victim must, where possible, be assessed taking the following aspects into consideration, in order to implement suitable precautions.</b></p>

The airbag's air sack inflates within a few milliseconds during the collision. A front airbag reaches its full volume within approximately 45 ms. Immediately after maximum volume is reached, the airbag starts to deflate. The gas escapes through an air hole or through the fabric and the airbag collapses (exception: windowbags).

Fully triggered airbags that are hanging down can be pushed upwards or to the side so as to create the necessary space for the rescue action. Airbags do not need to be cut out or covered. A fully triggered airbag represents no medical risk for the occupants or the rescue crew.

In cases in which the rescue or care is to be performed in the area of airbags that have not been triggered, the following must be observed:

- Switch off the ignition
- Disconnect or cut the electrical lines on the battery (on both batteries in vehicles with two batteries)
- Do not perform cutting work in the immediate vicinity of the airbag units concerned
- If there are no occupants on the rear seats, move the front seats as far to the rear as possible

Avoid overheating the area around the airbag unit, such as the steering wheel impact plate, the instrument panel on the passenger side and the door linings. If an airbag unit is heated to **over 160° C, it is likely to be triggered.**

**i** The white, powdery residues left inside the vehicle after deployment of an airbag are nontoxic. They consist for the most part of talcum, which acts as a lubricant for the airbag fabric!

## Occupant restraint systems • Mercedes-Benz passenger cars

### Seat belts

The seat belt buckles can usually be opened normally after a crash. However, it is often easier to cut the belts at an easily accessible point. In this way the rescue crew do not need to lean over the victim, which might cause further discomfort or injury. Furthermore, leaving the belt buckle fastened provides the police with evidence that the belt was being worn.

### Emergency tensioning retractor

Seat belt retractors, sometimes with reel tensioners, are installed as a unit lower down on the B and C-pillars, the buckle emergency tensioning retractors are located in the seat belt buckles. The seat belt emergency tensioning retractors are activated in frontal or rear-end collisions with a sufficiently high deceleration or acceleration acting in the longitudinal direction. Additionally, the emergency tensioning retractors are activated at specific rollovers around the vehicle's longitudinal axis, if the vehicle is equipped with a rollover sensor, and in the event of a side collision on the side away from the impact. Reel tensioners and buckle emergency tensioning retractors are only activated if the seat belt buckles are inserted.

Emergency tensioning retractors normally need no special consideration during a rescue.

Mercedes-Benz vehicles (depending on the vehicle model and equipment) are equipped with emergency tensioning retractors on both the driver and front passenger seats as well as the outer rear seats.

**i** When the seat belt emergency tensioning retractor is activated, the belt is retracted by max. 150 mm. The retractors cannot be triggered after the battery has been disconnected!



## Occupant restraint systems • Mercedes-Benz passenger cars

### Reversible emergency tensioning retractors with PRE-SAFE

The preventive passive occupant protection system PRE-SAFE can recognize critical driving situations that present an increased accident hazard, and prepare the vehicle and occupants preventively for a possible collision:

- The driver and front passenger seat belts are reversibly tensioned by means of an electric motor
- Depending on the vehicle equipment, the front passenger seat can be moved to a better longitudinal position and the cushion and backrest angles can be adjusted to a more favorable position.
- In vehicles with electrically adjustable individual rear seats, the inclination angle of the seat cushion can be optimized

The aim of this system is to move the occupants into the best possible position before any collision so that the seat belts and airbags can provide optimum protection in the crash.

When skidding outside the ESP controlled range, which could ultimately cause the vehicle to rollover, the sliding roof (when open) is closed.

### Reversible emergency tensioning retractors

The seat belt emergency tensioning retractors in the inertia reels are electrically operated and reversible. If an accident is prevented, the preventive emergency tensioning retraction loosen the seat belts again.



P91.40-2456-00

*Reversible emergency tensioning retractor*



P91.40-2457-00

*Buckle emergency tensioning retractor*

#### **i** Note

The pyrotechnical tensioning devices on vehicles equipped with PRE-SAFE may consist of buckle emergency tensioning retractors (model 164, 211, 221, 251...) or reel tensioners (model 204).

All Maybach vehicles are equipped with seat belts and an additional occupant restraint system (SRS). The system encompasses:

- Indicator lamp **SRS** in instrument cluster
- Emergency tensioning retractor
- Belt force limiter
- Airbags

The rough position of an airbag in the vehicle can be ascertained by the "**SRS AIRBAG**" or "**AIRBAG**" badge at the installation location or in its immediate vicinity.

The following airbags are present in the vehicle:

- Driver airbag (two-stage) in the steering wheel housing
- Front passenger airbag (two-stage) above the glove compartment
- Front sidebags (side airbags) in the outsides of the backrests
- Rear sidebags (side airbags) in the outsides of the backrests
- Front windowbags in the roof frame between A and B-pillars
- Rear windowbags in the roof frame between B and C-pillars



P91.60-3297-00

- 1 Driver airbag (two-stage)  
2 Front passenger airbag (two-stage)



P91.60-3298-00

- 3 Front sidebag  
4 Rear sidebag



P91.60-3299-00

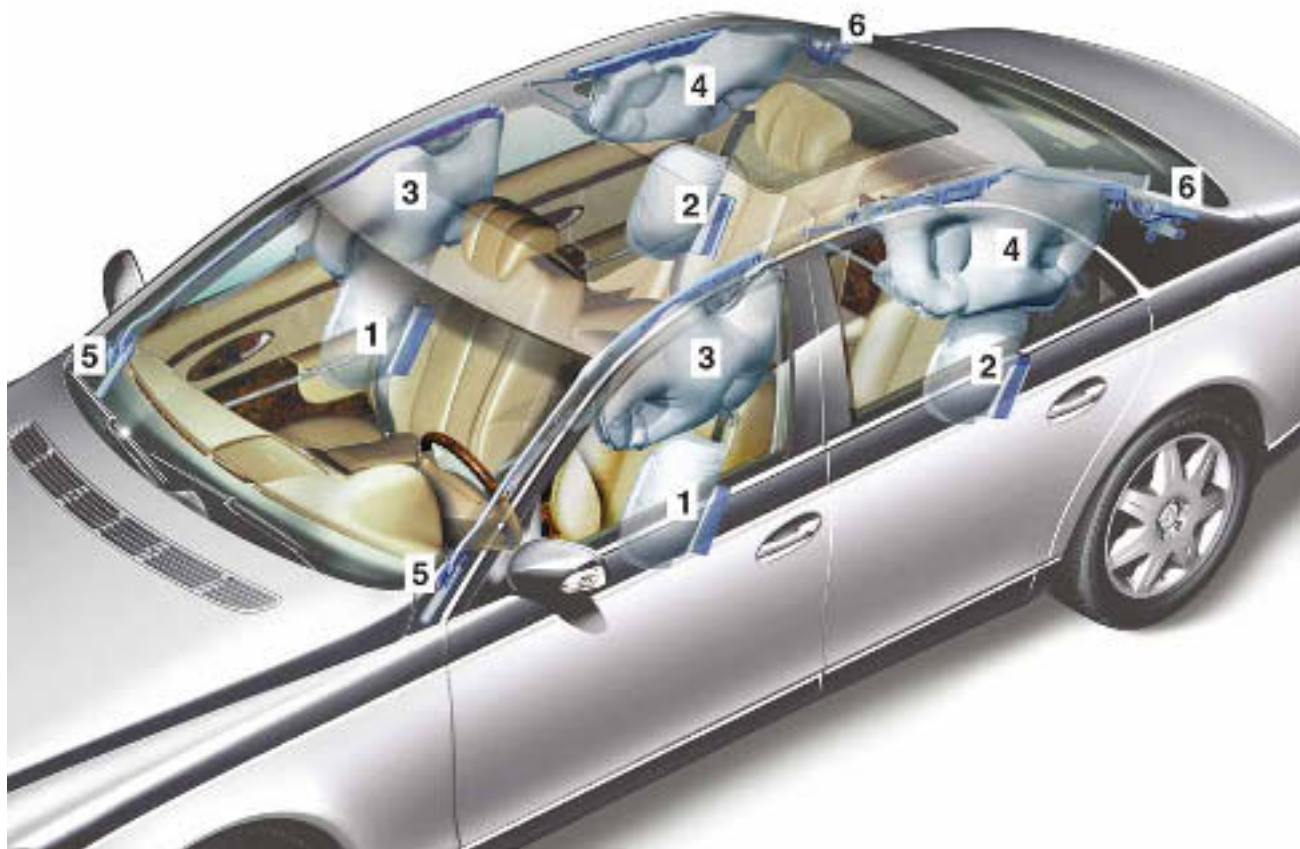
- 5 Front windowbag  
6 Rear windowbag

## Occupant restraint systems • Maybach

### Sidebags and windowbags

Windowbags (3, 4) and sidebags (1, 2) are triggered:

- Whenever a high vehicle deceleration or acceleration acts in the transverse direction in the early stages of a collision
- Whenever additional protection can possibly be provided
- Always on the side of the collision
- Independently of the front airbags
- Irrespective of any activation of the emergency tensioning retractors
- When the vehicle overturns, only if a high vehicle deceleration in the transverse direction is detected and additional protection can be provided as a precaution



P91.60-3296-00

- 1 Front sidebags
- 2 Rear sidebags
- 3 Front windowbags
- 4 Rear windowbags

- 5 Front windowbag gas generators
- 6 Rear windowbag gas generators

All smart vehicles are equipped with seat belts and an additional occupant restraint system (SRS). The system encompasses:

- Indicator lamp in the instrument cluster
- Emergency tensioning retractor
- Belt force limiter
- Airbags

The driver airbag is located in the steering wheel housing on all model series.



1 Driver airbag (all model series)

P91.60-2681-00

The front passenger airbag in the smart fortwo (model 450) is located below the instrument panel.



2 Front passenger airbag on smart fortwo (model 450)

P91.60-2734-00

The front passenger airbag on the smart fortwo (model 451) is located in the instrument panel above the glove compartment.



3 Front passenger airbag on smart fortwo (model 451)

P91.60-3458-00

## Occupant restraint systems • smart

The front passenger airbag on the smart roadster, smart roadster coupé and smart forfour is located in the instrument panel above the glove compartment.



P91.60-2682-00

4 Front passenger airbag on smart roadster (model 452) and smart forfour (model 454)

The head/thorax bags are located in the outsides of the backrests on all model series (only as sidebags in the front seats on the smart forfour).



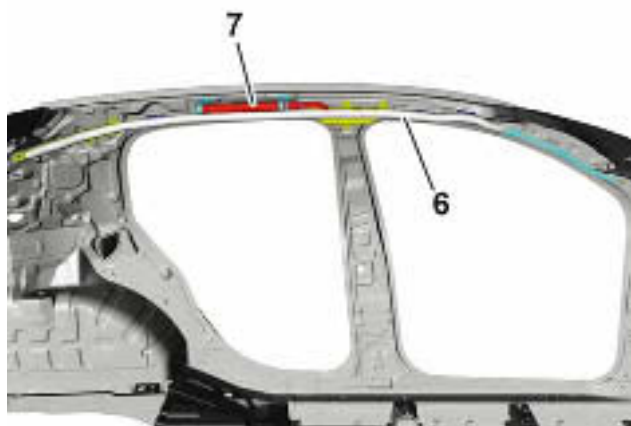
P91.60-2683-00

5 Head/thorax bags

### Only smart forfour (model 454)

The windowbags in the smart forfour (model 454) are located on the upper sides of the roof frame.

The gas generators are located in the area of the rear door behind the B-pillars.



P91.60-3238-00

6 Windowbag  
7 Gas generator

### Emergency tensioning retractor

All smart model series are equipped with three-point seat belts with belt force limitation.

The automatic belt retractors with integrated emergency tensioning retractors are located inside the bottom of the B-pillars





P91.40-2785-00



## Fuel cell drive system

### A-Class F-cell (model 168) with fuel-cell drive

 Risk of injury	Measures
<p><b>Risk of injury</b> from cables and components carrying the traction voltage.</p>	<p><b>Deactivate the traction voltage circuit.</b></p> <p><b>Do not cut traction voltage lines.</b></p> <p><b>Do not deform or cut through the bodywork near the right and left C-pillars or along the vehicle floor using cutting equipment.</b></p>

 Fire hazard!	Measures
<p><b>Risk of explosion</b> from escaping hydrogen. Hydrogen does not burn visibly!</p>	<p><b>Deactivate the traction voltage circuit.</b></p> <p><b>Deactivate the hydrogen circuit.</b></p> <p><b>Do not cut hydrogen lines.</b></p> <p><b>Do not deform or cut through the bodywork near the right and left C-pillars or along the vehicle floor using cutting equipment.</b></p>

## Special features of vehicles with fuel cell drive system (A-Class F-Cell)

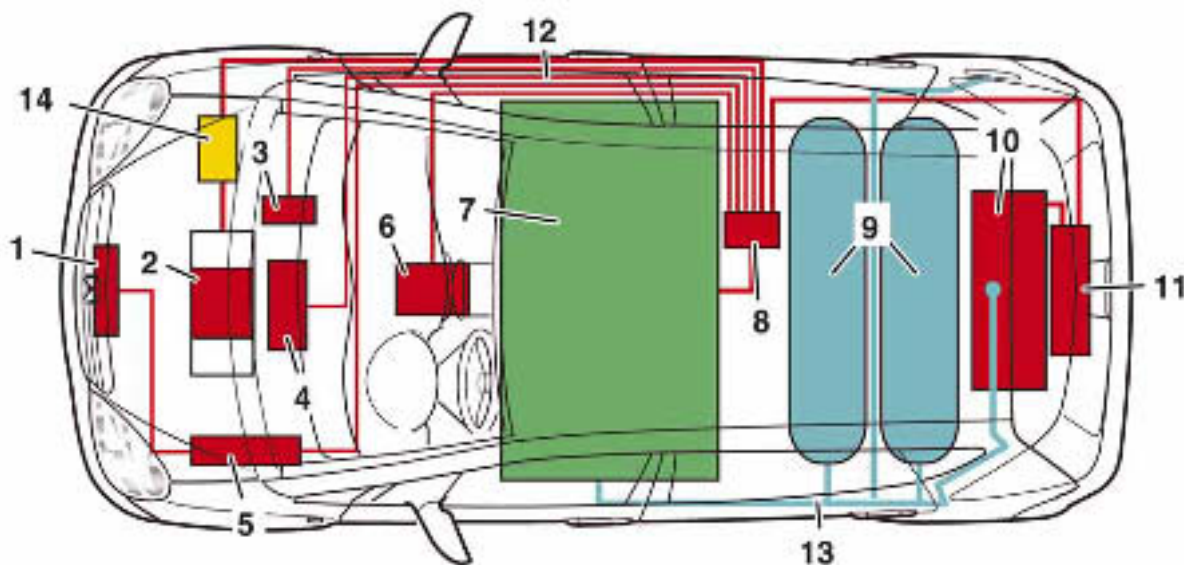
The body, interior equipment and the location of the airbags are the same as in the A-Class (model 168) with internal combustion engine (cf. summary on page 61).

The overall fuel cell system is arranged in the sandwich body floor of the A-Class (model 168) with long wheelbase.

The 12 V power supply battery (14) is located on the right side of the engine compartment, and two cylindrical hydrogen tanks (9) are installed at the rear in place of the fuel tank.



P00.10-4158-00



P00.00.3457-00

### Location of components

- |                                 |                                     |
|---------------------------------|-------------------------------------|
| 1 Fan motor                     | 8 Power distribution unit (PDU)     |
| 2 Engine with transmission      | 9 Hydrogen tanks                    |
| 3 High-temperature coolant pump | 10 450V traction voltage battery    |
| 4 Air conditioner compressor    | 11 DC/DC traction voltage converter |
| 5 Fan rectifier                 | 12 Traction voltage cables          |
| 6 PTC heater booster            | 13 Hydrogen lines                   |
| 7 Fuel cell package             | 14 12V power supply battery         |



## Fuel cell drive system

The traction voltage lines between the fuel cell stack, engine and the traction voltage battery in the trunk are routed under the right side of the vehicle. The **traction voltage lines** are colored **orange**.

The hydrogen lines between the tanks and the fuel cell stack are arranged at the bottom left of the vehicle. The tank line runs from the tank connection at the rear on the right over the wheel housing to the hydrogen tanks. The **hydrogen lines** are marked:

- **Yellow = low pressure**
- **Yellow/Red = high pressure**

**i** Before commencing any rescue action, make sure that the traction voltage and hydrogen circuits are deactivated!

**i** If the venting line is cut, hydrogen gas may escape into the inside of the car, or the cut venting line may seal itself.

### Venting line:

The venting line leads from the main valve on the hydrogen tanks, along the left C-pillar to the discharge opening in the base of the antenna (arrow) on the roof.



P47.30-2074-00

### Shutting off the voltage and hydrogen circuits manually:

- Move the selector lever to position "P"
- Turn the ignition key to position "OFF" and remove
- Disconnect 12 V battery (in engine compartment)
- Disconnect the Service Disconnect switch in the trunk (see "Shutting off the voltage and hydrogen circuits manually")

**i** The traction voltage battery (450 V) in the trunk does not need to be disconnected. It is automatically switched off via a protection device, if the hydrogen or 12 V voltage circuit is interrupted or disabled.

## Automatic shutoff of the voltage and hydrogen circuits:

The F-Cell safety system monitors all the safety-relevant operating states of the vehicle. If a critical state occurs, appropriate actions are initiated.

In event of a crash the active crash safety system actuates the restraint systems (airbags, emergency tensioning retractors) and disables by way of an additional crash switch the hydrogen supply of the fuel cell and the traction voltage circuit. The crash switch responds as of a defined acceleration in the longitudinal and transverse directions.

After triggering, the ball in the crash switch can be pushed back into its original position. This allows the vehicle to be driven to the nearest workshop following a minor accident, without damage to the safety-relevant components of the fuel cell system.

The crash switch is located on the center console in the right footwell (arrow).



P54.25-3408-00

## Shutting off the voltage and hydrogen circuits manually:

In order to ensure that the **hydrogen and traction voltage circuits have been deactivated**, the Service Disconnect switch must be actuated by separating plug connector. The plug connector (arrow) is located behind the cover on the right in the trunk. If the Service Disconnect switch is not accessible after an accident, disconnect the 12 V battery in the engine compartment or cut through the electrical lines on the battery.



P54.25-3409-00

## Bivalent engine operation

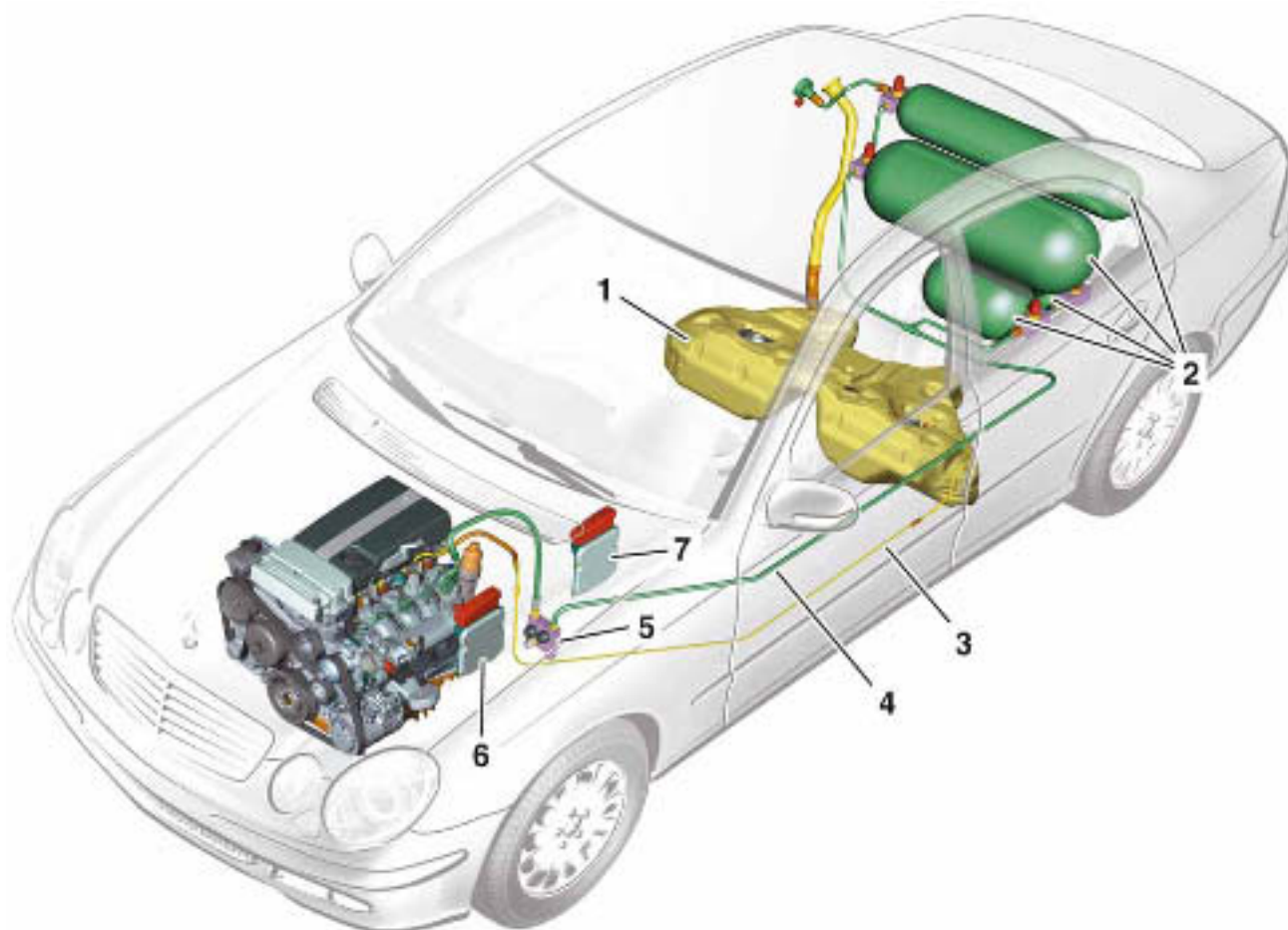
### E-Class (model 211)

In the sedan of the E-Class (model 211) an engine is used for the first time with a gasoline and natural gas drive. The engine can be operated with either natural gas or gasoline. The changeover of modes is done manually using the buttons on the multifunction steering wheel or automatically, if one of the two fuel modes has been used up.

In addition to the conventional fuel tank, the vehicle is fitted with four stainless steel gas cylinders which are located in the spare wheel well and behind the rear seats in the trunk. The natural gas is stored in these pressure tanks under a normal pressure of up to 200 bar at a gas temperature of 15 °C.

Filling of the gas cylinders is done by way of a filling connection, which is located next to the gasoline filler neck behind the extended fuel filler flap at the right rear in the direction of travel.

The most suitable form of natural gas for operating a vehicle is compressed natural gas (CNG). CNG is naturally occurring gas in compressed form.



P07.54-2012-00

#### *E-Class sedan (model 211) E 200 NGT (Natural Gas Technology)*

- |                         |                                       |
|-------------------------|---------------------------------------|
| 1 Gasoline fuel tank    | 5 Gas pressure regulator              |
| 2 Gas cylinder          | 6 Motor electronics control unit (ME) |
| 3 Gasoline fuel line    | 7 CNG control unit                    |
| 4 Natural gas fuel line |                                       |

## Safety

- Natural gas is lighter than air. Thus there are no restrictions on driving natural gas vehicles in multilevel car parks and tunnels.
- Extensive series of tests (drop tests, fire tests, crash tests) have demonstrated that the high-strength gas cylinders, lines, threaded connections and other fittings guarantee the highest possible safety levels even in the event of accidents. Thus, natural gas vehicles have no disadvantages in terms of crash behavior compared to conventionally powered vehicles.
- The installation of components in the vehicle for the natural gas mode serves to ensure that gas cannot enter the vehicle's interior.
- The risk of fire is no greater in natural gas vehicles than in gasoline or diesel-powered vehicles.



P07.54-2023-00

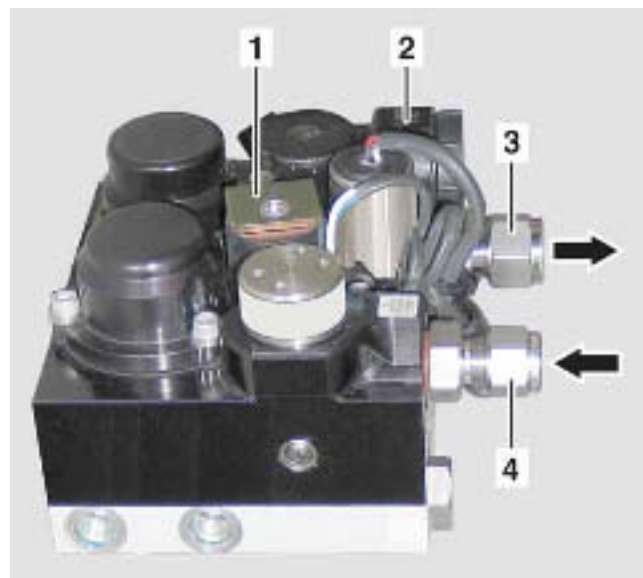
**Natural gas filling terminal**

## Gas pressure regulator

The task of the gas pressure regulator (in the engine compartment) is to reduce the high-pressure prevalent in the gas cylinders to the pressure required for the engine induction side.

The gas safety shutoff valve (1) in the pressure regulator is shutoff, if a system error is detected by the CNG control unit or, in the event of an accident, a corresponding crash signal is processed.

In the event of a malfunction in the pressure regulator, an overflow restrictor (2) reduces impermissibly high pressure by releasing it into the atmosphere via the vehicle floor.



P07.54-2036-00

**Gas pressure regulator**

- 1 Gas safety shutoff valve
- 2 Overflow restrictor
- 3 Line connection to engine
- 4 Line connection from gas cylinders

**⚠ Fire hazard!**

There is a risk of explosion due to escaping gas!



## Bivalent engine operation

### Gas cylinder and armature with safety features:

- **Gas safety shutoff valve (1)**

The safety shutoff valve is opened with ignition "ON" and in gas operation mode. When the engine is off or in gasoline mode or in an emergency situation (crash signal from ME-SFI control unit), the solenoid valve circuit is interrupted, and the valve closes automatically.

- **Mechanical shutoff valve (2)**

During service work, or if the natural gas tank system leaks, the gas cylinders can be sealed using a suitable tool with the mechanical shutoff valve. It is closed by turning in the clockwise direction.

- **Fuse (3)**

The fuse reacts at temperatures above 110 °C and opens the relevant gas cylinder. The content of the gas cylinder can then escape into the atmosphere in a controlled manner via the flow limiter (5).

- **Flow limiter (5)**

If there is a significant pressure drop in the system, e.g. in a crash involving separation of the entire connection fitting or a broken line in the system between the gas cylinders and the gas pressure regulator, the flow limiter screwed into the neck of the gas cylinder reduces the quantity of escaping gas by means of a very small shutter.

- **Rubber caps (7)**

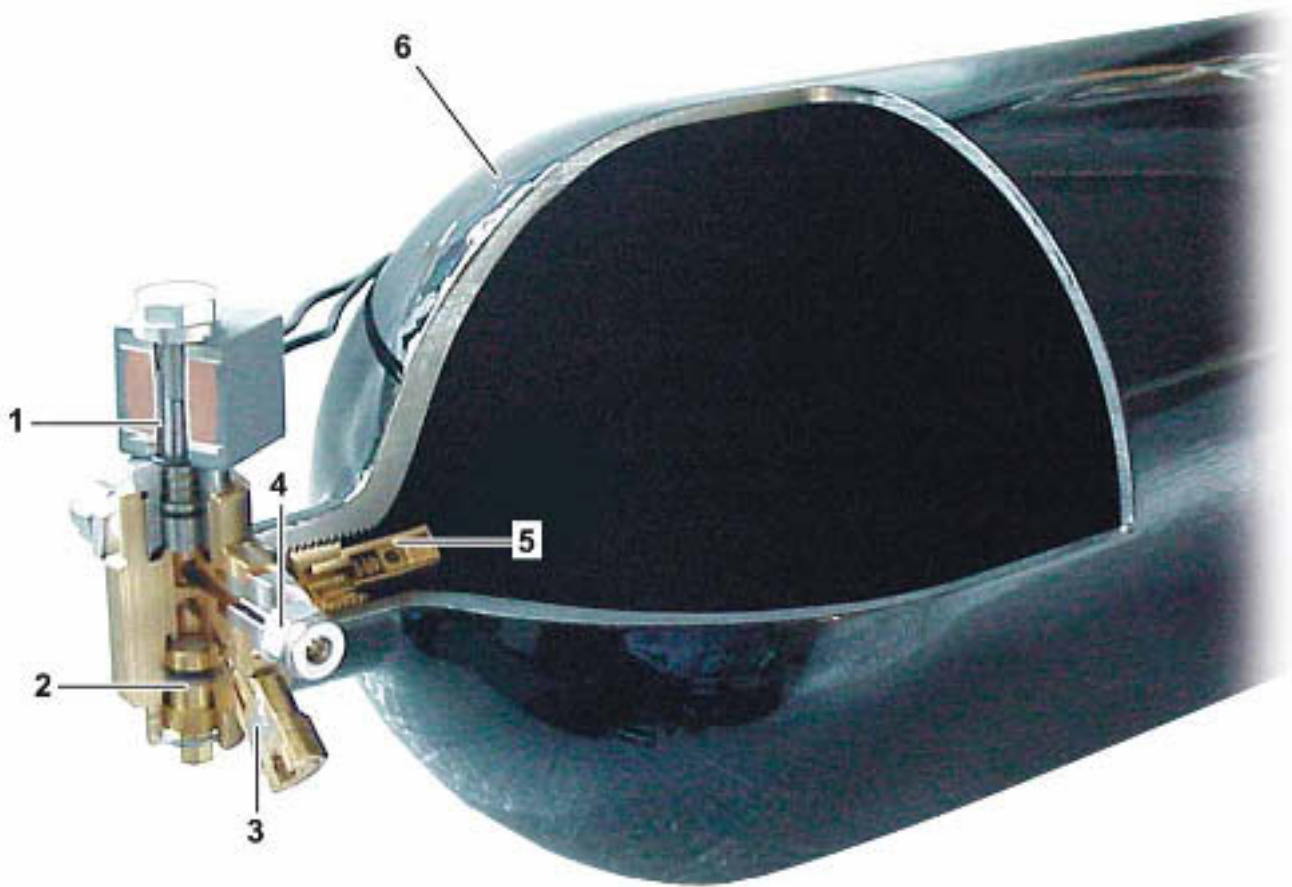
The safety fittings are fitted with gas-tight rubber caps. If the fuse (3) blows or gas escapes at the shutoff valves (1, 2), it is collected in the rubber caps and directed into the atmosphere via the connected corrugated tube on the vehicle floor.



#### **Fire hazard!**

There is a risk of explosion due to escaping gas!

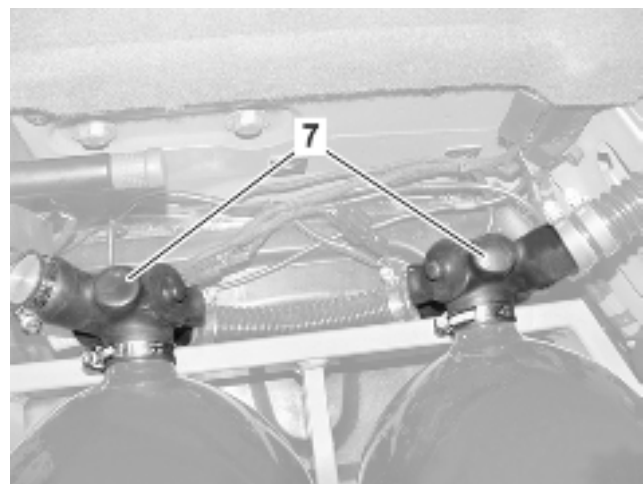




P07.54.2025-00

**Gas cylinder and armature with safety features:**

- 1 Safety shutoff valve
- 2 Manual shutoff valve
- 3 Fuse
- 4 Threaded connection
- 5 Flow limiter
- 6 Gas cylinder made of stainless steel
- 7 Rubber caps



P47.10-2424-00





## Bivalent engine operation

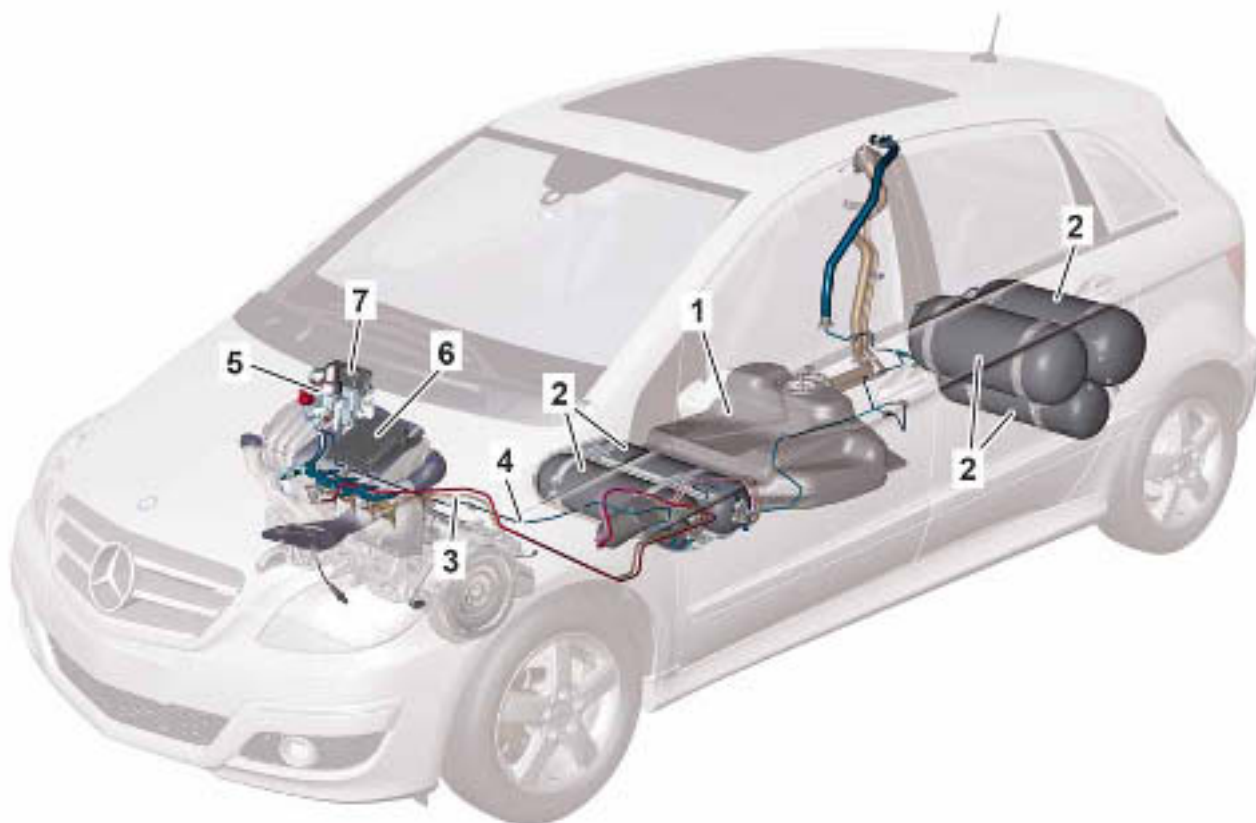
### B-Class (model 245)

The B170 NGT BlueEFFICIENCY is the first vehicle in the Mercedes-Benz range of compact models to be equipped with bivalent engine operation. The 4-cylinder engine can be operated with either natural gas CNG (Compressed Natural Gas) or premium-grade gasoline.

The driver can set the required operating mode using the multifunction steering wheel in the multifunction display in the instrument cluster.

The engine 266.960 and the fuel system have had the following components added to them:

- CNG control unit
- Filler connection for natural gas behind the fuel filler flap
- 5 gas cylinders with shutoff valve
- Pressure regulating unit with safety shutoff valve and high-pressure sensor
- Low pressure gas shutoff valve in the gas pipe to the gas distribution rail
- Gas distribution rail with injection valves
- Gas low-pressure sensor
- Gas temperature sensor



P07.54-2055-00

### **B-Class (model 245) B 170 NGT BlueEFFICIENCY**

- 1 Gasoline fuel tank
- 2 Gas cylinder
- 3 Gasoline fuel line
- 4 Natural gas fuel line

- 5 Pressure regulating unit
- 6 Motor electronics control unit (ME)
- 7 CNG control unit



In addition to the conventional fuel tank, five gas cylinders made of plastic composite material have also been installed. Two of them are located in the floor of the vehicle under the front passenger seat and the other three are arranged under the floor at the vehicle rear.

The nominal pressure for the gas cylinders is 200 bar. Each individual gas cylinder is checked at a test pressure of 300 bar, and each one has a burst pressure rating of more than 600 bar.

The gas cylinders are mounted in stable fixtures. Thermally activated safety valves equipped with a fuse, bursting disks and flow rate limiters help prevent gas cylinders from bursting. Each gas cylinder can also be mechanically locked using a manual shutoff valve.

Each of the five gas cylinders is equipped with a safety armature. In a parked vehicle that runs on gasoline, and depending on the predefined forces that act on a vehicle in the event of an accident, the cylinders are automatically locked by an electromagnetic shutoff valve.

### Safety shutoff

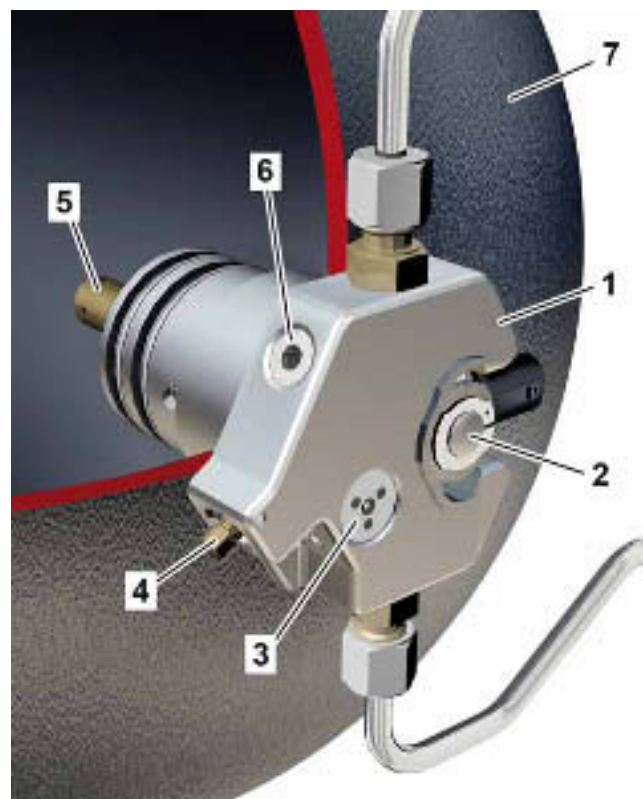
A safety shutoff can be activated by a system error or a crash signal.

For safety reasons, a fault in the natural gas system can result in the system being shutoff. Reactivation is only possible if the fault is deleted using the DAS.

A crash signal shuts off the natural gas or gasoline injection system. The gasoline injection system is available again, the next time the engine is started, when the necessary function requirements are complied with. A reactivation of the natural gas system following a crash signal is only possible using the DAS.

### Gas cylinder with safety armature

- 1 Gas cylinder safety armature
- 2 Electromagnetic shutoff valve
- 3 Thermally activate safety valve
- 4 Manual shutoff valve
- 5 Flow-rate limiter
- 6 Bursting disk
- 7 Gas cylinder



P07.54-2062-00



## General

### Location of airbags:

The airbags in Mercedes-Benz passenger car model series are located as follows if equipped:

- In the steering wheel (driver airbag)
- Above or in place of the glove box in the instrument panel (front passenger airbag)
- In the doors (sidebags or head/thorax sidebags)
- In the outer areas of the seat backrests (front sidebags or head/thorax sidebags)
- In the area of the roof pillars and side roof frame (windowbags)
- In the lower area of the instrument panel (knee airbags)

Depending on the model series, the position of each airbag is recognizable by the symbol "**SRS AIRBAG**" or "**AIRBAG**" on the airbag or in the immediate vicinity of the installation location.

### Location of battery:

The battery in Mercedes-Benz passenger car model series is located as follows if equipped:

- In the engine compartment
- In the right front of the passenger compartment
- Under the left or right rear seat
- Under the driver seat
- Under the front passenger seat
- In the luggage or load compartment

On vehicles with two batteries

- E-Class (model 211)
- CL-Class (model 216)
- CLS-Class (model 219)
- S-Class (model 221)
- SL-Class (model 230)

one battery is located in the trunk and one battery is located in the engine compartment.

On the SLR McLaren (model 199) both batteries are located in the trunk.

All models are fitted with a prefuse which breaks the connection between the alternator and the positive battery terminal in the event of a short circuit, thus eliminating one potential source of fire.

SLK-Class vehicles (model 171) with compressor engine are equipped with a cutoff relay (alternator/battery) or a prefuse. The cutoff relay interrupts the connection between the alternator and the positive battery terminal in the event of a crash involving activation of an airbag or the seat belt emergency tensioning retractors. This prevents possible short circuits caused by deformed vehicle parts. The cutoff relay is activated on "Ignition ON" and is triggered directly by the airbag control unit.



**Location of structural reinforcements:**

The structural reinforcements of relevance to rescue operations are all located in the region of the passenger cell.

The layout of the side protection elements differs according to the model series concerned. These include in particular the A, B and C-pillars, all the roof frames and the door areas. With regard to the doors, the significant areas are the end faces of the doors (hinge or lock area) and all the longitudinal and lateral reinforcements running between the door end faces. Tubular door reinforcements are installed at the height of the car bumpers.

**Location of fuel tank:**

The fuel tank in the Mercedes-Benz passenger car model series is located in the area in front or above the rear axle or under the loading floor.

The fuel lines are routed in protected areas along the center tunnel or the side skirt and are mainly made of metal. In the engine compartment they are routed such that in the event of a deformation of the front end as a consequence of a head-on collision a fuel line can for the most part not be ripped off.

The fuel pump is shut down automatically when the engine comes to a stop.

The illustrations on the following pages show the possible location of **airbags, batteries, structural reinforcements and fuel tanks**.

Some of the airbags are only available as special equipment. In other words, not all the airbags listed are necessarily present in each vehicle model.

**i** **The tubular door reinforcements between the end faces of the doors, the A and B-pillar reinforcements and the retractable top linkage on convertibles and roadsters cannot be cut using conventional fire brigade hydraulic cutting gear!**

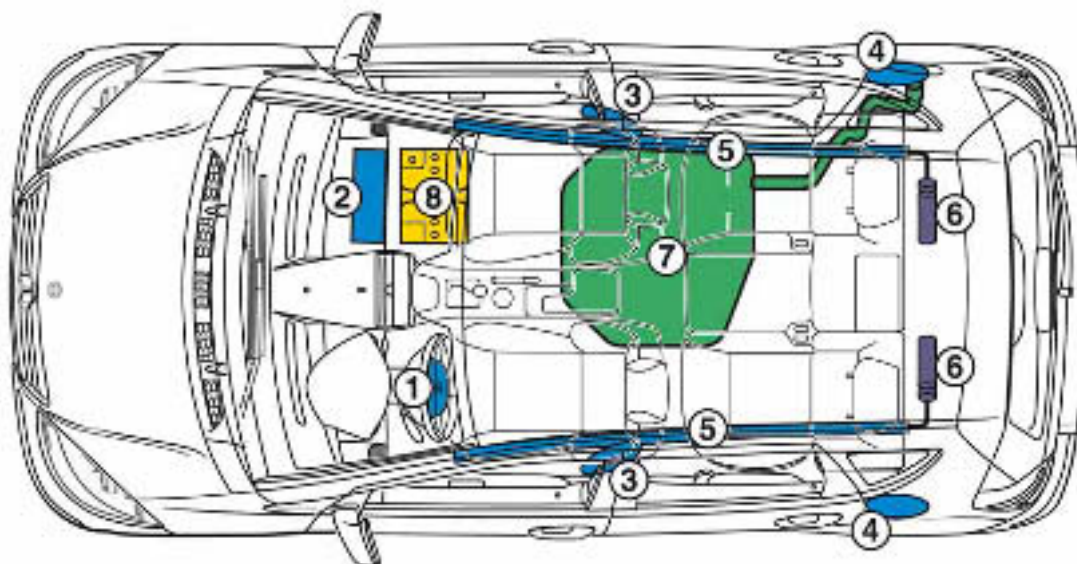
They are made of high-strength steel with a tensile strength significantly higher than  $1,000 \text{ N/mm}^2$ , they have a tube diameter between 20 and 30 mm and a wall thickness of approx. 2 to 3 mm.

## Sedan

**A-Class**  
(model 169)



P00.00-3665-00



P00.00-3664-00

**Location:**

Airbag



Gas generators



Battery



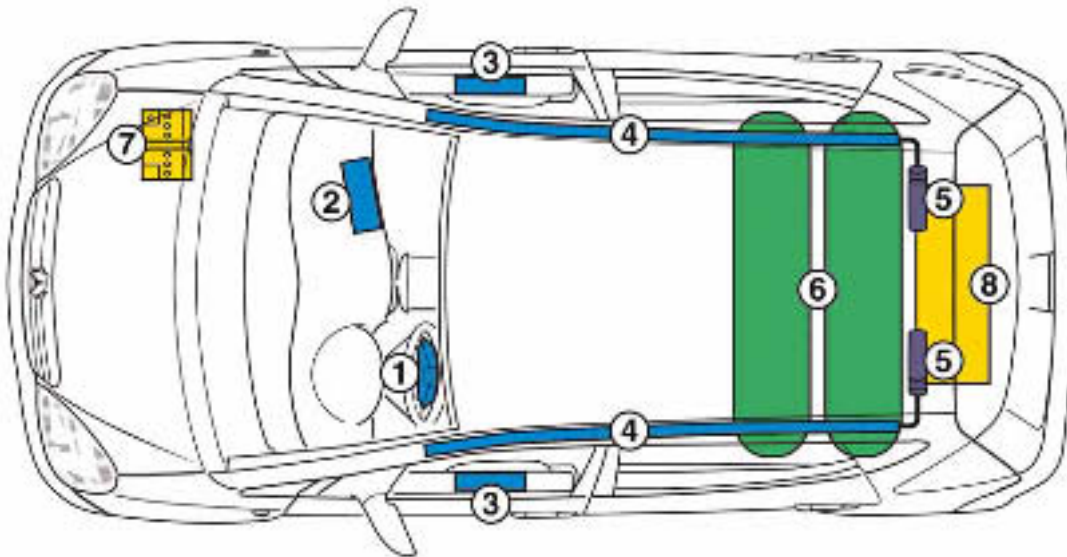
Fuel tank

- 1 Driver airbag
- 2 Front passenger airbag
- 3 Head/thorax sidebag or front sidebag (in backrest)
- 4 Rear sidebag (in C-pillar)
- 5 Windowbag
- 6 Windowbag gas generator
- 7 Fuel tank
- 8 Battery (in front right passenger footwell)

**A-Class F-Cell**  
(model 168)







P00.00-3459-00



P00.00-3460-00

**Location:**

-  Airbag
-  Gas generators
-  Battery
-  Fuel tank

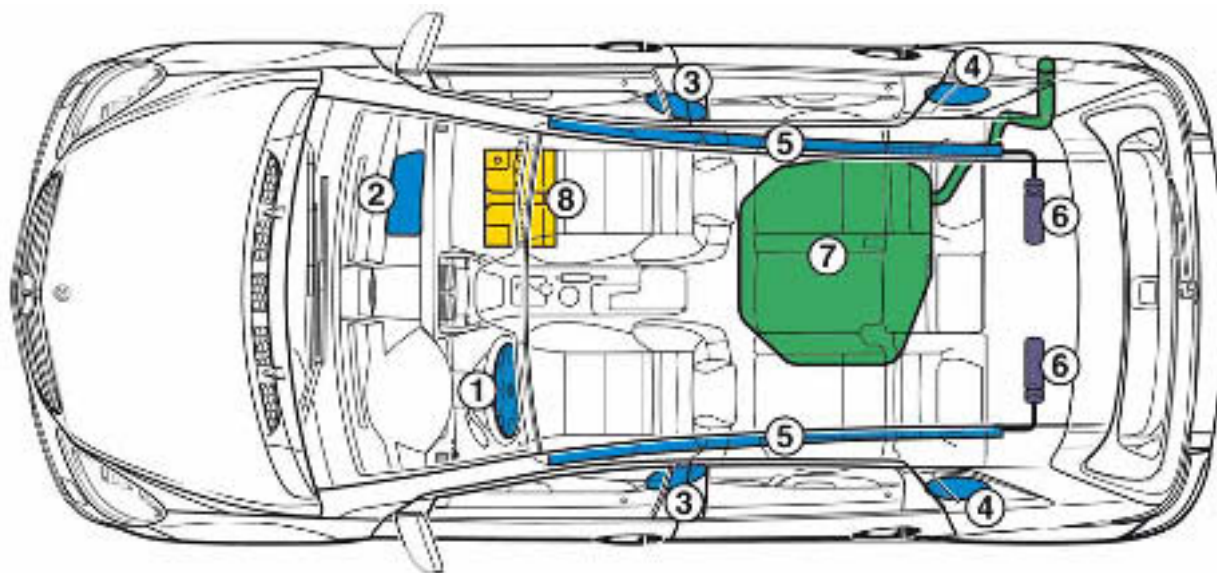
- 1 Driver airbag
- 2 Front passenger airbag
- 3 Front sidebag
- 4 Windowbag
- 5 Windowbag gas generator
- 6 Hydrogen tanks
- 7 Power supply battery 12V
- 8 450 V traction voltage battery

## Sedan

**B-Class**  
(model 245)



P00.00-3812-00



P00.00-3815-00

**Location:**

Airbag



Gas generators



Battery



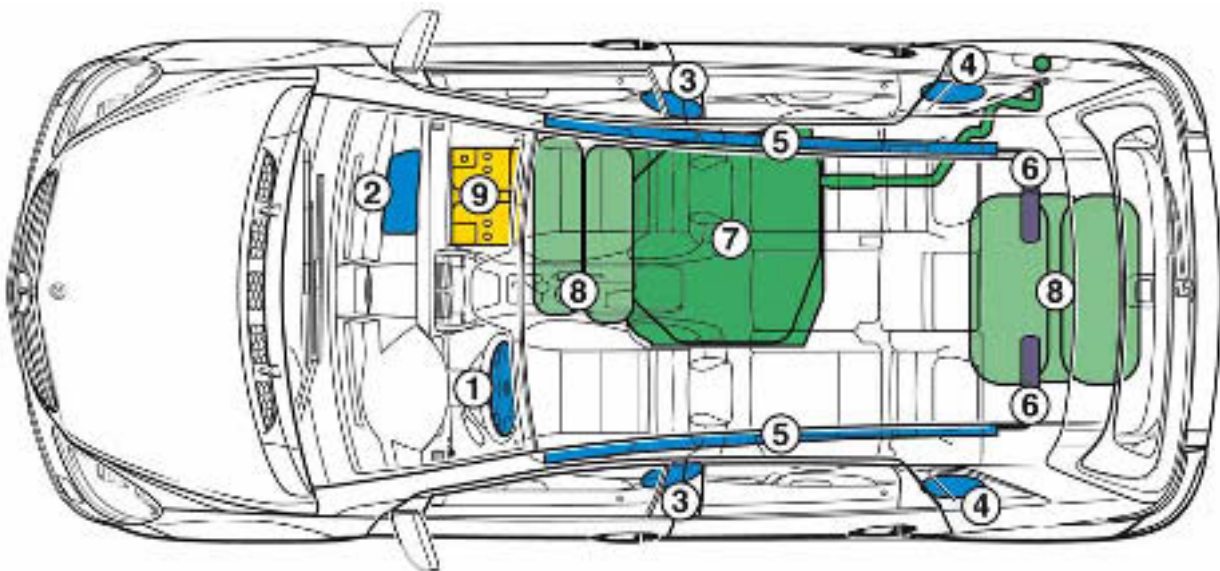
Fuel tank

- 1 Driver airbag
- 2 Front passenger airbag
- 3 Front sidebag (in backrest)
- 4 Rear sidebag
- 5 Windowbag
- 6 Windowbag gas generator
- 7 Fuel tank
- 8 Battery (in front right passenger footwell)

**B-Class (model 245)**  
**with bivalent engine operation**








P00.00-3812-00



P00.00-4344-00

**Location:**

-  Airbag
-  Gas generators
-  Battery
-  Tank
-  Gas cylinders

- 1 Driver airbag
- 2 Front passenger airbag
- 3 Front sidebag (in backrest)
- 4 Rear sidebag
- 5 Windowbag
- 6 Windowbag gas generator
- 7 Fuel tank
- 8 Gas cylinder
- 9 Battery (in front right passenger footwell)

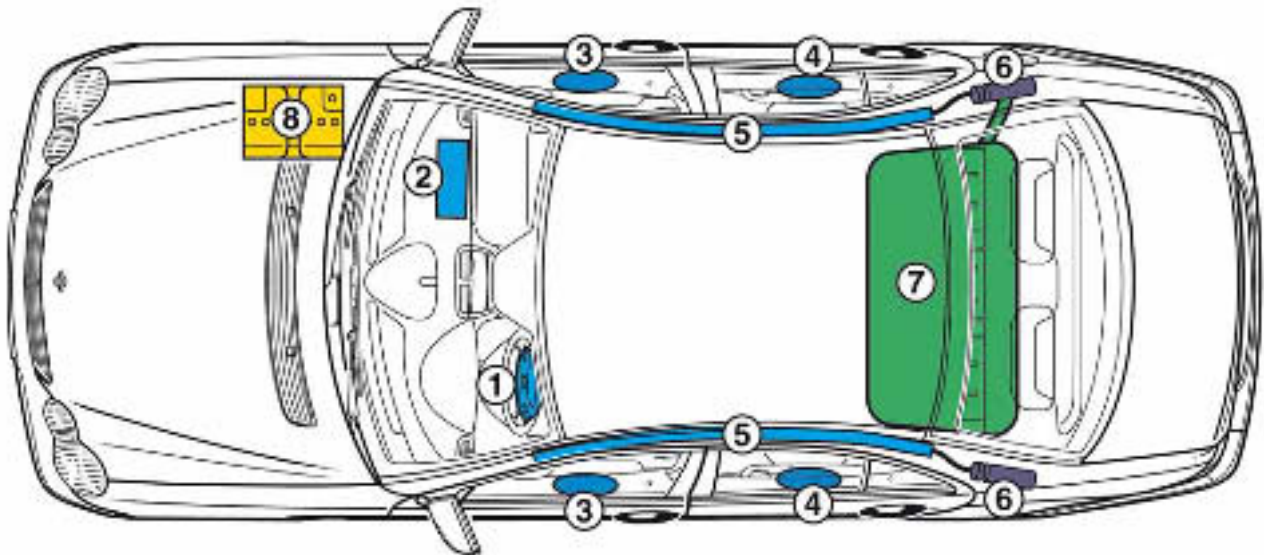


Sedan

*C-Class*  
(model 203)







P00.00-3248-00



P00.00-3249-00

**Location:**

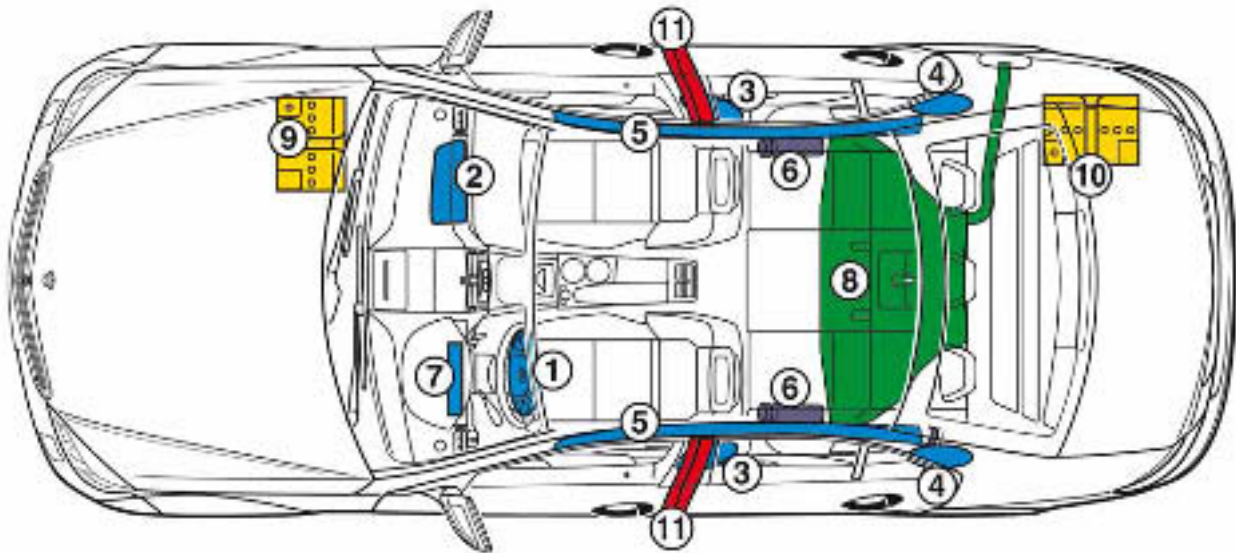
-  Airbag
-  Gas generators
-  Battery
-  Fuel tank

- 1 Driver airbag
- 2 Front passenger airbag
- 3 Front sidebag
- 4 Rear sidebag
- 5 Windowbag
- 6 Windowbag gas generator
- 7 Fuel tank
- 8 Battery

**C-Class**  
(model 204)



P00.00-4045-00



P00.00-4046-00

**Location:**

- Airbag
- Gas generators
- Battery
- Tank
- Structural reinforcements

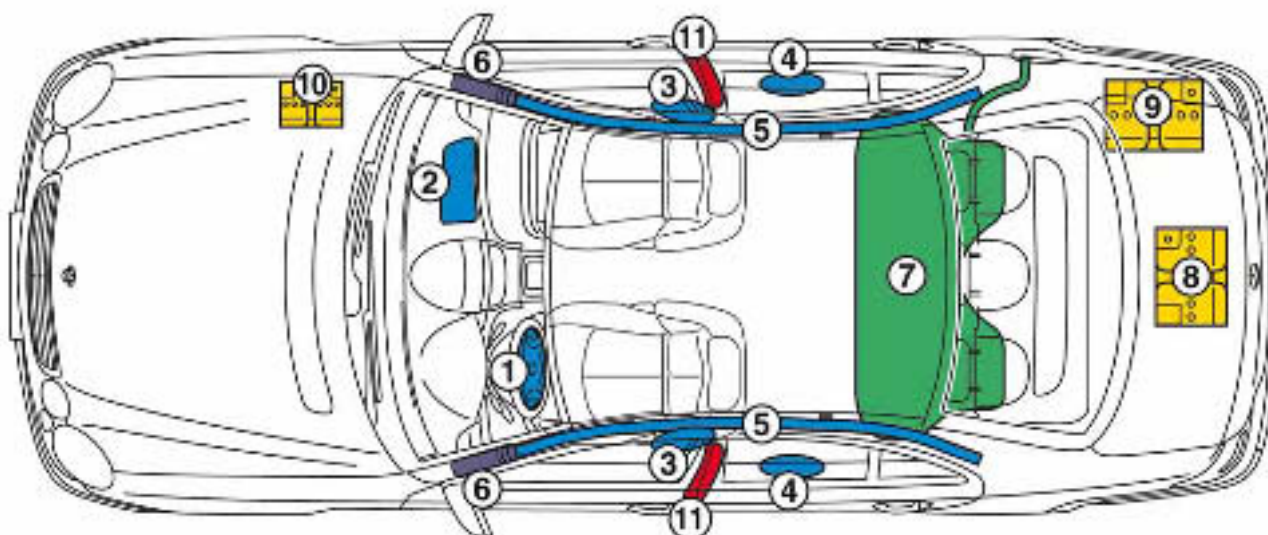
- 1 Driver airbag
- 2 Front passenger airbag
- 3 Front sidebag (in backrest)
- 4 Rear sidebag
- 5 Windowbag
- 6 Windowbag gas generator (in roof frame)
- 7 Knee airbag
- 8 Fuel tank
- 9 Battery in engine compartment (vehicles with gasoline engine)
- 10 Battery on right of trunk (vehicles with diesel engine)
- 11 Reinforcement for B-pillars

## Sedan

**E-Class**  
(model 211)



P00.00-3666-00



P00.00-3379-00

**Location:**



Airbag



Gas generators



Battery



Tank



Structural reinforcements

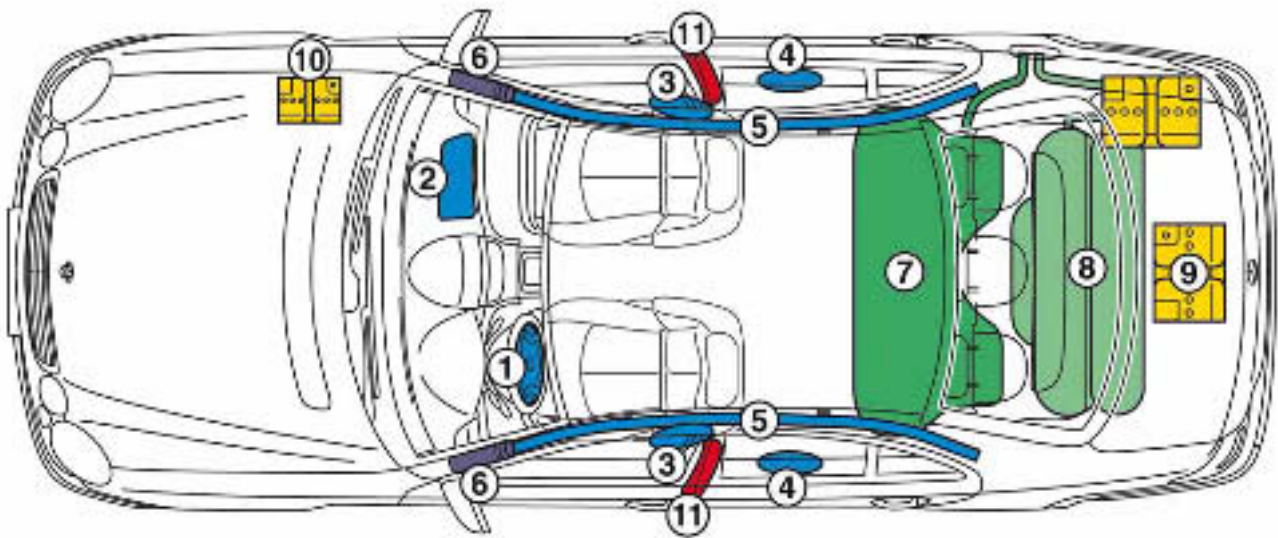
- 1 Driver airbag
- 2 Front passenger airbag
- 3 Front sidebag (in backrest)
- 4 Rear sidebag
- 5 Windowbag
- 6 Windowbag gas generator
- 7 Fuel tank
- 8 Main battery (equipment without spare wheel)
- 9 Main battery (equipment with spare wheel)
- 10 Battery in engine compartment
- 11 Reinforcement for B-pillars



**E-Class (model 211)**  
**with bivalent engine operation**



P00.00-3666-00



P00.00-3667-00

**Location:**

- Airbag
- Gas generators
- Battery
- Tank
- Gas cylinders
- Structural reinforcements

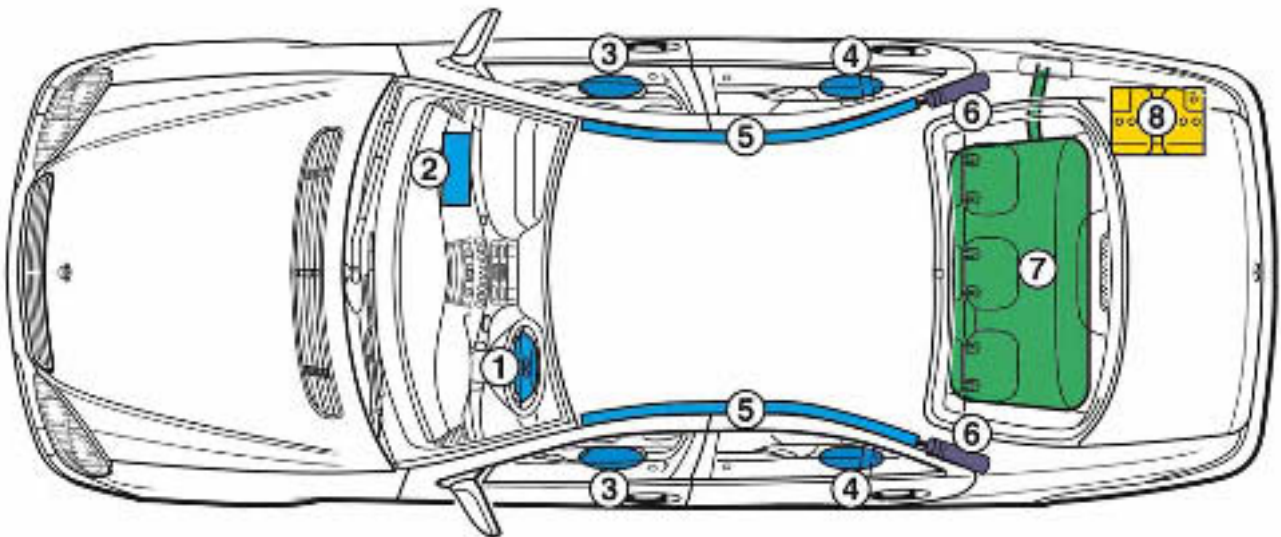
- 1 Driver airbag
- 2 Front passenger airbag
- 3 Front sidebag (in backrest)
- 4 Rear sidebag
- 5 Windowbag
- 6 Windowbag gas generator
- 7 Fuel tank
- 8 Gas cylinder
- 9 Main battery in luggage compartment
- 10 Battery in engine compartment
- 11 Reinforcement for B-pillars

## Sedan

**S-Class**  
(model 220)







P00.00-3256-00



P00.00-3257-00

**Location:**

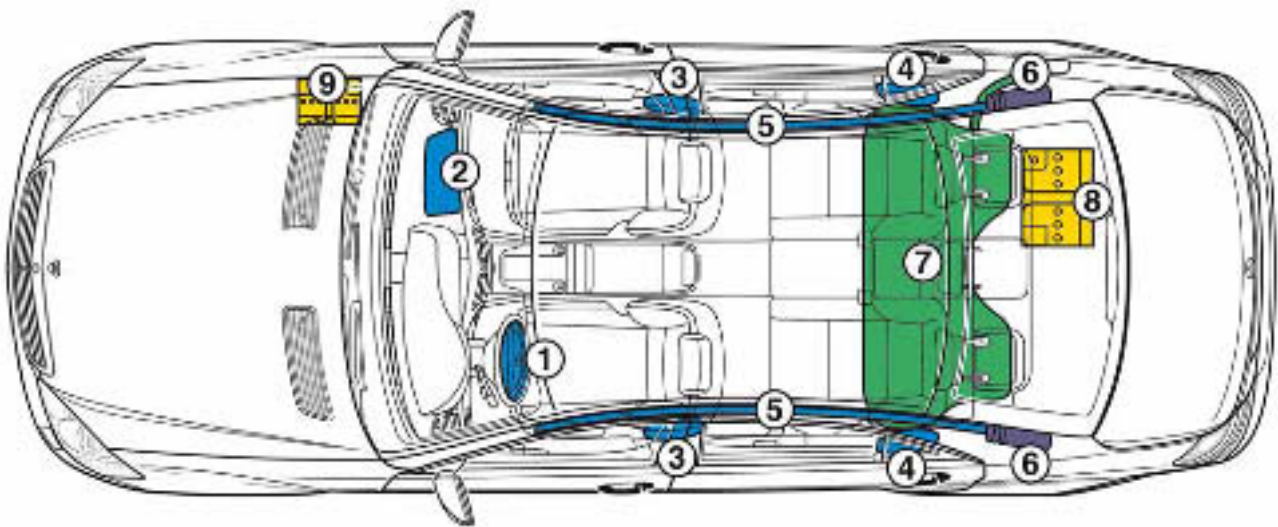
	Airbag
	Gas generators
	Battery
	Fuel tank

- 1 Driver airbag
- 2 Front passenger airbag
- 3 Front sidebag
- 4 Rear sidebag
- 5 Windowbag
- 6 Windowbag gas generator
- 7 Fuel tank
- 8 Battery in trunk

**S-Class**  
(model 221)



P00.00-3811-00



P00.00-3814-00

**Location:**

- Airbag
- Gas generators
- Battery
- Fuel tank

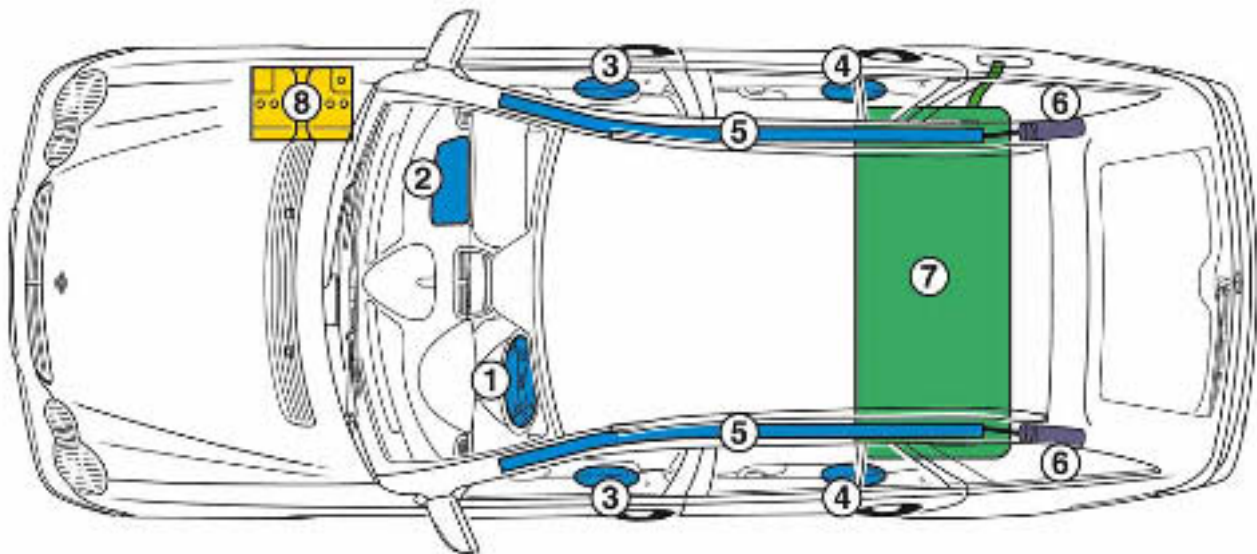
- 1 Driver airbag
- 2 Front passenger airbag
- 3 Front sidebag (in backrest)
- 4 Rear sidebag (in wheel well)
- 5 Windowbag
- 6 Windowbag gas generator
- 7 Fuel tank
- 8 On-board electrical system battery in trunk
- 9 Starter battery in engine compartment

# T-model

**C-Class**  
(model 203)



P00.00-3464-00



P00.00-3456-00

**Location:**

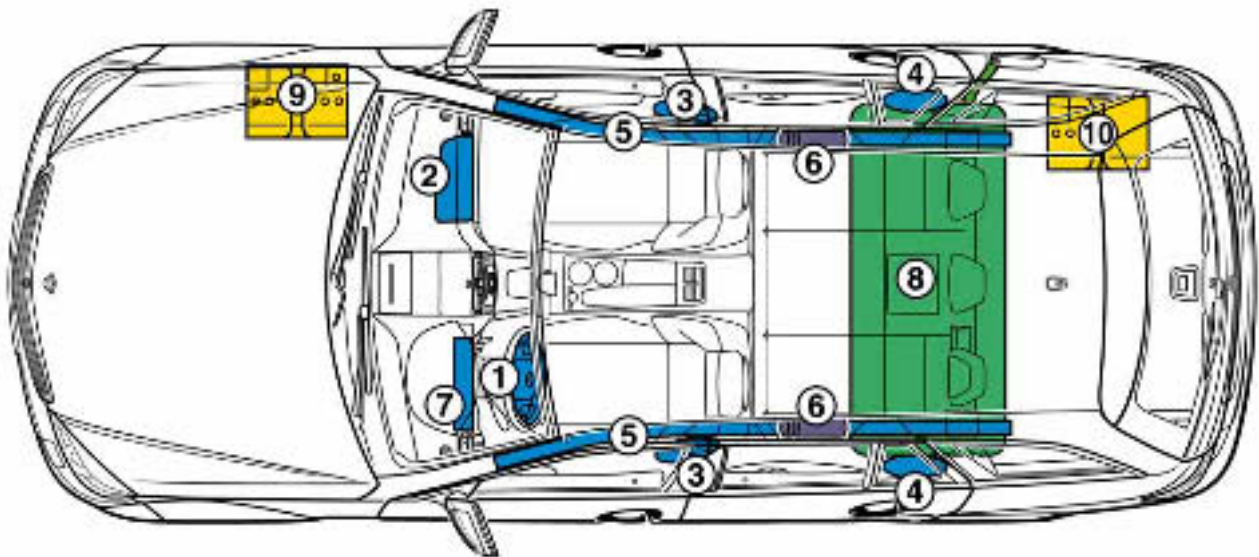
- Airbag
- Gas generators
- Battery
- Fuel tank

- 1 Driver airbag
- 2 Front passenger airbag
- 3 Front sidebag
- 4 Rear sidebag
- 5 Windowbag
- 6 Windowbag gas generator
- 7 Fuel tank
- 8 Battery in engine compartment

**C-Class**  
(model 204)



P00.00-4047-00



P00.00-4048-00

**Location:**

- Airbag
- Gas generators
- Battery
- Fuel tank

- 1 Driver airbag
- 2 Front passenger airbag
- 3 Front sidebag (in backrests)
- 4 Rear sidebag (in rear side paneling)
- 5 Windowbag
- 6 Windowbag gas generator
- 7 Driver knee airbag (under left instrument panel)
- 8 Fuel tank
- 9 Battery in engine compartment (for vehicles with gasoline engine)
- 10 Battery in cargo area (for vehicles with diesel engine)

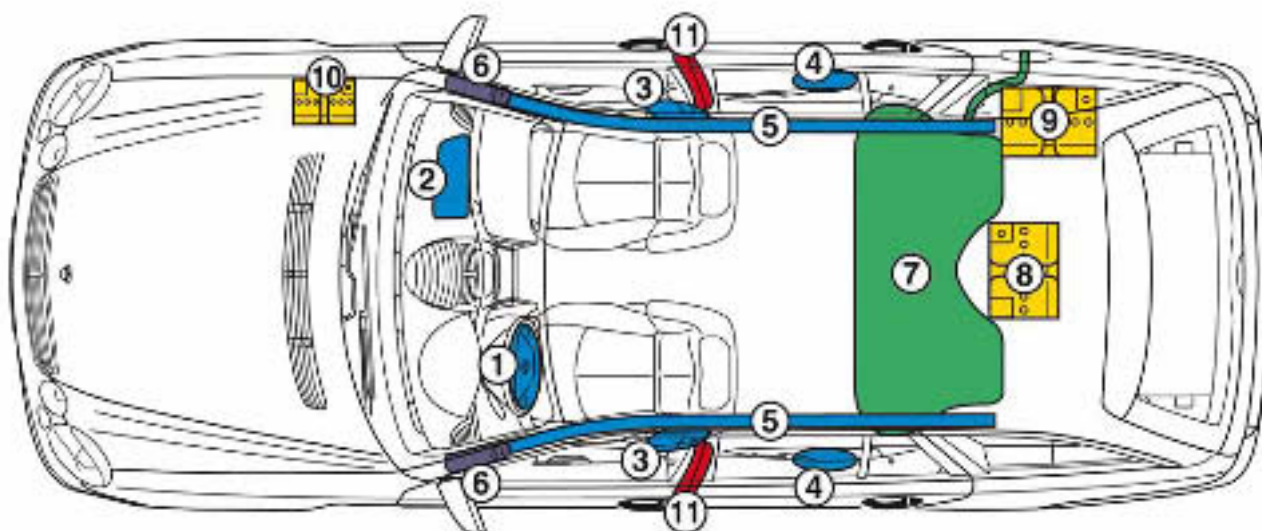


# T-model

**E-Class**  
(model 211)



P00.00-3453-00



P00.00-3454-00

**Location:**

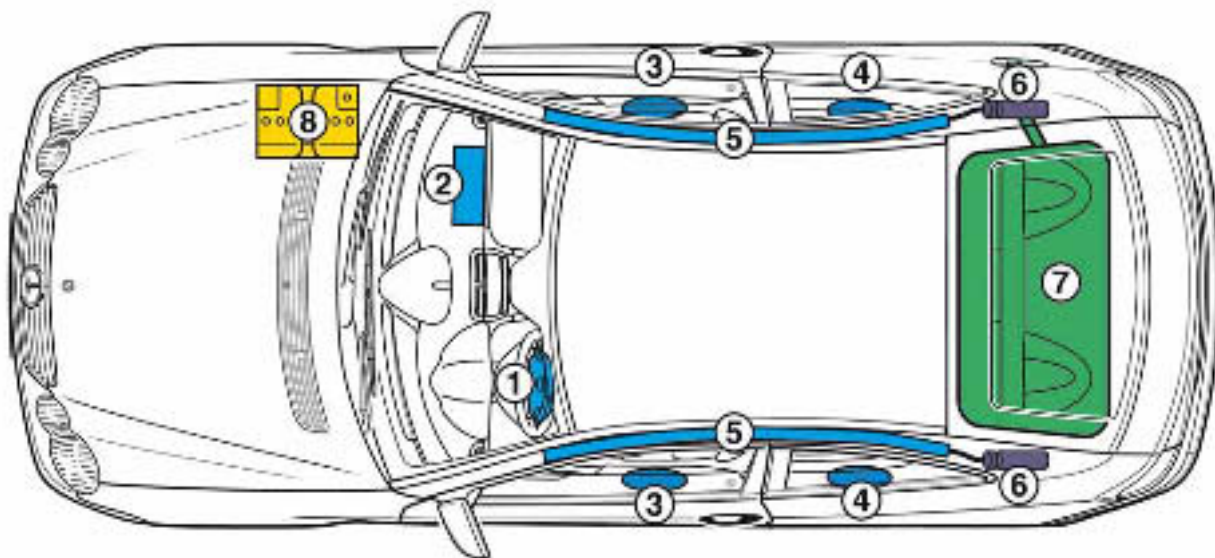
- Airbag
- Gas generators
- Battery
- Tank
- Structural reinforcements

- 1 Driver airbag
- 2 Front passenger airbag
- 3 Front sidebag (in backrest)
- 4 Rear sidebag
- 5 Windowbag
- 6 Windowbag gas generator
- 7 Fuel tank
- 8 Main battery (equipment without spare wheel)
- 9 Main battery (equipment with spare wheel)
- 10 Battery in engine compartment
- 11 Reinforcement for B-pillars

**C-Class sports coupé**  
(model 203)



P00.00-3246-00



P00.00-3247-00

**Location:**



Airbag



Gas generators



Battery



Fuel tank

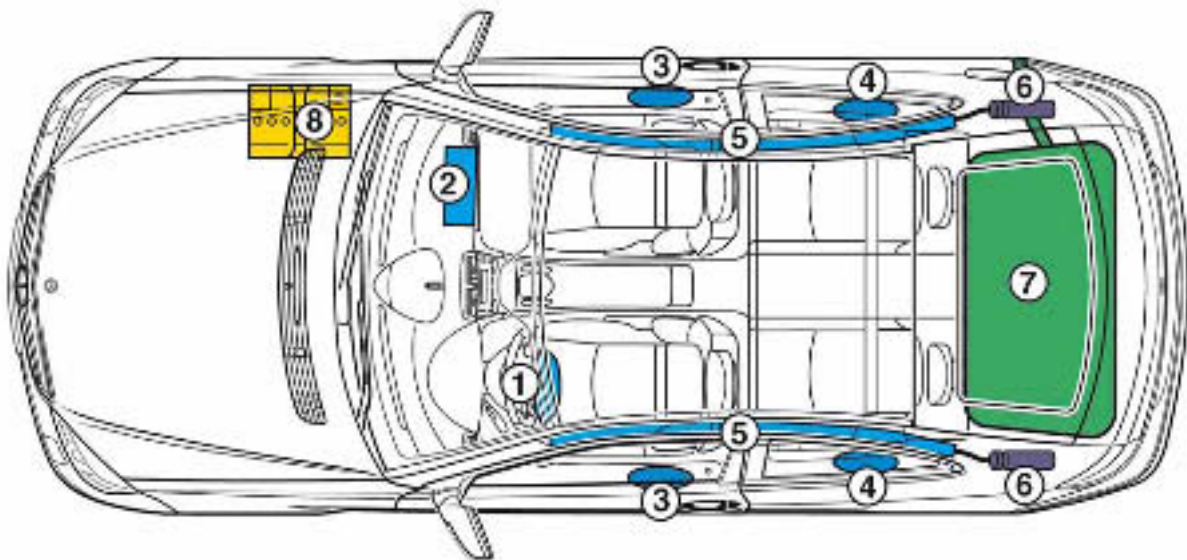
- 1 Driver airbag
- 2 Front passenger airbag
- 3 Front sidebag (in door trim)
- 4 Rear sidebag (in side trim)
- 5 Windowbag
- 6 Windowbag gas generator
- 7 Fuel tank
- 8 Battery

# Coupé

**CLC-Class**  
(model 203)



P00.00-4270-00



P00.00-4271-00

**Location:**

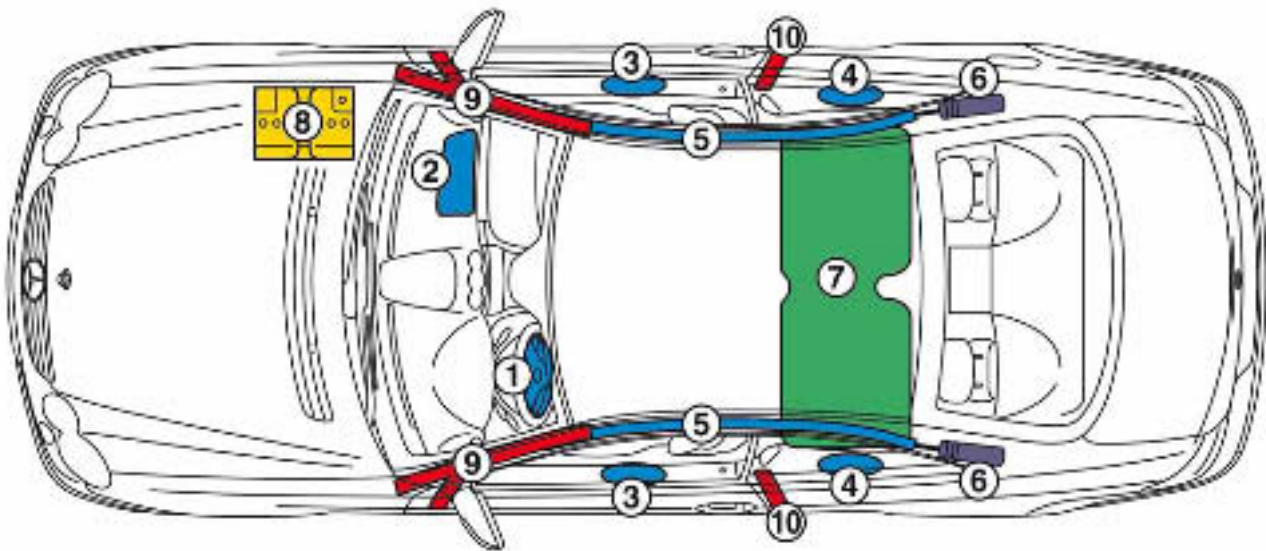
- Airbag
- Gas generators
- Battery
- Fuel tank

- 1 Driver airbag
- 2 Front passenger airbag
- 3 Front sidebag (in door trim)
- 4 Rear sidebag (in side trim)
- 5 Windowbag
- 6 Windowbag gas generator
- 7 Fuel tank
- 8 Battery

**CLK-Class**  
(model 209)








P00.00-3465-00



P00.00-3377-00

**Location:**

-  Airbag
-  Gas generators
-  Battery
-  Tank
-  Structural reinforcements

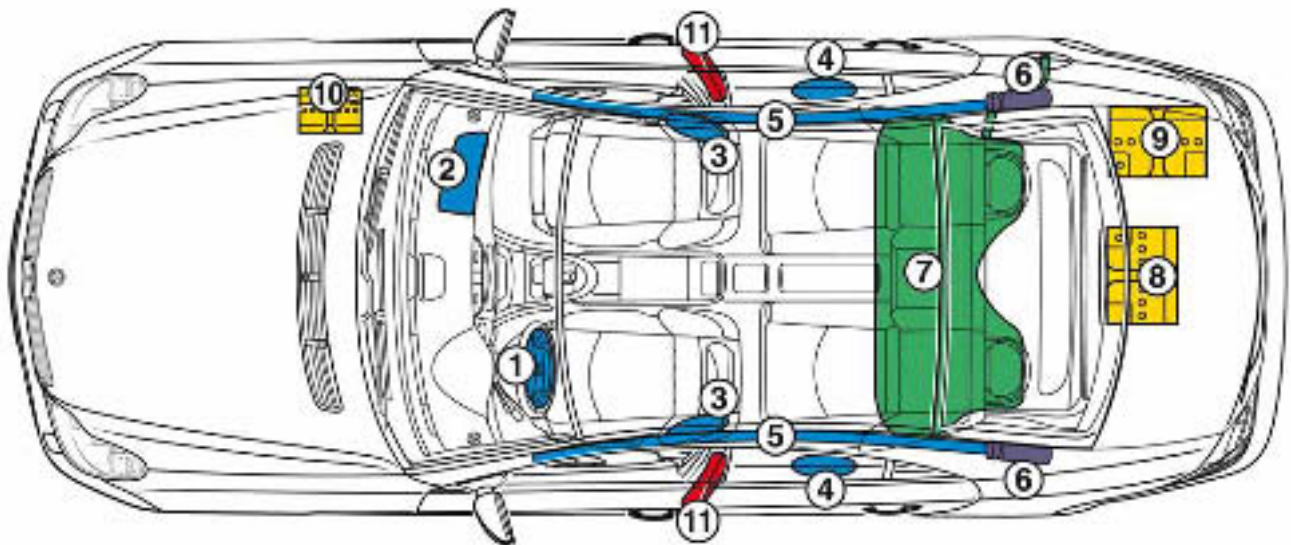
- 1 Driver airbag
- 2 Front passenger airbag
- 3 Front sidebag (in door trim)
- 4 Rear sidebag (in side trim)
- 5 Windowbag
- 6 Windowbag gas generator
- 7 Fuel tank
- 8 Battery
- 9 Structural reinforcement for A-pillars
- 10 Structural reinforcement of B-pillars

# Coupé

**CLS-Class**  
(model 219)



P00.00-3671-00



P00.00-3672-00

**Location:**

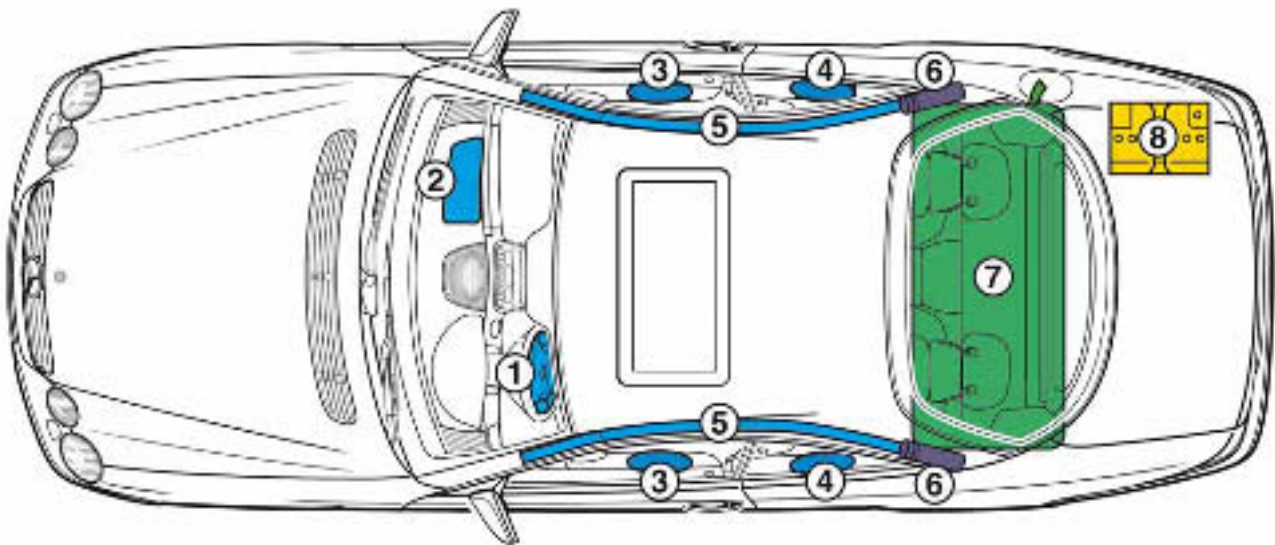
- Airbag
- Gas generators
- Battery
- Tank
- Structural reinforcements

- 1 Driver airbag
- 2 Front passenger airbag
- 3 Front sidebag
- 4 Rear sidebag
- 5 Windowbag
- 6 Windowbag gas generator
- 7 Fuel tank
- 8 Main battery (equipment without spare wheel)
- 9 Main battery (equipment with spare wheel)
- 10 Battery in engine compartment
- 11 Reinforcement for B-pillars

**CL-Class**  
(model 215)



P00.00-3467-00



P00.00-3255-00

**Location:**

- Airbag
- Gas generators
- Battery
- Fuel tank

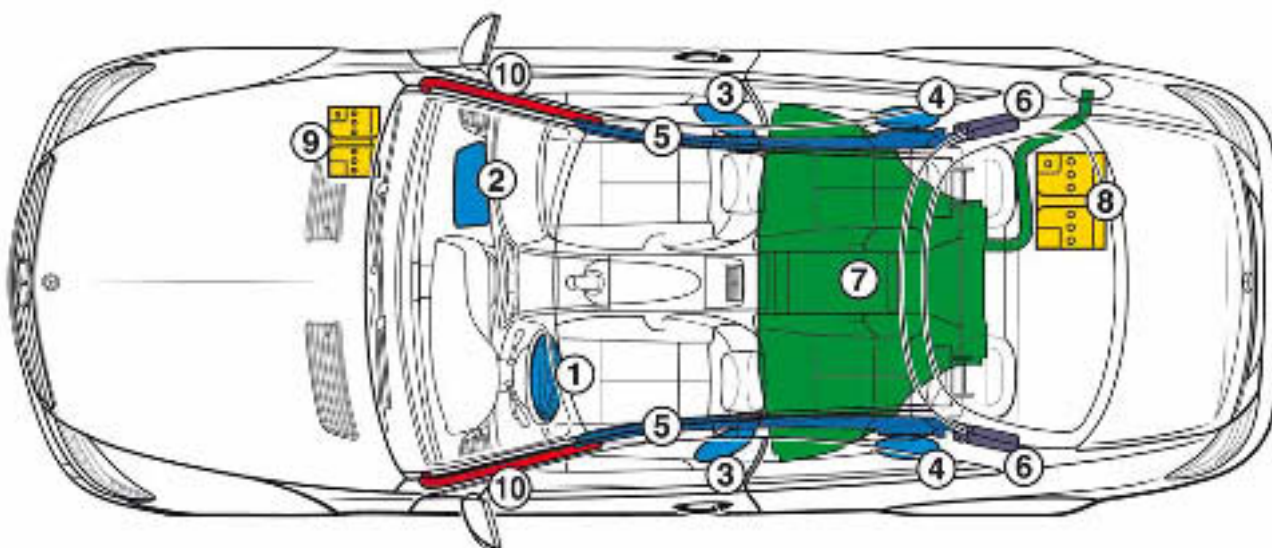
- 1 Driver airbag
- 2 Front passenger airbag
- 3 Front sidebag
- 4 Rear sidebag
- 5 Windowbag
- 6 Windowbag gas generator
- 7 Fuel tank
- 8 Battery

## Coupé

**CL-Class**  
(model 216)



P00.00-4044-00



P00.00-4043-00

### Location:



Airbag



Gas generators



Battery



Tank



Structural reinforcements

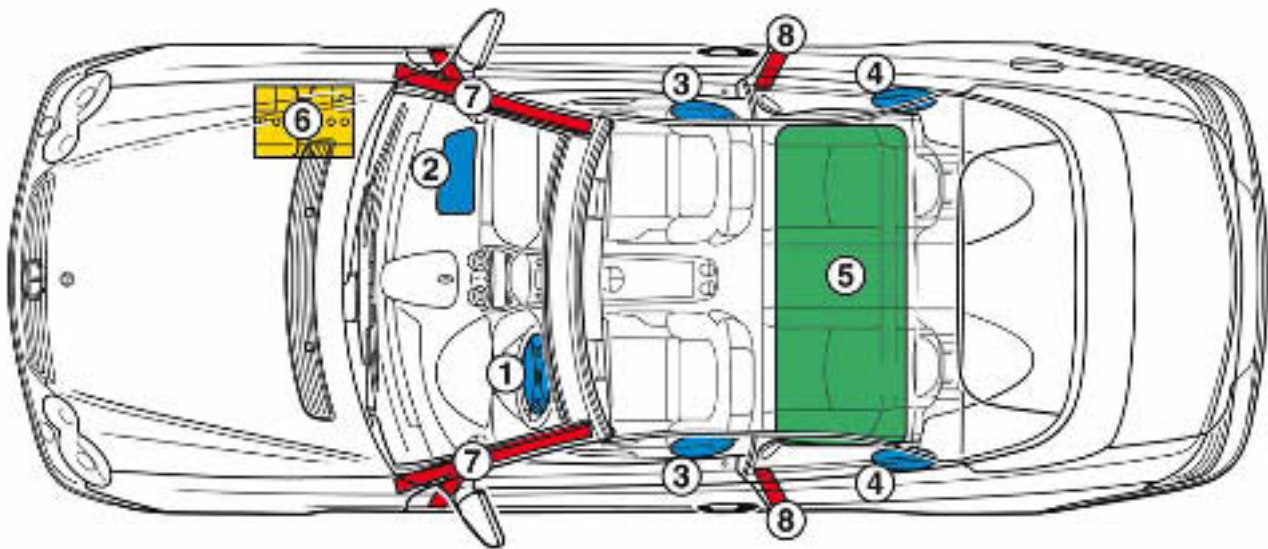
- 1 Driver airbag
- 2 Front passenger airbag
- 3 Front sidebag (in backrest)
- 4 Rear sidebags (in wheel well)
- 5 Windowbag
- 6 Windowbag gas generator
- 7 Fuel tank
- 8 On-board electrical system battery
- 9 Starter battery
- 10 Structural reinforcements on A-pillars



**CLK-Class**  
(model 209)



P00.00-3675-00



P00.00-3676-00

**Location:**

- Airbag
- Battery
- Tank
- Structural reinforcements

- 1 Driver airbag
- 2 Front passenger airbag
- 3 Front sidebag (in backrest)
- 4 Rear sidebag (in wheel well)
- 5 Fuel tank
- 6 Battery
- 7 Structural reinforcement for A-pillars
- 8 Structural reinforcement of B-pillars

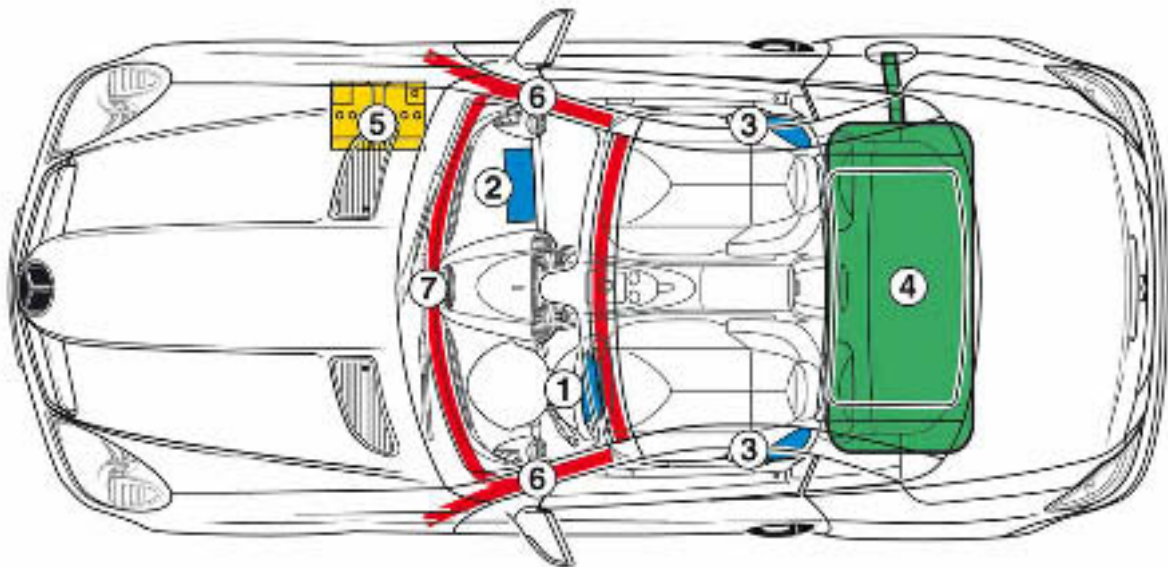


## Roadsters

### SLK-Class (model 171)



P00.00-3677-00



P00.00-3678-00

#### Location:



Airbag



Battery



Tank



Structural reinforcements

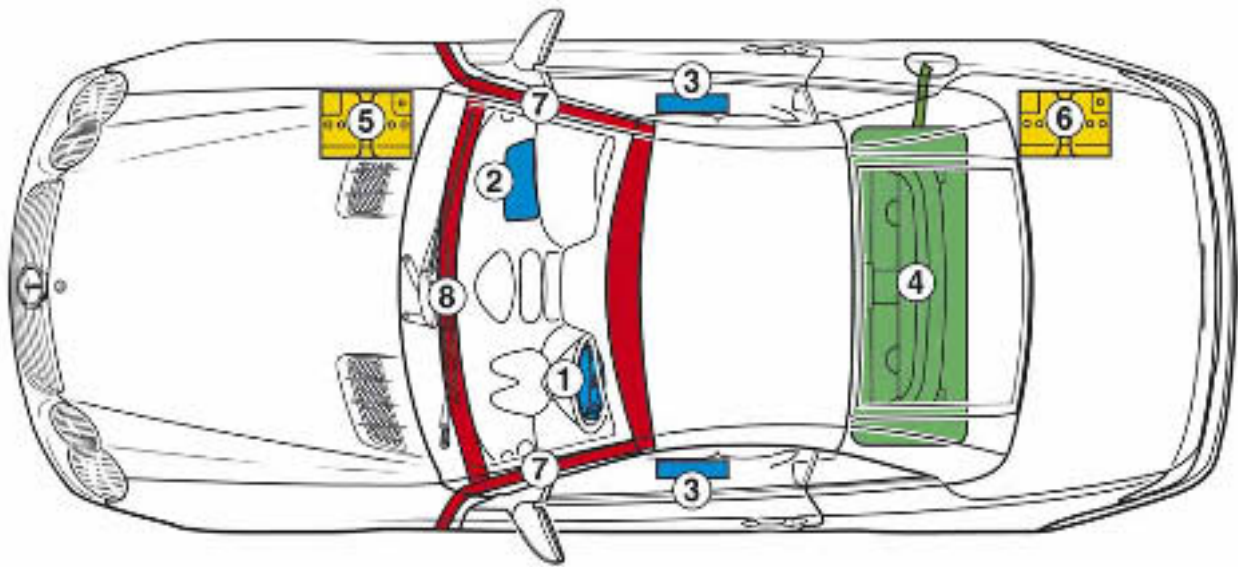
- 1 Driver airbag
- 2 Front passenger airbag
- 3 Head/thorax sidebag (in backrest)
- 4 Fuel tank
- 5 Battery
- 6 Structural reinforcement for A-pillars
- 7 Structural reinforcements on firewall



**SL-Class**  
(model 230)



P00.00-3258-00



P00.00-3259-00

**Location:**

- Airbag
- Battery
- Tank
- Structural reinforcements

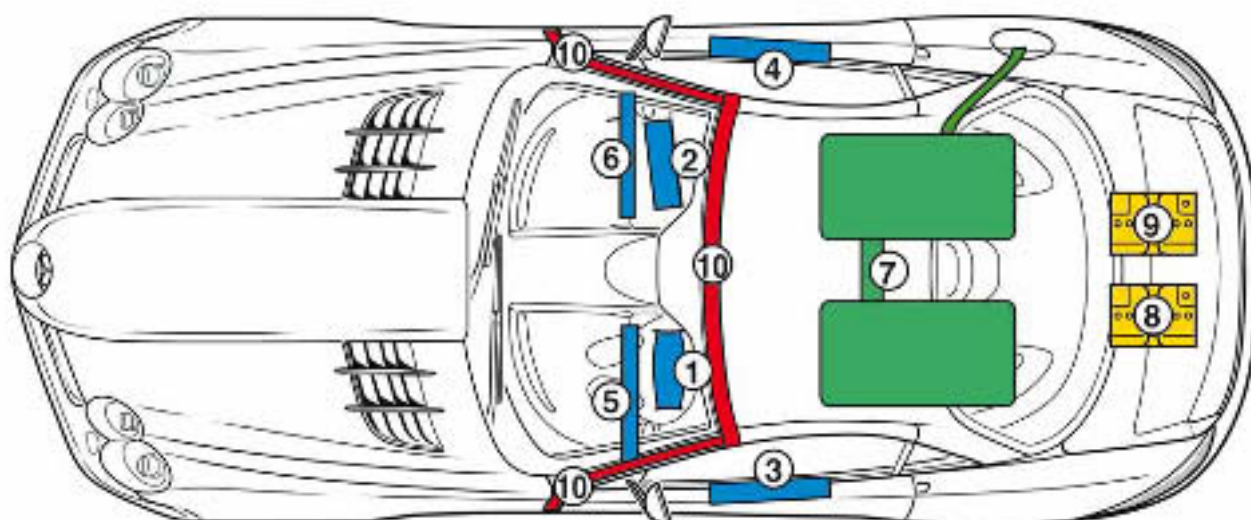
- 1 Driver airbag
- 2 Front passenger airbag
- 3 Head/thorax sidebags (in door)
- 4 Fuel tank
- 5 Starter battery
- 6 Power supply battery
- 7 Structural reinforcement for A-pillars
- 8 Structural reinforcements on firewall

## Roadsters

**SLR McLaren**  
**SLR McLaren roadster**  
 (model 199)



P00.00-3681-00



P00.00-3659-00

**Location:**



Airbag



Battery



Tank



Structural reinforcements

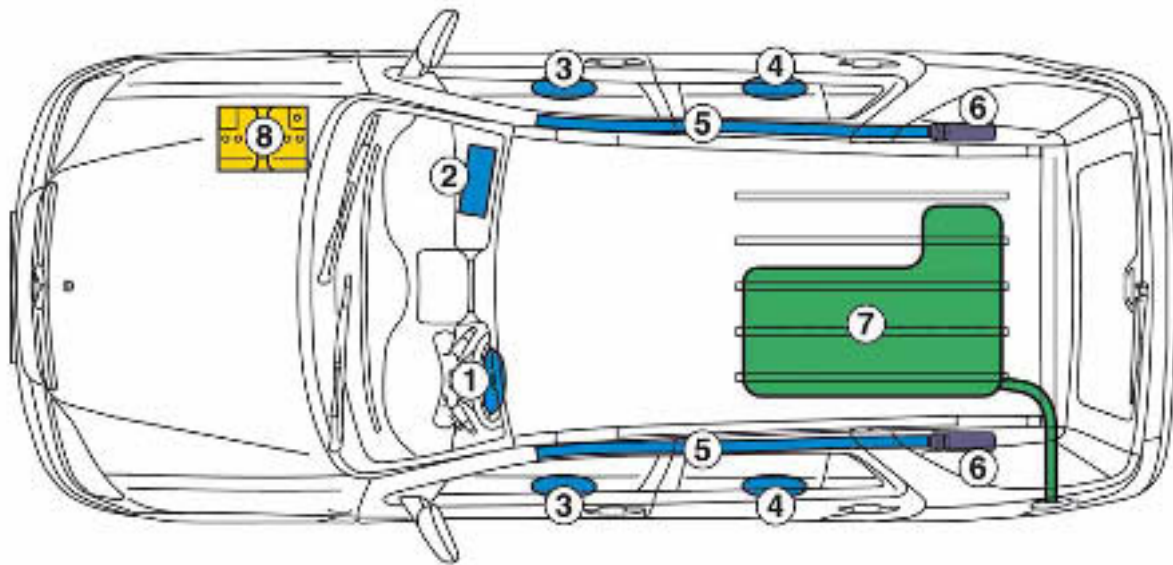
- 1 Driver airbag
- 2 Front passenger airbag
- 3 Driver head/thorax sidebag
- 4 Front passenger head/thorax sidebag
- 5 Driver knee airbag  
(under left instrument panel)
- 6 Front passenger  
knee airbag (under right instrument panel)
- 7 Fuel tank
- 8 Power supply battery
- 9 Starter battery
- 10 Structural reinforcement for A-pillars/window frame  
(roadster only)



**M-Class**  
(model 163)







P00.00-3238-00



P00.00-3239-00

**Location:**

-  Airbag
-  Gas generators
-  Battery
-  Fuel tank

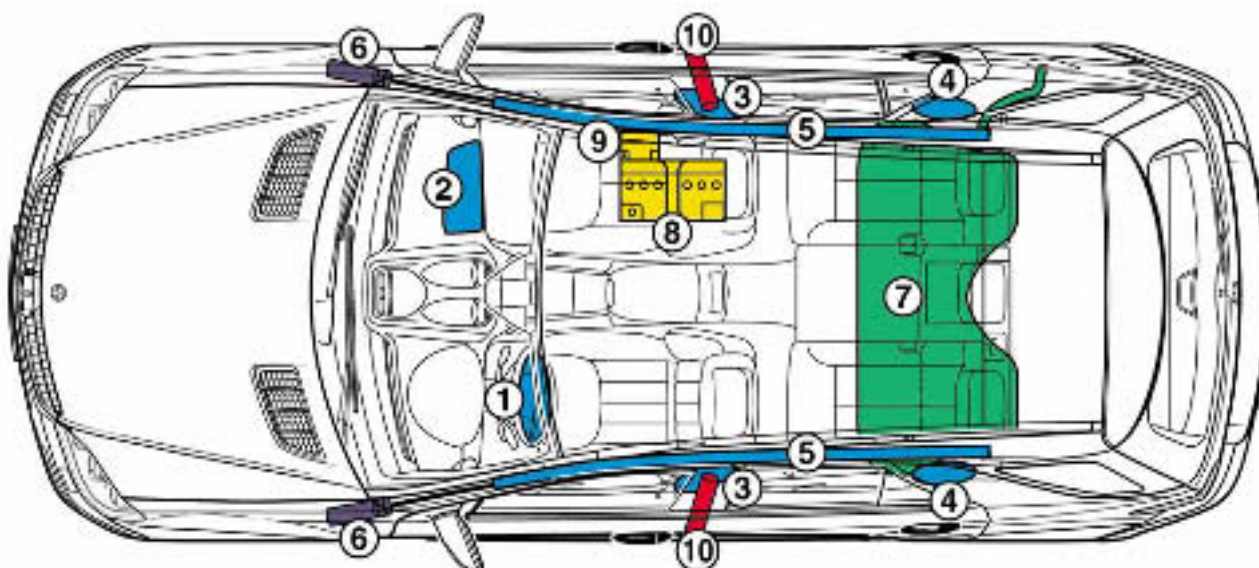
- 1 Driver airbag
- 2 Front passenger airbag
- 3 Front sidebag (in door trim)
- 4 Rear sidebag (in door trim)
- 5 Windowbag
- 6 Windowbag gas generator
- 7 Fuel tank
- 8 Battery

## Cross-country vehicles

**M-Class**  
(model 164)



P00.00-3813-00



P00.00-3816-00

### Location:



Airbag



Gas generators



Battery



Tank



Structural reinforcements

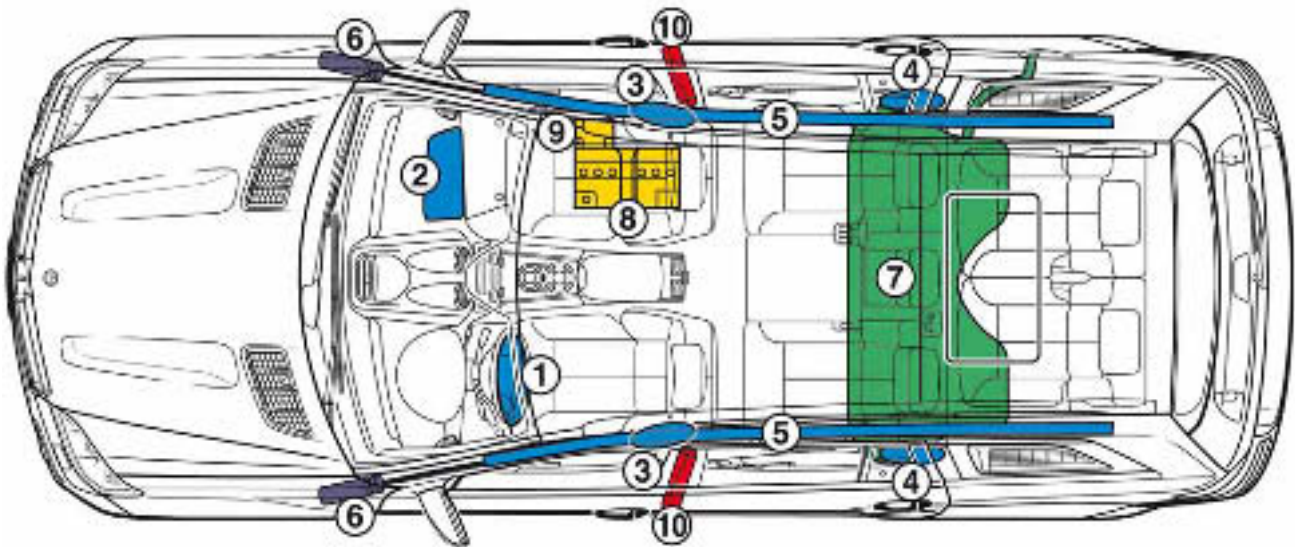
- 1 Driver airbag
- 2 Front passenger airbag
- 3 Front sidebag (in backrest)
- 4 Rear sidebag (in wheel well)
- 5 Windowbag
- 6 Windowbag gas generator
- 7 Fuel tank
- 8 Battery (under front right seat)
- 9 Additional battery
- 10 Structural reinforcement of B-pillars



**GL-Class**  
(model 164)








P00.00-4049-00



P00.00-4050-00

**Location:**

-  Airbag
-  Gas generators
-  Battery
-  Tank
-  Structural reinforcements

- 1 Driver airbag
- 2 Front passenger airbag
- 3 Front sidebag (in backrest)
- 4 Rear sidebag (in wheel well)
- 5 Windowbag
- 6 Windowbag gas generator
- 7 Fuel tank
- 8 Battery (under front right seat)
- 9 Additional battery
- 10 Structural reinforcement of B-pillars

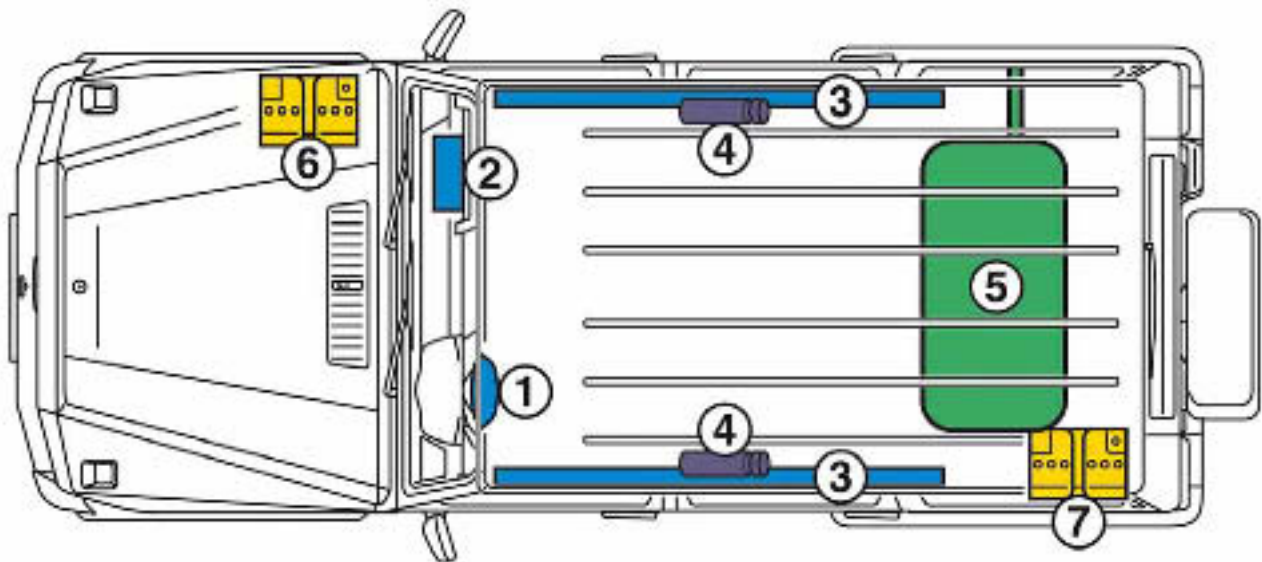
## Cross-country vehicles

### G-Class

(model 461, 463)







P00.00-3262-00



P00.00-3263-00

#### Location:

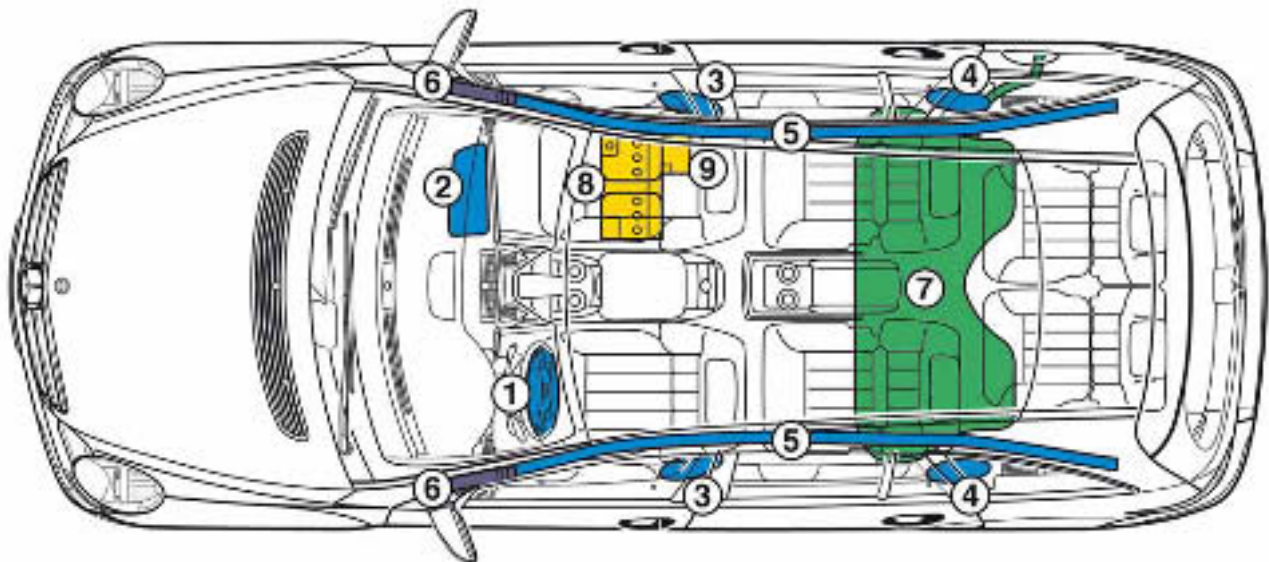
-  Airbag
-  Gas generators
-  Battery
-  Fuel tank

- 1 Driver airbag
- 2 Front passenger airbag
- 3 Windowbag (in roof frame); as of 06.04
- 4 Windowbag gas generator
- 5 Fuel tank
- 6 Battery: up to 09.96
- 7 Battery: as of 10.96

**R-Class**  
(model 251)







P00.00-4051-00



P00.00-4052-00

**Location:**

-  Airbag
-  Gas generators
-  Battery
-  Fuel tank

- 1 Driver airbag
- 2 Front passenger airbag
- 3 Front sidebag (in backrest)
- 4 Rear sidebag (in wheel well)
- 5 Windowbag
- 6 Windowbag gas generator
- 7 Fuel tank
- 8 Battery (under front right seat)
- 9 Additional battery



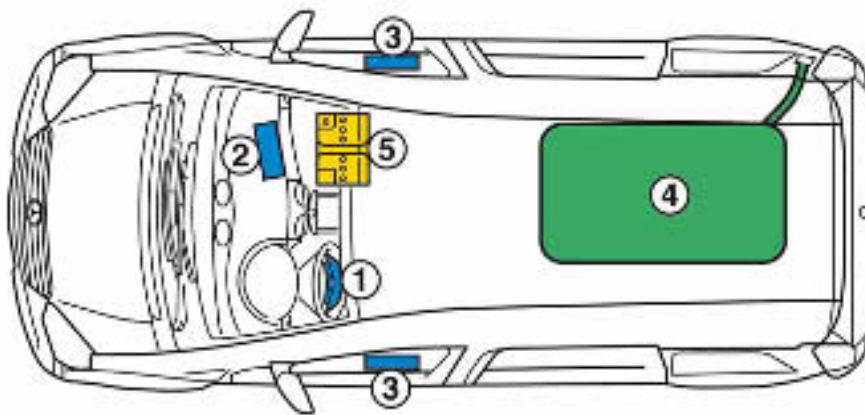
## Van

### Vaneo

(model 414)






P00.00-3260-00



P00.00-3261-00

#### Location:

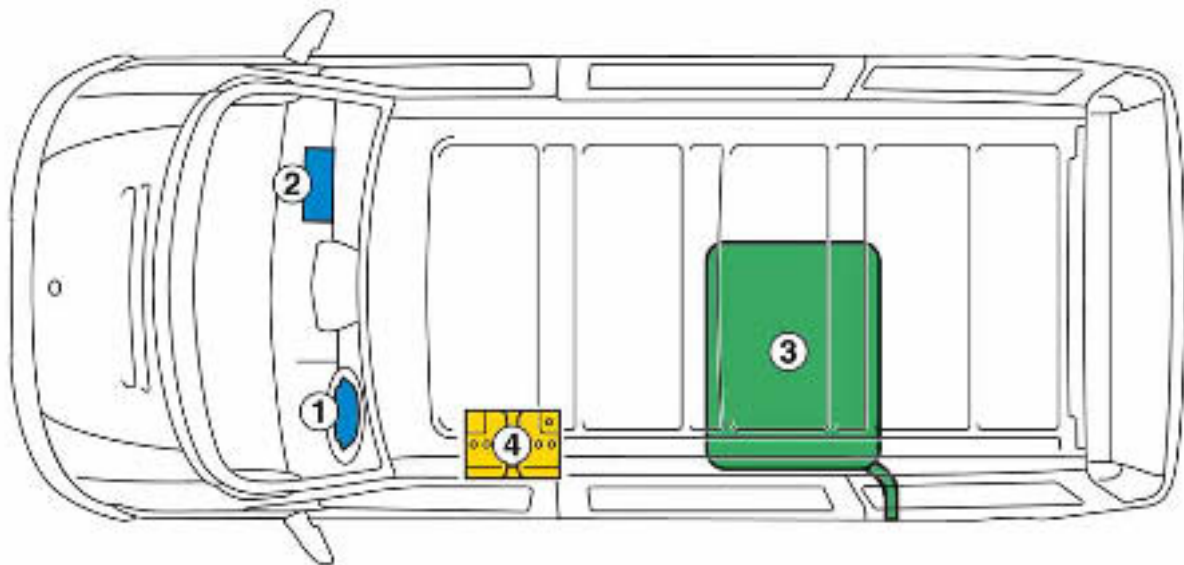
-  Airbag
-  Battery
-  Fuel tank

- 1 Driver airbag
- 2 Front passenger airbag
- 3 Front sidebag (in door trim)
- 4 Fuel tank
- 5 Battery (in front right passenger footwell)

**V-Class Vito**  
(model 638)



P00.00-3463-00



P00.00-3265-00

**Location:**

- Airbag
- Battery
- Fuel tank

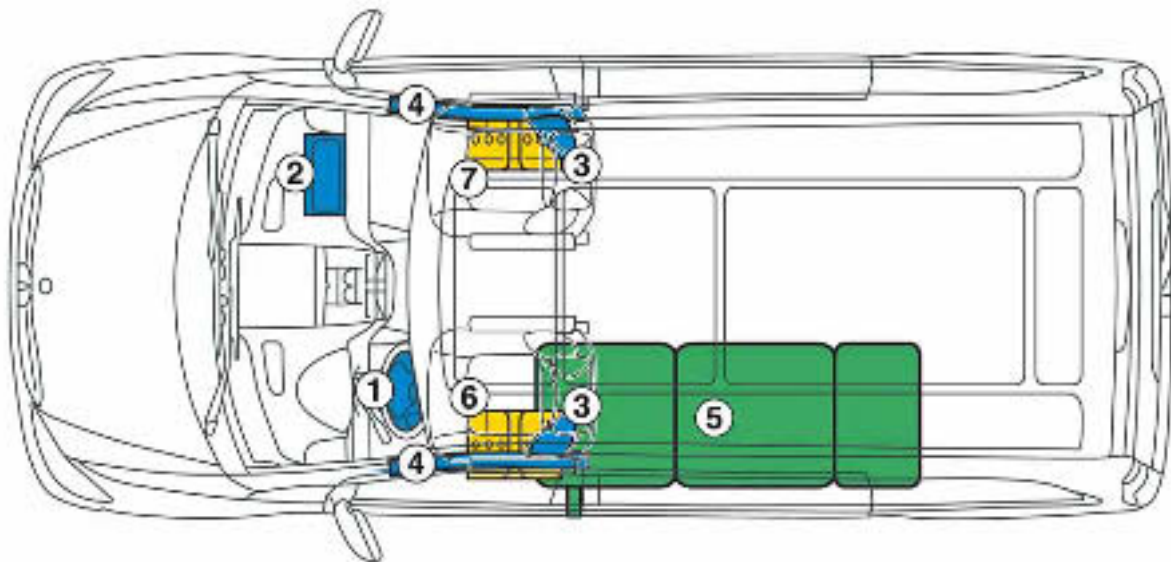
- 1 Driver airbag
- 2 Front passenger airbag
- 3 Fuel tank
- 4 Battery (under front left seat)

## Van

*Viano/Vito*  
(model 639)






P00.00-3679-00



P00.00-3680-00

## Location:

	Airbag
	Battery
	Fuel tank

- 1 Driver airbag
- 2 Front passenger airbag
- 3 Front sidebag (in backrest)
- 4 Windowbag\* (in roof frame)
- 5 Fuel tank
- 6 Battery (under front left seat)
- 7 Additional battery (under front right seat)  
in "Marco Polo" and "Fun" models

\* ) Gas generators with solid fuel and two squibs



## General

### Location of airbags:

The Maybach is equipped with the following airbags:

- Driver airbag (in steering wheel)
- Front passenger airbag (above glove compartment in instrument panel)
- Front and rear sidebags (on outside of backrests)
- Front windowbags (in area of A-pillars and side roof frame)
- Rear windowbags (in area of side roof frame and C-pillars)

The position of each airbag is recognizable by the symbol "SRS AIRBAG" or "AIRBAG" on the airbag or in the immediate vicinity of the installation location.



P91.60-3208-00

### Overview of airbags

- |                          |                                  |
|--------------------------|----------------------------------|
| 1 Driver airbag          | 5 Front windowbags               |
| 2 Front passenger airbag | 6 Rear windowbags                |
| 3 Front sidebags         | 7 Front windowbag gas generators |
| 4 Rear sidebags          | 8 Rear windowbag gas generators  |

**Location of batteries:**

The Maybach has a 2-battery on-board electrical system:

- Starter battery in engine compartment
- Power supply battery on right side of trunk

All models are fitted with a prefuse which breaks the connection between the alternator and the positive battery terminal in the event of a short circuit, thus eliminating one potential source of fire.

**i Note**

Both batteries are electrically connected via a cutoff relay which is switched by the on-board electrical system control unit.

In the event of a malfunction in the on-board electrical system (e.g. due to a discharged power supply battery), the starter battery supplies power to the on-board electrical system in limp-home mode.

**Both batteries must be disconnected to de-energize the vehicle!**



G1/4 Starter battery on right side of engine compartment



G1 Power supply battery on right side of trunk

P54.10-2726-00

## General

### Bodyshell structure:

One special feature of the Maybach is a continuous reinforcement made of high-strength steel that is installed in the A-pillar, the front section of the side roof frame and the B-pillar. The frame provides extra protection in the case of frontal collisions, side impacts and rollovers.



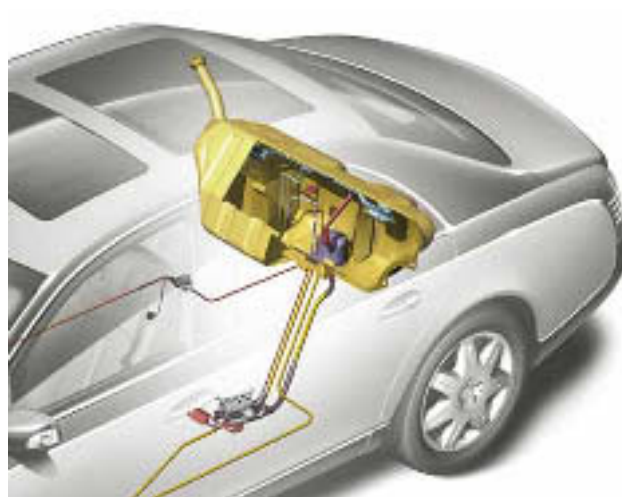
*Reinforcement*

### Location of fuel tank:

The fuel tank is located in the area in front of and above the rear axle.

The fuel lines are routed in protected areas along the center tunnel or the side skirt and are mainly made of metal. In the engine compartment they are routed such that in the event of a deformation of the front end as a consequence of a head-on collision a fuel line can for the most part not be ripped off.

The fuel pump is shut down automatically when the engine comes to a stop.



*Fuel tank*

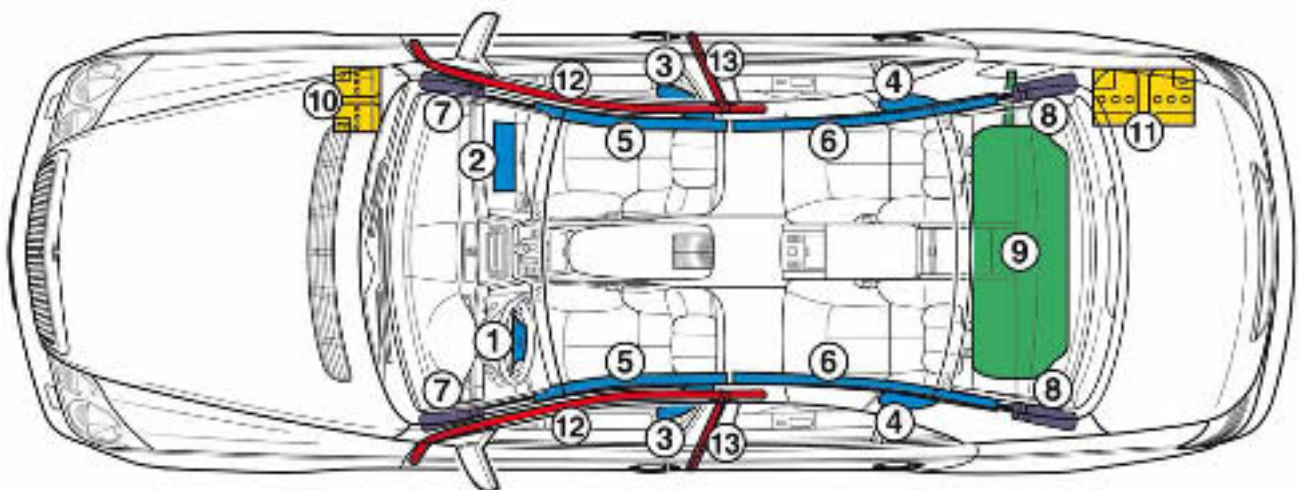
**i** The tubular frame made of high-strength steel cannot normally be cut using standard rescue shears.

If cutting the tubular frame is unavoidable for rescue-related reasons, this must be done using angle grinders or similar tools.

Maybach (model 240)



P00.00-3923-00



P00.10-3910-00

**Location:**

- Airbag
- Gas generators
- Battery
- Tank
- Structural reinforcements

- 1 Driver airbag
- 2 Front passenger airbag
- 3 Front sidebags
- 4 Rear sidebags
- 5 Front windowbags
- 6 Rear windowbags
- 7 Front windowbag gas generators
- 8 Rear windowbag gas generators
- 9 Fuel tank
- 10 Starter battery
- 11 Power supply battery
- 12 Tubular frame in area of A-pillar/roof frame
- 13 Tubular frame in area of B-pillar



## General

### Location of airbags:

The airbags in the smart model series are located:

- In the steering wheel (driver airbag)
- Above or in place of the glove box in the instrument panel (front passenger airbag)
- In the outer areas of the seat backrests (sidebags or head/thorax sidebags)
- In the area of the roof pillars and side roof frame (windowbags: only smart forfour)

The position of each airbag is recognizable by the symbol "SRS AIRBAG" or "AIRBAG" on the airbag or in immediate vicinity of installation location.



P00.00-3525-00

*smart fortwo cabrio: TRIDION cell body with structural reinforcements (red)*

### Location of battery:

#### smart fortwo coupé and cabrio:

In the front passenger footwell

#### smart roadster and roadster coupé:

In the front luggage well

#### smart forfour:

On the left in the engine compartment

### Location of structural reinforcements:

The structural reinforcements of relevance to rescue operations are all located in the region of the passenger cell.

The actual layout of the structural reinforcement elements varies according to the individual model series.



P00.00-3542-00

*smart roadster: TRIDION cell body with structural reinforcements (red)*



P60.00-2790-00

*smart forfour: TRIDION cell*

### Location of fuel tank:

The fuel tank is located in the area in front of the rear axle on the smart model series.

The fuel lines run in protected areas and are made of plastic. In the engine compartment they are routed so that in the event of a deformation of the body structure as a consequence of a frontal or rear-end collision, the fuel lines cannot normally be ripped off.

The fuel pump is automatically switched off if the airbags are activated or if the engine switches off.

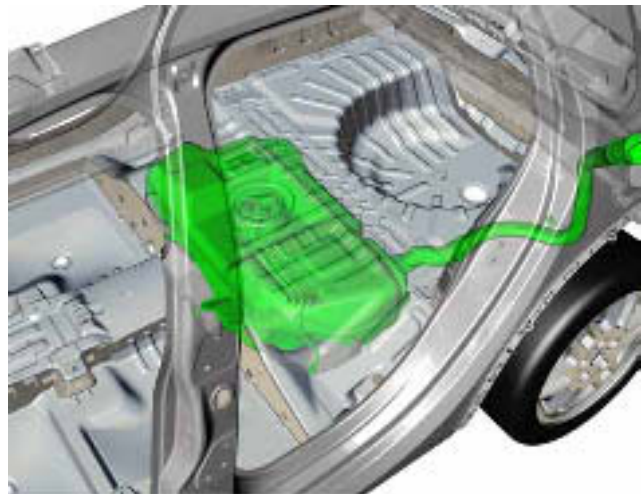
The illustrations on the following pages show the possible location of **airbags, batteries, structural reinforcements and fuel tanks**.

Some of the airbags are only available as special equipment. In other words, not all the airbags listed are necessarily present in each vehicle model.



P47.00-3525-00

*Fuel tank on smart fortwo (model 451)*



P47.10-2425-00

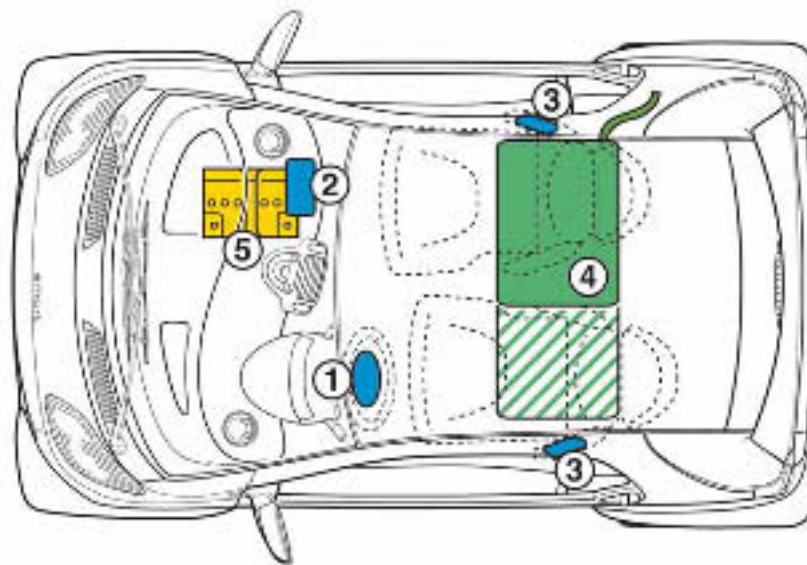
*Fuel tank on smart forfour (model 454)*

smart fortwo

*smart fortwo coupé (model 450)*






P00.00-3526-00



P00.00-3527-00

**Location:**

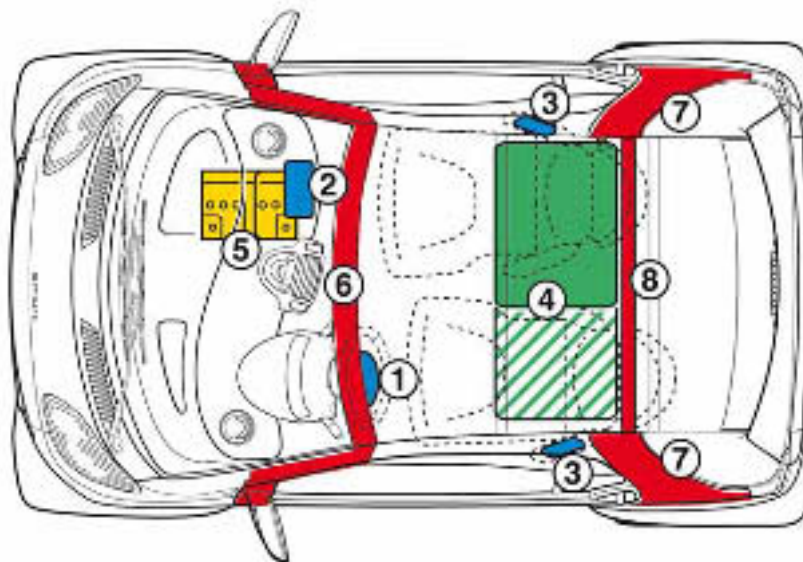
-  Airbag
-  Battery
-  Tank

- 1 Driver airbag
- 2 Front passenger airbag
- 3 Sidebag (in backrest)
- 4 Fuel tank
- 5 Battery (in right footwell)

*smart fortwo cabrio (model 450)*



P00.00-3528-00



P00.00-3529-00

**Location:**

- Airbag
- Battery
- Tank
- Structural reinforcements

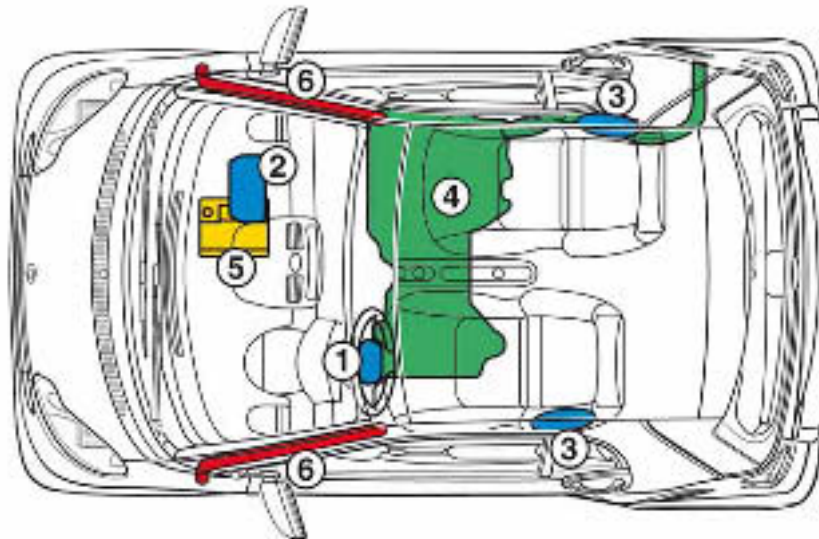
- 1 Driver airbag
- 2 Front passenger airbag
- 3 Sidebag (in backrest)
- 4 Fuel tank
- 5 Battery (in right footwell)
- 6 Structural reinforcement of A-pillars/windshield frame
- 7 Structural reinforcement of C-pillars
- 8 Structural reinforcement of roll bar

smart fortwo

*smart fortwo coupé (model 451)*



P00.00-4053-00



P00.00-4054-00

**Location:**



Airbag



Battery



Tank



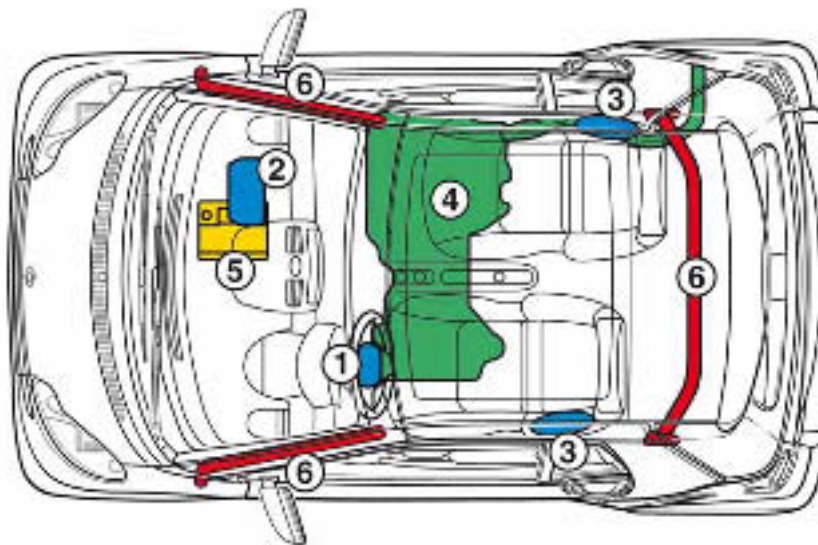
Structural reinforcements

- 1 Driver airbag
- 2 Front passenger airbag
- 3 Sidebag (in backrest)
- 4 Fuel tank
- 5 Battery (in right footwell)
- 6 Structural reinforcement for A-pillars

*smart fortwo cabrio* (model 451)



P00.00-4055-00



P00.00-4056-00

**Location:**



Airbag



Battery



Tank



Structural reinforcements

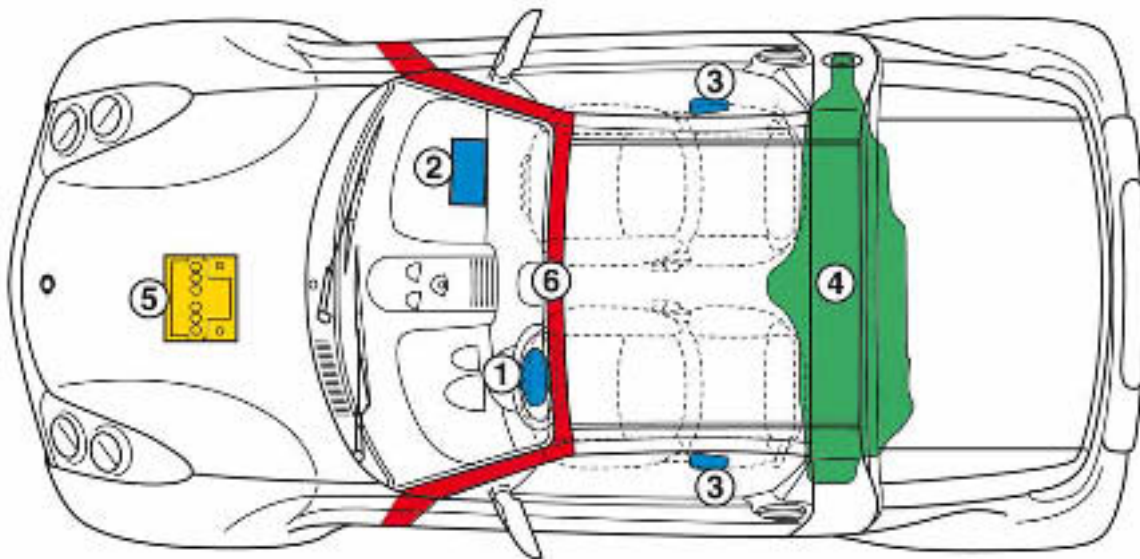
- 1 Driver airbag
- 2 Front passenger airbag
- 3 Sidebag (in backrest)
- 4 Fuel tank
- 5 Battery (in right footwell)
- 6 Structural reinforcement of A-pillars and roll bar

smart roadster

smart roadster/roadster coupé (model 452)



P00.00-3530-00



P00.00-3531-00

Location:



Airbag



Battery



Tank



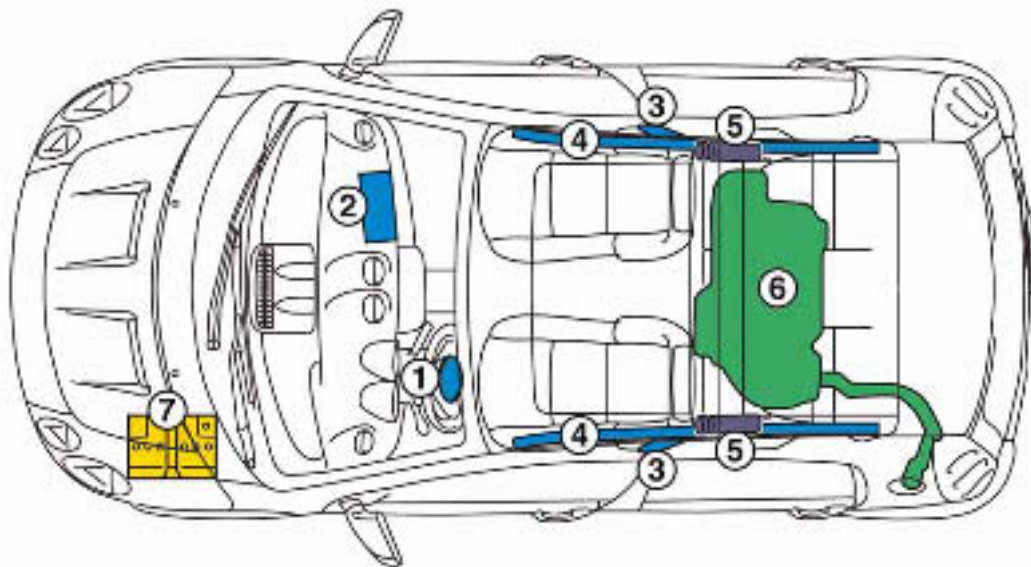
Structural reinforcements

- 1 Driver airbag
- 2 Front passenger airbag
- 3 Sidebag (in backrest)
- 4 Fuel tank
- 5 Battery (front luggage well)
- 6 Structural reinforcement of A-pillars/windshield frame

*smart forfour* (model 454)



P00.00-3908-00



P00.00-3909-00

**Location:**



Airbag



Gas generators



Battery



Fuel tank

- 1 Driver airbag
- 2 Front passenger airbag
- 3 Front sidebag (in backrest)
- 4 Windowbag
- 5 Windowbag gas generator
- 6 Fuel tank
- 7 Battery in left of engine compartment



## Safety concept

### Integral safety

The term "Integral safety" is understood to refer to the pooling of all automobile safety aspects and details and their processing with the aim of achieving the maximum level of safety for the customer.

"Integral safety" is based on the following modules:

### Safe driving

This includes aspects of active safety i.e. safety features and equipment that help to prevent dangers from occurring in the first place, that warn the driver of dangers in advance or that assist him or her in critical driving situations. In short, all the measures that can help to prevent an accident from even occurring.

Examples:

- Night View Assist
- DISTRONIC PLUS
- ADAPTIVE BRAKE
- Adaptive stop lamp
- AIRMATIC or ABC
- Intelligent Light System
- Tire pressure monitor
- Multicontour seat
- Aero wipers

### When hazards occur (PRE-SAFE)

The term PRE-SAFE refers to preventive occupant protection i.e. systems that act preventively in hazardous situations. Depending on the vehicle model, vehicle equipment and driving situation, PRE-SAFE can initiate a range of actions.

Examples:

- Reversible emergency tensioning retraction of front seat belts
- Positioning of front passenger seat and individual rear seats
- Closing of side windows
- Closing of the sliding roof
- BAS PLUS
- PRE-SAFE brake

### During an accident

This primarily includes aspects of passive safety, i.e. the construction of the shape-stability passenger cell and those systems and equipment that may become active during an accident.

Examples:

- Adaptive belt force limitation
- Side airbags
- Two-stage driver and front passenger airbags
- Pressure sensors in doors

### After an accident

This component includes systems and safety measures that, depending on the type of accident and severity of the collision, may become active after an accident in order to facilitate rescue of the vehicle occupants, reduce consequential damage and make finding the vehicle easier.

Examples:

- Cutting point markings on A-pillars and C-pillars
- Internet Guidelines for Rescue Services
- Automatic door unlocking
- Automatic engine OFF feature
- Interruption of the fuel supply
- Automatic partial opening of the windows to ventilate the interior compartment

## Safety concept

### Adaptable accident protection

The design of the bodyshell structure and the occupant restraint systems provide a high level of protection matched to the circumstances of the particular accident.

### Airbags

The vehicle has the following airbags depending on the vehicle model and vehicle equipment installed:

- Driver and front passenger airbags with two-stage situation-dependent triggering
- Side airbags
- Head/thorax sidebags
- Kneebags
- Windowbags

### Seat belts

Depending on the vehicle model and equipment installed, the three-point seat belts for driver and front passenger feature:

- Emergency tensioning retractors and adaptive belt force limitation
- Automatic seat belt height adjustment
- An electrically controlled belt comfort-fit function and belt use recognition

Depending on the model series, the three-point belt in the rear can be equipped with

- Automatic seat belt height adjustment
- Reel tensioners and belt force limiters

on the outboard seats.

The electrically-adjustable individual rear seats, for example in the S-Class (model 221) are also equipped with:

- An electrically controlled belt comfort-fit function with seat belt buckles that move with the seat



*Airbags and seat belts, shown on model 221 (S-Class)*

### Reducing the consequences of an accident

A range of safety features and equipment operate to try and prevent accidents where possible and then to provide the best possible protection if an accident is unavoidable.

Nevertheless, Mercedes-Benz continues to innovate and work hard to make occupant rescue easier and to prevent the situation from becoming worse after an accident has occurred.

Depending on the vehicle model, type of accident and severity of the collision, the following features may improve safety:

- Automatic shutoff of fuel supply to prevent fire
- Activation of hazard warning system to alert other road users and make it easier to find the vehicle in the dark
- Automatic door unlocking to allow occupants to exit the vehicle more quickly
- Online version of Guidelines for Rescue Services.

## List of abbreviations

---

**ABC**

Active Body Control

**AKSE**

Automatic Child Seat Recognition (ACSR)

**BAS**

Brake Assist

**CAN**

Controller Area Network

**CFK**

Carbon fiber Reinforced Plastic (CRP)

**CMS**

Crash Management System

**CNG**

Compressed Natural Gas

**DAS**

Diagnosis Assistance System

**ESG**

Single-pane safety glass

**ESP**

Electronic Stability Program

**LPG**

Liquefied Petroleum Gas

**ME**

Motor Electronics (ME-SFI)

**NGT**

Natural-Gas Technology

**PC**

Polycarbonate

**PDU**

Power Distribution Unit

**PU**

Polyurethane

**SRB**

Fuse and relay box

**SRS**

Supplemental Restraint System

**VSG**

Laminated safety glass

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