

Guidelines for Rescue Services - 2006



Guidelines for Rescue Services

smart
2006

Ordering workshop information

All printed workshop information from GSP/TI can be ordered as follows:

Within Germany:

From our GSP/TI shop on the internet at the following link:

<http://gsp-ti-shop.daimlerchrysler.com>

or alternatively

E-mail: service.information@daimlerchrysler.com

Outside Germany:

Please get in touch with the contact person responsible for your market.

Inquiries relating to smart aftersales

Telephone: +49-7031-90-71024

or

DaimlerChrysler AG

GSP/TIP

HPC R822

D-70546 Stuttgart

© 2006 Copyright DaimlerChrysler AG & smart GmbH

This document, including all its parts, is protected by copyright.

Any further processing or use requires the previous written consent of DaimlerChrysler AG and of smart GmbH. This applies in particular to reproduction, distribution, alteration, translation, microfilming and storage and/or processing in electronic systems, including databases and online services.



Preface	5
Overview	
Proper casualty rescue	6
Extinguishing vehicle fires	7
Rescue	
Securing and supporting	8
Removing the windows	10
Removing the doors	13
Pushing away the instrument panel	17
Removing the roof	21
Observing occupant restraint systems	27
Seat adjustment/head restraints	34
Steering wheel adjustment/roll bar	35
Model classes	
General	36
smart fortwo	38
smart roadster	40
smart forfour	41
Annex	
List of abbreviations	42
Index	43

Dear reader,

One of DaimlerChrysler's top priorities has traditionally been to guarantee the highest possible standards of safety. This emphasis on safety is especially pronounced also in vehicles of the "smart" brand, the ultra-compact line within the Mercedes Car Group.

Our comprehensive safety concept also extends to providing you, the rescue crews, with specific information about our vehicles and their safety systems. The top priority of the rescue crew is to save lives. You must be able to gain access to the accident victims as quickly as possible without exposing yourselves or the victims to additional dangers.

This is why we are providing you, the specialist, with this vital and reliable information. The object is to foster familiarity with the structures and safety systems in the individual vehicle versions and various model series. The automobiles manufactured by smart differ from conventional cars in a number of respects. This guideline manual responds to this fact by serving up information compiled especially for the use of rescue personnel. It describes the relevant technical features incorporated in the smart city coupé, smart roadster and smart forfour model series.

Because the concept behind the sport-oriented roadster has been largely derived from the city coupé, the two share a number of common features:

- Steel body with plastic paneling
- Aluminum doors
- Roof concepts
- Location of drive unit and tank etc.

This guide is intended to assist you in performing the duties that you usually carry out while working under considerable stress. So that every action will be carried out with precision when the time comes, this advance information booklet must cover all vital points as they relate to specific scenarios. We hope that this guide can be judged a success in this respect. At the same time, we would greatly appreciate any suggestions and feedback you can offer based on your own practical experience.

smart gmbh
Technical Communication (E/PD)

in collaboration with
DaimlerChrysler AG
Parts Engineering and
Technical Information (GSP/TI)

Whereas formerly priority was given to quickly rescuing the trapped casualty from his 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 urgent immediate measures at the scene of the 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. The most common method of immobilization is to use a cervical collar ("Stifnek"). This is a plastic collar which is placed around the neck and closed 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 **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 **The head restraints should only be cut away in exceptional cases!**

- Cutting the head restraints away exposes the casualty to additional movements
- The head restraint can no longer be used to stabilize the casualty's head
- Cutting away the head restraints produces 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. For example, the instrument panel structure in smart vehicles is made of magnesium.

When combatting fires within the vehicle's interior and in the area around the instrument panel, it is therefore vital to observe the special instructions issued by the fire department with respect to the materials employed in these areas!

Restraint systems:

If a fire breaks out inside the vehicle, it may activate any untriggered front airbags, sidebags and windowbags or the pyrotechnical emergency tensioning retractors.

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.

Windowbags

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

i Magnesium is a Class D flammable material according to the EN2 European Standard on "flammable materials of various kinds".

i When the front airbags, sidebags, windowbags and emergency tensioning retractors are triggered, controlled combustion takes place. The components do not explode.

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

i 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**

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

Action

To prevent dangerous movements from occurring while rescuing the casualties, 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 support must remain secure throughout the entire duration of the rescue operation and must be able to withstand the use of hydraulic equipment.

When using sliding support blocks to support the vehicle, the air can be let out of the tires after the blocks have been slipped underneath.



P00.60-2034-00

i **The vehicle must be supported with wooden planks, sliding support blocks or similar in order to ensure a gentle and smooth rescue! When positioning the sliding support blocks, care must be taken to ensure that subsequent rescue actions are not impeded.**

i **Never use the vehicle's tow eyes to secure or recover the car. The strength of the body in the area of the towing eyes may not be sufficient following an accident.**



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

- Secure vehicle using supporting struts
- 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



P00.60-2069-00

The STAB FAST passenger car support system is available as an alternative, with which vehicles can still be stabilized even when in complicated positions.



P00.60-2070-00

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 either by threading it through the window openings (also with the windows removed) or by slinging it around vehicle components such as axles or other parts rigidly bolted/welded onto the vehicle.

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



P00.60-2071-00

 **Risk of injury**

Work on windows and glass roofs may produce glass splinters which can cause injuries to the occupants and rescuers.

Action

Cover the occupants before commencing work, preferably with a transparent sheet.

Wear protective clothing, safety glasses and a protective mouth mask.

 **Risk of injury**

Always remove the windows when working on adjacent components.

Windows may shatter, throwing out tiny, sharp glass particles which may cause injuries to the occupants and rescuers.

Action

Cover the occupants before commencing work, preferably with a transparent sheet.

Wear protective clothing, safety glasses and a protective mouth mask.

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, they will be subjected to considerable pressure together with the associated body panels, e.g. when opening the doors with a spreader.

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 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 vehicle are made of single-pane safety glass (ESG).



Remove windows using a glass saw:

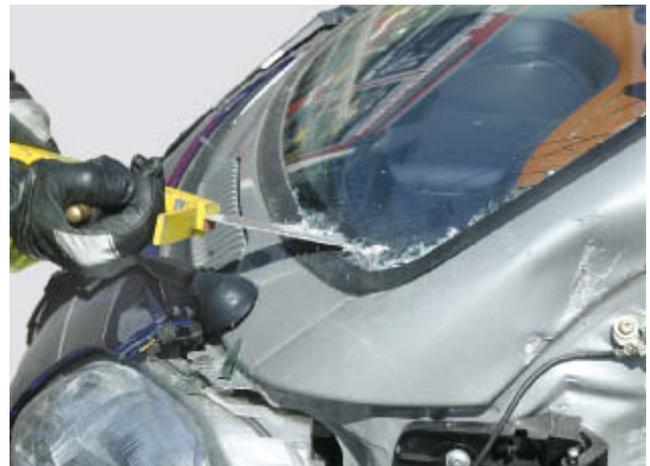
The glass saw is usually the tool of choice for cutting out laminated glass windows:

- First knock a hole in the window
- Then remove the window by cutting around the edges



P67.00-2037-00

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.



P67.00-2038-00

Removing windows using a spring center punch

The side windows, rear window and glass roof 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
- 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)



P67.00-2039-00

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

Glass roof on smart forfour (model 454)

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.



P67.00-2040-00

Quarter window on smart fortwo (model 450)

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. The following applies to the rescue personnel: Wear protective clothing, safety glasses and a protective mouth mask in addition to the helmet visor!



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, in order to avoid any unintended movement of the car body. Proceed carefully with the casualty in mind.

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

Opening on the lock side

- Position one tip of the spreader in the door gap near the lock
- Rotate the spreader to the left and right along its axis to bend the bodywork and obtain an opening large enough to accommodate both tips of the spreader



P72.00-2115-00

- Press both tips of the spreader into the opening produced, in order to expand the opening in a number of small spreading operations. Keep pushing the tips towards the door lock until the door springs open.



P72.00-2114-00

- If the plastic cover panel on the door obstructs your efforts, you can give it a sharp tug by hand to remove it.



P72.00-2116-00

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

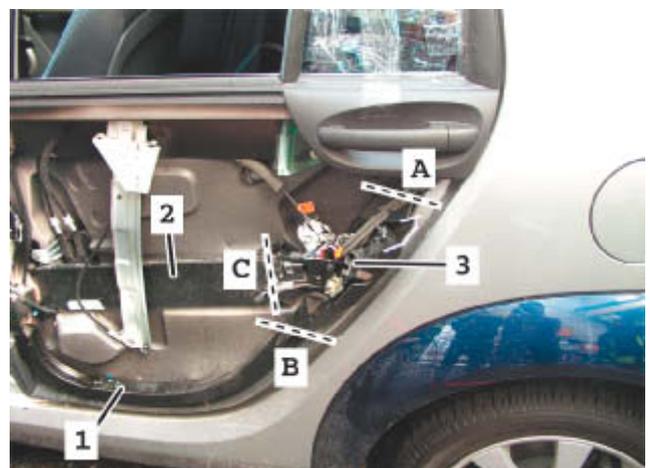
Should it be absolutely necessary to open the door on the hinge side, apply the spreader at the upper hinge, inserting it from above. Hold the spreader vertically.

smart forfour (model 454)

Opening on the lock side

The following procedure is recommended to open the doors on the lock side on the smart forfour:

- Remove door paneling (plastic panel)
- Cut through the door frame (1) above (cut A) and below (cut B) the door lock using rescue shears
- Cut through the cross strut (2) beside the door lock (cut C)
- Open the door and spread the hinges with the spreader until they break off
- Cut the electrical lines
- Remove the door



P72.00-2154-00

- 1 Door frame
- 2 Cross strut
- 3 Door lock



smart forfour (model 454)
Opening on the hinge side

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



P72.00-2157-00

1 Door frame

- Cut through the window frame (2)



P72.00-2158-00

2 Window frame

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



P72.00-2159-00

3 Crossmember

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



P72.00-2160-00

- Cover sharp-edged parts



P72.00-2161-00



 Risk of injury

Action

When vehicle parts are **cut open** or **cut off**, **sharp edges** are produced, which can cause **injury** to the **casualties** or to the **rescue personnel**.

Cover the relevant parts with protective covers or pillar padding.

 Risk of injury

Action

The gas generators of windowbags are filled with compressed gas and **they must not be cut!**

The gas generator will burst and **sharp-edged parts** may be ejected at high speeds.

The loud noise may result in casualties suffering a **blast trauma**.

Remove the inner paneling in the area of the roof frame above the B-pillar on the smart forfour using suitable tools and check whether gas generators are installed in the area of the planned cuts. Mark the installation location on the outside of the vehicle.

smart fortwo coupé (model 450)

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

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



P62.00-2079-00

i On the smart fortwo cabrio, smart roadster and roadster coupé, the A-pillars are reinforced on the inside by a high-strength steel tube that makes them impossible to cut through!

Pushing away the instrument panel

- Crush the rocker panel near the A-pillars using the spreader



P63.00-2049-00

- Cut through the rocker panel using rescue shears



P63.00-2050-00

- Make a depression at the bottom towards the rear of the rocker panel near the B-pillar and install the telescopic rescue ram
- Position the other end of the rescue ram on the A-pillar level with the instrument panel. To prevent the base of the rescue ram from breaking through, make sure that the **supporting points are strong.**
- 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



P63.00-2051-00



Pushing away the instrument panel

As an alternative to placing a rescue ram in the door opening, a chain can be slung around the steering column below the steering wheel. A second chain is then slung around the front axle from the front. Then use the spreader to pull the two chains together: This pulls the steering wheel and steering column forward.



P62.00-2080-00

A cable sling can be attached to the brake pedal to pull the pedal in the desired direction in order to free a trapped foot, etc.



P62.00-2081-00

smart forfour (model 454)

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



P62.00-2088-00

Pushing away the instrument panel

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



P62.00-2089-00

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

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.



P62.00-2090-00

- Position the rescue ram on the B-pillar. To prevent the base of the rescue ram from breaking through, make sure that the supporting points are strong. 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.



P62.00-2091-00



 Risk of injury

Action

When vehicle parts are **cut open** or **cut off**, **sharp edges** are produced, which can cause **injury** to the **casualties** or to the **rescue personnel**.

Cover the relevant parts with protective covers or pillar padding.

When the C-pillars are cut, the frameless single-pane safety glass rear window will probably break.

Remove the rear window (see chapter "Removing the windows", p. 11)

 Risk of injury

Action

The gas generators of windowbags are filled with compressed gas and **they must not be cut!**

The gas generator will burst and **sharp-edged parts** may be ejected at high speeds.

The loud noise may result in casualties suffering a **blast trauma**.

Remove the inner paneling in the area of the roof frame above the B-pillar on the smart forfour using suitable tools and check whether gas generators are installed in the area of the planned cuts. Mark the installation location on the outside of the vehicle.

smart fortwo coupé (model 450)

The roof plays a major role in lending rigidity to the vehicle. When cutting away the roof, it is absolutely essential to ensure that the vehicle is adequately supported so as to prevent the vehicle from collapsing and causing further injury to the occupants.

Furthermore, important fixed points on the bodywork, which may be necessary later in the rescue, could be destabilized or destroyed by cutting away the roof.



P62.00-2082-00

The smart fortwo coupé is fitted with an adhesive-bonded roof in either glass or plastic. Because the glass roof consists of single-pane safety glass, the recommended procedure is to cut out the entire roof structure as described in the following section. This procedure prevents flying glass particles from increasing the injury risk.

This procedure should also be employed on the plastic roof.

When removing the roof entirely:

- Cut through the A-pillars (about 10 cm below the roof)
- Saw out the windshield at the A-pillars and above the instrument panel. The upper side (roof side) of the windshield remains intact. It remains attached to the weather stripping, and is removed along with the roof itself once the A, B and C-pillars have been cut. The roof should be lifted off in a movement toward the front or the side.

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



P62.00-2083-00



P63.00-2052-00



Removing the roof

- 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.



P63.00-2053-00

smart forfour (model 454): Folding back the roof

- Cut through the A-pillars
- Saw out the windshield at the A-pillars and above the instrument panel. The upper side (roof side) of the windshield remains intact. It remains attached to the weather stripping, and is removed along with the roof itself once the A, B and C-pillars have been cut.



P62.00-2088-00

- Cut through the B-pillars below the seat belt height adjustment mechanism



P65.00-2107-00

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



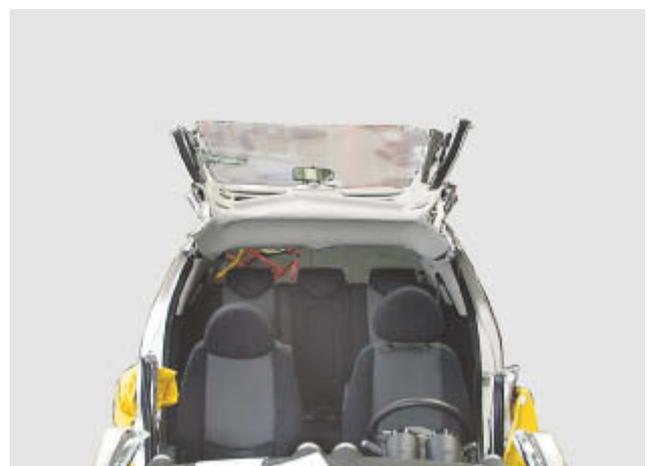
P65.00-2108-00

- Cut through the roof frame



P65.00-2109-00

- Fold the roof back and secure it to prevent it from springing back



P65.00-2110-00



Soft top/coupé roof on smart fortwo cabrio and smart roadster



Risk of injury

Action

When **opening** the **soft top or the coupé roof**, there is a **risk of injury** due to the **moving parts**.

Furthermore, the occupants' **freedom of movement** may be **restricted**.

Before and while opening the roof, always ensure that the casualties' freedom of movement is not restricted and that nobody will be injured by the moving parts of the soft top.

smart fortwo cabrio (model 450)

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

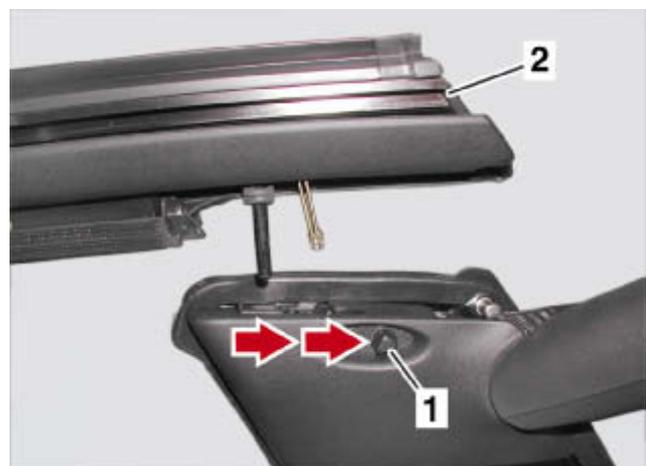
The control switch is located on the center console to the right of the gearshift lever.



P77.39-2070-00

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 rear side supports rise at the rear while still remaining secured
- Press the release button again
- Extract the side supports (2)



P77.33-2078-00

smart roadster/roadster coupé (model 452)

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.

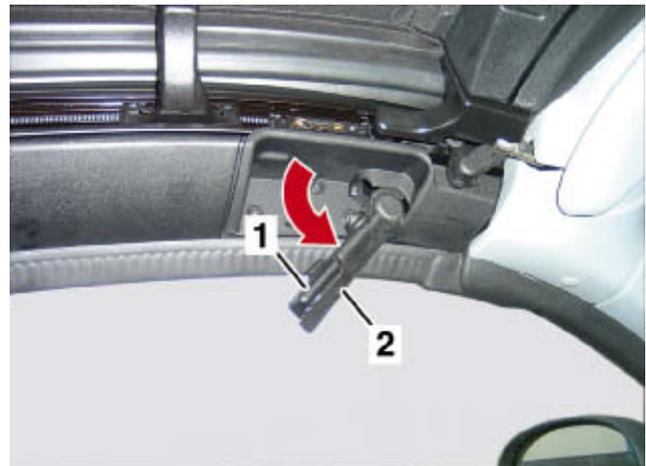
The soft top can only be opened completely if the voltage supply is present and the ignition is switched on.

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



P77.39-2146-00



P77.33-2075-00

Coupé roof

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

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



P77.50-2119-00



**Risk of injury****Action**

When **disconnecting** the **batteries** or when **cutting electrical lines**, the **ground lines** must always be disconnected or cut first, otherwise **there is a risk of short circuit**.

If this is not possible, insulated tools must be used to disconnect or cut the cables.

**Risk of injury****Action**

There is a **risk of injury** in the **deployment area** of undeployed **airbags**.

If, during **rescue work**, where the **battery has not been disconnected**, parts of the vehicle **undergo significant movement** or **electrical lines are cut**, then **an airbag** (front airbag, sidebag or windowbag) may be deployed. If this happens, then the **airbag as well as loose objects** and **glass splinters** may be thrown against the casualty or the rescuers, causing **injuries**.

Cover the occupants before commencing work, preferably with a transparent sheet.

Wear protective clothing/safety glasses.

Disconnect all batteries. If this is not possible, keep well away from undeployed airbags.

Do not perform cutting work near undeployed airbags.

Avoid heating near undeployed airbags.

Do not place any objects near untriggered airbags.



Merely cutting through the steering wheel rim or the spokes will not usually trigger the airbag.

Occupant restraint system (SRS - Supplemental Restraint System):

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 retractors
- Belt force limiters
- Airbags

The driver airbag (1) in the smart model series is located in the steering wheel housing.



P91.60-2681-00

1 Driver airbag (all model series)

The front passenger airbag (2) in the smart fortwo coupé and cabrio is located below the instrument panel.



P91.60-2734-00

2 Front passenger airbag (smart fortwo)

The front passenger airbag (3) in the smart roadster, roadster coupé and smart forfour is located in the instrument panel above the glove box.



P91.60-2682-00

3 Front passenger airbag (smart roadster and smart forfour)



The sidebags (4) in all model series are located in the outsides of the backrests (front seats only in the smart forfour).

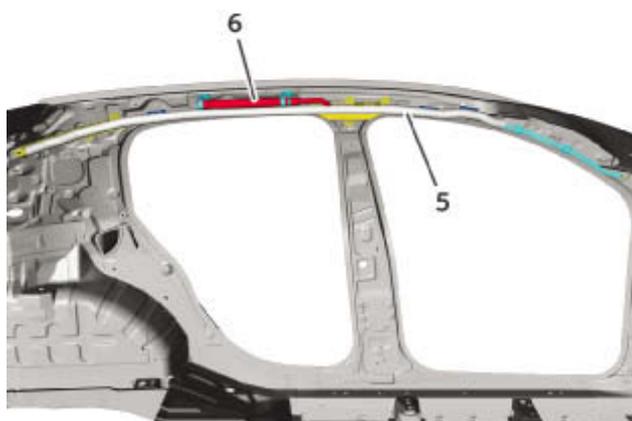


P91.60-2683-00

4 Sidebags

The windowbags (5) in the smart forfour model series (model 454) are located at the top in the side of the roof frame.

The gas generators (6) are located in the area of the rear door behind the B-pillars.



P91.60-3238-00

5 Windowbag

6 Gas generator

**Risk of injury**

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

If a **gas generator bursts**, and **sharp-edged parts** may be ejected at high speeds, causing **injuries** to the occupants and the rescuers.

The loud noise may result in casualties suffering a **blast trauma**.

Action

For this reason, we urgently recommend removing the appropriate inner paneling and checking whether and where gas generators for windowbags are installed before commencing any cutting work. Mark the installation location on the outside of the vehicle.

i Of the current smart model series, only the smart forfour (model 454) is equipped with windowbags. The gas generators are located at the top in the roof frame.

The illustration at the side shows the driver and front passenger airbags in their deployed and fully inflated state in the smart fortwo as an example.



P91.60-2684-00

i The air sack inflates within a few milliseconds during the collision. After full deployment, the air sack of the driver-side and passenger-side front airbag immediately deflate.

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

The airbag systems in smart vehicles are designed so that they can no longer be triggered by the airbag sensor systems after the battery has been disconnected. Such safety devices are therefore unnecessary.



**Risk of injury**

If using **safety devices** intended to protect against **airbag deployments** after an accident, there is a **danger** that these devices may be **cata-pulted** by the deploying airbag, presenting an **additional injury hazard** for casualties and rescuers alike.

We advise against the use of "**protective devices**" that are intended to prevent a pressure buildup by **piercing holes** in the airbag fabric because, if the airbag is triggered, the **hot ignition gases** can escape unhindered and cause **burns**.

Action

Cover the occupants before commencing work, preferably with a transparent sheet.

Wear protective clothing/safety glasses.

Disconnect all batteries. If this is not possible, keep well away from undeployed airbags.

Avoid heating near undeployed airbags.

Do not place any objects near untriggered airbags.

**Risk of injury**

From **contact with the airbag** during deployment, occupants may suffer slight **reddening of the skin** and **abrasions**, e.g. on the insides of the forearms or in the face. Slight **irritation of the respiratory passages** cannot be ruled out.

Action

The condition of the casualties must be assessed as accurately as possible, and taking these aspects into account, before deciding on further suitable precautionary measures.



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.



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

The airbag's air sack inflates within a few milliseconds during the collision. The air sack reaches its maximum volume in 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).

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 triggered airbag has no medical risks for the occupants or the rescue crew.

In cases where the rescue or treatment of casualties has to be carried out within the radius of an untriggered airbag, the following points 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.**



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 casualty, 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 retractors

The emergency tensioning retractors are activated in frontal collisions with a sufficiently high deceleration acting in the longitudinal direction or in rear-end collisions with a sufficiently high acceleration acting in the longitudinal direction.

The emergency tensioning retractors are integrated into the seat belt inertia reel mechanisms.

Because different activation strategies are used the retractors may therefore be triggered both when the belt is being worn and when it is not.

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

 **Risk of injury**

When vehicle parts are **cut open** or **cut off**, **sharp edges** are produced, which can cause **injury** to the **casualties** or to the **rescue personnel**.

Action

Cover the relevant parts with protective covers or pillar padding.

Seat adjustment

Vehicles in the smart model series feature manual seat adjustment mechanisms as standard equipment. 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

Head restraints

On the following smart vehicles the head restraints are integrated in the backrests:

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

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

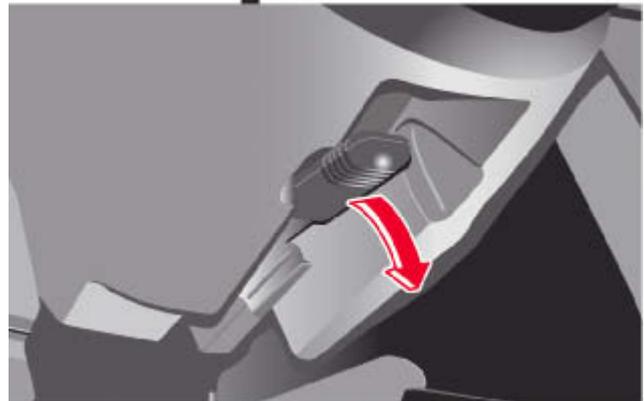
To remove, pull the head restraint upwards; it can then be lifted off.



Steering wheel adjustment

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

Roll bar

On the smart fortwo cabrio, the smart roadster and the smart roadster coupé the roll bars are integrated in the body structure (shown on smart fortwo cabrio).



PP91.50-2055-00

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 outsides of the backrests (front sidebags)
- In the area of the roof pillars and side roof frames (windowbags: smart forfour only)

The location of each airbag can be identified by the "**SRS AIRBAG**" or "**AIRBAG**" symbol on the airbag or in immediate vicinity of installation location.

Location of fuel tank

The fuel tank in the smart model series is located in the area in front of the rear axle or under the load compartment floor.

The fuel lines run in protected areas and are made of plastic. In the engine compartment they are routed so that the deformation caused by a collision will not usually break the fuel lines. The fuel pump is shut down automatically when one of the airbags is triggered.

Location of battery:**smart fortwo coupé and cabrio:**

In the front passenger footwell

smart roadster and roadster coupé:

In the front trunk under the 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 illustration shows the design of the TRIDION cells with structural reinforcements (red) as found on the smart cabrio (upper illustration) and smart roadster (lower illustration).



P00.00-3525-00

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



P00.00-3542-00

i The doors on smart vehicles consist of aluminum structures with plastic paneling on the outside and conventional trim panels on the inside.

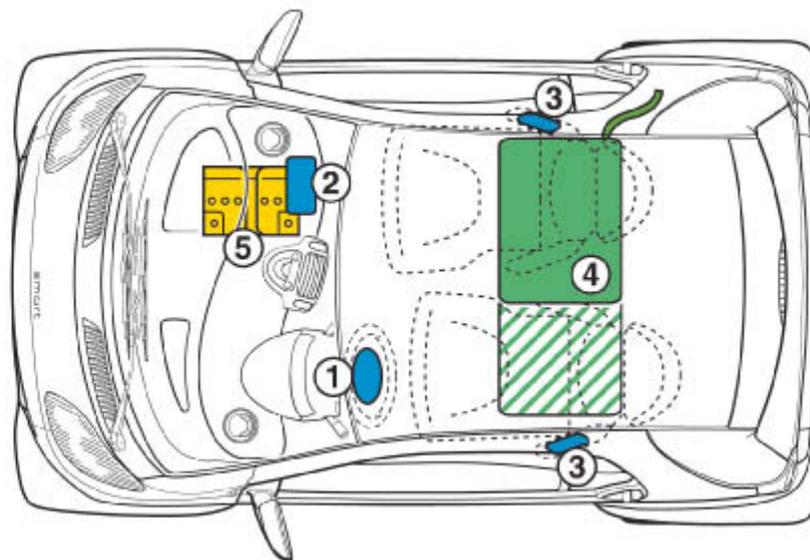
The illustrations on the following pages show the possible locations of **airbags, batteries, structural reinforcements and fuel tanks**.

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.

smart fortwo coupé (model 450.3)



P00.00-3526-00



P00.00-3527-00

Location:

-  Airbag
-  Battery
-  Tank

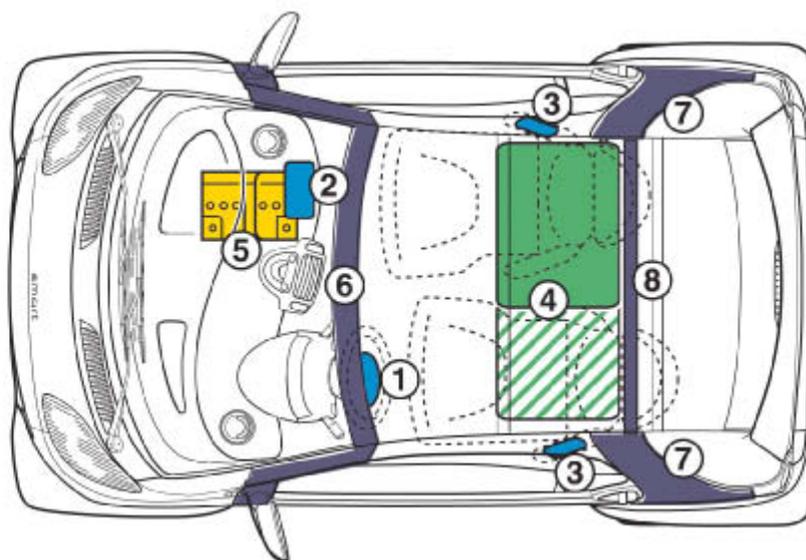
- 1 Driver airbag
- 2 Front passenger airbag
- 3 Sidebags (in the backrests)
- 4 Fuel tank
- 5 Battery (in front passenger footwell)



smart fortwo cabrio (model 450.4)



P00.00-3258-00



P00.00-3529-00

Location:

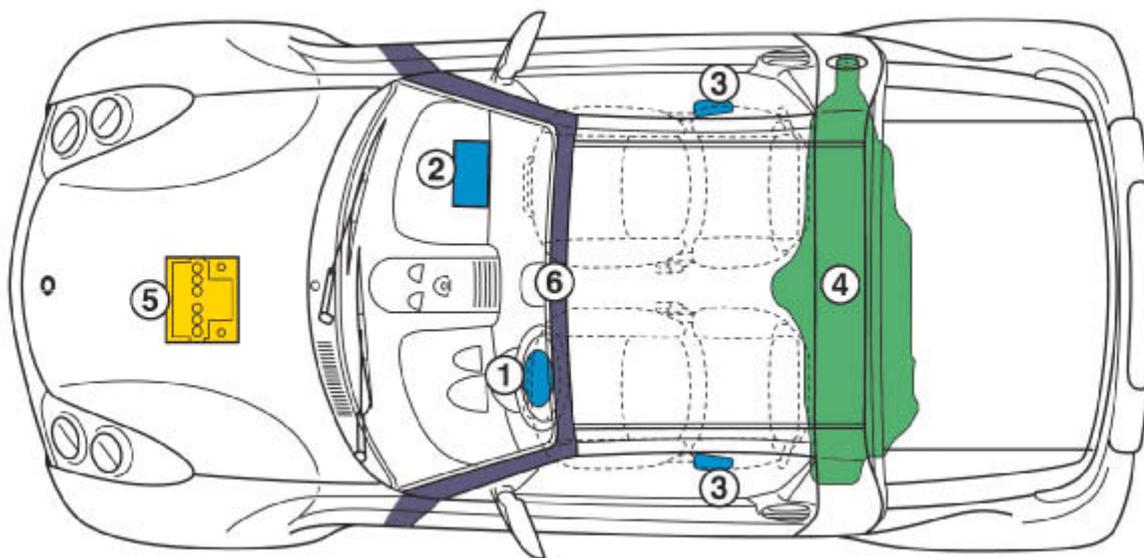
-  Airbag
-  Battery
-  Tank
-  Structural reinforcements

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

smart roadster/roadster coupé (model 452)



P00.00-3530-00



P00.00-3531-00

Location:

-  Airbag
-  Battery
-  Tank
-  Structural reinforcements

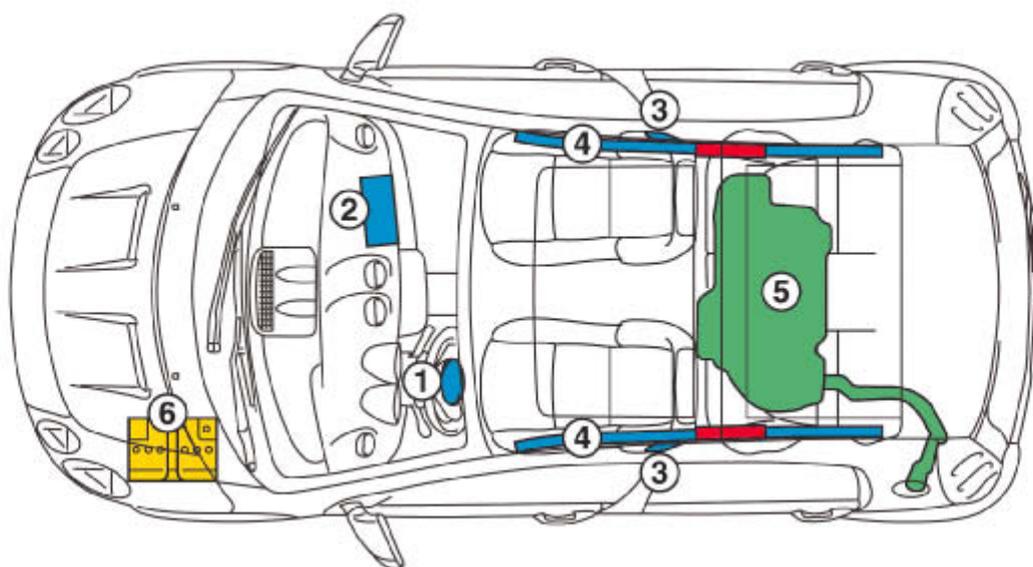
- 1 Driver airbag
- 2 Front passenger airbag
- 3 Sidebags (in the backrests)
- 4 Fuel tank
- 5 Battery (front luggage well)
- 6 Structural reinforcement of A-pillars/
windshield frame



smart forfour (model 454)



P00.10-3908-00



P00.10-3909-00

Location:



Airbag



Gas generators



Battery



Tank

- 1 Driver airbag
- 2 Front passenger airbag
- 3 Front sidebags (in the backrests)
- 4 Windowbags
- 5 Fuel tank
- 6 Battery (left side of engine compartment)

ESG

Single-pane safety glass

ESP

Electronic Stability Program

LED

Light emitting diode

SRS

Supplemental restraint system

VSG

Laminated safety glass



A		I	
Airbags		Immediate measures at scene of accident	6
Driver airbag	28	L	
Front passenger airbag	28	Laminated safety glass	10, 11
Gas generators	29	M	
Location	36	Magnesium	7
Sidebag	29	P	
Windowbag	29	Plastic roof	22
B		R	
Battery	36	Restraint systems	7
C		Rocker panel attachment	20
Cervical collar	6	Roll bar	
Chain	19	Integrated roll bar	35
Coupé roof	25, 26	S	
E		Seat adjustment	34
Emergency tensioning retractors	33	Seat belts	33
Endless sling	9	Single-pane safety glass	10, 11
F		Sliding support blocks	8
Fire classes	7	Soft top	
Folding top	25, 26	See folding top	25
Fuel tank	36	STAB FAST	9
G		Steering wheel adjustment	
Gas generator	7	Lock	35
Glass roof	12	Stepped wedge	
Glass saw	11	See sliding support block	8
H		Structural reinforcements	37
Head restraints	34	W	
Removal	6	Windowbag	7