Guidelines for
Emergency Services

Audi

Rescue and Recovery
involving Audi Vehicles

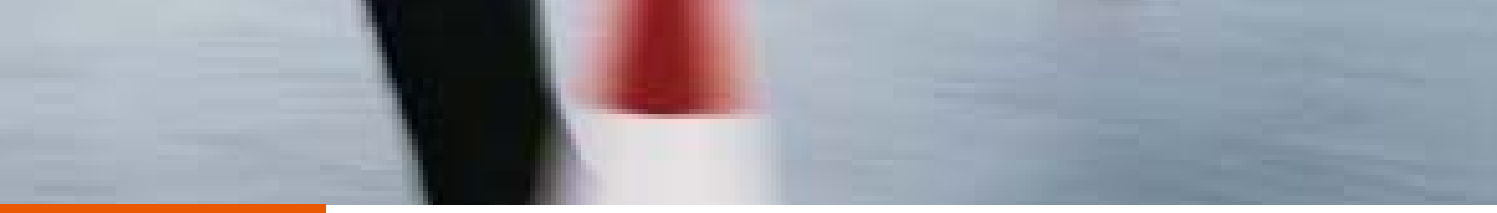
Legal Disclaimer:
This manual has been created exclusively for rescuers who have been specially trained in the area of providing emergency rescue after automobile accidents and who are therefore qualified to use the activities described in this manual.

Vehicle specifications and special options as well as Audi model availability are constantly subject to change. Therefore, Audi reserves the right to change the content of this manual at all times.

Please note: The information contained in this manual is not intended for customers or for repair shops and dealers. Customers may gather detailed information from their vehicle owner's manual regarding vehicle functions as well as any occupant safety features and system descriptions. Repair shops and dealers obtain repair information through their normal channels.

(Status: November 2012)

Content



Rescue data sheets

You will find separate Audi vehicle overviews in a separate part, entitled "Rescue data sheets".

01 Foreword

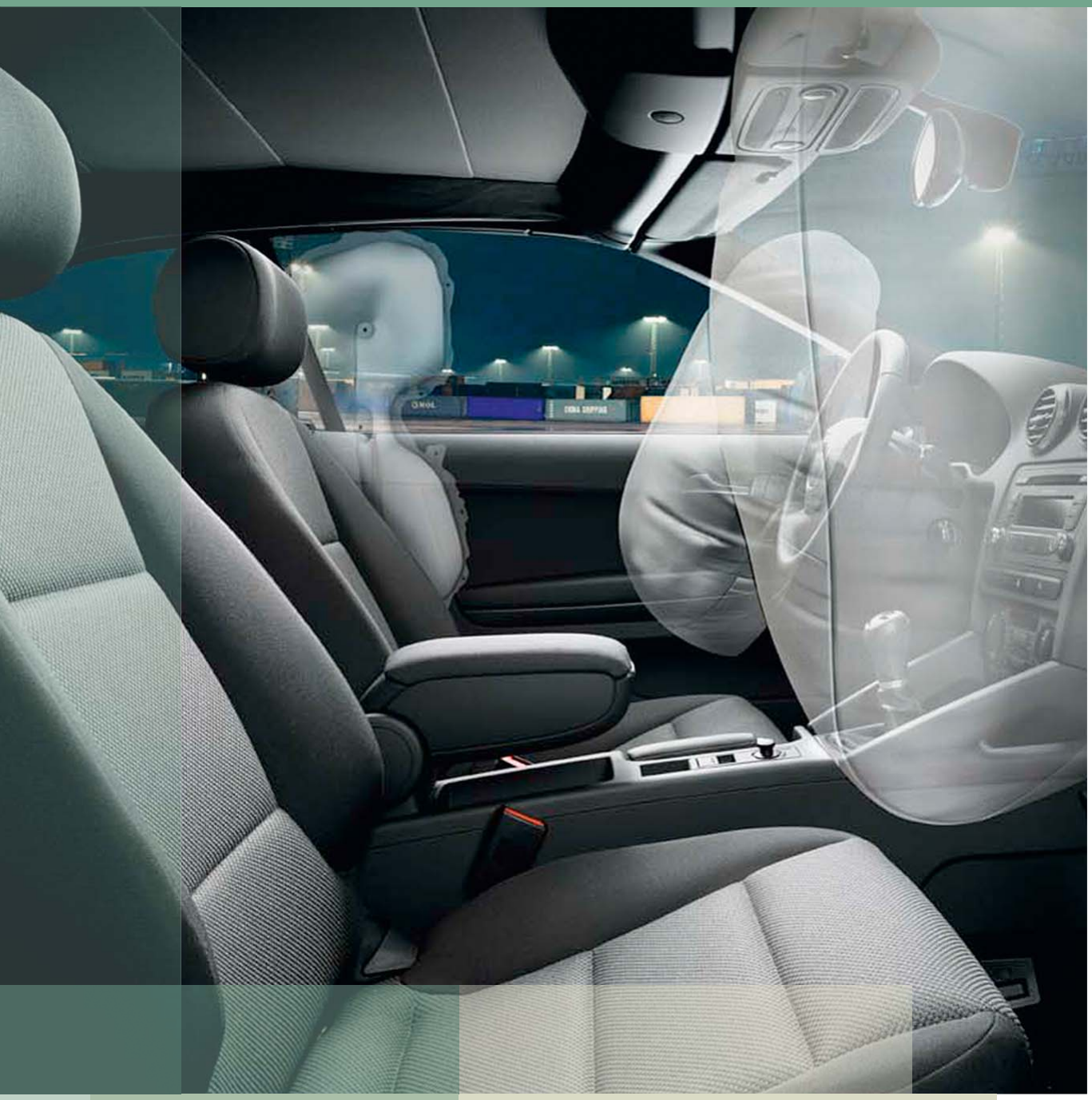
Driver, vehicle and environment – those are the contributing factors which determine the degree of traffic safety.

The existence of a short, quick and effective rescue effort remains indispensible. These guidelines should assist rescue personnel in accomplishing their task because it provides all applicable technical Audi vehicle information. It includes a detailed descriptive technical part. The rescue data sheets are vehicle-specific and include detailed information on various vehicles.

While the information in the technical part, in particular, is meant for rescue personnel training, the vehicle rescue data sheets are meant for the work necessary at the accident scene.

The creation of this Emergency Rescue guide and the rescue data sheets are supported by Moditech Rescue Solutions (www.moditech.com).
The vehicle overviews in the rescue data sheets are also included in interactive form in the data base “Crash Recovery System”.

- **Technical status: November 2012**



02 Safety systems

Today's motor vehicles may incorporate extensive occupant protection and restraint systems depending on vehicle type and optional equipment.

These systems usually consist of a protection system and related sensors which are responsible for accident recognition.

A current and fully equipped vehicle (for example the Audi A4) contains the following main components:

- Airbags
- Gas generators
- Control module for safety systems
- Sensors
- Seat belts with pretensioners
- If applicable, rollover protection

Illustration: Airbag system in Audi A4

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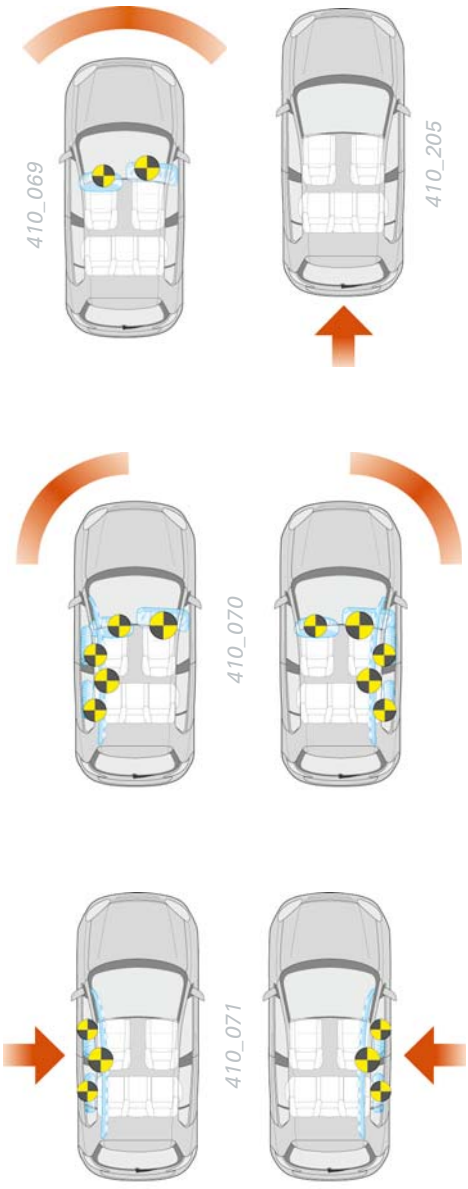
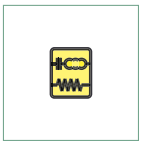
2.1 Control module for safety systems

Illustration: Each model is equipped with its own safety system and the deployment of which depends on the type of collision as well as the angle of impact.



The integrated electronics in the control module for safety systems have the task of measuring vehicle deceleration and/or acceleration and evaluating if a protection system should be triggered. Not only internal sensors in the control module but also external sensors are used during the event of a crash. After all sensor information has been evaluated, the control module for safety systems evaluates if, when and which safety components will be activated. In a crash with low severity usually only the pretensioners will be activated. In a high crash severity, additional relevant airbag systems applicable to the specific accident configuration will be deployed.

The control module is identified in the rescue data sheets as follows:



Control module

Only those protection systems, which also contain a protective function, will be deployed.

In addition to the main function of controlling the safety system, it has additional functions such as:

- Unlocks the central locking system
- Turns on the interior lights
- Turns off the fuel pump
- Turns on emergency flashers

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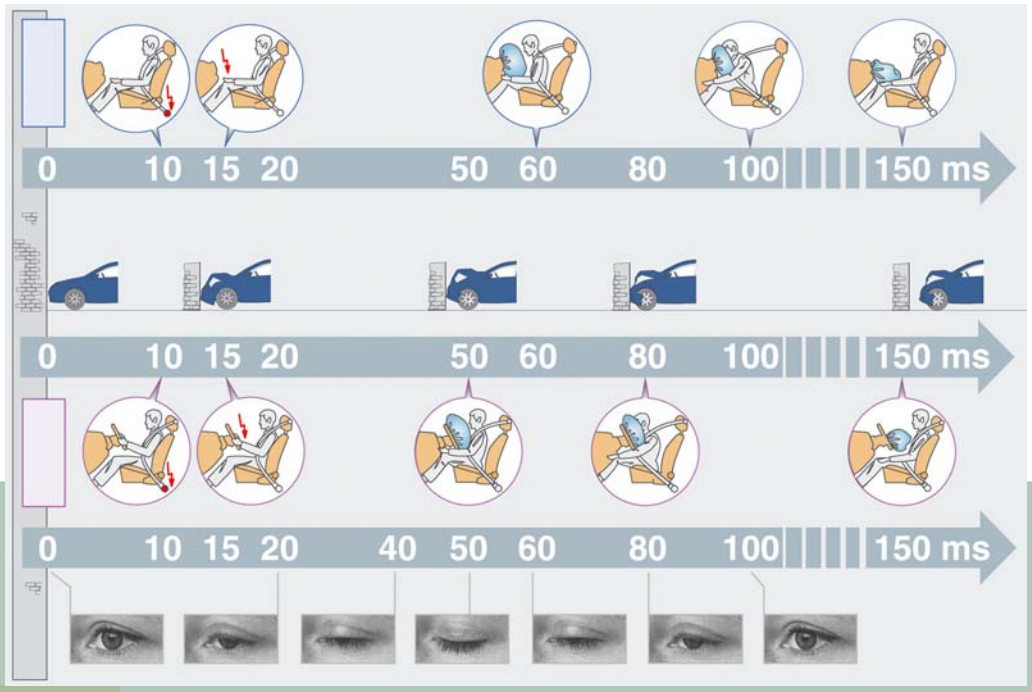
Illustration: Schematic time overview of the events during the activation of seat belt pretensioners and deployment of the front airbags in a frontal impact.



2.2 Airbags

The inflated airbags help protect belted vehicle occupants from impact with the vehicle interior (for example, steering wheel, instrument panel, etc.) during a severe accident. Gas generators inflate the airbags by generating the amount of gas required to fill them. Depending on their location and design requirements, inflator modules can have different designs and operating principles.

2.2.1 Front airbags

Driver airbag

The driver airbag unit consists of a cover, textile airbag and gas generator. It is attached to the steering wheel and is electrically connected to the airbag control module through a contact unit. The folded textile airbag is located under the cover and is designed in such a way that after its deployment it will fully inflate between the driver and steering wheel.

Illustration: Example of a driver airbag

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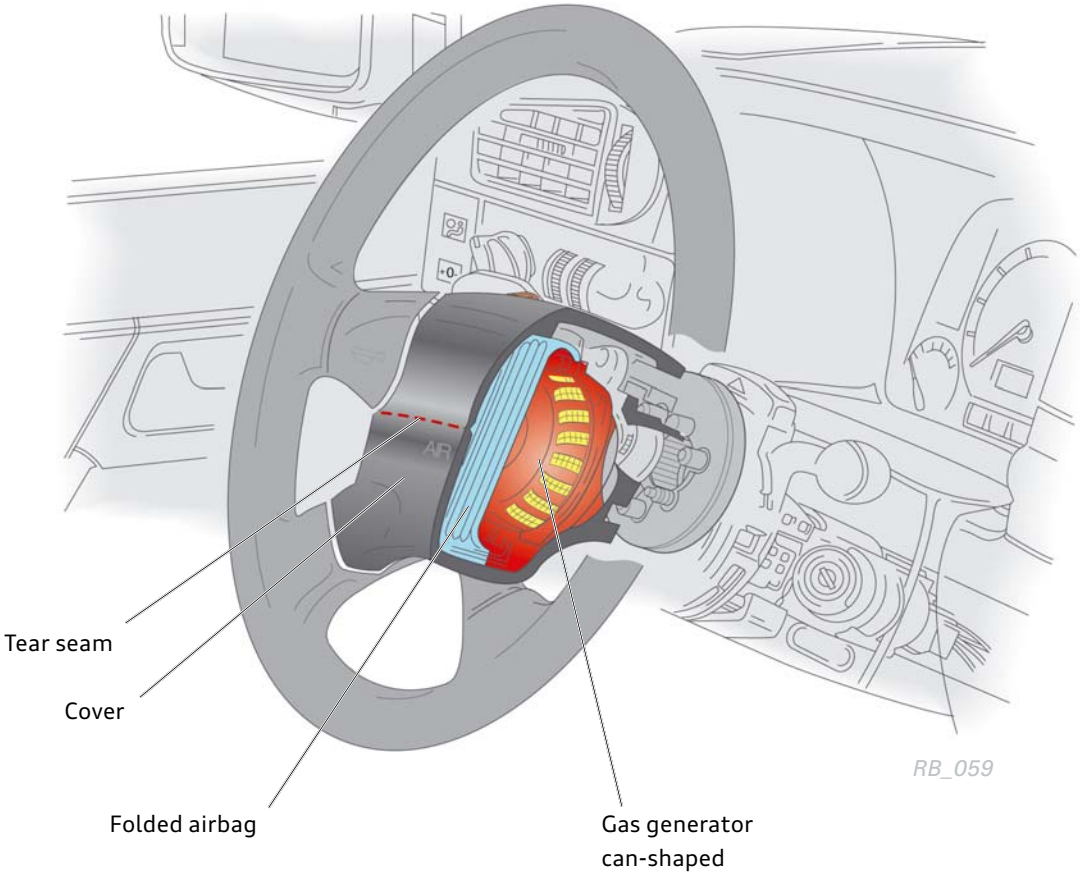
Gas generators located in the steering wheel deploy the driver airbag. The generators are either single or dual stage.

The deploying textile airbag opens from the steering wheel cover at a special seam and is instantaneously filled with gas. The process from triggering the inflator module to a deployed airbag takes approx. 30 ms. After deployment of the airbag and after the upper body has made contact with the airbag, the gas in the airbag will then escape evenly through little vent openings directed away from the driver thereby reducing the kinetic energy and the force of the airbag.

Illustration: Example of airbag construction



Passenger airbag

The airbag assembly for the passenger can be found in the instrument panel in front of the passenger seat. Because of the larger distance from the airbag assembly to the occupant, the passenger airbag has an larger volume. The passenger airbag cover is located in the instrument panel – either as a specially installed part, or as part of a special area with a partly invisible tear seam.

The effect of the passenger airbag, function as well as timing, are comparable with those of the driver airbag.

Gas generators of passenger airbags can either consist of solid propellant gas or hybrid gas generators.

Illustration: Example of a passenger airbag

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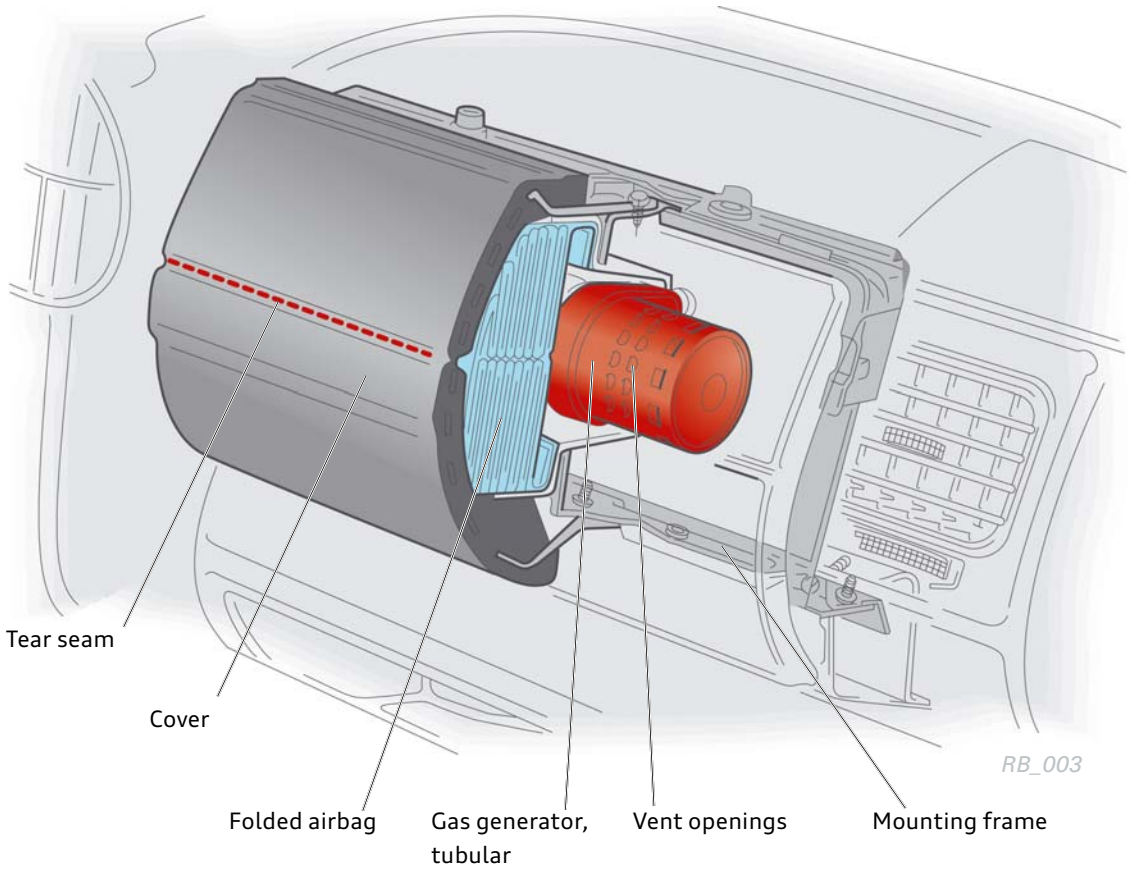
Illustration: Example of passenger airbag assembly



2.2.2 Dual-stage front airbags

The ignition of the propellant takes place in one stage with an airbag that has a single-stage gas generator.

Some of the Audi vehicles are equiped with dual-stage airbags. With this airbags, the gas generators work in two stages in which both propellants are sequentially activated. The control module for safety systems decides what the timing should be between the two ignitions based on severity and type of accident. The timing difference can, depending on the vehicle, be anywhere between 5 and 200 ms.

The second stage ensures that the airbag is filled with additional gas volume. The timing difference between the ignitions determines the inflation stiffness of the airbag: if the second ignition happens later, then the airbag pressure from the first ignition will have partially gone down, the airbag will be inflated with less pressure. If the ignitions take place right after each other, then the airbag pressure from the first ignition will not yet have gone down and the airbag will become stiffer.

In principle both stages will always ignite. This will avoid a propelling charge remaining active after the airbag deployment.

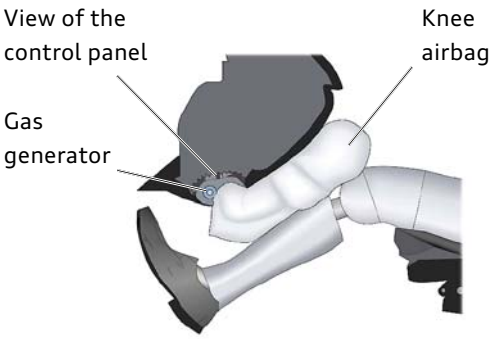
Adaptive front airbags

Some of the new Audi vehicles are equipped with driver and passenger airbags which consist of the so-called adaptive airbags. The cushioning effect of these airbag systems can be influenced by the activation of pyrotechnical units to the airbag gas generator or airbag module housing. This enables a different degree of filling for the airbag.

2.2.3 Knee airbags

The construction of the knee airbag is comparable to that of the passenger side airbag. The knee airbag is located underneath the instrument panel in the footwell area. The knee and driver airbags always deploy simultaneously. Single-stage gas generators are used for the inflation of the knee airbag.

Illustration: Example of knee airbags

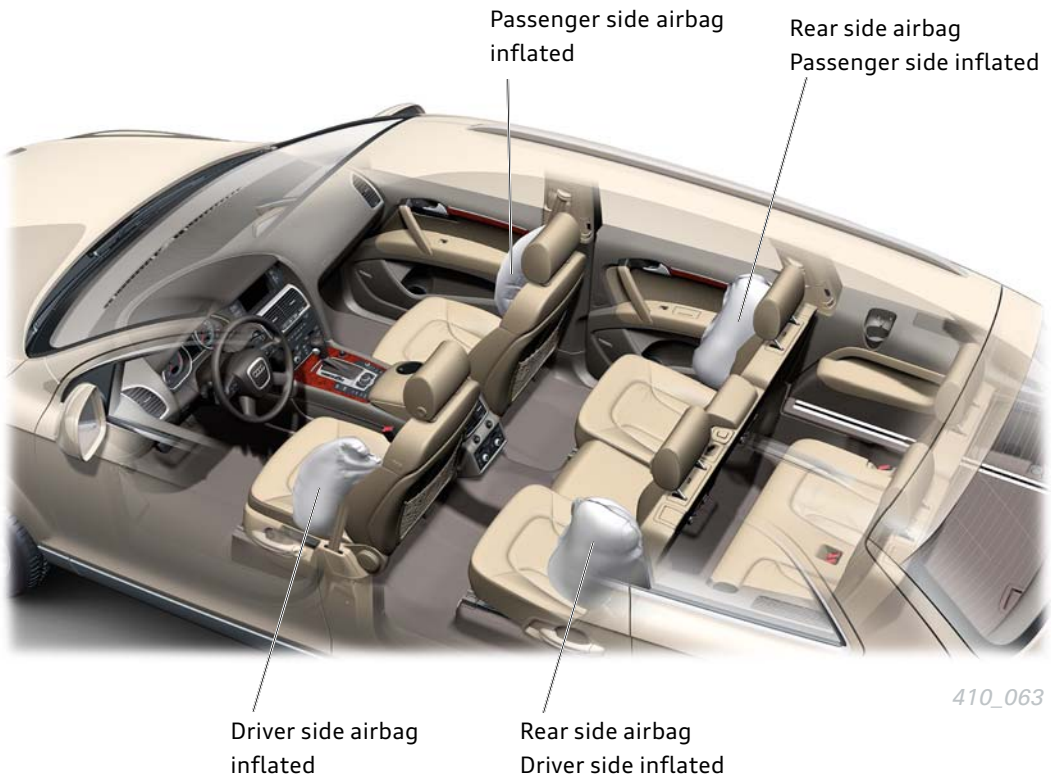


2.2.4 Side airbags

The side airbags are located in the driver and passenger seat back. This ensures that the distance to the occupant remains consistent. In addition, side airbags can also be installed in the rear seat. These are located in the vehicle seat back or side panel.

Tubular, single-stage solid propellant – or hybrid gas generators are used for inflating the airbag.

Illustration: Example of side airbags



2.2.5 Head airbags

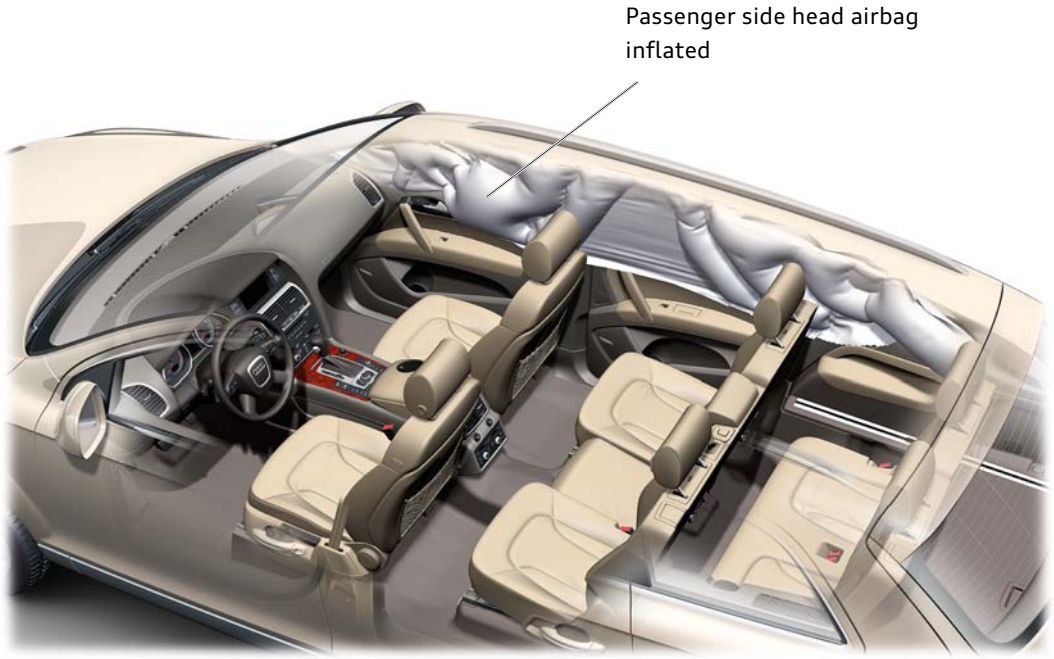
The head airbag consists of a large airbag that extends, depending on the model, from the A-pillar to the C-pillar or D-pillar and extends down to the window sill.

Also, depending on the vehicle model, the gas generators can be installed in the roof area in front and under the sun visors, in the area of the B-pillar, between C- and D-pillar or even in the rear roof area.

Unlike front and side airbags, the head airbag will stay inflated longer after deployment.

Side as well as head air bags are triggered by the safety system control module when a pre-determined threshold has been reached. A side impact is sensed through the lateral acceleration or pressure sensors located in the door.

Illustration: Example of head airbag



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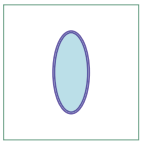
2.2.6 Head/thorax airbags

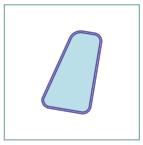
Some head/thorax airbags are installed as side airbags in convertibles and in some coupé vehicles.

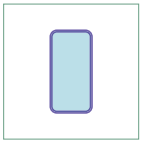
The bag of the airbag assembly is designed in such a way that it simultaneously acts as a side and head airbag.

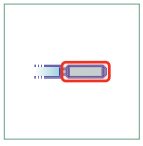
Illustration: Example of a head/thorax airbag in the A5 Cabriolet

Airbags are identified in the rescue data sheets as follows:


Driver airbag


Side airbag


Passenger airbag


Head airbag with gas generator

2.3 Airbag gas generators

Solid propellant gas generators

The solid propellant gas generators consist of a housing containing a solid propellant charge with an integrated pyrotechnic ignition unit.

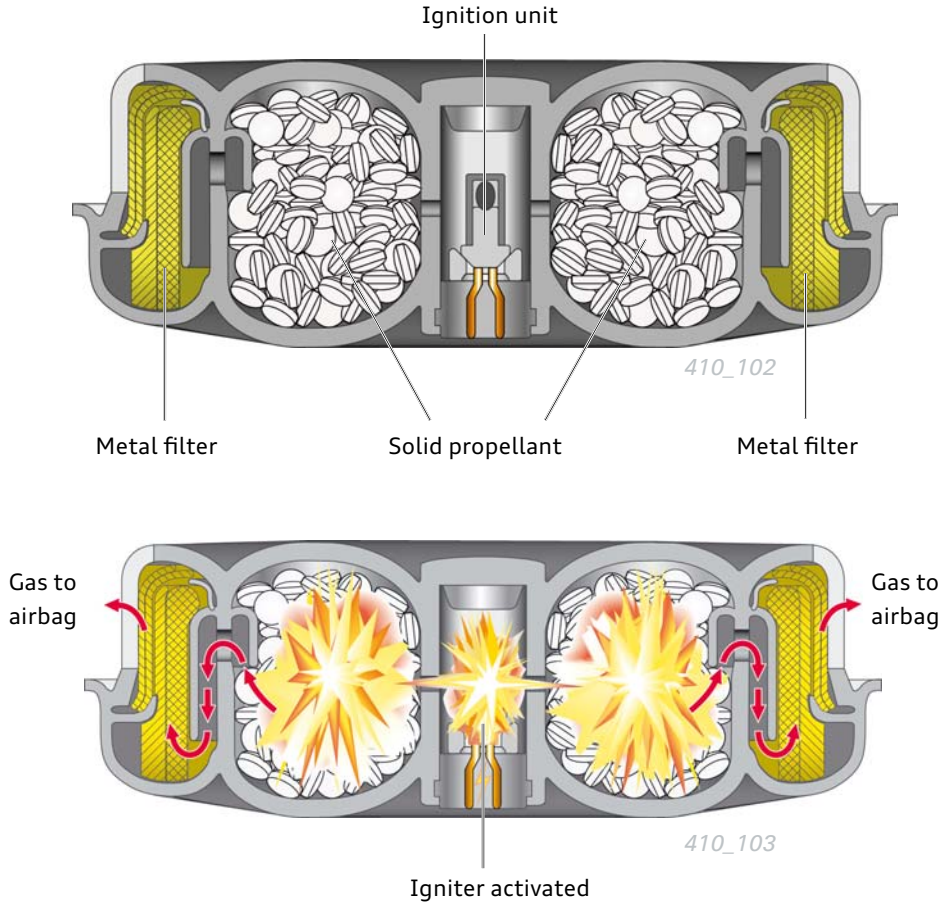
The housing's shape and design are adapted to the installation conditions that can be different from one vehicle model to the next. This type of gas generator can be found, for example, as a can-shaped or tubular gas generator. The solid propellant is used in tablet or ring-shaped form.

After ignition of the propellant, a gas consisting of a high nitrogen content, is emitted.

Function:

- The ignition unit is activated.
- The propellant charge is activated and burns down.
- The resulting gas flows through the metal filter into the airbag.

Illustration: An exemplary representation of a single-stage can-shaped gas generator in a driver's side airbag (non-triggered/triggered)



Hybrid gas generators

The hybrid gas generators consist of a cartridge of pressurized gas with a solid propellant charge and a pyrotechnic igniter. Construction and form of the generator cartridges vary in design depending on their application. Most of these generators are tubular.

The main components include the pressure cartridge containing the airbag propellant gas, and an integrated, or attached, solid propellant charge. The solid propellant is used in tablet or ring-shaped form. The stored and compressed gas is a mixture of inert gases such as argon and helium. Depending on the type of gas generator, it is under pressure between 200 and 600 bar.

Through the ignition of the propellant gas, the pressurized reservoir is opened and a gas mixture resulting from the propelling gas charge and inert gas mixture forms.

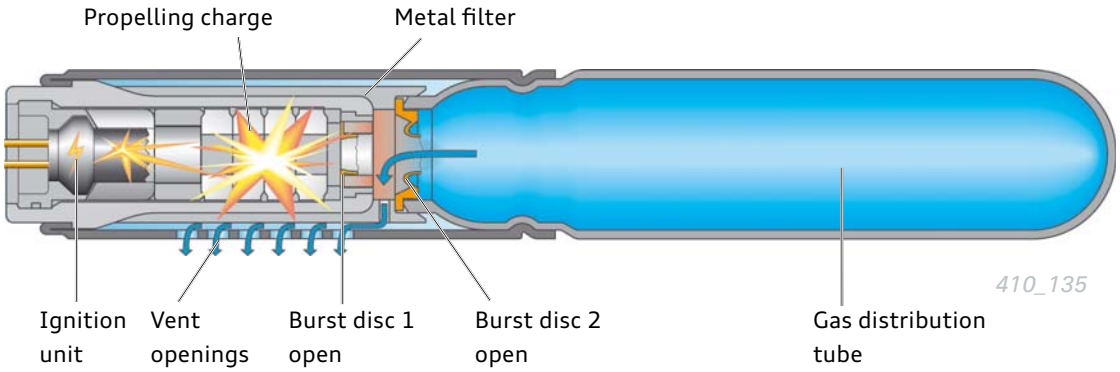
Function:

- The igniter is activated and the propelling charge is ignited.
- The resulting gas breaks through the 1st burst disc and the pressure in the gas distribution tube increases until the 2nd burst disc breaks.
- The gas mixture now flows from the gas distribution tube through the metal filter into the airbag.

Hybrid gas generators can either be single or dual stage.

Gas generators of adaptive airbags are equipped with an additional vent flow through which the filling gas, at a predetermined time, can escape into the atmosphere and not into the airbag. Hence, filling of the airbag can be adjusted to the crash severity.

Illustration: Example of a single-stage gas generator in a head airbag



To reduce the risk of serious injury do not damage the gas generators during rescue operations.

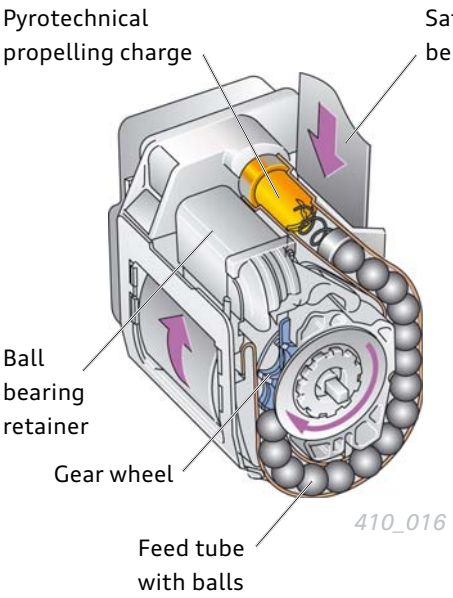
2.4 Safety belt pretensioners

Safety belt pretensioners retract the safety belt in case of a crash in the opposite direction of the pull direction. This reduces the belt slack (clearance between the belt and body). A pretensioner can retract the safety belt up to 130 mm in a matter of milliseconds. If the counter force of the belt load is greater than the force of the belt pretensioner itself, then the belt tightening is completed.

In Audi vehicles, the safety belt pretensioner system is electrically triggered.

The pretensioners are integrated into the safety belt systems and may be installed in different positions and locations depending on the vehicle (in the B-pillar, in the door sill next to the seats or in the outboard seating position of the rear seat) and may have different operating principles.

Illustration: Example of a pretensioner with ball bearings



As an example, the trigger using the so-called ball bearing pretensioner should be explained in more detail:

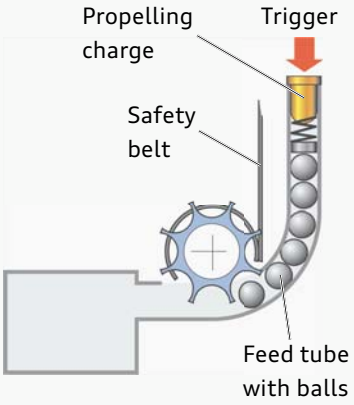
The ball bearing pretensioner consists of a compact unit which is driven by ball bearings. The ball bearings are stored in the ball bearing feed tube. In a crash, the ignition of the propellant charge is triggered by a release unit. The release of electric pretensioners is activated by the safety system control unit.

If the trigger is ignited, then the expanding gas moves the ball bearings, which forces them over a gear wheel into the ball bearing retainer. The belt spool is tightly connected with the gear wheel and is rotated by the movement of the ball bearings resulting in the belt being tightened.

To reduce the risk of injury do not damaged the pretensioners with the rescue equipment.

The safety belt should, if the position allows, be removed or cut as early as possible.

Illustration: Schematic of events during the activation of a pretensioner



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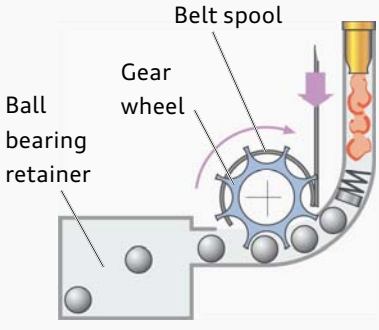

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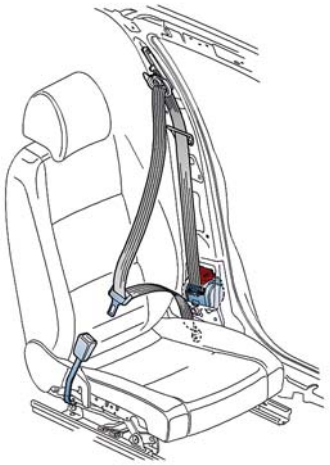
Illustration: Overview of various pretensioners



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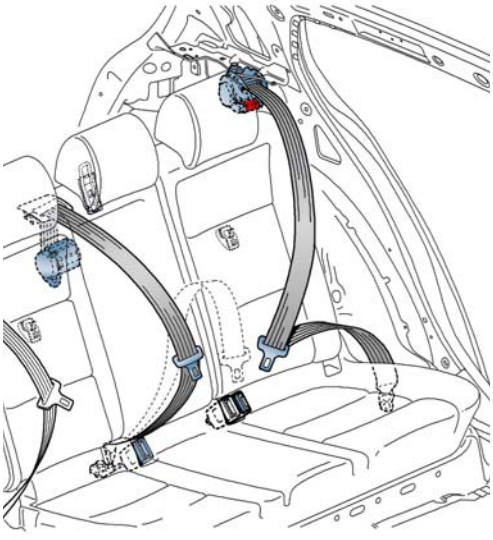
Version 1

The front compact retractor unit is located in the B-pillar and consists of an inertia-reel belt and pretensioner with either an electrically or mechanically activated ignition system.

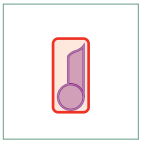


RLF_019

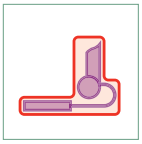
Version 2

The rear compact retractor unit is either located in the rear filler panel or rear seat back and consists of an inertia-reel belt and pretensioner with either an electrically or mechanically activated ignition system.

Pretensioners are identified in the rescue data sheets as follows:



Pretensioner



Cylindrical pretensioner

2.5 Rollover protection system

In case of the automatic rollover protection, a sensor which detects an imminent rollover, has been integrated into the safety system control module. The crash severity is interpreted and transmitted through sensors built into the control module resulting in the activation of the rollover protection system and the pretensioners.

As a precaution, the rollover protection is also deployed in a higher crash severity frontal, side or rear impact as soon as a pretensioner or air-bag is activated.

An electronical switch activates the rollover protection system. A compressed spring under tension propels the support into the extended position and a latching mechanism locks the supports in the extended position.

When the roof is closed (in the up position), the triggered rollover protection system moves up until it touches the rear window. If the rear window is still intact after a system deployment, the rollover protection system will not break the rear window. If the rear window is removed due to rescue activities, then the rollover bars will be pushed up an additional 10 cm, the resulting forces can cause glass splinters to be scattered.
Keep distance!
Wear personal protective equipment (gloves, protective goggles, and so on)!

The rollover protection is identified in the rescue data sheets as follows:

Rollover protection

Illustration: Example of a dynamic rollover protection

2.6 Hints

A – **A**lways keep your distance

I – **I**nspect the passenger compartment

R – **R**escue personnel to be warned

B – **B**attery management

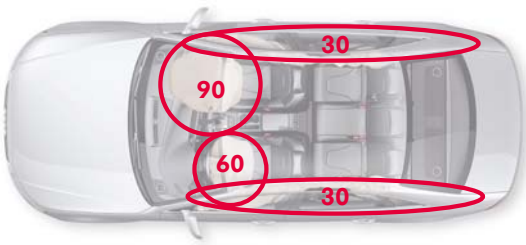
A – **A**ssess removal of interior lining

G – Airbag components

A – Always keep your distance

The deployment areas of non-deployed safety systems should remain free of obstruction. This is in particular true for when heavy rescue equipment is being used or when cable connections have to be severed. During this time, neither a person nor tools should be in the deployment area. And as far as medically allowed, the patient should also be kept out of the deployment area. With respect to non-activated pretensioners, fastened safety belts should be cut or unfastened. If non-deployed rollover bars are present, then their deployment area should also remain free of any obstruction.

Illustration: Deployment area of airbags (cm)



RLF_023

I – Inspect the passenger compartment

In order to determine the status of the safety system, rescue operations must first inspect the vehicle's interior.

The maximum possible airbag combination can be obtained from the rescue data sheets.

All airbag modules are identified with the logo "AIRBAG". The identification is usually located on top of the airbag module or in the area thereof. With a seat-mounted airbag, the identification could also be attached by means of a little flag to the seat backrest cover. With head airbags, one can find various identification locations in the upper area of the vehicle pillars or along the roof rails.

Identification of side airbags could be covered by a safety belt or slip covers.

Available pretensioners are not identified.
The rollover protection system is only utilized in convertibles and is located behind the rear head restraints. The cover of the rollover protection system has been provided with the words "do not cover".

The installation location of the belt pretensioners and the rollover protection system can be obtained from the rescue data sheets.

Illustration: Driver airbag

Illustration: Passenger airbag

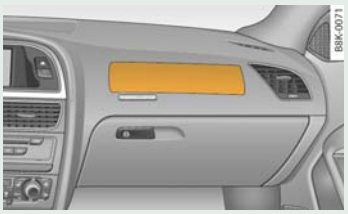


Illustration: Side airbag, front

Illustration: Side airbag, front and rear

Illustration: Head airbag

R – Rescue personnel to be warned

All rescue personnel working on the accident vehicle should be immediately informed about the nature and status of the encountered safety system. This is the only way to ensure that during the rescue work, all required safety rules are applied.

B – Battery management

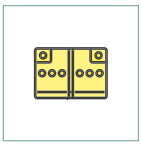
Audi vehicles are equipped with electrical ignition systems for the airbag and mostly also for the pretensioners. An electrical activation of the airbags by the control module for safety systems is not possible when power has been interrupted. In order to disable the safety systems, the vehicle must be disconnected from power.

The following systematic approach is offered (see “Vehicle electrics system”):

1. Turn off a running engine.
2. Turn on the warning lights.
3. Utilize the power comfort setting for the benefit of the rescue.
4. Turn off the ignition.
5. Locate the battery(ies)
6. Disconnect battery(ies)
7. Check for any voltage

If additional information is needed regarding the vehicle electrics system, please see the chapter, entitled “Vehicle electrics system”.

The location of the batteries can be found in the rescue data sheets. Batteries are identified as follows:



Battery

A – Assess removal of interior lining

Regardless of installation, undeployed airbag gas generators and undeployed pretensioners should not be damaged. This is especially important during roof removal, in particular during cutting of the vehicle pillars or when cutting through the bottom of the B-pillar.

In order to avoid damage to the pretensioner and gas generators, the following options are recommended:

Removal of interior trim panel

The interior trim panel should be removed from the area at which point the vehicle pillar is intended to be cut. This ensures that one can detect the presence of gas generators or pretensioners and the direction of cutting can then be determined in order to avoid damage.

Head airbag gas generators in Audi vehicles are installed in mirror image of each other. If the installation is known on one side of the vehicle, then the gas generator will be located exactly in the same location on the opposite side of the vehicle.

Check the installation location with the help of the rescue data sheets

The model overview in the rescue data sheets shows the mount position of the gas generators and pretensioners. The use of rescue equipment can be planned in such a way so as not to damage these components.

G – Airbag components

Deployed airbags, belt pretensioners and tripped rollover protection

If a deployed airbag interferes, then it could be pushed out of the way or, if necessary, it can be cut off.

The airbag dust, which emerges during deployment and during compression of the airbags, can cause slight irritation of the mucous membranes and skin. The vehicle occupant compartment should, when possible, be aired out. It is recommended that protective gloves and eye wear is worn. Out of precaution, unprotected skin should be washed with water after the rescue.

Due to the fact that the area around the gas generators could remain hot for a while, one should not lean on or against a deployed airbag module.

Undeployed airbags, belt pretensioners and non-tripped rollover protection

- Do not damage the gas generators of non-deployed airbags. Do not cut into the airbag module.
- Avoid damage to the control unit of the safety system during the rescue.
- The position of the control unit can be found in the rescue data sheets.
- The control unit is usually found on the transmission tunnel in the area of the shift lever.
- Do not put pressure on the non-deployed airbag modules nor untripped rollover protection.
- Avoid application of heat on the airbag module, for example, avoid the use of torch/gas cutting equipment. The airbag gas generator has a self-igniting temperature of about 200 degrees. Airbags will be triggered in a burning vehicle due to the prolonged heat.
- Non-deployed belt pretensioners should, if possible, not be damaged.
- Be careful when tilting or lifting the vehicle with the engine ignition on and the battery connected. An untripped rollover protection could possibly be activated.

2.7 Airbag safety systems

Safety devices, which should protect against an airbag deployment after an accident, could be displaced during an airbag deployment. We therefore advise against the use of a safety device which would puncture the airbag fabric in order to prevent a pressure build-up since this would result in hot burning gas escaping freely, possibly leading to burns.

2.8 Pedestrian protection system

The pedestrian protection system will automatically activated when the front of the vehicle collides with a pedestrian. The bonnet is raised several centimetres to create an additional crush zone above the engine.

The sensors of the pedestrian protection system are located in the front bumper. In rare cases, the system can be triggered because the possibility that a pedestrian has been hit cannot be ruled out by the sensors, for example:
- in a collision with a street post,
- in a collision with an animal, or
- if you drive into a pile of snow, or
- in the event of ground contact, e. g. when driving on extremely poor road surfaces.

When the pedestrian protection system has been triggered, the bonnet is raised by several centimetres.

Illustration: Schematic of the pedestrian protection system

03 Vehicle electrics system

With the increasing types of equipment in vehicles, energy consumption increases and therefore the demand for larger or more energy storage.

This also has consequences for the rescue effort. Particularly with the deactivation of the vehicle electrics system (turn off the ignition, disconnect battery), additional points must be observed.

Deactivation of the vehicle electrics system reduces the risk of fire caused by electrical shorts, and also the risk of delayed activation of airbags, belt pretensioners or rollover protection.

When deactivating the vehicle's electrics system, one must ensure that the power for any existing trailer is disconnected and that any existing solar panels located in the sunroof are covered.

3.1 Vehicle batteries

Audi vehicles are usually equipped with one battery. However, in some special vehicles, there may be additional vehicle batteries.

Risk of electrical shot, activation of restraint systems, rollover protection and so on.

Turn ignition off!

Disconnect 12V Batteries!

The location and numbers of the battery depends on the vehicles. After crashes, all batteries should, if possible, always be disconnected!

3.2 Battery cut-off relays

If the starter battery is located in the vehicle's interior or trunk, then a battery cut-off relay could be used.

The purpose of this cut-off relay is to interrupt the connection from the starter battery to the vehicle starter and alternator. This can be accomplished pyrotechnically, for example through a so-called cut-off relay, or through a switch for a battery disconnection. Should there be a short in the line to the vehicle starter and alternator, then a cut-off could possibly prevent a vehicle fire.

Is the airbag deployed during the crash, then the battery cut-off relay is automatically activated. During a rear impact, the deployment of the belt pretensioners will activate the battery cut-off relay.

The automatically battery cut-off relay only disconnects the battery-plus-line from the starter or the starter battery. Additional vehicle functions such as hazard warning flashing lights, interior lighting and safety systems will remain functional. This means, however, that the battery must still be disconnected.

Illustration: Installation location of the battery safety terminal

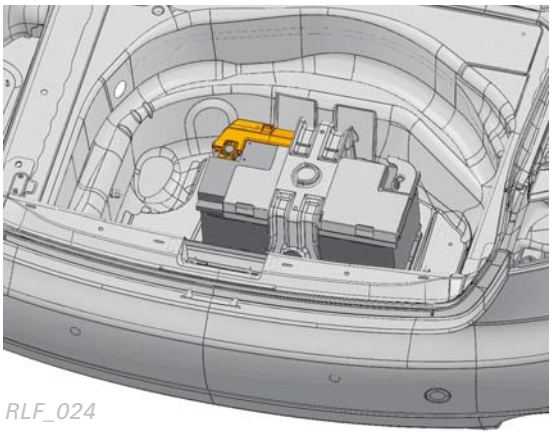


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Illustration: Battery safety terminal – starting position

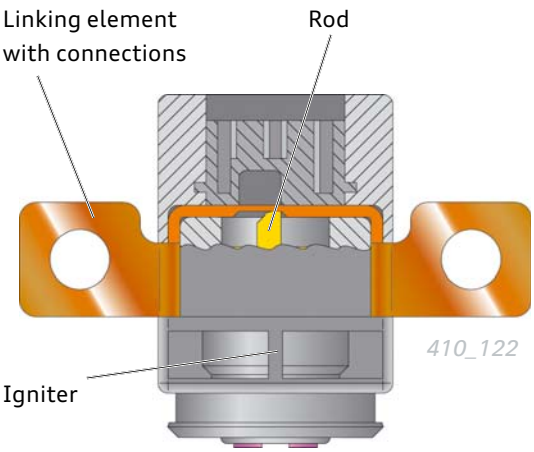
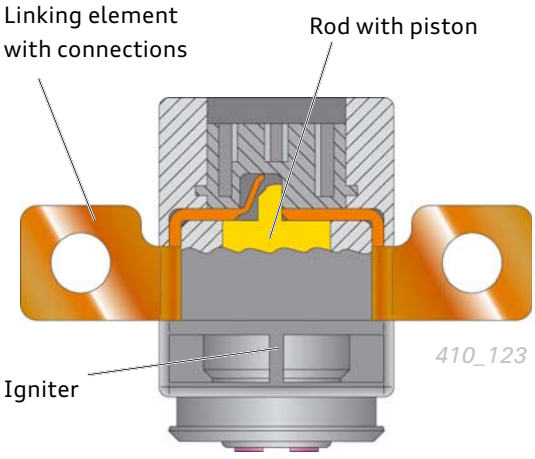
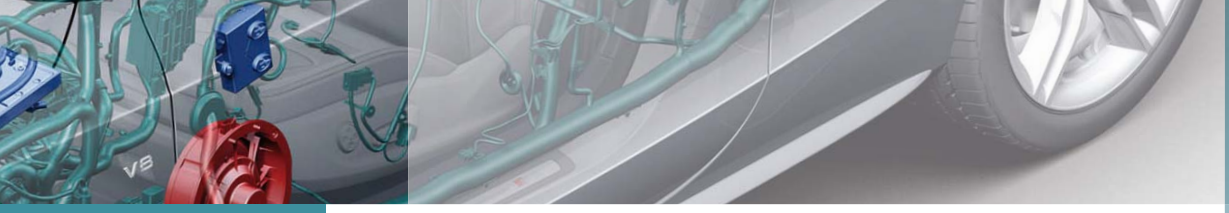


Illustration: Battery safety terminal – igniting





3.3 User information regarding handling of the vehicle's electric system

Turning off the power supply to the vehicle can be accomplished by following the following systematic approach:

1. Turn off the vehicle's running engine
There could be situations in which it is necessary for rescue personnel to turn off the vehicle's engine.

Normally this is accomplished by using the vehicle ignition key. However, some models could be equipped with a keyless entry and start ignition system. In this case, the running engine can be turned off by pushing the start/stop button.

Depending on vehicle type and model year, the fuel pump is turned off by the control module for the safety system. This will most likely prevent the engine from continuing to run.

2. Activate the warning lights
Any rescue personnel can use the activated warning lights as a visible sign of an active vehicle power supply.

Depending on vehicle type and model year, the warning lights are automatically activated by the control module for the safety system.

3. Use of power comfort settings for the purpose of rescue
Depending on the model line and vehicle equipment, Audi vehicles have a whole range of power operated comfort features, for example:

- Power windows
- Power sunroof
- Power seats
- Power adjustable steering column
- Power assisted trunk opening

These can no longer be utilized after the battery has been disconnected!

If possible, the power comfort features should be used for optimizing the rescue effort before the battery is disconnected!

4. Turn off the ignition
The voltage supply to the control unit for the airbag is interrupted by turning off the ignition. An electric ignition of the airbags, belt tensioners and the rollover protection by the control unit is no longer possible after a maximum of 30 seconds.

The shift lever must be positioned in the “P” position for automatic transmission equipped vehicles.

For vehicles with keyless entry and start ignition systems, the ignition is turned off by one push on the start/stop button or by complete removal of the keys out of the switch for start authorization.

Make sure that the brake pedal is not depressed, before pressing the START ENGINE STOP button! By pressing the START ENINGE STOP button with depressing brake pedal, the engine starts!

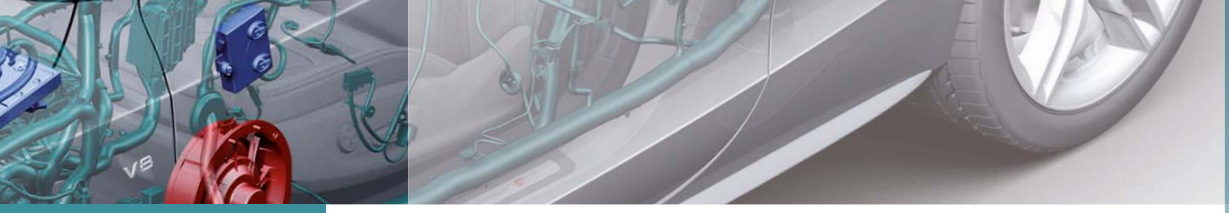
5. Locate the battery/batteries
Parallel to the aforementioned measures, the battery/batteries should be located.

The vehicle batteries for Audi vehicles are located, depending on vehicle model and engine:

- In the engine compartment
- In the trunk (in the side pocket or in the area of the spare tyre)
- Under the driver seat (only in the Audi Q7)
- Under the rear seat (with older models)

The battery location can be found in the rescue data sheets.

In order to successfully access the engine and luggage compartment, conventional methods of opening are possible such as a hood release, ignition key, etc. In case these do not work, then the engine and trunk lids could be forced to open with a crowbar or hydraulic spreader.



6. Disconnect the battery/batteries
After access to the battery is accomplished and then after the use of the power comfort features, both battery terminals on all batteries are disconnected. A 10/13 mm wrench is needed for this.

The battery must also be disconnected when a battery separator is attached.

To reduce the risk of an of an electrical short the negative ground wire has to be disconnected first.

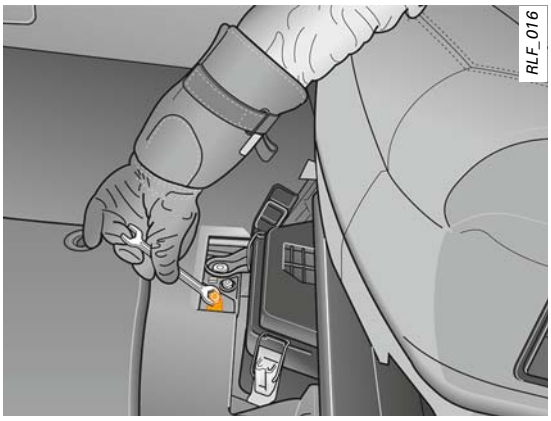
7. Test for electricity
If the battery has been disconnected, it should be double-checked if the vehicle is indeed free of electricity. A sign for this would be that the hazard warning and interior lights have been extinguished.

Instruction how to disconnect the battery in certain vehicle models ...

Audi Q7
The battery for the Q7 is located under the driver's seat and is only accessible after the seat has been moved to the most rearward position.

It is possible to de-energise the ground cable of the battery by separating a bolted connection. This connection is located in the foot area of the driver's seat and is accessible by removing the carpet.

Illustration: Disconnection of the ground connection of the battery in the Q7



Audi A3 V6 (until 2012)

The battery of the A3 V6 is located under a cover in the vehicle's trunk. The cover has been attached with several screws. The battery can be disconnected after removal of the cover.

An alternative possibility is to disconnect the ground connection from the vehicle body.

The ground wire runs from the battery box and ends in the right rear of the trunk.

Illustration: Battery cover in the trunk of the A3 V6

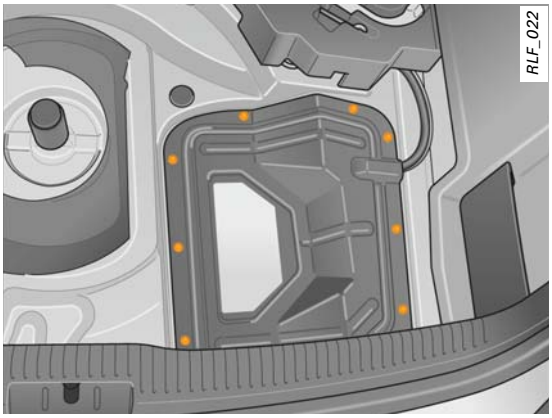


Illustration: Disconnection of the ground connection

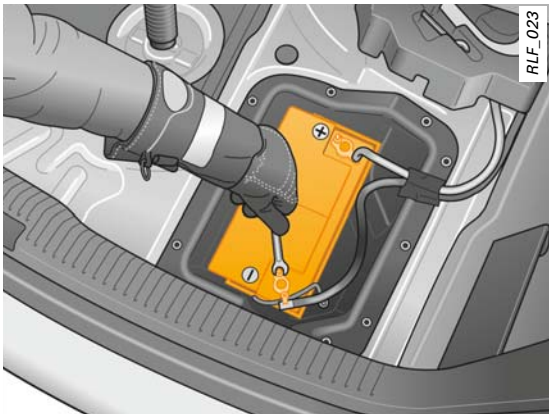
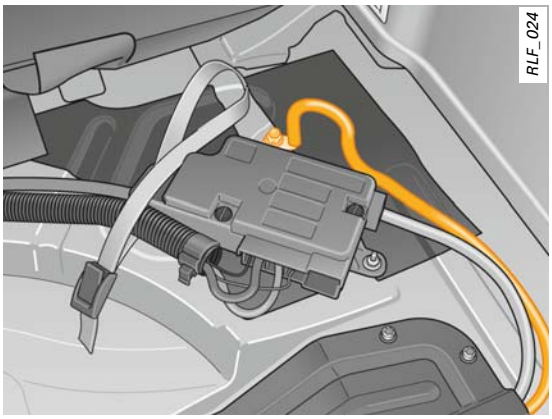
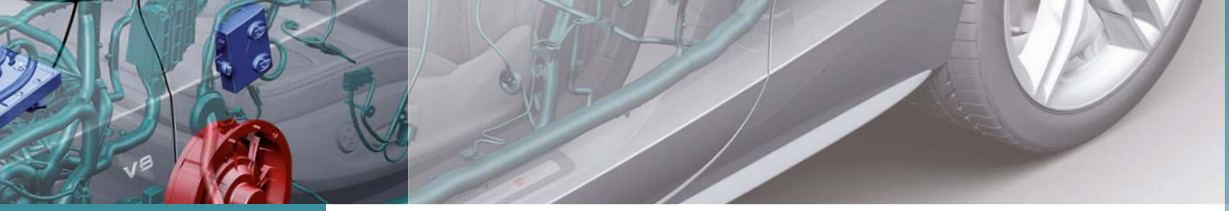


Illustration: Ground cable with ground connector of the A3 V6





Special situations with batteries located in the spare wheel compartment (depending on vehicle model)

Depending on battery concept, the battery of various Audi models could also be located in the trunk under the spare wheel.

Illustration: Removal of spare wheel

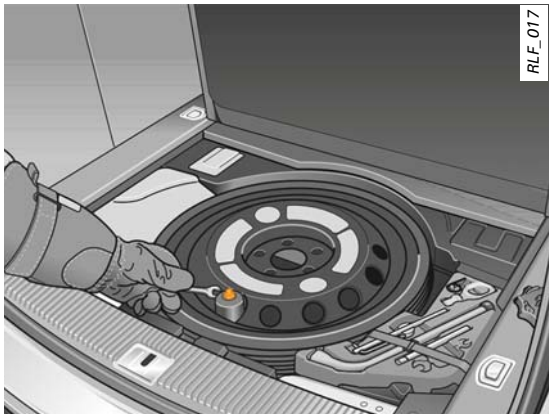
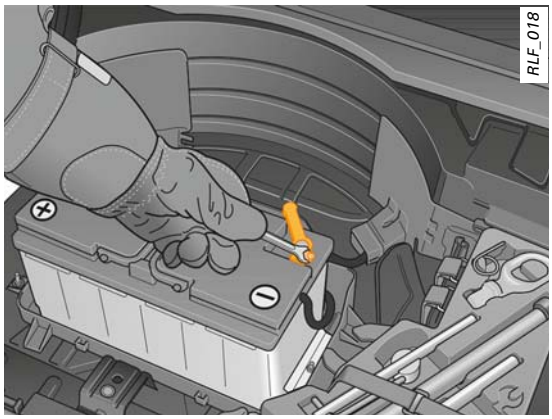


Illustration: Disconnection of the ground wire



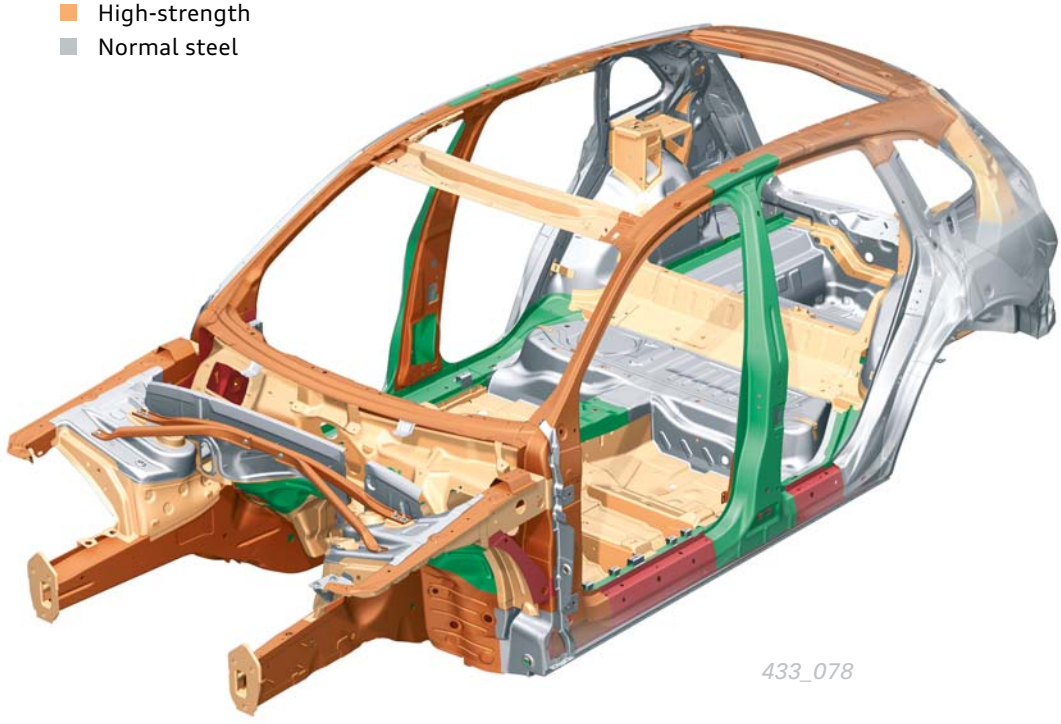
04 Vehicle structure and material

Modern vehicles utilize ultra-high-strength steels (hot formed/form hardened) for the construction of the B-pillars and sills. These ultra-high-strength steels can be cut with available standard hydraulic cutting equipment. In modern vehicles, specialized cutting devices are to be used.

Illustration: Example of vehicle structure – Example Q5

legend:

- Ultra-high-strength form hardened
- Ultra-high-strength
- Higher-strength
- High-strength
- Normal steel



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4.1 A-pillars

The convertibles' (Audi A3/A4/A5 Cabriolet, Audi TT Roadster) vehicle structure is especially reinforced in order to reach a certain vehicle structure rigidity without a roof. In order to accomplish this, tube reinforcements and ultra-high-strength steels are incorporated into various areas of the vehicle (for example, the A-pillars).

Due to the A-pillar reinforcement in the lower area, it is recommended to cut the A-pillar in the upper area.

Where appropriate, opening of the convertible roof is also possible in the conventional way or by putting high pressure on the convertible top cover with a hydraulic rescue device.

The areas of special reinforcements in the individual vehicles can be found in the rescue data sheets. The special reinforcements are shown as follows:

Reinforcement

Illustration: Example of tube reinforcement of the A-pillars

4.2 B-pillars

The B-pillar is especially reinforced with the use of highest-strength steel and multi-shell structures. In addition, modern B-pillars have a larger diameter than earlier versions.

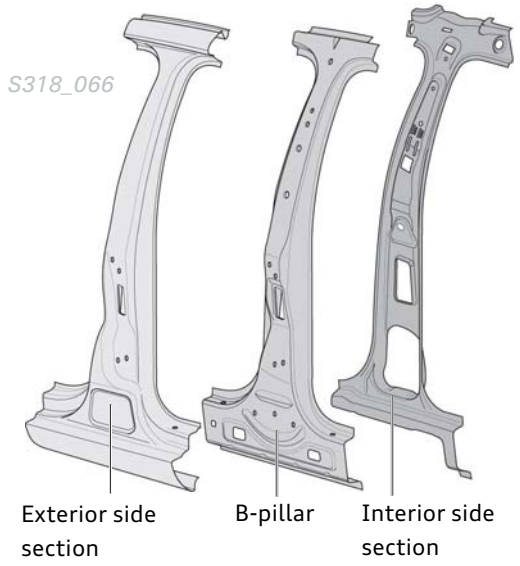
In the area of the vehicle seat belt webbing deflection point, an additional metal rail is mounted to the pillar because of the vehicle seat belt height adjuster. This also makes cutting more difficult in this area. These areas should therefore be deliberately avoided.

Cutting of the vehicle pillars is usually easiest in the area above the seat belt height adjuster. However, in this area one should be aware of the head airbag components.

The pillars could also be cut in the lower area. However, please note that the pillar diameter is quite large and that the belt pretensioners are usually located in this area.

Illustration: Example of B-pillars

Illustration: Example of B-pillars with multi-shell structure

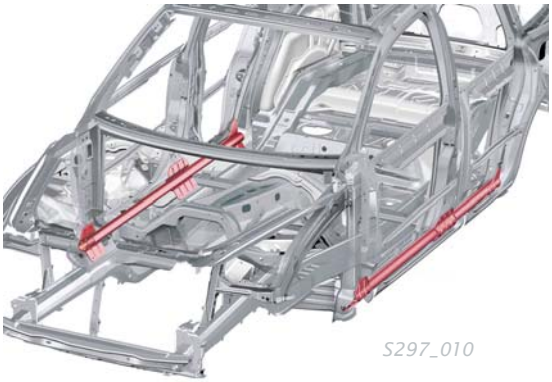


4.3 Door sill

An additional tubular reinforcement is used, for example, in the door sill of the Audi Q7.

The wall thickness of the high-strength tube is approximately 3 mm. The reinforcement can only be cut with modern rescue equipment.

Illustration: Example of tubular reinforced door sill



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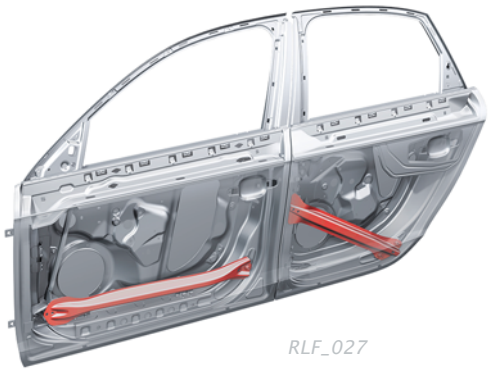
4.4 Side impact protection

Side impact protection in Audi vehicles consists of steel pipes, steel sections or aluminium extrusion profiles. The door reinforcements are installed horizontally or diagonally behind the outer door panels.

Illustration: Example of side impact protection



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The high-strength structures can only be cut with modern, powerful hydraulic cutting equipment.

The areas of special reinforcements in the individual vehicles can be found in the rescue data sheets. The special reinforcements are shown as follows:

Reinforcements relative to side impact protection

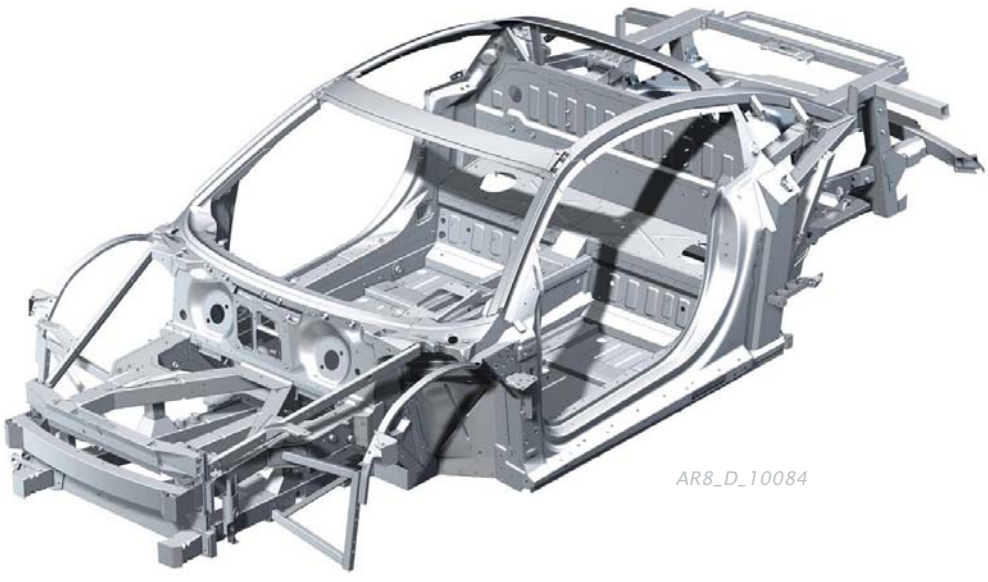
4.5 Audi Space Frame (ASF®) aluminum vehicle body

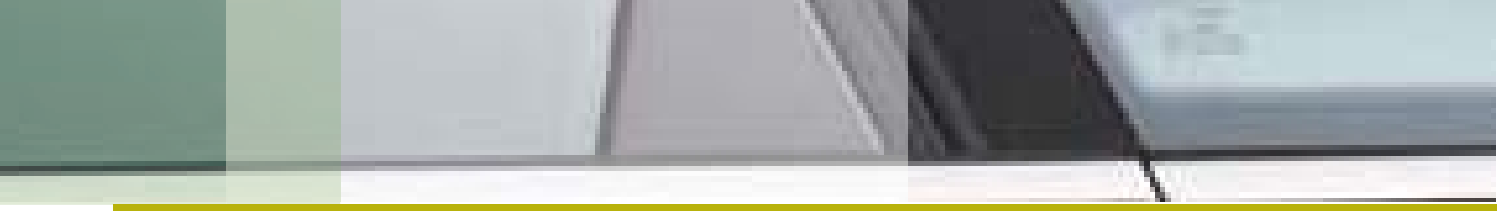
The ASF® aluminium construction consists of extruded aluminium sections connected with vacuum diecast jointing “nodes” to comprise the vehicle’s structure and passenger cell.

The Audi A8 was the first volume-production car in the world with a load-bearing body manufactured completely of aluminium alloy. Besides the Audi A8, the vehicle structures of the Audi A2 and R8 are also constructed in the form of space frame technology.

Due to the nature of aluminium, it is possible that certain rescue techniques for aluminium components will only function in a limited capacity. Tests have shown that aluminium parts tear sooner than, for example, parts made of steel during the preparation of the spreader or ram.

Illustration: Example of the construction of the ASF® aluminium body of the R8





4.6 Automotive glazing (heat absorbing glass)

Audi vehicles are equipped with two different types of glazing:

Tempered glass is used for the side windows, the rear windows and the sunroofs. It consists of thermally pre-treated glass which can withstand high loads. Should the load be too high, then the glass will shatter in many, but not particularly sharp, small pieces.

It is possible that tempered glass could suddenly burst during use of rescue equipment. Depending on the accident situation and extent of rescue work necessary, the tempered glass window should first be removed.

Laminated safety glass is used in front windows as well as in side windows of the A6 and A8. This type of glass consists of two glass plates which are held together by a film. The windows will stay intact even after it is damaged.

All vehicle windshields consist of laminated safety glass and are glued to the vehicle structure. Side windows and sunroofs usually consist of tempered glass and are either movable, hinged or glued.

There are special glass saws and metal cutters which are suitable for the removal of laminated safety glass.

Since laminated safety glass does not burst during rescue work with hydraulic equipment, these types of windows should only be removed if it is deemed necessary under the circumstances.

Tempered glass can be removed by breaking with a pointed load, for example with a spring centre punch or emergency hammer. The window should therefore be protected before removal.

Before removal of the windows, the vehicle occupants should be protected from dust and splinters.

Vorsprung durch Technik **www.audi.de**

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