RESCUE AND RECOVERY

FROM VOLKSWAGEN VEHICLES INVOLVED IN CRASHES

CUSTOMER SUPPORT

SERVICE

These guidelines are intended to provide operational support for emergency services and to help emergency personnel quickly and effectively aid accident victims. At the same time, these guidelines will help reduce uncertainties and minimize risk of injury to emergency personnel during rescue operations involving Volkswagen vehicles. The basic, vehicle information about safety-related vehicle systems needed in the context of rescue operations can be found here.

The guidelines include operational sheets in the Appendix with vehicle-specific information. Rescue personnel should read both the guidelines and the operational sheets to ensure familiarity with the necessary considerations when working on Volkswagen vehicles during rescue operations.

The guidelines in this booklet are not intended for consumers. Consumers seeking information about the proper operation (or features) of their Volkswagen vehicles should always consult their Owner's Literature. The Owner's Literature contains detailed information about all the vehicle's features plus important warnings about vehicle and passenger safety.

The guidelines in this booklet are also not for Technicians seeking information on how to repair a vehicle. Dealer Technicians seeking repair information should use their dealer-based resources.

Volkswagen of America, Inc. believes the specifications and information provided in this brochure to be correct at the time of printing. However, specifications, standard equipment and options are subject to change without notice. Some vehicles in this brochure are shown with European trim or equipment. All dates pertaining to product and feature availability indicate model years for vehicles sold in the U.S. and Canadian markets.

Rescue and recovery from Volkswagen vehicles involved in crashes

The demands on today's cars are many and change over time. Constantly increasing traffic density has made vehicle occupant safety a top priority. More and more vehicles are being fitted with increasingly effective safety features. These safety features can be divided into active and passive safety systems.

Active safety systems are designed to help prevent accidents with sophisticated systems including Anti-lock Braking System (ABS), the Electronic Differential Lock (EDL), and the Electronic Stabilization Program (ESP).

Passive safety systems are intended to minimize the consequences of accidents for vehicle occupants. Passive safety components include such things as the vehicle body structure with its passenger safety cell, crumple zones with programmed deformation characteristics, collapsible steering columns, and energy absorbing bumpers, seats and head restraints, as well as side impact protection. They also include all other safety-related parts of a vehicle that only come into play in a crash, including safety belts with pretensioners, load limiters and various kinds of supplemental airbag restraint systems.

RB_058

Important Note **Warning!**

The guidelines show current designs and explain how passenger protection systems function.

At a glance

Appendix

Disclaimer:
Some of the equipment described may not have been available until a later date or was unavailable for certain markets. Illustrations may vary from the actual vehicle and many illustrations depict European-specification models. For these reasons, you should regard illustrations as a general guide.

Rescue and recovery

Rescue and recovery when …

… an airbag has not deployed

The first thing to check after crash is whether the vehicle is equipped with airbags. The presence of airbags can be readily determined by **"AIRBAG"** on the steering wheel, instrument panel, seats and side headers. An overview of the locations where airbag identification labels can be found on Pages 10 and 11 of this book and in Appendix Page A1.

Before starting rescue operations, the ignition and vehicle battery must be disconnected. Some models have two batteries; if so, both batteries must be disconnected. Since all Volkswagen models equipped with airbags use electrical airbag ignition systems, the airbag cannot be activated if the power supply is disconnected. This means that it is also not possible to deploy an airbag by cutting through its ignition wires when the power has been disconnected.

If the battery cannot be disconnected, injured occupants must always be treated a safe distance away from the airbag deployment zone. Rescue personnel must always make sure there is enough distance between them, the airbag, and any injured person.
The airbag gas generators will not explode. They have a self-ignition temperature of approximately 390°F / 200°C. It is especially important not to expose the area near the gas generators to very high temperatures, as this could cause the airbag to deploy without warning.

The area around undeployed airbags must not be subjected to damage or any mechanical interference, such as drilling, cutting or impact. If a vehicle is on fire, the area around the airbag must be avoided until the fire has been extinguished and the vehicle has cooled down.

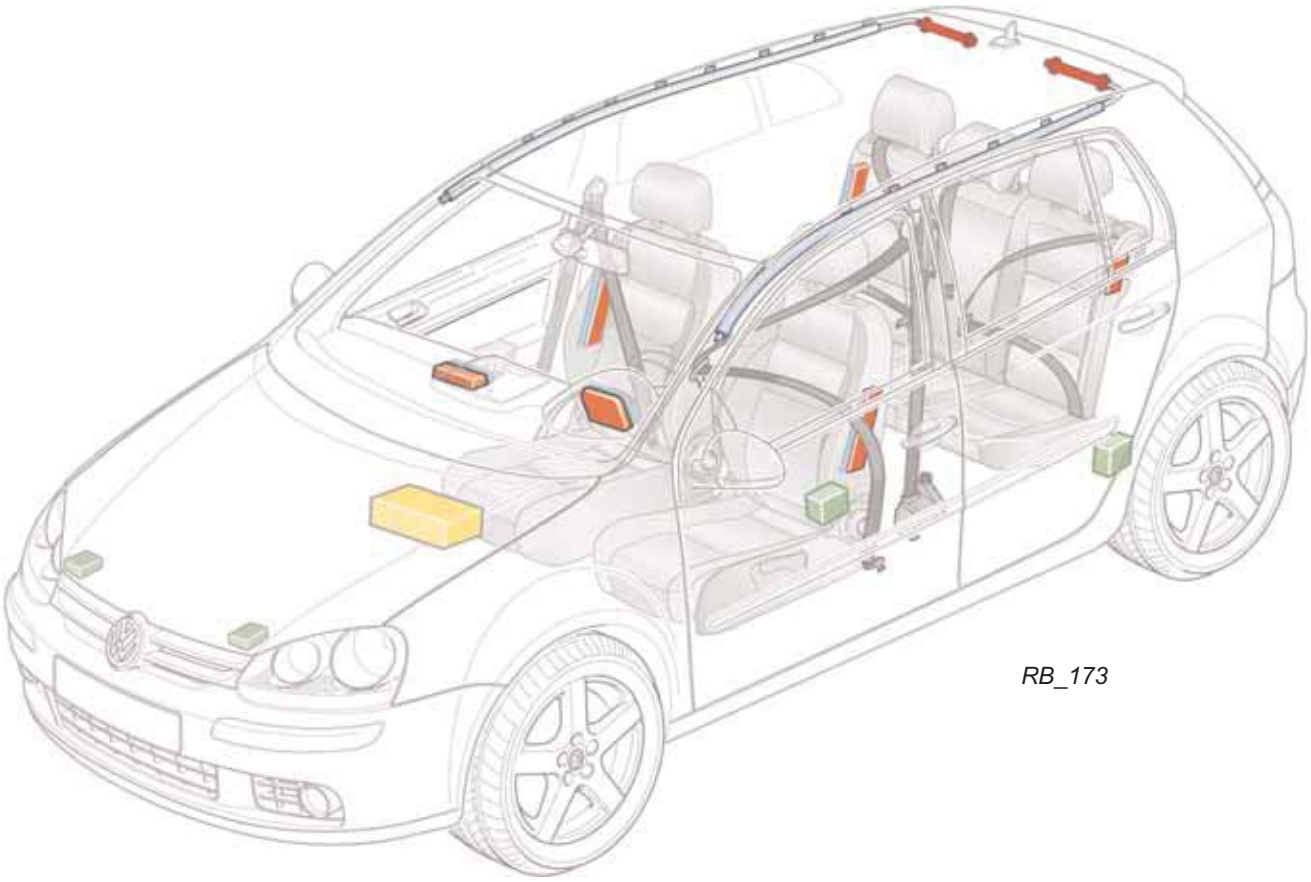
The operational sheets in the Appendix show each vehicle with the maximum number of airbags with which it may be equipped. Before beginning any cutting or separation procedures, it is always necessary to check whether an airbag has actually been installed at that location.

An airbag system that is still connected to the battery can deploy during rescue operations and cause serious personal injury.

- Always turn off the ignition and disconnect vehicle battery / batteries before starting rescue operations.
- Never damage or cut through gas generators during rescue operations.
- Never place any tools in the immediate vicinity of an airbag. Tools and other items can be propelled with great force if the airbag deploys, causing serious injury.
- Always check Appendix, Pages A2 – A9 for the location of airbag gas generators.

Rescue and recovery

Passenger car – airbags not deployed



RB_173

- Control unit
- Gas generator
- Crash sensors
- Airbag, folded

For the sake of clarity, the picture does not show the crash sensors installed on the right. These are fitted in the same relative position as the ones on the left side of the vehicle.

Rescue and recovery

Rescue and recovery when …

… an airbag has deployed

If the airbag has deployed the propellant gas has escaped and the airbag no longer poses a risk to vehicle occupants or rescue personnel.*

The rescue operation can begin immediately.

When leaning into the vehicle, do not contact the steering wheel hub or the deployed airbag module, because the airbag module and fabric will stay very warm for a time after deployment.

The propellant gas that deploys the airbags is a mixture of nitrogen and carbon dioxide. These gases are also in the air we breathe and are not toxic.

After an airbag has deployed, there may be some smoke, or smoke-like dust, but this does not indicate that there is a fire. Consequently, no measures to extinguish a fire need to be taken.

Although they pose no health risk, contact with the smoke and dust can cause irritation to the mucous membranes, skin, and eyes. Always take special care, particularly when detaching the head airbag.

The use of protective gloves and safety goggles is recommended. As a precautionary measure, always wash unprotected skin thoroughly with soap and water after the rescue operations have been completed, particularly before eating.

***Special Note:** Two kinds of front airbag systems were installed on the New Beetle sedan and the Phaeton:

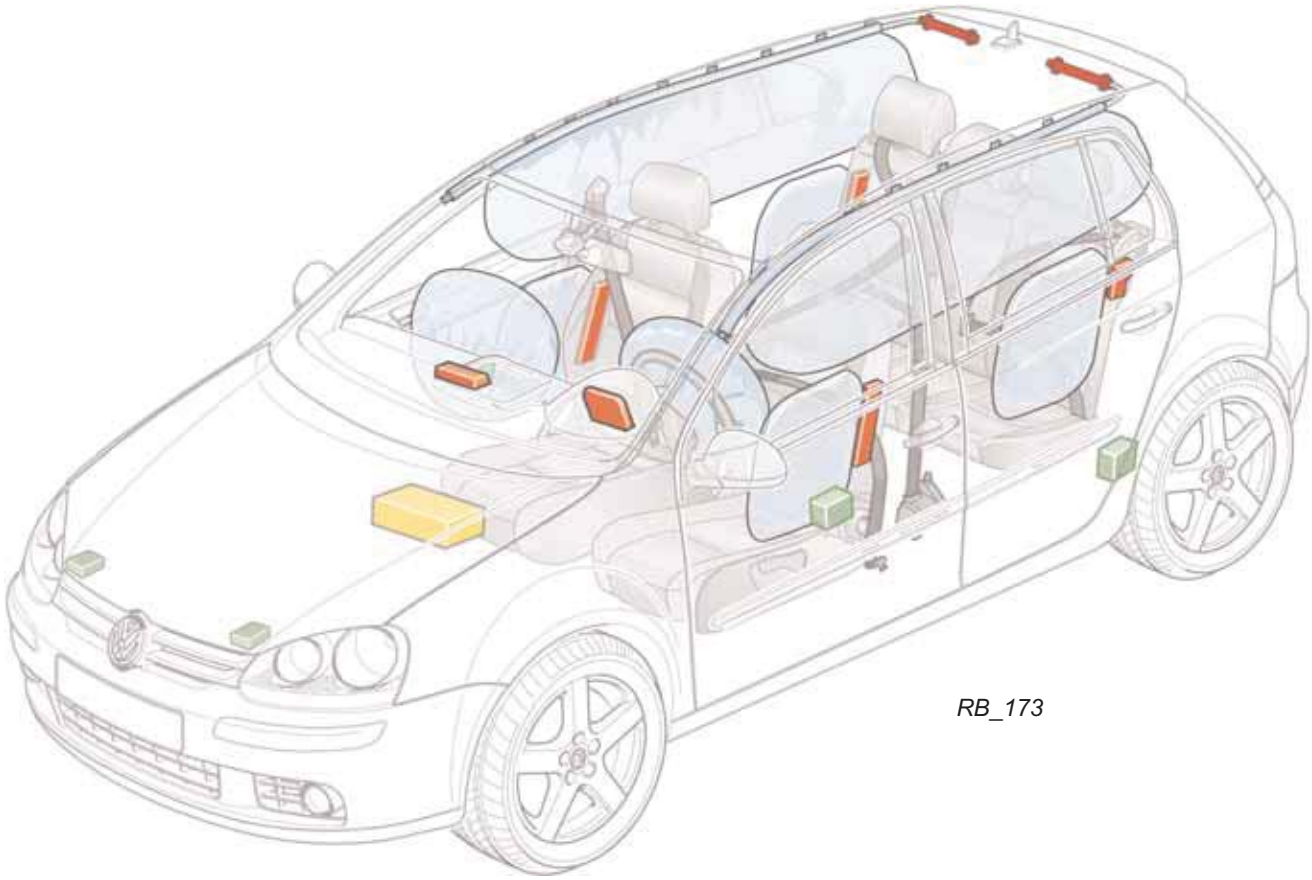
- Standard, **single stage** driver and passenger front airbags
- Advanced, **dual stage** driver and passenger front airbags

See the clarifications and precautions on Pages 8 and 9 for details.

Residue and dust from deployed airbags can irritate mucous membranes and exposed skin and can cause breathing problems for people with a history of asthma or other breathing conditions.

- Always make sure that those with asthma or other respiratory conditions get fresh air right away by getting out of the vehicle or opening windows or doors.
- Always keep residue and dust from deployed airbags out of eyes and away from cuts, scratches or exposed skin.
- If the residue should get into your eyes, flush them with water.
- Always wash hands and face with mild soap and water before eating after involvement in rescue operations involving a crash in which an airbag has deployed.

Passenger car – deployed airbags



RB_173

Control unit

Gas generator

Crash sensors

Airbag, deployed

For the sake of clarity, the picture does not show the crash sensors installed on the right. These are fitted in the same relative position as the ones on the left side of the vehicle.

Rescue and recovery

Identifying front airbag types

Standard, single stage front airbags

The New Beetle sedan was equipped with standard, single stage front airbags for the 1998 – 2003 model years. The Phaeton was equipped with standard, single stage front airbags for the 2004 model year. Precautions that need to be followed for these vehicles are the same as for other Volkswagen vehicles.

The presence of standard, single stage front airbags can also be identified by the warning label on the side of the sun visor that faces the passenger compartment when the sun visor is flipped down.

Warning label for standard, single stage airbags on sun visors of model year 1998 – 2003 New Beetle sedan and 2004 Phaeton sedan.

Advanced, dual stage front airbags

The New Beetle sedan and Convertible were equipped with Advanced, dual stage front airbags for the 2004 and later model years. The Phaeton was equipped with Advanced front, dual stage airbags for the 2005 and later model years. **Special precautions must be observed when performing rescue operations on these vehicles. See Page 9.**

The presence of Advanced, dual stage front airbags can also be identified by the warning label on the side of the sun visor that faces the passenger compartment when the sun visor is flipped down.

Warning label for Advanced, dual stage airbags on sun visors of model year 2004 and later model New Beetle sedan and Convertible and 2005 and later model Phaeton sedan.

Special precautions

The second stage of the front passenger airbag on the 2004 and later model New Beetle sedan and New Beetle Convertible, and both the driver and passenger front airbags on the 2005 and later model Phaeton sedan, may not deploy every time the first stage deploys. Deployment of the second stage depends on the nature of the collision as registered by the control unit.

Whenever performing rescue operations on these Volkswagen vehicles, always assume that the second stage of the Advanced Airbag in question has not deployed and follow all of the usual precautions when working in the area of this potentially "live" and undeployed airbag.

During a rescue, this second stage cannot be accidentally deployed by its sensors if the ignition is turned off and the battery(ies) have been disconnected.

In any crash that leads to front airbag deployment, both stages of a two-stage airbag are ignited and deployed on all Volkswagen vehicles except the 2004 and later model New Beetle sedan and Convertible, and the 2005 and later Phaeton model sedan.

The second stage of the front passenger Advanced Airbag System in the 2004 and later model New Beetle sedan and Convertible, and both the driver and passenger front Advanced Airbag System in the 2005 and later model Phaeton sedan, can deploy during rescue operations and cause serious personal injury if it is still connected to the battery.

- Always turn off the ignition and disconnect vehicle battery / batteries before starting rescue operations.
- Never damage or cut through gas generators during rescue operations.
- Never place any tools in the immediate vicinity of an airbag. Tools and other items can be propelled with great force if the airbag deploys, causing serious injury.
- Always check Appendix, Pages A1 – A9, for the location of airbag gas generators.

Rescue and recovery

Some facts about airbags and pretensioners

Myth	Fact
Airbags explode when they deploy.	Airbags do not explode. Airbags fill with a propellant gas that inflates them when they deploy. The propellant gas is generated by a flammable solid propellant, which undergoes controlled combustion when it reaches a temperature of about 390°F / 200°C.
When the airbags are deployed, the airbag covers are propelled through the interior of the vehicle.	The covers open along seams designed into the airbag covers and the airbags unfold in a controlled manner. The airbag cover stays attached to the vehicle.
Some remnants of explosive are left behind after the airbag has deployed.	All of the solid propellant is burned when the airbag deploys.
In minor accidents, the second stage of a two-stage front airbag may not deploy, in which case it will still be active.	In any crash that leads to airbag deployment, both stages of a two-stage front airbag are ignited and deployed in all Volkswagen vehicles except the 2004 and later model New Beetle sedan and Convertible (front passenger airbag) and the 2005 and later model Phaeton sedan (both front airbags). However, an undeployed second stage can't be "live" if the ignition has been turned off and the battery(ies) disconnected. The standard precautions for an undeployed airbag apply.
The white powder that spreads through the vehicle after the airbag has deployed is poisonous.	This powder is a non-toxic lubricant that makes he airbag fabric more pliable. The powder can cause irritation to the respiratory tracts, skin and eyes. Rescue personnel should always wear protective gloves and goggles or safety glasses, particularly when handling deployed airbags.

Rescue and recovery

Myth	Fact
Emergency personnel are at risk from the smoke.	The smoke is produced by the combustion of the solid propellant. This combustion releases the non-toxic airbag propellant gas, which consists of nitrogen and carbon dioxide. The residue from the ignition of the solid propellant and powder that lubricates the airbag is not toxic, but can irritate mucous membranes and irritate the skin. Rescue personnel should always wear protective gloves and goggles or safety glasses, particularly when handling deployed airbags.
You can burn yourself on hot metal parts after the airbag has ignited.	You should avoid touching the airbag module. The airbag module will cool down within a few minutes after the airbag deploys.
Emergency service personnel must wait until the interior of the vehicle is ventilated and the airbags have cooled down.	Do not wait! The rescue operation should begin immediately.
The airbag can still deploy after the battery has been disconnected.	The airbag system remains active for approximately 150 milliseconds after the battery is disconnected. **Exception**: On one Volkswagen model – the first generation Volkswagen Cabriolet – the airbag module has an energy reserve that remains active for up to 20 minutes after the battery is disconnected.

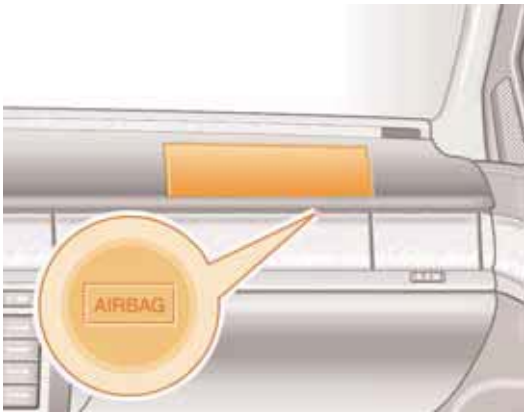
Rescue and recovery

Identification of airbags in the vehicle

This overview uses examples to show the location of the “AIRBAG” identifier when airbags are installed in a Volkswagen vehicle.

RB_088

Driver airbag:
“AIRBAG” on the steering wheel cover identifies vehicles with a driver airbag.

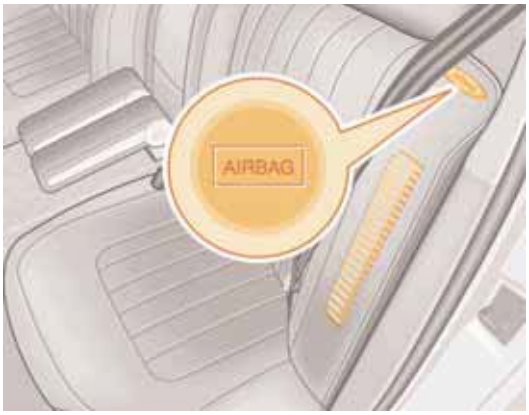


RB_077

Passenger airbag:
“AIRBAG” on the instrument panel shows the approximate location of the front airbag on the passenger side.

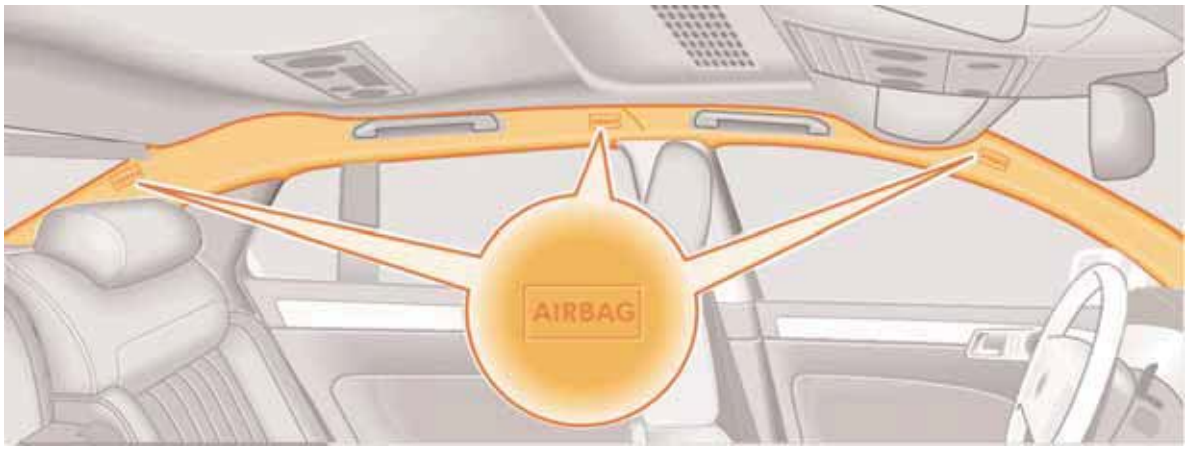
RB_089

Side airbag – front:
“AIRBAG” on the outboard sides of the front seat backs indicates that side airbags are in the backrest.



RB_075

Side airbag – rear:
“AIRBAG” on the outboard sides of the rear seat backs indicates that side airbags are located in the outboard side of the seat back.



RB_087

Head airbag – one-piece; Side Curtain Protection®:
“AIRBAG” on the A, B or C pillar indicates that a head airbag is under the side roof header covering.

Batteries

Batteries

The number of electrical systems in passenger cars is increasing with each new model year. This additional equipment needs increasing amounts of energy, creating a demand for more or larger energy reserves. Thus, more and more vehicles not only have a starter battery, but also an auxiliary battery for other on-board systems.

The following examples describe some of these two-battery systems.

Eos:
When equipped with the six-cylinder engine, the Eos uses a pair of six-volt batteries installed on the left and right side, behind the rear seat. These batteries are connected in series and therefore act as a twelve-volt system. When disconnecting, always remove the body-side negative cable first.

Phaeton and Touareg:
The Phaeton has a starter battery and an auxiliary battery. Depending on its powertrain and equipment level the Touareg may also have two batteries. In the event of a crash, a cut-off process disconnects the starter battery from the on-board supply system. This means that the auxiliary battery remains active so that emergency features such as lights, hazard warning lights, or a telephone can still be used.

EuroVan/MultiVan/EuroVan Camper:
Depending on the model, Eurovan and MultiVan models may also have an additional battery under the driver's seat. On the Camper, a pair of auxiliary batteries is located under the rearmost bench seat, accessible from the rear of the vehicle. Eurovan/MultiVan cab/chassis units with camper or recreational vehicle bodies built by third-party companies may have one or two additional batteries in various locations in the “living area.” Consult information provided by the vehicle outfitter to determine battery type and location.

RB_198

The locations of the battery/batteries are shown on the operational sheets in Appendix Pages B1 – B6.

A battery cutoff relay that is not working or that has been damaged in a crash can cause an undeployed airbag to deploy during rescue operations causing serious personal injury.

- Always turn off the ignition and disconnect vehicle battery / batteries before starting rescue operations.

Side impact protection

In Volkswagen vehicles, side impact protection structures typically consist of steel tubes or steel profiles (the Corrado has extruded aluminum profiles). The tubes or profiles are installed horizontally or diagonally behind the outer door panels.

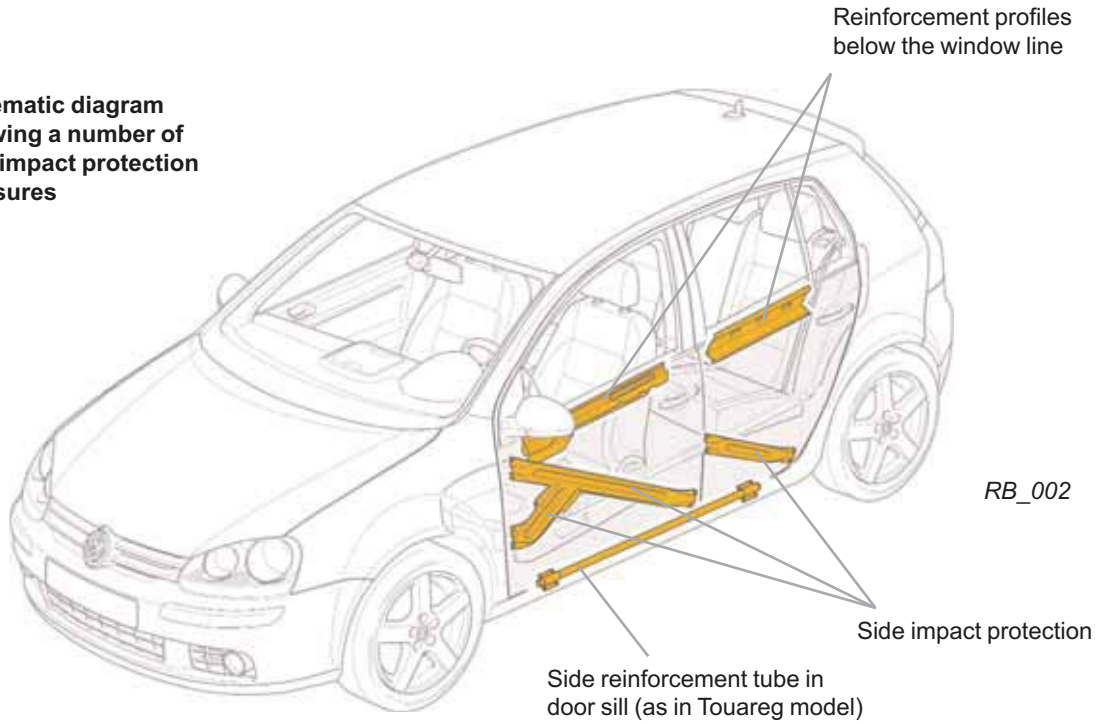
In some crashes with significant deformation, the side impact profiles can punch through the door panel and penetrate the B-pillar. The high-strength profiles can only be cut with modern, high-performance hydraulic cutting equipment. The use of abrasive cutting wheels and similar spark-producing tools should be avoided whenever possible.

If a hydraulic spreader or separating tool is applied to the door latch, the latch and striker pin are pulled apart, resulting in the lock pin being torn out of the B-pillar. However, the door may still be unable to be easily opened because the side impact profile has penetrated the B pillar.

It is thus better to apply the spreader tool to the front door hinges and push them apart individually. This will shear the hinge bolts so that the door can be opened. **Be careful, the door may burst open suddenly!**

As the side impact profiles can only penetrate into the B-pillar, the door can now be bent open from the front towards the rear of the vehicle. The advantage of this procedure is that it provides more space to work on an injured person in the front seat.

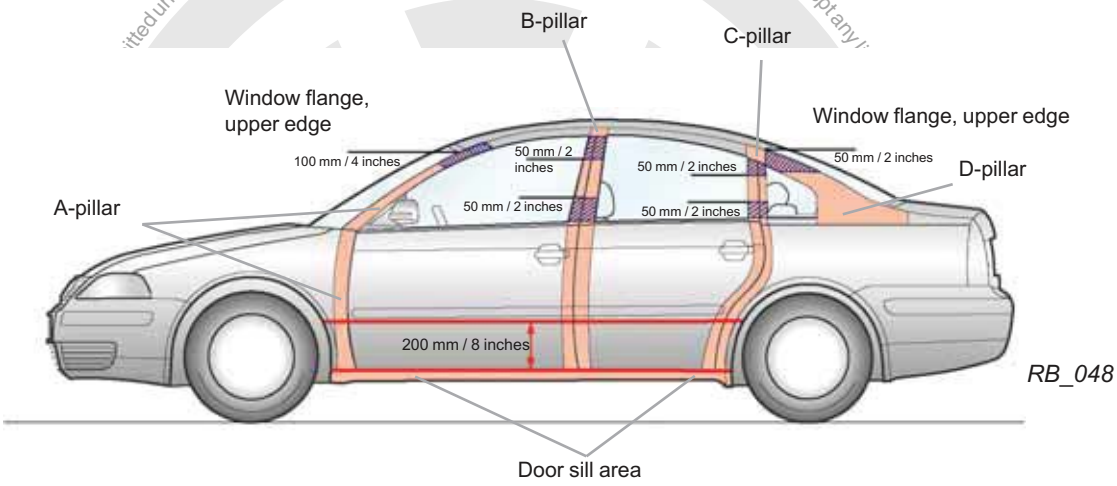
Schematic diagram showing a number of side impact protection measures



Body cutting areas

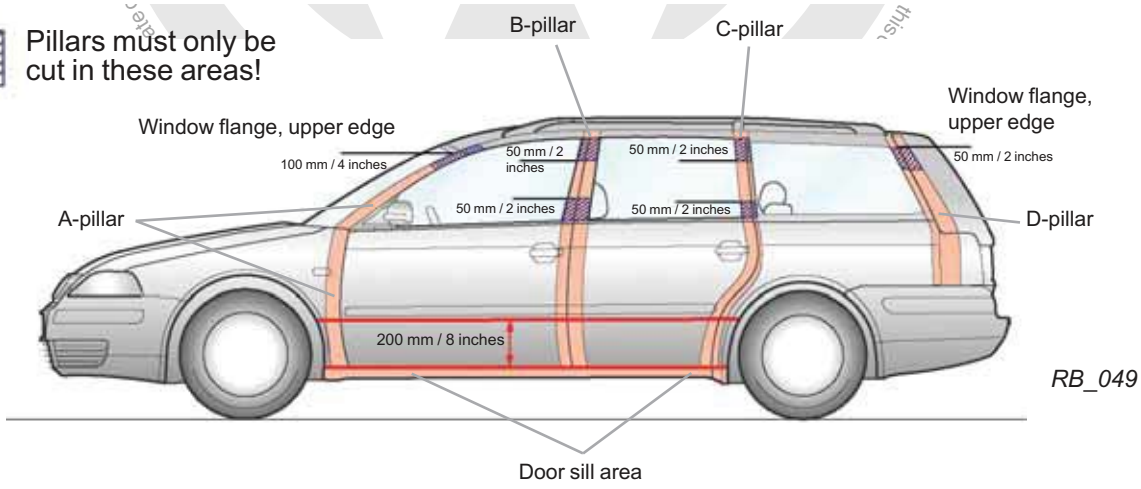
Cutting areas in the body (typical example)

Overview of key cutting areas in pillars and door sills



RB_048

Pillars must only be cut in these areas!



RB_049

Improper cutting of vehicle structures can cause sudden airbag and/or safety belt pretensioner deployment and serious personal injury.

- Never cut vehicle structures in the area 8 inches (200 mm) above the door sill.
- Cut vehicle structures only in the cross-hatched areas illustrated in this booklet.

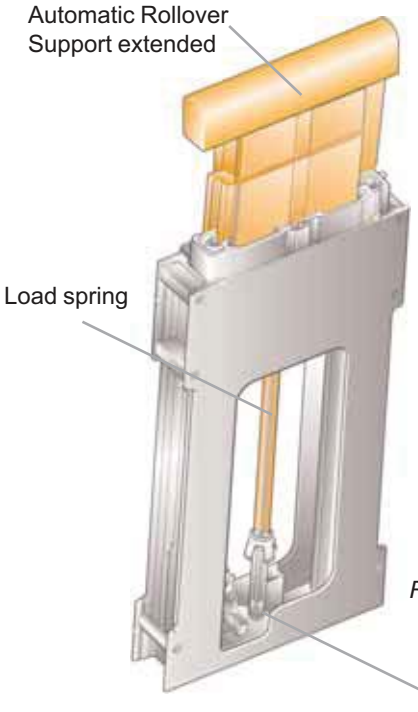
Automatic Rollover Support System® in the New Beetle Cabriolet and EOS

The Automatic Rollover Support System® is deployed by the airbag control unit at the same time as the airbags. It also uses yaw rate sensors and other internal sensors to detect when the vehicle is likely to roll.

The Automatic Rollover Support System is triggered by an integral solenoid. A compressed spring under tension of about 56 pounds (250 N) propels each support into the extended position in about 1/4 second. A latching mechanism locks the supports in the extended position.

In certain rear end collisions or lateral rollover accidents only the Automatic Rollover Support System and safety belt pretensioners can deploy.

RB_091



RB_092

An undeployed Automatic Rollover Support System® can deploy during rescue operations and cause serious personal injury, even after the battery has been disconnected.

- Always keep a safe distance of at least 1 foot (30 cm) from undeployed Rollover Supports, particularly when the area around and below the supports has been damaged.

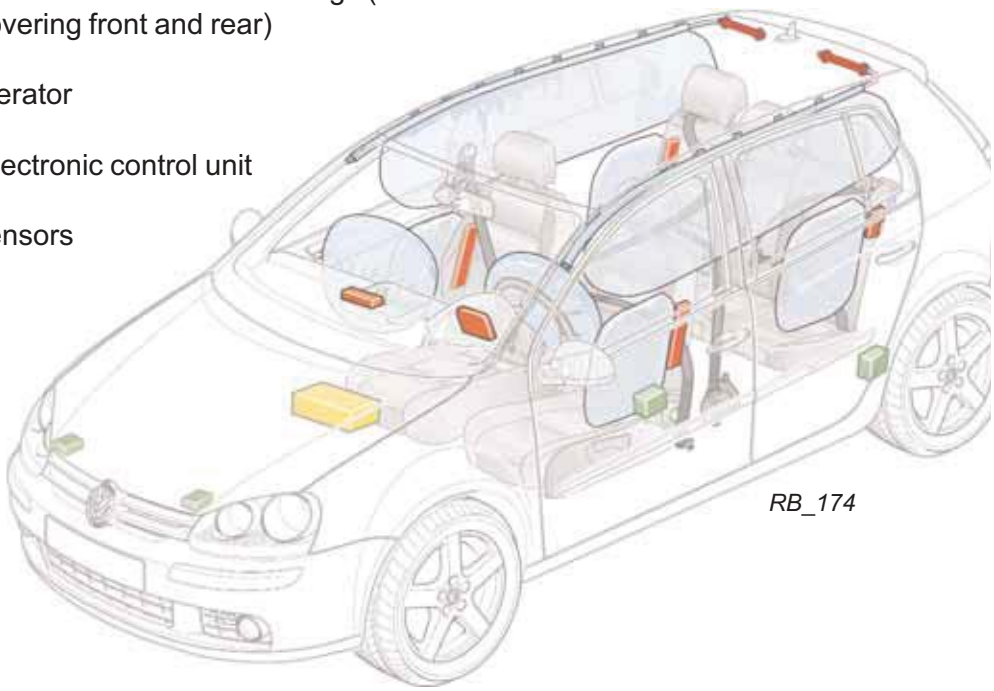
Airbag

The airbag system

Today's motor vehicles may be equipped with a number of airbags of different kinds in different locations, even in vehicles of the same model or even model year.

A new, fully equipped fifth generation Jetta, for example, includes the following main components:

- Front airbags (driver and passenger)
  Side airbags (front and rear; rear optional)
  Side Curtain Protection head airbags (one piece, covering front and rear)
- Gas generator
- Airbag electronic control unit
- Crash sensors



RB_174

In a crash the airbag control unit processes the signals generated by the sensors and, if a specific threshold value is reached, triggers the appropriate airbag.

In addition to deploying the airbags, the control unit performs additional functions. In a crash with enough deceleration to deploy an airbag, the control unit also:

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

Gas generators inflate the airbags by generating the gas required to fill them. The inflated airbags help protect belted vehicle occupants from impact with the vehicle interior (for example: the steering wheel, instrument panel, etc.).

Depending on their location and design requirements, gas generators can have different designs and operating principles.

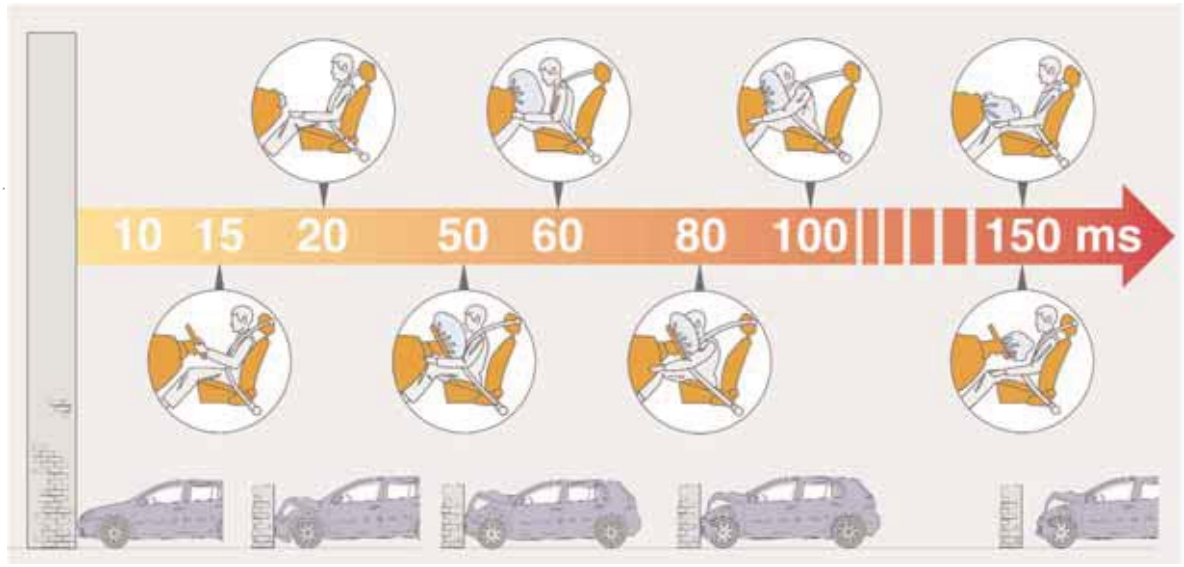
Chronological sequence of driver and front passenger airbag deployment

The time sequence shown below is representative for a general range of applications. The driver and passenger airbag inflators ignite at the same time.

0 ms*	Collision – the vehicle hits the crash barrier
Approximately 15 ms	The sensor triggers the airbags and safety belt pretensioners
Approximately 20 ms	Both airbags begin to inflate
Approximately 50 ms	The driver airbag is fully inflated; the driver makes initial contact with the airbag
Approximately 60 ms	The front passenger airbag is fully inflated; the passenger makes initial contact with the airbag
Approximately 80 ms	The driver begins to rebound away from the steering wheel
Approximately 100 ms	The passenger begins to rebound away from the instrument panel
Approximately 150 ms	The driver and passenger move rearward into their seats; both airbags are largely deflated; view ahead is clear again

RB_018

Chronological sequence of a crash test



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* ms = millisecond = one thousandth of a second

Airbag

Front airbag overview

The front airbag system includes the following components:
- Driver airbag
- Front passenger airbag

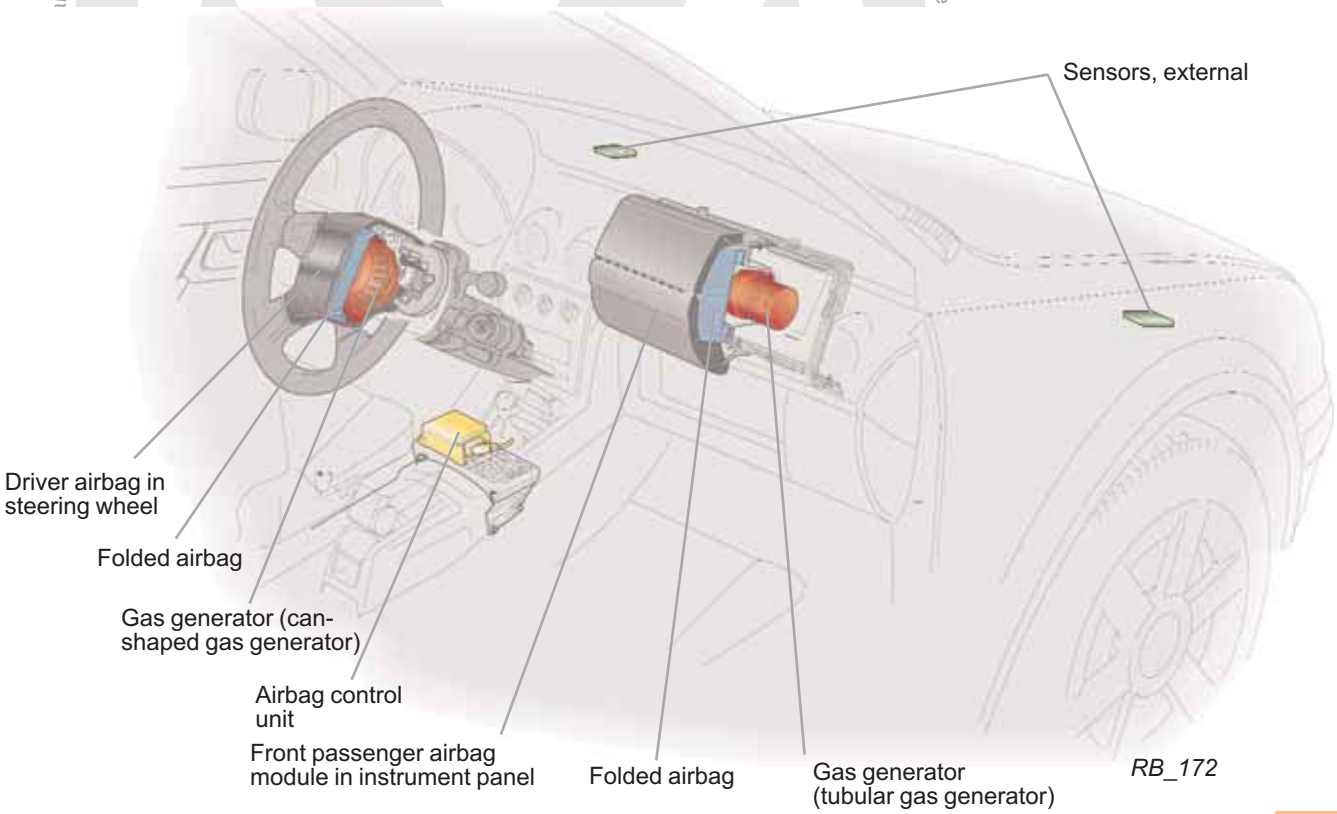
Gas generators generate the gas needed to fill the airbags. When deployed, the inflated airbags help protect the belted driver and front seat passenger from impact with the steering wheel or instrument panel.

Different types of gas generator are used for driver and front passenger airbags. The different design types are:
- Driver – can-shaped gas generators and
- Front passenger – tubular gas generators

Gas generators also differ according to the operating principle employed:
- Solid propellant generators and
- Hybrid gas generators

Airbag deployment does not pose a risk of fire and will not cause interior materials to ignite.

Front airbag overview



The illustration depicts a typical airbag system. The position of the sensors may vary depending on vehicle model and model year.

The first generation (1990 – 1993) Volkswagen Cabriolet has a power reserve that can deploy the driver airbag for as long as 20 minutes after the battery has been disconnected.

- Always keep a safe distance away from the undeployed driver airbag in a 1990 – 1993 Volkswagen Cabriolet until the reserve power capacitor has fully discharged

Airbag

Front Airbags

Driver airbag

The driver airbag has a can-shaped gas generator, which works on the same principle as a solid propellant generator.

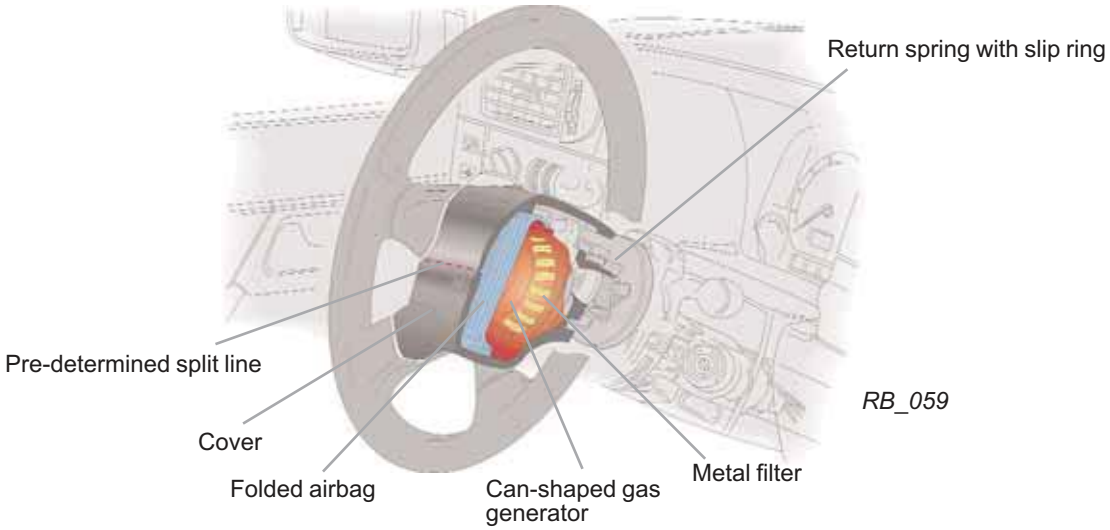
The complete airbag module is in the steering wheel hub. It includes the following components:

- Return spring with slip ring
- Gas generator and
- Airbag with cover

The control unit triggers the igniter and combustion of the solid propellant and the gas generator inflates the airbag with the propellant gas that is produced. The rapid increase in pressure tears open the airbag cover along special seams and the cover folds out clearing the way for the airbag to unfold.

The cover stays attached to the airbag module. There are no loose parts that fly through the passenger compartment!

The airbag fabric is nylon. The force of the occupant's upper body against the airbag is dissipated by controlled venting of the propellant gas.



The seams on the airbag cover may vary depending on the vehicle model.

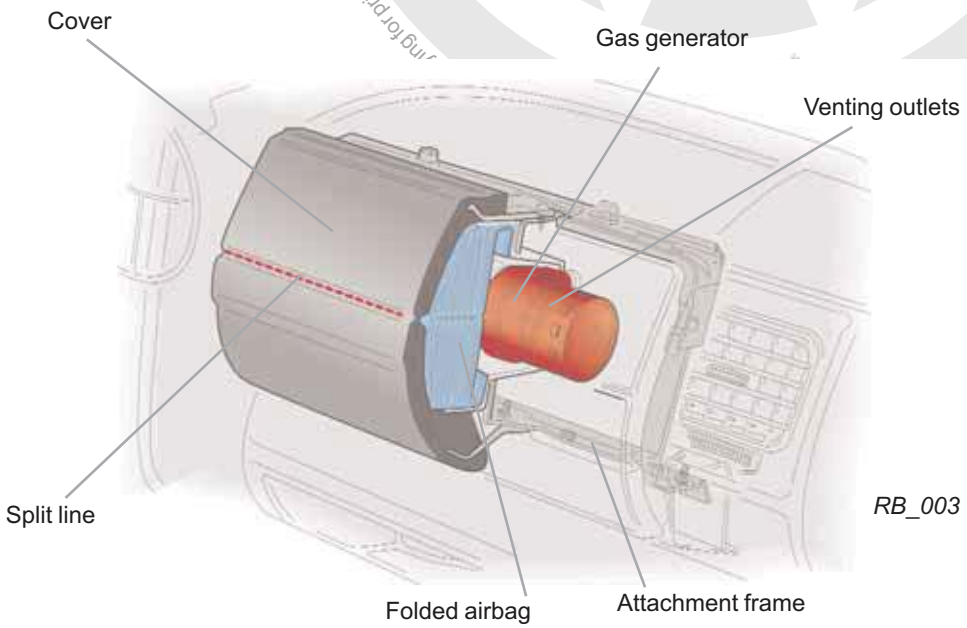
Front passenger airbag

The front passenger airbag has a tubular gas generator that can be one of the following:

- Solid propellant generator (a variety of the tubular gas generator) and
- Hybrid gas generator

The general design of the front passenger airbag is basically very similar to the driver airbag. It also deploys in the same way.

The illustration shows a typical front passenger airbag system. The type and alignment of the airbag installation may vary in different vehicles.



As there is more space to fill between the passenger and the airbag module on the passenger side, the airbag is much larger than on the driver's side.

Airbag

Side and head airbag overview

The side and head airbag systems include the following:
- Side airbag – driver/passenger
- Side airbag – rear (optional)
- Head airbag – driver/passenger/rear

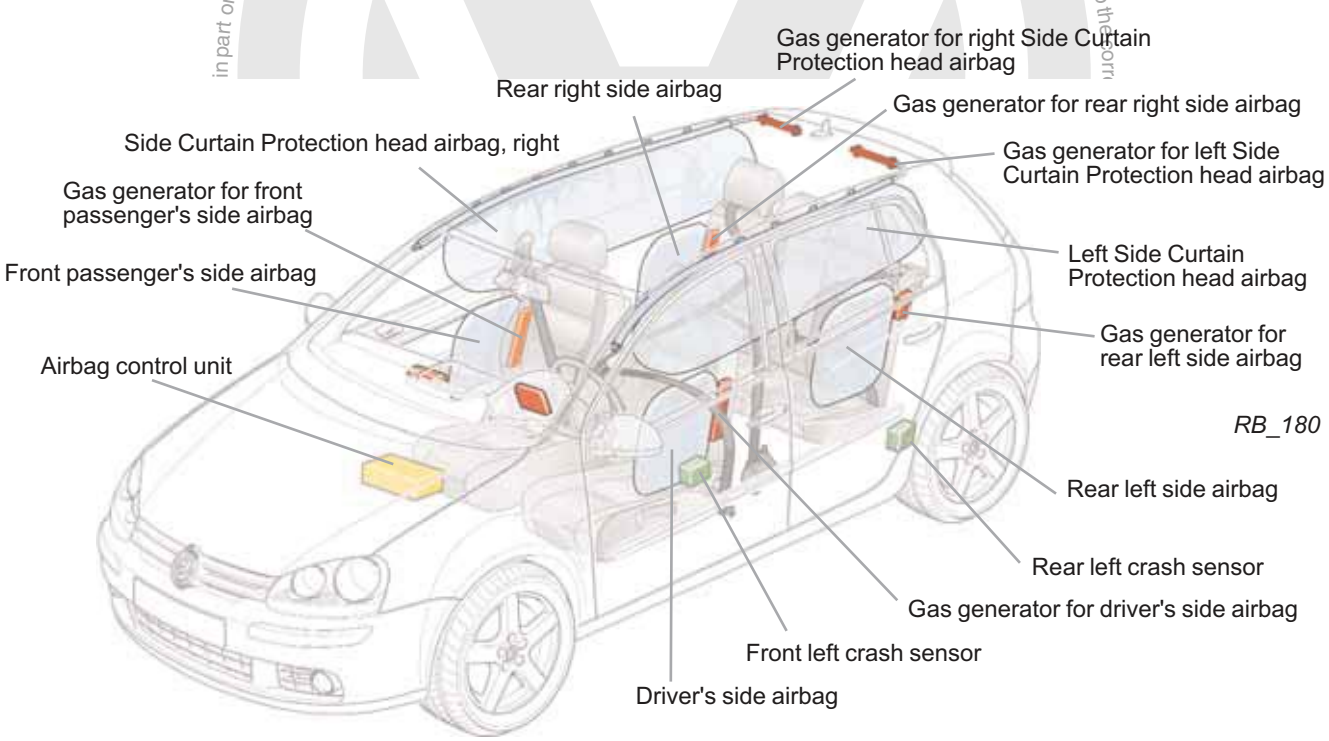
As with the front airbags, gas generators produce the gas needed to fill the airbags. The inflated airbags help protect belted vehicle occupants from impact with the side of the vehicle.

The gas generators have a tubular design. The different types are:
- Solid propellant generators
- Hybrid gas generators.

Airbag deployment does not pose a risk of fire and will not cause interior materials to ignite.

The illustration depicts a fifth generation Golf, known in the United States and Canada as the Rabbit. For other vehicle types, the number and locations of the crash sensors may vary.

In any side impact, only the airbags on the affected side of the vehicle can deploy. To show the complete head and side airbag systems, the illustration shows all the airbags inflated.



For clarity, the illustration does not show the crash sensors on the right side. These are in the same relative location as those on the left side of the vehicle.

Side and head airbag

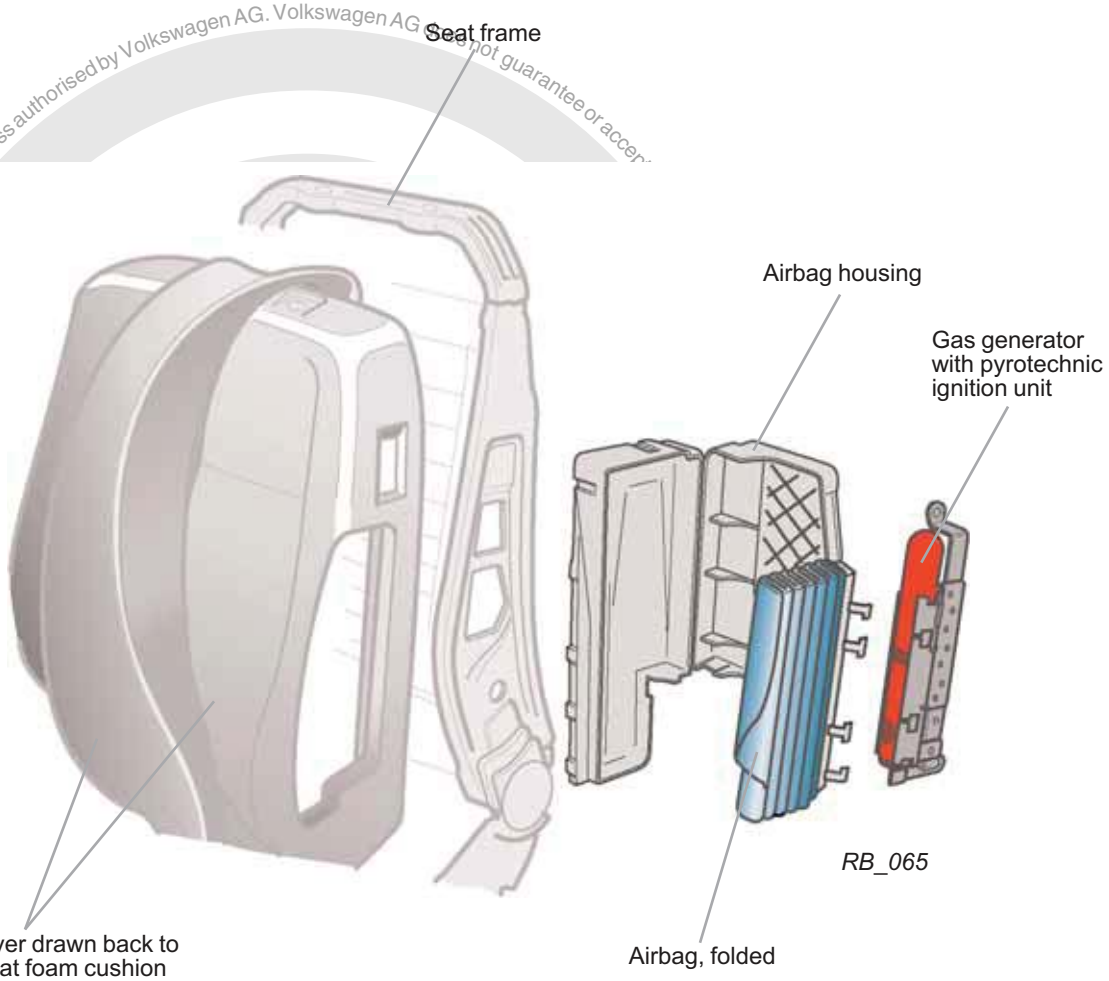
Tubular gas generators are used for the side airbags. These are generally hybrid gas generators.

The airbag module consists of a housing containing both the airbag and the gas generator.

For the front seats, the side airbags are in the outboard side of each of the seat backs.

In the rear seat, they may be installed in the outboard sides of the seat back or in the body next to the seat backs.

As with front airbags, the side airbags only deploy once the airbag control unit has detected a crash that meets the deployment criteria stored in the electronic control module.



Airbag

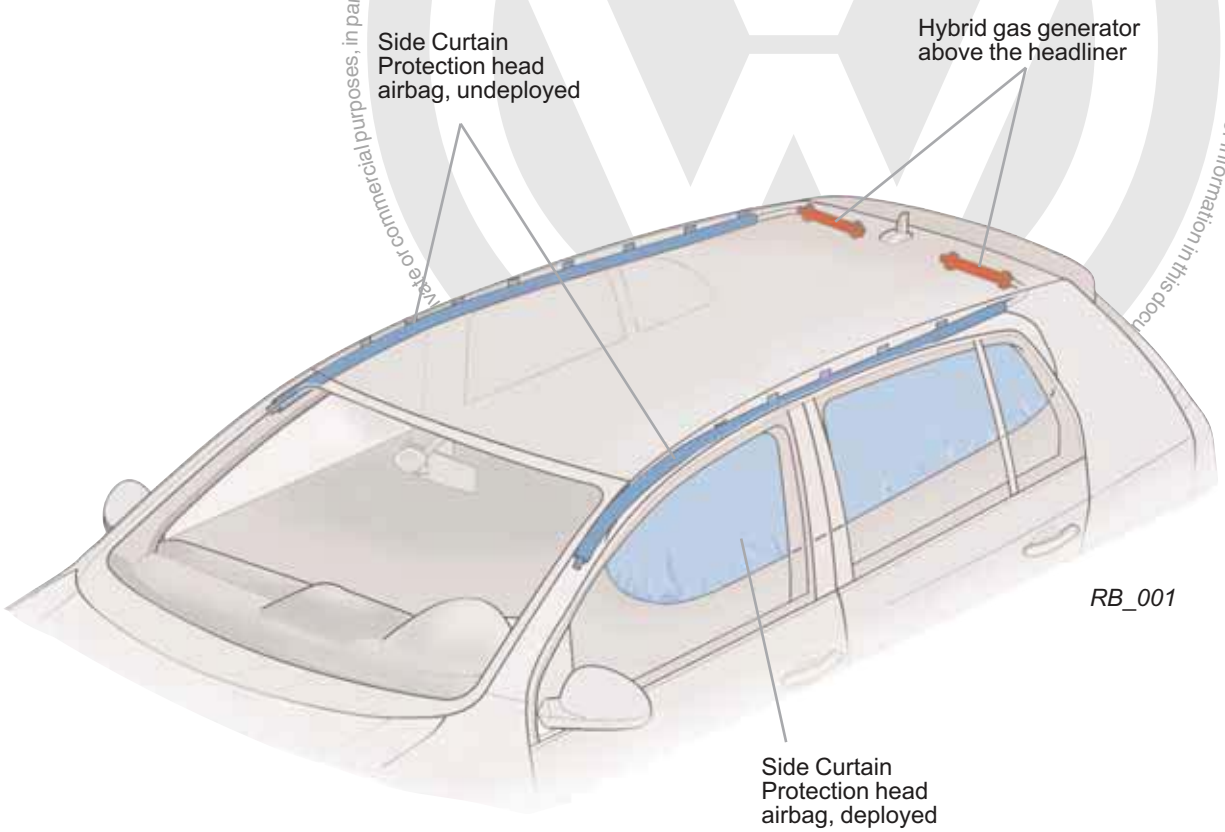
Head airbag

Tubular gas generators are used for the head airbags. These gas generators have an extremely slim design suited to the limited installation space in the side header. These are hybrid gas generators.

The head airbag is a one-piece textile bag. This extends from the A-pillar to the C-pillar of the vehicle.

The New Beetle sedan and Convertible models, and the EOS model, have a specially developed side airbag for the driver and front passenger. This airbag unfolds upward as well as outward, and thus also helps to protect the head.

As with the airbags described previously, the head airbag only deploys once and only when the electronic control unit has detected a crash that meets the stored criteria. Side impacts are detected by lateral acceleration sensors. No additional sensors are required for the head airbags.

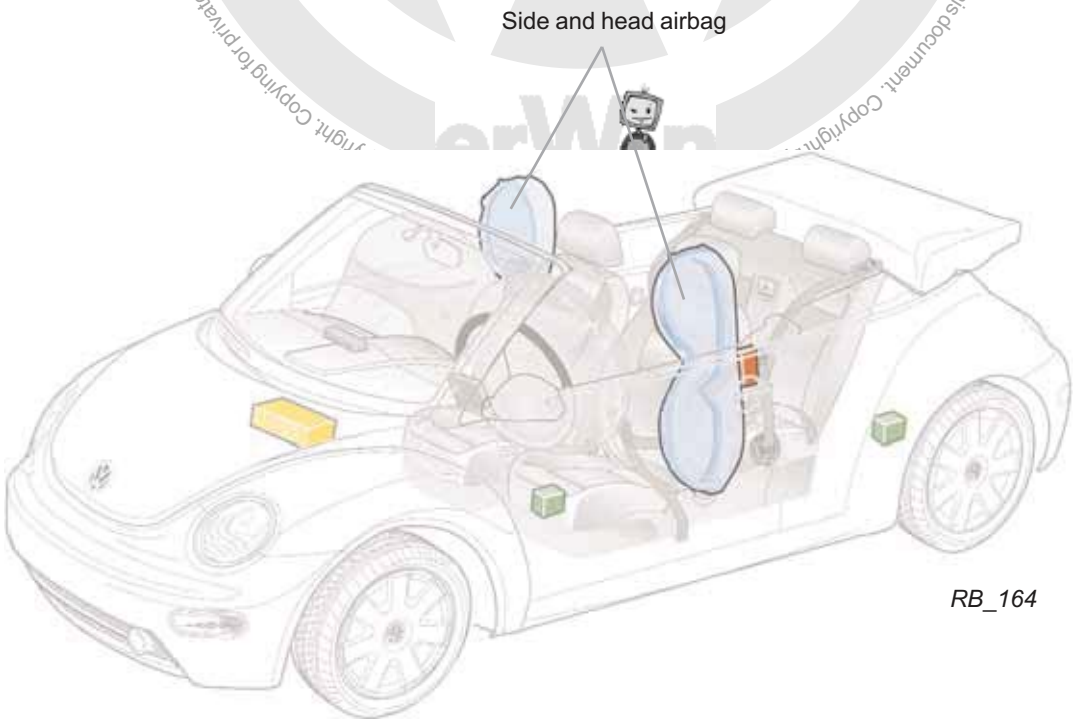


Head airbag – special design

Head airbag in the New Beetle and EOS

In the New Beetle sedan and Convertible models, and the EOS model, the side airbags for the front seat have integrated head airbags.

The illustration shows this airbag in the New Beetle Convertible. The New Beetle sedan and EOS are similar.



RB_164

In a side impact, only the airbag on the affected side of the vehicle can deploy. To show the complete side and head airbag system, the illustration depicts both side airbags inflated.

Airbag gas generators

In the early stages of airbag development, all airbags were inflated by gas generators with solid propellant (pyrotechnics). Hybrid gas generators were used in later models at the same time the solid propellant generators were used on other vehicles.

Depending on the vehicle, the gas generators deploy either in a single stage or two-stage process. In a single-stage gas generator, all of the charge ignites at once. With a two-stage gas generator, separate charges ignite in two steps with a slight delay between them. On the New Beetle sedan and convertible as well as on the Phaeton, only the first stage may fire in some collisions when the level of deceleration is not enough to require the second stage to be fired. Two stage gas generators are designed to have different deployment characteristics.

The overview below and on the following pages describes examples of different types of gas generators and explains the principles behind them.

Solid propellant gas generators

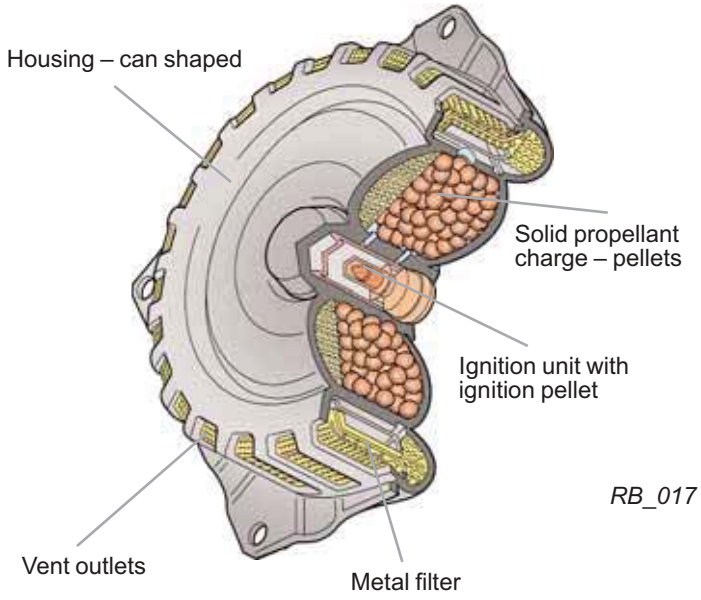
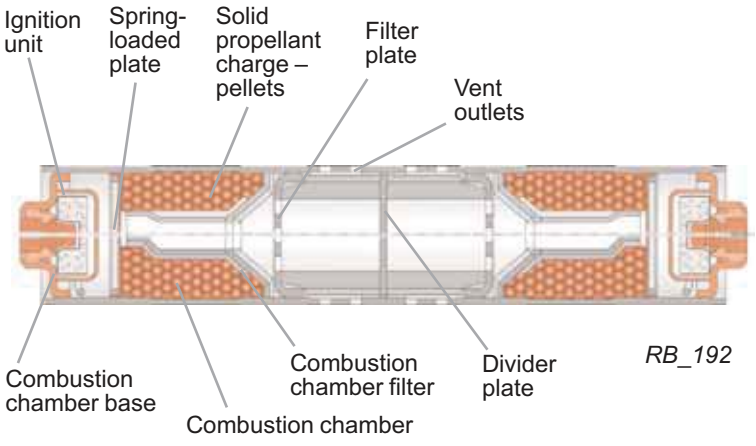
These gas generators consist of a housing containing a solid propellant charge with an integrated pyrotechnic ignition unit. The solid propellant is normally in the form of small pellets. The housing's shape and design are adapted to the installation conditions that can be different from one vehicle model to the next.

This type of gas generator can, for example, be found as a:
- Can-shaped gas generator for the driver airbag and
- Tubular gas generator for the front passenger airbag.

When the airbag control unit receives an appropriate signal from the crash sensor, the ignition pellet inside the gas generator is ignited. This instantaneously ignites the solid propellant, producing the propellant gas (nitrogen and carbon dioxide). The gas flows through the filter, where it is cooled and much of the particulate matter is filtered out. It then flows through the circle of vent outlets and inflates the folded airbag attached to the housing.

The two-stage gas generator shown in the illustration on the next page ignites the same way. This generator is actually a combination of two single stage gas generators that are simply ignited one after the other in very quick succession.

Please note that the pyrotechnic solid propellant does not deteriorate over time. It remains combustible indefinitely.

Solid propellant generators for the …	Construction
Driver airbag – single-stage (can-shaped gas generator)	
Front passenger airbag – illustration depicts a two-stage gas generator (tubular gas generator)	

Airbag

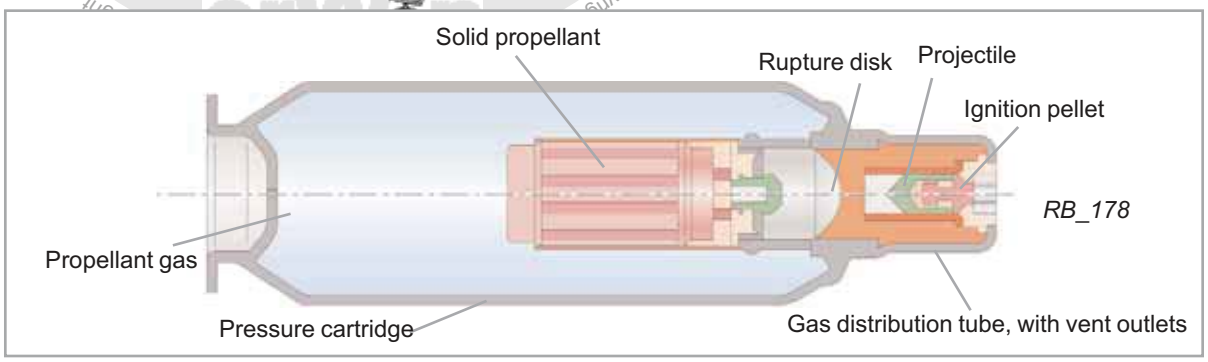
Hybrid gas generators

Hybrid gas generators combine a cartridge of pressurized gas with a solid propellant charge and a pyrotechnic igniter. There are both single stage and two stage units.

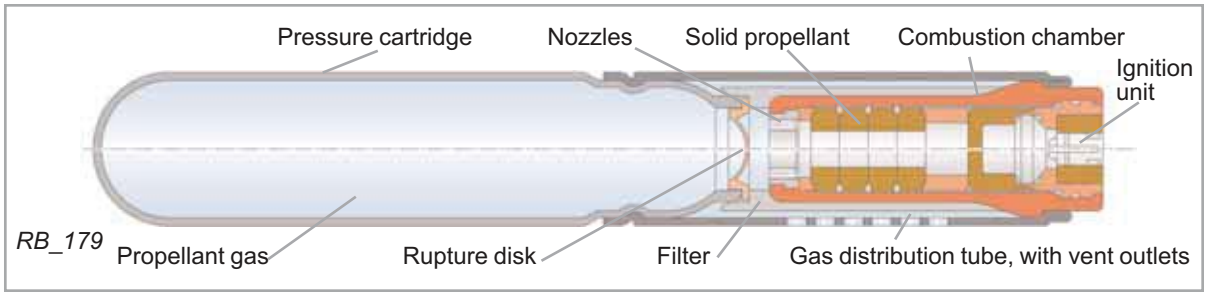
The hybrid gas generators are tubular, but vary in design depending on their application. The main components include the pressure cartridge containing the airbag propellant gas, and an integrated, or attached, solid propellant charge with a pyrotechnic igniter. The pressurized cartridge is sealed with a disk.

When the airbag control unit receives an appropriate signal from the crash sensor, the pyrotechnic ignition unit ignites the solid propellant. This breaks the disk and the hot gas from the solid propellant flows into the pressure cartridge. It mixes with the compressed gas in the pressure cartridge and heats it. This causes the gas to expand more quickly. The gaseous mixture then flows out of the cartridge, through the vents in the gas distribution tube and into the airbag.

Front passenger airbag – single-stage (illustration shows an airbag for the fourth generation Golf)



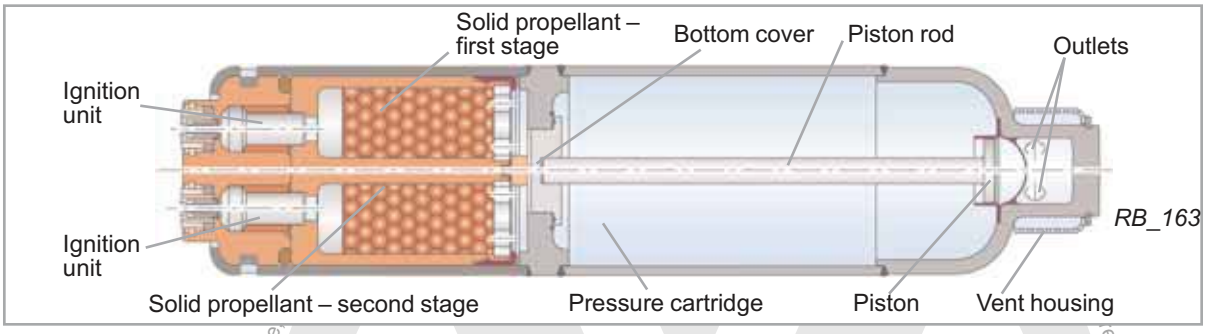
Head airbag – single-stage



The dual stage hybrid gas generator in the illustration deploys in two stages, one after the other. The second stage is ignited approximately 5–30 milliseconds after the first stage is ignited, fully inflating the airbag.

The discharge of propellant gas is controlled by a bottom cover, piston rod, and piston.

Front passenger airbag – two-stage



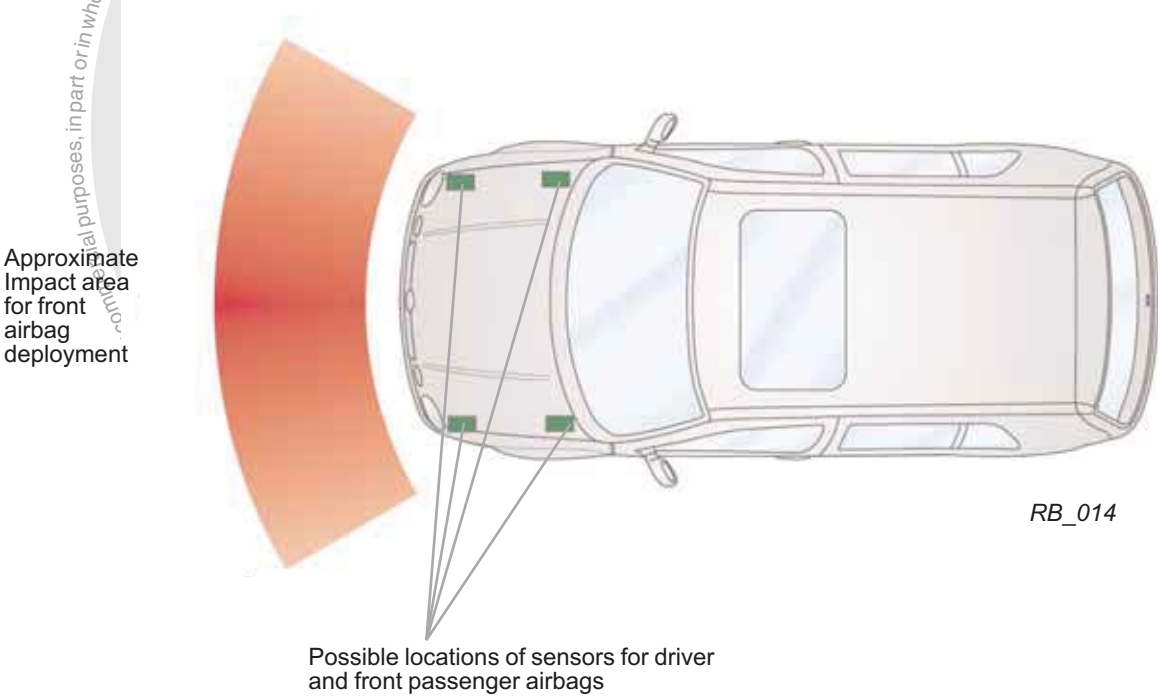
Airbag

Airbag deployment area

Front airbag

Front airbags deploy only in frontal head-on or oblique frontal collisions up to about 30° or more to the left or right of the vehicle's longitudinal axis when the deceleration levels in the crash as measured by the electronic control unit are high enough.

The front airbag system will usually not activate in other oblique collisions, side impact collisions, rollovers about the vehicle's longitudinal axis or rear-end collisions.



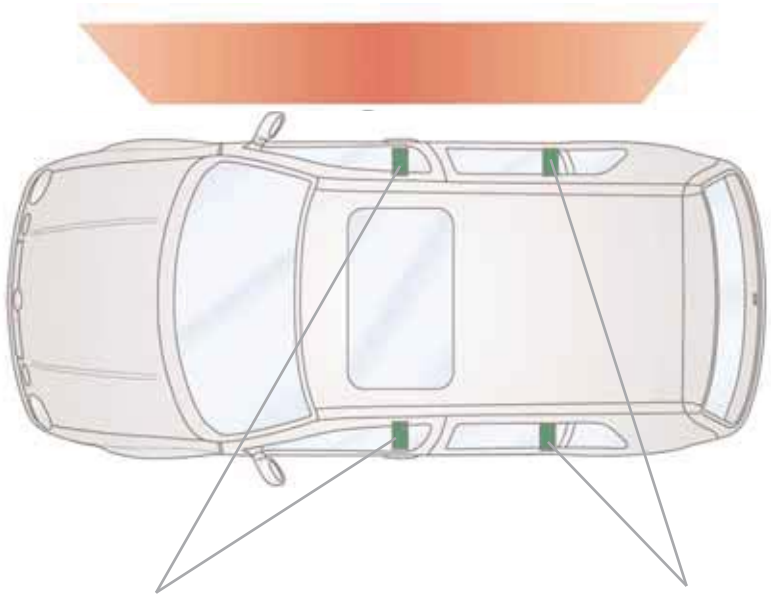
Side airbag

The electronic control unit analyzes the conditions for side airbag deployment and front airbag deployment separately. This helps to make sure that only the airbags that are needed in a specific kind of collision or angle of impact are deployed.

In a side impact, the side airbags will only deploy on the side of the vehicle where the crash occurs and then only if the deployment criteria stored in the electronic control unit are met. The side airbags on the other side will not deploy.

Even after an airbag deployment, the electronic control unit continues working and can deploy the other airbags as necessary.

Approximate impact area for side airbag deployment



RB_063

Front sensors for lateral acceleration

Rear sensors for head and side airbags

Safety belt pretensioners

Pretensioners

In Volkswagen vehicles, the safety belt pretensioner system is triggered either:
- mechanically or
- electrically.

The pretensioners are integrated in the safety belt system, although they may be installed in different positions and locations depending on the vehicle type.

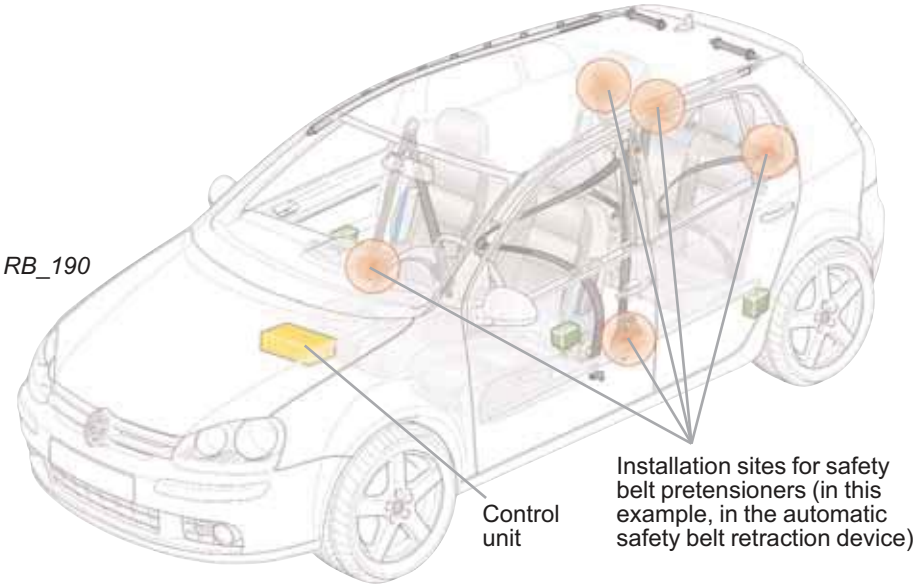
Activation of the pretensioner at the onset of a crash improves the ability of the safety belt to restrain and protect the occupant.

The pretensioner system retracts the safety belt webbing to help reduce the safety belt slack. Safety belt slack is the:
- free play between the safety belt and the body, taking into account loosely fitting clothing
- safety belt pay out that can occur before the automatic locking mechanism locks the inertia reel on which the safety belt is stored.
- “film spool effect” or spool-out that can occur with the tightening of the reeled safety belt on the retractor.

Reducing belt slack helps to protect the properly restrained occupant from contacting the steering wheel and instrument panel. The safety belt pretensioners may be:
- on the door sill next to the seats
- in the outer sides of the rear seats, or
- in the B-pillar

Safety belt pretensioners

Pretensioners



Safety belt pretensioners that have not deployed do not require any special procedures during rescue operations.

General advice for emergency services — Special note: Safety belt buckle
A safety belt that is buckled can help establish that the safety belt was in use at the time of the crash. This information can be important for treating physicians and when trying to determine the nature and cause of injuries that a vehicle occupant may have sustained. This fact may also be important for legal purposes.

It is usually fairly easy to tell whether or not a pretensioner has deployed. If a safety belt cannot be unreeled or will not retract, the pretensioner has usually deployed.

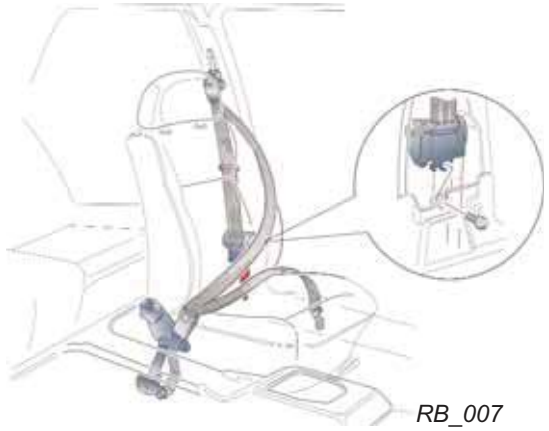
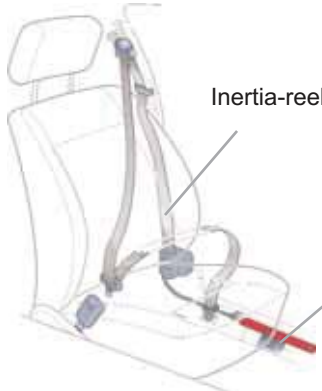
After an accident, it is almost always possible to unfasten the safety belt with the buckle release button. Buckles at the center of the vehicle may be less accessible for rescue personnel, and may also be difficult for an injured passenger to operate.

The illustration shows the primary locations for safety belt pretensioners, using a fifth generation Golf, known as the Rabbit in the United States and Canada, as an example.

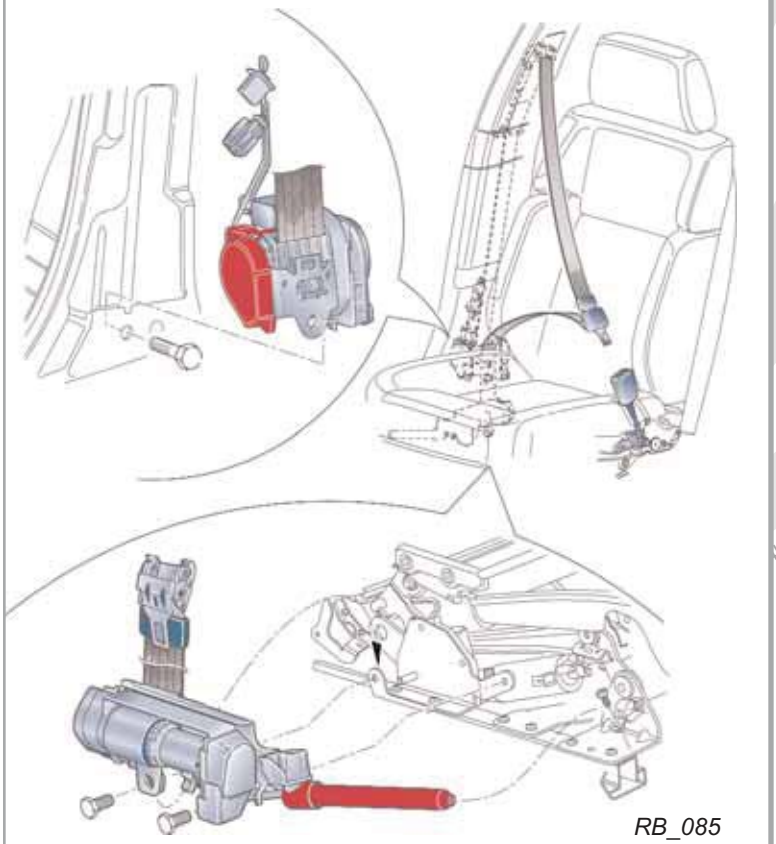
Safety belt pretensioners

Overview of pretensioner types

The table below shows examples of different types of safety belt pretensioners (shown in red) as installed in a Volkswagen vehicle.

 RB_007	**Type 1** Inertia reel safety belt and cylindrical pretensioner, electrical ignition deployment, combined to form a single module and installed in the B-pillar (below the automatic safety belt retractor).
 RB_079	**Type 2** Inertia reel safety belt and cylindrical pretensioner, mechanical ignition, installed as a separate component next to the door sill.
 RB_080	**Type 3** Inertia reel safety belt and cylindrical pretensioner, electrical ignition, installed as a single module in the B-pillar (above the automatic safety belt retractor).

Safety belt pretensioners

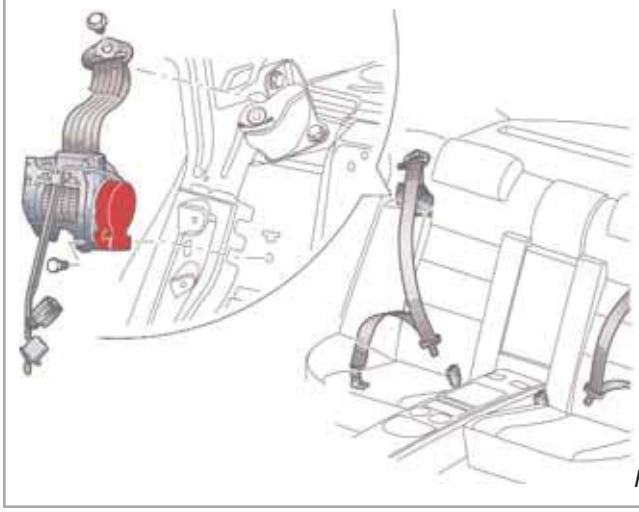


RB_085

Type 4

Dual retractor system comprised of:

- shoulder belt component with a ball type pretensioner, electrical ignition, installed in the B-pillar, and
- lap belt component with a cylindrical pretensioner, electrical ignition, installed as a single module in the seat frame.



RB_086

Type 5

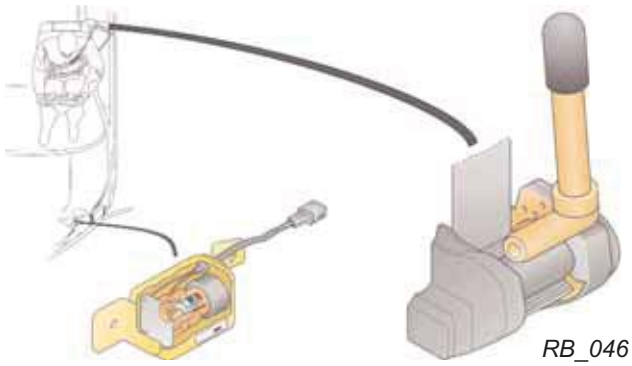
Inertia reel safety belt and pretensioner, electrical ignition, combined in a single module and installed, for example, in the rear seat back.

Safety belt pretensioners

Example of the pretensioning process

The process described here and the illustrations are an example of electrically triggered safety belt systems. The process is the same for all types of safety belt pretensioners. This description applies to a frontal collision with an obstacle at 30 mph (50 km/h).

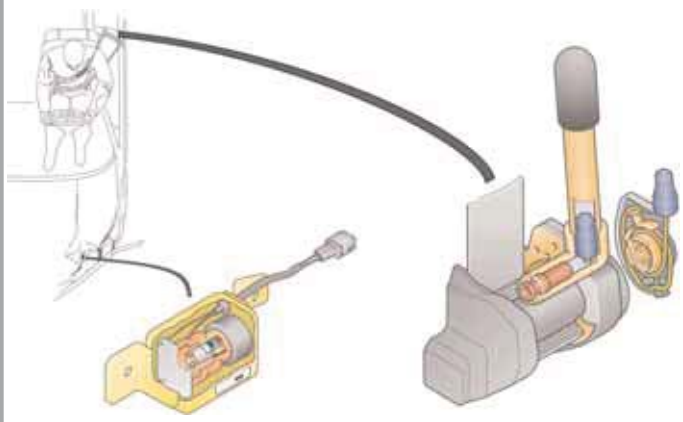
1. First phase after 10 ms
After 10 milliseconds, the threshold for deployment of the pretensioner is reached. The safety belt is still restraining the vehicle occupant with a normal amount of slack for occupant comfort.



RB_046

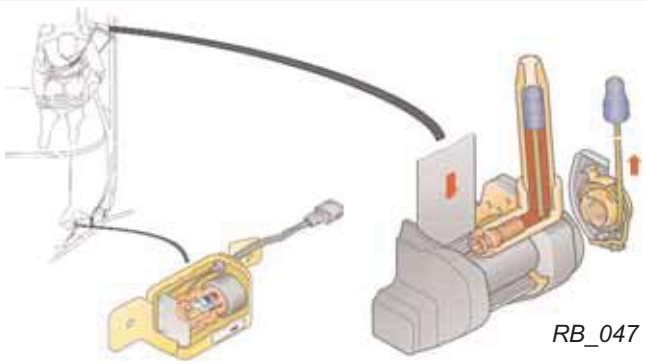
2. Second phase after 12 ms
After 12 milliseconds, the vehicle occupant has still not moved relative to the vehicle, i.e. he or she is still sitting upright. The crash sensor ignites the gas generator in the safety belt pretensioner. The inert propellant gas (nitrogen, carbon dioxide) produced during the combustion process flows into a cylinder, where it propels a piston with an attached cable.

The movement of the piston tightens the cable, turning the safety belt shaft to retract the safety belt webbing onto the retractor spool. The safety belt begins to tighten within about 12 milliseconds.



RB_045

3. Third phase after 24 ms
After 24 milliseconds, the vehicle occupant is still sitting upright. The taut cable has retracted the safety belt so that it fits more tightly on the person requiring protection.



RB_047

Glossary

Airbag
The airbag is an air cushion made of, for example, nylon fabric with a neoprene coating. When it unfolds, it helps protect the vehicle occupants against impact, specifically in the torso and head areas (throat, neck). The gas produced is not toxic.

A- B- C- D-pillars
Terms describing the pillar sections between the vehicle roof and floor or rear side structure. The pillars are located in alphabetical order, the A-pillar closest to the front and the C-pillar closest the rear in a sedan, the D-pillar closest to the rear in a wagon or van.

Capacitor
Component for storing small quantities of electricity.

Crash sensor
Electronic sensor that measures the vehicle's rate of deceleration.

Gas generator
Central component of the airbag module. It holds the igniter and gas generation device or gas reservoir. The gas produced is not toxic.

Hybrid gas generator
Hybrid gas generators combine a cartridge of pressurized gas and a solid propellant charge with a pyrotechnic igniter.

ms
Millisecond = one thousandth of a second
1 ms = 0.001 seconds

Roman numerals (I … V), as used in this guide
These indicate vehicle generations relating to certain Volkswagen models

Safety belt slack
This refers to the looseness between the safety belt and the upper body (thorax). It can vary in degree depending on the person's clothing.

Self-ignition temperature
This is the temperature required to ignite the charge in a gas generator.

Solid propellant charge
Chemical solid that, when ignited electrically, generates a large quantity of gas (consisting of 99% nitrogen) for inflating an airbag.

Precautions

Basic emergency rescue guidelines must always be observed during motor vehicle rescue and recovery operations.

Before starting any rescue operation, it is essential that the direct power supply to the battery be disconnected (**both** cables – **first** negative and then positive). Always remember – some vehicles have more than one battery!

In vehicles with electrical seat adjustment, the seats cannot be moved back and forth or up and down when the battery is disconnected.

The operational sheets in this booklet show each Volkswagen vehicle with the maximum number of airbags that can be installed.

Before beginning any cutting or separation procedures, always check to see whether the vehicle is actually equipped with an airbag at the location where rescue is necessary or where cutting or other procedures must be carried out.

All types of fire extinguishers may be used, provided that this does not endanger any of the accident victims.

The word “AIRBAG” is located in the immediate vicinity of each airbag module.

In a burning vehicle, heat may cause one or more airbags to deploy, but airbags and pretensioners do not explode!

Never use mechanical cutting and/or torch/gas cutting equipment near undeployed airbag modules or gas generators. Doing so can cause them to deploy.

Key to Operational sheets

V1 – Model Years and Vehicle Identification Numbers (VIN)

M1 – M6 Model overview

B1 – B6 Battery locations

A1 Identification of airbags in vehicle

A2 Locations of driver, front passenger, and side airbags

A3 – A9 Location of head airbag

S1 – S2 Body overview – cutting areas

Roman numerals (I … V) – Indicate the generation of vehicle models

Operational sheet

Model Year and Vehicle Identification Number (VIN)

Model Year

The Operational Sheets on the following pages describe the type and location of all airbags and safety belt pretensioners, as well as the vehicle battery, on applicable Volkswagen models as of the date of publication. The number and location of these safety features varies by product line and model year. When there is any doubt as to the location of this equipment, determining the model year of a vehicle involved in a rescue operation is a first priority.

Vehicle Identification Number

Every vehicle is required to have a 17-digit Vehicle Identification Number (VIN). This is located on an embossed plate attached to the instrument panel. It is easily read from outside through the lower left (driver's side) corner of the windshield.

The tenth character in the VIN defines the model year, according to the table below. Use this information with the Operational Sheets that follow to determine the location of the vehicle battery and all airbags an safety belt tensioners.

Vehicle Identification Number visible on the instrument panel through the lower corner of the windshield.

Vehicle Identification Number
10th Character = Model Year

G = 1986
H = 1987
J = 1988
K = 1989
L = 1990
M = 1991
N = 1992
P = 1993
R = 1994
S = 1995
T = 1996
V = 1997
W = 1998
X = 1999
Y = 2000
1 = 2001
2 = 2002
3 = 2003
4 = 2004
5 = 2005
6 = 2006
7 = 2007
8 = 2008
9 = 2009

Sample Vehicle Identification Number. The model year is defined by the tenth character. See table at right.

WVWFR71F76M000345

Tenth character is "6" = 2006

Model overview

Cabriolet (I) 1990 – 1993

Installation variations/equipment	Color of Operational sheet
Battery	B1
Driver airbag	A2

Cabrio (III) 1994 – 2002

Installation variations/equipment	Color of Operational sheet
Battery	B1
Driver/front passenger airbag	A2
Side airbag	A2

Golf and GTI (III) 1994 – 1998

Installation variations/equipment	Color of Operational sheet
Battery	B1
Driver/front passenger airbag	A2
Side airbag	A2

Operational sheet

Model overview

Jetta (III) 1994 – 1998

Installation variations/equipment	Color of Operational sheet
Battery	B1
Driver/front passenger airbag	A2
Side airbag	A2

Jetta and Jetta Wagon (IV) 1999 – 2005

Installation variations/equipment	Color of Operational sheet
Battery	B1
Driver/front passenger airbag	A2
Side airbag	A2
Head airbag (sedan)	A6
Head airbag (wagon)	A5

Golf, GTI and R32 (IV) 1999 – 2006

Installation variations/equipment	Color of Operational sheet
Battery	B1
Driver/front passenger airbag	A2
Side airbag	A2
Head airbag	A4

Model overview

Rabbit and GTI (V) from 2006 (Rabbit as of 2007)

Installation variations/equipment	Color of Operational sheet
Battery	B1
Driver/front passenger airbag	A2
Side airbag	A2
Head airbag	A3

Jetta (V) from mid-year 2005

Installation variations/equipment	Color of Operational sheet
Battery	B1
Driver/front passenger airbag	A2
Side airbag	A2
Head airbag	A6

Operational sheet

Model overview

New Beetle all


Special note: The second stage of the dual stage Advanced front passenger airbag on 2004 and later model sedans may not deploy in all crashes. Use the same precautions as for an undeployed airbag. See the Special Precautions on Page 9.

Installation variations/equipment	Color of Operational sheet
Battery	B1
Driver/front passenger airbag	A2
Side airbag with head airbag function	A2

New Beetle Convertible all


Special note: The second stage of the dual stage Advanced front passenger airbag may not deploy in all crashes. Use the same precautions as for an undeployed airbag. See the Special Precautions on Page 9.

Installation variations/equipment	Color of Operational sheet
Battery	B1
Driver/front passenger airbag	A2
Side airbag with head airbag function	A2

Eos all


Installation variations/equipment	Color of Operational sheet
Battery (4-cyl. engine)	B2
Battery (6-cyl. engine)	B2
Driver/front passenger airbag	A2
Side airbag with head airbag function	A2

Model overview

Passat/Passat wagon (IV) 1995 - 1997

Installation variations/equipment	Color of Operational sheet
Battery	B1
Driver/front passenger airbag	A2

Passat/Passat wagon (V) 1998 – 2005

Installation variations/equipment	Color of Operational sheet
Battery	B1
Driver/front passenger airbag	A2
Side airbag	A2
Head airbag (sedan)	A7
Head airbag (wagon)	A5

Passat/Passat wagon (VI) from 2006

Installation variations/equipment	Color of Operational sheet
Battery (4-cyl. engine)	B3
Battery (6-cyl. engine)	B3
Driver/front passenger airbag	A2
Side airbag	A2
Head airbag (sedan)	A8
Head airbag (wagon)	A8

Operational sheet

Model overview

Phaeton all

Special note: The second stage of the dual stage Advanced driver and front passenger airbags on 2005 and later models may not deploy in all crashes. Use the same precautions as for an undeployed airbag. See Special Precautions on Page 9.

Installation variations/equipment	Color of Operational sheet
Battery	B4
Driver/front passenger airbag	A2
Side airbag	A2
Head airbag	A7

Touareg all

Installation variations/equipment	Color of Operational sheet
Battery	B5
Driver/front passenger airbag	A2
Side airbag	A2
Head airbag	A9

EuroVan/MV/Camper 1999 - 2003

Installation variations/equipment	Color of Operational sheet
Battery	B6
Driver/ front passenger airbag	A2

Battery locations

Location 1

Front left of engine compartment

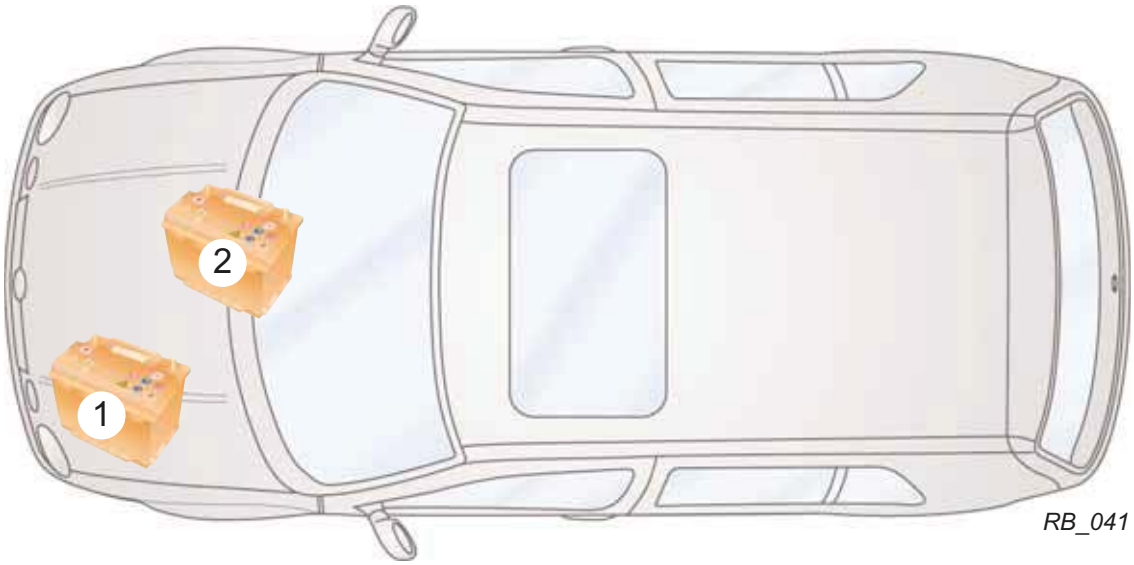
- New Beetle, New Beetle Cabriolet
- Golf (III, IV and V)
- GTI (III, IV and V)
- R32
- Rabbit (U.S. and Canadian Golf V)
- Cabriolet (I)
- Cabrio (III)
- Jetta, Jetta wagon (III, IV and V)
- Passat, Passat wagon (III and IV)

Location 2

Rear of engine compartment, in plenum area

- Passat, Passat wagon (V)

B1



RB_041

Disconnection sequence for vehicle batteries:

1. Disconnect battery's negative terminal.
2. Disconnect battery's positive terminal.

Operational sheet

B2

Battery locations

Location 1

Left side of engine compartment toward rear, under plastic cover

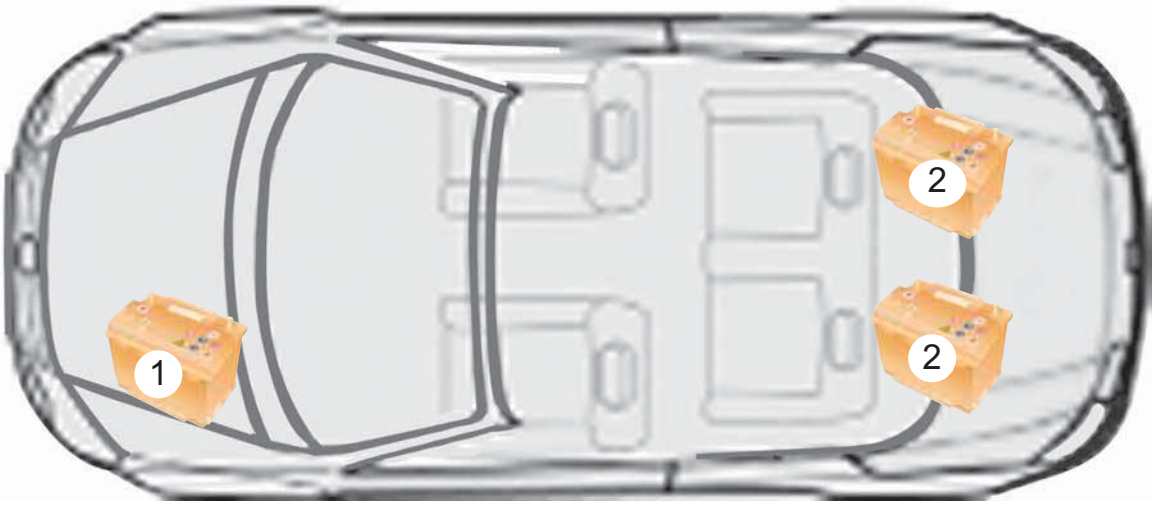
- Eos – with 4-cylinder engine

Location 2

Behind each rear seat (Note: Two six-volt batteries connected in series. Always disconnect the negative cable to body first)

- Eos – with 6-cylinder engine

B2



Disconnection sequence for vehicle batteries:

1. Disconnect battery's negative terminal. On Eos V6 with two six-volt batteries, always disconnect negative cable to body first
2. Disconnect battery's positive terminal. On Eos V6 with two six-volt batteries, disconnect positive cable to body second

Battery locations

Location 1

Front left of engine compartment

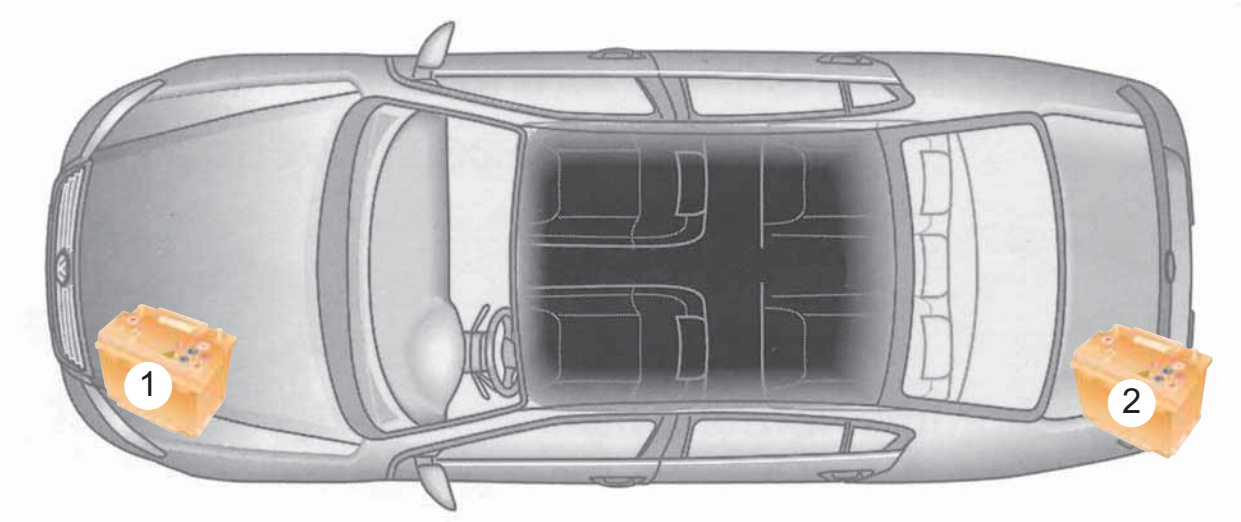
- Passat (VI) – with 4-cylinder engine

Location 2

Trunk area, left side

- Passat (VI) – with 6-cylinder engine

B3



Disconnection sequence for vehicle batteries:

1. Disconnect battery's negative terminal.
2. Disconnect battery's positive terminal.

Operational sheet

Battery locations

Location 1

Trunk area

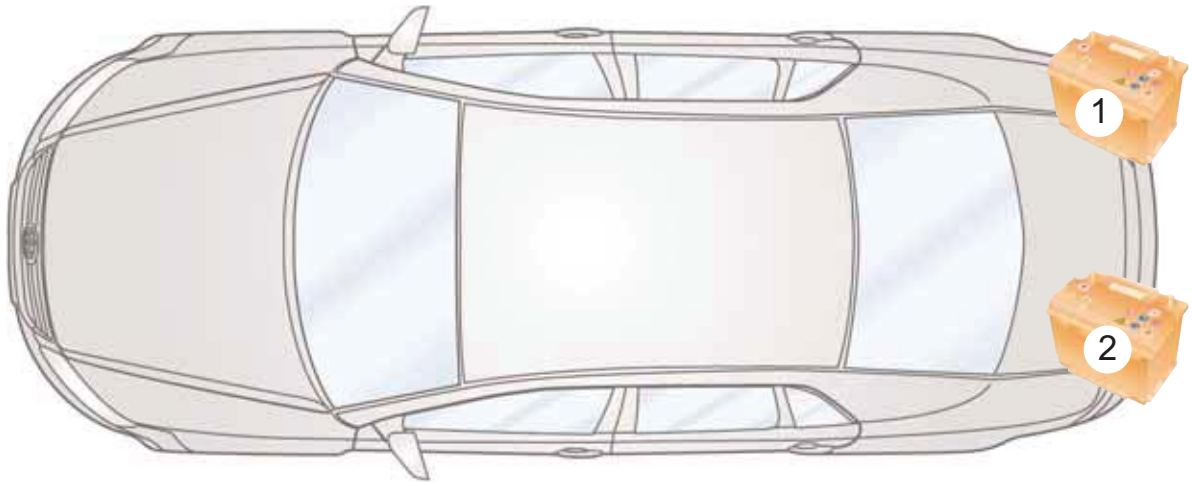
- Phaeton: starter battery

Location 2

Trunk area

- Phaeton: auxiliary battery

B4



RB_096

Disconnection sequence for vehicle batteries:

1. Disconnect battery's negative terminal.
2. Disconnect battery's positive terminal.

Battery locations

Location 1

Under the driver's seat

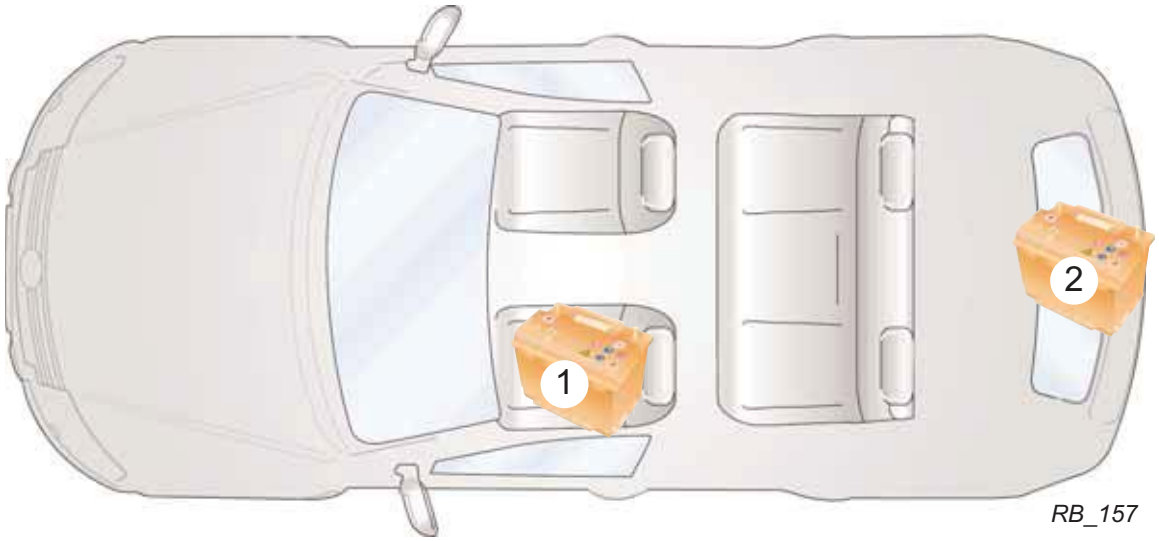
- Touareg
  Starter battery

Location 2

Spare wheel well

- Touareg
  Auxiliary battery, depending on equipment

B5



RB_157

Disconnection sequence for vehicle batteries:

1. Disconnect battery's negative terminal.
2. Disconnect battery's positive terminal.

Operational sheet

B6

Battery locations

Location 1

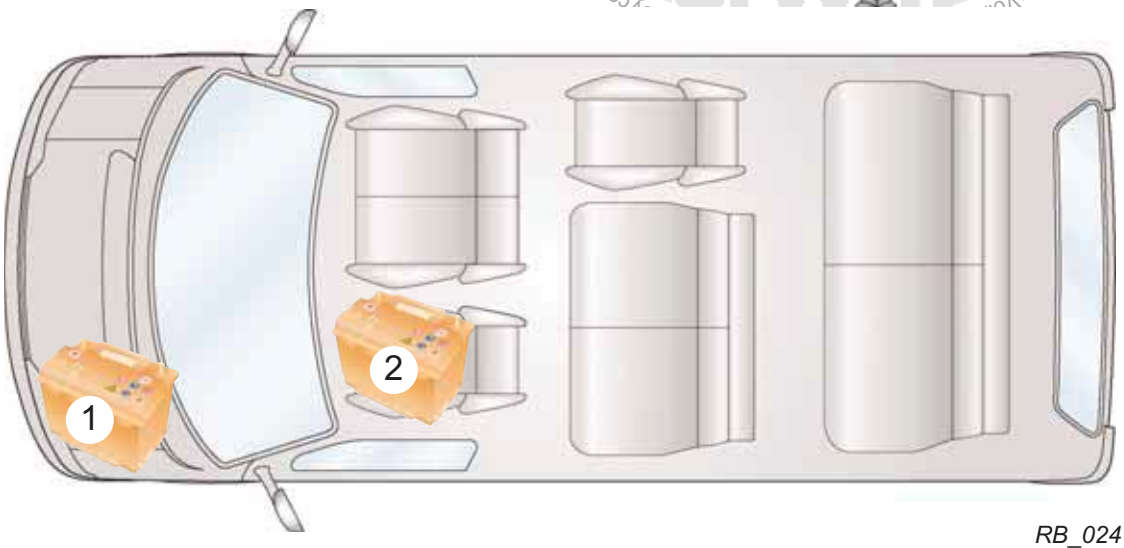
Front left of engine compartment

- EuroVan, MV, and EuroVan Camper (Volkswagen model) – starter battery

Location 2

Under the driver's seat

- EuroVan, MV, and EuroVan Camper (Volkswagen model) – auxiliary battery



RB_024

Disconnection sequence for vehicle batteries:

1. Disconnect battery's negative terminal.
2. Disconnect battery's positive terminal.

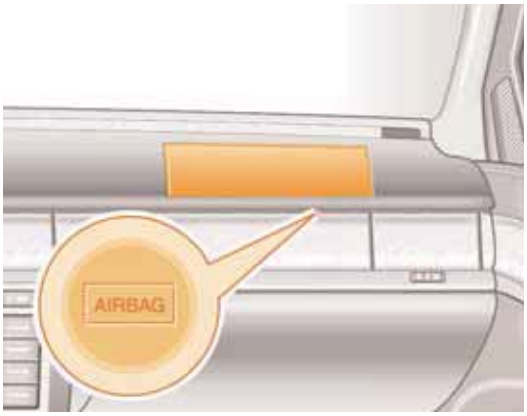
EuroVan cab/chassis models with third-party camper or recreational vehicle bodies made by vehicle converters may also have additional batteries installed in various locations. Their locations are beyond the scope of this guide.

Identification of airbags in the vehicle

The overview uses examples to show the location of the “AIRBAG” identifier when airbags are installed in the vehicle.

RB_088

Driver airbag:
“AIRBAG” on the steering wheel cover identifies vehicles with a driver airbag.

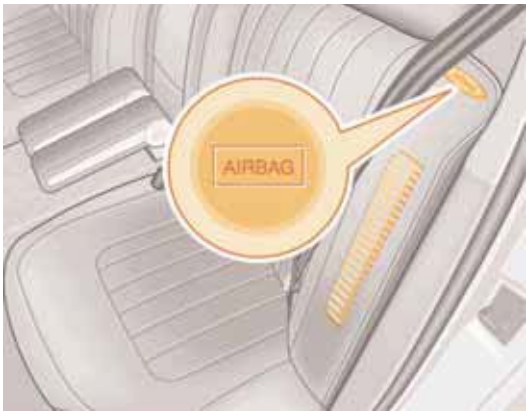


RB_077

Passenger airbag:
“AIRBAG” on the instrument panel shows the approximate location of the front airbag on the passenger side.

RB_089

Side airbag – front:
“AIRBAG” on the outboard sides of the front seat backs indicates that side airbags are in the backrest.

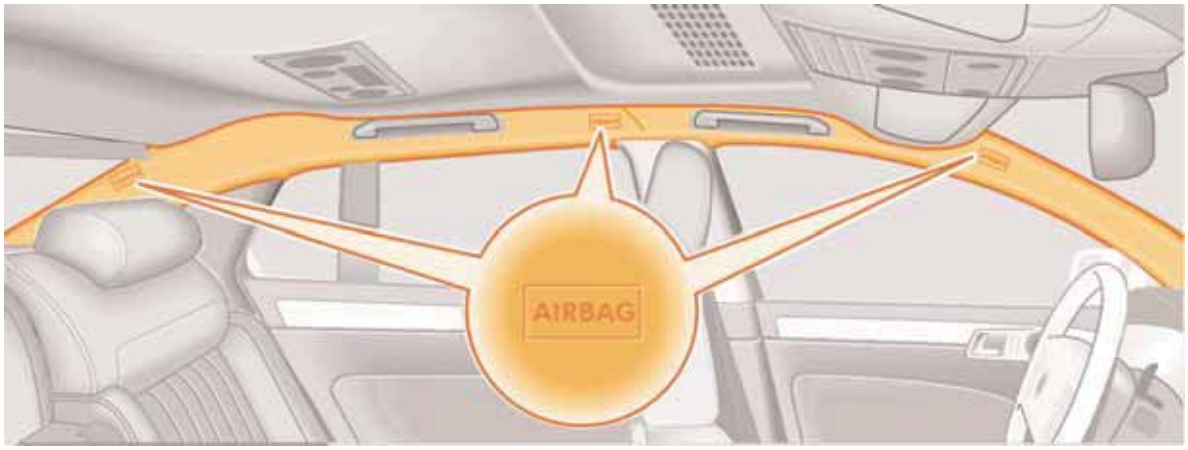


RB_075

Side airbag – rear:
“AIRBAG” on the outboard sides of the rear seat backs indicates that side airbags are located in the outboard side of the seat back.

Operational sheet

Identification of airbags in the vehicle



RB_087

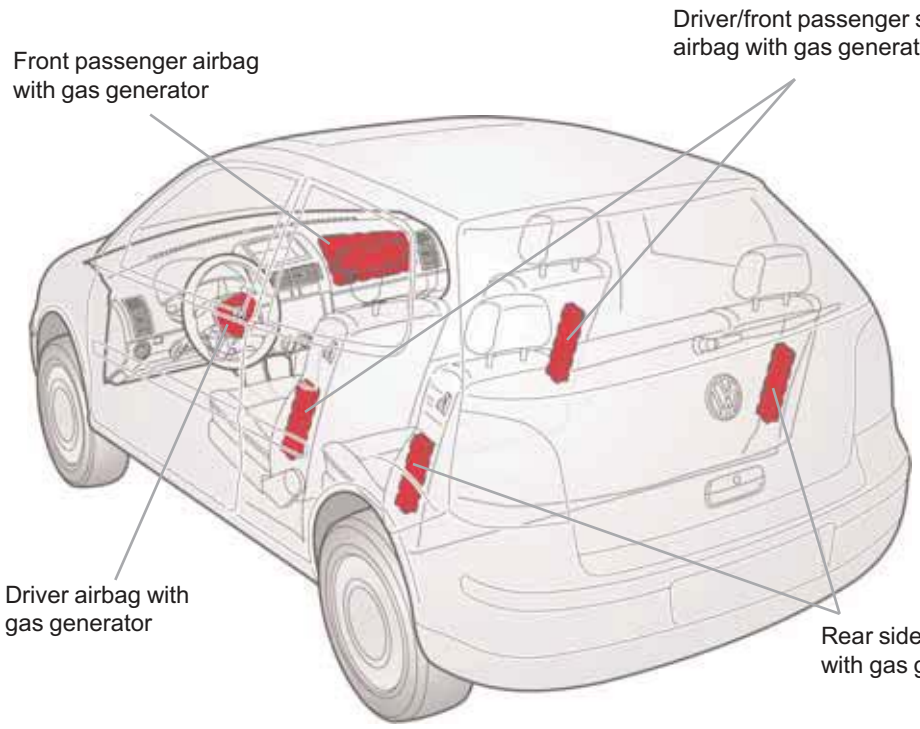
Head airbag – one-piece; Side Curtain Protection®:
"AIRBAG" on the A, B or C pillar indicates that a head airbag is under the side roof header covering.

A1

A1

Locations of driver, front passenger, and side airbags

The examples of driver, passenger, and side airbag locations apply generally to all models.

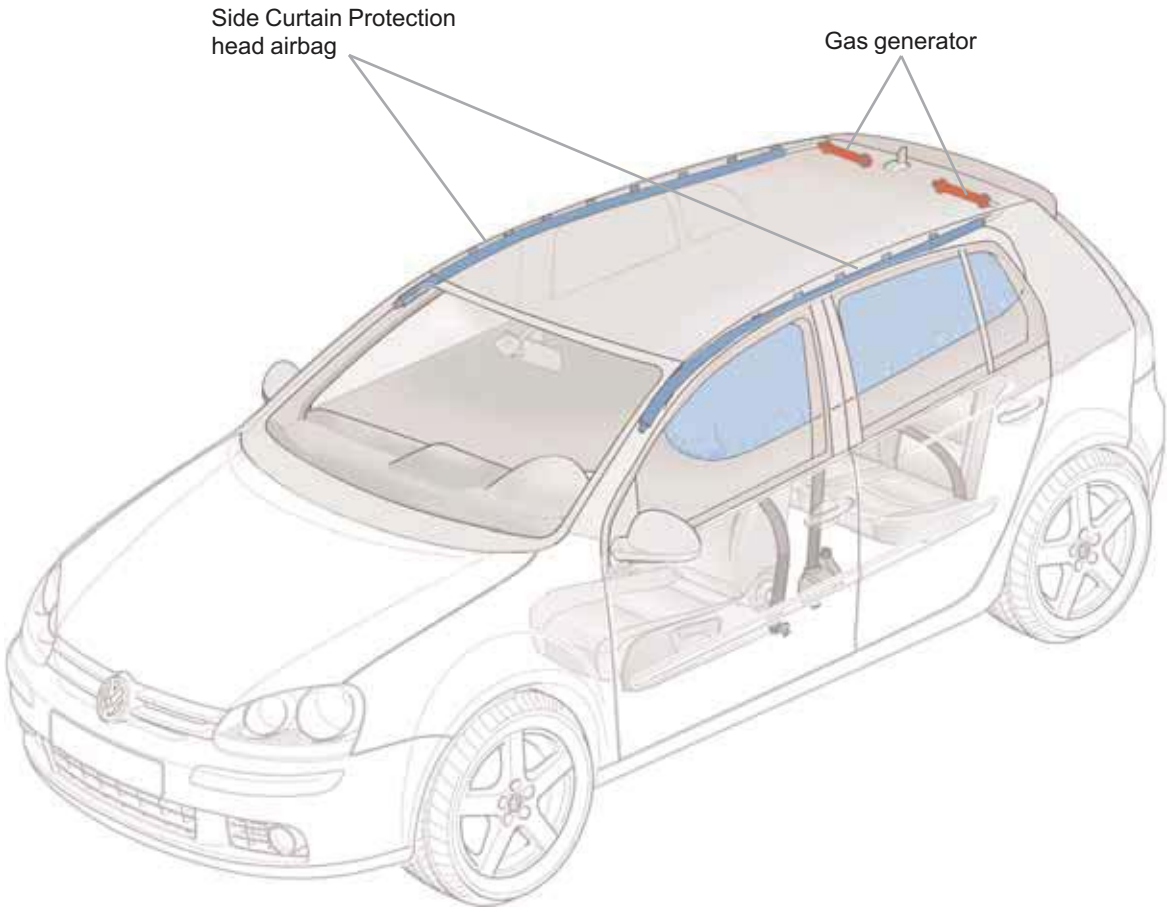


The gas generators must not be cut or detached!

Operational sheet

Locations of head airbags

The examples of head airbag locations apply to the following models:
- Rabbit (U.S. and Canadian name) or Golf (V)
- GTI (V)



The gas generators must not be cut or detached!

A3

Locations of head airbags

The examples of head airbag locations apply to the following models:
- Golf (IV)
- GTI (IV)
- R32 (Golf/GTI IV based)

RB_197

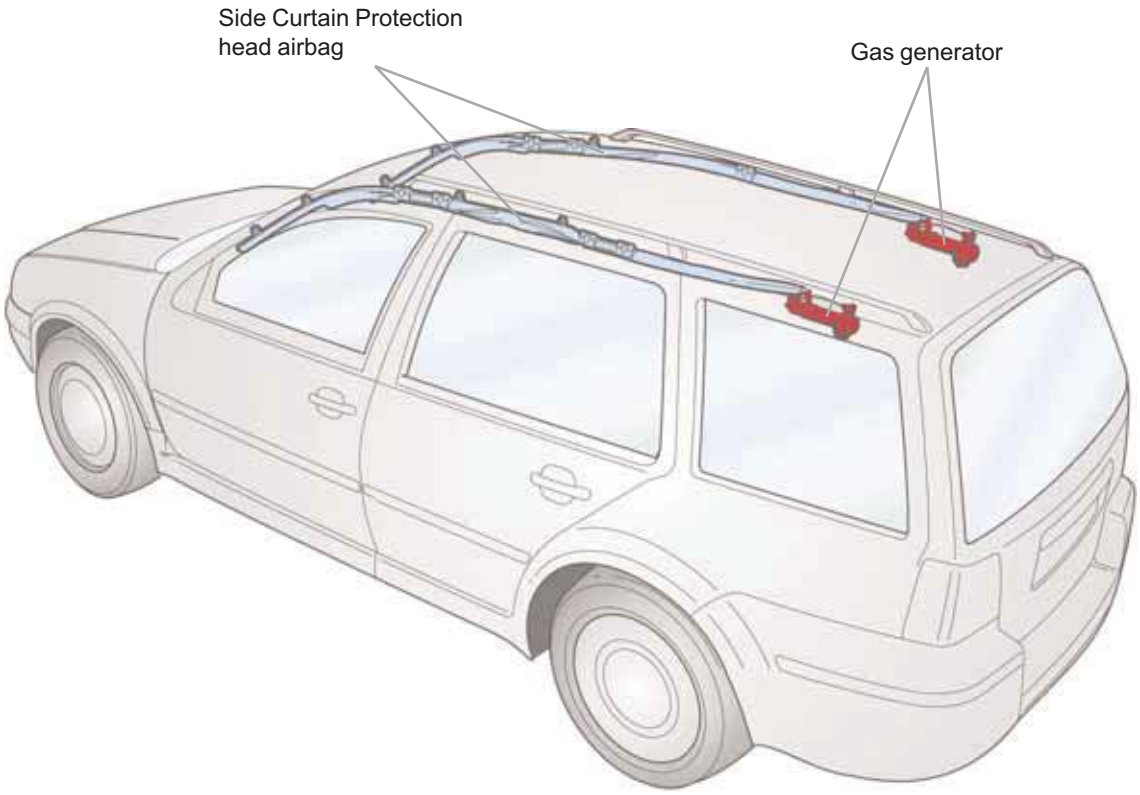
A4

The gas generators must not be cut or detached!

Operational sheet

Locations of head airbags

The examples of head airbag locations apply to the following models:
- Jetta wagon (IV)
- Passat wagon (V)



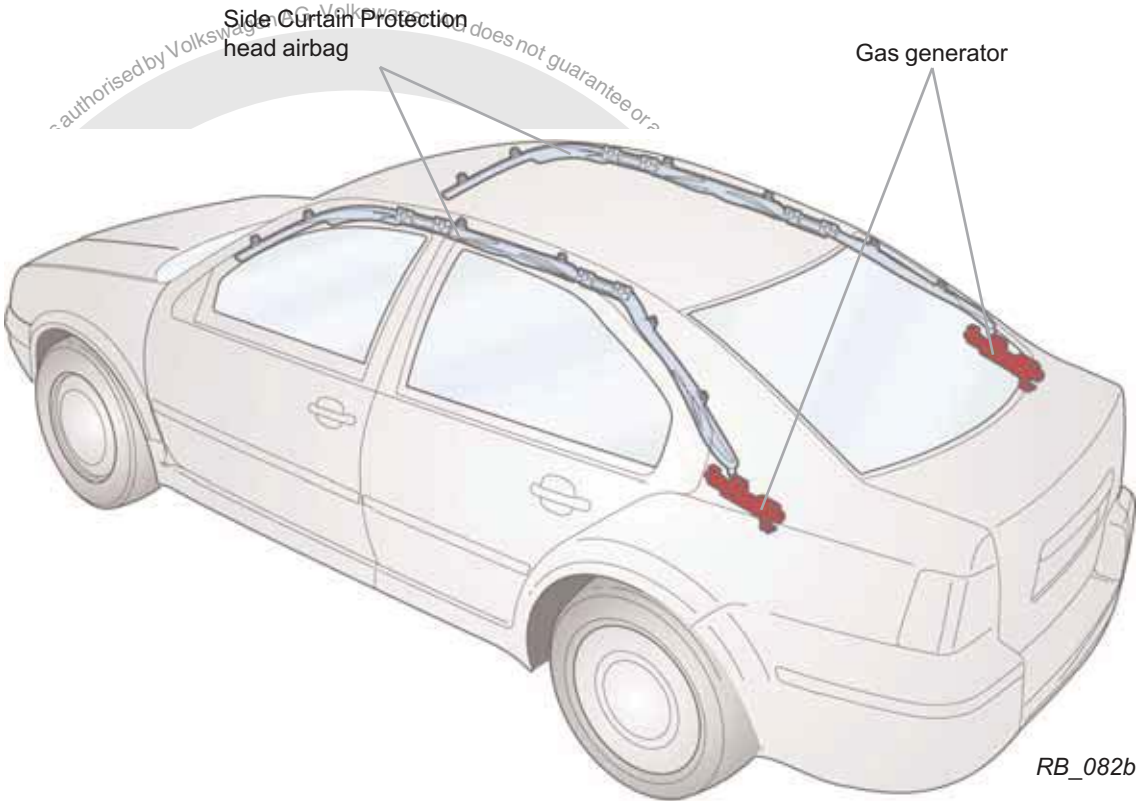
RB_082a

The gas generators must not be cut or detached!

A5

Locations of head airbags

The examples of head airbag locations apply to the following models:
- Jetta sedan (IV)
- Jetta sedan (V)



A6

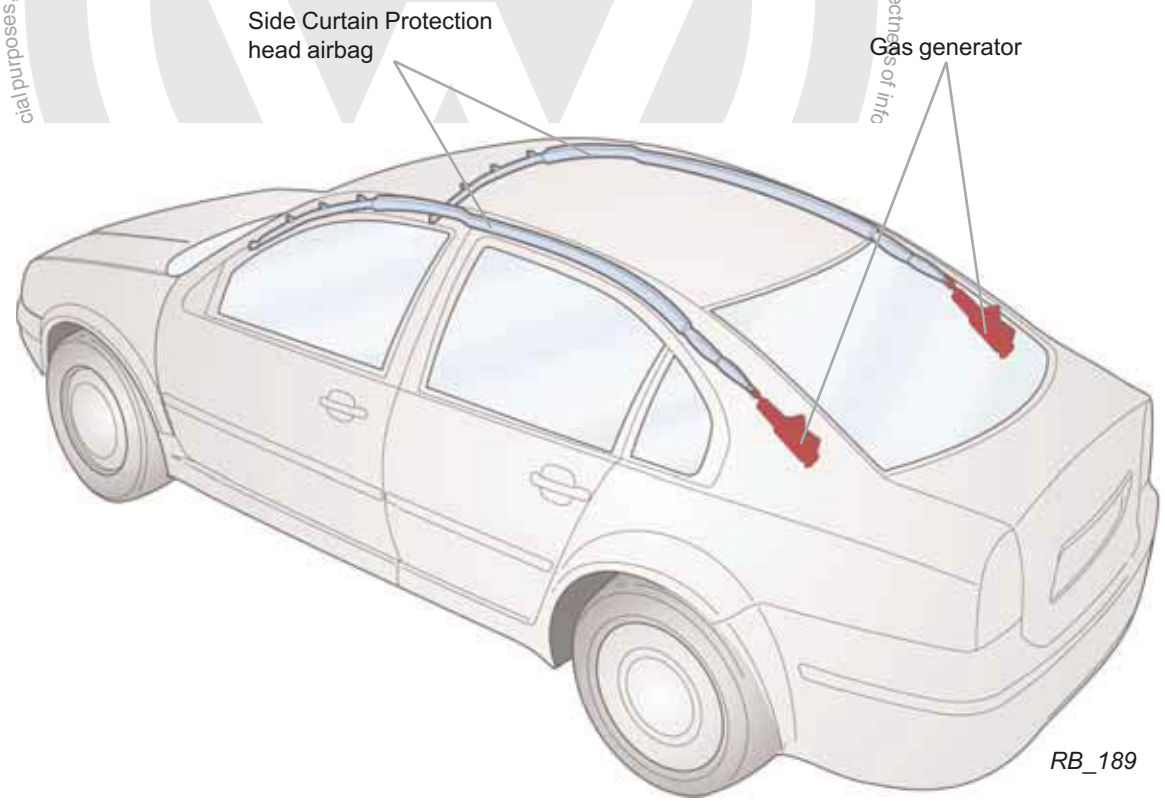
The gas generators must not be cut or detached!

Operational sheet

Locations of head airbags

The examples of head airbag locations apply to the following models:

- Passat sedan (V)
- Phaeton



RB_189

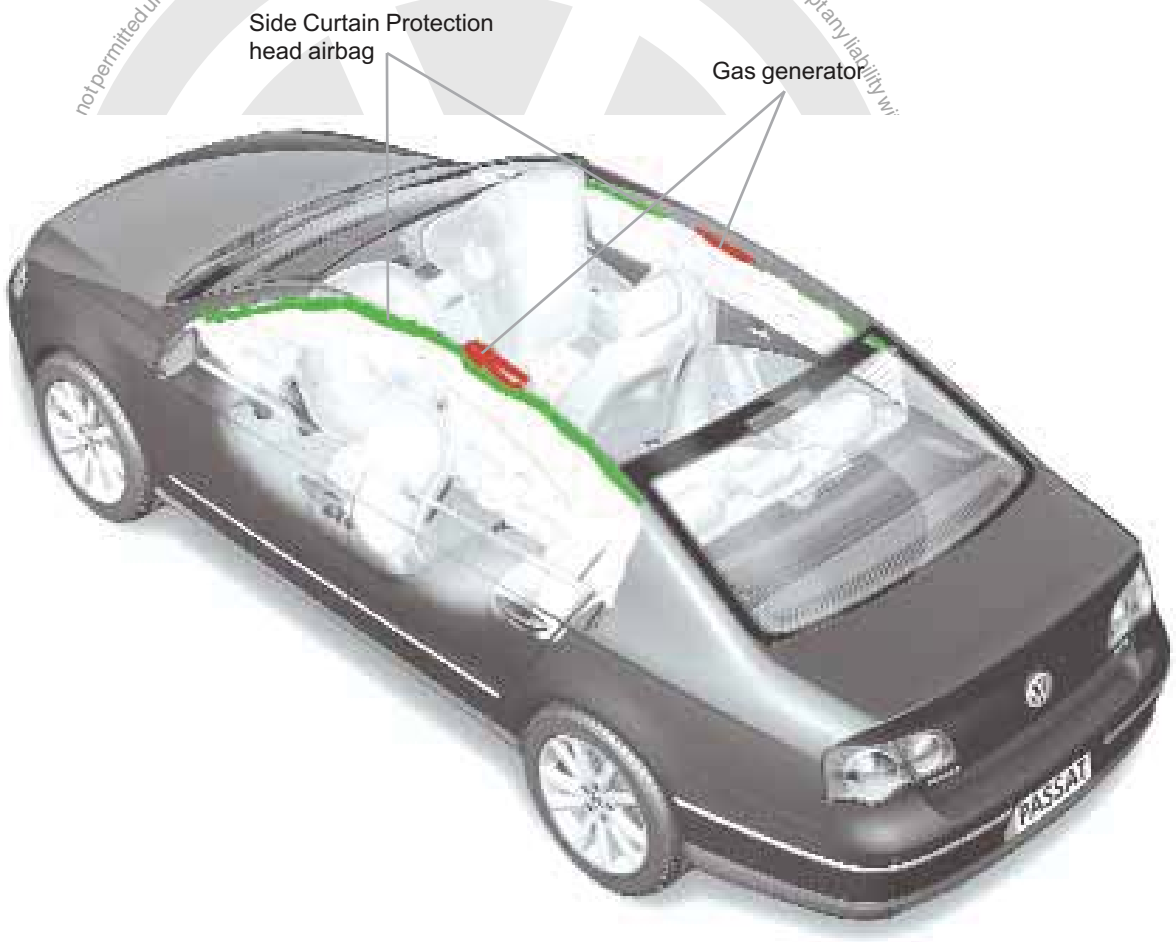
The gas generators must not be cut or detached!

A7

Locations of head airbags

The examples of head airbag locations apply to the following model:

- Passat sedan (VI)



The gas generators must not be cut or detached!

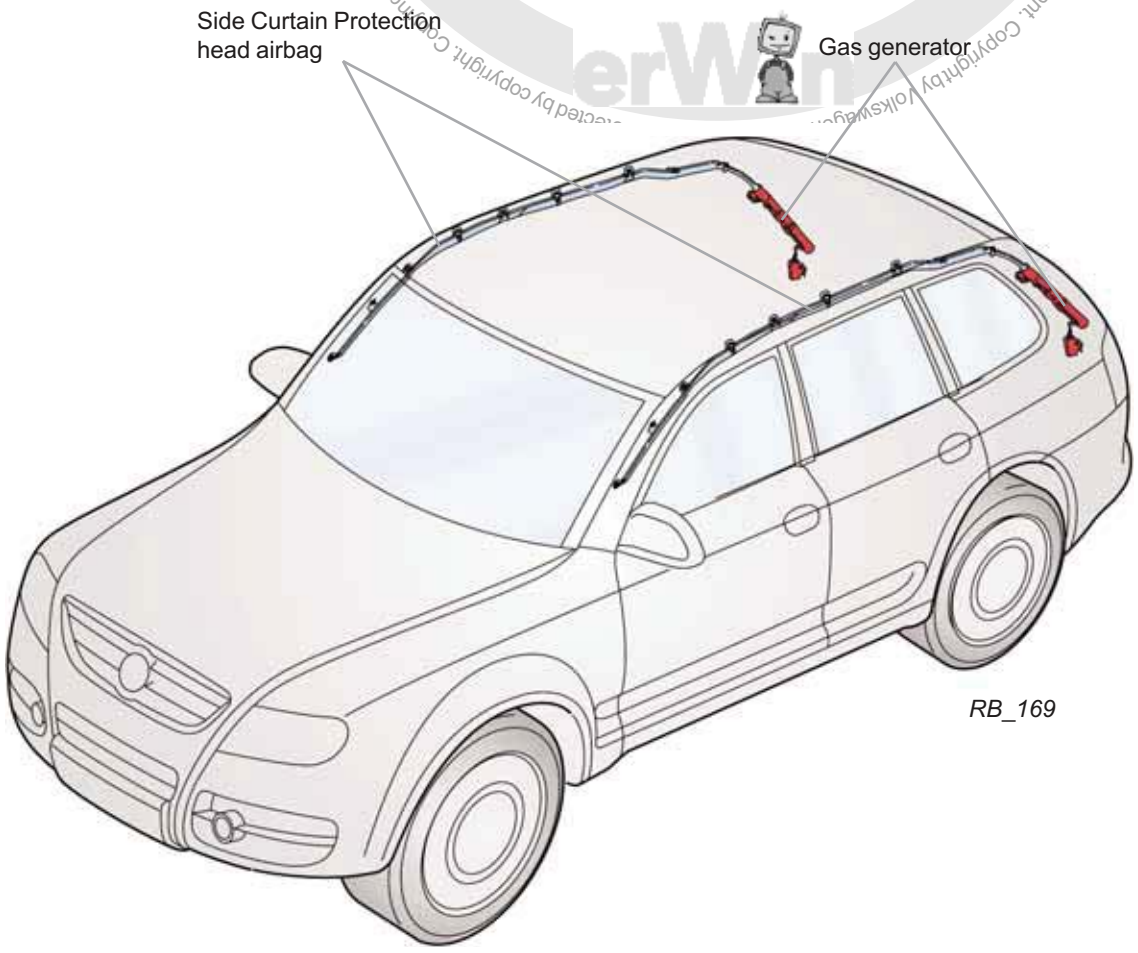
A8

Operational sheet

Locations of head airbags

The examples of head airbag locations apply to the following model:

- Touareg



RB_169

The gas generators must not be cut or detached!

A9

A9

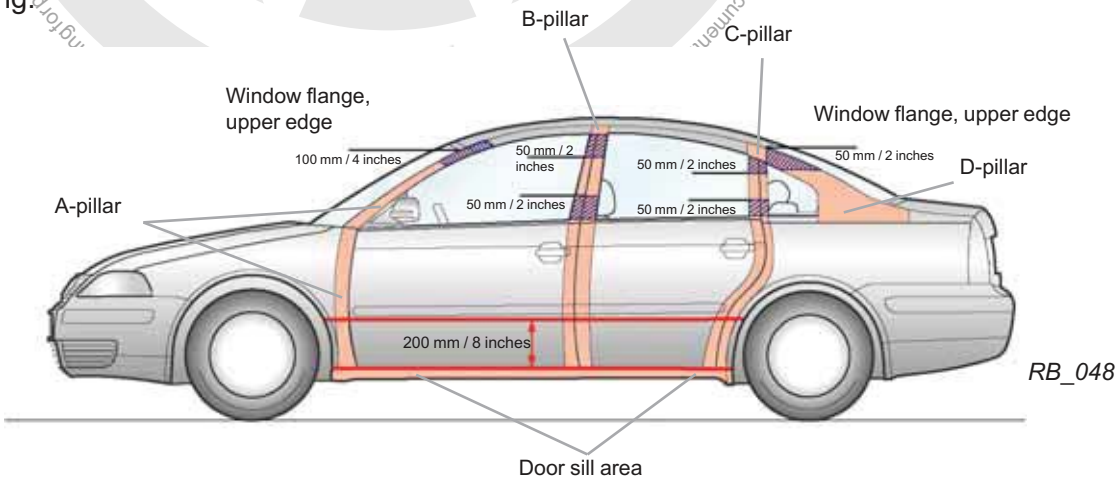
Body overview – cutting areas

The overview of pillars and door sills applies in general to all Volkswagen models

This overview shows the cutting sites generally applicable to all models. During rescue operations, cuts can be made safely in the shaded areas with respect to airbags and safety belt pretensioners.

Please be sure to take special note of the exceptions called out in the cross-hatched area of the pillars and the lower door area above the sills.

Some of areas where cutting is permitted are reinforced, so extra power may be required for cutting.



Pillars must only be cut in these areas!

S1

Improper cutting of vehicle structures can cause sudden airbag and/or safety belt pretensioner deployment and serious personal injury.

- Never cut vehicle structures in the area 8 inches (200 mm) above the door sill.
- Cut vehicle structures only in the cross-hatched areas illustrated in this booklet.

Body overview – cutting areas

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The overview of pillars and door sills applies in general to all Volkswagen models

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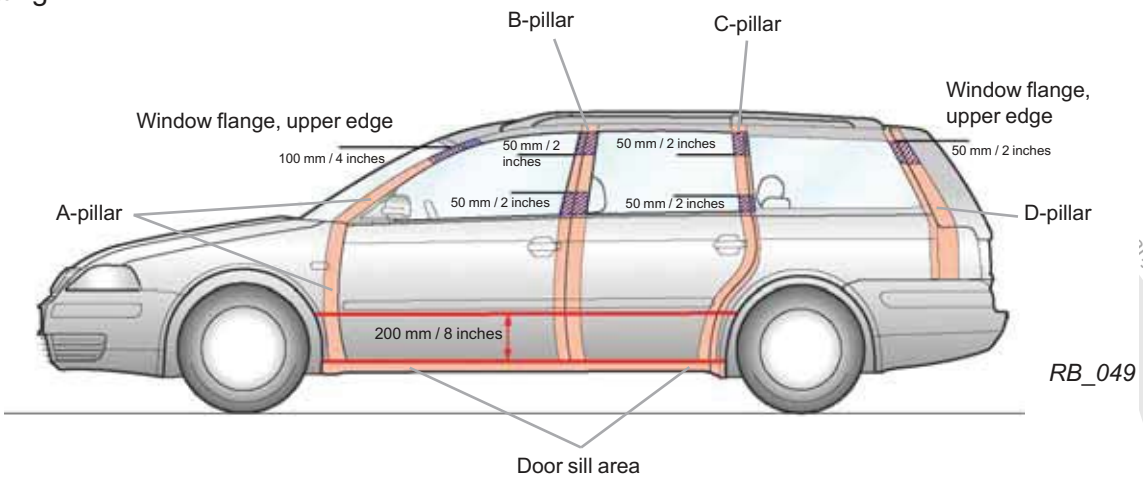

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S2

Cautions & Warnings

Please read these WARNINGS and CAUTIONS before proceeding with maintenance and repair work. You must answer that you have read and you understand these WARNINGS and CAUTIONS before you will be allowed to view this information.

- If you lack the skills, tools and equipment, or a suitable workshop for any procedure described in this manual, we suggest you leave such repairs to an authorized Volkswagen retailer or other qualified shop. We especially urge you to consult an authorized Volkswagen retailer before beginning repairs on any vehicle that may still be covered wholly or in part by any of the extensive warranties issued by Volkswagen.

- Disconnect the battery negative terminal (ground strap) whenever you work on the fuel system or the electrical system. Do not smoke or work near heaters or other fire hazards. Keep an approved fire extinguisher handy.

- Volkswagen is constantly improving its vehicles and sometimes these changes, both in parts and specifications, are made applicable to earlier models. Therefore, part numbers listed in this manual are for reference only. Always check with your authorized Volkswagen retailer parts department for the latest information.

- Any time the battery has been disconnected on an automatic transmission vehicle, it will be necessary to reestablish Transmission Control Module (TCM) basic settings using the VAG 1551 Scan Tool (ST).

- Never work under a lifted vehicle unless it is solidly supported on stands designed for the purpose. Do not support a vehicle on cinder blocks, hollow tiles or other props that may crumble under continuous load. Never work under a vehicle that is supported solely by a jack. Never work under the vehicle while the engine is running.

- For vehicles equipped with an anti-theft radio, be sure of the correct radio activation code before disconnecting the battery or removing the radio. If the wrong code is entered when the power is restored, the radio may lock up and become inoperable, even if the correct code is used in a later attempt.

- If you are going to work under a vehicle on the ground, make sure that the ground is level. Block the wheels to keep the vehicle from rolling. Disconnect the battery negative terminal (ground strap) to prevent others from starting the vehicle while you are under it.

- Do not attempt to work on your vehicle if you do not feel well. You increase the danger of injury to yourself and others if you are tired, upset or have taken medicine or any other substances that may impair you or keep you from being fully alert.

- Never run the engine unless the work area is well ventilated. Carbon monoxide (CO) kills.

- Always observe good workshop practices. Wear goggles when you operate machine tools or work with acid. Wear goggles, gloves and other protective clothing whenever the job requires working with harmful substances.

- Tie long hair behind your head. Do not wear a necktie, a scarf, loose clothing, or a necklace when you work near machine tools or running engines. If your hair, clothing, or jewelry were to get caught in the machinery, severe injury could result.

- Do not re-use any fasteners that are worn or deformed in normal use. Some fasteners are designed to be used only once and are unreliable and may fail if used a second time. This includes, but is not limited to, nuts, bolts, washers, circlips and cotter pins. Always follow the recommendations in this manual - replace these fasteners with new parts where indicated, and any other time it is deemed necessary by inspection.

next

Cautions & Warnings

- Illuminate the work area adequately but safely. Use a portable safety light for working inside or under the vehicle. Make sure the bulb is enclosed by a wire cage. The hot filament of an accidentally broken bulb can ignite spilled fuel or oil.

- Friction materials such as brake pads and clutch discs may contain asbestos fibers. Do not create dust by grinding, sanding, or by cleaning with compressed air. Avoid breathing asbestos fibers and asbestos dust. Breathing asbestos can cause serious diseases such as asbestosis or cancer, and may result in death.

- Finger rings should be removed so that they cannot cause electrical shorts, get caught in running machinery, or be crushed by heavy parts.

- Before starting a job, make certain that you have all the necessary tools and parts on hand. Read all the instructions thoroughly; do not attempt shortcuts. Use tools that are appropriate to the work and use only replacement parts meeting Volkswagen specifications. Makeshift tools, parts and procedures will not make good repairs.

- Catch draining fuel, oil or brake fluid in suitable containers. Do not use empty food or beverage containers that might mislead someone into drinking from them. Store flammable fluids away from fire hazards. Wipe up spills at once, but do not store the oily rags, which can ignite and burn spontaneously.

- Use pneumatic and electric tools only to loosen threaded parts and fasteners. Never use these tools to tighten fasteners, especially on light alloy parts. Always use a torque wrench to tighten fasteners to the tightening torque listed.

- Keep sparks, lighted matches, and open flame away from the top of the battery. If escaping hydrogen gas is ignited, it will ignite gas trapped in the cells and cause the battery to explode.

- Be mindful of the environment and ecology. Before you drain the crankcase, find out the proper way to dispose of the oil. Do not pour oil onto the ground, down a drain, or into a stream, pond, or lake. Consult local ordinances that govern the disposal of wastes.

- The air-conditioning (A/C) system is filled with a chemical refrigerant that is hazardous. The A/C system should be serviced only by trained automotive service technicians using approved refrigerant recovery/recycling equipment, trained in related safety precautions, and familiar with regulations governing the discharging and disposal of automotive chemical refrigerants.

- Before doing any electrical welding on vehicles equipped with anti-lock brakes (ABS), disconnect the battery negative terminal (ground strap) and the ABS control module connector.

- Do not expose any part of the A/C system to high temperatures such as open flame. Excessive heat will increase system pressure and may cause the system to burst.

- When boost charging the battery, first remove the fuses for the Engine Control Module (ECM), the Transmission Control Module (TCM), the ABS control module, and the trip computer. In cases where one or more of these components is not separately fused, disconnect the control module connector(s).

- Some of the vehicles covered by this manual are equipped with a supplemental restraint system (SRS), that automatically deploys an airbag in the event of a frontal impact. The airbag is operated by an explosive device. Handled improperly or without adequate safeguards, it can be accidentally activated and cause serious personal injury. To guard against personal injury or airbag system failure, only trained Volkswagen Service technicians should test, disassemble or service the airbag system.

back next

Cautions & Warnings

- Do not quick-charge the battery (for boost starting) for longer than one minute, and do not exceed 16.5 volts at the battery with the boosting cables attached. Wait at least one minute before boosting the battery a second time.

- Never use a test light to conduct electrical tests of the airbag system. The system must only be tested by trained Volkswagen Service technicians using the VAG 1551 Scan Tool (ST) or an approved equivalent. The airbag unit must never be electrically tested while it is not installed in the vehicle.

- Some aerosol tire inflators are highly flammable. Be extremely cautious when repairing a tire that may have been inflated using an aerosol tire inflator. Keep sparks, open flame or other sources of ignition away from the tire repair area. Inflate and deflate the tire at least four times before breaking the bead from the rim. Completely remove the tire from the rim before attempting any repair.

- When driving or riding in an airbag-equipped vehicle, never hold test equipment in your hands or lap while the vehicle is in motion. Objects between you and the airbag can increase the risk of injury in an accident.

I have read and I understand these Cautions and Warnings.

back OK