Emergency Response Guide



Information on rescue from vehicles that were in accidents made by the Lamborghini brand

Version dated: 11/2024

Legal Note

This guide has been prepared exclusively for first and second responders which have received a special training in the area of the technical assistance after traffic accidents and thus in the area of the activities described in this guide.

The specifications and the special equipment of Lamborghini vehicles are continuously subject to possible change.

For this, ***Automobili Lamborghini S.p.A.*** *expressively reserves adaptations and amendments of this document at any time.*

Please observe

The information included in this guide are neither intended for final customers nor for workshops or dealers. Final customers can take detailed information about the functions of their vehicle as well as important safety notes about vehicle and passenger safety from the on-board documentation of their respective vehicles.

Workshops and dealers receive repair information from the sources known to them.

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Preface

Driver, vehicle and surroundings: the interaction between these specific factors is decisive for road safety.

The vehicle is expected to perform the following functions, among others, when an accident occurs:

- Provide a rigid passenger cell to ensure a survival space to the greatest extent possible.
- Reduce the impact energy by means of intelligent structural concepts and elements.
- Protect the occupants effectively by means of an optimized restraint system consisting of airbags and seat belts with seat belt pretensioners and safety belt load limiters.
- Provide safety equipment to minimize the hazards presented by operating equipment or drive components.

This guide aims to support first and second responders in performing their tasks by giving them the information they require regarding the technology used in Lamborghini vehicles.

Technical innovations, such as new materials or drive technologies, mean the approach to recovering occupants from vehicles that have been involved in accidents needs to be changed.

The processes and procedures are usually governed by official regulations or guidelines issued by legislators or the emergency organizations themselves in the different countries around the world.

When information about the approach is provided in this Emergency Response Guide, it should therefore only be considered to be a suggestion.

The information is specifically intended for the training and further training of first and second responders.

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0. Rescue sheet/ sheets

Lamborghini provides rescue sheets for all models and vehicle versions.

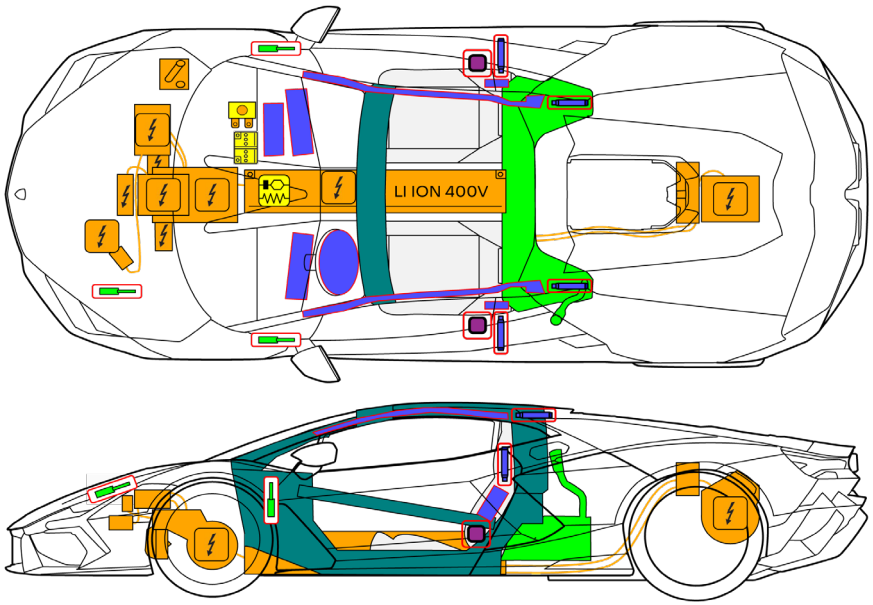
A model overview (www.lamborghini.com/en-en/guide-for-emergency-responders) lists all models made by the Lamborghini brand. The individual rescue sheets can be downloaded directly from the model overview.

The figure shown here shows the first page of the rescue sheet for the Lamborghini Revuelto, which was created in accordance with ISO 17840-1:2022, as an example.

The latest, complete rescue sheet and all other sheets issued by Lamborghini are available from www.lamborghini.com/en-en/guide-for-emergency-responders.

Lamborghini Revuelto
V12 PHEV





- The complete body is a multi-material construction, made of Carbon Fiber Reinforced Plastic (CFRP) and aluminium.
- Conventional reinforcements are used in the doors.

Area of application

This Emergency Response Guide is valid only for last vehicles made by the Lamborghini brand.

The model range includes vehicles with gasoline-hybrid drivers.

Current Lamborghini model range	
Revuelto	 **Revuelto**
Urus	 **Urus SE**
Temerario	 **Temerario**

1. Identification/ recognition

Distinguishing features of Lamborghini models

Along with the Lamborghini logo with the bull, the individual models can also be identified by the respective body shape, body size, and individual vehicle design. In addition, the model's name and the lettering on the side of the vehicle can also help with identification. The lettering is not there, however, if its removal was requested upon purchase, or it was subsequently removed.

Lamborghini logo



Lamborghini logo on the hood



Lamborghini lettering on the rear of the vehicle

Model name



Model name on the side of the vehicle

Classification of the type of electric drive at Lamborghini

After an accident, high-voltage vehicles present different hazards to first and second responders than vehicles with a conventional drive. This is why it is important to be able to recognize these vehicles on the scene.

Lamborghini offers gasoline-hybrid models. This type of vehicle is named PHEV (Plug-in hybrid electric vehicle) and is characterized by an external charging socket.

	Plug-In-Hybrid
Voltage	400
Electric motor	110-220 kW
Electric driving range	10-60 km
Source of energy	
Examples	Revuelto Urus SE Temerario

Key for energy sources

Symbol	Designation
	Conventional fuels such as gasoline and diesel fuel
	Battery operation
	Battery operation with charging option using a socket

Distinguishing features of high-voltage vehicles

1. Features on the outside of the vehicle

Lamborghini hybrid models do not have “hybrid” emblems on the vehicle exterior, or any other badges that would indicate the vehicle contains an electric drive. Therefore, it is necessary to identify the specific model to make certain that the vehicle has a hybrid powertrain.

Charging socket for high-voltage vehicles

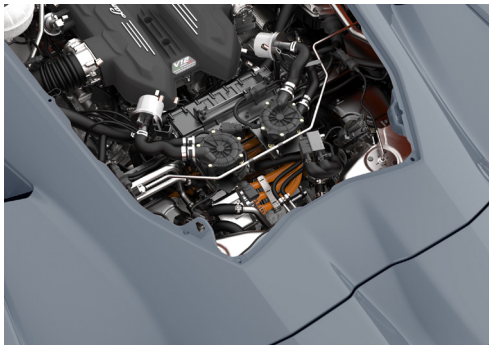


Charging socket on the rear side panel of Urus SE and Temerario.

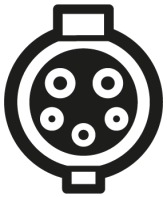
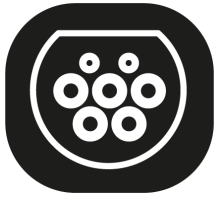
2. Features in the engine/motor compartment/frunk

- Orange high-voltage cables.
- All high-voltage cables and high-voltage connectors in visible areas are fitted with orange insulation. The cables may, however, be concealed by covers.
- Internationally standardized warning labels for high-voltage technology.

Features in the engine/motor compartment/frunk

	Orange high-voltage cables in the engine/motor compartment
	Charging socket of Revuelto in the frunk

Different charging sockets

	Charging socket type 1 AC (e.g. in NAR, South Korea, Japan)
	Charging socket type 2 AC (e.g. in the EU)
	Charging socket type GB/T AC (e.g. in China)

3. Features in the vehicle interior

- Electric vehicle-specific displays in the instrument cluster.
- EV mode button on the steering wheel.
- EV controls on the center console.

Features in the vehicle interior

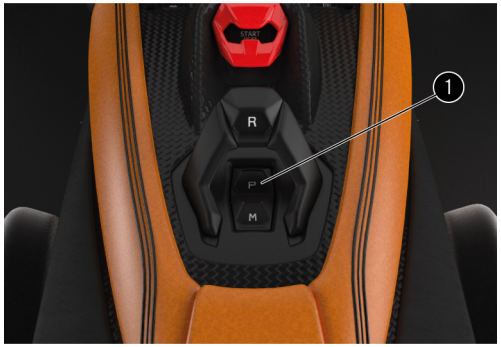
	Digital instrument cluster
	EV mode button on the steering wheel of Revuelto and Temerario
	EV controls on the center console of Urus SE

2. Immobilization/ stabilization/lifting

Prevent the vehicle from rolling away

Lamborghini models are equipped with an automatic transmission which has whether automatic or manual driving mode.

To prevent the vehicle from rolling away or unintentionally driving away, as a first step, the gearbox must be shifted in “Neutral” position and the “P” button (1) must be pressed.



“P” button of Revuelto and Temerario



“P” button of Urus SE

In the second step, the electromechanical parking brake (1) must be engaged.



Switch for the electromechanical parking brake of Revuelto and Temerario



Switch for the electromechanical parking brake of Urus SE

Switch off the ignition

No conventional ignition lock is installed in vehicles with Keyless entry system with push-button start. Drivers only need to have the vehicle key on their person.

The “START ENGINE STOP” (1) button is used to switch the ignition on or off and to start or stop the motor.

The “START ENGINE STOP” button is installed in the center console.



START ENGINE STOP button of Revuelto and Temerario



START ENGINE STOP button of Urus SE

⚠	The electric motor in vehicles with a high-voltage drive is silent. The full electric drive is ready if “READY” is displayed on the instrument cluster, also in park position “P”. When “P” is not engaged, also “EV” is displayed on the instrument cluster to denote electric traction. 
⚠	If the “START ENGINE STOP” button is pressed and the brake pedal is pressed at the same time, the vehicles may switch to drive-ready mode! Observe the information on the rescue sheets!

Lifting the vehicle

Vehicle-specific lifting points and prohibited points are indicated on the rescue sheets.

	When vehicles have been damaged in an accident, the first and second responders will decide on the scene which points may be used to lift the vehicle.
	If possible, lift the vehicle at the lifting points indicated.
	The position of the suitable lifting points are shown on the rescue sheets.

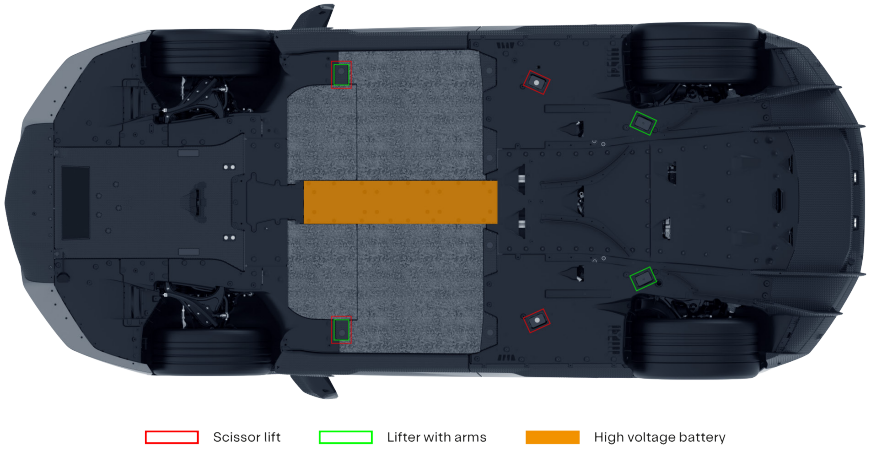


Illustration of suitable lifting points of Revuelto

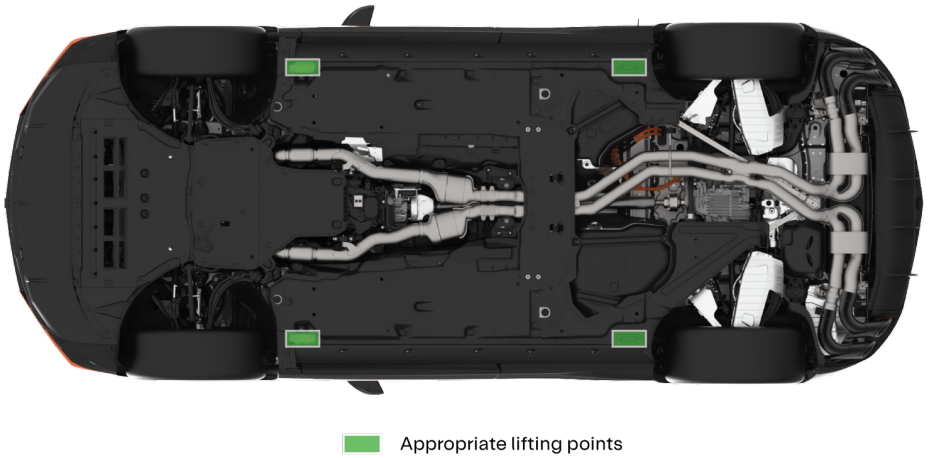


Illustration of suitable lifting points of Urus SE

3. Disable direct hazards/safety regulations

12 V electrical system

As the range of vehicle equipment available becomes more and more extensive, the number of power consumers also increases, making several energy storage devices necessary.

This also has an impact on rescue operations, as additional points need to be observed when deactivating the vehicle electrical system (switching off the ignition, disconnecting the batteries).

	Before performing any procedure, make sure the vehicle is powered OFF.

Switch off the ignition

The procedure for “switching off the ignition” is explained in chapter 2, “Immobilization/stabilization/lifting”.

12 V battery disconnection

Deactivating the vehicle electrical system reduces the risk of fire due to short circuits, but also the risk of any subsequent activation of airbags, seat belt pretensioners.

	When the 12 V vehicle battery has been disconnected, all functions of the vehicle electrical system stop operating (applies in particular for the emergency flashers and electric seat adjustment). Observe the additional information in chapter 4 “Access to the occupants” and chapter 9 “Important additional information”.

If the battery is to be fully disconnected, disconnect the ground/negative battery terminal, or otherwise there is risk of short circuit.

The negative terminal cable should be safeguarded against accidental repeated contact by isolating, securing or bending the cable away from other components.

After disconnection make sure to test and confirm that the vehicle’s electrical system is completely powered down and no longer energized.

	The position(s) of the 12 V vehicle battery/batteries is/are shown on the rescue sheets.
	It is also necessary to disconnect the battery when the batteries feature a pyrotechnic isolator in order to fully de-energize the vehicle.

For high-voltage vehicles: Disconnect devices for deactivating the high-voltage system

These disconnect high voltage devices, also called emergency cut-off points, provide first and second responders with an easy access option to deactivate the high-voltage system without risk.

In the event of accidents in which airbags are deployed, the high-voltage system is automatically deactivated. It takes a few seconds for the high-voltage system to be de-energized.

	The high-voltage system and the vehicle electrical system only need to be isolated if the vehicle can no longer be driven using its own power.

As a rule, there are at least two disconnect high voltage devices – one at the vehicle front end and one in the interior or in the luggage compartment. At least one of them should be accessible regardless of the accident scenario.

These disconnect high voltage devices, which are marked by yellow labels, only conduct the 12 V vehicle electrical system voltage and can therefore be disconnected by the first and second responders without risk when they follow the procedure described on the labels.

	Operating and disconnect high voltage device only deactivates the high-voltage system. Safety systems such as airbags or seat belt pretensioners will still be supplied by the 12 V vehicle electrical system.
	The position of the disconnect high voltage devices and the procedure for deactivating the vehicle are specified on the rescue sheets issued by Lamborghini.

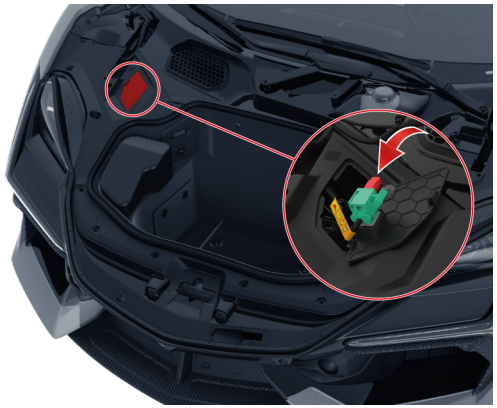
	The electric motor in vehicles with a high-voltage drive is silent. This is why it is particularly important to deactivate the vehicle when dealing with high-voltage vehicles. Observe the information on the respective rescue sheets.
	After operating the disconnect high voltage device, it takes a few seconds until the high-voltage system is de-energized. When airbags are deployed, the high-voltage system is automatically de-energized. No additional waiting time is necessary for the first and second responders. One of the disconnect high voltage devices that is accessible can also be opened to verify this.
	Even after the high-voltage system has been deactivated, there is still voltage inside the high-voltage battery. This is why the high-voltage battery may therefore neither be damaged, nor be opened, when performing rescue measures. If the high-voltage battery has been damaged by the accident, make sure to avoid contact with the high-voltage battery or any fluids or vapors that escape from the high-voltage battery!

Disconnect high voltage device in the engine/motor compartment/frunk

A feature called the low-voltage service disconnect in the engine/motor compartment is used as a disconnect high voltage device for the high-voltage system in plug-in vehicles (PHEV).

The connector has a green connector housing and a tab to release it.

A yellow label on the connector cable clearly indicates that the connector is a disconnect high voltage device.



Disconnect high voltage device in the frunk of Revuelto and Temerario

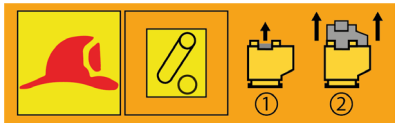
Procedure for deactivation of the high-voltage system using the disconnect high voltage device:



Pull out the red tab



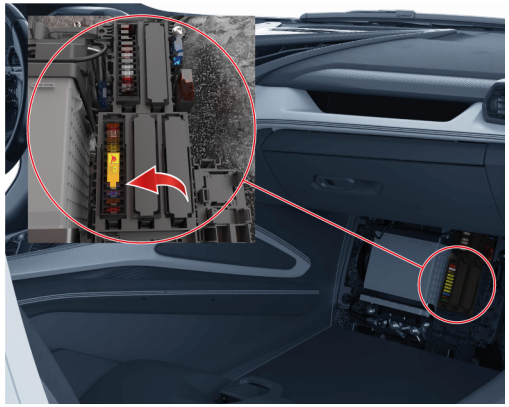
Press and hold the red tab and while doing so, pull out the black connector until it locks in place.

	Label for the disconnect high voltage device in the engine/motor compartment

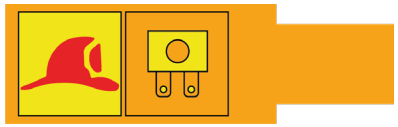
Disconnect high voltage device in the passenger compartment

An additional disconnect high voltage device is located on the fuse panel (in the interior near the instrument panel or in the luggage compartment), and the respective fuse is marked by a yellow flag. Disconnection and therefore deactivation of the high-voltage system is carried out by pulling the marked fuse out of its slot.

This also opens the contactors in the high-voltage battery, which disconnects the battery from the remaining high-voltage system, taking a few seconds until it is de-energized.



Disconnect high-voltage device (fuse) of Revuelto and Temerario located in the fuse panel in the passenger compartment

	Label for the disconnect high voltage device in the passenger compartment or luggage compartment (fuse on the fuse panel)

For vehicles with 48 V technology

Today's vehicles have intelligent drive systems and a large number of assistance systems. Depending on the model type and equipment, along with the 12 V vehicle electrical system, an additional 48 V vehicle electrical system is installed.

A number of examples of use are:

- Roll stabilization
- Advanced start/stop mode using a belt-driven start-alternator

Lamborghini models which are equipped with 48 V system have a supercapacitor to supply roll stabilization as a example.

48 V system cables and their insulation is identified by the warning color orange.

	In the event of accidents involving airbag deployment, the 48 V vehicle electrical system is automatically deactivated.

In all other cases, along with the 12 V lead battery, the 48 V system must be disconnected to deactivate the entire vehicle electrical system.

	The ignition must be switched off before disconnecting the supercapacitor!

To minimize the risk of an electric arc, the following procedure is recommended:

- After locating the batterie and supercapacitor (see rescue sheet), the negative terminal of the 12 V lead battery must be disconnected in the first step.
- Disconnecting the communication connector before disconnecting the negative terminal is recommended.

	The exterior of the vehicles with 48 V technology does not differ from the 12 V version of the respective model.



Disconnection of the 48 V electrical system of Urus SE

Disconnect from the charging station (manual release of charging connect)

Because high-voltage vehicles are generally charged while parked, high-voltage charging stations to which a vehicle is connected can be found in public car parks, private carports or public or private garages.

The more high-voltage vehicles there are on the market, the more public and private high-voltage charging stations will be installed. This must be taken into account by first and second responders that are deployed to the scene of an emergency or fire when assessing the situation and defining the measures to be taken.

⚠	Public charging stations for the power supply are, under some circumstances, connected to the public high-voltage grid with a voltage of more than 1,000 V. If this is the case, correspondingly larger safety distances must be maintained when dealing with a fire.
ℹ	The necessary procedure for emergency release from the charging station is described on the rescue cards.

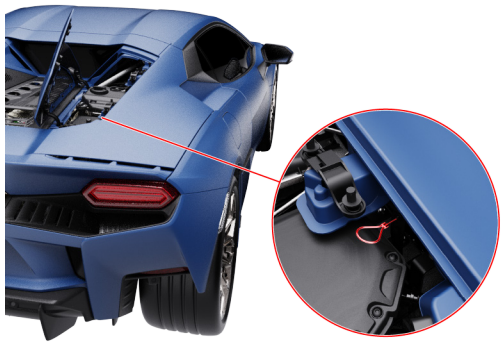
Another difference is the type of charging voltage. There are systems that charge with alternating voltage and systems that charge with direct voltage. A system with direct voltage (DC) supplies the battery directly using the charging socket. If alternating voltage (AC) is used to charge the high-voltage battery, the battery charger in the vehicle functions as a voltage converter.



Charging socket in the frunk of Revuelto



Emergency cable of Urus SE for the chargig plug disconnect



Charging socket in the rear bonnet of Temerario

4. Access to the occupants

General notes on use

Stay at arm's length

The deployment range of safety systems that have not been deployed should be kept clear. This applies in particular when heavy rescue equipment is used, or cable connections have been cut.

Neither bodies nor tools may be within the deployment range of the airbag at this time. When medically appropriate, the patient should be removed from the deployment range.

Seat belts that have been fastened should be cut or unfastened due to seat belt pretensioners that have not been deployed. If there are any rollover bars that did not deploy, their deployment range should also be kept clear.

Survey the interior

To determine the status of the safety systems, a survey of the vehicle interior must be carried out when rescue operations begin.

All airbag modules are marked by "AIRBAG" lettering. The label is usually found on the airbag module or close to it.

The side airbags installed in the backrests may also be labeled by a flag that is sewn into the backrest cover.

There are often several labels on head curtain airbags in the upper part of the vehicle pillars, or along the roof pillar.

Any seat belt pretensioners installed are not marked.

	The maximum number of airbags, seat belt pretensioners that the vehicle can be equipped with can be found in the rescue sheets.
	Labels indicating side airbags may be concealed by the seat belt or by protective covers!

Warn first responders

All first and second responders at the scene of the accident should be informed about the type and status of the safety systems encountered immediately after completing a survey of the vehicle.

This is the only way to ensure that all necessary safety rules are complied with during the rescue operations.

Battery management

The majority of Lamborghini are equipped with electrical ignition systems for the airbags and for the seat belt pretensioners. Electrical activation of the airbags by the control module for safety systems is not possible when the voltage supply has been disconnected.

To deactivate the safety systems, the vehicle that was in the accident should therefore be de-energized.

The procedure for switching off the engine/electric motor or drive and for deactivating/ disconnecting the batteries is described in chapters 2 and 3.

	The position of the batteries can be found in the rescue sheets.

Removal of the interior trim

Regardless of the design, gas generators of airbags that did not deploy, and seat belt pretensioners that did not deploy, should not be damaged.

To ensure that the seat belt pretensioners and gas generators are not damaged, the following measures are recommended:

- Removal of the interior trim.

  Before cutting vehicle pillars, the interior trim in the planned area of the cut should be removed. Any gas generators or seat belt pretensioners installed will then be visible, and a cut can be chosen that avoids damaging them.

- Checking the installation position using the rescue sheets.

  The rescue sheets should show the installation position of gas generators and seat belt pretensioners, among other items. The use of rescue equipment can be planned in a way that prevents damage to these components.

Danger at airbag components

Airbags and seat belt pretensioners that deployed

Deployed airbags can be safely moved or cut to access occupants. Use caution since the dust released after deployment can irritate the skin and mucous membranes. The vehicle interior should be ventilated when possible. Wearing protective gloves/safety goggles is recommended. Exposed areas of the skin should be washed off with water as a precaution following rescue operations.

Airbags and seat belt pretensioners that did not deploy

Do not damage gas generators of airbags that did not deploy. Do not cut into airbag modules.

- Avoid any damage to the control module for safety systems over the course of rescue operations. The location of the control module can be found in the rescue sheets. As a rule, the control module is installed on the center tunnel, near the shift lever.
- Avoid exposing airbag modules to heat, e.g. by using flame cutters. The gas generator in the airbag has a self-ignition temperature of approx. 200°C. Use caution. Airbags can deploy after being exposed to heat for long periods.
- Use caution to not damage seat belt pretensioners that did not deploy.



There is a description in chapter 9, “Important additional information”, that specifies which safety systems (airbags, seat belt pretensioners, active pedestrian protection system) are installed in today’s vehicles.

Body reinforcements

A higher level of safety for the vehicle occupants can be achieved by means of a passenger cell that is designed for rigidity in particular.

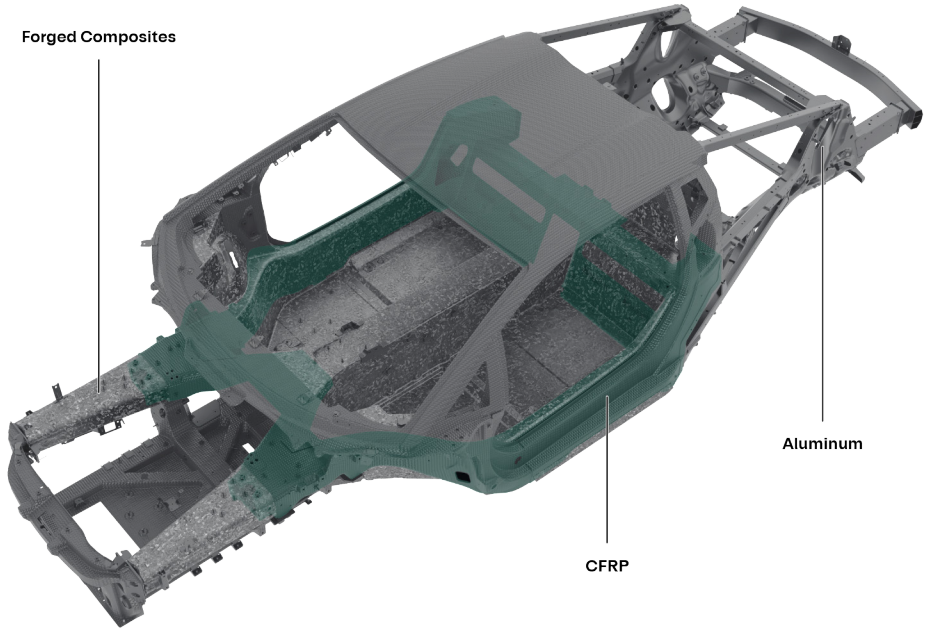
Higher-strength and hot-formed steels, thicker walls and a multi-layer shell is used in vehicle construction. These areas should be primarily avoided when rescuing vehicle occupants that were involved in an accident in today's vehicles, and correspondingly powerful hydraulic cutting equipment must be used.



Body with reinforced passenger cell

Lamborghini vehicles utilize CFRP (Carbon Fiber Reinforced Plastic) located at the chassis, front structure, full upper and lower panels of the monocoque and rocker panels.

The rear structure consists of high strength extruded aluminum. The rear shock towers are constructed with hollow casting technology.



Body multi-material construction of Revuelto

⚠	Hot-formed steel can only be cut using powerful cutting tools.
ℹ	Information on the position of reinforcements can be found in the vehicle-specific rescue sheets.

▬	Indicates high-strength areas on the rescue sheets.

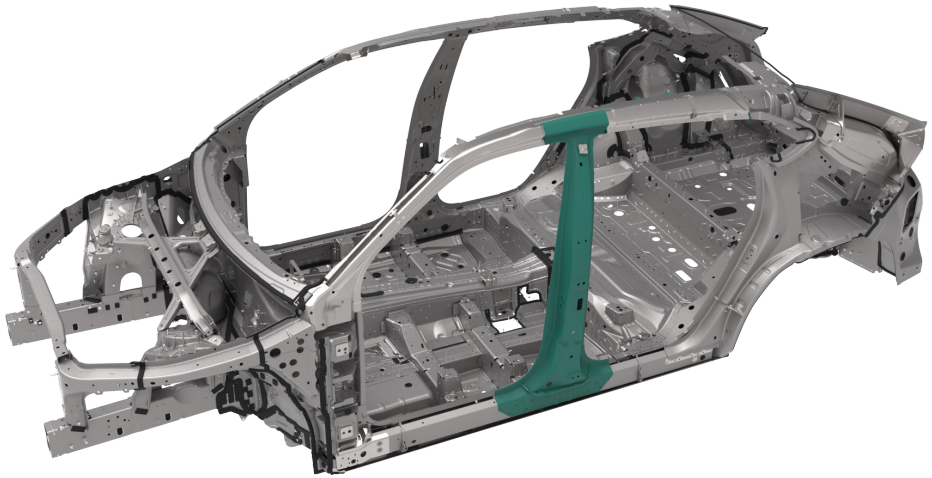
The side members

Special steels are used in today's vehicles to reinforce the side members. These are used to increase safety in the event of side collisions, especially in the event of a collision with a pole.

The B-pillar

The B-pillar in particular is reinforced by the use of higher-strength and hotformed sheet metal and a multi-layer shell. In addition, today's B-pillars have a larger cross-section.

The pillar is additionally reinforced in the area of the belt guide, making it more difficult to cut it. Therefore, these areas should be specifically circumvented.



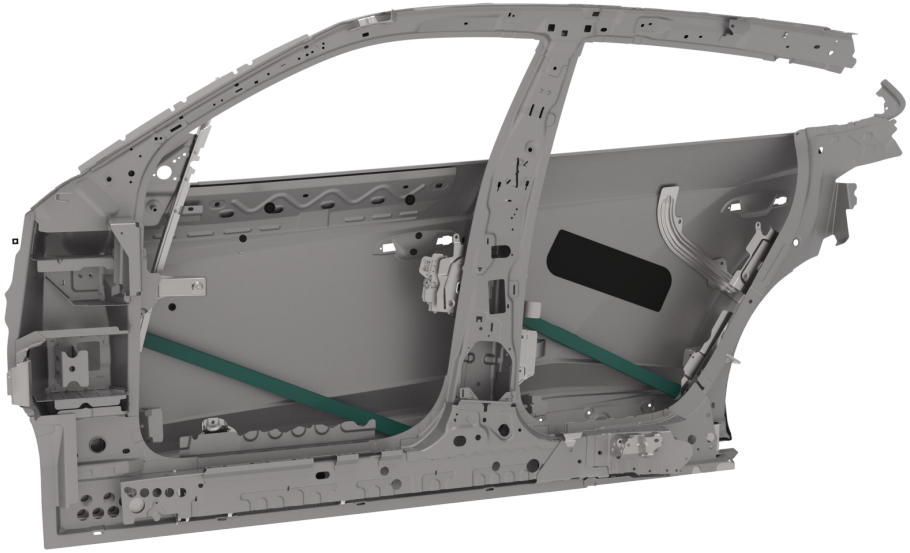
B-pillar with multi-layer shell

	It is easiest to cut through vehicle pillars in the area above the safety belt height adjuster! The lower part of the pillar can also be cut through, but it should be noted that the cross-section of the pillar is very large, and that the seat belt pretensioner is usually located here.

Side impact protection

Side impact protection is installed in the doors. The tubes or profiles are installed horizontally or diagonally behind the outer door panels.

These high-strength profiles can be cut using high-power cutting devices.



Side impact protection in the doors

	The position of specific reinforcement measures in the individual vehicles can be found in the rescue sheets!

Glazing

Lamborghini windows are made of single pane safety and laminated safety glass. The windshield is made of laminated safety glass and the side and rear windows and panoramic roofs are made of single pane safety glass.

Single pane safety glass

Single pane safety glass is tempered glass that can withstand high loads. If the load is too high, it bursts into many pieces.

Single pane safety glass is used for side windows.

	Intact windows can suddenly burst during rescue operations on the vehicle. Depending on the accident situation and the extent of the rescue operations, the windows should be removed first. Windows can be removed by means of a point load, e.g. with a spring center punch or an emergency hammer. The windows should be secured first.

Laminated safety glass

Laminated safety glass consists of two glass panes and an intermediate layer of film. The panes of glass remain largely intact when damaged. They are used for windshields and for side windows in some cases. The windshields are bonded to the body.

	As laminated glass windows cannot suddenly burst, they only have to be removed if it is necessary for the rescue operations. Laminated glass windows can be removed using special glass saws or hooligan tools.



Single pane safety glass



Laminated safety glass

	Protect the occupants from shards of glass before removing the glass panes.
	Information about the window versions installed are also described in the respective rescue sheets for the newer models.

Doors opening by handle

The Lamborghini high performance vehicle can have the hidden handles, therefore it's very important to know their position.



Position of the Revuelto handles

Seats and steering wheel height and forward/ back adjustment mechanisms

The seats and steering columns in Lamborghini vehicle models can be operated either mechanically or electrically.



Electric seats adjustment

1 Lumbar support adjustment

2 Backrest adjustment

3 Forward/back and height adjustment



Manual sport seats adjustment

1 Forward/back adjustment

2 Height adjustment

3 Tilt adjustment



Electric steering wheel position adjustment



Manual steering wheel position adjustment

Electric convenience systems

Depending on the model series and vehicle equipment, Lamborghini vehicles feature a large range of convenience systems that are operated electrically, such as:

- Electric doors
- Window regulators
- Electric sunroof
- Electric seat adjustment
- Electric steering column adjustment
- Electric release, opening and closing of the luggage compartment

After disconnecting the battery/batteries, these systems cannot be operated!

	In the event of accidents in which airbag deployment occurs, electrically operated doors and flaps are automatically unlocked.
	To the extent possible, the electrical convenience systems should be used to help with rescue operations before disconnecting the battery!
	The battery should only be reconnected to the vehicle electrical system by workshop personnel.

5. Stored energy/ liquids/gases

Energy storage device for vehicle drive

Lamborghini models comes with different drive concepts. Depending on the drive concept, fuel tanks (gasoline), batteries, or supecapacitors are installed in the vehicle as energy storage devices or fuel tanks.

Hybrid vehicles not only have a high-voltage battery but also a fuel tank.

Regardless of the drive system, each vehicle has one or several low-voltage batteries or supercapitors for the vehicle electrical system.

	The installation position of the fuel tank and batteries or supercapacitor are shown in the rescue sheet.

Vehicle with a high-voltage system

In the context of vehicle technology, the following voltage levels are referred to as “high voltage”:

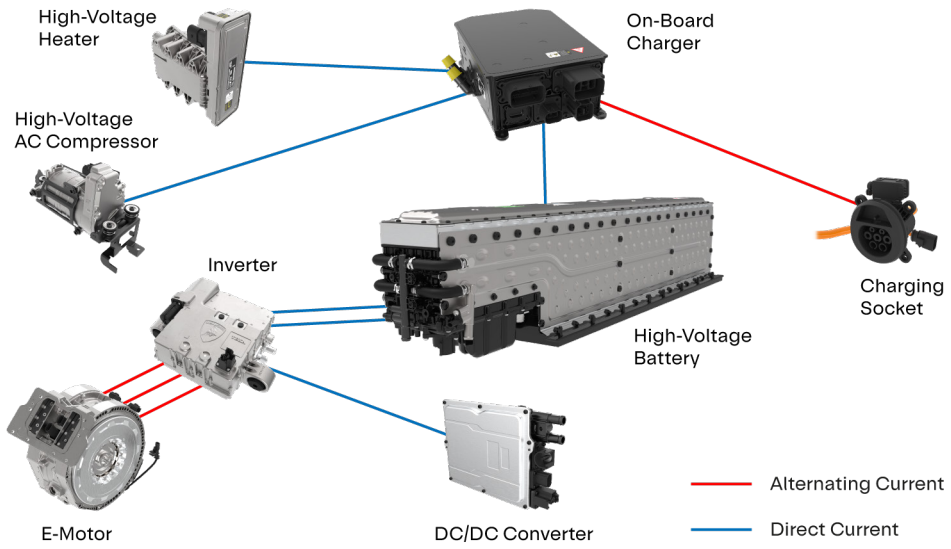
- Greater than 60 volts for direct current (DC)
- Greater than 30 volts for alternating current (AC)

High-voltage components

Along with the high-voltage battery, the electric motors, the external charging socket and the high-voltage distributor/control unit, which is known as the power electronics, a number of auxiliary units such as the high-voltage air conditioner compressor and supplementary heater are operated using high voltage and are connected to each other by high-voltage cables. All high-voltage cables or the high-voltage connectors have been fitted with orange insulation in the visible areas.

The components listed may also be installed in a vehicle multiple times. All other electrical components, such as lighting, vehicle electronics etc. are supplied with power from the 12 V vehicle electrical system.

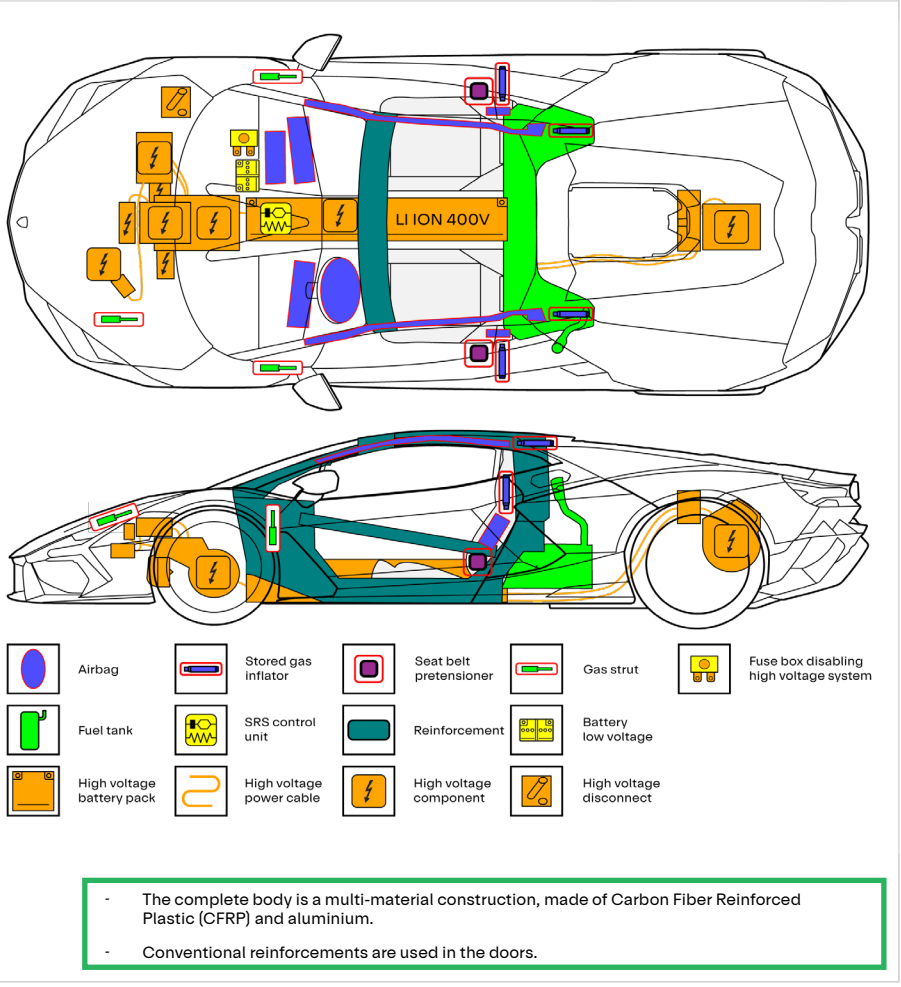
Example of Lamborghini high-voltage system:



The installation positions of the high-voltage components and the route taken by the high-voltage cables are shown in the rescue sheet.

Lamborghini Revuelto
V12 PHEV





- The complete body is a multi-material construction, made of Carbon Fiber Reinforced Plastic (CFRP) and aluminium.
- Conventional reinforcements are used in the doors.

High voltage safety concept

The electrical components in the vehicle, such as the power electronics, the electric motor, the high-voltage battery and auxiliary units such as an electric air conditioner compressor operate in a voltage range that is higher than 60 volts of direct current (DC). They are connected using high-voltage cables and their insulation is identified by the warning color orange, as the voltage level and the hazard potential is higher than it is for the usual direct current (DC) from the 12 V or 48 V system in conventional vehicles.

All cables that conduct direct current of more than 30 volts are also identified by the warning color orange.

If handled incorrectly, the high voltage in the high-voltage system presents a potential hazard. The vehicle therefore has a comprehensive safety concept.

The key principles of the safety concept are explained in the following chapter.

Touch protection

All connections (plugs, flange receptacles) at the high voltage components of the vehicle are safe to touch.

Galvanic isolation

The high voltage system is galvanically separated from vehicle earth. That means that there is no direct electric connection between the high voltage poles and the car body.

Insulating monitoring

The BMS (Battery Management System), located inside the HV battery system, monitors the insulation resistance of the vehicle. In the event of loss of insulation, the BMS will open the high voltage contactors.

5. Stored energy/liquids/gases

Voltage and temperature monitoring

The BMS reads the voltage and temperature of individual HV battery cell modules and limits the maximum current that can be delivered from the battery to the system, depending on the read values.

Temperature is critical for the battery and for this reason is constantly monitored on the various modules and directly controlled also by the cooling system.

The normal operation range is -28°C to +60°C. At 60°C the current supply is limited to zero, at 65°C contacts are opened reversibly and at 80°C contacts are opened permanently (shut off).

Short-circuit detection

A short-circuit detection/fuse is integrated in the battery system (precisely in the BJB) as an over-current protection. If it trips, the current flow will be interrupted.

Discharge of residual voltage

In case of an accident with airbag activation or after an unexpected malfunction the discharge circuit ensures that the high voltage system is free from voltage after approx. 60 seconds.

Disconnection in case of crash

In case of an accident with airbag activation, the airbag control unit sends a crash signal to the high voltage battery to activate the pyrofuse. The pyrofuse of the high voltage battery activates, the high voltage line is interrupted and the high voltage system outside the battery discharges.

However, responders should always assume that the high voltage system is powered on and must take the appropriate action described in this guide to power off the system.

	Improper handling of high-voltage components and high-voltage cables present a danger to life due to the high voltage and the flow of current through the human body that could potentially occur.
	Even after deactivation of the high-voltage system, there is still voltage in the high-voltage battery. The high-voltage battery must not be damaged or opened. Danger to life!
	When working with hydraulic rescue equipment, when lifting, stabilizing, towing or pulling the vehicle, the position of the high-voltage components and high-voltage cables must be observed (see vehicle-specific rescue sheet).
	Do not touch, cut or open any damaged high-voltage components and/or high-voltage cables! Wear appropriate protective equipment! Cover any damaged components with suitable equipment, e.g. insulating blankets.
	It takes a few seconds for the high-voltage system to be de-energized after shutdown/deactivation.

Warning labels for high-voltage components

All high-voltage components are marked by clear warning stickers. The high-voltage cables are an exception, as they are immediately visible due to the orange warning color of the cable sheaths.

Three types of warning stickers are used:

Yellow stickers with the warning symbol for electrical voltage

Stickers with the “Danger” lettering on a red background

The yellow stickers indicate the high-voltage components that are installed near the sticker or hidden under covers.

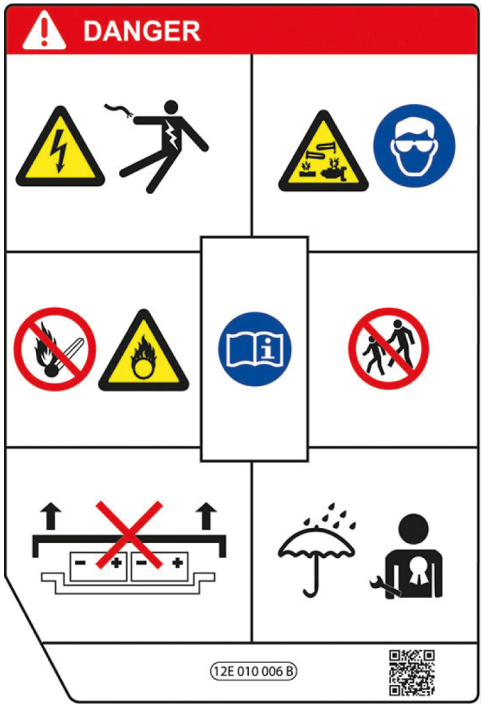
The warning stickers with the “Danger” lettering identify the high-voltage components directly.



Examples of warning stickers in high-voltage vehicles









The high-voltage battery

High-voltage batteries are rechargeable batteries. Different battery types are used depending on the manufacturer and the vehicle. They differ in the chemical components used in the battery cells for anode, cathode, and electrolyte, as well as the structure of the battery cell (round, prismatic, pouch).

The high-voltage batteries used at Lamborghini are lithium-ion batteries. The high-voltage battery is placed in a stable housing in areas in the vehicle that provide the best protection against deformation in most crash situations. The sizes and the fitting locations of the high-voltage batteries differ according to vehicle type. A fully electric vehicle requires a larger high voltage battery than a hybrid vehicle.

The high-voltage battery is usually bolted under the center of the vehicle as a load-bearing body component in electric vehicles. The high-voltage battery is usually found in the rear vehicle area (in front or behind the rear axle) in hybrid vehicles.

The high-voltage battery in both hybrid and electric vehicles is comprised of battery cells connected in series which, in turn, are interconnected to form modules. Several modules are installed in a metal housing together with the peripheral equipment. The housing is connected to the vehicle by an equipotential bonding cable.

All high-voltage batteries are installed in a sturdy housing to protect the battery cells in the event of an accident and avoid the escape of battery electrolyte from defective battery cells.

	Depending on the vehicle version/equipment, the high-voltage battery may be comprised of several battery packages.

	In addition to the high-voltage battery, Lamborghini electric vehicles also have one or several 12 V vehicle electrical system batteries.
	Due to the large number of different battery types with their different chemical components and due to the ongoing developments in rechargeable battery technology, the specific hazards and potential reactions associated with batteries cannot be explained in detail in this guide.

In the event of damage to, or overheating of, the high-voltage battery, exothermic chemical reactions may occur (thermal runaway): these reactions cause the battery cells to heat up quickly. This causes the battery to begin to burn and toxic vapors to be released.

Important information about this can be found in chapter 6, “In case of fire”.

Information on how to deal with the energy stored in the battery is also included in chapter 8, “Towing/transportation/storage”.

Lithium-ion battery disconnected from the vehicle

If the high-voltage energy storage device and/or parts of it are disconnected from the vehicle in the event of an accident, it can be assumed that the high-voltage energy storage device presents an electrical, chemical, mechanical and thermal hazard.

The following points must be observed:

	If high-voltage energy storage devices, high-voltage components or high-voltage cables are damaged, e.g. there are open components or torn cables, then contact with these damaged areas must be avoided at all costs!
	When working with hydraulic rescue equipment, when lifting, stabilizing, towing or pulling the vehicle, the position of the high-voltage components and high-voltage cables must be observed (see the vehicle-specific rescue sheet).
	If work in these areas cannot be avoided, then damaged parts or high-voltage energy storage devices must be covered so they are electrically insulated. In this case, using an electrically insulated, malleable blanket is recommended (undamaged plastic film or another suitable, electrically insulating blanket, e.g. in accordance with IEC 61112).

When a high-voltage energy storage device has been disconnected from the vehicle, there may still be other parts of the overall energy storage system in or on the vehicle.

Components of high-voltage energy storage devices that have been disconnected may only be lifted from the ground with electrically insulating equipment!

	Escaping electrolytes from damaged high-voltage insulation are irritating, combustible and potentially corrosive. Please wear the corresponding protective equipment!

Liquids that escape from high-voltage energy storage devices are usually coolants.

There are only small volumes of electrolytes (milliliters) in the individual cells.

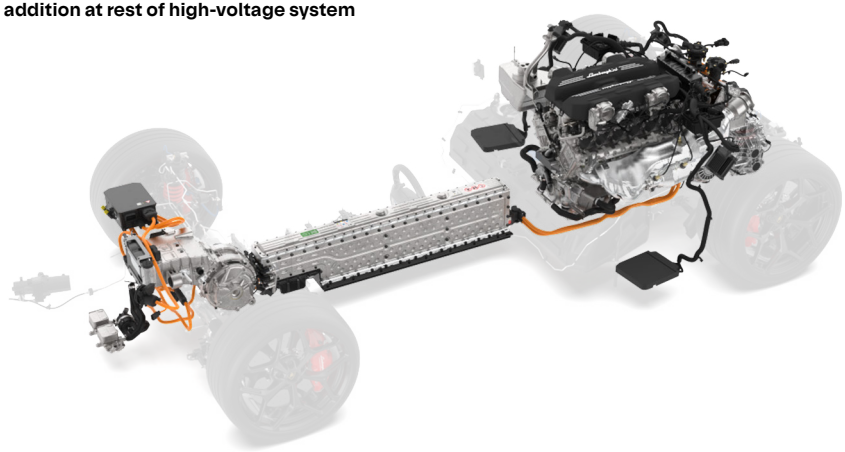
	Work should only be carried out with the helmet visor folded down to protect the face.

5. Stored energy/liquids/gases

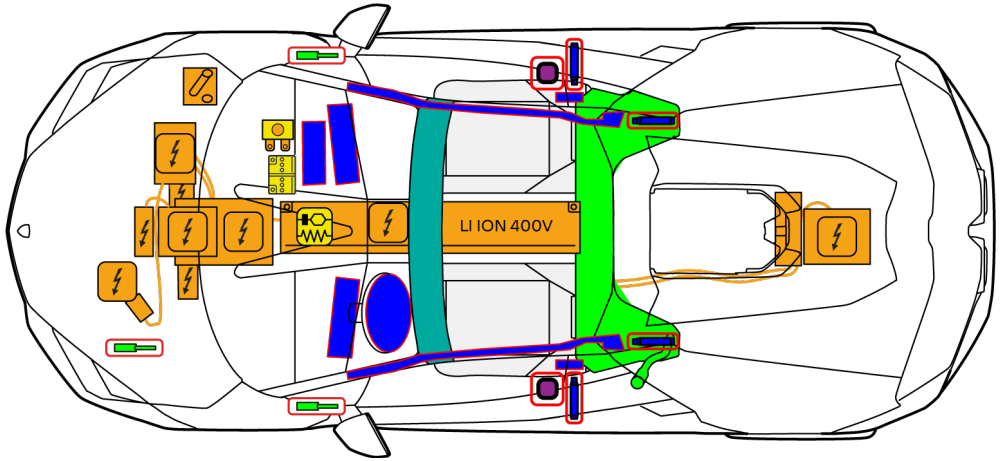
The following image shows an example of installation concepts for the high-voltage battery in Lamborghini vehicles. The exact installation position of the high-voltage battery can be found in the rescue sheet for the respective model.

Installation concepts for high-voltage battery

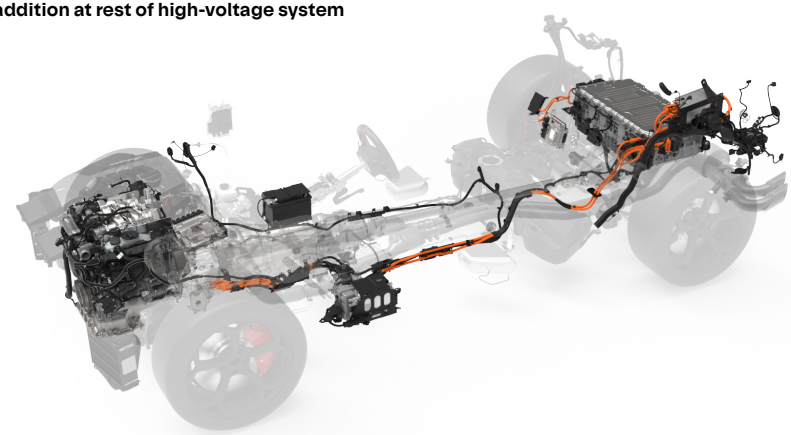
High-voltage battery in the underbody of Revuelto with addition at rest of high-voltage system



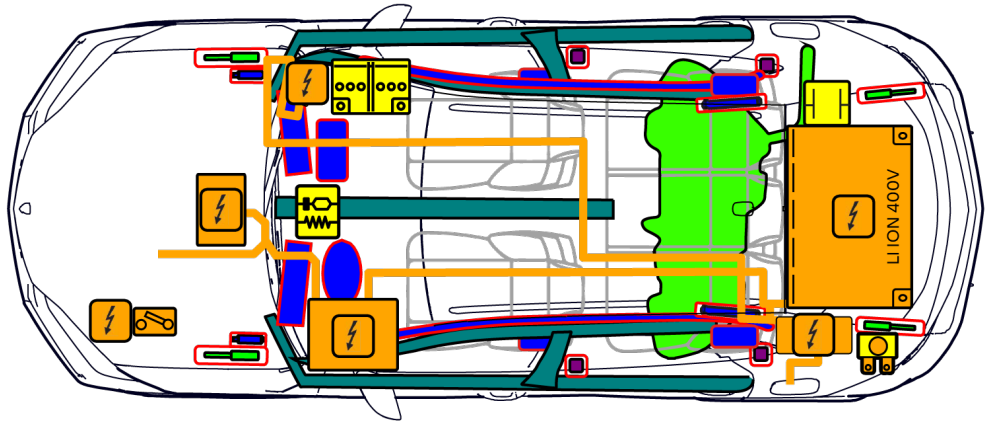
Lamborghini Revuelto rescue sheet



High-voltage battery in the underbody of Urus SE with addition at rest of high-voltage system

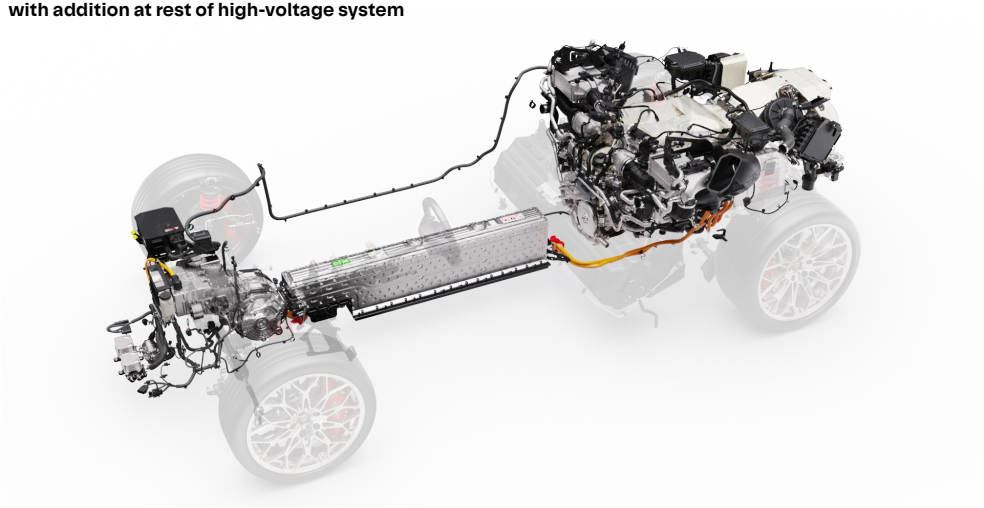


Lamborghini Urus SE rescue sheet

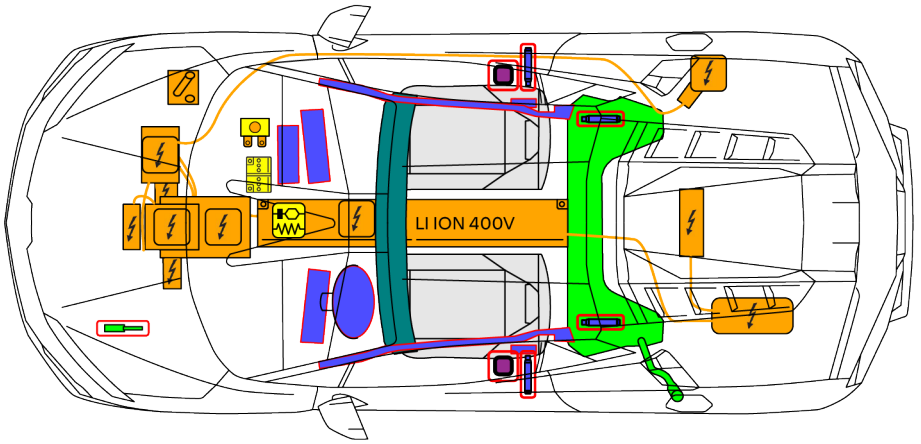


5. Stored energy/liquids/gases

High-voltage battery in the underbody of Temerario with addition at rest of high-voltage system



Lamborghini Temerario rescue sheet



Battery information, general first-aid measures and aspects relevant to environmental protection:

Under normal operating conditions, the battery presents no danger of exposure to its content.

	In the event that coolant escapes from the battery cooling system, there is a risk of a thermal reaction in the high-voltage battery. Monitor the temperature of the high-voltage battery!
	Avoid skin contact and inhaling electrolyte vapors as electrolytes are combustible, corrosive and irritant. Please wear the corresponding protective equipment!
	Contaminated extinguishing water is dealt with in accordance with the country-specific procedure for first and second responders.

A/C system

Refrigerants R1234yf is used for the A/C systems.

Compressed air tanks

Compressed air tanks for e.g. the air suspension or A/C systems are installed in a number of Lamboghini models. Do not damage these compressed air tanks or open them using force!

Flammable materials

These include, for example:

- Plastics
- Electrolytes
- Resins
- Gases or other flammable liquids

6. In case of fire

Vehicle fire

In the event of a vehicle fire, all country-specific regulations, work instructions, authorities, and firefighting associations guidelines must always be observed and followed. If possible, the fire must be prevented from spreading to energy storage devices (fuel tanks, battery).

All standard and conventional extinguishing agents such as water, foam, CO_2 or powder can be used.

The extinguishing agent and method to use can only be decided at the scene, and this choice largely depends on the specific situation and available equipment.



If the airbags did not deploy in the accident, they may do so, if the vehicle catches fire.

Fires in high-voltage vehicles

High-voltage vehicles are generally no more dangerous to deal with than gasoline or diesel vehicles, but some aspects may be different. Knowing these differences can be important for emergency operations following car accidents.

In the event of fires involving high-voltage vehicles, a distinction must be made:

Vehicle fire that has not spread to the high-voltage battery:

- Just like a passenger car with conventional drive, a “regular” fire in a hybrid or electric vehicle (HEV or BEV, where the high-voltage battery is not on fire) can be extinguished using all standard and conventional extinguishing agents, such as water, foam, CO_2 or powder, as required.

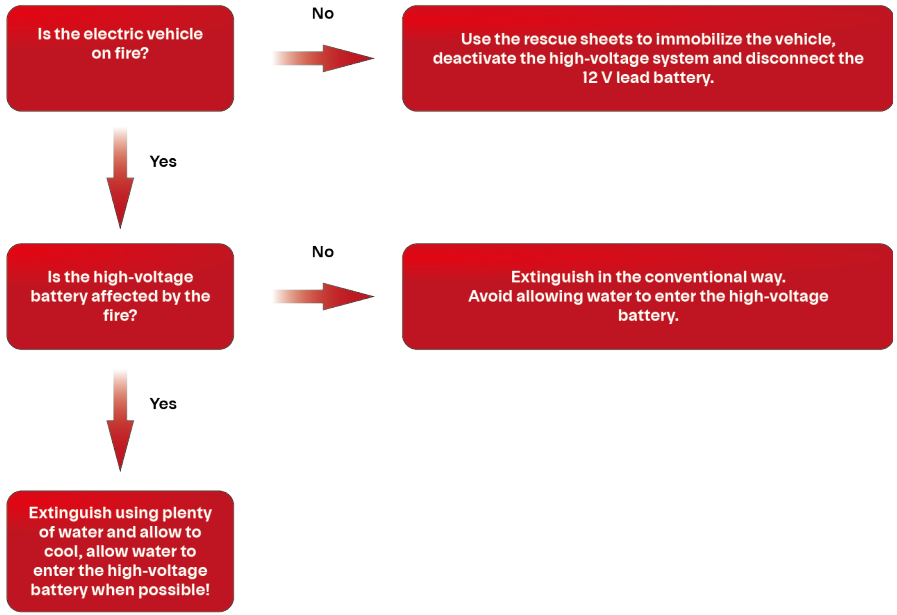
Vehicle fire that has spread to the high-voltage battery:

- Smoke, sparks or flames from the battery can indicate that the lithium-ion battery is also on fire.

  If a high-voltage battery is on fire, use water to extinguish and cool the battery. In this case make sure to use plenty of water and try to get water into the high-voltage battery through the openings caused by the fire or collision.

  The water jet should be aimed directly at the battery. The installation position of the high-voltage battery is shown on the rescue card for the model in question.

The decision for suitable measures should be made by the firefighters at the scene, since the appropriate action depends greatly on the given situation (e.g. how the fire has spread and the time arrival time of the firefighters) as well as the available equipment.



Flow chart for fires in electric vehicles

A severely damaged lithium-ion battery (for example with a crushed, broken or cracked housing) may react to the effects of water or fire quickly, or it may take some time. Therefore, when working on a vehicle with a lithium-ion battery that was in an accident, remain vigilant for signs of a reaction (smoke, heat, noises, sparks etc.).

Protective and counter-measures must be taken if there is a reaction in the lithium-ion battery.
Just as with conventional vehicles, harmful smoke is produced when electric/ hybrid vehicles catch fire. Therefore, suitable protective equipment is recommended.

6. In case of fire

Due to its safety technology, the high-voltage battery will not explode.

If the high-voltage battery catches fire, it is likely to release gas because it has mechanical safety devices that open, for example, when the temperature and pressure increase due to a fire, thereby allowing a controlled “outgassing” to relieve the pressure.

If the undamaged high-voltage battery is involved in a fire, then large amounts of water are required to cool or extinguish a reactive battery.

After a reaction, the lithium-ion battery must be cooled down with water until it is approximately the same temperature as the ambient temperature.

We recommend using a thermal imaging camera or an infrared thermometer.

It must be extinguished or cooled using plenty of water.

	After the fire has been extinguished, there may still be hazardous voltages.
	Batteries that have not completely burnt out may ignite again. Vehicles in which a fire has been extinguished must be taken to a suitable storage site and be monitored.

	Stay a sufficiently safe distance away. An appropriate self-contained breathing apparatus must be worn!
	Vapors and gases can be suppressed by spraying a jet of water.
	Exposed or defective cells may burst and cause an exothermic reaction.
	A fire may break out some time after the accident, because the residual risk of delayed ignition cannot be eliminated. This applies in particular to damaged high-voltage energy storage devices (see also section 8 “Towing/ Transportation/ Storage”). An electrical hazard is also still possible. High-voltage components must not be touched, and suitable protective equipment must be worn. High-voltage cables may have been damaged by the heat.

7. In case of submersion

Vehicle under water

A vehicle that is submerged in water must be treated the same way as a vehicle that was in an accident and has been damaged.

The safety regulations must be observed and the procedure for eliminating direct hazards must be followed, see chapter 3.

High-voltage vehicle under water

- The risk of electric shock presented by the high-voltage system is not, in principle, higher when the vehicle is in water.
- The same information that appears in chapter 3 “Disable direct hazards/ safety regulations” applies.
- The procedure for recovery is identical to the one for conventional vehicles.
- This also applies to bodies made of carbon fiber composite materials.

	When water enters the high-voltage battery, this may trigger electrolysis, which can lead to oxyhydrogen deflagration. The high-voltage system must be deactivated (see chapter 3 “Disable direct hazards/safety regulations”). Wear appropriate protective equipment!

8. Towing/transportation/storage

Recovery of vehicles that have been in accidents

When loading, transporting and storing, the information on the rescue sheets must be observed.

The vehicles are equipped with a threaded hole, covered by a plug, to be towed, and the towing eyelet can be contained in the tool kit.



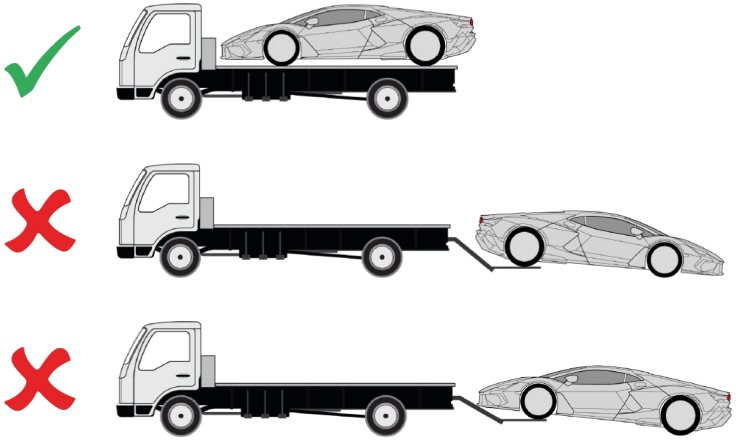
Threaded hole for the towing eyelet of Revuelto and Temerario located in the front-left of the bumper



Threaded holes for the towing eyelet of Urus SE located in the front and rear bumper

Recovery of high-voltage vehicles involved in accidents from a hazardous area

Vehicles with high-voltage batteries should, as a matter of principle, be transported away on flatbed trucks.



The high-voltage system must be deactivated before transport; see chapter 3 “Disable direct hazards/safety regulations”.

Before the vehicle is transported away (e.g. by a towing company), the condition of the lithium-ion battery must be checked again. The vehicle may only be loaded and transported away if the vehicle does not exhibit any signs of a reaction near the lithium-ion battery for an extended period, see the flow chart on the next page.

If the vehicle that was in an accident has a damaged or abnormal lithium-ion battery, the vehicle may only be loaded when the reaction has sufficiently abated and it can be assumed that no further reaction need be expected, see the flow chart on the next page.
Choose the shortest and least dangerous route possible. Avoid going through tunnels.

If required or in case of doubt, the tow truck may have to be accompanied by a fire engine.
Vehicles with a high-voltage battery that have been damaged should be transported to a safe storage site.

After transport, electric or hybrid vehicles that have been in accidents should be parked outside and not in enclosed buildings, at a sufficient distance from other vehicles, buildings, combustible objects or flammable surfaces.

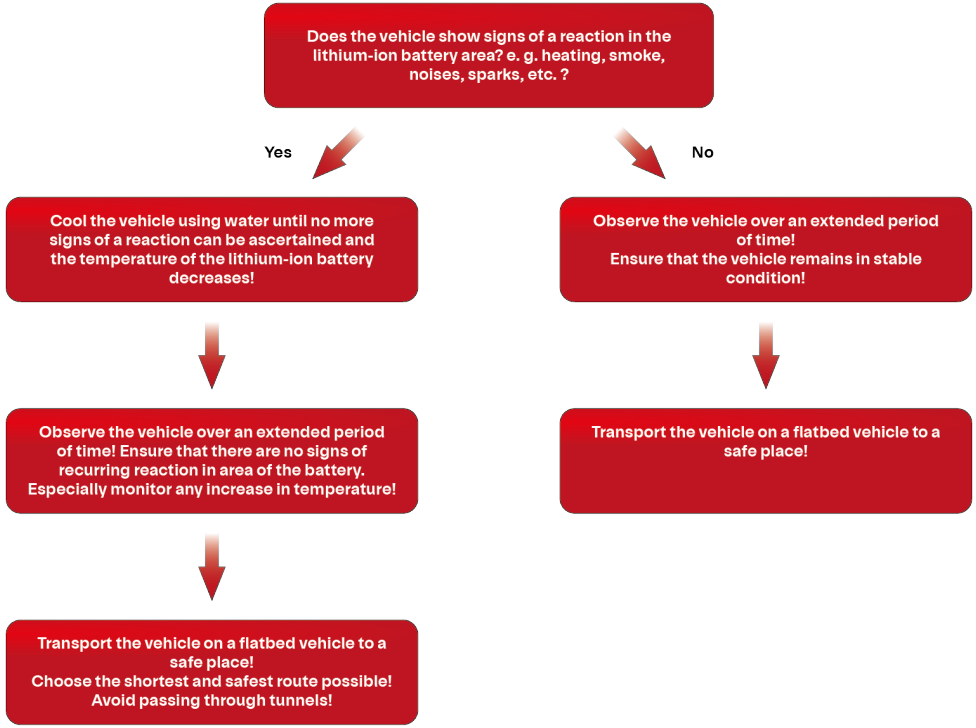
Preference should be given to the use of designated “quarantine areas” at the storage site. Because there is still a theoretical risk that the lithium-ion battery may react, the accident vehicle must be taken to a suitable outdoor site and left there. The parking site must be marked accordingly (signs/barriers). Park the vehicle at a safe distance from buildings and other vehicles in accordance with local regulations. The distance can be smaller if appropriate measures such as a fire barrier are in place.
Those responsible at the towing company, repair workshops and, if necessary, the disposal company must be told about the characteristics and hazards of the vehicle!

⚠	Lithium-ion batteries can ignite again after the fire has been extinguished!
⚠	If the vehicle has been in an accident or if the high-voltage battery is damaged or in an abnormal condition, deactivate the high-voltage system (see chapter 3). Park the vehicle at a safe distance from buildings and other vehicles in accordance with local regulations. (quarantine area).

⚠	Vibration during transport can cause high-voltage batteries to re-ignite.
⚠	Vibration during transport can cause high-voltage batteries to ignite again.
ℹ	Recommendations for specific vehicles are described on the respective rescue sheets.

The condition of the lithium-ion battery shall be checked before the vehicle is removed.

Manage or addresses „stranded energy“



Flow chart about transportation in case of fire in electric vehicles

8. Towing/transportation/storage

	Monitor the temperature using suitable devices such as an infrared camera for an extended period if possible!
	A large metal receptacle such as a container is recommended for transporting a high-voltage battery or parts of one that have been disconnected from the vehicle. The condition of the high-voltage energy storage device must be monitored (e.g. for smoke, noises, sparks, heat) and it must be ensured that the metal container can be quickly flooded with water.
	For more information, see chapter 5 “Stored energy/liquids/gases/solids” (lithium-ion battery disconnected from the vehicle).

9. Important additional information

Depending on the vehicle type and equipment version, today's vehicles can feature extensive passenger protection system.

Airbag

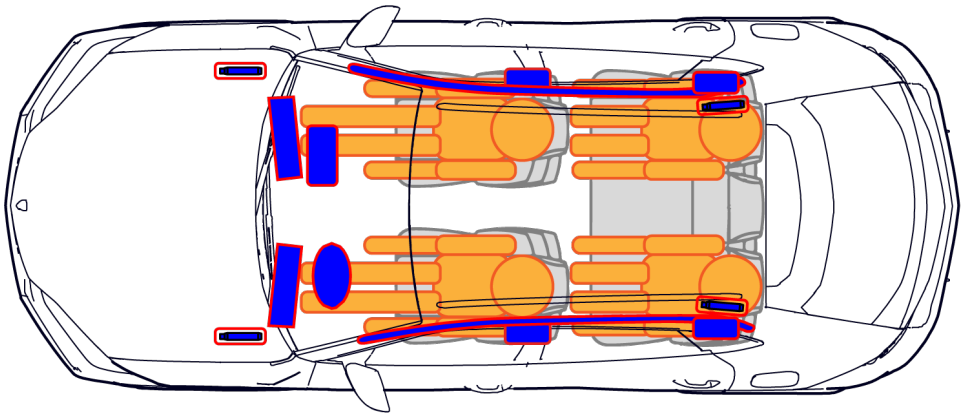
A current vehicle with the maximum equipment features will have these main \components:

- Airbags
- Airbag control unit
- Sensors
- Seat belt pretensioners and
- in convertibles, components that deploy the rollover bar

Pretensioned springs or pyrotechnics are deployed. The purpose of the electronics integrated into the airbag control unit is to detect vehicle deceleration and acceleration and to identify whether it is necessary to activate protection systems.
In addition to the sensors in the airbag control unit, sensors (e.g. crash sensors in the front doors) are used to detect vehicle deceleration or acceleration during an accident. Only once the information from all sensors has been evaluated do the electronics in the airbag control unit decide whether and when which safety components are activated. Depending on the nature and severity of the accident, only the seat belt pretensioners, for example, are deployed, or the seat belt pretensioners in combination with the airbags.

The control module is labeled in the rescue sheet as follows:

	Marking for airbag control unit in accordance with ISO 17840



Airbags position

Only those safety systems that have a protective function in the specific accident situation are activated. In addition to its main function of controlling the airbags, the airbag control unit can also have the following functions:

- Emergency release for central locking
- Switching on the interior lighting
- Switching off the fuel pump
- Switching on the emergency flashers
- Forwarding a signal for sending the e-call

Gas generators generate the quantity of gas required to fill the airbags and thereby inflate the airbags within milliseconds. The inflated airbags protect the seat-belted occupants from colliding with interior body contours (e.g. the steering wheel, the dash panel etc.) in the event of a serious accident. Depending on the installation location and requirements, gas generators are used in different designs or with different operating principles.

Airbags are labeled in the rescue sheets as a symbol, or as contours, as follows:

	Driver's airbag, front passenger's front airbag, side or center airbag, knee airbag and head curtain airbag

Front airbags

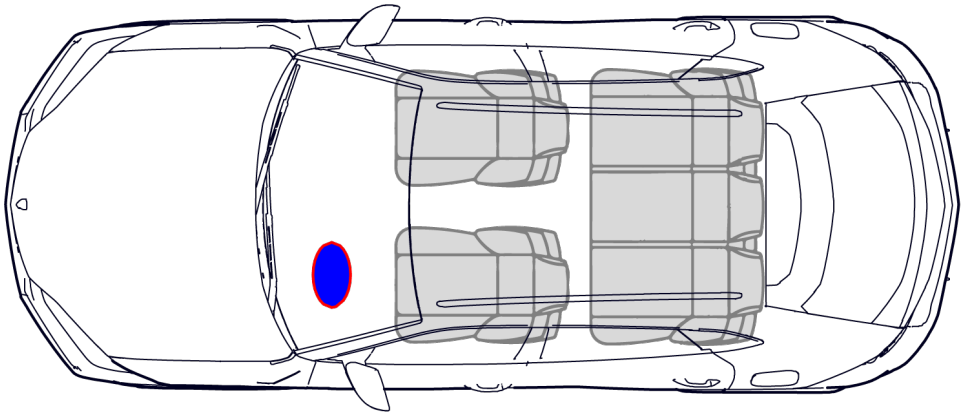
Driver's airbag

The driver's airbag unit essentially consists of a cap, an airbag and a gas generator. It is secured in the steering wheel and a contact unit provides an electrical connection to the airbag control unit.

The airbag is folded together under the cap, and its shape and size is designed to provide a protective barrier between the driver and the steering wheel once it is filled.

The driver's airbag is inflated by a gas generator. The unfolding airbag opens the cap on the steering wheel along a preconfigured tear seam and is filled with gas within a very short time. The entire process, from ignition of the gas generator to a fully inflated airbag only takes a few milliseconds.

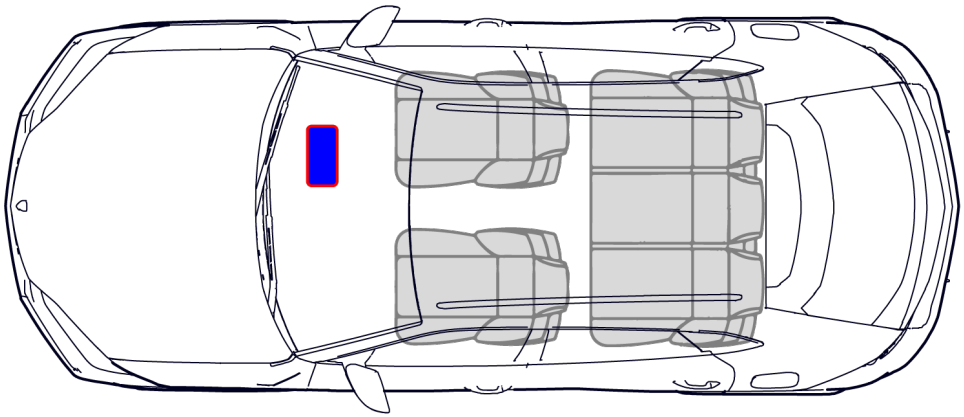
Vents on the side facing away the driver are used to reduce the kinetic energy caused by impact of the upper body by allowing the filling gas to escape evenly.



Driver's airbag position

Front passenger's front airbag

The airbag unit for the front passenger is installed in the instrument panel in front of the front passenger seat. Due to the larger distance between the airbag unit and the occupant, the airbag for the front passenger's front airbag has a significantly larger volume. The effect of the front passenger's front airbag, how it functions, and the deployment sequence are comparable to those of the driver's airbag.

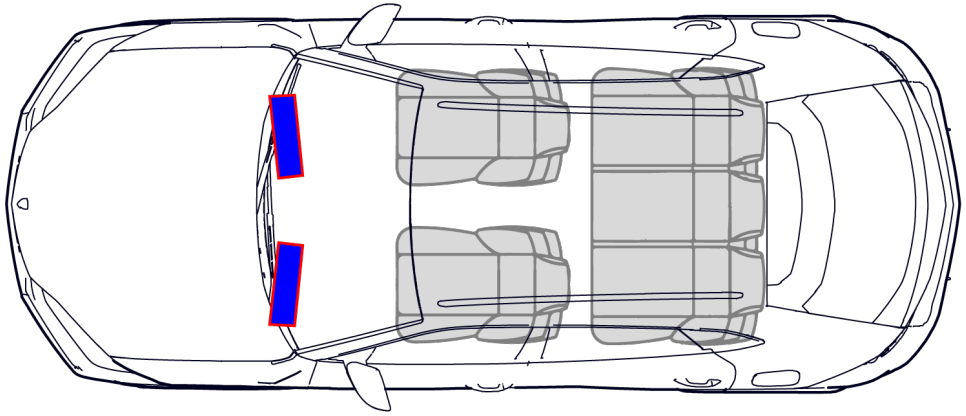


Passenger's airbag position

Knee airbags

The design of the knee airbag is comparable to the design of the front passenger's front airbag. It is installed in the footwell trim below the dash panel.

The knee airbag activates at the same time as the driver's airbag during a collision. It uses a single-stage gas generator to inflate quickly. This early deployment helps protect the occupant's knees and legs from injury and ensures that the occupant is engaged and secured sooner as the vehicle slows down.

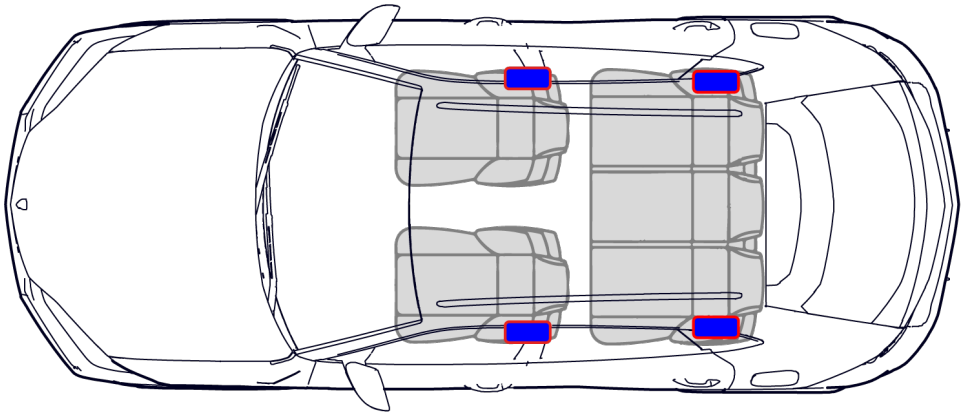


Knee airbags position

Side airbags

In the case of side collisions, side airbags safeguard the occupants' thorax and pelvis on the impacted side of the vehicle by lessening the forces exerted on them. These airbags inflate between the upper body and the protruding trim parts, helping to evenly distribute the forces on the occupants. This early coupling to the intrusion movement helps protect them more effectively.

The side airbags are installed in the seat backrest of the driver and front passenger seat, as well as in the outer seats in the second seat row in a number of Lamborghini models. This guarantees that a uniform distance to the occupant is maintained in every seat position.



Side airbags position

Head/thorax airbags

The head/thorax airbags for the driver and front passengers have been integrated into the respective backrests of the front seats. The design and the function are comparable to that of a side airbag.

They extend from the vehicle occupant's ribcage up to the head, and their installation is specific to convertibles, in which a head curtain airbag cannot be installed.

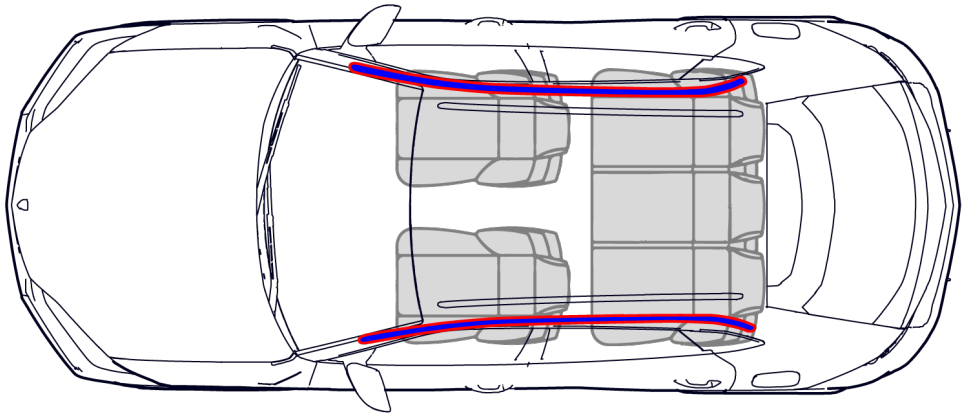
Head curtain airbags

Head curtain airbags are used to protect the head in the event of a side impact. They consist of an airbag with a large surface area, which usually extends from the A-pillar to the C-pillar in the vehicle's headliner.

Depending on the vehicle model, the gas generators may be installed in the roof area at the B-pillar or between the B-pillar and C-pillar, or between the C-pillar and D-pillar, or may be installed in the rear roof area. The exact installation position is described in the rescue data sheets.

In contrast to front and side airbags, the head curtain airbag may retain its internal pressure for some time following deployment in order to provide a protective effect if the vehicle rolls over or secondary collisions occur.

Both the side and head curtain airbags are deployed by the airbag control unit when a threshold value stored there is reached. A side impact is detected by lateral acceleration sensors or pressure sensors in the doors.



Head curtain airbags position

Airbag gas generators

Solid propellant gas generators

The solid propellant gas generators are comprised of a housing in which a solid propellant charge has been integrated together with an ignition unit. After ignition of the solid propellant, the filling gas that is produced is non-hazardous for the vehicle occupants.
Procedure:

- The igniter is activated by the airbag control unit.
- The propellant charge is ignited and burns off suddenly.
- The gas produced flows through the metal filter into the airbag.

Hybrid gas generators

The hybrid gas generators consist of a housing that combines compressed gas stored under high pressure and a solid propellant charge with an ignition unit. The design and shape of the generator housing are adapted to the respective installation conditions. These generators are usually tubular in shape. The main components are the pressure vessel with the airbag filler gas and the propellant charge (solid propellant) integrated into the pressure vessel, or flange-mounted to it. The solid propellant is inserted in tablet or ring form. The stored and compressed gas is a mixture of inert gases, e.g. argon and helium. Depending on the design of the gas generators, the gas is pressurized to between 200 bar and 800 bar.

– When the solid propellant is ignited, the pressure vessel opens, and a gas mixture is produced from the gas produced by the solid propellant charge and the inert gas mixture. The igniter is activated by the airbag control unit, and the propellant charge is ignited.

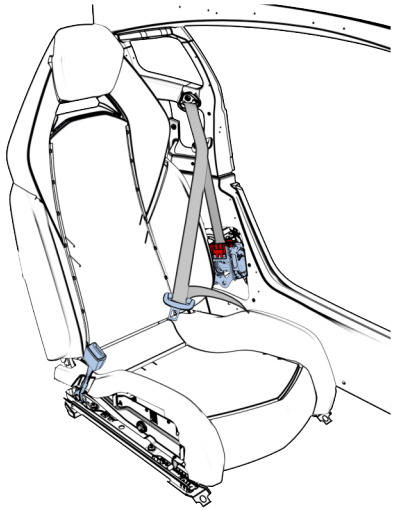
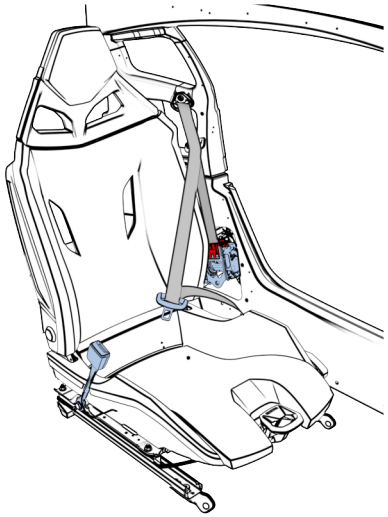
	Do not damage the gas generators during rescue operations. The compressed gas in the pressure vessel and the pyrotechnic fuels can pose a potential danger to the first and second responders and the occupants.

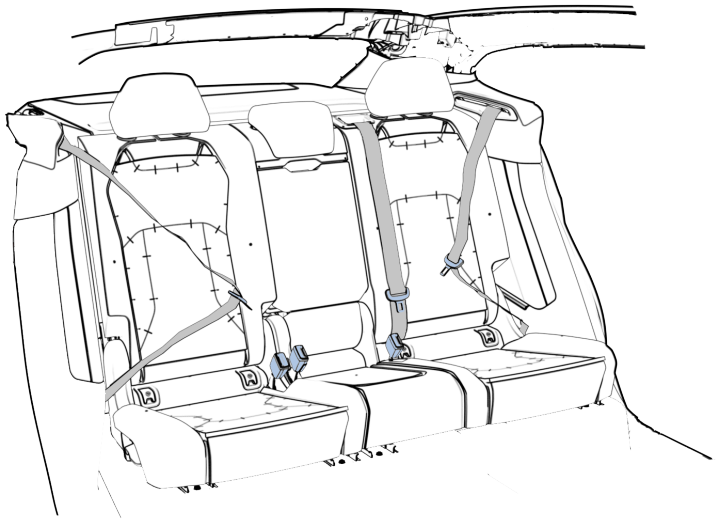
Seat belt pretensioners

In the event of a crash, seat belt pretensioners wind the belt in the opposite direction to its pull, thereby reducing the slack (play between the seat belt and the body). This prevents vehicle occupants from moving forward at an early stage (relative to the movement of the vehicle). A seat belt pretensioner can retract the seat belt by up to approx. 200 mm within approx. 10 ms.
The seat belt pretensioners have been integrated on the inside the belt system.
However, depending on the type of vehicle, they may be installed in a different place (e.g. in the B-pillar, in the side member next to the seat, or on the outside of the rear seat) and exhibit different functional principles. In some cases, two seat belt pretensioners are even used on one seat.

	Seat belt pretensioners should therefore not be damaged by rescue equipment, when possible. Striking this area must be avoided!
	The belt also locks in place when the vehicle is at an acute angle, has overturned, or if the seat belt pretensioner has sustained any damage in the accident.
	Seat belt pretensioners with mechanical activation that were not activated may still be activated even after disconnecting the battery.
	If the situation allows, the seat belt should be removed or cut off as early as possible.
	Marking for belt pretensioners as per ISO 17840

Installation versions

Version	Installation location
	**Driver/passenger electric version** The three-point seat and seat belt pretensioner with electric or mechanical ignition activation from a unit for the compact seat belt pretensioner. **Compact seat belt pretensioner in the B-pillar.**
	**Driver/passenger manual version** The three-point seat and seat belt pretensioner with electric or mechanical ignition activation from a unit for the compact seat belt pretensioner. **Compact seat belt pretensioner in the B-pillar.**



Rear seat

The three-point seat belt and seat belt pretensioner with electric or mechanical ignition activation form a unit for the rear compact seat belt pretensioner, and are installed behind the rear seat backrest or in the rear side trims.

Rear seat installation – rear compact seat belt pretensioner near the C/D-pillar (in vehicles with seat belt pretensioner for the center rear seat, the compact seat belt pretensioner is in the backrest).

10. Explanation of pictograms used

Components/functions/actions that shall be considered during the rescue procedure are represented by dedicated pictograms.

The pictograms are used:

- to indicate the location of the respective components/functions in the vehicle, in conjunction with the rescue sheet illustration
- (for details, see ISO 17840-1 and ISO 17840-2)
- to communicate a specific function or danger, for use under the rescue sheet additional
- to communicate the recognition of propulsion type; and
- to indicate the extinguish measures.

	Some pictograms may be modified to reflect the actual size and shape. A combination of simple shapes can also be used.

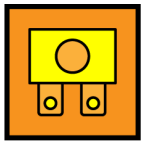
Pictograms concerning recognition



Propulsion type recognition

Reference: ISO 17840-4

Pictograms concerning disabling of the vehicle high voltage



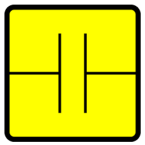
Fuse box disabling high voltage

To identify the low voltage fuse that controls the high voltage.



Disconnect high voltage device (e.g. service plug)

To identify the high voltage device that disconnects the high voltage, where appropriate PPE is needed for the action.



Supercapacitor

To identify the supercapacitor that controls the 48 V system.

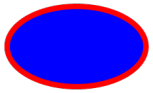
Pictograms concerning access to the occupants



Lifting point; central support

To identify the locations on the equipment where a lifting jack or support device can be used.

Other vehicle related pictograms



Airbag

To identify an airbag.

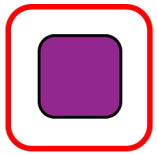
Pictogram can be adjusted to represent the actual size and form.
Different types of airbag-related occupant protection systems can be shown using the airbag pictogram with an appropriate size and form, e.g.:
- Driver / front passenger airbag
- Side airbag
- Curtain airbag
- Knee airbag
- Belt airbag
- Center airbag



Airbag inflator/stored gas inflator

To identify an airbag inflator/stored gas inflator.

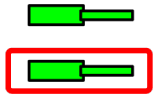
Pictogram is used to show the location of the stored gas inflator for e.g. inflatable curtains or pedestrian protection active system.
This pictogram should not be shown for conventional airbag systems with integrated gas inflator, such as frontal airbag in the steering wheel or in the dashboard, side airbag, knee airbag.



Seat belt pretensioner

To identify a seat belt pretensioner.

If a seating position has more than one pretensioner (e.g. for lap and shoulder belt), each pretensioner location shall be indicated by pictogram.



Gas strut, preloaded spring

To identify a gas strut, preloaded spring.

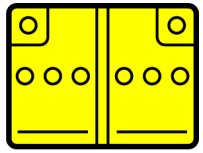
Red surrounding is used only if the device is triggered.

Other vehicle related pictograms



High strength zone

To identify a high strength zone.



Battery, low-voltage

To identify a low voltage battery.

It shall be accompanied with the technology of the battery (e.g. Li-Ion or Ni-MH) if different from a conventional battery type.



SRS control unit

To identify a SRS control unit.



Battery pack, high-voltage

To indicate a high voltage battery pack.

Pictogram can be adjusted to represent the actual size and form.
It shall be accompanied with the technology of the battery (e.g. Li-Ion or Ni-MH).
Optionally, the nominal voltage value of the battery may be added.



High voltage component

To indicate a high voltage component.

Flash may be omitted in case of space constraints.

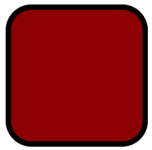
Other vehicle related pictograms



High voltage power cable

To identify a high voltage power cable.

It can optionally have a black contour line. HV components should be possible to differentiate from HV/ battery pack.
Legend and pictogram graphics should correspond with regard to the use of contour line concept.



Fuel tank content gasoline/ethanol

To indicate the content of the tank by using a defined colour.

Pictograms related to fire fighting and safety



General warning

To signify a general warning.



Warning, Electricity

To warn of electricity and dangerous voltage.



Use thermal infrared camera

To indicate that a thermal infrared camera should be used to detect a fire.



Use water to extinguish the fire

To indicate that water shall be used to extinguish the fire.

10. Explanation of pictograms used

Globally harmonized symbols



Flammable

To indicate the risk of flammability.



Corrosives

To indicate the risk of corrosive material/substances.



Hazardous to the human health

To indicate the risk of damaging human health.



Acute toxicity

To indicate the risk of acute toxicity.

Globally harmonized symbols



Environmental hazard

To indicate the risk of environmental hazard.

Symbols used in these guidelines



Note

General information