

The California 2025 – roof system





Preface

In order to be able to cover the roof systems of the California 2025 in detail and comprehensively, a separate self-study programme has been devoted to this topic.

The content focuses on the design and handling of the pop-up roof. One of the new features is that the pop-up roof can be operated via two different interfaces: using special buttons on the control panel and a smartphone with the California app installed.

Only design features of the California 2025 that differ from the “regular” Multivan are covered.



You will find comprehensive information on the new California 2025 in the Self-Study Programmes 750 “The California 2025” and 753 “The California 2025 – electrical and air conditioning systems”.



Important information



Preface

Notes on use

You will find a detailed explanation of how to use the new online Self-study Programmes via the menu option “Help”.

Notes on content

Self-study Programmes are used to teach users about the design and function of new developments. Please use the respective workshop information for up-to-date test, adjustment and repair instructions. The contents will not be updated.

Legal note

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The German displays shown in this Self-Study Programme are only intended as examples, and do not correspond to the displays in the relevant national languages.

The roof variants

The pop-up roof of the California 2025 is available in two different design variants:

- a mechanically operated pop-up roof
- an electrohydraulically operated pop-up roof

The structure of the sleeping cabin itself is identical. The pop-up mechanism with its connection points to the body, on the other hand, differ significantly from one another.

The two variants can be easily recognised by the different crossbar units of the opening mechanism, which are visible from the outside when the roof is raised.



Mechanical pop-up roof



Electrohydraulic pop-up roof



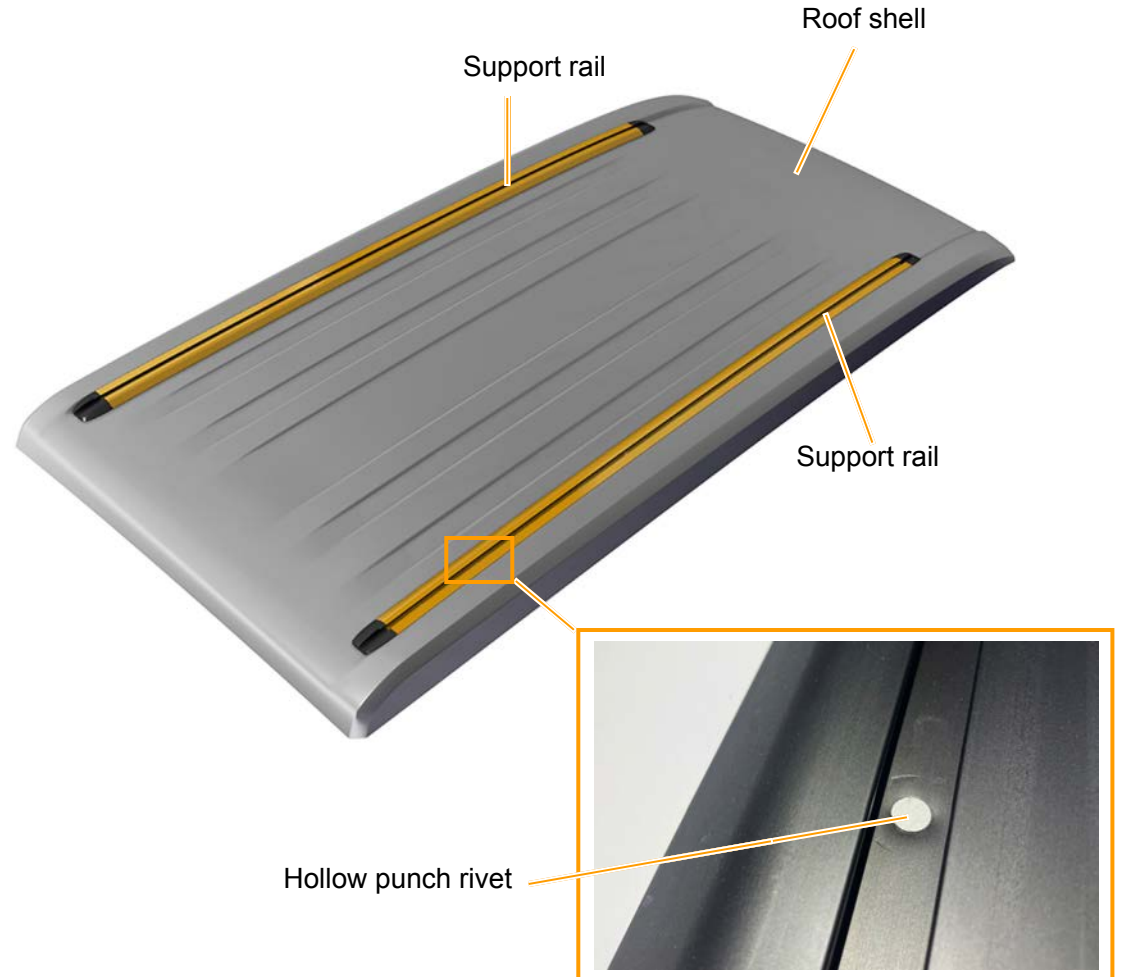
The roof shell

The one-piece roof shell is made of aluminium with a glued-in headliner.

The support rails (C-rails) for roof carriers are fitted as standard and are compatible with the rails of the previous model.

The rails are attached using hollow punch rivets.

The maximum roof load is 50 kg.



The roof is only allowed to be opened and closed without a roof load.



The concertina section

Colouration

All models feature a concertina section in adapted colour with a three-ply fabric.

The mechanical pop-up roof is offered exclusively with the concertina section in the exterior colour “Basalt Grey”. “Tobacco” and “Glacier Blue” exterior colours are only available with the electrohydraulic roof.

The inner layer of the concertina section is in the “Sandwich light” beige colour in all vehicles.

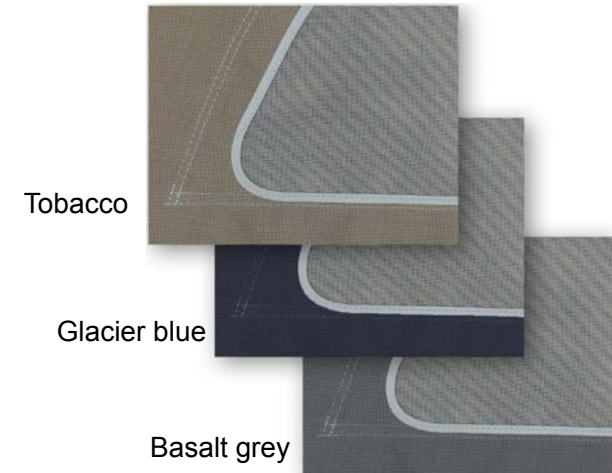
The outer and inner layers are bonded together with a breathable membrane.

This ensures pleasant air quality in the roof area.

The large window opening at the front is provided as standard on all concertina sections.

Technical features:

- Construction: two-layer polyester and polyamide fabric
- Impermeability: 5000 mm water column (fabric only)
- Outer material: 100% polyester fabric
- Inner material: 100% polyamide fabric





The concertina section

Design

The concertina section of the pop-up roof is a self-recovering concertina section. This means that when the roof is retracted, the concertina section automatically folds together into the storage position.

Folding inwards is performed by means of several pull-in tabs incorporated in the side panels, which pull the fabric inwards using integrated elasticated bands. Two spring steel wires incorporated into the front part of the fabric serve to pull it in under its own weight.



- + The sealing of the corner seams
- + The sealing of the attached seams

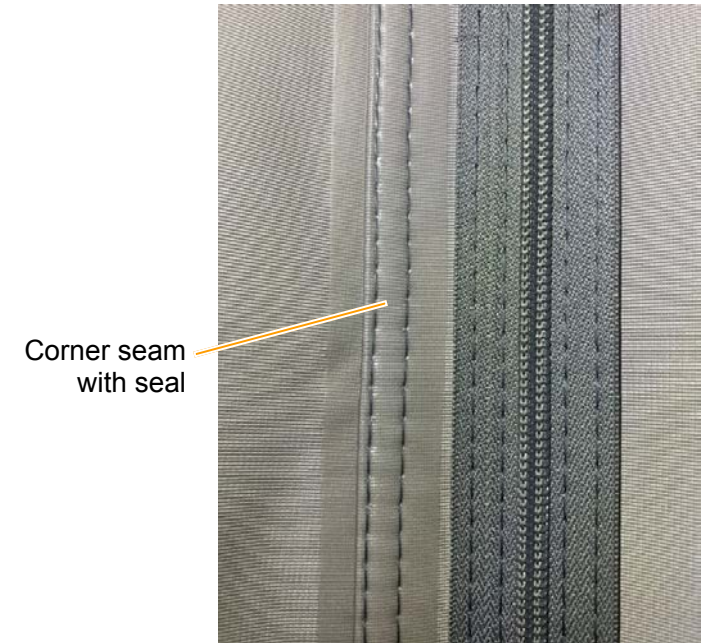
+ Sectional view
Piping with mounting section

The concertina section

Design

The sealing of the corner seams

All four corner seams are largely sealed:



The concertina section

Design

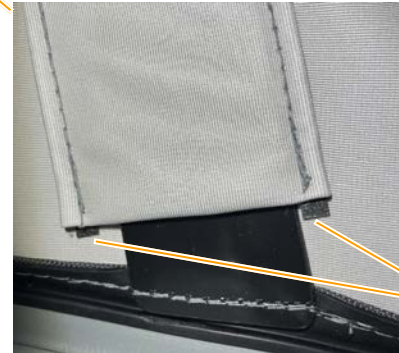
The sealing of the corner seams

All attached seams are additionally sealed with a foam underlining.

View from above
without roof shell



Foam underlining

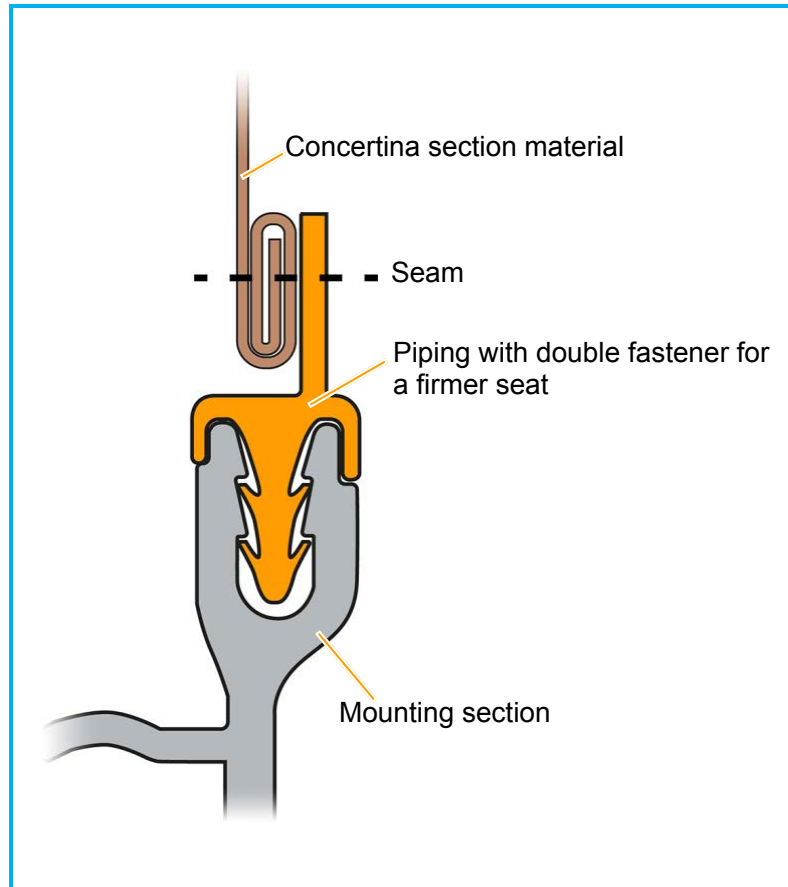


Foam underlining



The concertina section

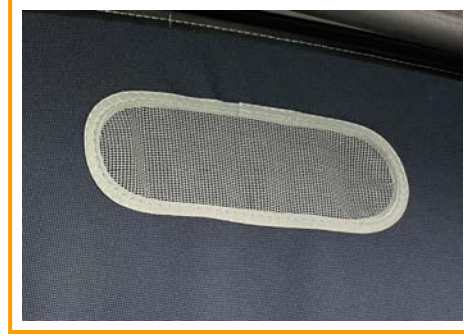
Design





Ventilation of the roof space

Forced ventilation is incorporated on the sides of the concertina section at the front under the connection to the roof shell. This ensures adequate ventilation of the sleeping cabin even when the side and front windows of the concertina section are closed.



Forced ventilation left and right
in the concertina section



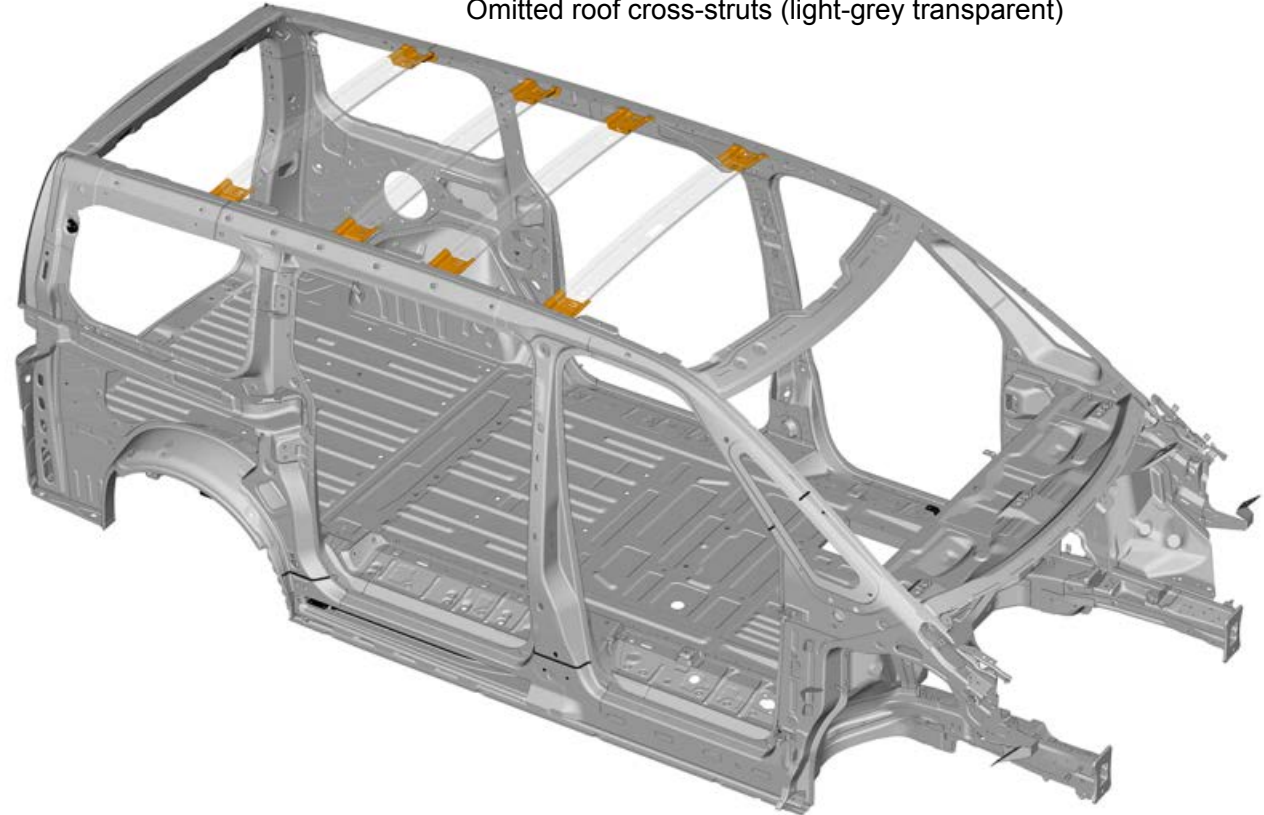


Body assembly

The roof cross-struts

The four roof cross-struts familiar from the Multivan have been omitted from the California 2025. The mounts for the cross-struts have been retained and, together with the body side panels, form the roof frame reinforcement for the pop-up roof and the bed surface. The maximum load on the bed surface in the pop-up roof is 200 kg.

Mounts of the roof cross-struts (coloured orange)
Omitted roof cross-struts (light-grey transparent)





Body assembly

The roof frame reinforcement

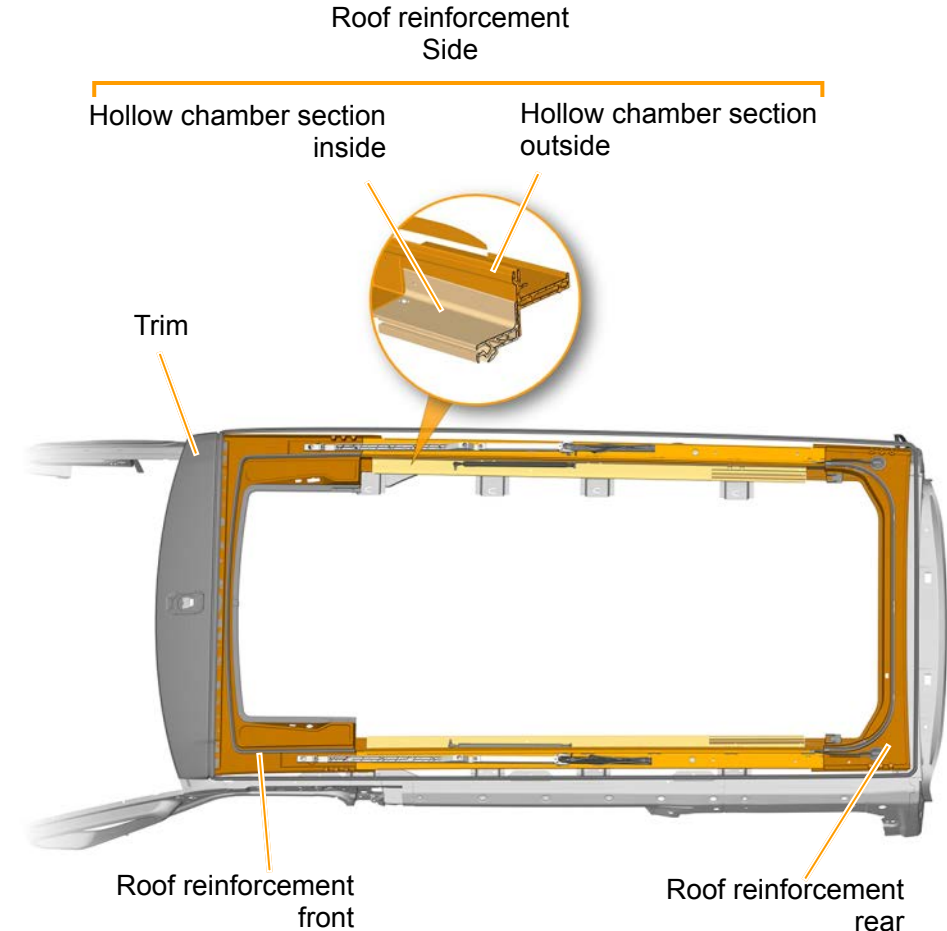
The roof opening means that the body is weakened in the roof area. A roof frame reinforcement is installed in order to meet the tough requirements of crash safety (rollover crash).

The roof cutout body reinforcement (RCBR) consists of the front, rear, and side modules. From a structural point of view, this results in an all-round body reinforcement around the entire roof cutout.

The front and rear reinforcements are made of die-cast aluminium, while the side reinforcements are made of extruded aluminium sections. Both are glued, screwed and riveted to the roof frame.

The two lateral roof reinforcements each consist of two hollow chamber sections screwed and riveted together. The external reinforcement also serves as a mounting section for the pop-up roof mechanism and the hydraulic components of the electrohydraulic pop-up roof.

RCBR is the abbreviation for “roof cutout body reinforcement”.





Body assembly

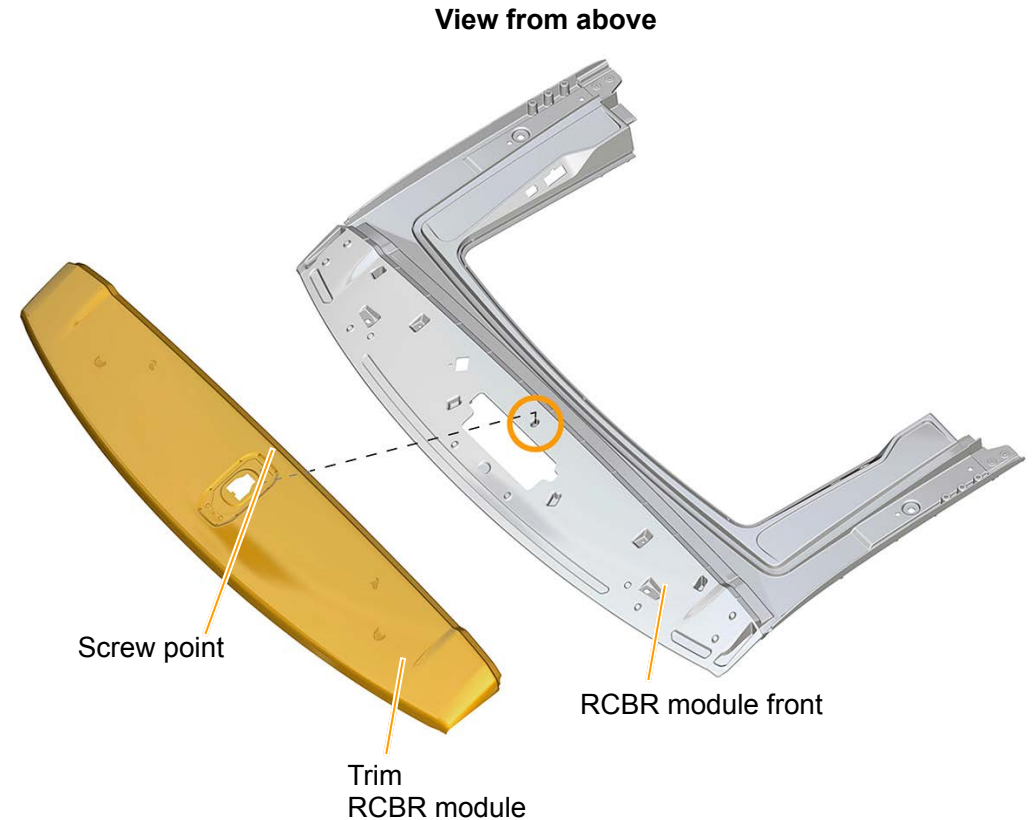
The roof frame trim

View from above

A roof frame trim (RCBR trim) made of PC-PET plastic is installed at the factory to protect the front RCBR module against the effects of weather from outside and stone chips. PC-PET plastic consists of polycarbonate and polyethylene terephthalate.

The trim is painted in the colour of the roof shell.

It is screwed to the front RCBR module with a screw point.





Body assembly

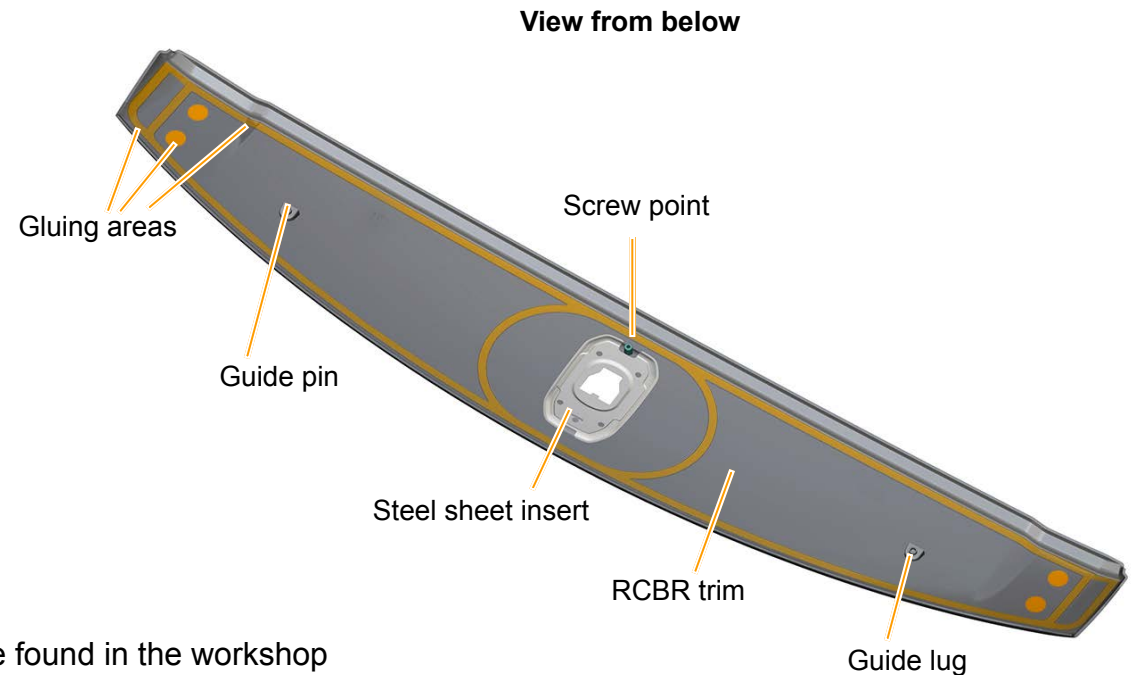
The roof frame trim

View from below

On the underside, the RCBR trim is glued all the way round to the front RCBR module.

The two guide pins facilitate mounting.

A steel sheet insert is incorporated into the cover cap in the area of the antenna mount.



Further instructions on how to renew the RCBR trim can be found in the workshop manual (ElsaPro).



Body assembly

The water drains in the mounting section of the roof frame

Front water drains

In the front area of the pop-up roof, two water drains in the form of a recess are incorporated into the mounting section on each side between the roof frame and the roof frame trim.



Front water drain on the roof frame



Water drain on the roof frame at the height of the front pop-up crossbar unit



The water drains can be cleaned using a brush, sponge or, in the event of a blockage, by blowing out with compressed air or water.



Body assembly

The water drains in the mounting section of the roof frame

Rear water drains

At the rear of the pop-up roof, two additional water drains are incorporated into the mounting section between the roof frame and the roof cross member on each side.



Rear water drain
on the roof cross member



Water drain on the roof frame
at the height of the rear pop-up crossbar unit



The water drains can be cleaned using a brush, sponge or, in the event of a blockage, by blowing out with compressed air or water.



The child lock in the pop-up roof

The California 2025 has a child lock for hooking into the sleeping cabin to prevent children from falling through the access opening when playing or sleeping in the sleeping cabin of the pop-up roof.

The child lock consists of a net material with fabric straps that are used to attach the child lock to the eyelets on the roof trim.



The California 2025 – roof system

The pop-up roof



Commercial
Vehicles

The manually operated pop-up roof

Overview of the pop-up roof

With the mechanical pop-up roof, a gas strut on both sides of the vehicle keeps the pop-up roof open.

The roof is locked by a manual locking mechanism when closed.





The manually operated pop-up roof

The manual locking and unlocking mechanism from the inside

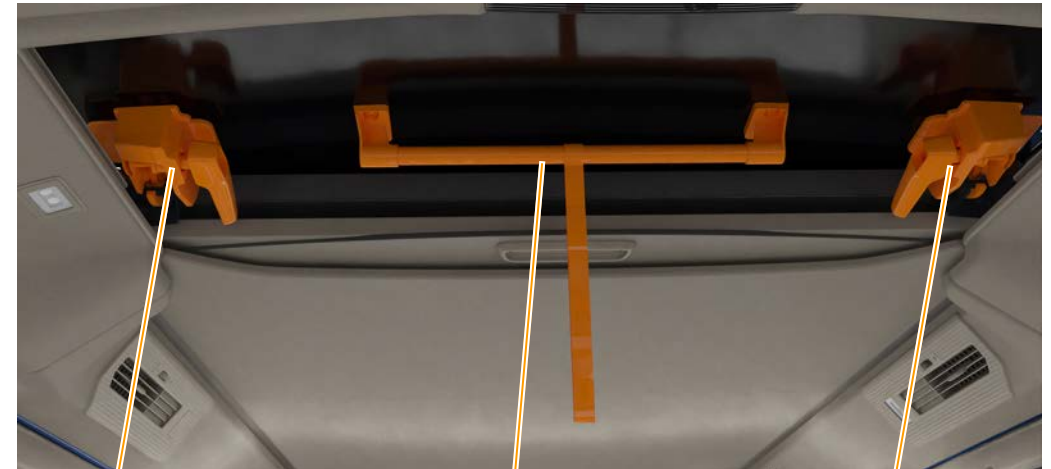
During the mechanical closing process, the roof shell is pulled down by the driver via the handle bar with a pull loop.

The manual pop-up roof is mechanically locked after closing via a rotary latch mechanism, which means the catch hook on the roof shell engages in the striker pin on the roof frame.

Locking does not take place until the release is pressed and the rotary handle is turned.

Opening takes place in the reverse sequence.

Rear view



Locking of the pop-up roof on the right (rotary latch mechanism)

Locking of the pop-up roof on the left (rotary latch mechanism)

Handle bar with pull loop





The manually operated pop-up roof

The manual locking and unlocking mechanism from the inside

Roof open

Rotary handle with release (rotary latch mechanism)

Release



Arrester



The manually operated pop-up roof

The manual locking and unlocking mechanism from the inside

Roof closed

Rotary handle with release (rotary latch mechanism)

Release



Striker pin



The manually operated pop-up roof

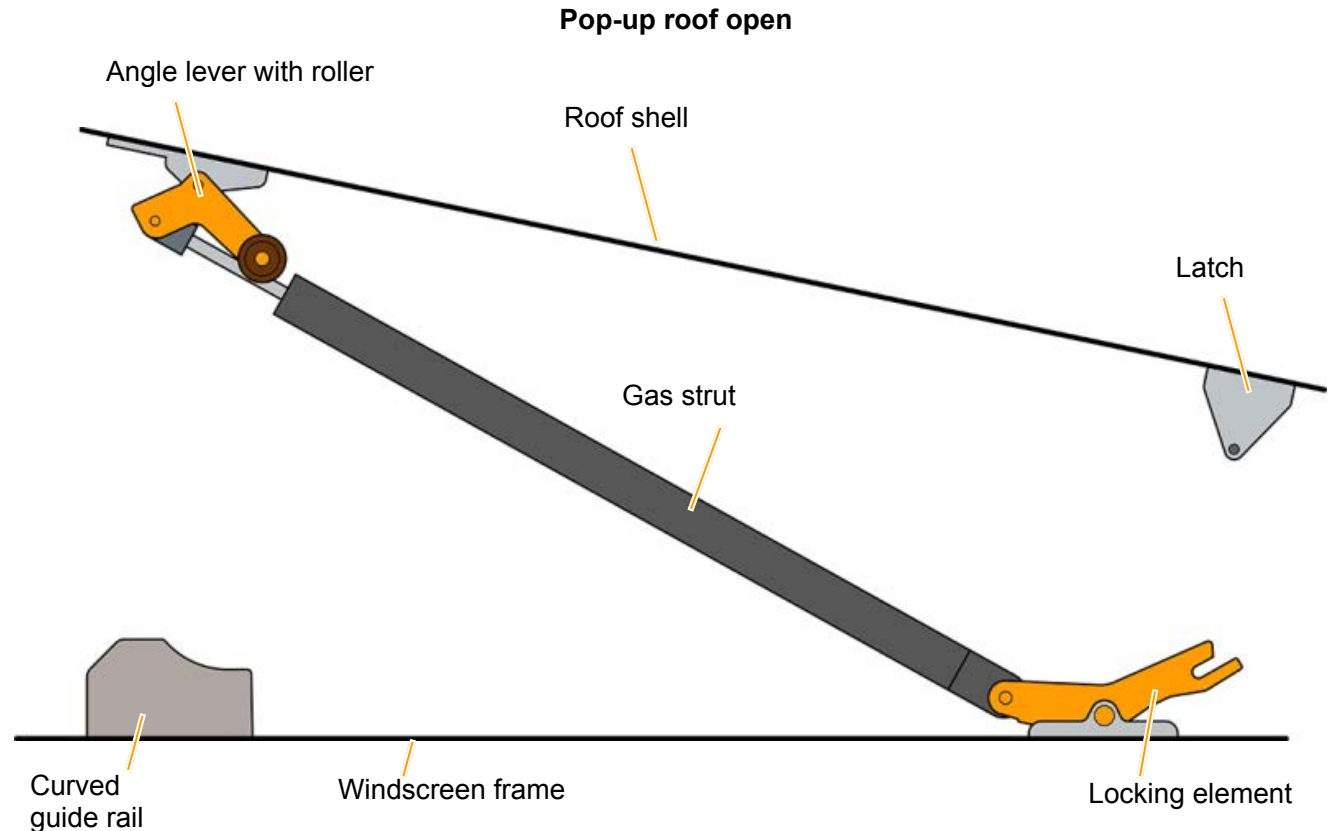
The locking mechanism of the rear roof crossbar unit

When closing the pop-up roof, the rear pop-up crossbar unit is mechanically secured against unintentional opening.

For this purpose, a locking element on the lower mounting bracket of the gas strut engages with its jaws in a latch on the roof shell.

During the closing movement, an angle lever with roller on the roof shell and a curved guide rail on the roof frame ensure that the locking element is lowered.

In this way, the rear pop-up crossbar unit is locked when the roof shell reaches the closed position.



Pop-up roof closed

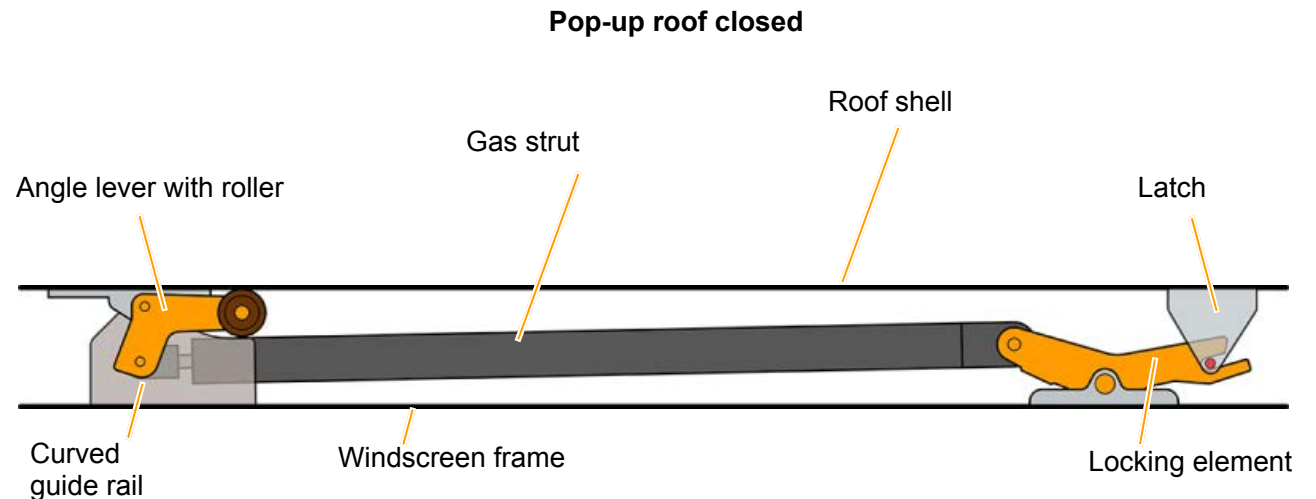


The manually operated pop-up roof

The locking mechanism of the rear roof crossbar unit



Further information on the movement sequence can also be found in the virtual training room for the California.



The California 2025 – roof system

The pop-up roof



Commercial
Vehicles

The electrically operated pop-up roof

Overview of the pop-up roof

In contrast to the mechanical pop-up roof, the optional electrohydraulic roof has a front pop-up crossbar unit with two hydraulic cylinders.

The roof is locked by a hydraulically activated, mechanical locking mechanism when closed.





The electrically operated pop-up roof

The electrohydraulics

Overview

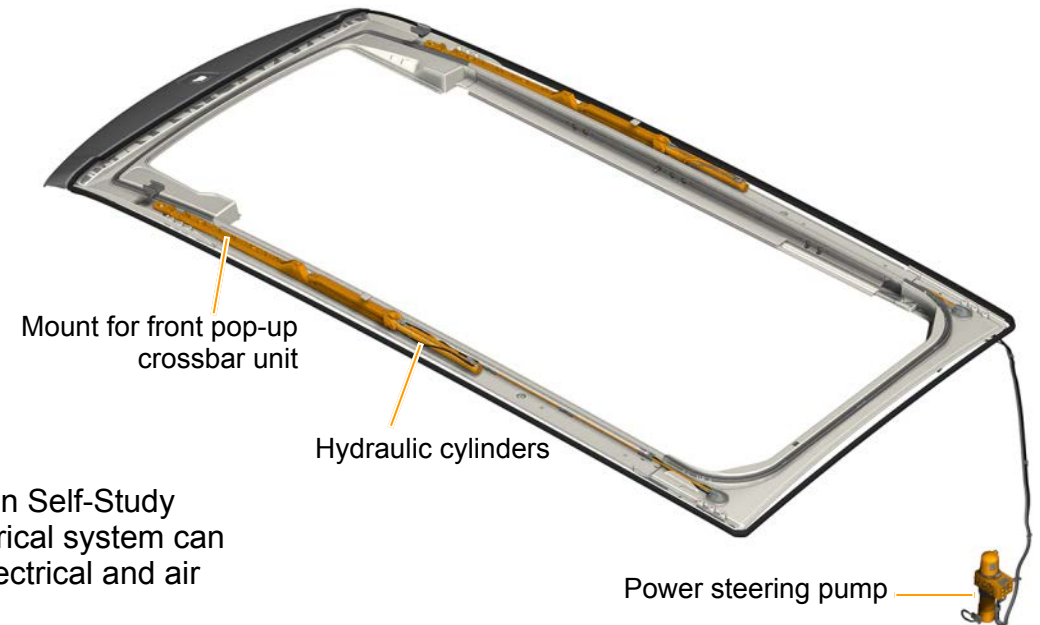
The electrohydraulic system of the roof kinematics consists of:

- the hydraulic pump with supply chamber
- two hydraulic cylinders
- the hydraulic lines
- the front pop-up crossbar units

The hydraulic pump (motor for pop-up roof V431) is controlled by the customer-specific functional control unit J608. It conveys the hydraulic fluid to the cylinders, which open or close the pop-up roof via their connection points to the front pop-up crossbar units.



Further information on the electrohydraulic system can be found in Self-Study Programme 708 “The California 6.1” and information on the electrical system can be found in Self-Study Programme 753 “The California 2025 – electrical and air conditioning systems”.





The electrically operated pop-up roof

The electrohydraulics

Hydraulic cylinders

The pop-up roof is opened and closed using a hydraulic cylinder on the left and right sides of the vehicle. The cylinder is connected to the roof frame and the piston acts on the front pop-up crossbar unit.

The hydraulic system is designed to keep the raised roof open.





The electrically operated pop-up roof

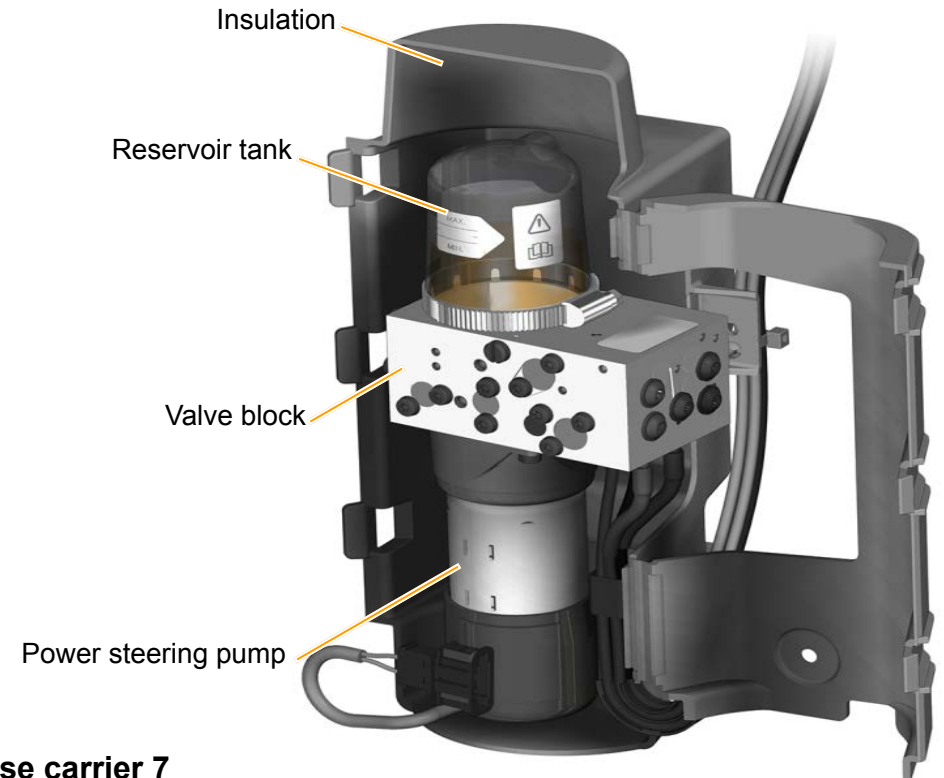
The electrohydraulics

Power steering pump

The hydraulic pump (motor for pop-up roof V431) is installed in the right rear side panel. It is surrounded by foam insulation. The pump is combined with the valve block and the reservoir to form a single component.

The hydraulic pump is controlled by the customer-specific functional control unit J608 via two multifunction outputs and two relays on the relay and fuse carrier 7 SR7.

As in the hydraulic system of the California 2004, the hydraulic pressure in the flow (roof open) is 180 bar and the holding pressure (roof closed) is 100 bar.





The electrically operated pop-up roof

The electrohydraulics

Power steering pump

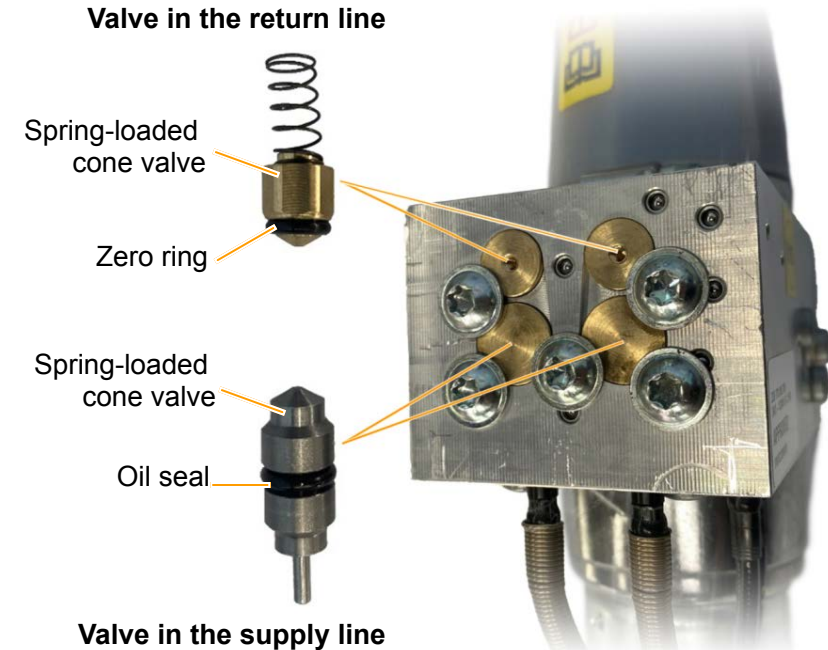
The valve block

Valves with a conical seat are now used in the valve block. They replace the spring-loaded ball valves.

The new valves have a larger sealing surface and a sealing ring. This minimises any slow pressure loss, which would otherwise allow the pop-up roof to move downwards if the roof were left open for a relatively long time.



It is essential to note the information in the workshop manual.





The electrically operated pop-up roof

The electrohydraulics

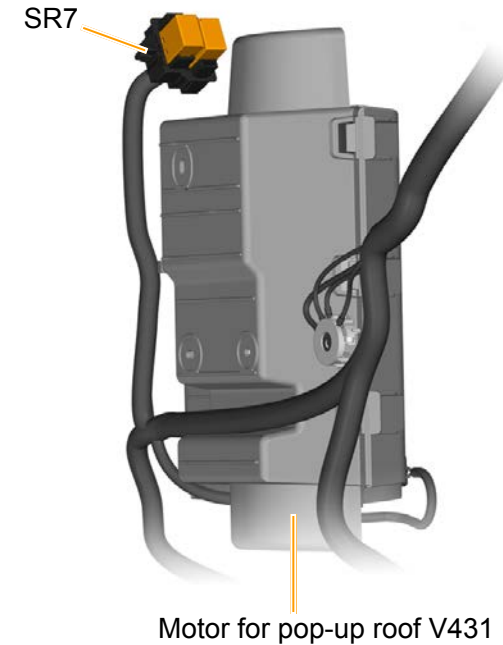
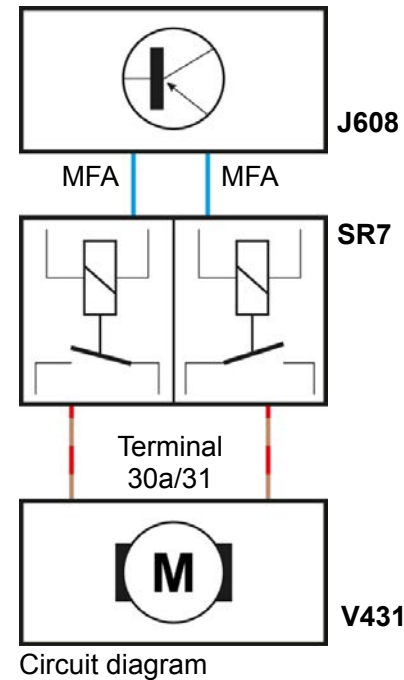
Power steering pump

Relay and fuse carrier 7 SR7

The two relays that control the motor for pop-up roof V431 (hydraulic pump) via the multifunction output (MFA) form one unit.

In the quiescent state, terminal 31 is connected to the output of both relays. When activated by the customer-specific functional control unit J608, one of the two relays is switched and its output switches to terminal 30a. In this way, the pumping direction of the hydraulic pump can be reversed.

The relay and fuse carrier 7 is located in the vicinity of the hydraulic pump.





The electrically operated pop-up roof

The unlocking mechanism when opening

Front unlocking

The hydraulic cylinder moves the front pop-up crossbar unit in the direction of travel in order to unlock the roof.

This pushes the front locking pin out of the corresponding stop piece, but the roof remains closed.

To raise the roof, the hydraulic cylinder extends further so that the crossbar mechanism raises the roof.

Front unlocking



Sliding piece

Locking pin



Further information on the movement sequence can also be found in the virtual training room for the California.

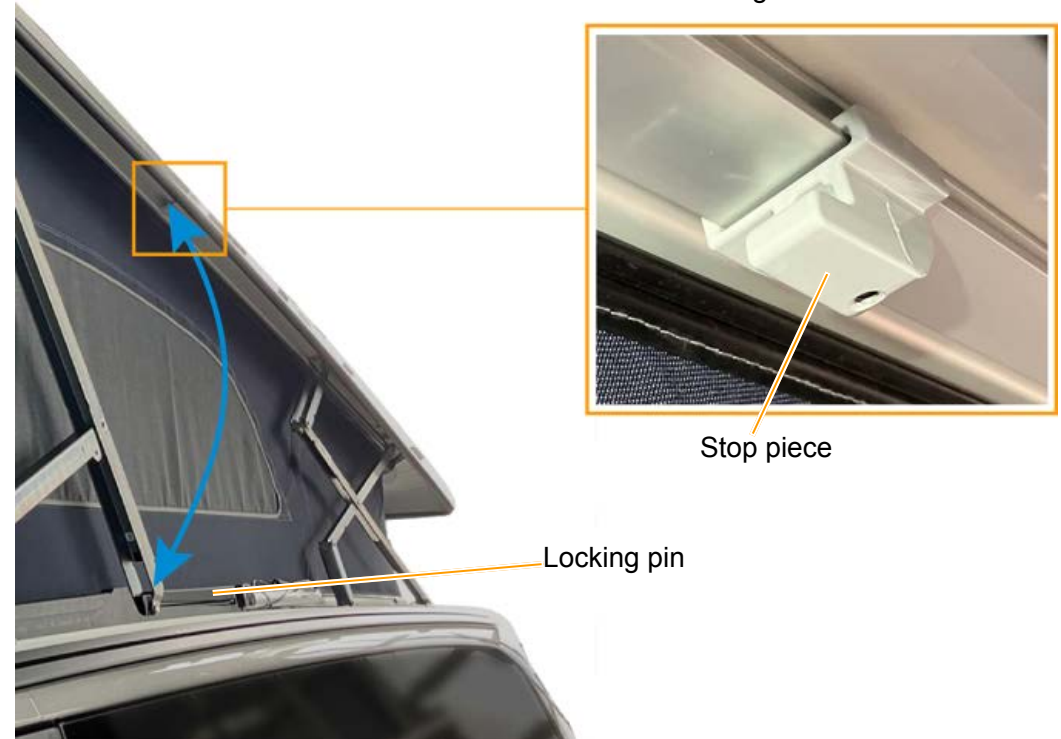


The electrically operated pop-up roof

The unlocking mechanism when opening

Rear unlocking

Movement of the front pop-up crossbar unit in the direction of travel also pushes the rear unlocking pin out of the corresponding stop piece synchronously with the front unlocking.





The electrically operated pop-up roof

The locking mechanism when closing

Front locking mechanism

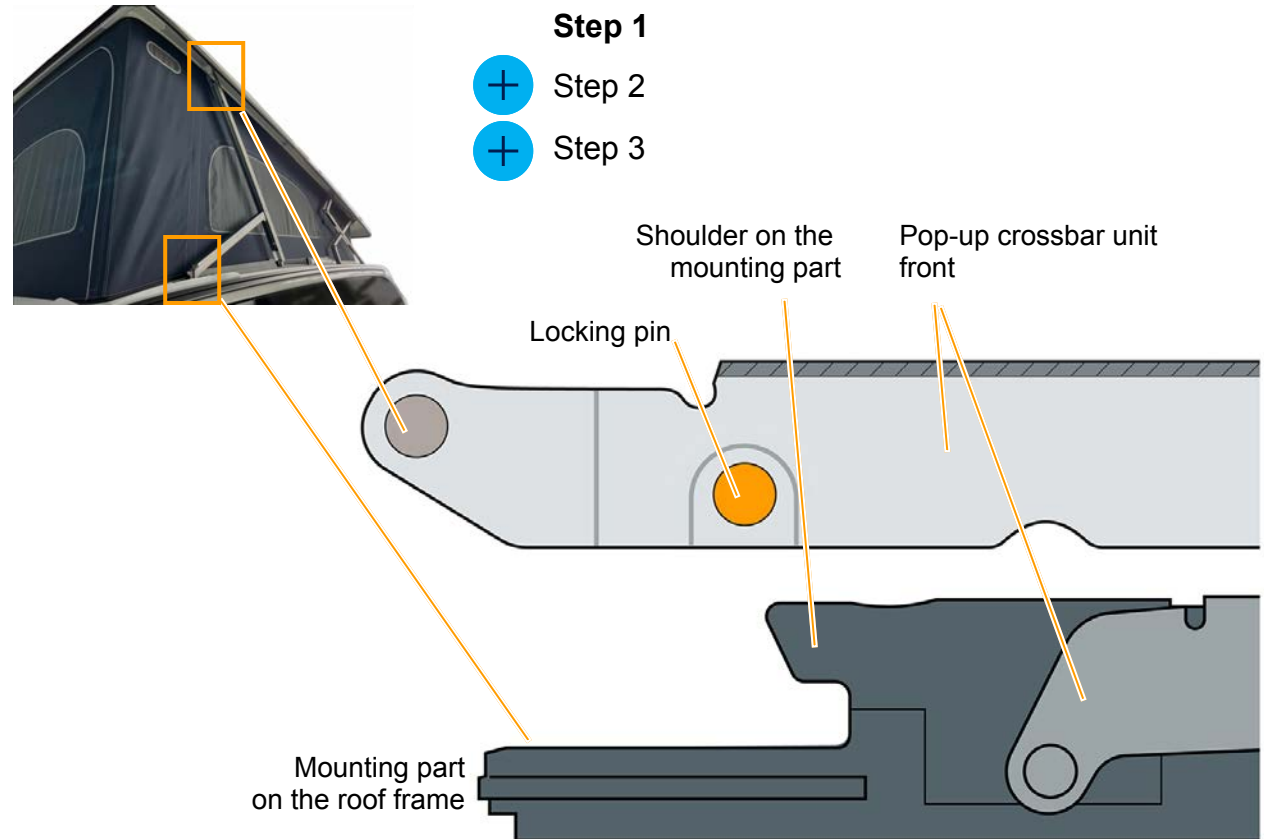
When the roof is closing, the front pop-up crossbar unit with the locking pin moves downwards (step 1) and rests on the upper mounting part (step 2).

The kinematics of the roof mechanism now retract the pop-up crossbar unit by means of the hydraulic cylinder. The locking pin moves under the shoulder on the mounting part (step 3), which functions as a stop piece. The shoulder prevents unintentional opening of the roof.

Step 1

+ Step 2

+ Step 3



Further information on the movement sequence can also be found in the virtual training room for the California.



The electrically operated pop-up roof

The locking mechanism when closing

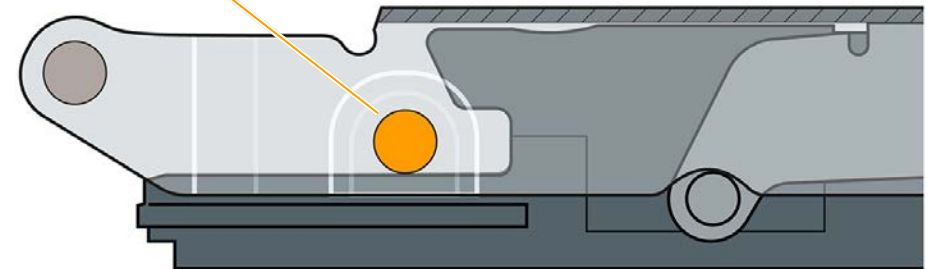
Front locking mechanism

When the roof is closing, the front pop-up crossbar unit with the locking pin moves downwards (step 1) and rests on the upper mounting part (step 2).

The kinematics of the roof mechanism now retract the pop-up crossbar unit by means of the hydraulic cylinder. The locking pin moves under the shoulder on the mounting part (step 3), which functions as a stop piece. The shoulder prevents unintentional opening of the roof.



Step 2





The electrically operated pop-up roof

The locking mechanism when closing

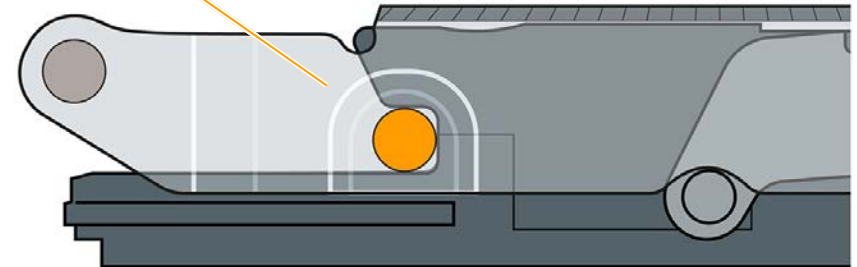
Front locking mechanism

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The kinematics of the roof mechanism now retract the pop-up crossbar unit by means of the hydraulic cylinder. The locking pin moves under the shoulder on the mounting part (step 3), which functions as a stop piece. The shoulder prevents unintentional opening of the roof.



Step 3





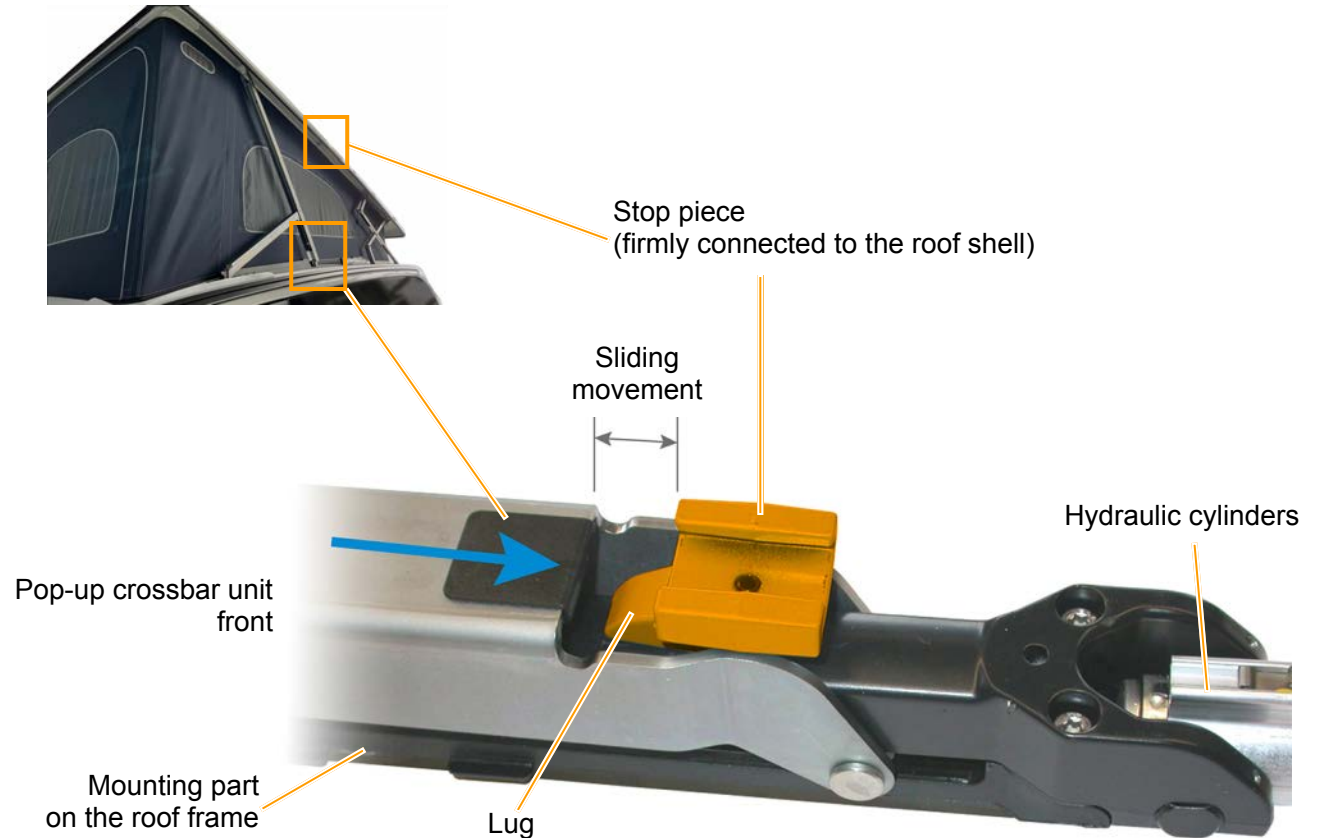
The electrically operated pop-up roof

The locking mechanism when closing

Rear locking mechanism

The kinematic system of the roof mechanism causes the pop-up crossbar unit at the front to be retracted a little by the hydraulic cylinder after being placed on the mounting part.

It moves over the lug of the stop piece, which is firmly connected to the roof shell. In this way, the rear locking mechanism is secured synchronously with the front locking mechanism to prevent the roof from being raised unintentionally.



The California 2025 – roof system

The pop-up roof



Commercial
Vehicles

The electrically operated pop-up roof

The customer-specific functional control unit J608

The customer-specific functional control unit J608 (CFCU: Max) takes over a large proportion of the control of the camper-specific equipment. Depending on the vehicle's equipment, the J608 controls the following vehicle components:

- Refrigerator box
- Lighting
- Roof hydraulics
- Fresh and waste water system
- 230-volt electrical system and energy management
- USB charging sockets

The control unit has an internal Bluetooth module.

The connection for an optional Bluetooth antenna remains unused.



The electrically operated pop-up roof

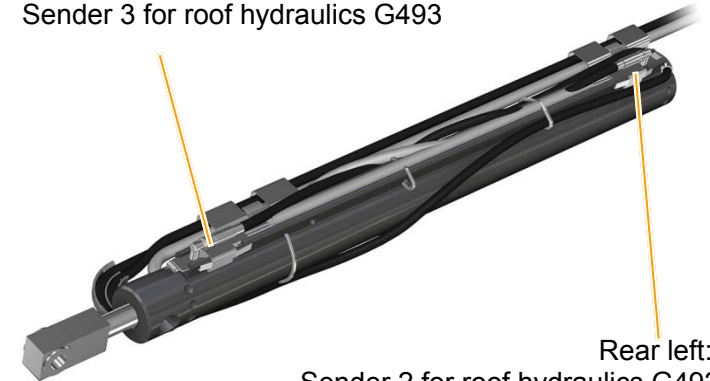
The encoders for roof hydraulics 1 to 4 G491 to G494

Two Hall sensors are clipped into each of the two hydraulic cylinders from the outside. They are activated by a magnet on the piston rod in the hydraulic cylinder. The Hall sensors enable the customer-specific functional control unit J608 to determine the respective end position of a hydraulic cylinder and thus the roof status. If no signal is detected by both Hall sensors of a hydraulic cylinder, the roof is in an intermediate position.

The Hall sensors can be renewed individually. They are marked by white paint dots. One dot means front left and four dots corresponds to rear right. The states of the Hall sensors can be read out via the measured value blocks. The Hall sensors are supplied with power via the J608.

The signal lines are connected to the protective resistor N235 to analyse the signals from the sensors for the customer-specific functional control unit J608.

Front left:
Sender 1 for roof hydraulics G491
Front right:
Sender 3 for roof hydraulics G493



Rear left:
Sender 2 for roof hydraulics G492
Rear right:
Sender 4 for roof hydraulics G494



The protective resistor N235



The electrically operated pop-up roof

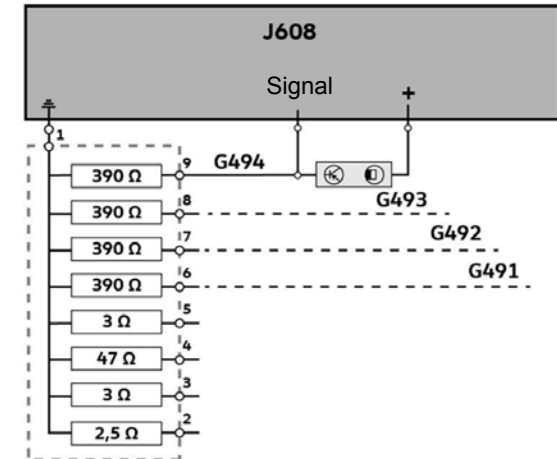
The encoders for roof hydraulics 1 to 4 G491 to G494

The protective resistor N235

The protective resistor N235 is clipped into the front RCBR module.

The protective resistor is a resistor box. Inside the resistor box, there are eight individual pull-down resistors. These are individually connected to the signal lines of the roof hydraulics senders G491 to G494.

The individual pull-down resistors are precisely matched to the sensor types connected to the customer-specific functional control unit J608. Together with the internal pull-down resistors of the J608, this means precise signal evaluation is possible for each sensor. In the California 2025, only the pull-down resistors are used for the senders for roof hydraulics.





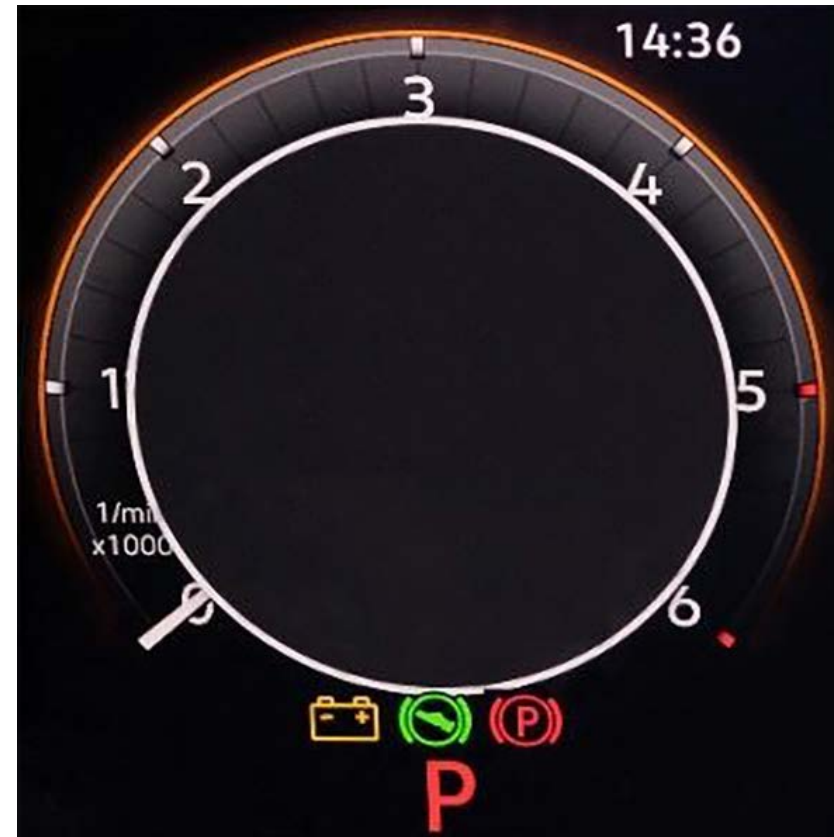
The electrically operated pop-up roof

Operation

Displays in the
Active Info Display

The Active Info Display shows the roof status and warnings for operating the pop-up roof.

- + Note 1 (opening procedure)
- + Note 2 (closing procedure)
- + Note on the roof status (closing procedure)

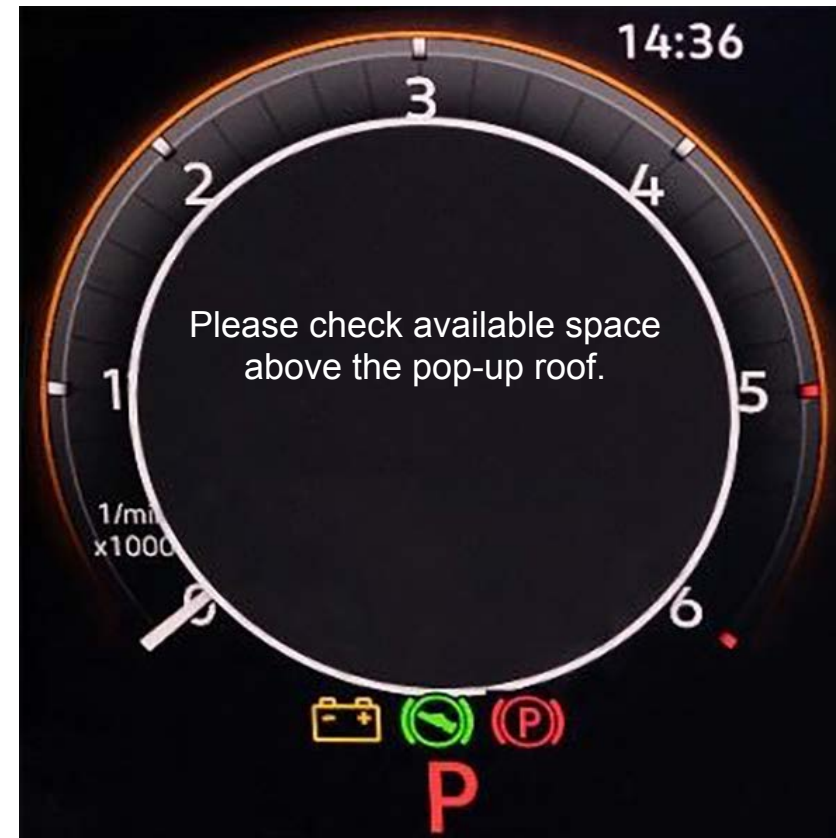




The electrically operated pop-up roof

Operation

Displays in the
Active Info Display



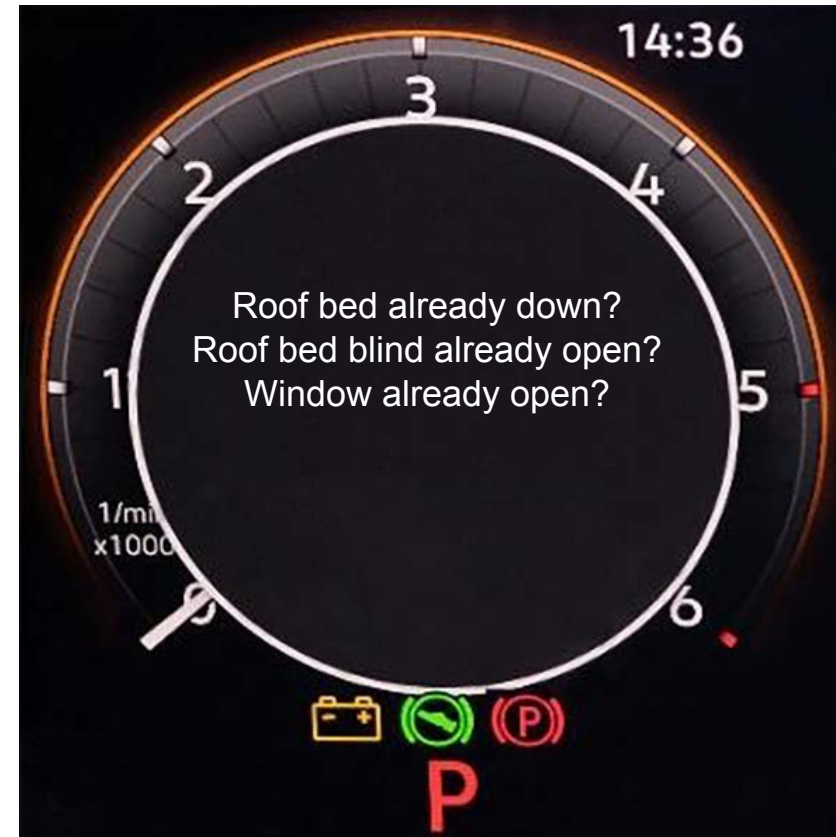
Note 1 (opening procedure)



The electrically operated pop-up roof

Operation

Displays in the
Active Info Display



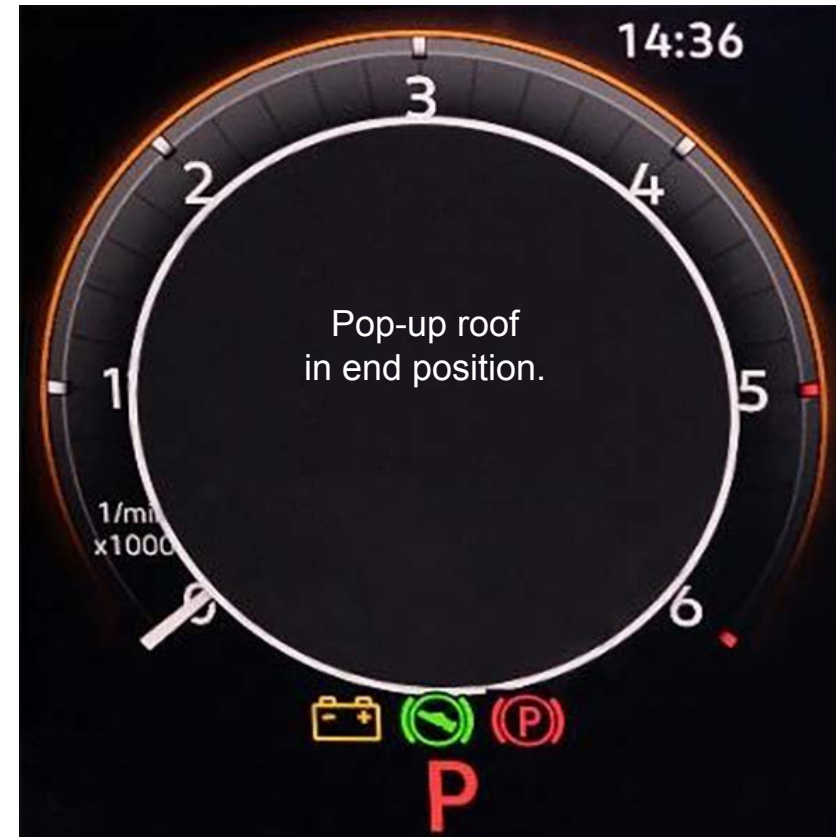
Note 2 (closing procedure)



The electrically operated pop-up roof

Operation

Displays in the
Active Info Display



Note on the roof status (closing procedure)



The electrically operated pop-up roof

Operation

Button in the dash panel

The electrohydraulic pop-up roof can be operated with terminal 15 “ON” either via two buttons in the dash panel or via the “California App”.

The two buttons belong to centre switch module 2 in dash panel EX35. The upper button opens the pop-up roof and the lower button closes it.

A waiting time of approx. 4 seconds must be observed between when the instructions appear on the dash panel insert and the next actuation via the buttons, otherwise the system will not continue moving.

Only the status of the roof can be queried in the display and operating unit for camping equipment E153 on the C-pillar.





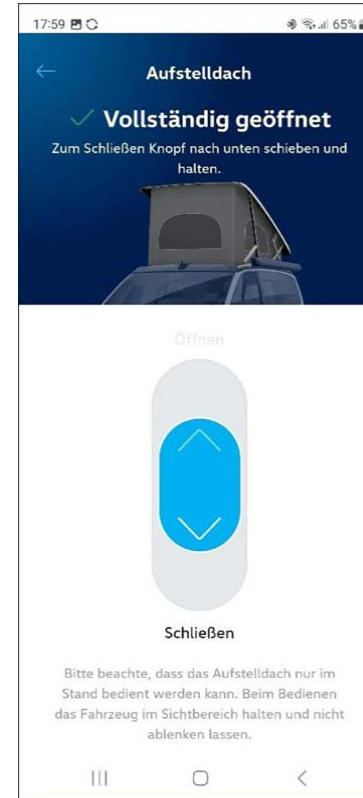
The electrically operated pop-up roof

Operation

California app

The California app shows the current roof status and the pop-up roof can be opened or closed using a virtual button in the bottom part of the display.

The illustration opposite shows an example of the California app with the German-language system setting on the smartphone.





The electrically operated pop-up roof

The safety instructions


After emergency lowering of the pop-up roof

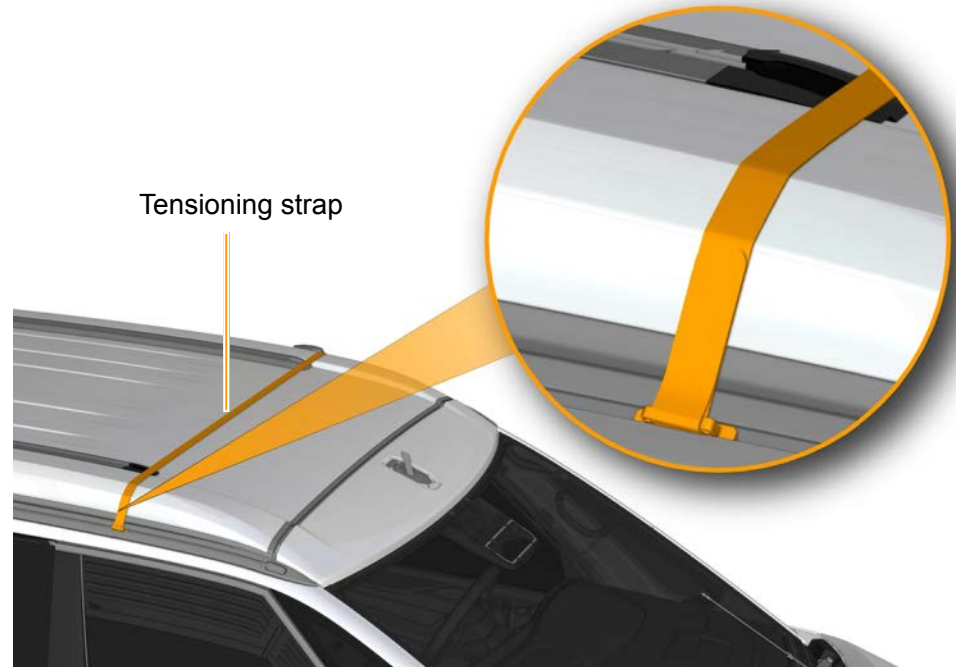
If the pop-up roof has to be closed by means of the emergency lowering system in order to continue the journey, it must be secured with a tensioning strap after lowering.

This prevents the roof from moving upwards again due to the airstream or jolting during the journey.

The procedure for attaching the tensioning strap is described in detail in the vehicle wallet, and must be strictly adhered to.

However, even with the pop-up roof secured, the vehicle is only allowed to be driven carefully and at a reduced speed of no more than 60 km/h to the nearest qualified workshop.

 Details on emergency lowering





The electrically operated pop-up roof

The safety instructions



Details on emergency lowering

Pierce the insulation at the pre-stamped point with a flat-bladed screwdriver and unscrew the screw for emergency lowering. The roof is lowered by gravity as the pressure in the hydraulic cylinder decreases.

During the journey, the pop-up roof must be mechanically secured using safety straps that are supplied in the vehicle.

Access to emergency lowering

Insulation of the hydraulic pump (motor for pop-up roof V431)



Thank you
for your
interest.

