Service Training

Commercial Vehicles

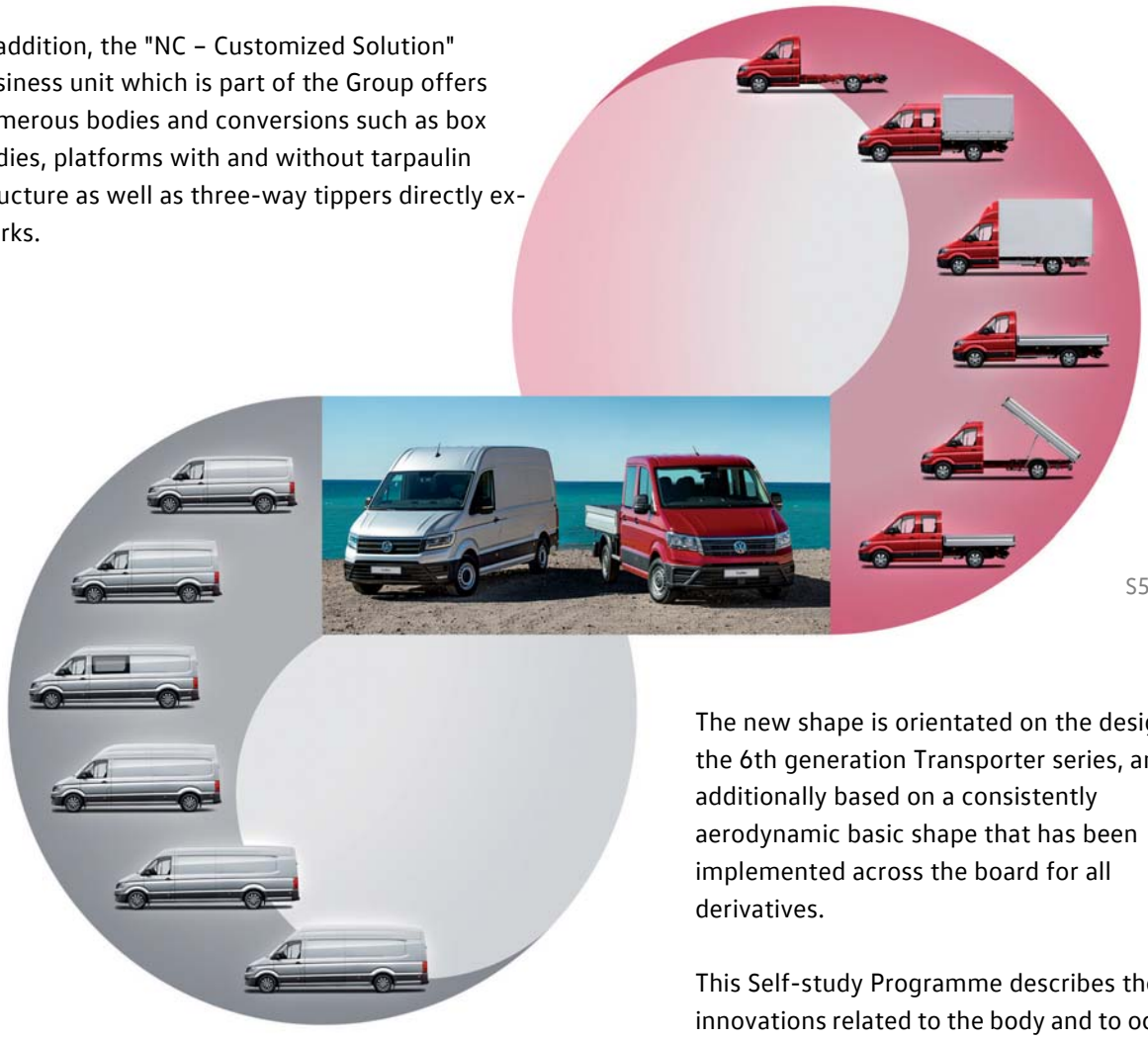
Self-Study Programme 568

The Crafter 2017 body and occupant protection

Design and function

The Crafter 2017 represents a completely new development and has once again been developed within the Commercial Vehicles arm of the Group like its forebear the LT1. One of the most important goals during the development of the new Crafter was reducing the vehicle's weight while simultaneously meeting the increased demands for vehicle safety, comfort as well as optimising the payload and package dimensions in a better way. These goals are achieved in the area of the body by a modular body concept with a common front end as well as increased use of gluing technology and fitting of a higher proportion of body panels made from the highest quality materials. With the Crafter 2017, the Volkswagen Commercial Vehicles brand is using ultra-high-strength hot-formed body panels for the first time. The completely new development makes it possible to implement a large number of different derivatives in the Crater 2017 with 2 wheelbases, 3 vehicle lengths and 3 roof heights in closed and open bodies.

In addition, the "NC – Customized Solution" business unit which is part of the Group offers numerous bodies and conversions such as box bodies, platforms with and without tarpaulin structure as well as three-way tippers directly ex-works.



S568_002

The new shape is orientated on the design of the 6th generation Transporter series, and is additionally based on a consistently aerodynamic basic shape that has been implemented across the board for all derivatives.

This Self-study Programme describes the innovations related to the body and to occupant protection in the Crafter 2017.

The Self-study Programme shows the design and function of new developments.
The contents are not updated.

For current testing, adjustment and repair instructions, refer to the relevant service literature.

Important note

At a glance

The modular structure of the Crafter

An important objective in development of the body structure was to create as many identical parts as possible. For this reason, the body structure is based on a modular concept. The objective is to allow the numerous derivatives and variants such as different wheelbases and roof heights to be manufactured with great synergy effects.

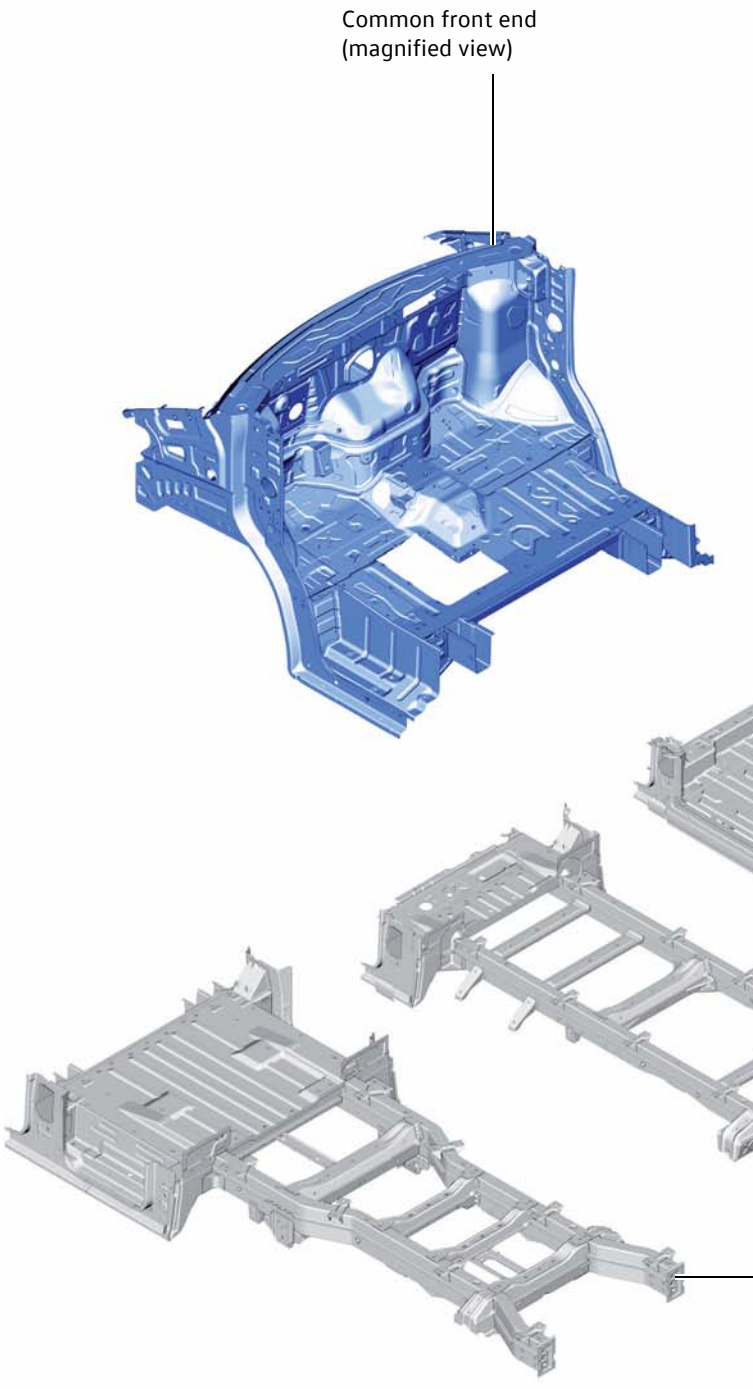
The floor structure of the Crafter 2017 is the same for all vehicle variants in the front end area.

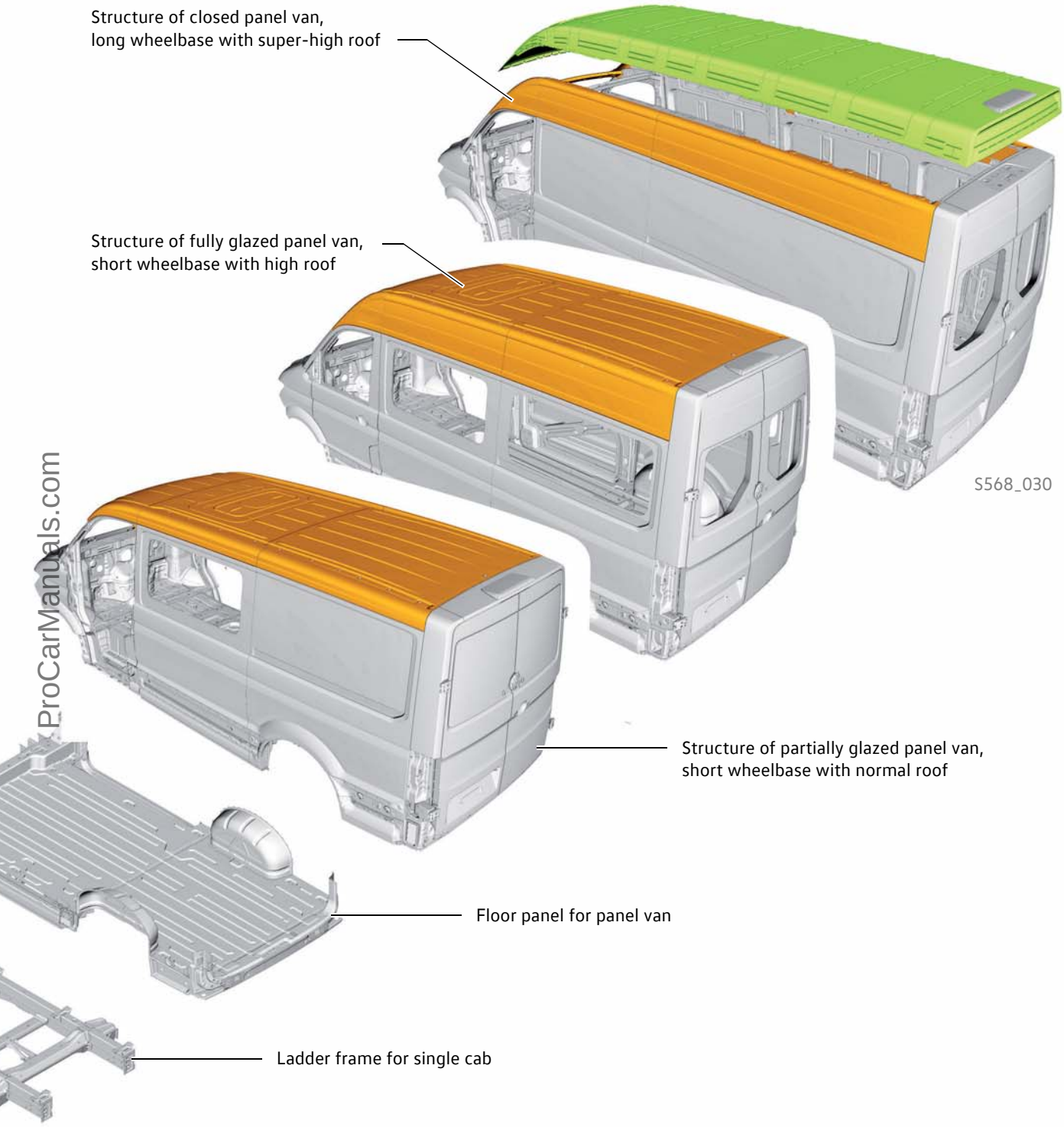
The front end comprises an area of the front longitudinal members, the inner wing panels, the area of the plenum chamber partition panel, the lower area of the A-pillars and the floor panel in the area where the driver sits.

In the rear end, there are significant differences with regard to the floor panel, floor plates, longitudinal members, wheel housings, ladder frame and the corresponding connection parts as well as reinforcements. Their configuration and design are determined by the following factors:

- Type of drive
- Wheelbase
- Rear overhang
- Type of body
- Single or twin tyres on the rear axle

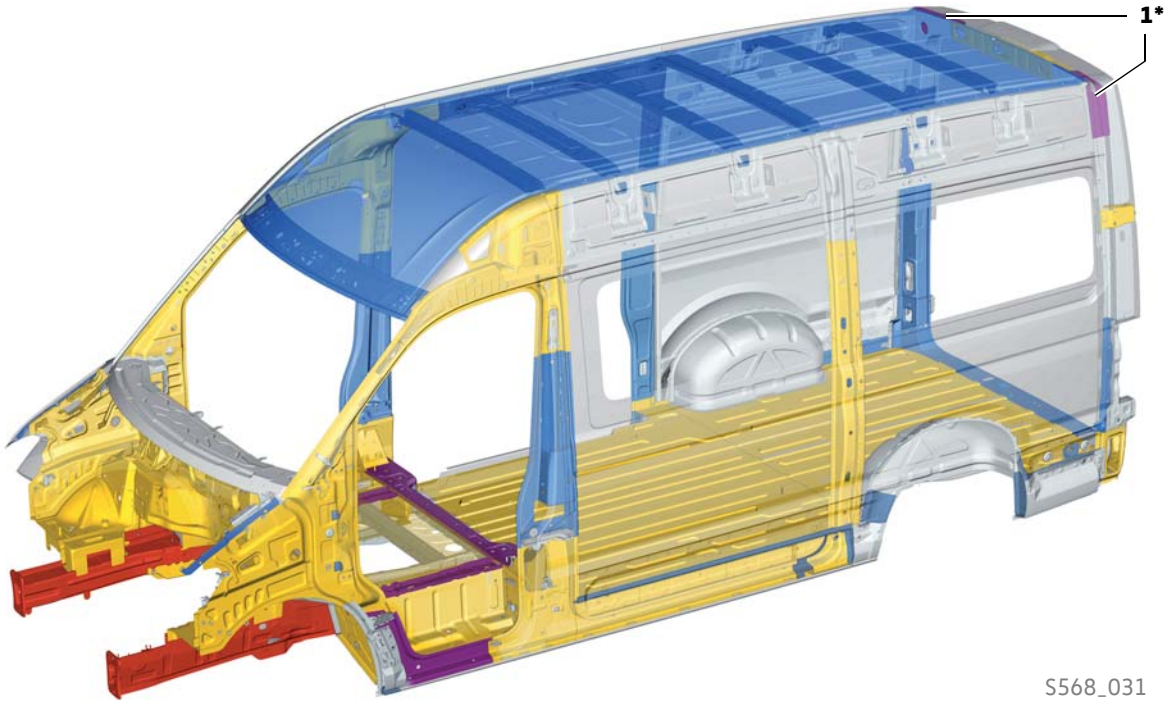
Some examples of the modular structure can be seen in the illustration on the right.





Body structure

The main aspects in development of the new body structure were, as well as the modular design, achieving high crash safety at the same time as a low weight and optimizing aerodynamics.
The Crafter 2017 has been optimised in the areas of payload, cost effectiveness and crash safety to achieve these goals.



Key to strength of the steel plates (yield strength "Re")

- < 160 MPa soft
- < 220 MPa high-strength
- < 420 MPa higher strength
- < 1000 MPa ultra high strength
- > 1000 MPa ultra high strength and hot formed

The attachments which are not shown such as doors, engine lid, wing panel and side parts are made of soft body sheet < 160 MPa.

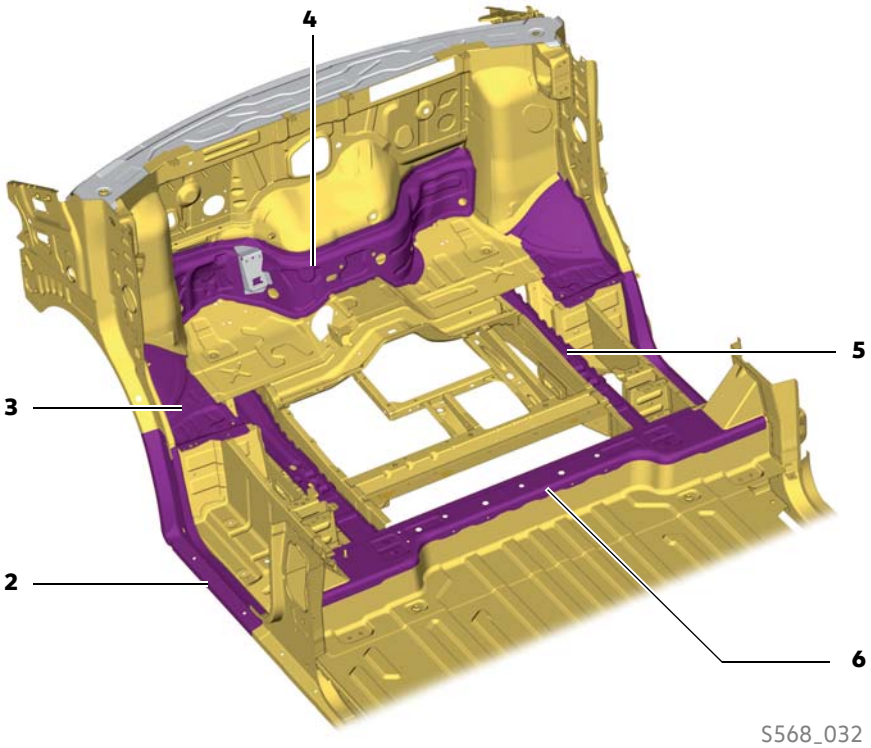
* Key see page 7

The strength increase and weight reduction have been achieved by the following design measures:

- Geometric lightweight design
- Increased use of ultra-high-strength steels and ultra-high-strength hot-formed steels
- Targeted use of modern processes for production of steel panels, e.g. hot forming, bake hardening and tailored blank technology
- Use of joining processes appropriate to the load, e.g. resistance spot welding, laser soldering, laser welding and gluing

Ultra-high-strength hot-formed steels are being used for the first time in the Volkswagen Commercial Vehicles brand with the Crafter 2017. Panels made of these steels are stronger than conventional steel panels for a comparable weight.

Hot-formed panels require special treatment during repair.
For more information, refer to ELSA (electronic service information system).



S568_032

Key

1	Reinforcement corner area at the rear roof (shown in graphic S568_031 on page 6)
2	Reinforcement area of A-pillar lower part and sill panel
3	Wheel housing area
4	Front bulkhead area
5	Area of longitudinal member reinforcement for driver's cab
6	End plate area

Floor structure on the closed body

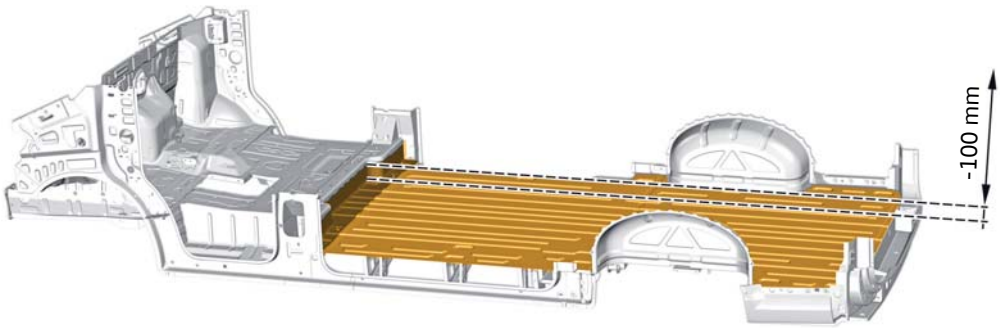
Depending on the drive concept, there are two different floor structures for Crafter vehicles with a closed body.

Vehicle with front-wheel drive

In these vehicles, the load compartment floor has been lowered by 100 mm compared to the level of the driver's area, because the space below is not required for the propshaft. This produces advantages such as

- Interior height increased by 100 mm
- Resultantly larger load space volume
- Correspondingly lower entry height to vehicles with sliding doors and wing doors.

Floor structure (load compartment floor -100 mm)



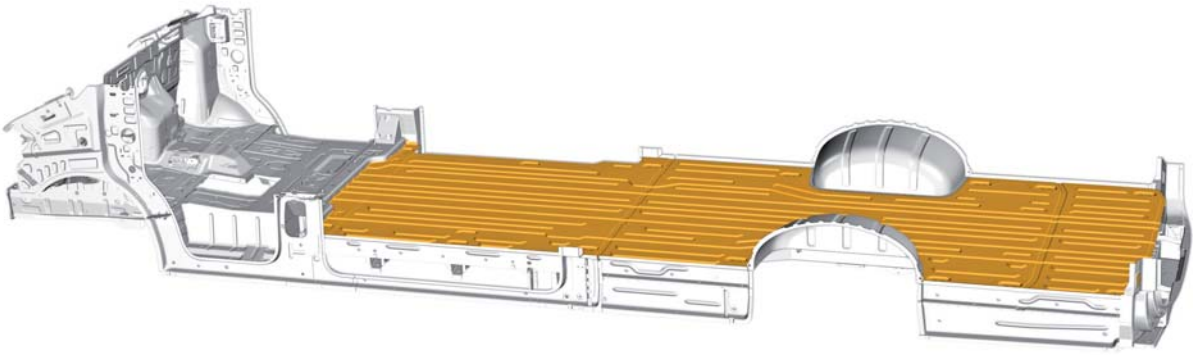
Example: short wheelbase

S568_027

Vehicles with four-wheel and rear-wheel drive

These vehicles have a single-level load compartment floor at the same height as the driver's area. The resulting structural space is required for fitting the propshaft and the rear final drive.

Floor structure (load compartment floor at driver's area level)

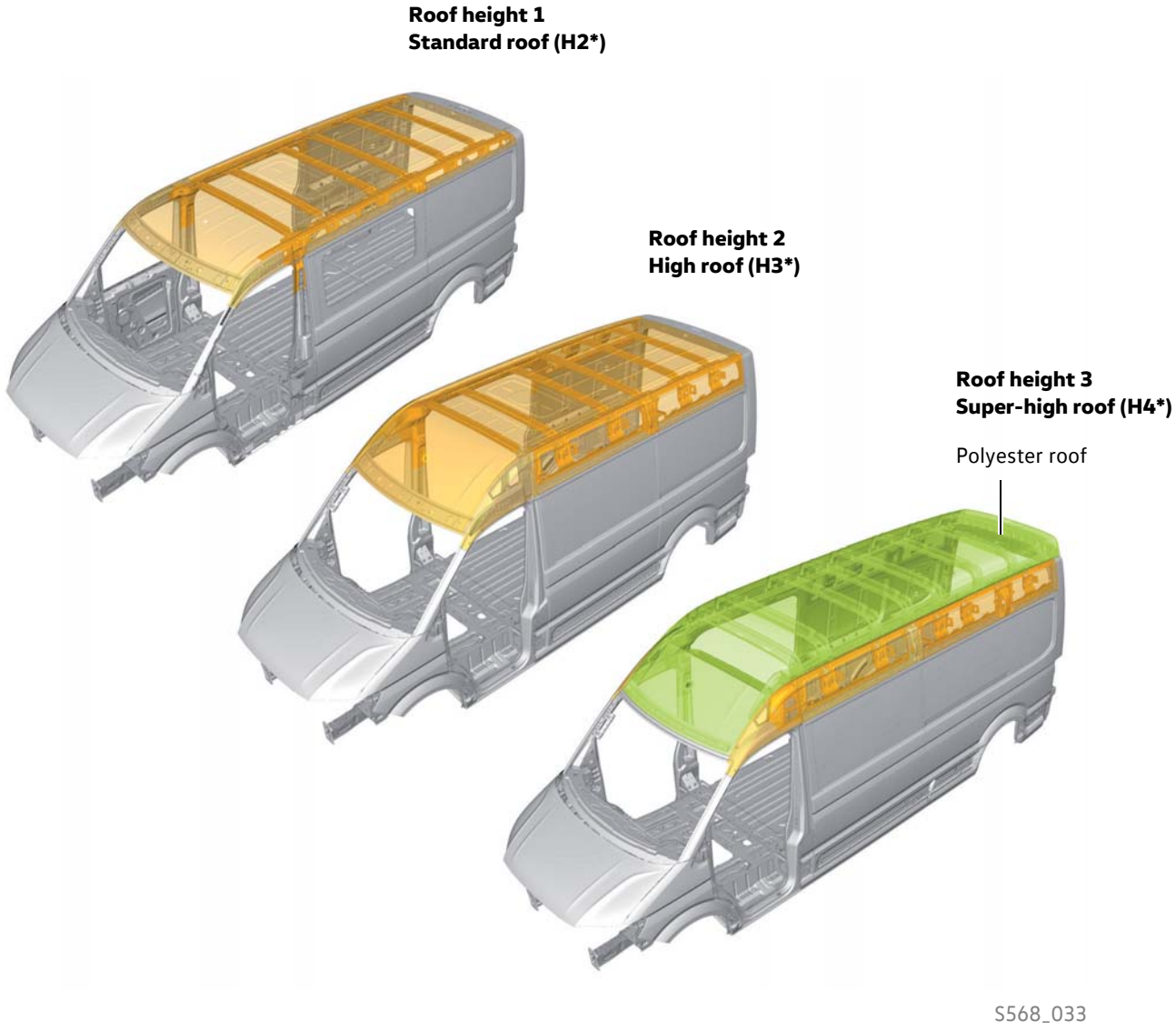


Example: long wheelbase with overhang

S568_028

Roof variants on the closed body

The standard roof and high roof are made of steel sheet. Roof cross members running sideways are used for reinforcing the roof.
The super-high roof is made of polyester. Roof cross members running sideways are laminated into the polyester roof for stabilisation. In addition, a reinforcement frame is integrated in the roof. The connection between the super-high roof and the body is made by glue and screw connections. Following assembly, the resulting gap between the body and polyester roof element is sealed with joint sealant.



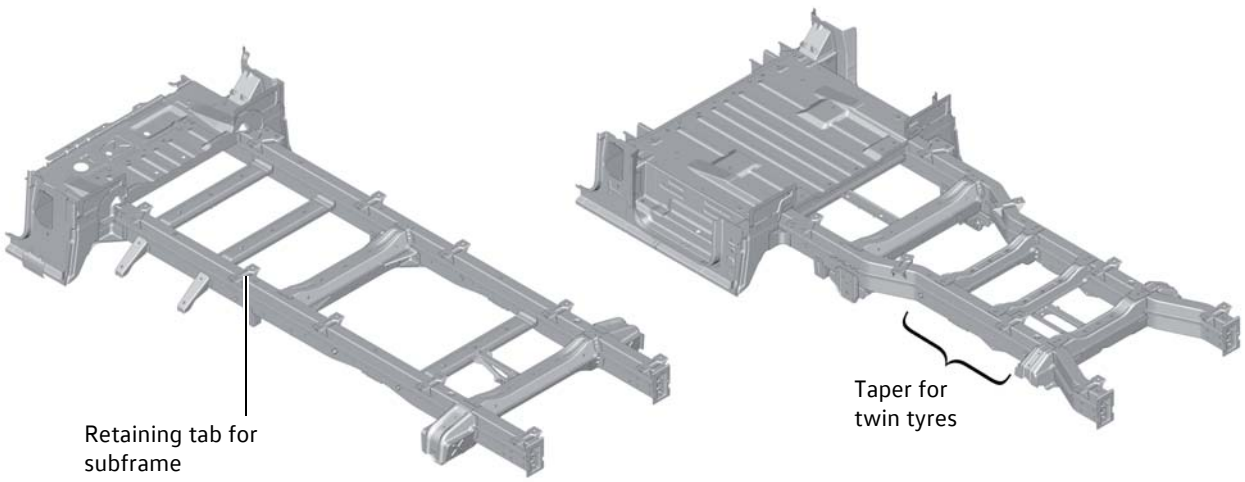
* These parameters are explained in Self-Study Programme 566 "The Crafter 2017" on page 9.

Open vehicle body with ladder frame

Vehicles with 3.5 t / 4 t and 5.5 t have different ladder frames. These are adapted to the particular payload and the corresponding tyres that are used.

Ladder frame 3.5 t / 4.0 t

Ladder frame 5.5 t



S568_034

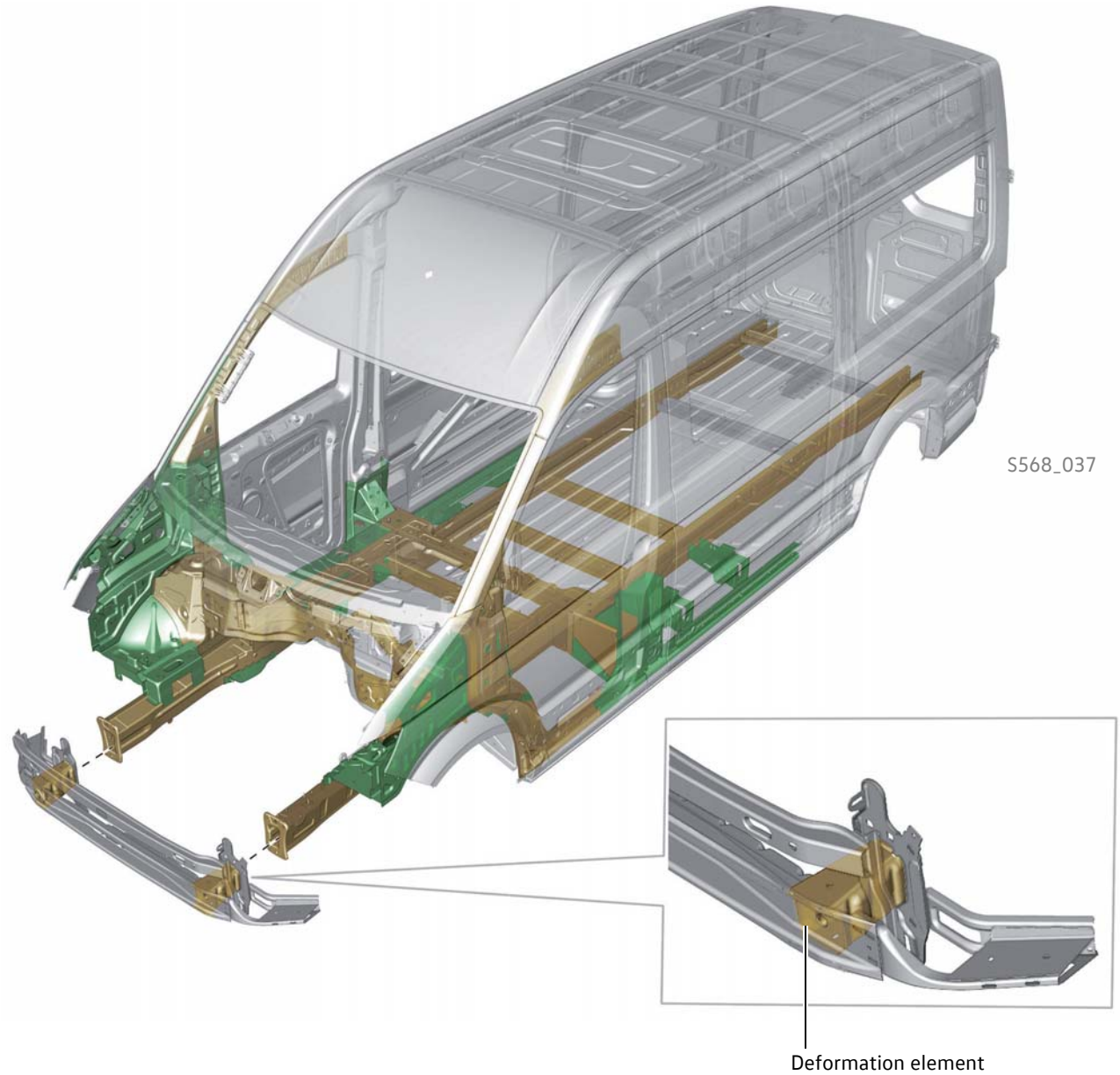
There is a flat frame for the use of special bodies (e.g. campers). This is based on the low base frame (without floor panel) of the Crafter panel van and is approx. 193.5 mm lower than the ladder frame for the open body. Optionally, the flat frame is available in combination with an axle that is about 200 mm wider.

Flat frame 3.5 t / 4.0 t

S568_099

Load pathways in the body structure

Specific components of the body structure have been designed accordingly to absorb high energy levels if there is a front or side-on crash; they are produced using steels with strength values specially selected for this purpose (shown in brown). If there is a crash, this means the absorbed energy can be dissipated by targeted deformations in a defined way. Other selected areas of the body structure have a support function (shown in green). Their task is to stabilise the cab if there is a front or side-on crash.



Key

- Components for high loads
- Components for support functions

The joining processes

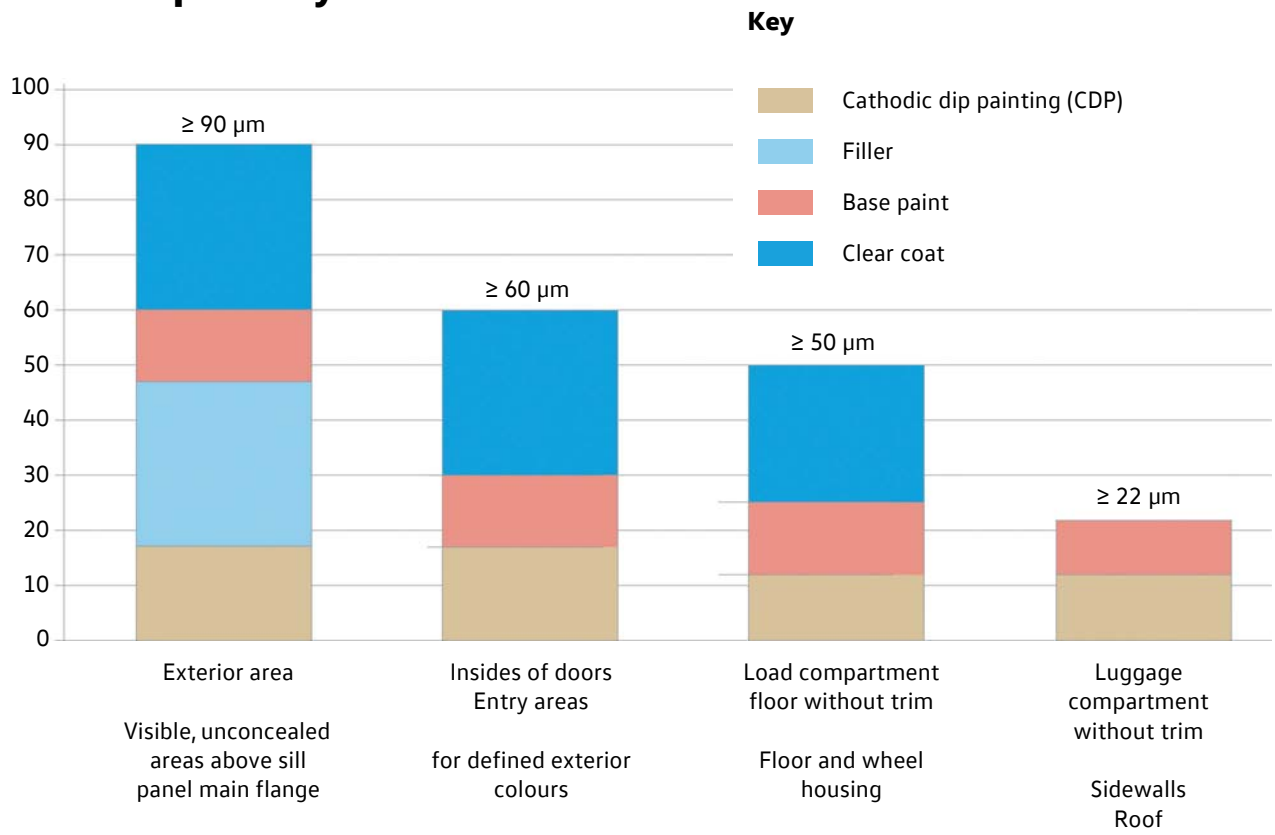
For design reasons, different joining processes are used in the Crafter 2017, e.g. resistance spot welding, laser soldering, laser welding and gluing technology.

Further information about joining processes can be found in Self-Study Programme 421 "Body Basics".

Paintwork structure

The Crafter is available with non-metallic or metallic paint. Both paint variants are subsequently given a clear-coat topcoat.

Minimum paint layer thicknesses



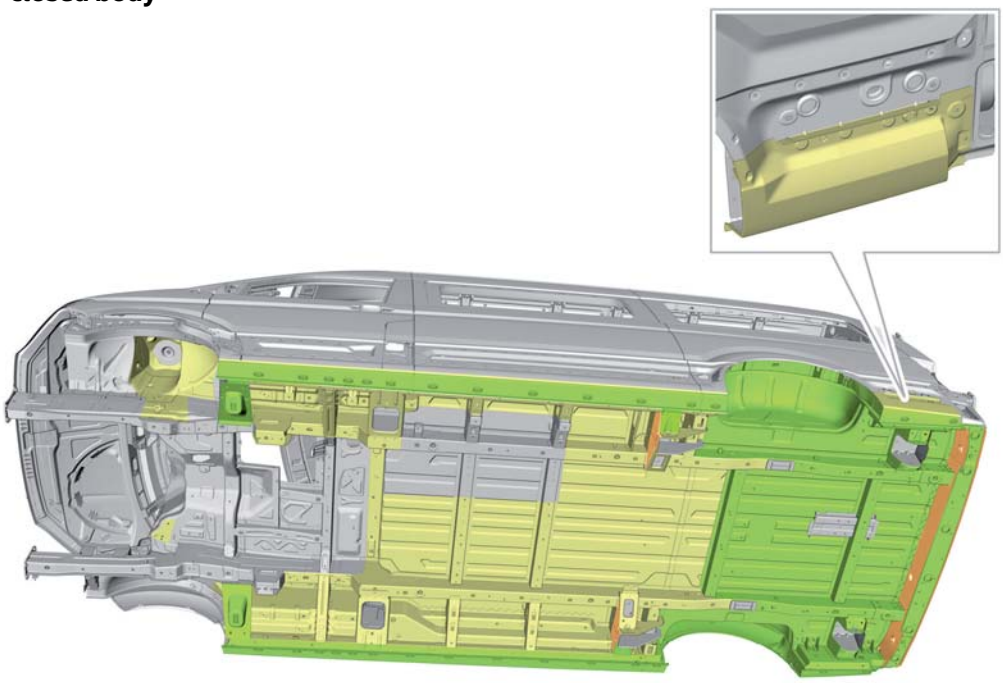
S568_038

Corrosion protection

The area of the underbody, the front and rear wheel housings as well as the outer panels of the sill panel are protected with underbody protection with coat thicknesses between 400 µm and 1000 µm. The coat thicknesses can deviate in the upwards direction (maximum 2000 µm).

The outer body panel behind the rear wheel housings is sealed over its surface with underbody protection in the visible area. The PVC underbody protection is applied directly to the electrodip coating. Cavities and assembly surfaces, e.g. for the leaf spring mounting, do not have PVC. All seams and folds on the underbody are sealed with joint sealant.

Example – closed body



S568_039

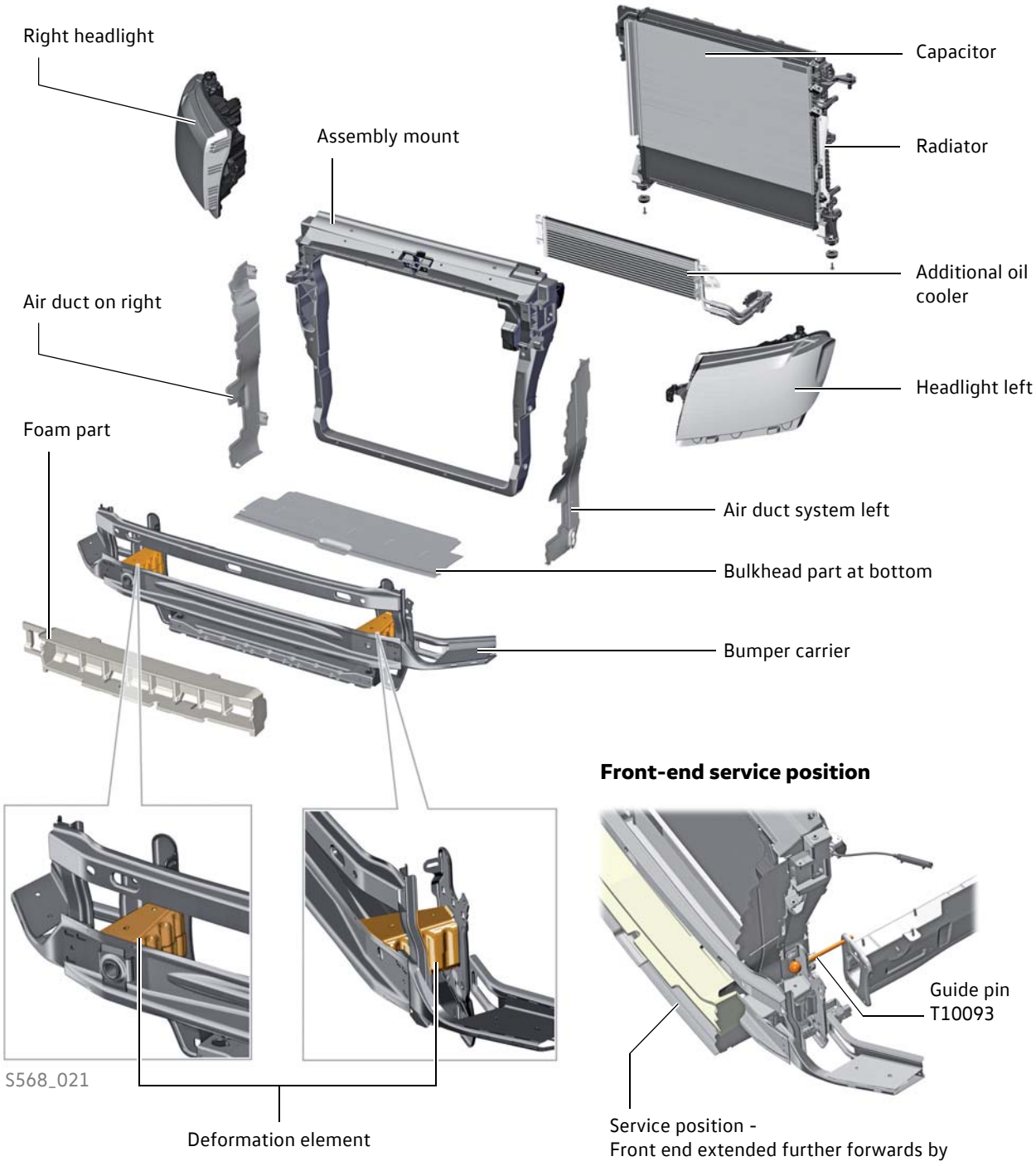
Key

- ~ 400 µm
- ~ 700 µm
- ~ 1000 µm
- Cathodic dip painting (CDP)

All cavities in the lower area of the body and on add-on parts are protected with cavity wax. The coat thickness of the cavity was is > 30 µm. The door cavities are protected up to a height of 80 mm. The body of the Crafter 2017 is galvanised with the exception of the hot-formed panels and some reinforcements in the interior area of the body. All doors, the engine lid and the wing panels are hot-dip galvanised. The remaining galvanised panels are electrically galvanised.

The front end

The assembly carrier is made of sheet steel and is used for accommodating the radiator, additional oil cooler and condenser of the air conditioning system. A reinforcement for the step is worked into the assembly carrier. The deformation element is used for absorbing crash energy in a front collision. The front end can be moved to the service position using guide pins T10093 in order to improve accessibility.



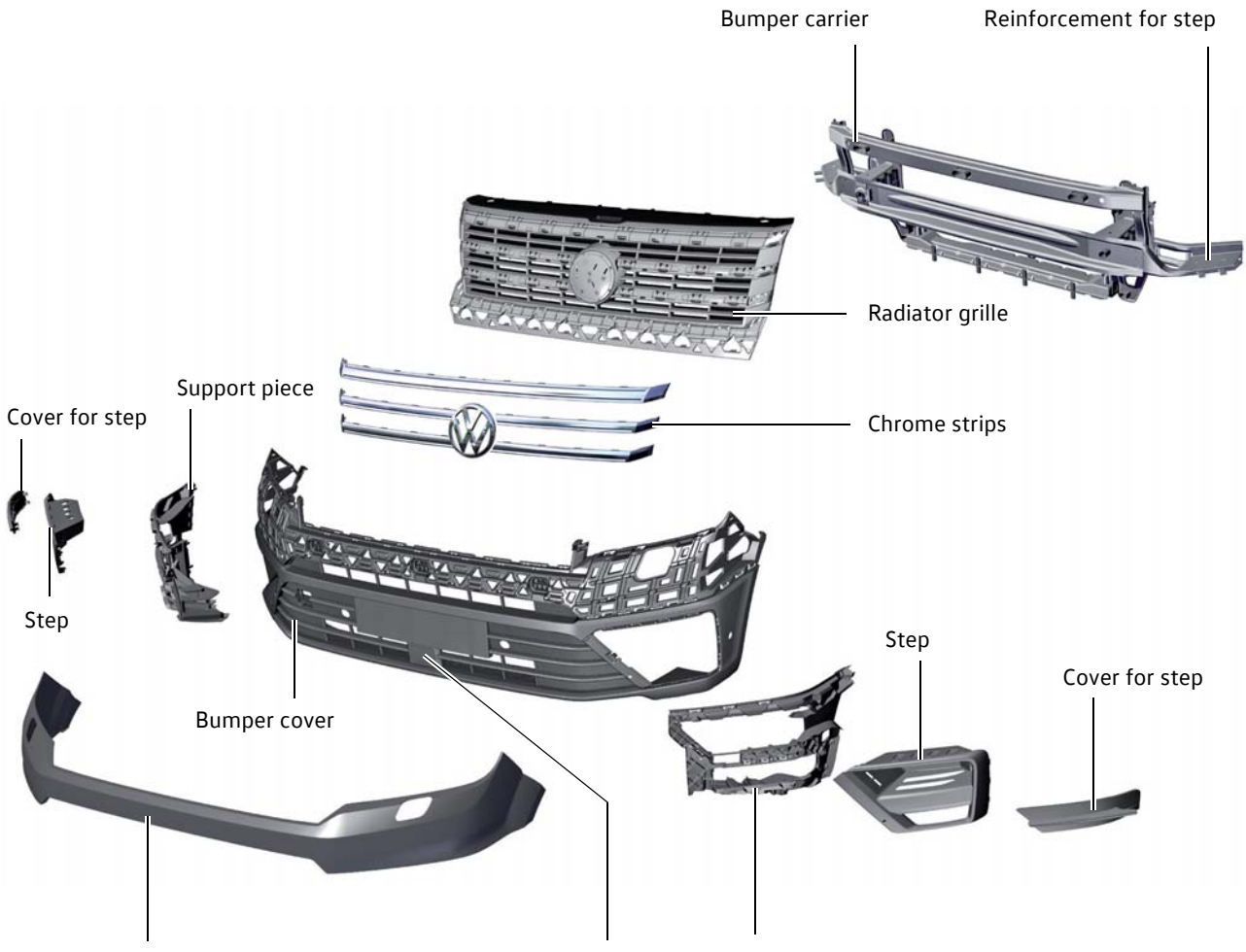
Front-end service position

Service position -
Front end extended further forwards by about 100 mm

S568_063

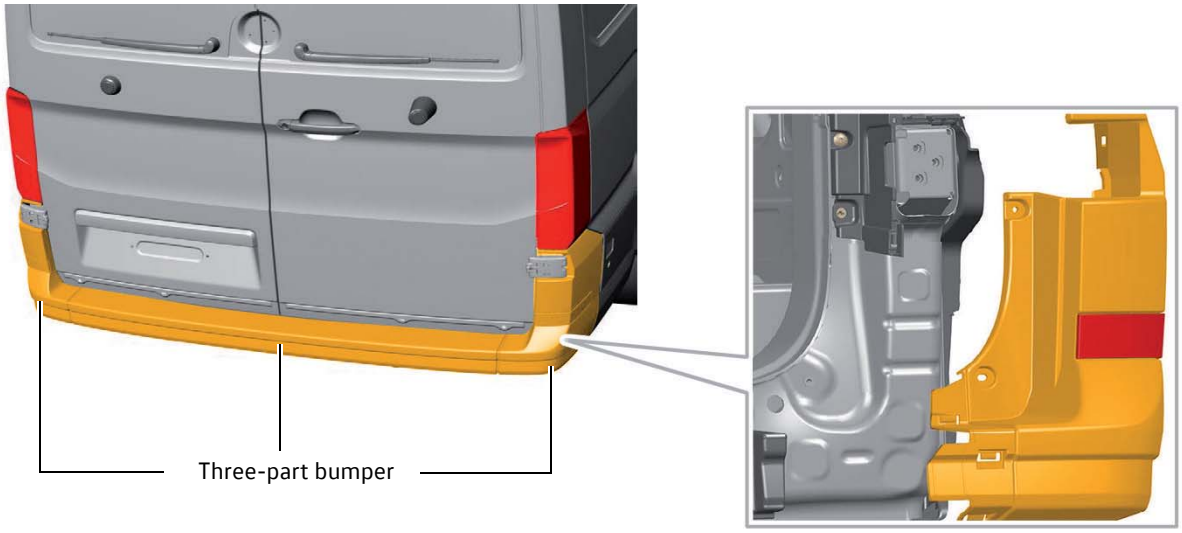
The front bumper

The front bumper chiefly comprises 3 assemblies, the bumper cover, the radiator grille and the trim panel. These are exclusively connected to one another using clip connections. The radiator grille can be fitted with chrome strips depending on the equipment.
The step and the fog lights are integrated into the bumper cover.
The trim panel can be painted or grained, depending on equipment.



The rear bumper

The rear bumper is made up of three parts in order to improve ease of repair. The middle part of the bumper can be configured as a step as an option. The step is reinforced by means of a frame part. Vehicles with a step are not available in combination with a towing bracket.



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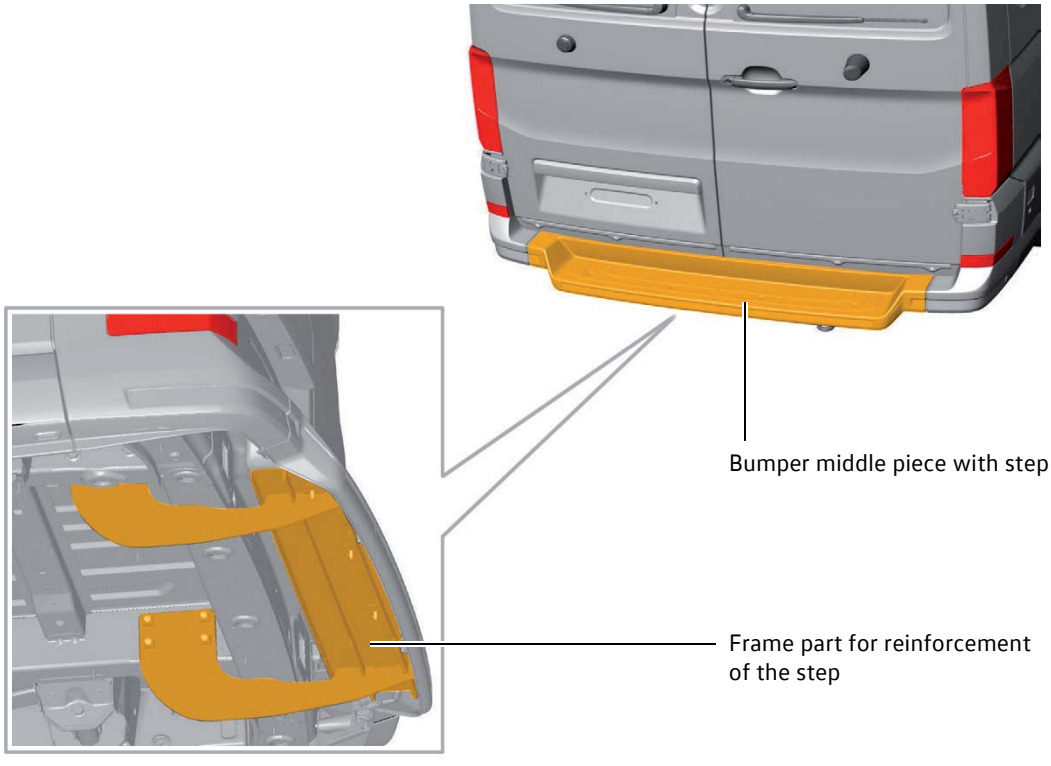
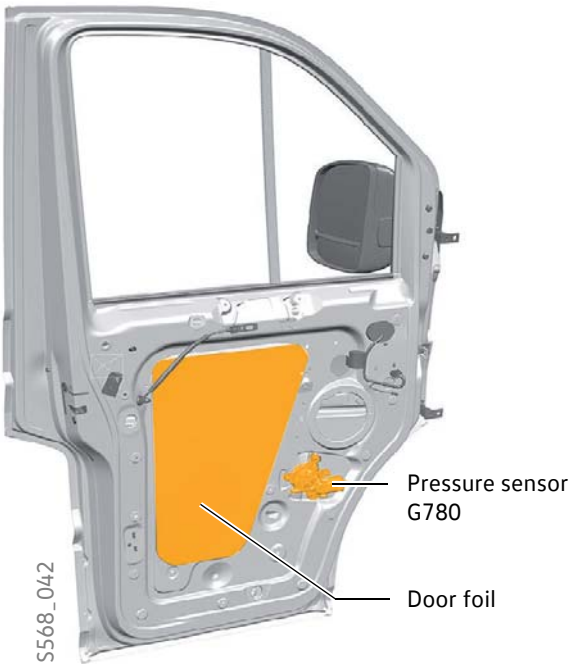


S568_041

Door concept

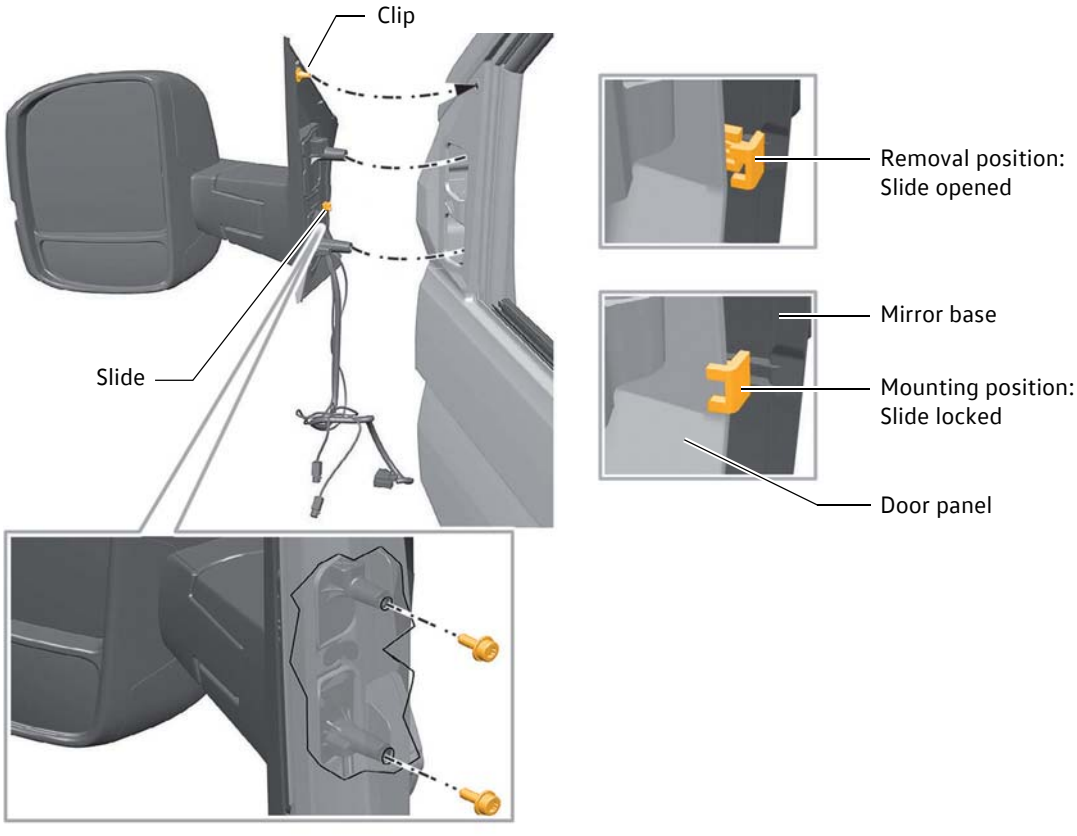
Driver/front passenger doors

The driver/front passenger doors of the Crafter 2017 comprise an outer panel and an inner panel. These have a one-piece structure. All inner components are mounted through a large assembly opening. The door foil seals the installation opening.



Exterior mirror

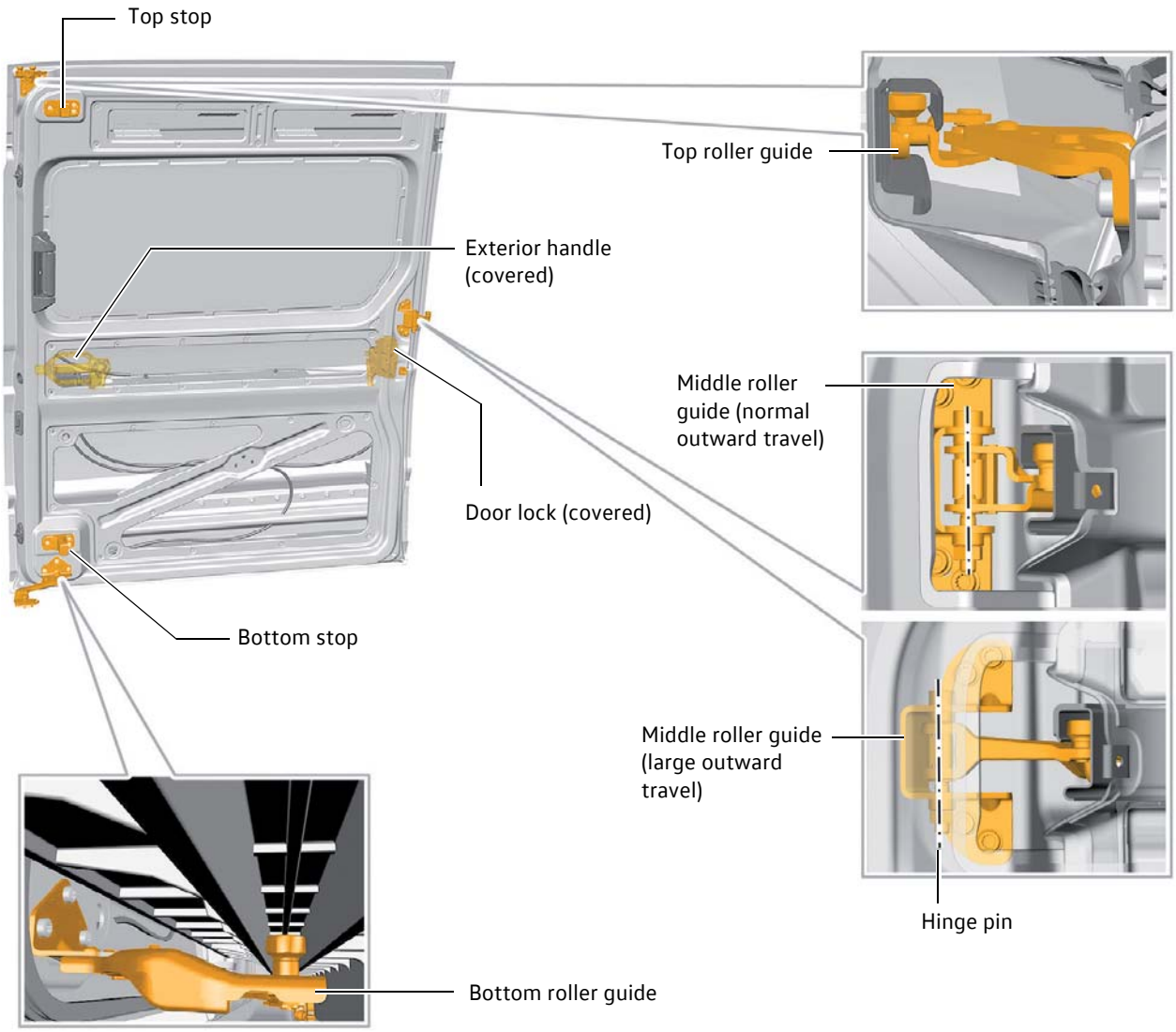
The exterior mirror is connected to the door by means of two screw connections. The clip on the mirror base cover and the slide are used to assist assembly.



Sliding door

In the version with a sliding door, this is always fitted on the side of the body opposite to the steering wheel. Optionally, Crafter vehicles are also available with two sliding doors, one on each side. Each door is guided on rollers in guide rails at the top, middle and bottom. There are sliding doors with 2 door heights for the different roof heights, one for the normal roof and one for the high and super-high roofs. There is a different variant of the middle roller guide with a large outward travel for the thicker, thermally insulated door used, for example, in refrigerated vehicles. This means the open sliding door is located about 25 mm further away from the body side panel in the rear area.

Illustration shows door of the high-roof vehicle



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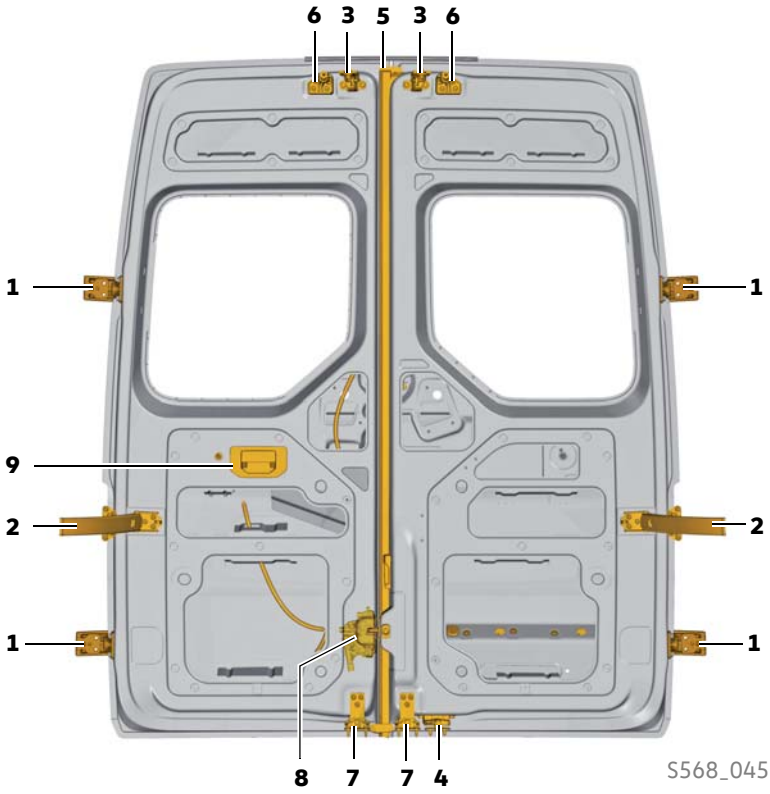
Rear doors

The rear doors are configured as wing doors. The maximum opening angle for both rear doors is 180°, 270° is also possible as an option. In this case, magnetic stops are fitted in order to hold the opened doors securely. On the sliding door side, the opening angle is somewhat less in order to avoid collisions with the sliding door. The right wing door always opens first. There are two different door heights, one for the normal roof and one for the high and super-high roofs.

Illustration shows door of the high-roof vehicle



S568_045

Key

1	Hinge
2	Door arresters
3	Rotary latch lock
4	Lock at bottom
5	Seal
6	Guide wedge
7	Guide ring
8	Door lock (covered)
9	Internal actuation
10	Stop (illustration bottom left)
11	Magnetic stop (illustration bottom left)

Rear door with magnetic stop - closed

S568_096

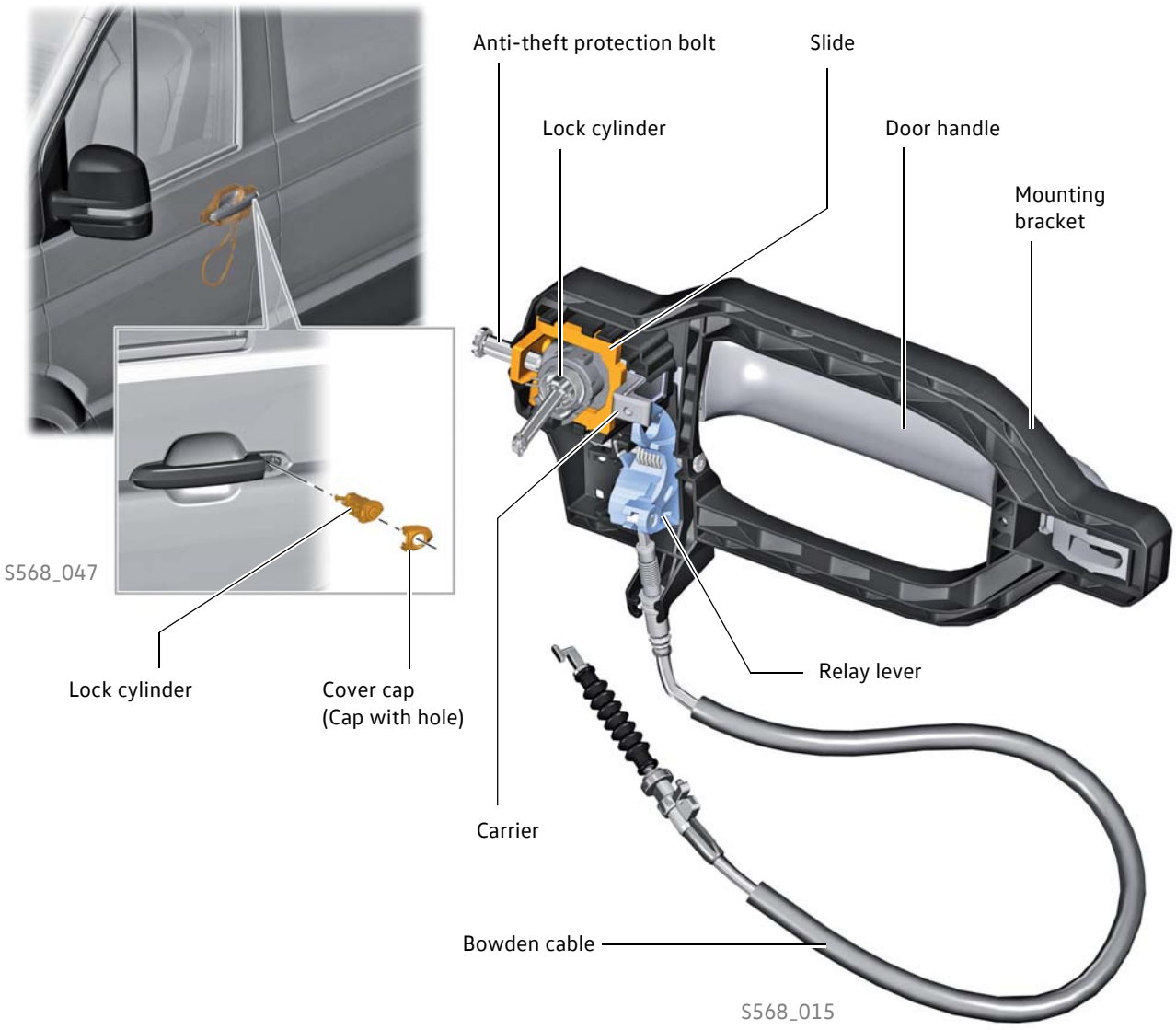
Rear door with magnetic stop - opened 270 degrees

S568_097

Door handle with lock cylinder

Newly designed door handles are used in the Crafter 2017. Lock cylinders are fitted in the driver door and the rear wing door.

Graphics show the door handle of the left-hand drive driver door

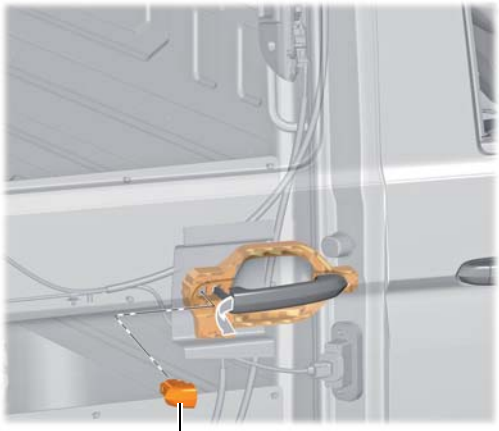


The door handle is guided in the bearing bracket. The follower of the door handle engages in the relay levers in the mounting bracket. For operating the door lock, the follower moves the relay lever which then activates the Bowden cable to the door lock. The lock cylinder is mechanically locked using the slide of the mounting bracket, and secured with an anti-theft protection bolt. The cap protects the lock cylinder.

Door handle without lock cylinder

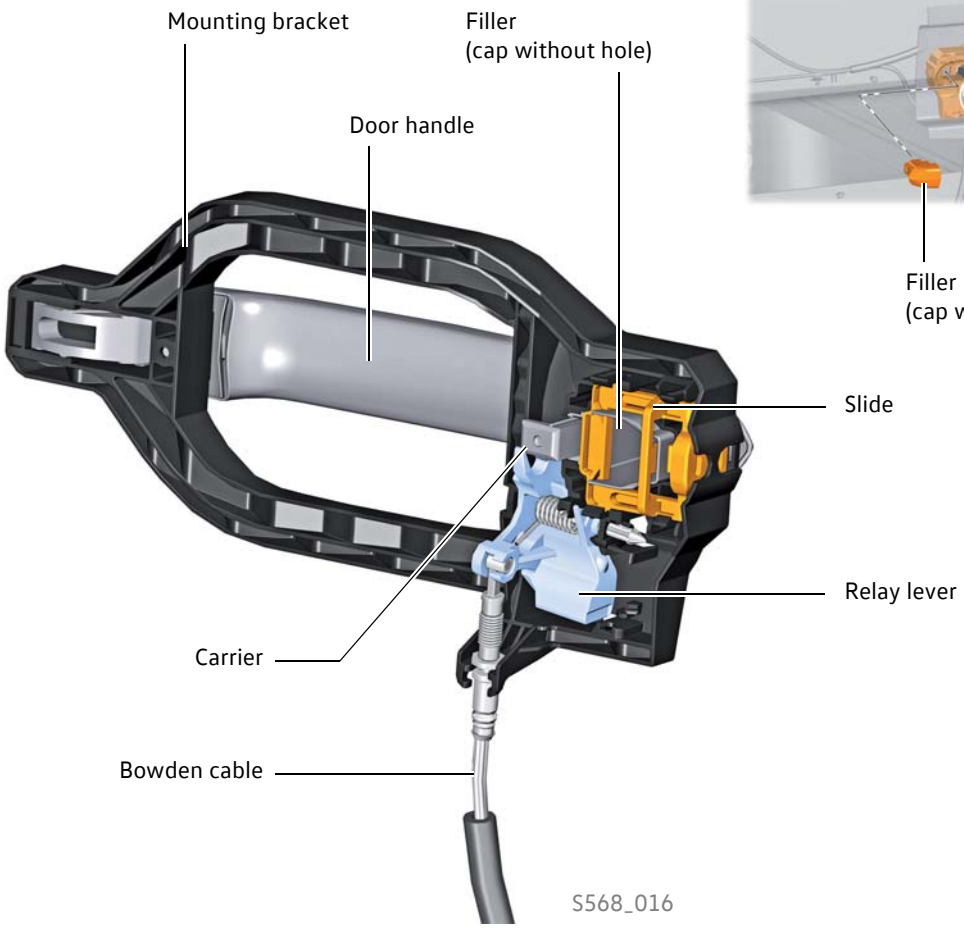
Instead of lock cylinders, filling pieces (cap without hole) are fitted on the front passenger door and the sliding door.

Graphics show the door handle on the right sliding door



S568_049

Filler
(cap without hole)



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The structure and function of the door handle basically corresponds to the door handle with lock cylinder, only that there is no lock cylinder and the corresponding anti-theft screw. The design of the slide has been adapted. The filling piece replaces the non-installed lock cylinder and is secured mechanically via the slide of the mounting bracket.

Lights

Interior lights

2 lights on the roof gallery

There are 2 lights on the underside of the roof gallery for the driver and front passenger

S568_051

Lights in the load compartment

The load compartment is provided with different lights for specific markets.

One variant has an incandescent bulb light above the rear and side doors.

Incandescent bulb light over rear door

S568_052

Incandescent bulb light over side door

S568_053

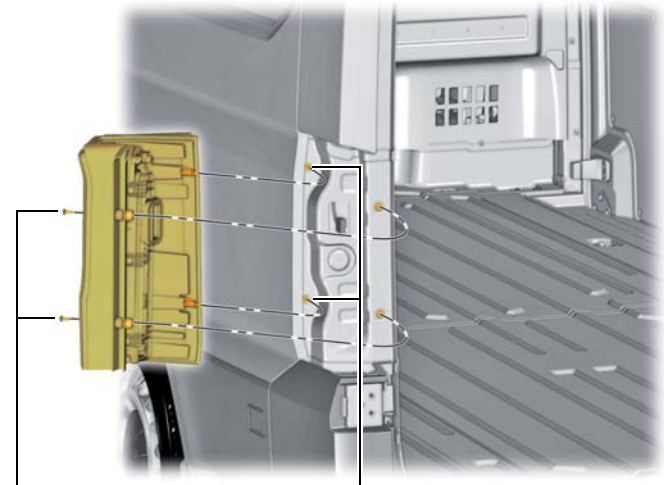
The other variant is equipped with 4 LED lights in the roof cross members.

S568_054

Tail lights with closed vehicle bodies

The tail lights are attached using 2 screw connections and 2 clip nut connections each.

S568_055



S568_056

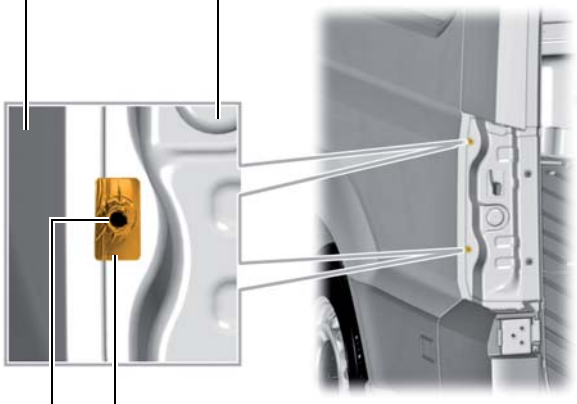
Screws

Clip nut

The outer connection of the tail lights is carried out using a clip nut connection. In the carrier plate for the clip nut, the outer panel of the side panel and the corner panel of the D-pillar overlap.

The accommodating hole for the clip nut is covered to prevent water ingress by means of self-adhesive sealing foil (zinc foil).

Following removal of the tail light cluster, the covering foil must be checked for damage and renewed if necessary.



Side part

D-pillar

S568_057

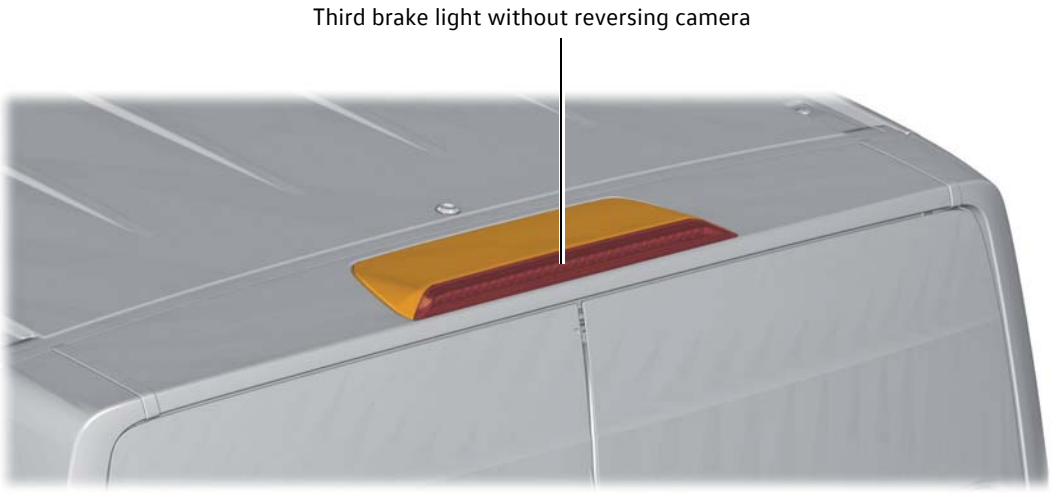
Sealing foil

Accommodating hole for clip nut

Additional information about the tail light clusters in closed vehicle bodies can be found in ELSA (electronic service information system).

High-level brake light

The high-level third brake light can optionally be equipped with an additional reversing camera. The housing of the brake light is attached to the roof cross member by means of eight metal clips and two screw connections. The metal clips and bolts are accessible through the openings on the underside of the roof cross member.



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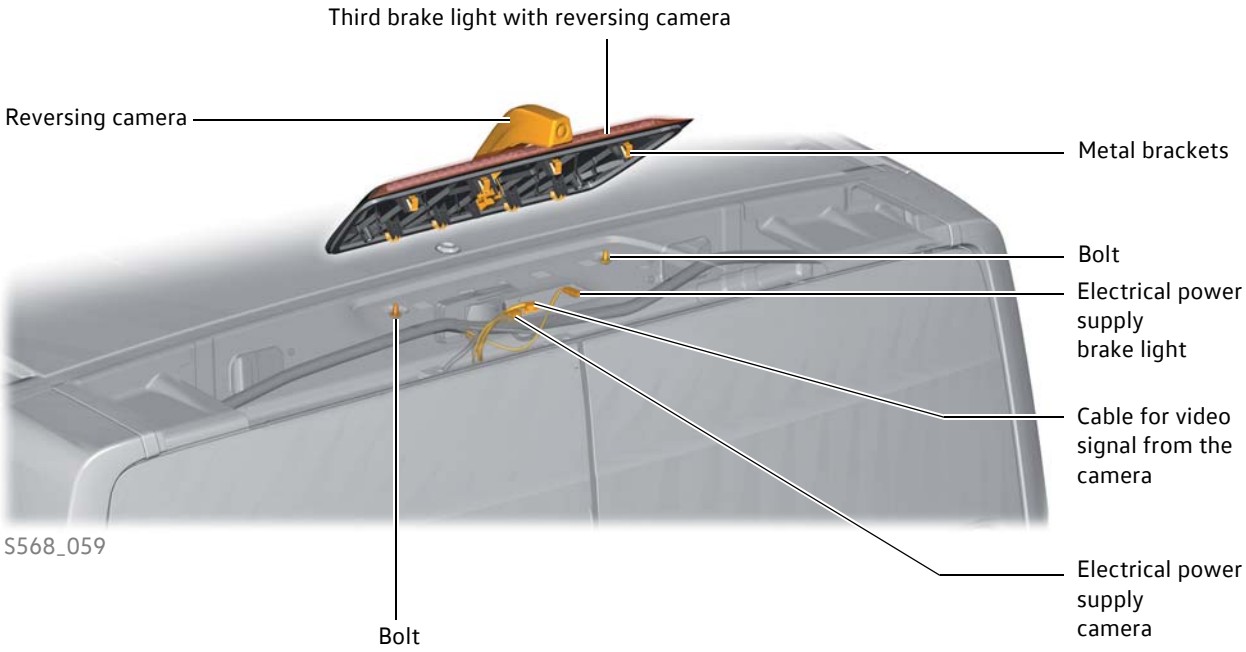


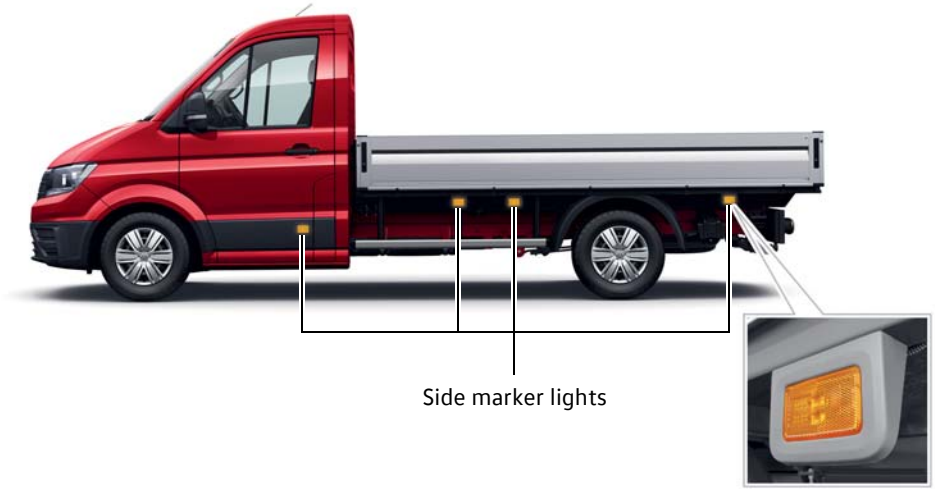
S568_059

Side marker lights

Depending on version, side marker lights in LED technology are fitted in the Crafter 2017. These are integrated in the side panelling of the closed vehicle.

S568_060

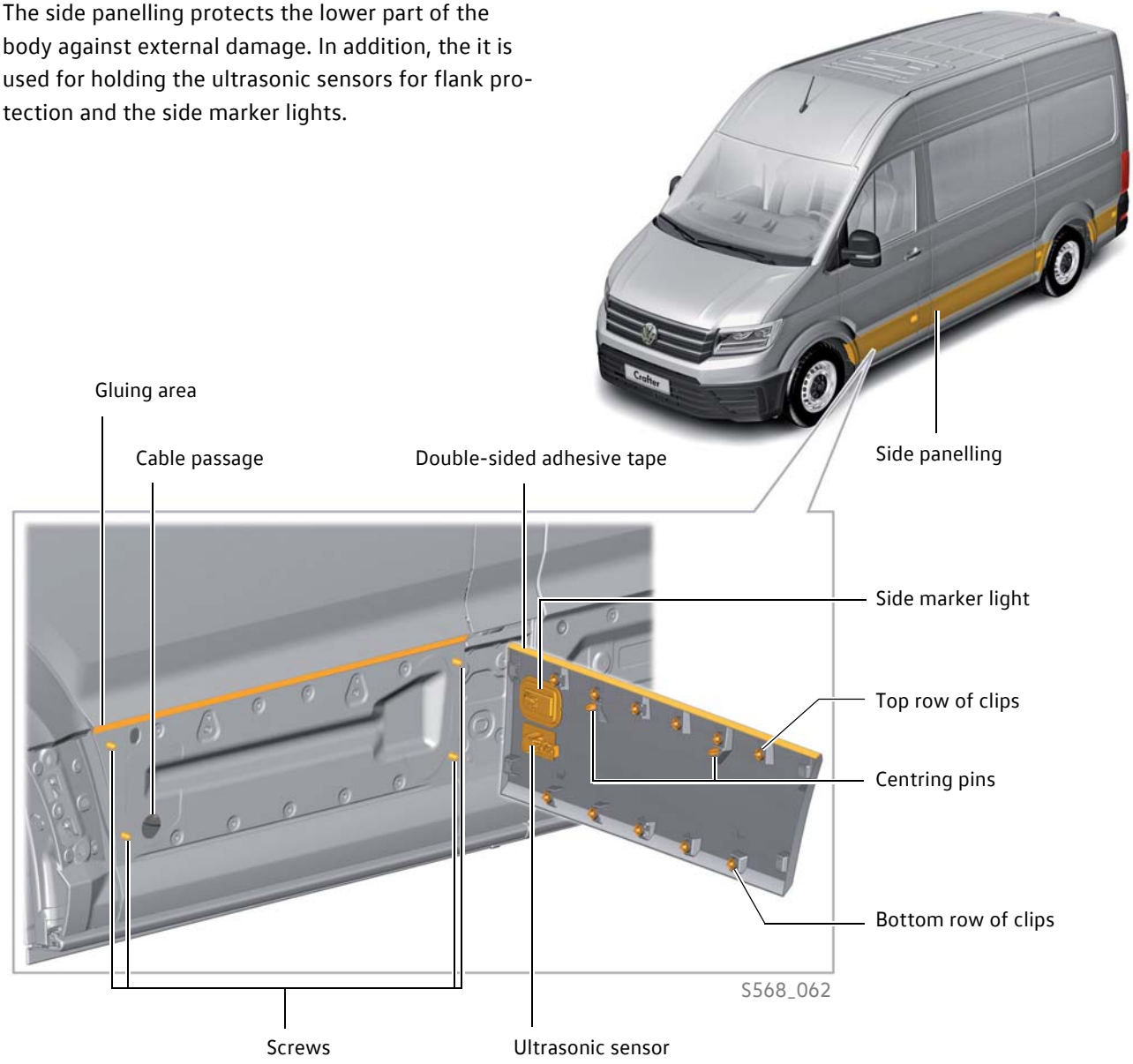
In the open vehicle, the first side marker light is integrated I the side panelling. The other side marker lights are mounted on a carrier on the body.



S568_061

The side panelling

The side panelling protects the lower part of the body against external damage. In addition, the it is used for holding the ultrasonic sensors for flank protection and the side marker lights.



The side panels are clipped in all cases and are additionally glued at the upper edge with double-sided adhesive tape. On the driver, front passenger and sliding doors, they are additionally secured using screw connections. The panels do not have any direct contact with the body, except at the gluing surface. The gluing prevents relative movements between the body and panelling, thereby avoiding damage to the paintwork and corrosion. Ultrasonic sensors and side marker lights are attached in the panelling using double-sided adhesive tape. The screw connections on the side panels are used as theft protection. This prevents them from being removed easily, and blocks access to the vehicle through body openings in the doors.

Windows

The windscreen, rear windows and side windows are glued. Depending on equipment, sliding windows are offered in closed vehicles and vent windows in the double cab.

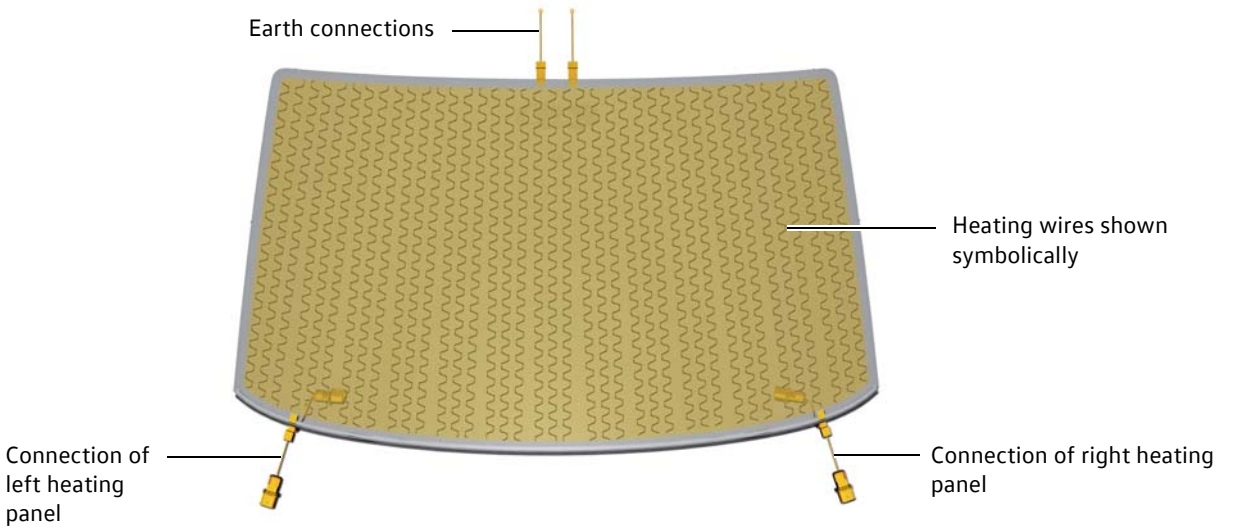
S568_065

Sliding windows in the side panel

S568_066

Heated windscreen

The heated windscreen helps with de-icing the windscreen and only functions when the engine is running.



S568_067

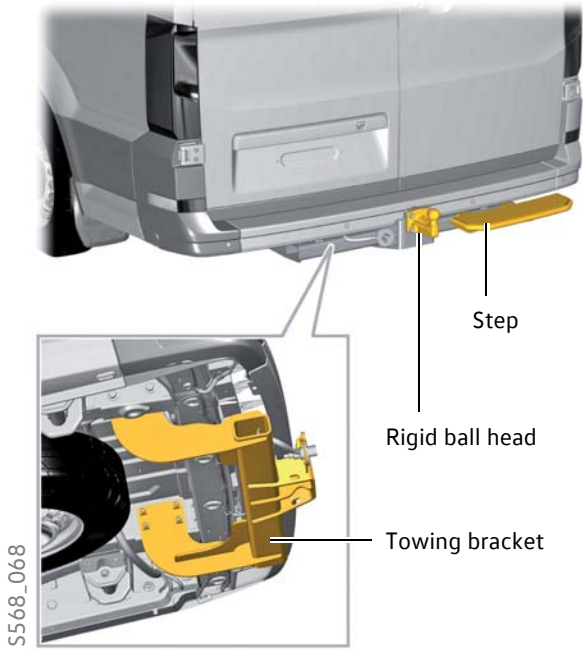
The towing bracket

The towing bracket is available for the Crafter 2017 in two different versions:

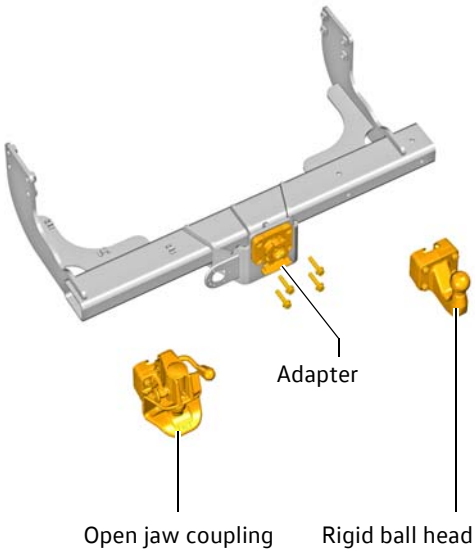
- with rigid ball head
- as a variable variant with the "Varioblock" system from Rockinger

In the variable variant, either a removable ball head or an open jaw coupling can be fitted on the towing bracket. The maximum trailer weight of the Crafter 2017 is 3500 kg. Vehicles with rigid and variable towing bracket can be equipped with a side step.

Variant with rigid ball head



Variant with variable towing bracket



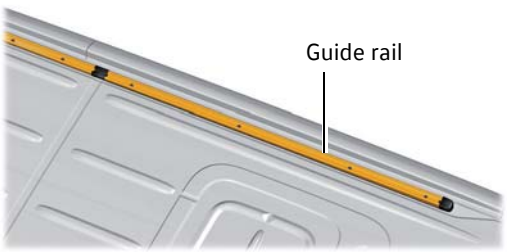
S568_069

The roof rack

The guide rails for the roof rack are screwed onto the body roof and are reinforced on the inside in the area of the D-pillar by a profile section that is also screwed on. The connection points are fitted as standard. This means the guide rails can always be retrofitted for roof racks.

Possible roof loads:

Normal roof	up to max. 300 kg
High roof	up to max. 150 kg



The preliminary assembly steps for special installations

Completely open chassis without platform body are available for body and conversion manufacturers. In addition, there is an incomplete chassis which enables cost-effective personalisation. These incomplete chassis differ in terms of the cowl panel and platform.

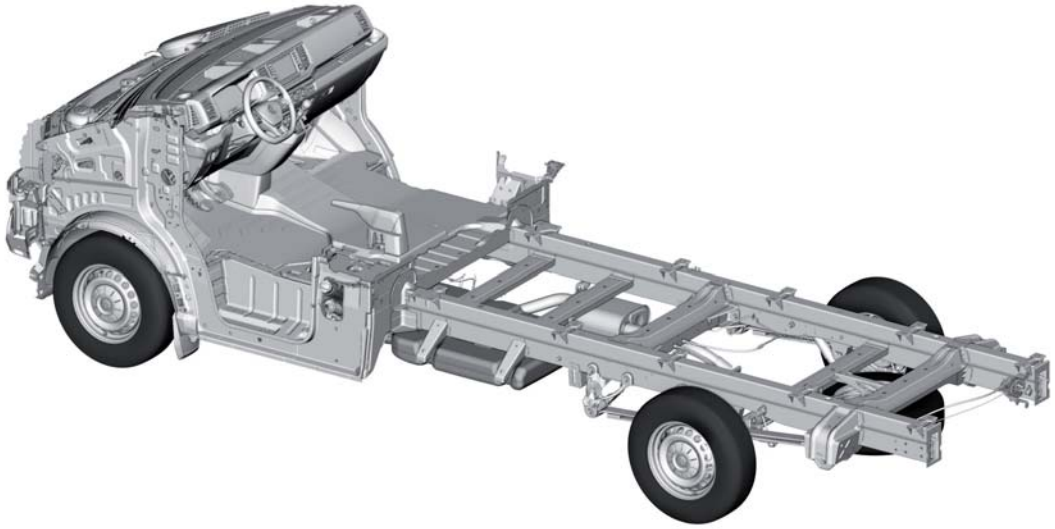
Cowl panel

Cowl panel refers to an open chassis without roof or rear wall. This design is favourable for conversion into delivery vehicles, campers or emergency service vehicles, for example.

S568_035

Platform

The platform does not have any upper body at all for the driver cabin or doors, engine lid, wing panels, bumpers, headlights and seats. This design is favourable for conversion into fully integrated delivery vehicles or campers, for example.



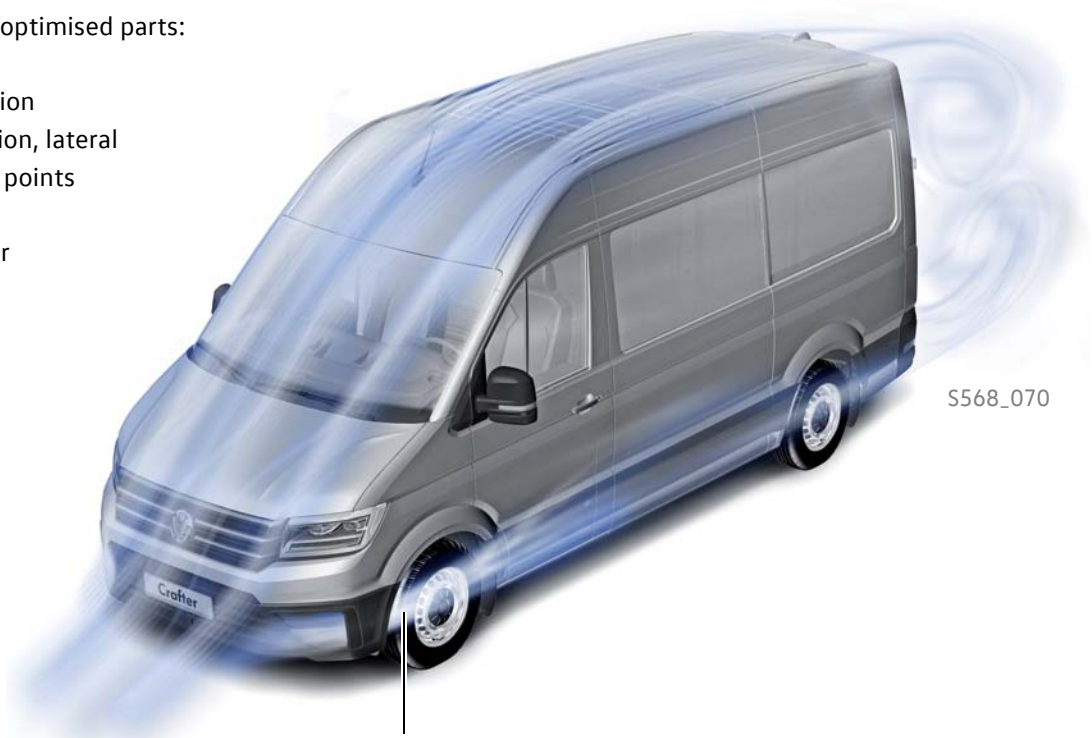
S568_036

Optimised aerodynamics

The basic shape of the body has been optimised with regard to aerodynamics compared to the previous model. For example, the design of the bumpers with a special air duct enables an air curtain to be created in the area of the front wheels. The roof indentation in conjunction with the lateral rear indentation create aerodynamically optimum air guidance along the outside contour of the body. This shape is also called a "fish belly". It is the most favourable aerodynamic design for a vehicle body. Special breaking edges at the rear of the vehicle are used to achieve an aerodynamically favourable flow shear.

Aerodynamically optimised parts:

- Roof indentation
- Rear indentation, lateral
- Rear breakoff points
- A-pillar
- Exterior mirror
- Bumper
- Step

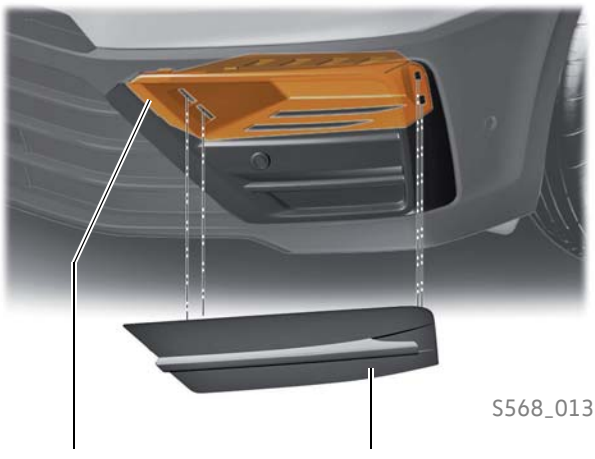


S568_070

Targeted air guidance past the wheel (Aircurtain)

Steps

There are two steps on the left and right in the front bumper. These are used for climbing up, for example to remove snow and ice from the windscreen. The covers over them are clipped into the bumper and can be taken out forwards. The shape of the cover means that the air ducting is optimised.



S568_013

Step

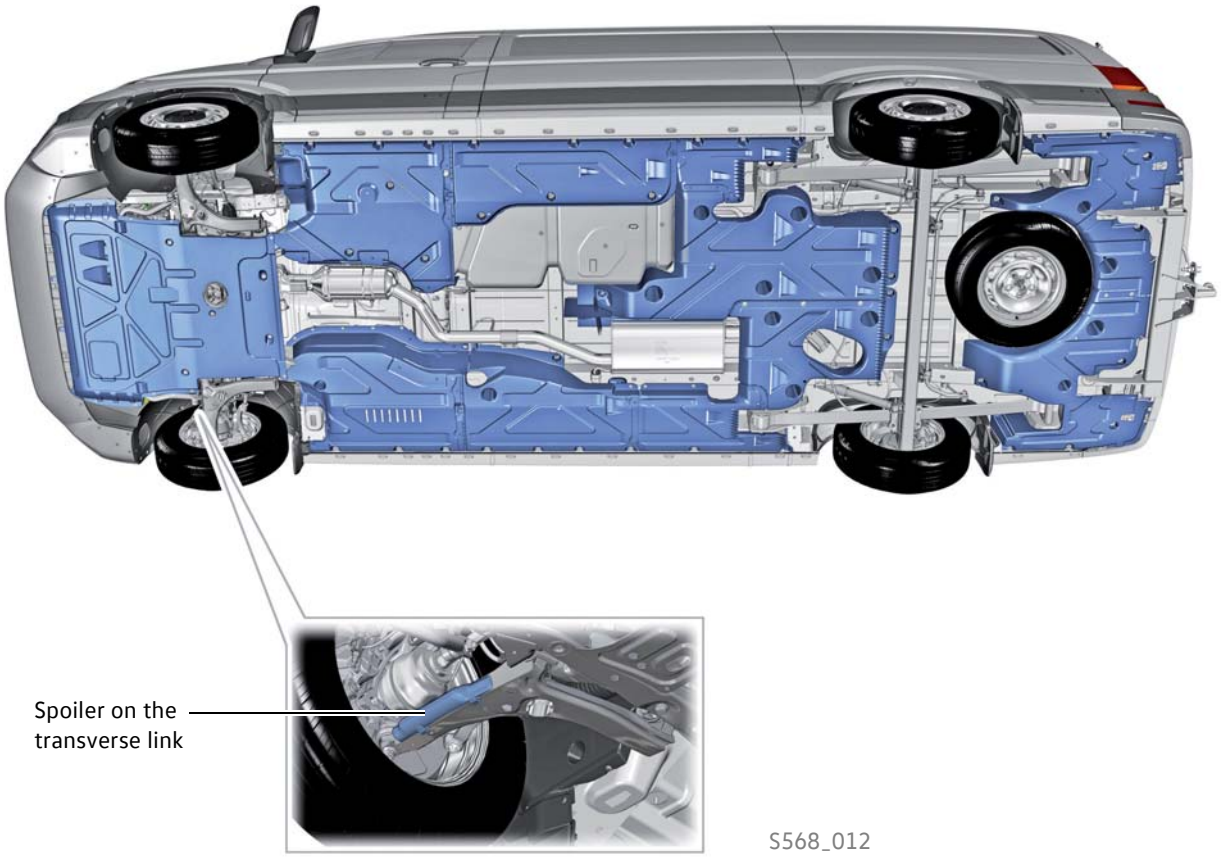
Cover

The consumption optimisation pack

Underbody cladding

Drag along the underbody of the vehicle make a substantial contribution to increased driving resistance. To reduce flow losses on the underbody as much as possible, the underbody of the Crafter 2017 has been specifically designed to have a smooth surfaces. An almost completely smooth underbody has been achieved with covers.

In vehicles equipped with an aerodynamic pack, underbody covers are used that considerably reduce the interior noise in addition to improving the aerodynamics. These underbody covers are exclusively available in vehicles with front-wheel drive. An additional spoiler on the left and right transverse link is also included in the aerodynamic pack.



S568_012

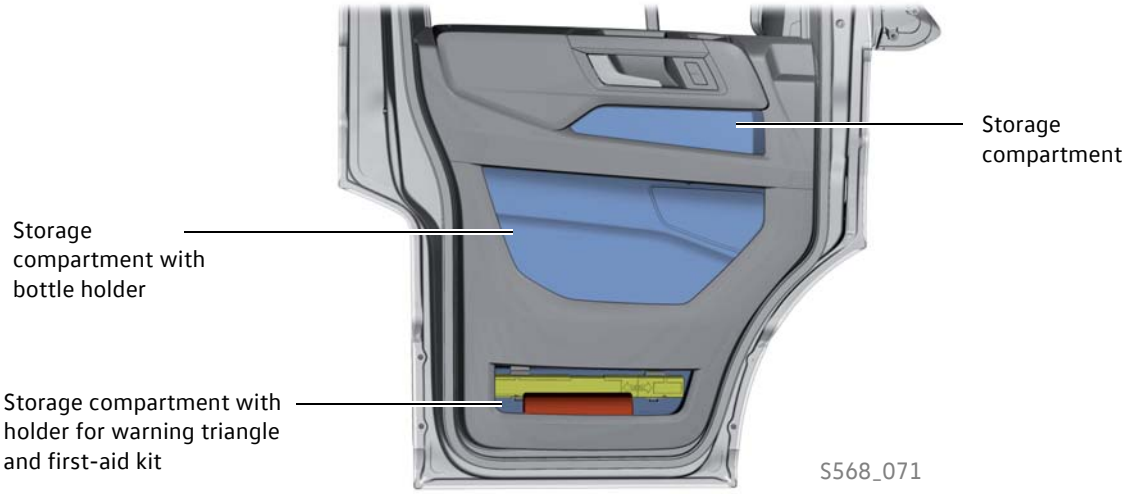
Storage concept

Dash panel

The dash panel has been completely redesigned. In addition to numerous storage and stowage compartments, it offers connection possibilities for mobile devices.

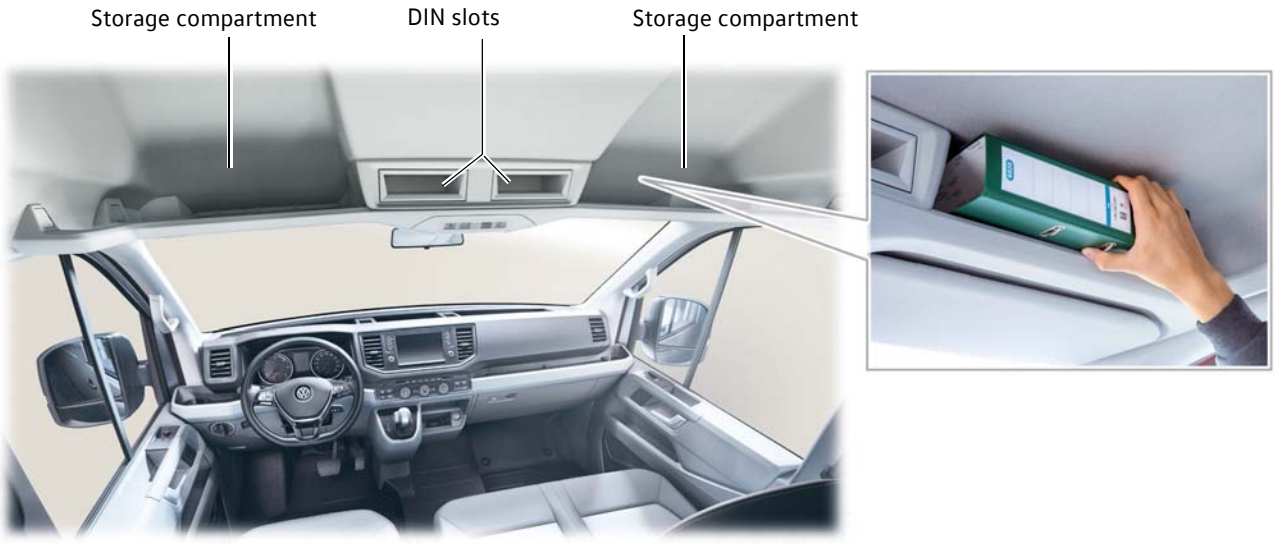
The dash panels fitted in the Crafter 2017 are the same in all vehicles. The surfaces are grained and have a robust quality. Chrome applications are available as an option to upgrade the appearance.

Door panels



Roof gallery

The roof gallery is optionally available with 2 spacious storage compartments and 2 DIN slots (only 1 DIN slot is available if the vehicle is equipped with a 2nd evaporator)



S568_072

Side trims in the load compartment

Optionally, multi-part side trims made of plastic and plywood are available in different heights.

S568_074

Side trim made of plastic

S568_075

Side panelling made of plywood

Seating design

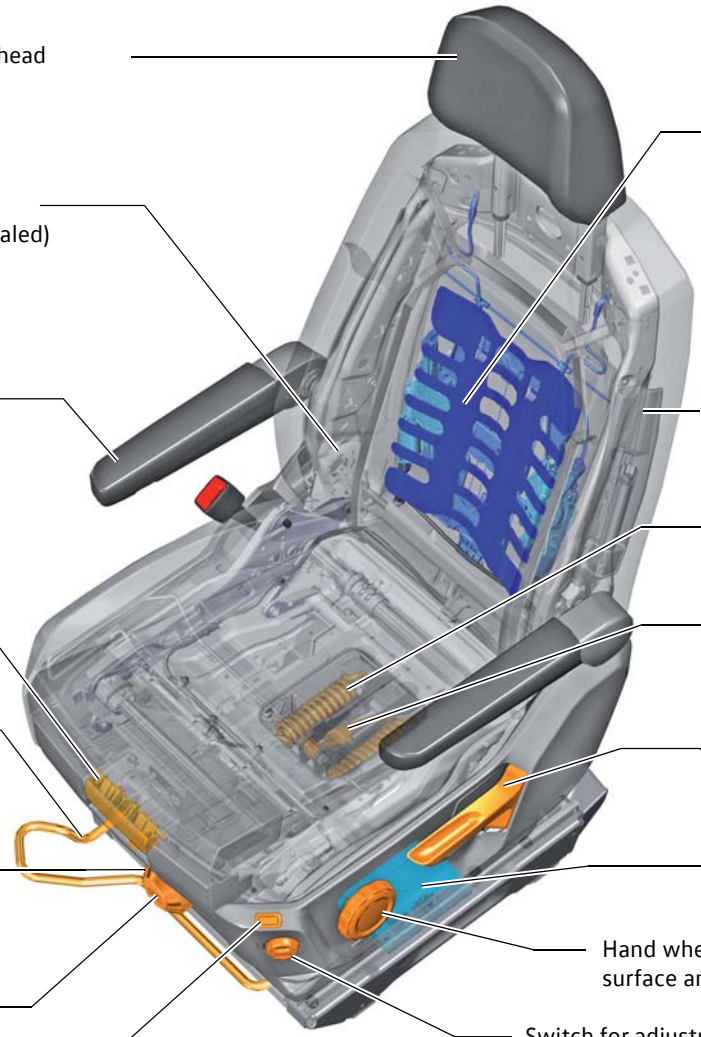
Individual seats in the cab

Individual seats in the cab are available with different versions

	Rigid seat	Comfort seat	Comfort "Plus" seat	"ergo-Comfort" seat	"ergo-Active" seat	Rotary seat
						
Backrest angle adjustment	●	●	●	●	●	●
Longitudinal adjustment	●	●	●	●	●	●
Height adjustment		●	●	●	●	●
Seat surface angle adjustment		●	●	●	●	●
Manual 2-way lumbar support		●				
Electric 4-way lumbar support			●	●	●	●
1 x inside armrest		●				
2 x inside/outside armrest			●	●	●	●
Swing unit with weight setting				●	●	
Seat depth adjustment				●	●	
Massage function					●	
Turn function						●

"ergoComfort" / "ergoActive" seat

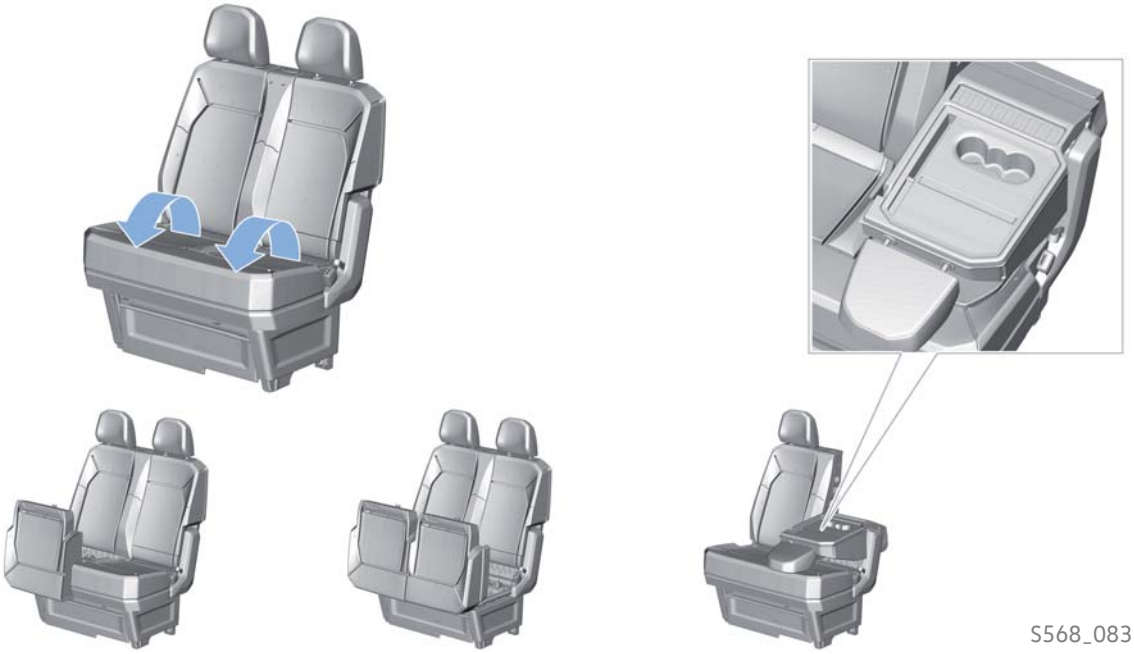
The "ergoComfort" and the "ergoActive" seats are 100% new developments. Two coil springs and a gas damper generate a vertical oscillating behaviour that can be adapted to the weight of the occupant's body. This ensures comfortable and fatigue-free sitting, especially on long journeys or poor quality roads. The comfortable feeling is boosted by the ability to set a large number of individual seat positions. The lumbar support integrated in the backrest reduces strain on the spine. The seat is available as "ergoComfort" (without massage function) or "ergoActive" (with massage function). The seat has already received the official seal of approval from AGR (Campaign for Healthier Backs) for its outstandingly good ergonomic characteristics. The control unit for massage function and lumbar support adjustment is located under the driver seat.



S568_004

Front passenger double seat bench

The seat cushions can be folded individually as standard. Behind them, there is a storage compartment within the seat frame that is concealed. Optionally, the inner backrest is equipped with a folding function as well. This offers additional loading possibilities. Furthermore, the backrest is provided with a writing surface for carrying out administration work (cup holder, writing surface, pen receptacle, storage compartment for tablet computer, mobile phone, etc. and clipboard).



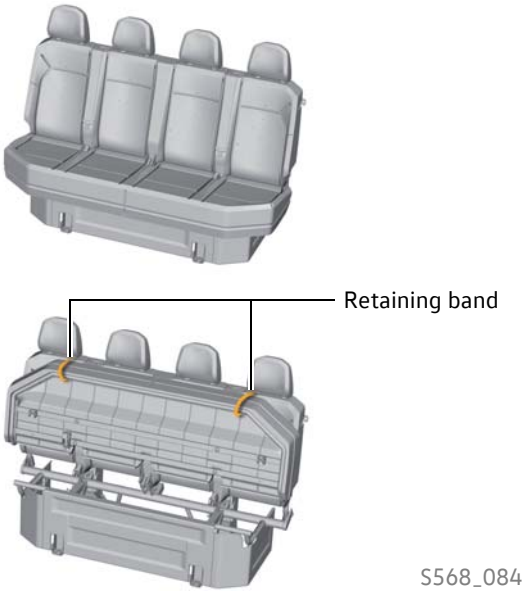
S568_083

4-seat bench for double cab

The double cab is equipped with a 4-seat bench in the second row of the passenger compartment.

Characteristics

- Storage compartment under seat bench accessible from above
- Integrated three-point automatic seat belts for the two middle seats
- Flat head restraints, adjustable height
- Retaining strap for securing the seat cushion when folded up



S568_084

The load compartment with closed vehicle bodies

The load compartment offers a wide range of applications.

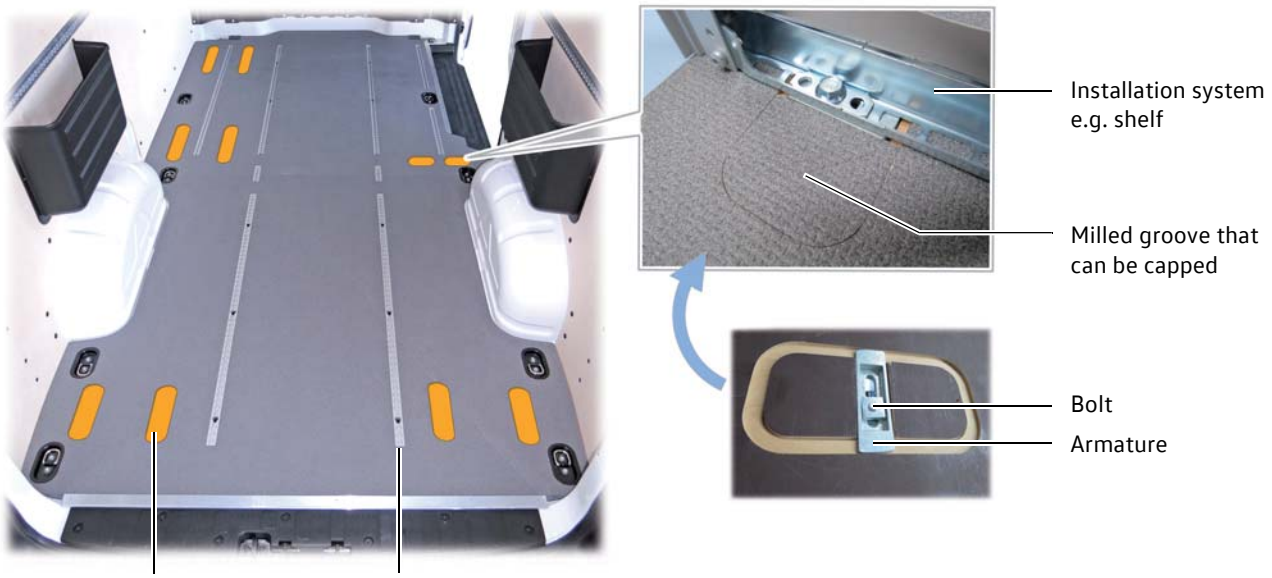
Universal floor

S568_085

The universal floor is based on the continuous wood floor covering of the Crafter 2017. It enables units to be built into the vehicle quickly without needing to adapt the load compartment floor. This is a precondition for setting up the load compartment individually –without any need for gluing or drilling. Rack and cabinet systems from various manufacturers can be installed and removed without difficulty depending on the customer's requirements. The built-in units can be removed if required without leaving any effects.

Body & Trim

The universal floor is made of a beech wood/hardwood veneer that is sealed with an anti-slip coating. It includes numerous milled grooves sealed with covers that can be removed. Floor adapters can be screwed in at these points, so as to accommodate cabinet systems from various manufacturers for example. The universal floor is not glued into the vehicle, which means it can easily be removed. Optionally, the universal floor can be equipped with fastening rails and eyelets.

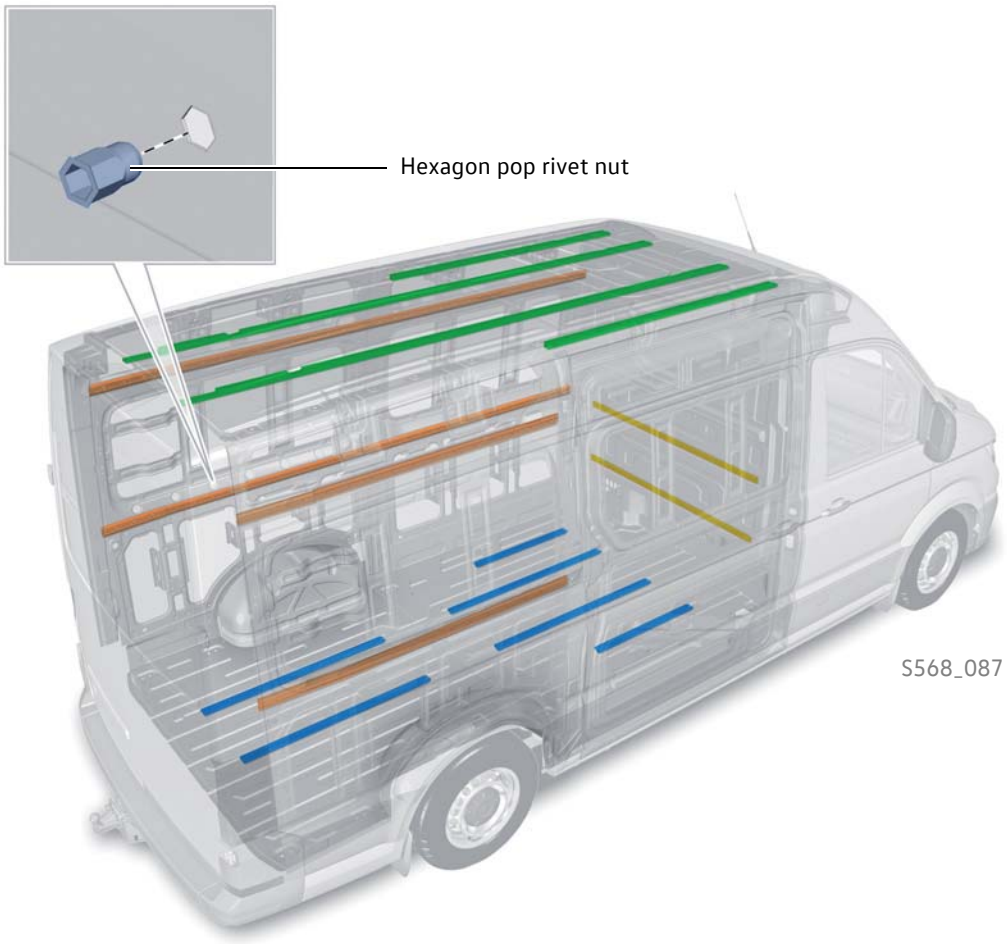


S568_086

Load securing

Closed vehicles can be equipped with fastening rails in the side parts, roof cross members, on the floor and the partition wall as options for load securing. The manufacturer's fastening rails correspond to a defined hole profile of the "Airline Profile" design, and are screwed onto the body using hexagonal pop rivet nuts with M6 thread.

The hexagonal holes for accommodating the pop rivet nuts are provided as standard in all vehicles and are located in the middle and top of the side parts, in the roof cross members as well as on the partition wall. The pop rivet nuts with an external hexagonal profile are pressed into these hexagonal holes. The hexagonal profile prevents them from turning inadvertently when securing bolts are being tightened or unscrewed.

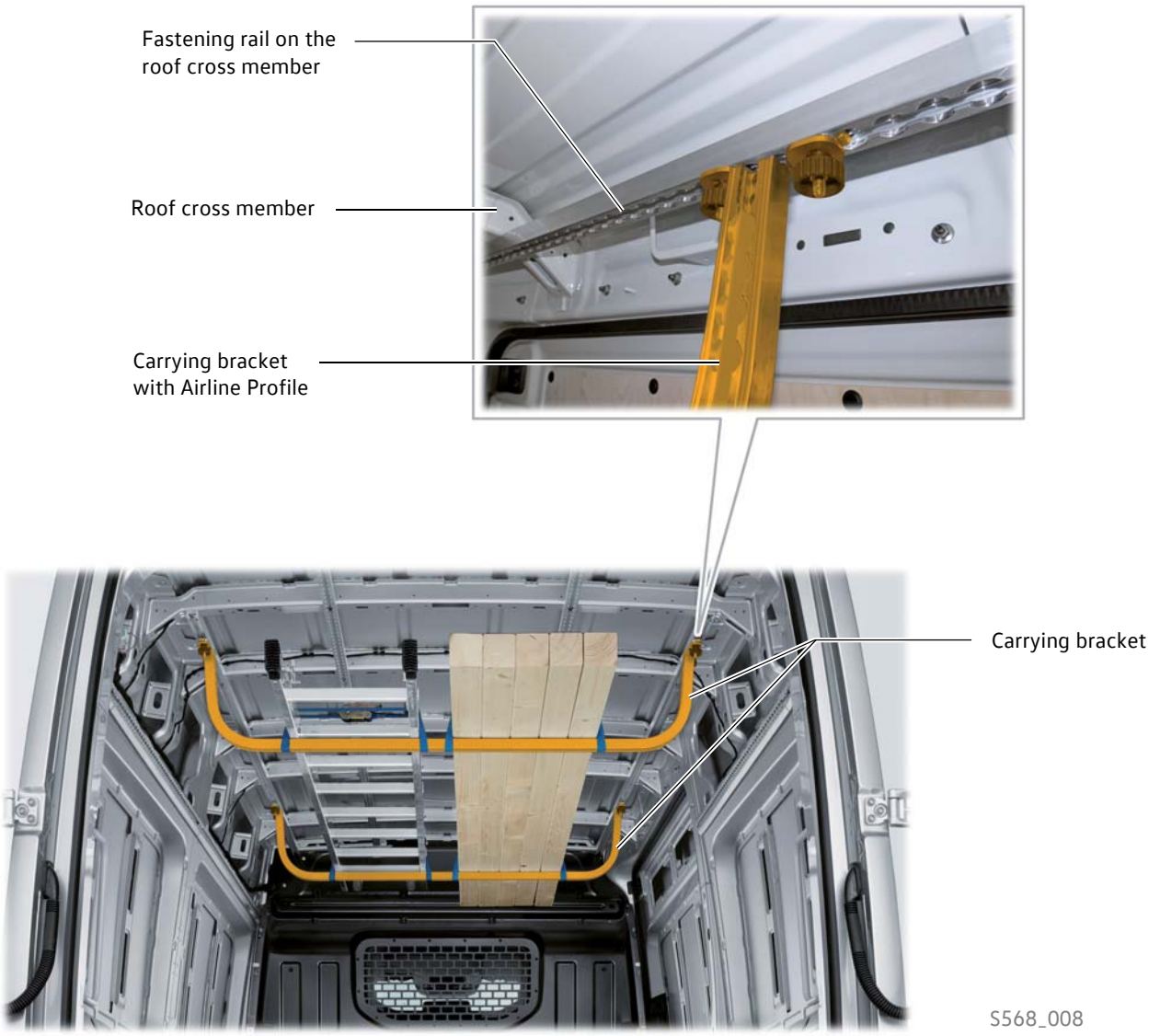


	Fastening rail on the partition walls		Fastening rail on the floor
	Fastening rail on the side walls		Fastening rail on the roof

Roof rack in the load compartment

Ladders or pipes, for example, with a weight up to 50 kg per carrying bracket can be stowed on the roof rack in the load compartment. The roof rack consists of 2 carrying brackets that are attached to the outer fastening rails of the roof cross members. These can be positioned variably in a front/back direction. When not in use, both carrying brackets can be pushed together to save space. The carrying brackets are provided with fastening options from the Airline Profile system.

Connection of the carrying bracket to the fastening rail



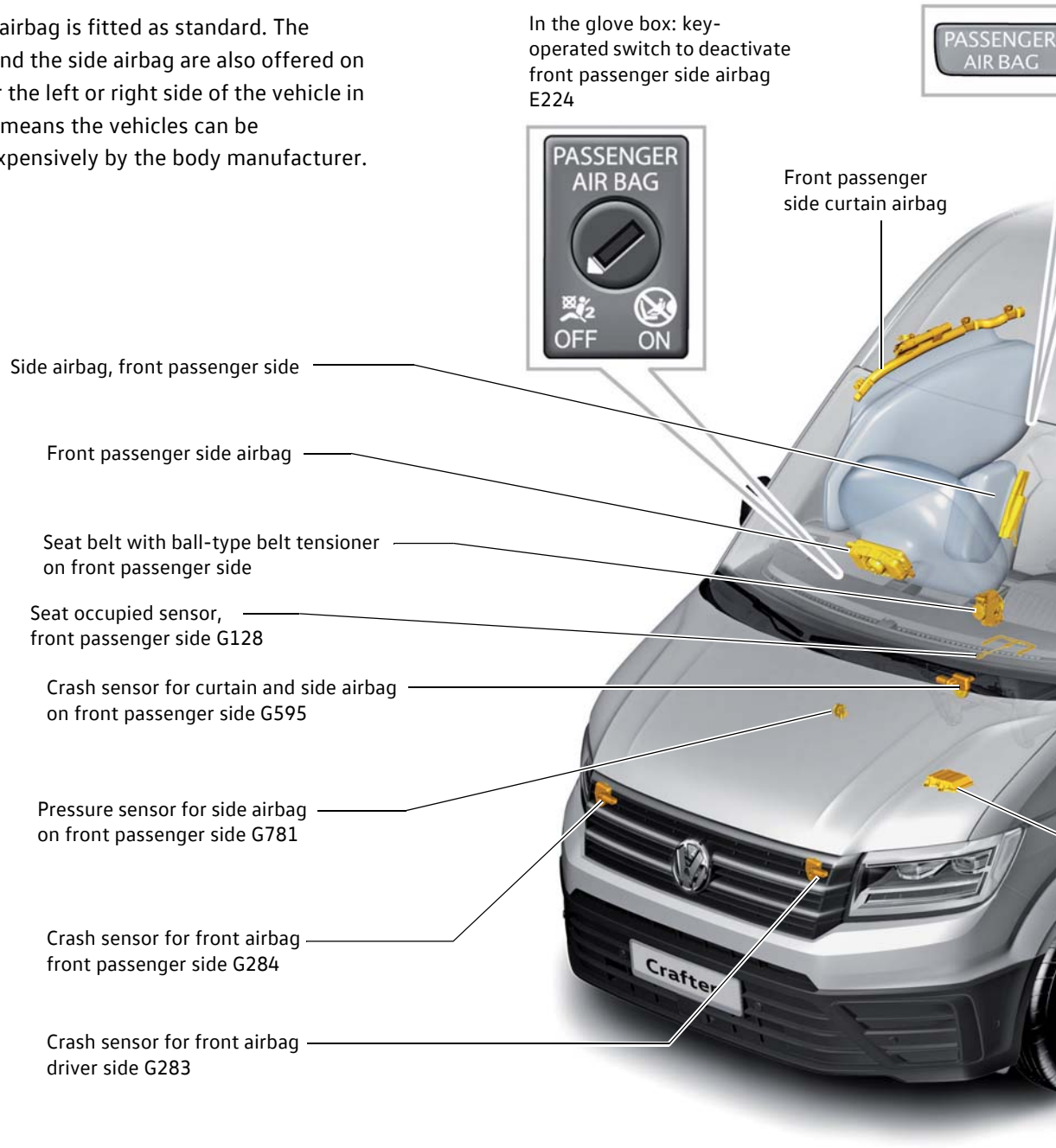
Occupant protection

Overview of safety systems

The following occupant protection is possible in the Crafter 2017:

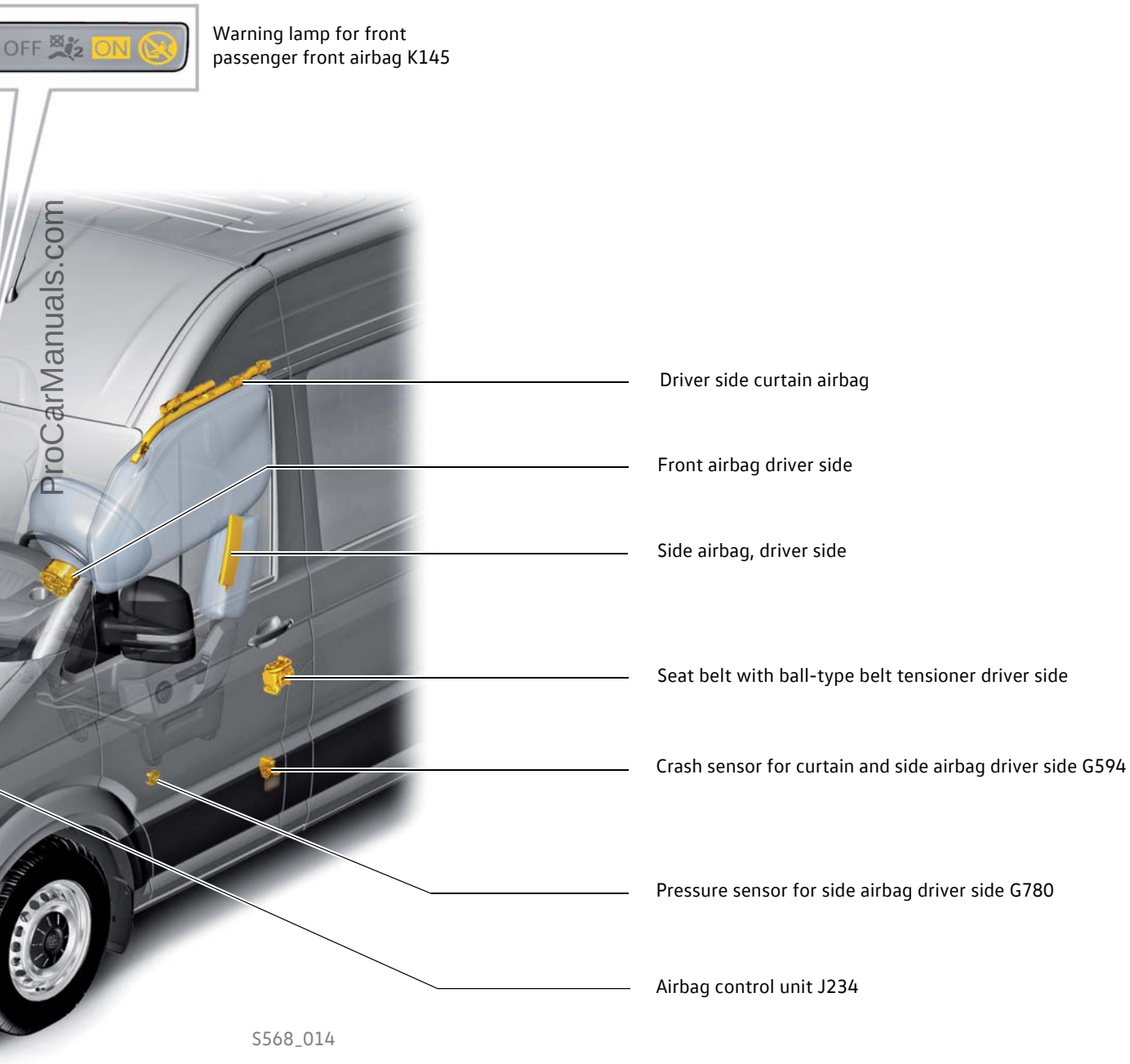
- Driver airbag, standard
- Front passenger airbag for individual seat/front passenger double seat, optional, can be deactivated
- Side airbag, optional
- Curtain airbag, optional

Only the driver airbag is fitted as standard. The curtain airbag and the side airbag are also offered on one side, i.e. for the left or right side of the vehicle in each case. This means the vehicles can be customised inexpensively by the body manufacturer.



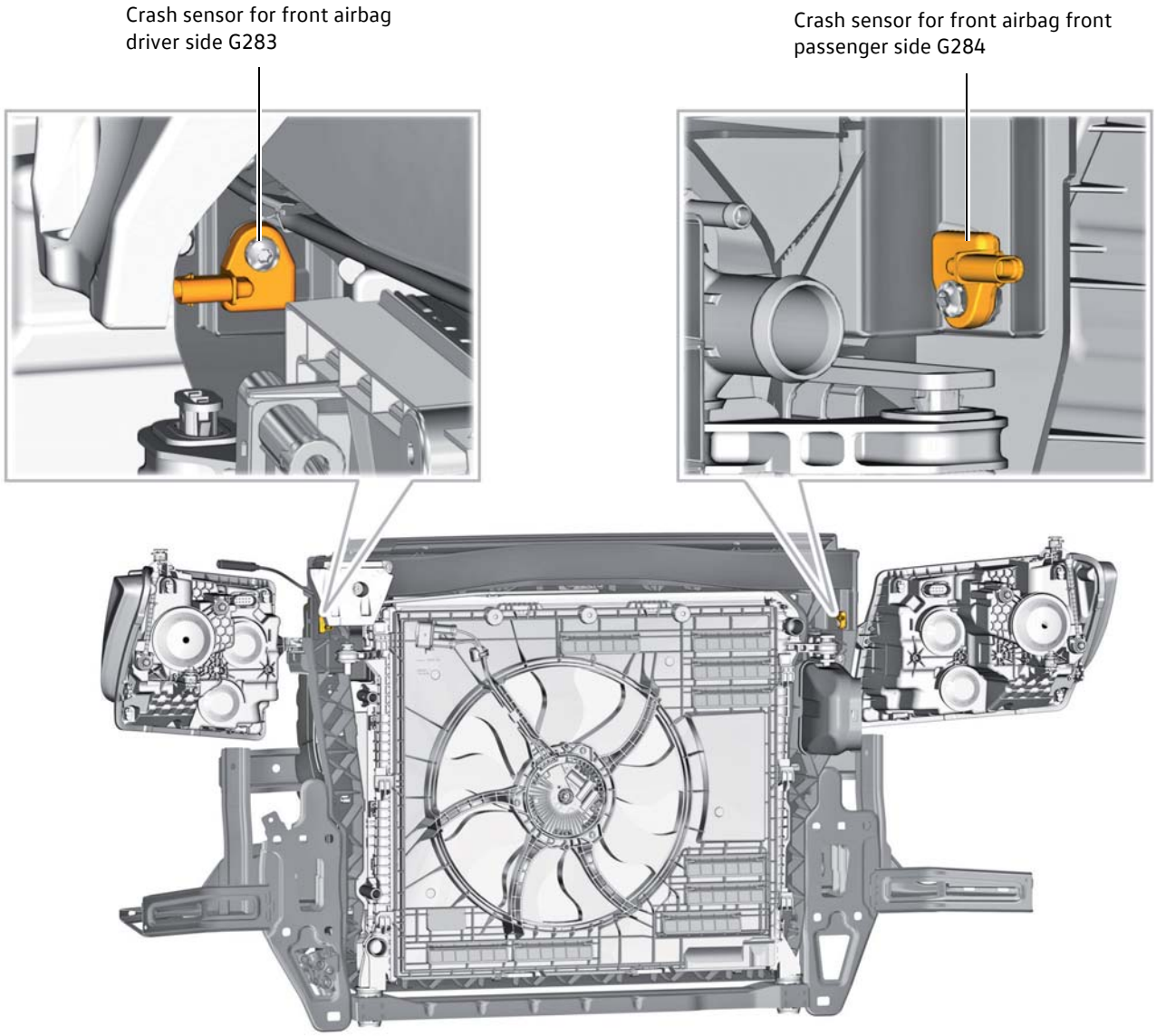
Crash sensors

Separate sensors for the front airbags and pressure sensors in the doors are being used for the first time by the Volkswagen Commercial Vehicles brand in the Crafter 2017.



Crash sensor for front airbag G283/G284

The crash sensors for front airbag G283 / G284 are acceleration sensors. They are fitted on the left and right at the front end, and are located in the front crumple zone of the vehicle. The control unit for airbag J234 thus receives the signals from both crash sensors particularly early. This means the severity of the front impact can be detected quickly. As a result, a higher level of protection is achieved for the occupants.

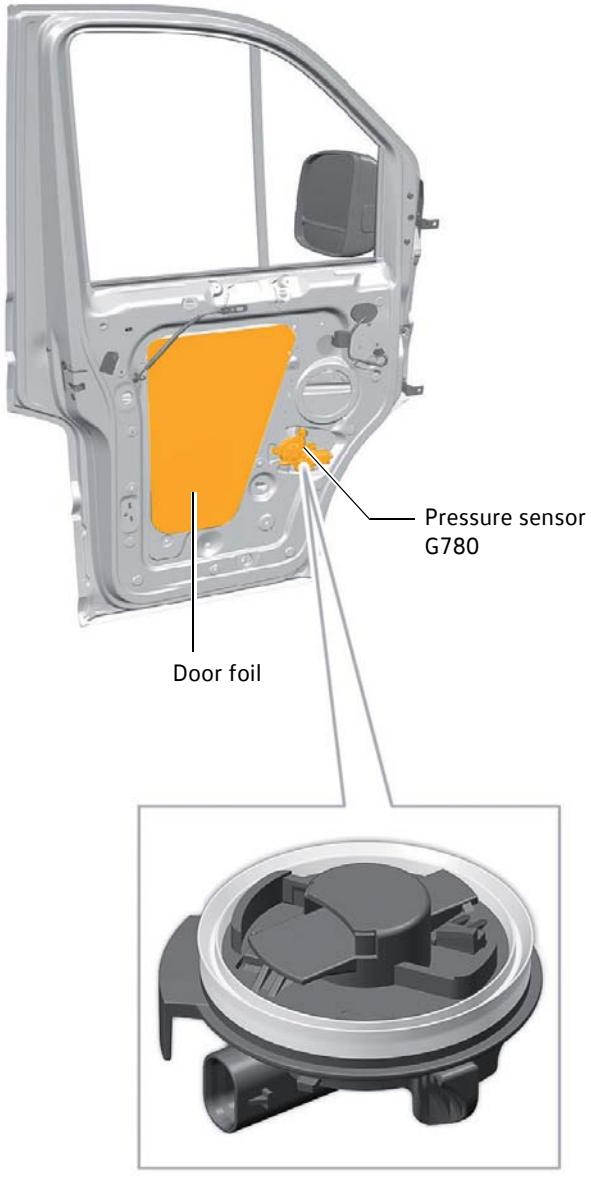


S568_088

Pressure sensors for side airbag G780 and G781

Particularly fast-response sensors, pressure sensors G780 and G781, are used in the Crafter 2017 in the side doors for detecting a side impact. The sensors are clipped into the inner door panel.

The pressure sensors require a pressure space within the door. The pressure space is established for the pressure sensor by sealing the assembly opening using a door foil. The door foil, sealing plugs and the sealing foils which seal the pressure space of the door are not allowed to be damaged otherwise the pressure sensor will not function correctly. As a result, these foils must always be renewed if they have been damaged or after their removal. The seals to be checked are located on the inside and the outside of the door.

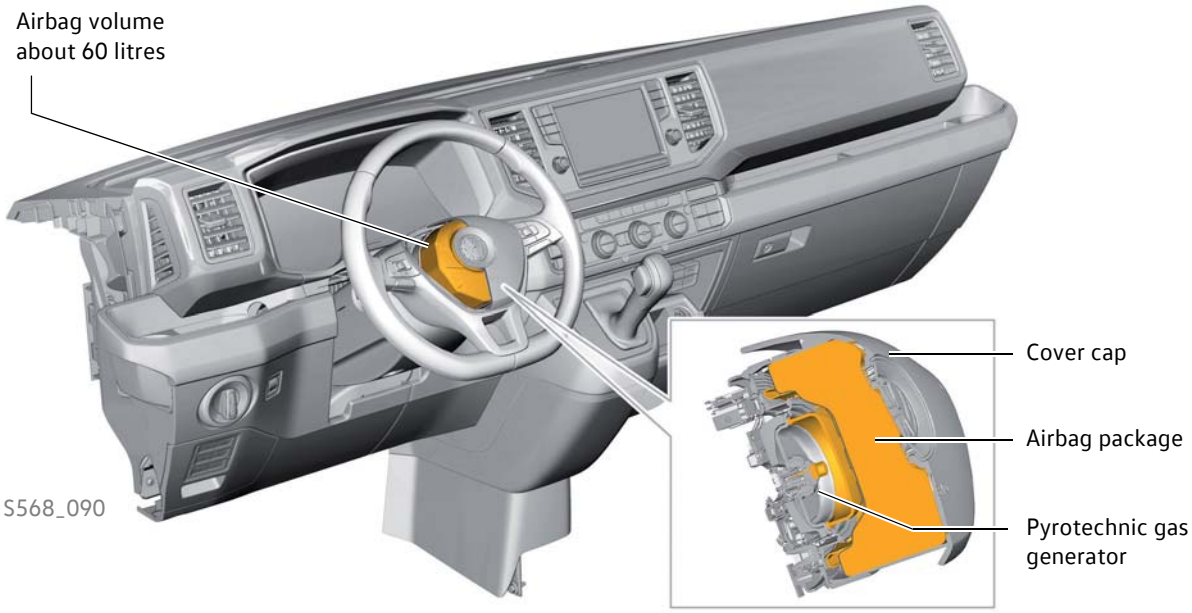


S568_089

In a side impact, the outer door panel is pushed in and overpressure occurs in the door. This pressure increase is transferred to a piezoelectric element in the sensor, and a deceleration signal is obtained according to the pressure profile within a particular time span. If the air pressure change exceeds a certain level, the sensor sends a corresponding signal to the airbag control unit J234. In the J234, this pressure signal is evaluated with the signals from the corresponding side crash sensor in the door entry on the B-pillar, and if required the side airbag and the curtain airbag are triggered.

Driver airbag

The driver airbag is fitted with a one-stage pyrotechnic gas generator.

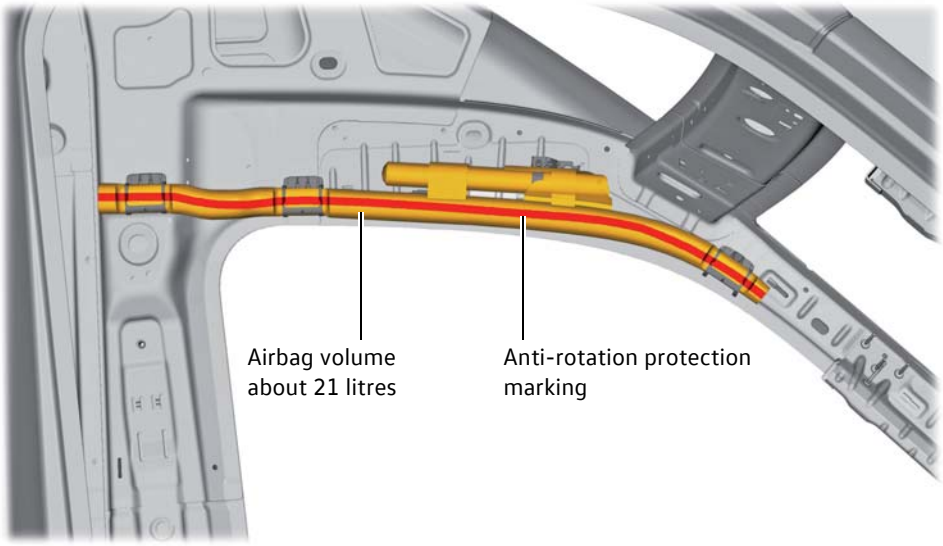


Front passenger airbag

A one-stage pyrotechnic gas generator is used in the front passenger airbag. This is fitted under the dash panel and can be accessed via the glove box. The different sizes of air volumes in the individual front passenger seat or front passenger double seat mean there are two airbag sizes. The larger airbag is used in conjunction with the front passenger double seat.

Curtain airbag

A one-stage pyrotechnic gas generator is fitted in the curtain airbag. The curtain airbag is connected to the roof frame using clip connections. The anti-rotation protection marking must be visible after installation and is not allowed to be twisted.

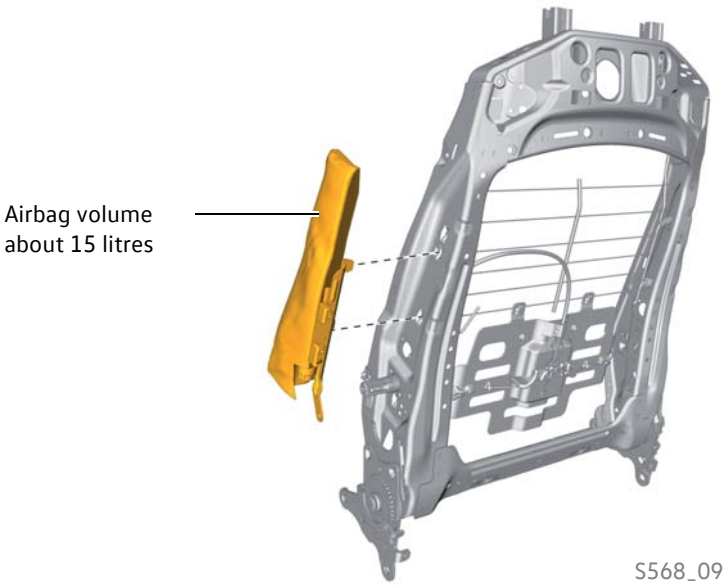


S568_092

Side airbag

A one-stage pyrotechnic gas generator is fitted in the side airbag. The airbag is fitted in the backrest frame of the following seats:

- Driver seat
- FS passenger seat
- Outer seat of the front passenger double seat



S568_093

Belt equipment

The following belt systems are fitted in the Crafter 2017:

Belt tensioner with roll-back function

- Always on driver side
- Front passenger side, with individual seat with front passenger airbag
- Outer seat of front passenger double seat with front passenger airbag

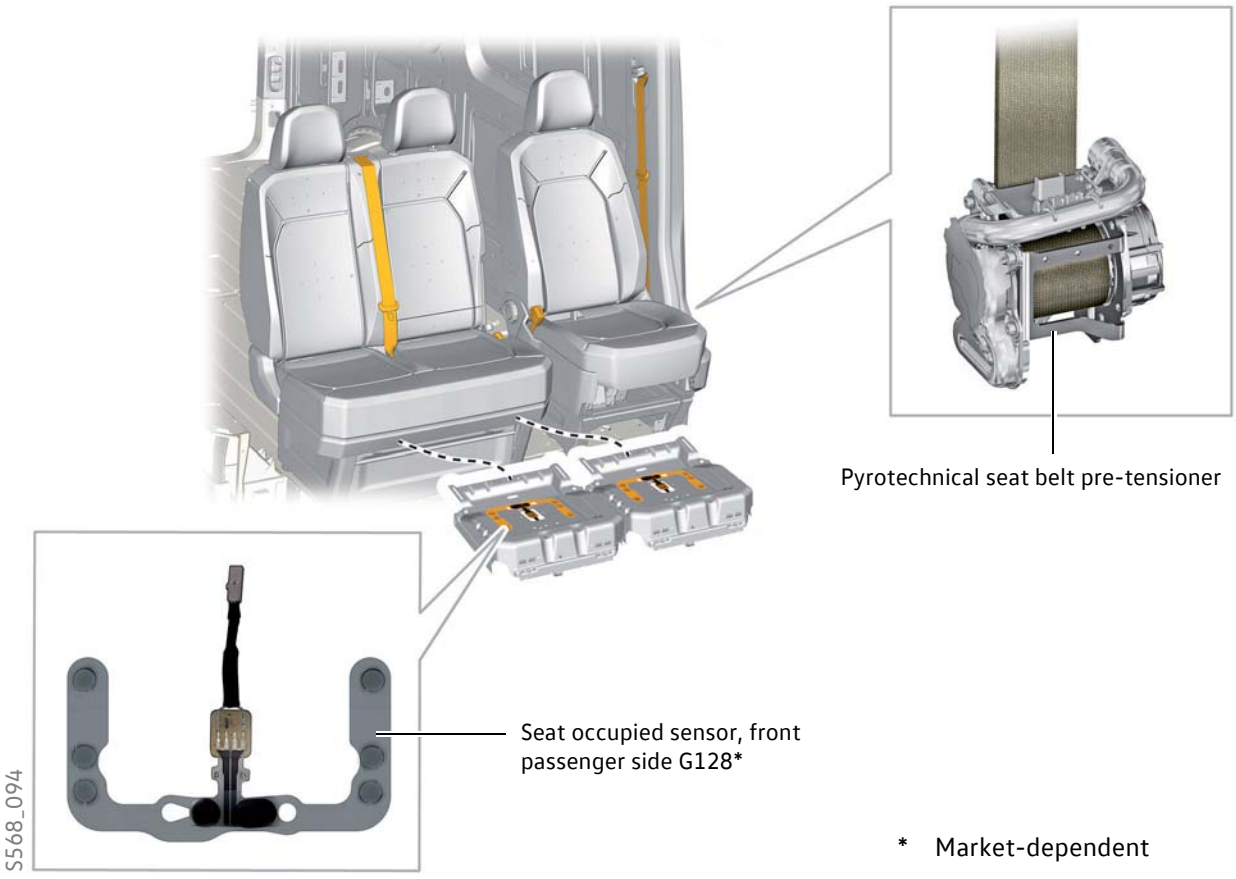
Belt tensioner (without roll-back function)

- Front passenger side, with individual seat without front passenger airbag

Normal belt reel (3-point automatic belt)

- Front passenger side, both belts on front passenger double seat without front passenger airbag
- Front passenger side, middle belt on front passenger double seat with front passenger airbag

The driver and front passenger seat and the front passenger double seat are equipped with a seatbelt fastening reminder. For this purpose, the front passenger seat/front passenger double seat have seat occupancy detection which works using a foil sensor. This is secured directly onto the seat shell using clip connections. The seat occupancy detection is used depending on the market. The driver seat is monitored by an electric belt buckle.



* Market-dependent

Bake-hardening steels

Bake-hardening steels are counted as higher and high-strength steels. The bake-hardening effect occurs when cold-formed steels are heated to about 150 °C - 200 °C. This creates a structural change which increases the strength. During production of the vehicle, the necessary temperature is achieved during bake-hardening in the painting process.

CDP

CDP = cathodic dip painting

Cathodic dip painting is an electro chemical painting process in which the complete body is coated in an immersion bath, thus ensuring comprehensive corrosion protection for the body. This takes place during vehicle production after phosphating of the body.

Drag coefficient

The drag coefficient, also known as the c_w value, is the decisive variable for air resistance alongside cross-section area A of a vehicle. It indicates how streamlined a vehicle is.

Tailored blank

Refers to a sheet metal plate that is typically made up of different material grades and/or sheet thicknesses. The different sheet thicknesses are created by repeated rolling.

Ultra-high-strength hot-formed steel panels

Ultra-high-strength hot-formed steels are must stronger than panels made from conventional steels. Using these panels for the body thus makes it possible to reduce material cross sections and thus also the body weights. At the same time as the weight reduction, greater stability and crash safety are achieved.

Ultra-high-strength hot-formed panels are manufactured in the die hardening process. This involves the body panel being heated until red hot (about 950 °C) before pressing. The panel is formed into its definitive shape during the pressing operation.
Cooling during pressing results in a structural change in the material, giving the panel its high ultimate strength.

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❀ This paper was manufactured using pulp bleached without the use of chlorine.