

# CREODUR

## INSTALLATION INSTRUCTIONS

ENGLISH







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## 2. SAFETY INSTRUCTIONS

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### INTENDED USE

Creotecc mounting systems are solely intended for the purposes of mounting photovoltaic modules and associated anchoring systems on buildings or on the ground. To ensure that the mounting system is used correctly, the user must comply with the safety instructions and maintenance instructions (see chapter 7 „Maintenance“) listed in these installation instructions.

To comply with the requirements for intended use the user must adhere to these instructions and the installation guidelines provided by the module manufacturer. Among other aspects, this applies to the mechanical attachment of the modules, the maximum loads that the module is capable of withstanding and other details such as orientation, rear ventilation, cable routing, wiring, choice of inverter etc.

### INAPPROPRIATE USE

Any use other than those described in the previous paragraphs is regarded as inappropriate use.

All claims relating to damage incurred through inappropriate use will be rejected. Inappropriate use voids all liability, warranty and guarantee claims against the manufacturer and the user is liable for any damage to the mounting system incurred during the installation and operation of the system, as well as any subsequent damage to other parts of the system, the roof, the building and any personal injuries.

### GENERAL SAFETY INSTRUCTIONS

Read the installation instructions fully and carefully before commencing any installation work. Make sure you have understood all the installation steps and instructions. Clarify any questions before you start the installation, then proceed according to the instructions and complete the various steps in the correct order.

The mounting system must be installed by qualified personnel. Ensure that the personnel performing the installation have read and understood the installation instructions and the safety instructions and that they are aware of – and able to recognise – any potential dangers. The installation must comply with all industrial safety regulations, accident prevention requirements, norms, building regulations and other relevant directives. The connection of all electrical equipment must comply with the relevant VDE guidelines and the safety regulations specified by the electrical industry.

Safety clothing that complies with the relevant national regulations must be worn at all times during the installation.

Make sure there is always a second person present throughout the entire installation, who can provide assistance in the case of an accident.

Leave at least one copy of the installation instructions near the installation site for the personnel to refer to. Only use original parts and accessories authorised by the manufacturer.

Keep a copy of the installation instructions in a safe and accessible place for documentation and maintenance purposes.

## 2. SAFETY INSTRUCTIONS



### SPECIFIC SAFETY INSTRUCTIONS

#### SPECIFIC SAFETY INSTRUCTIONS FOR PHOTO-VOLTAIC MOUNTING SYSTEMS

- ▶ Ensure that the installation follows a plan drawn up by a professional. In particular, the configuration of the mounting system (selection of materials and components, width, thickness of fastening elements) must be appropriate for the site conditions (snow and wind loads, roof and module tilt angle, other factors such as atmospheric and chemical stress and, if applicable, earthquakes).
- ▶ For installations on buildings, all personnel must adhere to the relevant building regulations; among others these include the technical regulations of the roofing industry and the timber construction industry (DIN EN 1995 among others) and the steel construction industry (DIN EN 1993 among others). The structure must be able to withstand the additional load of the PV system.
- ▶ If there are no exact planning guidelines available, the manufacturer or the user can generate a design for the mounting system using software, or using the figures listed in these installation instructions. However, such measures are merely non-binding recommendations and are no substitute for a plan drawn up by a professional engineer.
- ▶ Before beginning the installation, check the plausibility of the structural design in relation to the local conditions. Ensure that the conditions of use specified in these installation instructions are adhered to.
- ▶ Take into consideration the installation guidelines for the other system components, e.g. modules, cables, plug connectors and inverters. When installing the cabling, you must comply with the relevant VDE guidelines and electrical industry safety regulations, as well as the

manufacturer's instructions regarding the modules, cables, plug connectors and inverters being used.

#### SPECIFIC SAFETY INSTRUCTIONS FOR WORKING ON ROOFS

- ▶ Secure the construction site to prevent unauthorised access.
- ▶ Safeguard the roof working space if the eaves height is 3 metres or more. Among other measures, this involves the installation of a personal fall protection system. If a fall protection system cannot be used for practical working reasons then a safety net for falling persons must be installed.
- ▶ If the installation of a safety net is impractical then a safety harness connected to suitable safety anchoring points may be used. However, this is only permissible for short-term work.
- ▶ Secure all objects on the roof against falling. The ground underneath the safety net must also be cordoned off. Check the load bearing capacity of the roof surface, the roof structure and other building components that will have to bear the weight of personnel or materials during the installation.



## 2. SAFETY INSTRUCTIONS

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### SPECIFIC SAFETY INSTRUCTIONS FOR WORKING ON ELECTRICAL SYSTEMS

- ▶ Observe the relevant VDE regulations and guidelines.
- ▶ Be especially sure to observe the following instructions:
  - ▶ Even at low levels of solar irradiation, photovoltaic modules generate significantly high voltages and series connections of several modules are designed for voltages of up to 1,000 volts. Touching open connectors can therefore increase the risk of an accident or even cause life-threatening electric shocks.
  - ▶ For this reason you should establish the series connection of the modules as late as technically possible during the installation process, avoid lying or hanging cables and plugs and secure open electrical contacts against being touched.
- ▶ High DC currents flow in the circuits connected to photovoltaic modules and disconnecting these circuits can result in life-threatening arcing. Do not connect these circuits, e.g. to the inverter or generator junction box, until installation of the framing and modules has been completed. Always use the appropriate circuit breaker at the inverter or generator junction box to disconnect this circuit, e.g. for maintenance purposes.
- ▶ Do not perform any electrical connection work with moist or wet cable ends, sockets or plugs. Only install the modules under dry weather conditions.

### CLASSIFICATION OF DANGER NOTICES INTO DANGER CLASSES

- ▶ Dangerous situations are identified using corresponding danger notices in these installation instructions:
- ▶ Danger classes as per ANSI Z535.6-2006

- ▶ **DANGER** indicates a directly dangerous situation that can lead to death or serious injury if not avoided.



- ▶ **WARNING** indicates a possibly dangerous situation that can lead to death or serious injury if not avoided.



- ▶ **CAUTION** indicates a possibly dangerous situation that can lead to light injury if not avoided.



- ▶ **ATTENTION** refers to a situation that may lead to material damage if not avoided.



### 3. GENERAL INSTRUCTIONS



#### ▶ PRODUCT DESCRIPTION / AREA OF APPLICATION

- ▶ CREODUR is a mounting solution for PV installations on pantile roofs. It is suitable for practically all PV modules with frame heights between 31 and 50 mm. The installation instructions of the module manufacturer must be adhered to.
- ▶ Use only roof fastenings suitable for the respective roof structure and roof cladding. For example, the roof hooks must not press on the roof tiles or cause leaks by raising the roof tiles.
- ▶ The roof hooks described are not suitable for fastening to roofs with over rafter insulation.
- ▶ The roof substructure must be checked on site to ensure that it provides an adequate load-bearing reserve. Depending on the shape and pitch of the roof, wind suction loads  $> 2,400$  Pa can occur on the roof edges and corner regions in regions of wind zone 3 (as per DIN EN 1991-1-4) or more and most PV modules are not certified for this. Check this information for every project and, if in doubt, do not install on the roof edges and corner regions.

#### ▶ CORRECT EDITION OF THE INSTALLATION INSTRUCTIONS








- ▶ The mounting systems from Creotecc GmbH are continuously improved and optimised. Therefore installation procedures can change at short notice. Please compare the printed installation instructions with the currently valid instructions available on our website at [www.creotecc.com](http://www.creotecc.com). If you do not have access to the internet, we would be happy to send you an up-to-date printed copy of the instructions upon request. If you encounter any difficulties during the installation process please do not hesitate to contact us.

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## 4. MATERIAL & TOOL REQUIREMENTS

### MATERIAL – SYSTEM COMPONENTS

ITEM		ITEM NAME + NUMBER	DESCRIPTION
1		HSA 544 NUS 030275	HSA 544 cast aluminium roof hook set with slot bolt
2		ASSY 3.0SK 8x100 040081	Self-tapping woodscrew, washer head, Torx AW drive
3		RL ALUVER Standard 020000	Mounting rail 30x50, length 6000
4		AVS PC1-Set 020050	Connector set for RL AluVer Standard
5		CMC-M 31-40 20 040290	Module middle clamp, CITO 31-40 mm, packing unit: 20
6		CMC-E 31-40 25 040327	Module end clamp, CITO 31-40 mm, packing unit: 25
7		CMC-DS 31-32 25 040208	Module end clamp spacer, CITO 31-32 mm, packing unit: 25

### MATERIAL – OPTIONAL COMPONENTS







ITEM		ITEM NAME + NUMBER	DESCRIPTION
8		TOP AV Standard 040024	End cap for RL AluVer Standard
9		ULP 2 040094	HDPE underlay plate for roof hook, blue, 2 mm
10		ULP 5 040096	HDPE underlay plate for roof hook, grey, 5 mm



# 4. MATERIAL & TOOL REQUIREMENTS

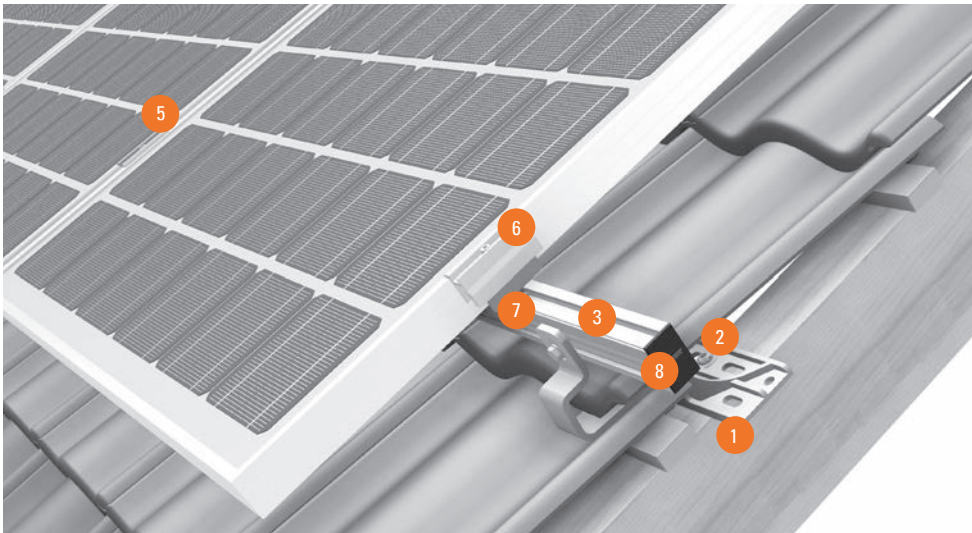


## TOOL REQUIREMENTS

ITEM		ITEM NAME + NUMBER	DESCRIPTION
A		Bit-8 F 040136	8 bit for hexagonal head, with spring circlips
B		On-site	Tape measure
C		On-site	Folding ruler
D		On-site	Angle grinder
E		On-site	Electric screwdriver
F		On-site	AW 30 bit, AW 40 bit



## 5. SYSTEM OVERVIEW



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1 HSA 544 NUS



2 ASSY 3.0SK 8x100



3 RL ALUVER Standard



4 AVS PC1-Set



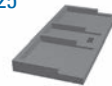
5 CMC-M 31-40 20



6 CMC-E 31-40 25



7 CMC-DS 31-32 25



8 TOP AV Standard



9 ULP 2



# 6. INSTALLATION OF CREODUR



## FASTENING DENSITY OF HSA 544 ROOF HOOKS

required number of roof hooks per m<sup>2</sup> of module area for different loading conditions

ROOF PITCH	WIND PRESSURE q*	SNOW LOAD SK** IN kN/m <sup>2</sup>			
		0.65	0.85	1.00	1.75
Degrees	kN/m <sup>2</sup>				
20°	0.50	0.81	0.98	1.11	1.77
	0.80	0.93	1.02	1.15	1.81
	0.95	1.11	1.11	1.17	1.83
	1.25	1.49	1.49	1.49	1.87
30°	0.50	0.87	1.04	1.17	1.84
	0.80	0.96	1.10	1.23	1.90
	0.95	1.15	1.15	1.26	1.93
	1.25	1.53	1.53	1.53	1.99
40°	0.50	0.70	0.81	0.89	1.30
	0.80	1.00	1.00	1.00	1.38
	0.95	1.19	1.19	1.19	1.42
	1.25	1.56	1.56	1.56	1.56

\*) Gust speed pressure      \*\*) Characteristic value of snow load on the ground

This table is for orientation purposes only. It does not replace proper structural planning! Higher wind loads in the edge regions of the roof and the system are not taken into account in this table.



## 6. INSTALLATION OF CREODUR

### SPANS FOR RL ALUVER STANDARD

maximum spans (in cm) for RL ALUVER Standard rails (as horizontal rail) for a module size of 1000 x 1700 mm, portrait mounting, under different loading conditions

ROOF PITCH	WIND- PRESSURE $q^*$	SNOW LOAD SK** IN kN/m <sup>2</sup>				
		0.65	0.85	1.00	1.75	
Degrees	kN/m <sup>2</sup>					
	20°	0.50	176	159	149	117
		0.80	172	156	147	116
		0.95	170	154	145	115
	1.25	155	151	143	114	
30°	0.50	169	153	144	115	
	0.80	164	149	141	113	
	0.95	161	147	139	112	
	1.25	153	144	136	110	
40°	0.50	189	175	167	136	
	0.80	179	167	160	132	
	0.95	175	164	156	131	
	1.25	153	152	151	127	

\*) Gust speed pressure      \*\*) Characteristic value of snow load on the ground

This table is for orientation purposes only. It does not replace proper structural planning! Higher wind loads in the edge regions of the roof and the system are not taken into account in this table.

## 6. INSTALLATION OF CREODUR



### CANTILEVER LENGHT FOR RL ALUVER STANDARD

maximum edge clearances (in cm) for RL ALUVER Standard rails (as horizontal rail) for a module size of 1000 x 1700 mm, portrait mounting, under different loading conditions

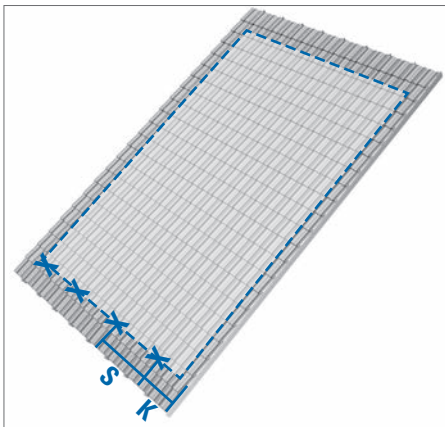
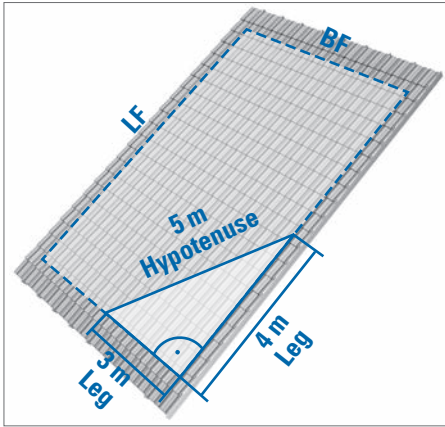
ROOF PITCH	WIND- PRESSURE q*	SNOW LOAD SK** IN kN/m <sup>2</sup>			
		0.65	0.85	1.00	1.75
Degrees	kN/m <sup>2</sup>				
20°	0.50	88	79	745	59
	0.80	86	78	73	58
	0.95	85	77	73	58
	1.25	78	76	71	57
30°	0.50	85	77	72	57
	0.80	82	75	70	56
	0.95	80	74	70	56
	1.25	77	72	68	55
40°	0.50	95	88	83	68
	0.80	90	84	80	66
	0.95	87	82	78	65
	1.25	76	76	75	64

\*) Gust speed pressure      \*\*) Characteristic value of snow load on the ground

This table is for orientation purposes only. It does not replace proper structural planning! Higher wind loads in the edge regions of the roof and the system are not taken into account in this table.



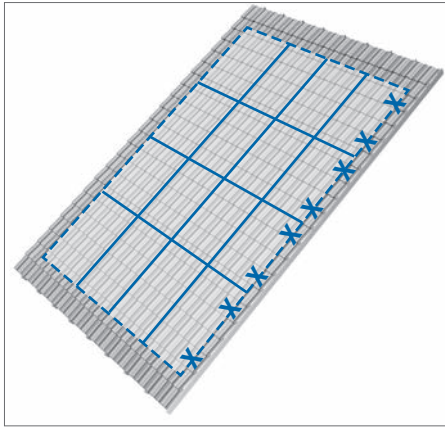
## 6. INSTALLATION OF CREODUR



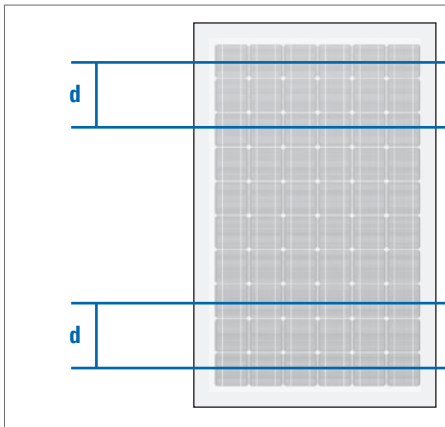
### MEASURING THE ROOF

- ▶ Mark the areas on the roof that will be covered by each continuous module array.
- ▶ Calculate the length and width of the field using the formulae  
 $LF = (\text{module length} + 20) \times \text{number of modules} - 20$ ;  
 $BF = (\text{module width} + 20) \times \text{number of modules} - 20$ ;  
[all dimensions in mm]
- ▶ **TIP:** You can measure an accurate right-angle using a sample right-angled triangle with sides of length 3-4-5.
- ▶ Select the rafters on which the roof hooks will later be installed.
- ▶ Mark the position of the selected rafters at the lower edge of the system.
- ▶ Make sure that the minimum fastening density of the roof hooks is adhered to and also make sure that the span S and cantilever length K of the mounting rails are not exceeded.

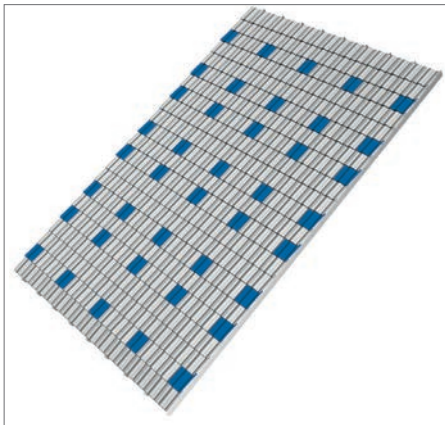
## 6. INSTALLATION OF CREODUR



- ▶ Select the row of tiles in which the roof hooks will later be installed.
- ▶ Mark the position of the selected tiles at the side edge of the system and across the entire area of the system starting from this position.



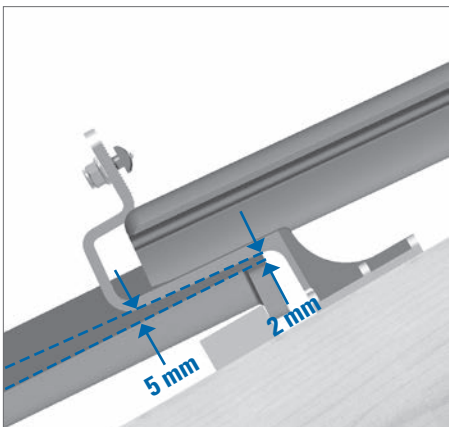
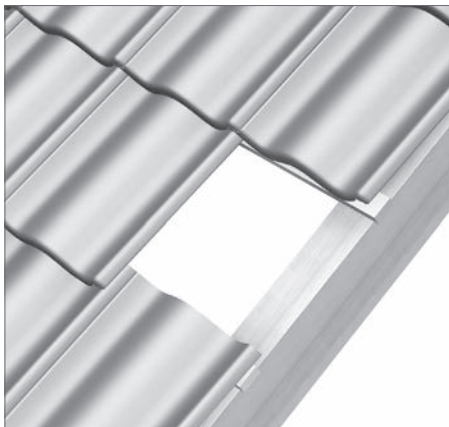
- ▶ When doing this, make sure that the modules are supported by the rails in the areas (d) specified by the module manufacturer.



- ▶ Mark all tiles in the entire area of the system under which the roof hooks will be mounted later.



## 6. INSTALLATION OF CREODUR



### ▶ ADJUST THE ROOF HOOKS

- ▶ Remove the marked tiles; it may also be necessary to lift, slide or remove adjacent tiles.
- ▶ If necessary, mark the part of the interlocking joint under the tile that needs to be removed so that the roof hooks can pass between this tile and the tile underneath.

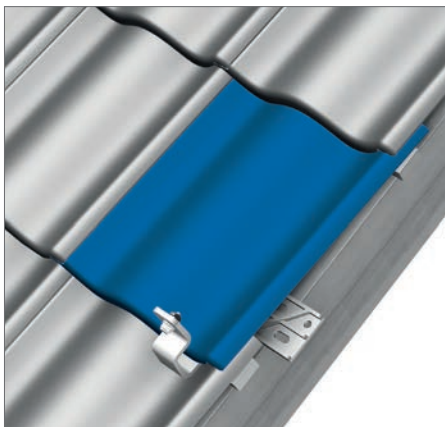
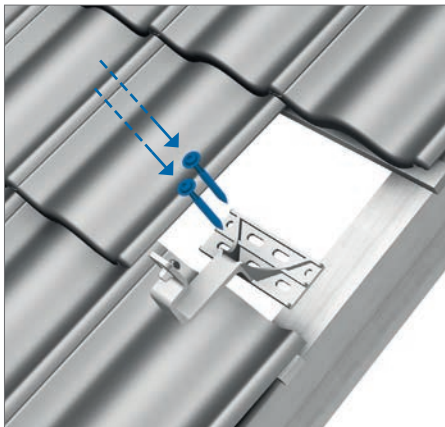
- ▶ If necessary, remove the interlocking joint at the marked position on the removed tile using an angle grinder (with clay tiles, an expert roofer can use a hammer for this). Remove only the amount of material that is absolutely necessary, work only on the interlocking joint and avoid weakening or damaging of the tile.

**⚠ ATTENTION** Work with gloves, protective clothing and protective goggles. Avoid damage caused by flying tile fragments and sparks.

- ▶ Adjust the roof hooks (item 1) correctly. Make sure that the hook sits in the „trough“ of the tile underneath, that the mounting bracket has a clearance of at least 2 mm from the upper edge of the tile and that the lower end of the mounting bracket has a clearance of at least 5 mm from the tile underneath.

**⚠ ATTENTION** An incorrectly adjusted roof hook can damage the tile underneath, even under normal loading deformation.





## INSTALL THE ROOF HOOKS

- ▶ If necessary, use underlay plates (items 9 and 10) to ensure adequate clearance between the roof hook and the tile underneath.
- ▶ If necessary, use HSA 561 (030111) 3-way adjustable roof hooks that allow continuous vertical and horizontal adjustment.
- ▶ Take care to ensure the minimum edge clearance in the wood and adequate sideways offset between the two screws.
- ▶ Fasten the roof hooks to the rafters using two self-tapping woodscrews (item 2).

**⚠ ATTENTION** Pilot holes may need to be drilled if other screws are used.

**⚠ ATTENTION** If counter battens that cannot be used for anchoring are mounted on the rafters then the length of the screws chosen must be increased by the thickness of the counter battens.

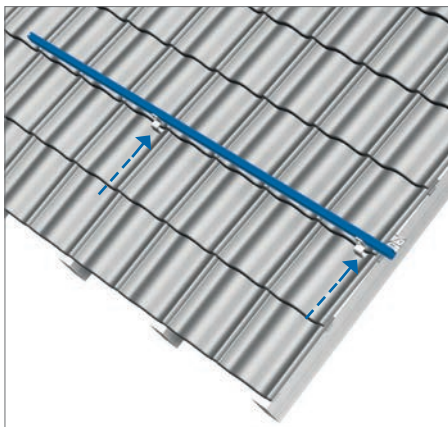
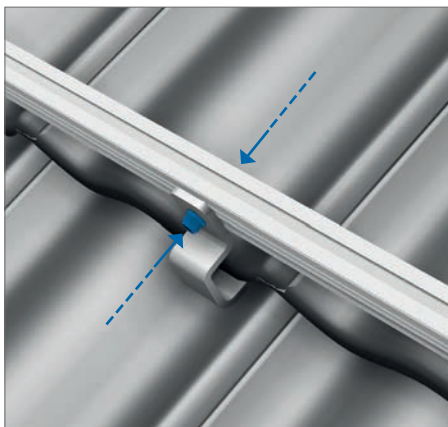
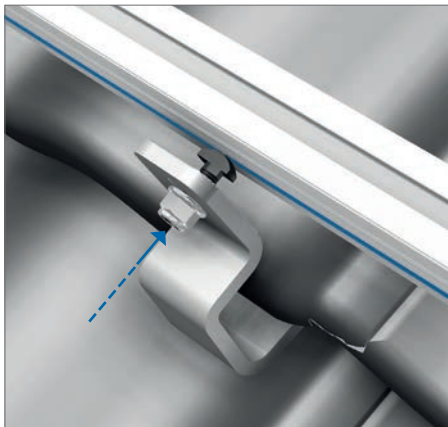
**⚠ ATTENTION** Make sure that the screws and hook are securely installed but do not use an impact screwdriver for installation.

- ▶ Replace the removed tile(s) and restore all other tiles to their correct position. After this, check to make sure that no tile is clamped (danger of breakage) or sits too high (danger of leakage).

**⚠ ATTENTION** The roof hooks are not approved for use as a climbing aid or a safety attachment point.



## 6. INSTALLATION OF CREODUR



### MOUNT THE HORIZONTAL RAILS

- ▶ Position the ALUVER rail (item 3) on the elongated hole in the roof hook so that the slot bolt fits into the slot in the rail (rotate the screw if necessary) and the corrugations on the roof hook and rail grip each other.

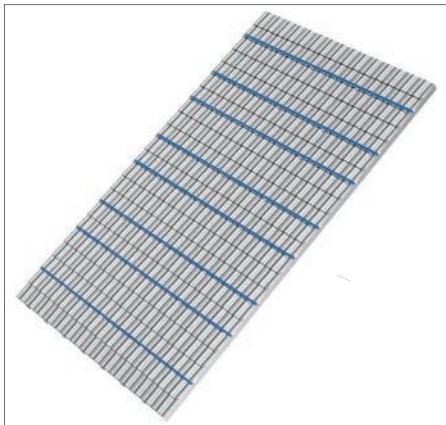
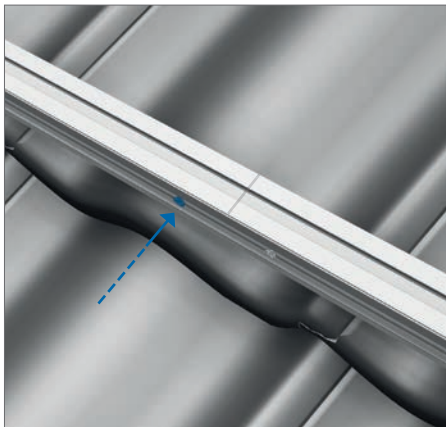
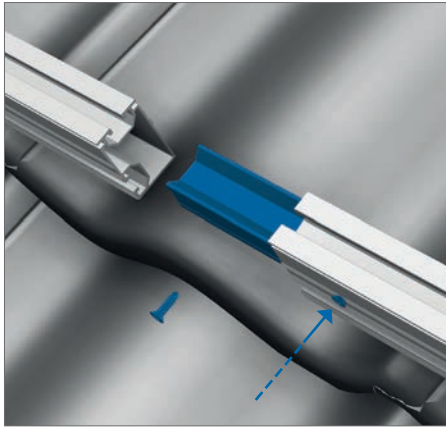
▶ **TIP:** Compensate for irregularities in the roof by fitting the rail higher or lower in the elongated hole.

- ▶ Fasten the connection by tightening the nut (tightening torque 25 Nm). Make sure that the screw head is first rotated by 90° so that it is anchored in the slot.

**⚠ ATTENTION** If the screw is not fully rotated, i.e. by a full 90°, then a secure screwed connection is not ensured.

- ▶ Screw each rail to each of the corresponding roof hooks in the same manner. Use the height adjustment feature to avoid any tensioning of the rails and roof hooks.

**⚠ ATTENTION** The screwed connection to the roof hooks must not occur at the outermost ends of the rail. Make sure that the end of the rail always protrudes sideways beyond the fastening flange of the roof hook.



## CONNECT THE HORIZONTAL RAILS

Slide the connector (item 4) halfway into one of the rails to be joined and fasten it in position using a self-drilling screw. Position the self-drilling screw in the side drill groove of the rail when doing this so that the screw can easily penetrate the connector.

Slide the other rail fully onto the connector so that no gap exists between the rail segments. Fasten the second rail to the connector as described above.

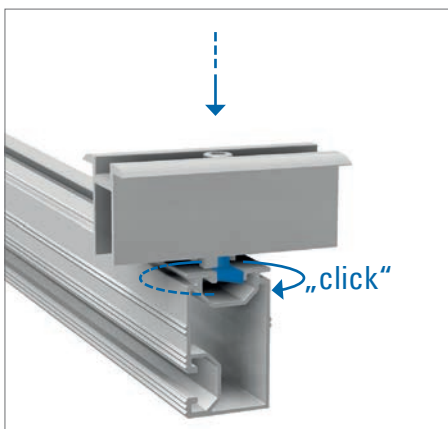
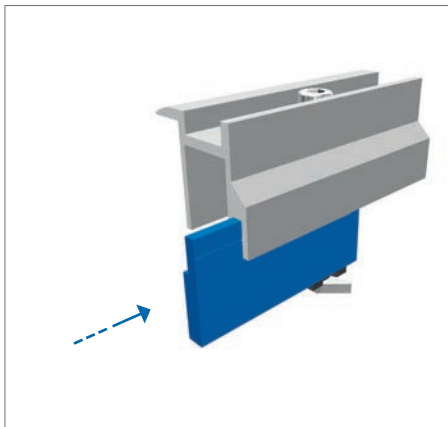
**NOTE:** The connection is rigid and does not function as an expansion joint.

Connect all rails in the manner described. Terminate the connected rails using the optional cover caps if desired.

**ATTENTION** Do not create rigidly connected rails to a length greater than 12 m to avoid damage caused by heat expansion of the aluminium. After 12 m, create either a maintenance gap or fasten the connector only on one side to create an expansion gap; note that in the latter case no module may then be mounted over this expansion gap.



## 6. INSTALLATION OF CREODUR



### MOUNT THE MODULE CLAMPS

- ▶ First fully assemble the end clamps. To do this, slide a spacer (item 7) sideways into each end clamp (item 6).

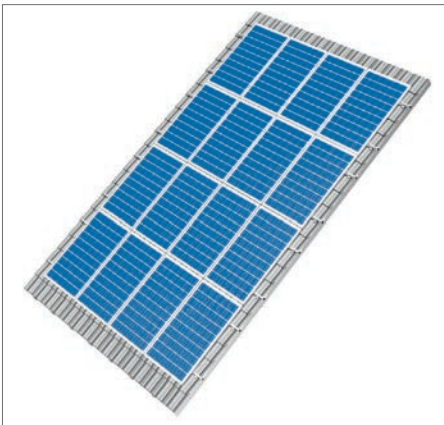
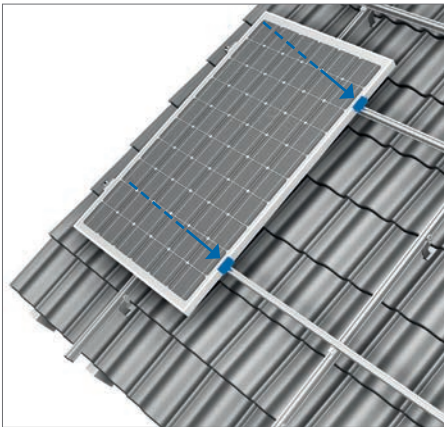
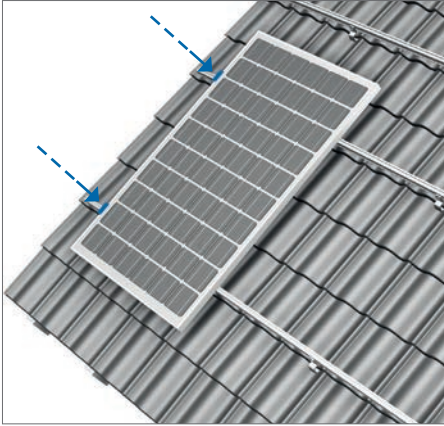
- ▶ Position the module clamp (items 5, 6 and 7) on the ALUVER rail (item 3) and press into place until the slot nut latches into place in the slot with an audible „click“.

- ▶ Shift the module (end clamp) or the modules (middle clamp) close to the clamp (leaving no gap between clamp and module) and align the module(s). Then tighten the module clamp (items 5, 6 and 7) using an electric screwdriver (item E) and AW 30 bit (item F) to a **maximum torque of 15 Nm**.

**⚠ ATTENTION** Observe the specifications of the respective module manufacturer.

- ▶ If necessary, secure the lowest row of modules against slipping down via short screws in the frame holes.

## 6. INSTALLATION OF CREODUR



### INSTALLING THE MODULES

- ▶ Fit the end clamps (items 6 and 7) to the outermost ALUVER rails at the edge of the roof. Ensure that the clamps latch correctly into the rails (spring mechanism).
- ▶ Position the first module on the ALUVER rails (item 3). The module must lie flat on the surface of the rails.
- ▶ Fasten the end clamps.
- ▶ Fit all middle clamps (item 5) to each ALUVER rail (item 3).
- ▶ Ensure that the clamps latch correctly into the rails.
- ▶ Fit and fasten the remaining modules step by step in the same manner.
- ▶ Then refasten the end clamps to the last module in each row.
- ▶ Finish the installation row by row.
- ▶ **TIP:** To aid with adjustment and prevent the modules from slipping during installation, 2 screws for each module can be screwed into the frame holes at the rear. This supports the module on the rails when the clamps are not yet holding the frame.



## 7. MAINTENANCE

### ▶ MAINTENANCE

- ▶ The following maintenance requirements must be adhered to:
  - ▶ Have the photovoltaic system checked annually by a specialist photovoltaic company to confirm the full functionality and mechanical stability of the system. In addition to a visual inspection of the mounting system, especially the tightness of the screwed connections and the watertightness of the roof cladding are to be checked.
  - ▶ The safety instructions and all other specifications in these installation instructions must be adhered to for all work on the mounting system and the DC cabling. The installation instructions also apply in principle to any removal work, in the reverse sequence where applicable.
  - ▶ Especially the DC electrical connections must never be disconnected while under load (danger of arcing) and the current must always first be switched off via the circuit breaker in or on the generator junction box or inverter.



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