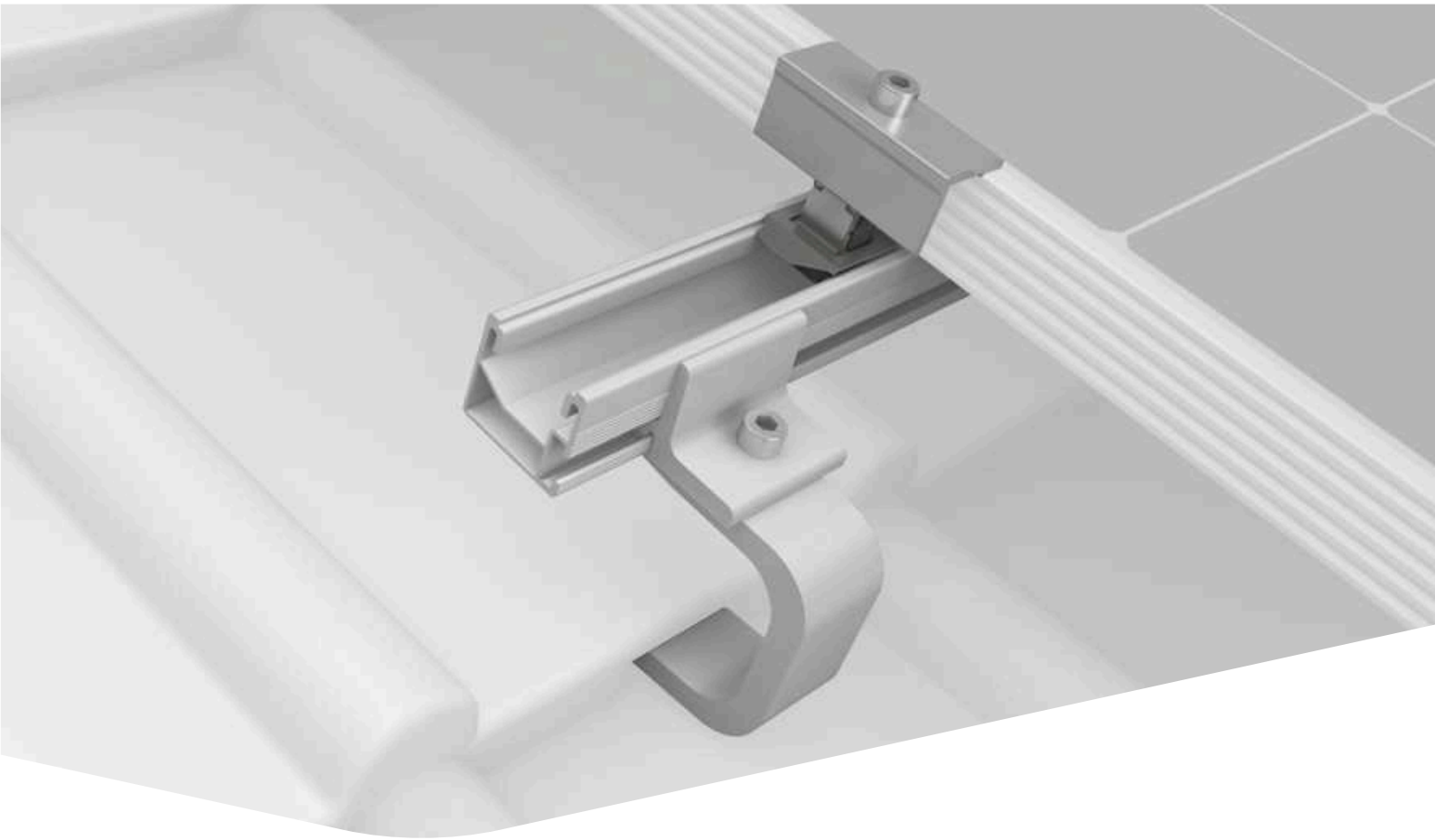
Connecting Strength



Assembly instructions

K2 SingleRail System

with roof hooks

General safety information

Please note that our general mounting instructions must be followed at all times and can be viewed online at k2-systems.com

- The equipment may only be installed and operated by qualified and adequately trained installers.
- Prior to installation, ensure that the product complies with on-site static loading requirements.
  For roof-mounted systems, the roof load-bearing capacity must always be checked.
- National and local building regulations and environmental requirements must be adhered to.
- Compliance with health and safety regulations, accident prevention guidelines and applicable standards is required.
  - Protective equipment such as safety helmet, boots and gloves must be worn.
  - Roofing works must be in accordance with roofing regulations utilising fall protection safeguards when eaves height exceeds 3 m.
  - At least two people must be present for the duration of the installation work in order to provide rapid assistance in the event of an emergency.
- K2 mounting systems are continuously developed and improved and the installation process may thereby change at any time. Prior to installation consult our website at k2-systems.com/en/technical-information for up-to-date instructions.
  We can send you the latest version on request.
- The assembly instructions of the module manufacturer must be adhered to.
- Equipotential bonding/grounding/earthing between individual parts is to be performed according to country specific standards, as well as national laws and regulations.
- At least one copy of the assembly instructions should be available on site throughout the duration of the installation.
- Failure to adhere to our general safety and assembly instructions and not using all system components, K2 is not liable for any resulting defects or damages. We do not accept liability for any damage resulting in the use of competitor's parts. Warranty is excluded in such cases.
- German law shall apply excluding the UN Convention on CISG. Place of venue is Stuttgart. Our General Terms of Business apply.
- If all safety instructions are adhered to and the system is correctly installed, there is a product warranty entitlement of 12 years! We strongly recommend reviewing our terms of guarantee, which can be viewed at k2-systems.com/en/warranty-terms-and-conditions We will also send this information on request.
- Dismantling of the system is performed in reverse order to the assembly.
- K2 stainless steel components are available in different corrosion resistance classes. Each structure or component must be carefully checked for possible corrosion exposure.

The following guidelines apply

This system can be used without further testing by K2 Systems in the following standard conditions. The system is also suitable for higher requirements. However, if a value exceeds the standard conditions, please contact K2 Systems.

Planning with K2 Base

We recommend our free online software K2 Base for the planning. In five steps, you can plan the right assembly system and get a construction recommendation, parts list and the structural analysis report. Simply register and start planning: base.k2-systems.com

Roof requirements

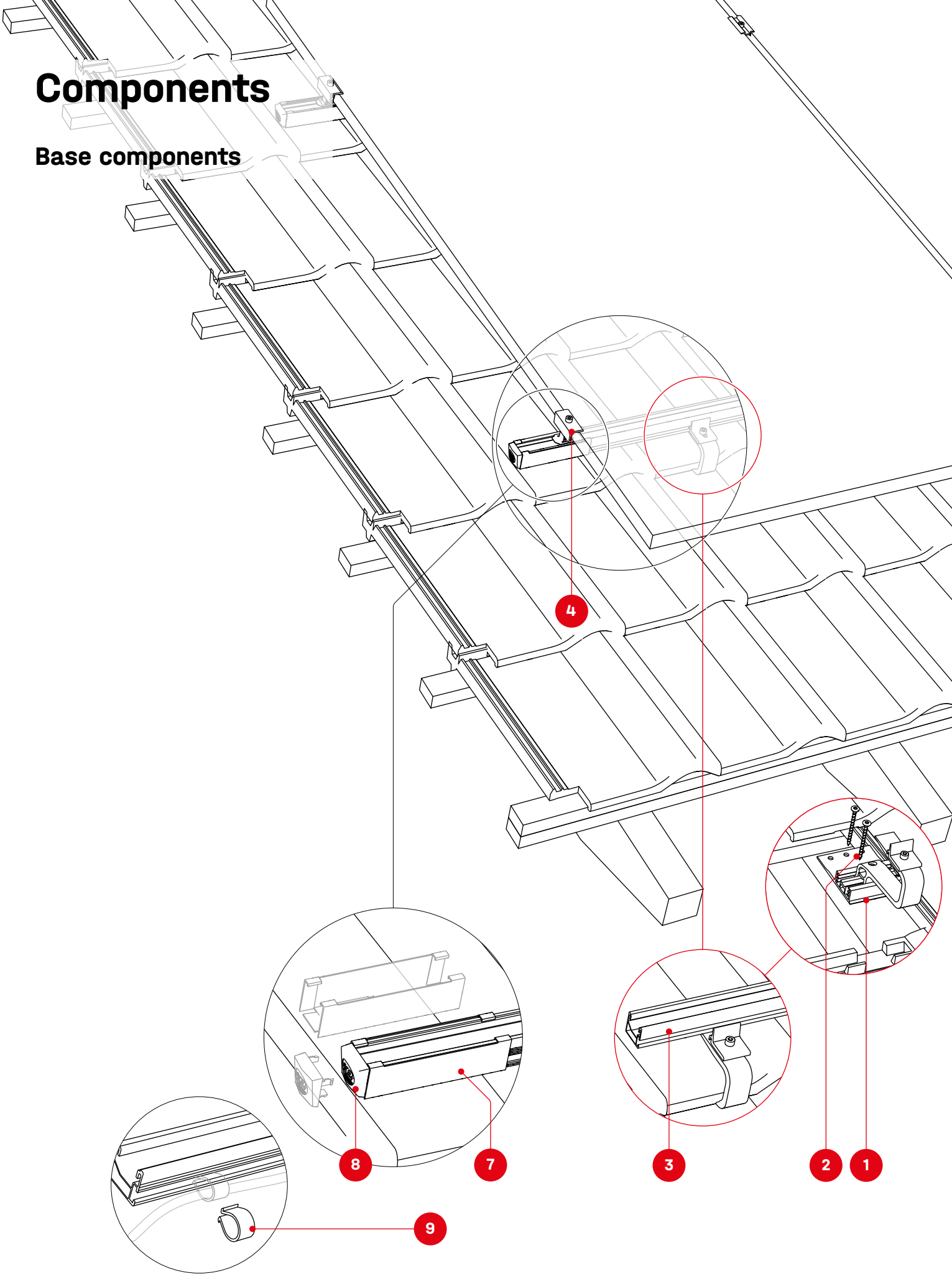
- The sufficient holding force of the roof covering at the support or substructure must be ensured on site.
- Roof pitch of 5 - 75°
- Sufficient load reserves to support the PV system.

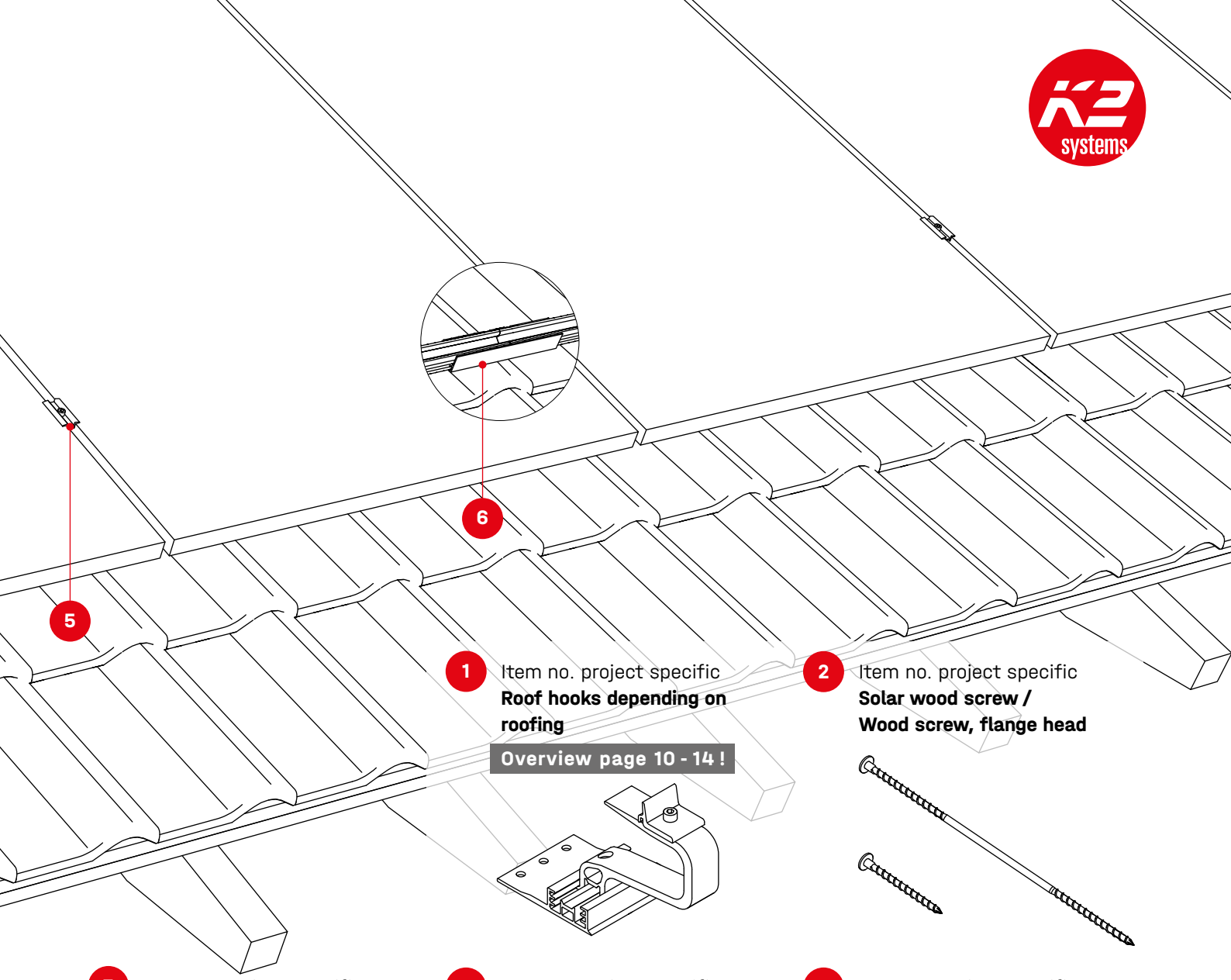
Important mounting instructions

- On-site general standards and regulations for lightning protection must be observed and consultation with a specialist to create a lightning protection concept is recommended (use lightning protection clamp if necessary).
- Please refer to our Handbook "Wood Screw Fixation of K2 Roof Hooks" for the installation of all roof hooks k2-systems.com/en/handbook-roof-hooks
- We recommend a thermal separation after maximum of 17.6 m.
- A minimum mounting distance of 50 mm from the end of the rail / rail joint to the module frame.
- Rail cut SingleRail ≥ 700 mm
- Tightening torque for all module clamps 16 Nm
- The SingleRail 36/50 RailConnector must always be positioned between two roof hooks; meaning, a cantilever extension at the rail edge outside the last roof hook is not permitted.
- For manufacturer information regarding clamps see the manufacturing module data sheet.
- In order to avoid damage under high snow loads, replace the clay/concrete roof tile with metal roof plate or sheet metal replacement tile under the bracket of the roof hook (exception SingleHook 2).
- Do not step on roof hooks or rails, as these are not climbing assists.
- Sizing and positioning of the wood screws are subject to the relevant regulations.
- In the case of pressure-soft rooftop insulation, especially that made of mineral fibres, care must be taken to ensure a suitable spacer screw connection of the counter batten to the rafter.
- The following applies to all insulation materials: With counter-batten thicknesses greater than 40 mm, the roof hooks can also be fastened exclusively into the counter-batten if it is sufficiently shear- and pressure-resistant.

Components

Base components



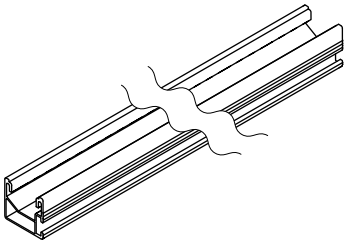


1 Item no. project specific
Roof hooks depending on roofing

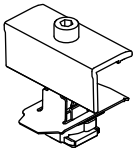
Overview page 10 - 14 !

2 Item no. project specific
Solar wood screw / Wood screw, flange head

3 Item no. project specific
SingleRail 36, 50 or 36 Light



4 Item no. project specific
Module end clamps

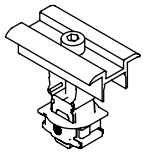


K2 Clamp EC
25 - 40



XS Clamp EC
30 / 33 / 35

5 Item no. project specific
Module middle clamps



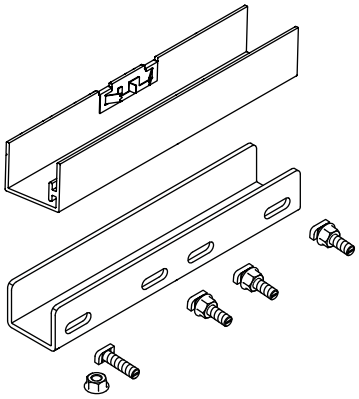
K2 Clamp MC
25 - 40



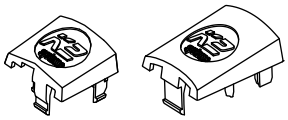
XS Clamp MC
30 / 33-35

6 2003605/2001976
SingleRail 36/50 RailConnector

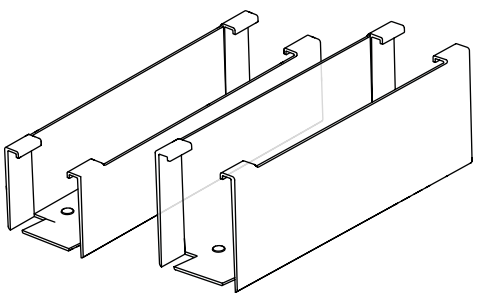
SingleRail 36/50 Connector Set



7 1004767/2004911
EndCap SingleRail 36/50



8 2003523/2002907
BlackCover SingleRail 36/50



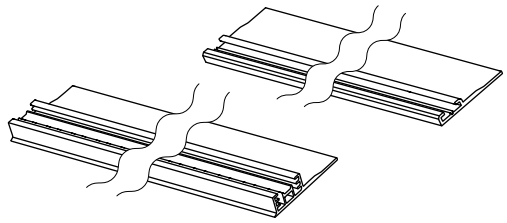
9 1005394
Omega Cable Clip



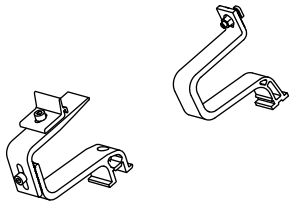
Components

SingleBoards

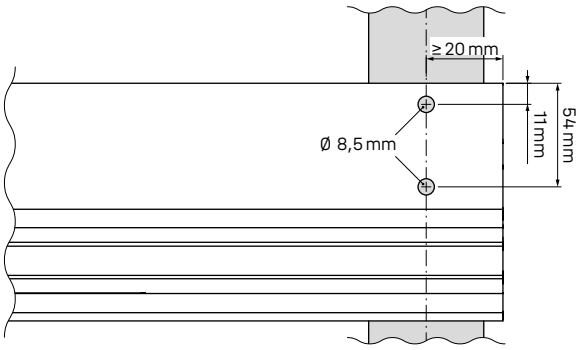
1 2001972 / 2002935
SingleBoard 3S/4S / SingleBoard



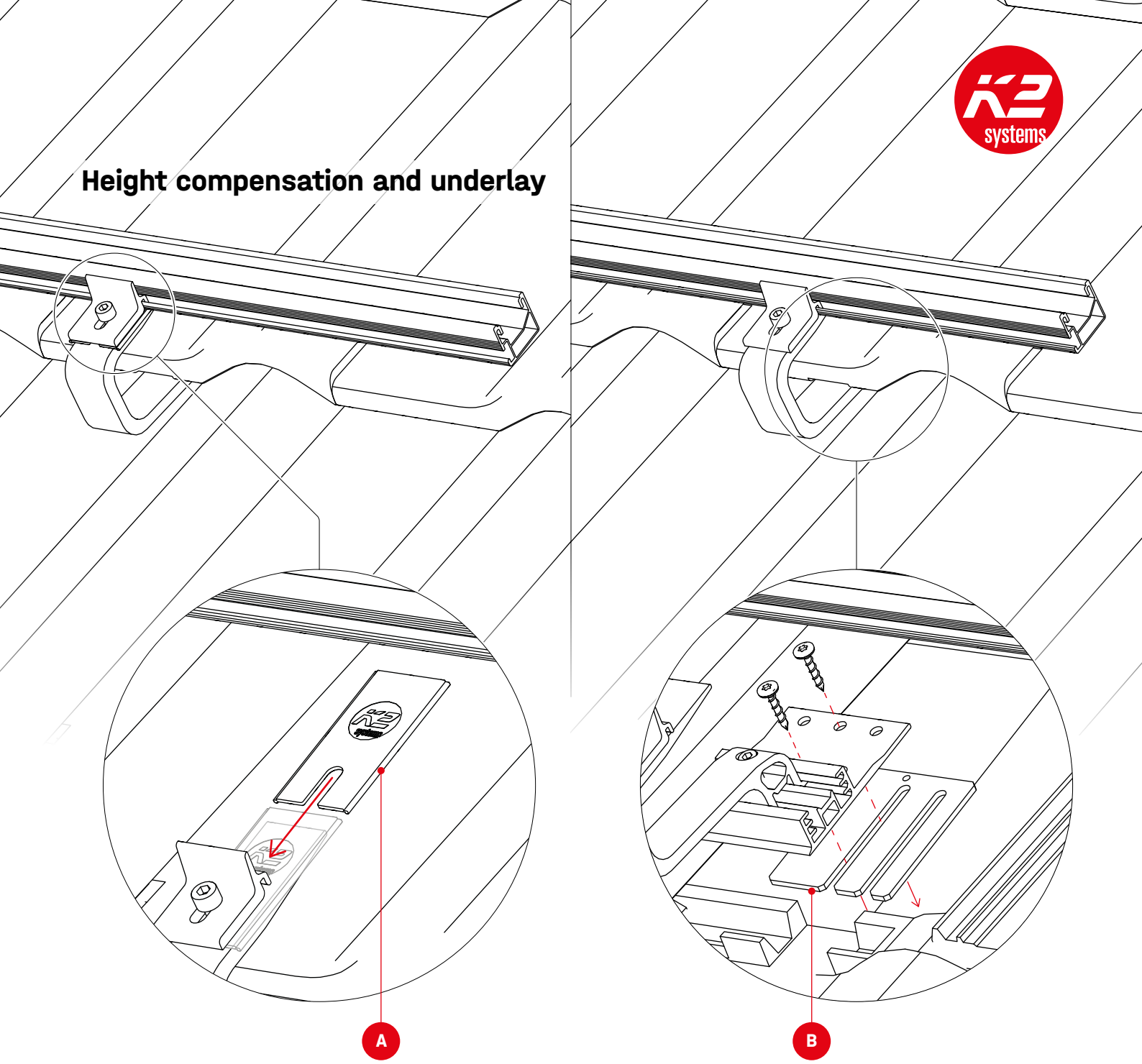
2 2002927 / 2003152
SingleBracket 4S / SingleBracket 1.1



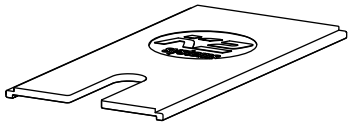
Drilling specifications for SingleBoards



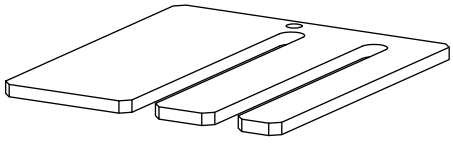
Height compensation and underlay

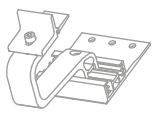
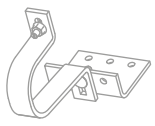


1002361
Distance Pad
2 mm



2002332
Roof Hook Height Compensator
4 mm

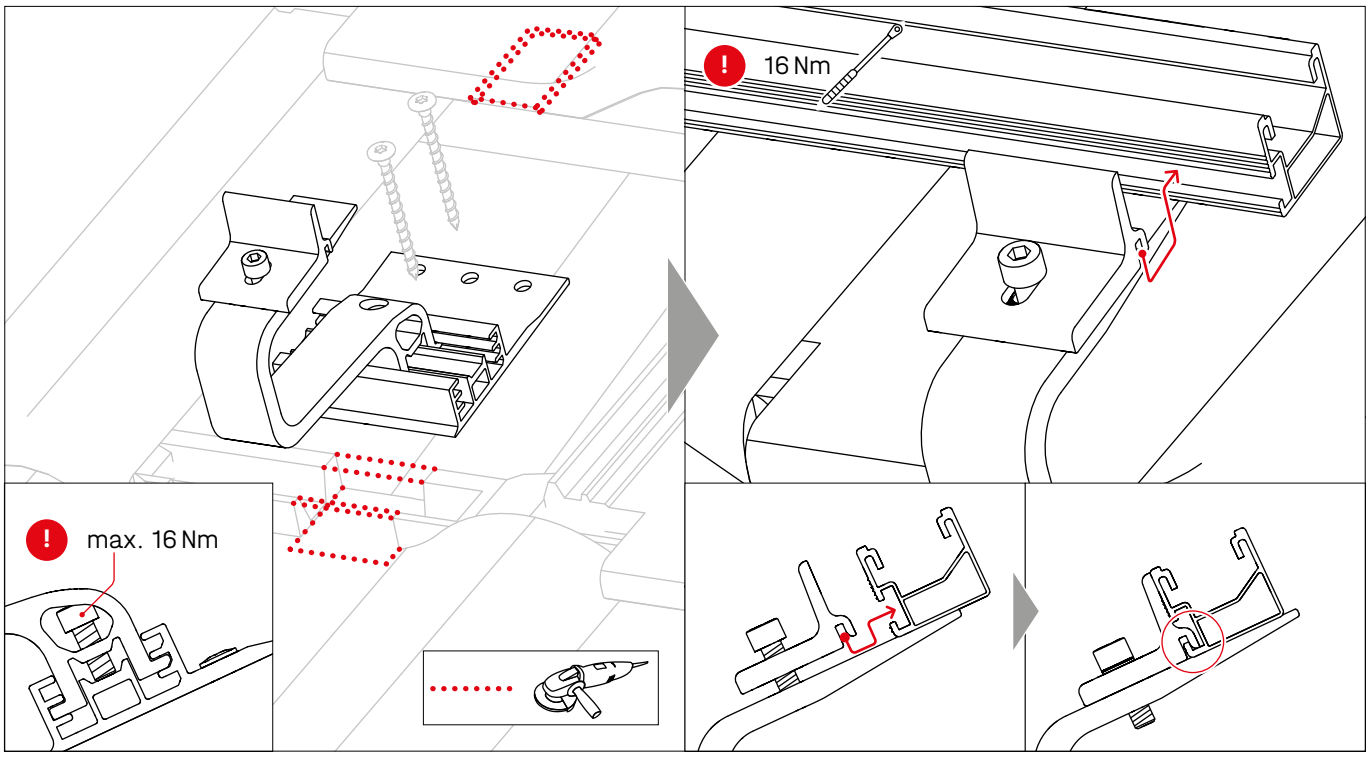


SingleHook 3S/4S/3S Long 	●	●
SingleHook 1.1/Vario/Alpin 	○	●

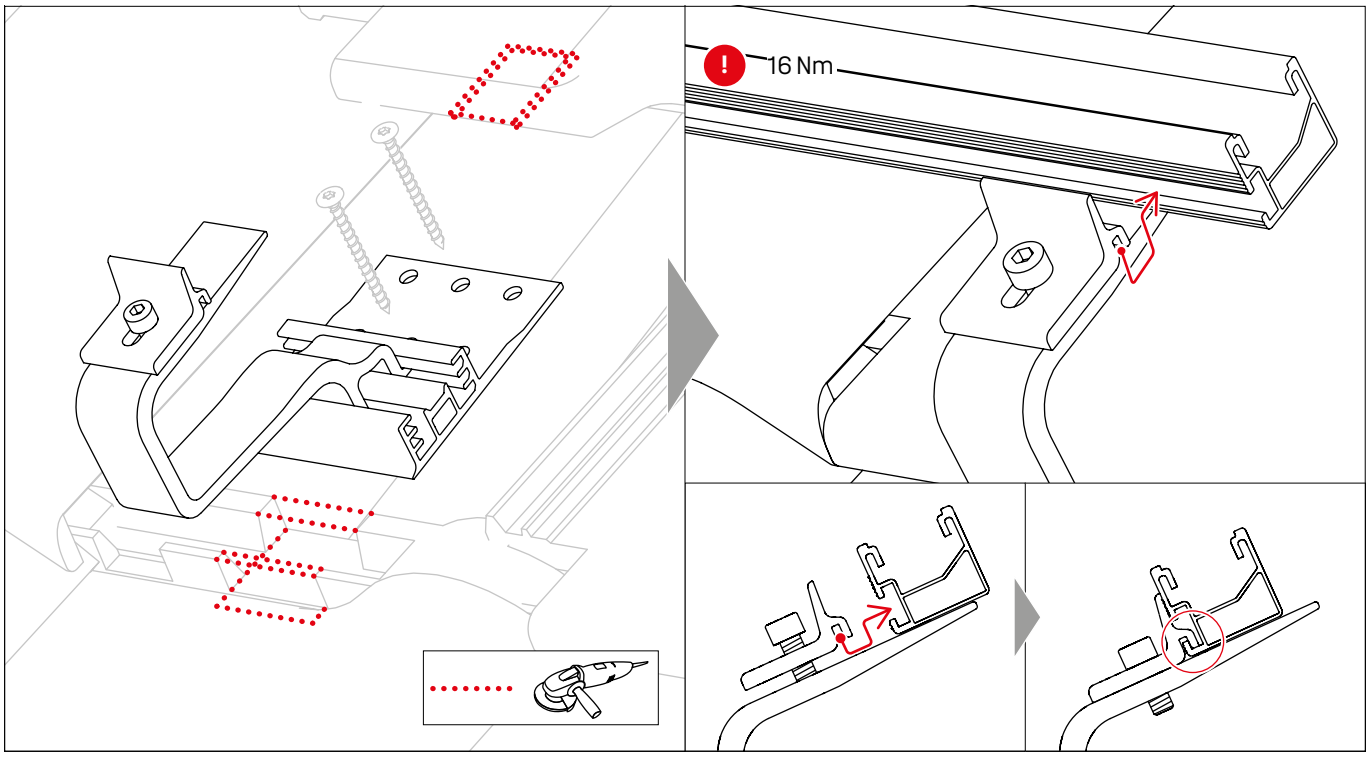
● Compatible ○ Not Compatible

Compatible roof hooks

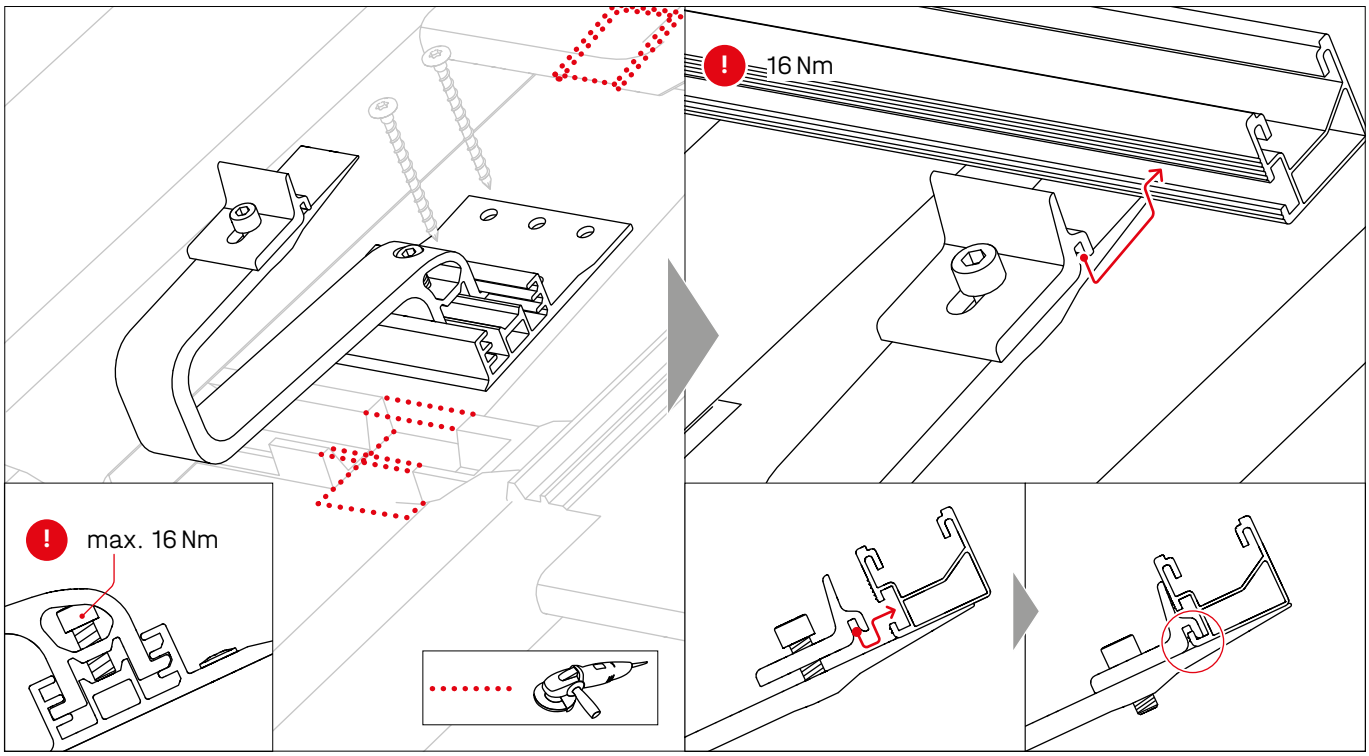
SingleHook 3S · 2003215



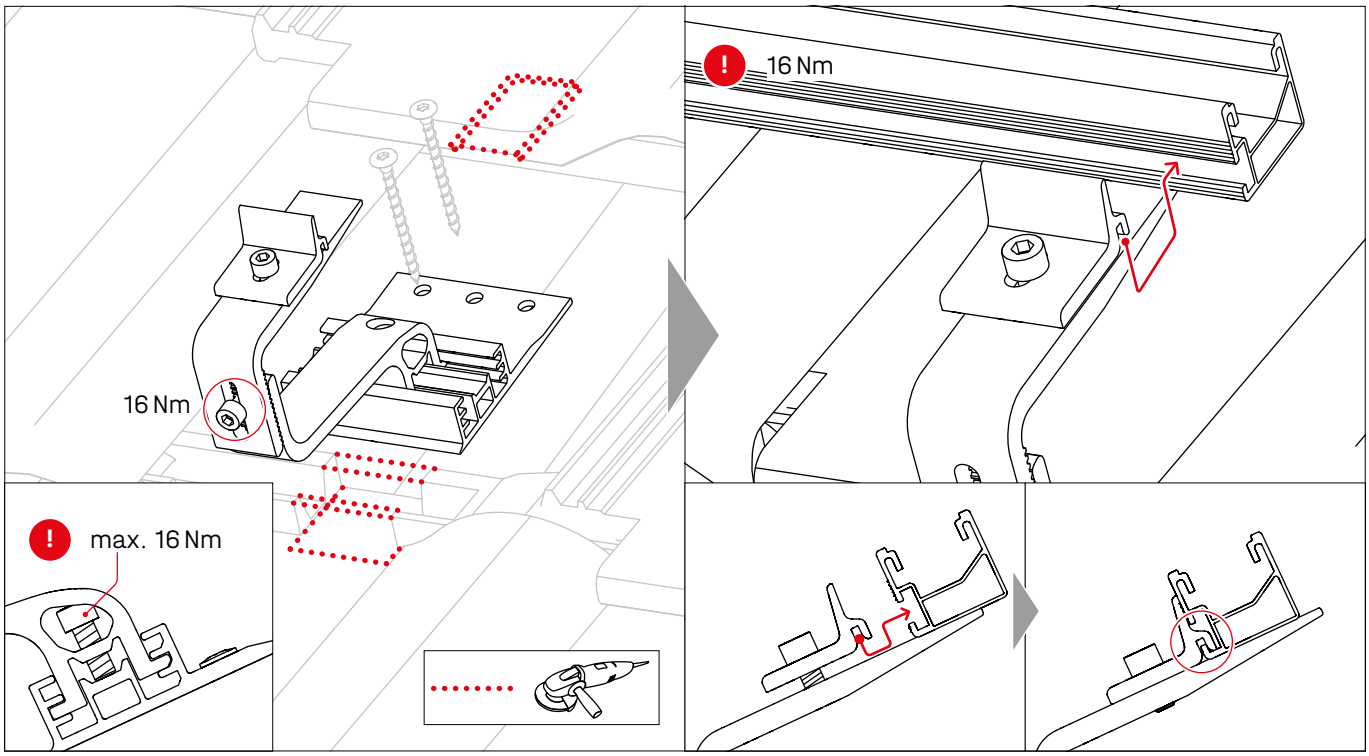
SingleHook 3S Light · 2004795



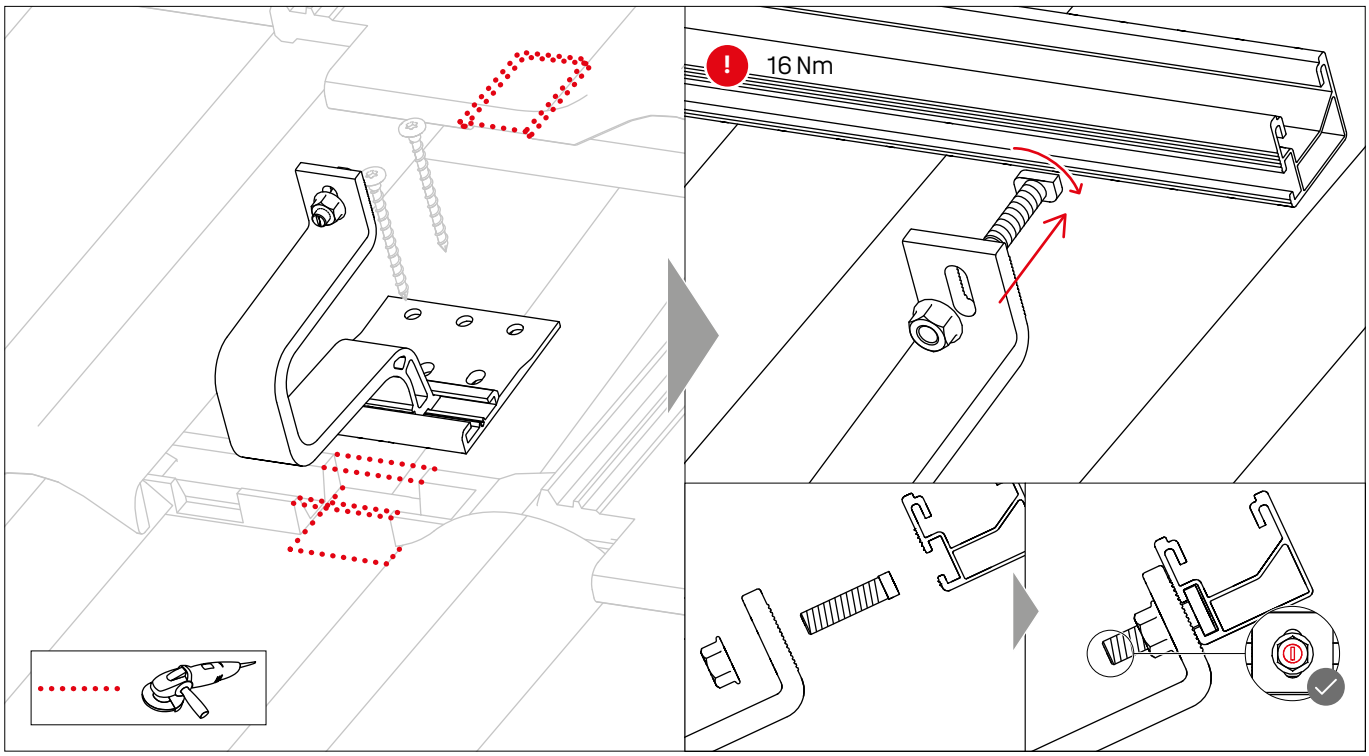
SingleHook 3S Long · 2004222



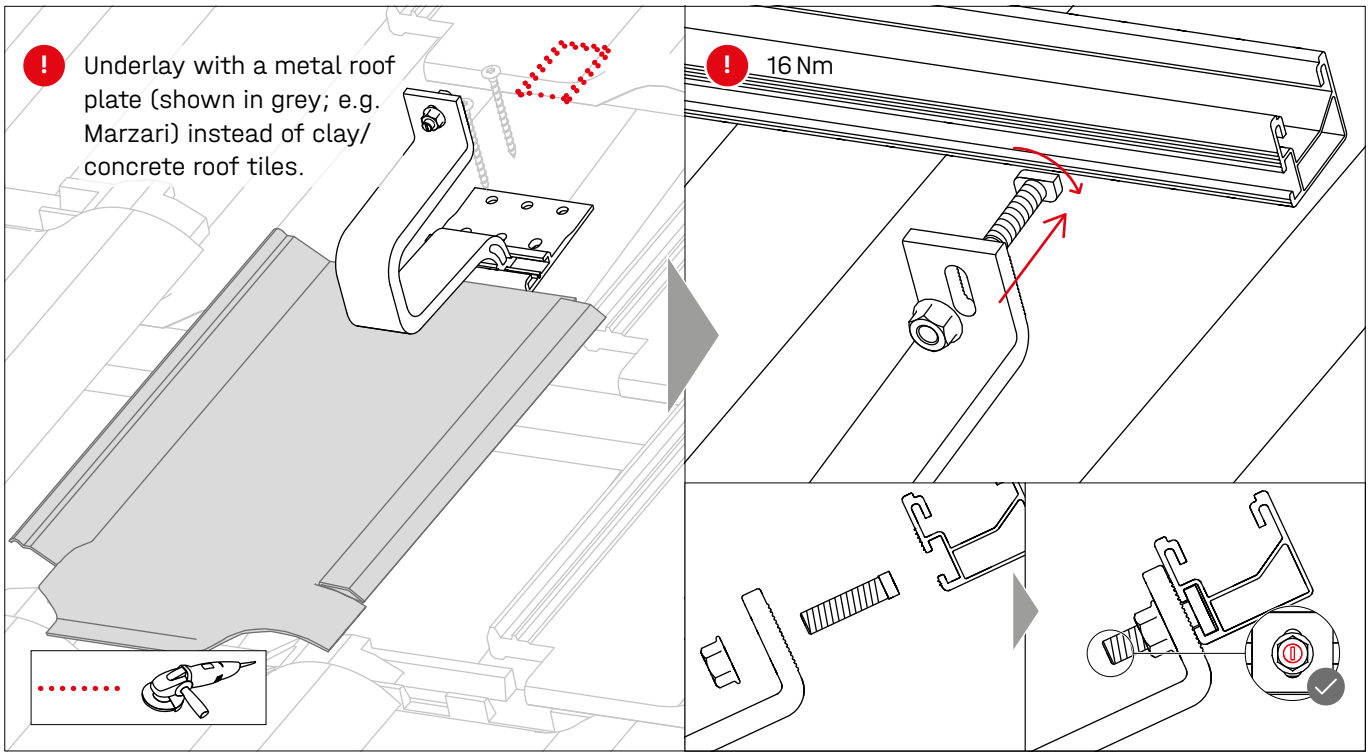
SingleHook 4S · 2003144



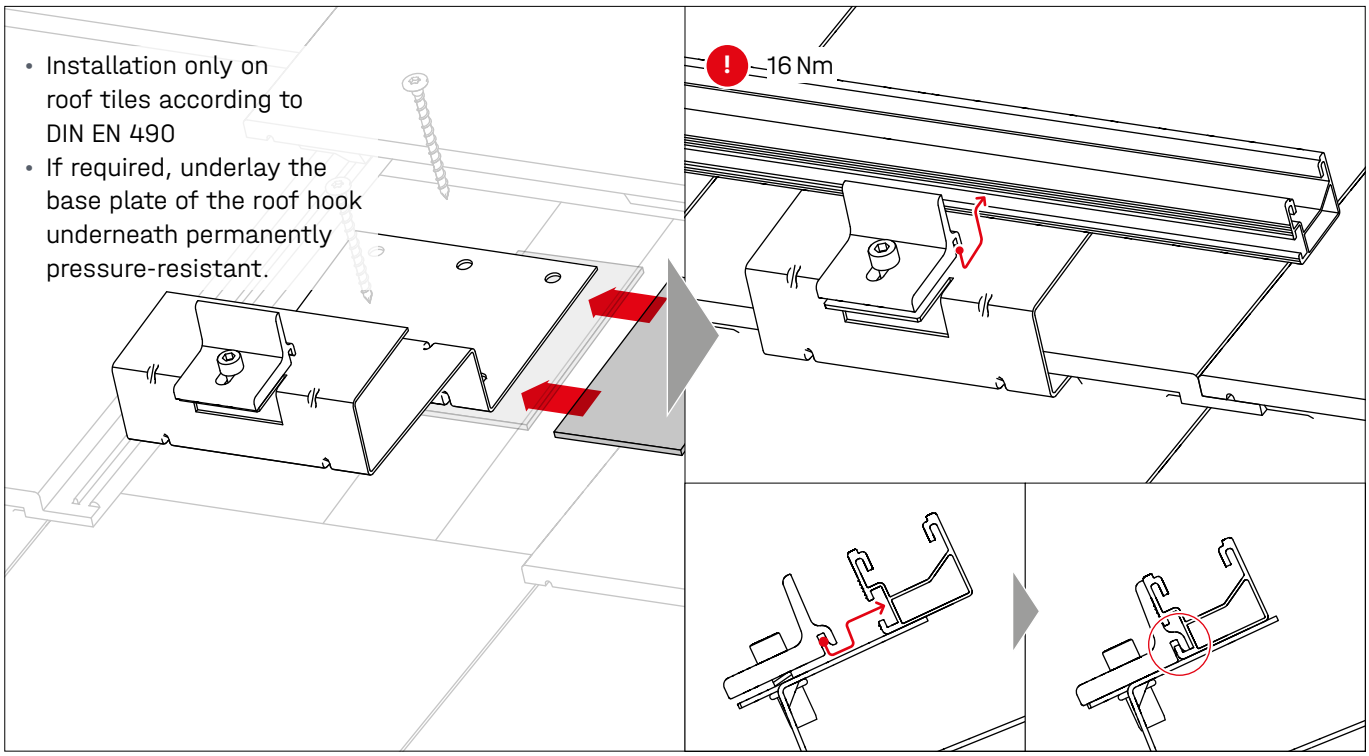
SingleHook 1.1 · 2001928



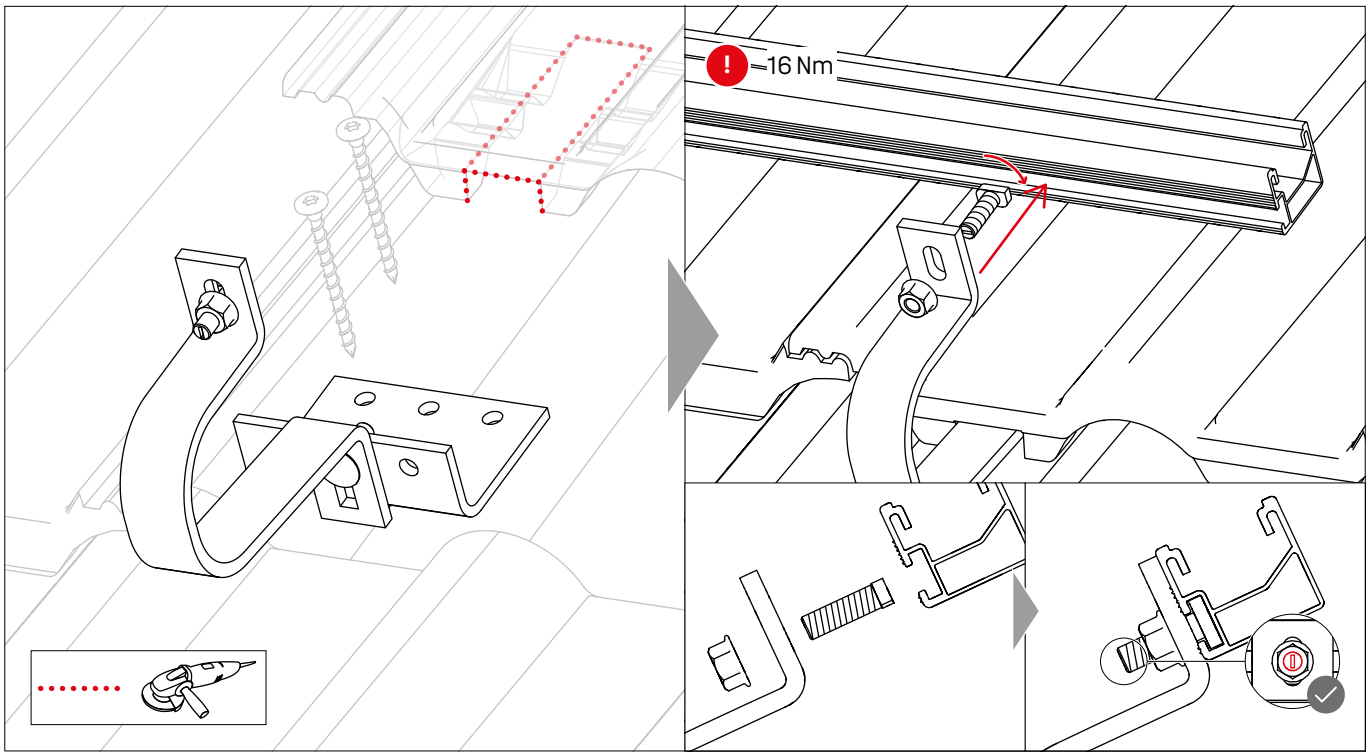
SingleHook Alpin · 2003155



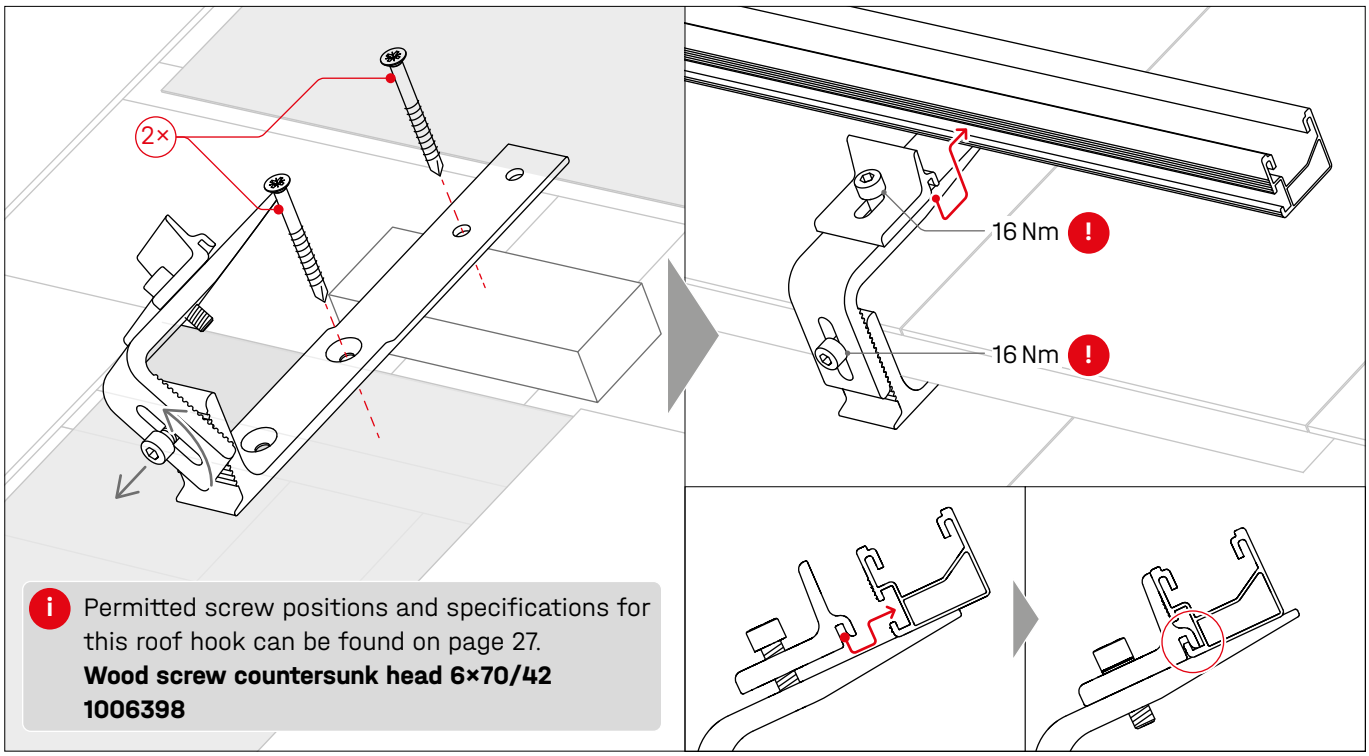
SingleHook 2 · 2003175



SingleHook Vario · 2002651

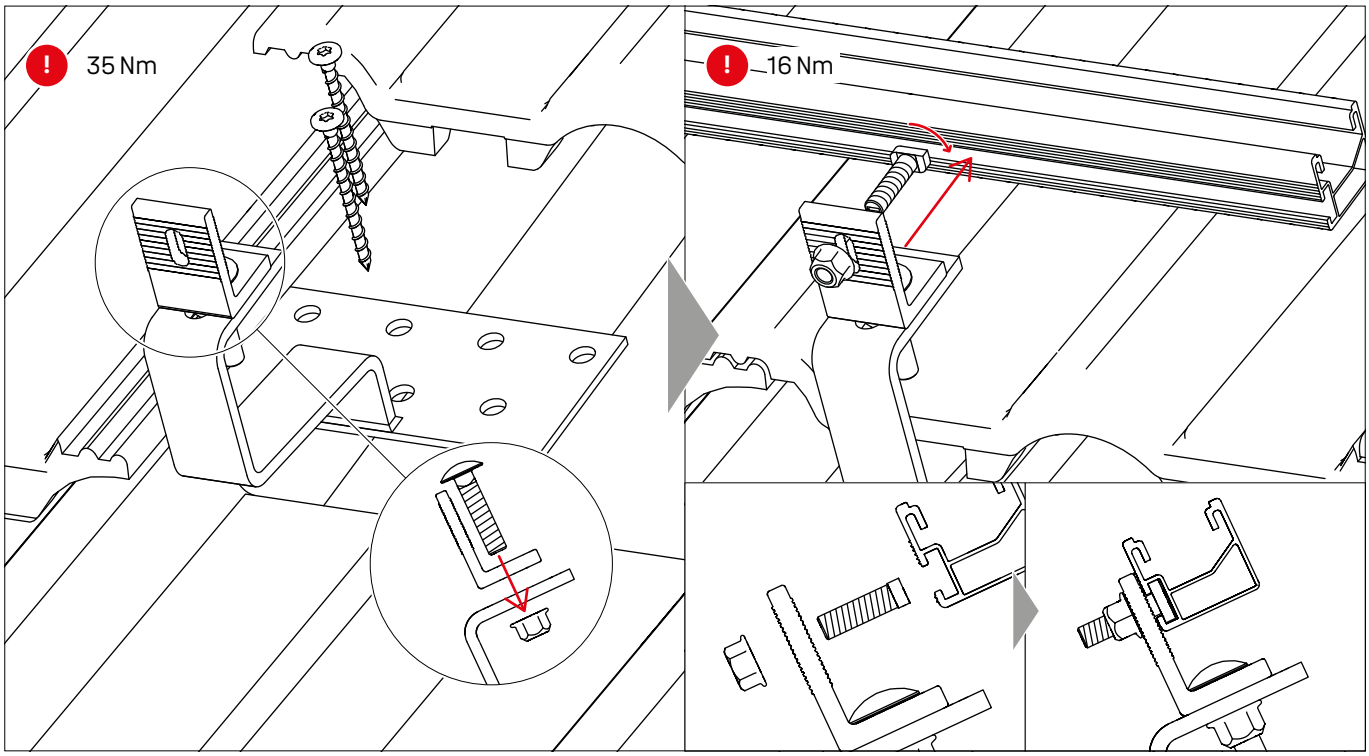


SingleHook Slate · 2005241



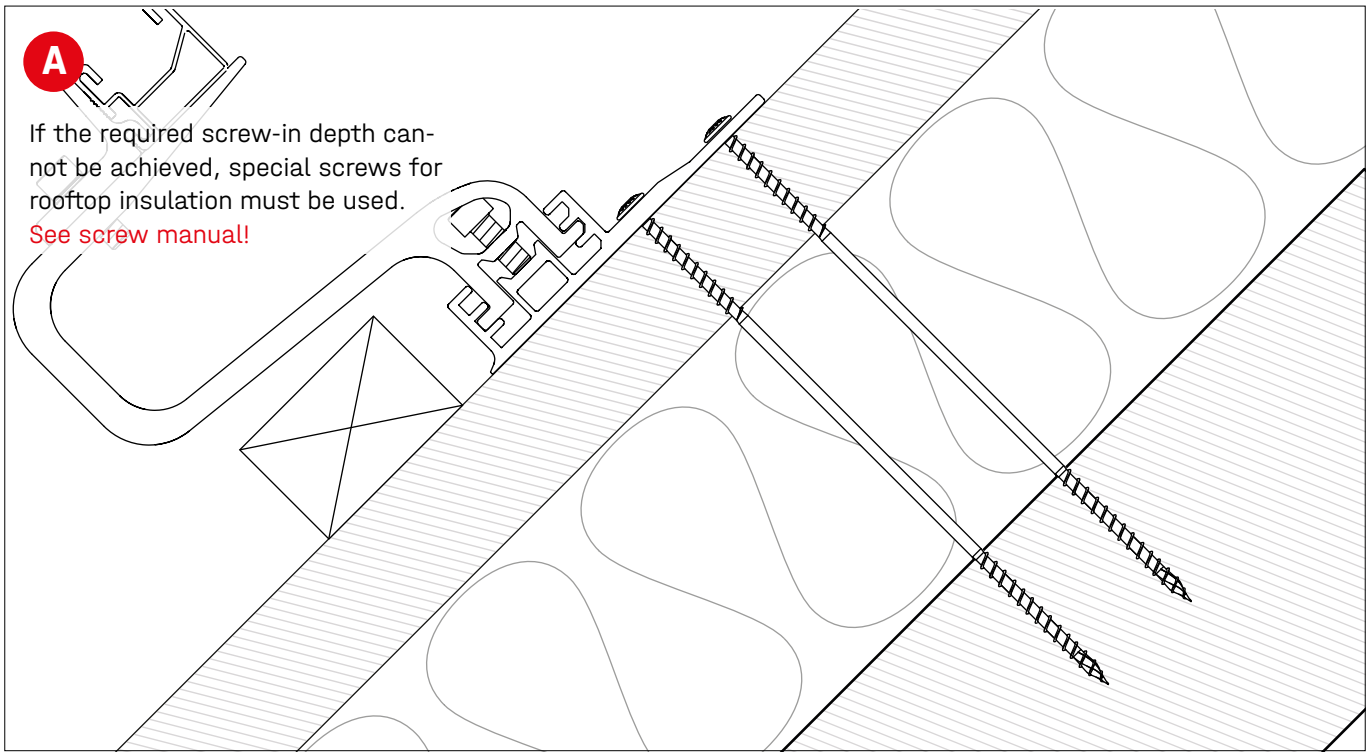
Permitted screw positions and specifications for this roof hook can be found on page 27.
Wood screw countersunk head 6×70/42
1006398

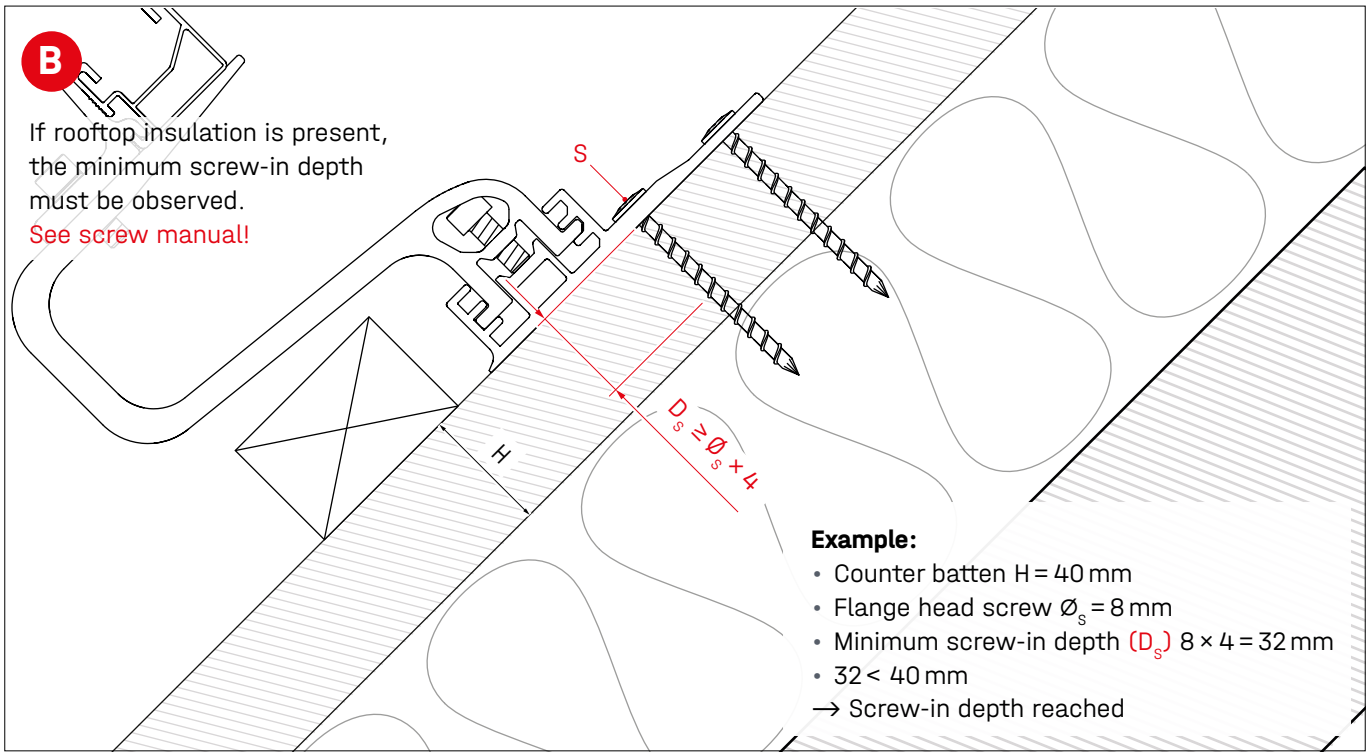
L-Adapter for further roof hooks · 2002683



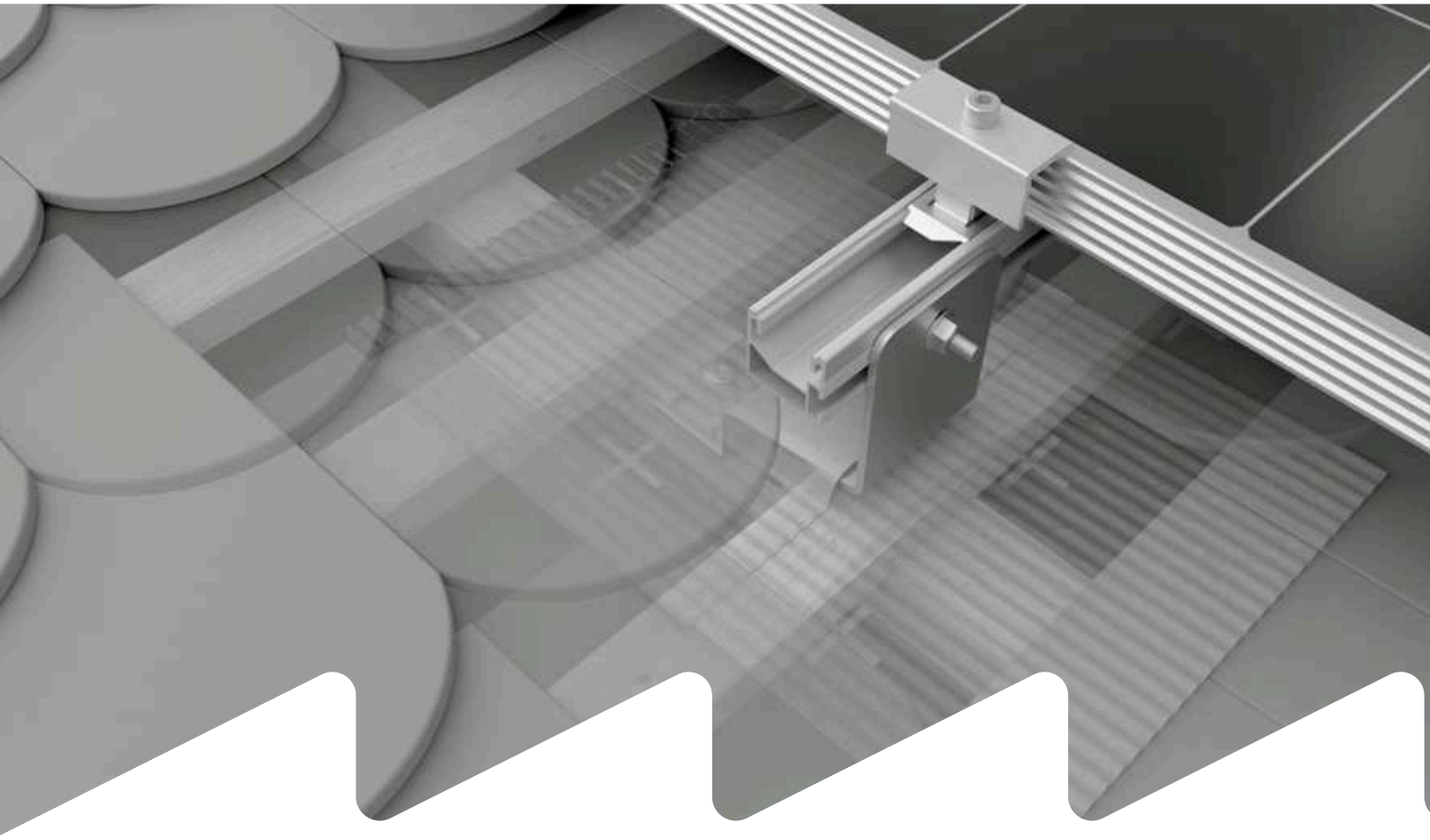
Assembly

Notes on rooftop insulation





Connecting Strength



Assembly instructions

SingleRail System

Roof hook flat tile

Inhalt

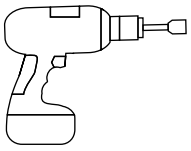
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Quality tested - multiple certifications

K2 Systems stands for secure connections, highest quality and precision. Our customers and business partners have known that for a long time. Independent institutes have tested, confirmed and certified our capabilities and components.

Please find our quality and product certificates under:
k2-systems.com/en/technical-information

Tools overview





6 mm



13 mm



25 / 40



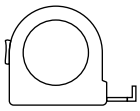
6 - 30 Nm
(4,5 - 22,2 lb-ft)



6 mm



13 mm

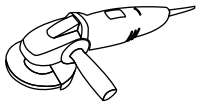


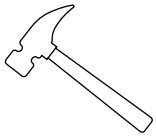
≥ 3,0 m



≥ 6,0 m

Optional





General safety information

Please note that our general mounting instructions must be followed at all times and can be viewed online at k2-systems.com

- The equipment may only be installed and operated by qualified and adequately trained installers.
- Prior to installation, ensure that the product complies with on-site static loading requirements.
  For roof-mounted systems, the roof load-bearing capacity must always be checked.
- National and local building regulations and environmental requirements must be adhered to.
- Compliance with health and safety regulations, accident prevention guidelines and applicable standards is required.
  - Protective equipment such as safety helmet, boots and gloves must be worn.
  - Roofing works must be in accordance with roofing regulations utilising fall protection safeguards when eaves height exceeds 3 m.
  - At least two people must be present for the duration of the installation work in order to provide rapid assistance in the event of an emergency.
- K2 mounting systems are continuously developed and improved and the installation process may thereby change at any time. Prior to installation consult our website at k2-systems.com/en/technical-information for up-to-date instructions.We can send you the latest version on request.
- The assembly instructions of the module manufacturer must be adhered to.
- Equipotential bonding/grounding/earthing between individual parts is to be performed according to country specific standards, as well as national laws and regulations.
- At least one copy of the assembly instructions should be available on site throughout the duration of the installation.
- Failure to adhere to our general safety and assembly instructions and not using all system components, K2 is not liable for any resulting defects or damages. We do not accept liability for any damage resulting in the use of competitor's parts. Warranty is excluded in such cases.
- German law shall apply excluding the UN Convention on CISG. Place of venue is Stuttgart. Our General Terms of Business apply.
- If all safety instructions are adhered to and the system is correctly installed, there is a product warranty entitlement of 12 years! We strongly recommend reviewing our terms of guarantee, which can be viewed at k2-systems.com/en/warranty-terms-and-conditions We will also send this information on request.
- Dismantling of the system is performed in reverse order to the assembly.
- K2 stainless steel components are available in different corrosion resistance classes. Each structure or component must be carefully checked for possible corrosion exposure.

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This System can be used without further testing by K2 systems in the following standard conditions. It is also suitable for higher requirements. However, if a value exceeds the standard conditions, please contact K2 Systems.



Planning with K2 Base

We recommend our free online software K2 Base for the planning. In five steps, you can plan the right assembly system and get an installation recommendation, a bill of materials and the structural analysis report. Simply register and start planning: base.k2-systems.com



Roof requirements

- Sufficient holding force of the roof covering at the support or substructure must be ensured on site.
- Roof pitches: 18 - 75°
- Sufficient load reserves to support the PV system

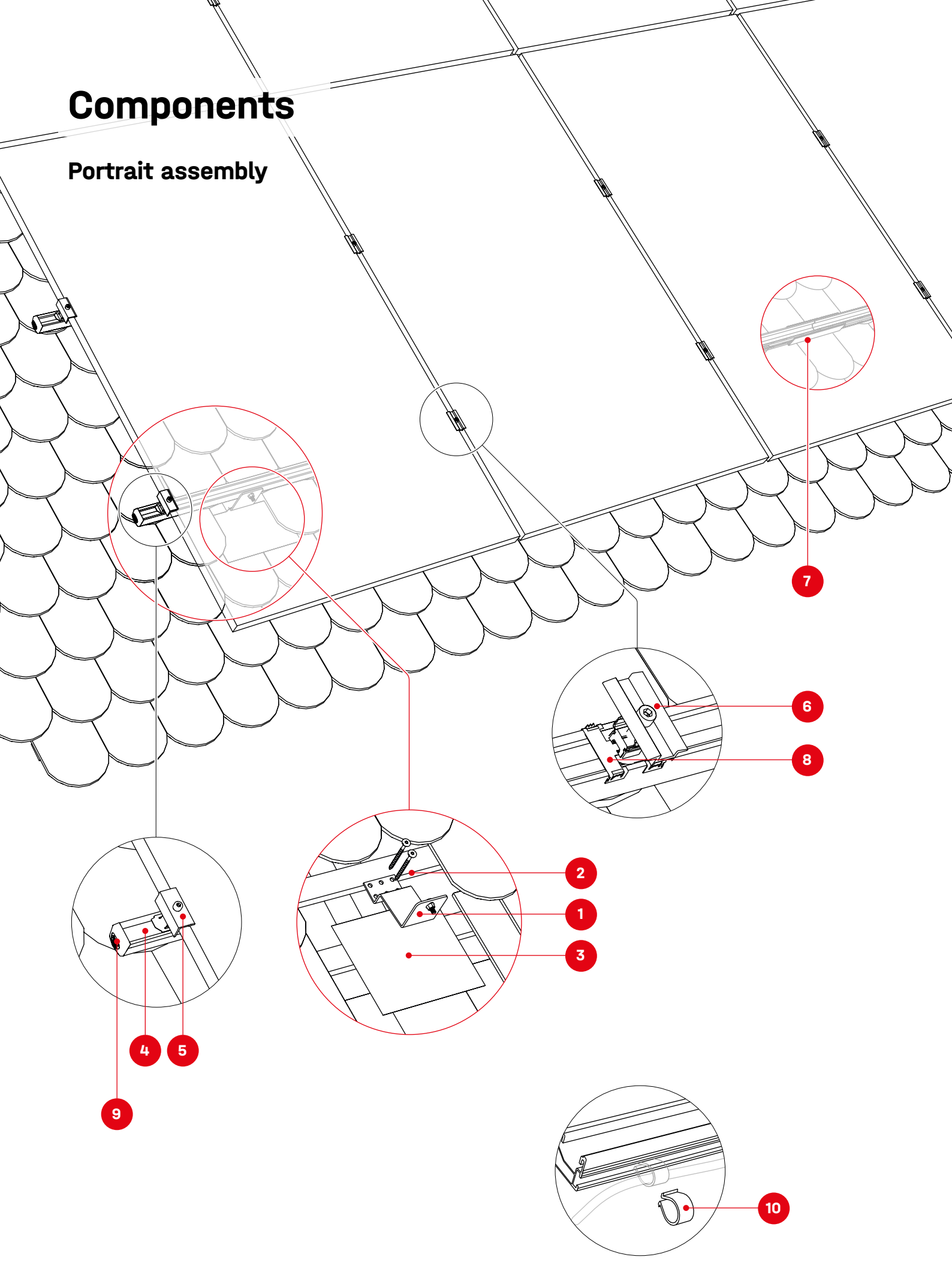


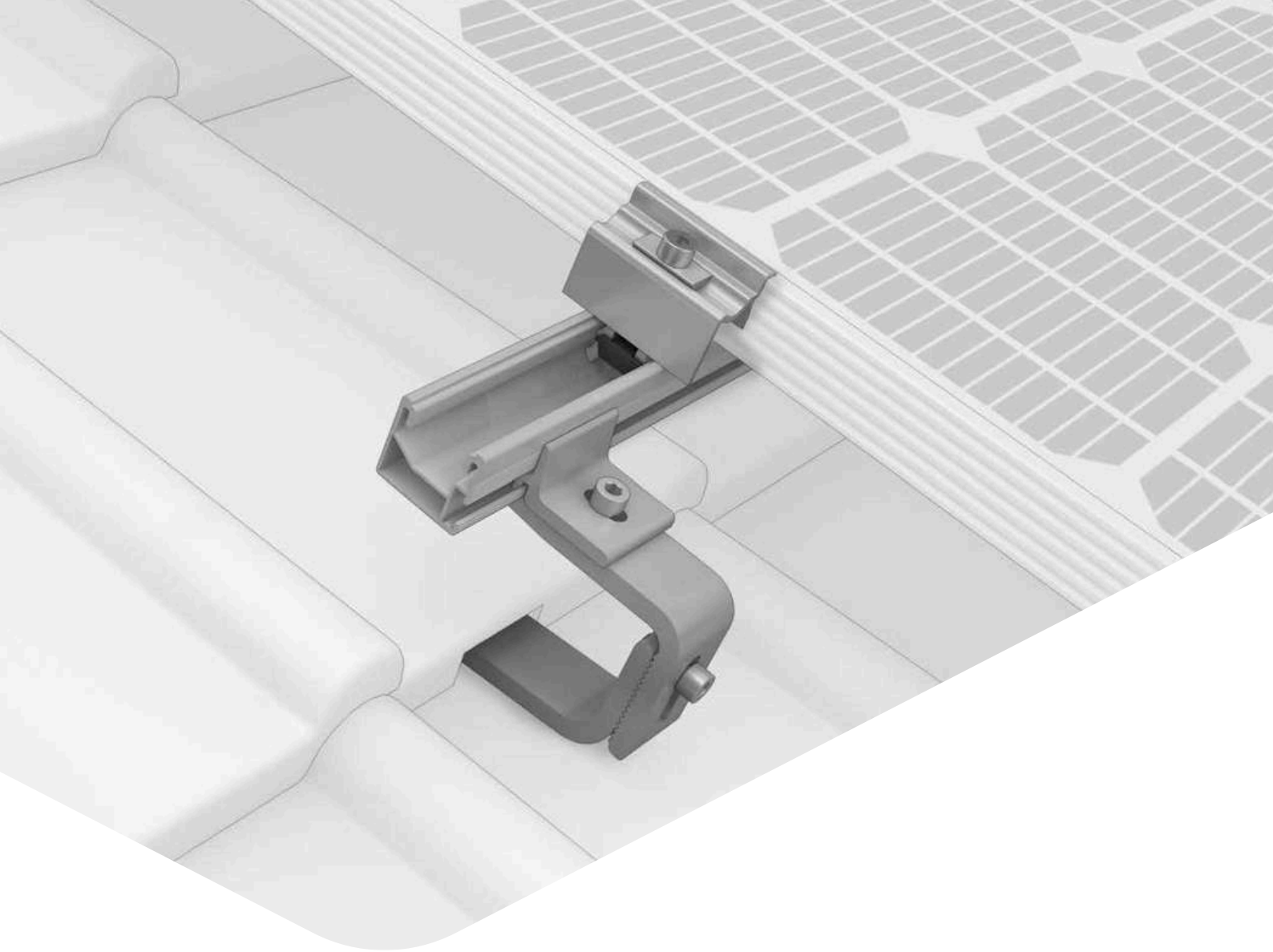
Important mounting instructions

- On-site general standards and regulations for lightning protection must be observed and consultation with a specialist to create a lightning protection concept is recommended (use lightning protection clamp if necessary). Country-specific regulations apply.
- Please refer to our manual "Attach K2 roof hooks with flat head screw" for the installation of all roof hooks k2-systems.com/en/handbook-roof-hooks
- Ensure a thermal separation after a maximum rail length of 17.6 m.
- A minimum mounting distance of 50 mm from the end of the rail/rail joint to the module frame.
- Rail cut SingleRail ≥ 700 mm
- Tightening torque for all module clamps 16 Nm
- The SingleRail 36/50 RailConnector must always be positioned between two roof hooks; meaning, a cantilever extension at the rail edge outside the last roof hook is not permitted.
- Please refer to the module manufacturer's installation manual regarding the clamps.
- Do not step on roof hooks or rails.
- Sizing and positioning of the wood screws are subject to the relevant regulations.
- In case of non-rigid on-roof insulation e.g. mineral fibre, ensure a suitable spacer screw connection between the counter batten and the rafter.
- The following applies to all on-roof insulation materials: With counter-battens >40mm in height the roof hook may be fastened into the counter-battens should these be sufficiently shear and pressure resistant.

Components

Portrait assembly





Manual

Attach K2 roof hooks with flange head screws

Connecting Strength

k2-systems.com

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  - Screw length in relation to rafter height 4
  - Edge distances 5

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  - Underlay of the roof hook 6
  - With on-roof insulation 7

Tested quality - certified several times

K2 Systems stands for secure connections, highest quality and precision. Our customers and business partners have known this for a long time. Independent bodies have tested, confirmed and certified our competences and components.

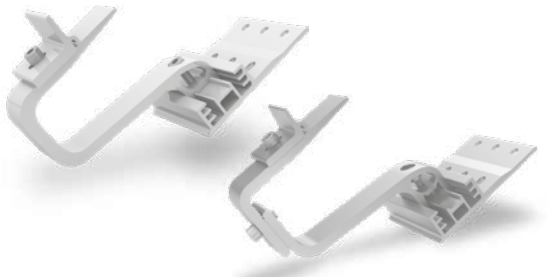
At k2-systems.com you will find our quality and product certificates.

Intruduction

The screw connection between K2 roof hooks and the roof substructure has the task of transferring the forces acting on the photovoltaic system via the roof hook and the screws into the supporting roof substructure and thus guaranteeing the stability of the photovoltaic system. K2 Systems recommends the use of HECO stainless steel screws for fastening its roof hooks. These are of high quality and ensure a secure and good corrosion-resistant connection.

The round oblong hole pattern of the K2 roof hooks has been matched to the flat head screws in particular, so that the combination allows particularly powerful force transmission in compliance with the European Technical Approval (ETA).

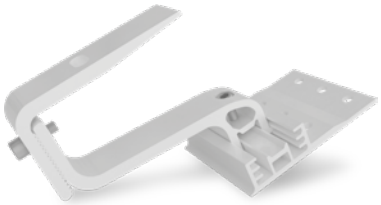
K2 roof hook with round slotted hole pattern and flat head screw



SingleHook 3S & SingleHook 4S
2003215 / 2003144



SingleHook Vario
2002651

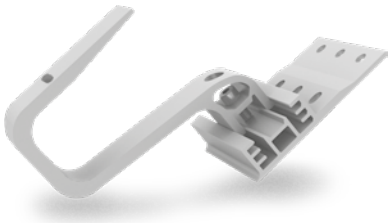




SingleHook 1.1
2001928



SingleHook Alpin
2003155

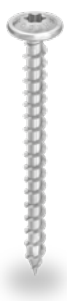


SolidHook 3S+/4S+
2002390 / 2002402



Self-drilling solar wood construction screw with flange head

Dimension	Art.-Nr.
8 × 180	2004551
8 × 240	2004119
8 × 300	2004552



Self-drilling wood construction screw with flange head

Dimension	Art.-Nr.
6 × 80	2004106
6 × 100	2004107
8 × 80	2004111
8 × 100	2004112
8 × 120	2004113
8 × 160	2004115
8 × 180	2004116
8 × 200	2004117

Requirements

General

Before installing roof hooks, it must always be checked whether the roof is capable of bearing the additional load of a photovoltaic system and the resulting changed loads. This usually requires a structural analysis. In the case of existing roofs, the condition of the structure, in particular the load-bearing timbers, must also be inspected on site. The regionally valid building regulations in this regard must be observed.

If the conditions are met, the bolted connection must be calculated according to Eurocode 5. This takes into account the local conditions, the substructure of the building and the geometry of the roof hook. The calculation result shows whether the selected type and number of screws can transfer sufficient forces from the roof hook to the timber substructure.

The values required for the calculation for the plate head screw can be found in the particular ETAs. The calculation method is specified by Eurocode 5. The screws may be used for fastening steel and aluminum roof hooks to the following types of wood with certain minimum requirements: Solid softwood, glulam, laminated beams, cross laminated timber and laminated veneer lumber. Further details can be found in the ETAs.

- Heco TOPIX-plus ETA-19/0553
- Reisser ETA-11/0106
- Eurotec ETA-11/0024
- Schäfer + Peters ETA-11/0283

For screw traceability purposes, document the lot number and manufacturer indicated on the packaging and provide it to the screw manufacturer in case of problems or complaints.

Screw diameter

The choice of screw diameter depends both on the rafter geometry in order to maintain the necessary minimum edge distances and on the forces to be transmitted according to the Eurocode calculation. The round oblong hole pattern of the K2 roof hooks offers the geometric prerequisites for the use of screw diameters from Ø 6 mm to Ø 8 mm. For these, the connections were mathematically verified taking into account exemplary load assumptions/actions and the bolt resistances defined in the ETA. The minimum distance from the centre of the screw to the rafter edge must be at least three times the diameter (Ø 6 mm × 3 = 18 mm; Ø 8 mm × 3 = 24 mm). With Heco TOPIX-plus (Ø 8 mm), the minimum distance to the edge of the rafter is 17.5 mm.

Screw length in relation to rafter height

To ensure maximum stress, the penetration depth must be at least the diameter times 4 (Ø 6 mm × 4 = 24 mm; Ø 8 mm × 4 = 32 mm). Only then can the screw transfer the specified forces from the roof hook into the rafter.