



**MOUNTING SYSTEMS  
FOR SOLAR INSTALLATIONS  
2012**

**WE SECURE THE SUN**

Delivery program 2012

STATUS: 05/2012 | SUBJECT TO CHANGE

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**NOTES**

All enquiry forms and order sheets can be found in chapter 9 for the respective product. Should you have any questions or require further information please contact us via

E-Mail: solar@wasi.de  
Phone: +49-(0) 202- 26 32-179 or  
Fax: +49-(0) 202- 26 32-377

**POSTAL ADDRESS**

Emil-Wagener-Straße 1  
D- 42289 Wuppertal  
solar@wasi.de  
www.wasi-solar.de

**VISITOR ADDRESS**

WASI-Straße  
D- 42287 Wuppertal

**SERVICE HOURS**

Mo. - Th. 7.30 - 17.00  
Fr. 7.30 - 16.00

Terms of shipment

We deliver small parts / pallet goods within Germany from 250.00 euro upwards free of charge.

Please note that you are responsible for unloading long items from the lorry. Please prepare your storage area or construction site accordingly. If it is not possible to deliver long items because the recipient is absent, we retain the right to invoice again for another

delivery. Please supply a telephone number, particularly when the delivery is to a construction site.

We deliver long items such as mounting rails at 6.1 m from our outside storage area in Bitterfeld. The freight costs are calculated according to the table below:

Freight rates inside Germany per 100 kg								
	Minimum each dispatch	up to 500 kg	501- 1000 kg	1001- 2000 kg	2001- 3000 kg	3001- 5000 kg	5001- 10000 kg	10001- 15000 kg
up to 50 km	61.60 €	28.75 €	20.90 €	12.26 €	7.36 €	4.52 €	2.73 €	1.88 €
51-75 km	61.60 €	28.75 €	20.90 €	12.28 €	8.52 €	5.58 €	3.39 €	2.35 €
76-100 km	63.00 €	30.81 €	22.39 €	13.26 €	9.36 €	6.60 €	4.28 €	2.98 €
101-125 km	64.30 €	33.43 €	24.34 €	14.61 €	10.61 €	7.15 €	5.27 €	3.62 €
126-150 km	65.70 €	35.18 €	25.67 €	15.60 €	10.97 €	8.00 €	5.31 €	4.11 €
151-200 km	67.00 €	37.83 €	27.55 €	16.84 €	12.58 €	8.78 €	6.44 €	5.00 €
201-250 km	68.30 €	40.93 €	29.64 €	18.29 €	13.88 €	9.45 €	7.50 €	6.04 €
251-300 km	69.70 €	42.34 €	30.87 €	19.10 €	14.58 €	9.67 €	7.78 €	6.84 €
301-350 km	72.40 €	46.38 €	33.91 €	21.28 €	16.54 €	10.23 €	8.14 €	6.95 €
351-400 km	73.70 €	47.93 €	35.00 €	21.99 €	17.15 €	11.15 €	8.88 €	7.42 €
401-450 km	76.40 €	49.41 €	36.14 €	22.81 €	17.94 €	11.42 €	8.97 €	8.09 €
451-500 km	77.80 €	50.21 €	37.08 €	23.48 €	18.48 €	11.79 €	9.38 €	8.54 €
501-600 km	80.40 €	51.68 €	37.84 €	24.01 €	19.00 €	13.02 €	10.38 €	9.46 €
601-700 km	83.10 €	51.87 €	38.04 €	24.25 €	19.27 €	14.05 €	11.22 €	10.22 €
ab 701 km	88.40 €	52.73 €	38.83 €	24.87 €	19.90 €	15.44 €	12.39 €	11.30 €

Example invoice. dispatch of long items

- Dispatch of 100 mounting rails 40 x 40 to Munich:

  - Weight of mounting rail 40 x 40 = 921 grams / metre
  - 100 rails at 6.1 metre therefore weigh 561.81 kg (calculation always to the nearest hundred)
- Distance Bitterfeld – Munich = 460 km
  - Freight rate 37.08 euro / 100 kg
  - Freight costs = 222.48 euro

Delivery times / lead times

- Small parts from the warehouse at Wuppertal:



  - Order input up to 12:00 : Ready for dispatch on the same day
  - Dispatch by parcel post (ordinary lead time 24 hours, maximum 72 hours) or courier (ordinary lead time 24 hours, maximum 72 hours)
  - Extra charge for dispatch by express service on enquiry. Secure dispatch arriving on the following day
- Long items from warehouse at Bitterfeld:

  - Dispatch is usually one day after submission of the order with a lead time of 2-4 working day







Key to symbols

In addition to item descriptions, we use small symbols in the delivery program to provide a quick review of the purpose and installation of the individual items. Here is an overview of all symbols and their explanation.


Product group

-  Flat roof
-  Ground-Mount
-  Pitched roof

Assembly information

-  Floor connection
-  Roof connection **with** roof cladding penetration
-  Roof connection **without** roof cladding penetration. Flat roof connection with ballast
-  Roof connection pitched roof
-  Modular connection
-  Frame technology

Notes on an item

-  Technically approved item or module





**panelclaw**  
European Business Partner of WASI Solar

POLAR BEAR®FR: TECHNICAL DATA

Application	Flat roof (max slope 5 degrees)
Installation Speed	160-180 modules per day (3-person crew)
Module Tilt Angle	10 – 12 degrees (depending on module width)
Module clamps	Longitudinal direction (on the short side)
Basic Wind Speed	up to 193 km/h (Zone 4)
Array Platform Load	approx. 14 and 39 kg/m² (distributed onto the unit surface)
Building height	up to 18.3 m (custom upon request)
Material	Aluminium or G90 Steel
Warranty (Standard)	10 years



1.1 - Polar Bear® FR Gen II 10° - innovative. aerodynamic construction with variable ballast

is part of a new generation of aerodynamic PV-assembly systems for flat roofs that uses only 3 system components. Polar Bear is especially lightweight and can be quickly set up and dissembled at low cost. The roof is ideally protected, no roof

breakthrough is needed. A folding function for single modules simplifies the module and roof maintenance - and thus helps to keep the maintenance costs low.

1.2 - Polar Bear® FR Gen II 10° - only three components



SUPPORT

- universal. module-independent design
- flexible row distances
- certified, location related ballast calculation of the system
- due to rail-free construction, water can drain freely
- more options to even roof slanting changes
- available with installed roof protection pad
- pre-installed screws to assemble the wind deflector
- stainless steel fastener kit with just two nut and bolt sizes



WIND DEFLECTOR







- optimized construction enables an efficient module cooling
- A-thermalized design for enhanced roof protection
- chamfered edges and lightweight construction facilitate
- common deflector for Grizzly and Polar Bear













CLAW

- patented claw. universal to all PanelClaw mounting systems
- UL 2703 certified for electric bonding and grounding
- factory-installed module-mounting stainless steel screw
- tested for use, also by leading module manufacturers



1.3 - Polar Bear® FR Gen II 10° - all components					
Art.No. / Figure	Article	Dimension	Variant Material	PU	Description
9675-5010059	<b>Support with</b> Roof protection pad 	876.3 mm x 284.1 mm (without Roof protection pad)	Alu-minium  Rubber	1	Assembly of two components consisting of east-support with thread connection and roof protection pad and a west-support without thread connection.
					
9675-5010081	<b>Support without</b> Roof protection pad 	876.3 mm x 284.1 mm	Alu-minium	1	Assembly of two components consisting of east-support with thread connection and a west-support without thread connection.
					
9675-5010082	<b>Support without</b> Roof protection pad 	876.3 mm x 284.1 mm	G90 Steel galva-nized	1	Assembly of two components consisting of east-support with thread connection and a west-support without thread connection.
					
9675-2000135	<b>Roof protection pad</b> for Polar Bear Support  /	876.3 mm x 200 mm x 9.5 mm	Rubber	1	2 pieces per foot. Directly for clicking it into the foot.
/					
9675-2000000	<b>Roof protection pad</b> for Polar Bear Support  /	900 mm x 416 mm x 10 mm	BSW Plates	1	1 piece per support. Not to click in. The support is only placed on the roof protection pad.
/					
9675-2000200	<b>Ballast stones</b> Polar Bear  /	190 mm x 400 mm x 90 mm	Concrete	/	The concrete stones are usually not included in the delivery scope and <b>can only be ordered upon request</b> . For manufacture we recommend a minimum compressive strength of 35 MPA and frost resistance must be given.
/					



Art.No. / Figure	Article	Dimension	Variant Material	PU	Description
9675-200010704 9675-200010705	<b>Wind deflector</b> Aluminium. 69 inch  <b>Wind deflector</b> Aluminium. 73 inch 	1754 mm x 275 mm  1854 mm x 275 mm	Alu-minium	1	Deflector 69 inch or 73 inch adequate for Polar Bear and Grizzly Bear (1" = 2.54 cm)
					
9675-200010804 9675-200010805	<b>Wind deflector</b> G90 Steel galvanized. 69 inch  <b>Wind deflector</b> G90 Steel galvanized. 73 inch 	1754 mm x 275 mm  1854 mm x 275 mm	G90 Steel galva-nized	1	Deflector 69 inch or 73 inch adequate for Polar Bear and Grizzly Bear (1" = 2.54 cm)
					
9675-2000139	<b>End plate Deflector</b> Aluminium 	222.6 mm x 38.1 mm	Alu-minium	1	End plate for the deflector adequate for Polar Bear and Grizzly Bear 1 End plate per completed module row
					
9675-2000140	<b>End plate</b> Deflektor G90 Steel galvanized 	222.6 mm x 38.1 mm	G90 Steel galva-nized	1	End plate for the deflector adequate for Polar Bear and Grizzly Bear 1 End plate per completed module row
					
9675-5010005	<b>Claw Standard</b> 	/	Alu-minium	1	Claw made of aluminium for Polar Bear and Grizzly Bear 4 Claws per module
					



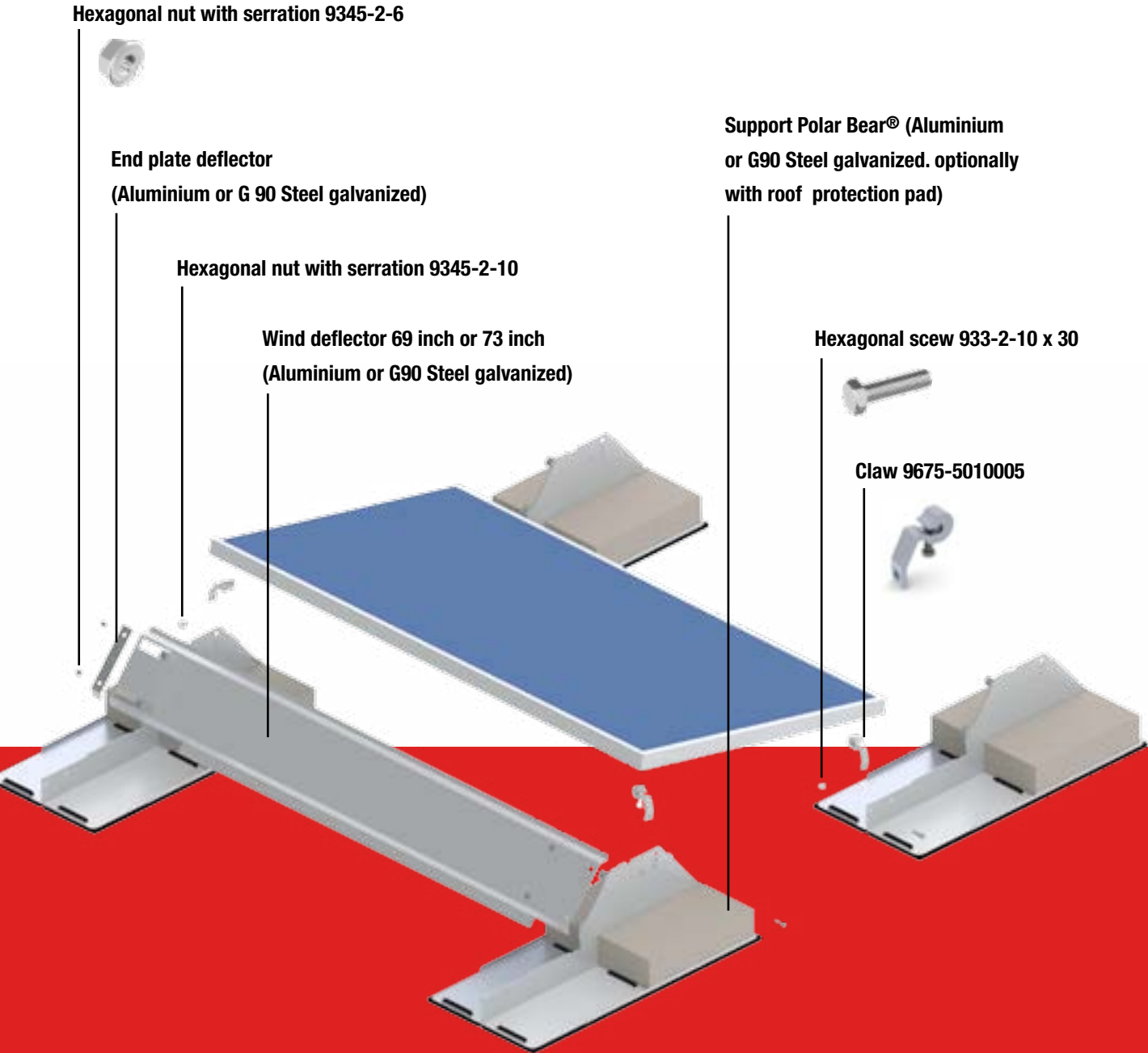


Fig.: Polar Bear® FR Gen II 10 Grad°



Art.No. / Figure	Article	Dimension	Variant Material	PU	Description
933-2-10 x 30	Hexagonal screw	10 mm x 30 mm	A2 A4	100	Thread all the way to the head; pursuant to DIN 933; also adequate for nearly all further WASI assembly rails
9345-2-10					
9345-2-10	Hexagonal nut with serration	M10	A2	100	Hexagonal nut with flange and serration in A2; M10; fitting for DIN 933-2-10 x 30
9345-2-6					
9345-2-6	Hexagonal nut with serration	M6	A2	200	Hexagonal nut with flange and serration in A2; M 6;
9345-2-6					





**panelclaw**  
European Business Partner of WASI Solar

GRIZZLY BEAR®FR: TECHNICAL DATA

Application	Flat roof (max slope 5 degrees)
Installation Speed	190-210 modules per day (3-person crew)
Module Tilt Angle	10 – 12 degrees (dependent on module width)
Module clamps	Longitudinal direction (on the short side)
Basic Wind Speed	up to 161 km/h (Zone 3)
Array Platform Load	approx. 19 kg/m² (distributed onto the unit surface)
Building height	up to 18.3 m (other heights upon inquiry)
Material	Aluminium or G90 Steel
Warranty (Standard)	10 years



1.4 - Grizzly Bear® FR Gen II 10° - innovative, aerodynamic construction with integrated ballast

is part of a new generation of aerodynamic PV-assembly systems for flat roofs that uses only 3 system components. Grizzly Bear is especially lightweight and can be quickly set up and dissembled at low cost. The roof is ideally protected, no

roof breakthrough is needed. A folding function for single modules simplifies the module and roof maintenance - and thus helps to keep the maintenance costs low.

1.5 - Grizzly Bear® FR Gen II 10° - only three components



SUPPORT

- universal, module-independent design
- flexible row distances
- cast concrete support with integrated G90 carrier and cable duct
- more options to even roof slanting changes
- available with installed roof protection pad
- pre-installed screws to assemble the wind deflector
- stainless steel fastener kit with just two nut and bolt sizes



WIND DEFLECTOR

- A-thermalized design for enhanced roof protection
- chamfered edges and lightweight construction facilitate
- common deflector for Grizzly and Polar Bear












CLAW

- patented claw, universal to all PanelClaw mounting systems
- UL 2703 certified for electric bonding and grounding modules and systems
- factory-installed module-mounting stainless steel screw
- tested for use, also by leading module manufacturers





1.6 - Grizzly Bear® FR Gen II 10° - all components					
Art.No. / Figure	Article	Dimension	Variant Material	PU	Description
9675-5010066		584 mm x 197 mm x 105.7 mm Height 105.7 mm incl. roof protection pad	Concrete  galva-nized Steel	1	incl. ballast universal, module-independent design
9675-200010704 9675-200010705		Wind deflector Aluminium. 69 inch Wind deflector Aluminium. 73 inch	Alu-minium	1	Deflector 69 inch or 73 inch adequate for Polar Bear and Grizzly Bear (1" = 2.54 cm)
9675-200010804 9675-200010805		Wind deflector G90 Steel galvanized. 69 inch Wind deflector G90 Steel galvanized. 73 inch	G90 Steel galva-nized	1	Deflector 69 inch or 73 inch adequate for Polar Bear and Grizzly Bear (1" = 2.54 cm)
9675-2000139		222.6 mm x 38.1 mm	Alu-minium	1	End plate for the deflector adequate for Polar Bear and Grizzly Bear 1 End plate per completed module row
9675-2000140		222.6 mm x 38.1 mm	G90 Steel galva-nized	1	End plate for the deflector adequate for Polar Bear and Grizzly Bear 1 End plate per completed module row

Art.No. / Figure	Article	Dimension	Variant Material	PU	Description
9675-5010005		/	Alu-minium	100	Claw made of aluminium for Polar Bear and Grizzly Bear 4 Claws per module
933-2-10 x 30		10 mm x 30 mm	A2 A4	100	Thread all the way to the head; pursuant to DIN 933; also adequate for nearly all further WASI assembly rails
9345-2-10		M10	A2	100	Hexagonal nut with flange and serration in A2; M10; fitting for DIN 933-2-10 x 30
9345-2-6		M6	A2	200	Hexagonal nut with flange and serration in A2; M 6;





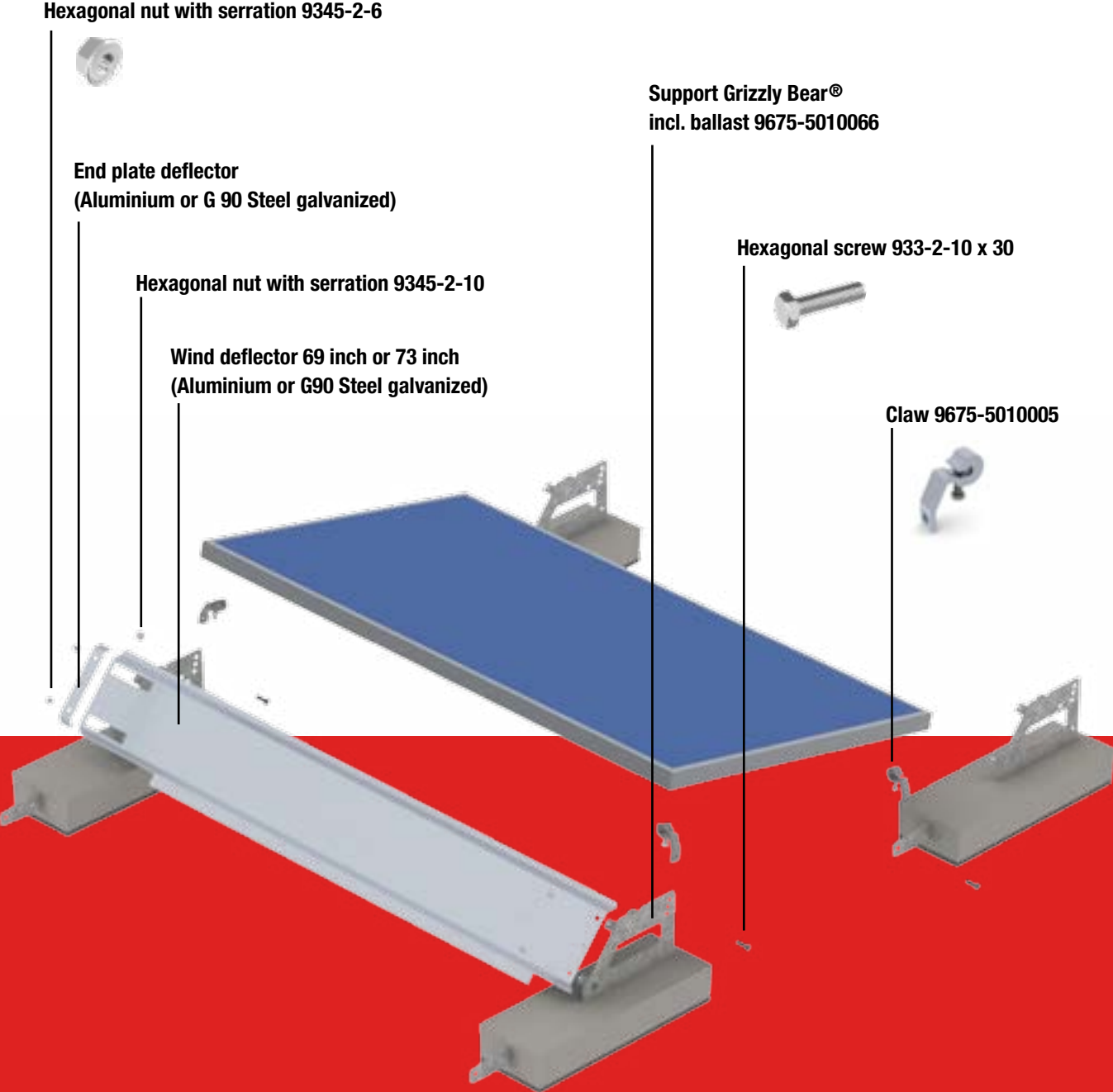


Fig.: Grizzly Bear® FR Gen II 10 °





2.1 WASI SOLAR GROUND-MOUNT SYSTEM FS LIGHT – FLEXIBILITY FOR NEARLY EVERY TYPE OF ASSEMBLY REQUIREMENT

The FS Light can be implemented as either a single or dual legged construction. The optimum object allocation combination can be chosen according to the area or ground conditions, as well as the geographical circumstances. The FS-Light System distinguishes itself with a light, material-efficient construction method which meets all stability, span and load bearing conditions. The system can be adapted for nearly every wind and snow load zone due to its high degree of flexibility. To achieve this, the leg distances of the respective table systems are changed. A specific static calculation is provided for every project.

2.2 WASI SOLAR GROUND-MOUNT SYSTEM FS LIGHT – ASSEMBLY AS SINGLE OR DUAL LEGGED TABLE

Our Ground-Mount System can be assembled as a single-leg construction with prop, whilst also suitable for assembly as a 2 leg table.

Both tables can be assembled particularly quickly due to their pre-mounted components.

In addition, the components within the rack system differ as follows:

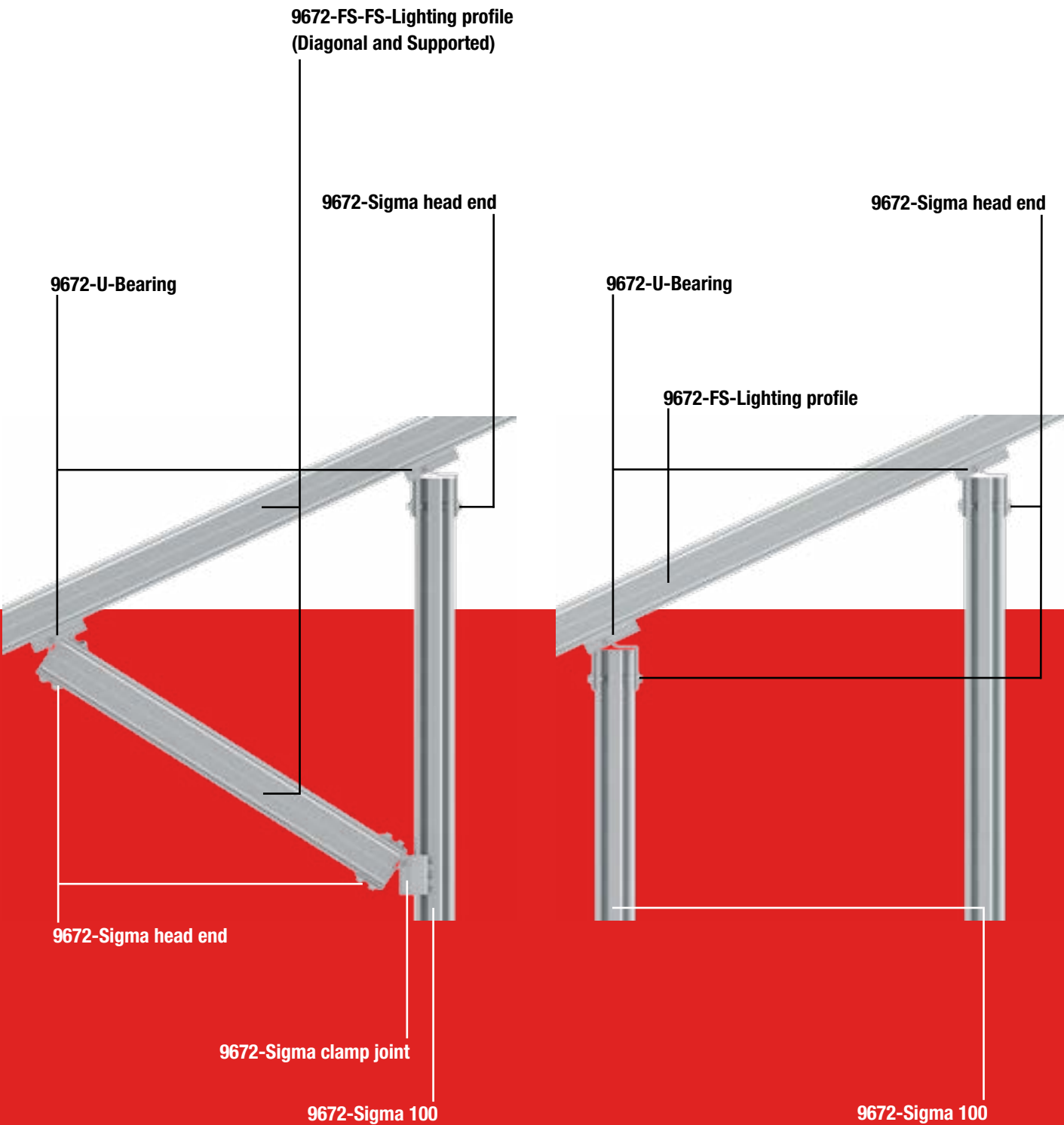


Fig.: Single leg

Fig.: Dual leg





2.3.1 - WASI Solar Grount-Mount System FS Light - Floor connection - Single leg				
Art.No. / Figure	Article	Dimension	Variant / Material	Description
9672-Sigma100	Sigma floor connection posts 	100 mm x 55 mm	galvanized Steel	Floor connection support posts $Wx = lx / (50) \text{ mm}; Wx = 28545 \text{ mm}^3$ $Wy = ly / (24.4) \text{ mm}; Wy = 10003 \text{ mm}^3$ Amount: *1
9672-Sigma clamp joint	Sigma clamp joint 	Hight 100 mm	mill-finished	The Sigma clamp joint assists in the connection of the FS-Light profile support and the Sigma posts in single-leg assembly. The angle of attack can be flexibly adjusted according to the layout and project aim. Amount: *1
9672-FS-Light profile support	Pre-mounted support profile 	110 mm x 60 mm	mill-finished	The FS-Light profile, featured here as a single-leg support construction is connected to the Sigma post with the the Sigma clamp joint with the profile head end. The support is delivered with two pre-mounted profile head ends. $lx = 1406739 \text{ mm}^4$ $ly = 411784 \text{ mm}^4$ Amount: *1
9672-Profile head end	Profile head end 	77 mm x 60 mm Internal spacing 111 mm	mill-finished	The profile head end connects the single leg FS Light profile construction support at the bottom, together with the Sigma clamp joint. The U-Bearing is connected above. Amount: *2
9672-Sigma head end	Sigma head end 	110 mm x 60 mm Internal spacing 102 mm	mill-finished	The Sigma head end is connected to the single leg construction at the upper end of the Sigma post, the diagonal profile connecting over the U-Bearing. Amount: *1

\*Number of items that are necessary to assemble a table

2.3.2 - WASI Solar Grount-Mount System FS Light - Sigma floor connection posts - Dual leg				
Art.No. / Figure	Article	Dimension	Variant / Material	Description
9672-Sigma100	Sigma floor connection posts 	100 mm x 55 mm	galvanized Steel	Floor connection support posts $Wx = lx / (50) \text{ mm}; Wx = 28545 \text{ mm}^3$ $Wy = ly / (24.4) \text{ mm}; Wy = 10003 \text{ mm}^3$ Amount: *2
9672-Sigma head end	Sigma head end 	110 mm x 60 mm Internal spacing 102 mm	mill-finished	The Sigma head end is connected to the dual leg construction at the upper end of the Sigma post, the diagonal profile connecting over the U-Bearing. Amount: *2







\*Number of items that are necessary to assemble a table



Fig.: Optional extras available for dual leg models are 40 mm x 40 mm x 5mm struts which are attached to the Sigma clamp supports.




Optional strut requirement is assessed according to the individual project requirements.



2.3.3 -WASI Solar Grount-Mount System FS Light – Frame technology, Single leg and Dual leg				
				
Art.No. / Figure	Article	Dimension	Variant / Material	Description
9672-FS-Light profile - Diagonal		110 mm x 60 mm	mill-finished	The FS-Light Profile is supplied with pre-mounted U-Bearing. Amount: *1
9672-FS-Light profile - Diagonal				
9672-U-Bearing		30 mm x 73 mm x Lenght 140 mm Internal spacing 61 mm	mill-finished	The U-Bearing is pre-assembled with the FS slot nut when supplied and is used for connecting the FS Light Profile in both the single and dual leg models. Amount: *2
9672-U-Bearing				
9672-FS-Light slot nut short / long		M 10 93 mm 140 mm	/	The FS-Light slot nut is available in two versions: 93 mm short and 140 mm long
9672-FS-Light slot nut short / long				
9672-P-Stone-M10		M 10 18 mm	/	Slot nut for cross bracing: 9664-WASI2-26 to the FS Light Profile is done using the FS Light slot nut clamp and the mounting bracket 9785-WASI26.
9672-P-Stone-M10				
9785-WASI26		M 10 40 mm	/	Mounting bracket for cross bracing
9785-WASI26				

\*Number of items that are necessary to assemble a table



Art.No. / Figure	Article	Dimension	Variant / Material	Description
9664-WASI2-26		80 mm x 40 mm Standard lenght 6.1 m	mill-finished	The WASI 2-26 is connected to the FS Light Profile Diagonal via the cross bracing. The 9742-WASI Clip E or the 9745-WASI Clip M pre-mounted centre and end clamps will be guided into the upper channel.
9664-WASI2-26				
9742-WASI Clip E		30 mm to 50 mm	mill-finished	The end clamp is pre-assembled complete with screw, nut and clip connection. When ordering, please specify the module height as modules ranging between 30 to 50 mm could be connected.
9742-WASI Clip E				
9745-WASI Clip M		30 mm to 50 mm	mill-finished	The central clamp is pre-assembled complete with screw, nut and clip connection. When ordering, please specify the module height as modules ranging between 30 to 50 mm could be connected.
9745-WASI Clip M				

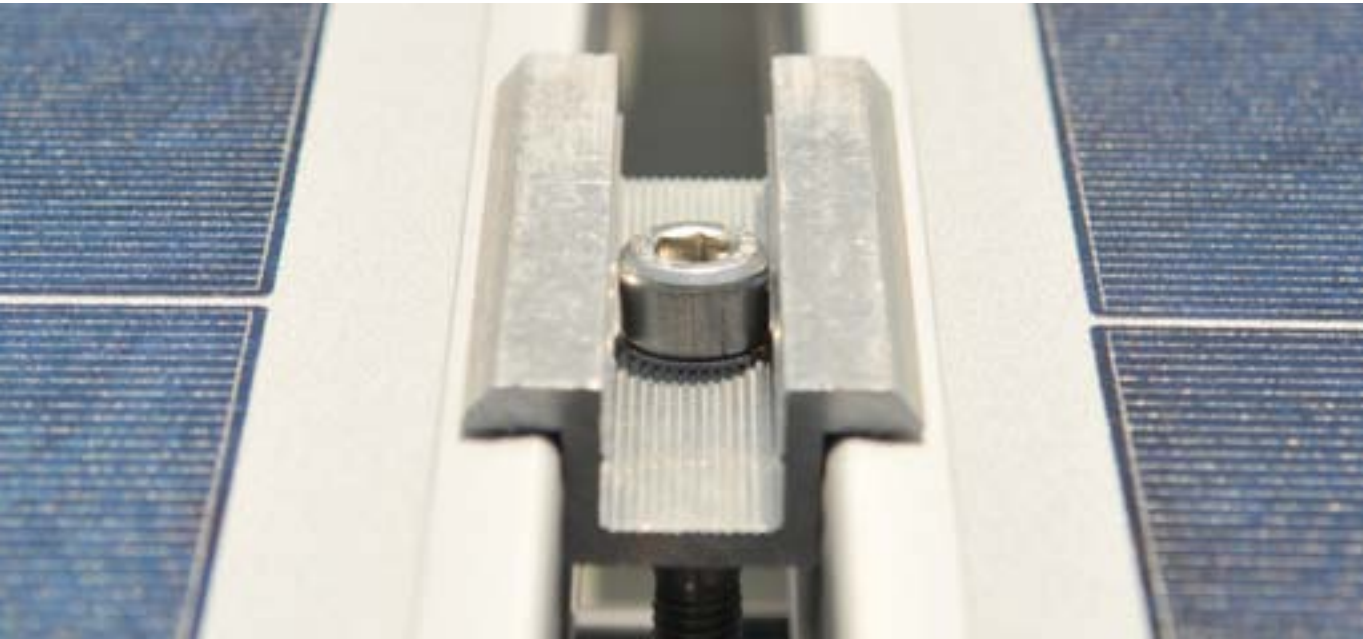




Fig.: Single leg board - connection FS-Light profile support to Sigma post. The pre-assembled support with the profile head-piece is connected to the Sigma post using the hexagonal screw 933-2-12-x 90 over the Sigma clamp joint.



Fig.: Single leg board- connection FS-Light profile-diagonal to the FS-Light profile support. The support is delivered with the profile head-piece attached. It is then connected to the U-bearing using the hexagonal screw 933-2-12-x 90. The U-bearing is attached to the lower slot of the FS-Light profile using the 9672-FS-Light slot nut.



Fig.: Single and dual leg tables- The Sigma head-piece is attached to the upper end of the Sigma post with a hexagonal screw 933-2-12 x 30. The FS-Light profile is connected using the U-bearings.

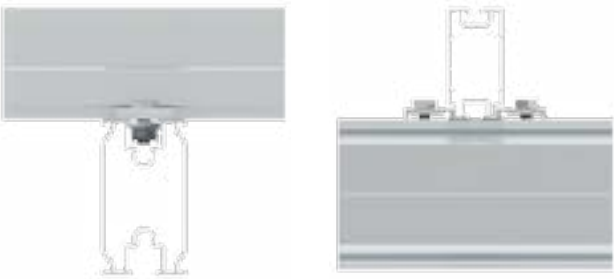
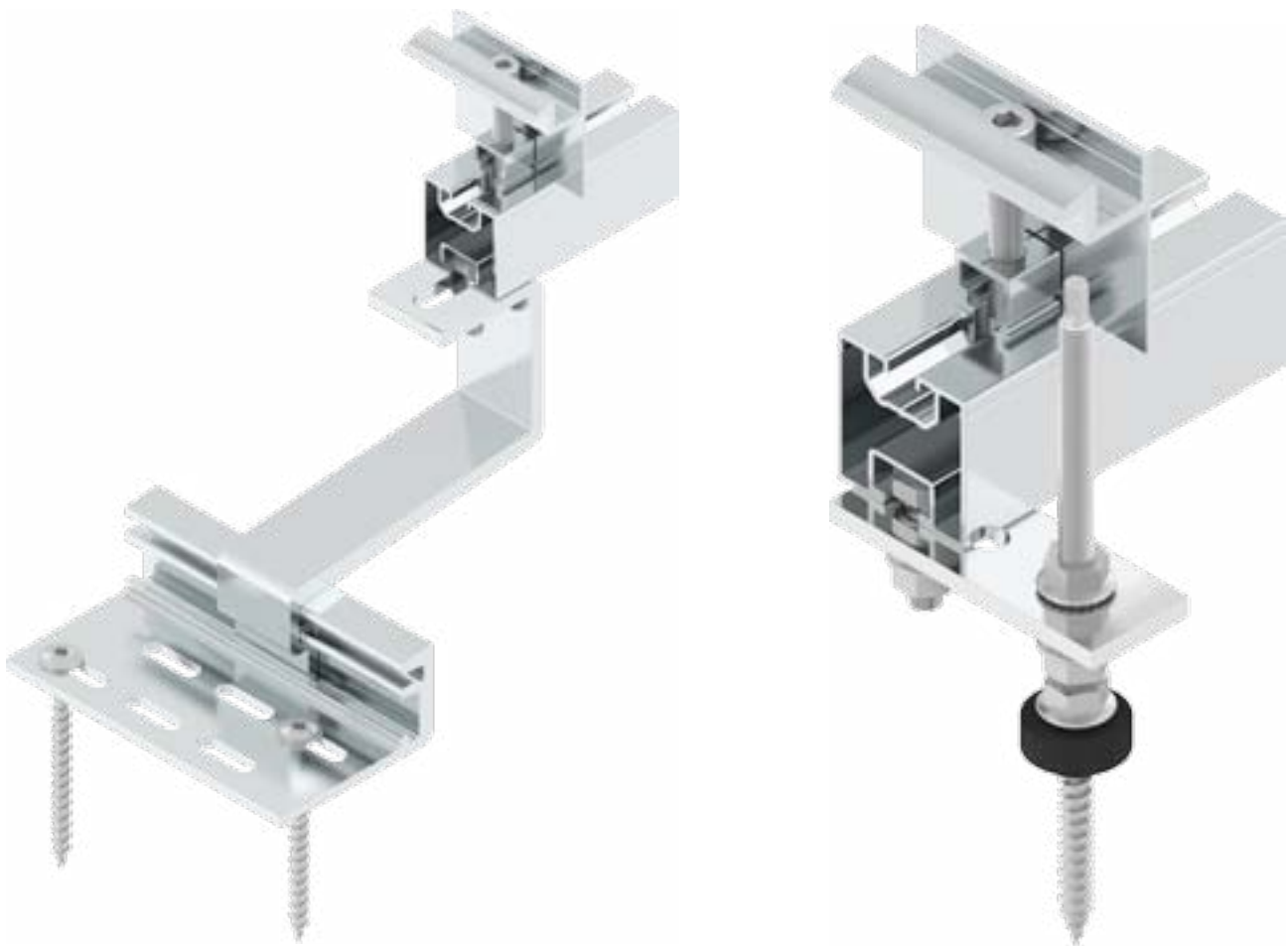


Fig.: Cross connection - The rack system is expanded using the mounting rails WASI 2-26. The WASI 2-26 crosses the FS-Light profile, and is connected using the 9672-P-slot nut-M10 and the mounting bracket 9785-WASI 26.





3.1 WASI SOLAR PITCHED ROOF SYSTEM - SAFE AND FAST ASSEMBLY





The WASI Solar Pitched roof system is a tested total system of tried and tested building supervision approved single components. Fabricated components guarantee fast assembly. Further components that offer you yet even more flexibility in assembly are available in the section WASI Solar Standard.

3.2 WASI SOLAR PITCHED ROOF SYSTEM - COMPONENTS FOR FLEXIBLE ASSEMBLY

WASI Aluminium roof hooks consists of a basic plate and hook for flexible assembly

- building supervision approved flat plate head screws for low-chip assembly without prior drilling
- building supervision approved fabricated hanger screws form the basis for simple assembly and exact adjusting of the solar unit
- Central and end clamps with clip connection can be clicked conveniently into the top channel of the assembly rail WASI 1
- Central clamp and end clamp: Significantly higher tensile strength than conventional fixing with aluminium-special alloy. The central clamp is fully fabricated with screw, nut and clip connection. When ordering please specify the module height.



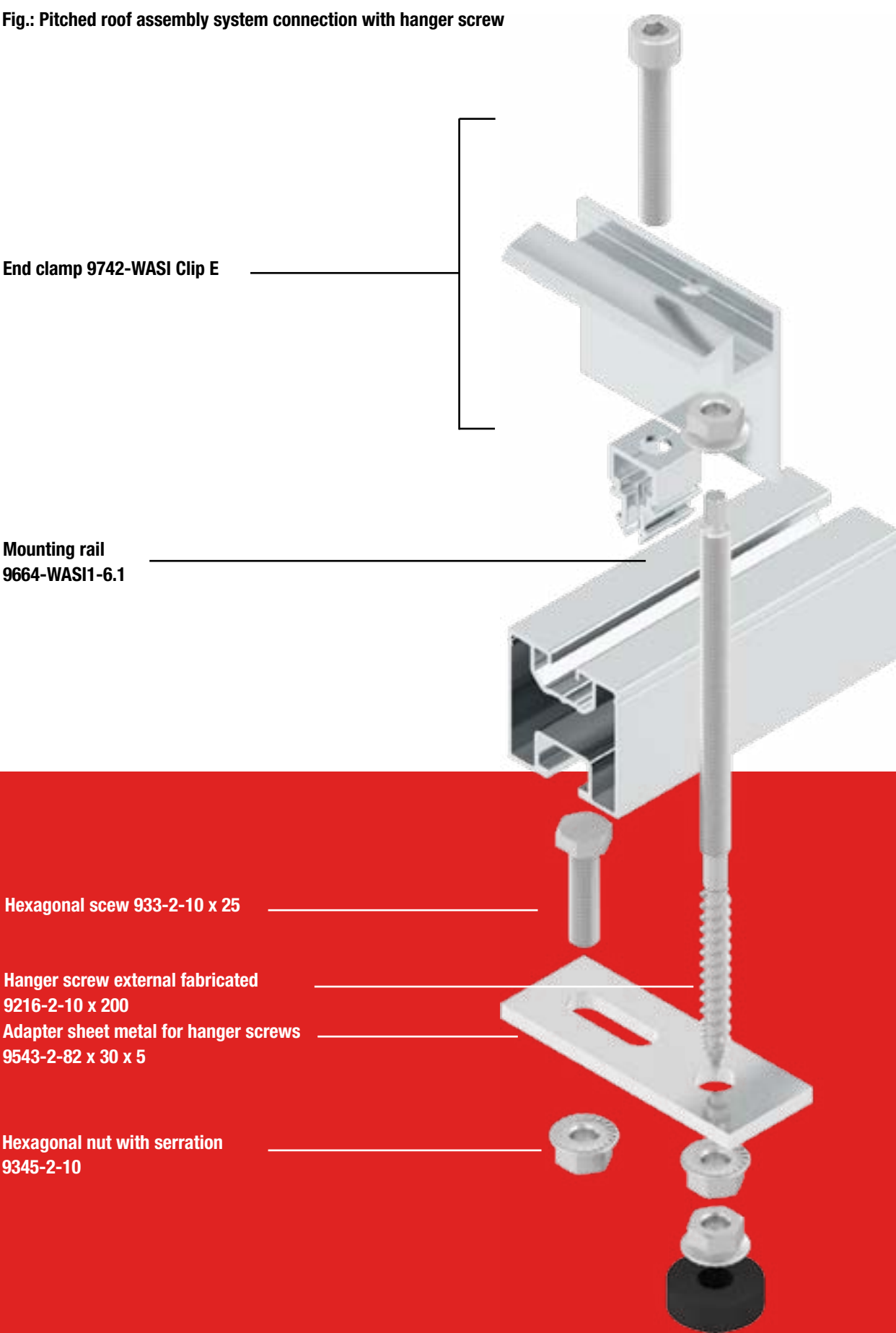
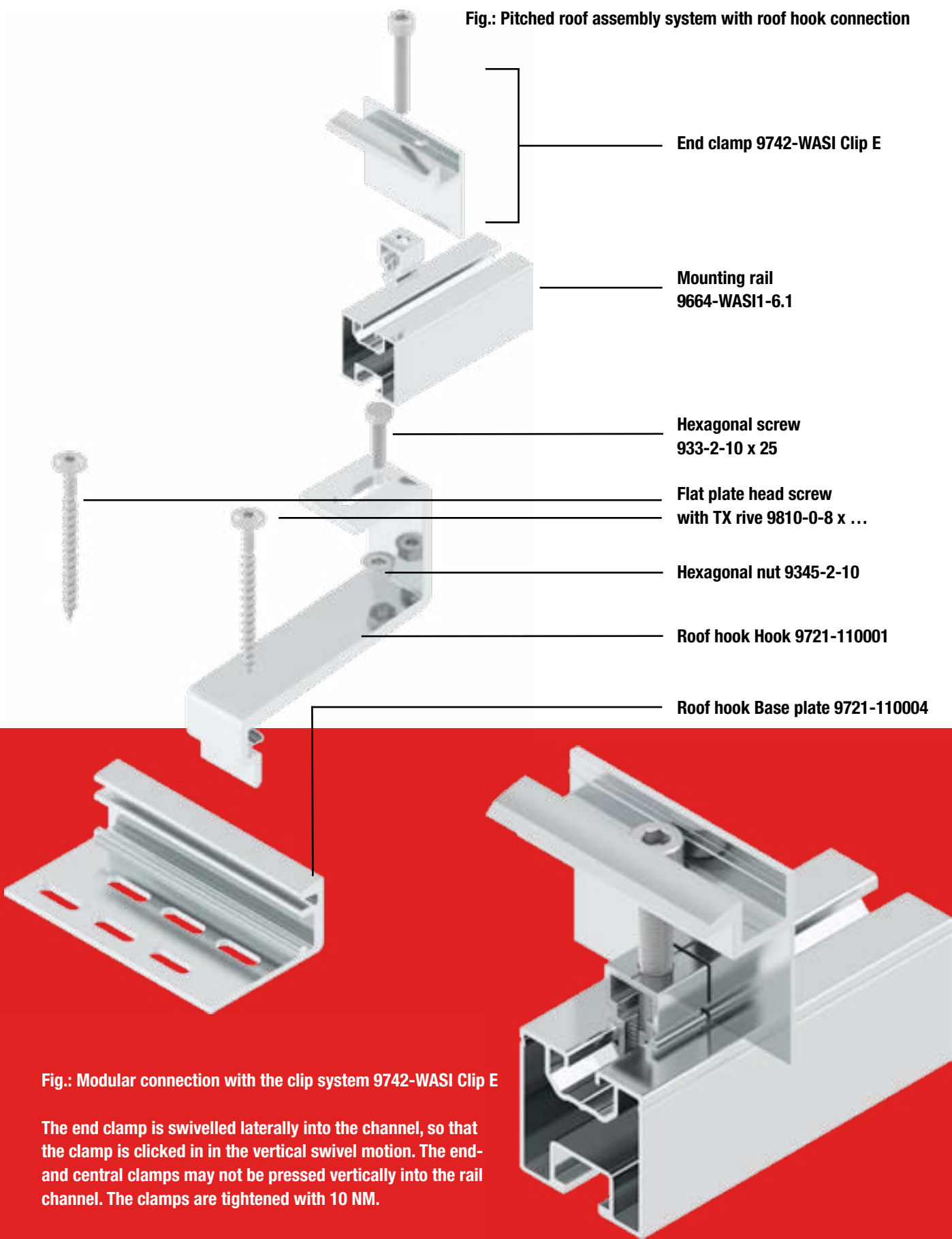
3.3 - WASI Solar pitched roof system - All components					
Art.No. / Figure	Article	Dimension	Variant Material	PU	Description
9721-110004 + 9721-110001	Roof hook Aluminium 	/	Alu	100	Roof hook continuous, consisting of base plate and hook to clip in, for 32 mm battens
9721-110004		150 mm x 83 mm Height of the base plate 46 mm	Alu	100	Base plate for 32 mm battens, Height of the base plate 46 mm
9721-110001	Roof hook hook 	Width: 40 mm Hook: 55 mm	Alu	100	Roof hook continuous to clip in, hook front 55 mm perforation 32 mm
9810-0-8 x...	Flat plate head screw with TX drive 	8mm x 80 mm 8mm x 100 mm 8mm x 120 mm	Stainless steel hardened	50	Premium Flat plate head screws made of C1 with TX-drive. Building supervision approval Z-9.1-661.
9216-2-10 x 200 9216-2-12 x 300	Hanger screw External hexagon Fabricated 	10 mm x 200 mm 12 mm x 300 mm	A2 and EPDM	50	Solar mount for wood base construction, fabricated with serrated nuts WS 9345, EPDM seal WS 9218, washers DIN 125 and DIN 9021. Building supervision approval Z-14.4-632.



Art.No. / Figure	Article	Dimension	Variant Material	PU	Description
9543-2-82 x 30 x 5	<b>Adapter sheet metal</b> for hanger screws M10 	30 mm x 5 mm x 82 mm	A2	100	Adapter sheet metal made stainless steel A2 for hanger screws M10
9544-2-82 x 30 x 5	<b>Adapter sheet metal</b> for hanger screws M12 	30 mm x 5 mm x 82 mm	A2	100	Adapter sheet metal made stainless steel A2 for hanger screws M12
9664-WASI1-6.1	<b>Mounting rail WASI1</b> 	40 mm x 40 mm Lenght 6.1 m	mill-finished	100	Span width 1.6 m*; connection bottom hexagonal screw DIN 933 M10; connection top slot nut M8 $Wx = lx / (20) \text{ mm}$ ; $WX = 3327 \text{ mm}^3$ $Wy = ly / (20.0.05) \text{ mm}$ ; $Wy = 3276 \text{ mm}^3$
9431-120901-100	<b>Slot nut</b>	M8 22 mm x 13 mm	Alu A2	100	Aluminium; ball of A2; rotatable
933-2-10 x 25	<b>Hexagonal screw</b>	M10 10 mm x 25 mm	A2	100	Thread all the way to the head; pursuant to DIN 933; also adequate for nearly all other WASI assembly rails

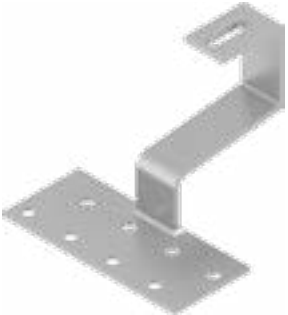





Art.No. / Figure	Article	Dimension	Variant Material	PU	Description
9345-2-10	<b>Hexagonal nut</b> with serration	M10	A2	100	Hexagonal nut with flange and serration in A2; M10; fitting for DIN 933-2-10 x 25
934-2-8	<b>Hexagonal nut</b>	M10	A2	200	Hexagonal nut in A2 pursuant to DIN 934. M10, if you decide on this hexagonal nut you need the spring washer to secure it DIN 127
127-2-10	<b>Spring washer</b>	M10	A2	1000	Spring washer in A2 pursuant to DIN 127; M10; only needed when using DIN 934
9742-WASI Clip E	<b>End clamp</b> incl. Clip 	30 mm to 50 mm width 70 mm	mill-finished	50	End clamp is fabricated with screw nut and clip connection. When ordering, please specify the module height as modules ranging between 30 to 50 mm can be connected.
9745-WASI Clip M	<b>Central clamp</b> incl. Clip 	30 mm to 50 mm width 70 mm	mill-finished	100	Central clamp is fabricated with screw, nut and clip connection. When ordering, please specify the module height as modules ranging between 30 to 50 mm can be connected.











4.1 - Roof hooks and stainless steel fittings			
Art.No. / Figure	Article	Comments	PU
9521-2-150 x 60 W	Roof hook Standard small	Plate 150 x 60 x 4 mm Hook 30 x 5 mm Height 130 mm	20
			
9521-2-180 x 80 W	Roof hook standard	Plate 180 x 80 x 4 mm Hook 40 x 6 mm Height 130 mm	10
			
9523-2-157 x 60	Roof hook heavy load	Plate 157 x 60 x 5 mm Hook 35 x 8 mm Height 150 mm	20
			
9525-2-140 x 56 K	Roof hook adjustable	Plate 144 x 56 x 5 mm Hook 5 mm packed Material: 1.4301	20
			

4.2 - Aluminium-roof hooks				
Art.No. / Figure		Article	Comments	PU
Baseplate 9721-110004 + Hook 9721-110001	Baseplate 9726-110020 + Hook 9721-110001	Roof hook. solid	For 32 mm battens Height baseplate 46 mm	100 25
			Including baseplate and clip-on hooks	
Baseplate 9721-110004 + Hook 9727-100000	Baseplate 9726-110020 + Hook 9727-100000	Roof hook. adjustable in height on the hook	For 40 mm battens Height baseplate 54 mm	100 25
			Including baseplate and hooks	
Baseplate 9721-110004 + Hook 9727-200000	Baseplate 9726-110020 + Hook 9727-200000	Roof hook side mounting with height adjustment	For 32 mm battens Height baseplate 46 mm	100 25
			Including baseplate and hook with T-piece packed	
			For 40 mm battens Height baseplate 54 mm	100 25







4.3 - Solar fastening for wooden substructures				
Art.No. / Figure	Article	Comments	Lenghts	PU
9221-2-...	 <b>Solar fastening hexagon socket packing unit</b> (similar to illustration) 	Solar fastening for wooden substructure, with special coating	10 x 134	25
		Packing unit with nuts, washers and fungicidal seal.	10 x 150	10
		Technical approval Z -14.4-555	10 x 170	25
			10 x 180	10
			10 x 200	10
			10 x 250	10
9221-2-...	 <b>Solar fastening hexagon socket packing unit</b> 	Solar fastening for wooden substructure, with special coating	10 x 134	25
		Packing unit with nuts, washers and calotte.	10 x 150	10
		Technical approval Z -14.4-555	10 x 170	25
			10 x 180	10
			10 x 200	10
			10 x 250	10

4.4 - Description for the solar fastening for wooden substructures				
Lenght	Article	Description	Thread lenght	
			Metric	Wood
10 x 134	9221	Solar fastening (WS 9221) for wooden substructure Wood 8 / Metric M10	70	64
10 x 150	9221	Solar fastening (WS 9221) for wooden substructure Wood 8 / Metric M10	50	100
10 x 170	9221	Solar fastening (WS 9221) for wooden substructure Wood 8 / Metric M10	70	100
10 x 180	9221	Solar fastening (WS 9221) for wooden substructure Wood 8 / Metric M10	50	130
10 x 200	9221	Solar fastening (WS 9221) for wooden substructure Wood 8 / Metric M10	50	150
10 x 250	9221	Solar fastening (WS 9221) for wooden substructure Wood 8 / Metric M10	50	200











The solar fastenings for **wooden** and **steel substructures** in stainless steel A2 with a special coating are easily fitted and are ideal for adjusting the solar plant exactly. With general technical approval.

- Z-14.4-555 the solar fastening ensures:
- Tightness
  - Certified load capacity
  - Highest safety during assembly

4.5 - Solar fastening for steel substructures				
Art.No. / Figure	Article	Comments	Lenghts	PU
9222-2-...	 <b>Solar fastening hexagon socket packing unit</b> 	Solar fastening for steel substructure. with special coating. Packing unit with nuts, washers and fugicidal seal.	10 x 130	10
		Technical approval Z-14.4-555	10 x 150	10
			10 x 170	10
			10 x 175	10
			10 x 195	10
			10 x 200	10
			10 x 210	10
			10 x 250	10
9222-2-...	 <b>Solar fastening hexagon socket packing unit</b> 	Solar fastening for steel substructure. with special coating. Packing unit with nuts, washers and calotte.	10 x130	10
		Technical approval Z-14.4-555	10 x 150	10
			10 x 170	10
			10 x 175	10
			10 x 195	10
			10 x 200	10
			10 x 210	10
			10 x 250	10
			10 x 270	25

4.6 - Description of the solar fastening for steel substructures				
Lenght	Article	Description	Thread lenght	
			Metric	Steel
10 x 130	9222	Solar fastening (WS 9221) for steel substructure Steel 8 / Metric M10	50	80
10 x 150	9222	Solar fastening (WS 9221) for steel substructure Steel 8 / Metric M10	50	100
10 x 170	9222	Solar fastening (WS 9221) for steel substructure Steel 8 / Metric M10	70	100
10 x 175	9222	Solar fastening (WS 9221) for steel substructure Steel 8 / Metric M10	50	125
10 x 195	9222	Solar fastening (WS 9221) for steel substructure Steel 8 / Metric M10	70	125
10 x 200	9222	Solar fastening (WS 9221) for steel substructure Steel 8 / Metric M10	50	150
10 x 210	9222	Solar fastening (WS 9221) for steel substructure Steel 8 / Metric M10	50	160
10 x 250	9222	Solar fastening (WS 9221) for steel substructure Steel 8 / Metric M10	50	200
10 x 270	9222	Solar fastening (WS 9221) for steel substructure Steel 8 / Metric M10	70	200



4.7 - Construction approved hanger bolts for wooden substructures				
Art.No. / Figure	Article	Comments	Lenghts	PU
9215-2-.... x ....	 <b>Hanger bolts external hexagon</b> made up  (Similar to illustration) 	Packing unit with 3 hexagonal nuts with serration DIN 934 A2 + 3 washers DIN125 A2 + EPDM-seal WS 9218 This packing unit is shippable from stock in all dimensions see WS 9211!  Technical approval Z-14.4-632	10 x 180	25
			10 x 200	
			10 x 250	
			10 x 300	
			12 x 250	
			12 x 300	
			12 x 350	
9216-2-.... x ....	 <b>Hanger bolts external hexagon</b> made up  (Similar to illustration) 	Packing unit with 3 hexagonal nuts with serration WS 9345 A2 + EPDM-seal WS 9218 This packing unit is shippable from stock in aSH dimensions see WS 9211!  Technical approval Z-14.4-632	10 x 180	25
			10 x 200	
			10 x 250	
			10 x 300	
			12 x 250	
			12 x 300	
			12 x 350	
9217-2-.... x ....	 <b>Hanger bolts external hexagon</b> made up  (Similar to illustration) 	Packing unit with 3 hexagonal nuts with serration WS 9345 A2 + EPDM-seal WS 9218 + 1 large U-washer above the seal Hanger bolt (WS 9211) with external hexagon SW8 M12 x 300 mm  Technical approval Z-14.4-632	10 x 180	25
			10 x 200	
			10 x 250	
			10 x 300	
			12 x 250	
			12 x 300	
			12 x 350	
9219-2-.... x ....	 <b>Hanger bolts external hexagon</b> made up  (Similar to illustration) 	Packing unit with 3 hexagonal nuts with serration DIN 934 A2 + 2 washers DIN 125 + 1 washer DIN 9021 A2 + EPDM-seal WS 9218 Hanger bolt (WS 9211) with external hexagon SW8 M12 x 300 mm  Technical approval Z-14.4-632	10 x 180	25
			10 x 200	
			10 x 250	
			10 x 300	
			12 x 250	
			12 x 300	
			12 x 350	



4.8 - Description of the technically approved hanger bolts for wooden substructures				
Lenght	Article	Description	Thread lenght	
			Metric	Wood
10 x 180	Hanger bolts A2	Hanger bolt (WS 9211) with external hexagon SW7 M10 x 180 mm	100	60
10 x 200	Hanger bolts A2	Hanger bolt (WS 9211) with external hexagon SW7 M10 x 200 mm	110	70
10 x 250	Hanger bolts A2	Hanger bolt (WS 9211) with external hexagon SW7 M10 x 250 mm	130	80
10 x 300	Hanger bolts A2	Hanger bolt (WS 9211) with external hexagon SW7 M10 x 250 mm	140	100
12 x 250	Hanger bolts A2	Hanger bolt (WS 9211) with external hexagon SW7 M10 x 250 mm	130	100
12 x 300	Hanger bolts A2	Hanger bolt (WS 9211) with external hexagon SW8 M12 x 300 mm	140	100
12 x 350	Hanger bolts A2	Hanger bolt (WS 9211) with external hexagon SW8 M12 x 300 mm	180	130












4.9 - Adapter sheet metal for hanger bolts				
4.9.1 - A2 adapter sheet metal for hanger bolts				
Art.No. / Figure	Article	Comments	Hole sizes	PU
9543-2-82 x 30 x 5	 <b>Adapter sheet metal stainless steel A2</b> for hanger bolts M 10  Material: 1.4301	Lenght: 82 mm Width: 30 mm Height: 5 mm	RH: 11 mm SH: 11 x 29.5 mm	100
9544-2-80 x 30 x 5				
9544-2-80 x 30 x 5	 <b>Adapter sheet metal stainless steel A2</b> for hanger bolts M 12  Material: 1.4301	Lenght: 80 mm Width: 30 mm Height: 5 mm	RH: 13 mm SH: 11 x 40 mm	100
9544-2-82 x 30 x 5				
9544-2-82 x 30 x 5	 <b>Adapter sheet metal stainless steel A2</b> for hanger bolts M 12  Material: 1.4301	Lenght: 82 mm Width: 30 mm Height: 5 mm	RH: 13 mm SH: 11 x 29.5 mm	100
9547-2-110 x 40				
9547-2-110 x 40	 <b>Adapter sheet metal stainless steel A2</b> for hanger bolts M 10  Material: 1.4301	Lenght: 110 mm Width: 40 mm Height: 5 mm	RH: 11 mm SH: 9 x 29 mm	100
9549-2-110 x 40				
9549-2-110 x 40	 <b>Adapter sheet metal stainless steel A2</b> for hanger bolts M 12  Material: 1.4301	Lenght: 110 mm Width: 40 mm Height: 6 mm	RH: 13 mm SH: 11 x 29 mm	100

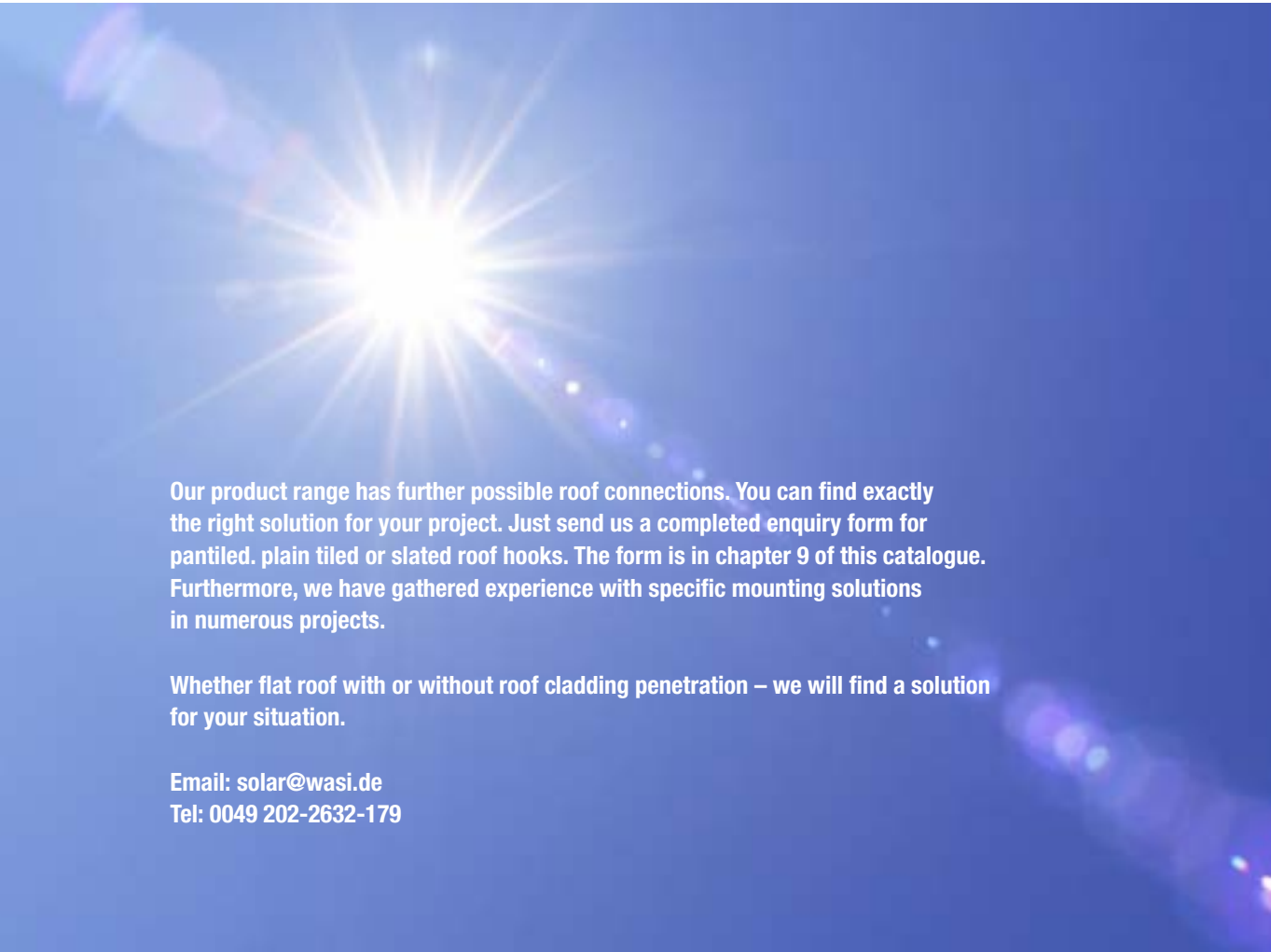


4.9.2 - Aluminium adapter sheet metal for hanger bolts				
Art. No. / Figure	Article	Comments	Hole sizes	PU
9543-AL-82 x 40 x 6	 <b>Adapter sheet metal aluminium</b> for hanger bolts M 10	Lenght: 82 mm Width: 40 mm Height : 6 mm	RH: 11 mm SH: 11 x 29.5 mm	100
9544-AL-82 x 40 x 6				
9544-AL-82 x 40 x 6	 <b>Adapter sheet metal aluminium</b> for hanger bolts M 12	Lenght: 82 mm Width: 40 mm Height : 6 mm	RH: 13 mm SH: 11 x 29.5 mm	100
9548-AL-110 x 40				
9548-AL-110 x 40	 <b>Adapter sheet metal aluminium</b> for hanger bolts M 10	Lenght: 110 mm Width: 40 mm Height : 6 mm	RH: 11 mm SH: 11 x 29.0 mm	50





4.10 - Fastening for sheet metal, eternit and kalzip roofs			
Art.No. / Figure	Article	Comments	PU
9583-SEAM REBATE			
	Roof rebate clamp angled M10	Slot hole 11mm bis 3.5 mm rebate	100
9583-KALZIP CLAMP			
	Kalzip clamp angled M10	Kalzip clamp A2 with slot hole for bar connection M10 packing unit includes screw/nut/U-washer	100



Our product range has further possible roof connections. You can find exactly the right solution for your project. Just send us a completed enquiry form for pantiled, plain tiled or slated roof hooks. The form is in chapter 9 of this catalogue. Furthermore, we have gathered experience with specific mounting solutions in numerous projects.


Whether flat roof with or without roof cladding penetration – we will find a solution for your situation.

Email: [solar@wasi.de](mailto:solar@wasi.de)  
Tel: 0049 202-2632-179










5.1-Mounting rails				
Art.No. / Figure	Article	Comments	Lenght	Variant
9664-WASI 1	 <b>Mounting rail</b> 40 x 40 mm	Span length: <b>1.6 m*</b> Bottom fixings: <b>DIN 933 M10</b> or <b>WASI hammer head screw</b> Top fixing: <b>Slot nut M8</b> or <b>DIN 603 M8</b> <i>Customer's required lengths are possible for call-off &gt;5 tons</i>	2.0 m 3.0 m 6.1 m 6.1 m 6.1 m	mill-finished mill-finished mill-finished anodized silver <b>anodized black*</b> <small>*Pack ends not anodized</small>
9664-WASI 2		Span length: <b>3.2 m*</b> Bottom fixings: <b>DIN 933 M10</b> or <b>WASI hammer head screw</b> Top fixing: <b>Slot nut M8</b> or <b>DIN 603 M8</b> <i>Customer's required lengths are possible for call-off &gt;5 tons</i>	3.0 m 6.1 m 6.1 m	mill-finished mill-finished anodized silver
9664-WASI 2-26		Static: <b>similar 9664-WASI 2</b> <b>Additional side fastening possible with mounting bracket 9785-WASI 26</b> (e.g. for cross bracing without angle) <i>Customer's required lengths are possible for call-off &gt;5 tons</i>	6.0 m 6.1 m 7.2 m	mill-finished mill-finished mill-finished
9664-WASI 3		Span length: <b>1.55 m*</b> Bottom fixings: <b>DIN 933 M10</b> or <b>WASI hammer head screw</b> Top fixing: <b>square nut M8</b> or <b>hexagon nut M8</b> <i>Customer's required lengths are possible for call-off &gt;5 tons</i>	6.1 m 6.1 m 6.1 m	mill-finished anodized silver <b>anodized black*</b> <small>*Pack ends not anodized</small>
9664-WASI 5		Span length: <b>2.0 m*</b> Bottom fixings: <b>DIN 933 M10</b> or <b>WASI hammer head screw</b> Top fixing: <b>slot nut M8</b> or <b>DIN 603 M8</b> <i>Customer's required lengths are possible for call-off &gt;5 tons</i>	6.1 m 6.1 m	mill-finished <b>anodized black*</b> <small>*Pack ends not anodized</small>

\* Load bearing capacities: Snow load sk = 1.21 kN/m2; module load: 0.22 kN/m2; Wind load: Wsuction = -0.80 kN/m2 Wpressure = 0.40 \*






Art.No. / Figure	Article	Comments	Lenght	Variant
9664-WASI 15	 <b>Mounting rail</b> 40 x 40 mm	Span length: <b>1.6 m*</b> Side fixings: <b>Slot nut M8 or DIN 603 M8</b> Top fixings: <b>Slot nut M8 or DIN 603 M8</b> <i>Customer's required lengths are possible for call-off &gt;5 tons</i>	6.1 m 6.1 m 6.1 m	mill-finished anodized silver <b>anodized black*</b> <small>*Pack ends not anodized</small>
9664-WASI 16		Span length: <b>3.2 m*</b> Side fixings: <b>Slot nut M8 or DIN 603 M8</b> Top fixings: <b>Slot nut M8 or DIN 603 M8</b> <i>Customer's required lengths are possible for call-off &gt;5 tons</i>	6.1 m 6.1 m	mill-finished anodized silver
9664-WASI 31	 <b>Trapezoidal plate rail</b> Width: 90 mm	Bottom fixings: Profile can be <b>screwed or riveted</b> directly onto the trapezoidal plate. The whole as- sembly should always be checked on site. Top fixings: <b>Upper slot for slot nut M8</b> or <b>DIN 603 M8</b>	2.0 m 3.0 m 6.1 m	mill-finished mill-finished mill-finished
9664-WASI 31-60		Bottom fixings: Profile can be <b>screwed or riveted</b> directly onto the trapezoidal plate. The whole as- sembly should always be checked on site. Top fixings: <b>Upper slot for slot nut M8</b> or <b>DIN 603 M8</b>	6.1 m	mill-finished
Z289921-001	 <b>Mounting rail</b> 20.4 x 39 mm	Mounting rail 20.4 x 39 mm Bottom fixings: <b>DIN 933 M10</b> Top fixings: <b>Slot nut M8 or DIN 603 M8</b>	6.0 m	mill-finished




\* Load bearing capacities: Snow load sk = 1.21 kN/m2; module load: 0.22 kN/m2; Wind load: Wsuction = -0.80 kN/m2 Wpressure = 0.40








5.2 - WASI LIGHT - Mounting rails				
Art.No. / Figure	Article	Comments	Lenght	Variant
9664-Light 1		Span length: <b>1.55 m*</b> Bottom fixings: <b>DIN 933 M10</b> or <b>WASI hammer head screw</b> Top fixings: <b>Slot nut M8</b> Cross bracing with mounting bracket <b>9785-WASI 26</b> <i>Customer's required lengths are possible for call-off &gt;5 tons</i>	6.1 m	mill-finished
9664-Light 3		Span length: <b>1.55 m*</b> Bottom fixings: <b>DIN 933 M10</b> or <b>WASI hammer head screw</b> Top fixing: <b>square nut M8</b> or <b>hexagon nut M8</b> Cross bracing with mounting bracket <b>9785-WASI 26</b> <i>Customer's required lengths are possible for call-off &gt;5 tons</i>	6.1 m	mill-finished
9664-WASI 1 UL		Span length: <b>1.6 m*</b> Bottom fixings: <b>DIN 933 M10</b> or <b>WASI hammer head screw</b> Top fixings: <b>Slot nut M8</b> <i>Customer's required lengths are possible for call-off &gt;5 tons</i>	6.1 m 6.1 m	mill-finished anodized black*
9664-WASI 3 UL		Span length: <b>1.6 m*</b> Bottom fixings: <b>DIN 933 M10</b> or <b>WASI hammer head screw</b> Top fixings: <b>square nut M8</b> or <b>hexagon nut M8</b> <i>Customer's required lengths are possible for call-off &gt;5 tons</i>	6.1 m 6.1 m	mill-finished anodized black*
9664-WASI 15 UL		Span length: <b>1.6 m*</b> Side fixings: <b>Slot nut M8</b> Top fixings: <b>Slot nut M8</b> <i>Customer's required lengths are possible for call-off &gt;5 tons</i>	6.1 m 6.1 m	mill-finished anodized black*




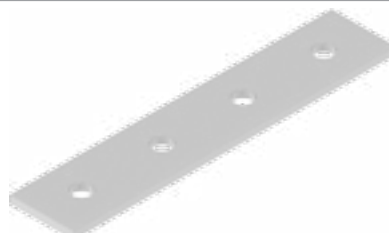
\*Load bearing capacities: Snow load sk = 1.21 kN/m2; Modul load: 0.22 kN/m2; Wind load: Wsuction = -0.80 kN/m2 Wpressure = 0.40

5.3 - Accessories for aluminium rails				
Art.No. / Figure	Article	Comments	Lenght	Variant
9671-40 x 40 x 3		<b>40 x 40 x 3 mm from stock</b> <i>Length as required</i>	6.0 m	mill-finished
9671-40 x 40 x 4		<b>40 x 40 x 4 mm from stock</b> <i>Length as required</i>	6.0 m	mill-finished
9671-40 x 40 x 5		<b>40 x 40 x 5 mm from stock</b> <i>Length as required</i>	6.0 m	mill-finished
9671-15441		<b>Z-section ALU</b> <b>40 x 40 x 40 x 3 mm</b> <i>Other measurements, e.g. 40 x 60 x 40 x 3 mm, on request</i>	6.0 m	mill-finished
9671-1-1431-A		<b>Z-section ALU</b> <b>40 x 40 x 40 x 3 mm</b> <i>Other measurements, e.g. 40 x 60 x 40 x 3 mm, on request</i>	6.0 m	mill-finished





5.4 - Mounting brackets			
Art.No. / Figure	Article	Comments	Zubehör / PU
9785-WASI 26-8 9785-WASI 26	Mounting bracket  M8 or M10  ALU	Mounting of WASI 2-26, LIGHT 1 and LIGHT 3 on WASI 1, WASI 2, WASI 2-26, WASI 3, WASI 5. WASI 15, WASI 31, WASI 31- 60., LIGHT 1, LIGHT 3, WASI 1 UL, WASI 3 UL and WASI 15 UL	1x slot nuts 1x screw DIN 912-2-8 x 16  or 1x screw DIN 603-2-8 x 25  PU = 100
			
9701-WASI 14	Cruciform joint connector angle  cross bracing	Mounting of 9664-WASI 15 or WASI 16 on WASI 1, WASI 2, WASI 2-26, WASI 3, WASI 5. WASI 15, WASI 31, WASI 31- 60., LIGHT 1, LIGHT 3, WASI 1 UL, WASI 3 UL and WASI 15 UL	3x slot nuts 3x screw DIN 912-2-8 x 16  PU = 100
			
9701-WASI 23W	Cruciform joint connector angle  cross bracing	Mounting of WASI 1, WASI 2, WASI 2-26, WASI 3, WASI 5, LIGHT 1, LIGHT 3, WASI 1 UL, WASI 3 UL on one of the same	2x slot nuts 2x screw DIN 912-2-8 x 16 1x screw DIN 933-2-10 x 25  or hammer head screw 9664-2-10 x 25 1x serrated locking nut 9345-2-10  PU = 100
			




5.5 - Profile connectors			
5.5.1 - U-profile connectors			
Art.No. / Figure	Article	Comments	PU
9751-WASI 12	<b>Profile connector</b>  200 mm	For mounting rails 9664-WASI 1/3/15 and UL-versions  You require 2 x drilling screws DIN 7504-2-4,8 x 25K for diagonal screw joints	100
			
5.5.2 - Slot-in connectors			
Art.No. / Figure	Article	Comments	PU
9751-WASI 18	<b>Profile connector slide-in</b>  200 mm	For mounting rails 9664-WASI 1/3/15/16 and UL-versions  WASI 1/3/15 = 1 connector / connections WASI 16 = 2 connectors / connections  <b>NOTE: Include an expansion joint every 12 metres.</b>	50
			
9751-WASI 18 L	<b>Profile connector slide-in</b> for LIGHT and WASI 5  200 mm	For mounting rails type Light and WASI 5  You require 2 pieces / connection for 9664-Light 1 and 9664-Light 3  <b>NOTE: Include an expansion joint every 12 metres.</b>	50
			
5.5.3 - Hole profile connectors			
Art.No. / Figure	Article	Comments	PU
9557-2-200 x 40	<b>4 hole profile connector</b>  200 x 40 x 5 mm rounded hole M10 stainless Steel A2	In particular for mounting rail WASI 2  (Can also be used with WASI 1 and WASI 3) Additionally you require 4x hexagonal screws DIN 933 M10 x 20 + hexagonal nuts with serration, 9345-2-10*	25
			



5.6 - Flat roof mounting frame with additional fastenings				
5.6.1 - Flat roof mounting frame - Adjustable				
Art.No. / Figure	Article	Comments	Variant	PU
9785-WASI 2040	Flat roofmounting frame triangle  Aluminium	<ul style="list-style-type: none"><li>• can be foldet up</li><li>• Adjustable variably from 20° to 40°</li><li>• Shippable fully assembled from stock</li><li>• Connection top: DIN 933-2-10x25 + 9345-2-10 + 9785-WASI 26</li><li>• Connection bottom: DIN 912-2-8x16 + 9431-120901 + 9785-WASI26</li></ul> <p>For each triangle you require 8 mounting bracket 9785-WASI 26 + 4 x 9021-2-8,4. The angle section 40 x 40 x 3 etc. can be used as a diagonal brace.</p> <p>For further information please see our „flat roof“ mounting brochure.</p>	mill- finished	1
				
9785-WASI 26	Mounting plates	Mounting plates for fastening the mounting rails on the triangle  M8 or M10	Alu	100
				



5.6.2 - Flat roof mounting frame - Fixed				
Art.No. / Figure	Article	Comments	Variant	PU
9785-		Fixed triangular stand-up mountings made of angle profiles, e.g.  40 x 40 x 3 or 40 x 40 x 5  All angle measurements are possible on request	mill-finished	1
5.6.3 - Standard mounting frames made of ALU-L angles 40 x 40 x 3				
Art.-No.	A	B	Angle	Material
...1450155015-3	1450	1550	15°	Alu-angle 40 x 40 x 3
...1450155020-3	1450	1550	20°	Alu-angle 40 x 40 x 3
...1450155025-3	1450	1550	25°	Alu-angle 40 x 40 x 3
...1450155030-3	1450	1550	30°	Alu-angle 40 x 40 x 3
...1450155035-3	1450	1550	35°	Alu-angle 40 x 40 x 3
...1450155040-3	1450	1550	40°	Alu-angle 40 x 40 x 3
...1450155045-3	1450	1550	45°	Alu-angle 40 x 40 x 3
...1450155050-3	1450	1550	50°	Alu-Angle 40 x 40 x 3
...900100015-3	900	1000	15°	Alu-angle 40 x 40 x 3
...900100020-3	900	1000	20°	Alu-angle 40 x 40 x 3
...900100025-3	900	1000	25°	Alu-angle 40 x 40 x 3
...900100030-3	900	1000	30°	Alu-angle 40 x 40 x 3
...900100035-3	900	1000	35°	Alu-angle 40 x 40 x 3
...900100040-3	900	1000	40°	Alu-angle 40 x 40 x 3
...900100045-3	900	1000	45°	Alu-angle 40 x 40 x 3
...900100050-3	900	1000	50°	Alu-angle 40 x 40 x 3





5.6.4 - Standard mounting frames made of ALU-L angles 40 x 40 x 5				
Art.-No.	A	B	Angle	Material
...1450155015-5	1450	1550	15°	Alu-angle 40 x 40 x 5
...1450155020-5	1450	1550	20°	Alu-angle 40 x 40 x 5
...1450155025-5	1450	1550	25°	Alu-angle 40 x 40 x 5
...1450155030-5	1450	1550	30°	Alu-angle 40 x 40 x 5
...1450155035-5	1450	1550	35°	Alu-angle 40 x 40 x 5
...1450155040-5	1450	1550	40°	Alu-angle 40 x 40 x 5
...1450155045-5	1450	1550	45°	Alu-angle 40 x 40 x 5
...1450155050-5	1450	1550	50°	Alu-angle 40 x 40 x 5
...900100015-5	900	1000	15°	Alu-angle 40 x 40 x 5
...900100020-5	900	1000	20°	Alu-angle 40 x 40 x 5
...900100025-5	900	1000	25°	Alu-angle 40 x 40 x 5
...900100030-5	900	1000	30°	Alu-angle 40 x 40 x 5
...900100035-5	900	1000	35°	Alu-angle 40 x 40 x 5
...900100040-5	900	1000	40°	Alu-angle 40 x 40 x 5
...900100045-5	900	1000	45°	Alu-angle 40 x 40 x 5
...900100050-5	900	1000	50°	Alu-angle 40 x 40 x 5

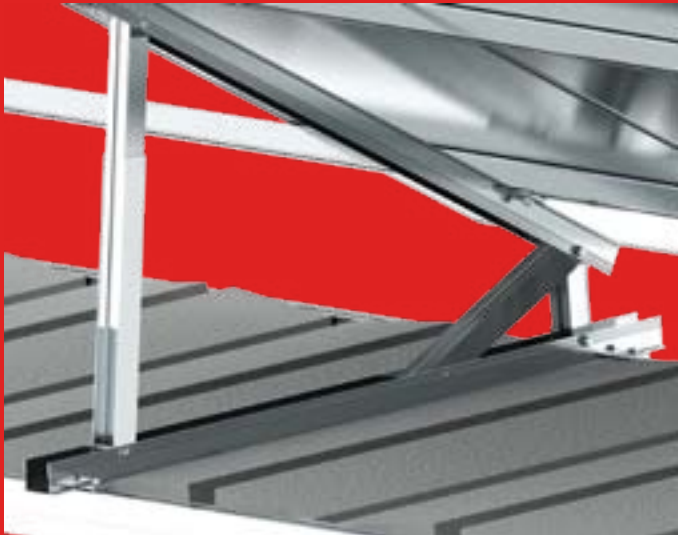





Fig.: Foldable, adjustable mounting frame 9785-WASI 2040 with additional fixing.





6.1 - Module clamps including KlickFIX clip connection for framed modules				
Art.No. / Figure	Article	Comments	Variant	PU
9742-WASI Clip E		<b>End Clamp</b>  ALU incl. clip  Distinctly higher tensile strength than traditional fastenings due to special aluminium alloy	   mill-finished anodized black	50
9745-WASI Clip M		<b>Middle clamp</b>  ALU  Distinctly higher tensile strength than traditional fastenings due to special aluminium alloy	   mill-finished anodized black	100



6.2 - Use of hexagon socket Allen screws for different module heights		
Art.No.	Article	PU
		
912-2-8 x 30	M8 x 30 mm	200
912-2-8 x 35	M8 x 35 mm	200
912-2-8 x 40	M8 x 40 mm	200
912-2-8 x 45	M8 x 45 mm	100
912-2-8 x 50	M8 x 50 mm	100
912-2-8 x 55	M8 x 55 mm	100
912-2-8 x 60	M8 x 60 mm	100

Module height	Screw for bars with slot nut	Safety washer (only for slot nut channels)	Screw for bar with square nut <sup>1</sup>
30 mm	Allen, M8 x 35	x	Allen, M8 x 35 oder x 40
31 mm	Allen, M8 x 35	x	Allen, M8 x 35 oder x 40
32 mm	Allen, M8 x 35		Allen, M8 x 35 oder x 40
33 mm	Allen, M8 x 35		Allen, M8 x 35 oder x 40
34 mm	Allen, M8 x 35		Allen, M8 x 35 oder x 40
35 mm	Allen, M8 x 40	x	Allen, M8 x 40 oder x 45
36 mm	Allen, M8 x 40	x	Allen, M8 x 40 oder x 45
38 mm	Allen, M8 x 40		Allen, M8 x 40 oder x 45
40 mm	Allen, M8 x 45	x	Allen, M8 x 45 oder x 50
41 mm	Allen, M8 x 45	x	Allen, M8 x 45 oder x 50
42 mm	Allen, M8 x 45		Allen, M8 x 45 oder x 50
43 mm	Allen, M8 x 45		Allen, M8 x 45 oder x 50
44 mm	Allen, M8 x 45		Allen, M8 x 45 oder x 50
45 mm	Allen, M8 x 50	x	Allen, M8 x 50 oder x 55
46 mm	Allen, M8 x 50	x	Allen, M8 x 50 oder x 55
47 mm	Allen, M8 x 50		Allen, M8 x 50 oder x 55
48 mm	Allen, M8 x 50		Allen, M8 x 50 oder x 55
50 mm	Allen, M8 x 55	x	Allen, M8 x 55 oder x 60



<sup>1</sup>Both screw lengths can be used for this version.







6.3 - Module clamps for frame modules					
Art.No. / Figure	Article	Comments	Lenght	Variant	PU
9742-WASI 4-...	End clamp ALU	Width: 30 m Please specify module height	70	mill-finished	50
			70	anodized black	
9745-WASI 13	Middle clamp ALU	Width: 36 mm Width between modules: 20 mm	40 50 70	mill-finished mill-finished mill-finished	100
			70	anodized black	
9745-WASI 13 N	Middle clamp ALU LIGHT	Lenght: 70 mm Width: 36 mm	70	mill-finished	100
					
912-2-8 x 35 912-4-8 x 35	Hexagon socket Allen screw	M8  To attach the clamps	35	/	200
					







6.4 - Module clamps for glass modules					
Art.No. / Figure	Article	Lenght	Clamping	Variant	PU
9742-Laminate-L 9745-Laminate-L	<div>Middle clamp and end clamp for glass modules</div> <div><ul style="list-style-type: none"><li>• Practical clip connection</li><li>• UV-resistant EPDM rubber</li><li>• Modular height adjustability</li><li>• FirstSolar certification</li></ul></div> <div>You require additional Allen screws DIN 912 A2 8 x 35 and safety washers 9250-2-8,4 - depending on the module height.</div> <div>Length as required</div>	80	6-9 mm	mill-finished	30 40
		100	4.2-7 mm	mill-finished or black	100 220
		100	6-9 mm	mill-finished or black	100 220
		150	6-9 mm	mill-finished	100
		200	6-9 mm	mill-finished	100
6.5 - Module clamps for glass modules					
Art.No. / Figure	Article	Comments		Variant	PU
9742-Laminate-S 9745-Laminate-S	<div>Middle clamp End clamp for glases modules</div> <div>ALU</div> <div>Clamping area: 6.8 mm</div>	<div><ul style="list-style-type: none"><li>• Elastic sealing inlay for optimized traction clamping</li><li>• FirstSolar certification</li></ul></div> <div>You require additional Allen screws DIN 912 A2 8 x 12</div>		mill-finished	200 390
					
	9742-Laminate-JT 9745-Laminate-JT	<div>Middle clamp End clamp for glases modules</div> <div>ALU shaped rubber</div> <div>Clamping area: 6.8 mm</div>	<div><ul style="list-style-type: none"><li>• Patented construction with EPDM rubber bed</li><li>• Practical end stop to prevent damage to module</li><li>• FirstSolar certificate</li></ul></div> <div>You require additional Allen screw DIN 912 A2 8 x 16</div>		mill-finished
					










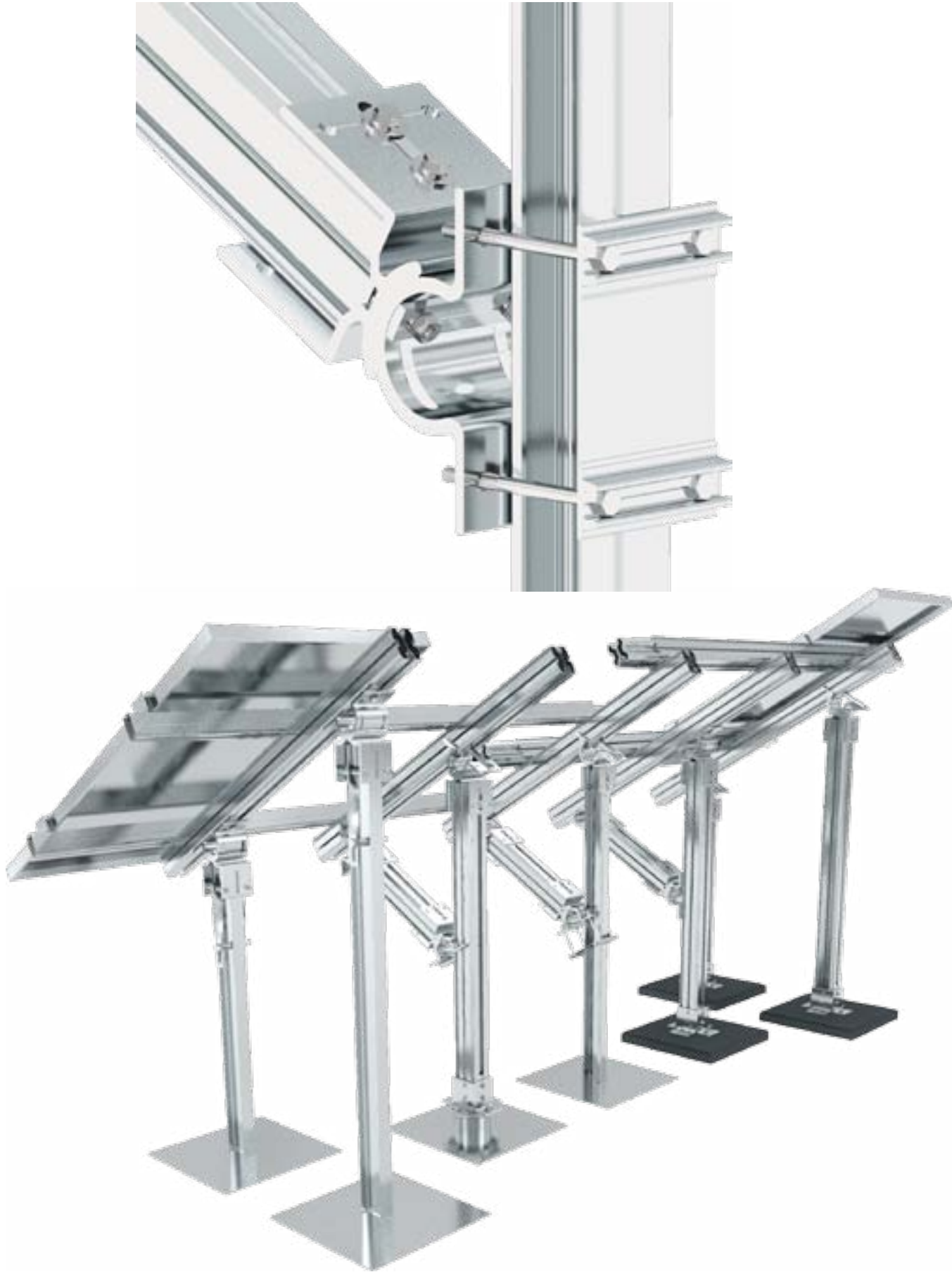
7.1 - Ground-Mount System heavy load – Mounting rails				
Art.No. / Figure	Article	Comments	Lenght	Variant
9672-SIGMA100-1.9 9672-Sigma100-2.5 9672-SIGMA10-3.0	<b>Sigma-pole ground connection</b> 100 mm x 55 mm	Pole SIGMA 100 FVZ Holes according to drawing 103 of TLSP99  Ground connection as driven pile, either in concrete foundation or as a screw pile.	1.9 m 2.5 m 3.0 m	galvanized steel
				
9672-WASI200-0.8 9672-WASI200-2.7 9672-WASI200-6.1 9672-WASI200-10.0 9672-WASI200-10.1	<b>Mounting rail heavy load</b> 100 mm x 80 mm	Aluminium Standard lenght 6.1 m Various connecting possibilities Span length: > 6 metres	0.8 m 2.7 m 6.1 m 10.0 m 10.1 m	mill-finished
				
9672-PRX100-20	<b>PRX mounting rail</b> 20° profile	Aluminium Top fixing 554 M8/ Clip	7.2 m	mill-finished
				
9672-EP-6.5	<b>Insertion profile Ground-Mount</b> 115 x 80 mm	Can be used for modules with a frame cross-profile height of 42 or 43 mm.	6.5 m	mill-finished
				



7.2 - Ground-Mount System heavy load - Joints			
Art.No. / Figure	Article	Comments	Variant
9672-AL-FS-FSU	<b>FS-joint with U-washers</b>	Connection FS-FSU pre-assembled	mill-finished
			
9672-AL-FS-SIGMA1U	<b>FS-joint with U-washers</b>	Connection Sigma top pre-assembled	mill-finished
			
9672-AL-FS-SIGMA2U	<b>FS-joint with U-washers</b>	Connection Sigma bottom pre-assembled	mill-finished
			
9672-AL-FS-PlateU	<b>Pressure plate with U-washers</b>	Connection Sigma 2 pre-assembled	mill-finished
			



7.3 - Ground-Mount System heavy load - Fittings				
Art.No. / Figure	Article	Comments	Lenght	PU
9672-FS-CONNECTOR				
	FS Girder profile Connector heavy load profile	Slot-in connector for WASI 200	400	15
9672-EP-CONNECTOR				
	Connector 20° profile	Insertion profile-connector for PRX Mounting rail	400 mm	1
9672-FS-SYSNUT220				
	System slot nut 220 mm	System slot nut Alu 220 mm with 2 pressed in M10 A2 nuts	220 mm	100
9672-CROSS CLAMP				
	Cross clamp for cross bracing	Packed hexagon bolt M 10 x 25 hexagon nut M10 mounting bracket WASI-26	/	100
9672-P-STEIN-M8 9672-P-STEIN-M10				
	Slot nut for Ground-Mount System	M 8 M 10 with hexagon nut pressed in	/	100




8.1 - Screws			
Art.No. / Figure	Article	Comments	PU
571-2-8 x 80 571-2-8 x 100 571-2-8 x 120	Hexagon - wood screw	Caution! Pre-drilling is necessary according to wood standards!	100 100 50
			
603-2-8 x 25	Cup square bolt in A2 according to DIN 603	M8 For Mounting rails: WASI 1, WASI 2, WASI 15, WASI 31, LIGHT1 Attention not for UL!!	100
			
7504-2-4.8 x 25 K	Self tapping screw A2	K-shape with hexagon head and flange	500
			
9110-0-8 x 80 9110-0-8 x 100 9110-0-8 x 120	Flat head screw with TX- drive Galvanized steel	Technically approved 8 x 80 8 x 100 8 x 120	50
			
9111-2-8 x 80 9111-2-8 x 100 9111-2-8 x 120	Flat head screw with TX- drive A2	8 x 80 8 x 100 8 x 120	50
			

Art.No. / Figure	Article	Comments	PU
912-2-8 x 12 912-2-8 x 16	Hexagon socket Allen screw  In A2 and DIN 912	M8 x 12 M8 x 16	200
			
9191-2-6.0 x 25	Facade bolt	For metal roof design with building supervision approval  E16 mm	500
			
9191-2-6.0 x 25R	Thin sheet metal facade bolt  A2 / bimetal, BZ 6.0 x 25 EPDM E164	Building supervision approval specially coated facade bolt (Z-14.1-4 und Z-14.1-537) no pre-drilling, virtually no sli- vers, halving mounting time E 16 mm	100
			
933-2-10 x 25	Hexagonal bolt fully threaded  In A2 according to DIN 933	M10 For mounting rails: WASI 1, WASI 2, WASI 2-26, WASI 3, WASI 5, LIGHT 1, LIGHT 3, WASI 1 UL and WASI 3 UL	100
			
9480-2-.....x.....	Safety screw Flat head screw in A2 similar to ISO738 0 (with TX-drive and securing splint.) BITS (WS 9488) and L-key (WS 9489) from stock	M8 x 20 M8 x 30 M8 x 40  Other measurements available from stock!! <b>See <a href="http://www.wasi.de">www.wasi.de</a></b>	depends on size
			
9664-2-10 x 25	Hammer head bolt  A2 according to WASI STANDARD	M10 For Mounting rails: WASI 1, WASI 2, WASI 2-26, WASI 3, WASI 5, LIGHT 1, LIGHT 3, WASI 1 UL and WASI 3 UL	100
			



8.2 - Disks			
Art.No. / Figure	Article	Comments	PU
125-2-...	 <b>Washer</b> in A2 according to DIN 125	for internal external (mm) (mm) M8 8.4 16.0 M10 10.5 20.0 M12 13.0 24.0 Other measurements available from stock!! <b>See www.wasi.de</b>	depends on size
127-2-...		M8 M10 M12 Other measurements available from stock!! <b>See www.wasi.de</b>	depends on size
25201-4-...x...	 <b>Self locking bolt retaining washer</b> in A4 according to DIN 25201	for internal external (mm) (mm) M8 8.7 13.5 M10 10.7 16.0 M12 13.0 19.5 Other measurements available from stock!! <b>See www.wasi.de</b>	depends on size
9021-2-10		M10 Nut fits DIN 933-2-10 x 25 or 933-4-10 x 25 and 9664-2-10 x 25	100
9250-2-.....	 <b>„S“ locking washer</b> also for our module clamps	for internal external (mm) (mm) M8 8.4 13.0 M10 10.5 16.0 M12 13.0 18.0 Other measurements available from stock!! <b>See www.wasi.de</b>	depends on size
9265-2-.....		M8 M10 M12 Other measurements available from stock!! <b>See www.wasi.de</b>	depends on size

8.3 - Nuts			
Art.No. / Figure	Article	Comments	PU
557-2-.....	 <b>Square nut</b> in A2 according to DIN 557	M8 M10 M12 Other measurements available from stock!! <b>See www.wasi.de</b>	depends on size
9300-2-..... x .....		M8 M10 M12 Other measurements available from stock!! <b>See www.wasi.de</b>	depends on size
985-2-.....	 <b>Stop nut low shape</b> in A2 according to DIN 985	M8 M10 M12 Other measurements available from stock!! <b>See www.wasi.de</b>	depends on size
9305-2-.....		M8 M10 M12 Other measurements available from stock!! <b>See www.wasi.de</b>	depends on size
934-2-.....	 <b>Hexagon nut</b> in A2 according to DIN 934	M8 M10 M12 Other measurements available from stock!! <b>See www.wasi.de</b>	depends on size
9345-2-.....		M8 M10 M12 Other measurements available from stock!! <b>See www.wasi.de</b>	depends on size

8.3 - Nuts			
Art.No. / Figure	Article	Comments	PU
9431-120901	 <b>Slot nut</b> ALU ball in A2 Pivotable	M8	100 200 500
		M8	
		For Mounting rails:	
		WASI 1, WASI 2, WASI 2-26, WASI 5, WASI 15, WASI 16, WASI 31, WASI 31-60, LIGHT 1, WASI 1 UL and WASI 15 UL	

8.4 - Miscellaneous			
Art.No. / Figure	Article	Comments	PU
9360-2-...	 <b>Joint anchor VA</b> <b>mortar cartridge VA-P</b>	To fix hanger bolts in concrete	depends on size
9490-2-6.25	 <b>Ball to knock in</b>	Balls Niro 304 6.25 mm straight 40 to secure Allen screws SW6	depends on size
9305-2-...	 <b>Safety star</b> for TX-drive	Material: Zinc die cast for the TX-sizes 10-40	depends on size
9664-KAPPE 40	 <b>End cap</b>	For all 40 x 40 mounting rails	100
9664-WASI 31-90 x 3-50	 <b>EPDM sealing tape</b> Width: 90 mm Stärke 3 mm	Sealing tape is fixed between <b>WASI 31</b> or <b>WASI 31-60</b> and the trapezoidal corrugated metal <b>Attach to one side</b>	50 m



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9.1 - Enquiry form for flat roof systems without roof cladding penetration

Please fill out all details stated here carefully. The details marked in grey are absolutely necessary, in order to prepare a project offer for you as quickly as possibly. Please also observe the notice about additional materials.

COMPANY

Company name:

WASI customer number:  
(if present)

Street:

Contact:

Postal Code / Place:

E-Mail:

Phone:

INFORMATION ABOUT THE PROJECT

Name:

Street:

Postal Code / Place:

SOLAR MODULE

Please send us the solar module datasheet directly as part of the intake form.

Manufacturer:

Model:

Planned number of modules:

Modules per string:

Array output:      kW DC  
( Without these details we can only prepare offers based on performance estimates.)



LOCATION

Basic Design Wind Speed:      (m/s)

Ground Snow Load:      (kg/m²) or      (kn/m²)

ROOF

Manufacturer:

Under Warranty?      ☐ yes      ☐ no

Age of the roof:      years

Roof pitch:      degrees

Roof load limits:      (kg/m²) or      (kn/m²)

Roof System Type:

☐ Ballasted  
☐ Mechanically attached  
☐ Fully adhered  
☐ Roof integrated construction

Built Up Roof (BUR):

☐ EPDM  
☐ TPO  
☐ PVC  
☐ Foam  
☐ Mod Bitumen  
☐ Asphalt  
☐ Coal Tar  
  
If additional coating, please specify...  
  
If gravel or river present, please specify...

Roof Color:      ☐ black  
                         ☐ white  
                         ☐ grey  
                         Other

Insulation thickness:      cm

Roof construction type:





### 9.1 - Enquiry form for flat roof systems without roof cladding penetration

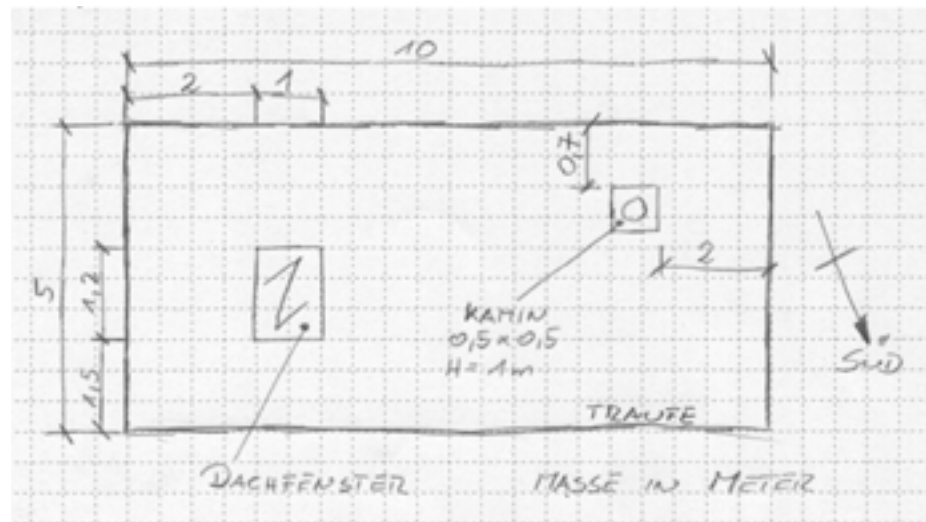
## BUILDING

Building Height form Grade:  m

Shortest Building Length:  mParapet Height:  m

Approximate Area for Array:  m<sup>2</sup>

Please send us a sketch of the flat roof array and enclose photographs of the area surrounding the building and the flat roof with the intake form.  
(See example:)



## ARRAY LAYOUT

You may also include a sketch of the planned roof covering to illustrate the series design and possible construction obstacles.

Number of Columns: \_\_\_\_\_

Number of Rows: \_\_\_\_\_

Layout Complexity: ☐ low ☐ regular / med-high

Row Spacing: ☐ Standard (3:1) ☐ Reduced (2:1). nur für Polar Bear


Setback Distance:  m

Access Requirements: \_\_\_\_\_

Date: \_\_\_\_\_ Signature: \_\_\_\_\_

Please check once again and make sure that you have fully answered all the details marked in grey. Send us the intake form with the datasheet of the solar module being used, the roof sketch and the photographs of the roof.

### Sketch





9.2 - Questionnaire to prepare a cost estimate

PV-GROUND-MOUNT SYSTEMS –  
QUESTIONNAIRE TO PREPARE A COST ESTIMATE

The following details are absolutely necessary to prepare a cost estimate for the mounting frame of a PV Ground-Mount System:

- **LOCATION OF THE BUILDING PROJECT, PLACE, COUNTRY**  
Possibly including details on snow and wind zones
- **PV MODULE USED**  
Important! Please send the module data sheet.
- **FOUNDATION TYPE**  
driven posts, revolving foundations (Ground screws), concrete foundations, others?
- **MODULE POSITION**  
Upright or horizontal installation of modules?  
How many modules are to be installed on top of the other?  
Details on the linking of the modules.

On basis of these details a theoretical ,table size‘ is calculated, which serves as the calculation basis for the cost of the framework (details of the costs then in EUR/Wp). The result of the estimated cost is a ,budget price‘, which is based on the optimum mounting conditions being present at the building location.

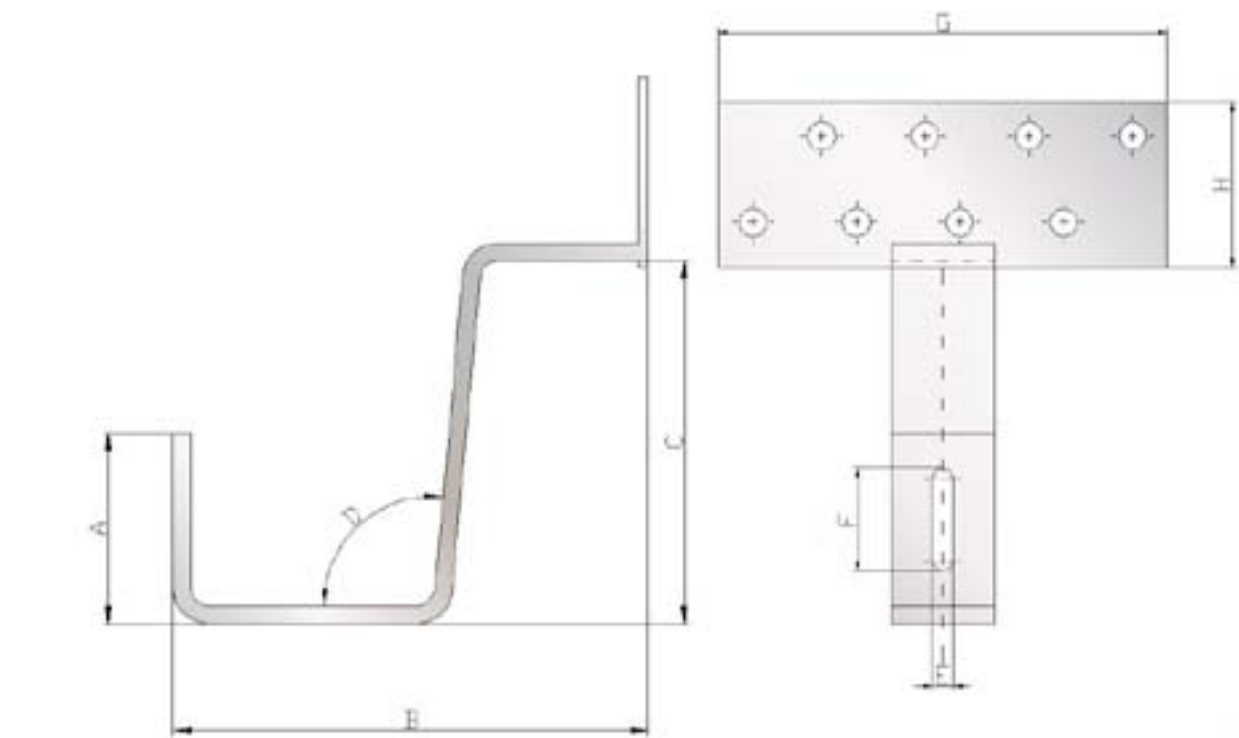
For the production of a complete offer the following documents for the site are required:

- **SITE PLANS WITH THE ,MODULE TABLES‘ ALREADY DRAWN IN**
- **GROUND SURVEY**

Based on these documents a more specific cost estimate is prepared, which is adjusted to the actual mounting conditions on site. In addition to this the design is checked for stability in connection with the actual conditions on site.

There will therefore be some change between the estimated cost and the budget price.

9.3 - Pantiled roof hooks



A	B	C	D	E	F	G	H

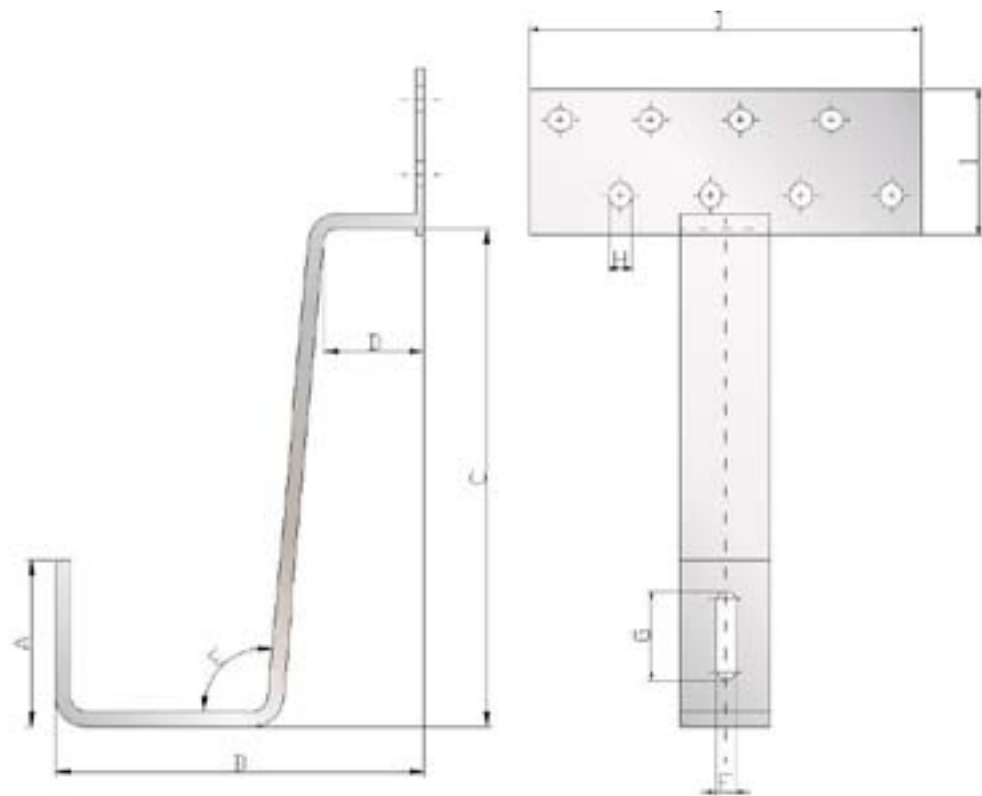
Quantity:

Shipping address:

We use stainless steel 1.4301, 5 mm thickness, as long as you have no other requirements.



9.4 - Plain tile roof hooks



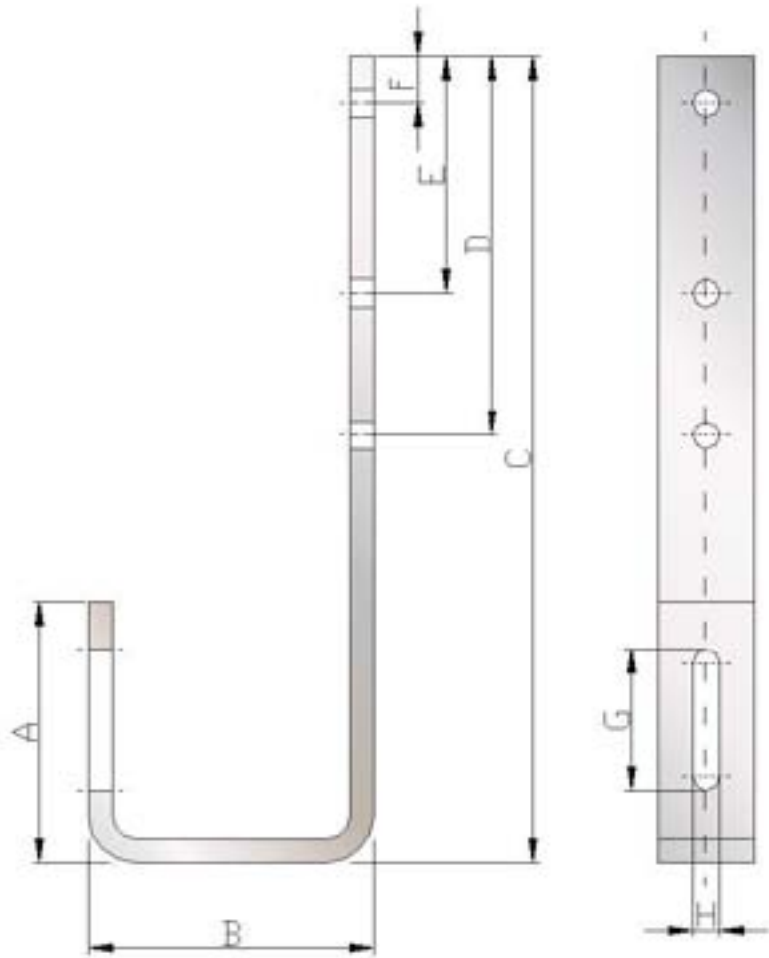
A	B	C	D	E	F	G	H	I	J

Quantity:

Shipping address:

We use stainless steel 1.4301, 5 mm thickness, as long as you have no other requirements.

9.5 - Slate roof hooks



A	B	C	D	E	F	G	H

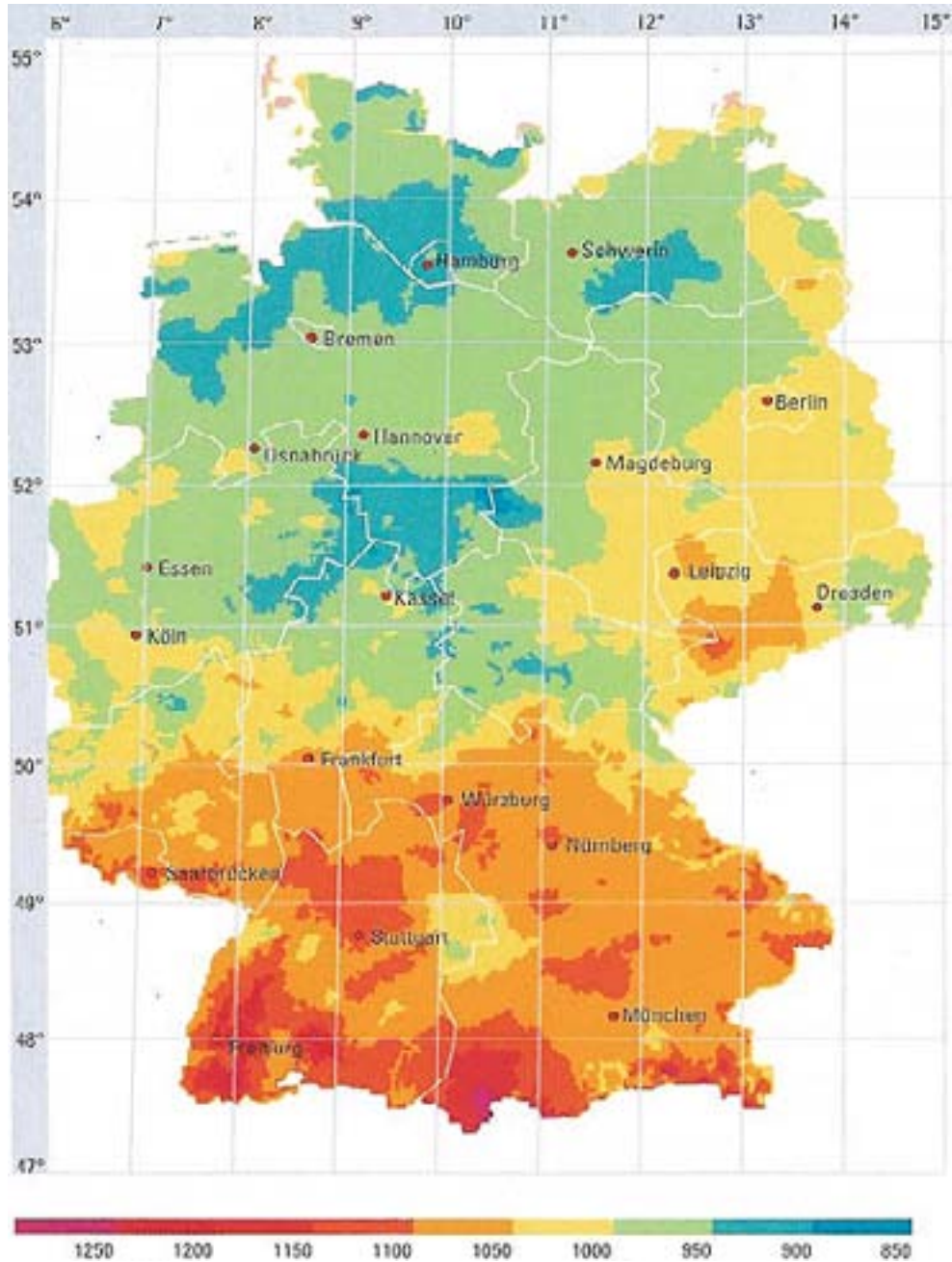
Quantity:

Shipping address:

We use stainless steel 1.4301, 5 mm thickness, as long as you have no other requirements.



10.1 - Global radiation Federal Republic of Germany



10.2 - Wind zones Federal Republic of Germany

Source: Wikipedia 15. Dez. 2005. Störfix



10.3 - Snow load zones Federal Republic of Germany

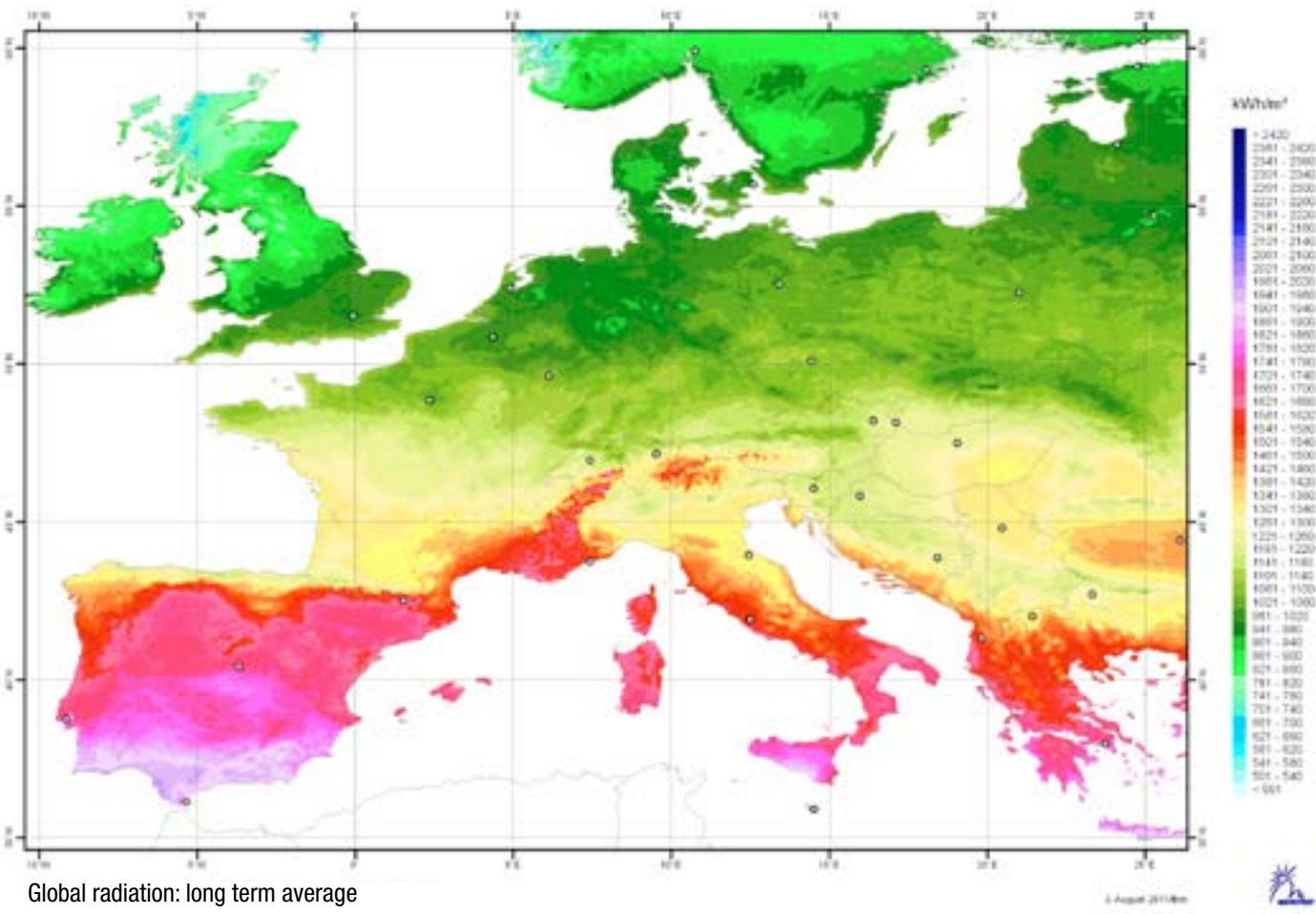
Source: Wikipedia 01. Okt. 2005. Störfix





10.4 - Solar and sky radiation Europe

Source: © METEOTEST; based on www.meteonorm.com



Global radiation: long term average

10.5 - Further information on WASI SOLAR

You can also find information on our products, contact persons and download materials such as the delivery program, product data sheets and enquiry forms on our website [www.wasisolar.de](http://www.wasisolar.de)

Should you have any questions about individual products, product set or project handling, please give us a call at 0049 202-2632-179 or write us an email at [solar@wasi.de](mailto:solar@wasi.de)





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