

KNUBIX®

KNUBIX® 100 ■ KNUBIX® 100/10° ■ KNUBIX® 80

– Sun with a system.



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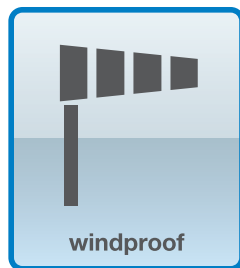
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Version: 3 / 2012

KNUBIX® 100 ■ KNUBIX® 100/10° ■ KNUBIX® 80



KNUBIX® offers a new flat roof mounting system for large photovoltaic arrays on industrial and commercial buildings.

The patent-pending **KNUBIX® 100** and the advanced **KNUBIX® 80** system were developed specifically to meet the requirements of large-scale rooftop systems. The lightweight aluminum spoiler system is installed without roof penetration and adds only a slight additional load to the roof.

The mounting system **KNUBIX® 100** is also available with an 10° inclination (**KNUBIX® 100/10°**) - especially developed for the South-European market. It features a higher power-output due to more modules per square-foot roof space.

From now on even difficult flat roofs can be suitable for efficient harvesting of solar power. The **KNUBIX® 100** and **KNUBIX® 80** flat roof mounting systems are corrosion-resistant and use only the highest quality components that are safety-tested for structural integrity.

The mounting systems are quick and easy to install and the efficient use of materials and installation capacity saves you time and money. You can rely on the quality and safety of your system because we individually certify each and every one.



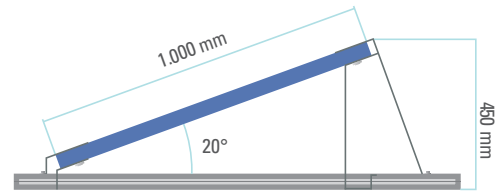
KNUBIX® 100 ■ KNUBIX® 100/10°

KNUBIX® 100 and **KNUBIX® 100/10°** is a lightweight, aerodynamic, self-supporting flat roof mounting system. It is installed without roof penetration and adds little to no extra load. For this reason, it is particularly suitable for plastic membrane roofs. The use of bitumen-free building protection mats as an installation foundation offer additional protection for the roof membrane.

KNUBIX® 100 and **KNUBIX® 100/10°** is suitable for all framed standard modules with a width of 950-1.013 mm (7.40 – 9.45 inches). Transverse installation is carried out with the KNUBIX click-in modules. Shading of the solar modules is avoided by the use of edge and row spacing. This ensures full efficiency of the photovoltaic system all year round.

KNUBIX® 100 exerts an additional load of about 9.8 kg/m² (2.0 lbs/ft²) (without ballast) at a module weight of 19 kg (41.89 lbs). The linear load of the module is about 16.8 kg/m (11.29 lbs/ft). To check if your roof is suitable for the installation of a photovoltaic system, you just need to do a load calculation for the support structure.

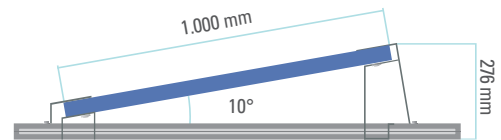
At **KNUBIX® 100/10°** the details of the loads will change minimum (See sketch).



Technical Specifications

Inclination	20°
Rail length	0,7 - 6,0 m
Module width	950 - 1.013 mm
Distributed load	ca. 9.8 kg/m ² *
Liniar load	ca. 16.8 kg/m *
Material	aluminium / stainless steel

* assuming a module weight of 19 kg



Technical Specifications

Inclination	10°
Rail length	0,7 - 6,0 m
Module width	950 - 1.013 mm
Distributed load	ca. 10.7 kg/m ² *
Liniar load	ca. 18.1 kg/m *
Material	aluminium / stainless steel

* assuming a module weight of 19 kg



KNUBIX® 100 ■ KNUBIX® 100 /10° – certified system



Zertifikat

Berichts-Nr.: 21211932

License Holder:

KNUBIX GmbH

Birkenstraße 6
88285 Bodnegg
Deutschland

Produkt:

PV-Befestigungssystem

Type: **KNUBIX 100**

Basis:

- TÜV Spec TZE/2.572.10**
"Qualifizierung netzgekoppelter
Photovoltaik (PV) Anlagen".
- Fertigungsstättenbesichtigung**
Zur Sicherstellung einer
gleichbleibenden Qualität werden
regelmäßig wiederkehrende Prüfungen
durchgeführt.



- Qualified
TUV-Spec. TZE/2.572.10
- Regelmäßig Überwacht

Bemerkungen:

Statik gemäß DIN1055:2005, Randbedingungen sind zu beachten.

Bedingungen:

Das Produkt wurde freiwillig nach geltenden technischen Regeln überprüft. Jede Veränderung bezüglich Design, Materialien, Komponenten oder Herstellung kann die Wiederholung einzelner oder aller Qualifikationstests erfordern um die Qualifizierung aufrecht zu erhalten.

Die Gültigkeit des Zertifikates beträgt 5 Jahre ab Ausstellungsdatum.

Regenerative Energien

Dipl.-Ing. W. Vaßen

Köln, den 05.08.2009

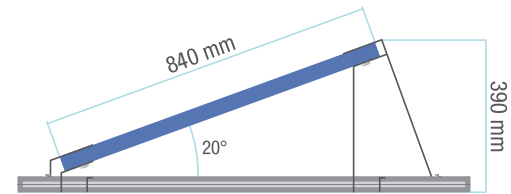
TÜV Rheinland Immissionsschutz und Energiesysteme GmbH, Am Grauen Stein, D-51105 Köln

KNUBIX® 80

KNUBIX® 80 is a lightweight, aerodynamic, self-supporting flat roof mounting system. It is installed without roof penetration and adds little to no extra load. For this reason, it is particularly suitable for plastic membrane roofs. The use of bitumen-free building protection mats as an installation foundation offer additional protection for the roof membrane.

KNUBIX® 80 is suitable for all framed standard modules with a width of 798-840 mm. Transverse installation is carried out with the KNUBIX click-in modules. Shading of the solar modules is avoided by the use of edge and row spacing. This ensures full efficiency of the photovoltaic system all year round.

KNUBIX® 80 exerts an additional load of about 8.5 kg/m² (2.0 lbs/ft²) (without ballast) at a module weight of 16 kg (41.89 lbs). The linear load of the module is about 13.8 kg/m (11.29 lbs/ft). To check if your roof is suitable for the installation of a photovoltaic system, you just need to do a load calculation for the support structure.



Technical Specifications

Inclination	20°
Rail length	0,7 - 6,0 m
Module width	798-840 mm
Distributed load	ca. 8,5 kg/m ² *
Liniar load	ca. 13,8 kg/m *
Material	aluminium / stainless steel

* assuming a module weight of 16 kg



KNUBIX® 80 – certified system



Zertifikat

Berichts-Nr.: 21214867

License Holder:
KNUBIX GmbH

Birkenstraße 6
88285 Bodnegg
Deutschland

Produkt:
PV-Befestigungssystem

Type: **KNUBIX 80**

Basis:

- TÜV Spec TZE/2.572.10**
"Qualifizierung netzgekoppelter
Photovoltaik (PV) Anlagen".
- Fertigungsstättenbesichtigung**
Zur Sicherstellung einer
gleichbleibenden Qualität werden
regelmäßig wiederkehrende Prüfungen
durchgeführt.



- Qualified
TUV-Spec. TZE/2.572.10
- Regelmäßig Überwacht

Bemerkungen:
Statik gemäß DIN1055:2005,
Randbedingungen sind zu beachten.

Bedingungen:
Das Produkt wurde freiwillig nach geltenden technischen Regeln überprüft. Jede Veränderung bezüglich Design,
Materialien, Komponenten oder Herstellung kann die Wiederholung einzelner oder aller Qualifikationstests erfordern um die
Qualifizierung aufrecht zu erhalten.

Die Gültigkeit des Zertifikates beträgt 5 Jahre ab Ausstellungsdatum.

Regenerative Energien


Dipl.-Ing. J. Althaus

Köln, den 09.08.2010

TÜV Rheinland Immissionsschutz und Energiesysteme GmbH, Am Grauen Stein, D-51105 Köln

Quick-Start Guide

Transverse installation of our mounting systems is carried out with the KNUBIX® click-in modules.

Installing ground rails

- ▶ PV system is measured out on the roof
- ▶ Building protection mats are laid down
- ▶ Ground sections are measured and lined up
- ▶ Sections are joined together with section connectors



KNUBIX® click-in modules

- ▶ Row divisions are measured
- ▶ Front and rear module supports are clicked into place without the use of tools
- ▶ Put ballast on if necessary



Module mounting

- ▶ Modules are placed onto the module supports
- ▶ PV modules are attached with the module clamps
- ▶ Module cabling is installed



Closing the system

- ▶ Wind baffles and side spoilers are attached to the PV modules



3 Steps to your mounting system

Send inquiry to **KNUBIX® GmbH** with the following

- ▶ Completely filled out checklist
- ▶ Assignment plan with module arrangement
- ▶ Drawing of the roof with section
- ▶ Information on directly bordering building areas including height specifications
- ▶ Photos of roof, location and surrounding area from all directions and a Google Earth image
- ▶ Data sheets on roof cladding and insula

Feasibility report by **KNUBIX GmbH**

Non-binding prior information on the amount of ballast required

After having placed the order

We will carry out an exact structural calculation and determine the final extra load according to the statics of the system.



Requirements

Technical and planning requirements for the mounting of **KNUBIX® 100**, **KNUBIX® 100 /10°** and **KNUBIX® 80**

- ▶ The **KNUBIX**-mounting systems are in stock and are offered according to the requirements of the project.
- ▶ Inclination: 20° oder 10°
- ▶ Minimum output: 30 kWp

Module Requirements:

- ▶ Modules with following dimensions can be used:

	KNUBIX® 100 KNUBIX® 100/10°	KNUBIX® 80
Module width:	950 - 1.013 mm	798 - 840 mm
Module length:	1.630 - 1.690 mm 1.470 - 1.530 mm 1.290 - 1.350 mm	1.558 - 1.660 mm

- ▶ Standard-gaps:
 - 2,00 m* for **KNUBIX® 100**
 - 1,50 m* for **KNUBIX® 100/10°**
 - 1,60 m* for **KNUBIX® 80**
 - Otherwise variable; max. 2,50 m*

* Measured from front edge to front edge of module.
(See attached drawing at page 12 and 13.)
- ▶ Minimum array:
4 x 8 modules or 8 x 4 modules, with at least three rows in the array.
- ▶ A separation of the ground rail or the module field must be planned after 15 horizontal modules and 15 vertical rows.
- ▶ After the separation of the module field there has to be kept 40 cm space for the spoiler.

Roof Requirements:

- ▶ Industrial roofs with film or bitumen covering
- ▶ Maximum roof pitch 5° (special solutions available on request)

- ▶ The minimum distance to parapet or roof edge is calculated with the following formula:

$$\frac{\text{Building-height} \times 2}{10}$$

Example for the calculation: Height 12 m $\frac{12 \times 2}{10} = 2,4$ m minimum distance (or after consultation)

- ▶ The edge distances specified in the structural analysis have to be observed.
- ▶ Flat, even roof surface (no creases in the covering, no sagging and no steps on the roof)
- ▶ For separating layer between the floor profile and the roof cladding there have to be used convenient building protection mats (You can find a list of the supplier on the following page).
- ▶ Critical roof areas are the NW and NE corners due to uplift forces. Higher ballasting must be planned for there.
- ▶ Skylights, chimneys, etc. have to be build round.
- ▶ Modules cannot be arranged individually.

Structural Calculations

- ▶ The costs for the structural calculation is included in the price of the order. If a structural analysis will be ordered in advance, the costs are calculated as follows:
 - System size up to 500 kWp: EUR 295,00 (plus 19% VAT)*
 - System size from 500 kWp: EUR 395,00 (plus 19% VAT)*
- * fully reimbursed if an order is placed

Building protection mats

We can just guarantee the stability of the construction if you use the suggested building protection mats from HMS (type 7153P) or BSW (type Regupol 9510 RHS). These mats were tested by us respective the friction coefficient in wet and dry conditions.

Important:

The compatibility with the roof cladding must be determined for each project. The KNUBIX® GmbH Company does not assume any warranties for this.

Examples of suppliers:

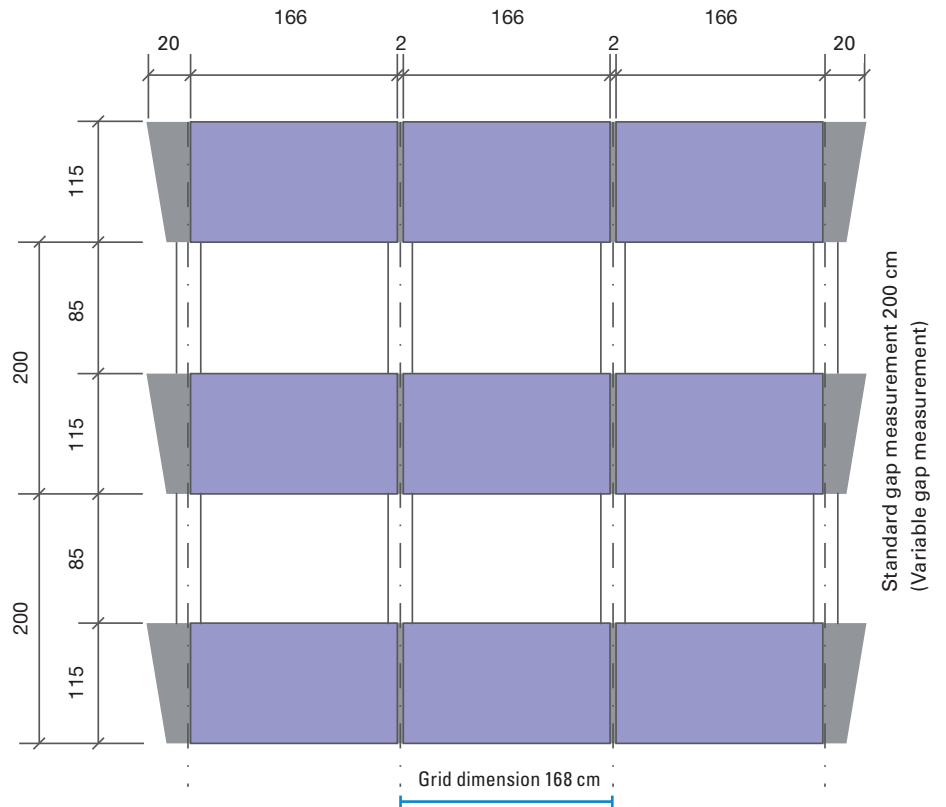
- ▶ HMS-Dichtungen GmbH & Co. KG
Bachstraße 2
49090 Osnabrück
Germany
Tel.: +49 (0)541-60 02 79 -0
Fax: +49 (0)541-60 02 79 -79
info@hms-dichtungen.de
www.hms-dichtungen.de
- ▶ BSW
Berleburger Schaumstoffwerk GmbH
Am Hilgenacker 24
57319 Bad Berleburg
Germany
Tel.: +49 (0) 2751 803-0
Fax: +49 (0) 2751 803-109
info@berleburger.de
www.berleburger.de

Sample with dimensions

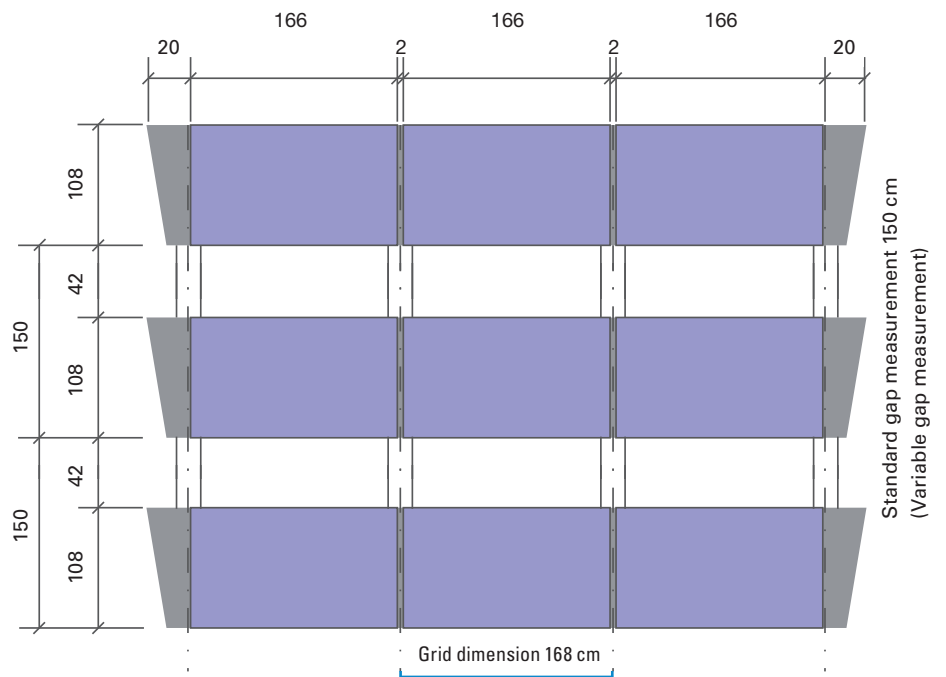
KNUBIX[®] 100 and KNUBIX[®] 100/10[°]

For a module array consisting of 3x3 modules of 166 cm width (65.35 in):

KNUBIX[®] 100:

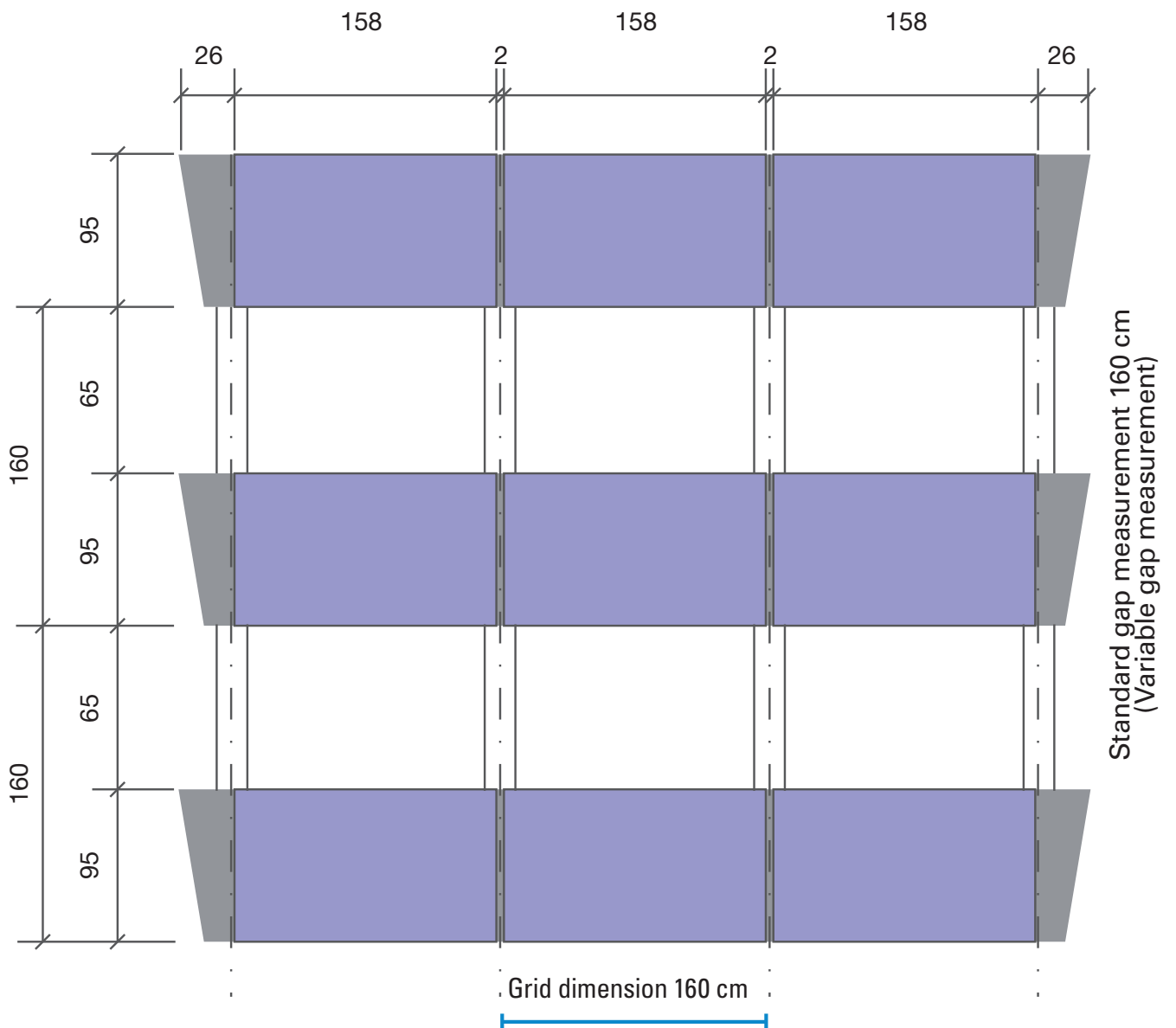


KNUBIX[®] 100/10[°]:



Sample with dimensions – KNUBIX® 80

For a module array consisting of 3x3 modules of 158 cm width:



Checklist (1)

KNUBIX® 100

KNUBIX® 100/10°

KNUBIX® 80

Installer

Name: _____ Telephone: _____

Company: _____ Mobile: _____

Street / No.: _____ Fax: _____

Postal Code / City: _____ E-Mail: _____

Construction project / Project

Name of customer: _____ Telephone: _____

Name of project: _____ Mobile: _____

Street / No.: _____ Fax: _____

Postal Code / City: _____ E-Mail: _____

Delivery address and site information

Street / No.: _____ Postal Code / City: _____

Ground-Elevation above MSL: _____ m

Wind zone according to DIN 1055: _____

Snow load zone according to DIN 1055: _____

Important: There is a possible extra load according to the building-statics (load-reserve) of:
_____ kg/m² _____ (lbs/ft²)

Terrain category

- 0 Coastal areas
- I Open terrain without obstacles
- II Open terrain with scattered obstacles
- III Suburbs, industrial or commercial areas
- IV Town

Checklist (2)

Roof specifications

Type of construction: existing roof renovated roof new building
Height of roof: _____ m Roof-pitch (max. 5°): _____ degrees
Useable roof area (length): _____ m (width): _____ m
Building dimensions (length): _____ m (width): _____ m
Age of roof: _____ years
Parapet available: Yes No Height: _____ m

Specifications of roof-type

Plastic-foil covered roof PVC-foil covered roof
Manufacturer (if known): _____
 Bitumen Additional gravel covering Green roof
 Other: _____
Type of insulation / Insulation-thickness / Compressive strength in kN/m²: _____

Gap-Measurement (measured front-edge module to front-edge module)

Standard gap-measurement 2,00 m (KNUBIX 100)
Standard gap-measurement 1,50 m (KNUBIX 100/10°)
Standard gap-measurement 1,60 m (KNUBIX 80)
Individual gap measurement: _____ m

Module data

Module manufacturer: _____
Output [Wp]: _____
Module dimensions [mm x mm x mm]: _____
Module weight (must be indicated): _____
Number of modules: _____

Checklist (3)

The following must be submitted

- Drawing of the roof (as AutoCAD or PDF-file) with module-arrangement and roof dimensions
- Please note where South is located
- Photos of roof, location and surroundings (from all directions)
- Section of the building
- Module datasheet

Is unloading equipment available on-site (forklift, crane etc.)?* Yes No

*Costs incurred due to the lack of unloading options (e.g. holding time, storage etc.), will be the responsibility of the customer.

Place, Date

X _____
Signature, company stamp

Order form

KNUBIX® 100
(Module width 950-1.013 mm)

KNUBIX® 100/10°
(Module width 950-1.013 mm)

KNUBIX® 80
(Module width 798-840 mm)

Only fully completed orders can be processed.

VAT-Number: _____
(Important information)

Company stamp

We herewith bindingly order the mounting system according to

Project-No.: _____

Special arrangements: _____

Shipping address: _____

Shipping address is business address: yes

Contact person for delivery: _____

Tel.-No. for notification by forwarding company: _____

Required delivery date: _____

We try to fulfill delivery-wishes, and guarantee the delivery date but no exact time.

Unloading-options: Please make sure that a forklift is available on the delivery date. KNUBIX will not cover costs occurring due to the lack of unloading options (e.g. holding time, storage, etc.).

Checklist up-to-date? yes no

Up-to-date, approved roof allocation plan and module data sheet must be attached (with date, signature)

We herewith confirm the accuracy of the information

Place, Date

Signature