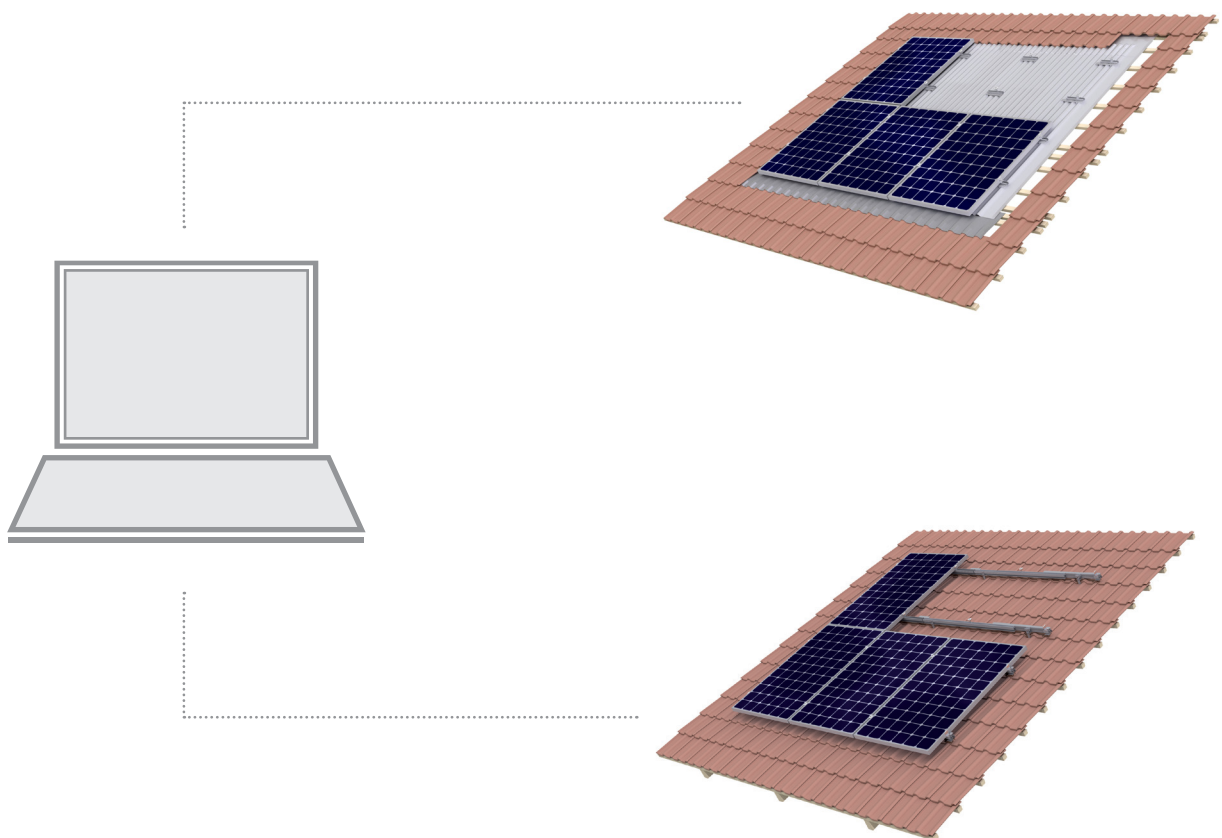




mounting
systems

Mounting Systems Quickplanner

Calculation tool for the static construction of mounting systems



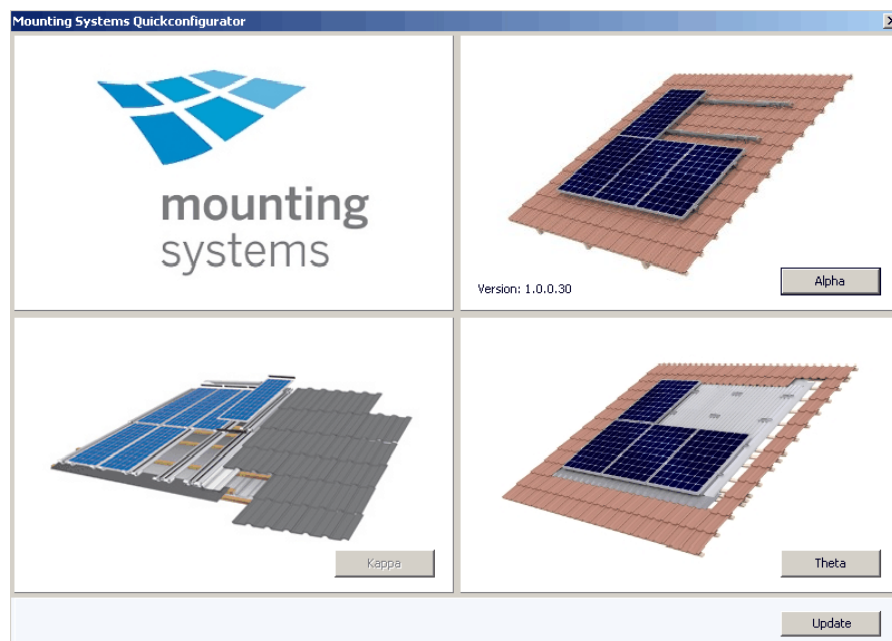
Index

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1 Start the program

After installation, the program automatically checks for updates. They should be installed absolutely. Therefore internet access is necessary. If required, some warning notices must be confirmed in the Internet Explorer.

Now the welcome screen appears. The desired type of mounting system has to be selected.



The general main buttons of the program:



Start new project



Open project



Save project



View printout / print



Select language. German, English, French, Spanish or Italian



Select country. Currently the standards for Germany, France, Spain and Italy are supported



Information about the program version



(only offline tool) activate / deactivate automatic update search



Quit program

2 Enter the project description



Open and create the locally stored address book.

After having entered all required contact data for the project, the index card "building data" has to be opened.

3 Alpha

3.1 Determination of building dimensions

The following tool is demonstrated with an example of the on-roof mounting system Alpha. The required information for the Theta system is mostly the same. See also paragraph 4 for the specific characteristics of Theta.

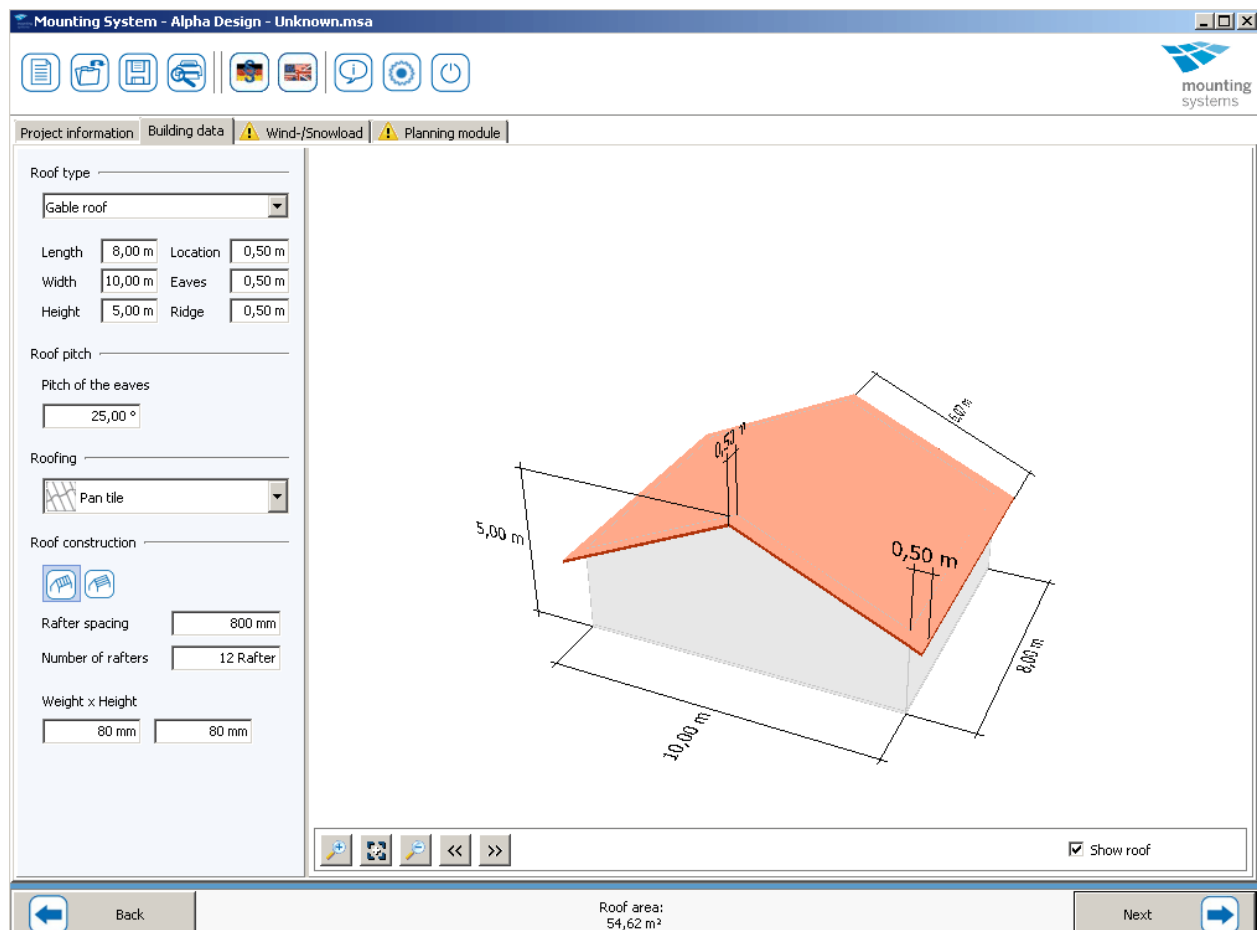
Having chosen the roof type, the building dimensions are entered. The solicited input can be inserted either in the left column, or with a click on the dimension chain directly in the graphics.



Selection of the roof construction. Fixation on rafters or purlins.



Regulation of the perspective: zoom +, standard view, zoom -, turn left, turn right



The input of the dimensions for rafters and purlins is used for a plausibility check and for a proof of the screws. A calculation of the substructure will not be realized.

3.2 Selection of wind and snow load

For constructions in Germany it is possible to determine the wind and snow zone by entering a zip code. The dialogue opens with a click in the field "zip code".

If the wind and/or snow zone are known, one can also select the values manually. It is equally possible to enter the wind and snow loads directly as surface load.

The terrain height of the project always has to be entered manually.

If the plant is situated in an exposed location, i.e. directly on a slope, a cliff or on a hill, the option exposed location is to be selected. On the sheet that appears, the type of the exposition location has to be determined, followed by various dimensions.

Mounting System - Alpha Design - Unknown.msa

Project information | Building data | Wind/Snowload | Planning module

Variant of input:

☒ Zip code

☐ manually

Wind load:

☒ Direct input: 0,00 kN/m²

☐ Wind load region

Snow load:

☒ Direct input: 0,00 kN/m²

☐ Snow load region

Terrain height: 0 m above sea level

☐ North German Plain

Exposed location:

☐ Yes

☒ No

Windlastzone

1 2 3 4

Back Snow load: 0,00 kN/m² Pressure of the gusts velocity: 0,00 kN/m² Next

Mounting System - Alpha Design - Unknown.msa

Project information | Building data | Wind/Snowload | Planning module

Wind load:

☒ Direct input: 0,00 kN/m²

☐ Wind load region

Terrain category

Distance to coastline: 0,0 km

Snow load:

☒ Direct input: 0,00 kN/m²

☐ Snow load region

Surrounding

Terrain height: 0 m above sea level

Isola della Maddalena

Capri Testa di

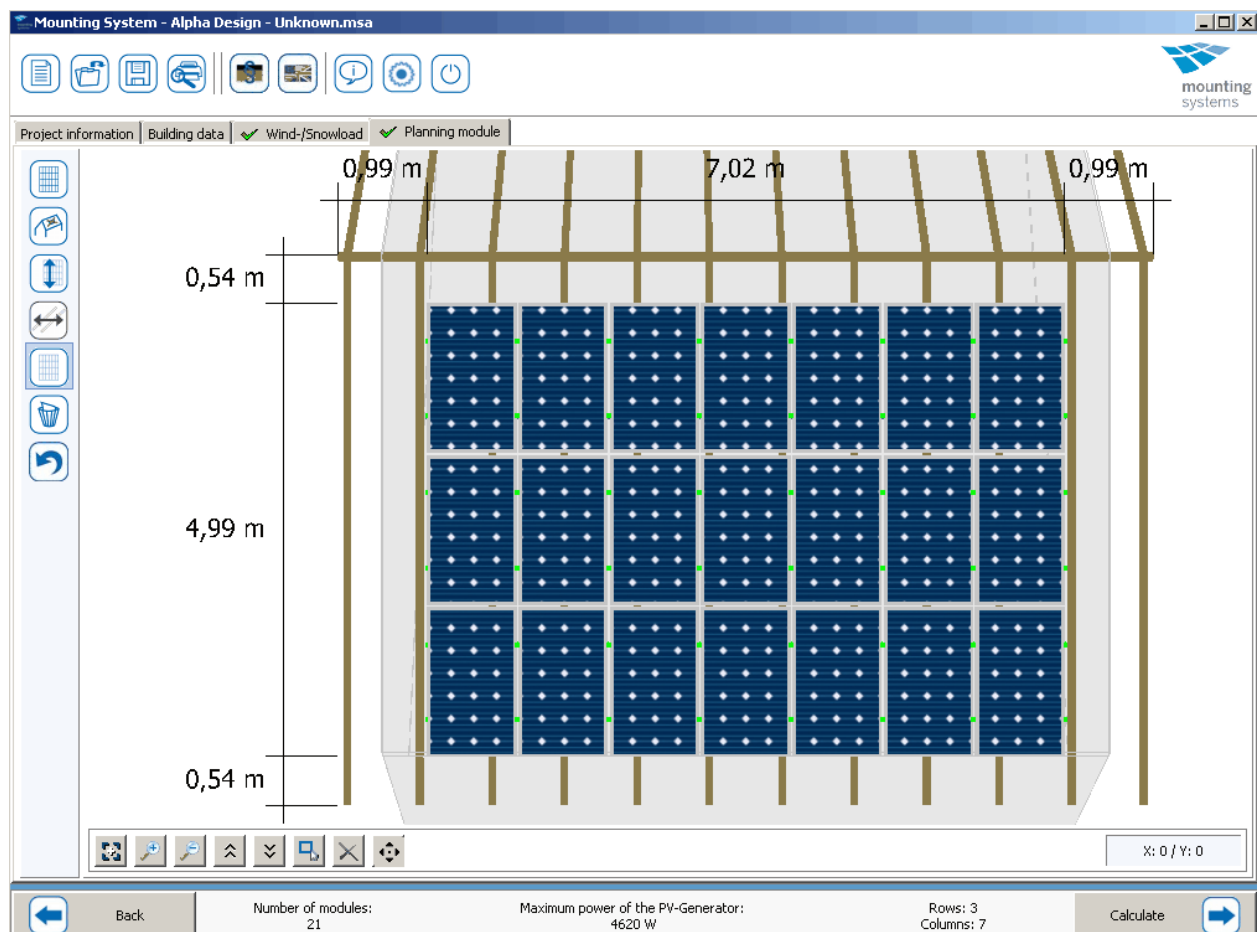
1 2 3 4 5 6 7 8 9

Back Snow load: 0,00 kN/m² Pressure of the gusts velocity: 0,00 kN/m² Next

The necessary input for the load norms of other countries is quite similar to the Germany version, but not identical. Specific norm requests have to be filled in consecutively. If the input is incomplete, a warning notice communicates that the calculation is not possible without the missing data.

3.3 Planning the module field

The roof surface is shown without any roofing at this point. Only the relevant components for the fixation (rafters and purlins) are shown.



Insert module



Insert obstacle



Module orientation. Portrait or landscape



Rail orientation. Horizontal or vertical



Show and hide modules



Delete planning



Back to the last process step. (undo function)

3.3.1 Insert obstacles



First, the surfaces where no solar modules can be fastened, e.g. chimneys or dormers, have to be determined.

The 'Insert barrier' dialog box has a title bar with a close button. It contains two sections: 'Type' and 'Size'. The 'Type' section has four radio buttons: 'Rooflights' (selected), 'Chimney', 'Dormer', and 'User-defined'. The 'Size' section has two input fields: 'Width' with the value '1,0 m' and 'Length' with the value '1,0 m'. At the bottom are three buttons: 'Ok', 'Delete', and 'Cancel'.

Insert module area



After selecting the desired solar module, the roof can be covered with modules.

There are three different planning methods:

- Entire roof surfaces with edges (default setting)
- Area in meter x meter
- Number of columns and rows

The 'Modul area' dialog box has a title bar with a close button. It contains two main sections: 'Choose the module to be inserted' and 'Size'. The 'Choose the module to be inserted' section has two dropdown menus: 'Module manufacturer' (set to 'Conergy') and 'Module type' (set to 'CPP 220'). There is a button with three dots to the right of the 'Module type' dropdown. The 'Size' section has three radio buttons: 'Area' (unselected), 'Direct' (unselected), and 'Entire roof surface with edges' (selected). The 'Area' option has input fields for '1,00 m' x '1,00 m'. The 'Direct' option has input fields for '0 Columns' x '0 Rows'. The 'Entire roof surface with edges' option has an input field for '0,50 m'. At the bottom are two buttons: 'Ok' and 'Cancel'.

3.3.2 Change the module field

The arrangement of obstacles and modules can easily be changed afterwards. With one single click modules can be deleted. With the help of the selection tool several modules can be selected at the same time:



Mark modules



Delete selected modules



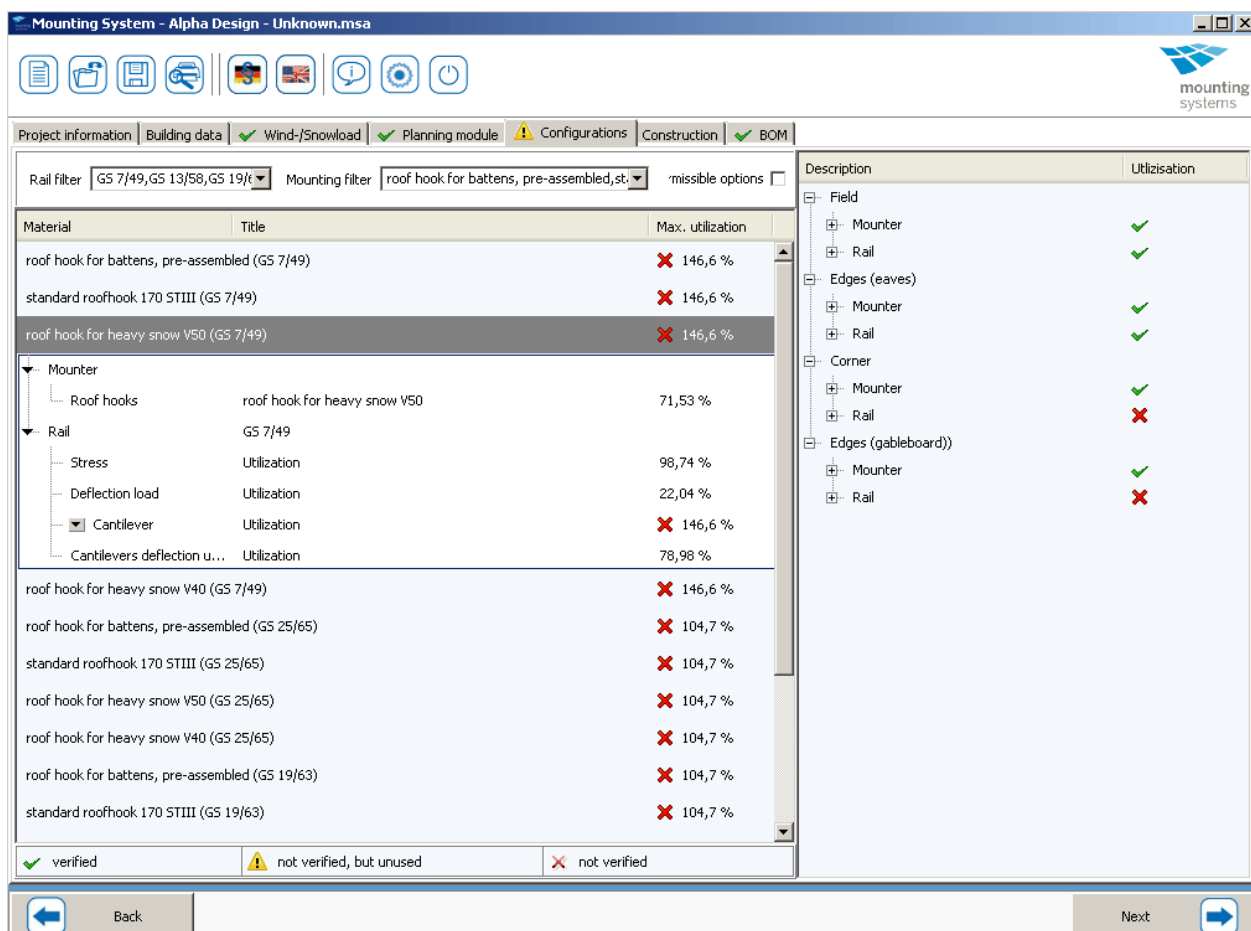
Move modules

3.3.3 Change obstacles

Obstacles and their position can also be changed subsequently. A click with the right mouse button opens the change dialogue and allows deleting the obstacle from the planning. The position of the obstacle can be changed by drag and drop. An accurate positioning is facilitated by the help of the automatically adapting dimension chains.

After completing the module field planning, the calculation is started by clicking on "Calculate".

3.4 Selection of the right configuration



The screenshot shows the 'Mounting System - Alpha Design - Unknown.msa' window. The 'Configurations' tab is active, displaying a table of material combinations and their utilization percentages. The table is filtered by 'Rail filter' (GS 7/49, GS 13/58, GS 19/63) and 'Mounting filter' (roof hook for battens, pre-assembled, st...). The table lists various materials and their utilization percentages, with some marked as 'not verified' (red X) and others as 'verified' (green checkmark).

Material	Title	Max. utilization
roof hook for battens, pre-assembled (GS 7/49)		146,6 %
standard roofhook 170 STIII (GS 7/49)		146,6 %
roof hook for heavy snow V50 (GS 7/49)		146,6 %
Mounter		
Roof hooks	roof hook for heavy snow V50	71,53 %
Rail	GS 7/49	
Stress	Utilization	98,74 %
Deflection load	Utilization	22,04 %
Cantilever	Utilization	146,6 %
Cantilevers deflection u...	Utilization	78,98 %
roof hook for heavy snow V40 (GS 7/49)		146,6 %
roof hook for battens, pre-assembled (GS 25/65)		104,7 %
standard roofhook 170 STIII (GS 25/65)		104,7 %
roof hook for heavy snow V50 (GS 25/65)		104,7 %
roof hook for heavy snow V40 (GS 25/65)		104,7 %
roof hook for battens, pre-assembled (GS 19/63)		104,7 %
standard roofhook 170 STIII (GS 19/63)		104,7 %

At the bottom of the window, there are buttons for 'Back' and 'Next'.

On the "Configuration" tab all combinations of roofing fixations and rail profiles are listed. Through three selection filters the list of indicated results can be narrowed down. It is possible to limit the shown results to a certain type of rail or roof hook, or to show valid combinations only.

There are three different icons indicating the mounting system's degree of utilisation:



The system fails in this combination.



The system would fail in areas which are not used in the planning (e.g. edges or corners).



The system could be proved successfully.

Once having decided for one configuration the detailed proof results appear.

3.5 Reasons for failure of the system

The load on the selected roof fixation is too heavy:

The program compares the calculated loads with the maximum permissible loads for the specific fasteners.

Corner	
Mounter	✓
Rail	✗
Stress	31,52 %
max. distance	1
Deflection load	19,87 %
max. distance	1
Cantilever	✗ 147 %
Cantilevers deflection under load	78,98 %

A red ✗ means that the maximum load is exceeded.

The program specifies the utilisation of the fasteners in percentage values.

The rail fails:

One frequent reason for failure of the rail is the exceeding of the maximum permissible cantilever.

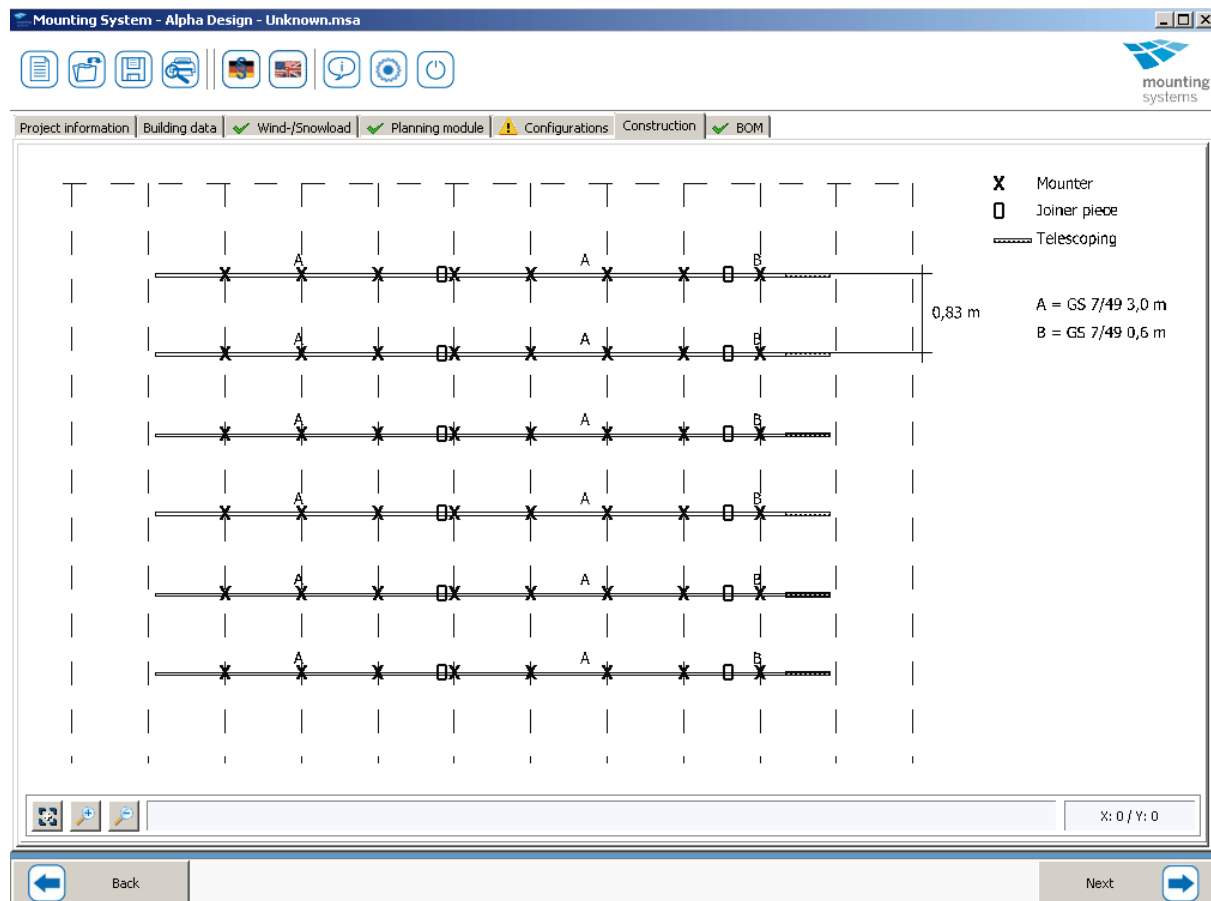
The maximal possible length of the cantilever is indicated in the list in the right column.

Mounter			
Roof hooks	roof hook for heavy snow W50		71,53 %
Rail			
	GS 7/49		
Stress	Utilization		98,74 %
Deflection load	Utilization		22,04 %

Possibly, a too long cantilever can be prevented by implementing some slight changes in the module field position.

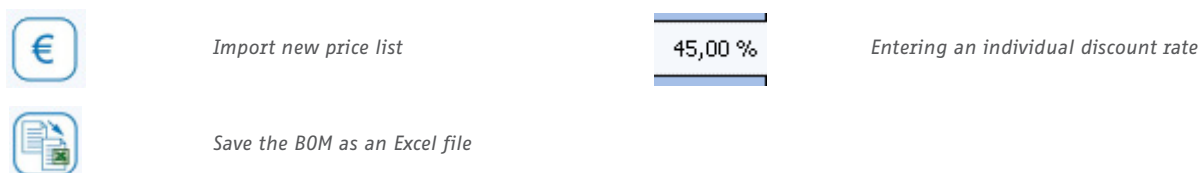
3.6 Construction view

The construction view offers an exact overview of the planning. All necessary information for the installation are illustrated.



3.7 Bill of materials

The next step is to carefully read the bill of materials. In general, the tool calculates without indicating prices. To receive a bill of materials with prices, a suitable price list has to be imported first. For further processing the BOM can be saved as an Excel file.



4 Theta

The inputs for the Theta differ slightly from those of the Alpha. Since the Theta is installed on the roof battens, the input of the roof batten distance, as well as the roof batten dimensions are required. These indications are important for the static verifications of the system. The highest possible roof batten distance amounts to 320 mm.

Roof battens

Distance

300 mm

Weight x Height

40 mm 20 mm

First of all, the module orientation has to be determined:

Portrait

Landscape

Theta parameter

Ober

top Cover Randstück Wellblech, abgeflacht, 2,05 m

obere Abdichtung Keins

Mitte

lbl/Wellbleche ☐ Wellbleche mit Antikondensflies

upper adapter EPDM Adapter hochkant

middle adapter EPDM Adapter hochkant

lower adapter EPDM Adapter hochkant

Seitlich

linke Abdeckung Seitenblech aufgekantet; 2,00 m

rechte Abdeckung Seitenblech aufgekantet; 2,00 m

seitliche Abdichtung Keins

Unten

lower cover Metal Roll, Rolle à 10 m

untere Abdichtung Profilfüller

Optionale Artikel

☐ Tritthilfe

☒ Eckbleche

☒ Kompriband

☐ Hammer für Perform

Ok

A portrait installation of the modules only permits the use of the one portrait adapter. For a landscape installation of the modules there are additional options available:

- Top adapter row: short
- Middle adapter row: short or long
- Lower adapter row: short or intermediate

In addition, the type of the top, lower and lateral flashings and sealings can be selected as well as additional features and optional components.

Top flashing:

- None
- Top flashing-piece corrugated metal sheet, flattened, 2,05 m

Top sealing:

- None
- Tree-foam profile filler
- Triangular foam profile filler

Corrugated metal sheet:

- Corrugated metal sheet with anti condensation fleece

Lateral flashing on left and right:

- None
- Lateral flashing, corrugated and upstand

Lateral sealing:

- None
- Compression strip
- Triangular foam profile filler

Lower flashing:

- None
- Lead strip 250 mm wide, roll of 8,25 m
- Lead strip 450 mm wide, roll of 4,40 m
- MetallRoll 320 mm wide, roll of 10 m
- Perform 465 mm wide, red, roll of 4 m
- Perform 465 mm wide, black, roll of 4 m
- Perform 465 mm wide, grey, roll of 4 m
- Perform 465 mm wide, brown, roll of 4 m

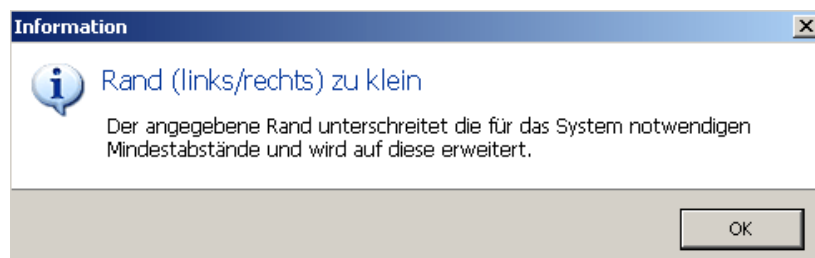
Lower sealing:

- Profile filler
- Comb for insect protection

Optional components are:

- Step
- Corner flashings
- Compression strip
- Hammer for Perform

To ensure the water tightness of the connections of the Theta to the rest of the roof, three roof tile rows (about 1.20 m) are included above and below the Theta as a distance to the roof edge.



One lateral tile row is scheduled as a minimum distance. A notice appears and the planning is adjusted accordingly. The possibilities of modifying the arrangement of the modules and the planning correspond to the procedure of the Alpha.

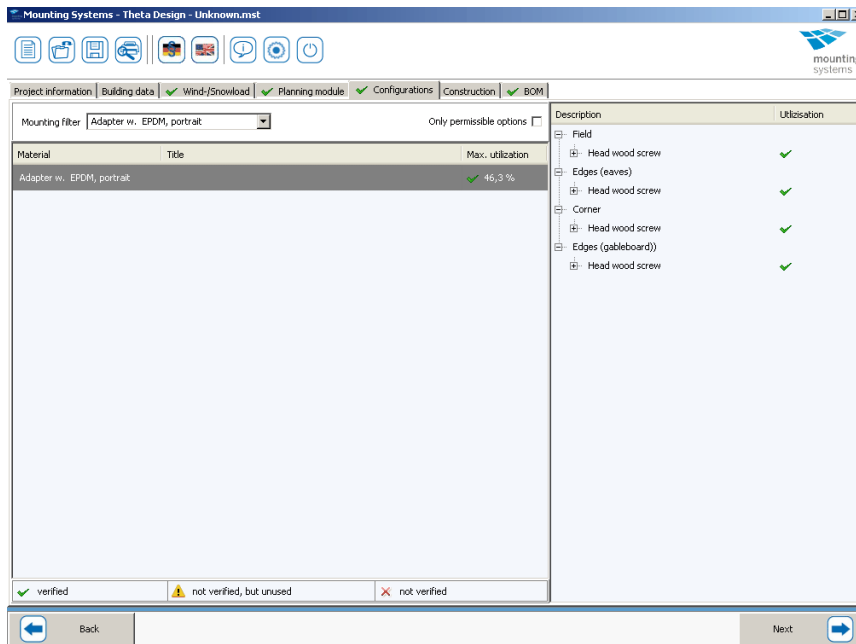
Using the standard components and materials, only rectangular module configurations with the described edge distances are possible.

Different configurations are possible but require an individual planning. Please do not hesitate to contact the Product team of Mounting Systems GmbH for assistance.

4.1 Selection of the configuration

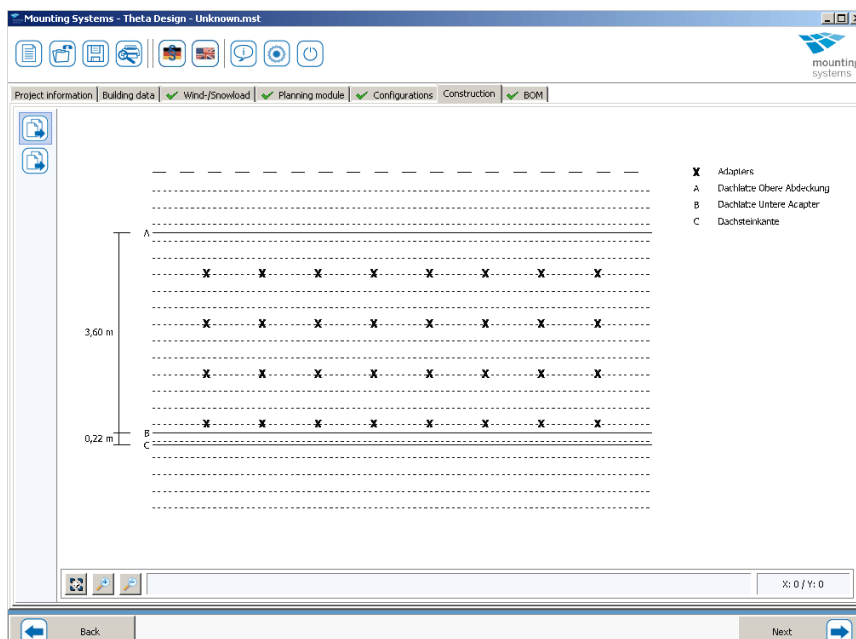
The static proof is the same for all adapters.

By selection of the adapter in the left column, it is possible to indicate detailed proof results in the right column.

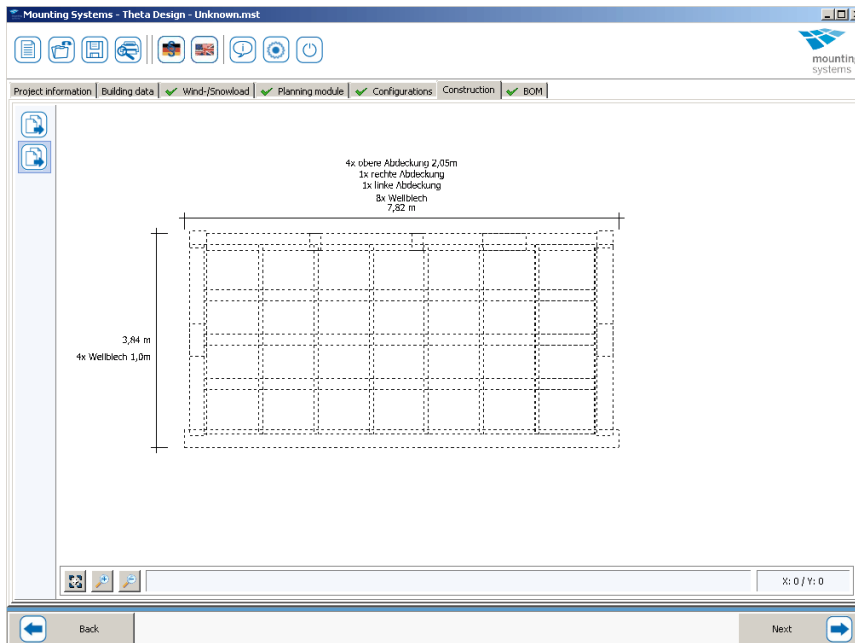


4.2 Construction view

Similar to the Alpha, the selected construction is shown with all required components and materials. Furthermore, the roof battens which are additionally required for the planning are illustrated and dimensioned.

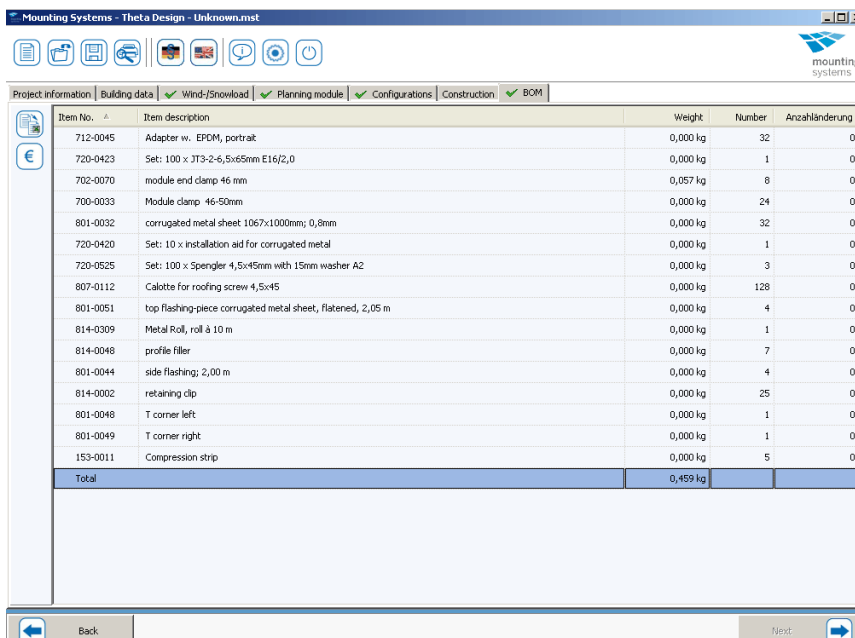


In an additional illustration the laying of the corrugated metal sheets is demonstrated.



4.3 Bill of materials

The BOM corresponds to the Alpha list with the following functions: export as an Excel file, import of a price list as well as the indication of an individual discount rate.



Item No.	Item description	Weight	Number	Anzahländerung
712-0045	Adapter w. EPDM, portrakt	0,000 kg	32	0
720-0423	Set: 100 x 373-2-6,5x65mm E16/2,0	0,000 kg	1	0
702-0070	module end clamp 46 mm	0,057 kg	8	0
700-0033	Module clamp 46-50mm	0,000 kg	24	0
801-0032	corrugated metal sheet 1067x1000mm; 0,8mm	0,000 kg	32	0
720-0420	Set: 10 x installation aid for corrugated metal	0,000 kg	1	0
720-0525	Set: 100 x Spengler 4,5x45mm with 15mm washer A2	0,000 kg	3	0
807-0112	Calotte for roofing screw 4,5x45	0,000 kg	128	0
801-0051	top flashing-piece corrugated metal sheet, flatened, 2,05 m	0,000 kg	4	0
814-0309	Metal Roll, roll à 10 m	0,000 kg	1	0
814-0048	profile filler	0,000 kg	7	0
801-0044	side flashing; 2,00 m	0,000 kg	4	0
814-0002	retaining clip	0,000 kg	25	0
801-0048	T corner left	0,000 kg	1	0
801-0049	T corner right	0,000 kg	1	0
153-0011	Compression strip	0,000 kg	5	0
Total		0,459 kg		

In the column "change of amount" additional articles can easily be entered.

5 Conclusion



The planning completed, the tool provides the opportunity to create a PDF file containing a detailed summary of the results or to print the evaluation directly.

The PDF/printout includes:

- Summary of the building data
- Exact listing of the scheduled loads and load case combinations
- Representation of the planning
- Static characteristics of the selected fasteners/adapters and the rail
- Information about the extent of utilisation of the system in the different roof areas
- Complete bill of materials
- Graphic planning documentation:

Alpha:

- Arrangement of fasteners (roof hooks), splices
- Working plan of all required rail components

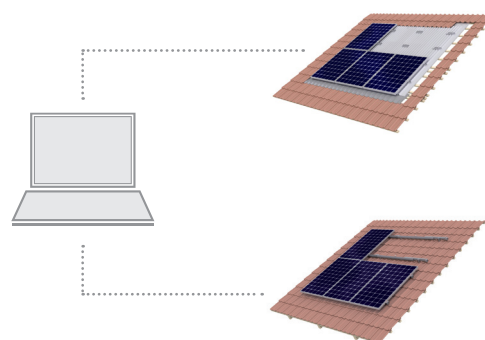
Theta:

- Positioning of the adapters
- Working plan of the metal sheets



**mounting
systems**

the base for solar power



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