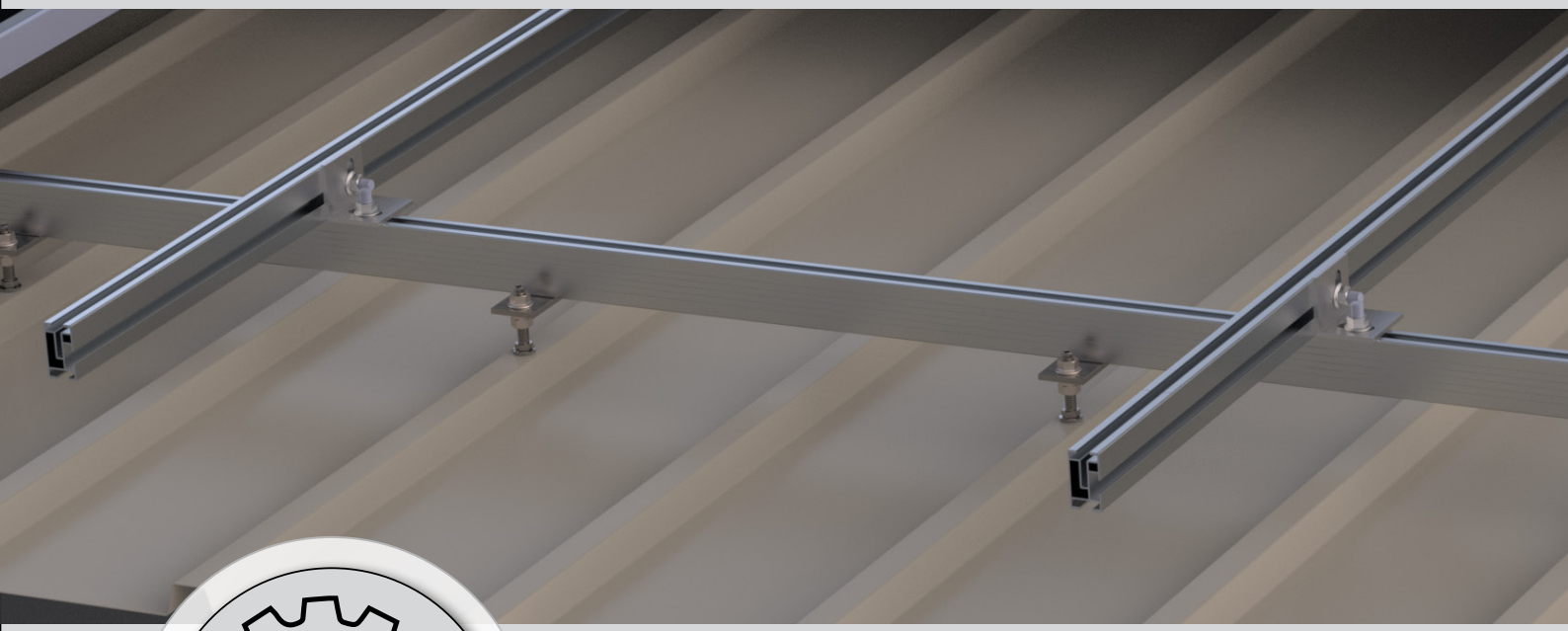
Installation Manual

BISOL EasyMount™

Robust BOLT

Solar company!



The sunny side of life!

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GENERAL REQUIREMENTS

The sole purpose of this installation manual is to demonstrate the installation of BISOL EasyMount™ mounting systems, therefore PV module installation guidelines and related safety precautions are not a part of this manual. For guidelines on how to safely and effectively install BISOL PV modules please refer to the PV installation manual, published on www.bisol.com.

PV design:
The installer carries all responsibility for PV system dimensioning, static calculations of the roof, weather and environmental conditions at location, proper selection and use of components and their mounting as well as the mechanical durability and water tightness of the installed interface connections at the building surface. All safety warnings outlined in this manual are to be closely considered.

Roof:
The continual pressure loading capacity (point load) of the insulation and the roofing material must be checked thoroughly and found to be sound before installation. If the compression strength of the roof surface is not sufficient, extra support surfaces must be added.
The roof must be in good condition and strong enough to bear the weight of the solar panels, including associated materials, ballast, wind and snow load. The customer is responsible to check the stability of the roof structure and, when necessary, employ a builder to correct it.
The customer is responsible to check the compatibility of EasyMount™ Quick RAIL mounting materials with local climate conditions (salt, acidity, sulphates etc.) and roof materials. The types of materials used in the Quick RAIL are stated in the product datasheets.

Installation work:
All installation work must be carried out by a specialised company with qualified personnel. Strict safety and accident prevention measures as defined by relevant regulations must be carried out and should be known by the installer. Appropriate protective equipment for work at height must be used throughout the installation process.

Electrical work:
Although electrical connections are strictly not part of this manual, some safety warnings are in place. PV modules and mounting structure must be grounded even when the site is already equipped with lightning protection. PV modules are under high voltage and generate electrical current even in low light conditions. When modules are connected in series, life-threatening voltage is present at the end of the terminals. Open circuited branches can cause electric arc when in touch with conductive surface. Electrical installations must not be carried out in case of dampness.

COMPONENTS OVERVIEW

	Component	ID Code	Component description
1		SEK-48_27_5400	EasyMount™ 48 x 27 x 5400 mm
2		SEK-48_27_2200	EasyMount™ 48 x 27 x 2200 mm
3		SEK-48_27_2200_B	EasyMount™ 48 x 27 x 2200 mm, Black
4		SEKP-EMC48	Connector set for EasyMount™ 48 x 27 mm
5		SEKP-EMC48_M	Connector set for EasyMount 48 x 27, Magnelis
6		EM-CLA.EA35S.2	Clamp end EasyMount™ 35 mm Direct, assembled
7		EM-CLA.MA35S.2	Clamp middle EasyMount™ 35 mm Direct, assembled
8		SEK-HHS_10_25	Screw hammerhead M10 x 25 A2-70
9		SEK-DIN6923_10	Nut M10 flange A2-70
10		SEK-HST80_13650	Hanger bolt, steel, fi 8.0 x 80/50 mm, trapezoid
11		SEK-HST80_15650	Hanger bolt, steel, fi 8.0 x 100/50 mm, trapezoid
12		SEK-HST80_20170	Hanger bolt, steel, fi 8.0 x 125/70 mm, trapezoid
13		SEK-HW100_200	Hanger bolt, wood, fi 10 x 200 mm, preassembled
14		SEK-HW100_250	Hanger bolt, wood, fi 10 x 250 mm, preassembled
15		SEK-HW100_300	Hanger bolt, wood, fi 10 x 300 mm, preassembled
16		SEK-HW120_200	Hanger bolt, wood, fi 12 x 200 mm, preassembled
17		SEK-HW120_300	Hanger bolt, wood, fi 12 x 300 mm, preassembled
18		SEK-EMLC	Connector L EasyMount™*

*For profile mesh.

TOOLS REQUIRED

Measuring tool

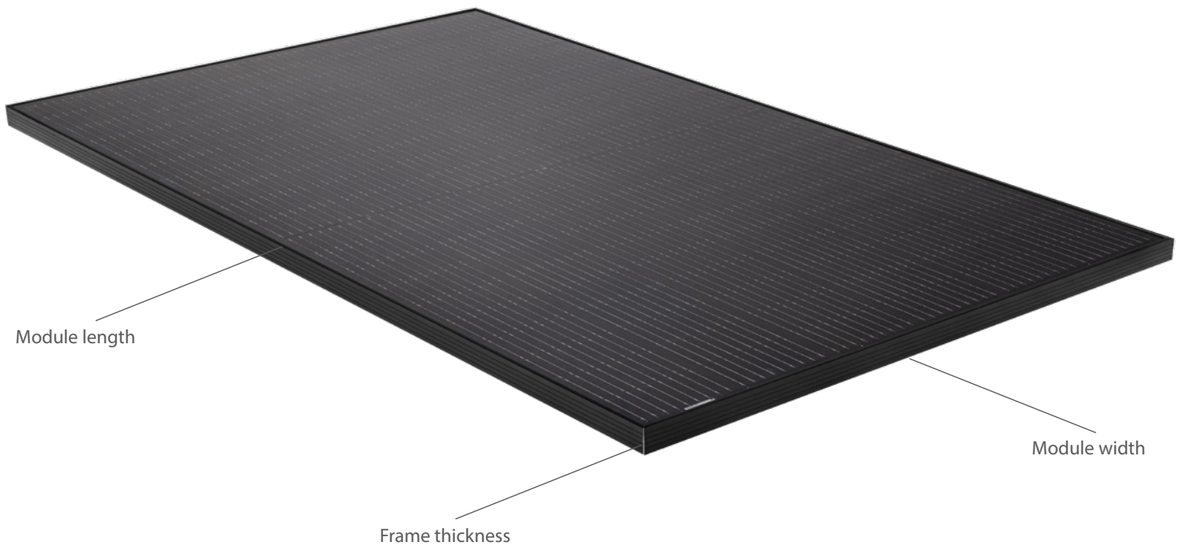
Electrical drill with drill bits

Open-end wrench

Bolt socket

PLANNING THE PV LAYOUT

Project Design



System Design Strength

Fastening screws are made of stainless steel. For the corrosion protection, the rules given in EN 1090-2:2008, EN 1993-1-3:2006 and EN 1993-1-4:2006 are taken into account.

Choose the Table 1 or 2 according to the specifics of your applications and the material your trapezoidal metal sheet roof is made of:

- for steel min. S280GD – EN 10346, choose Table 1,
- for aluminium $f_{u,min.}$ 165 N/mm^2, choose Table 2.

Design resistances given in Tables 1 and 2 are valid for **single screw** per fastening point and are determined according to ETA-10/0200. Design resistances for fastening points **with 4 screws** can be calculated by multiplying the values in Tables 1 or 2 with the number of screws. Together with the above, **the following formulas** are used to calculate the values of design resistance:

1. The recommended partial safety factor $\gamma_M = 1.33$ is used in order to determine the corresponding design resistances, provided no values are given in national regulations of the member state in which the fastening screws are used or in the respective National Annex to Eurocode 3.

$$N_{Rd} = \frac{N_{Rk}}{\gamma_M} \qquad V_{Rd} = \frac{V_{Rk}}{\gamma_M}$$

2. In case of combined tension and shear forces (windy and snowy weather conditions), the linear interaction formula according to EN 1993-1-3:2006, section 8.3 (8) is taken into account.

$$\frac{N_{Sd}}{N_{Rd}} + \frac{V_{Sd}}{V_{Rd}} \leq 1.0$$

Table 1

Steel trapezoidal metal sheet (min. S280GD)							
Trapezoidal metal sheet thickness [mm]	0.40	0.50	0.55	0.60	0.75	0.88	1.00
Pull-out design resistance [N_{Rk} in kN]	0.60	0.82	0.94	1.14	1.44	1.46	1.46
Shear design resistance [V_{Rk} in kN]	0.96	1.56	1.56	1.56	1.56	1.56	1.56

Table 2

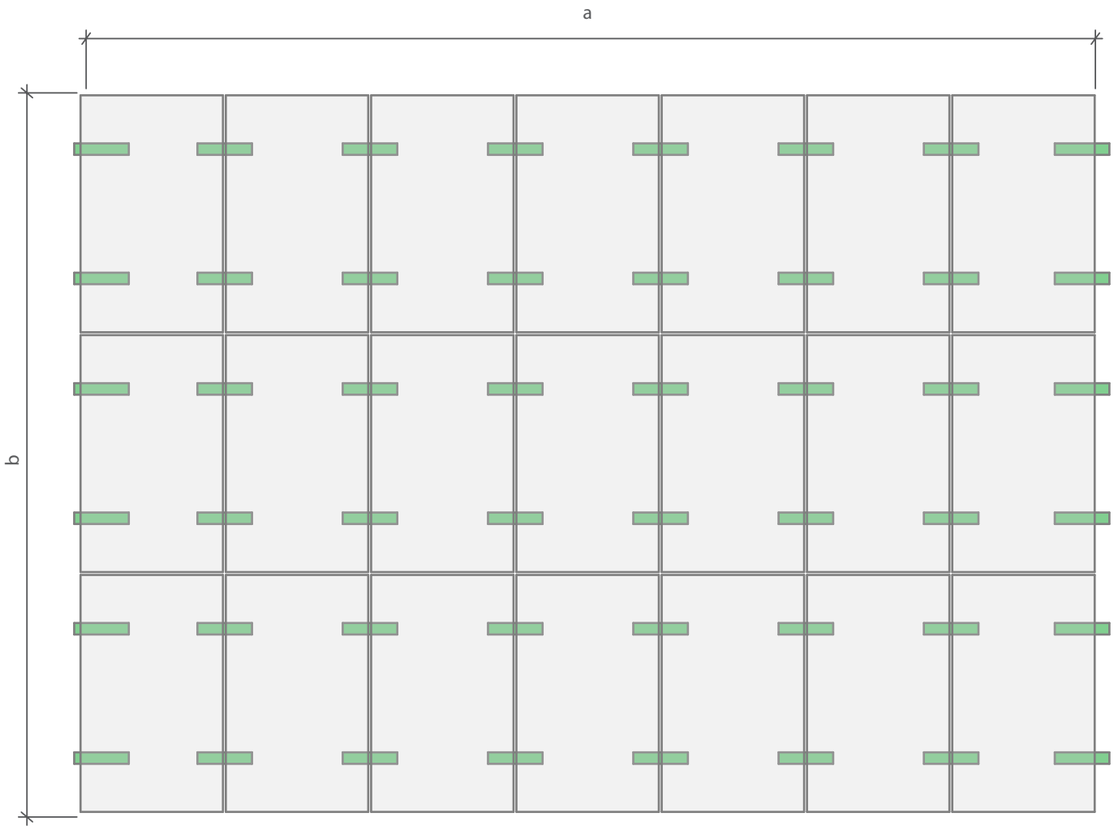
Aluminium trapezoidal metal sheet ($R_{m,min.}$ = 165 N/mm^2)							
Trapezoidal metal sheet thickness [mm]	0.50	0.60	0.70	0.80	0.90	1.00	1.20
Pull-out design resistance [N_{Rk} in kN]	0.35	0.45	0.58	0.69	0.80	0.91	1.13
Shear design resistance [V_{Rk} in kN]	0.62	0.71	0.79	0.88	1.04	1.19	1.24

Designing the PV Module Layout

Portrait Orientation

Minimal horizontal block space required:
a = (module width + 20 mm) * number of modules in one row + 100 mm (a_{max} = 20 m)

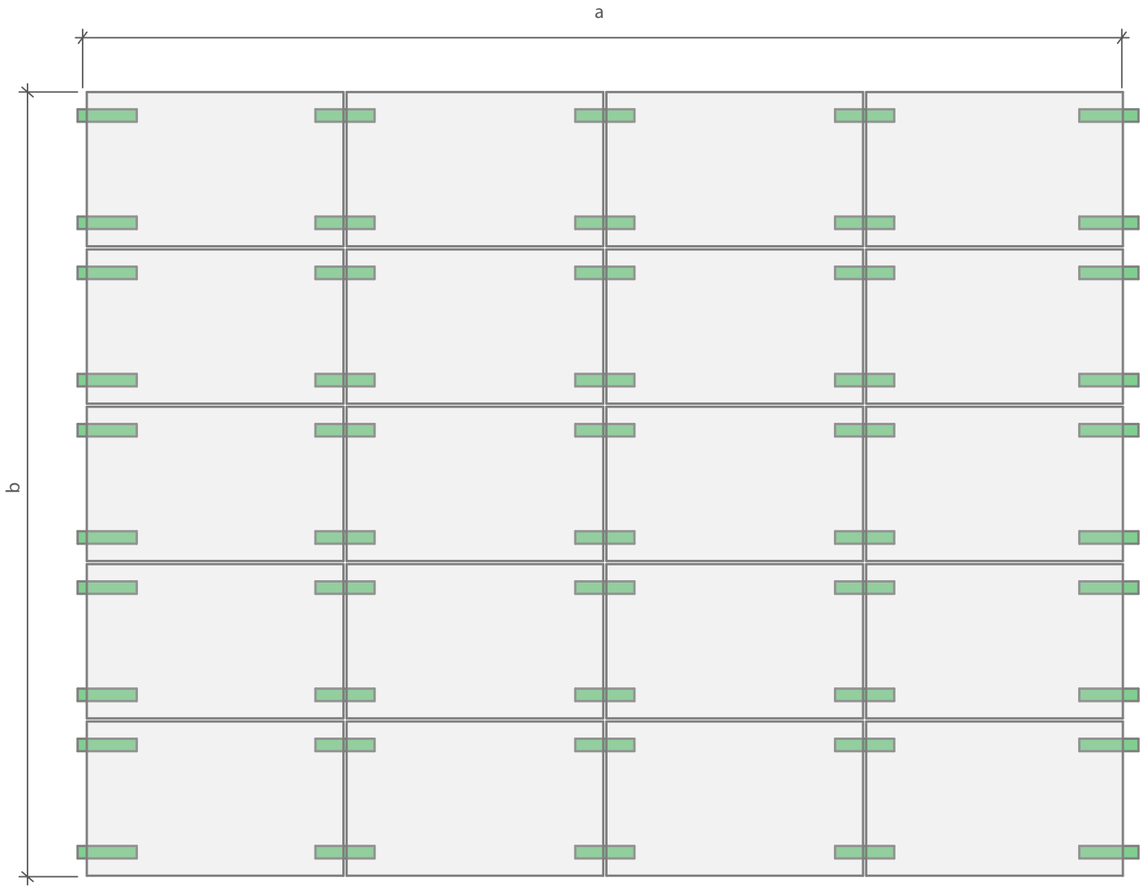
Minimal vertical block space required:
b = (module length + 20 mm) * number of modules in one column + 100 mm (b_{max} = 20 m)



Landscape Orientation

Minimal horizontal block space required:
a = (module length + 20 mm) * number of modules in one row + 100 mm (a_{max} = 20 m)

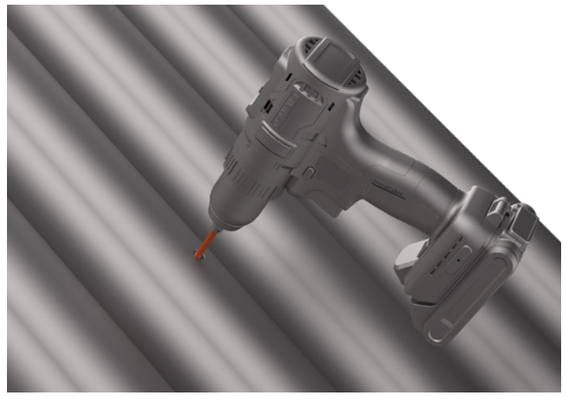
Minimal vertical block space required:
a = (module width + 20 mm) * number of modules in one column + 100 mm (b_{max} = 20 m)



ASSEMBLY

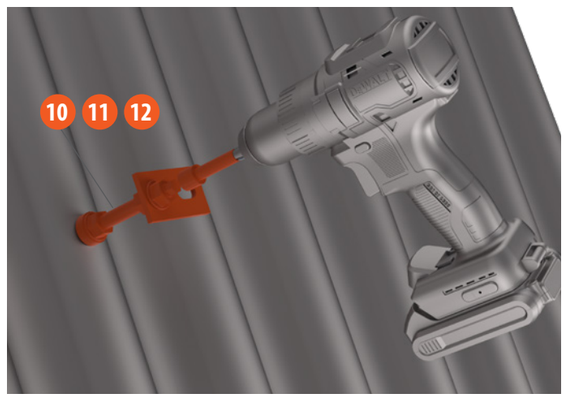
STEP 1: Drilling Holes

Drill the holes through the roof into the roof structure using electrical drill.



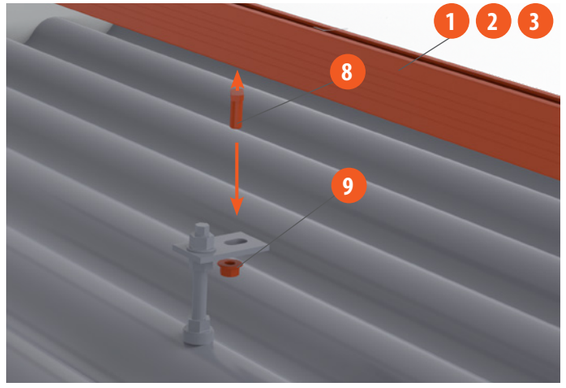
STEP 2: Screwing Bolts into the Roof Structure

Mount the hanger bolts with electrical drill into the holes. Set the height of the mounting plates on the hanger bolt between 10 and 50 mm above the roof surface. Fix the mounting plates using an open-end wrench.



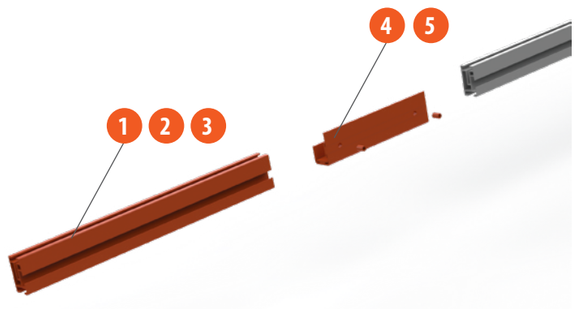
STEP 3: Mounting EasyMount™ 48x27 Profiles

Fix the EasyMount™ 48x27 profiles with hammerhead screws M10 x 25 A2-70 on mounting plates. The height of the mounting plates is still adjustable at this point. The distance between bolt axis and edge of EasyMount™ 48x27 profile should be as minimal as possible and not bigger than 30 mm.



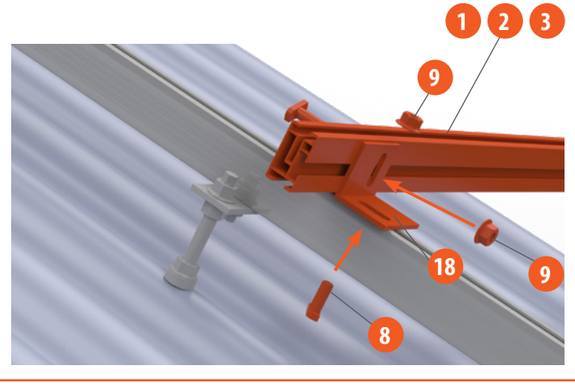
STEP 4: Extending Profiles (Optional)

If needed, extend the rails by using the connector set for EasyMountTM Rail 80. Mount the connector onto the EasyMountTM ALU Rail 80 and fix it with the screws. Connector set for EasyMountTM Rail 80 is delivered pre-assembled with two sets of screws.

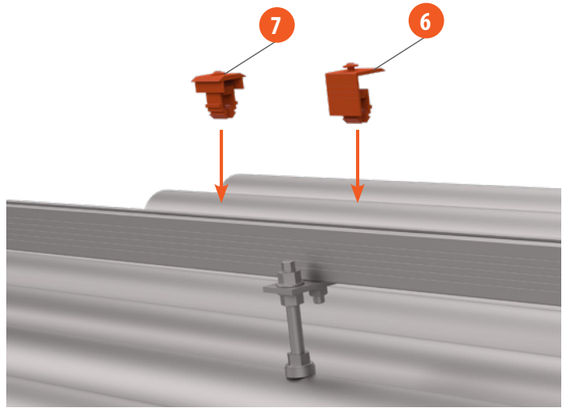


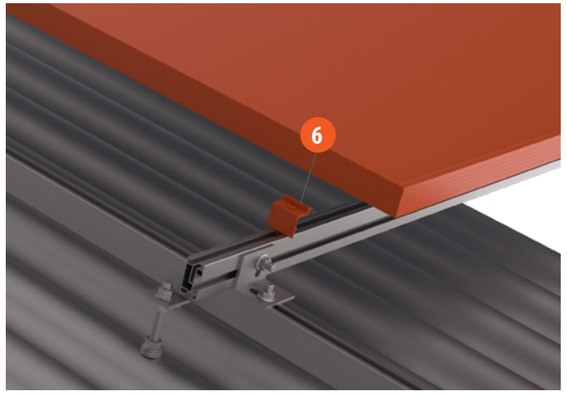
STEP 5: Mounting Cross Profiles (Optional)

For portrait orientation of the modules, it is necessary to mount additional cross (horizontally placed) EasyMount™ 48x27 profiles using L-profiles.



STEP 6: Attaching PV Modules with Clamps





Insert the lower part of the end or middle clamp into the top slot of the EasyMount™ 48 profile and rotate by 90°. Lay the PV modules on the profiles and fix them with the clamps using electrical drill and bolt socket applying a torque of maximum 10 Nm. Each module has to be fixed by four clamps. The end clamps are used at the ends of each row, while the middle clamps are used to fixate two adjoining modules in the same row. All clamps are delivered preassembled.

TERMS AND CONDITIONS

BISOL Production Ltd. as manufacturer of BISOL EasyMount™ mounting solutions in connection with their installation takes no responsibility for the design solutions of individual designers, also assumes no responsibility in connection with the installation of BISOL EasyMount™ mounting solutions by a third party and contrary to these instructions, as well as for the choice of mounting structure in this regard.

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Failure to follow the guidelines set out in this document and / or in the construction plan may invalidate all claims for product guarantees and liabilities.

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