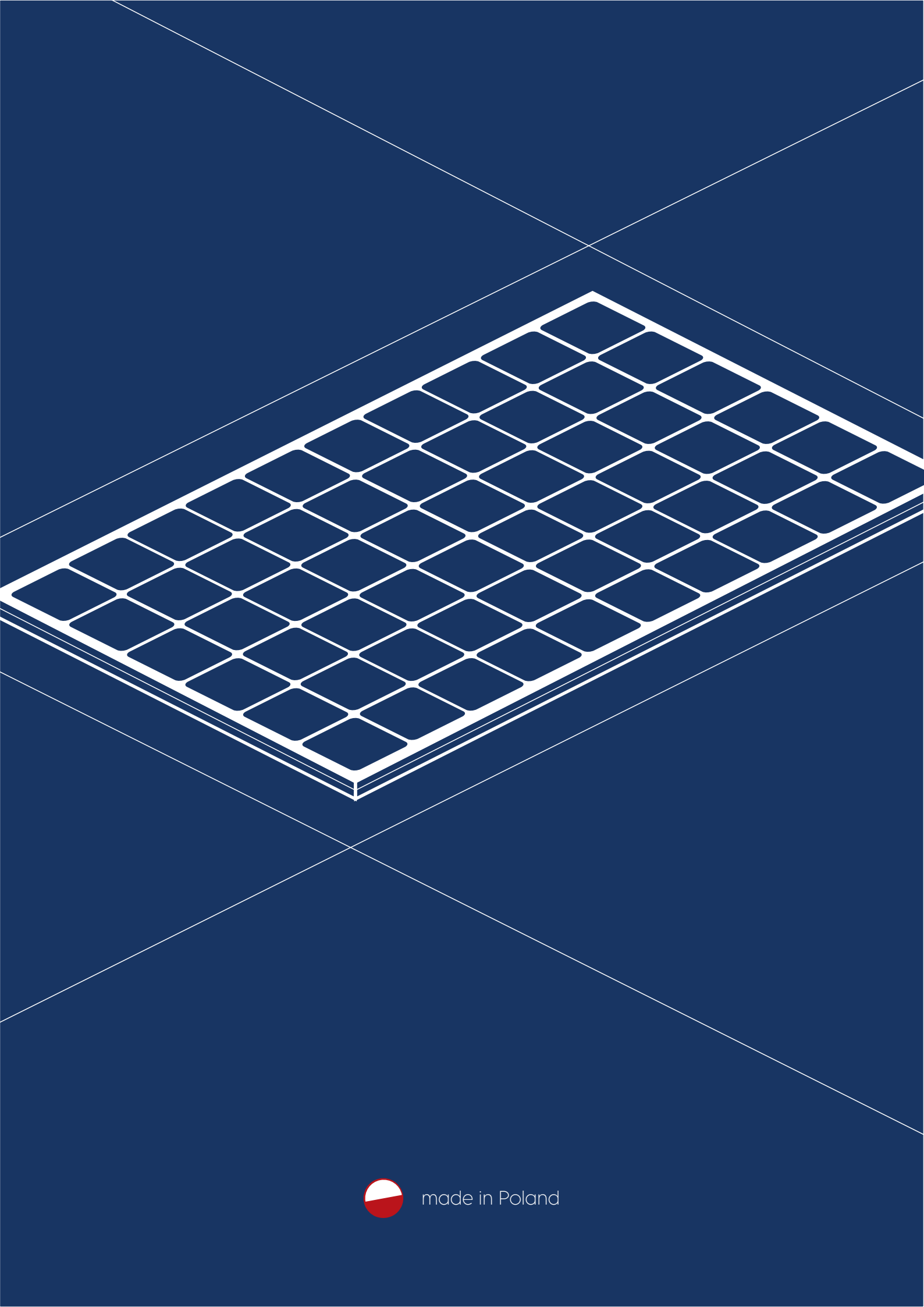
Helioenergia

Guide to custom PV

helioenergia.com



made in Poland

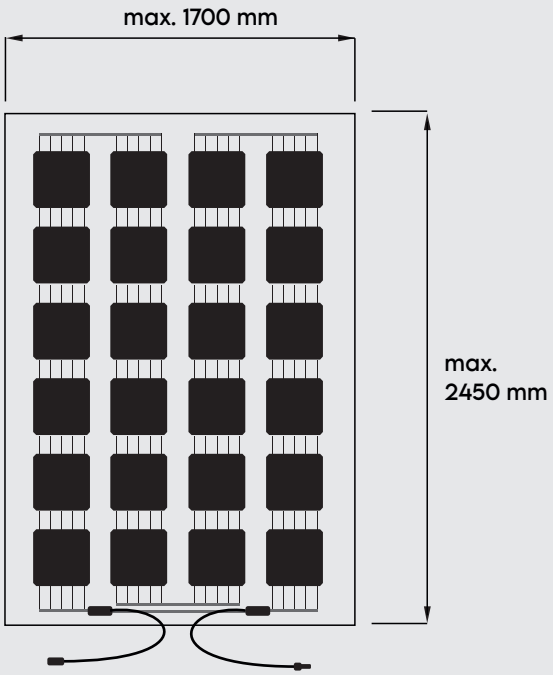
Module sizes

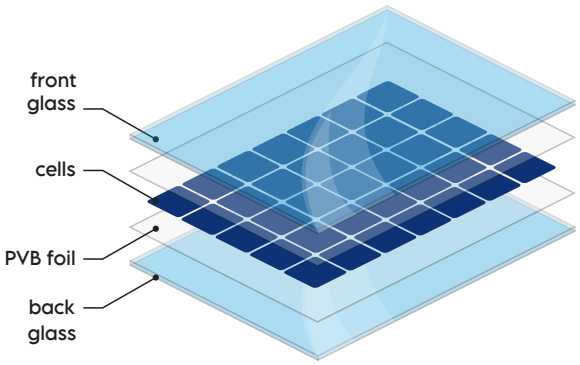
Helio GG series PV modules are custom-made in a glass-glass architecture, allowing them to be perfectly suited for elements of both small and large architecture.

These modules can be used independently as cladding elements for **facades or balustrades**.

Helio GG series modules can also be used as a **layer of insulated glass**.

Their maximum size is **2450 x 1700 mm**.





Helio GG modules have are divided into two main variants:

PV GG 44.6

- power - up to 180 W_p/m^2
- mono cells 5 - 10 busbars
- weight 22,5 kg/m^2
- 10.5 mm thickness

PV GG 66.6

- power - up to 180 W_p/m^2
- mono cells 5 - 10 busbars
- weight 32,5 kg/m^2
- 14.5 mm thickness

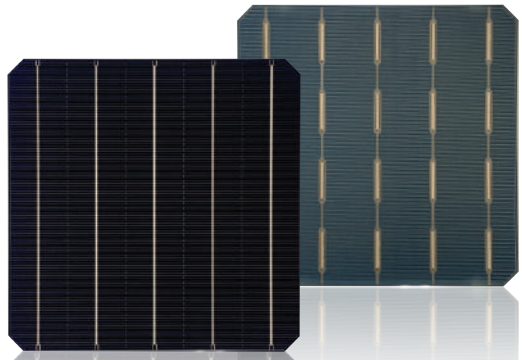
Modules and fills Helio PV GG

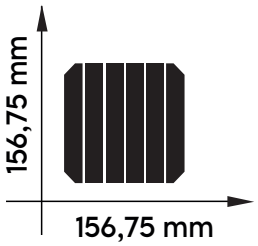
- frameless module
- mounted with glass mounting systems
- possbility of mounting the junction box on the edge
- cells arrangement tailored to project specification
- possibility of making the module semitransparent
- BIPV module
- electrical parameters (current - voltage) configured to order
- possibility of making a bifacial module

Solar cells

The Helio GG series photovoltaic modules primarily use three sizes of silicon cells. For modules with two active sides, bifacial cells are used.

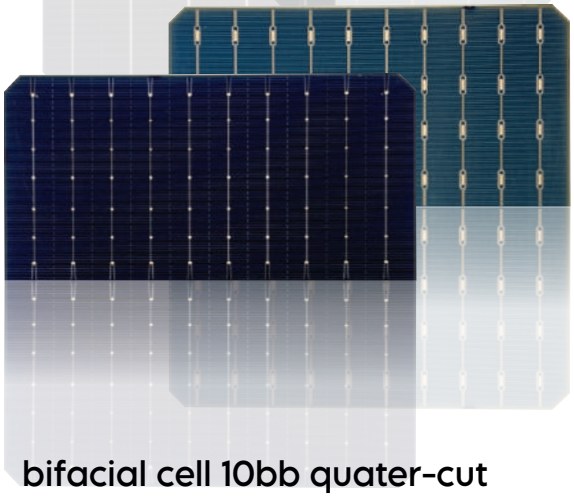
	size	1 cell power
bifacial cell 5BB	**M2**	

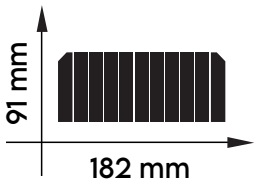




~ 5.14 Wp
200W/m²

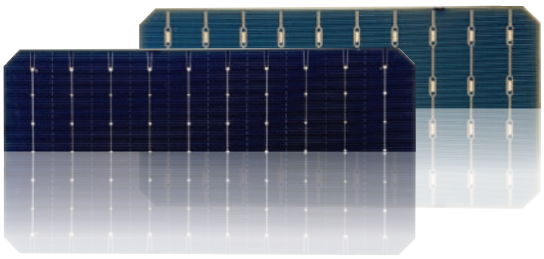
bifacial cell 10bb half-cut — **M10-hc**

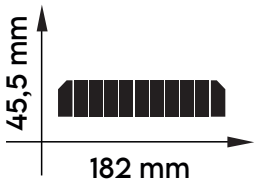




~ 3,68 Wp
210W/m²

bifacial cell 10bb quater-cut — **M10-qc**



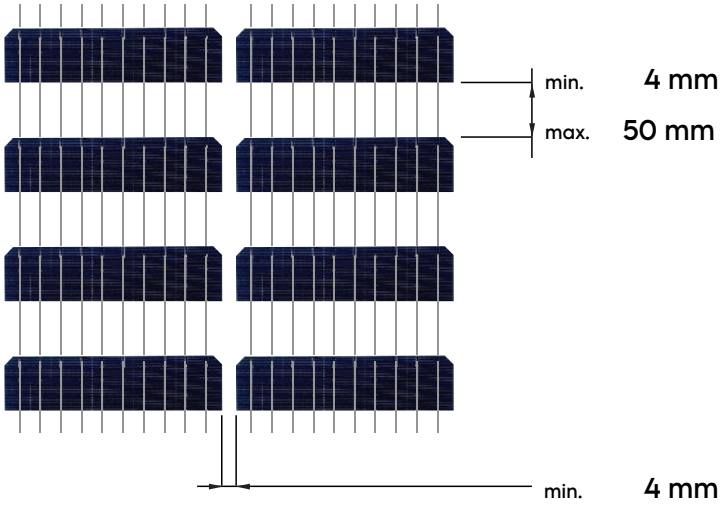


~ 1,84 Wp
210W/m²

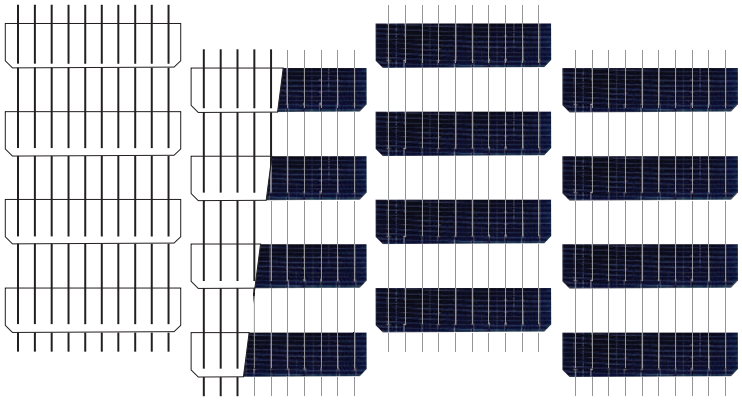
Each cell is characterized by a minimum efficiency of 20.0%.
The efficiency of the finished module, as well as its current-voltage parameters, depends on the number and arrangement of cells in the designed PV module.

Cells arrangement

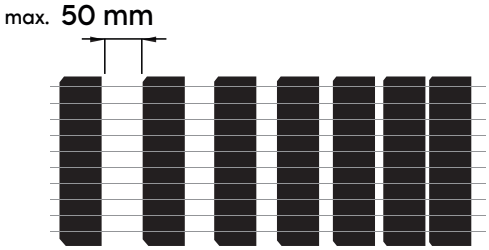
The cell layout can be individually designed. Depending on the selected cell size, different levels of transparency can be achieved. The minimum and maximum distances between cells and rows are shown below.

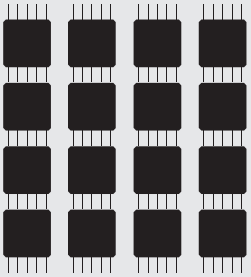


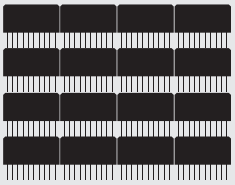
Individual rows of cells can be shifted relative to each other to create a checkerboard pattern.

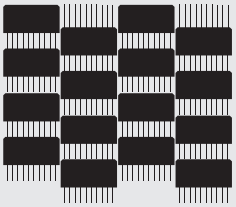


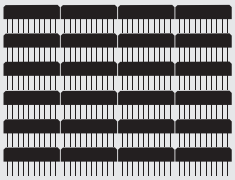
It is also possible to use variable widths between cells and rows; however, the maximum gap between cells should not exceed 50 mm.

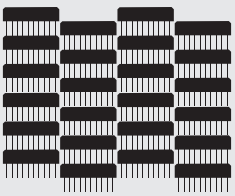


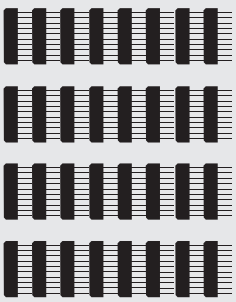

W1


W2

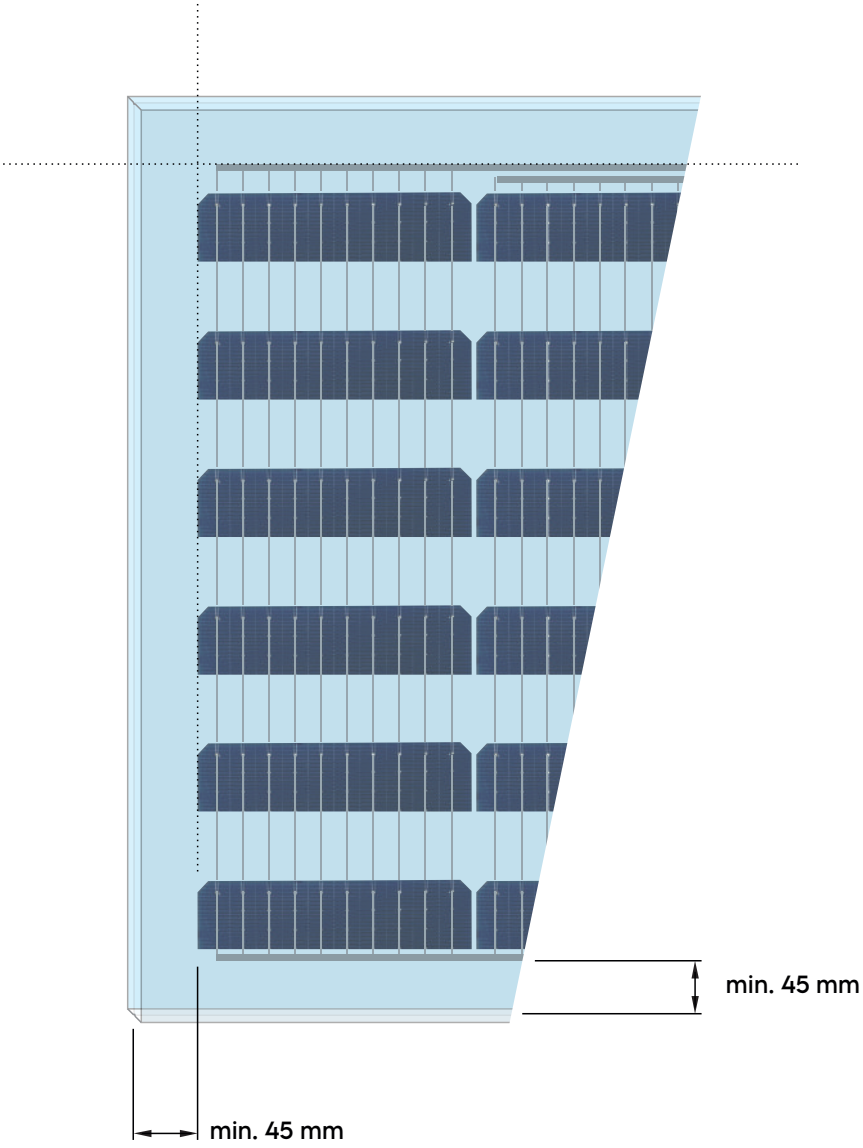

W3


W4

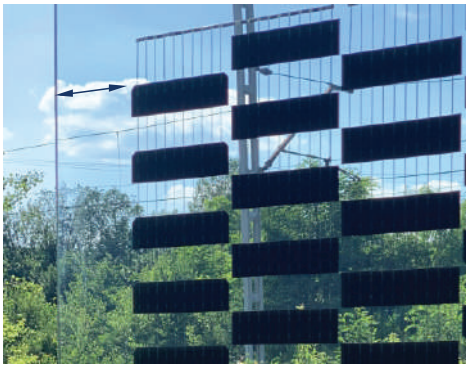

W5


W6

Margins



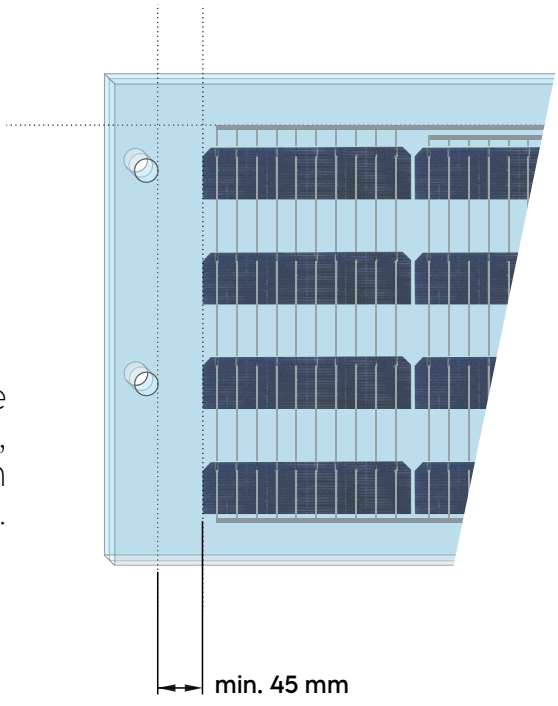
To ensure high durability of the modules, the solar cells and connecting tapes should be kept at a distance from the edge of the glass.



The distance from the edge of the glass to the busbar should be no less than 45 mm.

The distance from the edge of the glass to the cell should be no less than 45 mm.

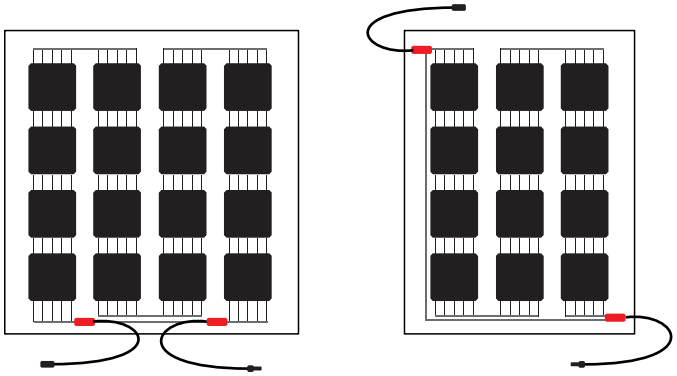
In the case of needing to make additional openings in the glass, the margin is measured from the edge of the opening.

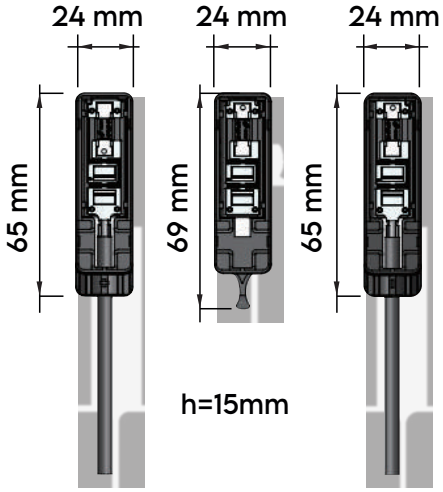


Box arrangement

junction boxes

Depending on the designed number of cell strings, it is possible to place the junction boxes adjacent to each other or at opposite ends of the module.



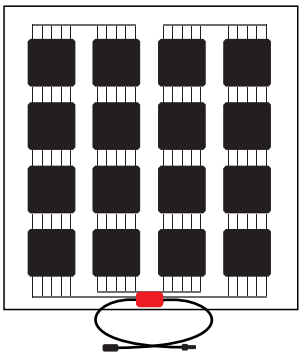


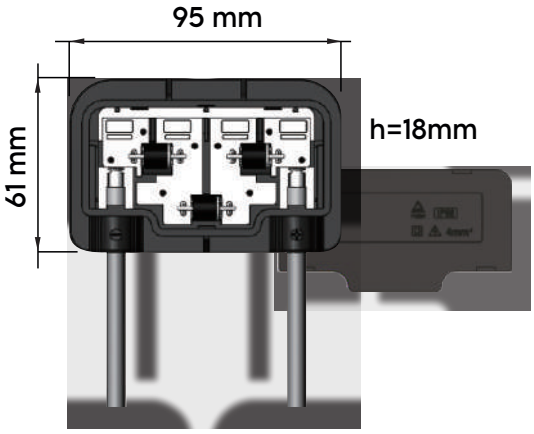
working temp.	-40 + 85 °C
max. voltage	1000V/1500V
IP standard	IP68
wires	4mm²
connectors	MC4

Junction boxes also play an additional role in protecting the electrical system in case of partial shading of the module. Therefore, their placement and connections are thoroughly checked each time.

single box

In cases where the small size of the junction box is not crucial, a single larger junction box can be used to handle the entire circuit.



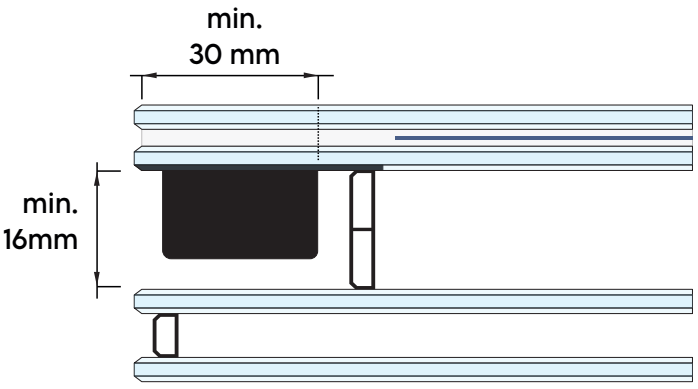


working temp.	-40 + 85 °C
max. voltage	1000V/1500V
IP standard	IP68
wires	4mm²
connectors	MC4

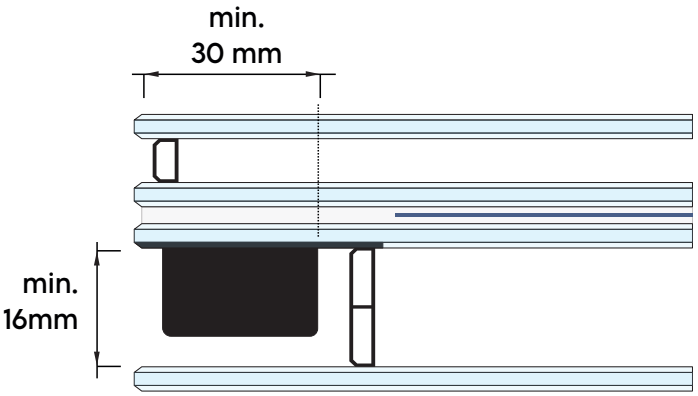
The placement of junction boxes and the tapes connecting individual rows of cells significantly affect the aesthetics of the module.
Therefore, these elements should be considered during the design of the PV module/insert.

Layered glass

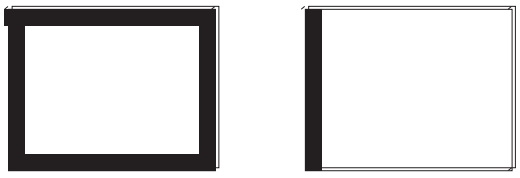
Helio GG modules can be used as a layer of insulated glass. In the case of lamination, the placement of junction boxes in the peripheral zone of the glass must be considered.



The modules can be used both as a front layer and an internal layer.

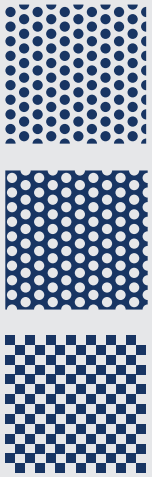


To conceal the junction boxes, it is recommended to use masking around the perimeter of the glass or on the margin where the box is located.



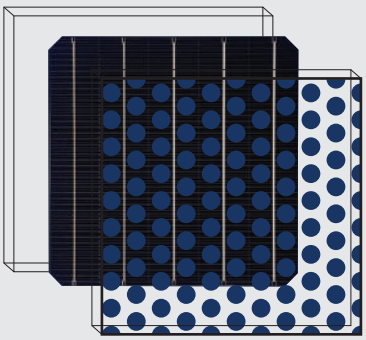
Depending on the application, masking can be achieved through glass coating or ceramic printing.

It is possible to create a pattern across the entire surface of the front glass, resulting in a glass panel with a unique design.



Such a pattern should be created using ceramic printing technology.

The resulting pattern will affect the final electrical parameters of the module: the drop in power and current. The decrease will be proportional to the level of shading of the cells by the pattern.



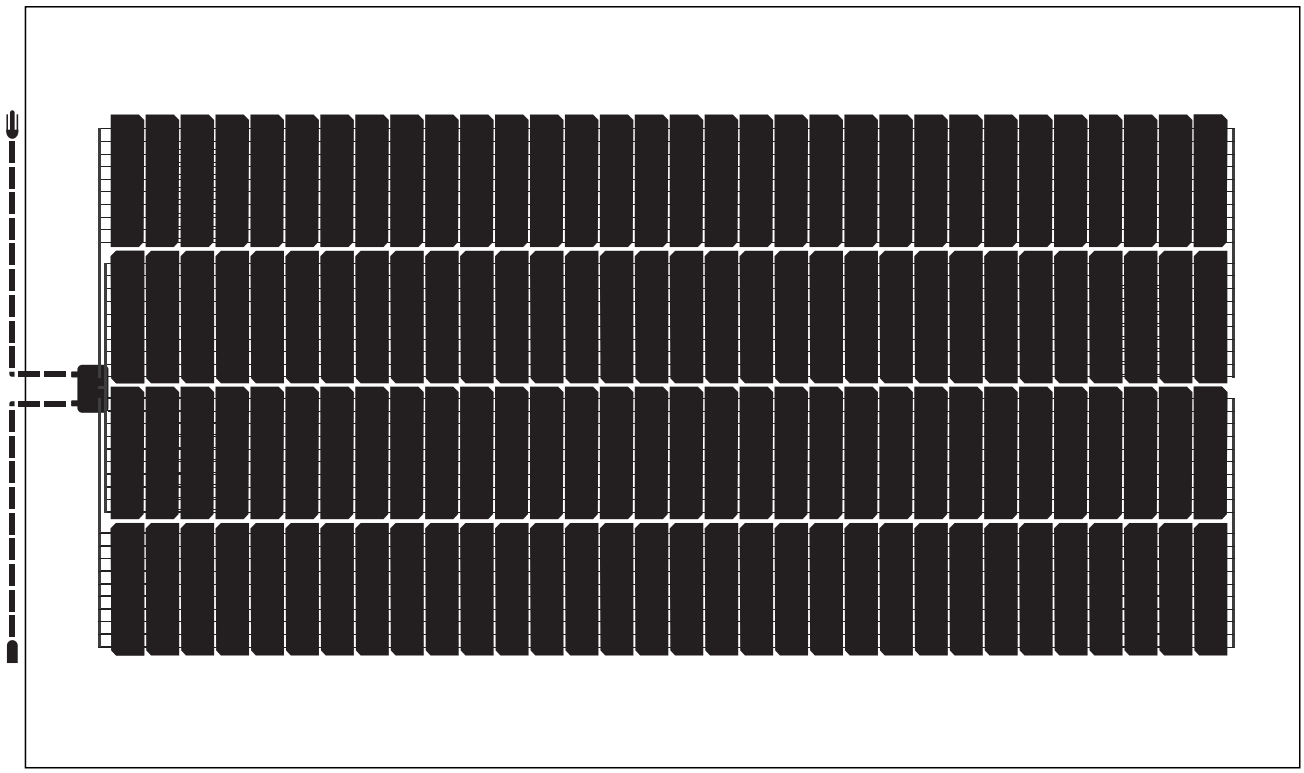
Example PV module

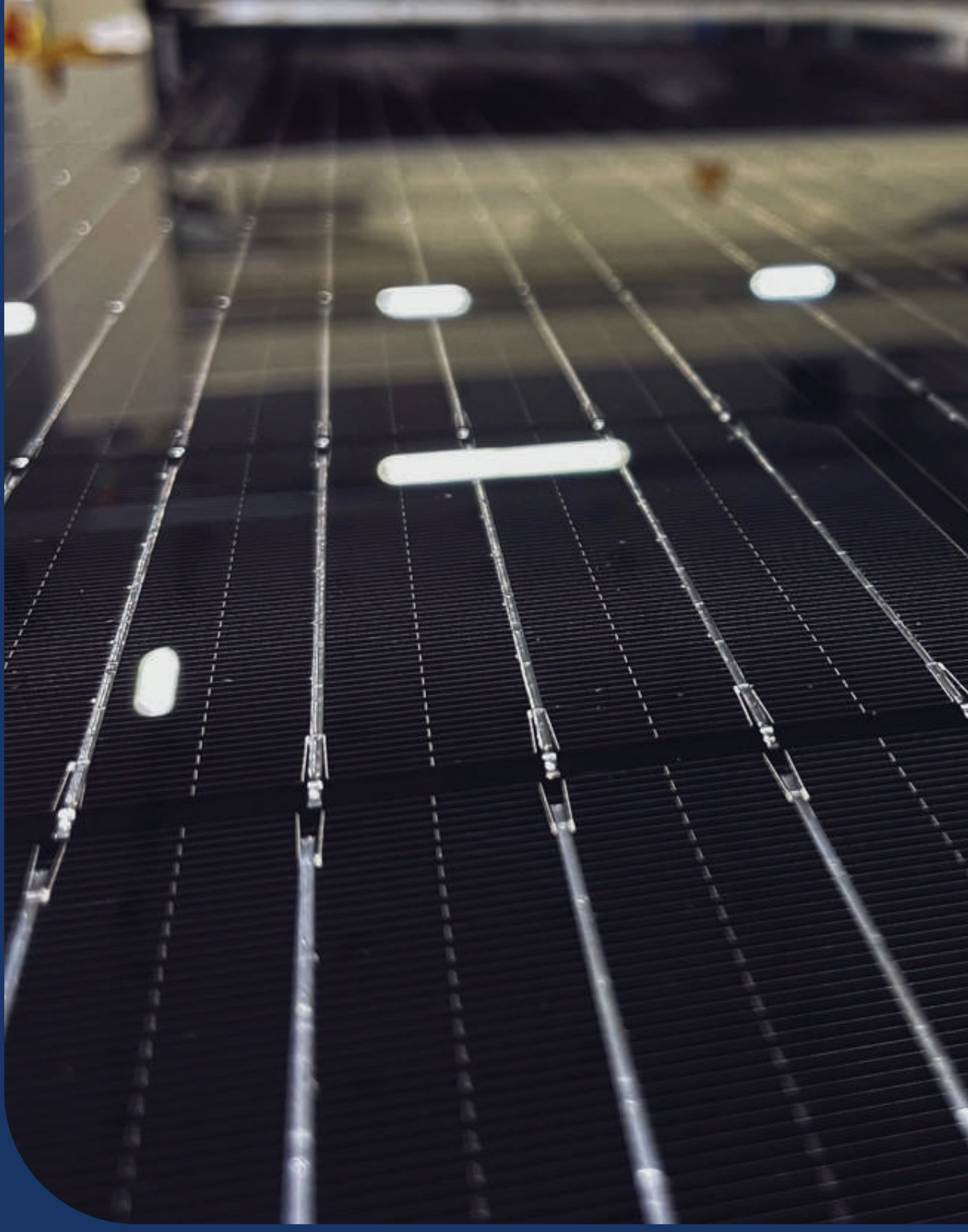
Full module M10-QC
1045 × 1750

Nominal power (rated power) (STC)	Pmmp	216	W
Voltage at maximum power point Umpp (STC)	Umpp	37.69	V
Current at maximum power point Impp (STC)	Impp	5.75	A
Open-circuit voltage Uoc (STC)	Uoc	44.52	V
Short-circuit current Isc (STC)	Isc	6.028	A

	PV GG 44.6		PV GG 66.6	
Dimensions H × W × depth	1045×1750×30	mm	1045×1750×34	mm
Mass	42.5	kg	60.5	kg
Laminate/glass thickness	4+4/10.5	mm	6+6/14.5	mm

Color	transparent		
Number of cells		128	szt.
Cell type		quarter-cut mono bifacial	
Number of busbars		10	
Connection	MC 4, three bypass diodes, IP 67 PV wire 4 mm²		
Temperature coefficient of current	α	0.06	%/°C
Temperature coefficient of voltage	β	-0.3	%/°C
"Temperature coefficient of power	γ	-0.39	%/°C
Maximum system voltage Umax	Umax	1000	V
Maximum permissible reverse current	Irev	16	A
Certificates	EN 14449:2005+AC: 2005, EN ISO 12543-2:2011 class 1/B/1 EN 12600: 2002		





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