

# Installation and operating Instructions

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## Introduction

Congratulations on purchasing your high-efficiency solar module from Meyer Burger Industries (MBI). Meyer Burger solar modules generate energy in a very sustainable and environmentally friendly way because energy generated in solar cells does not produce any greenhouse gases. MBI wants the manufacture of photovoltaic modules to be sustainable as well.

This is why MBI focused from the outset on high-quality materials, resource-efficient production processes, utmost recyclability within the closed circle economy, reliable and transparent supply chains, as well as optimized transportation routes, for example by rail. MBI's solar modules let you transform the sun's power into electrical energy in an environmentally friendly way, directly and without limitations, for several decades. Please read these instructions carefully and follow them to ensure that you get the most out of your MBI solar modules. Not following the instructions could lead to personal injury and property damage. These installation instructions describe how to install the MBI solar modules safely.

### General information

- Before installing the solar system, consult the applicable directives and licensing requirements from the competent local authorities and utility companies. You can only be sure of economic success once you have taken these requirements into consideration.

- Please follow all the necessary applicable safety instructions during setup and installation. The installer who sets up the system bears the responsibility.
- Keep the assembly instructions for the entire service life of the solar modules.
- Make sure that these assembly instructions are accessible to the operator at any time.
- Pass on these assembly instructions to any future owner or user of the solar panels.
- Pay attention to any other applicable documents.
- Remove the adhesive tape on the back that protects the cables and connectors before assembly.
- For more information, see our website:  
**[www.meyerburger.com](http://www.meyerburger.com)**

### Proper use

This manual is valid in Africa, Asia, Europe, Latin America as well as North and South America. The instructions provide information about safety when handling MBI's crystalline, high-performance solar modules and about their installation, assembly, wiring, maintenance and recycling.

### NOTE

**If the assembly instructions are not followed or changes are made to the module, the guarantee and warranty will lapse.**

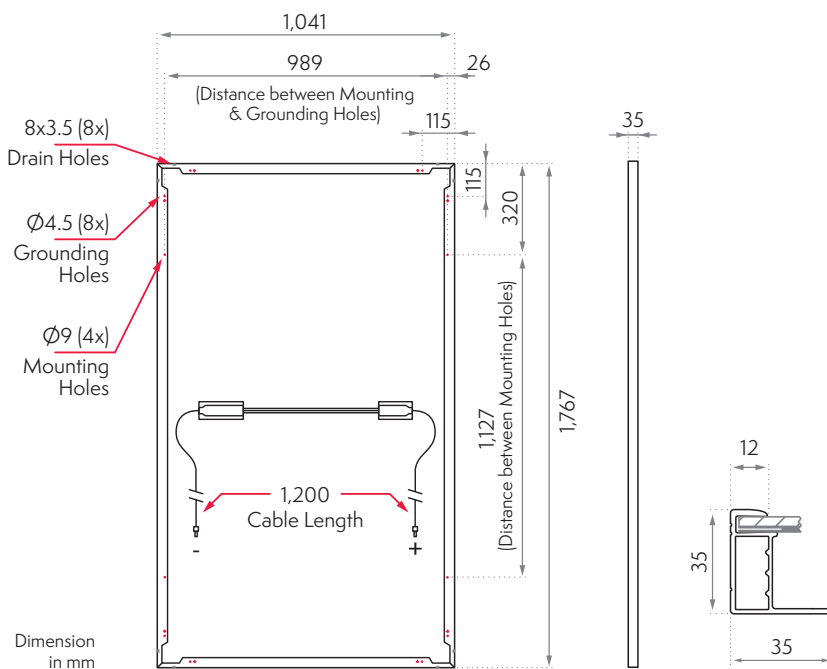
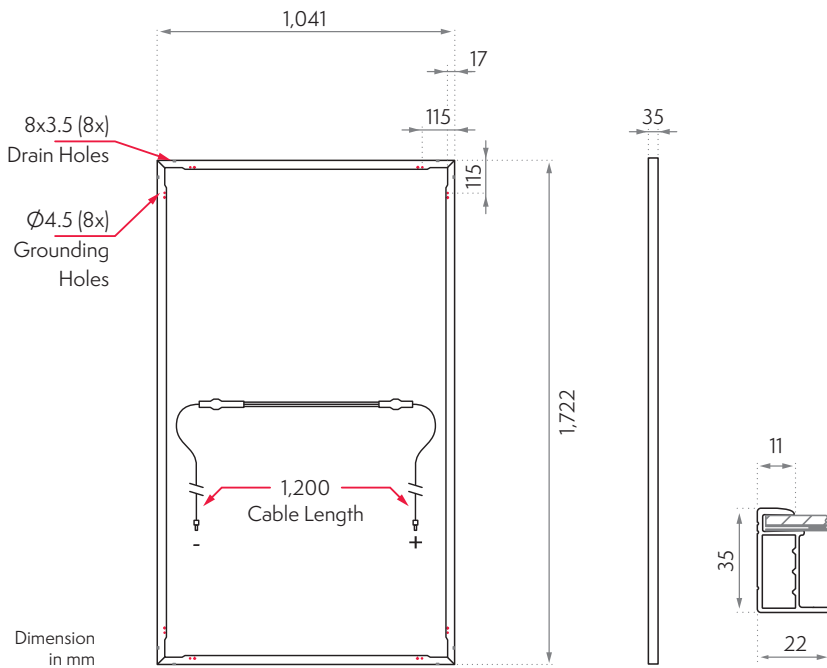
## Planning

### Field of application

The modules are suitable for the following fields of application:

- Operating temperature  $-40^{\circ}\text{C}$  to  $+45^{\circ}\text{C}$ .
  - Module operating temperature  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$ .
  - Pressure loads of max. 5,400 Pa and tensile loads of max. 2,400 Pa (including a safety factor of 1.5)\*.
  - Assembly is on a subframe for solar modules.
- The modules are tested and approved in accordance with IEC 61215-2016 and IEC 61730-2016.
  - All country-specific electrical and construction safety standards must be strictly observed during installation.
  - Do not point concentrated light onto the modules.

\* depending on the assembly variant (see the chapter on "Installation types")



Top: Meyer Burger glass, Bottom: Meyer Burger black and Meyer Burger white – Dimensions

### Technical data

For more detailed information about the corresponding modules, please visit: <https://www.meyerburger.com/>

Module Line	Meyer Burger black	Meyer Burger white	Meyer Burger glass
<b>Solar cell type</b>	120 half-cut, mono n-Si, HJT	120 half-cut, mono n-Si, HJT	120 half-cut, mono n-Si, HJT
<b>Front glass</b>	Solar glass, 3.2 mm, with anti-reflective surface	Solar glass, 3.2 mm, with anti-reflective surface	Solar glass, 2.1 mm, with anti-reflective surface
<b>Rear cover</b>	High-barrier construction, black	High-barrier construction, white	Solar glass, 2.1 mm
<b>Dimensions H x W x D [mm]</b>	1,767 x 1,041 x 35	1,767 x 1,041 x 35	1,722 x 1,041 x 35
<b>Area [m<sup>2</sup>]</b>	1.84	1.84	1.79
<b>Weight [kg]</b>	19.7	19.7	23.5
<b>Mechanical design load +/- [Pa]</b>	3,600/1,600	3,600/1,600	3,600/1,600
<b>Safety factor</b>	1.5	1.5	1.5
<b>Max. test load +/- (incl. a safety factor of 1.5) [Pa]</b>	5,400/2,400	5,400/2,400	5,400/2,400
<b>Permissible module temperature [°C]</b>	-40 – +85	-40 – +85	-40 – +85
<b>Permissible ambient temperature [°C]</b>	-40 – +45	-40 – +45	-40 – +45
<b>Maximum system voltage [V]</b>	1,000	1,000	1,500
<b>Maximum reverse current [A]</b>	15	15	18
<b>Junction box protection class</b>	3 diodes, IP68 rated in accordance with IEC 62790	3 diodes, IP68 rated in accordance with IEC 62790	3 diodes, IP68 rated in accordance with IEC 62790
<b>Cable</b>	PV cable 4 mm <sup>2</sup> , 1.2 m long, in accordance with EN 50618	PV cable 4 mm <sup>2</sup> , 1.2 m long, in accordance with EN 50618	PV cable 4 mm <sup>2</sup> , 1.2 m long, in accordance with EN 50618
<b>Connector</b>	MC4, in accordance with IEC 62852, IP68 rated only when connected	MC4, in accordance with IEC 62852, IP68 rated only when connected	MC4-Evo2, in accordance with IEC 62852, IP68 rated only when connected
<b>Fire class according to EN 13501-1</b>	B2	B2	B2
<b>Fire class (pending)</b>	C	C	C

Certifications IEC 61215:2016, IEC 61730:2016; Certifications (applied for) UL61730-1, UL 61730-2, PID (IEC 62804), salt mist resistance (IEC 61701), ammonia resistance (IEC 62716), dynamic mechanical load (IEC 62782:2016), dust and sand (IEC 60068)

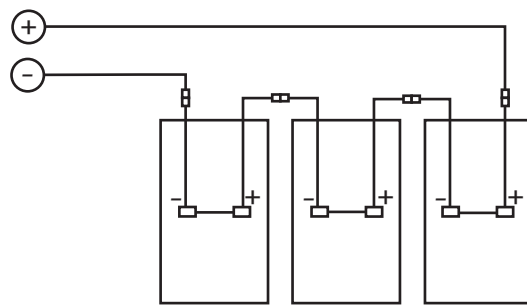
### Electrical configuration

- The key electrical data for the MBI modules is provided in the product data sheets at: <https://www.meyerburger.com/>.
- Meyer Burger modules have three pre-installed bypass diodes (non-exchangeable) that guarantee protection and improved performance in case of shade.
- Only modules from the same line and performance class can be interconnected.
- A safety factor of 1.25 for the electrical values ( $V_{oc}$ ,  $I_{sc}$ ) must be ensured because a module can produce a higher current and/or voltage in special ambient conditions than in standard test conditions.
- We recommend using UV-resistant PV cables. They must have a cross-section of at least 4 mm<sup>2</sup> (12 AWG) and be heat-resistant at least up to 90°C (194°F).
- Choose identical connectors (same manufacturer, same connector type) for extension and connection cables. The connectors for the Meyer Burger black and Meyer Burger white modules are MC4 from Stäubli. The connector for the Meyer Burger glass module is MC4-Evo2 from Stäubli.
- Avoid shade to achieve optimal solar irradiation and thus maximize yield.
- The individual system components (modules, fuses, inverters...) must be matched according to their data sheets.
- Observe the local, regional and national regulations on the installation of electrical systems.

### Series connection

- The modules can be connected in series for the desired total voltage.
- The current ( $I_{mpp}$ ) of modules connected in series should be the same because the maximum current is determined by the module with the lowest current.
- The maximum system voltage must be observed and can be found in the table in the "Technical Data" chapter under "Maximum system voltage" or the data sheet for the corresponding module.

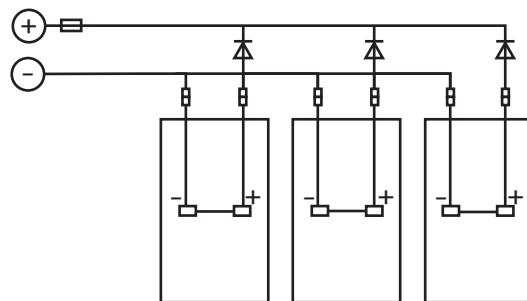
- The maximum number of modules in series depends on the max. system voltage ( $U_{sys}$ ) divided by 1.25 times the open-circuit voltage ( $V_{oc}$ ). The resulting value is rounded off. For example, Meyer Burger black 395 =  $U_{sys}/(V_{oc} \times 1.25) = 1000 \text{ V} / (44.7 \text{ V} \times 1.25) = 17.9 = \text{max. } 17 \text{ modules in series rounded off.}$



Series connection

### Parallel connection

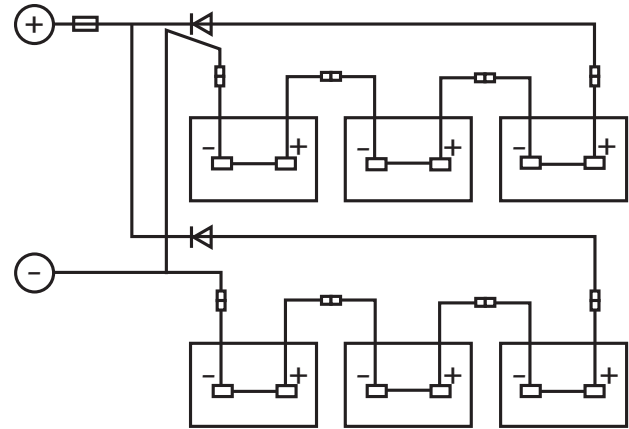
- The modules can be connected in parallel for the desired total voltage.
- The voltage ( $V_{mpp}$ ) of the modules connected in parallel should be the same.
- Additional reverse-current protection is needed to prevent a reverse current (e.g. blocking diodes).
- The cable cross-section of the extension cable must be matched to the maximum current of the connection.
- Only 2 strings can be connected in parallel.



Parallel connection

### Series-parallel connection

- The modules can also be connected in combination.
- All components must be matched and the individual connection instructions for series and parallel connection taken into consideration.
- Connect the same number of modules in a series string (same string voltage).
- Additional safety precautions are needed to protect the cables and modules from overcurrent.



Series-parallel connection

Key to the connections:



## Installation

### Safety and transport

#### Handling the modules

- When handling the modules, always wear clean gloves and hold them by the module frame.
- When unpacking the modules, the front side must be protected against scratches, etc.
- Do not short-circuit (couple) the solar module cables under any circumstances.
- Do not use the cables and junction boxes for handling and transport.
- Avoid accessing the modules and other point loads because this could lead to irreversible module damage.

#### Installation site

##### Follow the instructions below for the installation site:

- The modules must not be installed:
  - in closed spaces.
  - over 2,000 m above sea level\*.
  - on water surfaces\*.
  - in places where water may accumulate (e.g. due to floods).
  - near easily flammable gases or vapors (e.g. gas tanks or gas stations).

- at sites where contact between chemical substances (e.g. oil and solvent) and parts of the module is possible.
- in the direct proximity of ventilation and air conditioning systems.
- The modules must not be used as a substitute for roofing or facades.
- If installing less than 500 m from the sea, special precautions regarding grounding, maintenance, and cleaning are necessary.

#### Module orientation

- The modules can be installed horizontally or vertically.
- Make sure that there is no backwater. Rain and melted snow and ice water must be able to drain freely.
- Do not cover or seal off the water drains in the module frame.
- The minimal tilt angle is 5°.
- Observe the local regulations for the maximum tilt angle.
- A tilt angle of more than 20° has a positive impact on the module's self-cleaning capacity.

\* Assembly at altitudes of over 2,000 meters above sea level or on water surfaces can be planned in consultation with the manufacturer.

### Shading

#### Optimal solar irradiation leads to a maximum energy yield:

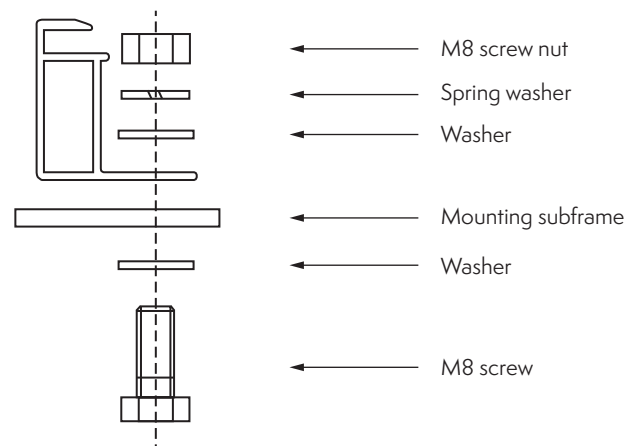
- Install the modules facing the sun.
- Avoid shade and partial shade (e.g. from trees, chimneys, buildings, dirt, snow, power lines, etc.).
- Avoid shade from the subframe of the Meyer Burger glass module line through reflections of the surroundings with high solar irradiation.

### Subframe

#### Subframe requirements:

- The subframe must meet the necessary structural requirements in accordance with the local snow and wind loads.
- Uneven snow loads (e.g. snow cornice, snow drifts) that lead to much higher local loads must be eliminated or prevented through technical measures.
- In addition to the wind and snow loads, no other forces must impact the module through the subframe.
- The subframe must be mounted on the roof or ground properly.
- The forces acting on the module must be transferred to the subframe.
- There may be no objects (air outlets, aerials, etc.) on the rear of the module that produce pressure concentrations during module deflection.
- The subframe must ensure adequate cooling through rear ventilation of the module.
- The mount should be free of tension to enable changes in length due to temperature.
- Additional tensions and torques at the assembly points are not permitted.

- Make sure that the clamps or slide-in profiles, etc. do not touch the glass, even in loading conditions.
- Make sure that there is a distance of at least 50 mm under the junction box to the subframe and other hard structures.
- Make sure that the cables cannot become jammed between the laminate and the mounting rails under a high pressure load. We recommend laying the cable along the module frame.
- Avoid contact between different metallic materials (contact corrosion; refer to the electrochemical series).
- Use corrosion-resistant screws and washers for mounting.
- The fastening screws and washers should have the same material properties.

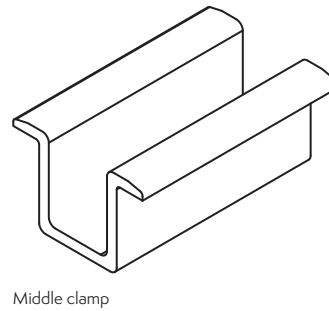
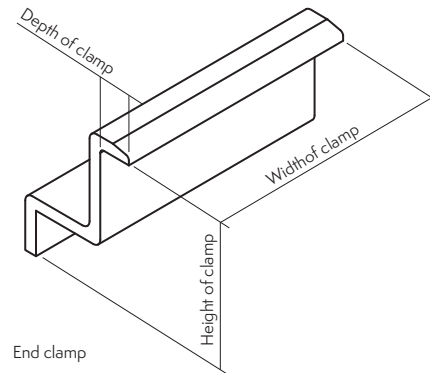


Recommended assembly for secure attachment

### Clamp system

Use clamps which meet the following requirements:

- Minimum clamp width: 40 mm.
- Clamp height for 35 mm module height.
- Clamp depth: 7-11 mm.
- The clamps must not touch the front glass.
- No cells must be shaded as a result of the clamps.
- The clamps must not damage or deform the module frame.
- The clamps must meet the necessary structural requirements at the installation site.
- The clamps must be fastened firmly in the assembly system.
- Use clamps which guarantee long-term stability and secure attachment of the modules to the subframe.
- The clamps must be installed in accordance with the manufacturer's instructions, including any specific hardware and torque requirements. Do not exceed a maximum torque of 20 Nm.





## Installation types

Module type	Assembly option	Clamp range [mm]	Test load (includes a safety factor of 1.5), compression/tensile [Pa]
<b>GB</b>	CP1/MP1	L = 320	6,000/4,000
	CP1/CL1	L = 200–450	5,400/2,400
	MP2	L = 320	5,400/2,400
	IP1	-	5,400/2,400
	CP1/CL1	L = 0–200 & 450–550	2,400/2,400
	CP2*/CL2	B = 0–300	2,400/2,400
	IP2	-	2,400/2,400
<b>GG</b>	CL1	L = 200–450	5,400/2,400
	IP1	-	5,400/2,400
	CL1	L = 0–200 & 450–550	2,400/2,400
	CP1	L = 0–550	2,400/2,400
	CP2*/CL2	B = 0–300	2,400/2,400
	IP2	-	2,400/2,400

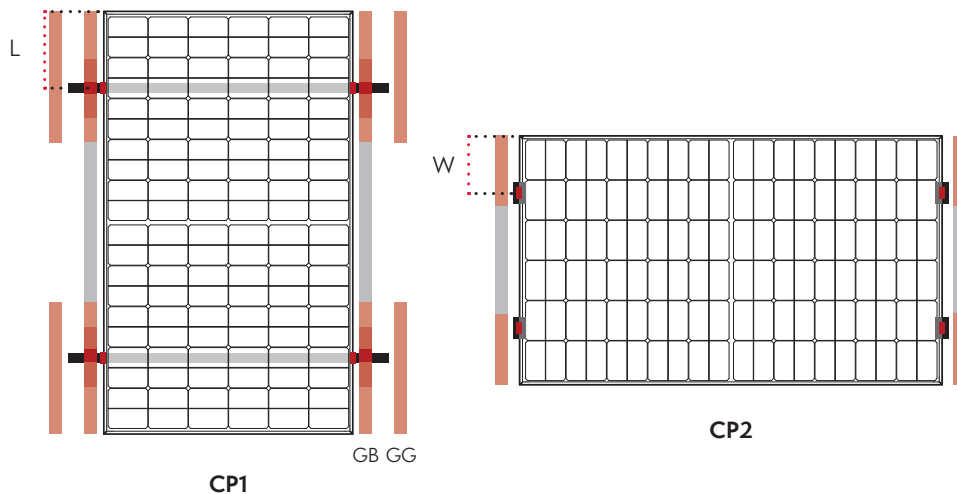
\* Installation type CP2: continuous rails under the module are not permitted.





Suitable alternative attachment options can be developed in consultation with Meyer Burger for non-specified mounting methods or higher loads.

Key: CP: Clamp point, CL: Clamp line, MP: Mounting point, IP: Installation profile

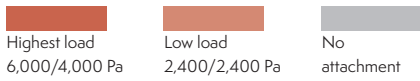
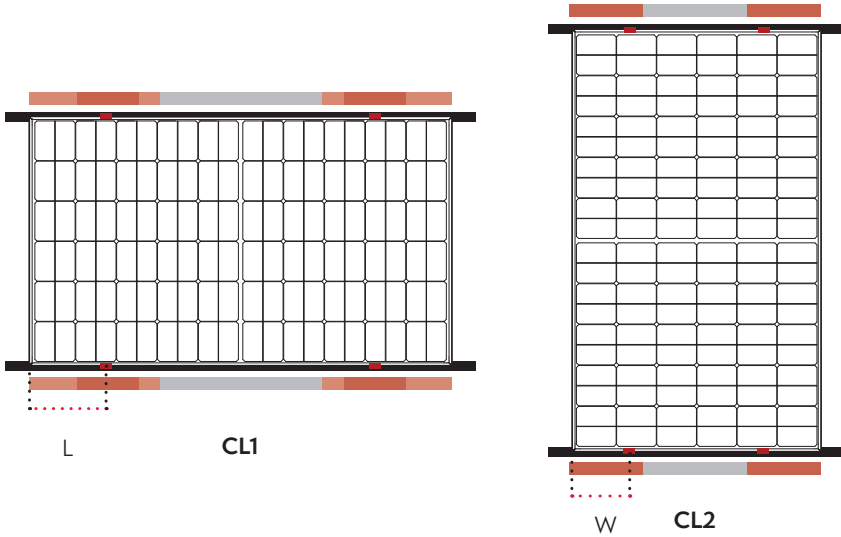
## Installation with clamps

### Point mounting



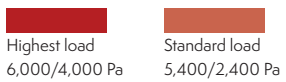
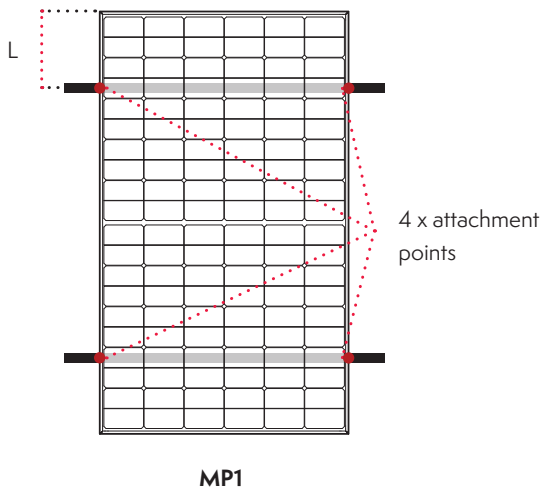
			
Highest load 6,000/4,000 Pa	Standard load 5,400/2,400 Pa	Low load 2,400/2,400 Pa	No attachment

## Line mounting

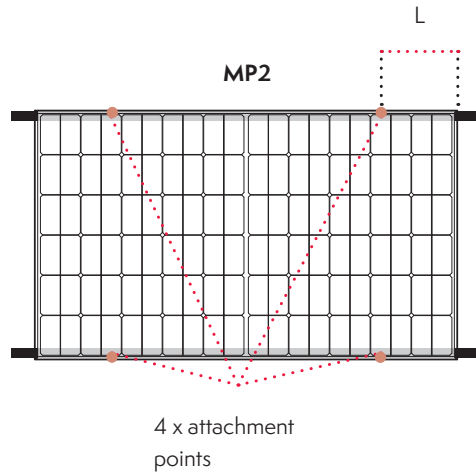


## Installation at the attachment points

### Point mounting

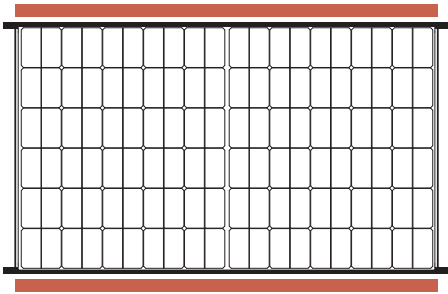


### Line mounting

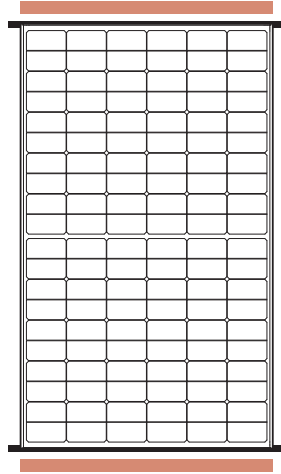


**Installation with slide-in rails**


**Line mounting**




**IP1**



**IP2**

  
Standard load  
5,400/2,400 Pa

  
Low load  
2,400/2,400 Pa

## Electrical connection

### Safety

#### Always follow the safety instructions:

- Only qualified experts may perform the work.
- The applicable safety instructions and regulations must be observed.
- Open-circuit voltage ( $V_{oc}$ ) is present even in poor light.
- Do not touch the solar modules with bare hands.
- Do not wear any metal jewelry when working with the modules.
- Use dry and insulated tools and wear insulated gloves.
- Do not modify the modules.
- Never connect or disconnect the modules under load. There is a risk of electric arc.
- To achieve maximum yields, only interconnect modules with similar electrical properties (same module class).

### Installation

#### Take the following into consideration when commissioning the modules:

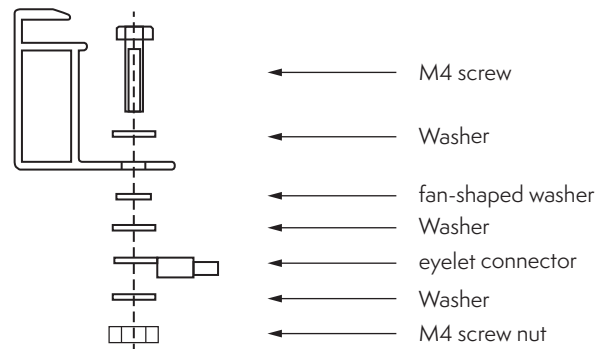
- The modules and tools must be dry during installation.
- Pay attention to the cable and connector polarities during connection.
- Check the modules, junction boxes, cables and connectors for damages and dirt and only install intact components.
- Please refer to the corresponding module data sheet for the maximum number of modules that can be connected, considering the maximum system voltage that may not be exceeded.
- We recommend using UV-resistant PV cables. They must have a cross-section of at least 4 mm<sup>2</sup> (12 AWG) and be heat-resistant at least up to 90°C (194°F).
- The minimum cable bending radius and its strain relief must be taken into account.
- The cables must not be run over sharp edges without protection.
- Protect the cables from direct sunlight, the effects of weather and animal bites.
- Always connect the cable with a suitable equal connector, do not pinch it and protect it from mechanical loads.
- Do not connect different modules or modules with different orientations and tilts to the same string.

- Connect the module string to an inverter suitable for the configuration.
- Connect the PV system to the local lightning protection system.

### Grounding

Ground the module according to the national, regional and local regulations.

Modules have connection options that are specified in the module data sheets ([www.meyerburger.com](http://www.meyerburger.com)).



Recommended installation for the ground connection

## Maintenance and cleaning

### Maintenance:

- Have an installer check the system regularly (annually).
- Check the glass surface, the frames and the connections for any damage.
- Check the electrical components to ensure that they are free from corrosion and have a good contact.
- If a module needs to be replaced, follow the instructions for disassembly and assembly. In addition, use a module with the same electrical properties.
- After an unusual weather event (storm, hail, heavy snow, etc.), have an installer check the module for damage.

### Cleaning:

- Do not use abrasive cleaning agents such as abrasive powder, steel wool, or scrapers.
- Do not use any cleaning devices made of steel or chemical cleaning agents.
- Strictly avoid using acids, alkalis, bleaching powder or strong bases.
- Do not use high-pressure cleaners for cleaning.

- Take care when cleaning sand or heavy soil to avoid scratches.
- Cleaning products should be checked for ingredients before use.
- Never touch the glass with your bare hands because you could leave fingerprints.
- Only clean the modules once they have cooled down.
- Remove leaves, snow, ice or other impurities carefully using a broom.
- Use cleaners containing alcohol (ethanol, isopropyl alcohol) for manual cleaning or hand washing. Do not use cleaners that are very acidic or alkaline, cleaners with hydrofluoric acid (HF) and pure alcohol or pure acetone. The modules can also be cleaned using a soap and water solution. Please make sure to remove any traces of cleaning agent from the glass surface.
- Use diluted alcohol or diluted acetone. Generous amounts of deionized (DI) water can be used for cleaning.
- Remove heavy soiling using plenty of water before wiping the glass surface. Leave stubborn dirt to soak where necessary.

## Troubleshooting

In case of a disruption, contact the installer or MBI's technical support.

## Disassembly/Recycling

Consult the data sheets of the system components as well for system disassembly:

- Only qualified experts may perform the work.
  - Switch off the inverter and wait until it disconnects.
  - Disconnect the module from the inverter.
  - Check the components for damage.
  - Only disconnect the connectors using an appropriate tool.
  - Disassemble the modules and subframe using an appropriate tool.
- Pack the modules and other components for safe transport.
  - Observe the local regulations for recycling or disposal.
  - Collection and return of the modules is taken care of by our partner take-e-away. For more information, visit: <https://kundenportal.take-e-way.de/>

### **Meyer Burger (Industries) GmbH**

Carl-Schiffner-Str. 17  
09599 Freiberg  
Germany

[www.meyerburger.com](http://www.meyerburger.com)

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