

# SOLARWATT

# INSTALLATION INSTRUCTIONS

# FOR FRAMED GLASS-GLASS MODULES

## VISION 60M HIGH POWER VISION 60M

## VISION 60M STYLE VISION 60P

The following directives and standards must be complied with when planning, setting up, and maintaining grid-connected PV systems:

### EU-STANDARDS

EUROCODE 1 (EN 1991-1)

Actions on structures

EN 13501

Fire behavior of building materials and building component

EN 60728-11

Setting up and operating (grounding) aerial systems

EN 62305

Lightning protection

EN 62446

Grid-coupled photovoltaic systems

IEC 60364

Erection of low-voltage systems

### VDE-DIRECTIVES

VDE 0100

Erection of low-voltage systems

VDE 0105-100

Operation of electrical systems

### EXCLUSION OF LIABILITY

The warranty terms available at [www.solarwatt.com](http://www.solarwatt.com) apply.

**You can check the current status of the installation instructions at [www.solarwatt.com](http://www.solarwatt.com).**

Please find other languages at [www.solarwatt.com](http://www.solarwatt.com).

## Congratulations on the purchase of your SOLARWATT Solar Module

These instructions describe the assembly, connection, maintenance, and disposal of solar modules. Please read them carefully and comply with them accordingly.

The installation and electrical connection of photovoltaic systems may only be carried out by specialist personnel, who are familiar with this work through their professional qualifications. For the operation, installation, use and maintenance of the other components, comply with the relevant installation instructions from the manufacturer.

Incorrect installation can cause damage to property, which could consequently pose a risk to people. SOLARWATT accepts no responsibility or liability for losses, damage, or costs resulting from incorrect installation, operation, use, or maintenance or losses, damage, or costs which are connected to any of the above in any way. The SOLARWATT installation instructions should be made available to the operator as part of the solar power system documentation and stored by the operator.

### **WARNING**

Failure to comply with the installation instructions results in the warranty and guarantee becoming null and void.

Comply with the guidelines, laws, and regulations valid in the relevant country when planning, setting up, and operating grid-connected PV systems. For information on additional requirements, please contact the responsible local authorities and the network operator.

SOLARWATT solar modules are made from high-quality materials and high-performance solar cells, and are therefore extremely reliable. The quality of the solar modules made exclusively in Germany is ensured by multiple tests carried out on the products throughout the entire production process. SOLARWATT solar modules are VDE-tested and fulfill the requirements of the extended test standard IEC 61215, as well as the safety standard IEC 61730. In SOLARWATT's own research and development department, tests are carried out using measuring, testing, and environmental simulation equipment which go above and beyond the current valid standards and enable us to optimize our products continually. If treated correctly,

your SOLARWATT solar modules will offer you several decades of service.

SOLARWATT recommends insuring the PV system against reduced yields or damage with SOLARWATT Full Coverage for complete security. Further information is available from your SOLARWATT partner or online at [www.solarwatt.com](http://www.solarwatt.com).

### Information on the solar module

Detailed electrical and mechanical properties for your specific module type can be found on the relevant data sheet. The key technical data under standard test conditions [STC, solar cell temperature: 25°C, irradiation: 1,000 Watt/m<sup>2</sup>, air mass: 1.5 (corresponds to a sun elevation angle of 41.8°)] can also be found on the nameplate of the solar module.

## Transport and Storage

SOLARWATT solar modules are made from high-quality materials and are therefore extremely stable and long-lasting. The solar modules should nevertheless be left in the packaging until installation to help prevent any damage. The modules should be stored in a dry place and protected from weather conditions. The packaging (film, tape, pallet, etc.) should be recycled. Contact the responsible local waste disposal company.

You are responsible for checking the goods and packaging for transport damage immediately on receipt. If any damage is discovered, note it on the shipping papers describing each pallet in detail, and take photographs as documentary evidence. Have the driver countersign these notes. If more than 33 % solar modules on one pallet are damaged, refuse to accept the pallet. Please fill out the „Transport Damage Complaint Notification“ form ([www.solarwatt.com](http://www.solarwatt.com)) and return it to SOLARWATT.

## Installation

During installation, please take into account the locally valid construction regulations, accident prevention regulations, the relevant, generally accepted rules of technology and safety regulations for working on roofs and buildings, as well as electrical installations. The modules may be installed at altitudes up to 2,000 m above sea level.

SOLARWATT solar modules must be fixed to suitable substructures, which are designed for

the relevant mechanical wind and snow loads, as well as the weight of the solar modules. The instructions from the installation system manufacturer must also be complied with. No mechanical stresses from the actual building (e.g., roof truss) must be transferred to the solar module. Have the structural suitability of the building for the installation of a solar power system checked by a specialist. The frame must not be mechanically or chemically processed.

### NOTE

Do not remove any parts or nameplates from the solar module. Do not install damaged solar modules.

Also not allowed are modifications of the solar module, such as the conversion to the use of the heat generated in the form of a thermal solar collector. If there is no approval in the form of a manufacturer's declaration or exceptional approval, the solar modules may not be installed in locations where there are aggressive ambient conditions. Furthermore, the use of the products on mobile units such as vehicles or ships is not permitted.

Make sure that there are no components such as cable ties, fasteners or similar materials bet-

ween the mounting rails and the backside of the module. When the modules are installed vertically (portrait), the bottom row modules must be positioned with the junction box towards the ridge.

During installation, avoid creating shades with the module clips or installation system to improve the energy yield. Comply with the minimum distance of 5 mm between the solar modules to allow the material to expand without tension.

## WARNING

The solar module is a glass product and should be handled with appropriate care. Do not stand on the solar module. Do not allow any objects to fall or place any objects on the solar module, as it can cause microcracks in the cells. Never hold or transport the solar module by the junction box or connection cables. For installation SOLARWATT strongly recommends the usage of clean, fat and silicone oil free gloves!

## WARNING

The solar modules are not designed for concentrated irradiation. Bundling or concentrating solar irradiation through lenses or mirrors is therefore not permitted and can damage the solar modules.

SOLARWATT solar modules fulfill all the requirements of the extended test standard IEC 61215. The test load for the mechanical load test was increased by the factor of 1.5. The local regulations or the standard EUROCODE 1

(EN 1991-1) should be used for the calculation of the snow loads on the module. It is important to note that these standards are designed for impact on structures and do not explicitly take into account the installation of solar modules.

## NOTE

The solar module heats up during operation. Ensure that there is sufficient rear ventilation to avoid reductions in yield. Also ensure that no flammable gases can escape or accumulate close by.

In regions with particularly high snowfall, the pressure load calculated in accordance with the standard based on local snow load information may be significantly exceeded due to snow overhang or build-up on the solar modules, which could result in above-average stress on the bottom frame edge. SOLARWATT therefore tests its modules above and beyond the standard IEC 61215 and in accordance with additional standards, taking into account additional loads in the event of snow overhang or

build-up to reflect the actual loads encountered in practice and to ensure that our products work safely throughout their entire service life. The maximum pressure loads for the fastening methods listed on the following pages already take into account these increased requirements and can be regarded as the maximum pressure load in the installation conditions taking into account the shape coefficients in accordance with EUROCODE 1 (EN 1991-1).

The maximum recommended pressure loads specified below for the different fastening methods have therefore been determined in accordance with EUROCODE 1 (EN 1991-1) taking into account the shape parameters. Regardless of the chosen installation method, SOLARWATT provides you the full warranty (acc. to its War-

ranty conditions) for modules in areas with an officially listed maximum possible pressure load of 8,100 Pa.



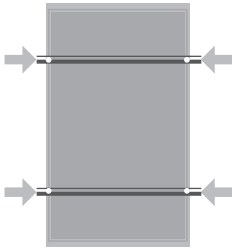
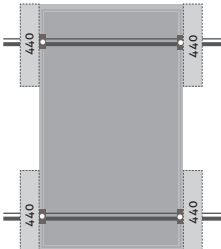
For system documentation, note the positions of the modules and their serial numbers. Before commissioning, a final inspection of the entire system is recommended.

The following tables show for each installation situation:

- the way of fastening (screws, clamps, insertion system)
- the frame areas, approved for fastening
- the maximum recommended pressure load on the modules\*

\* The specified recommended loads contain a safety factor of 1.5 in accordance with the IEC 61215 standard and apply to flat and sloping roofs with unobstructed snow slipping.

Information on the tightening torque can be found in the documentation of the clamp manufacturer. Fastenings must not deform the solar modules. Clamps must not touch the front glass.

Screws	Module clamps
	
<p>Only use the holes (diameter 9 mm) provided in the frame!</p> 	<p>Min. clamp surface area: 7 x 40 mm</p> 
<p>Max. recommended pressure load to the module: 2,800 N/m<sup>2</sup></p>	<p>Max. recommended pressure load to the module: 2,800 N/m<sup>2</sup></p>

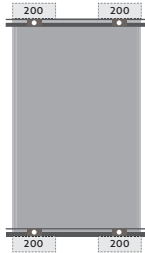
Module clamps

Module clamps

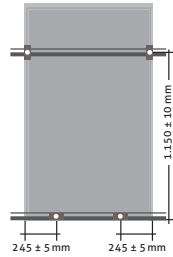
— substructure

▨ areas approved for fastening

Min. clamp surface area: 7 x 40 mm



Min. clamp surface area: 8 x 100 mm



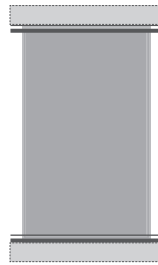
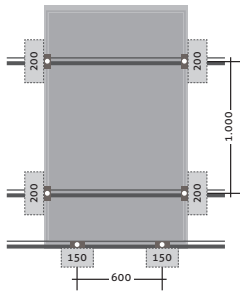
Max. recommended pressure load to the module: 2,400 N/m<sup>2</sup>

Max. recommended pressure load to the module: 3,600 N/m<sup>2</sup>

Module clamps

Insertion system

Min. clamp surface area: 7 x 40 mm



Max. recommended pressure load to the module: 5,400 N/m<sup>2</sup>

Max. recommended pressure load to the module: 2,400 N/m<sup>2</sup>

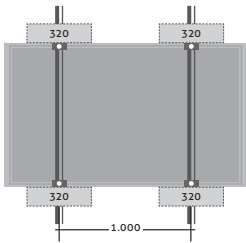
Module clamps

Module clamps

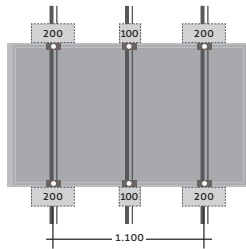
— substructure

▒ areas approved for fastening

Min. clamp surface area: 7 x 40 mm



Min. clamp surface area: 7 x 40 mm



Max. recommended pressure load to the module: 2,800 N/m<sup>2</sup>

Max. recommended pressure load to the module: 5,400 N/m<sup>2</sup>

Module clamps

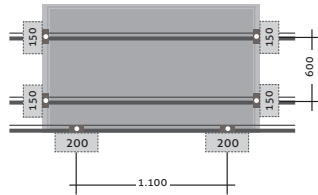
Module clamps

Min. clamp surface area: 7 x 40 mm



requires a central, round or linear support on the lower frame side (central support)

Min. clamp surface area: 7 x 40 mm



Max. recommended pressure load to the module: 2,400 N/m<sup>2</sup>

Max. recommended pressure load to the module: 5,400 N/m<sup>2</sup>

## Insertion system

— substructure

▒ areas approved for fastening



Max. recommended pressure load to the module: 3,600 N/m<sup>2</sup>

### NOTE

It is not permitted to use SOLARWATT solar modules as overhead glazing. For roof installation, these solar modules may only be installed over a fire-resistant roof covering.

**Additional system-specific load limits can be found in the download area at [www.solarwatt.com](http://www.solarwatt.com).**

### NOTE

Under mechanical load, no contact between solar glass and hard materials (eg. metal, glass) may occur. The drainage holes in the module frame must not be covered, as it could cause frost damage on the module frame. Do not place any plug connectors in the frame.



## Electrical connection and grounding

SOLARWATT solar modules are equipped at the factory with high-quality solar cables and reverse-polarity protected, shock proof plug connectors. The connection of the string line has to be done with identical connectors manufacture and type as to the module connecting cable. To be able to ensure this the module connector at the beginning and the end of the string may be removed and replaced (More information in the download area at [www.solarwatt.com](http://www.solarwatt.com)). The allowed cross-section and outer-diameter of the cable and instruction of the manufacturer have

to comply. The SOLARWATT pricelist contains matching cables, plugs, cables and installation accessories. When connecting the modules, ensure that the plugs engage with an audible click. The common bending radii of at least 5 times the outer cable diameter must be complied with. It is recommended to lay the cable firmly so that they are not subjected to mechanical loads. The cable and connector must not be exposed to moisture and will not rest on the ground or floor.

### WARNING

Solar modules generate electrical energy on the front side during incidence of light. A system with multiple solar modules can generate life-threatening voltages and electrical currents. Do not touch the electrical connections or cable ends while the solar module is exposed to light.

To ensure safety and compliance with the technical data of the products, only original tools of the manufacturer may be used in the self-assembly of solar cables.

Connection of modules in series is only permitted up to the maximum system voltage as listed in applicable data sheet. The maximum number of solar modules installed parallel without string fuse is two. Please comply with the value specified in the data sheet for reverse current feed and only use standardized photovoltaic cables (recommendation: at least 4 mm<sup>2</sup> cable cross-section).

The modules must not be allowed to operate on a short circuit permanently.

The solar modules correspond to application class II and can therefore be operated in systems with dangerous DC voltages (larger than 120 VDC in accordance with IEC 61730). Solar modules in this application class can be used in systems with unrestricted access, the relevant regulations must be complied with. SOLARWATT solar modules qualified within this application

class in accordance with IEC 61730 fulfill the requirements of protection rating II with correct electrical installation.

Under normal installation conditions, a solar module can deliver a higher current and/or higher voltage than under standardized test conditions. Consequently, the specified values on the solar module for short circuit current ISC should be multiplied by 1.25 and the open circuit voltage UOC should be multiplied by a factor of up to 1.25, based on the lowest expected ambient temperature for the given installation location, to determine the rated voltage values of components, the rated current values of conductors, the size of fuses and for dimensioning control units connected to the solar modules.

Any type of soiling on the plug contacts before or after installation (dust, moisture, aerosols containing salt, etc.) has a negative influence on the system function over the intended service period. For this reason it is necessary to pay particular attention to cleanliness during ins-

tallation. The use of lubricants is not permitted. Always protect unplugged connectors against soiling of any type during transport, storage, and during installation, as the connectors only satisfy the requirements for their protection category when plugged in. It is forbidden to open the junction box or modify or remove the cable

or frame.

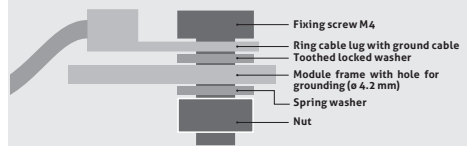
The cables must be laid so that mechanical strain on the conductors and connections is ruled out. Take into account the product-specific length of the connection cable specified in the relevant data sheets at [www.solarwatt.com](http://www.solarwatt.com).

## WARNING

The plug contacts must not be connected or disconnected under load. Failure to comply with this warning could result in DEATH!

Potential equalization of the solar generator is prepared in the factory and is recommended. It can be carried out using the existing grounding bores on the long sides of the frame (see figure) or suitable clamps with integrated grounding pins in accordance with the valid local regulations.

### Detailed view ground connection:



## NOTE

It is advisable to install lightning protection in exposed locations. The solar modules should be incorporated in existing lightning protection equipment. For this, take into account the relevant valid regulations (e.g. EN 62305 and VDE 100).

## Maintenance and servicing

A photovoltaic system needs practically no maintenance, as the solar modules are cleaned by the rain at the recommended minimum angle of 15°. To avoid reductions in yield, we do, however, recommend carrying out a regular visual check on the module surfaces. Particularly heavy soiling (e.g., leaves) can cause shades which reduce performance and should therefore be removed. Clean the glass surface with softened water, a water-ethanol- or water-isopropanol

intermixture and a soft nonabrasive cloth only. In exceptional cases, a conventional cleaning agent may also be used in the recommended dose. Do not use aggressive cleaning agents or metal objects, as they can be particularly damaging to the hardened glass surface. The electric cables should (where accessible) be checked regularly for damage, corrosion, and firm hold. Pay particular attention to DGUV regulation 3 and DIN VDE 0105-100.

## Disposal

Dispose of defective or old solar modules properly; they should never be disposed of with domestic waste. The national disposal directive must be observed. The disposal of solar modules is regulated in the EU Waste Electrical and Electronic Equipment Directive (WEEE). Old solar modules can be mostly returned in usual commercial quantities to nearby municipal collection sites and local civic waste collection points at no charge. The WEEE Directive is nati-

onally oriented, meaning that each EU Member State has its own legal regulations and practical handling for the sale and return of PV modules. Contact us by e-mail at [info@solarwatt.com](mailto:info@solarwatt.com) and specify the number and type of modules to be returned. We will then coordinate all further details for returning your modules.

## **NOTES ON COMPLAINTS**

If you still have cause for complaint despite the high quality of our products, please contact your dealer directly or:

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