

# SOLARWATT INSTALLATION INSTRUCTIONS

## FOR FRAMED GLASS-FOIL SOLAR MODULES

SOLARWATT BLUE 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.net](http://www.solarwatt.net) apply.

### VDE TEST MARK



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

- Weitere Sprachversionen finden Sie unter [www.solarwatt.net](http://www.solarwatt.net).
- Please find other languages at [www.solarwatt.net](http://www.solarwatt.net).

# 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.

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 Ed.2, 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.net](http://www.solarwatt.net).

## 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.



## WARNING

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

## 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.

## PROCEDURE IN THE EVENT OF TRANSPORT DAMAGE

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.net](http://www.solarwatt.net)) and return it to SOLARWATT GmbH.

# 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.

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. 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.

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. The rear side in particular must be protected from scratches and similar. 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!

## NOTE

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

SOLARWATT solar modules fulfill all the requirements of the extended test standard IEC 61215 Ed. 2, including the increased pressure load of 5,400 Pa, making them ideal for use in areas with large amounts of snow. 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.

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 Ed. 2 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).

Framed SOLARWATT solar modules can be fastened in a number of ways: Please refer to the details to the following pages.

## 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.

## NOTE

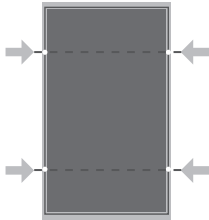
The solar module heats up during operation. Ensure that there is sufficient rear ventilation to avoid reductions in yield. Also ensure that no flammable gases can escape or accumulate close by.

SOLARWATT modules can be fastened in a number of ways:

# 1 SCREW FIXTURES

Fastening on the fastening holes with screws.

Only use the holes provided in the frame (diameter: 9 mm).



Fastening on the fastening holes  
The maximum pressure load to the solar module for the installation method is 2,400 N/m<sup>2</sup>.

# 2 CLAMPING SYSTEM

Fix in place with suitable module clips

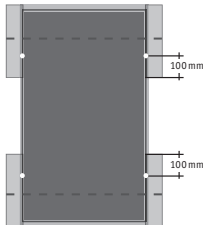
The bracket must not distort the solar module and the clips must not come into contact with the front pane. Please pay attention to the clip manufacturer's

specifications. The clip surfaces must be sufficiently sized (areas of 400 mm<sup>2</sup> per fastening point are required).

## Vertical installation



Fastening on short sides  
The maximum pressure load to the solar module for the installation method is 2,400 N/m<sup>2</sup>.



Fastening on long sides  
The maximum pressure load to the solar module for the installation method is 2,400 N/m<sup>2</sup>.

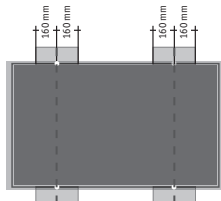
areas approved for fastening

## Horizontal installation



### Fastening on short sides

In addition, this fastening mode requires a central, round or linear support on the lower frame side (central support). The maximum pressure load to the solar module for the installation method is  $2,400 \text{ N/m}^2$ .



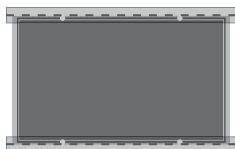
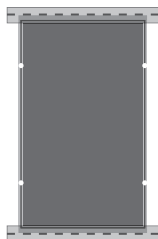
### Fastening on long sides

The maximum pressure load to the solar module for the installation method is  $3,500 \text{ N/m}^2$ .

## **i** 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.

## 3 INSERTION SYSTEM Fixed in place by inserting in a supporting frame



### Vertical installation

The maximum pressure load to the solar module for the installation method is  $2,400 \text{ N/m}^2$ .

 areas approved for fastening

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

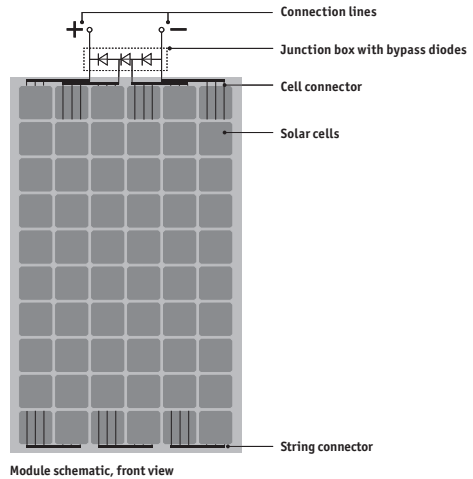
## **i** NOTE

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.net](http://www.solarwatt.net)). The allowed cross-section and outer-diameter of the cable and instruction of the manufacturer have to comply. The following table shows matching cablesets, 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. 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 solar modules correspond to application class A and can therefore be operated in systems with dangerous DC voltages (larger than 120 VDC in accor-


dance 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.



## 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.

ITEMNUMBER	DESIGNATION	FIGURE
500001818	PV4 plug, 4-6 mm <sup>2</sup> , OD 5,5 - 6 mm	
500001817	PV4 socket, 4-6 mm <sup>2</sup> , OD 5,5 - 6 mm	
500001721	Crimping tool for Tyco PV4	
500001719	PV4 plug, 4-6 mm <sup>2</sup> , OD 6 - 7 mm	
500001718	PV4 socket, 4-6 mm <sup>2</sup> , OD 6 - 7 mm	
500001721	Crimping tool for Tyco PV4	
500002075	Solar cable 4 mm <sup>2</sup> , black OD 5,6-5,9 mm	
500002022	Solar cable 6 mm <sup>2</sup> , black OD 6,4 mm	

ITEMNUMBER	DESIGNATION	FIGURE
500001720	Crimping tool for Tyco PV4	no figure
alternative for toolless connector assembly		
500002298	PC SUNCLIX PV-CF-S 2,5 - 6 (+) OD 5-8 mm	
500002299	PC SUNCLIX PV-CF-S 2,5 - 6 (-) OD 5-8 mm	

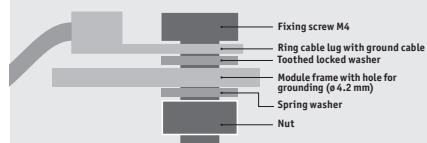
Under normal installation conditions, a solar module can deliver a higher current and/or higher voltage than under standardized test conditions. Consequently, the specified values on the solar module for short circuit current  $I_{sc}$  should be multiplied by 1.25 and the open circuit voltage  $U_{oc}$  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 installation. 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 minimum bend radius for the connection cable is 60 mm. 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.net](http://www.solarwatt.net).

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 in accordance with the valid local regulations.

#### Detailed view ground connection:



### ⚠ WARNING

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

### 📌 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 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 BGV A3 and DIN VDE 0105-100.

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## DISPOSAL

Dispose of defective or old solar modules properly; they should never be disposed of with domestic waste. 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 nationally 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.net](mailto:info@solarwatt.net) 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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Tel. + 49 351 8895-0 | Fax + 49 351 8895-111 | [info@solarwatt.net](mailto:info@solarwatt.net)  
Certified in accordance with ISO 9001 and ISO 14001 | BS OHSAS 18001:2007