# SOLARWATT INSTALLATION INSTRUCTIONS FOR FRAMED GLASS-GLASS MODULES

# VISION 60M HIGH POWER VISION 60P

# VISION 60M STYLE VISION 60P STYLE

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 apply.

### **VDE-TEST MARK**



### You can check the current status of the installation instructions at www.solarwatt.com.

Please find other languages at 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 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.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

### Procedure in the event of transort 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.com) and return it to SOLARWATT. 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.

### 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.

# ां 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. 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 mate-

rial 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 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.

# i 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 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 solar modules can be fastened in a number of ways:

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>.

### CLAMPING SYSTEM Fix in place with suitable module <u>clips</u>

= = = substructure

The PV-modules are to be fastened at four points within the fastening areas shown in the figure. For this purpose clamps with sufficient surface area (at least 8 mm x 40 mm) are to be used.

Please observe the fastening torque stipulated in the installation manual of the clamp producer. Pay attention that the fastening clamp does not deform the module nor touch the glass in any way.





Fastening on short sides The maximum pressure load to the solar module for the installation method is 3,000 N/m<sup>2</sup>. areas approved for fastening ---- substructure

#### Vertical installation for modules without additional feature "crossrail"



#### Vertical installation for modules with and without additional feature "crossrail"



#### Vertical installation for increased snow load (with and without additional feature "crossrail")



Fastening of Module on long and short edge The lower mounting rail needs to be repositioned such as to allow the bottom frame of the module to rest on the rail in its full length. Clamps with a clamping surface of at least 8x100mm are to be utilized.

The maximum pressure load to the solar module for the installation method is  $4,200 \text{ N/m}^2$ .

--- substructure

#### Vertical installation for increased snow load (only modules with additional feature "crossrail")



#### Horizontal installation for modules with additional feature "crossrail"



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 3,500 N/m<sup>2</sup>.



Fastening on long sides The maximum pressure load to the solar module for the installation method is 5,500 N/m<sup>2</sup>.



--- substructure

#### Horizontal installation for modules without additional feature "crossrail"



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 N/m<sup>2</sup>.



Fastening on long sides The maximum pressure load to the solar module for the installation method is 3,500 N/m<sup>2</sup>.



--- substructure

# (j) 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.



### 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  $N/m^2.$ 

areas approved for fastening

--- substructure

Additional system-specific load limits can be found in the download area at 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). The allowed cross-section and outer-diameter of the cable and instruction of the manufacturer have to comply. The SOLARWATT pricelist contains 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 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 solar modules correspond to application class A 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.



Module schematic, front view

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 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 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.

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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 in accordance with the valid local regulations.

#### Detailed view ground connection:



# (j) NOTE

It is advisable to install lightening protection in exposed locations. The solar modules should be incorporated in existing lightening 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 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 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.com and specify the number and type of modules to be returned. We will then coordinate all further details for returning your modules.

### Warranty conditions for SOLARWATT-solar modules of the glass-glass generation

#### A Scope

- The Warranty for SOLARWATT Solar Modules of the glass-glass generation pursuant to these Warranty Conditions (hereinafter "Warranty Conditions") of SOLARWATT GmbH (hereinafter "SOLARWATT") apply in addition to any of the End Customer's statutory rights arising from product defects. These Warranty Conditions do not affect any of the End Customer's statutory rights arising from product defects. Such rights continue to exist regardless of whether a Warranty Claim event is given or asserted.
- These Warranty Conditions apply to the following Solar Modules of the glass-glass generation:

Vision 60M high power Vision 36M glass Vision 60M style Vision 60P style Vision 60P

(hereinafter jointly referred to as "Solar Modules" or individually as "Solar Module").

- 3. The Warranty pursuant to these Warranty Conditions applies to Solar Modules which the End Customer has purchased in countries in which SOLARWATT does not have country-specific warranty conditions for Solar Modules in place. All warranty conditions for Solar Modules are available at http://www.solarwatt.com. The Warranty pursuant to these Warranty Conditions shall remain unaffected even if the End Customer transfers the Solar Modules to and operates the Solar Modules in a different country afterwards.
- 4. These Warranty Conditions do not apply for complete systems from SOLARWATT. For complete systems, SOLARWATT or a third party commissioned by SOLARWATT and working on behalf of SOLARWATT provides the End Customer with additional supplies and services, such as assembly service, in addition to the supply of Solar Modules. Any warranties from SOLARWATT for such complete systems are subject to separate warranty conditions.

#### B Product Warranty

SOLARWATT provides the Warranty pursuant to these Warranty Conditions exclusively to End Customers who have acquired Solar Modules from an authorised SOLARWATT dealer for their own use and not for the purpose of further sale or any other type of commercial exploitation ("End Customer"). SOLARWATT guarantees the End Customer pursuant to these Warranty Conditions that the Solar Modules are free from material and processing defects which influence the functionality of the Solar Modules ("Product Defects") for a duration of thirty (30) years from the date of shipment from the SOLARWATT factory ("Warranty Term") ("Product Warranty"). SOLARWATT shall provide the End Customer with the date on which the Solar Module was shipped from the factory immediately after the End Customer's respective request.

#### C Performance Warranty

SOLARWATT guarantees the End Customer pursuant to these Warranty Conditions:

- During the first (1st) year from the date of shipment from the factory of SOLARWATT, the output of the Solar Modules shall not decrease to less than 97% of the nominal output of the Solar Module as indicated by SOLARWATT on the respective Solar Module minus a tolerance range of 5% under Standard Test Conditions (irradiance 1,000 W/m<sup>2</sup>, spectral distribution AM 1.5, temperature 25±2° C, hereinafter "STC");
- From the beginning of the second (2nd) year until the end of the twenty-ninth (29th) year from the date of shipment from the factory of SOLARWATT, the output of the Solar Modules shall not decrease by more than 0.345%, per year, of the nominal output of the Solar Module as indicated by SOLARWATT on the respective Solar Module minus a tolerance range of 5% under STC;
- During the thirtieth (30th) year from the date of ship-ment from the factory of SOLARWATT the guaranteed output of the Solar Modules is at least 87% of the nominal output on the Solar

Module as indicated by SOLARWATT minus a tolerance range of 5% under STC;

(jointly "Performance Warranty", Product Warranty and Performance Warranty jointly "Warranty"). SOLARWATT shall provide the End Customer with the date on which the Solar Module was shipped from the factory immediately after the End Customer's respective request.

#### D SOLARWATT Warranty Services

- If one of the Warranty claim events indicated in Section B or C arises during the respective Warranty Term, SOLARWATT shall – at its own discretion –
  - a. repair the Solar Module on site at the End Custom-er's location,
  - b. repair the Solar Module at SOLARWATT's facility or that of a third party,
  - c. supply an additional Solar Module to the End Cus-tomer or
  - d. exchange the Solar Module with a replacement module. On receipt of a replacement module by the End Customer, the ownership of the original Solar Module is transferred to SOLARWATT. For replacement modules, the remaining Warranty Term of the relevant Solar Module applies exclusively.

Insofar as the Solar Module originally supplied by SOLARWATT was not or is no longer manufactured in serial production, an equivalent module shall be sup-plied as replacement or additional module.

- If SOLARWATT repairs the Solar Module at SOLARWATT's or a third party's facility pursuant to Section D.1. or supplies an equivalent replacement module pursuant to Section D.1, SOLARWATT will engage a carrier who will collect the affected Solar Module from the End Customer's location.
- 3. The Warranty pursuant to these Warranty Conditions covers the transport costs for the shipment of the af-fected Solar Module, a replacement or additional mod-ule as well as material and labor costs (personnel costs for repairs) for the Warranty service. SOLARWATT grants to the End Customer a flat rate payment of € 150.00 per system (i.e. photovoltaic system with a single

grid connection) and Warranty claim event, plus € 25.00 for each affected Solar Module for the costs of the dismounting of the affected Solar Module and the installation of the replacement or additional modules in total; any further costs shall be borne solely by the End Customer. Costs for measurements and for assessments by qualified experts (e.g. if SOLARWATT rejects a Warranty claim event or if the End Customer cannot conduct such measurements personally) must be coordinated and aligned with SOLARWATT before the End Customer incurs such costs, otherwise these costs will not be covered by SOLARWATT.

- 4. If the End Customer asserts a Warranty claim under these Warranty Conditions and it turns out that there is no valid Warranty claim event, SOLARWATT reserves the right to invoice the End Customer for any costs incurred for the provided Warranty services, provided that the End Customer knew or gross negligently did not know that no valid Warranty claim event was given.
- If a Warranty service of SOLARWATT is unsuccessful, SOLARWATT is entitled to repeat the same form of Warranty service or to provide a different service, unless this is unreasonable for the End Customer.

### E Exclusion of the Warranties

- The Warranty does not extend to Solar Modules that are impaired, damaged or destroyed as a result of
  - a. being improperly stored or transported by the End Customer or a third party,
  - b. not being installed or, if applicable, uninstalled or reinstalled, in accordance with the SOLARWATT as-sembly manual and the recognized good engineer-ing practices,
  - c. being operated in a manner inconsistent with the intended purpose and especially the instructions for operation in the assembly manual,
  - not being maintained properly, in particular not in accordance with the maintenance instructions in the assembly manual,
  - e. being improperly modified by the End

Customer or a third party or being otherwise improperly manipulated, or

- f. of force majeure (in particular lightning, fire or natural disaster). The insurance performance pursuant to the SOLARWATT Full Coverage remains unaffected in this respect.
- Insignificant changes or changes in appearance, in particular bleaching and discoloration of cells shall not constitute a Warranty claim event pursuant to the Product Warranty pursuant to Section B. The Performance Warranty pursuant to Section C remains unaffected.
- The Warranty is furthermore excluded if the End Cus-tomer manipulates or removes the serial number or type plate of the Solar Module.
- 4. The End Customer bears the burden of proof that the Warranty has not been excluded due to the aforemen-tioned reasons. This does not apply to circumstances which lie within SOLARWATT's sphere of responsibility or that of SOLARWATT's vicarious agents.
- The End Customer's Warranty claim is not valid if the notification period set forth in Section G.3 is exceeded unless the End Customer has not culpably exceeded this notification period.

#### F Transfer to a new owner

If the End Customer sells and transfers the title to the Solar Module on, this warranty is transferred to the new owner of the Solar Module to the extent of the remaining Warranty Term. The respective new owner is then considered the End Customer for the purposes of these Warranty Conditions. In this event, this Warranty expires for the prior End Customer.

### G Provisions on the assertion of Warranty claims

 Warranty claims have to be asserted in written form and by submitting a copy of the original delivery note or the original invoice issued by the SOLARWATT product dealer, or other proof of purchase. For this purpose, the End Customer shall use the claim form for End Customers, available at www.solarwatt.com.

Further documentation (e.g. photos or records) shall be provided to SOLARWATT upon request

from SOLARWATT.

- 2. The existence of a Warranty claim event due to the spontaneous breakage of the glass without any external influences or due to a reduced output of a Solar Module must be verified by an expert appraisal performed by SOLARWATT, a third party commissioned by SOLARWATT or an independent testing institute approved for module certifications in accordance with IEC 61215.
- 3. If an obvious Warranty claim event occurs, the End Customer must bring a claim in respect of this Warranty claim event as soon as possible and in any event no more than three (3) months after discovery of the Warranty claim event. Claims received after this time may be considered at SOLARWATT's sole discretion. Recognizable transport damages should be reported using the claim form for transport damages, available from www.solarwatt.com.

### H Limitation of liability

- Any claims for damages or expenses against 1. SOLARWATT irrespective of the legal basis (contract, tort or any other area of law) out of or in connection with the Warranty pursuant to these Warranty Conditions or Warranty services are excluded. SOLARWATT shall in no event and irrespective of the legal basis be liable to pay damages to the End Customer for loss of profit or revenue, loss of use, loss of data, cost of capital, down-time costs, cost of substitute goods, property damage external to the Solar Modules and any damage or loss arising out of such damage or any special, incidental, indirect or consequential damage. This also applies if such damage occurs at a third party's premises. The insurance performance pursuant to the SOLARWATT Full Coverage remains unaffected in this respect.
- 2. The aforementioned limitations of liability do not apply if SOLARWATT is liable pursuant to product liability law, in cases of willful intent, gross negligence, injury to life, body or health, or breach of material contractual obligations, i.e. obligations that actually enable the proper execution of the contract in the first place and which the End Customer can regularly and fully expect

to be met. Compensation for breach of material contractual obligations is, however, restricted to foreseeable losses arising from the type of contract, provided no willful intent or gross negligence is involved, there is no injury to life, body or health, and SOLARWATT is not liable under product liability law.

#### I Final provisions

- These Warranty Conditions are subject to German law to the exclusion of the conflict of laws and the United Nations Convention on Contracts for the International Sale of Goods (CISG). This does not affect the End Customer's rights under mandatory local law.
- If any individual provisions of these Warranty Condi-tions are or become invalid, the validity of the remaining provisions remains unaffected.

# **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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