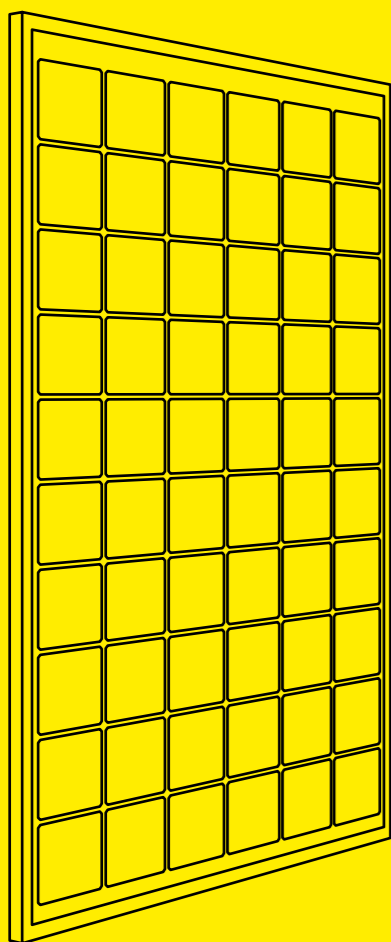


SETUP



Installation and Operating Instructions Sunways Solar Modules

SM 230M
SM 215L
SM 215M
SM 240M
SM 210U
SM 235U
SM 170U

English

EN

Sunways
Photovoltaic Technology

1 Safety first!

Follow the setup instructions!

Safe handling and trouble-free operation of the Sunways Solar Modules requires knowledge of the basic safety precautions.

This setup document provides an overview of the safe installation and commissioning procedures for Sunways Solar Modules.

In addition, the rules and regulations for accident prevention applicable for the operating site/plant must be observed.



Danger of death through electric shock!

Touching live parts can result in death.

All electrical work on the solar generator must be carried out by a qualified electrician while observing the VDE regulations, national and other regulations.

Due to the series connection of the modules, voltage levels may exceed the protective extra-low voltage.

Even with low solar radiation almost the full open-circuit voltage can be expected in the modules. During all installation and wiring work the modules must therefore be covered or disconnected from the consumer load. Otherwise there is a risk of arc formation on lines carrying direct current.



Suitable fall protection must be used when working on roof-mounted solar generators.

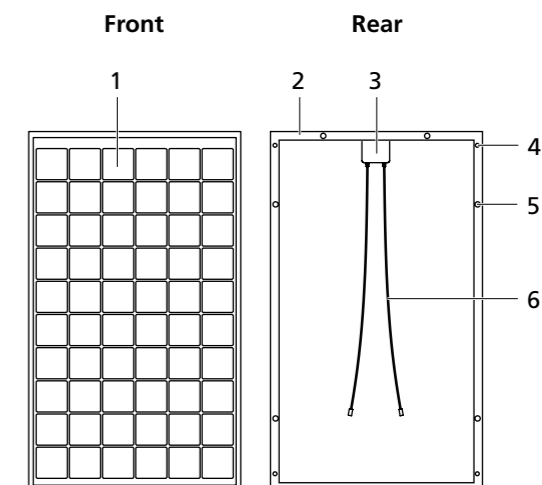


The standard solar module is a glass/film product and must not be walked on due to the risk of breakage.

Protect the front and rear of the solar modules from scratching.

2 Your Solar Modules

Your Sunways Solar Modules consist of the following components. Only the details relevant for the installation at the front and rear are shown.



- 1 Sunways Solar Cells
- 2 Aluminium profile frame
- 3 Junction box with connection cable and connectors
- 4 Hole for earthing
- 5 Mounting hole
- 6 Connection cables

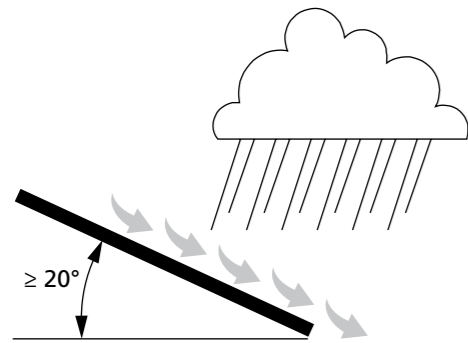
3 Installation

3.1 Orientation

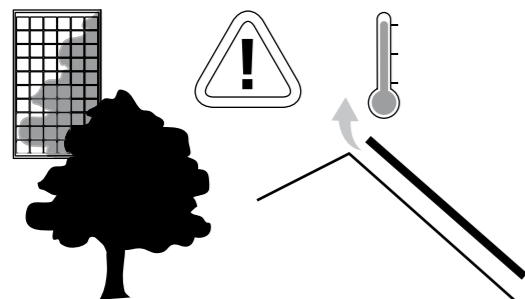
Ideally, the front of the solar modules should face due south.

The tilt angle can be calculated as follows:
The ideal tilt angle corresponds to the latitude of the installation site minus 20°

To achieve a good self-cleaning effect through precipitation the tilt angle of the solar modules should be at least 20°.



Avoid any shading and heat build-up at the rear of the module. Both can lead to significant losses in yield!



3.2 Maximum series/parallel configuration



CAUTION

Only solar modules of the same type and output class may be connected in series! The maximum system voltage of the modules must never be exceeded!

To achieve the required system currents the modules may be connected in parallel. Only modules of the same type and voltage may be used. Ensure that the specified permitted load capacity with regard to the return current IR is not exceeded!

4 Installation

4.1 General



CAUTION

Mount the modules only on suitable support structures. These structures must ensure that no mechanical stresses are transferred from the building (e.g. the roof structure) to the module.

The minimum distance between modules is 5 mm to allow for material expansion.

The modules must be installed such that water flow (particularly along the cable) towards the cable gland at the junction box is prevented.

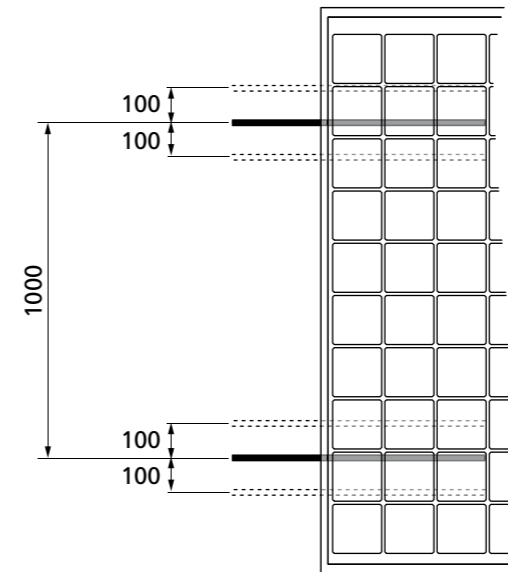
The connection cables between the modules and towards the inverter must be installed such that the closed connectors are not permanently in water. This means, for example, that rainwater must be able to drain from U-shaped profiles.

Use only the holes provided in the frame! Do not drill, nail or weld the module frames.

The mounting systems recommended and approved by Sunways can be found on our website at <http://www.sunways.de>.

4.2 Standard mounting

Each module must be secured at a minimum of four points (drill holes in the long sides - see diagram in section 2, Your Solar Modules). The frame is structurally approved for mounting on the long sides. Mounting on the short module sides must be avoided. The maximum tolerance is 100 mm.



Insertion systems (U-shaped profile over the whole long/short side) are permitted under the following load conditions:

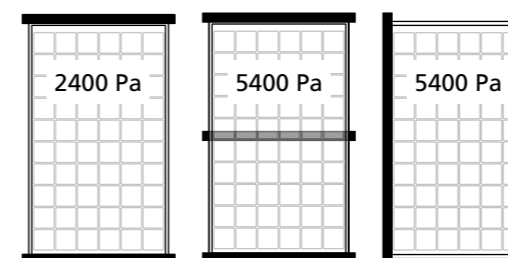
Short side mounting

Mounting rails only at the short edges without central support for loads up to 2400 Pa

Mounting rails at the short edges with central support for loads up to 5400 Pa

Long side mounting

Mounting rails covering the whole length of the long edges for loads up to 5400 Pa



Only use corrosion-resistant screws. Use a torque wrench and tighten the screws with 20 Nm.

4.3 Installation instructions for laminates (frameless modules)

Avoid pointwise support and mounting of the laminates, except with mounting brackets approved by Sunways. These brackets are designed for loads up to 2400 Pa. Further details and recommendations can be found on our website at <http://www.sunways.de>.

Otherwise the laminates must be linearly supported and fixed at both long module sides as a minimum.

All support rails must be aligned such that twisting or warping of the laminates is avoided.

Only use mechanical fixtures for mounting the modules. Do not use adhesives or adhesive tapes for fastening the laminates, unless they have been explicitly approved by Sunways.

Please ensure that the laminate edges are not permanently in water and are allowed to dry.

Please note that the glass edges of the modules are particularly sensitive to impact.

Follow the installation instructions for the respective mounting system.

4.4 Other data

Bundling or concentration of solar radiation, for example using lenses or mirrors, is prohibited!

Avoid covering the drainage holes in the module frames.

For any maintenance and repair work produce a plan documenting the module installation layout, including serial number allocation and cable layout.

5 Electrical connection



Danger of death through electric shock!

Touching live parts can result in death.

Make sure the polarity is correct when connecting the modules. Reverse polarity can lead to destruction of the protective diodes.

Before installing check junction box, the cables and connectors for obvious damage.

For safety reasons the junction box must not be opened.

Do not use the plug connectors if the plug contacts are dirty!

Do not install damaged solar modules!

The solar modules, and in particular the connectors and tools, must be dry during installation.

In exposed locations, installation of lightning protection is recommended. If lightning protection equipment is already present, the solar modules must be integrated properly. Follow the respective current regulations.

During normal conditions PV module may supply a higher current and/or voltage than specified under test conditions.

For determining the voltage design values of the components, the current design values of the conductors, the ratings of the fuses and the control units connected to the solar module output, the values of I_{sc} and U_{oc} specified on the module should be multiplied with a factor of 1.25.

The solar module is equipped with high-quality solar cables and the Tyco plug connector system, which is protected against reverse polarity and accidental contact. The connection polarity is marked.

The minimum cable cross-section should be 4 mm².

5.1 Tyco Solarlok plug connector system

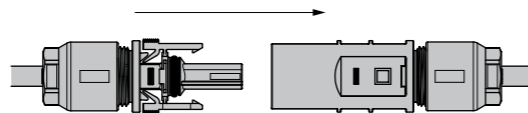
The Solarlok plug connector system is designed for convenient, reliable connection of individual solar generators and the Solar Inverter.

Plug connections

The positive/negative coded connectors are marked with polarity symbols and a coloured ring (blue = negative, red = positive). They are equipped with coding ribs for assignment, which ensure that only connectors of the same polarity can be connected to each other.

Connecting socket and plug:

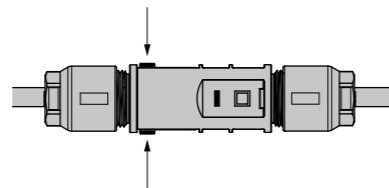
The system is only correctly locked if the locking hooks are recessed flush in the mating piece.



CAUTION

The plug connectors must not be disconnected or connected under load current! They may be connected and disconnected while voltage is present.

Release the locking mechanism by pressing on the ribbing of the locking hooks and pulling the connectors apart.



5.2 Application class

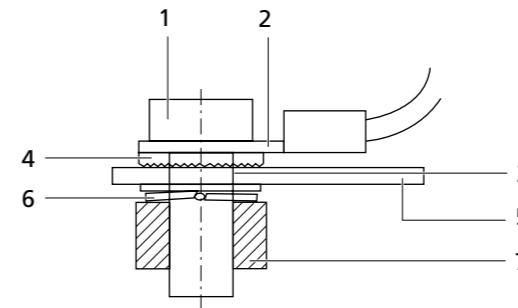
Sunways Solar Modules conform to application class A according to the international safety standard EN 61730 and therefore meet the requirements of protection class II.

Sunways Solar Modules can be used in systems with a DC voltage in excess of 120 V_{DC}.

5.3 Earthing of the modules

An overview of the solar module can be found in section 2, Your Solar Modules. A diagram indicates the holes for connecting the earthing cables.

Detail view of the earthing cable connection



- 1 Fastening screw M6
- 2 Ring terminal with earthing cable
- 3 Hole for earthing
- 4 Lock washer
- 5 Module frame
- 6 Spring washer
- 7 Nut

Proceed as follows to ensure correct earthing of the modules:

- 1 Place the lock washer (4) and the ring terminal with the earthing cable (2) over the earthing hole (3) on the front of the module.
- 2 Insert the fastening screw M6 (1).
- 3 Then push the spring washer (6) from the underside of the module onto the fastening screw (1) and fasten the nut (7).

6 Care and maintenance

Check your solar generator approx. every three years for soiling. This occurs especially on the lower edge of the modules and forms a haze that cannot be washed off even by heavy rain.

In the event of significant dirt build-up we recommend cleaning the glass surface. Use plenty of lukewarm water and a soft brush. This prevents loss of yield.



CAUTION

Do not use strong cleaning agents and metallic objects, in order to avoid damage to the hardened glass surface!

Occasionally check the cables for damage, corrosion and make sure they are secure.

7 Module parameters

The electrical parameters can be found in the corresponding module datasheet.

8 Declaration of conformity

EU declaration of conformity

Relevant EC Directives

- Directive 73/23/EEC
- Directive 89/336/EEC (EMC Directive)
- Directive 93/68/EEC (Low-Voltage Directive)

Sunways AG, Macairestraße 3-5, 78467 Konstanz, Germany declares under its sole responsibility that the solar module types listed above meet the requirements of the following standards

- DIN EN 50178
- EN 50081-1 (2)
- EN 50082-1 (2)
- DIN VDE 0101
- DIN VDE 0110

and therefore comply with the EC Directives listed above.



Roland Burkhardt, CTO

Sunways AG
Photovoltaic Technology
Macairestraße 3 - 5
78467 Konstanz
Germany
Phone +49 (0)7531 996 77-0
Fax +49 (0)7531 996 77-444
email info@sunways.de
www.sunways.de

Technical Hotline
Germany: +49 (0)7531 996 77-577
Spain: +34 93 665 20-40

Sunways
Photovoltaic Technology