

Sunmodule⁺

User Instructions



04/2011

Sunmodule Plus SW xxx poly

Sunmodule Plus SW xxx mono (black)

Sunmodule Plus SW xxx Compact mono (black)



DANGER!

⚠ Electric shock

The connection of several modules in series results in the adding up of voltage and imposes danger. Do not insert electrically conducting parts into connectors! Do not fit solar modules and wiring with wet connectors! Make sure to work with dry tools and under dry working conditions!

⚠ Work on live parts

When working on wiring, use and wear protective equipment (insulated tools, insulated gloves, etc.)!

WARNING!

⚠ Arcing

Modules generate direct current (DC) when exposed to light. When breaking a closed circuit, a dangerous arc may be generated. Do not cut any live wires.

⚠ Safe installation

Do not carry out installation work in strong winds. Secure yourself and other persons against falling. Secure work materials against dropping. Ensure a safe working environment so as to prevent accidents.

⚠ Fire protection/explosion protection

Modules must not be installed in the vicinity of highly flammable gases, vapors or dusts (e.g. filling stations, gas tanks, paint spraying equipment). The safety instructions for other system components must also be followed. Make sure to comply with local standards, building regulations and accident prevention regulations during installation. For roof installation, modules must be mounted on a fire-resistant base material.

ATTENTION

Do not use damaged modules. Do not dismantle modules Do not remove any parts or nameplates fitted by the manufacturer. Do not apply paint or adhesives on the back side, nor work on it with sharp objects.

Unpacking and intermediate storage

Do not use the junction box as a handle. Do not place modules roughly on hard floor or on their corners. Do not place modules on to of each other. Do not step or stand on modules. Do not place any objects on modules. Do not work on modules with sharp objects; store modules in a dry place.

Grounding of module and frame

We recommend ensuring the functional grounding of the module metal frame. If an exterior lightning protection system is already provided, the PV system has to be integrated into the protection concept against direct lightning stroke. Local standards shall be observed.

Grounding in the US and Canada

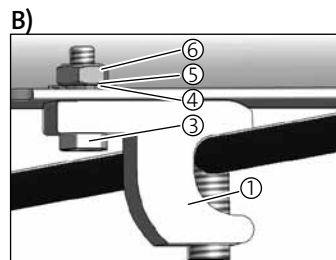
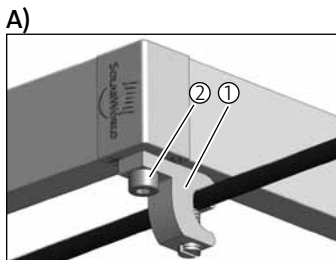
The modules can be connected to the grounding holes using a lay-in lug. The lug can be fixed:

- A) at the module corner by using a socket head cap screw, or
- B) at the hole provided in the flange by using a screw with a serrated washer, a washer and a nut.

Any grounding method and components listed according to NEC requirements are also acceptable in the US and Canada.

Table: Recommended components for grounding in the US and Canada

Item	Manufacturer/Description	Tightening torque
Lay-In lug ①	IlSCO GBL-4DB (E34440)	35 lbf-in, 4-6 AWG str 25 lbf-in, 8 AWG str 20 lbf-in, 10-14 AWG sol/str
Socket head cap screw ②	10-24, 5/8", SS 18-8	62 lbf-in (7.0 Nm)
Bolt ③	#6-32, SS	38 lbf-in (4.3 Nm)
Serrated washer ④	M5, SS	
Washer ⑤	ID 9/64", OD 3/8", SS	
Nut ⑥	#6-32, SS	



Underwriters Laboratories Information (U.S. and Canada)

The solar module electrical characteristics are within +/-10% of the module label indicated values of Isc, Voc and Pmpp under Standard Test Conditions (irradiance of 100 mW/cm², AM 1.5 spectrum, and a cell temperature of 25°C/77°F). Under normal conditions, a photovoltaic module is likely to experience conditions that produce more current and/or voltage than reported at standard test conditions. Accordingly, the values of Isc and Voc marked on this module should be multiplied by a factor of 1.25 when determining component voltage ratings, conductor capacities, fuse sizes, and size of controls connected to the PV output. Refer to section 690-8 of the National Electric Code (NEC) for an additional multiplying factor of 125% (80% de-rating) which may be applicable. Over-current protection shall be in accordance with the requirements of Article 240 of the NEC. Conductor recommendations: 8-14 AWG (1.5-10 mm²) USE-2 (nonconduit)/

THWN-2 (conduit), 90°C wet rated. Cable conduits should be used in locations where the wiring is accessible to children or small animals. Modification or tampering of diodes by unqualified personnel is not permitted. Please consult a SolarWorld Service Center for additional information regarding diode replacement/repair. To reduce the operating temperature the module has to be mounted on any surface with a minimum distance of 4 inches (1cm). In Canada the installation shall be in accordance with CSA C22.1, Safety Standard for Electrical Installations, Canadian Electrical Code, Part 1.

Suitable ambient conditions

The module is intended for use in moderate climatic conditions. The module must not be exposed to focused light. The module must neither be immersed in water nor be exposed to continuous wetting (e.g. by fountains). Exposure to salt or sulfur (sulfur sources, volcanoes) implies a risk of corrosion. The module must not be used for maritime (e.g. boats) or automotive (vehicles) purposes. The module must not be exposed to extraordinary chemical loads (e.g. emissions from manufacturing plants). If the modules are installed on stables, a distance of 1 m to ventilation openings shall be ensured; apart from this, the modules shall not be used as a direct roof panel on stables.

Appropriate installation situation

Make sure that the module meets the technical requirements of the overall system. Other system components should not exert any adverse mechanical or electrical influences on the module. Modules may bend under high loads. For this reason, sharp-edged fixing elements or other sharp objects (e.g. cable ties on mounting sections) must not be mounted near the module back side. For connection in series, only modules of the same amperage rating, for connection in parallel, only modules of the same voltage ranging may be used. The modules must not be operated at a higher voltage than the permissible system voltage. The inside opening of the frame corner element is intended for water drainage and must not be closed. For system documentation, please note the serial numbers.

Optimum installation

In order to avoid performance losses, all modules connected in series should be arranged with the same orientation and tilt angle. The modules should be installed in an all-season shadow-free area. Even partial shadowing results in yield losses and is to be avoided. Ventilation of the module back side will prevent heat build-up adversely affecting performance.

Mounting

The modules must be securely fixed at a minimum of 4 locations on the substructure. Fixing is only allowed in designated areas or at the provided mounting holes. These designated areas for fixing are located on the module long sides. They are located between 1/8 of the module length and 1/4 of the module length, measured from the module corner. Fixing the module on its narrow sides is not sufficient. In regards to "Top-Down" mounting methods, the clamping area on the module frame must be at least 130 mm² (0.20 in²) for each fixing point. The required clamping force is 100 N/m². For "Bottom-Up" mounting methods, use a stainless steel serrated lock nut and M8 (5/16") T-head bolt to secure the module to the mounting structure with the provided mounting holes. The bolts must be tightened to 20 Nm (11.8 ft-lbf). Do not drill any holes into the module. Use corrosion-proof fixing material.

Electrical connection

The modules are provided with factory-assembled cables and connectors. Do not open the junction box in any case. Connectors may only be connected under dry conditions. Make sure to avoid gaps in a plugged connection. Only singlecore solar cables with an adequate cross-section (4 mm² minimum) and appropriate connectors may be used for connecting the modules. Cables should be attached to the installation system by means of UV-resistant cable ties. Exposed cables should be protected against sunlight and damage by suitable precautions (e.g. conduits) In order to limit voltages released by indirect lightning shock, the area of all conductor loops must be reduced to a minimum. Check that wiring is correct (polarity!) prior to starting the generator.

Cleaning

On principle, the modules do not need any cleaning if the tilt angle is sufficient (> 15°; self-cleaning by rain). In case of heavy contamination, we recommend cleaning the modules with plenty of water (hose) without the addition of cleaning agents but application of a soft cleaning device (sponge). Never scrape or rub off dirt; this may result in micro-scratches.

Maintenance

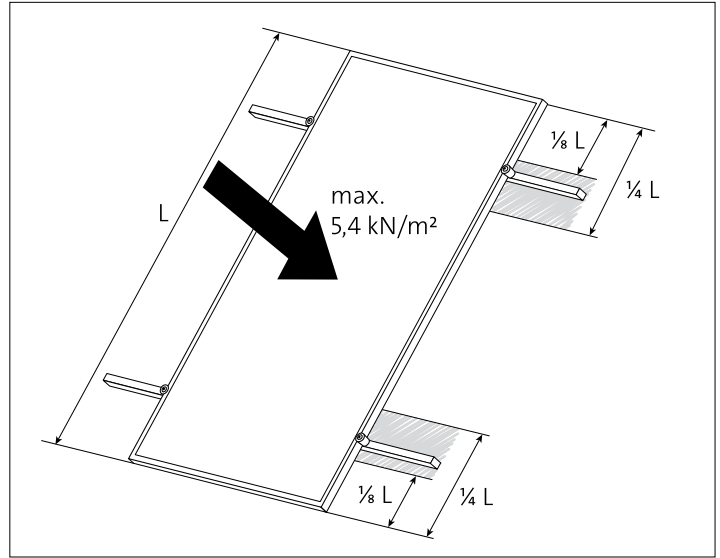
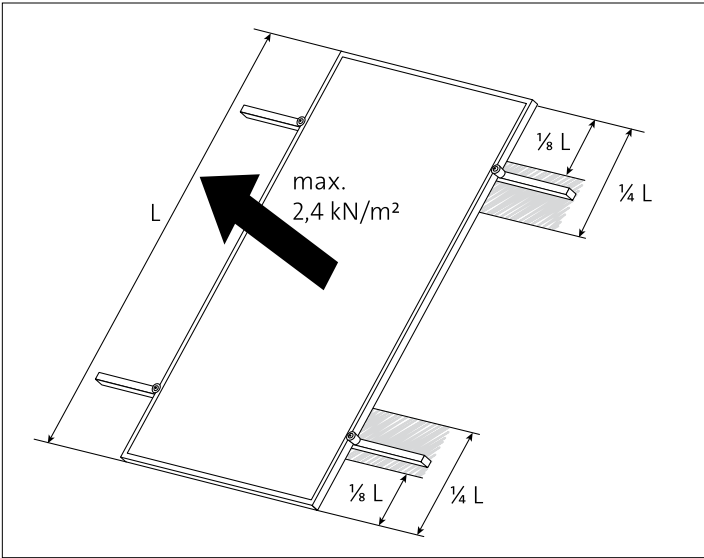
We recommend regular inspections of the system to ensure that:

1. All fixtures are securely tightened and corrosion-free;
2. Wiring is securely connected, properly arranged and free of corrosion;
3. Cables are free of damage;

Please also observe applicable standards.

Disclaimer of liability

SolarWorld AG does not guarantee the operational capability and functionality of modules if the instructions contained in the present user information are not complied with. Since compliance with this guide and the conditions and methods of installation, operation, use and maintenance of the modules are not checked or monitored by SolarWorld AG, SolarWorld AG accepts no liability for damage arising through improper use or incorrect installation, operation, use or maintenance. Furthermore, liability for infringements of patent law or of other third party rights arising from the use of the modules is excluded unless we are automatically liable by law.



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