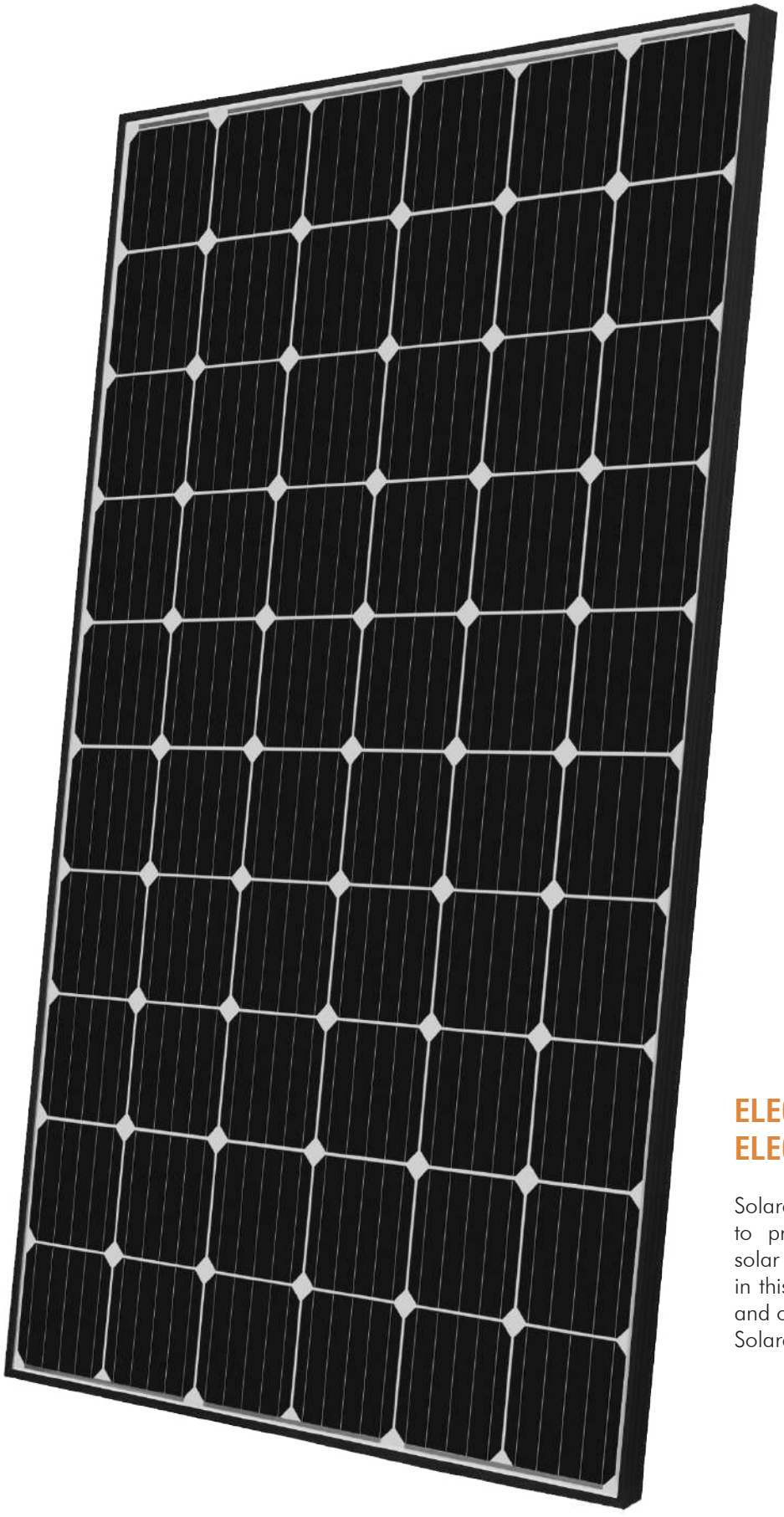
Photovoltaic modules

Use and Fitting manual

Solarday®



ELECTRIC CURRENT GENERATOR. ELECTRIC SHOCK HAZARD.

Solarday Photovoltaic modules are designed to produce continuous electric power from solar radiation. Main information is contained in this manual with respect to the safety, fitting and operating mode to be aware of prior using Solarday modules.

Summary

Solarday has been the first Italian manufacturer of photovoltaic panels for years, always characterized by its top quality and reliability.
Made in Italy monocrystalline and polycrystalline solar panels production restarted in an Italian primary manufacture, which can guarantee advanced and high performing products.
Business Partner, which has acquired ownership of the brand, produces and exclusively sells the entire line of Solarday photovoltaic panels.
We are a group of professionals who decided to put together their working knowledge in order to create a lean and responsive organization capable to catch the best market opportunities turning them into solutions for its customers.

In 2018 a new integrated production line has been installed providing to increase the declared production capacity from 80MW to 200MW. The line is composed of a new generation stringer able to realize approximately 80 modules per hour (calculation based on 60 cell modules) and with a new laminator that allows to process all quantities produced.
The new line includes 16 different control stations during the production of the module that can guarantee a hi-quality and extend the module warranty on manufacturing defects up to 20 years.
It is possible to verify for each module the real presence of microcracks in every photovoltaic cells before using them thanks to the high level of automation.
The company took actions with certification agencies to promote a power boost of the product range in order to optimize the photovoltaic plants efficiency based on the real available space.

The range of the products being marketed can be defined as follows:

. **PX SERIES**: modules assembled with polycrystalline cells of size 156,75x156,75 mm

. **SDM SERIES**: modules assembled with monocrystalline cells of size 156,75x156,75 mm

. **BPM SERIES**: modules assembled with monocrystalline cells of size 158,75x158,75 mm

. **XMP SERIES**: modules assembled with monocrystalline cells of size 161,7x161,7 mm

. **TX24:** The new photovoltaic roof tile

Photovoltaic modules mentioned above can be supplied as laminates too or with protective aluminium frame. Among Solarday modules, there is also the RL SERIES (modules assembled with double glass) and the photovoltaic tile where dedicated user manuals are available.
Modules can also be customized as per customer's requirements: the modifications can be aesthetical, of the dimensions and/or of the power output.

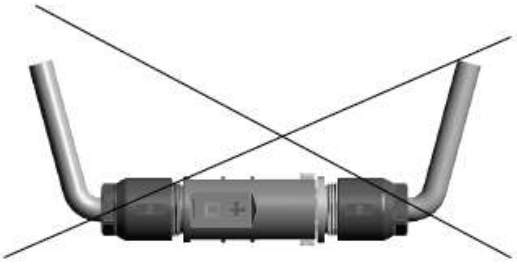
SUMMARY DATA OF SOLARDAY MODULES

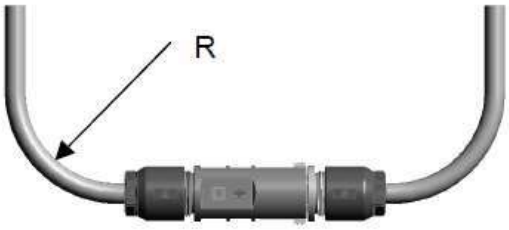
Product	Wp	Dimension LxWxh	Weight Kg	Technology	N. of cells	Frame	Colour of the Backsheet
PX60	270 - 290	1640 x 992 x 40	18	Poly	60	Yes	White
SDM60	300 - 315	1640 x 992 x 40	18	Mono	60	Yes	White
SDM60 ALL BLACK	300 - 310	1640 x 992 x 40	18	Mono	60	Yes	Black
SDM60 RED	270 - 280	1640 x 992 x 40	18	Mono	60	Yes	Black
BPM60	320 - 330	1665 x 1002 x 40	19	Mono	60	Yes	White
BPM60 ALL BLACK	315 - 325	1665 x 1002 x 40	19	Mono	60	Yes	Black
XMP60	335 - 340	1690 x 1021 x 40	19	Mono	60	Yes	White
PX72	315 - 340	1956 x 992 x 40	22	Poly	72	Yes	White
SDM72	350 - 370	1956 x 992 x 40	22	Mono	72	Yes	White
BPM72	385 - 400	1979 x 1002 x 40	22,5	Mono	72	Yes	White

Here below several **safety recommendations** to be considered while fitting photovoltaic modules.

Solarday modules are certified to be of A class: this is to say Hazardous voltage (IEC 61730: higher than di 50V DC; EN61730: higher than 120 V), hazardous power applications (higher than 240 W).
Modules classified as per the normative IEC 61730-1 and IEC 61730-2 are conforming to the safety class II.

Class of application





. In case of works on the roof (if the height is more than 3 m), it is mandatory to wear proper safety equipment conforming to the normative in force in the fitting country.

. Keep children away from dangerous zones.

. During fitting on the roof, be aware of the risk that equipment, assembling material or even photovoltaic modules may fall and injury persons. While carrying the modules on the roof, do not stress too much the frame avoiding thus jeopardizing module integrity.

. Do not use the junction box or the cables to move or transport the modules.

. Damaged modules must be handled with care and stored separately. Broken glass can cause injury if not handled with care with the proper equipment.

. Do not drop anything on the module, protect the front side of the glass as well as the rear from scratches or other damages.

. Do not paint, glue or put other product neither on the module front nor rear.

. Double check the integrity of cables and the connectors prior fitting the modules, protect them from excessive mechanical stress during fitting.

. Do not dismount, modify, adjust or remove any part installed by Solarday.

. Never install damaged modules.

. Do not stack modules outside, store them instead in dry and sheltered place.

. Do not leave the modules without any support.

. Do not step on the modules.

. It is forbidden the use of lens or mirrors to focus solar radiation on the modules.

. Electrical connexions are to be effected by qualified installer of PV systems only.

. **DANGER OF DEATH** - Never open the junction box for any reason, there is a risk of electric shock.

. Opening and/or tampering the junction box, substituting even partially the original component of the module will invalidate the warranty.

. Protect the connectors from dirt.

. Modules and connectors in particular must be dry during installation.

. Do not disconnect or connect the module while it is operating.

. Carry installation only when the modules are covered. Working with DC connectors may cause electric arcs.

. Modules are generators of electric power with their potential hazard. Even at low radiation take care of the charging voltage to avoid risks.

. A module with broken glass cannot be repaired: it cannot be in contact with other modules as the frame may cause electric shocks.

. When connecting lightning protection system, observe and respect the regulations in the country.

. After installing the modules, verify whether the cables in the junction box are under tension.

7.1 GENERAL INSTRUCTIONS

Before illustrating the various recommended types of fitting, a series of **technical considerations** regarding the choice of the best configuration are proposed in this chapter.

Remember that:

. The operating temperature of the modules is ranging between -40 and +85 ° C;

. the modules may output a power higher than the nominal power and the ambient conditions (such as snow, body of water or other reflective areas) may increase the power generated by the module;

. It is not recommended the use of modules in areas with high saline and sulphurous concentration (despite the panels are also certified for this use);

. To install the system on the roof, it is necessary to provide adequate air flow on the rear distancing the module from the roof (10 cm are recommended);

. Do not fit the modules in areas where they are immersed in water or continuously exposed to water such as irrigator or fountain;

. It is recommended to use only components and equipment suitable for a photovoltaic system for a correct installation and to ensure the durability of the system;

Photovoltaic modules are classified and sold according the watt peak output under standard conditions (STC): this means a solar radiation of 1000 W/m2, air mass spectrum of 1,5 and cell temperature of 25° C. As the real operating conditions of the module are different from the standard ones, eventual problems should be validated by parameterising the data in a laboratory.

7.2 TIPS FOR A CORRECT INSTALLATION

. Modules must be installed in a way to maximize exposure to the direct beam of the sun in order to eliminate or minimize shaded areas;

. Even partial shading will reduce the module output;

. Modules must be firmly fixed via the support structure or the installation kit properly sized for photovoltaic applications;

. Modules can be installed with any tilt angle – horizontally or vertically;

. Care should be taken to avoid low modules inclination which may cause dirt accumulation (above 15°);

. The accumulation of dirt on module surface may cause cells shading and then jeopardize module electrical performance;

. It is necessary a distance of at least 7 mm between the modules to allow thermal cooling of the frame;

. Keep the rear module area free of any object or structural element that may come into contact with the module in particular when it is operating;

. Make sure the modules are not subject to excessive wind or snow load above the values indicated in the technical datasheet neither to excessive force due to thermal expansion of the support structure.

7.3 FITTING METHODOLOGY

Fitting instructions written in the next part of this manual are not binding, they however must be followed to obtain the best result from the modules. Other configurations are allowed as far as they do respect the minimum permitted indications of wind and snow tests of the normative in force.
Modules are designed for a maximum allowable pressure of 5400Pa which corresponds to a wind speed of 130 km/h. The maximum allowable wind speed depends on the type of the module, on the fitting configuration, on the position or other factors. However, in no case modules can be exposed to high wind pressure or snow or any evenly distributed load.
It is not recommended to connect more than 20 modules in series.

Business Partner Srl makes available his experience and that of his **technical office** for any clarification for the fitting of modules not written in this manual. To avoid any problem, communication is required in case of use of alternative system mostly in case of the use of photovoltaic laminates.

Here below the fixing method most used for the installation of photovoltaic modules with frame:

1. Fit the module on the aluminium profile.

2. Insert the plate to fix the appropriate support.

3. Put the fixing plate in correspondence of the module to be installed.

4. Put the clamp as described in the picture below according to the need and the type of the fitting.

5. Fix the clamp using the specific screw.

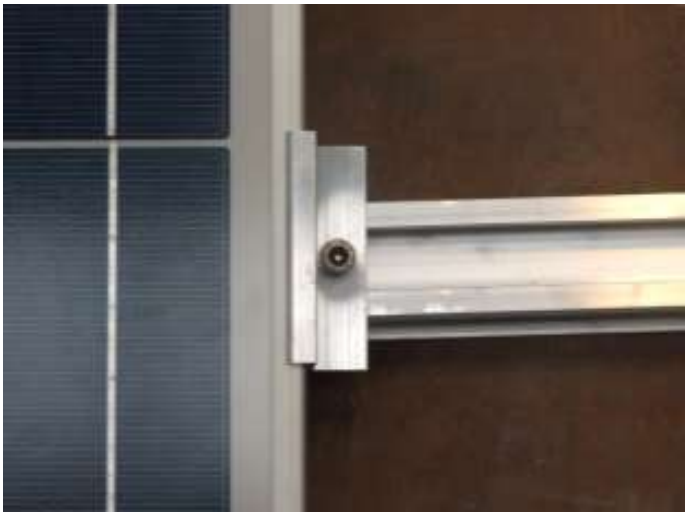
6. Make sure the screw is firm and that the installation is carried out correctly (a pressure of 8 Newton-meter is recommended).

The module is best fixed via special aluminium clamps fixed on the profile with hexagonal steel nuts and special fixing plates. More details are given in the next page with the description of the necessary distance during the installation.

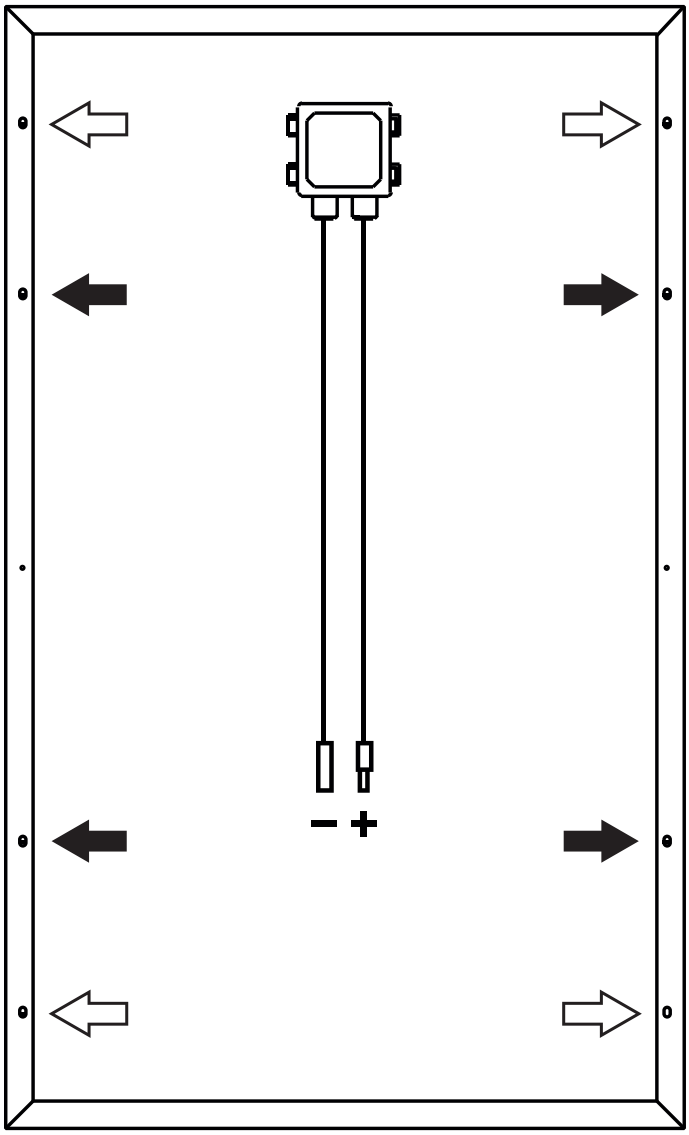
At least 4 fixing points are required for every module.

Clamp type: OMEGA For this clamp type, it is necessary to use screws which characteristics are: ∅ 8mm, length 35mm

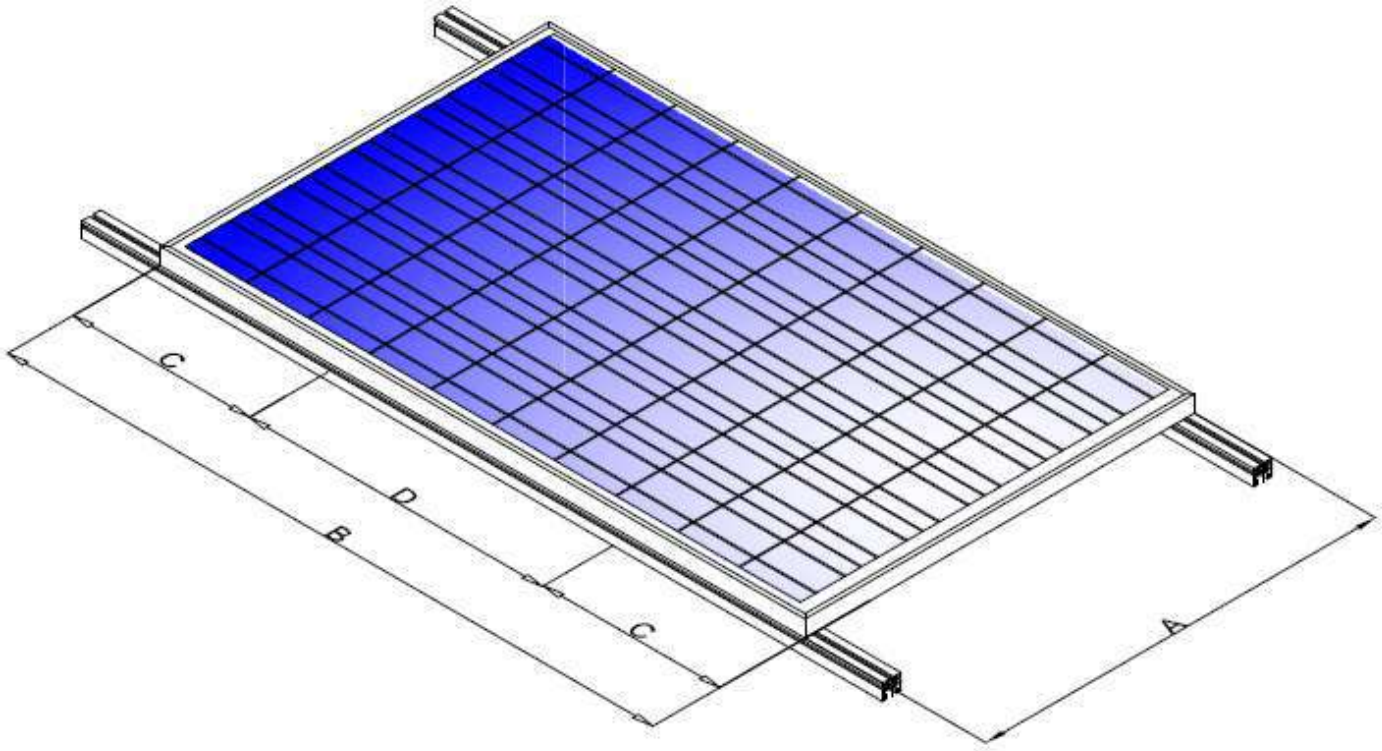
Clamp type: ZETA For this clamp type, it is necessary to use screws which characteristics are : ∅ 8mm, length 25mm



In case of direct installation through the slots on the frames of photovoltaic modules, use the slots highlighted below in black in order to ensure a better seal of the modules.



7.4 RECOMMENDED DISTANCE FOR FITTING THE MODULES OF THE SERIES PX AND SDM



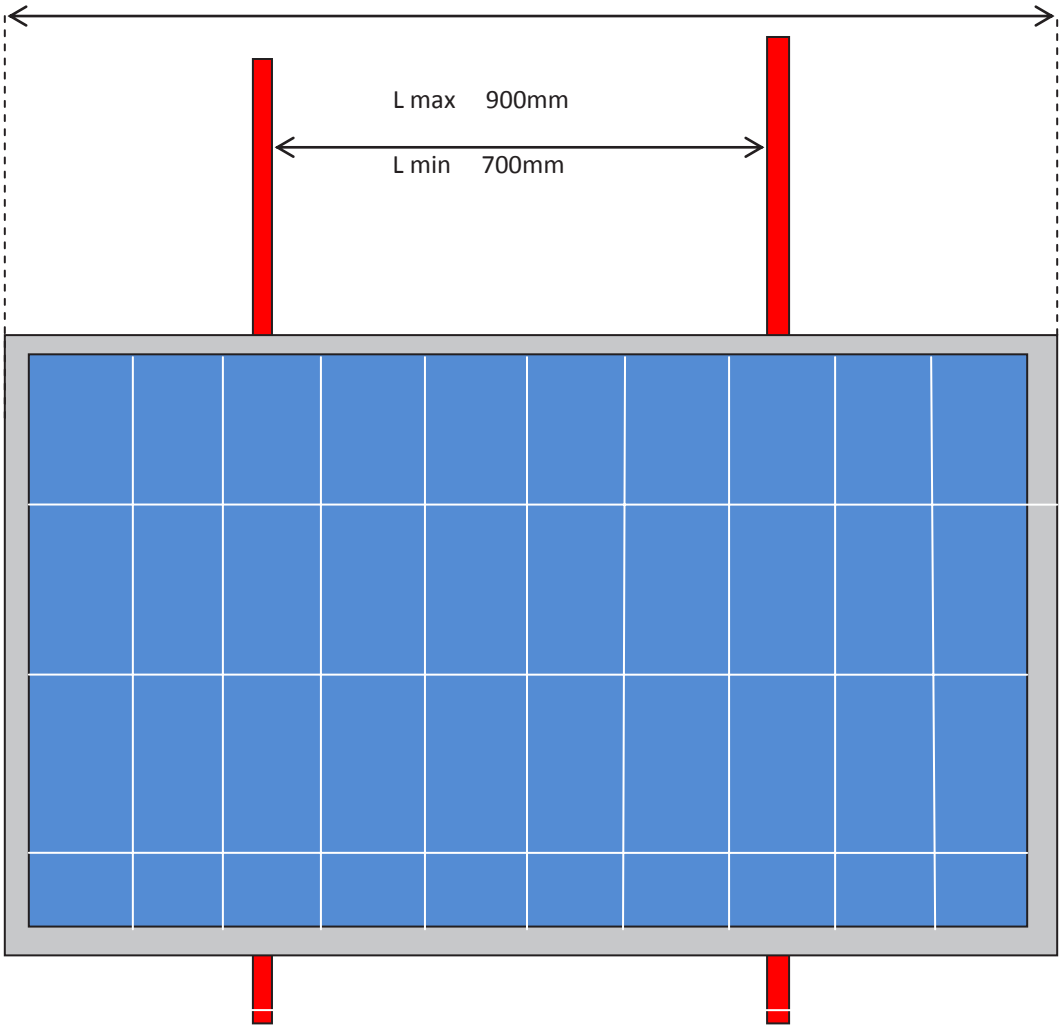
In this part fixing points must be identified.

Some center distance between modules with frame are reported below.

Type of module	A	B	C	D
PX72 / SDM72	992 mm	1956 mm	478 mm	1000 mm
PX60 / SDM60	992 mm	1640 mm	420 mm	800 mm
BPM60 / BPM72	1002 mm	1665 mm	432 mm	800 mm
XMP60	1021 mm	1690 mm	445 mm	800 mm

The optimal dimensions calculated above are subject to a tolerance of 10% with respect to the data reported according to the type of installation area.

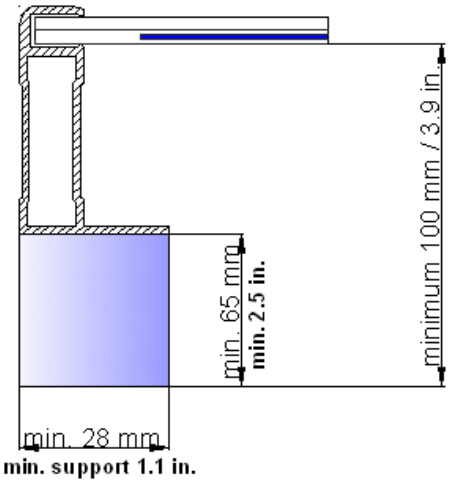
The summary scheme is reported below, taking for example a 60-cells module:



For installations requiring fixing points along the short side of the module it is advisable to keep a distance of 400 mm (± 100 mm) between the two bars.

It is advisable to consult our technical office in case of doubt or uncertainties info@solarday.it

It is advisable a distance of 7 mm between modules to allow thermal expansion of the frame.



In case of installation on a pitch, it is advisable to keep a distance of at least 10 cm from the underlying area to allow adequate ventilation of the rear of the module.

Herewith some basic instructions to respect during the **maintenance** of photovoltaic modules.

. No ordinary maintenance is required on the module. However it is advisable a periodical inspection on the modules (once a year) to control glass damage if any, the rear of the module, the frame, the junction box or the external connectors;

. Periodically check the electrical connections as they may become loose;

. Photovoltaic modules can still operate efficiently without ever being washed although it is preferable to remove the dirt of the glass using water and soft sponge to increase energy production;

. Solarday modules are made with a textured tempered front glass designed to improve energy productivity;

. Aggressive and abrasive cleaners or chemicals should never be used neither on the front nor the rear of the module;

. Alkaline-based chemicals must never be used, including solutions based on ammonia;

. Always wear insulated rubber gloves when washing and cleaning the modules;

. Do not scrape dirt, snow or ice from the modules.

Disclaimer liability

Business Partner is not liable directly or indirectly connected to the use of the information contained in this manual.

Business Partner is not liable for any infringement of patents or other third party that mat arise from the use of the photovoltaic module
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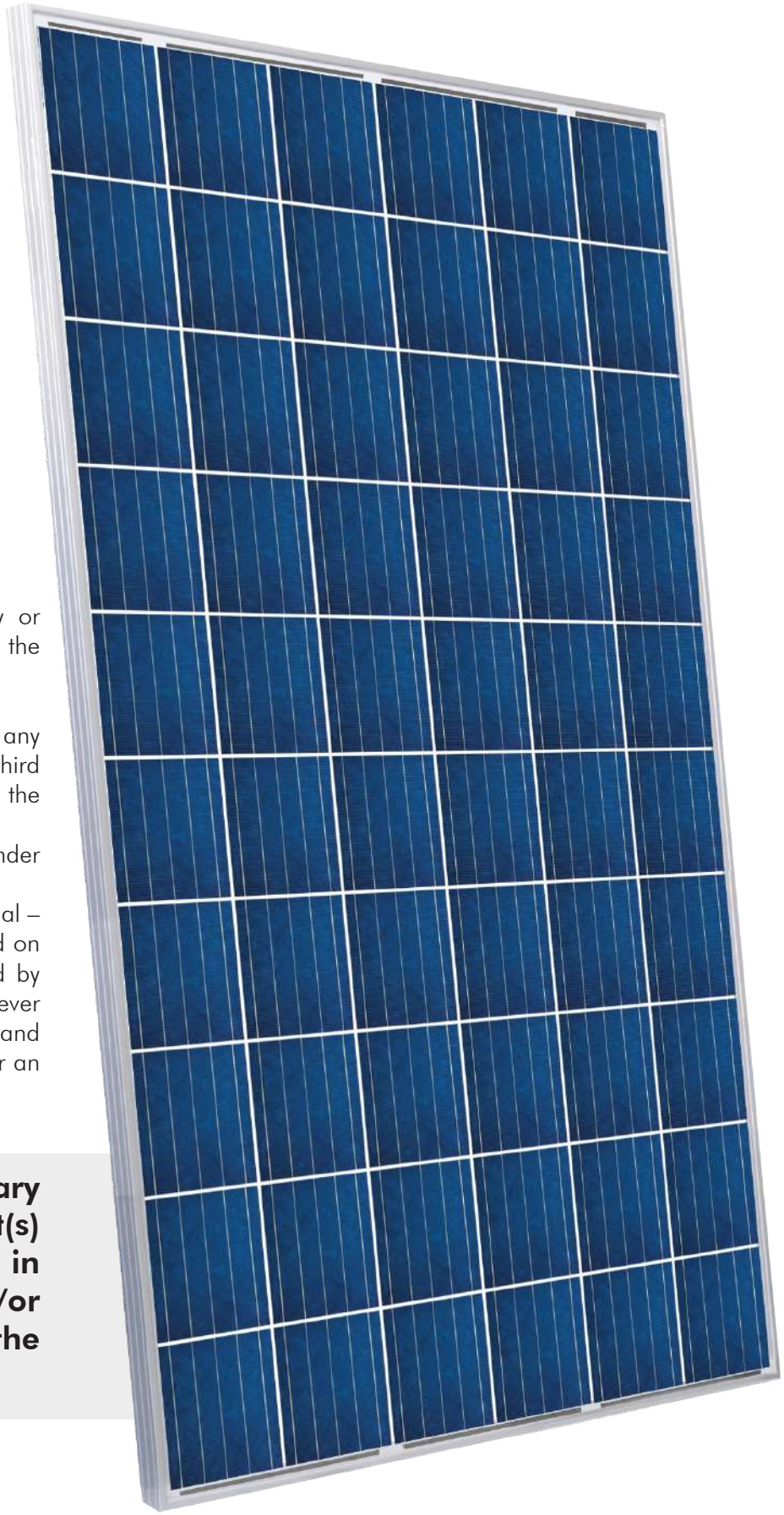

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