



Instruction Manual

Installation and maintenance of
semi-flexible GIOCOSOLUTIONS GSC/GSP S2 and 2face panel series

Manual made by:
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This manual includes information regarding safety and guidelines regarding the FLY-S2 flexible photovoltaic modules system manufactured by FLY SOLARTECH SOLUTIONS.

It is necessary to be acquainted with this manual prior to the installation, operation and maintenance of the modules. Non-compliance with the manual entries may result in the destruction of property, body injuries or, in extreme cases, in death.

LIMITED RESPONSIBILITY

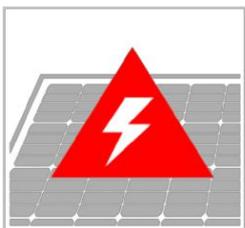
FLY SOLARTECH SOLUTIONS does not have any say in terms of the method of installation, operation and use of the FLY-S2 flexible modules. Due to the above, FLY SOLARTECH SOLUTIONS is not responsible for any losses, damage and costs resulting from incorrect installation, operation and use of the modules.

INTENDED USE

The FLY-S2 flexible photovoltaic modules are made for autonomous (off-grid) power supply systems.

GENERAL RECOMMENDATIONS

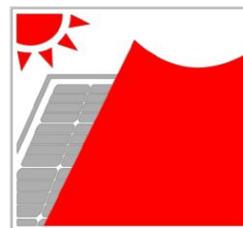
- All electrical systems must be executed according to the current legal regulations
- It is necessary to verify the technical condition of the module prior to installation
- The modules should be installed by a qualified personnel
- It is forbidden to connect power receivers directly to the photovoltaic module
- The total voltage of the system, the basis of which consists of the FLY-S2 modules, should not exceed 600 VDC.
- In real conditions, the photovoltaic modules may generate more current or more voltage than in the standard testing conditions. Due to safety reasons, during the system designing, it is necessary to consider increased rated values of the FLY-S2 modules short-circuit current (I_{sc}) and open circuit voltage (V_{oc}), by multiplying them by the 1.25 coefficient.



risk of electrical shock



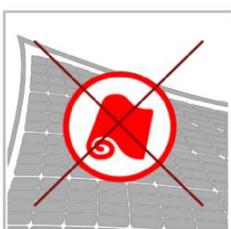
do not install the modules near sources of heat and combustible materials



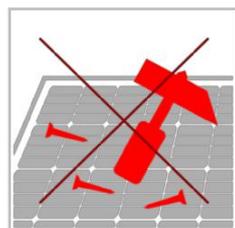
during the installation and disassembly of the module, cover the module with material which keeps the light out



install and disassemble in dry conditions



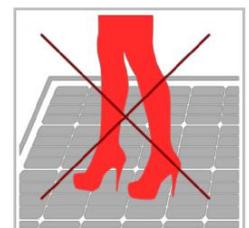
do not bend or fold



do not load the modules with tools or objects which may scratch the module's surface and damage the cells



use insulated tools



do not stand and walk on the module if it is not placed on a flat and fine surface, without visible faults, elevations and curves

**DANGER**

Take care! Contact with live module parts may cause sparks and low-intensity electrical discharges.

**DANGER**

Photovoltaic module exposed to sunlight or other source of light generates power. The voltage generated by a single module does not constitute a hazard. During the connection of several photovoltaic modules, the accumulated voltage or the intensity of the generated current may be high and constitute a hazard for health and life.

**PRECAUTIONS**

When working with the photovoltaic modules, it is necessary to use the recommended precautions.

Long-term load of the panels, incorrect transport and excess in the maximum bending radius may cause micro-cracks, which may result in hot spots.

- The photovoltaic module must be stored in its original packaging until installation.
- The modules may not be bent or folded. Do not bend the module excessively. This may cause permanent damage to the cells. The module's bending radius is 25% .
- It is necessary to keep the modules in a horizontal position when moved, hold them by their top edge and do not put pressure on the cells.
- It is forbidden to stand and walk on the module if it is not placed on a flat and fine surface, without visible faults, elevations and curves.
- Do not puncture the module, even at spots that are distant from the cells.
- Do not move the module by holding it by the connection cables.
- Do not disassemble or modify the module parts.

INSTALLATION AND DISASSEMBLY

- During the installation and disassembly of the module, it is recommended to cover the module with material which does not permeate light.
- It is necessary to use insulated tools during installation to minimise the risk of electrocution.
- The installation and disassembly must be executed in dry conditions.
- It is forbidden to load the modules with tools or objects which may scratch the module's surface and damage the cells.

PLACE OF INSTALLATION

An optimal place for the module's installation allows for maximisation of power generation, module security against damage as well as easy and safe connection of receivers which will collect the generated current.

- It is necessary to choose a place of installation that is most exposed to direct sunlight.
- It is necessary to avoid shaded places and places in which a part of the module is shaded for a long period of time.
- Do not install the modules near sources of heat and combustible materials.
- It is recommended to ensure air circulation on the module surface that is exposed to sunlight.

METHOD OF ASSEMBLY

The FLY-S2 modules may be assembled using assembly rings, double-sided tape, glue or silicone. The entire surface of the flexible panels should be supported.

ELECTRICAL CONNECTION

In the case of installation of more than one module, it is possible to use a single or parallel connection. Regardless of the connection, the modules of a single system should be equally exposed to sunlight.

SERIAL CONNECTION

The serial connection causes a voltage increase proportionate to the number of modules. In the case of the serial connection, it is forbidden to exceed the system's maximum voltage (600 VDC).

WARNING



In a serial connection, the modules must have the same parameters and derive from a single manufacturer. In case of connecting more than 2 modules, the installation should be carried out by a qualified person with proper authorisation.

PARALLEL CONNECTION

The parallel connection causes a circuit increase proportionate to the number of modules. It is recommended to connect a maximum of 2 rows of FLY-S2 modules in a parallel circuit. In case of connecting more rows, it is necessary to provide an additional security at each row (when the maximum reverse current exceeds the acceptable circuit breaker load, the serial rows must be secured before they are connected to other rows).

WARNING



Modules connected in a parallel circuit must be identical, have the same voltage and intensity and derive from a single manufacturer. It is necessary to comply with the current regulations regarding the required securities and limits of the maximum number of modules connected in a parallel circuit.

ATTENTION!



Serial chains may be connected in a parallel circuit only if the series include the same number of modules.

RECEIVER CONNECTION

A photovoltaic module may not provide direct supply to the power receiver. It is recommended to use a battery including a charging controller. The photovoltaic module and battery must be connected to the charging controller.

MAINTENANCE

The FLY-S2 modules do not require special maintenance. The module must be cleaned on a regular basis and verified periodically in terms of the mechanical and electrical connections. It is also necessary to control the system's performance by verifying the module's electrical parameters on a regular basis.

MODULE CLEANING

Dirt on the module's surface degrades its performance and may cause an analogous effect to the effect caused by the module's shading. The module must be cleaned with clean water, using a soft sponge or cloth.

WARRANTY

The FLY-S2 modules have a two-year material warranty and five-year limited power warranty. The warranty embraces material and manufacturing flaws as well as repairs executed during the warranty period. The warranty does not embrace, among others, damage caused by incorrect use, use which is non-compliant with the intended use, non-compliance to the entries of the user manual and natural wear. 5 years limited power warranty of 90% of the minimum specified power rating.

MANUFACTURER

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