



Sunpreme SmartSilicon® GxB 72-cell Series Bifacial Solar Module *Installation Manual*

SNPM-GxB 72-cell Series includes:
SNPM-GxB330, 340, 350

1. INTRODUCTION

General Installation Manual for Sunpreme Smart Silicon Photovoltaic Module SNPM-GxB 72-cell series.

Please read this manual completely before transporting, installing, wiring or operation of SmartSilicon® modules in anyway. This manual contains critical safety information for the electrical and mechanical installation of the solar panel. The information in this manual is described on the basis of Sunpreme's knowledge and experience. However the information and suggestions do not constitute a warranty.

2. DISCLAIMER OF LIABILITY

Installation techniques, handling and use of this product are beyond Sunpreme's control; therefore, Sunpreme does not assume responsibility for loss, damage or expense resulting from improper installation, handling or use. Sunpreme reserves the right to make changes to the product, the specifications, or this manual without prior notice. Sunpreme does not assume responsibility and expressly disclaims liability for damage, loss, expense arising out of, or in any way connected with installation, operation, use, or maintenance by using this manual.

Sunpreme requires the customer to obtain prior written authorization before modules can be returned.

3. REGULATORY INFORMATION

This product meets the certification and standards for UL1703, IEC 61646 & 61730 Application Class A & Safety Class II, for a maximum system voltage of 1000V with maximum overcurrent protection rating of 15A. It is the responsibility of the installer and/or system integrator to ensure compliance with all local electrical codes which may be applicable.

4. WARNINGS & SAFETY

Solar modules generate electricity when exposed to light. Modules and arrays containing modules can cause lethal shock and burn hazards.

- Only authorized qualified and trained personnel shall have access to these modules.
- Open circuiting, short circuiting, or opaque covering shall be used to disable an array or portions of an array for installation and service.
- Do not touch live terminals with bare hands.
- Do not make connections while under load. Do not disconnect under load.
- Work only in dry conditions with dry modules and tools.
- Use insulated tools for electrical connections.
- Systems should be installed by authorized qualified and trained personnel only. The system involves electricity, and can be dangerous if the personnel are not familiar with the appropriate safety procedures.
- Do not step or stand on the module, or drop module, or break the glass. Do not disassemble module or junction box. Do not place heavy objects on the surfaces.
- Employ a two or more person carry. Do not carry by its wires or junction box.

Wear non-slip, suitable gloves and protective clothing.

- Do not install the module where flammable vapors or gases are present. Do not install in corrosive environments. Salt air environments should be avoided.
- Artificially concentrated sunlight shall not be directed on the module or panel.
- Do not make connections while under load. Do not disconnect under load.

Fire Rating

If mounted over a roof, the module shall be mounted over a fire resistant roof covering rated for the application. Refer to your local authority for guidelines and regulations for building fire protection and required slope.

5. INSTALLING SMARTSILICON®GxB 72-cell SERIES MODULES

- SmartSilicon® modules may be installed in various applications, and the particular mounting is to be defined by the system designer. Care must be taken during handling and mounting the modules to prevent any impact on front surface, back surface, edges, and corners as this could result in module damage.
- Module support structures used to support SmartSilicon® module(s) should be wind rated and approved for use by the appropriate codes prior to installation. Additionally, they must be fabricated from materials that retain their structural integrity over the 25 years lifespan of the modules they support.
 - SmartSilicon® modules may be installed in portrait or landscape orientation. If the modules are mounted in portrait orientation, the use of a slide-prevention feature is required in the mounting structure to prevent the modules from sliding out of the retaining clips. A slide-prevention feature is not needed when mounted in landscape orientation.
 - A minimum 60mm clearance between the module and the mounting surface (roof, ground, or other solid surface) is required.

- A minimum of 10mm spacing must also be maintained between modules to allow for thermal expansion.
- Minimum recommended module tilt angle of 5 degrees is required to ensure drainage and enable rain water to keep the glass cleaner. The junction box edge should be at the top when mounted in portrait orientation.
- SmartSilicon® GxB 72-cell Series Modules should be mounted at the four (4) positions indicated in the drawing below.
- For flush-mount residential applications, the modules can be mounted with rails running across the modules (Figure 1). The modules must be installed using 120mm long Haticon mounting clamps (80-400-010, 80-400-011) and rails that are manufactured by Haticon Inc. Alternative mounting clamps and rails can be used, provided they have same or better performance as compared to Haticon clamps and rails specified above.
- For flat and horizontal commercial rooftop applications, the modules must be mounted using the rails and clamps configuration provided by Schletter Inc. and approved by Sunpreme. This includes tilted modules, rails running parallel to the module long edge, and clamps mounted at six (6) locations as shown in Figure 2. Please contact Sunpreme for mechanical design details and BOM.

6. MODULE WIRING

- SmartSilicon® GxB modules are pre-wired and terminated with Tyco PV4 (MC4-style) connectors.
- Connections to the module other than inter-module connection shall be made by use of compatible connectors that complies with code requirements.
 - Sunpreme recommends that all wiring be double insulated with a minimum rating of 90°C, and wiring should use flexible copper conductors where minimum size should be determined by the applicable

codes. We recommend a size not less than 4mm^2 cross section (12ga). The insulation type should be appropriate for the type of installation method used and must meet UL1703 and IEC 61730 requirements. The cables and connectors are UV and weather resistant from -40°C to $+90^\circ\text{C}$, and rated for 1000VDC (before de-rating for ambient temperature).

- Sunpreme GxB 72-cell modules are certified per UL1703 and IEC61646 for a maximum system voltage of 1000V. Modules may be wired in series or parallel to obtain desired voltages and current, but must not exceed the system rating for voltage and current (the aggregate Voc of the maximum number of modules must not exceed 1000 VDC for a 1000V application, less any de-rating factors required by code). In general, the maximum number of modules in a series is determined by system design and module temperature, and should not exceed 14 per series, or as limited by applicable Code. GxB 72-cell bifacial modules will produce up to 20% more power than the STC rating, depending on system design and project-specific albedo conditions. This additional power gain should be taken into consideration when determining optimum system sizing, string length, and selecting system components and wiring. Please refer to the product datasheet for details on module voltage and current values. Parallel connections shall not exceed 2 modules, unless additional overcurrent devices are utilized. Overcurrent protection devices should be employed (15A series rating for series or parallel). Please comply with all code and design requirements.

7. GROUNDING

Before installing your solar system, contact local authorities to determine the necessary system and/or equipment grounding. The SmartSilicon[®] GxB 72-cell modules do not

have exposed conductive parts and do not require equipment grounding. Other components of the system may still require grounding, per code requirements.

9. MAINTENANCE

SmartSilicon[®] modules are designed to require very little maintenance. Depending on local conditions, modules may need periodic cleaning to remove dirt build-up and soiling. Modules should be rinsed with water to remove dirt and soiling. Frequency of cleaning will depend on local weather conditions and the module mounting angle (low degree mounted modules may require more frequent cleaning). Once a year, have qualified service personnel check the general condition of the wiring and check to be sure that mounting hardware is tight. Loose connections may result in a damaged module or array. **(Caution: panels are generating electricity anytime there is sunlight, and cleaning/maintenance personnel must take proper precautions!)**

10. SPECIFICATIONS

The electrical characteristics are within ± 10 percent of the indicated values of I_{sc} , I_{pm} , V_{pm} , and V_{oc} , and $+3\%/-3\%$ of the indicated value P_{max} under standard test conditions (irradiance of $1000\text{W}/\text{m}^2$, AM 1.5 spectrum, and a cell temperature of 25°C).

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 I_{sc} and V_{oc} , inclusive of the bifacial gain, should be multiplied by a factor of 1.25, or more, when determining component voltage ratings, conductor amperage rating, fuse sizes, and size of controls connected to the PV output (please refer to code and design requirements).

SmartSilicon[®] modules have a maximum system voltage rating of 1000 volts DC. Some grid-tied systems operate at or near this voltage rating. The open circuit voltage of the SmartSilicon[®] module increases as the ambient temperature decreases. Maximum System voltage is computed as the sum of the open-circuit voltage of the series-connected photovoltaic modules for the lowest expected ambient temperature. *Refer to the appropriate codes for determining the maximum number of SmartSilicon[®] modules that can be placed in series.* Temperature coefficients, specific to the module of use, can be used to provide the most accurate prediction of module voltage under temperature extremes.

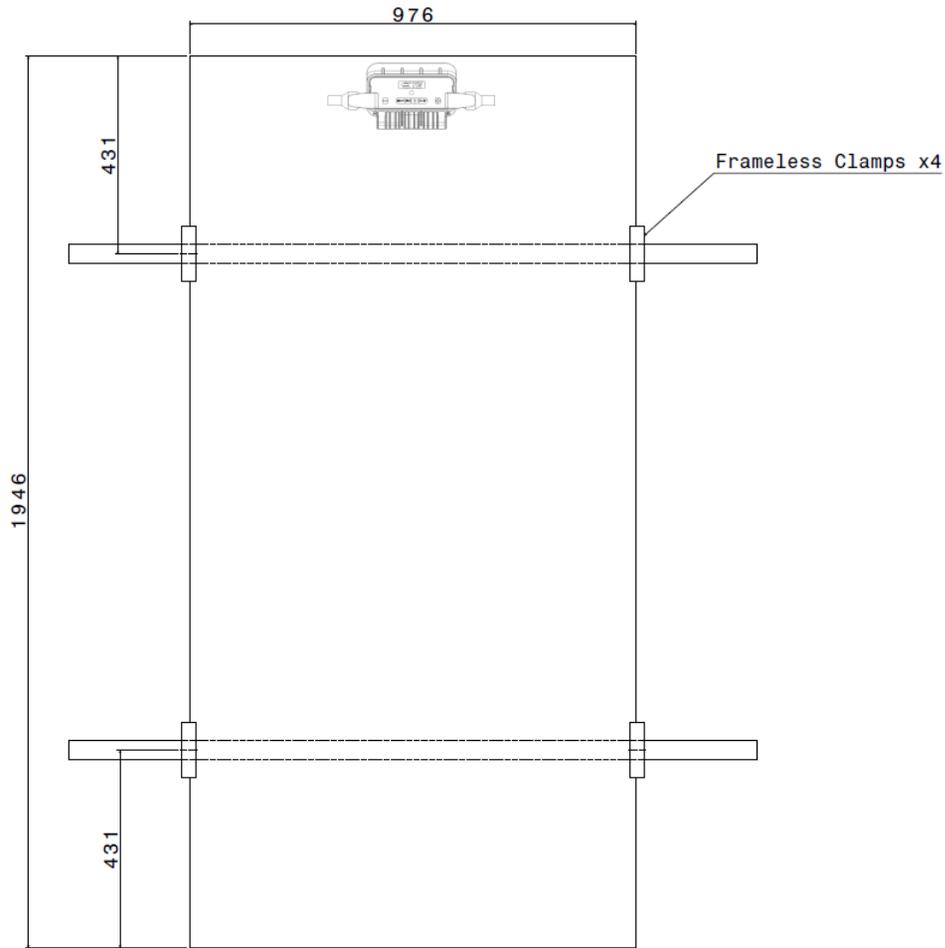


Figure 1

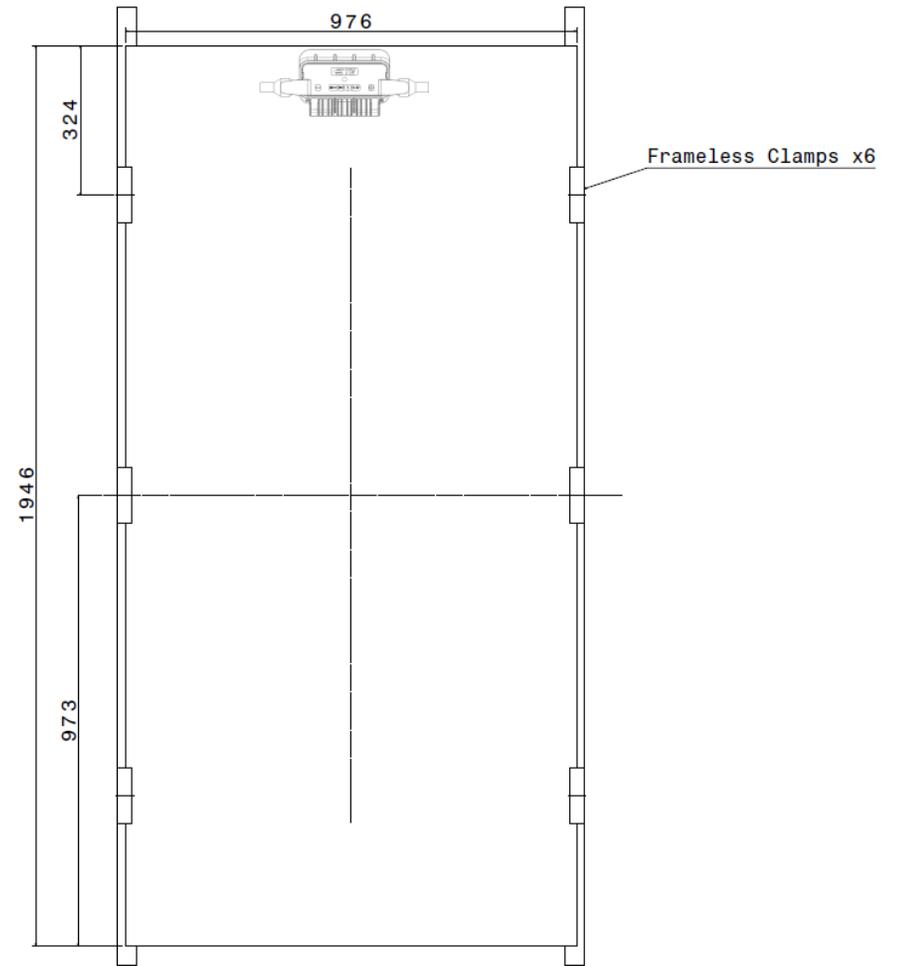


Figure 2

Sunpreme GxB 72-cell Series Module specification

ELECTRICAL SPECIFICATIONS¹	330	340	350
STC rated output P_{MPP} (W)	330	340	350
Cell Efficiency	20%	20.5%	21%
Standard sorted output	-3%/+5%	-3%/+5%	-3%/+5%
Open Circuit Voltage V_{OC} (V)	51.1	51.4	51.6
Short circuit current I_{SC} (A)	9.1	9.3	9.4
Rated Voltage V_{MPP} (V)	39.7	40.0	40.3
Rated Current I_{MPP} (A)	8.3	8.5	8.7

1: Standard Test Conditions for front-face of panel: 1000 W/m², 25°C.

MECHANICAL SPECIFICATIONS	
Dimensions	1,946 x 976 x 6 mm (6.4 x 3.2 x 0.02 ft)
Weight	27 kg
Area	1.90m ² (20.34 ft ²)
Cell type	Bifacial Mono N-type with proprietary SmartSilicon Hybrid Cell Technology (HCT)
Module type	72 Cells, Frameless double glass design with tempered glass, no grounding required
Glass	Tempered 2.9mm anti-reflective coating, low-iron
Junction Box	Tyco IP-67 rated; 1,000V UL/IEC, 3 diodes
Cables	4mm ² x 0.9 m cable: MC4 or MC4 compatible Tyco connectors

TEST OPERATING CONDITIONS	
Operating Temperature	- 40 to + 85°C
Storage Temperature	- 40 to + 85°C
Maximum Series Fuse	15 A
Maximum System Voltage	1,000VDC (UL & IEC)
Power/Sq.Ft. w/ 20% backside power boost	20.1 W / Sq. Foot
Maximum load capacity	5,400 Pa (snow load) 185 mph wind rating
Fire Class	Class C

BI-FACIAL OUTPUT	330	340	350
With 10% Backside Power Boost			
Power Output (W)	363	374	385
Module Efficiency	19.1%	19.7%	20.3%

With 20% Backside Power Boost			
Power Output (W)	396	408	420
Module Efficiency	20.8%	21.5%	22.1%

TEMPERATURE COEFFICIENTS	
Temperature coefficient P_{MPP}	-0.31%/C
Temperature coefficient I_{SC}	+0.06%/C
Temperature coefficient V_{OC}	-0.27%/C
Normal operating cell temperature (NOCT) ^o C	46C +/- 2