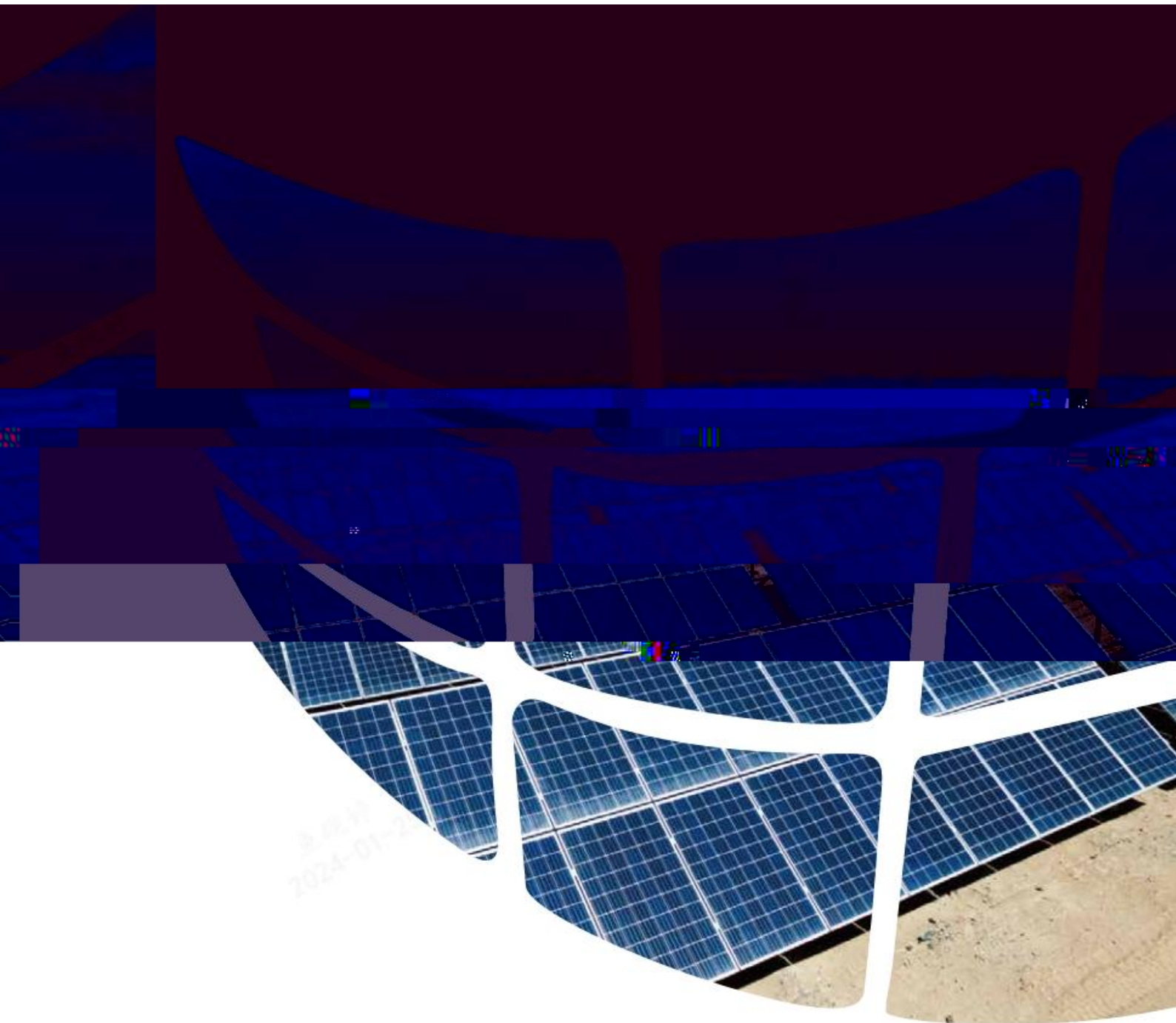




Gokin Solar

Installation manual for
Photovoltaic Module

Contents

. General Safety -----	
. Electrical Safety -----	
. Handling Safety -----	
. Fire Safety -----	
. Chemical Safety -----	
. Place and Environment -----	
. S	

- . Visual Inspection -----
- . Cleaning -----

APPLICABLE PRODUCT LIST

Category	Module Type
Single-glass GBC products	GK-3-72HG
	GK-5-60HG
	GK-5-60HGb
	GK-1-60HG
	GK-1-60HGb
	GK-5-54HG
	GK-5-54HGb
	GK-3-54HG
	GK-3-54HGb
Single-glass TOPCon products	GK-2-66HT
	GK-2-60HT
	GK-1-72HT
	GK-1-60HT
	GK-1-54HT
	GK-4-66HT
	GK-4-54HT
	GK-4-48HT
Single-glass PERC products	GK-2-66HP
	GK-2-60HP
	GK-1-72HP
	GK-1-60HP
	GK-1-54HP
Double-glass GBC products	GK-1-78HGBD
	GK-3-72HGBD
	GK-4-66HGBD
	GK-5-60HGBD
	GK-5-60HGDb
	GK-1-60HGBD
	GK-1-60HGDb
	GK-5-54HGBD
	GK-5-54HGDb

	GK-3-54HGBD
	GK-3-54HGDb
Double-glass TOPCon products	GK-2-66HTBD
	GK-2-60HTBD
	GK-4-78HTBD
	GK-4-54HTBD
	GK-4-66HTBD
	GK-4-48HTBD
	GK-3-72HTBD
	GK-3-54HTBD
	GK-1-78HTBD
	GK-1-72HTBD
	GK-1-60HTBD
	GK-1-54HTBD
Double-glass PERC products	GK-2-66HPBD
	GK-2-60HPBD
	GK-1-72HPBD
	GK-1-60HPBD
	GK-1-54HPBD

Contents of this document are subject to change without notice.

For the latest document please refer to Gokin Solar official website: www.gokinsolar.com

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01 Introduction

First of all, thank you very much for choosing Gokin Solar Co., Ltd.'s photovoltaic modules (hereinafter referred to as "modules").

This installation manual contains important electrical and mechanical installation information as well as safety information that you must be familiar with, providing important safety instructions for the installation, use and maintenance of solar modules. Users, installation, and maintenance personnel must read this manual carefully and strictly abide by it. Failure to comply with these safety guidelines may result in death, injury or property damage.

The installation and operation of solar modules requires professional skills, and only qualified professionals can perform this work. Please read the safety and installation instructions before operating, installing and maintaining the modules, and keep this manual in a safe place for future reference (maintenance and maintenance), and the installer must inform the end customer (or consumer) of the above matters accordingly.

Gokin reserves the right to change this installation manual without prior notice. You are advised to visit the Gokin official website for the latest version installation manual.

This installation manual does not have any warranty meaning, either express or implied. Gokin shall not be liable for any product defect or destruction, personal injury or property damage caused by any operation during the disposal of modules (including but not limited to disassembly/packaging, loading and unloading, handling, transportation, storage, installation, connection, disassembly, operation and maintenance, etc.). Failure by the customer to follow the requirements set forth in this manual in the installation of modules may result in the invalidation of the limited warranty provided to the Customer. Gokin shall not be liable for any infringement of patent rights or rights of third parties caused by the use of modules. At the same time, the suggestions in this manual are tested and verified by practice, and the purpose is to improve the security and stability of the module during installation and operation.

02 Laws and Regulations

Mechanical and electrical installation of photovoltaic modules should refer to the corresponding regulations, including electrical law, construction law and electrical connection requirements. These regulations vary depending on the installation location, and requirements may vary depending on the voltage, current nature (AC or DC) of the installed system. Please contact your local

than V or power greater than W systems.

For your safety, please do not perform installation and maintenance work without safety precautions, including but not limited to fall protection, ladders or stairs, and personal protective equipment.

For your safety, do not install or handle modules in dangerous or harsh environments, including but not limited to strong winds, rain, snow, or dust storms.

Please ensure that you install or handle the integrity of the modules, do not use or install damaged modules, including but not limited to the surface (back) glass is not damaged, the backplane is not broken, the junction box lid is kept closed, the cables and connectors are not broken, and there is no bare metal.

All installation work must be in full compliance with local regulations and corresponding national or international electrical standards.

3.2 Electrical Safety



No matter whether the module is connected to the system or not, appropriate protective measures should be taken when touching the module or entering the power station, such as: insulation tools, safety hats, insulation gloves, safety belts and insulation shoes, etc., to avoid direct contact with V or higher DC voltage, V or higher DC voltage is potentially fatal.

The module has no switch and can only be stopped by removing the module from light (for example, by shielding it with cloth, cardboard, or a completely opaque material).

In some cases, the open circuit voltage or short circuit current generated by the module exceeds the corresponding values tested under its standard test conditions (STC: irradiance W/m², module temperature °C, atmospheric mass 1.5). Therefore, the electrical design and calculation of the system need to be determined by a qualified electrical engineer, and reasonable coefficients should be multiplied when calculating the module rated voltage, rated current, safety fuse and control specifications connected to the PV output.

Under normal conditions, a photovoltaic module is likely to experience conditions that produce higher current and/or voltage than reported at standard test conditions. Accordingly, the values of I_{sc} and V_{oc} marked on this PV module should be multiplied by a factor of 1.25, when determining component voltage ratings, conductor current ratings, and size of controls (e.g. inverter) connected to the PV output.

Use dry tools to install or maintain modules in dry conditions. Do not touch modules when they are wet unless wearing appropriate anti-electric shock equipment; When cleaning modules, follow the instructions in this manual.

To avoid the risk of arcing and electric shock, do not disconnect the module from any electrical appliance while in operation. A faulty connection can also cause arcing and electric shocks. Connectors must be kept dry and clean to ensure they are in good working order. Do not insert other metal objects into the connector or make electrical connections in any other way.

When a grounding alarm occurs in the system, wear protective devices and disconnect the system from the faulty module under safe conditions. Do not touch other parts of the module to avoid potential electric shock.

Only use compatible connectors to connect modules or connect modules to other devices. Removing the connector will result in loss of product warranty.

3.3 Handling Safety



To ensure the safety of modules during transportation and storage, unpack modules after they arrive at the installation site.

When stacking modules, strictly comply with the upper limit on the number of layers printed on the packing case. Do not stack more than two layers of vertical packages on the short side, but allow stacking of vertical packages on the long side.

During the storage process, protect the package from damage, and store the module in a dry and ventilated environment to avoid direct sunlight and humidity. If the modules are stored in an uncontrolled environment, they shall not be stored for more than months and additional measures shall be taken to protect the modules from moisture or sunlight.

If the modules will not be installed within a short time after unpacking, the remaining modules should be placed horizontally on the tray in the form of border alignment, and the number of stacked pieces should not exceed . This temporary storage method does not allow secondary transfer; If a secondary transfer is required, place scattered modules of the same version together according to the number and placement of the whole package before unpacking, and secure the modules in the manner before unpacking with a packing tape (recommended pulling force: N). Finally, apply moisture-proof and dustproof measures before the secondary transfer.

When unpacking the modules, please follow the Gokin official packing and unpacking instructions.

Do not wear metal rings, watches, earrings, nose rings, lip rings or other metal materials when installing or repairing the photovoltaic system.



In any case, do not carry a module by lifting its wires and junction boxes. You can hold the frame of the module while carrying it.

Do not deform or bend modules due to factors other than their own weight during transportation or installation.



Do not stand, sit, trample, walk or jump on the assembly.

Do not apply excessive loads to modules or twist modules.

Disassemble or remove any part of the assembly, including but not limited to nameplates, labels, junction boxes, connectors, frames, etc.

Do not paint or apply any other adhesive to the surface of the module.

Drilling in the frame of the module is prohibited, which will result in a reduced load resistance of the

module and will lose the limited warranty of the module.

Do not damage or scratch the front or back of the module, which may affect the safety of the module. If the front or back of the module is damaged, do not use the module.

Do not drop or stack heavy objects, tools or sharp objects equal to modules.

Do not pull hard. Scratch or bend the cable too much, otherwise the insulated part of the cable will be damaged, resulting in leakage or electric shock. (The minimum bending radius of a cable is 100 mm.)

Do not insert any conductive material into the connector of the module.

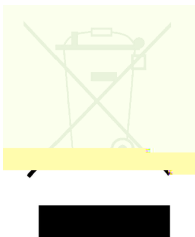
Do not use mirrors or other magnifying glasses to artificially focus sunlight on the modules.

It is prohibited to carry and secure modules by supporting them with the front or back of the modules, such as overhead modules, back modules, etc.

Do not repair modules by yourself.

Do not use damaged modules.

Do not expose modules or junction box connectors to unauthorized chemical substances. Including but not limited to gasoline, white flower oil, activating oil, mold temperature oil (e.g. KV 100), lubricating grease (e.g. Mol



instructions. For fire safety requirements and guidance for buildings and structures and support systems at the project site, please consult the relevant local agencies and support suppliers.

Use appropriate modules such as fuses, circuit breakers, and ground connectors according to local regulations.

Do not install or use modules near open flames or flammable or explosive objects.

Do not use water to extinguish the fire when the power supply is not disconnected.

3.5 Chemical Safety

In some coastal installation scenarios, the modules of corrosion protection products have certain properties that may pose a safety risk to the personnel installing the modules. Gokin urges anyone involved in or close to corrosion protection solutions to obtain a Material Safety Data Sheet (MSDS) for the selected corrosion protection application.

Whether you choose a fluorocarbon solution or a butyl tape product, read this user manual carefully and strictly follow it. Special protective equipment may be required before or during operation. Please refer to the Material safety data sheet of the product.

04 Installation Condition

4.1 Place and Environment

The modules cannot be used in space.

Do not manually focus sunlight with mirrors or magnifying glass onto modules.

Gokin modules shall be installed on proper buildings or other appropriate places (such as ground, garage, roof, PV tracking system) but shall not be installed on any vehicles.

Do not install modules at places that are possible to be flooded.

Module[T] max:

Gokin suggests that modules be installed in the working environment with the temperature of - to of which is the monthly average highest and lowest temperature of the installation sites. The extreme working environment temperature for modules is - to .

Make sure that installed modules do not suffer wind or snow pressure that exceeds the permissible maximum load limit.

Modules shall be installed in places free from shadows throughout the year. Make sure there are no light-blocking obstacles in the installation sites.

Carry out lightning protection for modules installed in places with frequent lightning and thunder.

Do not install modules in places with possible inflammable gases.

Modules cannot be used in environments with too much hails, snows, flue gas, air pollution and soot or in places with strong corrosive substances such as salt, salt mist, saline, active chemical steam, acid rain, **or other** corrosive substances modules, affecting modules' safety or performance.

Please take protective measures to ensure reliable and safe installation of modules in severe

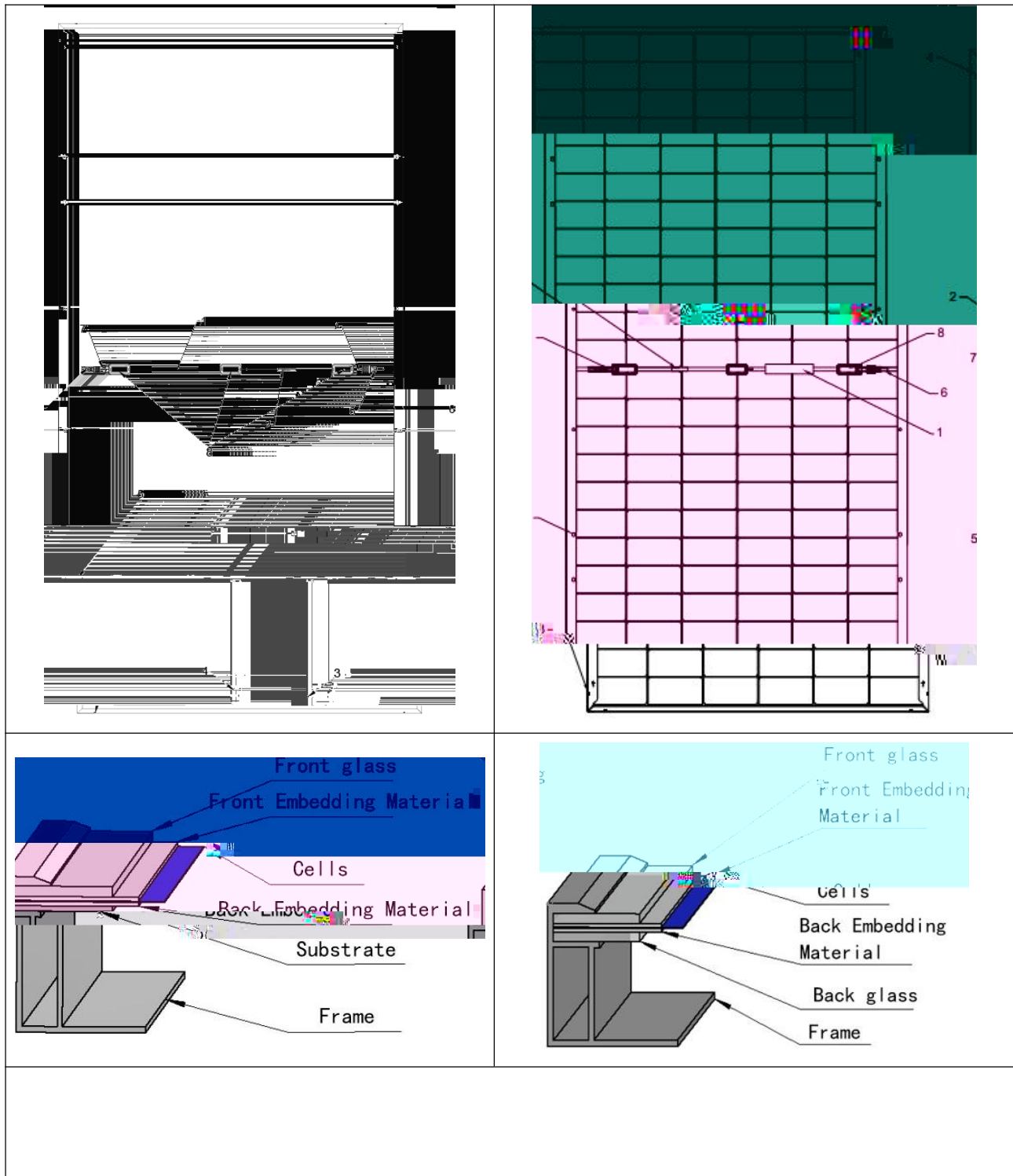
environments such as heavy snow, cold and strong wind or islands close to water and salt mist or deserts.

the corrosion may still occur where the modules frame is connected to the bracket or where the grounding is connected. Gokin modules can be installed m away from the ocean side, and related parts and components should be protected with anti-corrosion measures.

modules are installed at altitudes below m.

4.2 Selection of Tilt Angles

Tilt angle of PV modules refer to the included angle between module surface and horizontal ground. The module will obtain the maximum power output when directl w



Three labels on the module contain the information below:

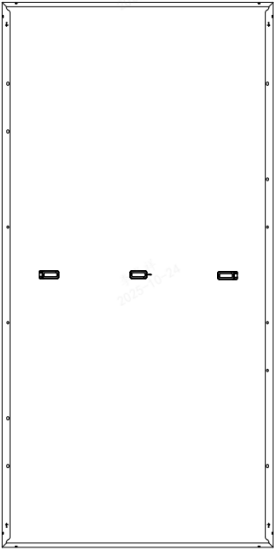
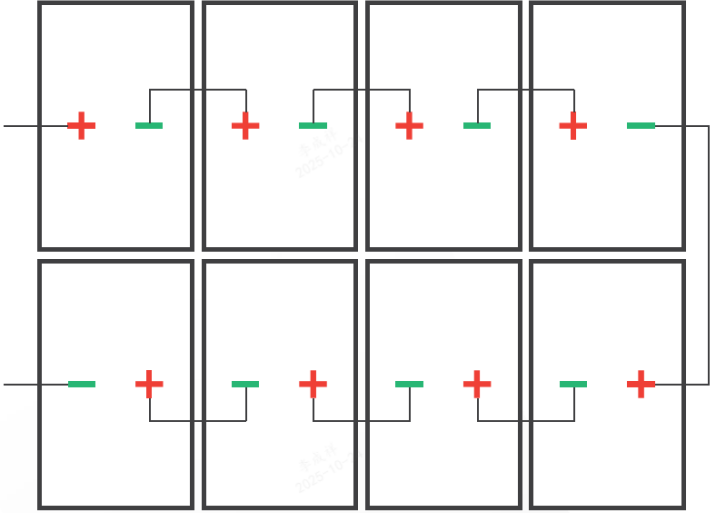
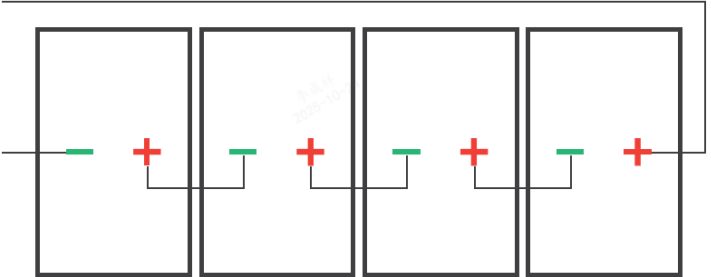
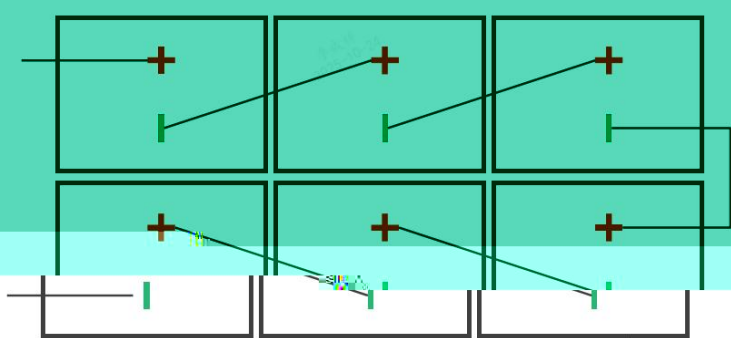
.Nameplate: Nameplate is placed on rear side of the module, which is printed with information such as product type, rated power, rated current, rated voltage, open circuit voltage, short circuit current under testing conditions, certification indicator, maximum system voltage, etc.

.Current classification label: Rated working current. (H indicates High, M indicates Medium, L indicates Low)

.Serial Number label: A unique serial number which is laminated inside the module permanently which can be found in the front of the module. There is another same serial number beside the module nameplate.

5.2 Wiring method

The Gokin component junction box is located in the middle. Refer to the table below for various component connection methods.

	Portrait installation: Standard short cable length	 C-type Wiring (Note: One end of the single row needs to be extended)
	Portrait installation: Standard short cable length	 Linear Wiring (Note: One end of the single row needs to be extended)
	Landscape installation: Standard long cable length or customized length	

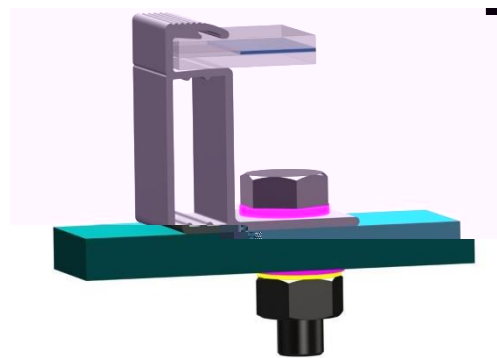
06 Mechanical Installation

Installation safety instructions: recommend people to handle the PV modules during the installation.

Modules can usually be mounted by using the following methods: fixed installation-mounting with bolts, fixed installation-mounting with clamps and tracker installation.

Note:

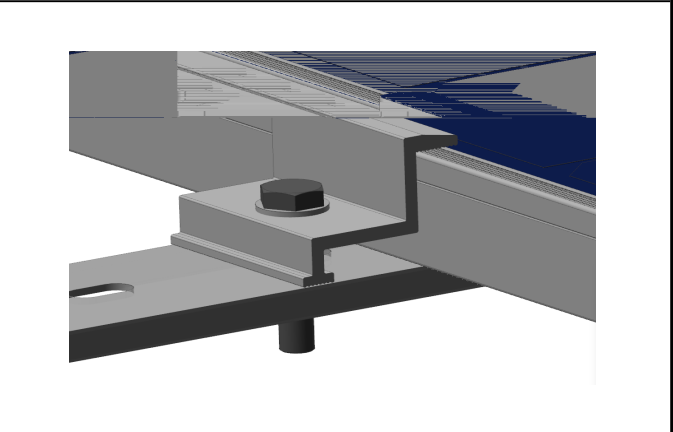
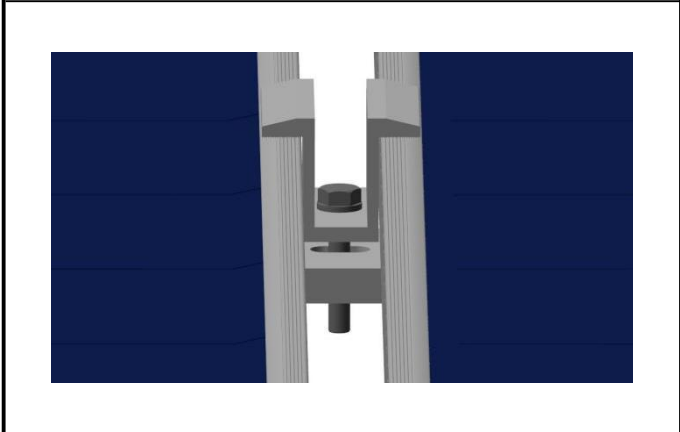
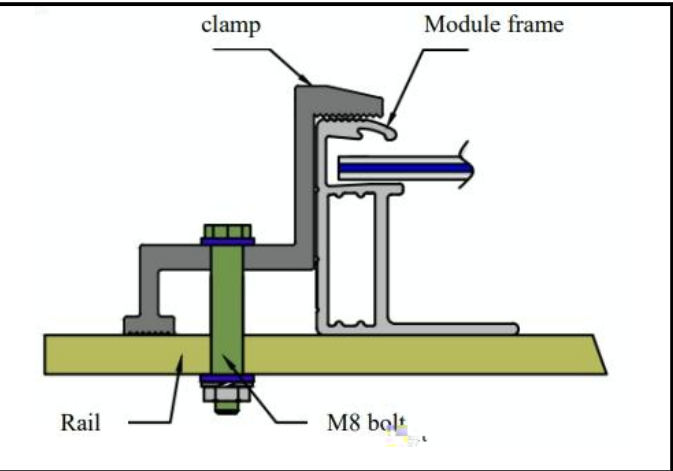
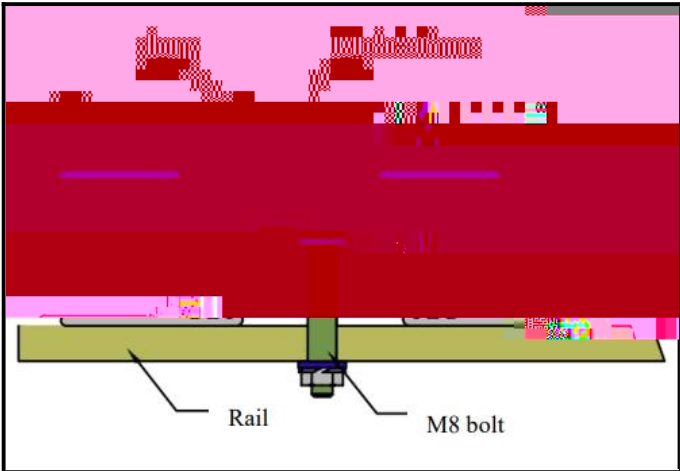
All installation methods herein are on ed



Mounting hole (mm)	Recommended bolt size
x	M
x	M

6.2 Fixed installation-mounting with clamps

The clamps must not be installed in contact with the front glass of the module and must not deform the module frame. Ensure that the clamps do not create a shadow on the module. Under no circumstances may the frame be altered. When choosing the mounting method for the clamps, make sure that there are at least four clamps on each module. The different mounting positions of the clamps determine the maximum load capacity of the module. Depending on the local wind and snow loads, if there is a possibility of excessive load combinations, additional clamps are required to ensure that the module has enough load carrying capacity. The torque value applied during installation of the clamps should be high enough to securely hold the module (consult installer or bracket supplier for exact torque value). Clamp dimensions and contact area must follow the values shown in Table .

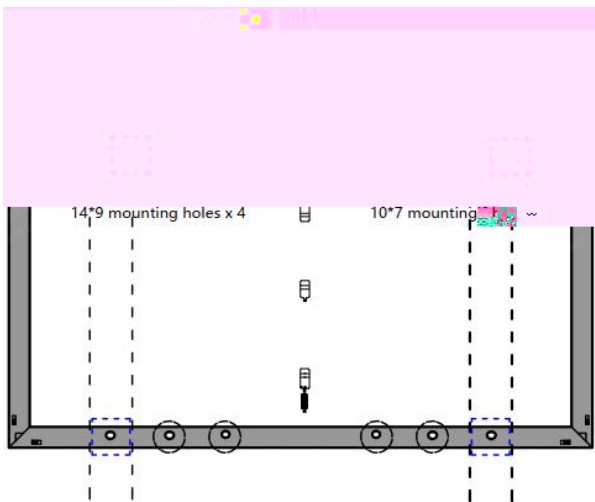


Middle modules installation

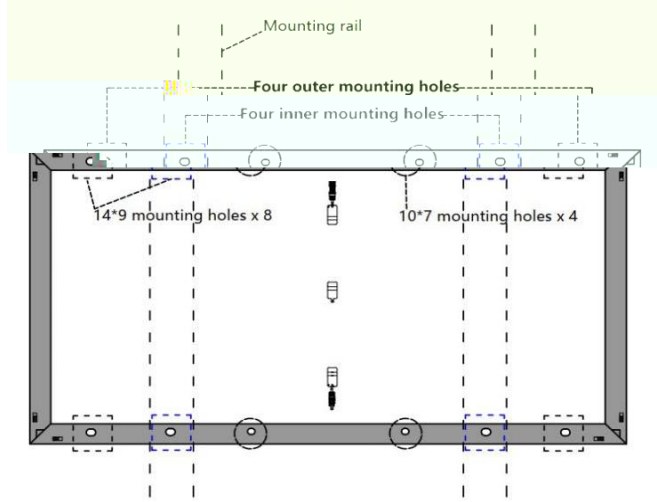
Fringe modules installation

6.3 Installation and Mechanical Load of Mono-facial Module

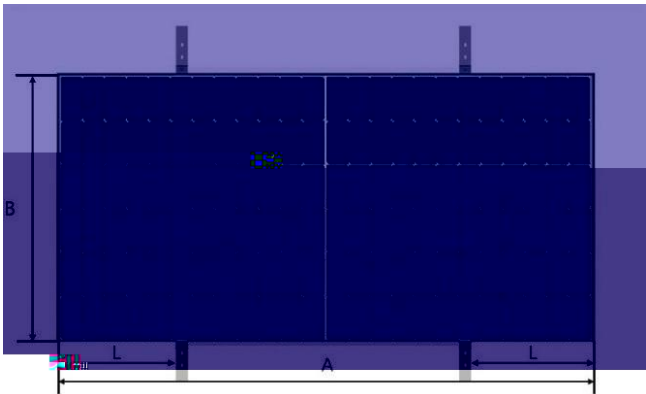
Mono-facial modules can be mounted by bolts or clamps. The mounting method and maximum test load are shown asfollow (The unit of distance and length in the table below is millimeter (mm), and the unit of



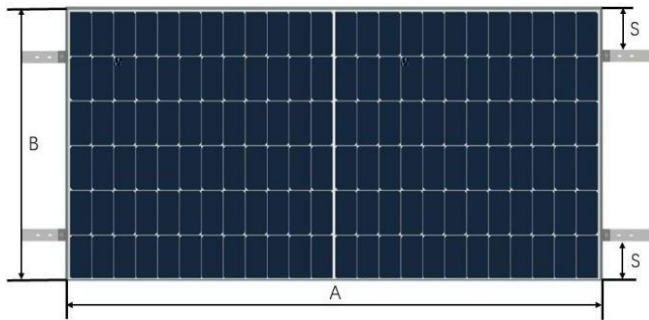
Outer four-hole bolts mounting
Mounting rails cross the long frame(Method)



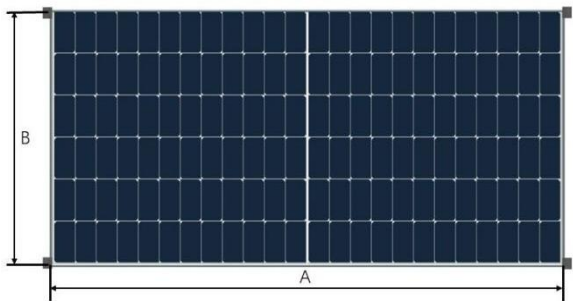
Inner four-hole bolts mounting
Mounting rails cross the long frame(Method)



Clamps mounting
Mounting rails cross the long frame(Method)



Clamps mounting
Mounting rails cross the short frame(Method)



Clamps are mounted at the corners of short frame(Method)

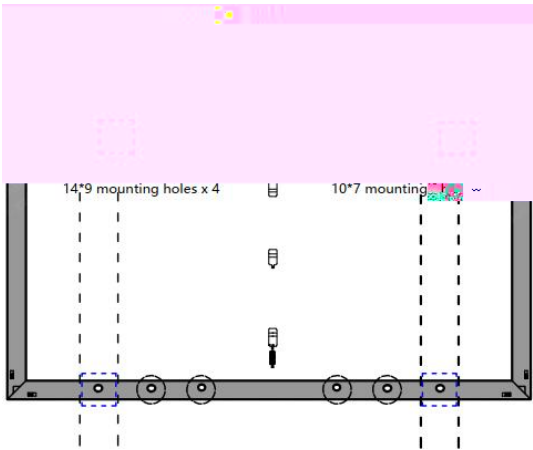
No.	of	Module Type	Labeling Method	Pole Mounting		Clamp Mounting		
				Mounting rails cross the long side		Mounting rails cross the long side	Mounting rails cross the short frame	Clamps mounted at the corners of the short frame
				the long side		the long side	the short frame	the corners of the short frame
				Outer Four-hole	Inner Four-hole	$L=1/4A \leq 50$	$150 < S < 250$	
				Method 1	Method 2	Method 3	Method 4	Method 5
		GK-1-54HP		± 2400	+5400, -2400	+5400, -2400	± 2400	+2400, -1800
		GK-1-60HP		± 2400	+5400, -2400	+5400, -2400	± 2400	+2400, -1800
		GK-1-54HT		± 2400	+5400, -2400	+5400, -2400	± 2400	+2400, -1800
		GK-1-60HT		± 2400	+5400, -2400	+5400, -2400	± 2400	+2400, -1800
		GK-4-48HT		± 2400	+5400, -2400	+5400, -2400	± 2400	+2400, -1800
		GK-4-54HT		± 2400	+5400, -2400	+5400, -2400	± 2400	+2400, -1800
		GK-5-54HG		± 2400	+5400, -2400	+5400, -2400	± 2400	+2400, -1800
		GK-5-54HGb		± 2400	+5400, -2400	+5400, -2400	± 2400	+2400, -1800
		GK-3-54HG		± 2400	+5400, -2400	+5400, -2400	± 2400	+2400, -1800
		GK-3-54HGb		± 2400	+5400, -2400	+5400, -2400	± 2400	+2400, -1800
		GK-1-60HG		± 2400	+5400, -2400	+5400, -2400	± 2400	+2400, -1800
		GK-1-60HGb		± 2400	+5400, -2400	+5400, -2400	± 2400	+2400, -1800
		GK-5-60HG		± 2400	+5400, -2400	+5400, -2400	± 2400	+2400, -1800
		GK-5-60HGb		± 2400	+5400, -2400	+5400, -2400	± 2400	+2400, -1800
		GK-1-72HP		+5400, -2400	+5400, -2400	+5400, -2400	/	/
		GK-1-72HT		+5400, -2400	+5400, -2400	+5400, -2400	/	/
		GK-2-60HP		+5400, -2400	/	+5400, -2400	/	/
		GK-2-60HT		+5400, -2400	/	+5400, -2400	/	/
		GK-2-60HP		+5400, -2400	/	+5400, -2400	/	/
		GK-2-66HP		+5400, -2400	/	+5400, -2400	/	/
		GK-2-66HT		+5400, -2400	/	+5400, -2400	/	/

6.3 Installation and Mechanical Load of Bifacial module

Bifacial modules can be mounted by bolts or clamps. The mounting method and maximum test load are shown as follow(The unit of distance and length in the table below is milimeter (mm), and the unit of pressure is Pascal (Pa)).



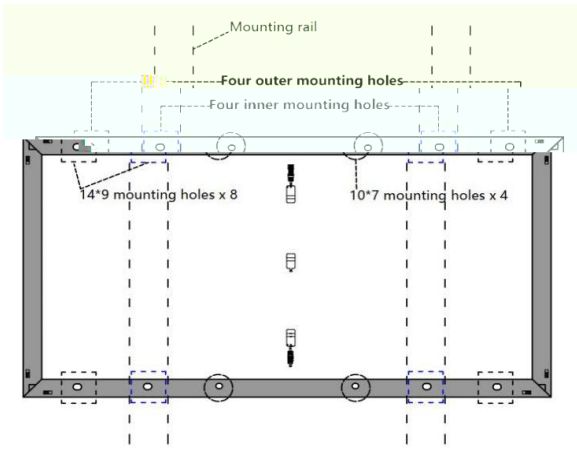
Outer Four-hole bolts Mounting
Mounting rails parallel the long frame(Method)



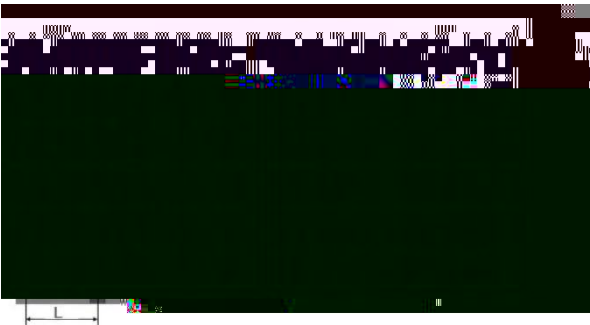
Outer four-hole bolts mounting
Mounting rails cross the long frame.(Method)



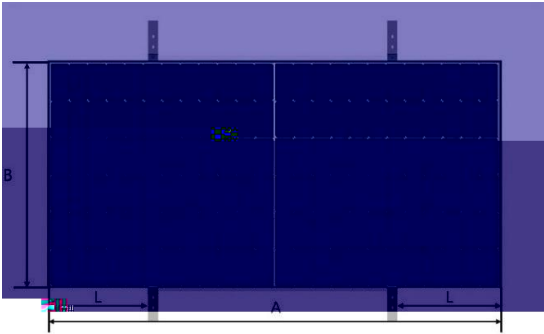
Inner Four-hole bolts Mounting
Mounting rails parallel the long frame(Method r)



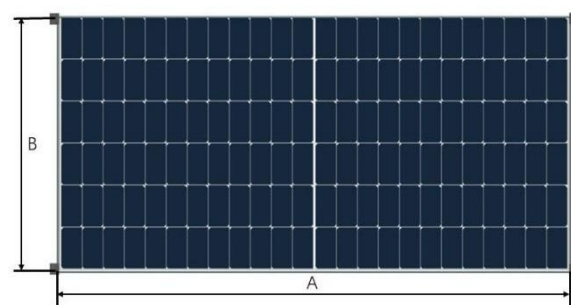
Inner four-hole bolts mounting
Mounting rails cross the long frame(Method)



Clamps mounting
Mounting rails cross the long framc @ rM



Clamps Mounting
Mounting rails cross the long frame(Method)



Clamps are mounted at the corners of short frame(Method

07 Grounding

To ensure safety and protect modules from lightning strikes and static electricity, ensure that the module frame is grounded.

Gokin recommends always referring to local ends

Gokin PV modules can be grounded using a third-party grounding device, but the grounding must be proven reliable.

08 Electrical Installation

8.1 Safety Instruction

All wiring installation should be carried out by qualified installers in accordance with local electrical construction codes, procedures, and regulations.

Modules can be connected in series to increase the operating voltage by connecting the positive terminal of one module into the negative terminal of the next one. Before connecting, always ensure that the contacts are corrosion-free, clean, and dry.

The product can be irreparably damaged if an array string is connected in reverse polarity to another. Always verify the voltage and polarity of each string before making a parallel connection. If a reversed polarity or a difference of more than 10V between strings was detected, check the string configuration before connection.

The standard copper cables applied in Gokin Solar modules are UV resistant and with a crosssectional area of 4mm² (12 AWG). All other cables applied to connect the DC system should be provided with a similar or larger wire cross section. Gokin Solar recommends that all cables are routed in appropriate conduits or rails where water does not accumulate.

The string voltage must not be higher than the maximum system voltage, as well as the maximum input voltage of the inverter and the other electrical devices installed in the system. In order to ensure this, the open circuit voltage of an array needs to be calculated at the lowest expected local ambient temperature, which can be determined using the following formula:

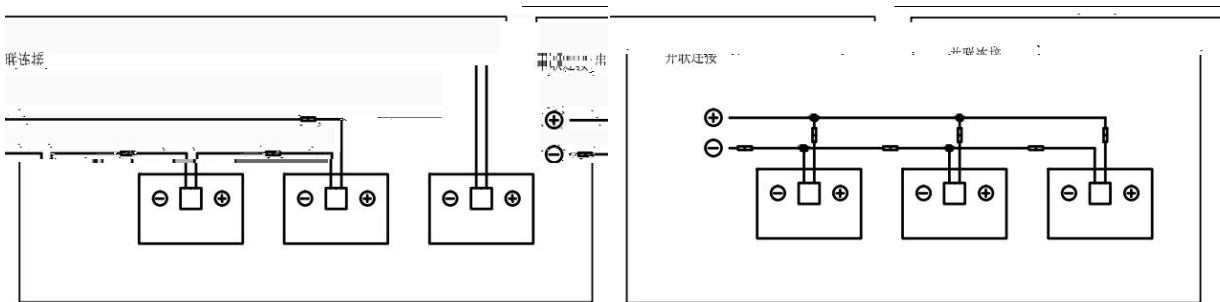
$$\text{Max System Voltage} = N \times [V_{oc} - (V_{oc} \times \alpha \times \Delta T)] \text{ where}$$

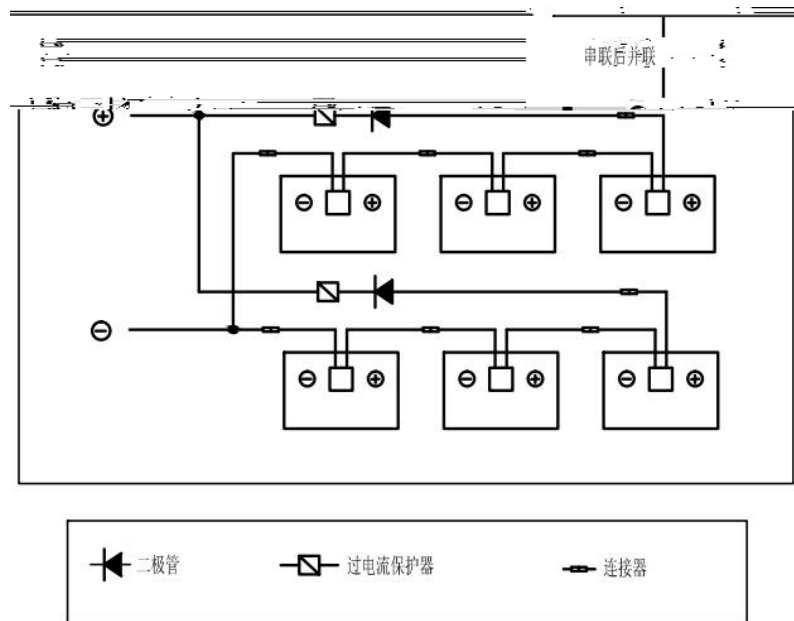
N Number of modules in series

Open circuit voltage (refer to product label or data sheet)

Temperature coefficient of open circuit voltage (refer to data sheet)

The minimum ambient temperature





If reverse current exceeding the component's maximum fuse current may flow through it, a current-limiting protection device of the same specification must be used to protect the component. For parallel strings of two or more, each string must have a current-limiting protection device, as shown in Figure .

8.2 WIRING

The number of modules that can be connected shall be determined by a qualified institution or person in accordance with the design specifications of the photovoltaic system and the local electrical design specifications. The calculation formula recommended by Gokin Solar shall be for reference only.

Every module is provided with two standard output cables, and each terminated with a plug-and-play connector. All wiring and electrical connect

The fuse rated current should be chosen depending on different standards, as follows:

$$\begin{aligned} & \cdot \quad \left(\frac{\partial}{\partial t} + \nabla_{\vec{v}} \right) \left(\frac{\partial}{\partial t} + \nabla_{\vec{v}} \right) \left(\frac{\partial}{\partial t} + \nabla_{\vec{v}} \right) \\ & \cdot \quad \left(\frac{\partial}{\partial t} + \nabla_{\vec{v}} \right) \left(\frac{\partial}{\partial t} + \nabla_{\vec{v}} \right) \left(\frac{\partial}{\partial t} + \nabla_{\vec{v}} \right) \end{aligned}$$

where

Fuse rated current [A]

Short circuit current of the module [A]

Temperature correction factor [-]

A correction factor () should be applied for determining the fuse rated current working at different temperatures. Please confirm the final fuse selection with the qualified design institutes and fuse manufacturer. The maximum series fuse rating value on the products' datasheet provided by Gokin Solar should be used for reference only.

09 Maintenance

Please be sure to check and maintain the modules regularly, especially during the warranty period, which is the user's responsibility, and notify Gokin customer service within two weeks if the modules are found to be damaged or other significant anomalies.

9.1 Visual Inspection

Please carefully check the modules for appearance defects, focusing on the following points:

- Module gprof2dot

should carefully read and strictly follow. Failure to follow these instructions may result in personal injury or property damage. Gokin is not responsible for any damage caused by improper cleaning methods and will lose the limited warranty of the product.



Warning

Cleaning can cause damage to modules and a range of modules, as well as increasing the risk of electric shock.

Cracked or damaged modules pose a risk of electric shock due to leakage of current, and damp modules increase this risk. It is necessary to thoroughly inspect the modules for cracks, damage, and loose joints before cleaning.

During the day, the voltage and current present in the array is sufficient to cause a fatal electric shock accident, and the photovoltaic module should be cleaned under low irradiance conditions.

Before cleaning, make sure the circuit is disconnected.

Please wear suitable protective clothing (clothing, insulating gloves, insulating shoes, etc.) when cleaning.

Do not immerse the module in part or in whole in water or any kind of cleaning solution.

Generally, the back of the module does not need to be cleaned. If it is necessary to clean the back of the double-sided module, be careful to avoid damage to the back of the module. It is recommended to carefully clean the stain with your hand or sponge.

Please use the solvent specified by Gokin in the cleaning method.

Cleaning Method

. High pressure water cleaning

Water quality requirements: PH ~

Water hardness: calcium carbonate concentration mg/L (Soft water cleaning is recommended)

Water pressure: MPa(bar)

. Compressed air cleaning

Air pressure cleaning is recommended when cleaning soft stains (like dust) on modules.

. Wash by hand

If there are too many stains on the surface of the module, carefully use an insulating brush, sponge, or other soft cleaning tool.

Make sure any brushes or agitating tools are made of insulating material to minimize the risk of electric shock, and that the tools do not scratch or scratch the glass or aluminum frame.

If oil stains are present, they can be carefully cleaned with an environmentally friendly cleaner.

. Robot cleaning

If robot cleaning is used, the brush is required to be soft plastic, the cleaning process and cleaning will not cause scratches to the glass surface of the module and the aluminum alloy frame, the weight of the cleaning robot should not be too large, and the module damage caused by improper cleaning of the cleaning robot and power attenuation are not within the scope of Gokin warranty.

To ensure optimum module performance, Gokin recommends the following maintenance measures:

Inspect electrical, grounding, and mechanical connections every 6 months to ensure they are clean, safe, undamaged, and free of rust. Otherwise, the warranty will be void.

In the event of a ground fault, do not use water to clean or spray the modules until corrected by an authorized solar inverter service person and until the inverter is fully operational, which could result in a shock accident or serious safety issue.

If you have any questions, please consult a professional solar service provider for advice.

Note: Please follow the solar manufacturer's maintenance instructions for all modules used in the system, such as brackets, charge regulators, inverters, batteries, etc.

Voc-STC () [V]	.	.	.	.	.	.	.	.			
Isc-STC () [A]	.	.	.	.	.	.	.	.			
VPmax-STC [V]	.	.	.	.	.	.	.	.			
IPmax-STC [A]	.	.	.	.	.	.	.	.			
Pmax () [W]											
Vsys [V]											
Maximum series fuse [A]											
Class of Protection	Class	Class	Class	Class	Class	Class	Class	Class			

	GK- - HT-M	GK- - HT-M	GK- - HT-M	GK- - HT-M	GK- - HT-M	GK- - HT-M	
Voc-STC () [V]	.	.	.	.	.	.	
Isc-STC () [A]	.	.	.	.	.	.	
VPmax-STC [V]	.	.	.	.	.	.	
IPmax-STC [A]	.	.	.	.	.	.	
Pmax () [W]							
Vsys [V]							
Maximum series fuse [A]							
Class of Protection	Class	Class	Class	Class	Class	Class	

	GK- - HT-M	GK- - HT-M	GK- - HT-M	GK- - HT-M	GK- - HT-M		
Voc-STC () [V]	.	.	.	.	.		
Isc-STC () [A]	.	.	.	.	.		
VPmax-STC [V]	.	.	.	.	.		
IPmax-STC [A]	.	.	.	.	.		
Pmax () [W]							
Vsys [V]							
Maximum series fuse [A]							
Class of Protection	Class	Class	Class	Class	Class		

	GK- - HP-M	GK- - HP-M	GK- - HP-M	GK- - HP-M	GK- - HP-M		
Voc-STC () [V]	.	.	.	.	.		
Isc-STC () [A]	.	.	.	.	.		
VPmax-STC [V]	.	.	.	.	.		
IPmax-STC [A]	.	.	.	.	.		
Pmax () [W]							
Vsys [V]							
Maximum series fuse [A]							
Class of Protection	Class	Class	Class	Class	Class		

	GK- - HP-M	GK- - HP-M	GK- - HP-M	GK- - HP-M	GK- - HP-M		
Voc-STC () [V]	.	.	.	.	.		
Isc-STC () [A]	.	.	.	.	.		

VPmax-STC [V]	.	.	.	.	.		
IPmax-STC [A]	.	.	.	.	.		
Pmax () [W]							
Vsys [V]							
Maximum series fuse [A]							
Class of Protection	Class	Class	Class	Class	Class		

	GK- - HP- M	GK- - HP- M	GK- - HP- M	GK- - HP- M	GK- - HP- M		
Voc-STC () [V]	.	.	.	.	.		
Isc-STC () [A]	.	.	.	.	.		
VPmax-STC [V]	.	.	.	.	.		
IPmax-STC [A]	.	.	.	.	.		
Pmax () [W]							
Vsys [V]							
Maximum series fuse [A]							
Class of Protection	Class	Class	Class	Class	Class		

	GK- - HP- M	GK- - HP- M	GK- - HP- M	GK- - HP- M			
Voc-STC () [V]	.	.	.	.			
Isc-STC () [A]	.	.	.	.			
VPmax-STC [V]	.	.	.	.			
IPmax-STC [A]	.	.	.	.			
Pmax () [W]							
Vsys [V]							
Maximum series fuse [A]							
Class of Protection	Class	Class	Class	Class			

	GK- - HP- M	GK- - HP- M	GK- - HP- M	GK- - HP- M
Voc-STC () [V]	.	.	.	.
Isc-STC () [A]	.	.	.	.
VPmax-STC [V]	.	.	.	.
IPmax-STC [A]	.	.	.	.
Pmax () [W]				
Vsys [V]				
Maximum series fuse [A]				

fuse [A]											
Class of Protection	Class	Class	Class	Class	Class	Class	Class	Class	Class	Class	

	GK- - HG- M/ GK- - HGb- M	GK- - HG- M/ GK- - HGb- M	GK- - HG- M/ GK- - HGb- M	GK- - HG- M/ GK- - HGb- M	GK- - HG- M/ GK- - HGb- M	GK- - HG- M/ GK- - HGb- M	GK- - HG- M/ GK- - HGb- M	GK- - HG- M/ GK- - HGb- M	GK- - HG- M/ GK- - HGb- M	GK- - HG- M/ GK- - HGb- M	GK- - HG- M/ GK- - HGb- M
Voc-STC () [V]	.	.	.	.	.	.	.	.	.	.	.
Isc-STC () [A]	.	.	.	.	.	.	.	.	.	.	.
VPmax-STC [V]	.	.	.	.	.	.	.	.	.	.	.
IPmax-STC [A]	.	.	.	.	.	.	i 8	.	.	.	t •
Pmax () [W]											
Vsys [V]											
Maximum series fuse [A]											
Class of Protection	Class	Class	Class	Class	Class	Class	Class	Class	Class	Class	Class
	GK- - HG- M/ GK- - HGb- M										
Voc-STC () [V]	.										
Isc-STC () [A]	.										
VPmax-STC [V]	.										
IPmax-STC [A]	.										
Pmax () [W]											
Vsys [V]											
Maximum series fuse [A]											
Class of Protection	Class										

GK- -

Bifaciality coefficient	ϕP_{max}	ϕI_{sc}	ϕV_{oc}								
	GK- - HTBD - M	GK- - HTBD - M	GK- - HTBD - M								
Voc-STC () [V]	.	.	.								
Isc-STC () [A]	.	.	.								
VPmax-STC [V]	.	.	.								
IPmax-STC [A]	.	.	.								
Pmax ()-STC [W]											
Voc-BNPI () [V]	.	.	.								
Isc-BNPI () [A]	.	.	.								
VPmax-BNPI [V]	.	.	.								
IPmax-BNPI [A]	.	.	.								
Pmax ()-BNPI [W]											
Isc-BSI () [A]	.	.	.								
Pmax ()-BSI [W]											
Vsys [V]											
Maximum series fuse [A]											
Class of Protection	Class	Class	Class								
Bifaciality coefficient	ϕP_{max}	ϕI_{sc}	ϕV_{oc}								

[illegible]

[illegible][illegible][illegible]

coefficient	
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[illegible]

Isc-STC () [A]	.	.	.	.	.	.	.	.
V _P max-STC [V]	.	.	.	.	.	.	.	.
I _P max-STC [A]	.	.	.	.	.	.	.	.
P _m ax ()-STC [W]	.	.	.	.	.	.	.	.

[illegible][illegible][illegible]

[illegible][illegible][illegible]

[illegible][illegible][illegible]

Class of Protection	Class	Class	Class	Class	Class	Class	Class	Class	Class	Class	
Bifaciality coefficient	ϕ_{Pmax}	, ϕ_{lsc}	, Voc								

J-box		Connector		cable		Bypass diode	
Manufacture	Type	Manufacture	Type	Manufacture	Type	Type	Technical data
Ningbo Minghe New Energy Technology Co.,Ltd	Mod z	Ningbo Minghe New Energy Technology Co.,Ltd	PV-MH	Wuxi Xinhongye Wire & Cable Co., Ltd.	RVV U * mm	SQ	Max. diode current [A]: Tj [C]:
		Stäubli Electrical connectors AG	PV-KST - EVO /xv UR.	Ningbo Kibor Wire & CableCo., Ltd	IEC * mm	SQ	Max. diode current [A]: Tj [C]:
				Xinya Electronic Co., Ltd	IEC * mm	SQ -SL (z)	Max. diode current [A]: Tj [C]:
						SQ (z)	Max. diode current [A]: Tj [C]:
		QC Solar(Suzhou)Corporation	QC ,c6A	QC Solar (Suzhou) Corporation	H Z ECK, * mm	QCCAC	Max. diode current [A]: Tj [C]:
QC Solar(Suzhou)Corporation	Type: Qxy						

S

Jiangxi Jinko PV Material Co., Ltd. X , ... mm HALOGEN
FREE LOW SMOKE

Jiangxi Jinko PV Material Co., Ltd. IEC x , mm

Suzhou Xtong Photovoltaic Technologies Co.,Ltd PV-XT . ;PV-XT Wuxi Xinhongye Wire & Cable Co., Ltd. IEC X , ... mm XT A (x , y , z) Max. d

Suzhou Xtong Photovoltaic Technologies Co.,Ltd PV-XT Nxyz