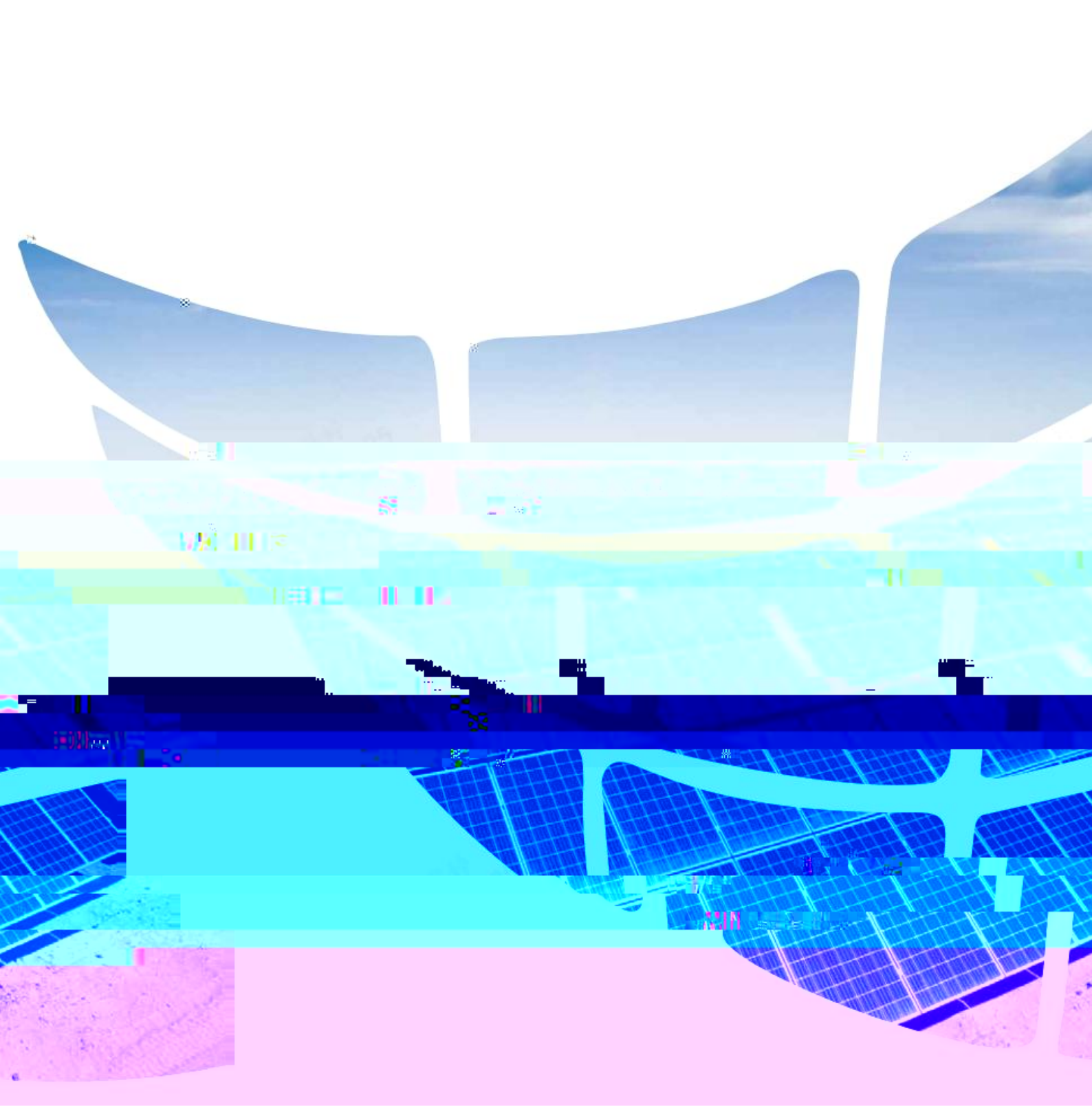

Gokin Solar

Installation manual for

Photovoltaic Module

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APPLICABLE PRODUCT LIST

Category	Module Type
Single-glass GBC products	GK-3-72HG-xxxM
	GK-5-60HG-xxxM
	GK-5-60HGb-xxxM
	GK-1-60HG-xxxM
	GK-1-60HGb-xxxM
	GK-5-54HG-xxxM
	GK-5-54HGb-xxxM
	GK-3-54HG-xxxM
	GK-3-54HGb-xxxM
	GK-3-72HGF-xxxM
	GK-3-54HGF-xxxM
	GK-3-54HGFb-xxxM

Introduction

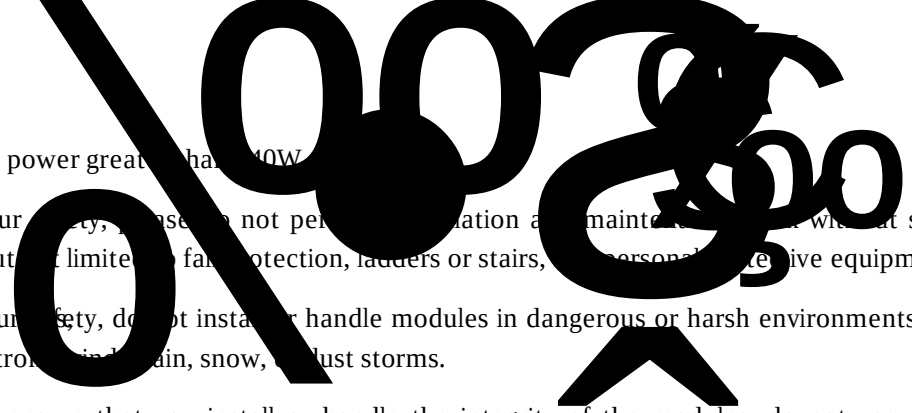
First of all, thank you very much for choosing Gokin Solar Co., Ltd. 's photovoltaic modules (hereinafter referred to as "modules").

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 of any kind, either express or implied. Gokin shall not be liable for any product defect or destruction, personal injury or property damage caused by any operation



than 50V or power great[illegible]ha[illegible]0W.

For your [illegible]ety, [illegible]ase[illegible] not per[illegible]lation a[illegible]maint[illegible]t wi[illegible]t safety precautions, including but[illegible]t limite[illegible] fa[illegible]otection, ladders or stairs, [illegible]ersona[illegible]ve equipment.

For your [illegible]ety, do[illegible]ot insta[illegible]r handle modules in dangerous or harsh environments, including but not limited to stro[illegible]ind[illegible]ain, snow, [illegible]ust 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 j

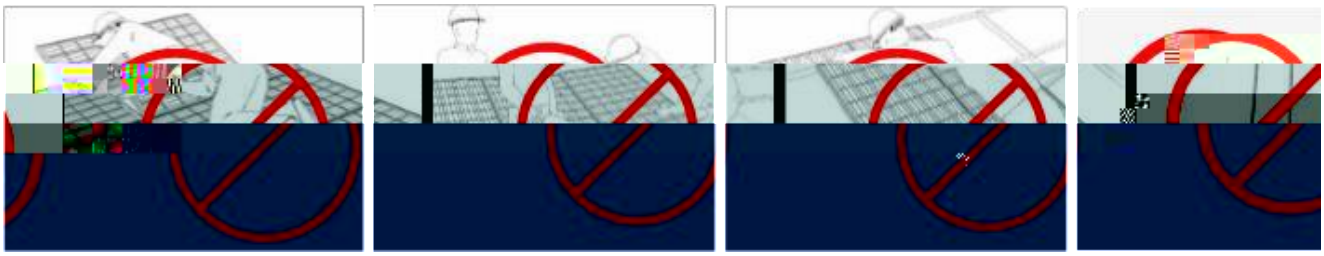
[illegible]

To ensure the [illegible] of modules during transportation and storage, unpack modules [illegible] 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.

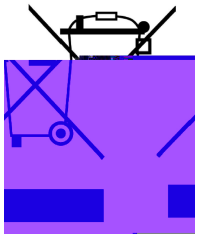
During the storage process, protect the package from damage, and store the module in a dry and ventilated environment to avoid direct sunlight and humidity. If the modules are stored in an uncontrolled environment, they shall not be stored for more than 3 months and additional measures shall be taken 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 packing, [illegible] of [illegible] alignment, and the [illegible] stacked pieces should not exceed 12. TŔ



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

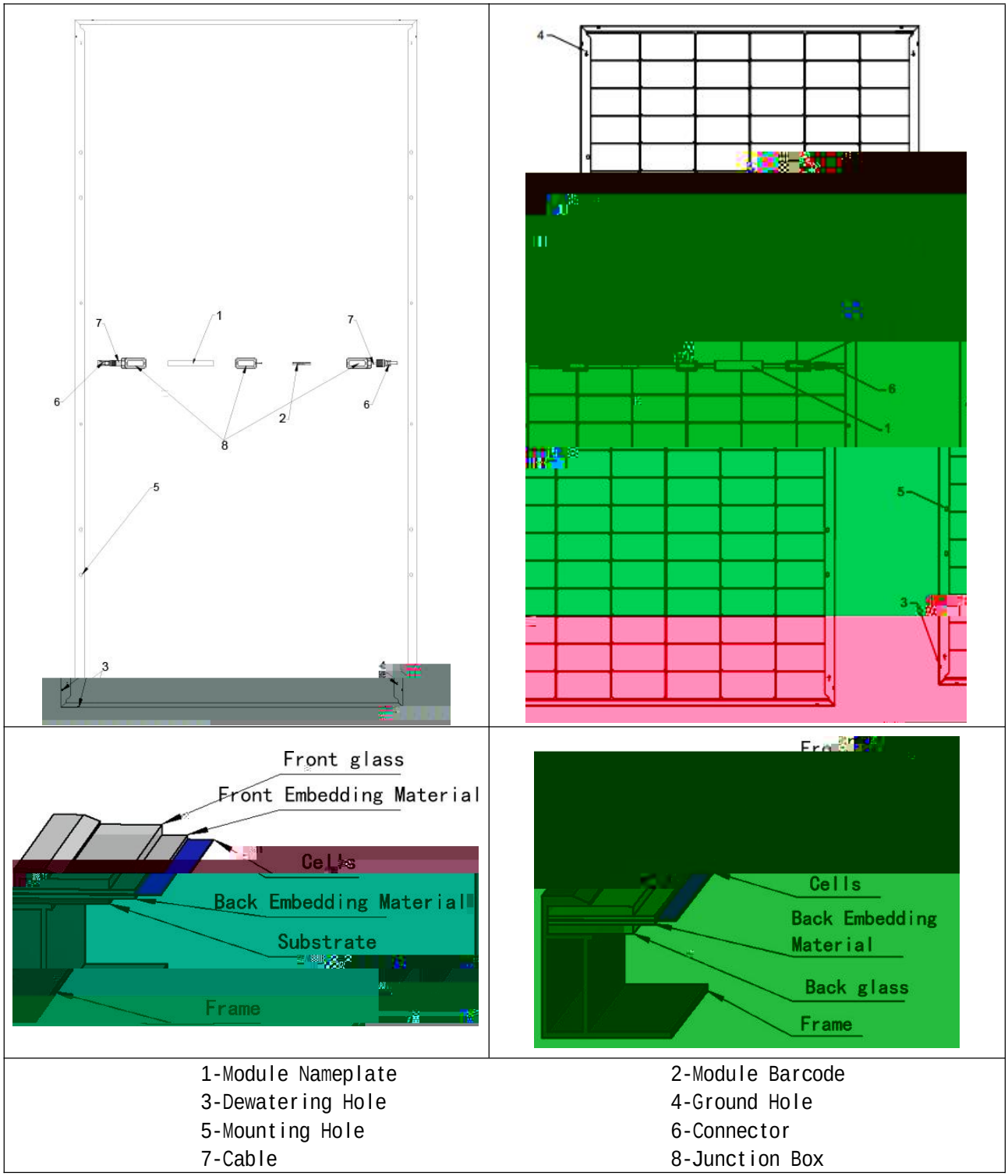
Drilling in the frame of the module is prohibited, which will result in a re



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 ≥50 m away from the ocean side, and related parts and com



1-Module Nameplate	2-Module Barcode
3-Dewatering Hole	4-Ground Hole
5-Mounting Hole	6-Connector
7-Cable	8-Junction Box

Three labels on the module contain the information below:

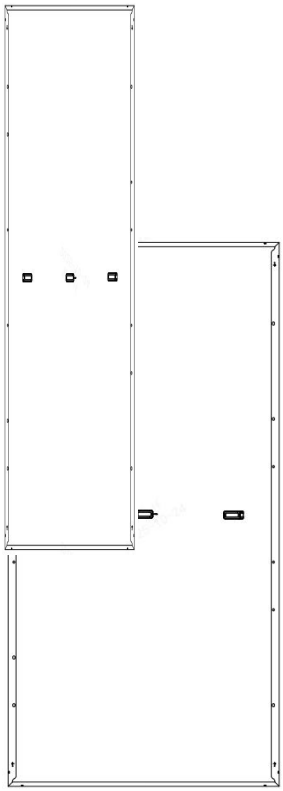
1.Nameplate: Nameplate is placed on rear side of the module, which is printed with information such as product type, rated power, rated current, rated voltage, open circuit voltage, short circuit current under testing conditions, certification indicator, maximum system voltage, etc.

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

3.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: Standan »a

06 Mechanical Installation

Installation safety instructions: recommend 2 people to handle the PV module 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 only for reference, and they are based on the test results from third-party tests and Gokin internal tests;

1.Gokin will not provide related mounting accessories, the system installer or trained professional personnel must be responsible for the PV system's design, installation, and mechanical load calculation and system security.

2.Before installation, the following items shall be addressed:

a) Visually check the module for any damage. Clean the module if any dirt or residue remains;

b) Check if module serial number stickers match.

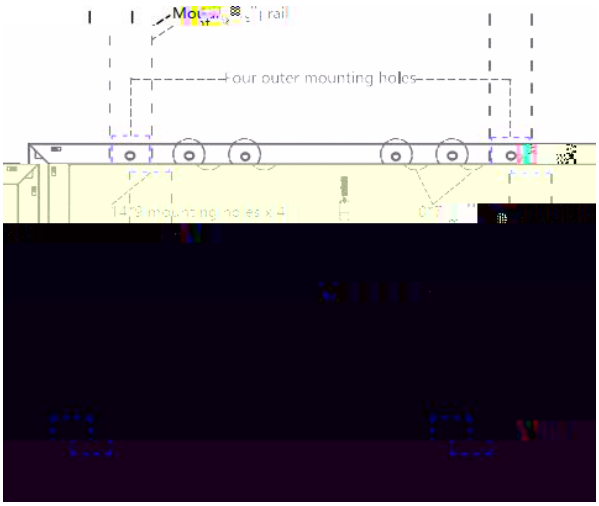
3.The maximum loads that different types of modules can withstand on the front side and back side are dependent on installation methods, which can be referred to Table 2, Table 3 and Table 5. If there is heavy snow and strong



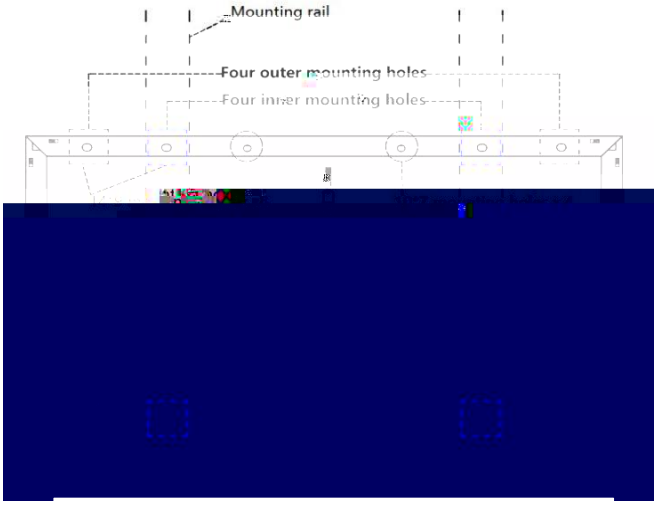
Mounting hole (mm)	Recommended bolt size
14 x 9	M8
10 x 7	M6

6.3 Installation and Mechanical Load of Mono-facial Module

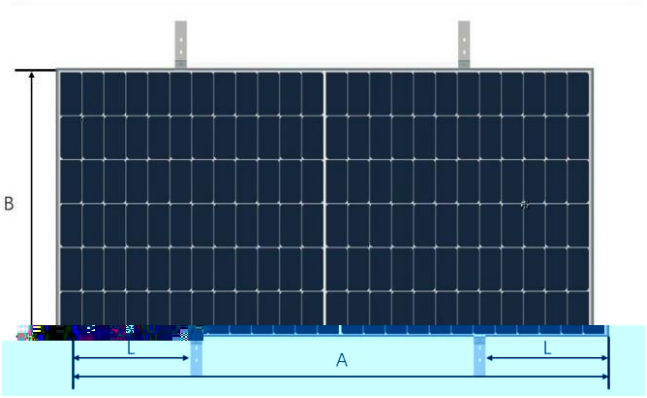
Mono-facial modules can be mounted by bolts or clamps. The mounting method and maximum test load are shown asfollow (The unit of distance and length in the table below is millimeter (mm), and the unit of



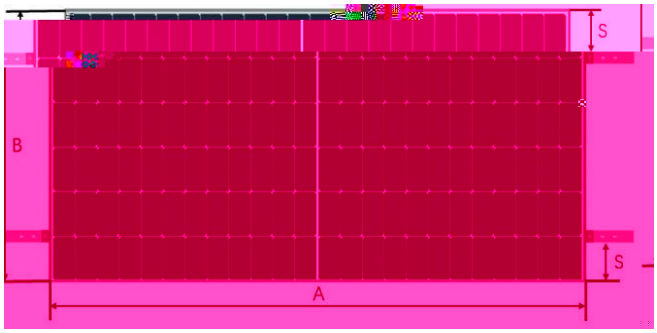
Outer four-hole bolts mounting
Mounting rails cross the long frame(Method 1)



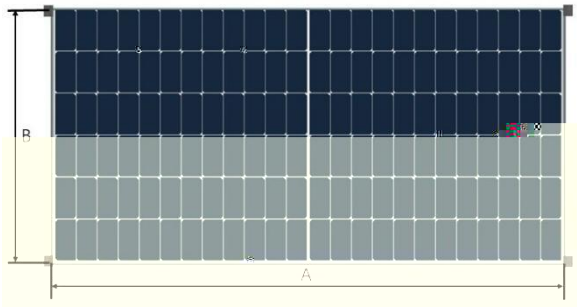
Inner four-hole bolts mounting
Mounting rails cross the long frame(Method 2)



Clamps mounting
Mounting rails cross the long frame(Method 3)



Clamps mounting
Mounting rails cross the short frame(Method 4)



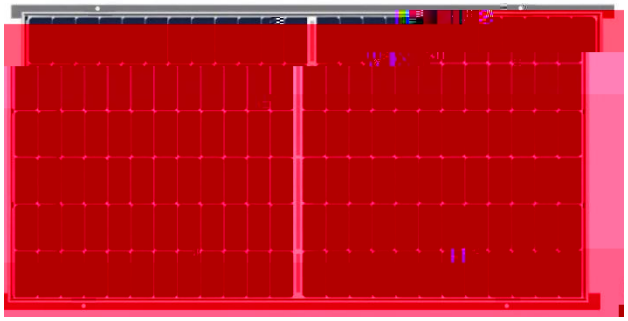
Clamps are mounted at the corners of short frame(Method 5)

Fig.3 Mono-facial Module Installation Position

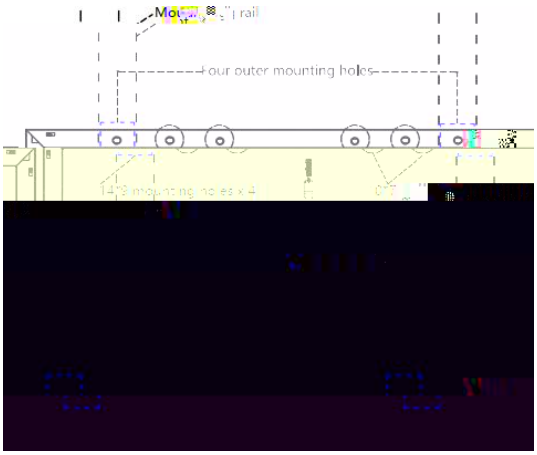
Table 3 The maximum test load of framed mono-facial modules

6.3 Installation and Mechanical Load of Bifacial module

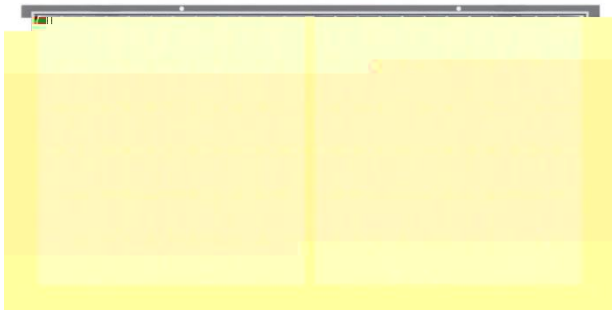
Bifacial modules can be mounted by bolts or clamps. The mounting method and maximum test load are shown as follow(The unit of distance and length in the table below is milimeter (mm), and the unit of pressure is Pascal (Pa)).



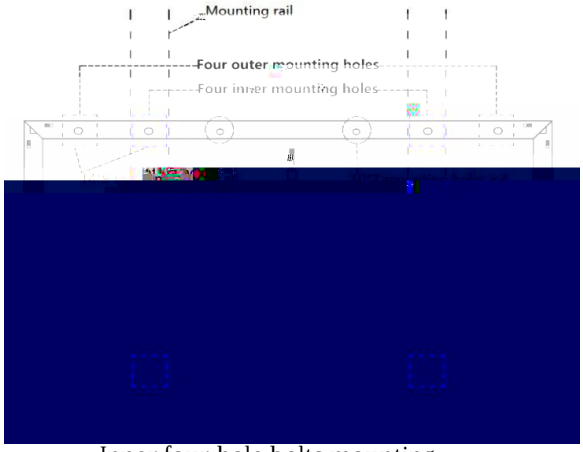
Outer Four-hole bolts Mounting
Mounting rails parallel the long frame(Method 1)



Outer four-hole bolts mounting
Mounting rails cross the long frame.(Method 2)



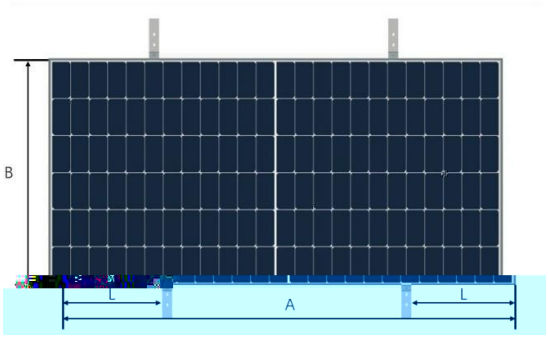
Inner Four-hole bolts Mounting
Mounting rails parallel the long frame(Method 3)



Inner four-hole bolts mounting
Mounting rails cross the long frame(Method 4)

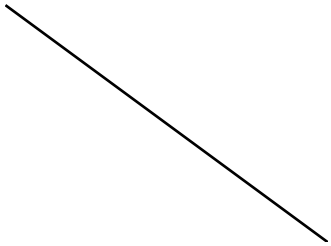


Clamps mounting
Mounting rails cross the long frame(Method 5)



Clamps Mounting
Mounting rails cross the long frame(Method 6)

Fig.3 Bifacial Module Installation Position



07 Grounding

To ensure safety and protect modules froù

(AWG6-12) exposed copper cable is recommended.

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 ≥4 mm² (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:

Max System Voltage ≥ N × × [1 + × (− 25)]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

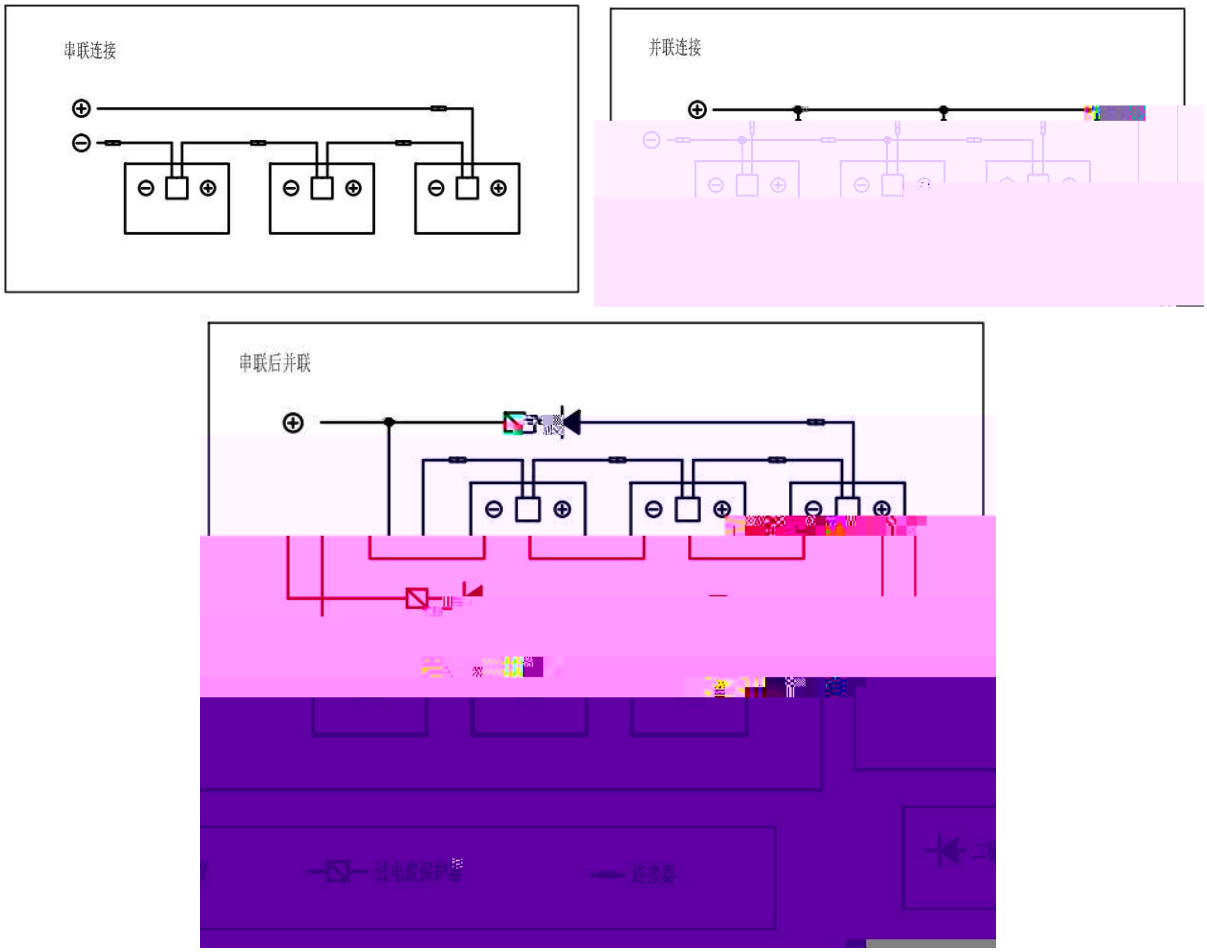


Fig.10 Electrical diagram of series and parallel lines

If reverse current exceeding the component's maximum fuse current may flow through it, a current-limiting protection device of the same s

increase the voltage and connected in parallel to increase the current.

Before connecting the module, please make sure using the connector approved by Gokin. Otherwise, Gokin does not responsible for any potential problem.

8.3 FUSING

The correction factor of a fuse shall be determined by an authorized professional electrical engineer in accordance with the relevant design regulations and system simulation results. Gokin Solar does not responsible for determining the minimum rating of fuse.

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

1.5

9.2 Cleaning

The power generation of photovoltaic modules is related to the solar radiation received by their cells. Dirt blocking the glass surface of the module will reduce its power output and may even cause regional heat spots, so it is important to keep the surface of the module clean, usually need to clean the surface of the module dirt such as: bird droppings, leaves, ash layer, etc. Gokin recommends that modules be cleaned at least once a year, and modules installed in dusty environments or at low angles should be cleaned appropriately to ensure the cleanliness of the module surface. Uncontrolled contamination and failure to clean modules in a timely manner will void the warranty.

This section contains Gokin PV module cleaning requirements, system users and professional installers 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

1. High pressure water cleaning

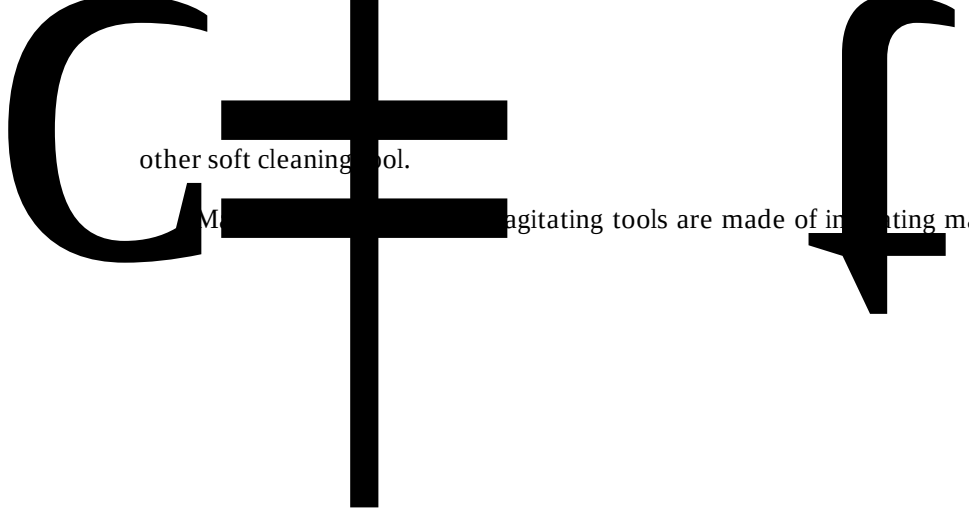
Water quality requirements: PH6~8
Water hardness: calcium carbonate concentration ≤600mg/L (Soft water cleaning is recommended)
Water pressure: ≤4MPa(40bar)

2. Compressed air cleaning

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

3. 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.

Ma agitating tools are made of in ting material to minimize the risk of electric

	GK-2-66HT-675M	GK-2-66HT-680M	GK-2-66HT-685M	GK-2-66HT-690M	GK-2-66HT-695M	GK-2-66HT-700M	GK-2-66HT-705M	GK-2-66HT-710M	GK-2-66HT-715M	GK-2-66HT-720M
Voc-STC (±3%) [V]	46.50	46.70	46.90	47.10	47.30	47.50	47.90	48.68	48.91	49.14	49.36
Isc-STC (±3%) [A]	17.90	17.93	17.96	17.99	18.02	18.05	18.08	18.11	18.15	18.19	18.24
VPmax-STC [V]	39.90	40.10	40.30	40.50	40.70	40.86	41.10	41.29	41.50	41.69	41.91
IPmax-STC [A]	16.86	16.89	16.92	16.95	16.98	17.01	17.04	17.07	17.11	17.15	17.18
Pmax (±3%) [W]	670	675	680	685	690	695	700	705	710	715	720
Vsys [V]	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Maximum series fuse [A]	30	30	30	30	30	30	30	30	30	30	30
Class of Protection	Class	Class	Class	Class	Class	Class	Class	Class	Class	Class	Class

	GK-2-66HT-725M	GK-2-66HT-730M	GK-2-66HT-735M
Voc-STC (±3%) [V]	49.55	49.71	49.87
Isc-STC (±3%) [A]	18.32	18.38	18.44
VPmax-STC [V]	42.10	42.25	42.39
IPmax-STC [A]	17.22	17.28	17.34
Pmax (±3%) [W]	725	730	735
Vsys [V]	1500	1500	1500
Maximum series fuse [A]	30	30	30
Class of Protection	Class	Class	Class

fuse [A]											
Class of Protection	Class										

	GK-1-72HT-560M	GK-1-72HT-565M	GK-1-72HT-570M	GK-1-72HT-575M	GK-1-72HT-580M	GK-1-72HT-585M	GK-1-72HT-590M	GK-1-72HT-595M	GK-1-72HT-600M	GK-1-72HT-605M
Voc-STC (±3%) [V]	51.67o									

Voc-STC (±3%) [V]	47.32	47.49	48.37	48.48	48.64	48.8	48.96	49.12			
Isc-STC (±3%) [A]	15.79	15.86	15.8	15.94	1	16.00	16.12	16.18			
VPmax-STC [V]	39.67	39.81	40.6	40.23	40.40	40.57	40.74	40.90			
IPmax-STC [A]	14.88	14.96	15.08	15.04	15.10	15.16	15.22	15.28			
Pmax (±3%) [W]	590	595	600	605	610	615	620	625			
Vsys [V]	1500	1500	1500	1500	1500	1500	1500	1500			
Maximum series fuse [A]	30	30	30	30	30	30	30	30			
Class of Protection	Class	Class	Class	Class	Class	Class	Class	Class			

	GK-4-54HT-485M	GK-4-54HT-490M	GK-4-54HT-495M	GK-4-54HT-500M	GK-4-54HT-505M	GK-4-54HT-510M
Voc-STC (±3%) [V]	39.41	39.61	39.81	40.02	40.22	40.42
Isc-STC (±3%) [A]	15.68	15.74	15.81	15.88	15.95	16.02
VPmax-STC [V]	32.45	32.65	32.85	33.05	33.25	33.45
IPmax-STC [A]	14.95	15.01	15.07	15.13	15.19	15.25
Pmax (±3%) [W]	485	490	495	500	505	510
Vsys [V]	1500	1500	1500	1500	1500	1500
Maximum series fuse [A]	30	30	30	30	30	30
Class of Protection	Class	Class	Class	Class	Class	

VPmax-STC [V]	34.15	34.35	34.55	34.75	34.95		
IPmax-STC [A]	17.28	17.32	17.37	17.41	17.46		
Pmax (±3%) [W]	590	595	600	605	610		
Vsys [V]	1500	1500	1500	1500	1500		
Maximum series fuse [A]	30	30	30	30	30		
Class of Protection	Class	Class	Class	Class	Class		

GK-1-72HP-540M	GK-1-72HP-545M

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

GK-3-54HG-445M/ GK-3-54HGb-445M

GK-3-54HG-450M/ GK-3-54HGb-

	GK-3-54HG Fb-470M/ GK-3-54HG F-470M	GK-3-54HG Fb-475M/ GK-3-54HG F-475M	GK-3-54HG Fb-480M/ GK-3-54HG F-480M	GK-3-54HG Fb-485M/ GK-3-54HG F-485M	GK-3-54HG Fb-490M/ GK-3-54HG F-490M	GK-3-54HG Fb-495M/ GK-3-54HG F-495M	GK-3-54HG Fb-500M/ GK-3-54HG F-500M	GK-3-54HG Fb-505M/ GK-3-54HG F-505M	GK-3-54HG Fb-510M/ GK-3-54HG F-510M
Voc-STC (±3%) [V]	40.24	40.34	40.44	40.54	40.64	40.74	40.84	40.94	41.04
Isc-STC (±3%) [A]	14.58	14.68	14.78	14.88	14.98	15.08	15.18	15.28	15.38
VPmax-STC [V]	34.94	35.04	35.14	35.24	35.34	35.44	35.54	35.64	35.74
IPmax-STC [A]	13.47	13.57	13.67	13.77	13.88	13.98	14.08	14.18	14.28
Pmax (±3%) [W]	470	475	480	485	490	495	500	505	510
Vsys [V]	1500	1500	1500	1500	1500	1500	1500	1500	1500

fuse [A]
Class of
Protection



IPmax-BNPI [A]	18.93	18.9	19.00								
Pmax (±3%)-BNPI [W]	7	800	805								
Isc-BSI (±3%) [A]	22 1	22.45	22.49								
Pmax (±3%)-BSI [W]	8	895	900								
Vsys [V]	1500	1500	1500								
Maximum series fuse [A]	35	35	35								
Class of Protection	Class	Class	Class								
Bifaciality coefficient	φPmax=80±5%,φIsc=80±5%,Voc=100±5%										

	GK-2-60HTBD-610M	GK-2-60HTBD-615M	GK-2-60HTBD-620M	GK-2-60HTBD-625M	GK-2-60HTBD-630M	GK-2-60HTBD-635M	GK-2-60HTBD-640M	GK-2-60HTBD-645M	GK-2-60HTBD-650M	GK-2-60HTBD-655M	GK-2-60HTBD-660M
Voc-STC (±3%) [V]	42.66	42.84	43.01	43.19	43.36	43.54	43.72	43.90	44.08	44.26	44.44
Isc-STC (±3%) [A]	17.83	17.96	17.99	18.02	18.05	18.08	18.11	18.14	18.17	18.21	18.25
VPmax-STC [V]	36.46	36.66	36.88	37.06	37.24	37.42	37.60	37.79	37.97	38.15	38.33
IPmax-STC [A]	16.73	16.78	16.82	16.87	16.92	16.97	17.02	17.07	17.12	17.17	17.22
Pmax (±3%)-STC [W]	610	615	620	625	630	635	6				
Voc-BNPI (±3%) [V]	42.75	42.91	43.07	43.23	43.39	43., 7	43.v 5				
Isc-BNPI											

Bifaciality coefficient	φPmax=80±5%,φIsc=80±5%,Voc=100±

Isc-STC (±3%) [A]	15.79	15.86	15.93	16.00	16.07	16.14	16.21	16.28	16.35	16.42	16.49
VPmax-STC [V]	39.67	39.81	39.95	40.09	40.22	40.35	40.48	40.63	40.73	40.85	40.98
IPmax-STC [A]	14.88	14.96	15.03	15.10	15.18	15.25	15.33				

Pmax-BNPI [V]	32.2	32.4	32.6	32.85	.05	33.25	3	33.64	33.84
max-BNPI [A	16.42	.48	16.5		16.64	16.69	1	16.80	16.86
[W]	5	535	540	545	550	555		565	570

Maximum	30		30	30	30	30	30	30	30	30	
Class of Protection	Class	Class	Class	Class	Class	Class	Class	Class	Class	Class	
Bifacial coefficient	φPmax=80±5%,φIsc=80±5%,Voc=100±5%										

	GK-1-60HTBD-465M	GK-1-60HTBD-470M	GK-1-60HTBD-475M	GK-1-60HTBD-480M	GK-1-60HTBD-485M	GK-1-60HTBD-490M	GK-1-60HTBD-495M	GK-1-60HTBD-500M	GK-1-60HTBD-505M		
Voc-STC (±3%) [V]	42.22	42.38	42.54	42.71	42.86	43.02	43.18	43.34	43.50		
Isc-STC (±3%) [A]	14.07	14.15	14.23	14.31	14.39	14.48	14.56	14.64	14.72		
VPmax-STC [V]	34.89	35.05	35.21	35.38	35.54	35.70	35.84	36.00	36.15		
IPmax-STC [A]	13.33	13.41	13.49	13.57	13.65	13.73	13.81	13.89	13.97		
Pmax (±3%)-STC [W]	465	470	475	480	485	490	495	500	505		
Voc-BNPI (±3%) [V]	42.23	42.47	42.60	42.75	42.88	43.04	43.20	43.36	43.52		
Isc-BNPI (±3%) [A]	15.45	15.60	15.68	15.76	15.84	15.93	16.01	16.09	16.17		
VPmax-BNPI [V]	34.89	35.18	35.33	35.48	35.62	35.74	35.88	36.02	36.16		
IPmax-BNPI [A]	14.63	14.78	14.86	14.94	15.02	15.11	15.19	15.27	15.35		
Pmax (±3%)-BNPI [W]	510	520	525	530	535	540	545	550	555		
Isc-BSI (±3%) [A]	17.29	17.37	17.45	17.53	17.68	17.78	17.86	17.94	18.00		
Pmax (±3%)-BSI [W]	575	580	585	590	600	605	610	615	620		
Vsys [V]	1500	1500	1500	1500	1500	1500	1500	1500	1500		
Maximum series fuse [A]	30	30	30	30	30	30	30	30	30		
Class of Protection	Class	Class	Class	Class	Class	Class	Class	Class	Class		
Bifaciality coefficient	φPmax=80±5%,φIsc=80±5%,Voc=100±5%										

	GK-1-54HTBD-420M	GK-1-54HTBD-425M	GK-1-54HTBD-430M	GK-1-54HTBD-435M	GK-1-54HTBD-440M	GK-1-54HTBD-445M	GK-1-54HTBD-450M	GK-1-54HTBD-455M
Voc-STC (±3%) [V]	38.11	38.30						

	GK-4-48HTBD-425M	GK-4-48HTBD-430M	GK-4-48HTBD-435M	GK-4-48HTBD-440M	GK-4-48HTBD-445M	GK-4-48HTBD-450M	GK-4-48HTBD-455M	GK-4-48HTBD-460M	GK-4-48HTBD-465M	
Voc-STC (±[illegible]) [V]	34.38	34.55	34.72	34.89	35.06	35.23	35.40	35.60	35.80	
Isc-STC (±[illegible]) [A]	15.73	15.80	15.87	15.94	16.01	16.08	16.15	16.21	16.28	
VPmax-STC [V]	29.00	29.18	29.36	29.54	29.72	29.90	30.08	30.28	30.48	
IPmax-STC [A]	14.66	14.74	14.82	14.90	14.98	15.05	15.13	15.19	15.26	

[W]

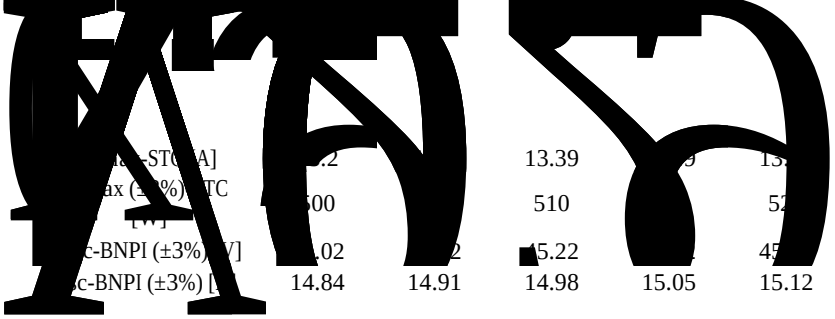
Voc-B

Pmax (±3%)-BSI [W]	540	545	555	560							
Vsys [V]	1500	1500	1500	1500							
Maximum series fuse [A]	30	30	30	30							
Class of Protection	Class	Class	Class	Class							
Bifaciality coefficient	φPmax=70±5%,φIsc=70±5%,Voc=100±5%										

	GK-1-54HPBD-405M	GK-1-54HPBD-410M	GK-1-54HPBD-415M	GK-1-54HPBD-420M							
Voc-STC (±3%) [V]	37.06	37.14	37.22	37.31							
Isc-STC (±3%) [A]	13.85	13.92	14.01	14.10							
VPmax-STC [V]	30.52	30.62	30.79	30.88							
IPmax-STC [A]	13.27	13.39	13.48	13.60							
Pmax (±3%)-STC [W]	405	410	415	420							
Voc-BNPI (±3%) [V]	37.07	37.16	37.25	37.34							
Isc-BNPI (±3%) [A]	15.12	15.19	15.28	15.37							
VPmax-BNPI [V]	30.53	30.62	30.79	30.88							
IPmax-BNPI [A]	Я-S1	Я-S4	Я-S3	Я-S5							
Pmax (±3%)-BNPI [W]	440	445	450	455							
Isc-BSI (±3%) [A]	16П1	16П6	16П5	17.04							
Pmax (±3%)-BSI [W]	485	495	500	505							
Vsys [V]	Я00	Я00	Я00	Я00							
Maximum series fuse [A]	30	30	30	30							
Class of Protection	Class	Class	Class	Class							
Bifaciality coefficient	φPmax=70±5%,φIsc=70±5%,Voc=100±5%										

	GK-3-72HGBD-635M	GK-3-72HGBD-640M	GK-3-72HGBD-645M	GK-3-72HGBD-650M	GK-3-72HGBD-655M	GK-3-72HGBD-660M	GK-3-72HGBD-665M	GK-3-72HGBD-670M			
Voc-STC (±3%) [V]	53.70	53.80	53.90	54.00	54.10	54.20	54.30	54.40			
Isc-STC (±3%) [A]	14.88	14.94	15.00	15.06	15.12	15.18	15.24	15.30			
VPmax-STC [V]	45.00	45.10	45.20	45.30	45.40	45.50	45.60	45.70			
IPmax-STC [A]	14.12	14.20	14.27	14.35	14.43	14.51	14.59	14.67			
Pmax (±3%)-STC [W]	635	640	645	650	655	660	665	670			
Voc-BNPI (±3%) [V]	53П0	53П0	53П0	54.00	54.Я	54.20	54.30	54.40			
Isc-BNPI (±3%) [A]	16.13	16.21	16.29	16.37	16.45	16.53	16.61	16.69			
VPmax-BNPI [V]	45.00	45.10	45.20	45.30	45.40	45.50	45.60	45.70			
IPmax-BNPI [A]	15.34	15.42	15.49	15.57	15.64	15.71	15.79	15.87			
Pmax (±3%)-BNPI [W]	690	695	700	705	710	715	720	725			
Isc-BSI (±3%) [A]	17.72	17.80	17.88	17.96	18.04	18.12	18.20	18.28			
Pmax (±3%)-BSI [W]	760	765	770	775	780	785	790	795			
Vsys [V]	1500	1500	1500	1500	1500	1500	1500	1500			
Maximum series fuse [A]	30	30	30	30	30	30	30	30			
Class of Protection	Class	Class	Class	Class	Class	Class	Class	Class			
Bifaciality coefficient	φPmax=70±5%,φIsc=70±5%,Voc=100±5%										

	GK-4-66HGBD-645M	GK-4-66HGBD-650M	GK-4-66HGBD-655M	GK-4-66HGBD-660M	GK-4-66HGBD-665M	GK-4-66HGBD-670M	GK-4-66HGBD-675M	GK-4-66HGBD-680M	GK-4-66HGBD-685M	GK-4-66HGBD-690M
Voc-STC (±3%) [V]	49.60	49.70	49.80	49.90	50.00	50.10	50.20	50.30	50.40	50.50
Isc-STC (±3%) [A]	16.55	16.64	16.72	16.80	16.88	16.96	17.04	17.12	17.20	17.28
VPmax-STC [V]	40.60	40.69	40.80	40.90	41.00	41.11	41.21	41.32	41.43	41.53
IPmax-STC [A]	15.89	15.98	16.06	16.14	16.22	16.30	16.38	16.46	16.54	16.62
Pmax (±3%)-STC [W]	645	650	655	660	665	670	675	680	685	690
Voc-BNPI (±3%) [V]	49.6	49.7	49.80	49.9	50	50.1	50.2	50.3	50.4	50.5
Isc-BNPI (±3%) [A]	18.17	18.23	18.29	18.35	18.41	18.47	18.53	18.59	18.65	18.71
VPmax-BNPI [V]	40.60	40.70	40.8	40.9	41	41.11	41.21	41.32	41.43	41.53
IPmax-BNPI [A]	17.12	17.20	17.28	17.36	17.44	17.52	17.6	17.67	17.75	17.82
Pmax (±3%)-BNPI [W]	695	700	705	710	715	720	725	730	735	740
Isc-BSI (±3%) [A]	18.81	18.86	18.91	18.96	19.01	19.06	19.11	19.16	19.21	19.26
Pmax (±3%)-BSI [W]	760	765	770	775	780	785	790	795	800	805
Vsys [V]	1500	1500	1500	1500	1500	1500	1500			
Maximum series fuse [A]	30	30	30	30	30					



[illegible]-STC [A]	[illegible].2	[illegible]	13.39	[illegible]	13.[illegible]	13.68	13.77
[illegible]ax (±[illegible]%) [illegible]TC [W]	[illegible]00	[illegible]	510	[illegible]	52[illegible]	525	530
[illegible]c-BNPI (±3%) [V]	[illegible].02	[illegible]2	[illegible]5.22	[illegible]	45[illegible]	45.52	45.62
[illegible]c-BNPI (±3%) [[illegible]	14.84	14.91	14.98	15.05	15.12	15.19	



[W]											
Voc-BNPI (±3%) [V]	44.92	45.02	45.12	45.22	45.32	45.42	45.52	45.62	45.72	45.82	
Isc-BNPI (±3%) [A]	14.77	14.84	14.91	14.98	15.05	15.12	15.19	15.26	15.33	15.40	
VPmax-BNPI [V]	37.80	37.90	38.00	38.10	38.20	38.30	38.40	38.50	38.60	38.70	
IPmax-BNPI [A]	13.80	13.86	13.95	14.05	14.14	14.23	14.32	14.42	14.51	14.60	
Pmax (±3%)-BNPI [W]	520	525	530	535	540	545	550	555	560	565	
Isc-BSI (±3%) [A]	15.69	15.73	15.77	15.83	15.88	15.94	15.98	16.04	16.09	16.14	
Pmax (±3%)-BSI [W]											
Vsys [V]	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	
Maximum series fuse [A]	30	30	30	30	30	30	30	30	30	30	
Class of Protection	Class	Class	Class	Class	Class	Class	Class	Class	Class	Class	
Bifaciality coefficient	φPmax=70±5%,φIsc=70±5%,Voc=100±5%										

GK-5-54HGBD-440M/GK-5-54HGDb-440M	GK-5-54HGBD-445M/GK-5-54HGDb-445M	GK-5-54HGBD-450M/GK-5-54HGDb-450M	GK-5-54HGBD-455M/GK-5-54HGDb-455M	GK-5-54HGBD-460M/GK-5-54HGDb-460M	GK-5-54HGBD-465M/GK-5-54HGDb-465M	GK-5-54HGBD-470M/GK-5-54HGDb-470M	GK-5-54HGBD-475M/GK-5-54HGDb-475M	GK-5-54HGBD-480M/GK-5-54HGDb-480M	GK-5-54HGBD-485M/GK-



[W]							
Isc-BSI (±3%) [A]	18.04	18.09	18.14	18.19	18.24		
Pmax (±3%)-BSI [W]	785	790	795	800	805		
Vsys [V]	1500	1500	1500	1500	1500		
Maximum series fuse [A]	25	25	25	25	25		
Class of Protectio	Class	Class	Class				
Bifaciality coefficient							

	GK-3-54HGFDb-490M	GK-3-54HGFDb-495M	GK-3-54HGFDb-500M	GK-3-54HGFDb-505M	GK-3-54HGFDb-510M
	GK-3-D-490M	GK-3-D-495M	GK-3-D-500M	GK-3-D-505M	GK-3-D-510M
Voc-STC (±3%) [	40.64	40.74	40.84	40.94	41.04
Isc-STC (±3%) [A	14.98	15.08	15.18	15.28	15.38
VPmax-STC [V	35.34	35.44	35.54	35.64	35.74
IPmax-STC [A	13.88	13.98	14.08	14.18	14.28

Pmax (±3%)-BSI [W]	900	905	910	915	920	925	930	935	940
Vsys [V]	1500	1500	1500	1500	1500	1500	1500	1500	

			or		cabl		Bypass diode	
Manufactu	pe	Manufacture	Type	Manufacture	Ty		Type	Technical data
		Nin o Minghe New Energy chnology Co.,Ltd	PV-MH5	Wu inhongye Wire&Ca ., Ltd.	62930 IEC131 1		25SQ045	Max. diode cu nt [A]: 25 Tj [°C
Ningbo Minghe New Energy Technology Co.,Ltd	MH2z							

			Jiangxi Jinko PV Material Co., Ltd.	62930 IEC 131 1X1,5...10mm² HALOGEN FREE LOW SMOKE		
			Jiangxi Jinko PV Material Co., Ltd.	62930 IEC 131 1x4,0mm2		
	Suzhou Xtong Photovoltaic Technologies Co.,Ltd	PV-XT101.1;PV-XT101.2;XT2	Wuxi Xinhongye Wire & Cable Co., Ltd.	62930 IEC 131 1X1,5...35mm²	XT3050A (x=3, y=3, z=7)	Max. diode current [A]: 30 Tj [°C]: 200
	Stäubli Electrical connectors AG	PV-KST4-EVO 2/xy_UR&PV-KBT4-EVO2/xy_UR PV-KST4-EVO2A/xy&PV-KBT4-EVO2A/xy	Suzhou Xtong Photovoltaic Technologies Co., Ltd	62930 IEC 131 1X1,5...35mm² HALOGEN FREE LOW SMOKE	XT3050M-B (x=2 or 4, y=2, z=8)	Max. diode current [A]: 30 Tj [°C]: 200
Suzhou Xtong Photovoltaic Technologies Co.,Ltd	PV-XT1609Nxyz				XT4050M-A (x=2	