

## Limited Warranty for PV-Modules

(Version EN-W-SM-2017-V2)

Phono Solar Standard PV Modules with the Model Names covered under this warranty are:

### Monocrystalline Products

PSXXXM-24/T (XXX = 310-365, in steps of 5)  
PSXXXM-20/U (XXX = 270-300, in steps of 5)  
PSXXXMBB-24/T (XXX = 310-365, in steps of 5)  
PSXXXMBB-20/U (XXX = 270-300, in steps of 5)  
PSXXXMBBSE-24/T (XXX = 310-365, in steps of 5)  
PSXXXMBBSE-20/U (XXX = 270-300, in steps of 5)  
PSXXXM-24/F (XXX = 180-210, in steps of 5)

### Polycrystalline Products:

PSXXXP-24/T (XXX = 305-345, in steps of 5)  
PSXXXP-20/U (XXX = 255-285, in steps of 5)  
PSXXXPBB-24/T (XXX = 305-345, in steps of 5)  
PSXXXPBB-20/U (XXX = 255-285, in steps of 5)  
PSXXXPBBSE-24/T (XXX = 305-345, in steps of 5)  
PSXXXPBBSE-20/U (XXX = 255-285, in steps of 5)

The product (hereinafter the “Product”) in this Warranty means the Standard PV Module(s) manufactured by Phono Solar Technology Co., Ltd. (hereinafter the “Phono Solar”). The Phono Solar warrants its Product(s) in compliance with the terms and conditions as stipulated below.

The Customer in this Warranty means the individual person or company who purchases Phono Solar Product.

This “Limited Warranty for PV-Modules” is valid for all Standard Modules delivered from Phono Solar since **September 1<sup>st</sup>, 2017**

### 1. Limited Product Warranty –Repair or Replacement

#### Ten (10) years

Phono Solar warrants that the Product including factory-assembled DC connectors and cables, if any, will be free from defects in material and workmanship under normal application, installation, operation, and use and service conditions. If Product fails to conform to this warranty, within a period of ten (10) years from the date of delivery by Phono Solar to its first buyer, Phono Solar will, at its sole discretion, either repair the defective Product(s) at no charge; or replace the defective Product(s) or part thereof by a new or remanufactured equivalent at no charge,

Page 1 of 5

#### 江苏辉伦太阳能科技有限公司

南京市浦口高新技术开发区星火路 1 号苏美达科技工业园 邮编: 210032  
电话: +86 25 58648000 传真: +86 25 58638009  
网址: www.phonosolar.com  
邮箱: info@phonosolar.com

#### Phono Solar Technology Co., Ltd.

No. 1 Xinghuo Rd., Nanjing Hi-tech Zone, Nanjing, China  
Tel: +86 25 58648000 Fax: +86 25 58638009  
Web: www.phonosolar.com  
E-mail: info@phonosolar.com

within the above specified period. This repair or replacement remedy shall be the sole and exclusive remedy provided under the "Limited Product Warranty" and shall not extend beyond the ten (10) years period set forth herein.

This "Limited Product Warranty" does not warrant a specific power output, which shall be exclusively covered under clause 2 hereinafter ("Limited Peak Power Warranty").

## 2. Limited Linear Peak Power Warranty - Limited Remedy

Phono Solar guarantees that during the first (1<sup>st</sup>) year from the date of delivery by Phono Solar to the first buyer, For **Monocrystalline Products**: 3.0% of the "Peak Power at STC"-1 as specified as of the Phono Solar's product label in the first year, thereafter the actual annual power decline no more than 0.7% per year, ending with 80.2% of the "Peak Power at STC"-1 as specified as of the Phono Solar's product label in the 25<sup>th</sup> year after the Warranty Start Date.

For **Polycrystalline Products**: 2.5% of the "Peak Power at STC"-1 as specified as of the Phono Solar's product label in the first year, thereafter the actual annual power decline no more than 0.7% per year, ending with 80.7% of the "Peak Power at STC"-1 as specified as of the Phono Solar's product label in the 25<sup>th</sup> year after the Warranty Start Date.

Provided that such loss in power is determined by Phono Solar (at its sole and absolute discretion) to be due to defects in material or workmanship, Phono Solar will, at its sole option, replace such loss in power by either (a) providing additional Product(s) to the Customer to make up for such loss in power or (b) replacing the defective Product(s) at the option of Phono Solar.

The remedies set forth in this clause 2 shall be the sole and exclusive remedies provided under the "Limited Linear Peak Power Warranty".

## 3. Exclusions and Limitations

- (1) In any event, all warranty claims must be received within the applicable warranty period for this warranty to be effective.
- (2) The "Limited Product Warranties" and the "Limited Linear Peak Power Warranties" do not apply to any Product(s) which have been subjected to:
  - Misuse, abuse, neglect or accident;
  - Alteration, improper installation or application;
  - Non-observance of Phono Solar's installation manual;
  - Impairments caused by external effects, such as e.g., dirt stains, smoke, damages caused by salt, by chemicals not explicitly authorized for use, e.g. for cleaning. Repair or modifications by someone other than an approved service technician of Phono Solar;
  - Power failure surges, lightning, flood, fire, accidental breakage or other events out of Phono Solar's control;
  - Caused by external events including but not limited to defective equipment parts, appliances, system components like, connecting cables, invertors, or the like, which have been coupled with the Module by anyone other than Seller, or caused by defective system design, configuration, or installation planning;

- Removal of Modules and reinstallation at a new site;
  - Installation on mobile platforms or in a marine environment; direct contact with corrosive agents or salt water; pest damage; or malfunctioning system components;
  - Alteration, removal or obliteration of the original Module label;
  - Other events that are reasonably beyond the control of Phono Solar.
- (3) Both the “Limited Product Warranties” and “Limited Peak Power Warranties” do not cover any costs associated with installation, removal or re-installation of the PV-modules and (except as explicitly set forth in the final paragraph of Section 5) customs clearance or any other costs for return of the Product(s); .
- (4) Both the “Limited Product Warranties” and “Limited Peak Power Warranties” do not cover cosmetic blemishes associated with installation, or the normal wear and tear of Phono Solar Modules.

#### 4. Limitation of Warranty Scope

These warranties as set forth herein are expressly in lieu of and exclude all other warranties of any kind whatsoever, whether express or implied, including but not limited to warranties of merchantability, of fitness for particular purpose, use, or application, of non-infringement and all other obligations or liabilities on the part of Phono Solar, unless such other obligations or liabilities are expressly agreed to in writing signed and approved by Phono Solar to the broadest extent permitted by law.

Phono Solar shall have no responsibility or liability whatsoever for damage or injury to persons or property, or for other loss or injury resulting from any cause whatsoever arising out of or related to the Product(s), including, without limitation, any defects in the Product(s), or from use or installation. Under no circumstances shall Phono Solar be liable for any special punitive, incidental, or consequential damages, howsoever caused, including but not limited to loss of use, loss of profits, loss of production, or loss of revenues, arising, directly or indirectly from the sale or use of any Product(s), whether such claim is based on warranty, contract, negligence, strict liability or otherwise, Phono Solar's aggregate liability, if any, in damages or otherwise, shall not exceed the invoice value as paid by the Customer, for the single unit of Product(s) involved. The rights and limitations herein shall leave unaffected any legal rights existing under mandatory applicable laws.

#### 5. Obtaining Warranty Performance

If the Customer has a justified claim covered by this “Limited Warranties for PV Modules”, an immediate notification directly to Phono Solar shall be filed by mailing a registered letter in writing to the address of Phono Solar listed hereunder, or by, sending an email letter to the email account of Phono Solar Service Center listed hereunder as soon as becoming aware of the circumstances which constitute a warranty case. Together with the notification, the Customer should enclose the following information:

- The necessary contact information of the Customer, including its name, address, telephone, email, etc.,
- The corresponding serial number of the Product(s)
- The date on which the Product(s) have been delivered and installed
- The pictures of the defective Module which show the defect and/or the pictures which show the shadowing situation at the installation location

The timely receipt of the notification by Phono Solar shall be decisive.

The return of any PV-modules will not be accepted unless prior written authorization for the return and evaluation of the claimed defect has been given by Phono Solar. To the extent necessary for processing the return request Phono Solar or its authorized person shall be given commercially reasonable access to the Product(s) for inspection and analysis of the claimed defect. In connection with both the "Limited Product Warranties" and "Limited Peak Power Warranties", Phono Solar shall reimburse Customer for reasonable, customary and documented transportation charges by sea freight for both the return of the Product(s) and reshipment of any repaired or replaced Product(s), only if this cost is authorized by Phono Solar customer service department.

## 6. Severability

If a part, provision or clause of this "Limited Warranty for PV-Modules", or the application thereof to any person or circumstance, is held invalid, void or unenforceable, such holding shall not affect and shall leave all other parts, provisions, clauses or applications of this "Limited Warranty for PV-Modules", and to this extent such other parts, provisions, clauses or applications of this "Limited Warranty for PV-Modules" shall be treated as severable.

## 7. Disputes

In case of any discrepancy in a warranty-claim, a first-class international test-institute such as Fraunhofer ISE in Freiburg/ Germany, TÜV Rheinland in Cologne/ Germany or ASU Arizona State University shall be involved to judge the claim finally. All fees and expenses shall be born by the losing party, unless otherwise awarded. The final explanation right shall be borne by Phono Solar.

## 8. Various

The repair or replacement of the Product(s) or the supply of additional Product(s), does not cause the beginning of new warranty terms, nor shall the original terms of this "Limited Warranty for PV-Modules" be extended. Any replaced Product(s) shall become the property of Phono Solar made for their disposal. Phono Solar has the right to deliver another type (different in size, color, shape and/or power) in case Phono Solar discontinued producing the replaced Product(s) at the time of the claim.

## 9. Warranty Transfer

This warranty is transferable from the original Customer to any assignee and remains in effect for the time period remaining under the limited warranties, provided the Product remains installed in its original location at the warranty registration.

## 10. Force Majeure

Phono Solar shall not be responsible or liable in any way to the customer or any third-party arising from any non-performance or delay in performance of any terms and conditions of sale, including this "Limited Warranty for

Page 4 of 5

### 江苏辉伦太阳能科技有限公司

南京市浦口高新技术开发区星火路 1 号苏美达科技工业园 邮编: 210032  
电话: +86 25 58648000 传真: +86 25 58638009  
网址: www.phonosolar.com  
邮箱: info@phonosolar.com

### Phono Solar Technology Co., Ltd.

No. 1 Xinghuo Rd., Nanjing Hi-tech Zone, Nanjing, China  
Tel: +86 25 58648000 Fax: +86 25 58638009  
Web: www.phonosolar.com  
E-mail: info@phonosolar.com

PV-Modules ", due to acts God, war, riots, strikes, warlike conditions, plague or other epidemics, fire, flood, or any other similar cause or circumstance beyond the reasonable control of such Phono Solar. In such cases, performance by Phono Solar of this Limited Warranty shall be suspended without liability for the period of delay reasonably attributable to such causes.

1 "Peak Power at STC" is the power in Watt peak that a PV- Module generates in its Maximum Power Point.

"STC" are as follows:

Light spectrum of AM 1.5, (b) an irradiation of 1000 W per m<sup>2</sup> and (c) a cell temperature of 25 degree centigrade at right angle irradiation.

The measurements are carried out in accordance with IEC 61215 as tested at the connectors or junction box terminals – as applicable – per calibration and testing standards of Phono Solar valid at the date of manufacture of the PV-modules. The power output shall be measured by a laboratory approved by Phono Solar.

## Contact

PHONO SOLAR TECHNOLOGY CO., LTD.

Address: No. 1 Xinghuo Rd., Nanjing Hi-tech Zone, Nanjing, China

Tel: 86 25 5863 8000

Fax: 86 25 5863 8009

Web: <http://www.phonosolar.com>

Email: [support@phonosolar.com](mailto:support@phonosolar.com)

# TWINPLUS MODULE SERIES

HIGH EFFICIENCY MONO-PERC M4-9B-R

## 435-455W



### OUTSTANDING PRODUCT PERFORMANCE

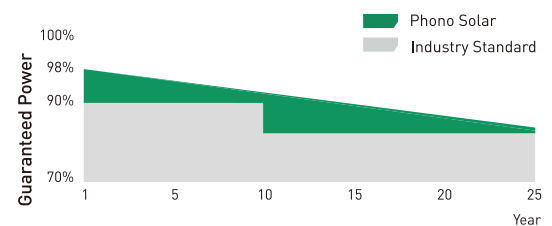
- Competitive high-temperature performance with ameliorated temperature coefficient
- Minimized power loss in cell connection
- Better performance under shading effect
- Decreased nominal operating cell temperature to  $43 \pm 2^{\circ}\text{C}$
- Higher power generation with multi-busbar and half-cut technology

### TRUSTWORTHY QUALITY AND RELIABILITY

- Guaranteed 0~+5W positive tolerance secures reliable power output
- 5400Pa maximum snow load, 2400Pa maximum wind load
- Optimized electrical design lowers hot spot risk and operating current

### PID RESISTANT

- Industry-leading cell processing technology and electrical design ensure solid PID resistance



12-year Product Warranty | 25-year Linear Performance Warranty

### MANAGEMENT SYSTEM CERTIFICATES

IEC 61215, IEC 61730

ISO 9001:2015 / Quality management system

ISO 14001:2015 / Standards for environmental management system

OHSAS 18001:2007 / International standards for occupational health & safety

IEC TS 62941: 2016 Terrestrial photovoltaic (PV) modules-guidelines for increased confidence in PV module design qualification and type approval



Bloomberg Tier1  
NEW ENERGY FINANCE



## ELECTRICAL TYPICAL VALUES

Model	PS435M4-24/TH PS435M4H-24/TH		PS440M4-24/TH PS440M4H-24/TH		PS445M4-24/TH PS445M4H-24/TH		PS450M4-24/TH PS450M4H-24/TH		PS455M4-24/TH PS455M4H-24/TH	
Testing Condition	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT
Rated Power (P <sub>mpp</sub> )	435	326	440	330	445	334	450	337	455	341
Rated Current (I <sub>mpp</sub> )	10.66	8.60	10.73	8.66	10.80	8.72	10.87	8.77	10.94	8.83
Rated Voltage (V <sub>mpp</sub> )	40.81	37.89	41.01	38.08	41.21	38.26	41.40	38.44	41.60	38.62
Short Circuit Current (I <sub>sc</sub> )	11.13	8.98	11.21	9.05	11.29	9.11	11.38	9.19	11.47	9.26
Open Circuit Voltage (V <sub>oc</sub> )	48.85	46.39	48.98	46.51	49.11	46.63	49.24	46.76	49.37	46.88
Module Efficiency (%)	19.89		20.12		20.35		20.58		20.80	

STC(Standard Testing Conditions):Irradiance 1000W/m<sup>2</sup>, AM 1.5, Cell Temperature 25°C

NOCT (Nominal Operation Cell Temperature): Irradiance 800W/m<sup>2</sup>, Ambient Temperature 20°C, Spectra at AM1.5, Wind at 1m/S

## MECHANICAL CHARACTERISTICS

Cell Type	Monocrystalline 166mm x 83mm
Dimension (L× W × H)	Length: 2103mm [82.80 inch]
	Width: 1040mm [40.94 inch]
	Height: 35mm [1.38 inch]
Weight	25.0kg (55.12 lbs)
Front Glass	3.2mm Toughened Glass
Frame	Anodized Aluminium Alloy
Cable (Including Connector)	4mm <sup>2</sup> (IEC), (+):450mm,(-):250mm or Customized Length
Junction Box	IP 68 Rated

## TEMPERATURE RATINGS

Voltage Temperature Coefficient	-0.28%/°C
Current Temperature Coefficient	+0.05%/°C
Power Temperature Coefficient	-0.35%/°C
Tolerance	0~+5w
NOCT	43±2°C

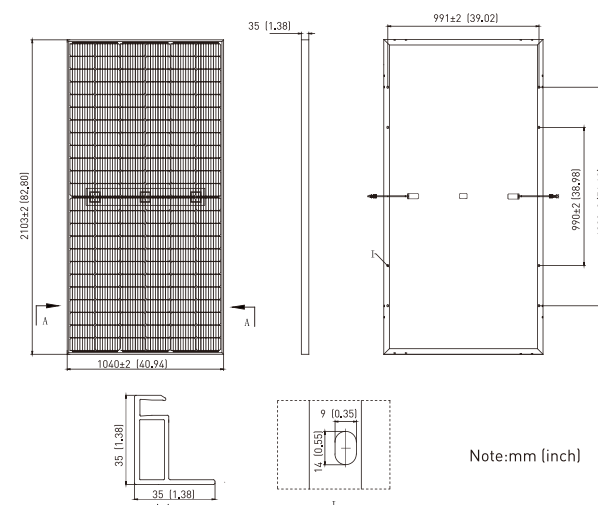
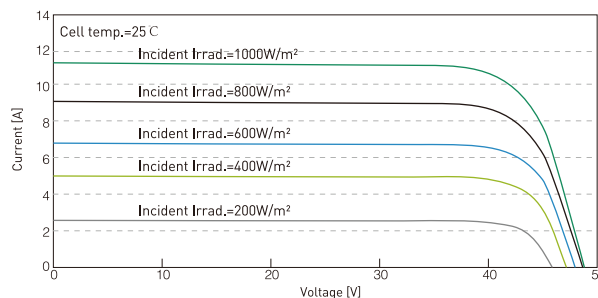
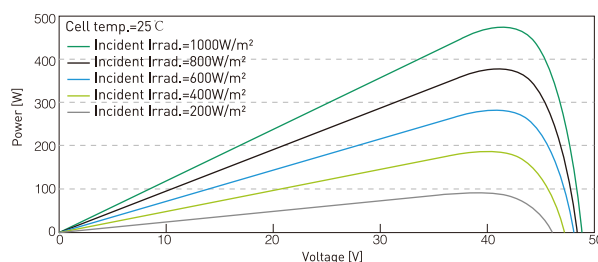
## ABSOLUTE MAXIMUM RATING

Operating Temperature	From -40 to +85°C
Hail Diameter @ 80km/h	Up to 25mm
Front Side Maximum Static Loading	5400Pa
Rear Side Maximum Static Loading	2400Pa
Maximum Series Fuse Rating	20A
PV Module Classification	II
Fire Rating (IEC 61730)	C
Maximum System Voltage	DC 1500V/1000V

## PACKING CONFIGURATION

Container	20' GP	40' HQ
Pieces/Container	255	682

## ELECTRICAL CHARACTERISTICS







Product Service

# CERTIFICATE

No. Z2 084700 0078 Rev. 02

**Holder of Certificate:** **Phono Solar Technology Co., Ltd**

No. 1 Xinghuo Rd.,  
Nanjing Hi-tech Zone,  
210061 Nanjing  
PEOPLE'S REPUBLIC OF CHINA

**Certification Mark:**



**Product:**

**Crystalline Silicon Terrestrial Photovoltaic (PV) Modules**

The product was tested on a voluntary basis and complies with the essential requirements. The certification mark shown above can be affixed on the product. It is not permitted to alter the certification mark in any way. In addition, the certification holder must not transfer the certificate to third parties. This certificate is valid until the listed date, unless it is cancelled earlier. All applicable requirements of the testing and certification regulations of TÜV SÜD Group have to be complied. For details see: [www.tuvsud.com/ps-cert](http://www.tuvsud.com/ps-cert)

**Test report no.:** 704061902703-02

**Valid until:** 2025-11-08

**Date,** 2020-11-09

  
( Zhulin Zhang )



# CERTIFICATE

No. Z2 084700 0078 Rev. 02

## Model(s):

### Mono-series:

PSxxxMH-24/T, xxx= 325 to 385 in steps of 5  
 PSxxxMH-22/W, xxx= 320 to 330 in steps of 5  
 PSxxxMH-20/U, xxx= 275 to 320 in steps of 5  
 PSxxxMH-18/V, xxx= 265 to 270 in steps of 5  
 PSxxxMH-12/G, xxx= 175 to 180 in steps of 5  
 PSxxxMH-24/TH, xxx= 360 to 390 in steps of 5  
 PSxxxMH-20/UH, xxx= 300 to 325 in steps of 5  
 PSxxxM1H-24/TH, xxx = 375 to 410 in steps of 5  
 PSxxxM1H-20/UH, xxx = 310 to 340 in steps of 5  
 PSxxxM1H-24/T, xxx = 375 to 395 in steps of 5  
 PSxxxM1H-20/U, xxx = 315 to 330 in steps of 5  
 PSxxxM4H-24/TH, xxx = 430 to 455 in steps of 5  
 PSxxxM4H-20/UH, xxx = 360 to 380 in steps of 5  
 PSxxxM-24/T, xxx= 325 to 385 in steps of 5  
 PSxxxM-22/W, xxx= 320 to 330 in steps of 5  
 PSxxxM-20/U, xxx= 275 to 320 in steps of 5  
 PSxxxM-18/V, xxx= 265 to 270 in steps of 5  
 PSxxxM-12/G, xxx= 175 to 180 in steps of 5  
 PSxxxM-24/TH, xxx= 360 to 390 in steps of 5  
 PSxxxM-20/UH, xxx= 300 to 325 in steps of 5  
 PSxxxM1-24/TH, xxx = 375 to 410 in steps of 5  
 PSxxxM1-20/UH, xxx = 310 to 340 in steps of 5  
 PSxxxM1-24/T, xxx = 375 to 395 in steps of 5  
 PSxxxM1-20/U, xxx = 315 to 330 in steps of 5  
 PSxxxM4-24/TH, xxx = 430 to 455 in steps of 5  
 PSxxxM4-20/UH, xxx = 360 to 380 in steps of 5

### Poly-series:

PSxxxPH-24/T, xxx= 315 to 335 in steps of 5  
 PSxxxPH-22/W, xxx= 285 to 305 in steps of 5  
 PSxxxPH-20/U, xxx= 260 to 280 in steps of 5  
 PSxxxPH-18/V, xxx= 235 to 250 in steps of 5  
 PSxxxPH-12/G, xxx= 155 to 170 in steps of 5  
 PSxxxPH-24/TH, xxx= 325 to 340 in steps of 5  
 PSxxxPH-20/UH, xxx= 270 to 280 in steps of 5  
 PSxxxP-24/T, xxx= 315 to 335 in steps of 5  
 PSxxxP-22/W, xxx= 285 to 305 in steps of 5  
 PSxxxP-20/U, xxx= 260 to 280 in steps of 5  
 PSxxxP-18/V, xxx= 235 to 250 in steps of 5  
 PSxxxP-12/G, xxx= 155 to 170 in steps of 5  
 PSxxxP-24/TH, xxx= 325 to 340 in steps of 5  
 PSxxxP-20/UH, xxx= 270 to 280 in steps of 5  
 xxx is standing for rated output power at STC

## Parameters:

Construction:	Framed, with Junction box, Cable and Connectors.
Severity of salt mist test:	Level 6
Safety Class:	Class II
Maximum System Voltage:	1500V DC or 1000V DC
Fire Safety Class:	Class C according to UL790

## Tested according to:

IEC 61215-1(ed.1)  
 IEC 61215-1-1(ed.1)  
 IEC 61215-2(ed.1)  
 IEC 61730-1(ed.2)  
 IEC 61730-2(ed.2)  
 IEC 61701(ed.2)

**Production Facility(ies):** 084700, 004770, 098336, 090968



Product Service

# CERTIFICATE

No. Z2 084700 0079 Rev. 02

**Holder of Certificate:** **Phono Solar Technology Co., Ltd**

No. 1 Xinghuo Rd.,  
Nanjing Hi-tech Zone,  
210061 Nanjing  
PEOPLE'S REPUBLIC OF CHINA

**Certification Mark:**



**Product:**

**Crystalline Silicon Terrestrial Photovoltaic (PV) Modules**

The product was tested on a voluntary basis and complies with the essential requirements. The certification mark shown above can be affixed on the product. It is not permitted to alter the certification mark in any way. In addition, the certification holder must not transfer the certificate to third parties. This certificate is valid until the listed date, unless it is cancelled earlier. All applicable requirements of the testing and certification regulations of TÜV SÜD Group have to be complied. For details see: [www.tuvsud.com/ps-cert](http://www.tuvsud.com/ps-cert)

**Test report no.:** 704061902704-02

**Valid until:** 2025-09-14

**Date,** 2020-09-16

( Zhulin Zhang )

# CERTIFICATE

No. Z2 084700 0079 Rev. 02

## Model(s):

### Mono-series:

PSxxxMH-24/T, xxx= 325 to 385 in steps of 5  
 PSxxxMH-22/W, xxx= 320 to 330 in steps of 5  
 PSxxxMH-20/U, xxx= 275 to 320 in steps of 5  
 PSxxxMH-18/V, xxx= 265 to 270 in steps of 5  
 PSxxxMH-12/G, xxx= 175 to 180 in steps of 5  
 PSxxxMH-24/TH, xxx= 360 to 390 in steps of 5  
 PSxxxMH-20/UH, xxx= 300 to 325 in steps of 5  
 PSxxxM1H-24/TH, xxx = 375 to 410 in steps of 5  
 PSxxxM1H-20/UH, xxx = 310 to 340 in steps of 5  
 PSxxxM1H-24/T, xxx = 375 to 395 in steps of 5  
 PSxxxM1H-20/U, xxx = 315 to 330 in steps of 5  
 PSxxxM4H-24/TH, xxx = 430 to 455 in steps of 5  
 PSxxxM4H-20/UH, xxx = 360 to 380 in steps of 5  
 PSxxxM-24/T, xxx= 325 to 385 in steps of 5  
 PSxxxM-22/W, xxx= 320 to 330 in steps of 5  
 PSxxxM-20/U, xxx= 275 to 320 in steps of 5  
 PSxxxM-18/V, xxx= 265 to 270 in steps of 5  
 PSxxxM-12/G, xxx= 175 to 180 in steps of 5  
 PSxxxM-24/TH, xxx= 360 to 390 in steps of 5  
 PSxxxM-20/UH, xxx= 300 to 325 in steps of 5  
 PSxxxM1-24/TH, xxx = 375 to 410 in steps of 5  
 PSxxxM1-20/UH, xxx = 310 to 340 in steps of 5  
 PSxxxM1-24/T, xxx = 375 to 395 in steps of 5  
 PSxxxM1-20/U, xxx = 315 to 330 in steps of 5  
 PSxxxM4-24/TH, xxx = 430 to 455 in steps of 5  
 PSxxxM4-20/UH, xxx = 360 to 380 in steps of 5

### Poly-series:

PSxxxPH-24/T, xxx= 315 to 335 in steps of 5  
 PSxxxPH-22/W, xxx= 285 to 305 in steps of 5  
 PSxxxPH-20/U, xxx= 260 to 280 in steps of 5  
 PSxxxPH-18/V, xxx= 235 to 250 in steps of 5  
 PSxxxPH-12/G, xxx= 155 to 170 in steps of 5  
 PSxxxPH-24/TH, xxx= 325 to 340 in steps of 5  
 PSxxxPH-20/UH, xxx= 270 to 280 in steps of 5  
 PSxxxP-24/T, xxx= 315 to 335 in steps of 5  
 PSxxxP-22/W, xxx= 285 to 305 in steps of 5  
 PSxxxP-20/U, xxx= 260 to 280 in steps of 5  
 PSxxxP-18/V, xxx= 235 to 250 in steps of 5  
 PSxxxP-12/G, xxx= 155 to 170 in steps of 5  
 PSxxxP-24/TH, xxx= 325 to 340 in steps of 5  
 PSxxxP-20/UH, xxx= 270 to 280 in steps of 5  
 xxx is standing for rated output power at STC

## Parameters:

Construction:	Framed, with Junction box, Cable and Connectors.
Safety Class:	Class II
Maximum System Voltage:	1500V DC or 1000V DC
Fire Safety Class:	Class C according to UL790

## Tested according to:

IEC 61215-1(ed.1)  
 IEC 61215-1-1(ed.1)  
 IEC 61215-2(ed.1)  
 IEC 61730-1(ed.2)  
 IEC 61730-2(ed.2)  
 IEC 62716(ed.1)

**Production Facility(ies):** 084700, 004770, 098336, 090968



Product Service

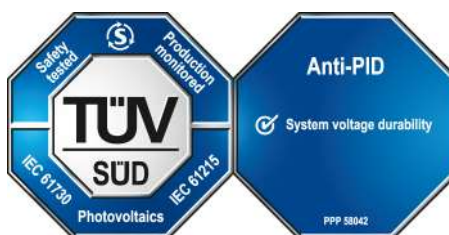
# CERTIFICATE

No. Z2 084700 0060 Rev. 03

**Holder of Certificate:** **Phono Solar Technology Co., Ltd**

No. 1 Xinghuo Rd.,  
Nanjing Hi-tech Zone,  
210061 Nanjing  
PEOPLE'S REPUBLIC OF CHINA

**Certification Mark:**



**Product:**

**Crystalline Silicon Terrestrial Photovoltaic (PV) Modules**  
**Mono-Crystalline Silicon Photovoltaic Module**

The product was tested on a voluntary basis and complies with the essential requirements. The certification mark shown above can be affixed on the product. It is not permitted to alter the certification mark in any way. In addition, the certification holder must not transfer the certificate to third parties. This certificate is valid until the listed date, unless it is cancelled earlier. All applicable requirements of the testing and certification regulations of TÜV SÜD Group have to be complied. For details see: [www.tuvsud.com/ps-cert](http://www.tuvsud.com/ps-cert)

**Test report no.:** 704061800303-03

**Valid until:** 2025-09-14

**Date,** 2020-09-16

( Zhulin Zhang )

# CERTIFICATE

No. Z2 084700 0060 Rev. 03

## Model(s):

### 1500V DC system modules:

PSxxxMH-24/T, xxx= 325 to 385 in steps of 5  
 PSxxxMH-22/W, xxx= 320 to 330 in steps of 5  
 PSxxxMH-20/U, xxx= 275 to 320 in steps of 5  
 PSxxxMH-18/V, xxx= 265 to 270 in steps of 5  
 PSxxxMH-12/G, xxx= 175 to 180 in steps of 5  
 PSxxxMH-24/TH, xxx= 360 to 390 in steps of 5  
 PSxxxMH-20/UH, xxx= 300 to 325 in steps of 5  
 PSxxxM1H-24/TH, xxx = 375 to 410 in steps of 5  
 PSxxxM1H-20/UH, xxx = 310 to 340 in steps of 5  
 PSxxxM1H-24/T, xxx = 375 to 395 in steps of 5  
 PSxxxM1H-20/U, xxx = 315 to 330 in steps of 5  
 PSxxxM4H-24/TH, xxx = 430 to 455 in steps of 5  
 PSxxxM4H-20/UH, xxx = 360 to 380 in steps of 5

### 1000V DC system modules:

PSxxxM-24/T, xxx= 325 to 385 in steps of 5  
 PSxxxM-22/W, xxx= 320 to 330 in steps of 5  
 PSxxxM-20/U, xxx= 275 to 320 in steps of 5  
 PSxxxM-18/V, xxx= 265 to 270 in steps of 5  
 PSxxxM-12/G, xxx= 175 to 180 in steps of 5  
 PSxxxM-24/TH, xxx= 360 to 390 in steps of 5  
 PSxxxM-20/UH, xxx= 300 to 325 in steps of 5  
 PSxxxM1-24/TH, xxx = 375 to 410 in steps of 5  
 PSxxxM1-20/UH, xxx = 310 to 340 in steps of 5  
 PSxxxM1-24/T, xxx = 375 to 395 in steps of 5  
 PSxxxM1-20/U, xxx = 315 to 330 in steps of 5  
 PSxxxM4-24/TH, xxx = 430 to 455 in steps of 5  
 PSxxxM4-20/UH, xxx = 360 to 380 in steps of 5  
 xxx is standing for rated output power at STC

## Parameters:

Construction: Framed, with Junction box, Cable and Connectors.  
 Safety Class: Class II  
 Maximum System Voltage: 1500 V DC or 1000 V DC  
 Fire Safety Class: Class C according to UL790  
 PID test condition: -1500 V DC or -1000 V DC  
 96 Hours, 85 °C , 85 % RH  
 PID testing method is according to IEC TS 62804-1:2015

## Tested according to:

PPP 58042B:2015  
 IEC 61215-1(ed.1)  
 IEC 61215-1-1(ed.1)  
 IEC 61215-2(ed.1)  
 IEC 61730-1(ed.2)  
 IEC 61730-2(ed.2)

## Production Facility(ies):

098336, 084700, 090968, 004770

# CERTIFICATE OF COMPLIANCE

**Certificate Number** E487662  
**Report Reference** E487662-2019-03-29  
**Date** 2020-November-10

**Issued to:** PHONO SOLAR TECHNOLOGY CO LTD  
No. 1 Xinghuo Rd  
Nanjing Hi-Tech Zone  
Nanjing Jiangsu 210032 CN

**This is to certify that**  
**representative samples of** PHOTOVOLTAIC MODULES AND PANELS WITH  
SYSTEM VOLTAGE RATINGS OVER 600 VOLTS  
See Addendum Page for Product Designation(s).

Have been investigated by UL in accordance with the  
Standard(s) indicated on this Certificate.

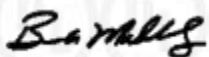
**Standard(s) for Safety:** See Addendum Page for Standard(s) for Safety

**Additional Information:** See the UL Online Certifications Directory at  
<https://iq.ulprospector.com> for additional information

This Certificate of Compliance does not provide authorization to apply the UL Mark. Only the UL Follow-Up Services Procedure provides authorization to apply the UL Mark.

Only those products bearing the UL Mark should be considered as being UL Certified and covered under UL's Follow-Up Services.

Look for the UL Certification Mark on the product.



Bruce Mahrenholz, Director North American Certification Program

UL LLC

Any information and documentation involving UL Mark services are provided on behalf of UL LLC (UL) or any authorized licensee of UL. For questions, please contact a local UL Customer Service Representative at <http://ul.com/aboutul/locations/>





# CERTIFICATE OF COMPLIANCE

**Certificate Number** E487662  
**Report Reference** E487662-2019-03-29  
**Date** 2020-November-10

This is to certify that representative samples of the product as specified on this certificate were tested according to the current UL requirements

USL/CNL - Photovoltaic Module, Models:

a) PS380MH-24/TH, PS385MH-24/TH, PS390MH-24/TH, PS395MH-24/TH, PS310MH-20/UH,  
PS315MH-20/UH, PS320MH-20/UH, PS325MH-20/UH

b) PS380M-24/TH, PS385M-24/TH, PS390M-24/TH, PS395M-24/TH, PS310M-20/UH,  
PS315M-20/UH, PS320M-20/UH, PS325M-20/UH

c) PS430M4H-24/TH, PS435M4H-24/TH, PS440M4H-24/TH, PS445M4H-24/TH,  
PS450M4H-24/TH, PS455M4H-24/TH

d) PS430M4-24/TH, PS435M4-24/TH, PS440M4-24/TH, PS445M4-24/TH, PS450M4-24/TH,  
PS455M4-24/TH

e) PS365M4H-20/UH, PS370M4H-20/UH, PS375M4H-20/UH, PS380M4H-20/UH

f) PS365M4-20/UH, PS370M4-20/UH, PS375M4-20/UH, PS380M4-20/UH

g) PS425M4H-24/THB, PS430M4H-24/THB, PS435M4H-24/THB, PS440M4H-24/THB

h) PS425M4-24/THB, PS430M4-24/THB, PS435M4-24/THB, PS440M4-24/THB

i) PS355M4H-20/UHB, PS360M4H-20/UHB, PS365M4H-20/UHB

j) PS355M4-20/UHB, PS360M4-20/UHB, PS365M4-20/UHB

k) PS380M1H-24/TH, PS385M1H-24/TH, PS390M1H-24/TH, PS395M1H-24/TH,  
PS400M1H-24/TH, PS405M1H-24/TH, PS410M1H-24/TH,

l) PS380M1-24/TH, PS385M1-24/TH, PS390M1-24/TH, PS395M1-24/TH,  
PS400M1-24/TH, PS405M1-24/TH, PS410M1-24/TH,

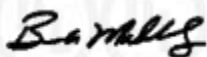
m) PS340M1H-20/UH,

n) PS340M1-20/UH,

o) PS380M1H-24/THB, PS385M1H-24/THB, PS390M1H-24/THB,

p) PS380M1-24/THB, PS385M1-24/THB, PS390M1-24/THB, q) PS325M1H-20/UHB,

r) PS325M1-20/UHB



Bruce Mahrenholz, Director North American Certification Program

UL LLC



Any information and documentation involving UL Mark services are provided on behalf of UL LLC (UL) or any authorized licensee of UL. For questions, please contact a local UL Customer Service Representative at <http://ul.com/aboutul/locations/>



# CERTIFICATE OF COMPLIANCE

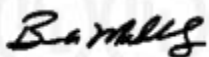
**Certificate Number** E487662  
**Report Reference** E487662-2019-03-29  
**Date** 2020-November-10

## Standard(s) for Safety

UL Standard for Safety for Photovoltaic (PV) Module Safety Qualification - Part 1: Requirements for Construction, UL 61730-1

UL Standard for Safety for Photovoltaic (PV) Module Safety Qualification - Part 2: Requirements for Testing, UL 61730-2

CAN/CSA-C22.2 No. 61730-1: Photovoltaic (PV) module safety qualification — Part 1: Requirements for construction and CAN/CSA-C22.2 No. 61730-2: Photovoltaic (PV) module safety qualification — Part 2: Requirements for testing



Bruce Mahrenholz, Director North American Certification Program

UL LLC

Any information and documentation involving UL Mark services are provided on behalf of UL LLC (UL) or any authorized licensee of UL. For questions, please contact a local UL Customer Service Representative at <http://ul.com/aboutul/locations/>





Product Service

# CERTIFICATE

No. Z2 084700 0067 Rev. 09

**Holder of Certificate:** **Phono Solar Technology Co., Ltd**

No. 1 Xinghuo Rd.,  
Nanjing Hi-tech Zone,  
210061 Nanjing  
PEOPLE'S REPUBLIC OF CHINA

**Certification Mark:**



**Product:**

**Crystalline Silicon Terrestrial Photovoltaic (PV) Modules**  
**Mono-Crystalline Silicon Photovoltaic Module**

The product was tested on a voluntary basis and complies with the essential requirements. The certification mark shown above can be affixed on the product. It is not permitted to alter the certification mark in any way. In addition, the certification holder must not transfer the certificate to third parties. This certificate is valid until the listed date, unless it is cancelled earlier. All applicable requirements of the testing and certification regulations of TÜV SÜD Group have to be complied. For details see: [www.tuvsud.com/ps-cert](http://www.tuvsud.com/ps-cert)

**Test report no.:** 704061710105-10

**Valid until:** 2025-11-19

**Date,** 2020-11-20

( David Bo )

# CERTIFICATE

No. Z2 084700 0067 Rev. 09

## Model(s):

1500 V DC system modules:  
 PSxxxMH-24/T, xxx = 325 to 385 in steps of 5;  
 PSxxxMH-22/W, xxx = 320 to 330 in steps of 5;  
 PSxxxMH-20/U, xxx = 275 to 320 in steps of 5;  
 PSxxxMH-18/V, xxx = 265 to 270 in steps of 5;  
 PSxxxMH-12/G, xxx = 175 to 180 in steps of 5;  
 PSxxxMH-24/TH, xxx = 360 to 390 in steps of 5;  
 PSxxxMH-20/UH, xxx = 300 to 325 in steps of 5;  
 PSxxxM1H-24/TH, xxx = 375 to 435 in steps of 5;  
 PSxxxM1H-20/UH, xxx = 310 to 360 in steps of 5;  
 PSxxxM1H-24/T, xxx = 375 to 395 in steps of 5;  
 PSxxxM1H-20/U, xxx = 315 to 330 in steps of 5;  
 PSxxxM4H-24/TH, xxx = 420 to 455 in steps of 5;  
 PSxxxM4H-20/UH, xxx = 350 to 380 in steps of 5;

1000 V DC system modules:  
 PSxxxM-24/T, xxx = 325 to 385 in steps of 5;  
 PSxxxM-22/W, xxx = 320 to 330 in steps of 5;  
 PSxxxM-20/U, xxx = 275 to 320 in steps of 5;  
 PSxxxM-18/V, xxx = 265 to 270 in steps of 5;  
 PSxxxM-12/G, xxx = 175 to 180 in steps of 5;  
 PSxxxM-24/TH, xxx = 360 to 390 in steps of 5;  
 PSxxxM-20/UH, xxx = 300 to 325 in steps of 5;  
 PSxxxM1-24/TH, xxx = 375 to 435 in steps of 5;  
 PSxxxM1-20/UH, xxx = 310 to 360 in steps of 5;  
 PSxxxM1-24/T, xxx = 375 to 395 in steps of 5;  
 PSxxxM1-20/U, xxx = 315 to 330 in steps of 5;  
 PSxxxM4-24/TH, xxx = 420 to 455 in steps of 5;  
 PSxxxM4-20/UH, xxx = 350 to 380 in steps of 5;  
 xxx is standing for rated output power at STC.

## Parameters:

Construction:	Framed, with Junction box, Cable and Connectors.
Test Laboratory:	Yangzhou Opto-Electrical Products Testing Institute No. 10 West Kaifa Road, Yangzhou 225009 Jiangsu, P. R. China
Safety Class:	Class II
Maximum System Voltage:	1500 V DC or 1000 V DC
Fire Safety Class:	Class C according to UL790

## Tested according to:

IEC 61215-1(ed.1)  
 IEC 61215-1-1(ed.1)  
 IEC 61215-2(ed.1)  
 IEC 61730-1(ed.2)  
 IEC 61730-2(ed.2)  
 EN IEC 61730-1:2018  
 EN IEC 61730-1:2018/AC:2018-06  
 EN IEC 61730-2:2018  
 EN IEC 61730-2:2018/AC:2018-06

## Production Facility(ies):

004770, 084700, 090968, 098336

# TWINPLUS MODULE SERIES

HIGH EFFICIENCY MONO-PERC M6-10B-R

## 530-550W



### OUTSTANDING PRODUCT PERFORMANCE

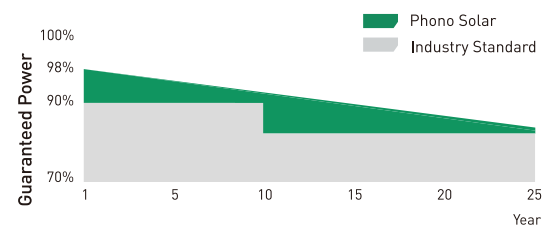
- Competitive high-temperature performance with ameliorated temperature coefficient
- Minimized power loss in cell connection
- Better performance under shading effect
- Decreased nominal operating cell temperature to  $45 \pm 2^{\circ}\text{C}$
- Higher power generation with multi-busbar and half-cut technology

### TRUSTWORTHY QUALITY AND RELIABILITY

- Guaranteed 0~+5W positive tolerance secures reliable power output
- 5400Pa maximum snow load, 2400Pa maximum wind load
- Optimized electrical design lowers hot spot risk and operating current

### PID RESISTANT

- Industry-leading cell processing technology and electrical design ensure solid PID resistance



12-year Product Warranty | 25-year Linear Performance Warranty

### MANAGEMENT SYSTEM CERTIFICATES

IEC 61215, IEC 61730

ISO 9001:2015 / Quality management system

ISO 14001:2015 / Standards for environmental management system

OHSAS 18001:2007 / International standards for occupational health & safety

IEC TS 62941: 2016 Terrestrial photovoltaic (PV) modules-guidelines for increased confidence in PV module design qualification and type approval



Bloomberg Tier1  
NEW ENERGY FINANCE



## ELECTRICAL TYPICAL VALUES

Model	PS530M6-24/TH		PS535M6-24/TH		PS540M6-24/TH		PS545M6-24/TH		PS550M6-24/TH	
	PS530M6H-24/TH		PS535M6H-24/TH		PS540M6H-24/TH		PS545M6H-24/TH		PS550M6H-24/TH	
Testing Condition	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT
Rated Power (P <sub>mpp</sub> )	530	394	535	398	540	402	545	405	550	409
Rated Current (I <sub>mpp</sub> )	12.88	10.41	12.97	10.48	13.06	10.55	13.15	10.63	13.24	10.70
Rated Voltage (V <sub>mpp</sub> )	41.15	37.89	41.25	37.98	41.35	38.07	41.45	38.16	41.55	38.25
Short Circuit Current (I <sub>sc</sub> )	13.42	10.84	13.52	10.92	13.62	11.00	13.72	11.09	13.82	11.17
Open Circuit Voltage (V <sub>oc</sub> )	49.19	46.44	49.29	46.53	49.39	46.62	49.49	46.72	49.59	46.81
Module Efficiency (%)	20.51		20.70		20.89		21.09		21.28	

STC(Standard Testing Conditions):Irradiance 1000W/m<sup>2</sup>, AM 1.5, Cell Temperature 25°C

NOCT (Nominal Operation Cell Temperature): Irradiance 800W/m<sup>2</sup>, Ambient Temperature 20°C, Spectra at AM1.5, Wind at 1m/S

## MECHANICAL CHARACTERISTICS

Cell Type	Monocrystalline 182mm x 91mm
Dimension (L× W × H)	Length: 2279mm (89.72 inch)
	Width: 1134mm (44.65 inch)
	Height: 35mm (1.38 inch)
Weight	29.0kg (63.93 lbs)
Front Glass	3.2mm Toughened Glass
Frame	Anodized Aluminium Alloy
Cable (Including Connector)	4mm <sup>2</sup> (IEC), (+):450mm,(-):250mm or Customized Length
Junction Box	IP 68 Rated

## TEMPERATURE RATINGS

Voltage Temperature Coefficient	-0.28%/°C
Current Temperature Coefficient	+0.05%/°C
Power Temperature Coefficient	-0.35%/°C
Tolerance	0~+5w
NOCT	45±2°C

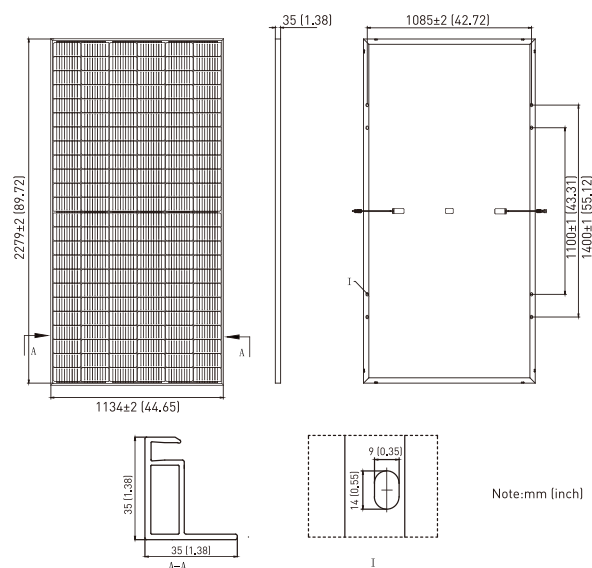
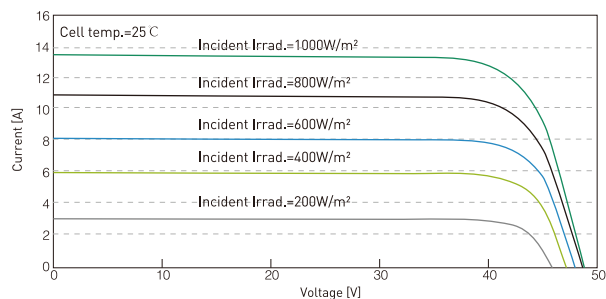
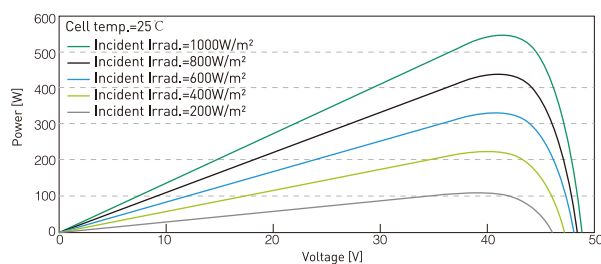
## ABSOLUTE MAXIMUM RATING

Operating Temperature	From -40 to +85°C
Hail Diameter @ 80km/h	Up to 25mm
Front Side Maximum Static Loading	5400Pa
Rear Side Maximum Static Loading	2400Pa
Maximum Series Fuse Rating	25A
PV Module Classification	II
Fire Rating (IEC 61730)	C
Maximum System Voltage	DC 1000V/1500V

## PACKING CONFIGURATION

Container	20' GP	40' HQ
Pieces/Container	155	620

## ELECTRICAL CHARACTERISTICS



**Phono<sup>®</sup> Solar**

PHONO SOLAR TECHNOLOGY CO.,LTD reserves the right to make necessary adjustments to the information described herein at any time without further notice. The specifications and certificates contained in this datasheet may deviate slightly from our actual products due to the on-going innovation and product enhancement. Please be sure to use the most recent version of data.



Product Service

# Attestation of Conformity

No. N8A 084700 0075 Rev. 03

**Holder of Certificate:** **Phono Solar Technology Co., Ltd**

No. 1 Xinghuo Rd.,  
Nanjing Hi-tech Zone,  
210061 Nanjing  
PEOPLE'S REPUBLIC OF CHINA

**Product:** **Crystalline Silicon Terrestrial Photovoltaic (PV) Modules**  
**Mono-Crystalline Silicon Photovoltaic Module**

This Attestation of Conformity is issued on a voluntary basis according to the Low Voltage Directive 2014/35/EU relating to electrical equipment designed for use within certain voltage limits. It confirms that the listed equipment complies with the principal protection requirements of the directive and is based on the technical specifications applicable at the time of issuance. It refers only to the particular sample submitted for testing and certification. For details see: [www.tuvsud.com/ps-cert](http://www.tuvsud.com/ps-cert)

**Test report no.:** 704062016604-01

**Date,** 2021-07-13

( Zhulin Zhang )

Page 1 of 3

After preparation of the necessary technical documentation as well as the EU declaration of conformity the required CE marking can be affixed on the product. The declaration of conformity is issued under the sole responsibility of the manufacturer. Other relevant EU-directives have to be observed.





Product Service

# Attestation of Conformity

No. N8A 084700 0075 Rev. 03

## Model(s):

### 1500 V DC system modules:

PSxxxMH-24/T, xxx = 325 to 385 in steps of 5  
 PSxxxMH-22/W, xxx = 320 to 330 in steps of 5  
 PSxxxMH-20/U, xxx = 275 to 320 in steps of 5  
 PSxxxMH-18/V, xxx = 265 to 270 in steps of 5  
 PSxxxMH-12/G, xxx = 175 to 180 in steps of 5  
 PSxxxMH-24/TH, xxx = 360 to 390 in steps of 5  
 PSxxxMH-20/UH, xxx = 300 to 325 in steps of 5  
 PSxxxM1H-24/TH, xxx = 375 to 435 in steps of 5  
 PSxxxM1H-20/UH, xxx = 310 to 360 in steps of 5  
 PSxxxM1H-24/T, xxx = 375 to 395 in steps of 5  
 PSxxxM1H-20/U, xxx = 315 to 330 in steps of 5  
 PSxxxM4H-24/TH, xxx = 420 to 455 in steps of 5  
 PSxxxM4H-22/WH, xxx = 385 to 415 in steps of 5  
 PSxxxM4H-20/UH, xxx = 350 to 380 in steps of 5  
 PSxxxM4H-18/VH, xxx = 315 to 345 in steps of 5  
 PSxxxM5H-24/TH, xxx = 425 to 455 in steps of 5  
 PSxxxM5H-22/WH, xxx = 390 to 415 in steps of 5  
 PSxxxM5H-20/UH, xxx = 355 to 380 in steps of 5  
 PSxxxM5H-18/VH, xxx = 315 to 340 in steps of 5  
 PSxxxM6H-24/TH, xxx = 510 to 555 in steps of 5  
 PSxxxM6H-22/WH, xxx = 470 to 505 in steps of 5  
 PSxxxM6H-20/UH, xxx = 425 to 460 in steps of 5  
 PSxxxM6H-18/VH, xxx = 385 to 415 in steps of 5

### 1000 V DC system modules:

PSxxxM-24/T, xxx = 325 to 385 in steps of 5  
 PSxxxM-22/W, xxx = 320 to 330 in steps of 5  
 PSxxxM-20/U, xxx = 275 to 320 in steps of 5  
 PSxxxM-18/V, xxx = 265 to 270 in steps of 5  
 PSxxxM-12/G, xxx = 175 to 180 in steps of 5  
 PSxxxM-24/TH, xxx = 360 to 390 in steps of 5  
 PSxxxM-20/UH, xxx = 300 to 325 in steps of 5  
 PSxxxM1-24/TH, xxx = 375 to 435 in steps of 5  
 PSxxxM1-20/UH, xxx = 310 to 360 in steps of 5  
 PSxxxM1-24/T, xxx = 375 to 395 in steps of 5  
 PSxxxM1-20/U, xxx = 315 to 330 in steps of 5  
 PSxxxM4-24/TH, xxx = 420 to 455 in steps of 5  
 PSxxxM4-22/WH, xxx = 385 to 415 in steps of 5  
 PSxxxM4-20/UH, xxx = 350 to 380 in steps of 5  
 PSxxxM4-18/VH, xxx = 315 to 345 in steps of 5  
 PSxxxM5-24/TH, xxx = 425 to 455 in steps of 5  
 PSxxxM5-22/WH, xxx = 390 to 415 in steps of 5  
 PSxxxM5-20/UH, xxx = 355 to 380 in steps of 5  
 PSxxxM5-18/VH, xxx = 315 to 340 in steps of 5  
 PSxxxM6-24/TH, xxx = 510 to 555 in steps of 5  
 PSxxxM6-22/WH, xxx = 470 to 505 in steps of 5  
 PSxxxM6-20/UH, xxx = 425 to 460 in steps of 5  
 PSxxxM6-18/VH, xxx = 385 to 415 in steps of 5  
 xxx is standing for rated output power at STC.





Product Service

# Attestation of Conformity

No. N8A 084700 0075 Rev. 03

## Parameters:

Construction:	Framed, with Junction box, Cable and Connectors.
Test Laboratory:	Yangzhou Opto-Electrical Products Testing Institute No. 10 West Kaifa Road, Yangzhou, 225009 Jiangsu, P. R. China
Safety Class:	Class II
Maximum System Voltage:	1500 V DC or 1000 V DC
Fire Safety Class:	Class C according to UL 790

## Tested according to:

EN IEC 61730-1:2018  
EN IEC 61730-1:2018/AC:2018-06  
EN IEC 61730-2:2018  
EN IEC 61730-2:2018/AC:2018-06



Product Service

# CERTIFICATE

No. Z2 084700 0078 Rev. 03

**Holder of Certificate:** **Phono Solar Technology Co., Ltd**  
No. 1 Xinghuo Rd.,  
Nanjing Hi-tech Zone,  
210061 Nanjing  
PEOPLE'S REPUBLIC OF CHINA

## Certification Mark:



**Product:** **Crystalline Silicon Terrestrial Photovoltaic (PV) Modules**

The product was tested on a voluntary basis and complies with the essential requirements. The certification mark shown above can be affixed on the product. It is not permitted to alter the certification mark in any way. In addition, the certification holder must not transfer the certificate to third parties. This certificate is valid until the listed date, unless it is cancelled earlier. All applicable requirements of the testing and certification regulations of TÜV SÜD Group have to be complied. For details see: [www.tuvsud.com/ps-cert](http://www.tuvsud.com/ps-cert)

**Test report no.:** 704061902703-03

**Valid until:** 2026-07-11

**Date,** 2021-07-13

  
( Zhulin Zhang )

# CERTIFICATE

No. Z2 084700 0078 Rev. 03

## Model(s):

### Mono-series:

PSxxxMH-24/T, xxx= 325 to 385 in steps of 5  
 PSxxxMH-22/W, xxx= 320 to 330 in steps of 5  
 PSxxxMH-20/U, xxx= 275 to 320 in steps of 5  
 PSxxxMH-18/V, xxx= 265 to 270 in steps of 5  
 PSxxxMH-12/G, xxx= 175 to 180 in steps of 5  
 PSxxxMH-24/TH, xxx= 360 to 390 in steps of 5  
 PSxxxMH-20/UH, xxx= 300 to 325 in steps of 5  
 PSxxxM1H-24/TH, xxx = 375 to 435 in steps of 5  
 PSxxxM1H-20/UH, xxx = 310 to 360 in steps of 5  
 PSxxxM1H-24/T, xxx = 375 to 395 in steps of 5  
 PSxxxM1H-20/U, xxx = 315 to 330 in steps of 5  
 PSxxxM4H-24/TH, xxx = 430 to 455 in steps of 5  
 PSxxxM4H-20/UH, xxx = 360 to 380 in steps of 5  
 PSxxxM4H-22/WH, xxx = 395 to 415 in steps of 5  
 PSxxxM4H-18/VH, xxx = 325 to 345 in steps of 5  
 PSxxxM6H-24/TH, xxx = 525 to 555 in steps of 5  
 PSxxxM6H-22/WH, xxx = 485 to 505 in steps of 5  
 PSxxxM6H-20/UH, xxx = 440 to 460 in steps of 5  
 PSxxxM6H-18/VH, xxx = 395 to 415 in steps of 5  
 PSxxxM-24/T, xxx= 325 to 385 in steps of 5  
 PSxxxM-22/W, xxx= 320 to 330 in steps of 5  
 PSxxxM-20/U, xxx= 275 to 320 in steps of 5  
 PSxxxM-18/V, xxx= 265 to 270 in steps of 5  
 PSxxxM-12/G, xxx= 175 to 180 in steps of 5  
 PSxxxM-24/TH, xxx= 360 to 390 in steps of 5  
 PSxxxM-20/UH, xxx= 300 to 325 in steps of 5  
 PSxxxM1-24/TH, xxx = 375 to 435 in steps of 5  
 PSxxxM1-20/UH, xxx = 310 to 360 in steps of 5  
 PSxxxM1-24/T, xxx = 375 to 395 in steps of 5  
 PSxxxM1-20/U, xxx = 315 to 330 in steps of 5  
 PSxxxM4-24/TH, xxx = 430 to 455 in steps of 5  
 PSxxxM4-20/UH, xxx = 360 to 380 in steps of 5  
 PSxxxM4-22/WH, xxx = 395 to 415 in steps of 5  
 PSxxxM4-18/VH, xxx = 325 to 345 in steps of 5  
 PSxxxM6-24/TH, xxx = 525 to 555 in steps of 5  
 PSxxxM6-22/WH, xxx = 485 to 505 in steps of 5  
 PSxxxM6-20/UH, xxx = 440 to 460 in steps of 5  
 PSxxxM6-18/VH, xxx = 395 to 415 in steps of 5

### Poly-series:

PSxxxPH-24/T, xxx= 315 to 335 in steps of 5  
 PSxxxPH-22/W, xxx= 285 to 305 in steps of 5  
 PSxxxPH-20/U, xxx= 260 to 280 in steps of 5  
 PSxxxPH-18/V, xxx= 235 to 250 in steps of 5  
 PSxxxPH-12/G, xxx= 155 to 170 in steps of 5  
 PSxxxPH-24/TH, xxx= 325 to 340 in steps of 5  
 PSxxxPH-20/UH, xxx= 270 to 280 in steps of 5  
 PSxxxP-24/T, xxx= 315 to 335 in steps of 5  
 PSxxxP-22/W, xxx= 285 to 305 in steps of 5  
 PSxxxP-20/U, xxx= 260 to 280 in steps of 5  
 PSxxxP-18/V, xxx= 235 to 250 in steps of 5  
 PSxxxP-12/G, xxx= 155 to 170 in steps of 5  
 PSxxxP-24/TH, xxx= 325 to 340 in steps of 5  
 PSxxxP-20/UH, xxx= 270 to 280 in steps of 5  
 xxx is standing for rated output power at STC

# CERTIFICATE

No. Z2 084700 0078 Rev. 03

## Parameters:

Construction:

Framed, with Junction box,  
Cable and Connectors.

Severity of salt mist test:

Level 6

Safety Class:

Class II

Maximum System Voltage:

1500V DC or 1000V DC

Fire Safety Class:

Class C according to UL790

## Tested according to:

IEC 61215-1(ed.1)  
IEC 61215-1-1(ed.1)  
IEC 61215-2(ed.1)  
IEC 61730-1(ed.2)  
IEC 61730-2(ed.2)  
IEC 61701(ed.2)



Product Service

# CERTIFICATE

No. Z2 084700 0079 Rev. 03

**Holder of Certificate:** **Phono Solar Technology Co., Ltd**

No. 1 Xinghuo Rd.,  
Nanjing Hi-tech Zone,  
210061 Nanjing  
PEOPLE'S REPUBLIC OF CHINA

**Certification Mark:**



**Product:**

**Crystalline Silicon Terrestrial Photovoltaic (PV) Modules**

The product was tested on a voluntary basis and complies with the essential requirements. The certification mark shown above can be affixed on the product. It is not permitted to alter the certification mark in any way. In addition, the certification holder must not transfer the certificate to third parties. This certificate is valid until the listed date, unless it is cancelled earlier. All applicable requirements of the testing and certification regulations of TÜV SÜD Group have to be complied. For details see: [www.tuvsud.com/ps-cert](http://www.tuvsud.com/ps-cert)

**Test report no.:** 704061902704-03

**Valid until:** 2026-07-11

**Date,** 2021-07-13

( Zhulin Zhang )

# CERTIFICATE

No. Z2 084700 0079 Rev. 03

## Model(s):

### Mono-series:

PSxxxMH-24/T, xxx= 325 to 385 in steps of 5  
 PSxxxMH-22/W, xxx= 320 to 330 in steps of 5  
 PSxxxMH-20/U, xxx= 275 to 320 in steps of 5  
 PSxxxMH-18/V, xxx= 265 to 270 in steps of 5  
 PSxxxMH-12/G, xxx= 175 to 180 in steps of 5  
 PSxxxMH-24/TH, xxx= 360 to 390 in steps of 5  
 PSxxxMH-20/UH, xxx= 300 to 325 in steps of 5  
 PSxxxM1H-24/TH, xxx = 375 to 435 in steps of 5  
 PSxxxM1H-20/UH, xxx = 310 to 360 in steps of 5  
 PSxxxM1H-24/T, xxx = 375 to 395 in steps of 5  
 PSxxxM1H-20/U, xxx = 315 to 330 in steps of 5  
 PSxxxM4H-24/TH, xxx = 430 to 455 in steps of 5  
 PSxxxM4H-20/UH, xxx = 360 to 380 in steps of 5  
 PSxxxM4H-22/WH, xxx = 395 to 415 in steps of 5  
 PSxxxM4H-18/VH, xxx = 325 to 345 in steps of 5  
 PSxxxM6H-24/TH, xxx = 525 to 555 in steps of 5  
 PSxxxM6H-22/WH, xxx = 485 to 505 in steps of 5  
 PSxxxM6H-20/UH, xxx = 440 to 460 in steps of 5  
 PSxxxM6H-18/VH, xxx = 395 to 415 in steps of 5  
 PSxxxM-24/T, xxx= 325 to 385 in steps of 5  
 PSxxxM-22/W, xxx= 320 to 330 in steps of 5  
 PSxxxM-20/U, xxx= 275 to 320 in steps of 5  
 PSxxxM-18/V, xxx= 265 to 270 in steps of 5  
 PSxxxM-12/G, xxx= 175 to 180 in steps of 5  
 PSxxxM-24/TH, xxx= 360 to 390 in steps of 5  
 PSxxxM-20/UH, xxx= 300 to 325 in steps of 5  
 PSxxxM1-24/TH, xxx = 375 to 435 in steps of 5  
 PSxxxM1-20/UH, xxx = 310 to 360 in steps of 5  
 PSxxxM1-24/T, xxx = 375 to 395 in steps of 5  
 PSxxxM1-20/U, xxx = 315 to 330 in steps of 5  
 PSxxxM4-24/TH, xxx = 430 to 455 in steps of 5  
 PSxxxM4-20/UH, xxx = 360 to 380 in steps of 5  
 PSxxxM4-22/WH, xxx = 395 to 415 in steps of 5  
 PSxxxM4-18/VH, xxx = 325 to 345 in steps of 5  
 PSxxxM6-24/TH, xxx = 525 to 555 in steps of 5  
 PSxxxM6-22/WH, xxx = 485 to 505 in steps of 5  
 PSxxxM6-20/UH, xxx = 440 to 460 in steps of 5  
 PSxxxM6-18/VH, xxx = 395 to 415 in steps of 5

### Poly-series:

PSxxxPH-24/T, xxx= 315 to 335 in steps of 5  
 PSxxxPH-22/W, xxx= 285 to 305 in steps of 5  
 PSxxxPH-20/U, xxx= 260 to 280 in steps of 5  
 PSxxxPH-18/V, xxx= 235 to 250 in steps of 5  
 PSxxxPH-12/G, xxx= 155 to 170 in steps of 5  
 PSxxxPH-24/TH, xxx= 325 to 340 in steps of 5  
 PSxxxPH-20/UH, xxx= 270 to 280 in steps of 5  
 PSxxxP-24/T, xxx= 315 to 335 in steps of 5  
 PSxxxP-22/W, xxx= 285 to 305 in steps of 5  
 PSxxxP-20/U, xxx= 260 to 280 in steps of 5  
 PSxxxP-18/V, xxx= 235 to 250 in steps of 5  
 PSxxxP-12/G, xxx= 155 to 170 in steps of 5  
 PSxxxP-24/TH, xxx= 325 to 340 in steps of 5  
 PSxxxP-20/UH, xxx= 270 to 280 in steps of 5  
 xxx is standing for rated output power at STC

# CERTIFICATE

No. Z2 084700 0079 Rev. 03

## Parameters:

Construction:

Framed, with Junction box,  
Cable and Connectors.

Safety Class:

Class II

Maximum System Voltage:

1500V DC or 1000V DC

Fire Safety Class:

Class C according to UL790

## Tested according to:

IEC 61215-1(ed.1)

IEC 61215-1-1(ed.1)

IEC 61215-2(ed.1)

IEC 61730-1(ed.2)

IEC 61730-2(ed.2)

IEC 62716(ed.1)





Product Service

# CERTIFICATE

No. Z2 084700 0081 Rev. 02

**Holder of Certificate:** **Phono Solar Technology Co., Ltd**

No. 1 Xinghuo Rd.,  
Nanjing Hi-tech Zone,  
210061 Nanjing  
PEOPLE'S REPUBLIC OF CHINA

**Certification Mark:**



**Product:**

**Crystalline Silicon Terrestrial Photovoltaic (PV) Modules**  
**Mono-Crystalline Silicon Photovoltaic Module**

The product was tested on a voluntary basis and complies with the essential requirements. The certification mark shown above can be affixed on the product. It is not permitted to alter the certification mark in any way. In addition, the certification holder must not transfer the certificate to third parties. This certificate is valid until the listed date, unless it is cancelled earlier. All applicable requirements of the testing and certification regulations of TÜV SÜD Group have to be complied. For details see: [www.tuvsud.com/ps-cert](http://www.tuvsud.com/ps-cert)

**Test report no.:** 704061902701-02

**Valid until:** 2026-07-11

**Date,** 2021-07-13

( Zhulin Zhang )

# CERTIFICATE

No. Z2 084700 0081 Rev. 02

## Model(s):

### 1500 V DC system modules:

PSxxxMH-24/T, xxx = 325 to 385 in steps of 5  
 PSxxxMH-22/W, xxx = 320 to 330 in steps of 5  
 PSxxxMH-20/U, xxx = 275 to 320 in steps of 5  
 PSxxxMH-18/V, xxx = 265 to 270 in steps of 5  
 PSxxxMH-12/G, xxx = 175 to 180 in steps of 5  
 PSxxxMH-24/TH, xxx = 360 to 390 in steps of 5  
 PSxxxMH-20/UH, xxx = 300 to 325 in steps of 5  
 PSxxxM1H-24/TH, xxx = 375 to 435 in steps of 5  
 PSxxxM1H-20/UH, xxx = 310 to 360 in steps of 5  
 PSxxxM1H-24/T, xxx = 375 to 395 in steps of 5  
 PSxxxM1H-20/U, xxx = 315 to 330 in steps of 5  
 PSxxxM4H-24/TH, xxx = 430 to 455 in steps of 5  
 PSxxxM4H-20/UH, xxx = 360 to 380 in steps of 5  
 PSxxxM4H-22/WH, xxx = 395 to 415 in steps of 5  
 PSxxxM4H-18/VH, xxx = 325 to 345 in steps of 5  
 PSxxxM6H-24/TH, xxx = 525 to 555 in steps of 5  
 PSxxxM6H-22/WH, xxx = 485 to 505 in steps of 5  
 PSxxxM6H-20/UH, xxx = 440 to 460 in steps of 5  
 PSxxxM6H-18/VH, xxx = 395 to 415 in steps of 5

### 1000 V DC system modules:

PSxxxM-24/T, xxx = 325 to 385 in steps of 5  
 PSxxxM-22/W, xxx = 320 to 330 in steps of 5  
 PSxxxM-20/U, xxx = 275 to 320 in steps of 5  
 PSxxxM-18/V, xxx = 265 to 270 in steps of 5  
 PSxxxM-12/G, xxx = 175 to 180 in steps of 5  
 PSxxxM-24/TH, xxx = 360 to 390 in steps of 5  
 PSxxxM-20/UH, xxx = 300 to 325 in steps of 5  
 PSxxxM1-24/TH, xxx = 375 to 435 in steps of 5  
 PSxxxM1-20/UH, xxx = 310 to 360 in steps of 5  
 PSxxxM1-24/T, xxx = 375 to 395 in steps of 5  
 PSxxxM1-20/U, xxx = 315 to 330 in steps of 5  
 PSxxxM4-24/TH, xxx = 430 to 455 in steps of 5  
 PSxxxM4-20/UH, xxx = 360 to 380 in steps of 5  
 PSxxxM4-22/WH, xxx = 395 to 415 in steps of 5  
 PSxxxM4-18/VH, xxx = 325 to 345 in steps of 5  
 PSxxxM6-24/TH, xxx = 525 to 555 in steps of 5  
 PSxxxM6-22/WH, xxx = 485 to 505 in steps of 5  
 PSxxxM6-20/UH, xxx = 440 to 460 in steps of 5  
 PSxxxM6-18/VH, xxx = 395 to 415 in steps of 5  
 xxx is standing for rated output power at STC

## Parameters:

Construction:	Framed, with Junction box, Cable and Connectors.
Dust and Sand Test Method:	Lc1
Dust/sand Type:	95% SiO <sub>2</sub>
Dust /sand Concentration:	5g/m <sup>3</sup>
Testing Air Velocity:	20m/s
Test Duration:	4h/each side
Safety Class:	Class II
Maximum System Voltage:	1500 V DC or 1000 V DC
Fire Safety Class:	Class C according to UL790

## Tested according to:

IEC 61215-1(ed.1)  
 IEC 61215-1-1(ed.1)  
 IEC 61215-2(ed.1)  
 IEC 61730-1(ed.2)  
 IEC 61730-2(ed.2)  
 PPP 59022B:2021



Product Service

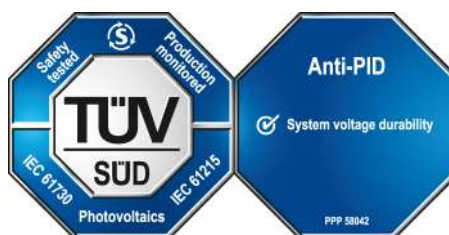
# CERTIFICATE

No. Z2 084700 0060 Rev. 04

**Holder of Certificate:** **Phono Solar Technology Co., Ltd**

No. 1 Xinghuo Rd.,  
Nanjing Hi-tech Zone,  
210061 Nanjing  
PEOPLE'S REPUBLIC OF CHINA

**Certification Mark:**



**Product:**

**Crystalline Silicon Terrestrial Photovoltaic (PV) Modules**  
**Mono-Crystalline Silicon Photovoltaic Module**

The product was tested on a voluntary basis and complies with the essential requirements. The certification mark shown above can be affixed on the product. It is not permitted to alter the certification mark in any way. In addition, the certification holder must not transfer the certificate to third parties. This certificate is valid until the listed date, unless it is cancelled earlier. All applicable requirements of the testing and certification regulations of TÜV SÜD Group have to be complied. For details see: [www.tuvsud.com/ps-cert](http://www.tuvsud.com/ps-cert)

**Test report no.:** 704061800303-04

**Valid until:** 2026-07-11

**Date,** 2021-07-13

( Zhulin Zhang )

# CERTIFICATE

No. Z2 084700 0060 Rev. 04

## Model(s):

### 1500V DC system modules:

PSxxxMH-24/T, xxx= 325 to 385 in steps of 5  
 PSxxxMH-22/W, xxx= 320 to 330 in steps of 5  
 PSxxxMH-20/U, xxx= 275 to 320 in steps of 5  
 PSxxxMH-18/V, xxx= 265 to 270 in steps of 5  
 PSxxxMH-12/G, xxx= 175 to 180 in steps of 5  
 PSxxxMH-24/TH, xxx= 360 to 390 in steps of 5  
 PSxxxMH-20/UH, xxx= 300 to 325 in steps of 5  
 PSxxxM1H-24/TH, xxx = 375 to 435 in steps of 5  
 PSxxxM1H-20/UH, xxx = 310 to 360 in steps of 5  
 PSxxxM1H-24/T, xxx = 375 to 395 in steps of 5  
 PSxxxM1H-20/U, xxx = 315 to 330 in steps of 5  
 PSxxxM4H-24/TH, xxx = 430 to 455 in steps of 5  
 PSxxxM4H-22/WH, xxx = 395 to 415 in steps of 5  
 PSxxxM4H-20/UH, xxx = 360 to 380 in steps of 5  
 PSxxxM6H-24/TH, xxx = 525 to 555 in steps of 5  
 PSxxxM6H-22/WH, xxx = 485 to 505 in steps of 5  
 PSxxxM6H-20/UH, xxx = 440 to 460 in steps of 5

### 1000V DC system modules:

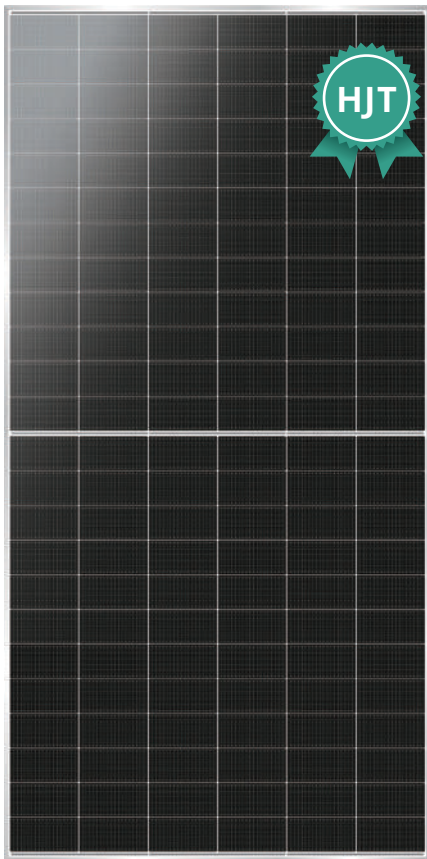
PSxxxM-24/T, xxx= 325 to 385 in steps of 5  
 PSxxxM-22/W, xxx= 320 to 330 in steps of 5  
 PSxxxM-20/U, xxx= 275 to 320 in steps of 5  
 PSxxxM-18/V, xxx= 265 to 270 in steps of 5  
 PSxxxM-12/G, xxx= 175 to 180 in steps of 5  
 PSxxxM-24/TH, xxx= 360 to 390 in steps of 5  
 PSxxxM-20/UH, xxx= 300 to 325 in steps of 5  
 PSxxxM1-24/TH, xxx = 375 to 435 in steps of 5  
 PSxxxM1-20/UH, xxx = 310 to 360 in steps of 5  
 PSxxxM1-24/T, xxx = 375 to 395 in steps of 5  
 PSxxxM1-20/U, xxx = 315 to 330 in steps of 5  
 PSxxxM4-24/TH, xxx = 430 to 455 in steps of 5  
 PSxxxM4-22/WH, xxx = 395 to 415 in steps of 5  
 PSxxxM4-20/UH, xxx = 360 to 380 in steps of 5  
 PSxxxM6-24/TH, xxx = 525 to 555 in steps of 5  
 PSxxxM6-22/WH, xxx = 485 to 505 in steps of 5  
 PSxxxM6-20/UH, xxx = 440 to 460 in steps of 5  
 xxx is standing for rated output power at STC

## Parameters:

Construction: Framed, with Junction box, Cable and Connectors.  
 Safety Class: Class II  
 Maximum System Voltage: 1500 V DC or 1000 V DC  
 Fire Safety Class: Class C according to UL790  
 PID test condition: -1500 V DC or -1000 V DC  
 96 Hours, 85 °C , 85 % RH  
 PID testing method is according to IEC TS 62804-1:2015

## Tested according to:

PPP 58042B:2015  
 IEC TS 62804-1:2015  
 IEC 61215-1:2016  
 IEC 61215-1-1:2016  
 IEC 61215-2:2016  
 IEC 61730-1:2016  
 IEC 61730-2:2016



**PHONO**

# 580-600w

## Helios Module Series

N-HJT HIGH EFFICIENCY MONO M6-18B-G

**Bloomberg**  
NEW ENERGY FINANCE

**Tier1**



### Excellent Power Generation Performance

- 182mm wafer with SMBB cell technology
- Over 85% bifaciality and up to 30% additional power generation
- Competitive high-temperature performance with ameliorated temperature coefficient ( $-0.26\%/^{\circ}\text{C}$ )
- Better weak illumination response of HJT technology leads higher power generation

### Consistent Reliability

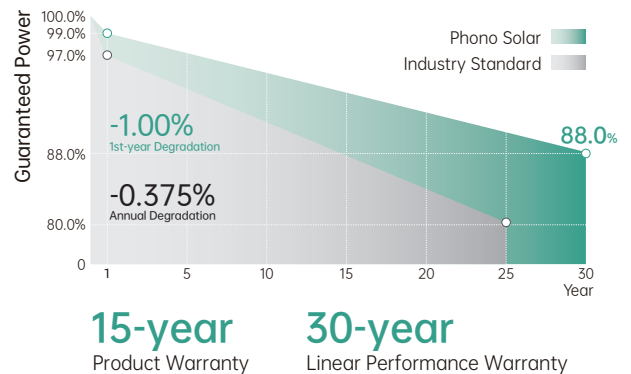
- Zero Light Induced Degradation
- Industry-leading cell technology of TCO thin film contributes to excellent anti-PID characteristic

### Shorter Payback Time

- Lower BoS cost ensure a better LCOE

### More Environmentally Friendly

- Low temperature welding technology & shorter manufacturing process contributes to lower carbon emissions



### MANAGEMENT SYSTEM CERTIFICATES

IEC 61215, IEC 61730

ISO 9001

2015 / Quality management system

ISO 14001

2015 / Standards for environmental management system

ISO 45001

2018 / International standards for occupational health & safety



## Electrical Typical Values

Model	PS580M8GFH-24/TSH		PS585M8GFH-24/TSH		PS590M8GFH-24/TSH		PS595M8GFH-24/TSH		PS600M8GFH-24/TSH	
Testing Condition	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT
Rated Power (Pmpp)	580	441	585	445	590	449	595	452	600	456
Rated Current (Impp)	12.89	10.39	12.94	10.43	12.99	10.47	13.04	10.51	13.09	10.55
Rated Voltage (Vmpp)	45.00	42.45	45.21	42.65	45.42	42.85	45.63	43.05	45.84	43.24
Short Circuit Current (Isc)	13.35	10.76	13.40	10.80	13.45	10.84	13.50	10.88	13.55	10.92
Open Circuit Voltage (Voc)	53.92	51.46	54.12	51.65	54.31	51.83	54.50	52.01	54.70	52.21
Module Efficiency (%)	22.45		22.65		22.84		23.03		23.23	

STC(Standard Testing Conditions): Irradiance 1000W/m<sup>2</sup>, AM 1.5, Cell Temperature 25°C

NOCT (Nominal Operation Cell Temperature): Irradiance 800W/m<sup>2</sup>, Ambient Temperature 20°C , Spectra at AM1.5, Wind at 1m/s

## BSTC\*\*

Maximum Power (Pmax)	640	645	650	655	660
Optimum Operating Current (Impp)	14.23	14.27	14.32	14.36	14.40
Optimum Operating Voltage (Vmpp)	45.00	45.21	45.42	45.63	45.84
Short Circuit Current (Isc)	14.73	14.77	14.82	14.86	14.91
Open Circuit Voltage (Voc)	53.92	54.12	54.31	54.50	54.70

\*\*BSTC:Front Side Irradiation 1000W/m<sup>2</sup>, Back Side Reflection Irradiation 135W/m<sup>2</sup> , AM 1.5, Ambient Temperature 25°C

## Mechanical Characteristics

Cell Type	HJT Monocrystalline
Dimension (L × W × H)	Length: 2278mm (89.69 inch) Width: 1134mm (44.65 inch) Height: 30mm (1.18 inch)
Weight	32.0kg (70.55 lbs)
Glass	2.0mm/2.0mm toughened glass
Frame	Anodized Aluminium Alloy
Cable (Including Connector)	4mm <sup>2</sup> (IEC), (+): 450mm,(-): 250mm or Customized Length
Junction Box	IP 68 Rated

## Temperature Ratings

Voltage Temperature Coefficient	-0.24%/°C
Current Temperature Coefficient	+0.04%/°C
Power Temperature Coefficient	-0.26%/°C
Power Tolerance	0~+3%
NOCT	44±2°C
Bifaciality	85±5%

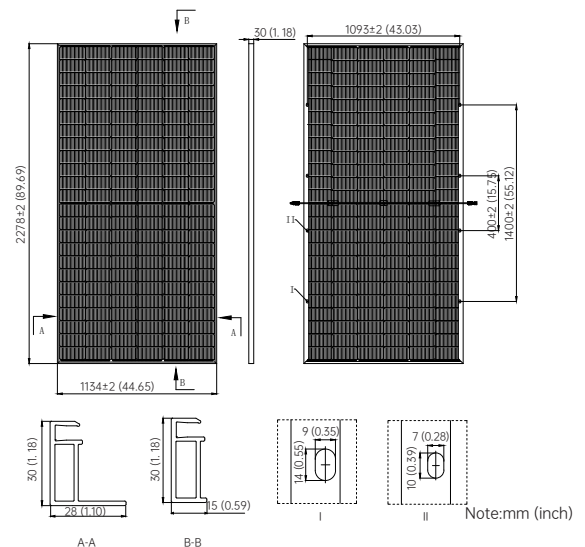
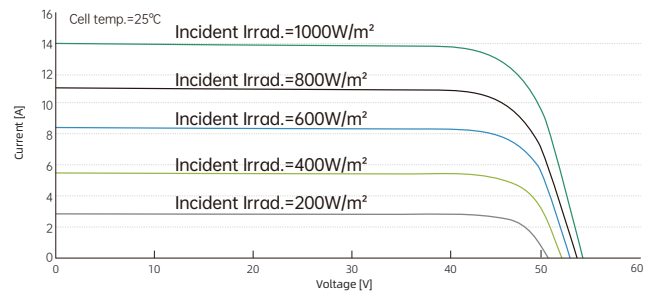
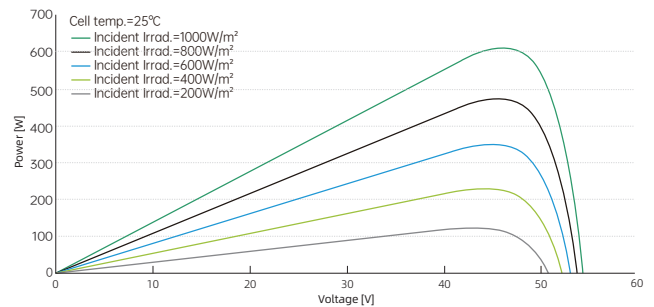
## Absolute Maximum Rating

Operating Temperature	From -40 to + 85°C
Hail Diameter @ 80km/h	Up to 25mm
Front Side Maximum Static Loading	5400Pa
Rear Side Maximum Static Loading	2400Pa
Maximum Series Fuse Rating	25A
PV Module Classification	II
Fire Rating (IEC 61730)	C
Maximum System Voltage	DC 1500V

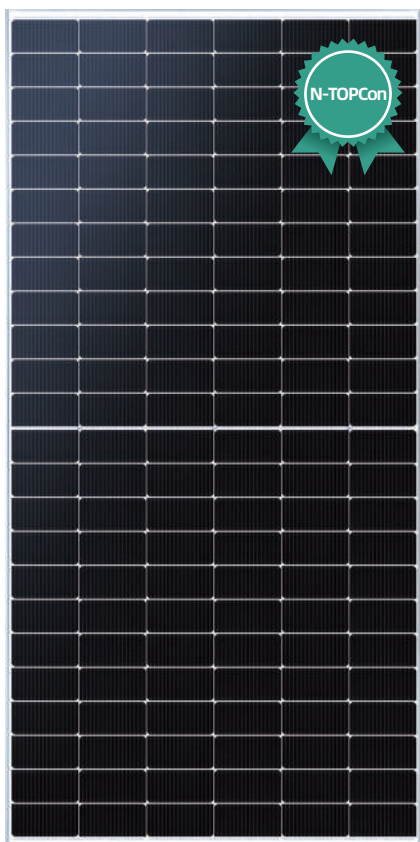
## Packing Configuration

Container	40' HQ
Pieces/Container	720
Pcs/Pallet	36
Pallets/Container	20

## Electrical Characteristics







# 565-585w

## Draco Module Series

N-TOPCON HIGH EFFICIENCY MONO BM6-16B-G

**Bloomberg**  
NEW ENERGY FINANCE

**Tier1**



### Extraordinary Product Performance

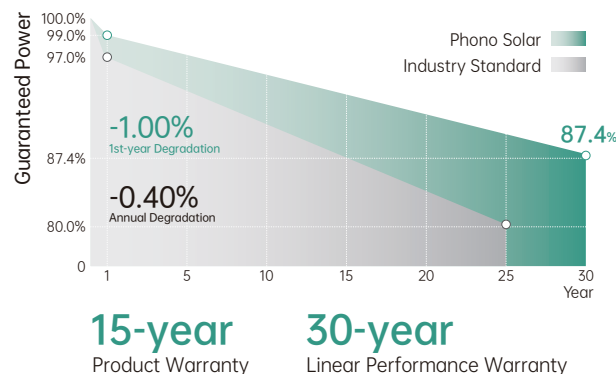
- Up to 30% additional power yield benefited from bifacial technology and up over 80% cell bifaciality
- Competitive high-temperature performance with ameliorated temperature coefficient
- Better weak illumination response, higher power generation with N-TOPCon technology

### Higher Quality Reliability

- Zero Light Induced Degradation(LID), can increase power generation
- Industry-leading cell processing technology and dual glass contributes to excellent anti-PID characteristic
- First-year degradation is less than 1.0%, with linear degradation of 0.4% per year for 30 years

### Wider Application Conditions

- BIPV, vertical installation, snowfield, high-humid area, windy and dusty area
- Safer and easier handling during transportation and installation



### MANAGEMENT SYSTEM CERTIFICATES

IEC 61215, IEC 61730

ISO 9001  
2015 / Quality management system

ISO 14001  
2015 / Standards for environmental management system

ISO 45001  
2018 / International standards for occupational health & safety





## Electrical Typical Values

Model	1000V	PS565M8GF-24/TNH		PS570M8GF-24/TNH		PS575M8GF-24/TNH		PS580M8GF-24/TNH		PS585M8GF-24/TNH	
	1500V	PS565M8GFH-24/TNH		PS570M8GFH-24/TNH		PS575M8GFH-24/TNH		PS580M8GFH-24/TNH		PS585M8GFH-24/TNH	
Testing Condition		STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT
Rated Power (Pmpp)		565	433	570	436	575	440	580	444	585	448
Rated Current (Imp)		13.24	10.66	13.30	10.71	13.36	10.76	13.42	10.81	13.48	10.86
Rated Voltage (Vmp)		42.68	40.57	42.86	40.74	43.04	40.92	43.22	41.09	43.40	41.26
Short Circuit Current (Isc)		13.89	11.19	13.95	11.24	14.04	11.31	14.11	11.36	14.18	11.42
Open Circuit Voltage (Voc)		51.49	49.30	51.73	49.53	52.20	49.98	52.44	50.21	52.68	50.44
Module Efficiency (%)		21.87		22.07		22.26		22.45		22.65	

STC(Standard Testing Conditions): Irradiance 1000W/m<sup>2</sup>, AM 1.5, Cell Temperature 25°C

NOCT (Nominal Operation Cell Temperature): Irradiance 800W/m<sup>2</sup>, Ambient Temperature 20°C , Spectra at AM1.5, Wind at 1m/s

## BSTC\*\*

Maximum Power (Pmax)	620	625	630	635	640
Optimum Operating Current (Imp)	14.53	14.58	14.64	14.69	14.75
Optimum Operating Voltage (Vmp)	42.68	42.86	43.04	43.22	43.40
Short Circuit Current (Isc)	15.24	15.29	15.28	15.33	15.38
Open Circuit Voltage (Voc)	51.49	51.73	52.20	52.44	52.68

\*\*BSTC:Front Side Irradiation 1000W/m<sup>2</sup>, Back Side Reflection Irradiation 135W/m<sup>2</sup> , AM 1.5, Ambient Temperature 25°C

## Mechanical Characteristics

Cell Type	N Type Monocrystalline
Dimension (L × W × H)	Length: 2278mm (89.69 inch)
	Width: 1134mm (44.65 inch)
	Height: 30mm (1.18 inch)
Weight	32.0kg (70.55 lbs)
Glass	2.0mm/2.0mm toughened glass
Frame	Anodized Aluminium Alloy
Cable (Including Connector)	4mm <sup>2</sup> (IEC), (+): 450mm,(-): 250mm or Customized Length
Junction Box	IP 68 Rated

## Temperature Ratings

Voltage Temperature Coefficient	-0.25%/°C
Current Temperature Coefficient	+0.04%/°C
Power Temperature Coefficient	-0.29%/°C
Power Tolerance	0~+3%
NOCT	42±2°C
Bifaciality	80±5%

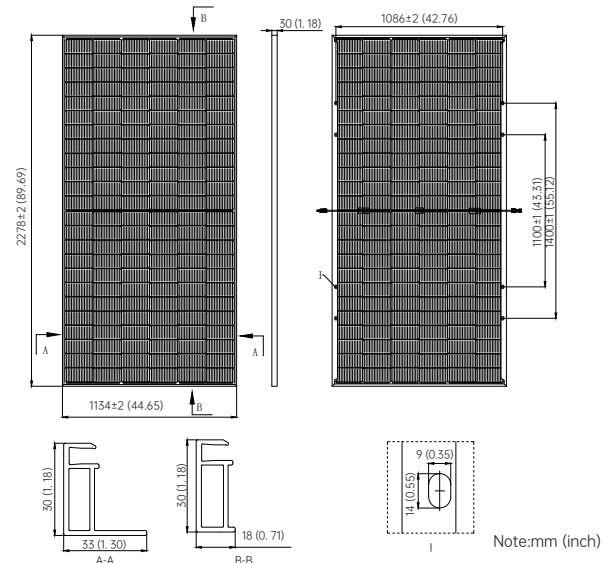
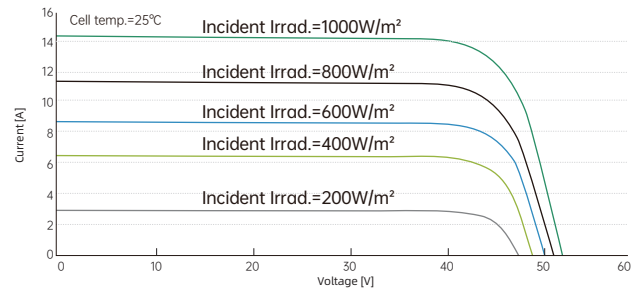
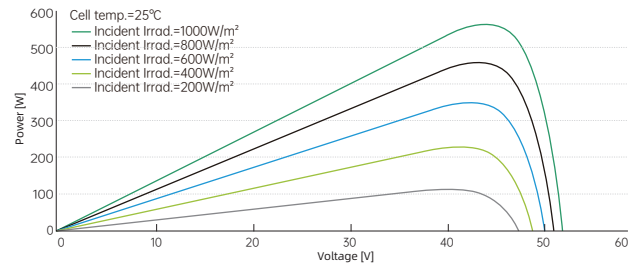
## Absolute Maximum Rating

Operating Temperature	From -40 to + 85°C
Hail Diameter @ 80km/h	Up to 25mm
Front Side Maximum Static Loading	5400Pa
Rear Side Maximum Static Loading	2400Pa
Maximum Series Fuse Rating	30A
PV Module Classification	II
Fire Rating (IEC61730)	C
Maximum System Voltage	DC 1000V/1500V

## Packing Configuration

Container	20' GP	40' HQ
Pieces/Container	180	720
Pcs/Pallet	36	36
Pallets/Container	5	20

## Electrical Characteristics





Product Service

# CERTIFICATE

No. Z2 084700 0069 Rev. 06

**Holder of Certificate:** Phono Solar Technology Co., Ltd  
No. 1 Xinghuo Rd.,  
Nanjing Hi-tech Zone,  
210061 Nanjing  
PEOPLE'S REPUBLIC OF CHINA

**Certification Mark:**



**Product:** Crystalline Silicon Terrestrial Photovoltaic (PV) Modules  
Mono-Crystalline Silicon Photovoltaic Module

The product was tested on a voluntary basis and complies with the essential requirements. The certification mark shown above can be affixed on the product. It is not permitted to alter the certification mark in any way. In addition, the certification holder must not transfer the certificate to third parties. This certificate is valid until the listed date, unless it is cancelled earlier. All applicable requirements of the testing and certification regulations of TÜV SÜD Group have to be complied. For details see: [www.tuvsud.com/ps-cert](http://www.tuvsud.com/ps-cert)

**Test report no.:** 704061800310-06

**Valid until:** 2027-12-05

**Date,** 2022-12-08

( David Bo )

# CERTIFICATE

No. Z2 084700 0069 Rev. 06

## Model(s):

1500 V DC system voltage:

PSxxxMGFH-20/U, xxx= 280 to 310 in steps of 5  
 PSxxxMGFH-24/TH, xxx= 365 to 390 in steps of 5  
 PSxxxMGH-24/TH, xxx= 365 to 390 in steps of 5  
 PSxxxMGFH-20/UH, xxx= 305 to 325 in steps of 5  
 PSxxxMGH-20/UH, xxx= 305 to 325 in steps of 5  
 PSxxxM5GFH-24/TH, xxx= 430 to 465 in steps of 5  
 PSxxxM5GFH-20/UH, xxx= 360 to 385 in steps of 5  
 PSxxxM8GFH-24/TH, xxx= 525 to 555 in steps of 5  
 PSxxxM8GFH-22/WH, xxx= 485 to 510 in steps of 5  
 PSxxxM8GFH-20/UH, xxx= 440 to 460 in steps of 5  
 PSxxxM8GFH-18/VH, xxx= 390 to 420 in steps of 5  
 PSxxxM8GFH-24/TNH, xxx= 535 to 570 in steps of 5  
 PSxxxM8GFH-22/WNH, xxx= 490 to 520 in steps of 5  
 PSxxxM8GFH-20/UNH, xxx= 445 to 475 in steps of 5  
 PSxxxM8GFH-18/VNH, xxx= 405 to 430 in steps of 5

1000 V DC system voltage:

PSxxxMGF-20/U, xxx= 280 to 310 in steps of 5  
 PSxxxMGF-24/TH, xxx= 365 to 390 in steps of 5  
 PSxxxMG-24/TH, xxx= 365 to 390 in steps of 5  
 PSxxxMGF-20/UH, xxx= 305 to 325 in steps of 5  
 PSxxxMG-20/UH, xxx= 305 to 325 in steps of 5  
 PSxxxM5GF-24/TH, xxx= 430 to 465 in steps of 5  
 PSxxxM5GF-20/UH, xxx= 360 to 385 in steps of 5  
 PSxxxM8GF-24/TH, xxx= 525 to 555 in steps of 5  
 PSxxxM8GF-22/WH, xxx= 485 to 510 in steps of 5  
 PSxxxM8GF-20/UH, xxx= 440 to 460 in steps of 5  
 PSxxxM8GF-18/VH, xxx= 390 to 420 in steps of 5  
 PSxxxM8GF-24/TNH, xxx= 535 to 570 in steps of 5  
 PSxxxM8GF-22/WNH, xxx= 490 to 520 in steps of 5  
 PSxxxM8GF-20/UNH, xxx= 445 to 475 in steps of 5  
 PSxxxM8GF-18/VNH, xxx= 405 to 430 in steps of 5  
 xxx is standing for rated output power at STC

## Parameters:

Construction:	Framed or frameless, with Junction box, Cable and Connectors.
Test Laboratory:	Yangzhou Opto-Electrical Products Testing Institute No. 10 West Kaifa Road, Yangzhou, 225009 Jiangsu, P. R. China
Safety Class:	Class II
Maximum System Voltage:	1500 V DC or 1000 V DC
Fire Safety Class:	Class C according to UL790

## Tested according to:

IEC 61215-1:2016  
 EN 61215-1:2016  
 IEC 61215-1-1:2016  
 EN 61215-1-1:2016  
 IEC 61215-2:2016  
 EN 61215-2:2017  
 IEC 61730-1:2016  
 EN IEC 61730-1:2018  
 EN IEC 61730-1:2018/AC:2018-06  
 IEC 61730-2:2016  
 EN IEC 61730-2:2018  
 EN IEC 61730-2:2018/AC:2018-06



Product Service

# CERTIFICATE

No. Z2 084700 0101 Rev. 00

**Holder of Certificate:** **Phono Solar Technology Co., Ltd**

No. 1 Xinghuo Rd.,  
Nanjing Hi-tech Zone,  
210061 Nanjing  
PEOPLE'S REPUBLIC OF CHINA

**Certification Mark:**



**Product:**

**Crystalline Silicon Terrestrial Photovoltaic (PV) Modules**  
**Mono-crystalline Silicon Hetero-junction Photovoltaic (PV) Modules**

The product was tested on a voluntary basis and complies with the essential requirements. The certification mark shown above can be affixed on the product. It is not permitted to alter the certification mark in any way. In addition, the certification holder must not transfer the certificate to third parties. This certificate is valid until the listed date, unless it is cancelled earlier. All applicable requirements of the testing and certification regulations of TÜV SÜD Group have to be complied. For details see: [www.tuvsud.com/ps-cert](http://www.tuvsud.com/ps-cert)

**Test report no.:** 701262303202-00

**Valid until:** 2024-03-30

**Date,** 2023-07-26

( Zhulin Zhang )

# CERTIFICATE

No. Z2 084700 0101 Rev. 00

## Model(s):

### Framed:

166 cell modules:

PSxxxM5GFH-24/TSH (xxx=440 to 500 in step of 5)  
 PSxxxM5GFH-22/WSH(xxx=405 to 455 in step of 5)  
 PSxxxM5GFH-20/USH (xxx=365 to 415 in step of 5)  
 PSxxxM5GFH-26/RSB (xxx=490 to 520 in step of 5)  
 PSxxxM4GFH-20/USH (xxx=370 to 400 in step of 5)  
 PSxxxM5GFH-16/QSH (xxx=295 to 320 in step of 5)  
 PSxxxM4GFH-24/TSH(xxx=450 to 480 in step of 5)  
 PSxxxM4GFH-22/WSH(xxx=410 to 440 in step of 5)

210 cell modules:

PSxxxM13GFH-22/WSH(xxx=640 to 720 in step of 5)  
 PSxxxM13GFH-20/USH (xxx=590 to 650 in step of 5)  
 PSxxxM13GFH-18/FSH (xxx=540 to 590 in step of 5)

182 cell modules:

PSxxxM8GFH-24/TSH (xxx=550 to 600 in step of 5)  
 PSxxxM8GFH-18/VSH (xxx=410 to 450 in step of 5)  
 PSxxxM6GFH-18/VSH (xxx=425 to 445 in step of 5)

xxx is standing for rated output power at STC

### Frameless:

166 cell modules:

PSxxxM5GH-24/TSH (xxx=440 to 500 in step of 5)  
 PSxxxM5GH-22/WSH(xxx=405 to 455 in step of 5)  
 PSxxxM5GH-20/USH (xxx=365 to 415 in step of 5)  
 PSxxxM5GH-16/QSH(xxx=295 to 320 in step of 5)

xxx is standing for rated output power at STC

## Parameters :

Construction:	Framed or Frameless, with Junction box, Cable and Connectors.
Safety Class:	Class II
Maximum System Voltage:	1500 V DC
Fire Safety Class:	Class C according to UL790
Test Laboratory:	Yangzhou Opto-Electrical Products Testing Institute No. 10 West Kaifa Road, Yangzhou, 225009 Jiangsu, P. R. China.

## Tested according to:

IEC 61215-1:2016  
 IEC 61215-1-1:2016  
 IEC 61215-2:2016  
 IEC 61730-1:2016  
 IEC 61730-2:2016  
 EN 61215-1:2016  
 EN 61215-1-1:2016  
 EN 61215-2:2017  
 EN IEC 61730-1:2018  
 EN IEC 61730-1:2018/AC:2018-06  
 EN IEC 61730-2:2018  
 EN IEC 61730-2:2018/AC:2018-06