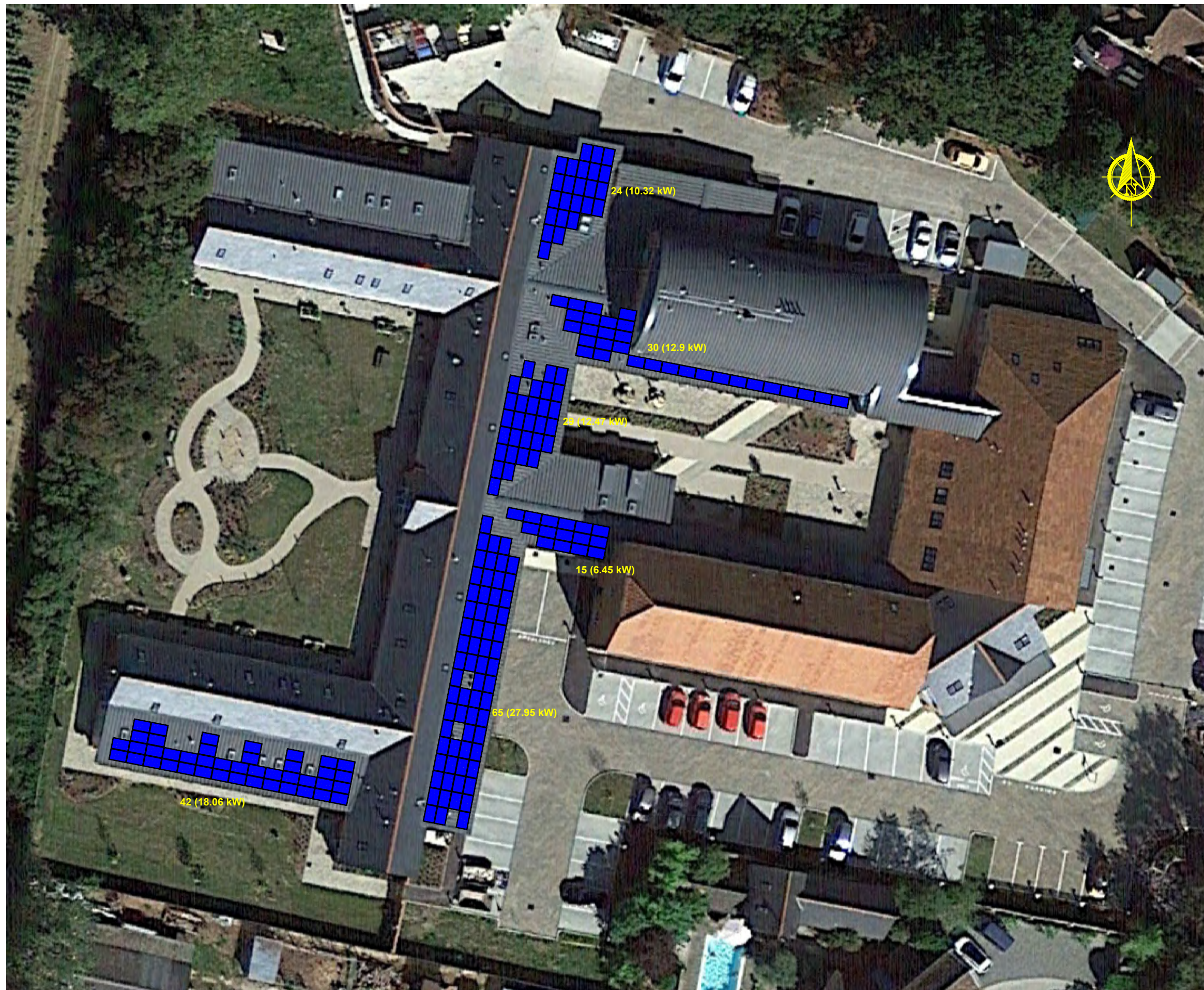


Unit 3,  
 Sovereign Business Park  
 Albert Drive  
 Burgess Hill  
 West Sussex  
 RH15 9TY  
 01444 480444  
 www.pdp.services



**88.15 kWp**

205 x Jinko 430W Panels

Solis 80 kW Inverter &  
 Export Power Manager

Orientation 191 & 101

Pitch 15 Degrees (Assumed)

MCS Zone 2  
 Kk Value 994.57  
 Estimated Generation  
 85,917 kWh's / Year

2% Shading (Assumed)

Rev.	Reason.	Date.
Scale		1:400 @ A3
Drawn By		MM
Date		10/08/2023

St Wilfrid's Hospice  
 Walton Lane  
 Bosham  
 Chichester  
 PO18 8QB

2720-23-1 Subject To Survey

St Wilfrid's Hospice  
 Walton Lane  
 Bosham  
 Chichester  
 PO18 8QB

Job Reference: **2720-23**  
 Date: **10/08/2023**  
 System size: **88.15**

**Solar PV & Bird Proofing (Subject to Full Survey)**

**Description of Goods and Services**

		Quantity	Total
Fixing Kit	Van Der Valk Trapezoidal & Bird Proofing (Assumed)	205	£7,464.67
Panels	Jinko 430W All Black Mono Tiger Neo	205	£29,885.31
Electrical	Electrical Components	1	£6,175.00
Inverter(s) Etc.	Solis 80 kW Inverter & Comms	1	£3,729.83
	Solis Export Power Manager & CT's	1	£341.08
	Optional 5 to 10 Year Inverter Warranty Extension	1	£590.07
Delivery	Pallet/s	10	£1,450.00
Total Materials			£49,635.96
<i>Allowance for Scaffold &amp; Telehandler</i>			£5,750.00
System Certification & Notifications (MCS, EIC, DNO)			£175.00
Labour			£19,500.00
Professional Services			£2,500.00
Sub Total			<b>£77,560.96</b>
VAT Criteria	Business	VAT Exempt	No
		VAT @ 5%	£0.00
		VAT @ 20%	£15,512.19
<b>Payment Terms (Stage payments will apply to multiple installations)</b>			<b>Total</b>
			£93,073.15

**Payment 1**

A 25% Deposit is payable on the confirmation of the order **£23,268.29**

**Payment 2**

A 65% Interim payment is payable on completion of the roof works **£60,497.55**

**Payment 3 (Invoices for 2 & 3 will be combined on 1 or 2 day installations)**

A 10% Final Payment is payable on completion **£9,307.32**

**Warranties & Compliance**

Fixing Kit	10 Years - MCS 012 Compliant
Panels	25 Year Product and 30 Year Linear Performance Warranty, MCS Approved
Inverters	10 Year Manufacturers Warranty (Extendable) ENA G99 Compliant
Optimisers	Not Applicable
Batteries	Not Applicable
Installation	2 Year Warranty (Can be extended at additional cost)

*This quotation is valid for 30 Days, payment can be made by Card, Cheque to PDP Services Ltd or by BACS: Sort Code: 40-15-16 Account Number: 51400916 with your name and job number as reference.*

*PDP Services Ltd are members of HIES, PDP/A/0491 and are MCS Accredited, NIC1224*

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 Walton Lane  
 Bosham  
 Chichester  
 PO18 8QB

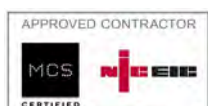
Job Reference: **2720-23**  
 Date: 10/08/2023  
 System size: 88.15

**Inclusions / Responsibilities**

	PDP Services	Client
Full Site Survey	Included	
Structural Engineers Report or Desktop Appraisal	Included	
System Design and CAD Drawings	Included	
Planning Approval (If required)		If Applicable
Building Control	Included	
Distribution Network Operator (DNO) Connection Application	Included	
Upgrade to Distribution Network (If required)		If Applicable
Scaffolding / Access	Included	
All labour and Materials other than those excluded	Included	
Internet connection with sufficient WiFi range for online monitoring		Yes
System Testing & Commissioning	Included	
DNO Witness Testing (If Required)	Assist	If Applicable
MCS Certification (Systems Under 50 kWp per MPAN)	Not Applicable	
RooFit Accreditation (Systems over 50 kWp per MPAN)	Not Applicable	
Obtain Export MPAN Number/s if required	Assist	
Arrange Data Collection & Meter Operator Contracts & Export Meter	Assist	If Applicable
DNO G98 or G99 Notification	Included	
Provide Handover Pack	Included	
On Site Secure Storage of All Materials (Insured By Client) <sup>(2)</sup>	Not Applicable	
Provide Electricity and Potable Water at the Site Location		Yes
Provide Toilet Facilities for the Installers		Yes

**Notes**

Many other options are available in terms of system size, inverters, panels and cost.  
 Export payments require a Data Collection & Meter operator Contract or SMART Meter  
**\*\*\*No Off-Grid Backup\*\*\***  
 The supply of materials and pricing is currently unpredictable, if we need to vary the price, delivery time or specification due to changes made by our suppliers we will discuss this with you and you will have the option to accept the changes or to cancel the contract and receive a full refund for any deposits and stage payments paid



St Wilfrid's Hospice  
 Walton Lane  
 Bosham  
 Chichester  
 PO18 8QB

Job Reference: **2720-23**

Date: 10/08/2023

System size: 88.15

**Estimated Generation & Financial Returns**

	MCS (2012)
System Size (kWp)	88.15
System Price (Exc. VAT)	£77,560.96
Orientation (Degrees)	South & East
Variation from South (Degrees)	11 & 79
Inclination (Degrees) <b>Assumed</b>	15
Array Area (M <sup>2</sup> )	390.28
Shading Factor (SF) <b>Assumed</b>	0.98
Postcode Region	2
Kk Value (Individual or calculated from multiple orientations)	994.560976
Occupancy Archetype	Hospice
<a href="#">Relevant MCS MGD 003 Table (Version 2)</a>	N/A
Battery Capacity kWh (If Applicable)	0.00
Battery Depth of Discharge % (If Applicable)	0%
Usable kWh Battery Storage (If Included) kWh x DOD	0.00
Annual Electricity Consumption (kWh's)	TBC
Estimated Generation in Year One (kWh) kWp x Kk x SF	85,917
Export of Electricity (Year 1) If applicable	TBC
Estimated Usage of Generated Electricity & Storage From MCS Table	TBC
Estimated Usage of Generated Electricity (Solar PV Only)	TBC
	TBC
Total Estimated Year One Financial Returns	TBC
Estimated Return on Investment in Year One	TBC
Estimated Payback Period (Years)	TBC
Estimated 25 Year Financial returns	TBC

**Assumptions and Data used in Calculations**

Costs / Tariffs		Annual Change	
Electricity Cost kWh (1st Year)	TBC	Annual Increase for Export	2.50%
Export Tariff (If Applicable) <b>Up To</b>	£0.290	Electricity Cost Increase	5.00%
		Panel Degradation Rate	0.400%

**Performance Estimate**

*The performance of Solar PV systems is impossible to predict with certainty due to the variability in the amount of solar radiation (sunlight) from location to location and from year to year.  
 This estimate is based upon the standard MCS procedure and is given as guidance only.  
 It should not be considered a guarantee of performance.*

**Shading Estimate**

*This shade assessment has been undertaken using the standard MCS procedure - it is estimated that this method will yield results within 10% of the actual annual energy yield for most systems*

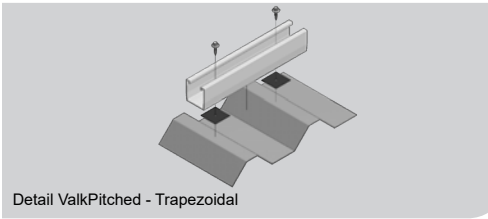
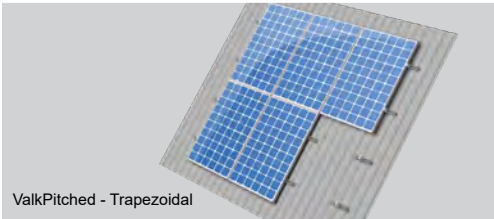
# Datasheet

## ValkPitched - Trapezoidal

**VAN DER VALK**



Innovation House, Discovery Park  
 Ramsgate Road, Sandwich CT13 9FF  
 United Kingdom  
 T +44 (0)1304 897658  
 info@valksolarsystems.co.uk  
 www.valksolarsystems.co.uk



### Technical specifications

- Mounting system for steel, aluminium, trapezoidal and corrugated roofs.
- Fixation by use of thin sheet screw.
- Minimum crown width: 25 mm.
- Watertight seal by neoprene ring on the thin sheet screw and rubber plates.
- Profiles equipped with pre-punched hole pattern.
- Panels can be installed in both portrait and landscape configuration.

### ValkPitched - Trapezoidal vs. competitive systems

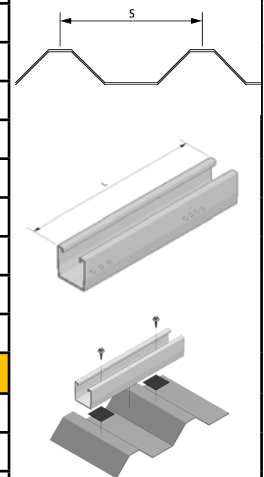
- Universal mid- and end-panel clamps (H 28-50 mm).
- Profiles provide a stable platform for panel mounting.
- Calculations and implementation according to Eurocodes.
- Very fast mounting.
- Low costs due to minimal material requirement.

### Project calculation

- With the use of a special calculation tool projects can easily be calculated.

### Article numbers

Profile lengths for portrait mounting		
Article numbers	Description	CtC (S)
Material type	EN AW 6060 (AlMgSi 0,5)	
7270240	Alu. trapezoidal profile L = 240 mm	110 - 150 mm
7270280	Alu. trapezoidal profile L = 280 mm	150 - 190 mm
7270320	Alu. trapezoidal profile L = 320 mm	190 - 230 mm
7270360	Alu. trapezoidal profile L = 360 mm	230 - 270 mm
7270400	Alu. trapezoidal profile L = 400 mm	270 - 310 mm
7270440	Alu. trapezoidal profile L = 440 mm	310 - 350 mm
7270610	Alu. trapezoidal profile L = 610 mm	480 - 520 mm
701807000	Alu. trapezoidal profile L = 7000 mm	
Profile lengths for landscape mounting		
7269120	Alu. trapezoidal profile L = 120 mm EPDM incl.	
7270120	Alu. trapezoidal profile L = 120 mm	
7270240	Alu. trapezoidal profile L = 240 mm	
Fixation material		
779223	Alu. rivet	see overleaf for more specifications
773225	SS thin sheet screw	see overleaf for more specifications
779220	Rubber plate	see overleaf for more specifications



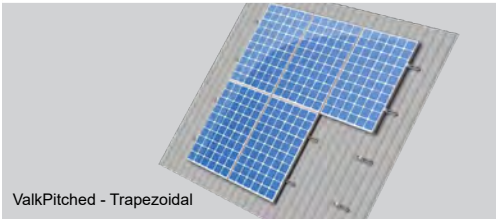
# Datasheet

## ValkPitched - Trapezoidal

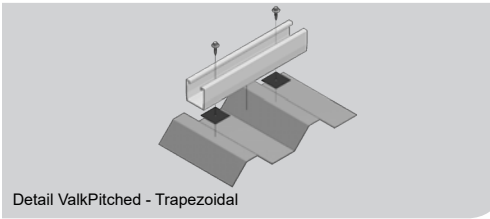
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ValkPitched - Trapezoidal



Detail ValkPitched - Trapezoidal

### Specification table fixation material

Aluminium rivet			
Article number	779223		
Description	Aluminium rivet with EPDM washer		
Size	6.3 x 23.4 mm		
Rivet	Ø 6.3 +/- 0.1 mm		
Head	Ø 14.4 +/- 0.3 mm		
Pin tail	Ø 3.9 mm x ≥ 25.4 mm		
Washer	EPDM		
Drill hole	6.5 mm incl. alu. profile		
Clamp range	3.2 - 9.5 mm		
Plate thickness	Steel 0.5 - 1.25 mm and Aluminium 0.5 - 1.5 mm		
Thin sheet screw			
Article number	773225		
Description	SS thin sheet screw with EPDM (E16) washer		
Size	6.0 x 25 mm		
Material	Bimetal (Stainless steel A2 / hardened steel)		
Plate thickness	Steel 0.5 - 1.25 mm and Aluminium 0.5 - 1.5 mm		
Advice max. torque	Steel plate		> 0.8 mm = 3 Nm
	Steel plate		< 0.8 mm = 1 Nm
	Aluminium plate	> 0.8 mm = 1 Nm	
	Aluminium plate	< 0.8 mm = 0.5 Nm	
Processing speed from 1600 to 1800 rev / min until the sheet is penetrated, then stop and tighten the screw slowly.			
Rubber plate			
Article number	779220		
Description	Rubber plate for trapezoidal profile		
Size	40 x 40 x 1 mm		
Material	EPDM 70 shore		
Central hole	Ø 5 mm		

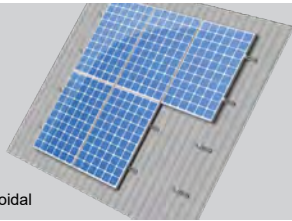
# Datasheet

## ValkPitched - Trapezoidal

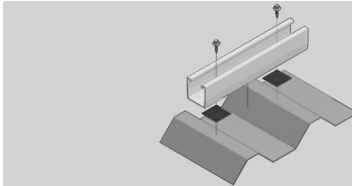
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ValkPitched - Trapezoidal



Detail ValkPitched - Trapezoidal

### Tools

Rivet pliers (example)		
Brand	Masterfix	
Type	MFX 260 - Rivet pliers with long legs for heavy use	
Capacity	Ø 3.0 - 6.4 mm stainless steel	
Body	ABS with steel parts	
Handle	Steel	
Length	500 mm	
Attachments	Nose pieces Ø 3.0- 6.4 mm	1 Collecting cup for the towing pin



# Tiger Neo N-type 54HL4R-B 420-440 Watt ALL-BLACK MODULE

## N-Type

Positive power tolerance of 0~+3%

IEC61215(2016), IEC61730(2016)

ISO9001:2015: Quality Management System

ISO14001:2015: Environment Management System

ISO45001:2018

Occupational health and safety management systems



## Key Features



### SMBB Technology

Better light trapping and current collection to improve module power output and reliability.



### PID Resistance

Excellent Anti-PID performance guarantee via optimized mass-production process and materials control.



### Durability Against Extreme Environmental Conditions

High salt mist and ammonia resistance.



### Hot 2.0 Technology

The N-type module with Hot 2.0 technology has better reliability and lower LID/LETID.

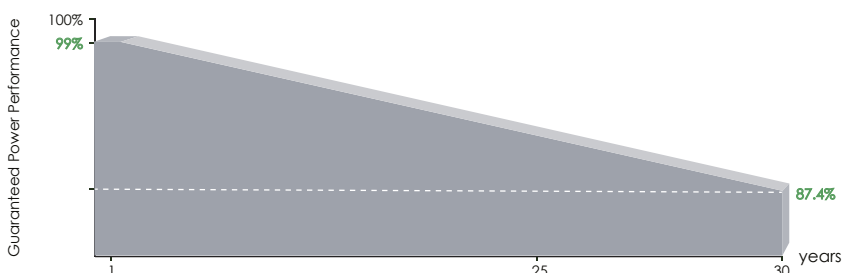


### Enhanced Mechanical Load

Certified to withstand: wind load (2400 Pascal) and snow load (5400 Pascal).



## LINEAR PERFORMANCE WARRANTY



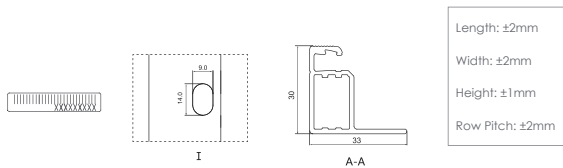
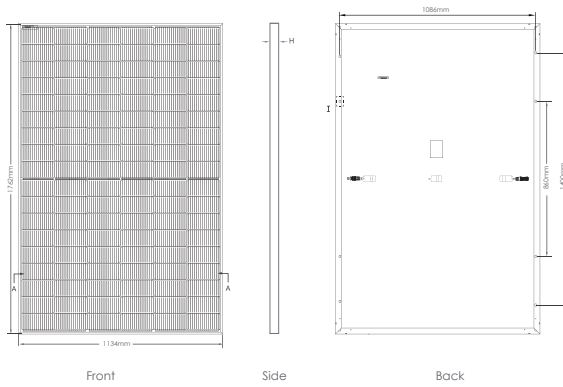
25 Year Product Warranty

30 Year Linear Power Warranty

0.40% Annual Degradation Over 30 years



## Engineering Drawings



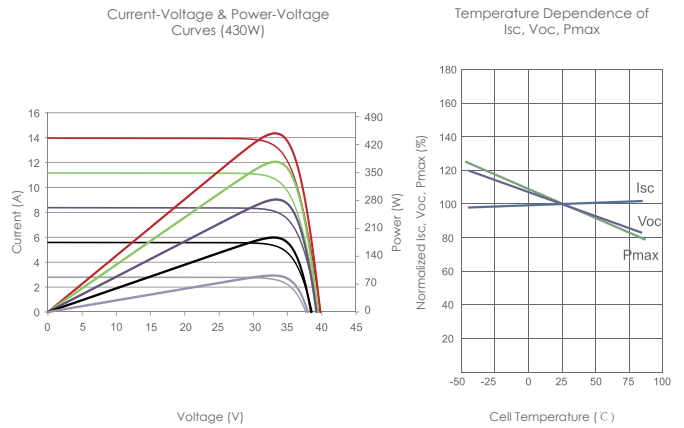
\*This tolerance range applies only to the four-angle distance of the module as indicated above.

## Packaging Configuration

( Two pallets = One stack )

36pcs/pallets, 72pcs/stack, 936pcs/ 40'HQ Container

## Electrical Performance & Temperature Dependence



## Mechanical Characteristics

Cell Type	N type Mono-crystalline
No. of cells	108 (6×18)
Dimensions	1762×1134×30mm (69.36×44.65×1.18 inch)
Weight	22 kg (48.50 lbs)
Front Glass	3.2mm, Anti-Reflection Coating, High Transmission, Low Iron, Tempered Glass
Frame	Anodized Aluminium Alloy
Junction Box	IP68 Rated
Output Cables	TUV 1×4.0mm <sup>2</sup> (+): 400mm, (-): 200mm or Customized Length

## SPECIFICATIONS

Module Type	JKM420N-54HL4R-B		JKM425N-54HL4R-B		JKM430N-54HL4R-B		JKM435N-54HL4R-B		JKM440N-54HL4R-B	
	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT
Maximum Power (Pmax)	420Wp	316Wp	425Wp	320Wp	430Wp	323Wp	435Wp	327Wp	440Wp	331Wp
Maximum Power Voltage (Vmp)	32.16V	29.95V	32.37V	30.19V	32.58V	30.30V	32.78V	30.50V	32.99V	30.73V
Maximum Power Current (Imp)	13.06A	10.55A	13.13A	10.60A	13.20A	10.66A	13.27V	10.72A	13.34A	10.77A
Open-circuit Voltage (Voc)	38.74V	36.80V	38.95V	37.00V	39.16V	37.20V	39.36V	37.39V	39.57V	37.59V
Short-circuit Current (Isc)	13.51A	10.91A	13.58A	10.96A	13.65A	11.02A	13.72A	11.08A	13.80A	11.14A
Module Efficiency STC (%)	21.02%		21.27%		21.52%		21.77%		22.02%	
Operating Temperature(°C)	-40°C~+85°C									
Maximum system voltage	1000VDC (IEC)									
Maximum series fuse rating	25A									
Power tolerance	0~+3%									
Temperature coefficients of Pmax	-0.29%/°C									
Temperature coefficients of Voc	-0.25%/°C									
Temperature coefficients of Isc	0.045%/°C									
Nominal operating cell temperature (NOCT)	45±2°C									

\*STC: Irradiance 1000W/m<sup>2</sup> Cell Temperature 25°C AM=1.5  
 NOCT: Irradiance 800W/m<sup>2</sup> Ambient Temperature 20°C AM=1.5 Wind Speed 1m/s

**Bird Proofing Example**





Solis-(80-110)K-5G-PRO

Perfect Fit For **182/210mm** Modules,  
Support Maximum **16/18A** Per String

Adapt To Larger AC Cables

(See Technical Parameters For Details)

## Solis-(80-110)K-5G-PRO

Solis Three Phase Inverters

### >> Models:

Solis-80K-5G-PRO

Solis-100K-5G-PRO

Solis-110K-5G-PRO



### Efficient

- 6/8 MPPTs, max. efficiency 98.5%
- > 150% DC/AC ratio
- Compatible with bifacial modules

### Smart

- Night SVG function
- Intelligent string monitoring, smart I-V curve scan
- Remote firmware upgrade with simple operation

### Safe

- IP66
- AFCI protection, proactively reduces fire risk
- Globally recognised branded componentry for longer life

### Economic

- Power line communication (PLC) (optional)
- DC side supports "Y" connector
- Supports aluminium wire access to reduce cost

**DATASHEET**
**Solis-(80-110)K-5G-PRO**

Models	80K	100K	110K
<b>Input DC</b>			
Max. input voltage	1100 V		
Rated voltage	600 V		
Start-up voltage	180 V		
MPPT voltage range	160-1000 V		
Max. input current	36 A / 32 A / 36 A / 32 A / 36 A / 32 A	36 A / 32 A / 36 A / 32 A / 36 A / 32 A / 36 A / 32 A	
Max. short circuit current	6*50 A	8*50 A	
MPPT number/Max. input strings number	6/12	8/16	
<b>Output AC</b>			
Rated output power	80 kW	100 kW	110 kW
Max. apparent output power	88 kVA	110 kVA	121 kVA
Max. output power	88 kW	110 kW	121 kW
Rated grid voltage	3/N/PE, 220 V / 380 V, 230 V / 400 V		
Rated grid frequency	50 Hz / 60 Hz		
Rated grid output current	121.6 A / 115.5 A	152.0 A / 144.3 A	167.1 A / 158.8 A
Max. output current	133.7 A	167.1 A	183.8 A
Power factor	>0.99 (0.8 leading - 0.8 lagging)		
THDi	<3%		
<b>Efficiency</b>			
Max. efficiency	98.5%		
EU efficiency	98%		
<b>Protection</b>			
DC reverse-polarity protection	Yes		
Short circuit protection	Yes		
Output over current protection	Yes		
Surge protection	DC Type II / AC Type II		
Grid monitoring	Yes		
Anti-islanding protection	Yes		
Temperature protection	Yes		
Strings monitoring	Yes		
I/V Curve scanning	Yes		
Integrated DC switch	Yes		
Integrated AFCI (DC arc-fault circuit protection)	Yes <sup>(1)</sup>		
<b>General Data</b>			
Dimensions (W*H*D)	1183*585*363 mm		
Weight	77 kg	93 kg	
Topology	Transformerless		
Self-consumption (night)	<2 W		
Operating ambient temperature range	-30 ~ +60°C		
Relative humidity	0-100%		
Ingress protection	IP66		
Cooling concept	Intelligent redundant fan-cooling		
Max. operation altitude	4000 m		
Grid connection standard	G99, IEC61727		
Safety/EMC standard	IEC/EN 62109-1/-2, IEC/EN 61000-6-2/-4		
<b>Features</b>			
DC connection	MC4 connector		
AC connection	OT terminal (max. 240 mm <sup>2</sup> )		
Display	LCD		
Communication	RS485, Optional: Wi-Fi, GPRS, PLC		

(1) Activation required.



# Solis 5G PLUS Export Power Manager

## Installation and Operation Manual

Ver 1.6

Ginlong Technologies Co., Ltd.

No. 57 Jintong Road, Binhai Industrial Park, Xiangshan, Ningbo,  
Zhejiang, 315712, P.R.China.

Tel: +86 (0)574 6578 1806

Fax: +86 (0)574 6578 1606

Email: [info@ginlong.com](mailto:info@ginlong.com)

Web: [www.ginlong.com](http://www.ginlong.com)

Please adhere to the actual products in case of any discrepancies in this user manual.

If you encounter any problem on the EPM, please find out the EPM S/N and contact us,  
we will try to respond to your question ASAP.

Ginlong Technologies Co., Ltd.

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# 1. Introduction

## 1.1 Product Description

Solis Export Power Manager can monitor and control the backflow power from the inverter to the grid thus providing export power control of inverters. It also has integrated datalogging function as well.

The export power manager is suitable for using with all solar PV grid tie inverters.

Model: Solis-EPM3-5G-PLUS is for three phase systems.

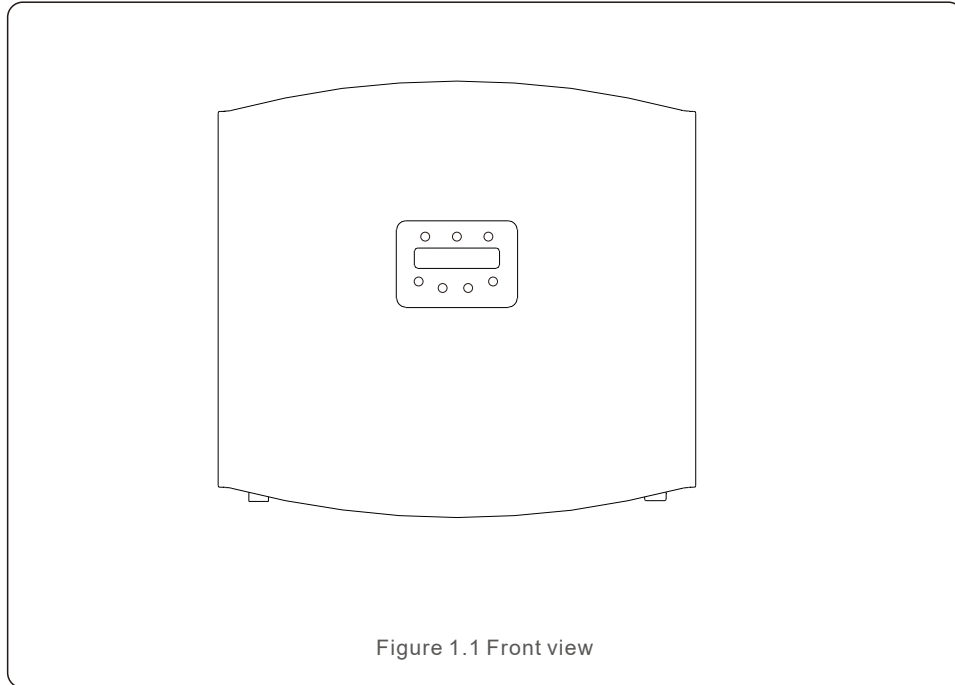


Figure 1.1 Front view

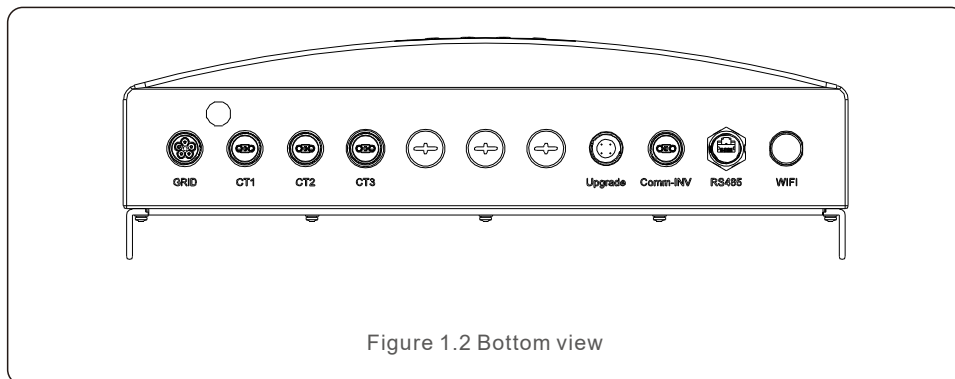
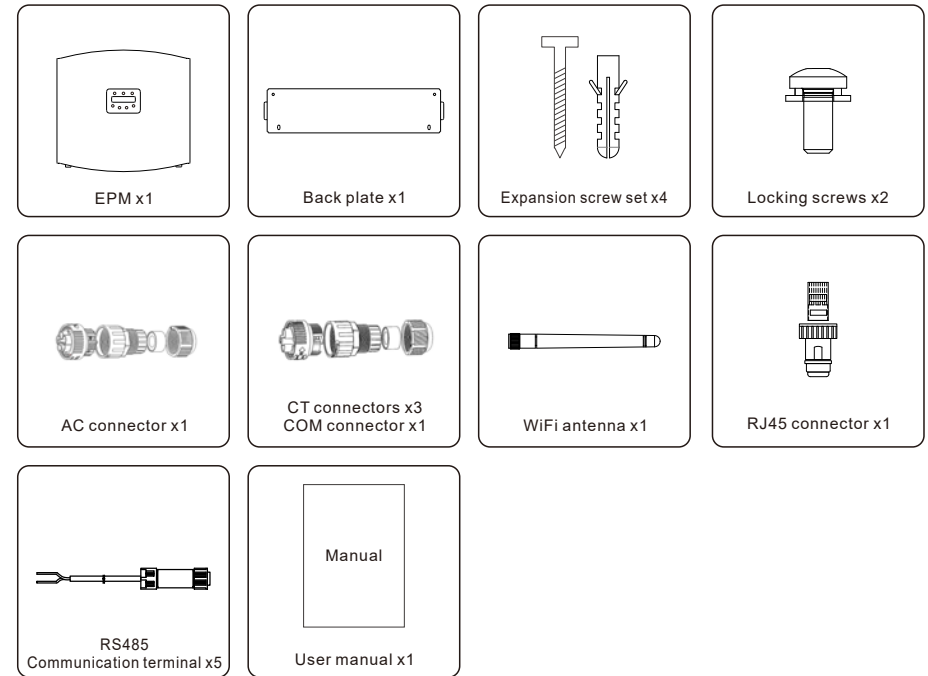


Figure 1.2 Bottom view

# 1. Introduction

## 1.2 Packaging

When you receive the EPM please ensure that all the parts listed below are included:



If anything is missing, please contact your local Solis distributor.



## 2. Safety Instructions

### 2.1 Safety Symbols

Safety symbols used in this manual, which highlight potential safety risks and important safety information, are listed as follows:



**WARNING:**

WARNING symbol indicates important safety instructions, which if not correctly followed, could result in serious injury or death.



**NOTE:**

NOTE symbol indicates important safety instructions, which if not correctly followed, could result in some damage or the destruction of the inverter.



**CAUTION:**

CAUTION, RISK OF ELECTRIC SHOCK symbol indicates important safety instructions, which if not correctly followed, could result in electric shock.



**CAUTION:**

CAUTION, HOT SURFACE symbol indicates safety instructions, which if not correctly followed, could result in burns.

### 2.2 General Safety Instructions



**WARNING:**

Electrical installations must be done in accordance with the local and national electrical safety standards.



**WARNING:**

It is forbidden to insert or unplug the CT cable with power on. If accidentally disconnected the CT cable, please turn off the main AC switch and wait for 5 mins before reconnect the cable.



**CAUTION:**

Risk of electric shock. Do not remove cover. There is no user serviceable parts inside. Refer servicing to qualified and accredited service technicians.



**CAUTION:**

Risk of electric shock from energy stored in capacitors. Do not remove cover until 5 minutes after disconnecting all sources of supply expect service technician. Warranty may be voided if any unauthorized removal of cover.

## 2. Safety Instructions

### 2.3 Notice For Use

The Export Power Manager has been constructed according to the applicable safety and technical guidelines.

Use the Export Device in installations that meet the following specification ONLY:

1. Permanent installation is required
2. The electrical installation must all the applicable regulations and standards.
3. The Export Power Manager must be installed according to the instructions stated in this manual.
4. The Export Power Manager must be installed according to correct technical specification.
5. To install the Export Device you should notice the phase of sampling voltage and the direction of sampling current, then you can connect sampling wires and CT (current transformer).

# 3. Overview

## 3.1 Front Panel Display

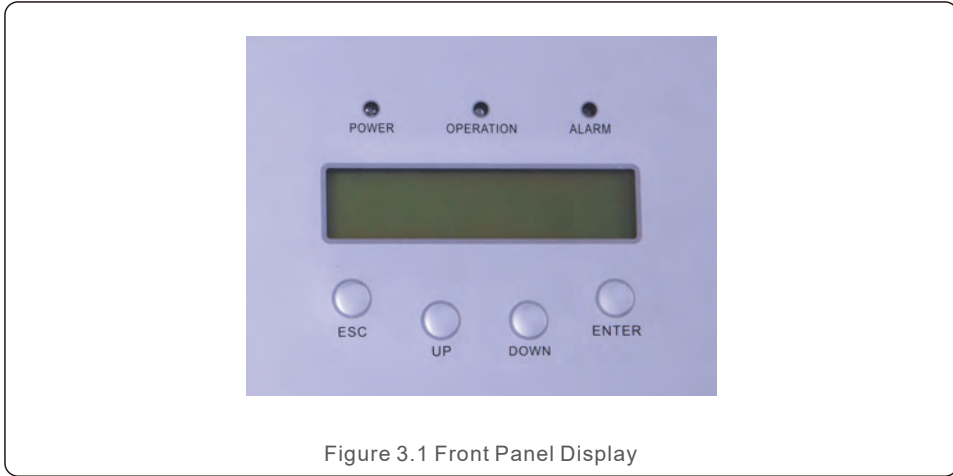


Figure 3.1 Front Panel Display

## 3.2 LED Status Indicator Lights

	Light	Status	Description
①	● POWER	ON	Export Device power on
		OFF	Export Device power off
②	● OPERATION	ON	Communication with inverter
		OFF	No communication with inverter
③	● ALARM	ON	Inverter, EPM or Communication Fault
		OFF	No alarm

Table 3.1 Status Indicator Lights

## 3.3 Keypad

There are four keys in the front panel of the Inverter(from left to right): ESC, UP, DOWN and ENTER keys. The keypad is used for:

- Scrolling through the displayed options (the UP and DOWN keys);
- Access to modify the adjustable settings (the ESC and ENTER keys).

## 3.4 LCD

The two-line Liquid Crystal Display (LCD) is located on the front panel of the EPM, which shows the following information:

- Export Power Manager operation status and data;
- Service messages for operator;

# 4. Installation

## 4.1 Select a Location for the EPM

To select a location for the EPM, the following criteria should be considered:

- The temperature of the EPM could up to 75°C.
- The EPM is designed to work in extreme temperature range is from -25°C to 60°C.
- The EPM should be kept minimum 300mm clearance from the other device.
- The EPM cannot be placed in direct sunlight.

## 4.2 Mounting the EPM

Please attach mounting plate on to wall horizontally where to install the product.

Then mark A , B , C and D to fix mounting plate.(see Figure 4.1)

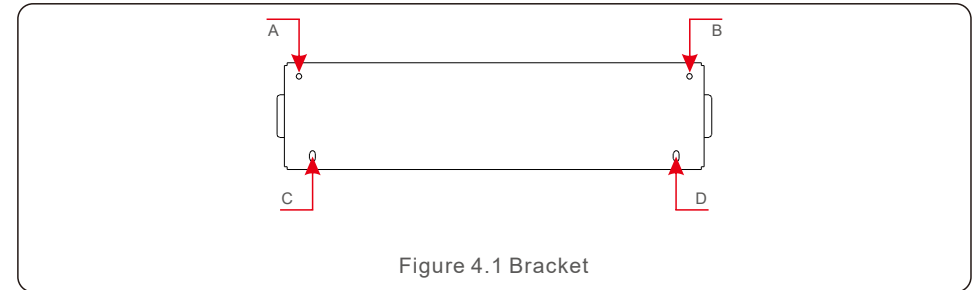


Figure 4.1 Bracket

Drill four  $\phi 8$  holes and insert expandable shell into the holes which make the bracket alignment. After that fix the bracket on the wall.(see Figure 4.2)

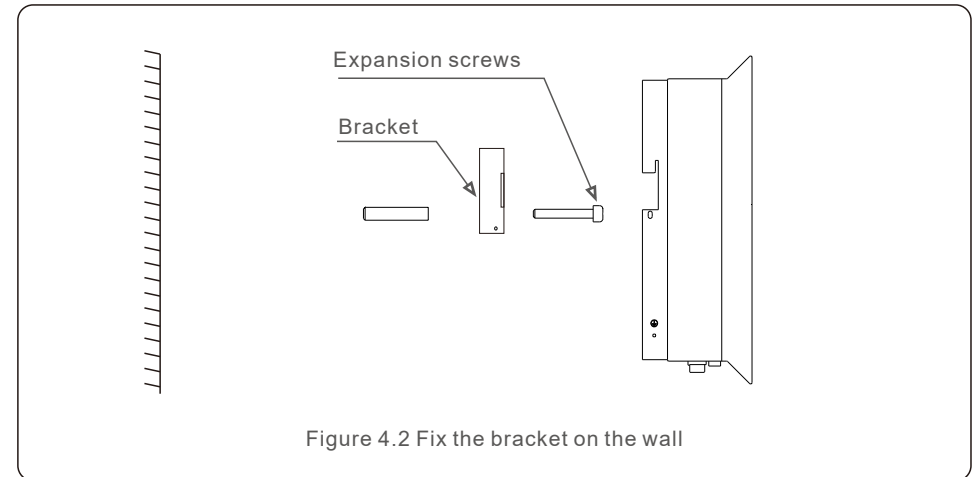


Figure 4.2 Fix the bracket on the wall

# 4. Installation

Hang the EPM in the bracket by the steps below .(see Figure 4.3)

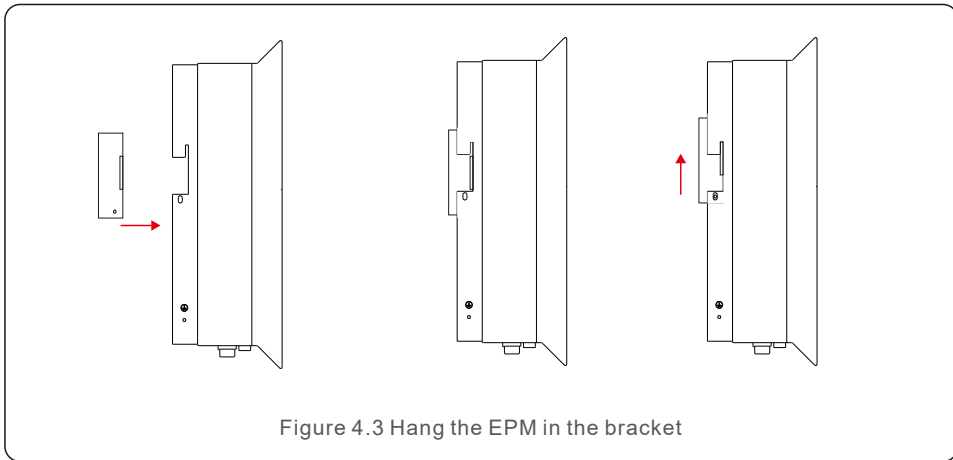


Figure 4.3 Hang the EPM in the bracket

Fix the two screw at the side of bracket.(see Figure 4.4)

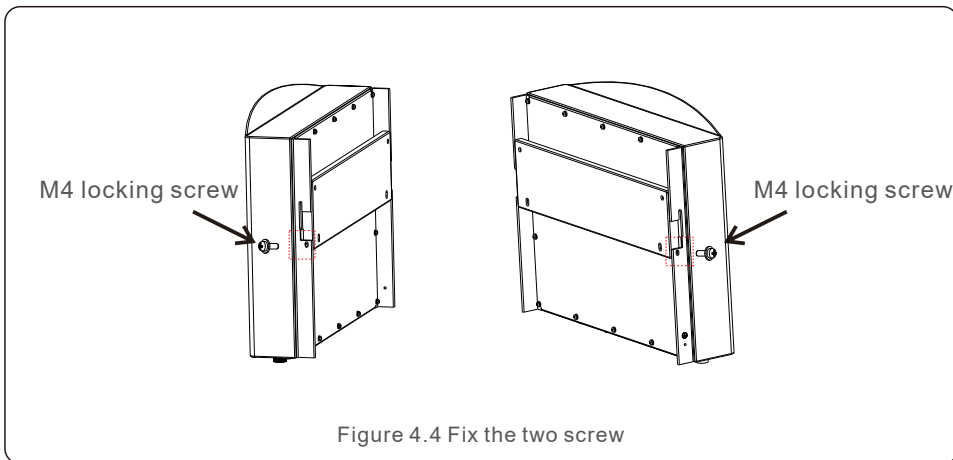


Figure 4.4 Fix the two screw

# 4. Installation

## 4.3 Electrical Connections

The Export Power Manager is designed for electrical connection without removing the cover.

The meaning of the symbols located at bottom of the EPM is listed in Table 4.1.

Grid_U.V.W.N	AC voltage sampling terminal
CT1	AC current sampling terminal(U)
CT2	AC current sampling terminal(V)
CT3	AC current sampling terminal(W)
Comm_INV	Connect to solis inverters
RS485	COM for upgrade
LAN	Connect to monitoring platform through wire
WIFI	WiFi antenna to monitoring platform (Wireless)

Table 4.1 The meaning of the symbols located at bottom of the EPM

System connection diagram is as follows:

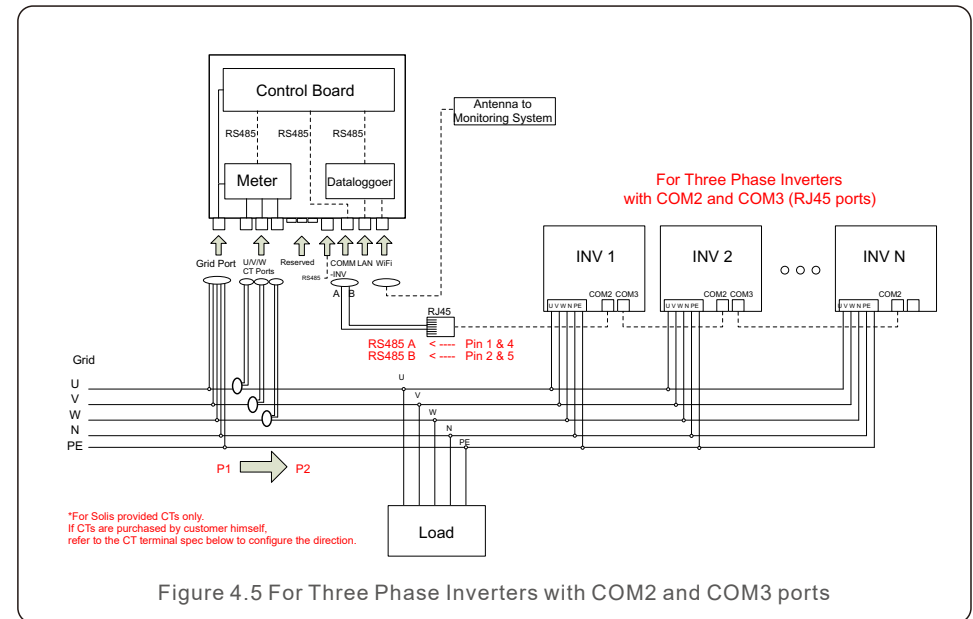
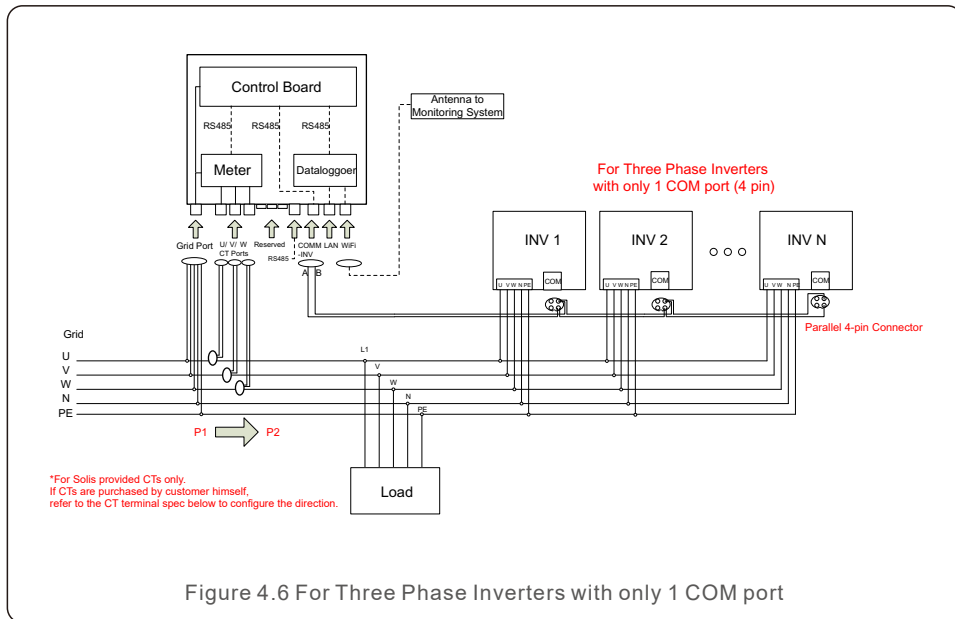


Figure 4.5 For Three Phase Inverters with COM2 and COM3 ports

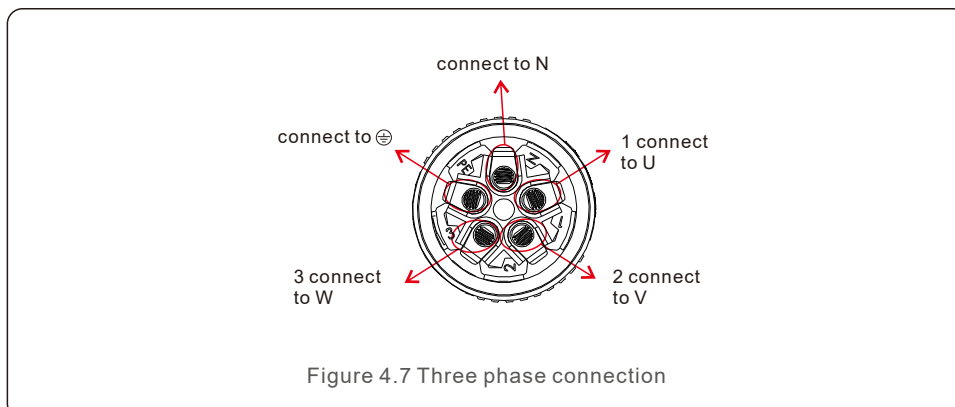
# 4. Installation

# 4. Installation

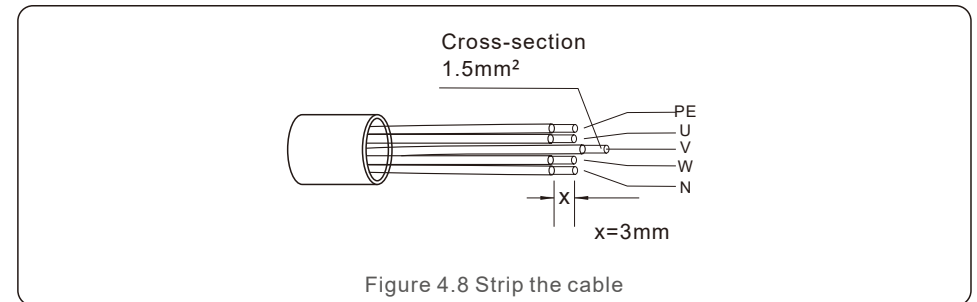


## 1 Make the Grid input cable

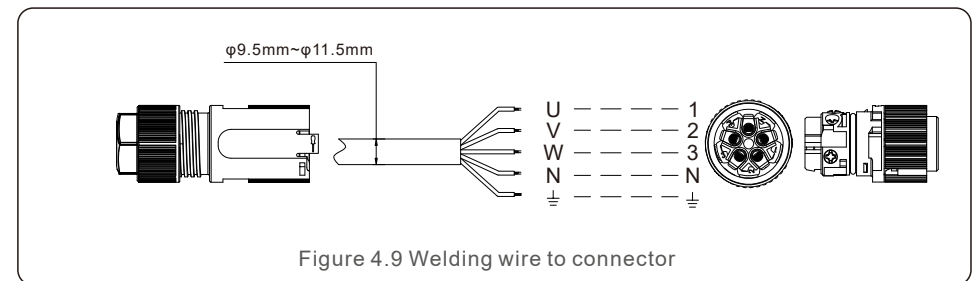
- Measure the distance from EPM to power distribution box. And find proper cable for grid input. 5 core cable for Solis-EPM3-5G-PLUS.
- For three phase inverter installation connect U, V, W to pin1, 2,3 and connect N to pin4, connect PE to ⊕ (see figure4.7).



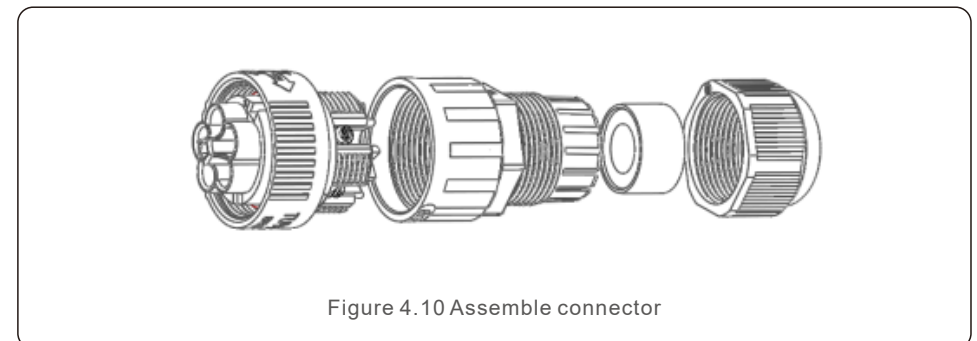
- Strip the end of cable to 3mm (see Figure 4.8)



- Through the cable to the washer and use a suitable screw driver to fix the wire to the connector (see Figure 4.9).



- Assemble the connector (see Figure 4.10)



# 4. Installation

# 4. Installation

## 2. Make RS485 cable (COMM-INV port)

a. Refer to figure 4.11, the RS485 terminals for inverter and EPM are already assembled.

Tips:RS485 cable: preferred 0.5mm.

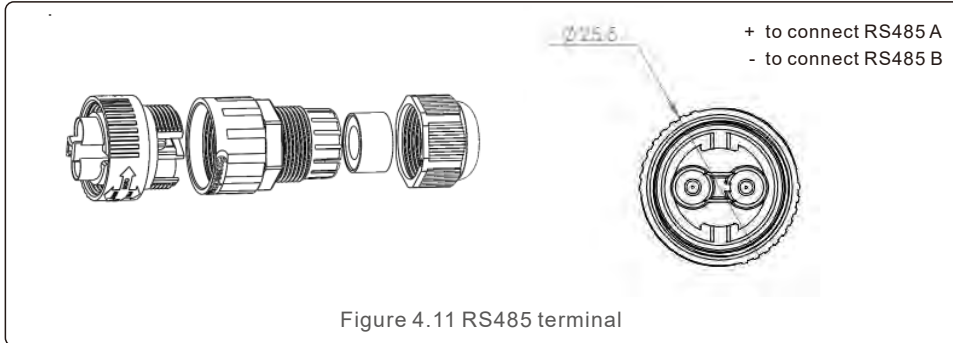


Figure 4.11 RS485 terminal

b. Refer to figure 4.11, connect communication cable between inverter with EPM, and then measure the distance from EPM to inverter. Use proper cable for RS485 connection. (0.5mm<sup>2</sup>)

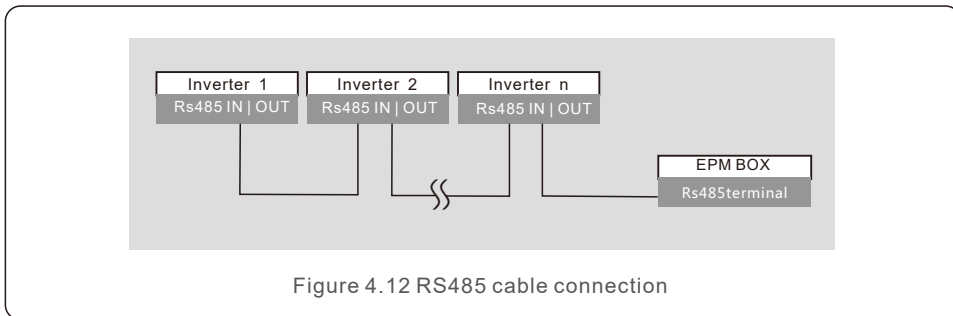


Figure 4.12 RS485 cable connection

c. Follow step1 to assemble 2 connectors to each end of cable.

## 3. Connect and fix the CT

To detect the backflow power, the CTs need to be installed at the PCC (Point of Common Coupling), instead of the load branch circuit.



### Note:

For three phase system, CT1,CT2 and CT3 must be installed on U,V and W with correct sequence, otherwise EPM can not detect the correct data.  
 “The CT cable outer diameter is 6.5mm-7.5mm, cross-sectional area 1.5mm<sup>2</sup>”.

a. Switch off the main switch, disconnect the line cables.

b. Insert the cables through the CT, make sure the P1 on CT is towards grid and P2 is towards the inverter.

c. Reconnect the line cables.



### Note:

If the CT is installed in the wrong direction, the EPM can't work normally.



### Note:

The standard package of EPM DOESN'T include the CT current sensor. Please select CT with secondary current of 5A.

Specification	Dimensions(mm) W x H x D	Hole size(mm) a x e	CT Ratio	AKH-0.66K
CT-30×20-100A	90 x 114 x 40	22 x 32	100:5A	
CT-60×40-300A	114 x 140 x 36	42 x 62	300:5A	
CT-80×40-600A	122 x 162 x 40	42 x 82	600:5A	
CT-80×40-1000A	122 x 162 x 40	42 x 82	1000:5A	
CT-160×80-2000A	184 x 254 x 52	82 x 162	2000:5A	
CT-160×80-3000A	184 x 254 x 52	82 x 162	3000:5A	

Table 4.2 CT Ratio



### Note:

Solis recommends customers to purchase suitable current transformers from local suppliers according to the max possible current in different projects. As long as the secondary current is 5A, it will not affect the warranty of the EPM devices and inverters.  
 Solis can also provide above current transformers as an optional accessory. Customers can contact Solis sales rep to place the order based on their project requirements.

## 4. Installation

### 4. Muti inverter connection

Please follow figure 4.6 system diagram to connect muti-inverters. EPM can control maximum 80 inverters. One grid connection point ONLY.

**The inverter address must be set to different value. Please set address from 01 to 80. Before start up inverter please follow 6.5.1 to set inverter number in EPM.**

### 5. Monitoring

Two methods of monitoring are available with the EPM device connected.

1. Through WiFi antenna on the EPM device.

This is similar with the Solis WiFi datalogger. The WiFi antenna can broadcast data to the local router and then to the Solis monitoring platform. No wiring is needed.

2. Through RJ45 cable

This port is used for connection directly to the router.



**Note:**

When connect the inverters to the EPM, do not use the other ports on inverters to realize the monitoring function.

## 5. Commission and decommission

### 5.1 Commissioning

1. Make sure the main switch is off and the system is powered off.
2. Connect all the necessary cables on EPM, such as the CT ports, COMM-INV port, Grid port and (if needed) the LAN port.
3. Connect the other end of the cables to inverter, PCC or monitoring device(if needed), respectively.
4. Turn on the main switch, go to the EPM LCD.
5. Set the inverter number, backflow power, CT parameter as described in section 6.5
6. Check if the backflow power of the system is limited to the set value.

### 5.2 Decommissioning

In order to avoid the backflow power to grid, please stop the inverter before stop the EPM.

1. Turn off the inverter output AC breaker or select "grid off" on each inverters' LCD.
2. Turn off inverter input DC breaker or pull out PV cable to stop inverter.
3. Turn off the grid input breaker of EPM.
4. Disconnect all cable of EPM, disassemble EPM after 5mins.

# 6. Operation

During normal operation, the display alternately shows the power of grid side and the operation Status. Screens can also be scrolled manually by pressing the UP and DOWN keys. Press the ENTER key to access to the Main Menu.

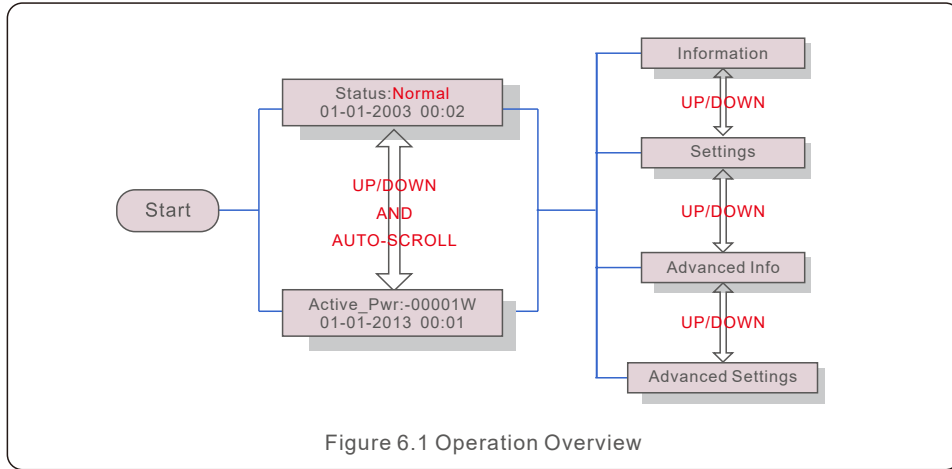


Figure 6.1 Operation Overview

There are 6 status:

Normal: The system works normally

RS485 AllFail: EPM has lost communication with ALL inverters

M-ComFailsafe: EPM has lost communication with the Meter inside

CT-Failsafe: Current Sensor failed

M-VFailsafe: One phase voltage of the meter is ZERO

RS485Fail: EPM has lost communication with one or some of the inverters

## 6.1 Main Menu

There are four submenus in the Main Menu (see Figure 6.1):

1. Information
2. Settings
3. Advanced Info.
4. Advanced Settings

## 6.2 Information

Solis Export Power Manager main menu provides access to operational data and information. The information is displayed by selecting "Information" from the menu and then by scrolling up or down.

# 6. Operation

Display	Description
VacA_Grid: 000.0V IacA_Grid: 000.0A	Vac_Grid: Grid voltage and current.
VacB_Grid: 000.0V IacB_Grid: 000.0A	
VacC_Grid: 000.0V IacC_Grid: 000.0A	
Load_Pwr: 0000.0KW Total_PINV: 0000.0KW	Load_Pwr: Load Power. Total_PINV: Total output power of inverters.
Export Limited: 000% Frequency: 00.00Hz	Export Limited: Inverter output power percentage. Frequency: Grid frequency.
Active_APwr: +00000W Active_BPwr: +00000W	Active_Pwr: Power of the power grid.
Active_CPwr: +00000W Active_TPwr: +00000W	Active_Pwr: Power of the power grid. Active_TPwr: :Power flows through CTs.
Inverter SN: XXXXXXXXXXXXXXXX	Series number of the inverter.

Table 6.1 Information list

## 6.2.1 Lock screen

Pressing the ESC key returns to the Main Menu. Pressing the ENTER key locks (Figure 6.2(a)) or unlocks (Figure 6.2 (b)) the screen.

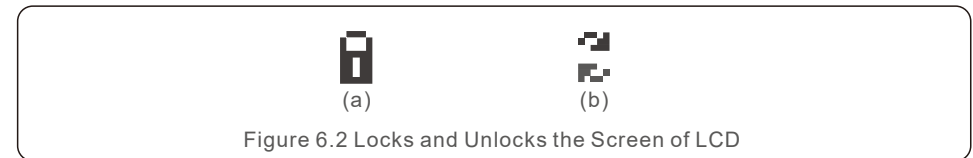


Figure 6.2 Locks and Unlocks the Screen of LCD

# 6. Operation

## 6.3 Settings

The following submenus are displayed when the Settings menu is selected:

- 1.Set Time
- 2.Set Address

### 6.3.1 Set Time

This function allows time and date setting. When this function is selected, the LCD will display a screen as shown in Figure 6.3.



```
NEXT=<ENT> OK=<ESC>
01-01-2016 16:37
```

Figure 6.3 Set Time

Press the UP/DOWN keys to set time and data. Press the ENTER key to move from one digit to the next (from left to right). Press the ESC key to save the settings and return to the previous menu.

### 6.3.2 Set Address

This function is used to set the address when muti inverters are connected to three monitor. The address number can be assigned from "01" to "99"(see Figure 6.4). The default address number is "01".



```
YES=<ENT> NO=<ESC>
Set Address: 01
```

Figure 6.4 Set Address

Press the UP/DOWN keys to set the address. Press the ENTER key to save the settings. Press the ESC key to cancel the change and return to the previous menu.

# 6. Operation

## 6.4 Advanced Info - Technicians Only



### NOTE:

To access to this area is for fully qualified and accredited technicians only. Enter menu "Advanced Info." and "Advanced settings" (need password).

Select "Advanced Info." from the Main Menu.  
The screen will require the password as below:



```
YES=<ENT> NO=<ESC>
Password:0010
```

Figure 6.5 Enter password

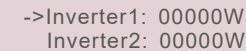
After enter the correct password the Main Menu will display a screen and be able to access to the following information.

- 1. Inverter Power
- 2. CT Connect Status
- 3. Version
- 4. Model Inverter
- 5. Communication Data
- 6. Energy Info

The screen can be scrolled manually by pressing the UP/DOWN keys. Pressing the ENTER key gives access to a submenu. Press the ESC key to return to the Main Menu.

### 6.4.1 Inverter Power

The screen shows the information of Inverter Power for each inverter which connected to the EPM.

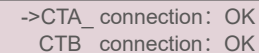


```
->Inverter1: 00000W
Inverter2: 00000W
```

Figure 6.6 Inverter Power

### 6.4.2 CT Connect Status

The position of three-phase CT installation and direction of current detection refer to 4.3, P1 on CT is towards grid and P2 is towards the inverter, then EPM detection will display OK, as shown in figure 6.7. Otherwise, the status will display "NG" which indicates wrong CT direction.



```
->CTA_connection: OK
CTB_connection: OK
```

Figure 6.7 CT Connect Status



# 6. Operation

## 6.4.3 Version

The screen shows the model version and the software version of the Inverter.

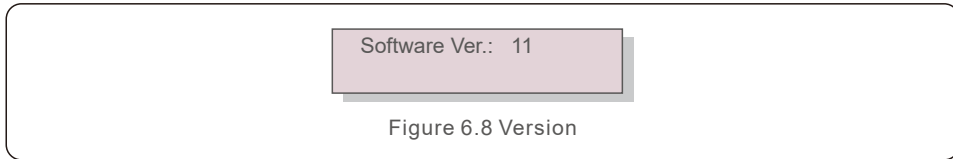


Figure 6.8 Version

## 6.4.4 Model Inverter

The screen shows the Rated power of inverters that are connected to the EPM.

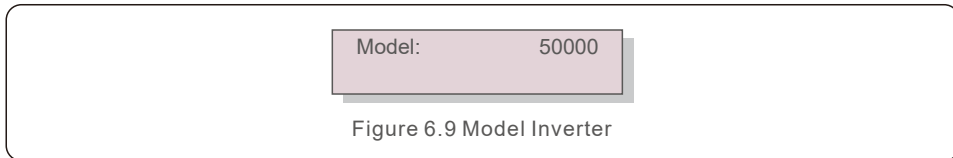


Figure 6.9 Model Inverter

## 6.4.5 Communication Data

The screen shows the internal communication data of the Inverter, for service technicians only.

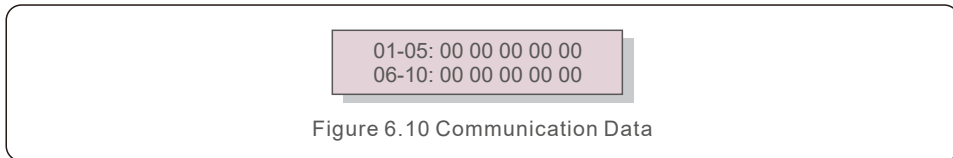


Figure 6.10 Communication Data

## 6.4.6 Energy Info

This shows the energy records on the EPM.

1.Load Total E. 2.INV Send Total E. 3.Send Grid Total E. 4.Get Grid Total E.

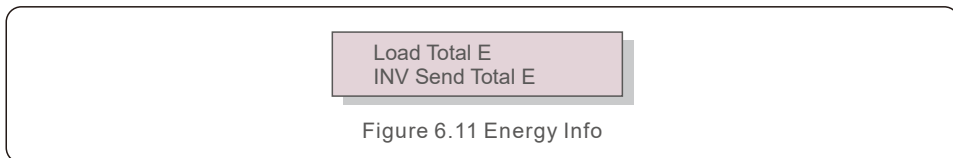


Figure 6.11 Energy Info

# 6. Operation

## 6.5 Advanced Settings - Technicians Only



### NOTE:

To access to this area is for fully qualified and accredited technicians only. Please follow 6.4 to enter password to access this menu.

Select Advanced Settings from the Main Menu to access the following options:

1. Inverter Qty. Set
2. Backflow Power
3. Set CT Ratio
4. FailSafe ON/OFF
5. Backflow Work Mode
6. PELD ON/OFF
7. Transmit ON/OFF
8. System Update
9. Reset Password
10. Restore settings
11. Set Capacity

### 6.5.1 Inverter Qty. Set

This submenu is used for setting inverter number.

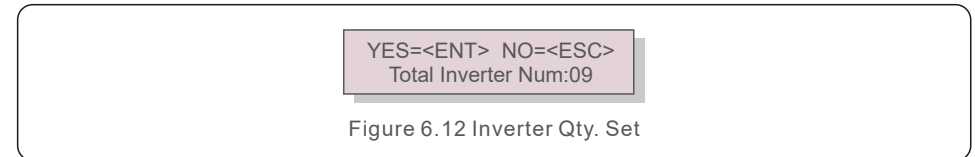


Figure 6.12 Inverter Qty. Set

Enter the screen ,it shows all the number of inverters which conected to the EPM.

The number(01~99) can be select by pressing the UP/ DOWN keys.

Press the ENTER key to set the inverter number ESC key to return to the previous menu.

### 6.5.2 Backflow Power

This submenu is used for setting allowed power that inverter can generate to grid.

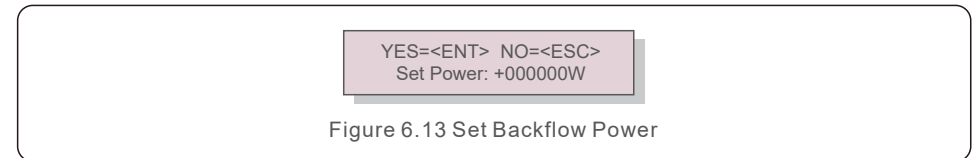


Figure 6.13 Set Backflow Power

Press the UP/DOWN keys to set data.Press the ENTER key to set backflow power

Then press UP/DOWN keys to change the number( the times of 100).

Press the ESC key to save the settings and return to the previous menu.

# 6. Operation

## 6.5.3 Set CT Ratio

This is used to set the CT ratio for the current transformer.  
 Setting range is from 20:1 to 9900:1 with 10:1 interval.  
 For example, if 1000:5A current transformer is used, please set the ratio as 200:1

YES=<ENT> NO=<ESC>  
 Set Para:0030:1

Figure 6.14 Set Meter CT

Press the UP/DOWN keys to set data. Press the ENTER key to set CT Para.  
 Press the ESC key to save the settings and return to the previous menu.

## 6.5.4 FailSafe ON/OFF

The submenu is used for setting fail Safe ON/OFF.  
 Fail Safe indicates the communication status between EPM and inverters.  
 The default setting is "Run". DON'T change it without technicians.

YES=<ENT> NO=<ESC>  
 FailSafe: RUN

Figure 6.15 FailSafe ON/OFF

When the Fail Safe is set as "Run". If some of inverters lost communication with EPM , EPM's LCD screen will display "RS485 fail"; if all inverters lost communication with EPM, then the LCD screen of EPM will display "fail safe". And The inverter stops output power.

When the Fail Safe is set as "Stop", communication lost between EPM and inverters will not affect the output of inverters.

## 6.5.5 Backflow Work Mode

This submenu is used for set backflow work mode: 01, 02. "01" is the default mode.

YES=<ENT> NO=<ESC>  
 Mode:01

Figure 6.16 Backflow Work Mode

# 6. Operation

Mode "01", As shown in the figure 6.17, the average limiting mode, the output power of each phase is the average of the three-phase load power, and it is more than the phase of the lowest power in three phases.

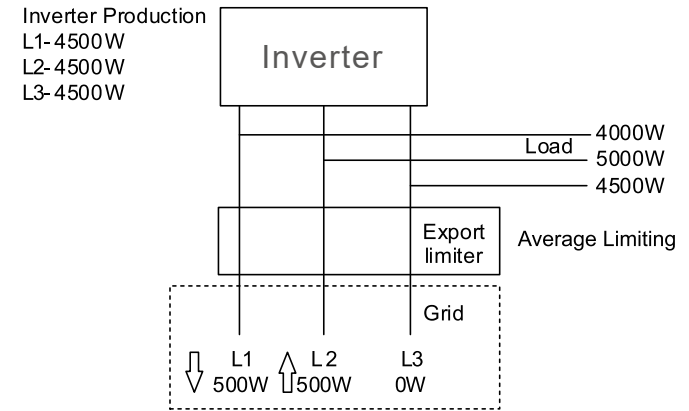


Figure 6.17

Mode "02", As shown in the figure 6.18 the per phase limiting mode, the inverter only generate the power that equals to one of three-phase load power that is the lowest load power of a certain phase.

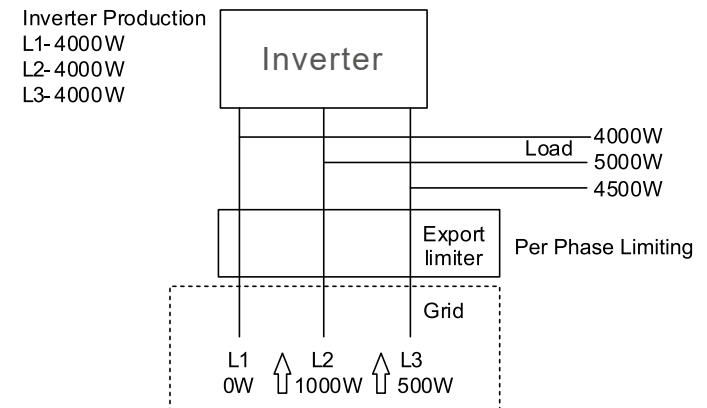


Figure 6.18

# 6. Operation

## 6.5.6 PELD ON/OFF

This submenu is used for set PELD on/off. PELD decides EPM works or not.



YES=<ENT> NO=<ESC>  
Switch: OFF

Figure 6.19 PELD Switch

Set PELD is on, EPM can monitor and manage the working condition of inverters in real time, and it prevents backflow generated. Set PELD is off, which means EPM shutdowns the function of controlling backflow power.

## 6.5.7 Transmit ON/OFF

This is a setting for Solis technician use only.  
Please keep the switch as OFF for normal use.



YES=<ENT> NO=<ESC>  
Switch:OFF

Figure 6.20 Transmit ON/OFF

## 6.5.8 System Update

The upgrade of EPM's system can realize by external wire.  
Please consult our technical engineer for more details.



YES=<ENT> NO=<ESC>  
Current Ver.: 11

Figure 6.21 System Update

# 6. Operation

## 6.5.9 Reset Password



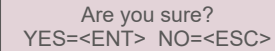
YES=<ENT> NO=<ESC>  
Password: 0000

Figure 6.22 Reset Password

Firstly, input the origin password and press Enter button;  
Second, input the new password, press Enter button to save it. UP/DOWN button can be used to move the cursor.  
Third, Press ESC button to get to the previous page.

## 6.5.10 Restore Settings

When Restore Settings is selected, the LCD will display as shown in Figure 6.21.



Are you sure?  
YES=<ENT> NO=<ESC>

Figure 6.23 Restore Settings

Press the ENTER key to execute the setting.  
Press the ESC key to return to the previous menu.

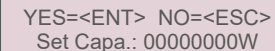
## 6.5.11 Set Capacity

This item is used to set the sum of the capacities of the connected inverters.



->Capacity Setting

Figure 6.24



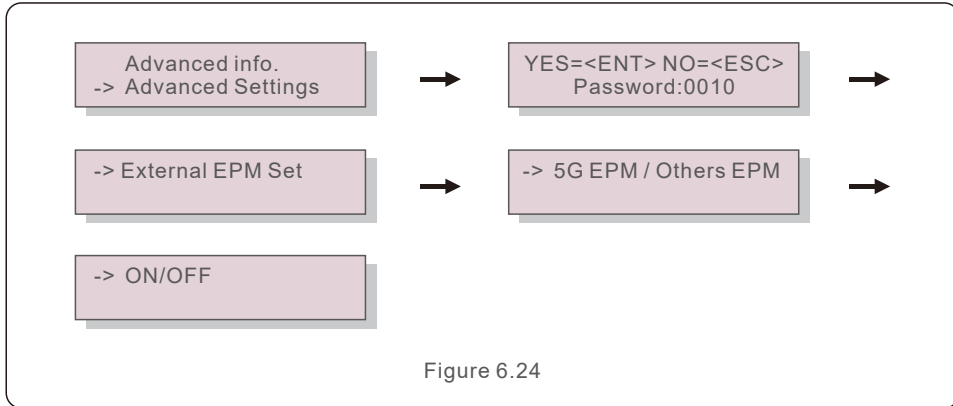
YES=<ENT> NO=<ESC>  
Set Capa.: 0000000W

Figure 6.25

# 6. Operation

## 6.6 Inverter Set

EPM has two versions: EPM-2G, EPM-5G. While inverter is working with EPM, please be reminded to change the inverters settings as below:



**NOTE:**

If you are using EPM-5G, please choose "5G EPM", and set it "ON", if you are using EPM-2G. Please choose "Others EPM", and set it "ON", only one setting needs to be set.



**NOTE:**

If "5G EPM" is chosen, for inverters produced before Nov 30th 2019 (SN: XXXXXX19B30XXXX) need to update the firmware, please contact with Solis local service center or [service@ginlong.com](mailto:service@ginlong.com) for instructions on firmware update.

# 7. Trouble Shooting

The EPM is designed in accordance with the most important international safety and EMC requirements. Before delivering to the customer, the EPM has been subjected to several tests to ensure its optimal operation and reliability.

In case of failure, the LCD screen will display alarm message.

The EPM can show Alarm it self or alarm from inverter. There are 3 alarm can be showed on LCD:

**1. Backflow**

There are backflow current to grid, customer need to stop inverter. and check the connections for the RS485 cable between EPM and inverter.

**2. INV. fault**

There are fault alarm in inverter, need to check inverter status.

**3. Fail safe**

RS485 All Fail: EPM has lost communication with ALL inverters

M-Com Failsafe: EPM has lost communication with the Meter inside

CT-Failsafe: Current Sensor failed

M-V Failsafe: One phase voltage of the meter is ZERO

RS485 Fail: EPM has lost communication with one or some of the inverters

# 8. Specifications

<b>Model</b>	<b>Solis-EPM3-5G-PLUS</b>
<b>AC Input</b>	
Rated voltage	400V,3/N/PE
Input voltage range	320V~480V (L to L)
Input frequency range	45~65Hz
<b>Communication</b>	
Inverter communication	Modbus RS485
Communication interface	2pin RS485, RJ45
Maximum communication inverter numbers	80①
Maximum communication distance	1000m
Monitoring	DLB-W (Bulit-in)
<b>General data</b>	
Ambient temperature	-25°C~+60°C
Relative Humidity	5%~95%
Ingress protection	IP65
Self power consumption	< 15W
Dimensions(W*H*D)	488mm*446mm*149mm
Weight	5.4kg
AC connection	Quick connection terminal
Display	LCD , 2*20Z
CT conection	Plug terminal
CT specification	Optional (5A) ②
<b>Features</b>	
Failsafe fuction	Yes
Remote upgrated	Yes
Control time	5s
Power Accuracy	3%
Warranty	2 years

①: The AC capacity of EPM system should not exceed 2MW.

②: Due to different on-site installation conditions, Solis currently has optional specifications as shown in the above table. It is suggested that the client can choose the appropriate CT specifications according to the actual installation requirements.

# 9. Appendix

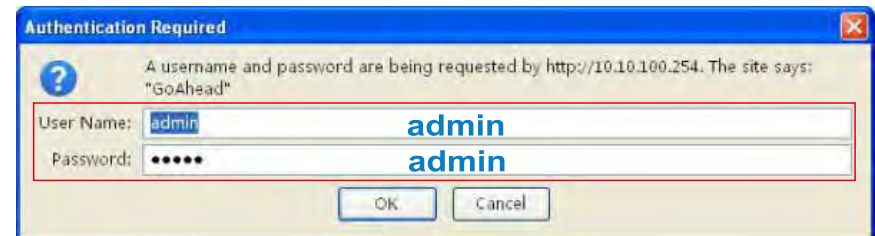
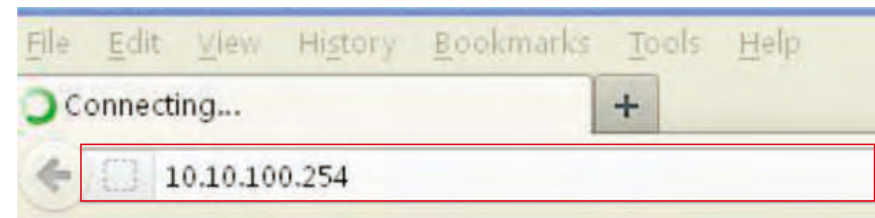
## Connection via Ethernet

1. Connect router and data logger via Ethernet port with network cable.
2. Reset the data logger.  
Reset : Press the reset button with a needle or open paper clip and hold for a while when the 4 LEDs should be on. Reset is successful when 3 LEDs, except POWER, turn off.
3. Enter the configuration interface of your router, and check the IP address of the data logger assigned by the router. Open a web browser and enter the assigned IP address to get access to the configuration interface of the data logger.  
Fill in username and password, both of which are admin as default.



**NOTE:**

Supported browsers: Internet Explorer 8+, Google Chrome 15+, Firefox 10+.



4. Set parameters of data logger.

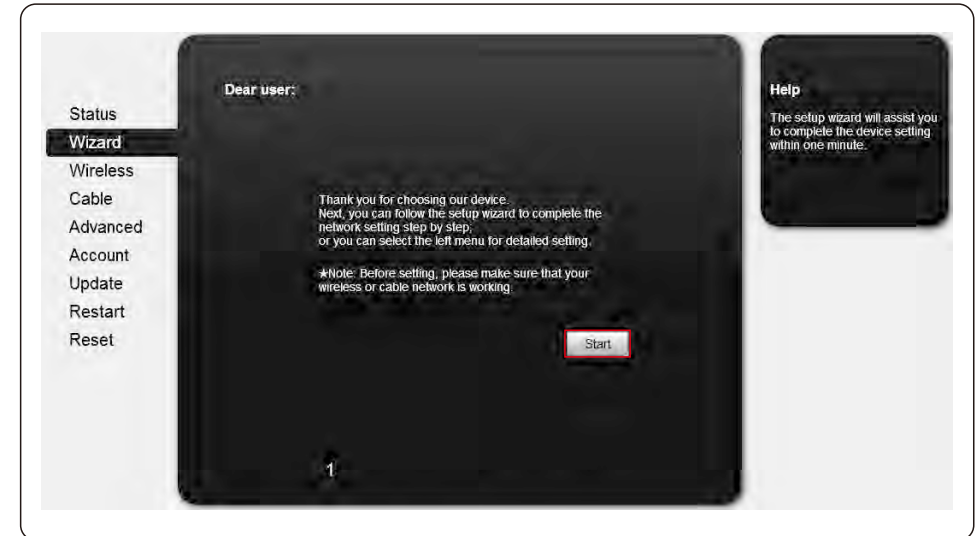
In the configuration interface of data logger, you can view general information of the device.

Follow the setup wizard to start quick setting.

Step1: Click "Wizard" to start.



Step2: Click "Start" to continue.



Step3: Select "Cable Connection", and you can choose to enable or disable the wireless function, then Click "Next".



Step4: Select "Enable" to obtain an IP address automatically, then click "Next".

**Status**  
**Wizard**  
 Wireless  
 Cable  
 Advanced  
 Account  
 Update  
 Restart  
 Reset

**Please fill in the following information:**

Obtain an IP address automatically: **Enable**

IP address: 0.0.0.0

Subnet mask: 0.0.0.0

Gateway address: 0.0.0.0

DNS server address:

**Back** **Next**

5

**Help**  
 Most systems support the function of DHCP to obtain IP address automatically. Please select disable and add it manually if your router does not support such function.

Step5: If setting is successful, the following page will display. Click "OK" to restart.

**Status**  
**Wizard**  
 Wireless  
 Cable  
 Advanced  
 Account  
 Update  
 Restart  
 Reset

**Setting complete!**

Click OK, the settings will take effect and the system will restart immediately.

If you leave this interface without clicking OK, the settings will be ineffective.

**Back** **OK**

6

**Help**  
 After clicking OK, the system will restart immediately.

Step6: If restart is successful, the following page will display.

**Status**  
**Wizard**  
 Wireless  
 Cable  
 Advanced  
 Account  
 Update  
 Restart  
 Reset

**Setting complete! Please close this page manually!**

Please login our management portal to monitor and manage your PV system. (Pleasee register an account if you do not have one.)

To re-login the configuration interface, please make sure that your computer or smart phone and our device are in the same network segment, and enter the new IP address of the device to access the interface.

**Back** **Reset**

**Help**  
 \*Note: The IP address of the device may have changed, please refer to User Manual to check the procedures to obtain the new IP address.



**NOTE:**

After setting is completed, if STATUS is permanently on after about 30 seconds, and the 4 LEDs are all on after 2-5minutes, the connection is successful. If STATUS is flashing, which means unsuccessful connection, please repeat the setting from step 3.

# Monitoring System

DLS-W  
DLS-L  
DLS-G

## Ginlong Monitoring System



Data Logging Stick  
WiFi

Data Logging Stick  
LAN

Data Logging Stick  
GPRS

### Data Logging Stick: WiFi

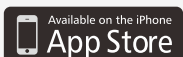
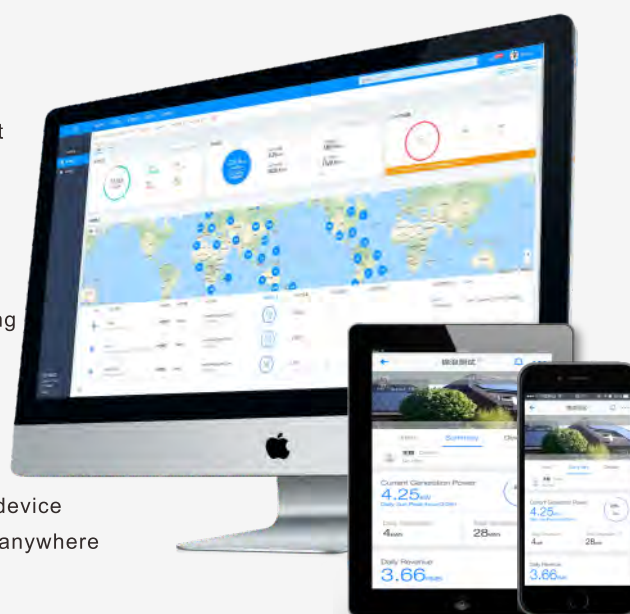
- ▶ Quick installation and easy operation
- ▶ Enabling local and remote monitoring
- ▶ WiFi communication supporting remote monitoring
- ▶ Easy visualization of data and other information via Internet

### Data Logging Stick: LAN

- ▶ Quick installation and easy operation
- ▶ Not need to set,plug and play function
- ▶ LAN communication is stable and reliable,remote monitoring

### Data Logging Stick: GPRS

- ▶ Quick installation and easy operation
- ▶ Connecting inverters with 'plug and play'function
- ▶ Easy visualization of data and other information via mobile device
- ▶ GPRS communication enabling mobile monitoring anytime anywhere





# Datasheet

Model	DLS-W(WiFi)	DLS-L(LAN)	DLS-G(GPRS)
Max.number of inverters	1		
Inverter communication	4Pin		
Remote communication	WiFi (802.11 b/g/n)	Ethernet 10/100Mbps	GPRS Class 12
Communication rate	9600bps	1200-9600bps	9600bps
Frequency	2.412GHz-2.484GHz	---	850/900/1800/1900 MHz
GPRS multi-slot	---	---	12/10/8
WiFi communication range	100m in outdoor open area without obstruction	---	---
LAN communication range	---	50m(CAT-5e Shielded Twisted Pair)	---
WiFi transmitting power	802.11b: +20dBm (Max) 802.11g: +18dBm (Max) 802.11n: +15dBm (Max) Configurable by users	---	---
WiFi receiving sensitivity	802.11b: -89dBm 802.11g: -81dBm 802.11n: -71dBm	---	---
GPRS Mobile Station	---	---	Class B
Compatible with the GSM Phase 2/2 +	---	---	Class 4 (2W @ 850/900 MHz) Class 1 (1W @ 1800/1900 MHz)
External antenna	I-PEX antenna	I-PEX antenna	I-PEX connector
Data collection intervals	5 minutes		
Data interface	UART: 9600bps	UART: 9600bps	GPRS Class 12 Max 85.6kbps
Preferences setting	Web Server		
Firmware updates	Wireless	Ethernet	Wireless
Data access	WiFi point-to-point/Remote server	Remote server	Remote server
Data storage	8MBYTE FLASH		
<b>Electrical</b>			
Input voltage	DC 5V	DC 5V (+/-5%)	DC 5V (+/-5%)
Working current	130mA@5V	110mA~200mA	500mA
Static power consumption	---	---	<2W
Max. instantaneous power consumption	---	---	<8W
<b>Environmental</b>			
Operating temperature	-10°C~+85°C	-40°C~+85°C	-10°C~+85°C
Operating humidity	10%-90% Relative humidity, no condensa		
Storage temperature	-40°C~+125°C	-45°C~+90°C	-40°C~+125°C
Storage humidity	<40%		
Protection class	Ip65		
<b>Physical</b>			
Dimension(L*W*H)	118mm*43mm*43mm	105mm*43mm*43mm	118mm*43mm*43mm
Weight(g)	56g		
<b>Other</b>			
Warranty	2 years		
Certificates	FCC,CE		