fullwat PDA3000 Series Power DC AC Inverter Instructions

PDA1500-STATION / PDA3000-STATION series

pure sine wave

Power DC-AC Inverter
Multi-function INVERTER/CHARGER:
inverter + MPPT solar charger + battery charger

Contents

INTRODUCTION

This is a mulfifunciion inverter/charger, combining funclions of inverter, solar charger and battery charger to offer uninteruptible power support with portabe size. s comprehensive LCD display offers user-configurable and easy-accessible button operation such as battery charging curent, AC/solar charger priority, and accepiable input vottage based on different applications.

FEATURES

- Pure sine wave inverter
- Configurable input voltage range for home appliances and personal computers via LCD setiing Configurable:

  battery charging current based on applcations via LCD sefing
- Configurable AC/Solar Charger priority via LCD sefiing.
- Compatbie to mains voliage or generator power.
- Auto restart while AC is recovering.
- Overload Over femperature/ shot circut profection.
- Smart battery charger design for opfimized battery performance.
- Cold start funcion.
- MPPT mode regulation charger

BASIC SYSTEM ARCHITECTURE

The following ilusiration shows basic appication for this inverter/charger. It also includes following devices fo have a complete running system

- Generator or Uilly.
- PV modules (opion).

Consult with your system infegrator for oiher possible system architectures depending on your requirements.
This inverter can power all kinds of appliances in home o office environment, including motorfype appliances such as fube light, fan, refiigerator and air condifioner.
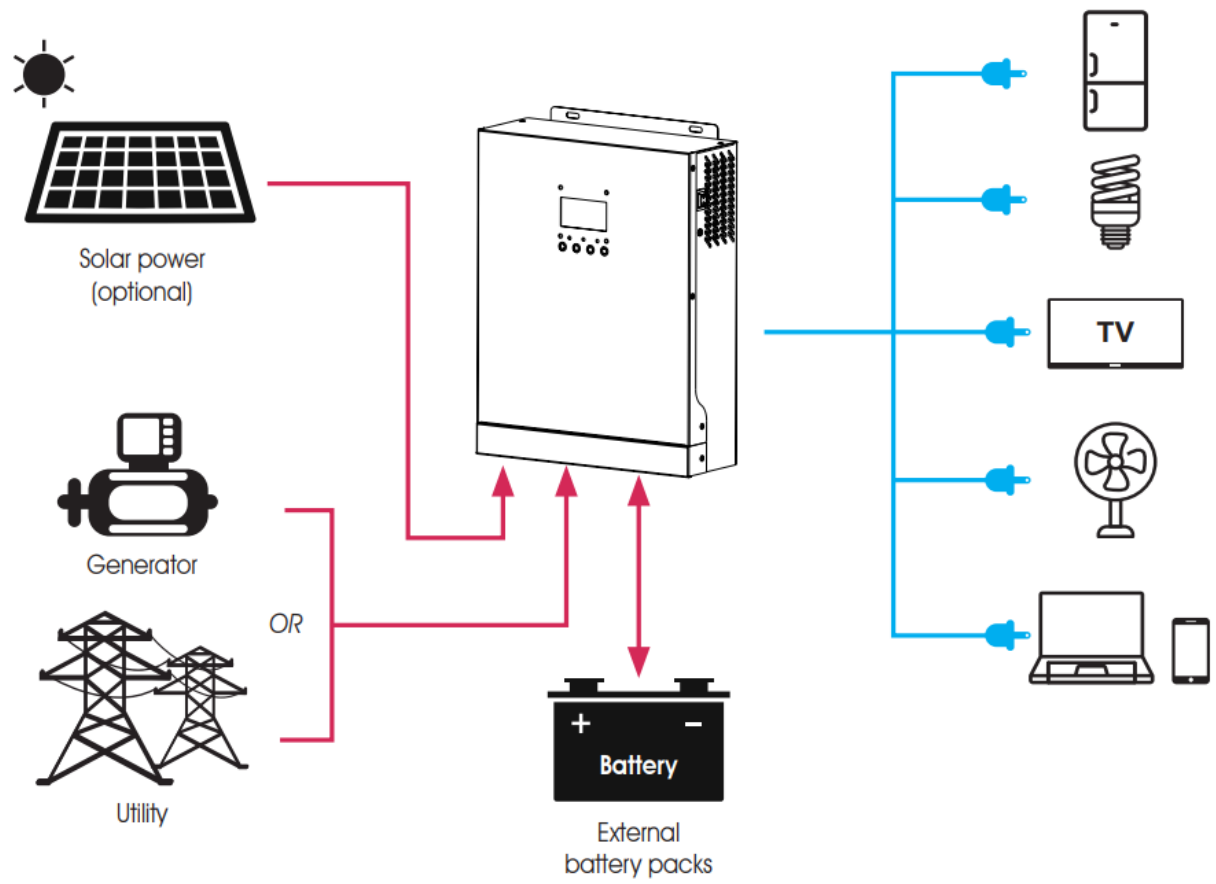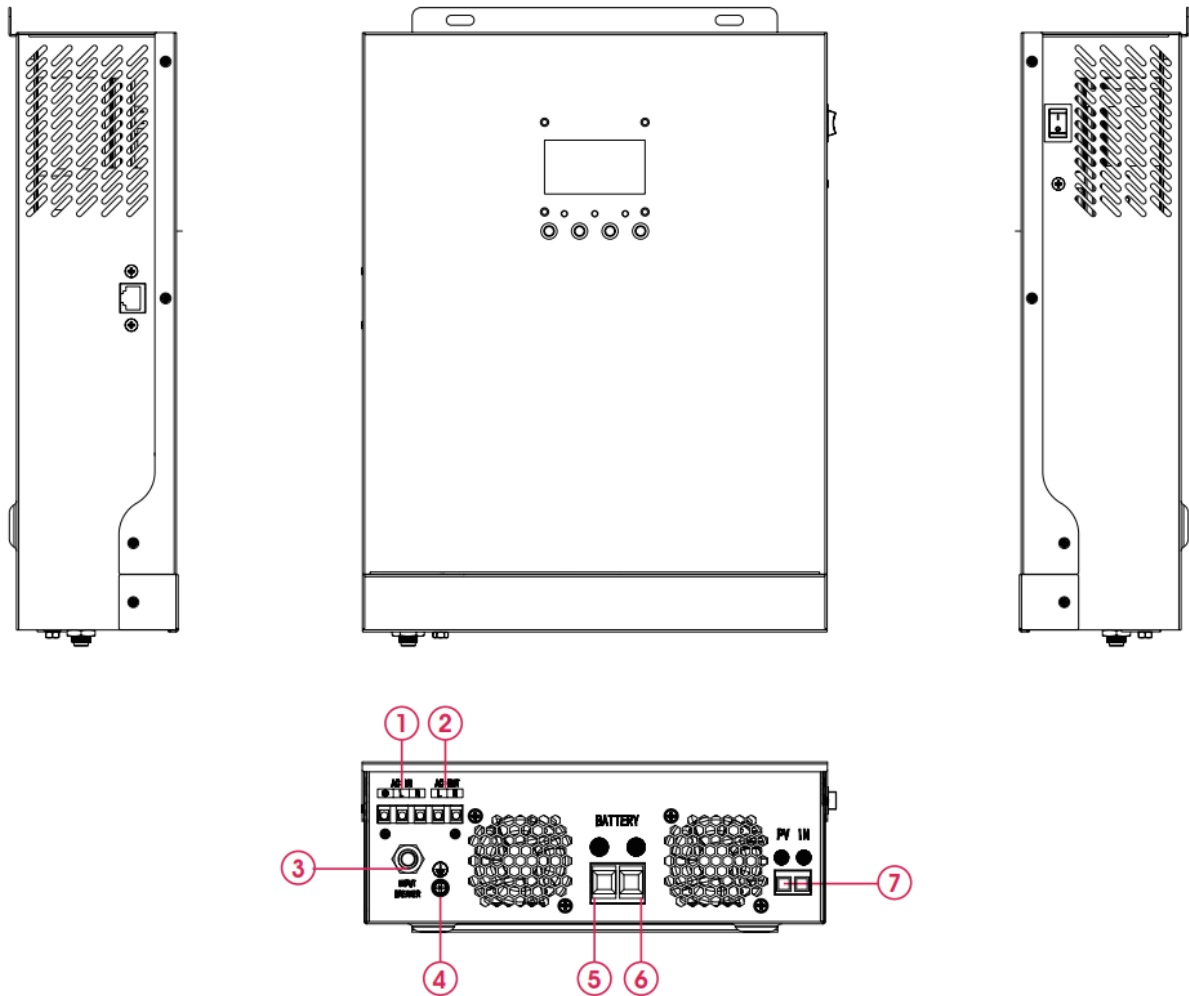
Fig. 1 - Hybrid power system

PRODUCT OVERVIEW

Indication

1. AC Input
2. AC Output
3. Circuit breaker
4. Safety (Earih) ground
5. Battery positive
6. Pattery negative
7. PV Input
8. ON/OFF
9. RS232 communication

INSTALLATION

5.1 Unpacking and Inspection
Before installation, please inspect fhe unit. Be sure fhat nothing inside he package i damaged. You should have received the folowing ffems inside of package:

- The unitx 1
- User manual x 1
- Commurication cable x 1
- Software CDx 1

5.2 Preparation

Before conneciing allwiings, please fake off batiom cover by removing two screws s shown below.
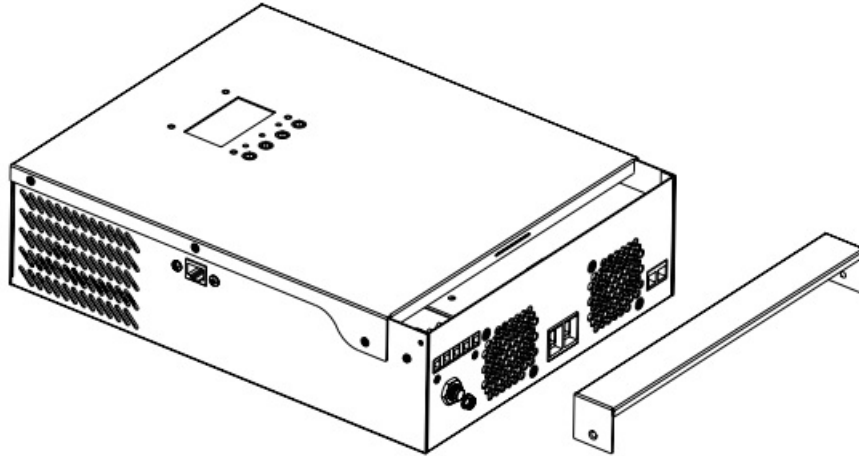
5.3 Mounting the unit

Consider the following points before seleciing where fo install

- Do not mount fhe inverter on flammable constucfion materils
- Mount on a sofd surface.
- Install this inverter t eye level in order fo allow the LCD display fobe read t all times.
- For proper air citculafion to dissipate heaf, alow a clearance of appiox. 20 om fo the side and approx. 50 cm above and below the unt
- The ambient femperaure should be befwsen 0°C and 55°C fo ensure opiimal operation.
- The recommended installation posifion is fo be adhered fo the: wall vertically
- Be sure fo keep ofher abjects and sufaces s shown in he diagram to guarantee sufficient heat dissipation and fo have enough space for removing wires

⚠ SUITABLE FOR MOUNTING ON CONCRETE OR NON-COMBUSTIBLE SURFACE ONLY.

Insiall the unit by screwing fhee screws.

It's recommended fo use M4 or M5.

OTHER
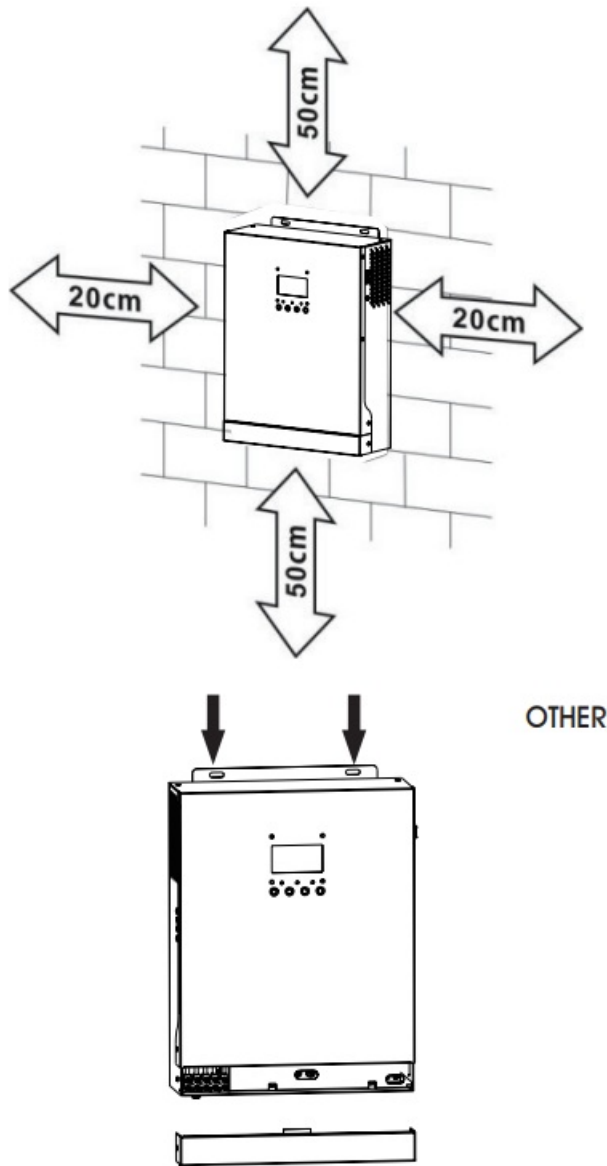
5.4 Battery connection
Caution:

For safety operaion and regulation compliance, i's requested fo insfal separate DC over-curient protector or disconnect device between battery andinverter.

It may not be requesied to have a disconnect device in some applications, however, i sil requested fo have over-current protection nstalled. Please refer fo fypical amperage in below fable as tequired fuse or breaker size.

WARNING! All wiing must be performed by a qualified personnel.

WARNING! It's very imporiant for system safety and efficient operation fo use appropiiate cable for battery connection. To reduce sk of injury, please use the proper recommended cable and feminal size as below.
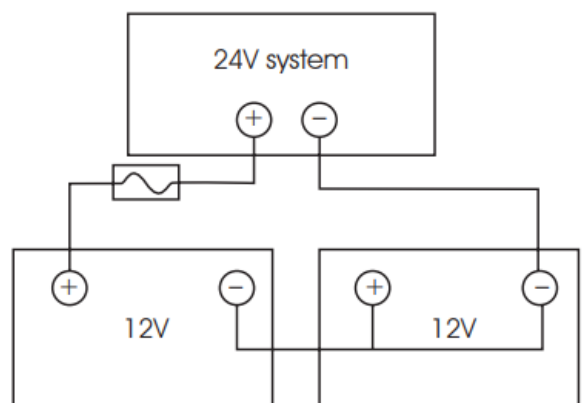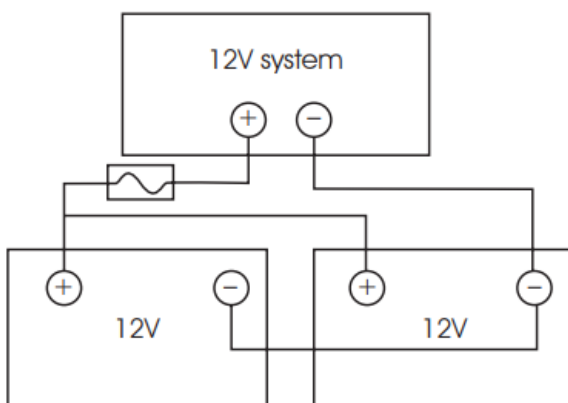
Ring terminal
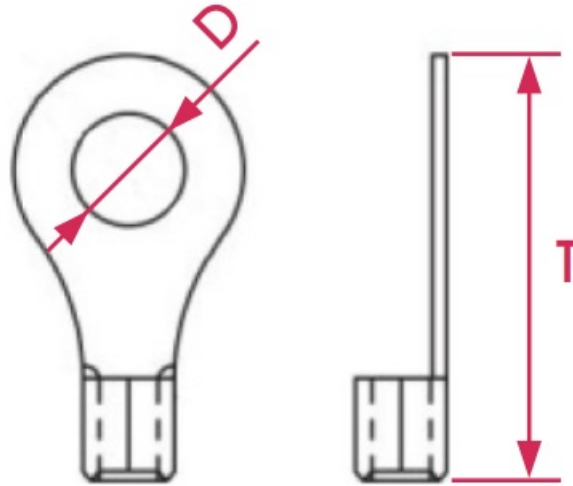
Recommended battery cable and terminal size:

Model	Input voltage	Typical amperage	Battery capacity	Wire size	Ring terminal			Torque value
					Cable mm2	Dimensions		
						D (mm)	L (mm)	
PDA3000-STATION	24V	100A	100AH 200AH	2*8AWG	14	6.4	29.2	2-3 Nm
PDA1500-STATION	12V			1 *4AWG	22	6.4	33.2	
	24V	50A	100AH	1 *6AWG	14	6.4	29.2	
				2*10AWG	8	6.4	23.8	

Please follow below steps fo implement battery connection:

1. Assemmble battery iing feminal based on recommended battery cable and tenminal sizs.
2. PDATS00-STATION mode! supports 12VDC or 24VDC system. Connect all batiery packs as below chat. It is suggested fo connect at least **100Ah.**

Note: Please only use sedled lead acid battery or sedled GEAGM lead-acid battery.

3. Insert e fing fermminal of batiery cable fiatly info batiery connector of inverter and make sure the bolts are tightened wih forque of 2-3 Nm. Make sure polarily ot both the batiery and the inverter/charge is correctly

connected and iing feminals are fightly screwed to the battery temminals.
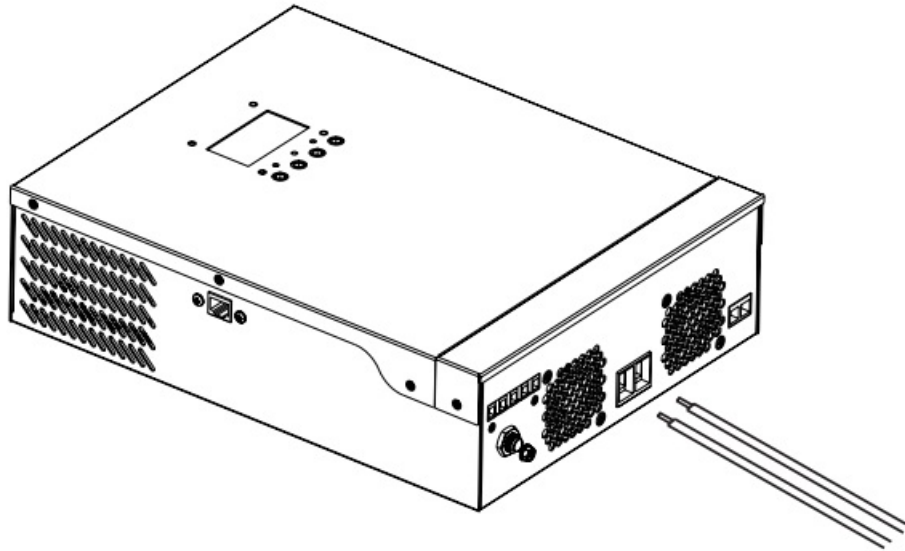
⚠ **Warning:** Shock Hazard

Installation must be performed with care due fo high battery voliage in sefies.

⚠ **Caution!!** Do not place anything between the flat part of the inverter terminal and the fing tenminal. Other wise, overheating may ocout

Caution!! Do not apply anti-oxidant substance on the tenminals before feminals are connected fightly.

Caution!! Bsfore making the findl DC connection or closing DC breaker/disconnector, be sure postive (+) must be connected fo pasilive (+) and negaiive (-) must be connected fo negaive [-].

5.5 AC Input/Output connection

'Caution!! Before connecting fo AC input power source, please install a separate AC breaker between inverter and AC input power sourc. This will ensure the inverer can be securely disconnected duing maintenance and fully profected fiom over curent of AC input. The recommended spec of AC breaker is 104 for PDAT500-STATION, 32 Afor PDA3000-STATION.

Caution!! There are two teminal blocks with IN* and *OUT" markings. Please do NOT mis-connect input and oufput connectors.

WARNING! All wiring must be performed by a qualified personnel.

WARNING! It's very important for system safety and efficient operation fo use appropriate cable for AC input connection. Toreduce fisk of injury, please use he proper recommended cable size as below.

Suggested cable requirement for AC wires.

Model	Gauge	Torque value
PDA1500-STATION	14AWG	0.5~0.6 Nm
PDA3000-STATION	12AWG	1.2~1.6Nm

Please follow below steps fo implement AC input/output connection:

1. Before making AC inpui/oufput connection, be sure fo open DC profector or dsconnector first.

2. Remmove insulation skeeve 10mm for sk conductors. And shoren phase L and neutral conductor N 3mm.

3. Insert AC input wires according to polartiies indicated on ferminal block and fighten the ferminal screws.
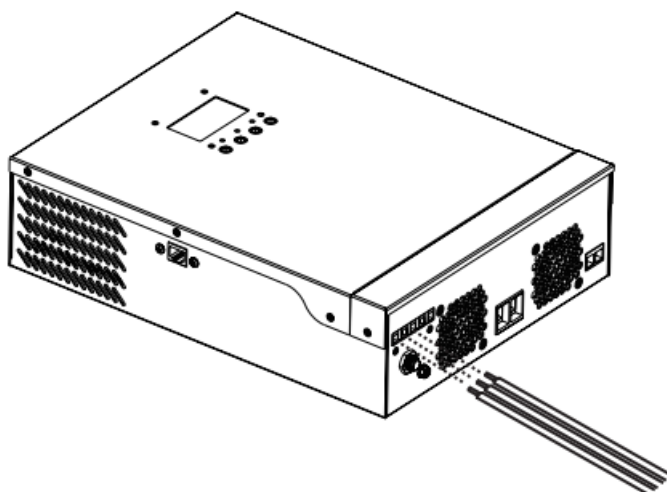
   Be sure fo connect PE protective conductor (⏚) first.

   ⏚ ──▶ Gound (yelow-green}

   L ──▶ UNE (brown or black}

N ➤ Neulal (blue}

Warning: Shock

Be sure ihat AC power source s disconnected before atiernpting to hardwire it fo the unit.

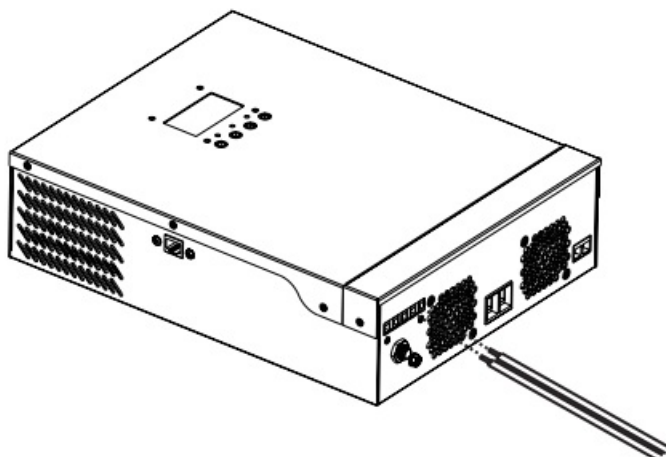4. Then, insert AC output wires according fo polariies indicated on terminal block and fighten ferminal screws.

Be sure to connect PE protective conductor (⏚) first.

⏚ ➜ Gound yelow-green}

L ➤ UNE (brown or black}

N ➤ Neufal (blue}

5. Make sure the wires are secursly connected.

Caution: Important!!
Be sure fo connect AC wires with correct polaiiy. If Land N wires are connected reversely, it moy cause ufifty shortcircuited when these inverters are worked in pardilel operaion.
Caution:
Applances such as air condifioner are requited at least 2~3 minutes o restart because it required fo have enough time fo balance refrigerant gas inside of circus. If a power shortage oceurs and recovers in a short time, it il cause damage fo your connected appliances. To prevent ihis kind of damage, please check manufacturer of air condioner i i's equipped with fime-delay function before installafion. Othewise, fhis inverter/charger wil tig overload fault and cut off oufput fo protect your appliance but somefimes it stil causes intemnal damage fo the i conditioner.
5.6.PV CONNECTION
PV Module selection for MPPT mode.

| Inverter model	PDAI500-STATION		PDA3000-STATION
Rafed out power	12V	24V	24V
Charging curient (PWM)	40A mox.		
Max PV Amay open circuit vofiage	102		
MPPT operating voliage range:	17-80V	30-80VDC	

Take 300Wp PV module as an example. After considering above two parameters, the recommendesd module configrurdtions are lised s below fable.

Inverter model		PDA1 500-STATION		PDA3000-STATION
Rated out power	300W	12V	24V	24V
Maximum power (Pmax)	32175A	2 pieces in serial		2 pices in serial and 2 sets in parallel
Max. Power current lmmp (A)	8.93A			
Open circuit voltage Voc (V)	39184A			
Short circuit current Is° (A)	9.78A			

Please follow below steps fo implement PV module connecfion:

1. Remove insulation skeeve 10mm for positive and negative conductors.
2. Check corect polarity of connection cable fiom PV modulesan PV input connectors. Then, connect positive pole (+) of conncecfion cable fo postive pole (+) of PV input connector, Comnect negative pole [of connection cable fo negative pole () of PV input connecior.
3. Moke sure the wies are securely connected.
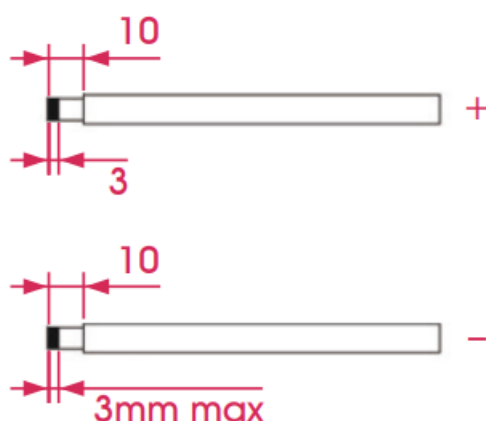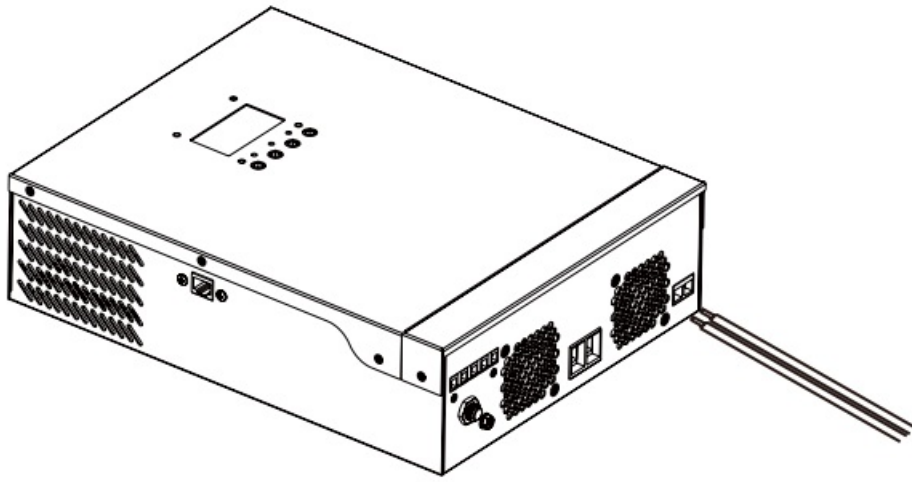
5.7.Final Assembly
After connecting all wirings, please put botiom cover back by screwing two screws as shown below.
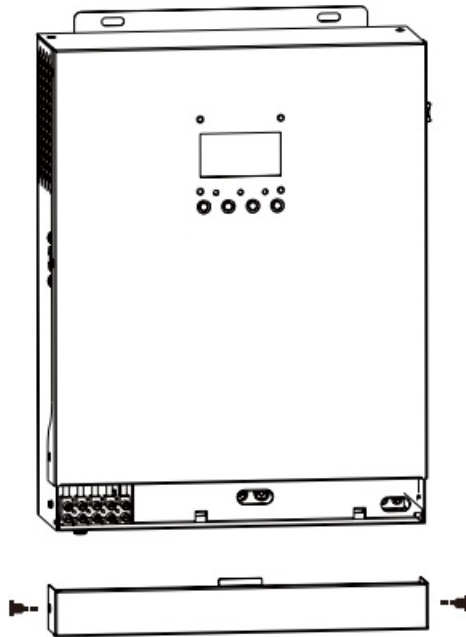
5.8.Communication connection
Please use supplied communication cable to connect to inverter and PC. Insert bundled CD info a computer 'and follow on-screen instruction fo install fhe monitoring software. For the detaled software operation, please check user manual of software inside of CD.

5.9 Dry contact signal
There i one oy contact (3A/250VAC) availdble on fhe rear panel. It could be used to deiver signal fo extemal device when baitery vofage reaches warning level.

Unit status	Condition			Dry contact port:	
				NC & C	NO & C
Power OFF	Unitis off and no oufput is powered.			Close	Open
Power ON	Oulput is powered from Utiity			Close	Open
	Output is powe red from Batiery or Solor	Program 01 set as Utiity	Baftery vofiage <LowDC wa ming voltage	Open	Close
			Battery vottage > Sefting valu e in Progiam 13 or battery ch aiging reaches floating stage:	Close	Open
		Program 01 is s et as SBU or sol or fist	Battery vofiage < Seffing valu e in Program 12	Open	Close
			Battery voltage > Setting yaiu e in Progiam 13 or battery ch arging reaches floating stage:	Close	Open

OPERATION

6.1 Power ON/OFF
Once the unit has been properly installed and he batteries are connected well simply press ONIOFF switch (located on the button of the case) fo fum on the unit.
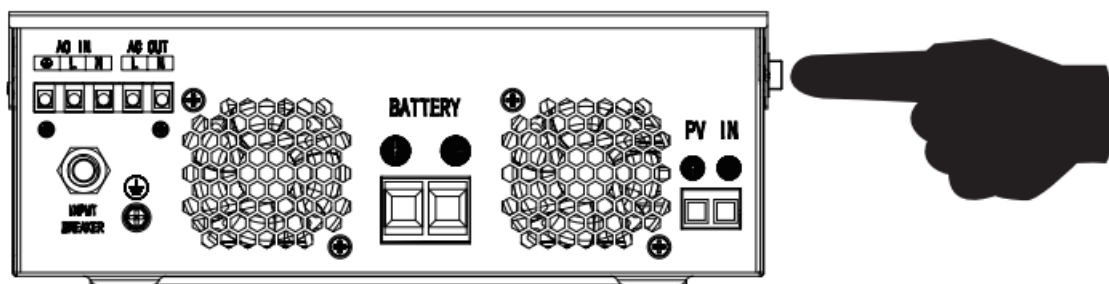
6.2 Operation and Display panel
The operation and display panel, shown in below chart,is on the fiont panel of the inverier. It includes three indlicators, four function keys and a LD display, indicating the operaiing status and inputfoutput power information.
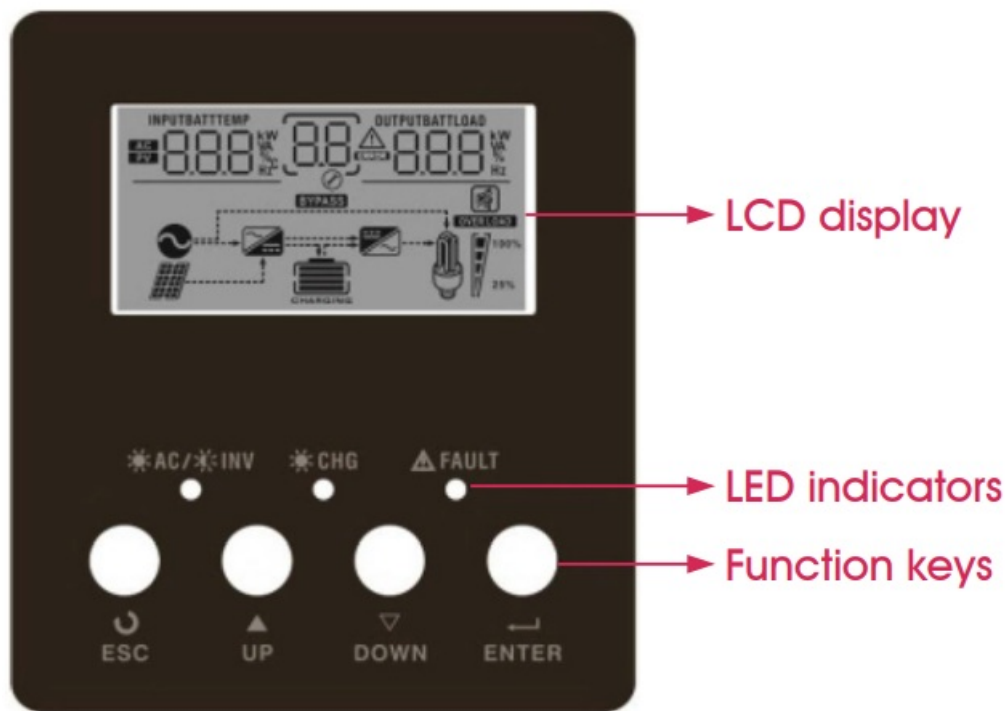
LED Indicator

Led indicator			Messages
☀AC / ☀INV	Green	Solid ON*	Outputis powsred by utiity in Line mode.
		Floshing	Outputis powered by battery o PV in battery mode.
☀ CHG	Green	Solid ON	Battery is fully charged.
		Floshing	Batfery i charging.
⚠ FAULT	Red	Solid ON	Fault occurs in the inverter.
		Floshing	Waming condifion occurs in the inverter.

Function KEVs

Function Key	Description
ESC	To exitseffing mode.
UP	To go fo previous selection.
DOWN	To go fo next sefection.
ENTER	To confim the selection in seffing mode or enter seffing mode.
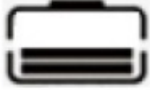
6.3 LCD Display Icons
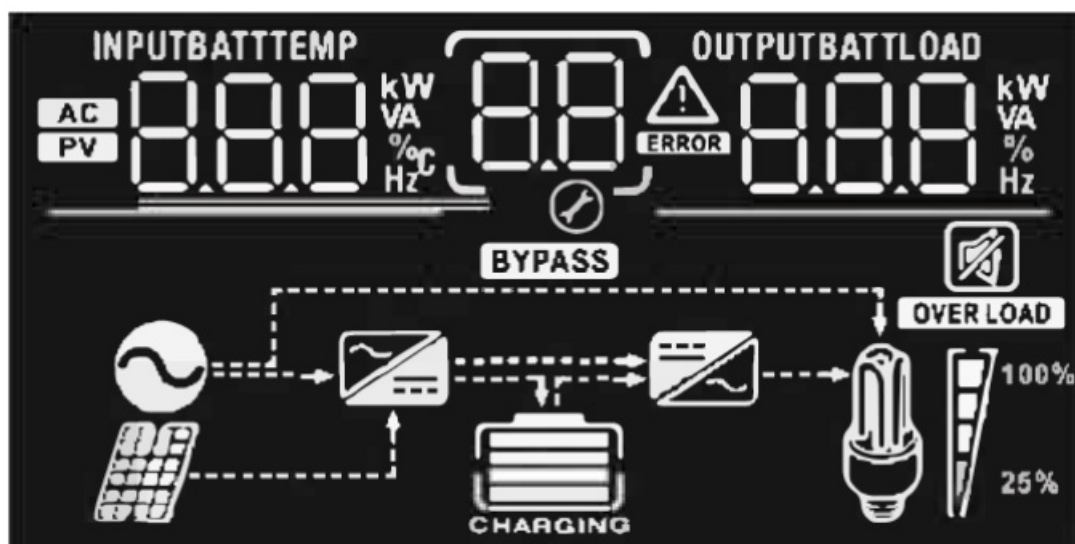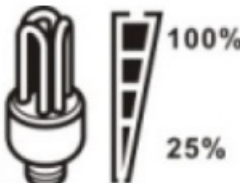
Icon	Function description
Input source information	
AC	Indicates the AC input.
PV	Indicates the PV input.
INPUTBATT 8.8.8 kW VA %°C Hz	Indicate input voltage, input frequency, PV voltage, battery voltage and charger current.
Configuration program and fault information	
88 ⊘	Indicates the setting programs.
88 ⚠ ERROR	Indicates the warning and fault codes. **Warning:** 88 ⚠ flashing with warning code. **Fault:** 88 ERROR lighting with fault code.
Output information	

OUTPUTBATTLOAD **8.8.8** kW VA % Hz	Indicate output voltage, output frequency, load percent, load in VA, load in Watt and discharging current.
Battey information	
CHARGING	Indicates battery level by 0-24%, 25-49%, 50-74% and 75-100% in battery mode and charging status in line mode.

In AC mode, it will present battery charging status.

Status	Battery voltage	LCD Display
Constant current mode / Constant voltage mode	<2V/cell	4 bars will flash in turns.
	2 ~ 2.083V/cell	Bottom bar will be on and the other three bars will flash in turns.
	2.083 ~ 2.167V/cell	Bottom two bars will be on and the other two bars will flash in turns.
	2.167V/cell	Bottom three bars will be on and the top bar will flash.
Floating mode. Batteries are fully charged.		4 bars will be on.

In battery mode, it will present battery capacity.		
Load percentage	**Battery voltage**	**LCD Display**
Load>50%	<1.717V/cell	
	1.717V/cell ~ 1.8V/cell	
	1.8 ~ 1.883V /cell	
	>1.883 V /cell	
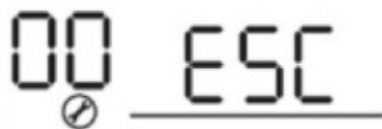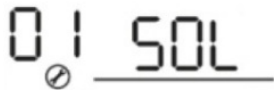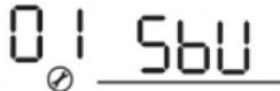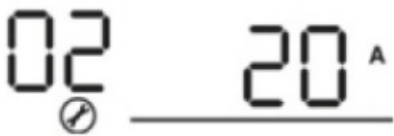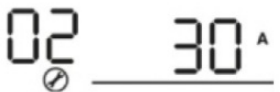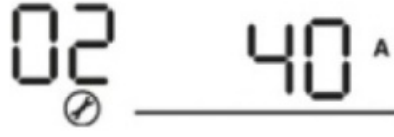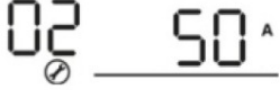
50%>Load >20%	<1.817V/cell	
	1.817V/cell ~ 1.9V/cell	
	1.9 ~ 1.983V/cell	
	>1.983	
Load<20%	<1.867V /cell	
	1.867V/cell ~ 1.95V/cell	
	1.95 ~ 2.033V/cell	
	>2.033	

Load information	
OVER LOAD	Indicates overload.

	Indicates the load level by 0-24%, 25-50%, 50-74% and 75-100%.			
100% 25%	0%~25%	25%~50%	50%~75%	75%~100%

Mode operation information	
	Indicates unit connects to the mains.
	Indicates unit connects to the PV panel.
BYPASS	Indicates load is supplied by utility power.
	Indicates the utility charger circuit is working.
	Indicates the DC/AC inverter circuit is working.

Mute operation	
	Indicates unit alarm is disabled.

6.4 LCD Settings

After pressing and holding ENTER button far 3 seconds, the unit will enter seffing mode. Press "UP" or "DOWN' button to select seffing programs. And hen, press "ENTER" button fo confirm the selection or ESC bution to ext.

Setting Programs		
Program	Description	Selectable option

00	Exit setting mode	Escape 00 ESC	
01	Output source priority: To configure load power source priority	Solar first 01 SOL	Solar energy provides power to the loads as first priority. If solar energy is not sufficient to power all connected loads, battery energy will supply power the loads at the same time. Utility provides power to the loads only when any one condition happens: – Solar energy is not available – Battery voltage drops to low-level warning voltage or the setting point in program 12.
		Utility first (default) 01 UtI	Utility will provide power to the loads as first priority. Solar and battery energy will provide power to the loads only when utility power is not available.
		SBU priority 01 SbU	Solar energy provides power to the loads as first priority. If solar energy is not sufficient to power all connected loads, battery energy will supply power to the loads at the same time. Utility provides power to the loads only when battery voltage drops to either low-level warning voltage or the setting point in program 12.
02	Maximum charging current: To configure total charging current far solar and utility chargers. (Max. charging current = utility charging current + solar charging current)	10A (Only available far PDA1500-STATION (12 V) model) 02 10 A	20A 02 20 A
		30A 02 30 A	40A 02 40 A
		50A 02 50 A	60A 02 60 A

		70A	80A (Only for PDA3000-STATION model)
		02 70 A	02 80 A

Setting Programs		

Program	Description	Selectable option	
03	AC input voltage range	Appliances (default) 03 APL	If selected, acceptable AC input voltage range will be within 90-280VAC.
		UPS 03 UPS	If selected, acceptable AC input voltage range will be within 170-280VAC.
04	Power saving mode enable/disable	Saving mode disable (default) 04 SdS	If disabled, no matter connected load is low or high, the on/off status of inverter output will not be effected.
		Saving mode enable 04 SEn	If enabled, the output of inverter will be off when connected load is pretty low or not detected.
05	Battery type	AGM (default) 05 AGn	Flooded 05 FLd
		User-Defined 05 USE	If "User-Defined" is selected, battery charge voltage and low DC cut-off voltage can be set up in program 26, 27 and 29.
06	Auto restart when overload occurs	Restart disable (default) 06 Ltd	Restart enable 06 LtE

07	Auto restart when over temperature occurs	Restart disable (default) 07 ttd	Restart enable 07 ttE
09	Output frequency	50Hz (default) 09 50 Hz	60Hz 09 60 Hz

11	Maximum utility charging current. Note: If setting value in program 02 is smaller than that in program in 11, the inverter will apply charging current from program 02 for utility charger.	Available options in PDA1500-STATION (12V) model:
		10A 11 10A $\qquad$ 20A (default) 11 20A
		Available options in PDA1500-STATION (24V) / PDA3000-STATION model:
		20A 11 20A $\qquad$ 30A (default) 11 30A

Setting Programs		
Program	Description	Selectable option
		Available options in PDA1500-STATION (12V) model:

11.0V	11.3V
12 BATT **110** v	**12** BATT **113** v
11.5V (default)	11.8V
12 BATT **115** v	**12** BATT **118** v
12.0V	12.3V
12 BATT **120** v	**12** BATT **123** v
12.5V	12.8V
12 BATT **125** v	**12** BATT **128** v

Available options in PDA1500-STATION (24V) / PDA3000-STATION model:

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12 — Setting voltage point back to utility source when selecting "SBU priority" or "Solar first" in program 01.

	22.0V **BATT** 12 22.0 v	22.5V **BATT** 12 22.5 v
	23.0V (default) **BATT** 12 23.0 v	23.5V **BATT** 12 23.5 v
	24.0V **BATT** 12 24.0 v	24.5V **BATT** 12 24.5 v
	25.0V **BATT** 12 25.0 v	25.5V **BATT** 12 25.5 v

13	Setting voltage point back to battery mode when selecting "SBU priority" or "Solar first" in program 01.	Available options in PDA1500-STATION (12V) model:
		Battery fully charged **BATT** 13 FUL | 12.0V **BATT** 13 12.0 v
		12.3V **BATT** 13 12.3 v | 12.5V **BATT** 13 12.5 v
		12.8V **BATT** 13 12.8 v | 13.0V **BATT** 13 13.0 v

Setting Programs	

Program	Description	Selectable option	
		13.3V ![13.3V BATT display]	13.5V (default) ![13.5V BATT display]
		13.8V ![13.8V BATT display]	14.0V ![14.0V BATT display]
		14.3V ![14.3V BATT display]	14.5V ![14.5V BATT display]
13	Setting voltage point back to battery mode when selecting "SBU priority" or "Solar first" in program 01.	Available options in PDA1500-STATION (24V) / PDA3000-STATION model:	

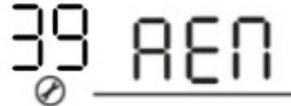| Battery fully charged	24V
13 FUL BATT	13 24.0 BATT v
24.5V	25V
13 24.5 BATT v	13 25.0 BATT v
25.5V	25V
13 25.5 BATT v	13 26.0 BATT v
26.5V	27V (default)
13 26.5 BATT v	13 27.0 BATT v
27.5V	28V
13 27.5 BATT v	13 28.0 BATT v
28.5V	28V
13 28.5 BATT v	13 29.0 BATT v

Setting Programs		
Program	Description	Selectable option
16	Charger source priority: To configure charger source priority	If this inverter/charger is working in Line, Standby or Fault mode, charger source can be programmed as below:

Solar first **16 CSO**		Solar energy will charge battery as first priority. Utility will charge battery only when solar energy is not available.
Utility first **16 CUt**		Utility will charge battery as first priority. Solar energy will charge battery only when utility power is not available.
Solar and Utility **16 SNU**		Solar energy and utility will charge battery at the same time.
Only Solar **16 OSO**		Solar energy will be the only charger source no matter utility is available or not.

If this inverter/charger is working in Battery mode or Power saving mode, only solar energy can charge battery. Solar energy will charge battery if it's available and sufficient.

Program	Description	Selectable option	
18	Alarm control	Alarm on (default) **18 bON**	Alarm off **18 bOF**
19	Auto return to default display screen	Return to default display screen (default) **19 ESP**	If selected, no matter how users switch display screen, it will automatically return to default display screen (Input voltage / output voltage) after no button is pressed for 1 minute.
20	Backlight control	Stay at latest screen **19 ⊢EP**	If selected, the display screen will stay at latest screen user finally switches.
22	Beeps while primary source is interrupted	Backlight on (default) **20 LON**	Backlight off **20 LOF**
		Alarm on (default) **22 AON**	Alarm off **22 AOF**

Setting Programs		
Program	Description	Selectable option
23	Overload bypass: When enabled, the unit will transfer to line mode if overload occurs in battery mode.	Bypass disable (default) 23 byd Bypass enable 23 byE
25	Record fault code	Record enable 25 FEn Record disable (default) 25 FdS
26	Buk charging voliage (CV votage)	PDA1500-STATION (12V) model default setting: 14.1V Cu 26 14.1v BATT PDA1500-STATION (24V) / PDA3000-STATION model default setting: 28.2V Cu 26 28.2v BATT If self-defined is selected in program 5, this program can be set up. Setting range is from 12.0V to 14.6V for PDA1500-STATION (12V) model, 24.0V to 29.2V for PDA3000-STATION model. Increment of each click is 0.1V.
27	Floating charging voltage	PDA1500-STATION (12V) model default setting: 13.5V FLu 27 13.5v BATT PDA1500-STATION (24V) / PDA3000-STATION model default setting: 27.0V FLu 27 27.0v BATT If self-defined is selected in program 5, this program can be set up. Setting range is from 12.0V to 14.6V for PDA1500-STATION (12V) model: 24.0V to 29.2V for PDA1500-STATION (24V) / PDA3000-STATION model Increment of each click is 0.1V.

29	Low DC cut-off voltage	PDA1500-STATION (12V) model default setting: 10.5V COᵁ 29 BATT 105V PDA1500-STATION (24V) / PDA3000-STATION model default setting: 21.0V COᵁ 29 BATT 21.0V
		If self-defined is selected in program 5, this program can be set up. Setting range is from 10.0V to 12.0V for PDA1500-STATION (12V) model, 20.0V to 24.0V for PDA1500-STATION (24V) / PDA3000-STATION model. Increment of each click is 0.1V. Low DC cut-off voltage will be fixed to setting value no matter what percentage of load is connected.

Setting Programs		
Program	Description	Selectable option
33	Battery equalization	33 EEn 33 EdS
		If "Flooded" or "User-Defined" is selected in program 05, this program can be set up.
34	Battery equalization voltage	PDA1500-STATION (12V) model default setting: 14.6V Eᵁ 34 BATT 14.6V Setting range is from 12.5V to 15V. Increment of each click is 0.1V. PDA1500-STATION (24V) / PDA3000-STATION model default setting: 29.2V Eᵁ 34 BATT 29.2V Setting range is from 25.0V to 30V. Increment of each click is 0.1V.
35	Battery equalized time	Setting range is from 5min to 900min. Increment of each click is 5min.

36	Battery equalized timeout	60min (default) 35 60	Setting range is from 5min to 900 min. Increment of each click is 5 min.
37	Equalization interval	120min (default) 36 120	Setting range is from 0 to 90 days. Increment of each click is 1 day
39	Equalization activated immediately	30 days (default) 37 30d	Disable (default) 36 AdS

If _____ ed in program 30, this program can b _____ d in this program, it's to actívate batt e _____ nd LCD main page will shows E9 . If" _____ cel equalization function until next activated equalization time arrives based on program 35 setting. At this time, E9 will not be shown in LCD main page.

(Enable 39 AEn)

6.5 Display Settings

The LCD display informion will be switched in fums by pressing "UP* or DOWN" key. The seleciable information is swiiched as below order: input voliage, input frequency. PV voliage, charging current, battery voltage, output vattage, output frequency, load percentage load in Watl, load in VA load in Wat, DC discharging curren, main CPU Version and second CPU Version.
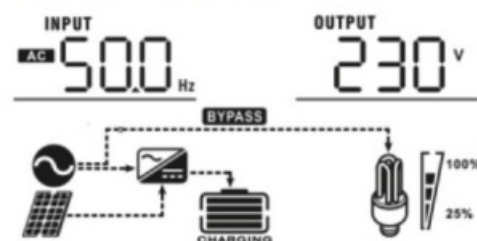
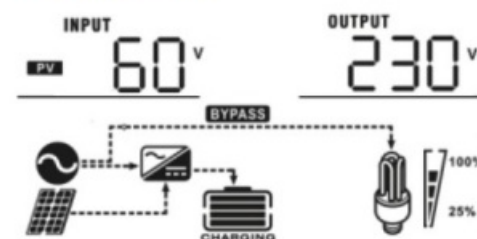| Selectable information	LCD display
Input voltage/Output voltage (Default Display Screen)	
Input frequency	
PV voltage	
Charging current	
Battery voltage/DC discharging current	

Output frequency

Input Voltage=230V, output voltage=230V
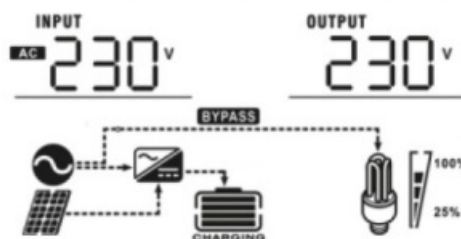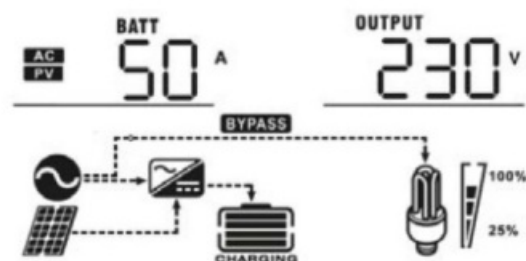

Input frequency=50Hz
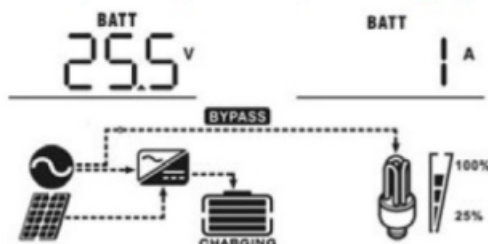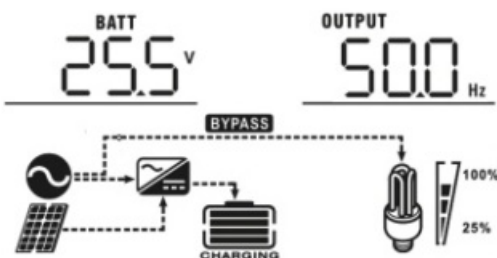

PV voltage=60V

Charging current=50A

Battery voltage=25.5V, discharging current=1A

Output frequency=50Hz

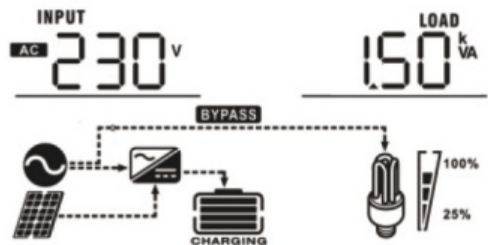| Selectable information	LCD display
Load percentage	
Load in VA	
Load in Watt	

Load percent=70%
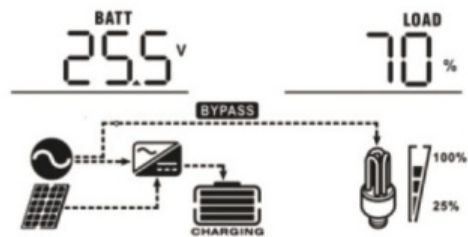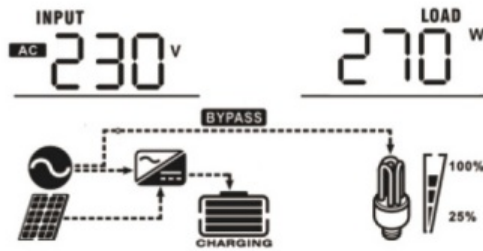

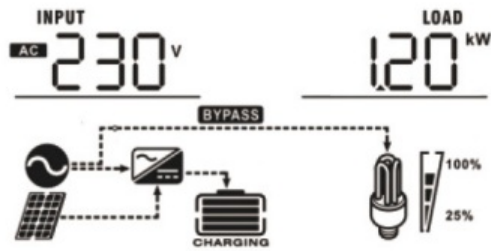When connected load is lower than 1kVA, load in VA will present xxxVA like below chart.
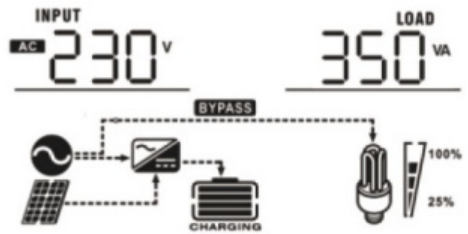
When load is larger than 1kVA (≥1KVA), load in VA will present x.xkVA like below chart.

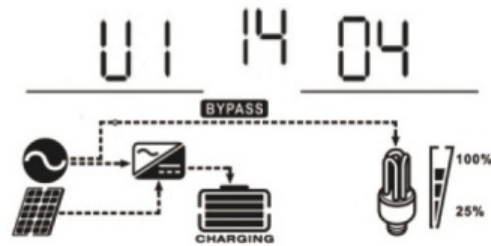|	
	When load is lower than 1kW, load in W will present xxxW like below chart.
	INPUT **230** v LOAD **270** W BYPASS 100% 25% CHARGING
	When load is larger than 1kW(≥1kW), load in W will present x.xkW like below chart.
	INPUT **230** v LOAD **1.20** kW BYPASS 100% 25% CHARGING
Main CPU version checking	Main CPU version 00014.04. U1 14 04 BYPASS 100% 25% CHARGING

6.6 Operating mode descritption

Operation mode	Description	LCD display
Standby mode / **Power saving mode** **Note:** * **Standby mode:** The inverter is not turned on yet but at this time, the inverter can charge battery without AC output. * **Power saving mode:** If enabled, the output of inverter will be off when connected load is pretty low or not detected.	No output is supplied by the unit but it still can charge batteries.	Charging by utility and PV energy. Charging by utility. Charging by PV energy. No charging. Charging by utility and PV energy. Charging by utility. Charging by PV energy.
Fault mode Note: * **Fault mode:** Errors are caused		

by inside circuit error or external reasons such as over temperature, output short circuited and so on.	PV energy and utility can charge batteries.	

by inside circuit error or external reasons such as over temperature, output short circuited and so on.

PV energy and utility can charge batteries.

Operation mode	Description	LCD display
Fault mode Note: * **Fault mode:** Errors are caused by inside circuit error or external reasons such as over temperature, output short circuited and so on.	PV energy and utility can charge batteries.	No charging
	Utility can power loads when the unit starts up without battery.	
Line Mode	The unit will provide output power from the mains. It will also charge the battery at line mode.	Power from utility
Battery mode	The unit will provide output power from battery and PV power.	Charging by utility and PV energy. Charging by utility Power from battery and PV energy. Power from battery only.

Battery equalization description
Equalizaion funciion is added info charge controller.f reverses fhe buidup of negaive cherical effects like shaification, a condifion where acid concentration is redter at he botiom of the battery than af the fop. Equalizaiion also helps fo remove sulfate crystals that might have bt up on the plates. If eft unchecked, this condifion, called sufiation, will reduce the overall capacily of the bttery. Therefore, ifs recommended fo equalze battery perodicaly."
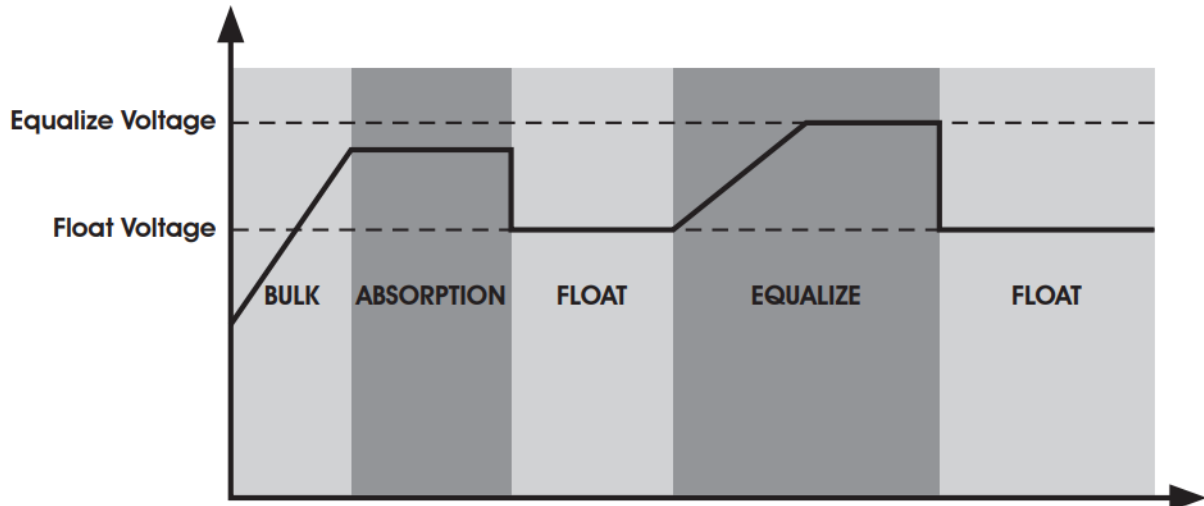
How to apply equalization funcfion

You must enable battery equalization funcfion in monitoring LCD seting program 30 fis. Then, you may apply his funclion in device by either one of following methods:

1. Sefiing equaiization inferval in program 35.
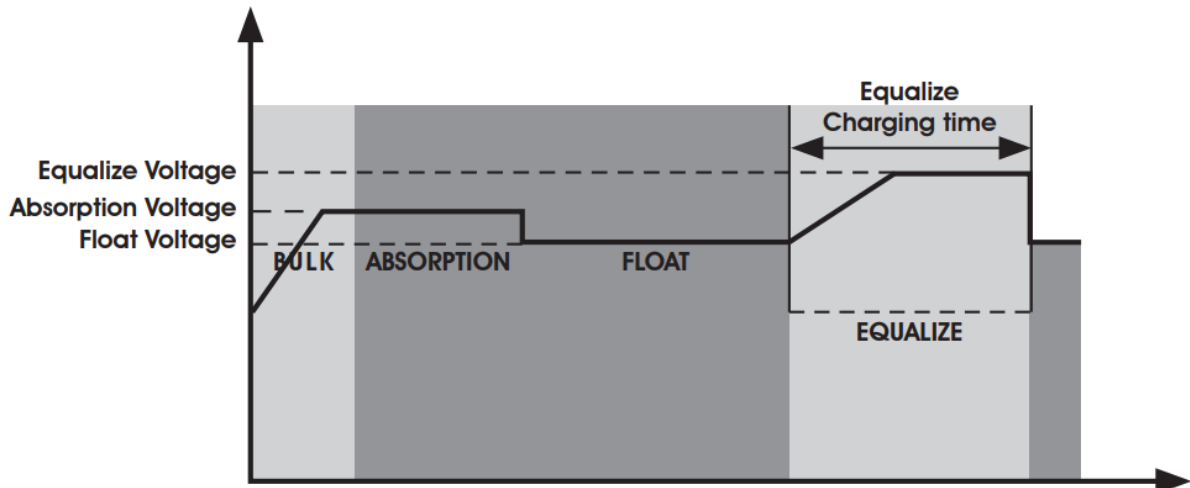
2. Aciive equaization immediately in program 36.

When fo equalizer

In float siage, when e sefiing equaization interval (oattery equaiization cyce) is anived. or equalization is active inmediately, ihe controller il start fo enter Equalize stage.


Equalize charging fime and fimeout

In Equaiize siage, the controller wil supply power fo charge battery as much as possible unii battery volfage taises to batiery equalization voliage. Then, constantvottage regulafion is applied fo maintain battery volfage atthe battery equalzaion votiage. The bttery willemain in the Equalize stage uniilsetiing batery equalized time is arived.

However, in Equaiize stage, when batiery equaized fime is expired and batiery voliage doesnt ise fo batery equalization voliage point, ihe charge conrallerwill xtend the batiery equaized fime unfil battery voliage achieves battery equalization vofiage. If batiery voltage i sfl lower than battery equalizaion vofiage when battery equalized fimeout sefiing is over, the charge controller wil stop equalization and return fo float stage.
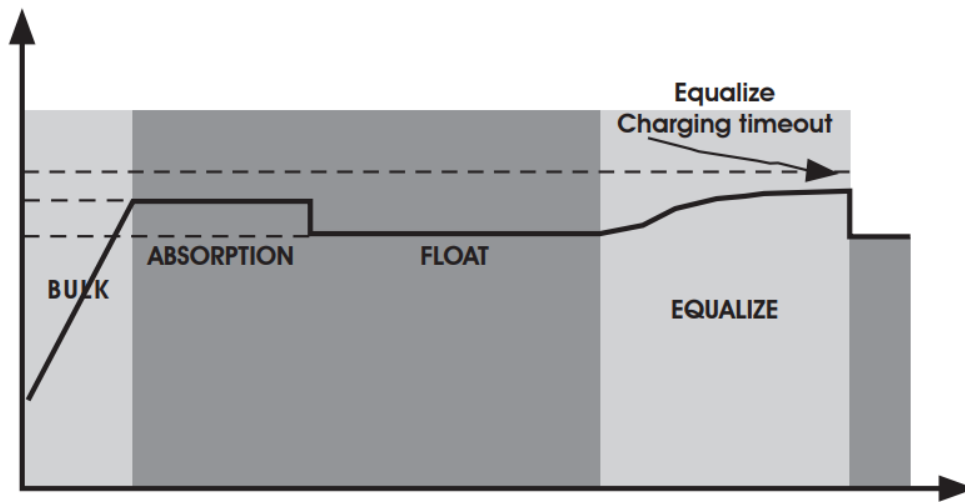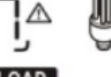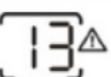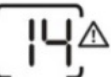
6.7 Fault reference code

Fault code	Fault Event	Icon on
01	Fan is locked when inverter is OFF.	
02	Over temperature.	
03	Battery voltage is tooo high.	
04	Battery voltage is too low.	
05	Output short circuited ar over temperature is detected by internal converter components.	
06	Output voltage is abnormal.	
07	Overload time out.	
08	Bus voltage is tooo high.	
09	Bus soft start failed.	

11	Main relay failed.	01 ERROR
		02 ERROR
		03 ERROR
		04 ERROR
		05 ERROR
		06 ERROR
		07 ERROR
		08 ERROR
		09 ERROR
		11 ERROR

6.8 Warning indicator flashing

Warning code	Warning event	Audible alarm	Icon flashing
01	Fan is locked when inverter is ON .	Beep three times every second.	
03	Battery is over-charged.	Beep once every second.	
04	Low battery.	Beep once every second.	
07	Overload.	Beep once every 0.5 second.	
10	Output power derating.	Beep twice every 3 seconds.	
12	Solar charger stops due to low battery.		
13	Solar charger stops due to high PV voltage.		
14	Solar charger stops due to overload.		
E9	Battery equalization		

SPECIFICATIONS

Table 1- Line mode specifications
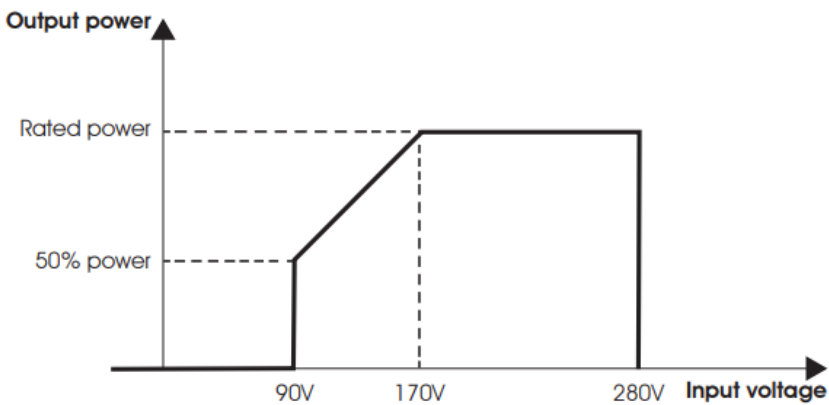
Inverter model	PDA1500-STATION		PDA3000-STATION
Input voltage	12V	24V	24V
Input voltage waveform	Sinusoidal (utility or generator)		
Nominal input voltage	230Vac		
Low loss voltage	170Vac±7V (UPS); 90Vac±7V (Appliances)		
Low loss return voltage	180Vac±7V (UPS); 100Vac±7V (Appliances)		
High loss voltage	280Vac±7V		
High loss return voltage	270Vac±7V		
Max AC input voltage	300Vac		
Nominal input frequency	50Hz / 60Hz (Auto detection)		
Low loss frequency	40±1Hz		
Low loss return frequency	42±1Hz		
High loss frequency	65±1Hz		
High loss return frequency	63±1Hz		
Output short circuit protection	Circuit Breaker		
Efficiency (Line mode)	95% (Rated R load, battery full charged)		
Transfer time	10ms typical (UPS); 20ms typical (Appliances)		
Output power derating: When AC input voltage drops to 170 V, the output power will be derated.			

Table 2 – Inverter mode specifications

Inverter model	PDA1500-STATION		PDA3000-STATION
Nominal DC input voltage	12V	24V	24V
Rated output power	1200W		2400W
Output voltage waveform	Pure sine wave		
Output voltage regulation	230Vac±5%		
Output frequency	50Hz		
Peak efficiency	95%		
Overload protection	5s@≥c150% load; 10s@110%~150% load		
Surge capacity	2*rated power for 5 seconds		
Cold start voltage	11.5Vdc	23.0Vdc	
Low DC Warning voltage			
@load<20%	11.0Vdc	22.0Vdc	
@20%≤load<50%	10.7Vdc	21.4Vdc	
@load≥50%	10.1Vdc	20.2Vdc	
Low DC Warning return voltage			
@load<20%	10.5Vdc	21.0Vdc	
@20%≤load<50%	10.2Vdc	20.4Vdc	
@load≥50%	9.6Vdc	19.2Vdc	
High DC cut-off voltage	15.5Vdc	31.0Vdc	
No load power consumption	<15W		<20W
Saving mode power consumption	<5W		<10W

Table 3 – Inverter mode specifications
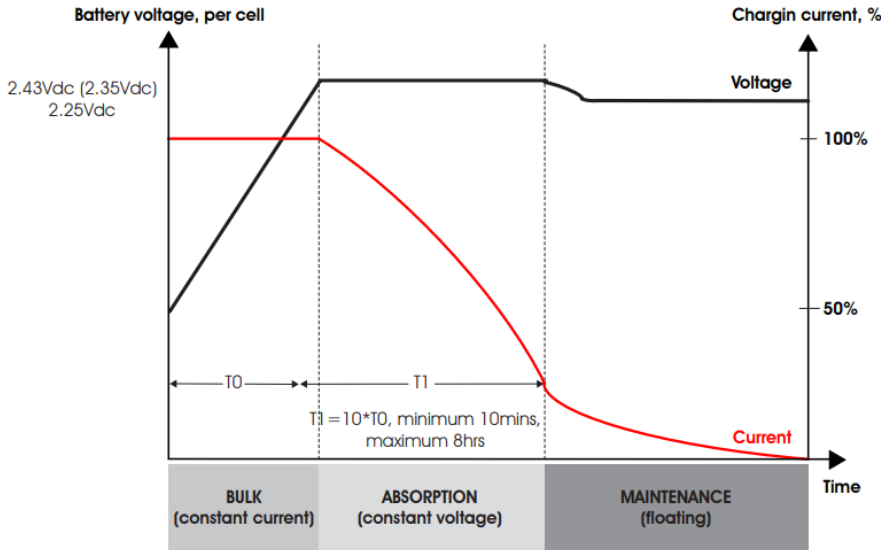
Inverter model	PDA1500-STATION		PDA3000-STATION
Nominal DC input voltage	12V	24V	24V
Charging algorithm	3-step		
AC Charging current	10/20Amp	20/30Amp (@VI/P=230Vac)	
Bulk charging voltage	Flooded battery	14.6	29.2
	AGM / Gel battery	14.1	28.2
Floating charging voltage	13.5Vdc	27Vdc	
Charging curve			

Table 4 – General specifications

Inverter model	PDA1500-STATION		PDA3000-STATION
Rated out power	12V	24V	24V
Max. current	40A max.		
Max. PV array open circuit voltage	102V		
MPPT operating voltage range	17-80V	30-80V	
Max. charging current (utility charging + solar charging)	60A	70A	

TROUBLE SHOOTING

Problem	LCD / LED / Buzzer	Explanation / Possible cause	What to do

Unit shuts down automatically during startup process.	LCD/LEDs and buzzer will be active for 3 seconds and then complete off.	The battery voltage is too low (<1.91V/Cell) .	1. Re-charge battery. 2. Replace battery.
No response after power on.	No indication.	1. The battery voltage is far too low. (<1.4V/Cell) 2. Battery polarity is connected reversed.	1. Check if batteries and the wiring are connected well. 2. Re-charge battery. 3. Replace battery.
Mains exist but the unit works in battery mode.	Input voltage is displayed as 0 on the LCD and green LED is flashing.	Input protector is tripped.	Check if AC breaker is tripped and AC wiring is connected well.
	Green LED is flashing.	Insufficient quality of AC power. (Shore or Generator).	1. Check if AC wires are too thin and/or too long. 2 Check if generator (if applied) is working well or if input voltage range setting is correct. (UPS ⟶ Appliance)
	Green LED is flashing.	Set "Solar First" as the priority of outout source.	Change output source priority to Utility first.
When the unit is turned on, internal relay is switched on and off repeatedly.	LCD display and LEDs are flashing.	Battery is disconnected.	Check if battery wires are connected well.
Buzzer beeps continuously and red LED is on.	Fault code 07.	Overload error. The inverter is overload 110% and time is up.	Reduce the connected load by switching off some equipment.
	Fault code 05.	Output short circuited.	Check if wiring is connected well an remove abnormal load.
		Temperature of internal converter component is over 120ºC.	Check whether the air flow of the unit is blocked or whether the ambient temperature is too high.
	Fault code 02.	Internal temperature of inverter component is over 100ºC.	
	Fault code 03.	Battery is over-charged.	Return to repair center.
		The battery voltage is too high.	Check if spec and quantity of batteries are meet requirements.
	Fault code 01.	Fan fault.	Replace the fan.
	Fault code 06.	Output abnormal (inverter voltage below than 190Vac or is higher than 260VAC).	1. Reduce the connected load. 2. Return to reoair center.
	Fault code 08/09.	Internal components failed.	Return to repair center.

APPENDIX: Approximate Back-up Time Table

Model	Load (VA)	Backup Time @ 12Vdc 100Ah (min)	Backup Time @ 12Vdc 200Ah (min)
PDA1500-STATION (12V)	100	766	1610
	200	335	766
	300	198	503
	400	139	339
	500	1112	269
	600	95	227
	700	81	176
	800	62	140
	900	55	125
	1000	50	112
PDA1500-STATION (24V) PDA3000-STATION	300	449	1100
	600	222	525
	900	124	303
	1200	95	227
	1500	68	164
	1800	56	126
	2100	48	108
	2400	35	94
	2700	31	74
	3000	28	67

Note: Backup fime depends on the qualify of the battery, age of battery and fype of battery.
Specifications of batteries may vary depending on different monufacturers.

Documents / Resources

	fullwat PDA3000 Series Power DC AC Inverter [pdf] Instructions PDA3000 Series Power DC AC Inverter, PDA3000 Series, Power DC AC Inverter, AC Inverter, Inverter

References

- 🌐 **FULLWAT - Fabricante de iluminación led, conversores y acumuladores de energía**