MPPT Solar Inverter User Manual

ELEGO-STAR-6.5KW



Version: UM-ELEGO-STAR01001

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Revision History

Version	Date	Description
UM-ELEGO-STAR01001	2024.12.02	First official release.

Information on this Manual

Validity

This manual is valid for the following devices: ELEGO-STAR-6.5KW

Scope

This manual provides the installation, operation and troubleshooting of this unit, please read this manual carefully before installations and operations.

Target Group

For qualified persons and end users. Qualified persons and end users must have the following skills:

- Knowledge about this unit's operation
- Training on security issues associated with installations and electrical safety
- Training in the installation and commissioning of electrical devices and installations.
- Knowledge of the applicable local standards and directives.

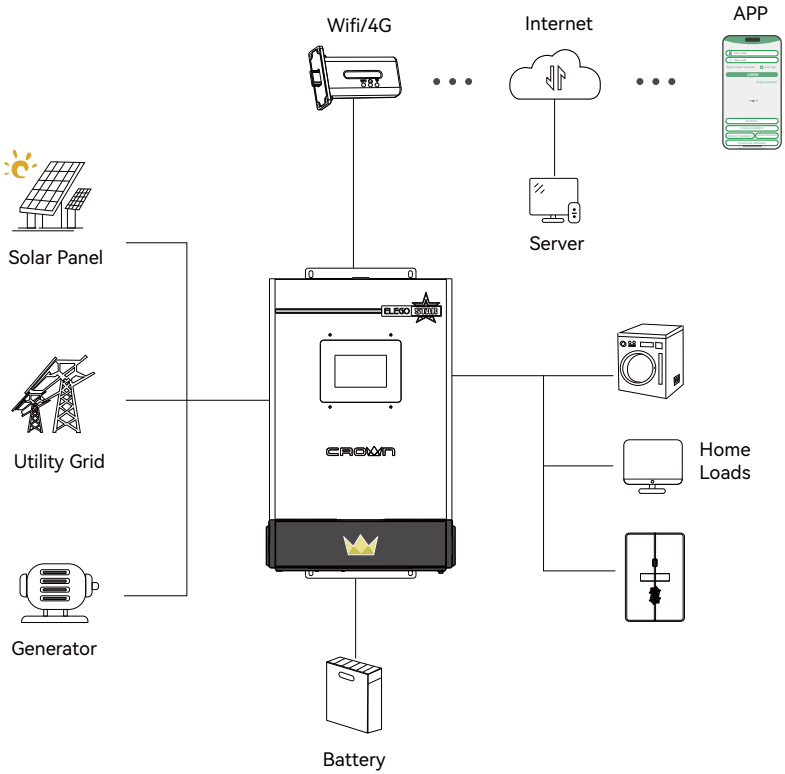
Safety Instructions

WARNING: This chapter contains important safety and operating instructions. Read and keep this manual for future reference.

- All operations and connections need to be carried out by qualified persons.
- Before using the unit, read all instructions and cautionary markings on the unit. Any damage caused by inappropriate operation is not warranted by Crown Micro.
- All the electrical installations must comply with the local electrical safety standards.
- Do not disassemble the unit. Take it to a qualified service center when service or repair is required, incorrect re-assembly may result in a risk of electric shock or fire. Do not open inverter cover or change any components without Crown Micro authorization, otherwise the warranty commitment for the inverter will be invalid.
- To reduce risk of electric shock, disconnect all wirings before attempting any maintenance or cleaning. Turning off the unit will not reduce this risk.
- CAUTION-To reduce risk of injury, charge only deep-cycle lead-acid type rechargeable batteries and lithium batteries, other types of batteries may burst, causing personal injury and damage.
- NEVER charge a frozen battery.
- For optimum operation of this unit, please follow the required specifications in selecting the appropriate cable size and circuit breaker
- Please strictly follow installation procedure when you want to disconnect AC or DC terminals. Refer to the installation section of this manual for details.
- GROUNDING INSTRUCTIONS -This unit should be connected to a permanent grounded wiring system. Be sure to comply with local requirements and regulations when installing this inverter.
- Never short circuit the AC and DC outputs. Do not connect to the mains when the DC input is short circuited.

1. Brief Introduction

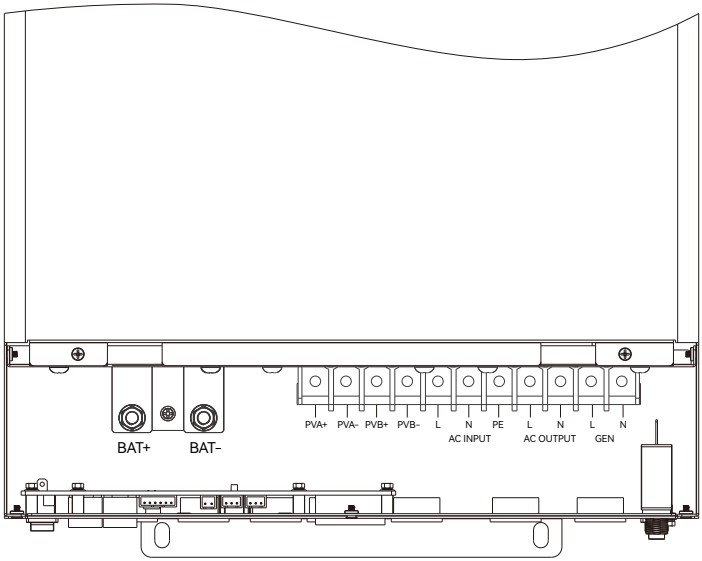
1.1 Features of the inverter

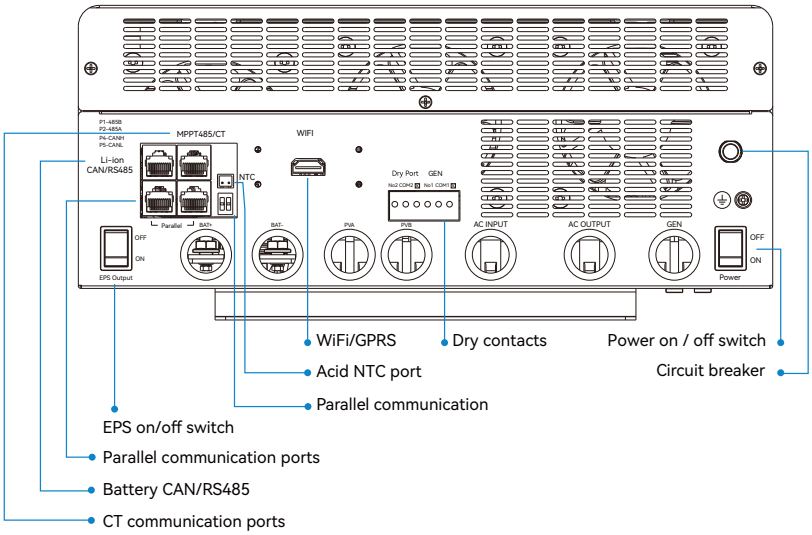


This is a multifunctional, high frequency pure sine wave hybrid solar inverter.

- Applicable for pure off grid inverter/backup power/self-consumption/ongrid situation.
- Integrated with 2 MPPT solar charge controllers, MPPT ranges 120V~400V.
- Rated power factor 1
- Able to run with or without battery connection
- With separated generator input interface, able to control generator remotely.
- Solar and utility grid can power loads at the same time.
- With integrated advanced parallel function. Up to 16 inverters connected in parallel.
- Support CAN/RS485 for Li-ion battery BMS communication.
- WIFI/GPRS remote monitoring, setting and firmware update, support website, free IOS/Android APP.

1.2 Interface of the inverter





1.3 Packing List

Before installation, please inspect the unit. Be sure that nothing inside the package is damaged.

You should have received the following items in the package:



ELEGO-STAR-6.5KW X1



Quick Installation Instruction X1



Expansion Screw and Tube X4



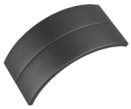
Cross Head Screw X5 / Nut X2



Wi-Fi Module X1



Parallel Communication cable L=2m X 1(grey)



Soft Magnetic Strip X1



1000:1 CT X1
(For STAR 6.5KW model only)

Storing the Inverter

The inverter must be stored appropriately if not installed immediately, refer to below figure.

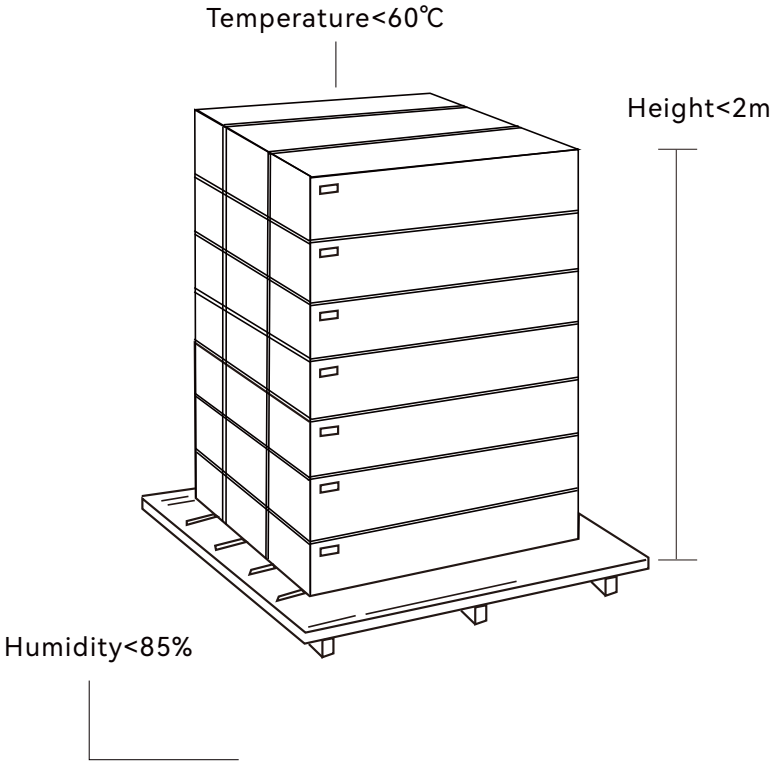
CAUTION

a) The inverter and its components must be stored in its original packaging.

b)The storage temperature should be within -25~60 and humidity within 0~85%.

c)The packing should be upright and maximum stacked layers is 8.

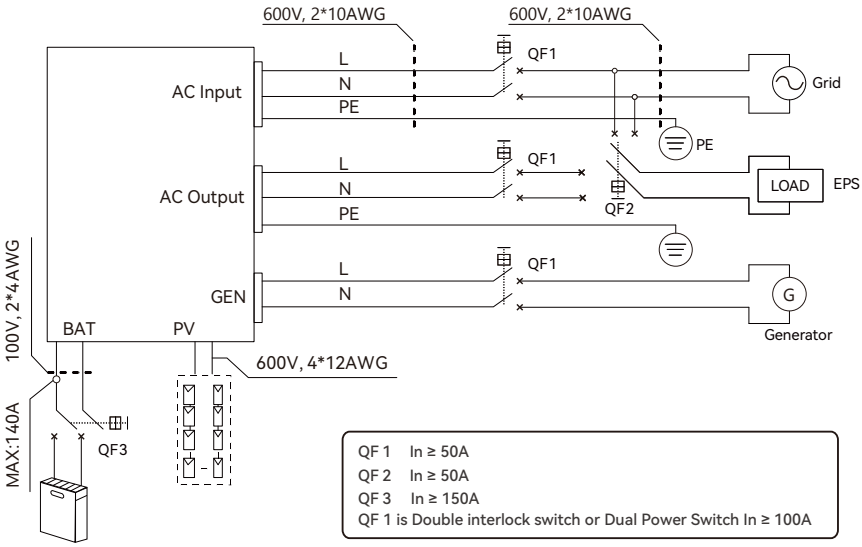
d)Do not directly exposed the inverter and its packaging to sunshine, raindrops and keep away from corrosion.


Temperature<60℃
Height<2m
Humidity<85%

2. Installation

2.1 Preparation

The system connection is as below:



Please prepare the breakers and cables in advanced before installation.

1. **Battery connection**: For safe operation and regulatory compliance, please install a separate DC over-current protector or disconnect device between battery and inverter. The recommended battery capacity is at least 200AH, the recommended spec of DC breaker is 200A/80V. Recommended battery cable and terminal size:

Model	Maximum Amperage	Battery capacity	Wire Size	Ring Terminal			Torque value	
				Cable mm²	Dimensions D (mm)	L (mm)		
ELEGO-STAR -6.5KW	140A	≥200AH	1/1AWG	42	6.4	39.2	4~5 N·m	

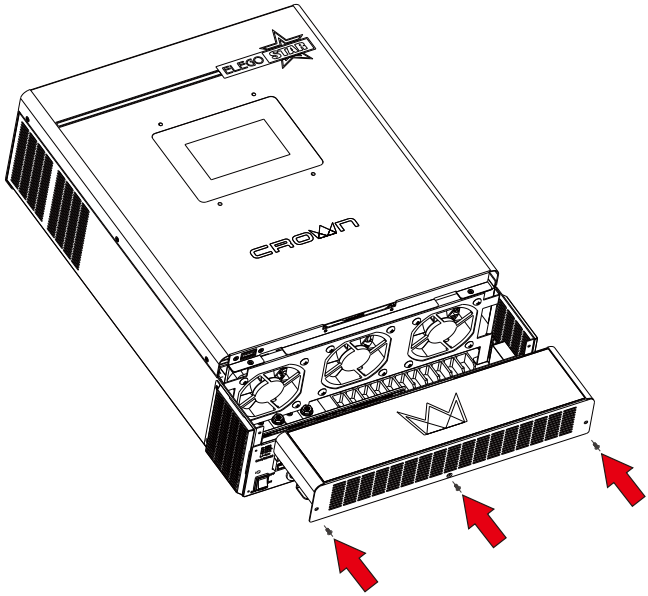
2. **AC connection:** Please install a separate AC breaker between inverter and AC input power source, inverter and AC output load. This will ensure the inverter can be securely disconnected during maintenance and fully protected from over current of AC input. The recommended spec of AC breaker is 50A. Recommended AC input/AC output/GEN cable size for each inverter.

Model	Gauge	Cable (mm²)	Torque Value
ELEGO-STAR-6.5KW	10AWG	6	2.0 N·m

3. **PV Connection:** Please install separately a DC circuit breaker between inverter and PV modules. The recommended of DC breaker is 600V/25A. It's very important for system safety and efficient operation to use the appropriate cable for PV module connection. To reduce risk of injury, please use the proper recommended cable size as below:

Model	Gauge	Cable (mm²)	Torque Value
ELEGO-STAR-6.5KW	1x10AWG	6	2.0 N·m

4. Before connecting all wiring, please take off bottom cover by removing 3 screws as shown below.



2.2 Mounting the Unit

NOTICE

Consider the following points before selecting where to install:

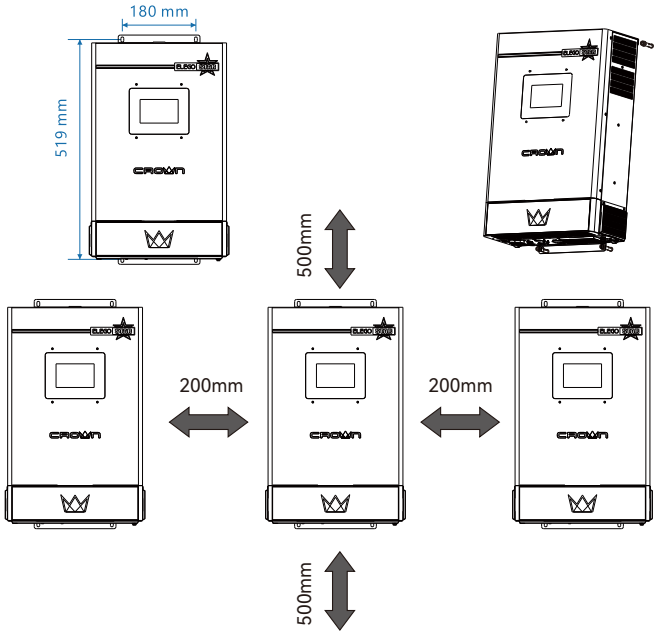
- Mount on a solid surface.
- Do not mount the inverter on flammable construction materials.
- For proper air circulation to dissipate heat, allow a clearance of approx. 20cm to the side and approx. 50cm above and below the unit.
- The ambient temperature should be between 0°C and 50°C to ensure optimal operation.
- The recommended installation position is to be adhered to the wall vertically.

Steps to mounting the unit

Step 1. Use the wall-mounting bracket as the template to mark the position of the 4 holes, then drill 8 mm holes and make sure the depth of the holes is deeper than 50mm.

Step 2. Install the expansion tubes into the holes and tight them, then use the expansion screws (packaged together with the expansion tubes) to install and fix the wall-mounting bracket on the wall.

Step 3. Install the inverter on the wall-mounting bracket and lock the inverter using the security screws.



2.3 Battery Connection

2.3.1 Battery Power Cable Connection

Note: For lead acid battery, the recommended charge current is 0.2C (C to battery capacity).

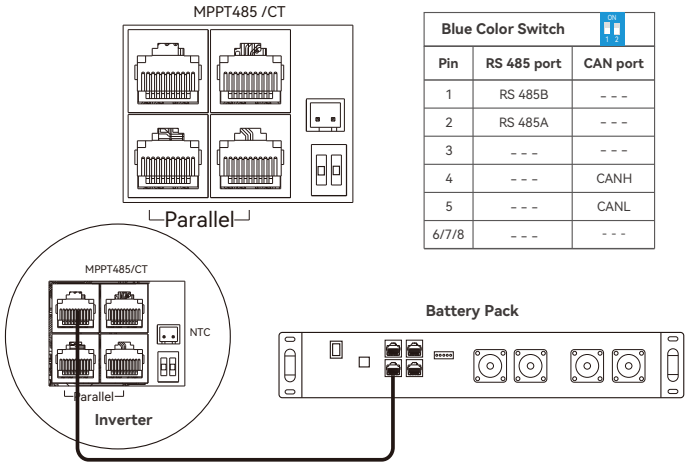
1. Please follow below steps to implement battery connection:
2. Assemble battery ring terminal based on recommended battery cable and terminal size.
3. Connect all battery packs as units requires. It's suggested to connect at least 200Ah capacity battery for ELEGO-STAR-6.5KW
4. Insert the ring terminal of battery cable flatly into battery connector of inverter and make sure the bolts are tightened with torque of 4~5N·m. Make sure polarity of the battery is correctly connected and ring terminals are tightly screwed to the battery terminals.

2.3.2 Lithium Battery Connection

If choosing lithium battery for ELEGO-STAR Series, please make sure the battery BMS is compatible with Crown Micro inverter. Please check the compatible list in the Crown Micro website.

Please follow below steps to implement lithium battery connection:

1. Connect power cable between inverter and battery
2. Connect the CAN or RS485 communication cable between inverter and battery. If you do not get the communication cable from inverter manufacturer or supplier, please make the cable according to the PIN definition
3. Lithium battery configuration, in order to communicate with battery BMS, you should set the battery type to" Li-ion" in Advanced page.



Blue Color Switch		
Pin	RS 485 port	CAN port
1	RS 485B	- - -
2	RS 485A	- - -
3	- - -	- - -
4	- - -	CANH
5	- - -	CANL
6/7/8	- - -	- - -

2.4 CT

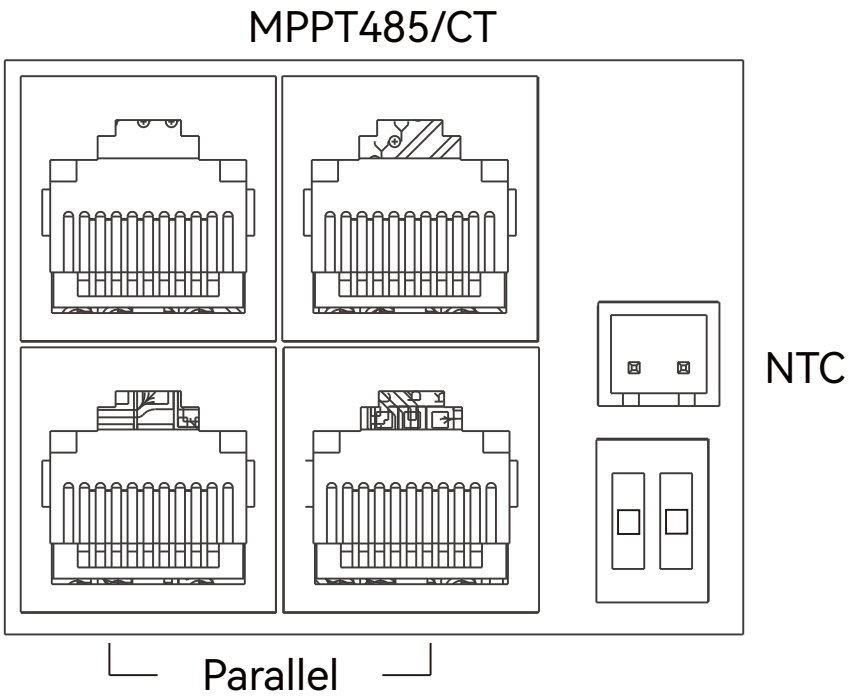
To measure the power imported from and exported to the grid, the CT must be installed at the service entry point in or near the main service panel. "External Grid CT" function is off by default, and if you need inverter to export power to compensate the grid loads, you can set "External Grid CT" function to "Enable" state. Please refer to section 4.0 LCD Settings for detected setting info.

CT Port Pin definitio

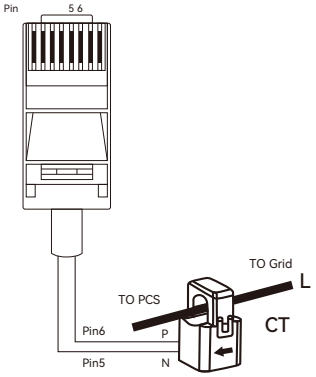
The CT interface for CT connection is a RJ45 port.

Pin	Description
	CT
1/3	B
2/4	A
5	CT1N
6	CT1P
7	B2
8	A2



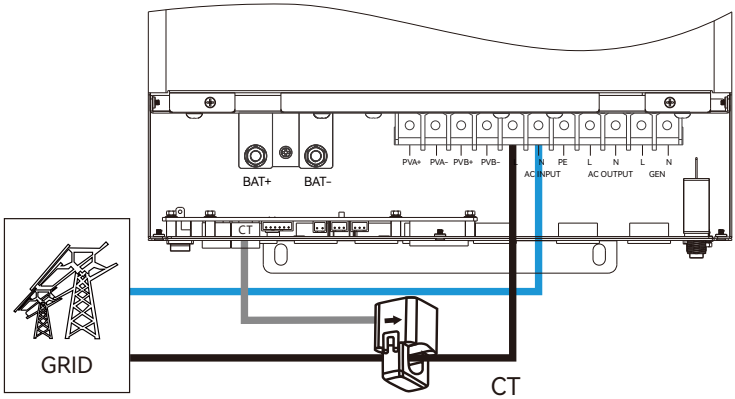


Please refer to the connection diagram for the correct positions of Grid CT and clamp the CT on the wires at the service entry point in the main service panel. The arrow on the CT is pointing to the inverter(*** Incorrectly install CT will cause The Display to show incorrect information and features of the inverter will not function correctly). If the CT is in a wrong direction, there is an option you can change the direction of the CT on your inverter call: CT Direction Reversed in Advanced Tab. You would not need to go change it physically.



CT Clamp Ratio

The inverter support 3 ratios of CT clamp–1000:1, 2000:1 and 3000:1. The CT ratio in the accessory bag is 1000:1. If you are using a 3rd party CT, please ensure the CT ratio is one of them, and select the correct CT ratio setting in the inverter monitor page or on the inverter LCD.



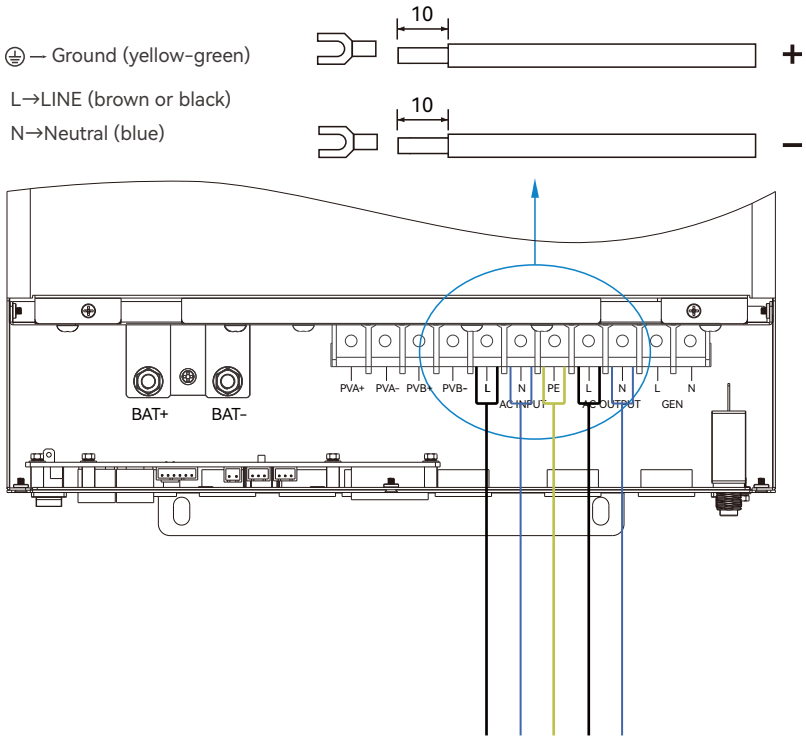
2.5 AC Input/Output Connection

CAUTION

- There are two terminal blocks with “IN” and “OUT” markings. Please do NOT mis-connect input and output connectors.
- Be sure to connect AC wires with correct polarity. If the L and N wires are connected in reverse, it may cause a short circuit when the inverters are connected in parallel.

Please follow the steps below to implement the AC input/output connection:

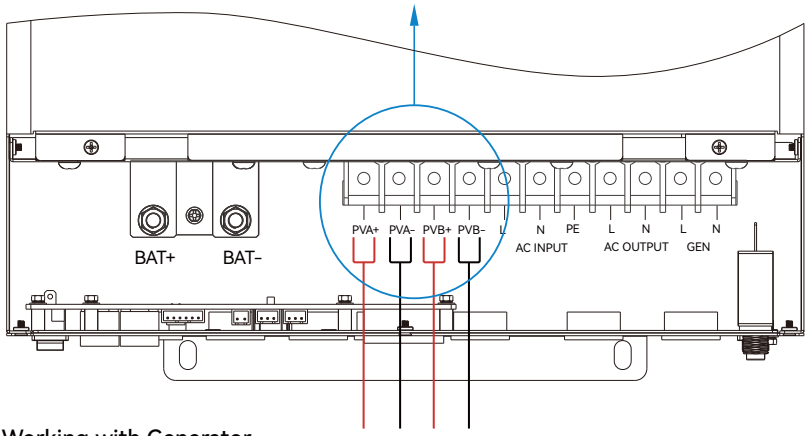
1. Before making the connection, ensure you open the DC protection device or disconnect it FIRST.
2. Remove 10mm of the insulation sleeve for the six conductors and shorten the L and N conductors by 3mm.
3. Insert AC input wires according to polarities indicated on terminal block and tighten the terminal screws. Be sure to connect PE protective conductor first.
4. Insert AC output wires according to polarities indicated on terminal block and tighten terminal screws. Be sure to connect PE protective conductor first.
5. Make sure the wires are securely connected.



2.6 PV Connection

Please follow below steps to implement PV module connection:

1. Remove 10mm of the insulation sleeve from the positive and negative conductors.
2. Check correct polarity of connection cable from PV modules and PV input connectors.
3. Connect positive pole (+) of connection cable to positive pole (+) of PV input connector. Connect negative pole (-) of connection cable to negative pole (-) of PV input connector.
4. Make sure the wires are securely connected.



2.7 Working with Generator

L→LINE (brown or black) N→Neutral (blue)

1. Before making Generator connection, be sure to open DC protector or disconnected first.
2. Remove insulation sleeve 10mm for 2 conductors.
3. Insert L and N wires according to polarities indicated on terminal block and tighten the terminal screws.
4. Make sure the wires are securely connected.
5. Finally, after connecting all wiring, please put bottom cover back by screwing two screws as shown below.

All Crown units can work with generator:

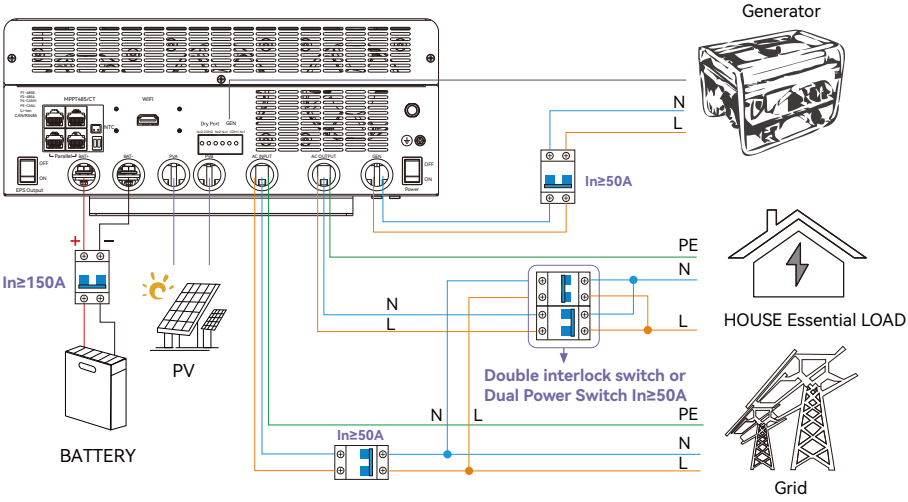
- Users can connect the generator output to the GEN input terminal of the MPPT Solar inverter
- The generator will be automatically started when battery voltage is lower than the cut-off value or there is charge request from BMS. When voltage is higher than AC charge setting value, it will stop the generator.
- Battery will get charged when the generator is turned on, and the generator is bypassed to AC output to take all loads.
- The system will use AC first if there is both utility input and generator input.

2.7.1 Generator system connection

The ELEGO-STAR Series can use a generator for backup power during grid failures. When selecting a generator, ensure it provides sufficient power and maintains a frequency with a Total Harmonic Distortion (THD) of less than 3%. As a general guideline, the generator should be at least 1.5 times the inverter's output to accommodate both load powering and battery charging. The table below lists the recommended generator capacities for optimal performance.

Number of inverters in parallel	Generator Capacity
1	>10KW
2	>15KW
3	>20KW
4	25KW

This ELEGO-STAR-6.5KW product can work with a generator and includes a dedicated Gen port for generator connection.



When properly wired and configured, the generator, if compatible with remote start, will automatically start when the battery voltage/ SOC drops below the cut-off value, or if there is a charge request from the BMS. While the generator is running, it will charge the batteries, and any excess AC power will be diverted to the AC output (LOAD) to power loads

2.7.2 Integrated two-wire Start/Stop

The Dry port (NO2, COM2) could be used to deliver signal to external device when battery voltage reaches warning level. The GEN port (NO1, COM1 could be used to wake-up the Generator and then the generator can charge the battery.

Reminder:

Notice: NO---Normal open

Dry Port Relay Maximum Specification: 250VAC 5A

Gen Port Relay Maximum Specification: 250VAC 5A

Unit Status	Condition		Dry port NO2 COM2 NO2 & COM2	GEN NO1 COM1 NO1 & COM1
Power Off	Inverter is off and no output is powered.		Open	Open
Power On	Without Grid	Battery voltage < Low DC warning voltage	Close	Close
		Battery voltage > Setting value or battery charging reaches floating stage	Open	Open
	With Grid	Battery voltage < Low DC warning voltage	Close	Open
		Battery voltage > Setting value or battery charging reaches floating stage	Open	Open

2.7.3 Generator AC connection

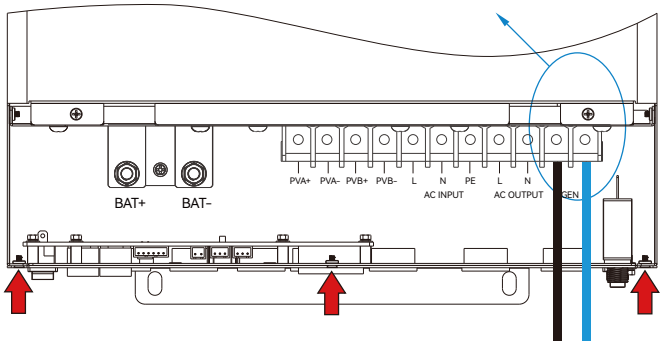
Please follow the steps listed below to ensure the generator connections are properly installed.

Step 1. Before making any wiring connections, ensure the inverter(s) are powered off, the generator is powered off, and all circuit breakers are open (off) to prevent damage to the unit.

Step 2. Properly identify the generator's output lines. According to European wiring standards, the Live (L) wire will be black, Neutral (N) will be blue, and Ground (PE) will be green/yellow. Once identified, strip approximately 10mm (≈3/8 in.) of insulation from the wires.

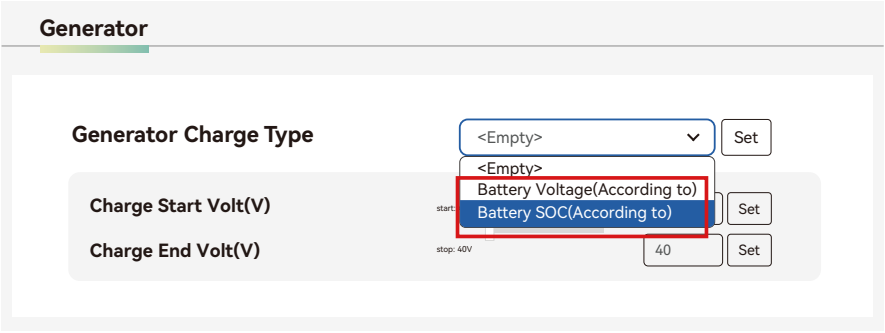
Step 3. Ground the generator's output ground to the Ground Bus (labeled PE) of the inverter.

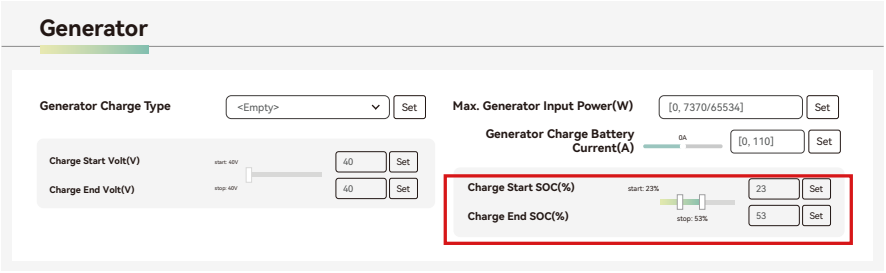
Step 4. Connect the Live (L) wire to the GEN port's L terminal and the Neutral (N) wire to the GEN port's N terminal.



2.7.4 Generator start and stop settings

Using the Crown Micro Monitoring Software, navigate to the “Maintenance” page where “Remote Set” will be automatically selected. Scroll to the “Generator” section and select the “Generator Charge Type” (see screenshot below). Typically, lead-acid batteries are charged based on voltage, while lithium batteries are charged based on SOC (State of Charge).





Generator Start Conditions:

The generator will start when utility fails and one of the following conditions is met:

- The battery is discharged to the cut-off setting
- There is a force charge request from the battery
- The battery voltage or SOC is lower than the “Generator Charge Start Battery Volt / SOC” setting

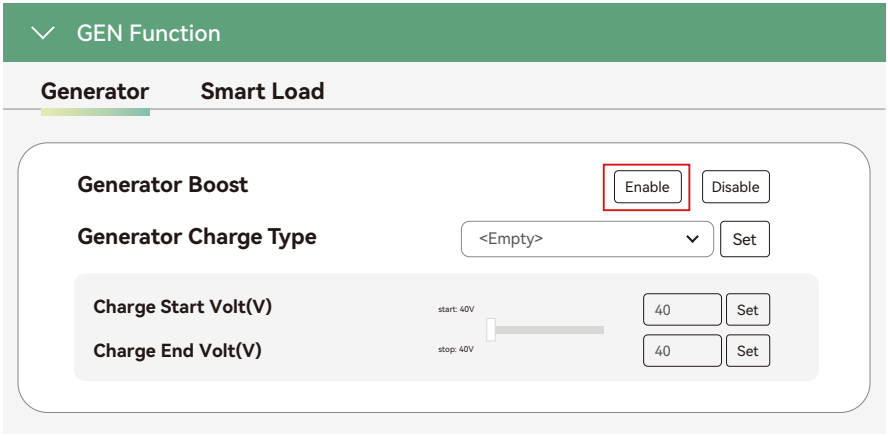
Generator Stop Conditions:

The generator will stop when the battery voltage or SOC is higher than the “Generator Charge End Battery Volt / SOC” settings.

2.7.5 Gen Boost Function

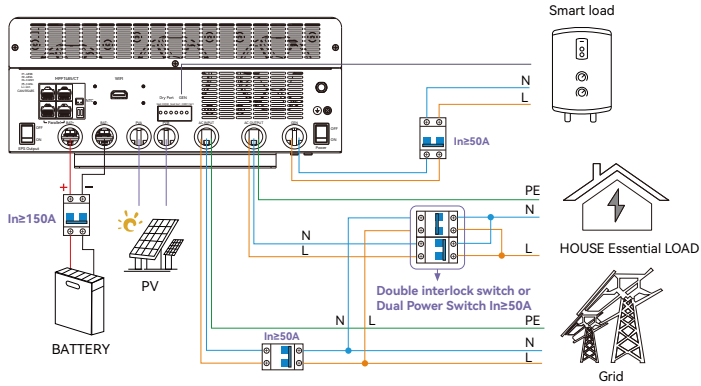
In real applications, customer loads often fluctuate, making generators highly sensitive to frequent changes. Activating GEN Boost can allocate a margin for the generator's input power, preventing it from consistently operating near overload conditions.

Enable GEN boost



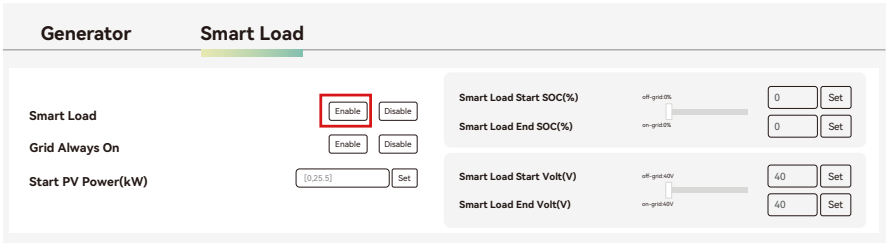
2.8 Smart load Connection

The ELEGO-STAR-6.5KW dedicated generator port can also connect to various smart loads, such as water heaters, in addition to generators.



2.8.1 Smart Load Settings

Enable smart load



Enable “Grid always on”: When connected to the grid, the smart load remains continuously connected.
Start PV Power: Input the PV power threshold at which you want the smart load to start. You can also input the battery's SOC or voltage to select when to start and stop.

If your home already has an existing grid-tied system, you can connect it to our generator interface as an AC power input, transforming your grid-tied system into an energy storage system.

2.9 AC Coupling Settings

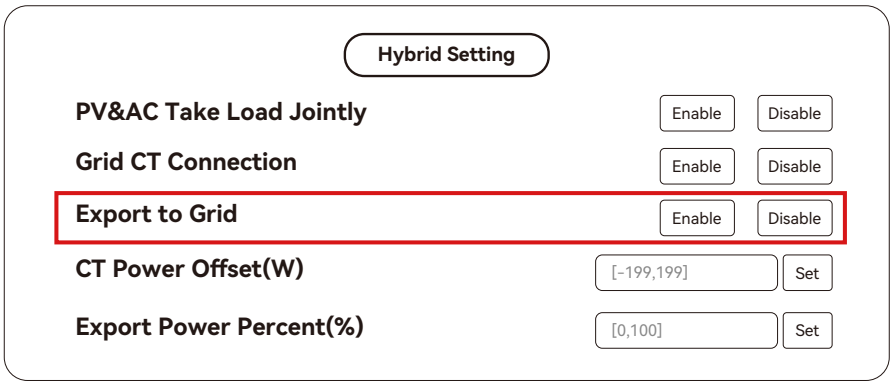
The AC Coupling setting must be enabled when connecting an existing grid-tied system to the GEN port.

- Start SOC(%): The SOC at which the AC-coupled inverters are turned on when in off-grid mode (50% to 70% recommended).
- End SOC(%): The SOC at which the AC-coupled inverters are shut down when in off-grid mode (90% recommended).



When on-grid and export to grid are enabled, the AC-coupled inverter will always be on, selling any extra power back to the grid. Ensure you are permitted to sell power to your utility provider when using AC-coupled PV arrays on-grid.

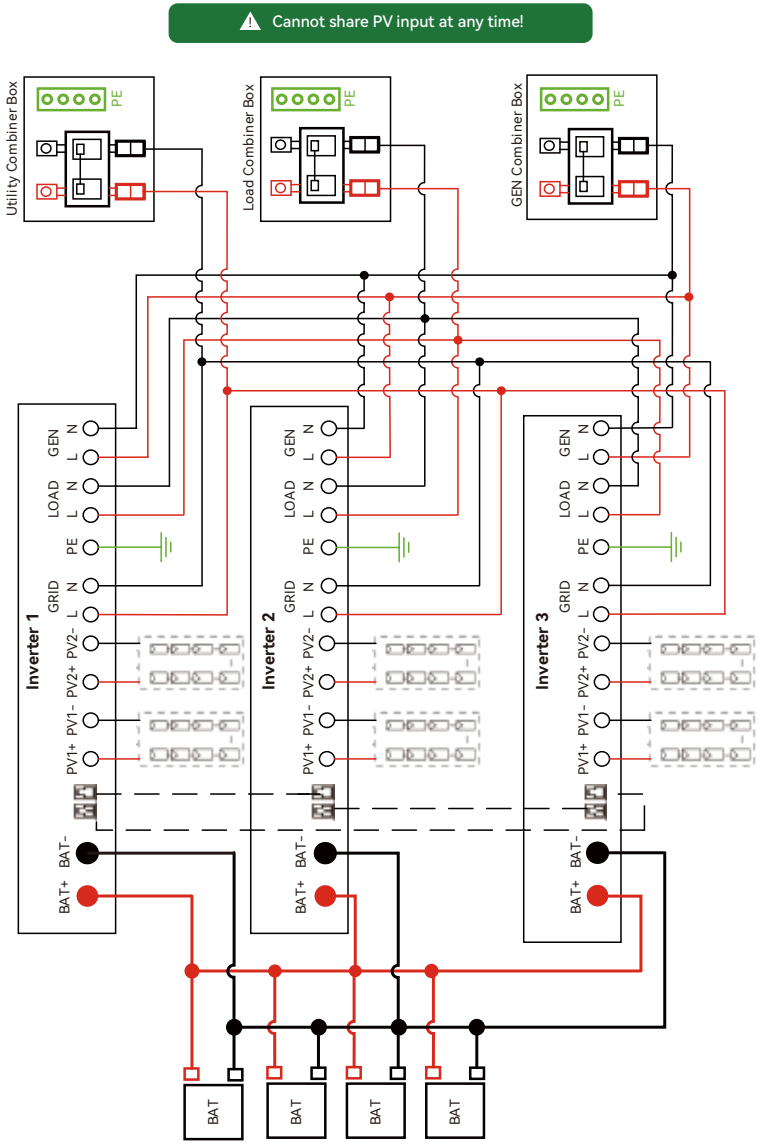
Note: It is recommended to keep the Start Volt/SOC and End Volt/SOC within 5%-10% of each other for optimal operation when utilizing the AC coupling function.

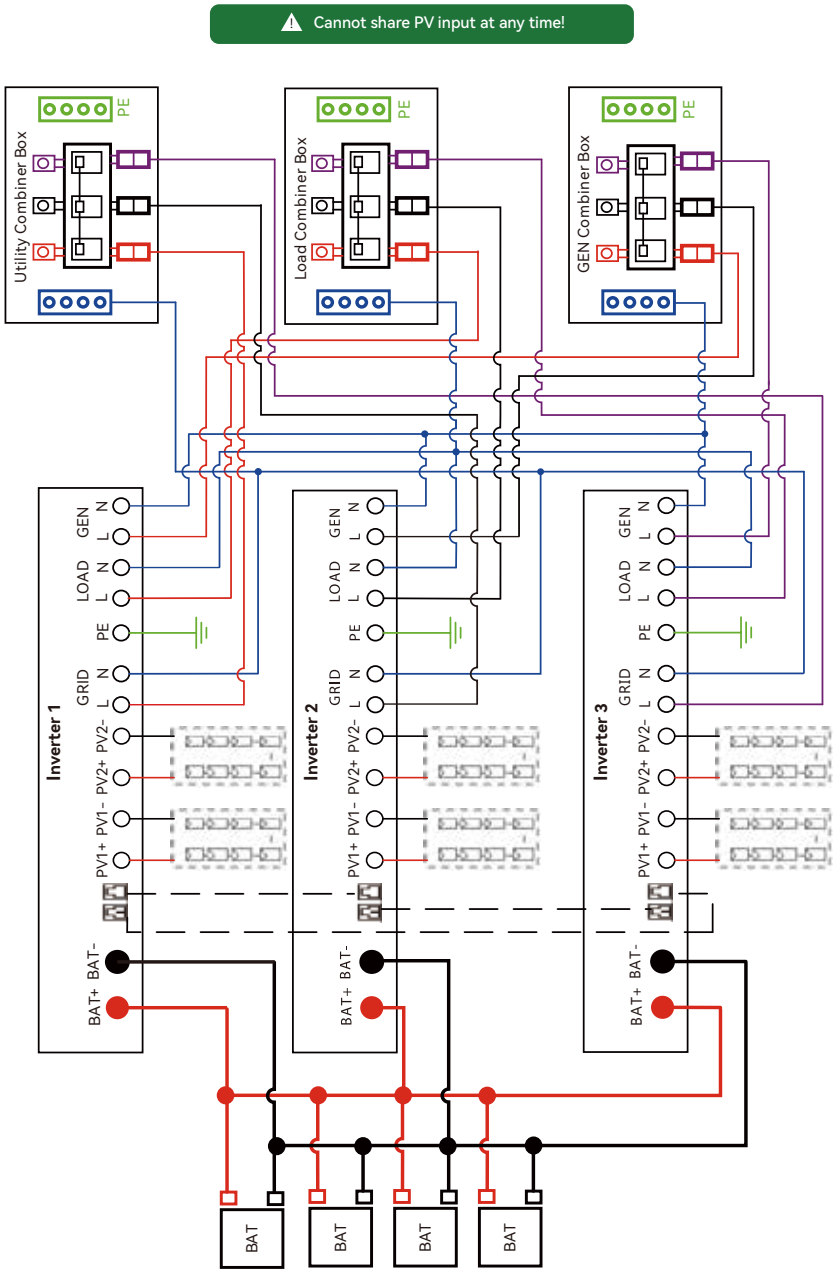


2.10 Parallel Function

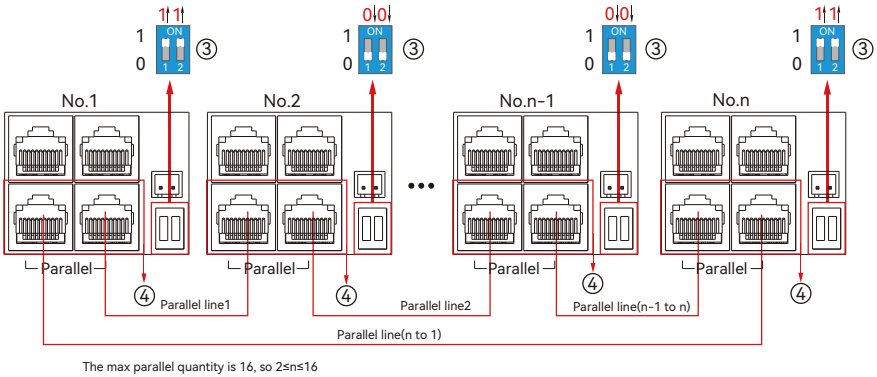
ELEGO-STAR Series inverter support up to 16 units to composed single phase parallel system or three phase parallel system, for parallel system setup

Step 1. Cable connection: the system connection is as below:



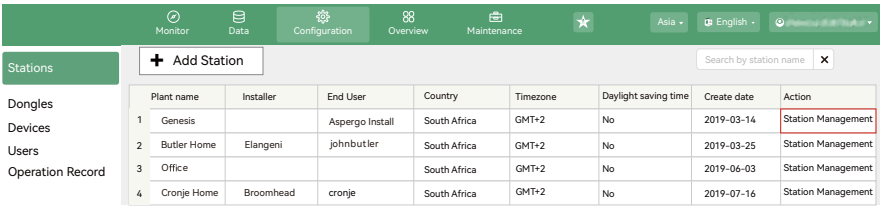

Cannot share PV input at any time!
Utility Combiner Box
Load Combiner Box
GEN Combiner Box
PE
Inverter 1
Inverter 2
Inverter 3
GEN N L
LOAD N L
PE
GRID N L
PV2- PV2+ PV1- PV1+
BAT- BAT+
BAT
BAT
BAT
BAT

Step 2. Cable connection: the system connection is as below:



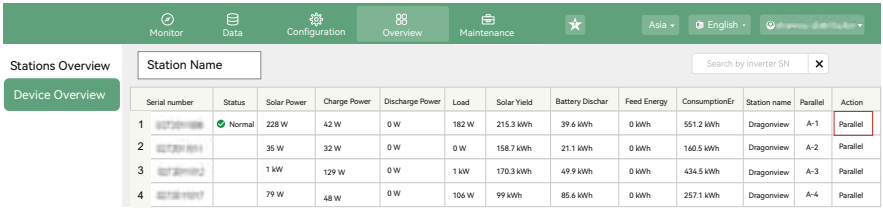
The max parallel quantity is 16, so 2≤n≤16

Step 3. Setup the monitor for the system, add all datalogs in one station. Users can login to the visit interface of monitor system, Configuration->station->Plant Management->add datalog to add the datalogs.



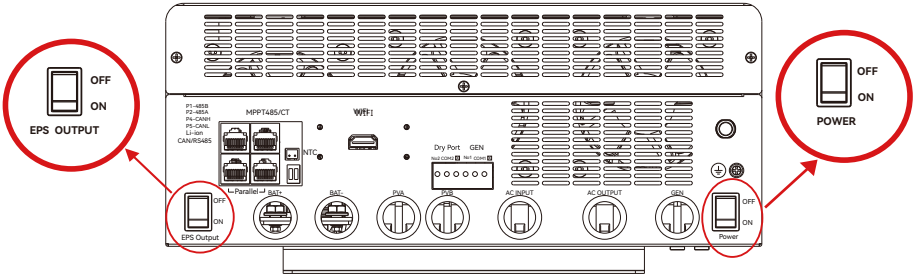
Step 4. Enable share battery for the system if the system share one battery bank, otherwise disable the shared battery function.

Step 5. Set the system as a parallel group in the monitor system.



For more detailed guidance for paralleling system, please visit supplier website and down the guidance.

2.11 Power and EPS ON/OFF



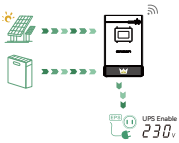
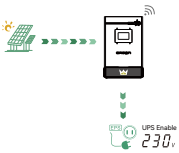
1. Power Switch: Control power supply for the unit
2. EPS Output Switch: Use to control the AC output

After connection, please turn on both switch. Users can turn off the EPS output switch to turn off power supply in some emergency case.

3. Working modes

3.1 ELEGO-STAR Series inverter modes introduction:

Bypass Mode		AC is used to take the load.
PV Charge Bypass		PV charge the battery while the AC power the load.
BAT Grid off		Battery is used to take the load.
PV+BAT Grid off		PV+battery power the load together.

PV Charge		1.When the EPS key off, the inverter charge the battery only. 2.When the battery is power off, the PV can wake up the battery automatically.
PV Charge+Grid off		PV charge the battery and power the load.
AC Charge		1. AC charge the battery from AC Input or GEN Input. 2. When the battery is power off, the AC can wake up the battery automatically
PV+AC charge		PV+AC charge the battery. AC is from AC Input or GEN Input.
PV Grid off		NOTE: The output power depends on the PV energy input, if the PV energy is unstable, witch will influence the output power. When you power off the battery, the PV will supply power to the load.
PV charge Grid on		PV charge battery and power the load. *The rest power from PV can feed in Grid.
PV+BAT Grid on		PV+battery power the load, and the AC can power the load if PV+battery power not enough.
PV Grid on		PV power the load, the rest power feed in Grid.

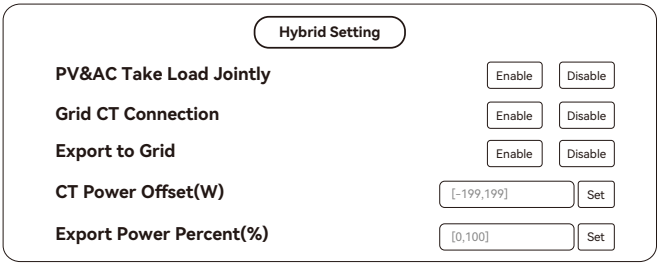
3.2 Working Modes related setting description

Situation	Setting 1	Setting 2	Setting 3	Working modes and Description
AC abnormal	NA	NA	NA	off grid inverter mode if P_Solar>=P_load, solar is used to take load and charge battery if P_Solar<P_load, solar and battery take the load together, system will discharge until battery lower than the Cut Off Voltage / SOC.
AC normal	PV&AC Take Load Jointly Enable	In the AC first time	NA	Hybrid Mode 1(charge first) Solar power will used to charge battery first, The solar power will be used to charge the battery first. AC will take load. 1. 2. if solar power is higher than power need to charge the battery, the extra power will used to take load together with grid. 3. If there is still more energy after charge battery and take the load, it will feed energy into grid if export to grid function is enabled.
		Enable AC charge and in the AC charge time	AC charge accroding to Time	Hybrid Mode 1(charge first)+AC charge battery if solar power is not enough to charge battery.
			AC charge accroding to battery voltage or SOC	Hybrid Mode 1(charge first)+AC charge battery if solar power is not enough to charge battery and the battery voltage / SOC is lower than AC start charge voltage / SOC, the AC will stop charging when the battery Voltage / SOC is higher than AC end charge battery voltage / SOC.
		Not in the AC first time and disable AC charge or not in the AC charge time	NA	Hybrid Mode 2(load first) Solar power will used to take load first, 1. if solar power is lower than load, battery will discharge together to take load until battery lower than EOD voltage / SOC. if solar power is higher than load, the extra power will used to charge battery, if there is still 2. more energy, it will feed into grid if enable export.
	PV&AC Take Load Jointly Disable	In the AC first time	NA	Bypass Mode AC will take the load and Solar is used to charge battery.
		Enable AC charge and in the AC charge time	AC charge accroding to Time	Bypass Mode+AC charge battery / Solar is used to charge battery. AC will take load and also charge battery during AC charge time if solar power is not enough.
			AC charge accroding to SOC / Battery voltage	Bypass Mode+AC charge battery Solar is used to charge battery. AC will take load and also charge battery when battery SOC/Volage is lower than start SOC / Voltage, and the AC will stop charging when the battery Voltage/SOC is higher than AC end charge battery voltage / SOC.
		Not in the AC first time and disable AC charge or not in the AC charge time	NA	off grid inverter mode if P_Solar>=P_load, solar is used to take load and charge battery if P_Solar<P_load, solar and battery take the load together, system will discharge until battery lower than EOD Voltage / SOC.

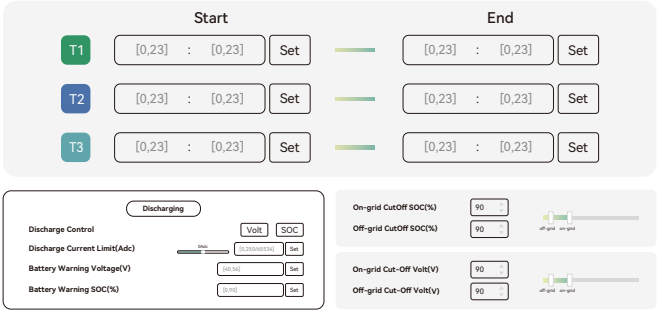
3.3 Working as a hybrid inverter

3.3.1 ELEGO-STAR Series can work as traditional off grid inverter or as a hybrid inverter. When PV&AC Take Load Jointly function is disabled, it works as a traditional off-grid inverter; In this situation, inverter either use (solar+battery) to take load or use AC take load. otherwise, it will work in hybrid mode.

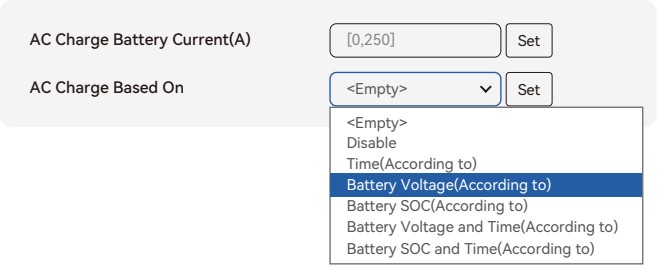
Related setting



3.3.2 During the set time period, the system will use AC power to take the load and use solar power to charge the battery. After this time, the system will switch to using solar power and the battery to take the load until the battery charge (voltage/SOC) drops below the On-Grid EOD value. At that point, it will switch back to AC power for the load.



3.3.3 AC Charge function Disable: The system will not use AC to charge the battery (except Li ion BMS set force charge flag).



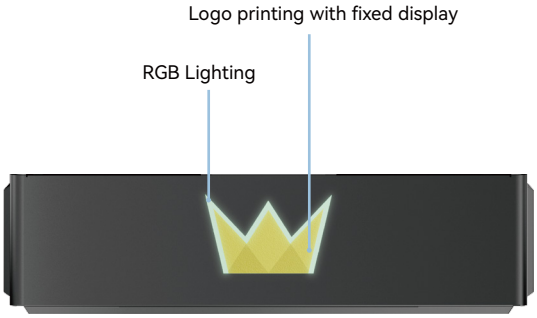
- According to Time: During the setting time, system will use AC to charge the battery until battery full and battery will not discharge during the setting time.
- According to Battery Voltage: During the setting voltage, system will use AC to charge the battery if battery voltage is lower than AC Charge Start Battery Voltage and will stop when Voltage is higher than AC Charge End Battery Voltage.
- According to Battery SOC: During the setting SOC, system will use AC to charge the battery if battery SOC is lower than AC Charge Start Battery SOC and will stop when Voltage is higher than AC Charge End Battery SOC.
- According to Battery Voltage and Time: During the setting time, system will use AC to charge the battery if battery voltage is lower than AC Charge Start Battery Voltage and will stop when Voltage is higher than AC Charge End Battery Voltage. And battery will not discharge during the setting time.
- According to Battery SOC and Time: During the setting time, system will use AC to charge the battery if battery SOC is lower than AC Charge Start Battery SOC and will stop when Voltage is higher than AC Charge End Battery SOC. And battery will not discharge during the setting time.

4. LCD display and settings

4.1 LED Display

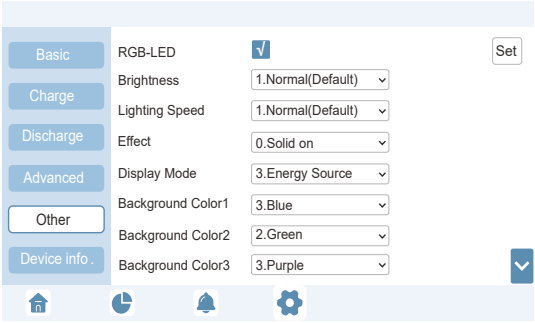
RGB LED Display Settings

The RGB LED strip on the machine serves multiple functions, with customizable settings available through the LCD screen. Below is a detailed explanation of each setting:



RGB Color Definitions

Status of Inverter	Color	
Normal	Customizable via the LCD screen	
Alarm	Yellow	
Fault	Red	
Flash	Cyan	



Enable RGB-LED √

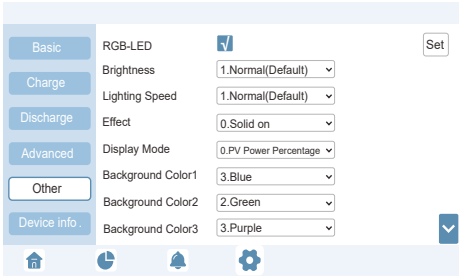
Brightness: Adjusts the brightness of the LED strip.		
0: High	1: Normal(Default)	2: Low
Maximum brightness for vivid display in bright environments.	Balanced brightness for typical conditions.	Reduced brightness for darker environments or energy saving.

Lighting Speed: Controls the flashing speed of the RGB light strips when the effect is set to "Chasing".		
0: Fast	1: Normal(Default)	2: Slow
Quick flashing speed for a dynamic "Chasing" effect.	Standard flashing speed for a balanced effect.	Slow flashing speed for a more subtle "Chasing" effect.

RGB Color Effect Explanation

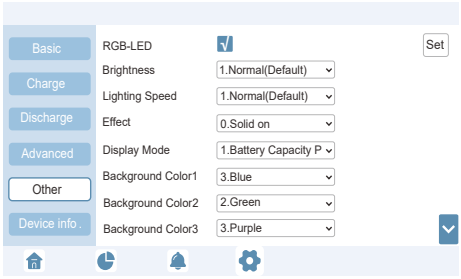
Effect: Solid on -1

Effect	0: Solid on(Default)	
Display Mode	0: PV Power Percentage	
Background Color 1 (Default Sky blue)	0:Sky blue(Default) 1:Yellow 2:Green 3:Blue 4:Pink 5:Purple 6:Others	The effective background color will depend on the color selected in the Color 1 section.



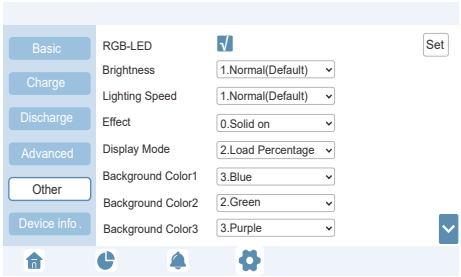
Effect: Solid on -2

Effect	0: Solid on(Default)	
Display Mode	1: Battery Capacity Percentage	
Background Color 1 (Default Sky blue)	0:Sky blue(Default) 1:Yellow 2:Green 3:Blue 4:Pink 5:Purple 6:Others	The effective background depend on the color 1 selected you choose.



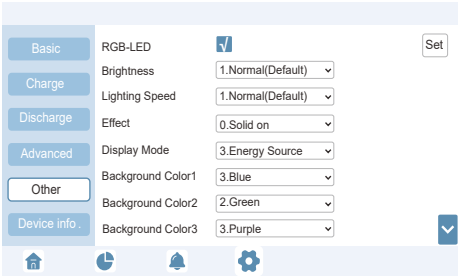
Effect: Solid on-3

Effect	0: Solid on(Default)	
Display Mode	2: Load Percentage	
Background Color 1 (Default Sky blue)	0:Sky blue(Default) 1:Yellow 2:Green 3:Blue 4:Pink 5:Purple 6:Others	The effective background depend on the color 1 selected you choose.



Effect: Solid on-4

Effect	0: Solid on(Default)	
Display Mode	3: Energy Source	
Background Color 1 (Default Sky blue)	0:Sky blue(Default) 1:Yellow 2:Green 3:Blue 4:Pink 5:Purple 6:Others	This background color will be effective when there is PV input
Background Color 2 (Default: Purple)	0:Sky blue(Default) 1:Yellow 2:Green 3:Blue 4:Pink 5:Purple 6:Others	This Background color will be effective when there is Utility Grid input.
Background Color 3 (Default: Green)	0:Sky blue(Default) 1:Yellow 2:Green 3:Blue 4:Pink 5:Purple 6:Others	This background color will be effective in all scenarios except for the two mentioned above.

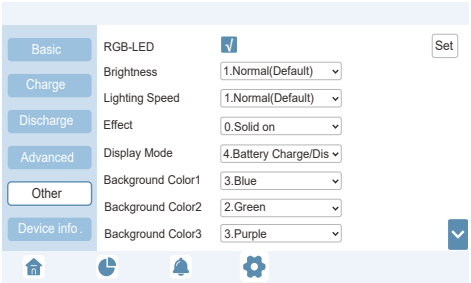


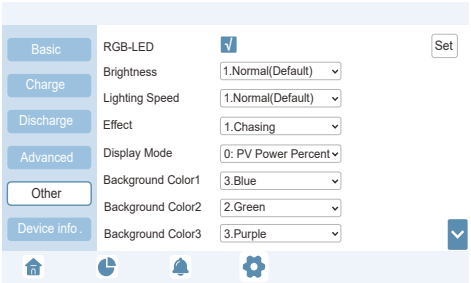
Effect: Solid on-5

Effect	0: Solid on(Default)	
Display Mode	4: Battery Charge/Discharge status	
Background Color 1 (Default Sky blue)	0:Sky blue(Default) 1:Yellow 2:Green 3:Blue 4:Pink 5:Purple 6:Others	This background color will be effective when the battery is being charged.
Background Color 2 (Default: Purple)	0:Sky blue(Default) 1:Yellow 2:Green 3:Blue 4:Pink 5:Purple 6:Others	This background color will be effective when the battery is being discharged.

Effect: Chasing-1

Effect	1: Chasing	The effective background color will be determined by the Color 1 selection and the display mode percentage. For example, if the current PV Power percentage is 50% and Color 1 is set to Yellow, the resulting background color will be a 50% shade of yellow.
Display Mode	0: PV Power Percentage	
Background Color 1 (Default Sky blue)	0:Sky blue(Default) 1:Yellow 2:Green 3:Blue 4:Pink 5:Purple 6:Others	



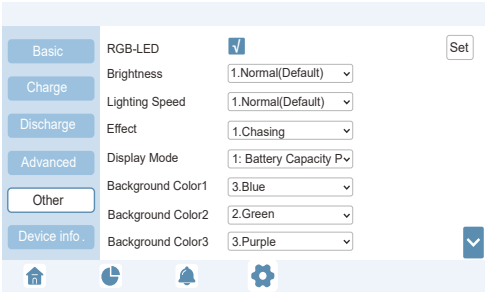


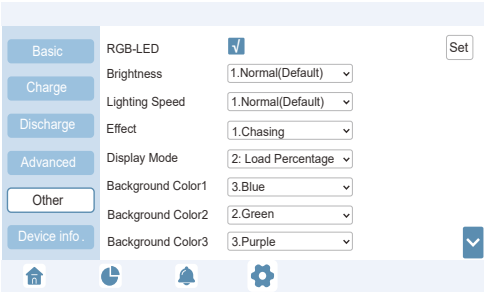
Effect: Chasing-2

Effect	1: Chasing	The effective background color will be determined by the Color 1 selection and the display mode percentage. For example, if the current battery capacity percentage is 50% and Color 1 is set to Green, the resulting background color will be a 50% shade of Green.
Display Mode	1: Battery Capacity Percentage	
Background Color 1 (Default Sky blue)	0: Sky blue(Default) 1: Yellow 2: Green 3: Blue 4: Pink 5: Purple 6: Others	

Effect: Chasing-2

Effect	1: Chasing	The effective background color will be determined by the Color 1 selection and the display mode percentage. For example, if the current Load percentage is 50% and Color 1 is set to Blue, the resulting background color will be a 50% shade of Blue.
Display Mode	2: Load Percentage	
Background Color 1 (Default Sky blue)	0: Sky blue(Default) 1: Yellow 2: Green 3: Blue 4: Pink 5: Purple 6: Others	

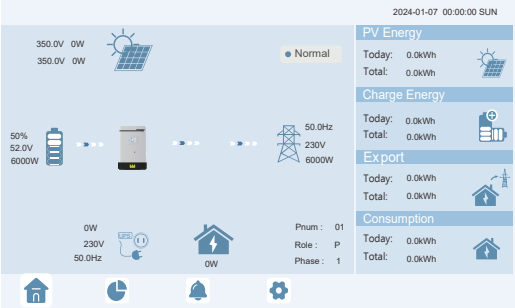




4.2 LCD Display

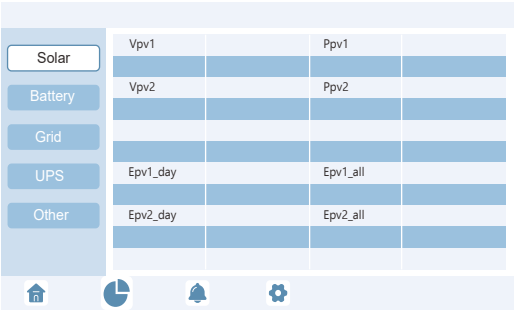
Home Page

Touch the screen to light it up if it's in sleep mode. The Home page will appear on the display. Users will see a system overview diagram along with the real time information of each component, such as battery SOC, battery charging/discharging power, grid import/export power, load power, etc. On the right part of the screen, users can check daily and accumulated solar energy, battery charged/discharged energy, grid imported/exported energy, as well as load consumption.



Detailed System Information

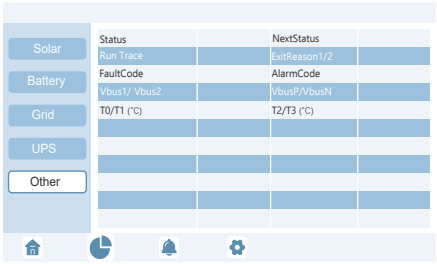
Click on the pie icon at the bottom of the screen, and you'll be able to view the detailed real time solar information, battery information, grid information and EPS output information.





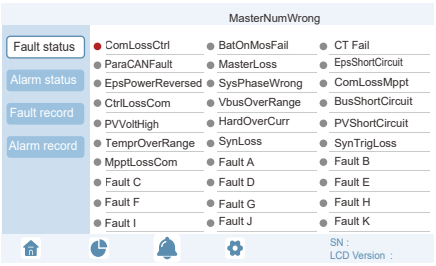


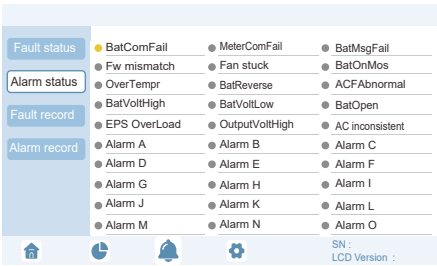


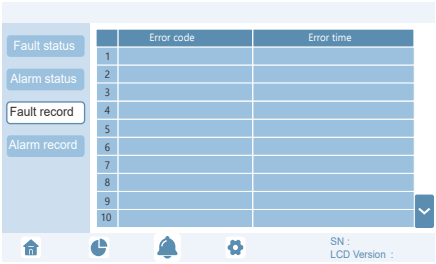


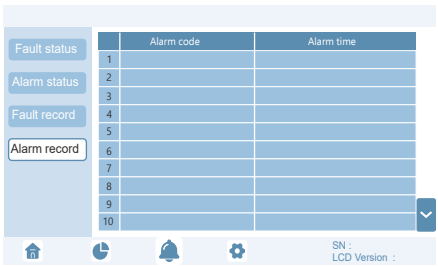
Fault/Alarm Information

Touching the bell icon at the bottom of the screen, you'll see all the current and historical fault & warning information on this page.





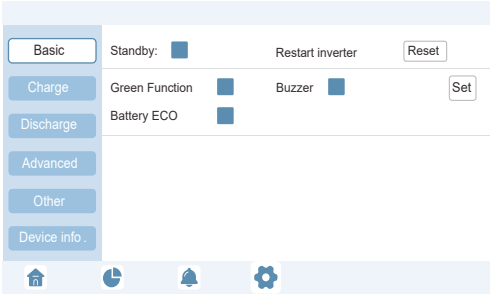




4.2.2 Setting Parameters

Clicking on the gear icon at the bottom of the screen, you'll get into the parameter setting page of the inverter.

a. Basic settings



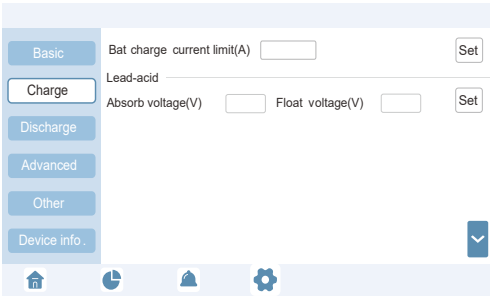
Restart inverter: Restart the system, please note the power maybe interrupted when restarted.

Green Function Enable: When enabled, the inverter will work in green mode if EPS power output is less than 5W for 10 seconds and shut off the EPS output and If a load is detected to be greater than 10W for 200ms, the inverter will exit the green mode and return to normal EPS output.

Battery ECO: When enabled, the inverter will switch to bypass mode if the battery has reached the On-Grid EOD value and AC charging is disabled. The inverter will stay in bypass mode until the battery is being charged again. When enabled, switch over time may be increased up to 15 ms.

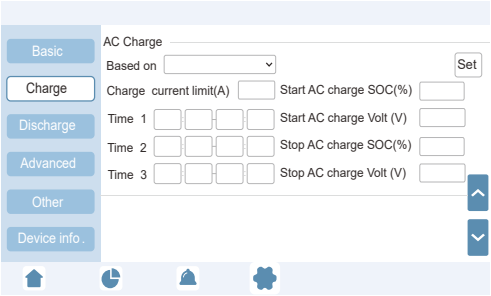
Standby: It is for users to set the inverter to normal status or to standby status. In standby status, the inverter will stop any charging or discharging operations, as well as solar-feed-in.

b. Charge setting

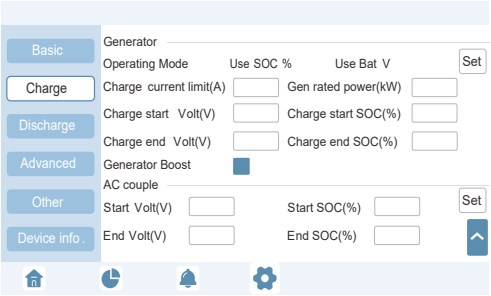


Bat charge current limit(A): Users can set Max charge current.

Lead acid: When using Lead-acid battery, you need to set parameters in these programs, follow the battery manufacturer's recommendation.



AC Charge: If users want to use grid power to charge the battery, they can enable "AC Charge" and set it based on time, start SOC and start voltage. "AC Charge Power (kW)" to limit utility charging power, and "Stop AC Charge SOC (%)" as the target SOC for stopping utility charging. "Stop AC Volt (V)" as the target battery voltage for stopping utility charging.



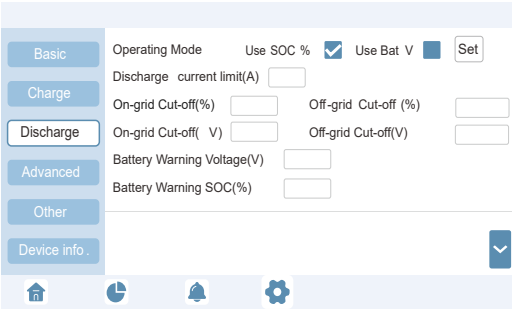
Generator

Operating Mode: Users can decide to use SOC or BatV to control charge and discharge logic depending on battery type.

Bat charge current limit(A): Set the Max. battery charge current from the Generator. The Generator will start charging according to the Charge start Volt/SOC, and stop charging when the battery voltage or SOC reaches the Charge end Volt/SOC value.

Gen rated power: Inverter has the peak-shaving function, when you need you can enable it and setup the Gen peak- shaving power(W)

c. Discharge setting



Discharge current limit(A): The Max. discharge current from battery

Discharge start power(W): The Min. value can be set to 50. When the inverter detects the import power is higher than this value, battery start discharging, otherwise battery will keep standby

On-grid Cut-off(%) and Off-grid Cut-off(%) /On-grid Cut-off(V) and Off-grid Cut-off(V): End of discharge SOC/Cut off voltage in on-grid and off-grid condition respectively.

Battery Warning Volt/SOC: The inverter will display a battery low warning when the battery Voltage/SOC falls to this value.

Operating Mode

You can choose “Use SOC %” or Use Bat V” to control the battery discharge state

Battery Warning Volt/SOC



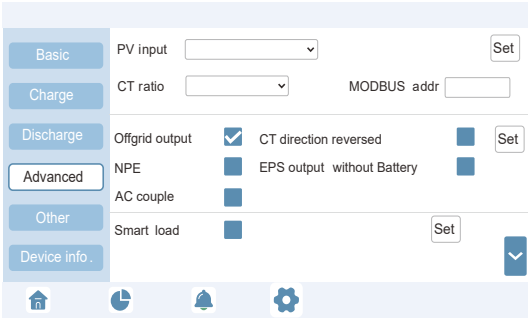
AC First: During the set time period, the system will use AC power to take the load and use solar power to charge the battery.

Smart Load: This function is to make the Gen input connection point as an load connection point, if you enable it, inverter will supply power to this load when the battery SOC and PV power is above a user setup value. e.g. Smart load start SOC=90%, Smart load end SOC=85%, Start PV power=300W, it means: When the PV power exceeds 300W, and the battery system SOC gets to 90%, the Smart Load Port will switch on automatically to supply the load which is connected on this side. When the battery reaches SOC<85% or PV power<300w, the Smart Load Port switch off automatically.

*Note: If you enable the Smart load function, it's forbidden to connect the generator at the same time, otherwise the device will be damaged!

d. Advanced setting

Advanced setting is mainly by installer after installation.



The supported CT ratio is 1000:1, 2000:1, 3000:1. default CT ratio is 3000:1. If 3rd party CT is to be used, please ensure its CT ratio is one of them, and set it accordingly. The battery brand in the Lithium brand drop down list.

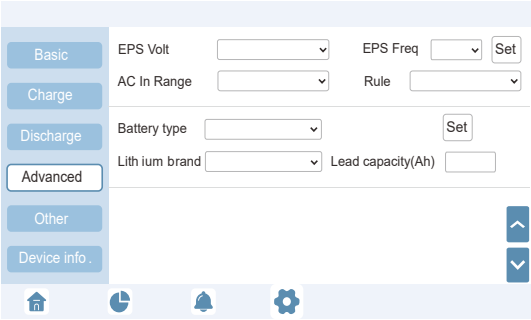
CT direction reversed: If the CTs are in a wrong direction which will cause the display to show incorrect information and features of the inverter will not function correctly, the installer can modify it by selecting it(only for direction not CT 1 or CT 2 placement), there is no need to reconnect the CTs and no need to go change it physically, in the order of loads--grid export--battery charging.

PV Input Mode: The connection type of solar modules.

NPE: Enable or disable the neutral ground bond inside the inverter. This is not a dynamic bond, meaning it is only disabled or enabled.

EPS output without Battery: When enabled, provides off-grid functionality without using battery backup. AC output is only supplied by solar which can cause output voltage instability due to fluctuating voltages from the solar modules.

Modbus addr: Configure COM address in the RS-485 communication system. If you install more than one inverter in the field and use an RS-485 bus to communicate, you need to set the inverters to different address. Addresses range from 1-250.



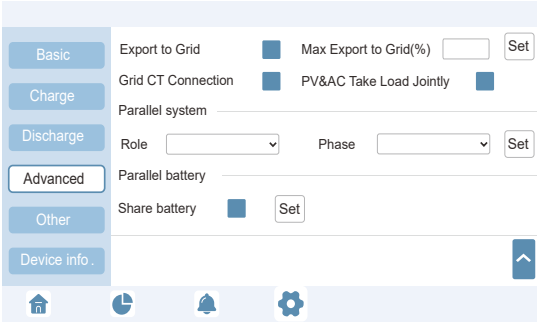
EPS type: You can choose by yourself, 240V、230V,

EPS Freq: You can choose by yourself, 50Hz、60Hz,

Battery type: No battery, lead -acid or lithium-ion.

AC In Rang: APL | UPS

APL: Grid voltage range 90~280Vac, inverter switch time is more than 20ms.
UPS: Grid voltage range 170~280Vac, inverter switch time is within 20ms when in single inverter usage.
If lead-acid battery is selected, please input correct battery capacity
If lithium-ion battery is selected, please choose the battery brand in the Lithium brand drop down list.



PV & AC Take Load Jointly(Hybrid): When this feature is enabled, both PV and AC will work together to supply energy for the loads. This allows the system to operate in a hybrid inverter mode, maximizing energy efficiency by combining renewable energy and grid power seamlessly.

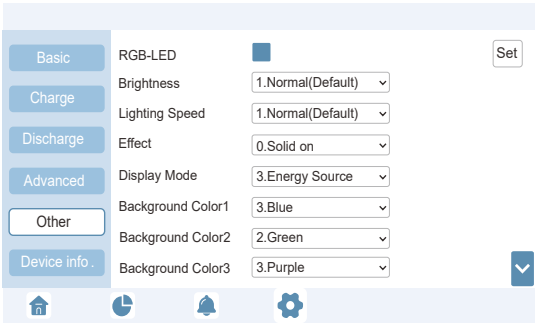
System Type: Set to “No Parallel” when using a single inverter. Set to “Single Phase Parallel” when connecting two or more inverters using single phase. Set to “Three Phase Parallel” when composing a three-phase system using three or more inverters.

Phase: No need to set the phase when No Parallel. Set to “R phase” when on the single phase parallel. Set to “R phase”, “S phase“, ”T phase” for each of the three phases when the system parallel type is three phase parallel.

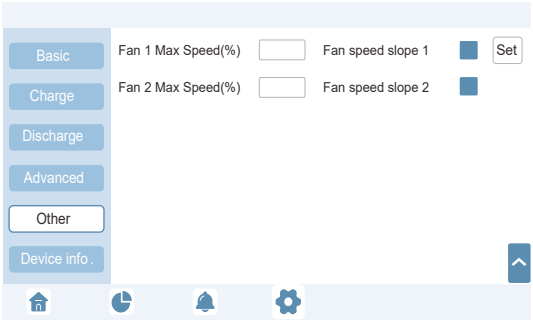
Battery Shared: Enable or disable the battery sharing functionality. Enable battery sharing when configuring more than one inverter in parallel mode sharing a battery bank.

e.Other setting

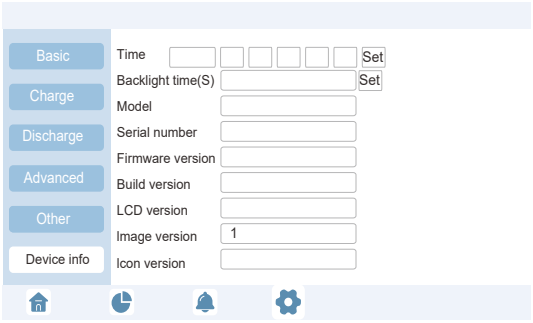
Set LED and FAN



RGB-LED Settings: Users can customize the LED colors and patterns according to their preferences.



Fan Setting
Fan 1/2 Max Speed: Set the cooling fans maximum speed for fan 1/2. Range is 20-100%.
Fan speed new slope 1/2: Set the fan 1/2 speed slope to new or default.



Time: Set the system time and date.
Backlight Time: Refers to how long the LCD screen stays lit after operation. Users can customize this duration.
Model: Displays the inverter model information.
Serial Number: Shows the unique serial number of the device.
Firmware Version: Indicates the current firmware version installed.
Build Version: Displays the build version of the firmware.
LCD Version: Shows the version of the LCD software.
Image Version: Displays the version of the system's image file.
Icon Version: Shows the version of the icon pack used in the LCD.

5. Monitor System for ELEGO-STAR Series inverter

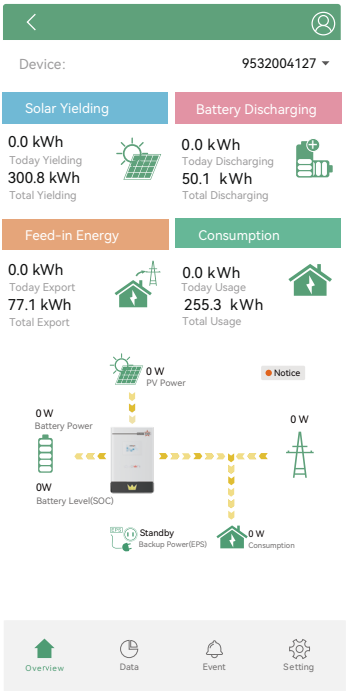
- Users can use wifi dongle to monitor the energy storage system, Please download the introduction of guldance on the supplier website.
- The APP is also available in the google play and apple APP store (Scan two code bar to download the APP).
- Please download the introduction of guidance by website: https://crownmicroglobal.com/downloads/

1. Wifi Quick Guidance
Quick guidance for setting password for wifi module.

2. Monitor system setup for Distributors and **Monitor system setup for endusers,** Monitor system registration, wifi password setting, and wifi local monitor and setting.

3. Crown_Monitor_UI_Introduction
Introduction of monitor interface

4. Website Setting Guidance
Introduction of website settings for MPPT Solar Inverter



6. Specifications

Table 1 MPPT Mode Specifications	
INVERTER MODEL	ELEGO-STAR-6.5KW
Max. PV Array Power(W)	9600(4800/4800)
Rated PV Input Voltage(V)	320
Number of Independent MPPT Inputs	2
PV Input Voltage Range(V)	100~500
MPPT Voltage Range(V)	120~400
Start-up Voltage(V)	100
Max. PV Input Current per MPPT (A)	17/17
Max. PV Short-circuit Current per MPPT(A)	25/25
Max. PV Charging Current(A)	140
Table 2 Battery Mode Specifications	
INVERTER MODEL	ELEGO-STAR-6.5KW
Output Voltage Waveform	Pure Sine Wave
Output Voltage Regulation	208Vac / 220Vac / 230Vac / 240Vac±5%
Output Frequency	50Hz / 60Hz
Rated Output Power(W)	6500
Rated Output Current(A)	28.3
Max. Charging / Discharging Current(A)	140/140
Max. Charging / Discharging Power(W)	6500
Peak Efficiency	93%
Overload Protection	5s@≥150% load; 10s@110%~150% load
Surge Capacity	2* rated power within 5 seconds
Recommend Capacity of Battery per Inverter	>200AH
Battery Voltage Range	46.4V-60V(Li) 40V-60V(Lead_Acid)
High DC Cut-off Voltage	59VDC(Li) 60VDC(Lead_Acid)
High DC Recovery Voltage	57.4VDC(Li) 58VDC(Lead_Acid)

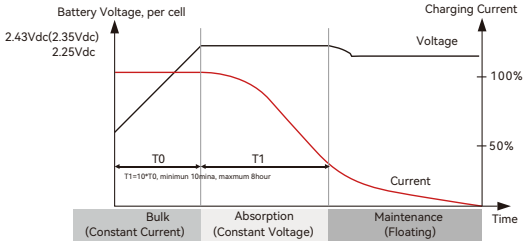
Low DC Warning Voltage(Lead Acid)	load < 20%	44.0Vdc(Settable)
	20% ≤ load < 50%	Warning Voltage@load < 20% -1.2V
	load ≥ 50%	Warning Voltage@load < 20% -3.6V
Low DC Warning Return Voltage(Lead Acid)		Low DC Warning Voltage@Different load+2V
Low DC Cut-off Voltage(Lead Acid)	load < 20%	42.0Vdc(Settable)
	20% ≤ load < 50%	Cut-off Voltage@load < 20% -1.2V
	load ≥ 50%	Cut-off Voltage@load < 20% -3.6V
Low DC Cut-off Return Voltage(Lead Acid)	Cut-off Voltage@ load<20%≥45V	Low DC Cut-off Voltage@load<20%+3V
	Cut-off Voltage@ load<20%<45V	48V
Low DC Warning SOC		20% SOC(Settable)
Low DC Warning Return SOC		Low DC Warning SOC +10%
Low DC Cut-off SOC		15% SOC (Grid on) (settable)
		15% SOC (Grid off) (settable)
Low DC Cut-off Return SOC		Low DC Cut-off SOC +10%
Charge Cut-off Voltage		58.4Vdc
No Load Power Consumption		<60W
Lead_Acid Battery Charging Algorithm		3-Step
Bulk Charging Voltage		Flooded Battery 58.4Vdc
		AGM / Gel Battery 56.4Vdc
Floating Charging Voltage		54Vdc
Charging Curve		

Table 3 Line Mode Specifications	
INVERTER MODEL	ELEGO-STAR-6.5KW
Input Voltage Waveform	Sinusoidal(utility or generator)
Nominal Input Voltage(V)	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	280Vac
Nominal Input Frequency	50Hz/60Hz(Auto detection)
Max. AC Input Current(A)	45
Max. AC Input Power(W)	9000
Max. AC Charging Current(A)	140
Rated AC Current of Bypass Relays(A)	60
Output Short Circuit Protection	Circuit Breaker Protect when GridOn Bypass Software Protect when GridOff Discharge
Transfer Time	<10ms@Single ; <20ms@Parallel
Output power derating: When AC input voltage drops to 200V, the output power will be derated.	Max inv current: 30A Max inv power: 6.5kW

Table 4 Generator Mode Specifications	
INVERTER MODEL	ELEGO-STAR-6.5KW
Rated GEN Voltage(V)	230
Rated GEN Frequency(Hz)	50/60
Rated GEN Input Current(A)	32
Rated GEN Input Power(W)	7370
Rated GEN Current of Bypass Relays(A)	60

Table 5 Protection/General Specifications	
INVERTER MODEL	ELEGO-STAR-6.5KW
Over Current / Voltage Protection	YES
Grid Monitoring	YES
AC Surge Protection Type III	YES
Safety Certification	EN 62109-1:2010; EN 62109-2:2011; IEN 61683:1999; EN61000-3-2; EN61000-3-4; EN61000-3-12; EN61000-3-3; EN61000-3-11; IEC62109-1, IEC62109-2; CB
Ingress Protection Rating	IP 20
Display&Communication Interface	LCD+LED, RS485 / WIFI / CAN
Warranty	2 Years
Cooling Method	FAN
Topology	Transformer-less
Noise Emission(typical)	<50dB
Operating Temperature Range	0℃ to 45℃(full load)
Storage temperature	-15℃ ~ 60℃
Humidity	5% to 95% Relative Humidity(Non-condensing)
Altitude	<2000m
Dimension(D*W*H)mm	505*330*135mm
Net Weight	14.5kg

7. Trouble Shooting & Error List

The failures mainly divided into 5 categories, for each category, the behavior is different:

Code	Description	Trouble shooting
E000	Internal communication fault1	Restart inverter, if the error still exist, contact us (DSP&M3)
E002	Bat On Mos Fail	Restart inverter, if the error still exist, contact us
E003	CT Fail	Restart inverter, if the error still exist, contact us
E008	CAN communication error in Parallel System	Check CAN cable connection is connected to the right COM por
E009	No master in parallel system	Check parallel setting for master/Slave part, there should be one master in the system
E012	UPS output short circuit	Check if the load is short circuit, try to turn off the load and restart inverter
E013	UPS reserve current	Restart inverter, if the error still exist, contact us
E015	Phase Error in three phase parallel system	Check if the AC connection is right for three phase system, there should one at least one inverter in each phase
E016	Relay fault	Restart inverter, if the error still exist, contact us
E017	Internal communication fault2	Restart inverter, if the error still exist, contact us (DSP&M8)
E018	Internal communication fault3	Restart inverter, if the error still exist, contact us (DSP&M3)
E019	Bus voltage high	Check if PV input voltage is higher than 480V
E020	EPS connection fault	Check if EPS and AC connection is in wrong terminal
E021	PV voltage high	Check PV input connection and if PV input voltage is higher than 480V
E022	Over current internal	Restart inverter, if the error still exist, contact us
E024	PV short	Check PV connection
E025	Temperature over range	The internal temperature of inverter is too high, turn off the inverter for 10minutes, restart the inverter, if the error still exist, contact us
E026	Internal Fault	Restart inverter, if the error still exist, contact us (Bus sample)
E028	Sync signal lost in parallel system	Check CAN cable connection is connected to the right COM port
E029	Sync triger signal lost in parallel system	
E031	Internal communication fault4	Restart inverter, if the error still exist, contact us (DSP&M8)

Code	Description	Trouble shooting
W000	Communication failure with battery	Check if you have choose the right battery brand and communication cable is right, if the warning still exist, contact us
W003	Communication failure with meter	Check communication cable, if the warning still exist, contact us
W004	Battery failure	Inverter get battery fault info from battery BMS, restart battery, if the warning still exist, contact us or battery manufacture
W008	Software mismatch	Please contact Crown Micro for firmware update
W009	Fan Stuck	Check if the fan is OK
W012	Bat On Mos	Restart inverter, if the error still exist, contact us
W013	Over temperature	The temperature is a little bit high inside inverter
W015	Bat Reverse	Check the battery connection with inverter is right, if the warning still exist, contact us
W018	AC Frequency out of range	Check AC frequency is in range
W019	AC inconsistent in parallel system2	Reconnect the AC input or Restart inverter, if the error still exist, contact us
W025	Battery voltage high	Check if battery voltage is in normal range
W026	Battery voltage low	Check if battery voltage is in normal range, need to charge the battery if battery voltage is low
W027	Battery open	Check if there is output from the battery and battery connection with inverter is OK
W028	EPS Over load	Check if EPS load is too high
W029	EPS voltage high	Restart inverter, if the error still exist, contact us
W031	EPS DCV high	Restart inverter, if the error still exist, contact us

Note

Note

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