EG4® 12kPV HYBRID INVERTER

DEVICE MONITORING & SETTINGS GUIDE

This document contains information to educate the end-user on how to use the EG4 Monitor System and the various settings of the unit.

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MODEL #: IV-8000-HYB-AW / IV-8000-HYB-AW-00

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1. TECHNICAL SPECIFICATIONS

AC INPUT DATA				
NOMINAL AC VOLTAGE	120/240VAC; 120/208VAC (L1/L2/N required)			
FREQUENCY	50/60Hz			
MAX. AC INPUT POWER	12000W			
MIN. GENERATOR SIZE	>5000W			
MAX. GEN | GRID PASSTHROUGH CURRENT	80A | 80A			
AC GRID OUTPUT DATA				
MAX. OUTPUT CURRENT	33.3A@240VAC | 38.5A @208VAC			
OUTPUT VOLTAGE	120/240VAC; 120/208VAC			
NOMINAL POWER OUTPUT	8000W			
OUTPUT FREQUENCY	50/60Hz			
POWER FACTOR	0.99 @ Full Load			
REACTIVE POWER ADJUST RANGE	±0.8			
MAX CONT. LINE WATTAGE	4000W			
PEAK POWER	0.5 s	1 s	1 min	12 min
	16kW	12kW	10kW	8.8kW
OPERATING FREQUENCY	50/60Hz			
THD (V) @FULL LOAD	<3%			
TRANSFER TIME	Single			Parallel
	20 ms – Default, 10 ms – Selectable			20 ms
PV INPUT DATA				
NUMBER OF MPPTS	2			
INPUTS PER MPPT	2			
MAX. USABLE INPUT CURRENT	25/25A			
	25A per MPPT | 41.6A in total			
MAX. SHORT CIRCUIT INPUT CURRENT	31/31A			
DC INPUT VOLTAGE RANGE	100-600 VDC			
UNIT STARTUP VOLTAGE	100 VDC			
MPPT OPERATING VOLTAGE RANGE	120-500 VDC			
NOMINAL MPP VOLTAGE	360 VDC			
MAXIMUM UTILIZED SOLAR POWER	12000W			
RECOMMENDED MAXIMUM SOLAR INPUT	15000W			
EFFICIENCY				
MAXIMUM EFFICIENCY (PV TO GRID)	97.5%			
MAXIMUM EFFICIENCY (BATTERY TO GRID)	94%			
CEC WEIGHTED EFFICIENCY	96.4%			
MAXIMUM EFFICIENCY (PV TO BATTERY)	99.9%			
IDLE CONSUMPTION (STANDBY MODE)	<55W			
BATTERY DATA				
COMPATIBLE BATTERY TYPES	Lead-Acid/Lithium			
MAX. CHARGE/DISCHARGE CURRENT	167A @ 48 VDC			
NOMINAL VOLTAGE	48 VDC			
VOLTAGE RANGE	40-60 VDC (Lithium); 40-60 VDC (Lead-Acid)			
RECOMMENDED BATTERY CAPACITY PER INVERTER	>200Ah			

GENERAL DATA	
MAX. UNITS IN PARALLEL	10
PRODUCT DIMENSIONS (H×W×D)	29.5×20.5×11.2 in (750×520×285 mm)
UNIT WEIGHT	110 lbs. (50 kg)
DESIGN TOPOLOGY	High Frequency - Transformerless
RELATIVE HUMIDITY	0-100%
OPERATING ALTITUDE	<2000 m (<6561 ft)
OPERATING AMBIENT TEMPERATURE RANGE	-13°F – 140°F (-25°C – 60°C)
STORAGE AMBIENT TEMPERATURE RANGE	-13°F – 140°F (-25°C – 60°C)
NOISE EMISSION (TYPICAL)	<50 dB @ 3 ft
COMMUNICATION INTERFACE	RS485/Wi-Fi/CAN
STANDARD WARRANTY*	10-year standard warranty
INGRESS PROTECTION RATING	IP65
SAFETY FEATURES	PV Arc Fault Protection, PV Ground Fault Protection, PV Reverse Polarity Protection, Pole Sensitive Leakage Current Monitoring Unit, Surge Protection Device, integrated PV disconnect

STANDARDS AND CERTIFICATIONS
UL1741 SB
CSA C22.2#107.1:2016
CSA C22.2#330:2017 ED 1
HECO SRD-IEEE-1547.1:2020 ED 2
RAPID SHUT DOWN (RSD) NEC 2020:690.12
FCC PART 15, CLASS B

*For information regarding warranty registration on EG4® Electronics products, please navigate to https://eg4electronics.com/warranty/ and select the corresponding product to begin the registration process.

2. INVERTER SAFETY

2.1 SAFETY INSTRUCTIONS

International safety regulations have been strictly observed in the design and testing of the inverter. Before beginning any work, carefully read all safety instructions, and always observe them when working on or with the inverter. The installation must follow all applicable national or local standards and regulations.

Incorrect installation may cause:

- Injury or death to the installer, operator or third party
- Damage to the inverter or other attached equipment

2.2 IMPORTANT SAFETY NOTIFICATIONS

DANGER: ***Hazardous Voltage Circuits!***

There are various safety concerns that must be carefully observed before, during, and after the installation, as well as during future operation and maintenance. The following are important safety notifications for the installer and any end users of this product under normal operating conditions.

1. **Beware of high PV voltage.** Install an external DC disconnect switch or breaker and ensure it is in the “off” or “open” position before installing or working on the inverter. Use a voltmeter to confirm there is no DC voltage present to avoid electric shock.
2. **Beware of high grid voltage.** Ensure the AC switch and/or AC breaker are in the “off” or “open” position before installing or working on the inverter. Use a voltmeter to confirm there is no voltage present to avoid electric shock.
3. **Beware of high battery current.** Ensure that the battery module breakers and/or on/off switches are in the “open” or “off” position before installing or working on the inverter. Use a voltmeter to confirm there is no DC voltage present to avoid electric shock.
4. **Do not open the inverter while it is operating to avoid electric shock and damage from live voltage and current within the system.**
5. Do not make any connections or disconnections (PV, battery, grid, communication, etc.) while the inverter is operating.
6. An installer should make sure to be well protected by reasonable and professional insulative equipment [e.g., personal protective equipment (PPE)].
7. Before installing, operating, or maintaining the system, it is important to inspect all existing wiring to ensure that it meets the appropriate specifications and conditions for use.
8. Ensure that the PV, battery, and grid connections to the inverter are secure and proper to prevent damage or injuries caused by improper installation.
9. Some components of the system can be very heavy. Be sure to utilize team-lift among other safe lifting techniques throughout the installation.

WARNING: *TO REDUCE THE RISK OF INJURY, READ ALL INSTRUCTIONS!*

All work on this product (system design, installation, operation, setting, configuration, and maintenance) must be carried out by qualified personnel. To reduce the risk of electric shock, do not perform any servicing other than those specified in the operating instructions unless qualified to do so.

1. Read all instructions before installing. For electrical work, follow all local and national wiring standards, regulations, and these installation instructions.
2. Make sure the inverter is properly grounded. All wiring should be in accordance with the National Electrical Code (NEC), ANSI/NFPA 70.
3. The inverter and system can inter-connect with the utility grid only if the utility provider permits. Consult with the local AHJ (Authority Having Jurisdiction) before installing this product for any additional regulations and requirements for the immediate area.
4. All warning labels and nameplates on the inverter should be clearly visible and must not be removed or covered.
5. The installer should consider the safety of future users when choosing the inverter's correct position and location as specified in this manual.
6. Keep children from touching or misusing the inverter and relevant systems.
7. **Beware!** The inverter and some parts of the system can be hot when in use. Do not touch the inverter's surface or most of the parts when they are operating. During operation, only the LCD and buttons should be touched.

WARNING!

Cancer and Reproductive Harm – See www.P65Warnings.ca.gov for more details.

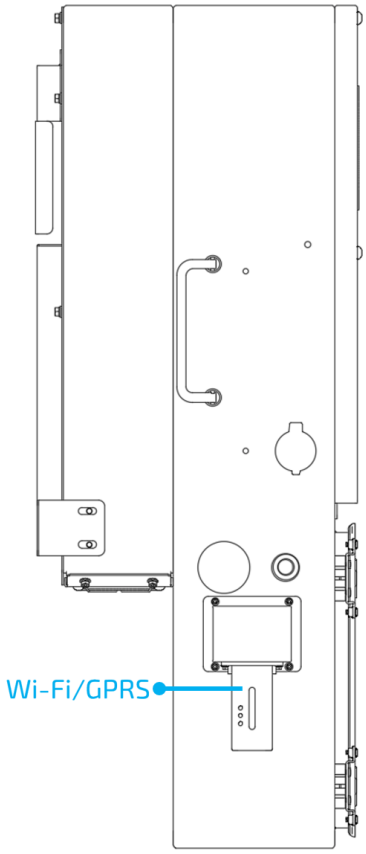
DISCLAIMER

EG4 reserves the right to make changes to the material herein at any time without notice.
Please refer to www.eg4electronics.com for the most updated version of our manuals/spec sheets.

3. MONITOR SYSTEM

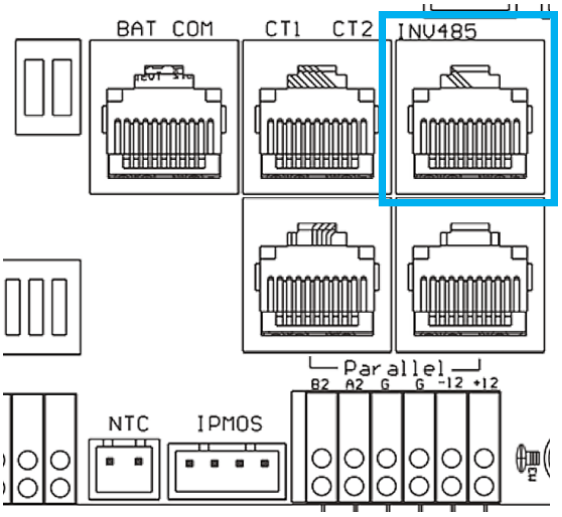
3.1 WI-FI DONGLE CONNECTION

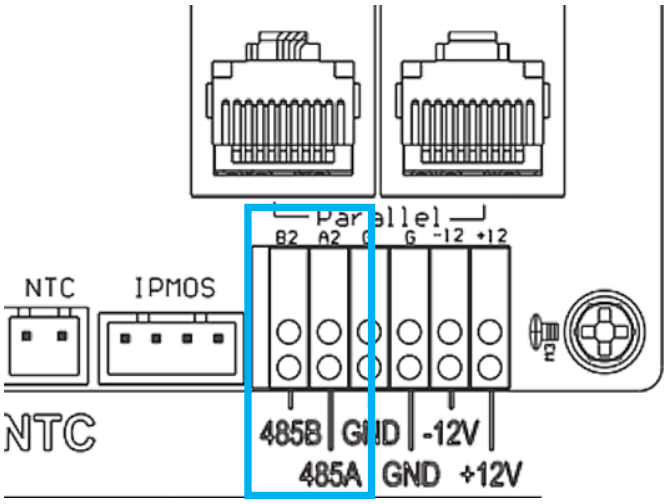
A Wi-Fi dongle can be used to monitor the inverter and remotely view the monitoring data on a computer or smart phone. This module can be attached by plugging it in to the “Wi-Fi” connector on the inverter and securing it with the 4 included size M3x.5 Phillips head screws and a PH1 screwdriver. See section 10 for more information on dongle setup.



3.2 THIRD-PARTY RS485 COMMUNICATION

Ports 485B and 485A (pictured below-right) can be used when an electrical meter is not connected. These two ports can be used to communicate with the inverter using the RS485 Modbus protocol.
INV485: This interface (pictured below-left) is shared with the Wi-Fi module. If the Wi-Fi module is not in use, this interface can be used to communicate with the inverter. Please contact the distributor to get the Modbus protocol for third-party app development.



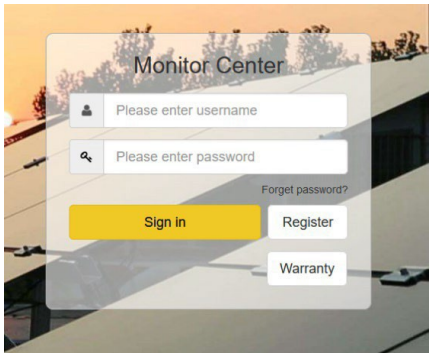


View data on smart phone:

A QR code with app installation steps can be found on the side of the inverter.

Or visit our downloads page at www.eg4electronics.com for more information.

3.3 ONLINE MONITORING SYSTEM USER INTERFACE

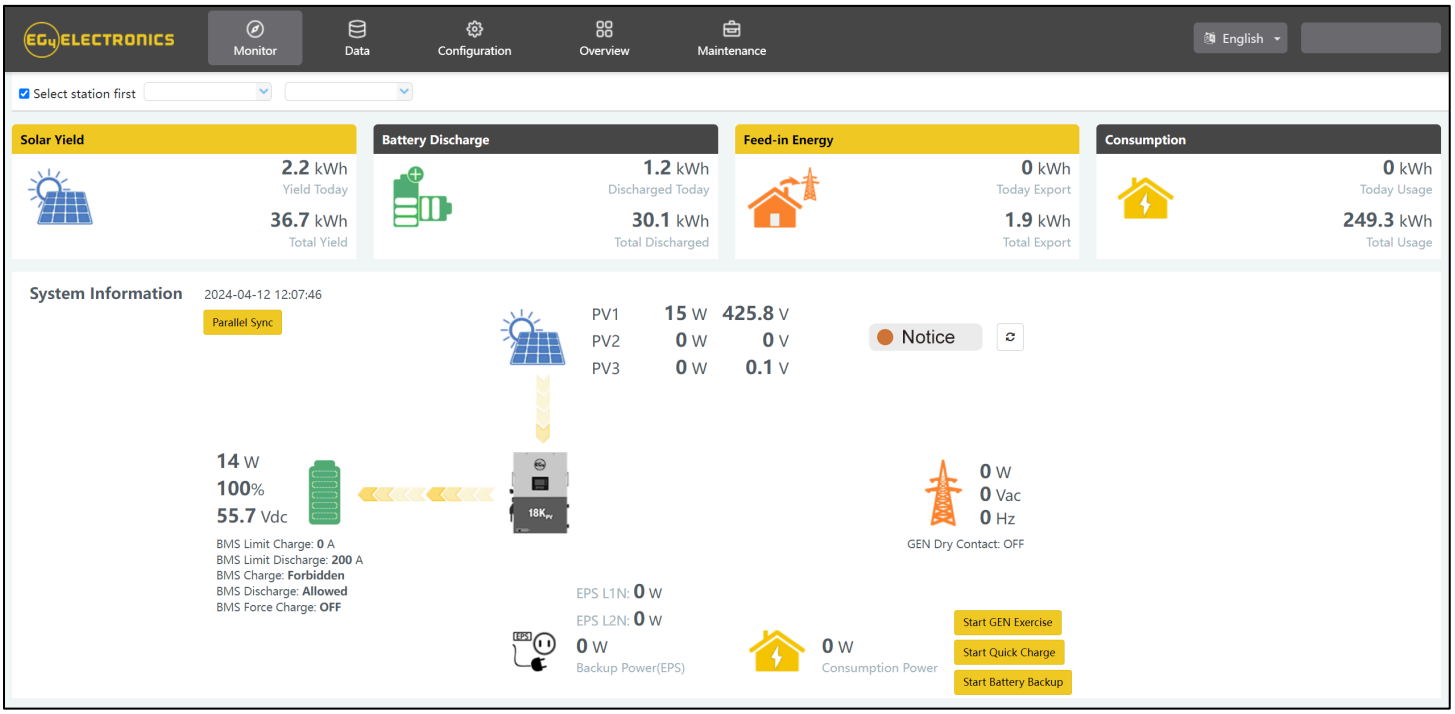


After connecting the Wi-Fi dongle, create an account by registering at https://monitor.eg4electronics.com/.

3.3.1 DASHBOARD (MONITOR TAB)

NOTE: The monitoring system may change due to updates, so you may find the following UI descriptions vary from the current pages on the site. If you have any questions, or to create distributor or installer accounts, please contact support@eg4electronics.com for assistance.

Once the account is created, log in and the main page of the monitoring interface will appear.



NAME	DESCRIPTION
Select station first	Select which station to view, and then select which unit/dongle to view by choosing a serial number from the dropdown list. Note: Unchecking the box will only display serial numbers linked to the account.
Solar Yield	Shows power generated by the solar panels (for AC coupled inverters it shows the power generated by the on-grid inverter). The PV CT clamp will have to be installed to be able to show the data correctly. When the picture of the solar yielding is clicked, it will display how the solar energy has been used that day. A second click will show the totals since commissioning.
Battery Discharging/ Charging	Shows the charge and discharge energy from the battery/batteries. When the battery picture is clicked, the display will switch between battery discharging and battery charging, showing totals for that day and since commissioning.
Feed-in Energy	Shows energy exported to grid for that day and since commissioning. When the picture is clicked, it shows energy imported from the grid for that day and since commissioning.
Consumption	Shows the total energy consumption of the property for that day and since commissioning.
Start Quick Charge	Clicking this will direct the inverter to charge batteries faster for one hour. It will then default back to its original setting.
Select station first	Select which station to view, and then select which unit/dongle to view by choosing a serial number from the dropdown list. Note: Unchecking the box will only display serial numbers linked to the account.

Input & Output Power and Energy Overview can also be viewed via the EG4 Monitoring Software.
See following page for examples.

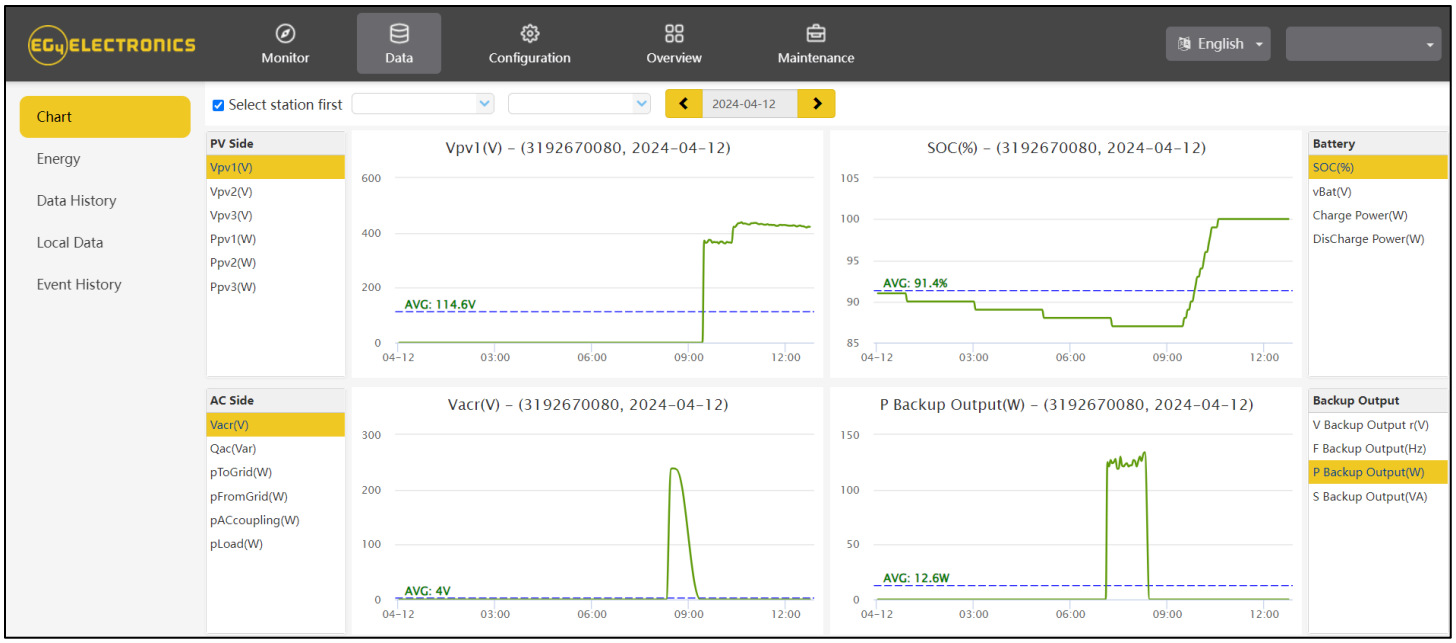
NAME	DESCRIPTION
Input & Output Power	This chart shows the power curve for each day, including solar power, battery charge/discharge power and grid import/export power and consumption. Hovering over an item name will highlight it in the chart. Clicking it will remove it from the list.
Energy Overview	This chart shows energy production and consumption for each day, including solar production, battery, grid export and consumption. Hovering over an item name will highlight it in the chart. Clicking it will remove it from the list. Selecting “Month” will show the energy statistics for each day. Selecting “Year” will show energy for each month. Selecting “Total” will show energy for each year.

3.3.2 DASHBOARD (DATA TAB)

The Data Tab displays additional detailed data including technical details for PV, battery, grid, and loads, that is helpful for analysis and maintenance.
Five categories make up the Data Tab view: "Chart," "Energy," "Data History," "Local data," and "Event History." For more details on each category, please see the following tables.

Chart

Displays various parameters in chart format over a 24-hour period. There are separate charts for “PV Side,” “Battery,” “AC Side,” and “Backup Output.”

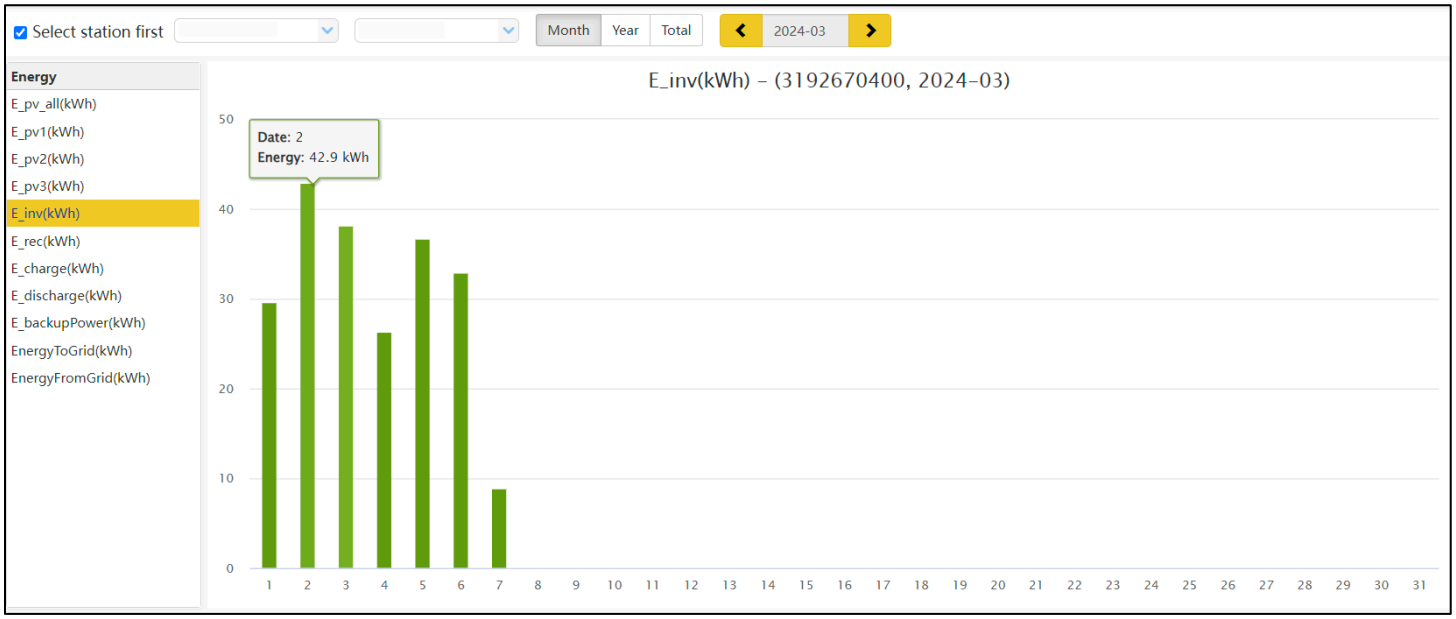


NAME	DESCRIPTION
Vpv	Voltage of solar input
Ppv	Power of solar input
SOC(%)	Battery state of charge
Vacr	Voltage of AC output
Qac	Reactive power of AC output
V Backup Output(V)	Load rated voltage
F Backup Output(Hz)	Load frequency
P Backup Output(W)	Load output power
S Backup Output(VA)	Load Apparent power
pToGrid	Power feed into grid

Energy

Displays how key energy parameters have varied over time.

- Selecting “Month” will show the energy statistics for each day of the month.
- Selecting “Year” will show energy for each month of the year.
- Selecting “Total” will show energy for each year.

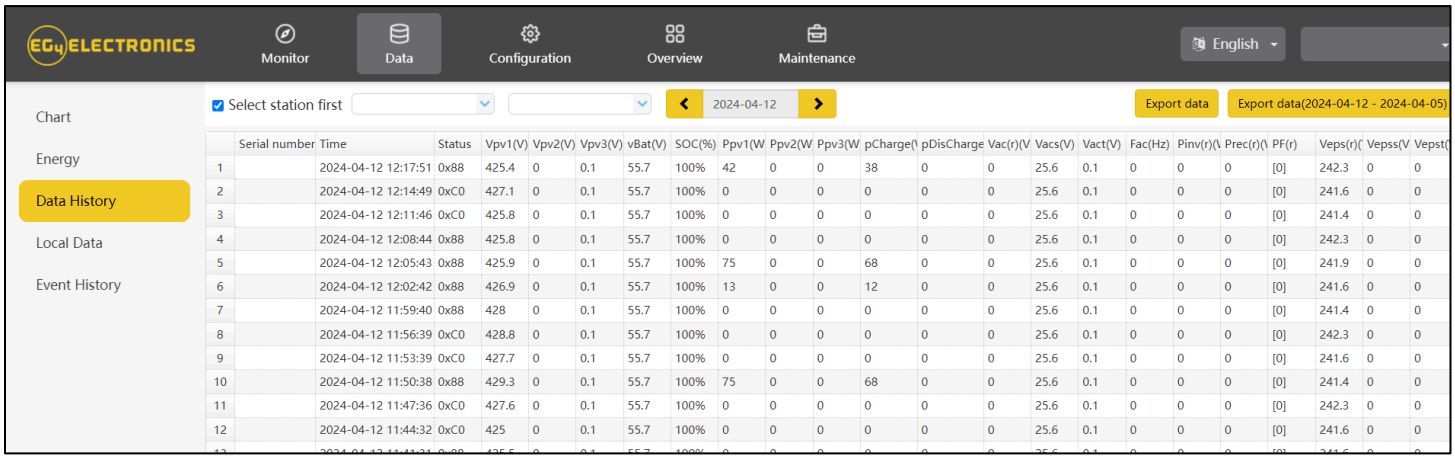


NAME	DESCRIPTION
E_pv1(kWh)	Energy generated by PV string 1
E_pv2(kWh)	Energy generated by PV string 2
E_inv(kWh)	Energy output via AC output
E_rec(kWh)	Energy of AC charge
E_charge(kWh)	Energy used for battery charge
E_discharge(kWh)	Energy output by battery discharging
E_backupPower(kWh)	Load energy output
EnergyToGrid(kWh)	Feed-in energy
EnergyToUser(kWh)	Energy import from grid

History Data

Displays the measured technical characteristics of PV, battery, load, and grid for users or their distributor's examination to promptly address any potential issues.
Advanced technical knowledge is necessary to properly comprehend this table. End users are advised to concentrate solely on the "Monitor" view, "Chart" and "Energy" sections as these only offer simple to comprehend performance data.

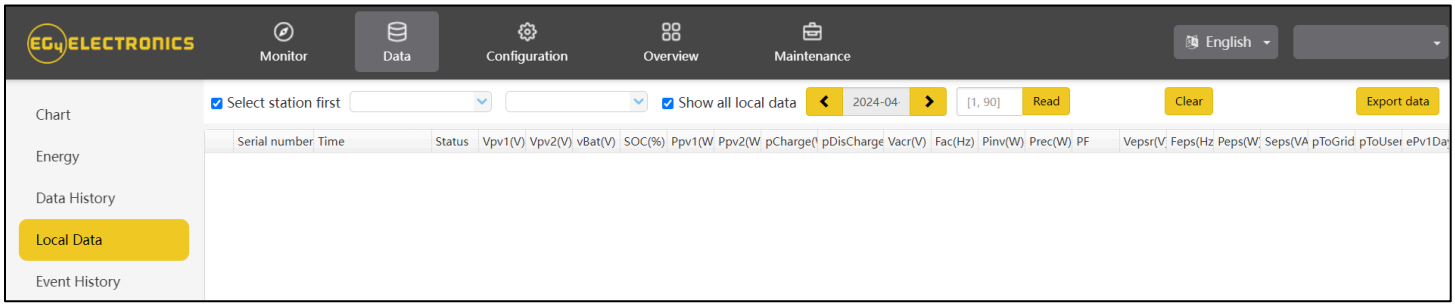
HELPFUL TIP: Data can be exported to an Excel file to provide the distributor for technical support. Distributors can then analyze the following factors to perform quick troubleshooting for their end users.



NAME	DESCRIPTION
PtoGrid/PtoUser	To check if CT was connected correctly
Vpv/Ppv	To check the MPPT
Vo/Po/So	To check the load type and if there is an overload when in load mode
Vb/SOC	To check the current state of charge and if the battery is overcharged or overly discharged.
Vac/Fac	To evaluate Grid performance and to check if working voltage and frequency range is adjusted to comply with grid
E-xxday	To evaluate energy distribution
E-xxall	To check if the system is working well under off grid mode

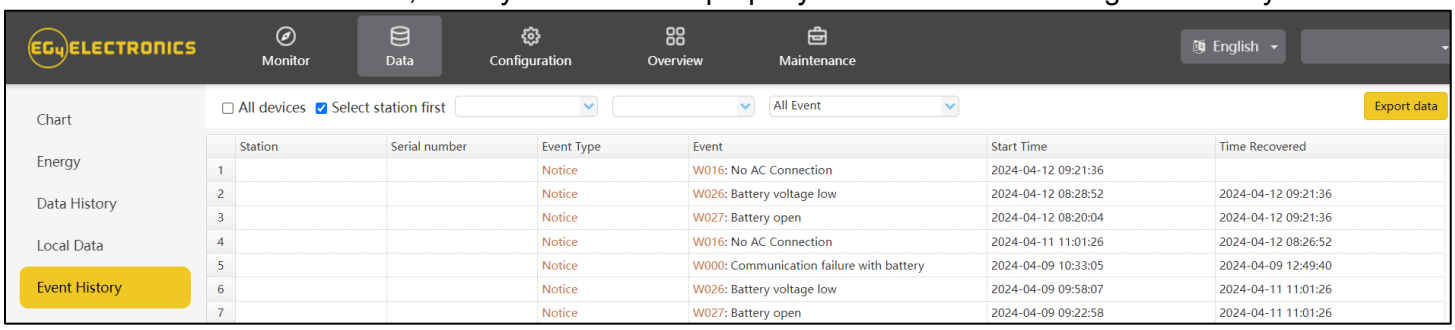
Local Data

The data captured during the offline periods are displayed in the "Local data" section (loss of Internet or Wi-Fi). The only distinction from “Data History” is that it is used for offline data recording. Local data is recorded while the system is offline for more than 20 minutes and is taken every 5 minutes. Data can be stored in the system for a maximum of 90 days.



History Event

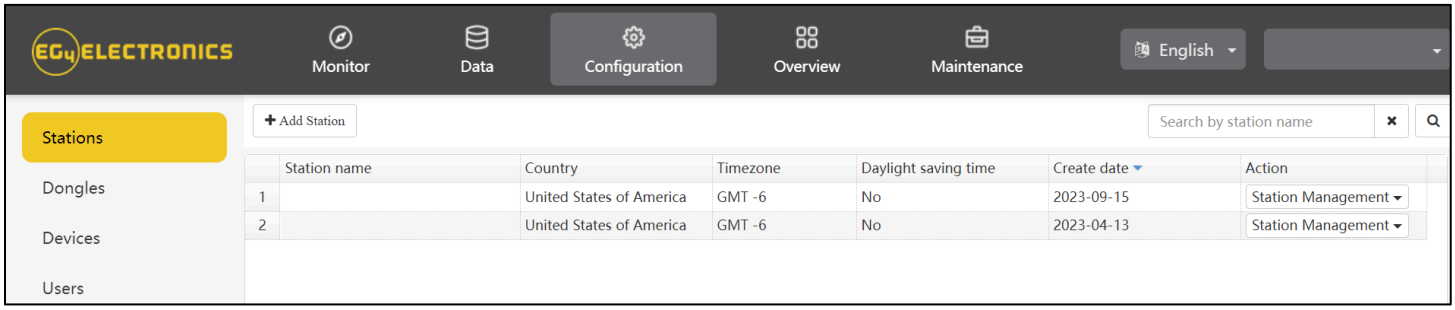
The "Event History" section displays a timeline of events. (Notice and Fault events) If there is not a record of a "historical event," the hybrid inverter is properly connected and working without any issues.



	Station	Serial number	Event Type	Event	Start Time	Time Recovered
1			Notice	W016: No AC Connection	2024-04-12 09:21:36	
2			Notice	W026: Battery voltage low	2024-04-12 08:28:52	2024-04-12 09:21:36
3			Notice	W027: Battery open	2024-04-12 08:20:04	2024-04-12 09:21:36
4			Notice	W016: No AC Connection	2024-04-11 11:01:26	2024-04-12 08:26:52
5			Notice	W000: Communication failure with battery	2024-04-09 10:33:05	2024-04-09 12:49:40
6			Notice	W026: Battery voltage low	2024-04-09 09:58:07	2024-04-11 11:01:26
7			Notice	W027: Battery open	2024-04-09 09:22:58	2024-04-11 11:01:26

3.3.3 DASHBOARD (CONFIGURATION TAB)

The “Configuration” page is used for users to manage their station, dongle, and user information.

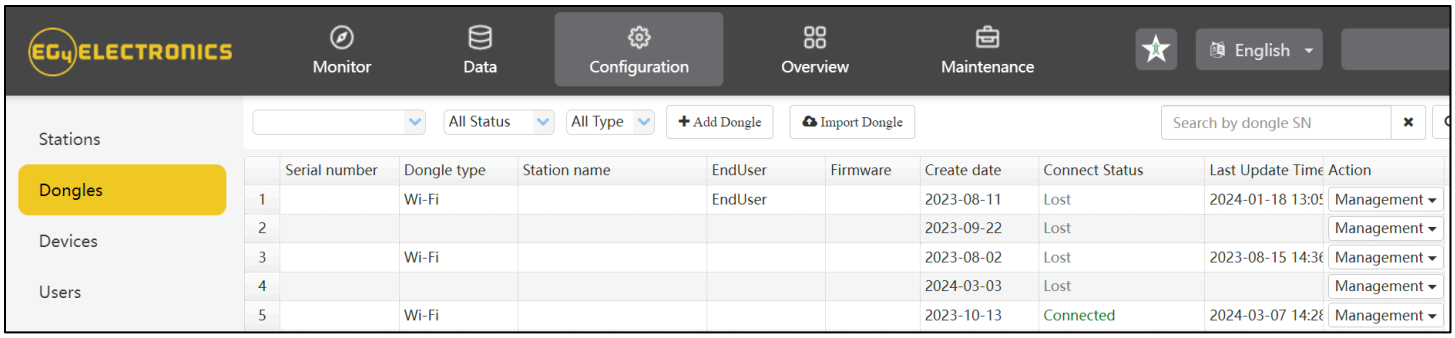


	Station name	Country	Timezone	Daylight saving time	Create date	Action
1		United States of America	GMT -6	No	2023-09-15	Station Management
2		United States of America	GMT -6	No	2023-04-13	Station Management

Stations

The Stations section will show all stations linked to the account. Clicking on a station name will display all inverters under that station or location.

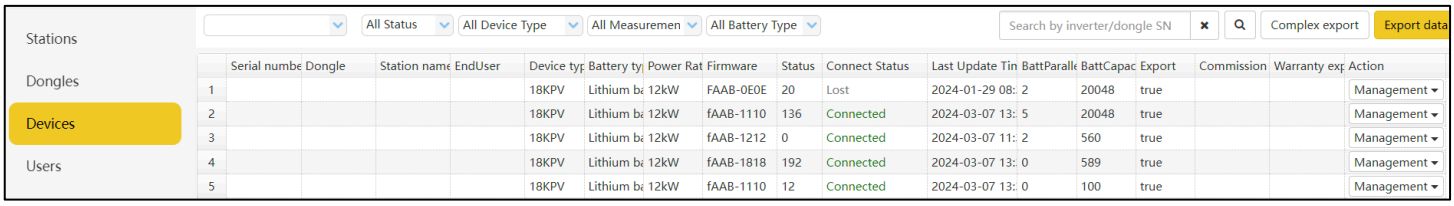
Clicking the Add Station button creates another site if there is more than one station under the same account. This is useful for distributors who have multiple customers who would like assistance with monitoring/troubleshooting their inverters.



Dongles

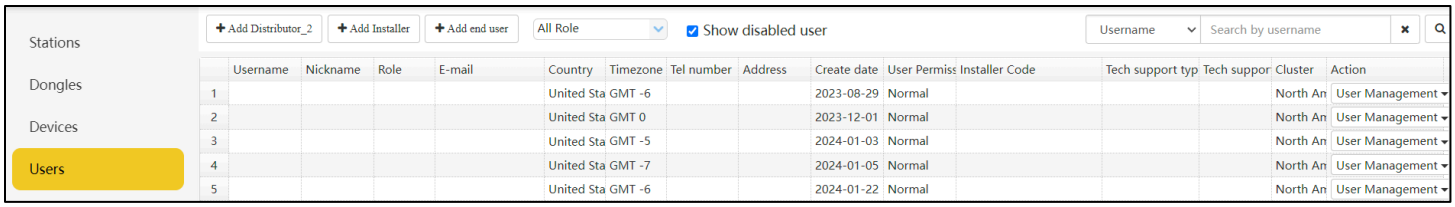
Users can add the dongle Serial Number (SN) in the station if they have more than one inverter in the station. The inverter will be shown on the system immediately when powered on after adding the dongle and configuring the proper password for the Wi-Fi dongle. Dongles can also be searched by individual serial number.

IMPORTANT: Before configuring the password for the Wi-Fi dongle, please add the dongle to the monitor system.



Devices

Users can see the entire inverter list connected to the account and check if the inverter is online. Data can be exported to an Excel file for record keeping or to view specific inverter stats.



Users

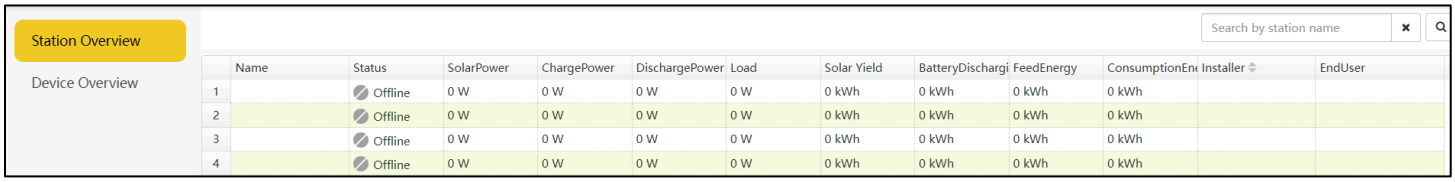
This tab shows a full list of users, distributors and any other roles linked to the account. End users can edit password and personal information in the user page. Distributors can add an installer account and end user account on this page.

3.3.4 DASHBOARD (OVERVIEW TAB)

"Overview" allows EG4 or its distributors to quickly monitor system-wide data for their end users, such as solar yields, battery discharging, and other factors.

Station Overview

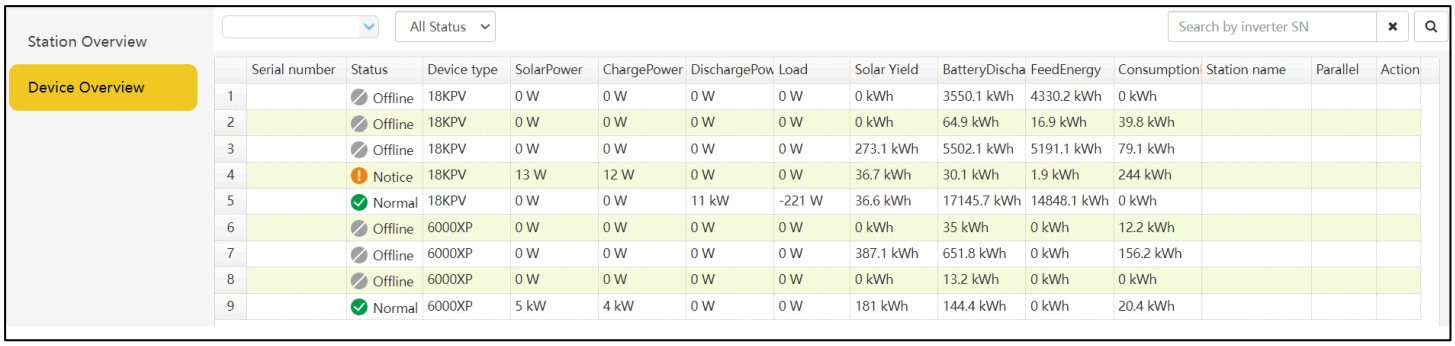
All the stations linked to the account can be found here. Clicking a station name will switch the main page to show the real time data.



	Name	Status	SolarPower	ChargePower	DischargePower	Load	Solar Yield	BatteryDischargi	FeedEnergy	ConsumptionEn	Installer	EndUser
1		Offline	0 W	0 W	0 W	0 W	0 kWh	0 kWh	0 kWh	0 kWh		
2		Offline	0 W	0 W	0 W	0 W	0 kWh	0 kWh	0 kWh	0 kWh		
3		Offline	0 W	0 W	0 W	0 W	0 kWh	0 kWh	0 kWh	0 kWh		
4		Offline	0 W	0 W	0 W	0 W	0 kWh	0 kWh	0 kWh	0 kWh		

Device Overview

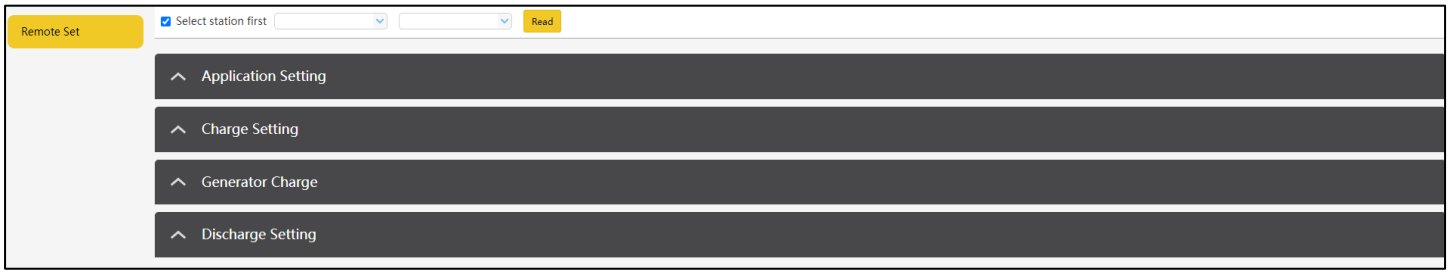
All the inverters linked to the account can be found here. Clicking a serial number will switch the main page to show the real time data for that inverter.



	Serial number	Status	Device type	SolarPower	ChargePower	DischargePow	Load	Solar Yield	BatteryDischa	FeedEnergy	Consumption	Station name	Parallel	Action
1		Offline	18KPV	0 W	0 W	0 W	0 W	0 kWh	3550.1 kWh	4330.2 kWh	0 kWh			
2		Offline	18KPV	0 W	0 W	0 W	0 W	0 kWh	64.9 kWh	16.9 kWh	39.8 kWh			
3		Offline	18KPV	0 W	0 W	0 W	0 W	273.1 kWh	5502.1 kWh	5191.1 kWh	79.1 kWh			
4		Notice	18KPV	13 W	12 W	0 W	0 W	36.7 kWh	30.1 kWh	1.9 kWh	244 kWh			
5		Normal	18KPV	0 W	0 W	11 kW	-221 W	36.6 kWh	17145.7 kWh	14848.1 kWh	0 kWh			
6		Offline	6000XP	0 W	0 W	0 W	0 W	0 kWh	35 kWh	0 kWh	12.2 kWh			
7		Offline	6000XP	0 W	0 W	0 W	0 W	387.1 kWh	651.8 kWh	0 kWh	156.2 kWh			
8		Offline	6000XP	0 W	0 W	0 W	0 W	0 kWh	13.2 kWh	0 kWh	0 kWh			
9		Normal	6000XP	5 kW	4 kW	0 W	0 W	181 kWh	144.4 kWh	0 kWh	20.4 kWh			

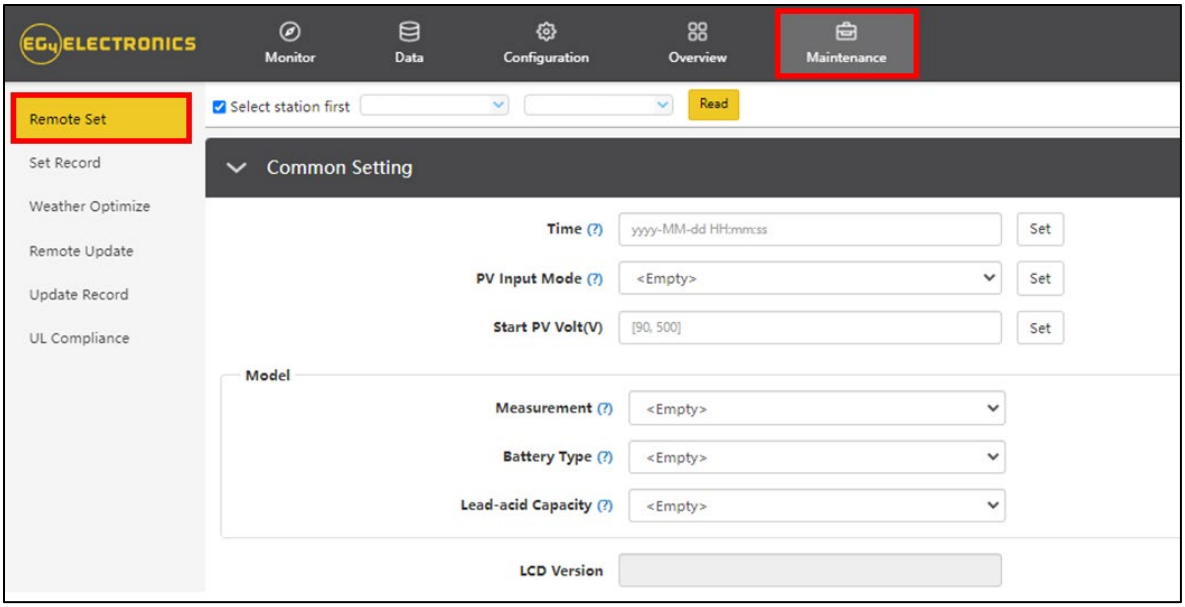
3.3.5 DASHBOARD (MAINTENANCE TAB)

The "Maintenance" view is used for firmware updates and to remotely change settings on the inverter by selecting a station and then an inverter serial number.
Distributors can manage all settings for all inverters at once with the help of the batch setting capability supported by EG4's monitor system.

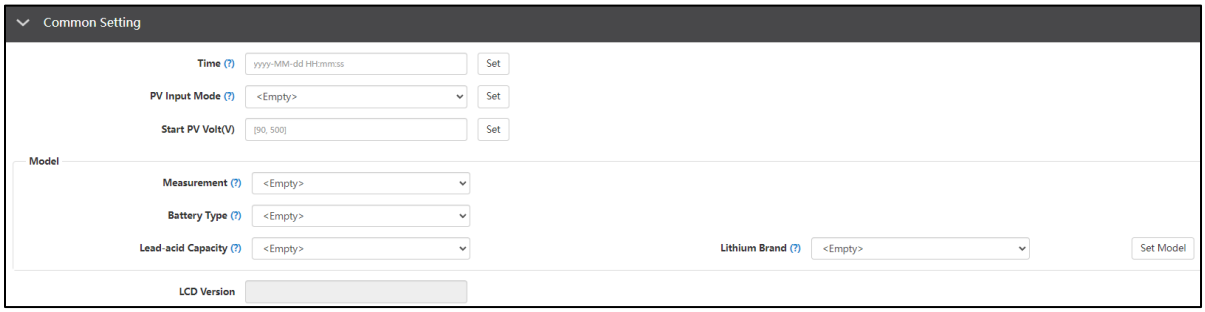


4. MONITOR SYSTEM SETTINGS OVERVIEW

All of the settings that will be discussed in section 4 can be found under the Maintenance Tab of the EG4 Monitor site, as shown below.



4.1 COMMON SETTINGS



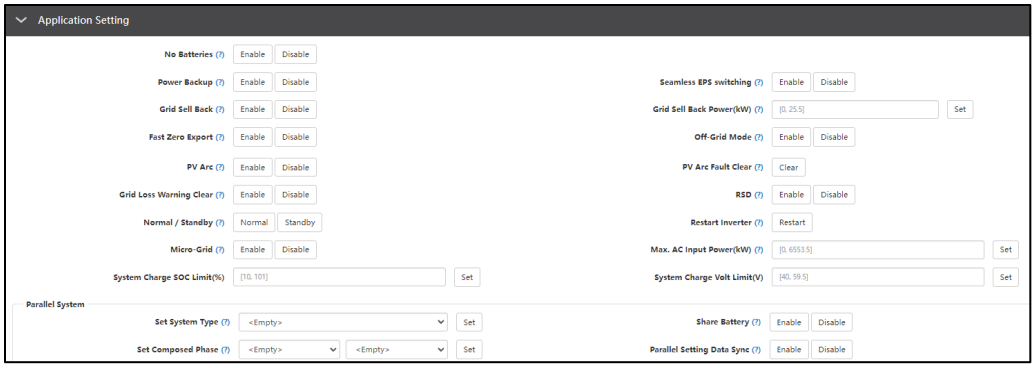
- **Time:** Set the time/date of the inverter. The input format is 2019-02-14 14:44:00 (YYYY-MM-DD HH:MM:SS.)
- **PV Input Mode:** The connection type of solar modules.
- **Start PV Volt (V)**

Model

- **Measurement:** Choose the correct measurement, Meter Type or CT Sample Ratio according to the external measuring device you installed. The default measurement is CT with sample ratio: 1000/1, and you can adjust the measurement if you have installed a meter to the inverter.
- **Battery Type:** Choose the battery type and then select Lithium Brand (for closed-loop communications), or battery capacity for Lead-Acid/Lithium batteries with no communications. Please note after setting the battery type, all other settings will reset to default.
- **Lead-acid Capacity:** Set the total capacity when using Lead-Acid batteries.
- **Lithium Brand:** Choose the brand of lithium battery being used.

NOTE: *When you need to change the "Model" settings, you need to set inverter to "Standby" first, and then press "Set Battery" to change the model.*

4.2 APPLICATION SETTINGS



- **No Batteries:** Allows access to off-grid mode when only solar input is available without battery storage.
- **Power Backup:** If Power Backup function is Enabled, the LOAD terminal will maintain output when AC is interrupted. You can set “Power Backup” via web or “Off-Grid Output” by LCD. (When enabling this mode, the inverter’s output will be uninterrupted.)
- **Seamless EPS Switching:** When power is interrupted, the inverter will turn to EPS mode seamlessly unless there is a grid voltage fluctuation issue; in which case, we suggest you set to “Disable” to avoid misjudgment.
- **Grid Sell Back:** In some cases, the customer cannot feed energy into grid. If the customer does not want to feed energy to grid, the Grid Sell Back function can be disabled.
- **Grid Sell Back Power(kW):** If Grid Sell Back function is enabled, you can adjust the power limitation to feed into the grid.
- **Fast Zero Export:** Normally the inverter will adjust output power every 5 seconds to avoid export. If Fast Zero Export is enabled, the inverter will adjust output power accordingly.
- **Off-Grid Mode:** Enable for nominal Off-Grid operations while utilizing AC Input as a backup power source, allowing for absolute zero export.
- **PV Arc:** The inverter will detect when there is a PV input Arc Fault and protect the inverter from an Arc Fault.
- **PV Arc Fault Clear:** Clear the records of PV Arc fault.
- **Grid Loss Warning Clear:** Enable for Off-Grid Operations.
- **RSD:** The rapid shut-down detection of the PV inputs.
- **Normal/Standby:** “Standby” is used to set the system into standby mode, stopping feed in, charge and discharge. “Normal” is used to set the whole system to auto run status.
- **Restart Inverter:** Resets the inverter.
- **Micro-Grid:** Should be set only when the generator is connected to the Inverter’s Grid terminal. With this option enabled, the inverter will used AC power to charge the battery and will not export any power through the Grid terminal if AC power is present at the inverter’s Grid terminal.
- **Max. AC Input Power(kW):** The inverter can adjust the charge power based on the detected inverter’s load consumption and maximum AC input power limitation.
- **System Charge SOC Limit(%)**
- **System Charge Volt Limit(V)**

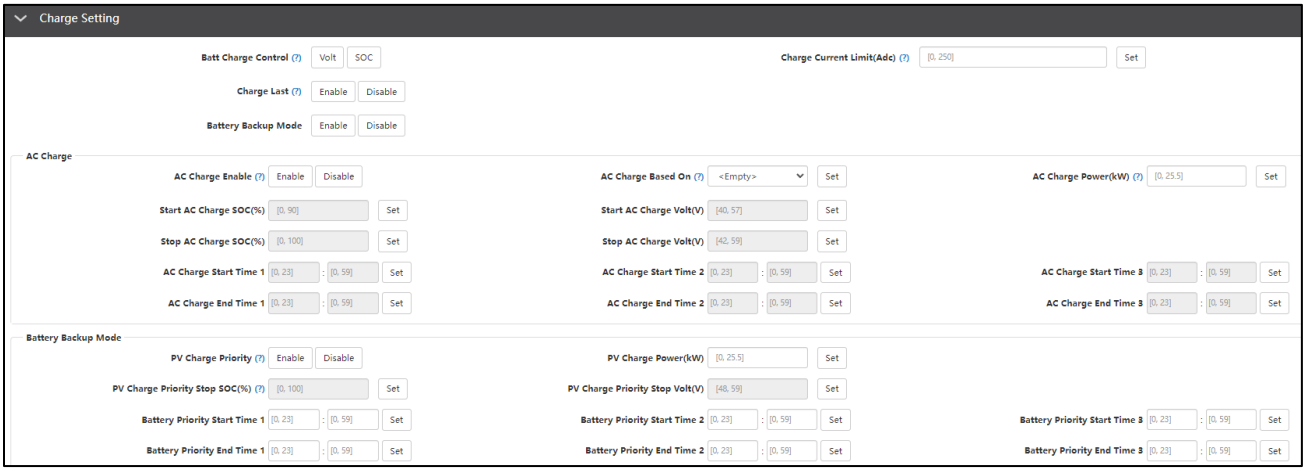
Parallel System

- **Set System Type:** The EG4 12kPV supports paralleling of multiple inverters. You would need to connect the LOAD terminals together for paralleling. In this scenario we need to set one of the inverters to Master and the others to Slave. If you install all inverters as single-phase, be sure to set one of the inverters to “1 Phase Master.” If you want to compose a three-phase system, set one of the inverters to “3 Phase Master.” All inverters are set to Slaves by default, so when you get the inverters, you will need to set one inverter to Master when paralleling multiple inverters.
- **Share Battery:** For paralleled systems: if all inverters connect to same battery bank, you must enable Share Battery. The Master inverter will broadcast the battery information to all other inverters.
- **Set Composed Phase:** When you use ≥ 3 inverters to compose a three-phase system, you must connect the AC terminals of the inverter to a three-phase grid (used when composing a three-phase system). If the system is connected to the grid, the inverter will detect the phase it connects to automatically, record it and output the phase as it detected. If the user setting is different from the phase the inverter detected, it will output the phase detected. The output phase record will be cleared if the customer clears it. If the system is not connected to the grid, the inverter will use the user output phase setting to compose the three-phase output. If the customer sets the wrong phase, i.e., 2 U phase and no W phase, the system will report error.
- **Parallel Setting Data Sync:** Syncs master inverter settings to those of the slave inverter(s).

4.3 GRID CONNECT SETTINGS

- **Grid Frequency:** If the Grid Frequency is nominal at 50Hz, then the inverter’s Frequency will be adjusted to 50Hz automatically. If there is no grid power and it is read as 50Hz but the devices are 60Hz, then you can set it to 60Hz manually. This is based on the rated frequency of the local grid regulation and devices.
- **Grid Type:** Select the correct Grid type to function, such as split phase: 240/120 or 208/120V.

4.4 CHARGE SETTINGS



- **Battery Charge Control:** If the inverter communicates with the Lithium battery and is capable of closed-loop communication, then you can select charge control according to "SOC." If communication is not available, you can always select charge control according to "VOLT."
- **Charge Current Limit (Adc):** The Max. Charge current limitation of the entire system.
- **Charge Last:** Charges battery last.
- **Battery Backup Mode**

AC Charge

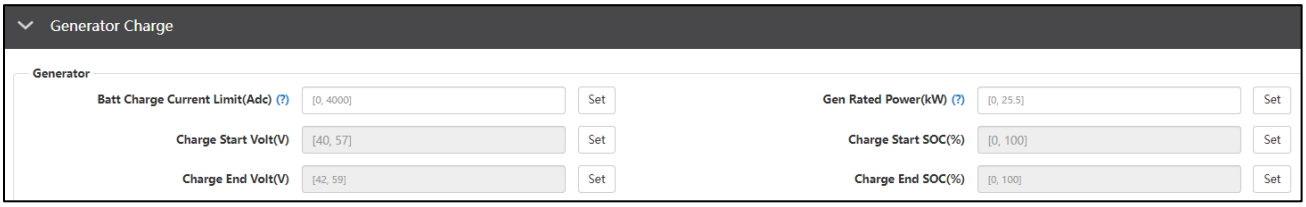
- **AC Charge Enable:** If using AC (i.e., the Grid) to charge the battery, the customer must (1) Enable "AC Charge Enable," (2) set the max power to charge the battery from AC (AC Charge Power (kW), (3) set the SOC and Voltage Limits (Start AC Charge SOC(%)/Volt(V) and Stop AC Charge SOC (%)/Volt(V)) and (4) set the time period to use the AC to charge the battery. There are 3 time periods that can be set. If the battery SOC and Voltage is within the limits, the system will use AC from the Grid to charge the battery during the time that is set.
- **AC Charge Based On:** According to time: Set a preferred time period to charge your battery range: 00:00 – 23:59. According to voltage: Set AC to charge the battery when it drops to a pre-set voltage. Range: 50-59V. (Recommend using with Lithium Battery)
- **AC Charge Power (kW):** The max charging power from grid.
- **AC Charge:** Set AC charging according to Time or Volt(V)/SOC (%).
- **Start AC Charge SOC(%)/Volt(V):** Limit of SOC and Voltage at which system will start charging batteries from AC.
- **Stop AC Charge SOC(%)/Volt(V):** Limit of SOC and Voltage at which system will stop charging batteries from Grid.
- **AC Charge Start Time 1-3:** Start AC Charging according to these time settings.
- **AC Charge End Time 1-3:** Stop AC Charging according to these time settings.

Battery Backup Mode

- **PV Charge Priority:** In this mode, solar will charge battery first. After charging batteries, solar will supply any loads. Lastly, it will feed into the grid if surplus power is generated.
- **PV Charge Power(kW)**
- **PV Charge Priority Stop SOC (%):** When SOC reaches this limit, charge first mode will end.

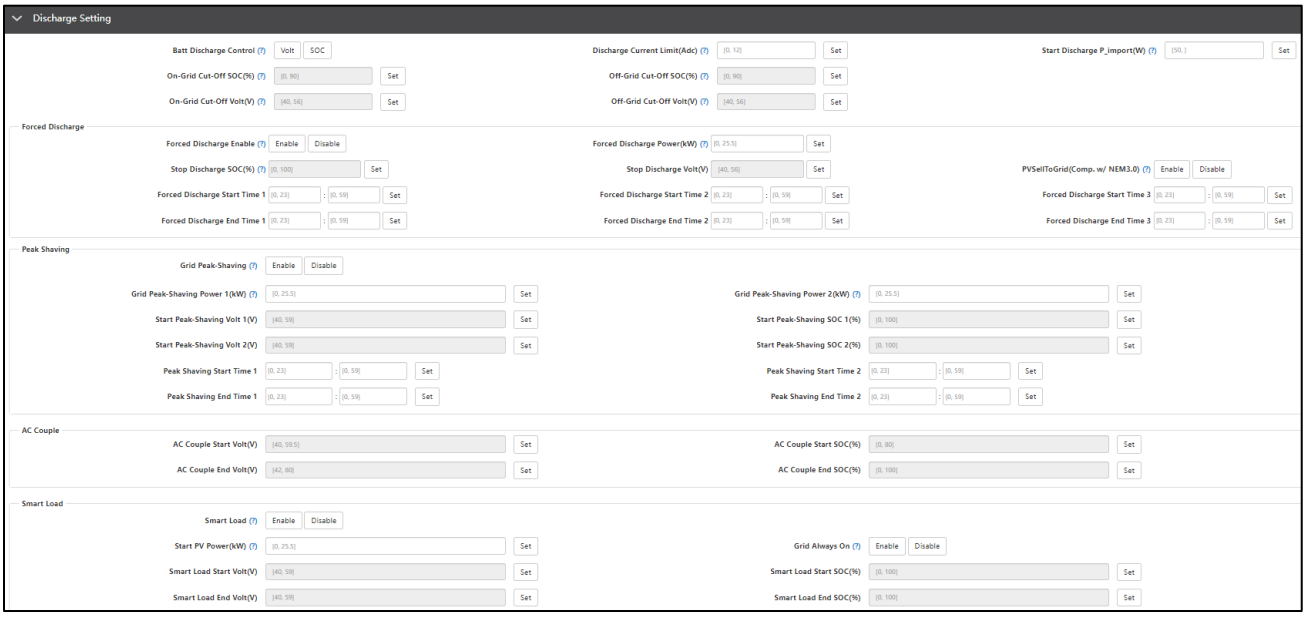
- **PV Charge Priority Stop Volt (V):** When voltage reaches this limit, charge first mode will end.
- **Battery Priority Start Time 1-3:** Start time for charge first setting.
- **Battery Priority End Time 1-3:** End time for charge first setting.

4.5 GENERATOR CHARGE SETTINGS



- **Batt Charge Current Limitation (Adc)** - Battery charge current limitation from Generator.
- **Gen Rated Power (kW)** - You can limit the battery charge power based on the detected inverter's load consumption and Generator input power limitations.
- **Charge Starts Volt(V)/SOC (%)**- While using auto-start function of the generator, you can limit the charge start voltage / SOC to start up the generator automatically.
- **Charge End Volt(V)/SOC (%)**- While using auto-start function of the generator, you can limit the charge end voltage / SOC to turn off the generator automatically.

4.6 DISCHARGE SETTINGS



- **Batt Discharge Control:** If the inverter communicates with the Lithium battery and is capable of closed-loop communication, then you can select discharge control according to "SOC." When using Lead-Acid batteries or Lithium batteries without communication, you can always select discharge control according to "VOLT."
- **Discharge Current Limit (Adc):** The max. discharge current limit when grid power is on.
- **Start Discharge P_Import(W):** Default value is 100 which means the battery will begin to discharge power to take the load when the import power from grid is higher than 100W. (Adjust range [50-100]).

- **On-Grid Cut-Off SOC(%)/Volt(V):** When the inverter connects to the grid and if the battery is discharging to take the load, it will stop discharge when the SOC/Voltage is lower than this limit.
- **Off-Grid Cut-Off SOC(%)/Volt(V):** When the inverter is not connected to the grid and the battery is discharging to take the load, the battery will stop discharging when the SOC/Voltage is lower than this limit.

Forced Discharge

- **Forced Discharge Enable/Disable:** If the customer wants to simply discharge the battery; you can enable forced discharge function and set both the discharge power and time period.
- **Forced Discharge Power(kW):** Forced discharge power limit.
- **Stop Discharge SOC(%)/Volt(V):** If Battery SOC is lower than this limit, the inverter will stop forced discharging function.
- **PVSellToGrid(Comp. w/ NEM3.0):** Enable or disable PV sell back to grid feature.
- **Forced Discharge Start Time 1-3:** Start time for Forced Discharge.
- **Forced Discharge End Time 1-3:** End time for Forced Discharge.

Peak Shaving

- **Grid Peak-Shaving:** Peak-Shaving is used to avoid peak demand charges from the grid. Peak shaving can be accomplished by halting Grid Charging at specific times. For example, during periods of peak demand (i.e., high grid rates), or when the batteries are near fully charged based on SOC and Voltage. See Section 11.1.2 for more information regarding Peak-Shaving settings.
- **Grid Peak-Shaving Power 1-2(kW):** Used to set the max. power that the inverter can draw from the grid.
- **Start Peak-Shaving Volt/SOC 1(V):** The point at which Peak-Shaving starts.
- **Start Peak-Shaving Volt/SOC 2(V):** The point at which Peak-Shaving stops.
- **Peak-Shaving Start Time 1-2:** The time of day at which charging by the grid will be halted.
- **Peak-Shaving End Time 1-2:** The time of day at which charging by the grid will resume.

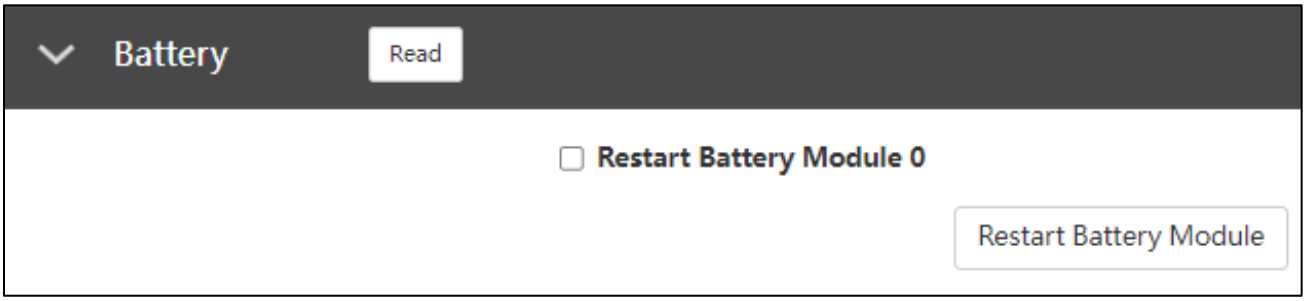
AC Couple

- **AC Couple Start Volt(V)/SOC (%):** AC Coupling will start at this set Voltage/SOC.
- **AC Couple Stop Volt(V)/SOC (%):** AC Coupling will stop at this set Voltage/SOC.

Smart Load

- **Smart Load Enable/Disable:** When Smart load function is enabled, the GEN terminal will be reused to Smart Load, and the inverter will offer power to this load based on the setup values.
- **Start PV Power (kW):** This is the min. PV power limit to function with smart load output.
- **On Grid Always On:** Once this function is enabled, smart load will always function when grid power is on.
- **Smart Load Start SOC (%) / Volt (V):** The high limit for battery to turn on smart load.
- **Smart Load Stop SOC (%) / Volt (V):** The low limit for battery to turn off smart load.

4.7 BATTERY



- **Restart battery module**

4.8 RESET

- **Reset:** Reset all settings to default.

5. OPERATION GUIDE

5.1 OPERATION MODE AND FUNCTION

5.1.1 SELF-USAGE MODE

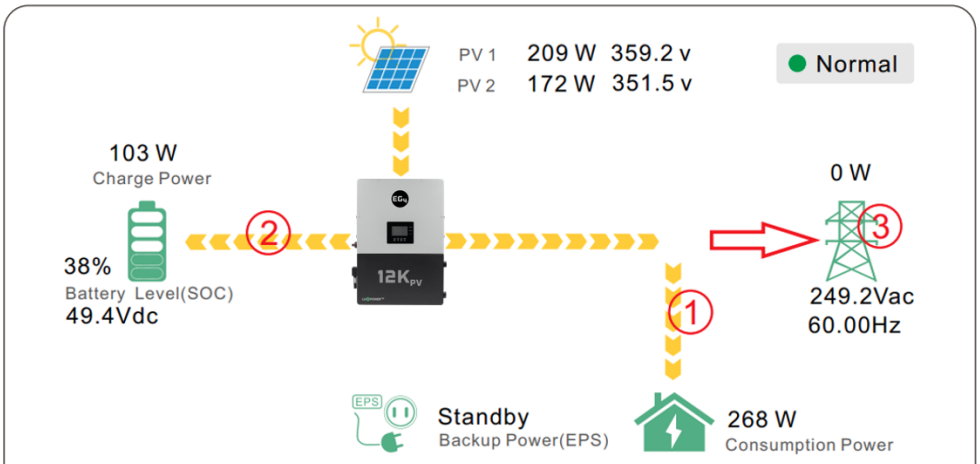
In this mode, the order of priority for powering loads is Solar>Battery>Grid. The order of priority for solar power usage is Load>Battery.

Application Scenarios

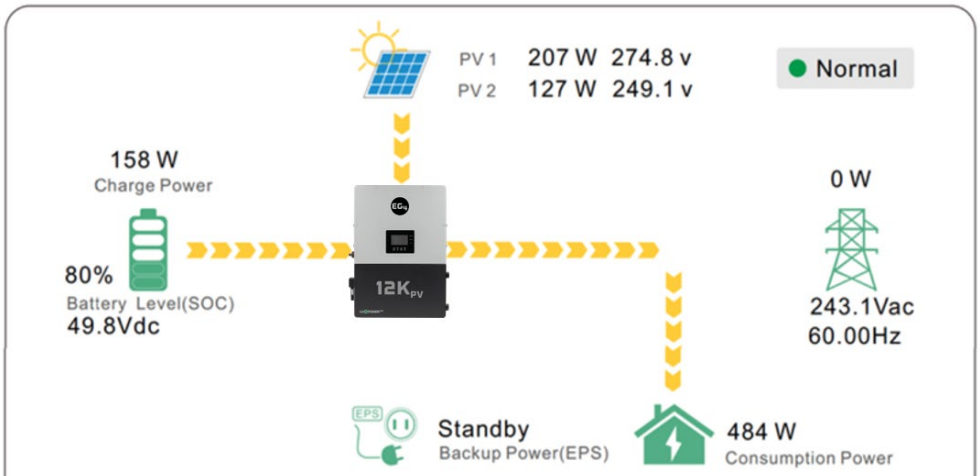
Self-usage mode will increase the self-consumption rate of solar power and reduce energy bills.

Related Settings

Effective when Charge Priority, AC Charge, and Forced Discharge are disabled.



When solar power is adequate, solar will first power the load. Then, with any excess power, it will charge the battery.



When solar is not enough to power the load, solar and battery will power the load together. If the battery is empty, the grid will then be used to power the load.

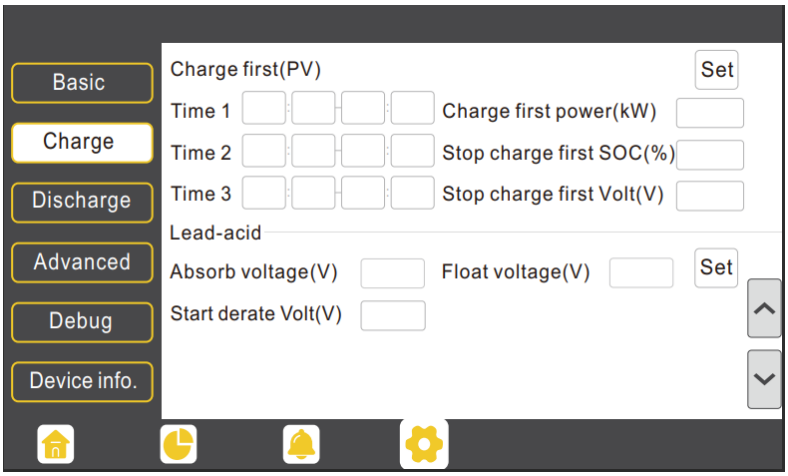
5.1.2 CHARGE FIRST MODE

The order of priority for solar power usage will be Battery>Load>Grid. During the **charge first** period, loads are first supplied power from the grid. If there is excess solar power after charging batteries, the excess solar will power the loads along with grid power.

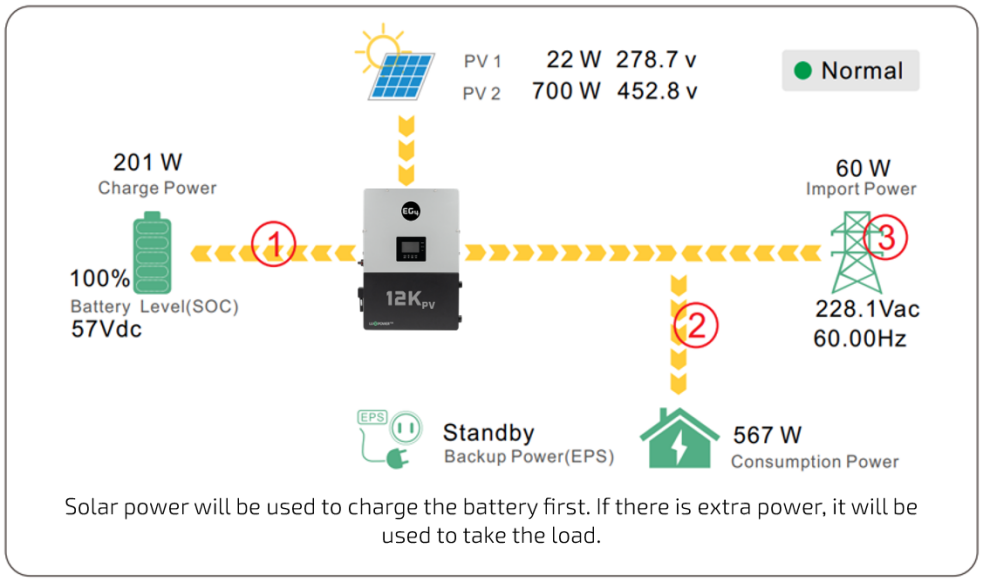
Application Scenarios:

When users want solar power to charge batteries and the grid is used to power loads.

Related Settings:

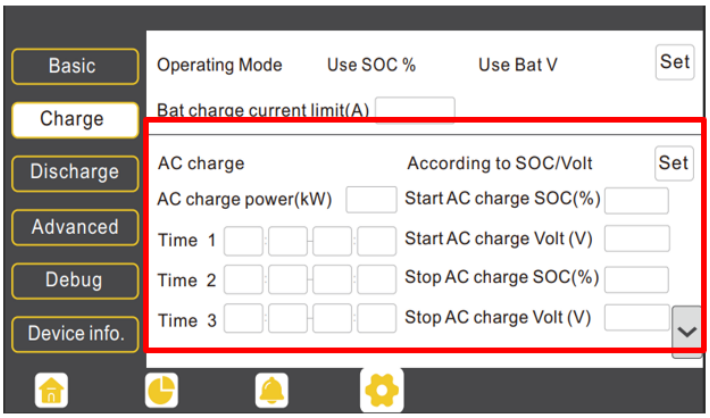


Example



Solar power will be used to charge the battery first. If there is extra power, it will be used to take the load.

5.1.3 AC CHARGE MODE



AC charge mode

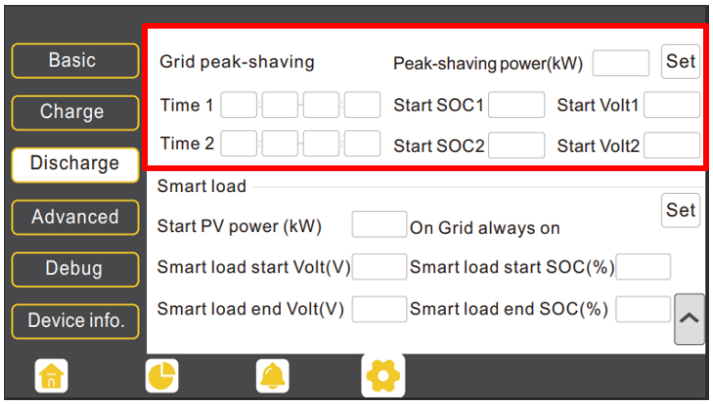
Users can charge batteries with grid power when electricity prices are low, then use battery power run loads or export to the grid when electricity prices are high.

Application Scenarios

When users have a Time of Use (TOU) rate plan.

Related Settings (see image to left)

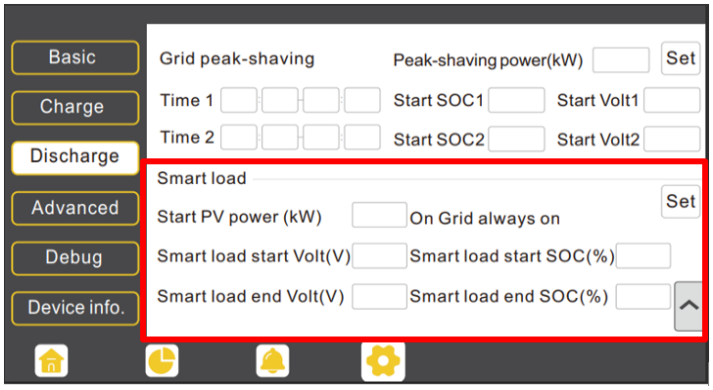
5.1.4 GRID PEAK-SHAVING FUNCTION

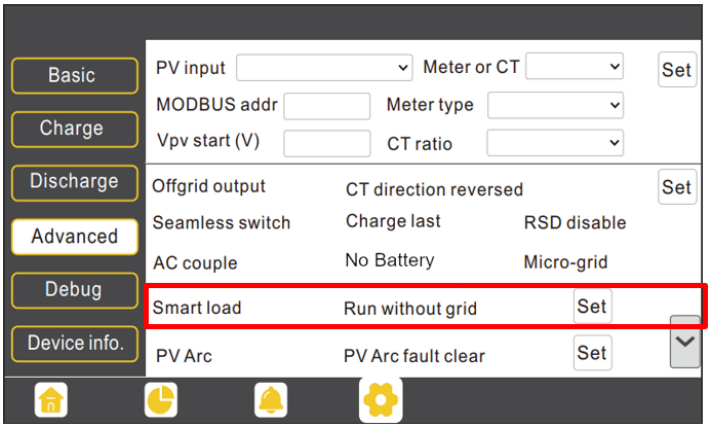


Grid peak-shaving and peak-shaving power (kW):

Used to set the maximum power that the inverter will draw from the grid. The minimum setting value is 0.2kW.

5.1.5 SMART LOAD FUNCTION





Smart Load: This function will make the GEN input connection point to a load connection point. If enabled, the inverter will supply power to this load when the battery SOC and PV power are above user set values.

For Example: *Smart load start SOC=90% Smart load end SOC=85%*
Start PV power=1kW means:

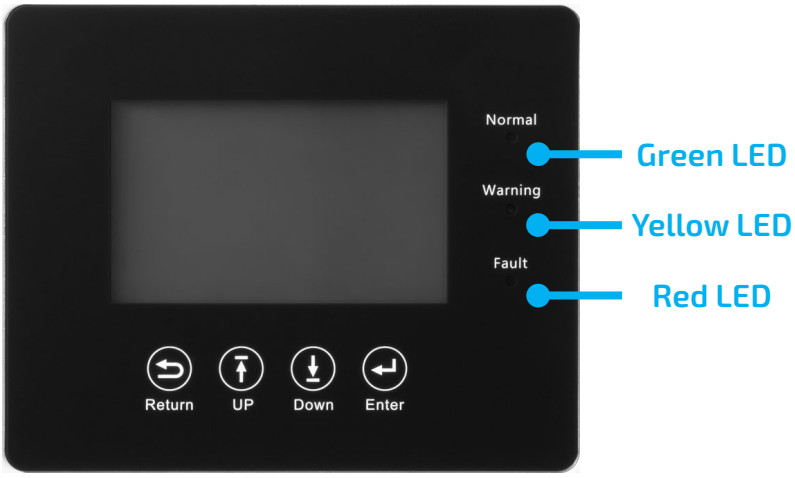
When the PV power exceeds 1000W, and the battery system SOC gets to 90%, the Smart Load Port (GEN) will automatically switch on to power the connected load. When the battery reaches SOC<85% or PV power<1000W, the Smart Load Port automatically switches off.

Important Note:
*If the smart load function is enabled, a generator **cannot** be connected at the same time; otherwise, the device will be damaged!*

5.2 LCD DISPLAY AND SETTINGS

Users can wake up the LCD screen by simply pressing the Enter button. System status, real-time power, and daily/accumulated energy information can all be conveniently viewed on the inverter's LCD screen. Additionally, users can also check the alarm and fault record on the display for troubleshooting.

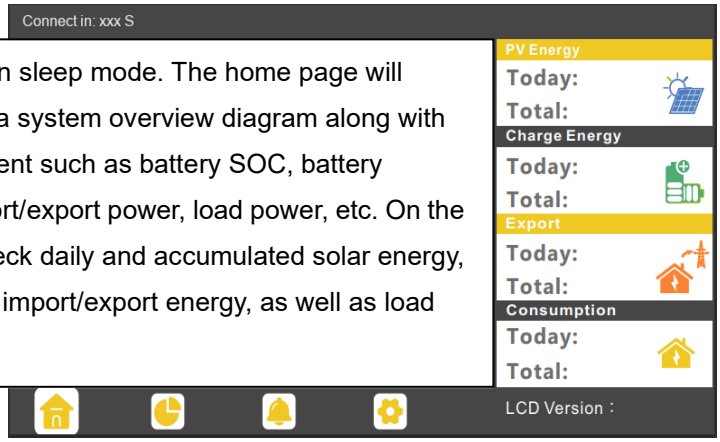
LED	Display	Description	Action
Green LED	Solid lit	Working normally	No action needed
	Flashing	Firmware upgrading	Wait until update is complete
Yellow LED	Solid lit	Warning, inverter may stop working	Needs troubleshooting
Red LED	Solid lit	Fault, inverter will stop working	Needs troubleshooting



5.2.1 VIEWING INFORMATION AND ALARM FAULT/RECORD

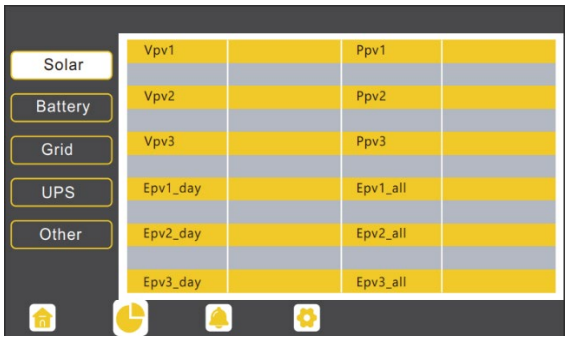
Home Screen

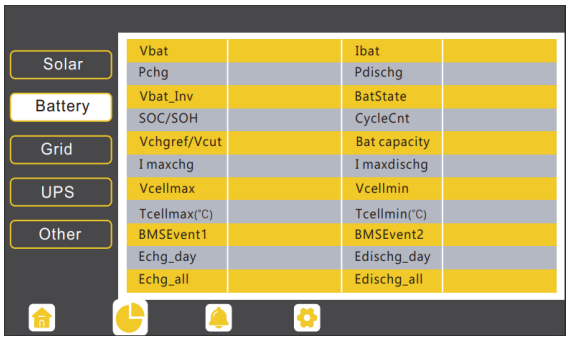
Touch the LCD screen to light it up if in sleep mode. The home page will appear on the display. Users will see a system overview diagram along with real-time information of each component such as battery SOC, battery charging/discharging power, grid import/export power, load power, etc. On the right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

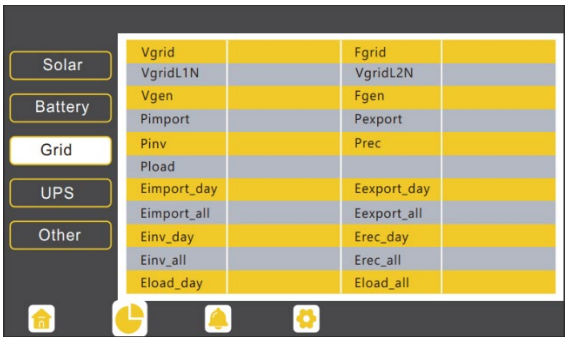


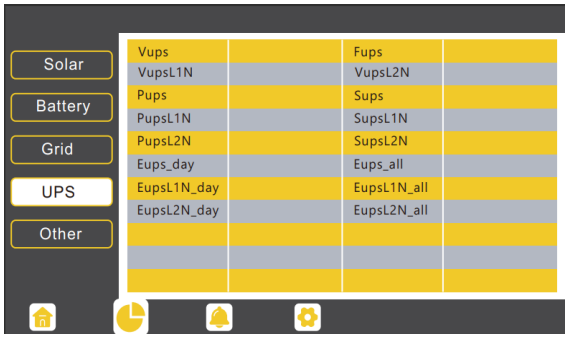
Detailed System Information

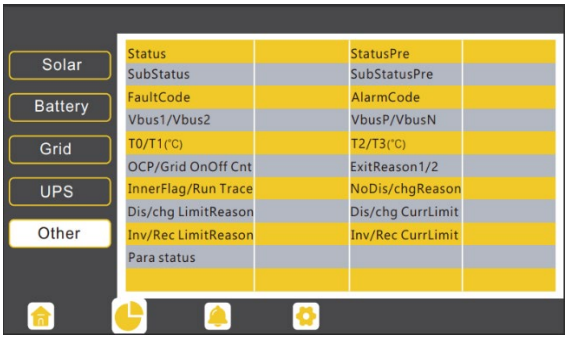
Click on the pie icon at the bottom of the screen to view the detailed real-time solar information, battery information, grid information, and load output information.











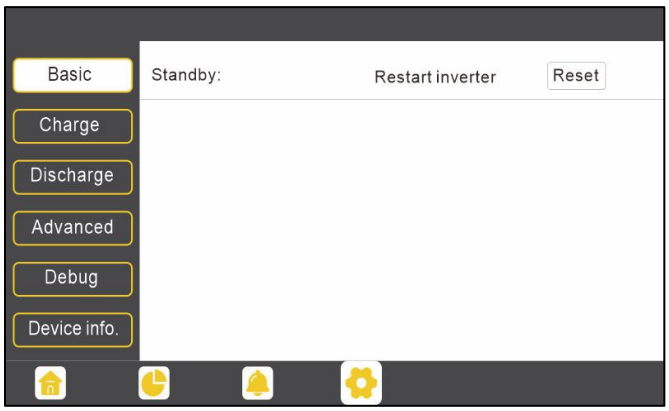
5.2.2 SETTING PARAMETERS

Click on the gear icon at the bottom of the screen to get into the parameter setting page for the inverter. If prompted during setting changes, enter **"00000"** as the password.

Basic Settings

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

Restart Inverter: This selection restarts the system. *Please note the power may be interrupted when the unit is restarted.*



NOTE: *Zero Export cannot prevent export of energy supplied by inverters that are AC Coupled to the 12kPV.*

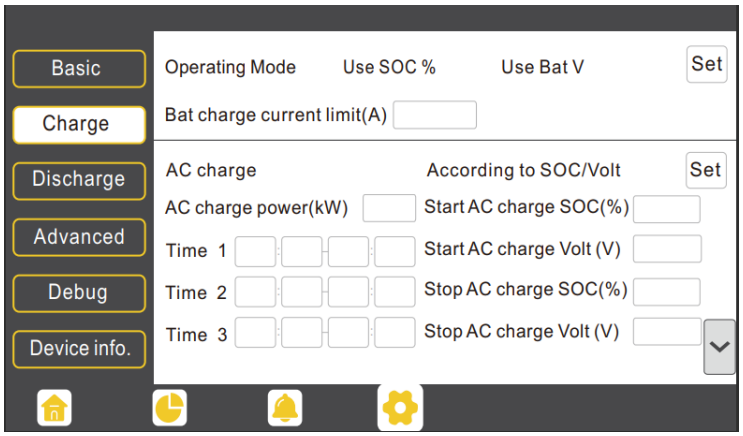
Charge Settings

Operating Mode: Users can decide to use state of charge (SOC) or battery voltage (Bat V) to control charge and discharge logic depending on battery type.

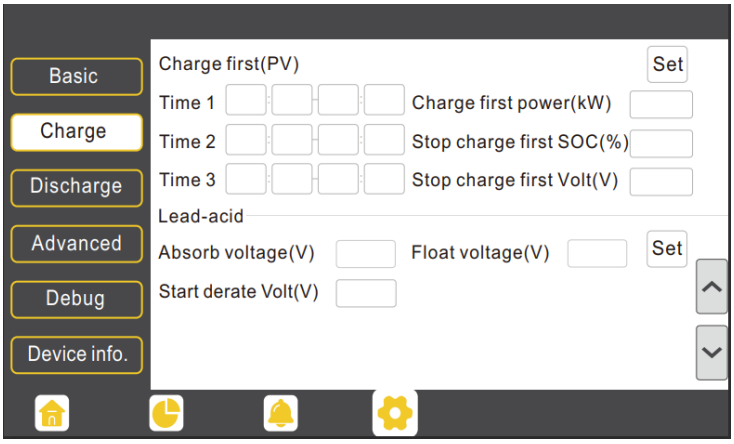
Bat. charge current limit (A): Users can set the maximum charge current.

AC Charge: Utility charge configuration. If users want to use grid power to charge their battery, then they can enable ***'AC Charge'*** and set up to three different time periods when AC charging can happen. Set ***'AC charge power (kW)'*** to limit utility charging power.

Set ***'Stop AC Charge SOC (%)'*** as the target SOC for utility charging or ***'Stop AC charge Volt (V)'*** as the target battery voltage for utility charging.



Charge first (PV): PV charge configuration. When using ***'Charge first,'*** PV will charge the battery as the priority. Users can set up to three different time periods when PV charge can happen.



Charge first power (kW): Limits PV charge *power*

Stop charge first SOC (%): The target SOC for PV charge first.

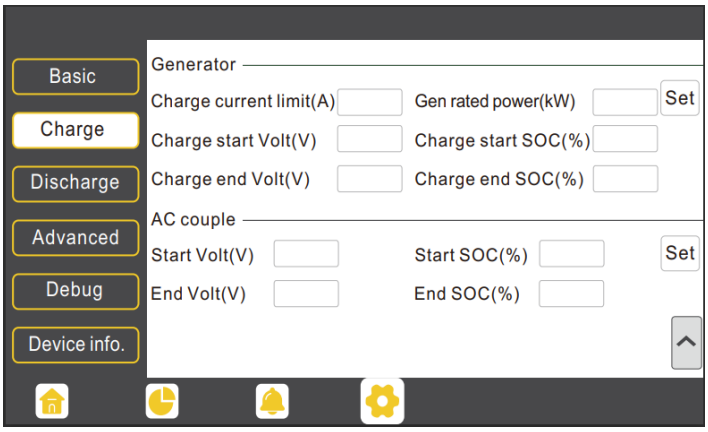
Stop charge first Volt(V): The target battery voltage for PV charge first.

Lead-Acid: When using a Lead-Acid battery, users need to set parameters in these programs. Follow the battery manufacturer's recommendation for these settings.

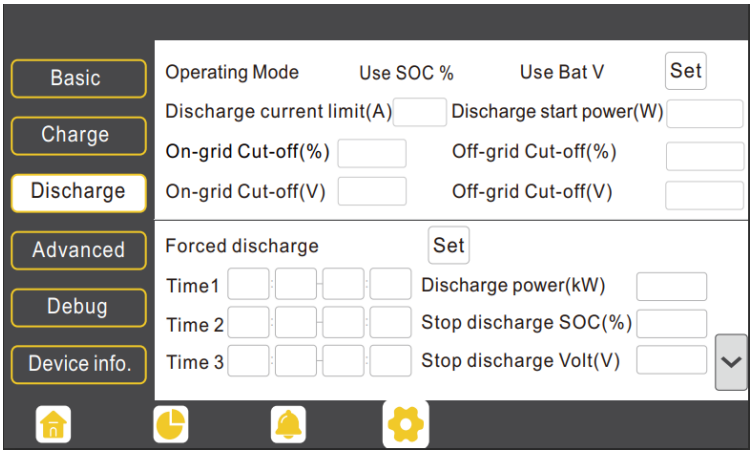
Generator

Bat. charge current limit(A): Maximum 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(kW): The inverter has a peak-shaving function. Users can enable it and set up the Gen peak-shaving power with this setting.



Discharge Settings



Operating Mode: Users can choose ***"Use SOC %"*** or ***"Use Bat V"*** to control the battery discharge state.

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

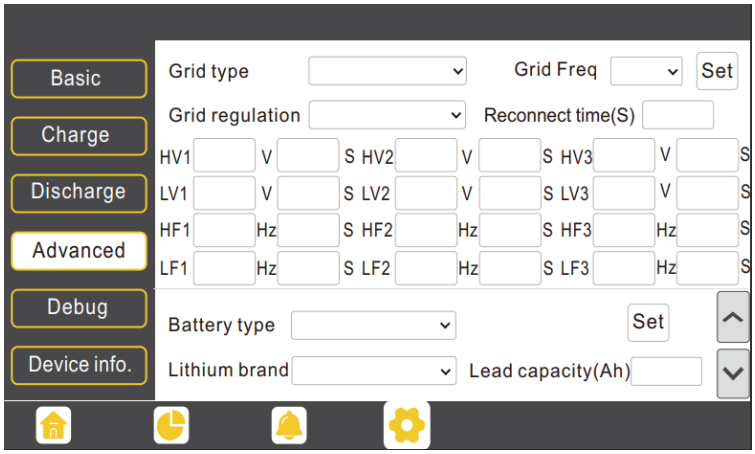
Discharge start power(W): The minimum value can be set to 50. When the inverter detects the import power is higher than this value, the battery starts discharging; otherwise, the battery will stay in standby.

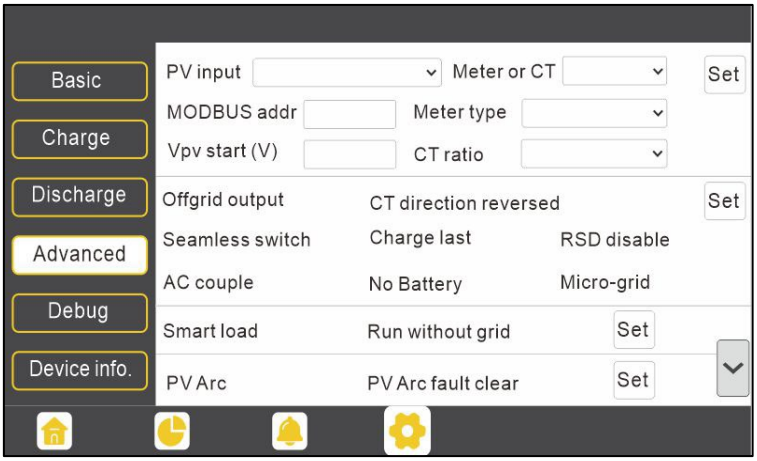
On-grid Cut-off (%), Off-grid Cut off (%) / On-grid Cut-off(V), Off-grid Cut off(V): End of discharge SOC/Cutoff voltage when the system is in an on-grid or off-grid situation, respectively.

Forced discharge: This setting will force the battery to discharge within the programmed period. In the preset period, the inverter will discharge the battery at the power set by ***"Discharge power(kW)"*** until battery SOC or voltage reaches ***"Stop discharge"*** value.

IMPORTANT: The following settings may need to be adjusted by the installer after installation. Please consult with your installer/distributor before making any changes to avoid conflicting settings or damage to your system!

Advanced Settings





Grid type: You can choose 240/120V or 220/208V

Grid Regulation: Select the correct grid safety regulation.

Grid Frequency: If the grid frequency is nominal at 50Hz, then the inverter's frequency will be adjusted to 50Hz automatically. If there is no grid power and it is read as 50Hz but the devices are 60Hz; then you can set to 60Hz manually. This is based on the rated frequency of the local grid regulation and devices.

Battery type: No battery, Lead-acid, or Lithium.

If ***'Lead-acid'*** battery is selected, please input the correct battery capacity.

If ***'Lithium'*** battery is selected, please choose the battery's brand in the Lithium brand drop-down list.

Meter or CT: The supported CT ratio is 1000:1, 2000:1, and 3000:1. The default CT ratio is 3000:1. If a third-party CT is used, please ensure the CT ratio is one of the three supported types and set it accordingly.

Meter type: Please choose setting according to the meter installed.

Off-grid output: Enabling this setting will cause the inverter to provide backup power if the grid is lost.

"Seamless switch" must be enabled if users want the load to be transferred seamlessly to the inverter backup power.

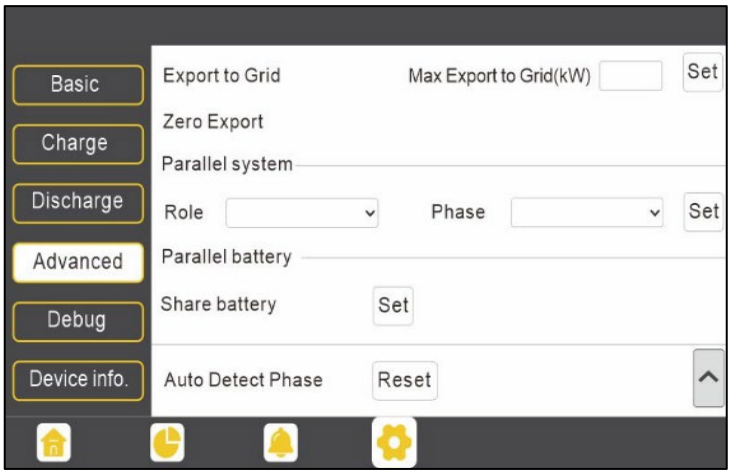
"No Battery" can be enabled to use solar power to supply load when the grid fails or load-shedding happens. If users do not have a battery installed yet but still wish to have inverter backup power with only solar panels connected, this setting can be enabled.

"Micro-grid" should be set ***only*** when the generator is connected to the inverter's Grid terminal. With this option enabled, the inverter will use AC power to charge the battery and will not export any power through the Grid terminal if AC power is present at the inverter's Grid terminal.

"Charge last" will use solar power in the following order: 1. Loads 2. Grid export 3. Battery charging.

"CT direction reversed" occurs when both CTs are installed in the wrong direction; the installer can remedy this by checking this box.

Export to Grid: This selection is for users to set a zero-export function. If exporting solar power is not allowed, users need to disable the ***"Export to Grid"*** option. If a user's utility meter is tripped with minimal solar export, ***"Zero Export"*** can be enabled; thus, the export detection and adjustment will take place every 20ms, which will effectively avoid any solar power being exported. If export is allowed, users can enable ***"Export to Grid"*** and set a maximum allowable export limit in ***"Max Export to Grid(kW)".***



"Role" setting of the parallel system. It is set to ***"1 phase master"*** by default. **In a parallel system, only one inverter is allowed to be set as Master and the others are set as Slaves.**

"Phase" is the phase code setting of the load output. The system will automatically detect the phase sequence of the inverter (consistent with the phase sequence of the connected grid mains) and display it on the inverter after it is connected to the grid.

"Share battery": If all inverters are connected to the same battery bank when configured as a parallel system, then this setting must be ***enabled.*** If the inverters are configured as a parallel system and are connected to independent battery banks, then this setting must be ***disabled.***

REMINDER: All setting changes for parallel inverters must be done while in Standby Mode.

- If the system is connected to a Lithium battery, the host of the battery bank needs to communicate with the inverter that is set as Master in the parallel system.
- Keep all the settings the same for each inverter in the parallel system on the LCD or remote monitor!

6. WARRANTY INFORMATION

For information regarding warranty registration on EG4® Electronics products, please navigate to https://eg4electronics.com/warranty/ and select the corresponding product to begin the registration process.

CHANGELOG

Version 1.2.2

- Removed (Pending) from FCC Part 15 cert on spec sheet

Version 1.2.1

- Modified warranty information

Version 1.2

- Updated safety information
- Added California Prop 65 label to safety section

Version 1.1

- Modified safety information for consistency.

Version 1.0

- First iteration of the completed white sheet

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