USER MANUAL

EG4® 18kPV HYBRID INVERTER

TABLE OF CONTENTS

1. TECHNICAL SPECIFICATIONS

AC INPUT DATA	
NOMINAL AC VOLTAGE	120/240VAC; 120/208VAC (L1/L2/N required)
FREQUENCY	50/60Hz
MAX. AC CURRENT	50A @ 240VAC
MAX. AC INPUT POWER	12000W
MAX. AC BYPASS	200A

AC GRID OUTPUT DATA	
MAX. OUTPUT CURRENT	50A
OUTPUT VOLTAGE	120/240VAC; 120/208VAC (L1/L2/N required)
OPERATING VOLTAGE RANGE	180-270VAC
NOMINAL POWER OUTPUT	@240V 12000W | @208V 10400W
OUTPUT FREQUENCY	50/60Hz
POWER FACTOR	0.99 @ Full Load
REACTIVE POWER ADJUST RANGE	(-0.8) ≈ (+0.8) Leading Adjustable
MAX CONT. LINE WATTAGE	4000W
PEAK POWER (SURGE CAPACITY)	w/ PV: 14700W (10 min), 15500W (5 min) W/O PV: 13500W (10 min)
OPERATING FREQUENCY	50/60Hz
THD @FULL LOAD	<5%
TRANSFER TIME	20ms (Default), 10ms (Configurable) | Parallel – 20ms

BACKUP/UPS AC OUTPUT DATA	
RATED OUTPUT CURRENT (240/208VAC)	50A
AC BYPASS (GENERATOR)	90A
NOMINAL OUTPUT VOLTAGE	240 | 120/240 | 120/208VAC
RATED OUTPUT POWER	@240VAC 12000W | @208VAC 10400W
MAX. CONTINOUS LINE WATTAGE	8kW per 120V
PEAK POWER	w/ PV: 14700W (10 min), 15500W (5 min) W/O PV: 13500W (10 min)
OPERATING FREQUENCY	50/60Hz
THDV (TOTAL HARMONIC DISTORTION VOLTAGE)	<5%
SWITCHING TIME	10ms

PV INPUT DATA	
NUMBER OF MPPTS	3
INPUTS PER MPPT	2 (MPPT 1) | 1 (MPPT 2) | 1 (MPPT 3)
MAX. USABLE INPUT CURRENT	25A (MPPT 1) | 15A (MPPT 2) | 15A (MPPT 3)
MAX. SHORT CIRCUIT INPUT CURRENT	31A (MPPT 1) | 19A (MPPT 2) | 19A (MPPT 3)
DC INPUT VOLTAGE RANGE	100-600 VDC
UNIT STARTUP VOLTAGE	100 VDC
MPPT OPERATING VOLTAGE RANGE	140-500 VDC
NOMINAL MPPT VOLTAGE	360 VDC
MAXIMUM UTILIZED SOLAR POWER	18000W
RECOMMENDED MAXIMUM SOLAR INPUT*	21000W

EFFICIENCY

CEC	96.9%
MAXIMUM EFFICIENCY (PV TO GRID)	97.5%
MAXIMUM EFFICIENCY (BATTERY TO GRID)	94%
MAXIMUM EFFICIENCY (PV TO BATTERY)	99.9%
IDLE CONSUMPTION (NORMAL | STANDBY MODE)	~70W	~18W

BATTERY DATA

COMPATIBLE BATTERY TYPES	Lead-acid/Lithium
MAX. CHARGE/DISCHARGE CURRENT	250A
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)	34.3×20.5×11.2 in (870×520×285mm)
UNIT WEIGHT	121 lbs. (55kg)
DESIGN TOPOLOGY	High Frequency - Transformerless
RELATIVE HUMIDITY	0-100%
OPERATING ALTITUDE	<2000m (<6561ft)
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)	68dB @ 3ft
COMMUNICATION INTERFACE	RS485/Wi-Fi/CAN
STANDARD WARRANTY	10-year standard warranty
INGRESS PROTECTION RATING	NEMA 4X
SAFETY FEATURES	PV Arc Fault Protection, PV Ground Fault Protection, PV Reverse Polarity Protection, Pole Sensitive Leakage Current Monitoring Unit, Surge Protection Device, Output Over-Voltage Protection, Output Over-Voltage Protection Varistor, Integrated Disconnect DC switch for each MPPT

STANDARDS AND CERTIFICATIONS

Ul1741B Rule 21

Rapid Shut Down (RSD) NEC 2020:690.12

Arc-Fault Circuit Interrupter (AFCI) NEC 2020:690.11 / UL1699B

Ground Fault Monitoring (GFDI) NEC 2020:690.41(b)

CSA 22.2.107.1

CSA 22.2.330

IEEE 1547.1:2020; IEEE 1547:2018

Hawaii Rule 14H

California Rule 21 Phase I, II, III

FCC Part 15, Class B

2. ABBREVIATION LIST

- AWG – American Wire Gauge
- A – Amp(s)
- Ah – Amp hour(s)
- AC – Alternating Current
- AFCI-Arc-Fault Circuit Interrupter
- AHJ – Authority Having Jurisdiction
- ANSI – American National Standards Institute
- BAT-Battery
- BMS – Battery Management System
- COM-Communication
- CT-Current Transformer
- DC – Direct Current
- DIP – Dual In-line Package
- DOD – Depth of Discharge
- EG – Equipment Ground
- EGS – Equipment Grounding System
- EMC-Electromagnetic Compatibility
- EPS – Emergency Power System
- ESS – Energy Storage System
- E-Stop-Emergency Stop
- E-Stop NO – Emergency Stop Normally Open
- FCC-Federal Communication Commission
- GE – Grounding Electrode
- GEC – Grounding Electrode Conductor
- GEN-Generator
- GES – Grounding Electrode System
- GFCI-Ground Fault Circuit Interrupter
- GFDI-Ground Fault Detector/Interrupter
- Imp – Maximum Power Point Current
- IEEE-Institute of Electrical and Electronic Engineers
- IP-Ingress Protection

- Isc – Short-Circuit Current
- In. lbs. – Inch Pounds
- kW – Kilowatt
- kWh – Kilowatt-hour
- LCD-Liquid Crystal Display
- LFP – Lithium Iron Phosphate or LiFePO4
- L1-Line 1; Typically, a black wire
- L2-Line 2; Typically, a red wire
- mm – Millimeter(s)
- MPPT-Maximum Power Point Tracking
- mV – Millivolt(s)
- N-Neutral; Typically, a white wire
- NEC – National Electrical Code
- NEMA- National Electrical Manufacturers Association
- NFPA – National Fire Prevention Association
- Nm – Newton Meters
- NOCT-Normal Operating Cell Temperature
- PC – Personal Computer
- PCB – Printed Circuit Board
- PE – Protective Earth (G or Ground)
- Pnum-Parallel Number
- PPE – Personal Protective Equipment
- PV – Photovoltaic
- RSD – Rapid Shut Down
- SCC- Standards Council of Canada
- SOC – State of Charge
- STC – Standard Testing Conditions
- UL-Underwriters Laboratories
- UPS-Uninterrupted Power Supply
- V – Volt(s)
- VOC – Open-Circuit Voltage
- VMP – Voltage Maximum Power

3. SAFETY

3.1 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

3.2 IMPORTANT SAFETY NOTIFICATIONS

DANGER!   *Hazardous Voltage Circuits!*
AVERTISSEMENT!   *Circuits à tension élevée!*

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.** Please 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.** Please 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.** Please 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.

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 you are 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 your local AHJ (Authority Having Jurisdiction) before installing this product for any additional regulations and requirements for your area.
4. All warning labels and nameplates on this 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. Please keep children away from touching or misusing the inverter and relevant systems.

CAUTION: The inverter and some parts of the system can be hot when in use. Please 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.

4. SYSTEM DIAGRAMS

This unit and its associated system are suitable for the following applications:

A. Solar and battery storage system
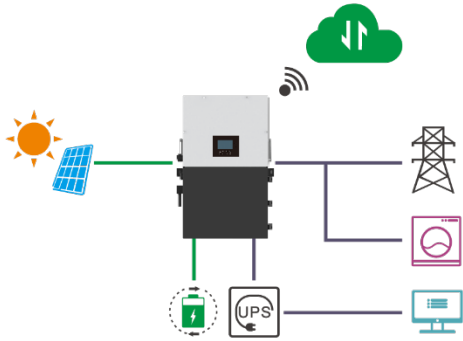
B. AC Coupling with existed solar system

Existed On-grid Solar System
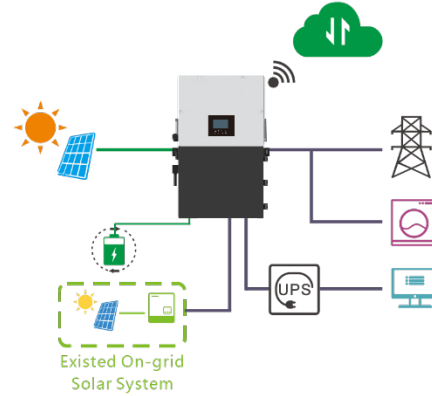
C. On-grid solar system without battery (Support EPS even without battery)

Reserved Battery&UPS Interfaces
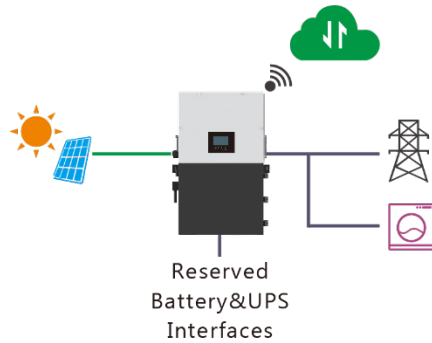
D. Off-grid and back-up applications
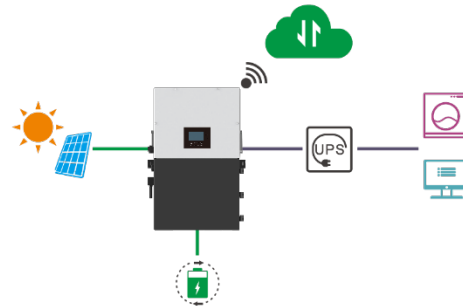
E. Single and three phase paralleling system

Router
Viewer
Grid
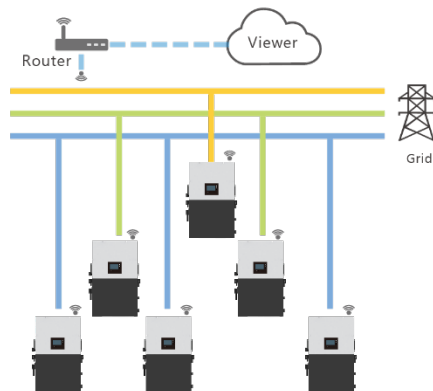
F. Energy storage system with peak shaving Function
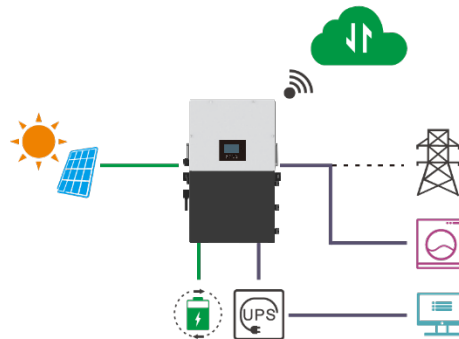
5. INSTALLATION

5.1 PACKAGING LIST AND PLACEMENT

When the product is unpacked, the contents should match those listed below:

	User Manual	1" CT ×2	Wifi Dongle	Mounting Hardware
Hybrid Inverter ×1	Battery Communication Cable L=2m×1(Orange)	Parallel Communication Cable L=2m×1(Grey)	Key	Additional Hardware annd Accessories	Paperboard

Pictures for reference only, subject to our available products.

5.2 LOCATION SELECTION AND INSTALLATION

5.2.1 REQUIREMENTS FOR INSTALLATION LOCATION

1. The mounting wall should be strong enough to bear the weight of the inverter.
2. Please maintain the minimum clearances presented below for adequate heat dissipation.

7.87 in. (20 cm)

7.87 in. (20 cm) 7.87 in. (20 cm)

7.87 in. (20 cm)
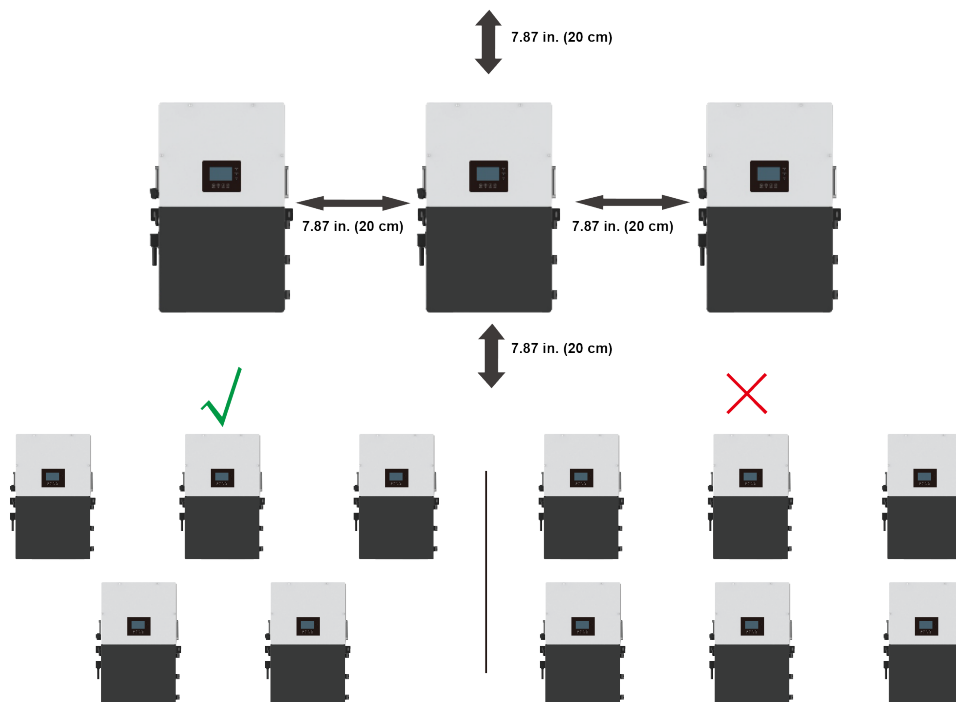
3. Never position the inverter in direct sunlight. Please refer to the figure below and choose a well-shaded site or a shed to protect the inverter from direct sunlight. PROTECT the LCD screen from excessive UV exposure.
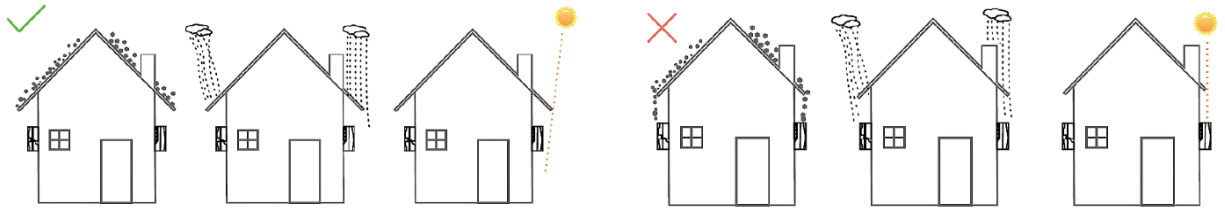
4. The inverter should be installed upright on a vertical surface.
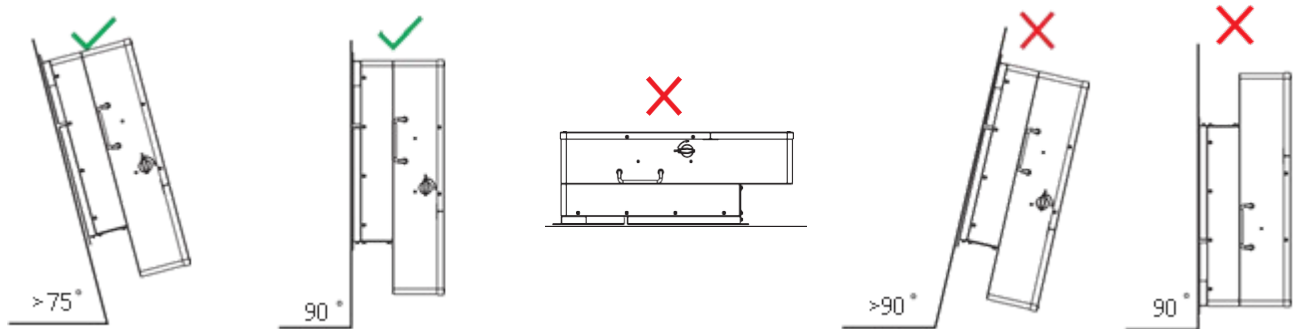
5.2.2 INSTALLING THE INVERTER

The inverter is designed to be wall-mounted and should be installed on a vertical, solid, mounting surface, such as brick, concrete, or other **non-combustible** material. Two or more people may be needed to install the inverter due to its weight. The slots on the mounting bracket can accommodate various stud spacings from 12 in. (305 mm) to 16 in. (406 mm).
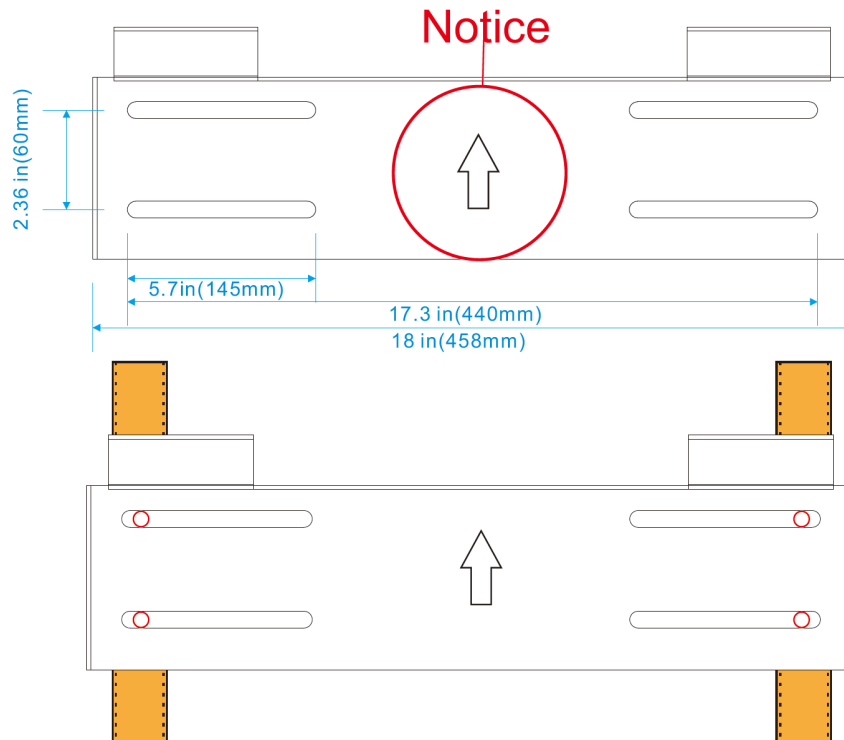
5.2.3 MOUNTING STEPS

For installation on brick or concrete:

1. Mark the drill hole positions with the mounting bracket.

2. Drill four, 5/16 in. (48 mm) diameter holes, making sure the holes are deeper than 2 in. (50 mm).
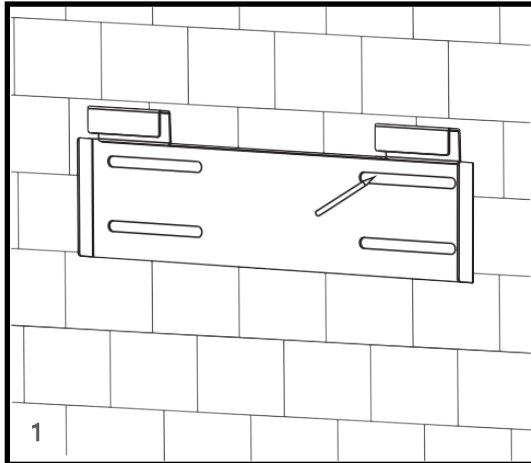
3. Insert the expansion bolts into the holes and tighten.

4. Use the corresponding nuts and washers (packaged together with the expansion bolts) to install and affix the wall-mount bracket onto the wall.
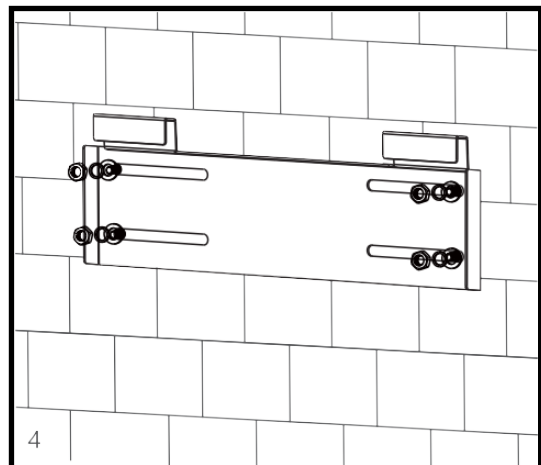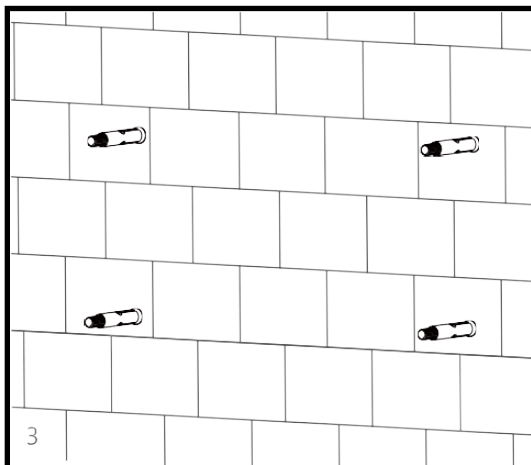
5. Hang the inverter on the wall-mount bracket and lock the inverter on the wall using two (2) self- tapping screws on the top of the inverter (not included with inverter). Lock the safety screws on the left and right sides.
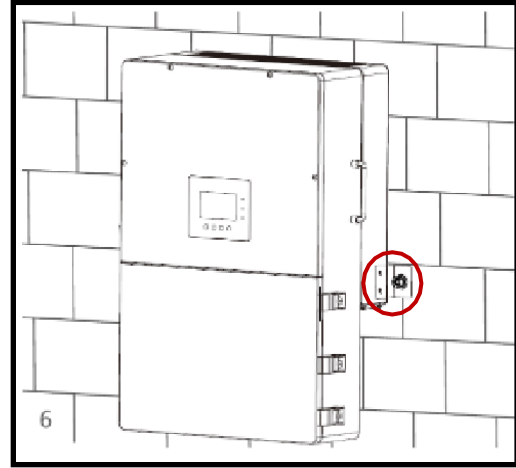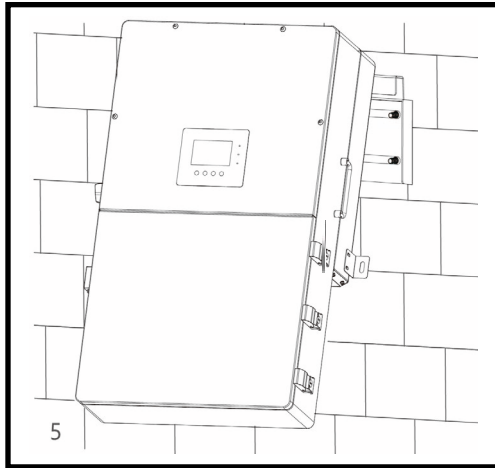
For installation on concrete board with wood studs:

Fasten the mounting bracket to the studs with four (4) heavy duty wood screws, then hang the inverter on the bracket and lock the inverter on the wall with two (2) self-tapping screws.

Please note that the wood screws and self-tapping screws are not provided with the inverter. Installers will need to acquire the screws before installation.

5.3 CONNECTION OVERVIEW

Breaker selection recommendation for both DC and AC

Breaker/Switch	Recommended Breaker Rating
PV Input	PV Disconnect Switch: 600VDC/32A
AC Input/Output	See breaker notes on wiring diagrams (Section 6)
Generator	240VAC/100A

EG4 ELECTRONICS

Overview of the Cable Box
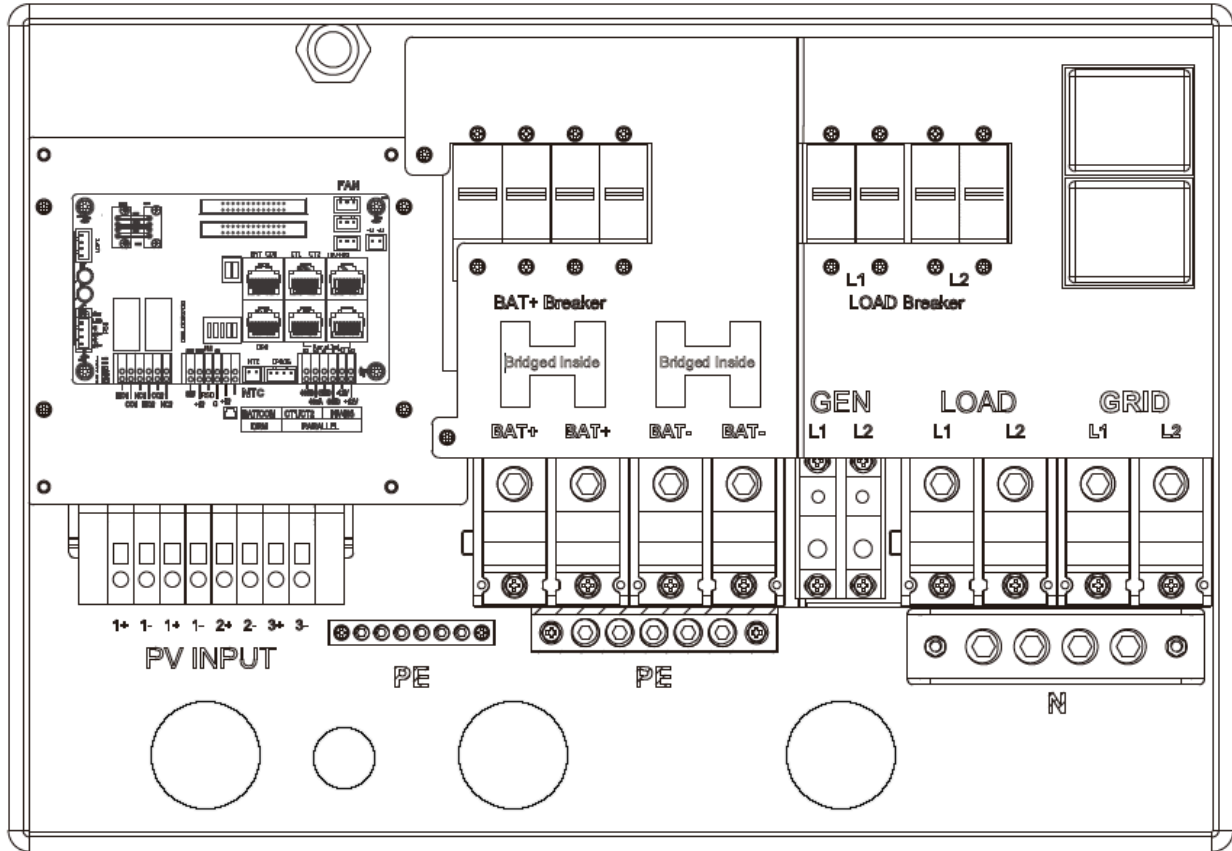
Integrated Bonded Load Breaker	L1 :200A L2: 200A
Integrated Bonded Bat. Breaker	200A × 2

Back View of the Cable Box Knockouts

2X Ø 1.99in. [50.4mm]

Ø 2.48in. [63mm]

Ø 2.48in. [63mm]

Ø 1.12in. [28.5mm]

Ø 1.99in. [50.5mm]

Bottom View of Cable Box Knockouts

4X Ø 50.5mm [1.99in]

4X Ø 63.0mm [2.48in]

2X Ø 28.5mm [1.12in]

2X Ø 35.0mm [1.38in]

Ø 50.5mm [1.99in]

i. parallel CAN matching resistance
a. Battery Communication Interface
e. FAN1/2/3
l. LCD Upgrade
b. CT Interface
c. INV485
d. Parallel communication Interface
f. NTC
g.
h.
j.
k.
m.

FAN

BAT COM   CT1 CT2   INU485

NO1 NC   CO2   SW RSD
CO1 NO2 NC2   +12 G   +12 G
NTC
485B GND 12V
485A GND +12V
Meter485   ±12V

BAT/COM | CT1/CT2 | INV485
DRM | PARALLEL

a. Battery communication port (CAN & RS485)
b. CT interface (refer to Section 5.5.6 for CT connection)
c. INV 485: debugging port
d. Parallel communication port (refer to Section 5.9 for parallel connection)
e. Fans 1/2/3
f. Temp sensor connection for lead-acid battery
g. Meter 485B & 485A: for meter communication
h. ±12V: reserved for customer to use – 500mA max
i. CAN matching resistance: set DIP switch when using inverters in parallel
j. Connection for generator auto-start function: GEN (NO, NC)
k. Reserved: DRY (NO, NC)
l. LCD UI upgrade port
m. RSD Terminals

5.4 PV CONNECTION

5.4.1 CONNECTING PV TO THE INVERTER

Cable Requirements:

Cable Size	Minimum Insulator Voltage
10 AWG – 6AWG (Max) (6 mm^2 – 16 mm^2)	600V

Consult with your installer to ensure that appropriate cable sizing is used due to various factors such as voltage drop and VOC.

IMPORTANT: Verify the lowest ambient temperature of the installation location. The rated VOC on the solar module nameplate is obtained at STC (77°F/25°C). As the ambient temperature drops, the solar module VOC increases. Please ensure the maximum solar string voltage, corrected at the lowest temperature, does not exceed the inverter's maximum input voltage of 600V.

PV Input Data	Description	Parameter
DC Input Voltage Range	Range required for the unit to operate up to max input	100–600 VDC
Unit Startup Voltage	Voltage needed for the LCD to turn on	100 VDC
Load Output Minimum Voltage	Minimum voltage needed to output power on Load side	>140 VDC
MPP Operating Voltage Range	Range where the MPPT can track	120–500 VDC
Full Power MPPT Voltage Range	Range where the MPPT operates at max capabilities	230–500 VDC
Nominal MPPT Voltage	The MPPT will operate most optimally at this voltage	360 VDC
Maximum Utilized Solar Power	Number of watts the unit can utilize from array after considering all power loss factors	18,000W
Rec. Maximum Solar Input	The suggested PV power input into the device for it to utilize the full 18kW of PV that it can process.	21,000W

5.4.2 STRING SIZING
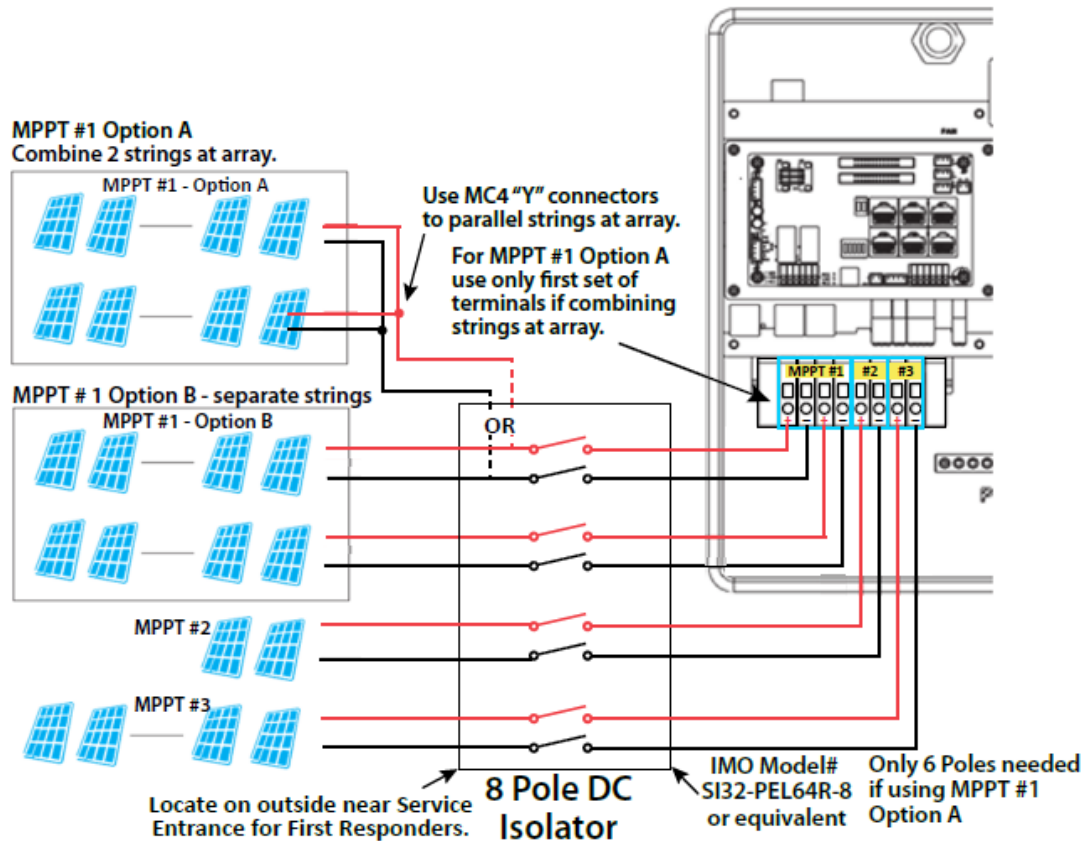
When solar modules are put in a series string, the voltage multiplies times the number of modules and the amperage stays the same as each module.

For example: Using solar modules that have a 40 Voc (77ºF) with an amperage of 10 Amps (Imp) - 10 modules wired in a series string would have a Voc of 400 VDC (77ºF) and a string amperage of 10 Amps. When the temperature lowers, the voltage can rise above the maximum allowed by the inverter and damage will result.

⚠️ **CAUTION:** To determine how many modules you can have per string; first verify the lowest possible ambient temperature of the installation location. Next, find the rated Voc, Vmp, Isc and Imp of the solar module at 25ºC and the temperature coefficients for voltage and power. Then, calculate highest possible Voc for the entire string when the ambient temperature falls to the lowest possible ambient temperature upon sunrise. To make this calculation, use a string calculator or consult your solar designer or solar electrician.

⚠️ **DANGER:** DAMAGE WILL OCCUR if the string voltage on a cold, sunny morning exceeds the inverter's maximum input voltage of 600V!

Finally, calculate the maximum current of the string so as not to exceed the Inverter's MPPT circuit ratings. Double check if the calculated Vmp range is within the 230-500 VDC optimal MPPT circuit operating range. Consult a solar designer if needed.

NOTE: For all modules, the calculations need to be performed or verified by using a string calculator or consulting a professional.

The inverter has three MPPT PV charging circuits. MPPT #1 will use up to 25 amps which means two strings can be paralleled for any modules having less than a 12.5 A (Imp) rating. MPPT #2 and MPPT #3 will use up to 15 Amps each so they are usually limited to one string. (Unless you have a module with < 7.5 Amps)

Each string ideally should contain the same model, brand, and quantity of panels for ease of design, racking, and wiring. However, varying string sizes can be used for unique MPPTs. If two strings are used for MPPT #1 they MUST be the same model, brand and # per string. MPPT#2 and MPPT #3 could differ in model, brand, and # per string (same make/model per string) on the condition that each string complies with the lowest temperature (maximum string number) and maximum amperage calculations above.

All panels on a series/parallel string should face the same orientation and hopefully be exposed to roughly the same shading across the string. Consideration should be placed on string location and wiring order on the racking to minimize shading effects. One shaded module can disproportionately reduce output for the entire string, so avoiding linear strings in favor of rectangular strings can increase output. Optimizers can also achieve this.

The inverter will limit the total MPPT current to 25 A for MPPT #1, 15 Amps for MPPT #2, and 15 Amps for MPPT #3.

NOTE: The array can have a higher Imp than the 25A/15A specified, but the MPPTs will not make full use of the extra current. Having an array that can produce more current than the MPPTs can utilize is useful for increasing morning, winter, or cloudy day solar production.

5.4.3 STEPS FOR PV WIRING
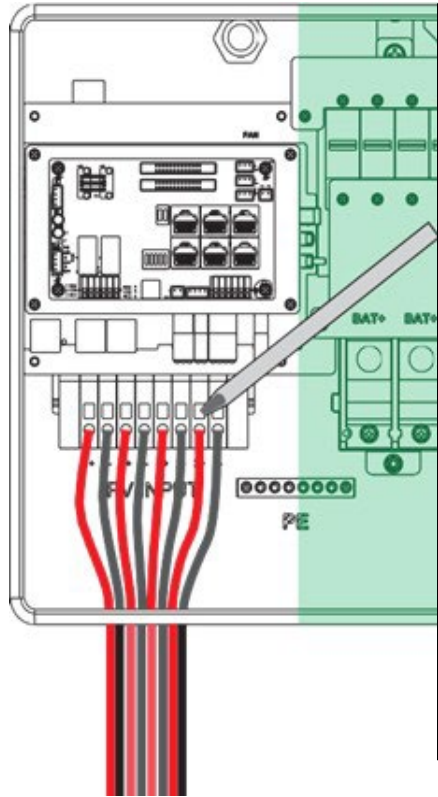
1. **Ensure all breakers and disconnect switches are in the OFF position before connecting or disconnecting wires. Use a voltmeter to confirm there is no voltage present.**

2. Strip off 1/4 in. – 5/16 in. (6mm – 8 mm) insulation on the PV string's positive and negative conductors.

3. Use wire ferrules for the PV string conductors if they are stranded wire.

4. Insert the conduit fitting into the opening for the PV connection and tighten it from the inside using the counter nut.

5. Route the PV conductors through the conduit fitting and into the inverter.

6. Secure the PV conductors in place into the inverter inputs. Verify that they are secured properly by *lightly* pulling on them.

7. Ensure the conduit and conduit fittings are fastened reliably and the cable entry holes are sealed.

Note: According to the NEC (National Electric Code) in the USA, all PV Systems above 50V must have one current-carrying conductor connected to the ground/earth. With that, all exposed metal parts of the system must be grounded, regardless of voltage. **DO NOT GROUND THE NEGATIVE PV LINE. ONLY GROUND THE SOLAR PANEL FRAMES.**

5.5 BATTERY CONNECTION

5.5.1 CONNECTING BATTERIES TO THE INVERTER

Cable Requirements (suggestions based on distance and battery bank quantity)

# of cables	Cable Size (90°C)	Max. Distance	Torque for cable connection
2 sets	1/0 AWG (53.5 mm^2)	10 ft.	165 in. lbs. (18.6 Nm)
2 sets	2/0 AWG (67.4 mm^2)	20 ft.	165 in. lbs. (18.6 Nm)
1 set	4/0 AWG (107 mm^2)	10 ft.	Max. 275 in. lbs. (31.1 Nm)
1 set	250 kcmil (127 mm^2)	20 ft.	Max. 275 in. lbs. (31.1 Nm)

5.5.2 BATTERY POWER CABLE CONNECTION
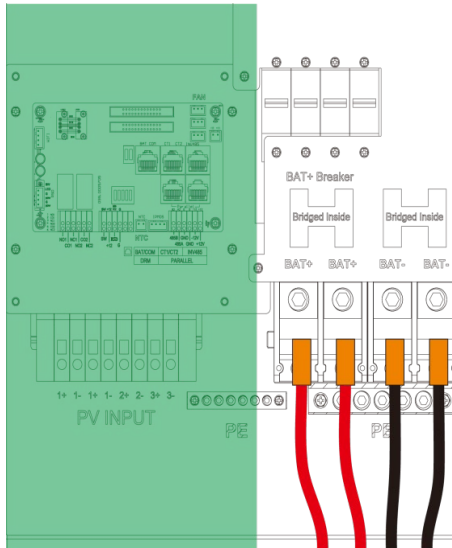
1. **Place all breakers in the OFF position before connecting or disconnecting wires. Ensure that there is no voltage present with a voltmeter.**

2. Strip 5/8 in.–13/16 in. (15-20 mm) insulation from the cable end.

3. Route the battery power cable, connecting positive to BAT +, and negative to BAT -.

4. Secure the conduit fitting to the enclosure using the counter nut.

5. Fasten battery positive and negative cables to the mechanical terminals according to the markings with an M8 hex wrench.

5.5.3 BATTERY COMMUNICATION CABLE CONNECTION

1. Use the included battery communication cable to connect the battery to the inverter and choose *'Lithium'* as the battery type*. Please select the *'Lead-Acid'* setting if the Lithium battery cannot communicate with the inverter. The battery communication port on the inverter is an RJ45 socket with the pinout for the RJ45 plug shown on the following image. Users can make the communication cable according to the inverter pin description below and the correct pinout of the communication port on the battery. The inverter supports both CAN and RS485 communication.

NOTE: If using EG4 LifePower4 batteries in the system, an optional firmware update is required for closed-loop communications. Please contact your distributor for this file, or navigate to https://www.eg4electronics.com/ for the most recent updates and documentation.

For inter-battery communication and battery bank setup with EG4 batteries, please refer to the respective battery manual.

Pin	Description
1	BAT RS485 B
2	BAT RS485 A
3	NC
4	BAT CAN H
5	BAT CAN L
6	NC
7	NC
8	NC
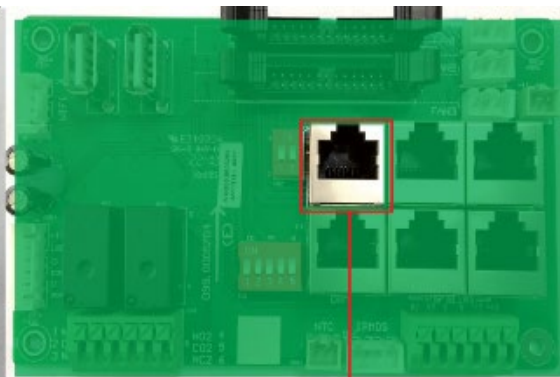
Battery CAN & RS485

2. After connecting the battery power and communication cables, enter the *'Advanced'* settings to choose the battery type and brand. When prompted, enter *"00000"* as the password to enter settings menu.

NOTE: For communication with EG4 batteries, select "Lithium" under *'Battery type'* and then select "0: EG4" under *'Lithium Brand'.*

For more information on configuring charge/discharge settings, refer to Section 12.3.2 – Setting Parameters

For Lithium Battery:

Please be sure that the Lithium battery being used is compatible with the inverter. EG4® strongly recommends using closed-loop communications between your battery and inverter. *Please contact your distributor or support@eg4electronics.com for an updated battery closed-loop communications list.*

If you are using multiple battery modules with the inverter, the inverter communication cable must be connected to the master battery. Please check with your battery supplier for battery master and slave settings.

For Lead-Acid Battery:

The temperature sensor for Lead-Acid batteries is optional. There are three stages for Lead-Acid battery charging. For charge/discharge related parameters, please check the *'Charge'* and *'Discharge'* settings in *Section 12.3.2 - Setting Parameters.*

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5.5.4   AC WIRING INFORMATION

When sizing AC wires please adhere to the following information.

Cable Requirements:

Terminal Connection	Wire Size	Torque Values
GRID	6-4/0 AWG (26.7mm$_2$-107mm$_2$)	95-165 in-lbs. (10.7Nm-18.6Nm) depending on wire
GEN	Size according to generator output	95-165 in-lbs. (10.7Nm-18.6Nm) depending on wire
LOAD	6-4/0 AWG (26.7mm$_2$-107mm$_2$)	95-165 in-lbs. (10.7Nm-18.6Nm) depending on wire

See wiring diagrams in Section 6 for more information.

Ground-Neutral Bonding

The information below describes the nature of the ground and neutral in the inverter and their relationship to the system. Always consult with your installer or a licensed electrician to ensure that the right configuration is being used:

- The neutral line is a solid connection between AC input and AC output (known as a Common Neutral Architecture).

- The neutral line between the AC input and AC output is never disconnected.

- **The inverter never creates a ground-neutral bond in any mode of operation.**

IMPORTANT: The system should have one and only one ground-neutral bond. (This is typically the Main Bonding Jumper located at the first grid system disconnect.)

5.5.5 STEPS FOR AC CONNECTION

REMINDER: After connecting all AC wiring, put the built-in LOAD breaker back to the ON position before providing power to the load.
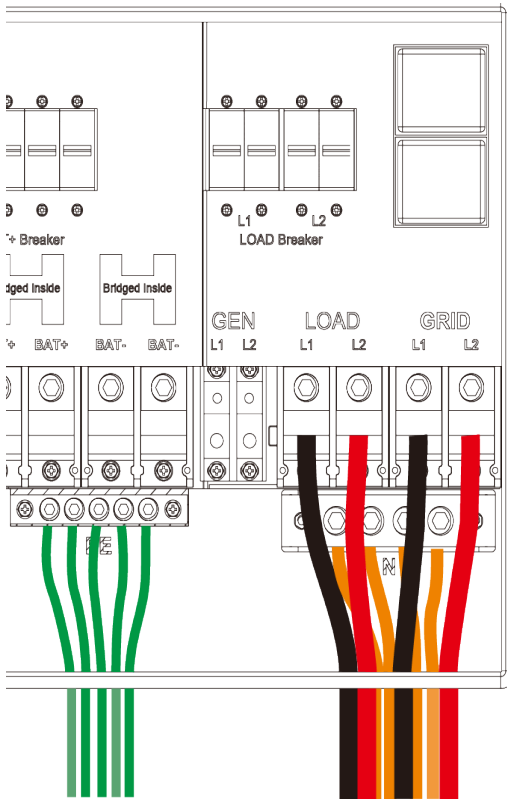
1 **Before connecting or disconnecting AC wires, ensure all breakers are in the OFF position. Check that there is no voltage present with a voltmeter.**

2 Strip off 5/16–3/8 in. (8–10 mm) insulation from the AC cables.

3 Use wire ferrules if the cables are made of fine stranded wires.

4 Secure the conduit fitting to the enclosure using the counter nut of the fitting.

5 Fasten the GRID and LOAD cables to the terminal block in accordance with the terminal labels using an M8 hex wrench. (For ground terminal, use an M5 hex wrench.)

   See section 4.5.4 for torque information

6 Secure conduit to the conduit fitting.

7 Check that the cables are connected properly. Take appropriate measures to ensure that the conduit and conduit fitting are properly secured and seal the cable entry holes.

5.5.6 CT/METER CONNECTION

To measure the power imported from and exported to the grid, a pair of CTs or one three-phase meter must be installed at the service entry point in or near the main service panel. Two CTs are provided with each inverter.

CT Port Pin Definition

The CT interface for the two (2) CT connections is an RJ45 port. The two (2) CTs come with premade plugs that can be connected directly to the port.

Pin 1 2 3 4 5 6 7 8

Pin	Description
1-4	Reserved
5	CT2N
6	CT2P
7	CT1N
8	CT1P

Pin 5 6 7 8

CT 1
To Inverter
L1
To Grid
P N
Pin8 Pin7

CT 2
To Inverter
L2
To Grid
P N
Pin6 Pin5
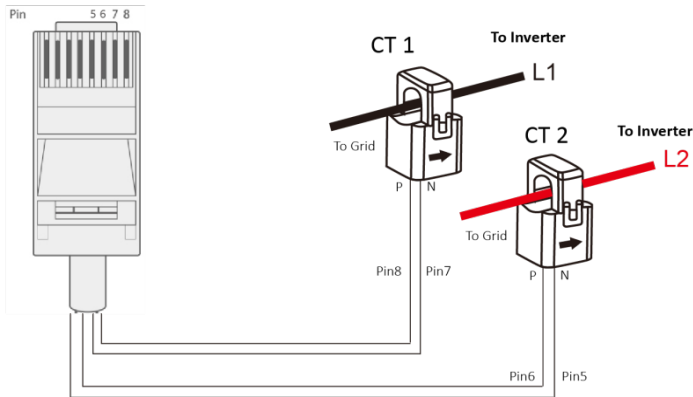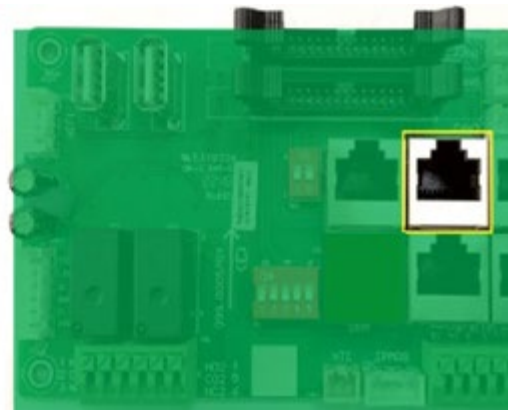
Please refer to the connection diagram to the left for the correct position of the CTs. Clamp the 2 CTs onto the L1 and L2 wires at the service entry point in the main service panel.

The arrows on the CTs must point toward the inverter and be placed on the proper line based on their number. (CT 1 for L1, CT 2 for L2)

CT Clamp Ratio

The inverter supports three ratios of CT clamps - 1000:1, 2000:1, and 3000:1. The CT ratio of the included CTs is 3000:1.

If you are using a third-party CT, please ensure that the CT ratio is one of the supported types. Select the correct CT ratio setting on the inverter monitoring page or on the inverter LCD.

GRID

C 1

CT 2
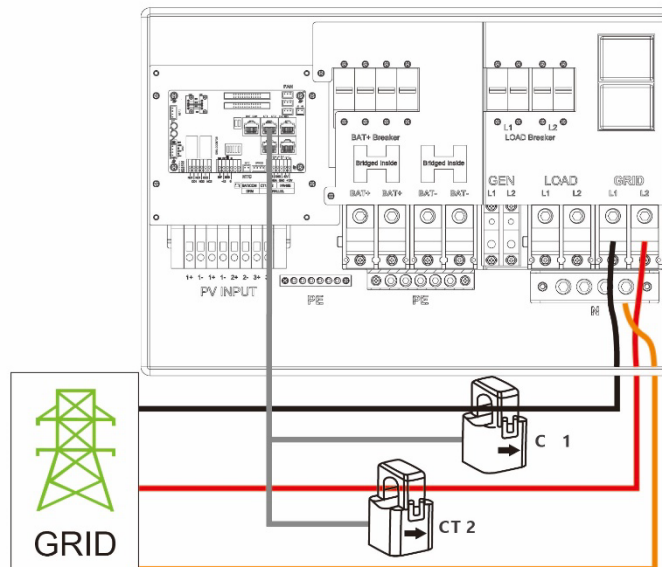
In the above diagram, Black wire is L1, Red is L2 and Orange is Neutral.

Extending the CT Clamp Cable

The CT wires can be extended with a common ethernet cable if they are not long enough. An RJ45 adapter is needed for the extension. The CT wires can be extended up to 300 ft. (around 90 m).

5.6 WORKING WITH A GENERATOR

5.6.1 GENERATOR SYSTEM CONNECTION

This hybrid inverter can work with a generator. There are GEN terminals on the inverter for connecting the generator. When the generator is started, it will supply the inverter with the generator's max. power. If the generator's power is not adequate to power all loads, the inverter will pull from batteries as supplemental power.

Generator requirements:

1. Generator should be a 120/240VAC, 60 Hz generator.

2. Generator capacity should be **between** 6kW – 21.6kW.

5.6.2 CONNECTING THE GENERATOR START SIGNAL (2-WIRE START)
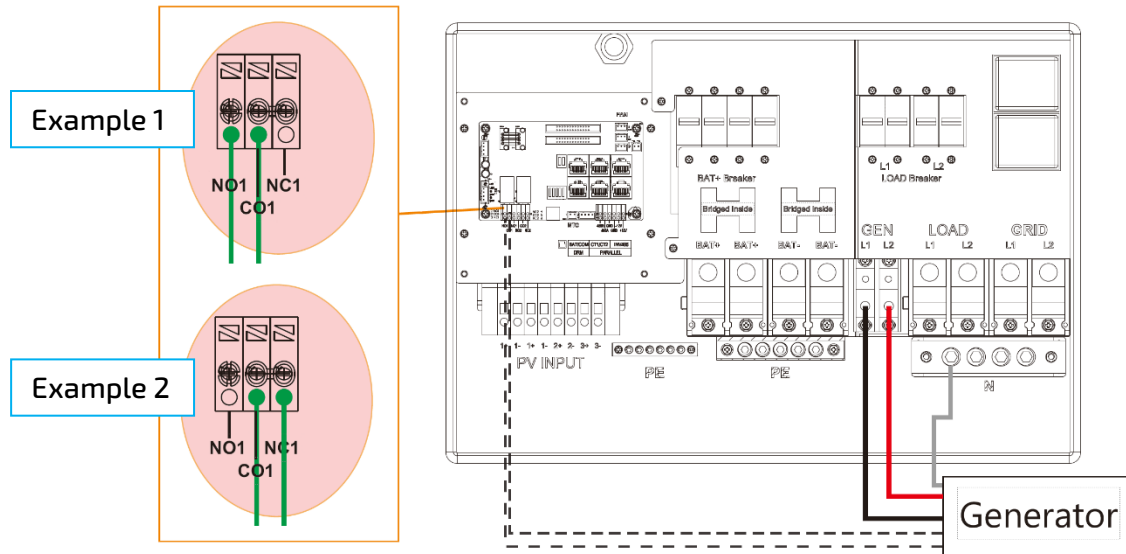
When the generator is started, all the loads connected to the LOAD terminals will be supplied by the generator while still charging batteries. The pass-through relay on the generator terminal is 90A. When the generator is on, please ensure the total load and charge current does not exceed 90A. The generator start signal shall be connected to the COM board GEN Normally Open (NO1 and CO1), or Normally Closed (NC1 and CO1) terminals, if users want to start generator remotely. See diagram above for 2 examples.

Generator 2-Wire Start Specs:

- Max Voltage 30VDC, 277VAC.

- Max NO Contact Current: 5A

- Max NC Contact Current: 3A

5.6.3 GENERATOR START AND STOP SETTINGS

The **"Operating Mode"** setting will determine whether the system will use battery SOC or battery voltage to start or stop the generator.
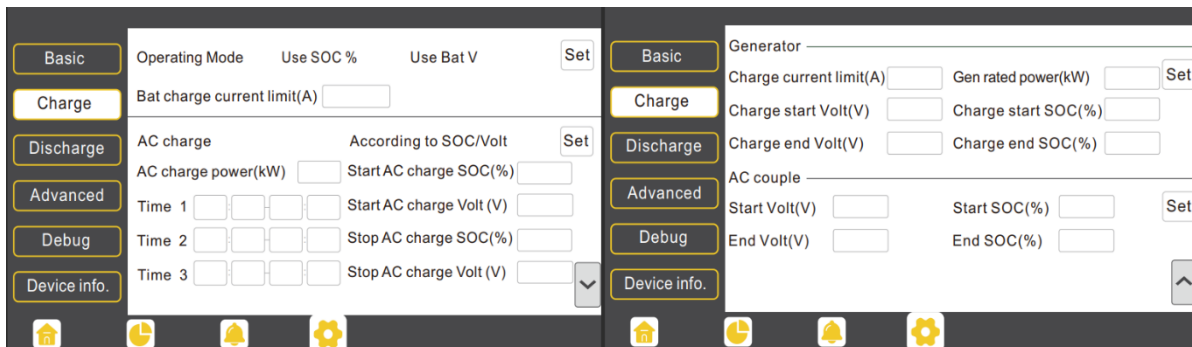
Generator Start Conditions

The generator will start *when utility fails* **and** one of the following conditions is met:
- *When the battery is discharged to the cut-off setting* **or**
- *There is a force charge request from battery* **or** *when the battery voltage or SOC is lower than the generator* **'Charge start Volt/SOC'** *setting*

Generator Stop Conditions

When battery voltage or SOC is higher than the **Charge end Volt/SOC** settings.

5.7 OFF-GRID WIRING

The 18kPV can fully function in Off-Grid only mode. It does not need the utility or generator to function. Purely off-grid systems that do not have access to the utility should strongly consider having a 2-wire start backup generator for extended cloudy periods (8-12 kW diesel recommended per 18kPV inverter - 21kWs max per inverter). Off-Grid systems should have robust battery banks sized to ensure multiple days of power and to reduce generator run time.

The 18kPV can also utilize AC coupled solar input through the GEN port in purely Off-Grid Systems. The Generator can then be connected to the Grid Port.

The 18kPV can accept up to 90 Amps (21kWs) of generator power and will pass through all available power to the loads. Therefore, the Loads subpanel can be sized up to the size of the backup generator with a 60 Amp minimum per inverter. *(See Wiring Diagrams in section 6)*

5.8 AC COUPLING INSTALLATION CONNECTION

The inverter can accept PV solar inputs to both MPPT channels and AC coupled solar input at the same time. The AC coupled solar input can be up to 90A of AC power or 21.6kW of solar. The MPPT channels can handle up to 18kW of solar, with 12kW available for back feeding the utility grid. Therefore, up to 33.6kW of AC power could be sent back to the grid. For this amount of back feed, users will need either a feeder tap or supply side tap as the point of utility interconnection. The existing solar system is connected to the inverter's GEN terminal. *(See Wiring Diagrams in section 6)*

After the AC couple function is enabled:

When the grid is on, the GEN terminal is connected to the GRID terminal inside the inverter. In this case, the hybrid inverter will bypass the interactive inverter AC to the GRID and LOAD. Any remaining energy will be exported to the grid.

When the grid is off, the GEN terminal is connected to the LOAD terminal inside the inverter. In this case, the hybrid inverter will work as a power source for the grid-interactive inverter to synchronize and feed power to the micro-grid. The loads will be supplied by solar power first. If solar panels are generating more power than load consumption, the excess solar power will be stored in the batteries. When solar power exceeds the sum of load power and max battery charging power (e.g., when the batteries are nearly full), the inverter will signal the grid interactive inverter to reduce power via the frequency-shifting, power-reduction mechanism, thus maintaining the balance of generation and consumption of the micro-grid system.

What is frequency-shifting power reduction?

All UL1741SA compliant grid-interactive inverters have the Frequency-Watt feature, which requires the grid-interactive inverter to reduce power with increasing grid frequency. The power will drop to zero before the over-frequency trip threshold is reached.

When the grid is down and the hybrid inverter requires an AC coupled inverter to reduce power, it simply shifts the output frequency up slightly, and the grid-interactive inverter will limit its output power accordingly after sensing this frequency shift.

When the grid is up, the frequency is dictated by the grid and the hybrid inverter will reduce exported power if the frequency goes up.

AC Coupling Settings

The **AC couple** setting must be enabled when connecting an existing on-grid system to the GEN terminal.

Start SOC/Voltage (%/V): The SOC or Voltage at which the AC coupled inverters are turned on when in off-grid mode (50% to 70% recommended).

End SOC/Voltage (%/V): The SOC or Voltage at which the AC coupled inverters are shut down when in off-grid mode (90% recommended).

Note: If looking to frequency shift when AC Coupling, it is recommended to set the Start SOC to 99% and the End SOC to 100%.

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

Note: It is recommended to keep the Start V/SOC and the End V/SOC within 5-10% of each other for optimal operations when utilizing AC Coupling.

5.9 PARALLEL SYSTEM CONNECTION
5.9.1 CONNECTIONS FOR PARALLEL SYSTEM

The hybrid inverter supports parallel connection to expand power and energy capacity to suit different usage scenarios. **Up to 10 units can be paralleled to reach a capacity of 120kW.**

The parallel wiring diagrams are as follows. The manual bypass switch connects the loads to LOAD panel as default. If the inverters fail, users can switch the loads to utility.

REMINDER: Put the CAN communication PIN to ON status for the first and the last inverter and OFF for inverters in between.
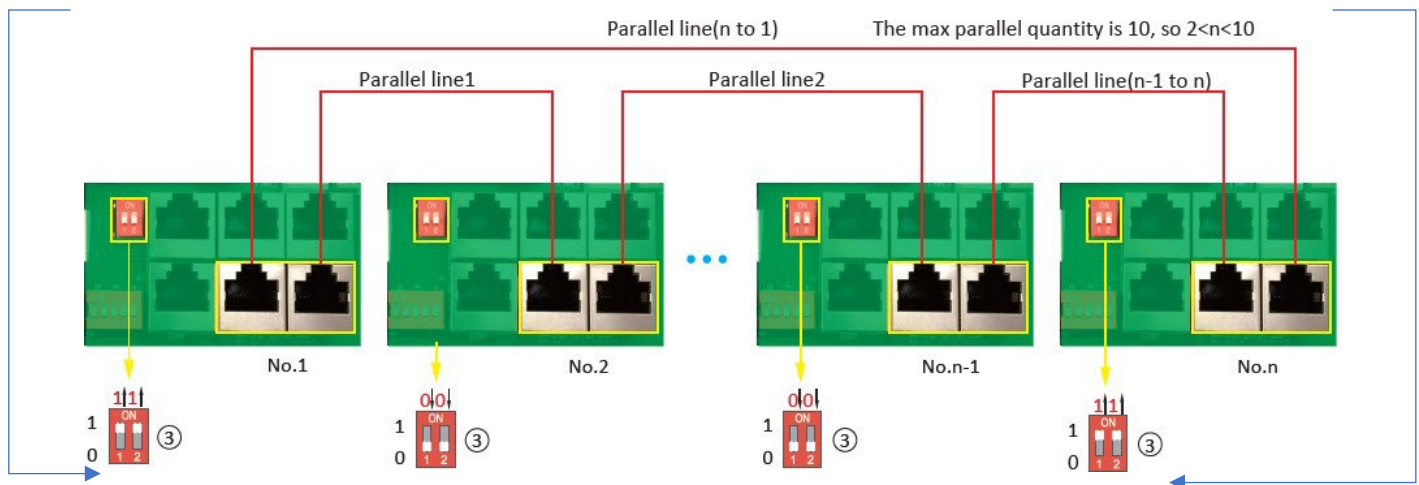
NOTE: Both switches in the "ON" position translates to address 1. Both switches in the "OFF" position translates to address 0.

REMINDER: If needing to extend the inverter-to-inverter paralleling cable, ensure the cable is a straight-through CAT5 and up cable. See image below for reference.

12 3 4 5 6 7 8

RJ45

Stock Inverter Paralleling Communications Cable
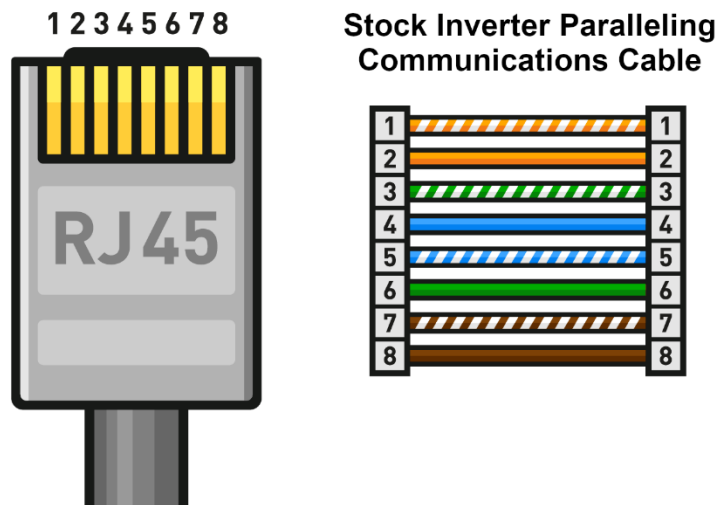
Please contact the inverter supplier for more detailed guidance on paralleling a system.

5.9.2 Parallel Information Display
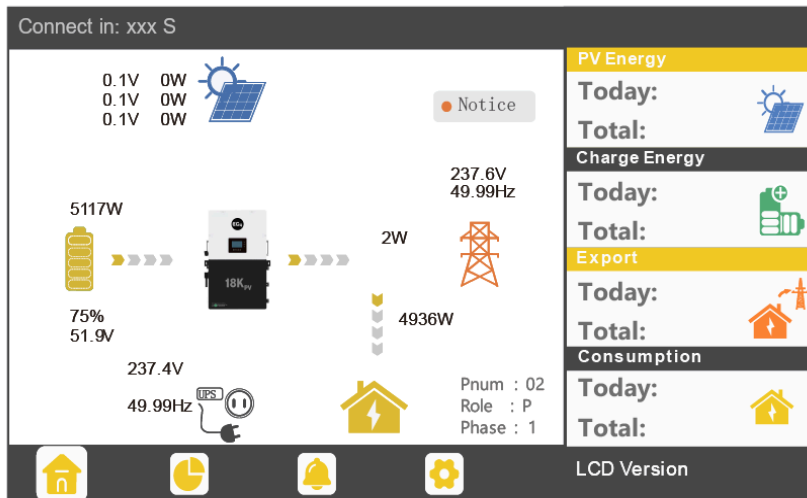
The information in the red box shows the parallel information:
- **Pnum:** 01 – 10
  a. Display number of parallel units
- **Role:** P or S:
  a. P = Master
  b. S = Slave
- **Phase:** 1 – 3:
  a. 1: U Phase
  b. 2: V Phase
  c. 3: W Phase

IMPORTANT:

Notices for parallel system:

✓ Ensure that the generator is connected to all inverters in parallel (if available).

✓ If you cannot divide the number of PV panels connected to each inverter, it is recommended to have more PV panels on the master inverter.

✓ The values shown on the LCD of each inverter represent the inverter's contribution to the system, **not the system's total.**

5.9.3 PARALLEL CONFIGURATION

Before commissioning:

1. Verify that all the inverters are updated to the latest firmware. Please contact your distributor to confirm you have the latest version.

2. Make sure the power cables and parallel communications cables have been wired correctly and verify the DIP switch configurations are correct.

3. Power on the inverters and set them to standby via the *"Basic"* page in the settings.

4. Verify that the inverter status is *"0".*

5. Select which unit you want as the Master by selecting *"1 phase master"* in Advanced settings. Set the others as *"Slave."*

6. Ensure all inverters are set to U phase.

27
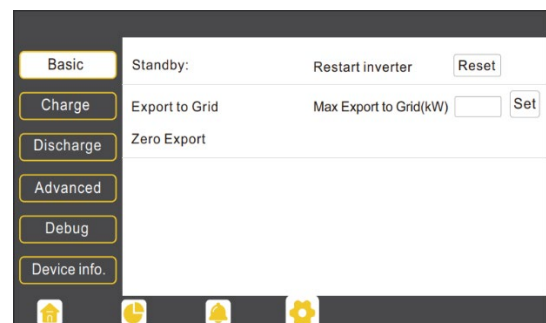
7. Enable Share battery on all inverters and ensure the communication cable from the battery is connected to the Master unit.
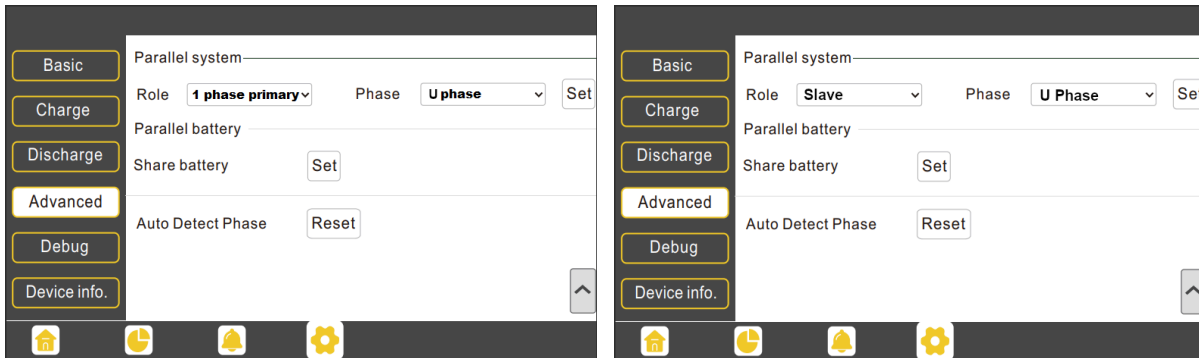
IMPORTANT: Make sure the safety standard and grid type configurations are consistent. (See image on right)

Commissioning Steps:

1. Turn on the battery and make sure the communication works on all units.
2. Check the parallel info via the Home page.
3. Turn on the *"Off-grid output"* function in the *"Advanced"* page.
4. Before connecting load to load output terminal, check the output of L1 and L2, and L1 and N.
5. Add some small loads to the load output and verify power output.
6. Finish the commissioning.
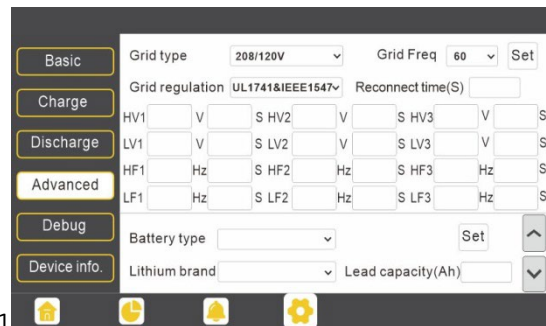
5.10 GRID, LOAD, AND AC CONNECTION

This inverter can be used in 120/240V or 120/208V phase systems. This inverter has passed the main grid connection regulations in the U.S. Users can choose the different grid type and regulation in the *'Advanced'* program, as shown in the image below.

6.

7. GRID AND LOAD CONNECTIONS FOR SPLIT- PHASE SERVICE

The inverter can withstand up to 8kW of imbalance between L1 and L2. However, the loads should be balanced as much as possible to avoid damaging the load side equipment.

The connection diagrams for 120/240V service are shown in the following pages. The connection diagram for 120/208V service is roughly the same except that the generator input is **not supported.**

The inverter can be connected to the load side of the service disconnect. This means if the busbar rating in the main panel must meet the NEC705.12(B)(3) requirements. Otherwise, a Line side connection can be made to avoid an expensive main panel upgrade.

DANGER: There is a very real danger of overloading the service entrance wires with supply side taps. (Refer to NEC 220.) Users could essentially be adding loads to a possibly already fully loaded service entrance. DO THIS ONLY UNDER ADVISEMENT OF YOUR ELECTRICIAN AND/OR INSPECTOR.

8. DECISION TREE AND WIRING DIAGRAMS

How to Connect the EG4 18kPV to the Utility and Home Wiring

Work should be performed by a licensed electrician.

AC Grid-Tie Backfeed Only

Off-Grid

Grid-Tie with Battery Backup on Selected Loads

Grid-Tie with Battery Backup for All Loads

Backup Generator?

Existing Grid-Tie Solar System?

Are you planning to use your EG4 18kPV with batteries now or in the future?

Yes

No

Are you totally off-grid and plan to stay off-grid?

Yes — See Section 4.7 - Off-grid Wiring Configuration and diagram 4.9

No

Would you like to backup your whole home when the utility fails or a selected loads subpanel?

Pass 200A *through inverter*

Pass 60-100A *through inverter*

Whole home backup

Selected loads backup

Is this new construction or do you have an existing service entrance from the utility?

New construction

Whole home backup with feeder tap recommended - see wiring diagram 4.4

Existing utility service entrance equipment

Do you have an existing grid-tie solar system without batteries?

Yes

No

See if your existing service entrance can use the Backfeed breaker diagram

I only wish to use the 18kPV to backfeed solar power to the utility grid

See if your existing service entrance can use the Backfeed breaker diagram

No

Go to "Existing utility service entrance equipment" bubble

See AC coupling diagram 4.9

What is the configuration of your service entrance equipment?

See Section 4.6 - Working with a Generator and diagram in Section 4.1

Meter-main is one integrated panel with utility meter socket, main breaker and load breakers

Meter-main with main breaker only (integrated panel with utility meter socket and main breaker only (no load breakers)

My meter main has bus bars leading from the socket to the main breaker and has load breakers on the bus bar

Upgrade service entrance using components in Feeder tap diagram

My meter main has accessible cables in the customer accessible compartment leading from the meter socket to the main breaker.

Use Whole home backup - supply side tap diagram

Or upgrade service entrance with components in Feeder tap diagram

Use Whole home backup with feeder tap diagram

Meter socket is standalone. Main panel is connected to meter socket with wiring to separate panel.

Main breaker is also standalone - then cables feed a load panel

Main breaker is part of a load center with load breakers

Use Whole home backup with supply side tap diagram

Or replace main breaker panel with components in Feeder tap diagram

Partial Home Backup with Backfed Breaker

BACKFED BREAKERS are the most cost effective and simple way to connect your inverter to the Utility grid. They are simply a breaker installed on your main breaker panel that is backfed for net metering.

HOWEVER TO USE A BACKFED BREAKER: Your 200 Amp panel MUST HAVE a 225 Amp rated breaker bus bar OR you need to downsize your Main Breaker to 175 Amps - see table below.

The other main disadvantage of a backfed breaker is you cannot take advantage of the 18K's ability to pass-through a full 200 Amp Service to your breaker panel thus making whole home backup impossible. The maximum Critical Loads Subpanel breaker with this configuration is 70 Amps.

The NEC Code formula for working with backfed breakers is as follows:

THE SUM OF THE MAIN SERVICE BREAKER PLUS 125% OF THE INVERTER OUTPUT RATING CANNOT EXCEED 120% OF THE BUS BAR RATING ON THE BREAKER PANEL.

VIOLATING THIS RULE CAN LEAD TO BUS OVERLOAD AND FIRE.

Refer to 2020 NEC Code: 705.12 (B)(3)

PERMITTED COMBINATIONS OF MAIN BREAKER RATINGS AND MAIN BUS RATINGS (Amps):

Main Panel Bus Rating	225	200	200	200	150
Main Breaker Rating	200	200	200	175	100
Inverter Rating (x 1.25)	62.5	62.5	62.5	62.5	62.5
Meets NEC Code Safety	√	✗	√	√	√

NOTE: The Inverter Breaker must be located at the opposite end of the bus from the Main Breaker. Use 70 Amp Breaker for Inverter.

Utility Meter

KWH

L1 L2

CT

MUST HAVE 225 A Rated Bus

200

70

N

G

Bond N to G here and only here

Grounding Electrode System

Main Load Panel
225 Amp Bus Bars
200 Amp Main Breaker
70 Amp Inverter Breaker
(See Table to right)

Rapid Shutdown Switch

Locate near outdoor service entrance for access by utility & first responders

For supported EG4 Batteries, RSD also initiates ESS Disconnect.

PV Interactive System 2 Pole Disconnect

L1 L2 N G

60

Critical Loads Subpanel

18kPV INVERTER

GRID L1 L2 N

LOAD 200

GEN L1 L2 G

RSD Terminal (see section 6.2.2)

CT PORT

GEN START

BATT

Closed Loop to Batteries (if supported)

Generator Breaker

G L1 N L2 Generator

2-Wire Start

#1 (25 A)
PV MPPT #2 (15A)
#3 (15A)

BATT 250

POS NEG

PV Isolator

Solar PV Strings (see 3,4)

Alternate configuration for strings to MPPT #1 (combined strings ≤ 25 A)

Locate near outdoor service entrance for access by utility & first responders

Negative Battery Bus Bar or Power Distribution Block ≥500 A Rated

BATTERIES

Fused Positive Battery Bus Bar ≥ 500 A Rated Min or ≥ 250 A/Inverter. Mega fuses - 200 A @ 58 VDC Use Victron High Current Bus Bar/ Mega Fuse System or equivalent.

If using only 1 battery rack and 1 inverter and short battery cables that are fully contained in conduit or gutters, then the distribution bus bars and fusing shown can be omitted. Overcurrent Protection for the battery cables is then dependent on the battery breaker in the inverter. Multiple batteries racks require distribution fusing as shown.

Partial Home Backup with Supply Side Tap

SUPPLY SIDE TAPS - If your home has - like most homes do - a 200 Amp Rated Main Panel and a 200 Amp Main Breaker and therefore cannot use a 60 or 70 A Backfed Breaker (see Backfed Breaker diagram) then a supply side tap with a Critical Loads Subpanel may be your solution. This only works when you can find a place in your meter main that will allow your electrician to make a tap between the utility meter and the main 200 Amp breaker. Some Meter-Mains have an actual cable that runs between the meter socket output and the Main Breaker allowing for a KUP-L type tap or equivalent.

DANGER: THERE IS THE VERY REAL DANGER OF OVERLOADING YOUR SERVICE ENTRANCE WIRES WITH THIS CONFIGURATION. You will be essentially adding loads to your perhaps already fully loaded Service Entrance without any breaker capacity to protect it. DO THIS ONLY UNDER ADVISEMENT OF YOUR ELECTRICIAN AND/OR INSPECTOR.

UPGRADING YOUR SERVICE ENTRANCE TO A STAND-ALONE METER SOCKET AND STAND-ALONE MAIN BREAKER ALLOWS YOU TO DO A WHOLE HOME BACKUP SAFELY USING A FEEDER TAP (See Feeder Tap Diagram).

Note: The amperage rating of the PV Interactive System Disconnect should be at least 70 Amps and should match the amperage of the Critical Loads Subpanel's Main Breaker. Consult your electrician for sizing of the Supply Side Tap conductors, the PV Interactive System Disconnect, and the Critical Loads subpanel.

Refer to 2020 NEC Code: 705.12 (A)

Utility Meter

KWH

L2

L1

Refer to 2020 NEC Code: 705.12 (A)

Supply Side Tap

CT

GES

Main Breaker Panel

Critical Loads Subpanel Can be 60-200 Amps - However total loads from the Main Breaker Panel and the Critical Loads SubPanel must not exceed 160 Amps continuous rating in line with NEC 220 requirements or risk of fire is present. Consult your electrician.

G

L2

200

L1

N

Bond N to G here and only here.

Rapid Shutdown Switch

Locate near outdoor service entrance for access by utility & first responders

For supported EG4 Batteries, RSD also initiates ESS Disconnect.

PV Interactive System 2-Pole Fused Disconnect

Critical Loads Subpanel

G

L2

60

L1

N

18kPV INVERTER

RSD Terminals (see section 6.2.2)

CT PORT

GEN START

BATT

Closed Loop to Batteries (if supported)

GRID L1 L2

N

LOAD 200

GEN L1 L2

G

Generator Breaker

Generator

G L1 N L2

2-Wire Start

Alternate configuration for strings to MPPT #1 (combined strings ≤ 25 A)

#1 (25 A) PV MPPT
#2 (15A)
#3 (15A)

BATT 250

POS NEG

Solar PV Strings (see 3.4)

DC Disconnect

Locate near outdoor service entrance for access by utility & first responders

Negative Battery Bus Bar or Power Distribution Block ≥500 A Rated

BATTERIES

Fused Positive Battery Bus Bar ≥ 500 A Rated Min or ≥ 250 A/Inverter. Mega fuses - 200 A @ 58 VDC Use Victron High Current Bus Bar/ Mega Fuse System or equivalent.

If using only 1 battery rack and short battery cables that are fully contained in conduit or gutters, then the distribution bus bars and fusing shown can be omitted. Overcurrent Protection for the battery cables is then dependent on the battery breaker in the inverter. Multiple batteries racks require distribution fusing as shown.

Whole Home Backup with Supply Side Tap

SUPPLY SIDE TAPS - If your home has - like most homes do - a 200 Amp Rated Main Panel and a 200 Amp Main Breaker and therefore cannot use a 60 or 70 A Backfed Breaker (see Backfed Breaker diagram) then a Supply-Side Tap with a Critical Loads Subpanel may be your solution. This only works when you can find a place in your meter main that will allow your electrician to make a tap between the utility meter and the main 200 Amp breaker. Some Meter-Mains have an actual cable that runs between the meter socket outputs and the Main Breaker allowing for a KUP-L type tap or equivalent. Alternatively you can reconfigure your service entrance by installing a stand-alone Main Breaker as shown. However even better is to install a Feeder Tap as per the Feeder Tap diagram.

DANGER: THERE IS THE VERY REAL DANGER OF OVERLOADING YOUR SERVICE ENTRANCE WIRES WITH THIS CONFIGURATION. You will be essentially adding loads to your perhaps already fully loaded Service Entrance without any breaker capacity to protect it. DO THIS ONLY UNDER ADVISEMENT OF YOUR ELECTRICIAN AND/OR INSPECTOR.

UPGRADING YOUR SERVICE ENTRANCE TO A STAND-ALONE METER SOCKET AND STAND-ALONE MAIN BREAKER ALLOWS YOU TO DO A WHOLE HOME BACKUP SAFELY USING A FEEDER TAP (See Feeder Tap Diagram).

Refer to 2020 NEC Code: 705.12 (A) & (B)

Utility Meter

KWH

L2 · L1

CT

Supply Side Tap

200 Amp Main Service Breaker

Bond N to G here and only here

GES

Manual Transfer Switch 200 Amps 2-Pole

Common Poles

On / Off / On

L2 · G · L1 · N

Main Breaker Panel

RSD Initiator

Locate near outdoor service entrance for access by utility & first responders

For supported EG4 Batteries, RSD also initiates ESS Disconnect.

PV Interactive System 2-Pole Fused Disconnect

On — Solar/Battery/Inverter powers loads with 200 A Utility backup.

Off — Load Panel is off. Battery charging still active from Grid, PV & Gen.

On — Only Utility powers loads. Battery charging active (Grid,PV & Gen).

Generator Breaker

G L1 N L2 Generator 2-Wire Start

18kPV INVERTER

CT PORT

RSD Terminal (see section 6.2.2)

GEN START

GRID L1 L2 · N · LOAD 200 · GEN L1 L2 · G · BATT

Closed Loop to Batteries (if supported)

BATT

ON ON N30 ON

Alternate configuration for strings to MPPT #1 (combined strings ≤ 25 A)

Solar PV Strings (see 3.4)

#1 (25 A) PV MPPT · #2 (15A) · #3 (15A)

DC Disconnect

BATT 250

POS NEG

Locate near outdoor service entrance for access by utility & first responders

Negative Battery Bus Bar or Power Distribution Block ≥ 500 A rated Min or ≥ 250 A per Inverter if multiple.

BATTERIES

Fused Positive Battery Bus Bar ≥ 500 A Rated Min or ≥ 250 A/Inverter Mega fuses - 200 A @ 58 VDC Use Victron High-Current Bus Bar/ Mega Fuse System or equivalent.

If using only 1 battery rack and short battery cables that are fully contained in conduit or gutters, then the distribution bus bars and fusing shown can be omitted. Overcurrent Protection for the battery cables is then dependent on the battery breaker in the inverter. Multiple batteries racks require distribution fusing as shown.

Whole Home Backup using a Feeder Tap

FEEDER TAPS ARE THE IDEAL AND SAFEST WAY TO TIE YOUR INVERTER TO THE UTILITY GRID while achieving whole home backup, full solar backfeed, and full battery charging capability while fully protecting your home's wiring.

However, Feeder Taps must be installed correctly.

Refer to 2020 NEC Code: 705.12 (B)(1&2)

The Main Service Breaker and the Feeder Tap Breaker must be a stand-alone breaker - not a load center. There can be no loads between the Utility Meter and the Feeder Tap. If the Main Breaker Panel has a Main 200 Amp Breaker and it is within 10' of the Feeder Tap then some inspectors will allow omitting the 200 Amp Feeder Tap Breaker. However if this is done the conductors between the Feeder Tap and the Main Breaker Panel - as well as the Manual Transfer Switch are subject to the combined amperage of the Utility (200 Amps) and the backfeed capability of the inverter (50 Amps) while only being rated to 200 Amps. Best to include that breaker as shown.

Feeder Taps should be done by a professional electrician. Ilsco KUP-L-Taps are recommended but must be adhere strictly to installation instructions with proper torque applied measured by a torque wrench. Alternatively a Polaris or Burnby Insulated MultiTap Connector can be used but these need to be torqued twice - once upon installation and once 24 hours later.

Utility Meter
KWH
L1 L2

200 Amp Main Service Breaker

Bond Neutral to Ground here and only here

Square D QOM22225NRB or Equivalent

GES

CT

200 Amp Feeder Tap Breaker

Feeder Tap

Manual Transfer Switch 200 Amps 2-Pole

On
Off
On

Common Poles

L2
G
L1
N

Main Breaker Panel

RSD Initiator

Locate near outdoor service entrance for access by utility & first responders

For supported EG4 Batteries, RSD also initiates ESS Disconnect.

PV Interactive System 2-Pole Fused Disconnect

On Solar/Battery/Inverter powers loads with 200 A Utility backup.

Off Load Panel is off. Battery charging still active from Grid, PV & Gen.

On Only Utility powers loads. Battery charging active (Grid, PV & Gen).

18kPV INVERTER

CT PORT

RSD Terminals (see section 6.2.2)

GEN START

BATT

GRID
L1 L2
N

LOAD
200

GEN
L1 L2
G

Closed Loop to Batteries (if supported)

Generator Breaker

G L1 N L2
Generator
2-Wire Start

Locate near outdoor service entrance for access by utility & first responders

Negative Battery Bus Bar or Power Distribution Block ≥ 500 A Rated Min or ≥ 250 A per Inverter if multiple.

If using only 1 battery rack and 1 inverter and short battery cables that are fully contained in conduit or gutters, then the distribution bus bars and fusing shown can be omitted. Overcurrent Protection for the battery cables is then dependent on the battery breaker in the inverter. Multiple batteries racks require distribution fusing as shown.

BATTERIES

Alternate configuration for strings to MPPT #1 (combined strings ≤ 25 A)

Solar PV Strings (see 3.4)

#1 (25 A)
PV MPPT
#2 (15A)
#3 (15A)

DC Disconnect

BATT
250

POS NEG

Fused Positive Battery Bus Bar ≥ 500 A Rated Min or ≥ 250 A/Inverter. Mega fuses - 200 A @ 58 VDC Use Victron High Current Bus Bar/ Mega Fuse System or equivalent.

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2 x 18kPv Inverters - Whole House Backup with Feeder Tap - 120/240 VAC

Utility Meter

KWH

200 Amp Main Service Breaker

Bond Neutral to Ground here and only here

Grounding Electrode System

200 Amp Feeder Tap Breaker

Feeder Tap

CT

Do not add additional loads to Dedicated Panels

2-Pole Manual Transfer Switch 200 Amps

On Off On

Center Poles

Optional Whole House Generator Transfer Switch

Main Breaker Panel

To House Loads

Generator

2-Wire Start/Stop

AC Coupled Inverters Dedicated Combiner Panel

Solar PV Dis-connect

DC Disconnect

AC-COUPLED SOLAR

AC Coupled Solar Inverter(s)

Dedicated Gen OR AC-Coupled Combiner Panel The Inverter's GEN port can accept Generator OR AC-Coupled Inverters.

OR

PV Interactive System 2-Pole Fused Disconnect ≥120 Amps

Dedicated Grid Input Combiner Panel (200A)

200

Dedicated Inverter Output (Load) Combiner Panel (200A)

200

RSD Initiator

Locate near outdoor service entrance for access by utility & first responders

For supported EG4 Batteries, RSD also initiates ESS Disconnect.

INVERTER #1 - MASTER

GRID L1 L2 N

LOAD 200

GEN L1 L2 G

CT PORT

RSD Terminals (see section 6.2.2)

GEN START

PARALLEL PORTS

INVERTER #2

GRID L1 L2 N

LOAD 200

GEN L1 L2 G

DC-Coupled Solar

Solar PV Strings

Alternate configuration for strings to MPPT #1

See PV diagram section 3.4

PV MPPT
#1 (25 A) #2 (15A) #3 (15A)

BATT 250

POS NEG

DC Disconnect

Locate near outdoor service entrance by utility & first responders

PV MPPT
#1 #2 #3

BATT 250

POS NEG

DC Disconnect

Negative Battery Bus Bar or Power Distribution Block ≥500 Amp Rated @ 30°C

Fused Positive Battery Bus Bar ≥ 500 A Rated Min or ≥ 250 A/Inverter. Mega fuses - 200 A @ 58 VDC Use Victron High Current Bus Bar/Mega Fuse System or equivalent.

BATTERIES

Important! – Make sure to "Enable" Share battery on every inverter pulling from common battery bank.

Grid Type Settings for each inverter

| Basic | Charge | Discharge | Advanced | Debug | Device info. |

Grid type: **240/120V** ›   Grid Freq: **60** ›   Set

Grid regulation: **UL1741&IEEE1547** ›   Reconnect time(S)

HV1	V	S HV2	V	S HV3	V	S
LV1	V	S LV2	V	S LV3	V	S
HF1	Hz	S HF2	Hz	S HF3	Hz	S
LF1	Hz	S LF2	Hz	S LF3	Hz	S

Battery type ›   Set

Lithium brand ›   Lead capacity(Ah)

Inverter 1 Settings

| Basic | Charge | Discharge | Advanced | Debug | Device info. |

Parallel system

Role: **1 phase primary** ›   Phase: **U phase** ›   Set

Parallel battery

Share battery

Auto Detect Phase   Reset

Inverter 2 Settings

| Basic | Charge | Discharge | Advanced | Debug | Device info. |

Parallel system

Role: **Subordinate** ›   Phase: **U phase** ›   Set

Parallel battery

Share battery   Set

Auto Detect Phase   Reset

EG4 ELECTRONICS

Utility Meter

Bond Neutral to Ground here and only here

Grounding Electrode System

200 Amp Main Service Breaker

200 Amp Feeder Tap Breaker

NEC See 2020 NEC Code 705.12(B)

Feeder Tap

2-Pole Manual Transfer Switch 200 Amps

On Off On

Center Poles

Optional Whole House Generator Transfer Switch

Main Breaker Panel

G

L2

L1

To House Loads

Generator

2-Wire Start/Stop

AC-COUPLED SOLAR

DC Disconnect

AC Coupled Inverters Dedicated Combiner Panel

Solar PV Dis-connect

AC Coupled Solar Inverter(s)

PV Interactive System 2-Pole Fused Disconnect 200 Amps

Do not add additional loads to Dedicated Panels

CT

L2 G 200 60 60 60 L1 N

Dedicated Grid Input Combiner Panel (200A)

L2 G 200 60 60 60 L1 N

Dedicated Inverter Output (Load) Combiner Panel (200A)

G N L2 L1

OR

Dedicated Gen OR AC-Coupled Combiner Panel
The Inverter's GEN port can accept Generator OR AC-Coupled Inverters.

RSD Initiator

Locate near outdoor service entrance for access by utility & first responders

For supported EG4 Batteries RSD also initiates ESS Disconnect.

GRID L2 L1 N

LOAD 200

GEN L1 L2 G

INVERTER #1 - MASTER

RSD Terminals (see 6.2.2)

CT PORT

GEN START

PARALLEL PORTS

DC-Coupled Solar

Alternate configuration Strings for strings to MPPT #1

See PV diagram section 3.4

Solar PV Configuration Strings

PV MPPT #1 (25 A) #2 (15A) #3 (15A)

BATT 250 POS NEG

DC Disconnect

GRID L2 L1 N

LOAD 200

GEN L1 L2 G

INVERTER #2

Locate near outdoor Service Entrance for access by Utility & First Responders

PV MPPT #1 #2 #3

BATT 250 POS NEG

DC Disconnect

PARALLEL PORTS

GRID L2 L1 N

LOAD 200

GEN L1 L2 G

INVERTER #3

Locate near outdoor Service Entrance for access by Utility & First Responders

PV MPPT #1 #2 #3

BATT 250 POS NEG

DC Disconnect

PARALLEL PORTS

BATTERIES

Neg Battery Bus Bar or PDB (≥ 750A)

Fused Positive Battery Bus Bar (e.g. Victron) ≥ 750 A Rated
Mega fuses - 200 A @ 58 VDC

3 x 18kPv Inverters – Whole House Backup with Feeder Tap – 120/240 VAC

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Important! – Make sure to "Enable" Share battery on every inverter pulling from common battery bank.

Inverter Settings

Grid type settings for each inverter

Inverter #1

Basic	Parallel system
Charge	Role	1 phase primary ∨	Phase	U phase ∨	Set
Discharge	Parallel battery
Advanced	Share battery	Set
Debug	Auto Detect Phase	Reset
Device info.	

Inverter #1 (settings screen)

Basic	Grid type	240/120V ∨	Grid Freq	60 ∨	Set
Charge	Grid regulation	UL1741&IEEE1547 ∨	Reconnect time(S)
Discharge	HV1 [ ] V	S HV2 [ ] V	S HV3 [ ] V	S
Advanced	LV1 [ ] V	S LV2 [ ] V	S LV3 [ ] V	S
Debug	HF1 [ ] Hz	S HF2 [ ] Hz	S HF3 [ ] Hz	S
Device info.	LF1 [ ] Hz	S LF2 [ ] Hz	S LF3 [ ] Hz	S
	Battery type [∨]	Set
	Lithium brand [∨]	Lead capacity(Ah) [ ]

Inverter #2

Basic	Parallel system
Charge	Role	Subordinate ∨	Phase	U phase ∨	Set
Discharge	Parallel battery
Advanced	Share battery	Set
Debug	Auto Detect Phase	Reset
Device info.	

Inverter #3

Basic	Parallel system
Charge	Role	Subordinate ∨	Phase	U phase ∨	Set
Discharge	Parallel battery
Advanced	Share battery	Set
Debug	Auto Detect Phase	Reset
Device info.	

3 x 18kPv Inverters - Whole Service Backup with Feeder Tap - 3 phase -120/208 VAC

Please follow the steps below to configure parallel settings:

Step 1: Make sure power cables and parallel comms cables have been wired correctly and make sure the DIP configurations are correct.

Step 2: Power on inverters and set inverters to **standby** (set standby via Basic page)

Step 3: Set Grid type to "208V/120V" and correct grid regulation option, ensure the same configurations to both two inverters

Step 4: Set the host inverter to "3 phase Master" and "phase U", and set slave inverter to "Slave" and "phase W".

Step 5: Set "Share battery" enable on both inverters

EG4 ELECTRONICS

OFF-GRID

DC-COUPLED SOLAR

Alternate configuration for strings to MPPT #1 (combined strings ≤ 25 A)

18kPV INVERTER

Rapid Shutdown Switch

For supported EG4 Batteries RSD also initiates ESS Disconnect.

Locate near outdoor Service Entrance for access by Utility & First Responders

RSD Terminal (see section 6.2.2)

PV System 60 A AC Disconnect 2-Pole Non-Fused

The Inverter's GEN port can accept Generator OR AC Coupled Inverters up to 90 Amps.

PV System AC Disconnect

OR

Generator Breaker

Generator 240 VAC - 20-90 Amps 2-Wire Start

L1 L2 G N

GRID L1 L2

LOAD 200

GEN L1 L2

N

G

GEN START

BATT

NO / NO / GEN / -BAT / +BAT

Closed Loop to Batteries (if supported)

#1 (25A)

PV MPPT

#2 (15A)

#3 (15A)

BATT 250

POS NEG

PV Disconnect

Solar PV Strings (see 3.4)

Locate outdoors for easy access in emergencies and for Fire Department.

Negative Battery Bus Bar or Power Distribution Block (see Pos Bar Ratings)

Fused Positive Battery Bus Bar ≥ 500 A Rated Min or ≥ 250 A/Inverter Mega fuses - 200 A @ 58 VDC Use Victron High-Current Bus Bar/ Mega Fuse System or equivalent.

BATTERIES

If using only 1 battery rack and 1 inverter and short battery cables that are fully contained in conduit or gutters, then the battery distribution bus bars and fusing shown can be omitted.

Battery Charging Option (up to 5KW) when GEN port is used for AC Coupling

EG4 Charge Verter

Auxiliary Generator

PV System Disconnect and Main Breaker can be same amperage as generator with 60 Amp as minimum.

L2

L1

G

N

60

House Loads

Main Breaker Panel

Bond N to G here and only here

Grounding Electrode System

In OFF-Grid mode, the inverter can accept BOTH DC-COUPLED AND AC-COUPLED SOLAR at the same time. The AC COUPLED SOLAR CAN BE UP TO 21.6 KWS (AC) or 90 Amps of AC output. The DC COUPLED MPPT CHANNELS CAN HANDLE UP TO 18kW of PV input (DC). However battery charging is limited to 12 KWs (230 Amps @ 51.6 VDC). For PV input over 18KWs a second and/or third inverter is recommended.

PV Disconnect

AC-COUPLED SOLAR

Note: The amperage of the critical loads subpanel can be the same amperage as the generator input if present. The generator can be 25-90A—the critical loads subpanel should have a minimum of 60A to fully utilize battery power. Therefore, if a generator larger than 60A is installed, the critical loads subpanel amperage should match to use the full backup power of the generator.

Utility Meter

KWH

CT

L1

L2

Backfed Breaker, Feeder Tap or Supply Side Tap Utility Interconnection (see wiring diagrams)

G

GES

Bond Neutral to Ground here and only here

L2

200

L1

N

Main Breaker Panel

Critical Loads Subpanel (Not present if Whole Home Backup)

G

L2

L1

N

Rapid Shutdown Switch

For supported EG4 Batteries RSD also initiates ESS Disconnect.

Locate Near Outdoor Service Entrance for Access by Utility & First Responders

PV Interactive System Fused Disconnect 2-Pole

RSD Terminal (see section 6.2.2)

CT PORT

GRID
L2
L1
N

LOAD
L2
L1

GEN
L1 L2

G

BATT

Closed Loop to Batteries (if supported)

18kPV INVERTER

DC COUPLED SOLAR

#1 (25 A) PV MPPT #2 (15A) #3 (15A)

BATT

250

POS   NEG

DC Disconnect

Alternate MPPT #1 See 3.4

Solar PV Strings (see 3.4)

AC COUPLING

DC Disconnect

Locate near outdoor service entrance for access by utility & first responders

Negative Battery Bus Bar or Power Distribution Block ≥250 A Rated per Inverter

Fused Positive Battery Bus Bar ≥ 500 A Rated Min or ≥ 250 A/Inverter Mega fuses - 200 A @ 58 VDC Use Victron High-Current Bus Bar/ Mega Fuse System or equivalent.

BATTERIES

EG4 Charge Verter

Auxiliary Generator

Battery Charging Option (up to 5KW) when GEN port is used for AC Coupling

(Existing) PV System AC Disconnect

DC Disconnect

Existing Grid-Tie or New AC COUPLED SOLAR

The inverter can accept BOTH DC COUPLED AND AC COUPLED SOLAR at the same time. The AC COUPLED SOLAR CAN BE UP TO 21.6 KWS (AC) or 90 Amps of AC output. The DC COUPLED MPPT CHANNELS CAN HANDLE UP TO 18kW of PV input(DC), with 12kW (50 A AC) of that 18kW available for back feeding the utility grid. Therefore, up to 33.6kW of AC power could be sent back to the grid. For this amount of back feed, users will need either a feeder tap or supply side tap as the point of utility interconnection. 2 Inverters and >30 KWhrs of batteries are recommended for systems needing more than 18KWs (DC) of solar.

9. END USER SETTINGS

9.1 APPLICATION SETTINGS

- **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, LOAD output will be uninterrupted)

- **Grid Sell Back:** In some cases, the customer cannot feed energy into grid. If the customer does not want to feed energy to grid, you can disable the Grid Sell Back function.

- **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.

9.2 PARALLEL SETTINGS

- **Set Slaves or Master:** The EG4 18kPV 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 in one 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.

- **Set Composed Phase:** When you use ≥3 inverters to compose a three-phase system, you must connect the AC terminals of the inverter to three-phase grids. (Used when composing a three-phase system) If there is utility in the system, the inverter will detect the phase it connects to automatically and record it. Next time it will output the phase as it detected. If the user setting is different from the phase inverter detected, it will output the phase detected. The output phase record will be cleared if customer clears it. If there is no utility input, the inverter will use the user output phase setting to compose three-phase output. If the customer sets the wrong phase, i.e., 2 U phase and no W phase, the system will report error.

- **Share Battery:** For paralleled systems: if all inverters connect to same battery bank, then Share Battery must be enabled. The master inverter will broadcast the battery info to all other inverters.

9.3 CHARGE SETTINGS

- **Batt Charge Control (Volt/SOC):** Batt Charge Control will charge batteries according to Voltage/SOC% depending on selection.
- **Charge Current Limit (Amps DC):** Users can set the maximum battery charge current.
- **AC Charge**
- **AC Charge Enable:** 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.
- **AC Charge (Time/Volt/SOC):** Set AC charging according to Time or Volt(V)/SOC(%).
- **AC Charge Power(kW):** The max charging power from grid.
- **Start AC Charge SOC (%):** Percentage at which system will start charging batteries from Grid.
- **Stop AC Charge SOC (%):** Percentage at which system will stop charging batteries from Grid.
- **AC Charge Start Time 1-3:** Start AC Charging according to time-frame.
- **AC Charge End Time 1-3:** Stop AC Charging according to time-frame.

Battery Priority

- **Battery Priority:** Set to "enable" to prioritize solar power for charging batteries first. If there is excess PV power it will help power loads. If there is excess PV power past powering loads, the rest will feed into the grid.

Battery Backup Mode

For the EG4 18kPV in default mode; if PV power is sufficient to cover the demands of home loads, then PV power will prioritize home loads first. If there is excessive PV power; the remainder will be used to charge the battery. If there is still PV power after powering loads and battery charging; the remaining PV power will be sold back to the grid. In some situations, the customer would want solar power to charge battery first, and if there is more energy than needed; it will then power your loads. We would want to enable PV Charge Priority (PV) function. PV Charge Priority power CMD is the max power percent when charging battery in PV Charge Priority mode. If the time is in the period that the user set and the battery SOC is less than the limit, the solar power will used to charge the battery first.

- **PV Charge Priority:** Enable this setting to prioritize Solar for charging batteries.

- **PV Charge Power (kW):** The max charge power from PV.

- **PV Charge Priority Stop SOC (%)/Volt (V):** The inverter will stop charging the batteries if the battery SOC or Voltage exceeds these limits.

- **Battery Priority Start Time 1-3:** Start time for PV Charge Priority setting.

- **Battery Priority End Time 1-3:** End time for PV Charge Priority setting.

9.4 GENERATOR CHARGE SETTINGS

- **Generator Boost:** Enable or disable the generator boost feature. Enable to allow the inverter to pull supplemental power from both PV and battery whenever the generator power is not sufficient to handle all loads.

- **Generator Cool-Down Time (Min):** Set the cool-down time for the generator before re-engaging the generator output to the inverter.

- **Batt Charge Current Limitation (A):** Battery charge current limitation from Generator.

- **Gen Rated Power (kW):** The battery charge power can be limited based on the detected 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.

9.5 DISCHARGE SETTINGS

- **Batt Discharge 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." When using Lead-Acid batteries or Lithium batteries without communication, you can always select charge control according to "VOLT."

- **On-Grid Discharge Cut-Off SOC(%)/Volt(V) Off-Grid Discharge 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 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.

- **Forced Discharge Start Time 1-3:** Start time for Forced Discharge.

- **Forced Discharge End Time 1-3:** End time for Forced Discharge.

AC Couple

The inverter supports AC coupling connection with the existing grid-interactive solar system. The existing solar system is connected to the inverter's GEN terminal. Please see section 5.8 for more information.

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

- **AC Couple End Volt(V)/SOC (%):** AC Coupling will stop at this set V/SOC.

10. INSTALLER SETTINGS
10.1 COMMON SETTINGS

- **Time:** Set the time/date of the inverter. The input format is 2019-02-14 14:44:00. Format YYYY-MM-DD HH:MM:SS

- **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 0-150.

- **PV Input Mode:** The connection type of solar modules.

- **Neutral Detect Enable/Disable:** Detects if the customer has connected the Neutral line to the AC Input terminal.

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

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 your total capacity when using Lead-Acid batteries.

10.2 APPLICATION SETTINGS

- **EPS Voltage Set(V):** Set voltage of the inverter's output.

- **PV Grid Off:** If the customer wants the system to have Off-Grid functionality without installing any batteries, please enable PV Grid Off. Please note, in this situation the Off-Grid energy is supplied by solar and is not stable. We suggest the customer install battery/batteries to keep the EPS/UPS output voltage stable if they want to have Off-Grid function. (Allow system to access the Off-Grid mode when only solar input is available)

- **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, you can disable the Grid Sell Back function.

- **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.

- **Max. AC Input Power(kW):** The inverter can adjust the charge power based on the detected inverter's load consumption and max. AC Input power limitation.

- **PV Arc: Only available for the US model.** 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.

- **Run Without Grid:** Enable for Off-Grid operations with no AC Input.

- **Off-Grid Mode:** Enable for nominal Off-Grid operations while utilizing AC Input as a backup power source, allowing for absolute zero export.

- **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.

Parallel System

Parallel System					
Set System Type (?)		⌄	Set	Share Battery	Enable Disable
Set Composed Phase (?)	⌄	⌄	Set		

- **Set System Type:** The EG4 18kPV 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.

- **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.

- **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.

10.3 GRID CONNECT SETTINGS

- **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.

- **Grid Type:** Select the correct Grid type to function, such as split phase: 240/120 or 208/120V.

Connection

- **Connect Time:** The wait time to connect to the grid if the solar input is ready and the grid power is in range of the voltage and frequency settings below.

- **Reconnect Time:** The inverter will attempt to reconnect to the grid after abnormal situations (i.e. voltage/frequency fluctuations) once this amount of time has elapsed.

- **Grid Connect Condition Settings:** If the voltage and frequency is in range of the below settings, the inverter will connect to grid.
    - o **Grid Volt Connect High (V)**
    - o **Grid Volt Connect Low (V)**
    - o **Grid Freq Connect High (Hz)**
    - o **Grid Freq Connect Low (Hz)**

Power Command

- **Active Power Percent (%):** Max AC Output power percent of the inverter.

- **OVF Load Derate Enable:** If the frequency is higher than 50.2/60.2Hz, the output power will be reduced according to a linear derating curve.

- **Reactive Power Type**

- **PF CMD**

- **Reactive Power Percent (%)**

Grid Protection

- **Grid Volt Limit 1-3 Low (V):** Minimum acceptable grid voltage for inverter(s).

- **Grid Volt Limit 1-3 High (V):** Maximum acceptable grid voltage for inverter(s).

- **Grid Freq Limit 1-3 Low (Hz):** Minimum acceptable grid frequency for inverter(s).

- **Grid Freq Limit 1-3 High (Hz):** Maximum acceptable grid frequency for inverter(s).

- **Grid Volt Mov Avg High(V)**

- **Power Soft Start Slope(%/min):** The rate at which the inverter will reactivate Grid Input after an outage.

- **Grid Soft Start:** Enable or disable Grid Soft Start. If enabled, the inverter will output AC power more slowly than under normal conditions.

10.4 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.

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:** Set AC charging according to Time or Volt(V)/SOC (%).

- **AC Charge Power (kW):** The max charging power from grid.

- **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

For the EG4 18kPV in default mode; if PV power is sufficient to cover the demands of home loads, then PV power will prioritize home loads first. If there is excessive PV power; the remainder will be used to charge the battery. If there is still PV power after powering loads and battery charging; the remaining PV power will be sold back to the grid. In some situations, the customer would want solar power to charge battery first, and if there is more energy than needed; it will then power your loads. We would want to enable PV Charge Priority (PV) function. PV Charge Power power is the max power percent when charging battery in PV Charge Priority mode. If the time is in the period that the user set and the battery SOC is less than the limit, the solar power will used to charge the battery first.

- **PV Charge Priority (PV):** Enable this setting to prioritize Solar for charging batteries.
- **PV Charge Power (kW):** The max charge power from PV.
- **PV Charge Priority Stop SOC (%)/Volt (V):** The inverter will stop charging the batteries if the battery SOC or Voltage exceeds these limits.
- **Battery Priority Start Time 1-3:** Start time for PV Charge Priority setting.
- **Battery Priority End Time 1-3:** End time for PV Charge Priority setting.

10.5 GENERATOR CHARGE SETTINGS

- **Generator Boost:** Enable or disable the generator boost feature. Enable to allow the inverter to pull supplemental power from both PV and battery whenever the generator power is not sufficient to handle all loads.
- **Generator Cool-Down Time (Min):** Set the cool-down time for the generator before re-engaging the generator output to the inverter.
- **Batt Charge Current Limitation (A):** Battery charge current limitation from Generator.
- **Gen Rated Power (kW):** The battery charge power can be limited based on the detected 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.

10.6 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 fully charged based on SOC/Voltage. See Section 12.1.4 for more information regarding Peak-Shaving settings.

- **Grid Peak-Shaving Power(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 Enable/Disable:** When there is an existing On-Grid PV inverter and you need the 18kPV system to function in both On-Grid and Off-Grid mode, you would connect the AC output of the existing On-Grid PV inverter to the GEN terminal of the 18kPV and enable the AC Couple function.

- **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.

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

11. MONITOR SYSTEM SETUP

11.1 WI-FI/4G DONGLE CONNECTION

A Wi-Fi/4G dongle can be used to monitor the inverter and remotely view the monitoring data on a computer or smart phone. You can attach this module by plugging it in to the side of the inverter and securing it with the 4 Phillips head screws. *(See image below)*
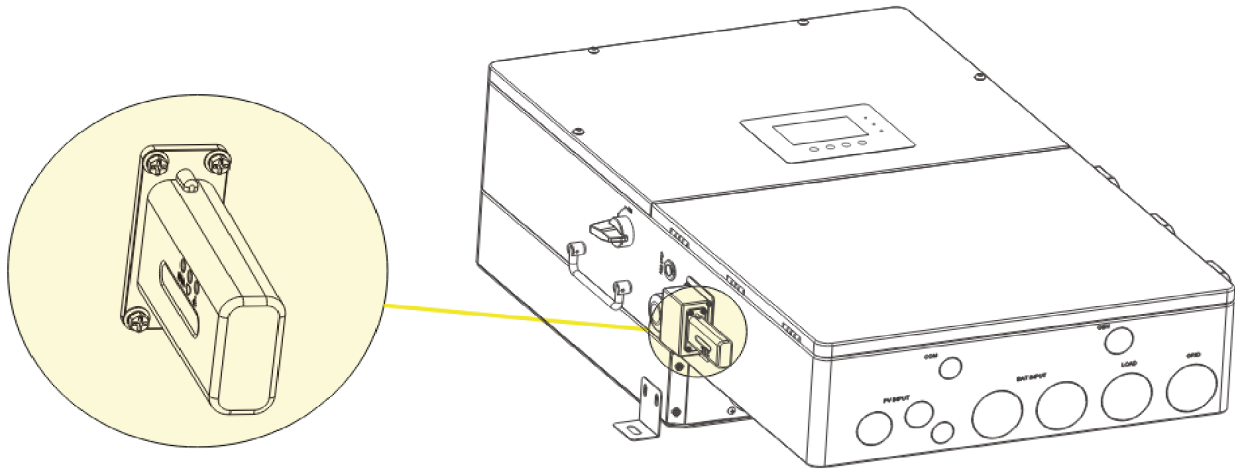
View data on smart phone:

A QR code with a link to our website 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.

11.2 THIRD-PARTY RS485 COMMUNICATION

Meters 485B and 485A can be used when a meter is not connected. These two pins can be used to communicate with the inverter using the RS485 Modbus protocol.

INV485: This interface 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 your distributor to get the Modbus protocol for third-party app development.
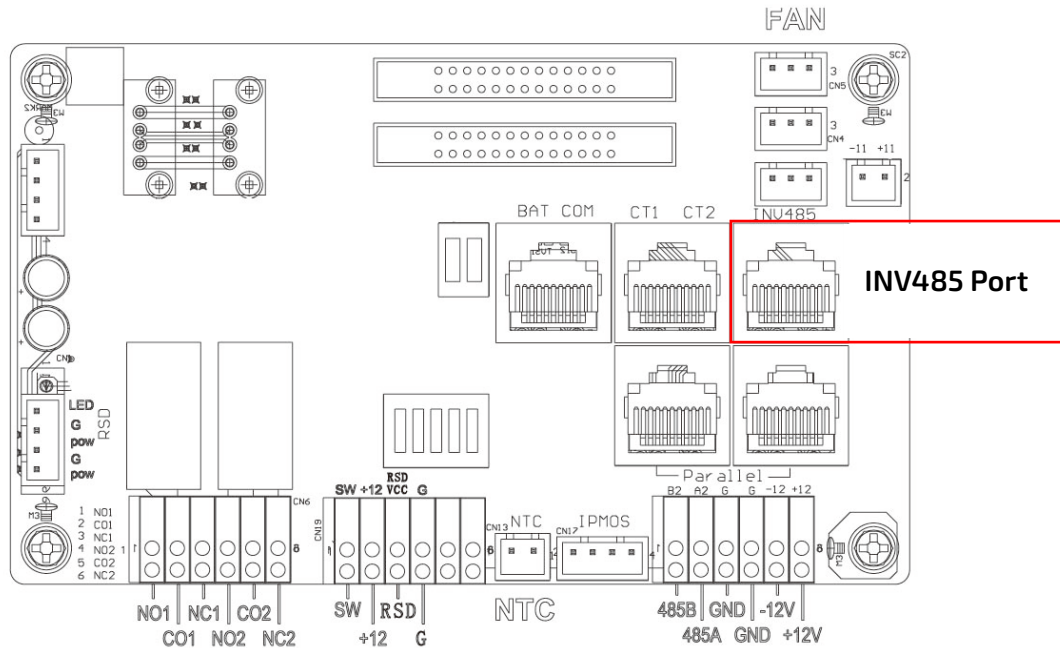
Pin	Description
1	RS485B
2	RS485A
3-8	/

11.3   ONLINE MONITORING SYSTEM USER INTERFACE

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

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.
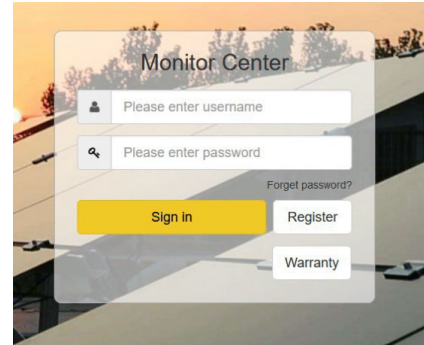
11.3.1   USING THE WEB INTERFACE TO SET YOUR WI-FI PASSWORD.

1. Power on the inverter and connect your mobile phone or laptop to the hotspot after the INV LED on the Wi-Fi module is solid on. The name of the hotspot is the same as the SN on the Wi-Fi dongle shell. *(See image on right)*

2. Enter 10.10.10.1 in your browser window. The username and password are both "admin" for this dialog box. After logging in, select English on the right side. *(See images below)*
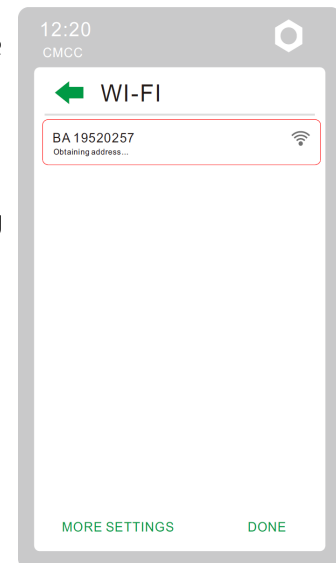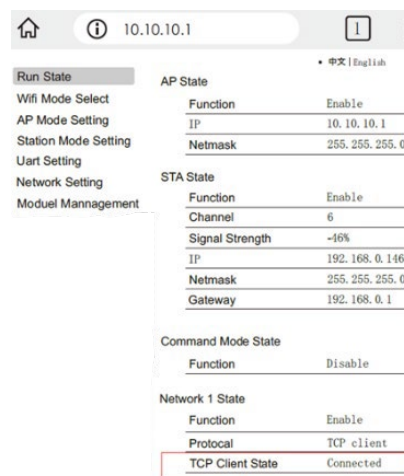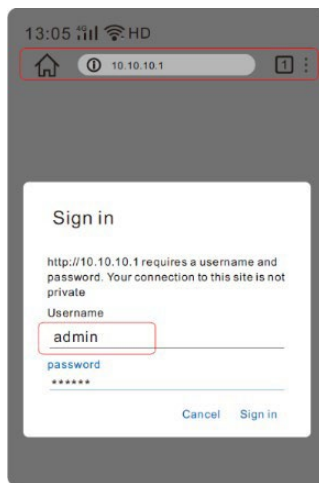
3. Go to the "Station Mode Setting" page. Click "Scan."
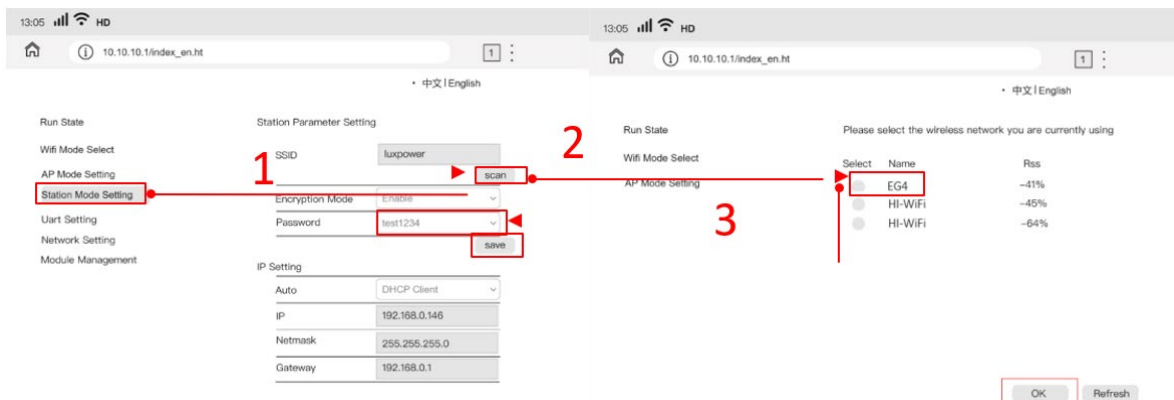
4. Select the Wi-Fi network you want to connect to and the click "OK." Input the Wi-Fi password and click "Save."
5. After saving your settings, the dongle will restart. After you set the password, three lights will be solid on, which means the inverter is connected to the server. You can now input your account login and password to begin monitoring your system.

11.3.2 DASHBOARD (MONITOR TAB)

Once your account is created, log in and you will be brought to the main page (Monitor tab) of the monitoring interface.

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 Yielding	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/Import	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.

Cluster	**North America** – Clicking this will allow you to change the country. **English** – Clicking this will allow you to change the language of the page. **(Username)** – Clicking this will open a list with User Center (used for editing your profile), Modify password (used to change your password), and Logout (to logout of this account)

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.

11.3.3 DATA TAB

Data view displays additional in-depth running data, including technical details for PV, battery, grid, and loads, that is helpful for analysis and maintenance.

Five categories make up the data view: "Chart," "Energy," "Historical data," "Local data," and "History event." For more details on each component, please see the following sections.

Chart

This chart shows how key parameters of "PV side," "Battery," "AC Side" and "Backup Output" change over a 24 hour period.
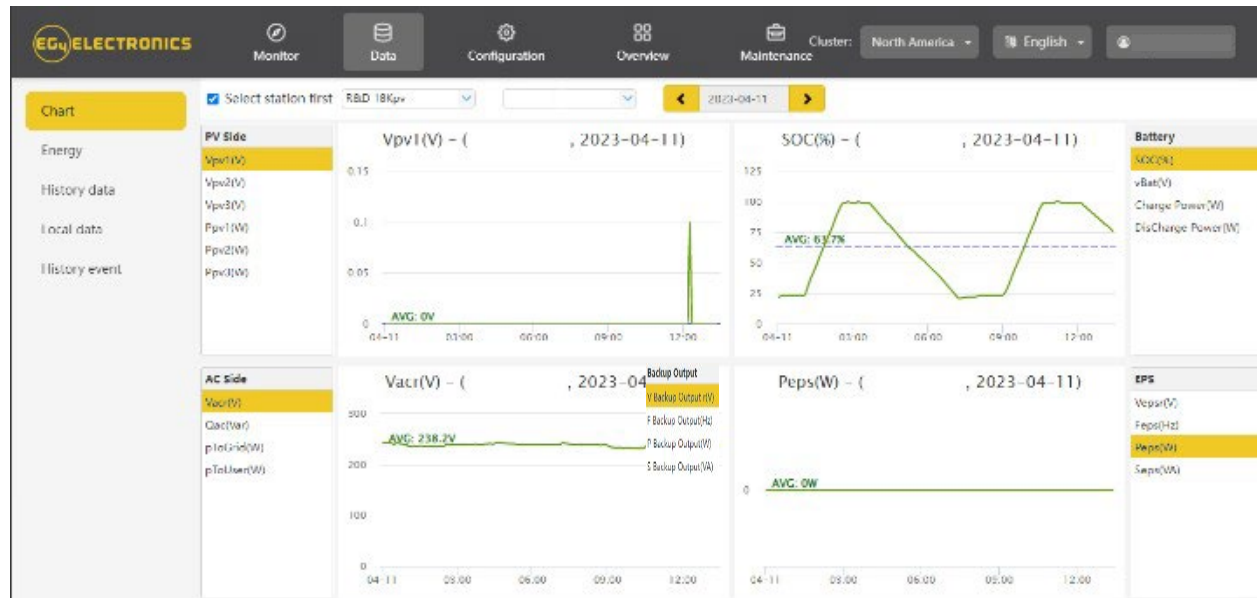
Name	Description
Vpv	Voltage of solar input ("V" stands for volts, lower-case "pv" stands for PV)
Ppv	Power of solar input (first letter "P", lower-case "pv" stands for PV)
SOC(%)	Battery/batteries state of charge.
Vacr	Voltage of AC output ("V" stands for voltage, "ac" for AC, and "r" for phase U)
Qac	Reactive power of AC output ("Q" stands for reactive power)
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 (first letter "S" stands for apparent power)
pToGrid	Power feed into grid

Energy

"Energy" tab shows how energy (y-axis) changes with time, daily, by date (x-axis) in one month.

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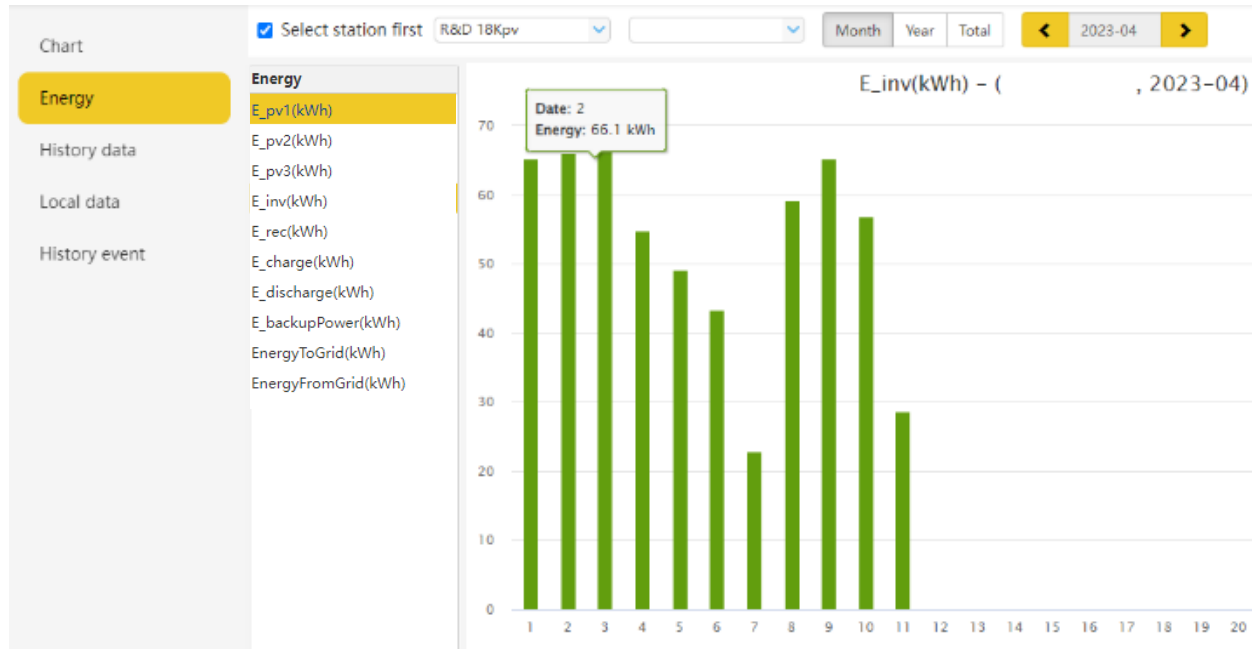
Name	Description
E_pv1(kWh)	Energy generated by PV string 1
E_pv2(kWh)	Energy generated by PV string 2
E_inv(kWh)	Energy output via AC output
E_rec(kWh)	Energy of AC charge
E_charge(kWh)	Energy used for battery charge
E_discharge(kWh)	Energy output by battery discharging
E_ebackupPower(kWh)	Load energy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

History Data

The measured technical characteristics of PV, battery, load, and grid are listed under "Historical data" 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 your 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 "History data" 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 "History Event" 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	R&D 18Kpv		Notice	No AC Connection	2023-04-05 16:28:28	2023-04-05 16:33:28
2	R&D 18Kpv		Notice	No AC Connection	2023-04-05 11:44:45	2023-04-05 11:49:41
3	R&D 18Kpv		Notice	No AC Connection	2023-04-05 10:51:06	2023-04-05 10:56:05
4	R&D 18Kpv		Notice	No AC Connection	2023-04-05 10:33:15	2023-04-05 10:53:15
5	R&D 18Kpv		Fault	CAN communication Fault in Parallel System	2023-04-05 10:33:15	2023-04-05 10:53:15
6	R&D 18Kpv		Notice	No AC Connection	2023-04-05 09:13:22	2023-04-05 09:18:20
7	R&D 18Kpv		Notice	No AC Connection	2023-04-05 08:51:59	2023-04-05 08:56:59
8	R&D 18Kpv		Notice	No AC Connection	2023-04-05 08:51:15	2023-04-05 08:56:17
9	R&D 18Kpv		Notice	No AC Connection	2023-04-05 08:26:58	2023-04-05 08:36:58
10	R&D 18Kpv		Notice	No AC Connection	2023-04-05 08:26:16	2023-04-05 08:36:16
11	R&D 18Kpv		Notice	Communication failure with battery	2023-04-04 14:20:51	2023-04-04 14:35:52
12	R&D 18Kpv		Notice	Battery open	2023-03-29 15:15:14	2023-03-29 15:25:03
13	R&D 18Kpv		Notice	Battery voltage low	2023-03-29 15:15:14	2023-03-29 15:25:03
14	R&D 18Kpv		Notice	Battery open	2023-03-29 15:04:15	2023-03-29 15:07:56
15	R&D 18Kpv		Notice	Battery voltage low	2023-03-29 15:04:15	2023-03-29 15:07:56
16	R&D 18Kpv		Notice	Battery open	2023-03-29 15:01:03	2023-03-29 15:02:47
17	R&D 18Kpv		Notice	Battery voltage low	2023-03-29 15:01:03	2023-03-29 15:02:47
18	R&D 18Kpv		Notice	LCD communication fault	2023-03-29 14:37:46	2023-03-29 14:59:09
19	R&D 18Kpv		Notice	No AC Connection	2023-03-29 14:01:30	2023-03-29 16:12:11
20	R&D 18Kpv		Notice	No AC Connection	2023-03-29 14:00:09	2023-03-29 16:11:36
21	R&D 18Kpv		Notice	Over temperature or No master set in parallel	2023-03-29 08:33:23	2023-03-29 08:41:28
22	R&D 18Kpv		Fault	Primary Inverter Lost in Parallel System	2023-03-29 08:33:23	2023-03-29 08:41:28
23	R&D 18Kpv		Fault	CAN communication Fault in Parallel System	2023-03-29 08:33:23	2023-03-29 08:41:28
24	R&D 18Kpv		Notice	Battery open	2023-03-29 08:33:02	2023-03-29 08:34:28
25	R&D 18Kpv		Notice	Battery voltage low	2023-03-29 08:33:02	2023-03-29 08:34:28
26	R&D 18Kpv		Notice	Battery open	2023-03-29 08:26:37	2023-03-29 08:30:16
27	R&D 18Kpv		Notice	Battery voltage low	2023-03-29 08:26:37	2023-03-29 08:30:16
28	R&D 18Kpv		Notice	No AC Connection	2023-03-29 08:24:01	2023-03-29 08:46:32
29	R&D 18Kpv		Notice	No AC Connection	2023-03-29 08:23:01	2023-03-29 08:46:28
30	R&D 18Kpv		Notice	Over temperature or No master set in parallel	2023-03-29 08:23:01	2023-03-29 08:23:40

Displaying 1 to 30 of 131 items

11.3.4 CONFIGURATION TAB

The "Configuration" page is used for users to manage their station, dataloggers and user information.

Stations

This tab will show all stations linked to your account. Clicking on a station name will display all inverters under that station or location.

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

Dongles

Users can add the datalogger 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 datalogger and configuring the proper password for the Wi-Fi datalogger. Dongles can also be searched by individual serial number.

IMPORTANT: Before configuring the password for the Wi-Fi datalogger, please add the datalogger 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.

11.3.5 OVERVIEW

"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.

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.

11.3.6 MAINTENANCE

The "Maintenance" view is used for firmware updates and to remotely change settings on your 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.

NOTE: *If trying to update firmware locally, see Section 10*

IMPORTANT: Advanced technical knowledge is necessary to properly make changes. End users will only be able to see the "Remote Set" tab to make changes to their inverter. See Section 6 for more information.

Remote Set

12. FIRMWARE UPDATES

12.1 FIRMWARE UPDATE VIA EG4 ELECTRONICS APP

NOTE: When updating your firmware through the EG4 APP, be sure to have plenty of battery life on your device and do not close the application. Make sure you have the Wi-Fi dongle connected securely and correctly configured (See Section 9.1 for Wi-Fi Dongle connection steps) for the inverter before performing the following steps:

Step 1: Open the EG4 Electronics APP on your mobile phone and select the "DOWNLOAD FIRMWARE" button.

Step 2: Choose the correct firmware file (contact your distributor for most up to date files) and select "DOWNLOAD" on the right side to download the file to your mobile device.

Step 3: Keep the APP running and go to your phone's Wi-Fi settings. Connect your mobile device to the Dongle's network. The Dongle's Network ID will be the same as the Dongle's Serial Number.

Step 4: Return to the home screen of the APP and select "LOCAL CONNECT". Select the "Set" button on the bottom right side and proceed to the next step.

Step 5: After completing step 4, the Local Set Interface as shown above will appear. Swipe upward on your phone screen until the "UPDATE FIRMWARE" button is visible at the bottom of the APP's display.

Step 6: Choose the correct installation package in the dropdown box and click "UPDATE FIRMWARE" to begin the updating process.
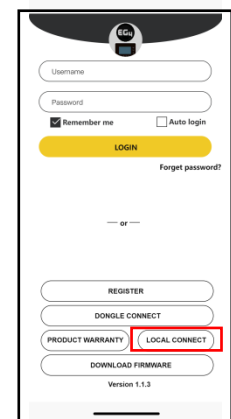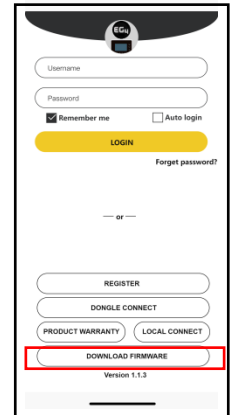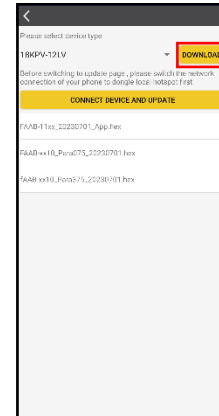
After clicking the "UPDATE FIRMWARE" button, the update will begin. Update progress can be viewed via the APP as well as the inverter's LCD screen. Once the update is completed, a notification will appear confirming that the firmware has been successfully updated (as shown in photo). After successfully updating firmware, the inverter will restart itself.

Make sure to update all inverters to the latest firmware that are installed in the same ESS.

12.2 FIRMWARE UPDATE VIA HARD-WIRED ETHERNET CONNECTION

Step 1: First, construct a USB-A to RS485 converter cable. You will utilize Pins 1 & 2 on the RJ45 connector crossed over to pins A & B on the USB connector. (1 to B and 2 to A)
Step 2: With the inverter powered on, plug the RS485 end of your cable into the IN485 port on the interface board as shown in the image to the right, and plug the USB end into your PC.
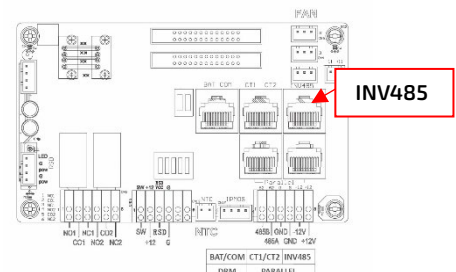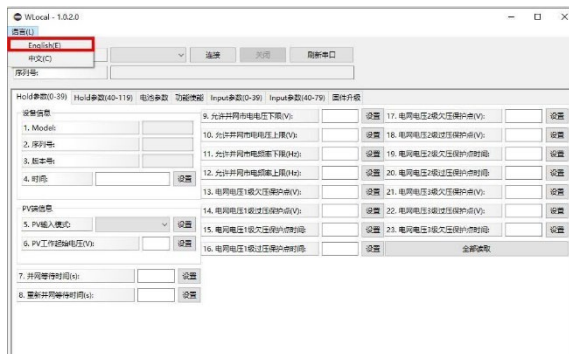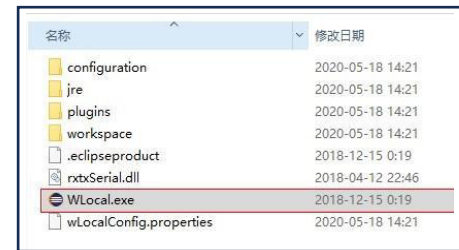
**NOTE:** *Be sure to disconnect the Wi-Fi dongle when utilizing this direct connection.*

Step 3: Run the Wlocal.exe software. (Please contact your distributor for access to this program)

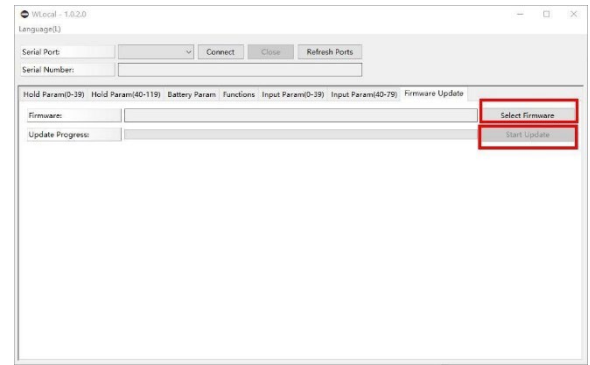**Step 4:** Select the top left button (L), and change your language to English if need be.

Step 5: Select your COM (Serial) port and click "Connect". You will then get the SN of the inverter that is connected.

Step 6: Select "Firmware Update".
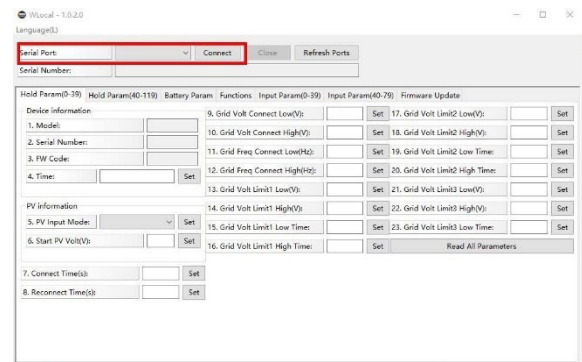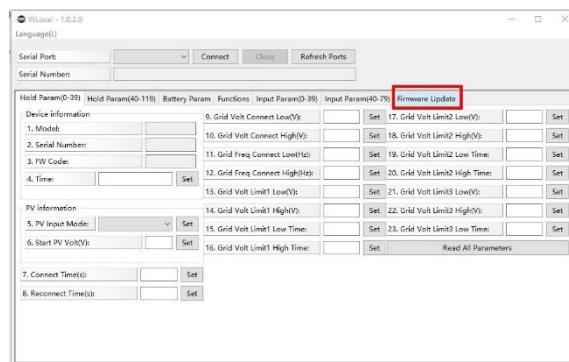
Step 7: Select the correct Firmware file (contact your distributor for most up to date files) and then select "Start Update" to begin the process.

Step 8: Once the software is finished uploading the first firmware file, proceed to upload the second file. (The order in which you upload the files is irrelevant)

NOTE: The progress bar on the WLocal.exe software only represents the firmware files uploading to the inverter, NOT the progress of the update itself. You will have to monitor your inverter's LCD screen to see that status of the update. Once it is finished updating, the inverter will flash and restart.

12.3 FIRMWARE UPDATE VIA MONITOR CENTER (WEBSITE)

Step 1: Distributors and installers can update the firmware for their inverters by using the EG4 Electronics website monitoring system. Please contact EG4 to make sure you have the correct files.

Step 2: Log into the EG4 Electronics Monitor System. Select "Maintenance," and then select "Remote Update."

Step 3: Choose the inverter you would like to update and then select "Standard Update". The Monitor Center will begin updating both firmware files in the inverter. The latest version of the firmware will be displayed in the bottom right window.

13. SMARTPHONE APP SETUP

You need to register for a monitoring account and set the Wi-Fi password for the Wi-Fi dongle *before* using EG4's monitoring system.

1. **Register your account**

   Visit https://monitor.eg4electronics.com/ or download the 'EG4 Monitor' app to register for an end-user account. Please contact support@eg4electronics.com for distributor or installer accounts.

2. **When registering the account, provide the following information:**

   a. Customer code: This is the code for a distributor or installer. Please contact your distributor or installer to obtain this code.

   b. Dongle SN: The serial number is attached to the Wi-Fi/LAN shell.

   c. Dongle PIN: PIN is attached to the Wi-Fi/LAN shell below the SN.

3. **Set your Wi-fi password**

   a. Plug in the Wi-Fi dongle, and power on the inverter.

   b. Wait until the INV LED on the Wi-Fi module is solid on, then connect your phone to the Wi-Fi hotspot. The hotspot name is the same as the Wi-Fi dongle serial number. (See image on left)

   c. Open the app. Click on "DONGLE CONNECT".

      Click the Yellow refresh button to display a list of available networks. Select your wireless network name and enter your password.

   d. After clicking Home Wi-Fi Connect, the Wi-Fi dongle will reset. After you set the correct password, three lights will be solid on, which means the inverter is connected to the server. You can then return to the login page and input your account and password to begin monitoring your system.
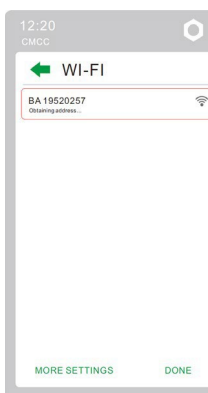
13.1 LOCAL MONITORING SETUP WITH THE EG4 MONITOR APP

If there is no Wi-Fi available at the location, you can use the local function to monitor or set up the system.

1. Download the EG4 Monitor app.

2. Connect your device to the Wi-Fi hotspot after the INV LED on the Wi-Fi module is solid on. The name of the hotspot is the same as the serial number on the Wi-Fi module shell.

3. Click "Local Connect." You can now monitor and set up the system.
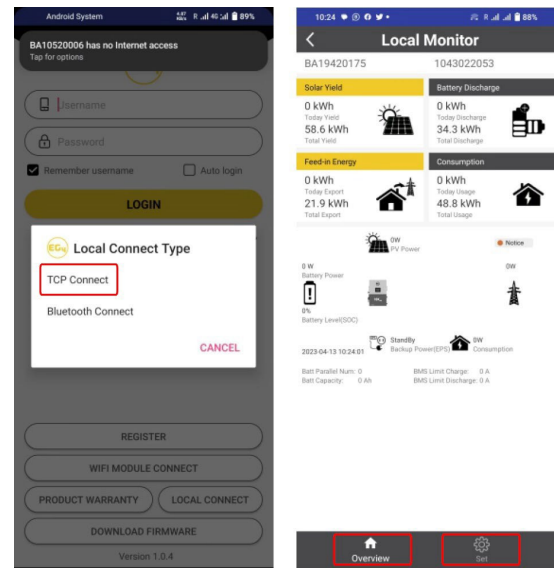
13.2 TROUBLESHOOTING WI-FI MODULE

Why is the middle light for the Wi-Fi module flashing?

After setting the right Wi-Fi password, all three lights should be on solidly. If it is still flashing, try the following:

1. Check to see if the Wi-Fi is connected and that the correct password has been entered. You can use your device to connect to a Wi-Fi hotspot and visit the website 10.10.10.1 to check; the TCP client status should be "connected" as seen in the image. The login username and password are both "admin." Check your Wi- Fi name and password if it is.

2. Prior to setting the password, you should add the dongle to the system. After you register and enter the Wi-Fi SN and PIN, this dongle is automatically added to the system. While logged in, go to "Configuration" -> "Dongles" -> "Add dongle" on https://monitor.eg4electronics.com/ to add this dongle to your current configuration if you have more than one dongle. Restart the Wi-Fi module by unplugging it and plugging it back in after installing the dongle.
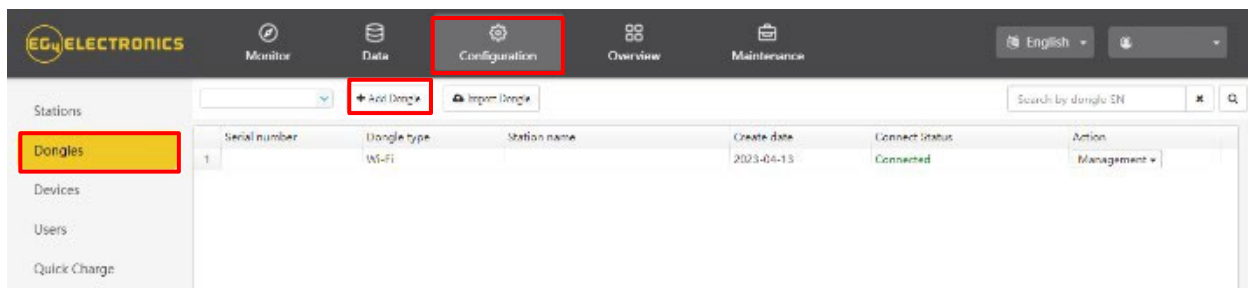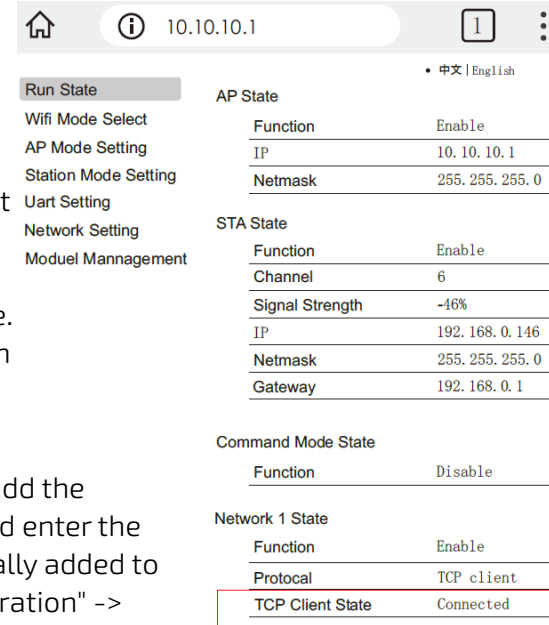
14. OPERATION GUIDE
14.1 OPERATION MODE AND FUNCTION
14.1.1 SELF-USAGE MODE

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>Grid.
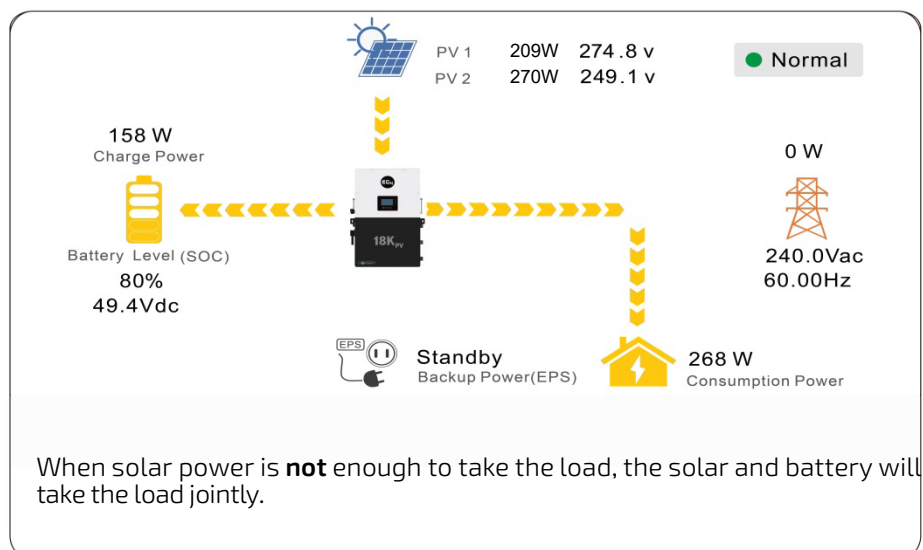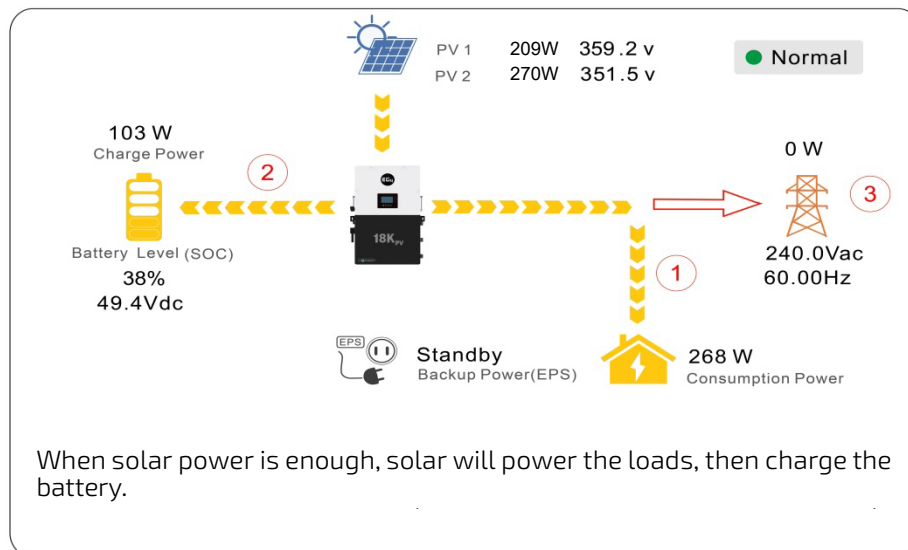
- **Application Scenarios**
  Self-usage mode will increase the self-consumption rate of solar power and reduce energy bills significantly.

- **Related Settings**
  Effective when Charge Priority, AC Charge, and Forced Discharge are disabled.

Example

PV 1   209W   359.2 v
PV 2   270W   351.5 v
● Normal

103 W
Charge Power

0 W

18K_PV

Battery Level (SOC)
38%
49.4Vdc

240.0Vac
60.00Hz

Standby
Backup Power(EPS)

268 W
Consumption Power

When solar power is enough, solar will power the loads, then charge the battery.

PV 1   209W   274.8 v
PV 2   270W   249.1 v
● Normal

158 W
Charge Power

0 W

18K_PV

Battery Level (SOC)
80%
49.4Vdc

240.0Vac
60.00Hz

Standby
Backup Power(EPS)

268 W
Consumption Power

When solar power is **not** enough to take the load, the solar and battery will take the load jointly.

14.1.2 PV CHARGE PRIORITY MODE

The order of priority for solar power usage will be Battery>Load>Grid. During the **PV Charge Priority** 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.
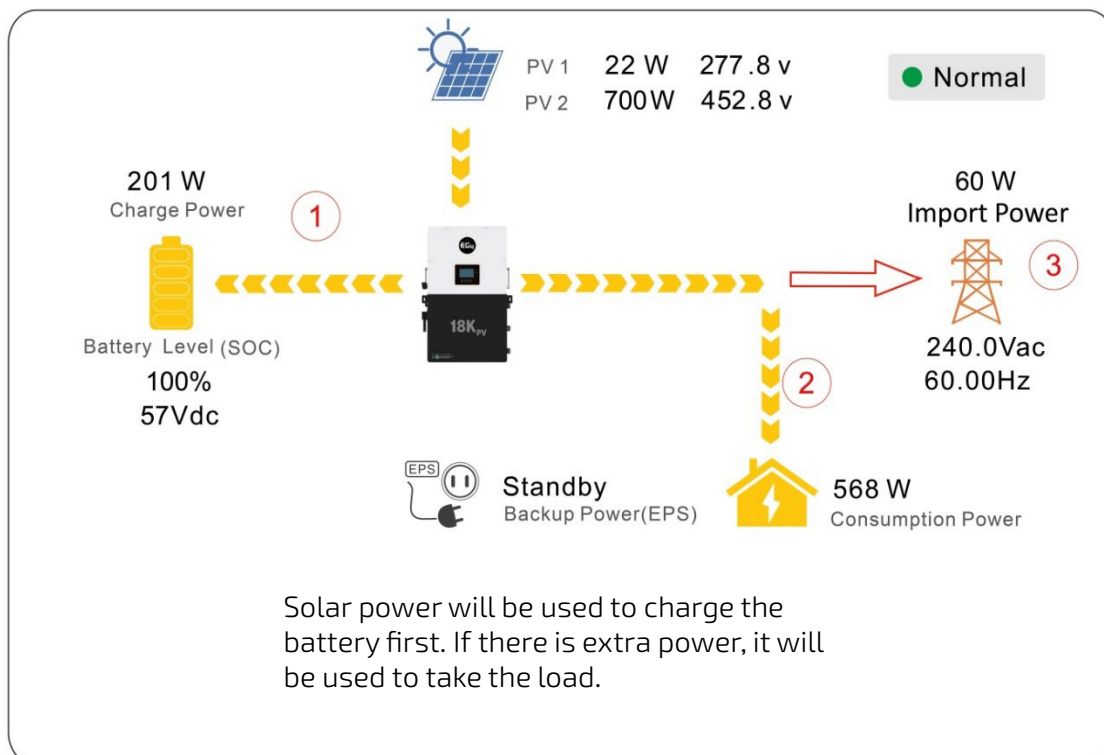
14.1.3 AC CHARGER MODE

AC charger 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)

14.1.4 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. See page 84 for examples.

14.1.5 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.
<u>**Important Note:**</u>
*If the smart load function is enabled, a generator **cannot** be connected at the same time; otherwise, the device will be damaged!*

14.2 RAPID SHUTDOWN (RSD)

The inverter includes a rapid shutdown system that complies with 2017 and 2020 NEC 690.12 requirements. A rapid shutdown switch should be connected to the RSD terminals on the inverter and mounted on a readily accessible location outdoors (check with your AHJ for requirements).

NOTE: *When using supported EG4 batteries in closed-loop communications with the inverter, the RSD also initiates ESS Disconnect as required by NEC code.*

In case of emergency, press the rapid shutdown button to cut off the RSD power supply, in turn cutting the inverter's AC Output along with dropping the PV Conductors voltage to <30V in 30 seconds.
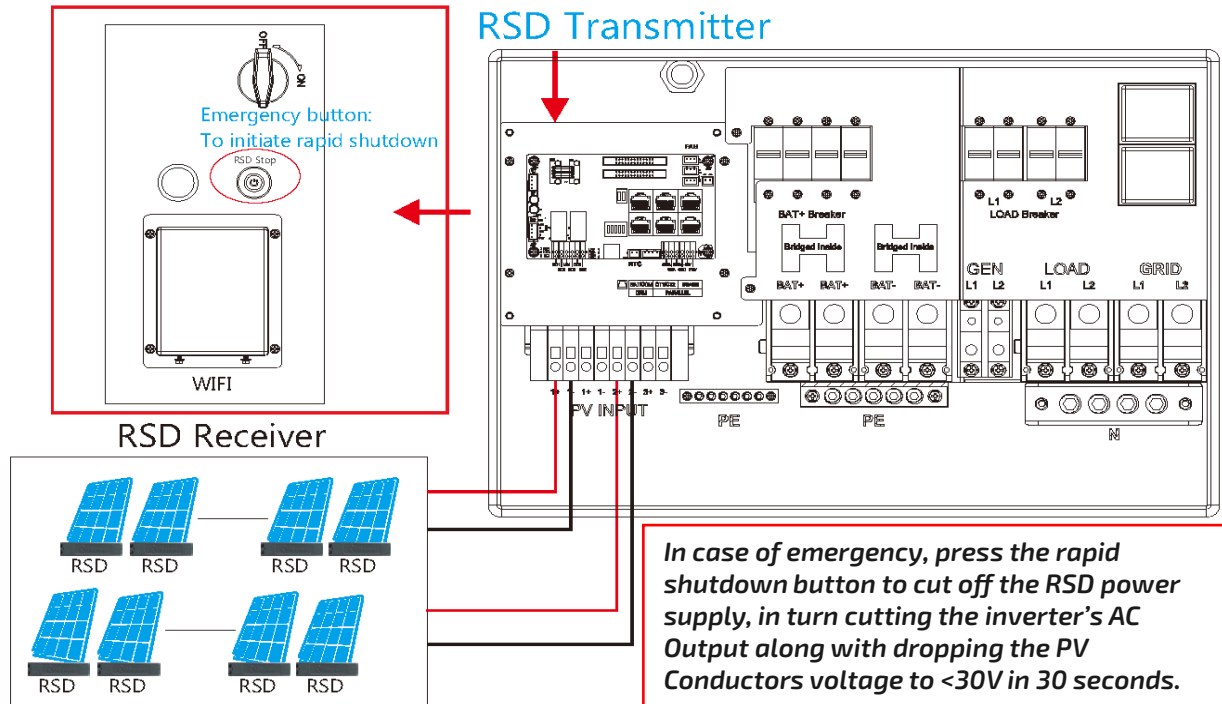
14.2.1 EXTERNAL RSD

The system can also utilize an External E-Stop Switch if your AHJ deems it necessary.

1. Type of External E-Stop Switch for RSD Requirements:

   a. The external switch must have normally closed contact type for emergency shutdown.

2. If trying to utilize external E-Stop switch, please see following subsection for instructions.

Location of RSD Terminals
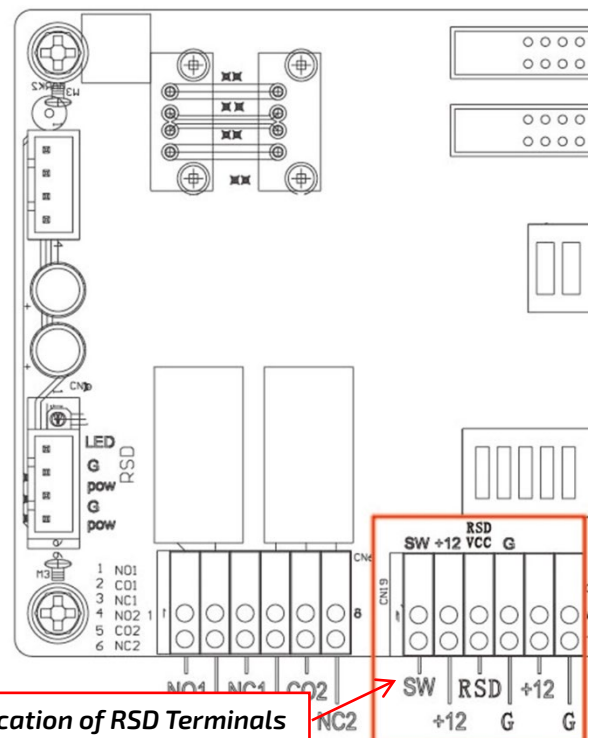
14.2.2 EXTERNAL RSD WIRING INSTRUCTIONS

Wire the E-Stop Switch into the RSD terminals according to the Switch's specifications.

See image to the right
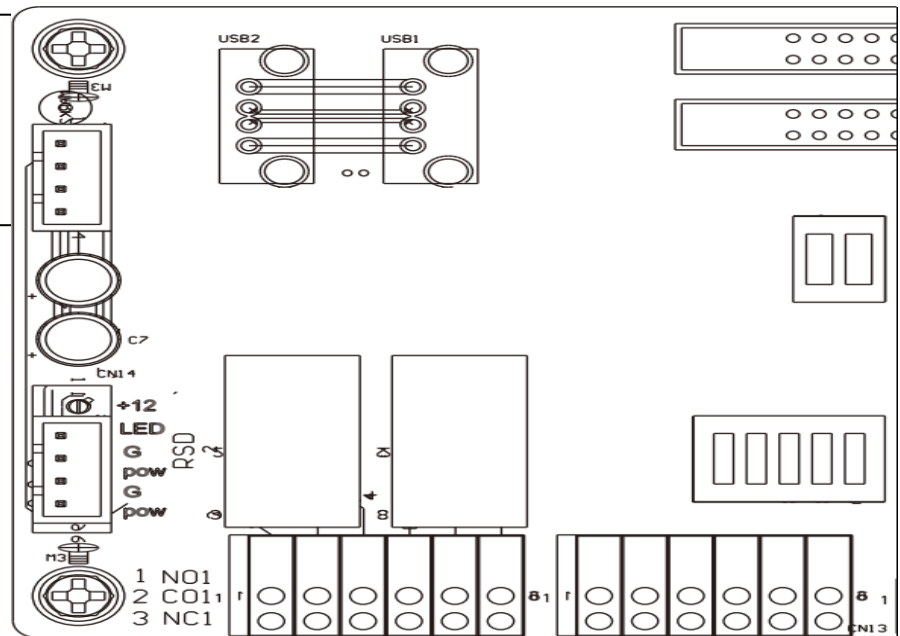
E-Stop Switch

NOTE: If your inverter does not have the RSD terminals located in the above photo, please contact your distributor for information regarding the steps for RSD installation.

14.3 LCD SCREEN

Running status, real-time power, and daily and accumulated energy information can all be conveniently viewed on the inverter's LCD screen. Additionally, users can check the alarm and fault record on the display for troubleshooting.

14.3.1 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.

Fault/Alarm Information

By touching the bell icon at the bottom of the screen, users will see all the current and historical faults and warning information on this page.
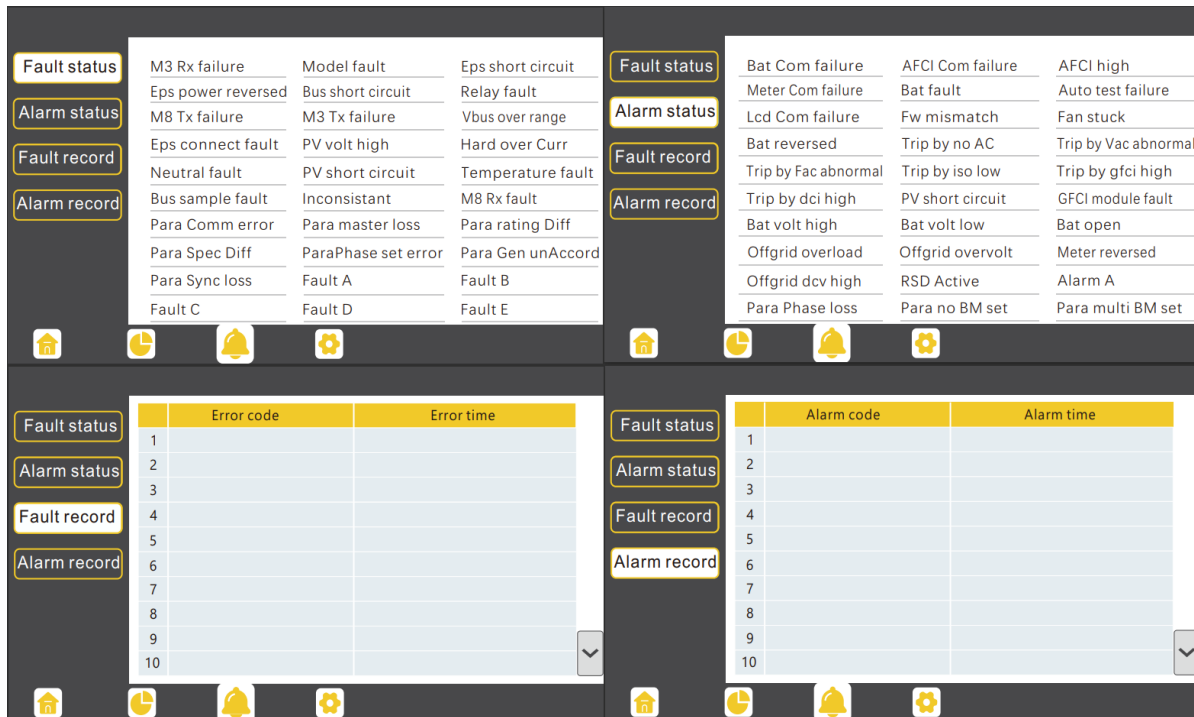
14.3.2 SETTING PARAMETERS

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.

1. **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.*

    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
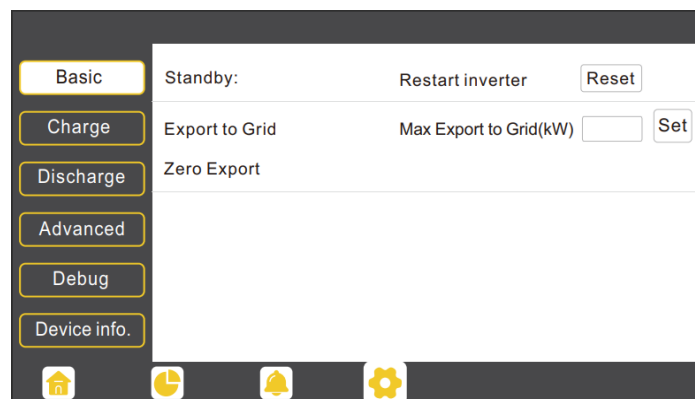
power being exported. If export is allowed, users can enable **'Export to Grid'** and set a maximum allowable export limit in **'Max Export to Grid(kW).'**

NOTE: *Zero Export cannot prevent export of energy supplied by inverters that are AC Coupled to the 18kPV.*

2. 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.

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

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

Stop PV Charge Priority SOC (%): The target SOC for PV Charge Priority.

Stop PV Charge Priority Volt(V): The target battery voltage for PV Charge Priority.

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.

3. 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.

4. 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.

5. Advanced Settings

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!

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.

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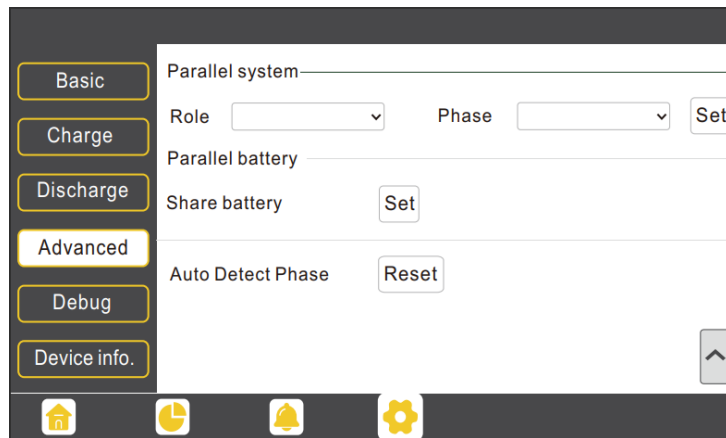
'Share battery': If all inverters are connected to the same battery bank when configured as a parallel system, then this setting must be **enabled.** If the inverters are configured as a parallel system and are connected to independent battery banks, then this setting must be **disabled.**

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!*

14.4 INVERTER START-UP AND SHUTDOWN PROCEDURE
14.4.1 STARTING UP THE INVERTER

1. If equipped, turn on(close) the DC breaker between battery and inverter first. Turn on the BAT breaker located in the cable box of the inverter and then power on the battery system.
2. Make sure the PV voltages of the strings are within operating parameters. Turn on(close) PV isolator switches between the inverter and array and then on the side of the inverter.
3. Make sure Steps 1 and 2 are running properly before turning on the grid power or generator breaker.
4. Power on the load breakers in the cable box of the inverter and then in the load panel.

14.4.2 SHUTTING DOWN THE INVERTER

DANGER: *Never disconnect the battery, PV, or AC input power under load. If there is an emergency and users must shut down the inverter, please follow the steps outlined below:*

1. Turn off the grid breaker feeding the inverter.
2. Switch off the load breaker.
3. Turn off the PV Isolator switch and then battery breaker. Wait for the LCD to go off.

15. TROUBLESHOOTING & MAINTENANCE
15.1 REGULAR MAINTENANCE

Inverter Maintenance

✓ Inspect the inverter every 6 months to check for any damaged cables, accessories, or terminals, and inspect the inverter itself.

✓ Inspect the inverter every 3 months to verify if the operating parameters are normal and there is no abnormal heating or noise from all components in the system.

✓ Inspect the inverter every month to confirm nothing covers the inverter heat sink. If there is, shut down the inverter and clear the heat sink to restore proper cooling.

Battery Maintenance

✓ Follow the manufacturer's requirements on maintenance. When users carry out maintenance on batteries, please make sure to fully shut down the inverter for safety.

15.2 LED DESCRIPTION

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

15.3 TROUBLESHOOTING BASED ON LCD SCREEN

Once there is any warning or fault occurring, users can troubleshoot according to the LED status description and the warning/fault information on the LCD screen.

15.3.1 FAULTS ON THE LCD AND FAULT LIST

If the dot on the left of the fault item is red, it means the fault is active.

When the dot is grey, it means the fault is inactive.

Fault status	● M3 Rx failure	●Model fault	● Eps short circuit
	● Eps power reversed	●Bus short circuit	● Relay fault
Alarm status	● M8 Tx failure	● M3 Tx failure	● Vbus over range
	● Eps connect fault	●PV volt high	● Hard over Curr
Fault record	● Neutral fault	●PV short circuit	● Temperature fault
	● Bus sample fault	●Inconsistant	● M8 Rx fault
Alarm record	● Para Comm error	●Para master loss	● Para rating Diff
	● Para Spec Diff	●ParaPhase set error	● Para Gen unAccord
	● Para Sync loss	●Fault A	● Fault B
	● Fault C	●Fault D	● Fault E

Fault List

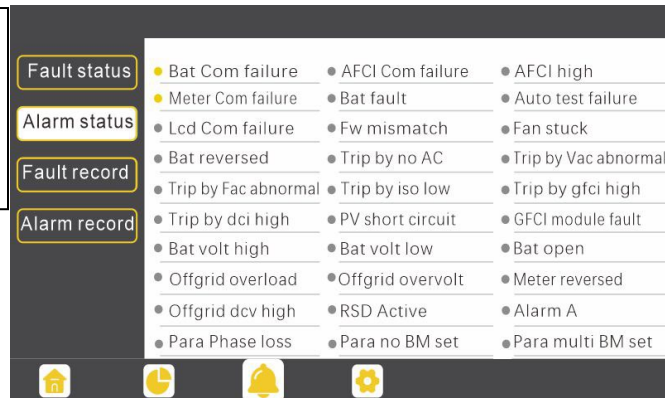| Fault	Meaning	Troubleshooting
M3 Rx failure	M3 microprocessor fails to receive data	Restart the inverter. If the error persists, contact your supplier.
Model fault	Incorrect model value	
EPS short circuit	Inverter detected short-circuit on load output terminals	1. Check if the L1, L2, and N wires are connected correctly at the inverter load output terminal. 2. Disconnect the load breaker to see if fault remains. If the fault persists, contact your supplier.
EPS power reversed	Inverter detected power flowing into load terminal	Restart the inverter. If the fault persists, contact your supplier.
Bus short circuit	DC Bus is short circuited	
Relay fault	Relay abnormal	
M8 Tx failure	DSP fails to receive data from M8 microprocessor	
M3 Tx failure	DSP fails to receive data from M3 microprocessor	
Vbus over range	DC Bus voltage too high	Ensure the PV string voltage is within the inverter specification. If string voltage is within range and this fault persists, contact your supplier.
EPS connect fault	Load terminal and grid terminal are connected wired incorrectly or reversed	Check if the wires on load terminal and grid terminal are wired. correctly. If the fault persists, contact your supplier.

PV volt high	PV voltage is too high	Please check if the PV string voltage is within the inverter specification. If string voltage is within range and this fault persists, contact your supplier.
Hard over curr	Hardware level over current protection triggered	Restart the inverter. If the fault persists, contact your supplier.
Neutral fault	Voltage between N and G is greater than 30V	Ensure the neutral wire is connected correctly.
PV short circuit	Short circuit detected on PV input	Disconnect all PV strings from the inverter. If the error persists, contact your supplier.
Temperature fault	Heat sink temperature too high	Install the inverter in a place with good ventilation and no direct sunlight. If the installation site is okay, check if the NTC connector inside the inverter is loose.
Bus sample fault	Inverter detected DC bus voltage lower than PV input voltage	Restart the inverter, if the fault persists, contact your supplier.
Inconsistent	Sampled grid voltage values of DSP and M8 microprocessor are inconsistent	
M8 Rx fault	M8 microprocessor fails to receive data from DSP	
Para Comm error	Parallel communication abnormal	1. Check whether the connection of the parallel cable is loose. Connect the parallel cable correctly. 2. Ensure the PIN status of the CAN communication cable from the first to the end inverter is connected correctly.
Para master loss	No Master in the parallel system	1. If a Master has been configured in the system, the fault will automatically be removed after the Master works. 2. If a Master has not been configured and there are only Slaves in the system, set the Master first. **Note:** For a single-unit system, the role of the inverter should be set as "1 phase Master."
Para rating Diff	Rated power of parallel inverters are inconsistent	Confirm that the rated power of all inverters is the same.

Para Phase set error	Incorrect setting of phase in parallel	First confirm the wiring for the parallel system is correct. Once verified, connect each inverter to the grid. The system will automatically detect the phase sequence and the fault automatically resolves after the phase sequence is detected. If the fault persists, contact your supplier.
Para Gen in Accord	Inconsistent generator connection in parallel	Some inverters are connected to generators, and some are not. Confirm *all* inverters in parallel are connected to common generator output, or *none* are connected to generators.
Para sync loss	Parallel inverter fault	Restart the inverter. If the fault persists, contact your supplier.

15.3.2 ALARM ON THE LCD AND ALARM LIST

If the dot to the left of the fault item is yellow, it means the fault is active. When it is grey, it means the fault is inactive.

Fault status / Alarm status / Fault record / Alarm record

● Bat Com failure	● AFCI Com failure	● AFCI high
● Meter Com failure	● Bat fault	● Auto test failure
● Lcd Com failure	● Fw mismatch	● Fan stuck
● Bat reversed	● Trip by no AC	● Trip by Vac abnormal
● Trip by Fac abnormal	● Trip by iso low	● Trip by gfci high
● Trip by dci high	● PV short circuit	● GFCI module fault
● Bat volt high	● Bat volt low	● Bat open
● Offgrid overload	● Offgrid overvolt	● Meter reversed
● Offgrid dcv high	● RSD Active	● Alarm A
● Para Phase loss	● Para no BM set	● Para multi BM set

Alarm List

Alarm	Meaning	Troubleshooting
Bat com failure	Inverter fails to communicate with battery	Check if the communication cable pinout is correct, and if you have chosen the correct battery brand on the inverter's LCD. If all is correct but this alarm persists, contact your supplier.
AFCI com failure	Inverter fails to communicate with AFCI module	Restart inverter. If the error continues, contact your supplier.
AFCI high	PV arc fault is detected	Check each PV string for correct open-circuit voltage and short-circuit current. If the PV strings are in good condition, please clear the alarm on the inverter LCD.
Meter com failure	Inverter fails to communicate with the meter	Check if the communication cable is connected correctly and in good working condition. Restart inverter. If the alarm persists, contact your supplier.

Bat Fault	Battery cannot charge or discharge	1. Check the battery communication cable for correct pinout on both inverter and battery end. 2. Check if you have chosen an incorrect battery brand. 3. Check if there is fault on battery's indicator. If there is a fault, please contact your battery supplier.
LCD com failure	LCD fails to communicate with M3 microprocessor	Restart the inverter. If the fault still occurs, contact your supplier.
Fwm mismatch	Firmware version mismatch between the microprocessors	
Fan stuck	Cooling fan(s) are stuck	
Trip by GFCI high	Inverter detected leakage current on AC side	1. Check if there is ground fault on grid and load side. 2. Restart inverter. If the alarm persists, contact your supplier.
Trip by dci high	Inverter detected high DC injection current on Grid terminal	Restart inverter. If the alarm persists, contact your supplier.
PV short circuit	Inverter detected a short circuit in PV input	1. Check whether each PV string is connected correctly. 2. Restart inverter. If the alarm persists, contact your supplier.
GFCI module fault	GFCI module is abnormal	Restart inverter. If the alarm persists, contact your supplier.
Bat volt high	Battery voltage too high	Check whether the battery voltage exceeds 59.9V; battery voltage should be within inverter specification.
Bat volt low	Battery voltage too low	Check whether the battery voltage is under 40V; battery voltage should be within inverter specification.
Bat open	Battery is disconnected from inverter	Check battery breaker or battery fuse. Reconnect as needed.
Off-grid overload	Overload on Load terminal	Check if load power on inverter LOAD terminal is within inverter specification.
Off-grid overvolt	Load voltage is too high	Restart inverter. If the alarm persists, contact your supplier.
Meter reversed	Meter connection is reversed	Check if the meter communication cable is connected correctly on the inverter and meter sides.
Off-grid dcv high	High DC voltage component on load output when running off-grid	Restart inverter. If the alarm persists, contact your supplier.
RSD Active	Rapid shutdown activated	Check if the RSD switch is pressed.

Para phase loss	Phase losing in parallel system	Confirm that the wiring of the inverter is correct. If the Master is set to 3-phase Master, the number of parallel inverters must be ≥3. (The grid input for each inverter should be connected correctly to Grid L1, L2, L3.) If the Master is set to 2x 208 Master, the number of parallel inverters needs to be ≥2. (And the grid input of each inverter should be connected correctly to Grid L1, L2, L3.)
Para no BM set	Master is not set in the parallel system	Set one of the inverters in the parallel system as the Master.
Para multi BM set	Multiple Primaries have been set in the parallel system	There are at least two inverters set as the Master in the parallel system. Keep one Master and set the other as Slave.

16. STANDARDS AND CERTIFICATIONS

The EG4 18kPV is ETL & cETL listed and complies with national and international standards for safety and reliability when connected to the grid.

Safety

- UL1741SB Rule 21
- RSD NEC 2020:690.12
- AFCI NEC 2020:690.11 / UL1699B
- GFDI NEC 2020:690.41(B)
- CSA 22.2.107.1
- CSA 22.2.330

Grid Connection

- IEEE 1547.1:2020; IEEE 1547:2018
- Hawaii Rule 14H
- California Rule 21 Phase I, II, III

EMC

- FCC Part 15 Class B

Outdoor Rating

- NEMA 4X / IP65

17. EG4 10-YEAR LIMITED WARRANTY

EG4 Electronics offers a 10-year Full Parts Replacement or Full Product Replacement Prorated Warranty from the date of battery purchase. Your warranty must be registered within the first year of purchase or provide proof of purchase from an EG4 authorized distributor to remain valid. If you choose not to register or cannot provide proof of purchase, your warranty may be invalidated. This limited warranty is to the original purchaser of the product and is one time transferable only if the product remains installed in the original installation location. All parts exchanges, including BMS, are covered during the warranty period. If a full replacement warranty is needed, the warranty is prorated 1/9th per year after the first year at the current retail pricing. Replacement shipping charges may incur on a case-by-case basis. Outside of the continental US, replacement shipping charges may apply. Product that is not purchased through an EG4 approved vendor is not covered under this warranty. A list of approved vendors can be found on our website. Reselling or removing the product from the original installation site will void the warranty.

Warranty Exclusions - EG4 Electronics has no obligation under this limited warranty for products subjected to the following conditions (including but not limited to):

- Damages incurred during installation/reinstallation or removal
- Poor workmanship performed by an individual, installer, or a firm
- Damages caused by mishandling the product or inappropriate environmental exposure
- Damages caused by improper maintenance or operating outside the specified operating conditions
- Tampering, altering, and/or disassembly of the product
- Using product in applications other than what the manufacturer intended
- Lightning, fire, flood, earthquake, terrorism, riots, or acts of God
- Any product with a serial number that has been altered, defaced, or removed
- Any unauthorized firmware updates/upgrades/patches
- Damages incurred from a voltage or current spikes due to open-loop Lithium Battery communications

EG4 product warranty is a limited warranty – EG4 limits its liability in the event of a product defect to repair or replacement in accordance with the terms of this limited warranty. EG4 is not responsible for any additional or indirect damages that may arise from the malfunctioning of the product. These damages could be incidental or consequential, including without limitation, any liability for the loss of revenue, profits, or time. EG4 shall not be liable for any direct or indirect loss of life, including but not limited to bodily injury, illness, or death arising from the misuse or mishandling of the product, whether caused by negligence or otherwise.

Contact your original place of purchase for Return Policy and Warranty Claims.

NOTES

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