EG4® 12kPV HYBRID INVERTER

TROUBLESHOOTING & MAINTENANCE GUIDE

The purpose of this document is to educate the end-user on troubleshooting and maintaining the integrity of the 12kPV hybrid inverter.

VERSION 1.2.1 | INFORMATION SUBJECT TO CHANGE WITHOUT NOTICE.
MODEL #: IV-8000-HYB-AW / IV-8000-HYB-AW-00

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1. TECHNICAL SPECIFICATIONS

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

BATTERY DATA	
COMPATIBLE BATTERY TYPES	Lead-Acid/Lithium
MAX. CHARGE/DISCHARGE CURRENT	167A @ 48 VDC
NOMINAL VOLTAGE	48 VDC
VOLTAGE RANGE	40-60 VDC (Lithium); 40-60 VDC (Lead-Acid)
RECOMMENDED BATTERY CAPACITY PER INVERTER	>200Ah
GENERAL DATA	
MAX. UNITS IN PARALLEL	10
PRODUCT DIMENSIONS (H×W×D)	29.5×20.5×11.2 in (750×520×285 mm)
UNIT WEIGHT	110 lbs. (50 kg)
DESIGN TOPOLOGY	High Frequency - Transformerless
RELATIVE HUMIDITY	0-100%
OPERATING ALTITUDE	<2000 m (<6561 ft)
OPERATING AMBIENT TEMPERATURE RANGE	-13°F – 140°F (-25°C – 60°C)
STORAGE AMBIENT TEMPERATURE RANGE	-13°F – 140°F (-25°C – 60°C)
NOISE EMISSION (TYPICAL)	<50 dB @ 3 ft
COMMUNICATION INTERFACE	RS485/Wi-Fi/CAN
STANDARD WARRANTY*	10-year standard warranty
INGRESS PROTECTION RATING	IP65
SAFETY FEATURES	PV Arc Fault Protection, PV Ground Fault Protection, PV Reverse Polarity Protection, Pole Sensitive Leakage Current Monitoring Unit, Surge Protection Device, integrated PV disconnect
STANDARDS AND CERTIFICATIONS	
UL1741 SB	
CSA C22.2#107.1:2016	
CSA C22.2#330:2017 ED 1	
HECO SRD-IEEE-1547.1:2020 ED 2	
RAPID SHUT DOWN (RSD) NEC 2020:690.12	
FCC PART 15, CLASS B	

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

2. INVERTER SAFETY

2.1 SAFETY INSTRUCTIONS

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

Incorrect installation may cause:

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

2.2 IMPORTANT SAFETY NOTIFICATIONS

DANGER: *Hazardous Voltage Circuits!*

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

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

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

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

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

WARNING!

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

DISCLAIMER

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

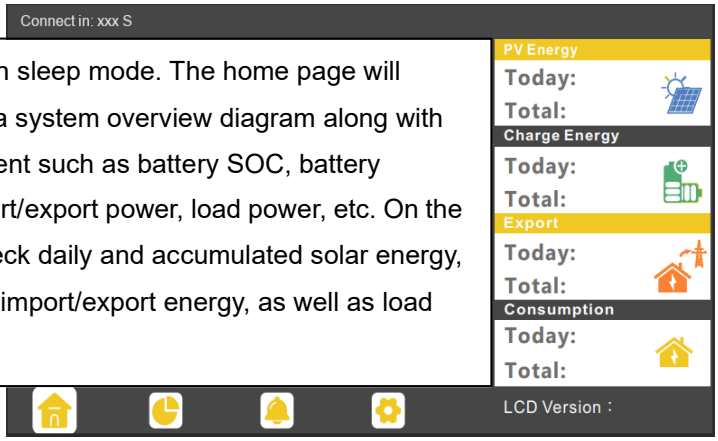
3. INVERTER TROUBLESHOOTING

Please follow the troubleshooting steps in the tables below when encountering any faults and/or errors on the inverter.

3.1 VIEWING INFORMATION AND ALARM FAULT/RECORD

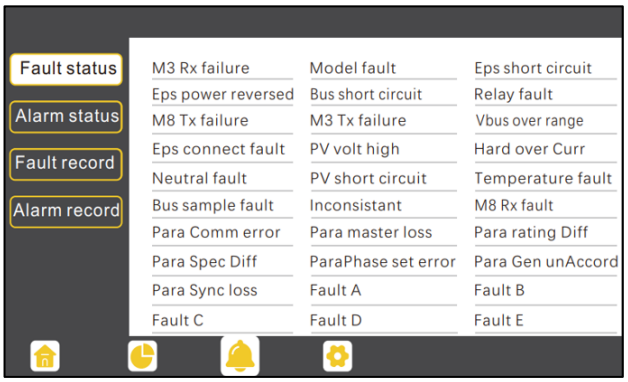
Home Screen

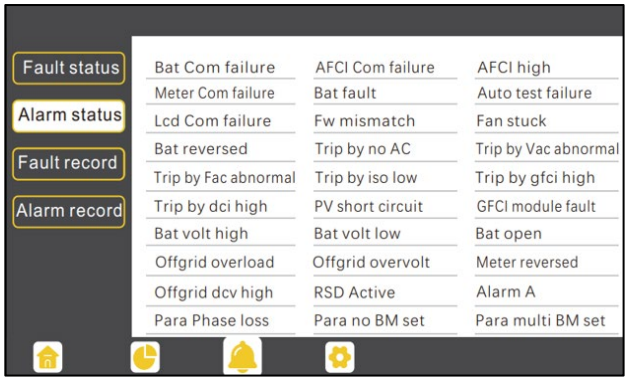
Touch the LCD screen to light it up if in sleep mode. The home page will appear on the display. Users will see a system overview diagram along with real-time information of each component such as battery SOC, battery charging/discharging power, grid import/export power, load power, etc. On the right 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.

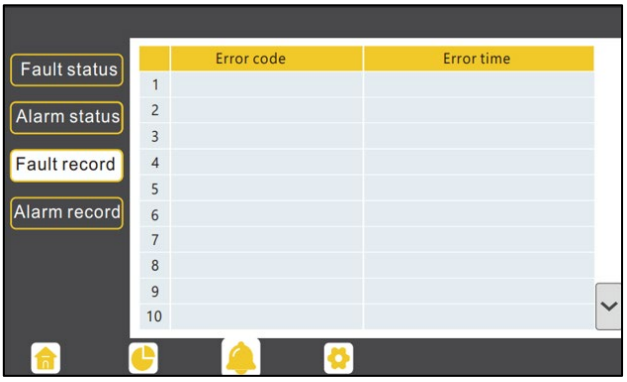


Fault/Alarm Information

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.







3.2 REGULAR MAINTENANCE

Inverter Maintenance

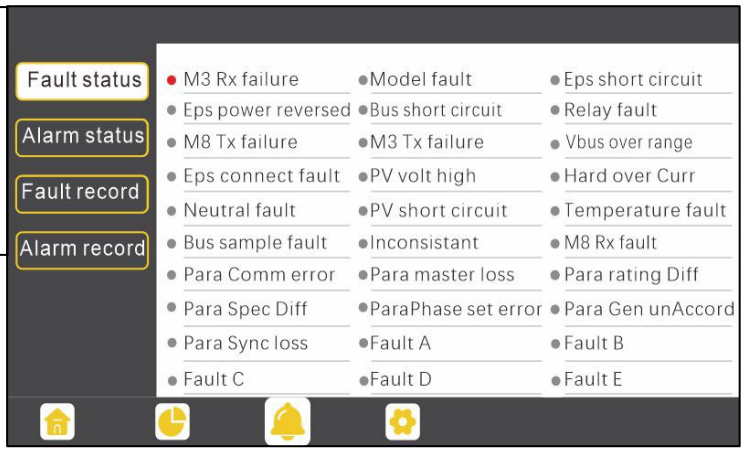
- Inspect the inverter every 6 months to check for any damaged cables, accessories, or terminals, and inspect the inverter itself.
- Inspect the inverter every 3 months to verify if the operating parameters are normal and there is no abnormal heating or noise from all components in the system.
- Inspect 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.

3.3 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.

3.3.1 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.

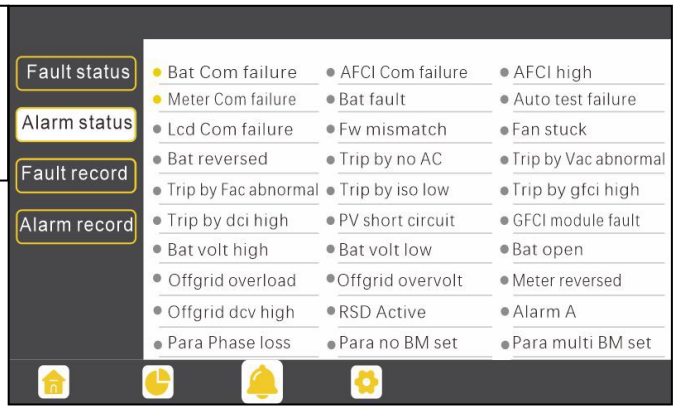


FAULT	MEANING	TROUBLESHOOTING
M3 Rx failure	M3 microprocessor fails to receive data from DSP	Restart the inverter. If the error persists, contact the supplier.
Model fault	Incorrect model value	
EPS short circuit	Inverter detected short-circuit on load output terminals	1. Check if the L1, L2, and N wires are connected correctly at the inverter load output terminal. 2. Disconnect the load breaker to see if fault remains. If the fault persists, contact the supplier.
EPS power reversed	Inverter detected power flowing into load terminal	Restart the inverter. If the fault persists, contact the 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. Also, check inverter and battery voltage. If voltage readings are within range and this fault persists, contact the 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 the 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 the supplier.
Hard over curr	Hardware level over current protection triggered	Restart the inverter. If the fault persists, contact the 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 the 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 the 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 is 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 the 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 the supplier.

3.4 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.



Alarm List

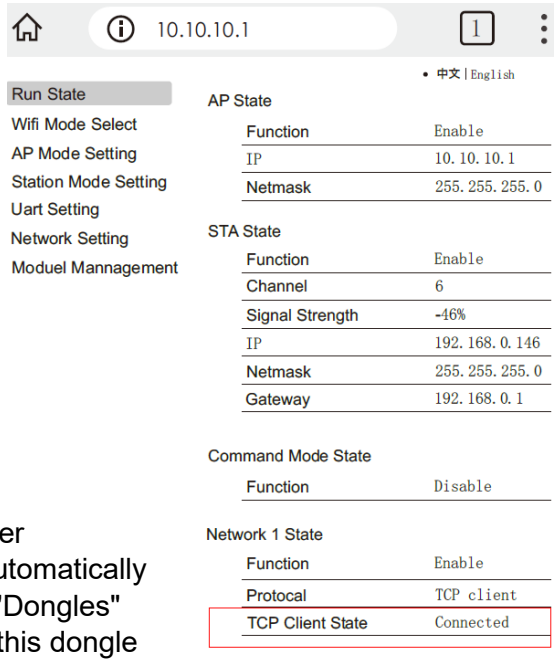
ALARM	MEANING	TROUBLESHOOTING
Bat com failure	Inverter fails to communicate with battery	Check if the communication cable pinout is correct, and if the correct battery brand is selected on the inverter's LCD. If all is correct but the alarm persists, contact the supplier.
AFCI com failure	Inverter fails to communicate with AFCI module	Restart inverter. If the error continues, contact the 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 the 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 an incorrect battery brand is selected. 3. Check if there is fault on battery's indicator. If there is a fault, please contact the battery supplier.
LCD com failure	LCD fails to communicate with M3 microprocessor	Restart the inverter. If the fault still occurs, contact the supplier.
Fwm mismatch	Firmware version mismatch between the microprocessors	Restart the inverter. If the fault still occurs, contact the supplier.
Fan stuck	Cooling fan(s) are stuck	Restart the inverter. If the fault still occurs, contact the supplier.
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 the supplier.
Trip by dci high	Inverter detected high DC injection current on Grid terminal	Restart inverter. If the alarm persists, contact the 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 the supplier.
GFCI module fault	GFCI module is abnormal	Restart inverter. If the alarm persists, contact the 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 the 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 the 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.

4. TROUBLESHOOTING WI-FI MODULE

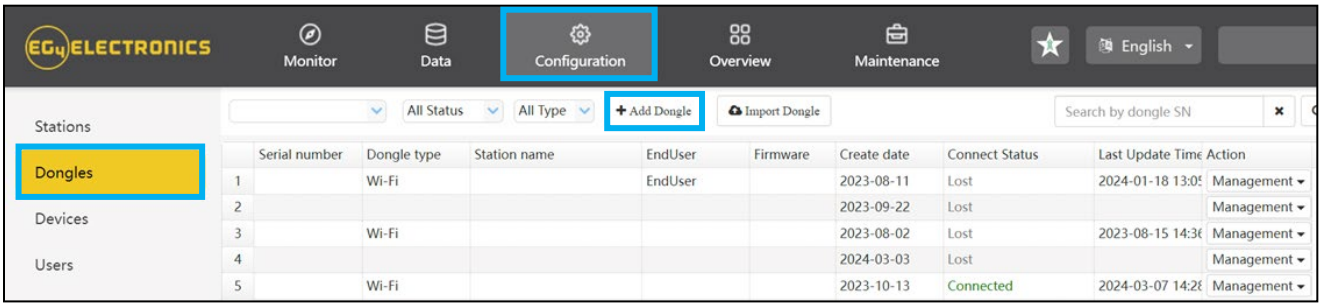
4.1 CENTER LIGHT FLASHING

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. The device can be used 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, add the dongle to the system. After registering and entering 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 the 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.



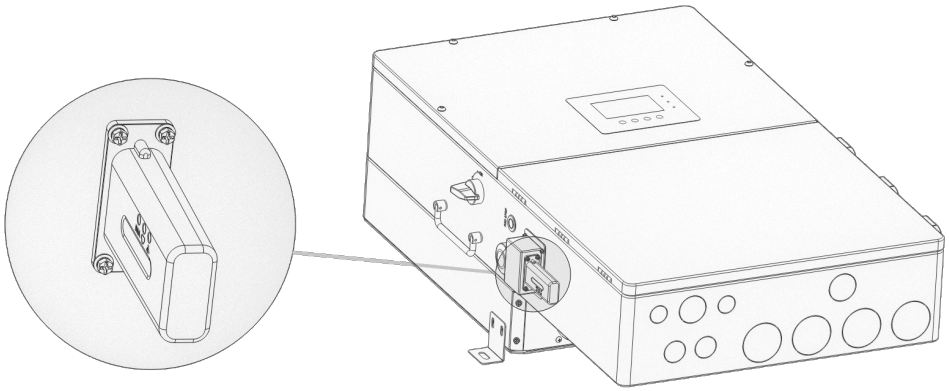
4.2 DONGLE RECOVERY

This guide will detail the steps needed to recover Wi-Fi dongles with serial numbers starting with the letters ***"BA"*** after being reset to factory settings.

Please read the guide in its entirety before performing the steps listed below.

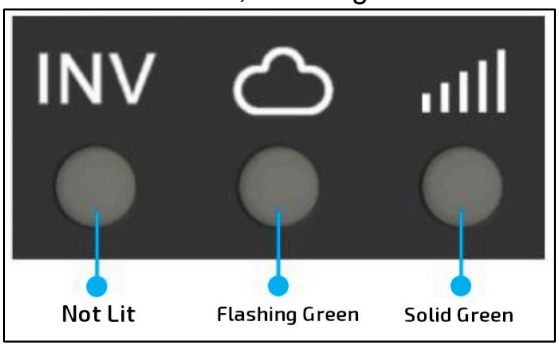
Step 1

Connect the dongle to the inverter's Wi-Fi dongle port as shown below.



Step 2

After ~30 seconds, the dongle's LED status will appear as shown below.



- INV LED "OFF"
- Network LED "Blinking"
- Module LED "ON"

Step 3

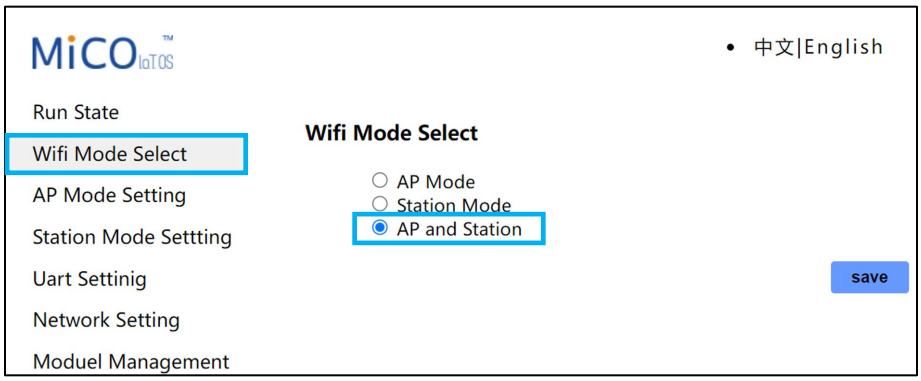
Connect the mobile device/PC to the dongle's network. The network name will match the serial number (SN) on the outer shell of the dongle. If unable to locate the network named after the SN, check for a network named, "MXCHIP-xxxxxxx". Write this number down for step 6.

Step 4

Enter "10.10.10.1" (no quotes) into the browser. Both the username and the password are "admin" (no quotes). After logging in, select the language on the right side. See image below.

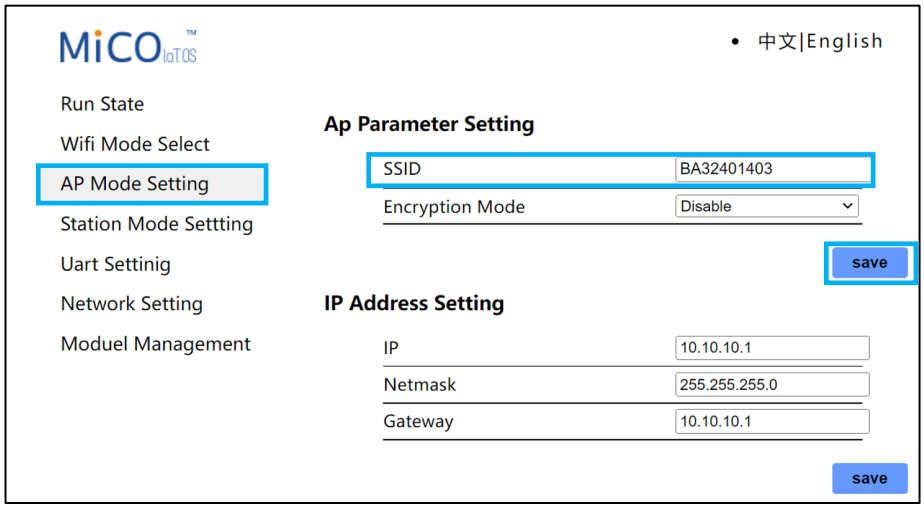
Step 5

Select the “Wifi Mode Select” option on the left-hand side of the screen. From here, select “AP and Station” and save. See image below.



Step 6

Next, select the “AP Mode Setting” on the left-hand side of the screen. Enter the dongle’s SSID and select “save”. The SSID will match the dongle’s SN or “MXCHIP-xxxxxx” as determined by step 3 above. See image below for reference.



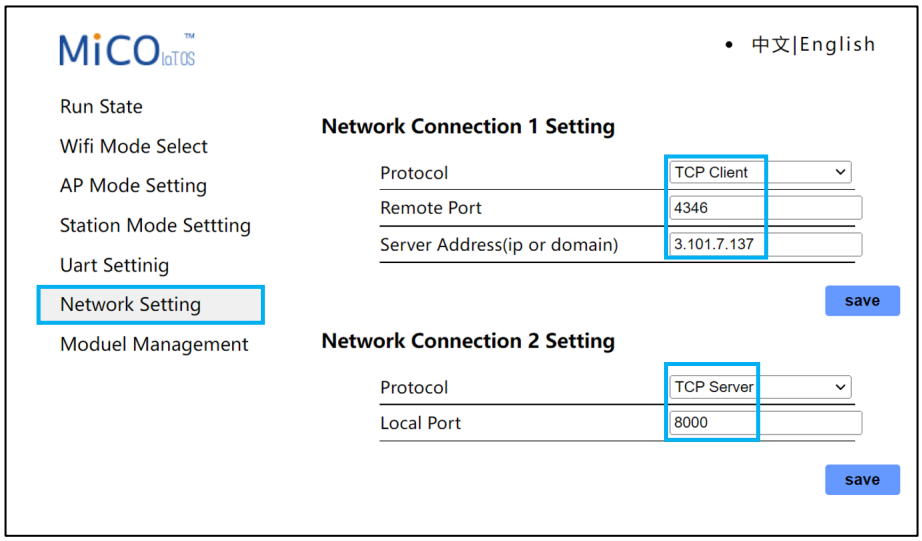
Step 7

Navigate to the “Network Setting” page. Under “Network Connection 1 Setting”, enter the following data and save.

- Protocol: TCP Client
- Remote Port: 4346
- Server Address (IP or domain) 3.101.7.137

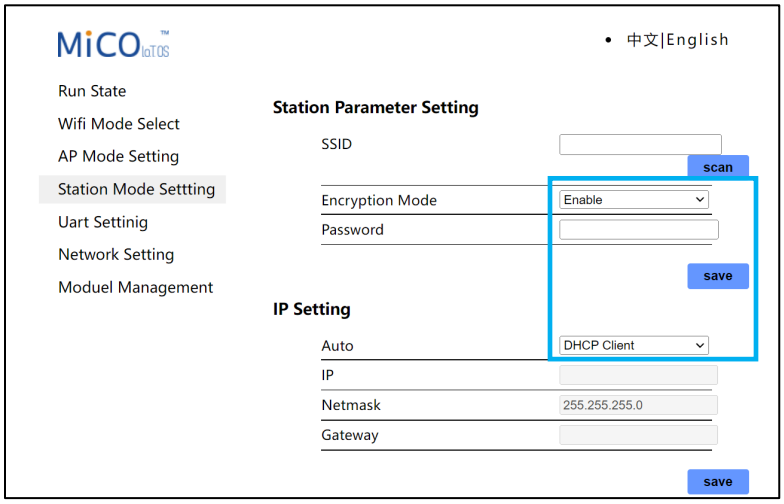
Under “Network Connection 2 Setting”, enter the following data and save. (see image below)

- Protocol: TCP Server
- Local Port: 8000



Step 8

Navigate to the “Station Mode Setting” page. Enter the home Wi-Fi SSID information. Ensure that “Encryption Mode” is set to “Enable”. Enter in the home Wi-Fi password and select “Save”. See figure below.



5. STORAGE INFORMATION

If placing the inverter into storage upon receipt, keep the following factors in mind when selecting a storage location.

1. The inverter and its components must be stored in its original packaging.
2. The storage environment temperature should remain within -13°F – 140°F (-25°C – 60°C), and humidity should be within 30% – 75%.
3. The packing should remain upright.
4. **Do not** store the inverter or its packaging in direct sunlight or where there is potential for water to accumulate.

NOTE: *If any of the warnings or faults from either table persist, please contact the distributor for additional troubleshooting steps.*

6. WARRANTY INFORMATION

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

CHANGELOG

Version 1.2.2

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

Version 1.2.1

- Modified warranty information

Version 1.2

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

Version 1.1

- Modified safety information for consistency

Version 1.0

- First version complete

CONTACT US

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