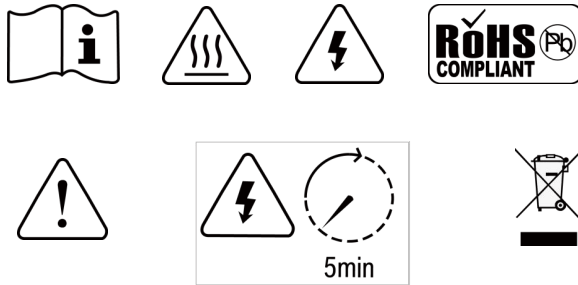


# User Manual



## Energies Pro series Bi-directional inverter A3.1



WARNING : FIRE HAZARD

SUITABLE FOR MOUNTING ON CONCRETE OR OTHER  
NON- COMBUS TIBLE SURFACE ONLY

CAUTION : THE DC AND AC BREAKER MUST HAVE BEEN  
TURNED OFF BEFORE SERVICING

MADE IN CHINA

## Disclaimer

Unless specially agreed in writing, TBB Power Co., Ltd

- Take no warranty as to the accuracy, sufficiency of suitability of any technical or other information provided in this manual or other documentation.
- Assumes no responsibility or liability for loss or damage, whether direct, indirect, consequential or incidental, which might arise out of the use of such information
- TBB offer standard warranty with its products, taking no responsibility for direct or indirect loss due to equipment failure.

## About this Manual

Thank you for choosing our product, this is the user manual for the Energier pro bi-directional inverter.

## General Instruction

Thanks for choosing our products and this manual were suitable for Energier pro bi-directional inverter.

This chapter contains important safety and operation instructions. Read and keep this user guide safe for later reference.

The Energier pro bi-directional inverter needs to be installed by professionals and please pay attention to the following points prior to installation:

- 1) Please check the input voltage or battery voltage is the same as the nominal input voltage of the inverter.
- 2) Please connect positive terminal "+" of battery to "+" input of the inverter.
- 3) Please connect negative terminal "-" of battery to "-" input of the inverter.
- 4) Please use the shortest cable and ensure the connection is secure.
- 5) While connecting, please secure the connection and avoid short cut between positive terminal and negative terminal of battery, which will cause damage of battery.
- 6) Inverter will have high voltage inside. Only authorized electrician can open the case.
- 7) The inverter WAS NOT designed to use in any life retaining equipment.

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# 1. General Safety Instruction

## 1.1 Safety Instruction

As dangerous voltages and high temperature exist within the Energier pro bi-directional inverter, only qualified and authorized maintenance personnel are permitted to open and repair it..Please make sure Energier pro bi-directional inverter is turned off before open and repair it.

This manual contains information concerning the installation and operation of the Energier pro bi-directional inverter. All relevant parts of the manual should be read prior to commencing the installation. Please follow the local stipulation meantime.

Any operation against safety requirement or against design, manufacture, safety standard, and are out of the manufacturer warranty.

## 1.2 General Precaution

- 1.2.1** Do not expose to dust, rain, snow or liquids of any type , it is designed for indoor use. DO NOT block off ventilation, otherwise the Energier pro bi-directional inverter would be overheating.
- 1.2.2** To avoid fire and electric shock , make sure all cables selected with right gauge and being connected well. Smaller diameter and broken cable are not allowed to use.
- 1.2.3** Please do not put any inflammable goods near to inverter.
- 1.2.4** Never place unit directly above batteries, gases from a battery will corrode and damage Energier pro bi-directional inverter.
- 1.2.5** Do not place battery over Energier pro bi-directional inverter.

## 1.3 Precaution regarding battery operation

- 1.3.1** Use plenty of fresh water to clean in case battery acid contacts skin, clothing, or eyes and consult with doctor as soon as possible.
- 1.3.2** The battery may generate flammable gas during charging. NEVER smoke or allow a spark or flame in vicinity of a battery.
- 1.3.3** Do not put the metal tool on the battery, spark and short circuit might lead to explosion.
- 1.3.4** REMOVE all personal metal items such as rings, bracelets, necklaces, and watches while working with batteries. Batteries can cause short-circuit current high enough to make metal melt, and could cause severe burns.

## 2.Description of main functions

Energier pro bi-directional inverter is a new generation of inverter charger, which integrates a powerful sophisticated battery charger, true sine wave inverter and a high-speed AC transfer switch into a single unit. Multiple power management functions/devices makes it ideal to compose many different advanced hybrid independent power systems. The product was delivered with following equipment:

- Energier pro bi-directional inverter
- user's manual
- TS - battery temperature sensor
- VS - battery voltage sensor (optional)
- RCF (Remote module, optional)
- Vision Lite (optional)
- AGS (optional)
- TAI (optional)
- Rapconfig- configuration Software offered by TBB

For model with "-TAI", TAI is built-in



Energier pro  
Bi-directional inverter



RCF  
Remote Control Panel



TS  
Battery Temperature  
Sensor



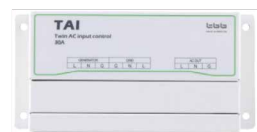
VS  
Voltage Sensor



Vision Lite



AGS  
Automatic Generator Start



TAI  
Twin AC Inputs

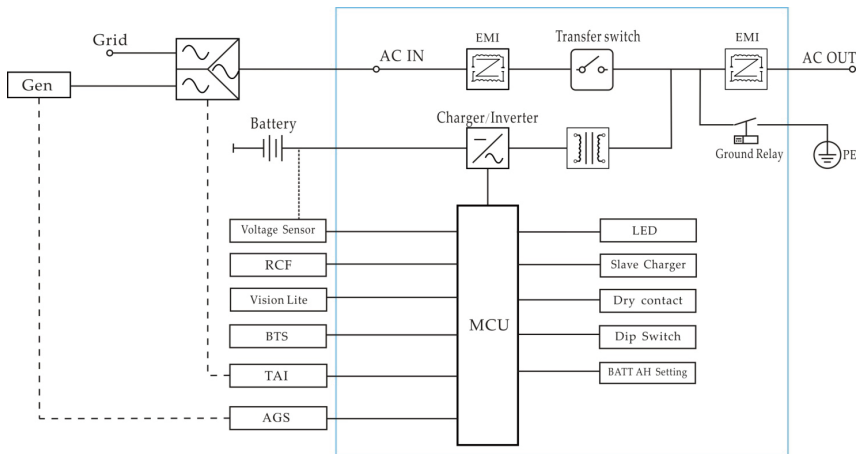


## 2.1 General Description

Energier pro bi-directional inverter is a new generation inverter charger, of which integrated a powerful sophisticated battery charger, true sine wave inverter and a high speed AC transfer switch into a single enclosure. Meantime, multiple power management functions/devices make it convenient to compose different advanced hybrid independent power systems.

Twin AC input devices (TAI) is available, with which a hybrid system with two AC inputs (Grid or Generator) can be composed. The Energier pro bi-directional inverter will automatically control the input according to the logic preset.

### Working principle



## 2.2 Inverter

- **Pure Sine Wave**

Energier pro bi-directional inverter is a sine wave inverter which generates a near perfect sinusoidal AC wave power output that is very similar or even better to what you could get from your utility grid. Pure sine wave can guarantee the correct function of sensitive equipment (computer, laser printer, TV etc) or most demanding inductive load. Also, your home appliances will work smoother, cooler and more efficient, such as fridge, microwave and power tools.

- **High surge power**

Provided with outstanding surge power capability and low frequency transformer, Energier pro bi-directional inverter is suitable for heavy inductive load like refrigerator, coffee maker, microwave, power tools, air conditioner etc.

## 2.3 Battery Charger of stationery/service battery

The charger automatically starts up when qualified AC power is presented either from grid or generator, charging the stationery or service battery connected, featuring:

- **Powerful Charger**

The built-in charger of Energier pro bi-directional inverter was designed with high power, which can quickly charge a battery within 6-8hrs.

- **Multi stage sophisticated charging algorithm for lead acid battery**

Fitted with multistage charging algorithm (bulk-absorption-float-recycle), the built-in charger of the Energier pro bi-directional inverter is designed to charge batteries quickly and fully. Microprocessor controlled charging algorithm with variable absorption charging times guarantees the optimal charging for batteries of different discharged state.

Float charging and Recycle charging programs guarantee your batteries receive proper maintenance in case of prolonged connected.

- **Battery temperature compensation**

Battery temperature is a key factor in correct charging, the charging formula must be adjusted (automatically and in real time) according to the actual battery temperature to ensure that battery are fully charged but not overcharged or undercharged. All charging voltages recommended by battery manufacture are in fact only applied at 20°C - 25°C.

The TS (battery temperature sensor) supplied with Energier pro bi-directional inverter measures the temperature of battery and automatically makes adjustments at real time to properly charge your batteries at compensation rate of  $-4\text{mv} / ^\circ\text{C} / \text{cell}$ . In case of BTS was not present, Energier pro bi-directional inverter will use 25°C as default setting.

- **Voltage compensated charging**

Through separately installed VS (battery voltage sensor), Energier pro bi-directional inverter could automatically adjust its output compensating the voltage drop on the cable assuring the full charging through delivering the right voltage to battery.

- **Charger capacity adjustable**

Through the clock switch at central panel or through Vision Lite or Rapconfig, the user can choose the capacity of batteries they want to charge. Depending on the selection, Energier pro bi-directional inverter will automatically adjust its output power making it suitable for the battery capacity selected. The charging current default threshold rate is 15% of the battery capacity ( $I = 0.15C$ ) chosen.

- **Lithium battery charging**

Energier pro bi-directional inverter can be configured to charge Lithium battery and charging parameter can be programmed as well through Vision Lite or Rapconfig.

## 2.4 Slave Charger

Along with a powerful charger for stationery/service battery, Energier pro bi-directional inverter also offers a slave charger which is a 3-5A floater charger(Only for 12VDC / 24VDC model without CF5090M).For mobile application, it can be used for on board starter battery charging.

## 2.5 Transfer

When voltage/frequency/waveform of external AC input matches the minimum quality, the voltage will be switched directly to AC output. Energier pro bi-directional inverter will switch off, battery charger will switch on and any loads connected will be powered by external AC input. You will have the same voltage on the AC output as AC input.

In case of AC input source failure or exceeding the minimum requirement, Energier pro bi-directional inverter will initiate a quick switching to inverter (about 15ms), of which will guarantee an undisturbed power for the majority of appliances. Once AC input resumes or matches the quality, the unit will switch back again within 15ms. In this mode, Energier pro bi-directional inverter could be used as an UPS. Energier pro bi-directional inverter can also be configured to solar mode (DC priority), please refer to 2.10.

## 2.6 Multi battery chemical available

Commonly encountered battery chemicals include AGM, GEL/OPzV, Flooded and Lithium. The voltage required for an optimum charging profile is different for each battery chemical. Energier pro bi-directional inverter can offer a premium charging profile for all of the above battery types. This can be adjusted by the DIP switch at central panel, through Vision Lite or Rapconfig (configuration software offered by TBB), you can configure the appropriate charging voltage for the battery installed.

## 2.7 Manual Equalization

Over a period of time, the cells in a Flooded battery can develop uneven chemical states. This will result in a weak cell which in turn can reduce the overall capacity of the battery. To improve the life and performance of these types of battery, Energier pro bi-directional inverter includes a manual equalization program that can be used as recommended by battery manufacturer, to equalize the battery. For details, please refer to chapter 7.12.

This charging program can ONLY be applied to Flooded and OPzS batteries. As a protection, the EQ mode will automatically disable if you select either LFP, GEL/OPzV or AGM as battery type.

## 2.8 Settable Low voltage disconnect level

Deep discharge of a lead acid battery leads to high losses in capacity and early aging. Energier pro bi-directional inverter continuously monitors and controls the battery condition.

For different applications, the user can set different low voltage disconnection levels. For example, for solar applications, the user intends to have less DOD to prolong the battery life cycle. For mobile applications, the user intends to have more DOD to reduce battery capacity and on board weight.

Through DIP switches, Energier pro bi-directional inverter offers 2 levels of settable low voltage disconnect for user to configure.

## 2.9 Weak Grid

Upon a weak grid supply where the voltage frequently drops to very low levels and the Energier pro bi-directional inverter cannot deliver charge to the battery connected. You can set the Energier pro bi-directional inverter to weak grid mode, of which it can deliver charging current to battery with low grid voltage. The voltage range can be configured through Vision Lite or Rapconfig.

## 2.10 Solar mode

The Energier pro bi-directional inverter has two operating modes built in. With threshold setting under standard mode, Energier pro bi-directional inverter will charge battery upon available AC and provide power to any loads connected. Upon power failure, Energier pro bi-directional inverter will automatically transfer to inverter taking energy stored in the battery.AC priority

Under SOLAR mode, you can use Energier pro bi-directional inverter to compose a solar hybrid system, of which solar energy will be used as priority and will bring grid/D.G. in and meantime charge battery upon battery runs to protection level. DC Priority.

## 2.11 Gen mode

In systems with a small generator, if the output voltage is too unstable and distorted to be used. The Energier pro bi-directional inverter won't deliver charge and will remain in inverter mode. In this application, you can set Energier pro bi-directional inverter to GEN mode, after which Energier pro bi-directional inverter will reduce its requirement for AC input (voltage, frequency and waveform). As a consequence, the transfer time will be prolonged to about 2s. The load may have problem of loss of power in case of transfer.

In some applications such as sudden overload in short period such as starting Vacuum cleaner on generator, the output voltage of generator will be decreased dramatically. The switch at this circumstance is not desired. You could also set GEN mode.

Through Vision Lite or Rapconfig, the voltagerange can be programmable.

## 2.12 Power Save Mode (PS mode)

In Power Save mode, the no load power consumption will be reduced by approx 70%. Energier pro bi-directional inverter will switch off in case of load is less than preset level and will resume after the power reach the preset level.

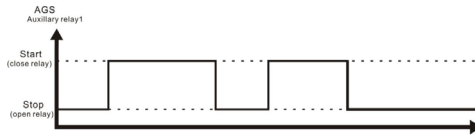
Energier pro bi-directional inverter offers the approach to fully adjust this entry level. Please refer to chapter 7.11 for detail instruction. You can also achieve this programming through optional Vision Lite or Rapconfig .

## 2.13 AGS (Automatic Generator Start)

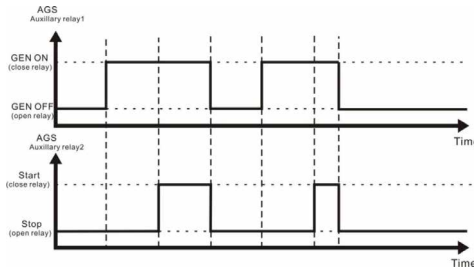
The Energier pro bi-directional inverter has an internal or external AGS that can be used to start the Generator upon battery runs low. To use this function, the Generator needs to have automatic start function. Upon battery runs to low voltage alarm level, signal will be sent to start the Generator. After generator output stabilized, the Energier pro bi-directional inverter will pass the current to load. AGS can be programmed as well through Rapconfig for various parameters.

Basically, there are two ways of automatic start:

- Two wires: needs only one relay to control the “start” and “stop” of generator. Please refer to following Figure.



- Three wires: needs two relays to control the Generator. Relay 1 control the “ON” and “OFF” of generator. Relay 2 control the “START” and “STOP” of generator.



## 2.14 AEA – automatic energy allocation

This function was designed for system with limited input (either grid or generator). It can automatic allocate the power available with AC source (either grid or genset) using whatever extra for charging, thus avoiding grid or generator to be overloaded.

## 2.15 Vision Lite - control center

Optional devices - Vision Lite can be bought to be connected to the Energier pro bi-directional inverter through RS485 interface with following functions:

- Monitoring : with all real time figures
- Configuration : Energier pro bi-directional inverter is fully programmable with Vision Lite
- Active alarm info
- History record



## 2.16 RCF remote module (optional device)



Through RCF remote module, following information and function can be obtained.

- Load percentage monitor
- Battery State of Charge monitor
- Main switch (CHG ONLY/OFF/ON)
- System info (AC input, Charger, Inverter, Fault)
- AEA function (AC input current setting)

## 2.17 Twin AC inputs

Energier Pro has internal or external TAI for systems with two AC inputs (Grid and Diesel Generator). TAI function can help the system to connect Grid and Diesel Generator in meantime.

- Upon Grid failed or abnormal, Energier pro bi-directional inverter will change to inverter and discharging battery.
- Upon battery discharging to low protection alarm level, through AGS, Energier pro bi-directional inverter will send signal to start Diesel Generator connected.
- After detecting output of Diesel Generator was stable, Energier pro bi-directional inverter will pass the electricity from Diesel Generator to load and meantime charging the battery.
  - If grid resume during Diesel Generator running, Energier pro bi-directional inverter will send signal to stop the generator and bring the Grid in. Energier pro bi-directional inverter will change to inverter mode between the switching for seamless transfer.
  - If grid did not recover, Diesel Generator will keep running to charge the battery until the bulk stage finish. Then, Energier pro bi-directional inverter will send signal to stop generator and change to inverter mode.

### Notice

- If unit was set GEN/On mode, Energier pro bi-directional inverter will treat two AC input resources as Generator. If unit was set at GEN/Off mode, Energier pro bi-directional inverter will treat "Grid Input" as normal grid and treat "Gen Input" as generator.



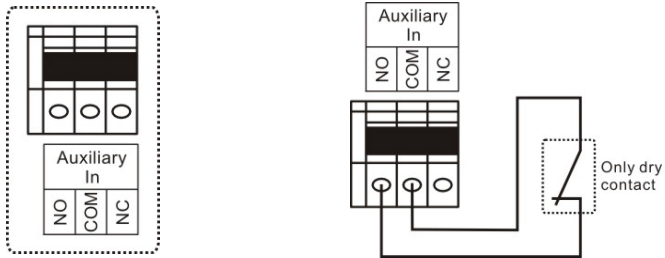
5000-8000 VA models only support built-in TAI.



## 2.18 Dry contact

### • Dry Contact Input

A group of dry contact input (Auxiliary In) was available on Energier pro bi-directional inverter, of which can be used to remotely turn off the equipment.



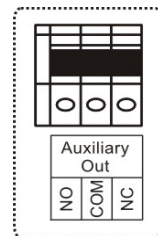
Only Dry Contact.

### • Dry Contact Output

A group of dry contact output (Auxiliary Out) was available on Energier pro bi-directional inverter. The default setting of this dry contact output was battery low voltage. It will activate once the voltage was detected dropping to preset level. This dry contact can be used for load management or other function.

Through Vision Lite or Rapconfig, other functions can be configured for this contact.

The maximum contact load is:  
 230 VAC : 2 A  
 12 VDC / 24 VDC / 36 VDC : 2 A



Please find following chart the default setting:

LVD setting	Default	LVD setting	Default	LVD setting	Default
10.5 VDC	11 VDC	21 VDC	22 VDC	42 VDC	44 VDC
11.7 VDC	12 VDC	23.4 VDC	24 VDC	46.8 VDC	48 VDC

## 2.19 Charger only

On main switch of either Energier pro bi-directional inverter or RCF remote, you can set the unit under charger only mode. This function was designed for mobile or marine application, in case you parked your vehicle or boat for a period of time without operation. Under this mode, in case of mains failure or cut off, the Energier pro bi-directional inverter will not switch on inverter mode. With this function, it can protect your battery to be discharged under unintentionally power cut out.

## 2.20 RS485 communication

RS485 / MODBUS was offered in this port. It can be connected to the Vision Lite or Rapconfig .

## 2.21 Software configuration

Energier pro bi-directional inverter was fully programmable through PC of following parameters:

- Battery charging parameters
- AC input range
- Switching parameters
- Battery configuration : capacity, type and low voltage protection level
- AC source rated current
- Working mode
- Dry contact configuration

## 2.22 Comprehensive Protection

The equipment is being protected against many failures through hardware and software making it robust and reliable.

### • Overload protection

Both of charger and output are being protected against overload by software.

In case of the Energier pro bi-directional inverter is too long or too heavily overloaded, it will switch off. After 60secs, it will switch on automatically.

In case of 3times overload shutdown, it will not switch on automatically. In this case, you need to manually switch on Energier pro bi-directional inverter.

- **Overheat protection**

In case of too high internal temperature was detected, Energier pro bi-directional inverter will switch off for overheat protection. After cooling down, it will switch on automatically.

- **Short circuit**

The Energier pro bi-directional inverter will shut down and need manually start.

- **Battery over temp protection**

During charging, Energier pro bi-directional inverter will keep monitoring battery temperature and will reduce charging rate or even shut down upon too high temperature detected. This will help to prevent thermal runaway of battery. Energier pro bi-directional inverter will resume charging once the temperature fall into the scope.

- **Battery Low voltage**

User can set its own preferred low voltage disconnect level. Energier pro bi-directional inverter will shut down upon battery voltage reach the preset level preventing battery to be over-discharged or discharged exceeding desired level. Once battery voltage raise, Energier pro bi-directional inverter will resume working.

## 2.23 Naming rule

### • CF AA BB C - DD

field	figure	explanation	
	CF	series name	
AA	08	Rated Output Power	800VA / 750W
	12		1200VA / 1100W
	16		1600VA / 1300 W
	20		2000VA / 1600W
	30		3000VA / 2500W
	40		4000VA / 3500W
	50		5000VA / 4500W
	60		6000VA / 5000W
	80		8000VA / 7000W
BB	15	Rated charge current	15A
	20		20A
	25		25A
	30		30A
	40		40A
	45		45A
	50		50A
	60		60A
C	L	Rated DC voltage	12V
	M		24V
	S		48V
DD	N/A	TAI	No built-in TAI
	TAI		Built-in TAI

#### For example: CF2060L:

Energier Pro series Bi-directional inverter: Rated DC voltage 12V;Rated output power: 2000VA/1600W;Rated charge current: 60A.  
No built-in TAI

#### CF5090M -TAI:

Energier Pro series Bi-directional inverter: Rated DC voltage 24V;Rated output power: 5000VA/4500W;Rated charge current: 90A.  
With built-in TAI

## 3. Structure

### 3.1 Product drawing

#### 3.1.1 Energier pro bi-directional inverter

1) CF0825L, CF0815M, CF1240L, CF1220M, CF1650L, CF1625M



2) CF2060L, CF2030M, CF2015S, CF3090L, CF3045M, CF3020S, CF4030S



3) CF5090M, CF6050S, CF8060S, CF5040S



### 3.1.2 RCF remote



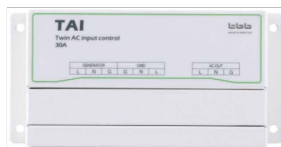
### 3.1.3 Vision Lite



### 3.1.4 AGS



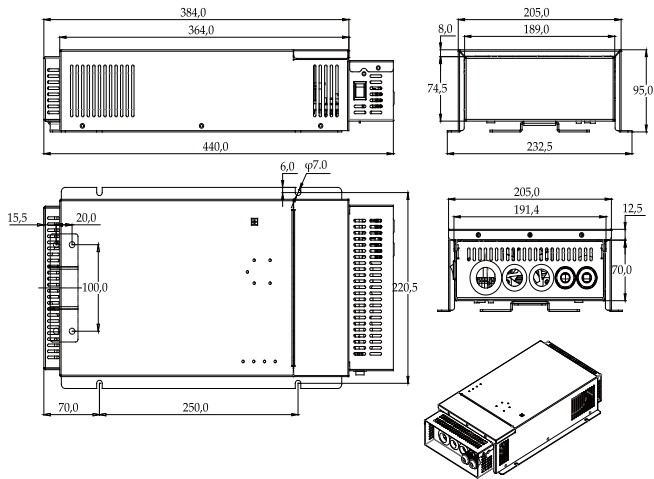
### 3.1.5 TAI



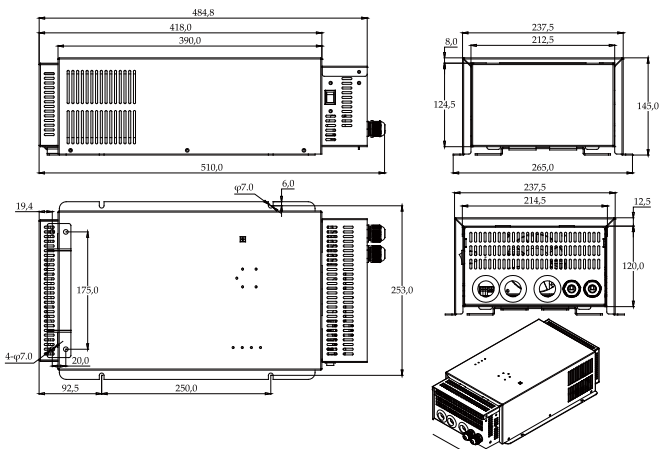
## 3.2 Product size

### 3.2.1 Energier pro bi-directional inverter

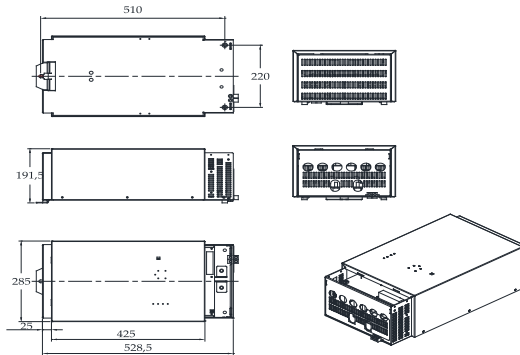
CF0825L,CF0815M,CF1240L,CF1220M,CF1650L,CF1625M



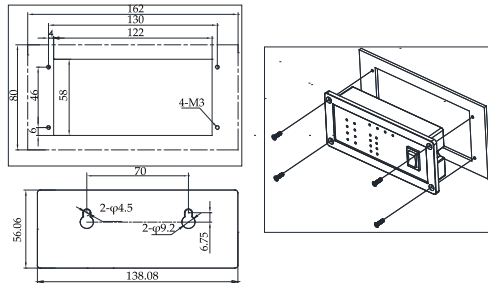
2)CF2060L,CF2030M,CF2015S,CF3090L,CF3045M,CF3020S,CF4030S



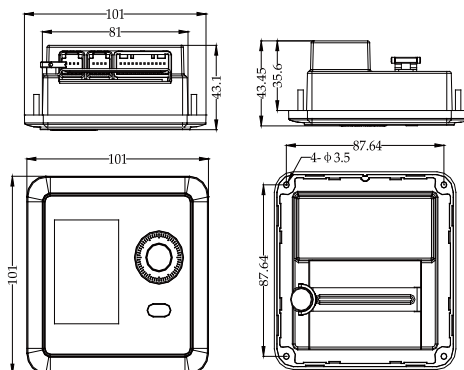
3) CF5090M, CF6050S, CF8060S, CF5040S



**3.2.2 RCF remote**

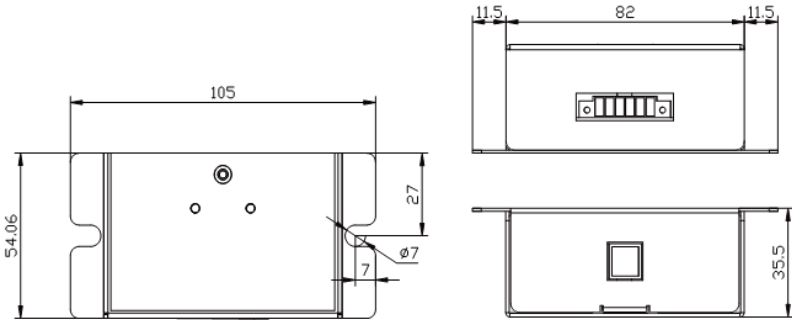


**3.2.3 Vision Lite**

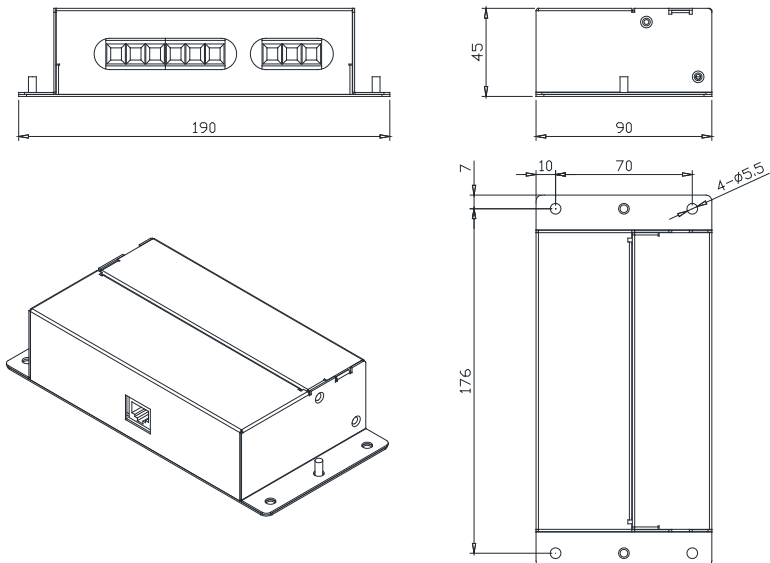




### 3.2.4 AGS

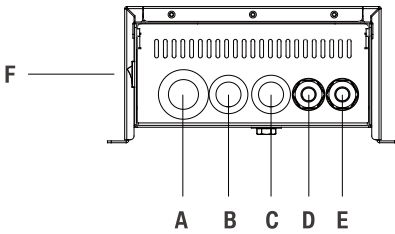


### 3.2.5 TAI

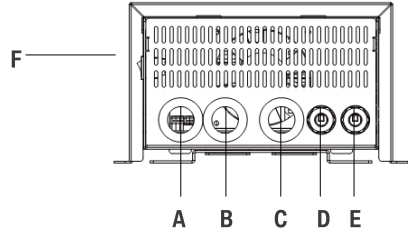


## 4.Pre-installation Configuration

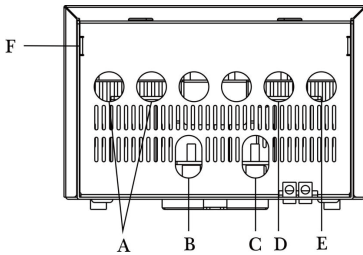
### • Front Panel



CF(800VA-1600VA) Model



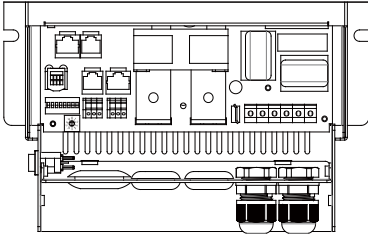
CF(2000VA-4000VA) Model



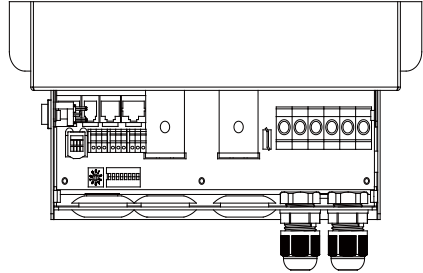
CF(5000VA-8000VA) Model

A	Gland for remote control cable
B	Battery- cable through hole
C	Battery+ cable through hole
D	Gland for AC output
E	Gland for AC input
F	Main switch

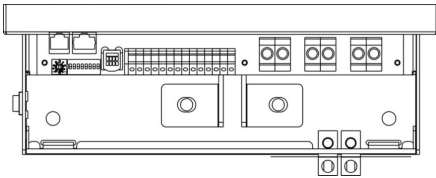
• **Central Panel**



CF(800VA-1600VA) Model



CF(2000VA-4000VA) Model



CF(5000VA-8000VA) Model

Before the installation, you need to do some basic configurations, of which can be done either by DIP switch or through Vision Lite or Rapconfig. The latest configuration will be saved in the Energier pro bi-directional inverter, no matter through which device.

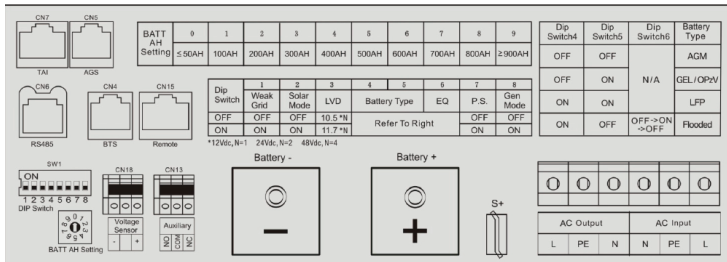
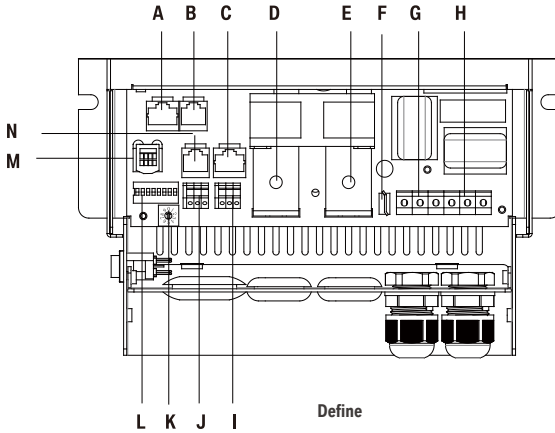


If you perform the latest configuration through Vision Lite or Rapconfig and unplug the Vision Lite or Rapconfig, The setting will be saved in Energier pro bi-directional inverter, of which might not match the setting on DIP switch. Please always use Vision Lite or Rapconfig to read the latest configuration.

Following introduction is being prepared for configuration through dipswitch. In case you bought Vision Lite or Rapconfig, please refer to Vision Lite or Rapconfig for detail introduction.

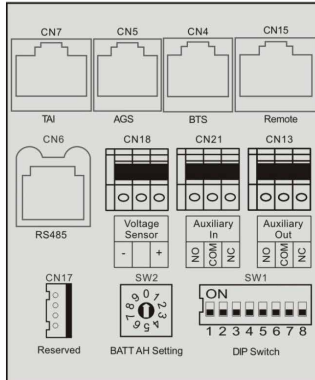
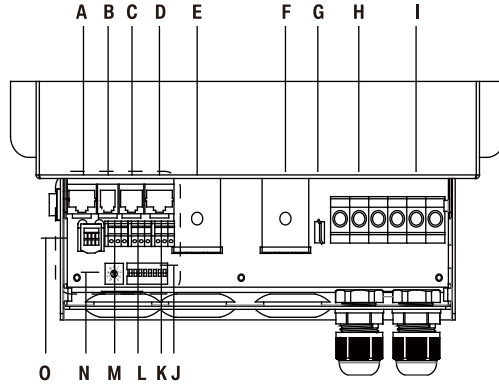
Loose screws and remove the top panel you will see the central panel where you can finish all the configurations.

• CF(800 VA-1600 VA) Model:



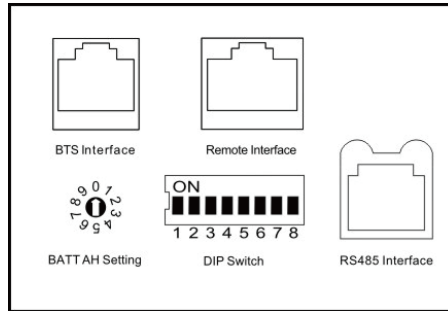
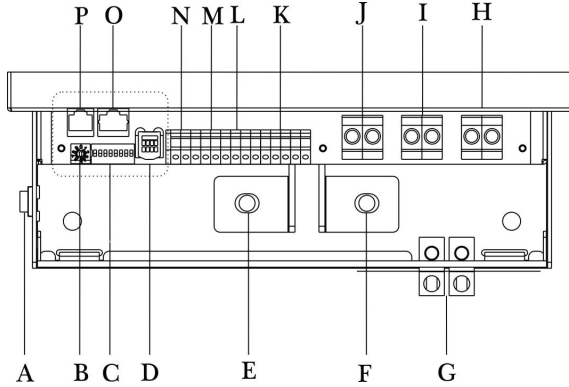
A	TAI Interface	H	AC Input terminals
B	AGS Interface	I	Auxiliary terminals
C	Remote Interface	J	Voltage Sensor terminals
D	Battery- terminal	K	Battery AH setting clock switch
E	Battery+ terminal	L	DIP Switches
F	Slaver Charger + terminal	M	RS485 Interface
G	AC Output terminals	N	BTS Interface

• **CF(2000 VA-4000VA) Model:**



A	TAI Interface	I	AC Input terminals
B	AGS Interface	J	DIP Switches
C	BTS Interface	K	Auxiliary Out terminals
D	Remote Interface	L	Auxiliary In terminals
E	Battery- terminal	M	Voltage Sensor terminals
F	Battery+ terminal	N	Battery AH setting clock switch
G	Slaver Charger + terminal	O	RS485 Interface
H	AC Output terminals		

• **CF(5000VA-8000VA) Model**



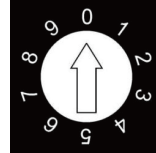
A	Main Switch	I	Grid Input terminals
B	Battery AH setting clock switch	J	AC Output terminals
C	DIP Switches	K	AGSTerminal
D	RS485 Interface	L	Auxiliary Out terminals
E	Battery-Terminal	M	Voltage Sensor terminals
F	Battery+ terminal	N	Auxiliary In terminals
G	Chassis Ground	O	Remote Interface
H	Generator Input terminals	P	BTS Interface

## 4.1 Battery Capacity

Through the clock switch, you can configure the battery you are going to connected for a premium charging current. The charger capacity in specification was the max charge current the model you selected could supply. Please refer to following fig of setting.

### The charging current was set at following terms:

**$I=0.15C$  (15% of the battery capacity you choose)**  
**Or**  
**Max Charger Capacity of the model you choose.**



Position	Battery Capacity
0	≤50 AH
1	100 AH
2	200 AH
3	300 AH
4	400 AH
5	500 AH
6	600 AH
7	700 AH
8	800 AH
9	≥900 AH

- In case you choose ≤50 AH, the charge current was 7.5 A.
- In case you choose ≥900 AH, the charge current was the max charging current.
- The max charging current of the model you are using can only deliver its max charging current as specified in data no matter how big battery you selected.
- In case you want to charge your battery faster, you could set bank one gear larger to get higher charging current. However, please make sure the current did not exceed 0.2C (20% of battery capacity).

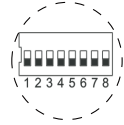
### For example, for model CF1650L with battery capacity of 12V/200AH.

- 1) If you choose battery capacity at 200 AH, you could get charging current of  $15\% \times 200 \text{ AH} = 30 \text{ A}$
- 2) If you want to charge faster, you could choose 300AH, you could get charging current  $15\% \times 300 \text{ AH} = 45 \text{ A}$ .

For example, for model CF1650L with battery capacity of 12 V / 400 AH.  
 since the max charging current of this model is 50 A, you will get 50 A. Not 0.15C, 60 A.  
 The default setting was position 0 (≤50 AH)

• **Please refer to following chart for all setting of DIP Switch:**

DIP Switch	1	2	3	4	5	6	7	8
	Weak Grid Mode	Solar Mode	LVD	Battery Type		EQ	P.S.	GEN Mode



## 4.2 Weak Grid mode

Using DIP Switch 1, you can set the system in weak grid mode. Please refer to chapter 2.9 for explanation.



This configuration will adjust the minimum voltage of AC input which Energier pro bi-directional inverter will qualify and pass through to your AC appliance. Majority of present appliance will work properly. However, before perform this configuration, please double check the electrical rating of connected load. Low voltage might cause damage for particular load.

## 4.3 SOLAR mode

Through DIP Switch 2, you could configure the system in solar mode. For explanation, please refer to chapter 2.10.

## 4.4 Low Voltage disconnect (LVD)

Through the DIP Switch 3, you can configure the premium low voltage protection level for your system. Following please find following the data.

The following DOD is ONLY estimation. The exact measure of the battery SOC is almost impossible with only electrical parameter.

It may vary according to discharge current, battery healthy etc.

DS3	12 VDC model	24 VDC model	48 VDC model	est DOD	recommendation
off	10.5 VDC	21.0 VDC	42.0 VDC	>90%	mobile
on	11.7 VDC	23.4 VDC	46.8 VDC	ab. 60%	solar or backup

The default setting was OFF, 10.5 VDC (12 V model) / 21VDC (24 V model) / 42 VDC (48 V model).



## 4.5 Battery Type

Please select the battery type at the DIP Switch 4-5, following please find the list of available battery type and charging voltage.

Dip	Dip	Battery type	Absorption			Float		
			12 VDC	24 VDC	48 VDC	12 VDC	24 VDC	48 VDC
off	off	AGM	14.4	28.8	57.6	13.5	27	54
off	on	GEL / OPzV	14.1	28.2	56.4	13.5	27	54
on	on	LFP	14.4	28.8	57.6	13.5	27	54
on	off	Flooded	14.8	29.6	59.2	13.5	27	54
		GEL / OPzS	15.2	30.4	60.8	13.5	27	54
		Lead-Carbon	14.1	28.2	56.4	13.62	27.24	54.48

The default setting was AGM (OFF-OFF).

When dip switch 4 is ON and dip switch 5 is OFF, the battery type can be set as flooded , OPzS or Lead-Carbon.

Flooded is the default setting. The other two can be set by Rapconfig software ("Programmable IO" ->"Dip switch" ->"battery type").

Please update the label on the unit to avoid any mistake after you change the default setting.

## 4.6 Equalization (EQ)

Through switch dip switch 6 with a cycle from OFF to ON to OFF, you could choose Equalization program for your Flooded、OPzS battery, of which the charger will, after a normal charging cycle (bulk-absorption), raise the voltage to EQ level with a timer of 30mins after voltage reaching the EQ voltage level.

Dip	Battery type	12VDC model	24VDC model	48VDC model
Switch 6		EQ	EQ	EQ
X	AGM	N/A	N/A	N/A
X	GEL / OPzV	N/A	N/A	N/A
X	LFP	N/A	N/A	N/A
Off-On-Off	Flooded	16.2	32.4	64.8
Off-On-Off	OPzS	16.2	32.4	64.8
X	Lead-Carbon	N/A	N/A	N/A

The field 'X' means this program can not be applied on AGM、GEL / OPzV or LFP battery, it only be applied on Flooded、OPzS battery.

As a protection, if you choose wrong battery type, Energier pro bi-directional inverter won't delivery equalization charging program and will only deliver the battery type you chose.

Please refer to chapter 7.12 for details of performing equalization charging.

## 4.7 Power Save mode (PS mode)

Using DIP Switch 7, you can set the system in power save mode. Please refer to chapter 2.12 for explanation.

## 4.8 Weak Grid and GEN mode

Through DIP Switch 1 and 8, you could configure the system to different modes for different appliance. For explanation, please refer to chapter 2.11.

Dip switch 1	Dip switch 8	Mode	Voltage range	Frequency range	Waveform
Off	Off	Standard	184 VAC-264 VAC	45 Hz-65 Hz	sensitive
Off	On	GEN	173 VAC-276 VAC	40 Hz-70 Hz	less sensitive
On	Off	Weak Grid	167 VAC-264 VAC	45 Hz-65 Hz	sensitive
On	On	GEN & Weak Grid	167 VAC-276 VAC	40 Hz-70 Hz	less sensitive



This configuration will adjust the minimum quality of AC input which Energier pro bi-directional inverter will qualify and pass through to your AC appliance. Voltage or frequency variation might cause damage for particular load. Before adjusting these setting, refer to electrical rating of connected load. Failure to follow the instruction can cause damage over appliance connected.

## 4.9 AC input current setting

Through RCF supplied, you can set the AC input current. This configuration can be done only after Energier pro bi-directional inverter was switched on.

Please refer to chapter 7.2 for detail instruction.

## 5. Pre-Installation

### 5.1 Material list

The unit is packed with following materials. Please confirm the series number on Energies pro bi-directional inverter is same to that on outer carton.

- Energies pro bi-directional inverter
- TS – battery temperature sensor
- VS – battery voltage sensor ( optional )
- User's manual

### 5.2 Location

Please install the equipment in a location of Dry, Clean, Cool with good ventilation.

- Working temperature : -10 C -55 C
- Storage temperature : -40-70 C
- Relative Humidity : 0%-95%, non-condensing
- Cooling : Forced air

### 5.3 Wiring recommendation

Please find the following minimum wire size. In case of DC cable longer than 1m, please increase the cross section of cable to reduce the loss.

System capacity	AC wiring		DC wiring		
	110 VAC	230 VAC	12 VDC	24 VDC	48 VDC
CF08xx	2.5 mm <sup>2</sup>	2.5 mm <sup>2</sup>	16 mm <sup>2</sup>	10 mm <sup>2</sup>	/
CF12xx	4 mm <sup>2</sup>	2.5 mm <sup>2</sup>	25 mm <sup>2</sup>	16 mm <sup>2</sup>	/
CF16xx	4 mm <sup>2</sup>	2.5 mm <sup>2</sup>	35 mm <sup>2</sup>	25 mm <sup>2</sup>	/
CF20xx	4 mm <sup>2</sup>	2.5 mm <sup>2</sup>	50 mm <sup>2</sup>	25 mm <sup>2</sup>	16 mm <sup>2</sup>
CF30xx	/	4 mm <sup>2</sup>	70 mm <sup>2</sup>	50 mm <sup>2</sup>	25 mm <sup>2</sup>
CF40xx	/	4 mm <sup>2</sup>	/	/	25 mm <sup>2</sup>
CF50xx	/	6 mm <sup>2</sup>	/	70 mm <sup>2</sup>	50 mm <sup>2</sup>
CF60xx	/	10 mm <sup>2</sup>	/	/	50 mm <sup>2</sup>
CF80xx	/	10 mm <sup>2</sup>	/	/	70 mm <sup>2</sup>

## 6. Installation and Connection



For the user operation safety, cut off the power before installation.

### 6.1 General advice

- Ensure that the Energier pro bi-directional inverter has the correct DC voltage with your existing battery system.
- Install Energier pro bi-directional inverter as close to the batteries as possible reducing the voltage drop on cable for the better performance of the equipment.



Do not connect the output of this equipment to your AC system at the same time as any other AC source such as the 230V external mains or a generator.

- We recommend connecting a DC fuse corresponding to the conductor between battery and Energier pro bi-directional inverter, which will offer protection to the battery cable. Please refer to following chart of our recommendations.

Systemcapacity	12 VDC model	24 VDC model	48 VDC model
CF08xx	150 A	75 A	/
CF12xx	200 A	100 A	/
CF16xx	250 A	125 A	/
CF20xx	300 A	150 A	80 A
CF30xx	500 A	250 A	125 A
CF40xx	/	/	175 A
CF50xx	/	400 A	200 A
CF60xx	/	/	250 A
CF80xx	/	/	300 A

- On the AC output side, we recommend connecting the output from Energier pro bi-directional inverter to a suitable Residual Current Circuit Breaker and Circuit Breaker.
- The neutral of this equipment is not connected to the earth. If requested, additional devices need to be installed internally. Please contact your installer.

## 6.2 Fix the equipment

- Basically, Energier pro bi-directional inverter could be installed either vertically on wall or horizontally on floor.
- For example, install on wall, please choose a flat surface and with 4XM6 to fix the unit securely.

### Steps for 800 – 4000 VA models:

- Step.1: Fix the widget on the wall with 4\*M6 screw.
- Step.2: Pre-installation picture for the unit.
- Step.3: Buckle the pothook of the unit into the widget that was already fixed on the wall.
- Step.4: Use 4\*M6 screw to fix the unit on the wall.

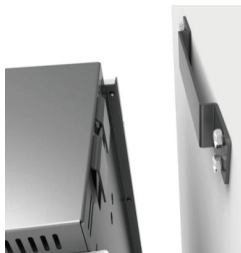
STEP.1



STEP.2



STEP.3



STEP.4

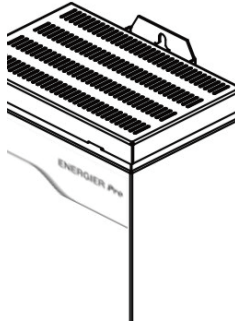


**Steps for 5000-8000 VA:**

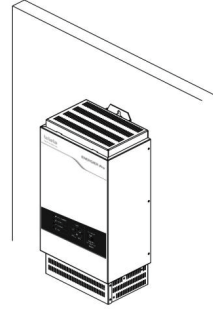
- Step.1: Drill 3 holes according to location hole schematic diagram, the holes have diameters of 9 mm
- Step.2: Fixed the expansion screw , Buckle the pothook of the unit into the expansion screw that was already fixed on the wall.
- Step.3: Use the other 2\*M6 expansion screws to fix the unit on the wall.



STEP.1



STEP.2



STEP.3

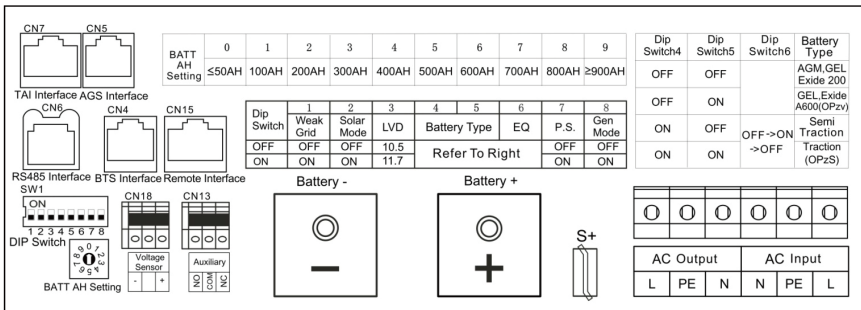
**6.3 Connecting the cable**



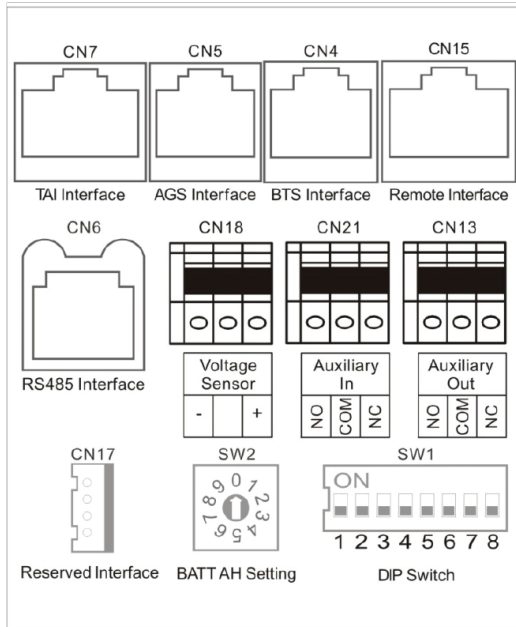
Please make sure Energier pro bi-directional inverter is turned off before connection. Otherwise, high voltage could be present.

- Loose the screw and remove the top panel.

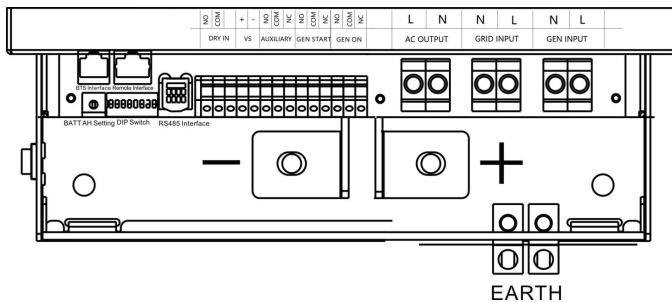
**• CF(800 VA-1600 VA) Model:**



• **CF(2000 VA-4000 VA) Model:**



• **CF(5000 VA-8000 VA) Model:**



## • Connecting battery cable of service battery.



Please double check battery voltage match the model you are going to install, the wrong battery could destroy equipment and is out of warranty.



Please double confirm the polarity of battery input. Reverse polarity could cause permanent damage on equipment and it is out of warranty.

- Choose the right cable size (refer to 5.3) and follow polarity guide marked on the panel.
- Pull through the battery cables through the holes at front panel, clamping the cable terminal on cable.
- Secure the battery cable on DC+ and DC- terminals respectively making sure it is tightly screwed.

## • Connecting Slave charger

If you are intending to use this charger, please follow the following steps:



- Use 2x2.5 mm<sup>2</sup> wire.
- Connecting the POSITIVE (+) terminal of the starter battery to the terminal marked S+ output on central panel, see picture left.
- The MINUS (-) terminal of starter battery should be connected to the minus terminal of your service battery.
- Only 12 VDC / 24 VDC models (except CF5090M) has this slave charger.

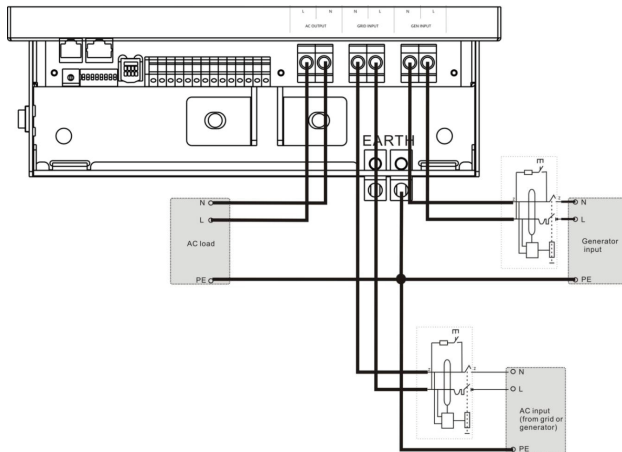
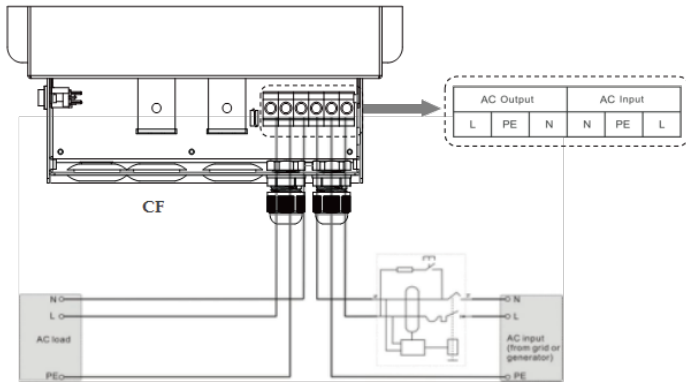


Fail to connecting the minus terminal of starter battery to minus terminal of service battery might cause the slave charger fail to perform charging.

## • Connecting the AC cable

- AC input cable: choose the right cable size (refer to 5.3), pull through the AC input cable through Gland and connect it on AC input block. Connectors are marked as "L"-line, "N"-neutral and "PE"-earth. Making sure it is tightly screwed.
- AC output cable: choose the right cable size (refer to 5.3), pull through the AC output cable through Gland and connect it on AC output block. Connectors are marked as "L"-line, "N"-neutral and "PE"-earth. Making sure it is tightly screwed.



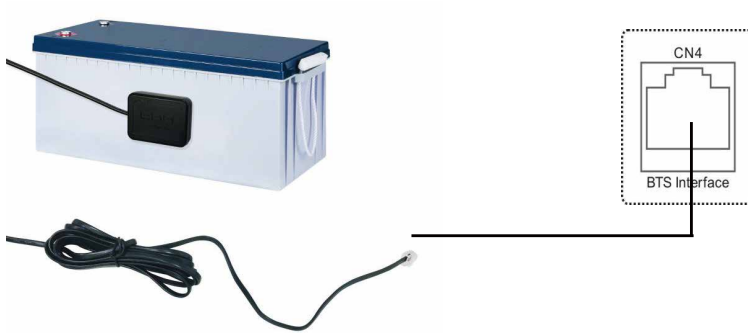


Please double check the AC input and AC output was right after connection. Wrong connection will cause permanent damage of equipment and it is out of warranty.

- The neutral output of Energier pro bi-directional inverter is automatically connected to earth upon no external sources is available. Once external AC sources present, the ground relay will open.
- For mobile application, the frame of this product must be connected to the frame of the vehicle or the ground plate of boat. See following the earth point of this product.

## 6.4 Install the temperature sensor

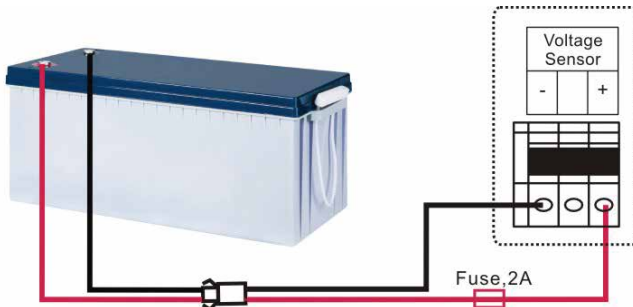
- Pull through the TS cable through gland and connect it on socket marked "BTS Interface".
- Please glue the temperature sensor, which was plugged into BTS socket at central panel, on the SIDE of battery and secure the attachment.



Please notice the cable supplied is around 300cm. Do not pull cable too hard avoid loose contact loose.

## 6.5 Install the voltage sensor

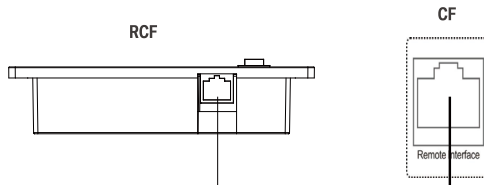
- Pull through the VS cable through gland and connect it on port marked "Voltage Sensor". Please refer to following fig.
- The minus (-) of voltage sensor should be connected to the minus (-) of service battery, and the positive (+) of voltage sensor should be connected to the positive (+) of service battery. Wrong connection will damage the Energier pro bi-directional inverter.
- Please secure the sensor on battery terminal.



## 6.6 Install the RCF - remote controller

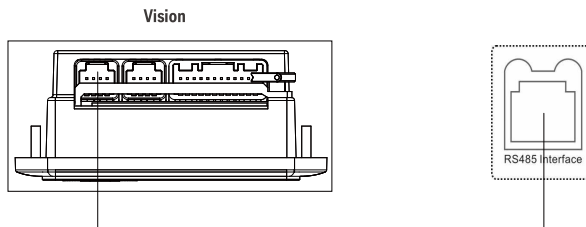
The RCF was dash mounting design. Please cut the hole (refer to 3.2.2) and screw the remote controller securely through four screws at corners and connected the cables.

Connect the RCF to the "remote interface" of Energier pro bi-directional inverter with RJ45 cable, please refer to following figure.



## 6.7 Install the Vision Lite

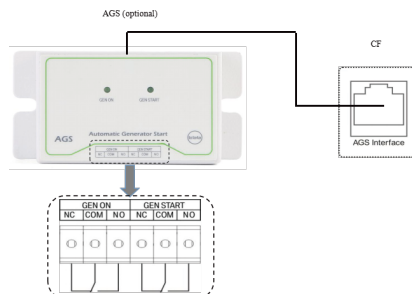
Connect the Vision Lite to the "RS485 interface" of Energier pro bi-directional inverter with the cable, please refer to following figure.



## 6.8 Install the AGS

Please find following the wiring guide of AGS to Energier pro bi-directional inverter and Generators.

Connect the AGS to the "AGS interface" of Energier pro bi-directional inverter with the cable, please refer to following figure.



## 6.9 Install the TAI

If your system has two independent AC input sources, you need to install TAI. Please refer to chapter 2.17 for detail introduction.

- Connecting two AC input resources to the terminal marked "GEN" and "GRID".
- Connecting the output on terminal marked "OUT".

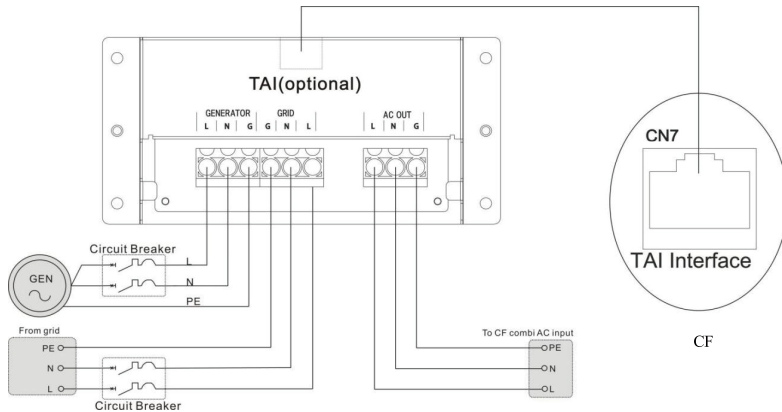


Please double check the polarity of the input and output. Wrong connection will damage the equipment and it is out of warranty.

- Using cables supplied with TAI connecting TAI unit to the "TAI Interface" of Energier pro bi-directional inverter.
- TAI port is a 8pin port.



TAI need to be connected with Energier pro bi-directional inverter with cable supplied. Otherwise, it will not perform.



## 7. Operation

○ : illuminate


◐ : extinguish

● : flash

### 7.1 Double Checking

- Check the DC input voltage of this Energier pro bi-directional inverter is same to your battery nominal voltage. NEVER try to connect different DC input to Energier pro bi-directional inverter.
- Inspect the right polarity of DC on service battery, otherwise unit can not power ON.
- Please check if you connect the Negative terminal of starter battery to the DC- terminal of Energier pro bi-directional inverter.
- Inspect AC input and AC output is correct, make sure unit is no short cut.

### 7.2 Set the AC input current

- Check the AC input limit of your system (either diesel generator or grid).
- On RCF connected, you can set the input. Total nine rating are available (4 A, 6 A, 10 A, 12 A, 16 A, 20 A, 25 A, 30 A, unlimited).
- By pressing the button(  )until beep was heard and the rating LEDs are flashing, you can enter into setting.
- Pressing "Input Current Setting" button again to choose the rating you would like to set.
- After make the choice, press "Input Current Setting" button for about 5 seconds until beep was heard to save the change.



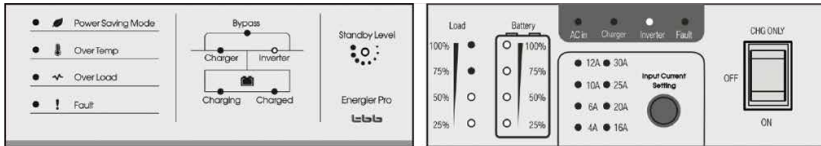
AEA function is not available when Energier Pro is set as Solar mode.

### 7.3 Main switch function

- With the switch the unit can be switched to "ON" or "CHG ONLY". When the unit is switched "ON", Energier pro bi-directional inverter will start charging in case AC input is present. When the AC input is not present, Energier pro bi-directional inverter will go to inverter mode automatically.
- In case the user does not want to use the inverter mode, but wants the batteries to be fully charged, the "CHG ONLY" can be selected. In this way the batteries will be fully charged, but if the AC input is not present, the batteries will not be drained by the inverter mode.

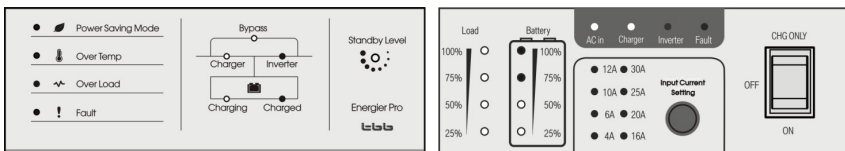
## 7.4 Switch on the inverter

- Disconnect the AC input power, switching on the unit, the LED will all illuminate for analysis then there should be AC available at inverter output. The inverter LED will illuminate. You could switch on the load which will be powered by inverter.
- The Load % LEDson remote will reflect the load level connected.
- The Battery SOC LEDson remote will reflect the battery condition, which are 25%-50%-75%-100% respectively from bottom.



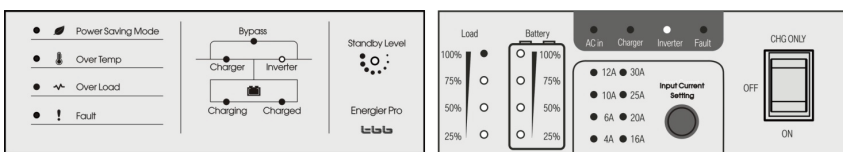
## 7.5 Switch on Charger

- Then switch on the AC input power, Energier pro bi-directional inverter should go on bypass mode feeding the power to load and meantime battery charger will start work. The bypass LED and charger LED on front panel will illuminate.
- The AC in LED and Charger LED on remotewill illuminate .
- While connecting to a generator, in case you could not get charging after connecting in, you need to switch off the inverter and change the work mode and repeat 7.4.
- The Load LEDs on remote will reflect the present charging power.
- The Battery SOC LEDson remote will reflect the charging status.



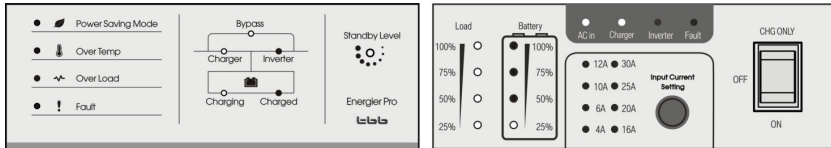
## 7.6 Switch off AC input

- Remove the AC input, the Energier pro bi-directional inverter will transfer to inverter mode quickly and load should continue work without interruption. Inverter LED will illuminate.



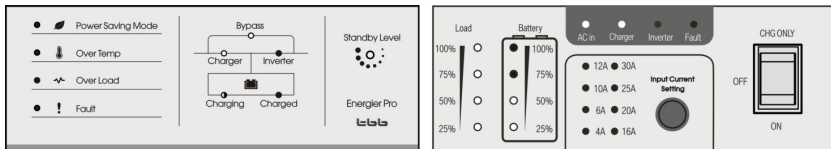
## 7.7 Battery Charging – Bulk

- Upon your AC input meet the minimum quality, the Energier pro bi-directional inverter will perform charging. Both LED charger and LED charging will illuminate on front panel.
- The charger LED and AC in LED on remote will illuminate.
- The Bulk LED (Battery SOC 25%) on remote will illuminate.



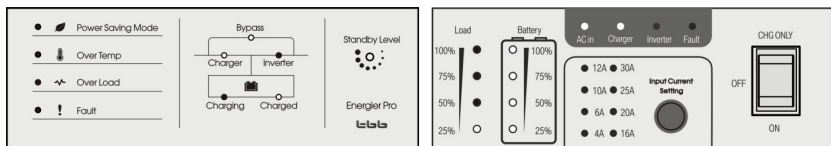
## 7.8 Battery Charging – absorption

- The charging LED on front panel will flash.
- The Bulk(Battery SOC 25%) LED and ABS(Battery SOC 50%) LED on remote will illuminate.
- Along with more energy being charged into battery, the 75% LED will illuminate reflecting the progress.



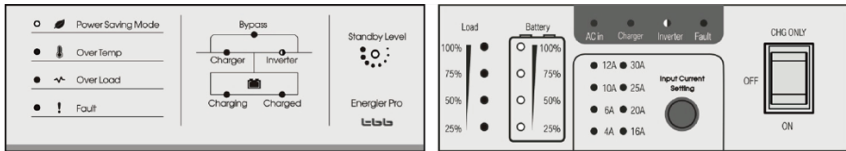
## 7.9 Battery charged – floating

- After coming into floating, the Battery Charged LED on front panel will illuminate.
- On remote panel, all Battery LED (25%-50%-75%-100%) will illuminate.



## 7.10 Power Saving mode

- You can set Energier pro bi-directional inverter working in power save mode, in which the status consumption power can be dramatically reduced.
- Upon Energier pro bi-directional inverter being set in this mode, Power Save mode LED on front panel will illuminate.
- On remote, upon Energier pro bi-directional inverter enter into power saving, the Inverter LED on remote will flash. After resume normal output, it will illuminate.



## 7.11 Standby level adjustment

If you want to use POWER SAVE mode, you can adjust the standby level by yourself setting the entry level. The range is 0.25%-1%.



- On front panel of Energier pro bi-directional inverter, you can see a switch marked Standby Level as pictures shows on left.
- Switch off all the appliances as you normally do with remote etc.
- Using screw driver to slowly turn around the switch from left until you see all power goes off. It will be the entry level of your Power Save mode.

## 7.12 Performing De-sulphation Charging



It is strongly recommended to read this section carefully before you set the de-sulphation charging and DO NOT leave battery unattended while performing de-sulphation.



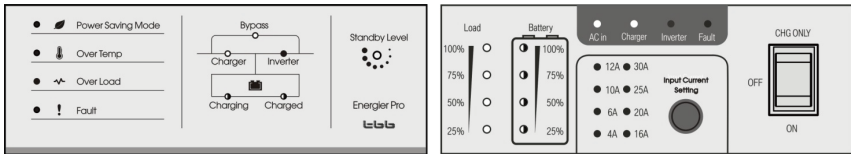
Always check if your battery supplier recommended de-sulphation charging. Only start when it is suitable.

Over a period of time, the cells in flooded and OPZS batteries can develop uneven chemical states. This will result in a weak cell which in turn can reduce the overall capacity of battery. To improve the life and performance of these non sealed batteries, Energier pro bi-directional inverter includes a manual equalization program that can be used, if recommended by battery manufacturer.

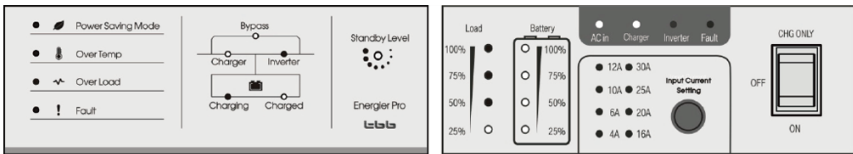
Through the dip switch at central panel, you can initiate the de-sulphation program manually. Once you trigger on the EQ program, Energierpro bi-directional inverter will perform de-sulphation charging.



- After you choose this program, the charger will start an ordinary charging cycle, afterwards of which it will raise the voltage to EQ level on purpose. Both of the CHARGING and CHARGED will flash.
- On remote, all Battery SOC(25%-50%-75%-100%) LEDs will flash and Charger LED will illuminate.



- After 30 mins, it will quit and come into floating.



- Check electrolyte level and refill battery with distilled water if necessary.



During equalization, the battery generates potentially flammable gases. Follow all the battery safety precautions listed in this guide. Ventilate the area around the battery thoroughly and ensure that there are no sources of flame or sparks in the vicinity.



Turn off or disconnect all loads on the battery during equalization. The voltage applied to the battery during equalization may be above the safe levels for some loads.

- **Frequency:** Maximum once a month, for heavily used battery, you may wish to equalize your battery. For battery with light service only need to be equalized every 2-3 months.
- **Important:** Equalization can damage your batteries if it is not performed properly. Always check battery fluid before and after equalization. Fill batteries only with distilled water.

Always check the equalization switch is set back to OFF after each time's equalization.

Battery manufactures' recommendations on equalization vary. Always follow the battery manufacturer's instructions so batteries are properly equalized. As a guide, a heavily used battery may require equalization once a month while a battery in light duty service, only needs equalizing once every 2 to 4 months.

- **Battery type:** ONLY perform equalization to flooded and OPZS batteries. Do not equalize Gel / OPzV, AGM or LFP batteries.

## 8.Specification

Model No.	12VDC	CF0825L	CF1240L	CF1645L	CF2060L	CF3090L	/	/	/	/
	24VDC	CF0815M	CF1220M	CF1625M	CF2030M	CF3045M	/	CF5090M /-TAI	/	/
	48VDC	/	/	/	CF2015S	CF3020S	CF4030S	CF5040S /-TAI	CF6050S /-TAI	CF8060S /-TAI
<b>INVERTER</b>										
Nominal Voltage		12 VDC / 24 VDC				12 VDC / 24 VDC 48 VDC				
Cont. power @25 C (VA)		800	1200	1600	2000	3000	4000	5000	6000	8000
Cont. power @25 C (W)		750	1100	1300	1600	2500	3500	4500	5000	7000
Cont. power @40 C (W)		700	1000	1200	1450	2200	3200	4000	4500	6000
Output voltage		230 VAC / 110 VAC ± 2%				230 VAC ± 2%				
Output frequency		50 / 60 Hz ± 0.1%								
Cos φ		0.9-1								
Overload Capability	>110%	15 mins				1 mins				
	>125%	60 s								
	>150%	20 s								
Overload	>150%	60 s								
Capability(Bypass)	>200%	Immediately								
Surge		300%								
Efficiency (MAX.)	12 V	89%								
	24 V	92%								
	48 V	95%								
Crest factor		3:1								
THD		<3%								
Bypass range	UPS mode	184VAC-264 VAC / 88 VAC-127 VAC				184 VAC- 264VAC				
	GEN mode	173 VAC-276 VAC / 67 VAC-132 VAC				173 VAC- 276 VAC				
	Weak Grid	167 VAC-264 VAC / 80 VAC-127 VAC				167 VAC- 264 VAC				
Zero load power		10W/11W	11W/12W	11W/13W	14W	17W	25W	26W	28W	30W
Zero load power (power save mode)		2.5W	2.5W/3W	2.5W/3W	3.5W	4W	6W	6.5W	7W	7.5W
Overload and overheat protection		auto disconnect with 3 times restart attempt								
Shortcut protection		auto disconnect								

<b>Charger</b>										
Nominal Output Voltage		12 VDC / 24 VDC			12 VDC / 24 VDC / 48 VDC					
Max Output current (A) - adjustable		25 / 15	40 / 20	50 / 25	60 / 30 / 15	90 / 45 / 20	30	90 / 40	50	60
AC Input range		195 VAC - 264 VAC / 93.5 VAC - 126.5 VAC			195 VAC - 264 VAC					
Battery types		AGM / GEL / OPzS / LFP / Flooded / Lead carbon								
Absorption time		variable								
Temperature compensation		-4mV / C / cell								
Slave Charger	12VDC	3-5A float charge(12VDC and 24Vdc model only)				/				
	24VDC									
<b>Other Data</b>										
Transfer time	UPS mode	15ms								
	GEN mode	2 s								
Transfer switch		16 A		31 A		90 A				
Dry contact		Battery low								
Battery connector		M6 x 2				M8 x 2				
AC connector		M3 terminal block			M4 terminal block					
<b>Mechanical Data</b>										
Enclosure		Steel with powder paint								
Dimension (mm) (max)		440×232.5×95			485×265×145			550×285×191.5		
Net Weight (KGs)		10.5	11.65	11.9	18	19.2	21	35	40	46
Cooling		Forced fan								
Protection		IP22					IP20			
<b>Standard</b>										
Safety		EN60950-1								
EMC		EN61000-6-1, EN61000-6-3, EN61000-3-11, EN61000-3-12 EN55014-1, EN55014-2, EN55032, EN55024								
Automotive Directive		/	(E4) ECE R10 (12VDC model only)				/			

# 9. Trouble Shooting

## 9.1 LED indicator on front panel and audible alarm

✓: ON x: OFF

Status	Function	LED on front panel									
		Bypass	Charger	Inverter	Charging	Charged	PS mode	Over temp	Over load	Fault	Audible alarm
Charge Function	Constant current	✓	✓	×	✓	×	×	×	×	×	×
	Constant voltage	✓	✓	×	flash	×	×	×	×	×	×
	Float	✓	✓	×	×	✓	×	×	×	×	×
	Stop charging	✓	×	×	×	×	×	×	×	×	×
	EQ	✓	✓	×	flash	flash	×	×	×	×	×
Inverter	Inverter ON	×	×	✓	×	×	×	×	×	×	×
	Power Save mode	×	×	flash	×	×	✓	×	×	×	×
Alarm Mode	Battery low voltage	×	×	✓	×	×	×	×	×	flash	beep 0.5s every 5s
	Battery overvoltage	×	×	✓	×	×	×	×	×	flash	beep 0.5s every 1s
	Inverter overload	×	×	✓	×	×	×	×	✓	flash	
	Inverter overtemp	×	×	✓	×	×	×	✓	×	flash	
	Bypass overtemp	✓	×	×	×	×	×	✓	×	flash	
	Over charge	✓	flash	×	×	×	×	×	×	flash	
	AEA limited	flash	×	×	×	×	×	×	×	flash	
Protection mode	Fan block	×	×	×	×	×	×	×	×	✓	beep continuously
	Battery overvoltage	×	×	×	✓	×	×	×	×	✓	
	Battery low voltage	×	×	×	×	×	✓	×	×	✓	
	Inverter overload	×	×	×	×	×	×	×	✓	✓	
	overtemp	×	×	×	×	×	×	✓	×	✓	
	Charger fault	✓	×	×	×	×	×	×	×	✓	
	Shortcut	×	×	✓	×	×	×	×	×	✓	beep continuously

## 9.2 LED indicator on Remote

### 9.2.1 Operating status

✓: ON x: OFF

Status	Function	LED on remote panel				
		AC in	Charger	Inverter	Fault	other
Charge Function	Constant current	✓	✓	×	×	
	Constant voltage	✓	✓	×	×	
	Float	✓	✓	×	×	
	EQ	✓	✓	×	×	
Inverter	Inverter ON	×	×	✓	×	
	Power Save mode	×	×	flash	×	
Alarm Mode	Battery low voltage	×	×	✓	flash	
	Battery overvoltage	×	×	✓	flash	
	Inverter overload	×	×	✓	flash	
	Inverter overtemp	×	×	✓	flash	
	Bypass overload	✓	×	×	flash	
	Bypass overtemp	✓	×	×	flash	
	Over charging	✓	flash	×	flash	
Protection mode	AEA limited	flash	/	/	flash	/
	Fan block	×	×	×	✓	
	Battery overvoltage	×	×	×	✓	SOC 100% on
	Battery low voltage	×	×	×	✓	SOC 25% on
	Inverter overload	×	×	×	✓	Load 100% on
	Charger fault	✓	×	×	✓	
Shortcut	×	×	✓	✓		

## 9.2.2 Battery SOC bar

	Battery SOC bar
Status of Charger	from bottom to top representing Bulk, Absorption, 75% SOC, Float (100% SOC)
Status of Inverter	from bottom to top representing 25%-50%-75%-100% battery SOC

## 9.2.3 Load percentage bar

	Load percentage bar
Status of Charger	representing 25%-50%-75%-100% of max preset charging power
Status of Inverter	representing 25%-50%-75%-100% load percentage of inverter

## 9.3 Common failure analysis

Following please find frequent common failure which no maintenance on Energier pro bi-directional inverter was needed.

### 9.3.1 No output first power on

Phenomenon 1 : No output at inverter mode, No alarm.

Reason : Battery low voltage.

Solution : Check battery voltage; Check battery capacity; Check battery LVD setting.

Phenomenon 2 : No output at inverter mode, No alarm, Burn smell.

Reason : DC input reverse polarity.

Solution : Replace PCB.

### 9.3.2 No output during operation

Phenomenon 1 : No output at inverter mode upon load switch on, fault and power saving mode lights illuminate.

Reason : Battery low voltage.

Solution : Check battery voltage; Check battery capacity; Check battery LVD setting.

Phenomenon 2 : No output, long beep, fault and inverter lights illuminate.

Reason : Output shortcut .

Solution : Remove output shortcut.

Phenomenon 3 : No output, fault and charging lights illuminate.

Reason : High DC voltage.

Solution : Check DC voltage .

Phenomenon 4 : No output, fault and overload lights illuminate.

Reason : Overload shutdown.

Solution : Reducing load and switch on again.

Phenomenon 5: No output, fault and overtemp lights illuminate.

Reason : Over temperature shutdown.

Solution : Check if there is good ventilation on installation site; check if fan was blocked.

Phenomenon 6: No output, long beep, fault light illuminate.

Reason : Fan failure/block.

Solution : Check if fan is blocked; check fan wire connection well.

### **9.3.3 No charging delivered**

Reason 1 : AC input wire loose connection.

Solution : Secure the connection.

Reason 2 : Wrong connection of N and PE of AC input.

Solution : Correct the connection.

Reason 3 : Check if using Generator as AC input.

Solution : Change working mode to GEN Mode through dip switch 8 at POWER PCB.

### **9.3.4 Normal mode and Power save mode keep changing over**

Reason 1 : Energier pro bi-directional inverter work in power save mode but the load was fluctuating .

Solution : Change work mode to normal mode.

### **9.3.5 Normal mode or Charger Only mode not working**

Reason 1 : The work mode setting on Energier pro bi-directional inverter and on RCF was different with each other.

Solution : Put main switch at Energier pro bi-directional inverter at OFF, using RCF to set the working mode.

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