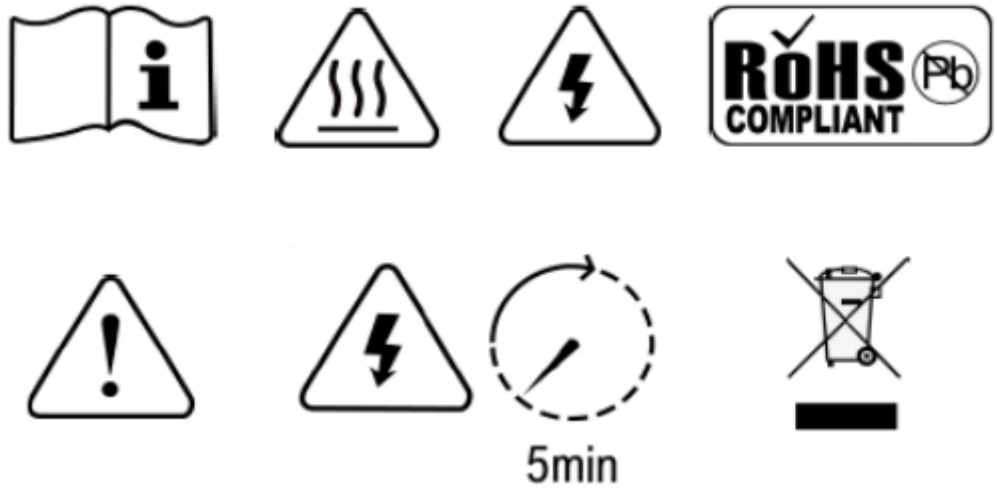
PURSUIT OF PERFECTION

Kinergier Pro Series

Bi-directional inverter

A3.0

TBB POWER Co.,Ltd.
www.tbbpower.com



WARNING: HIGH VOLTAGE INSIDE

CAUTION: THE DC FUSE MUST HAVE BEENTURNED OFF BEFORE SERVICING

MADE IN CHINA

Disclaimer

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- 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

This manual describes our product features and provides procedure of installations. This manual is for anyone intending to install our equipment.

General Instruction

Thanks for choosing our products and this manual were suitable for Kinergier pro bi-directional inverter. This chapter contains important safety and operation instructions. Read and keep this User Guide well for later reference.

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

Please check the input voltage or voltage of battery is same to the nominal input voltage of this inverter.

- Please connect positive terminal “+” of battery to “+” input of the inverter.
- Please connect negative terminal “-” of battery to “-” input of the inverter.
- Please use the shortest cable to connect and ensure the secure connection.
- While connecting, please secure the connection and avoid short cut between positive terminal and negative terminal of battery, which will cause damage of battery.
- Inverter will have high voltage inside. Only authorized electrician can open the case.
- The inverter WAS NOT designed to use in any life retaining equipment.

Contents

1.General Safety Instruction....1
1.1Safety instruction....1
1.2 General precaution....1
1.3 Precaution regarding battery operation....1
2.Instruction....2
2.1 Brief Instruction....2
2.1.1 General Description....2
2.1.2 Naming Rules....2
2.2 Structure....3
2.2.1 Front....3
2.2.2 Control panel....3
2.2.3 Connection compartment....5
2.2.4 Dimension....6
2.3 Function....7
2.3.1 DC Couple and AC Couple system....7
2.3.2 Parallel and Three phase....7
2.3.3 Power control and Power assist....7
2.3.4 System working mode....7
2.3.5 Built in load management....7
2.3.6 Powerful and Reliable Inverter....7
2.3.7 Professional Battery Charger....8
2.3.8 Transfer....10
2.3.9 Protect function....11
2.3.10 Communication....11
3.Installation and Wiring....12
4.Configuration....13
4.1 Check before Operation....13
4.2 Power ON Test....13
4.3 Power OFF....13
4.4 Setup Wizard....14

5. Operation 15
5.1 Menu introduction 15
5.2 Initial interface 16
5.3 Main Menu 16
5.4 Tier one menu - Information query interface 17
5.5 Tier one menu - configuration interface 20
5.5.1 General operation instruction 20
5.5.2 Parameter set 21
5.6 User control 30
5.6.1 ACin Logic 30
5.6.2 Relay function 32
5.6.3 AGS Driver 32
5.6.4 ACout2 Logic 34
5.6.5 Screen Set 34
5.6.6 Date & Time 34
5.6.7 Trigger Command 34
6. FAQ 35
6.1 Error code 35
6.1.1 Inverter Error 35
6.1.2 MPPT Error 36
6.1.3 BMS Error 36
6.2 Warning code 37
6.2.1 Inverter Warning 37
6.2.2 MPPT Warning 38
6.2.3 BMS Warning 39
6.2.4 BGK Warning 39
7. Specification 40

1. General Safety Instruction

1.1 Safety instruction

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

This manual contains information concerning the installation and operation of the Kinergier 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 are out of the manufacturer warranty.

1.2 General precaution

- 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 Kinergier pro bi-directional inverter would be overheating.
- 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.
- Please do not put any inflammable goods near to inverter.
- NEVER place unit directly above batteries, gases from a battery will corrode and damage Kinergier pro bi-directional inverter.
- DO NOT place battery over Kinergier pro bi-directional inverter.

1.3 Precaution regarding battery operation

- Use plenty of fresh water to clean in case battery acid contacts skin, clothing, or eyes and consult with doctor as soon as possible.
- The battery may generate flammable gas during charging. NEVER smoke or allow a spark or flame in vicinity of battery.
- DO NOT put the metal tool on the battery, spark and short circuit might lead to explosion.
- 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. Instruction

2.1 Brief Instruction

2.1.1 General Description

Kinergier Pro is the new generation bi-directional inverter designed for various type of off grid system including AC Couple system, DC Couple system and generator hybrid system. It can provide UPS class switching speed and with capability to support parallel as well as composing three phase system.

Kinergier Pro delivers high reliability, performance and industry leading efficiency for mission critical application. Its distinguishing surge capability makes it capable to power most demanding appliances, such as air conditioner, water pump, washing machine, freezer etc.

With the function of power assist & power control, it can be used to work with a limited AC source such as generator or limited grid. Kinergier Pro can automatically adjust its charging current avoiding grid or generator to be overloaded. In case of temporary peak power appear, it can work as the supplement source to generator or grid.

2.1.2 Naming Rules

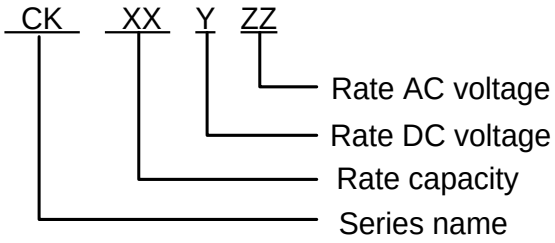


figure	explanation	
CK	series name	
3.0	Represent rate capacity	3000W(30min)
4.0		4000W(30min)
5.0		5000W(30min)
6.0		6000W(30min)
8.0		8000W(30min)
L	Represent rate DC voltage	12VDC
M		24VDC
S		48VDC
LV	Represent rate AC voltage	120VAC
--		230VAC

Naming example **:** CK 8.0S
Kinergier pro bi-directional inverter
Rate capacity **:** 6500W(nom) / 8000W(30min)
Rate dc voltage **:** 48V

2.2 Structure

2.2.1 Front

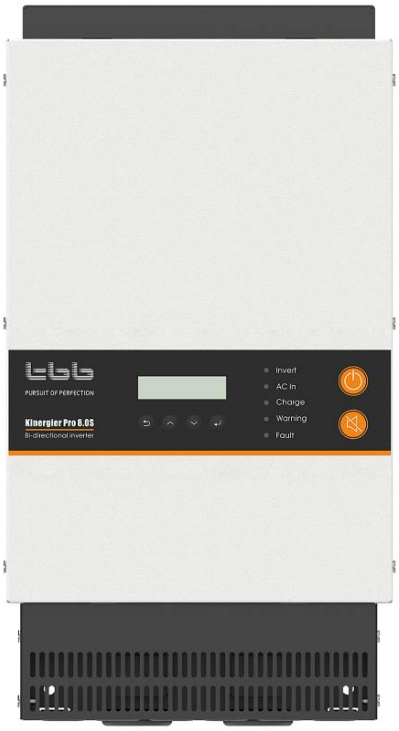


Figure 2-1 Bi-directional inverter structure in front view

2.2.2 Control panel

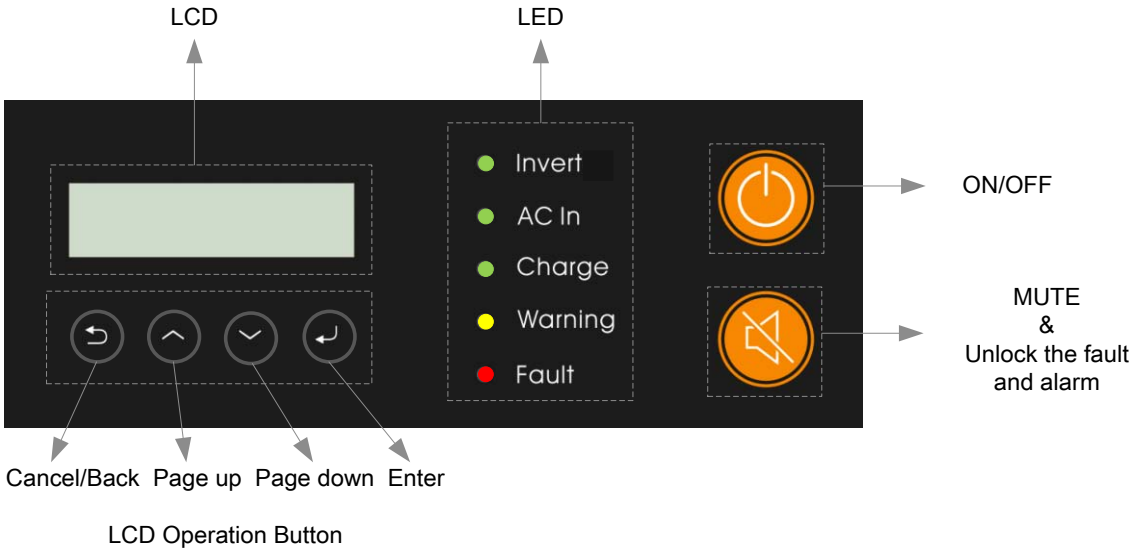


Figure 2-2 Bi-directional inverter Control buttons

Table 2-1 Control Buttons

Button	Function
	➢ Cancel the selection. ➢ Display the previous level of menu.
	➢ Display the previous page. ➢ Increase the value of the selected item. ➢ Press the button for more than 2 seconds to scroll the page up.
	➢ Display the next page. ➢ Decrease the value of the selected item. ➢ Press the button for more than 2 seconds to scroll the page down.
	➢ Enter into this menu, displaying the next level. ➢ Select and confirm the selection of a menu item.

Table 2-2 LED directive function

LED	Function
Invert	➢ It will illuminate when CK is inverting.
AC In	➢ It will flash when CK detect any input, mains or generator.
Charge	➢ It will flash when CK is in float charging. ➢ It will illuminate when CK is in bulk or absorption charging.
Warning	➢ It will flash when CK have warning.
Fault	➢ It will flash when CK have error.

2.2.3 Connection compartment

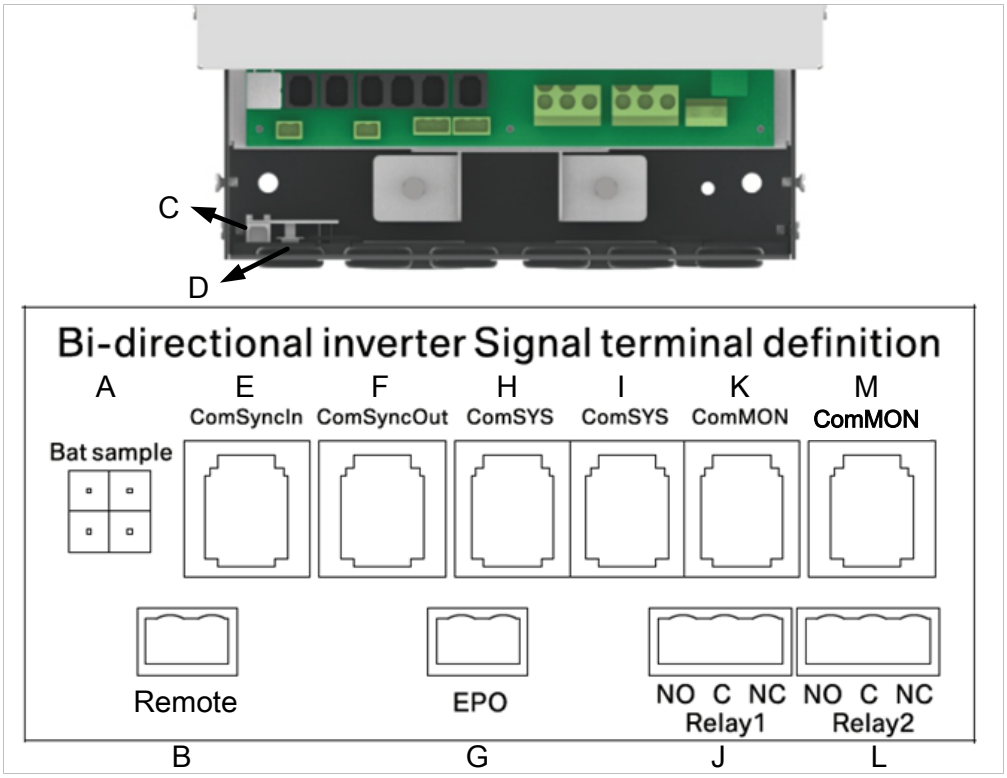


Figure 2-3 Signal terminal

Table 2-3 Signal terminal introduction

No.	Silk-screen	Definition
A	Bat Sample	Battery temperature and voltage sample.
B	Remote	Dry contact input control, remote ON/OFF control.
C	Com MON	Connected to the connector K by default.
D	WCM	connected to the WCM data logging stick.
E	Com Sync In	Parallel synchronous communication input(CAN) .
F	Com Sync Out	Parallel synchronous communication output(CAN) .
G	EPO	Dry contact input control, emergency power off.
H	Com SYS	System communication(RS485), connected to SP or BGK.
I	Com SYS	System communication(RS485), connected to SP or BGK.
J	Relay1 (NO,C,NC)	Dry contact output control 1(NO,C,NC) .
K	Com MON	Connected to connector C by default.
L	Relay2 (NO,C,NC)	Dry contact output control 2(NO,C,NC) .
M	Com MON	RS485 port for external monitor such as MCK, SNMP etc.

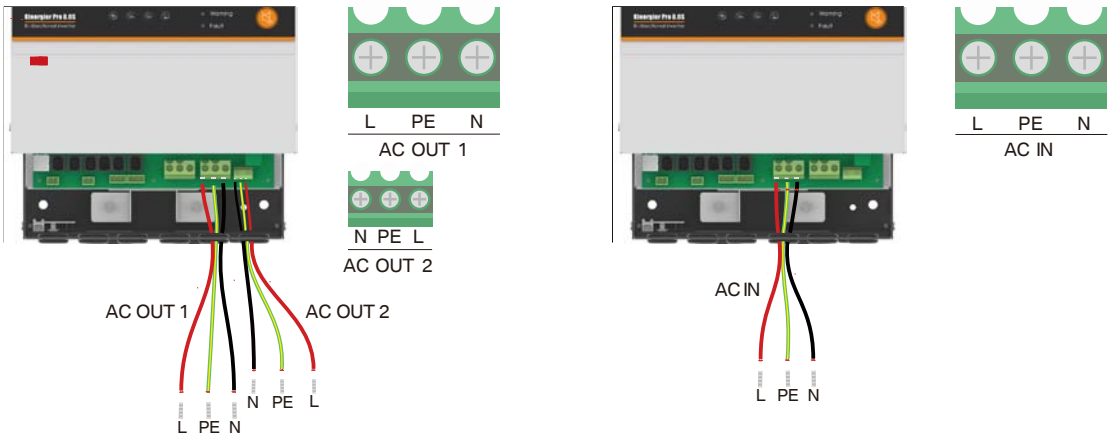


Figure 2-4 Power terminal

2.2.4 Dimension

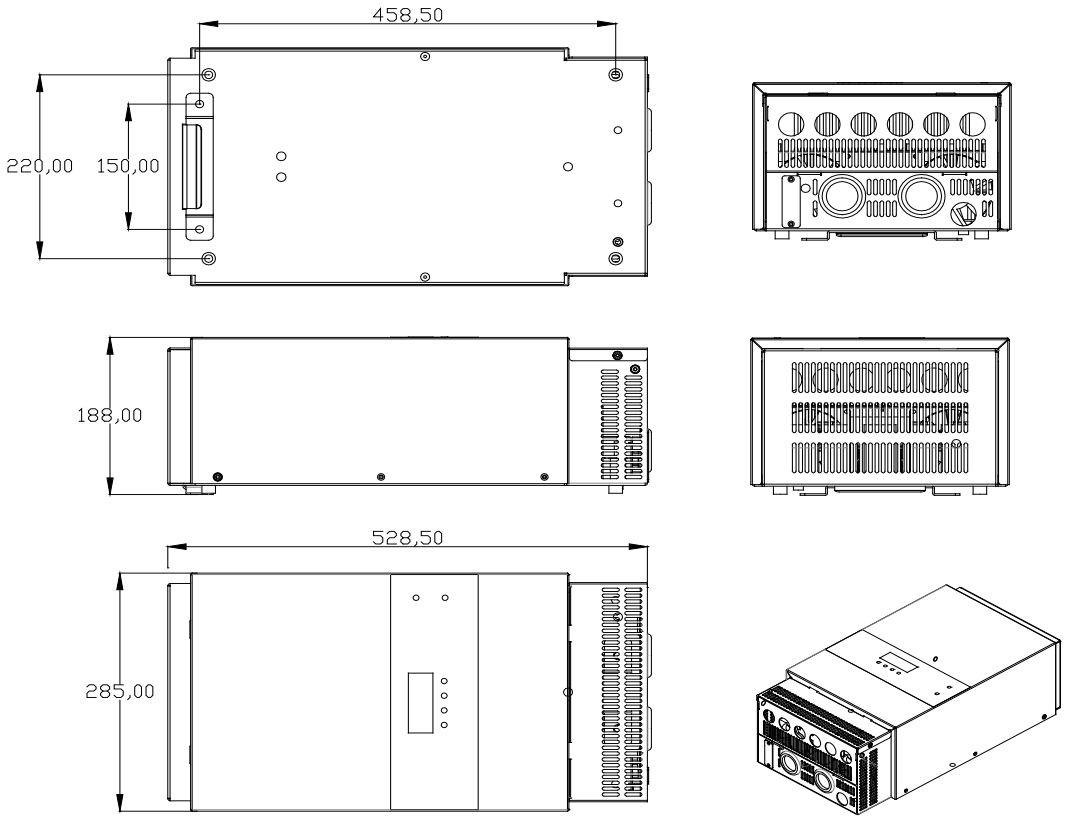


Figure 2-5 Dimension of Bi-directional inverter

(CK4.0M,CK5.0M,CK4.0S,CK5.0S,CK6.0S,CK8.0S)

2.3 Function

2.3.1 DC Couple and AC Couple system

Using Kinergier Pro in together with Solar Max MPPT and PV inverter from TBB Power, you can compose both DC Couple system and AC Couple system. Featuring greater flexibility, AC Couple system can achieve higher system power and is much more suitable for commercial project. Please refer to 5.5.2.1 for explanation in details.

It is recommended to use IG series PV inverter from TBB Power to compose AC Couple system. In case you want to use third party PV inverter, please consult with TBB Power sales.

2.3.2 Parallel and Three phase

Two or more units can be connected in parallel to compose a single-phase parallel system or a three-phase parallel system, which is convenient for system expansion or to construct a micro-grid system. For single phase system, max three units can be connected in parallel. For three phase system, max six units can be connected in together.

2.3.3 Power control and Power assist

Kinergier Pro offers a unique feature of power control & power assist, which is very useful upon you have a limited grid supply or working with generator. Kinergier Pro will take control of energy flow automatically, using extra power to charge the battery or inverting as the supplement to the grid or generator. With this feature, you can avoid tripping of shore power MCB or generator oversize.

2.3.4 System working mode

Kinergier Pro offers powerful functions for user to program for different systems, such as power backup, solar hybrid, ESS, ESS with peak tariff shaving etc. Please refer to chapter 5.6.1 for details.

2.3.5 Built in load management

There are two outputs built in Kinerger Pro. AC output 1 is used to connect critical loads which will be backed up with battery connected. AC OUT2 is the secondary outputs and you can configure it with different function, such as grid only, base on specific time zone or specific battery voltage or SOC. Please refer to chapter 5.6.4 for details.

2.3.6 Powerful and Reliable Inverter

High performance pure sine wave

Kinergier Pro is a pure sine wave inverter generating a near perfect sinusoidal AC wave power output that is very similar or even better to what you can get from your utility grid. Pure sine wave can guarantee the correct function of sensitive equipment (computer, laser printer, TV etc.). Also, your home appliances will work smoother, cooler and more efficient, such as fridge, microwave and power tools.

High surge power capability

Provided with outstanding surge power capability and low frequency transformer, Kinergier Pro is suitable for heavy inductive load like fridge, coffee maker, microwave, power tools, air conditioner etc.

Battery low voltage protect

Kinergier Pro provides configurable battery low voltage protection.

2.3.7 Professional Battery Charger

Multi stage sophisticated charging algorithm for lead acid battery

Fitted with multistage charging algorithm (bulk-absorption-float-recycle), the built-in charger of Kinergier Pro is designed to charge battery quickly and fully. Microprocessor controlled charging algorithm with variable absorption charging timer could guarantee the optimal charging for batteries of different discharged state.

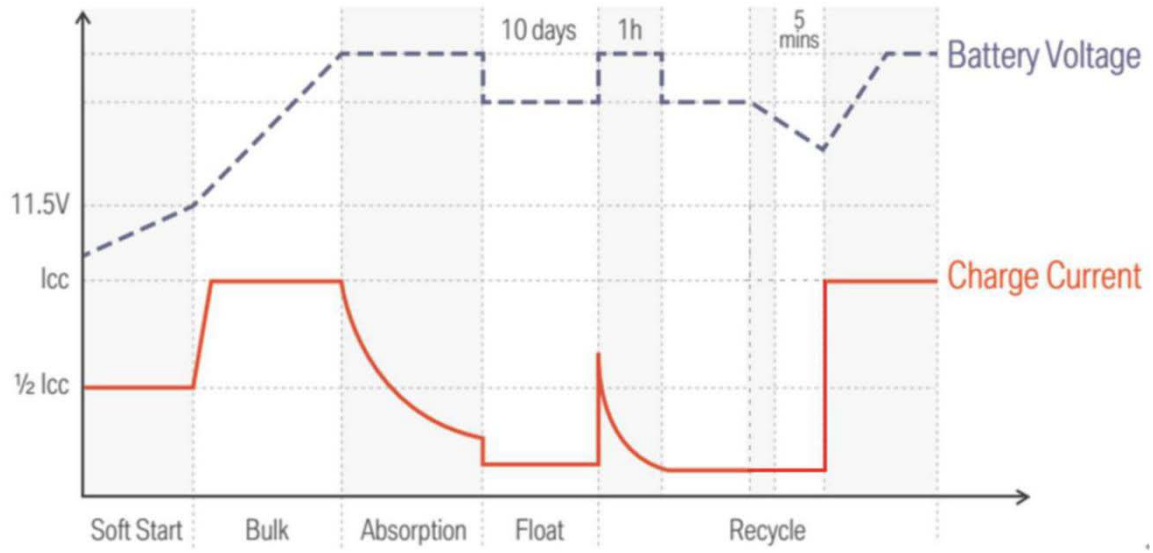


Figure 2-6 Multi stage sophisticated charging algorithm for lead acid battery

Float charging and recycle charging program guarantee your battery getting proper maintenance in case of long time connected and less aging in case of long time connected with no use.

Battery Sample Cable (Temperature and voltage)

Battery temperature is a key factor in correct charging for lead acid battery, 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℃-25℃.

The Bat sample cable (battery temperature and voltage sensor) supplied with Kinergier Pro measures the temperature of battery and automatically makes adjustments at real time to properly charge your batteries at compensation rate of – 4mV/℃/cell. In case of Bat sample cable is not present, Kinergier Pro will use 25℃ as default setting. This feature is especially recommended for sealed batteries and/or when important fluctuations of battery temperature are expected.

Multi battery chemical available

Kinergier Pro offers premium charging algorithm for commonly encountered lead acid battery chemicals include AGM, GEL, Flooded, lead-carbon and Lithium battery, of which you can set through LCD interface and TBB Link software.

Lithium Battery Compatible

Kinergier Pro has built in communication compatible with for Super L lithium battery from TBB.

Manual Equalization

It is strongly recommended to read this section carefully before you start the EQ charging and Don't leave battery unattended while performing desulfuration.

Always check if your battery supplier recommended EQ charging. Only start when it is suitable.

If battery type was set at AGM, GEL or Lead-Carbon , this charging profile can't be triggered on.

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 battery. To improve the life and performance of flooded battery, Kinergier Pro includes a manual equalization program that can be used, if recommended by battery manufacturer. You can initiate the desulfuration program manually. Once you trigger on the equalization program, Kinergier Pro will perform equalization charging.

After 30 minutes, it will quit EQ and enter into float charge.

- Check electrolyte level and refill battery with distilled water if necessary.
- If you want to come to normal charging, you need stop equalization charging and switch off the unit.
- Switch on the unit again, then you will have your equipment back to normal charging.

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: As a protection, equalization charging can be performed if and Only if you set the battery to be traction, Flooded /OPzS batteries. If you choose AGM, GEL or Lead-Carbon, EQ charging can't be performed.

2.3.8 Transfer

Uninterrupted AC power

In case of voltage/frequency/waveform of AC input match the minimum quality, the voltage will be switched directly to AC output. Kinergier pro bi-directional inverter will work as a battery charger and load will be powered by AC input. You will have at the output the same voltage as AC input.

In case of AC input failure or exceeding the maximum AC input current set by the user, Kinergier pro bi-directional inverter will initiate a quick switching to inverter, of which will guarantee an undisturbed power. Upon AC input resume or match the quality, it will switch back again. Due to its ultra quick transfer design, as quick as 0ms, Kinergier pro bi-directional inverter could be used as an UPS.

Ground Relay

The neutral output of Kinergier pro bi-directional inverter is automatically connected to earth upon no external AC sources is available. Once external AC sources present, the ground relay will open. You can disable this feature through TBB Link.

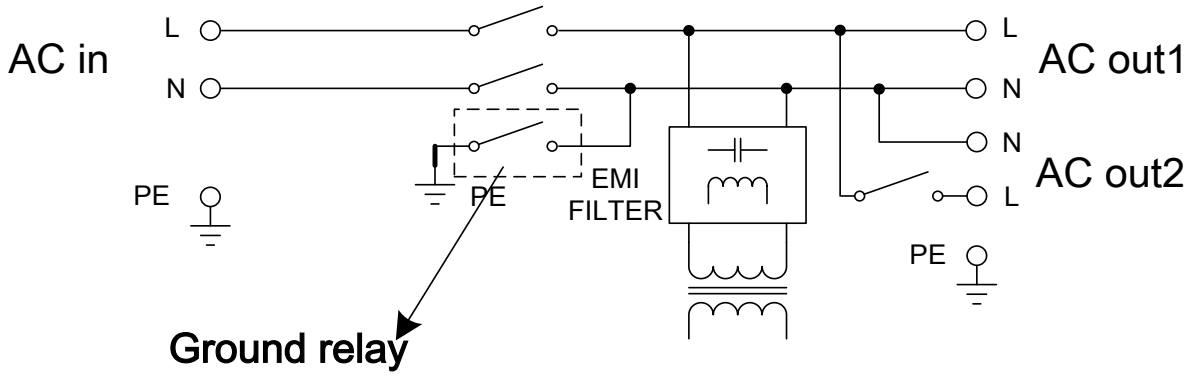


Figure 2-7 Ground Relay Schematic

2.3.9 Protect function

The Kinergier pro bi-directional inverter is equipped with a series of complete hardware and software protection functions to ensure its stable and reliable operation.

Overload protection

When overload protection is trigger on, it will restart automatically after 60s. And after three consecutive overload shutdown protections, the equipment will not restart automatically. At this time, the user needs to manually restart.

Over temperature protection

When the internal temperature is too high, Kinergier Pro will enter into the over-temperature protection. After the internal temperature returns to normal, it can automatically resume normal operation.

Short circuit protection

The equipment will automatically shut down when the AC output is shorted and needs to be manually activated.

Battery over temperature protection

During the charging, the equipment will continuously monitor the battery temperature. When the battery temperature is too high, the equipment will automatically reduce the charging current. When the battery is severely heated, the charger will automatically turn off to protect the battery.

Battery low voltage protection

To prevent the permanent damage caused by the over discharge of battery, the equipment will automatically cut off the output according to the low voltage protection point set by the user.

2.3.10 Communication

Dry contact input

Kinergier Pro is equipped with two dry contacts input for remote on/off and EPO control.

Dry contact output

Kinergier Pro is equipped with two NO/NC relay type dry contact output, the user can set specific functions through the LCD. Following is the default setting.

- Relay1: The relay is closed when the battery is under voltage.
- Relya2: The relay is closed when a fault or overload occurs.

RS485

Equipped with two RS485 interfaces.

CAN

Equipped with a CAN interface.

3. Installation and Wiring

Please refer to "Quick Installation Guide".

Keep away from fire, avoid direct sunlight and rain; do not store flammable, explosive or corrosive gases or liquids in the working environment. Don't install in a working environment with metal conductive dust.

- Please install the equipment in a location of dry, clean, cool with good ventilation.
- Operating temperature: -20～65℃
- Storage temperature: -40～70℃
- Cooling: Force fan
- Relative humidity in operation: 95% without condensation.

4. Configuration

4.1 Check before Operation

Please check before Operation according to the following.

- Inverter is installed correctly and steady.
- Reasonable cable layout to meet customer requirements.
- Make sure the grounding is reliable.
- Make sure the ground wire is properly connected and firm and reliable.
- Double check the battery breaker is OFF.
- Make sure the cables are properly connected and firm and reliable.
- Reasonable installation space, clean and tidy environment, no construction residue.

4.2 Power ON Test

Make sure the battery voltage is within the permissible range before turning ON the breaker.

Please follow the following instruction step by step.

- Step 1: Turn on the circuit breaker between the battery and the inverter.
- Step 2: Press the On/Off button to turn on the inverter entering into self diagnostic.
- Step 3: Set the parameters following the setup wizard.
- Step 4: Press the On/Off button Again to turn on the inverter.
- Step 5: Observe the LED light to make sure the inverter is running normally.

  (refer to Tab 2-2 LED directive function)

4.3 Power OFF

After the inverter is power OFF, there is still residual power and heat in the chassis, which may lead to electric shock or burn. Therefore, after the MPPT charger is powered off for 5 minutes, you should wear protective gloves before removed the MPPT charger.

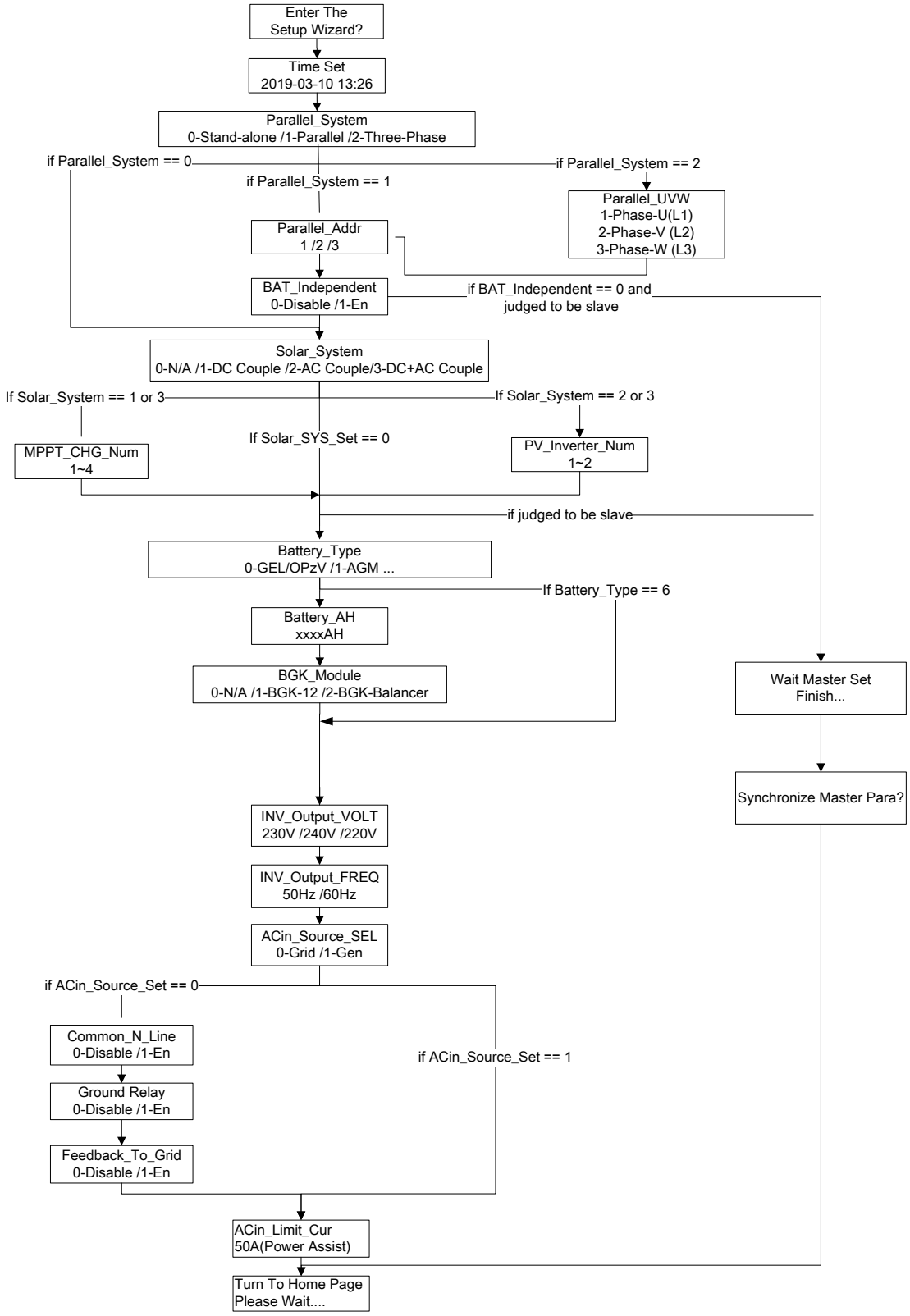
- Method 1:Press the On/Off button about 2secs to turn off the output of inverter. Afterwards, you can press and hold the On/Off for 5secs, after hearing consecutive beep, you can permanently shut down the inverter.

- Method 2:Press and hold the On/Off for 5secs, after hearing consecutive beep, you can permanently shut down the inverter straight away.

4.4 Setup Wizard

For the purpose of a quick configuration, upon turning on Kinergier Pro for first time or after restoring the factory settings, the equipment will enter into the setup wizard automatically covering all basic setting you need to perform.

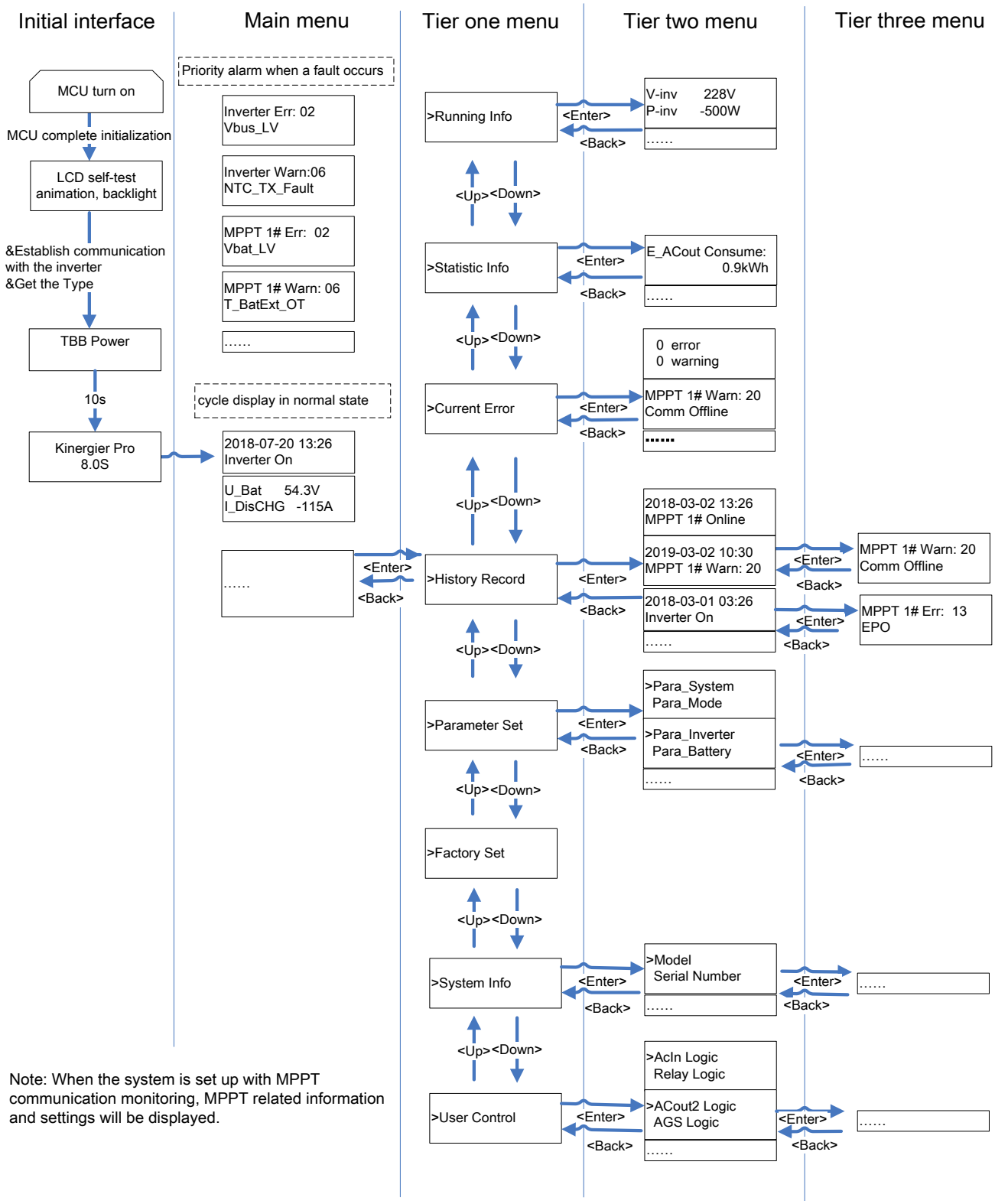
Please refer to 5.5.2 for detail explanation for each parameter.



5. Operation

5.1 Menu introduction

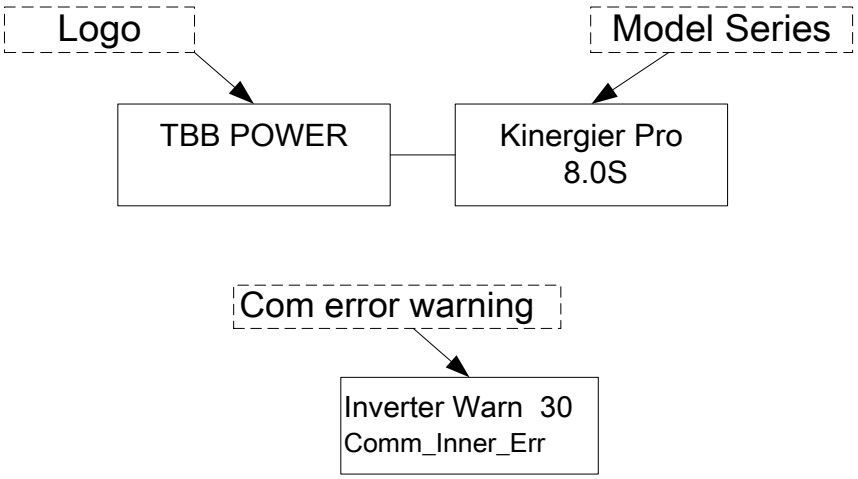
There will be Main menu and Three tiers of menu on LCD showing all active parameters and alarm and for you to configure all parameter of Kinergier Pro as well.



Note: When the system is set up with MPPT communication monitoring, MPPT related information and settings will be displayed.

5.2 Initial interface

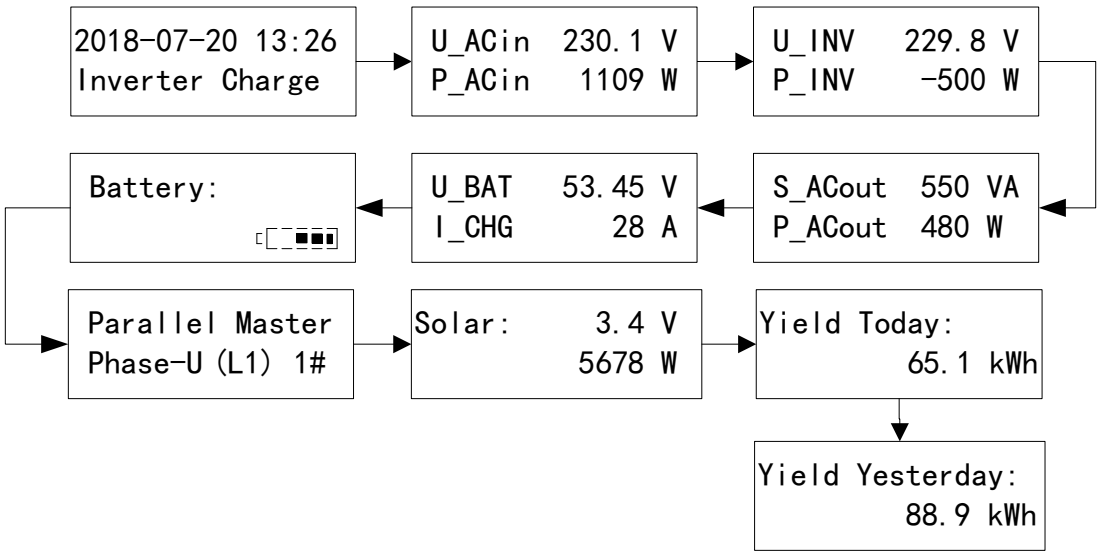
Once powering on, following screen will be showed displaying manufacturer name and model number. In case of communication failure between LCD and inverter, there will be alarm displayed as well.



5.3 Main Menu

The LCD main menu is a real-time information interface displaying data of the equipment. The default interval time is 5S, and the time can be set manually. When press <UP> and <Down> to turn pages, it will stay on chose page for 30S and the time can be set manually.

In the parallel system or three phase system with the common battery pack, the battery's parameter only display on the master inverter.

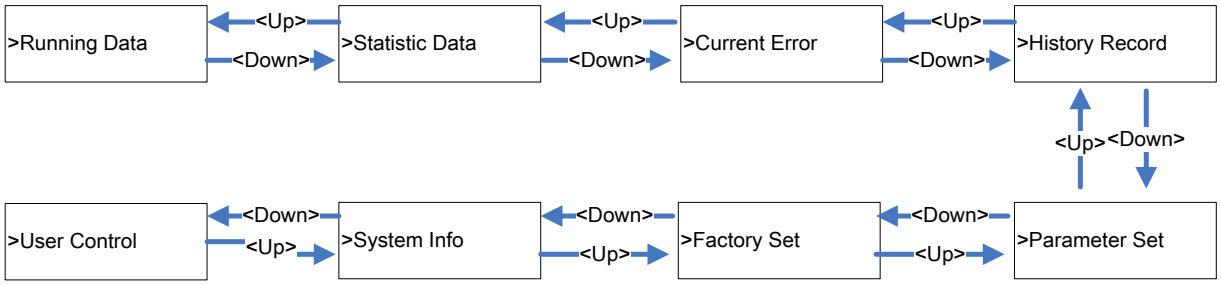


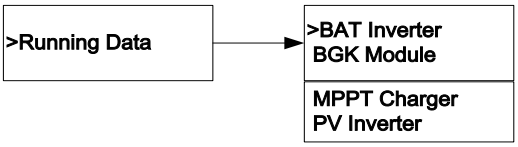
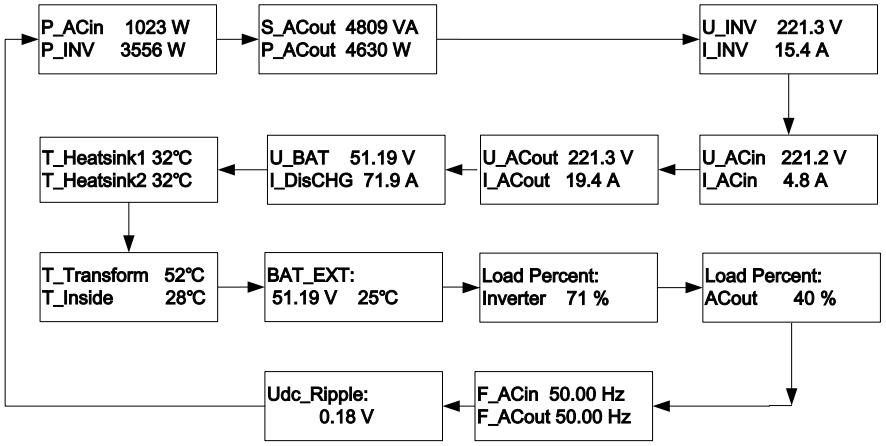
5.4 Tier one menu - Information query interface

After pressing <Enter> button, you will approach Tier One Menu. At specific screen along scrolling, after pressing <Enter> button, you can enter into Tier Two Menu and Tier Three Menu. Pressing <Back> button, you can return to previous menu.

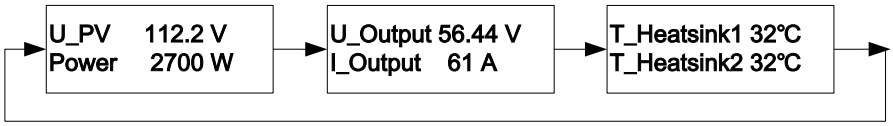
Among Tier one menu, there are three categories: information query, configuration and control.

Tier one menu

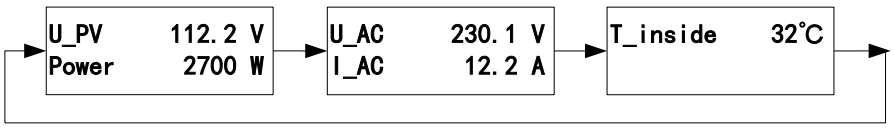


>Running Data	Select **Running Data** page, pressing <Enter> button you can approach all the active running data of Kinergier Pro. Upon other equipment was linked together, such as IG PV inverter, Solar Mate MPPT or Battery Guard BGK module, you can read the data through this screen as well.  After selecting **BAT Inverter**, pressing <Enter> button you can approach all the active running data of Kinergier Pro inverter. Through pressing <UP> and <Down> button, you can go through the current data of Kinergier Pro inverter. 

Select **MPPT**, pressing <Enter> button you can approach all the active running data of Solar Mate MPPT. Please notice, this data will be only available upon you install Solar Mate MPPT from TBB Power.

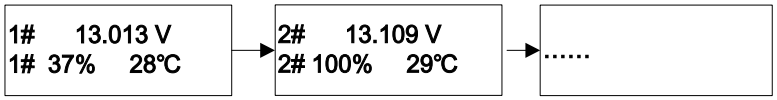


Select **PV inverter**, pressing <Enter> button you can approach all the active running data of IG PV inverter. Please notice, this data will be only available upon you install IG PV inverter from TBB Power.

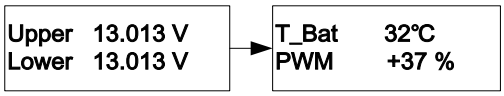


Select **BGK**, pressing <Enter> button you can approach all the active running data of BGK battery guard. Through pressing <UP> and <Down> button, you can go through the current data for each battery cell and the working status of each BGK module.

BGK-12

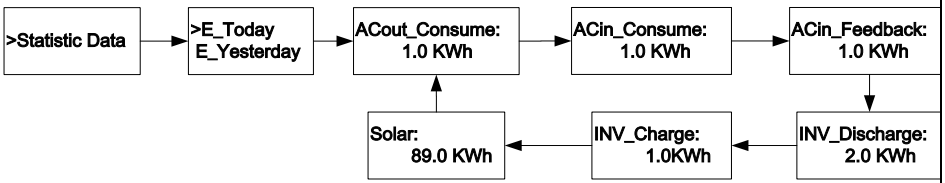


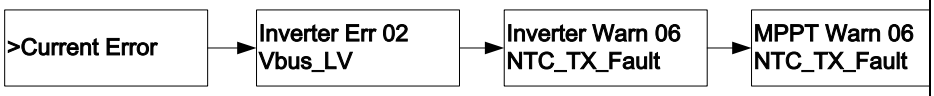
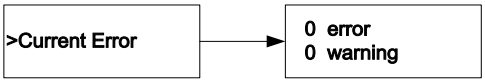
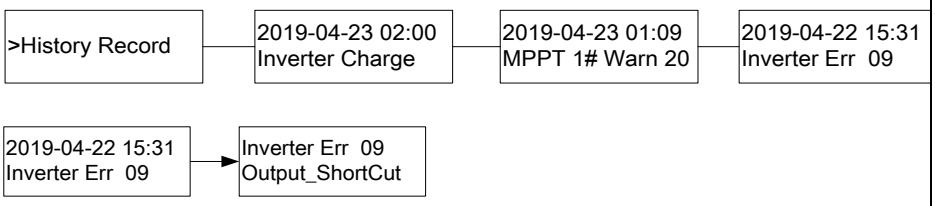
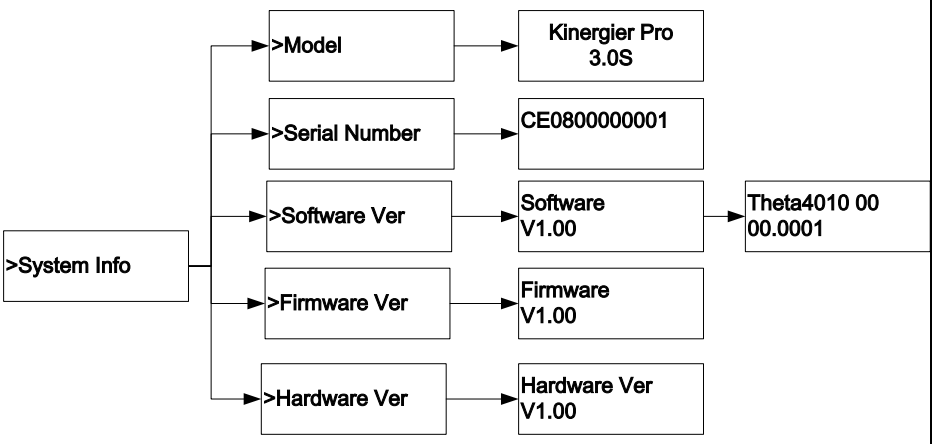
BGK-Balancer:



>Statistic Data

Entering into this page, you can check the statistic data of today and yesterday, including consumption KWh, AC charging KWh, PV Charging KWh, Battery Charging/Discharging KWh etc. In the parallel system or three phase system with the common battery pack, the battery's parameter only display on the master inverter.



>Current Error	Entering into this page, you can check the active alarm and error. Press <UP> and <Down> to scroll through the pages. For details explanation of error code, please refer to Chapter 6.  Displayed when there is no fault: 
>History Record	Entering into this page, through pressing <UP> and <Down> button, you can review the history record including event and alarm. Holding the <UP> and <Down>, it will enter into auto scroll. If you want to check details for specific alarm, you can press <Enter> 
>System Info	Entering into this page, you can check the manufacturing data this Kinergier Pro inverter including serial number, software version, firmware version etc. 

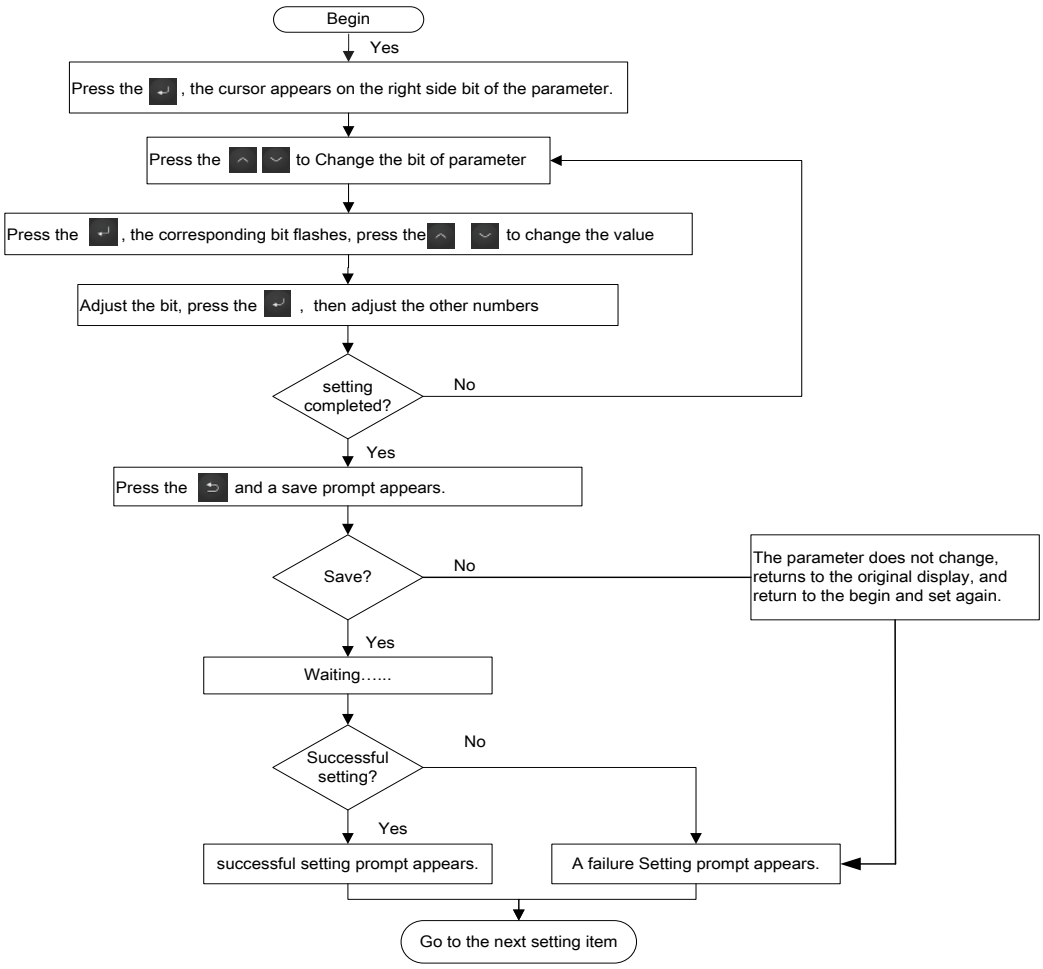
5.5 Tier one menu - configuration interface

5.5.1 General operation instruction

Kinergier Pro offers unlimited possibility for users to program the inverter and system for different configurations, systems and applications. The configuration can be done by combination of four switches on front panel or through TBB Link software supplied by TBB Power.

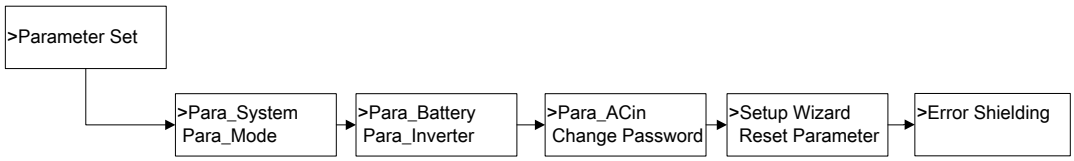
Following chapters explain how to configure the parameters through combination of switches.

- Scrolling to the “Parameter Set” screen and press “Enter” to confirm.
- This menu was protected by password. The default pass word is “1000” and it can be changed by client.
- Choose the screen of parameter you want to set.
- Combined four buttons, you can achieve all configurations of this chapter. Please find following the function of each button during configuration.
  1. Press <UP> and <DOWN> button to choose specific number you want to program.
  2. Press <Enter> button to activate the entering.
  3. Press <UP> and <Down> button to choose digit you want to put.
  4. Press <Enter> button to confirm this digit.
  5. After entering into all four digit, please press <Back> button and <Enter> button to confirm.



5.5.2 Parameter set

A password is required to enter the parameter setting interface. The default is '1000' and it can be changed. This menu contains the following settings submenus:



5.5.2.1 Para_System – system parameter setting

There are total three sub-menus which are **Parallel_System, Solar_System and BMS_System**

"Parallel System" submenu offers you all the parameters you need to configure upon you are using Kinergier Pro to compose a single phase parallel system or three phase systems.

- Upon composing a single phase system, max three units of Kinergier Pro can be connected together.
- Upon composing a three phase system, max six units of Kinergier Pro can be connected together with two units on each phase.

Parallel_System:

	Item	Setting range	Description
Parallel System	Parallel_Syetem	0-Stand-alone 1-Parallel 2-Three-phase	Set the unit's in stand alone or parallel or three phase system. **Defaul**:0-Stand-alone
	Parallel_UVW	1-U(L1) 2-V(L2) 3-W(L3)	Set the unit's phase **Default**:1-U(L1)
	Parallel_Address	Parallel system:1~3 Three phase system:1~2	Can not set in Stand alone system. **Default**:1
	BAT_Independent	0- Disable(Common battery pack System) 1- Enable(Independent battery pack system)	Not applicable to AC Couple system and Stand-alone. **Default**: 0- Disable
	Redundant_Mode	0- Disable 1- Enable	This function is designed for Power backup system ONLY. After enabling this function, once the master inverter fail for a parallel system, a new master inverter will be appointed without system failure. **Default:** 0- Disable

Solar System submenu offers the approach to compose DC Couple or AC Couple systems using Kinergier pro.

- Upon composing the DC Couple system, all the parameter you configured with Kinergier Pro will be updated automatically with Solar Mate MPPT.
- For parallel system, only Master unit need to be configured.

Solar System:

	Item	Setting range	Description
Solar System	Solar_System	0-N/A 1-DC Couple 2-AC Couple 3-DC+AC Couple	Select Solar system you are intending to compose. DC Couple: using Solar mate series MPPT Charger. AC Couple: using IG seriesPV Inverter **Default:**0-N/A
	MPPT_CHG_Num	1~4	Number of Solar Mate MPPT connected.(only applicable for DC Couple system) **Default:**1
	PV_Inverter_Num	1~2	Number of IG PV inverter connected. (only applicable for AC Couple system) **Default:**1
	Drop Start Freq	50.1~51.0Hz (@50Hz) 60.1~61.0Hz (@60Hz)	Drop Start Freq： When frequency reaches this set value, PV inverter starts to derate. **Default**: 50.8Hz
	Drop Stop Freq	51.1~53.5Hz (@50Hz) 61.1~63.5Hz (@60Hz)	Drop Stop Freq: When frequency reaches this set value, PV inverter derates to the minimum power. **Default**: 53.0Hz
	Disconnect Freq	51.5~54.5Hz (@50Hz) 61.5~64.5Hz (@60Hz)	Disconnect Freq: When frequency reaches this set value, PV inverter has no output. **Default**: 54.1Hz

BGK System submenu offers the approach to compose the BGK parameter.

- In case you choose relevant BGK you installed, Kinergier Pro will trigger on function of BGK.
- For battery bank composed by 2Vdc cell, you need BGK Master and BGK-02.

BGK_System:

	Item	Setting range	Description
BGK_System	BGK_Module	0-N/A 1-BGK-12 2-BGK-Balancer	For 24Vdc system, please set 2. For 48Vdc system, please set 1. **Default**: 0-N/A
	BGK_Restart	Trigger BGK Restart	The BGK-12's address can be reset.

5.5.2.2 Para_Mode

Para_Mode:

	Item	Setting range	Description
Para_Mode	Common_N_Line	0-Disable 1-Enable	Input and output Neutral line setting. Disable: The input and output Neutral lines are isolated. – normally used for Grid connection Enable: Input and output Neutral lines are connected. – normally used for Generator connection **Default**: 0-Disable
	Ground_Relay	0-Disable 1-Enable	The neutral output of inverter is automatically connected to earth upon no external AC sources is available. Disable: Neutral grounding is disable Enable: Neutral grounding is disable **Default**: 1-Enable
	Bypass_Supply_EN	0-Disable 1-Enable	Allow bypass to power the load in case inverter failure or battery reach underdischarged. Disable: Bypass output is disable Enable: Bypass output is enable **Default**:1-Enable
	Silent_Mode_EN	0-Disable 1-Enable	To mute the inverter buzzer sound upon inverter runs fault or alarm. Disable: Buzzer silent mode is disable Enable: Buzzer silent mode is enable **Default**: 0-Disable
	N2G_U_DET_EN	0-Disable 1-Enable	Voltage detection between Netrual and Ground. Disable: Disable the voltage detection Enable: Enable the voltage detection

			Default:1-Enable
		 With this function enabled, it can be used to detec reverse polarity of L and N input. Or, it can be used to detect if there is propergrounding of your grid input. Upon input reverse polarity or bad grounding, an alarm will be triggered on at inverter.	
	Main_Switch_SEL	0-Default 1-Mobile 2-REGO System	Main Switch Control Mode Default: Inverter will controlled through membrane switch at front panel. Mobile : It is designed for mobile application. An external remote panel MCK can be purchased from TBB Power to control the inverter working either at normal mode or charger only mode. REGO : It is designed for REGO system.Inverter can be controlled by communication in the REGO System. **Default**: 0-Default
	EPO_Function_EN	0-Disable 1-Enable	Whenther EPO Function is Enable Disable: Disable the EPO Funciton Enable: External signal will turn off the inverter, displaying fault by LED and LCD. **Default**: 1-Enable
	Remote_Ctrl_ EN	0-Disable 1-Enable	Whether or not allowing remote console (such as the APP or PC) to set parameters. Disable: Remote Ctrl mode is disable. Enable: Remote Ctrl mode is enable. **Default**: 1-Enable
	IDC_Optimize_EN	0-Disable 1-Enable	Optimize the charge current, reduce the current ripple. **Default**: 1-Enable

5.5.2.3 Para_Battery

With this menu, you can configure comprehensive parameters related with battery and battery charging. There are three sub menu which is **Basic Set, Advanced Set** and **EQ Control and Setting** which are only applicable for flooded and traction battery.

Basic Set

	Item	Setting range	Description
Basic Setting	Battery_Type	Five different type of lead acid battery and one lithium battery, as well as a customerized battery type.	Set the following Battery Type chart. **Default**: 0-GEL/ OPzV
	Battery_AH	50~5000AH	Set the battery capacity (not applicable with TBB SUPER-L lithium battery) **Default**: 200AH

Battery type Description

No	Battery Type	Absorption Charging Voltage	Float Charging Voltage	Charge rate	Max allowed Charge rate	EQ charging voltage
		Default	Default	Default		
0	GEL/OpzV	14.1V	13.7V	0.15C	0.25C	N/A
1	AGM	14.4V	13.5V	0.15C	0.25C	N/A
2	Lead-Carbon	14.1V	13.5V	0.2C	0.5C	N/A
3	Flooded	14.7V	13.5V	0.15C	0.25C	Enable (15.5V)
4	Traction	15.2V	13.5V	0.15C	0.25C	Enable (16.2V)
5	Customerize	14.2V (12/24V Sys) 13.5V (48V Sys)	13.5V (12/24V Sys) 13.3V (48V Sys)	0.2C	0.5C	N/A
6	TBB SUPER-L Only applicable for 48Vdc	BMS taking control of charging parameter (CAN)				

Advanced Set

The following parameter is being referred to 12Vdc battery. In case you are using 2Vdc battery to compose the battery bank, please multiply your intended voltage by 6 to enter into each value.

	Item	Setting range	Description
Advanced set	SYS_CHG_MaxCur	5~900A	Battery bank allowed maximum charging current. Note: there is default current according to the battery type and size you chose, and it can be adjusted as well.
	U_Absorp_CHG	This value is affected when changing the battery type.	The abosorption charging voltage (voltage mentioned here is refer to 12Vdc battery) Note: This value is affected when changing the battery type.
	U_Float_CHG	This value is affected when changing the battery type.	The float charging voltage (voltage mentioned here is refer to 12Vdc battery) Note: This value is affected when changing the battery type.
	LV_PRO_Recover	11.0~14.0V	Undervoltage protection recovery value. (voltage mentioned here is refer to 12Vdc battery) **Default**: 13.0V
	BAT_LV_WARN	10.0~13.0V	Undervoltage warning for single battery. (voltage mentioned here is refer to 12Vdc battery) **Default**: 11V
	BAT_LV_Protect	9.5~12.0V	Undervoltage protection for single battery. (voltage mentioned here is refer to 12Vdc battery) **Default**: 10.5V
	U_DisCHG_End	9V~11V max	Ultimate undervoltage protection for single-cell battery. (voltage mentioned here is refer to 12Vdc battery) Note: the status consumption power will be 0mA once trigger on this protection.With Solar Mate MPPT, inverter can be trigger on automatically upon sun resume next day. **Default**: 9.9V
	Min_Bulk_Time	10~600min	Minimum Bulk time. **Default**: 30min
	Max_Absorp_Time	1~120h	Maximum absorption time. Note: the allowed max time varies

			according to battery type selected. **Default**: 8h
	Auto_CHG_Cycle	8~2400h	Absorption cycle time. **Default**: 240h
	CHG_T_Compensate	0-Disable 1-Enable	Enable the charging temperature compensation. **Default**: 1-Enable
	CHG_TEMP_Coef	0~-30mV/℃	Charging temperature compensation coefficient. (voltage mentioned here is refer to 12Vdc battery) **Default**: -18mV/℃
	BAT_OT_WARN_Gate	25~65℃	Battery over temperature warn gate **Default**: 55℃
	SOC_Low_Warning	15~90%	Can be set in TBB SUPER-L mode, the inverter warning when the SOC under the setting value **Default**: 15%
	SOC_Low_Protect	3~50%	Can be set in TBB SUPER-L mode, the inverter warning when the SOC under the setting value **Default**: 5%
	SOC_CHG_Enough	30~99%	Can be set in TBB SUPER-L mode, the inverter will stop charging once reaching this value and will switch to inverter mode. **Default**: 80%

EQ Ctrl_Set

	Item	Setting range	Description
EQ Ctrl_Set	EQ_Command	0-OFF 1-ON	EQ charging Switch Through choose 1, you can turn on the EQ charging and it will auomaticlaly quit after performing the EQ charging. it can be manually shut down at any time after choose 0. **Default**: 0-OFF
	EQ_Voltage	15.5~16.3V	User can change the EQ voltage for flooded and traction battery. **Default**: 15.5V(Flooded) 16.2V(Traction)
	EQ_Sustain_Time	30~90min	User can change the EQ timer for flooded and traction battery. **Default**: 30min

5.5.2.4 Para_Inverter

Para_Inverter:

You can configure the output of inverter through this menu.

	Item	Setting range	Description
Para_Inverter	INV_Output_Volt	200~240V	Inverter output voltage RMS. **Default**: 230V
	INV_Output_FREQ	50/60Hz	Rated AC frequency. **Default**: 50Hz
	Search_Load_Mode	0-Disable 1-Enable	Enable the search mode. This function is only applicable for 12Vdc model. **Default :** 0-Disable
	Search_Load_Gate	25-500W	The threshold power value entering into power save mode. This function is only applicable for 12Vdc model. **Default**: 80W

5.5.2.5 Para_ACin:

Through this menu, you can configure the input range and nature of to this inverter.

	Item	Setting range	Description
Para_ACin	ACin_Source_SEL	0-Grid 1-Generator	Select the ACin Source. When “1-Generator” is selected, the parameter “Common N” is Enable and “GND connect “is Disable. **Default**: 0-Grid
	ACin_U_Max	240~265V @230Vac 240~280V @120Vac	Maximum AC in input voltage Eg:240~280V @120Vac means the actual value is 120~140V **Default**: 265V
	ACin_U_Min	145~200V @230Vac 160~220V @120Vac	Minimum AC in input voltage Eg:160~220V @120Vac means the actual value is 80~110V **Default**: 175V
	ACin_F_Max	51~55Hz @50Hz 61~65Hz @60Hz	Maximum AC in input frequency **Default**: 55Hz
	ACin_F_Min	42~49Hz @50Hz 52~59Hz @60Hz	Minimum AC in input frequency **Default**: 45Hz
	Harmonic_Adapt	0-Normal 1-Weak AC Input	AC input harmonic adaptation mode. Note: When the AC in input harmonic is too large and the inverter cannot track its phase, select 1 to enable the inverter a greater

			chance to track the phase of the AC input. Please refer to specification for transfer time after this setting. **Default**: 0-Normal
	ACin_Limit_Cur (PowerAssist)	5~50A	The maximum current allowed for AC in input. Note:Once set up, the inverter will use only extra power to charge the battery. And, upon the input current of ACin reaches this set value, the excess energy required by the load will be taken from the battery. **Default**: 50A
Para_ACin	AC_Connect_Delay	10~1800s	Time delay upon detected qualified grid. **Default**: 20s
	Feedback_To_Grid	0-Disable 1-Enable	Whether allowing energy to feed back into grid. **Default**: 0-Disable
	Feedback_MaxCur	0~50A	Maximum current allowed to feed back to Grid. **Default**:40A
	Feedback_Delay	0~1800s	Time delay of energy feed back upon detected qualified grid. **Default**: 0s

5.5.2.6 Change Password

Through this menu, you can change the password.

5.5.2.7 Setup Wizard

Setup wizard is a quick configuration process for all basic setup. Please refer to chapter 4.4 for detail.

5.5.2.8 Reset Parameter

With this menu, you can restore the factory setting of Kinergier Pro inverter.

5.5.2.9 Error Shielding

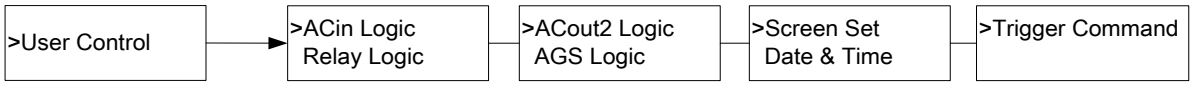
With this menu, you can shield some alarm which you do not bother to see.

	Item	Setting range	Description
Error Shielding	ACin_LV Warn	0-Display 1-Shield	Whether shield the ACin_LV Warning. For UPS application, it recommend to enable this alarm. **Default:** 1-Shield
	MPPT Offline	0-Display 1-Shield	Whether shield the Solar Mate MPPT offline Warning. **Default:** 0-Display
	PV_INV Offline	0-Display 1-Shield	Whether shield the IG PV inverter offline Warning. **Default:** 1-Shield

5.6 User control

Using this menu, user can configure some working logic of this Kinergier Pro inverter. This feature is only being applicable for Master unit.

- System working logic
- AC output 2 logic
- Output relay logic
- AGS logic

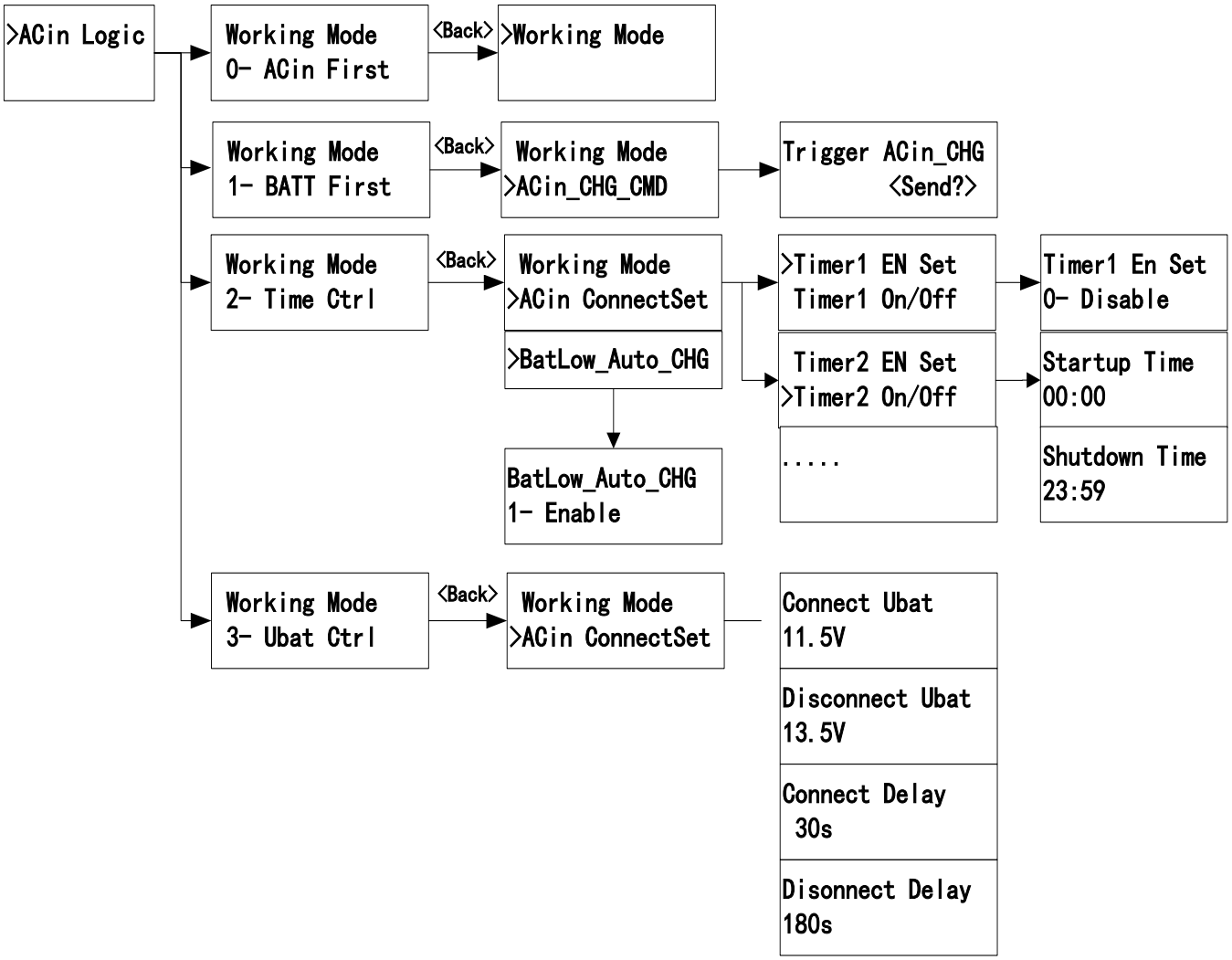


5.6.1 ACin Logic

With this menu, you could set up the working logic of Kinergier pro working at different application.

Item	Setting range	Description
Working Mode	0-ACin First 1- BATT First 2-Time Ctrl 3-Ubat Ctrl 4- SOC Ctrl	0- ACinFirst： Under this mode, the grid will supply load as priority and meantime charging the battery. Kinergier Pro will switch to battery only upon grid fail. 1- BATT First： Under this mode, the load will be powered by PV and battery. Only upon battery reach discharged protection level, Kinergier Pro will bring AC in (grid or generator) to charging the battery. Once battery reach absorbtion stage or lithium battery BMS sending signal, Kinergier Pro will stop charging and use battery to power the load. 2-Time Ctrl： Kinergier Pro offers Time Ctrl mode as an advanced control mode through offering three timers for user to

		configure. Within the time zone set up, Kinergier Pro will work at AC In First Mode. Beyond the time zone, Kinergier Pro will work at BATT First mode. Meantime, upon battery discharged under Batt First Time zone, you can configure whether or not you want Kinergier Pro entering into AC in First mode. This mode can be used in area where they have peak/off peak tariff policy. 3-Ubat Ctrl: This is the advanced mode base on BATT First. Under this mode, some energy can be reserved for power up purpose in case of grid failure. User can set the battery voltage to bring grid meantime charigng battery and the battery voltage that he want to disconnect the grid. 4-SOC Ctrl: This is the mode with same function to that of Ubat_Ctrl mode, but designed for TBB SUPER-L lithium battery only. Under this mode, user can program the SOC percentage entering into charging or existing charging. **Default**: 0-ACin First
ACin_CHG_Derate	0~100%	This setting is designed for user to configure the charging current of this inverter or even switch off the charger.



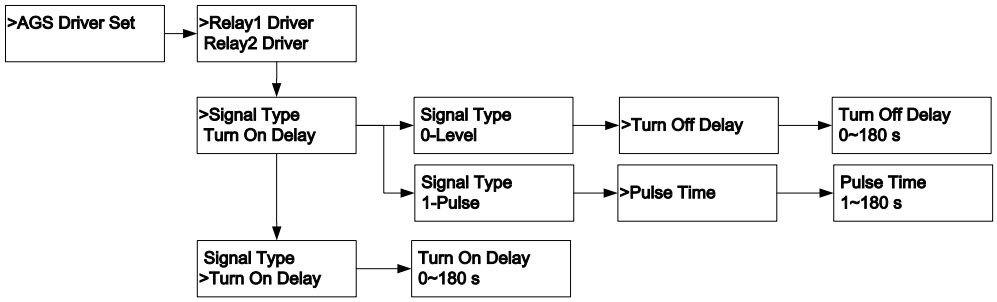
5.6.2 Relay Function

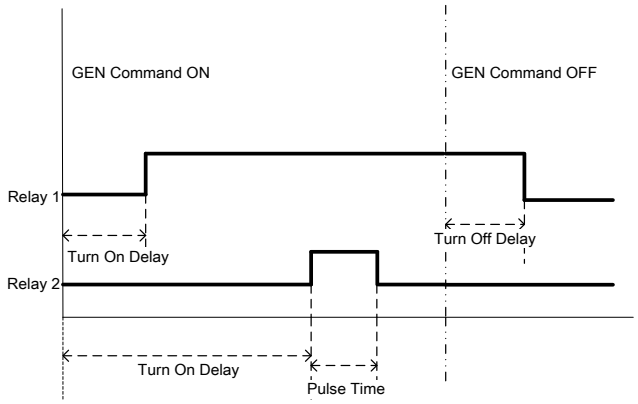
With this menu, you could set up the function of dry contact output relay built in Kinergier Pro.

Item	Setting range	Description
Relay Function -->Function Mode	0-Default	Under Default, 1: The dry contact relay 1 is defined as battery low voltage alarm. 2: The dry contact relay 2 is defined as inverter overload alarm.
	1-User Define	The two dry contact relays can be programmed with following function respectively. 0-Ubat Low 1-OverLoad/OT 2-INV Fault 3-ACin Error 4-ACin Charging 5-ACin Ready 6-ACin Voltage 7-Fan Running
	2-AGS Driver	Both relay 1 and 2 will perform as AGS driver. Please refer to 5.6.3 for explanation in details.

5.6.3 AGS Driver

With this menu, relay 1 and relay 2 will be programmed to control the start and stop of generator. Please find following chart with detail definition.



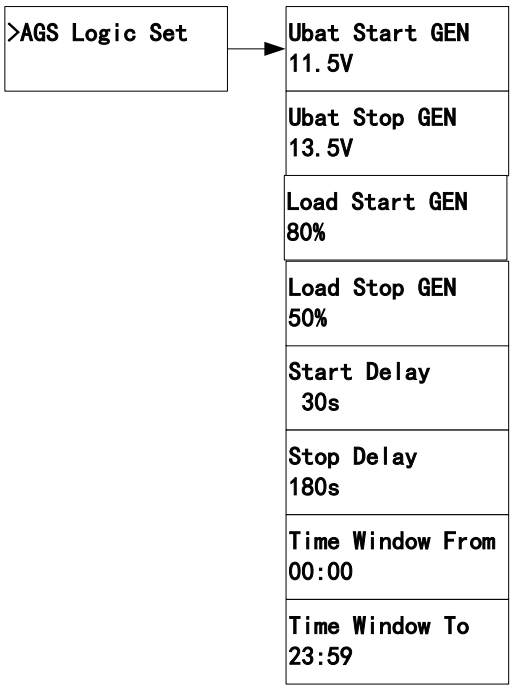


Item	Setting range	Description
AGS Driver Set	See AGS Driver Set Table	Set the Relay1 and Relay2 to Generator Control See Relay1 and Relay2 parameter setting
Min Run Time	180~1800s	Minium time of generator running **Default:** 180s
Interval Time	30~1800s	Minium interval time of generator start **Default:** 30s
AGS Logic Set	See AGS Logic Set Diagram	Generator rcontrol (start/stop) logic

AGS Driver Set Table: Relay1 and Relay2 parameter setting

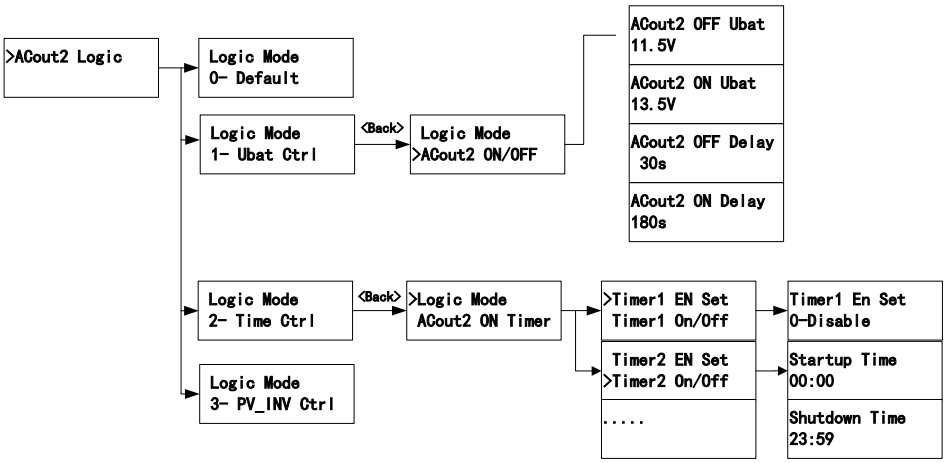
Item	Setting range	Description
Signal Type	0-Level 1-Pulse	0-Level: Relay will operate in Level Mode 1-Pulse: Relay will operate in Pluse Mode **Default:** 0-Level
Turn On Delay	0~180s	Turn ON after the Delay time when get the turn on command. **Default:** 0s
Turn Off Delay	0~180s	Turn OFF after the Delay time when get the turn on command. **Default:** 0s
Pulse Time	1~180s	Pulse Time **Default:** 1s

AGS Logic Set Diagram



5.6.4 ACout2 Logic

Item	Setting range	Description
ACout2 Logic -->Logic Mode	0-Default 1-Ubat Ctrl 2-Time Ctrl 3-PV_INV Ctrl	0-Default: ACout2 relay is turned on with output only when AC in powered or grid connection. 1-Ubat Ctrl: Control ACout2 relay according to battery voltage. 2-Time Ctrl: Timing control ACout2 relay. 3-PV_INV Ctrl: There is such option when AC couple mode has been selected, after that option is set, the oversized PV inverter can be connected to AC Output 2 to improve the AC couple system suitability. The size of PV inverter connected on AC output 2 can not be bigger than the size of battery inverter.



5.6.5 Screen Set

Backlight _KeepOn	Backlight fixed lighting function enabled. 0-Disable 1-Enable **Default:** 0-Disable
Page_Interval	Automatically page turning time of the real-time information display interface, 3~30s. **Default:** 5s

5.6.6 Date & Time

Set the current Date & Time.

5.6.7 Trigger Command

Fault Unlock	Set the fault unlock, and the inverter can be restarted.
Fan Dedusting	Clear Energy calculation data.
Parameter Sync	In parallel or three phase system, the slave inverter can use the function to synchronous the parameter with the master inverter.

6. FAQ

6.1 Error code

6.1.1 Inverter Error

No.	Error Code	Description	Solution
101	U_Bus_OV	DC bus is over voltage	Check the battery voltage.
102	U_Bus_LV	DC bus is under voltage	Check the battery connection and voltage.
103	U_Bus_HW_Pro	Hardware protection against DC bus over voltage	Check the battery voltage and charger output voltage
104	PSU_Fault	Auxiliary power supply is abnormal	Restart inverter. Contact installer in case still exist
105	T_HS_OT	Heat sink's temperature is too high	Check and assure inverter has good ventilation
106	T_TX_OT	Transformer's temperature is too high	Too high ambient temperature.
107	Sam_HD_Fault	Sampling is abnormal	Restart inverter. Contact installer in case still exist.
108	EEPROM_Fail	ROM is abnormal	
109	Output_ShortCut	Output short circuit	Check if there is short circuit at load.
110	Output_OverLoad	Output over load	Reduce the load.
111	CoolSys_Err	Cooling system is abnormal	Checking if fan is working properlly.
112	U_BAT_Low_Deep	Battery is severe under voltage	Connect to a valid grid or generator. Restart inverter and charge the battery.
114	Instant_OC_Soft	Instantaneous over current	Check if there is short circuit at load.
115	EPO	Emergency stop	Check the EPO Dry Input.
116	Rly_Err	Relay is abnormal	Restart inverter. Contact installer in case still exist.

6.1.2 MPPT Error

No.	Error Code	Description	Solution
301	U_Bus_OV	DC bus is over voltage	Check the PV input voltage.
302	U_BAT_OV	DC bus is under voltage	Check the battery voltage.
304	Buck_ShortCut	Buck short circuit	Check if there is short circuit at the MPPT output.
305	I_Buck1_OC	Buck 1 is over current	Check the MPPT output connection. Restart the equipment, contact the installer in case error still exist.
306	I_Buck2_OC	Buck 2 is over current	
307	T_Board_OT	Control Board's temperature is too high	Check fan ventilation.
308	T_HS_OT	Heat sink's temperature is too high	Too high ambient temperature.
309	PSU_LV	Auxiliary power supply is abnormal	Restart the MPPT. Contact installer in case error still exist.
310	PSU_LV_HD	Auxiliary power supply is abnormal(hardware)	
311	Sam_HD_Fault	Sampling is abnormal	
312	EEPROM_Fail	ROM is abnormal	
313	EPO	Emergency stop	Check the EPO Dry Input.

6.1.3 BMS Error

No.	Error Code	Description
40	Module_OV	Lithium module is over voltage protection.
41	Module_UV	Lithium module is under voltage protection.
42	Module_OT	Lithium module's temperature is too high.
43	Module_UT	Lithium module's temperature is too low.
44	Discharge_OC	Lithium module's discharge current is over normal value.
45	Charge_OC	Lithium module's charge current is over normal value.
46	SYS_Err	Lithium Battery Module fault.

6.2 Warning code

6.2.1 Inverter Warning

No.	Warning Code	Description	Solution
1	U_BAT_OV	Battery is over voltage	Check the battery voltage.
2	U_BAT_LV	Battery is under voltage	Check the battery voltage.
3	U_BAT_LV_Fault	Battery is under voltage protection	Check the battery voltage.
4	Overload	Overload warning	Reduce the load.
5	NTC_HS_Fault	Heat sink NTC fail	Power off the inverter and check the internal NTC connection. Contact installer if fault still exist.
6	NTC_TX_Fault	Transformer NTC fail	
7	T_BAT_OT	Battery temperature is too high	Check battery sensor connection; Check battery temperature; Check battery connection
8	Fan_Fault	Fan is abnormal	1.Check whether the fan is blocked. 2.Open the case, check the fan connection. Contact installer if fault still exist.
9	ParConnect_Err	Parallel connect is abnormal	Check the connection of parallel communication cable.
10	ParComm_Err	CAN communication is abnormal	Check the parallel parameter setting.
11	Par_ID_Conflict	Parallel address conflict	Check the parallel parameter setting (ID address)
12	Para_Conflict	Parameters do not match	Check the parameter setting or trigger Parameter Sync.
13	Par_SyncTimeOut	synchronization overtime	
14	ModeSet_Mismatch	The system mode and parameter setting does not match	Check the parameter setting (Lithium battery, AC Couple)
15	Out_Circuit_Err	Parallel system or three system's AC output is abnormal	Check the output wire connection
16	Comm_HMI_Err	Internal communication of LCD is abnormal	Open the case, check the LCD wire connection. Contact installer if fault still exist.
20	ACin_OV	AC input is over voltage	Check the AC input voltage and connection
21	ACin_LV	AC input is under voltage	
22	ACin_OF	AC input is over frequency	
23	ACin_LF	AC input is under frequency	
24	ACin_PhaseErr	AC input phase sequence	

		is abnormal	
25	U_Neu_2_GND_Err	The voltage between N and GND is abnormal	1.Check the ACin L-N connection. 2.Check the GND connection.
30	Comm_Inner_Err	Communication between inverter and DSP is abnormal	Open the case, check all the inner connection. Contact installer if fault still exist.
31	Model_Detect_Err	Software and hardware matching error	Restart the inverter. Contact installer if fault still exist.

6.2.2 MPPT Warning

No.	Warning Code	Description	Solution
201	U_BAT_OV	Battery is over voltage	Check the battery voltage and connection
203	Cur_Limit	MPPT current limitation alarm	Check if there is shortcuit at output
204	BAT_UnConnect	The MPPT is not connected to battery	Check the battery connection.
205	NTC_HS_Fault	Heat sink NTC fail	Power off the inverter and check the internal NTC connection. Contact installer if fault still exist.
206	T_BAT_OT	Battery temperature is too high	Check battery sensor connection; Check battery temperature; Check battery connection
207	Fan_Fault	Fan is abnormal	1.Check whether the fan is blocked. 2.Open the case, check the fan connection. Contact installer if fault still exist.
209	Comm_Sys_Err	Communication Between MPPT and Inverter is abnormal, at DC Couple system	Check the connection of communication cable.
210	Comm_HMI_Err	Internal communication of LCD is abnormal	Open the case, check the LCD wire connection. Contact installer if fault still exist.
213	U_BAT_LV_Protect	Battery is under voltage protection	Check the Rate_Volt set of the MPPT.
214	NTC_Board_Fault	Internal NTC fail (SP)	Check battery sensor connection; Check battery temperature; Check battery connection
215	I_Load_OC_Fault	Load output overcurrent (SP)	Check load
220	MPPT Comm offline	Communication off line	Check the comm connection with inverter, at DC Couple system

6.2.3 BMS Warning

No.	Warning Code	Description
50	Module_HV	Lithium module is over voltage.
51	Module_LV	Lithium module is under voltage.
52	Module_HT	Lithium module's temperature is too high.
53	Module_LT	Lithium module's temperature is too low.
54	Discharge_HC	Lithium module's discharge current is over normal value.
55	Charge_HC	Lithium module's charge current is over normal value.
56	INV Comm Fail	Communication with inverter is abnormal.
57	Extern Comm Fail	Communication among Lithium modules is abnormal.
58	BMS_SOC_Low	Lithium module's SOC is too low.

6.2.4 BGK Warning

No.	Warning Code	Description
601	U_BAT_OV	Battery over voltage alarm.
602	U_BAT_LV	Battery under voltage alarm.
603	U_BAT_Unbalance	Individual Battery Block/Cell Voltage unbalance.
605	Module_T_BAT_OT	Battery low temperature.
606	Module_NTC_Fault	NTC fail
607	Module_UnMatch	Battery Cell voltage does not match.
608	Module_Init_Err	Communication address error.
609	Module_Comm_Err	Communication error with inverter.
610	Module_Inner_Err	Communication error among BGK modules.
611	SYS_Init Timeout	System initialization error.

7. Specification

Model	CK4.0M	CK5.0M	CK4.0S	CK5.0S	CK6.0S	CK8.0S
Power Assist	Yes					
AC inputs	Input voltage range:175~265 VAC, Input frequency:45~65Hz					
AC input Current	50A (transfer switch)					
Inverter						
Nominal battery voltage	24VDC		48VDC			
Input voltage range	21~34VDC		42~68VDC			
Output	Voltage: 220/230/240 VAC ± 2%, Frequency: 50/60 Hz ± 0.1%					
Harmonic distortion	<2%					
Power factor	1.0					
Cont. output power at 25°C	3600W	4500W	3200W	4000W	4800W	6500W
Peak power (30min)	4000W	5000W	4000W	5000W	6000W	8000W
Peak power (10 sec)	5600W	6700W	6400W	8000W	9600W	13000W
Cont. output power at 40°C	2800W	3600W	2800W	3600W	4200W	5600W
Maximum efficiency	94%		96%			
Zero load power	18W	23W	17W	19W	20W	26W
Charger						
Charge voltage 'absorption'	28.8VDC		57.6VDC			
Charge voltage 'float'	27.6VDC		55.2VDC			
Battery types	AGM / GEL / OPZV / Lead-Carbon / Li-ion / Flooded					
Battery Charge current	120A	150A	55A	70A	80A	110A
Temperature compensation	Yes					
General data						
AC Out Current	AC Out1 Current :50A, AC Out2 Current :32A					
Transfer time	<2ms(<15ms when WeakGrid Mode)					
Remote on-off	Yes					
Programmable relay	2x					
Protection	a) output short circuit, b) overload, c) battery voltage over voltage d) battery voltage under voltage, e)over temperature, f) Fan block g) input voltage out of range, h) input voltage ripple too high					
CAN Bus communication port	For parallel and three phase operation, remote monitoring and system integration					
General purpose com. Port	CAN,RS485 (Bluetooth,GPRS,WLAN optional)					
Operating temperature range	-20 to +65˚C					
Storage temperature range	-40 to +70˚C					
Relative humidity in operation	95% without condensation					
Altitude	2000m					
Mechanical Data						
Dimension	530*285*185mm					
Net Weight	33kg	36kg	30kg	33kg	35kg	40kg
Cooling	Forced fan					
Protection index	IP20					
Standards						
Satety	EN60950-1					
EMC	EN61000-6-2,EN61000-6-4,EN61000-3-11,EN61000-3-12					

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