SONAR 5K WPV Quick Guidance

Contents

Part 1. Connection for SNA 5K WPV

1. System Connection
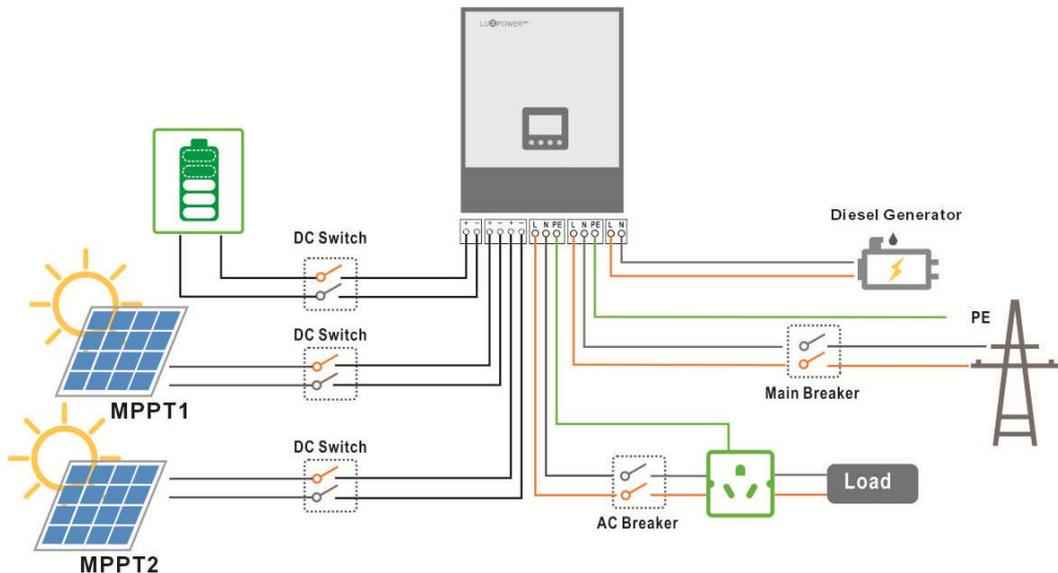
Normally the off grid inverter need to connect

➢ **Solar panel**: SONAR support two different strings input, the input voltage range is **100V-480V**, please keep mind that the PV1 and PV2 voltage can not higher than 500V, otherwise, it will damage the inverter.

➢ **Battery input:**
   ◼ **Battery Type**: SONAR support both Li battery and lead acid battery. For Li battery, SONAR is compatible with Pylontech and Dyness battery, you can choose the battery type and brand in the monitor system or LCD after power on.
   ◼ **Battery Voltage:** The battery voltage input range is **40V-60V,** if battery voltage higher than 60V, inverter will report error.
   ◼ **Battery Charge Current:** The totally max charge current is 140A. The max solar charge current is **100A**, max AC charge current is **60A.**
   ◼ **Battery Discharge Current:** The max discharge current is 120A.

➢ **AC input:** The AC input voltage range is 110V-280V, max AC charge current is 100A

➢ **Off grid output:**
   ◼ 5000w nominal
   ◼ 115% overload 10 seconds
   ◼ 150% overload 5 seconds
   ◼ 10000VA inrush power
   ◼ can be parallel and extend to 50kW(support this function since 2021)

➢ **Genset input**: There is separated input for genset, the genset can be used charge the battery and take the load. AC and genset can input at the same time, inverter

will use AC first if there if AC input.

2. Interface of SONAR
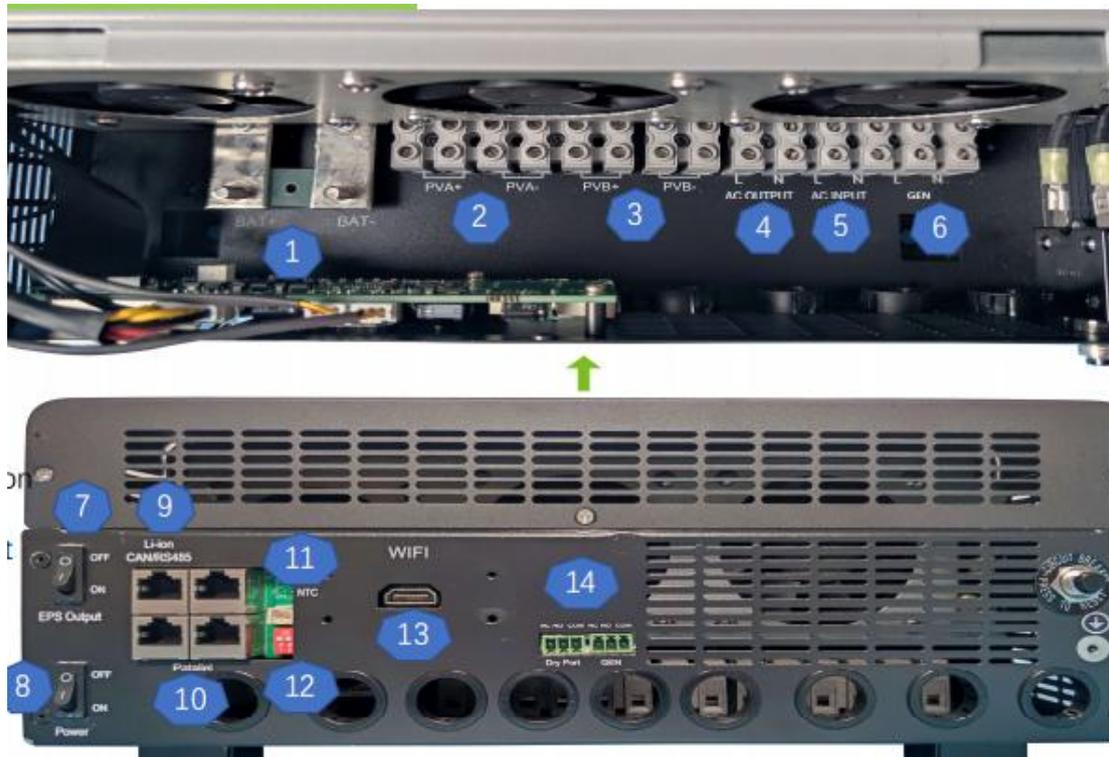
1. Battery Cable Interface
2. Solar Input String 1
3. Solar Input String2
4. Off Grid Output
5. AC Grid Input
6. Generator Input
7. Off grid Output Switch, when turn off it, there will be no output in the output terminal, but the system can still charge the battery
8. System Power Switch, the whole system will shutdown if the switch is off.
9. Battery communication cable
10. Parallel cable communication   interface
11. Temperature sensor input
12. Balance resistor PIN for paralleling communication
13. Wifi plug in interface
14. Dry contact/Genset control port

Part 2. Monitor System Guidance

Step 1. After connection of the cables, the next step is to setup wifi to monitor the system and update the firmware to lastest version if necessary.
For Endusers: Please refer the document **'Monitor system setup for endusers'** for register an enduser account and wifi password setting.
For Distributors: Please refer the document **' Monitor system setup for Distributors'** for add datalog in the system and wifi password setting.

Step2. Website settings
Users can set all the parameters by website, for the setting explanations, please refer **' Off grid settings'**.

Part 3. LCD Display and Setting

3.1 Inverter Status Display

➢ **Normal status**
There is a smile on the LCD which means the inverter is running normally, the number 40 means inverter is in the 40 status.
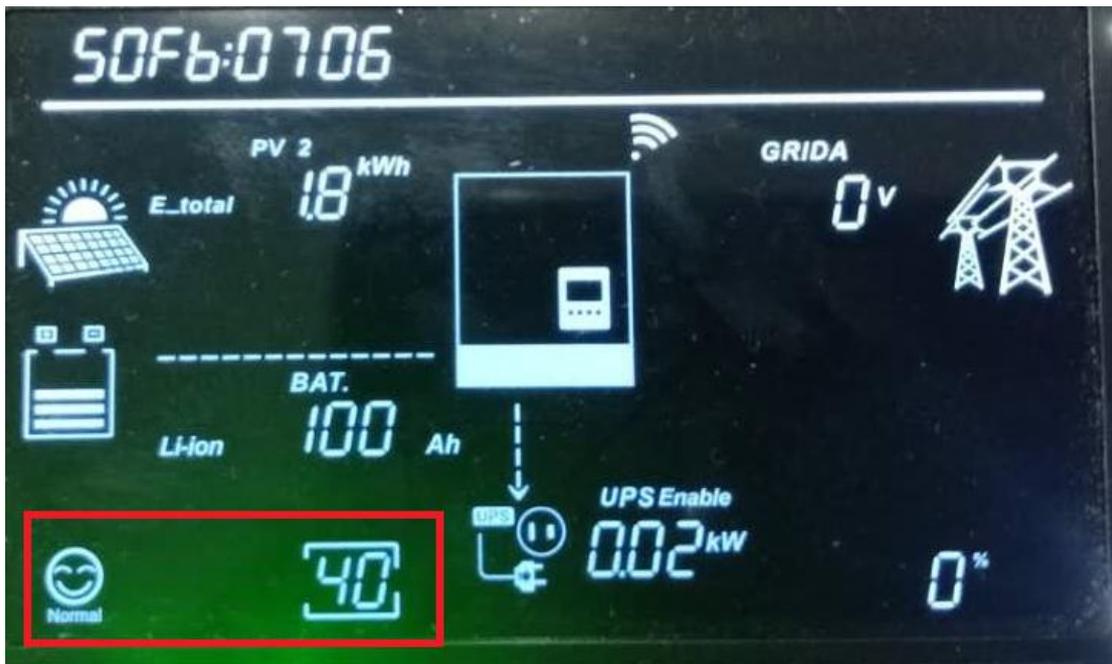
➢ **Warning Status**
There is a warning face, and number 29 next to it, which means warning29
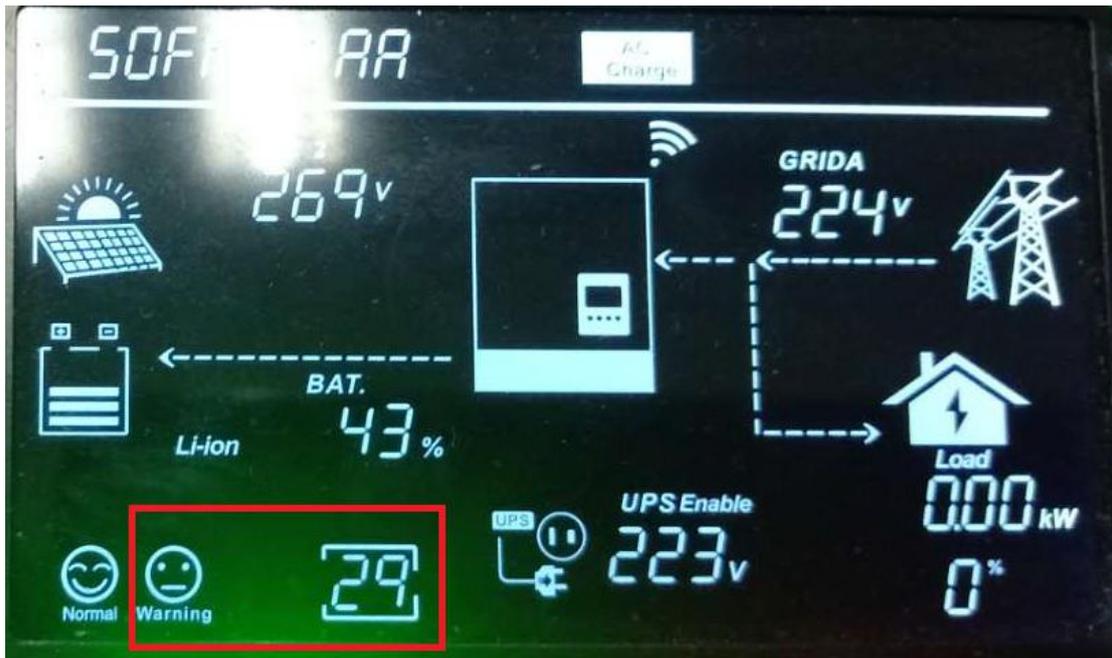
➢ **Fault Status**

There is a fault face, and number 21 next to it, which means Fault 21

➢ **Download firmware**

When we update firmware, the LCD will show update progress on the LCD as below, the download percent is 33% in the below picture
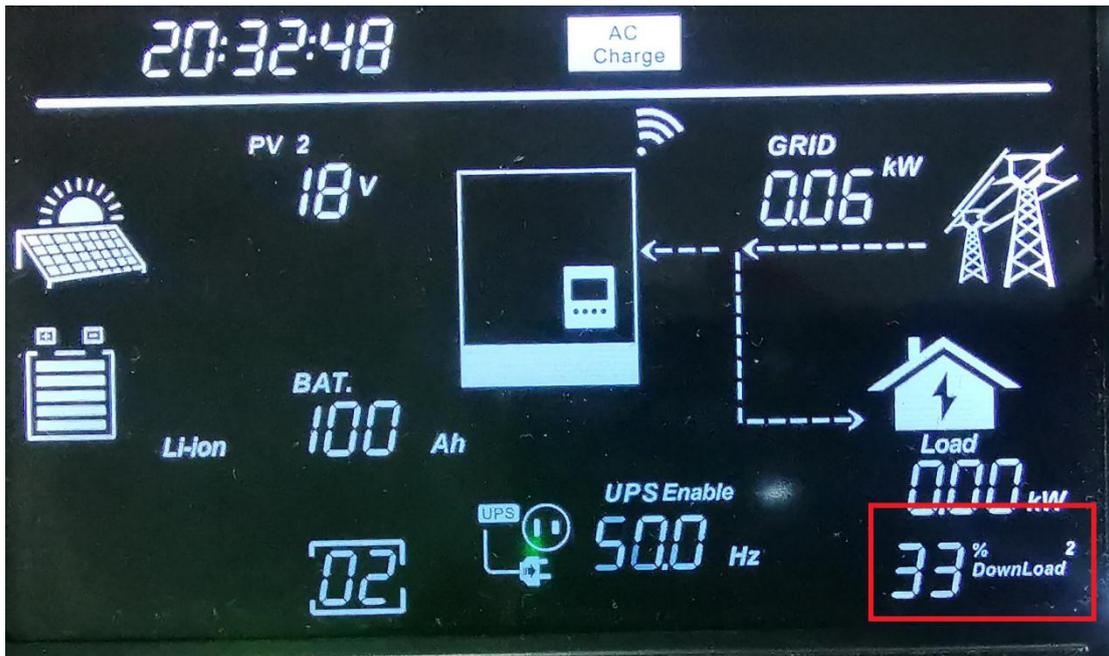
3.2 Other Information Display

➢ **Grid A：** when display 'GRIDA', it means the information is about AC utility

➢ **Grid B：** when display 'GRIDB', it means the information is about Genset
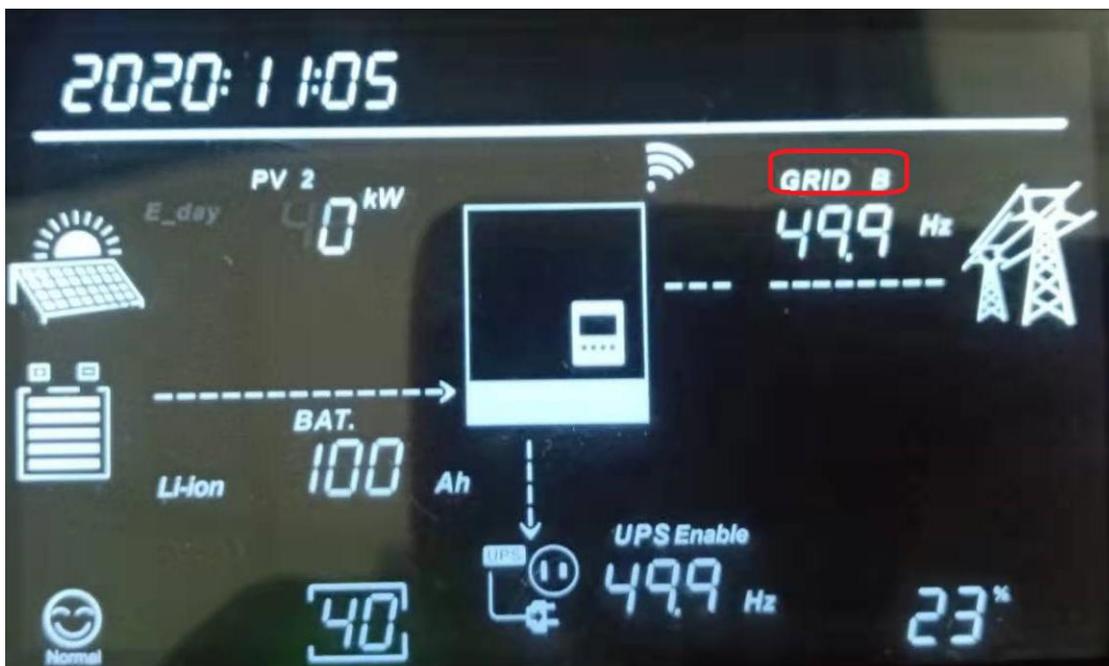
➢ The percent display on the right down corner means the load percentage

3.3 LCD Settings

Button	Function
Return ⮌	return，enter LCD setting mode
UP ⬆	Go up
Down ⬇	Go down
Enter ↵	Enter

Step1: After touch **Return** button , the unit will enter setting mode.

Step2:Touch **UP** or **Down** button to select setting index from 1 to 15.

Step3: Then touch **Enter** button to set this item

Step4: Touch **UP** or **Down** button to change the settings

Step5: Touch **Enter** to confirm the setting or **Return**

the setting list is as below

Index	Description	Setting Option
01	Setting time	
		Setting Year/Month/day `2020:10:28`
		Year default 2017, range 2017~2099 Month default 01, range 01~12 Day default 01, range 01~31
		Setting hour/minute/second `20:18:28`
		Hour default 00, range 00~24 Minute default 00, range 00~59 Second default 00, range 00~59
02		
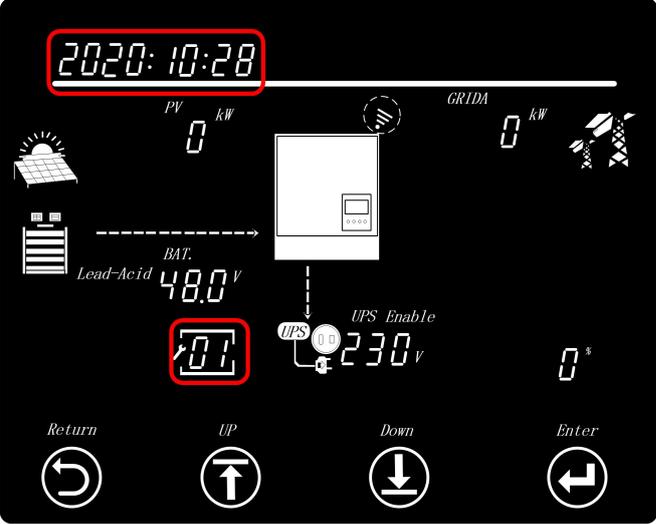
	PV input mode setting		
		Default in two independent Mppts mode	PV12 S
		Setting two mppts in parallel mode	PV12 P
03	Battery type setting	Lead-acid battery type choose setting	Type BAT. Lead-Acid
		Lead-acid battery capacity setting **Capacity default 100Ah , range 50Ah~400Ah**	BAT. Lead-Acid 100Ah
		Lithium battery type choose setting (only suitable when communicated with BMS)	Type BAT. Li-ion
		Lithium brand setting 0------ Standard Battery 1------ not used 2------ Pylon Battery 3------ reserve 4------reserve 5------ reserve 6------ Lux Battery 7------ reserve 8------ Dyness Battery 9------ reserve 10------ reserve 11------ Merit Battery 12------ reserve 13------ reserve 14------ WECO Battery 15~18 not used	BAT. Brand Li-ion 18
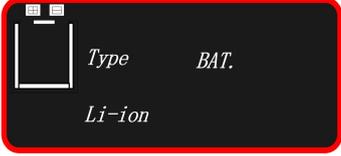
04	AC Output voltate and frequency of EPS setting		
		AC Output voltage setting 208Vac 220Vac 230Vac(Default) 270Vac	
		AC Output frequency setting 50Hz (Default) 60H	
05	Buzzer enable setting		
		Buzzer enable(Default)	
		Buzzer Disable	
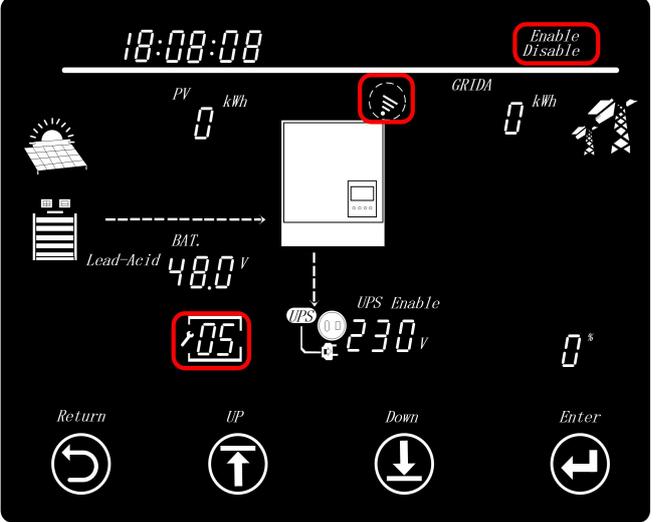
06	Curr:Totoal charge current setting （Maximum charging current: set total charging current for solar and utility chargers. (Max. charging current = utility charging current + solar charging current)）	
		Totoal charge current setting Setting range :10A~140A Default: 110A
07	ConChr:CV voltage setting （Only in Lead-acid battery type）	
		Setting range: 50.0-59.0Vdc Default: 56.4V
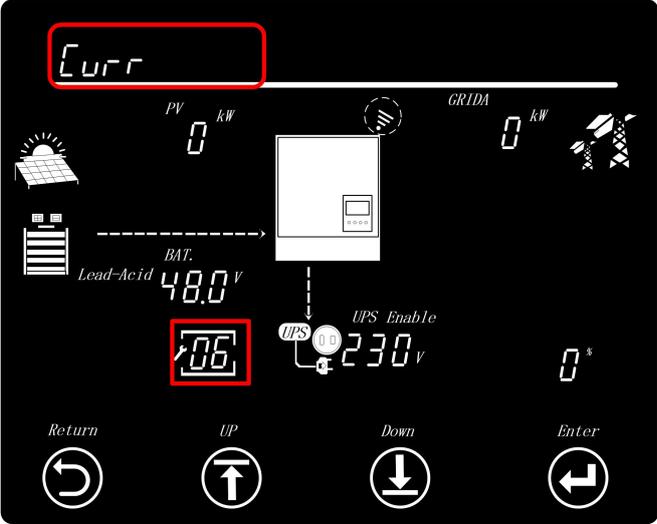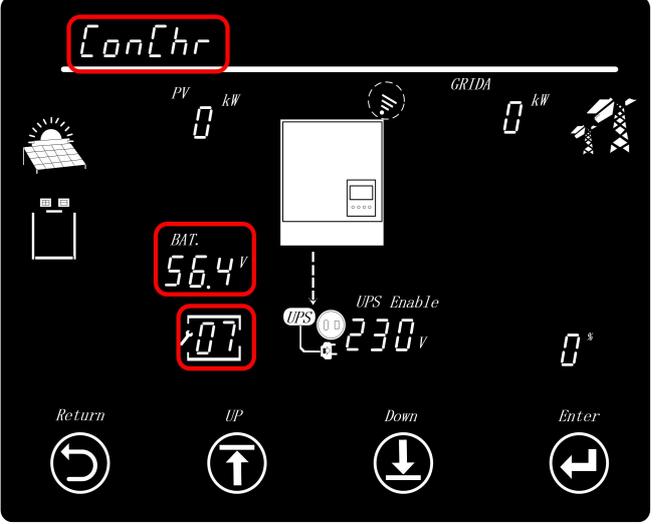
08	FloChr:Floating charging voltage setting （Only in Lead-acid battery type）	FloChr PV 0 kW GRIDA 0 kW BAT. 54.0 V ;08 UPS Enable 230 V 0 ° Return UP Down Enter
	Setting range: 50.0-56.0Vdc Default: 54.0V	BAT. 54.0 V
09	ConChr:CV voltage setting （Only in Lead-acid battery type）	CutOFF PV 0 kW GRIDA 0 kW BAT. 42.0 V ;09 UPS Enable 230 V 0 ° Return UP Down Enter
	Setting range: 40.0-50.0Vdc Default: 42V	BAT. 42.0 V
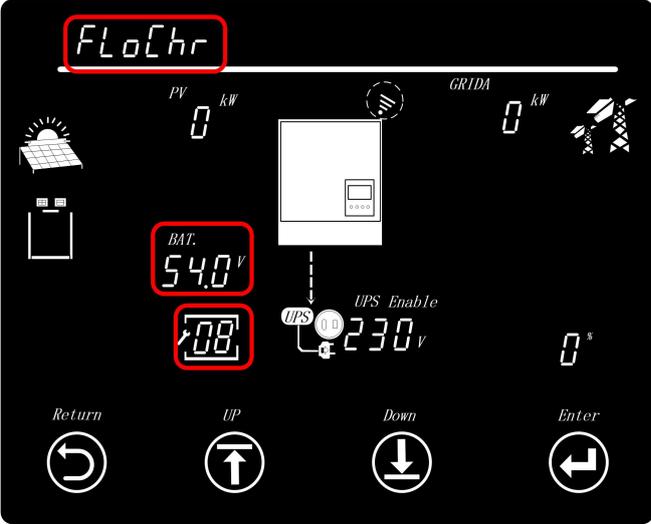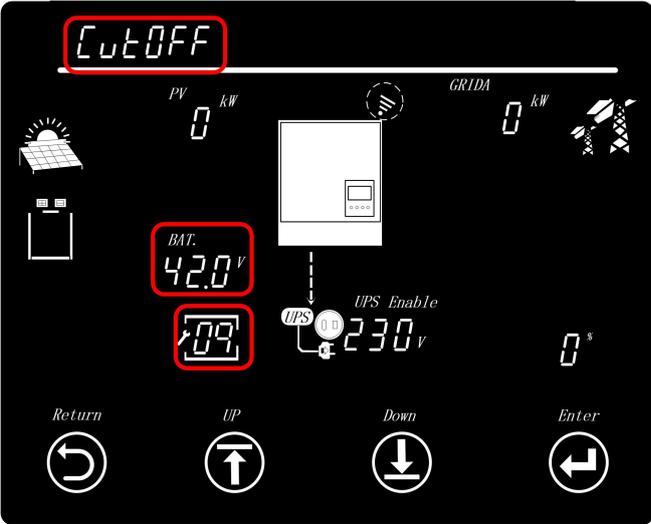
10	batLo:Battery low switch to UTI setting	
		Setting range: 44.4-46.4Vdc Default: 46.4V
11	OPSr:Priority output source setting	
		AC First
		Battery First
		PV First
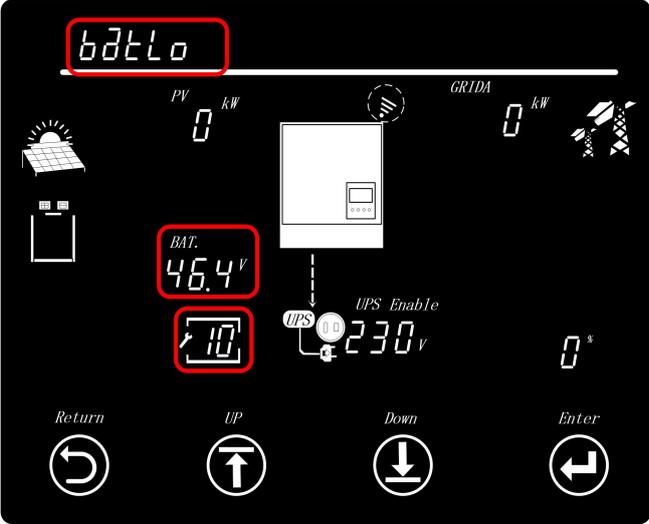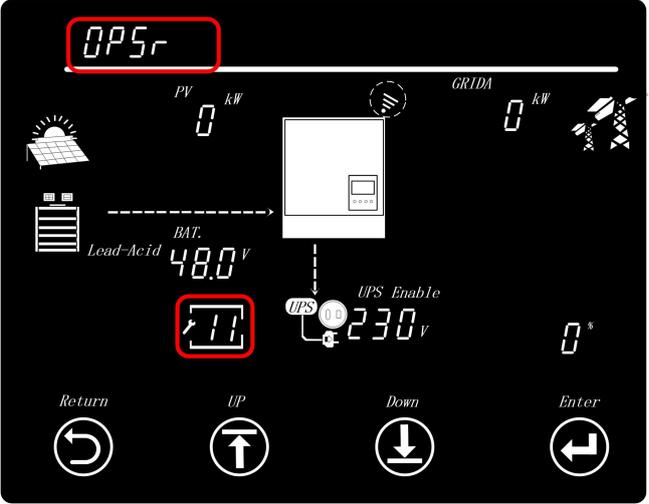
12	AcIn:AC voltage range setting		
		Unity AC Input voltage range : 90Vac~280Vac	
		AC Output voltage range : 170Vac~280Vac	
		Generator Input voltage range : 80Vac~280Vac	
13	AC charge setting (The setting process must enable the AC charging function, confirm the full battery SOC value, and set the confirmation time period 1, 2, 3 to truly complete the AC charging function setting)		
		AC Charge function: Disable(Default)	
		AC Charge function: Enable (Touch "Enter" button to set ac charge parameter)	
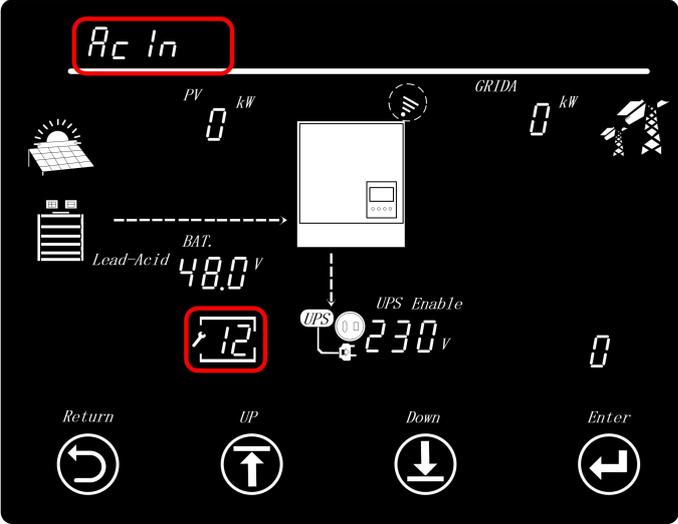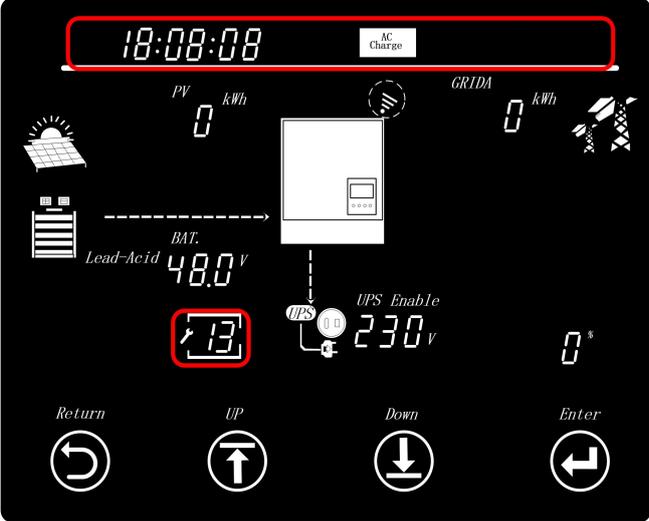
			Setting AC Charge current: 30A(Default) 40A 50A 60A	`AcCb:030A` AC Charge
			Setting AC Charge to battery SOC: Range:0%~100% Default:100%	`100` %SOC AC Charge
			Setting AC Charge time of 1 start: Range:00:00~23:59 Default:00:00~00:00	`P1:00:00` Start AC Charge
			Setting AC Charge time of 1 end: Range:00:00~23:59 Default:00:00~00:00	`P1:23:59` End AC Charge
			Setting AC Charge time of 2 start: Range:00:00~23:59 Default:00:00~00:00	`P2:00:00` Start AC Charge
			Setting AC Charge time of 2 end: Range:00:00~23:59 Default:00:00~00:00	`P2:00:00` End AC Charge
			Setting AC Charge time of 3 start: Range:00:00~23:59	`P3:00:00` Start AC Charge
			Setting AC Charge time of 3 end: Range:00:00~23:59 Default:00:00~00:00	`P3:00:00` End AC Charge

14	Utility source(AC Input) to take Load setting	
15	Utility source(AC Input) to take Load time setting	
		Setting time of 1 start: Range:00:00~23:59 Default:00:00~00:00	
		Setting time of 1 end: Range:00:00~23:59 Default:00:00~00:00	
		Setting time of 2 start: Range:00:00~23:59 Default:00:00~00:00	
		Setting time of 2 end: Range:00:00~23:59 Default:00:00~00:00	
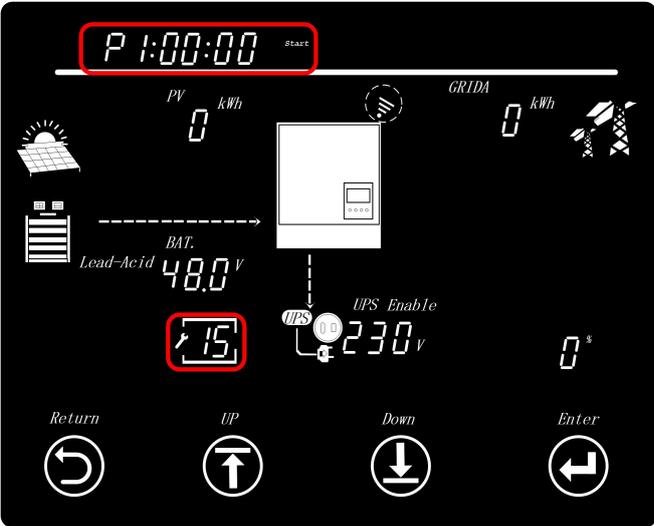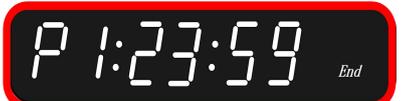
		Setting time of 3 start: Range:00:00~23:59	$P3{:}00{:}00$ Start
		Setting time of 3 end: Range:00:00~23:59 Default:00:00~00:00	$P3{:}00{:}00$ End
16	Eod:Endding SOC of discharge setting	Eod PV kW GRIDA kW 0 0 BAT. Lead-Acid 48.0 V 16 UPS UPS Enable 230 V 0 Return UP Down Enter	
		Endding SOC of discharge setting: Range:10%~90% Default:15%	Eod: 15 %SOC
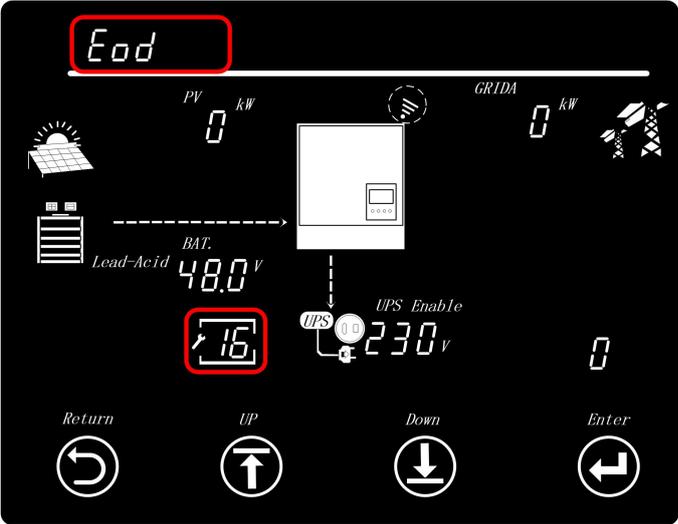
Part 4. SONAR 5K Working Mode Introduction

SONAR can work as traditional off grid inverter or as a hybrid inverter.

➢ **Working as a traditional off grid inverter**

When disable PV&AC take load jointly, the inverter will work as a traditional off grid inverter.

In this situation, inverter either use solar+battery take load or use AC take load.
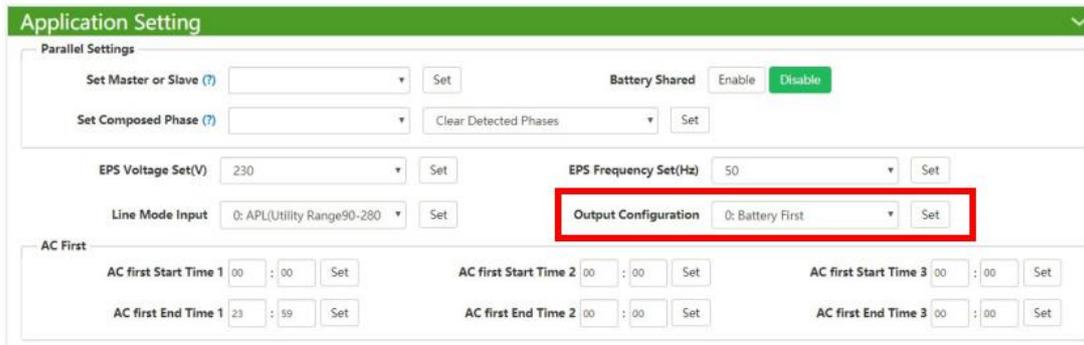
Output Configuration:

Battery First: Inverter will use battery and solar (if there is) to take the load until battery low，then it will go to utility bypass mode(grid take the load). The picture shows the solar and the battery take load together.
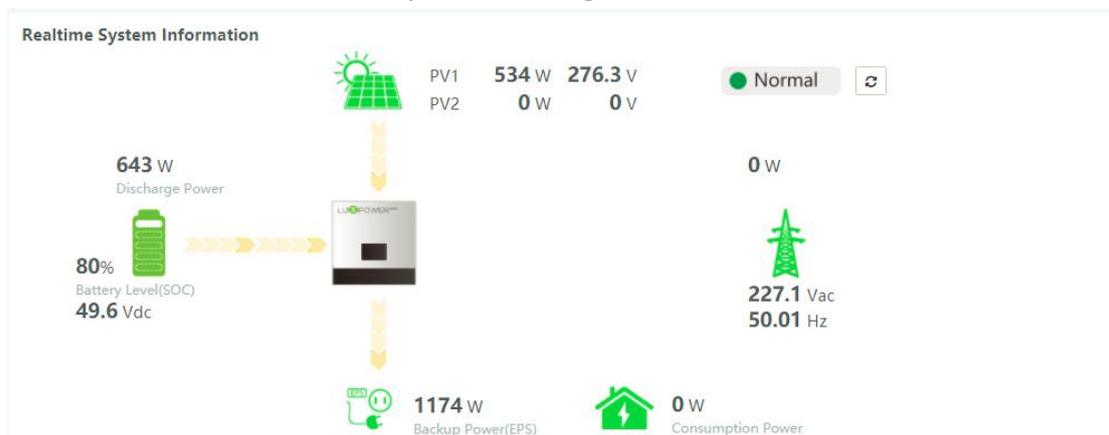
PV First: Inverter will use battery and solar take load together only when there is solar; If there is no solar, inverter will use utility bypass to take the load.

AC First: Inverter use utility bypass to take first, if the utility out of range, it will go to battery mode; Customer need to set the time for AC first when choose this option,

and the rest
of the time will use battery and solar to take load.

> **Working as a hybrid inverter**

When enable PV&AC take load jointly, the inverter will work as a hybrid inverter,which means solar, battery and grid will take the load together.
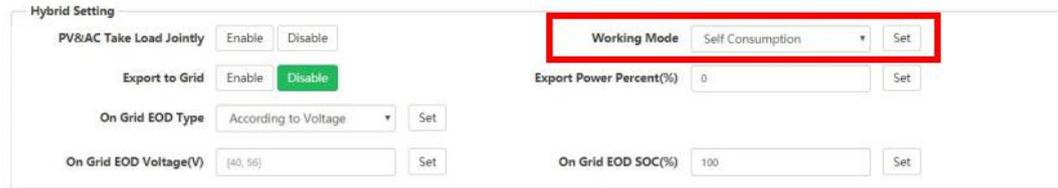
Working mode:

Self Consumption: The inverter will use solar, battery and AC to take load together. Inverter will try to use solar and battery to take load first, if the power from solar and battery is not enough, it will use AC together to take the load.
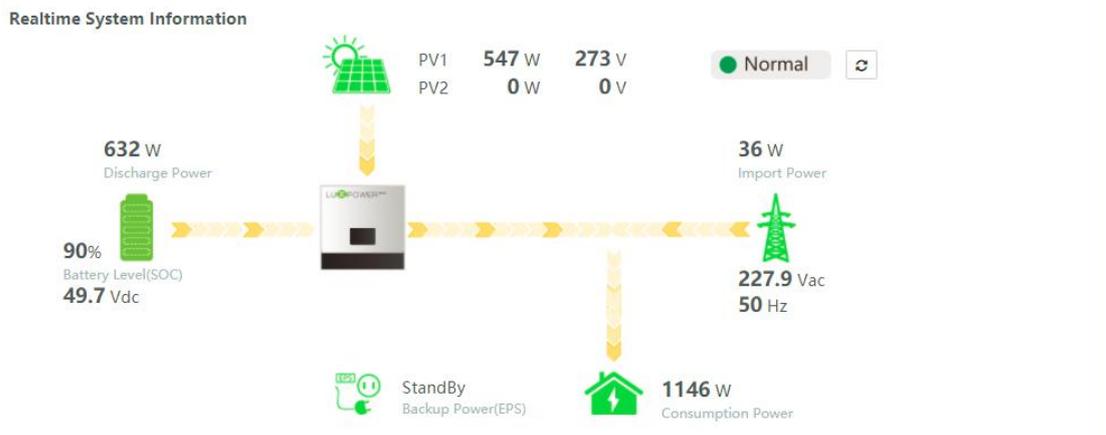
Charge First: The inverter will use solar to charge battery first.If there is more solar power, it will take the load, otherwise system will use AC to take the load
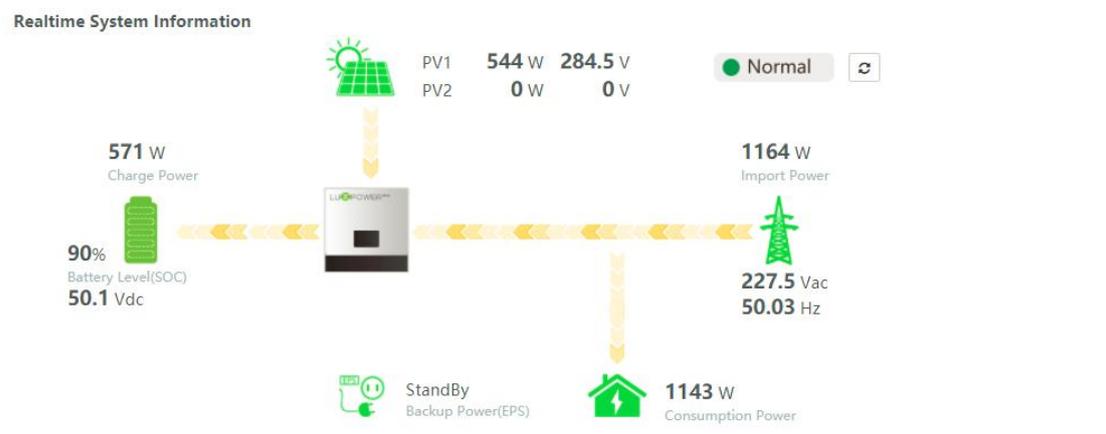
On-grid : when enable export function, the inverter can work as on grid inverter. If solar power is higher than the power (load+power need to charge the battery), the extra power can feed into grid

Realtime System Information
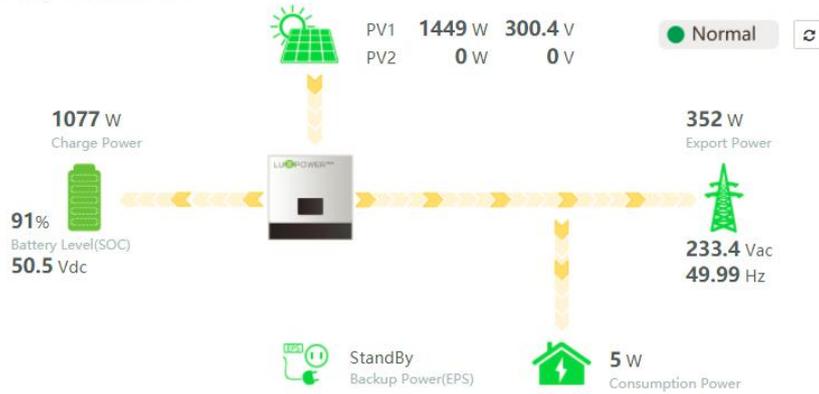
On Grid EOD: when there is grid, battery and solar will take the load until SOC/Vbattery is lower than settings EOD voltage or EOD SOC.

Part 5. Error/Warning List

Thefailures mainly divided into 5 categories, for each category, the behavior is different:

- ➢ **System Failure:** the error system within this failure will stop running.
- ➢ **PV Failure:** If a single PV fails, it belongs to the warning level. The solar charger will not work, inverter can still have off grid output from battery or bypass the AC to off grid output.
- ➢ **INV Failure:** if a single failure of DC-AC side(inverter) existed, it belongs to the warning level, the DC-AC will not work, the system can still charge the battery and bypass AC to off grid output**.**
- ➢ **Battery Failure:** if a single failure of battery side(inverter) existed, battery can not charge or discharge**.**

Error List

FaultCode	Fault decription	Trouble shooting
E000	Internal communication fault1	Restart inverter, if the error still exist, contact us (DSP&M3)
E001	rsvd	
E002	BatOnMosFail	Restart inverter, if the error still exist, contact us (DSP&M3)
E003	CT Fail	Restart inverter, if the error still exist, contact us (DSP&M3)
E004	rsvd	
E005	rsvd	
E006	rsvd	
E007	rsvd	
E008	**CAN communication error in Parallel System**	Check CAN cable connection is connected to the right COM port
E009	**No master in parallel system**	Check parallel setting for master/Slave part, there should be one master in the system
E010	**Multi master in parallel system**	Check parallel setting for master/Slave part, there should be one master in the system

E011	AC inconsistent in parallel system	Check if AC Connection is same for all inverters in parallel system
E012	Off grid output short circuit	Check if the load is short circuit, try to turn off the load and restart inverter
E013	UPS reserve current	Restart inverter, if the error still exist, contact us
E014	rsvd	rsvd
E015	Phase Error in three phase parallel system	Check if the AC connection is right for three phase system, there should one at least one inverter in each phase
E016	Relay fault	restart inverter, if the error still exist, contact us
E017	Internal communication fault2	restart inverter, if the error still exist, contact us (DSP&M8)
E018	Internal communication fault3	restart inverter, if the error still exist, contact us (DSP&M3)
E019	Bus voltage high	check if PV input voltage is higher than 480V
E020	EPS connection fault	check if EPS and AC connection is in wrong terminal
E021	PV voltage high	Check PV input connection and if PV input voltage is higher than 480V
E022	rsvd	
E023	rsvd	
E024	PVshort	check PV connection
E025	Temperature over range	The internal temperature of inverter is too high, turn off the inverter for 10minutes, restart the inverter, if the error still exist, contact us
E026	Internal Fault	restart inverter, if the error still exist, contact us (Bus sample)
E027	rsvd	
E028	rsvd	
E029	rsvd	
E030	rsvd	
E031	Internal communication fault4	Restart inverter, if the error still exist, contact us (DSP&M8)

Warning List

WarningCode	Warning decription	Trouble shooting
W000	Communication failure with battery	Check if you have choose the right battery brand and communication cable is right, if the warning still exist, contact us

W001	Battery temprature high	Check battery temperature sensor is right connected and the battery temperature is not too high
W002	Battery temprature low	Check battery temperature sensor is right connected and the battery temperature is not too lowa
W003	rsvd	rsvd
W004	Battery failure	Inverter get battery fault info from battery BMS, restart battery, if the warning still exist, contact us or battery manufacture.
W005	rsvd	
W006	rsvd	
W007	rsvd	
W008	Software mismatch	Please contact Luxpower for firmware update
W009	Fan Stuck	Check if the fan is OK
W010	rsvd	
W011	rsvd	
W012	BatOnMos	Restart inverter, if the error still exist, contact us
W013	Overtemprature	The temperature is a little bit high inside inverter.
W014	rsvd	
W015	rsvd	
W016	rsvd	
W017	rsvd	
W018	AC Frequency out of range	Check AC frequency is in range
W019	rsvd	
W020	rsvd	
W021	rsvd	
W022	rsvd	
W023	rsvd	
W024	rsvd	
W025	Battery voltage high	Check if battery voltage is in normal range
W026	Battery voltage low	Check if battery voltage is in normal range, need to charge the battery if battery voltage is low
W027	Battery open	Check if there is output from the battery and battery connection with inverter is OK
W028	EPS Over load	check if EPS load is too high
W029	EPS voltage high	Restart inverter, if the error still exist, contact us
W030	rsvd	
W031	EPS DCV high	Restart inverter, if the error still exist, contact us