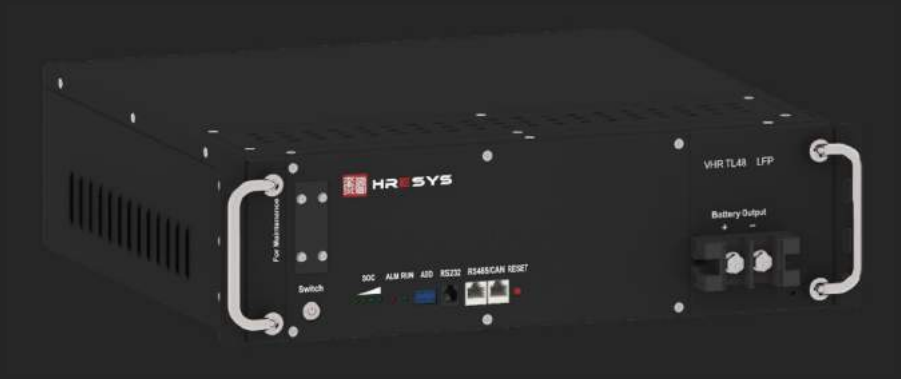
User Manual



Lithium Battery Systems Series TUV

VHR TL4850LFP, VHR TL4880LFP, VHR TL48100LFP, VHR TL48100LFP-3U,VHR TL48150LFP, VHR TL48200LFP

STATEMENT

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Preface

Instructions

Thank you for purchasing HRESYS lithium battery products!

This manual introduces the main features, configuration and system principles of the TL series, and provides installation instructions, operation instructions, maintenance management, transportation and storage.

Explain

The drawings in this manual are for illustration only, for specific products, please refer to the actual products received.

Sign Contract

The safety symbols referenced in this manual are shown in the following table, these symbols are used to remind the reader of the safety precautions to be observed in the installation, operation and maintenance of the equipment.

Sign	DESCRIPTION
 **Danger**	Indicates a high level of potential danger, if you can't avoid it, can lead to death or serious injury.
 **Warning**	Indicates a moderate or low degree of potential risk, if you can't avoid it, may cause minor or moderate injury to personnel.
 **Attention**	There is a potential risk, if you ignore the text, may result in equipment damage, performance degradation, or unpredictable results.
 **High Voltage**	Beware of electric shock.
 **ESD**	To prevent electrostatic.
 **Explain**	Represents additional information in the body, emphasis and complement to the text.

Revision History

VERSION NO.	DATE	DESCRIPTION
V1.0.1	2020.05.21	First Edit
V1.0.2	2020.06.08	Increase grounding requirements
V1.0.3	2020.08.24	Modify cell parameters
V1.0.4	2020.11.16	Update the RJ45 definition
V1.0.5	2020.12.14	Add certification requirement information
V1.0.6	2021.01.18	Add certification requirement information

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1 Safety Instructions

1.1 Safety Precautions

This section mainly introduces the general safety precautions to be followed when debugging, testing and maintaining the battery system.

For specific safety precautions in use and maintenance, please refer to the safety instructions in the corresponding section.



Attention

- ✧ Before we do that, please read the notes and instructions in this section carefully, to avoid accident.
- ✧ The "Danger", "Warning", "Attention" and other matters in the manual do not represent all the safety matters to be followed, but only supplement the safety matters to be noted in each operation.

Explain

HRESYS shall not be liable for any violation of general safety operation requirements or safety standards of design, manufacture or use of batteries.

1.2 Electric Safety



Danger

- ✧ The battery system has a rated output of 48V dc, which can be dangerous to humans. Operate in strict accordance with all warning marks and operating instructions in the battery pack and manual.



Warning

- ✧ Check the insulation between power line terminal and panel.
- ✧ Check if the power line is bare.
- ✧ The output terminal is not allowed to mount loads beyond the power range.



Attention

- ✧ Check the power line terminal contact is reliable.
- ✧ It is strictly prohibited to mix batteries of different specifications and brands.
- ✧ The case shall be connected to the ground.
- ✧ The system shall operate in a suitable temperature and humidity environment.
- ✧ Do not exceed permitted current.

1.3 Operational Safety

Explain

Only qualified electrical technicians are allowed to operate, do not wear watches, bracelets, rings and other easily conductive objects during operation, Insulation protection should be done well.



Danger

- ✧ No foreign liquid, metal or other conductor is allowed in the battery box.
- ✧ Do not short circuit or reverse connect the battery to prevent heat or electric shock.
- ✧ Non live installation.



Warning

- ✧ Do not remove the battery without permission.
- ✧ Do not move the battery with power.



Attention

- ✧ Start the Charge-Discharge Equipment after the battery system is started.
- ✧ Close the battery system after the Charge-Discharge Equipment is closed.
- ✧ Do not place tools or other conductive objects on the battery.
- ✧ Do not step on or flip the battery.

1.4 Operating Environment



Danger

- ✧ keep away from fire.



Attention

- ✧ Away from the water.
- ✧ Avoid direct sunlight.
- ✧ Battery operating temperature 0~60℃(charge); -20~60℃(discharge).
- ✧ Storage ambient temperature 0~40℃.
- ✧ Storage environment humidity <85% RT.
- ✧ The battery system should be placed horizontally.
- ✧ The battery protection level is IP20, which is recommended for indoor use without additional protection.
- ✧ The battery should be stored at places with good ventilation. (When choosing the place of the installation, please notice that the cooling air must flow without restrictions through the ventilation holes. The system must have enough space in front of it for operation and service functions. Notice the direction of the

cabling and the required space of the other equipment)

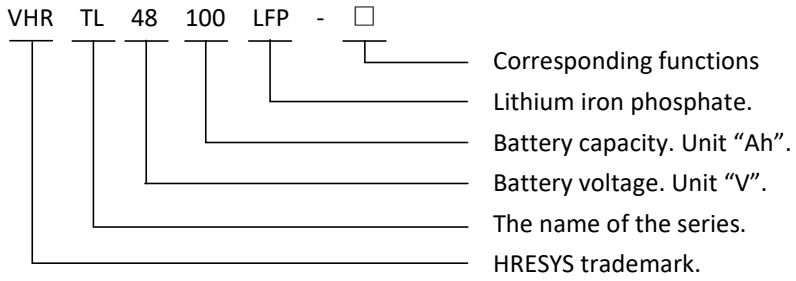
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2 General Introduction

2.1 Product Presentation

HRESYS TL series use high energy density lithium iron phosphate battery, the voltage platform is 48V, it can be used in communication base stations, financial institutions, medical institutions, etc.

2.2 Types of Meaning



2.3 Product Feature

- **Multiple communication modes**

Equipped with RJ11 and RJ45 ports, support CAN, 485, 232 communication.

- **Perfect protection function**

With over voltage, under voltage, over current, over temperature, under temperature, short circuit, reverse connection and other protection functions.

- **Anti-Surge**

Pre-charge function to prevent load startup shock.

- **Rich additional features**

Some models have LED display, module heating, GPS positioning, anti-theft Bluetooth, data storage and other capabilities.

- **High-performance**

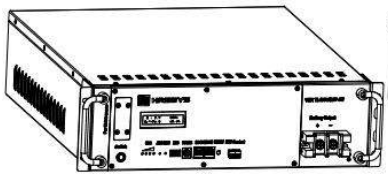
Adopt high energy density lithium iron phosphate battery, safe and efficient.

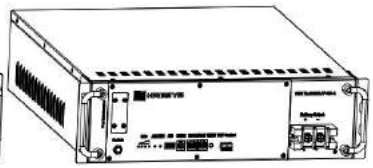
- **Authentication**

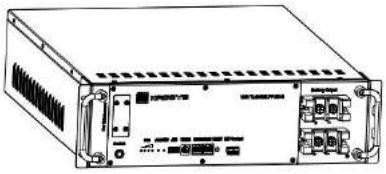
Meet TUV and CE.

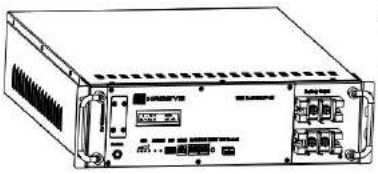
2.4 Appearance and Structure

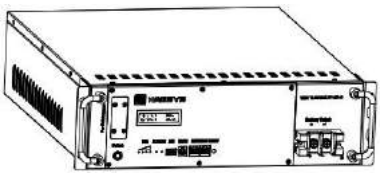
2.4.1 Appearance

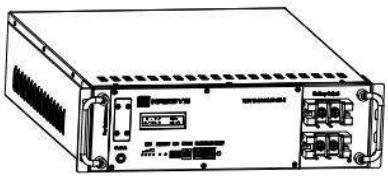

picture 2.4.1-A


picture 2.4.1-B

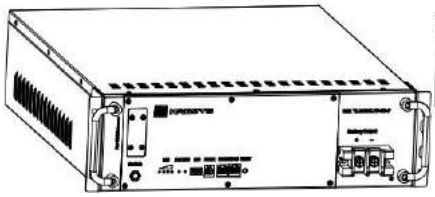

picture 2.4.1-C

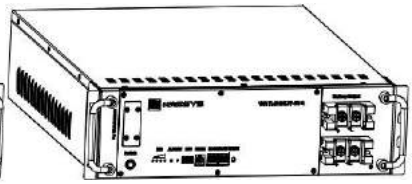

picture 2.4.1-D


picture 2.4.1-E


picture 2.4.1-F

Explain


picture 2.4.1-G

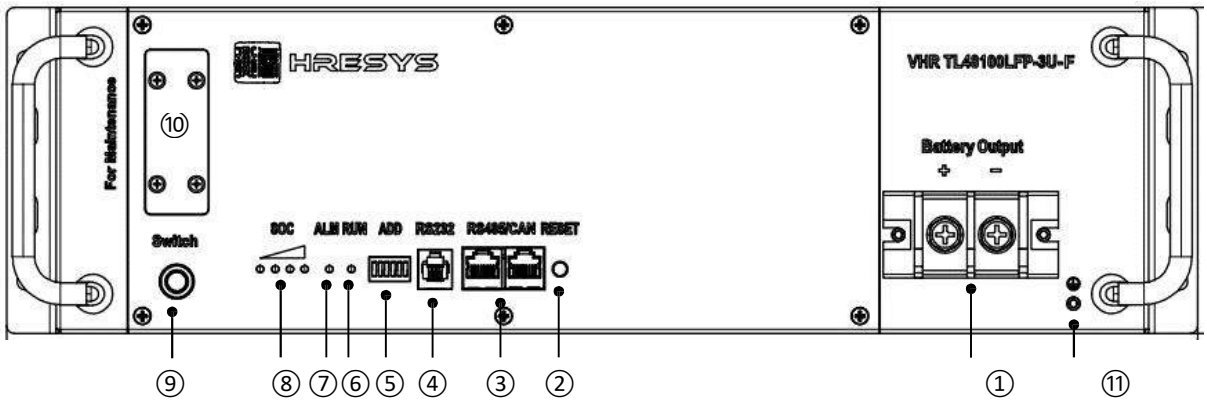

picture 2.4.1-H

No.	Name	LCD	DRY	Terminal
picture 2.4.1-A	TL48100LFP-3U	√	√	2P
picture 2.4.1-B	TL48100LFP-3U-A	-	√	2P
picture 2.4.1-C	TL48100LFP-3U-B	-	√	4P
picture 2.4.1-D	TL48100LFP-3U-C	√	√	4P
picture 2.4.1-E	TL48100LFP-3U-D	√	-	2P
picture 2.4.1-F	TL48100LFP-3U-E	√	-	4P
picture 2.4.1-G	TL48100LFP-3U-F	-	-	2P
picture 2.4.1-H	TL48100LFP-3U-G	-	-	4P

2.4.2 Panel Interface

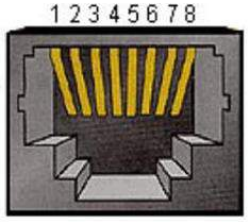
Explain

Take the appearance of a “TL48100LFP-3U-F” battery as an example, the battery that add optional functionality are slightly different.



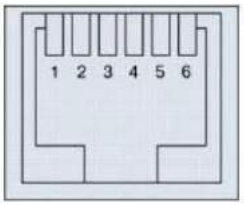
No.	Name	Description	Remark
1	Battery Output	Nominal 48V output	Positive/Negative
2	Reset	After a long press 5S, release and restart the system; When the system is asleep, press the button to wake up	N.A
3	CAN/RS-485	RJ-45 for RS485/CAN Communication and firmware update	Internally parallel.
4	RS-232	RJ-11 for RS232 Communication	N.A
5	ADD	Select communication protocol	Reserved
6	RUN	Display battery status, please refer to common failures and maintenance	Please refer to common failures and maintenance
7	ALM	Display battery status, please refer to common failures and maintenance	Please refer to common failures and maintenance
8	SOC	Display battery capacity	Please refer to common failures and maintenance
9	Switch	Control BMS up and down	N.A
10	Maintenance window	Measure the cell voltage; Through the external 2A small current, carry out the equalization function	N.A
11	Ground	Ground connection	N.A

2.4.3 Communication Interface



CAN/RS485

RJ45 Pin Definition		
Pin	**Definition**	**Description**
1	RS485_B	N.A.
2	RS485_A	N.A.
3	-	N.A.
4	CAN_L	Dominant Low
5	CAN_H	Dominant High
6	-	N.A.
7	RS485_A	N.A.
8	ISO_GND	Signal Ground



RS232

RJ11 Pin Definition		
Pin	**Definition**	**Description**
1	NC	N.A.
2	GND	Signal Ground
3	RS232_TX	Transmission
4	RS232_RX	Reception
5	GND	Signal Ground
6	NC	N.A.

2.4.4 LED Indication

The state of the system can be determined by observing the LED.

RUN	**ALM**	**SOC**	**BUZZ**	**Pack Status**
OFF	OFF	OFF	no buzzing	Power down / Sleep
Flash 1	OFF	-	no buzzing	Standby Normal Standby Voltage Alarm Voltage Project Current Limiting Discharge Current Alarm
Flash 1	Flash 3	-	no buzzing	Standby Temp Alarm Standby Temp Project
Flash 2	OFF	-	no buzzing	Charge Normal Charge Voltage Alarm Charge Current Alarm
Flash 2	Flash 3	-	no buzzing	Charge Temp Alarm
ON	OFF	-	no buzzing	Discharge Voltage Alarm
ON	Flash 3	-	no buzzing	Discharge Temp Alarm
Flash 1	Flash 2	-	buzzing	Temp Project Current Project Short-circuit Protection Reverse connect protection
ON	OFF	OFF	buzzing	system failure guard against theft;

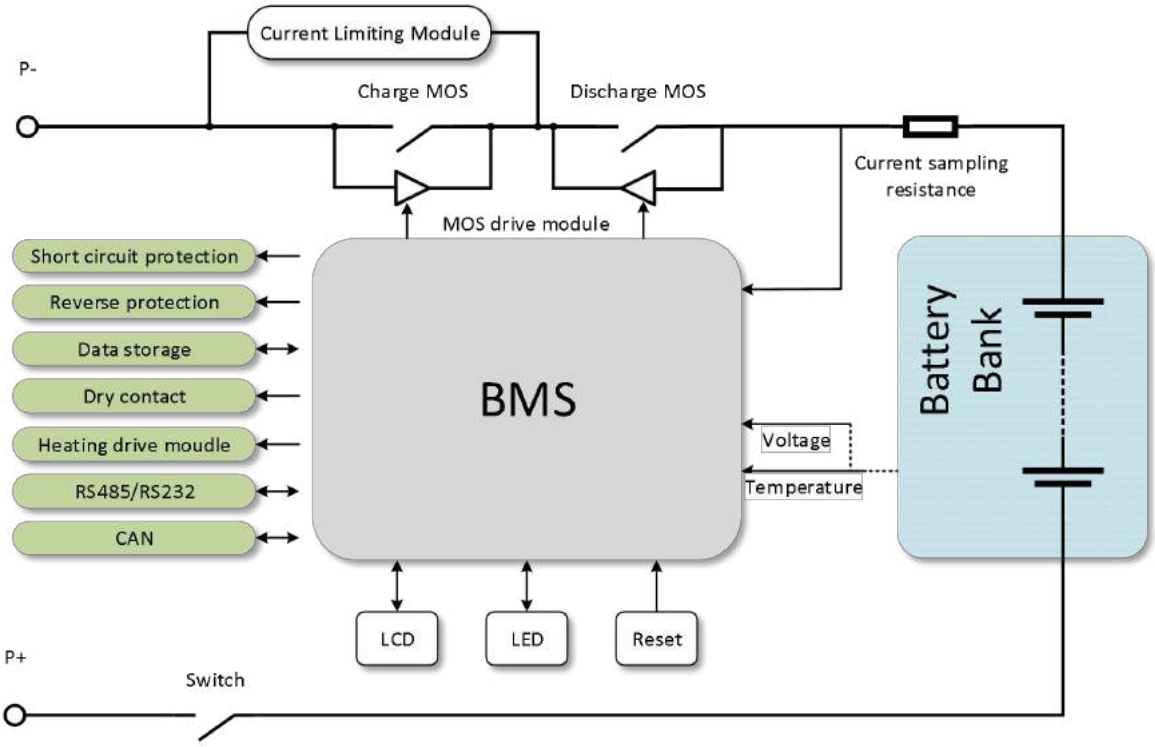
LED Flash State.

	Light	**Extinguish**
Flash 1	0.25S	3.75S
Flash 2	0.5S	0.5S
Flash 3	0.5S	1.5S

SOC-LED State.

	●	●	●	●
76%~100%	Bright	Bright	Bright	Bright
51%~75	Bright	Bright	Bright	
26%~50%	Bright	Bright		
0%~25%	Bright			

2.4.5 Schematic diagram of battery system



Explain

When the switch is off, the battery has no output.

3 Installation and Commissioning

3.1 OOBA (Out of Box Audit)

After the battery arrives, open the package and check the following items:

- Check for collision damage during transportation, if there is any damage, please inform the carrier immediately.
- Check whether the parts are complete and correct according to the shipping list. If missing parts or wrong specifications are found, please make on-site records in time and inform the supplier immediately.

3.2 Production of Cable

Explain

If no special purchase requirements, HRESYS provides 1:1 number of wire terminal and communication terminal by default. The cable needs to be made by the customer to meet the needs of the site.

3.2.1 Make the power cord

Please make the power cable according to the actual peak current. If batteries are used in parallel, note that the current on the total output cable of the battery is the sum of the output current of each battery.

DC Current	**≤50A**	**≤100A**	**≤120A**	**≤150A**
Copper wires are laid in the air (without pipes, single core)	5AWG 16mm^2	3AWG 25mm^2	1 or 2AWG 35mm^2	0AWG 50mm^2

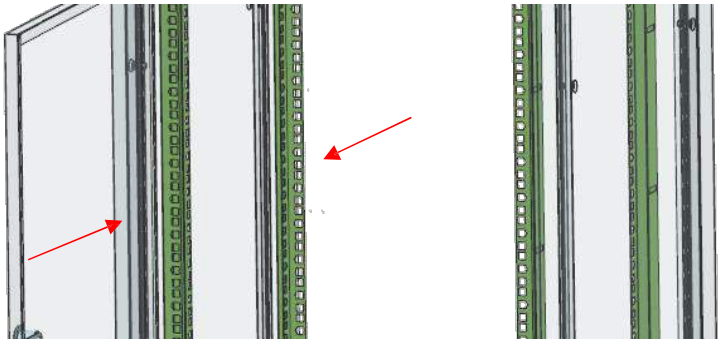
3.2.2 Make a communication cable

The communication interface of the battery is RJ45 or RJ11. Please make the communication interface of charging and discharging equipment according to the actual situation.

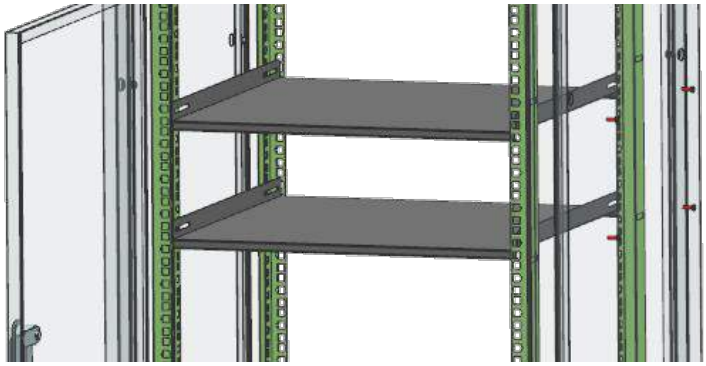
Protocols	**485 or CAN**	**232**
Hardware Interface	RJ45	RJ11
Line	5 types or 6 types of network cable	4 or 6 core single strand telephone line
The graphic description		
Remark	The sequence is modified according to the pin definition	The sequence is modified according to the pin definition

3.3 Rack Installation

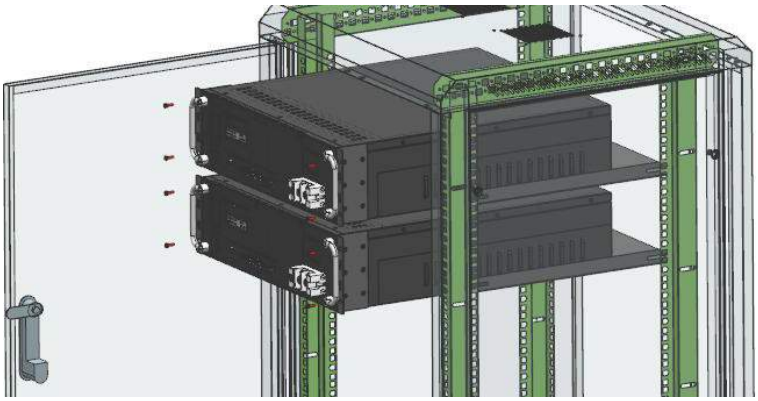
1) According to different battery models, adjust the front and rear distance of the cabinet mounting bracket appropriately to keep sufficient space between the front and rear panels of the battery and the front and rear doors of the cabinet.



2) The cabinet is set at a suitable baffle distance to place the battery.



3) The battery is pushed into the cabinet and secured with screws.



Explain

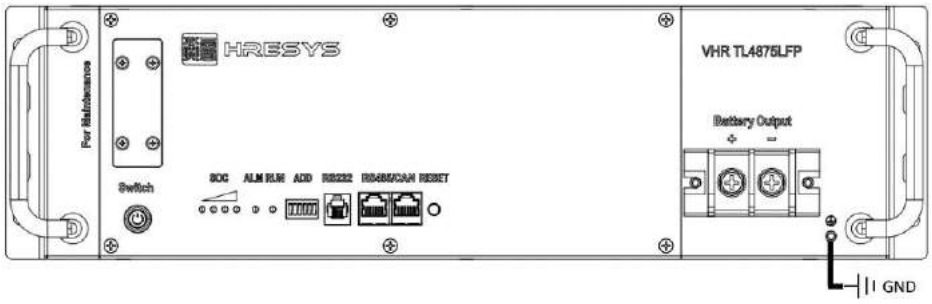
The battery is heavy, please confirm the load bearing of the cabinet and install the appropriate number of batteries in the same cabinet.

3.4 Grounding

Every battery should be grounded.

It is recommended to use conductors with the same cross-sectional area or not less than 1/2 of the cross-sectional

area of the power cord. Or wipe the paint off battery lug, screw to the cabinet, used for grounding.



Attention

✧ Check whether the positive and negative terminals of the battery are connected to the case. If they are connected, please do not use them. Liaise with suppliers in a timely manner.

3.5 Battery Installation

Warning

✧ Make sure that the battery is turned off and the external device is turned off and properly placed before wiring harness connection.

Attention

✧ Please consult the supplier before expanding or reducing the battery capacity.

✧ Installation between batteries should follow the principle of proximity. The minimum installation distance between the battery and the adjacent battery is recommended to be greater than 10mm.

✧ The connection distance between the charge-discharge equipment and the battery system should not exceed 2 meters.

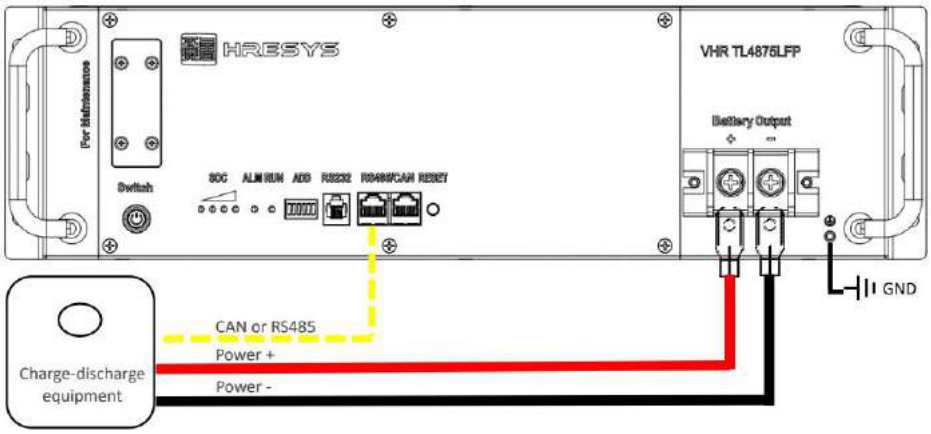
✧ The battery of the VHR TL48 Series have a single pole internal DC switch / isolator on the +P polarity, as the +P conductor is active polarity. In order to provide complete isolation of the battery output conductors, an external DC isolator is required in each live conductor. To achieve the complete isolation, a 2-pole isolator (Miniature Circuit Breaker) is required to be installed between the battery output and the inverter input on both polarities (+P and -P).

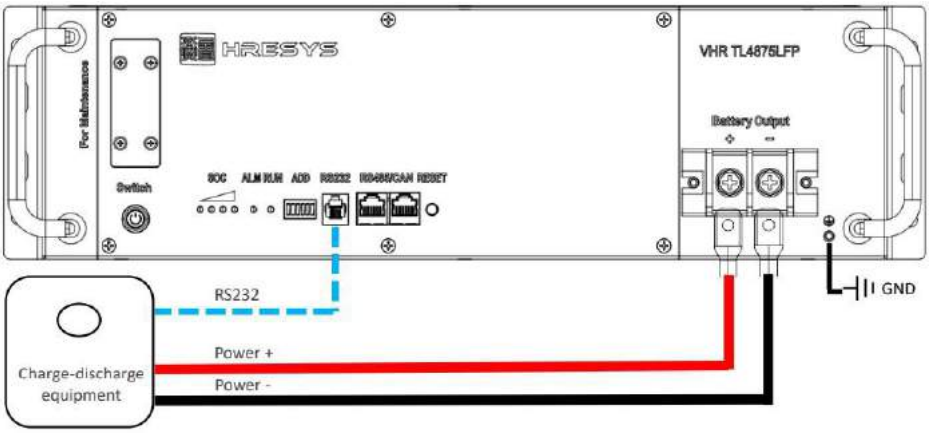
The rating of the circuit breaker must be: maximum battery output current times 1.2, i.e.:

Irat = Imax x 1.2 Amp DC;

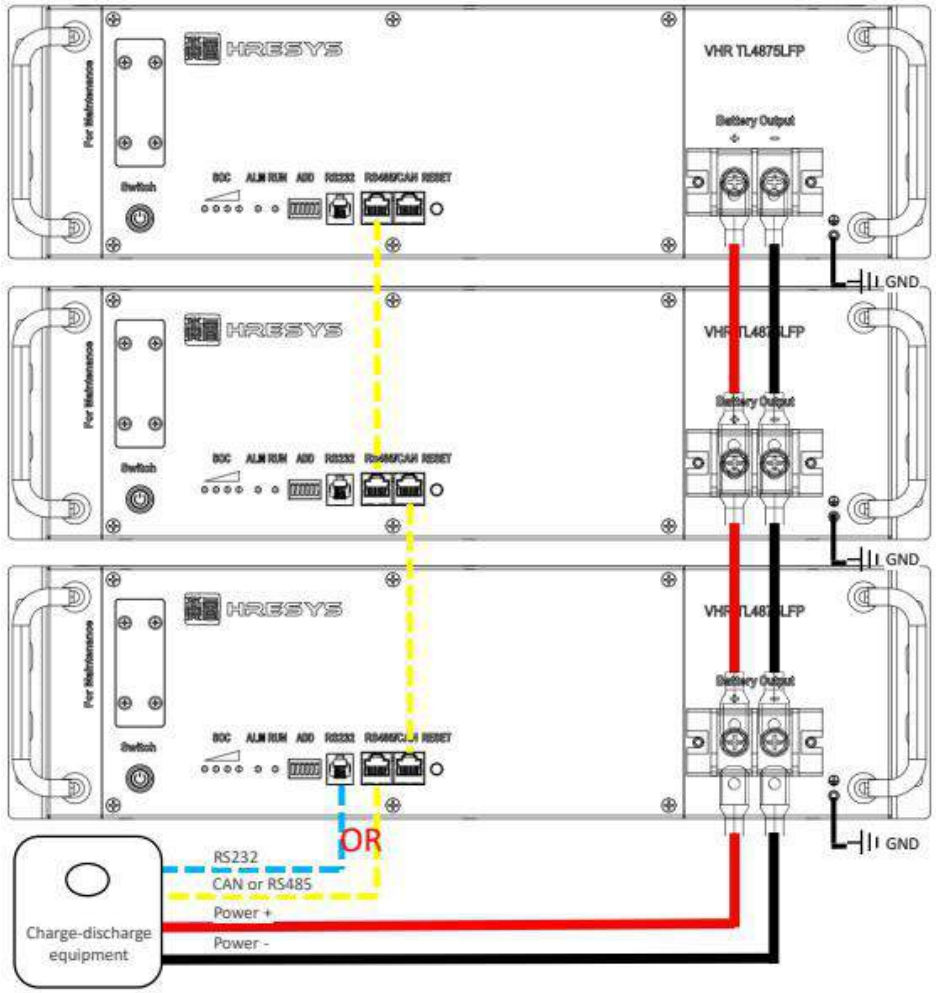
The breaking capacity of the isolator switch must be greater than 4kA.

3.5.1 Single battery installation





3.5.2 Multi-battery parallel application



Explain

According to the different protocol, the corresponding interface is selected for the communication harness connection.
"Battery Output" Please make the connection according to the actual situation.

When the total output current is less than 300A, a maximum of 16 batteries can be connected in parallel.
DC isolators are required in between battery systems in case multi-battery parallel connection

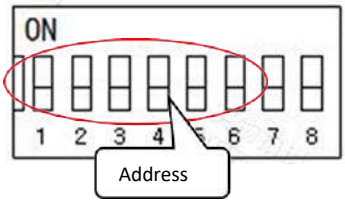
Warning

Installers are advised to adhere to the correct section of AS 5139 when batteries are connected in parallel. To meet AS 5139 requirements installer may need to alter the power cables and this will not void the product warranty.

3.6 Dial address configuration

During the multi-machine communication of the battery in parallel, the different Pack addresses can be distinguished by the dial switch. The hardware addresses can be set by the dial switch on the board.

- Single machine address setting: 0000 0000
- Parallel machine address setting: Refer to the following table for the definition of dial - code switch



PACK	Address			
	#1	*#2*	*#3*	*#4*
PACK1	OFF	OFF	OFF	OFF
PACK 2	ON	OFF	OFF	OFF
PACK 3	OFF	ON	OFF	OFF
PACK 4	ON	ON	OFF	OFF
PACK 5	OFF	OFF	ON	OFF
PACK 6	ON	OFF	ON	OFF
PACK 7	OFF	ON	ON	OFF
PACK 8	ON	ON	ON	OFF
PACK 9	OFF	OFF	OFF	ON
PACK 10	ON	OFF	OFF	ON
PACK 11	OFF	ON	OFF	ON
PACK 12	ON	ON	OFF	ON
PACK13	OFF	OFF	ON	ON
PACK 14	ON	OFF	ON	ON
PACK 15	OFF	ON	ON	ON
PACK 16	ON	ON	ON	ON



Attention

✧ It can be choose the seal cover and install it over the dial code to prevent miscontact after setting the address.

---

4 Use and Maintenance

4.1 Check Before Starting Up

- Check whether the wiring harness connection point is reliable.
- Check if the ground point is reliably grounded.
- Check whether the wiring is composite process specification.
- Check whether the load power exceeds the allowable range of the system.



Attention

✧ If the load startup power and startup time is too large, the equipment may be damaged. Ask the vendor before configuring.

4.2 System Power Up and Down

1) All devices are turned off.
2) Press the battery "switch", the switch enters the locked state, the battery is energized, the battery is running, and the "run" indicator flashes. If multiple batteries are connected in parallel, turn on the battery “switch” in turn.
3) Delay for 10S, wait for the Charge-Discharge Equipment capacitance to be full, close the Charge-Discharge Equipment switch, and the Charge-Discharge Equipment will be electrified.
4) After waiting for Charge-Discharge Equipment to work stably, start the load device.
5) Power down the system priority to close the Charge-Discharge Equipment switch, and then manually close the battery “switch”.



Attention

✧ Do not start the load at the same time, wait until the previous load is stable, then start one by one.

✧ The starting principle of high power load should be followed.

4.3 Battery Reset and Wake Up

Sleep condition	Wake-up condition	Remark
In the idle state (no charge, discharge, no communication), the lowest voltage of any cell is lower than the set sleep voltage (can be set), after 30 minutes, enter normal sleep.	Charge and discharge, communication, reset button	The battery with a soft switch and LCD can be waked up.
When the minimum cell voltage is lower than the cell over-discharge protection value (can be set) or the total voltage is lower than the overall over-discharge protection value (can be set), and after 1 minute, the under-voltage sleep is entered.	Charge, reset button, soft switch	The battery with a soft switch can be waked up.

Battery will enter to normal sleep after keeping idle state (no charge and discharge, no communication) for 24 hours.	Charge and discharge, communication, reset button	The battery with a soft switch and LCD can be waked up.
Forcing sleep through the host computer or soft switch	Reset button, soft switch	N.A.

4.4 Periodic Maintenance

In order to improve the system operation efficiency and reliability, it is recommended to complete maintenance operations regularly:

- Carry out full charge and full discharge operation regularly to calibrate SOC value.
- Regularly check the reliability of input/output and communication cable contacts.
- Clean the surface of the system with a dry cloth regularly, do not use liquid or spray cleaning, cleaning, pay attention to avoid short circuit.
- Check the running status of the system regularly to ensure timely detection of faults.

Explain

Full discharge: the battery pack continues discharging after full discharge until the BMS does not allow the system to continue discharging.

Full charge: the system charges the battery pack until the BMS does not allow the system to continue charging.

If Charge-Discharge Equipment operates the discharge state of the battery pack through the SOC value, please adjust the SOC protection point to 0% before full discharge.

4.5 Battery maintenance

Battery life depends on the ambient temperature and the number of charges and discharges. Long-term high or low temperature use, or deep charge and discharge will shorten the battery life.

- The battery runs for a long time, which will lead to the deviation of the cell consistency. The battery can be maintained regularly with a current of 0.1c or less
- The battery itself consumes electricity is less than 4%/month at 25 ℃ . The factory capacity of the battery is 30%~40%, if the battery is not used when it leaves the factory, it is recommended to take the battery out again and charge it to 50% capacity within 5 months. It can then be stored for a year.
- The battery itself consumes electricity is less than 4%/week at 50 ℃ . Please shorten the recharge time accordingly.
- Because the battery should avoid the temperature is too high or too low, humidity over the environment use. Refer to section 1.3 of the first sheet for details of the usage environment.
- The normal service life of the battery in a normal environment is about 3000~4000 cycles. If two cycles are carried out every day, the battery can be used for 4~5 years.
- If the battery is found to be in bad condition, please replace it as soon as possible, do not replace it without permission, please get the supplier's permission.

4.6 Common Fault Diagnosis

Fault Phenomenon	Cause Analysis	Solution
Battery not recharging	1) The battery is in the state of full-charge, no charging sign has not been removed. 2) The battery over-temperature, under-temperature and over-current cause protection, no charging allowed. 3) The positive and negative power lines are inversely connected to the positive and negative terminals of the battery. 4) External or internal short circuit causes battery protection. 5) Other faults caused by battery protection.	Observe the operation of the panel indicator light and judge the battery status. 1) After discharging or restarting the system, the battery can be charged normally. 2) After the protection is automatically eliminated or manually restarted, the battery can be charged normally. Please first eliminate the external factors that cause battery protection. 3) Check whether the external wiring is correct. 4) Check external circuit for short circuit. Battery short circuit, contact the supplier to solve. 5) Contact the supplier for handling.
Battery does not discharge	1) The battery is in the state of discharge, and the discharge mark is not removed. 2) The battery over-temperature, under-temperature and over-current cause protection, no charging allowed. 3) The positive and negative power lines are inversely connected to the positive and negative terminals of the battery. 4) External or internal short circuit causes battery protection. 5) Other faults caused by battery protection.	Observe the operation of the panel indicator light and judge the battery status. 1) The battery can discharge normally after charging or restarting. 2) The battery can discharge normally after the protection is automatically eliminated or restarted manually. Please first exclude external factors that cause battery protection. 3) Check whether the external wiring is correct. 4) Check external circuit for short circuit. Battery short circuit, contact the supplier to solve. 5) Contact the supplier for handling.
Battery failed to start	1) The total battery pressure is too low, so the BMS cannot start. 2) The switch damaged, unable to press the. 3) LED damaged, battery on. 4) The battery is disconnected internally.	1) Contact the supplier to restore battery voltage. 2) Contact the supplier to change the switch. 3) Observe whether the inverter can display battery data and contact the supplier to replace the LED. 4) Contact the supplier for handling.
Battery display capacity and	1) SOC display deviation.	1) Calibrate the SOC according to the

the actual use of a large gap		content in section 4.4 of chapter 4 and maintain it regularly.
Off - grid system, first open the Charge-Discharge Equipment, then open the battery, the system cannot start	1) Starting current is too large, resulting in battery short circuit protection.	1) Start in the exact order specified in the Charge-Discharge Equipment setup manual.
Battery protection after system load is turned on. An off-grid system can cause the entire system to go offline	1) The starting power of the load exceeds the maximum current allowed by the battery pack. 2) The load rating exceeds the maximum current allowed by the battery pack.	1) Ask the supplier to change the battery threshold or add a battery pack. 2) Consult the supplier to add battery pack.

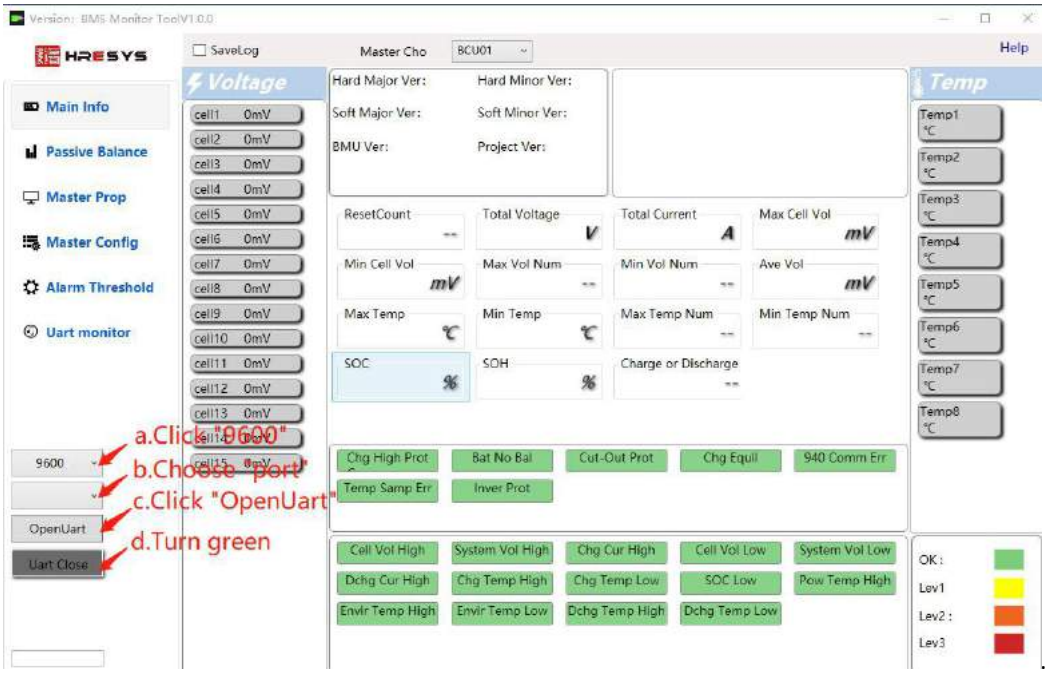
5 Battery Status Monitoring

5.1 Monitor the use of tools

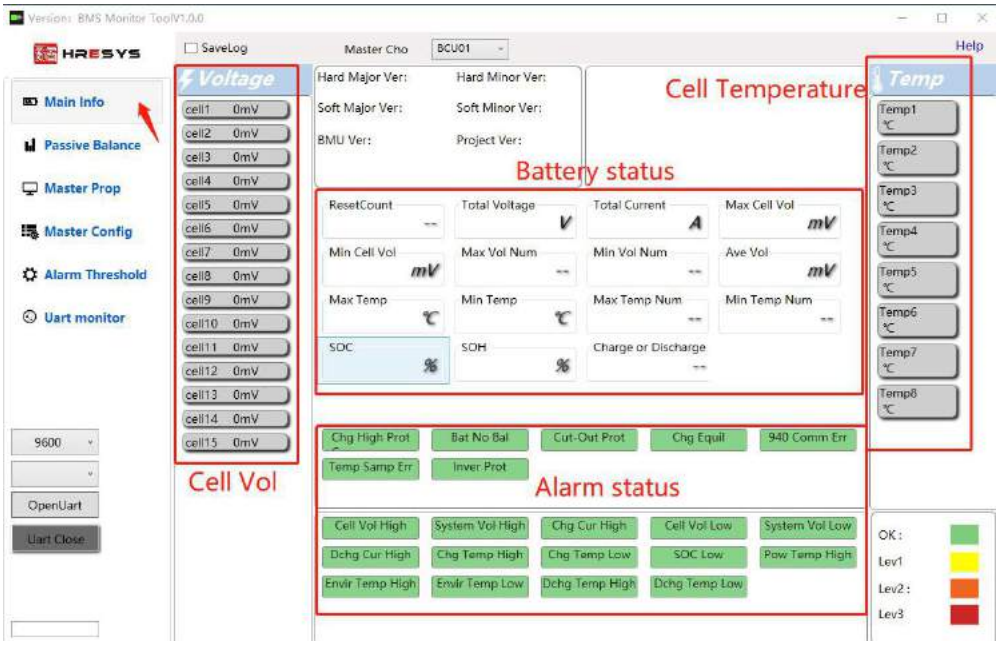
1) Please open the “BMS Monitor ToolVx.x.exe” program, under the folder “../TOOLS/HR BMS Monitor ToolVx.x”.



2) Use RS485 connection monitoring tool, select baud rate to 9600, select port number according to the actual situation, and then click "OpenUart". After opening the port, the gray "Uart Close" changes to the green "Uart OK".



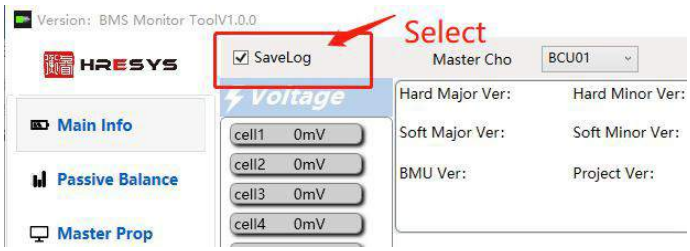
3) When the communication connection is successful, can see the relevant data of the battery pack in the “Main Info” page, contains cell voltage, cell temperature, charge and discharge status, alarm status and other information..



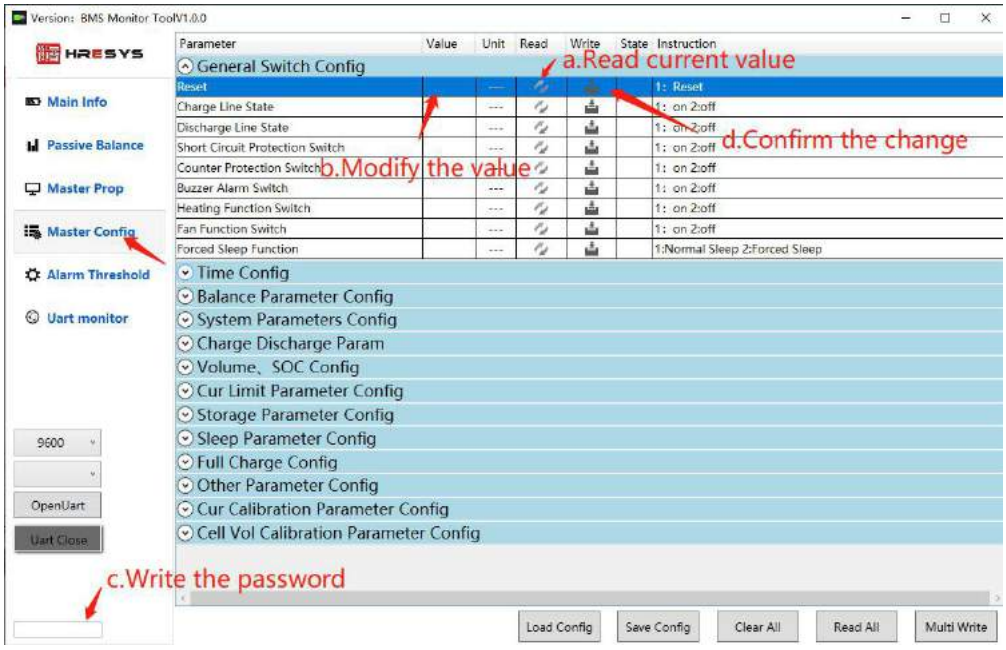
4) When multiple battery packs are connected, the data of different battery packs can be monitored by selecting the device number.



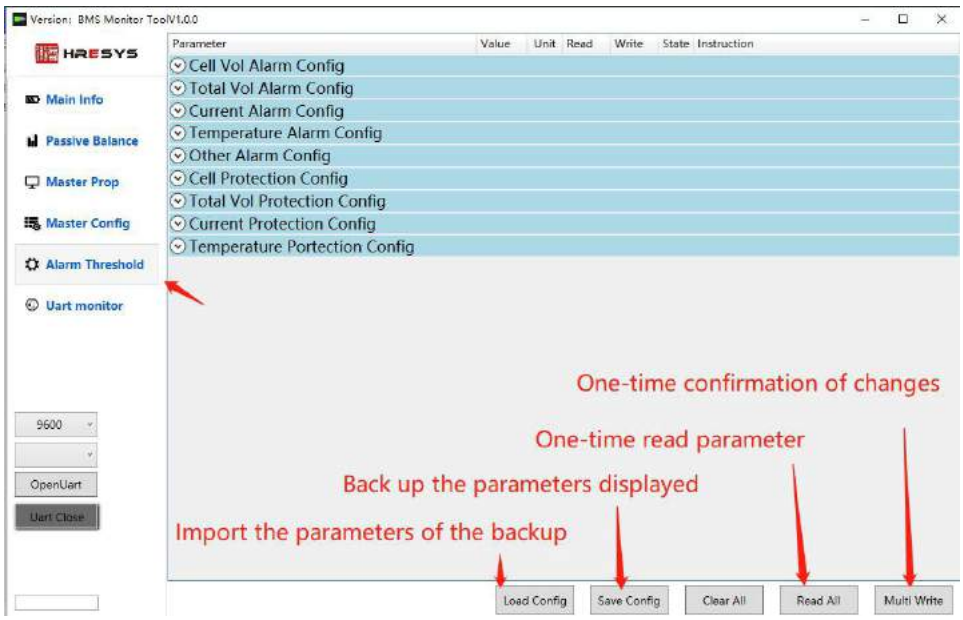
5) Check the “Savelog” and keep the tool and battery pack in constant communication. Can record battery pack data in "../HR BMS Monitor ToolV1.0/LogFile/BACK_UP_POWER_2".



6) On the ”Master Config” page, can read and modify some system parameters. Need to read the current parameter first, write the password if necessary, and finally write the parameter. Once parameters have been written, it is impossible to restore them with one click, so be careful when modifying them or doing backups.



7) On the ”Alarm Threshold” page, can read and modify some protect parameters. Need to read the current parameter first, write the password if necessary, and finally write the parameter. Once parameters have been written, it is impossible to restore them with one click, so be careful when modifying them or doing backups.



8) Keep the parameters of other page unchanged.

9) When the software has a large iteration, the monitoring tool will display the parameters or garbled code of the previous version, write 2 in "Reset Eeprom" in "MasterConfig" page to reset the alarm parameters on “Alarm Threshold” page and some system parameters on “Master Config” page back to factory Settings.







Attention

✧ If just finished the upgrade and the parameter display is incorrect, please write “1” to reset the system in the "Reset" under "Master Config" page.

✧ Do not easily reset “EEPROM”, which may cause written parameters to be reset to factory parameters.

✧ If want to keep the parameters written before, should not reset “EEPROM” before or after upgrading.

✧ Do not arbitrarily change any parameters, which may affect the system operation.

✧ By default, red is the highest alarm level.

✧ If the communication is unsuccessful, check that the connection is correct, check if the serial port is occupied, check that the baud rate is correct.

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6 Technical Parameters

Explain

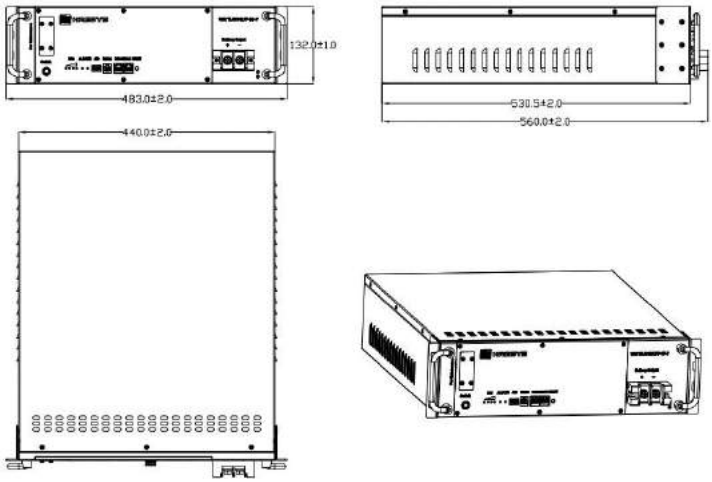
The threshold value is different according to different projects, which is only for reference here.

Subject to change without prior notice.

Item	VHR TL48100LFP-3U-(A/B/C/D/E/F/G)
Nominal Capacity	100Ah
Nominal Voltage	48.0V
Charge Voltage	54.0V
Voltage at End of Discharge	41.5V
Maximum Continuous Charge Current (CC Threshold)	100A
Allowable Maximum Continuous Charge Current (Charge-Discharge Equipment)	50A
Over Current Protection(Charge)	105A/3S
Over Voltage Protection	3.70V/cell
Maximum Continuous Discharge Current (CC Threshold)	100A
Allowable Maximum Continuous Discharge Current (Charge-Discharge Equipment)	100A
Over Current Protection(Discharge)	105A/3S
Under Voltage Protection	2.75V/cell
Operation Allowable Temperature Range	Charge: 0～55°C Discharge: -20～55°C
Operation Allowable Humidity Range	≤90% RH Operation ≤75% RH Storage
Recommended Storage temperature	10～35°C
FUSE	180A

6.1 Appearance and Structure

The size of the certification battery shall refer to the drawing, refer to 2.4.1 for appearance. The details shall be in kind. The minimum clearance distance required around VHR TL48100LFP-3U is 12mm.



VHR TL48100LFP-3U-F

7 Acronyms

B	
BMS	Battery management system
C	
CC	Constant Current
CAN	Controller Area Network
G	
GND	Ground
GPS	Global Positioning System
L	
LED	Light-emitting Diode
LCD	Liquid Crystal Display
N	
NC	Reserved
R	
RT	Room-temperature
RS232	Recommend Standard 232
RS485	Recommend Standard 485
S	
SOC	State of Charge



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