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Integrated Lithium-ion Battery Pack for Telecom

User Manual

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REPLUS

An HEG Advanced Materials Company

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FOREWORD

Overview

This manual describes the installation, history recording and parameter settings etc.

Please keep the manual in safety for more information.

Readers

This document provides technical details regarding the tools and infrastructure used by the following users:

- Sales engineer
- Technical support engineer
- Installation engineer
- Application engineer
- Maintenance engineer

Symbol convention

The following symbols may appear in this article, and they are represented as follows:

Symbol	Indication
	Used as warning in an emergency, if not avoided, it will result in death or serious personal injury.
	Used as a warning of a middle or low potential hazards, if not avoided, it may cause minor or normal injury.

 caution	Used as a warning of potential dangers, if ignore this information, it may result in broken equipment, damage, data lost, equipment performance decrease and other unpredictable result.
	Represents the supplement information of main text to emphasize or replenish.

Change History

Changes between document issues are cumulative. The latest document contains all the changes made in previous issues.

Version：V1.0 (2026-09-10)

This version is the first official release.

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1 OVERVIEW

1.1 Product specification

The model of integrated lithium-Ion battery (hereafter referred to as lithium battery or PACK) for Telecom is shown in figure 1-1.

OVERVIEW

Belonging to one of the series of 48V communication for back-up lithium battery products, the system adopts the international advanced lithium iron phosphate battery application technology and BMS control

technology. Due to it's a long lifecycle, small size, light weight, stable performance, safety and environmental protection, as well as a strong ability to adapt, it can be used in harsh outdoor environments.

The system integrates advanced battery management system (BMS), including charge and discharge management, thermal management, communication management, balance management, data management, and realize remote centralized monitoring, remote management and maintenance of the battery. It has outstanding advantages on specific occasions, as a backup power supply is widely used in the remote access network equipment, exchange, mobile communication equipment, transmission equipment, satellite and microwave communication equipment and communication.

.2 Product profiles

The lithium battery group is developed by © **REPLUS ENGITECH PRIVATE LIMITED**

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2 ILLUSTRATION

2.1 Panel description

The INDUS REPL48100_01 series lithium battery panel as Figure2-1 shows below.

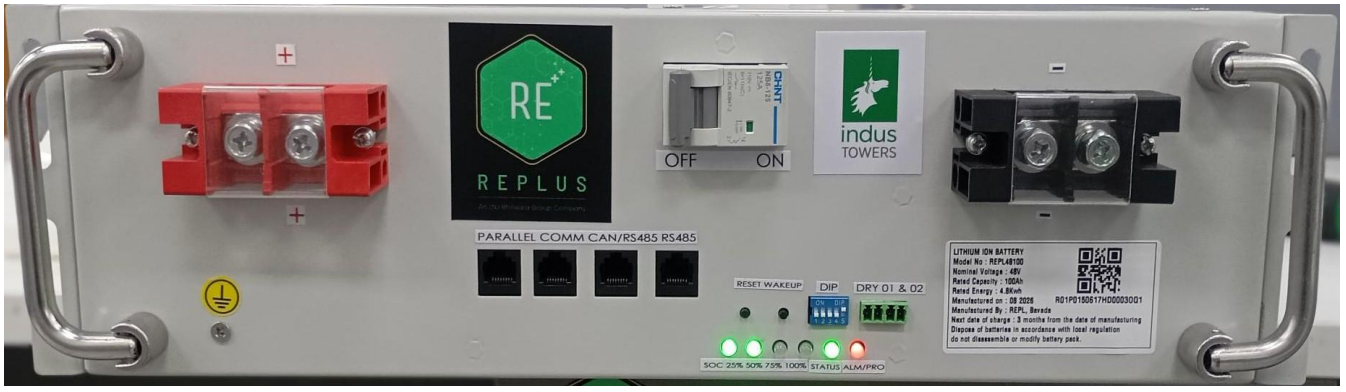
Figure2-1 Module panel description



For detailed descriptions of each location, see the following figure2-2.

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Figure2-2 Panel Effect Chart



Handle

Made of galvanized steel and made for transportation.

SOC

The meaning of SOC indication light shown in table 2-1

Table2-1 the relationship between the capacity of the battery and the light

●	●	●	●	Capacity
¤	¤	¤	¤	75%-100%
¤	¤	¤	○	50%-75%
¤	¤	○	○	25%-50%
¤	○	○	○	0%-25%

INTRO ¤indicates ON, ○indicates OFF。

ALM

When the battery is at fault, "ALM" light is red.

RUN

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During charging, the "RUN" light will be green.
During discharging, the "RUN" light will be flashing.

"RUN" and "ALM" can display the battery status, as shown in table 2-2.

Table2-2 the explanation of “RUN” and “ALM”

Function	Mark	Color	Flashing frequency	Indication
Running	RUN	Green	No light	Not working
			Slow Flash (about 3 secs)	Standby state
			Fast flash	Working state
Alarm	ALM	Red	No light	Normal
			stable lighting	Alarm

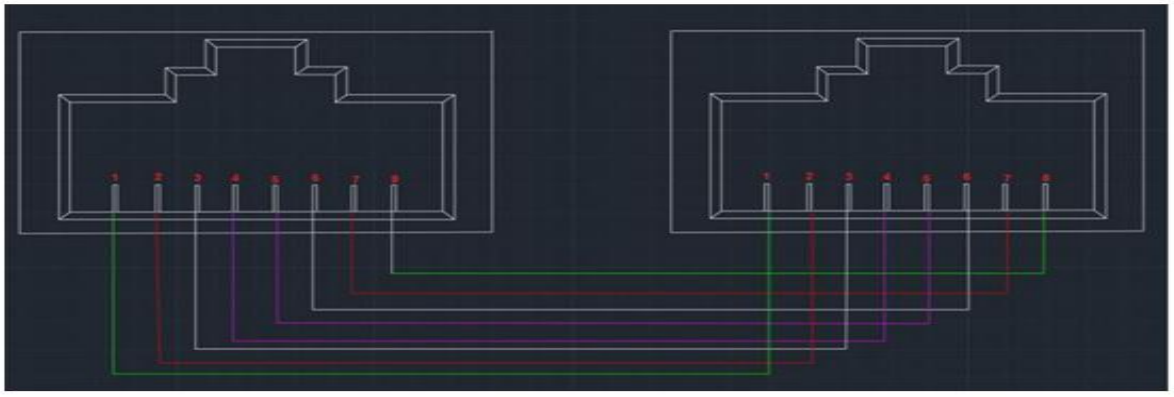
ADD

In parallel, band switch using four dip switches to address set cell system. The explanation of its dial switch as shown in table 2-3.

Table2-3 Band switch address code

RS485 Communication Single pack address setting: #1, #2, #3, #4, #5, #6, #7, #8 all set OFF					
	1	2	3	4	5
1st PACK	OFF	OFF	OFF	OFF	ON
2nd PACK	OFF	OFF	OFF	ON	OFF
3rd PACK	OFF	OFF	OFF	ON	ON
4th PACK	OFF	OFF	ON	OFF	OFF
5th PACK	OFF	OFF	ON	OFF	ON
6th PACK	OFF	OFF	ON	ON	OFF
7th PACK	OFF	OFF	ON	ON	ON
8th PACK	ON	OFF	OFF	OFF	OFF
9th PACK	ON	OFF	OFF	OFF	ON
10th PACK	ON	OFF	OFF	ON	OFF
11th PACK	ON	OFF	OFF	ON	ON
12th PACK	ON	ON	OFF	OFF	OFF
13th PACK	ON	ON	OFF	OFF	ON
14th PACK	ON	ON	ON	OFF	OFF
15th PACK	ON	ON	ON	ON	ON

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PINS	DEFINITION
1/8	RS485 B
2/7	RS485 A
3	GND
6	NC
4	CAN H
5	CAN L

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When the system is in parallel mode, it can use the RS-485 serial Telecom for data transfer. The main system through the Master Pack to get data for each Slave Pack. Connection as shown in figure 2-4.

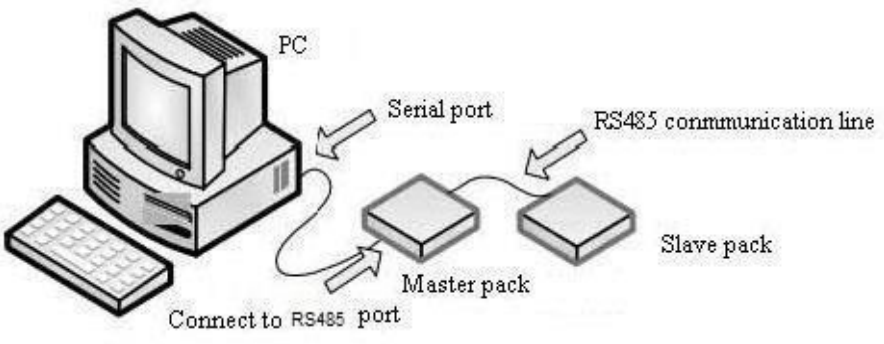


Figure 2-4 RS-485 connection schematic diagram

RESET

Press RST key for 3 seconds, then start the device, press the RST key for 3 seconds again, and then shut down the device. When the system is running, should there be an exception, press this button for 6 seconds to reset the system (press / release) to ensure the stability of the system.

Dry contact

The function of the dry node is to provide an interface for the status of the remote monitoring battery. Failure Alarm: indicate BMS or battery failure including but not limited to charge and discharge MOS failure, cell voltage under 0.5V, NTC disconnect. Protection Alarm: Output short circuit, charge and discharge over current, charge and discharge over temperature/low temperature.

Output

A terminal of 4 pin, 2 pin for the positive, 2 pins for the negative, each pin is the specification for M6 Stud.

LCD display (optional)

LCD display can read Battery status, cell status, firmware version, protection/alarm, etc.

2.2 Menu operation instructions (optional)

The LCD display interface is user-friendly, as shown in figure 2-5. It provides 320* 240 dot matrix graphic display. The LCD can display alarm information in real time and provides historical warning records for the user to query and provide a reliable basis for fault diagnosis.
Figure 2-5 LCD Display

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2.3 The working principle

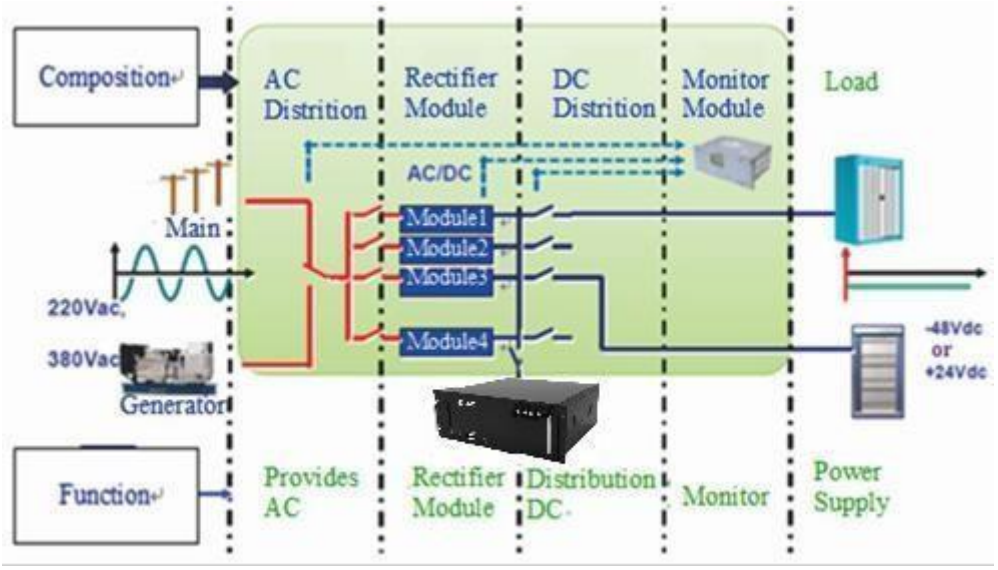
INDUS REPL48100_01 series lithium battery pack is equipped with charging and discharging management module and monitoring module.

Charge and discharge management module protects battery charge and discharge functioning, prevents overcharging, discharge over-current, the charging process by the adapter charger to the DC input form, the discharge process is completed by connecting the load discharge.

The monitoring module has balance function and power, temperature and SOC. The monitoring module transmits the real-time information collected in the operation of the product through the Telecom protocol network to the monitoring platform, and the user can observe the operation status of the battery in each group through the display screen.

A single module has a 48V 100Ah, with a large capacity, can be used in accordance with user requirements arbitrary combination. As shown in figure 2-6.

Figure 2-6 the working principal diagram



2.4 The product features

INDUS REPL48100_01 series integrated lithium battery pack for Telecom has the following remarkable characteristics:

- The lithium iron phosphate as cathode material has a long-life cycle, its safety is extremely good.
- The operating temperature range is: 0 ~ 45 ℃.
- It has strong charge discharge capacity, charge and discharge rate can support 1.0C.

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- It can support multiple batteries for expansion.
- During storage and transport, L can enter the sleep mode, to reduce the loss of capacity.
- The Port design is convenient; all wire harnesses connected to the plug, convenient connection.
- Lightweight, small size, easy to install and maintain, meets the requirements of the standard cabinet, can be wall mounted, or mounted on a pole.
- Battery status parameter is the system for real-time monitoring of current and voltage, temperature, alarm and protection function.
- The function of "four remote" (telemetry, remote signaling, remote regulating and remote control), can be connected by computer with remote control center.
- It is environmentally friendly.



1) Telemetry: voltage, current, temperature, SOC, SOH (optional), etc.
2) Tele-signal state of charge and discharge, overcharge / overcurrent, under voltage
overcurrent alarm / alarm, environment / battery /PCBA/ battery temperature alarm, low environmental temperature alarm, battery capacity is too low, the battery temperature / voltage / current sensor failure alarm, battery failure alarm (just not cut off the monomer pressure high limit alarm) (optional), battery failure alarm (optional).
3) Remote control: charge / discharge (optional), alarm sound off, intelligent intermittent charging mode, current limiting charging mode, etc.
4) Optional: Battery charge / discharge management parameters and the output parameters of the switching power supply system.

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3 INSTALLATION GUIDE

3.1 Installation precaution notes

Comply with local laws and regulations

When operating the equipment, make certain to comply with local laws and regulations.

Personnel requirements

Technicians who are responsible for installation and maintenance are required to undertake strict training in REPL first. Master the correct methods for operation and safety, only then the installation, operation and maintenance can be carried out.

To maximize the efficiency of the equipment, to obtain best possible operating results, and ensure maximum lifespan, please pay careful attention to the correct installation and usage requirements.

Personal safety

- Insulated tools and gloves should be used and always worn – During the installation process, watches, bracelets, rings and other metal products should be removed.
- Avoid any fall or collision during the installation process.
- Do not remove the battery components. The maintenance of the battery should be carried out by a professional engineer.
- Should be operated and supervised by engineers who have experience and can take preventive measures for potential hazards of battery.

Field and environment

- Site requirements

1) Cleanliness

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Lithium battery packs cannot be placed in or near garbage disposals, or accidentally dropped or placed in smaller disposal units, as their interaction with metals is likely to cause short circuits and endanger the system and personal safety.

2) Fire protection

The room is prohibited to store flammable, explosive and other dangerous goods, and it should be equipped with effective fire equipment (such as CO2 fire extinguishers).

3) Ventilation and heat dissipation

To facilitate the operation and maintenance of equipment for the heat, the equipment should be left around (50~30) cm around at least, left about 50cm for upper space. The space should be equipped with exhaust fan, to maintain good indoor ventilation.

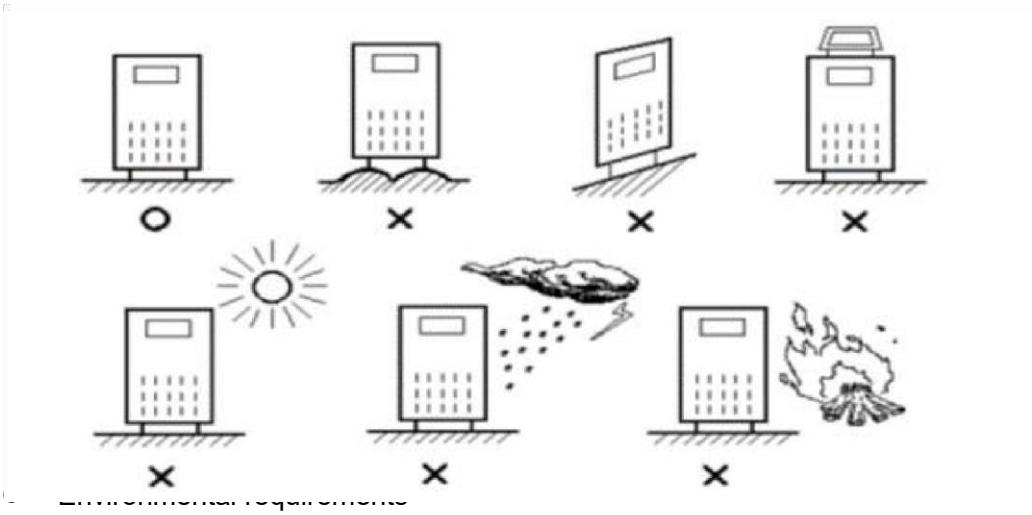
4) Installation requirements

Installation should be carried out as shown in figure 3-1 to avoid possible risks.

Put the lithium battery on the ground (to avoid tilt, uneven ground). Avoid

placing in the sunlight, rain or wet surfaces.

Figure 3-1 Requirements for installation scenarios



Ambient temperature: (-10~+40) ℃.

Relative humidity level: 0%RH~95%RH, no condensation.

Cooling method: air cooler.

Height above sea level: match to the standard requirement of GB3859.2-93.

Verticality: no vibration and the vertical inclination does not exceed 5º.

Pollution level: Level ⅱ.

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Recommended operating temperature: (20~25) ℃, humidity level control within 50%.

- Do not install in the working environment with metal conduction type dust.
- Do not put anything containing corrosive gases.
- Do not put anything in the dust concentrated areas.
- Do not place any items on the top of lithium-ion battery pack. People could not sit on the battery.

Power check

Before installation, please confirm that the load capability of inlet wire meets the requirements of the new equipment. Check to see if the power supply corresponds to the equipment nameplate of the voltage and frequency and if the current capacity has decreased due to the aging of the wire.

If you are in doubt, please check with your local power supply Consultation Department.

- Ground wire

Earthling terminal is ready; zero voltage required in the room cannot exceed 5V.

- DC output voltage and load capacity

  Lithium-ion battery pack of rated DC output 48V.

  DC output power

- When installing the lithium-ion battery pack, the user should check the lithium-ion battery pack in advance to make sure that the contacts and connectors are safely in place to avoid an open circuit or short circuit fault.
- During installation, do not connect the lithium batteries polarity in reverse or in any way incorrectly, to avoid causing a short circuit.
- Please do not connect the terminals with no security or insulation protection, to avoid the risk of electric shock.

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3.2 Installation preparation

3.2.1 Unpacking and inspection

INDUS REPL48100_01 series lithium batteries and accessories use packaging of cardboard boxes or wooden boxes. When unpacking, be careful when dismantling. Inspect the device and accessories according to the package list, to ensure its complete and make certain nothing was damaged during shipping.

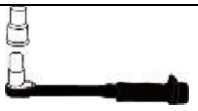
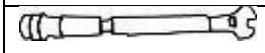
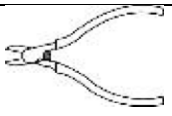
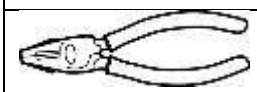
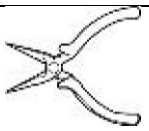
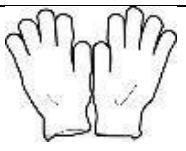
Before clearing the packaging, make sure that all parts are included. If equipment or accessories are damaged in transit, or incomplete or incompatible, the equipment, accessories and order contracts should be recorded and immediately contact the local branch or office of LIB company.

The site needs to be reviewed and inspected once again to make sure the audit documents are for the audit. Before inspection, the site should be clean.

3.2.2 Installation tools

Potential commonly used tools as shown in table 3-1~3-4 the field technician will increase or decrease the amount according to the construction.

Table3-1 General purpose tools

The appearance of the tools, parameters, and names			
Adjustable wrenches	Phillips screwdriver	Slotted screwdriver	Socket wrench
			
Torque wrench	Open-end wrenches	Double offset ring spanner	Diagonal cutting pliers
			
Wire cutters	Needle nosed pliers	Marking pen	Working gloves
			
Ladder (2m)	Flashlight	Tape measure	Impact drill

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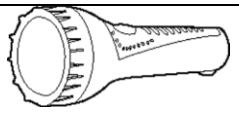
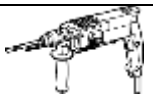
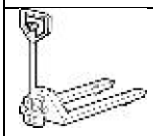
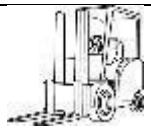
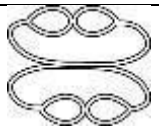
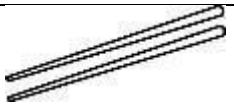
			

Table3-2 Tools for delivery and unpacking

The appearance of the tools, parameters, and names			
Manual forklifts	Electric forklift	Sling weight≥ 400kg）	Leverage （weight≥400kg）
			

Table[2]-3 Electrical installation tools

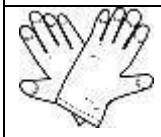
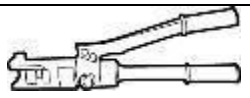
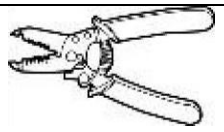
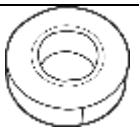
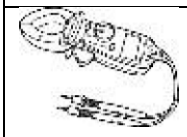
The appearance of the tools, parameters, and names			
Insulated gloves	Power cable crimping plier	Wire stripping pliers	Electrical tape
			

Table3-4 Measuring Tools

The appearance of the tools, parameters, and names			
Clamp the flow table			-
			-

3.3.1 Standard cabinet installation

Mounting fixed

The standard cabinet installation is to place the product on a pallet in a 19-inch standard cabinet, push into the cabinet, with 6 m6*15 bolts through the product on both sides of the chassis hanging ears on the 6 mounting holes, with square nuts to

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3.3 .2 Installation and wiring

- Before installing, make sure that the switching power supply system is off and that the battery's system switch is off.
- The installation should ensure that the wiring platoon, bus and so on the dust has been wiped clean, after installation check, all connecting bolts are tightened. To designate a person to check, the person responsible, to ensure that all bolts are in a state of tightening.
- If the installation is complete without connecting mains, disconnect the battery and switching power supply. Before the official opening of the battery pack must be supplemented, so as not to the future of the normal use of battery packs to bring great harm hidden danger.
- At least two or more people should be operated on the construction site.

The product fixed in the square cabinet must ensure that more than or equal to 4 holes in the lock and die.

Figure3-2 Schematic diagram of standard cabinet installation

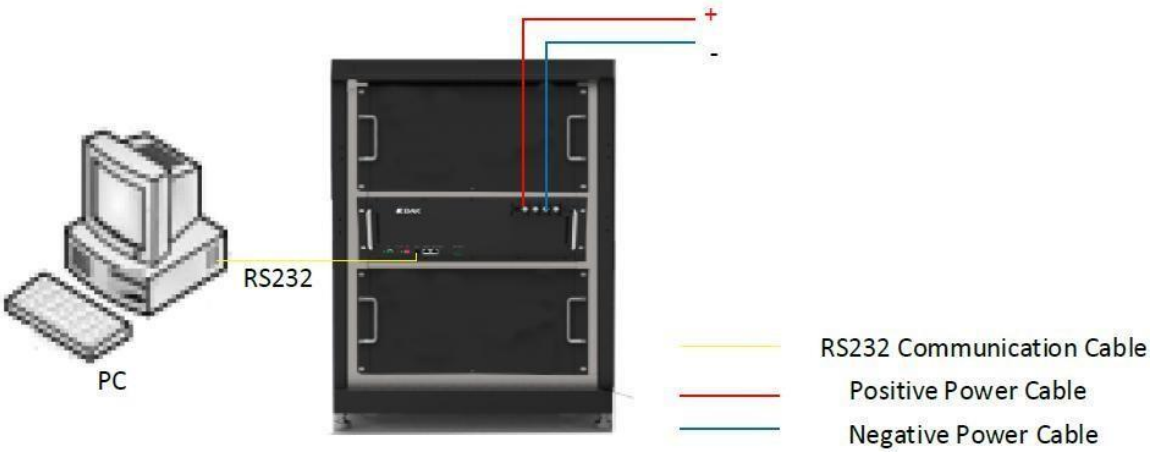


Battery Output Connection

The positive and negative polarity of the battery output terminals on the lithium-ion battery system chassis relates to the positive and negative polarity of the DC switching Power module battery terminals by using the attached red and black cords respectively.

Figure 3-3 Connection diagram

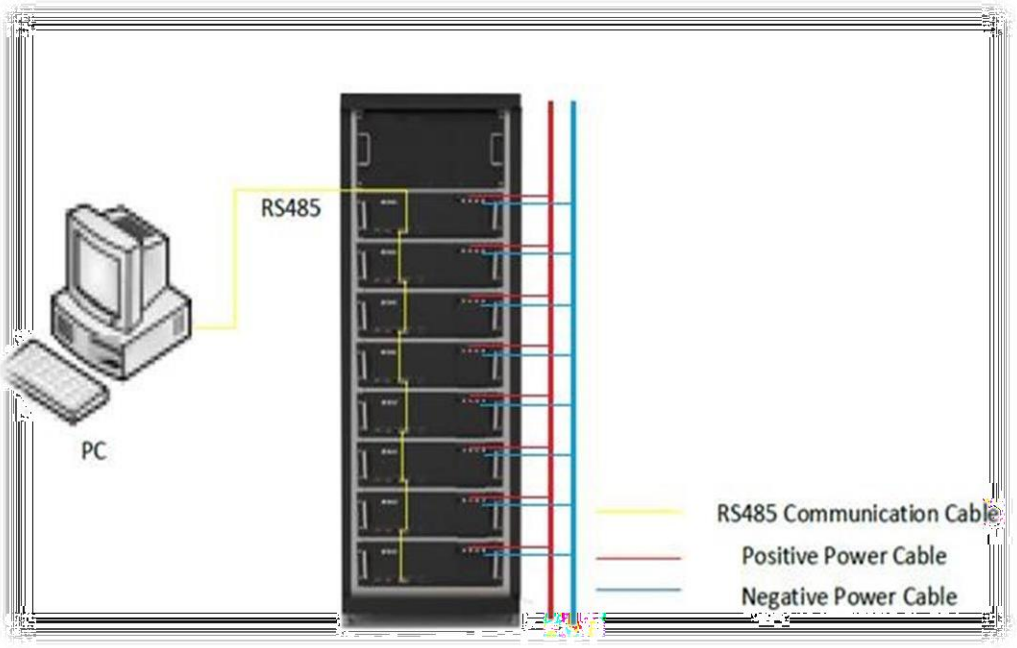
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Multi-group Parallel use

If multiple systems are required in parallel, the positive electrodes of the output terminals of several lithium-ion batteries are connected, and the negative be connected with the negative. Please refer to the figure below.

Figure 3-4 parallel use



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Switch power supply parameter setting

After installation, test whether there is a short-circuit phenomenon, if not, you can directly on the electricity.

Switch power supply module parameters should be set according to the following table:

Table3-5 Switch power supply parameter setting

Item	Parameters	Notes
Floating charge voltage	51.00V ~ 51.75V	/
Uniform charge voltage	52.50V ~ 54.00V	/
Charge current	≤0.2C/Module	If the current exceeds 0.2C/Module please contact our technical staff.

After the parameter is set up, it can be used normally, when the power outage, the product is no delayed to the communication equipment to provide back-up power supply support.

INTRO

1) Before the parallel installation, setting the battery to the limited charging mode is very important. For detailed operations, please refer to Integrated Lithium-ion Battery Pack PC Software User Manual, and it will be provided with this manual.

2) Capacity load (namely in line with the voltage-hysteresis current load), to ensure the work, start the power supply module first, then load.

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4 MAINTENANCE

To ensure the lithium-ion battery pack achieves the longest life cycle, the maintenance technician should carry out regular inspections and maintenance care.

The maintenance records should be complete and routine, so that subsequent verification of management parameters of the battery pack can be tracked.

4.1 Electrical maintenance

Maintenance of the electrical parts may refer to table 4-1.

Table4-1 Table of contents for maintenance

Items	The checking Points	Methods	Repair conditions	Repair solution
Electrical	Check if the Output of the voltage is normal	Multi meter	Battery voltage out of range set	See the following troubleshooting section
Fault inspection	Check if lights are normal	Visual inspection	Alarm	
Cable	Insulation, Terminal	Visual inspection	● Insulation cracks, aging ● Exfoliated, corrosion of the terminals	● Replace the cable ● Replace the terminal block

4.2 Battery maintenance

Table4-2 Contents of battery maintenance

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Frequency	Items	Solutions
Monthly	Operating environment	Stay away from heat source and avoid direct sunlight.
	Visual inspection	If there is any breakage, leakage or deformation, Isolate the problematic battery pack, take a photograph and replace the battery.
Quarterly	Visual inspection	Use cotton cloth to clean the appearance. Be careful during cleaning because the voltage is high.
	Connection status	● Check each terminal, check the bolt, if it's loose, and tighten it again. ● Check the reason if the cable temperature exceeds 40℃.
Every 6 months	Measure and record the voltage	● At the final stage of charging, record the voltage; make sure the positive and negative voltage of the battery are the same. Otherwise, should check and repair the corresponding connection cable. ● Collect the discharging data at least once every six months for the first year. ● In the second year, capacity is determined by every three months. Through the RS232 interface to view history, which shows frequent overcharge of a battery in the alarm message, indicating that the batteries have reached the charging and discharging protection point. This may result in time for preparing electricity is not enough and suggest changing the battery immediately.

INTRO

1) Charge and discharge status at the final stage can go through capacity light to display. Please refer to 2.2 for the definition of capacity lights.

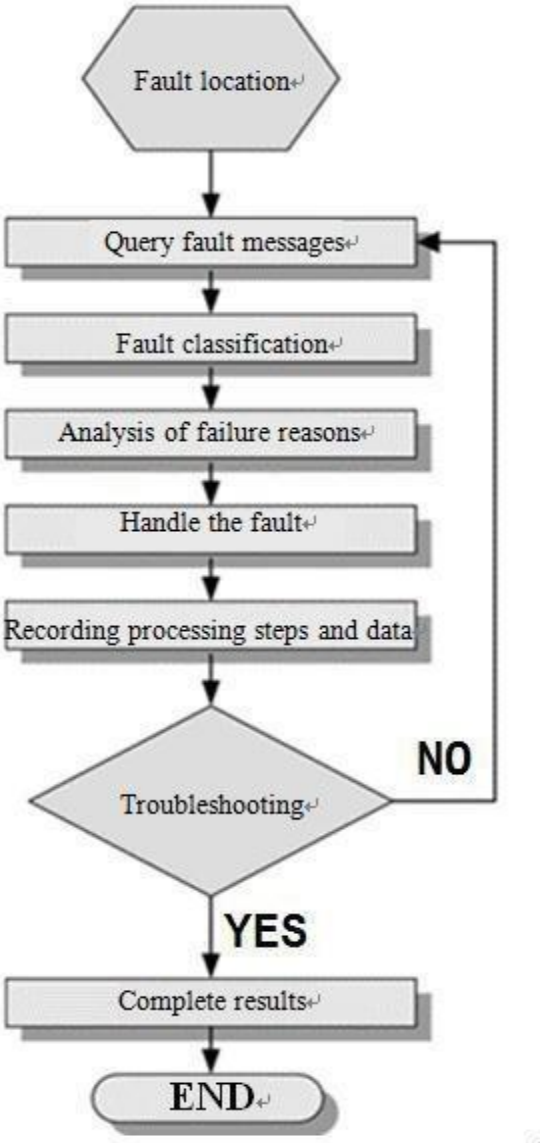
4.3 Treatment for malfunctions

Solutions

Follow figure4-1 to process the malfunction.

Figure4-1 Table of Battery maintenance

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Step 1 Check the LED lights to determine which part may fail.

Step 2 Check the information about failure in the monitor module.

Step 3 Classify the information (DC, AC, modules, batteries, control, etc.).

Step 4 Find the problem according to the information.

Step 5 Debugging the failure.

Step 6 Record the data while processing.

Step 7 Confirm all malfunction removed.

Step 8 Fill the report.

Step 9 Repeat these steps if any more malfunction.

Faulty reasons and handling methods

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Table 4-3 lists of most frequent failures and solutions.

Table4-3 Checklist

Failure modes	Possible reasons	Solutions
Over voltage	● DC over-voltage alarm set Unreasonable. ● In manual control mode, the power supply voltage is set too high. ● Rectifier module failure.	● Check if the DC over-voltage alarm point (default value is 58.5V) is reasonable. If it is unreasonable, adjust according to the actual situation. ● Check whether the manual control increases the system voltage. If yes, confirm the cause and return to the normal value when the operation is completed. ● Pull out the rectifier module one by one to check whether the alarm disappears. If The alarm still exists, insert the rectifier module into the home position. If the alarm disappears, replace the module.
Under voltage	● No AC power. ● Monitoring module DC Under voltage alarm points are unreasonable. ● System Configuration is unreasonable. ● In manual control mode, the power supply voltage is set too low. ● Check whether the exchange of power outage and restore AC power supply.	● Check the DC under voltage alarm point (Default value is 45V). If it is not reasonable, adjust it according to the actual situation. ● Check that the power system's current value is greater than the current power system capacity and, if so, increase capacity configuration or reduce the power system load. ● Check whether the manual control to reduce the system voltage, if so, should confirm the reason, to be restored to normal after the completion of the action. ● Check whether the rectifier module is faulty and the system capacity does not meet the load demand. If yes, replace the rectifier module.
Charge over current	● Module Communication interruption. ● lose contact for monitor module. ● Monitoring failures.	● If there is a commutation module communication interruption alarm, if yes, plug and unplug the commutation module of communication interruption to confirm whether the alarm is cleared. If the alarm continues, replace the rectifier module. ● Reinstall the monitoring module, if there is still alarm, replace the module.

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000000000000 Failure modes	Possible reasons	Solutions
Ambient temperature is too high	● Temperature alarm parameter setting is unreasonable. ● The temperature control system of the cabinet where the temperature sensor is located is faulty. ● The temperature sensor is faulty.	● Check if the ambient temperature alarm value (default 50 ℃) is reasonable. If not, adjust it according to the actual situation. ● Check whether the temperature control system of the cabinet is faulty. If so, handle the fault of the temperature control system. When the temperature in the system cabinet returns to the normal range, the alarm will be cleared automatically. ● Check the temperature sensor is faulty, if so, replace the temperature sensor.
Ambient temperature is too low	● Low temperature alarm parameter setting is unreasonable. ● Temperature sensor system cabinet where the temperature control system failure. ● The temperature sensor is faulty.	● Check if the ambient temperature alarm value (default 0℃) is reasonable. If not, adjust it according to the actual situation. ● Check the system cabinet temperature control system is faulty, if it is, then deal with temperature control system failure. After the temperature in the system cabinet returns to the normal range, the alarm will be cleared automatically. ● Check that the ambient temperature sensor is faulty and, if so, replace the ambient temperature sensor.
Battery temperature is too high	● The battery Temperature is too high alarm point set unreasonable. ● Battery compartment cooling system failure. ● The temperature sensor is faulty.	● Check the battery temperature is too high alarm value (default 53 ℃) is reasonable, if unreasonable, according to the actual situation adjustment. ● Check the battery compartment temperature control system is faulty, and if so, then deal with temperature control system failure. When the battery temperature returns to normal, the alarm will be cleared automatically. ● Check the temperature sensor is faulty, and if so, replace the temperature sensor.
Failure modes	Possible reasons	Solutions
Battery temperature is too low	● Battery temperature is too low alarm set unreasonable. ● Battery compartment heating system failure. ● The temperature sensor is faulty.	● Check if the battery temperature is too low (default: 0 ℃). If it is not reasonable, adjust the battery temperature according to the actual situation. ● Check the battery compartment temperature control system is faulty, and if so, then deal with temperature control system failure. When the battery temperature returns to normal, the alarm will be cleared automatically. ● Check the temperature sensor is faulty, and if so, replace the temperature sensor.

INTRO 1) Only when the power system is configured with a battery temperature sensor there should be a temperature alarm.

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5 SPECIFICATIONS

5.1 Technical specifications

INDUS REPL48100_01 series Lithium batteries, the main technical indicator for a single module is shown in table 5-1, 5-2, when performing multiple sets of parallel battery, the charge and discharge parameters are shown in table 5-3, table 5-4.

Table5-1 Technical data of single module charging

Model	Voltage (V)	Capacity (Ah)	Limited charging voltage(V)	Charging current (A)	
				Standard value	Largest value
INDUS REPL48100_01	48	100	54.75	20	100

Table5-2 Technical parameters of single module discharge

Model	Voltages (V)	Capacity (Ah)	limited discharge voltage(V)	Discharging current (A)	
				Standard value	Biggest value
INDUS REPL48100_01	48	100	40.5	50	100

Table5-3 Multi group of INDUS REPL48100_01 lithium batteries parallel charging parameters：

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Voltage	Capacity	Limited charging voltage(V)			largest	Notes
		smallest value	typical value	biggest value		
48	100	52.5	54.0	54.75	20	1 parallel
48	200	52.5	54.0	54.75	40	2 parallels
48	300	52.5	54.0	54.75	60	3 parallels
48	400	52.5	54.0	54.75	80	4 parallels
48	500	52.5	54.0	54.75	100	5 parallels

Table5-4 Multi group of INDUS REPL48100_01 lithium batteries parallel discharging parameters

Voltage (V)	Capacity (Ah)	Limited discharge voltage(V)			The largest current (A)	Notes
		The smallest value	The classical value	The biggest value		
48	100	37.5	40.5	45	50	1 parallel
48	200	37.5	40.5	45	100	2 parallels
48	300	37.5	40.5	45	150	3 parallels
48	400	37.5	40.5	45	200	4 parallels
48	500	37.5	40.5	45	250	5 parallels

Table5-3 Multi group of INDUS REPL48100_01 lithium batteries parallel charging parameters

Voltage (V)	Capacity (Ah)	Limited charging voltage(V)			largest current (A)	Notes
		smallest value	typical value	biggest value		
48	100	52.5	54.0	54.75	30	1 parallel
48	200	52.5	54.0	54.75	60	2 parallels
48	300	52.5	54.0	54.75	90	3 parallels
48	400	52.5	54.0	54.75	120	4 parallels
48	500	52.5	54.0	54.75	150	5 parallels

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Table5-4 Multi group of INDUS REPL48100_01 lithium batteries parallel discharging parameters

Voltage (V)	Capacity (Ah)	Limited discharge voltage(V)			largest current (A)	Notes
		The smallest value	The classical value	The biggest value		
48	100	52.5	54.0	54.75	75	1 parallel
48	200	52.5	54.0	54.75	150	2 parallels
48	300	52.5	54.0	54.75	225	3 parallels
48	400	52.5	54.0	54.75	300	4 parallels
48	500	52.5	54.0	54.75	375	5 parallels

5.2 The main performance index of the battery

For lithium battery of INDUS REPL48100_01 series module, the electrical performance as shown in table 5-5. Table 5-5Multiple group parallel discharge technology parameters

Items for test	Testing methods	Requirements
0.1C discharge performance	Standard battery charge, 1h within 1h with 0.1C discharge current to 40.5V, Record the discharge time.	Discharge time ≥ 600min
0.5C discharge performance	Standard battery pack, 1h within 0.5C discharge current to 40.5V, record the discharge time.	Discharge time≥ 115min
High temperature performance	After the battery pack is charged in the standard (60 ± 2) ℃ high temperature box for 4 hours and then discharged to 40.5V at 0.1C, record the discharge time.	Discharge time≥ 600min
Low temperature performance (-10 ℃)	After charging, the battery pack is put in the low temperature box of (-10 ± 2) ℃ for 6 hours, then discharged to 40.5V at 0.2C at this temperature, record the discharging time.	Discharge time≥ 180min
Low temperature performance (-20 ℃)	After charging, the battery pack is allowed to stand for 6 hours at (-20 ±2) ℃, then discharged to 40.5V at 0.2C at this temperature. Record discharge time.	Discharge time≥ 120min

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6 ENVIRONMENT PROTECTION

6.1 Environmental Label

The product described in this manual does not contain toxic and hazardous substances or elements. It is a green product. It can be recycled after being discarded and should not be discarded at will. The environmental label shown in Table 6-1.

Table6-1 Environmental label

Specification	Mark
48V	

6.2 Recycle



This mark indicates that the product cannot be classified with other waste. To prevent potentially hazardous substances from hazardous waste disposal hazards to the environment and human health, please refer to the classification of waste recycling to promote the sustainable use of material resources.

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In order to recycle the used equipment, please use the recycling system or contact the manufacturer or seller of the product or the local authority to manage the waste products.

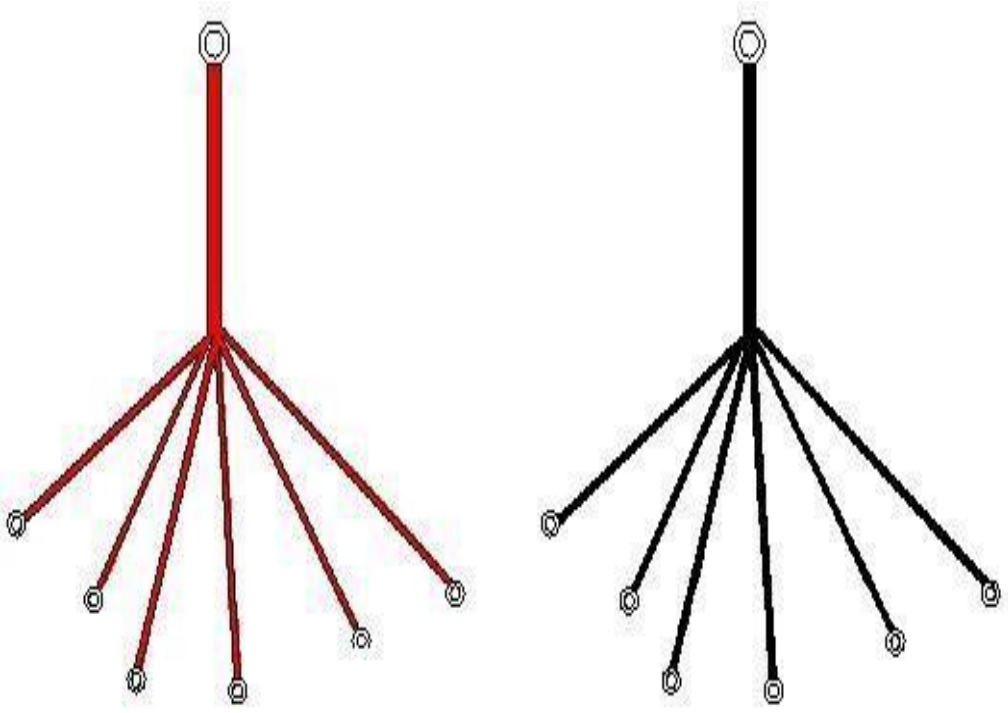
7 APPENDIX

7.1 Connection cable

If groups (4~10) of parallel sets of lithium batteries are not supplied by REPL battery racks, you can choose the customized wiring cables to replace. Relevant technical requirements are the feeder cable number, and the number of parallel battery pack is consistent, and the specifications of each extension cable (length, diameter, and material) are the same.

For example, a customized six parallel wiring cable diagram as shown in figure7-1.

Figure7-1 Customized wiring cable diagram



According to the customer requirements, selecting the appropriate connector, cables, extension cable specifications, refer to relevant cable specifications given in table 7-1.

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7 APPENDIX

Table7-1 Corresponds to AWG line number table

AWG	Diameter		cross-sectional area（mm^2）	Resistance（Ω/km）	Rated current（A）	Maximum current（A）
	mm	inches				
0000	11.68	0.4600	107.22	0.17	423.2	482.6
000	10.40	0.4096	85.01	0.21	335.5	382.6
00	9.27	0.3648	67.43	0.26	266.2	303.5
0	8.25	0.3249	53.49	0.33	211.1	240.7
1	7.35	0.2893	42.41	0.42	167.4	190.9
2	6.54	0.2576	33.62	0.53	132.7	151.3
3	5.83	0.2294	26.67	0.66	105.2	120.0
4	5.19	0.2043	21.15	0.84	83.5	95.2
5	4.62	0.1819	16.77	1.06	66.2	75.5
6	4.11	0.1620	13.30	1.33	52.5	59.9
7	3.67	0.1443	10.55	1.68	41.6	47.5
8	3.26	0.1285	8.37	2.11	33.0	37.7
9	2.91	0.1144	6.63	2.67	26.2	29.8
10	2.59	0.1019	5.26	3.36	20.8	23.7
11	2.30	0.0907	4.17	4.24	16.5	18.8
12	2.05	0.0808	3.332	5.31	13.1	14.9
13	1.82	0.0720	2.627	6.69	10.4	11.8
14	1.63	0.0641	2.075	8.45	8.2	9.4

Installation steps are shown below:

1) Preparation before installing insulation metal mounting tool (such as a cross screwdriver, wrench), insulation tape and customized wiring cables.
2) Lithium-ion battery pack should be installed in a suitable location.
3) Connect each connector in turn with each of the output end of the lithium-ion battery pack. First, connect all lithium-ion battery packs with to the positive terminals (“+”), and then all the negative terminals of lithium-ion battery packs.

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