

MANUAL



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RCTerra Pro 1.0 Series 932kWh C&I Energy Storage System

Model:

CESS 932-500-02D

CESS 699-375-02D

CESS 466-250-02D

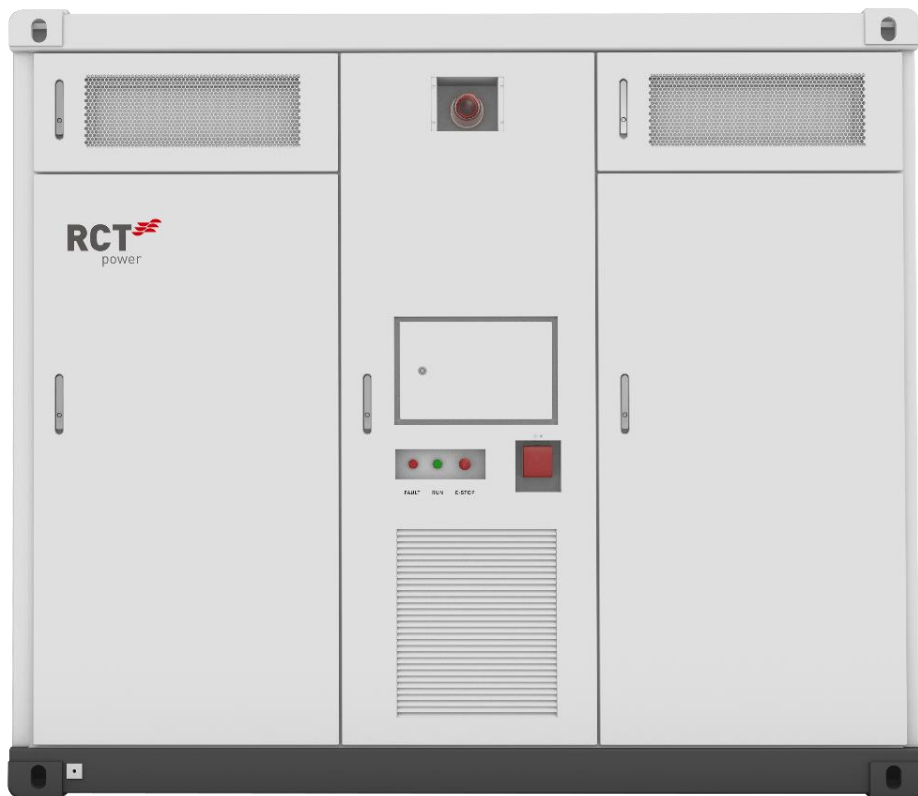


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PREFACE

Thank you for choosing the RCT Power C&I Energy Storage System!

You have purchased an innovative, high-quality product with unique features and consistently high efficiency. RCTerra Pro 1.0 Series products are transformer-less, highly flexible and robust. With this device, you will always achieve the highest possible yield from our energy storage system.

 WARNING	The C&I energy storage system is electrical device. During installation, wiring, grid connection, operation, maintenance and service they can cause various hazards. Please read the documents supplied with the product carefully and follow the instructions and device information to avoid material damage and personal injury.
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	Keep this manual in a safe place for future reference.
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1 About this Manual

1.1 Applicable products

This document applies to the following types of energy storage systems.

- CESS 932-500-02D
- CESS 699-375-02D
- CESS 466-250-02D

1.2 Validity, Purpose, Scope of this document and Legal Regulations

This document is applying to the RCTerra Pro 1.0 Series products.

This manual describes the transportation and storage, mechanical installation, electrical connection, power-on and power-off operation, troubleshooting, and maintenance of the energy storage system.

Target Group

This manual is for operators of the power storage plant and qualified technical personnel. The RCTerra Pro 1.0 cabinet must and can only be installed by professional technicians who meet the following requirements:

- Has been trained
- Read this manual thoroughly and understand the safety instructions related to operations
- Be familiar with local standards and relevant safety regulations of electrical systems

The content of this manual is regularly updated and revised as a part of the continuous product development.

The current document version can be found at: www.rct-power.com.

We explicitly reserve the right to make technical changes which improve the device or increase its safety standard. These changes do not require a separate notification. RCT Power is not liable for damages resulting from the use of this document.

This manual does not supersede existing laws, regulations, rules, standards or conventions.

The warranty conditions are enclosed with the device. No further warranty claims can be derived from this document.

1.3 Explanation of Symbols and References

It is important to follow the references in the manual during the installation, operation and maintenance of the cabinet. The table below shows the warning signs and symbols used in the manual.

Symbols and References	Description
 DANGER	This symbol indicates a direct imminent danger. If the safety regulations are not observed, this may result in death, personal injury or serious damage to property.
 WARNING	This symbol indicates a direct imminent danger of medium risk. If the safety regulations are not observed, this may result in death, personal injury or serious damage to property.
 CAUTION	This symbol indicates a direct imminent danger of low risk. If the safety regulations are not observed, it might result in minor or moderate material damage.
 NOTICE	This symbol indicates a potentially hazardous situation which, if not avoided, could result in material damage to equipment or property.

Symbols and References	Description
	This symbol indicates important information and hints. They will help you to better understand the functionality of the cabinet.
	This symbol indicates that the user manual must be read and understood before the device is put into operation.
	HIGH VOLTAGE WARNING! Indicates hazardous high voltages are present, which, if not avoided, will result in death or serious injury. Thus, only authorized and trained personnel should install and/or maintain this product.
	After disconnecting the electrical connections, wait a minimum of 10 minutes before opening the unit.
	Hot surface!
	Equipment grounding conductor (PE).
	This product must not be disposed of as normal household waste.
	TUV certified

1.4 Abbreviation

It is important to follow the references in the manual during the installation, operation and maintenance of the cabinet. The table below shows the warning signs and symbols used in the manual.

Complete designation	Description
Commercial and Industrial Storage System	CESS
Power Conversion System	PCS
Battery Management System	BMS
Energy Management System	EMS
Uninterruptible power supply	UPS
Battery Monitoring Unit	BMU

2 Safety Instructions

2.1 Personnel and Qualifications



WARNING

The cabinet and the battery must only be installed, wired, connected, commissioned and serviced by qualified personnel to prevent material damage or personal injury.

Qualified personnel authorised to perform the tasks described in this manual must have the following skills and technical expertise:

The hoisting, transportation, installation, wiring, operation, and maintenance of the energy storage system must be carried out by professional electrical technicians in accordance with local regulations. The professional technician is required to meet the following requirements:

- Should know electronic, electrical wiring and mechanical expertise, and be familiar with electrical and mechanical schematics.
- Should be familiar with the composition and working principles of the energy storage system and its front and rear-level equipment.
- Should have received professional training related to the installation and commissioning of electrical equipment.
- Be able to quickly respond to hazards and emergencies that occur during installation and commissioning.
- Be familiar with the relevant standards and specifications of the country/region where the project is located.

2.2 Electrical Safety

The RCTerra Pro 1.0 Series products were developed and tested in strict accordance with international safety regulations.

All safety instructions relating to electrical and electronic equipment must be complied with during installation, operation and maintenance.



DANGER

Danger to life or serious injury due to electric shock!

- When the cabinet is connected to the power grid, the cables and components inside the cabinet generate high voltage.
- Before electrical connection, ensure that the device is not damaged; otherwise, electric shock or fire may occur.
- Qualified personnel must perform any work that involves wiring, connecting or opening the cabinet case.
- Important: Before performing any electrical work, it is necessary to ensure that the devices and systems in the energy storage integrated system are completely free of power.
- Touching the power grid or the contact points and terminals in the devices connected to the power grid may lead to electric shock.
- The battery side or the power grid side may generate voltage. Always use a multimeter to ensure that there is no voltage before touching.
- Lethal voltages are present inside the product!
 - Note and observe the warnings on the product.
 - Respect all safety precautions listed in these manual and other pertinent documents.
 - Respect the protection requirements and precautions of the lithium battery.
- When installing, maintaining, and repairing the device, ensure that:
 - To disconnect the battery voltage. To turn OFF the battery voltage, you must turn off the voltage source (AC / mains) and turn the isolation switch handles of the switch gears to "OFF" position to turn off the battery DC voltage.
 - Disconnect the MCCB to cut off the supply voltage (AC) and do not reconnect until the work is complete.

	■ Electricity may still exist in the battery when the power supply of the system is disconnected. Wait 10 minutes to ensure the equipment is completely voltage-free before any operation. ■ Ensure that other persons stay away from cables and internal components. ■ Do not open the door while the device is in operation.
--	--

 WARNING	Risk of injury due to electric shock! ■ Installation, service and maintenance work must only be carried out by a qualified electrician. ■ Only power on again after all electrical work has been completed. ■ All hoisting, transportation, installation, wiring, operation, and maintenance must be carried out complying with the relevant codes and regulations of the country where the project is located. ■ Hazardous Voltage Circuits. ■ To Reduce the Risk of injury, read all instructions. ■ Risk of Electric Shock or Serious Injury. Care shall be taken when entering enclosure- Authorized personnel only.
---	---

 CAUTION	Risk of burns on hot parts of the device. ■ During standard operation of the device, some parts of the device can become hot. ■ Use care when touching the housing while the device is operating.
---	--

 NOTICE	■ All electrical installations must be carried out in accordance with local and national standards and guidelines. ■ Contact your local energy supplier or grid operator before connecting the energy storage system to the grid. ■ Ensure that electrically conductive surfaces of the entire energy storage system are grounded to prevent personal injury. ■ A malfunction can impair cabinet safety. Do not operate or start the energy system if it shows visible damage or if the displayed error message is unclear. ■ The cabinet does not contain any parts to be serviced by the owner. Please contact qualified personnel locally for servicing work on the energy storage system. ■ Only use devices and accessories approved by the manufacturer. Do not make any changes to the device. Do not remove the type plate. ■ Post prominent warning signs around the project location to prevent accidents caused by false switching. ■ Place necessary warning signs or barriers near the product.
--	---

2.3 Battery Safety

For safe use of the product, the technician should carefully read and strictly observe the safety requirements. The company shall not be liable for product functional abnormality, component damage, personal safety accident, property loss, or other damage caused by the following reasons:

- The batteries are not charged as required, resulting in capacity loss or irreversible damage to the batteries.
- A battery is damaged, falls, or leaks due to improper operations or failure to operate the battery as required.
- The batteries are not powered on in time, which causes damage to the batteries due to over discharge.
- The damage is caused to batteries due to the use of improper equipment for charging and discharging.
- Batteries are frequently over discharged due to improper maintenance, capacity is incorrectly expanded, or the batteries have not been fully charged for a long time.
- Battery operation parameters are incorrectly set.
- Damage is caused to batteries because the battery operating environment does not meet the requirements.
- The customer uses the batteries beyond the scenarios specified in this manual, including but not limited to connect extra loads.
- Batteries are not maintained based on the system manual.

- The product is damaged due to the customer's continued use of batteries beyond the warranty period.
- The product is damaged due to the use of defective or deformed batteries.
- Use batteries provided by the company with other batteries, including but not limited to batteries of other brands or batteries of different rated capacities.
- Product damage or property loss are caused due to storing or installing batteries with flammable/explosive materials.
- Personal safety accidents and property loss are caused by battery-related operations performed by non-professional personnel, or by not wearing qualified protective equipment during operations.
- The battery is damaged due to eating, drinking, smoking and other behaviours near the battery.
- Batteries are stolen.

2.4 Electric Arc protection



To avoid unnecessary injury and device damage, strictly follow the instructions in this manual.

If not properly operated, it may cause arc hazards, and may even cause fire, explosion and other risks. RCT is not responsible for arcing, fire, explosion and other accidents caused by failure to operate according to the machine identification or product manual.

The following improper operation may cause arcing, fire, explosion and other hazards inside the device. And always remember that in the event of an accident, it must be handled by qualified professionals. Improper operations for existing accidents may cause a wider range of failures or accidents.

- Plug and unplug DC high-voltage fuses of each device on power.
- Touch the uninsulated end of a potentially live cable.
- Touch wiring bars, terminals, or other parts inside the device that may be live.
- The power cable is improperly connected.
- Parts such as screws fall into the power module.
- Incorrect operation by unqualified operators without training.

Before operating the equipment, assess whether there is an arc risk in the operating area. If there is a risk of arcing, you need to:

- Operators must receive safety training in advance.
- Try to assess the area where the shock is likely to occur.
- Before operating in a possible electric shock area, you must wear the required protective clothing.

2.5 Protective Tools

Special protective equipment must be used during operation, such as wearing protective clothing, insulating shoes, goggles, and insulating gloves.

Item	Name and Graphics			
Protective tools				
	Insulating gloves	Protective clothing	Goggles	Insulating shoes

2.6 Nameplate and stickers

 Suzhou RCT Power Energy Technology Co.,Ltd Email: info@rct-power.com.cn Add: Unit 01 and 02, Building B, No.28, Yongchang Road, Caohu Street, Suzhou, Jiangsu, P.R. China	
Model	CESS466-250-02D
Manufacturer/Date	RCT Power /
Serial Number of Unit	
Battery Chemistry	LiFePO ₄
DC Voltage Range	715~928.2Vd.c.
Max. Storage Capacity/Nominal Voltage	466kWh / 832Vd.c.
Output/input Voltage/Frequency	480Va.c. (3P+N+PE) / 60Hz
Output/input Current/Power	330Aa.c. Max / 275kW Max
Rated Short-Time Withstand Current	10kA/1s
Rated Operating Short-Circuit Breaking Capacity	50kA
AUX. Power/Voltage/Frequency	10kW / 277Va.c. Max / 60Hz
Protection/Salt Mist	I / Severity 2
Ingress Protection	IP54 (Battery Room IP55)/TYPE 3R
Dimensions (mm)/Weight	W2991*D2438*H2591 (mm) /
Operating Temperature Range	-20 to 45°C

 Suzhou RCT Power Energy Technology Co.,Ltd Courriel : info@rct-power.com.cn Adresse : Unité 01 et 02, Bâtiment B, n° 28, Yongchang Road, Caohu Street, Suzhou, Jiangsu, R.P. de Chine	
Modèle	CESS466-250-02D
Fabricant/Date	RCT Power /
Numéro de série de l'unité	
Composition de la batterie	LiFePO ₄
Plage de tension CC	715~928.2Vd.c.
Capacité de stockage maximale/tension nominale	466kWh / 832Vd.c.
Tension d'entrée/sortie/fréquence	480Va.c. (3P+N+PE) / 60Hz
Courant de sortie/entrée/Puissance	330Aa.c. Max / 275kW Max
Courant nominal de courte durée	10kA/1s
Capacité nominale de coupure en cas de court-circuit lors du fonctionnement	50kA
Puissance/tension/fréquence AUX	10kW / 277Va.c. Max / 60Hz
Protection/brouillard salin	I / Gravité 2
Protection contre les infiltrations	IP54 (salle des batteries IP55)/TYPE 3R
Dimensions (mm)/Poids	W2991*D2438*H2591 (mm) /
Plage de température de fonctionnement	-20 à 45°C

 Suzhou RCT Power Energy Technology Co.,Ltd Email: info@rct-power.com.cn Add: Unit 01 and 02, Building B, No.28, Yongchang Road, Caohu Street, Suzhou, Jiangsu, P.R. China	
Model	CESS699-375-02D
Manufacturer/Date	RCT Power /
Serial Number of Unit	
Battery Chemistry	LiFePO ₄
DC Voltage Range	715~928.2Vd.c.
Max. Storage Capacity/Nominal Voltage	699kWh / 832Vd.c.
Output/input Voltage/Frequency	480Va.c. (3P+N+PE) / 60Hz
Output/input Current/Power	495Aa.c. Max / 412.5kW Max
Rated Short-Time Withstand Current	10kA/1s
Rated Operating Short-Circuit Breaking Capacity	50kA
AUX. Power/Voltage/Frequency	10kW / 277Va.c. Max / 60Hz
Protection/Salt Mist	I / Severity 2
Ingress Protection	IP54 (Battery Room IP55)/TYPE 3R
Dimensions (mm)/Weight	W2991*D2438*H2591 (mm) /
Operating Temperature Range	-20 to 45°C

 Suzhou RCT Power Energy Technology Co.,Ltd Courriel : info@rct-power.com.cn Adresse : Unité 01 et 02, Bâtiment B, n° 28, Yongchang Road, Caohu Street, Suzhou, Jiangsu, R.P. de Chine	
Modèle	CESS699-375-02D
Fabricant/Date	RCT Power /
Numéro de série de l'unité	
Composition de la batterie	LiFePO ₄
Plage de tension CC	715~928.2Vd.c.
Capacité de stockage maximale/tension nominale	699kWh / 832Vd.c.
Tension d'entrée/sortie/fréquence	480Va.c. (3P+N+PE) / 60Hz
Courant de sortie/entrée/Puissance	495Aa.c. Max / 412.5kW Max
Courant nominal de courte durée	10kA/1s
Capacité nominale de coupure en cas de court-circuit lors du fonctionnement	50kA
Puissance/tension/fréquence AUX	10kW / 277Va.c. Max / 60Hz
Protection/brouillard salin	I / Gravité 2
Protection contre les infiltrations	IP54 (salle des batteries IP55)/TYPE 3R
Dimensions (mm)/Poids	W2991*D2438*H2591 (mm) /
Plage de température de fonctionnement	-20 à 45°C

 Suzhou RCT Power Energy Technology Co.,Ltd Email: info@rct-power.com.cn Add: Unit 01 and 02, Building B, No.28, Yongchang Road, Caohu Street, Suzhou, Jiangsu, P.R. China	
Model	CESS932-500-02D
Manufacturer/Date	RCT Power / (xx/2024)
Serial Number of Unit	
Battery Chemistry	LiFePO ₄
DC Voltage Range	715~928.2Vd.c.
Max. Storage Capacity/Nominal Voltage	932kWh / 832Vd.c.
Output/input Voltage/Frequency	480Va.c. (3P+N+PE) / 60Hz
Output/input Current/Power	660Aa.c. Max / 550kW Max
Rated Short-Time Withstand Current	10kA/1s
Rated Operating Short-Circuit Breaking Capacity	50kA
AUX. Power/Voltage/Frequency	10kW / 277Va.c. Max / 60Hz
Protection/Salt Mist	I / Severity 2
Ingress Protection	IP54 (Battery Room IP55)/TYPE 3R
Dimensions (mm)/Weight	W2991*D2438*H2591 (mm) /
Operating Temperature Range	-20 to 45°C

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Modèle	CESS932-500-02D
Fabricant/Date	RCT Power /
Numéro de série de l'unité	
Composition de la batterie	LiFePO ₄
Plage de tension CC	715~928.2Vd.c.
Capacité de stockage maximale/tension nominale	932kWh / 832Vd.c.
Tension d'entrée/sortie/fréquence	480Va.c. (3P+N+PE) / 60Hz
Courant de sortie/entrée/Puissance	660Aa.c. Max / 550kW Max
Courant nominal de courte durée	10kA/1s
Capacité nominale de coupure en cas de court-circuit lors du fonctionnement	50kA
Puissance/tension/fréquence AUX	10kW / 277Va.c. Max / 60Hz
Protection/brouillard salin	I / Gravité 2
Protection contre les infiltrations	IP54 (salle des batteries IP55)/TYPE 3R
Dimensions (mm)/Poids	W2991*D2438*H2591 (mm) /
Plage de température de fonctionnement	-20 à 45°C

Rechargeable Lithium-Ion Battery Rack RCT^{power}

Product Name: C&I Energy Storage System Battery Rack
Model: RACK-233L1D-UL -20
Battery Designation: IFpP/73/175/208/[((13S)4S)5S]E/-10+40/90
Nominal Voltage: 832 Vd.c.
Rated Capacity: 280 Ah
Rated Energy: 232960 Wh
Operating Voltage Range: 715~928.2Vd.c.
Maximum Charging Power: 116480W
Maximum Discharging Power: 116480W
Ingress Protection: IP20 / Battery Pack IP67
Protection Class: I
Operating Temperature Range: -20~45°C
Icc / Icp, mr: 15kA with fuse / 8000A@1500Vd.c.(L/R≤2ms)



Suzhou RCT Power Energy Technology Co., Ltd
Add: Unit 01 and 02, Building B, No.28, Yongchang Road, Caohu Street, Suzhou, Jiangsu, P.R. China

Support de batterie rechargeable au lithium-ion RCT^{power}

Désignation du produit: Support de batterie du système de stockage d'énergie C&I
Modèle: RACK-233L1D-UL -20
Désignation de la batterie: IFpP/73/175/208/[((13S)4S)5S]E/-10+40/90
Tension nominale: 832 Vd.c.
Capacité nominale: 280 Ah
Énergie nominale: 232960 Wh
Plage de tension de fonctionnement: 715~928.2Vd.c.
Puissance de charge maximale: 116480W
Puissance de décharge maximale: 116480W
Entrée/sortie CCCC: 832V, 1.5A / 24V, 12.5A
Protection contre les infiltrations: IP20 / Batterie IP67
Classe de protection: I
Température de fonctionnement: -20~45°C
Icc / Icp, mr: 15kA avec fusible / 8000A@1500 Vd.c.(L/R≤2 ms)



Suzhou RCT Power Energy Technology Co., Ltd
Adresse: Unité 01 et 02, Bâtiment B, N° 28, Yongchang Road, Caohu Street, Suzhou, Jiangsu, R.P. de Chine

Rechargeable Lithium-Ion Battery Rack RCT^{power}

Product Name: C&I Energy Storage System Battery Rack
Model: RACK-233L1D-UL -21
Battery Designation: IFpP/73/175/208/[((13S)4S)5S]E/-10+40/90
Nominal Voltage: 832 Vd.c.
Rated Capacity: 280 Ah
Rated Energy: 232960 Wh
Operating Voltage Range: 715~928.2Vd.c.
Maximum Charging Power: 116480W
Maximum Discharging Power: 116480W
DCDC Input/Output: 832Vd.c. / 24Vd.c.
Ingress Protection: IP20 / Battery Pack IP67
Protection Class: I
Operating Temperature Range: -20~45°C
Icc / Icp, mr: 15kA with fuse / 8000A@1500Vd.c.(L/R≤2ms)



Suzhou RCT Power Energy Technology Co., Ltd
Add: Unit 01 and 02, Building B, No.28, Yongchang Road, Caohu Street, Suzhou, Jiangsu, P.R. China

Support de batterie rechargeable au lithium-ion RCT^{power}

Désignation du produit: Support de batterie du système de stockage d'énergie C&I
Modèle: RACK-233L1D-UL -21
Désignation de la batterie: IFpP/73/175/208/[((13S)4S)5S]E/-10+40/90
Tension nominale: 832 Vd.c.
Capacité nominale: 280 Ah
Énergie nominale: 232960 Wh
Plage de tension de fonctionnement: 715~928.2Vd.c.
Puissance de charge maximale: 116480W
Puissance de décharge maximale: 116480W
Entrée/sortie CCCC: 832V, 1.5A / 24V, 12.5A
Protection contre les infiltrations: IP20 / Batterie IP67
Classe de protection: I
Température de fonctionnement: -20~45°C
Icc / Icp, mr: 15kA avec fusible / 8000A@1500 Vd.c.(L/R≤2 ms)



Suzhou RCT Power Energy Technology Co., Ltd
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DANGER

NOTES:

- Disassembly or modification is prohibited without the maintenance personnel;
- Do not drop, impact, cut, deform or spearing with a sharp object;
- Do not place at a children or pet touchable area;
- Keeping away from the source of fire to avoid fire or explosion;
- Prohibit spraying, trampling, hitting and destroying, so as not to cause corrosive chemical leakage, fire or explosion;
- Please read the maintenance manual or instructions carefully before maintenance;
- Please wear protective equipment as required before maintenance or replacement



DANGER

NOTES:

- le démontage ou la modification est interdit sans le personnel de maintenance;
- ne pas tomber, impacter, couper, déformer ou lancer avec un objet tranchant;
- ne pas placer dans une zone touchable pour les enfants ou les animaux de compagnie;
- se tenir à l'écart de la source du feu pour éviter le feu ou l'explosion;
- interdire la pulvérisation, le piétinement, frapper et détruire, afin de ne pas causer corrosif Fuite de produits chimiques, incendie ou explosion;
- veuillez lire le manuel d'entretien ou les instructions soigneusement avant l'entretien;
- veuillez porter un équipement de protection au besoin avant l'entretien ou le remplacement.



Rechargeable Lithium-Ion Battery RCT^{power}

IFpP/73/175/208/[((13S)4S)E]-20+45/90
Product Name: C&I Energy Storage System Battery Pack
Model: POWER CESS PACK 47L1D2
Battery Voltage Range: 143~185.6V
Nominal Voltage: 166.4 V
Rated Capacity: 280 Ah
Rated Energy: 46592 Wh
Maximum Charging Power: 23296W
Maximum Discharging Power: 23296W
Ingress Protection: IP67
Protection Class: I



Suzhou RCT Power Energy Technology Co., Ltd
Add: Unit 01 and 02, Building B, No.28, Yongchang Road, Caohu Street, Suzhou, Jiangsu, P.R. China

RACK-233L1D-UL-20



UL20-5S-XX-XX-XXXX



CAUTION

**Keep Doors Close
Do Not Operate Under Load**



DANGER



**ARC FLASH&SHOCK
HAZARD**

Appropriate PPE Required

WARNING  AVERTISSEMENT	
DO NOT OPEN UNDER LOAD <i>NE PAS MANOEUVRER EN CHARGE</i>	

	Warning! High leakage currents. It is essential to establish an earthing connection before connecting to the power supply circuit (AC mains)!
	Warning fire.
	Hight voltage inside! Risk of electric shock by touching it.
	TUV Rheinland certified.
	Pay attention to corrosion.
	No fire.
	No steeping on the surface.
	This symbol indicates that the user manual must be read and understood before the device is put into operation.



Wear protective goggles before operating.



Wear protective gloves before operating.



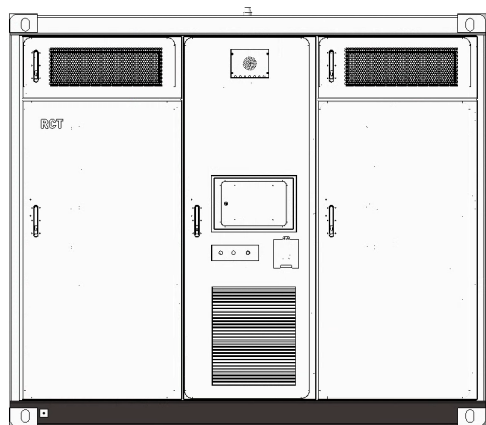
This product is recyclable.

3 Product Presentation

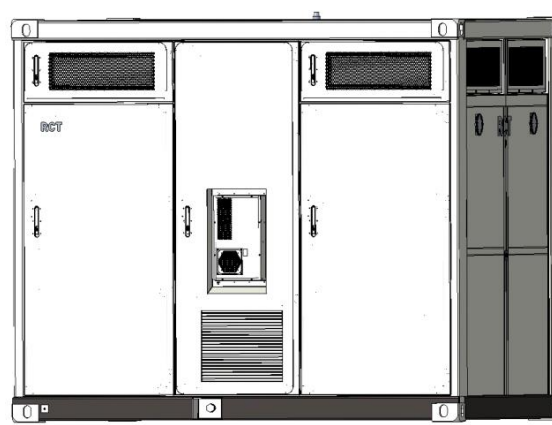
3.1 Product Introduction

RCTerra Pro 1.0 Series product is commercial & industrial energy storage system (CESS) rated for outdoor installation. It uses liquid-cooled and lithium iron phosphate battery (LFP), which are installed inside a compact cabinet together with the necessary safety instrumentation and other accessories.

The design of RCTerra Pro 1.0 Series product provides the very short-time installation. And it provides the unique flexibility. The modular, scalable design for precise project sizing.



Front View



Back and Left View

Fig. 3-1 Product pictures

3.2 System solution

The battery is converted into grid-compliant AC current.

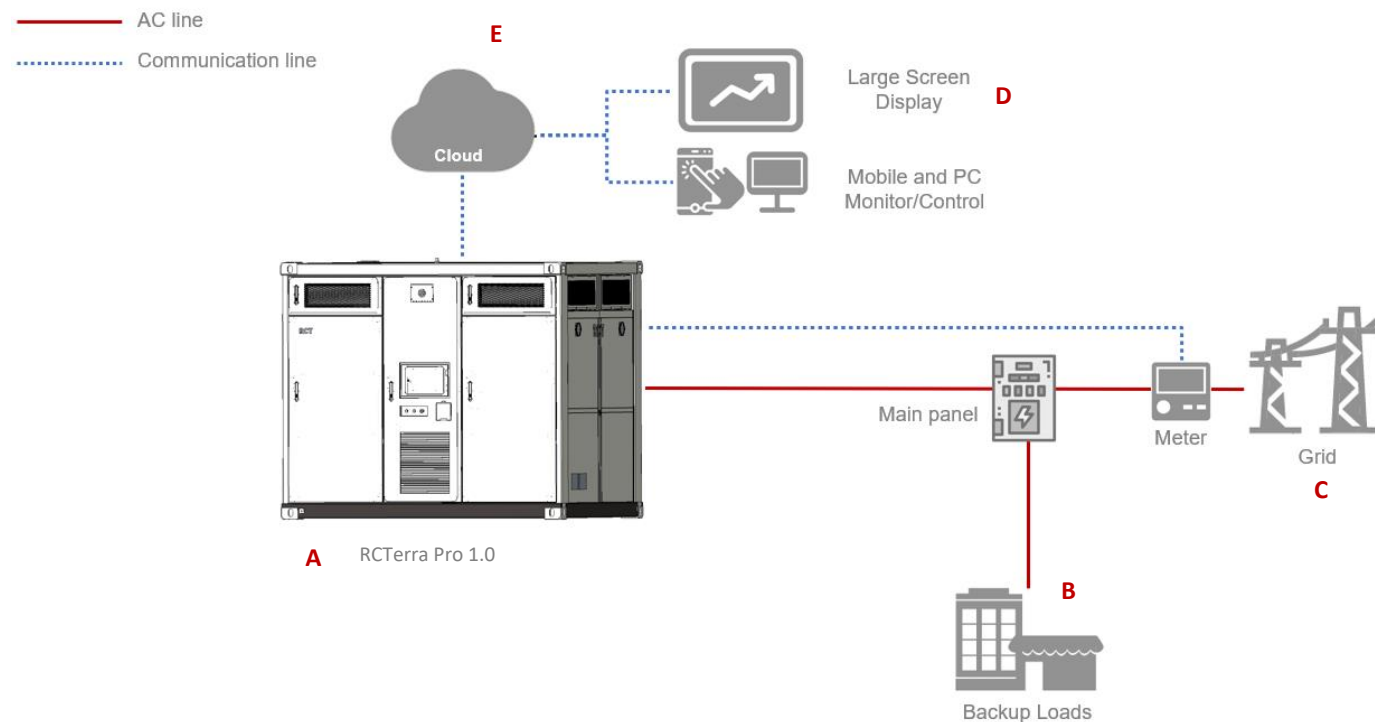


Fig. 3-2 Intended use of the cabinet

Item	Description	Comment
A	C&I Energy Storage System	CESS466-250-02D
		CESS699-375-02D
		CESS932-500-02D
B	Backup Loads	Loads which are not necessary to be fed with electrical energy during grid outage.
C	C&I Public Grid	480V, L1/L2/L3/N
D	HMI	Energy data display and function control.
E	Cloud	Energy cloud data storage platform.

3.3 Work Mode

There are three work modes of system: Self Consumption, TOU and Backup-Only.

3.3.1 Self-Consumption

The PV inverter at the customer's site can be used to charge the cabinet.

In this mode, the PV energy is preferentially used by local load (main load and backup load) to improve the self-consumption rate and self-sufficiency rate. The battery is automatically charged and discharged to meet consumption needs and reduce the amount of electricity purchased from the grid.

- 1) Load priority: Load consumption -> charging the battery -> feeding to the grid

When the PV energy is sufficient, first supply power to the load, then charges the battery, finally feed to the grid.

- 2) Power priority: PV -> battery -> grid

The PV energy is as the main energy to supply the load, if the PV energy cannot satisfy the needs of local load, then the battery will discharge to the load, and finally use the power from GRID.

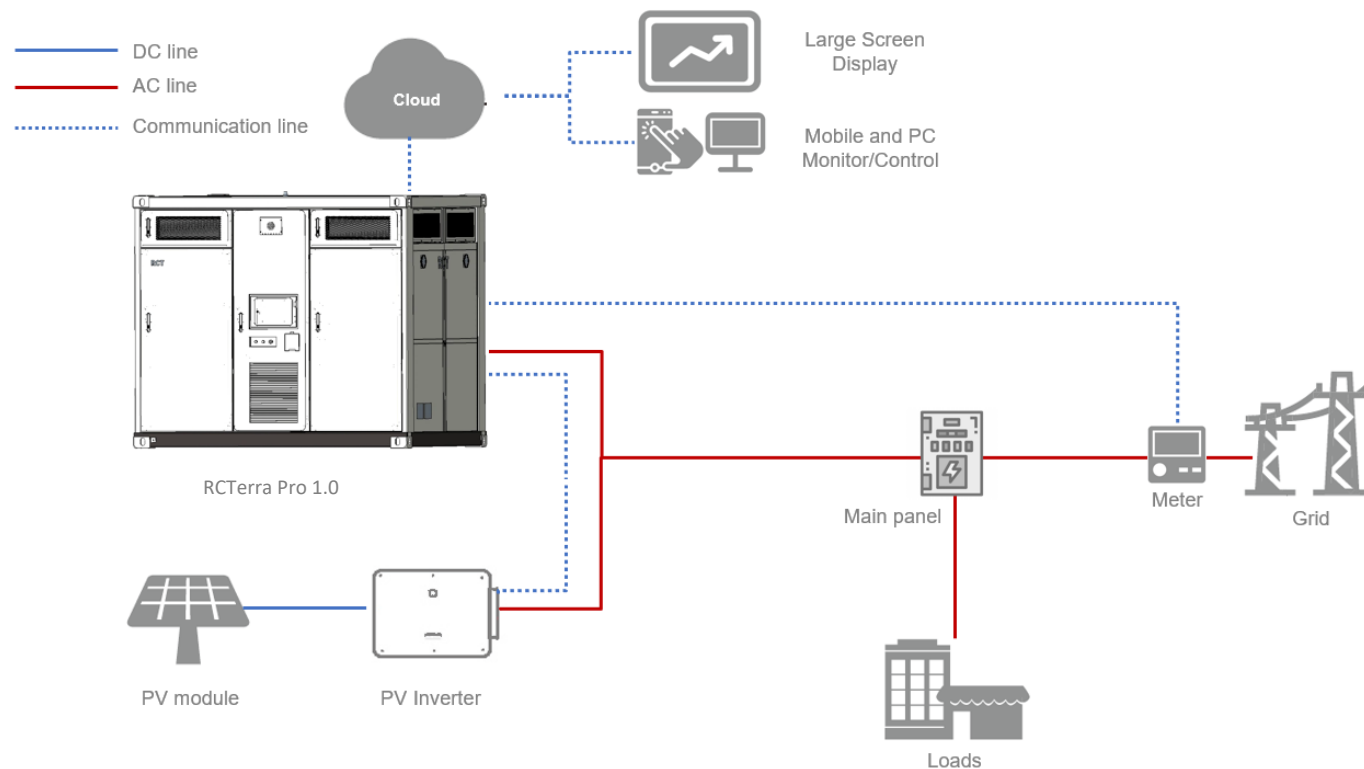


Fig. 3-3 Self Consumption

3.3.2 T.O.U

In this mode, users can manage the energy according to their own needs, and set the daily regular charging and discharging configurable profile on the app. The system operates according to a configurable charge/discharge profile - a Time-of-use (T.O.U) arbitrage profile, in which the battery is charged from the grid when tariffs are low, and discharged when tariffs are high.

3.3.3 Backup-Only

In this mode, if customer set a minimum SOC 60% manually, our System should ensure there is enough capacity in our product to face the next load shedding (grid outage) period.

3.4 Product Specification

3.4.1 Scope of Supply

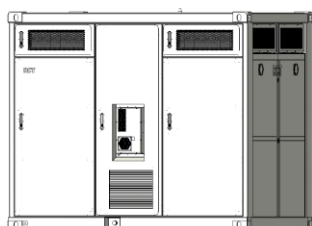
Our products are inspected for proper condition before shipment.

Despite careful packaging, transport damage can occur. The transport company usually has to take responsibility for this damage.

Please inform the transport company immediately if you notice any damage to the packaging or the cabinet. Your specialist dealer will be happy to assist you if necessary.

Do not install, wire or operate the cabinet if any damage has been detected.

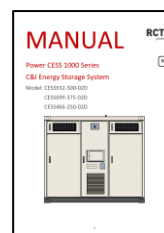
Check the contents of the shipment for completeness in accordance with below.



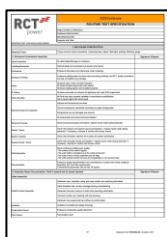
1 x RCTerra Pro 1.0 cabinet



20 x MSD (Manual Service Disconnect) *



1 x User manual document



1 x Test report



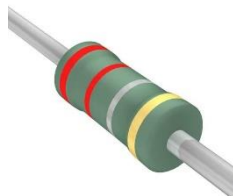
1 x Point-touch Pen of EMS



2 x Door key



2 x Fuse 6.3A



1 x EOL Resistance



2 x Key of fire START/STOP button



1 x Bleeder Tube

4 x Side twist lock at the bottom of the container

4 x M27X60 A4-80 316 External Hexagonal Stainless Steel Screw

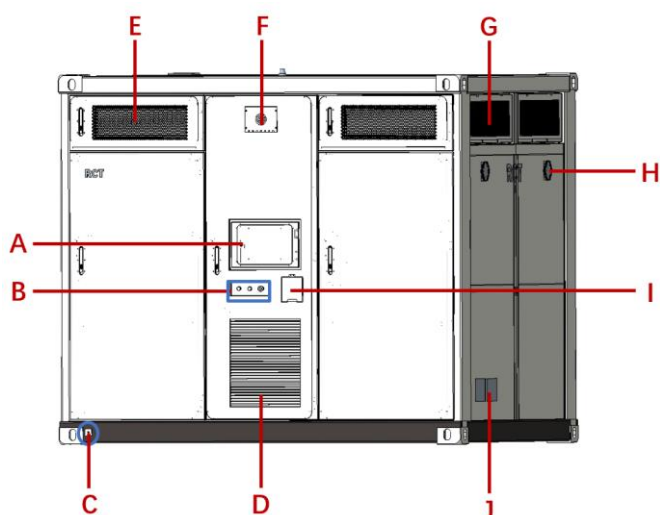
4 x M27 Flat Mat Stainless Steel A4

4 x M27 spring washer, stainless steel A4

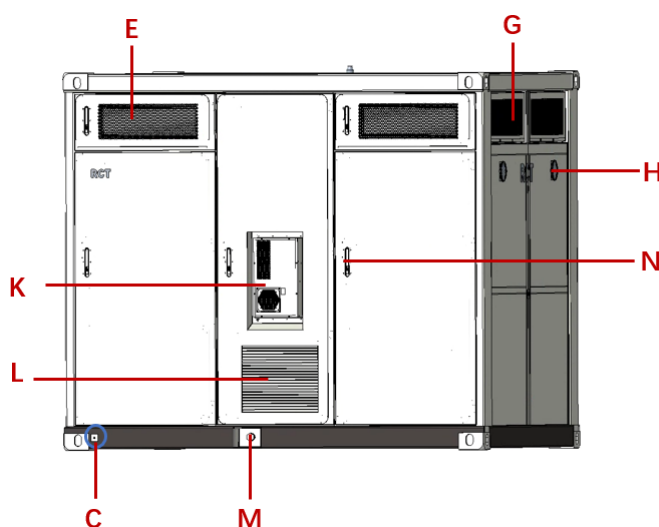
* In order to protect the safety of technicians who repair RCTerra Pro 1.0 product in high voltage environments or respond to some sudden events, the connection of the battery DC high voltage circuit can be quickly separated via the MSD device, so that the maintenance and other work is in a relatively safe state.

3.4.2 External Description

The appearance of cabinet is shown as below:



Front and Right View



Back and Left View

Item.	Description
A	Touch panel cover
B	Indicator Light & Emergency stop button
C	Grounding point
D	Air intake grill
E	Chiller air outlet grill
F	Strobe and siren
G	Chiller air intake grill
H	Explosion proof valve
I	Fire switch
J	Name plate
K	Air conditioner
L	Air outlet grill
M	Water inlet
N	Door lock

3.4.3 Mechanical Parameters

The external dimensions of cabinet are shown as below:

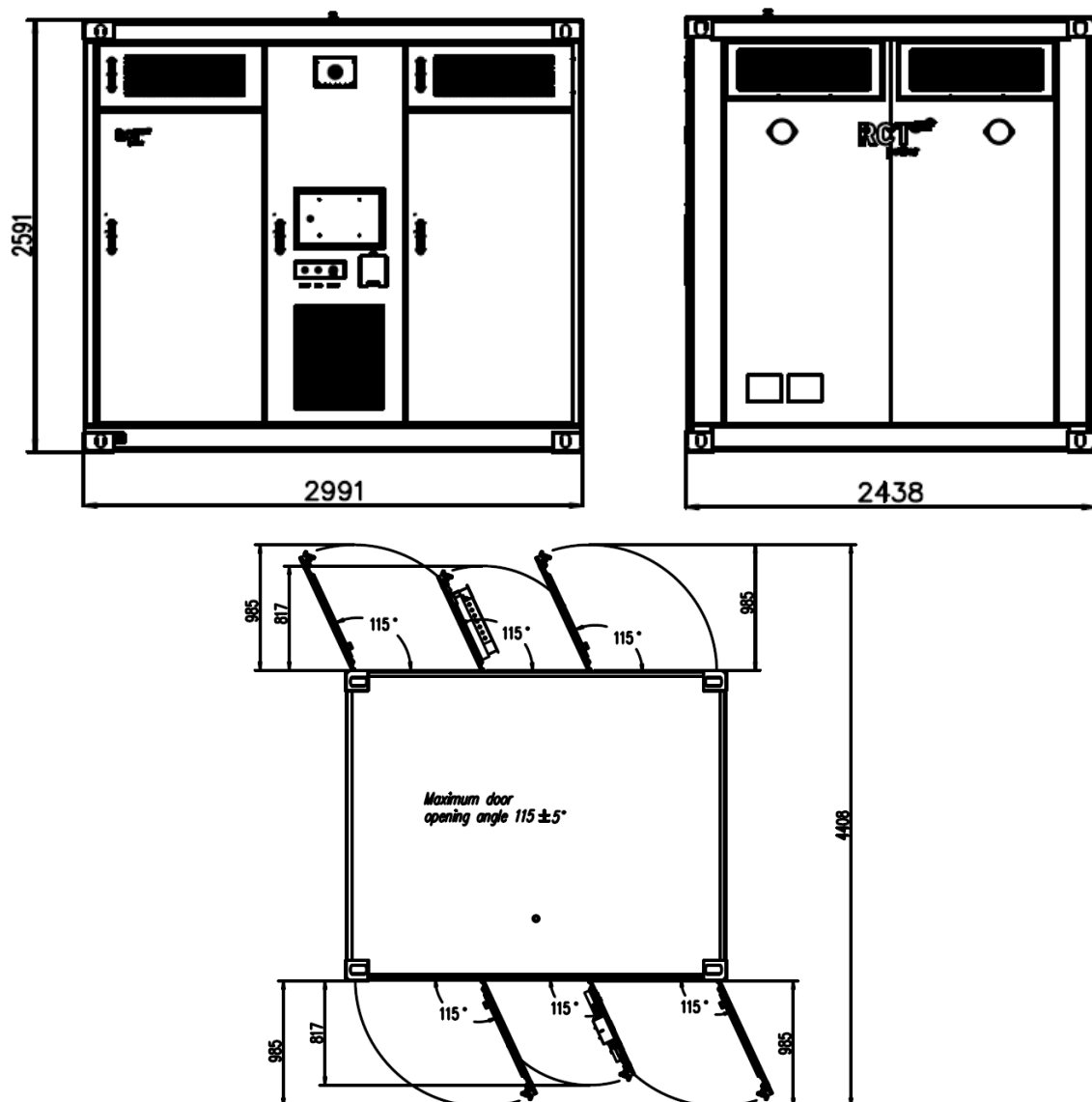
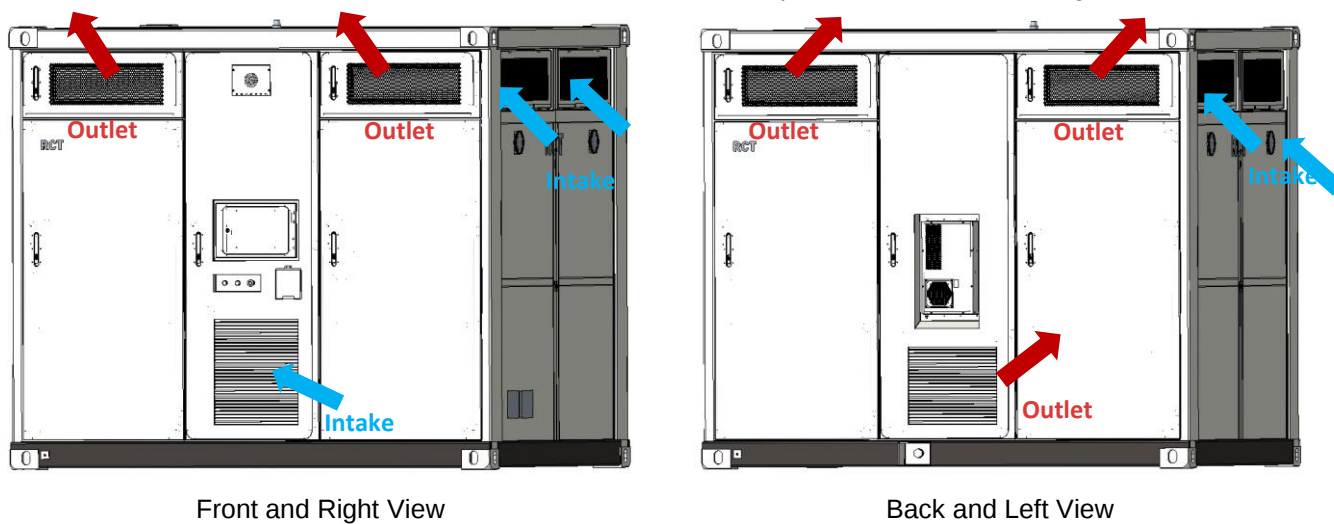


Fig. 3-4 Cabinet dimension

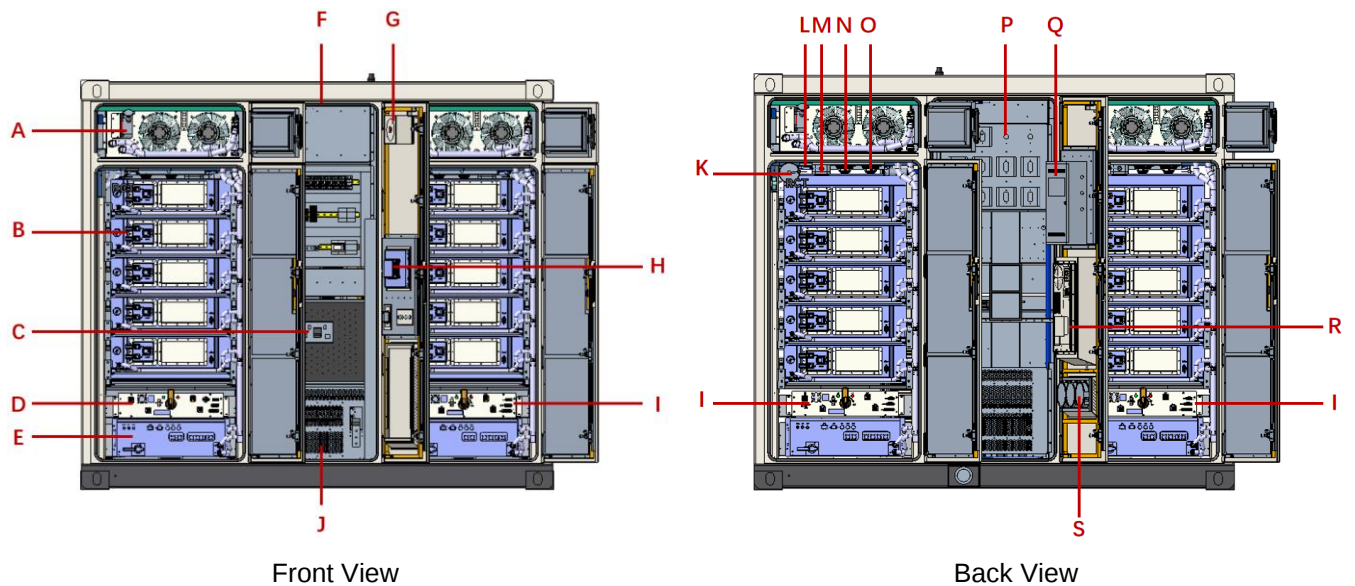
3.4.4 Ventilation Design

The electrical enclosure intakes air from the front side and expels it from the back side.

The chiller enclosure intakes air from the front and back side and expels it from the left and right side.



3.4.5 Internal Design



Item.	Component	Comment
A	Chiller	x 4
B	Battery pack	x 20, 1P52S, 46.59kWh per pack
C	Grid connection MCCB	x 1, 3P, L1/L2/L3/N
D	Switch gear	x 1, with dark start function
E	AC/DC inverter	x 4, AC/DC inverter module
F	Illumination	x 2
G	Strobe and siren	x 1
H	Touch panel	x 1, EMS platform
I	Switch gear	x 3
J	Transformer	x 1
K	Aerosol fire suppression	x 2
L	Door switch	x 6
M	Mixed gas detector	x 2, Detect flammable and explosive gas.
N	Temperature detector	x 2, Monitor the temperature inside the cabinet.
O	Smoke detector	x 2
P	Switch Board	x 1
Q	Fire control unit	x 1
R	Air conditioner	x 1
S	Exhaust fan	x 3

3.4.5.1 Cell Introduction



Parameter	Value
Size (T x H x W)	71.7 ± 0.8 mm * 207.3 ± 0.5 mm *173.9 ± 0.5 mm
Weight	Max. 5.70kg
Cell type	LiFePO4
Nominal capacity	280Ah
Rated voltage	3.2Vd.c
Rated capacity	280Ah
Nominal energy	896Wh
Voltage range	2.5~3.65Vdc

3.4.5.2 Battery Pack introduction

The LFP battery module is mainly composed of cells in series. The dedicated cells are used for battery management. Control commands are received by means of daisy chain communication, and the collected data is reported.



Parameter	Value
Model	POWER CESS PACK 47L1D2
Structure	1P52S
Cell type	LiFePO4
Voltage range	143 Vdc~185.6 Vdc (Actual Operation Voltage Range Of Battery Cell: 2.75Vdc~3.57Vdc)
Rated voltage	166.4Vdc

Rated capacity	280Ah
Rated energy	46.592kWh
Cooling method	Liquid cooling
Delivery capacity	30% SOC
Standard charge/discharge rate	0.5P
Operating temperature range	-20~45°C
Dimension	W 810 x L 1106 x H 243 mm
Weight	332.5 ± 5 kg
Application altitude	2000m

3.4.5.3 AC/DC Inverter Module



Parameter	Value
Operating voltage range (DC connection)	700~950 Vdc
Power Rating	125 kW
Rated AC current	150 A
AC line voltage	480 Vac (-15%~10%)
Rated Grid Frequency	60Hz
Rated AC line voltage	480 Vac, 3P/N/PE
Cooling Function	Liquid-cooling

4 Transport and Storage



Failure to transport and store the product in accordance with the requirements in this manual may invalidate the warranty.

NOTICE

4.1 Shock-Resistant Label

To ensure the safety of the product during shipping, a shock-indicator label is affixed to the outer packaging. If you notice that this label has turned red upon receipt, please do not panic. A red label simply indicates that the device has been subjected to a certain degree of vibration. This does not mean the device is damaged or inoperable. To protect your rights, we recommend following these steps:

- Document the scene: Immediately take photos or videos of the discolored shock-indicator label, the outer packaging, and the overall condition of the product to preserve objective evidence.
- Inspect the product's exterior: Carefully check the product's casing, ports, and key components for any visible signs of impact, deformation, or damage.

Contact After-Sales Service: Regardless of whether the visual inspection reveals any abnormalities, please contact our after-sales team immediately upon discovering the issue and provide the relevant visual evidence. Based on your feedback, we will conduct a professional assessment and handle the matter as soon as possible.

4.2 Transport Methods

RCTerra Pro 1.0 cabinet can be transported by sea or road, but does not support railway or air transportation. RCTerra Pro 1.0 cabinet is highly integrated and easy to hoist, which facilitates its transport. RCTerra Pro 1.0 cabinet can be transported by truck in the country.

4.3 Requirements for Transportation

All devices in the RCTerra Pro 1.0 cabinet have been installed and fixed before leaving the factory, and they can be hoisted and transported as a whole during transportation.



NOTICE

In the whole process of loading, unloading, and transportation, the safe operation regulations of RCTerra Pro 1.0 cabinet in the country/region where the project is located must be observed!

- All tools used for the RCTerra Pro 1.0 cabinet and during operation shall be properly maintained.
- All personnel engaged in loading, unloading and anchoring should have received relative training, especially in safety.
- Ensure that all switches of the device are turned off and not accidentally powered on, and that all MSDS are not installed.

- Maritime transportation complies with the transportation requirements of the IMDGCODE and the International Maritime Dangerous Goods Rules.
- Land transport shall comply with the ADR or JTT617 transport requirements.
- To meet the regulatory requirements of the transport regulatory authorities in the transport starting country, route country and destination country.
- Compliance with the international transport of dangerous goods rules and the regulatory requirements of the transport regulatory authorities of the corresponding countries.
- Stacking is prohibited when transportation at ports and on-board ships.

4.4 Storage Requirements

- To prevent possible condensation or its bottom from being soaked by rain water in the rainy season. The RCTerra Pro 1.0 cabinet should be stored on higher ground.
- Raise the container base due to site conditions. The specific height should be reasonably determined based on site geological and meteorological conditions.
- Store the RCTerra Pro 1.0 cabinet on a dry, flat, and stable ground with sufficient carrying capacity and

without any vegetation covers. The ground must be flat and dry.

- Before storage, the MSD of any battery PACK should be disconnected and ensure that the doors of the container and all internal equipment are locked.
- Storage environment temperature: -13°F~ 122°F, recommended storage temperature: 32°F~ 86°F.
- Long-term storage of batteries is not recommended because it may cause the decrease in battery capacity. Even if the battery is stored at the recommended storage temperature, irreversible capacity fade will still occur during periods of rest. The longer it has been stored, the greater the capacity fade. Please refer to the technical protocol for specific rate of capacity fade.
- The relative humidity should be between 0 ~ 95% without condensation.
- The air inlet and outlet of the RCTerra Pro 1.0 cabinet should be effectively protected to prevent rain water, sand and dust from penetrating into the container.
- Carry out periodic inspections. Check the cabinet and the inner equipment for damage at least every half a month.
- Before installing a cabinet that has been stored for more than six months, open the door to visually check and ensure that there is no condensation. Check the cabinet and the inner equipment for damage. Check the product after it is powered on and starts. If necessary, request professionals for testing before installation.
- Starting from the date of delivery of RCT Power, the RCTerra Pro 1.0 cabinet with a storage period of more than 3 months under the above conditions are to be charged and discharged once to bring the system SOC to 20%~50%.

5 Mechanical Installation

5.1 Inspection Before Installation

5.1.1 Deliverables Inspection

Check whether deliverables are complete against the attached packing list.

5.1.2 Product Inspection

- Check whether the container received is the ordered one.
- Check the RCTerra Pro 1.0 cabinet and the internal equipment for any damage.

If any problems are found or there is any question, please contact the forwarding company or RCT Power.



NOTICE

Only install the RCTerra Pro 1.0 cabinet when it is complete and intact. Before installation, ensure that:

- The RCTerra Pro 1.0 cabinet is in good condition without any damage.
- All internal equipment is in good condition without any damage.

5.2 Installation Environment Requirements

5.2.1 Installation Site Requirement

- The climate environment and geological conditions, such as stress wave emission and underground water level, should be fully considered when selecting the installation site.
- The environment around the installation site should be dry and well ventilated.
- There should be no trees around the installation site to prevent branches or leaves blown off by heavy winds from blocking the door or air inlet of the energy storage system.
- The installation site should be away from areas where toxic and harmful gases are concentrated, and free from inflammable, explosive and corrosive materials.
- The installation site should be far away from residential areas to avoid noises.

5.2.2 Foundation Requirements



NOTICE

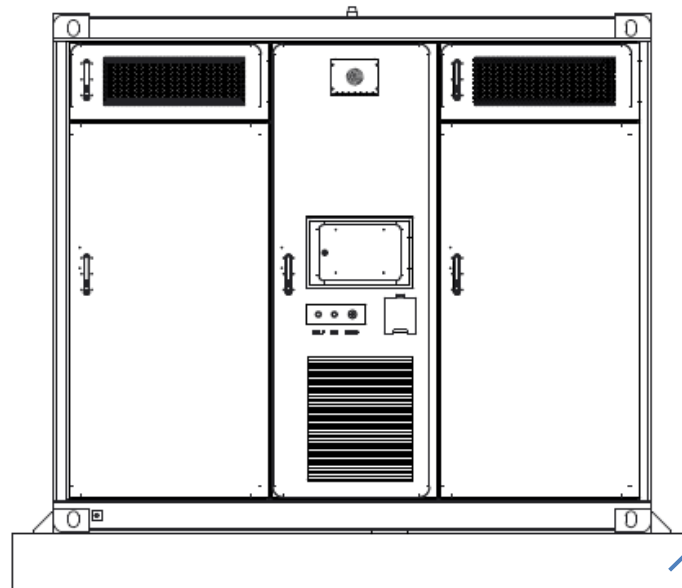
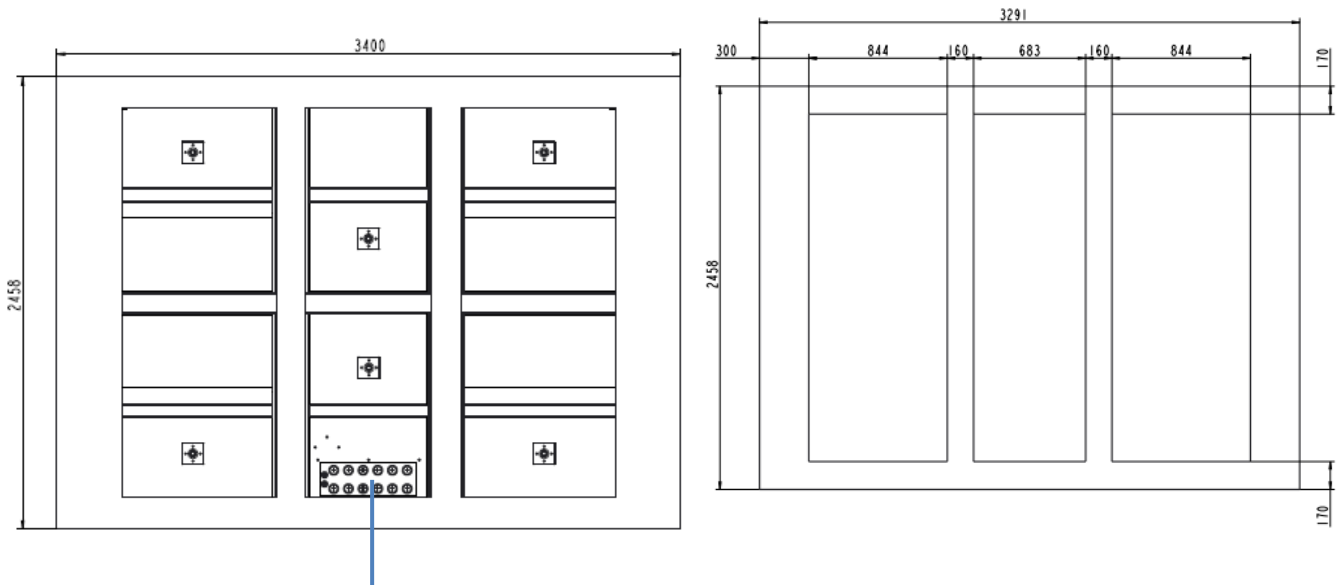
The RCTerra Pro 1.0 cabinet is heavy as a whole. Before constructing the foundation, it is necessary to inspect the installation site in detail (mainly referring to the geological conditions and environmental climatic conditions, etc.). Commence the design and construction of the foundation only after confirming that all requirements are met.

Unreasonably constructed foundation will bring great troubles to the installation of the RCTerra Pro 1.0 cabinet, affecting the normal opening and closing of the doors and the normal operation. Therefore, the foundation of the RCTerra Pro 1.0 cabinet must be designed and constructed according to certain standards to meet the requirements of mechanical support, cable routing and later maintenance and overhaul.

- The soil at the installation site should be compact.
- Compact and fill the foundation pit to provide sufficient and effective support for the container.
- Raise the foundation to prevent the container base and the interior from rain erosion.
- The cross-sectional area and height of the foundation should meet the requirements.
- Construct corresponding drainage in conjunction with local geological conditions.
- Built a cement foundation with sufficient cross-sectional area and height. The foundation height is determined by the construction party according to the site geology.
- Consider cable routing when building the foundation.
- Built a maintenance platform around the foundation to facilitate later maintenance.
- During the foundation construction, reserve enough space for the AC side cable trench according to the position and size of the cable inlet and outlet holes and pre-embed the cable conduit.
- A drainage system is necessary to prevent the bottom or internal equipment of the cabinet from being soaked in water during the rainy season or during heavy rainfall.
- Both ends of all embedded pipes should be temporarily sealed to prevent impurities from entering and

causing troubles to later wiring.

- After all cables are connected, cable inlet, outlet and connector should be sealed with fireproof mud or other suitable materials to prevent rodent access.



The height recommended of
the foundation >300mm.

Fig. 5-1 Foundation instruction bottom view Unit: mm

5.2.3 Installation Spacing Requirement

Equipment space requirements must also meet installation environment requirements. To ensure optimal heat dissipation and facilitate maintenance such as replacing battery modules, PCS components, please reserve sufficient space around the installation site. The diagram below illustrates the minimum clearance required for forklift access.

For a single cabinet installation, please maintain a clearance of at least **6.5ft** in front of and behind the equipment, and at least **3.3ft** to the left and right. The following diagram shows the minimum space requirements for single-cabinet installation and maintenance.

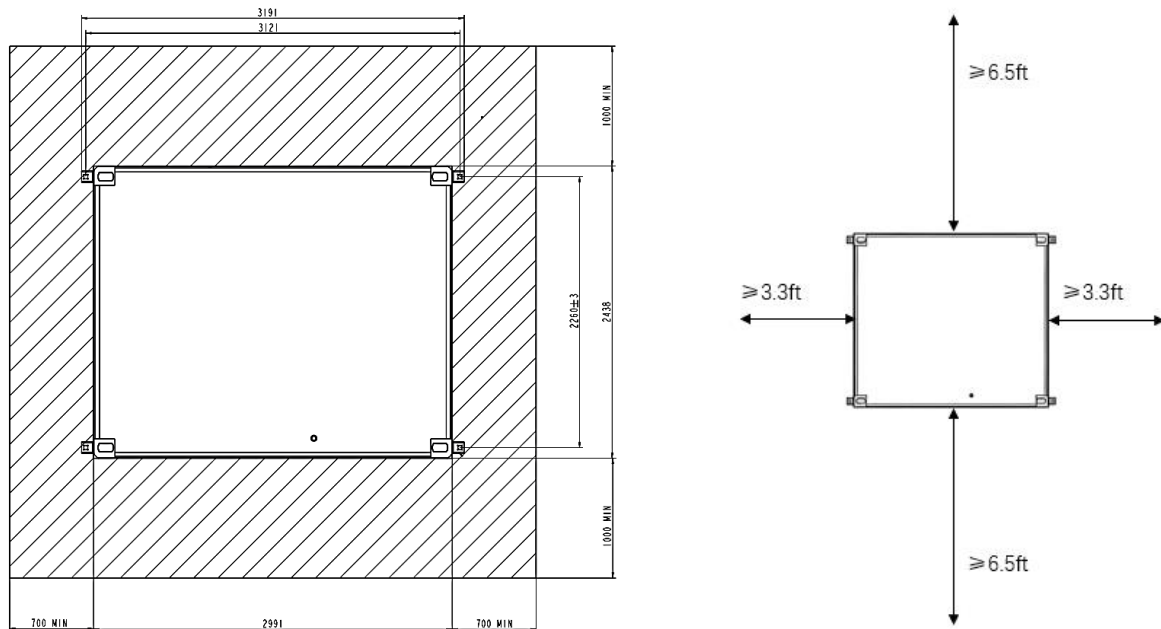


Fig. 5-2 Installation space top view Unit: mm

5.2.4 Parallel space requirements

Impacted Factors of Parallel Installation:

■ Fire Safety:

Preventing Thermal Runaway Propagation: Sufficient spacing acts as a physical fire barrier, preventing heat and flames from spreading too quickly to adjacent cabinets if a thermal runaway event occurs in one unit.

Providing Firefighting Operation Space: It offers essential working space for fire rescue efforts and equipment deployment (e.g., fire extinguishers, hydrants).

■ Heat Dissipation and Thermal Management:

Energy storage cabinets typically use a forced-air cooling mode, such as "front intake, rear exhaust". If the spacing is too small, hot exhaust air can be recirculated into the intake of adjacent cabinets. This leads to elevated intake air temperatures, creating a heat cycle that significantly reduces cooling efficiency. This can cause the system to report high-temperature faults and may even trigger safety risks.

■ Operations, Maintenance and Safety:

Working Space: Technicians require adequate space to open cabinet doors (the doors themselves have thickness and require swing clearance), perform wiring, and conduct inspections and maintenance tasks.

Emergency Evacuation: In the event of an incident, personnel must be able to evacuate quickly.

Recommended Distance:

- The recommended distance between parallel machines is **3ft**. If there is a great ventilation around the cabinets, the distance between parallel machines can be properly reduced. The figure below shows the minimum space requirements for installation and maintenance in a parallel configuration

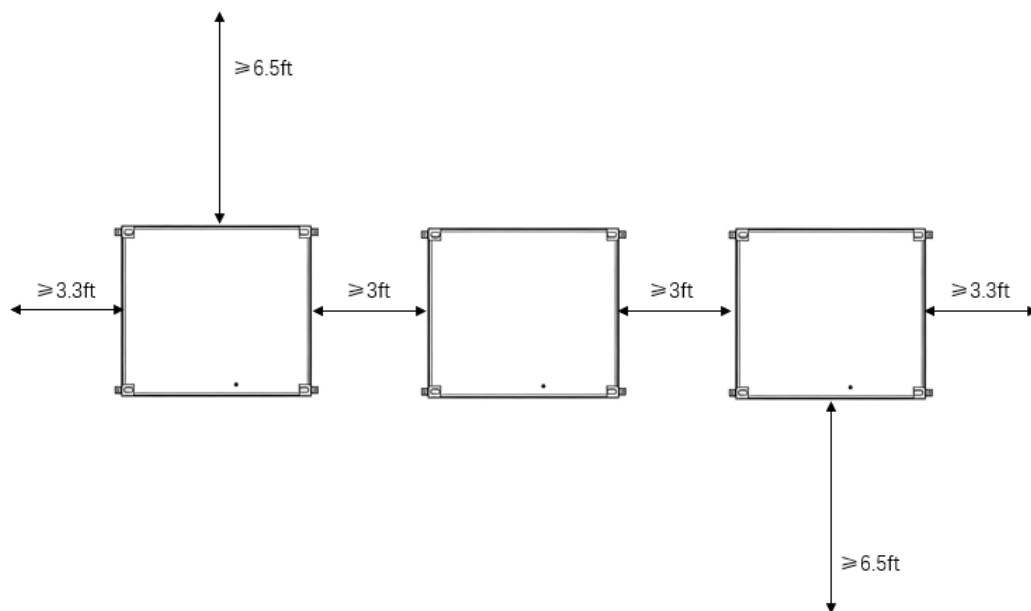


Fig. 5-3 Parallel space top view Unit: ft

- For easy operations and maintenance, the recommended clearance between the front and rear of the machines is **6.5ft**, and a minimum clearance of **3.3ft** must be maintained on both sides of the parallel system.
- Maximum number of parallel machines: Please refer to the technical data.

5.3 Hoisting and Transport

5.3.1 Safety Precautions

When lifting the device, at least the following requirements must be met:

- All safety requirements must be met.
- A professional instructor is needed in the whole hoisting process.
- The strength of the sling used should be able to withstand the weight of the devices.
- Ensure that all sling connections are safe and reliable, and that the lengths of the slings connected to the corner fittings are equal.
- The length of the sling can be adjusted appropriately according to the actual requirements of the site.
- During the lifting process, the devices must be stable and not skewed.
- Please lift the devices from the top.
- Take all necessary auxiliary measures to ensure the safe and smooth lifting of the devices.



NOTICE

- Observe the safety operating rules of the crane at all times.
- Standing within 5 to 10 meters of the hoisting areas is strictly forbidden! Anybody standing under the boom or station is strictly forbidden in the whole hoisting process.
- The hoisting work must be stopped in violent weather days. For example, in strong wind, heavy rain, or thick fog conditions.

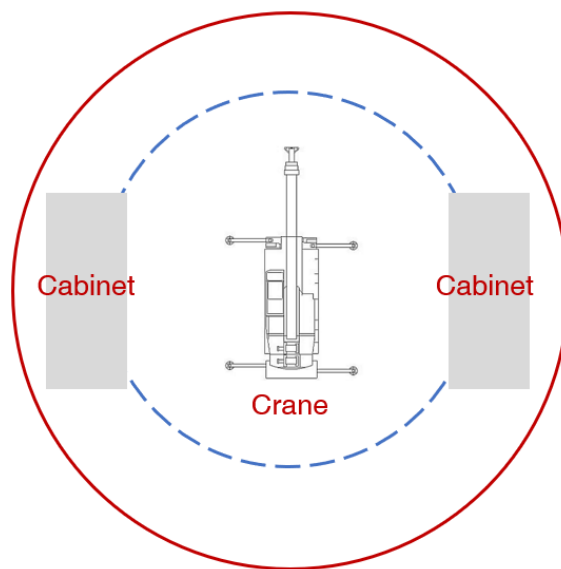
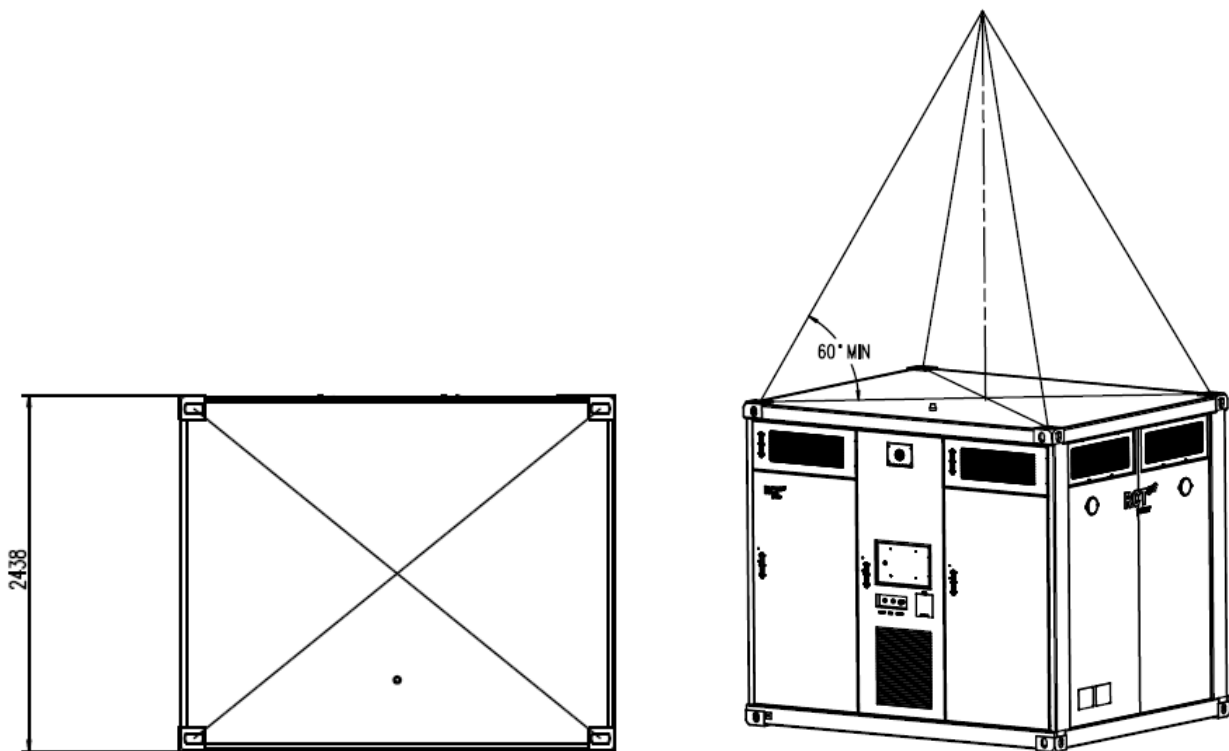


Fig. 5-4 Hoisting safety guide

5.3.2 Hoisting

In the process of lifting the devices, each operation link should be carried out according to the following requirements:

- The devices should be lifted vertically, and no dragging on the ground or the top of the lower cabinet should occur when lifting, and the devices should not be dragged on any surface.
- The devices should be suspended after being lifted 300 mm from the supporting surface. Check the connection between the lifting tools and the devices. Lift only after confirming that the connection is firm.
- After the devices are in place, they should be put down gently and steadily. It is strictly forbidden to place the devices in a vertical place by shaking the lifting tools.
- The place where the devices are placed should be solid and flat, with good drainage, without obstacles or protrusions.
- The recommended hoisting position is showing as below.



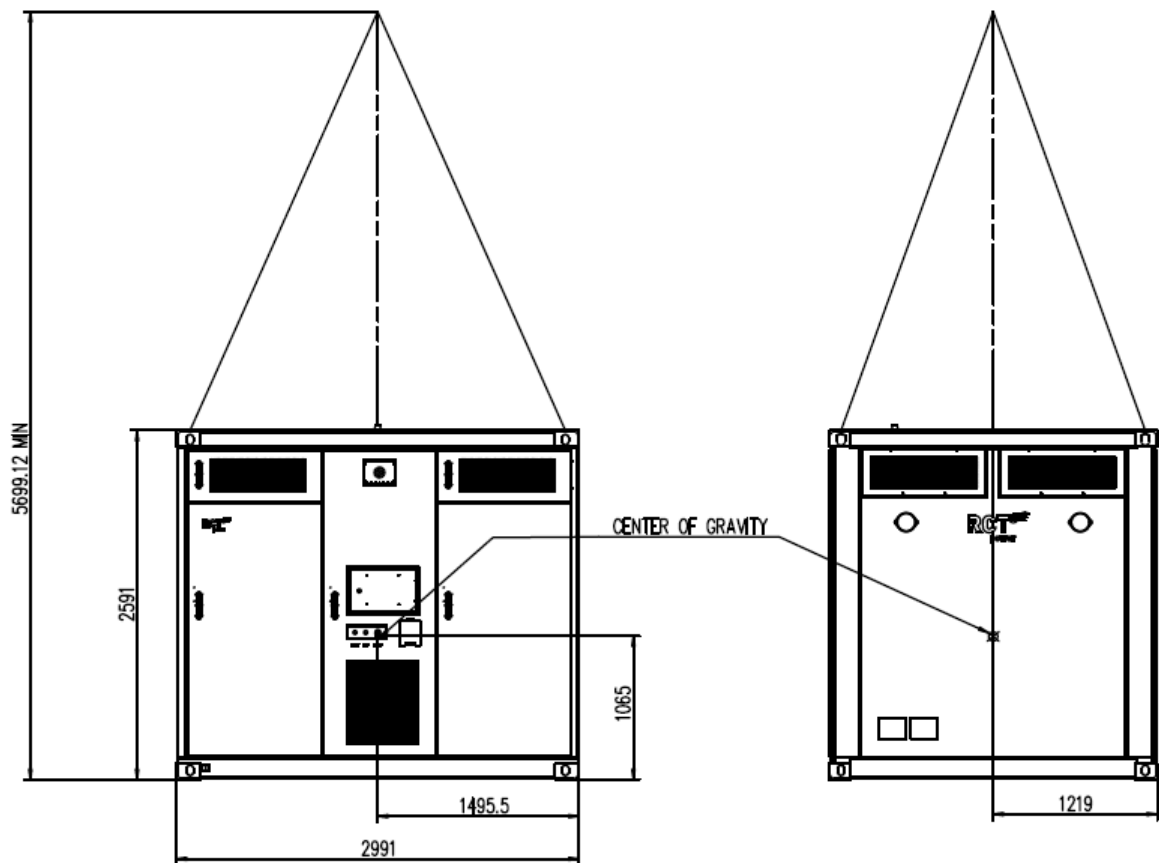


Fig. 5-5 Hoisting guide Unit: mm

5.4 Fixed Installation

The recommended rod is M27 x 60. After customer places our cabinet across the threaded rods, put on the gasket and then screw on the nuts. See the reference line drawing for the bottom view as below.

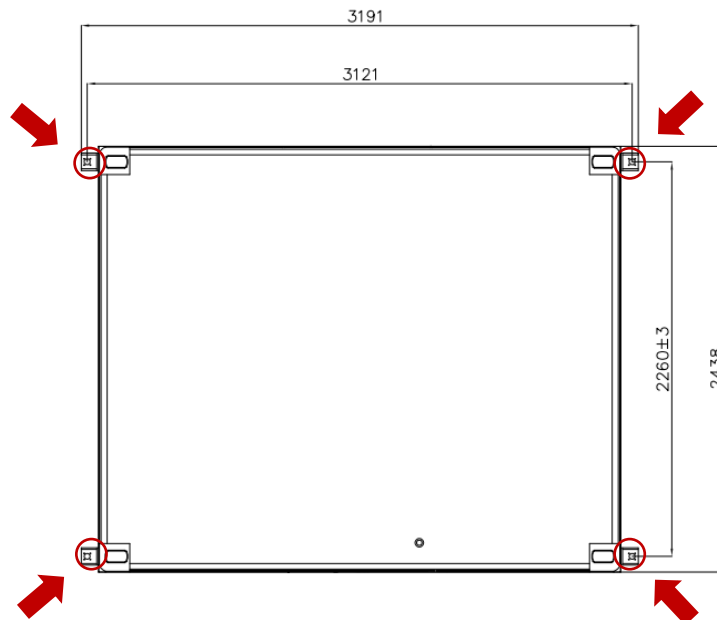


Fig. 5-6 Cabinet fixation guide bottom view Unit: mm

6 Electrical Connection

6.1 Precautions

 DANGER	High voltage! Electric shock! - It is strictly forbidden to directly touch the live parts in the unprotected state! - Before installation, ensure that the all switches are off. - If the cabinet is left for a long time (for example, more than one week), at least one MSD of each cluster battery system is removed to ensure that the DC side is powered off.
 WARNING	Sand and moisture penetration may damage the electrical equipment in the CESS, or affect their operating performance! - Avoid electrical connections during sandstorms or when the relative humidity in the surrounding environment is greater than 95%. - Perform electrical connection when there is no sandstorm and the weather is fair and dry. - Before wiring, check and ensure that the polarity of all input cables is correct. - During electrical installation, do not forcibly pull any wires or cables, as this may compromise the insulation performance. - Ensure that all cables and wires have sufficient space for any bends. - Adopt the necessary auxiliary measures to reduce the stress applied to cables and wires. - After completing each connection, carefully check and ensure that the connection is correct and secure.

6.2 Electrical Connection Overview

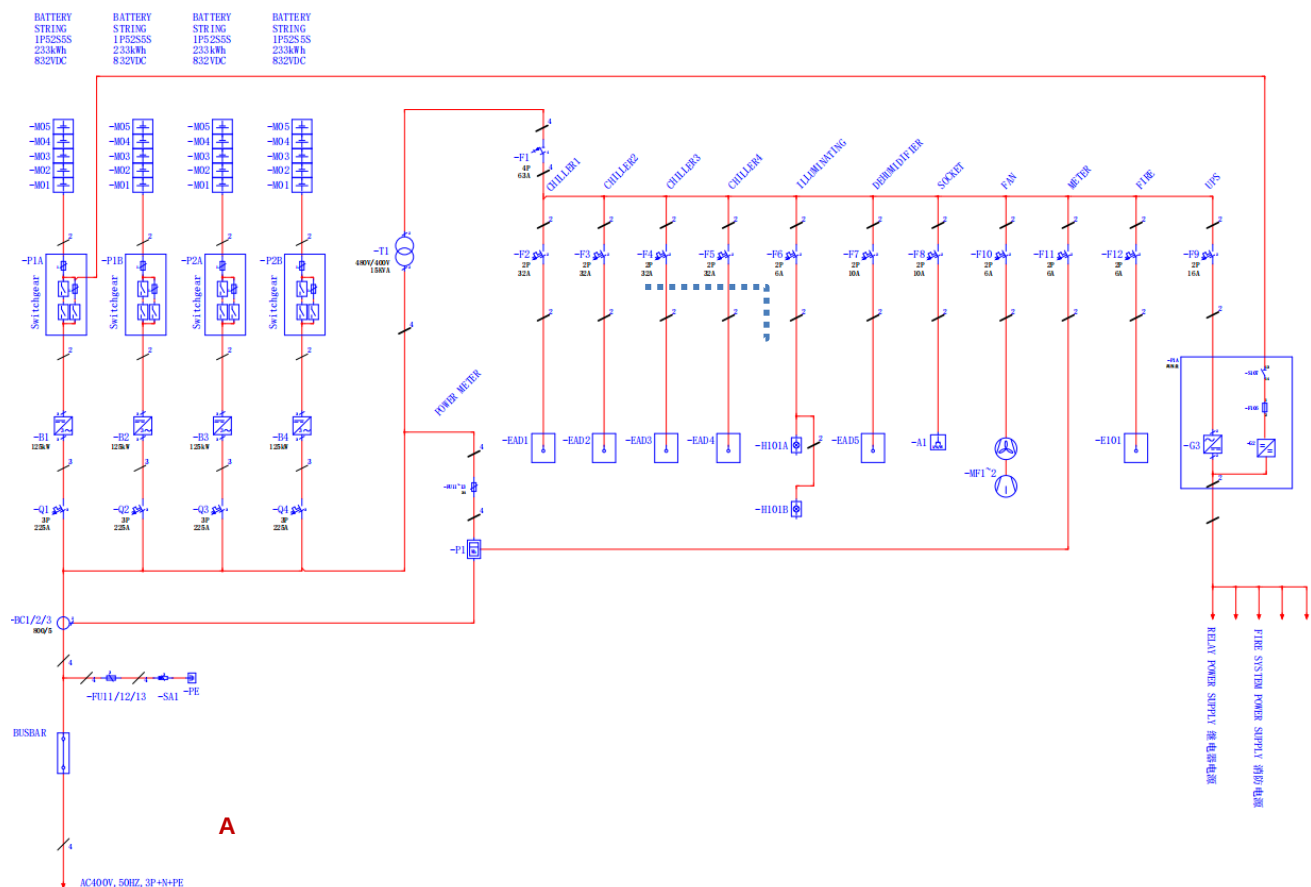


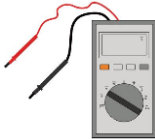
Fig. 6-1 Electrical SLD overview

6.2.1 Wiring instructions

Item	Recommended specification
Grid port connection terminals A	3*(3/0~4/0 AWG), L1/L2/L3
	3*(1/0~2/0 AWG), N

6.3 Preparation Before Wiring

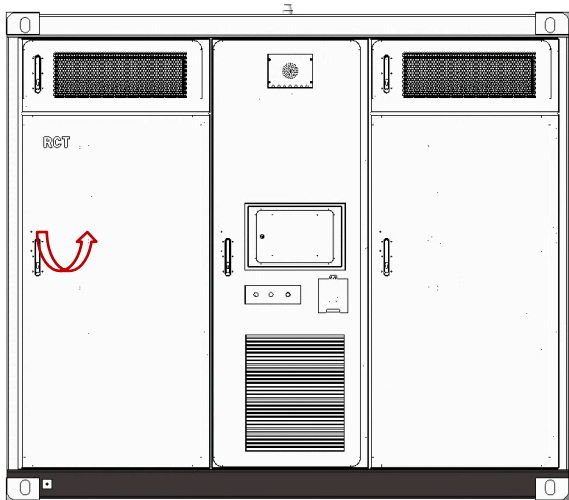
6.3.1 Preparing Installation Tools

Item	Name and Graphics
Installation tools	
	Torque screwdriver
	
	Heat gun
	
	Wire stripper
	
	Hydraulic pliers
	
	Torque wrench
	
	Screwdriver
	
	Multimeter

6.3.2 Open the Door

Open the door before the cable is connected.

- Move upward the cover over the lock hole.
- Insert the door key and turn it clockwise
- Rotate the handle anti-clockwise.



6.3.3 Preparing Cables

The cables must meet the following requirements:
The current carrying capacity of the cable meets requirements. Factors affecting the current carrying capacity of a conductor include but are not limited to:

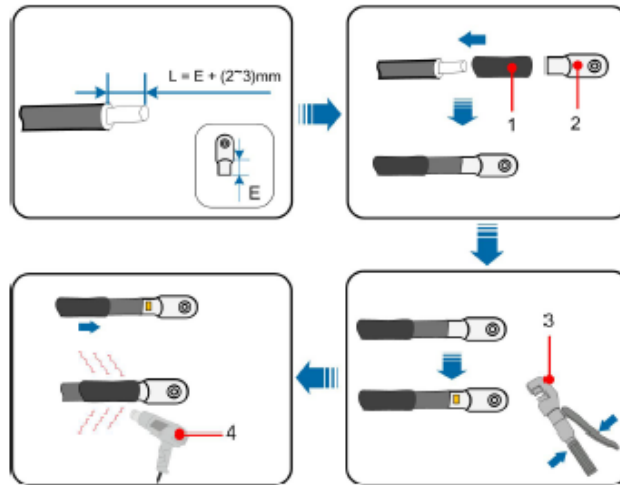
- Environmental conditions;
- Type of the insulation material of the conductor;
- Cabling method;
- Material and cross-sectional area of the cable.

- Select cables with a proper diameter according to the maximum load, and the cables should be long enough.
- Only flame-retardant cables can be used.
- AC output cables of three phases must be of the same specifications and materials.
- All DC input cables must be of the same specifications and materials.

6.3.4 Crimp terminal

Crimp OT/DT terminals

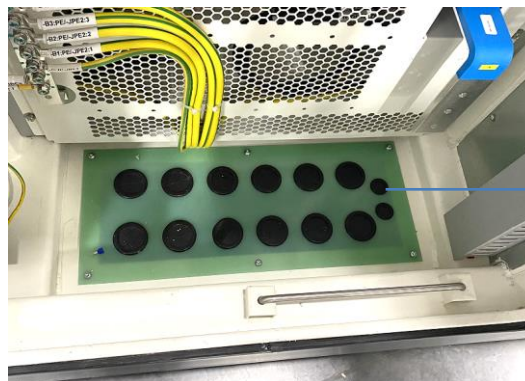
Follow the steps shown below to crimp terminal.



6.3.5 Cable Entry Design

The cables connecting the outdoor cabinet and external equipment can enter the inside from the bottom cable entry or the side cable entry of the outdoor cabinet.

Cables entry hole is shown as below:



PCS AC side and
communication
cable entry

Cable entrance is from the bottom with split area for Grid Power cable and signal cables.

- Grid port cables connect to terminal bus bar (3 phases), copper cable conductor cross sectional area:
L1/L2/L3: 3*(3/0~4/0 AWG)
N: 3*(1/0~2/0 AWG)
- Signal cables come in/out cabinet, Copper cable conductor cross sectional area: 2*(18 ~20AWG).



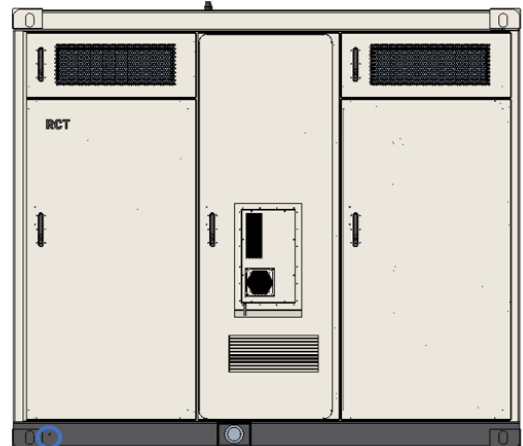
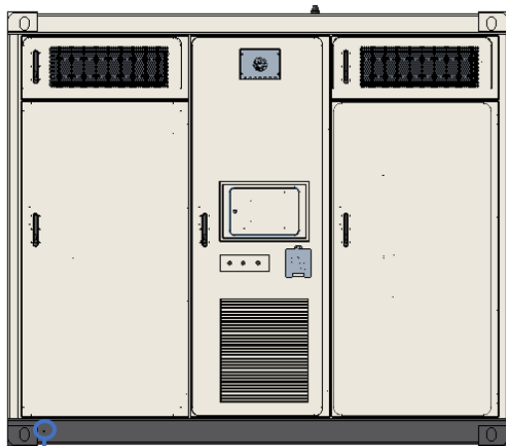
6.4 Ground Connection

Auxiliary electricity side:

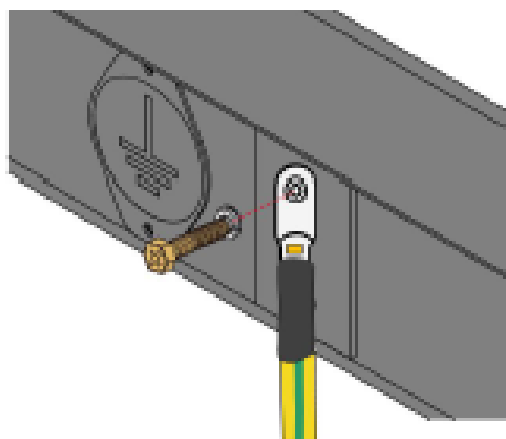


- Use a grounding cable of 5~7 AWG to ensure a reliable connection between the grounding points.

Cabinet side:



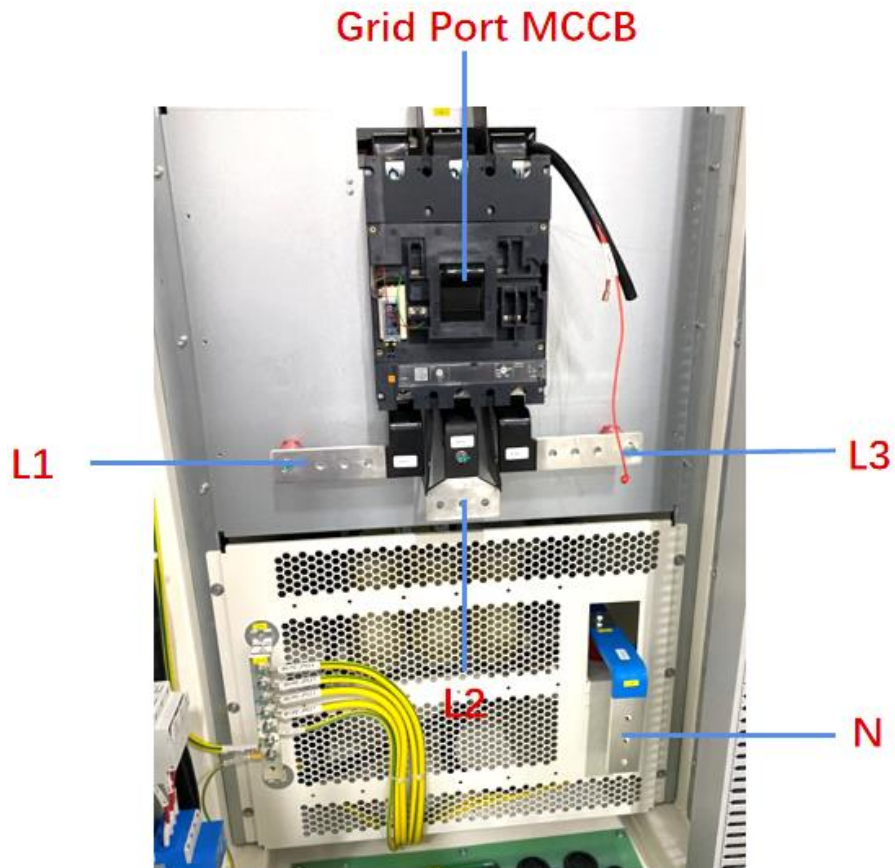
External grounding points



- Use a grounding cable of 3*(1/0~2/0 AWG) to ensure a reliable connection between the grounding points.

6.5 AC Connection

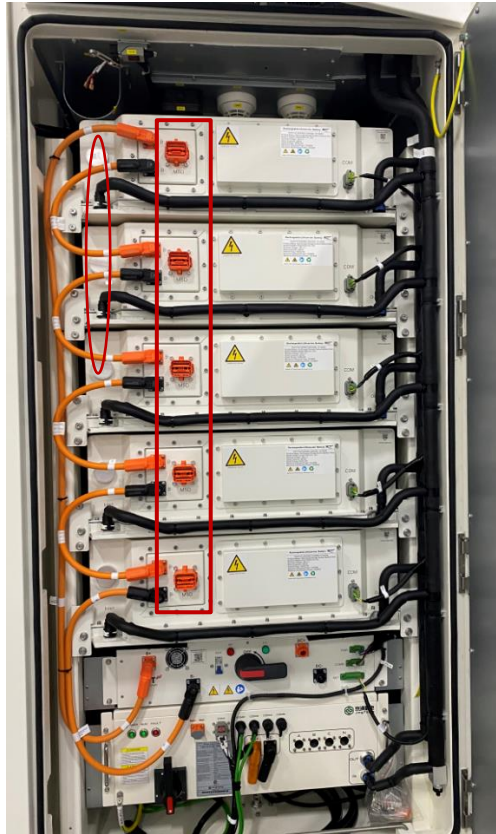
6.5.1 Grid port connection



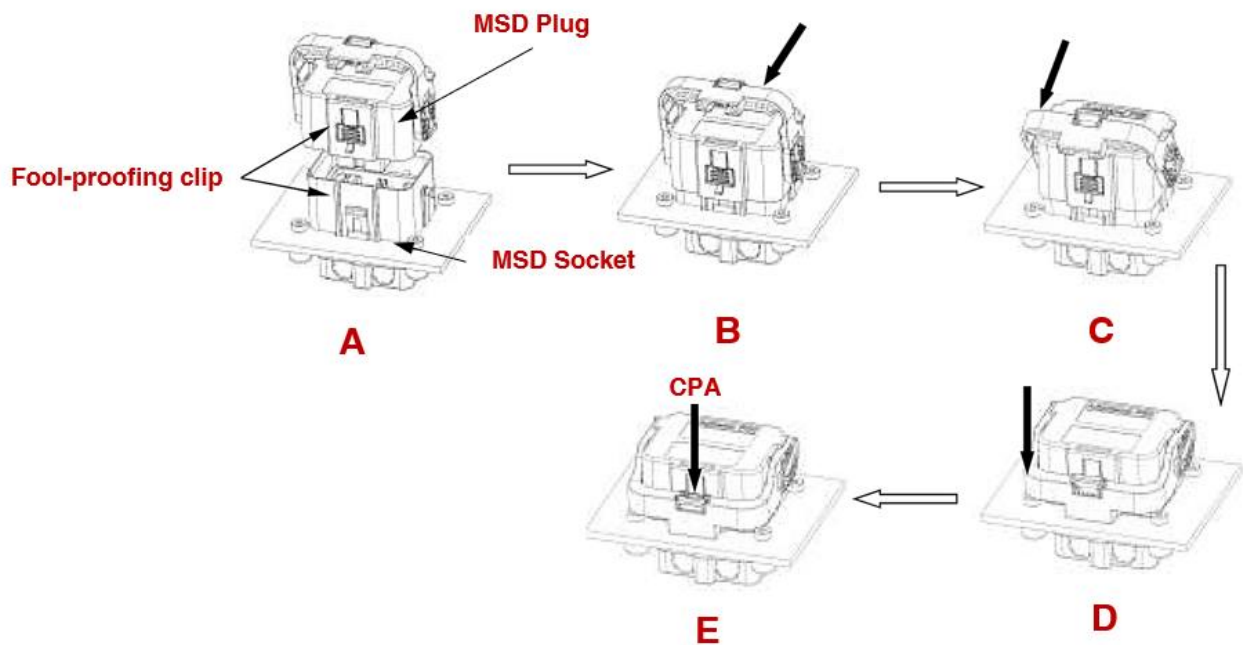
- Grid port cables connect to terminal MCCB (3P4W, L1/L2/L3/N).
- Use copper cable conductor cross sectional area:
L1/L2/L3: 3*(3/0~4/0 AWG)
N: 3*(1/0~2/0 AWG)

7 Battery MSD installation

The illustration shows 1 cluster, with a total of 4 clusters.



■ Installation Procedure

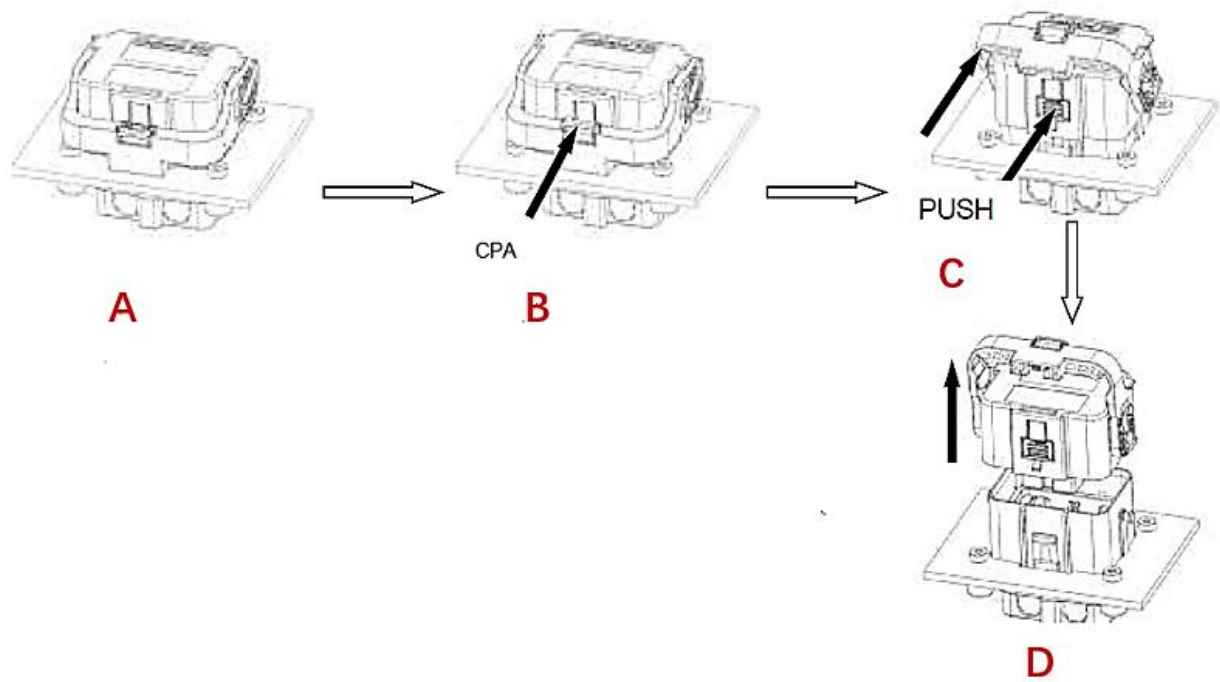


Step 1. Insert the plug and socket vertically according to the fool-proofing clip position (Figure A).

Step 2. Rotate the black handle to the vertical position and hear the “click” to ensure the plug is locked to socket tightly (Figure B to D).

Step 3. Press CPA button to complete locking (Figure E).

■ Remove Procedure



Step 1. Pull the CPA from the black handle upward (Figure B).

Step 2. Then rotate the black handle to about 60° to stop (Figure C).

Step 3. Press the PUSH button on the plug and rotate the black handle to 90° (Figure C to D).

Step 4. Unplug the socket.

8 Powering up and Shutdown



- The RCTerra Pro 1.0 cabinet can only be put into operation after confirmation by a professional and approved by the local power department.
- For RCTerra Pro 1.0 cabinet with a long shutdown time, check the equipment thoroughly and carefully to ensure all indexes are acceptable before powering it on.

8.1 Inspection Before Powering up

Before powering up the equipment, check the following items carefully.

- Check that the phase sequence of the AC cable to the user side is correct and the connection is reliable.
- Check whether the protective covers inside the equipment are installed firmly.
- Check whether the emergency stop button is released.
- Check and ensure that there is no grounding fault.
- Check whether the AC and DC voltages meet startup conditions and ensure that there is no over-voltage with a multimeter.
- Check and ensure that no tools or components are left inside the equipment.
- Check all air inlets and outlets for blockage.

If the RCTerra Pro 1.0 cabinet has been stored for more than six months, the top radiator fan should be checked for proper rotation, noise or stalling before powering up. If the storage time is too long, check the cabinet at least once every six months.

8.2 Powering Up Steps

Step 1 Preparations

- Open the doors and open the EMS protective cover window by using the keys delivered with the cabinet.
- Determine whether the connectors between all battery packs are fully plugged.
- Install the MSD to the battery pack. There are 20 battery packs need to be installed with MSD. (For the installation step, please see the part "[7 Battery MSD installation](#)")

Step 2 Power up the cabinet

- Close the MCCB Q1.



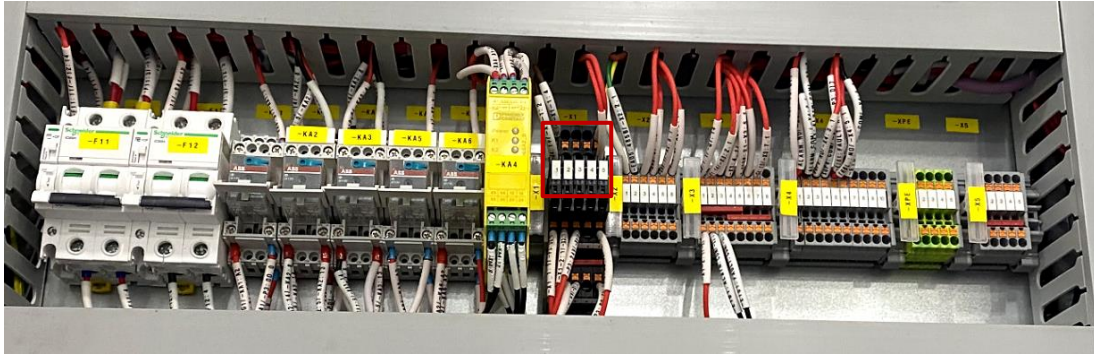
- Close auxiliary micro circuit breaker switch F1.



- Close the micro circuit breaker F2~F10(F2: Chiller 1, F3: Chiller 2, F4: Chiller 3, F5: Chiller 4, F6: Illumination, F7: Dehumidifier, F8: Socket, F9: UPS, F10: Fan).



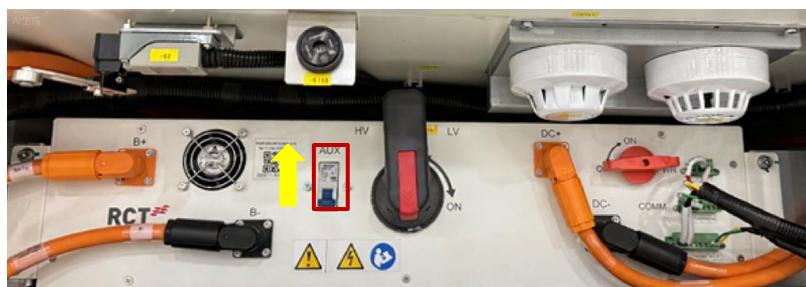
- If X1 terminals are not closed when the device is shipped, close X1 terminals and do not need to be disconnected again.



- Turn on the QS2 switch of the P1A switch gear.
Note: Minimize prolonged idling of the discharge end. The 24V power comes from the battery system. Long idling means constant 24V output. If the discharge end idles for over 3 days, with individual cell voltage under 2.5V for 30 minutes straight, the QS2 switch will cut off 24V output. Then, the equipment need to be repowered and recharged. After the system experiences an extended shutdown lasting over one week, the main switch of the switch gear and the QS2 must be turned to the OFF position to prevent the battery system from becoming over-discharged and unable to restart.



- Turn on the auxiliary 24V DC supply switches of the four switch gears in turn. And the BMS could get power and start the self-inspection.



- Turn the isolation switch handles of four switch gears clockwise to ON in turn.



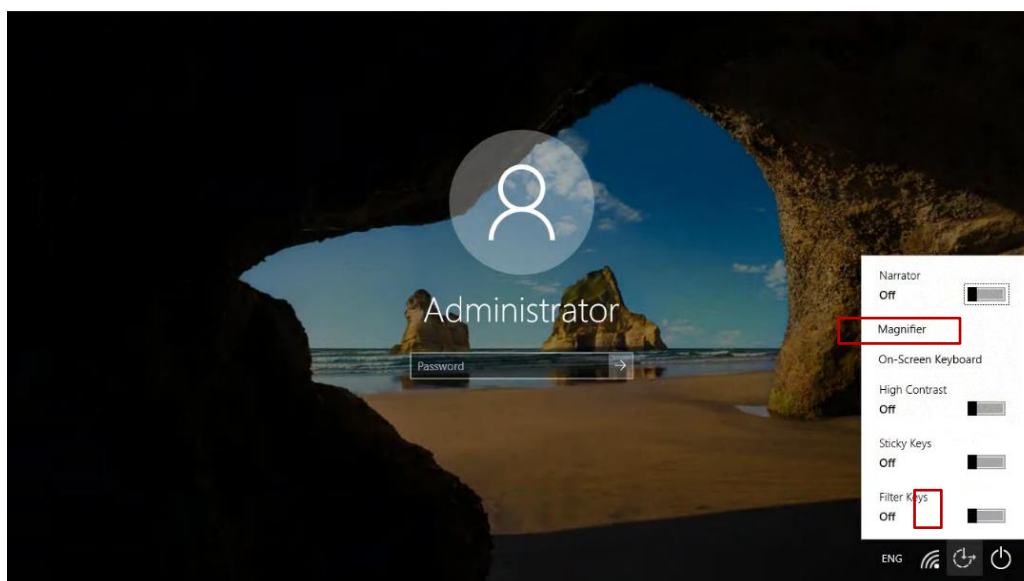
- Turn the isolation switch handle of all PCS clockwise to ON in turn.



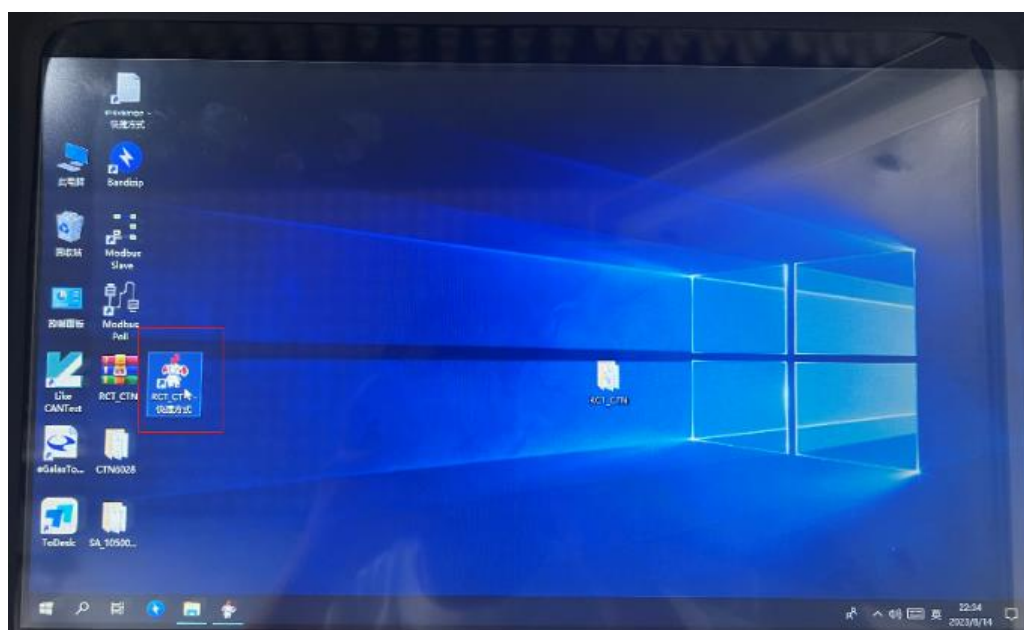
- Close all doors.

Step 3 Start the system through the EMS software.

- Open the touch panel protective window and wait for the startup page.
- Click  button to display the selection screen, click "on-screen keyboard" to enter the password. The default password is 0.



- Find the "RCT_CT_N" application icon. And double click it to open up the EMS control interface.



- Start all devices through the EMS. For the EMS setting. Please read the instruction of EMS following contents.

8.3 Shutdown steps

Step 1 Shutdown the EMS software

- Shutdown PCS and BMS through EMS (refer to [11.7.1 PCS](#) and [11.7.2 BMS](#) for details).
- Exit the EMS software. For the EMS setting. Please read the instruction of EMS following contents.

Step 2 Shutdown the cabinet

- Open all doors by using the keys delivered with the cabinet.
- Disconnect the MCCB Q1.
- Disconnect the micro circuit breaker F1.
- Disconnect the micro circuit breakers F2~F10.
- Turn off the auxiliary 24V DC supply switches of four switch gears.
- Turn the isolation switch handles of the four switch gears anticlockwise to OFF.
- Disconnect the QS2 switch of the P1A switch gear.
- Turn the isolation switch handle of all PCS anticlockwise to OFF.
- If the cabinet is left for a long time (for example, more than one week), at least one MSD of each cluster battery system is removed to ensure that the DC side is powered off.
- Close all the door.

9 The Thermal Management System

The TMS system is liquid cooling, which main function is to maintain the temperature of the battery system to an allowable operating temperature range. Following is the coolant pipe layout.

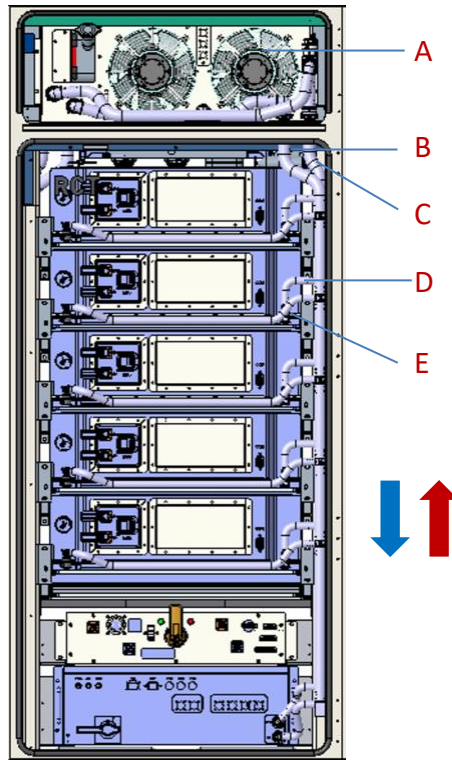


Fig. 9-1 Thermal management system

Item.	Description
A	Chiller
B	Main Coolant Inlet Pipe Line
C	Main Coolant Outlet Pipe Line
D	Sub Coolant Outlet Pipe Line
E	Sub Coolant Inlet Pipe Line

Blue arrow: Low temperature; Red arrow: High temperature.

Cooling power is auto-adjustable according to ambient temperature & discharge/charge status. TMS system components' working status is depend on the target battery cell temperature controlling by BMS.

Coolant: BASF Glysantin G30 50% concentration

Refrigerant pipe line pressure: 3.5Mpa

Coolant pipe line pressure: <3bar

10 Fire Suppression

10.1 General Rules

Please comply with the fire laws and regulations of the country/region where the project is located. Check and maintain the fire equipment regularly to ensure a normal operation of all functions.

10.2 Fire Suppression Equipment

The RCTerra Pro 1.0 cabinet has an aerosol fire suppression system that can effectively extinguish the fire. It is equipped with hydrogen detector, smoke detector and temperature detector. If any abnormality is detected, the system sends a signal to the station-level alarm host through the electrical compartment external terminal for early warning of fire.



NOTICE

Combustible gas detectors need to be functionally tested and calibrated every year to ensure the detection accuracy.

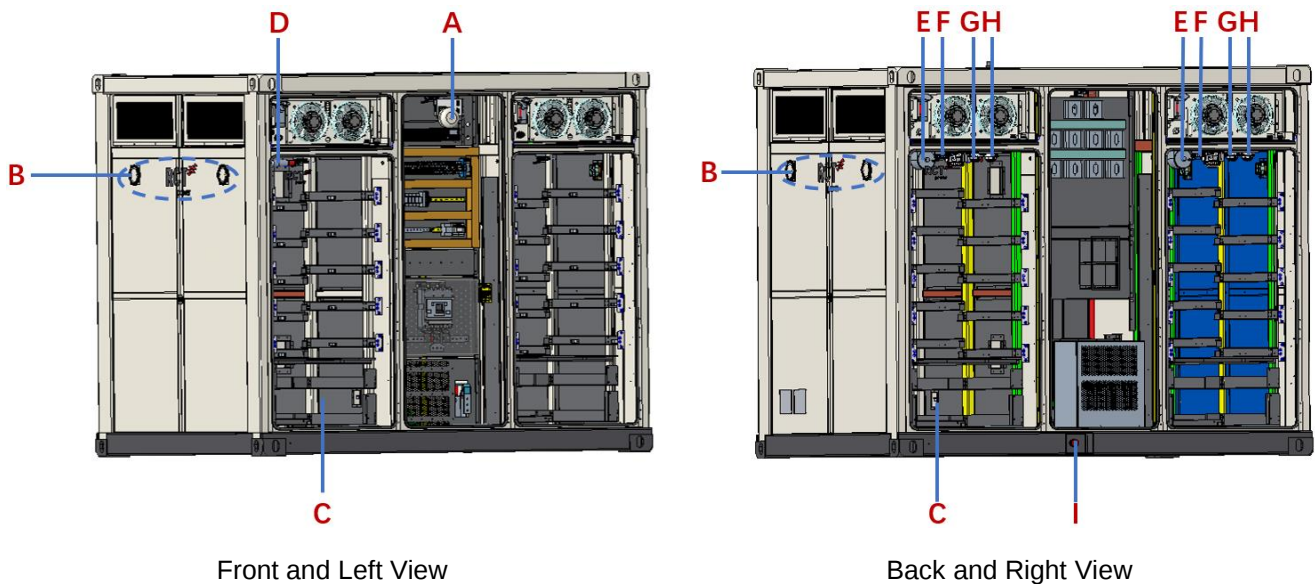


Fig. 10-1 Fire suppression system design

Item.	Description
A	Strobe and siren
B	Explosion proof valve, with fan
C	Explosion proof valve, without fan
D	Dry pipe and sprinkler
E	Aerosol fire suppression generator
F	Mixed gas detector
G	Temperature detector
H	Smoke detector
I	Water inlet

10.3 Exhaust System

When the concentration of combustible gas is detected to reach setting value, the combustible gas detector in the cabinet sends a signal to the EMS for fire warning, while the signal is transmitted to the EMS to shut down the system and turn on the exhaust system (start the air intake equipment and exhaust equipment).

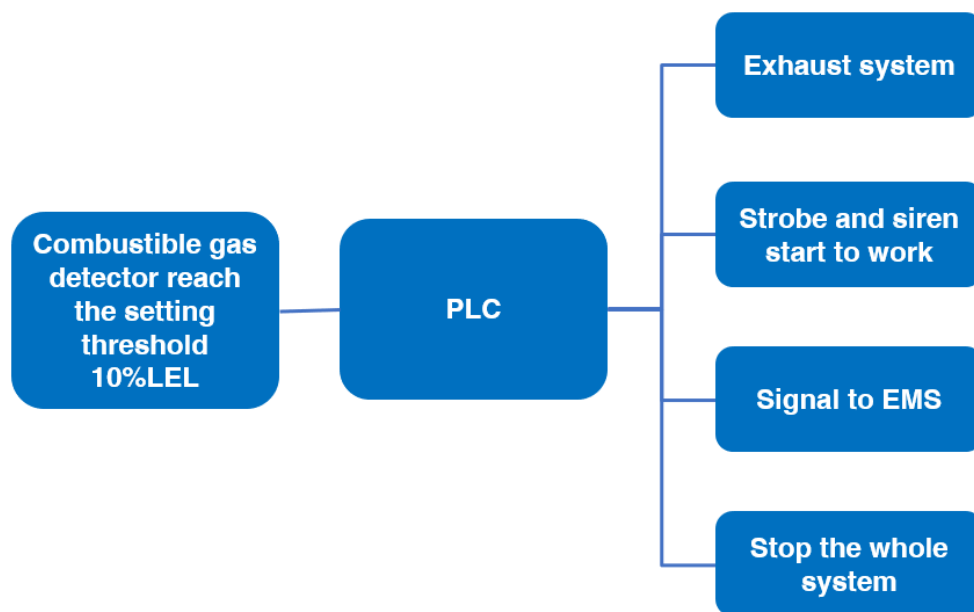


Fig. 10-2 Principle of exhaust system

10.1 Water-based Fire Protection System

The RCTerra Pro 1.0 cabinet is equipped with water-based fire protection system. External firefighting water sources are introduced through the water inlet at the lower front of the cabinet. The water is conveyed via internal dry pipelines to the battery cabinet, where specialised sprinkler convert the water flow into water mist to implement firefighting. This process provides forced cooling to the battery clusters, isolates oxygen, and suppresses the spread of thermal runaway, thereby achieving rapid fire suppression and preventing reignition.

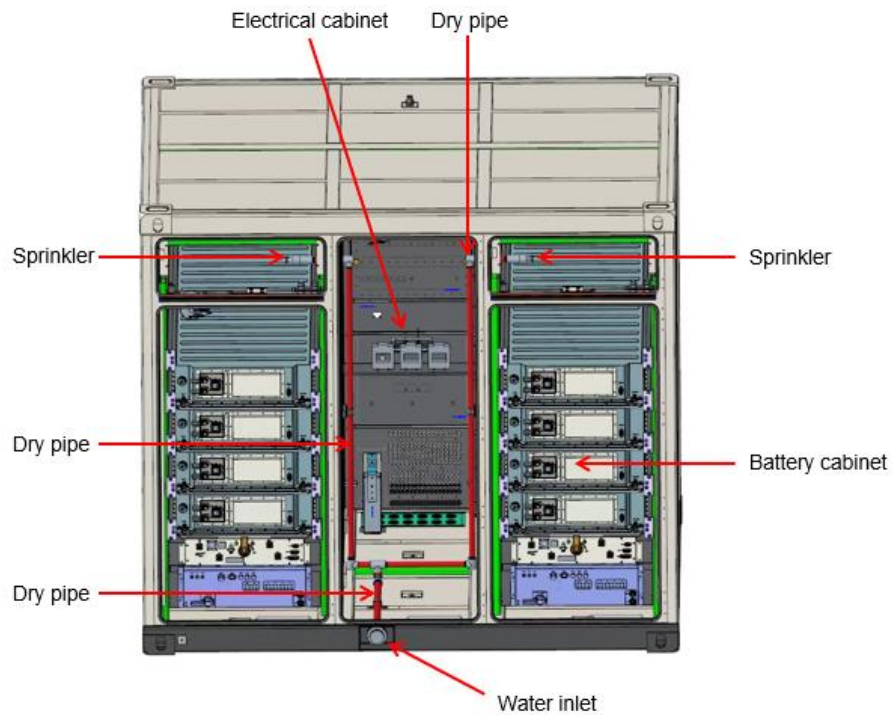


Fig. 10-3 Water-based fire protection system

10.2 Aerosol Fire Suppression System

The RCTerra Pro 1.0 cabinet is equipped with an aerosol fire suppression system. Aerosol generators are automatic units which are thermally activated. The aerosol fire suppression system is automatically activated when the smoke and temperature detector reach the setting threshold.

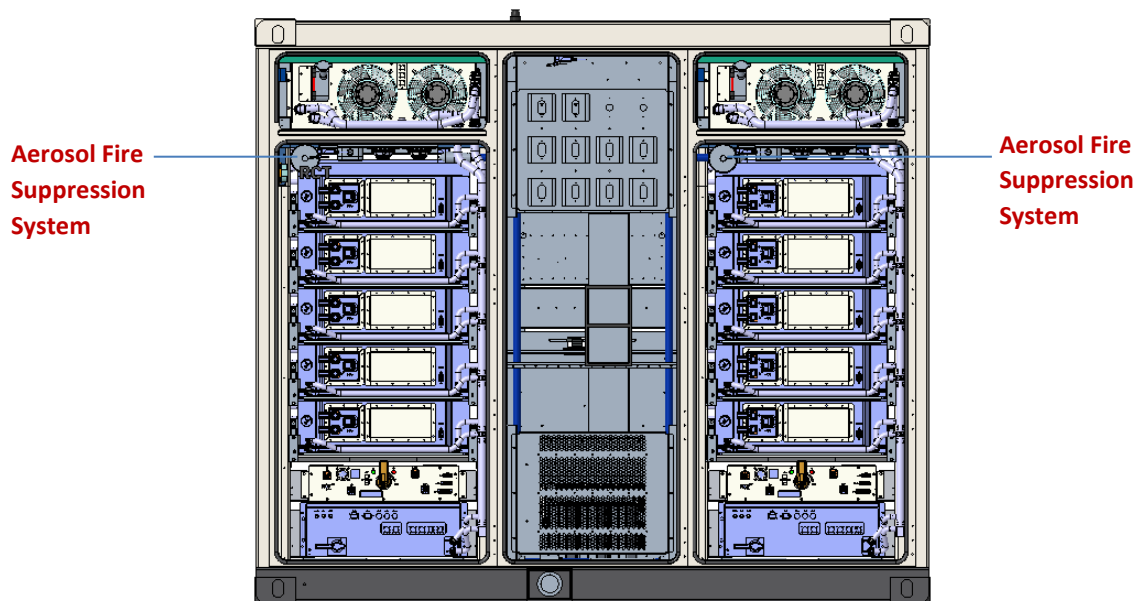


Fig. 10-4 Aerosol fire suppression system

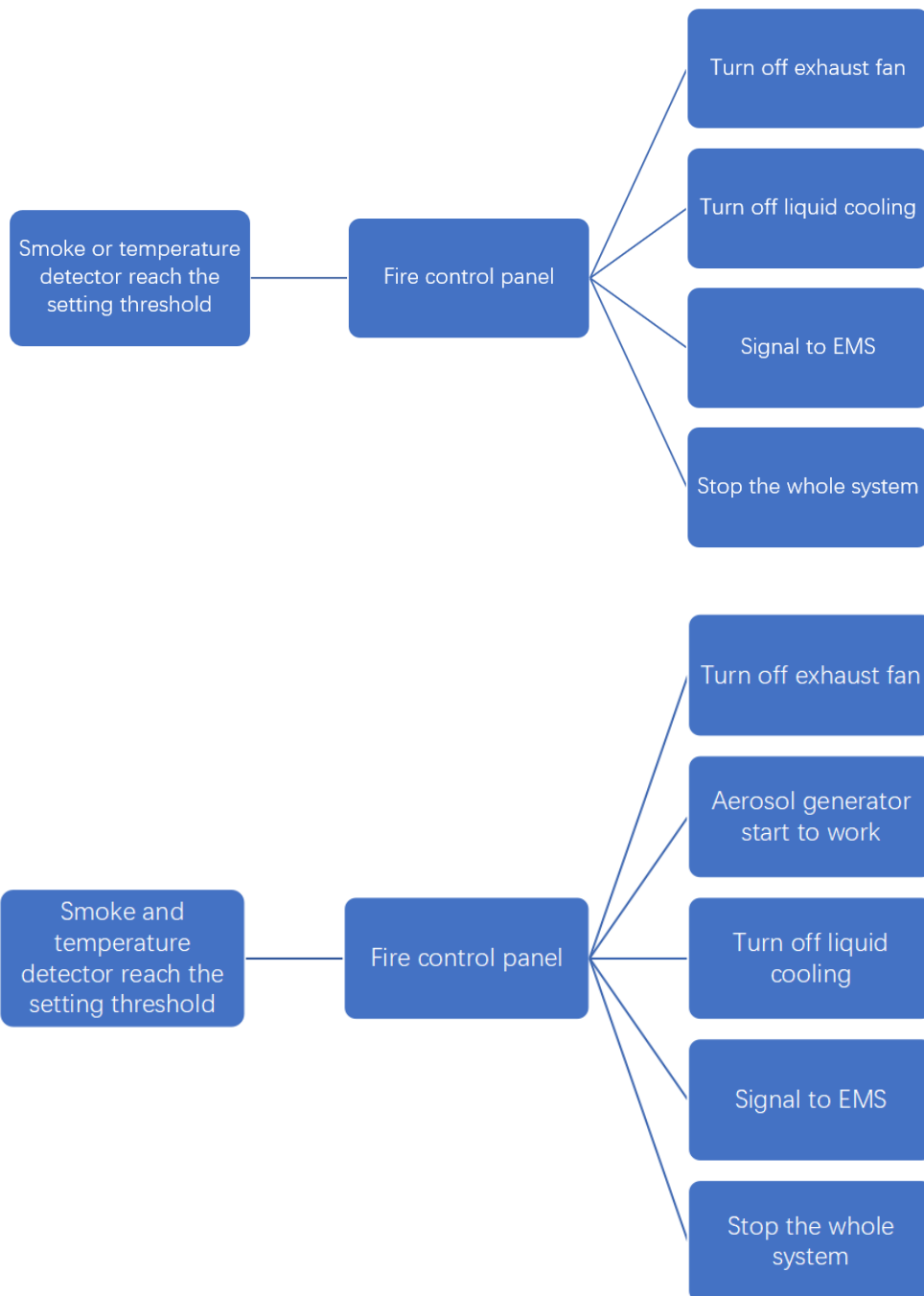
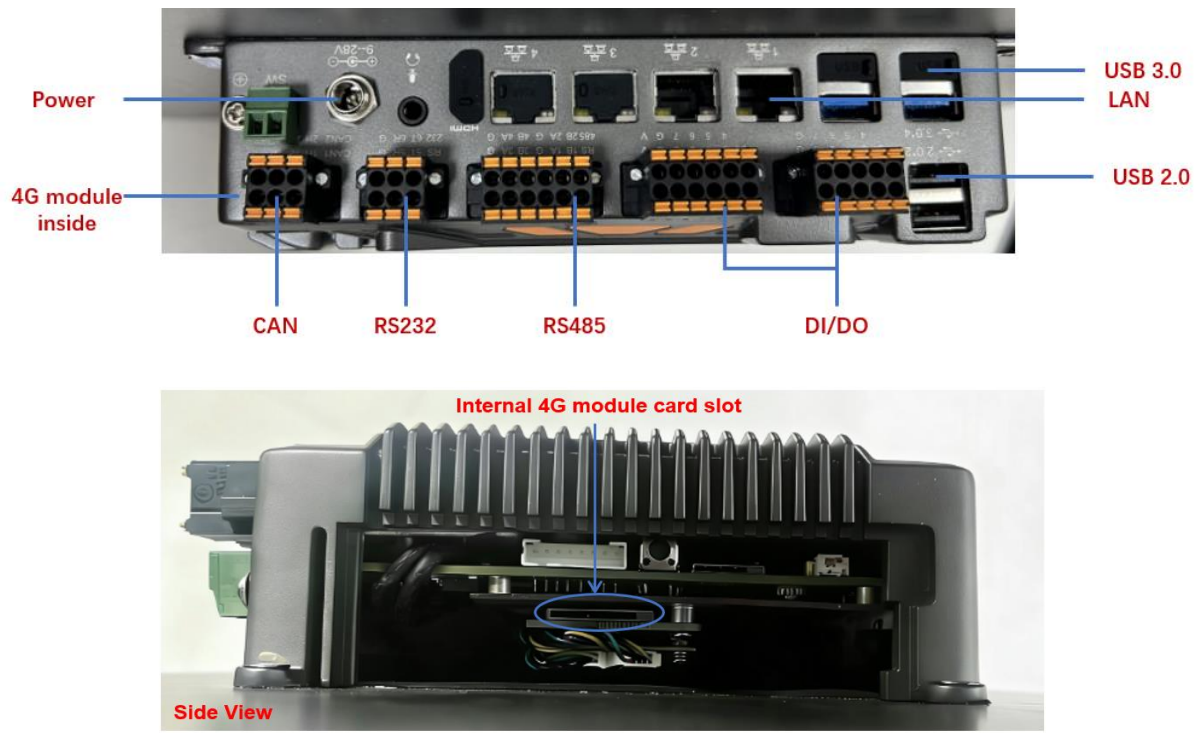


Fig. 10-5 Principle of aerosol fire suppression system

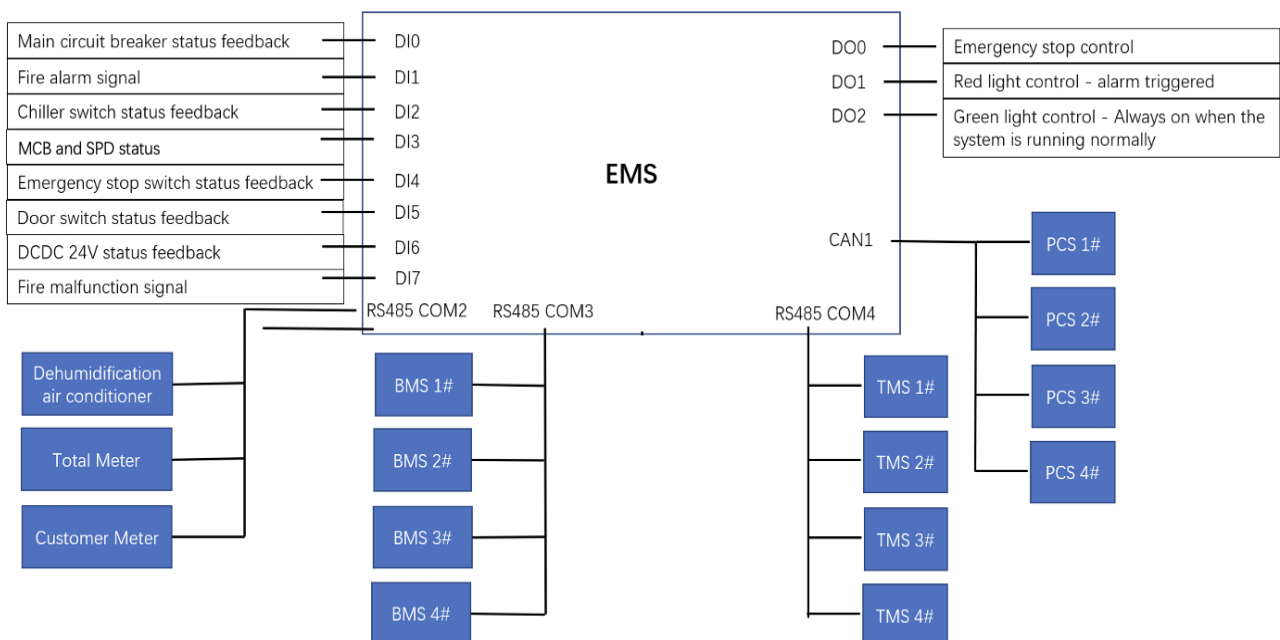
11 EMS Instruction

11.1 Touch panel interface



Note: The 4G module card slot is located within the touch panel and currently supports select carriers only.

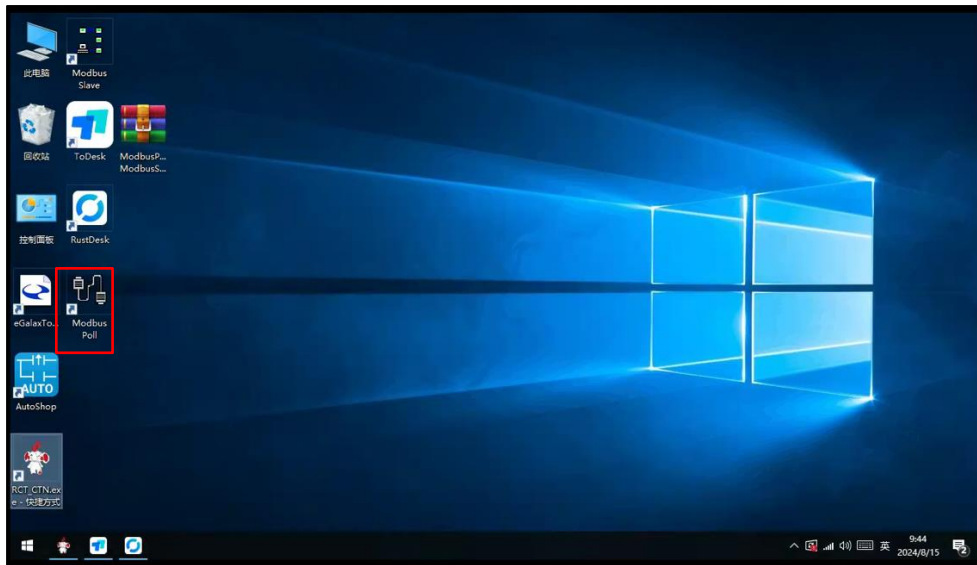
11.2 System chart



11.3 Modbus Poll Communication

Note: During hardware debugging, ensure that cables are connected to all devices and auxiliary power supply is complete.

1. Remotely connect the industrial computer of the storage cabinet.
2. Open Modbus Poll on the industrial control computer of the energy storage cabinet to test the communication. The connection method is shown below.



1) BMS

- Connection Setup (As shown in figure 1)

Connection: Serial port;

Serial Settings: COM3;

9600 Baud, 8 Data bits, Node Parity, 1 Stop Bit;

- Read/Write Definition (As shown in figure 2)

Slave ID: 2,3,4,5;

Function: Select according to PCS manual; register: 04 ;

Address: Select according to PCS manual; address: 8193;

Quality: Fill in as needed (Default 10); Read: 100.

2) Ele Meter

- EEM-MA370 Connection Setup (As shown in figure 3)

Connection: Modbus TCP/IP;

IP Address or Node Name: COM3;

- Read/Write Definition (As shown in figure 2)

Slave ID: 1;

Function: Select according to meter manual; register: 03 ;

Address: Select according to PCS manual; address: 1025;

Quality: Fill in as needed (Default 10); Read: 7.

3) Chiller

- Connection Setup (As shown in figure 1)

Connection: Serial port;

Serial Settings: COM4;

9600 Baud, 8 Data bits, Node Parity, 1 Stop Bit;

■ Read/Write Definition (As shown in figure 2)

Slave ID: 1,2,3,4;

Function: Select according to meter manual; register: 03,04 ;

Address: Select according to PCS manual; address: read 1, write 1;

Quantity: Fill in as needed (Default 10); read: 67, write: 55.

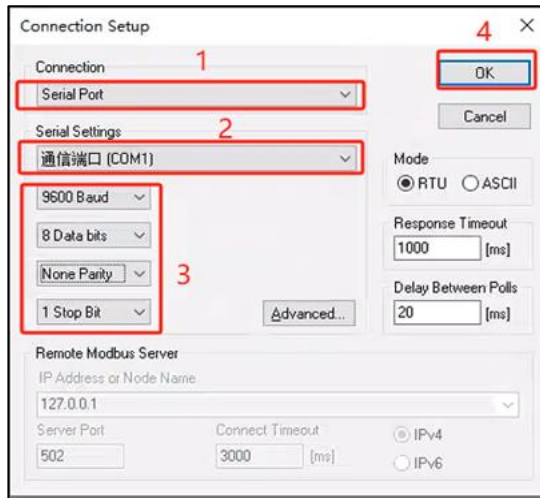


Figure 1

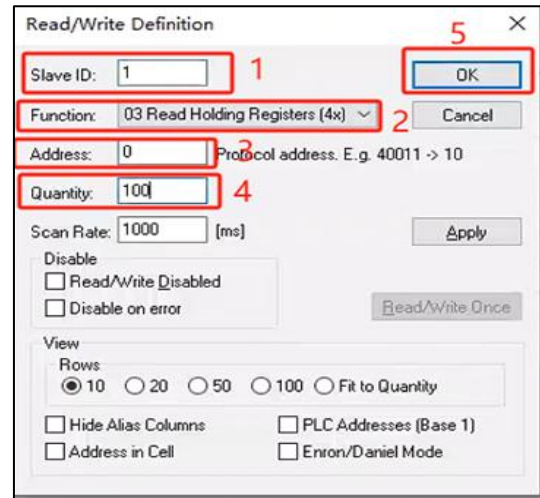


Figure 2

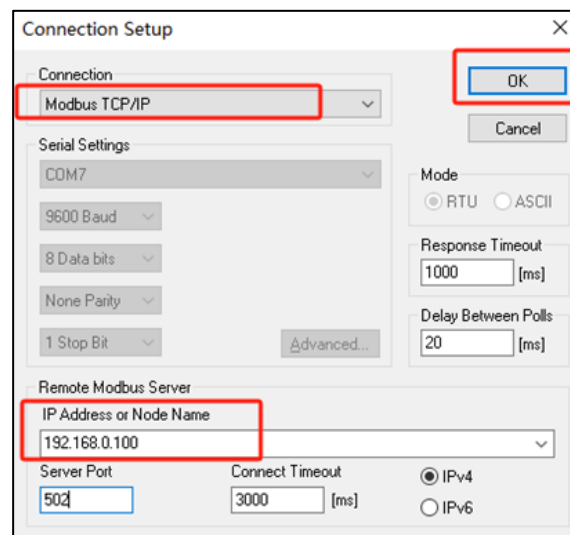
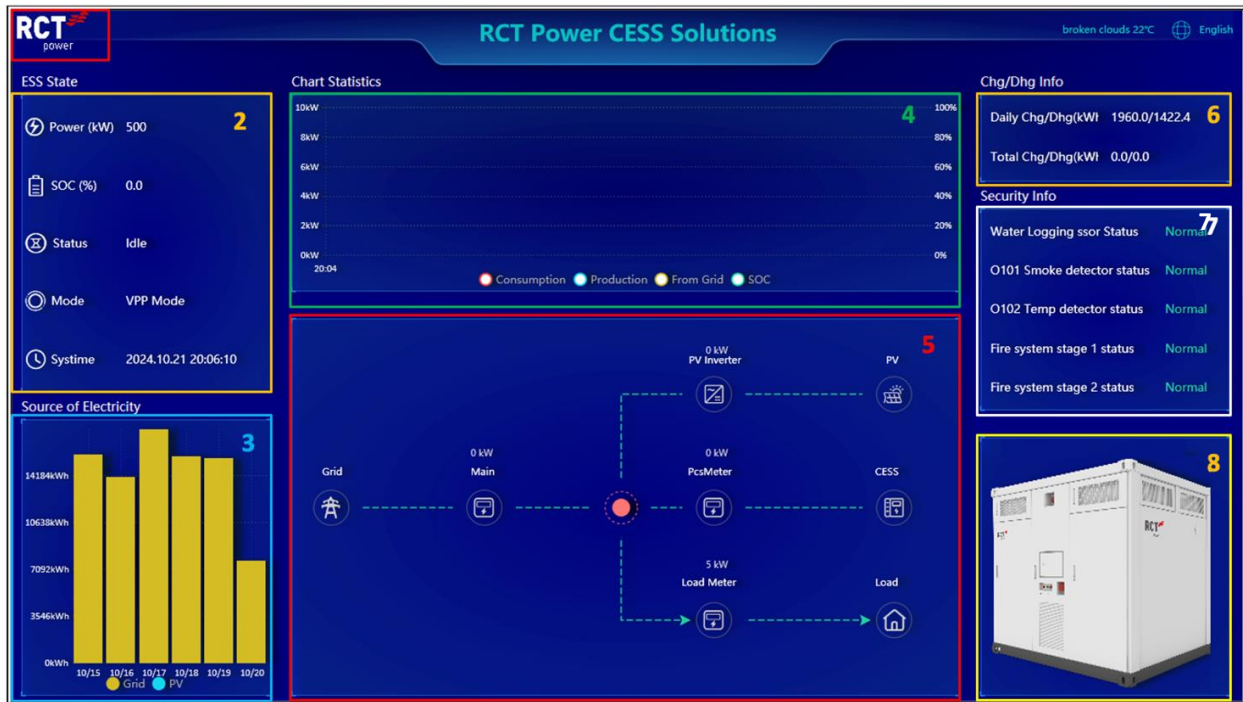


Figure 3

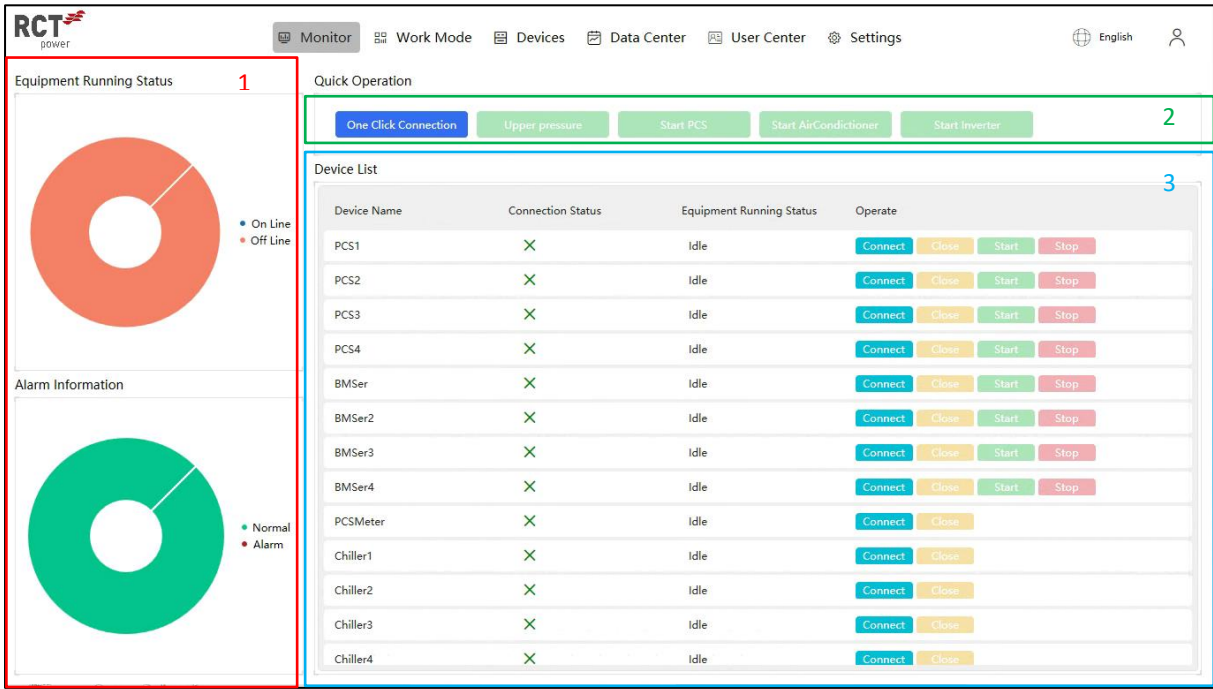
Note: The above communication settings are for reference only, and the specific settings depend on the project location.



NO. Description

- 1 RCT Power: Click the "RCT Power" logo with left mouse button to enter the monitor page.
Click the right mouse button to exit the software.
- 2 ESS State: To display detailed information about the energy storage cabinet.
Include: Power, SOC, Status, Mode and SysTime.
- 3 Source of Electricity: To display the source of electricity diagram, sources include grid and PV.
- 4 Chart Statistics: Energy graph.
Includes: Load Consumption, Cabinet Production, Electricity from the grid, Cabinet SOC.
- 5 Dynamic flow diagram: Real-time dynamic adjustment according to the actual power flow of the grid.
- 6 Chg/Dhg Info: To display the charge and discharge amount of the day and the accumulated charge and discharge amount.
- 7 Safety Info: Hardware device status.
- 8 Energy storage cabinet picture display

11.5 **Monitor**



NO.	Description
1	Equipment Running Status and Alarm Information
2	Quick Operation
3	Device List

■ **Equipment Running Status and Alarm Information**

Equipment Running Status	Monitors the online and offline status of the device.
Alarm Information	Monitors the normal and alarm status of the device.

■ **Quick Operation**

One Click Connection	Click the One Click Connection button to connect all devices in the cabinet.
Upper Pressure	Click Upper pressure button, all BMS can be switched to high voltage.
Start PCS	Click Start PCS button, all PCS can be switched to running state.
Start Air Conditioner	Click Start AirConditioner button, all air conditioners can be switched to running state.
Start Inverter	Click Start AirConditioner button, all inverters can be switched to running state.

■ **Device List**

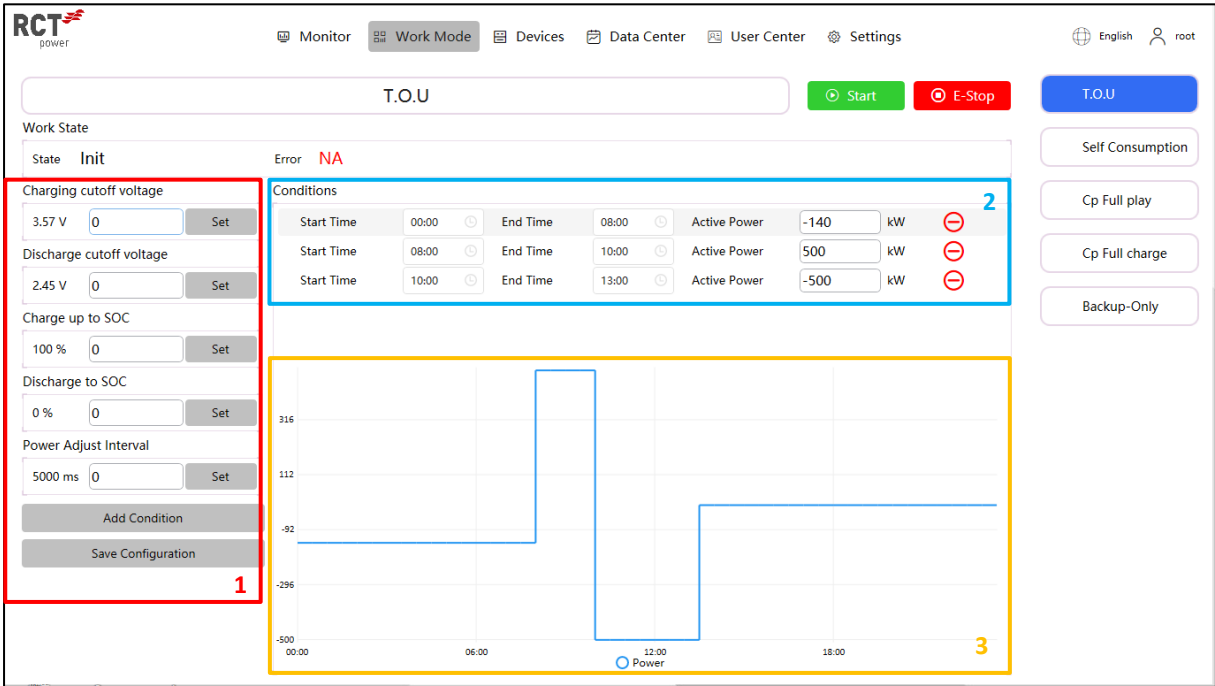
The device list contains all the communication devices of CESS 1000. You can operate the devices, and observe the running status and connection status of devices (as shown below).

Device List			
Device Name	Connection Status	Equipment Running Status	Operate
PCS1	X	Idle	Connect Close Start Stop
PCS2	X	Idle	Connect Close Start Stop
PCS3	X	Idle	Connect Close Start Stop
PCS4	X	Idle	Connect Close Start Stop
BMSer	X	Idle	Connect Close Start Stop

11.6 Work mode

11.6.1T.O.U

- 1. Parameter setting area
- 2. Set the power curve area
- 3. Power curve panel



Step 1: Click “Work Mode” button->Click “T.O.U” button;

Step 2: Enter parameters in the and click the corresponding button;

Charging cutoff voltage	2.75 V~3.57 V;
Discharging cutoff voltage	2.75 V~3.57 V;
Charge up to SOC	0 ~ 100%
Discharge to SOC	0 ~ 100%
Power Adjust Interval	The default value is 5000 ms, not less than 1000 ms;

Step 3: Each time click the button will add a row of

Start Time 00:00 End Time 07:59 Active Power -140 kW

Step 4: Enter the start time, end time and active power. To cancel the row, click button;

Step 5: Click button, the power curve appears in area 3.

Step 6: Click button, observe that the “work state” changes from “Init” to “Discharge” or “Charge”.

Step 7: To stop running, click button; To E-stop, click button.

11.6.2Self Consumption

RCTpower

MonitorWork ModeDevicesData CenterUser CenterSettings

Englishroot

Self Consumption

StartE-StopT.O.U

Work State

StateInitErrorNA

Self Consumption

Cp Full play

Cp Full charge

Backup-Only

Charging cutoff voltage

3.57V0Set

Discharge cutoff voltage

2.75V0Set

Power Adjust Interval

5000ms0Set

Step 1: Click “Work Mode” button->Click “Self Consumption” button;

Step 2: Enter parameters in the 0 and click the corresponding Set button;

Charging cutoff voltage	2.75 V~3.57 V;
Discharging cutoff voltage	2.75 V~3.57 V;
Power Adjust Interval	The default value is 5000 ms, not less than 1000 ms;

Step 3: Click Start button, observe that the “work state” changes from “Init” to “Discharge” or “Charge”.

Step 4: To stop running, click Stop button; To E-stop, click E-Stop button.

11.6.3Backup-Only

RCTpower

MonitorWork ModeDevicesData CenterUser CenterSettings

Englishroot

Backup-Only

StartE-StopT.O.U

Work State

StateInitErrorNA

Self Consumption

Cp Full play

Cp Full charge

Backup-Only

Backup battery SOC

0%0Set

SOC fluctuation range

0%0Set

Charging cutoff voltage

3.57 V0Set

Charge power

0 kW0Set

Step 1: Click “Work Mode” button->Click “Backup-Only” button;

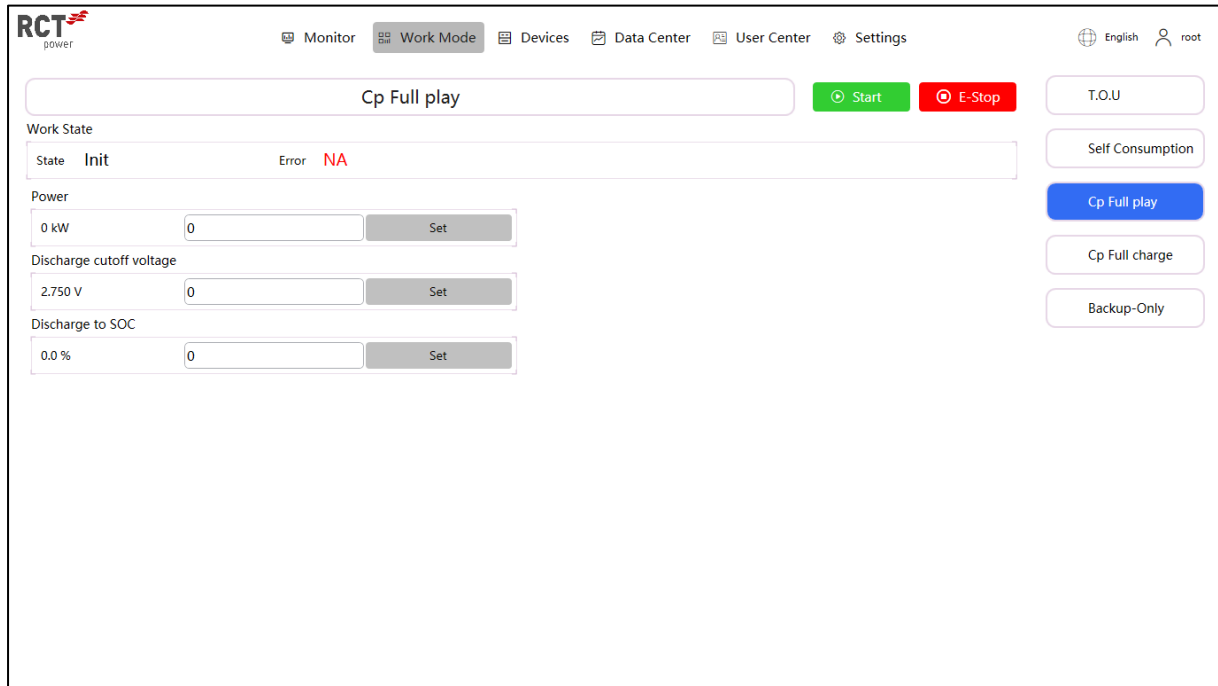
Step 2: Enter parameters in the 0 and click the corresponding Set button;

Backup battery SOC	0 ~ 100%;
SOC fluctuation range	0 ~ 100%;
Charging cutoff voltage	2.75 V~3.57 V;
Charge power	Not exceeding rated power.

Step 3: Click  button, observe that the “work state” changes from “Init” to “Discharge” or “Charge”.

Step 4: To stop running, click  button; To E-stop, click  button.

11.6.4Cp Full Play



Step 1: Click “Work Mode” button->Click “Cp Full play” button;

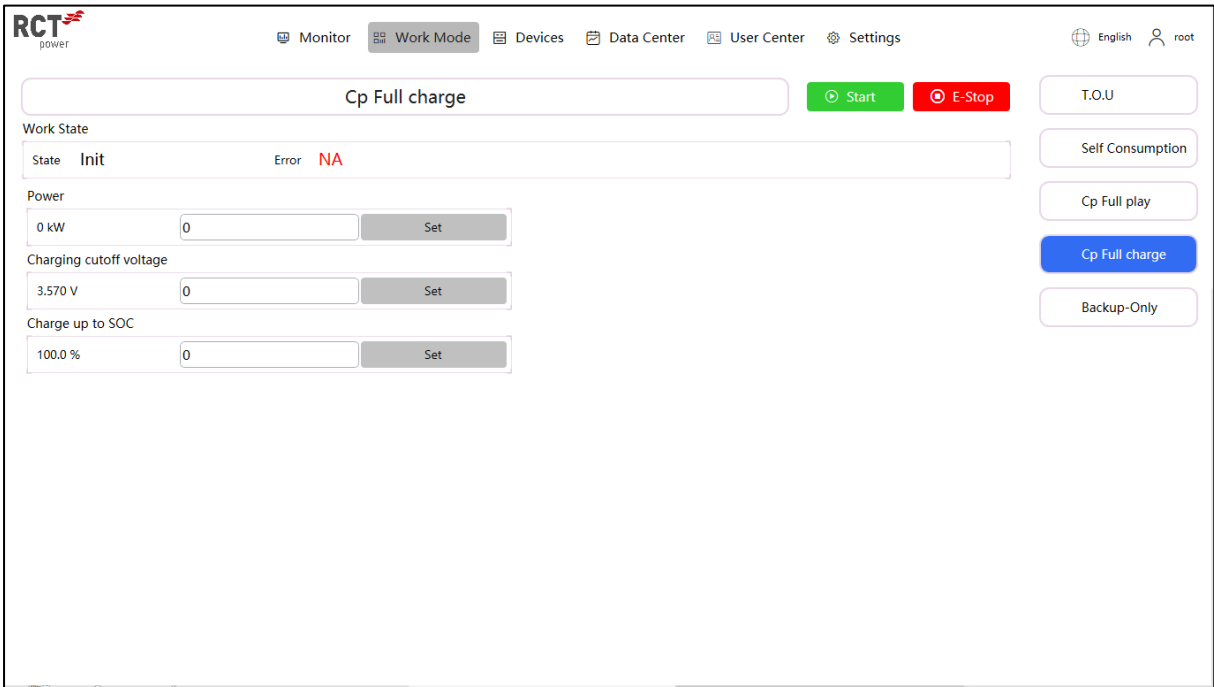
Step 2: Enter parameters in the and click the corresponding  button;

Power	0-100%
Discharge cutoff voltage	2.75 V~3.57 V;
Discharge to SOC	0-100%

Step 3: Click  button, observe that the “work state” changes from “Init” to “Discharge”.

Step 4: To stop running, click  button; To E-stop, click  button.

11.6.5Cp Full Charge



Step 1: Click “Work Mode” button->Click “Cp Full charge” button;

Step 2: Enter parameters in the and click the corresponding button;

Power	0-100%
Charging cutoff voltage	2.75 V~3.57 V;
Charge up to SOC	0-100%

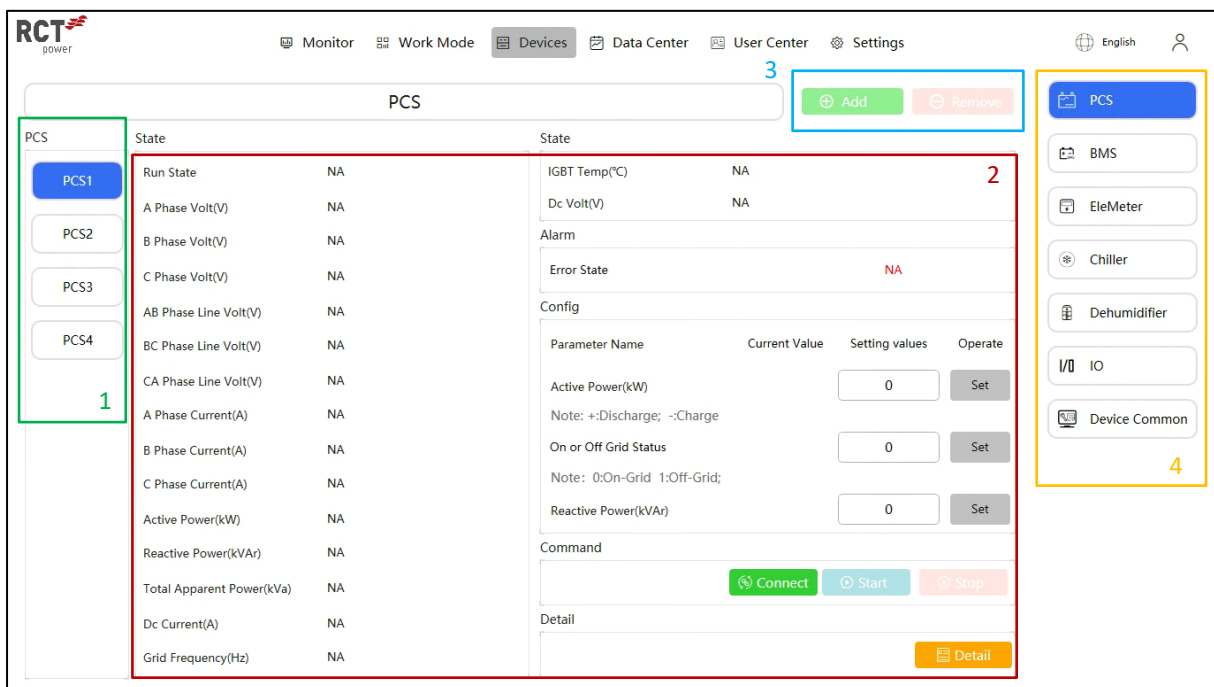
Step 3: Click button, observe that the “work state” changes from “Init” to “Charge”.

Step 4: To stop running, click button; To E-stop, click button.

11.7 Devices

Step: Click on the left menu bar “Device” button-> “PCS” button.

1. Device List.
2. General status of the device.
3. Device add and remove buttons.
4. Device navigation.

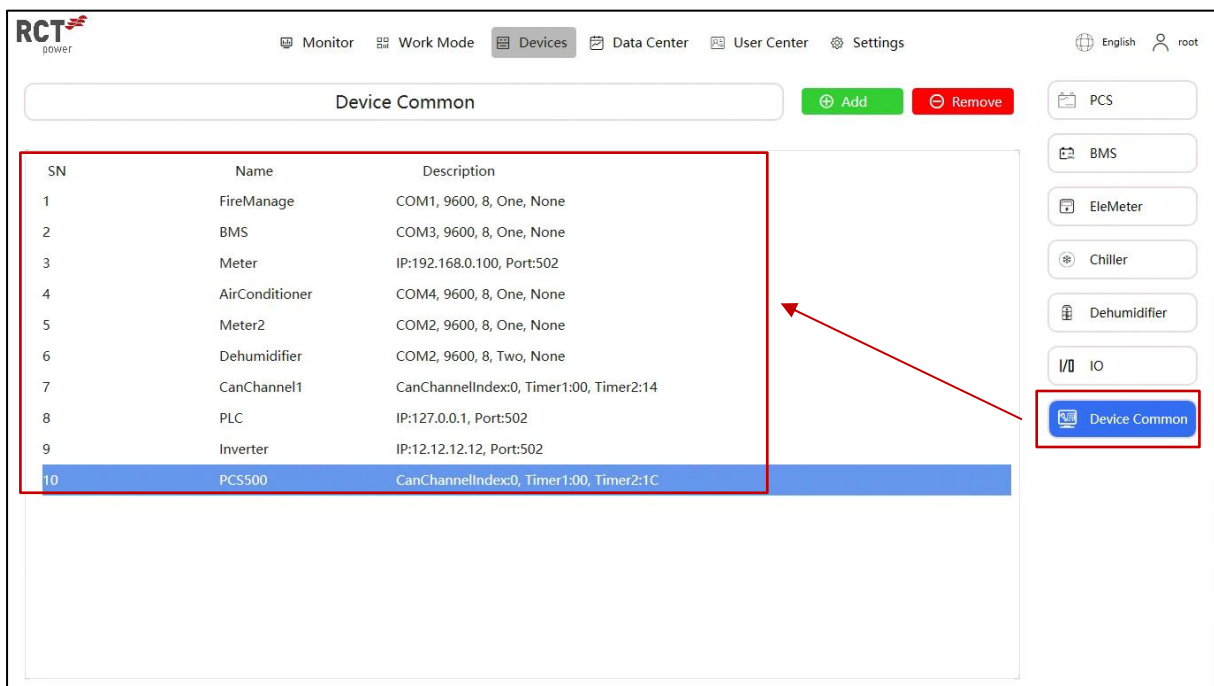


Note: Devices can be added or removed according to the project, and device communication needs to be established before adding devices.

■ Add Device

Example: Take adding PCS devices as an example.

Step 1: Switch to the "Device Common" interface to add the communication configuration. (For details, see [11.7.7 Device Common](#).);



Step 2: Click **Add** button to pop up the following window, enter the Device Name, fill in the Device Index (the number of devices increases), and select the communication name (the communication module created through "Device Common" interface).

RCT power

Monitor Work Mode **Devices** Data Center User Center Settings

English root

PCS

Add **Remove**

PCS

State	Value
Run State	NA
A Phase Volt(V)	NA
B Phase Volt(V)	NA
C Phase Volt(V)	NA
AB Phase Line Volt(V)	NA
BC Phase Line Volt(V)	NA
CA Phase Line Volt(V)	NA
A Phase Current(A)	NA
B Phase Current(A)	NA
C Phase Current(A)	NA
Active Power(kW)	NA
Reactive Power(kVAr)	NA
Total Apparent Power(kVa)	NA
Dc Current(A)	NA
Grid Frequency(Hz)	NA

State

IGBT Temp(°C) NA

Dc Volt(V) NA

Alarm

Error State NA

Config

Parameter Name	Current Value	Setting values	Operate
Active Power(kW)	NA	0	Set
Note: ++Discharge; --Charge			
On or Off Grid Status	NA	0	Set
Note: 0:On-Grid 1:Off-Grid;			
Reactive Power(kVAr)	NA	0	Set

Command

Connect **Start** **Stop**

Detail

Detail

PCS BMS EleMeter Chiller Dehumidifier IO Device Common

RCT power

Device Name PCS1

Device Index: 1

Communication Name: PCS500

Cancel **OK**

Step 3: Click **OK** button to generate a PCS button in the device list area.

RCT power

Monitor Work Mode **Devices** Data Center User Center Settings

English root

PCS

Add **Remove**

PCS

PCS1

State	Value
Run State	NA
A Phase Volt(V)	NA
B Phase Volt(V)	NA
C Phase Volt(V)	NA
AB Phase Line Volt(V)	NA
BC Phase Line Volt(V)	NA
CA Phase Line Volt(V)	NA
A Phase Current(A)	NA
B Phase Current(A)	NA
C Phase Current(A)	NA
Active Power(kW)	NA
Reactive Power(kVAr)	NA
Total Apparent Power(kVa)	NA
Dc Current(A)	NA
Grid Frequency(Hz)	NA

State

IGBT Temp(°C) NA

Dc Volt(V) NA

Alarm

Error State NA

Config

Parameter Name	Current Value	Setting values	Operate
Active Power(kW)	NA	0	Set
Note: ++Discharge; --Charge			
On or Off Grid Status	NA	0	Set
Note: 0:On-Grid 1:Off-Grid;			
Reactive Power(kVAr)	NA	0	Set

Command

Connect **Start** **Stop**

Detail

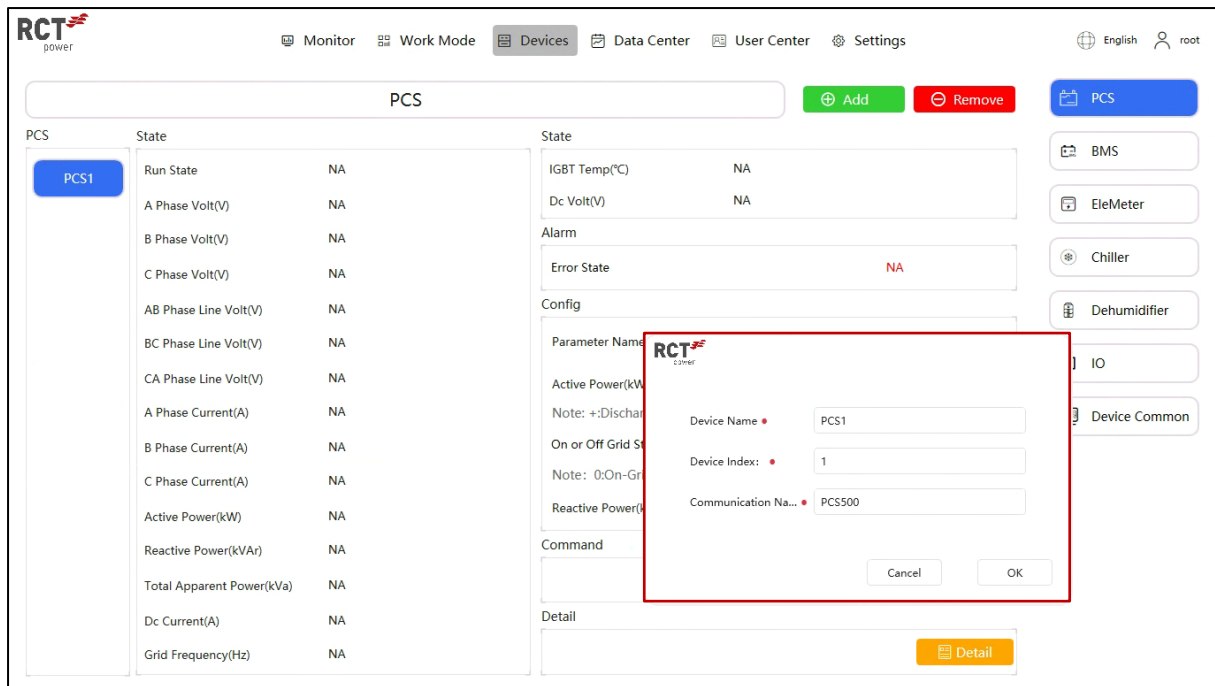
Detail

PCS BMS EleMeter Chiller Dehumidifier IO Device Common

Remove Device

Select the device list on the left and click  Remove button to remove the device.

Double-click the device button in the device list. The device settings details are displayed. The following figure: Take PCS as an example.



■ General status of the device

Device General status and main command area contains: Device general status, device command area and device details.

a. The general device status includes the general device status and alarm information.

Alarm (as shown in the following figure): Displays detailed fault information.



b. The command area of the device contains: Connect button , start button , and Stop button .

The command button allows sequential conditions: Connect -> Start -> Stop.

c. Details include: Status, Config, Warning and so on.

RCT

power

Status

Config

Warning

Connect

Start

Stop

State

Run Mode	N
Water Level Switch	N
Remote Test	N
High Pressure State1	N
Water Pump Status	N
Internal Fan1 State	N
Internal Fan2 State	N
Internal Fan3 State	N
High Pressure State2	N
Electric Heating State	N
Water Replenishment Pump	N
Cooling Fan State1	N
Cooling Fan State2	N
Crankshaft Heating State1	N
Crankshaft Heating State2	N
Main Waterway Solenoid Valve	N
Free Cooling Solenoid Valve	N
Electric Control Box Cooling Fan	N
Alarm	N

Cancel

OK

State

Environment Temp (°C)	N
Backwater Temp (°C)	N
Effluent Temp (°C)	N
Backwater Sensor (kPa)	N
Effluent Pressure Sensor (kPa)	N
Electric Control Box Temp (°C)	N
Inhale Pressure (kPa)	N
Inhale Saturated Temp (°C)	N
Inhale Temp (°C)	N
Inhale Super Heat (K)	N
Exhaust Pressure (kPa)	N
Exhaust Saturation Temp (°C)	N
Exhaust Temp (°C)	N
Exhaust Superheat (K)	N
Fan Gear	N
Fan Speed1 (%)	N
Fan Speed2 (%)	N
Fan Speed3 (%)	N

State

Alarm	N
Compressor1 State	N
Fréquence Cible Du Compre	N
Compressor Operating Freq	N
Compressor Bus Volt (V)	N
Compressor IPM Temp (°C)	N
Compressor Phase Current (	N
Electron Expansion Open	N
Pump Phase Current (A)	N
Actual Speed Of Pump (Hz)	N
IPM Temp Of The Pump (°C)	N
Target Speed Of Pump (Hz)	N
Water Pump Device	
Compressor Device Fault1	
Compressor Device Fault2	
Fan Device Fault	

11.7.1PCS

RCT

power

Monitor

Work Mode

Devices

Data Center

User Center

Settings

English

PCS

Add

Remove

PCS

PCS

State

PCS1	Run State	NA
PCS2	A Phase Volt(V)	NA
PCS3	B Phase Volt(V)	NA
PCS4	C Phase Volt(V)	NA
	AB Phase Line Volt(V)	NA
	BC Phase Line Volt(V)	NA
	CA Phase Line Volt(V)	NA
	A Phase Current(A)	NA
	B Phase Current(A)	NA
	C Phase Current(A)	NA
	Active Power(kW)	NA
	Reactive Power(kVAr)	NA
	Total Apparent Power(kVA)	NA
	Dc Current(A)	NA
	Grid Frequency(Hz)	NA

a

State

IGBT Temp(°C)	NA
Dc Volt(V)	NA

Alarm

Error State	NA
-------------	----

Config

Parameter Name	Current Value	Setting values	Operate
Active Power(kW)		0	Set
Note: ++Discharge; --Charge			
On or Off Grid Status		0	Set
Note: 0:On-Grid 1:Off-Grid;			
Reactive Power(kVAr)		0	Set

Command

Connect

Start

Stop

Detail

Detail

BMS

EleMeter

Chiller

Dehumidifier

I/O IO

Device Common

■ Device Communication

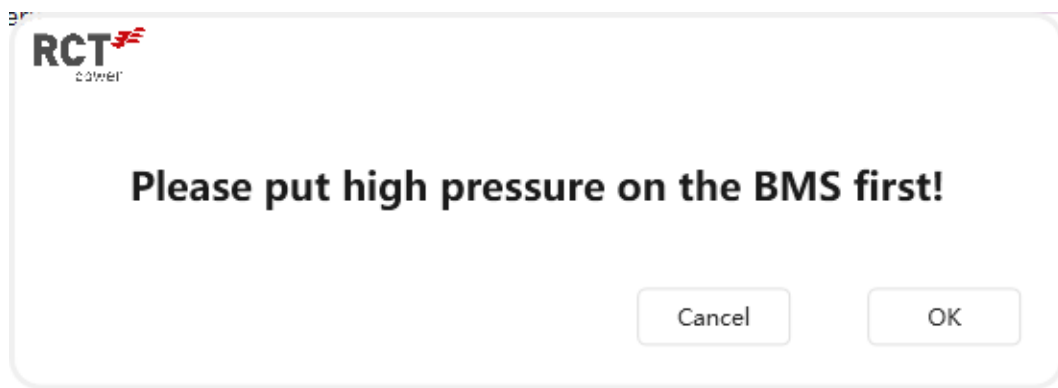
Click

Connect

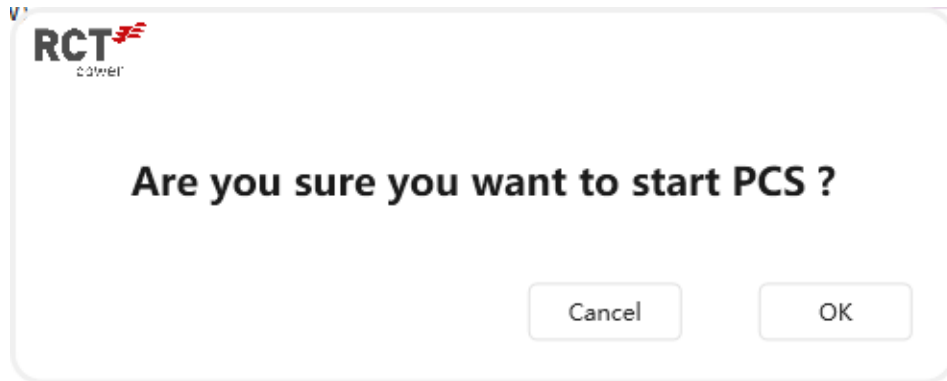
 button, observe that the value displayed on the “State” changes from "NA" to the specific value, indicating that the communication is successful.

■ Start PCS

Step 1: Before PCS start, the BMS must be in the DC high voltage state (For details, please see “[11.7.2 BMS](#)”).



Step 2: Click  button and the PCS confirmation window will pop up. Click the "Confirm" button.



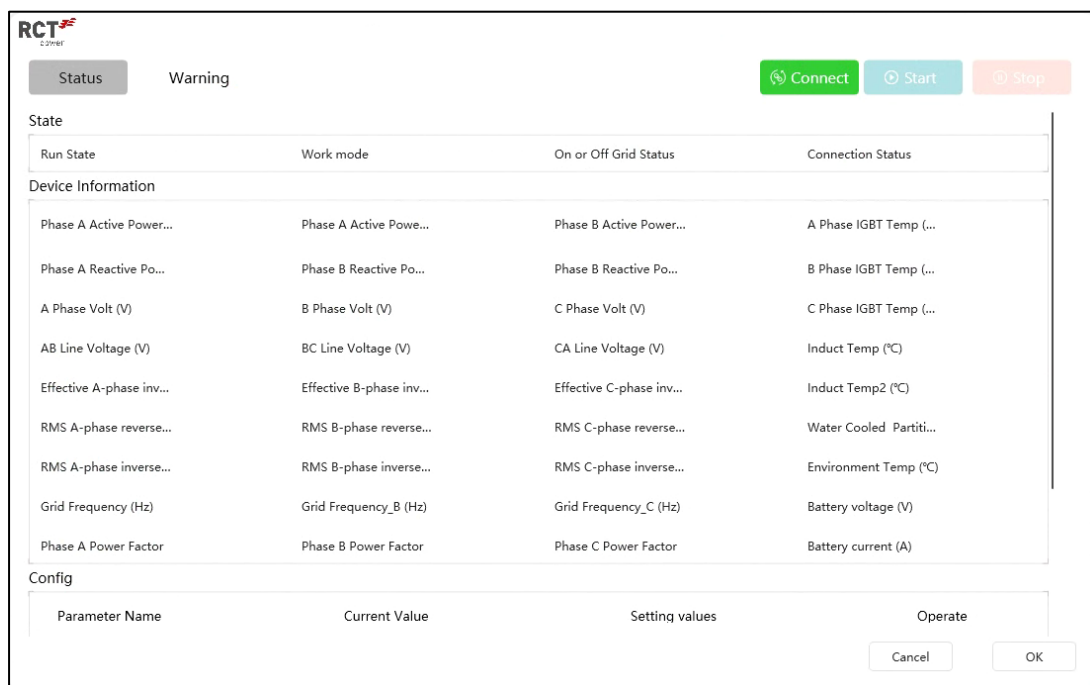
Step 3: Observe the "Run State" changes from "Standby" to "Run", the PCS is successfully started.

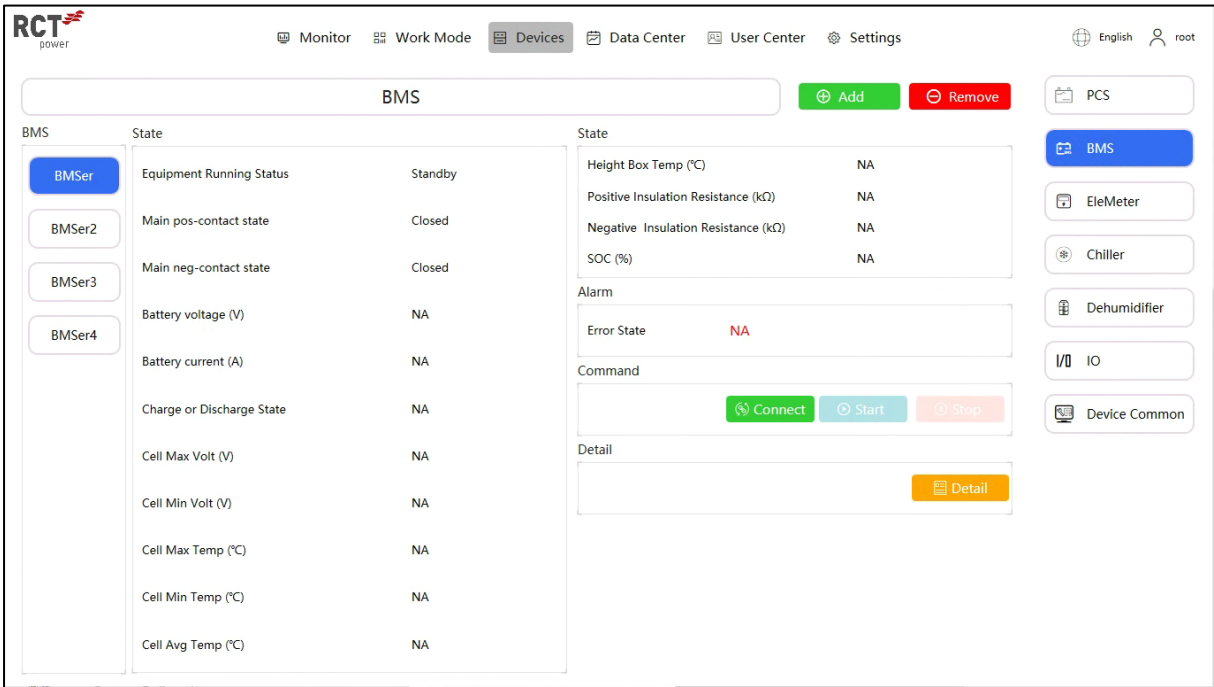
■ Stop PCS

Click the  button and the PCS will stop.

■ Detail

Click  button to view the device status and warning information.



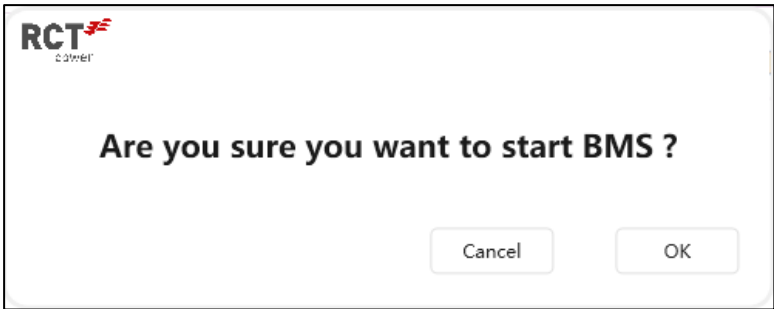


■ **Device Communication**

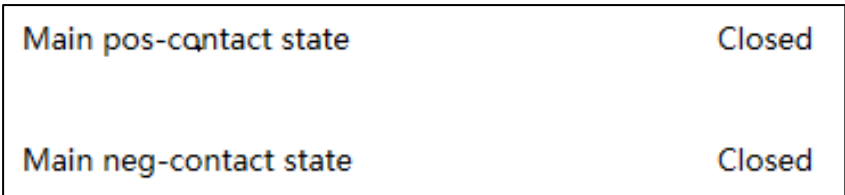
Click  button, observe that the value displayed on the “State” changes from "NA" to the specific value, indicating that the communication is successful.

■ **Connect the DC high volt**

Step 1: Click  button and the BMS high voltage prompt pops up, click  button.



Step 2: Observe “Main pos-contact State” and “Main neg-contact state” change from "Open" to "Closed".

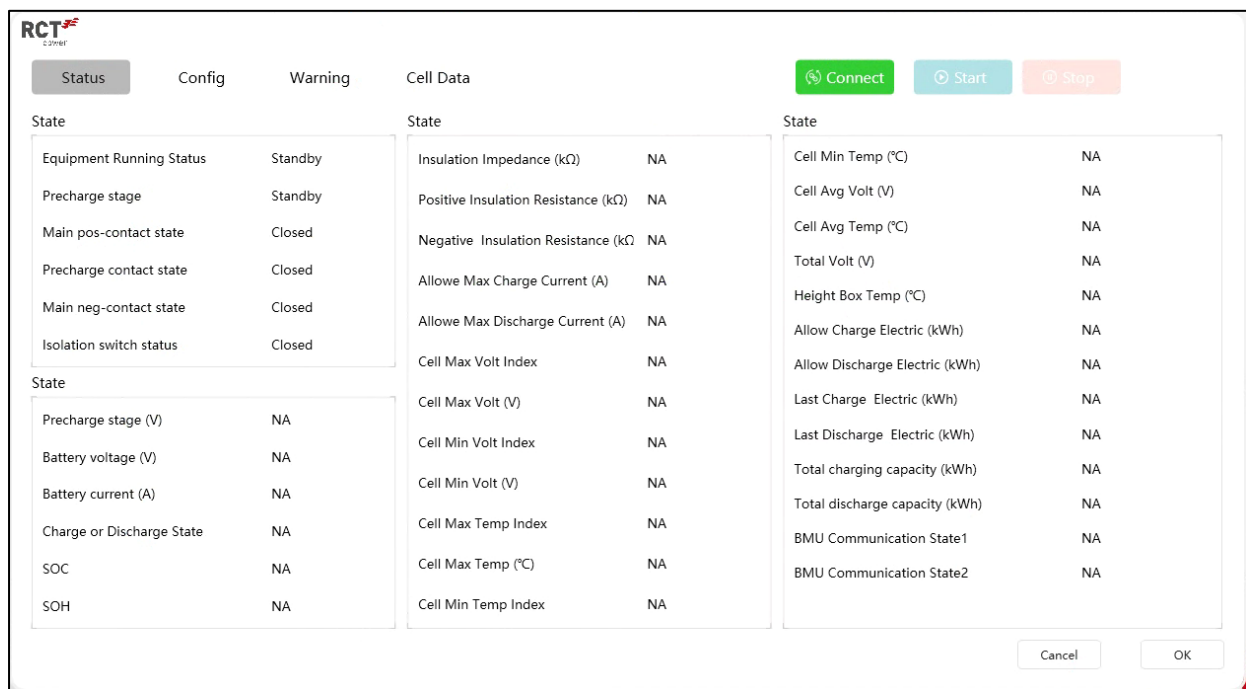


■ **Disconnect the DC high volt:**

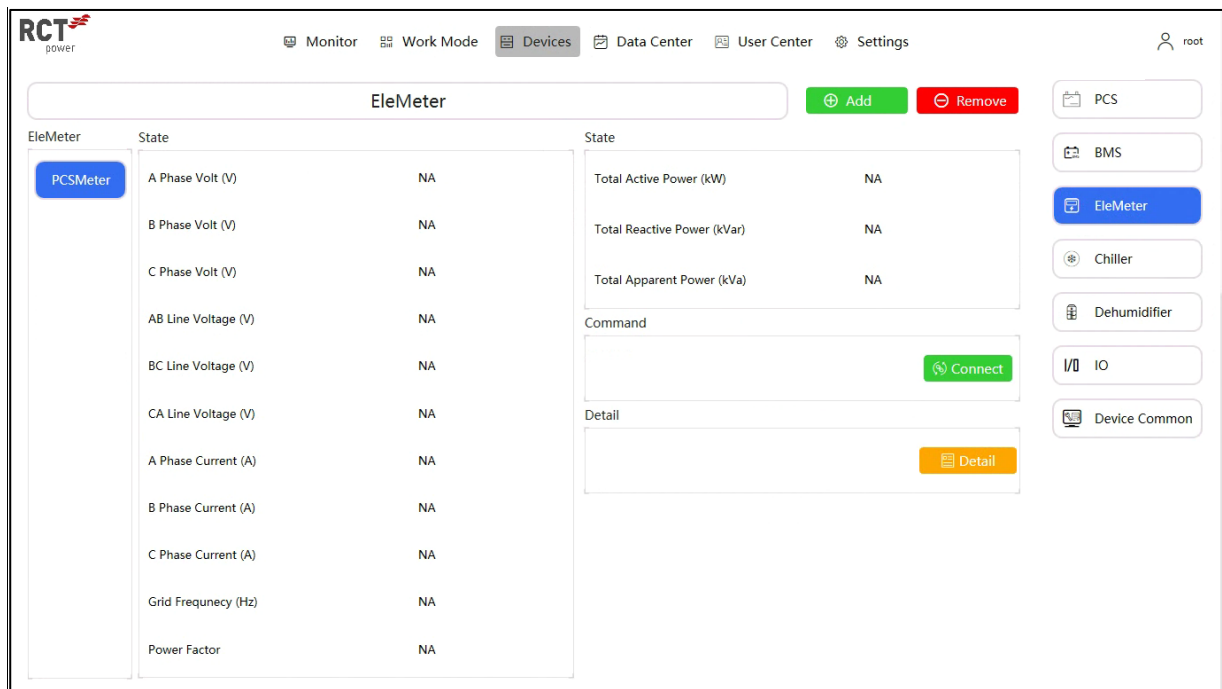
Click the  button and Observe “Main pos-contact State” and “Main neg-contact state” change from "Close" to "Open".

■ **Detail**

Click  button to view the device status, config, warning and cell data information.



11.7.3 Ele Meter



■ Device Communication

Click  button, observe that the value displayed on the "State" changes from "NA" to the specific value, indicating that the communication is successful.

■ Detail

Click  button to view the device status, and set the voltage and current ratio.



[Connect](#)

State

A Phase Current(A)	B Phase Current(A)	C Phase Current(A)	N line current(A)
Phase A Active Power(...)	Phase A Active PoweB(...)	Phase B Active Power(k...	Total Active Power(kWh)
Phase A Reactive Powe...	Phase B Reactive Powe...	Phase B Reactive Powe...	Total Reactive Power(k...
Phase A Apparent Pow...	Phase B Apparent Pow...	Phase C Apparent Pow...	Total Apparent Power(...)
Phase A Power Factor	Phase B Power Factor	Phase C Power Factor	Power Factor
AB Line Voltage(V)	BC Line Voltage(V)	CA Line Voltage(V)	Grid Frequency(Hz)
A Phase Volt(V)	B Phase Volt(V)	C Phase Volt(V)	Combination Active En...
Positive Active Energy(V)	Negative Active Energy...		

Subharmonic

A Phase Volt THD(%)	B Phase Volt THD(%)	C Phase Volt THD(%)
A Phase Current THD(%)	B Phase Current THD(%)	C Phase Current THD(%)

[Cancel](#)
[OK](#)

11.7.4Chiller



[Monitor](#)
[Work Mode](#)
[Devices](#)
[Data Center](#)
[User Center](#)
[Settings](#)

[English](#)
[root](#)

Chiller
+ Add
 - Remove

[PCS](#)

Chiller

[Chiller1](#)

[Chiller2](#)

[Chiller3](#)

[Chiller4](#)

State

Actual WorkMode	NA
Outdoor Temp(°C)	NA
Effluent Temp(°C)	NA
Backwater Temp(°C)	NA
Effluent Pressure Sensor(kPa)	NA
Backwater Sensor(kPa)	NA

Alarm

Error State OFF

Command

Connect
Start
Stop

Detail

[Detail](#)

[BMS](#)
[EleMeter](#)
[Chiller](#)
[Dehumidifier](#)
[IO](#)
[Device Common](#)

■ Device Communication

Click Connect button, observe that the value displayed on the “State” changes from "NA" to the specific value, indicating that the communication is successful.

■ Start Chiller

Click Start button and the “Equipment Running Status” will change.

■ Stop Chiller

Click Stop button to stop the chiller.

■ Detail

Click Detail button to view the device status, config and warning information.

RCT

power

Status

Config

Warning

Connect

Start

Stop

State

Run Mode	N
Water Level Switch	N
Remote Test	N
High Pressure State1	N
Water Pump Status	N
Internal Fan1 State	N
Internal Fan2 State	N
Internal Fan3 State	N
High Pressure State2	N
Electric Heating State	N
Water Replenishment Pump	N
Cooling Fan State1	N
Cooling Fan State2	N
Crankshaft Heating State1	N
Crankshaft Heating State2	N
Main Waterway Solenoid Valve	N
Free Cooling Solenoid Valve	N
Electric Control Box Cooling Fan	N
Alarm	N

State

Environment Temp (°C)	N
Backwater Temp (°C)	N
Effluent Temp (°C)	N
Backwater Sensor (kPa)	N
Effluent Pressure Sensor (kPa)	N
Electric Control Box Temp (°C)	N
Inhale Pressure (kPa)	N
Inhale Saturated Temp (°C)	N
Inhale Temp (°C)	N
Inhale Super Heat (K)	N
Exhaust Pressure (kPa)	N
Exhaust Saturation Temp (°C)	N
Exhaust Temp (°C)	N
Exhaust Superheat (K)	N
Fan Gear	N
Fan Speed1 (%)	N
Fan Speed2 (%)	N
Fan Speed3 (%)	N

State

Alarm	N
Compressor1 State	N
Fréquence Cible Du Compre	N
Compressor Operating Freq	N
Compressor Bus Volt (V)	N
Compressor IPM Temp (°C)	N
Compressor Phase Current (	N
Electron Expansion Open	N
Pump Phase Current (A)	N
Actual Speed Of Pump (Hz)	N
IPM Temp Of The Pump (°C)	N
Target Speed Of Pump (Hz)	N
Water Pump Device	
Compressor Device Fault1	
Compressor Device Fault2	
Fan Device Fault	

Cancel

OK

11.7.5 Dehumidifier

RCT

power

Monitor

Work Mode

Devices

Data Center

User Center

Settings

English

root

Dehumidifier

Add

Remove

PCS

BMS

EleMeter

Chiller

Dehumidifier

I/O IO

Device Common

Dehumidifier

State

WorkingState	NA
Humidity (%RH)	NA
Temperature (°C)	NA
HeatingState	NA
AutomaticDehumidifyingHandSwitch	NA

Alarm

Error State

Command

Connect

Detail

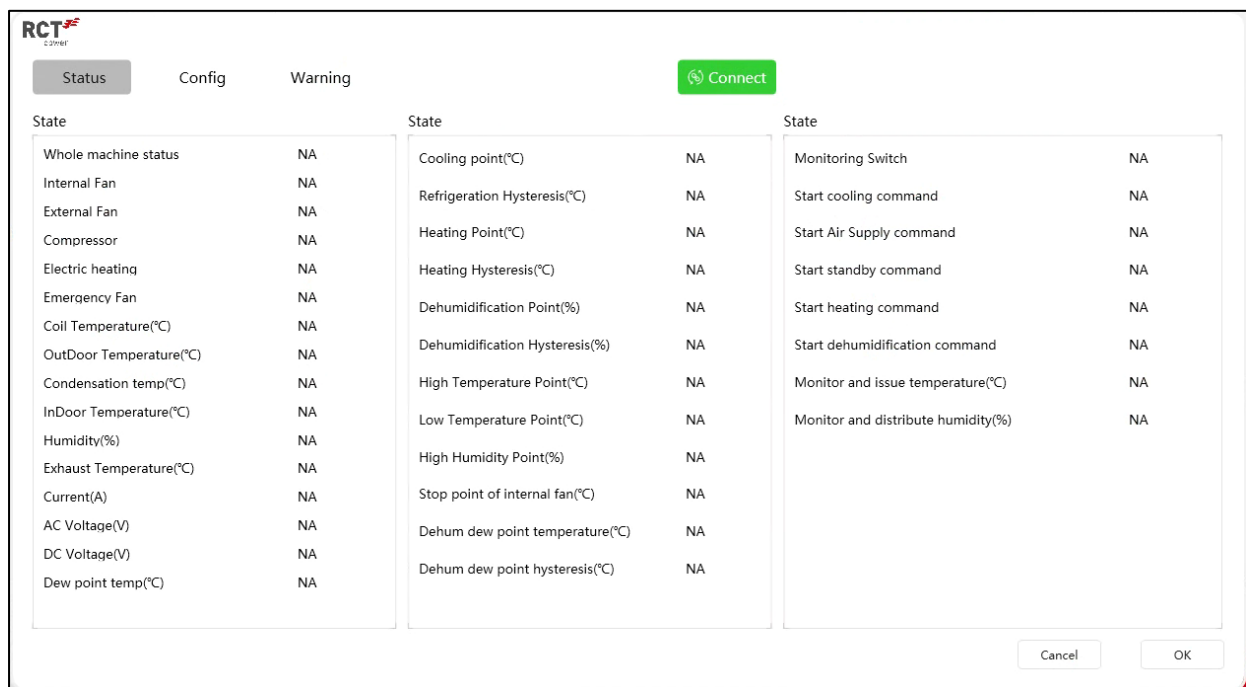
Detail

■ Device Communication

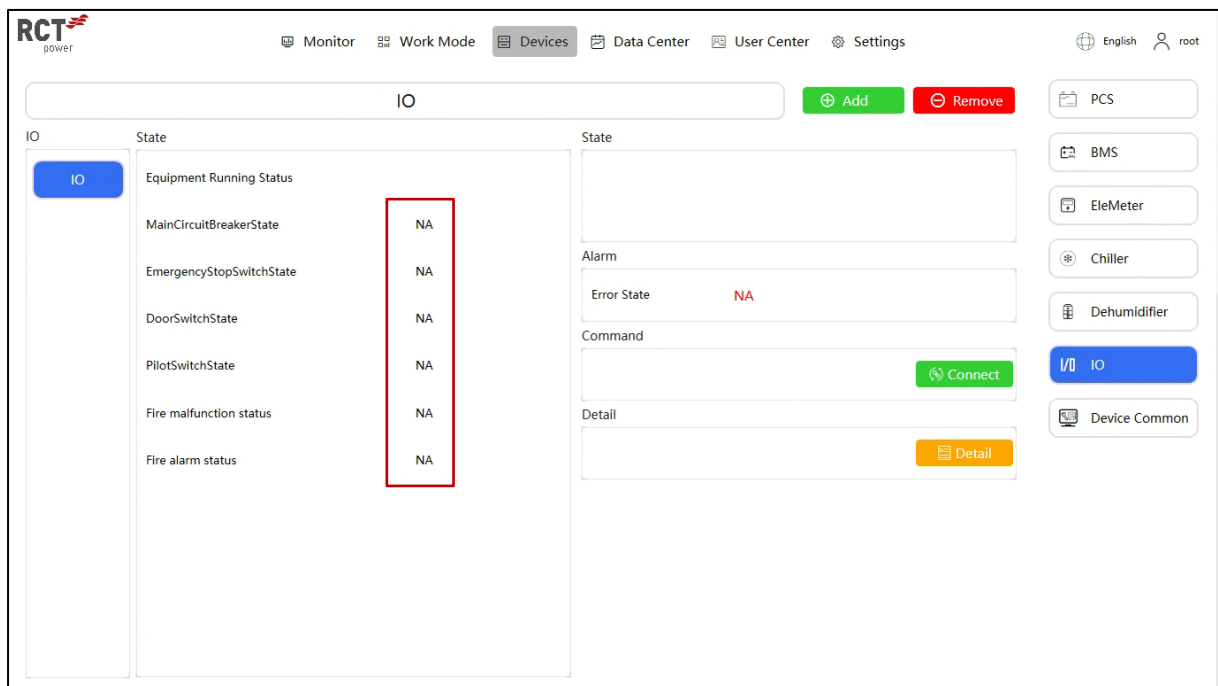
Click  button, observe that the value displayed on the “State” changes from "NA" to the specific value, indicating that the communication is successful.

■ Detail

Click  button to view the device status.



11.7.6 IO



■ Device Communication

Click **Connect** button, observe that the value displayed on the “State” changes from "NA" to the specific value, indicating that the communication is successful.

■ Detail

Click **Detail** button to view the device status.



RCT power

Connect

Alarm

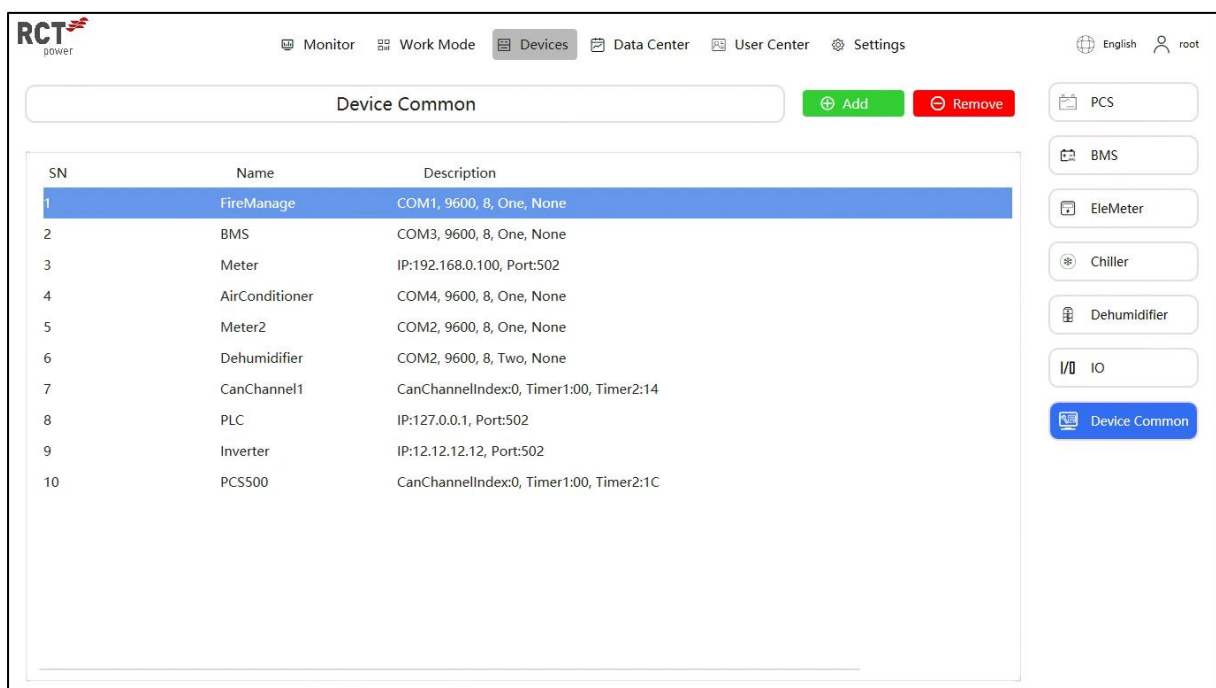
MainCircuitBreakerState	☐
Fire alarm status	☐
AirSwitchState	☐
DehumidifierwitchState	☐
EmergencyStopSwitchState	☐
DoorSwitchState	☐
DCDC24VSwitchState	☐
Fire malfunction status	☐
Reset	Set

Cancel OK

11.7.7 Device Common

Use an administrator account to add or remove communication devices.

- Add** To add communication devices;
- Remove** To remove communication devices.



RCT power

Monitor Work Mode **Devices** Data Center User Center Settings

English root

Device Common

Add Remove

SN	Name	Description
1	FireManage	COM1, 9600, 8, One, None
2	BMS	COM3, 9600, 8, One, None
3	Meter	IP:192.168.0.100, Port:502
4	AirConditioner	COM4, 9600, 8, One, None
5	Meter2	COM2, 9600, 8, One, None
6	Dehumidifier	COM2, 9600, 8, Two, None
7	CanChannel1	CanChannelIndex:0, Timer1:00, Timer2:14
8	PLC	IP:127.0.0.1, Port:502
9	Inverter	IP:12.12.12.12, Port:502
10	PCS500	CanChannelIndex:0, Timer1:00, Timer2:1C

PCS BMS EleMeter Chiller Dehumidifier IO Device Common

■ PCS communication configuration

RCT
csmw

Communication Name: PCS500

Communication Type: Can

CAN Index: 1

Timer1: 00

Timer2: 14

Cancel OK

■ **BMS communication configuration**

RCT
csmw

Communication Name: BMS

Communication Type: Serial

Port Name: COM3

Baud Rate: 9600

Data Bits: 8

Parity: None

Stop Bits: One

Cancel OK

■ **Air Conditioner communication configuration**

RCT
csmw

Communication Name: AirConditioner

Communication Type: Serial

Port Name: COM2

Baud Rate: 9600

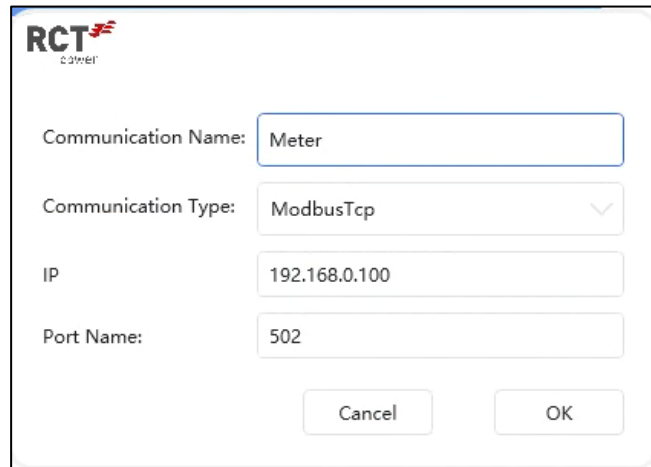
Data Bits: 8

Parity: None

Stop Bits: One

Cancel OK

■ Meter communication configuration



The dialog box is titled 'RCT power'. It contains the following fields and buttons:

- Communication Name: Meter
- Communication Type: ModbusTcp
- IP: 192.168.0.100
- Port Name: 502
- Buttons: Cancel, OK

Note: The above device communication settings are for reference only, and the specific settings depend on the project location.

11.8 Data Centre

11.8.1 Real Time Chart

The real-time curve includes the current SOC, PCS power curve, PV energy and cabinet discharge energy.

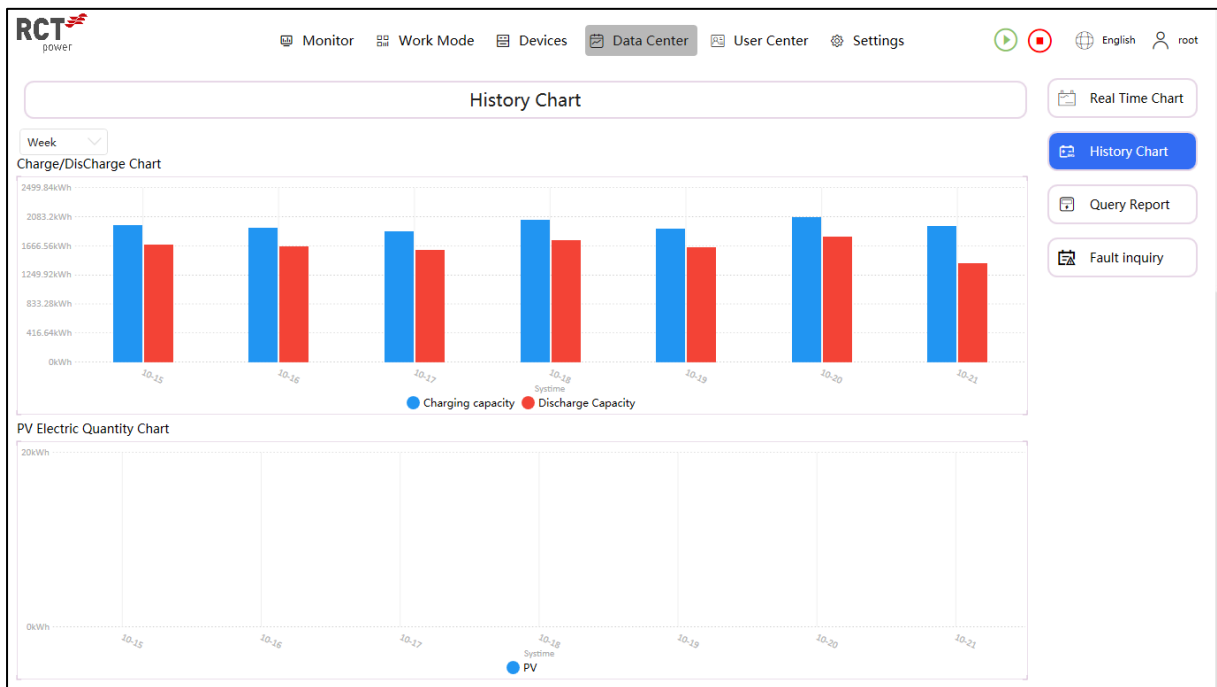
SOC and PCS charts show the curve within 4 hours; PV and grid charts displays the 24-hour curve of the day.



11.8.2 History Chart

Including cabinet charging or discharging power and PV electric quantity.

The history curve can be switched by week, month and year.



11.8.3 Query Report

Query Report

10/21/2024 ~ 10/21/2024 Report Type: DailyReport

Paramter Name Value Paramter Name Value

Real Time Chart
History Chart
Query Report
Fault Inquiry

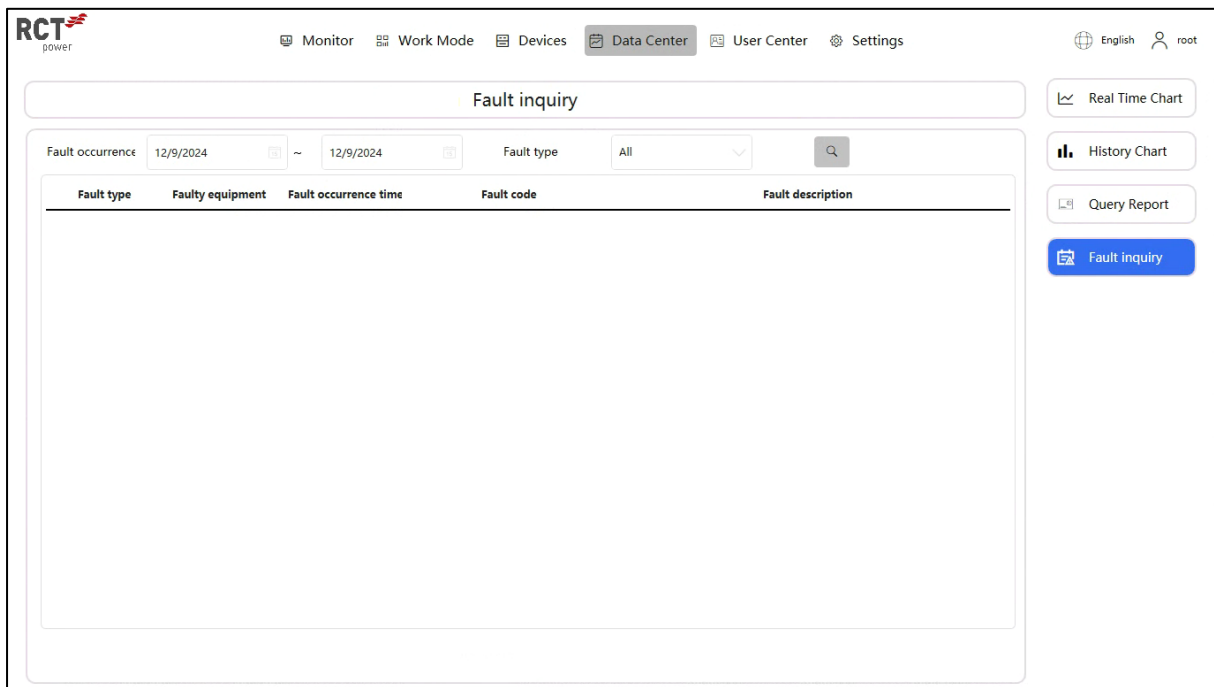
Step 1: Enter the start and end time in and click button to select the report type.

Step 2: Click  button to display the report information below.

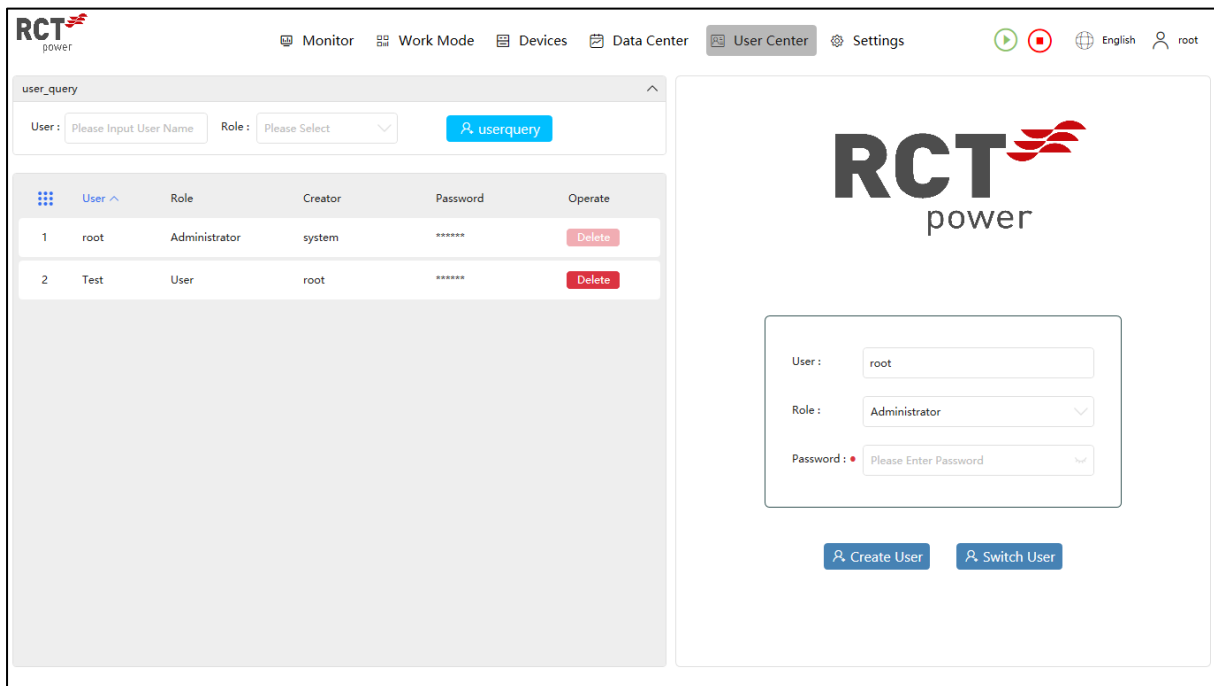
Step 3: Click  button to export the report.

11.8.4 Fault Inquiry

Record all device faults and software faults, which can be queried by time and fault type.



11.9 User Center



■ User Query

The left column displays the information of all local users. To query a user, enter the user name in the "User Query" area, and select "User Role", and click [userquery](#) button.

■ Create User

Step 1: Enter a user name in the "User" field.

Step 2: Choose the role.

Step 3: Enter the "Password" and click the [Create User](#) button.

■ Create User

Step 1: Enter the created user name in the "User" field.

Step 2: Choose the role.

Step 3: Click [Switch User](#) button to switch the role of the current user.

11.10 Settings

11.10.1 Upload

1. Option Area
2. Thingsaboard Connection
3. Cloud Connection
4. Manual Area

1. Option Area

SSL Connection: Secure connection with SSL certificate;

Enable Reconnect: Automatic reconnection for non-human disconnection;

Test Mode: The manual area subscription function is enabled.

Close Thingboard:

Option

☐ SSL Connection ☒ Enable Reconnect ☒ Test Mode ☒ Close ThingBoard ☐ Close Cloud

Thingsaboard Connection

Server Address: 81 . 69 . 252 . 27 Port: 1883 Qos: 0 Connect

Device ID: 04WM01BIQdw1LXNdNnCB Device Secret:

Queue Status: Clear

Close Cloud:

Option

☐ SSL Connection ☒ Enable Reconnect ☒ Test Mode ☐ Close ThingBoard ☒ Close Cloud

Thingsaboard Connection

Server Address: 81 . 69 . 252 . 27 Port: 1883 Qos: 0 Connect

Device ID: 04WM01BIQdw1LXNdNnCB Device Secret:

Queue Status: 6376 Clear

Cloud Connection

Server Address: mqtt-rp.rct-power.com.cn Port: 31748 Qos: 0 Connect

Station SN: sta20240002

Queue Status: Clear

2. Thingsaboard Connection

Enter the Server Address, Port and Device ID, then, click Connect button;

Click Clear button to clear the current data that is not uploaded.

3. Cloud Connection

Enter the Server Address, Port and Station SN, then, click Connect button;

Click Clear button to clear the current data that is not uploaded.

4. Manual

Select Thingsaboard or Cloud Connection in Option Thingsaboard, enter a Subscribe topic and click Subscribe button; then, enter the Publish topic and Publish Message and click Publish button.

11.10.2 Sys Settings

■ Card No Setting

Card No: Enter the 4G card number, record the 4G card number of the industrial computer, to avoid the need to open the cover to view the card number when the traffic is used up.

■ Sys Setting

Access Mode	No Access Ac Access Dc Access Multi Access
Demand Point	Power demand control input, generally minus a maximum rated power of the device.
Rated Power	Rated power of energy storage system.
Min Power From Grid	Minimum load power of the grid.
Power Factor Target	Power factor.
Fan start number	The air conditioner is bound to the PCS serial number and starts according to the PCS running status.
Standby Temp of AC	Set the air conditioner temperature according to different conditions
Low Power Temp of AC	
High Power Temp of AC	
Excess AC Temperature	
Reactive Compensation Enabled	The default is off. OFF:  ON: 
Demand Enabled	
Charging Station Enabled	
Include Auxiliary Power	
Starting Fan	

■ Counter Setting

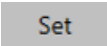
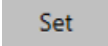
Prevent Counter Current Enabled	The default is off.
---------------------------------	---------------------

	OFF:  ON: 
Allow Max Reactive Power	The time allowed to feed power to the grid. =0, indicates that countercurrent is not allowed at all; >0, indicates the value that allows countercurrent.
Allow Counter Max Duration Time	The maximum power allowed to be fed to the grid.

■ Longitude Latitude Setting

Enter latitude and longitude to display local weather conditions.

■ IO Test

Bit (0-7)	DI or DO port (8 of each).
Value	0: low level; 1: high level.
Write	The default is Read. Read:  Write: 
	Enter Bit, Value, select Read or Write, then, click  button.

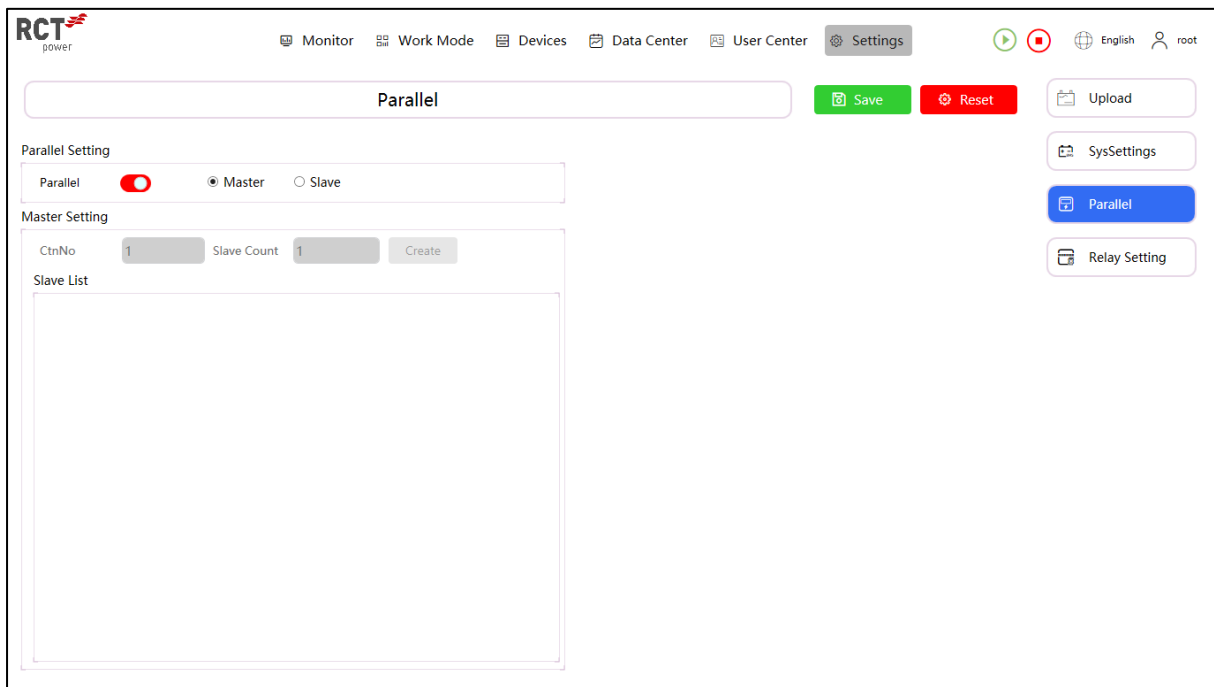


The System Settings screen contains energy storage calculation parameters and conditions. All parameter modifications and settings must be completed by the specified agent (the administrator with the highest authority). For parameters whose meanings are not clear, please contact service. Do not modify them without authorization.

11.10.3 Parallel

If there are multiple devices, you need to achieve 1 master multi-slave or multi-master multi-slave, you need to perform parallel settings.

The default parallel mode is off. Click  button to turn the red button into  and select the current device as the master station or slave station.



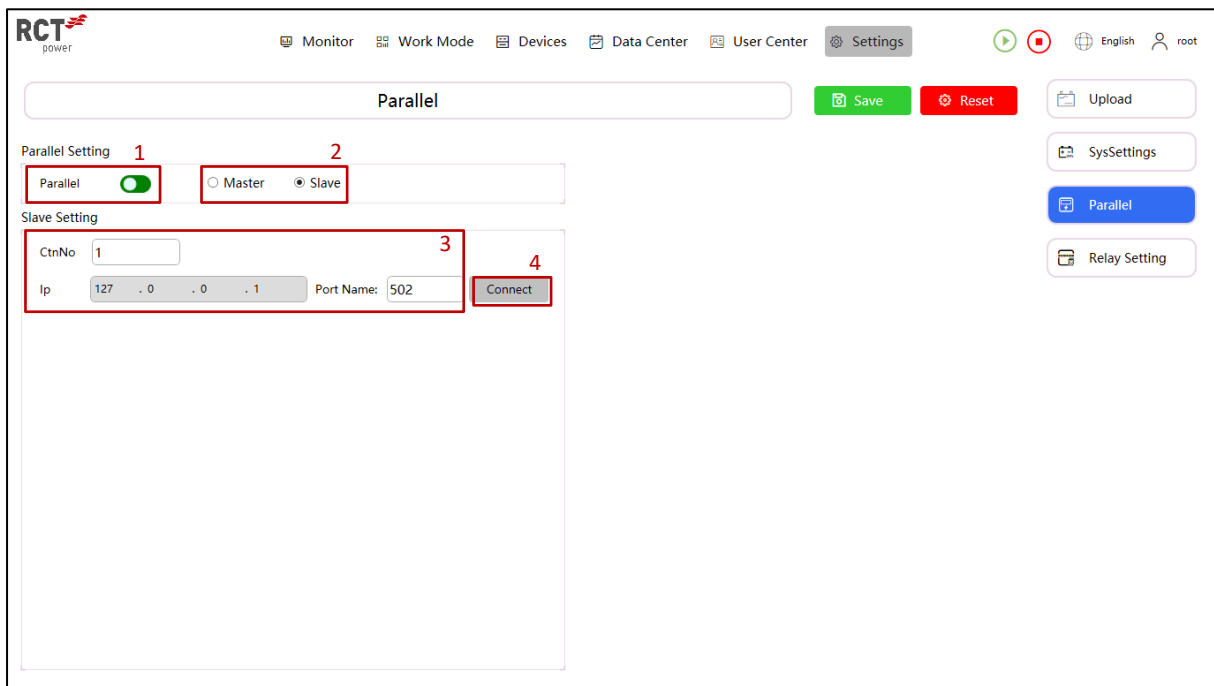
■ Slave Setting (Operation on slave device)

Step 1: Click  button to turn the red button into .

Step 2: Select .

Step 3: Enter the CtnNo, IP and Port Name.

Step 4: Click the  button and the settings are complete.



■ Master Setting (Operation on master device)

Enter the CtnNo, starting with 1 by default, and then enter the number of slave count.

Take 1 master station and 2 slave stations as an example:

Step 1: Click  button to turn the red button into .

Step 2: Select .

Step 3: Enter the CtnNo: 1, Slave Count: 2, click the **Create** button; two lines appear in the "Slave List" panel.

Step 4: Enter the IP and port number of the slave station respectively, and then click the **Connect** button.

Note: Before performing this operation, you must set and connect the two slave devices. If the slave device is not connected, a communication fault is reported to the master device.

CtnNo2	IP	Port Name	Connect
CtnNo2	127 . 0 . 0 . 1	0	Connect
CtnNo3	127 . 0 . 0 . 1	0	Connect



WARNING

Parallel interface is one of the operating conditions of working mode. All parameter modifications and settings must be completed by the specified agent (highest authority administrator). For parameters whose meanings are not clear, please contact service. Do not modify them without authorization.

11.10.4 Relay Setting

Index	IOSetAddr	IOReadAddr	RelayIndexName	ProjectName
-------	-----------	------------	----------------	-------------



WARNING

All modification and setting of parameters in the relay setting interface must be completed by the specified salesman (the highest authority administrator). For parameters whose meanings are not clear, please contact service. Do not modify them without authorization.

12 Charge and Discharge Test



NOTICE

After the device is installed for the first time, perform insulation and voltage resistance tests and ground continuity tests.

■ Manually enable the charge and discharge function.

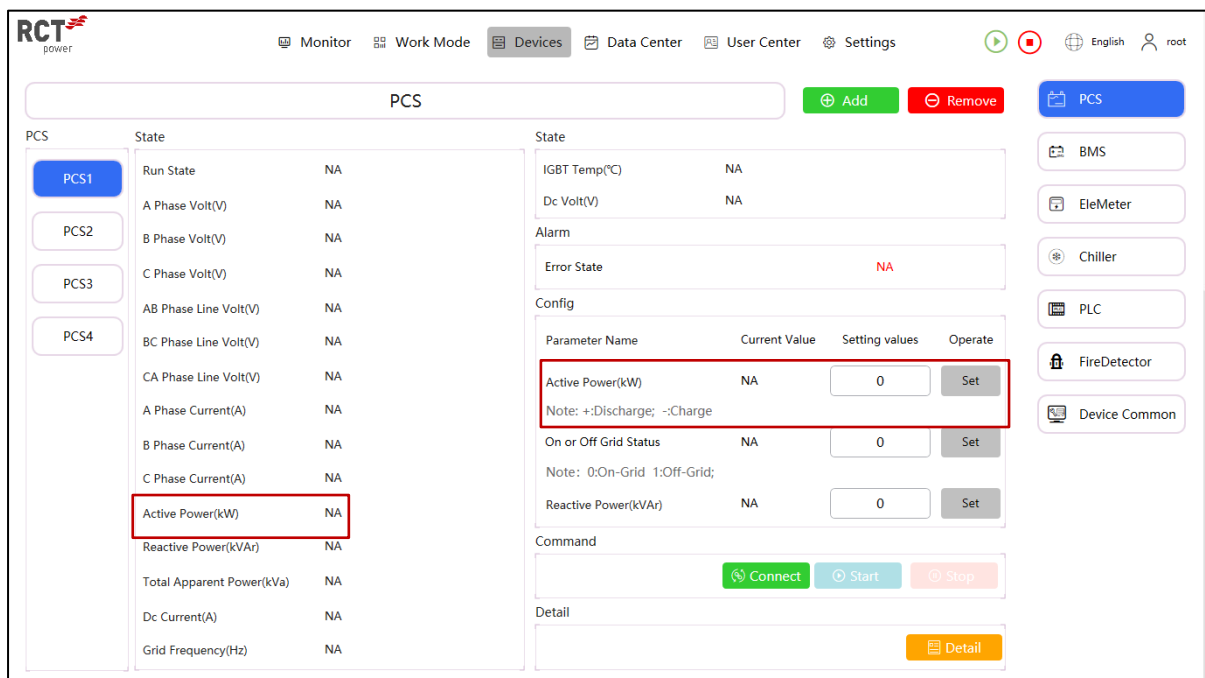
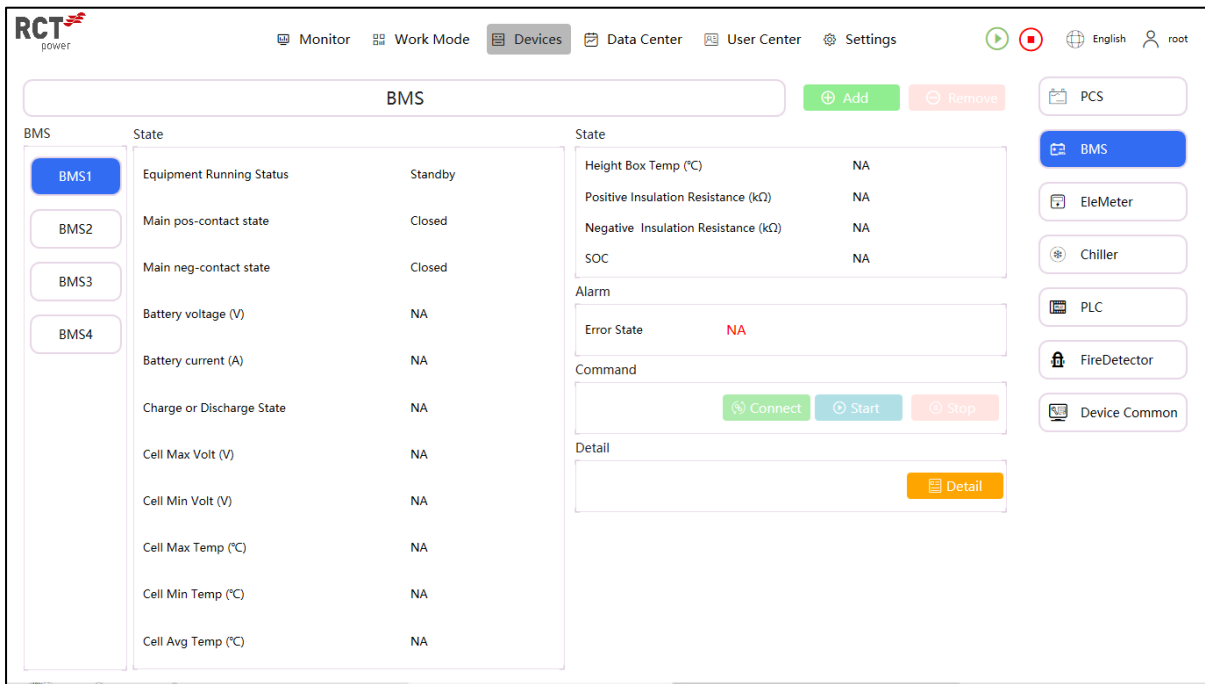
Step 1: Connect the DC high volt of BMS (As Figure 12-1).

Step 2: PCS manually operate charge and discharge, click the PCS  button.

Step 3: Set charge and discharge parameters on the PCS configuration interface (As Figure 12-2)

Note: "+" Discharge, "-" Charge.

In the "Config" area, input power in the "Active Power", click  button, and compare the "Active Power" of "Config" interface and "State" interface.



13 Error message and trouble shooting

13.1 PCS

Error message	Description	Cause and possible corrective action
ERR_Pcs{i}_g_abnoral	The grid voltage is abnormal.	Check whether the AC connection is correct, if no problem, disconnect the main AC connection MCCB Q1 and wait for 10 minutes to connect Q1 again. If the error still occurs, please contact service.
ERR_Pcs{i}_Instant_V_High	Instantaneous power grid voltage high fault	
ERR_Pcs{i}_LineV_Eff	The RMS of power grid line voltage is faulty.	
ERR_Pcs{i}_G_V_Unb	The grid voltage imbalance is faulty.	Disconnect the main AC connection MCCB Q1 and wait for 10 minutes to connect Q1 again. If the error is still unresolved, please contact service.
ERR_Pcs{i}_G_I_Unb	The grid current imbalance is faulty.	
ERR_Pcs{i}_G_Frq	The grid frequency is abnormal.	
ERR_Pcs{i}_G_O_Frq	Pcs Device Grid Over Frequency	Check whether the AC connection is correct, if no problem, disconnect the main AC connection MCCB Q1 and wait for 10 minutes to connect Q1 again. If the error still occurs, please contact service.
ERR_Pcs{i}_G_U_Frq	Pcs Device Grid Under Frequency	
ERR_Pcs{i}_Lock_Pha	Hardware phase-locked fault	
ERR_Pcs{i}_DC_Bus_O_V	Dc bus overvoltage fault	Disconnect the main AC connection MCCB Q1 and wait for 10 minutes to connect Q1 again. If the error is still unresolved, please contact service.
ERR_Pcs{i}_DC_Bus_V_DevM	Dc bus voltage deviation major fault	
ERR_Pcs{i}_Dc_Bus_U_V	Dc bus undervoltage fault	
ERR_Pcs{i}_Cell_O_V	Pcs Device Cell Over Volt	
ERR_Pcs{i}_Cell_U_V	Pcs Device Cell Under Volt	
ERR_Pcs{i}_DC_O_I	DC overcurrent fault	
ERR_Pcs{i}_hawe	Hardware failure	
ERR_Pcs{i}_abclnver_I_SampOffset	The sampling offset of the inverter current is faulty.	Wait 10 minutes and the alarm will be cleared automatically. If the error still occurs, disconnect the main AC connection MCCB Q1 and wait for 10 minutes to connect Q1 again. If the error is still unresolved, please contact service.
ERR_Pcs{i}_Inver_O_I	The inverter current overcurrent is faulty.	
ERR_Pcs{i}_Inver_O_I_abnormal	The inverter current is abnormal.	
ERR_Pcs{i}_AC_Main_KM	The AC contactor is faulty.	
ERR_Pcs{i}_Start_Open	Power-on self-test detects faults.	
ERR_Pcs{i}_Induct1_O_T	Inductor 1 overtemperature fault.	
ERR_Pcs{i}_ShellInside_T_O_High	The temperature inside the shell is too high.	
ERR_Pcs{i}_Induct2_O_T	Inductor 2 overtemperature fault.	
ERR_Pcs{i}_Ac_Contactor_Adhesion	Ac contactor adhesion failure.	
ERR_Pcs{i}_IGBT_Pha_O_T	Phase A IGBT overtemperature fault	Check whether the battery connection is correct; power off and restart PCS, connect DC high volt of BMS. Wait 10 minutes and the alarm will be cleared automatically. If the error still occurs, disconnect the main AC connection MCCB Q1 and wait for 10 minutes to connect Q1 again. If the error is still unresolved, please contact service.
ERR_Pcs{i}_DC_Reverse_Connect	The DC reverse connection is faulty	

Error message	Description	Cause and possible corrective action
ERR_Pcs{i}_IGBT_Ph_b_O_T	Phase B IGBT overtemperature fault	Wait 10 minutes and the alarm will be cleared automatically. If the error still occurs, disconnect the main AC connection MCCB Q1 and wait for 10 minutes to connect Q1 again. If the error is still unresolved, please contact service.
ERR_Pcs{i}_IGBT_Ph_c_O_T	Phase C IGBT overtemperature fault	
ERR_Pcs{i}_water_cool_O_T	The water cooling plate overtemperature fault.	
ERR_Pcs{i}_high_low_wear	High-low penetration fault	
ERR_Pcs{i}_Ex_EStop	E-Stop detection (Dry contact signal)	Check whether the cable connection is correct, if no problem, disconnect the main AC connection MCCB Q1 and wait for 10 minutes to connect Q1 again. If the error still occurs, please contact service.
ERR_Pcs{i}_IMD	Insulation fault detection	BMS and EMS insulation test can only open one. Please contact service to close.
ERR_Pcs{i}_g_ph_v_eff	The RMS of the phase voltage of the grid is faulty	Check whether the AC connection is correct, if no problem, disconnect the main AC connection MCCB Q1 and wait for 10 minutes to connect Q1 again. If the error still occurs, please contact service.
ERR_Pcs{i}_Ac_SPD	Ac lightning protection is faulty	Wait 10 minutes and the alarm will be cleared automatically. If the error still occurs, disconnect the main AC connection MCCB Q1 and wait for 10 minutes to connect Q1 again. If the error is still unresolved, please contact service.
ERR_Pcs{i}_Inductor	Reactor failure	
ERR_Pcs{i}_Syntony	Resonance fault detection	
ERR_Pcs{i}_Fan_fault	Fan failure	
ERR_Pcs{i}_leak_i_fault	Leakage current fault	

13.2 BMS

Error message	Description	Cause and possible corrective action
ERR_Bms[i]_BMU_Hardware	BMS Device BMU Hardware Fault	Please contact service to replace the BMU of the BMS device.
ERR_Bms[i]_BCU_Hardware	BMS Device BCU Hardware Fault	Please contact service to replace the BCU of the BMS device.
ERR_Bms[i]_FusePro	BMS Device Fuse Fault	Check all battery MSD installation status, if the error still occurs after all MSDS are inserted, please contact service.
ERR_Bms[i]_ConAdh	BMS Device Contactor Adhesion Fault	Click the  button on the EMS BMS command area to disconnect DC high voltage, wait 10 minutes to restart again, the alarm will be cleared automatically. If the error still occurs, please contact service.
ERR_Bms[i]_BMU_Comm	BMS Device BMU Communication Fault	Please contact service.
ERR_Bms[i]_BAU_Comm	BMS Device BAU Communication Fault	
ERR_Bms[i]_CurSen	BMS Device Current Sensor Fault	
ERR_Bms[i]_IMD	BMS Device Insulation Monitoring Device Fault	Check whether the positive or negative insulation resistance value is smaller than 20000kΩ, please contact service.
ERR_Bms[i]_DisOpen	BMS Device Isolation switch Disconnect abnormally	Please contact service.
ERR_Bms[i]_O_V	Level 1 alarm for overvoltage.	This fault can not affect device running.
ERR_Bms[i]_U_V	Level 1 alarm for undervoltage.	
ERR_Bms[i]_Cell_O_V	Level 1 alarm for cell overvoltage.	
ERR_Bms[i]_Cell_U_V	Level 1 alarm for cell undervoltage.	
ERR_Bms[i]_Dis_O_I_Le1	Level 1 alarm for discharging overcurrent.	
ERR_Bms[i]_Cha_O_I_Le1	Level 1 alarm for charging overcurrent.	
ERR_Bms[i]_DisBat_O_T	Level 1 alarm for battery discharging over temperature.	This fault can not affect device running.
ERR_Bms[i]_DisBat_U_T	Level 1 alarm for battery discharging under temperature.	
ERR_Bms[i]_ChaBat_O_T	Level 1 alarm for battery charging over temperature.	
ERR_Bms[i]_ChaBat_U_T	Level 1 alarm for battery charging under temperature.	
ERR_Bms[i]_IR_Low	Level 1 alarm for low insulation resistance.	
ERR_Bms[i]_Ter_T_H	Level 1 alarm for pole temperature is too high.	
ERR_Bms[i]_HVB_T_H	Level 1 alarm for switch gear connector high temperature.	
ERR_Bms[i]_CellV_H	Level 1 alarm for high cell voltage difference.	
ERR_Bms[i]_Cell_T_H	Level 1 alarm for high cell temperature difference.	
ERR_Bms[i]_SOC_Low_Le1	Level 1 alarm for low SOC.	
ERR_Bms[i]_O_V_Le2	Level 2 alarm for overvoltage.	
ERR_Bms[i]_U_V_Le2	Level 2 alarm for undervoltage.	
ERR_Bms[i]_Cell_O_V_Le2	Level 2 alarm for cell overvoltage.	

Error message	Description	Cause and possible corrective action
ERR_Bms[i]_Cell_U_V_Le2	Level 2 alarm for cell undervoltage.	
ERR_Bms[i]_Dis_O_I_Le2	Level 2 alarm for discharging overcurrent.	
ERR_Bms[i]_Cha_O_I_Le2	Level 2 alarm for charging overcurrent.	
ERR_Bms[i]_DisBat_O_T_Le2	Level 2 alarm for battery discharging over temperature.	
ERR_Bms[i]_DisBat_U_T_Le2	Level 2 alarm for battery discharging under temperature.	
ERR_Bms[i]_ChaBat_O_T_Le2	Level 2 alarm for battery charging over temperature.	
ERR_Bms[i]_ChaBat_U_T_Le2	Level 2 alarm for battery charging under temperature.	
ERR_Bms[i]_IR_Low_Le2	Level 2 alarm for low insulation resistance.	
ERR_Bms[i]_Ter_T_H_Le2	Level 2 alarm for pole temperature is too high.	
ERR_Bms[i]_HVB_T_H_Le2	Level 2 alarm for switch gear connector high temperature.	
ERR_Bms[i]_CelVolDif_H_Le2	Level 2 alarm for high cell voltage difference.	
ERR_Bms[i]_Cell_T_Dif_H_Le2	Level 2 alarm for high cell temperature difference.	
ERR_Bms[i]_SOC_Low_Le2	Level 2 alarm for low SOC.	
ERR_Bms[i]_O_V_Le3	Level 3 alarm for overvoltage.	
ERR_Bms[i]_U_V_Le3	Level 3 alarm for undervoltage.	
ERR_Bms[i]_Cell_O_V_Le3	Level 3 alarm for cell overvoltage.	
ERR_Bms[i]_Cell_U_V_Le3	Level 3 alarm for cell undervoltage.	
ERR_Bms[i]_Dis_O_I_Le3	Level 3 alarm for discharging overcurrent.	
ERR_Bms[i]_Cha_O_I_Le3	Level 3 alarm for charging overcurrent.	Disconnect the DC high volt on the EMS BMS command area and turn off the switch gear 24V DC auxiliary power supply switch. Wait for 10 minutes to restart. If the error still occurs, please contact service. Power up the cabinet, chiller will start cooling. Wait 10 minutes and the alarm will be cleared automatically. Power up the cabinet, chiller will start heating. Wait 10 minutes and the alarm will be cleared automatically. Power up the cabinet, chiller will start cooling. Wait 10 minutes and the alarm will be cleared automatically. Power up the cabinet, chiller will start heating. Wait 10 minutes and the alarm will be cleared automatically. Check whether the positive or negative insulation resistance value is smaller than 20000kΩ, please contact service to check whether the fuse needs to be replaced. Disconnect the DC high volt on the EMS BMS command area and turn off the switch gear 24V DC auxiliary power supply switch. Wait for 10 minutes to restart. If the error still occurs, please contact service.
ERR_Bms[i]_DisBat_O_T_Le3	Level 3 alarm for battery discharging over temperature.	
ERR_Bms[i]_DisBat_U_T_Le3	Level 3 alarm for battery discharging under temperature.	
ERR_Bms[i]_ChaBat_O_T_Le3	Level 3 alarm for battery charging over temperature.	
ERR_Bms[i]_ChaBat_U_T_Le3	Level 3 alarm for battery charging under temperature.	
ERR_Bms[i]_IR_Low_Le3	Level 3 alarm for low insulation resistance.	
ERR_Bms[i]_Ter_T_H_Le3	Level 3 alarm for pole temperature is too high.	

Error message	Description	Cause and possible corrective action
ERR_Bms[i]_HVB_T_H_Le3	Level 3 alarm for switch gear connector high temperature.	Wait 10 minutes and the alarm will be automatically cleared. If the error still occurs, please contact service.
ERR_Bms[i]_Cell_V_Dif_H_Le3	Level 3 alarm for high cell voltage difference.	Wait 3 hours and the alarm will be automatically cleared. If the error still occurs, please contact service.
ERR_Bms[i]_Cell_T_Dif_H_Le3	Level 3 alarm for high cell temperature difference.	
ERR_Bms[i]_SOC_Low_Le3	Level 3 alarm for low SOC.	Battery discharge to the lowest SOC. Note: This fault can not affect device running.

13.3 Chiller

Error message	Description	Cause and possible corrective action
ERR_Ac{i}_out_w_t_sensor and Ac{i}_return_w_t_sensor	Return water temperature sensor malfunction Water outlet temperature sensor malfunction	Please contact service.
ERR_Ac{i}_inhale_t1_sensor	Inhalation temperature sensor 1 malfunction	(Malfunction of suction temperature sensor or suction pressure sensor) and (Malfunction of exhaust pressure sensor or exhaust temperature sensor) Please contact service.
ERR_Ac{i}_exhaust_t1_sensor	Exhaust temperature sensor 1 malfunction	
ERR_{i}_inhale_press1_sensor	Inhalation pressure sensor 1 malfunction	
ERR_Ac{i}_exhaust_press1_sensor	Exhaust pressure sensor 1 malfunction	
ERR_Ac{i}_wp_faultt	Pump malfunction	Wait 10 minutes and the alarm will be cleared automatically. If the error still occurs, disconnect the main AC connection MCCB Q1 and wait for 10 minutes to connect Q1 again. If the error is still unresolved, please contact service.
ERR_Ac{i}_sys1_exhaust_superheat_l	System 1 exhaust superheat is too low	Wait 10 minutes and the alarm will be cleared automatically. If the error still occurs, disconnect the main AC connection MCCB Q1 and wait for 10 minutes to connect Q1 again. If the error is still unresolved, please contact service.
ERR_Ac{i}_sys1_inhale_press_l	System 1 low suction pressure	
ERR_Ac{i}_sys1_exhaust_press_h	System 1 exhaust pressure is too high	
ERR_Ac{i}_sys1_exhaust_t_h	System 1 exhaust temperature is too high	
ERR_Ac{i}_sys1_press_ratio_h	System 1 pressure ratio is too high	
ERR_Ac{i}_sys1_press_ratio_l	System 1 pressure ratio too low	Wait 10 minutes and the alarm will be cleared automatically. If the error still occurs, disconnect the main AC connection MCCB Q1 and wait for 10 minutes to connect Q1 again. If the error is still unresolved, please contact service.
ERR_Ac{i}_sys1_leak	System 1 leakage fault	
ERR_Ac{i}_cmp1_o_i	Compressor 1 overcurrent protection	
ERR_Ac{i}_cmp1_device_o_t	Compressor 1 drives over temperature protection	
ERR_Ac{i}_wp_device_o_i	Pump driven overcurrent protection	
ERR_Ac{i}_wp_device_o_t	Pump driven over temperature protection	Wait 10 minutes and the alarm will be cleared automatically. If the error still occurs, disconnect the main AC connection MCCB Q1 and wait for 10 minutes to connect Q1 again. If the error is still unresolved, please contact service.
ERR_Ac{i}_out_w_t_l	Low outlet temperature protection	
ERR_Ac{i}_memory_write_freq	Frequent memory writing	
ERR_Ac{i}_memory_e2_fault	Memory (E2) error	Please contact service.
ERR_Ac{i}_wp_device_offline	Water pump drive offline	Wait 10 minutes and the alarm will be cleared automatically. If the error still

		occurs, disconnect the main AC connection MCCB Q1 and wait for 10 minutes to connect Q1 again. If the error is still unresolved, please contact service.
ERR_Ac{i}_cmp1_device_off device	Compressor 1 drives offline	Please contact service.
ERR_Ac{i}_cmp1_device_fault	Compressor 1 drive failure	
ERR_Ac{i}_f1_device_offline	Fan 1 drives offline	Wait 10 minutes and the alarm will be cleared automatically. If the error still occurs, disconnect the main AC connection MCCB Q1 and wait for 10 minutes to connect Q1 again. If the error is still unresolved, please contact service.
ERR_Ac{i}_f1_device_fault	Fan 1 drive failure	

13.4 **IO**

Error message	Description	Cause and possible corrective action
Main Circuit Breaker State	Main circuit breaker fault	Check if the main circuit breaker is closed; If the switch has been closed, please contact the after-sales personnel
Fire alarm Status	Fire alarm fault	Contact after-sales personnel
AirC Switch State	Air Container Switch fault	Check if F2, F3, F4, F5, F10 are closed; If it has been closed, contact the after-sales personnel;
Dehumidifier Switch State	Dehumidifier Switch fault	Check if F6 is closed; If it has been closed, contact the after-sales personnel;
Emergency stop switch State	Emergency stop Switch fault	Check if the emergency stop switch is engaged; If not engaged, contact after-sales personnel;
Door Switch State	Door Switch fault	Check if all doors of the cabinet are closed. If they are closed, contact the after-sales personnel;
DCDC24V Switch State	DCDC24V Switch fault	Check if the 24V switch is closed. If it is closed, contact the after-sales personnel;
Fire Malfunction Status	Fire Malfunction fault	Contact after-sales personnel

14 Routine Maintenance

14.1 Precautions Before Maintenance

- There is a fatal high voltage inside the cabinet equipment of the energy storage integrated system. If accidentally touched, there is a risk of fatal electric shock.
- After shutdown, please wait at least 10 minutes before opening the cabinet door. Before performing maintenance work, please ensure that there is no electricity inside the equipment.
- Only qualified and authorized personnel can perform maintenance and other operations on the energy storage integrated system.
- When carrying out maintenance work, do not leave screws, washers and other metal parts inside the energy storage integrated system, otherwise it may damage the equipment!
- The entry of sandstorms and moisture may damage the electrical equipment within the energy storage integrated system or affect the operational performance of the equipment!
- During the sandstorm season or when the relative humidity in the surrounding environment exceeds 95%, do not open the equipment cabinet doors inside the energy storage integrated system.
- Maintenance work can only be started when there is no wind or sand and the weather is clear and dry.
- To avoid the risk of electric shock, all AC/DC side switches and the front and rear circuit breakers of the energy storage integrated system should be disconnected before maintenance, repair, and other operations.

14.2 Maintenance Item and Period

14.2.1 Maintenance (Every half a year to once a year)

Maintenance Tasks	Method
Software Maintenance	Check the settable parameters on the EMS.
Safety function	■ Check whether the emergency stop button work normally. ■ Simulate shutdown. ■ Check the warning marks and other device marks, and replace them timely when they are fuzzy or damaged.
Internal components inspection	■ Check the cleanness of the circuit board and other elements and components. ■ Check the temperature of the radiator and the amount of dust accumulated. ■ Clean heat-dissipation modules with a vacuum cleaner if necessary. ■ Replace the air filter screen when necessary. Note: It is necessary to check ventilation of the air inlet. Otherwise, fault may occur due to overheating if the module cannot be cooled effectively.
Device maintenance	■ Carry out regular inspection for corrosion of all metal components (Once per half a year). ■ Check the contactors (auxiliary switches and micro-switches) annually to ensure the good mechanical operation. ■ Check the running parameters (especially voltage and insulation). ■ The radiator fan is a wearing part and it is recommended that it is replaced when abnormalities are found.

14.2.2 Maintenance (Once a year)

Maintenance Tasks	Method
Outside the container	Check the following items, and correct immediately those failing to meet relevant requirements: ■ Check whether there are flammable objects on the top of the container. ■ Check whether the welding points between the container and the foundation steel plate is firm and whether there is corrosion. ■ Check whether there is any damage, flaking paint or sign of oxidization on the enclosure. ■ Check whether the lock of the cabinet door can be unlocked flexibly. ■ Check whether the sealing strip is fixed properly.
Inside the container	Check whether there are foreign objects, dust, dirt, and condensed water inside the integrated energy storage system.
Air inlet and outlet	Check the temperature of the radiator and the amount of dust accumulated. Clean

Maintenance Tasks	Method
	heat-dissipation modules with a vacuum cleaner if necessary.
Wiring and cable layout	Completely power off the devices inside the system before checking. For any non-conformances found during inspection, correct them immediately. ■ Check whether the cable layout is normal and whether there is a short circuit. For any non-conformances found during inspection, correct them immediately. ■ Check whether all cable entrances are well sealed. ■ Check whether there is water seepage inside the device. ■ Check whether the power cables are loose, and fasten them again by the torque specified previously. ■ Check whether the power cables and control cables are damaged, especially if the surface contacting the metal surface is cut. ■ Check whether the insulation tapes on the power cable terminals fall off.
Ground connection and equipotential connection	■ Check whether the ground connection is correct and the grounding resistance value meets the specifications. ■ Check whether the equipotential connection inside the integrated system is correct.
Fan	■ Check the running status of fans. ■ Check whether fans are blocked. ■ Check if there is abnormal noise during operation of the fans.
Screw	Check whether internal screws fall off.

14.2.3 Maintenance (Every two years)

Maintenance Tasks	Method
System status and cleaning	Check the following items and correct them immediately if they do not meet the requirements: ■ Check whether there is any damage or deformation of the container and internal devices. ■ Check if there is abnormal noise during operation of internal devices. ■ Check whether the temperature in the container is excessively high. ■ Check whether the humidity and the amount of dust inside the container is within the normal range. Clean the equipment if necessary. ■ Check whether the air inlet and outlet of the device are blocked.
Warning marks	Check whether the warning labels and marks are clearly visible and free of stains and damage. Replace them if necessary.
Ground of the shielded layer of cables	Check whether the cable shielding layer is in good contact with the insulation sleeve and whether the copper bus bar is firmly fixed.
Surge protection device and fuse	Check whether the SPD and fuse are properly fastened.
Corrosion	■ Check whether there is oxidation or rust inside the cabinet. ■ Check sign of animals or insects inside the cabinet.

14.3 Maintenance of Liquid Cooling System

Maintenance Tasks	Content	Method	Maintenance tools
Chiller system	Check that the HMI of the liquid cooling unit does not report a warning.	Check if the unit reports a "low water tank level" alarm and replenish the fluid when this alarm is received.	Slotted screwdriver, Phillips screwdriver, water pump, water pipe, clamp.
Chiller pump	■ Check whether the cooling air inlet hole of the chiller pump is blocked. If so, clear it with a brush; ■ Visually inspect the pump body (not the joint	■ The pump runs smoothly without abnormal noise; ■ There is no obvious dripping on the pump body (except condensate).	Brush

	parts) and check whether there is obvious liquid dripping (except condensate). If so, replace the sealing ring of the pump.		
Chiller fan	Check whether the fan blades cannot rotate or are damaged. If so, replace the fan.	■ The fan blade rotates smoothly without abnormal noise. ■ No damage to fan blade. Note: Check this item at least half a year. Blade damage inspection is not mandatory.	Screwdriver with long handle

14.4 Container Maintenance

14.4.1 Measures for repairing appearance damage

	It is necessary to check whether the protective paint sprayed on the shell has peeled off or peeled off. If found, please repair it in a timely manner. It is strictly prohibited to touch up paint in adverse weather conditions such as rain, snow, strong winds, and sandstorms when there is no obstruction outdoors.
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Case 1: Dirt on surface caused by water spots and dusts can be cleaned.

No.	Cleaning Tools	Component source
1	Cleaning cloth	Not included in the scope of supply
2	Water	
3	Alcohol or other non-corrosive detergent	

Procedure:

- 1、Wet the cleaning cloth (or other scrubbing tools) with water, and scrub the dirty parts on surface.
- 2、If the dirt cannot be cleaned with water, scrub with 97% alcohol till the surface is acceptable. (Or try to use non-corrosive detergents that are generally used locally)

Case 2: Shallow scratches (without exposing the steel plate substrate) and indelible stains and rust.

No.	Cleaning Tools	Component source
1	Abrasive paper	Not included in the scope of supply
2	Cleaning cloth	
3	Water	
4	Alcohol	
5	Brush	
6	Color code RAL9010 paint	

Procedure:

- 1、Polish the paint surface with blistering or scratches with an abrasive paper for a smooth surface.
- 2、Wet the cleaning cloth with water or 97% alcohol, and scrub the damaged parts to remove surface stains.
- 3、Perform paint repair for the scratched parts with a soft brush after the surface is dried; brush the paint as uniform as possible.

Case 3: Dirt on surface caused by water spots and dusts can be cleaned.

No.	Cleaning Tools	Component source
1	Abrasive paper	Not included in the scope of supply
2	Cleaning cloth	
3	Water	
4	Alcohol	

5	Zinc rich primer
6	Brush
7	Color code RAL9010 paint

Procedure:

- 1、Polish the paint surface with blistering or scratches with an abrasive paper for a smooth surface.
- 2、Wet the cleaning cloth with water or 97% alcohol, and scrub the damaged parts to remove surface stains.
- 3、After the surface is dry, spray zinc rich primer on the exposed parts of the substrate for protection. Spraying should completely cover the exposed substrate.
- 4、Perform paint repair for the scratched parts with a soft brush after the primer is dried; brush the paint as uniform as possible.

14.4.2 Checking Sealing Strips

If the sealing strip is in good condition, it can effectively prevent water seepage inside the container. Therefore, carefully check the sealing strip and replace it immediately if there is any damage.

14.5 Coolant Replacement



- Normally coolant is not a health hazard, excessive exposure may cause irritation to the eyes, skin and breathing.
- Different brands or models of coolant should not be mixed, and the same model and brand of coolant should be used for rehydration.

Object	Replacement standard	Period	Tools
Coolant (Glysantin G30: Ethylene glycol concentration 50%)	1. There are obvious impurities in antifreeze; 2. Antifreeze is significantly darker in color.	1 year	Water pump, hose, hose clamp, slotted screwdriver

Personal protection

Wear personal protective equipment (PPE) when changing coolant. PPE should comply with relevant national standards, including but not limited to the following protective equipment.

No.	Protective parts	Protective equipment
1	Respiratory protection	Please use gas masks in high concentration areas.
2	Hands protection	Use oil-resistant, chemical-resistant protective gloves.
3	Eyes protection	Please use protective goggles.
4	Skin and body protection	Use non-permeable protective clothing and safety shoes.

Disposal considerations

No.	Protective parts	Protective equipment
1	Coolant	Discharges are made in accordance with local regulations and are not disposed of haphazardly.
2	Rubbish remnant	Separate and recycle, and if it meets the relevant regulations, it can be burned or reused.
3	Containers	Unpolluted containers can be recycled, while containers that cannot be cleaned clearly must be disposed of.

Accidental release measures

- When a coolant leak occurs, refer to the following measures to deal with it.
- Immediately contact a professional to have uninvolved persons evacuated quickly to safety.
- Cut off the source of the spill as far as possible and prevent it from entering spaces such as sewers, drains and bodies of water.

- When cleaning up spilled liquids, wear protective equipment to protect your body from contact with the spilled or released material.
- Use sand, mud or other materials that can be used as barriers to set up barriers to prevent diffusion. Recover liquid directly or store in absorbent. Clean the contaminated area with detergent, water and a hard broom. Put the collected liquid in a disposable container.

No.	Contact method	Measures
1	Inhalation	Move to fresh air. If breathing has stopped, give artificial respiration first aid. Seek medical attention.
2	Skin contact	Take off contaminated clothing. Rinse the skin thoroughly with soap and water. Seek medical attention if skin inflammation or rash occurs.
3	Eyes contact	Flush eyes with plenty of water for at least 15 minutes. Seek medical attention.
4	Ingestion	If ingested, but conscious, water or milk to drink and actively seek medical help, do not induce vomiting unless instructed by healthcare patients. If you cannot get help from a doctor, please send the patient and the container and label to the nearest medical emergency center or hospital. Do not give any food to unconscious patients.

15 Exclusion of liability

Although the information contained in this manual has been carefully checked for accuracy and completeness, no liability can be assumed for errors or omissions.

RCT Power reserves the right to change the hardware and software features described in this manual at any time without prior notice.

Warranty or liability claims of any kind are excluded due to one or more of the following reasons:

- Incorrect use or installation of the product.
- Installation or operation of the product in an unsuitable environment.
- The relevant safety regulations during installation and commissioning at the operation site are ignored.
- The product relevant safety notices and instructions contained in the product documentation are ignored.
- By installing or operating the product under insufficient safety and security conditions.
- By modifying the product or by unauthorised software installation.
- A defect in the product caused by the operation of the product or adjacent equipment outside the permitted limits.
- Damage caused by force majeure.

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RCT Power does not accept any liability for damage caused by incorrect or lost data, due to incorrect operation or malfunction of the cabinet, the software, additional devices or personal computers.

16 Recycle



NOTICE

- The Company does not recycle batteries. Contact local recycling agencies to handle batteries.
- If there are no such agencies in your area, you can contact the nearest foreign recycling agencies.

Procure:

Step 1: Contact the nearest recycling agency.

- According to the requirements of the recycling agency, electrical and iron components of the energy storage system should be dismantled and classified after a power outage.

Step 2: Recycling agencies assess the costs.

- All costs/revenues arising from recycling shall be borne by the user themselves.

Step 3: Recycling agencies carry out recycling.

- Collect all recycled lithium batteries in one area and have the recycling agency come to the site for centralized processing.
- Electrical components such as refrigerators and inverters do not contain flammable or explosive dangerous goods and can be scrapped and recycled in accordance with relevant laws and regulations of overseas countries.

Step 4: Recycling companies handle recycling.

- The recycled lithium batteries are at the disposal of the recycling companies.

17 Technical Data

Technical Data	RCTerra Pro 1.0 Series		
Model Name	CESS932-500-02D	CESS699-375-02D	CESS466-250-02D
GENERAL			
Nominal Capacity	932 kWh	699 kWh	466 kWh
Usable Capacity(95% DOD)	885.4kWh	664.05kWh	442.7kWh
Maximum Charge\Discharge Rate	0.5C		
Self-Discharge Rate	≤3.5%(per month)		
Relative Operating Humidity	0%-95% RH, No-condensation		
Operating Temperature Range	-4°F ~ 113°F		
Storage Temperature Range	-13°F~ 122°F (Recommended 32°F ~ 86°F)		
Operating Altitude	≤2000m		
Dimensions (mm)	W 2991 x H 2591 x D2438		
Corrosion-proof Grade/Salt Spray Resistance	C4		
Weight	Approximately 25000 lbs	Approximately 21000 lbs	Approximately 17000 lbs
Max. Number Of ESS used in parallel(Off-grid)	2	2	4
IP Rating	IP54		
Noise Level	≤70dB@1m		
Communication Protocol	Modbus TCP/RTU, CAN		
Black-start Function(Dark Start)	Yes		
Auxiliary Power Supply	Self-powered		
BMS	Integrated		
EMS	Integrated		
SAFETY FEATURE			
Flammable/explosive Gas Detection	Yes		

Technical Data	RCTerra Pro 1.0 Series		
Model Name	CESS932-500-02D	CESS699-375-02D	CESS466-250-02D
Flammable/explosive Gas Exhaust	Yes		
Smoke Detection	Yes		
Temperature Detection	Yes		
Fire Suppression	Aerosol		
Siren and Strobe Alarm	Yes		
Dry Pipe and Sprinkle	Yes		
Fire Alarm Control Panel	Yes		
Emergency Stop Button	Yes		
BATTERY			
Battery Rack Quantity	4	3	2
Battery Pack Quantity Per Rack	5		
Battery Pack Structure	1P52S		
Battery Capacity Per Pack	46.592kWh		
Battery Type	LiFePO4		
DC-side Rated Voltage	832 Vdc		
DC-side Operating Voltage Range	715 ~ 928 Vdc		
Cooling Concept	Liquid-cooling		
Cycle Lifetime	≥6000cls(70%SOH,25±2°C)		
PCS			
DC Connection			
Operating Voltage Range	700 ~ 950 Vdc		
Max. DC Current	4×196=784A	3×196=588A	2×196=392A
AC Connection			
Rated AC Power	4×125=500kW	3×125=375kW	2×125=250kW

Technical Data	RCTerra Pro 1.0 Series		
Model Name	CESS932-500-02D	CESS699-375-02D	CESS466-250-02D
Rated AC Current	4×150=600A	3×150=450A	2×150=300A
Rated AC Voltage	480 Vac, 3P+N+PE		
AC Line Frequency	60Hz		
Power Factor Adjustable Range	-1 ~+1		
Peak Efficiency	> 98.6%		
Long-term Overload Capacity	110%		
CEC Efficiency	98%		
Cooling Method	Liquid-cooling		
STANDARDS			
UL1973, UL 9540A, UL 60730-1 Annex H, NFPA 69, UL 9540, UL 1741CRD, UN38.3			

18 Contact

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REV 1.8

Date:2026/07/06