

MANUAL



Power CESS 1000 Series C&I Energy Storage System

EN

Model:

CESS932-500-01D

CESS699-375-01D

CESS466-250-01D

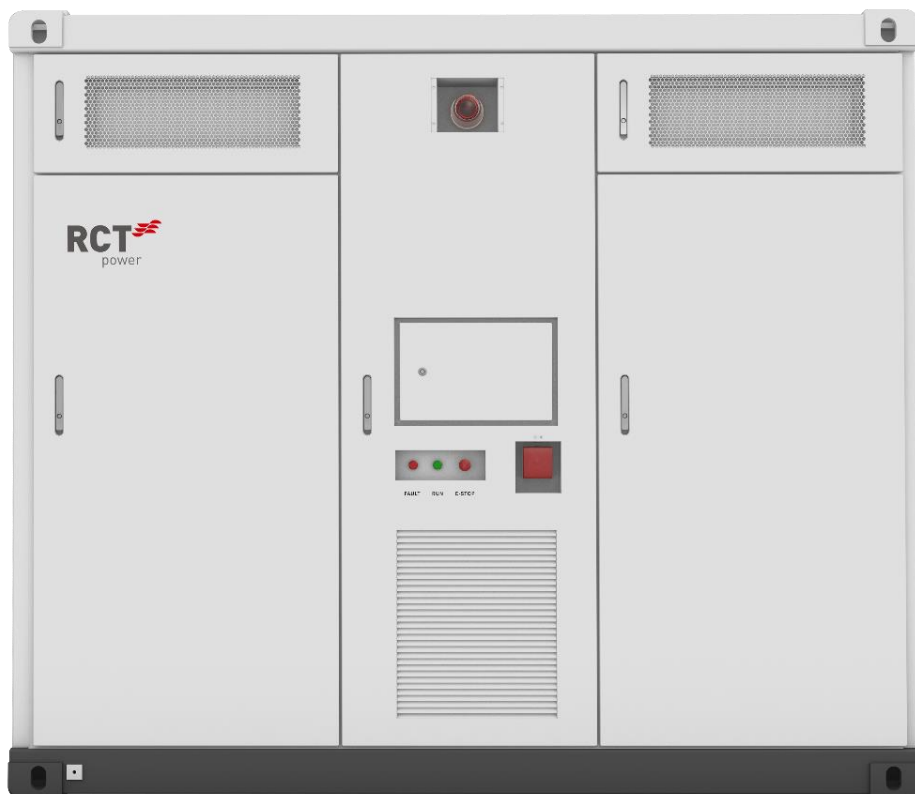


Table of Contents

1	ABOUT THIS MANUAL	1
1.1	Applicable products	1
1.2	Validity, Purpose, Scope of this document and Legal Regulations.....	1
1.3	Explanation of Symbols and References	1
1.4	Abbreviation.....	2
2	SAFETY INSTRUCTIONS	3
2.1	Personnel and Qualifications	3
2.2	Electrical Safety	3
2.3	Protective Tools	5
2.4	Nameplate and stickers	5
2.5	Electric Arc protection	10
3	PRODUCT PRESENTATION	11
3.1	Product Introduction	11
3.2	System solution.....	11
3.3	Work Mode.....	12
3.3.1	Self Consumption.....	12
3.3.2	T.O.U	12
3.3.3	Backup-Only	12
3.4	Product Specification.....	12
3.4.1	Scope of Supply	12
3.4.2	External Description	14
3.4.3	Mechanical Parameters	15
3.4.4	Ventilation Design	15
3.4.5	Internal Design	16
3.4.5.1	Cell Introduction	17
3.4.5.2	Battery Pack introduction.....	17
3.4.5.3	AC/DC Inverter Module	18
3.4.5.4	Switch Gear(Including BMS module).....	20
4	TRANSPORT AND STORAGE	22

4.1	Precautions.....	22
4.2	Transport Methods.....	22
4.3	Requirements for Transportation.....	22
4.4	Storage Requirements	22
5	MECHANICAL INSTALLATION	24
5.1	Inspection Before Installation.....	24
5.1.1	Deliverables Inspection.....	24
5.1.2	Product Inspection.....	24
5.2	Installation Environment Requirements.....	24
5.2.1	Installation Site Requirement.....	24
5.2.2	Foundation Requirements	24
5.2.3	Installation Spacing Requirement.....	26
5.2.4	Parallel space requirements.....	26
5.3	Hoisting and Transport.....	26
5.3.1	Safety Precautions.....	26
5.3.2	Hoisting.....	27
5.4	Fixed Installation	28
6	ELECTRICAL CONNECTION	30
6.1	Precautions.....	30
6.2	Electrical Connection Overview.....	31
6.2.1	Electrical Main Circuit Diagram.....	31
6.2.2	Electrical Auxiliary Circuit Diagram	32
6.2.3	Wiring instructions	32
6.3	Preparation Before Wiring	32
6.3.1	Preparing Installation Tools.....	32
6.3.2	Open the Door.....	33
6.3.3	Preparing Cables	33
6.3.4	Crimp terminal.....	33
6.3.5	Cable Entry Design.....	34
6.4	Ground Connection	34
6.5	AC Connection	35
6.5.1	Grid port connection	35
6.5.2	Auxiliary power connection.....	36
6.6	PLC Digital Input.....	38
7	BATTERY MSD INSTALLATION	39
8	POWERING UP AND SHUTDOWN.....	43
8.1	Inspection Before Powering up.....	43
8.2	Powering Up Steps.....	43

8.3	Shutdown steps.....	45
9	THE THERMAL MANAGEMENT SYSTEM	47
10	FIRE SUPPRESSION.....	48
10.1	General Rules.....	48
10.2	Fire Suppression Equipment.....	48
10.3	Exhaust System	49
10.4	Aerosol Fire Suppression System.....	49
11	EMS INSTRUCTION	50
11.1	Touch panel interface.....	50
11.2	System chart.....	50
11.3	Modbus Poll Communication	50
11.4	UI.....	53
11.5	Monitor.....	54
11.6	Work mode.....	55
11.6.1	T.O.U	55
11.6.2	Self Consumption.....	56
11.6.3	Backup-Only	56
11.7	Devices.....	57
11.7.1	PCS.....	60
11.7.2	BMS	62
11.7.3	Ele Meter	63
11.7.4	Chiller.....	64
11.7.5	Fire Detector	65
11.7.6	Dehumidifier.....	66
11.7.7	IO.....	67
11.7.8	Device Common.....	68
11.8	Data Centre.....	70
11.8.1	Real Time Chart.....	70
11.8.2	History Chart.....	71
11.8.3	Query Report.....	72
11.8.4	Fault Inquiry	72
11.9	User Center.....	73
11.10	Settings.....	73
11.10.1	Upload	73
11.10.2	Sys Settings.....	75
11.10.3	Parallel.....	77
11.10.4	Relay Setting	79
12	CHARGE AND DISCHARGE TEST	80

13	ERROR MESSAGE AND TROUBLE SHOTTING	82
13.1	PCS.....	82
13.2	BMS	83
13.3	Air Conditioner.....	85
14	ROUTINE MAINTENANCE	87
14.1	Precautions Before Maintenance	87
14.2	Maintenance Item and Period	87
14.2.1	Maintenance (Every half a year to once a year)	87
14.2.2	Maintenance (Once a year).....	87
14.2.3	Maintenance (Every two years).....	88
14.3	Maintenance of Liquid Cooling System	88
14.4	Container Maintenance.....	89
14.4.1	Measures for repairing appearance damage.....	89
14.4.2	Checking Sealing Strips.....	90
14.5	Coolant Replacement.....	90
15	EXCLUSION OF LIABILITY	92
16	RECYCLE	93
17	TECHNICAL DATA	94
18	CONTACT	97

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. RCT Power CESS 1000 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.
	Keep this manual in a safe place for future reference.

1 About this Manual

1.1 Applicable products

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

- CESS932-500-01D
- CESS699-375-01D
- CESS466-250-01D

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

This document is applying to the **Power CESS 1000 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 POWER CESS 1000 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.
	CE mark The cabinet complies with the requirements of the applicable CE guidelines

1.4 **Abbreviation**

Unless otherwise specified, devices in this manual are referred to as the abbreviations below.

Complete designation	Description
Commercial and Industrial Storage System	CESS
Static Transfer Switch	STS
Battery Management System	BMS
Energy Management System	EMS
Uninterruptible power supply	UPS

2 Safety Instructions

2.1 Personnel and Qualifications



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 Power CESS 1000 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 to life or serious injury due to electric shock!

High voltages are present in cables and inner parts of the cabinet if it is connected to the grid (AC / AC voltage source) is exposed to sunlight.

- Qualified personnel must perform any work that involves wiring, connecting or opening the cabinet case.
- Important: Both voltage sources (battery switch gear and AC / grid) must be switched off before any electrical work.
- 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 standard voltmeter 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.
- Turn the battery DC Switch into the "off" position to disconnect the battery DC voltage.
- Activate the circuit breaker to disconnect the mains voltage (AC). Do not reconnect until the work has been completed.
- To disconnect the battery voltage, voltage source (AC / mains) must be switched off and the battery switch on the master must be set to "off".
- 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.



Risk of injury due to electric shock!

Installation, service and maintenance work must only be carried out by a qualified electrician.

- Only switch 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.



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.
- 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.



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.

2.3 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

2.4 Nameplate and stickers

RCT power Suzhou RCT Power Energy Technology Co., Ltd Email: info@rct-power.com.cn Add: Unit01 and 02, Building B, No.28, Yongchang Road, Caohu Street, Suzhou, Jiangsu, P.R. China	
Model	CESS466-250-01D
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	466kWh / 832Vd. c.
PCS AC Rate Power/Current/Max Current	250kW/360A/396A
Nominal Grid/Load/Voltage/Frequency	400Va. c. (3P+N+PE) / 50/60Hz
AUX. Power/Voltage/Frequency	9.6kW / 230Va. c. Max / 50/60Hz
Rated Short-Time Withstand Current	20kA/1s
Rated Operating Short-Circuit Breaking Capacity	50kA
Protection Class	I
Ingress Protection	IP54 (Battery Room IP55)
Dimensions (mm) /Weight	W2991*D2438*H2591 (mm) /
Operating Temperature Range	-20 to 45℃










RCT power Suzhou RCT Power Energy Technology Co., Ltd Email: info@rct-power.com.cn Add: Unit01 and 02, Building B, No.28, Yongchang Road, Caohu Street, Suzhou, Jiangsu, P.R. China	
Model	CESS699-375-01D
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	699kWh / 832Vd. c.
PCS AC Rate Power/Current/Max Current	375kW/540A/594A
Nominal Grid/Load/Voltage/Frequency	400Va. c. (3P+N+PE) / 50/60Hz
AUX. Power/Voltage/Frequency	9.6kW / 230Va. c. Max / 50/60Hz
Rated Short-Time Withstand Current	20kA/1s
Rated Operating Short-Circuit Breaking Capacity	50kA
Protection Class	I
Ingress Protection	IP54 (Battery Room IP55)
Dimensions (mm) /Weight	W2991*D2438*H2591 (mm) /
Operating Temperature Range	-20 to 45℃










 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	CESS932-500-01D
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.
PCS AC Rate Power/Current/Max Current	500kW/720A/792A
Nominal Grid/Load/Voltage/Frequency	400Va.c. (3P+N+PE) / 50/60Hz
AUX. Power/Voltage/Frequency	9.6kW / 230Va.c. Max / 50/60Hz
Rated Short-Time Withstand Current	20kA/1s
Rated Operating Short-Circuit Breaking Capacity	50kA
Protection Class	I
Ingress Protection	IP54 (Battery Room IP55)
Dimensions (mm)/Weight	W2991*D2438*H2591 (mm) /
Operating Temperature Range	-20 to 45°C



Rechargeable Lithium-Ion Battery Rack 
Product Name: C&I Energy Storage System Battery Rack Model: RACK-233L1D-IEC-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

Rechargeable Lithium-Ion Battery Rack 
Product Name: C&I Energy Storage System Battery Rack Model: RACK-233L1D-IEC-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

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	
---	------------------------------

Rechargeable Lithium-Ion Battery

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

CAUTION

Keep Doors Close

Do Not Operate Under Load

DANGER

	ARC FLASH&SHOCK HAZARD Appropriate PPE Required
--	--

WARNING  AVERTISSEMENT	
DO NOT OPEN UNDER LOAD NE PAS MANOEUVRER EN CHARGE	

	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.

2.5 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:

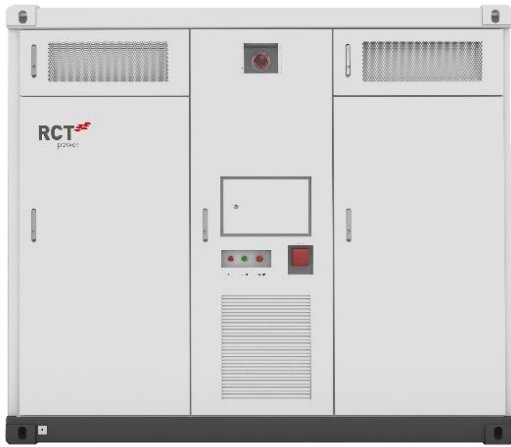
- Operators must receive safety training in advance.
- Try to assess the area where the shock is likely to occur.
- Before operating in a possible electric shock area, you must wear the required protective clothing.

3 Product Presentation

3.1 Product Introduction

POWER CESS 1000 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 POWER CESS 1000 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.

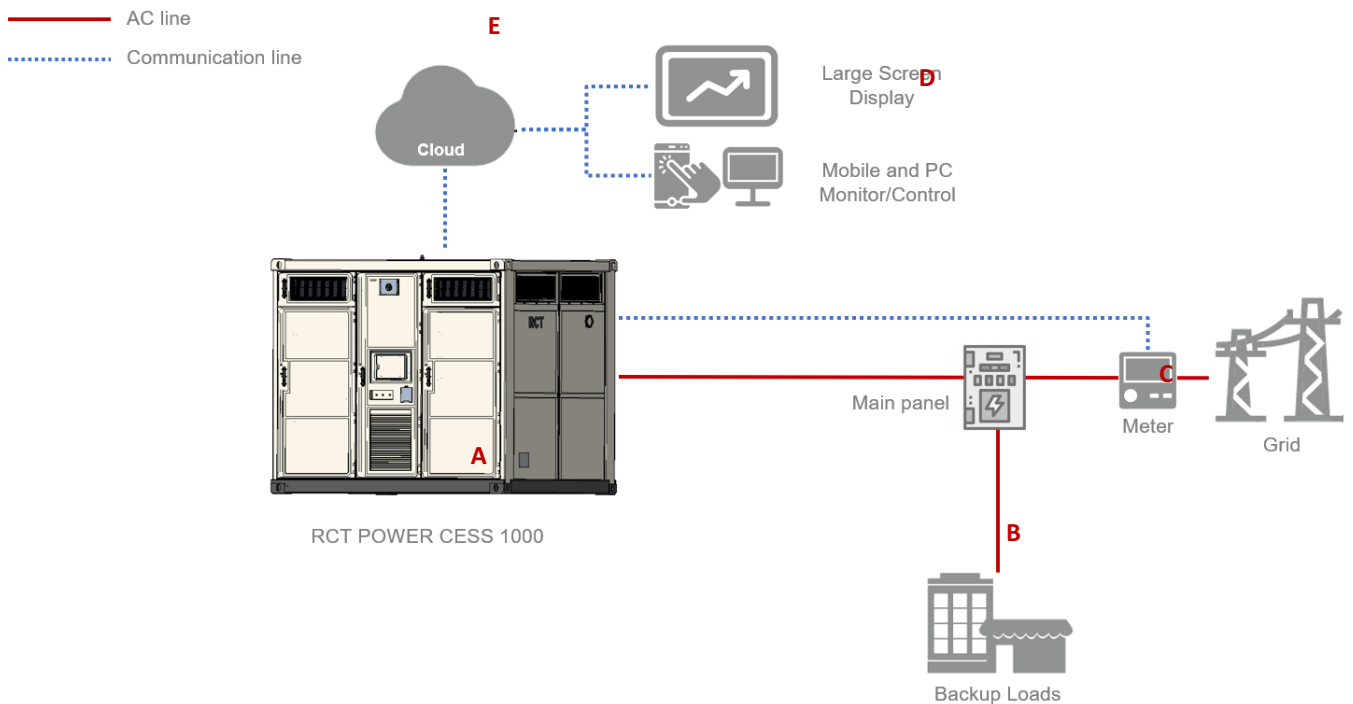


Fig. 3-2 Intended use of the cabinet

Item	Description	Comment
A	C&I Energy Storage System	CESS466-250-01D
		CESS699-375-01D
		CESS932-500-01D
B	Backup Loads	Loads which are not necessary to be fed with electrical energy during grid outage.
C	C&I Public Grid	400V, 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.

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.



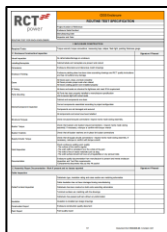
1 x Power CESS 1000 cabinet



20 x MSD (Manual Service Disconnect) *1



1 x User manual document



1 x Test report



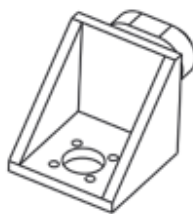
1 x Point-touch Pen of EMS



2 x Door key



1 x Keys of fire START/STOP button SR-A105

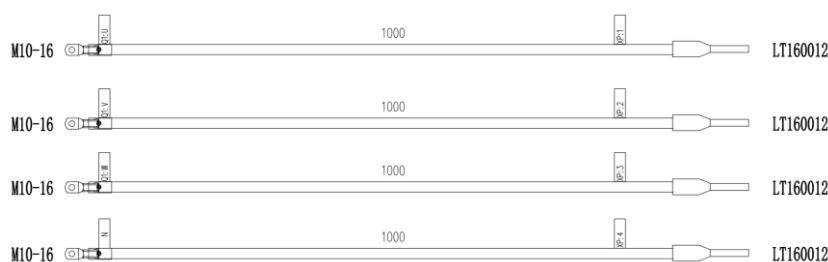


4 x Side twist lock at the bottom of the container

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



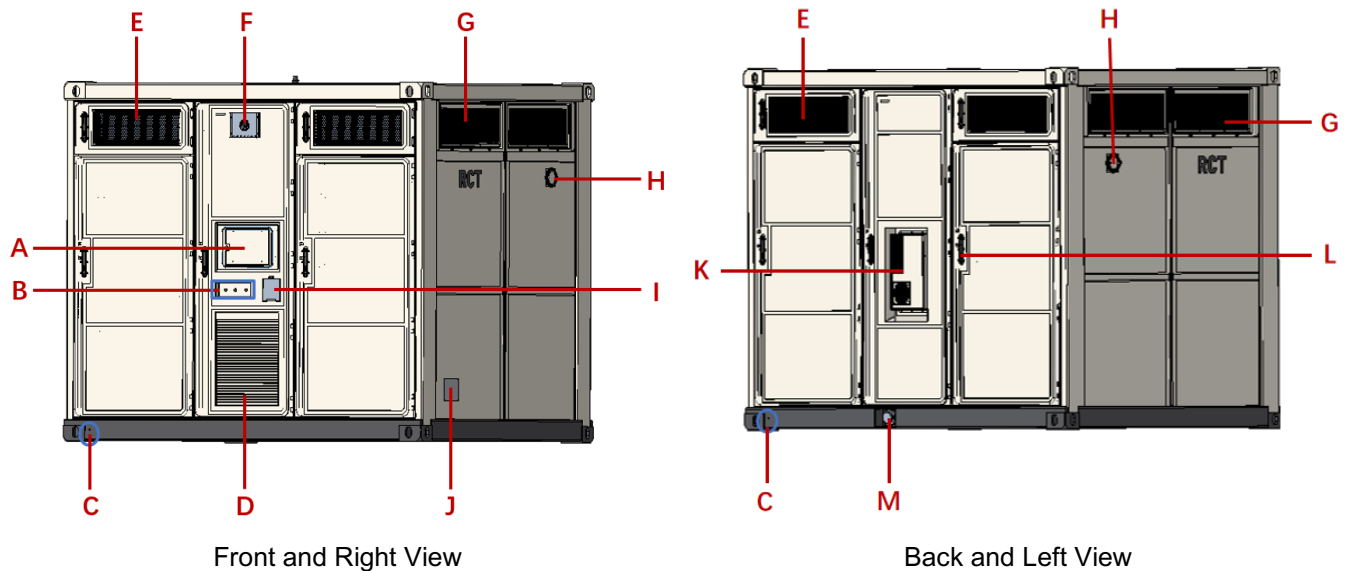
4 x 16mm² AC Cable (Length:1m, U/V/W/N) *2

*1: In order to protect the safety of technicians who repair POWER CESS 1000 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.

*2: When there is no auxiliary power supply at the customer site, these lines can be connected to the MCCB to take power from the main circuit.

3.4.2 External Description

The appearance of cabinet is shown as below:

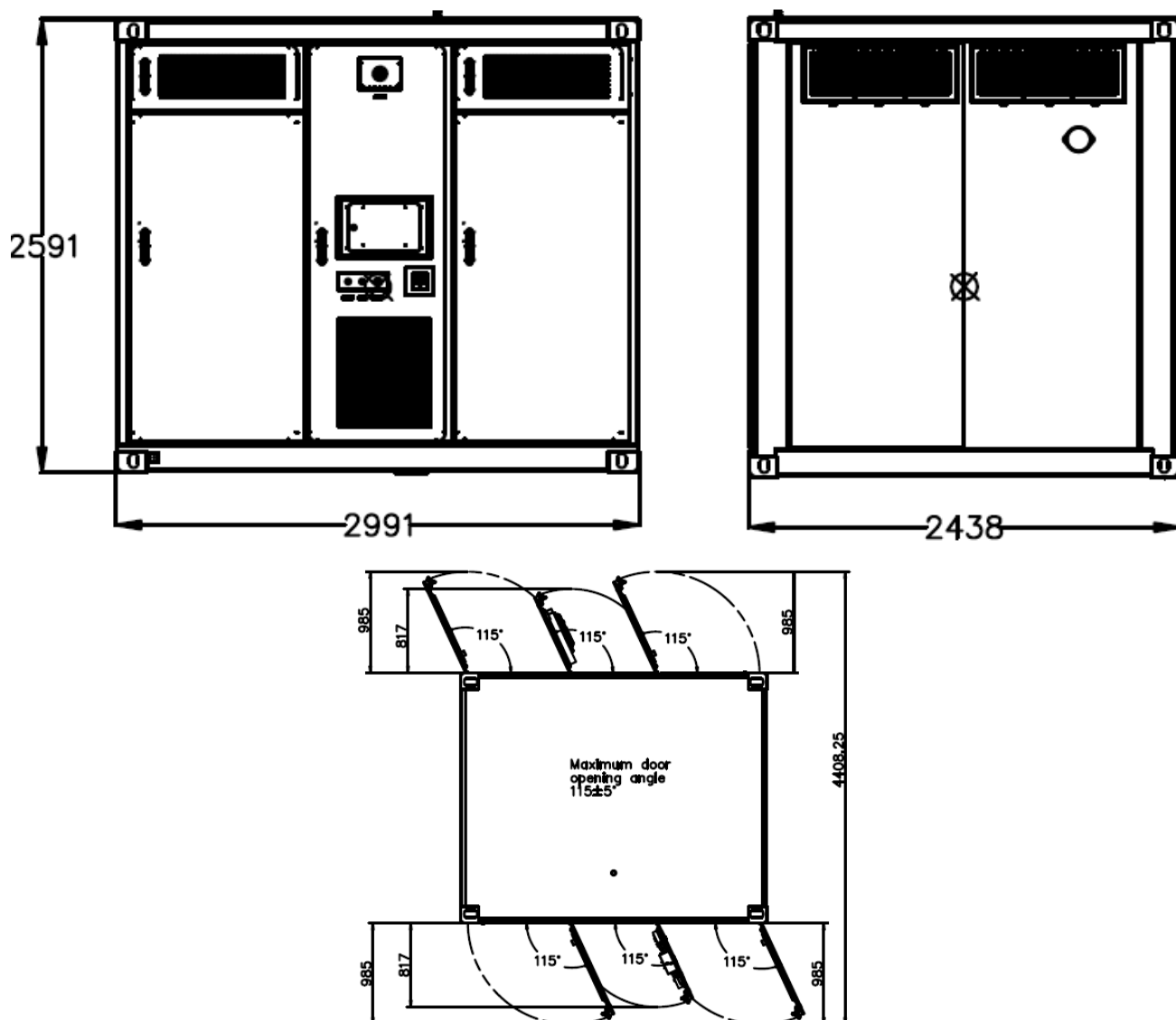


Item.	Description
A	Touch panel cover
B	Indicator Light* & Emergency stop button
C	Grounding point
D	Air grill
E	Chiller air outlet grill
F	Strobe and siren
G	Chiller air intake grill
H	Explosion proof valve
I	Fire switch
J	Name plate
K	Air conditioner
L	Door lock
M	Water inlet

* When the FAULT light is on, the device stops running. You can query the alarm code in the data center on the EMS interface to view the fault information.

3.4.3 Mechanical Parameters

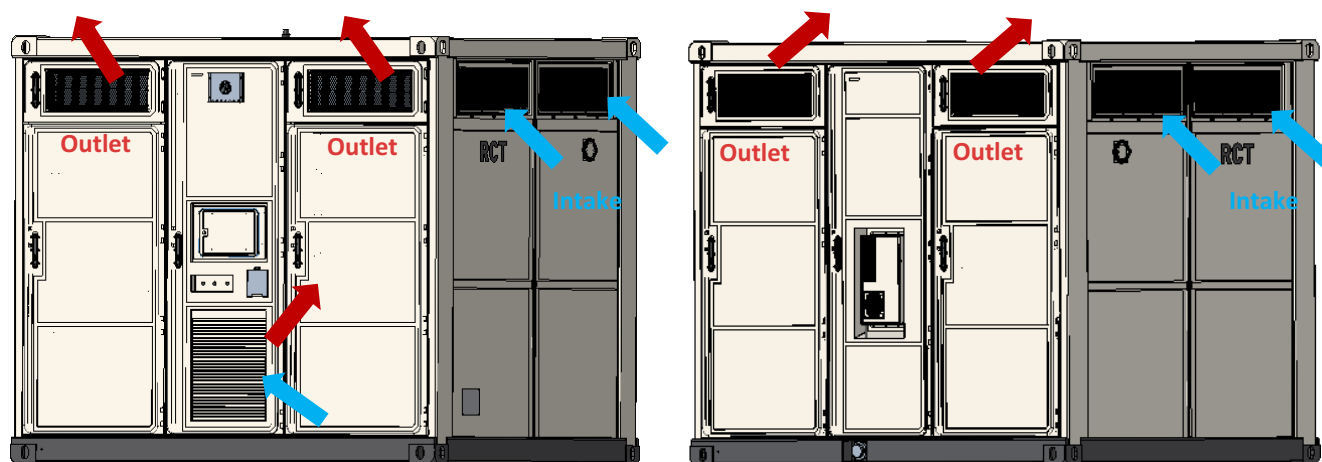
The external dimensions of cabinet are shown as below:



3.4.4 Ventilation Design

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

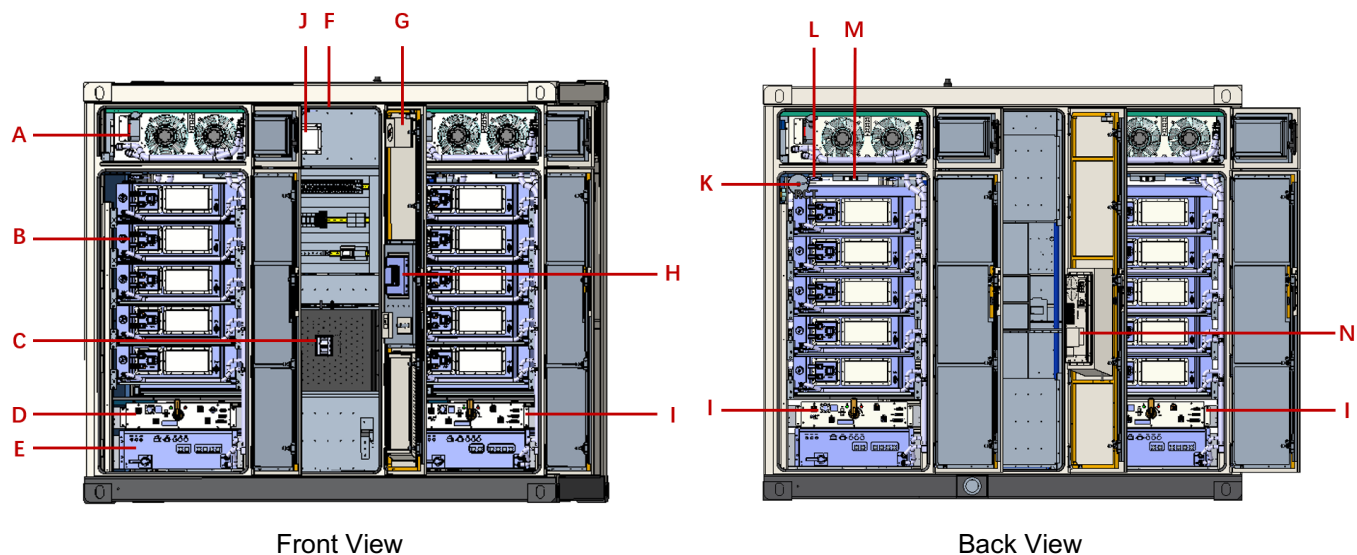
The chiller enclosure intakes air from the front and back side and expels it from the left and right side.



Front and Right View

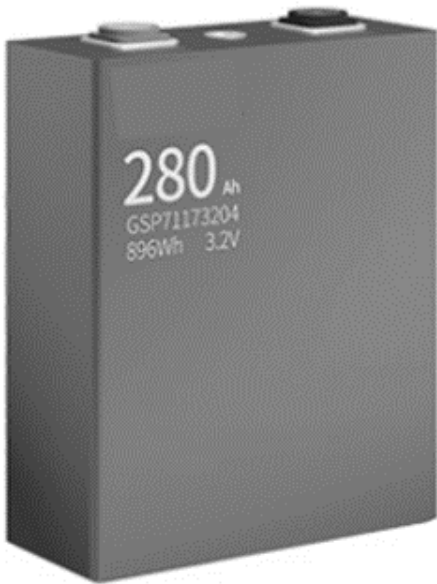
Back and Left View

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, 125 kW 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	Fire control unit	x 1
K	Aerosol fire suppression	x 2
L	Door switch	x 6
M	Composite detector	x 2
N	Air conditioner	x 1

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
Rated capacity	280Ah
Rated voltage	3.2Vd.c
Rated 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
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)	700~1000 Vdc
Max. DC Current	198 A
Rated AC power	125 kW
Rated AC current	180 A
AC line voltage	400 Vac ±15%
Rated AC line frequency	50Hz

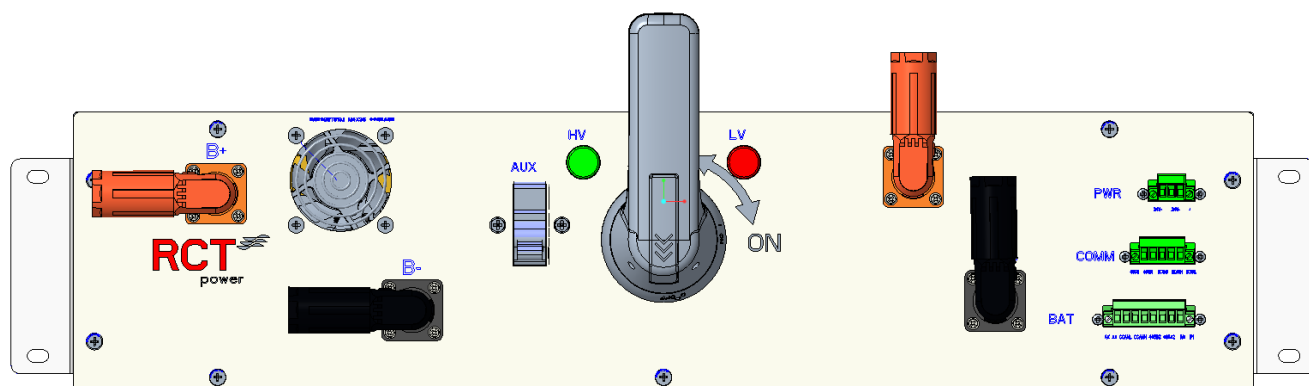
Parameter	Value
Rated AC line voltage	400 Vac, 3P4W+PE



Item	Instructions
COM4	Ethernet Of EMS
COM3	Port 2 on the parallel network
COM2	Port 1 on the parallel network
COM1	Communication and DIO signal interface
Bat+ Bat-	High voltage output port
Power indicator light	When the DC side is powered on, the DC indicator is steady on
Running indicator light	The green indicator is steady on in running mode and blinking in standby mode at a frequency of 1s.
Fault indicator light	When there is a fault, the red fault light is steady on. When there is no fault, the red fault light is not on.
DC isolation switch handle	Isolate and break the battery voltage. Do not break the battery with power.
DC plug DC+	Connect the battery or the positive terminal of the high voltage switch box.
DC plug DC-	Connect the battery or the negative terminal of the high voltage switch box.
AC plug L1	The AC side outputs phase A.
AC plug L2	The AC side outputs phase B.
AC plug L3	The AC side outputs phase C.
AC plug N	The AC side outputs phase N.

Coolant outlet	Coolant output port
Coolant inlet	Coolant input port

3.4.5.4 Switch Gear(Including BMS module)



Parameter	Value
Rated voltage (V)	1500V
Rated current (A)	140A
Protection level	IP53
Temperature range	-40~120℃
Humidity range	5~95%
Salt spray resistance	96H
Altitude (m)	2000
Size (mm)	D470 x W661.5 x H156
Weight (kg)	20

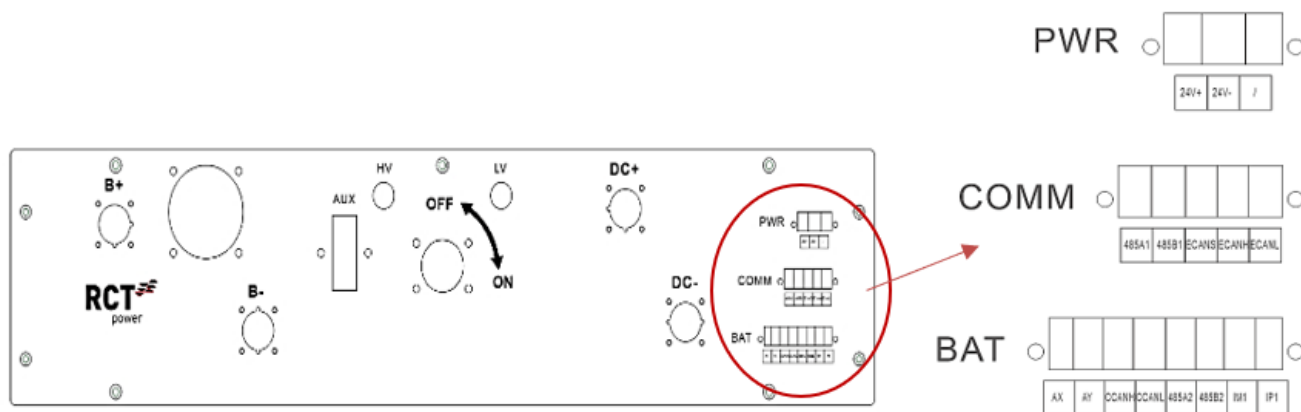


Fig.3-3 Switch Gear Port Identification

Name	Instructions
B+	High voltage input, connected to the positive terminal of the battery pack.
B-	High voltage input, connected to the negative terminal of the battery pack.
P+	High voltage output, connected to PCS bus positive.
P-	High voltage output, connected to PCS bus negative.
PWR	24V power input, connected to an uninterruptible power supply.
BAT	Battery communication, connected to battery COM.
COMM	External communication, connected to the main control EMS.
AUX	24V control power input.
HV	Bus high voltage status indicator light.
LV	Control power status indicator light.
ON/OFF	Isolation switch operation.

4 Transport and Storage

4.1 Precautions



NOTICE

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

4.2 Transport Methods

POWER CESS 1000 cabinet can be transported by sea or road, but does not support railway or air transportation. POWER CESS 1000 cabinet is highly integrated and easy to hoist, which facilitates its transport. POWER CESS 1000 cabinet can be transported by truck in the country.

4.3 Requirements for Transportation

All devices in the POWER CESS 1000 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 POWER CESS 1000 cabinet in the country/region where the project is located must be observed!

- All tools used for the POWER CESS 1000 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 POWER CESS 1000 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 POWER CESS 1000 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: -20 °C ~ 50 °C, recommended storage temperature: -10 °C ~ 35 °C.
- 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 POWER CESS 1000 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 POWER CESS 1000 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 POWER CESS 1000 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 POWER CESS 1000 cabinet when it is complete and intact. Before installation, ensure that:

- The POWER CESS 1000 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 POWER CESS 1000 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 POWER CESS 1000 cabinet, affecting the normal opening and closing of the doors and the normal operation. Therefore, the foundation of the POWER CESS 1000 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.
- The installation carrier should be firm and reliable. The bearing capacity of the foundation of CESS932-500-01D should exceed 12 tons. (Estimated weight of the assembly is 12 tons.) , the bearing capacity of the foundation of CESS699-375-01D should exceed 10 tons. (Estimated weight of the assembly is 10 tons.) and the bearing capacity of the foundation of CESS466-250-01D should exceed 8 tons. (Estimated weight of the assembly is 8 tons.)
- The bottom of the foundation pits must be strengthened and filled. The surface of the foundation shall be solid, flat and level (horizontal error $\leq 4\text{mm}$). Sunken or filled foundation is not acceptable.
- 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.

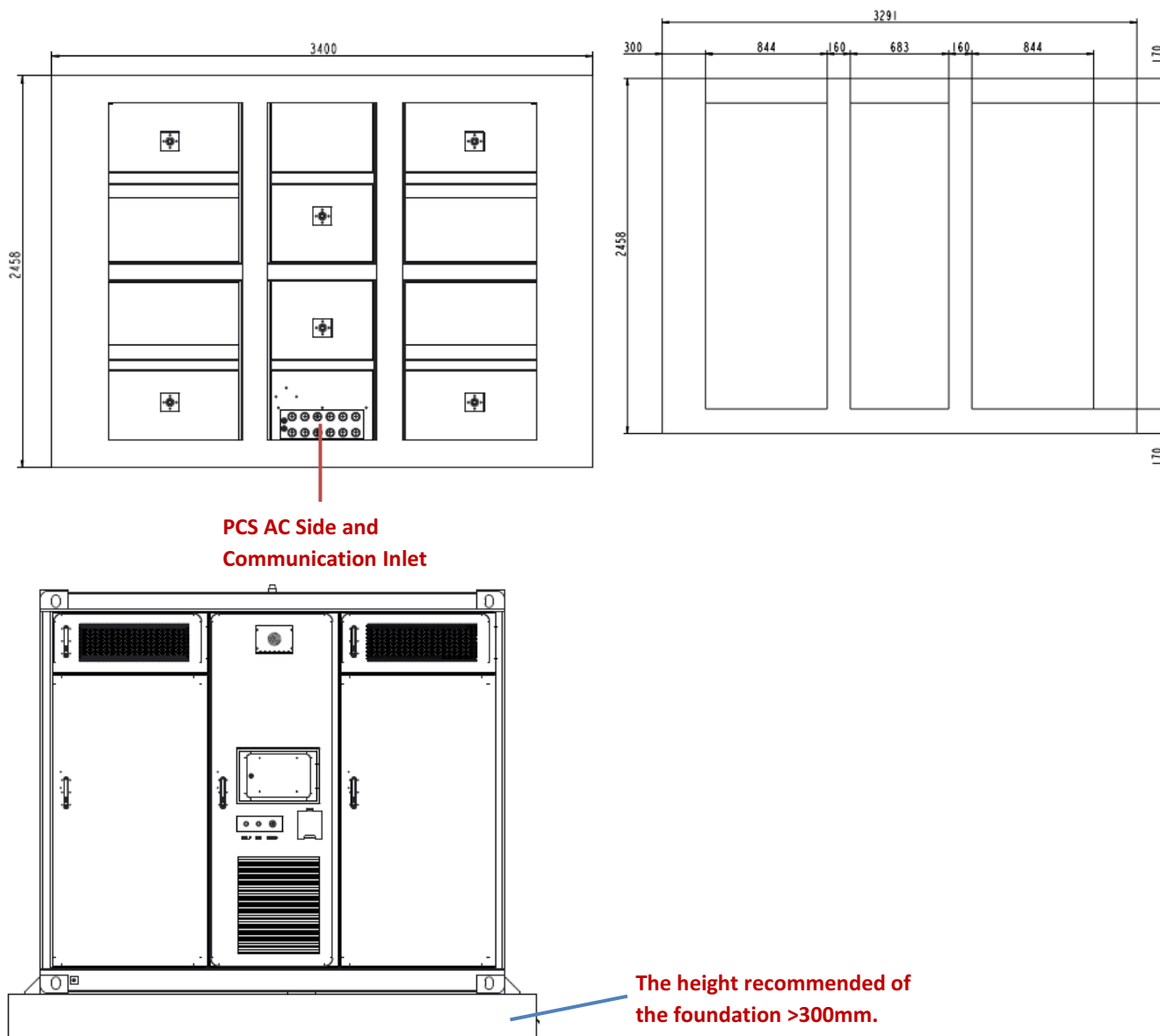


Fig. 5-1 Foundation instruction bottom view Unit: mm

5.2.3 Installation Spacing Requirement

To ensure that the equipment can be better dissipated and maintained, reserve enough space around the installation site. The following figure shows the required minimum spacing.

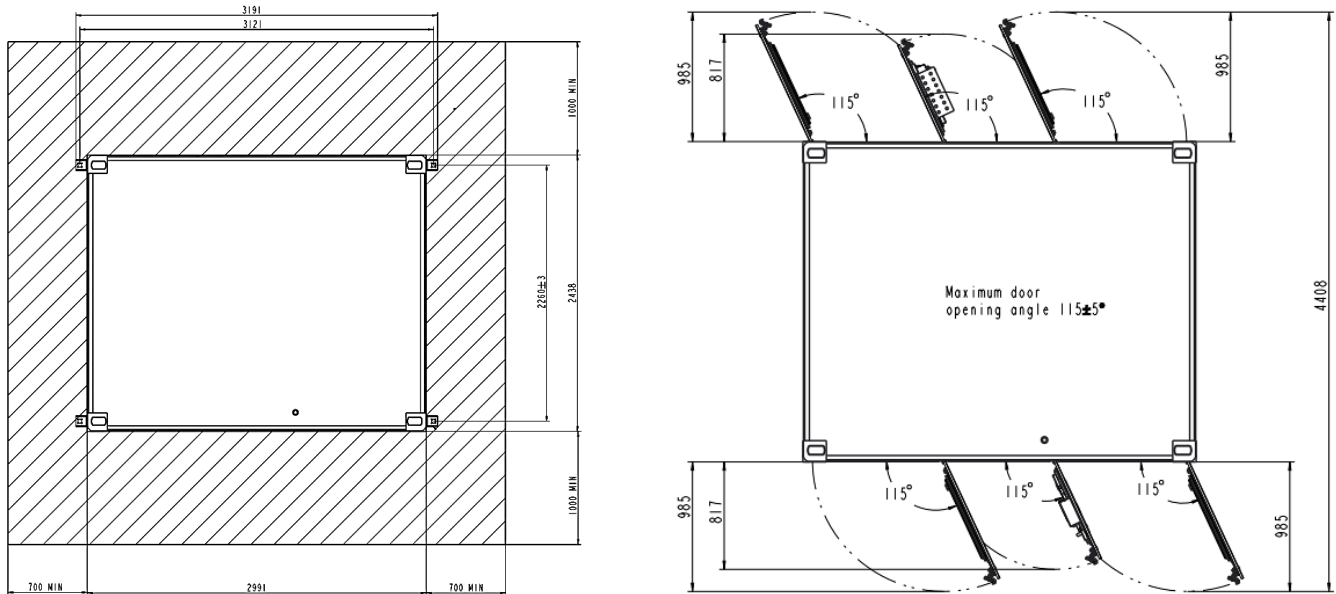


Fig. 5-2 Installation space top view Unit: mm

5.2.4 Parallel space requirements

- The recommended distance between parallel machines is $> 0.9\text{m}$.

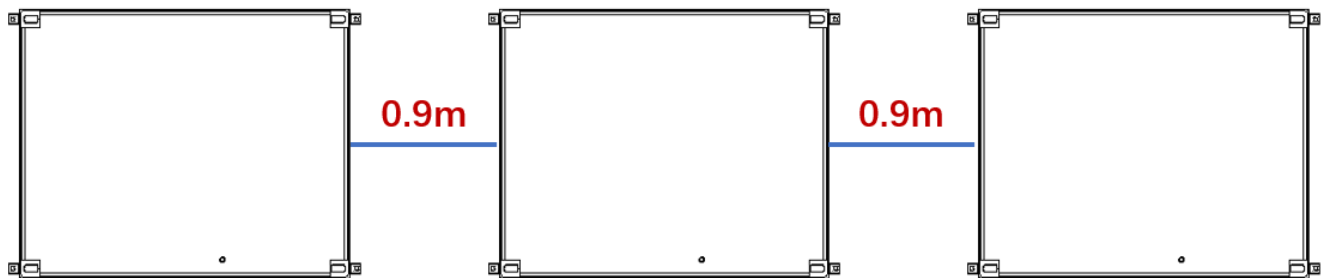


Fig. 5-3 Parallel space top view Unit: m

- The recommended distance between the front and rear of the machines with the wall is $> 2.5\text{m}$, this distance can provide the enough space for maintenance.
- 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.

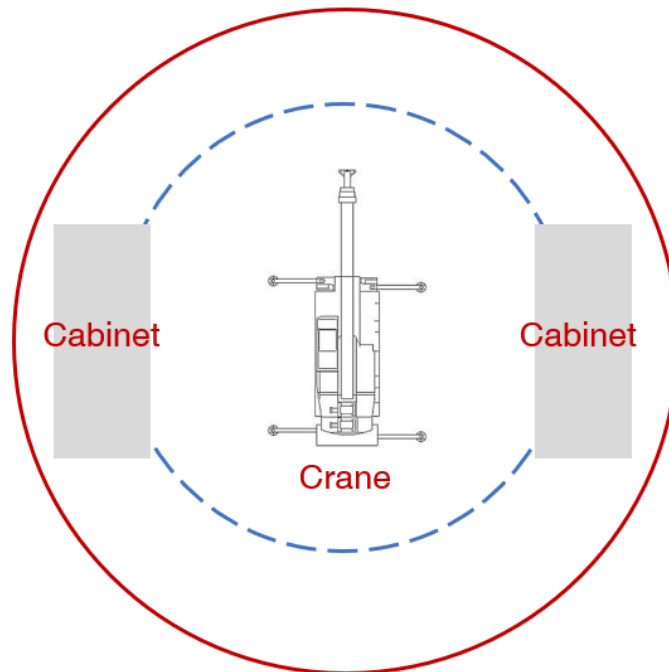


Fig. 5-4 Hoisting safety guide

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.

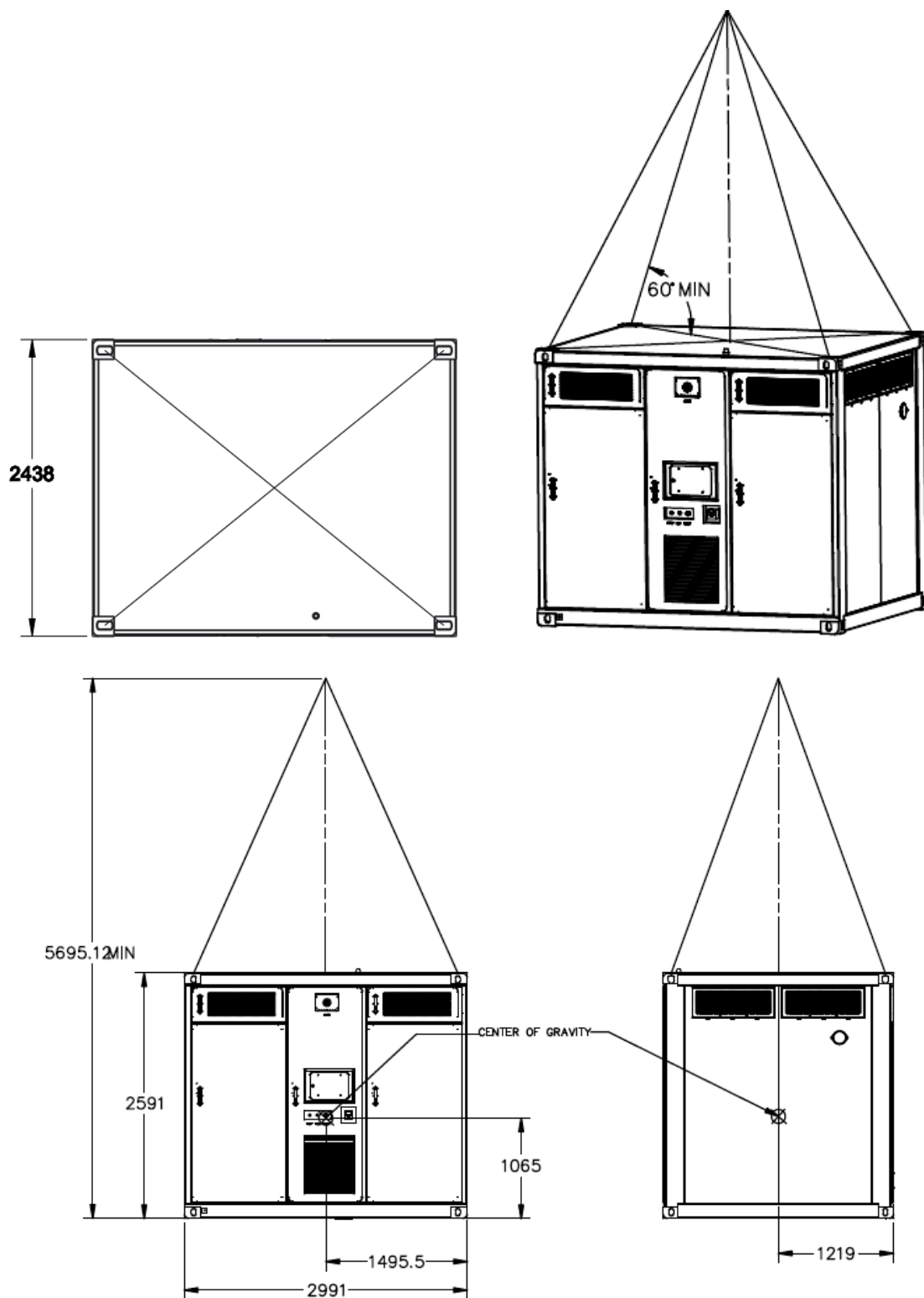


Fig. 5-5 Hoisting guid Unit: mm

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.

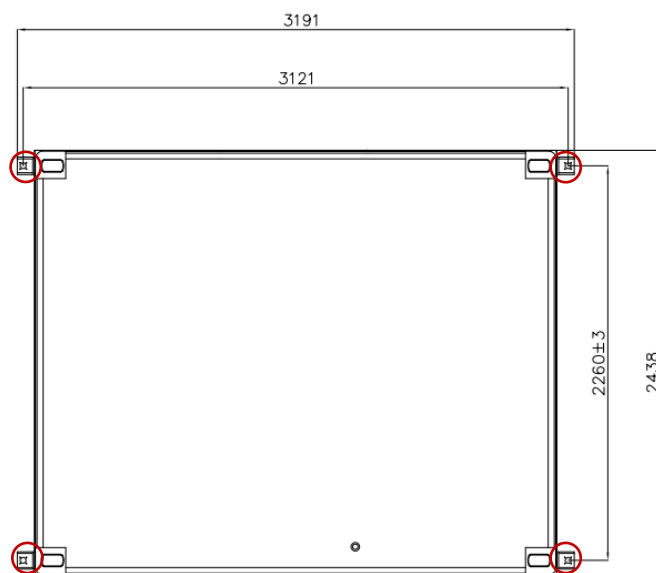


Fig. 5-6 Cabinet fixation guide bottom view Unit: mm

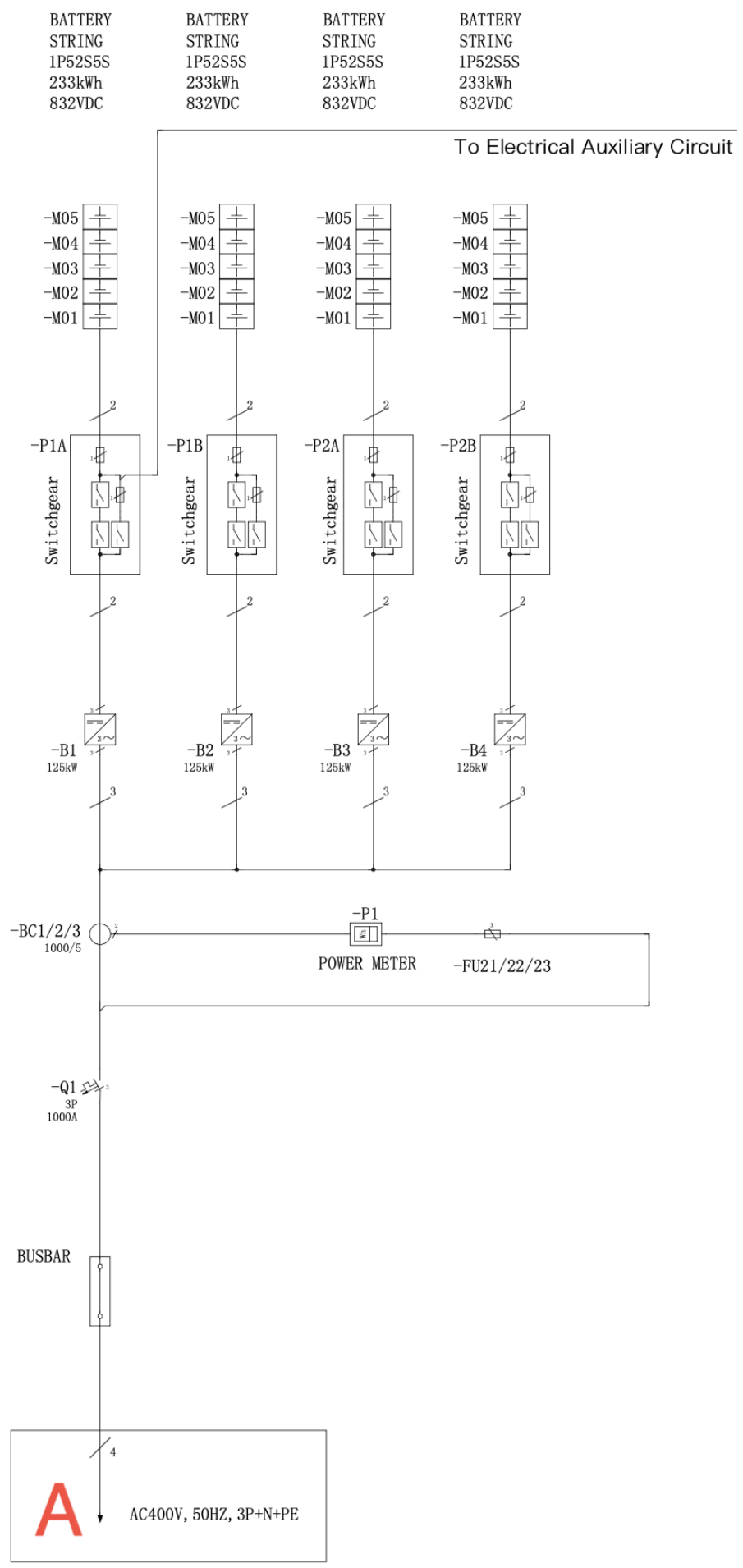
6 Electrical Connection

6.1 Precautions

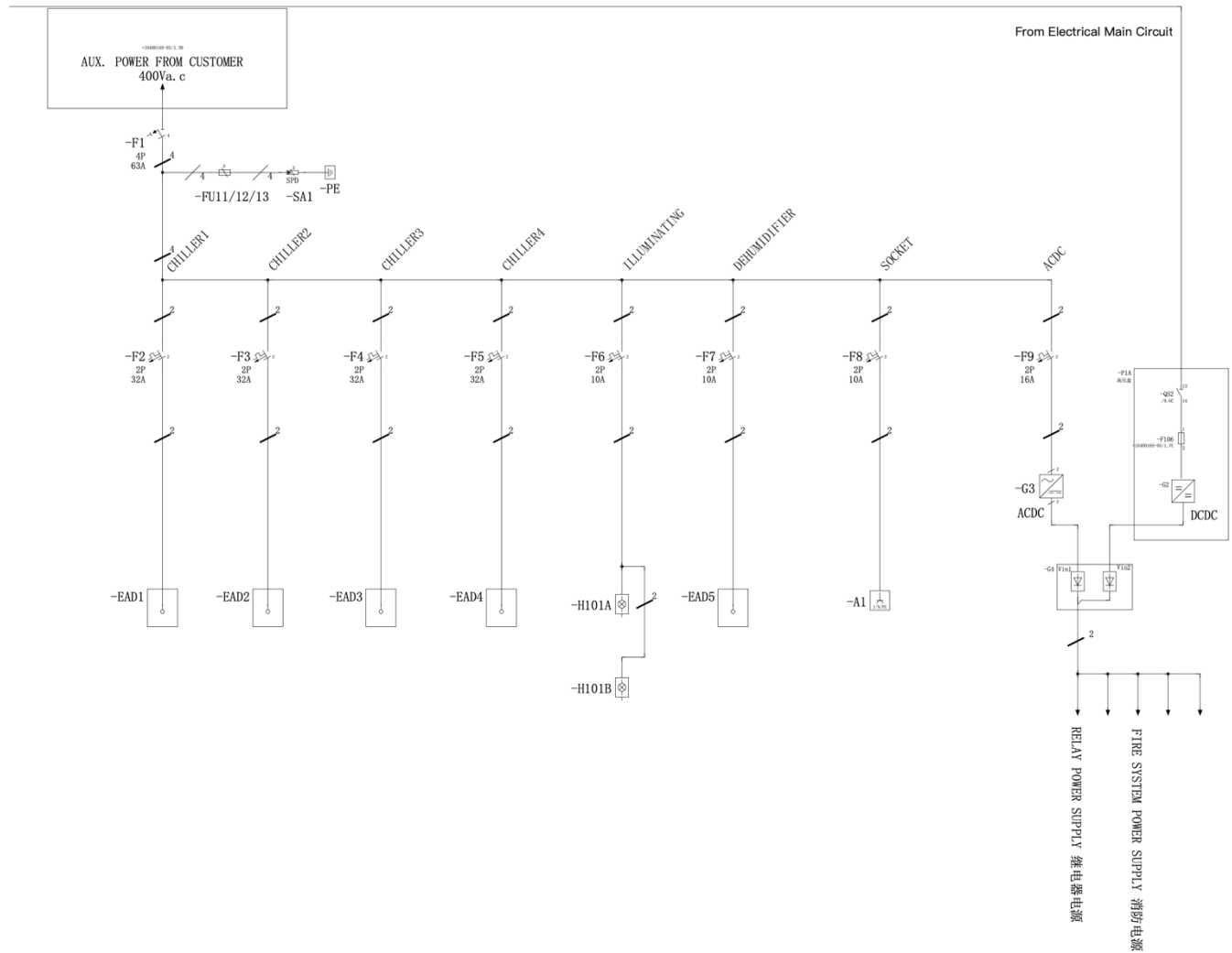
 DANGER	High voltage! Electric shock! ■ It is strictly forbidden to directly touch the live parts in the unprotected state! ■ Before installation, ensure that the all switches are off. ■ If the cabinet is left for a long time (for example, more than one week), at least one MSD of each cluster battery 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**

6.2.1 **Electrical Main Circuit Diagram**



6.2.2 Electrical Auxiliary Circuit Diagram

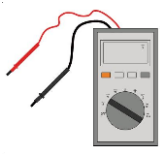


6.2.3 Wiring instructions

Item	Recommended specification
Grid port connection terminals A	2*(185~240mm ²), L1/L2/L3
	2*(95~120mm ²), N

6.3 Preparation Before Wiring

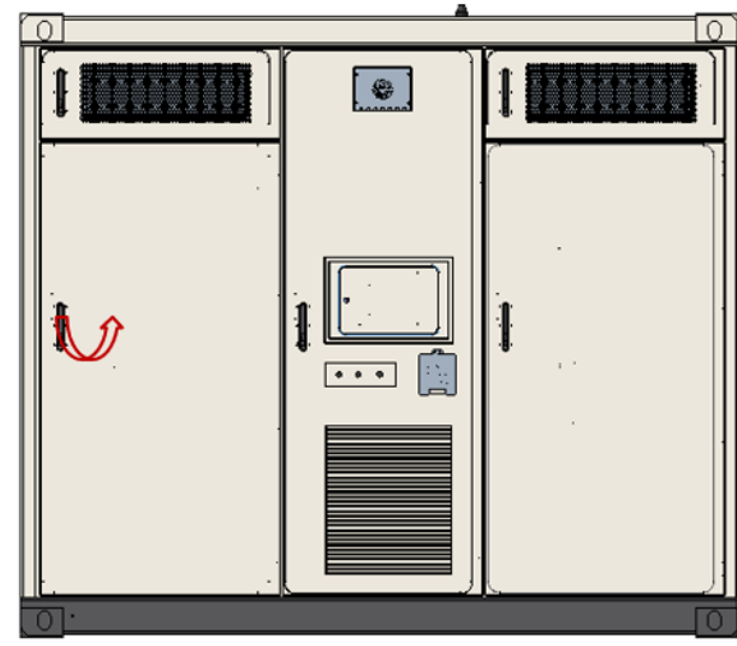
6.3.1 Preparing Installation Tools

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:

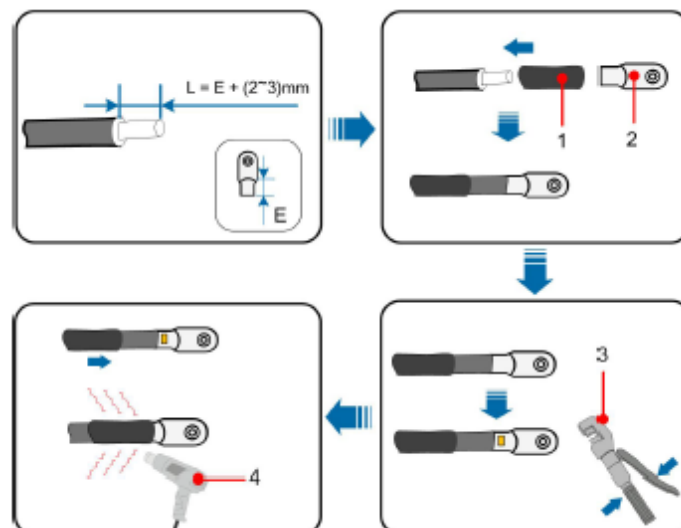
- Environmental conditions;
- Type of the insulation material of the conductor;
- Cabling method;
- Material and cross-sectional area of the cable.

- 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.

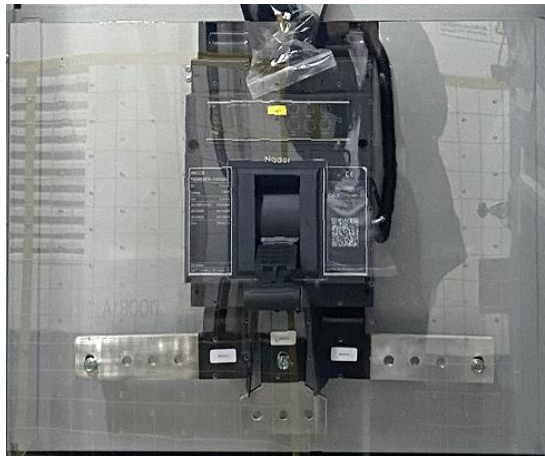
Cables entry hole is shown as below:



PCS AC side and communication cable entry

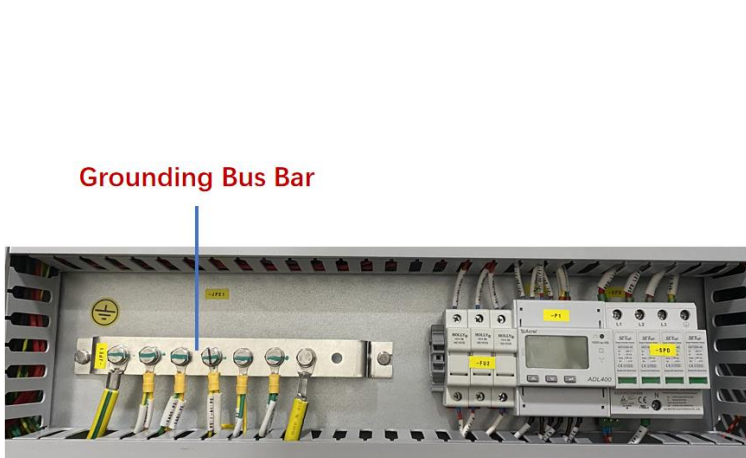
Cable entrance is from the bottom with split area for Grid Power cable and signal cables.

- Grid port cables connect to terminal bus bar (3 phases), copper cable conductor cross sectional area:
L1/L2/L3: 2*(185~240mm²)
N: 2* (95~120 mm²)
- Signal cables come in/out cabinet, Copper cable conductor cross sectional area: 2*(0.5mm² ~0.75mm²).



6.4 Ground Connection

Auxiliary electricity side:



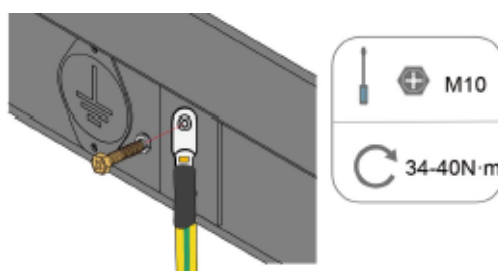
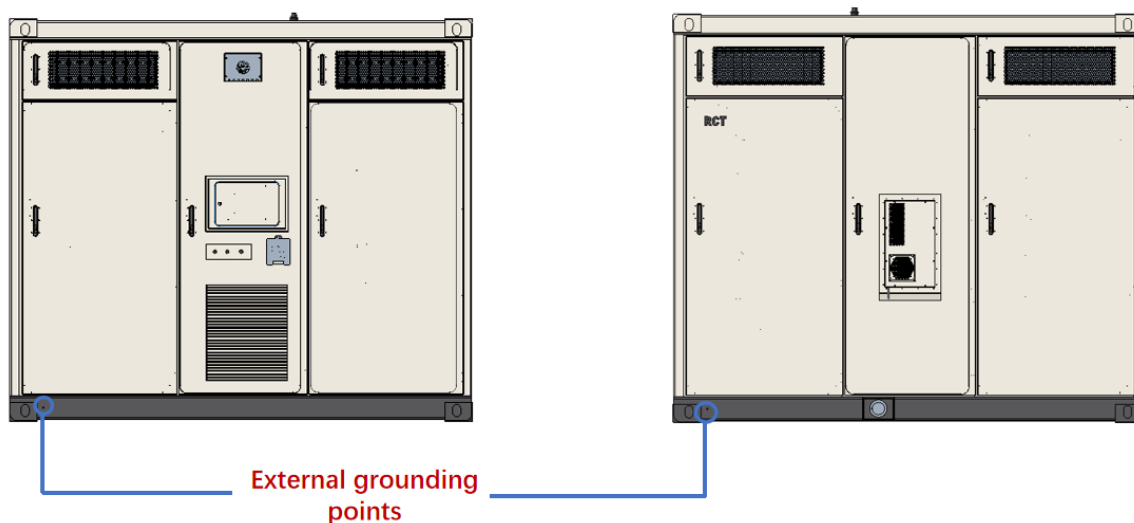
Grounding Bus Bar

Grounding Bus Bar



- Use a grounding cable of 10~16 mm² to ensure a reliable connection between the grounding points.

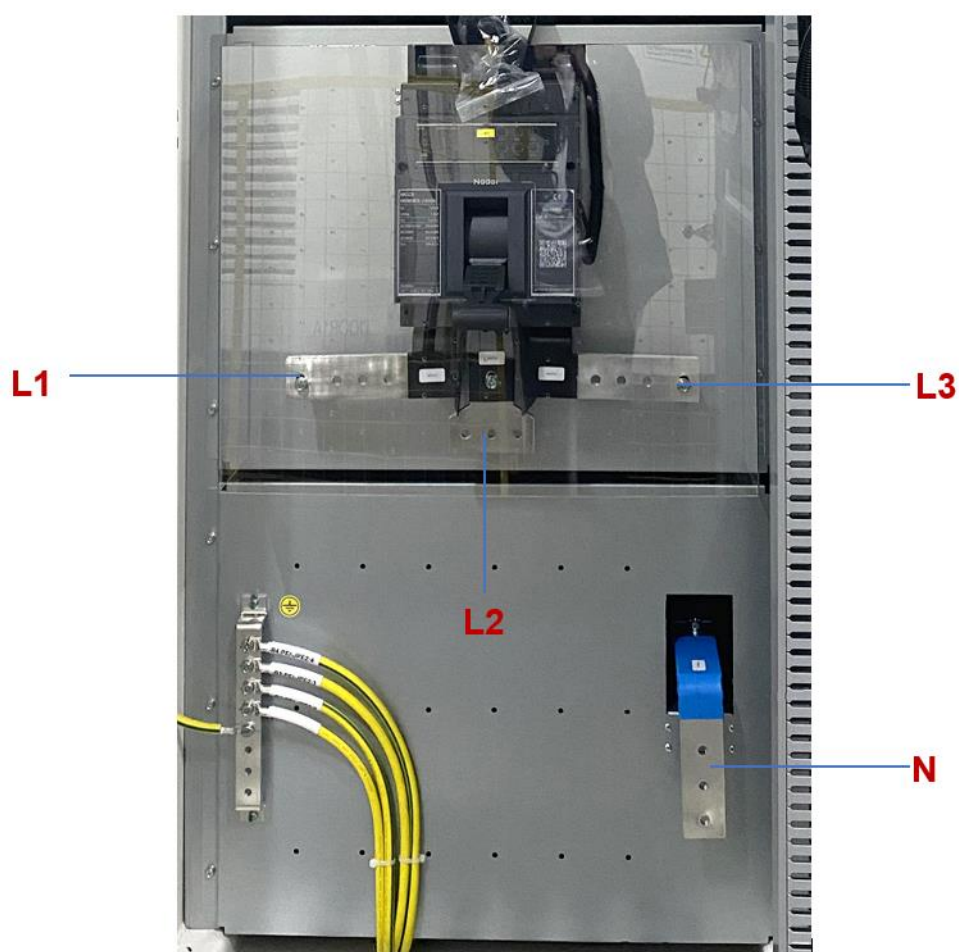
Cabinet side:



- Use a grounding cable of 2*(95~120 mm²) to ensure a reliable connection between the grounding points.

6.5 AC Connection

6.5.1 Grid port connection

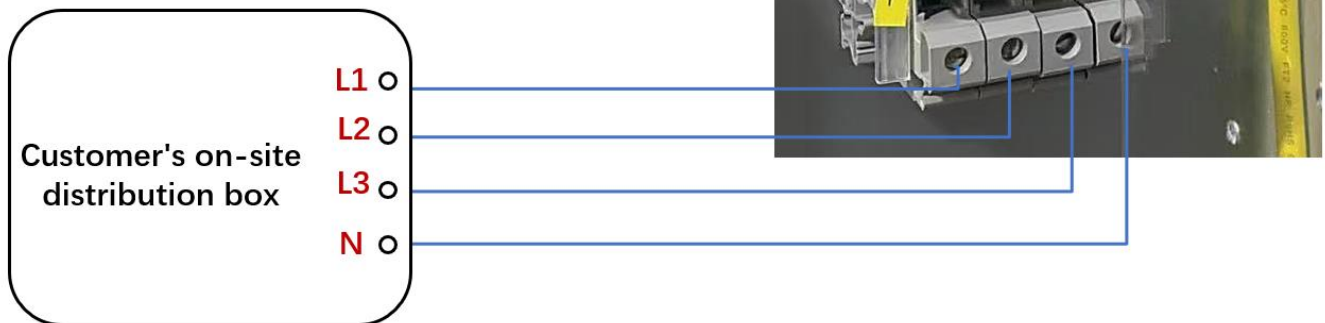


- Grid port cables connect to terminal MCCB (3P4W, L1/L2/L3/N).
- Use copper cable conductor cross sectional area:

L1/L2/L3: 2*(185~240mm²)
N: 2* (95~120 mm²)

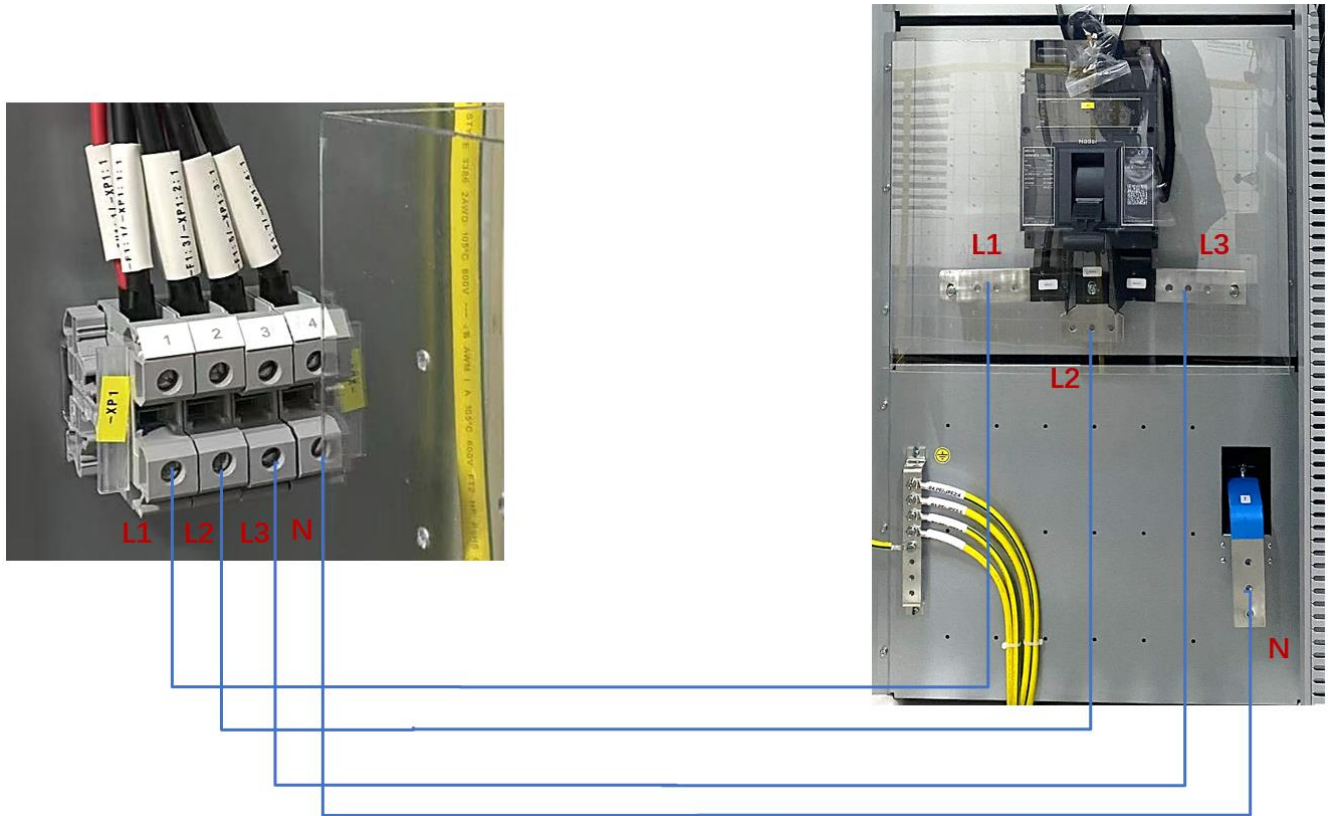
6.5.2 Auxiliary power connection

Customer site with distribution box:

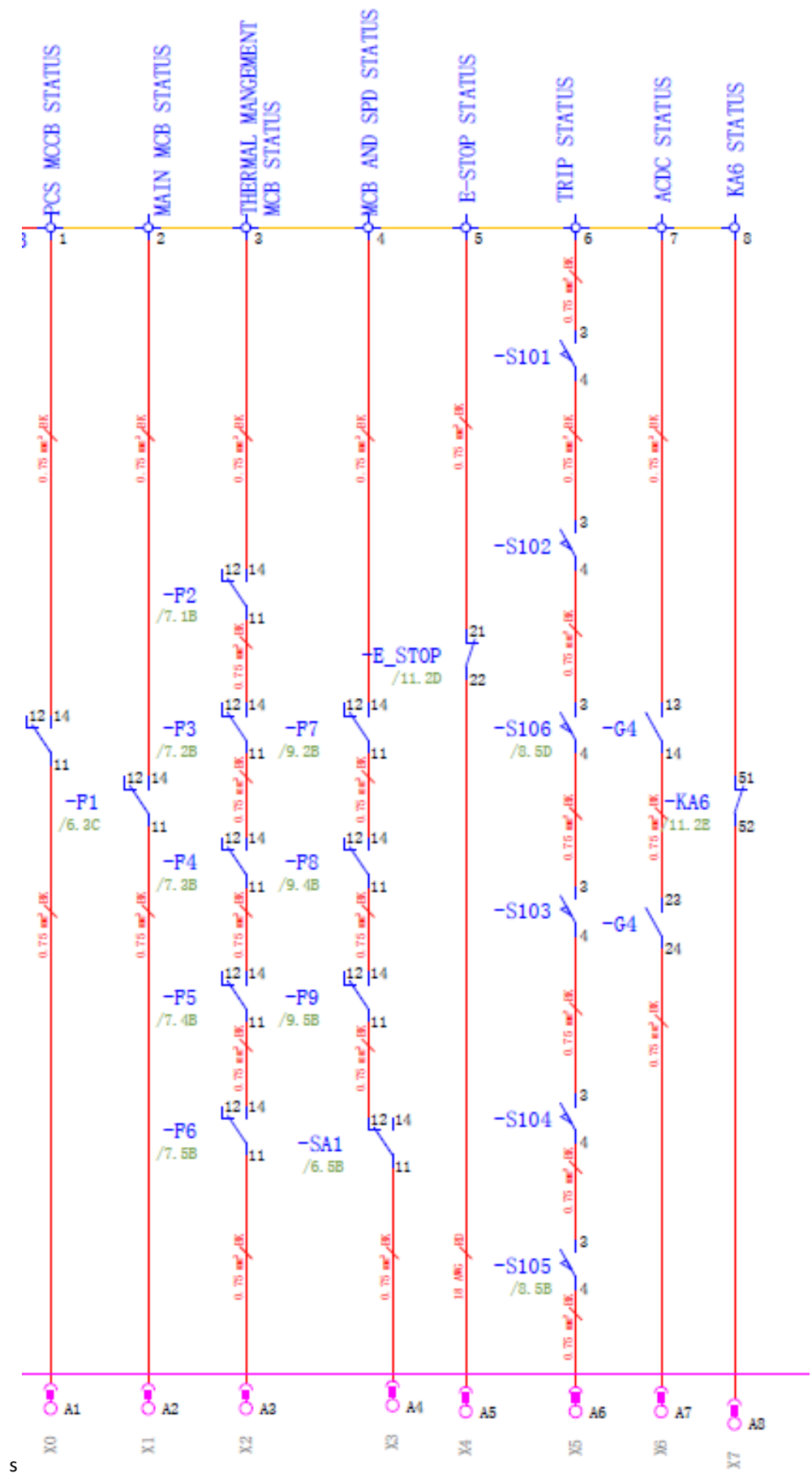


- Connect to customer site 400vac voltage source (3P4W, L1/L2/L3/N).
- Use copper cable conductor cross sectional area:
L1/L2/L3/N: 16~25mm²

Customer site without distribution box:



- Connect to the MCCB using the cable provided (L1/L2/L3/N: 16mm²)



7 Battery MSD installation

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



■ Installation procedure

Step 1. Press latch Push lever unlock Press the button and rotate the push rod up at the same time.



Step 2. Rotate the push rod towards the opposite insert surface. Hearing a click indicates that the putter is in the pre-loaded position.



Step 3. Plug and socket housing should overlap each other.



Step 4. The socket rotation column should be fully inserted into the guide rail, and the clicking sound can be heard at this time.



Step 5. Rotary push rod 90° :

- a. Make sure that the rotating column is all in the guide rail before rotating the push rod; otherwise, the rotating column may break.
- b. Rotate the push rod to the horizontal position, when the push rod is parallel to the mounting surface.



Step 6. Push into CPA. Nudge the red CPA with your hand.



Step 7. Install in place. Installation in place as shown in the following picture.



■ **Remove procedure**

Step 1. Pull back the red CPA.



Step 2. Press latch push lever unlock. Press the button and rotate the push rod up at the same time.



Step 3. Rotate the push rod towards the opposite insert surface. The feeling of a stick in the hand indicates that the putter is in place.



Step 4. Press the plug to unlock the button. Press the plug to unlock the button.



Step 5. Separation completion.



8 Powering up and Shutdown



- The Power CESS 1000 cabinet can only be put into operation after confirmation by a professional and approved by the local power department.
- For Power CESS 1000 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 POWER CESS 1000 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.

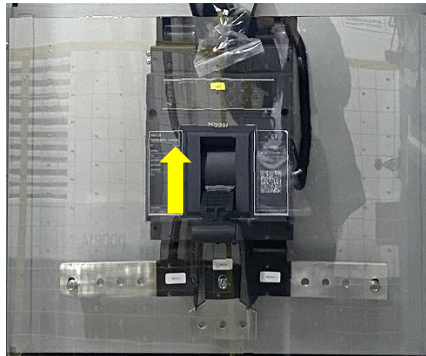
8.2 Powering Up Steps

Step 1 Preparations

- Open the front 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.



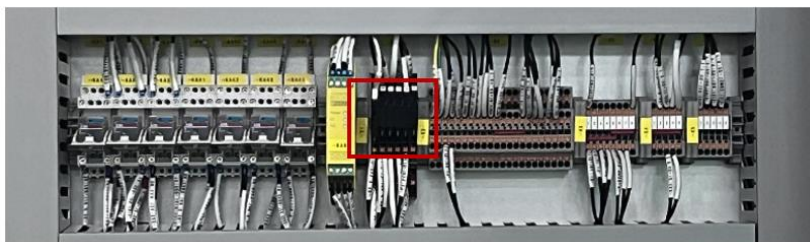
- Close auxiliary micro circuit breaker switch F1.



- Close the micro circuit breaker F2~F9.



- 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 and the LDE2 ACDC loop indicator light of G4 will light up.



- 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.



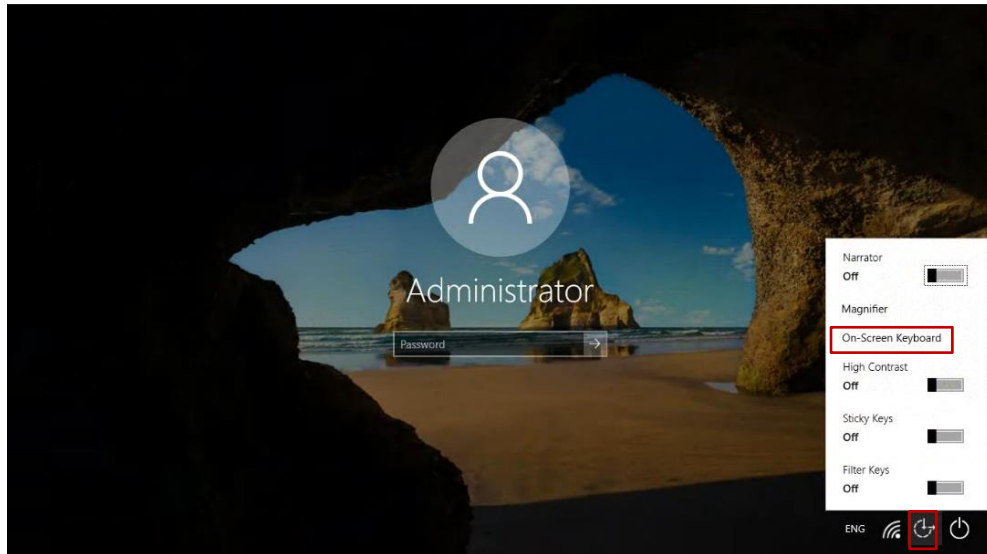
- Turn the isolation switch handle of all PCS clockwise to ON in turn. If the three indicators of the KA4 safety relay light up, it means that the line is normal.



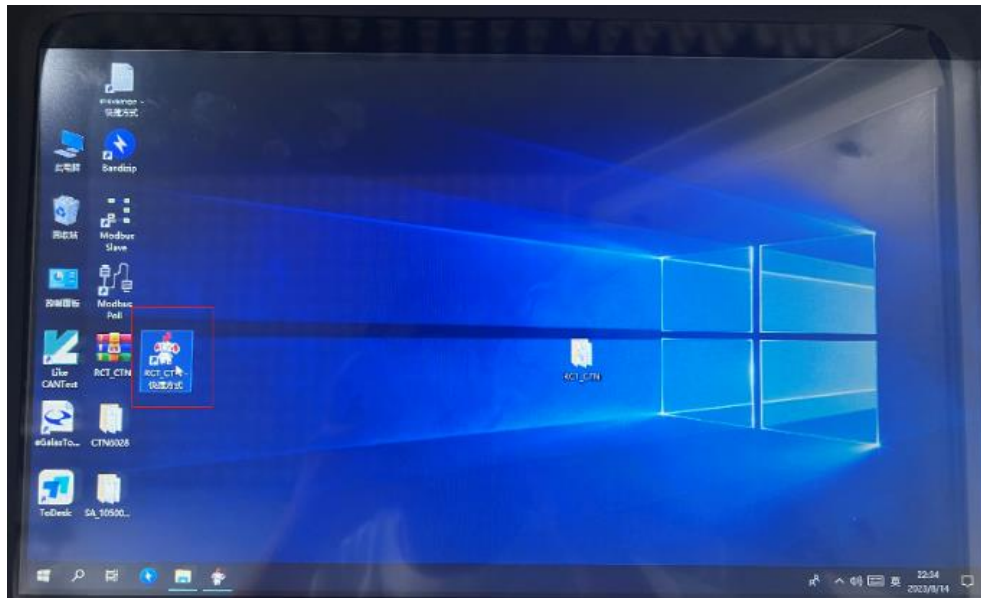
- Close all doors.

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_CTN" 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.

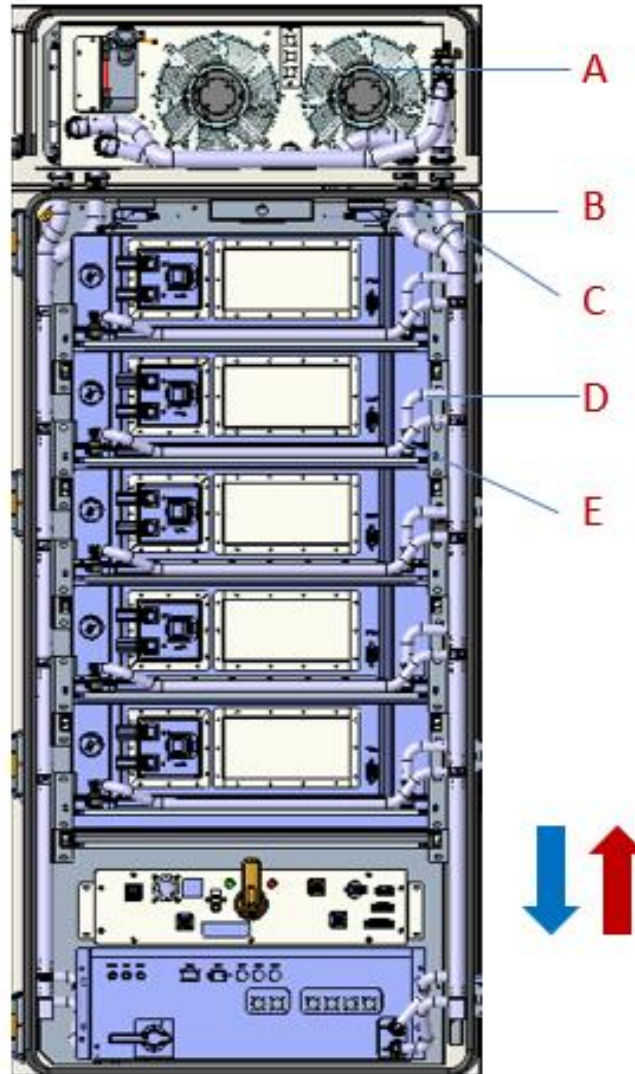
Step 2 Shutdown the cabinet

- 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~F9.
- 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.



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.

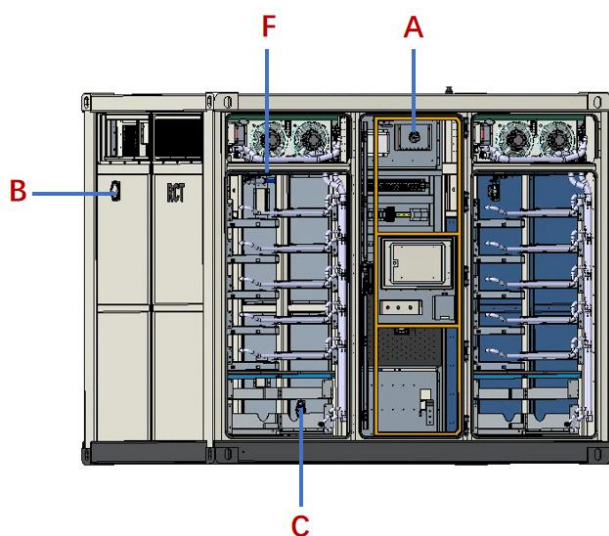
10.2 Fire Suppression Equipment

The Power CESS 1000 cabinet has an aerosol fire suppression system that can effectively extinguish the fire. It is equipped with composite 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.

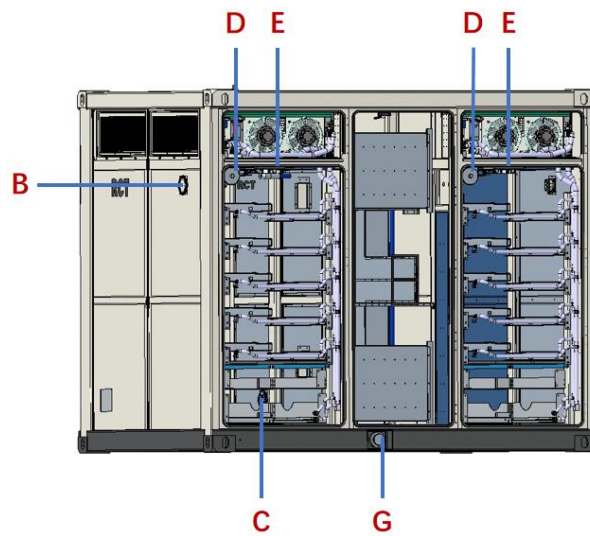


NOTICE

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



Front and Left View

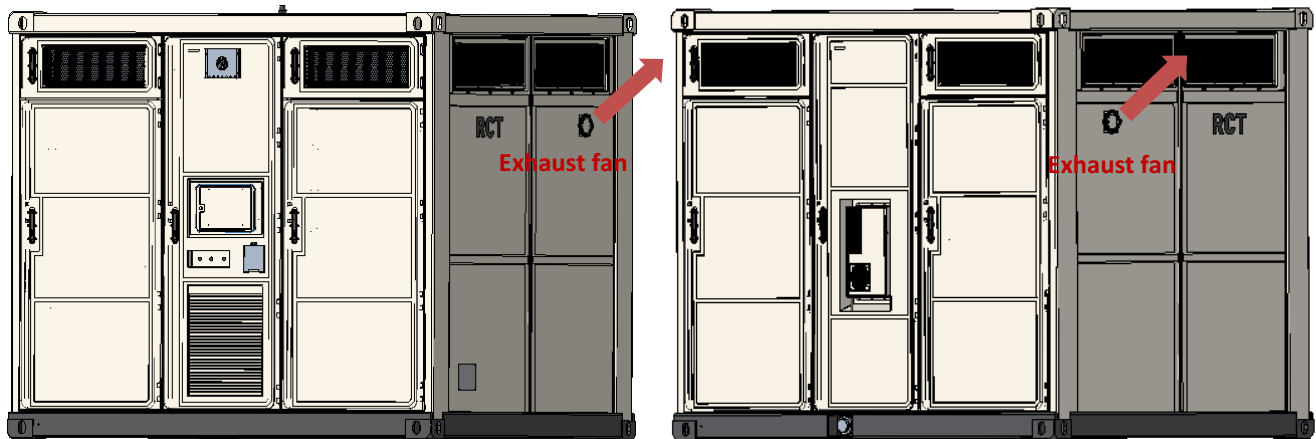


Back and Right View

Item	Description
A	Strobe and siren
B	Explosion proof valve, with fan
C	Explosion proof valve, without fan
D	Aerosol fire suppression generator
E	Composite detector
F	Dry pipe and sprinkler
G	Water inlet

10.3 Exhaust System

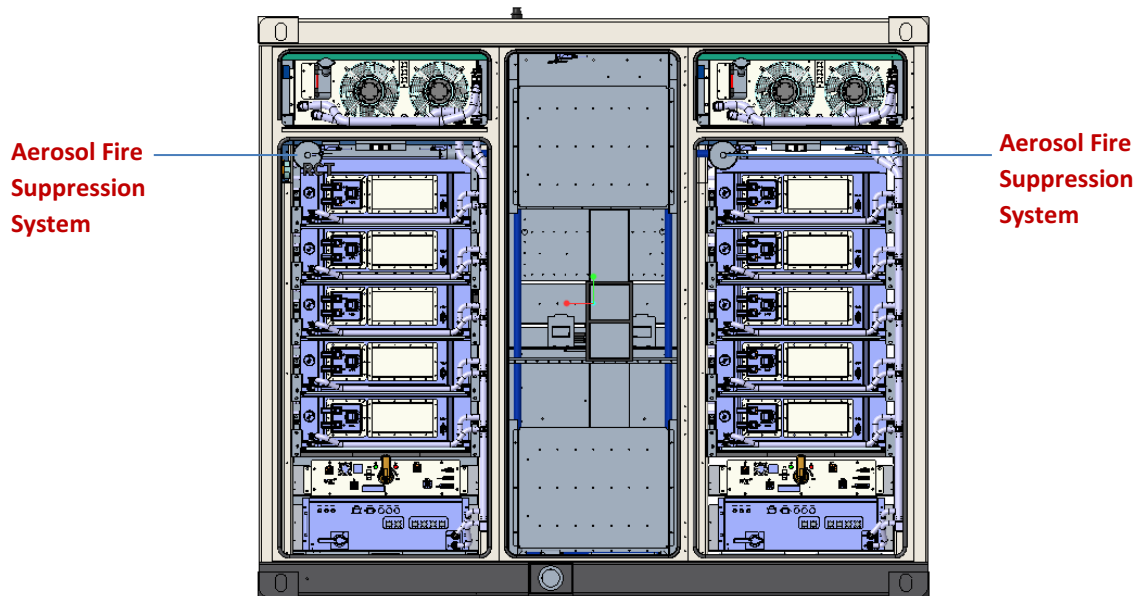
When the concentration of combustible gas is detected to reach setting value, the combustible gas detector in the cabinet sends a signal to the EMS for fire warning, while the signal is transmitted to the EMS to shut down the system and turn on the exhaust system (start the air intake equipment and exhaust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



10.4 Aerosol Fire Suppression System

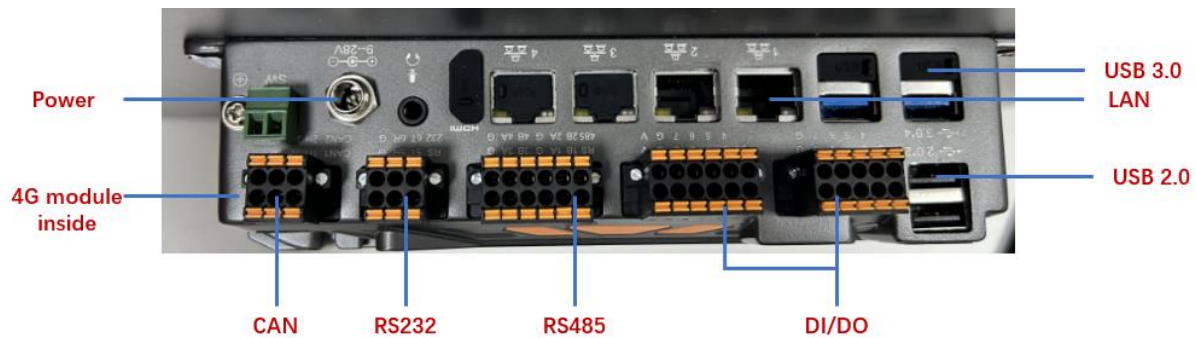
The Power CESS 1000 cabinet is equipped with an aerosol fire suppression system. Aerosol generators are automatic units which are thermally activated. The aerosol fire suppression system is automatically activated when the smoke and temperature detector reach the setting threshold.

Note: Fire aerosol can only be wired after on-site installation and testing.



11 EMS Instruction

11.1 Touch panel interface

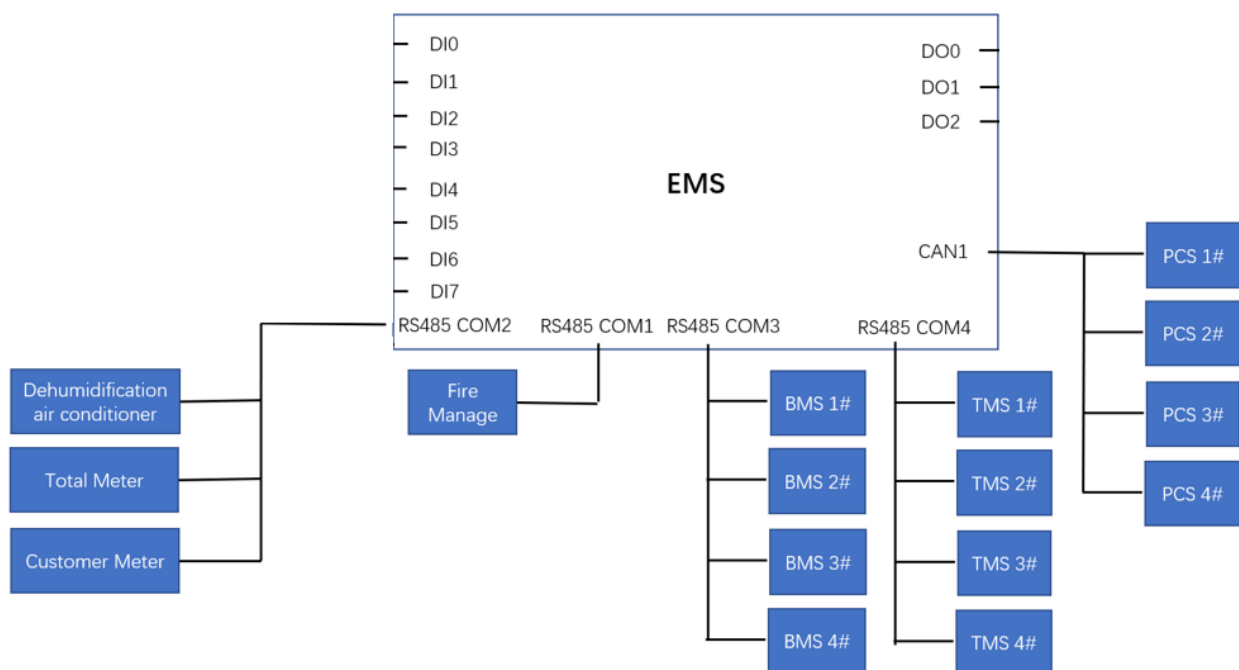


■ 4G Module:

Wireless Operating Band:

NO.	Description
1	GSM 900/1800 MHz: 33 ±dBm
2	WCDMA B1/8: 23 ±dBm
3	LTE B1/3/7/8/20/28/38/40: 23 ±dBm

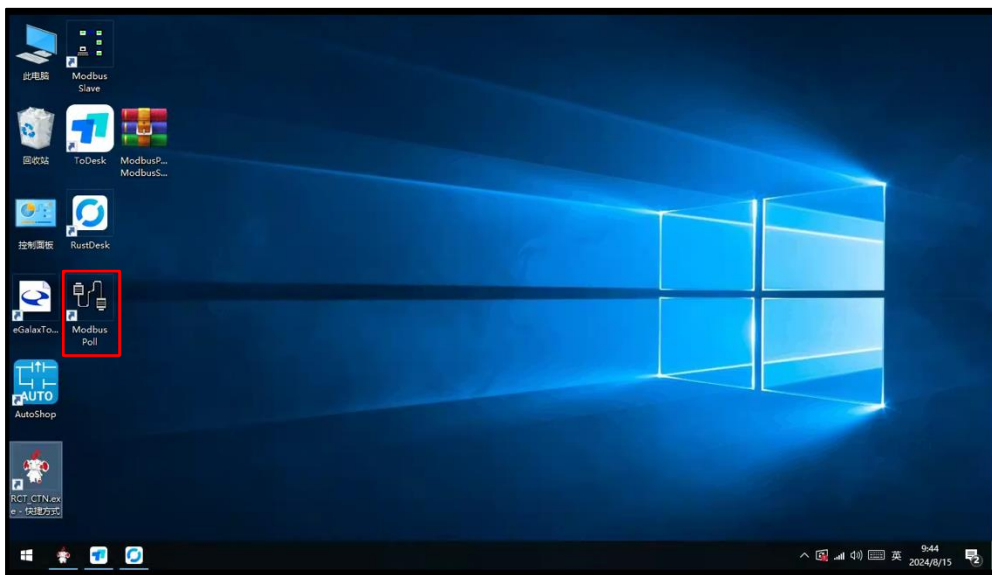
11.2 System chart



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: COM2;

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

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

Slave ID: 2;

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) Meter

■ ADL400 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: 1;

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

Address: Select according to PCS manual; address: 0;

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

■ ADL100 Connection Setup (As shown in figure 3)

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;

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

Address: Select according to PCS manual; address: 0;

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

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;

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

Address: Select according to PCS manual; address: read 2001, write 3001;

Quality: Fill in as needed (Default 10); read: 18, write: 1.

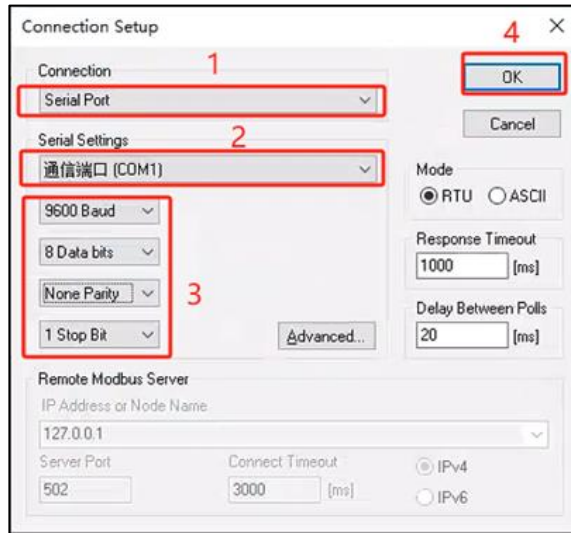


Figure 1

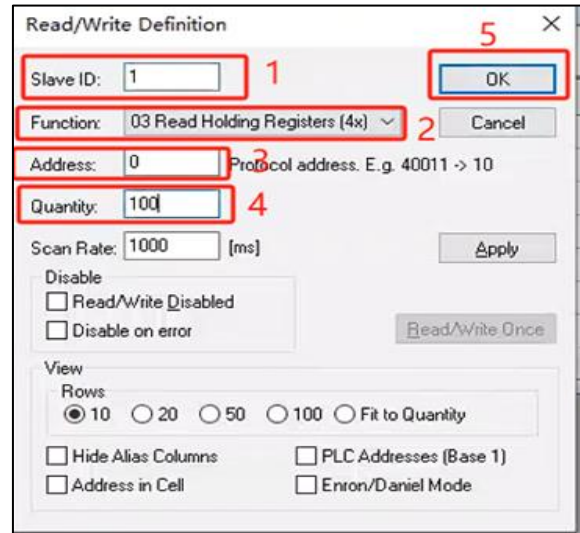


Figure 2

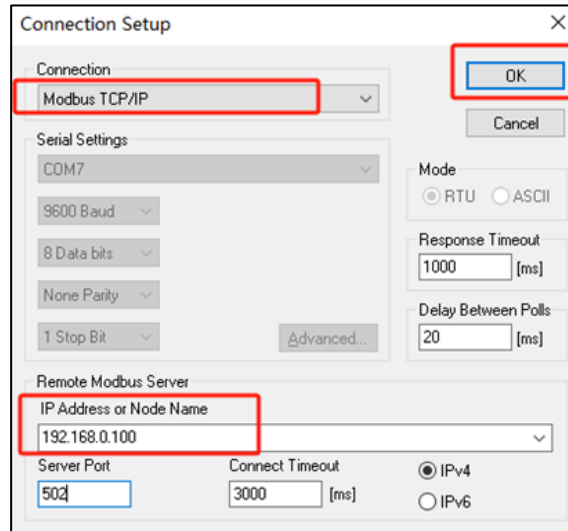
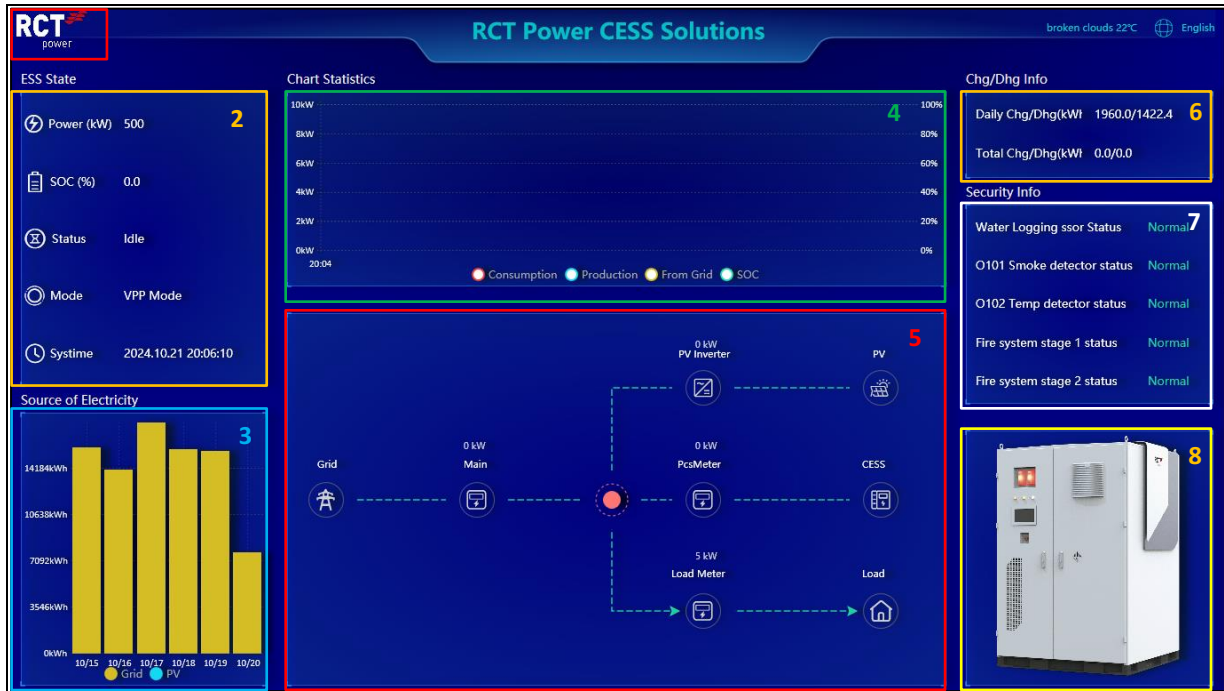


Figure 3

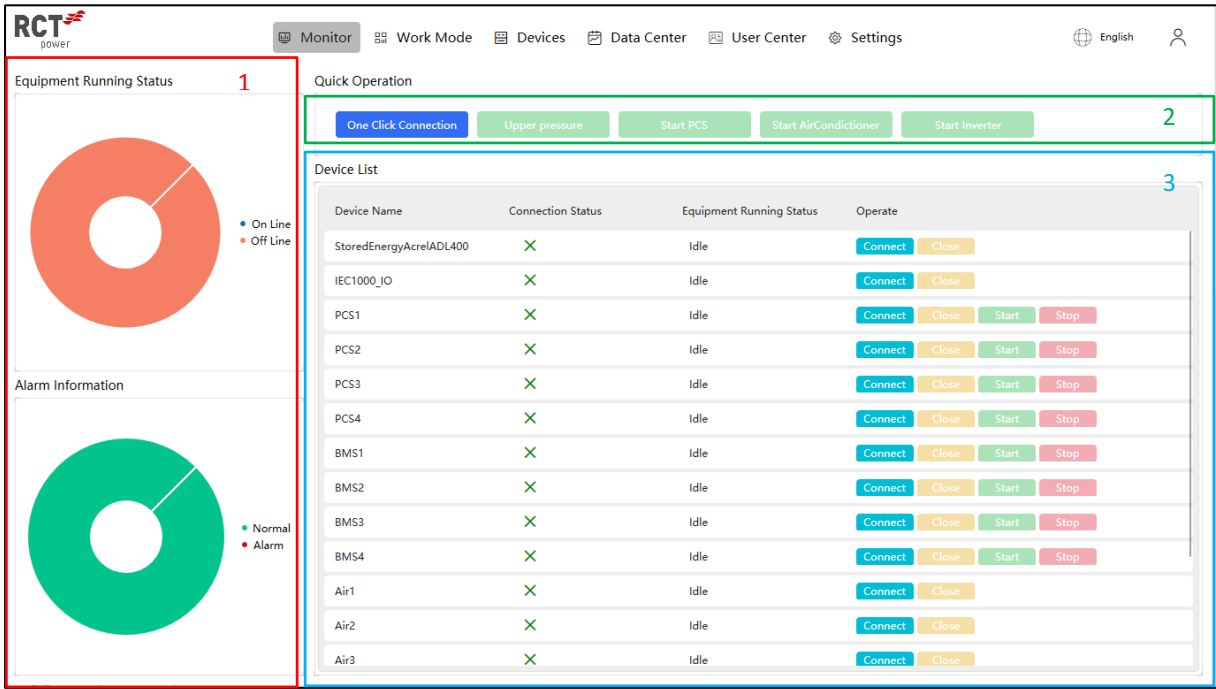
Note: The above communication settings are for reference only, and the specific settings depend on the project location.



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 Systeime. |
| 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**

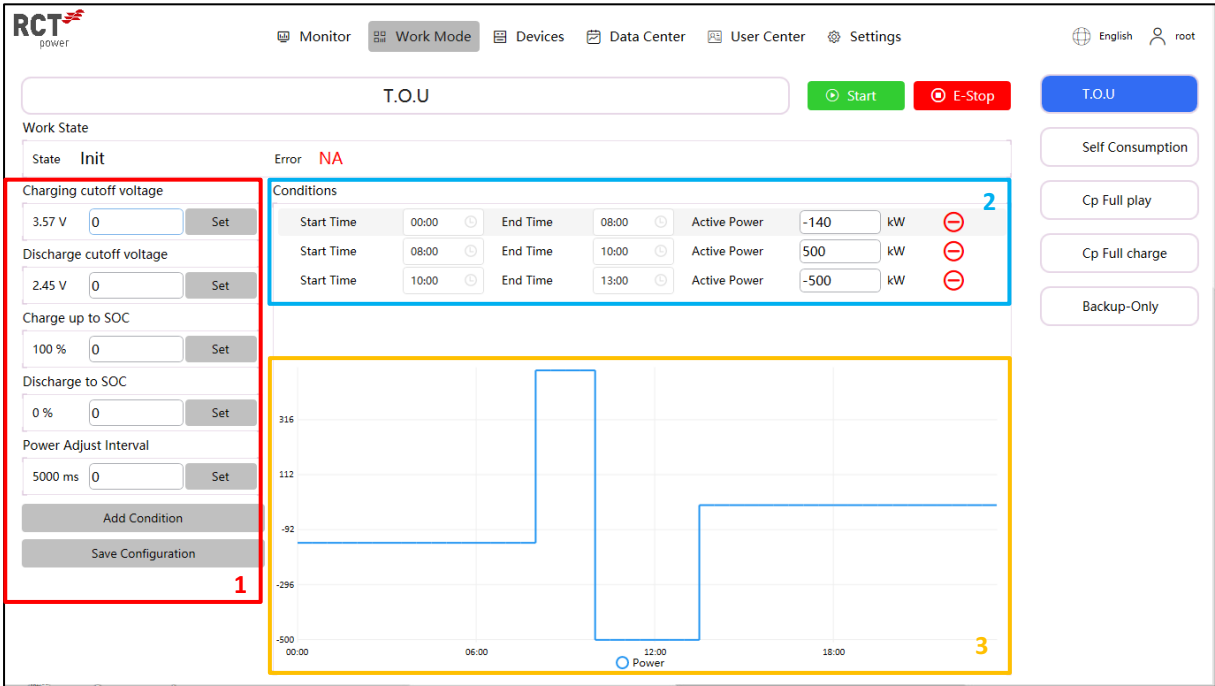
The device list contains all the communication devices of CESS 1000. You can operate the devices, and observe the running status and connection status of devices (as shown below).

Device List			
Device Name	Connection Status	Equipment Running Status	Operate
StoredEnergyAcreADL400	✕	Idle	Connect Close
IEC1000_IO	✕	Idle	Connect Close
PCS1	✕	Idle	Connect Close Start Stop
PCS2	✕	Idle	Connect Close Start Stop
PCS3	✕	Idle	Connect Close Start Stop
PCS4	✕	Idle	Connect Close Start Stop
BMS1	✕	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.

11.6.2 Self Consumption

The screenshot shows the 'Self Consumption' configuration page in the RCT power management system. The top navigation bar includes 'Monitor', 'Work Mode' (selected), 'Devices', 'Data Center', 'User Center', and 'Settings'. The user is logged in as 'root' in 'English'. The main title is 'Self Consumption'. Below it, there are 'Start' and 'E-Stop' buttons. The 'Work State' section shows 'State: Init' and 'Error: NA'. There are three input fields with 'Set' buttons: 'Charging cutoff voltage' (3.57V), 'Discharge cutoff voltage' (2.75V), and 'Power Adjust Interval' (5000ms). On the right side, there are buttons for 'T.O.U', 'Self Consumption' (highlighted in blue), 'Cp Full play', 'Cp Full charge', and 'Backup-Only'.

Step 1: Click “Work Mode” button->Click “Self Consumption” 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;
Power Adjust Interval	The default value is 5000 ms, not less than 1000 ms;

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.

11.6.3 Backup-Only

The screenshot shows the 'Backup-Only' configuration page in the RCT power management system. The top navigation bar is the same as the previous screenshot. The main title is 'Backup-Only'. Below it, there are 'Start' and 'E-Stop' buttons. The 'Work State' section shows 'State: Init' and 'Error: NA'. There are five input fields with 'Set' buttons: 'Backup battery SOC' (0%), 'SOC fluctuation range' (0%), 'Charging cutoff voltage' (3.57 V), 'Charge power' (0 kW), and 'Backup-Only' (highlighted in blue). On the right side, there are buttons for 'T.O.U', 'Self Consumption', 'Cp Full play', 'Cp Full charge', and 'Backup-Only'.

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

Step 2: Enter parameters in the and click the corresponding 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.

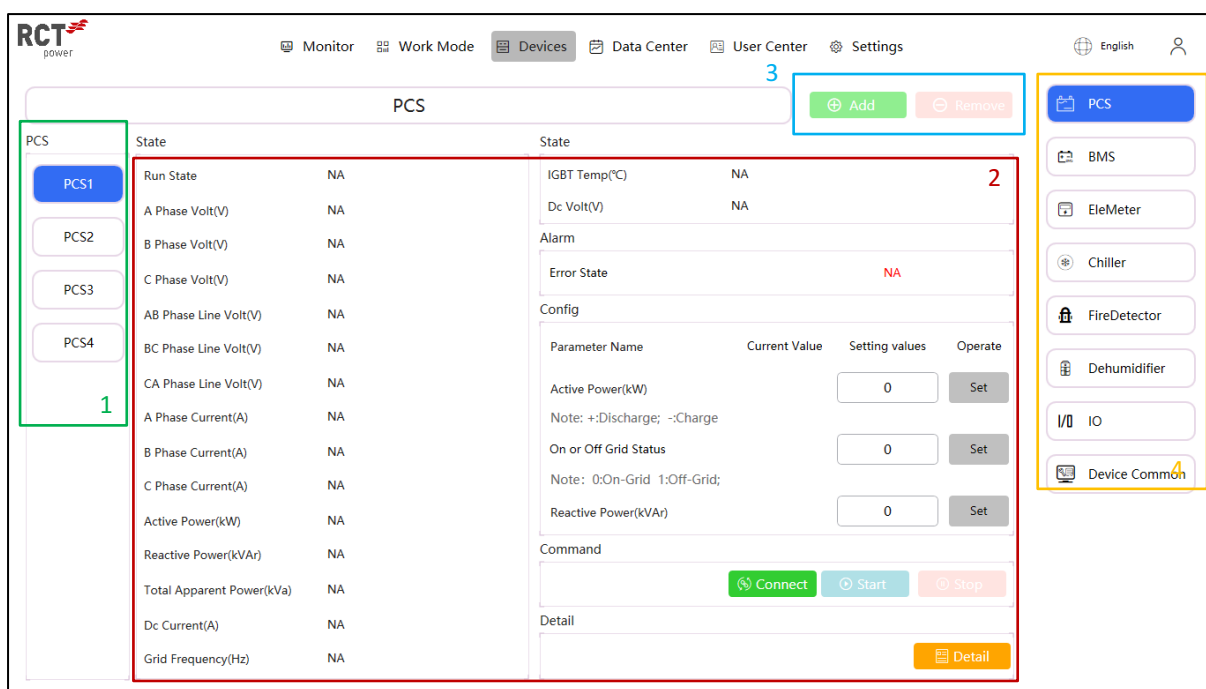
Step 3: Click  button, observe that the “work state” changes from “Init” to “Discharge” or “Charge”.

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

11.7 Devices

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

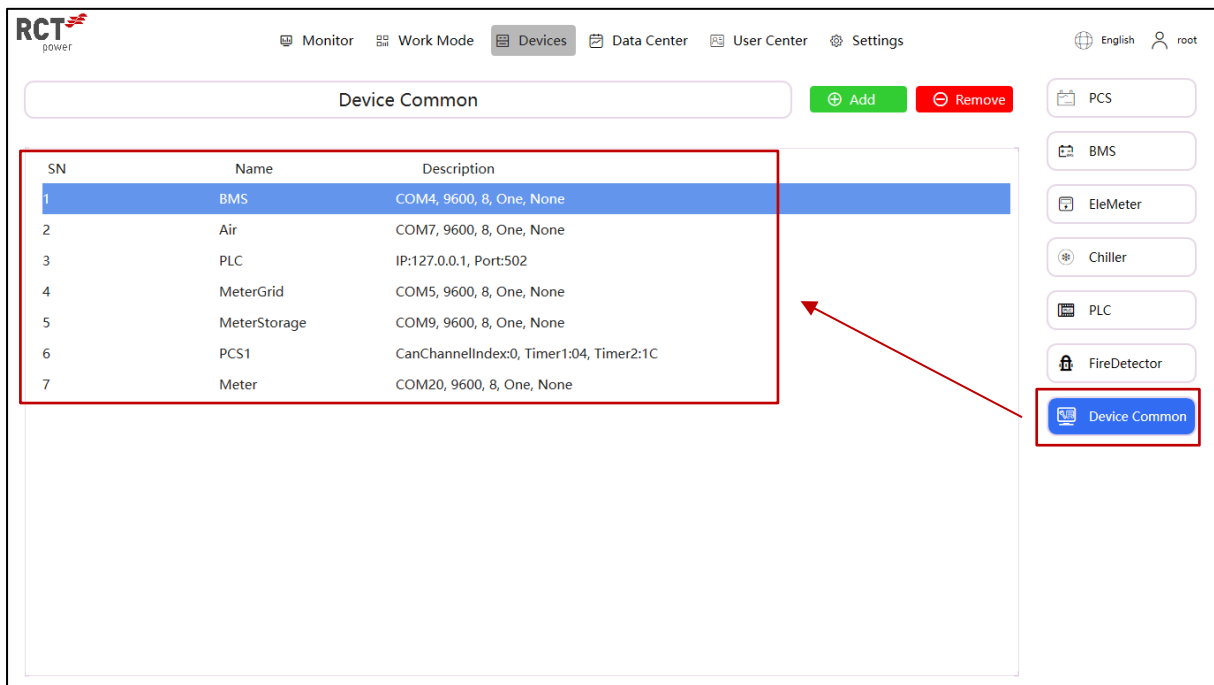
1. Device List.
2. General status of the device.
3. Device add and remove buttons.
4. Device navigation.



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

■ Add Device

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).

Example: To add PCS, click the drop-down box to select PCS device.

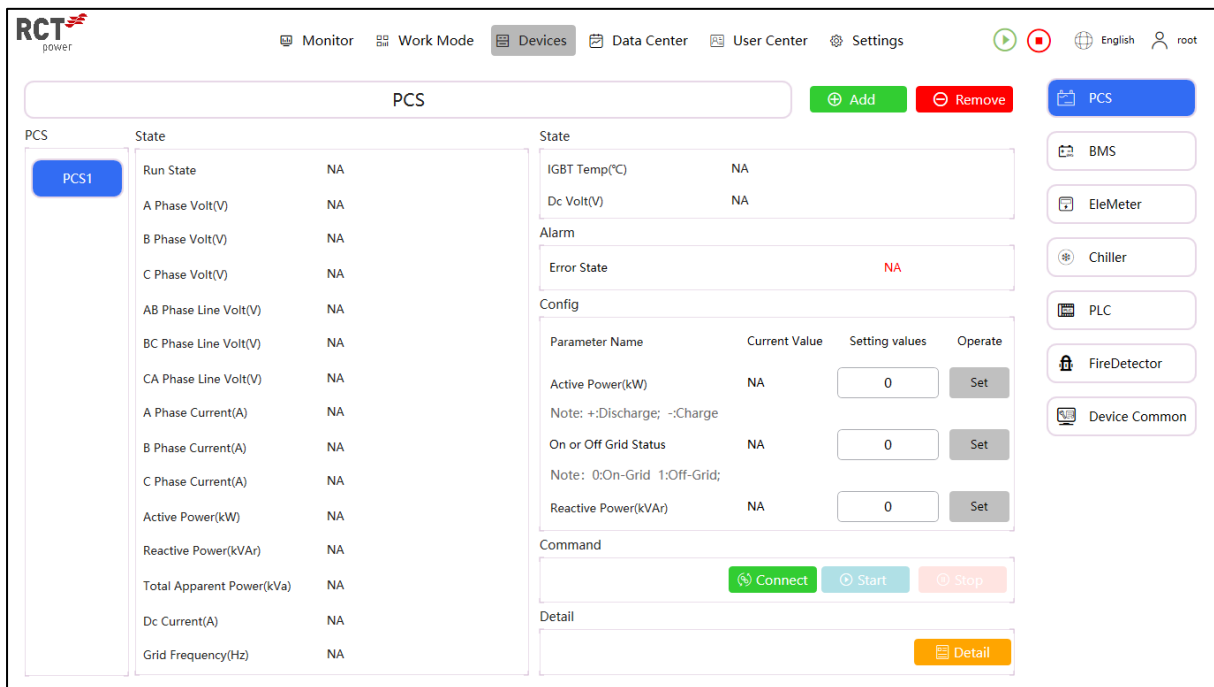
Device Name: PCS1

Device Index: 1

Communication Name: PCS

Cancel OK

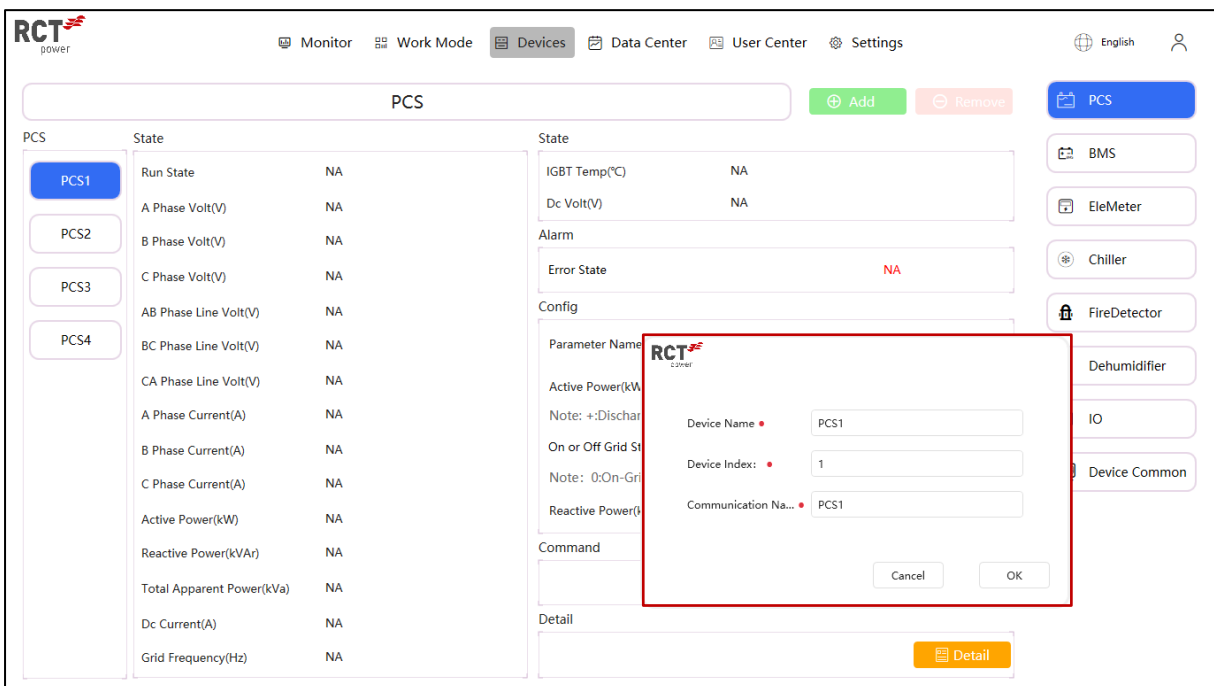
Step 3: Click  OK button to generate a PCS button in the device list area.



■ 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 .

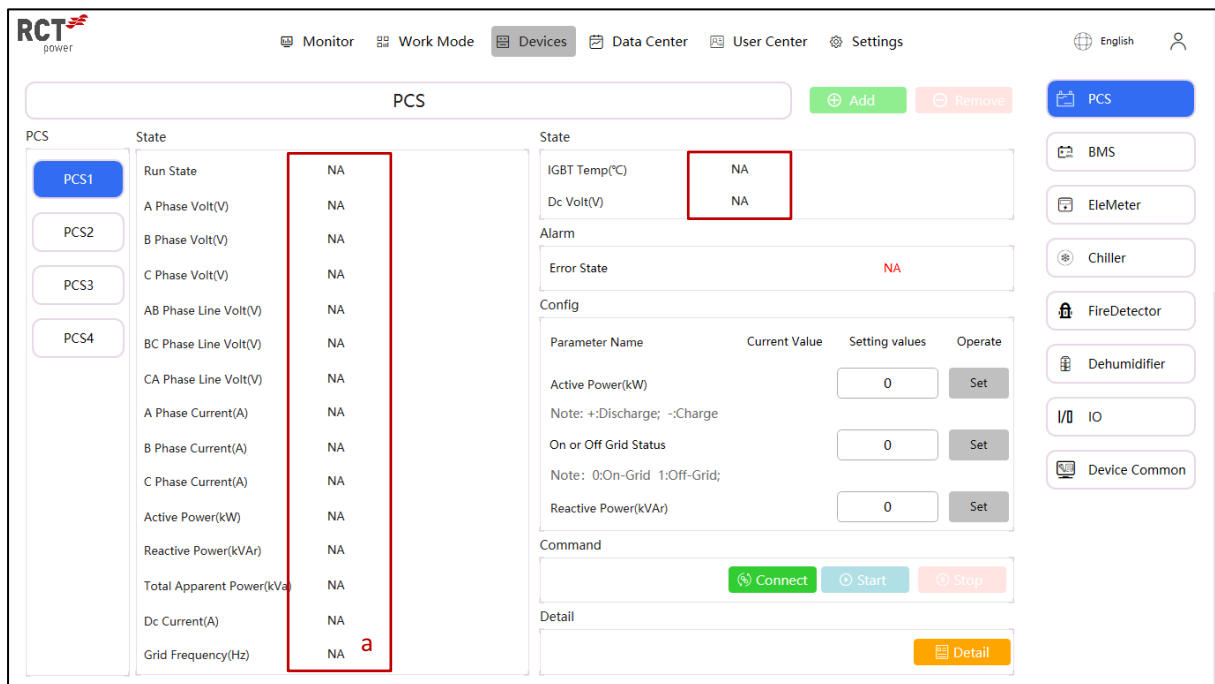
The command button allows sequential conditions: Connect -> Start -> Stop.

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



Run Mode	Environment Temp (°C)	Alarm
Water Level Switch	Backwater Temp (°C)	Compressor1 State
Remote Test	Effluent Temp (°C)	Fréquence Cible Du Compre
High Pressure State1	Backwater Sensor (kPa)	Compressor Operating Freq
Water Pump Status	Effluent Pressure Sensor (kPa)	Compressor Bus Volt (V)
Internal Fan1 State	Electric Control Box Temp (°C)	Compressor IPM Temp (°C)
Internal Fan2 State	Inhale Pressure (kPa)	Compressor Phase Current (
Internal Fan3 State	Inhale Saturated Temp (°C)	Electron Expansion Open
High Pressure State2	Inhale Temp (°C)	Pump Phase Current (A)
Electric Heating State	Inhale Super Heat (K)	Actual Speed Of Pump (Hz)
Water Replenishment Pump	Exhaust Pressure (kPa)	IPM Temp Of The Pump (°C)
Cooling Fan State1	Exhaust Saturation Temp (°C)	Target Speed Of Pump (Hz)
Cooling Fan State2	Exhaust Temp (°C)	Water Pump Device
Crankshaft Heating State1	Exhaust Superheat (K)	Compressor Device Fault1
Crankshaft Heating State2	Fan Gear	Compressor Device Fault2
Main Waterway Solenoid Valve	Fan Speed1 (%)	Fan Device Fault
Free Cooling Solenoid Valve	Fan Speed2 (%)	
Electric Control Box Cooling Fan	Fan Speed3 (%)	
Alarm		

11.7.1 PCS



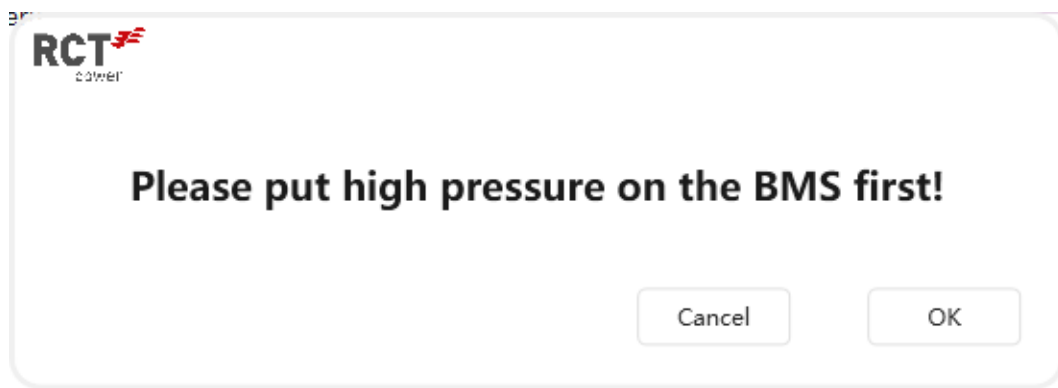
PCS	State
PCS1	Run State
PCS2	A Phase Volt(V)
PCS3	B Phase Volt(V)
PCS4	C Phase Volt(V)
	AB Phase Line Volt(V)
	BC Phase Line Volt(V)
	CA Phase Line Volt(V)
	A Phase Current(A)
	B Phase Current(A)
	C Phase Current(A)
	Active Power(kW)
	Reactive Power(kVAr)
	Total Apparent Power(kVA)
	Dc Current(A)
	Grid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

■ Device Communication

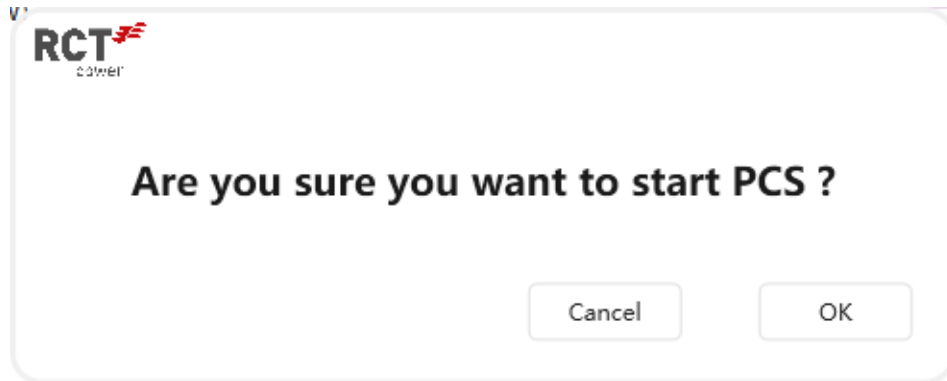
Click  button, observe that the value displayed on the “State” changes from "NA" to the specific value, indicating that the communication is successful.

■ 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.



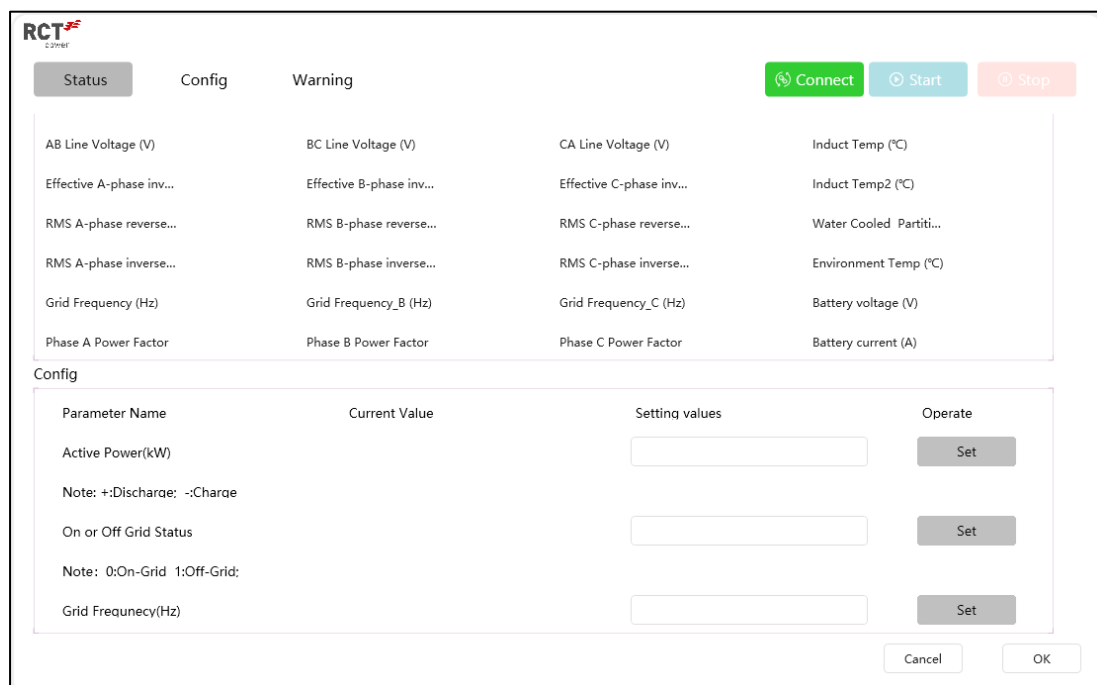
Step 3: Observe the "Run State" changes from "Standby" to "Run", the PCS is successfully started.

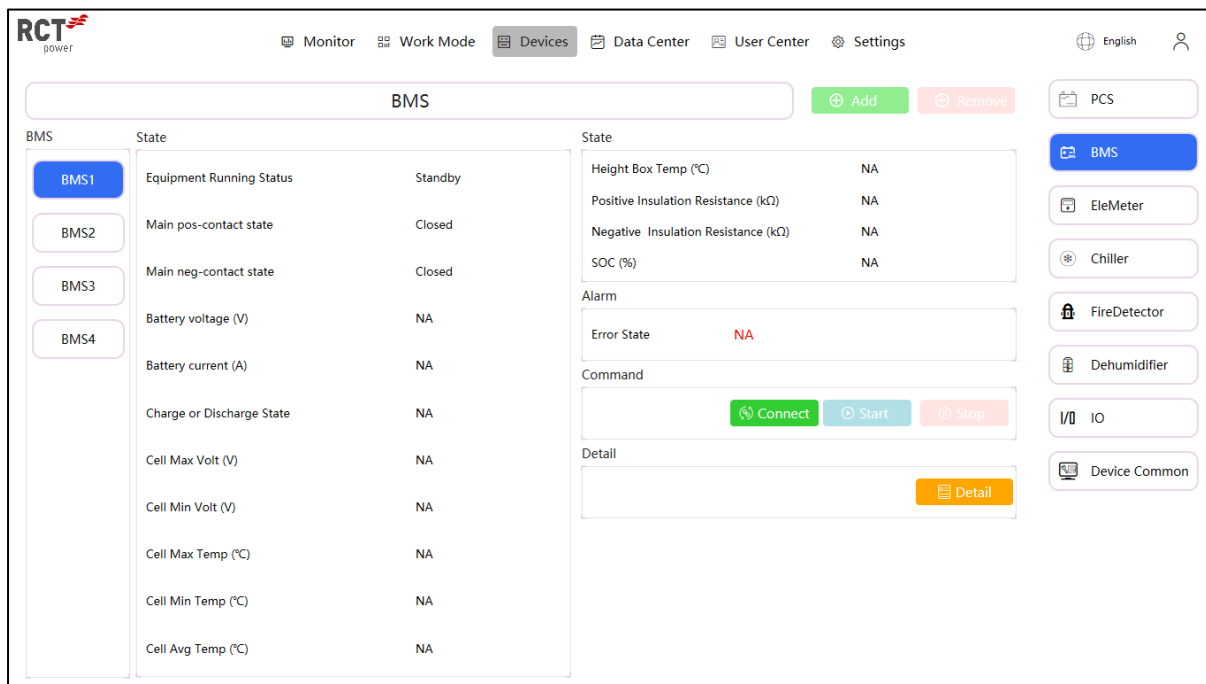
■ Stop PCS

Click the  button and the PCS will stop.

■ Detail

Click  button to view the device status and warning information.



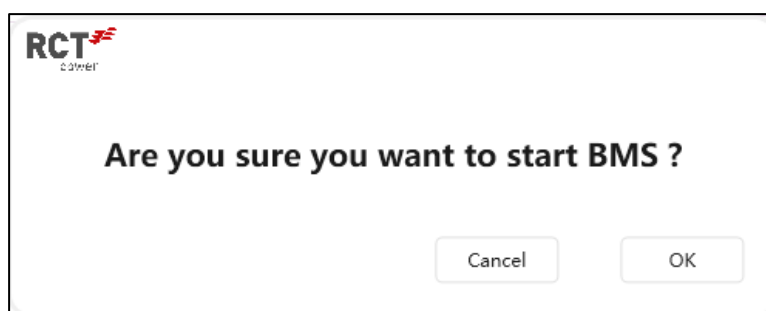


■ Device Communication

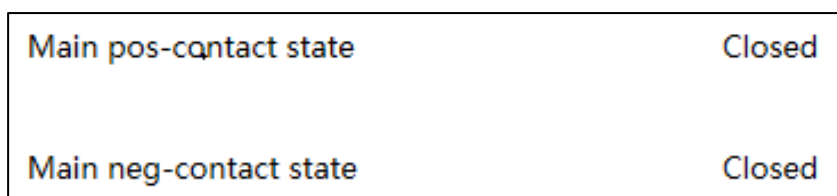
Click  button, observe that the value displayed on the “State” changes from "NA" to the specific value, indicating that the communication is successful.

■ 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".

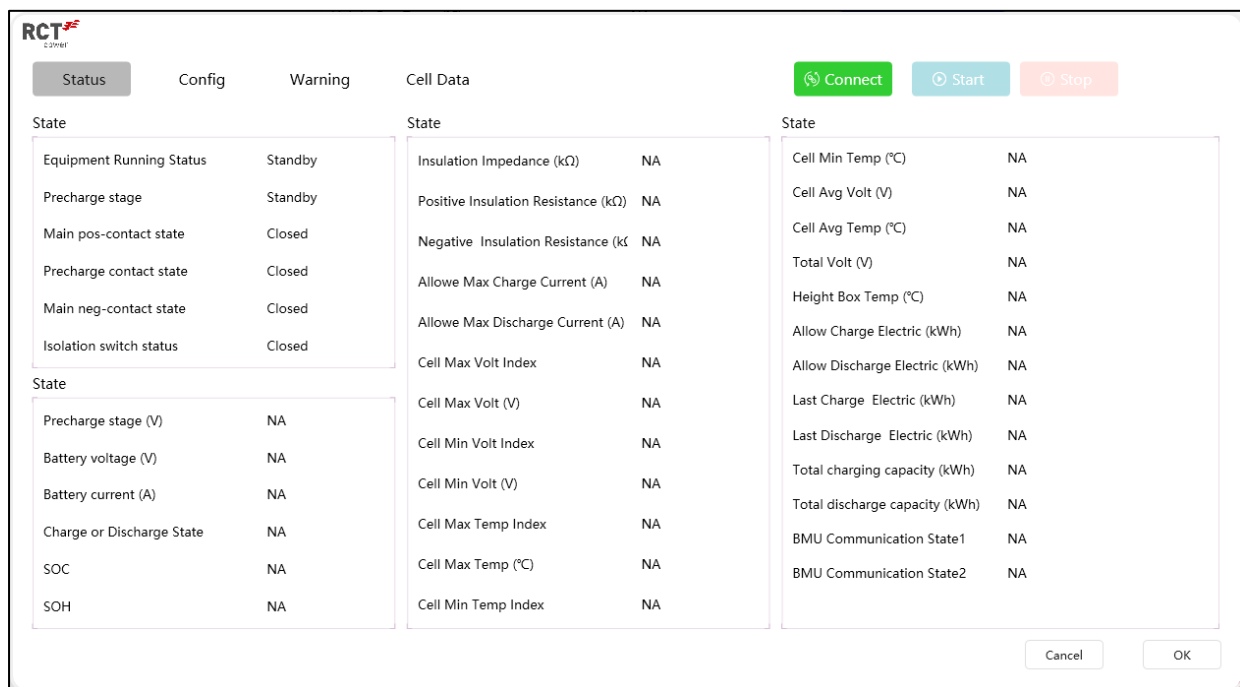


■ Disconnect the DC high volt:

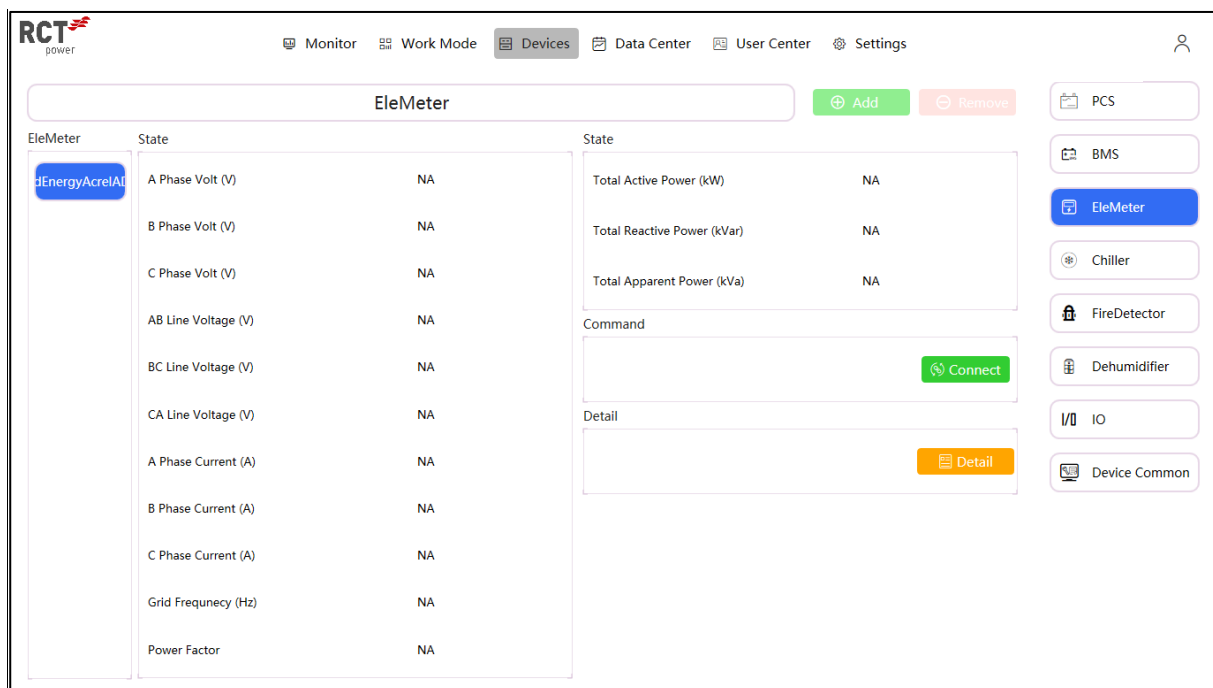
Click the  button and Observe “Main pos-contact State” and “Main neg-contact state” change from "Close" to "Open".

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

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	Total Found Active Po...	Total Harm Reactive Po...

Config

Parameter Na	Current Value	Setting values	Operate
Volt Ratio(PT)			Set
Current Ratio(			Set

Cancel
OK

11.7.4Chiller



Monitor
Work Mode
Devices
Data Center
User Center
Settings

English

Chiller

Add
Remove

Chiller

Air1

Air2

Air3

Air4

Actual WorkMode

Outdoor Temp(°C)

Effluent Temp(°C)

Backwater Temp(°C)

Effluent Pressure Sensor(kPa)

Backwater Sensor(kPa)

NA

NA

NA

NA

NA

NA

Alarm

Error State

OFF

Command

Connect
Start
Stop

Detail

Detail

PCS

BMS

EleMeter

Chiller

FireDetector

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 Fire Detector

RCT

power

Monitor

Work Mode

Devices

Data Center

User Center

Settings

English

FireDetector

Add

Remove

FireDetector

State

NqnFire	CO	NA
	Temperature (°C)	NA
	Start Switch State	NA
	EStop Switch State	NA
	Delay Remain Time	NA

Alarm

Error State

Command

Connect

Detail

Detail

PCS

BMS

EleMeter

Chiller

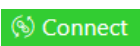
FireDetector

Dehumidifier

I/O IO

Device Common

■ 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 alarm information.





State	Alarm
Device State •	Manual analog alarm ☐
System Status •	Quick-Start ☐
VOC • 0	Quick-Stop ☐
Temperature(°C) • 0	Manual Mode ☐
Co • 0	Feedback Signal ☐
H2 • 0	Sensor Fault ☐
Smog(ppm) •	Sound and light alarm ☐
GridState •	Temperature Alarm ☐
FanCondition •	Smog Alarm ☐
	CO Alarm ☐
	H2 Alarm ☐
	VOC Alarm ☐
	Level1 Alarm ☐
	Level2 Alarm ☐

11.7.6 Dehumidifier



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

[English](#)


Dehumidifier

Dehumidifier	State	Alarm
dehumidifierSDC	WorkingState NA	Error State
	Humidity (%RH) NA	Command
	Temperature (°C) NA	Connect
	HeatingState NA	Detail
	AutomaticDehumidifyingHandSwitch NA	Detail

PCS

BMS

EleMeter

Chiller

FireDetector

Dehumidifier

IO

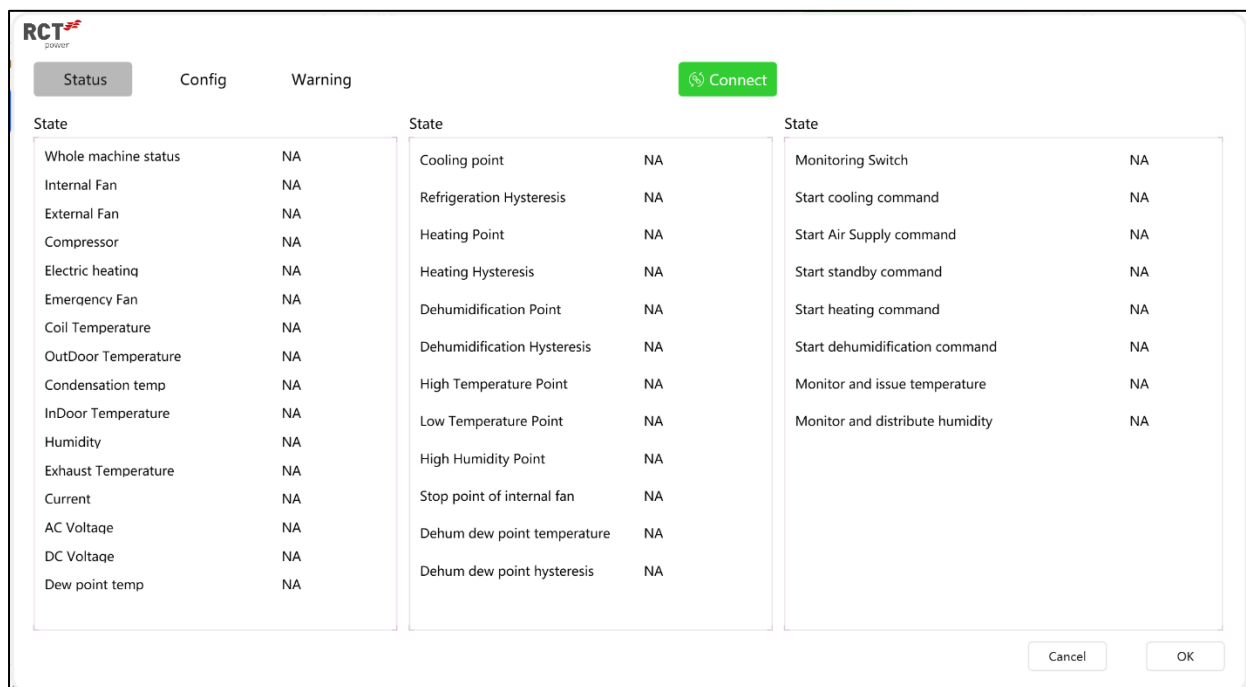
Device Common

■ Device Communication

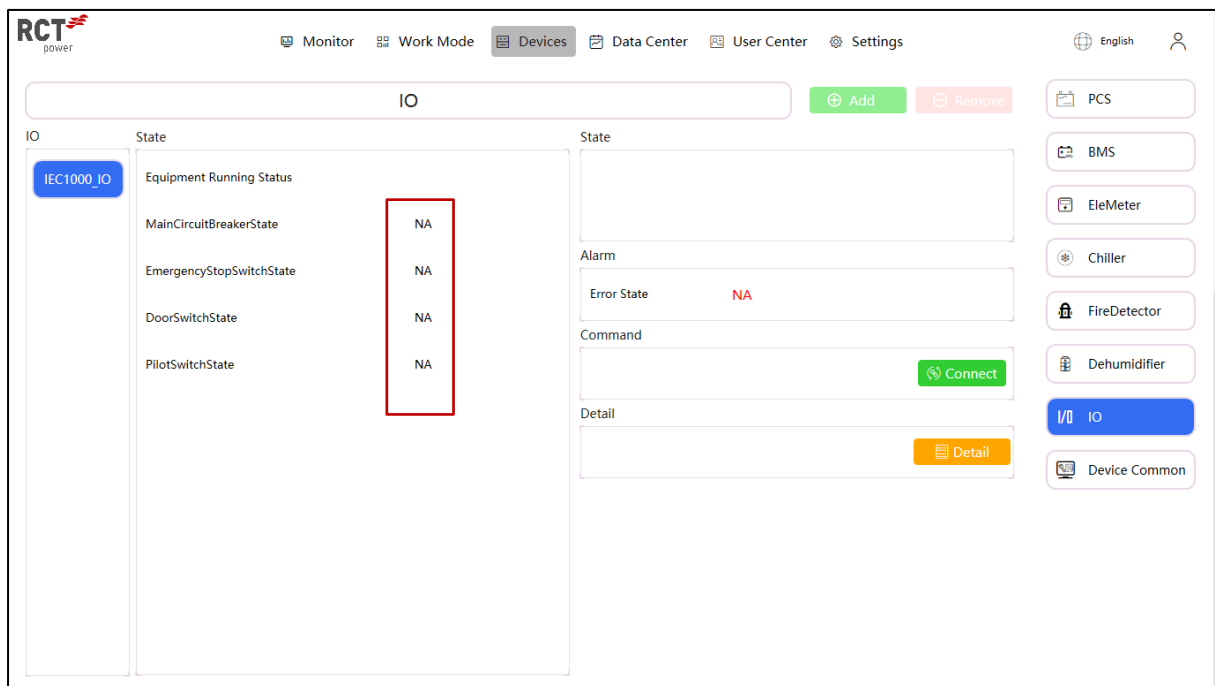
Click  button, observe that the value displayed on the “State” changes from "NA" to the specific value, indicating that the communication is successful.

■ Detail

Click  button to view the device status.



11.7.7 IO

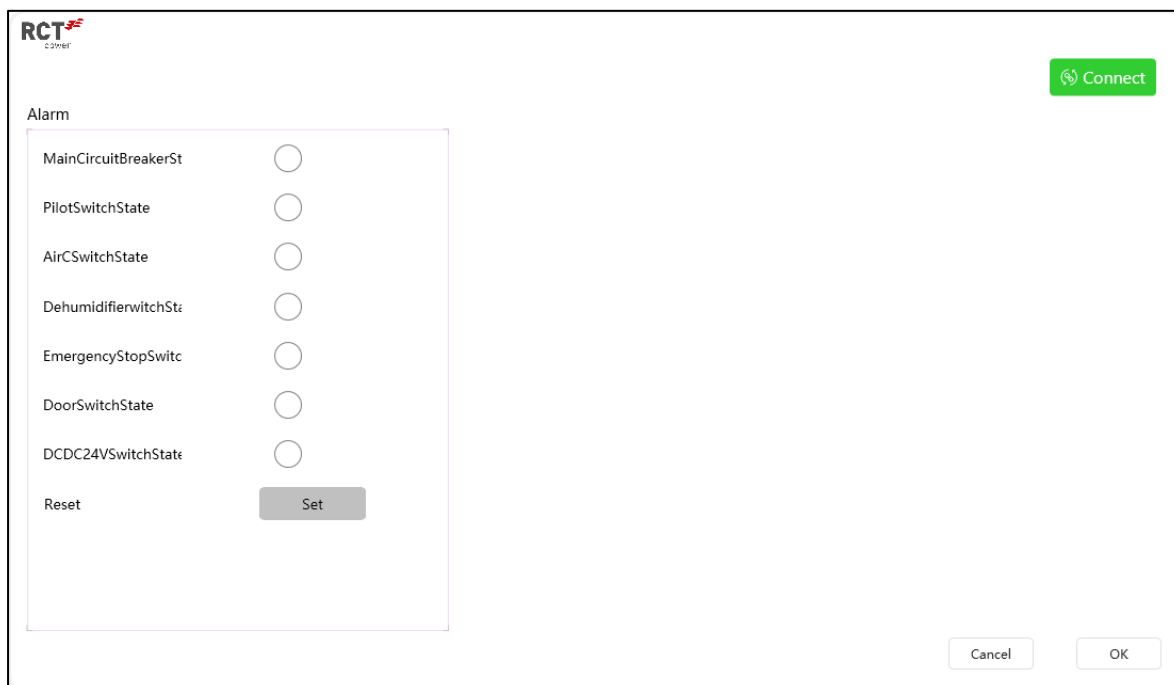


■ Device Communication

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.



RCT power

Alarm

MainCircuitBreakerSt ☐

PilotSwitchState ☐

AirCSwitchState ☐

DehumidifierwitchSt ☐

EmergencyStopSwitc ☐

DoorSwitchState ☐

DCDC24VSwitchState ☐

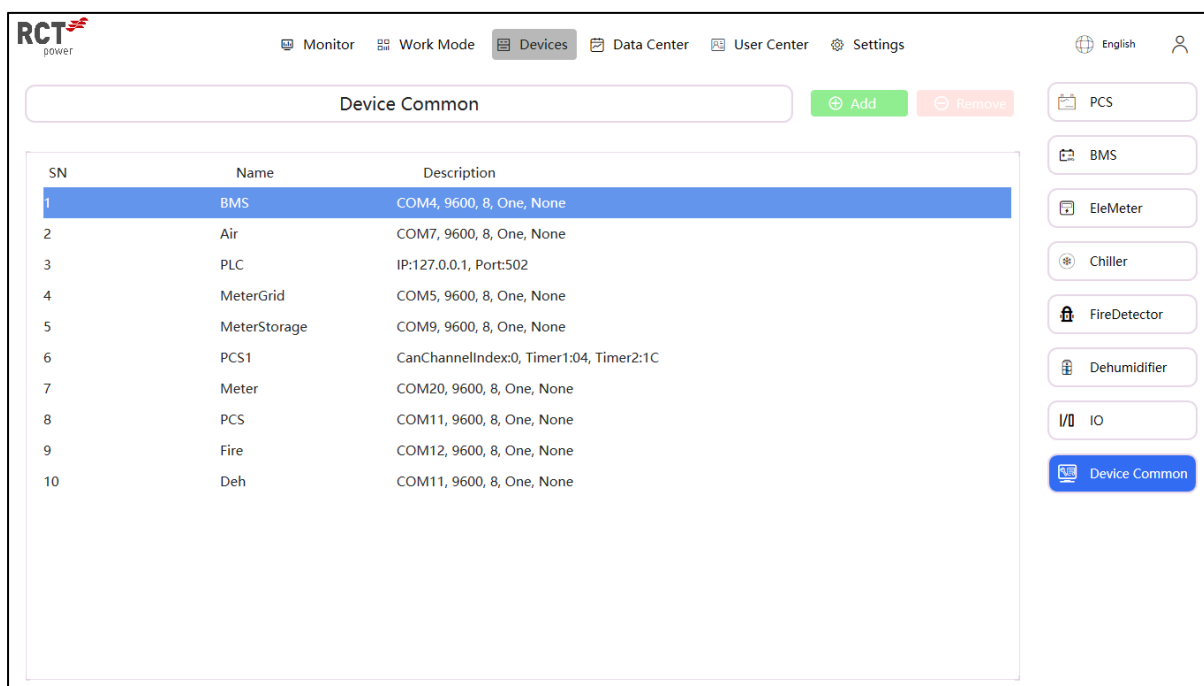
Reset

11.7.8 Device Common

Use an administrator account to add or remove communication devices.

To add communication devices;

To remove communication devices.



RCT power

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

English

Device Common

SN	Name	Description
1	BMS	COM4, 9600, 8, One, None
2	Air	COM7, 9600, 8, One, None
3	PLC	IP:127.0.0.1, Port:502
4	MeterGrid	COM5, 9600, 8, One, None
5	MeterStorage	COM9, 9600, 8, One, None
6	PCS1	CanChannelIndex:0, Timer1:04, Timer2:1C
7	Meter	COM20, 9600, 8, One, None
8	PCS	COM11, 9600, 8, One, None
9	Fire	COM12, 9600, 8, One, None
10	Deh	COM11, 9600, 8, One, None

PCS BMS EleMeter Chiller FireDetector Dehumidifier IO Device Common

■ PCS communication configuration



Communication Name: PCS

Communication Type: ModbusRTU

Port Name: COM1

Baud Rate: 9600

Data Bits: 8

Parity: None

Stop Bits: One

Cancel OK

■ BMS communication configuration



Communication Name: BMS

Communication Type: ModbusRTU

Port Name: COM2

Baud Rate: 9600

Data Bits: 8

Parity: None

Stop Bits: One

Cancel OK

■ Air Conditioner communication configuration

The screenshot shows the 'RCT Configurator' dialog box. The 'Communication Name' field is set to 'AirConditioner'. The 'Communication Type' is 'ModbusRTU'. The 'Port Name' is 'COM4'. The 'Baud Rate' is '9600'. The 'Data Bits' are '8'. The 'Parity' is 'None'. The 'Stop Bits' are 'One'. There are 'Cancel' and 'OK' buttons at the bottom right.

Communication Name:	AirConditioner
Communication Type:	ModbusRTU
Port Name:	COM4
Baud Rate:	9600
Data Bits:	8
Parity:	None
Stop Bits:	One

■ Meter communication configuration

The screenshot shows the 'RCT Configurator' dialog box. The 'Communication Name' field is set to 'Meter'. The 'Communication Type' is 'ModbusRTU'. The 'Port Name' is 'COM3'. The 'Baud Rate' is '9600'. The 'Data Bits' are '8'. The 'Parity' is 'None'. The 'Stop Bits' are 'One'. There are 'Cancel' and 'OK' buttons at the bottom right.

Communication Name:	Meter
Communication Type:	ModbusRTU
Port Name:	COM3
Baud Rate:	9600
Data Bits:	8
Parity:	None
Stop Bits:	One

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.



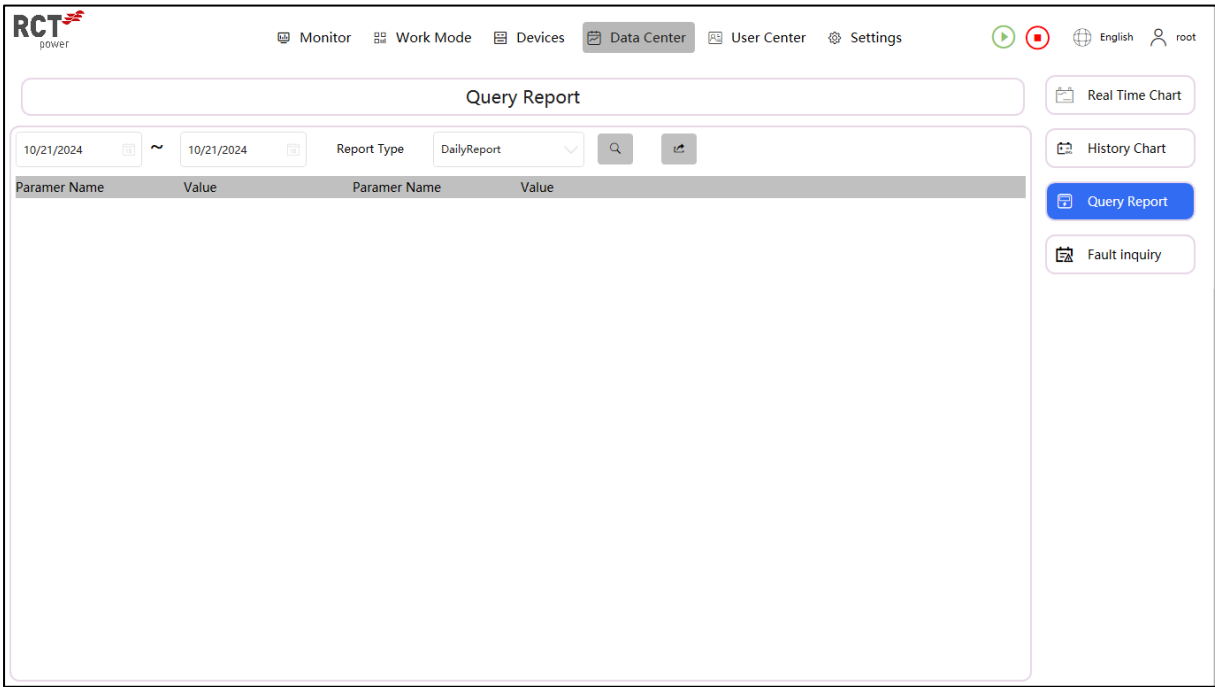
11.8.2History Chart

Including cabinet charging or discharging power and PV electric quantity.

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



11.8.3Query Report



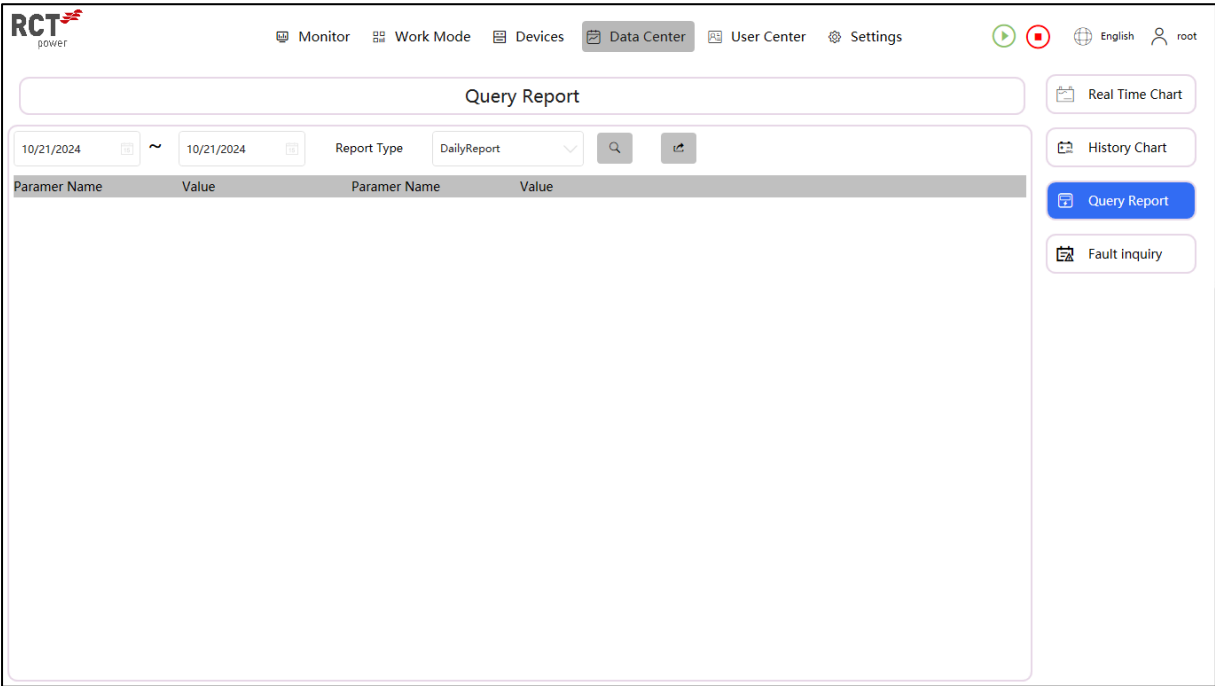
Step 1: Enter the start and end time in ~ and click button to select the report type.

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

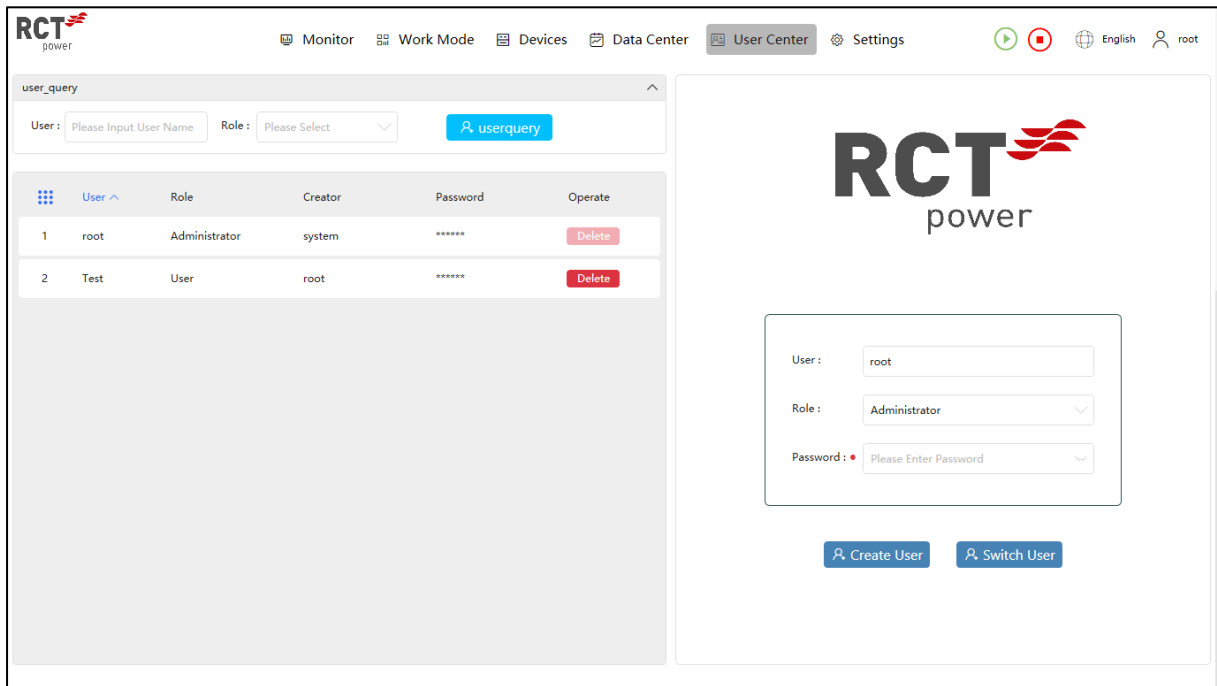
Step 3: Click  button to export the report.

11.8.4Fault 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:

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: [Connect](#)

Queue Status: 6376 [Clear](#)

Cloud Connection

Server Address: mqtt-rp.rct-power.com.cn Port: 31748 Qos: 0 [Connect](#)

Station SN: sta20240002 [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

RCT power

Monitor Work Mode Devices Data Center User Center Settings English root

SysSettings [Save](#) [Reset](#) [Upload](#)

Card No Setting

Card No: 1441621270778

SysSettings

AccessMode: NoAccess	Fan start number: 1	ReactiveCompensation: On
DemandPoint: 1300	StandBy Temp Of AC: 28	DemandEnabled: On
RatedPower: 500	Low Power Temp Of AC: 26	ChargingStationEnable: On
MinPowerFromGrid: 20	High Power Temp Of AC: 22	IncludeAuxiliaryPower: On
PowerFactorTarget: 0.95	Excess AC Temperature: 20	Starting Fan: On

Counter Setting

Prevent Counter Current Enable: [On](#)

Allow Max Reactive Power: 20 kW

Allow Counter Max Duration T: 20 s

Longitude Latitude Setting

Longitude: 120.4116 Latitude: 27.5117

IO Test

Bit(0-7): 0 Value: 0 Wi: [On](#) [Set](#)

[SysSettings](#) [Parallel](#) [Relay Setting](#)

■ 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	

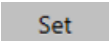
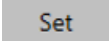
■ Counter Setting

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

■ 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 ☒ Slave.

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  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  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.



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



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.

The screenshot shows the RCT power BMS configuration interface. The top navigation bar includes Monitor, Work Mode, Devices, Data Center, User Center, and Settings. The main content area is divided into two columns. The left column lists BMS units (BMS1, BMS2, BMS3, BMS4). The right column displays the 'State' of the selected BMS unit, including 'Equipment Running Status' (Standby), 'Main pos-contact state' (Closed), 'Main neg-contact state' (Closed), 'Battery voltage (V)' (NA), 'Battery current (A)' (NA), 'Charge or Discharge State' (NA), 'Cell Max Volt (V)' (NA), 'Cell Min Volt (V)' (NA), 'Cell Max Temp (°C)' (NA), 'Cell Min Temp (°C)' (NA), and 'Cell Avg Temp (°C)' (NA). On the right side, there is a 'State' section with 'Height Box Temp (°C)' (NA), 'Positive Insulation Resistance (kΩ)' (NA), 'Negative Insulation Resistance (kΩ)' (NA), and 'SOC' (NA). Below this is an 'Alarm' section with 'Error State' (NA) and a 'Command' section with 'Connect', 'Start', and 'Stop' buttons. A 'Detail' button is also present.

12-1 Connect the DC high volt

The screenshot shows the RCT power PCS configuration interface. The top navigation bar includes Monitor, Work Mode, Devices, Data Center, User Center, and Settings. The main content area is divided into two columns. The left column lists PCS units (PCS1, PCS2, PCS3, PCS4). The right column displays the 'State' of the selected PCS unit, including '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), and 'Grid Frequency(Hz)' (NA). On the right side, there is a 'State' section with 'IGBT Temp(°C)' (NA) and 'Dc Volt(V)' (NA). Below this is an 'Alarm' section with 'Error State' (NA) and a 'Config' section with 'Parameter Name', 'Current Value', 'Setting values', and 'Operate' columns. The 'Active Power(kW)' row is highlighted with a red box, showing 'NA' for Current Value, '0' for Setting values, and a 'Set' button. Below this is a 'Command' section with 'Connect', 'Start', and 'Stop' buttons. A 'Detail' button is also present.

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_PhB_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_PhC_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.

Error message	Description	Cause and possible corrective action
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.	
ERR_Bms[i]_DisBat_U_T	Level 1 alarm for battery discharging under temperature.	This fault can not affect device running.
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.	
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.	

Error message	Description	Cause and possible corrective action
ERR_Bms[i]_SOC_Low_Le2	Level 2 alarm for low SOC.	
ERR_Bms[i]_O_V_Le3	Level 3 alarm for overvoltage.	Disconnect the DC high volt on the EMS BMS command area and turn off the switch gear 24V DC auxiliary power supply swich. Wait for 10 minutes to restart. If the error still occurs, please contact service.
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.	
ERR_Bms[i]_DisBat_O_T_Le3	Level 3 alarm for battery discharging over temperature.	Power up the cabinet, chiller will start cooling. Wait 10 minutes and the alarm will be cleared automatically.
ERR_Bms[i]_DisBat_U_T_Le3	Level 3 alarm for battery discharging under temperature.	Power up the cabinet, chiller will start heating. Wait 10 minutes and the alarm will be cleared automatically.
ERR_Bms[i]_ChaBat_O_T_Le3	Level 3 alarm for battery charging over temperature.	Power up the cabinet, chiller will start cooling. Wait 10 minutes and the alarm will be cleared automatically.
ERR_Bms[i]_ChaBat_U_T_Le3	Level 3 alarm for battery charging under temperature.	Power up the cabinet, chiller will start heating. Wait 10 minutes and the alarm will be cleared automatically.
ERR_Bms[i]_IR_Low_Le3	Level 3 alarm for low insulation resistance.	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.
ERR_Bms[i]_Ter_T_H_Le3	Level 3 alarm for pole temperature is too high.	Disconnect the DC high volt on the EMS BMS command area and turn off the switch gear 24V DC auxiliary power supply swich. Wait for 10 minutes to restart. If the error still occurs, please contact service.
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 Air Conditioner

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	Please contact service.
	Water outlet temperature sensor malfunction	
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 or	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	
ERR_Ac{i}_sys1_inhale_press_l	System 1 low suction pressure	
ERR_Ac{i}_sys1_exhaust_pressure_h	System 1 exhaust pressure is too high	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_temperature_h	System 1 exhaust temperature is too high	
ERR_Ac{i}_sys1_pressure_ratio_h	System 1 pressure ratio is too high	
ERR_Ac{i}_sys1_pressure_ratio_l	System 1 pressure ratio too low	
ERR_Ac{i}_sys1_leak	System 1 leakage fault	Please contact service.
ERR_Ac{i}_cmp1_o_i	Compressor 1 overcurrent 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}_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	
ERR_Ac{i}_out_w_t_l	Low outlet temperature protection	
ERR_Ac{i}_memory_write_freq	Frequent memory writing	Please contact service.
ERR_Ac{i}_memory_e2_fault	Memory (E2) error	
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_offdevice	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	

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 parts) and check	■ The pump runs smoothly without abnormal noise; ■ There is no obvious dripping on the pump body (except condensate).	Brush

	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	Power CESS 1000		
Model Name	CESS932-500-01D	CESS699-375-01D	CESS466-250-01D
GENERAL			
Nominal Capacity	932 kWh	699kWh	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	-20℃~ 45℃		
Storage Temperature Range	-20℃~ 50℃		
Operating Altitude	≤2000m		
Dimensions (mm)	W 2991 x H 2591 x D2438		
Corrosion-proof Grade/Salt Spray Resistance	C4 / C5		
Weight	Approximately 11.6 Tons	Approximately 9.7 Tons	Approximately 7.8 Tons
Max. Number Of ESS used in parallel(On-grid)	4	5	8
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 Power Supply		
BMS	Integrated		
EMS	Integrated		
SAFETY FEATURE			
Flammable/explosive Gas Detection	Yes		

Technical Data	Power CESS 1000		
Model Name	CESS932-500-01D	CESS699-375-01D	CESS466-250-01D
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 Method	Liquid		
Cycle Lifetime	≥6000cls(80%SOH,25±2℃)		
PCS			
DC Connection			
Operating Voltage Range	700~1000 Vdc		
Max. DC Current	792A	594A	396A
AC Connection			
Rated AC Power	500kW	375kW	250kW

Technical Data	Power CESS 1000		
Model Name	CESS932-500-01D	CESS699-375-01D	CESS466-250-01D
Rated AC Current	720A	540A	360A
Rated AC Voltage	400 Vac,3P+N+PE		
AC Line Frequency	50 / 60 Hz		
Power Factor Adjustable Range	-1 ~ +1		
Peak Efficiency	98.6%		
Long-term Overload Capacity	110%		
Cooling Method	Liquid		
STANDARDS			
UN 38.3 IEC 62619 IEC 63056 EN 62477 EN 62040 IEC 60730 EN 62933 EN 61000			

18 Contact

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Legenda toegepaste uitzonderingsgrondslagen

In dit document zijn gegevens definitief geanonimiseerd op grond van:

Wet	Artikel	Omschrijving	Pagina's
Wet open overheid	Art. 5.1 lid 2 sub e	De eerbiediging van de persoonlijke levenssfeer	103