User Manual

Micro Data Center

（MC1000 / MC2000）

P/N: 15-013615-00

Preface

This manual includes the description, use and operation of MC series. Please read this manual carefully before installing the system. Please do not operate the machine before reading all the safety instructions and operation instructions. This manual contains important information. Please strictly follow all warnings and operation instructions provided in this manual and on the machine and keep this manual properly.

MC micro data center must be grounded before use.

The battery must be replaced by a qualified maintenance person. According to the law, the batteries are toxic waste, so according to the requirements of environmental protection, the batteries should be classified for recycling.

For the installation and use of rack type air conditioners, please refer to Installation and Operation Manual for EK04 Rack Type Air Conditioners or Installation and Operation Manual for EK15&30 Rack Type Air Conditioners

This product is only limited to the partners who have a basic understanding of MC micro data center. In order to prevent accidents, it is necessary to understand other installation requirements or measures.

Table of Contents

1 Safety Information

1.1 General safety instructions

This section provides some safety precautions that should be observed during the installation, maintenance and related operations of the company's equipment.

During all operations of the company's products and equipment, make sure to strictly follow the relevant equipment precautions and special safety instructions provided by the company. The safety warnings listed in this manual are only those which the company is aware of, and the company shall not be liable for any violation of the general safety operation requirements or the safety standards for design, production and use of equipment.

1.2 Statement

The company shall not be liable for any of the following.

- Operation in harsh environments beyond those described in this manual.
- Any installation and use environment that exceeds the requirements of the relevant international standards.
- Change of the product or modification of the software code without authorization.
- Failure to follow the instructions and safety warnings of the product and this manual.
- Equipment damage caused by abnormal natural environment.
- Damage resulting from use of the battery provided by us for those other than our MC1000/2000.
- Damage resulting from use of those other than the batteries provided by us.

1.3 Grid requirement

Single-phase three-wire (L, N, PE) system is used for standard MC1000, and three-phase five-wire (L1, L2, L3, N, PE) system is used for MC2000.

Local regulations and specification

Comply with local laws and regulations when operating equipment. The safety instruction provided in this manual are only provided to supplement local safety regulations.

Basic installation requirement

MC 1000/2000 must be adjusted and maintained by the engineer certified by the manufacturer or its agent, otherwise it may endanger personal safety and cause equipment failure, and the damage to MC1000/2000 caused thereby will be excluded from the warranty. The personnel who are responsible for the installation and maintenance of the company's equipment must receive strict training to understand various safety instructions, and master the correct operation methods before the installation, operation and maintenance of the equipment.

- Only qualified and trained personnel are allowed to install, operate and maintain the equipment.
- Only qualified professionals are allowed to dismantle safety facilities and repair equipment.
- Replacement and alteration of equipment or components (including software) must be done by a person certified or authorized by the company.
- The operators should promptly report any failures or errors that may cause safety problems to the

responsible person.

- This product shall be installed and used in accordance with the specification requirements described in this manual (refer to the section of "installation" and "technical parameters"), otherwise it is possible to cause product failure, and the product functional abnormalities or component damage caused thereby will be excluded from product quality assurance.

Grounding requirement

The following only applies to equipment requiring grounding (except for energy storage units).

- Before installing equipment, the equipment must be grounded; when removing the equipment, the ground wire must be removed after removal of the equipment.
- Do not damage grounded conductors.
- Do not operate equipment without installation of the grounding conductors.
- The equipment shall be permanently connected to the protective grounding wire. Before operating the equipment, check the electrical connection of the equipment to ensure that the equipment has been reliably grounded.

Personal safety

- It is forbidden to operate equipment and cables in thunderstorm weather.
- To avoid the danger of electric shock, it is prohibited to connect the terminals of the safety extra-low voltage (SELV) circuit to the terminals of the communication network voltage (TNV) circuit.
- Before operating the equipment, wear anti-static work clothes, anti-static gloves and wristbands, and remove jewelry and watches and other conductive objects, so as to avoid electric shock or burns.
- In case of fire, evacuate from the building or equipment area and press the fire alarm, or dial the fire telephone number. Under no circumstances shall re-enter the burning building.
- If there is a cabinet with an anti-static jack, make sure to wear an anti-static wristband and insert the other end into the anti-static jack.
- Do not close the switch before the equipment installation is completed.
- Please do not power on MC1000/2000 until the authorized engineer arrives.

Equipment safety

- Before operation, the equipment should be firmly fixed on the floor or other solid objects, such as the wall or mounting frame.
- Do not block the vent when the system is in operation.
- Before powering on, make sure that the internal screws of the equipment are tightened to avoid falling off during operation.
- After installing the equipment, please remove the empty packing material from the equipment area.
- Timely replace unclear danger signs.
- MC 1000/2000 can be used for capacitive, resistive and micro inductive load, not for pure capacitive, pure inductive load and half wave rectifier load, as well as energy feedback load.
- Under any circumstances, without the permission of the manufacturer, do not arbitrarily change the structure, installation sequence, etc. of the equipment,
- Under any circumstances, do not clean electrical component inside and outside the cabinet with water.

1.4 Electrical safety

High voltage

High voltage power supply provides power for the operation of equipment. Direct contact or indirect contact with high voltage power supply through wet objects may result in death or serious injury. Non-standard, incorrect high -voltage operation may cause fire or electric shock and other accidents

- Electrical equipment should only be installed, operated, serviced, and maintained by qualified personnel who has skills and knowledge related to the construction, installation, and operation of electrical equipment and has received safety training to recognize and avoid the hazards involved.
- All selection, connection and routing of cables must conform with local laws and regulations.
- Conform with local laws and regulations when operating AC power supply equipment.
- Before wiring MC1000/2000, make sure again that the input power is disconnected from the mains supply.
- Use special tools, rather than common tools, for high voltage and AC power operations
- Avoid damping the equipment when operating in damp environment. If water or moisture is found in the cabinet, immediately disconnect the power supply.

Large leakage current

Before the equipment is connected to the power supply, it must be grounded, otherwise it is possible to endanger personal and equipment safety.

- If the "large leakage current" sign is pasted near the equipment panel, the protective grounding terminal of the equipment housing must be grounded before connecting the AC input power supply to prevent the electric shock caused by leakage current of the equipment.
- The UPS in MC1000/2000 is a large leakage current device, and it is not recommended to install the air switch with leakage protection function.

Power cable

It is forbidden to install or dismantle the power cable while the equipment is still in operation. At the moment that the copper core of the power cable contacts the conductor, it is possible to cause arc or spark, which may cause fire or eye injury.

- When it is required to move or rewire MC1000/2000, the power supply, battery and other inputs must be disconnected, and the corresponding operation shall be carried out after MC1000/2000 is fully powered down (about 5 minutes), otherwise there may still be current in the port and inside of the equipment.
- Turn off the power switch before installing and removing the power cable.
- Before connecting the power cable, make sure that the label and mark of the power cable is correct.

Fuse

In order to ensure the safe operation of the equipment, when the fuse on the equipment is fused, replace with the same type and specification of the fuse.

Electrostatic discharge

The static electricity generated by human body will damage the electrostatic sensitive components on the single board, such as large scale integrated circuit (LSI).

- Electrostatic electromagnetic field may be produced on human body under the circumstance such as human movement, attrition of clothes, friction between shoes and floor or the hand with common plastic product, which is not easy to disappear before discharging.
- In order to prevent electrostatic damage to sensitive components, make sure to wear anti-static gloves

or anti-static wristband before touching the equipment or handling the single board or application-specific integrated circuit (ASIC) chip. The other end of the anti-static wristband is well grounded.

1.5 Operating environment of equipment

Any operation of any electronic equipment in a flammable air environment may cause an extreme risk and the use and storage of the equipment must be in accordance with the environmental requirements set out in the user manual.

Avoid long-term use in the following environment:

- High and low temperature and humidity environment exceeding technical indicators (temperature: - 20 ℃ - 45 ℃, relative humidity: 0% RH to 95% RH).
- Location exposed in direct sunlight or close to a heat source.
- Location that vibrates and is vulnerable to impact
- Environment with dust, corrosive substances and salt
- Offshore environment or land outdoor environment near pollution source and environment with only simple shelter. The pollution source refers to the area within the following radius:
  - 3.7 km away from saline water (e.g. an ocean, a salt lake)
  - 3 km away from heavy pollution sources such as metallurgy, coal mines and thermal power plants.
  - 2 km away from medium pollution sources such as chemical industry, rubber and electroplating.
  - 1 km away from light pollution sources such as food, leather, and heating boiler.

1.6 Safe operation of battery

Safety instructions for safe operation of battery

- Improper operation of the battery may cause dangerous. During operation make sure to strictly prevent the short circuit of the battery or electrolyte overflow and loss.
- Electrolyte overflow may cause potential damage to the equipment. The spilled electrolyte may corrode metal objects and single board, leading to the single board damaged.
- The battery has high energy, and improper operation may lead to short circuit and serious personal harm.
- It is strictly prohibited to reversely connect the positive and negative terminals of the battery.
- The use of non-regulated storage batteries may lead to battery damage. Please use the required model of the battery.
- Check the screws of the battery connection parts regularly to ensure that they are tight and not loose. If the screws are loose, they must be tightened immediately.
- The battery should be installed, stored in clean, cool and dry environment.
- Do not decompose, change or destroy the battery. Otherwise it is possible to cause the short circuit, electrolyte leakage, and even personal injury.

Technical specifications

Table1-1 Technical specifications of battery

Battery type	Minimum/ maximum of cells			Floating charging voltage of cell	Even charging voltage of cell	Minimum voltage of cell
Sealed lead acid battery	3KUPS 8x 12V cell	6/10KUPS 16x 12V cell	20KUPS 32-40x 12V cell	2.23V/cell - 2.27V/cell	2.3V/cell - 2.4V/cell	1.6V/cell - 1.9 V/cell

Note: the single cell refers to a 1x 2V single cell. 1 x 12V battery consists of 6 single cells.

Basic precautions

Before installation, maintenance and other operations of the battery, in order to ensure safety, attention should be paid to:

- Use special insulation tools.
- Use eye protection devices and provide proper protection.
- Wear rubber gloves and protective clothing to prevent the harm caused by electrolyte overflow.
- In the process of handling the battery, always keep the electrode upward, do not invert and tilt the battery.
- During installation, maintenance and other operations, the charging power supply should be kept disconnected.

Short circuit of battery

In order to avoid short circuit of the battery, online maintenance is not allowed for the battery.

Noxious gas

The lead-acid batteries may release flammable gas during operation, and the storage environment of the battery should be kept ventilated and provided with fire prevention measures.

Temperature of battery

- The installation location of the battery must be away from the transformer and other heating product. Do not use or store the battery close to fire source, and do not bury the battery.
- When the temperature of the battery is more than 60 ℃, check the battery for electrolyte overflow in case of any electrolyte overflow, dealt with timely.

Electrolyte leakage of battery

When handling or moving the leaky battery, attention should be paid to the possible damage caused by the electrolyte. Once the electrolyte overflow is found, the following substances can be used for neutralization and absorption.

- Sodium bicarbonate (baking soda): NaHCO3
- Sodium carbonate (soda): Na2CO3

The material used for absorbing and neutralizing the electrolyte shall be subject to the guidance of the battery manufacturer.

If the body contacts the electrolyte leaking from the battery leakage, immediately washed with water. For serious cases, seek medical advice immediately after washing.

1.7 Lifting

Work at height shall meet the following requirements:

- Lifting operator may work only after the relevant training
- Ensure that the lifting tools are firmly fixed on load-bearing fixtures or walls before lifting operations.
- In the lifting process, ensure that the included angle any two lifting cables is not more than 90 °.

1.8 Machinery safety

Sharp objects

When handling the equipment by hand, protective gloves should be worn to avoid cutting hands by the sharp corners of the equipment.

When moving or lifting the equipment, hold the equipment handle or the bottom edge of the equipment.

Fan

Do not put fingers or single board into the running fan before the fan is turned off or stops, so as to prevent hand injury or equipment damage.

1.9 Cabling

When the temperature is too low, the violent impact and vibration may lead to brittle cracking of the plastic sheath of the cables. To ensure construction safety, the following requirements shall be followed:

- All cables shall be laid and installed above 0℃.
- If the storage temperature of the cable is below 0℃, the cable must be placed at room temperature for more than 24 hours before laying.
- When handling cables, especially during construction in low-temperature environment, handle the cables with care, do not directly push the cable from the car and prohibit other non-standard operation.
- If the cable is used in high temperature environment, it is possible to cause aging and damage of the insulation layer. Sufficient distance should be kept between the cable and the DC bus, the shunt and the fuse. The user-provided cables shall have flame retardant capability; no cables are allowed to pass behind the air outlet of the cabinet, and no foreign bodies are allowed to block or cover the air outlet.

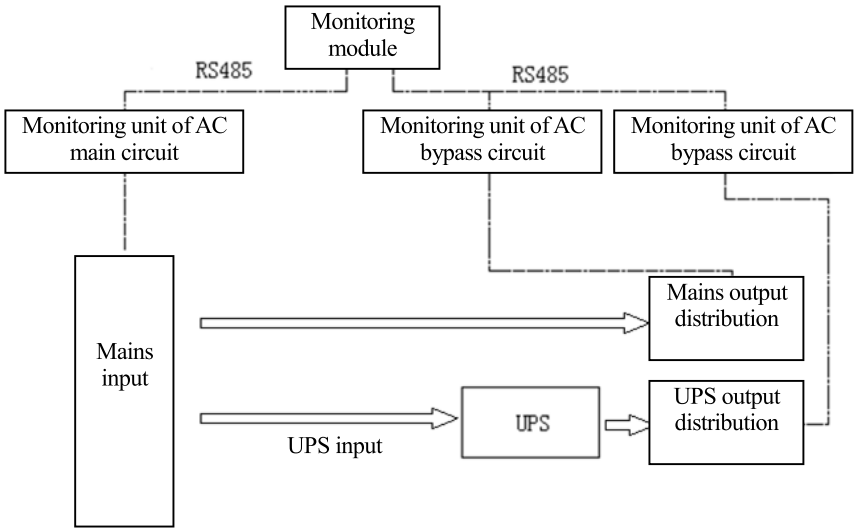
Before connecting the cable, check whether the cable and cable label are consistent with the actual installation requirement.

2 Product Overview

2.1 Operating principle

2.1.1 Functional block diagram

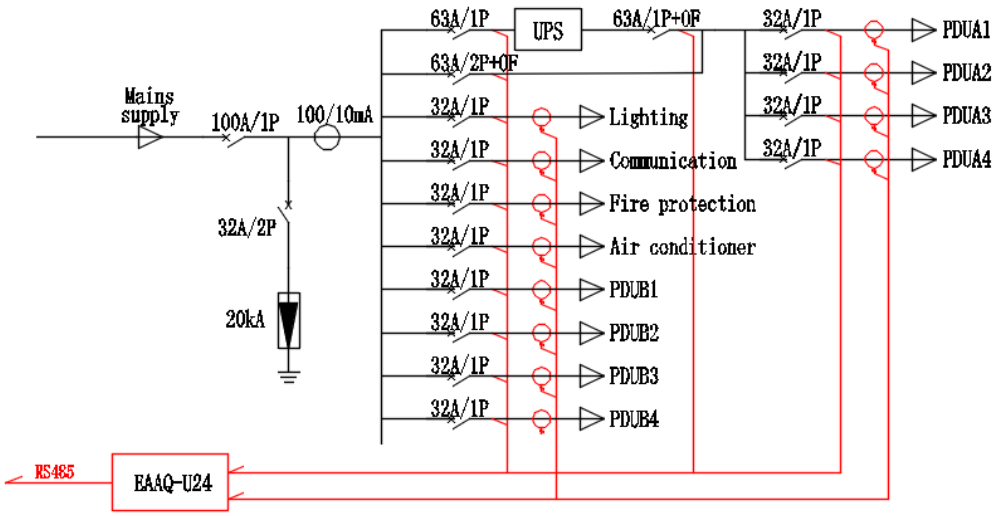
The functional block diagram of MC serial micro data centers is shown in Fig. 2-1.



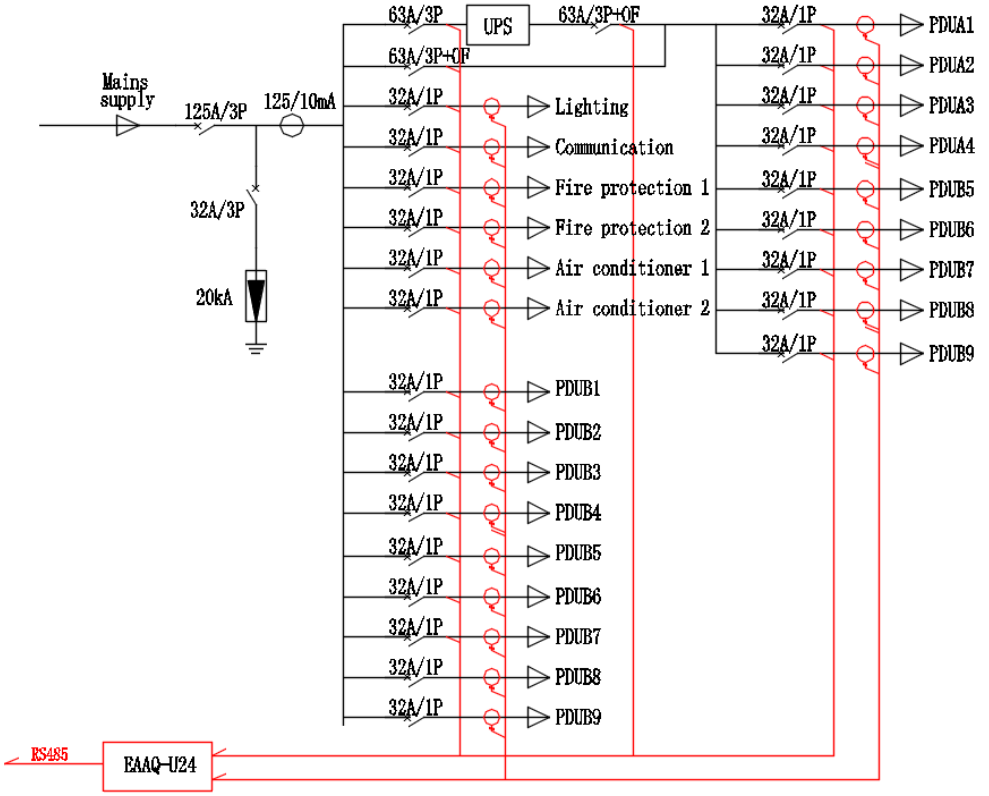
(Fig. 2-1 Functional block diagram)

2.1.2 Topological graph

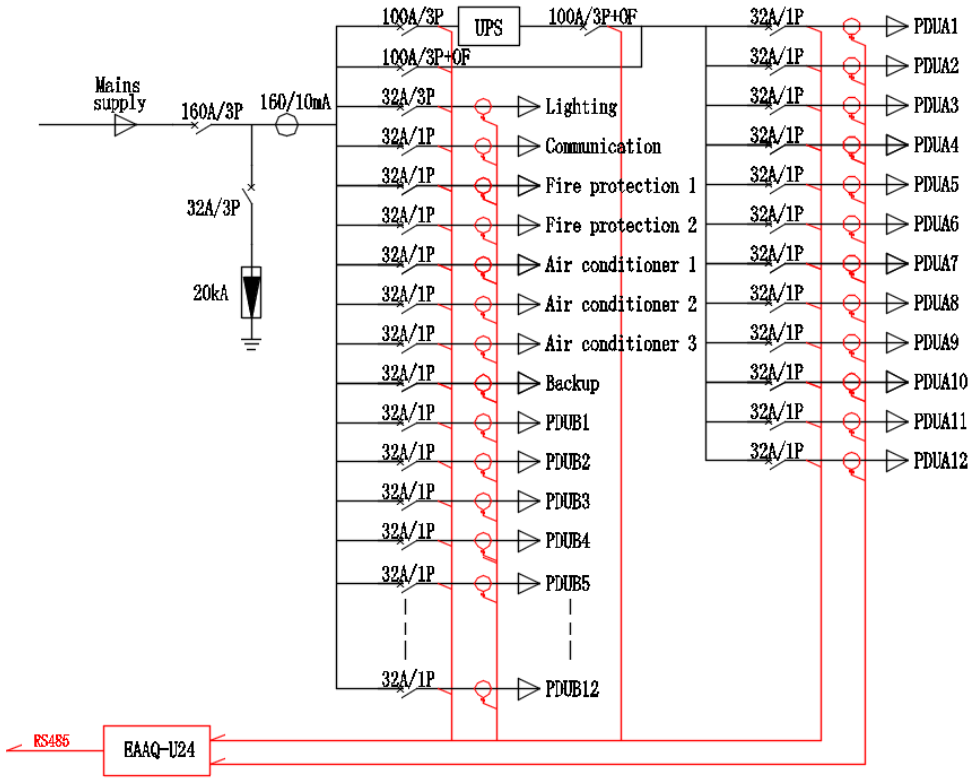
The topological graph of MC series micro data centers is shown in figure 2-2 to figure 2-7



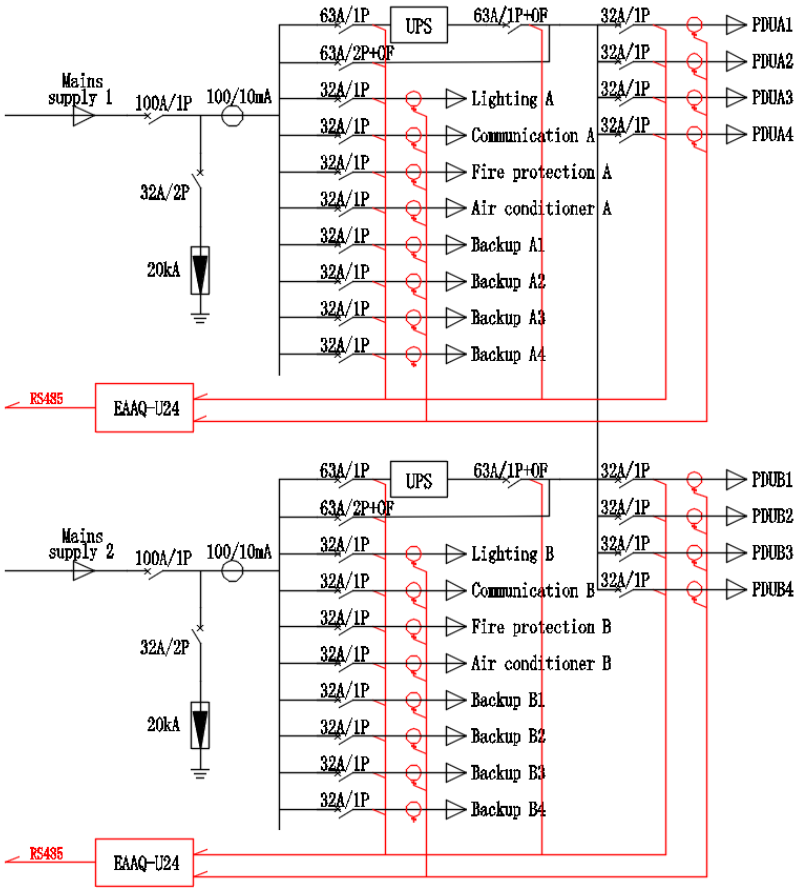
(Fig. 2-2 Topological graph of MC1000 4 x cabinet)



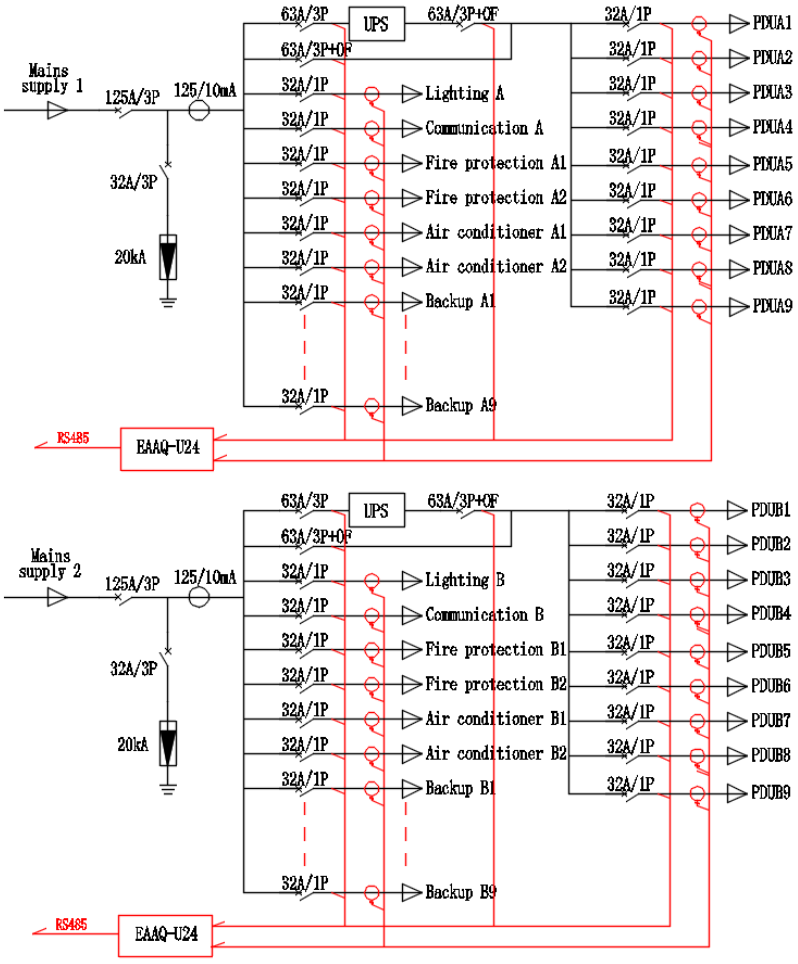
(Fig. 2-3 Topological graph of MC2000 9 x cabinet)



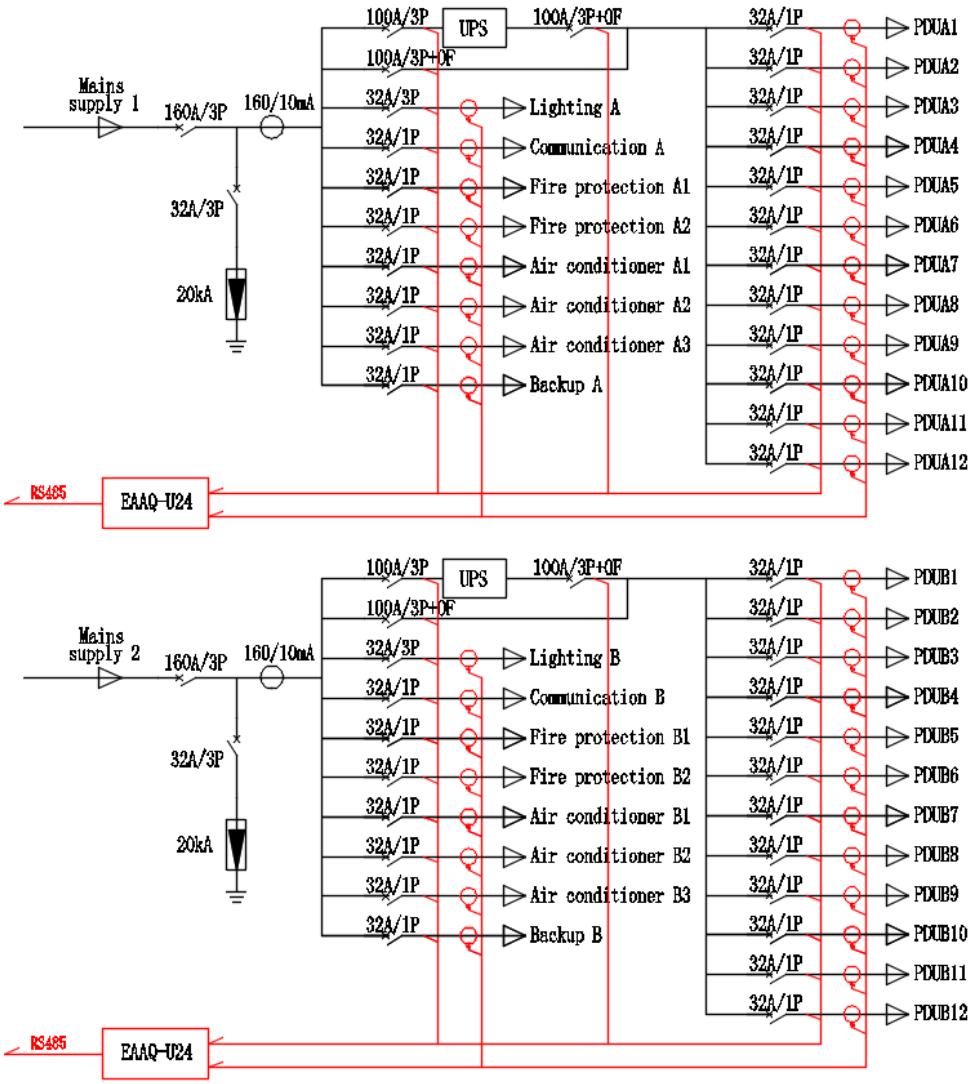
(Fig. 2-4 Topological graph of MC2000 12 x cabinet)



(Fig. 2-5 2N topological graph of MC1000 4 x cabinets)



(Fig. 2-6 2N topological graph of MC2000 9 x cabinet)



(Fig. 2-7 2N topological graph of MC2000 12 x cabinets)

2.2 Product description

2.2.1 Product appearance

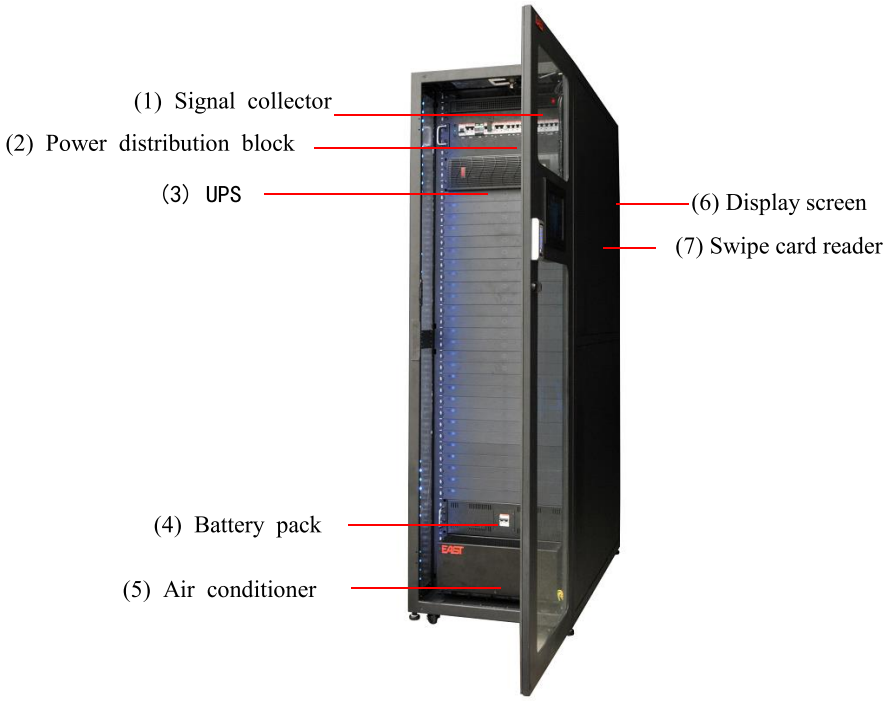
The appearance diagram of MC1000/2000 micro data center is shown in Fig. 2-8 for single cabinet and Fig. 2-9 for 4x cabinets.

(Fig. 2-8 Appearance diagram of single cabinet MC1000)

(Fig. 2-9 Appearance diagram of 4x cabinets MC2000)

2.2.2 Product structure

The product structure of MC1000/2000 is shown in Figs. 2-10 and 2-11.



(Fig. 2-10 Product structure of equipment cabinet)

(Fig. 2-11 Product structure of IT cabinet)

2.3 List of optional components

Table 2-1 List of optional components

Optional component	Model	Function
Firefighting module	-	The firefighting module which the system operates independently
Fresh air module	-	Used together with the firefighting module
Hemisphere camera		Environment monitoring camera
Router	-	Used together with the camera
Short message module	-	Transmit the system alarm to bound mobile number
Electromagnet ic lock	-	Used to open or close the door together with moving ring and access control all-in-one machine
Infrared sensor	-	Infrared induction, used together with moving ring infrared linkage function group
Sound-light alarm	-	Used together with moving ring alarm group
Integration access control	-	Used to open by password and ID card together with magnetic lock

2.4 Weight and dimensions

Ensure the ground or installation platform can bear the weight of MC1000/2000, the battery and the battery rack. The weight of the battery and the battery rack is calculated according to the actual use. The weight of each type of MC1000/2000 is shown in Table 2-5.

Table 2-2 Weight of MC1000/2000

Model	Configuration	Weight
MC1000 single cabinet	Equipment cabinet	200kg
MC1000 multi-cabinet	Equipment cabinet	205kg
MC2000 multi-cabinet	Equipment cabinet	275kg
MC1000/2000IT cabinet	It cabinet	140kg

The external dimension of MC1000/2000 is shown in Figs.2-12 to 2-17.

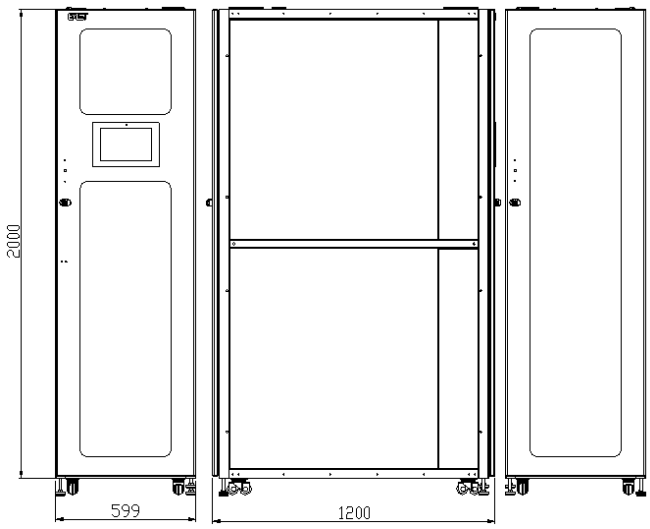


Fig. 2-12 Dimension of 1200mm cabinet of MC1000 single cabinet, in mm)

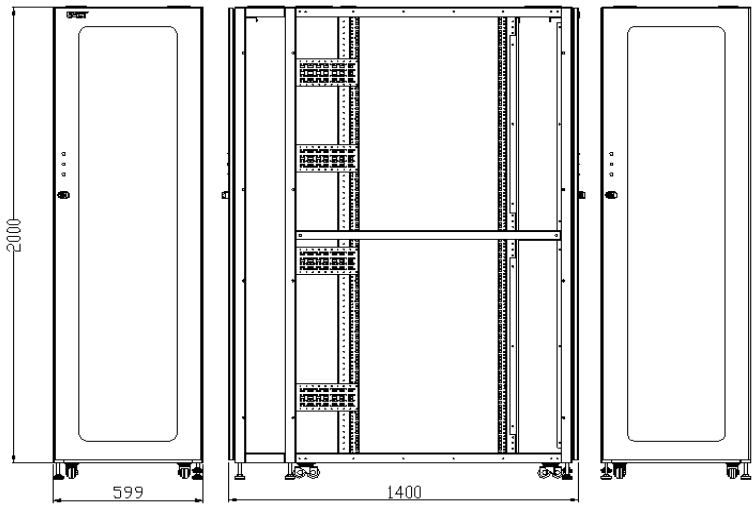
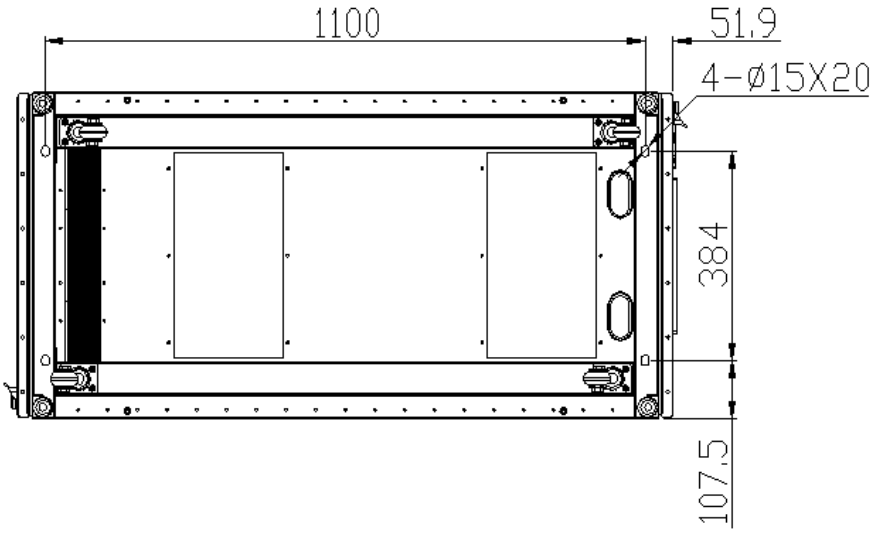
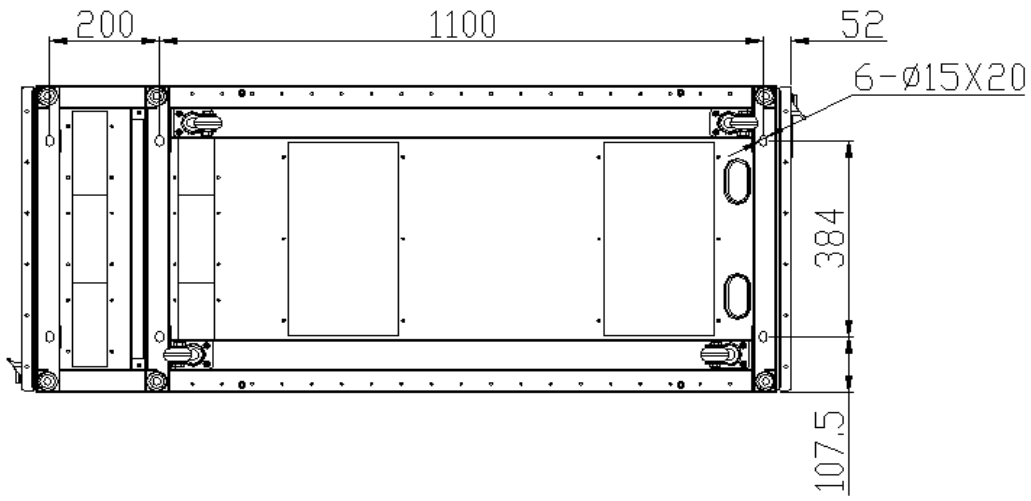


Fig. 2-13 Dimension of 1400mm cabinet of MC1000/2000, in mm)

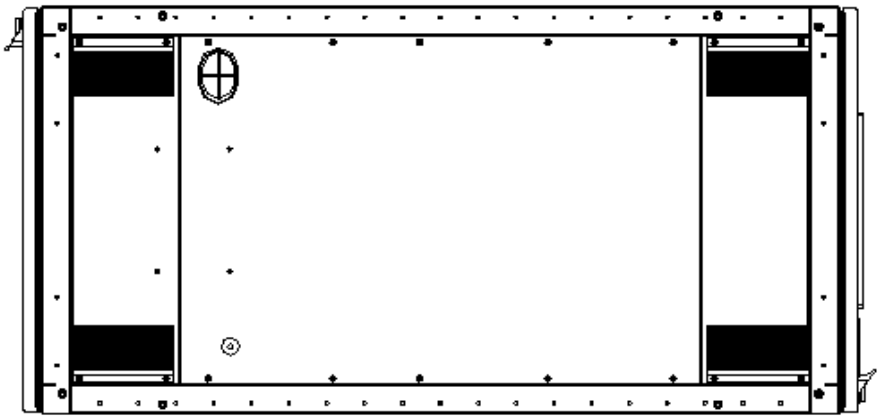


(Fig. 2-14 Foundation diagram of 1200mm, in mm)

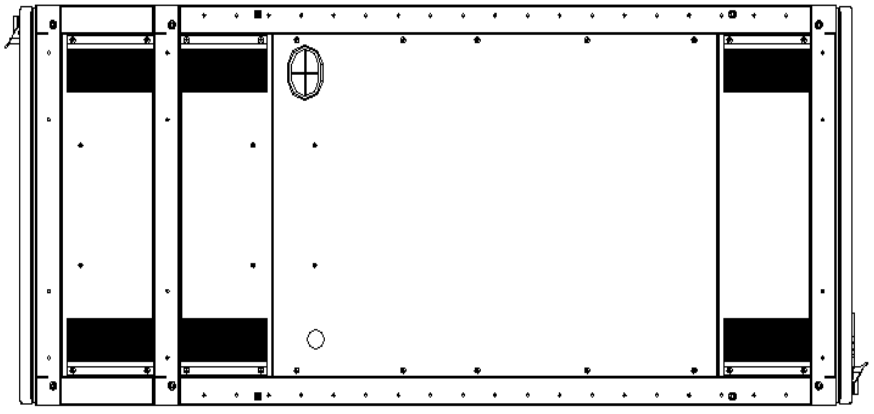


(Fig. 2-15 Foundation diagram of 1400mm, in mm)

Note: 1400mm cabinet consists of 1200mm plus 200mm flushed cabinet. The flushed cabinet cannot bear load. Attention should be paid during making load-bearing bracket of the machine room.



(Fig. 2-16 top cap diagram of 1200, in mm)



(Fig. 2-17 top cap diagram of 1400, in mm)

3 Installation

3.1 Installation environment

Do not install MC1000/2000 in a high and low temperature or humidity environment that exceeds the "environmental characteristics" index.

Table 2-3 Environmental characteristics

Environmental characteristics	
Operating temperature	-20℃ - 45℃
Relative humidity	0% RH - 95% RH (no condensation)
Altitude	1000m - 4000m In case of more than 1000m, derated according to IEC62040-3. Maximum 4000m
Noise	< 70dB

- Keep MC1000/2000 away from water source, heat source and inflammable and explosive materials. Do not install MC1000/2000 in the environment with direct sunlight, dust, volatile gases, corrosive substances and high salt content.
- Do not install MC1000/2000 in the working environment with metal conductive dust.
- The best operating temperature of the valve control type sealed lead acid battery is 20 ℃ - 30 ℃. In case of operation at more than 30 ℃ the battery life may be reduced, and the battery time may be used in case of operation at less than 20 ℃.

Clearance

A space should be reserved around the cabinet for operation and ventilation:

- At least 800mm operation space reserved in the front.
- At least 480mm operation space reserved above the top.
- At least 800mm operation space reserved in the back.
- The reserved space is shown in Fig. 2-18.

(Fig. 3-1 Clearance dimensions (mm))

3.2 Preparation of power cable

The recommended diameters of power cables for MC1000/2000 are shown in Table 2-4.

Item			MC1000		MC2000/9 x cabinets	MC2000/12 x cabinets
Main input	Rated current of main input (A)		100		125	160
	Recommended diameter (mm^2)		2×25（Φ+N）		4×35（3Φ+N）	4×50（3Φ+N）
Output	Rated current of bypass output (A)		32		32	32
	Recommended diameter (mm^2)		2×6（Φ+N）		4×6（3Φ+N）	4×6（3Φ+N）
Battery input	Nominal discharge current of battery (A)		3K 96V	6K 192V	10K 192V	20K ±240V
			41	31	52	42
	Maximum discharge current of battery (discharge current at 2Vsingle cell, 1.67V/cell) (A)		50	38	62	50
	Recommended diameter (mm^2)	+	2×10	2×10	2×10	4×16
		N				
		-				
Grounding cable	Recommended diameter (mm^2)	PE	2.5	6	6	6

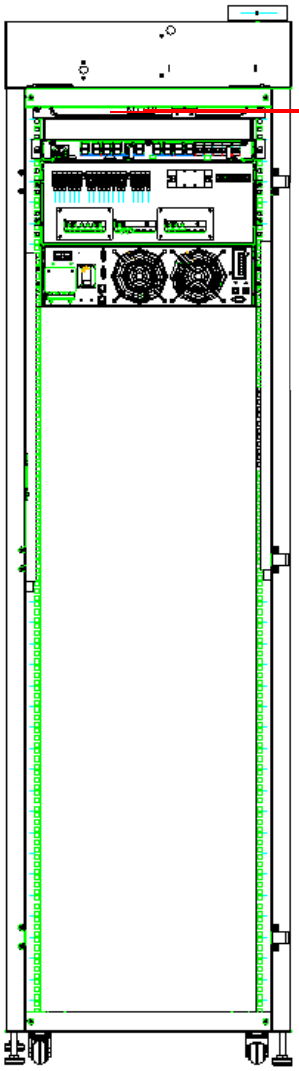
- The selection, connection and routing of cables must comply with local laws and regulations.
- In case of change in external conditions, such as laying mode or ambient temperature, verification shall be performed according to IEC -60364-5-52 or relevant local regulation.
- The current value shown in the table refers to the data obtained at rated voltage 380V. For the rated voltage 400V, the current value needs to be multiplied by 0.95. For 415V rated voltage, the current value shall be multiplied by 0.92.
- When the main load is non-linear, the section of N wire should be increased to 1.5-1.7 times.
- If same power supply is use for main and bypass circuit, the input cable is configured according to the main input cable. In addition, the recommended values shown in Table 2-3 are only applicable to the following conditions:
  - Laying method: a single layer is laid on the ladder frame or splint (F of IEC 60364-5-52).
  - Ambient temperature: 30℃
  - AC voltage loss less than 3%, and DC voltage loss less than 1%.
  - 90℃ flexible cable with copper conductor
  - It is recommended that the AC cable shall not be more than 30m long and the DC cable shall not be more than 50m long.

Table 2-5 Requirement of power cable terminal

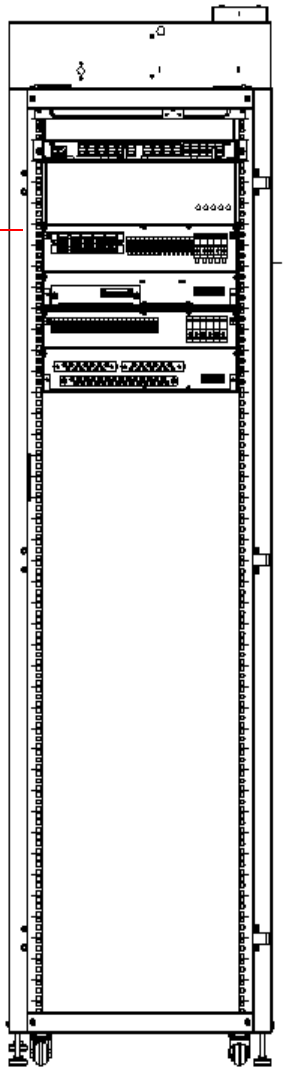
Interface description	Connection method	Specification	Bolt hole diameter
Main input	Cable crimping with OT terminal	OT-25mm^2-M6 terminal	M6
		OT-35mm^2-M8 terminal	M8
		OT-50mm^2-M8 terminal	M8
Battery input	3KUPS/72V battery inserting terminal	PA5900-T-SA50/SA50B8-H	/
	6&10KUPS/192V battery inserting terminal	PA5900-T-SA50/SA50B8-H	/
	20KUPS/240V battery wiring terminal	OT-16mm^2-M6 90° terminal	M6
Output	Cable crimping with OT terminal (live wire)	E6012 (Tubular pre-insulated terminal)	/
	Cable crimping with OT terminal (null line)	OT-6mm^2-M6 terminal	M6
Protective grounding wire	Cable crimping with OT terminal	OT-6mm^2-M6 terminal	M6
		OT-6mm^2-M8 terminal	M8
		OT-6mm^2-M8 terminal	M8

3.3 Installation of power cable

After the machine is installed, the power cable is installed. Fig. 2-19 shows the equipment cabinet of MC1000 4xcabinet, and Fig. 2-20 shows the rear view of the equipment cabinet of MC2000 9 x cabinet after opening the door. First, remove the screws from the back cover of the distribution module, open the distribution cover, and install input and battery cables.



(Fig. 3-2 Rear view of MC1000 4 x cabinet)



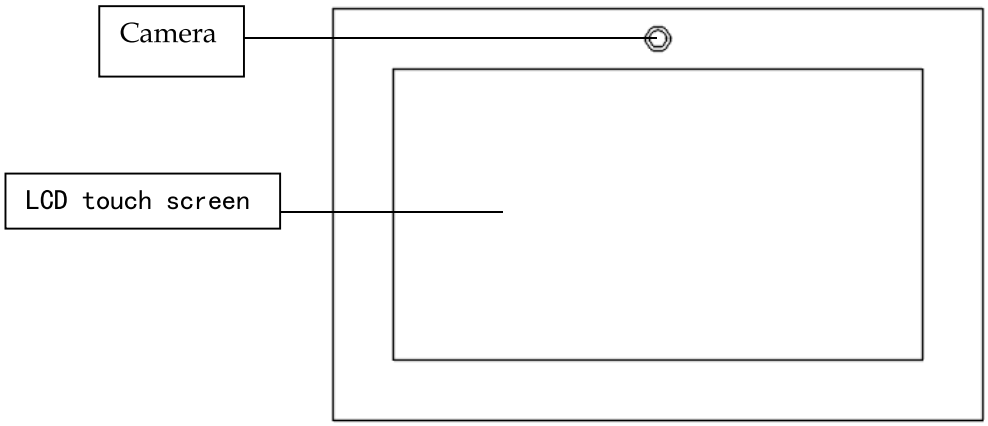
(Fig. 3-3 Rear view of MC2000 9 x cabinet)

4 User Interface

4.1 LCD interface

4.1.1 LCD appearance

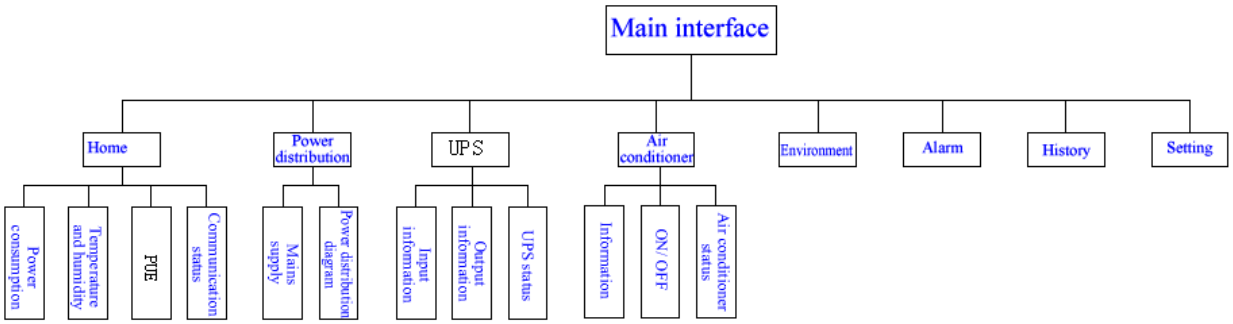
The MC1000/2000 monitoring display unit is installed on the front door of the equipment cabinet. Through the operation monitoring display unit, the functions of MC1000/2000, such as operation control, running state view, parameter setting and alarm view, can be realized.



(Fig. 4-1 Monitoring display unit)

4.1.2 LCD menu

The menu structure of the monitoring display interface is shown in Fig. 4-2.



(Fig. 4-2 Menu structure)

4.2 User interface

4.2.1 Main menu

The monitoring display menu is divided into two parts: property bar and information display area. Exampling the default main menu, the menu interface is shown in Fig. 4-4, and the function description of each area on the interface is shown in Table 3-3.

(Fig. 4-3 Main menu)

Table 3-1 Function description of main interface

No.	Area	Function description
1	Property bar	Display relevant information, such as power distribution, UPS, air-conditioning, environment, alarm number, configuration properties, time.
2	Information display area	Display the relevant information of submenu

4.2.2 Home

On the home, 4 items, such power consumption of current day, PUE, temperature and humidity, and communication status, are displayed.

(Fig. 4-4 Home interface)

1. Power consumption of current day

   Including: total power consumption, power consumption of IT equipment, other power consumption.

2. PUE

   Including: PUE current value, total load power, IT load power.

3. Temperature and humidity

   Including: temperature (cold channel side), humidity (cold channel side).

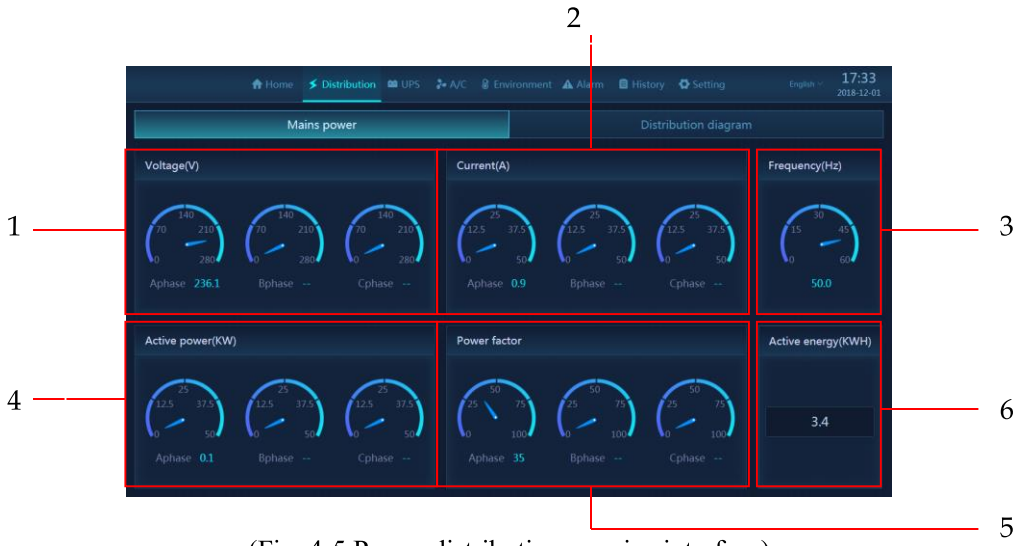
4. Communication status

   Including: UPS, power distribution, air conditioning, temperature and humidity, and environmental quantity, sub-device communication status

   Note: if  is displayed, click “setup – equipment status” to view the equipment with communication failure.

4.2.3 Power distribution

In the power distribution interface, six items, such as voltage, current, frequency, power factor, active energy and active power, are displayed in the submenu mains interface. The topological graph of power distribution is displayed on the submenu power distribution interface, as shown in Fig. 4-5.



(Fig. 4-5 Power distribution – mains interface)

1. Voltage (V), including A phase, B phase, C phase voltage.
2. Current (A), including A phase, B phase and C phase current.
3. Frequency (Hz)
4. Active power (KW), including active power of A phase, B phase, C phase
5. Power factor (%), including power factor of A phase, B phase, C phase
6. Active energy (KWH)

Fig. 4-6 Power distribution - power distribution interface)

Note:  indicates switch closed, and  indicates switch opened.

4.2.4 UPS

Four items, such as UPS input, UPS output, UPS status, topological graph of UPS, are displayed on the UPS interface.

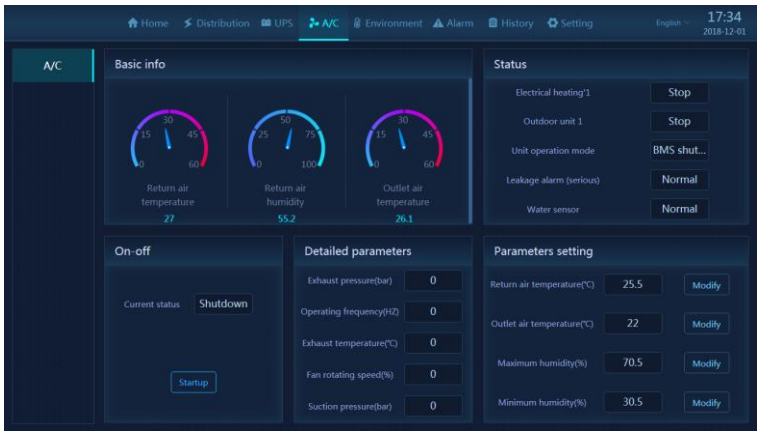
(Fig. 4-7 UPS interface)

1. UPS: select the UPS to be viewed, and support separate selection and view of multiple UPS.
2. UPS input information: input voltage, input frequency, bypass voltage and bypass frequency.
3. UPS output information: output voltage, output current and output power.
4. UPS status: power supply mode, battery status, input mode and output mode (four core states of UPS, which can be modified/replaced by other objects at background, and if required, please contact the company)
5. Schematic diagram for operating status of UPS

4.2.5 Air conditioner

5 items, such as Basic information, status, ON/ OFF, details and setting parameters, are displayed on the air conditioner interface

The air conditioner interface is shown in Fig. 4-8.



(Fig. 4-8 Air conditioner interface)

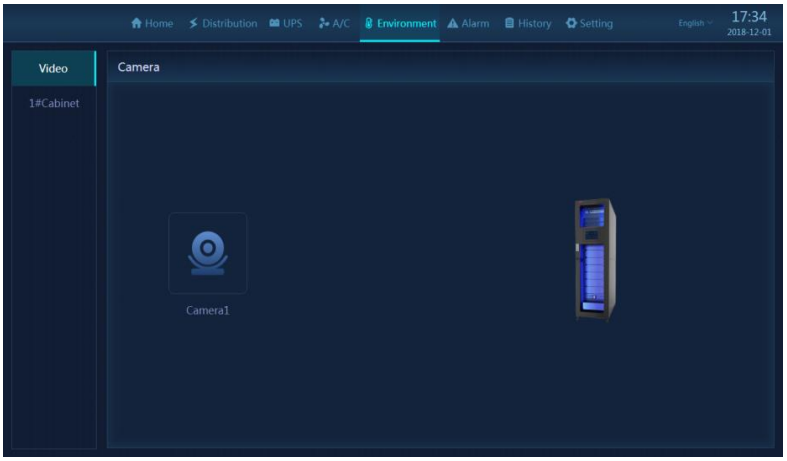
1. Air conditioner: select the air conditioner number to be checked. Support separate selection and view

of multiple air conditioners.

2. Basic information: return air temperature, return air humidity and outlet air temperature.
3. Status: electric heating, outdoor unit, unit operation, leakage status, water immersion status.
4. ON/ OFF: start/ stop the air conditioner at the interface, and view current ON/ OFF status.
5. Detailed parameters: exhaust pressure, operating frequency, exhaust temperature, fan speed, suction pressure
6. Setting parameters: air return temperature, outlet air temperature, maximum humidity and minimum humidity can be set. Click "modify" to set parameters.

4.2.6 Environment

In the environment interface, the environment quantity information of each cabinet is displayed, as shown in Fig. 4-9 and Fig. 4-10.



(Fig. 4-9 Environment interface)

IPC configuration information:

Camera address:

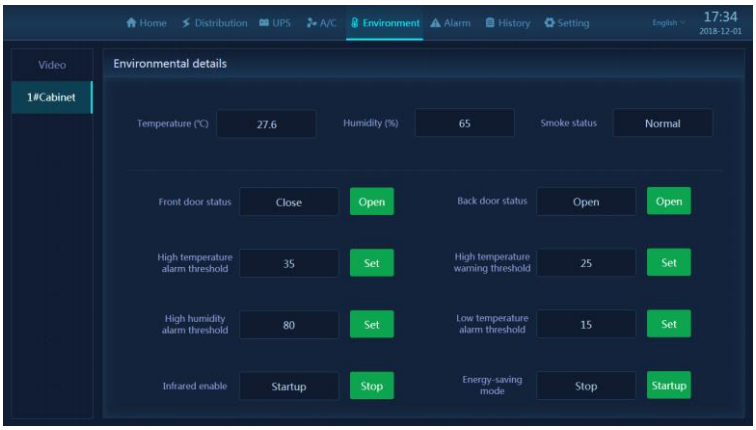
MC1000:10.1.1.101 user name: admin, password: east12345

MC2000:10.1.1.201 user name: admin, password: east12345

Note: the camera is optional.

Only real-time video view at PC browser (install VLC plug-in in PC end), and do not support video view at HDMI display.

The video monitoring provides the interface to the local video monitoring system for calling MC series does not perform other processing for video monitoring no other processing.



(Fig. 4-10 Environmental quantity interface of cabinet)

1. Cabinet 1#: select the cabinet number to be viewed. Support separate selection and view of the environment details of multiple cabinet.
2. Environmental details: temperature, humidity, and smoke sensor status.
3. Environment detail settings/controls

A. Access control: front/rear door opening control, with door opening password which default to 123456; the current status of the cabinet door can be inquired.

Note: In addition to the control of n front and back rear door by the interface operation, the door may be opened by entering 1357# on password keyboard.

B. High temperature warning point/warning point threshold, the threshold parameters can be set, and default to35/25 degrees Celsius.

Note: the lamp color varies with the temperature setting;

Less than 25 degrees Celsius: blue

25-35 degrees Celsius: yellow

More than 35 degrees Celsius: red

C. Enable infrared and enable/ disenable energy-saving mode

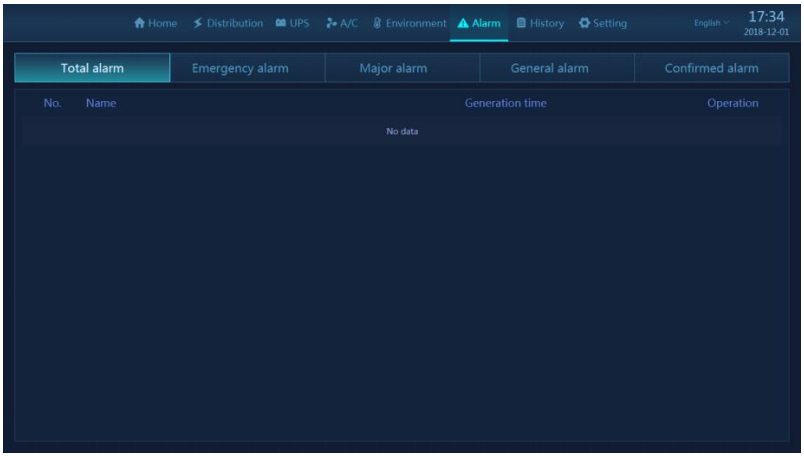
Enable infrared: if enabled, when the infrared detector detects "object movement" in the range, the system will automatically turn on the atmosphere light of the front door. When no "object movement" is detected more than 5 minutes, the atmosphere light of the front door will be automatically turned off.

4. Energy saving mode: premise condition is installation of a temperature and humidity sensor outside the indoor cabinet. After the energy saving mode is enabled, when the temperature is less than 18 degrees Celsius outside the cabinet, the air conditioner will be automatically shut down, and the emergency fan will be directly started to feed low temperature air into the cabinet, to achieve the effect of energy saving. This mode is suitable for the cold north region.

Note: this function is not available at present. If the energy saving mode is enabled, only current atmosphere lamp becomes green.

4.2.7 Alarm

In the alarm interface, all alarms, emergency alarm, important alarm, general alarm and confirmed alarm information are displayed.
The alarm interface is shown in Fig. 4-11.



(Fig. 4-11 Alarm interface)

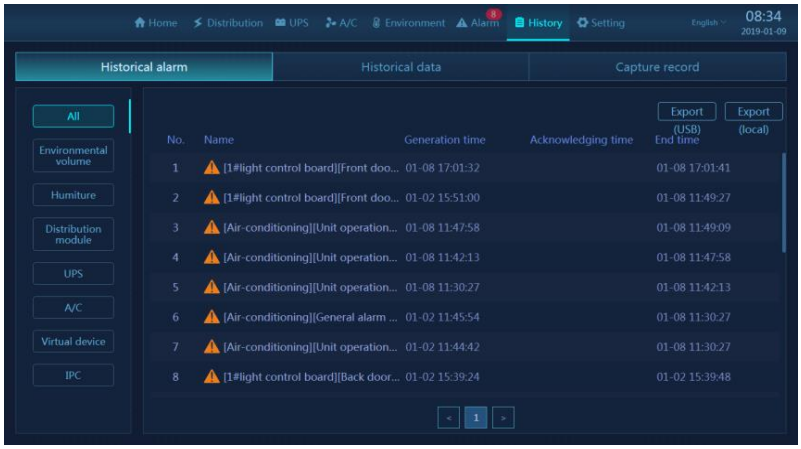
The alarm can be viewed according to alarm grade (all, emergency, important and general).
Confirm alarm: click "confirm" to confirm real-time alarm. After confirmation, the alarm information will not be displayed in the number of current alarm and header alarm, and will be transferred to "confirmed alarm". After the alarm is eliminated, real-time elimination will be displayed.
Note: The "alarm" tab of the MC system displays only currently generated and unfinished alarms. Closed alarms may be queried on the “history” tab.

4.2.8 History

In the history interface, historical alarms, historical data and snapshot record information are displayed.

The historical alarms, historical data and snapshot record interfaces are shown in Fig. 4-12, 4-13 and 4-14.

1. Historical alarms



(Fig. 4-12 Historical alarms interface)

A. The historical data can be queried by device type.

B. The historical data of 1 day, 7 days and 30 days can be queried

C. Export data: the data may be exported and stored in USB flash disk by the USB interface of the MC monitoring host.

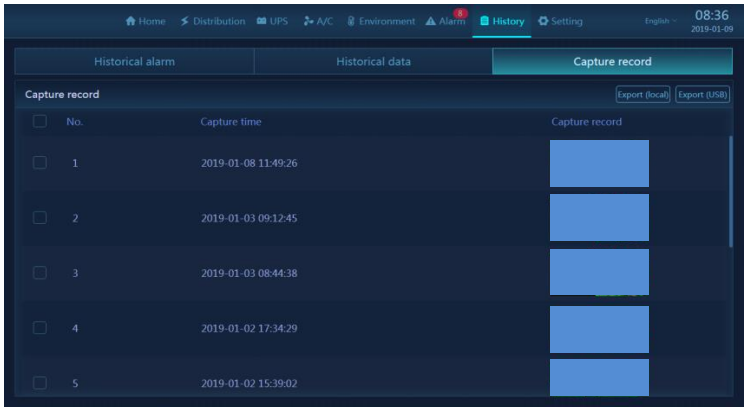
Note: the data may be exported and locally stored by WEB browser.

2. Historical data

(Fig. 4-13 Historical data interface)

The historical data curve of communication equipment is displayed.

3. Snapshot record



(Fig. 4-14 Snapshot record interface）

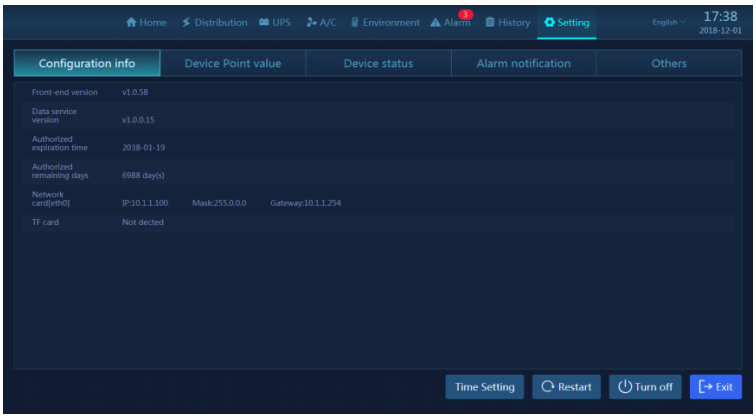
After the MC system enters the standby screen protection status, when the display system will be awakened by manual operation, the screen will capture the current screen will be snapshot and recorded as current information.

Note: the USB camera is called for this function.

4.2.9 Setup

In the setting interface, there are five sub-menus including configuration information, equipment point value, equipment status, alarm notification and others.

1. Configuration information



(Fig. 4-15 Configuration information interface)

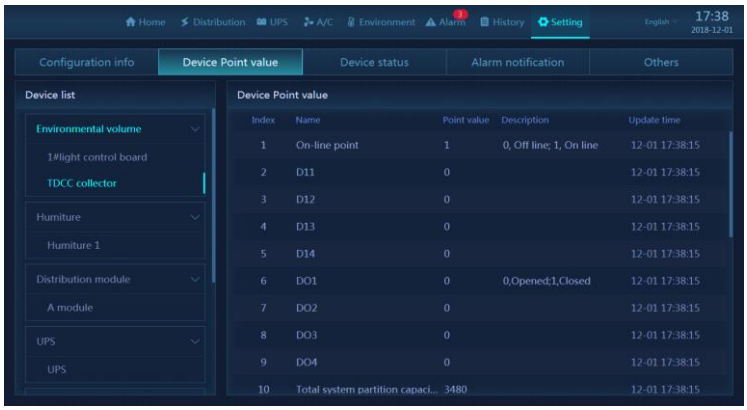
A. Current version: display current version and data service version.

B. Authorization information: display authorized version and the remaining days of authorization. Authorization is associated with the proper functioning of the software.

C. Network card: display network card information for easy use of remote WEB connections.

D. TF card: check the status of TF card: no detected (not inserted or damaged), used storage capacity/total storage capacity. A TF card is related to historical data storage.

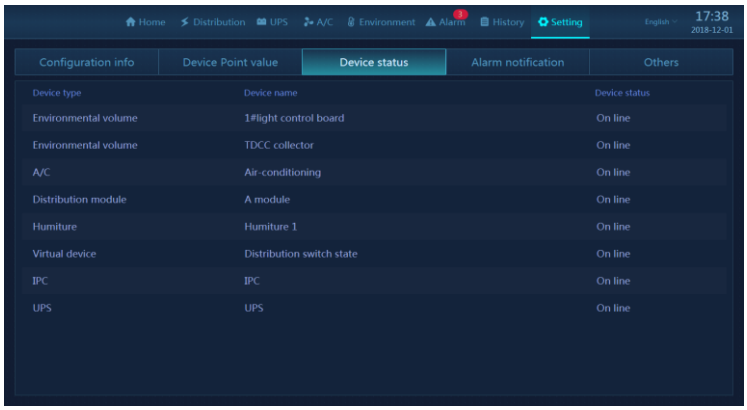
2. Equipment point value



(Fig. 4-16 Equipment point value interface)

A. Equipment list: indicate the current connected equipment types and all equipment under each type.
B. Equipment point value: the protocol point value of the selected equipment will be loaded on the right side after the equipment is selected.

3. Equipment status



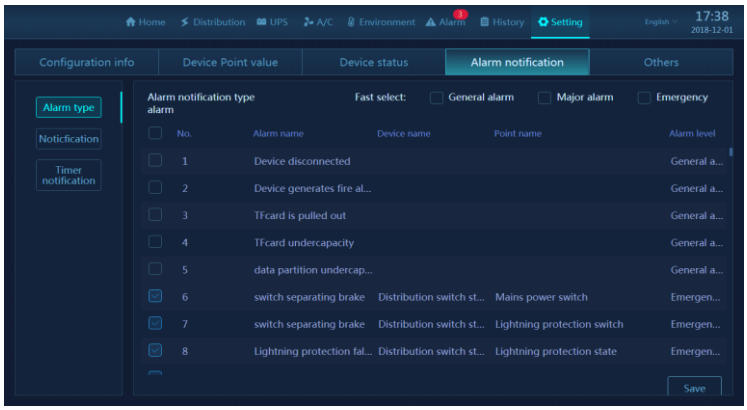
(Fig. 4-17 Equipment status interface)

A. Equipment type: display the equipment type connected with this machine (default equipment type includes environment quantity, collector, air conditioner, distribution module, UPS, temperature and humidity, IPC camera, virtual point value).

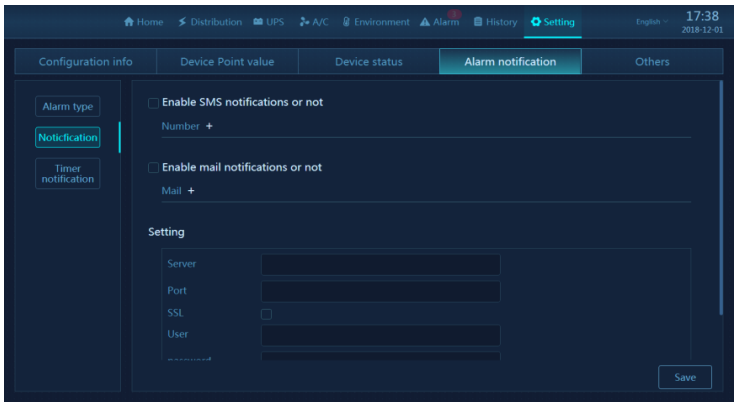
B. Equipment name: the equipment name named according to the equipment type.

C. Equipment status: corresponding communication status of equipment (online is normal status, offline is fault status).

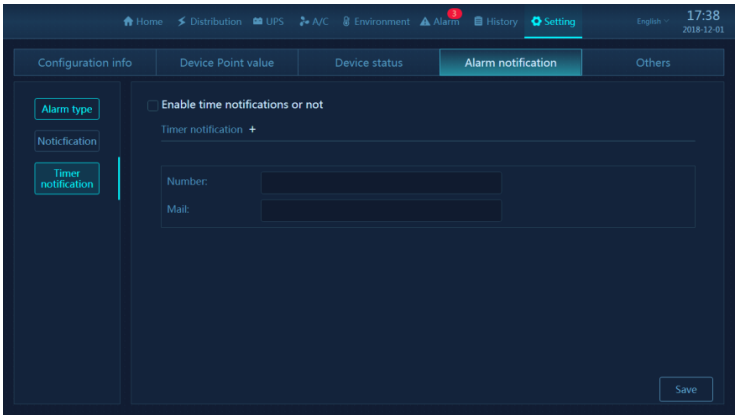
4. Alarm notification



(Fig. 4-18 Alarm notification/alarm type interface)



(Fig. 4-19 Alarm notification/notification mode interface)



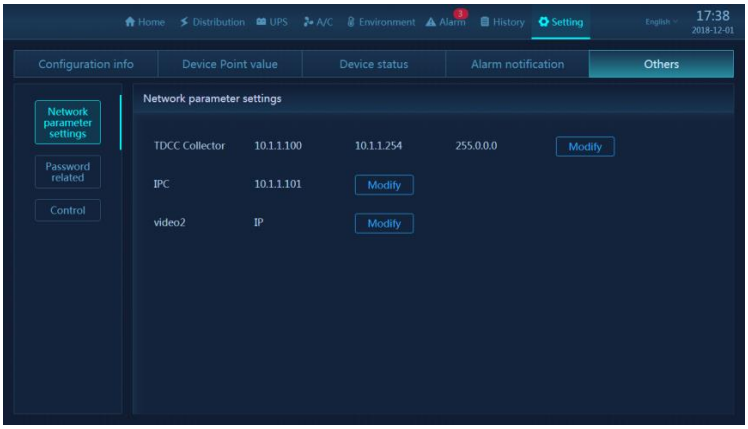
(Fig. 4-20 Alarm notification/timing notification interface)

A. Alarm type: the alarm information to be notified can be selected according to the alarm grade.

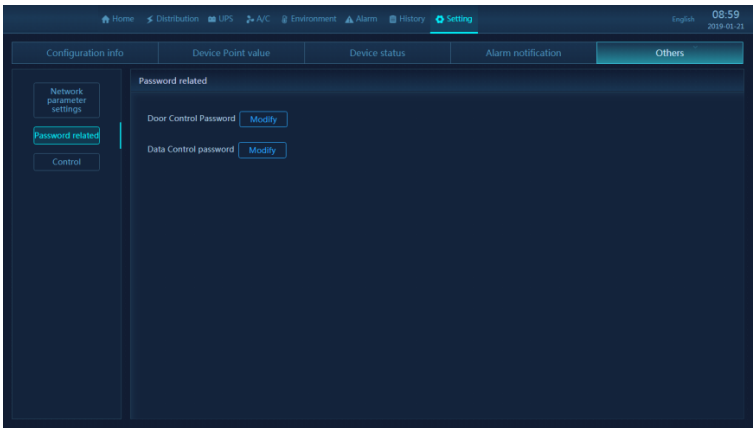
B. Alarm mode: set the alarm notification mode. SMS notification and email notification are selectable.

C. Timing notification: the alarm notification can be set to send at a fixed time. It can be used for two alarm modes.

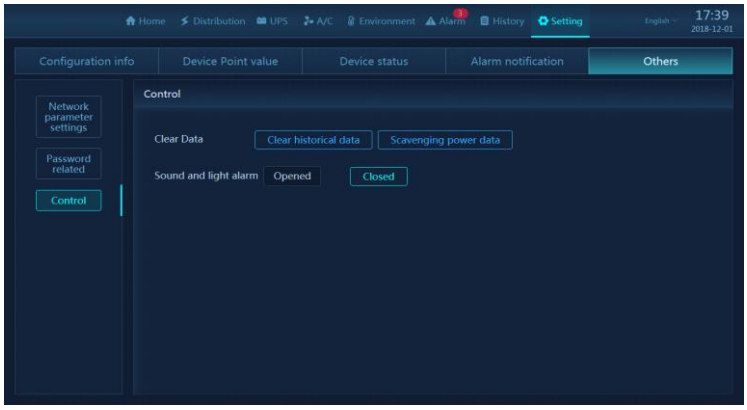
5. Other



(Fig. 4-21 Other/network parameter setting interface)



(Fig. 4-22 Other/password-related interfaces)



(Fig. 4-23 Other/control interfaces)

1. Network parameter setting interface:

A. Display the IP address of the equipment collector and IPC camera. Click "modify" to change the IP address (as shown in Fig. 4-21).

B. Restart the collector after changing its IP address. Enter a new IP address in the WEB interface to log in normally.

C. When changing the IPC address on the interface, change the IP address of the camera to ensure that the camera address should always be consistent with the IPC address on the interface.

2. Password-related:

A. Click "modify" to change the door opening control password and data control password. The default password is 123456.

B. The door opening control password is used to control the front and back doors of the cabinet in the environment quantity interface (as shown in Fig. 4-10).

C. The data control password is used to clear historical data and power data at the control interface (as shown in Fig. 4-23).

3. Control:

A. Click it to clear the historical data or power data, or clear the data by the password.

B. Sound and light alarm status: click the button "valid" to enable sound and light alarm, and under this condition the status changes from invalid to valid. The button changes from "valid" to invalid. Click the button "invalid" again to reset the sound-light alarm. This function is mainly used to realize the artificial short-time resetting of sound and light alarm after the occurrence of sound and light alarm (as shown in Fig. 4-23).

4.2.10 WEB interface

Operation procedure

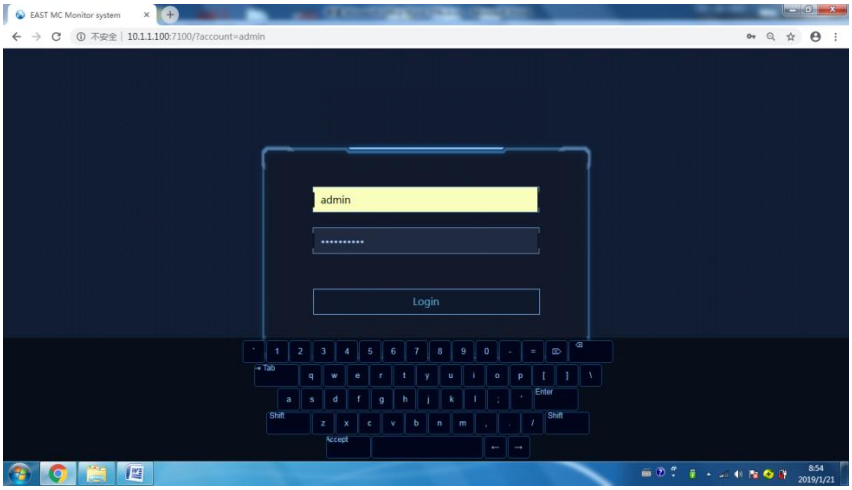
Step 1: Modify the gateway and IP address of the computer to ensure that they are similar to the MC system.

Step 2: Enter the moving ring IP address of MC1000/2000 by the Google browser.

http://10.1.1.100:7100 (MC1000 defaults to this port and this IP)
http://10.1.1.200:7100 (MC2000 defaults to this port and this IP)

Note: the network card information in the Settings can be viewed.

Step 3: Enter the user name: admin (default) and the password: admin12345 (default) to log in to the web monitoring interface of MC1000/2000.The login interface is shown in the following figure:



(Fig. 4-24 WEB login interface)

- After login, the display and operation is same with those of the display operation interface.

5 Maintenance

5.1 Maintenance of MC1000/2000

- The engineers who perform the following operations must be professionally trained. Before operation and maintenance of MC1000/2000, wear anti-static work clothes, anti-static gloves and wristbands, and remove jewelry and watches and other conductive objects to avoid electric shock or burns.
- All internal maintenance and maintenance of MC1000/2000 shall be performed by insulated tools and shall be performed by trained personnel. The user is prohibited to maintain the component with the protective cover which can be opened by a too. If maintenance is required, please consult with our customer service center for details.
- Only maintenance engineer can maintain the power module and the bypass module.
- MC1000/2000 shall be maintained according to the following requirements, otherwise it is possible to cause impact on the normal operation of MC1000/2000 and reduce the normal service life of MC1000/2000.

5.1.1 Monthly maintenance

Inspection content	Standard requirement	Treatment method
Operating environment	➢ Ambient temperature: -20℃ - 45℃ ➢ Humidity: 0% RH - 95% RH (no condensation) ➢ Input voltage of MC1000: 220V AC ➢ Input voltage of MC2000: 380V AC /400V AC /415V AC (line voltage) ➢ Frequency: 40Hz - 70Hz	➢ In case of abnormal temperature, check the air conditioner ➢ In case of abnormal input voltage, check the grid and the input cable. ➢ In case of abnormal output voltage, check the operating status of MC1000/2000 for alarm.
Noise	70dB at 25℃, ordinary pressure and 100% load	Check whether the fan operates normally and alarm.
Moving ring system	All graphic display units on the monitoring panel are in normal operation, and all operating parameters of the power supply are within the normal range. No fault or alarm information appears in the displayed record	In case of alarm, check equipment status and parameters according to alarm content.
Abnormal sound	No abnormal sound	Check the source of the abnormal sound. Mainly check UPS and the air conditioner. In case of failure to identify the cause, timely contact the customer service center.
Cleanness	After the cabinet surface is wiped by white paper. The white paper does not become black obviously	Remove the dust
Cables	The cables are properly connected and not ageing and damaged.	In case of damage, analyze damage cause, and control rats
Energy change	-	Regularly check and record the energy change curve.

Inspection content	Standard requirement	Treatment method
Component function	-	Regularly check whether the optional components are normal. If no, timely contact the customer service center for replacement.
Prepare MC1000/2000 Maintenance report	-	Treat the abnormal condition and alarm according to their class.
Export alarm information	-	Analyze and output alarm analysis report.

5.1.2 Quarterly maintenance

In addition to repeated monthly inspection item, the items shown in Table 5-1 shall be performed.

Table 5-1 Quarterly maintenance

Inspection content	Standard requirement	Treatment method
Cleanness	After the cabinet surface is wiped by white paper. The white paper does not become black obviously	Remove the dust, particularly remove the dust from the fan and the air outlet.
External cables and terminal	No signs of aging, breakage, ignition and loosening	1. Replace the cables 2. Reinforce all output terminal
Internal cables and terminal	No damage, crack or abrasion to the connecting cable	Reinforce all power cable connection terminals and inter-plate wiring terminal
Input and output transformer (if any)	No over-heat discoloration and delamination and peeling. The connecting terminals should be firm, without rust and corrosion	1. Tighten the terminal 2. In case of over-heat discoloration and delamination and rust, replace the transformer.
Parameter inspection	Check the input, output, battery, load voltage and current with a multimeter and clip-on ammeter, which consist with those required for the system and displayed in the LCD	Reset

5.1.3 Semi-annual maintenance

Repeat all quarterly maintenance and inspection

Remove the dust from MC1000/2000, including top, interior, and front.

Check whether the connecting nut between the assemblies of MC1000/2000 modules is loose. If yes, timely tighten the nuts.

5.1.4 Annual maintenance

Repeat all semi-annual maintenance and inspection

In order to prevent the system failure resulting from the wear-out failure of some components and functional components, it is recommended to replace them within their expected life. The life parameters of key components and recommended replacement time are shown in Table 5-2.

Table 5-2 Life parameters of key components and recommended replacement time

Key component	Expected life	Recommended replacement time
UPS	≥ 7 years (62,000h)	5-6 years
Air conditioner	≥ 7 years (62,000h)	5-6 years
Monitoring camera (optional)	≥ 7 years (62,000h)	5-6 years
Moving ring monitoring system	≥ 7 years (62,000h)	5-6 years
Valve-controlled lead-acid battery	5 years	3-4 years

5.2 Battery maintenance

Before operation of the battery, make sure to carefully read the user manual provided by the battery supplier and understand its safety precautions and the accurate connection method of the battery.
Before the installation and maintenance of the battery, in order to ensure safety, attention should be paid to:

- The tools need to be insulated and wrapped.
- Use eye protection devices and take protection measure.
- Wear rubber gloves and protective clothing to prevent the harm caused by electrolyte overflow.
- During handling the battery, do not put the battery terminal upside down. Please handle it with care and pay attention to personal safety.
- The battery switch should be kept disconnected during installation, maintenance and other operations.

5.2.1 Considerations during battery maintenance

During battery maintenance, insulation treatment is performed for the used tools (spanner, etc.). Do not put any sundries on the top of the battery.
Do not use any organic solvent to clean the battery.
Do not remove the safety valve of the battery or add anything to the battery.
Do not smoke or use open flames near the battery pack.
After discharging, the battery should be charged in time to avoid affecting its service life.
All maintenance work must be done by professionals.

5.2.2 Monthly maintenance

Keep the battery room clean.
Check the battery management parameters of MC1000/2000 to ensure that the parameters meet the requirements.
Check the batteries one by one for abnormal phenomena such as terminal damage and heating, shell damage or deformation, and acid overflow at the safety valve, and if found, solve the problems in time.
Measure and record the indoor environment temperature, battery pack voltage, single battery voltage and charging current data of the battery, which should meet the requirements of Table 5-3.

Table 5-3 Monthly inspection content

Inspection content	Standard requirement	Treatment method
Battery management parameter information	The parameter setting meets the requirements, and the capacity setting is consistent with the actual configuration	Parameter error. Correct parameter Settings.
Battery management alarm information	No any battery management alarm information	Identify the cause according to alarm information
Charging current	The charging current value should not be greater than 0.15c10a	Adjust the charging current value of MC1000/2000
Charging voltage of battery pack	Even charging voltage (2.35v /cell 1%) x cell number Floating charge voltage (2.25v /cell 1%) x cell number	1. When it is found that the voltage drops between the output terminal of the battery pack and the battery input terminal at the side of the MC1000/2000 main machine is greater than 1% of the battery voltage, check whether the connection between the battery pack and the MC1000/2000 main machine is too long and cable diameter is too small. 2. Check whether the even charging voltage and floating charging voltage of MC1000/2000 is set properly. 3. If failure persists, timely contact the customer service center.
Battery appearance	4. Good battery shell and no deformation, swelling, acid leakage, acid crawling and acid popping 5. No dust and dirt	6. Take photos of battery deformation and fault location. 7. Check and record the charging voltage and current of the battery pack as well as the voltage of each cell of the battery pack. 8. Measure the surface temperature of the battery. 9. Remove the fault battery after the battery pack is disconnected and let it sit for 30min to detect and record the open circuit voltage of the fault battery. 10. If failure persists, timely contact the customer service center.
Battery connection	Good contact between battery terminal and connection wire	Confirm whether the contact battery terminal and connection wire is good.

Inspection content	Standard requirement	Treatment method
Operating temperature of battery	11. Check the deviation between the temperature value reported by the battery temperature sensor and the actual temperature value, which shall not exceed the specified value 12. The operating temperature of the battery should be less than 45 ℃	13. Identify the failure cause of the temperature sensor. 14. Identify the cause for the abnormal operating temperature of the battery. 15. If failure persists, timely contact the customer service center.

5.2.3 Quarterly maintenance

In addition to the monthly inspection items, the items shall be checked.

Inspection content	Standard requirement	Treatment method
Cell voltage	➢ Even charging voltage (2.35V/cell±0.02V/cell) x cell number ➢ Floating charge voltage (2.25V/cell±0.02V/cell) x cell number	1. Check whether the average charging voltage and floating charging voltage of each cell are normal. 2. If it is found that the battery charging voltage exceeds the standard, the forced even charging is performed for the battery pack, and recheck whether the battery voltage is normal. 3. If failure persists, timely contact the customer service center.
Shallow discharge test (recommended)	After the standby power of MC1000/2000 system is well prepared, make the shallow discharge test for the battery to ensure that the battery can discharge normally	4. Check the problem point in case of problem. 5. If failure persists, timely contact the customer service center.

5.2.4 Annual Maintenance

In addition to the monthly inspection items, the items shall be checked.

Inspection content	Standard requirement	Treatment method
Capacity test (recommended)	After the standby power of MC1000/2000 system is well prepared, discharge the battery to the under-voltage alarm point to ensure the real-time capacity of the battery is refreshed	6. If abnormal, identify the problem point 7. If failure persists, timely contact the customer service center.

6 Troubleshooting

Remove the common failure in the treatment method shown in Table 6-1. If it is difficult to determinate and solve problems or in case of other problems in the process of fault treatment, please inquire the alarm list and contact our customer service center.

Table 6-1 Troubleshooting

Problem		**Possible cause**	**Solution**
Failure of touch display screen	After the screen protection appears on the display screen, failure to awaken the screen by click	Check whether the display screen is powered on Check whether HDMI terminals become loose or falls Check whether the moving ring host of MC is powered on Check whether two ends of USB touch control cable become loose or falls	If the failure is removed by the above operation, please contact the consumer service center.
No historical data	No historical data curve of equipment in “historical – historical data”.	Check whether TF card is normal by “setting – TF card status”. No historical data if TF card is configured.	Replace the TF card
Equipment communication failure	Communication connection failure of assembly and equipment	The connecting terminal of the communication equipment is loose.	Confirm that terminal contact is firm.
		Error equipment address	Contact the customer service center for verification of the address. Automatically connect after dialing.
Camera failure	Failure to view video by browser	Check whether IPC is powered on	Connect the power supply.
		Check IPC network configuration is normal	Default: MC1000:10.1.1.101 User name: admin, Password: east12345; MC2000:10.1.1.201 User name: admin, Password: east12345
		Check whether VLC plug-in for WEB browser.	Install the plug-in
WEB display failure	Rear display ratio of WEB interface	The browser with Chrome core is not selected. The Chrome core is selected.	Set to browser top speed mode
		Correct scaling ratio is not selected.	Better ratio 1280*800
Abnormal system time	Large difference between system time and actual time.	The battery is not installed for the moving ring host of MC or low. Install/ replace the battery.	The system supports NTP timing. Please contact the customer service center to set up the NTP timing server

7 Specifications

7.1 Physical characteristics

Physical characteristics	
Wiring mode	MC1000/MC2000 supports up and low wire incoming
Weight	MC1000 single cabinet – equipment cabinet: 200kg MC1000 multi-cabinet – equipment cabinet: 205kg MC2000 standard – equipment cabinet: 275kg MC1000/2000 – IT cabinet: 140kg

Model	**Configuration**	**Weight**
MC1000 single cabinet	Equipment cabinet	200kg
MC1000 multi- cabinet	Equipment cabinet	205kg
MC2000	Equipment cabinet	275kg
MC1000/2000I cabinet	IT cabinet	140kg

7.2 Safety regulation and EMC

Safety regulation and EMC	
Safety regulation	EN62040-1: 2008 IEC62040-1: 2008

7.3 System information

Item	Description	Model	
		MC1000	MC2000
System parameter	Quantity of single module cabinet	1-4	4-24
	Quantity of IT cabinet	0-3	3-21
	Channel type	Single row channel, natural heat dissipation/closed cool channel/closed hot and cold channel	
	Power consumption at maximum load	3-18kW	18-54kw
	Maximum power density of single cabinet	3kW	6kW
	Battery deployment mode	Battery pack, battery cabinet, battery rack	

	Standby time of battery	15min-240min				
	Installation mode	Cement floor, overhead floor				
	Power supply system	1Φ+N+PE		3Φ+N+PE		
	Operating temperature	-20℃-45℃				
Cabinet system	Natural heat dissipation	(N*600)*1200*2000mm, excluding foot wheels and adjusting foundation bolt, front and rear high-density ventilation mesh doors. N is the number of cabinets				
	Closed cool channel	(N*600)*1200*2000mm, excluding foot wheels and adjusting foundation bolt,, front glass door, rear mesh door. N is the number of cabinets				
	Closed heating channel	(N*600)*1400*2000mm, excluding foot wheels and adjusting foundation bolt, and front and rear glass door. N is the number of cabinets				
	Large available space	420U (12 x cabinet, excluding battery pack, load 60kW)				
	Protection grade of system	IP20 (mesh door) , IP50 (glass door)				
Refrigerating system	Input power supply	1Φ+N+PE		3Φ+N+PE		
	Refrigerating capacity	4.5kW/4U	8kW/10U	15kW/12U	30kW/21U	
	Air conditioner configuration	1+0, 1+1, 2+0, 2+1, 3+0, 3+1				
	Sensible heat ratio (sensible cooling rate/total cooling rate)	1				
	Refrigerant	R410A				
	Air supply mode	Front air supply, rear air return				
	Installation mode	Rack-mounted				
Power distribution system	Power supply input	1Φ+N+PE		3Φ+N+PE		
	UPS capacity	3 KVA/6 KVA/10 KVA		20 KVA		
	UPS configuration	N, N+1, 2N（N≤4）				
	Maintenance bypass	Support				
	Quantity of main output circuits	A: 8	B: /	C1: 15	C2: 12	D: 8
	Output circuit of UPS	A: 4	B: /	C1: 9	C2: 12	D: /
	AC lightning protection	Class B and C				
Moving ring system	Monitoring system host	1U size, 6 x serial port +4 x DI port +4 x DO port + 1x Ethernet port		1U size, 10 x serial port +4 x DI port +4 x DO port + 1x Ethernet port		
	Display	10.1 inch LCD screen				
	Signal collector	Used for collecting and monitoring the environmental status of the cabinet. one per cabinet.				
Sensor system	Smoke sensor	One smoke sensor per cabinet, DI signal.				
	Temperature and humidity	Used for detecting the temperature and humidity of cool channel of the cabinet. one per cabinet, 485 signal.				
	Water leakage detector + water leakage rope	Used for detecting the water leakage of the cabinet. 1 water leakage rope connectable as standard configuration. The quantity of the water leakage rope is determined according to actual condition. DI signal.				
	Infrared sensor	Optional, used together with the atmosphere lamp on the front door of the cabinet. DI signal				
	Audible and visual alarm	Optional, used together with the moving ring monitoring alarm. DO signal				