Micro Data Center

Eaton iCube

User Manual

Powering Business Worldwide

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About this manual

Thank you for choosing Eaton iCube micro data center (MDC).

This user manual introduces how to install the MDC cabinets, components, and cooling units and how to control the MDC using the web UI. Commissioning and troubleshooting information is also provided.

NOTE

The web UI may vary with versions. The web UI actually displayed shall prevail.

Conventions

The symbols that may be found in this user manual are defined as follows.

Symbol	Definition
WARNING	Indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
CAUTION	Indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.
NOTE	Information notes call attention to important features or instructions. Ignoring this type of note may result in ineffective configuration, loss of data or damage to device.

Change history

Release date	Description
2023-11-30	Updated **Installation site planning diagram (top view)** in Requirements about installation site.
2023-10-20	– Updated 2.1 Introduction to the MDC. – Updated the **Temperature and humidity of 3.5 kW integrated cooling unit (with self-evaporative kit)** figure in 2.4 System specifications. – Added the operation requirement for connecting a fire extinguishing module in 4.2.8.1 Introduction to the fire extinguishing module. – Updated the input cable specifications in 4.2.9 Connect external cables. – Updated the cooling unit models in 5.3.4.2 Wiring instructions for power terminal of the unit, 5.3.8.4 Vacuumize the pipes, and 5.3.8.5 Calculate refrigerant amount. – Updated **Step 3** in 7.2.3 Log in to the MDC through a computer (wired connection). – Updated the parameter description of **SMTP Service**, **Port** and **SSL** in 7.15.2 Set email addresses for receiving alarm notifications. – Updated the operation procedure in 9.2.9.2 Replace a PDM switch.
2023-09-28	First release.

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1 Safety precautions

General requirements

- Read this manual carefully before operating the product.
- The “caution” and “warning” sections in this manual do not represent all the safety precautions. These sections only highlight some points for safety precautions.
- This product is recommended for commercial or other professional use.
- This product is to be used for its design purposes only and Eaton will not accept any responsibility of misuse.
- The areas inside the product cabinet are restricted areas. Eaton recommends that access to restricted areas be given to authorized employees only.
- The product password must be kept by the designated person-in-charge.
- For the safety precautions of the uninterruptible power systems (UPS) and air-conditioners, refer to their user manuals and maintenance manuals.

Electrical safety

- For electrical connections, insulating tools must be used.
- After the product emits a warning through the monitoring floor, locate and eliminate the cause promptly to avoid further problems or failures.

Risk of electric shock

An electric shock can cause personal injury or even death. Therefore, pay attention to the following points:

- Before working on components inside the product, disconnect the control box and the remote power supply.
- Before installation, read all the operating instructions, verify that all the components are received at the installation site and check the nameplate to ensure that the voltage matches the mains supply.
- Comply with the on-site or local laws and regulations.

Cooling unit safety

- Use the R410A refrigerant only.
- Brass must support a minimum working pressure of 55bar.
- At least two persons are required on a welding site. A welder must have a work permit.
- In the welding site, inflammables must be avoided, and a fire extinguisher, wet wiper, and water container must be available.
- A burning welding torch must not be placed on a component or on the floor and must not be placed in a metal container with acetylene and oxygen. Otherwise, the gas may leak and cause a fire.
- High-temperature pipes after welding must be promptly cooled.
- Do not weld or cut on pressurized containers or pipes. Electric devices must be powered off before welding.

- When maintaining or replacing components, pay attention to high-temperature components (such as the compressor, refrigerant pipe, and electric heater) to prevent scalds and to prevent the refrigerant system from being cracked or exploded due to misoperations.
- Refrigerant leakage may cause frostbite. Take protective measures (for example, wear antifreeze gloves) when handling refrigerant.

Installation environment requirements

Pay attention to the following when working at least 2 meters above the ground:

- Comply with local laws and regulations.
- The operator must be trained and qualified.
- Before working at heights, check the climbing tools and safety gears such as safety helmets, safety belts, ladders, springboards, scaffolding, and lifting equipment. If they do not meet the requirements, take corrective measures or disallow working at heights.
- Wear personal protective equipment such as the safety helmet and safety belt or waist rope and fasten it to a solid structure. Do not mount it on an insecure moveable object or metal object with sharp edges. Make sure that the hooks will not slide off.
- Set a restricted area and eye-catching signs for working at heights to warn away irrelevant personnel.
- Carry the operation machinery and tools properly to prevent them from falling off and causing injuries.
- Personnel involving working at heights are not allowed to throw objects from the height to the ground, or vice versa. Objects should be transported by tough slings, hanging baskets, highline trolleys, or cranes.
- Ensure that guard rails and warning signs are set at the edges and openings of the area involving working at heights to prevent falls.
- Do not pile up scaffolding, springboards, or other sundries on the ground under the area involving working at heights. Do not allow people to stay or pass under the area involving working at heights.
- Inspect the scaffolding, springboards, and workbenches used for working at heights in advance to ensure that their structures are solid and not overloaded.
- Any violations must be promptly pointed out by the site manager or safety supervisor and the involved personnel should be prompted for correction. Personnel who fail to stop violations will be forbidden from working.

Potential risks

- Operate the product only after disconnecting it from all power sources.
- Before opening internal components for maintenance, disconnect the mains switch and all power supplies to the UPS.

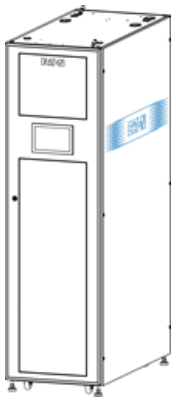
2 Product overview

2.1 Introduction to the MDC

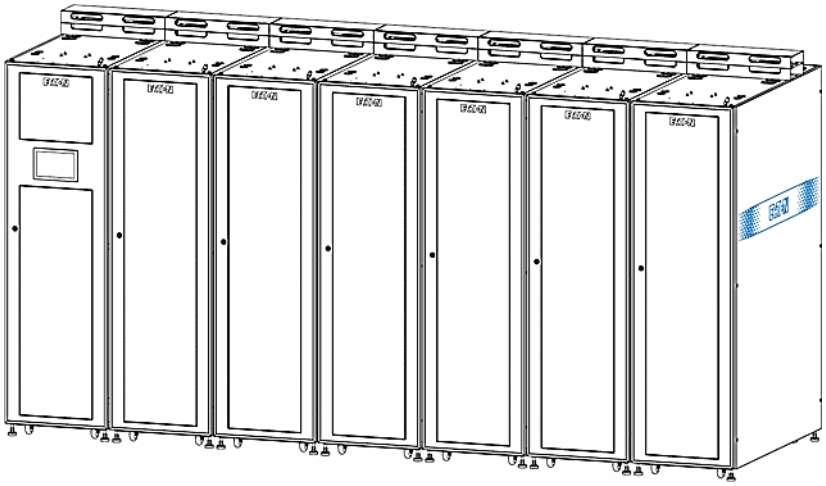
As a converged data center infrastructure solution, Eaton's new generation of iCube Micro Data Center has the following features:

- Integrating subsystems such as UPS, power distribution, cooling, environmental monitoring, and lighting
- Available as a single cabinet or as multiple cabinets to accommodate different applications
- Pre-designed systems with factory validation
- Quick cabinet deployment and flexible configurations

Eaton iCube is designed for use in environment requiring micro data centers, computers, or server rooms for small and medium businesses and branch offices. It comes with a choice of single cabinet and row or multiple cabinet system. All devices that meet EIA-310-D standards can be installed in the cabinet. It comes standard with a 10.1-inch touchscreen, LED lighting with colorful atmosphere lights, temperature and humidity sensor, smoke sensor, water leakage detector, electronic door locks, etc.

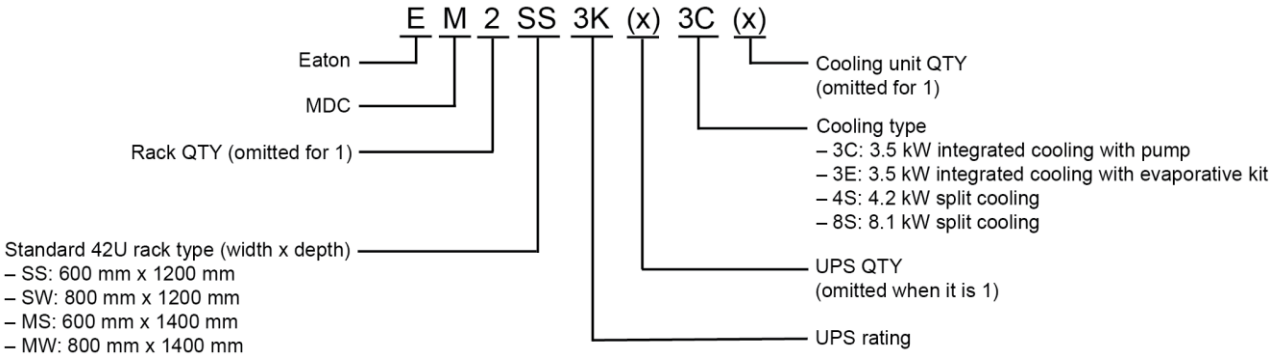


Standard single cabinet (42U)



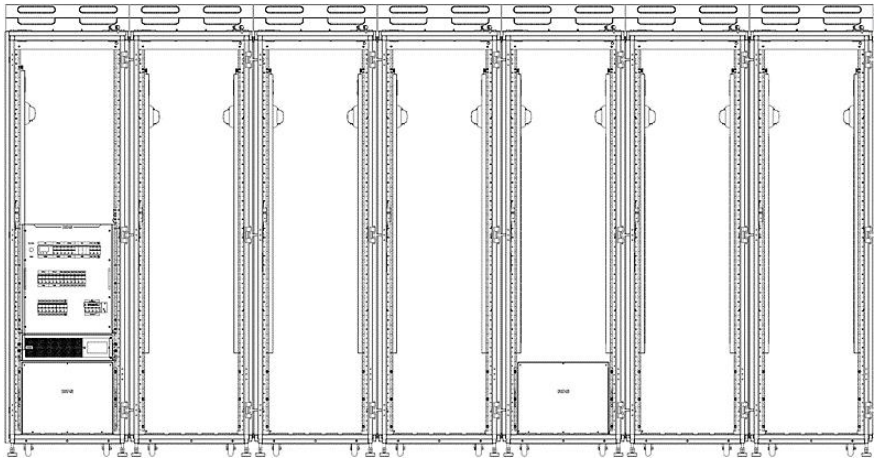
Row (multiple) cabinet

2.2 Model number definition



2.3 System assembly

The following figure shows how a system is assembled with one main cabinet and six IT cabinets for example.



System assembly (1+6 for example)

The following table describes how a system is assembled.

Model	*Load capacity	Number of cabinets	UPS	Air-conditioning	Module	PDU
EMSS6K3C	3.0 kW	1	9PX6Ki	R03A	PDM6K-E	Basic type IEC32A-20x C13, 4 x C19 (2PCS)
EMSS6K3E	3.0 kW	1	9PX6Ki	R03A	PDM6K-E	Basic type IEC32A-20x C13, 4 x C19 (2PCS)
EMSW6K3C	3.0 kW	1	9PX6Ki	R03A	PDM6K-E	Basic type IEC32A-20x C13, 4 x C19 (2PCS)
EMSW6K3E	3.0 kW	1	9PX6Ki	R03A	PDM6K-E	Basic type IEC32A-20x C13, 4 x C19 (2PCS)
EMSS6K4S	3.5 kW	1	9PX6Ki	E04SE/ EW06E	PDM-6K	Basic type IEC32A-20x C13, 4 x C19 (1PCS)
EM3MS10K8S	*7 kW	1+2	9PX11KiPM31	E08SE/ EW10E	PDM-10K	Basic type IEC32A-20x C13, 4 x C19 (5PCS)
EM5MS20K8S(2)	*14 kW	1+4	9SX20KPMCH	E08SE/ EW10E *2	PDM-20K	Basic type IEC32A-20x C13, 4 x C19 (9PCS)

Model	*Load capacity	Number of cabinets	UPS	Air-conditioning	Module	PDU
EM7MS20K(2)8S(3)	*21 kW	1+6	9SX20KPMCH *2	E08SE/ EW10E *3	PDM-2*20K	Basic type IEC32A-20x C13, 4 x C19 (13PCS)

Note

The load capacity of the model marked with an asterisk (*) need to be derated to 90% when the cabinets are used in an environment of 30°C to 40°C.

When using three-phase power, pay attention to the principle of equal load distribution of each phase and try to distribute the load evenly in each cabinet.

2.4 System specifications

The following table lists the system specifications.

System	Item	Description
System	Single cabinet size (W×D×H)	600 mm×1200 mm×2000 mm (42U)
	Row cabinet size (W×D×H)	600×(3–7) mm×1400 mm×2000 mm (42U)
	Number of cabinets	1–7 pcs
	Power Usage Effectiveness (PUE)	Low as 1.34
	Input power	– Single cabinet: 220/230/240 Vac (L+N+PE) - 50/60 Hz – Row cabinets: 380/400/415 Vac (3Ph+N+PE) - 50/60 Hz
	Installation site	Raised floor/Cement floor
Rack enclosure and aisle containment system	Static load of the cabinet	1860 kg
	Vibration level of the cabinet	Level 8 (YD5083-2005)
	Color	RAL9005 (black)
	Front/Rear door of single cabinet/Row cabinet	Single glass door/Single metal door
	Emergency Plan (Fire/High temperature)	Pop-up front and rear doors (see Note 1)
Cooling system	Cooling capacity/set	3.5 kW (integrated cooling)/4.2 kW (Split cooling)/ 8.1 kW (split cooling) (see Note 3)
	Air flow/set	600 m^3/h (3.5 kW)/800 m^3/h (4.2 kW)/1600 m^3/h (8.1 kW)
	Air supply	Up
	Installation method	Rack mounted
Power supply subsystem	UPS power level	3 kVA/6 kVA/10 kVA/20 kVA
	UPS installation method	Rack mounted
Power distribution system	Power distribution module form factor	3–12U
	Power distribution unit (PDU)	32A Basic type 0U PDU (standard IEC socket) Monitored and managed PDU as an option
Monitoring subsystem	Control monitoring server	0U monitoring module integrating user screen - single cabinet/row cabinet
	Remote monitoring	Web page (Google Chrome recommended) Mobile APP (Android only)

System	Item	Description
	Monitoring content	Such information of the system including power, cooling, temperature, smoke, water leakage, and access control
	Sensor	Such information including water leakage, smoke, temperature and humidity, and access control (sensor quantity varies with system configuration)
Wire layout subsystem	Cable management	Power troughs/Cable trays go above
	Monitoring wire	Pre-installed inside the cabinet

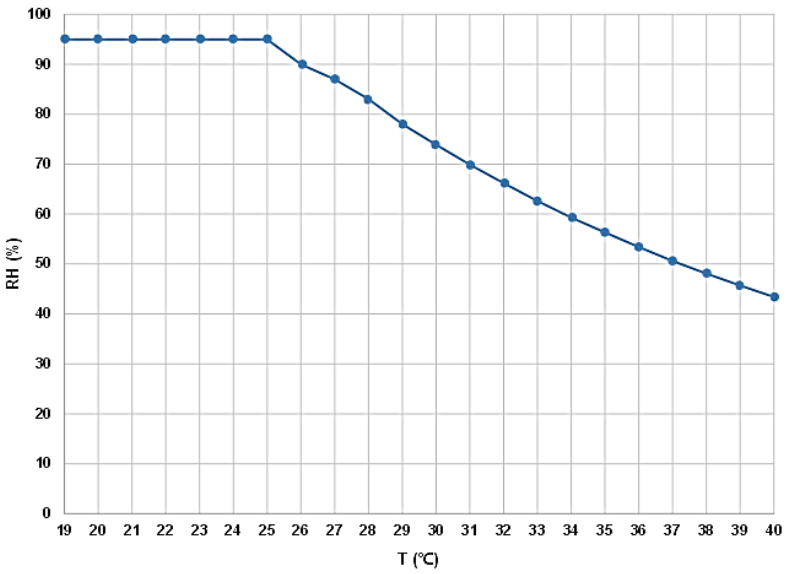
Note

1. *Standard single cabinet and row (multiple) cabinets are equipped with a swing door. When the system works normally, the door is closed. When the system overheats (temperature of rack inlet higher than 35°C) or a smoke alarm occurs, the door automatically opens, and the system enters the emergency operation mode.*
2. *Cooling capacity is measured under this working condition:*

   Indoor return air: @37.8°C/20%RH

   Outdoor ambient temperature: 35°C
3. *All cooling units are integrated cooling units without refrigerant, which needs to be charged on site.*
4. *For 3.5 kW cooling units, there are two ways to drain condensate: condensate pump and evaporative kit for free drainage.*
5. *If an evaporative kit of 3.5 kW cooling unit is used, it is necessary to check in advance the temperature and humidity conditions on site.* ***Please refer to the chart below****: In a well-sealed cabinet (leakage rate below 10%), the T/H condition below the curve will not trigger an overflow (condensate) alarm and shutdown. If the T/H condition is higher than the curve, there is a risk of overflow because the condensate volume is higher than the capacity of the evaporation kit. In this case, it is recommended to use with a condensate pump instead.*
6. *An emergency gravity drain is provided to prevent overflow alarms. Gravity drainage can be performed by manually opening the manual water valve of the cooling unit.*

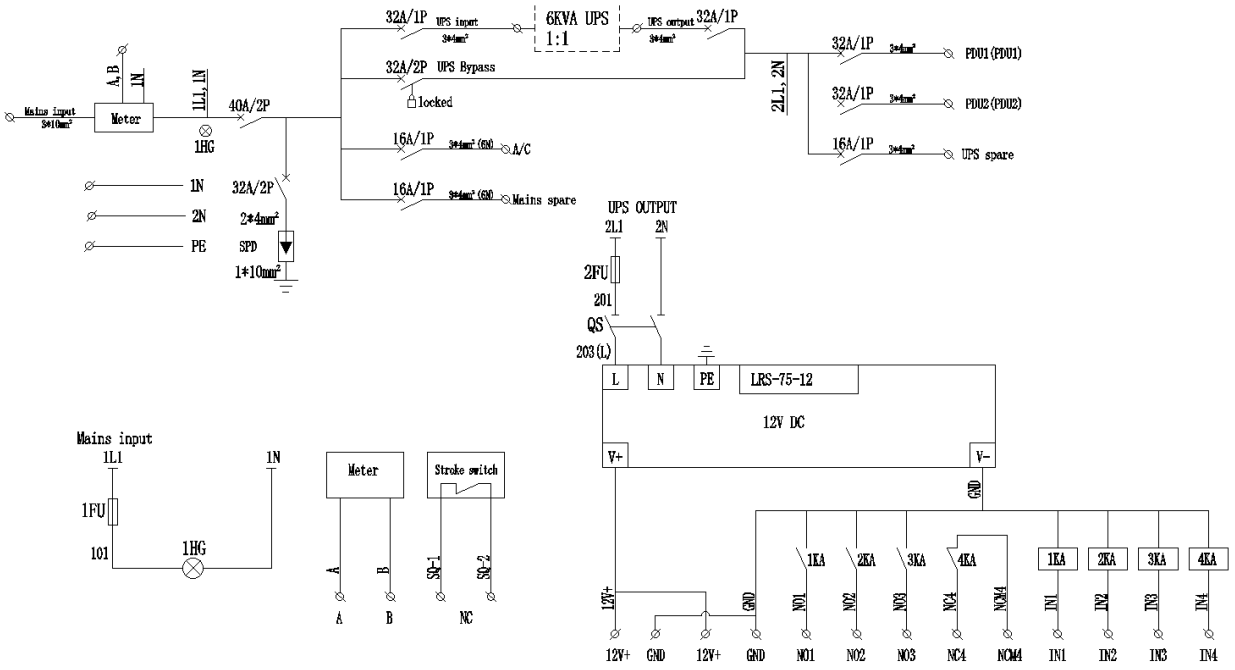
Ambient temperature (°C)	Ambient humidity (%)
19	95
20	95
21	95
22	95
23	95
24	95
25	95
26	90
27	87
28	83
29	78
30	74
31	70
32	66
33	63
34	59
35	56
36	53
37	51
38	48
39	46
40	43



Temperature and humidity of 3.5 kW integrated cooling unit (with self-evaporative kit)

2.5 System electrical diagram

The following figure shows a circuit example of a single cabinet. Circuits of other models are similar. The circuits of row (multiple) cabinets are almost similar to that of the single cabinet, except for the wiring of cooling units and PDUs.

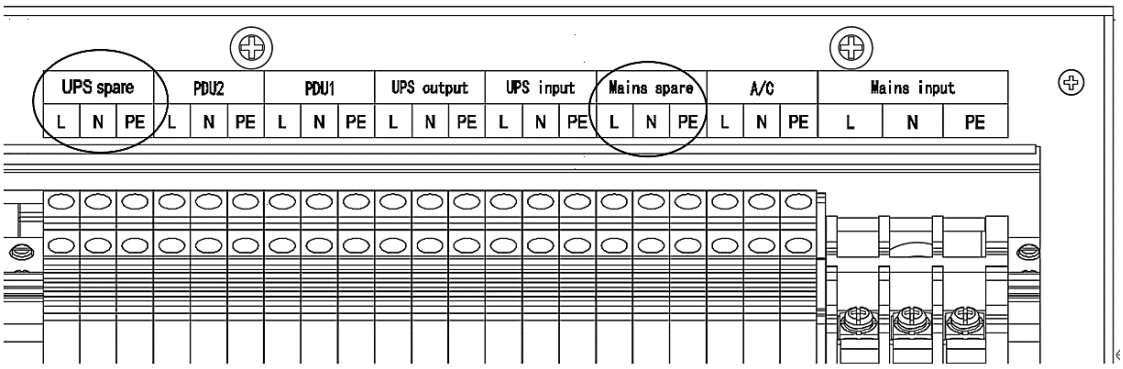


Electrical diagram

Note

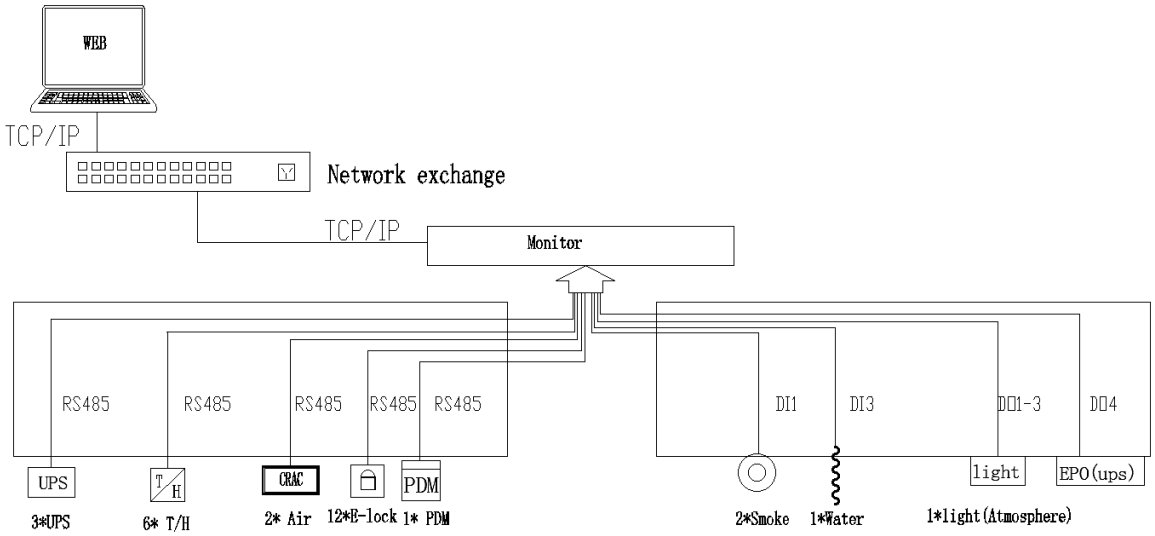
Two spare terminals, one for mains backup circuit and one for UPS backup circuit, are available to meet additional customer requirements.

To connect the spare terminals, connect the wires from the back end of the power distribution module (PDM).



Spare terminals

2.6 Monitoring system



Monitor circuit

2.7 Environment requirements

The recommended operating and storage environment are as shown below.

Storage temperature	-25ºC to +55ºC (battery excluded)
Storage environment	Indoor/clean (no dust, etc.)
Operating temperature	0ºC to 40ºC
Ambient humidity	5%RH to 95% RH (no condensation)
Altitude	≤ 3000 m (consult us for usage over 1000 m)

3 Installation preparation

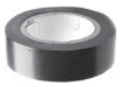
3.1 Installation tools

Before installation, it is recommended to have the relevant tools available. The following table lists the tools needed to install the MDC.

Note

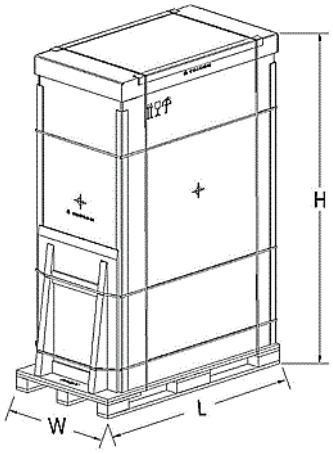
The cooling unit needs to be installed by professionals. See details in 5 Installation of cooling units.)

Tool specifications

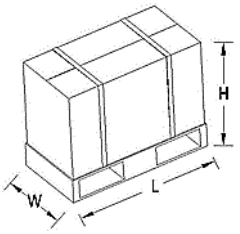
Adjustable wrench (6")	**Phillips screwdriver**	**Slotted screwdriver**	**Needle-nose pliers**	**Diagonal cutters**
				
Used to adjust the device cabinet screws and assemble the device cabinet	Used to install system components and connect wires	Used to connect wires to the cooler	Used to connect wires	Used to connect wires
Crimping tool	**Wire stripper**	**Hex wrench**	**Tape measure (5m)**	**Spirit level**
				
Used to connect wires	Used to connect wires	Used to install system components	Used to locate the device cabinet	Used to check whether cabinets are placed horizontally
Protective gloves	**Antistatic gloves**	**Insulation tape**	**Multimeter**	**Electroprobe**
				
Used for protection when assembling components	Used for protection when installing the cooler	Used for insulation tape when connecting wires	Used to test circuits	Used to test circuits

3.2 Package

The figure below shows the package of MDC.



Cabinet package



Split cooling unit package

The following table lists the dimensions and weight of the components with package.

Package size (unit: mm)					
System component (packed)		**L**	**W**	**H**	**Gross weight (kg)**
Main cabinet	EMSS6K3C	1430	774	2236	325
	EMSS6K3E	1430	774	2236	325
	EMSW6K3C	1430	974	2236	355
	EMSW6K3E	1430	974	2236	355
	EMSS6K4S	1430	774	2236	300.5
	EM3MS10K8S	1630	774	2236	350.9
	EM5MS20K8S(2)	1630	774	2236	359.5
	EM7MS20K(2)8S(3)	1630	774	2236	384.3
IT cabinet (without cooling unit/with cooling unit)		1630	774	2236	128.5/168
Outdoor cooling unit (4.2 kW)		890	545	300	33.5
Outdoor cooling unit (8.1 kW)		1008	452	747	46.5

Accessory kits are listed as below.

No.	**Name**	**QTY**	**Unit**	**Remarks**
1	Accessory kit	1	Set	Including battery cables, installation screws, and cable ties
2	Upper cable tray	1	Set	One set per cabinet (applicable for row cabinets)

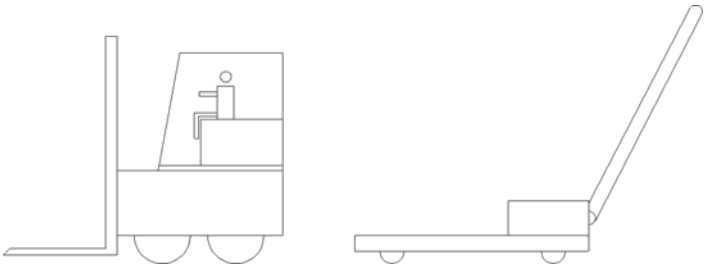
3.3 Transportation and unpacking

CAUTION

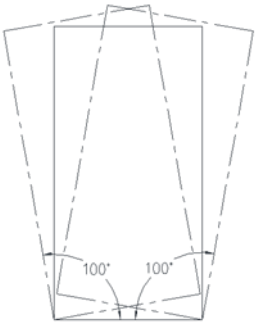
Ask a qualified technician to install infrastructure of the data center room.

3.3.1 Transportation

Because cabinets and cooling outdoor units are heavy, electric forklift or manual forklift is recommended for handling and moving them to the installation site. When transporting, ensure that the inclination angle of the cargo should not exceed 10°, as shown in the following figures.



Transporting tools



Tilt angle range

Note

- *All devices must be kept upright all the time.*
- *Since the device is heavy, the center of gravity of the device must be balanced during transportation.*
- *The cooling outdoor unit must be kept upright. Do not reverse the unit or set it upside down, otherwise it will be damaged.*

3.3.2 Unpacking

For the convenience of unpacking and transporting the MDC, you can move the unit to the nearest flat ground before unpacking.

The unpacking procedure is as follows:

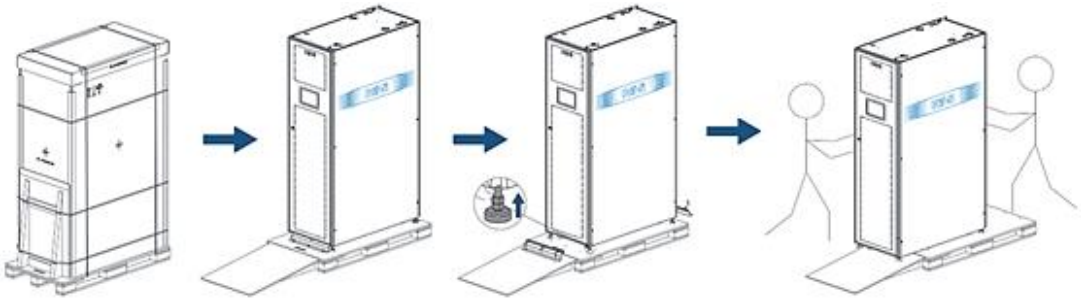
Step 1 Transport the packaged device to an open, flat, and firm ground. Remove the packaging and cushion materials.

Step 2 Place the ramp pallet at the front of the cabinet as shown in figure below.

Step 3 Open the front and rear doors, remove the angle bracket, and screw the feet to ensure smooth movement of casters.

Step 4 Close the front and rear doors. Slowly push the cabinet down along the pallet

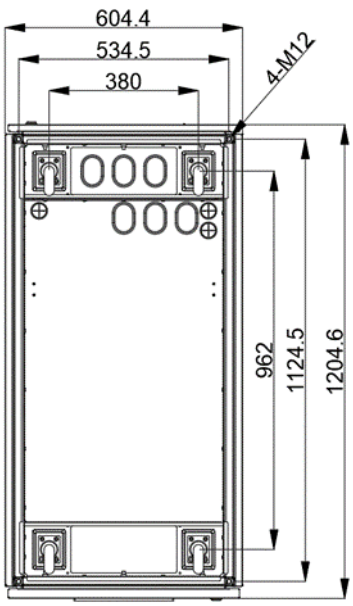
It is recommended that at least two operators perform this step to ensure safety.

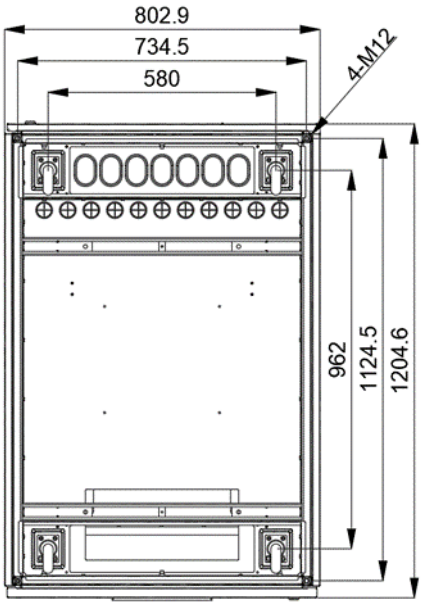


—End

3.4 Requirements about installation site

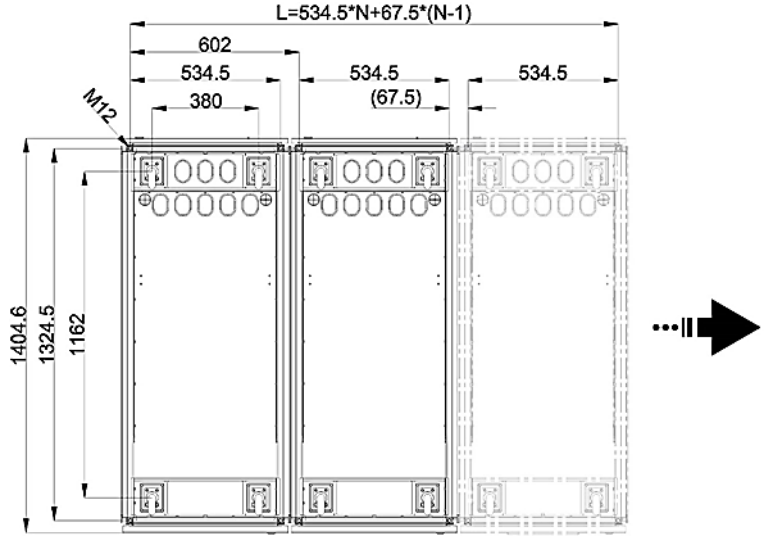
The MDC can be installed on cement floor or raised floors. Ensure sufficient space or height between the cabinet bottom and the ceiling. See the bottom dimensions of the MDC cabinet in the following figures.





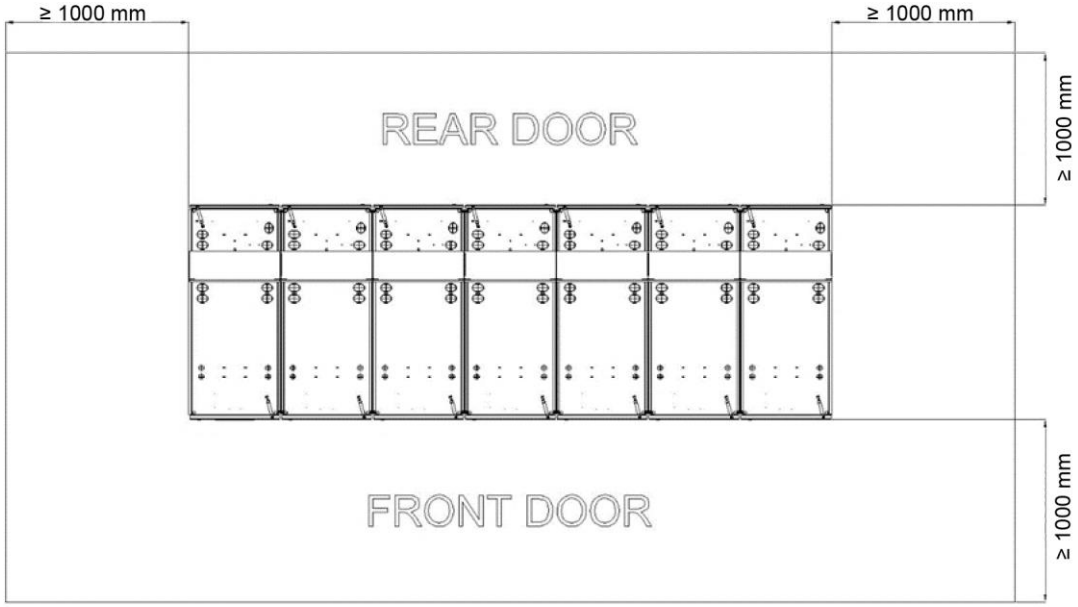
(unit: mm)

Bottom of a 42U 600 mm cabinet **Bottom of a 42U 800 mm cabinet**



(unit: mm)

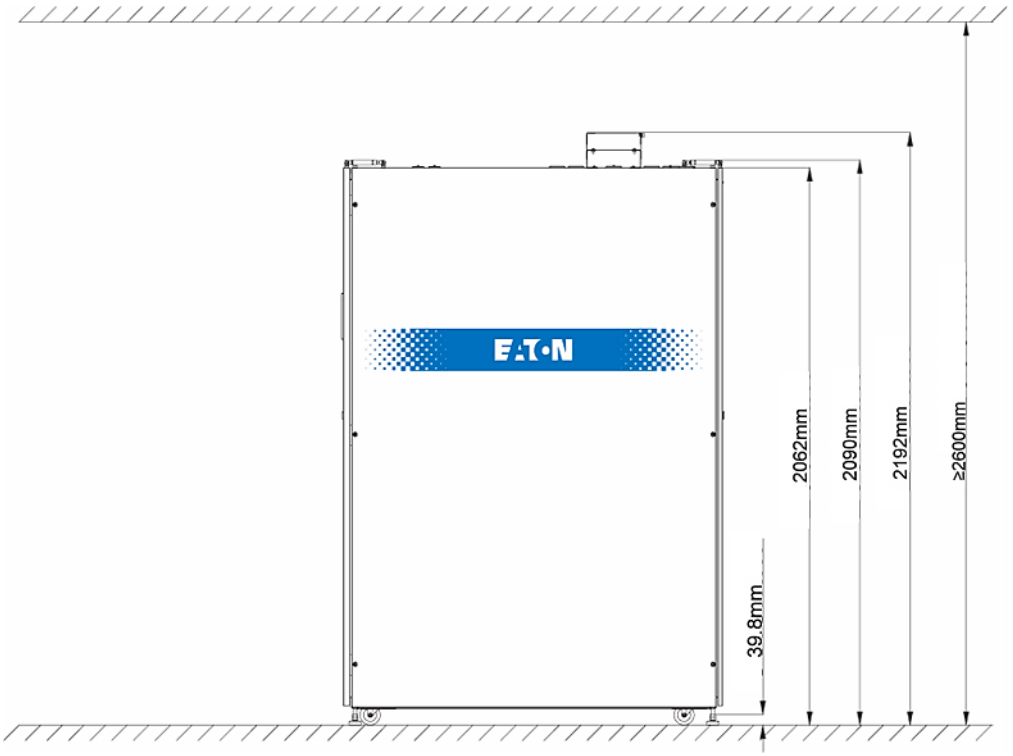
Bottom of a row (multiple) cabinet system



NOTE

- The cabinet layout and labeled data shown in the figure are only for explanation and recommended values, and cannot be directly used as a reference for engineering layout drawings.
- The distance between the cabinet and the wall should not be less than 1m.
- If the length of the row (multiple) cabinets exceeds 6m, it is recommended to leave passages at both ends. The width of the passage should not be less than 1m.
- If the actual site conditions do not meet the site requirements, contact our customer service center.

Installation site planning diagram (top view)



Installation site planning diagram (side view)

4 Cabinet installation and electrical wiring

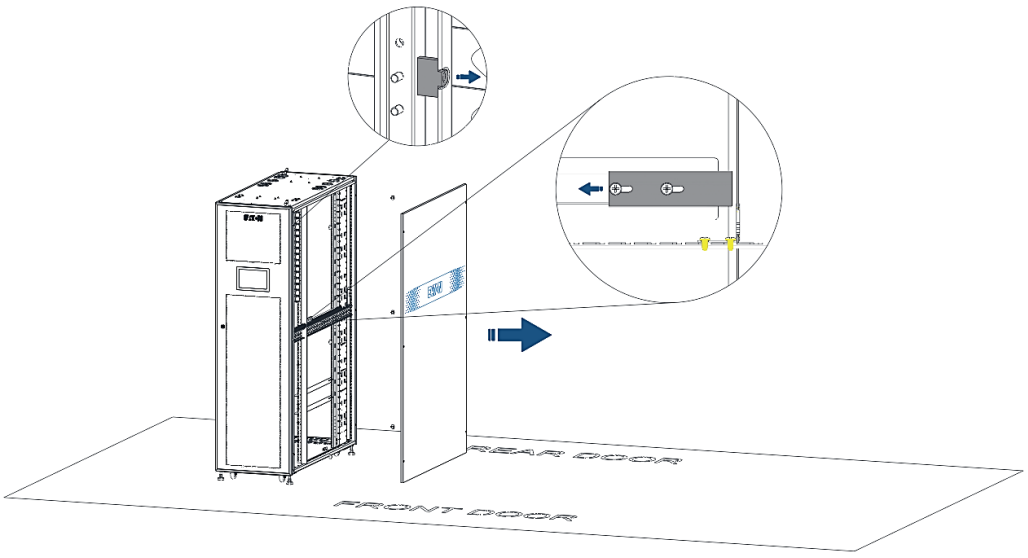
For a single cabinet, perform operations described in 4.2.9 Connect external cables and 4.3 Link fire alarms (optional). For row (multiple) cabinets, perform all operations described in the following sections.

4.1 Join cabinets

The MDC cabinets are easy to attach together. The main steps applicable to row (multiple) cabinets are as follows:

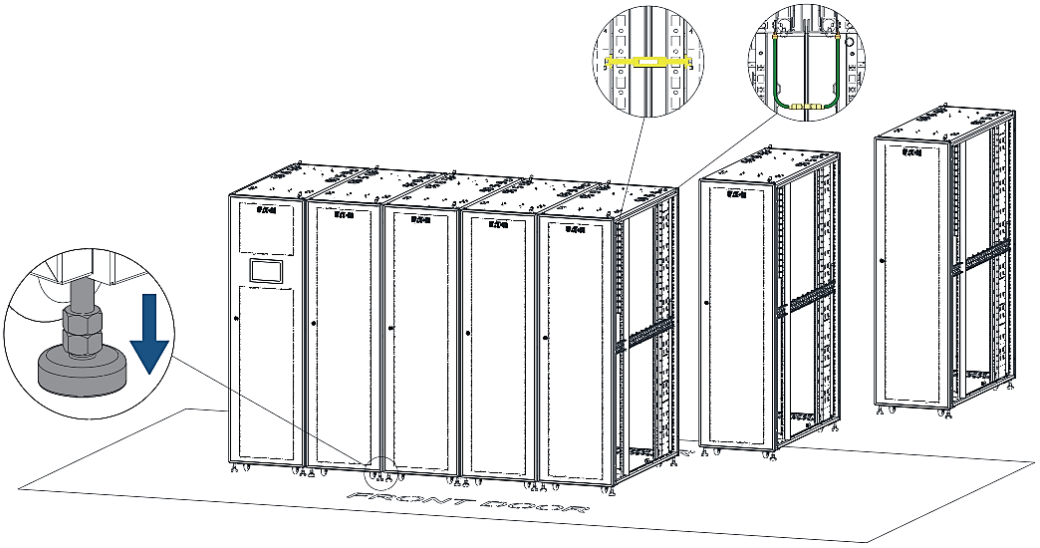
Step 1 Remove the side panel of the main equipment cabinet and side panel of IT cabinets.

1. Remove the fixing screws and accessories of the side panel.
2. Loosen the sliding bolt screws of the side panel and slide them to prevent them from jamming the cabinet body.
3. Remove the ground cable between the side panel and the cabinet body.
4. Lift the side plate and remove it.

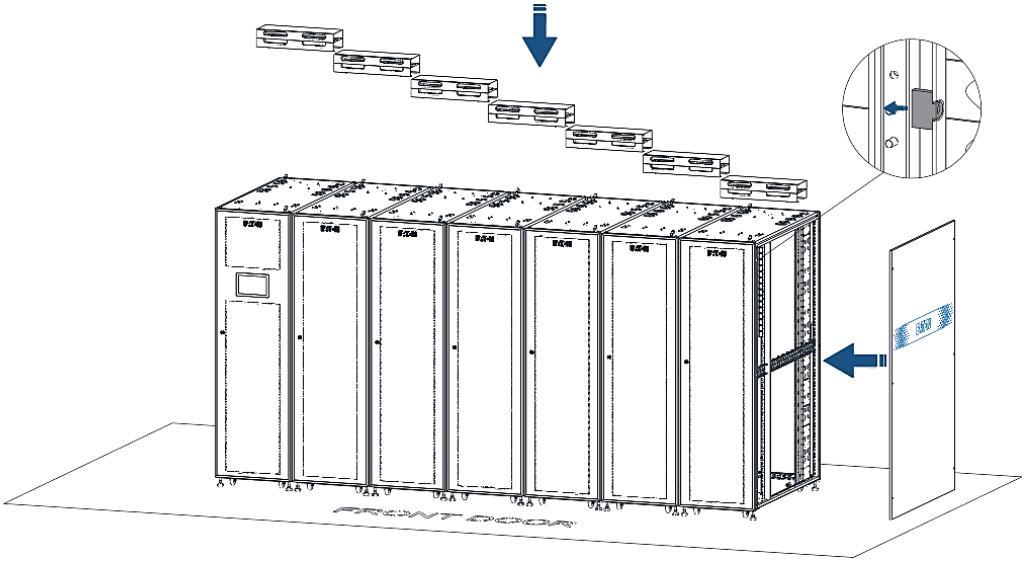


Step 2 Join the cabinets.

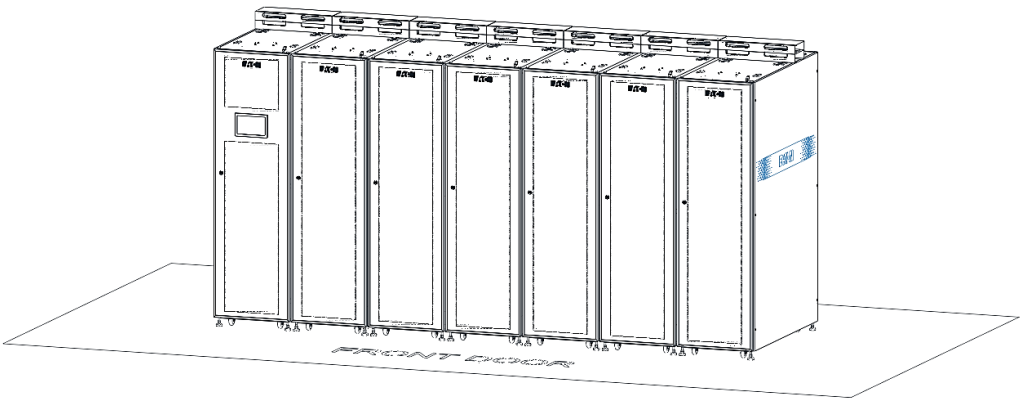
1. Place the main cabinet and IT cabinets in order according to the number marked on the lower right of the front cabinet door.
2. Secure and fix adjacent cabinets with cabinet screws and rivets (6 pieces per adjacent cabinet).
3. Connect the ground wires of two adjacent cabinets.



Step 3 Install the top cable trays.



Step 4 Install the side panel, removed in step 1, on the end cabinet.



—End

4.2 Connect components and cables

WARNING

- All cables must be connected horizontally and vertically. Route cables in the cable tray or use cable ties inside the cabinets to keep the cables neat.
- For the row (multiple) cabinet system, the upper layer of the overhead cable tray is for low voltage cabling including data and control connections, and the lower layer of the cable tray is for high voltage power cabling.

The following electrical connections of the MDC row (multiple) cabinets are required in the field:

- Connect PDUs between the main equipment cabinet and IT cabinets.
- Connect power and communication cables to cooling units.
- Connect communication cables to electronic locks, temperature and humidity sensors, smoke sensor, and water leakage detector.

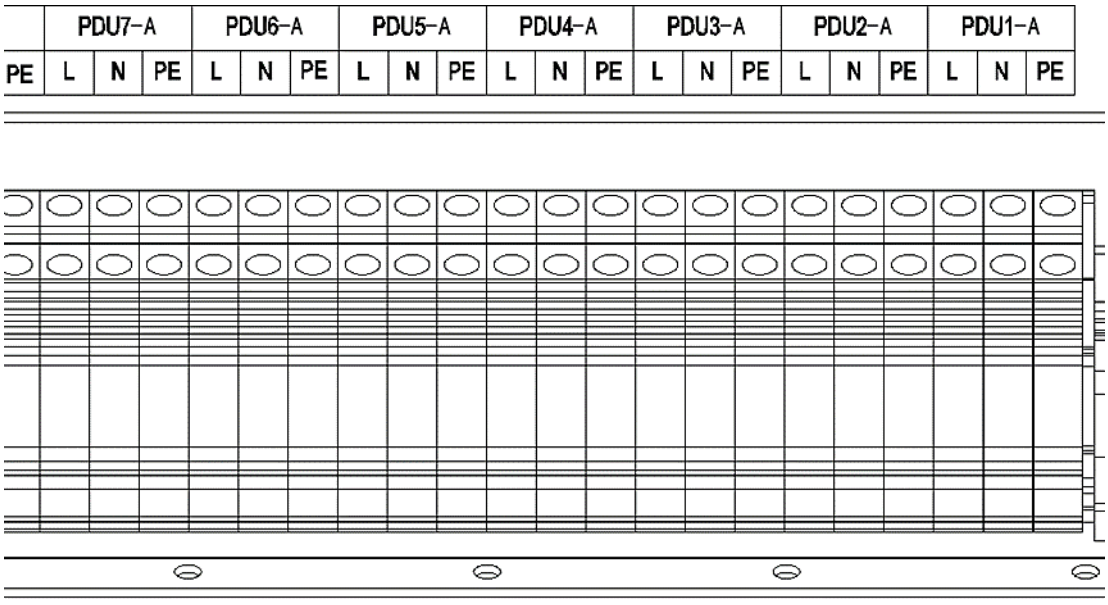
Note

All cables are provided except for an external input cable.

4.2.1 Connect PDUs between main equipment cabinet and IT cabinets

Connect the PDU cables on the top of each IT cabinet to the terminal blocks at the rear of the PDM in the main equipment cabinet. PDU2-A and PDU2-B corresponds to the two PDUs in #2 IT cabinet, the same for #3 IT cabinet and so forth. Follow this principle to connect all the PDUs to the terminal blocks.

Note that cables must be connected between the same labels (L→L, N→N, PE→PE).

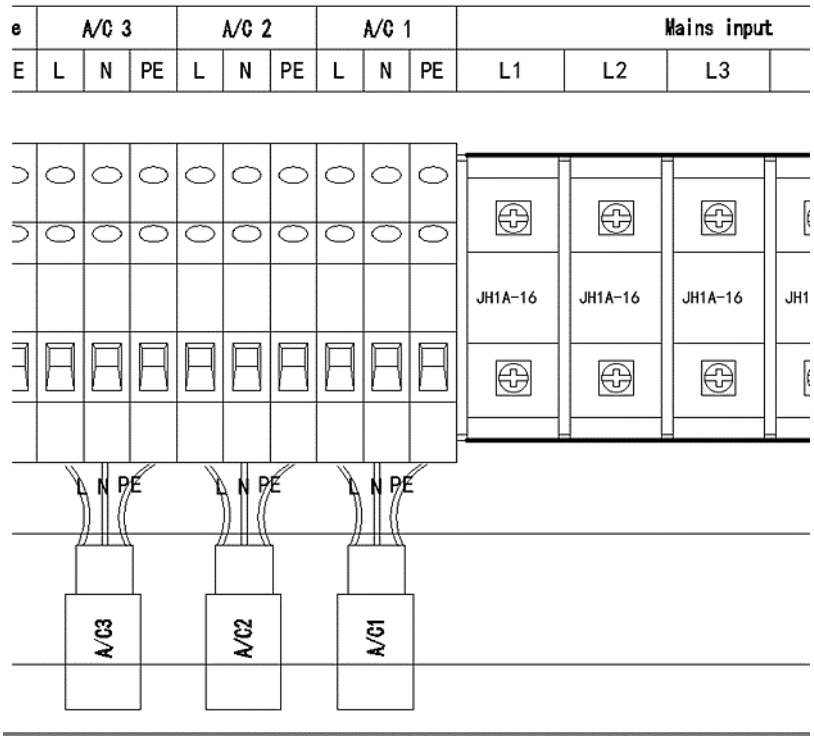


4.2.2 Connect power cords to cooling units

For a single cabinet, there is only one cooling unit and the wiring has been pre-assembled in factory. For row (multiple) cabinets, on-site wiring may be required when one or more cooling units are installed in IT cabinets.

Connect the cooling power cables pre-installed on the top of the IT cabinet to the terminals labeled A/C at the rear of the PDM.

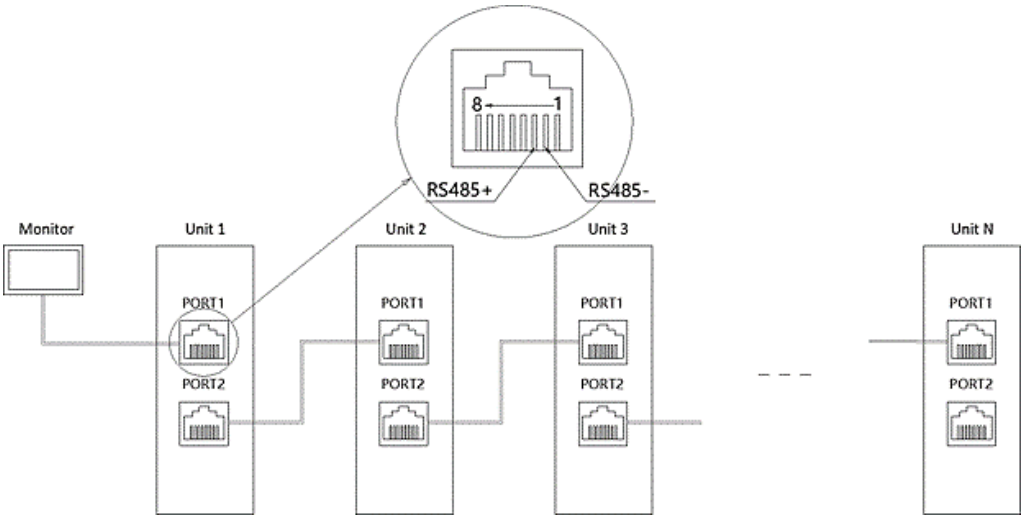
Note that the three wires of the power cord must be connected to the terminals with corresponding labels (L→L, N→N, PE→PE).



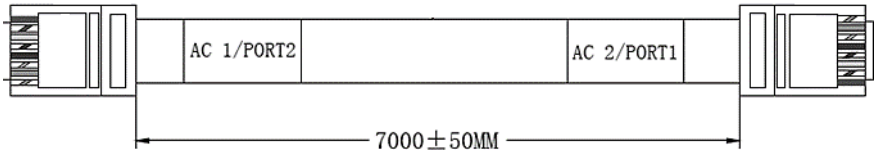
4.2.3 Connect communication and monitoring cables to cooling units

4.2.3.1 Connect communication cables to cooling units

Connect the network cable (labeled with **AC PORT**) left on the top of cooling unit cabinet 1 to the **PORT1** port at the rear of cooling unit 2 and so forth for the remaining cabinets, as shown in the following figure.

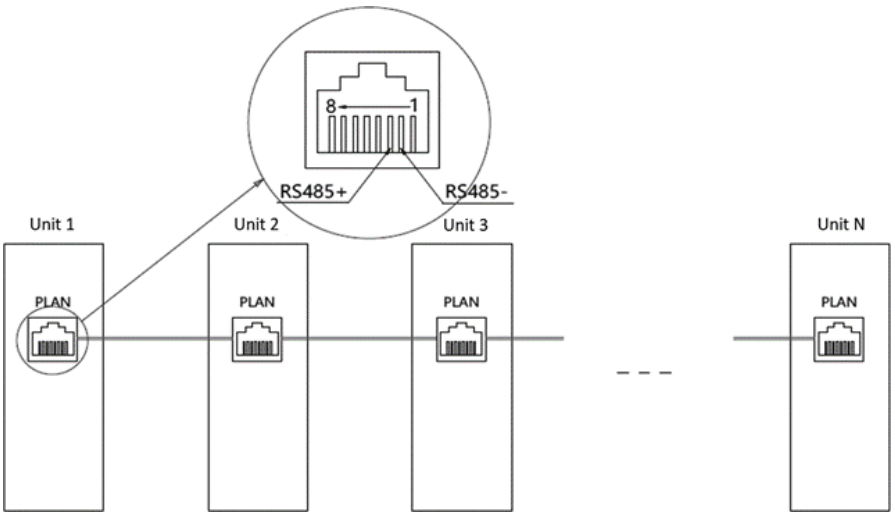


Network cables are as follows.

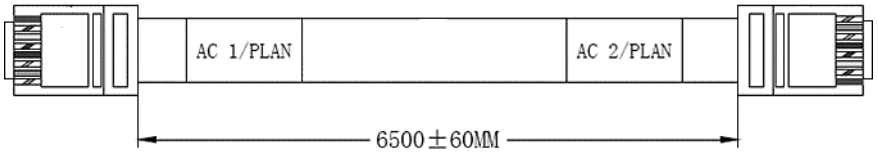


4.2.3.2 Connect group control cables to cooling units

Connect the network cable (labeled with **PLAN** identifier) left on the top of cooling unit cabinet 1 to the **PLAN** port at the rear of cooling unit 2, and so forth for the remaining cabinets, as shown in the following figure.



Group control communication wires are as follows:



4.2.4 Connect and configure electronic locks

To connect electric locks:

Step 1 Connect the network cable (labeled with **Lock4 IN**) left on the top of cabinet 1 to the **IN** port of the electronic lock on the rear door of cabinet 2.

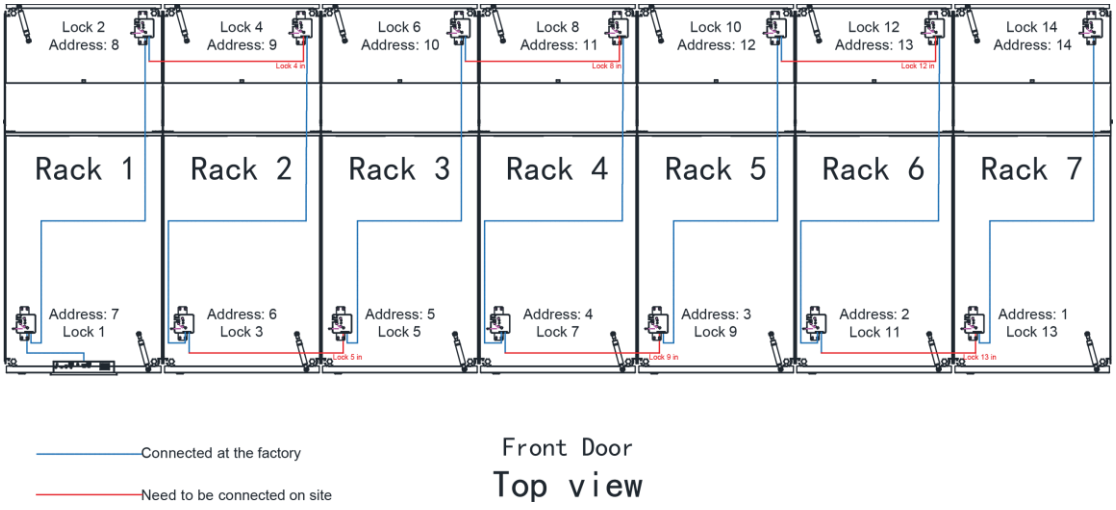
Step 2 Connect the network cable (labeled with **Lock5 IN**) left on the top of cabinet 2 to the **IN** port of the electronic lock on the front door of cabinet 3.

Step 3 Connect the network cable (labeled with **Lock8 IN**) left on the top of cabinet 3 to the **IN** port of the electronic lock on the rear door of cabinet 4.

Step 4 Connect the network cable (labeled with **Lock9 IN**) left on the top of cabinet 4 to the **IN** port of the electronic lock on the front door of cabinet 5.

Step 5 Connect the network cable (labeled with **Lock12 IN**) left on the top of cabinet 5 to the **IN** port of the electronic lock on the rear door of cabinet 6.

Step 6 Connect the network cable (labeled with **Lock13 IN**) left on the top of cabinet 6 to the **IN** port of the electronic lock on the front door of cabinet 7.



—**End**

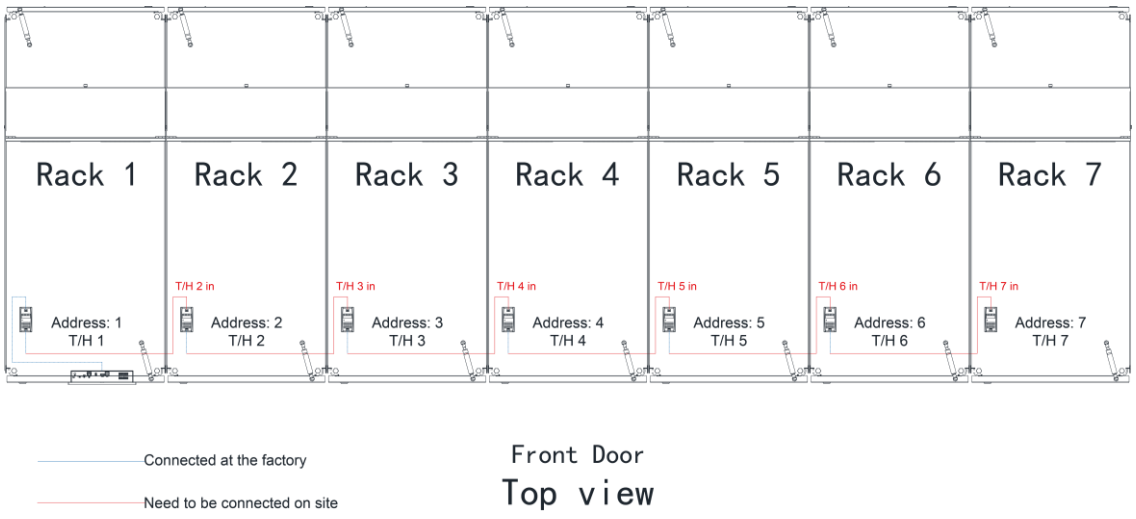
To set electronic lock addresses for communication with the human machine interface (HMI):

Facing the front cabinet doors, set addresses to the front doors from right to left in ascending order starting from 1. Facing the rear cabinet doors, set addresses to the rear doors from left to right in ascending order starting from 8, as shown in the preceding figure (clockwise). Address settings for other cabinets (thee/five cabinets) are similar.

Address/Location	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6
Address No. 0	0	0	0	0	0	0
Address No. 1	1	0	0	0	0	0
Address No. 2	0	1	0	0	0	0
Address No. 3	1	1	0	0	0	0
Address No. 4	0	0	1	0	0	0

Address/Location	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6
Address No. 5	1	0	1	0	0	0
Address No. 6	0	1	1	0	0	0
Address No. 7	1	1	1	0	0	0
Address No. 8	0	0	0	1	0	0
Address No. 9	1	0	0	1	0	0
Address No. 10	0	1	0	1	0	0
Address No. 11	1	1	0	1	0	0
Address No. 12	0	0	1	1	0	0
Address No. 13	1	0	1	1	0	0
Address No. 14	0	1	1	1	0	0
Address No. 15	1	1	1	1	0	0
Address No. 16	0	0	0	0	1	0
Address No. 17	1	0	0	0	1	0
Address No. 18	0	1	0	0	1	0
Address No. 19	1	1	0	0	1	0
Address No. 20	0	0	1	0	1	0

4.2.5 Connect and configure temperature and humidity sensors



To connect temperature and humidity sensors:

Step 1 Connect the cable (labeled with **T/H2**) left on the top of cabinet 1 to the **T/H2 IN** port in front of the cabinet 2.

Step 2 Connect the cable (labeled with **T/H3**) left on the top of cabinet 2 to the **T/H3 IN** port in front of the cabinet 3.

Step 3 Connect the cable (labeled with **T/H4**) left on the top of cabinet 3 to the **T/H4 IN** port in front of the cabinet 4.

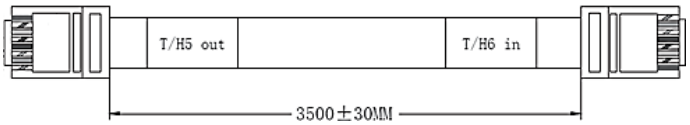
Step 4 Connect the cable (labeled with **T/H5**) left on the top of cabinet 4 to the **T/H5 IN** port in front of the cabinet 5.

Step 5 Connect the cable (labeled with **T/H6**) left on the top of cabinet 5 to the **T/H6 IN** port in front of the cabinet 6.

Step 6 Connect the cable (labeled with **T/H7**) left on the top of cabinet 6 to the **T/H7 IN** port in front of the cabinet 7.

—**End**

The following figure shows a network cable for example. Other network cables are similar.

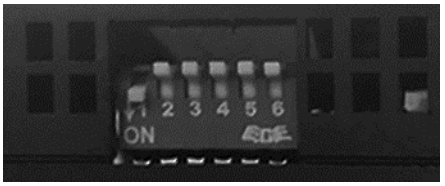


To set addresses for temperature and humidity sensors:

Set **1** for the temperature and humidity sensor address in cabinet 1, **2** for that in cabinet 2, and so forth for other cabinets.

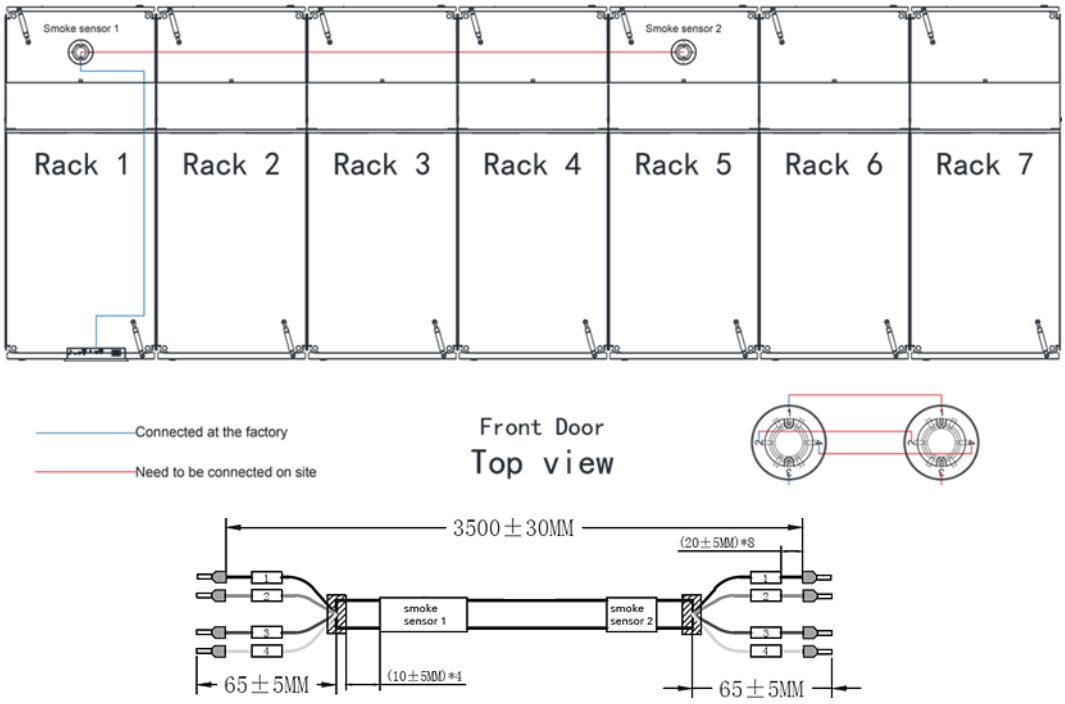
Address/Location	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6
Address No. 1	0	0	0	0	0	0
Address No. 2	1	0	0	0	0	0
Address No. 3	0	1	0	0	0	0
Address No. 4	1	1	0	0	0	0
Address No. 5	0	0	1	0	0	0
Address No. 6	1	0	1	0	0	0
Address No. 7	0	1	1	0	0	0
Address No. 8	1	1	1	0	0	0
Address No. 9	0	0	0	1	0	0
Address No. 10	1	0	0	1	0	0

The following figure shows an example with the address set to 2.



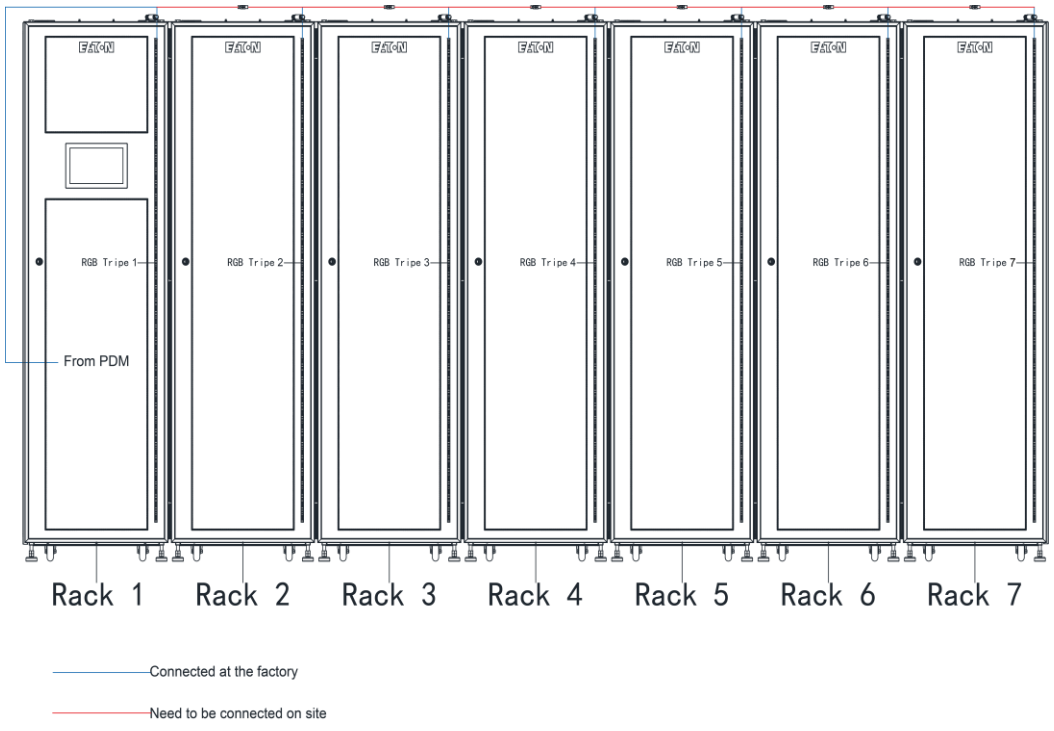
4.2.6 Connect smoke sensors

Loosen and unscrew the smoke sensor on the top of rack 1 and connect smoke sensor cable (labeled with **Smoke sensor 1**) left on the top of cabinet 5 to it, as shown in the following figure.

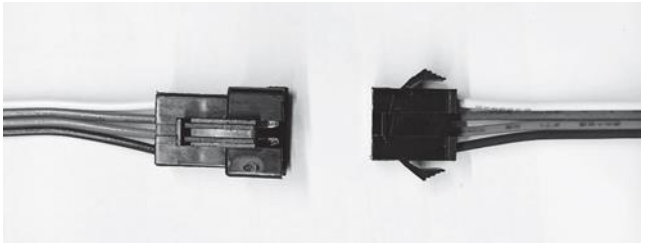


4.2.7 Connect the lighting system

Connect ambient lighting cables on the top of two adjacent cabinets.



The following figure shows the four-core ambient lighting cables with plug-in terminals.



4.2.8 Connect a fire extinguishing module (optional)

4.2.8.1 Introduction to the fire extinguishing module

⚠ CAUTION

To ensure normal and reliable operation of the fire extinguishing module and system, when the fire extinguishing module is installed inside the MDC, contact our service personnel to disable the external fire linkage function (that is, do not allow automatic door opening when the smoke sensor detects smoke).

The rack-mounted fire extinguishing module is a non-pressure stored automatic thermosensitive fire extinguisher. As an integrated module, it is easy to be installed on the rack and easy to be used when a fire occurs.

It can be started by either of the following ways:

- The thermosensitive glass bulb breaks due to high temperature burning, which triggers the magnetic generator. The fire extinguishing module will then be activated to release the fire extinguishing agent from the nozzle to put out the fire.
- A fire detector such as the smoke sensor or temperature sensor detects that a fire occurs and generates an alarm that triggers the fire extinguishing module to release the fire extinguishing agent from the nozzle to put out the fire.

The following table describes the specifications of the fire extinguishing module.

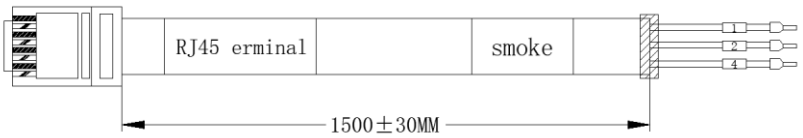
Class A fire rating	3.45 m^3
Trigger temperature	68℃
Trigger voltage	5 – 24 VDC, ≥ 400 mA
Fire extinguishing agent	Novec1230 fire extinguishing agent (3 kg)

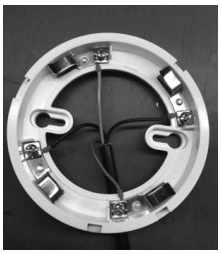
4.2.8.2 Connect cables to the fire extinguishing module

Step 1 Install the fire extinguishing module on the cabinet top.

Step 2 Connect the RJ45 interface of a cable to the RJ45 port at the back of the fire extinguishing module.

Step 3 Connect the other end of the cable to the smoke sensor (cables 1, 2, and 4 connected to terminals 1, 2 and 4 in sequence respectively).



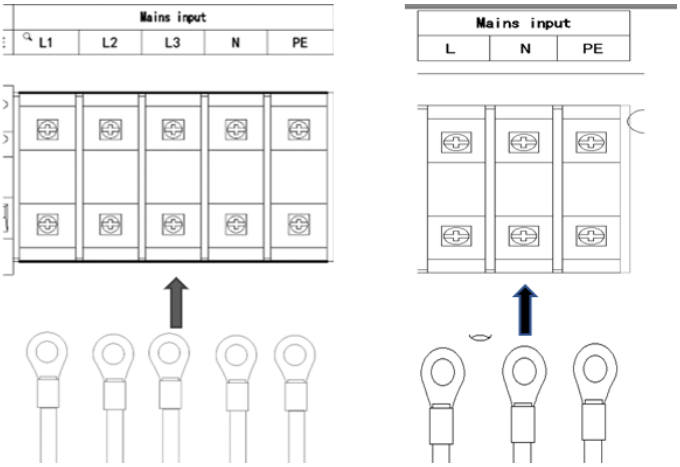


—End

4.2.9 Connect external cables

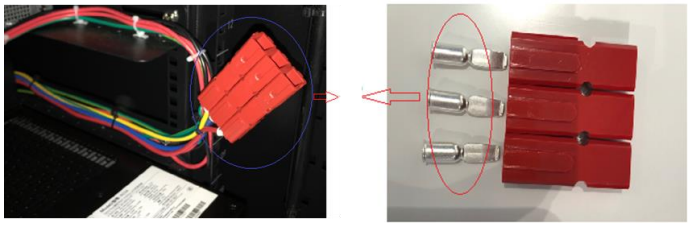
For both single cabinet and row (multiple) cabinets, external input cables (single-phase three-wire/three-phase five-wire) are required to connect the utility power with internal pre-assembled PDM.

To connect with PDM, the input cables must be configured with OT terminals as shown in the figures below. OT terminals are available in the accessory kit provided by Eaton, or you can use your own.



For single cabinets equipped with 3.5 kW integrated cooling unit, one extended cable with red terminals for easy connection with utility power is provided on the PDM. You can crimp a Butt terminal provided in Eaton's accessory kit or prepared by yourself on the input cable and connect it to the red terminals.

The following figure shows the Butt terminals.

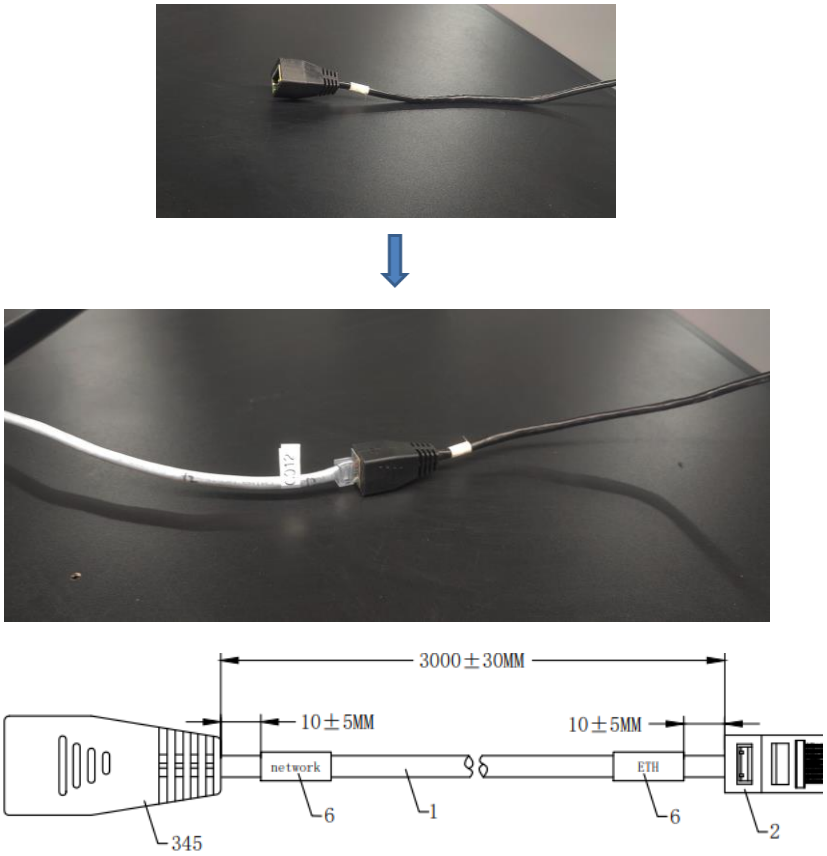


For single rack MDC with 3.5 kW cooling unit

The following table lists the specifications of the input cable.

Model	Load capacity	Number of cabinets	Main input switch	Input cable specifications
EMSS/SW6K3E/C	3.0 kW	1	40A/2P	RVV3*6 mm²/AWG10#
EMSS6K4S	3.5 kW	1	40A/2P	RVV3*10 mm²/AWG8#
EM3MS10K8S	7 kW	1+2	63A/3P	RVV5*16 mm²/AWG6#
EM5MS20K8S(2)	14 kW	1+4	63A/3P	RVV5*16 mm²/AWG6#
EM7MS20K(2)8S(3)	21 kW	1+6	100A/3P	RVV5*25 mm²/AWG4#

The MDC provides an RJ45 northbound port on the top of the cabinet. You can use a standard network cable to connect it to your local area network (LAN).



4.3 Link fire alarms

When a fire breaks out in a cabinet, the smoke alarm will be triggered. You can link the smoke alarm in the following two ways to activate emergency operations.

- Automatically open cabinet doors:

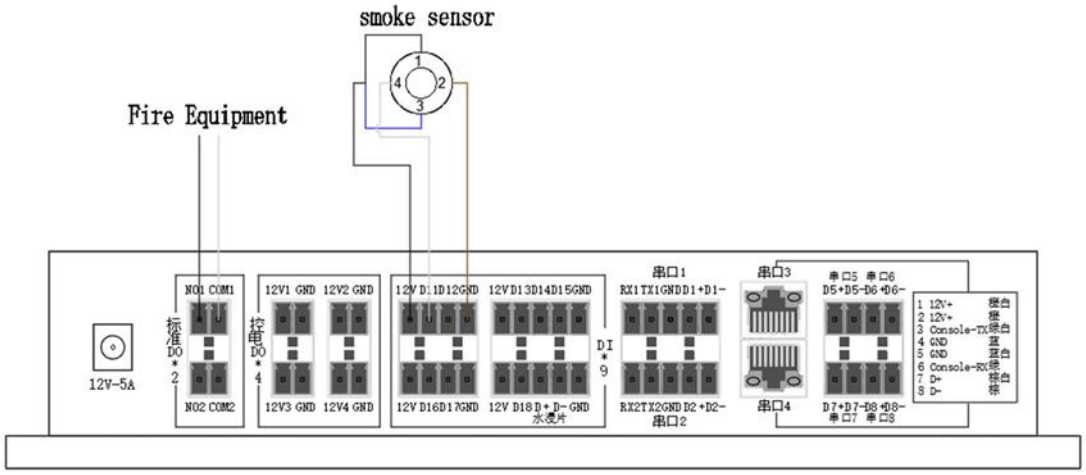
  The monitoring system will send a passive NC switching signal to automatically open the front and rear doors of the cabinet, so that external firefighting gases can used in the cabinet to extinguish the fire.

  Wiring method: Connect 2-core signal cables to ports NO1 and COM1 of the monitor.

- Activate room-level fire control devices:

  The smoke-sensing signal in the cabinet can also be directly connected to the room-level fire control device. 12 V active dry contact signals can be used as the smoke-sensing signals.

  Wiring method: Connect 4-core signal cables to contacts 1/2/3/4 of smoke sensor (contacts 1/2 are for 12 VDC power supply, and contacts 3/4 are for alarm output).



5 Installation of cooling units

The cooling indoor unit has been assembled as a sub-component in the cabinet, with power wires and communication cables connected before delivery. For integrated cooling, no outdoor unit is needed and only the drainpipe and air duct need to be installed on site. For a split cooling system, the indoor unit and outdoor unit must be connected with pipes. All the cooling units are shipped without refrigerant.

5.1 Installation tools and material preparation

The following table describes the specifications of main tools that may be used for the installation and maintenance of cooling units. The installation and maintenance personnel can choose proper tools as required.

Installation and maintenance tools

Tool	Figure	Specifications	Usage	Remarks
Pressure gauge		Low-voltage test range: -0.1 MPa to +3.6 MPa (-30 Psi to +550 Psi) High-voltage test range: -0.1 MPa to +5.5 MPa (-30 Psi to 800 Psi) Accuracy level: 1.6	Used to check whether the pressure of the system is normal.	For integrated cooling and split cooling units
Refrigerant hose		R410A hoses = 3 Wall thickness ≥ 12 mm Impervious grade: RMA-A	Used to vacuumize and replenish/ charge refrigerant. Used to check the system pressure.	For integrated cooling and split cooling units
Electronic scale		Resolution ≤ 5g Accuracy: ± 5% Built-in solenoid valve, automatic quantitative injection	Used for weighing during cold refrigerant charging/replenishing.	For integrated cooling and split cooling units
Vacuum pump		R410A special vacuum pump with solenoid check valve Absolute pressure of 12 Pa	Used to vacuumize during installation and maintenance.	For integrated cooling and split cooling units
Philips screwdriver		——	——	For integrated cooling and split cooling units

Tool	Figure	Specifications	Usage	Remarks
Multimeter		Digital clamp meter	– Used to check whether the power supply voltage is normal. – Used to check whether the current of the compressor is normal during startup and commissioning.	For integrated cooling and split cooling units
Hex wrench		5 mm（5#）	Used to open or close the globe valve.	For split cooling units
Cutter		Pipe diameter: 4–28 mm	Used to cut copper pipes.	For split cooling units
Scraper		——	Used to polish the machined surface of copper pipes.	For split cooling units
Pipe bender		Pipe diameter: 6.35–12.7 mm	Used to bend pipes when arranging refrigerant pipes.	For split cooling units
Copper pipe flaring tool (bell mouth)		Eccentric flaring	Used to expand the flare to connect it with the globe valve.	For split cooling units
Copper pipe expander (copper pipe connection)		Pipe expansion for cup mouth	Used to expand the flare to connect the refrigerant pipes.	For split cooling units

Tool	Figure	Specifications	Usage	Remarks
Adjustable wrench		——	Used to tighten the connection between the copper pipe joint and the globe valve.	For split cooling units
Torque wrench		Torque range: 20–110 N·m	Used to tighten the connection between the copper pipe joint and the globe valve.	For split cooling units
Welding torch, acetylene, oxygen		——	Used to weld copper pipes.	For split cooling units
Silver brazing rod		Low silver ≤ 20% Ag	Used to weld copper pipes.	For split cooling units
Pliers		Vise-grip pliers	Used to weld clamp pipes.	For split cooling units
Tape measure		Measuring range: ≥ 5m	Used to measure installation size, distance, and length of copper pipes.	For split cooling units
Spirit level		——	Used for leveling during installation.	For split cooling units
Crimping tool		——	Used to crimp OT and tubular terminals.	For split cooling units

Installation materials

Item	Specifications	Remarks
Refrigerant	DuPont SUVA R410A recommended	For integrated cooling and split cooling units
Gravity drainage pipe (for integrated cooling unit)	Hard PVC pipe Inner diameter ⩾ 12 mm	– For integrated cooling units with self-evaporative kit – Used with pump drainage pipe – Use other methods as required, for example, you can cut off the seal plug of the water pipe
Pump drainage pipe (for integrated cooling unit)	Soft pipe Inner diameter ⩾ 6 mm	For integrated cooling with condensate pump
Copper pipes and related thermal insulation materials used to connect indoor and outdoor units	See 5.3.3 Connect pipes for details.	– For split cooling units – Vary with unit types and pipe length
Outdoor unit mounting brackets	Determined by on-site engineering Thickness ⩾ 3 mm	– For split cooling units – Used when the outdoor unit is installed on the wall
Gravity drainage pipe (for split cooling units)	Hard PVC pipe Outside diameter: ϕ 22x6 mm	For split cooling units
Pump drainage pipe (for split cooling units)	Soft PVC pipe Outside diameter: ϕ 7x3 mm	For split cooling units
Gravity drainage pipe adapter	PVC pipe adapter: G1/2" External thread joint	– For split cooling units – Matched with the gravity drainage pipe – Use other methods as required
Pump drainage pipe adapter	Double pagoda adapter Outside diameter: ϕ4 mm	– For split cooling units – Matched with the pump drainage pipe – Use other methods as required
Power cord to connect the indoor and outdoor units	3x2.5 mm^2	For split cooling units
Signal lines to connect the indoor and outdoor units	2x1.5 mm^2	For split cooling units

Item	Specifications	Remarks
Power terminal	M4 OT terminal	– For split cooling units – Used to connect the outdoor unit
Power terminal	E2512 and E1512 tubular terminal	– For split cooling units – Used to connect the indoor unit
Refrigeration oil	FV50S	– For split cooling units – Additional refrigeration oil is required when the copper pipe is longer than 30m or low-temperature components are added
Oil trap	See 5.3.3 Connect pipes.	– For split cooling units – When the outdoor unit is higher than the indoor unit by more than 6m, install an oil trap every 6m to 7.5m.

5.2 Install the integrated cooling unit

For integrated cooling, no outdoor unit is needed and only the drainpipe and air duct need to be installed on site. The cooling units are shipped without refrigerant. See 5.2.2 Charge the refrigerant for vacuum and refrigerant charge.

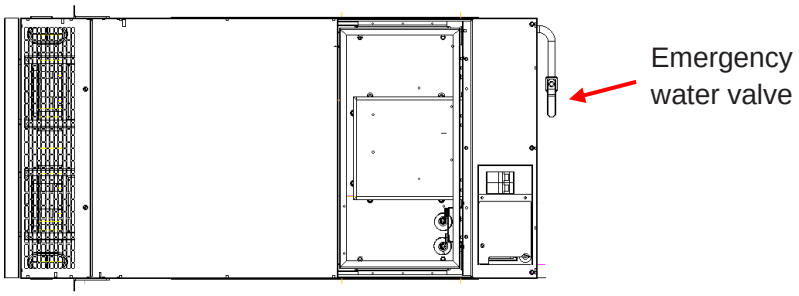
5.2.1 Connect the drainpipe

The following two drainage configurations are available for the 3.5 kW integrated cooling units to meet different user needs:

- Option 1: Use a self-evaporative kit. The rating power for the evaporative kit is 500 W and the evaporating rate is 0.85L/h. To use this option, use a 1m gravity drainpipe with 12 mm OD together with the emergency water valve. The water valve is off by default. You can manually open the water valve to start gravity drainage when overflow or evaporative kit failure occurs.
- Option 2: Use a condensate pump with 1m pipe. To use this option, prepare a water pipe on site for extension and drainage. The inner diameter of the pipe connected to the condensate pump is 4.5 mm and the length is 1m.

Note

It is recommended to connect the gravity drainpipe on site for emergency use when a self- evaporative kit fault, water leakage, or high water level alarm occurs.



5.2.2 Charge the refrigerant

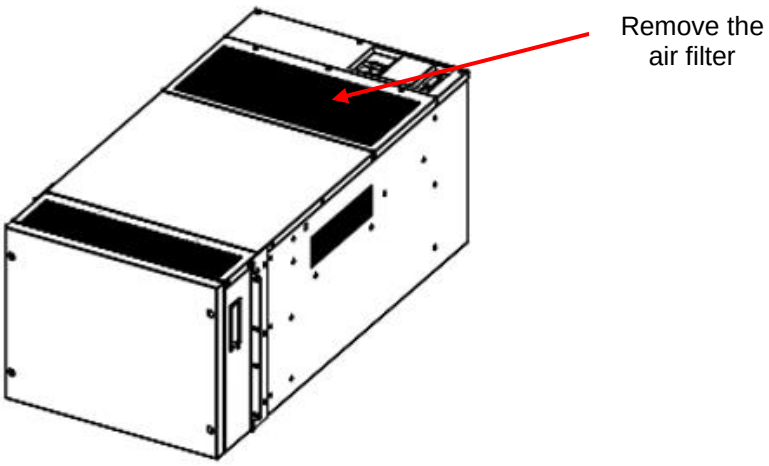
5.2.2.1 Vacuum

The unit does not contain refrigerant, and it needs to be charged with refrigerant as required before normal use. The recommended charge amount is 600g.

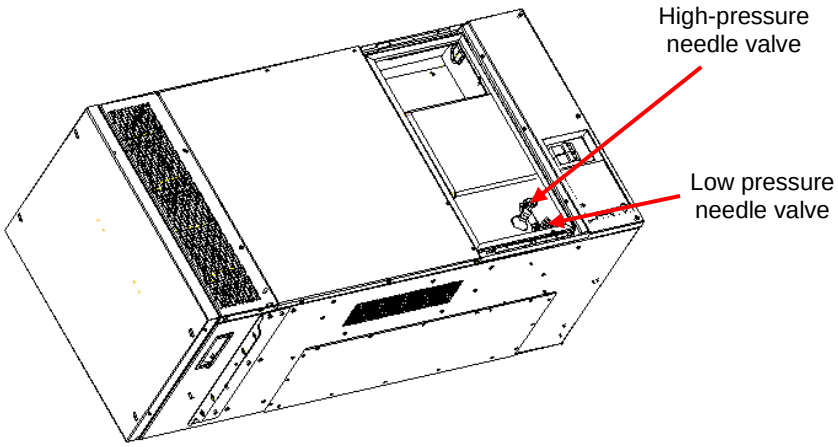
Note

Refrigerant charging does not require pulling the cooling device out of the cabinet before vacuumizing and refrigerant charging. Ensure that the cooling unit is powered off during vacuumizing and refrigerant charging. See the steps below:

Step 1 Use a Phillips screwdriver to remove the three screws at the rear filter of the unit, remove the cover panel, and take out the air filter.



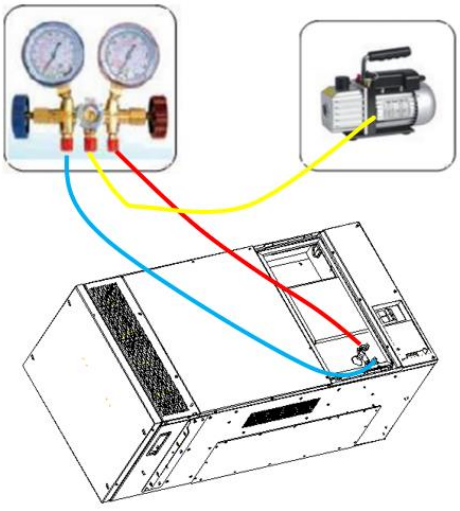
Step 2 Locate the system high- and low-pressure needle valves.



Step 3 Connect pressure gauge to both the high- and low-pressure needle valves and the middle pipe to the vacuum pump.

Note

The high-pressure gauge should be connected to the high-pressure needle valve, and the low-pressure gauge should be connected to the low-pressure needle valve. Connect the red pipe to the high-pressure gauge and blue pipe to the low-pressure gauge.



Step 4 Turn on the vacuum pump to start vacuumizing.

The system vacuum degree is required to be below 0 Pa.

Note

If there is no vacuum meter on site, you can keep vacuumizing for over 1 hour with a 3L vacuum pump to meet the requirement. This duration is obtained based on previous experiments. If you use a vacuum pump lower than 3L, extend the vacuumizing time appropriately.

Step 5 Maintain system pressure.

1. Turn off pressure gauges and then vacuum pump.
2. Observe whether the pressure gauge pointer remains motionless (at -0.1 MPa) within 10 minutes to 20 minutes. If yes, the system is well sealed and ready for refrigerant charging.

—**End**

5.2.2.2 Charge R410A refrigerant

After the system pressure is maintained, remove the vacuum pump from the pipeline and connect the refrigerant tank for refrigerant charging. The total charge amount of R410A refrigerant is 600g.

The refrigerant charging process is as follows:

Step 1 Connect the refrigerant tank with the middle gas pipe connected to the vacuum pump and tighten it.

Step 2 Loosen the middle pipe connected with the double-ended pressure gauge for four to five turns.

Step 3 Turn on the switch of the refrigerant tank to have the gas fill the pipe and rush out from the connection.

This process lasts about 10 seconds.

Step 4 Place the refrigerant tank upside down on the scale.



Note

During charging, the refrigerant tank must be inverted, and those with siphon tubes do not need to be inverted.

Step 5 Tighten the pressure gauge connection, and open the high- and low-pressure valves.

After the pipeline is emptied, the refrigerant is charged. Wait until the charging completes.

Step 6 Close the high- and low-pressure valves of the pressure gauge, keep the pipes connected, and power on for refrigeration operation.

Step 7 If it cannot be charged in a static state, turn on the cooling unit and open the low-pressure valve to enable slow charge from the suction tube (low-pressure valve).

You can turn on the cooling unit by either of the following tools:

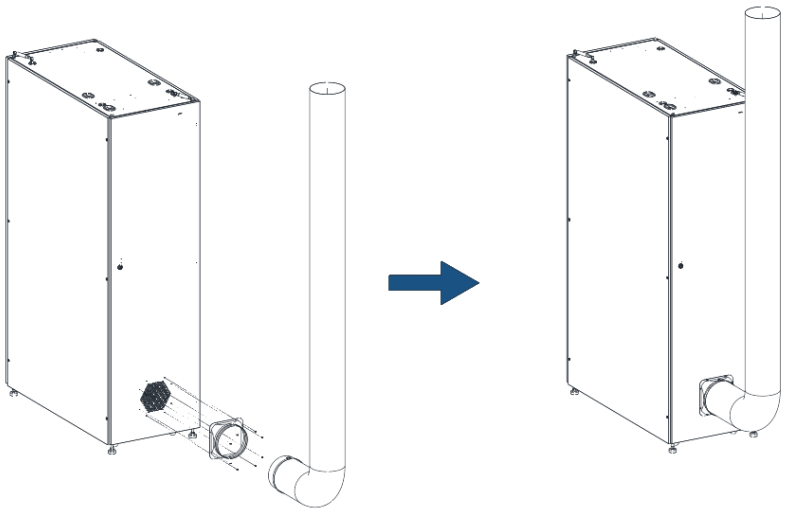
- HMI: See 7.8.1 Turn on/off the cooling unit for details.
- Manual operator: See Appendix A Turn on the cooling unit with a manual operator for details.

Step 8 Remove the pressure gauge.

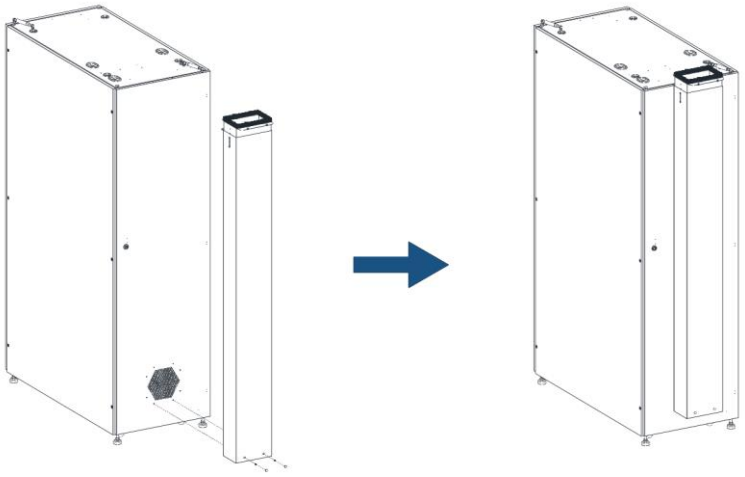
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5.2.3 Connect the soft air duct or air chimney

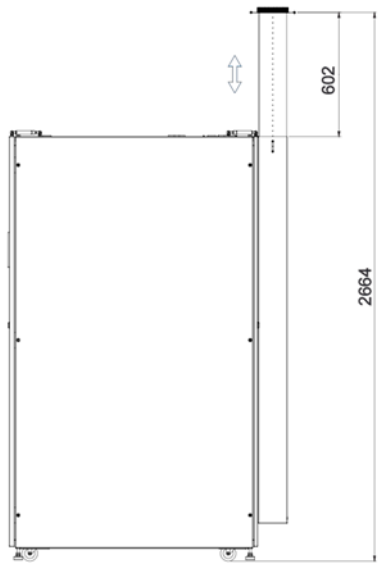
For cabinets equipped with 3.5 kW integrated cooling units, a soft air duct and a square to round pipe adapter are provided. Connect them to the hot air outlet at the rear door to vent the hot air to the ambient. The following figure shows the connection.



Or you can use a sheet metal air chimney (optional kit 760-16038) as below to vent the hot air directly to the top ceiling, which is more aesthetic and suitable for computer room.

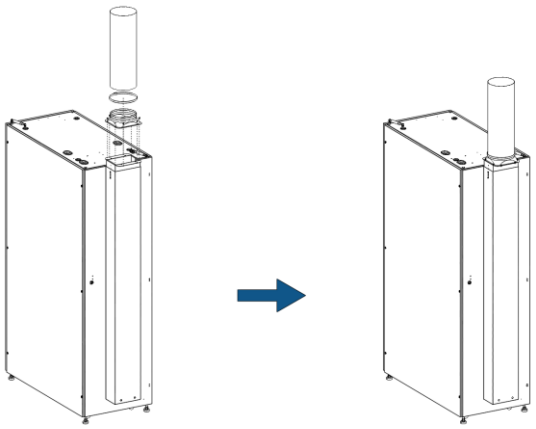


The chimney is designed to be telescopic, and its height can be adjusted, as shown in the following figure.



(unit: mm)

You can also connect the air chimney with the soft air duct by using a square to round pipe adapter, as shown below.



Note

It is recommended that the hot air be exhausted outside, otherwise the indoor temperature will gradually rise and the cooling capacity of cooling unit will be derated.

5.3 Install split cooling units

5.3.1 Installation requirements

The following table describes the requirements for installing split cooling units.

Item	Condition
Installation site	– Maximum equivalent piping length between indoor and outdoor units: 60m – Maximum vertical distance between outdoor and indoor units: outdoor unit placed 20m higher than or 5m lower than indoor unit
Installation method	– Indoor unit: mounted in a 19-inch rack – Outdoor unit: horizontal installation
Ambient temperature	– Indoor unit: 0–40°C – Outdoor unit: -20°C to +45°C (common type), -35°C to +45°C (with low temperature kit)
Elevation	≤ 4000m When elevation is higher than 1000m, the capacity load should be reduced. The maximum operating temperature should be reduced by 1°C and rated cooling capacity should be reduced by 1% for every 200m increase in elevation.

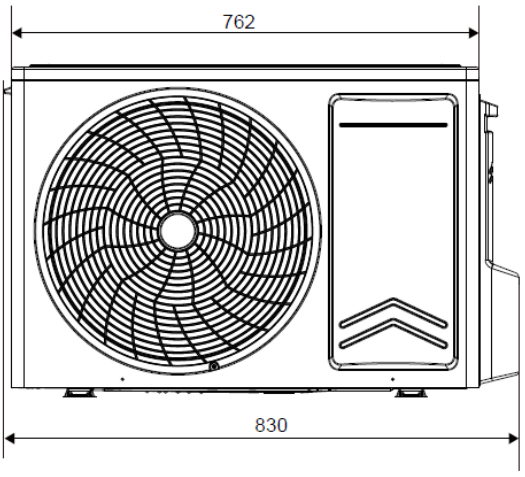
5.3.2 Install the outdoor unit

The indoor unit of the split cooling unit is installed inside the cabinet before delivery. For the outdoor unit, the horizontal air outlet mode is adopted. Therefore, it must be installed vertically on the floor or wall with bolts secured.

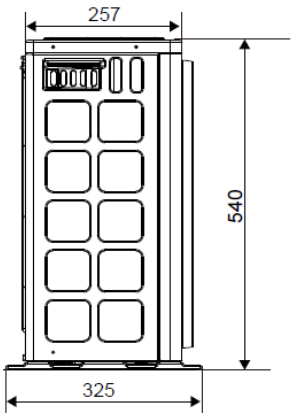
To mount the outdoor unit on wall, use a level meter and tape measure to locate the position of fixed holes on the wall and fix the bracket horizontally on wall with enough expansion bolts. The distance between the holes of left and right brackets must be consistent with that between the holes in the cooling unit base.

The following figures shows the dimensions of the cooling outdoor units.

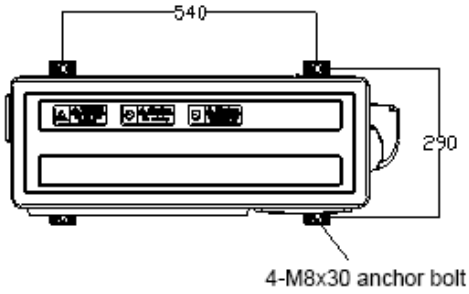
- EW06E (unit: mm)



Front view

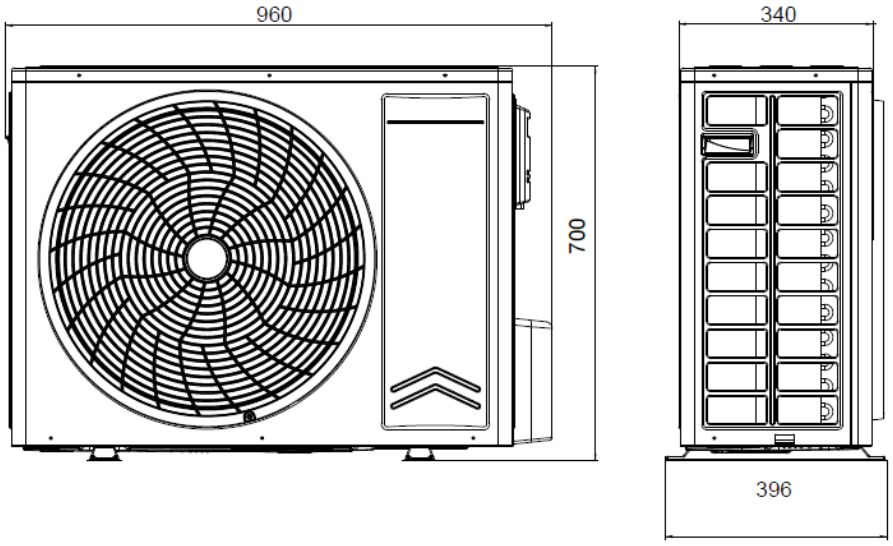


Side view

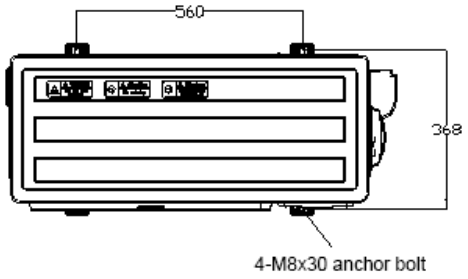


Top view

- EW10E (unit: mm)



Front view **Side view**



Top view

For installation of outdoor units, see the following steps:

Step 1 Fix the left bracket with one M10x100 (or bigger) expansion screw.

Step 2 Use a spirit level to locate the position of the right bracket horizontally and fix bolts on the right bracket.





Step 3 Put the outdoor unit on the installed bracket.

Step 4 Tighten all the M8x30 anchor bolts.

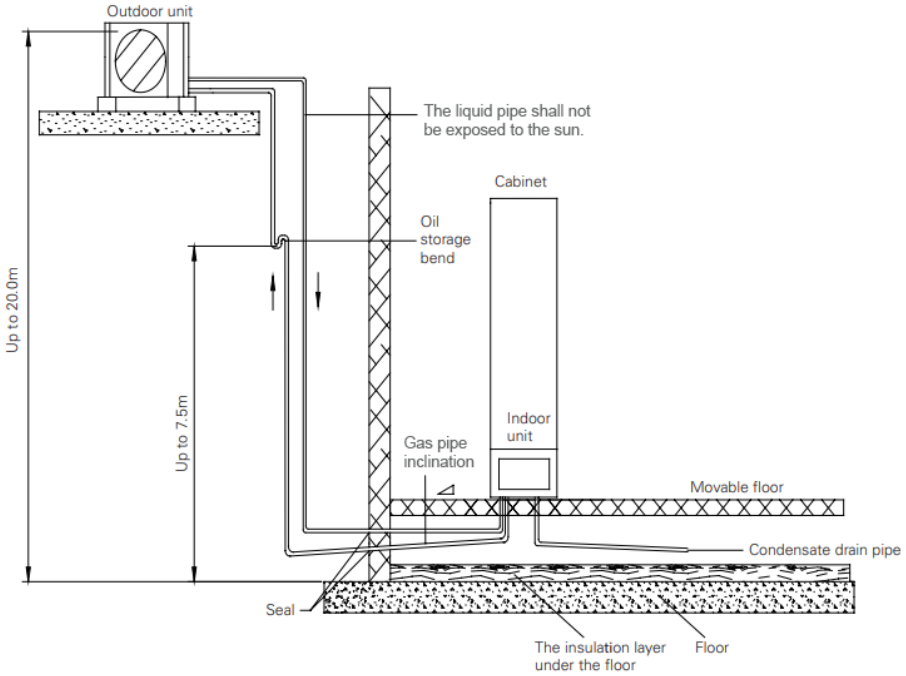
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Note

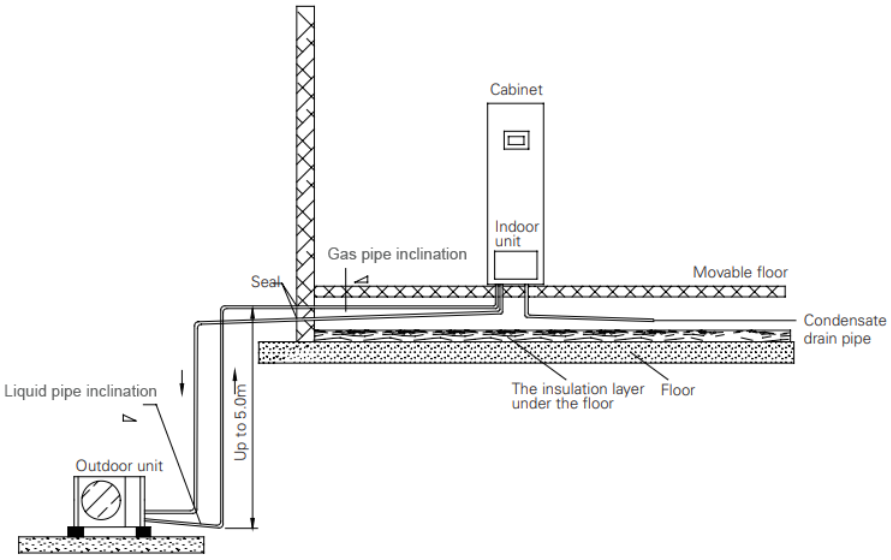
- *Install the brackets with crossbeams produced by the formal manufacturer.*
- *When assembling the bracket, the bolts should be inserted from top to bottom and tightened with a wrench.*
- *When the installation surface is not strong enough (made of wood for example), measures such as reinforcement, support and vibration reduction should be adopted.*
- *Rainy and snowy days are not recommended for installation. Protective measures such as safety harness are required when the cooling unit is installed at a place higher than 2 meters to ensure personal safety.*

5.3.3 Connect pipes

When the indoor and outdoor units are installed at different heights, the piping should be arranged according to the figure below. The horizontal part of the gas pipe should slope downwards after leading out from the indoor unit, with an inclination of at least 1:200 (should be reduced by 5 mm per 1m). When the outdoor unit is lower than the indoor unit, the liquid pipe is drawn out from the outdoor unit and slopes downward, and its inclination is the same as that of the gas pipe.



Piping arrangement for outdoor unit higher than indoor unit



Piping arrangement for indoor unit higher than outdoor unit

Note

- *If the outdoor unit is installed 6m higher than the indoor unit, the oil trap should be installed on the gas pipe every 6 m to 7.5 m to ensure that the compressor oil flowing back into the oil trap in the gas pipe at the vertical height can be quickly taken away when the compressor is stopped and restarted.*
- *Adopt nitrogen-filled welding to prevent the formation of oxide scale.*
- *Release nitrogen from the indoor unit before connecting. If there is no nitrogen discharged, contact our customer service.*
- *Prepare the copper tubes used to connect indoor and outdoor units. The copper tubes must be clean, free of impurities and moisture.*

- *If you need to connect the copper pipe through the wall, seal the two ends of the copper pipe when passing through the wall.*
- *After the connection is completed, it is necessary to charge dry nitrogen to test leakage and then vacuumize.*
- ***The damage to the unit caused by the user's failure to operate in accordance with the above instructions is not within the scope of warranty promised by Eaton.***

5.3.3.1 Overall pipeline requirements

Arrange your piping according to the site conditions by referring to the following principles:

- Shorten the pipe length as much as possible (preferably within 10 m). Avoid unnecessary turns and lifts.
- Minimize the height difference between indoor and outdoor units as much as possible.
- Reduce the number of elbows in the piping as much as possible.
- The sum of the equivalent length of the straight pipe and the one-way straight pipe length of the indoor and outdoor unit is the total length of the indoor and outdoor pipes.

Length of connecting pipe

Equivalent length of straight pipe of each component			
Copper pipe diameter (mm)	**Equivalent length (m)**		
	45° elbow	**90° elbow**	**180° elbow**
15.88	0.15	0.25	0.5
12.7	0.14	0.25	0.5
9.52	0.10	0.20	0.34
6	0.06	0.12	0.24

If the pipe connecting indoor and outdoor units is longer than 10m, the pipe diameter must be increased appropriately to reduce the system flow resistance. The recommended pipe size is listed in the following table.

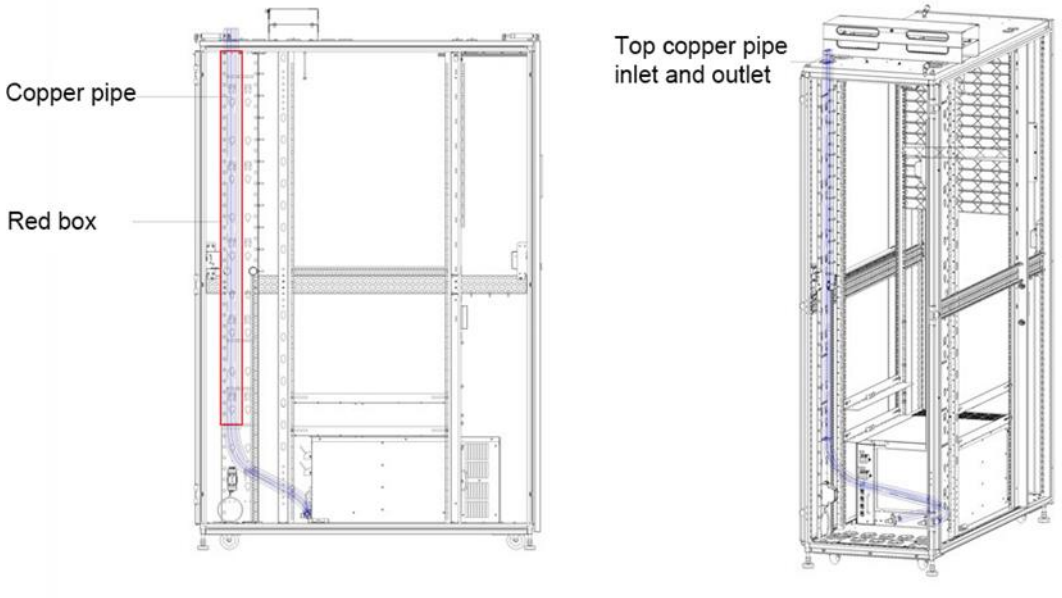
Model / **Pipe length**	**E04SE**		**E08SE**	
	D (mm)	**L (mm)**	**D (mm)**	**L (mm)**
10m	9.52	6	12.7	9.52
20m	12.7	9.52	15.88	9.52
30m	12.7	9.52	15.88	12.7
40m	12.7	9.52	15.88	12.7
50m	12.7	9.52	15.88	12.7
60m	12.7	9.52	15.88	12.7

Note

- **D** indicates the gas pipe and **L** indicates the liquid pipe.
- If the pipe is longer than 60m, consult our service personnel.

5.3.3.2 Requirements for connecting a pipe with the indoor unit

- Copper pipes should not be flattened or bended.
- The refrigerant piping should not block the square hole on the rack's vertical post. Otherwise, the installation of customer's IT equipment will be affected.
- For top piping, to avoid impact on IT device installation, the copper pipes should be routed near the rear left PDU plate and as close to the outside as possible, as shown in the red box in the figure below.



Side view of the top piping area for 8.1 kW split cooling unit

5.3.3.3 Connect a pipe with the outdoor unit

Step 1 Use a wrench to unscrew the large and small valve nuts.

Step 2 Align the copper pipe flare with the center of the globe valve.

Step 3 Screw the tube nut by hand until it cannot be turned, then tighten it with a wrench.





Note

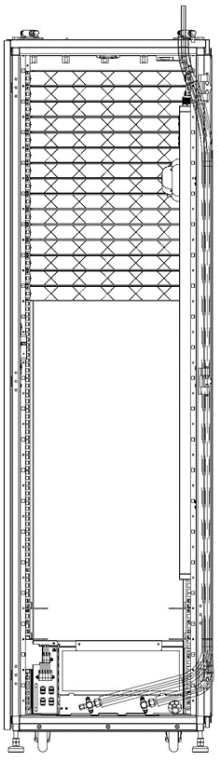
Complete this process as soon as possible to prevent sundries from entering the system.

—End

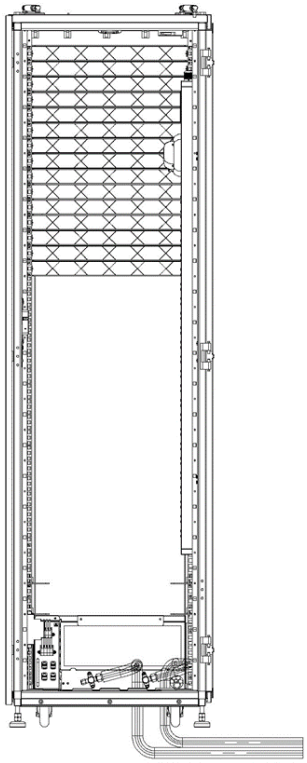
5.3.3.4 Connect a pipe with the 4.2 kW indoor unit

Suggestions:

- Before installing the top piping, remove the right-side panel first (rear view). Then, connect the pipe and reinstall the side panel.
- To facilitate bottom piping, raised floor higher than or equal to 200 mm is required. The copper pipe should be routed through the holes reserved at the bottom of the cabinet.
- After insulating the copper pipe, secure it to the square hole on the cabinet using cable ties.



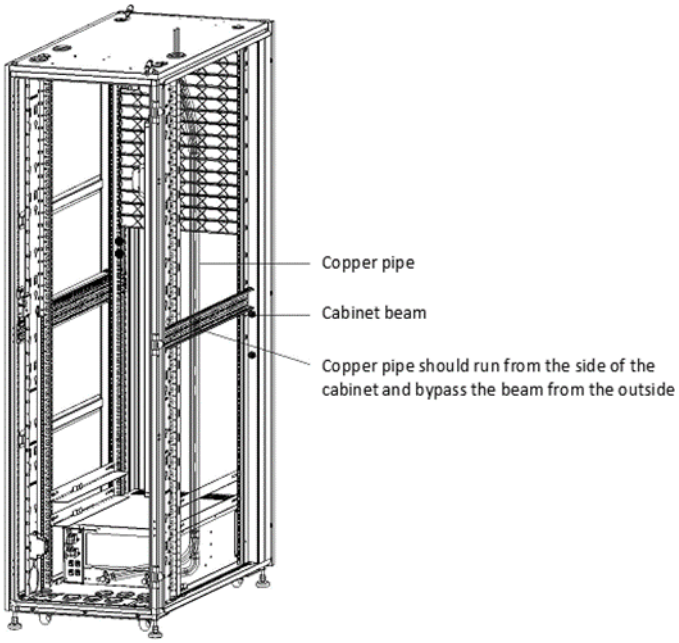
Top piping



Bottom piping

Note

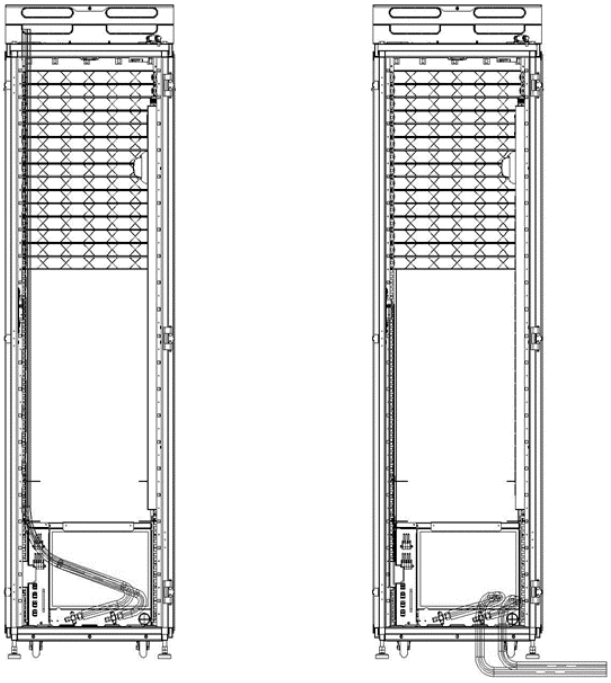
For top piping, see the figure below for the installation path of the copper pipe in the cabinet.



5.3.3.5 Connect a pipe with the 8.1 kW indoor unit

Suggestions:

- Route top pipes from the left side of the cabinet (rear view).
- To facilitate bottom piping, raised floor higher than or equal to 200 mm is required. The copper pipe should be routed through the holes reserved at the bottom of the cabinet.
- After insulating copper pipes, secure it to the square hole on the cabinet using cable ties.

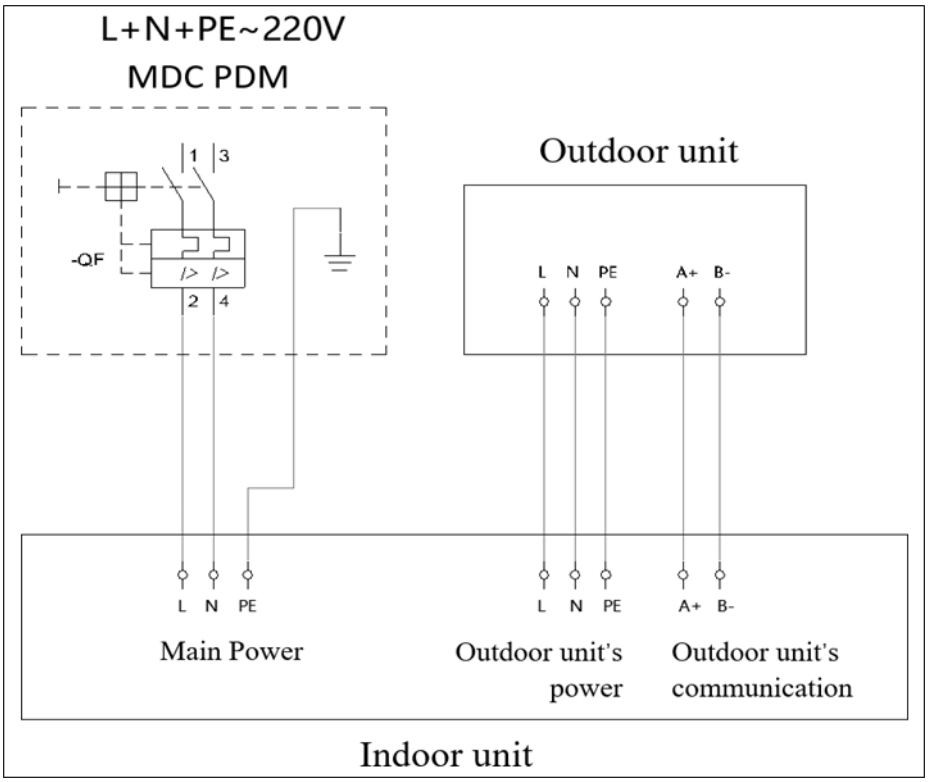


Top piping **Bottom piping**

5.3.4 Electrical connection

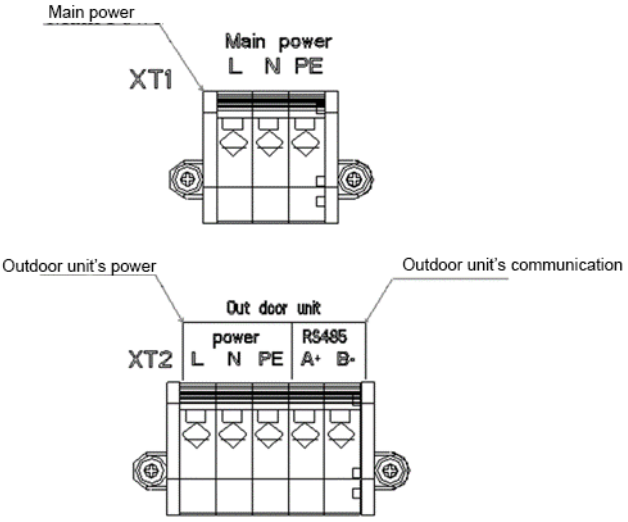
The power cable of the indoor unit and the communication cable with the central monitoring host have been connected before delivery. The power and communication cables between the outdoor unit and the indoor unit need to be connected onsite by referring to the following requirements:

- All wiring must conform to local standards. Check that the power supply complies with the requirements on the nameplate.
- To avoid corrosion and overheating of the terminals, all required power supply wires must be copper wires.
- The power cable connected to the electrical control box should be selected according to the maximum operating current on the nameplate. The total power supply should have a certain margin with recommended value of 1.25 to 1.3 times the nominal specification.
- The current carrying capacity of the power supply cable (cord) should be slightly greater than the maximum operating current of the unit, and the influence of the working environment should be considered.

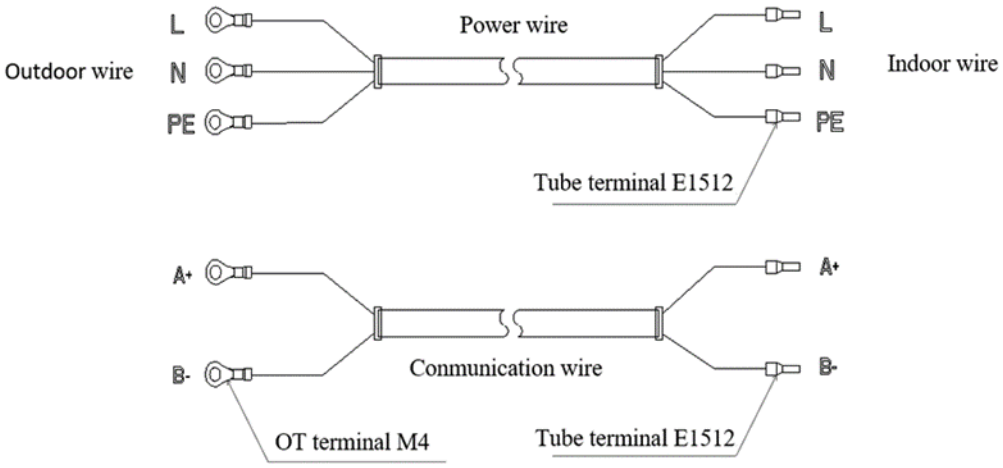


5.3.4.1 Connect the power cable

The indoor unit is equipped with power terminals as shown in the following figure. XT1 is connected to the main power supply of the unit. XT2-L, N and PE are connected to the outdoor power supply, and XT2-A+ and B- are connected to the outdoor unit communication cable.

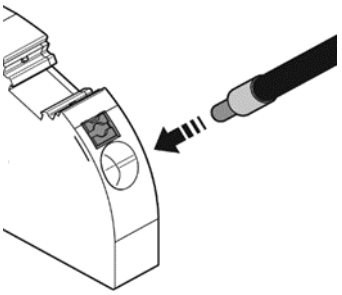


The power supply of the outdoor unit is provided by the indoor unit, and the cable connection is shown in the figure below.



5.3.4.2 Wiring instructions for power terminal of the unit

The power cable can be plugged directly into the circular power terminal of the unit.



The following table lists the recommended cable for connecting the outdoor unit.

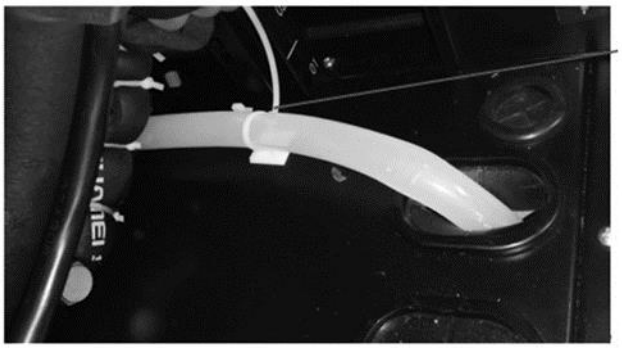
Model	Maximum operating current	Recommended specification of power and communication cables
EW06E	7.99 A	3x2.5 mm^2 + 2x1.5 mm^2
EW10E	13.8 A	4x2.5 mm^2 + 2x1.5 mm^2

5.3.5 Connect the drainpipe

The split cooling unit has been equipped with both gravity drain and active condensate pump. The drainpipe specifications (gravity + pump) are as follows:

- The inner diameter of the gravity drainpipe (milky) is 16 mm, and the outer diameter is 22 mm. The length of the pipe out of the cabinet is 1m, with external 0.5-inch threaded connector.
- During the draining process, the gravity drainpipe should be blocked with a plug.
- Pump drainpipe (transparent pipe) is only appliable to the split cooling unit. The inner diameter of this pipe is 4 mm, and the outer diameter is 7 mm. The length of the pipe out of the cabinet is 1m.





Tie to prevent the water pipe from curving up

Note

The middle of the gravity drainpipe cannot be arched, flattened, or bent to avoid affecting the drainage. It is recommended to ensure a drainage slope of at least 1:200. It is recommended to have a U trap to keep the unit draining smoothly. The maximum lift of the pump for upper drainage is 5m.

5.3.6 Vacuumize and add refrigeration oil

5.3.6.1 Vacuum

After leakage test with nitrogen, use a vacuum pump to exhaust the air in the pipe. Do not charge the refrigerant to exhaust the air in the pipe, otherwise the residual non-condensable air will increase the high pressure of the system and decrease the refrigeration performance.

Step 1 Open the globe valves of the indoor unit and outdoor unit, connect the pressure gauge to the indoor unit gas pipe needle valve and liquid pipe needle valve respectively, and then connect the vacuum pump.

Step 2 Start the vacuum pump.

When vacuumizing starts, the vacuum pump will be loud and white smoke will be emitting from the outlet at the beginning. If there is still white smoke coming out after 10 minutes, it may be due to poor sealing of the refrigeration system, or excessive residual refrigerant and moisture in the refrigeration system. In this case, continue to observe for 10 minutes. If this phenomenon still exists, check that the valves of the gauge are closed properly.

After 20 minutes, the pointer of the pressure gauge should be in the negative area, and the sound of the vacuum pump is relatively low.

Step 3 Close and open the vacuum pressure gauge for several times and check that the pointer of the pressure gauge and sound of vacuum pump do not change a lot.

Otherwise, the refrigeration system may be poorly sealed. In this case, check the leakage part and rectify the fault.

Step 4 Keep vacuumizing for at least 80 minutes using a 2L vacuum pump, and check that the final pressure displayed on the vacuum pump should not be greater than 60 Pa (absolute pressure).

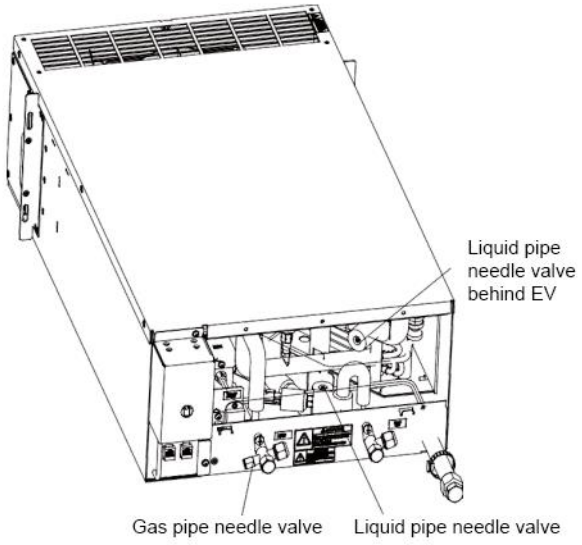
The vacuumizing time varies with vacuum pumps, as listed in the following table.

Vacuum pump size	Time suggestion
1L	2h
2L	80 min
4L	30 min

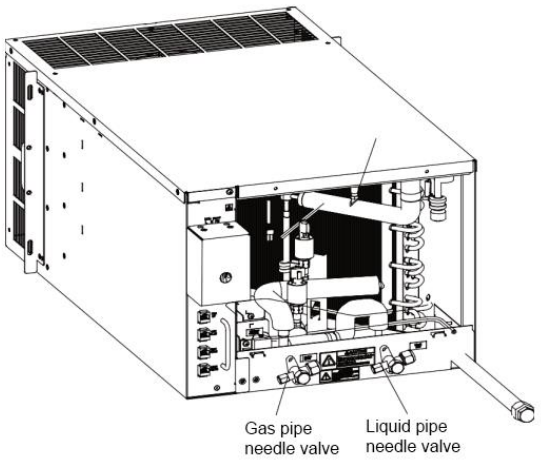
Step 5 Close all valves of the pressure gauge, close the vacuum pump (no need to remove the connection), hold pressure for 10 minutes, and check that the pressure of the refrigeration system should not be greater than 90 Pa (absolute pressure).

Note

If there is no vacuum meter on site, you can keep vacuumizing for over 1 hour with a 3L vacuum pump to meet the requirement. This duration is obtained based on previous experiments. If you use a vacuum pump lower than 3L, extend the vacuumizing time appropriately.



Needle valves of E04SE



Needle valves of E08SE

—End

5.3.6.2 Add refrigeration oil

Adding refrigerant will dilute the refrigeration oil in the system, affecting the lubrication and cooling effect of refrigeration oil. Therefore, adding refrigeration oil is required. The type of refrigeration oil used in the unit is FV50S. If other types of refrigeration oil is used, irreversible damage to the compressor will be caused.

The unit has been filled with refrigeration oil based on standard pipe connection before delivery. If the pipe connecting the indoor and outdoor units is longer than 30m, refrigeration oil must be added to make the system run normally. When the length of the connecting pipe increases by 1m, the supplementary amount of refrigerated oil is calculated as follows:

Amount of refrigeration oil (ml) = 300 (ml) + Additional refrigerant* (kg) × 22.6 (ml/kg)

*Additional refrigerant refers to the amount of refrigerant that is added when the pipe length exceeds the standard length (10m). For the amount of refrigeration oil required when low-temperature components are equipped, see 5.3.8.6 Calculate refrigeration oil amount.

The refrigeration oil shall be added at the gas pipe needle valve of the indoor unit after vacuumizing and before filling refrigerant. The refrigeration oil container and needle valve can be connected by a pressure hose.

Note

The system needs to be vacuumized again after the refrigeration oil is added.

5.3.7 Charge refrigerant

The unit is not filled with refrigerant before delivery. The unit must be filled with the refrigerant on site. If the pipe connecting indoor and outdoor units is longer than 10 m, additional refrigerant needs to be charged.

R410A refrigerant charge within 10m pipe length

Type	R410A refrigerant (kg)	Remarks
E04SE+EW06E	1.0	Charged on site
E08SE+EW10E	1.8	

If the pipe connecting indoor and outdoor units is longer than 10 m, additional refrigerant must be added to make the system operate normally. The following table lists the additional refrigerant required for each increase of 1 m in the pipe length. For units equipped with low-temperature components, see 5.3.8.5 Calculate refrigerant amount.

Liquid pipe diameter (mm)	Additional refrigerant per unit length (kg/m)
6	0.009
9.52	0.04
12.7	0.1

Note

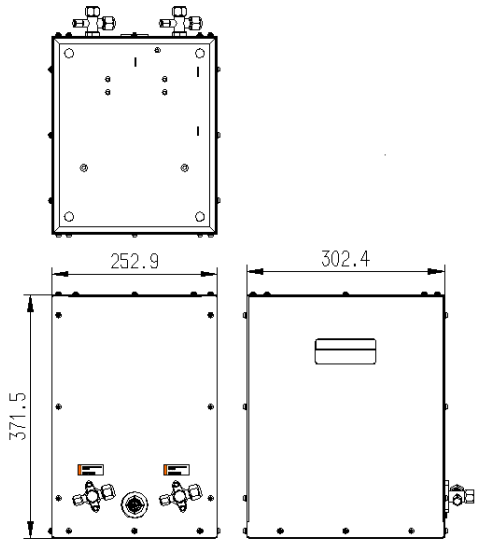
The optimal refrigerant amount varies with operating conditions. The preceding table is for reference only.

When the cooling unit stops working, the supplementary refrigerant can be filled from the needle valve of the exhaust pipe (high-pressure side, smaller nozzle of compressor). When the device is working, the supplementary refrigerant must be inhaled from the needle valve behind the expansion valve (low-pressure side) in a handstand or inclination (more than 45°) manner. Ensure that the refrigerant is inhaled slowly into the compressor to avoid damage caused by liquid shock. See 5.2.2 Charge the refrigerant for reference of the operation procedure.

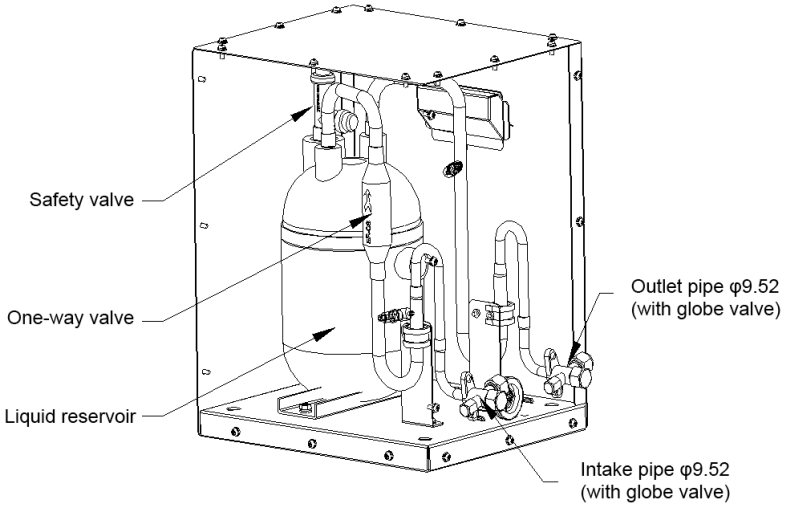
5.3.8 Install low-temperature components (optional)

When the ambient temperature of the outdoor unit is lower than -20℃, it is necessary to configure low-temperature components to ensure the normal start-up and reliable operation of cooling units in winter. The low-temperature components are applicable in the ambient temperature of -40℃ to +45℃.

The following figures show a low-temperature component for example. The actual component may be different.



Low-temperature component outline (unit: mm)



Low-temperature component outline (inside)

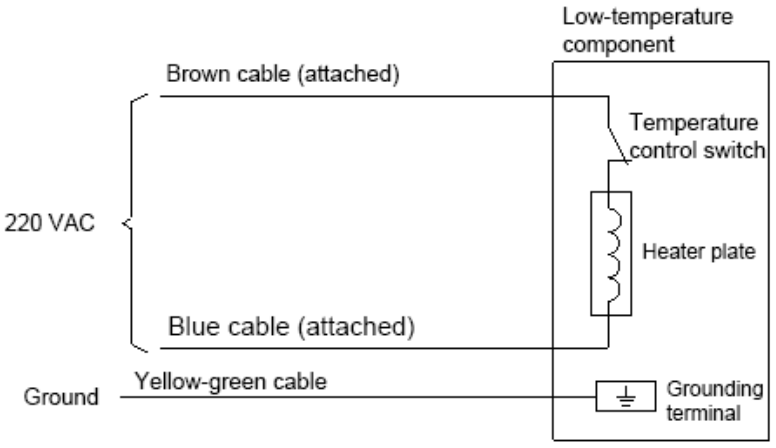
5.3.8.1 Connect power supply cables to the low-temperature component indoors (recommended)

Note

When the indoor unit is installed at least 5m higher than the outdoor unit, the low-temperature components must be installed indoors.

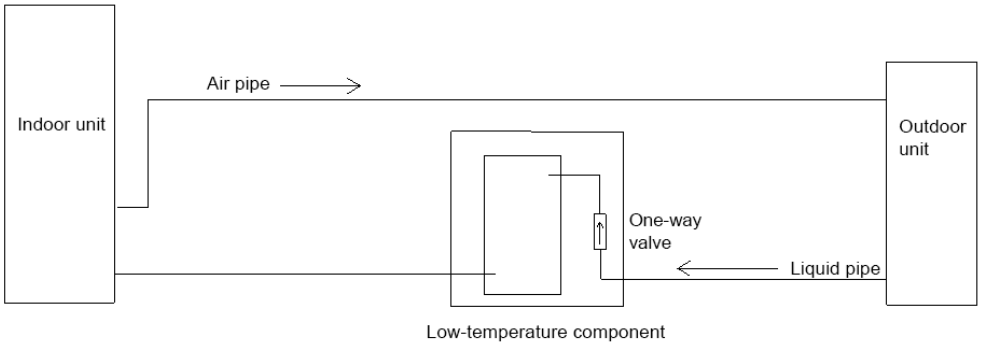
The low-temperature component is equipped with a brown cable and a blue cable, which are 5m two-core low-temperature resistant cables. Connect the 220 VAC power supply from an indoor user cabinet or power distribution box to the low-temperature component, with the brown cable connected to phase L and blue cable connected to phase N.

The following figure shows the wiring diagram.



5.3.8.2 Connect power supply cables to the low-temperature component outdoors

When the low-temperature components are installed outdoors, the distance between the low-temperature components and the outdoor unit must be within the range of 0.5m to 2m. The bottom of the low-temperature component should be at the same height as that of the outdoor unit or slightly lower than that of the outdoor unit.



The low-temperature component is equipped with a brown cable and a blue cable, which are 5m two-core low-temperature resistant cables.

To connect the power supply from the outdoor unit to the low-temperature component:

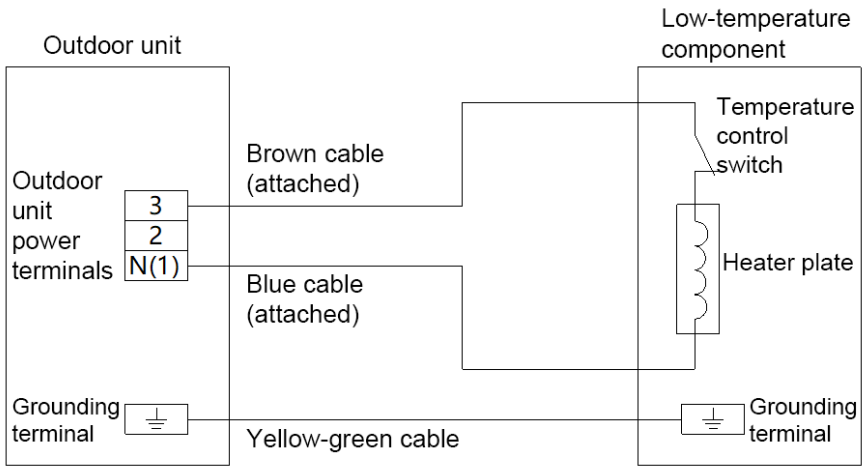
Step 1 Connect the brown cable of the low-temperature component to terminal 3 of the outdoor unit.

Step 2 Connect the blue cable of the low-temperature component to terminal N (1) of the outdoor unit.

Step 3 Use the yellow-green cable to connect the grounding terminals of the outdoor unit and low-temperature component.

—End

The following figure shows the wiring diagram.



5.3.8.3 Connect liquid pipes to the low-temperature component

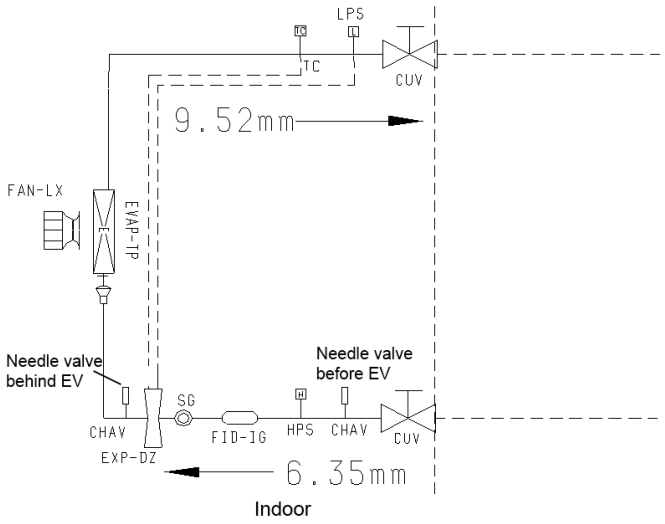
The inlet and outlet pipes of the low-temperature components are connected by a 3/8-inch globe valve, and the actual on-site connection pipeline may vary with the nozzle requirements in the installation instructions. The low-temperature component is connected with the liquid pipes of the indoor unit and the outdoor unit respectively using the globe valve cone seal and threaded pipe. If the diameter of the liquid pipes of the indoor and outdoor units are different from that of the globe valve, enlarge or shrink the liquid pipes respectively and then weld one end of them to the liquid pipe of the low-temperature component, and thread the other end of the liquid pipe of the low-temperature component to its own globe valve through the bell-mouth joint.

5.3.8.4 Vacuumize the pipes

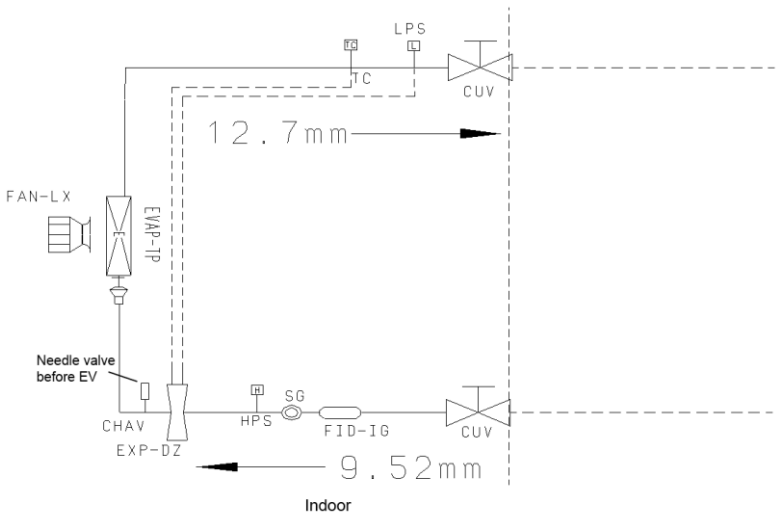
The indoor unit has been equipped with an electronic expansion valve, which will be closed upon shutdown. The low-temperature component is equipped with a one-way valve. To ensure that the whole pipeline is vacuumized, the cooling unit installed with a low-temperature component must be vacuumized at the following positions:

- Needle valve in front of the EV of the indoor unit (for the 8.1 kW unit, on the globe valve of the internal liquid pipe)
- Needle valve behind the EV

When a one-way valve is added to the pipeline, it is necessary to vacuumize the pipes in the front and back of the one-way valve. The globe valve of the indoor unit must be opened during vacuumizing.



Rack-mounting cooling unit E04SE



Rack-mounting cooling unit E08SE

5.3.8.5 Calculate refrigerant amount

The amount of refrigerant to be charged can be calculated using the following formulas:

- Rack-mounted cooling unit E04SE: unit charging capacity without low-temperature components + 2 kg
- Rack-mounted cooling unit E08SE: unit charging capacity without low-temperature components + 2.5 kg

5.3.8.6 Calculate refrigeration oil amount

The amount of refrigeration oil to be added can be calculated using the following table:

Model	Refrigeration oil
E04SE+EW06E	200 mL
E08SE+EW10E	250 mL

5.4 Operation and commissioning

5.4.1 Check before operation

The daily operation and management of the unit must be carried out by special personnel in accordance with the relevant regulations. Inspection should be performed before power-on.

- Check whether the circuit breaker specifications are in line with power requirements on the unit nameplate.
- Use a multimeter to carefully check whether all electrical cables are properly connected. Use a megohmmeters to check whether the enclosure is short circuited. Check that the grounding cable is properly connected and that the insulation resistance to the ground is greater than 2 mΩ. Check that the power cable meets the capacity requirements.
- Check the power cable and communication cable of the indoor and outdoor units.

5.4.2 Commissioning

Step 1 Set the return air temperature lower than the current ambient temperature.

Step 2 Turn on the compressor and outdoor unit to start system refrigeration.

Turning on the outdoor unit is not required for the integrated cooling unit.

Step 3 Observe the change of the high- and low-pressure gauge.

During the startup of the compressor, the low pressure should decrease, and the high pressure should rise. If there is no change in pressure, stop the device immediately.

Note

If any abnormal situation is found during the startup of the compressor, stop the unit immediately and eliminate the faults.

Step 4 Use a clamp ammeter to measure the running current of the integrated cooling unit or split outdoor unit.

The running current must be lower than the rated current. For the split cooling unit, check that the outdoor unit is free from abnormal noise and vibration.

—**End**

5.4.3 Test record and form

Item	Reference range	Actual record		Item	Reference range	Actual record
Indoor unit model	See nameplate			Outdoor unit model (only for split cooling unit)	See nameplate	
Indoor unit serial number	See nameplate			Outdoor unit serial number (only for split cooling unit)	See nameplate	
SN code (indoor unit/integrated cooling unit)	See the rear of the unit			SN code (only for split cooling unit)	See nameplate	
Indoor ambient temperature during test run	24–30℃ generally			Total current of outdoor unit	Lower than the maximum current on the nameplate	
Indoor ambient humidity during test run	40%–60% generally			Condenser inlet air temperature (Outdoor ambient temperature)	⩽45℃	
Power supply voltage	220 V ± 15% 50/60 Hz ± 2 Hz			Condenser outlet temperature	Generally 8–12℃ higher than the inlet air temperature	
Total current of indoor unit	Lower than the maximum current on the nameplate			Condensation pressure	22–30 bar generally (affected by the environment)	
Running time	/			System high pressure	22–30 bar generally (affected by the environment)	
Indoor air intake dry bulb temperature	25–35 ℃ generally (default: 35 ℃)			System low pressure	8.9–11 bar generally (affected by load)	
Indoor air inlet humidity	40%–60% generally (default 50%)			Inspiratory temperature	12–24 ℃ generally (affected by load)	
Air outlet dry bulb temperature of indoor unit	Generally 8–15℃ lower than the inlet air temperature (affected by load)			Exhaust temperature	70–80 ℃ generally (affected by environment)	
Remarks	Generally, the temperature difference between inlet and outlet air of the indoor unit/integrated cooling unit is about 15℃ when it is fully loaded.					

6 Turn on/off the MDC

6.1 Check before turning on the MDC

Before turning on the MDC, check and confirm a few aspects such as the system settings, the power distribution cable connection, and the cooling unit installation.

6.1.1 Check the system settings

- Check that cabinets are installed (including cable tray and side panel) and fixed to the correct location in sequence. You can open the cabinet door and find the cabinet number in lower right corner of the cabinet bottom. Ensure that the leveling feet of the cabinet are adjusted and leveled.
- Check that the cabinets are joined together at equal height, the screws between the cabinets are tightened, and the cabinets are sealed without gaps.
- Check that the protective coil on the cabinet is not loose or dropped.
- Check that the blank plate has been installed in the spare part of the cabinet where no equipment is installed.

6.1.2 Check electrical connections

- Check that all cabinets (including battery cabinets) are grounded and the ground cable between the cabinet door and body is connected.
- Check that the number of battery cells is correct, the connections between the batteries are correct and the positive and negative connections of the battery are correct.
- Check that the wiring of the PDM is secured and not loose.
- Confirm that the power supply voltage and frequency meet the conditions and verify that the phase order of the three-phase source is correct by using a multimeter.
- Check that the PDU in each cabinet is connected to the PDM correctly.

6.1.3 Check cooling unit installation

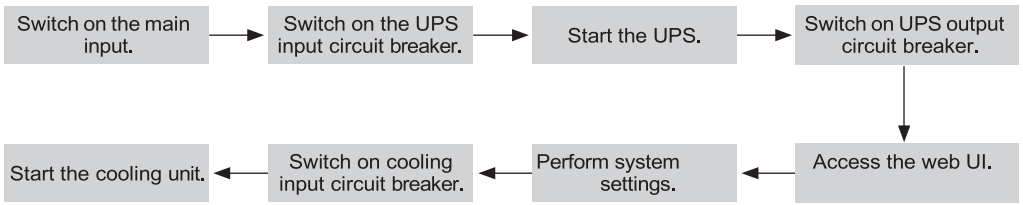
- Check that the pipes of the cooling units are connected and fixed properly, and correct pipe insulation measures has been taken.
- Check that the cooling unit pipes have been vacuumized, and pressure holding and leakage detection measures has been taken.
- Check that the cooling unit drainpipe is installed and fixed properly, and the drainage works correctly.
- Check that the outlet of the copper pipes on top or bottom of the cabinet are sealed and protected.
- Check that the globe valves on the refrigerant pipes are open and the refrigerant circuit has been set up.
- Check that the power and communication cables to outdoor unit/indoor unit/integrated cooling unit are properly connected.
- For the outdoor unit, check that it is fixed in place, and there are no obstructions affecting its ventilation.

6.2 Turn on the MDC

CAUTION

Installation or commissioning of the MDC must be performed by Eaton's customer service engineers or authorized Eaton specialists.

To turn on the MDC:



Step 1 Switch on the system main input.

Step 2 Switch on the UPS input circuit breaker on the PDM.

Step 3 Switch on the circuit breaker for the UPS's battery.

Step 4 Start the UPS by following its user guide.

You can download the user guide from Eaton's official website www.eaton.com.

Step 5 Switch on UPS's output circuit breakers on the PDM.

Step 6 Switch on PDU input circuit breakers on the PDM to turn on the PDUs.

Step 7 Check that the user screen is on.

If it is off, turn on the DC module switch on the back of the PDM.

Step 8 Access the user interface to set the system language, time and address on the user settings page and set the installation time, serial number, system type on the maintenance page.

The default username/password for the administrator is **admin/admin**. For details, see 7 General operations on the HMI or computer.

Step 9 Switch on cooling input circuit breakers on the PDM.

Step 10 On the HMI, go to **A/C** > **Details** and tap the **ON** button of the cooling unit to start the cooling unit.

If a cooling unit fault is displayed on the monitor screen, clear the fault first.

Step 11 Tap **UPS** in the bottom menu bar to check whether the UPS is working properly.

Step 12 Tap **Environment** in the bottom menu bar to check whether door lock and water leakage faults are reported. Tap **A/C** in the bottom menu bar to check whether the operation of cooling units and the temperature of each cabinet are normal.

Step 13 Tap **Alarm** in the left menu bar to check whether there is any alarm reported. If yes, locate the cause and eliminate the alarm.

—End

6.3 Turn off the MDC

Caution

- Before shutting down, ensure that the user load has been turned off with authorization.
- Do not turn off the MDC by turning off the power directly to avoid damaging the cooling unit.

To turn off the MDC:

Step 1 Switch off the PDU circuit breaker on the PDM.

Step 2 Tap the **OFF** button of the cooling unit (**A/C** > **Details** > **OFF**). Wait until the compressor stops output, and then turn off the cooling unit's input switch on the PDM.

Step 3 Turn off the UPS switch and disconnect the UPS's input and output switches on the PDM. Turn off the battery switch.

Step 4 Disconnect the main switch controlling the system input.

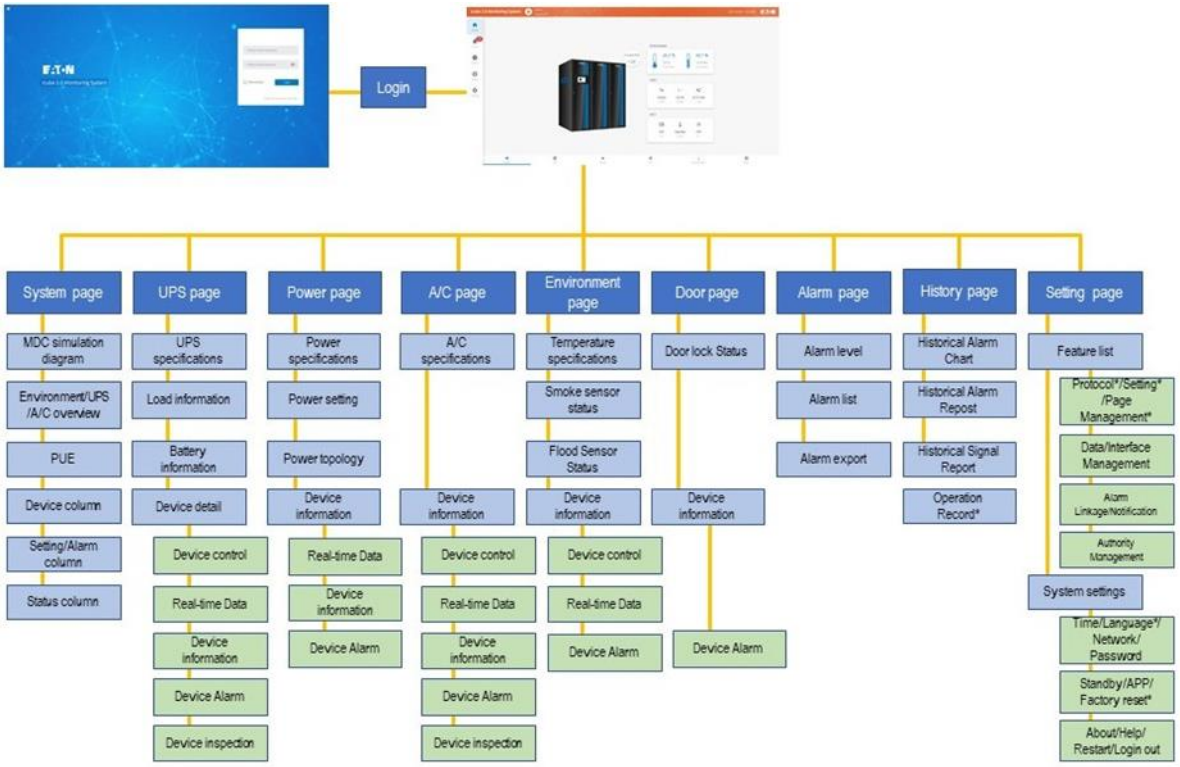
—**End**

7 General operations on the HMI or computer

This chapter introduces the monitoring method and user interface of the MDC, including local and remote monitoring and display. If you want to manage the MDC on app, contact our service personnel to purchase the app and obtain related user manual.

7.1 User interface overview

The following figure shows the overview of the user interface.



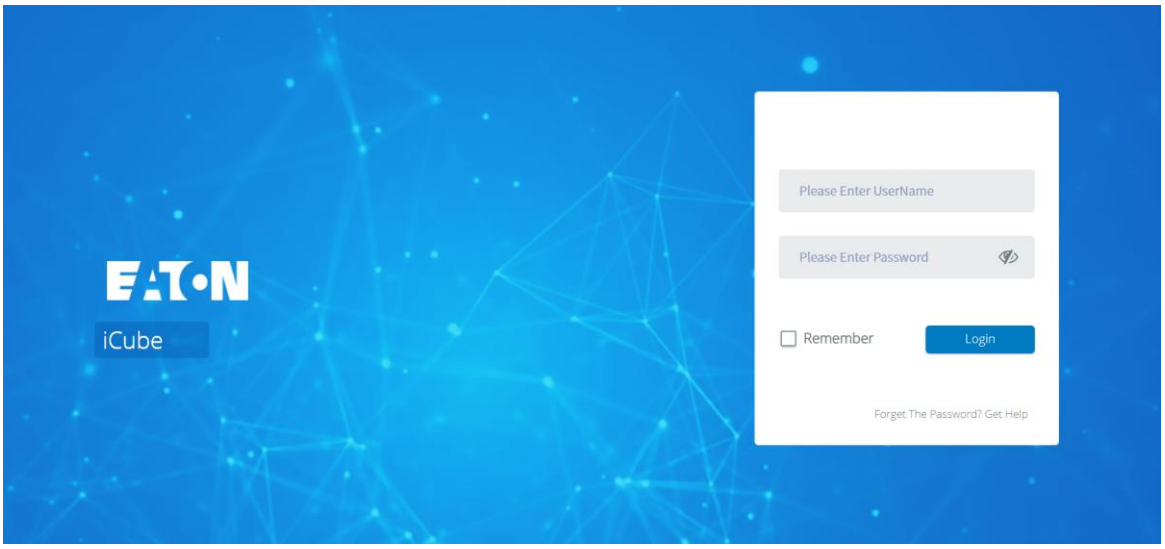
***** indicates that the menu can be accessed only by authorized accounts.

7.2 Log in to/Log out of the MDC system

You can log in to the MDC through the HMI on the cabinet or a computer connected to the same LAN with the MDC.

Note

One account can be used to log in to the MDC on only one client.



7.2.1 Log in to the MDC through the HMI

Refer to section 6.2 to turn on the MDC, enter your username and password on the login page, and tap **Login**.

Note

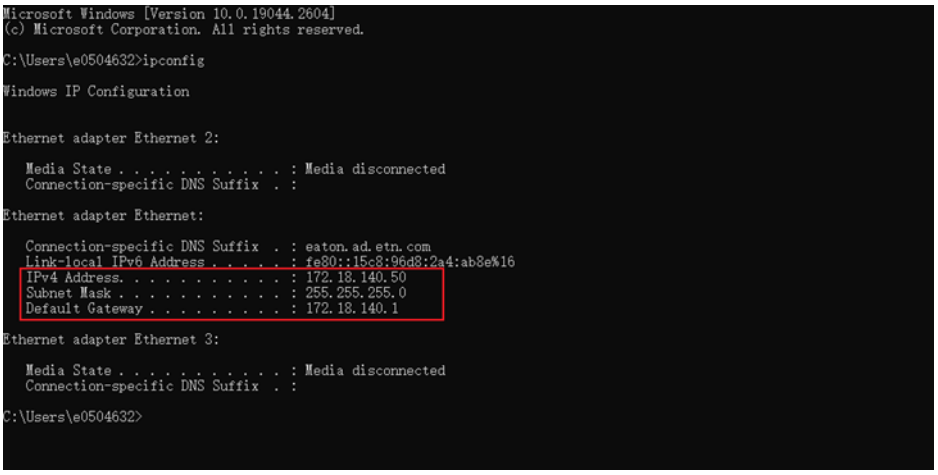
*The default username/password for the administrator is **admin/admin**, and the default username/password for the common user is **user/user**. You will be required to change the default password when you log in to the MDC system for the first time.*

If you forget your password, contact Eaton's service personnel.

7.2.2 Log in to the MDC through a computer (wireless connection)

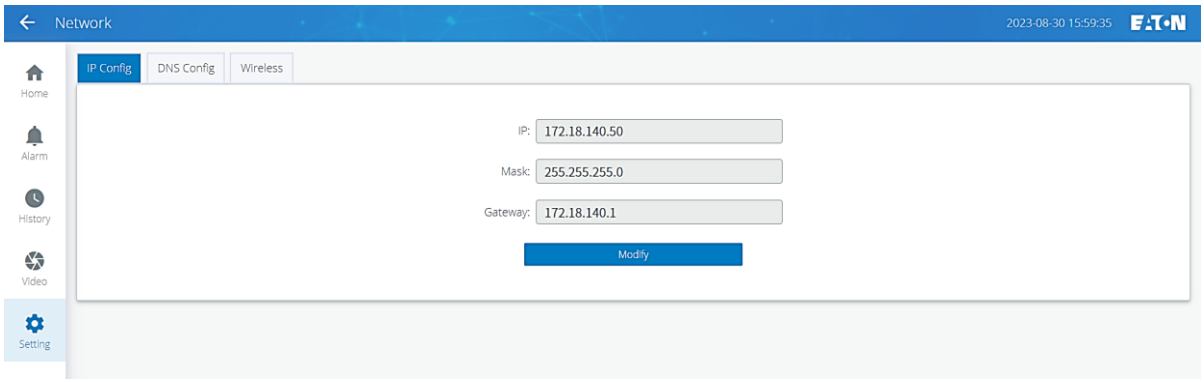
Step 1 Obtain the IP address that will be used for the MDC in the LAN.

1. Connect your computer to the network cable which will be used to connect to the MDC.
2. Press **Win**+**R**, enter **cmd**, and press **Enter**.
3. Enter **ipconfig** and press **Enter**. Record the values of **IPv4 Address**, **Subnet Mask**, and **Default gateway**. The following figure shows an example.



Step 2 Set the IP address for the MDC.

1. Refer to 7.2.1 to log in to the HMI of the MDC, and go to **Setting** > **Network** > **IP Config** on the HMI.
2. Set **IP**, **Mask**, and **Gateway** to the values recorded in Step 1, and tap **Modify**.



Step 3 Connect the MDC and your computer to the same LAN.

1. Disconnect the network cable from your computer, and connect the network cable to the **network** port on the top of the cabinet.
2. Connect your computer to the same LAN with the MDC.

Step 4 Start a browser (Google Chrome recommended) on your computer, enter the IP address of the MDC that you set in Step 2 in the address bar, and press **Enter**.

Step 5 Enter your username and password and click **Login**.

Note

- *The default username/password for the administrator is **admin/admin**, and the default username/password for the common user is **user/user**. You will be required to change the default password when you log in to the MDC system for the first time.*
- *If you forget your password, contact Eaton's service personnel.*
- *If you cannot select **I agree to all license terms and conditions of this user agreement** upon your first login, scroll down to finish reading the agreement and zoom out the screen.*

—End

7.2.3 Log in to the MDC through a computer (wired connection)

Step 1 Use a network cable to connect your computer to the **network** port on the top of the cabinet.

Step 2 Change the IP address of your computer to an unoccupied one in the same network segment with the MDC.

1. Go to **Start** > **Settings** > **Network & Internet**.
2. Click **Change adapter settings**.
3. Right-click the network adapter and select the **Properties** option.
4. Select **Internet Protocol Version 4 (TCP/IPv4)** and click **Properties**.
5. Select **Use the following IP address**, and specify **IP address**, **Subnet mask**, and **Default gateway**.

   By default, the IP address of the MDC is 192.168.100.100, subnet mask is 255.255.255.0, and gateway is 192.168.100.1. In this case, you can set the IP address of your computer to **192.168.100.*X*** (***X*** indicates any integer ranging from 2 to 254 except 100).

   If you have changed the IP address of the MDC before, refer to section 7.2.1 to log in the HMI of the MDC, and go to **Setting** > **Network** > **IP Config** to obtain the IP address.
6. Click **OK**.

Step 3 Start a browser (Google Chrome recommended) on your computer, enter the IP address of the MDC (for example, **192.168.100.100**) in the address bar, and press **Enter**.

Note

*Check whether **https://** is automatically added before the IP address you entered. If not, manually add **https://** before the IP address.*

Step 4 Enter your username and password and click **Login**.

Note

- *The default username/password for the administrator is **admin/admin**, and the default username/password for the common user is **user/user**. You will be required to change the default password when you log in to the MDC system for the first time.*
- *If you forget your password, contact Eaton's service personnel.*
- *If you cannot select **I agree to all license terms and conditions of this user agreement** upon your first login, scroll down to finish reading the agreement and zoom out the screen.*

—End

7.2.4 Log out of the MDC

After you log in to the MDC, you can tap **Setting** in the left menu bar and then tap **Log out** to log out of the MDC.

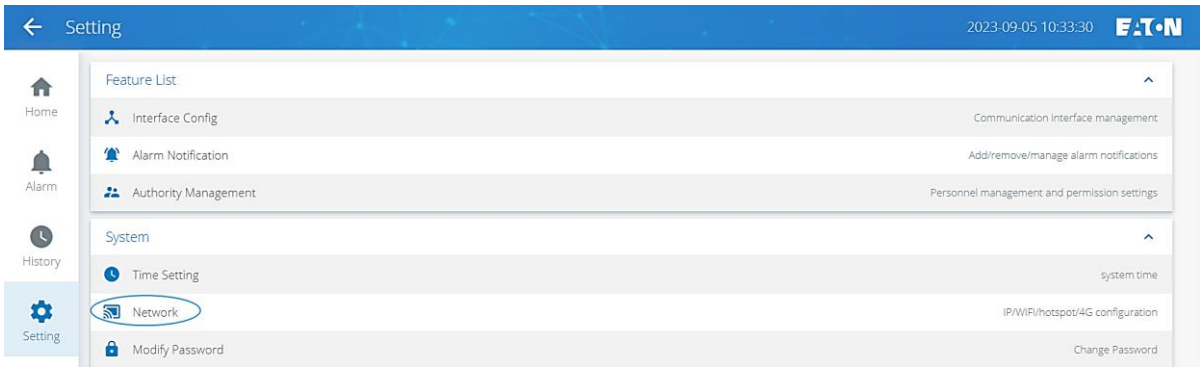
7.3 Change IP address of the system

Note

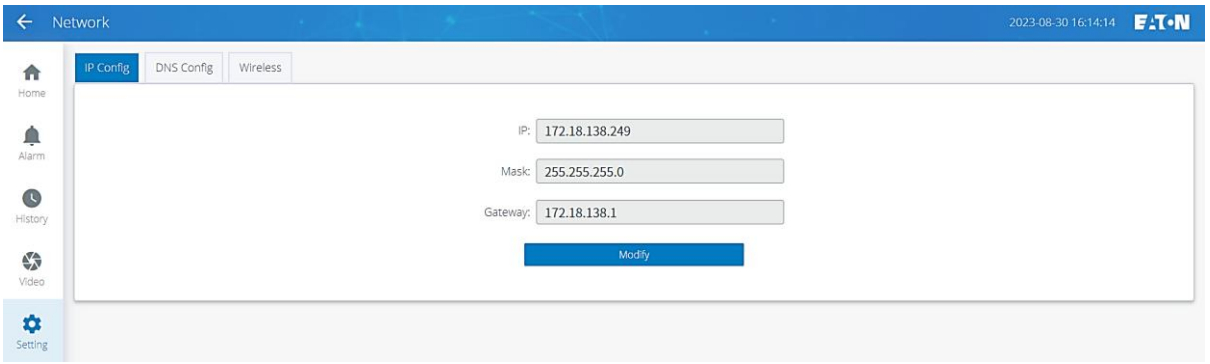
This operation is only available for authorized accounts.

Step 1 Refer to section 7.2 to log in to the system.

Step 2 Tap **Setting** in the left menu bar and then tap **Network**, as shown below.



Step 3 Tap **IP config**, enter the IP address and gateway, and then tap **Modify**. Wait for about 10 seconds for the configuration to take effect.



Step 4 Shut down and restart the monitoring server.

—End

7.4 Set wireless parameters

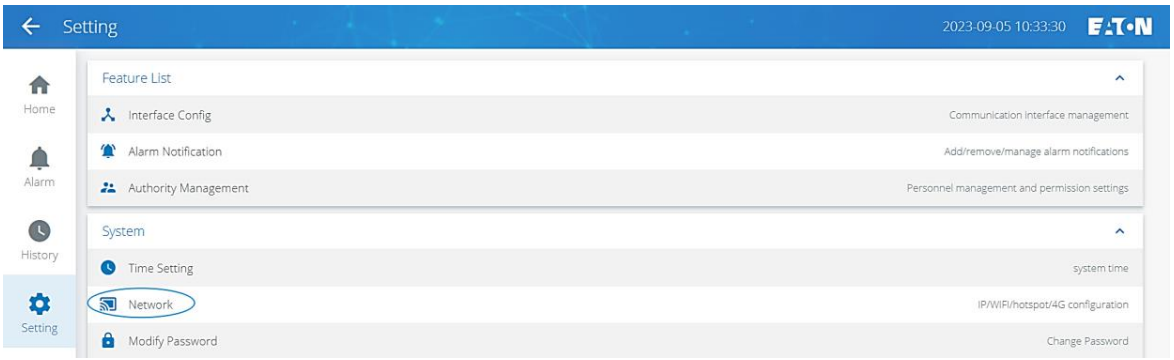
Note

This operation is only available for authorized accounts.

If you purchased a monitor with the 4G function, you can configure wireless parameters for communication.

Step 1 Refer to section 7.2 to log in to the system.

Step 2 Tap **Setting** in the left menu bar and then tap **Network**, as shown below.

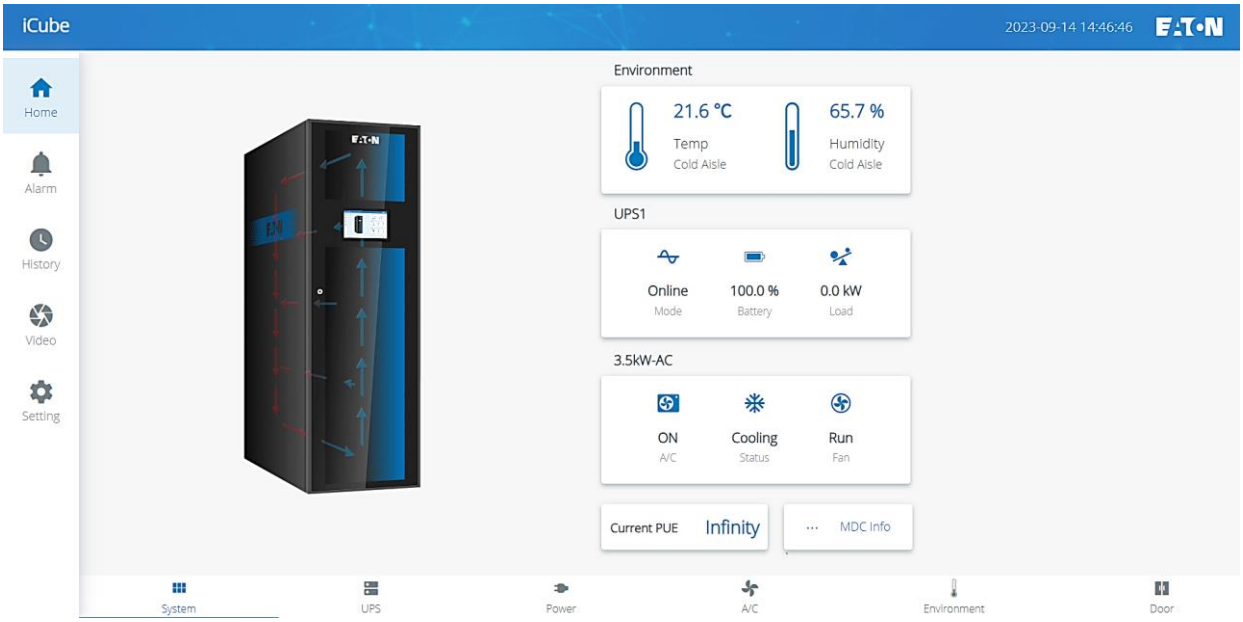


Step 3 Tap **Wireless**, and set parameters as required.

—End

7.5 View system information

After you log in to the system, the following system homepage is displayed.



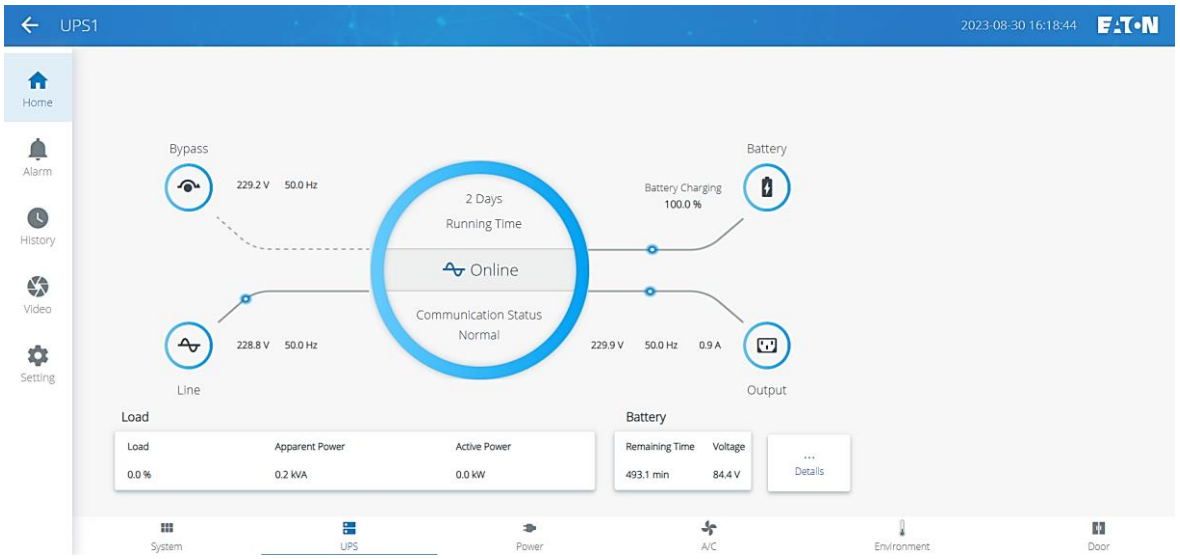
On this page, you can see the following information.

System homepage

MDC diagram	Displays the number of cabinets, heat flow and system layout of the MDC.
Environment	Displays current temperature and humidity of the cold aisle.
UPS	Displays current operating mode, battery level and load status of the UPS.
A/C	Displays the working status of the cooling unit and operating status of the fan.
PUE	Displays the current power usage effectiveness (PUE) value.
MDC Info	Click it to check the product name, model, serial number, material number, installation time, and running time of the MDC.
Bottom menu bar (device menu)	Includes the system, UPS, power distribution, cooling unit, environment, and door lock menus (at the bottom of the page).
Side menu bar (settings menu)	Includes the homepage, alarm, history, and configuration menus in sequence (on the left side of the page).
Status column	Displays the system name, number of alarms, time, trademark, and brand information. When the status column is displayed in blue, the MDC is working properly without any alarm. When the status column is displayed in orange, at least one common alarm is generated. When the status column is displayed in red, at least one critical alarm is generated.

7.6 View UPS details and control UPS

To view overall information about the UPS, refer to section 7.2 to log in to the system, and tap **UPS** in the bottom menu bar to access the **UPS** page, as shown below.



On this page, you can see the following information.

UPS page	
UPS parameters	Displays the UPS name, bypass, mains electricity, battery, output, running time, working mode, and communication status.
Load	Displays load rate, apparent power, and active power.
Battery	Displays the remaining battery usage time and battery voltage.

7.6.1 Stop the UPS by EPO button

Note

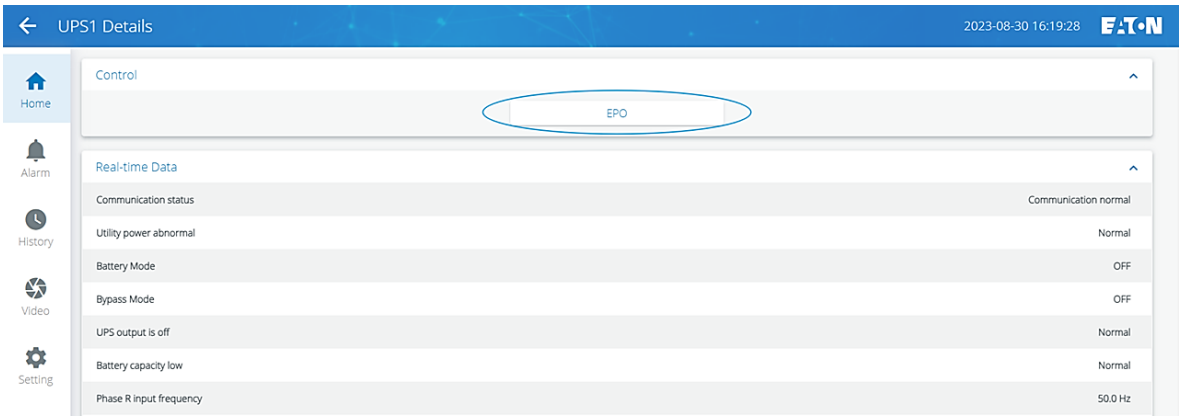
This operation is only available for authorized accounts.

You can stop the UPS remotely by using the EPO button upon emergency.

Step 1 Refer to section 7.2 to log in to the system, and tap **UPS** in the bottom menu.

Step 2 Tap **Details** in the lower right corner of the page.

Step 3 Tap **EPO** under **Control**.



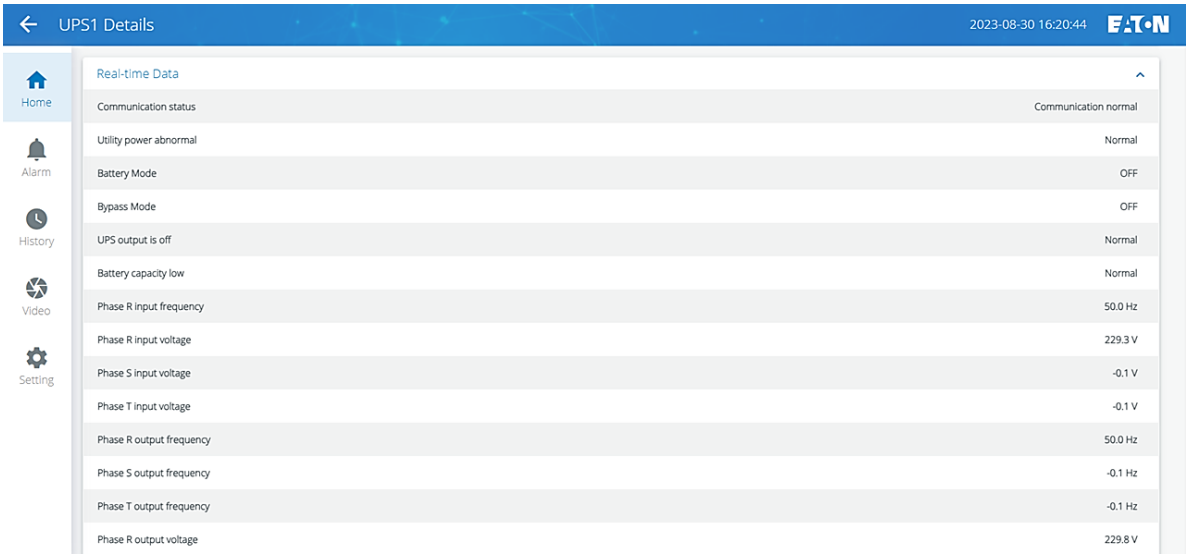
—End

7.6.2 View real-time UPS data

Step 1 Refer to section 7.2 to log in to the system, and tap **UPS** in the bottom menu.

Step 2 Tap **Details** in the lower right corner of the page.

Now you can see the real-time data of UPS under **Real-time Data**. The following figure shows an example.



—End

7.6.3 View UPS information

To view information of the UPS, including the model, serial number, installation time, and running time:

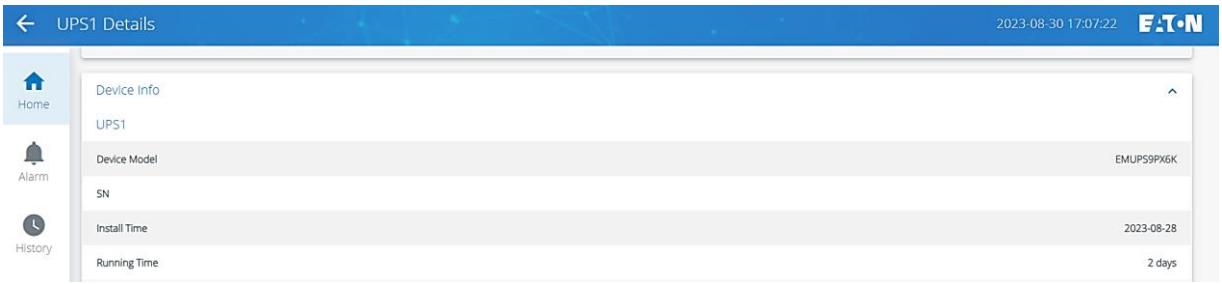
Step 1 Refer to section 7.2 to log in to the system, and tap **UPS** in the bottom menu.

Step 2 Tap **Details** in the lower right corner of the page.

Step 3 Scroll down to locate the **Device Info** module.

Note

The device information may vary with the presettings. The following figure shows an example.



—End

7.6.4 Perform inspection on the UPS

Note

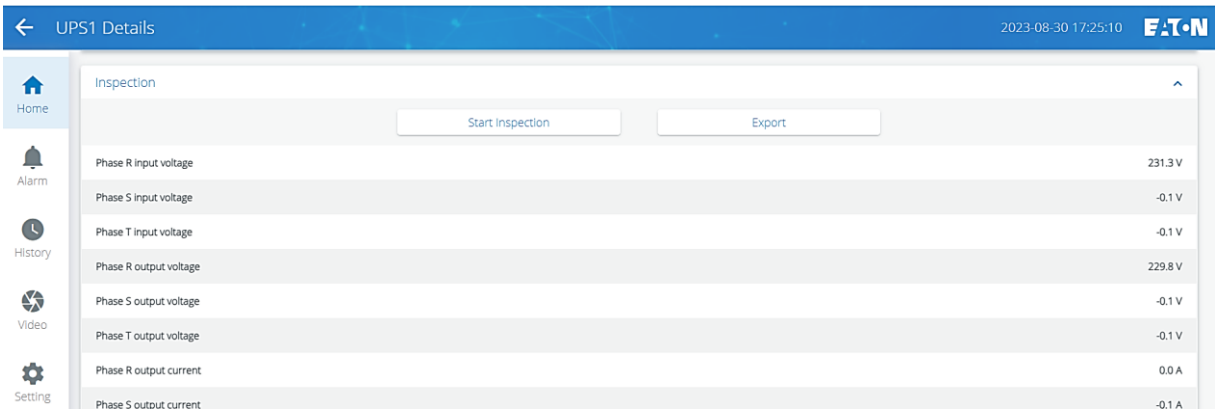
This operation is only available for authorized accounts.

If a UPS fault occurs, you can perform inspection on the UPS and export the result to locate faulty data.

Step 1 Refer to section 7.2 to log in to the system, and tap **UPS** in the bottom menu.

Step 2 Tap **Details** in the lower right corner of the page.

Step 3 Scroll down to locate the **Inspection** module and tap **Start Inspection**.



If you log in to the MDC using a computer, you can click **Export** to download the inspection results as an Excel file to your computer.

—End

7.6.5 View UPS alarms

Step 1 Refer to section 7.2 to log in to the system, and tap **UPS** in the bottom menu.

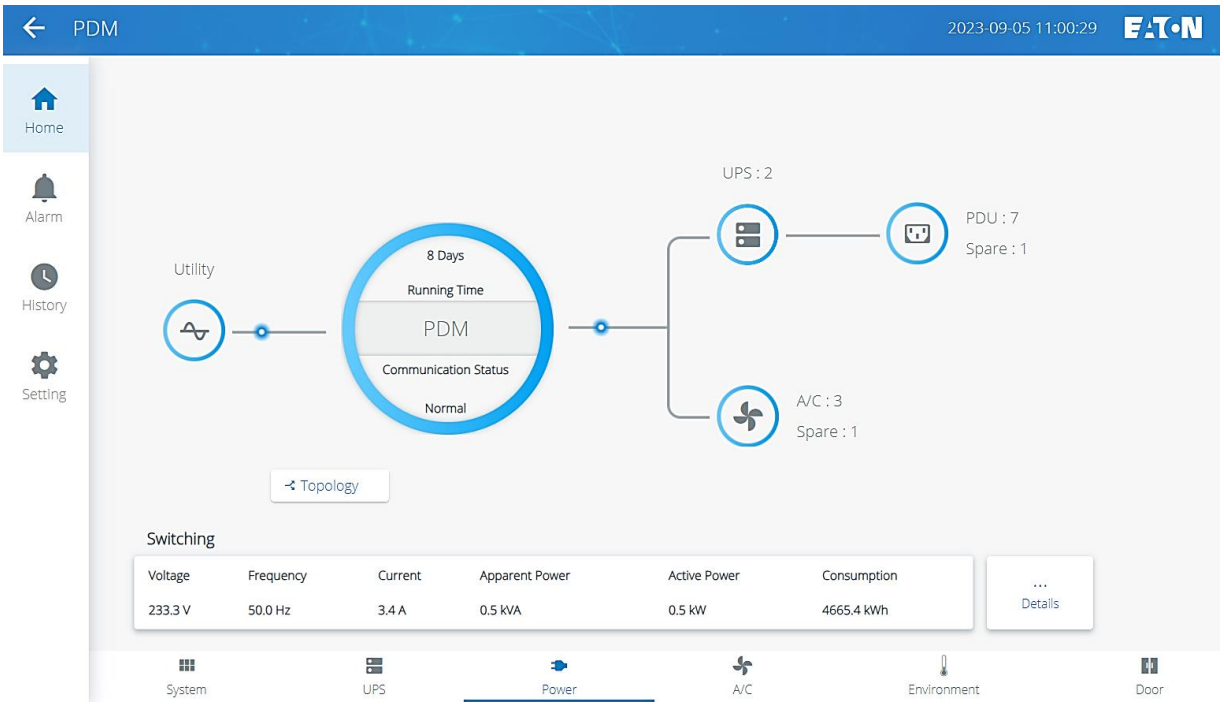
Step 2 Tap **Details** in the lower right corner of the page.

Step 3 Scroll down to locate the **Alarm** module.

—End

7.7 View PDM details and control PDM

To view overall information about the PDM, refer to section 7.2 to log in to the system, and tap **Power** in the bottom menu bar to access the **Power** page, as shown below.



On this page, you can see the following information.

Power page

PDM parameters	Displays the power distribution operation status and communication status of the PDM.
Topology	Used to check the topology of the PDM.
Switching	Displays such information of the PDM including voltage, frequency, current, total apparent power, total active power, and power consumption.

7.7.1 Check PDM topology

To check the PDM topology, refer to section 7.2 to log in to the system, tap **Power** in the bottom menu, and then tap **Topology**.

7.7.2 Set the PDM address

Note

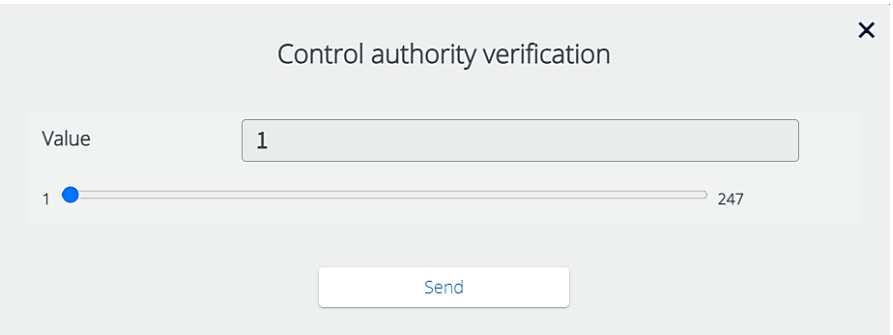
This operation is only available for authorized accounts.

To set the PDM address:

Step 1 Refer to section 7.2 to log in to the system, and tap **Power** in the bottom menu.

Step 2 Tap **Details** in the lower right corner of the page.

Step 3 Tap **Address setting** under **Control**, set an address value, and tap **Send**.



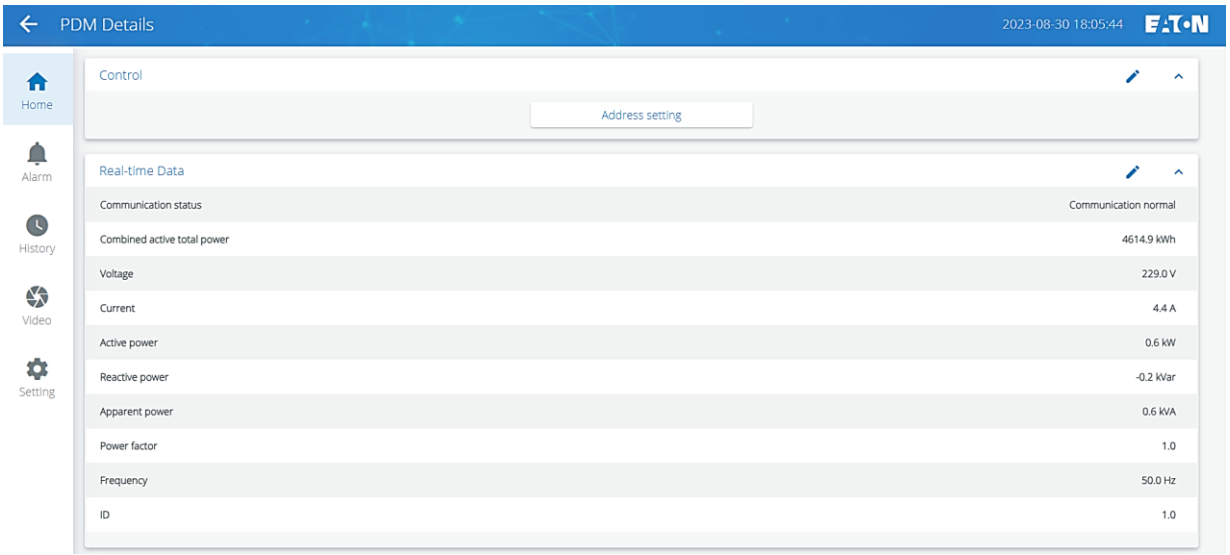
—End

7.7.3 View real-time PDM data

Step 1 Refer to section 7.2 to log in to the system, and tap **Power** in the bottom menu.

Step 2 Tap **Details** in the lower right corner of the page.

Now you can see the real-time data of PDM under **Real-time Data**. The following figure shows an example.



—End

7.7.4 View PDM information

To view information of the PDM, including the model, serial number, installation time, and running time:

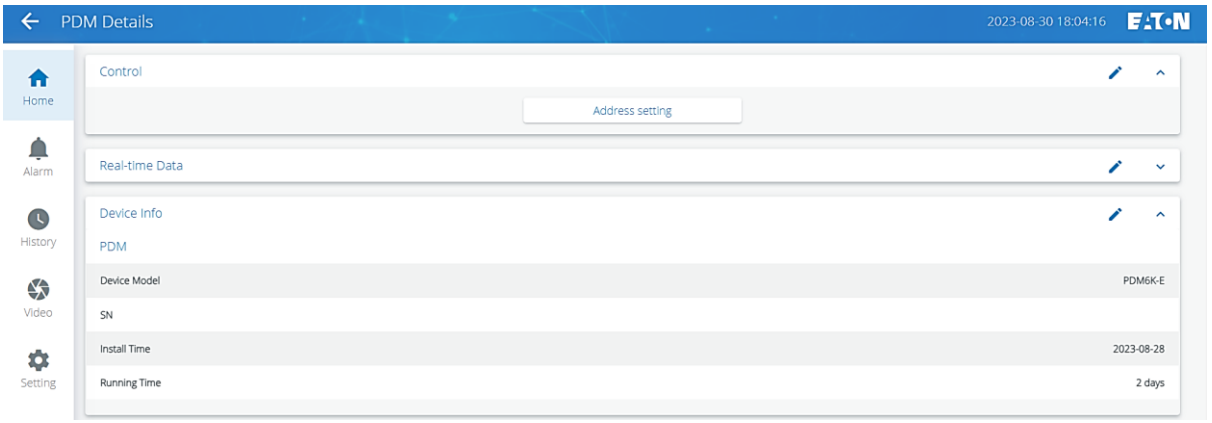
Step 1 Refer to section 7.2 to log in to the system, and tap **Power** in the bottom menu.

Step 2 Tap **Details** in the lower right corner of the page.

Step 3 Scroll down to locate the **Device Info** module.

Note

The device information may vary with the presettings. The following figure shows an example.



—End

7.7.5 View PDM alarms

Step 1 Refer to section 7.2 to log in to the system, and tap **Power** in the bottom menu.

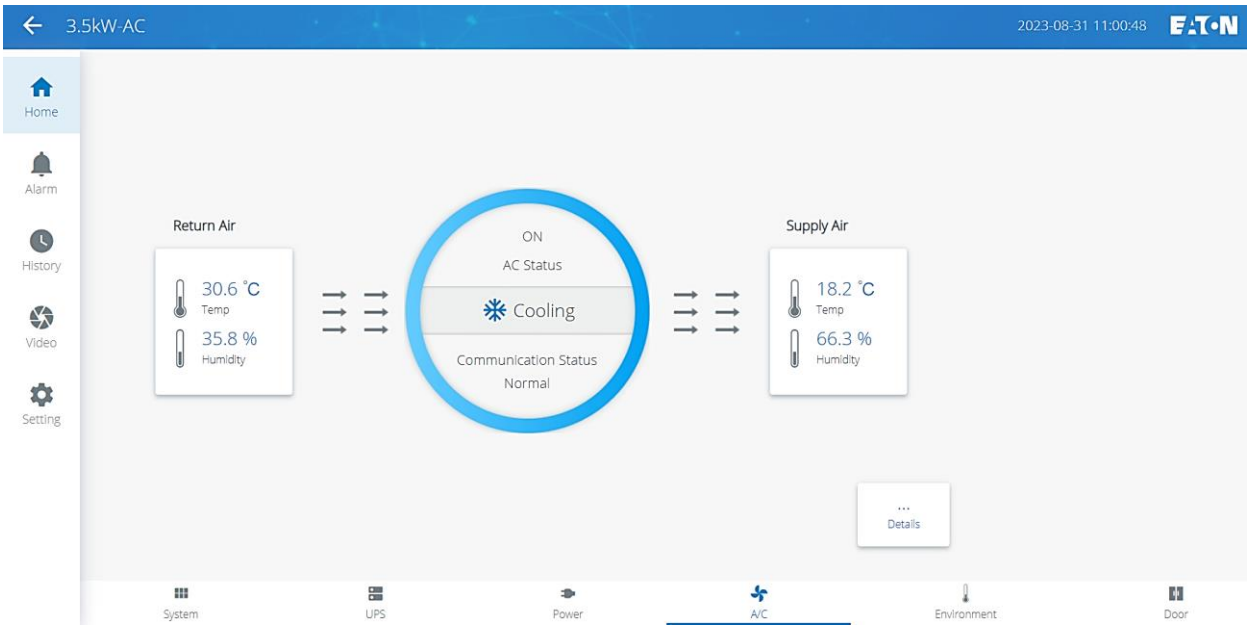
Step 2 Tap **Details** in the lower right corner of the page.

Step 3 Scroll down to locate the **Alarm** module.

—End

7.8 View cooling unit details and control the cooling unit

To view overall information about the cooling unit, refer to section 7.2 to log in to the system, and tap **A/C** in the bottom menu bar to access the **A/C** page, as shown below.



On this page, you can see the overall information of the cooling unit, including cooling unit name, returned air temperature and humidity, supplied air temperature and humidity, A/C operating status, and communication status.

7.8.1 Turn on/off the cooling unit

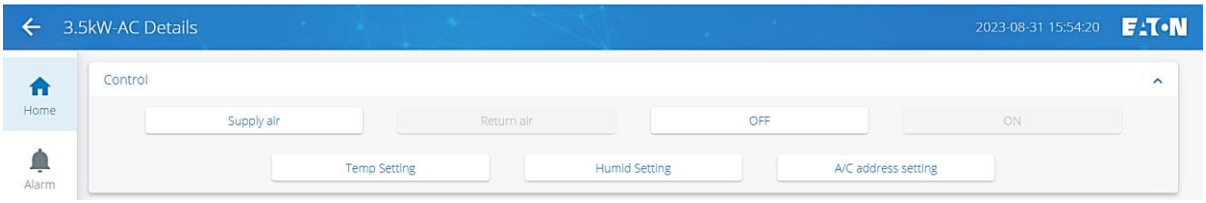
Note

This operation is only available for authorized accounts.

Step 1 Refer to section 7.2 to log in to the system, and tap **A/C** in the bottom menu.

Step 2 Tap **Details** in the lower right corner of the page.

Step 3 In the **Control** module, tap **ON** to turn on or **OFF** to turn off the cooling unit.



—End

7.8.2 Supply air

Note

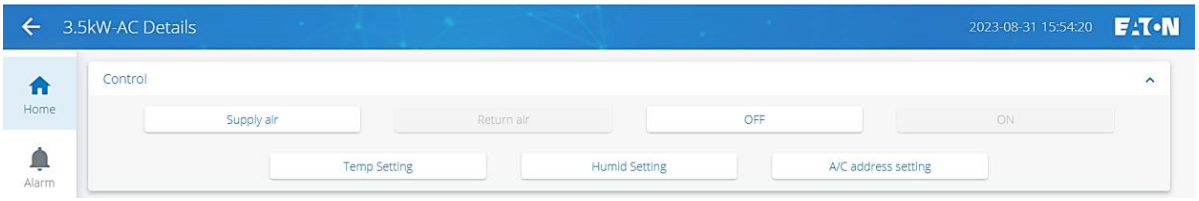
This operation is only available for authorized accounts.

By default, the return air mode is used. If you want to enable the supply air mode, following the steps below. The default mode is recommended.

Step 1 Refer to section 7.2 to log in to the system, and tap **A/C** in the bottom menu.

Step 2 Tap **Details** in the lower right corner of the page.

Step 3 In the **Control** module, tap **Supply air** and then **Start**.



—**End**

7.8.3 Set temperature

Note

This operation is only available for authorized accounts.

Step 1 Refer to section 7.2 to log in to the system, and tap **A/C** in the bottom menu.

Step 2 Tap **Details** in the lower right corner of the page.

Step 3 In the **Control** module, tap **Temp Setting**.

Step 4 Set a temperature value and tap **Send**.

—**End**

7.8.4 Set humidity

Note

This operation is only available for authorized accounts.

Step 1 Refer to section 7.2 to log in to the system, and tap **A/C** in the bottom menu.

Step 2 Tap **Details** in the lower right corner of the page.

Step 3 In the **Control** module, tap **Humid Setting**.

Step 4 Set a humidity value and tap **Send**.

—**End**

7.8.5 Set cooling unit address

Note

This operation is only available for authorized accounts.

Step 1 Refer to section 7.2 to log in to the system, and tap **A/C** in the bottom menu.

Step 2 Tap **Details** in the lower right corner of the page.

Step 3 In the **Control** module, tap **A/C address setting**.

Step 4 Set a value in the range of 1 to 255 and tap **Send**.

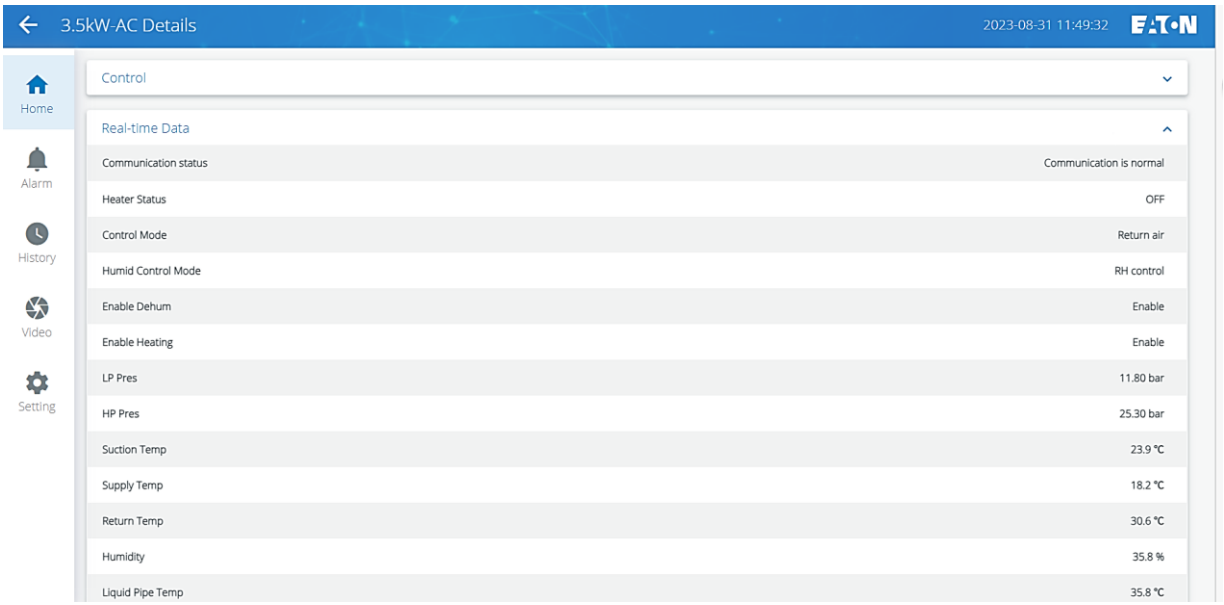
—**End**

7.8.6 View real-time data of cooling unit

Step 1 Refer to section 7.2 to log in to the system, and tap **A/C** in the bottom menu.

Step 2 Tap **Details** in the lower right corner of the page.

Now you can see the real-time data of cooling unit under **Real-time Data**. The following figure shows an example.



—End

7.8.7 View cooling unit information

To view information of the cooling unit, including the model, serial number, installation time, and running time:

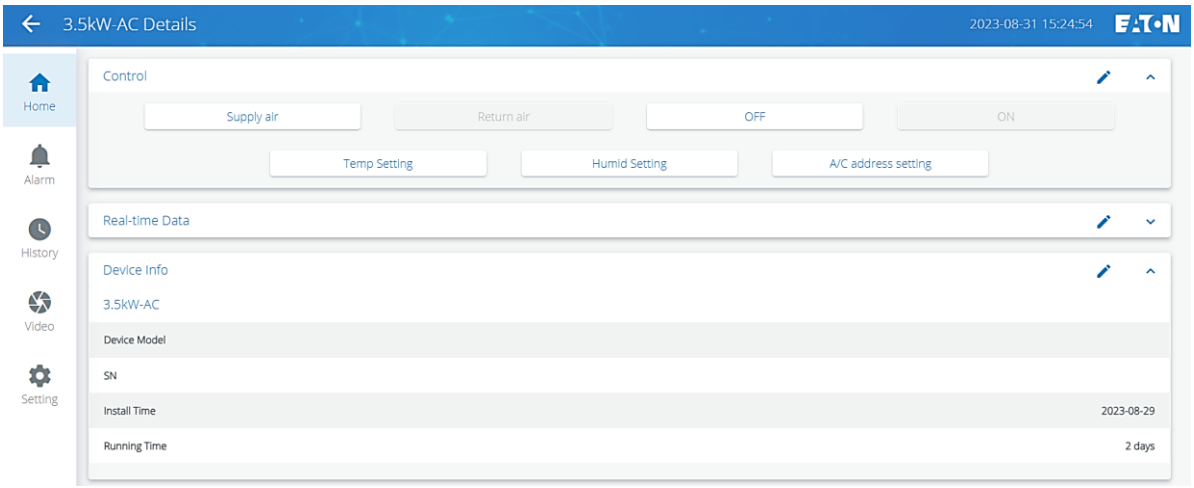
Step 1 Refer to section 7.2 to log in to the system, and tap **A/C** in the bottom menu.

Step 2 Tap **Details** in the lower right corner of the page.

Step 3 Scroll down to locate the **Device Info** module.

Note

The device information may vary with the presettings. The following figure shows an example.



—End

7.8.8 Perform inspection on the cooling unit

Note

This operation is only available for authorized accounts.

If a cooling unit fault occurs, you can perform inspection on the cooling unit.

Step 1 Refer to section 7.2 to log in to the system, and tap **A/C** in the bottom menu.

Step 2 Tap **Details** in the lower right corner of the page.

Step 3 Scroll down to locate the **Inspection** module and tap **Start Inspection**.

If you log in to the system using a computer, you can click **Export** to download the inspection results as an Excel file to your computer for further analysis.

—End

7.8.9 View cooling unit alarms

Step 1 Refer to section 7.2 to log in to the system, and tap **A/C** in the bottom menu.

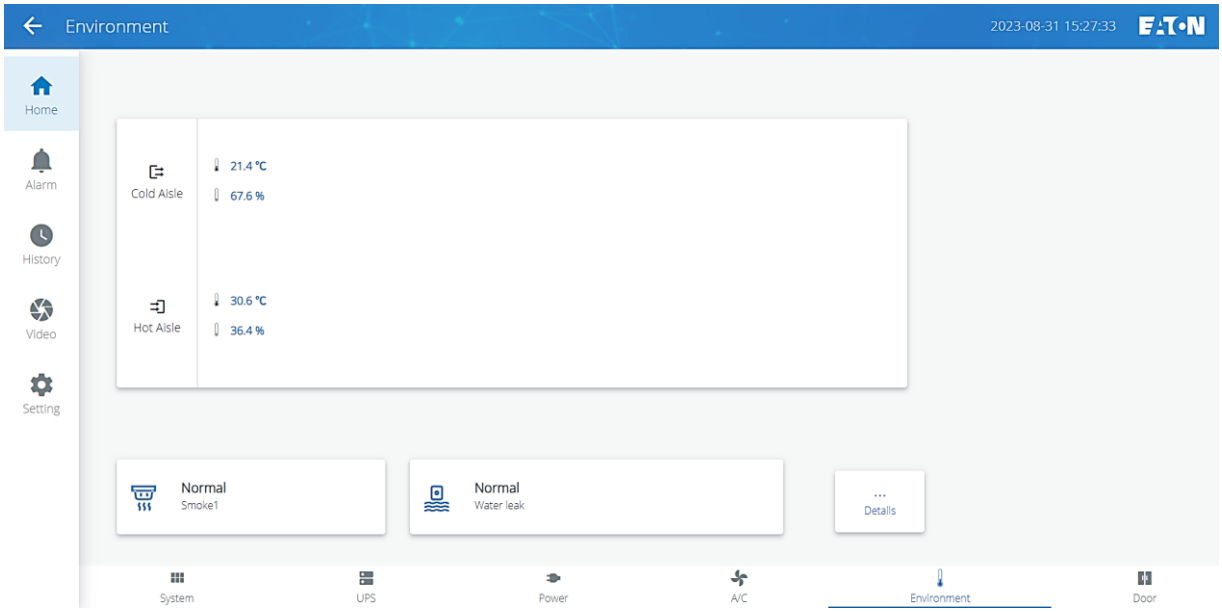
Step 2 Tap **Details** in the lower right corner of the page.

Step 3 Scroll down to locate the **Alarm** module.

—End

7.9 View environment details

To view overall information about the environment, refer to section 7.2 to log in to the system, and tap **Environment** in the bottom menu bar to access the **Environment** page, as shown below.



On this page, you can see the following information.

Environment page

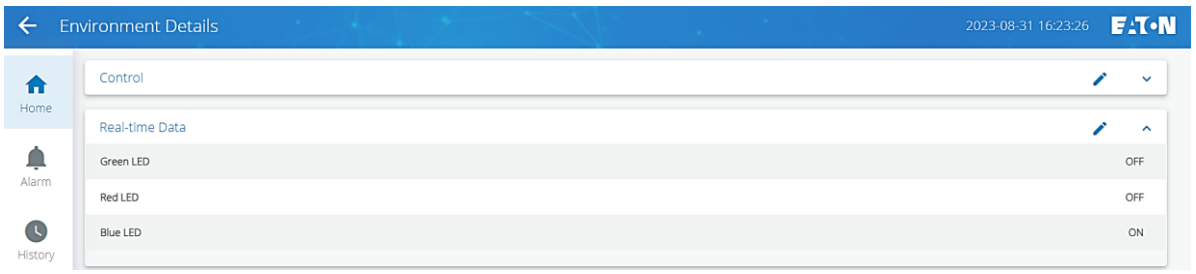
Temperature and humidity sensor parameters	Displays temperature and humidity of hot aisle and cold aisle.
Smoke sensor status	Displays the status of the smoke sensor.
Water leakage detector status	Displays the status of the water leakage detector.

7.9.1 View real-time data of ambient lights

Step 1 Refer to section 7.2 to log in to the system, and tap **Environment** in the bottom menu.

Step 2 Tap **Details** in the lower right corner of the page.

Now you can see the real-time data of ambient lights under **Real-time Data**. The following figure shows an example.



—End

7.9.2 View environment alarms

Step 1 Refer to section 7.2 to log in to the system, and tap **Environment** in the bottom menu.

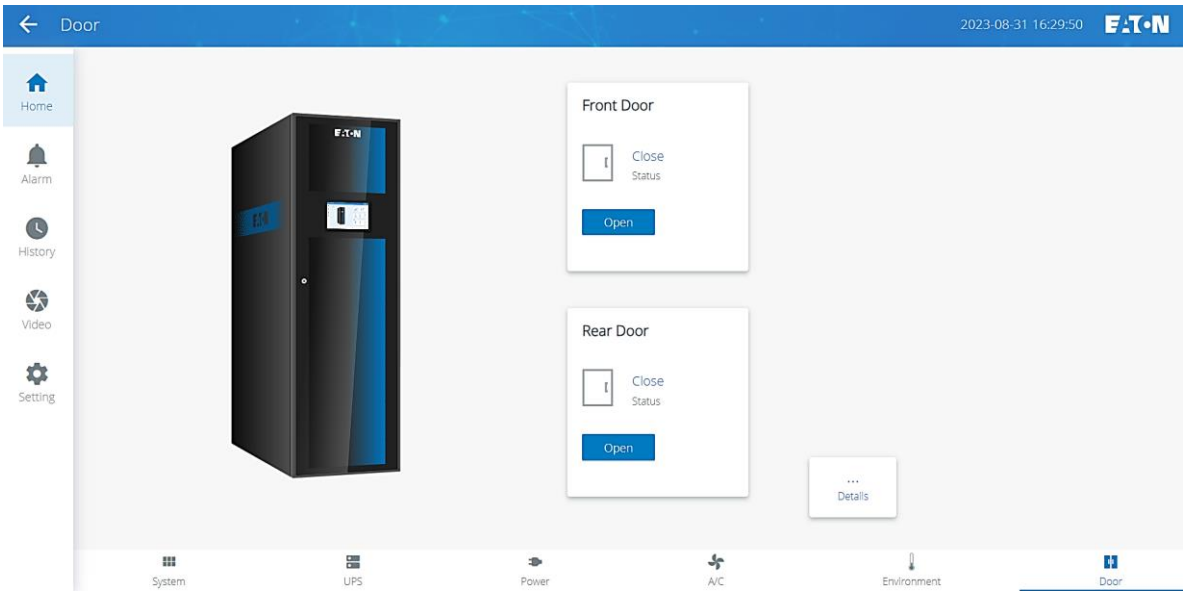
Step 2 Tap **Details** in the lower right corner of the page.

Step 3 Scroll down to locate the **Alarm** module.

—**End**

7.10 View door lock details and control door locks

To view overall information about door locks, refer to section 7.2 to log in to the system, and tap **Door** in the bottom menu bar to access the **Door** page, as shown below.



On this page, you can see the status of the front and rear doors of each cabinet.

7.10.1 Open a cabinet door

Step 1 Refer to section 7.2 to log in to the system, and tap **Door** in the bottom menu.

Step 2 Tap **Open** to open a door.

—**End**

7.10.2 View door lock alarms

Step 1 Refer to section 7.2 to log in to the system, and tap **Door** in the bottom menu.

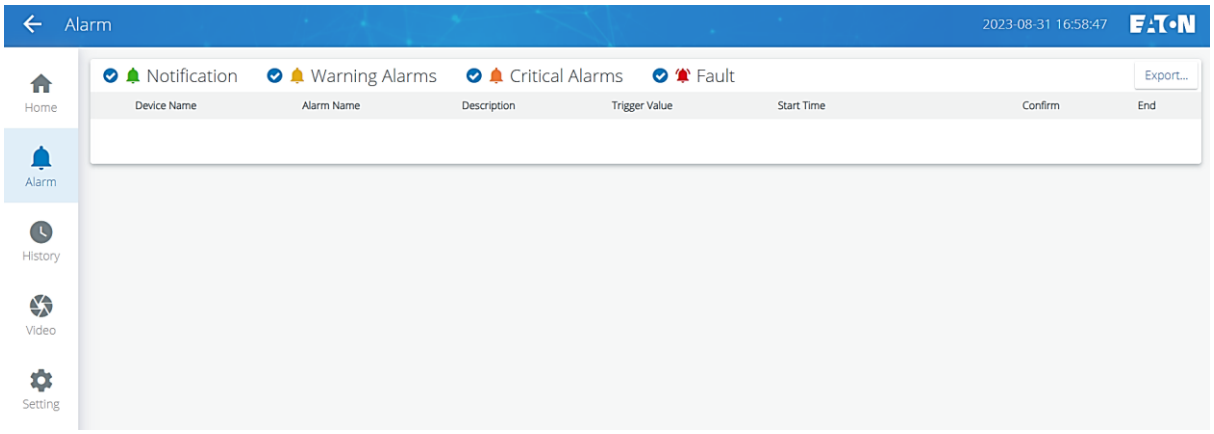
Step 2 Tap **Details** in the lower right corner of the page.

Step 3 Scroll down to locate the **Alarm** module.

—**End**

7.11 View and export current alarms

To view current alarms, refer to section 7.2 to log in to the system, and tap **Alarm** in the left menu bar to access the **Alarm** page, as shown below.



By default, all levels of alarms are displayed on this page. You can select **Notification**, **Warning Alarms**, **Critical Alarms**, and **Fault** to view alarms by level.

If you log in to the system using a computer, you can click **Export** to download the displayed alarms.

7.12 View and export historical alarms

7.12.1 View historical alarm charts

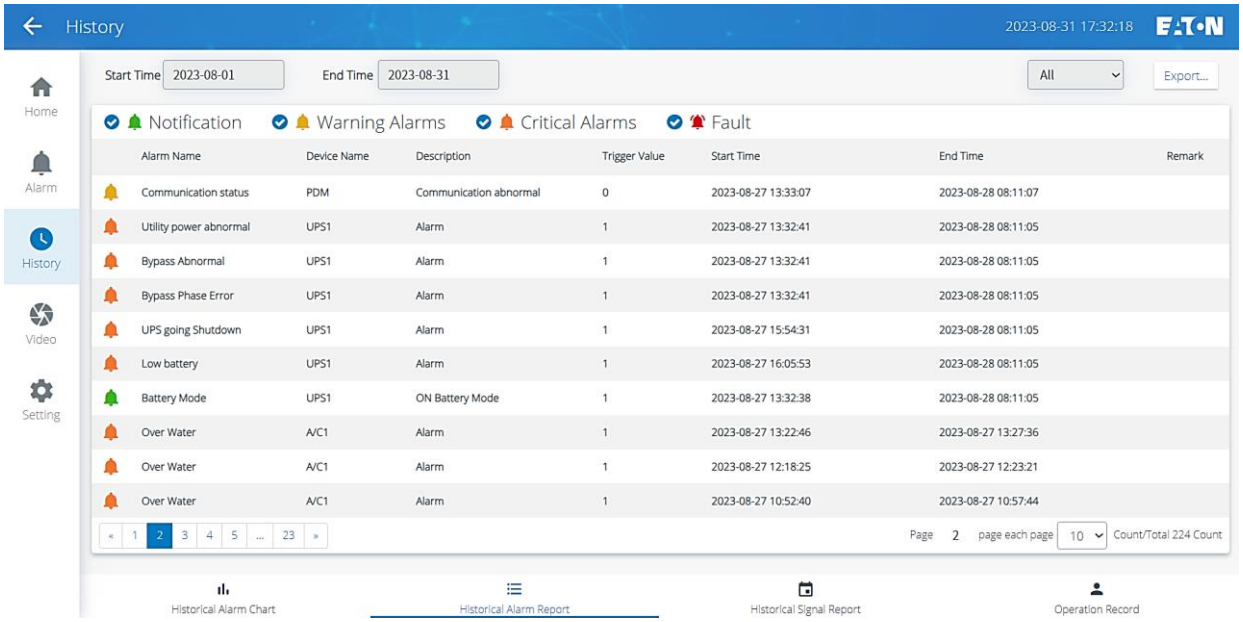
To view historical alarm charts, refer to section 7.2 to log in to the system, tap **History** in the left menu bar, and select the **Historical Alarm Chart** tab, as shown below.



On this page, the numbers of alarms are displayed by days (last 30 days), months, and devices. Devices with maximum number of alarms are also displayed. You can check the data for alarm analysis.

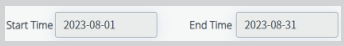
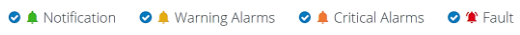
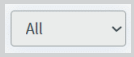
7.12.2 View and export historical alarm report

To view historical alarm report, refer to section 7.2 to log in to the system, tap **History** in the left menu bar, and select the **Historical Alarm Report** tab, as shown below.



By default, information of all alarms is displayed on this page, including the alarm name, device name, description, trigger value, start time, and end time. You can set filters to display certain alarms.

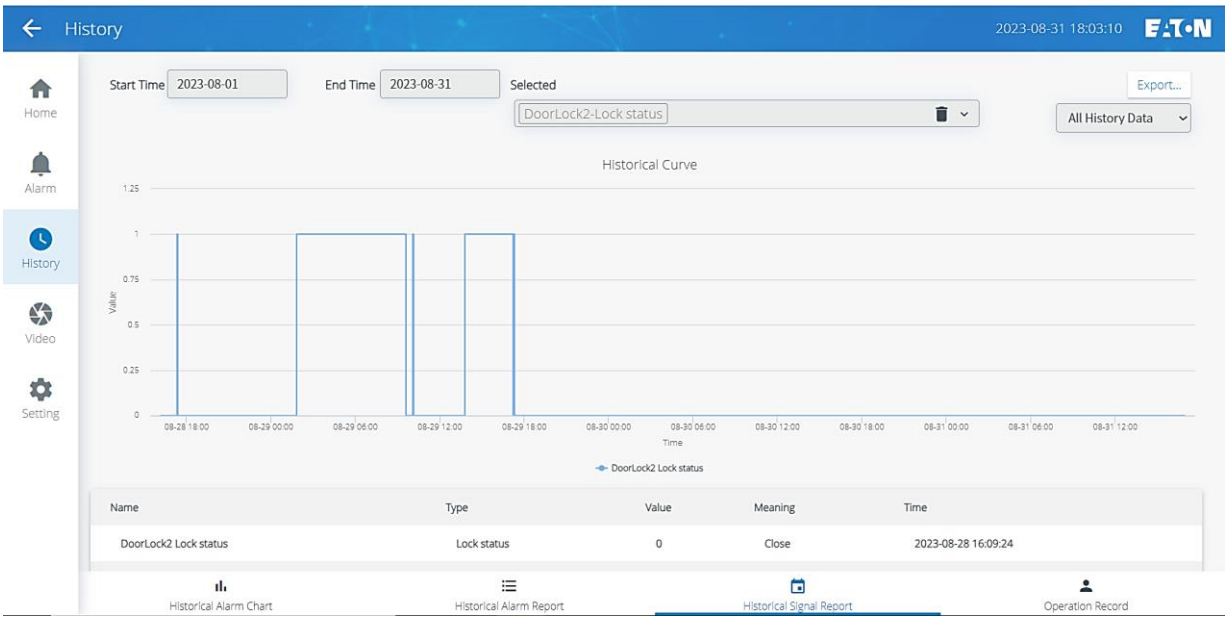
Filter description

	Specifies the time when the alarms were generated.
	Specifies the type of alarms to be displayed.
	Specifies the type of devices on which alarms are generated.

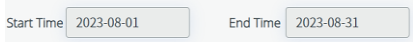
If you log in to the system using a computer, you can click **Export** to download displayed alarms as an Excel file.

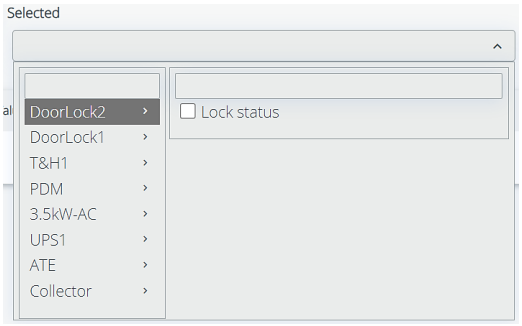
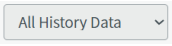
7.12.3 View and export historical signal report

To view historical signal report, refer to section 7.2 to log in to the system, tap **History** in the left menu bar, select the **Historical Signal Report** tab, and set filters as required.



The following table describes the filters available on this page.

Filter	Description
	Specifies the time when the signals were generated.

Filter	Description
	Specifies the type of signals to be displayed.
	Specifies the type of signals to be displayed by signal value. – **All History Data**: All historical signal data is displayed. – **Daily Maximum**: Only the historical signal data with the maximum value on each day is displayed. – **Daily Minimum**: Only the historical signal data with the minimum value on each day is displayed. – **Daily Average**: Average data on each day is displayed.

If you log in to the system using a computer, you can click **Export** to download displayed alarms as an Excel file.

7.13 Manage accounts

7.13.1 Create an account

Note

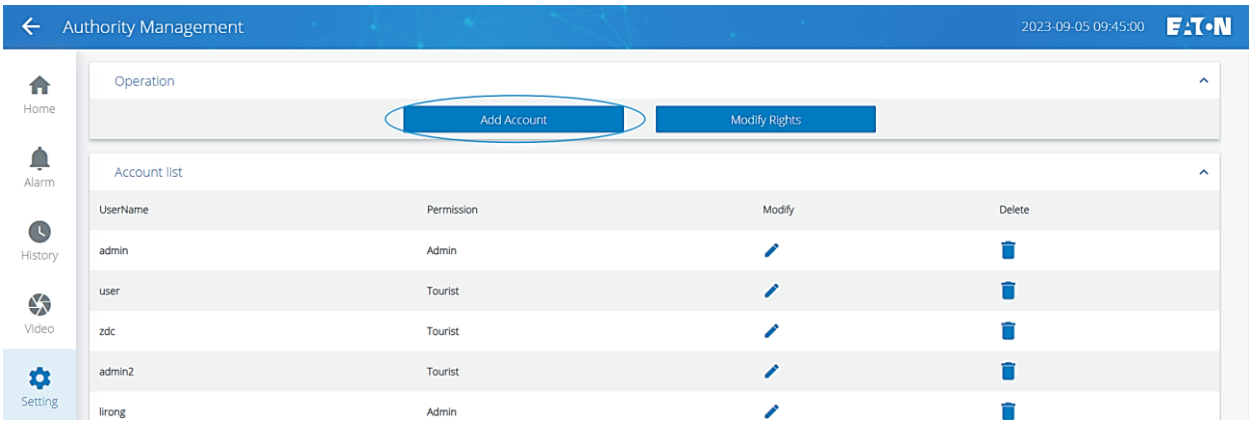
This operation is only available for authorized accounts.

Step 1 Refer to section 7.2 to log in to the system.

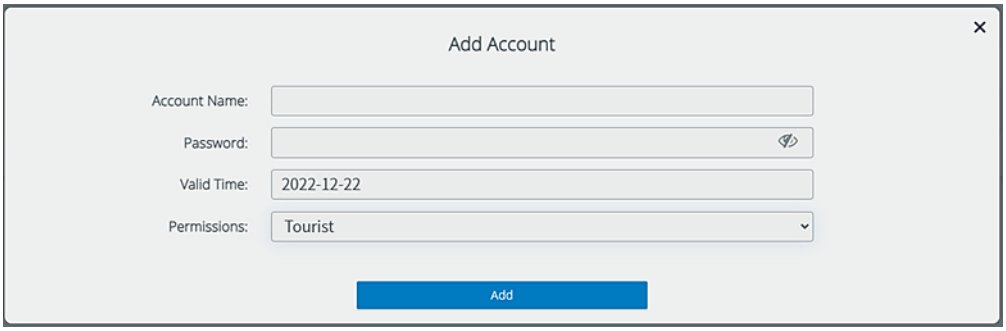
Step 2 Tap **Setting** in the left menu bar and then tap **Authority Management**.



Step 3 Tap **Add Account**.



Step 4 Enter the account name and password, choose the valid time and permission level, and tap **Add**.



—End

7.13.2 Modify account permissions

Note

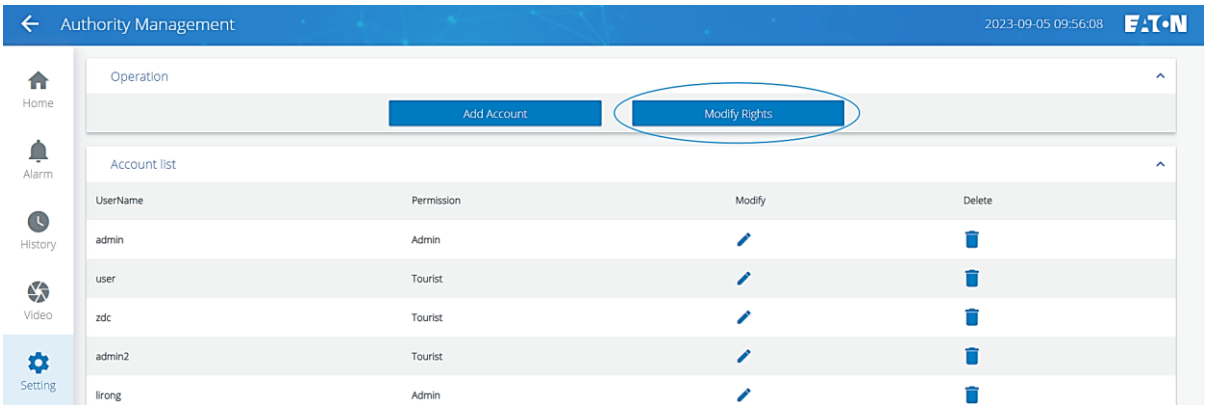
This operation is only available for authorized accounts.

Step 1 Refer to section 7.2 to log in to the system.

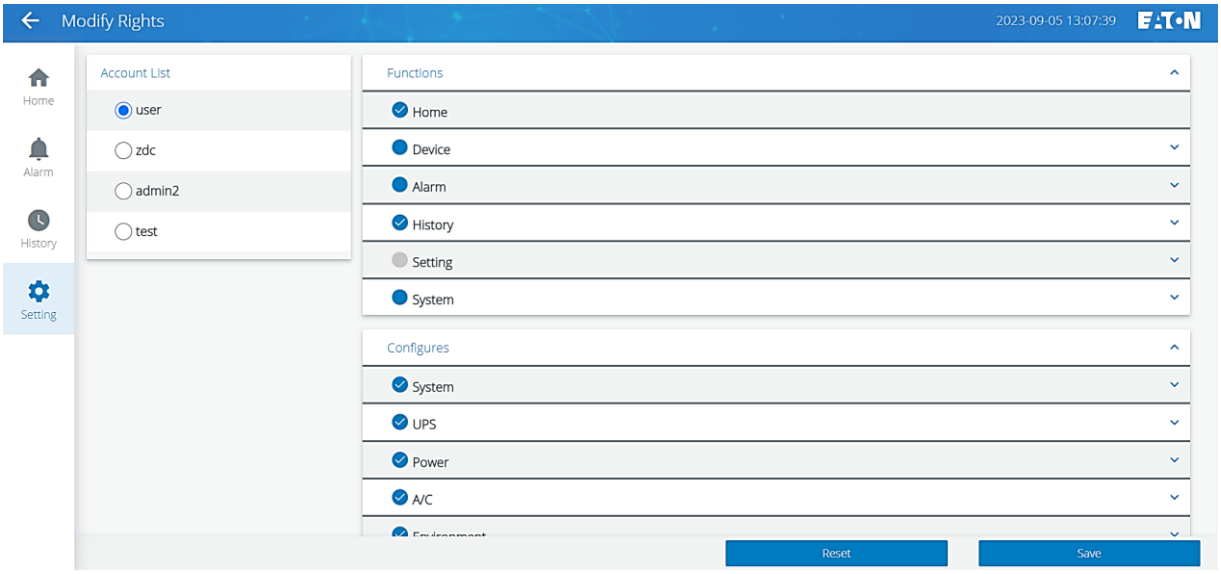
Step 2 Tap **Setting** in the left menu bar and then tap **Authority Management**.



Step 3 Tap **Modify Rights**.



Step 4 Select an account, and then select required permissions for the account, and tap **Save**.



—End

7.13.3 Modify an account

Note

This operation is only available for authorized accounts.

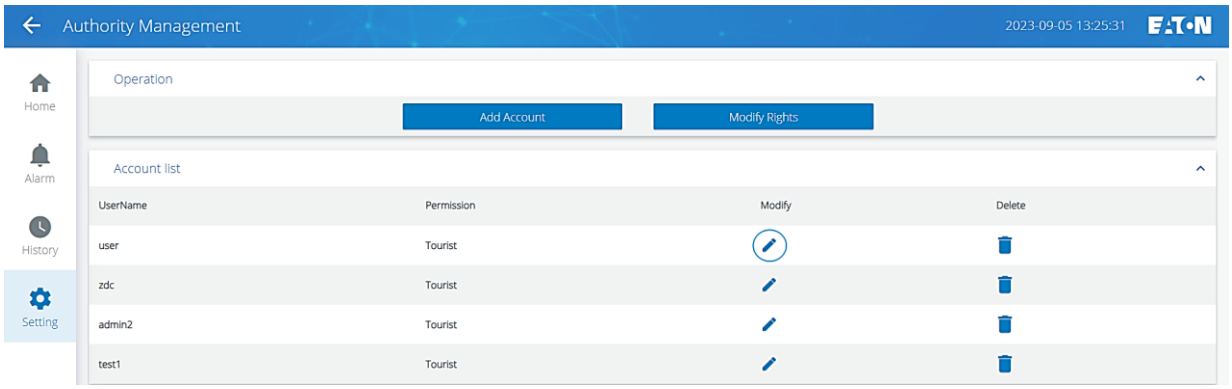
After an account is created, you can modify the username, password, and valid period of the account by following the steps below.

Step 1 Refer to section 7.2 to log in to the system.

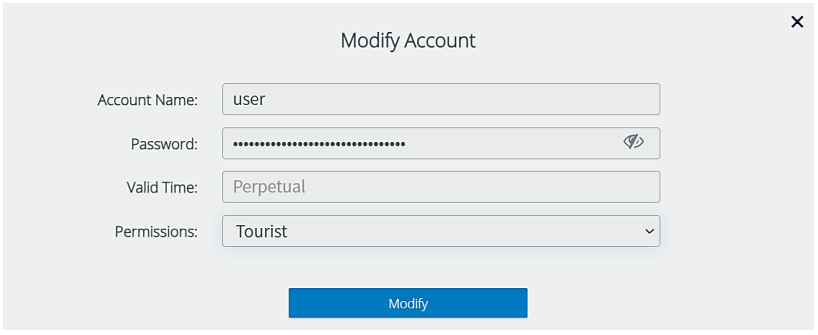
Step 2 Tap **Setting** in the left menu bar and then tap **Authority Management**.



Step 3 Tap ✎ in the line of the account to be modified.



Step 4 Modify **Account Name**, **Password**, and **Valid Time** as required, and tap **Modify**.



—End

7.13.4 Delete an account

Note

This operation is only available for authorized accounts.

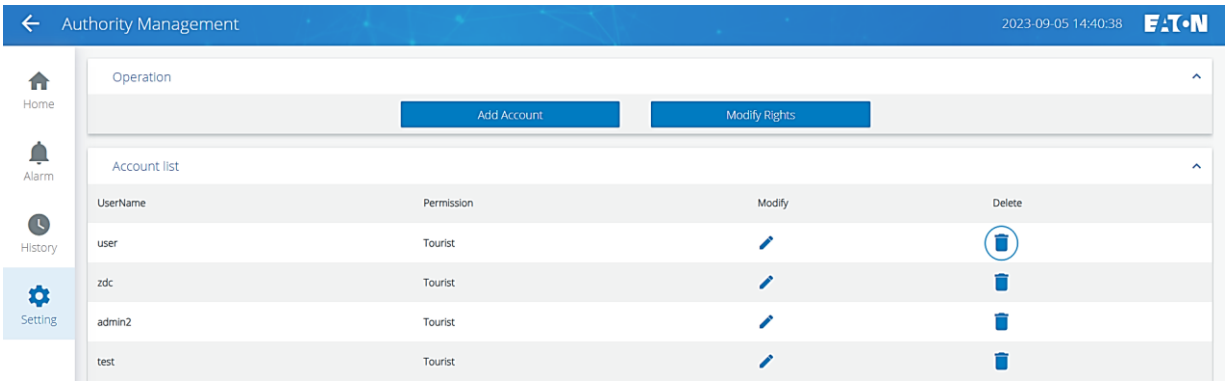
After an account is created, you can delete it as required by following the steps below.

Step 1 Refer to section 7.2 to log in to the system.

Step 2 Tap **Setting** in the left menu bar and then tap **Authority Management**.



Step 3 Tap in the line of the account to be modified.



—End

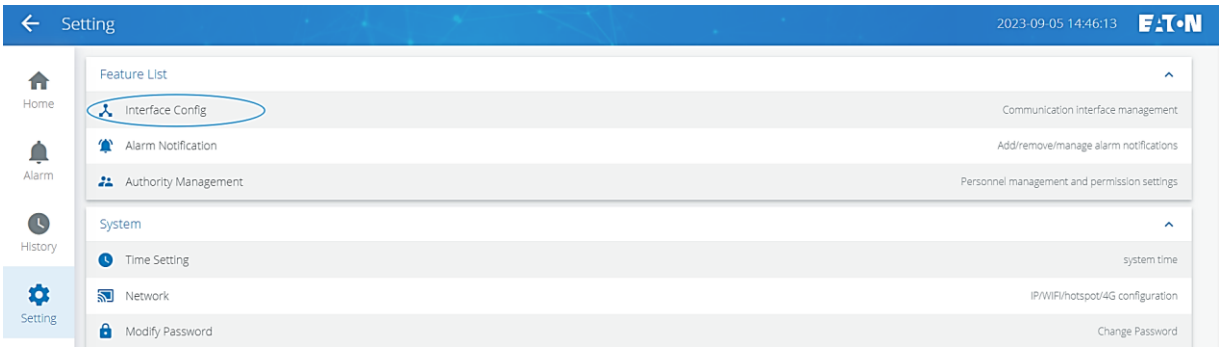
7.14 Configure the SNMP interface

Note

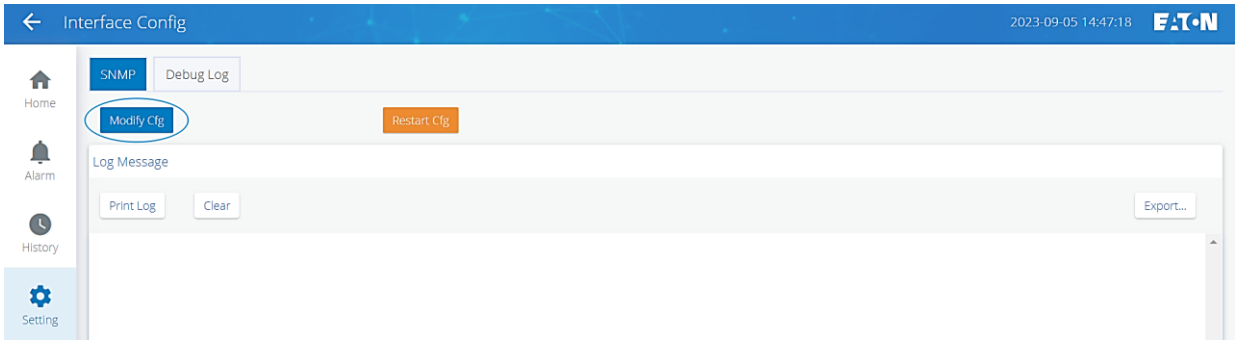
This operation is only available for authorized accounts.

Step 1 Refer to section 7.2 to log in to the system.

Step 2 Tap **Setting** in the left menu bar and then tap **Interface Config**.



Step 3 Tap **Modify Cfg** to access the **SNMP Config** page.



Step 4 Select an SNMP version (V1&V2, V3).

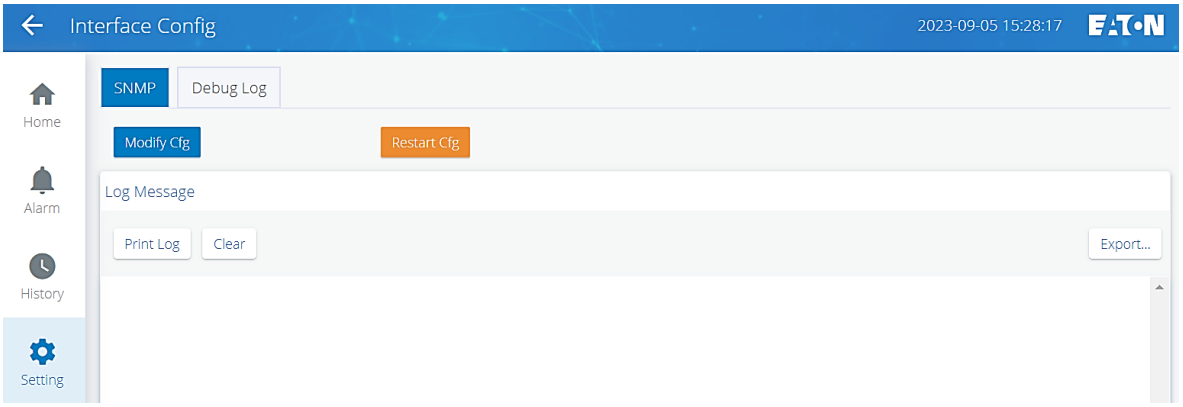
V1&V2 are mainly used while V3 features higher security. You can select one as required. In this example, **SNMP v1&v2** is selected. If you select **SNMP v3**, security parameters such as passwords must be set.



Step 5 Tap to modify IP addresses and permissions as required and tap **Save**. Or, tap to add another group of read/write/Trap IP addresses and tap **Add**. Then, tap **Save**.



Step 6 Tap **Restart Cfg**.



—End

7.15 Set alarm notifications

Alarm notifications can be sent through the SMS and email. You can set the alarm notification channel as required.

7.15.1 Set mobile numbers for receiving alarm notifications through SMS

Note

This operation is only available for authorized accounts.

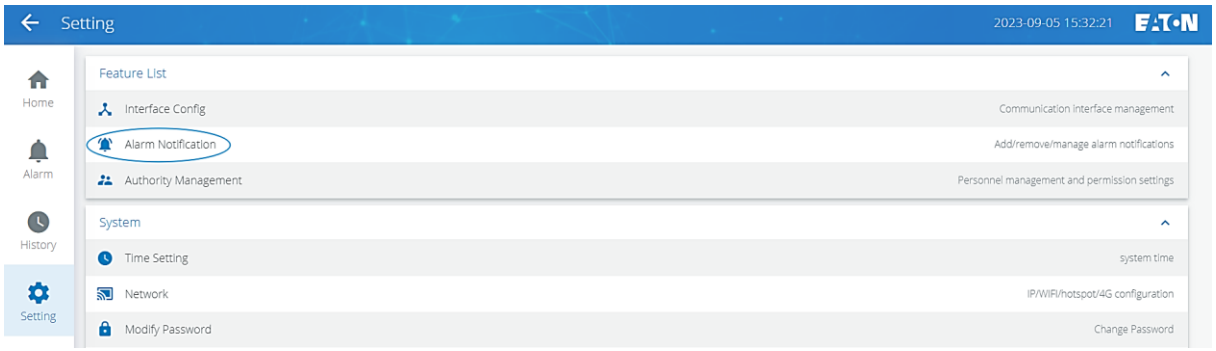
Step 1 Insert a Micro SIM card into the card slot on the top of the HMI by following the direction displayed by the silkscreen beside the card slot.

Note

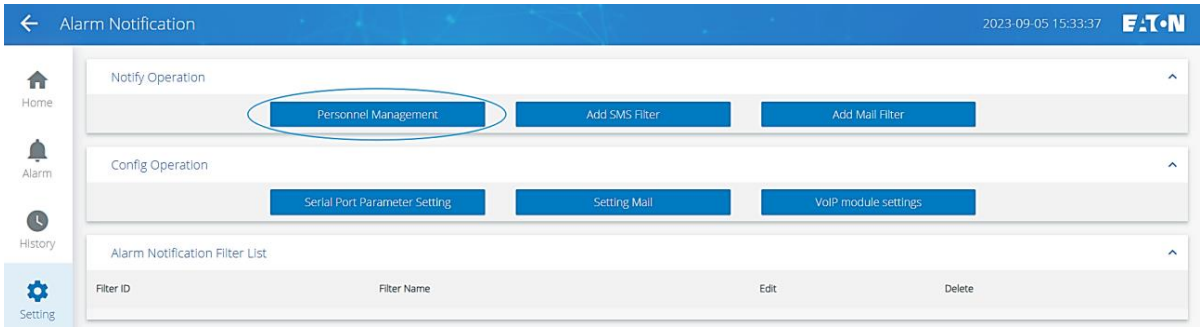
If you want to remove the SIM card, gently press it to pop it out.

Step 2 Refer to section 7.2 to log in to the system.

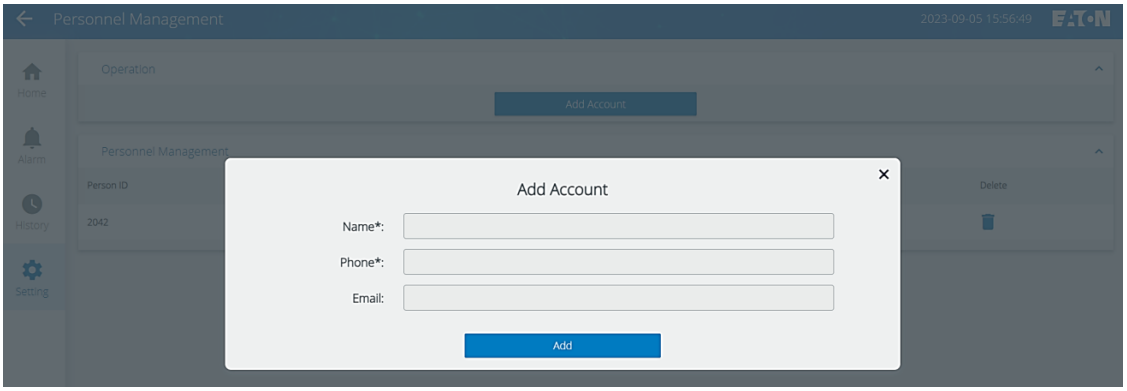
Step 3 Tap **Setting** in the left menu bar and then tap **Alarm Notification**.



Step 4 Tap **Personnel Management**.



Step 5 Tap **Add Account**. Then, set **Name** and **Phone** and tap **Add**.



—End

7.15.2 Set email addresses for receiving alarm notifications

Note

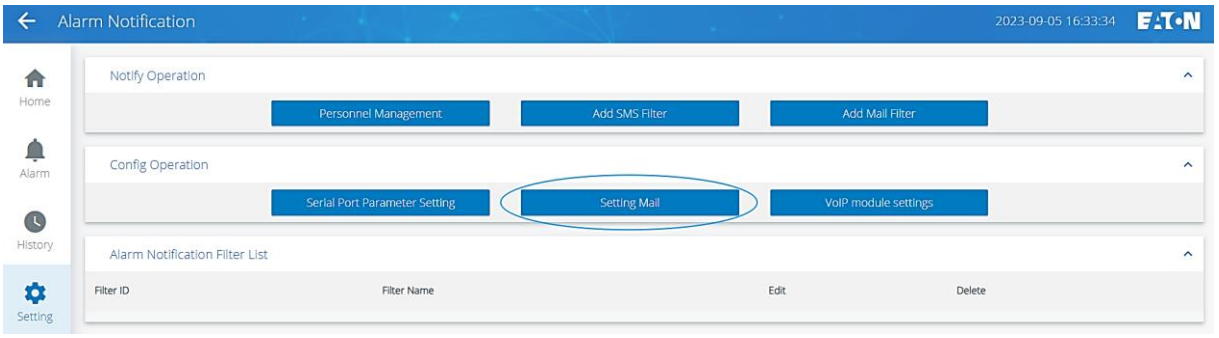
This operation is only available for authorized accounts.

Step 1 Refer to section 7.2 to log in to the system.

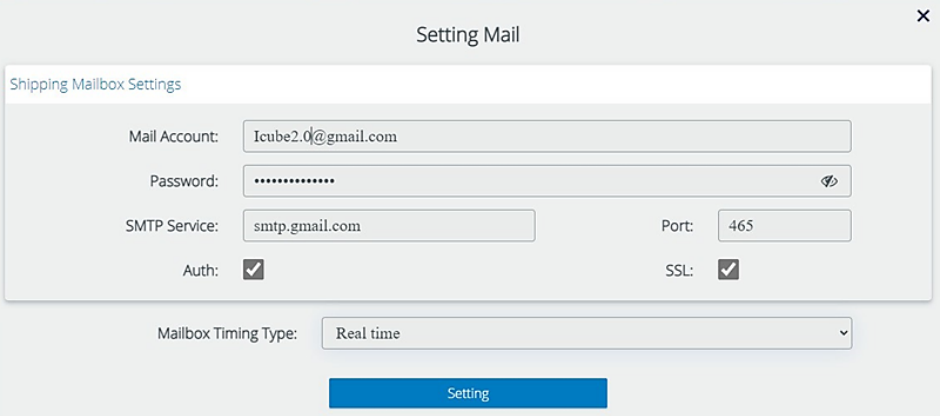
Step 2 Tap **Setting** in the left menu bar and then tap **Alarm Notification**.



Step 3 Tap **Setting Mail**.



Step 4 Set required parameters in the **Setting Mail** dialog box, and tap **Setting**.



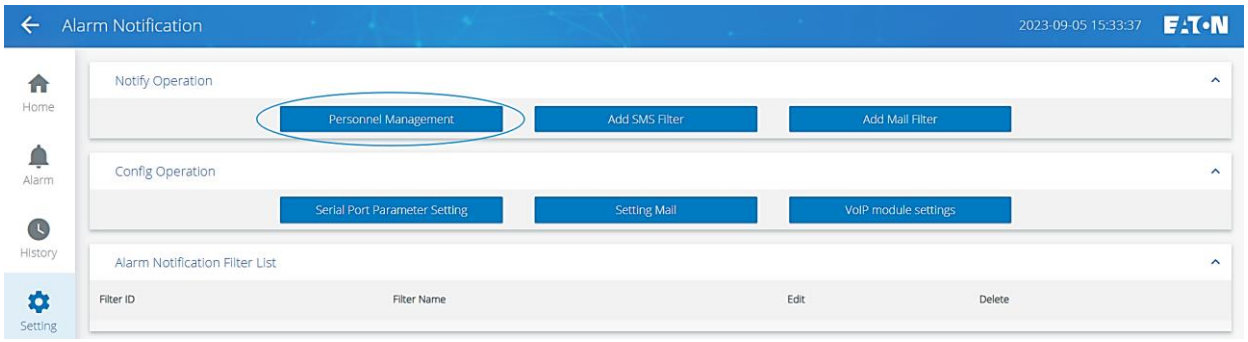
Parameter description

Parameter	Description
Mail Account	Specifies the email address used to send the email notifications.
Password	Specifies your email password (authorization password for some email addresses).
SMTP Service	Specifies the domain name or IP address of the server used for sending mails. If you set it to a domain name, check that the default DNS address of the monitoring host (**8.8.8.8**) is supported. If not, configure the DNS server that supports resolution of your domain name in **Setting** > **Network** > **DNS Config**. ***Note*** *SMTP sever is used for sending emails. Therefore, this parameter must be set.*
Port	Generally, this parameter is set to **25** for unencrypted communication. For SSL encryption, this parameter is usually set to **465** and **SSL** must be selected. ***Note*** *For the specific port, refer to the actual email parameters.*
Auth	Specifies whether authorization is required. You can tick it to enable authorization.
SSL	Specifies whether SSL encryption is required. When it is selected, SSL encryption is enabled and **Port** is usually set to **465**. When it is unselected, SSL encryption is disabled and **Port** is usually set to **25**. ***Note*** *For the specific port, refer to the actual email parameters.*
Mailbox Timing Type	Specifies the email sending frequency. – **Real time**: Alarm notification emails are sent in real time. – **Days**: Alarm notification emails are sent once every day. – **Week**: Alarm notification emails are sent once every week. – **Monthly**: Alarm notification emails are sent once every month.

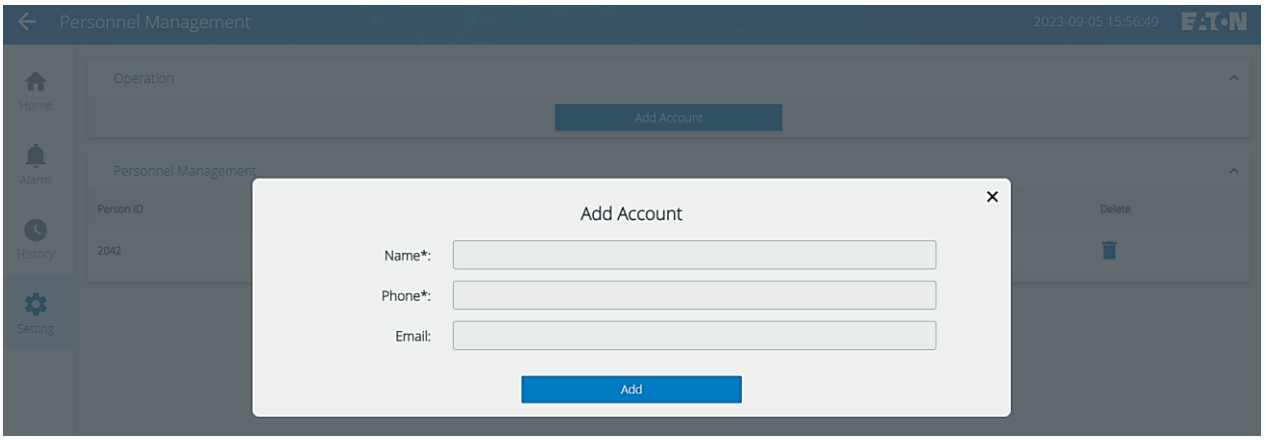
The following email address is for reference only (please refer to the actual parameters of the user):

Mailbox type	Mailbox server domain name	Encryption method and SMTP port	Mailbox server IP address	Remark
Gmail	smtp.gmail.com	SSL encryption: 465	Get method: 1. Click **Start** on the computer, enter **cmd** in the **Run** box, and click **Enter** to enter the administrator interface. 2. At the blinking point of the mouse, enter **ping mailbox server domain name**, and press **Enter** to obtain the IP address of each email server.	– The mailbox server must conform to the standard SMTP protocol, and the email sending or receiving function will be normal. – In the **Password** of Gmail, the app passwords of the mailbox client must be entered. – If your mailbox is not in the list, refer to the help guide of the mailbox to set the parameters.

Step 5 Tap **Personnel Management**.



Step 6 Tap **Add Account**. Then, set **Name**, **Phone**, and **Email**, and tap **Add**.



—End

7.15.3 Set an SMS message filter

Note

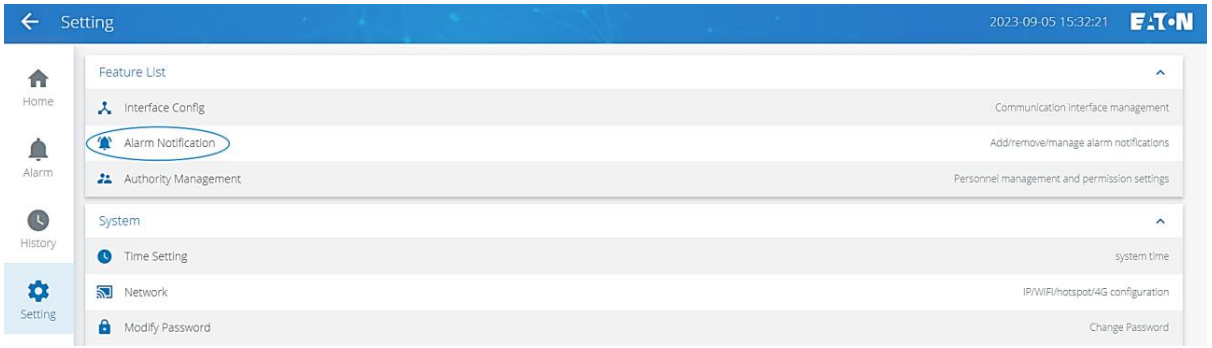
This operation is only available for authorized accounts.

If you want to send SMS messages by status, alarm level, recipient, or equipment to a specified recipient, you can set an SMS filter.

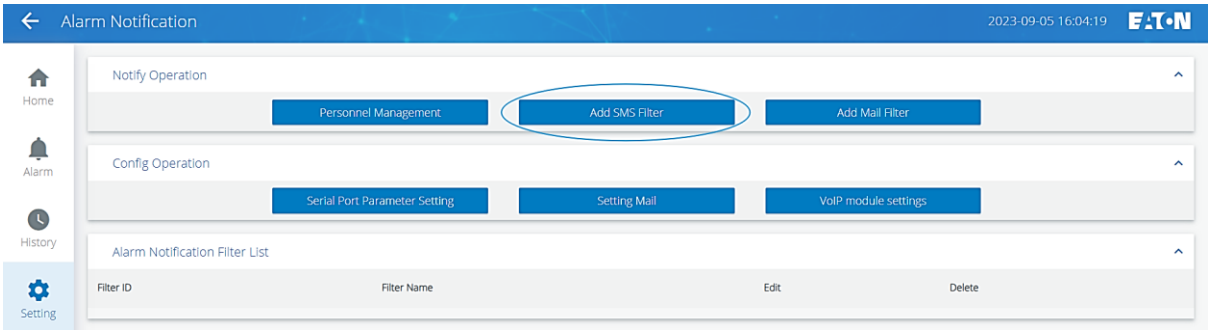
To add a filter:

Step 1 Refer to section 7.2 to log in to the system.

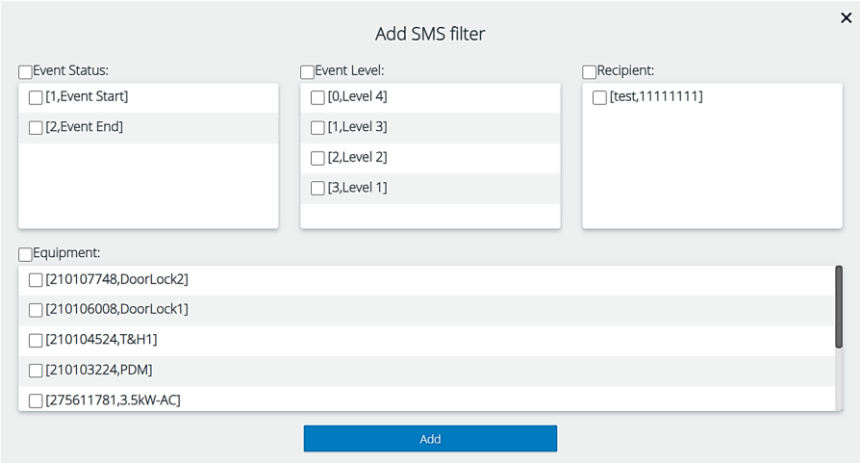
Step 2 Tap **Setting** in the left menu bar and then tap **Alarm Notification**.



Step 3 Tap **Add SMS Filter**.



Step 4 Set **Event Status**, **Event Level**, **Recipient**, and **Equipment** as required, and tap **Add**.



Step 5 Set a filter name and tap **Add**.

—End

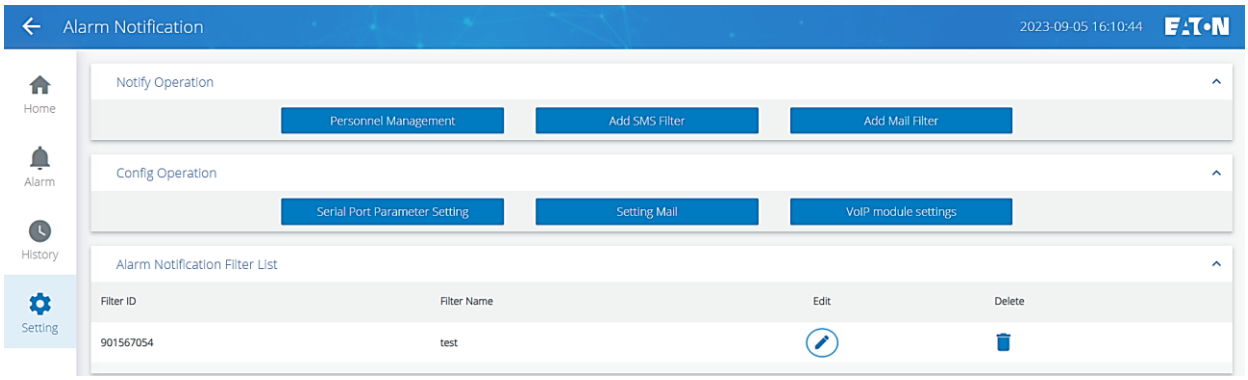
To edit an existing filter:

Step 1 Refer to section 7.2 to log in to the system.

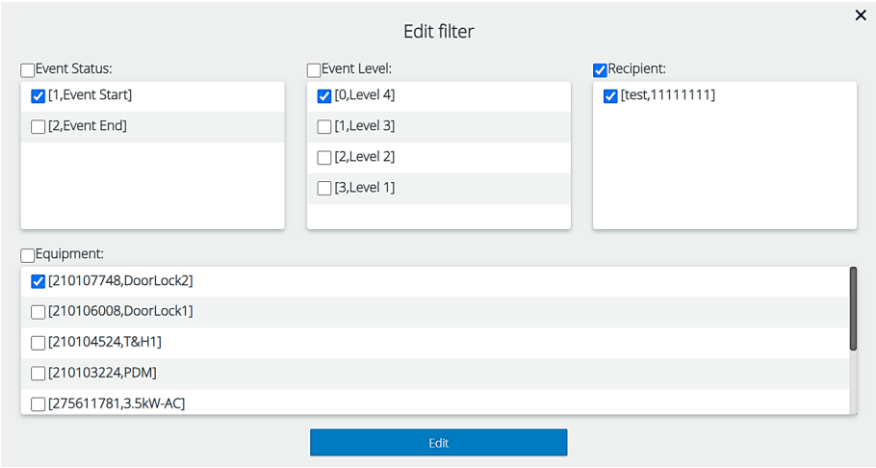
Step 2 Tap **Setting** in the left menu bar and then tap **Alarm Notification**.



Step 3 In the **Alarm Notification Filter List**, tap ✎ in the line of the filter to be edited.



Step 4 Set **Event Status**, **Event Level**, **Recipient**, and **Equipment** as required, and click **Edit**.

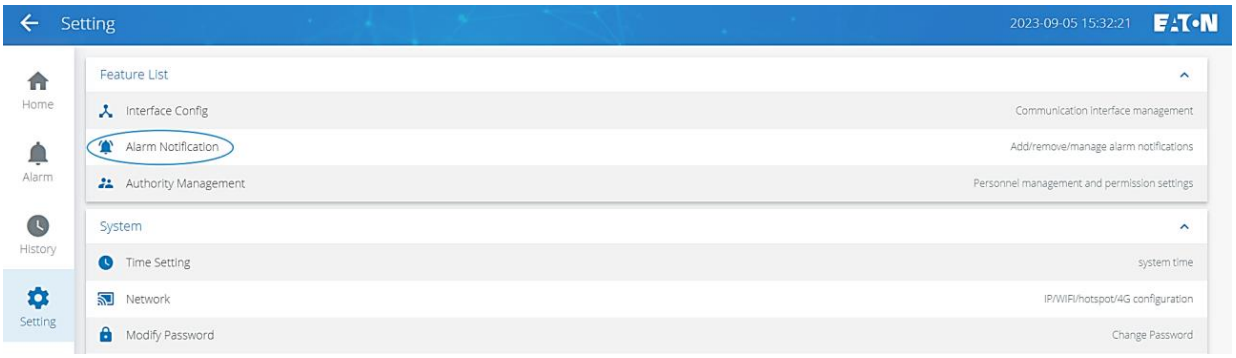


—End

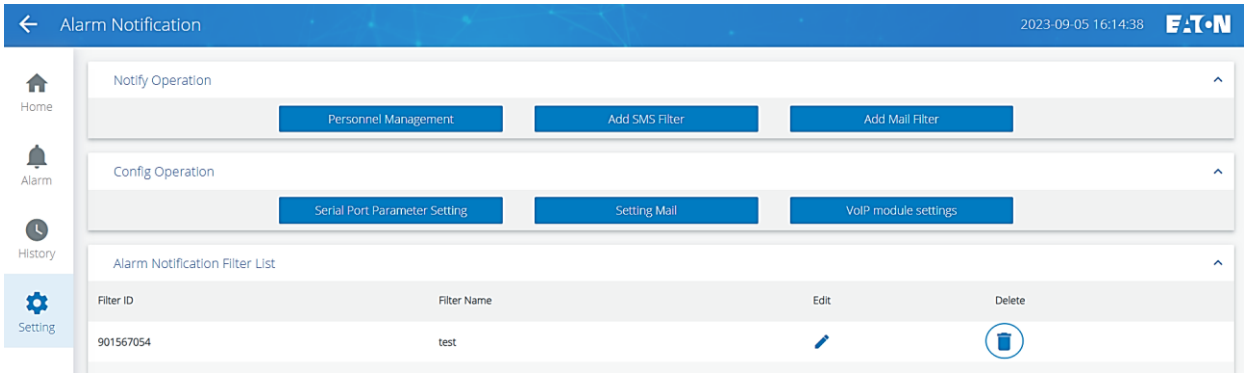
To delete an existing filter:

Step 1 Refer to section 7.2 to log in to the system.

Step 2 Tap **Setting** in the left menu bar and then tap **Alarm Notification**.



Step 3 In the **Alarm Notification Filter List**, tap in the line of the filter to be edited.



Step 4 Tap **OK** in the pop-up dialog box.

—End

7.15.4 Set a mail filter

Note

This operation is only available for authorized accounts.

If you want to send mails by status, alarm level, recipient, or equipment to a recipient, you can set a mail filter.

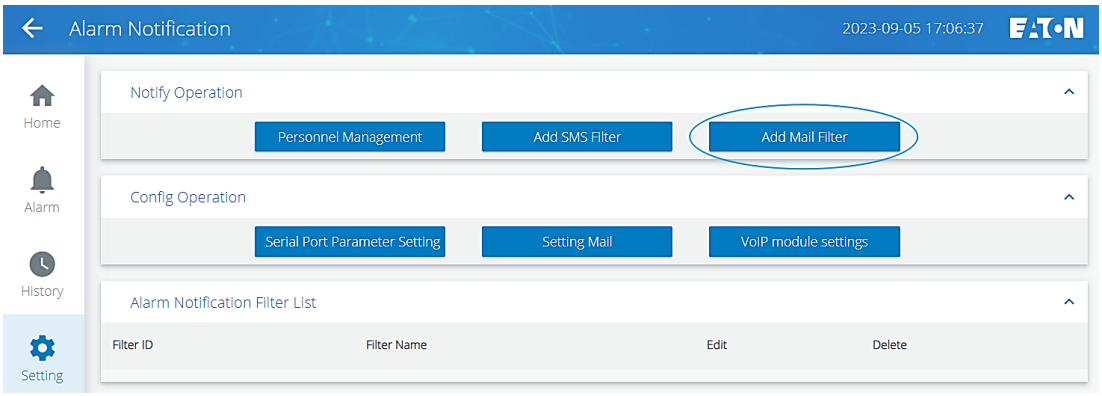
To add a filter:

Step 1 Refer to section 7.2 to log in to the system.

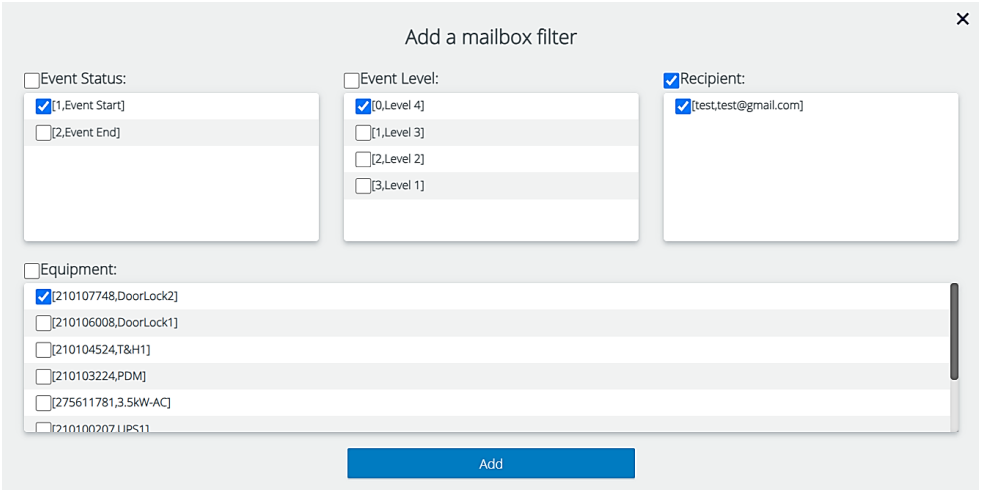
Step 2 Tap **Setting** in the left menu bar and then tap **Alarm Notification**.



Step 3 Tap **Add Mail Filter**.



Step 4 Set **Event Status**, **Event Level**, **Recipient**, and **Equipment** as required, and tap **Add**.



Step 5 Set a filter name and tap **Add**.

—End

The operations for editing and deleting an email filter are similar to those for editing and deleting an SMS filter. For details, see 7.15.3 Set an SMS message filter.

7.15.5 Configure gateway parameters

Note

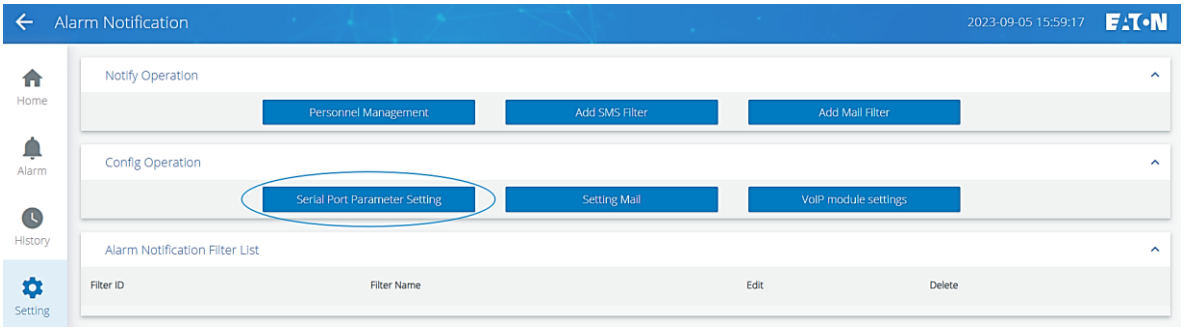
This operation is only available for authorized accounts. Default settings are recommended.

Step 1 Refer to section 7.2 to log in to the system.

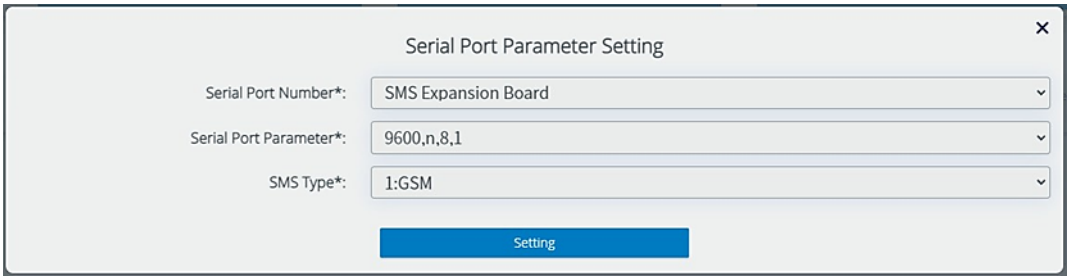
Step 2 Tap **Setting** in the left menu bar and then tap **Alarm Notification**.



Step 3 Tap **Serial Port Parameter Setting**.



Step 4 Set **Serial Port Number**, **Serial Port Parameter**, and **SMS Type** as required and tap **Setting**.



—End

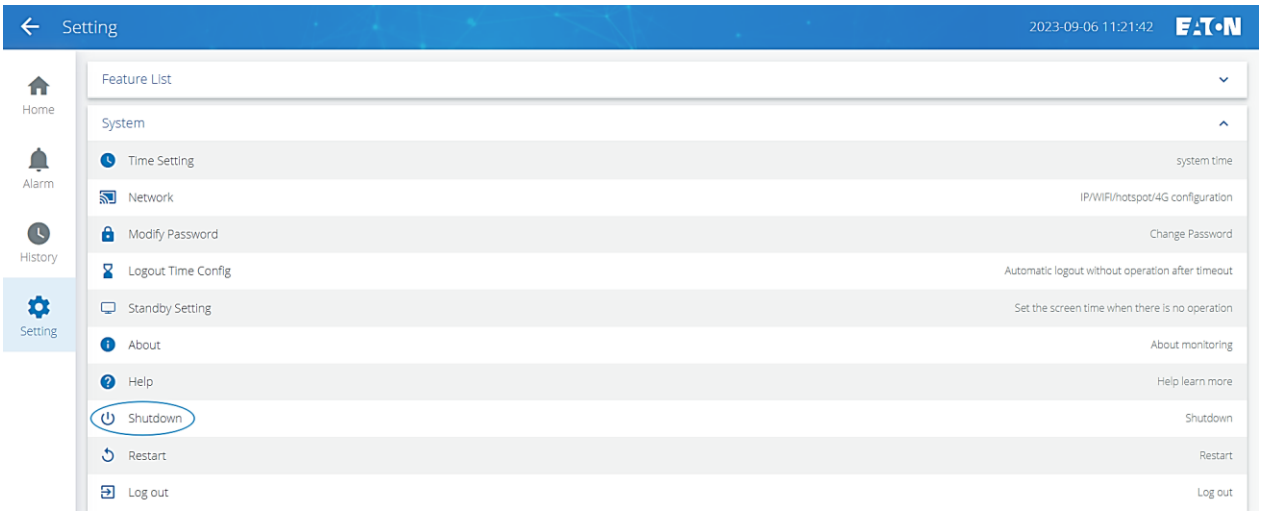
7.16 Shut down the MDC

Note

This operation is only available for authorized accounts.

Step 1 Refer to section 7.2 to log in to the system.

Step 2 Tap **Setting** in the left menu bar and then tap **Shutdown**.



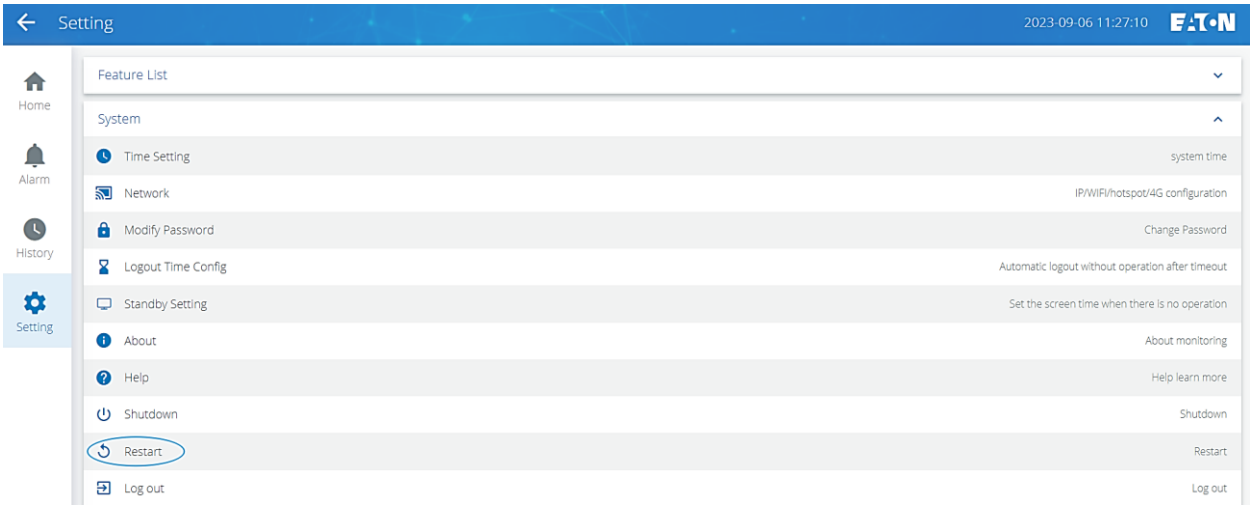
Step 3 Tap **OK** in the pop-up dialog box.

—End

7.17 Restart the MDC

Step 1 Refer to section 7.2 to log in to the system.

Step 2 Tap **Setting** in the left menu bar and then tap **Restart**.



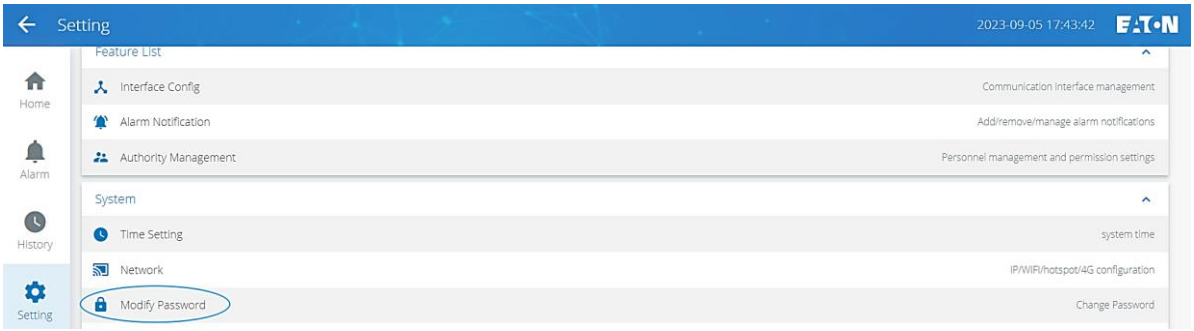
Step 3 Tap **OK** in the pop-up dialog box.

—End

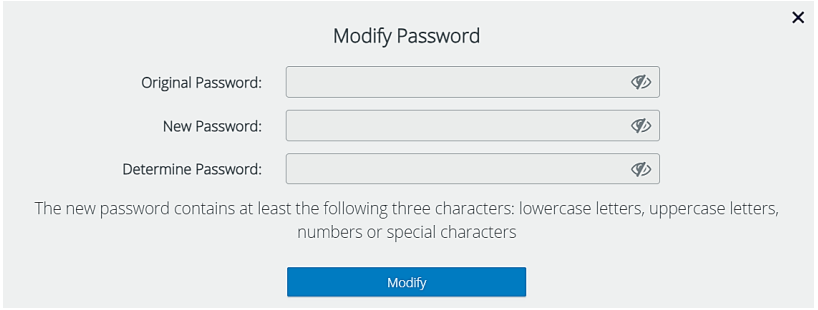
7.18 Modify password

Step 1 Refer to section 7.2 to log in to the system.

Step 2 Tap **Setting** in the left menu bar and then tap **Modify Password**.



Step 3 Specify **Original Password**, **New Password**, and **Determine Password**. Then, tap **Modify**.



—End

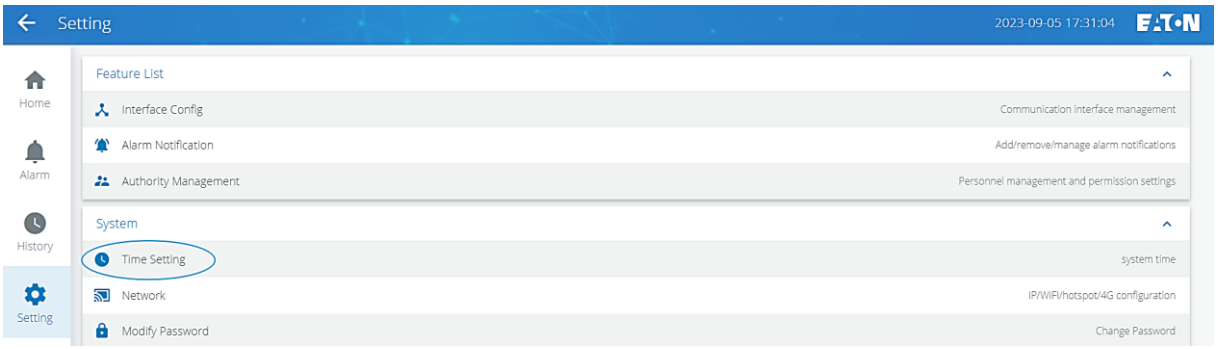
7.19 Set system time

Note

This operation is only available for authorized accounts.

Step 1 Refer to section 7.2 to log in to the system.

Step 2 Tap **Setting** in the left menu bar and then tap **Time Setting**.



Step 3 Set time and tap **OK**.

—End

7.20 Set automatic logout interval

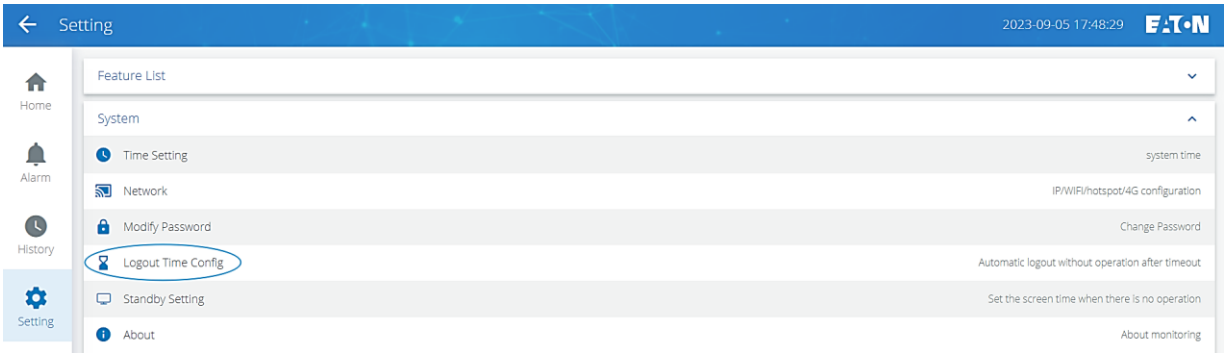
Note

This operation is only available for authorized accounts.

To automatically log users out after they do not perform operations after an interval:

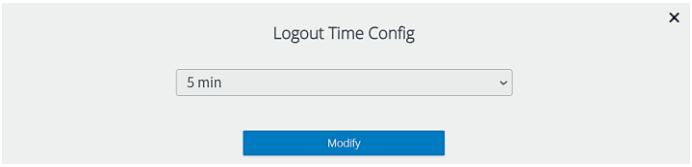
Step 1 Refer to section 7.2 to log in to the system.

Step 2 Tap **Setting** in the left menu bar and then tap **Logout Time Config**.



Step 3 Select a time interval and tap **Modify**.

If you want to keep users logged in, select **No Logout**.



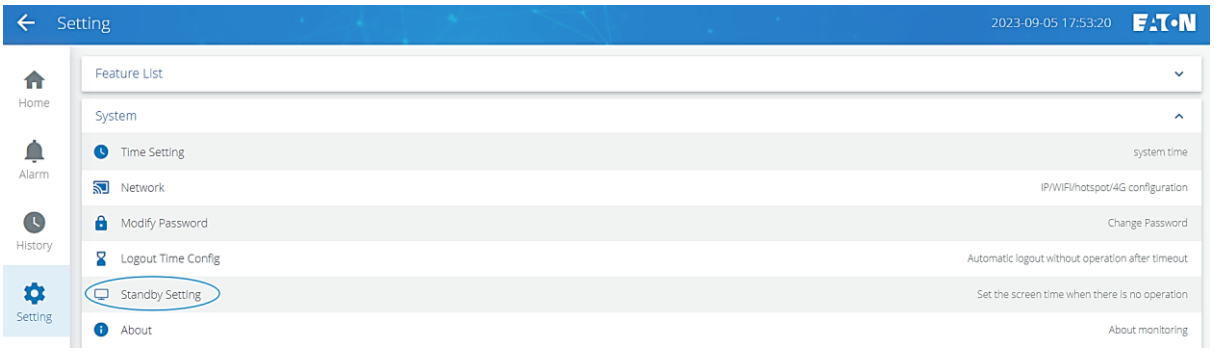
—End

7.21 Set screen off interval

To automatically turn off the screen after no operations is performed on the screen after an interval:

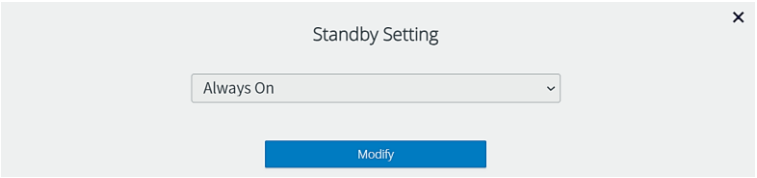
Step 1 Refer to section 7.2 to log in to the system.

Step 2 Tap **Setting** in the left menu bar and then tap **Standby Setting**.



Step 3 Select a time interval and tap **Modify**.

If you want to keep the screen on, select **Always On**.



—End

7.22 Check MDC version and SN

To check the product version, firmware version, and serial number of the MDC, refer to section 7.2 to log in to the system, tap **Setting** in the left menu bar and then tap **About**.



8 Maintenance

This chapter introduces how to maintain the MDC, including safety notes and the maintenance of major components such as the power distribution unit, the cooling unit, and the monitor.

CAUTION

- System maintenance must be completed by authorized technical and professional personnel.
- All maintenance must be subject to local electrical, cooling and manufacturing laws and regulations. Otherwise, no warranty will be given.
- Unsuitable parts may cause degradation or damage to the MDC. It is recommended to use original parts when a replacement is required.

8.1 Periodic maintenance of the power distribution system

8.1.1 Periodic cleaning

Clean the vents regularly on the front and back of the UPS to keep the airflow inside the UPS unobstructed and confirm that nothing is obstructing the ventilation of the UPS.

8.1.2 Fan maintenance

With the UPS, check every six months to see if all fans are working properly (users should check if the fans are spinning and if there is a fan error information on the LCD of the UPS panel) and replace faulty fans promptly.

8.1.3 Battery maintenance

If the UPS is equipped with battery, the battery must be maintained regularly. Note that:

- Battery life is greatly affected by the ambient temperature and the environment temperature should be kept from 15°C to 25°C.
- When the battery is not used for a long time (more than three months), it needs to be charged once every three months for at least 10 hours.
- If you find that the battery backup time is short, contact the supplier in time to determine whether the battery needs to be replaced.
- Use the same brand and model for battery replacement. If you want to replace with another brand or model, consult our customer service.

8.1.4 Check the UPS status

Perform regular checks on the status of the UPS, including:

- Check whether the UPS faulty light is up, and whether a faulty alarm is generated.
- Check whether the UPS is working in a bypass mode. Under normal circumstances, the UPS will operate in the online mode. If the UPS is operating in a bypass mode, confirm the cause. Possible causes may include:
  - Manual switching
  - UPS overload
  - UPS error

- Check whether the battery is in an electrical discharge state. Under normal circumstances with mains power, the battery should not be discharging. If the UPS is operating in battery discharge mode, confirm the cause. Possible causes may include:
  - Mains power failure
  - Manual switching
  - Battery test
  - UPS failure

8.2 Periodic maintenance of the cooling system

Recommend maintenance periods of the cooling system are listed in the following table.

Classification	Parts	Monthly	Each quarter	6 months	Yearly
Refrigerant circuit	High pressure/low pressure	✔	☐	☐	☐
	Pipeline system	☐	☐	✔	☐
Air circuit	Indoor fan	☐	☐	☐	✔
	Filter	☐	✔	☐	☐
	Outdoor condenser and fan	☐	☐	✔	☐
Water line	Drainpipe	✔	☐	☐	☐
General maintenance	Power connection	☐	☐	☐	✔
	Structural fixation	☐	☐	☐	✔

The filter needs to be cleaned every three months. For details about how to take out and install the filter, see 9.2.1 Replace a filter of the cooing unit.

Note

For more information, contact our service personnel.

8.3 Recommend periodic maintenance of monitoring system

It is recommended to periodically check the working status of the monitoring module and sensors. This includes the following steps:

Step 1 Check whether alarms are reported on the alarm page. If yes, check the corresponding device to clear the alarm.

Step 2 Check that information such as UPS operating status, cooling unit working status, environment, and running parameters are properly displayed on the HMI.

Step 3 Check that input and output parameters, battery and other parameters of the UPS are displayed normally on the **UPS** page.

Step 4 Check whether the air temperature and humidity of the input and output on the **A/C** page are displayed normally and whether an overheating alarm occurs. If an alarm is reported, locate and rectify the cause to clear the alarm.

Step 5 Check whether water leakage, smoke and other alarms are displayed on the **Environment** page. If yes, locate and rectify the cause to clear the alarm.

Step 6 Check whether access control alarms are displayed on the **Door** page. If yes, locate and rectify the cause to clear the alarm.

Step 7 Check whether the temperature sensor is connected to the cabinet securely.

Step 8 Check whether the location of the water leakage sensor is moved.

Step 9 Check whether the smoke sensor operates normally and the interface functions normally.

Step 10 Check whether the electronic door locks can be opened normally.

—**End**

9 Troubleshooting

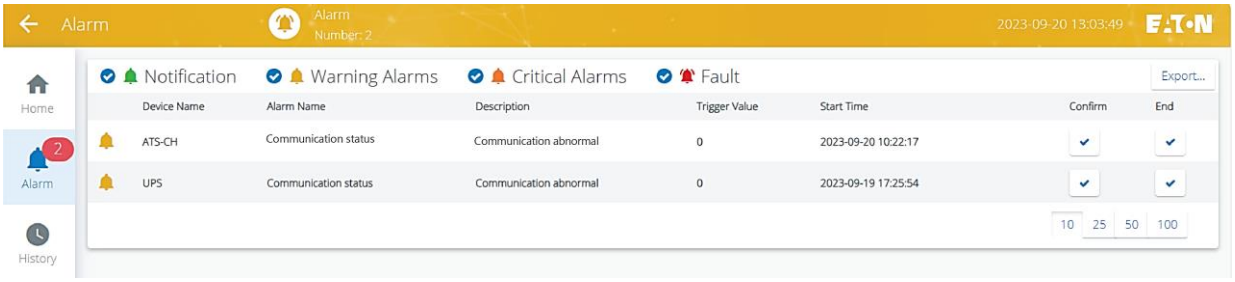
9.1 Alarms and solutions

You can check alarms and faults on the HMI. This chapter describes some alarms and corresponding solutions for your inspection and troubleshooting. If the problem persists, contact our customer service center.

If you need to report bugs, errors, or issues to Eaton's customer service center, please take note of and report the following information:

- Serial numbers of the monitoring module, UPS, and cooling unit
- Date of the incident
- Complete problem description

To check alarms on the HMI, refer to section 7.2 to log in to the system, and tap **Alarm** in the left menu bar.



See the following table for common faults and possible solutions. After the faults are rectified, the alarms will be automatically cleared, and the MDC will continue working properly.

Alarm	Possible cause	Solution
Output overload	The load exceeds the allowed range.	Reduce the load.
Door ban alarm	The cabinet door is not closed properly.	Check and close the cabinet door.
	The door lock is not connected properly.	Connect the door lock properly.
	The door is opened due to the high temperature of the air inlet.	Locate and rectify the cause and close the door manually.
Water leakage detector alarm	Leakage occurs in the drainpipe of the cooling unit or the connection part.	Repair the drainpipe or interface of the cooling unit.
	The water intrusion sensor is short-circuited.	Locate and rectify the cause.
Smoke sensor alarm	The load is damaged, which generates smoke.	Repair the load.
	Smoke occurs in the engine room.	Eliminate the source of smoke in the engine room.
	The smoke sensor is faulty and generates the alarm by mistake.	Refer to 9.2.5 Replace a smoke sensor.

Alarm	Possible cause	Solution
Temperature too high (temperature and humidity)	The cabinet load exceeds allowed range.	Reduce or balance the cabinet load.
	There is no shield installed in the cabinet's spare parts.	Assembly the shield in the spare parts of the cabinet.
High humidity in hot chamber	The ambient humidity is too high.	Reduce the ambient humidity.
	The engine room is not sealed properly.	Seal the engine room properly.
	There is a humidifier in the engine room.	Turn off the humidifier in the engine room.
	High humidity alarm threshold of the cooling unit's returned air is set too low.	Increase the high humidity alarm threshold (80% by default) of the cooling unit.
Cooling unit's air supply temperature too high	The system is overloaded.	Reduce the system load.
	High temperature alarm threshold of the cooling unit's outlet is set too low.	Increase the high temperature alarm threshold (35°C by default) of the cooling unit's outlet by referring to 7.8.3 Set temperature.
	Outlet temperature of the cooling unit is set too high.	Reduce the outlet temperature setting (10°C by default) of the cooling unit by referring to 7.8.3 Set temperature.
Cooling unit's air supply temperature too low	The temperature of cooling unit is set too low.	Increase the temperature setting to 29℃ or above by referring to 7.8.3 Set temperature.
	The cabinet load is too low.	Increase the load.
Abnormal communication with the UPS	The UPS's communication cable is not connected properly.	Check the communication interfaces at both ends of the monitoring module and UPS and connect the communication cable properly.
Abnormal communication with the cooling unit	The communication cable of the cooling unit is not connected properly.	Check the communication interfaces at both ends of the monitoring module and cooling unit and connect the communication cable properly.
Abnormal communication with the temperature and humidity sensor	The temperature and humidity sensor is not connected properly.	Check and connect the temperature and humidity sensor properly.
	The address of the temperature and humidity sensor is set incorrectly.	Check and set the DIP switch of the temperature and humidity sensor properly.
Abnormal communication with the door lock	The door lock is not connected properly.	Check and connect the door lock properly.
	The address of the door lock is set incorrectly.	Check and set the DIP switch of the door lock properly.

9.2 Replacement of common parts

If a common part is damaged, you can replace the part by yourself by following the description in the following sections. Original components are recommended for replacement.

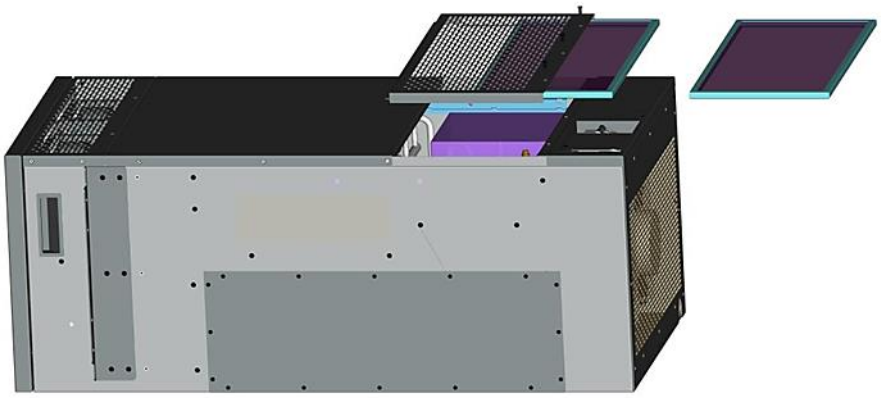
9.2.1 Replace a filter of the cooing unit

9.2.1.1 Replace the internal return air filter of the integrated cooling unit (3.5 kW)

Step 1 Loosen the screws on the upper cover panel and remove the cover panel.

Step 2 Remove the filter and replace it with a new one.

Step 3 Install the upper cover panel by fixing the screws on it.



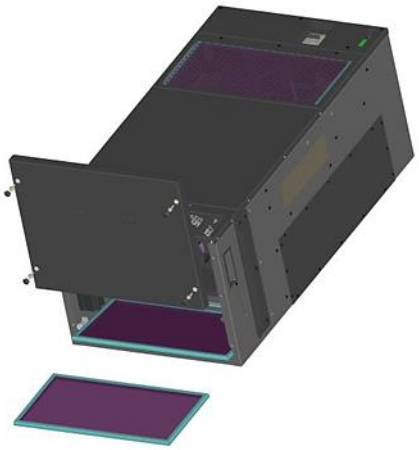
—End

9.2.1.2 Replace the external air inlet filter of the integrated cooling unit (3.5 kW)

Step 1 Loosen the screws on the front cover panel and remove the cover panel.

Step 2 Loosen the screws on the filter, remove the filter and replace it with a new one.

Step 3 Install the upper cover panel by fixing the screws on it.



—End

9.2.1.3 Replace the filter of the split cooling unit (4.2 kW and 8.1 kW)

Step 1 Loosen the self-tapping screws on the filter fastener.

Step 2 Remove the fastener and pull out the filter.

Step 3 Insert a new filter and fix the fastener with the self-tapping screws.

—**End**

9.2.2 Replace a temperature and humidity sensor

The temperature and humidity sensor is installed in the cold aisle in front of the cabinet. The temperature and humidity sensor is magnetically attached to the metal sheet without screws. It is hot swappable.



To replace a temperature and humidity sensor:

Step 1 Unplug the network cable connected to the temperature and humidity sensor and remove the sensor.

Step 2 Connect the network cable to the new temperature and humidity sensor and attach the sensor to the sheet metal.

—**End**

9.2.3 Replace a water leakage detector

The water leakage detector is placed at the bottom of the main cabinet’s rear rail. When disassembling it, press down on the rail buckle.



To replace a water leakage detector:

Step 1 Unplug the terminal connected to the water leakage detector.

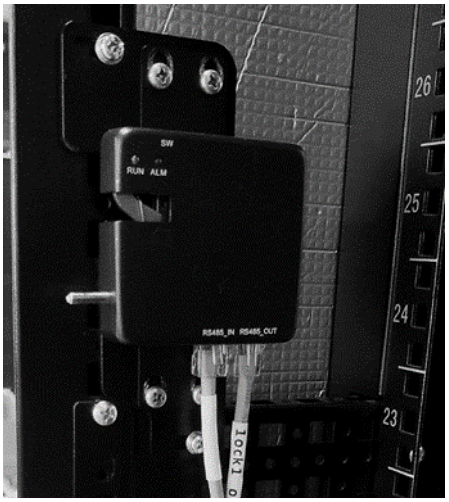
Step 2 Press down the rail buckle to remove the water leakage detector.

Step 3 Press down the rail buckle and install the new water leakage detector, then connect the terminal to it.

—**End**

9.2.4 Replace an electronic door lock

The electronic locks are installed on the front and rear doors with Pozidriv screws. A dedicated spanner is provided in the accessory kit for removing and fixing them.



To replace an electronic door lock:

Step 1 Unplug the network cables connected to the door lock.

Step 2 Loosen the fixing screws of the door lock.

Step 3 Replace the original door lock with a new one, adjust its position, and fix it with screws.

Step 4 Connect the network cables with the new lock.

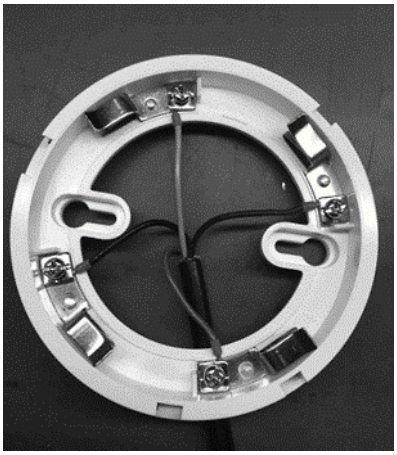
> ***Note***
>
> *Check the cable labels to ensure that the cables are connected correctly.*

—**End**

9.2.5 Replace a smoke sensor

The smoke sensor is installed inside of the top of the cabinet. It consists of a wiring base and a sensor body.





To replace a smoke sensor body:

Step 1 Turn the smoke sensor body by 30° counterclockwise in the arrow direction shown on the senor body to remove it from the base.

Step 2 Fit a new smoke sensor body to the base and rotate it clockwise to fix it.

—End

To replace a smoke sensor base:

Step 1 Loosen the screws on the base to disconnect the cables and remove the base.

Step 2 Connect the cables to a new sensor base by referring to the cable labels and fix the screws.

If the indicator on the smoke sensor blinks green every 9 seconds, the smoke sensor is installed successfully.

—**End**

9.2.6 Replace illuminating lights

The lights are installed on the top of cabinet and fixed by locking pins.

To replace the illuminating light:

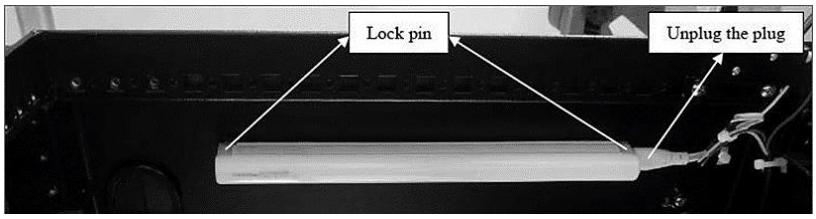
Step 1 Disconnect the power plug on the PDU.

Step 2 Disconnect the power plug on the light.

Step 3 Replace the illuminating light with a new one.

Step 4 Connect the power plug on the light.

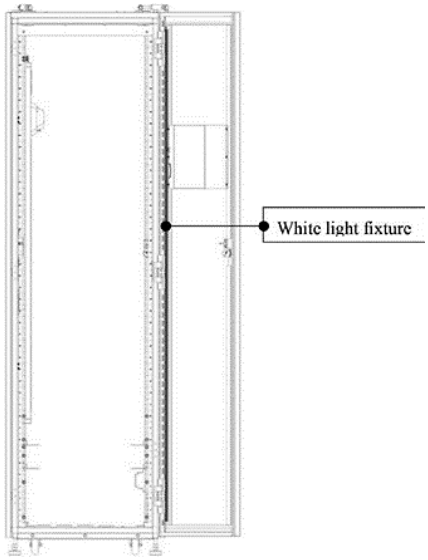
Step 5 Connect the power plug on the PDU to turn it on.



—End

9.2.7 Replace ambient lights

The ambient lights are installed in a white light fixture on the right inside the front door of the cabinet. All the lights are hot swappable.

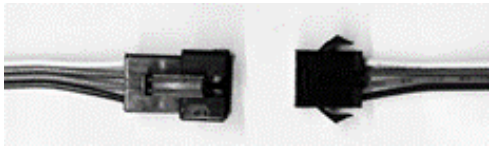


To replace ambient lights:

Step 1 Remove the light cover plate.

Step 2 Remove the cover of the monitoring host inside the front door.

Step 3 Disconnect the plug pairs of the ambient light.



Plug pairs for IT cabinet



Plugs for single cabinet and main cabinet in multiple cabinet system

Step 4 Remove the ambient lights and cables and replace them with the new ones.

Step 5 Connect the plug pair and install the covers.

—End

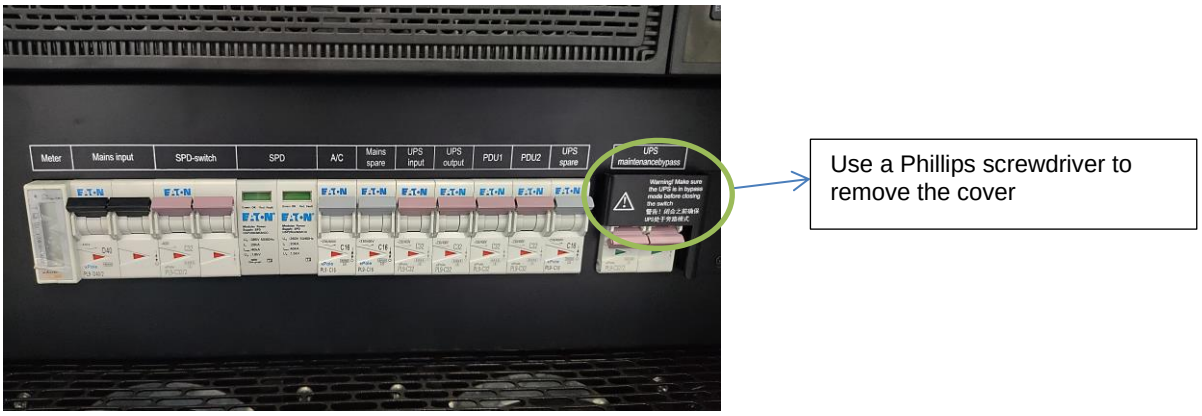
9.2.8 Replace the UPS

Note

Replacing the UPS cannot interrupt the power supply to backend loads.

The UPS 9PX3K is used as an example in this section. The replacement steps for other types of UPS are similar.

Step 1 Keep all switches stationary, and use a Phillips screwdriver to remove the maintenance bypass cover on the PDM.



Step 2 Check the UPS by indicator or HMI to see whether the UPS has switched to the bypass mode.

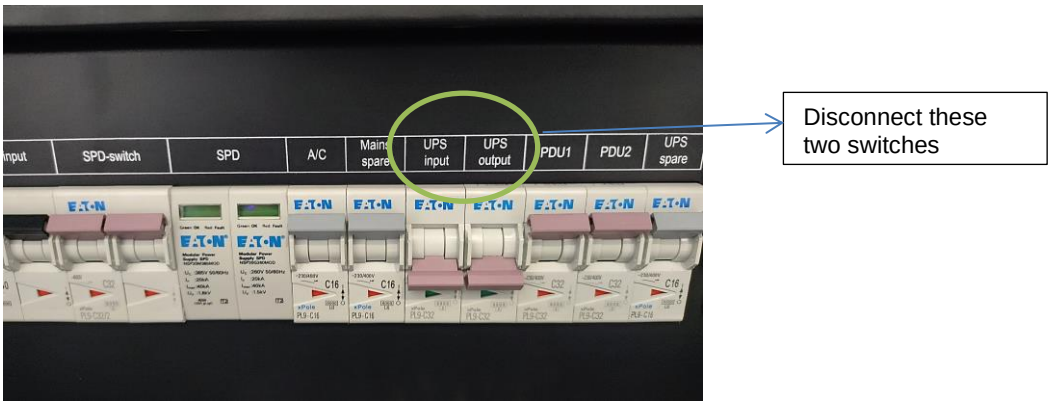
Note

This step cannot be skipped. If the UPS does not work in the bypass mode, stop the operation and rectify the cause. Otherwise, the UPS may be damaged.

Step 3 Close the UPS maintenance bypass switch on the PDM.

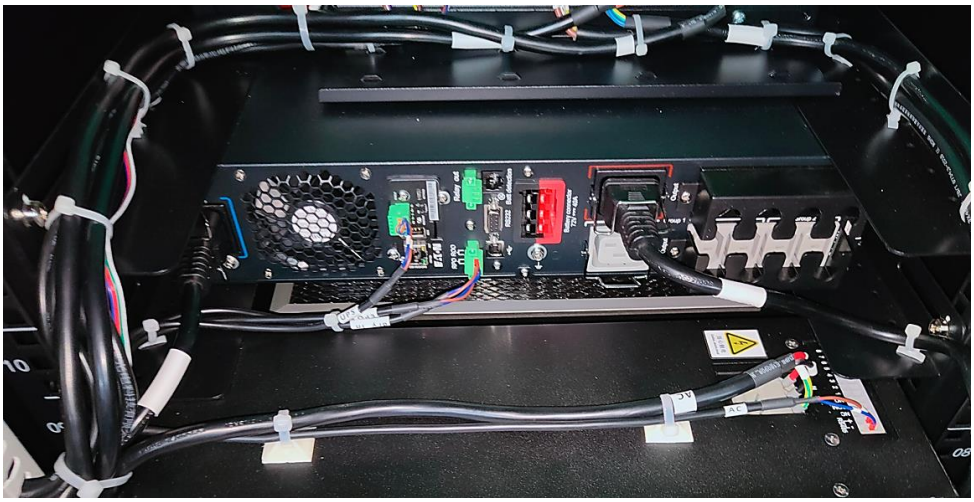
This switch is exposed after the cover is removed.

Step 4 Disconnect the UPS output switch on the PDM and the UPS input switch.



Step 5 Press the UPS shutdown button to turn off the UPS.

Step 6 Remove the input and output cables and other signal cables at the rear of the UPS, bundle them briefly, and then take out the UPS.



Step 7 Install a new UPS, connect the incoming and outgoing cables and signal cables in accordance with the cable marks at the rear, and restore the rear wiring to the original state.

Step 8 Close the UPS input switch on the PDM, and then start the UPS.

Step 9 Check that the UPS works in the bypass state.

> ***Note***
>
> *This step cannot be skipped. If the UPS does not work in the bypass mode, stop the operation and rectify the cause. Otherwise, the UPS may be damaged.*

Step 10 Close the UPS output switch.

Step 11 Disconnect the PDM panel bypass switch and install the cover.

—End

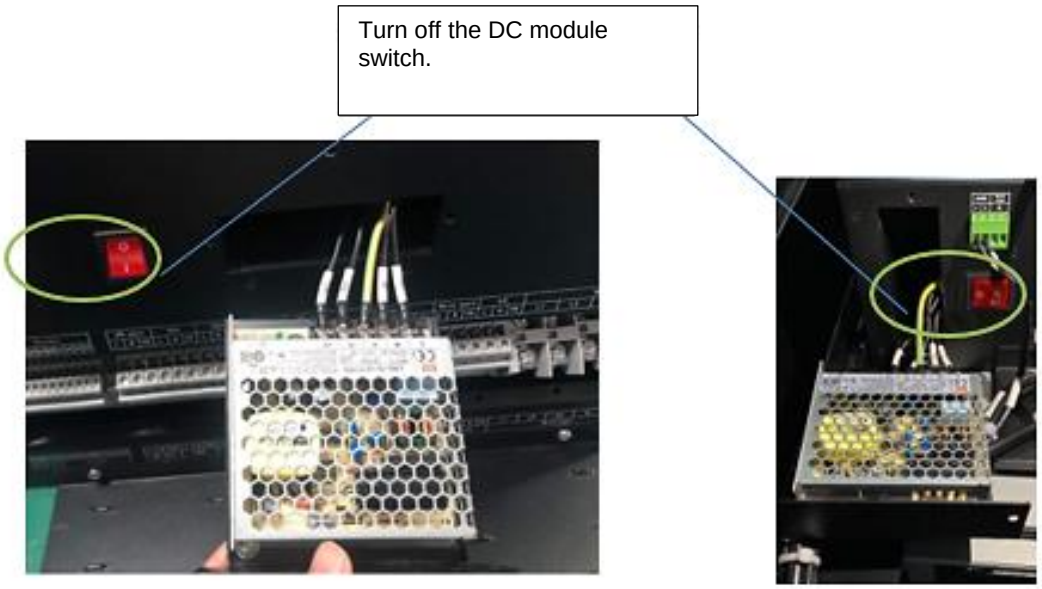
9.2.9 Replace internal components of the PDM

9.2.9.1 Replace the DC module

In this section, the replacement of the DC module is described with PDM-6K as an example. The replacement steps for other models are similar.

> ***Note***
>
> *Replacing the DC module does not require disconnecting the main power supply, and the customer's back-end equipment continues to operate normally.*

To replace the DC module:



Example figure

Step 1 Turn off the DC module switch.

Step 2 Loosen the screws that fix the DC module.

Step 3 Pull out the DC module and disconnect the cables.

Step 4 Connect the cables with a new DC module.

Step 5 Push in the PDM and fix the screws on it.

Step 6 Turn on the DC module switch.

If the MDC is powered on successfully, the DC module switch is replaced successfully.

—**End**

9.2.9.2 Replace a PDM switch

⚠ CAUTION

Before replacing a PDM switch, disconnect the main power supply and input power supply of the PDM to avoid electronic shocks.

To replace a PDM switch:

Step 1 Disconnect the main power supply and input power supply of the PDM.

Step 2 Remove the front panel. Disconnect cables on the switch, and open the buckle to remove the switch.

Step 3 Connect cables to the new switch by referring to the original cable connection.

Step 4 Install the front panel and connect power supply again.

—**End**

9.2.10 Replace the monitor

9.2.10.1 Replace an integrated monitor

The replacement of this monitor can be performed online. During this process, the system will no longer be monitored until the monitor is maintained and turned on.

To replace an integrated monitor:

Step 1 Disconnect the power input switch of the monitor (DC switch at the rear of the PDM).

Step 2 Remove the inner cover of the front door, and disconnect all cables on the monitor.

Note

You can take a picture before disconnecting the cables for further reference to connect the cables again.

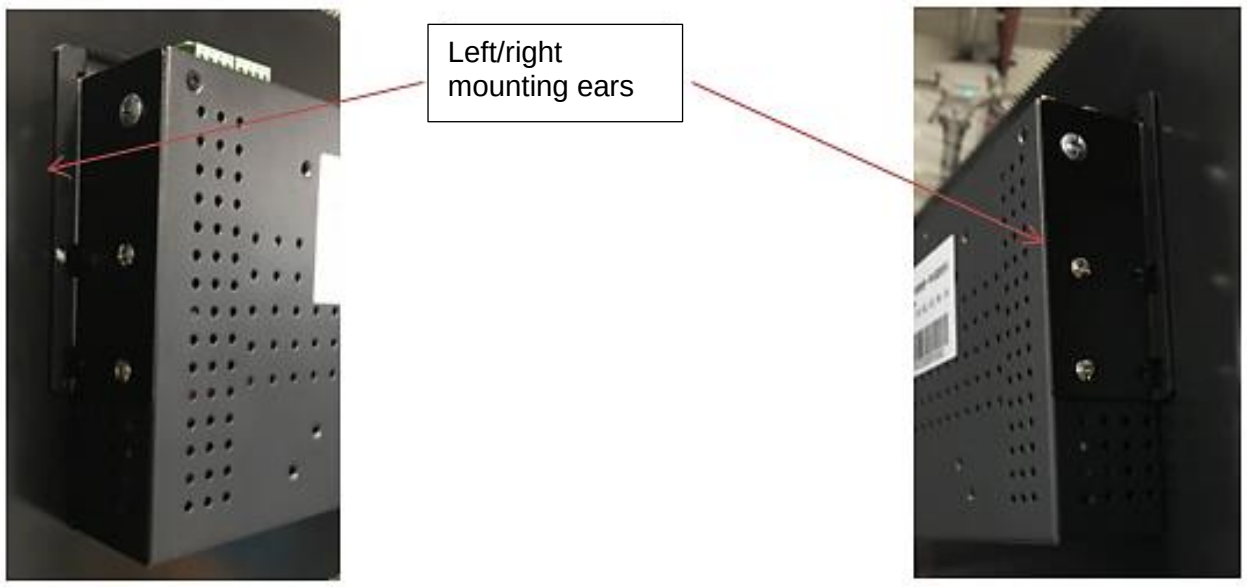


Inner cover of the front cabinet door



Terminals on the monitoring host (example)

Step 3 Remove the fixing screws of the mounting ears on both sides of the monitor, and take out the monitor.



Step 4 Reinstall the new monitor to the front door of the cabinet, and fix the screws on the left and right mounting ears.

Step 5 Reconnect the monitoring and power cables by following the way they were connected before.

If you have taken a picture in Step 2, see the picture for reference.

Step 6 Turn on the DC power switch and wait for 1 minute for the module to automatically turn on.

—**End**

9.2.10.2 Replace the 1U monitoring host

The 1U monitoring host is installed on the rack above the PDM, as shown in the figure below.



To replace the 1U monitoring host:

Step 1 Turn off the power switch on the monitoring host.

Step 2 Disconnect all cables on the back of the monitoring host.

Note

You can take a picture before disconnecting the cables for further reference to connect the cables again.

Step 3 Remove the 4-M6 fixing screws on the front.

Step 4 Replace the 1U monitoring host with a new one, and connect all cables by following the way they were connected before.

If you have taken a picture in Step 2, see the picture for reference.

Step 5 Turn on the DC switch on the PDM.

—**End**

9.2.11 Replace other components of split and integrated cooling units

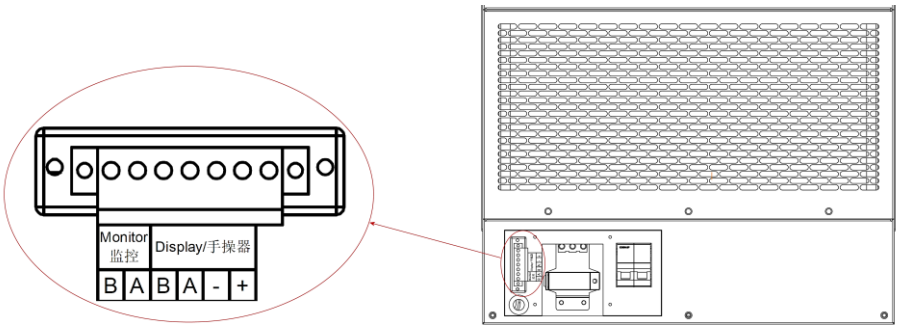
Obtain service manuals from our official website (www.eaton.com) for details.

Appendix A Turn on the cooling unit with a manual operator

The manual operator is an option provided by Eaton. You can purchase it as required.

A.1 Turn on the integrated cooling unit with a manual operator

Step 1 Connect the manual operator to the **B**, **A**, **-**, and **+** terminals of the cooling unit.



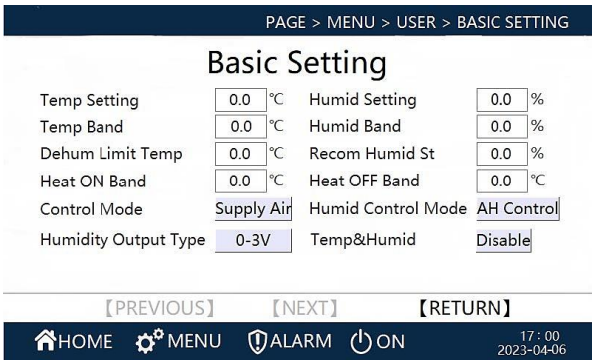
Integrated cooling unit (top view)

Step 2 Turn on the switch on the system main input and cooling input circuit breakers on the PDM.

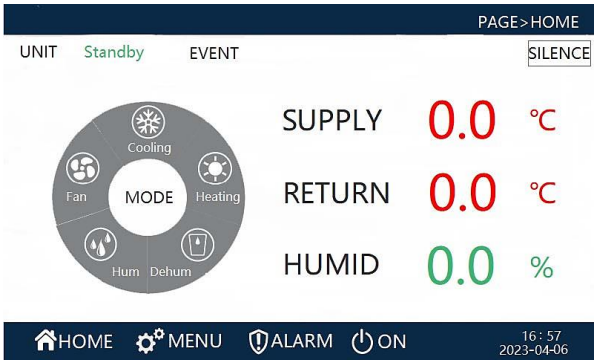
Step 3 On the touchscreen of manual operator, tap **MENU** > **USER** > **Basic Setting**. Set **Temp Setting** to a low value (recommended: at least 3℃ lower than the actual return air temperature).

Note

- *The default user password is **4321**.*
- *If the temperature is set too high, the air compressor will fail to start.*



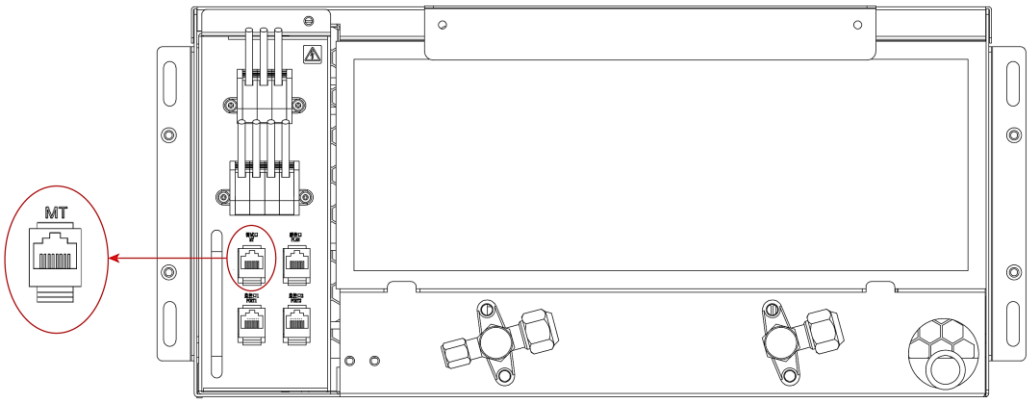
Step 4 Tap **ON** on the touchscreen of the manual operator.



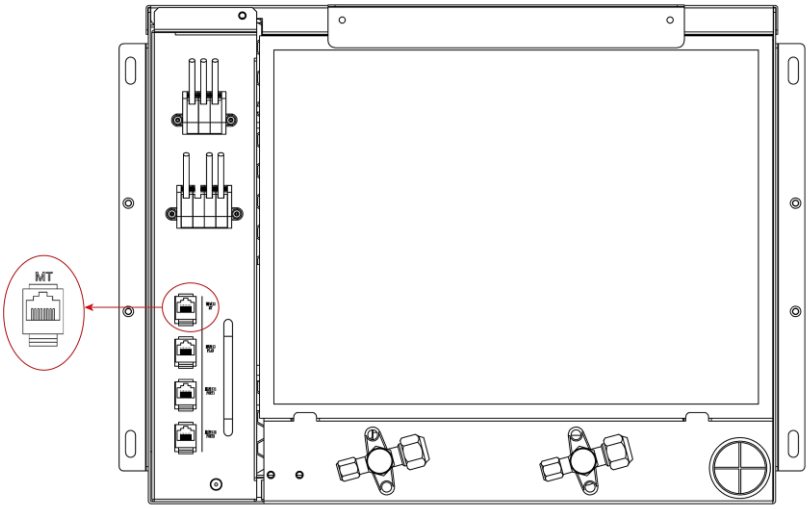
—End

A.2 Turn on the split cooling unit with a manual operator

Step 1 Connect the RJ45 network cable attached on the manual operator to the MT port of the split cooling unit.



4.2 kW cooling unit (rear view)



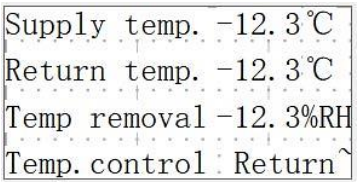
8.1 kW cooling unit (rear view)

Step 2 Turn on the switch on the system main input and cooling input circuit breakers on the PDM.

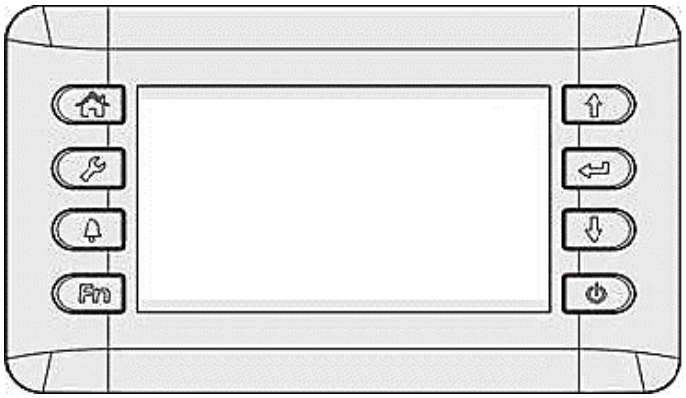
Step 3 On the manual operator, press , select **User Settings**, and press to access the **User Settings** page. Then, set **Return Temp** to a low value (recommended: at least 3℃ lower than the actual return air temperature).

Note

If the temperature is set too high, the air compressor will fail to start.



Step 4 Press the button on the manual operator.



—**End**

Appendix B Acronyms and abbreviations

Abbreviation/Acronym	Full Form
HMI	human machine interface
MDC	micro data center
PDU	power distribution unit
PDM	power distribution module
PUE	power usage effectiveness
UPS	uninterruptible power systems

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