ANAPF

Active Power Filter

Installation Instructions

Ankerui Electric Co., Ltd.

state bright

Please read the installation and operation manual carefully before using this product and keep it in a safe place.

The company does not assume any responsibility for any accidents caused by precautions for use and installation.

The contents of this manual will be continuously updated and revised, but the product functions are constantly upgraded and there will inevitably be discrepancies between the actual product and the manual.

Any discrepancy will be treated without prior notice. Please refer to the actual product purchased and visit www.

Download the latest version of the instruction manual from ACREL.cn or contact sales channels.

Overview

This user manual mainly introduces the installation, electrical connection, commissioning, maintenance and troubleshooting of active power filters.

Before installing an active power filter, be familiar with the functions and features of the active power filter and carefully read the precautions in this manual.

Product Model

ANAPF XXX-380: ANAPF module/machine

Target Audience

This manual is intended for electrical operators and electrical technicians with corresponding qualifications.

Symbol Conventions

The following symbols may appear in this document and their meanings are as follows.

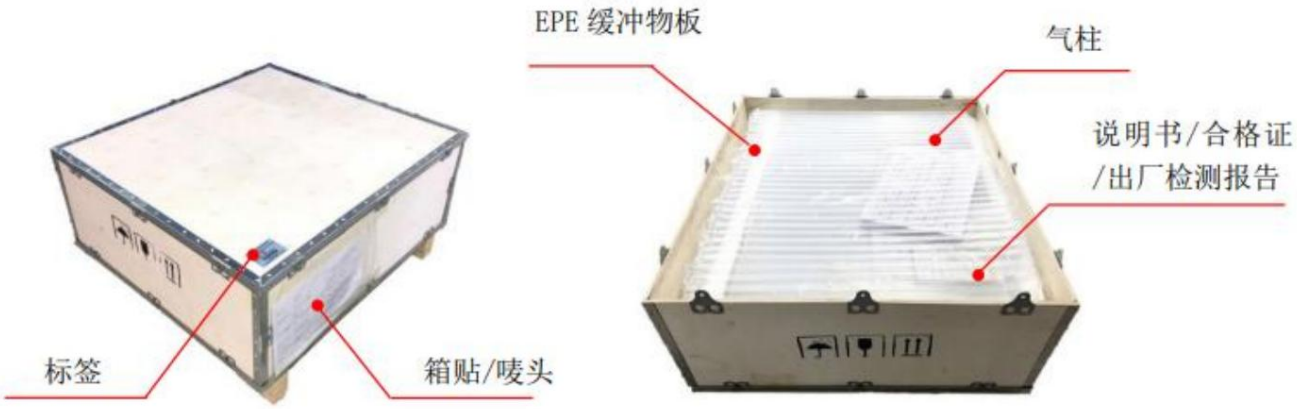
符号	说明
危险	用于警示紧急的危险情形，若不避免，将会导致人员死亡或严重的人身伤害。
警告	用于警示潜在的危险情形，若不避免，可能会导致人员死亡或严重的人身伤害。
小心	用于警示潜在的危险情形，若不避免，可能会导致中度或轻微的人身伤害。
注意	用于传递设备或环境安全警示信息，若不避免，可能会导致设备损坏、数据丢失、设备性能降低或其它不可预知的结果。 “注意”不涉及人身伤害。
说明	用于突出重要/关键信息、最佳实践和小窍门等。 “说明”不是安全警示信息，不涉及人身、设备及环境伤害信息。

Unpacking and Inspection

When unpacking, please carefully confirm:

Notice	ÿ Check whether the capacity on the nameplate of the whole cabinet, the capacity and model on the module label are consistent with your order. ÿ The box contains user manual, product certificate and factory inspection report. ÿ If the order includes a centralized monitoring touch screen, it is usually packaged separately. The package includes a 7-inch touch screen, Touch screen related installation accessories, touch screen connection module communication line, equipment engineering drawings, module Terminal insulation cover. ÿ Is the product damaged during transportation? If you find any omission or damage, please contact us immediately. Contact the company to resolve.

Module packaging content



Packing box pictures

Note: Module packaging is usually wooden box packaging or carton packaging, which can be packaged according to user requirements. Generally, wooden box packaging is the default. Carton packaging is only suitable for short-distance

Transportation, has passed the ISTA-3A drop test, and the carton packaging is no longer explained here.

ÿ Accessory packaging contents

ÿ First time use

For users who are using this product for the first time, please read this manual carefully. If you still have questions about the product functions and installation, please consult our technical staff.

It is beneficial to use this product correctly.

Table of contents

0 About the manual

Thank you for purchasing and using the ANAPF active power filter product from Ankerui Electric Co., Ltd. This manual describes how to use this product correctly.

Please read this manual carefully before use (installation, wiring, operation, maintenance, inspection). In addition, please read this manual carefully after understanding the safety precautions of the product.

Use this product again.

ÿ This manual is delivered with the product.

ÿ This manual is applicable to ANAPF: 380V: 30A, 50A, 75A, 100A, 150A, 200A.

ÿ This manual is also applicable to ANAPF: 690V: 50A, 100A.

ÿ This manual introduces the functions, features and usage of ANAPF, including product selection, parameter setting, operation and debugging, maintenance and inspection, etc.

Please read this manual carefully before use. Equipment manufacturers should send this manual to end users along with the equipment for easy use.

refer to.

ÿ The illustrations in this manual are only for illustrating the installation and use of the product and may be different from the product you ordered.

ÿ Our company is committed to the continuous improvement of products and the continuous upgrading of product functions. The information provided is subject to change without prior notice.

ÿ If you have any questions during use, please contact our regional agents, or directly contact our sales and technical personnel.

1 Safety Instructions

Please read the safety precautions in this manual carefully. If ignored, serious personal injury or death may result.

1.1 Safety Signs

In this manual, there are three types of security levels:

Table 1-1 Use of symbols, terms and names

	Notes
 Notice	Failure to follow the manual requirements may result in losses or equipment failure or damage!
 warn	Failure to follow the manual requirements may result in equipment damage and minor personal injuries!
 Danger	Failure to follow the manual may result in serious accidents and serious injuries or death!!!

Whenever these three types of marks are used in this manual, they indicate that the relevant information is important for safety. Failure to observe these precautions may result in serious economic losses, resulting in minor or serious injuries or death, damage to this product, damage to related components and cabinets. In addition, if your company or your customers fail to comply with this

The company will not be held responsible for any injuries or equipment damage caused by not following the contents of this manual.

1.2 Safety Matters

1.2.1 Before equipment installation

Before Installation	
 Danger	ÿ When you unpack the box or find water in the equipment, or if parts are missing or obviously damaged, Please do not install! ÿ If the packing list does not match the actual name and the name of the ordered device, please do not install it!

 Notice	ÿ When transporting the module, be sure to hold the housing tightly. If it falls during transportation, Risk of injury and possible equipment damage. ÿ The device should be lifted and placed with care during transportation, otherwise there is a risk of damaging the device! ÿ Do not use a damaged or missing module, as there is a risk of injury! ÿ The device has been tested for withstand voltage before leaving the factory. Any component cannot be subjected to withstand voltage test. And high voltage may cause damage to the insulation and internal components of the equipment. Damage to the parts.

1.2.2 Equipment Installation

When installing	
 Danger	ÿ Non-electrical construction professionals are not allowed to install, maintain, inspect or replace parts. Otherwise, there may be electric shock. of danger! ÿ It is strictly forbidden to tear off the anti-tear label of the equipment. Any damage caused is not within the scope of the company's responsibility and warranty. ÿ For renovation projects, when installing the primary cable and the current sampling secondary line, ensure that the access system is powered off. And it is safe to work in the surrounding area. Is there a risk of electric shock, which may cause casualties!
 Notice	ÿ Please place the module gently during installation and be careful not to bump into it. If any damage is caused, it is not the company's responsibility. Scope of responsibility and warranty. ÿ When placing two or more modules in the same cabinet, please pay attention to the installation position to ensure the heat dissipation effect. It is recommended to add cooling measures such as fans. ÿ The module installation location should ensure ventilation. Do not cover the air inlet and outlet of the module's built-in cooling fan. ÿ The module installation location should ensure safe debugging and maintenance by after-sales personnel. ÿ The wall-mounted module should be installed in a place where people rarely move around, and safety hazards should be placed in obvious locations. Logo.

1.2.3 Power on and run the device

When powered on	
 Danger	ÿ Do not open the cover after power is turned on. Otherwise, there is a risk of electric shock, resulting in casualties! ÿ It is strictly forbidden to install or wire the equipment while it is energized! ÿ Do not touch any primary or secondary terminals of the module. Otherwise, there is a risk of electric shock, resulting in casualties! ÿ This equipment needs to be debugged by our company's designated after-sales engineer. Other personnel must operate it under the supervision of our company's after-sales engineer. Please operate under the guidance of an engineer. Do not operate without permission! Otherwise, it may cause equipment damage or even personal injury. Death!
 Notice	ÿ When the device is running, please do not change the factory parameters of the device at will. Otherwise, it may cause damage to the device! ÿ When the device is running, avoid objects falling into the device. Otherwise, the device may be damaged! ÿ After the device is powered on, avoid frequently starting and stopping the device or frequently turning on and off the upper switch of the device. ÿ During debugging, if the equipment makes abnormal noise or has fault information, you should cut off the power supply immediately and contact our technical support. personnel.

1.2.4 Equipment maintenance

During maintenance	
 Danger	ÿ Personnel without professional training are not allowed to repair or maintain the equipment. Otherwise, personal injury may occur. Injury or equipment damage! ÿ Do not repair or maintain the device while it is powered on. Otherwise there is a risk of electric shock! ÿ Make sure that the input power of the equipment is cut off for at least 10 minutes before performing maintenance and repair on the equipment. Otherwise, the residual charge on the capacitor may cause harm to people! ÿ Before performing maintenance work on the device, ensure that the device is safely disconnected from all power sources. ÿ After replacing the device, the parameters must be set and checked. ÿ Do not power on a device that has reported a fault or is damaged. Otherwise, the damage to the device will be further increased.

1.3 Specific Purpose

 Notice	ÿ Please pay attention to whether there are reactive compensation devices composed of passive components such as capacitors and reactances in the same system. If not done properly, the active filter/static var generator may conflict with these passive compensation devices. Or cannot fully exert its compensatory capacity. ÿ When ANAPF is used for harmonic compensation, it is necessary to ensure that there is no pure capacitive compensation equipment or capacitive load in the system. If there is any load device, necessary measures must be taken (such as series reactor) to make it harmonic The wave is inductive, avoid resonance, otherwise the APF will be damaged or the pure capacitance compensation equipment and capacitive load will be damaged. Risk of damage to onboard equipment; ÿ ANAPF output contains harmonic components, which may interfere with nearby communication equipment. Keep the transmission signal line away from the APF primary circuit. If necessary, install an anti-interference EMI filter to reduce interference. The impact of disturbance. ÿ The altitude should not exceed 1000 meters. If the altitude exceeds 1000 meters, the equipment will be derated for every 100 meters increase. 1% usage.

2 Product Introduction

This chapter introduces the function, application, appearance and working principle of the active power filter.

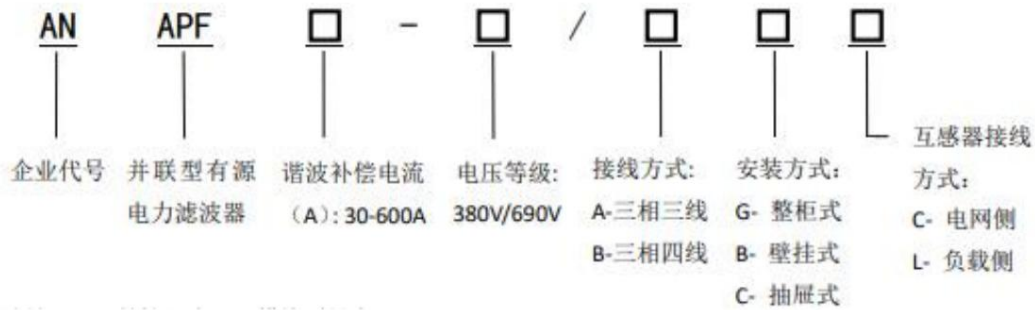
2.1 Product Introduction

This section introduces the functions, models and applications of active power filters.

2.1.1 Product Features

This product is a three-phase three-wire/three-phase four-wire active power filter. Its main functions are to compensate harmonics, compensate reactive power and balance three-phase current.

2.1.2 Product Model



2.2 Working Principle

2.2.1 Working principle of ANAPF module

ANAPF series active power filters are connected in parallel in low-voltage power distribution systems containing harmonic loads, and can quickly and effectively control dynamically changing harmonic currents.

The principle is as follows: ANAPF series active power filter collects system harmonic current through CT, and the controller quickly calculates and extracts

The content of each harmonic current generates a harmonic current command, and a compensation current with the same amplitude and opposite direction as the harmonic current is generated through the power actuator.

Injected into the power system to offset the harmonic currents generated by non-linear loads.

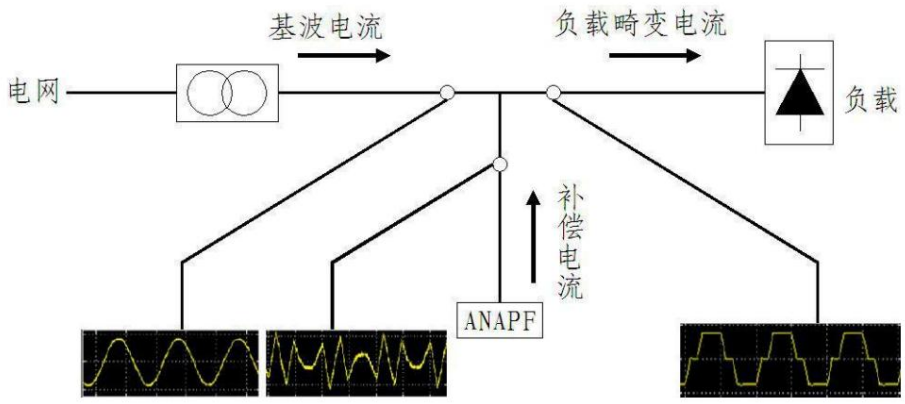


Figure 2-1 ANAPF working principle diagram

2.2.2 ANAPF control principle

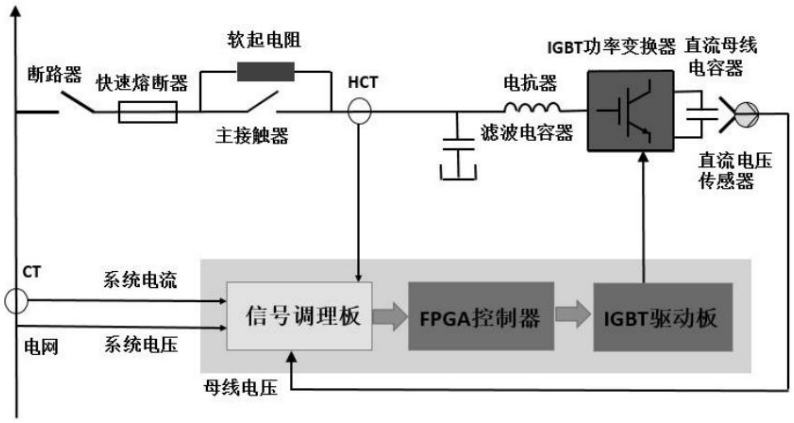


Figure 2-2 ANAPF internal control principle diagram

After the circuit breaker is closed, in order to prevent the instantaneous impact of the power grid on the DC bus capacitor when power is turned on, ANAPF first connects the capacitor of the DC bus through the soft start resistor.

When the bus voltage Udc reaches the preset value, the main contactor closes. The DC capacitor acts as an energy storage device and outputs power to the outside through the IGBT inverter and the internal reactor.

The ANAPF collects the current signal in real time through the external CT and sends it to the signal conditioning circuit, and then to the controller.

The current is decomposed to extract the harmonic current, reactive current, and three-phase unbalanced current, and the collected current components to be compensated are compared with the current components issued by ANAPF.

The difference between the compensation currents is obtained by comparison and is output to the drive circuit as a real-time compensation signal, triggering the IGBT converter to inject the compensation current into the power grid to achieve closed-loop control.

system to complete the compensation function.

2.2.3 ANAPF working principle

Active power filter is a new type of power electronic device used for harmonic control, reactive power compensation and unbalanced regulation; the intelligent control system actively adjusts the system

The linear dynamic demand of the system automatically adjusts the output of the module; the ANAPF machine is mainly composed of ANAPF modules; it can complete the compensation of harmonic current with larger capacity

The whole machine realizes human-computer interaction through a 7-inch touch screen. The touch screen communicates with the ANAPF module through RS485.

2.3 Product Features

1) Modular design, any module failure will not affect the normal operation of other modules, greatly improving the reliability of the whole equipment; can achieve multiple

When multiple modules are connected in parallel, all modules can share a single set of

Current transformer;

2) It can filter out odd harmonic currents below 2~50 at the same time, and can set 13 harmonic subbands that need filtering according to needs.

When the load current distortion rate is greater than 20%, the filtering rate shall not be less than 85%; when the load current distortion rate is less than 20%, the filtering rate shall not be less than 75%; reactive power compensation can make the power

The factor reaches 1; it can correct the three-phase current imbalance to complete balance;

3) Adopting the fifth generation IGBT of internationally renowned imported brands, it can automatically adjust the output according to the harmonic current of the load and dynamically filter;

4) Adopting the American Xilinx military-grade FPGA control chip, it has fast operation speed and high reliability; 5) Adopting imported IGBT,

it has high power density and high reliability; 6) Adopting the digital control system of DSP

high-speed detection and calculation; 7) Adopting the layered design, dust and rain will not

adhere to the circuit board, which is suitable for use under harsh working conditions; 8) Filtering, compensation of reactive power, compensation of three-phase

imbalance can be selected individually or multiple times, and the priority of the functions can be set;

9) Adopt sliding window iterative DFT detection algorithm, with fast calculation speed, instantaneous response time less than 0.1ms, and device compensation full response time less than 20ms;

10) The output filter adopts LCL structure to access the power grid. Its own high-frequency carrier will not be fed back to the power grid, and there will be no interference to other equipment in the power distribution system;

11) It has complete protection functions, including overvoltage, overcurrent, overheating, short circuit and other complete protection functions, and also has system self-diagnosis function; 12) It has a soft start control circuit to avoid excessive inrush current at the moment of startup and limit the current within the rated range; 13) It adopts a reliable current limiting control link. When the current to be compensated in the system is greater than the rated capacity of the device, the device can automatically limit the current to 100% Capacity output, maintain normal operation, no overload burnout or other faults;

14) The main circuit adopts a three-level topology structure, with high output waveform quality and low switching loss;

15) The wall-mounted module comes with a 4.3 touch screen, which can be used for parameter setting, parameter viewing, status viewing, event viewing, etc. The rack-mounted module is installed in the cabinet and can be centrally monitored using a high-definition 7-inch touch screen. It is easy to operate, the screen displays the system and device operating parameters in real time, and has a fault alarm function;

16) To save space for users, the maximum power of the 800mm wide cabinet can reach 1000A/750kvar.

2.4 Module Technical Specifications

1) Rated voltage: 380V (-20%+20%), 660V (-20%ÿ+20%); 2) Rated frequency: 50Hz (-10% ~ +10%); 3) Response time: full response time ÿ5ms, transient response time ÿ100ÿs; 4) Compensation mode: linear compensation; 5) Total harmonic compensation rate: ÿ 95%; 6) Function setting: only compensate harmonics, only compensate reactive power, compensate both harmonics and reactive power; 7) Self-loss: ÿ2.5%; 8) Efficiency: ÿ97.5%; 9) Working temperature: -10ÿ ÿ+45ÿ; 10) Storage temperature: -25ÿÿ +60ÿ; 11) Altitude: ÿ1000m, above 1000m, use with reduced capacity according to GB/T 3859.2; 12) Relative humidity: 5%-95%, no condensation; 13) Overload protection: automatically limited to rated current output; 14) Working mode: automatic or manual; 15) Communication interface: RS485, Ethernet, communication function optional; 16) Module capacity: 30A/50A, 75A, 100A, 150A, 200A, the same model can be directly connected in parallel; 17) Noise: ÿ65dB; 18) Protection level: IP20; 19) Average switching frequency: 20kHz; 20) Cooling method: forced air cooling.

3 Product Information

3.1 Product appearance and dimensions (200A/150A/100A/75A/50A/30A)

(1) 200A module: drawer installation

ÿ Appearance display

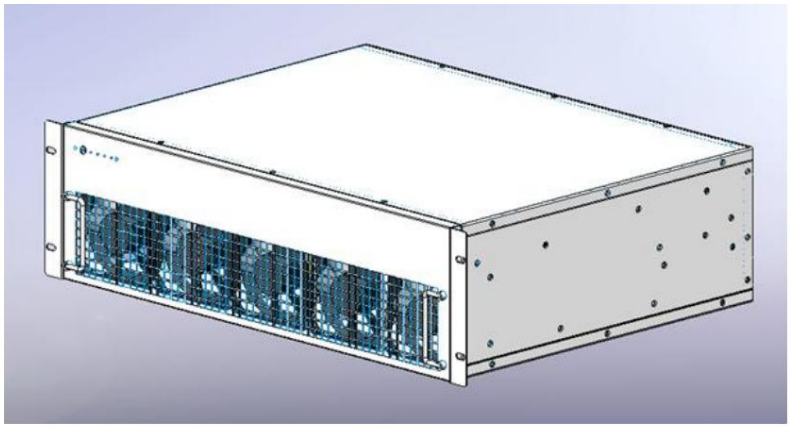


Figure 3-1 Appearance of 200A drawer module

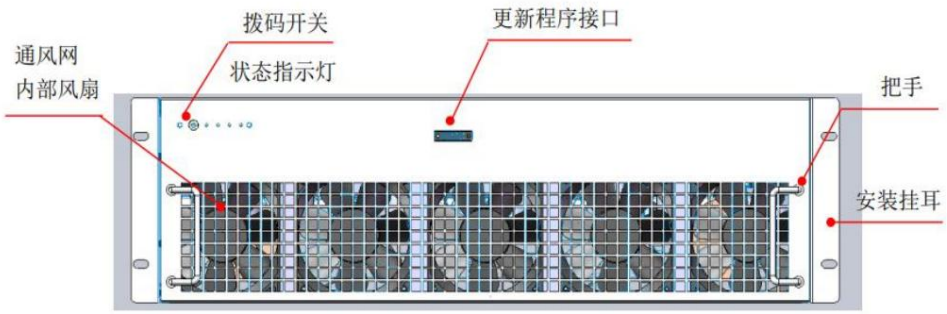


Figure 3-2 Front view of 200A drawer-type module

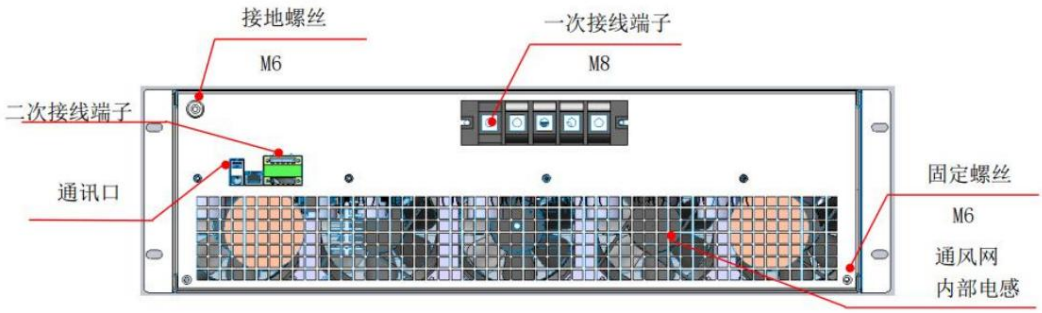


Figure 3-3 Back of 200A drawer module

ÿ Product size

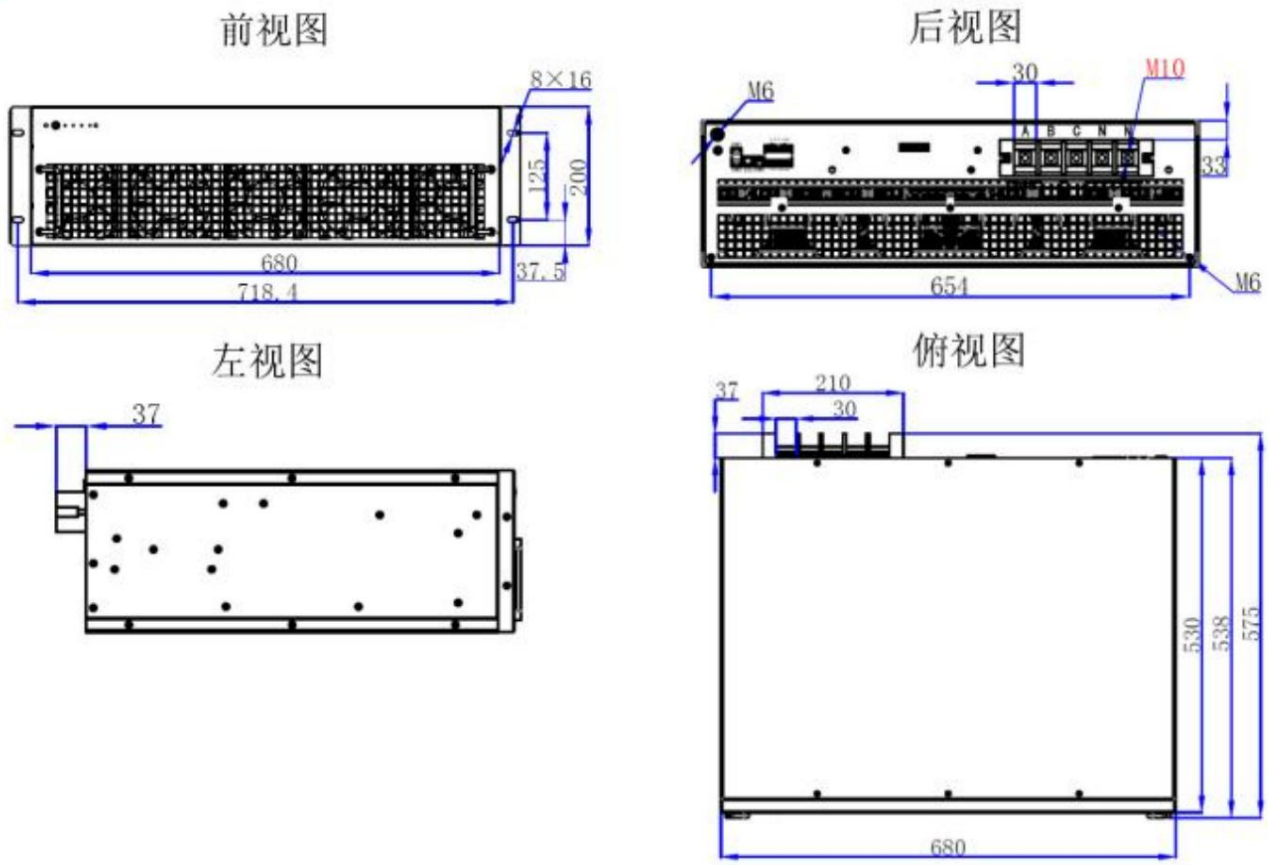


Figure 3-4 200A drawer-type module dimensions

(2) 150A/100A module ÿ Drawer

installation ÿ Appearance

display

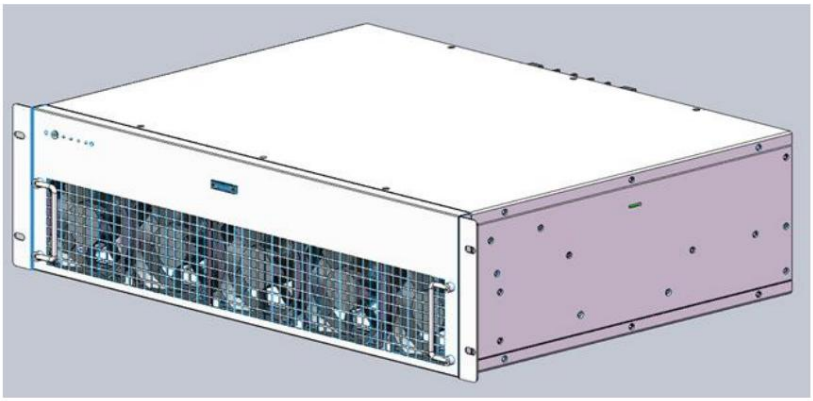


Figure 3-5 Appearance of 150A/100A drawer module

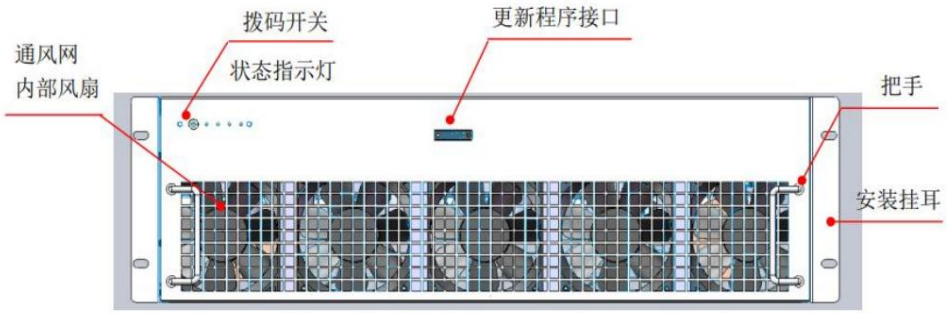


Figure 3-6 Front view of 150A/100A drawer module

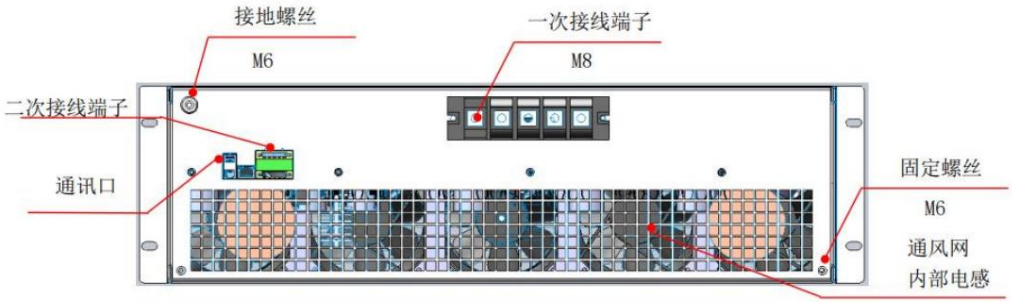


Figure 3-7 Back of 150A/100A drawer module

ÿ Product size

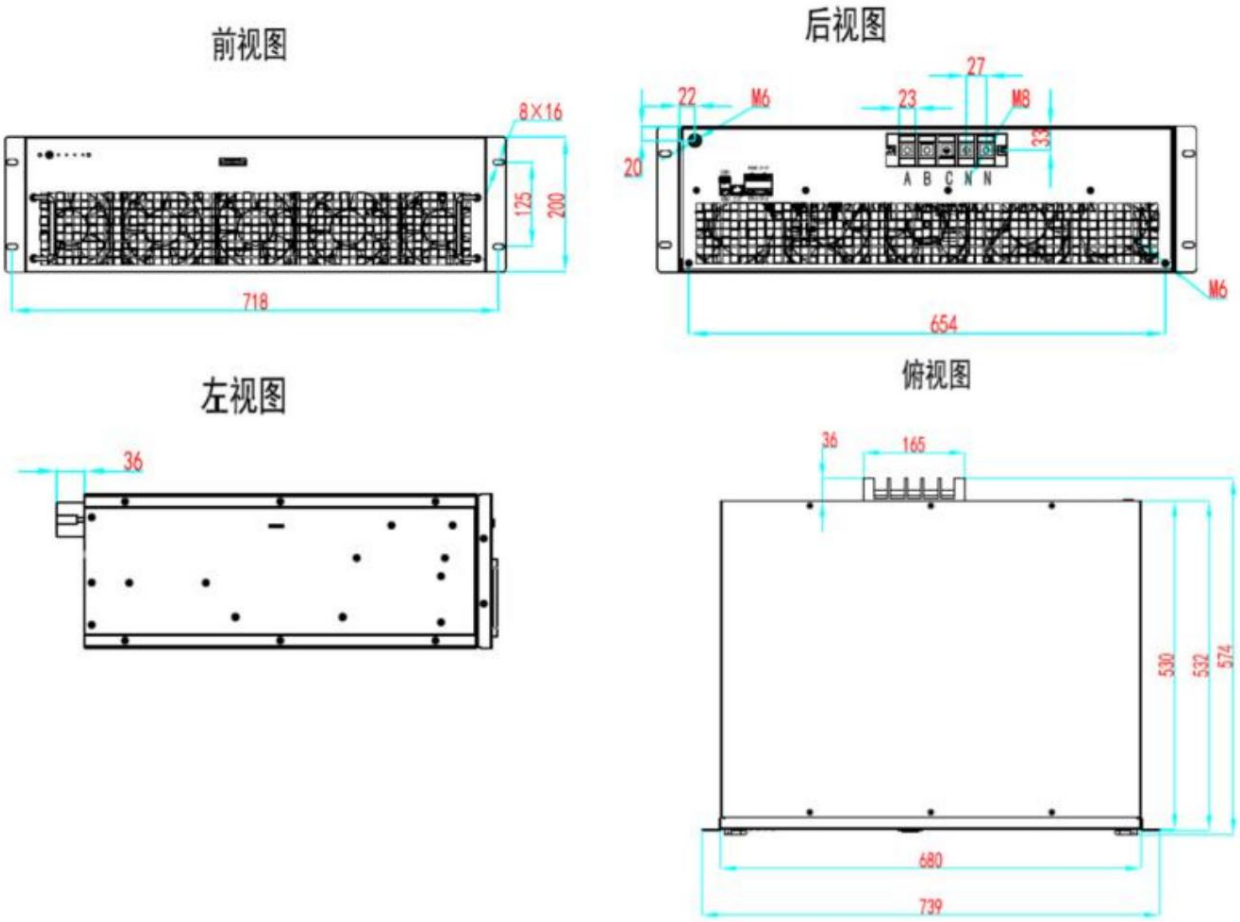


Figure 3-8 150A/100A drawer module dimensions

ÿ Wall mounting

ÿ Appearance display

Figure 3-9 Appearance of 150A/100A wall-mounted module

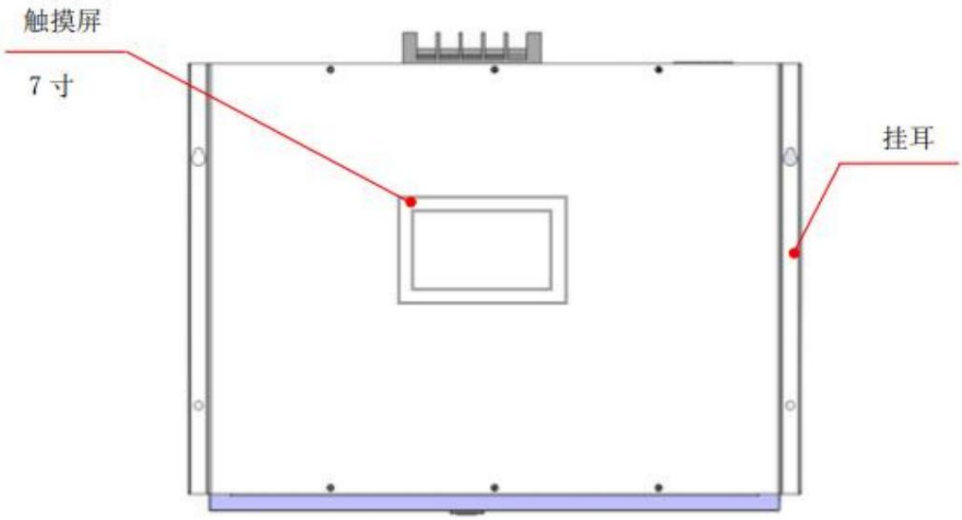


Figure 3-10 Front view of 150A/100A wall-mounted module

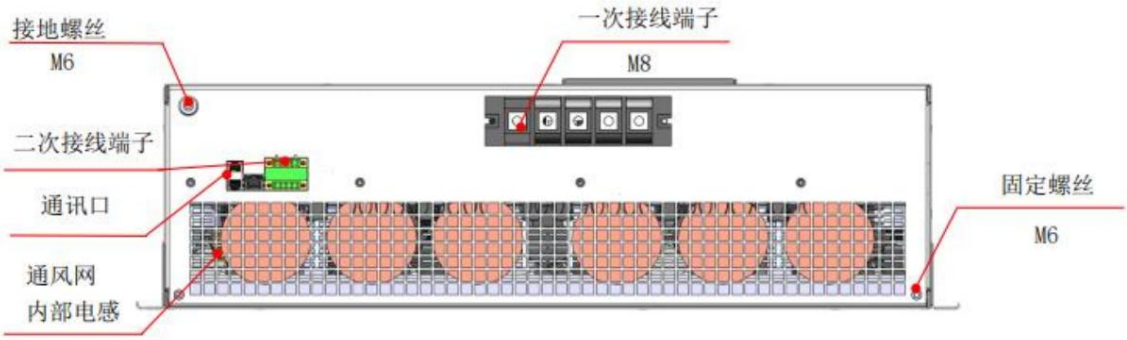


Figure 3-11 Top of 150A/100A wall-mounted module

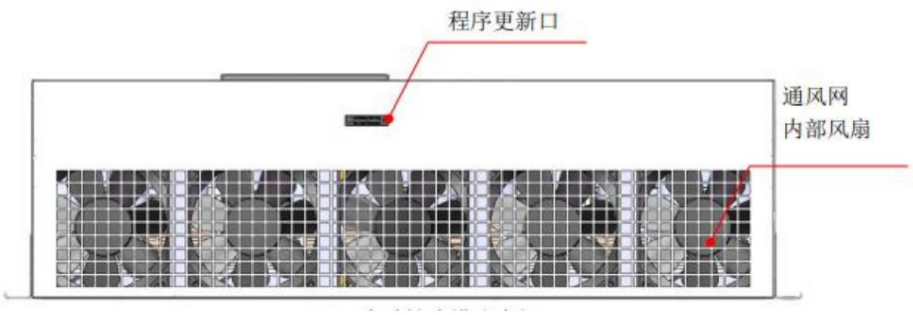


Figure 3-12 Bottom of 150A/100A wall-mounted module

ÿ Product size

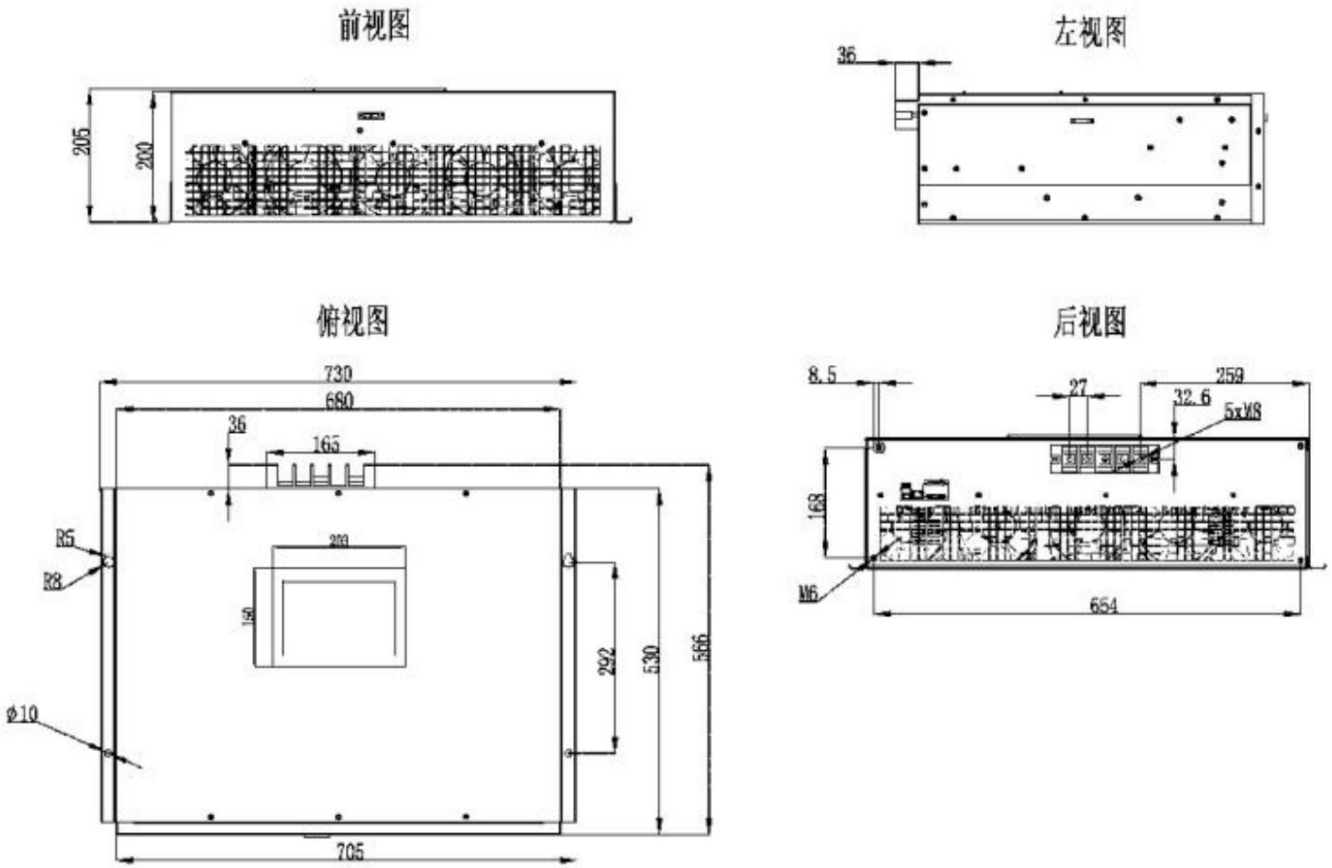


Figure 3-13 150A/100A wall-mounted module dimensions

(3) 50A/75A module

ÿ Drawer installation ÿ

Appearance display

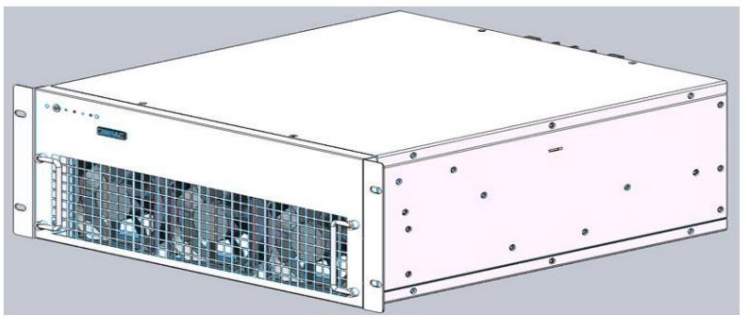


Figure 3-14 Appearance of 50A/75A drawer-type module

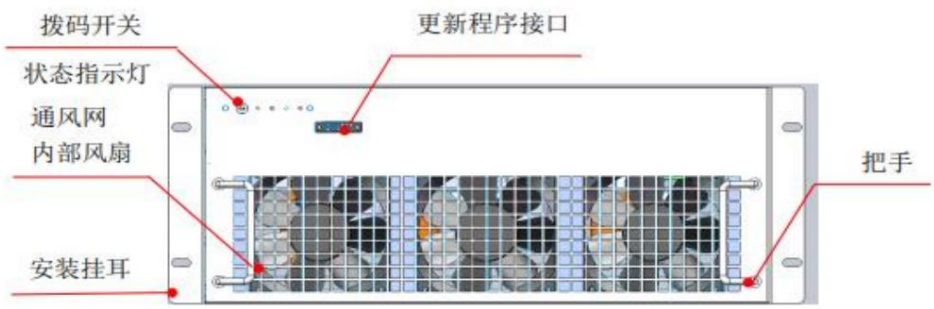


Figure 3-15 Front view of 50A/75A drawer module

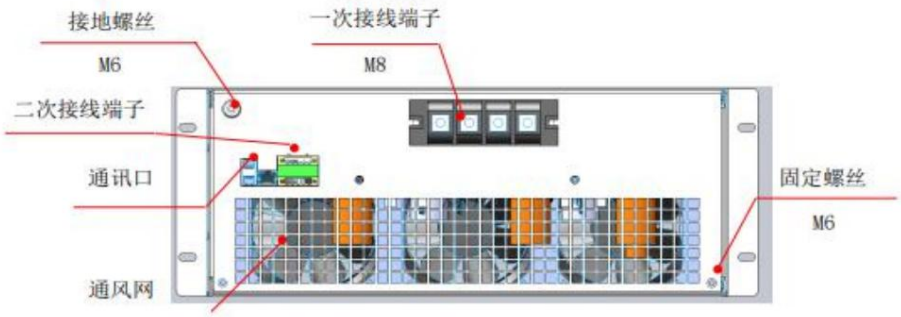


Figure 3-16 Back of 50A/75A drawer module

ÿ Product size

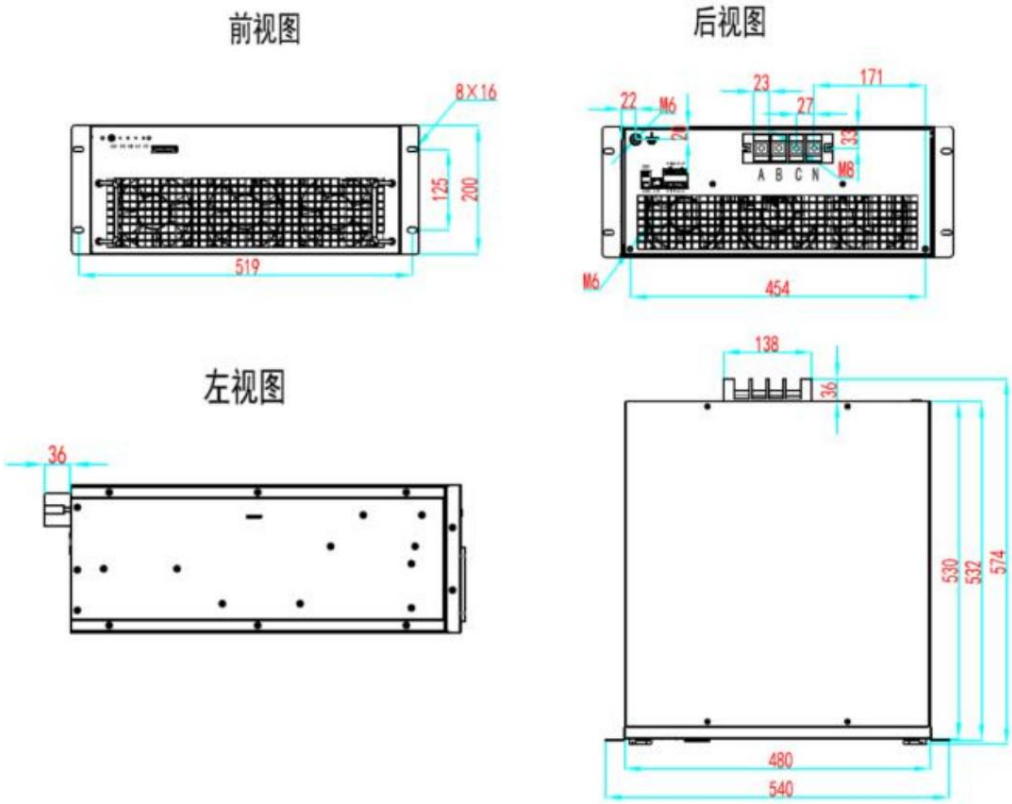


Figure 3-17 50A/75A drawer-type module dimensions

ÿ Wall-mounted installation

ÿ Appearance display

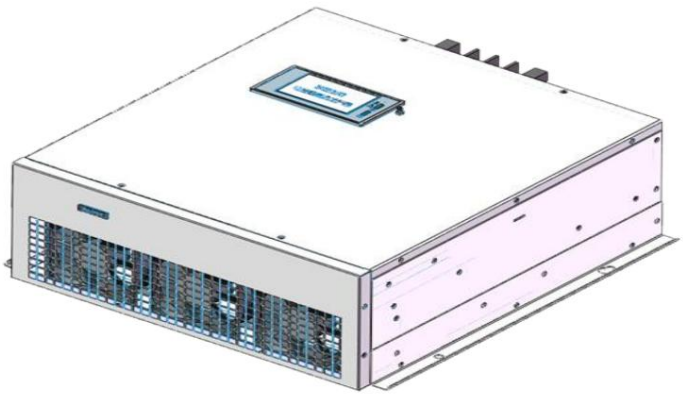


Figure 3-18 Appearance of 50A/75A wall-mounted module

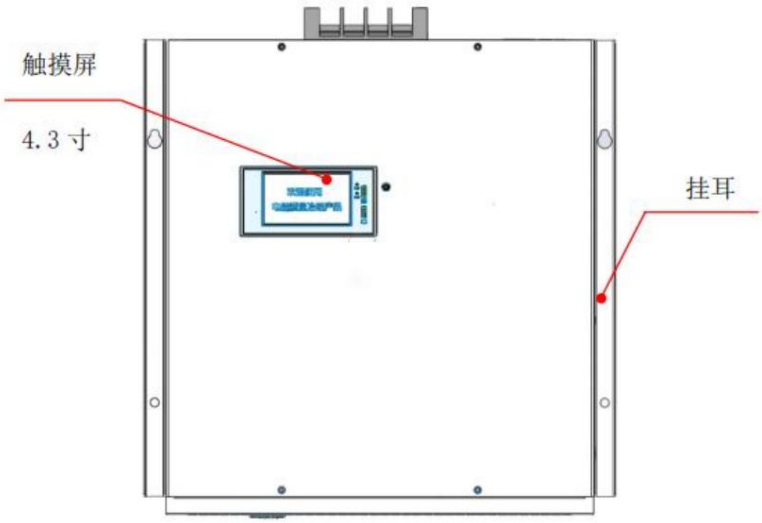


Figure 3-19 Front view of 50A/75A wall-mounted module

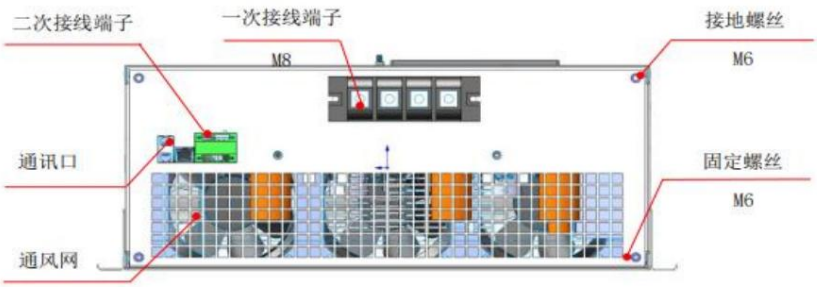


Figure 3-20 Top of 50A/75A wall-mounted module

Figure 3-21 Bottom of 50A/75A wall-mounted module

ÿ Product size

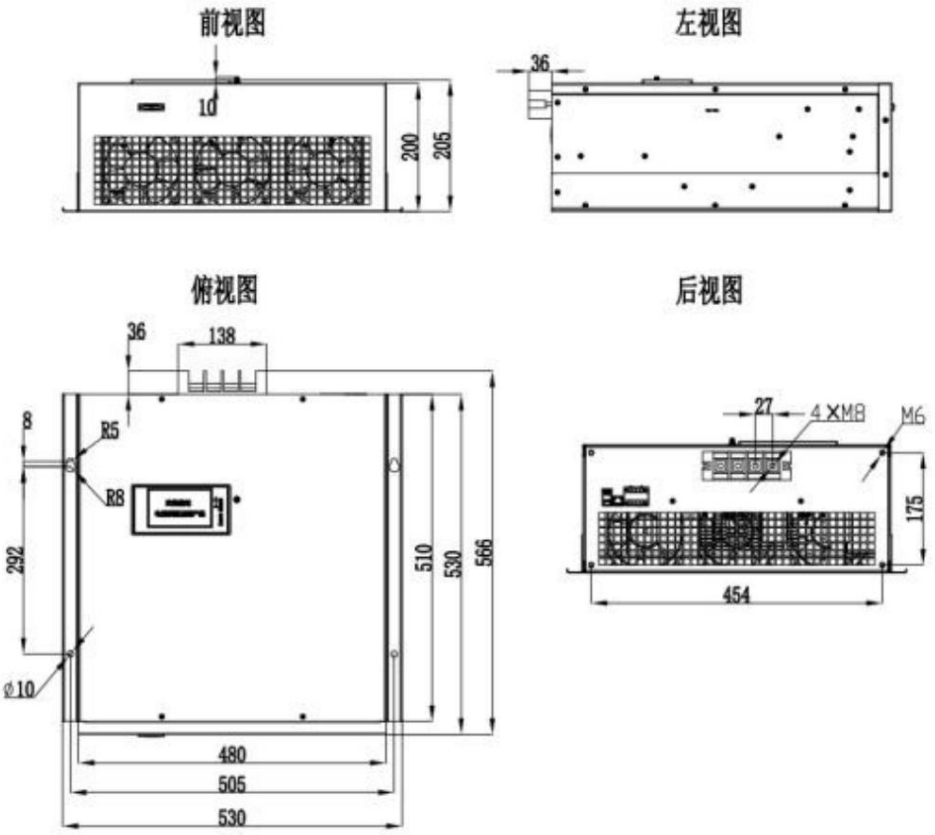


Figure 3-22 50A/75A wall-mounted module dimensions

(4) 30A module ÿ

Drawer installation

ÿ Appearance display

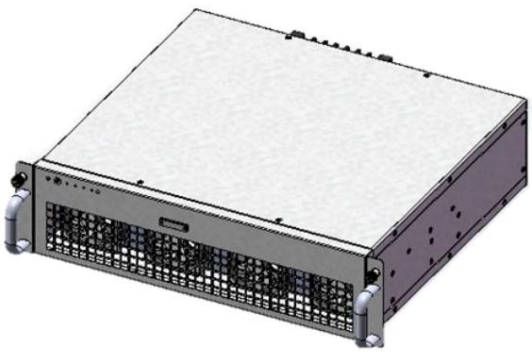


Figure 3-23 Appearance of a 30A drawer-type module

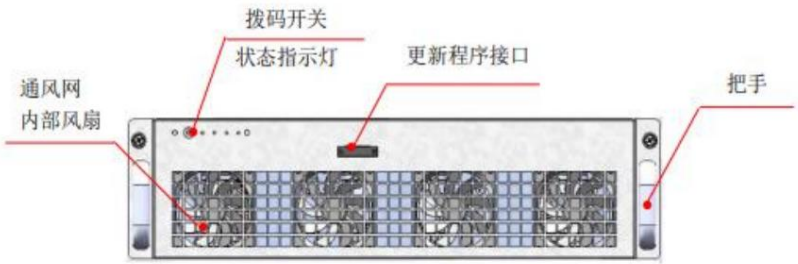


Figure 3-24 Front view of 30A drawer-type module

Figure 3-25 Back of 30A drawer module

ÿ Product size

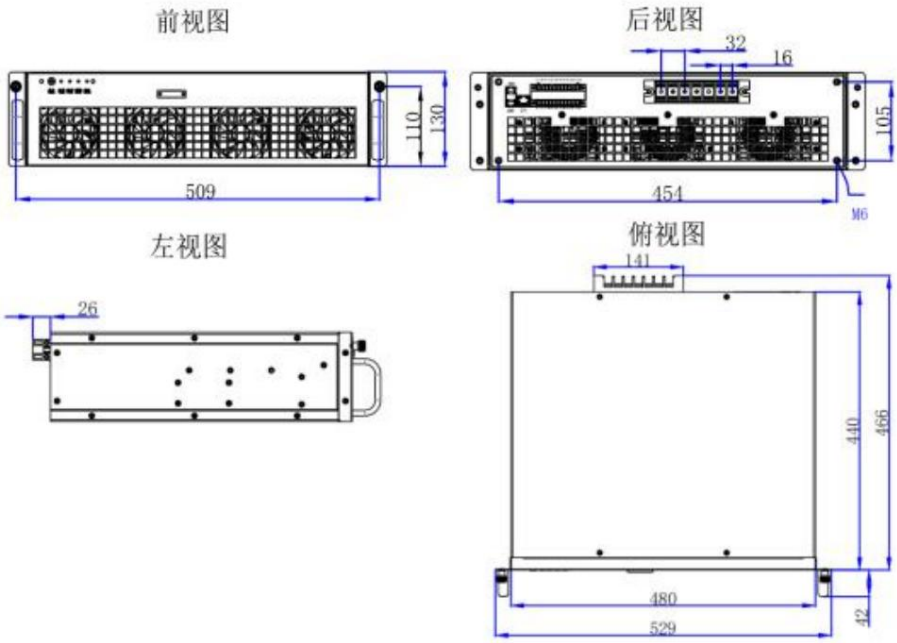


Figure 3-26 Dimensions of 30A drawer-type module

ÿ Wall mounting

ÿ Appearance display

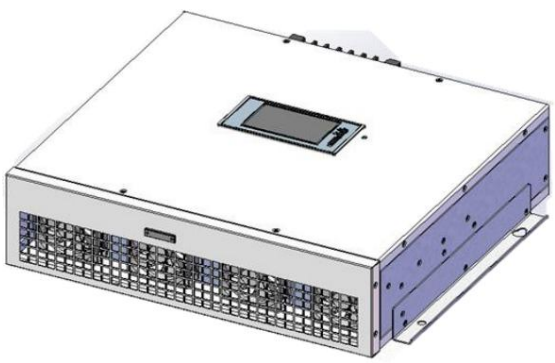


Figure 3-27 Appearance of 30A wall-mounted module

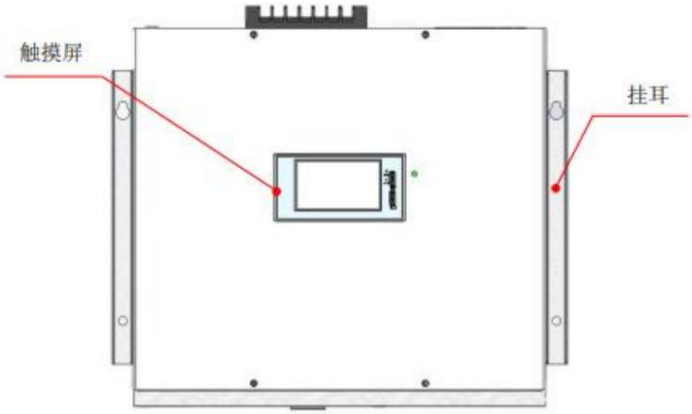


Figure 3-28 Front view of 30A wall-mounted module

Figure 3-29 Top of 30A wall-mounted module

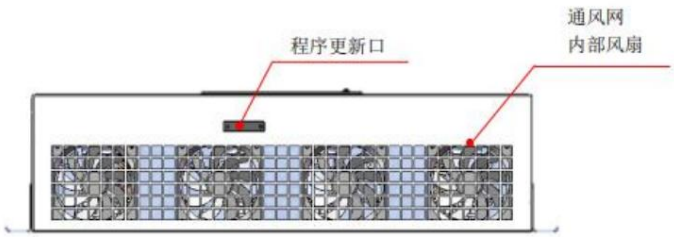


Figure 3-30 Bottom of 30A wall-mounted module

3.2 Terminal Description

(1) 200A module terminal block

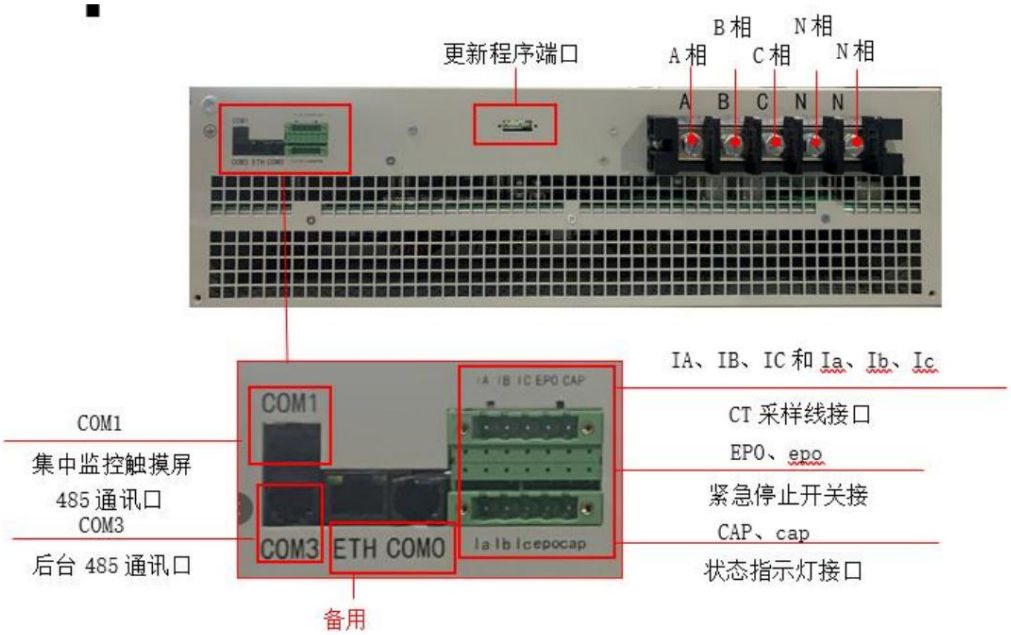


Figure 3-31 200A module terminal diagram

(2) 100A/150A module terminal blocks

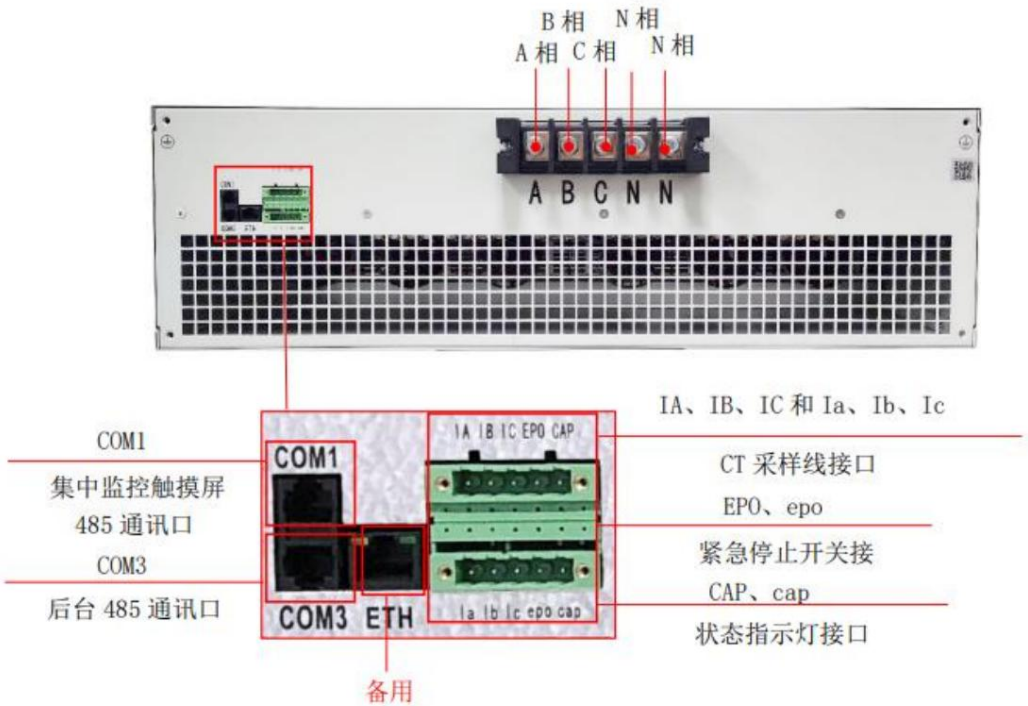


Figure 3-32 100A/150A module terminal diagram

(3) 50A/75A module terminal blocks

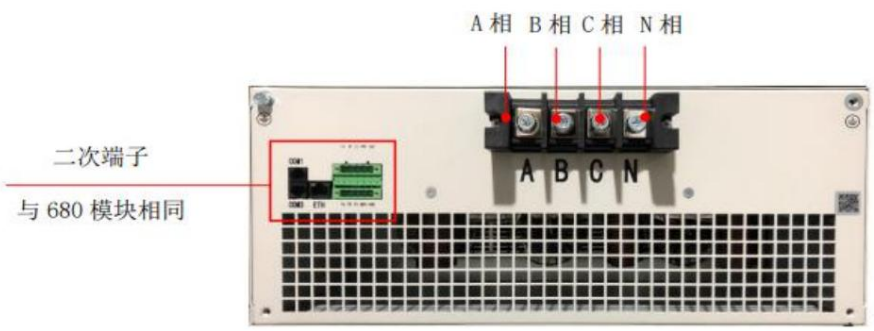


Figure 3-33 Schematic diagram of 50A/75A module terminals

(4) 30A module terminal

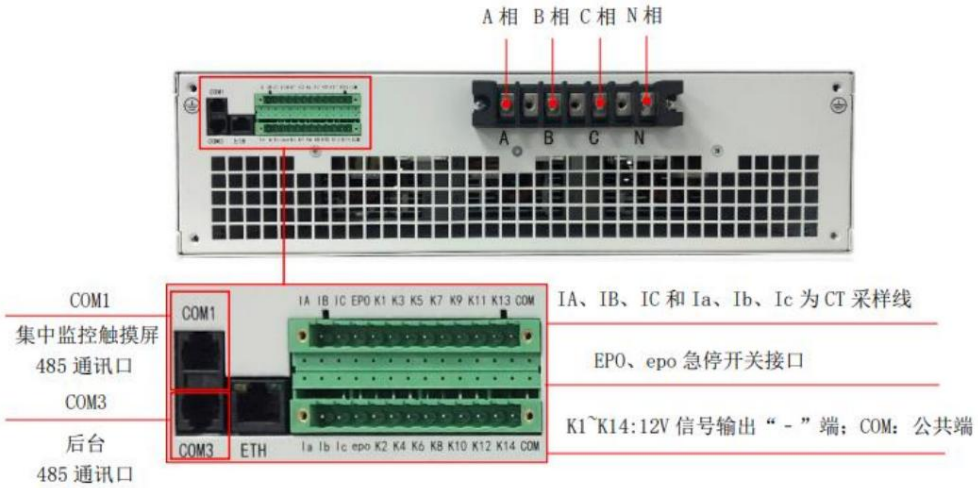


Figure 3-34 Schematic diagram of 30A module terminals

(5) 690V 100A/50A module terminal block:

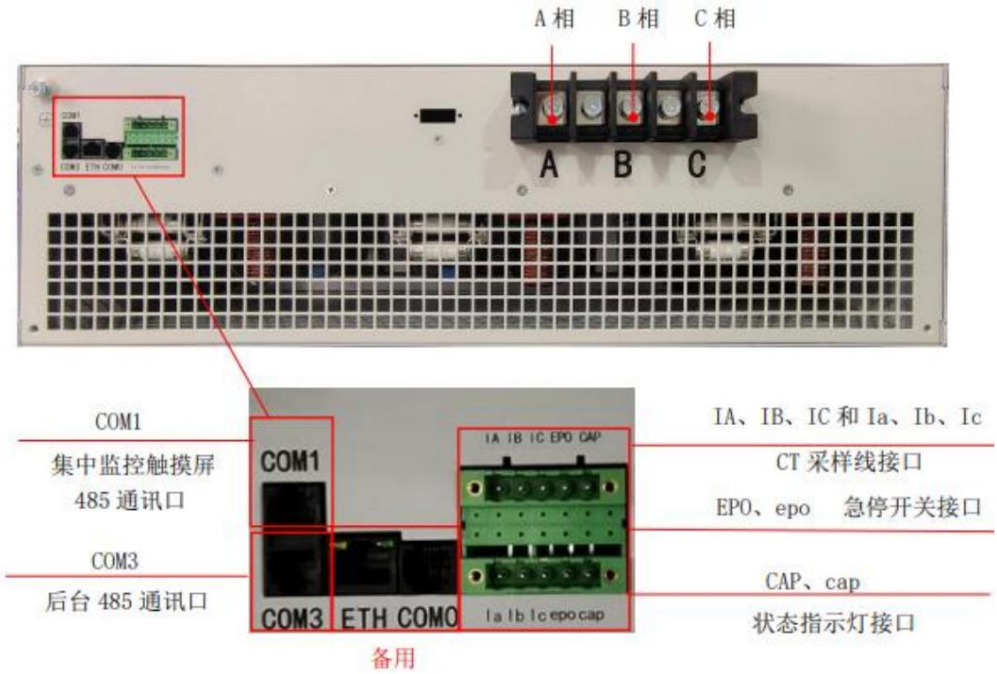


Figure 3-34 100A/50A module terminal diagram

3.3 DIP switch and status indicator light description

Figure 3-35 Diagram of DIP switch and status indicator light

(1) DIP switch

"ADDR" is a dip switch. For drawer-type modules, since the module body does not have a 4.3-inch touch screen, the module address can be set by rotating the dial switch.

Only when the correct module address is set, the external centralized monitoring touch screen can communicate with the module normally; for example, if there are 2

When the module is set, the first module can rotate the dip switch to position 1, and the second module can rotate the dip switch to position 2. The dip switch has a total of 15 digits, the maximum

When 15 modules are connected in parallel, the 0 bit is invalid.

(2) There are four status

indicators: "POW (power), RUN (running), ALM (alarm), COM (communication)". The POW indicator shows whether the module is powered on normally. If the mains power is connected, the POW indicator (green) will light up. After the module is powered on, if the module is in normal operation, the RUN indicator (green) will light up. If the module alarms, the ALM indicator (yellow) will light up. If the module communication is normal, the COM indicator (green) will light up and flash. If the communication is abnormal, it will not light up.

4 System Connection

4.1 System connection diagram

(1) Single module connection

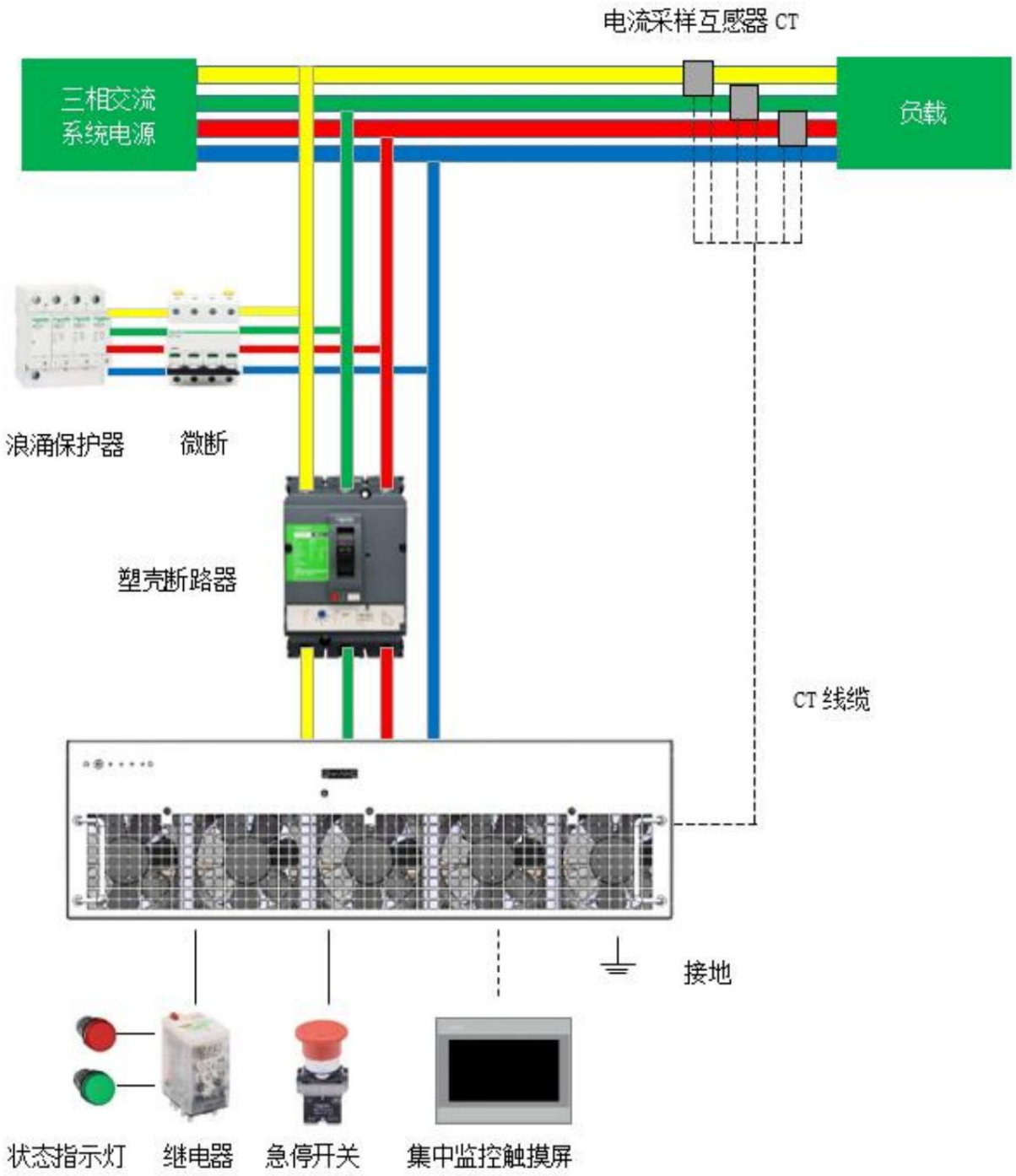


Figure 4-1 ANAPF single module system connection diagram

(2) Parallel connection of multiple modules

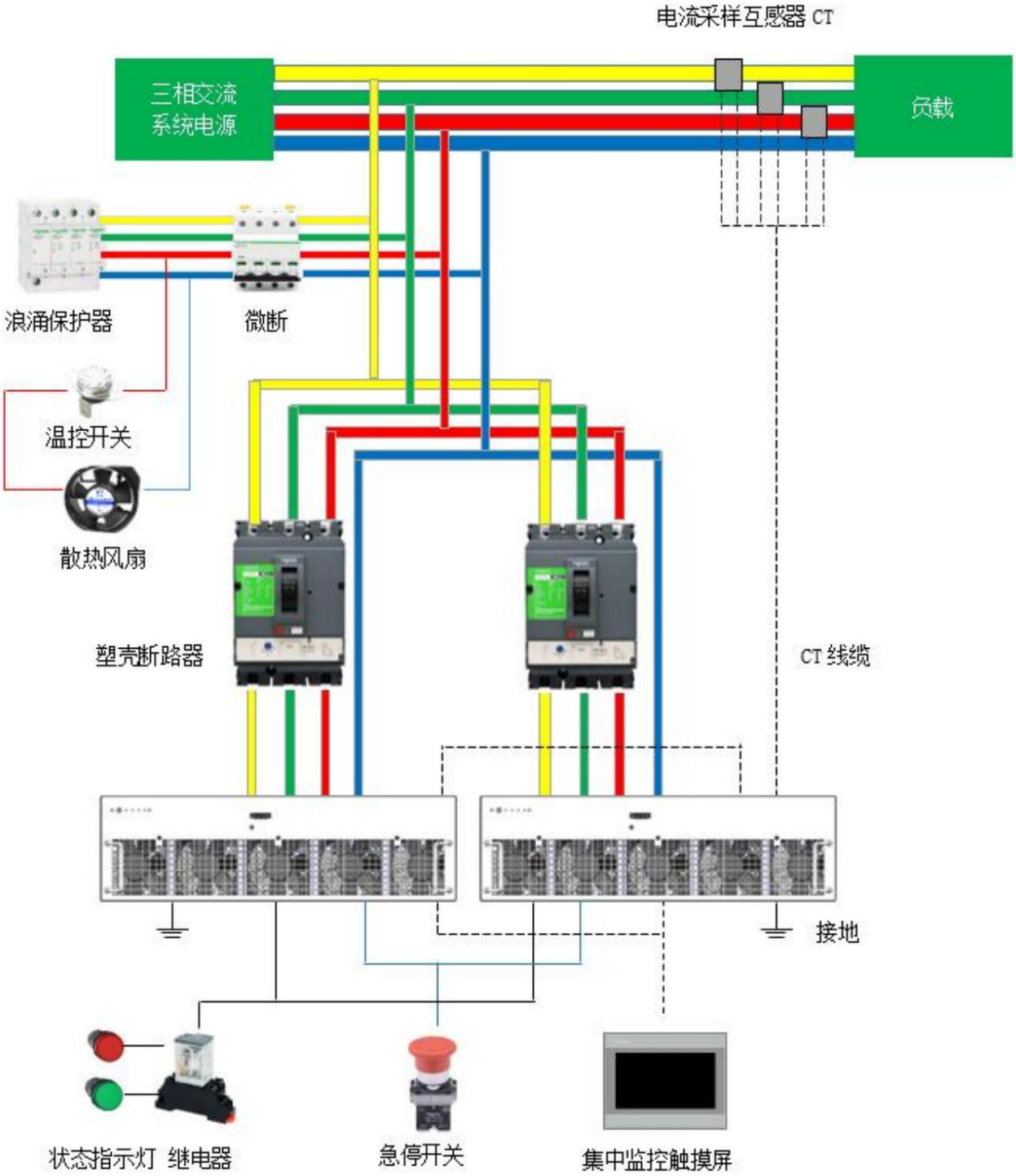


Figure 4-2 ANAPF multi-module system parallel connection diagram

Note: 1) The system connection diagram is only used as a reference for the connection of the main components in normal situations. Some projects may be slightly different depending on the project situation; 2) Wall-mounted module

The connection is basically the same as the rack-mounted module system, except that the installation method is different; 3) The location of the current sampling transformer is different, and the secondary wiring of the current transformer is different.

The secondary wiring in the system connection diagram is just a simple indication. For detailed wiring, refer to the product

Engineering drawings of products.

4.2 System composition and accessories selection

Parts Name	Installation location	Functional Description	Selection suggestions
 Molded case circuit breaker (Must be installed)	ÿ Module power input terminal ÿ Rack-mount module disconnection The device is installed in the cabinet ÿ Circuit breaker of wall-mounted module The device is installed in the wall-mounted module Installed in the distribution box	ÿ Control module on and off ÿ It also has overload, short circuit and Undervoltage protection function can protect The circuits and modules are not damaged.	ÿ Generally, one module can be configured with one plastic Shell circuit breaker, can also be configured in multiple modules A large molded case circuit breaker ÿ Recommended rated current of molded case circuit breakers According to the module rated current 1.25~1.5 Double to choose ÿ Pole number 3P/4P, thermal magnetic tripping ÿ Breaking capacity 35KA and above
 Surge protector (Optional installation)	ÿ The power input terminal of the module, Upper port of molded case circuit breaker ÿ Install in a cabinet or Inside the electrical box	ÿ Provide installation for cabinets and modules Full protection. When a peak current or voltage occurs, Surge protector can Inter-circuit conduction shunt, thus avoiding Overvoltage to other parts of the electrical circuit Cause damage to the equipment.	ÿ Number of poles: 3P+N ÿ Maximum discharge current Imax 40kA and above
 Micro-break (Optional installation)	ÿ Surge protector input terminal. ÿ Install in a cabinet or Inside the electrical box.	ÿ Install air before the surge protector The function of opening is mostly as a surge protector. The internal components of the protector have a continuous short circuit. When the circuit fails, avoid burning Fire accidents;	ÿ Rated current 20A and above ÿ Number of poles: 4P
 Centralized monitoring touch screen (Optional installation)	ÿ Cabinet installation, can be installed Installed on the cabinet door ÿ Wall-mounted installation, can be installed Installed on the door of the distribution box ÿ Communication connected to the module com1 port	ÿ Centralized monitoring, more convenient to check View and set parameters.	ÿ Our company's supporting
 Emergency stop switch (Optional installation)	ÿ Install on the cabinet door or On the door of the distribution box. ÿ Connect to the module's EPO, epo port.	ÿ When a fault occurs in the cabinet or module In case of abnormal situation (smoke, abnormal noise, Fire) can immediately press the emergency stop button Off, stop the module from working. Effective protection module.	ÿ Button release type ÿ Operating part diameter 40mm

 Temperature switch (Optional installation)	ÿ Installed in the terminal block inside the cabinet ÿ Connect to the fan power supply Entrance	ÿ Turn the fan power on and off	ÿ Withstand voltage 250V ÿ Overload current 10A ÿ Normally open, closed when over 35ÿ
 fan (Must be installed)	ÿ Install on the cabinet door	ÿ When the number of modules is ÿ2, it is recommended Install 2 fans. ÿ When the number of modules is greater than 2, it is recommended Install 4 fans.	ÿ AC220V 50HZ ÿ 87W and above ÿ Air volume 850CFM ÿ Running direction counterclockwise ÿ Recommended size: 254*254*89
 Relay Relay (Optional installation)	ÿ Installed in the cabinet ÿ Connect to the module's CAP and cap	ÿ Control status indicator, display Module running/stopping, normal/fault Fault status	ÿ AC230V (AC250V/5A) ÿ 8 pins, 2 normally open and 2 normally closed
 Indicator Lights (Optional installation)	ÿ Install on the cabinet door ÿ Connect to the normally open terminal of the relay Normally closed contact circuit.	ÿ Display module running/stop, Normal/fault status	ÿ AC220V ÿ Red and green ÿ Twist head diameter 22mm
 Current transformer (Must be installed)	ÿ Installed in the main power distribution system On the busbar.	ÿ Detect the load of the power distribution system Electric current.	ÿ Transformation ratio must be /5, 100/5-10000/5 Choose at will ÿ Accuracy 0.5 or above ÿ Rated load 2.5VA or above
Other accessories			
 Distribution box (wall mounted)	ÿ Wall-mounted modules are installed on When mounted on a wall, Add a distribution box at the input end	ÿ Install accessories such as circuit breakers.	ÿ Reference size (W*H*D) 300*400*200 (1 module) 400*500*200 (2 modules) 500*600*200 (3~4 modules) 600*800*200 (5~6 modules)

4.3 Cable and copper busbar selection

(1) Primary cable selection

ÿ The selection of APF filter incoming cables with different capacities and current levels should comply with relevant electrical regulations and take environmental conditions into consideration.

The following table can be used as a reference:

Device rated current 30A		50A, 75A	100A	150A	200A
ABC three-phase cable 16mm²		25mm²	35 mm²	50mm²	95 mm²
N wire size 25 mm²		50mm²	50mm²*2 50mm²*2	95 mm²*2	

Note: APF is rated in current, SVG is rated in kvar, the conversion relationship is 1kvarÿ1.5A. If it is an aluminum cable, it corresponds to the corresponding copper wire load

Flow specifications.

ÿ Cables are usually made of BVR multi-strand copper core PVC insulated flexible wires.

ÿ If the current is relatively large, two double-ended wires can be used according to the situation;

ÿ Neutral line (N line): Generally, it can be selected to be the same as the phase line. Because some projects have third harmonics, the harmonic current will generate overlapping on the N line.

The current reaches 3 times of the phase line, so the N line specification must be one specification larger than the phase line. The N line terminal of 100A, 150A, 100kvar module

There are 2, and 2 N wires must be connected.

ÿ Grounding cable (PE wire): yellow-green BVR multi-strand copper core soft wire; when the AC phase wire diameter S<16mm², the wire diameter should be the same as the phase wire;

Phase line diameter 16 ÿ S ÿ 35 mm², the protective ground line diameter is 16 mm²; Phase line S> 35 mm², half of the phase line diameter is used as the protective ground

The diameter of the wire.

(2) Other cable selections

name	Specification
Surge protector primary cable	6mm² BVR multi-strand copper core soft wire
Fan loop cable	1.5mm² BVR multi-strand copper core soft wire
Emergency stop switch loop cable	
Indicator light loop cable	
Ground cable	Yellow-green BVR multi-strand copper core soft wire; Recommendation for selecting protective grounding PE wire: When the AC phase wire diameter S is less than 16mm², select The wire diameter is the same as the phase wire; the phase wire diameter is 16ÿSÿ35mm², the protective ground wire The wire diameter is 16mm²; if the phase wire S>35mm², half of the phase wire diameter is used. The diameter of the protective ground wire.
CT current transformer sampling signal line	CT cable uses 2.5mm2 shielded twisted pair RVSP2×2.5 (line length L<15m), or use 4mm2 shielded twisted pair RVSP2×4 (line length 15m<L<30m).
Touch screen communication line	2.5mm² BVR multi-strand copper core soft wire (provided by our company)

(3) Copper busbar selection

Device rated current	150A or less	150A~300A	300A~600A	600A~900A
Copper busbar specifications	15*3	30*4	50*5	60*8

Note: The main related accessories of the APF/SVG system are as described in the table above, which can be used for reference. However, it does not mean that all projects are exactly the same.

In some special or different cases, reasonable adjustments can be made according to the circumstances.

5 Installation and wiring

5.1 Installation Notes

5.1.1 Installation Environment

Installation environment requirements	
Notice warn	ÿ Ambient temperature: The ambient temperature has a great impact on the life of the APF filter equipment. The operating environment temperature exceeds the allowable temperature range (-10ÿ~45ÿ). If the temperature is lower than -10ÿ, you need to increase Add appropriate heating equipment; if the temperature is higher than 45ÿ, add air conditioning or other cooling equipment. ÿ APF is installed on the surface of flame retardant objects, and there should be enough heat dissipation space around the installation. Generates a lot of heat. ÿ Please install it in a place where it is not easy to vibrate. The vibration should not be greater than 0.6G. Pay special attention to keep it away from punching machines and other equipment. ÿ Avoid installing in places that are exposed to direct sunlight, humidity, or water droplets. ÿ Avoid installing in places where there are corrosive, flammable, or explosive gases in the air. ÿ Avoid installing in places with oil, dust, etc. ÿ When the drawer-type module is installed in a cabinet, the cabinet must meet relevant standards and regulations. ÿ Wall-mounted modules must be installed in places where there are few people moving around, and must be labeled with obvious safety signs. ÿ The wall-mounted installation location must be on a dry wall.

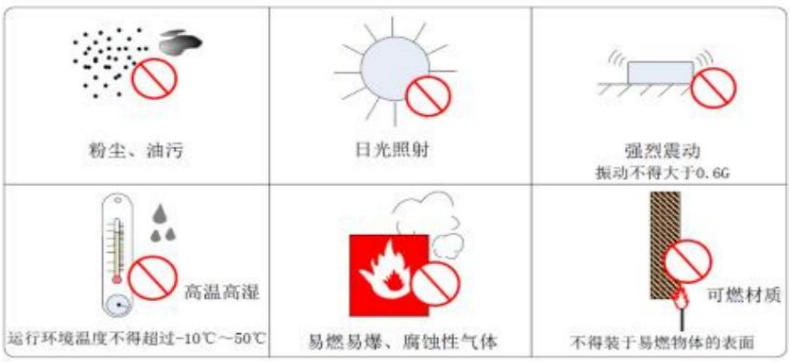


Figure 5-1 Schematic diagram of installation environment requirements

5.1.2 Installation space and direction

(1) Installation space

When installing the APF filter equipment, ensure space for the air inlet and outlet.

Installation space requirements

Notice warn	ÿ It is strictly forbidden to block the module air outlet ÿ For vertical cabinet installation, at the front and rear exits of the cabinet, at least 600 mm of air inlet and outlet space and the rear Maintain the space and ensure that the cabinet rear door can be opened and closed normally. ÿ For wall-mounted installation, at least 150 mm of air inlet and outlet space must be reserved at the upper and lower outlets of the module. ÿ The distance between the wall-mounted installation location and the ground should be more than 1.5 meters, and a warning of electric shock hazard should be posted in a conspicuous place. 's logo.

ÿ Cabinet installation space requirements

When installed in a cabinet, the module takes in air from the front and exhausts it to the back. Heat is dissipated from the front to the back.

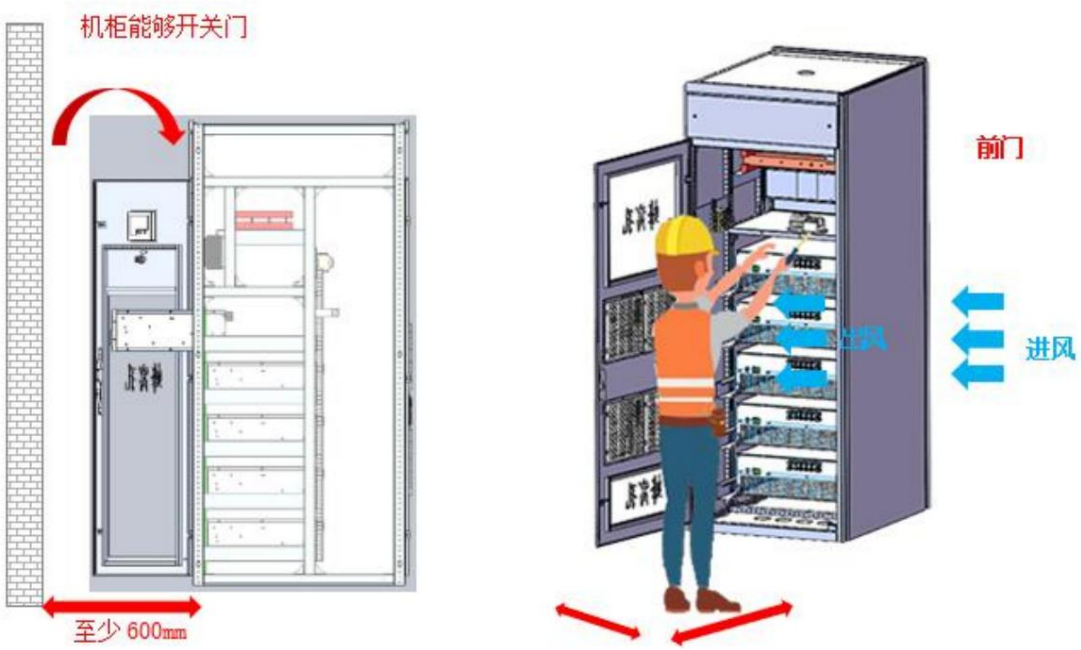


Figure 5-2 Schematic diagram of space requirements for vertical cabinet installation

ÿ Wall-mount installation space requirements

When mounted on a wall, the module takes in air from the bottom and exhausts air upwards, so heat is dissipated from the bottom to the top.

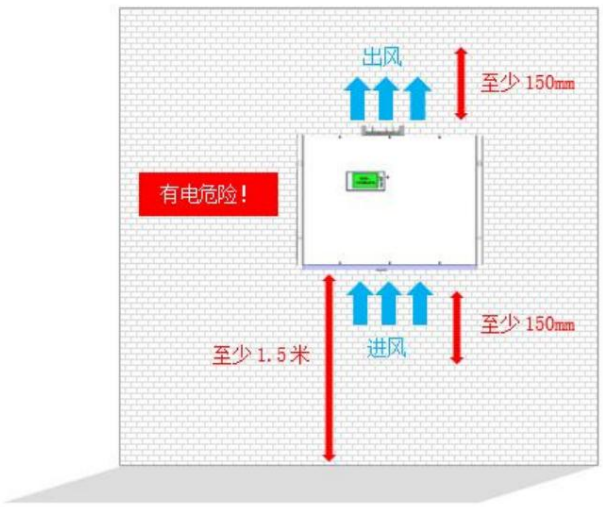


Figure 5-3 Schematic diagram of space requirements for vertical cabinet installation

(2) Installation direction

Please install the device horizontally and avoid installing it sideways, upside down, or tilted.

The same is true, try to install it vertically on the wall, do not hang it sideways or upside down.

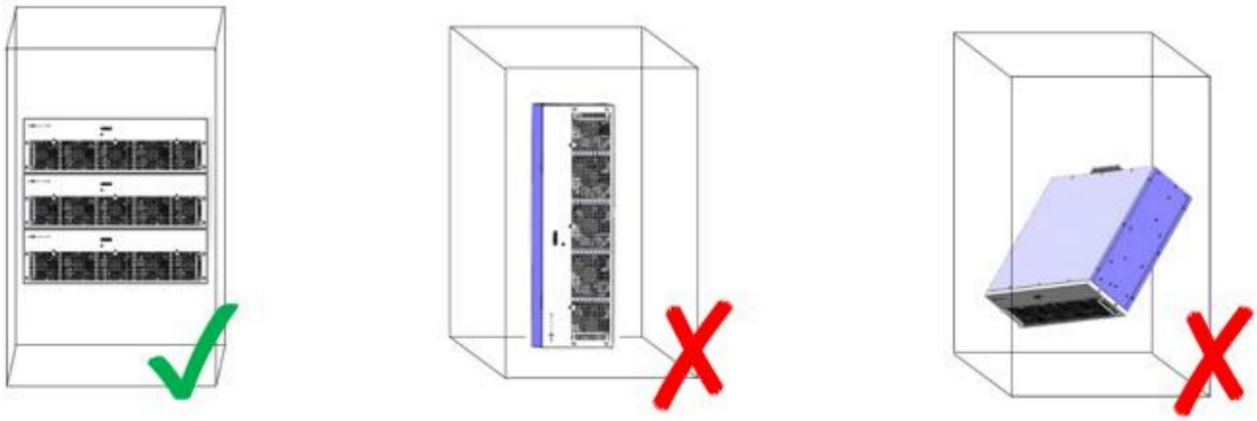


Figure 5-4 Module installation direction diagram

5.2 Installation Instructions

5.2.1 Cabinet Installation

(1) Cabinet structure

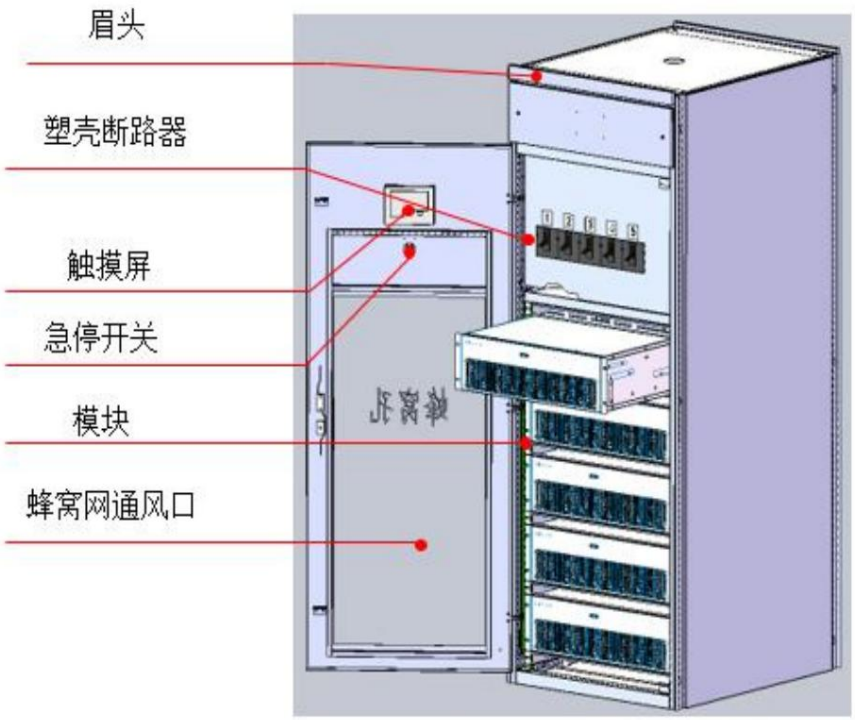


Figure 5-5 Schematic diagram of the entire cabinet (front)

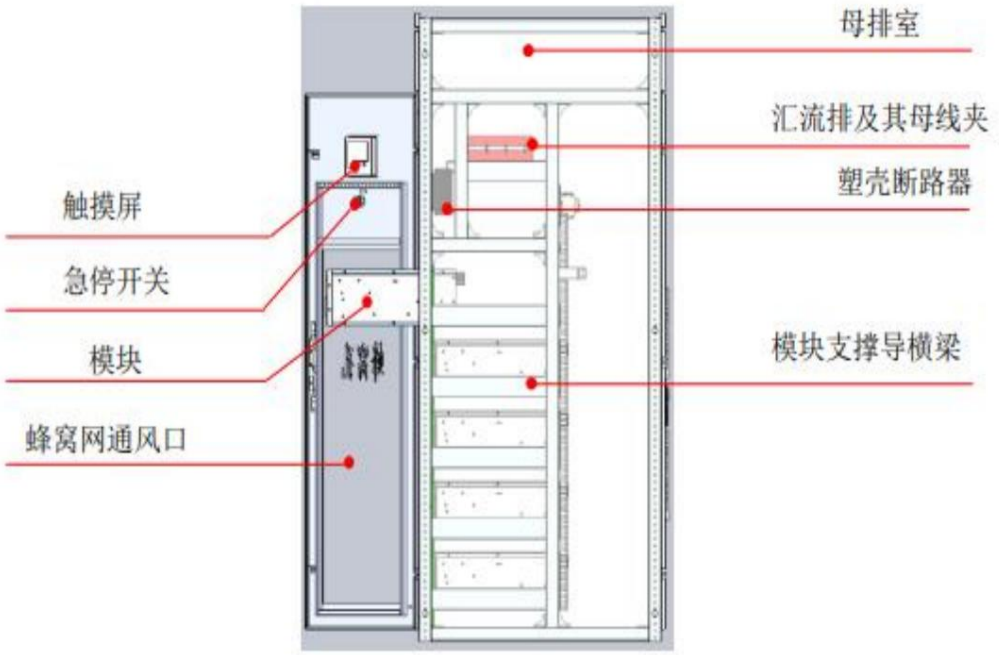


Figure 5-6 Schematic diagram of the entire cabinet (side view)

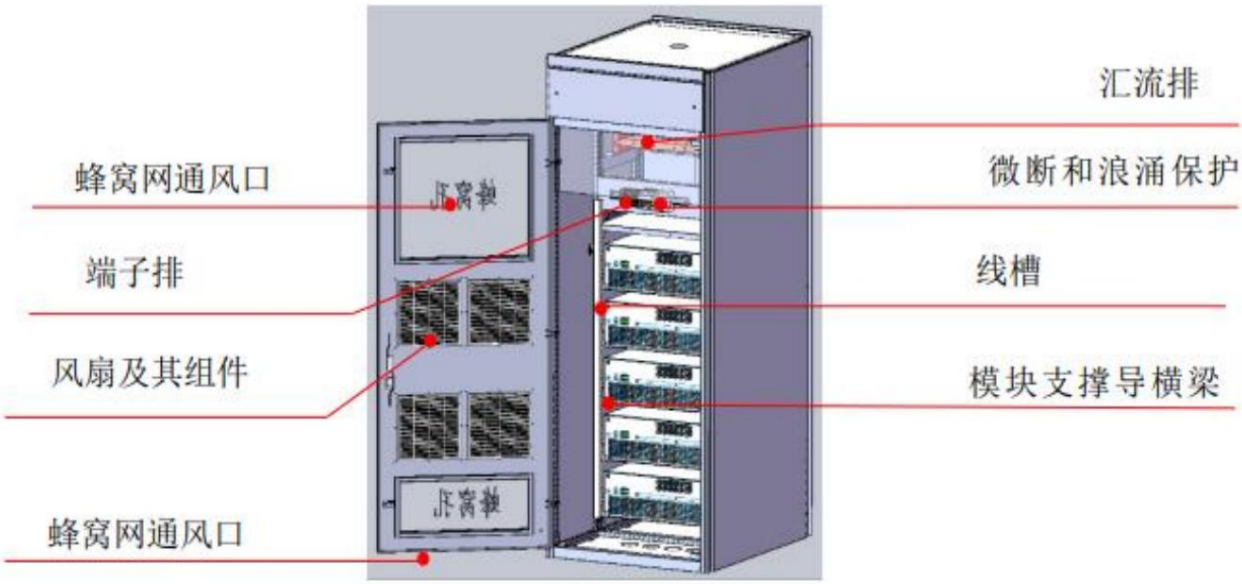


Figure 5-7 Schematic diagram of the entire cabinet (back side)

The equipment is divided into three parts from top to bottom:

Busbar room, the main busbar passes through the busbar room and penetrates the filter cabinet;

Circuit breaker room, multiple modules can be connected to the main busbar through circuit breakers; each module can also be assigned a circuit breaker separately, and multiple circuit breakers can be connected to the main busbar through the busbar.

The flow bar is connected to the main busbar;

Module room: A single cabinet can hold up to 5 drawer-type modules. The front and rear door panels of the module room should have honeycomb holes for ventilation and heat dissipation. The air duct should be inlet from the front.

Rear air outlet.

A touch screen is installed on the cabinet door to facilitate setting parameters of each module and display module operation data.

When the number of modules in the cabinet is ÿ2, it is recommended to install 2 fans on the rear door; when the number of modules is >2, it is recommended to install 4 fans.

Note: As described in Chapter 4 System Connection, some accessories in the cabinet are required, and some accessories are optional.

The cabinet structure and accessories here are designed by our company's structural engineers and electrical engineers, and only consider the general project situation.

Some components are not installed, such as the cabinet door installation status indicator light, cabinet door installation current meter,

etc. (2) Module installation and fixation

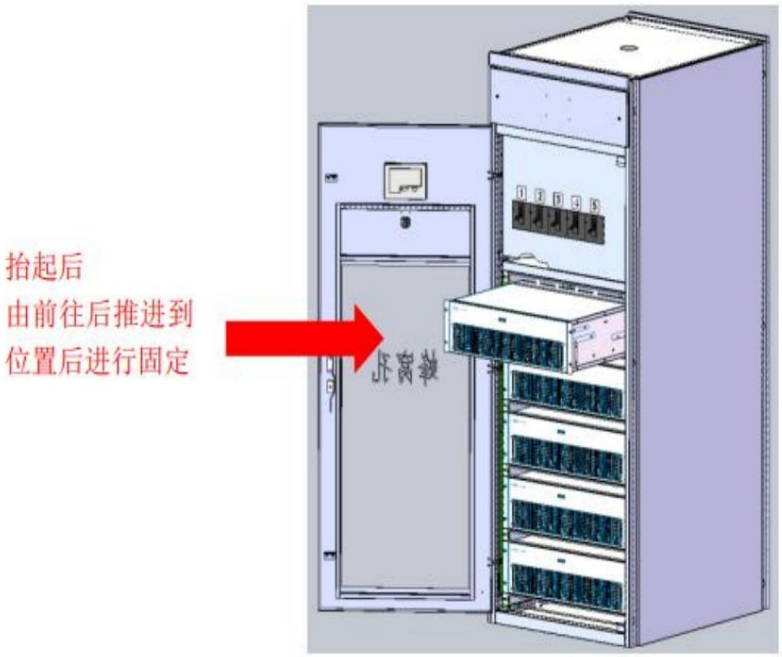


Figure 5-8 Module installation diagram

Notice	ÿ The weight of a 480mm wide module is 27kg, and the weight of a 680mm wide module is 44kg. The installation must be completed with specified transport equipment and at least 2 persons are required to lift and install. ÿ Please place the module gently during installation and be careful not to bump the module, especially the touch screen on the front panel of the module. Any damage caused by the product is not within the scope of the company's responsibility and warranty.

When the module is installed in the cabinet, our company will provide two mounting ears as standard for each module to fix the front end of the module to the cabinet.

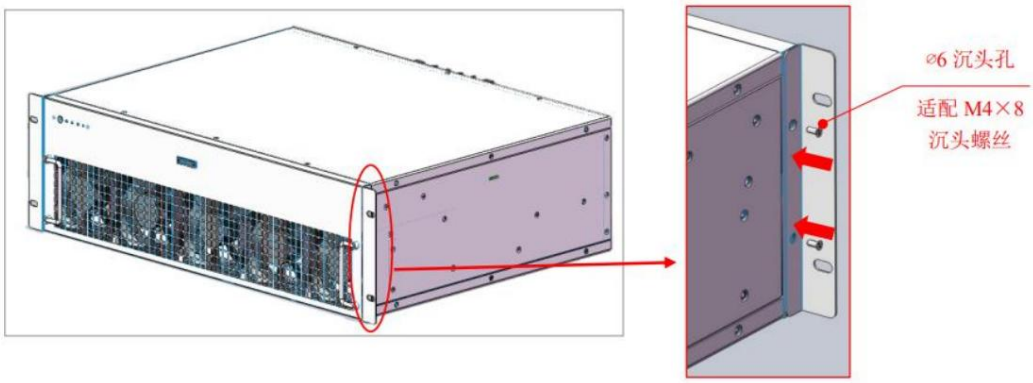
Two guide beams are installed on the left and right sides to fix the supporting module. The rear side of the module needs to be fixed, as shown in Figure 5-10, where the module is fixed with the guide beam.

(The mounting lugs are provided by our company, but the guide rails and crossbeams are not provided by our company. We recommend that they be provided during the production of the cabinet sheet metal.)

Note: 1) The fixing and installation method of the above modules is designed by our structural engineers. It is easy to install, meets the requirements of mechanical strength, and is easy to operate.

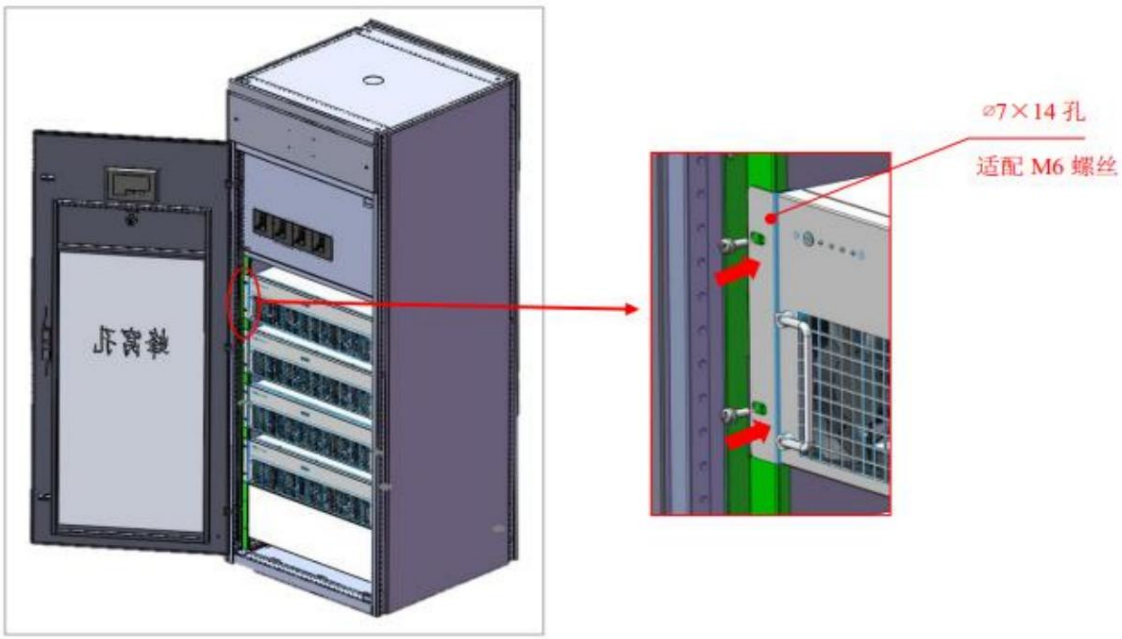
1) It is easy to disassemble and maintain; 2) If the customer has other installation and fixing methods, it is also acceptable as long as the mechanical strength and heat dissipation conditions of the module installation space are guaranteed.

ÿ Schematic diagram of mounting ear fixation (mounting ear is provided by our company)



Note: The module comes with M4×8 screws, and there are 4 more in the packaging bag.

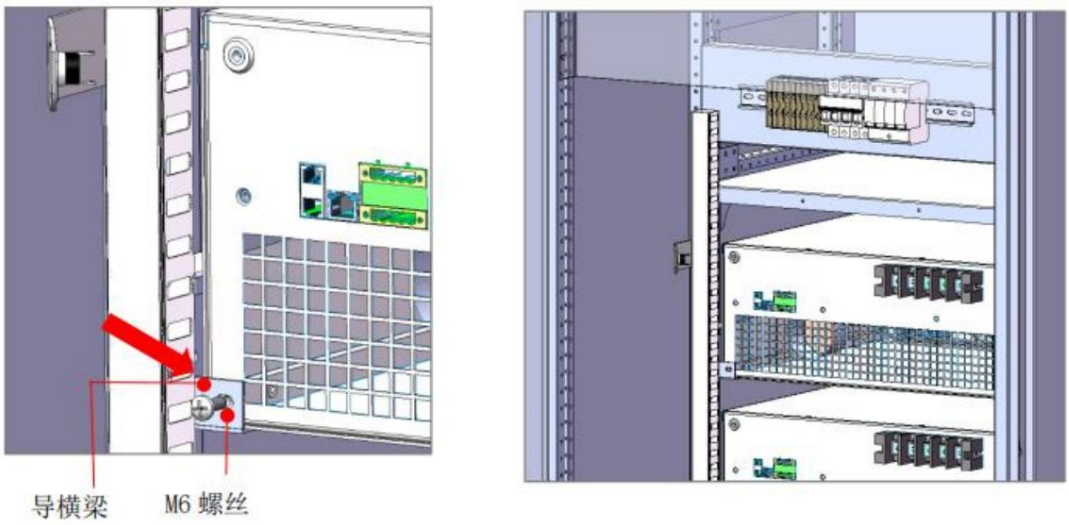
ÿ Install the mounting ears and fix them to the cabinet



Note: You need to prepare the M6 screws yourself.

Figure 5-9 Installing the mounting ears

ÿGuide rail beam (mounting lugs are provided by our company)



Note: Our company does not provide related installation accessories.

Figure 5-10 Schematic diagram of module installation and fixation

(3) Installation of centralized monitoring touch screen

When installing a cabinet, a 7-inch external centralized touch screen can be installed on the cabinet door to centrally monitor all modules in the cabinet. The touch screen is equipped with installation parts

In addition, the touch screen is equipped with a DB9 to RJ11 port adapter module and a power port terminal. After the touch screen is connected to the module, the module

The module supplies 24V power to the touch screen through the communication line, without the need for an external power supply.

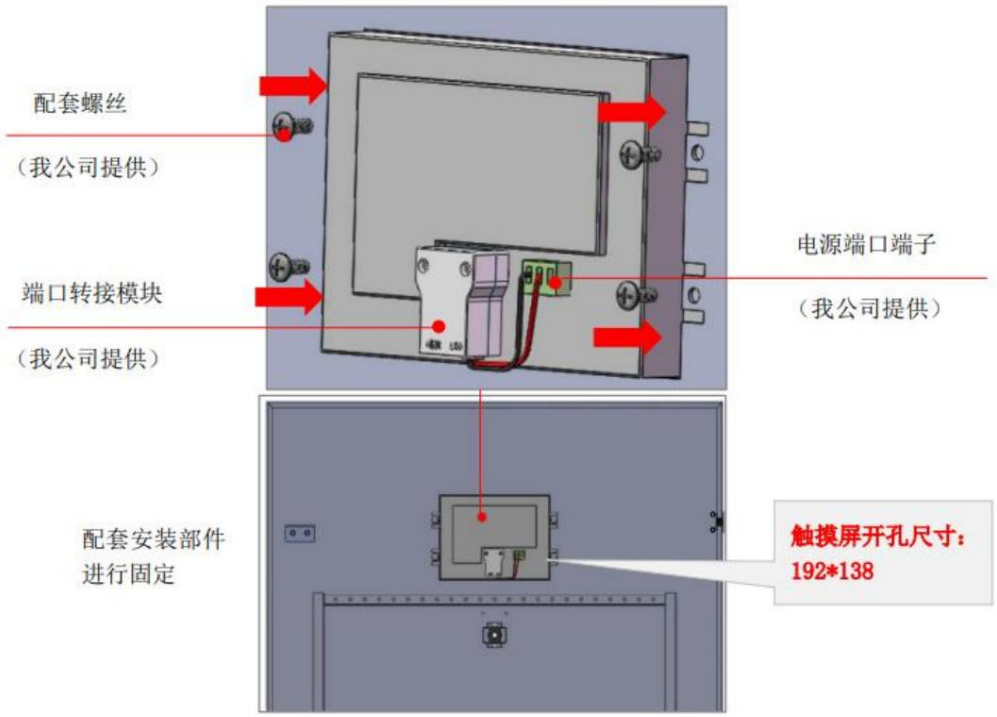


Figure 5-11 Touch screen installation diagram

5.2.2 Wall-mounted installation

Wall-mounted modules are usually mounted on a wall or in a small cabinet. They are equipped with a pair of mounting ears as standard, as shown in the figure.

Drill a ÿ10 hole in the wall and fix it with M8 expansion screws.

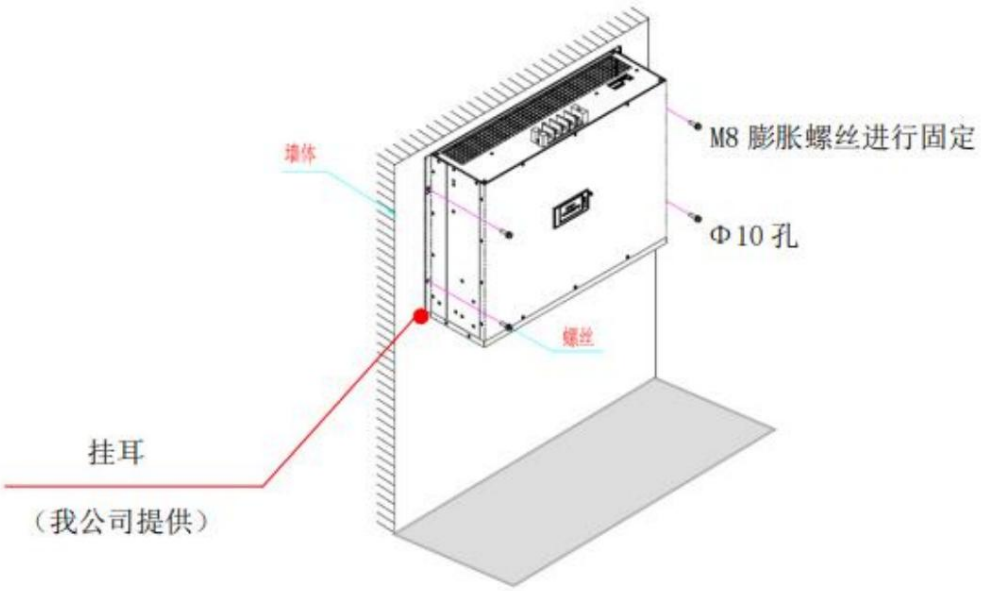


Figure 5-12 Schematic diagram of wall-mounted module installation (I)

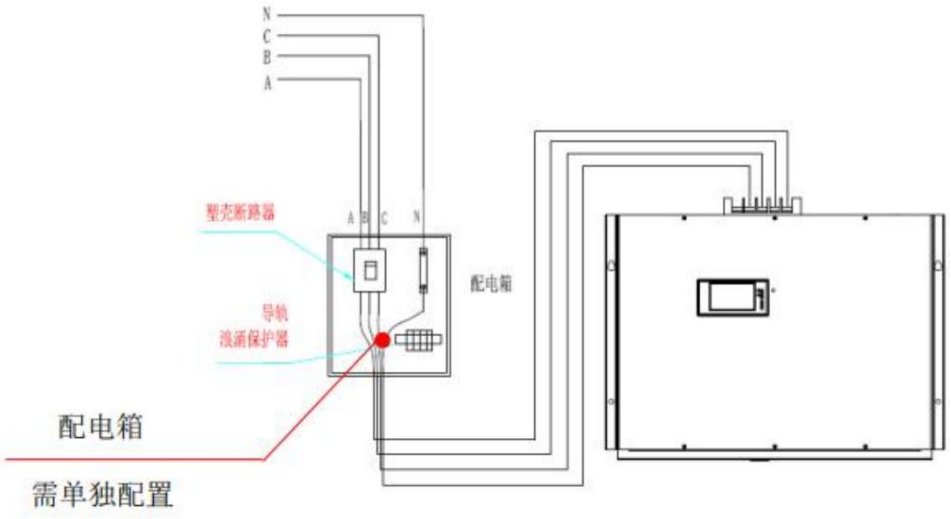


Figure 5-13 Schematic diagram of wall-mounted module installation (II)

Note: 1) When wall-mounted, it cannot be directly connected to the power distribution system. A molded case circuit breaker is required to switch the power supply of the module, and surge protection is also required.

Therefore, it is recommended to install a small distribution box to install the molded case circuit breaker and surge protector; 2) The selection reference of the distribution box is as follows:

 Distribution box (wall mounted)	**Reference size (W*H*D) mm** 300*400*200 (1 module) 400*500*200 (2 modules) 500*600*200 (3~4 modules) 600*800*200 (5~6 modules)

5.3 Wiring

5.3.1 Primary wiring

(1) Wiring diagram

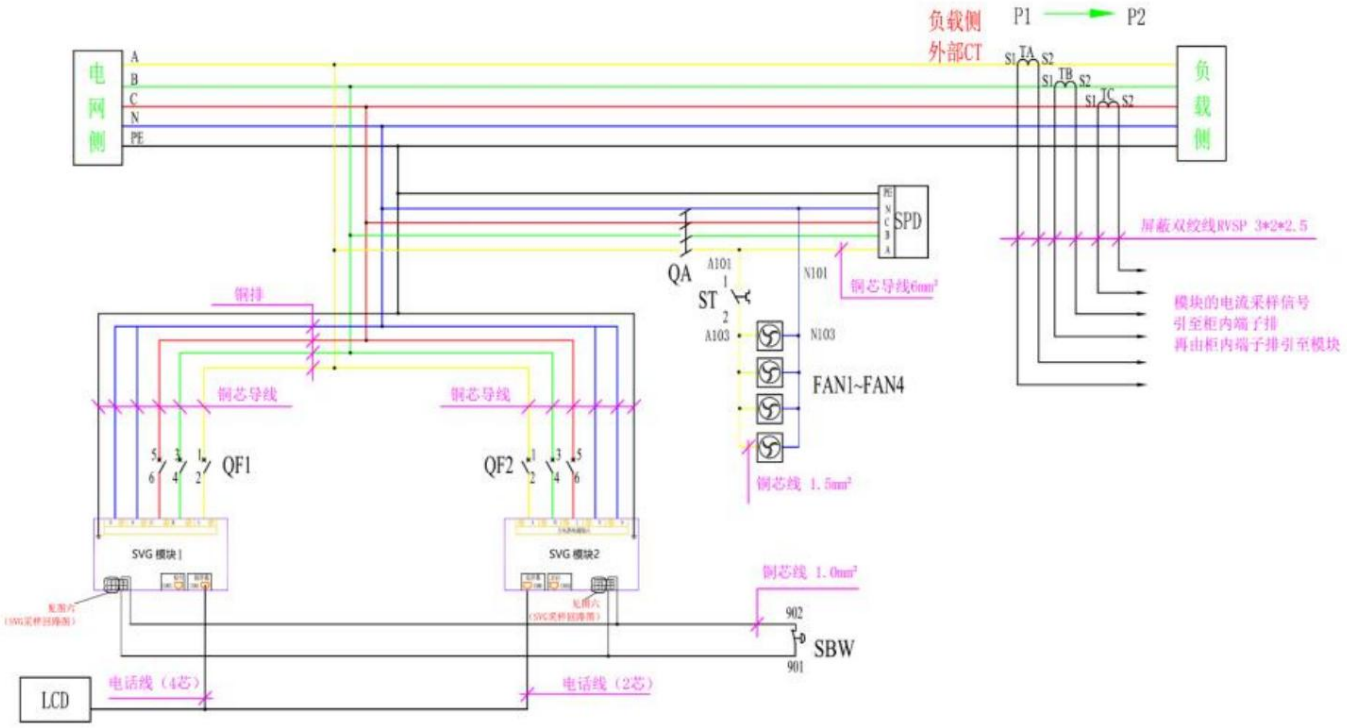


Figure 5-14 Typical wiring diagram for vertical cabinet installation

(2) Primary terminal description

Figure 5-15 Primary terminal diagram

Note: Please select the appropriate primary cable copper nose according to the size of the primary terminal. The width of the copper nose should not exceed the width of the terminal.

5.3.2 Centralized monitoring touch screen wiring

The external centralized touch screen is connected and communicated through the COM1 port on the back of the module. The fixing parts, port transfer module and communication cables are standard accessories.

Plug one end of the communication cable into the module com1 port, and the other end into the port transfer module on the back of the touch screen.

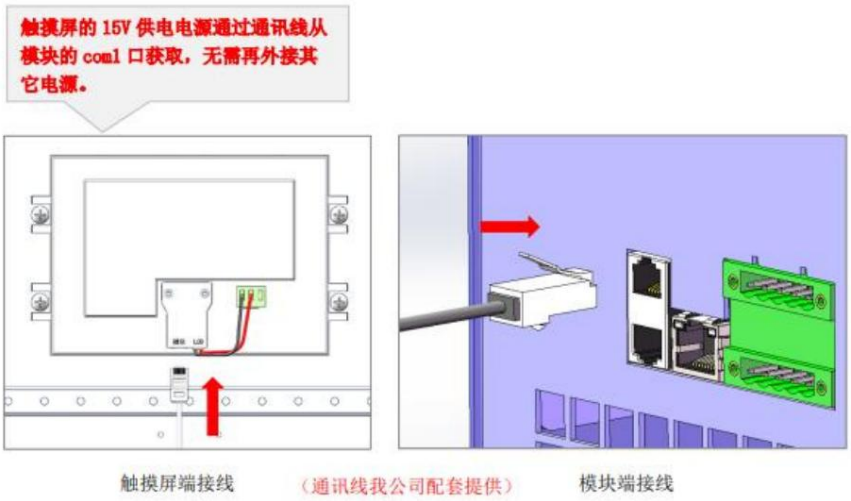


Figure 5-16 Schematic diagram of centralized monitoring touch screen communication line wiring

5.3.3 CT Wiring

(1) CT position and direction

APF is installed in parallel in the system. The current transformer CT can be installed on the grid side or the load side at will. The monitoring touch screen can be set according to the installation situation.

Set the CT position to grid side or load side.

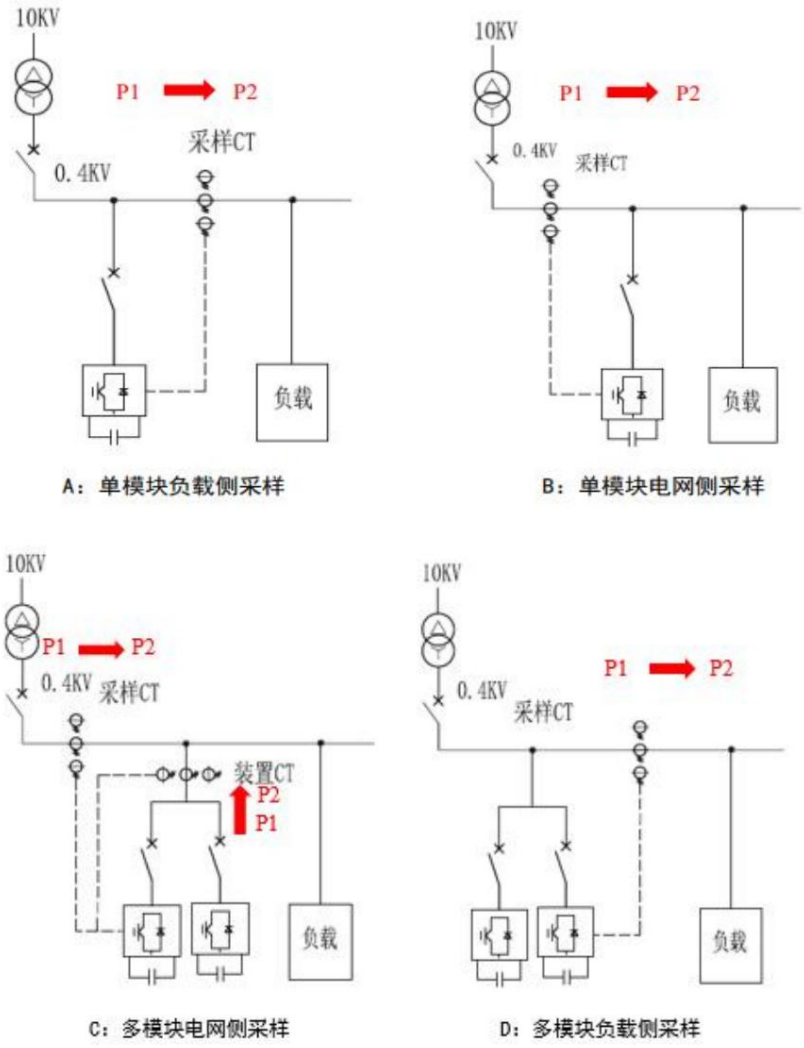


Figure 5-17 CT sampling scheme diagram

ÿ Single module

When a single APF module is connected to the system, the CT can be installed on the grid side or the load side, as shown in Figures A and B.

ÿ Multiple modules

When multiple modules are connected to the system in parallel, the sampling grid side and the sampling load side are different, and the wiring on the sampling load side is more convenient.

Load side sampling: When sampling the load side of multiple modules in parallel, only one set of CT is needed, as shown in Figure D.

Grid-side sampling: When sampling the grid-side of multiple modules in parallel, it is necessary to add a CT device in the APF/SVG cabinet to sample the current output by the module itself.

Then, the load-side current signal is obtained by subtracting the grid CT signal from the device CT signal in anti-parallel connection, and is input into the module as the final sampling signal.

The sampling signals between blocks are connected in series, as shown in Figure C.

CT installation direction

P1 is towards the grid and P2 is towards the load.

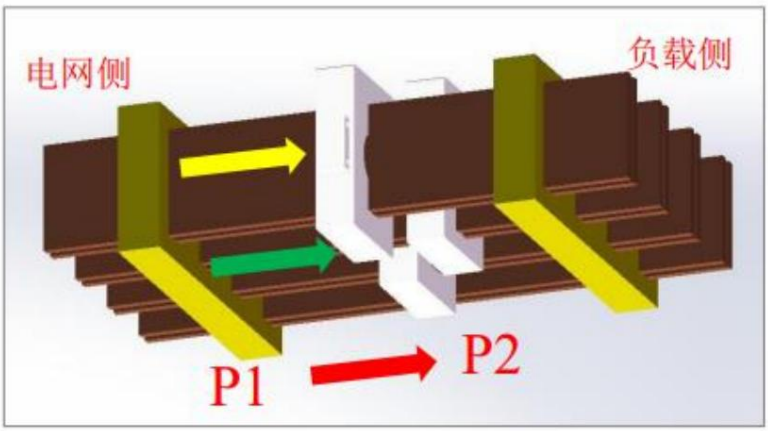


Figure 5-18 Schematic diagram of the direction of current transformer P1 and P2

Note: If the CT current flows from P1 to P2, then S1 is + and S2 is -; otherwise, S1 is - and S2 is +.

(2) CT transformer wiring

Heed the warning	If the current transformer is not connected correctly, an open circuit may cause fatal electric shock! ÿ Refer to the wiring diagram when installing and wiring the sampling CT. If you have any questions, please contact our technical staff in time. ÿ The installation and wiring of APF CT must be carried out by trained and qualified engineers in accordance with the "Electrician's Law". It is forbidden for other personnel to perform installation in violation of regulations. This manual only introduces the basic contents of installation. For specific installation details, please refer to Test the electrical engineering specifications. ÿ Before installing the primary side of the current transformer, short-circuit the secondary side with the separation short-circuit terminal, otherwise the open circuit state The current transformer below will generate high voltage on the secondary side. ÿ Ensure that the current transformer is in short-circuit state until the CT connection terminals of the APF are connected. ÿ Before separating the current transformer from the APF, short-circuit it using the detachable short-circuit terminal.

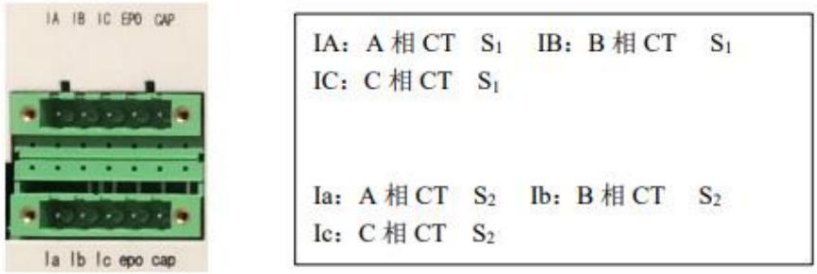


Figure 5-19 Schematic diagram of module secondary terminals and CT cable access

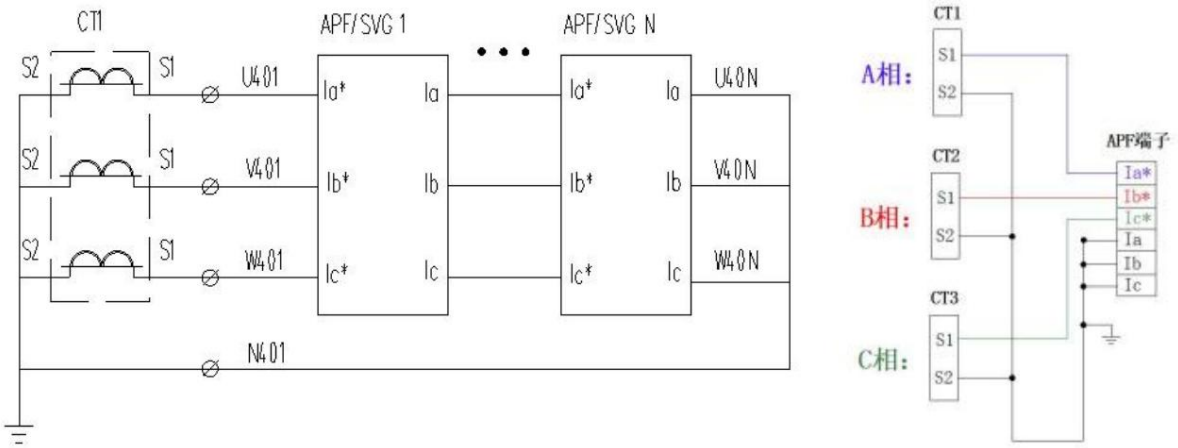


Figure 5-20 Transformer current sampling (single CT on the load side) circuit wiring diagram

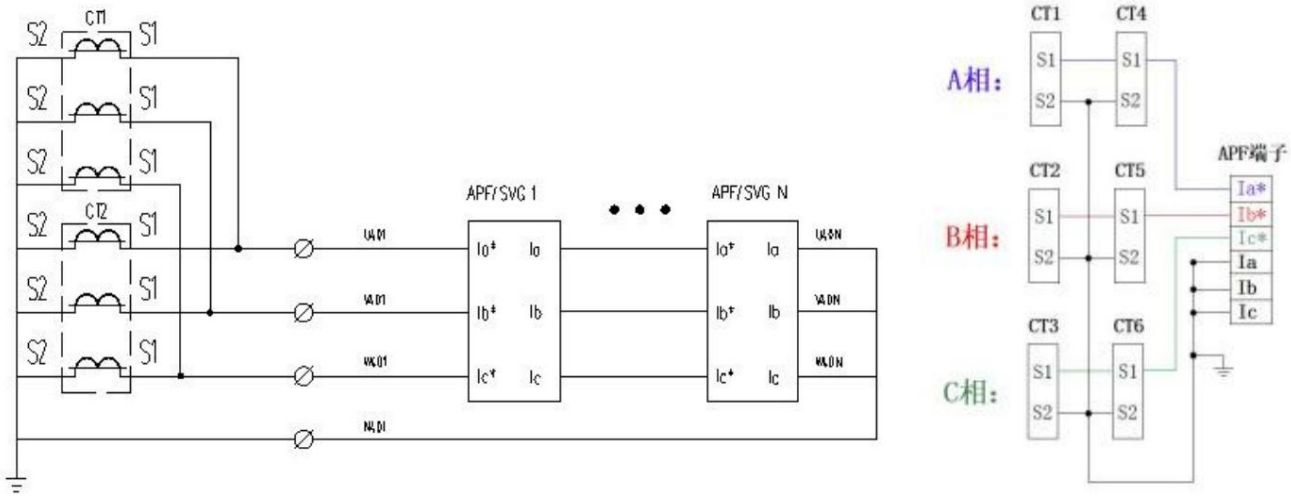


Figure 5-21 Transformer current sampling (double CT on the grid side) circuit wiring diagram

ÿ Load side sampling

When multiple modules are paralleled and sampled on the load side, only one set of transformer device CT is needed to collect the load side current signal and input it into the module as the sampling signal.

The sampling signals between modules are connected in series, as shown in Figure 5-20.

Grid-side sampling

When multiple modules are paralleled and the grid side is sampled, it is necessary to add a CT device in the APF cabinet to sample the module's own output current, and then use the grid CT

The load side current signal is obtained by anti-parallel subtraction of the signal and the device CT signal, and is input into the module as the final sampling signal.

Sample signals are connected in series, as shown in Figure 5-21.

Note: 1) The two sets of transformers are connected in reverse parallel for the dual CT sampling on the grid side: 2) The CT cable should be 2.5mm2 shielded twisted pair RVSP2×2.5 (line length L<15m), or

Use 4mm2 shielded twisted pair cable RVSP2×4 (line length 15m<L<30m).

5.3.4 Emergency stop switch wiring

When installing an APF cabinet, an emergency stop switch is usually installed on the cabinet door.

Fire) can press the emergency stop switch to stop the module immediately and effectively protect the module.

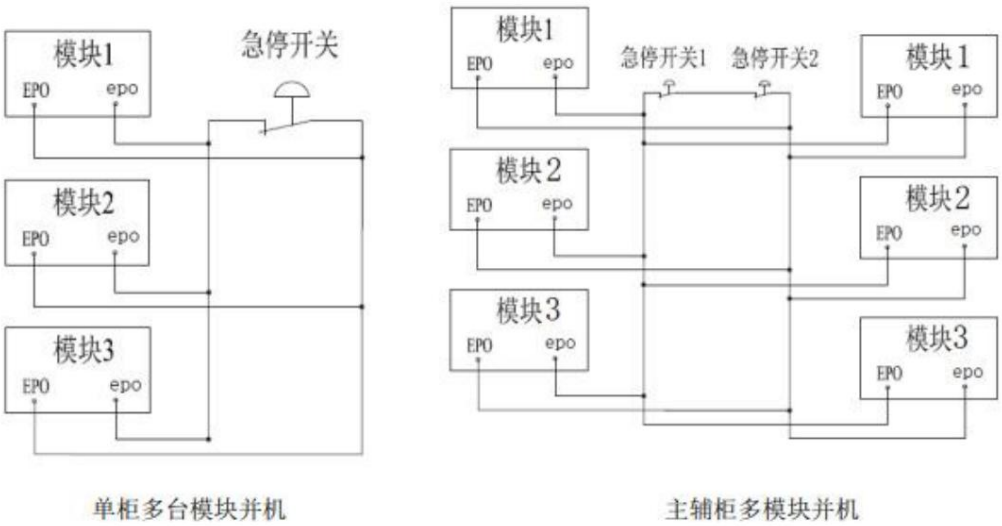


Figure 5-22 Emergency stop switch wiring diagram

ÿ Multi-module parallel operation

The EPO and epo of each module are connected to the emergency stop switch and the normally closed signal.

ÿ Main and auxiliary cabinets

Each main cabinet and auxiliary cabinet is connected with an emergency stop switch. The emergency stop of the main cabinet and the auxiliary cabinet are connected in series, and then connected in parallel with each module.

When the emergency stop switch is turned on, all modules will stop immediately.

Notice	ÿ The emergency stop switch is not mandatory to install. If it is not installed, the EPO and epo ports need to be short-circuited.

5.3.5 Status indicator light wiring

When installing the APF cabinet, a status indicator light can be installed on the cabinet door. The CAP and cap ports of the module are a pair of dry nodes, which can be connected through a 220V relay.

The electrical appliance is connected to the status indicator light. The wiring is shown in Figure 5-23

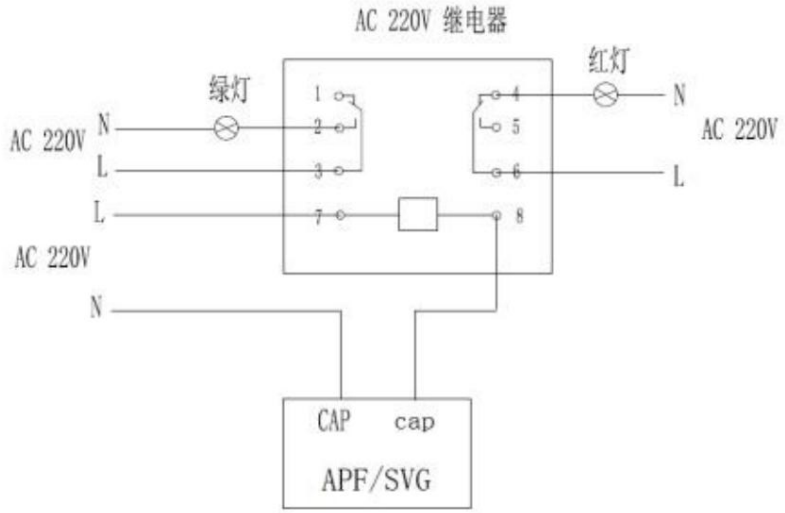


Figure 5-23 Status indicator interface diagram

There are two types of status:

(1) The green light is on when the machine is running and the red light is on when the machine is stopped.

(2) The light is green when normal and red when faulty.

The port can indicate two states, "running/stopping" or "normal/fault", and the port output signal function can be set as needed through the touch screen.

Set.

6 Power On/Off Operation Guide

6.1 Power-on steps

6.1.1 Check the wiring

(1) Check the wiring between the busbar and the circuit breaker, and between the circuit breaker and the equipment to see if there is any obvious phase sequence error. If any problem is found, it should be corrected in time.

(2) Check whether the busbar of the equipment is tightly connected and whether there is any looseness. Make sure the line is tightly connected.

(3) Use a multimeter to check whether there is a short circuit between devices ABCNPE.

(4) Check whether the CT wiring is correct and whether the wiring at both ends of the terminal block corresponds. If not, make sure to correct it.

6.1.2 Checking Communications

(1) After ensuring that there are no problems with the above process, disconnect the emergency stop switch and close the circuit breaker.

(2) Check whether the communication status indicator on the front of the module is lit and flashing normally. If it does not flash or is not lit, it means there is a communication problem.

If the parameters on the touch screen are grayed out, you need to check whether the address DIP switches of each module are set correctly. If they are all set to 1, communication will definitely fail.

The address of the module in the cabinet should be set in the order of 1, 2, 3, and 4 from top to bottom. If there is still a communication problem, contact the factory.

Resolve through communication.

(3) Enter the login permission interface, select a login identity, and enter the password to log in.

(4) Enter the setting interface to set parameters. In this interface, users can set relevant parameters, such as CT ratio, CT position, number of parallel paths,

Compensation mode, turn on the corresponding compensation switch, etc.

6.1.3 Check parameters

(1) When all parameters are entered, click the upper left corner of the touch screen to return to the main page. Click the single channel (if multiple modules are connected in parallel) in the upper right corner of the screen.

(Displayed as multiple channels) Check whether the parameters on this interface are consistent with those entered previously. If not, re-enter until the display is consistent.

(2) Check whether the parameters displayed on the main page are consistent with the actual parameters displayed in the system. If the power factor, active and reactive power are displayed incorrectly (for example

If the power factor is very low, or one or two phases of active or reactive power are negative), there may be a problem with the CT wiring, and you need to contact the manufacturer in time to resolve it.

 warn	ÿ When executing the APF power-on procedure, the APF output terminals will be energized. ÿ If a load is connected to the APF output terminal, please confirm with the user whether it is safe to supply power to the load. If the load is not ready to receive power, it is necessary to safely isolate the load from the APF output terminals.

6.2 Power-on steps

There are two ways to shut down the device. One is to directly disconnect the circuit breaker above the APF, and the device is in a power-off state. The other way is to click the touch screen "Click

"Shutdown", then disconnect the circuit breaker. In the shutdown state, APF blocks the IGBT trigger pulse and the device is in non-compensation mode. It should be noted that APF

Do not disassemble the module immediately after power failure. Wait until the internal capacitor of the module is fully discharged before operation. The discharge time is about 10 minutes.

 warn	ÿ To prevent personal injury, if you want to perform maintenance or open the chassis after shutting down, please use a multimeter first. Measure the voltage at the input terminal to ensure that no mains power is connected before performing related operations! ÿ The module can be disassembled 10 minutes after power failure (the internal energy storage capacitor of the module is discharged for about 10 minutes). bell).

6.3 Automatic Startup

If the system loses power or the voltage or frequency is abnormal, the APF will automatically shut down and stop outputting compensation current. If the following conditions are met, the APF will automatically shut down without any operation.

Automatic restart to compensate.

(1) The city power supply returns to normal;

(2) APF is in the power-on state before power failure;

(3) Automatic start after a delay of 20 seconds.

If APF is not turned on, the user can manually start APF through the touch screen control panel.

7 7-inch large screen operation guide

When the module is placed in a cabinet, an external touch screen can usually be installed on the front door of the cabinet to facilitate users to set and view parameters.

It is divided into a 7-inch large screen and a 4.3-inch small screen. The following is an introduction to the operation of the 7-inch large screen.

7.1 Main Interface

After the device is powered on, the screen is in the startup state, and the startup process lasts for several seconds. After the startup is successful, if the system is normal, the main interface will be displayed as shown in Figure 7-1

Shown

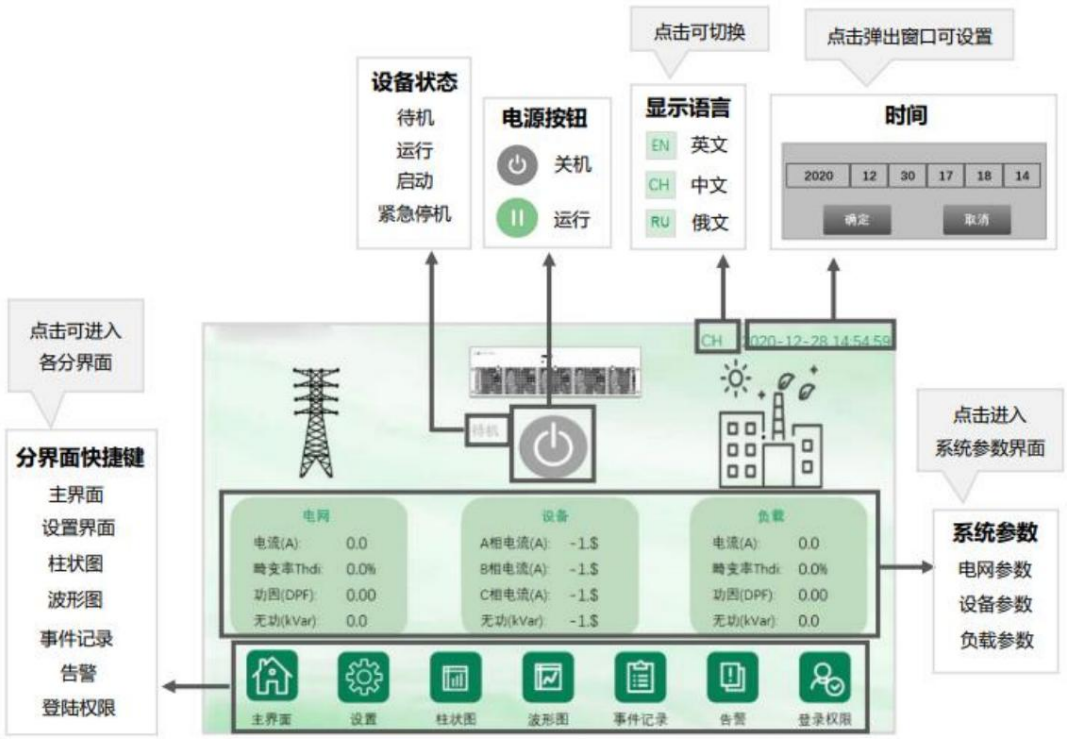
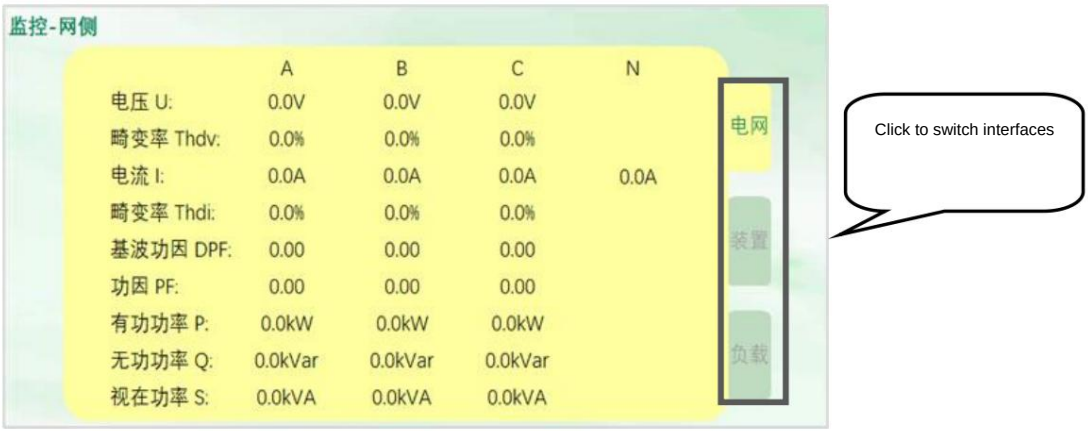


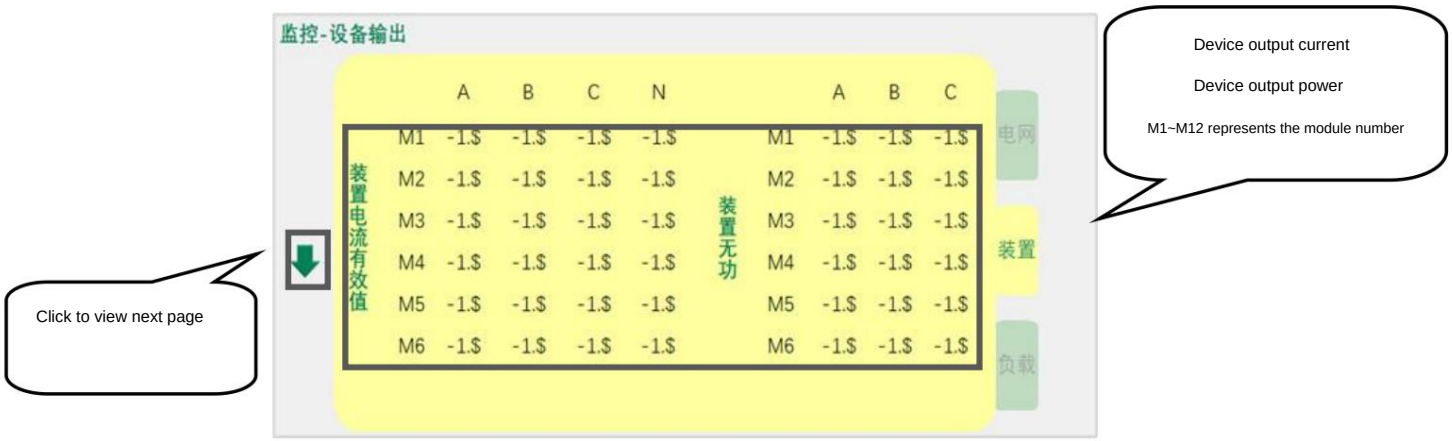
Figure 7-1 Main interface

7.2 System Parameters Interface

Grid side parameters



ÿ Equipment output parameters



ÿ Load side parameters

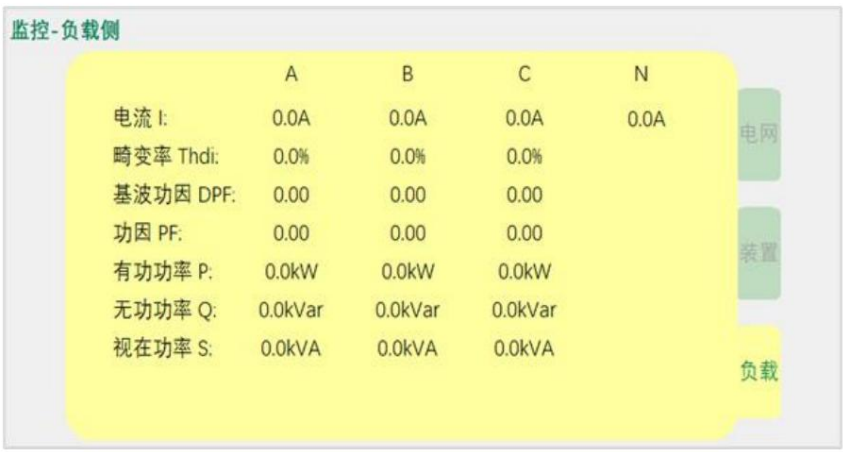


Figure 7-2 System parameter interface

7.3 Login Permission Interface

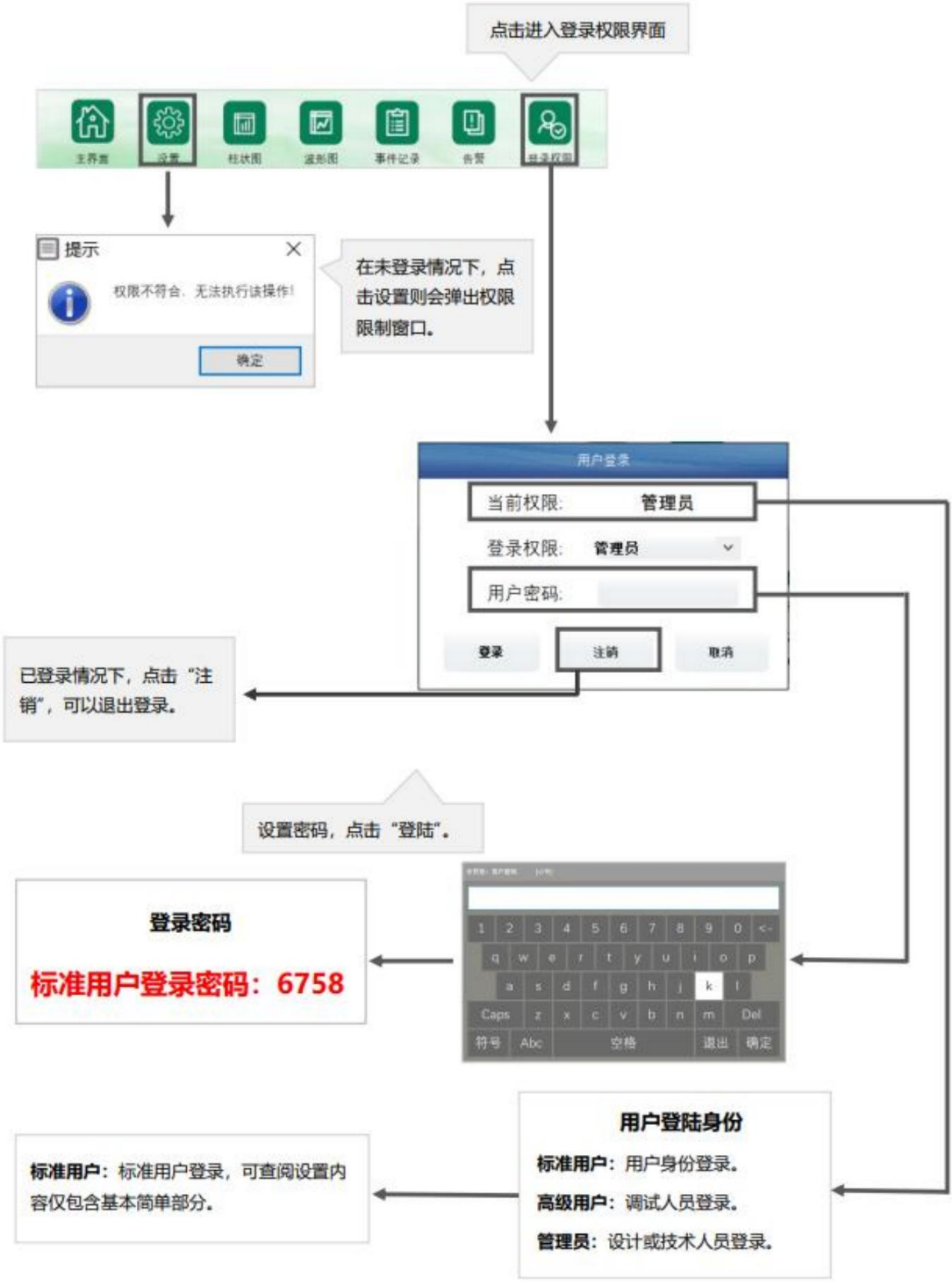


Figure 7-3 Login permission interface

7.4 Settings interface

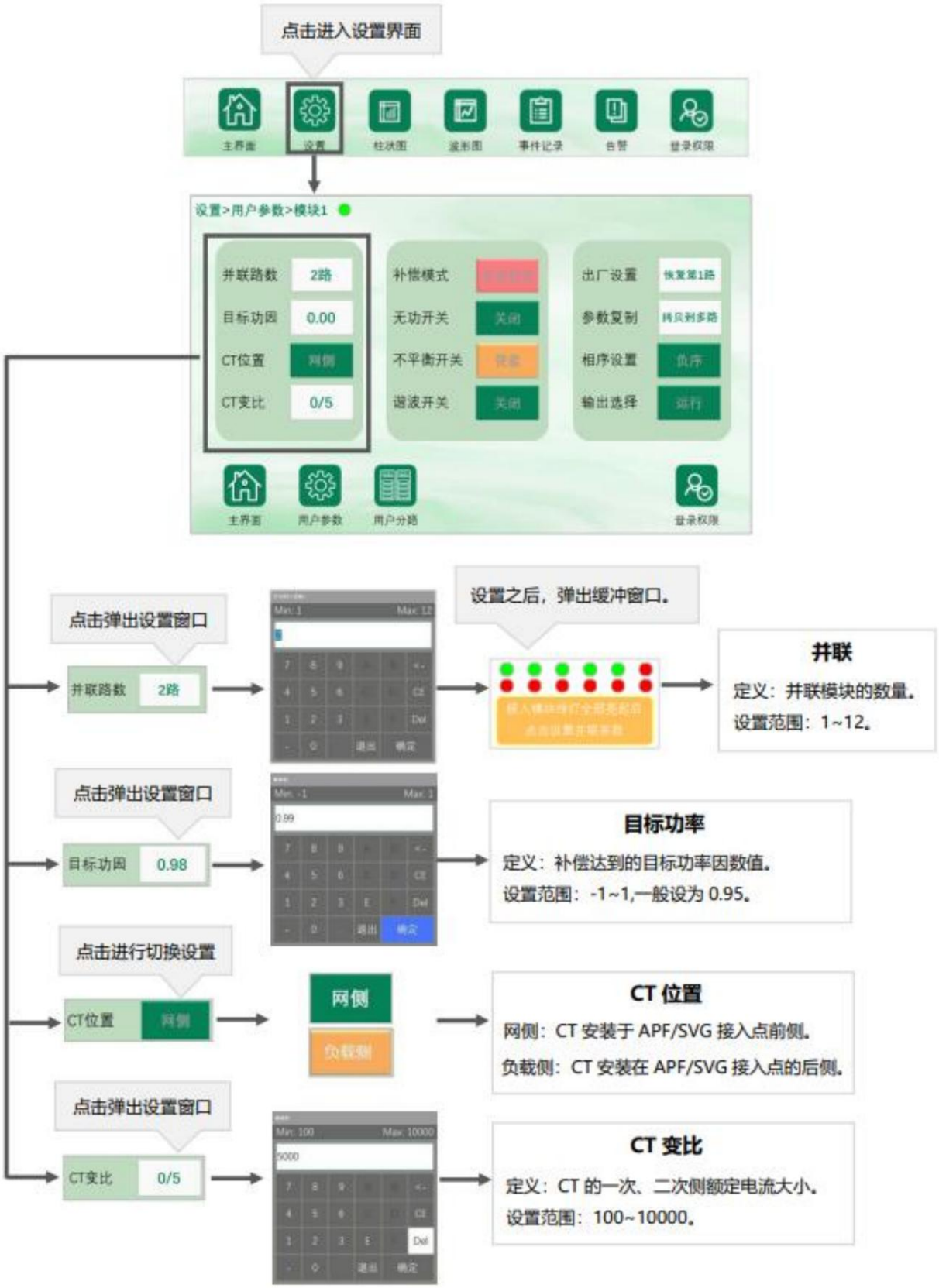


Figure 7-4 User parameter setting interface 1

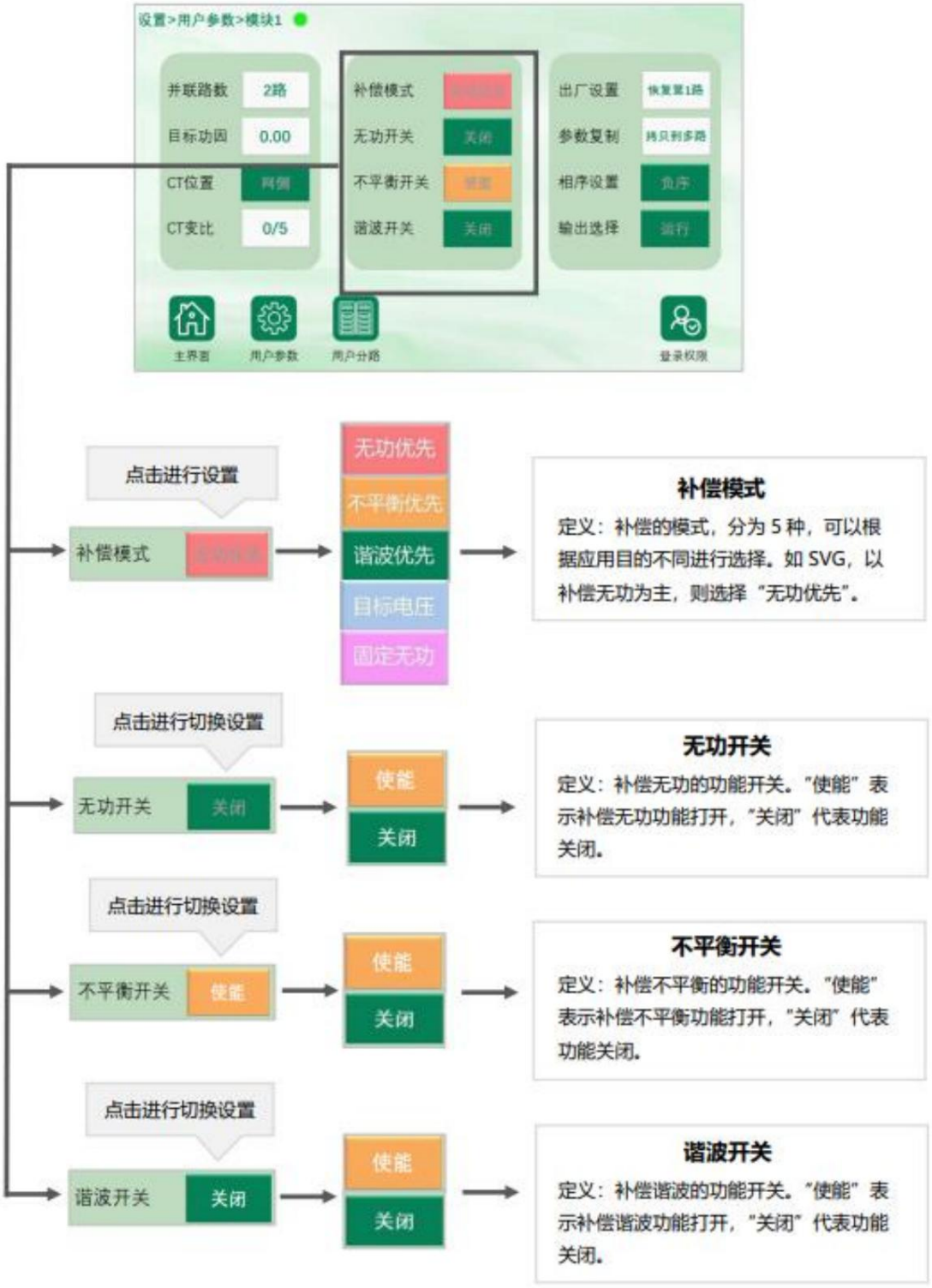


Figure 7-5 User parameter setting interface 2

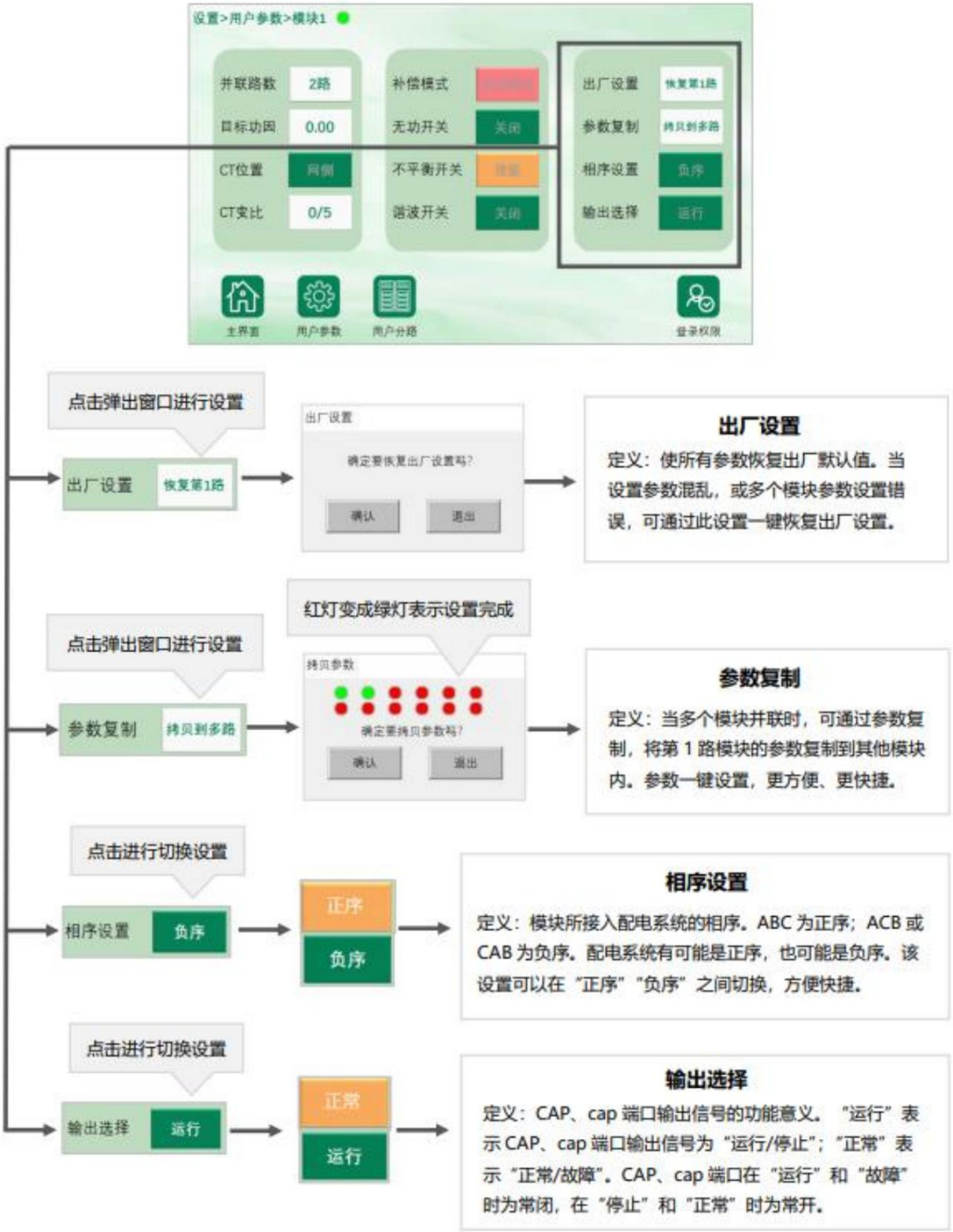


Figure 7-6 User parameter setting interface 3

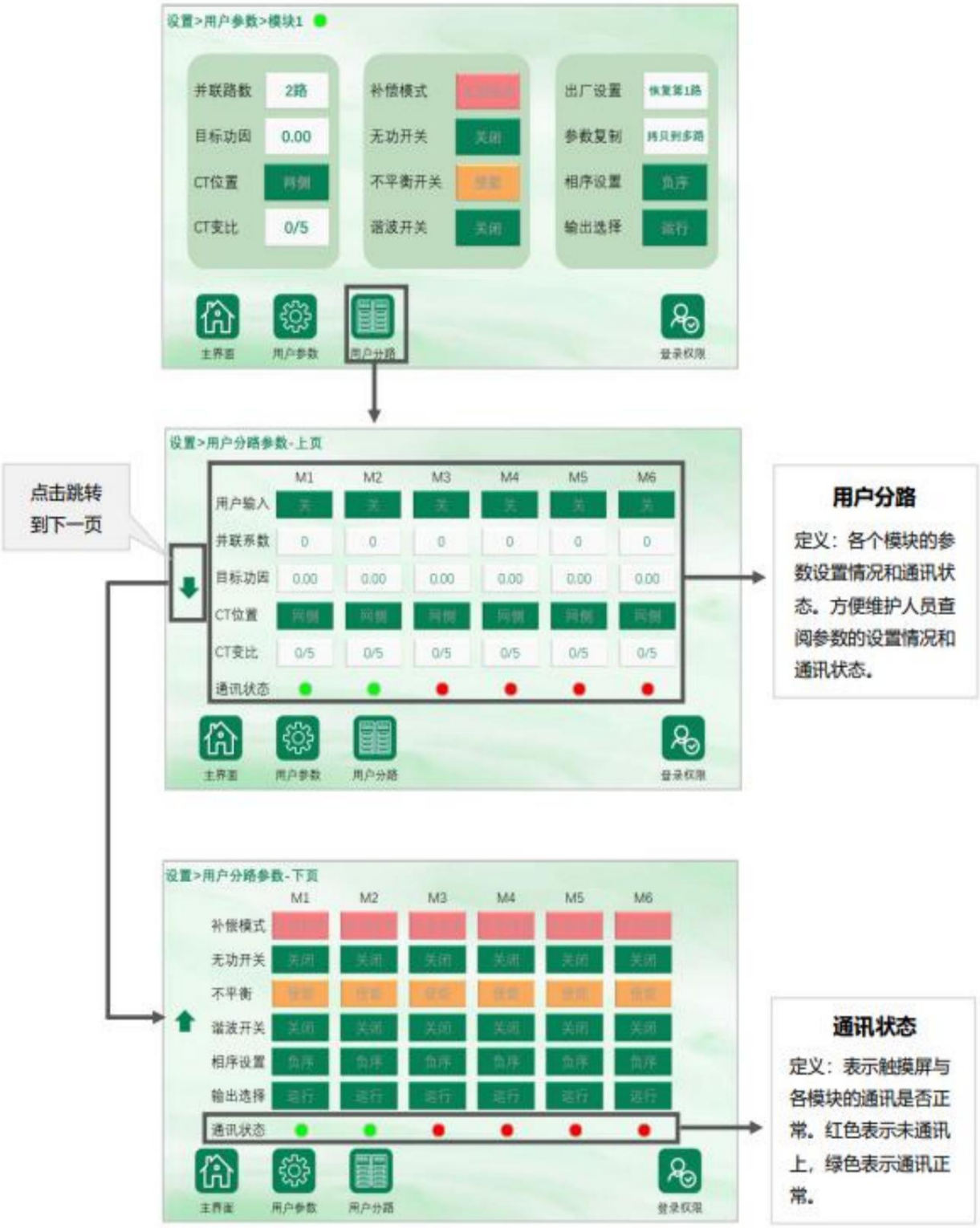


Figure 7-7 User parameter setting interface 4

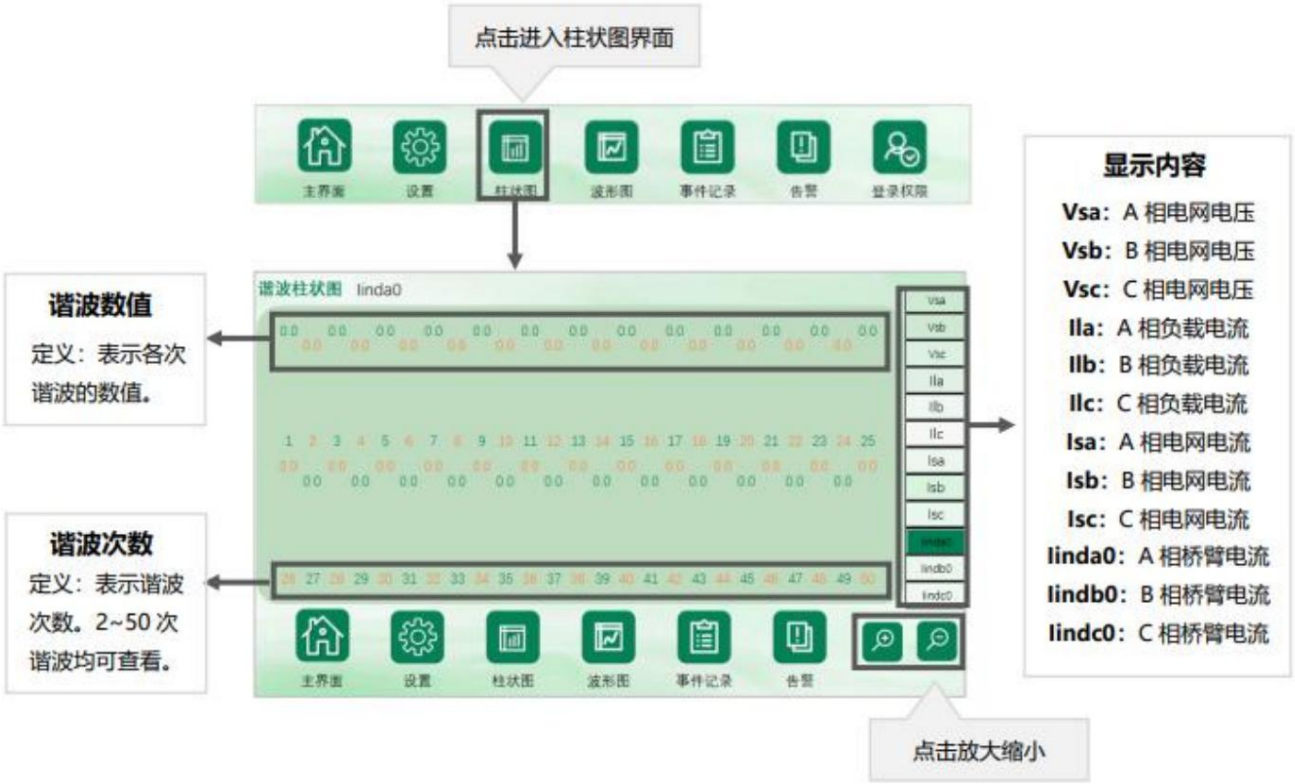


Figure 7-8 Histogram interface

Figure 7-9 Histogram interface

Figure 7-10 Event Recording Interface

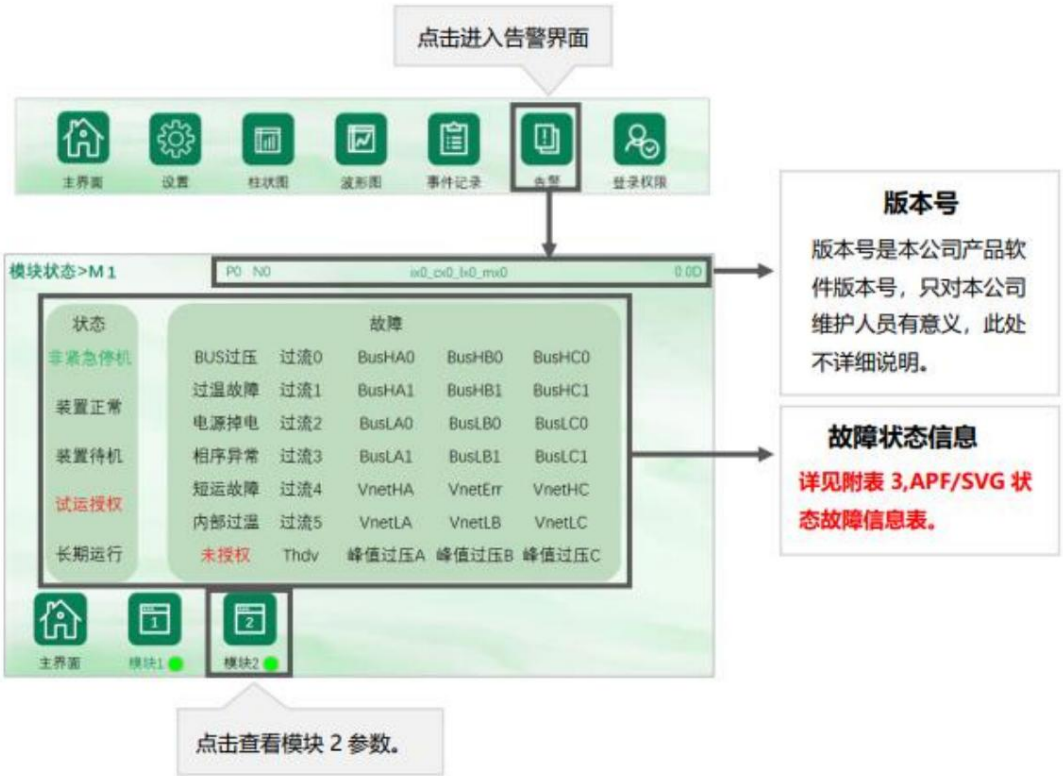


Figure 7-11 Alarm interface

8 4.3-inch small screen operation guide

The wall-mounted module is equipped with a 4.3-inch color touch screen by default. Users of the drawer-type module can also choose to install a 4.3-inch color touch screen on the cabinet door.

The communication line is connected to the module. Users can view system device parameters, set parameters, and turn on and off the device through the 4.3-inch small screen.

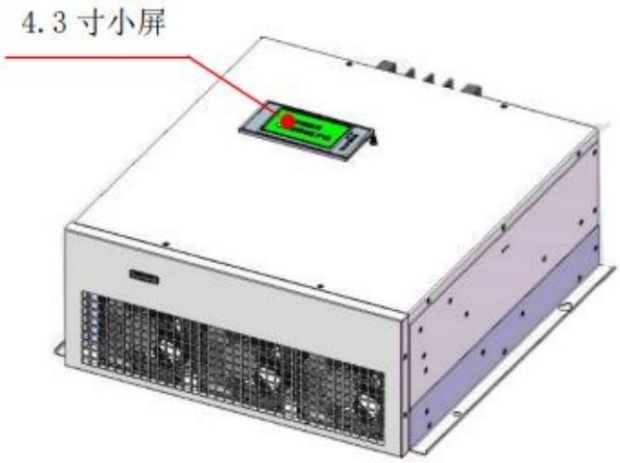


Figure 8-1 Wall-mounted module (4.3-inch touch screen)

8.1 Monitoring interface

Figure 8-2 Monitoring interface - grid side parameter interface

Figure 8-3 Monitoring interface - load side parameter interface

Figure 8-4 Monitoring interface - harmonic parameter interface

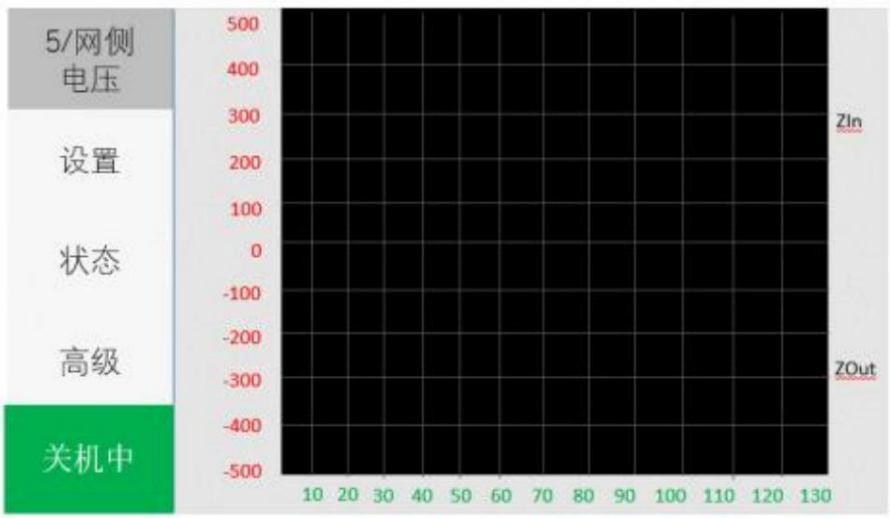


Figure 8-5 Monitoring interface - grid side voltage waveform interface

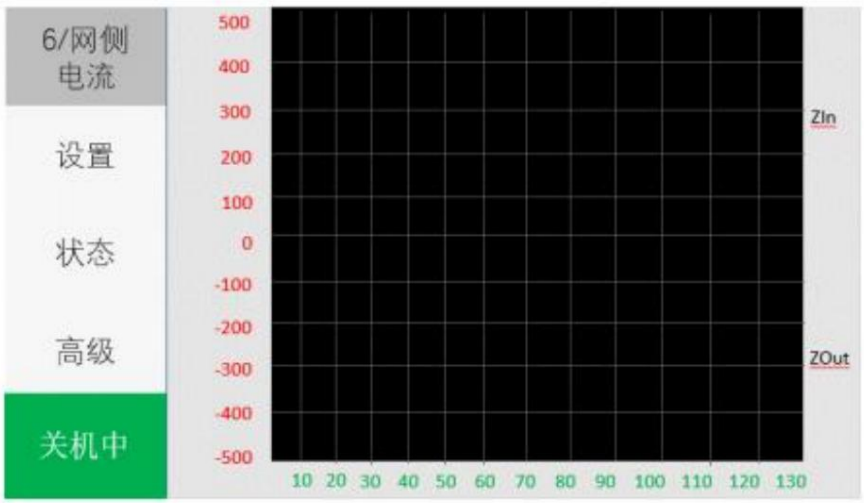


Figure 8-6 Monitoring interface - grid side current waveform interface

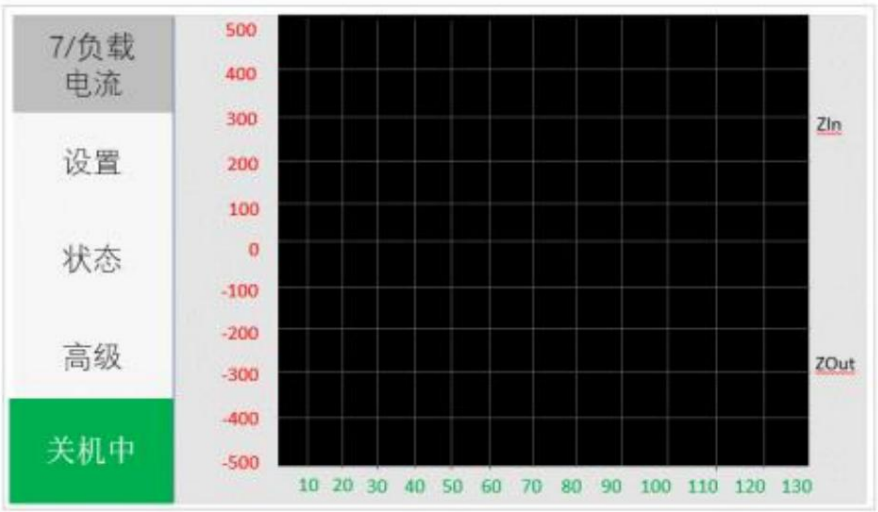


Figure 8-7 Monitoring interface - load side current waveform interface

8.2 Settings interface

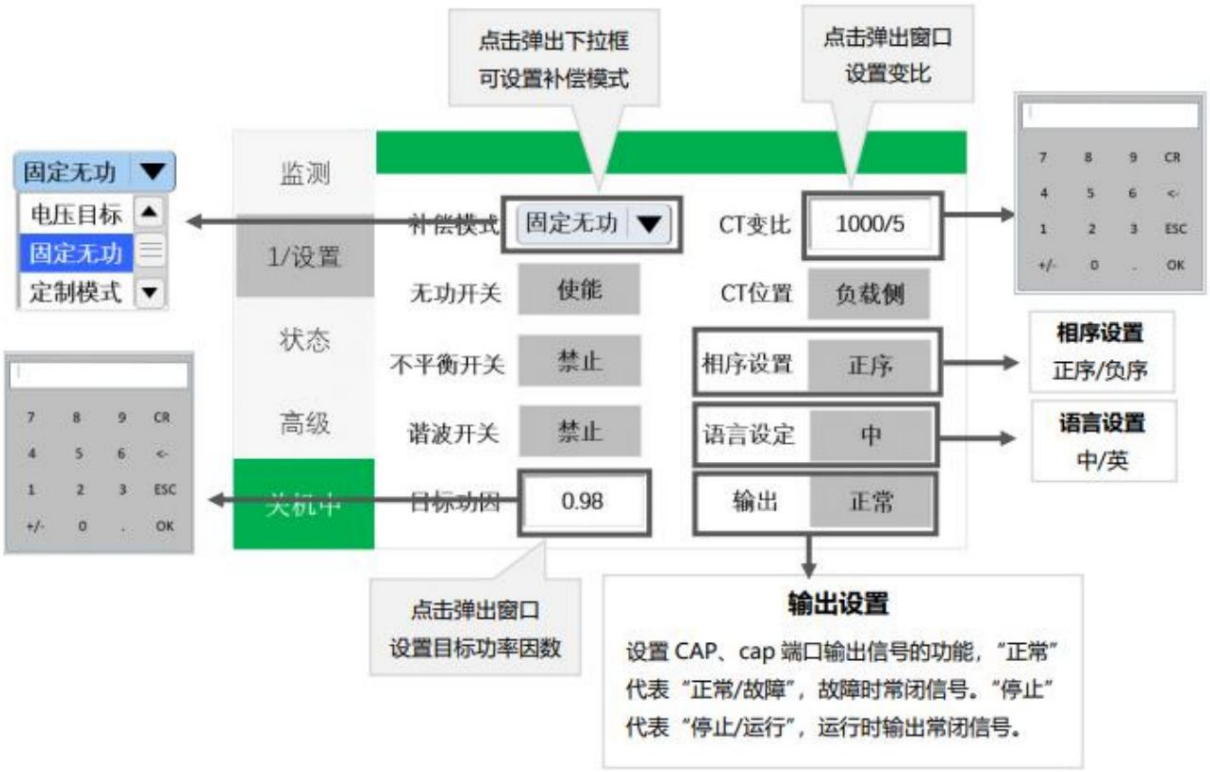


Figure 8-8 Setting interface 1-Basic settings

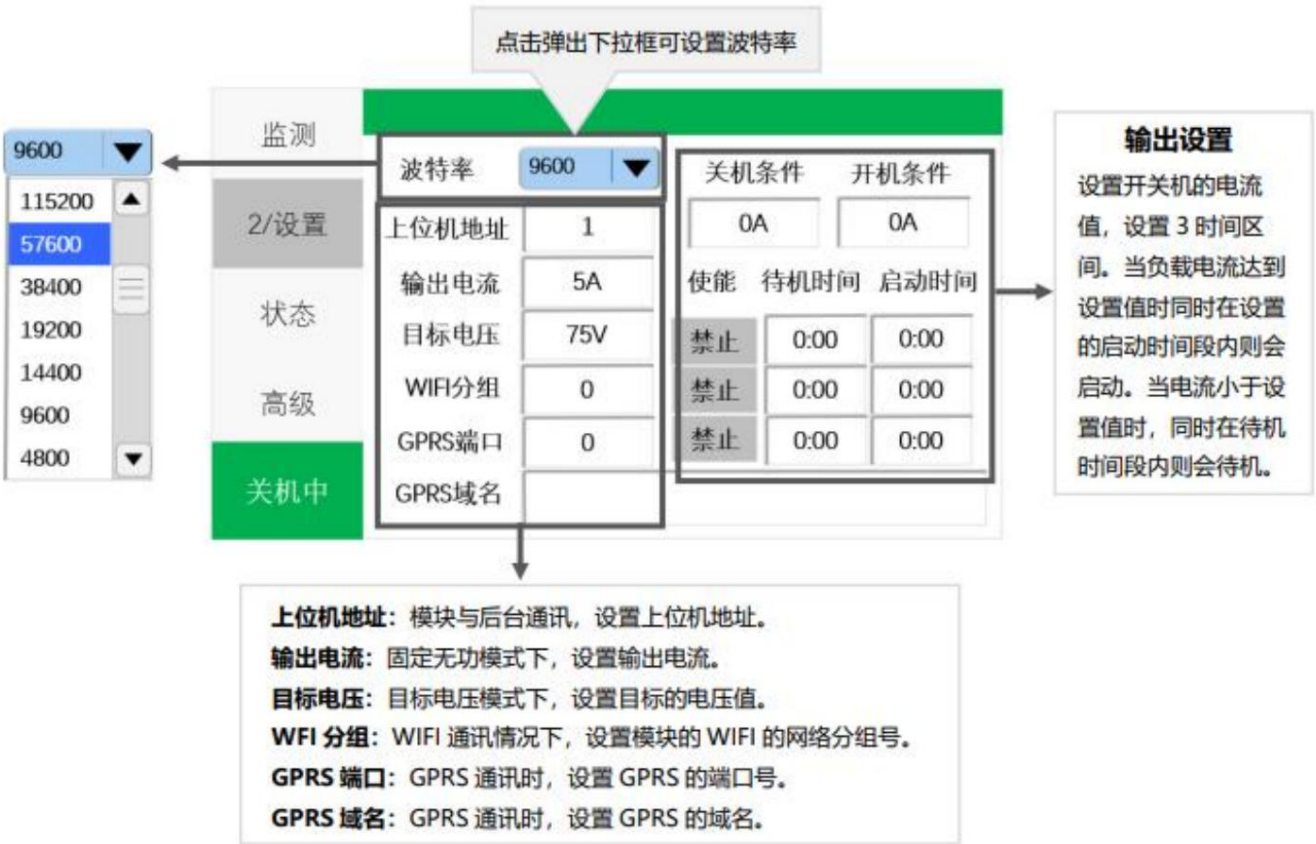


Figure 8-9 Settings interface 2-Advanced settings 1

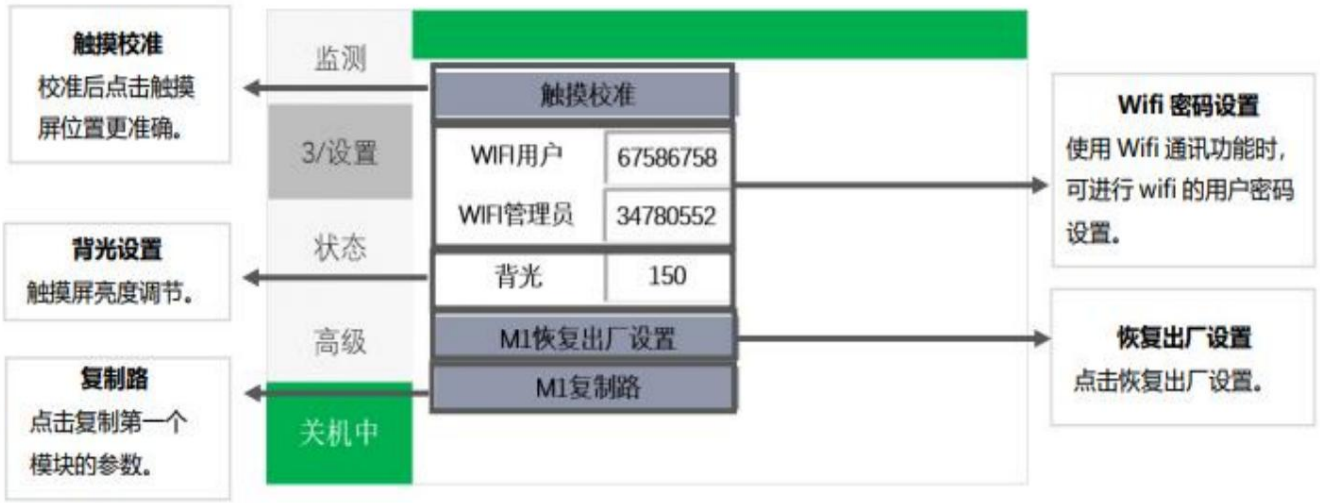


Figure 8-10 Settings interface 3-Advanced settings 2

8.3 Status screen

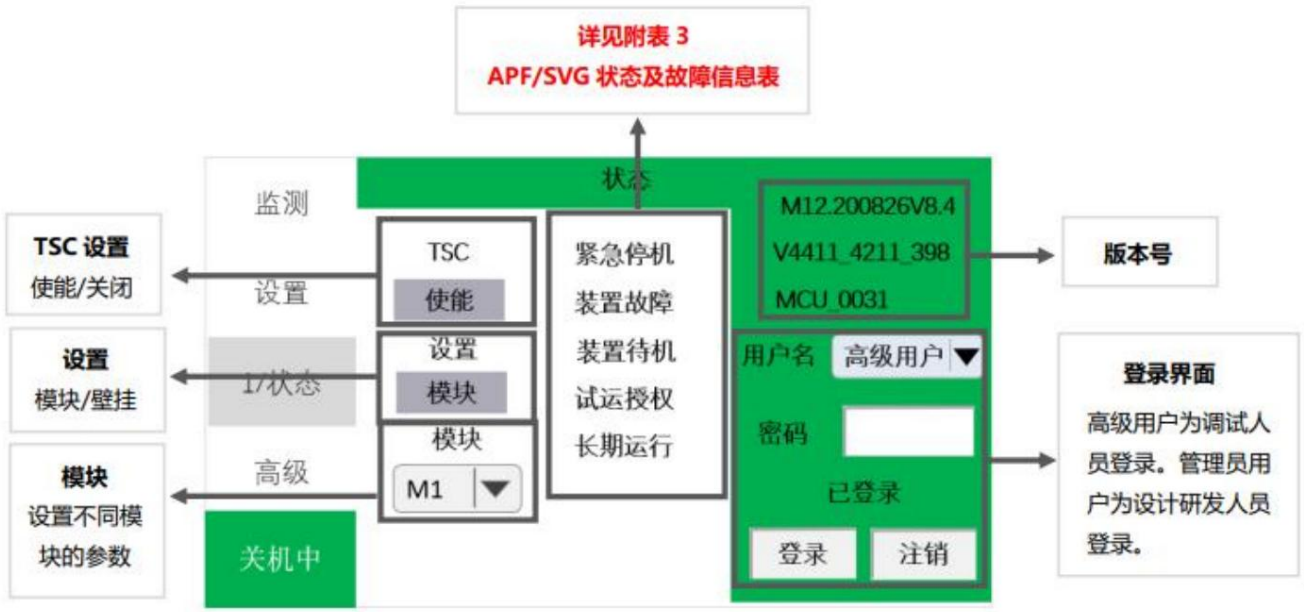


Figure 8-11 Status screen 1 - Login and module status

Figure 8-12 Status screen 2 - Fault alarm

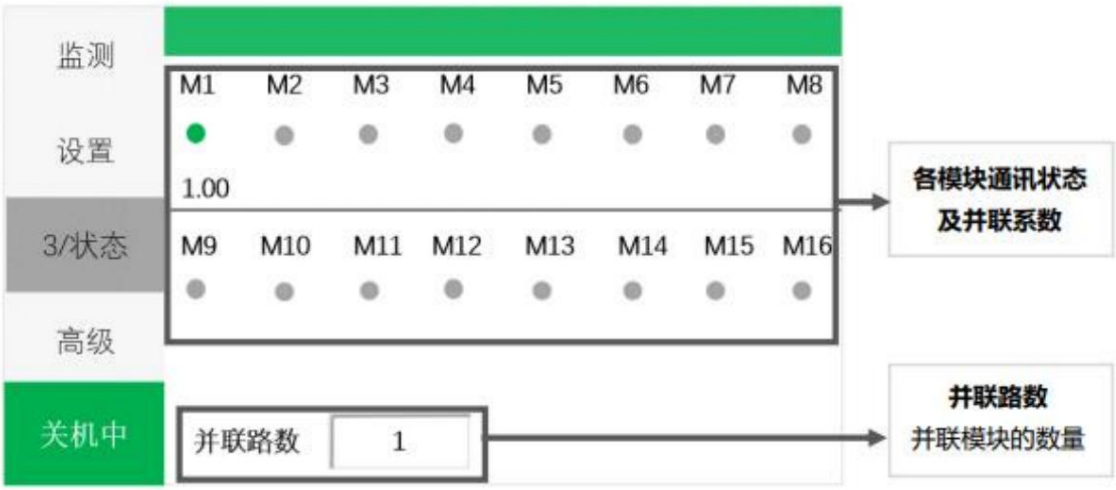


Figure 8-13 Status interface 3 - module communication status

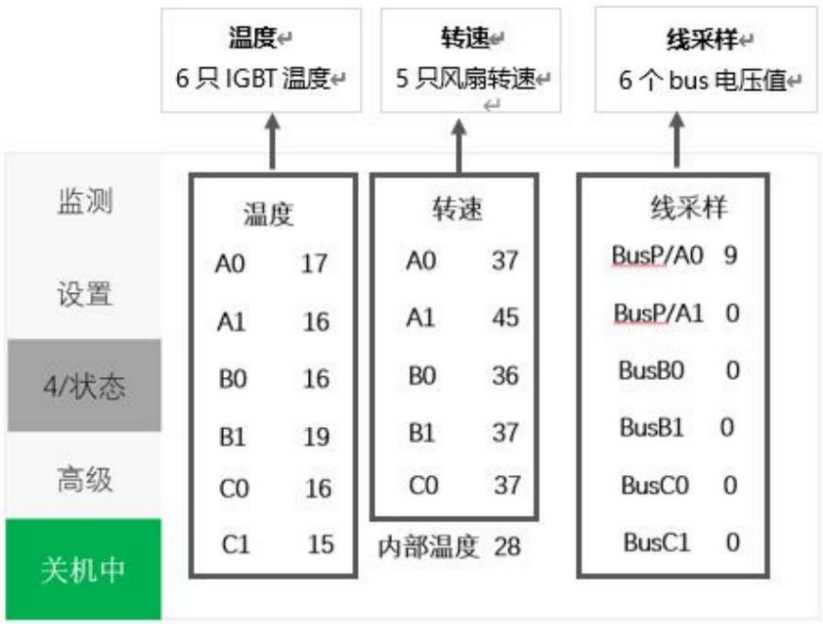


Figure 8-13 Status interface 4 - temperature and speed sampling status

9 System Maintenance

In order to ensure the good operation of the active power filter module in the next few years, it is recommended to perform routine maintenance and troubleshooting according to the description in this manual.

do.

9.1 Daily Maintenance

Except for the cooling fan, all other components inside the device are stationary. There is very little daily maintenance, as the normal operation of the device is affected by the environment.

The environment has a great impact on the equipment, so it is necessary to ensure that the equipment meets the environmental requirements during daily maintenance. It is recommended that users record the following inspection contents to ensure that the equipment

Keep your equipment at peak performance and prevent minor problems from turning into major failures.

9.1.1 Daily Inspection

1) Check the data on the control panel to see if it is constantly changing and maintaining communication with the modules in the cabinet;

2) Check that the fan output of each module in the cabinet has no obvious high temperature;

3) Whether there is any abnormal noise or odor;

4) Confirm that the ventilation grille is not blocked;

5) Check whether the communication line between the module and the control panel is detached, loose or damaged;

6) Check whether all fans are operating normally and confirm that there is air blowing out of the fans. The life of the fans will be shortened if used in a high temperature environment;

7) Measure and record the voltage and current of each phase of the equipment. If the measured values are significantly different from the previous ones, record the size, type and location of the new load.

It is helpful to help analyze whether a fault will occur.

9.1.2 Monthly Inspection

1) First, check according to the content of daily inspection;

2) Shut down the machine according to the shutdown procedure, wait for 30 minutes, and then check again when the DC side capacitor voltage drops to a safe voltage value;

3) Check the voltage cables, current transformer cables and communication cables for signs of aging, wear and overheating.

Check whether the communication cable is firmly connected;

4) Use a vacuum cleaner to remove impurities on the surface, and use low-pressure air to blow away dust in the heat dissipation duct to keep the duct unobstructed;

9.1.3 Other inspections

1) Check the cable insulation jacket and connection ends: It is recommended to conduct regular inspections. At this time, the equipment needs to be completely powered off. The inspection cycle should not exceed 1

Year;

2) Power off and power on the equipment: If the equipment needs to be powered off, it must be shut down according to the shutdown procedures. Do not directly power off the equipment while it is running, which may cause equipment damage.

After the device is powered off, do not directly supply power. Wait for more than 5 minutes before re-supplying power, otherwise the device may be damaged.

3) When the active filter module needs to be removed from the cabinet for maintenance under load current, the secondary side of the transformer needs to be short-circuited with a short-circuit wire.

The secondary side cannot be open circuited, otherwise the transformer may be damaged.

Appendix 1 APF Technical Specifications

category	project		index				
name	Product Name		APF				
Specification	Voltage		380V				690V
	level module		30A	50A	75A	100A/150A/200A	50A/100A
	Module size (W*H*D) (Note 1)	specification 480*130*440 ÿ					
		480*200*530		ÿ ÿ			
		680*200*530				ÿ	
		680*200*550					ÿ
	Number of parallel connections		12				
	Single cabinet Large capacity	800*800	1000A				500A
enter	Working voltage		380V (-20%+20%), 690V (-20%ÿ+20%)				
	Working frequency		50Hzÿ-10% ~ +10%)				
	Current transformer		100:5 ~ 10000:5				
Function	compensation		2-50 times				
	Harmonic Harmonic		Better than the requirements of the standard "JB/T11067-2011 Low Voltage Active Power Filter Device"				
	filtering rate		-1~+1 adjustable (within the equipment capacity range)				
	compensation Reactive power		100% unbalanced full compensation				
communication protocol	compensation Three-		RS485, Modbus protocol				
	phase imbalance		RS485				
	Communication mode		Yes, all parameters can be set via the host computer				
	Communication		Yes, up to 500 alarm messages can be recorded				
	interface		Support independent monitoring of each module/centralized monitoring of the whole machine				
technology index	Host computer software		ÿ20ms				
	Fault alarm		ÿ2.5%				
	monitoring Full		Intelligent air cooling				
	response		ÿ60dB				
	time Active power loss Heat dissipation method Noise protection function		Over 20 protections including overvoltage, undervoltage, overheating, overcurrent, short circuit, etc.				
	CT installation location		Load side/grid side optional				
mechanical characteristic	Module weight		13kg (35A); 24kg (75A); 38kg (100A/150A); 45kg (200A);				
	color		7035 Fine Orange Texture				
environment Require	Working		-10ÿ~+50ÿ				
			<5000m (above 1000m, capacity decreases by 1% for every 100m increase)				
	temperature		<95%, no condensation				
	Altitude Relative		Module IP20 + electronic layer IP42 (IP54 can be customized)				
	humidity Protection level Anti-pollution level		2 levels (3 levels can be customized)				

Appendix 2 APF Technical Specifications

Parameter settings		
Set the content setting range		Setup Instructions
Number of parallel paths	1~12 The number of parallel modules is set according to the number of actual connected modules.	
Target Factor	-1~1 Target power factor value, target value after compensation. Generally set to 0.95	
CT location	The location where the grid-side/load-side CT is installed is the "grid-side" before the APF access point and the "load-side" after the access point.	
CT ratio	100~10000 Current transformer CT ratio, for example, 5000/5, input 5000.	
Compensation Mode	Reactive power priority	Prioritize reactive power compensation. When the power factor reaches the set target power factor value, the remaining capacity can be used to compensate reactive power. Compensation for other set compensation functions, such as compensation for harmonics or imbalance.
	Harmonic priority	Prioritize harmonic compensation. When the system harmonic value has been compensated to the best effect of equipment compensation, the remaining capacity Other compensation functions that have been set can be compensated, such as reactive power compensation or unbalance compensation.
	Unbalanced Priority	Priority is given to compensating for the unbalanced three-phase current. When the three-phase currents of the system are basically consistent, the remaining capacity can be used to compensate for the imbalanced three-phase current. Compensate for three-phase current imbalance.
	Fixed reactive power	In fixed reactive mode, the current value can be manually input into the device, and the device will emit current as required. If it is set to a negative value, an inductive current is generated, and if it is set to a positive value, a capacitive current is generated.
	Target voltage	At the target voltage, the device can output capacitive current to increase the system voltage and output inductive current to reduce System voltage.
Reactive switch	The module can compensate reactive power only when the reactive power compensation function is turned off/on.	
The module can adjust the three-phase current imbalance only when the imbalance switch is turned off/the imbalance function is turned on.		
Harmonic Switching	The module can compensate harmonics only when the harmonics are turned off/on.	
Factory settings	Restore No. 1 After clicking, the settings of this channel will be restored to factory settings.	
Parameter Copy	After copying to multi-way click, the set parameters will be automatically copied to other parallel modules.	
Phase sequence setting	After clicking Positive/Negative Sequence, change the phase sequence. Then, the system can quickly adapt when the phase sequence is not positive.	
Output Selection	Running/Normal	"Run" means the output signal of CAP and cap port is "Run/Stop"; "Normal" means "Normal/Fault" The CAP and cap ports are normally closed in "running" and "fault" and normally closed in "stop" and "normal". Normally open.

Appendix 3 APF status and fault information table

name		meaning
state	Non-emergency shutdown	Includes non-emergency stop and emergency stop. There are EPO and epo ports on the back of the module, which can be connected to the emergency stop switch. After pressing the emergency stop switch or disconnecting the EPO or epo port, “Emergency Stop” will be displayed. The status will be displayed on the main interface of the touch screen.
	Device is normal	Contains device normal and device fault. Indicates whether the module is in normal state or fault state.
	Device standby	Includes device standby, resistance soft start, device delay, control soft start, and operation mode. "Resistor soft start" indicates that the module is in the resistance soft start state; "Device delay" indicates that the module is in the resistance soft start state. Indicates that the module is in the relay delay state; "Control soft start" indicates that the module is in the control soft start state; "Operation "Running mode" means the module is in running state and can compensate normally.
	Trial Operation Authorization	Indicates that the module is in the trial operation authorization state. The trial operation period is 600 hours after the module leaves the factory when it is powered on. During this period, if there is a correct test run authorization code, the module can be run. If there is no correct test run authorization code, the module can be run. Authorization code will not work.
	Long-term operation	Including long-term operation and trial operation. After our company's module leaves the factory, it can only run normally after obtaining the authorization code. The authorization code is divided into long-term authorization and trial operation authorization. Only with a long-term authorization code can it be permanently operated; The trial operation authorization can only be obtained during the factory trial operation period. If the trial operation period is exceeded and long-term authorization is not obtained, Will not function properly.
Fault Alerts	BUS overvoltage	If the DC bus voltage exceeds the designed protection value, a "BUS overvoltage" alarm will be issued.
	Over temperature fault	If the IGBT temperature inside the module exceeds the designed protection value, an "over-temperature fault" alarm will be issued.
	Power failure	If the internal power board fails to supply power normally, a "power failure" alarm will be issued.
	Abnormal phase sequence	If the phase sequence of the external primary line is negative, but the phase sequence setting is positive, an "abnormal phase sequence" alarm will be triggered.
	Short transport failure	If the module fails three times in succession within a short period of time, a "short operation failure" alarm will be issued.
	Internal over temperature	If the internal ambient temperature of the module exceeds the set protection value, an "internal overtemperature" alarm will be issued.
	Unauthorized	If the module does not enter the correct authorization code, it will issue an "unauthorized" alarm.
	Overcurrent 0~5	If the IGBT bridge arm current exceeds the designed protection value, an “overcurrent” alarm will be issued.
	tDV	If the system voltage distortion rate exceeds the set protection value, a "Thdv" alarm will be issued.
	BusHA0, BusHB0, BusHC0 BUS overvoltage. The three-phase DC bus voltage of phase A, phase B, and phase C is too high and exceeds the designed protection value.	
	BusHA1, BusHB1, BusHC1 BUS overvoltage, the three-phase DC bus voltage of phase A, phase B, phase C is too high and exceeds the designed protection value.	
	The BusLA0, BusLB0, and BusLC0 BUS are undervoltage. The three-phase DC bus voltage of phase A, phase B, and phase C is too low and exceeds the designed protection value.	
	The BusLA1, BusLB1, and BusLC1 BUS are undervoltage. The three-phase DC bus voltage of phase A, phase B, and phase C is too low and exceeds the designed protection value.	
	VnetHA, VnetHB, VnetHC The voltage of the three-phase power grid of phase A, phase B, and phase C is too high and exceeds the designed protection value.	
	VnetLA, VnetLB, VnetLC The voltage of the three-phase power grid of phase A, phase B, and phase C is too low and exceeds the designed protection value.	
	Peak overvoltage A, B and C	The peak voltage exceeds the designed protection value.

10. Quality Assurance

Warranty period:

Our company's products are under warranty for 2 years, starting from the date the product leaves the factory. If the product fails or parts are damaged during the warranty period, the technicians will If it occurs under normal use, our company will provide free repairs.

In the following cases, material costs and maintenance labor costs will be charged:

ÿ Transport damage

Improper installation

Improper use

ÿ Damage caused by abnormal natural environment

ÿ Operating in harsh environments beyond those described in this manual

ÿ Damage caused by unauthorized disassembly or modification of parts

ÿ Unauthorized changes to the product or modification of the software code

ÿ Damage caused by failure to follow the instructions in the instruction manual

ÿ Any installation and use environment beyond the requirements of relevant international standards

ÿ Ignore the safety warnings and related safety regulations stated in the product and documentation

In line with the tenet of high-quality service, the company will negotiate with the user to resolve any unresolved issues. If the two parties cannot resolve the issue through negotiation, they will jointly The Consumer Protection Law of the Republic of China is used as the basis for resolving the problem.

The right to interpret this manual belongs to Ankerui Electric Co., Ltd.

For questions about the use of our products and warranty services, please call the service hotline:

800-820-6632 (86)21-69158300 69158301 69158302

Fax: (86)21-69158303 69158339 Mailing address: No.

253, Yulu Road, Jiading District, Shanghai

Zip code: 201801

Website: http://www.acrel.cn

Packing List

Serial number	name	Number of units		Remark
1	ANAPF Active Power Filter	tower		
2	Cabinet key	Bundle		
3	Inspection certificate	open		
4	ANAPF Active Power Filter Installation and Operation Manual	Book		
5				
6				
7				
8				
9				
10				

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