



Active Harmonic Filter (AHF)



User manuals

2024.03

Version number:24-03


ILEC


Active Harmonic Filter (AHF)



Safety Instructions

This manual contains instructions for installation and use of active harmonic filters(AHF).Before the AHF is installed,it is important to have a thorough understanding of this manual and to review all the safety elements involved in order to avoid accidents and protect the safety of person and equipment.

	a	AHF is used in 0.4KV/0.69 power supply and distribution system,and it is strictly prohibited to work with electricity to avoid personal injury events.
	b	Non-professional maintenance personnel are strictly prohibited to from contacting any electrically charged parts of the device to avoid personal injury events.
	c	When installing or removing the device,the main circuit breaker must be verified to ensure that the power supply is disconnected to avoid personal injury events.
	d	In any case,it must be ensured that the secondary coil of the sampling current transformer(CT) accompanying the active harmonic filter(AHF)is short-circuited to avoid the high voltage caused by open circuit,which can lead to personal injury events.
	e	The AHF is connected to the power supply and must be reliably grounded before the device is turned on and operated.
	f	The AHF uses DC bus capacitors inside,when the device needs to be dismantled,first cut off the power supply of its and wait 10 minutes to ensure that the DC bus capacitor is discharged,then can do the job of dismantling, power distribution and other operations.
	g	The installation and storage of AHF should be away from fire sources, heat sources, and flammable, explosive and corrosive items.
	h	It is strictly prohibited to modify the inside of the device by non-professionals of our company.

	a	Be sure to read this manual carefully, understand the requirements of the device, and install the device according to the relevant guidance to avoid problems such as device failure, ineffective governance, and device damage caused by installation problems. After the installation and commissioning of the device is normal, please keep this manual for future use.
	b	During the installation and commissioning of the AHF, the debugging personnel must take necessary precautions, strictly abide by the safety operation regulations, and use the correct debugging tools to prevent arc stretching, short circuit, personnel injury, and device damage caused by the tools.
	c	Please use the device correctly, if a fault alarm occurs on the device, exclude it strictly according to the instructions in this manual, or contact our service personnel.
	d	The installation and commissioning of the device must be carried out by professional trained and certified personnel. Prohibit other personnel from operating the device to avoid device damage and personnel injury issues.
	e	Store and transport the device in strict accordance with this manual.
	f	The dust net should be regularly cleaned or replaced once a month to ensure that the device ventilation and heat dissipation is normal to avoid overheating problems leading to the decline in the compensation effect of the device, and the device can not operate normally.
	g	After our device is sent to the installation site, first of all, please check whether the delivery list is consistent with the received goods. If there is any abnormality, please contact our relevant personnel as soon as possible to deal with it.
	h	The corresponding auxiliary materials of AHF, such as CT current sampling transformers and cables, are recommended to configure according to the recommendations of this manual. If there is any doubt, please contact our relevant personnel.

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Part 1:Equipment transportation and storage

1.1 Equipment inspection and transportation

1) After the equipment shipment arrives at the site, please check the goods according to the delivery list. If there is abnormal conditions, such as damaged packaging, obvious deformation of equipment, and inconsistent quantity and equipment delivery list, please ask the carrier to sign and confirm, and contact us at once.

2) After removing the equipment,check the device for external damage,such as panel scratches,peeling paint and dents. Check whether the equipment parts and auxiliary components with the box are complete.

3) Check the product specifications and models,our active harmonic filter (AHF) equipment shell has a prominent label,and the label clearly describes the device model,rated parameters and other information,consistent with the shipping list.

4) Each set of active harmonic filter is strictly packaged for transportation,and can not be inverted or tilted during handling to ensure that the active harmonic filter (AHF) is not damaged during transportation.

1.2 Equipment Storage

- 1) Avoid prolonged outdoor storage. Ensure that the indoor storage environment is dry, well-ventilated, and away from flammable, explosive, and corrosive substances, and should not have strong mechanical vibration and magnetic field.
- 2) Our active harmonic filter in the default packaging, the indoor storage time is up to 6 months (from the date of shipment). If you need to store longer, please specify in advance when ordering, we will provide the corresponding equipment packaging form.
- 3) When it is necessary to store for a long time, check the equipment regularly to ensure that the packaging is free of mildew, damage and other problems.
- 4) Storage environment requirements:
 - Temperature: $(-40^{\circ}\text{C} \sim +55^{\circ}\text{C})$;
 - Relative humidity of air: $(15\% \sim 90\%)$ (when below 20°C).

Part 2: Installation and fixation

2.1 Environmental requirements

1) Before installing and fixing the equipment, ensure that the installation environment meets the operating requirements of the device to avoid device faults or efficiency reduction caused by external environments.

2)

3) The installation environment must consider the heat dissipation of the active harmonic filter to meet the heat dissipation requirements of the device and avoid device operating efficiency reduction and device faults caused by poor heat dissipation. The active harmonic filter adopts forward air inlet and rear air outlet (wall-mounted with lower air inlet and upper air outlet) heat dissipation mode.

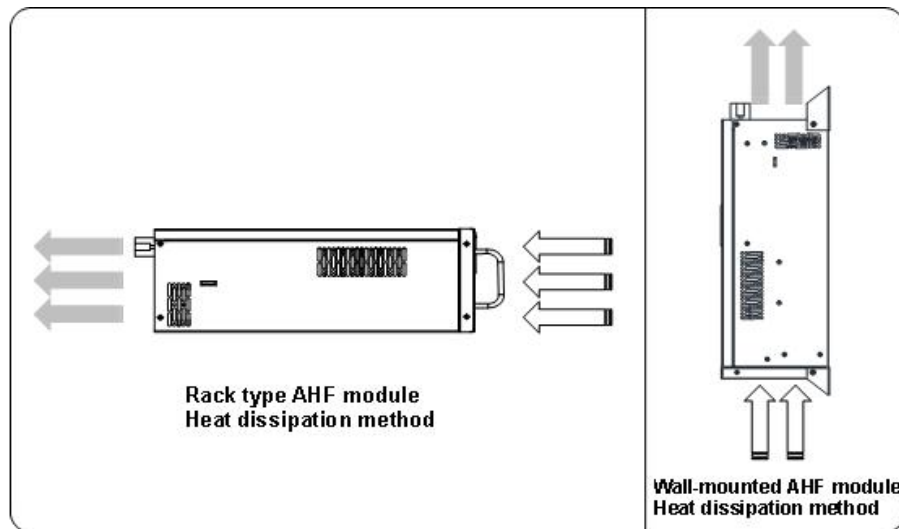


Figure 2-1

4) When designing the installation position of the active harmonic filter cabinet and wall-mounted active harmonic filter module, avoid heat dissipation problems and ensure smooth heat dissipation.

- a. Keep away from excessively humid and high-temperature environments.
- b. The installation location needs to comply with fire protection requirements.
- c. The installation location of the equipment should be reserved enough space to conduct electrical wiring and equipment debugging.
- d. If there are serious problems such as dust and flotsam onsite, it is recommended to take special treatment of the installation environment of the AHF to avoid device damage or efficiency reduction.
- e. Equipment installation location should be away from flammable, explosive, corrosive substances, to avoid causing damage to the equipment.

2.2 Equipment introduction

2.2.1 0.4KV-Active Harmonic Filter

0.4KV-Active harmonic filter is mainly composed of the following parts:

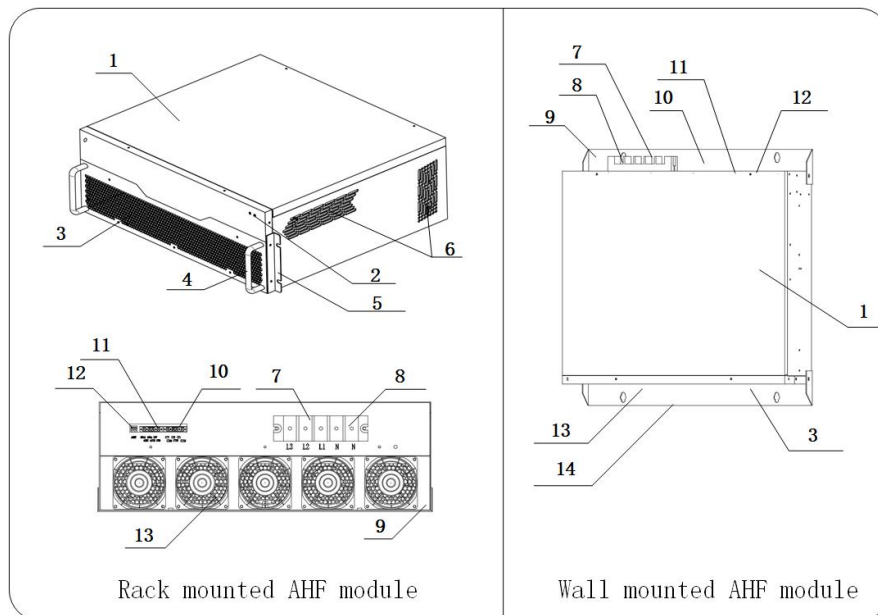


Figure 2-2

	Name	Remark
1	Front panel	AHF Module front panel
2	Status indicator	Device running status display
3	Cooling Fan	/
4	Handle	(only for rack mounted AHF modules)
5	Rack mounting ear	Rack mounted module mounting fixed (rack mounted only)
6	Cooling duct	/
7	Main circuit input terminal	L1、 L2、 L3
8	Neutral input terminal	N*2
9	Ground wire input terminal	PE
10	Current sampling input terminal	CT1/CT1N、 CT2/CT2N、 CT3/CT3N
11	Auxiliary circuit terminal	DC 24V auxiliary power supply、 RS485 communication
12	DIP switch	Communication address setting
13	Cooling duct	/
14	Wall mounting ear	Wall-mounted module mounting fixed (wall-mounted only)

Table 2-1

0.4KV- Active Harmonic Filter Dimension

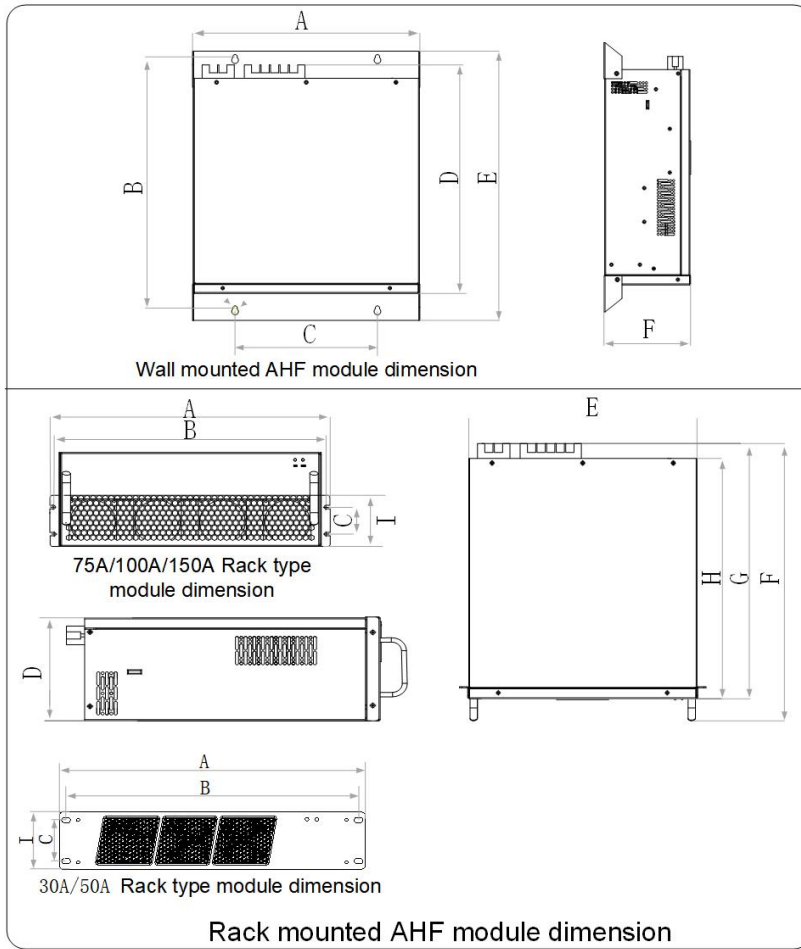


Figure2-3

0.4KV- Dimension Table for Each Capacity of Active Harmonic Filter

	Rack module dimension			Wall mounted module dimension		
	30A/50A	75A/100A	150A	30A/50A	75A/100A	150A
A	460	540	540	424	504	504
B	440	524	524	491	543	567
C	62	85	110	230	315	315
D	86	190	219	445	507	513
E	420	500	500	541	584	608
F	483	545	551	88	191	220
G	451	507	515	UNIT: mm		
H	420	478	479			
I	86	135	145			

Table 2-2

0.48KV Active harmonic filter Dimension

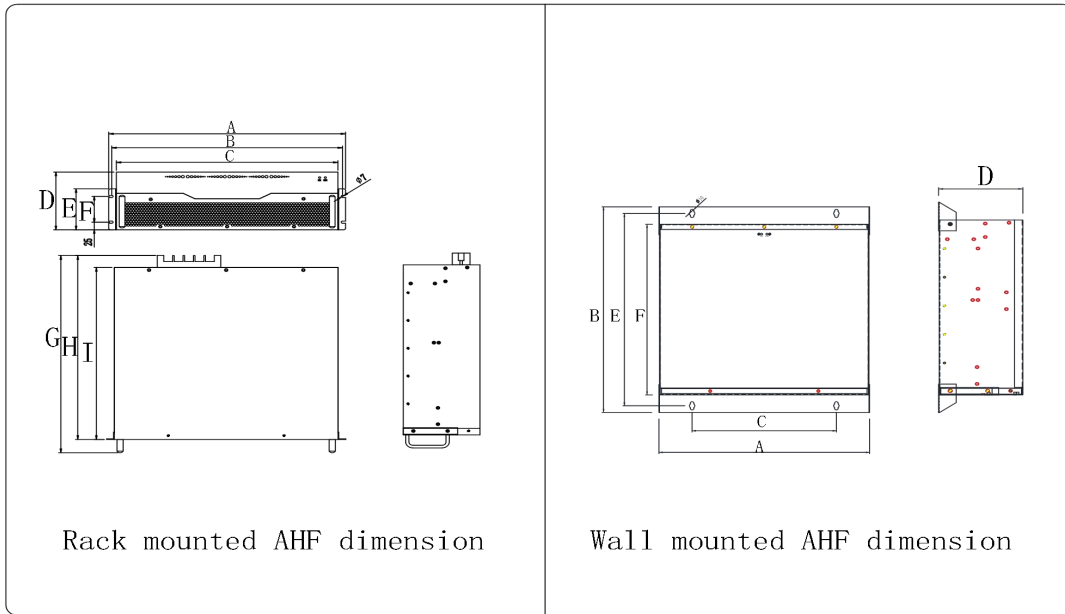


Figure2-4

0.48KV Dimension table for each capacity of Active harmonic filter

	Rack Module Dimension (UNIT: mm)								
	A	B	C	D	E	F	G	H	I
AHF 100A	620	604	580	190	135	85	596	556	520

Table2-3

	Wall mounted module dimension (UNIT: mm)					
	A	B	C	D	E	F
AHF 100A	584	626	400	191.5	586	520

Table2-4

2.2.2 0.69KV- Active Harmonic Filter

0.69KV-Active harmonic filter is mainly composed of the following parts:

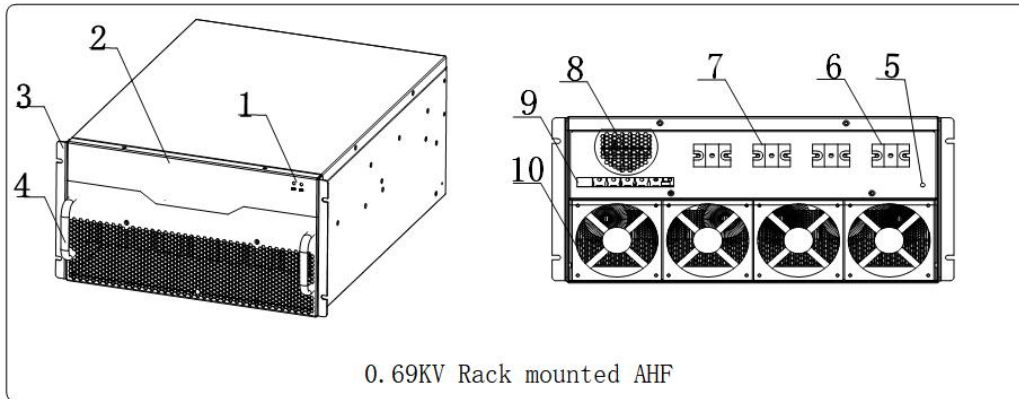


Figure 2-5

	Name	Remark
1	Status indicator	Device running status display
2	Front panel	AHF Module front panel
3	Rack mounting ear	Rack mounted module mounting and fixing
4	Handle	Rack mounted AHF module front handle
5	Ground wire input terminal	PE
6	Neutral input terminal	N
7	Main circuit input terminal	L1、L2、L3
8	Upper cooling duct	Upper heat dissipation
9	Current sampling input terminal	CT1/CT1N、CT2/CT2N、CT3/CT3N
	Auxiliary circuit terminal	DC 24Vauxiliary power supply、RS485 communication
	DIP switch	Communication address setting
10	DIP switch	Bottom fan

Table 2-5

0.69KV- Active Harmonic Filter Dimension

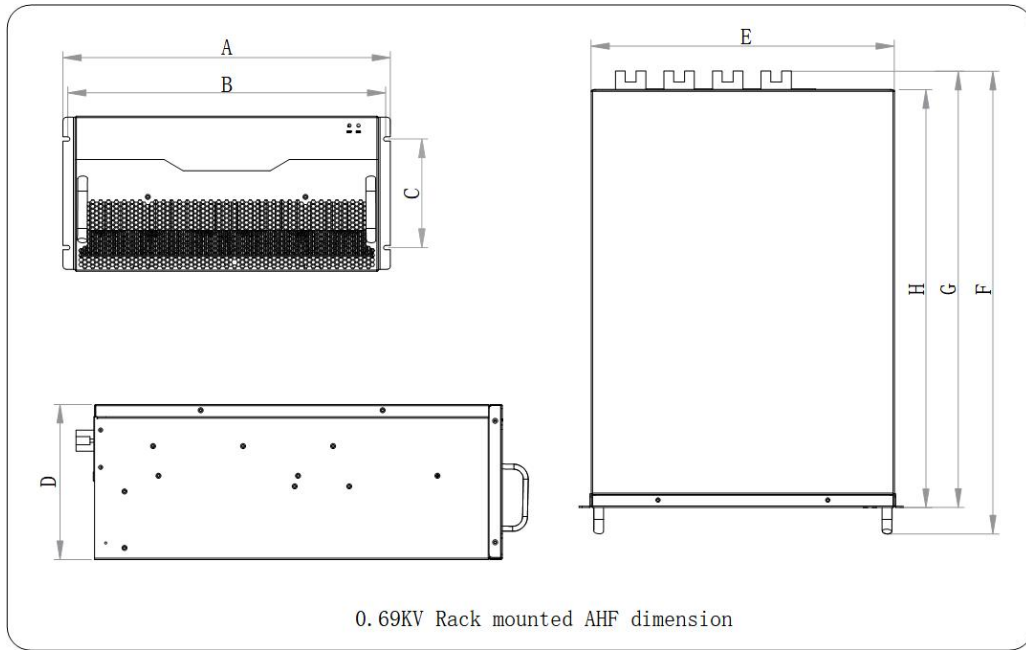


Figure 2-6

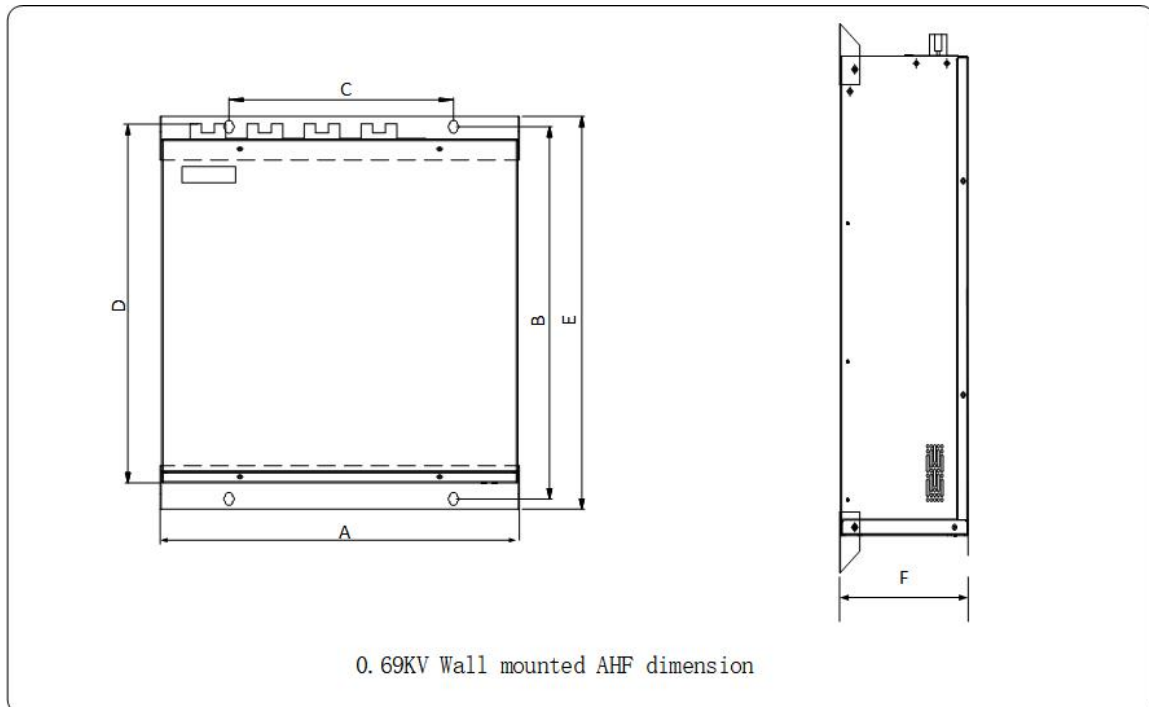


Figure 2-7

0.69KV- Dimension Table for Each Capacity of active harmonic filter

	Rack module dimension(UNIT:mm)							
	A	B	C	D	E	F	G	H
AHF 100A	540	524	175	250	500	743	703	674
	Wall mounted module dimension(UNIT:mm)							
	A	B	C	D	E	F		
	504	729	315	703	769	252		

Table 2-6

2.3 Installation and fixation

a. Rack mounted AHF installation and fixation.

- 1) Remove the packages of the device.
- 2) Place the AHF along with the mounting guide rail.
- 3) Connect the AHF to the power distribution cabinet using the fixing screws.

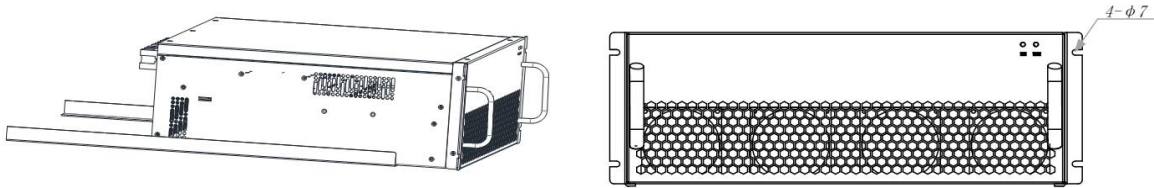


Figure 2-8

b. The installation and fixation of the wall mounted AHF module. (Only 0.4KV active harmonic filter support wall-mounted installation.)

1.The wall-mounted active harmonic filter is modular designed,and the installation position can be selected on the wall and other vertical installation position.It is required to be fixed vertically, not inverted or tilted, and it can be stabilized according to the equipment fixing requirement.

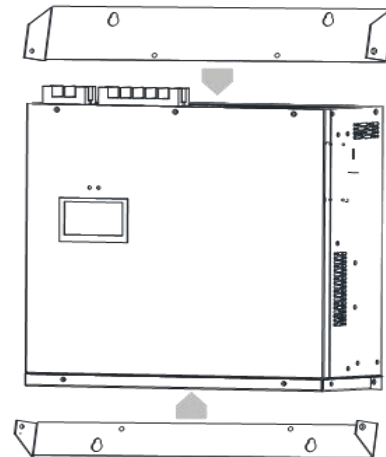


Figure 2-9

2.According to the mounting holes in the active harmonic filter mounting ears,cut holes in the corresponding installation

positions, and then secure the active harmonic filter using expansion bolts.

3. The wall-mounted module can be configured with a 4.3-inch controller.

2.4 Inspection

After the installation and fixing of the active harmonic filter is completed, please be sure to check to ensure reliable installation.

1) All the position fixing screws have been fastened, no omission, loosening and other problems.

2) All electrical components are installed and fixed in a reasonable position for easy wiring and later maintenance.

3) The inside of the power distribution cabinet should fully consider the equipment ventilation and heat dissipation problems, to ensure that the heat dissipation air ducts are smooth, no obstruction of electrical components.

4) No tools, materials, installation screws left.

Part 3:Accessories selection

3.1 Current transformer

Select the model of the current transformer strictly according to the instruction manual to ensure that it meets the requirements of the device.

The external current transformer has a minimum allowable ratio of 150:5 and a maximum allowable ratio is 8000:5. Between these two settings, the ratio can be set according to the actual current transformer.

The accuracy of external current transformer is 0.5 level (open type) and above.If a lower accuracy is selected,the compensation accuracy of the AHF may be affected.

3.2 Cable

When selecting the accessories,you must choose regular cables which meet safety standards to ensure that the carrying capacity meet the operating requirements of the equipment.

a. Since the active harmonic filter compensation principle is output reverse current to compensate, and there is high frequency current in the compensation current, it is recommended to raise a specification when selecting the main power loop cable current carrying capacity to prevent the cable from aging,overheating,etc.problem. (Refer to the following table for the primary cable selection specifications of the main power circuit)

Rated voltage	Capacity	Corresponding capacity cable selection specifications
0.4KV	30A/50A	25mm ²
	75A/100A	35mm ²
	150A	50mm ²
0.48KV	100A	35mm ²
0.69KV	100A	35mm ²

b. When the cable length is less than 15m, RVVSP 2 x 2.5mm shielded twisted pair cables are recommended. When the cable length is between 15m and 30m, RVVSP 2 x 4mm shielded twisted pair cables are recommended.

c. All cables are recommended to use different colors or clear line numbers to facilitate later line maintenance and equipment maintenance.

3.3 Common installation tools and equipment


a. It is necessary to strictly follow the safety requirements, the use of insulated boots, insulated gloves and other protective tools tested to ensure personal safety, to avoid the occurrence of personnel electrocution accident.

b. All installation tools and test measuring instruments need to be inspected to ensure that there are no safety hazards, in the process of use, will not cause equipment damage and personal injury.

C. During the installation process, strictly comply with the installation requirements, and after completing the installation work, carry out a comprehensive inspection to ensure that there is no tool omission, material omission and other problems, to avoid short-circuiting, electrocution and other accidents caused by tools and materials.


Part 4:Electrical wiring

4.1 Electrical environment

	Electrical environments requirements
Before connecting the device to the power supply and distribution system, specify the electrical parameters of the power supply and distribution system.	

- a. Rated voltage:AC 0.4KV;AC 0.48KV;AC 0.69KV
- b. Rated frequency:50Hz/60Hz;
- c. Phase type: 3 phase 4 wire
- d. Safety ground:Be sure to confirm the location of the safe ground point on site.

4.2 Terminal definition

	Definition
Please make electrical connection in strict accordance with the definition of equipment identification terminals. Any unauthorized change and electrical connection is strictly prohibited to avoid equipment damage, power supply and distribution system failure and personal injury.	

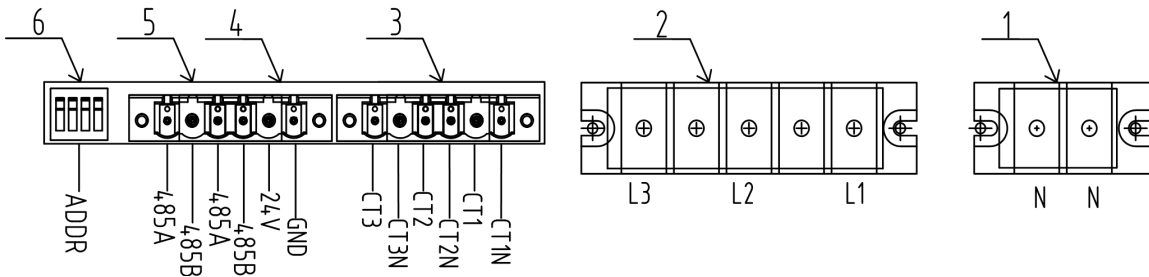



Figure 4-1

	Purpose	Terminal No.		Purpose	Terminal No.
1	Neutral Line	N*2	4	DC 24V Auxiliary power supply	24V、 GND
2	Main loop incoming line	L1、 L2、 L3	5	RS485 Communication terminal	485A、 485B 485A、 485B
3	Current sampling input	CT1/CT1N CT2/CT2N CT3/CT3N			

Table 4-1

4.3 Electrical wiring

	Safety operation
To ensure the normal operation of the device and good compensation effect, please strictly follow the design drawings and device installation instructions for wiring, and strictly follow the safety operation process for electrical wiring to avoid personal injury and equipment failure.	

a. The main power cable access location is downstream of the system reactive power compensation cabinet and upstream of electrical access point of the load device.

b. The current sampling transformer installation position is downstream of the active harmonic filter (AHF) and upstream of the load power equipment. The direction of the current sampling transformer installation is as follows: P1 points to the power supply side of the grid, and P2 points to the side of the load power equipment side.

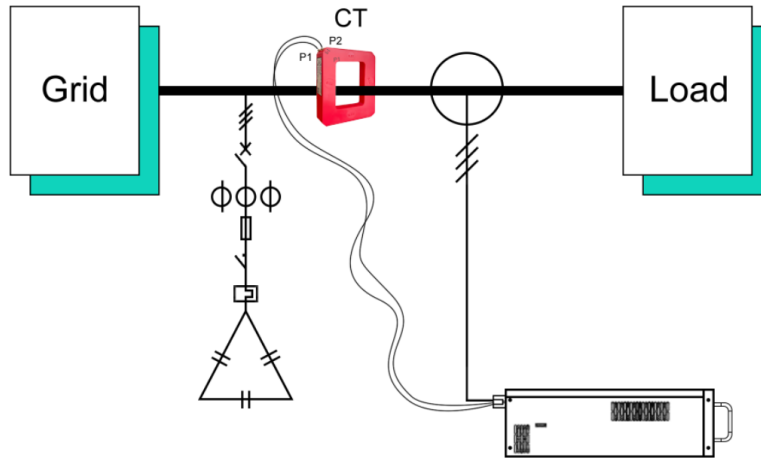


Figure 4-2

c. After electrical wiring is completed, verify that the phase sequence of the main power cable connection is correct, the phase sequence of the current sampling transformer cable connection is correct, and the phase sequence between the power loop and the current transformer loop is consistent.

d. The minimum allowable ratio of the external current transformer is 150:5, and the maximum allowable ratio is 8000:5. Between the two settings, the ratio can be set according to the actual current transformer in use.(The CT requirement for secondary side is 5A).

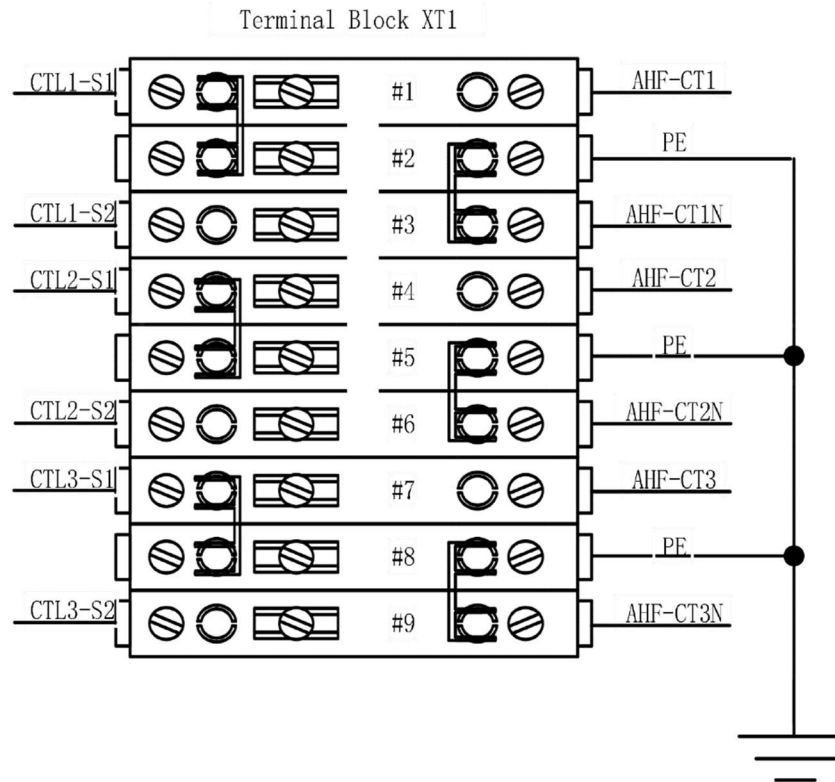


Figure 4-3

e. After completing the wiring, please make sure to check all cables to ensure that the connections are tight, that there are no short circuits between phases of the main power circuit, that there are no open circuits on the secondary side of the current sampling transformer, and that there are no loose or false connections on any of the cables, in order to avoid heat generation due to poor contact or high voltages due to open circuits, which could result in fires or accidents with personal injuries.

f. Before the equipment is electrically connected and commissioning has not yet taken place, make sure that the main power circuit switch is disconnected, that there is no danger of electric shock, and that the secondary side of the current sampling transformer is shorted.

4.4 Check electrical connection

1) All cables are firmly connected, no false connections, loose problems.

2) All cables are clearly marked, supporting electrical drawings, please be sure to properly store.

3) All AHF modules, voltage and current sampling loops, L1/L2/L3 in right phase sequence.


4) Voltage sampling loop, between L1/L2/L3, no short circuit

5) Current sampling loop with no open circuit between CT1/CT1N, CT2/CT2N, CT3/CT3N.

6) All connecting cables should be left with sufficient length allowance to prevent cable tightness.

7) All cables tied and fixed without flying wires.

Part 5:HMI Interaction system

	Device debugging
Before the commissioning of the equipment on the power, we must confirm that all external wiring is reliable and clearly labeled, strictly comply with the requirements of safe operation, the use of tested and reliable tools and protective gear, good protection of personnel, to prevent equipment damage and personal injury accidents.	

5.1 MCGS Centralized Monitor OS (optional)

5.1.1 External wiring and address dipping code adjustment

The MCGS centralized monitoring controller wiring operation must be strictly in accordance with the wiring diagram of the operation, all cables must be clearly identified and carefully checked. If the MCGS centralized monitoring controller power supply and RS485 communication loop is connected incorrectly, it will lead to MCGS centralized monitoring controller hardware damage.

Our MCGS centralized monitoring controller adopts DC 24V power supply, which can be directly powered by AHF module auxiliary power supply (24V+, 24V-). The data transmission between AHF module, using RS485 communication mode to ensure the accuracy and timeliness of data transmission. Each MCGS centrally monitors the controller device and manages up to six AHF modules.

Our active harmonic filter modules have dip switches at the rear of the module for module communication address setting.

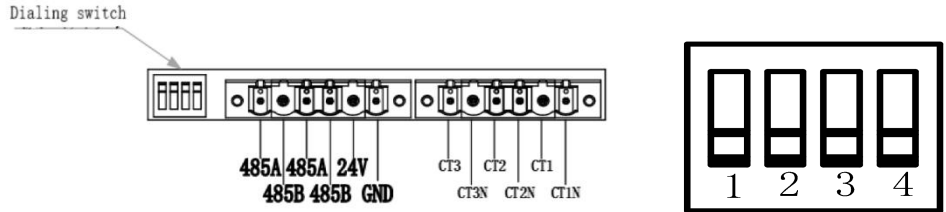


Figure 5-1

When multiple modules (two or more modules) are installed in the cabinet, the RS 485 communication address of all AHF modules must be unique. Otherwise, device communication may be abnormal.

Decimal/binary conversion (8421 code)

Decimal	Binary	Decimal	Binary
1	0001	4	0100
2	0010	5	0101
3	0011	6	0110

Table 5-1

5.1.2 Application interface

Our centralized controller can centrally manage the AHF module, monitor the real-time electrical parameters of the system, administer the compensation output, status information, alarm information and other parameters of all AHF modules, and issue system parameter setting instructions, fault reset instructions, start and stop instructions and other command parameters, while communicating with the host computer monitoring system and uploading real-time system data. Provide data support for the management system.

A. System display interface: Display real-time system electrical parameters, monitor the operating status of all subordinate AHF modules, start/stop/fault reset operations.

At the top is the model capacity column, the time and date column, and the

Chinese and English switching column (CN/EN).



At the bottom is the system function menu bar, which is divided into 7 functions.



Figure 5-2

No.	Function	Definition
1	Detailed data	Real-time electrical parameters of the active harmonic filter module are queried.
2	Data summary	Query and monitor the total operating electrical parameters of active harmonic filter module.
3	Fault Alarms	AHF alarm status, record and reset.
4	Real-time waveform	Enter the real-time waveform query interface of the system, you can query the A/B/C/N phases, the current and voltage waveform before the system compensation, the output waveform of the active harmonic filter (AHF) compensation, and the current and voltage waveform information after the system compensation. Histogram analysis data of successive harmonic components.
5	Manual	Version number of the AHF module and controller.
6	Setup	The AHF module system parameters, protection thresholds, and parallel parameters setting.
7	Rotation mode	Working mode: Manual/Auto.

Table 5-2

The middle position of the interface, displaying the electrical structure of the system, the number of AHF modules under management, and real-time electrical data.

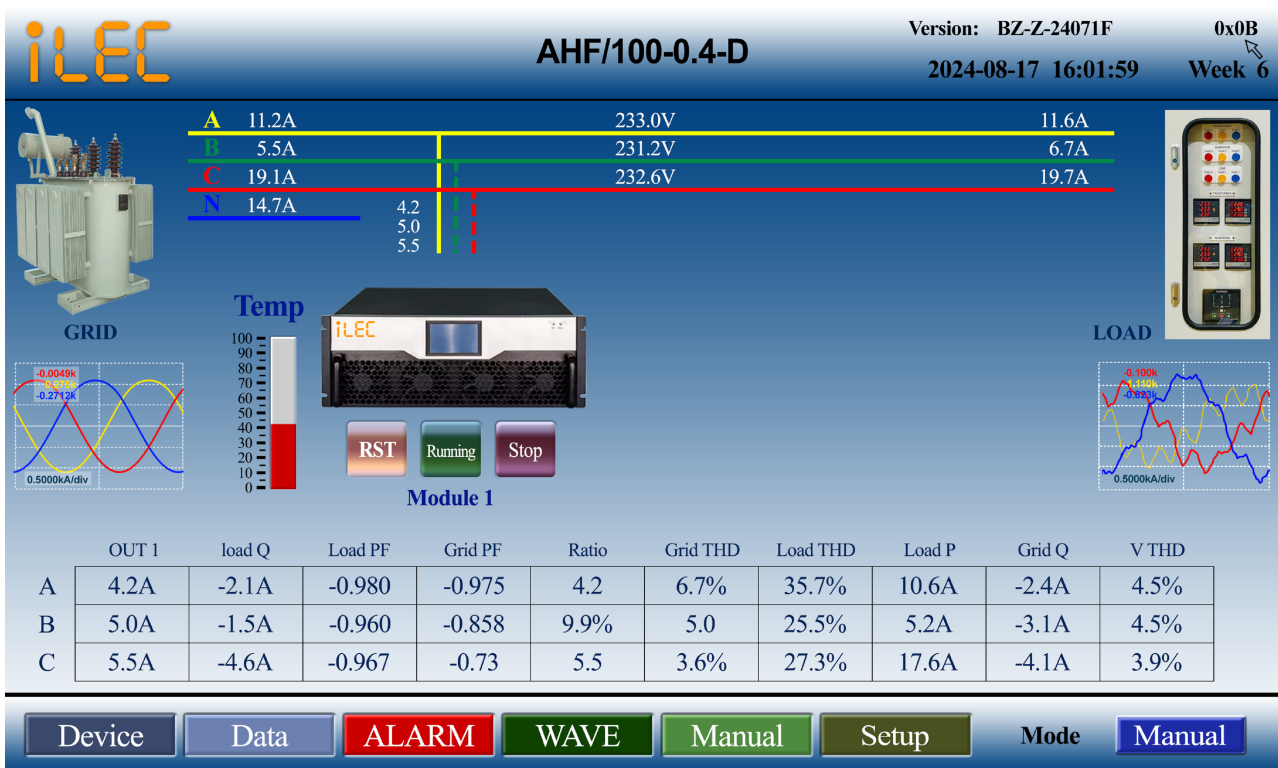


Figure 5-3

The upper section displays real-time current and voltage data of the system.

No.	Name	Definition
1	Left side current data	System real-time current value after compensation.
2	Middle side voltage data	System real-time voltage value.
3	Right side current data	System real-time current value before compensation.

Table 5-3

The middle section displays the status of all AHF modules.

No.	Function	Definition
1	The upper current value	This AHF module compensates the output current amplitude in real time.
2	Icon light	The real-time status of the AHF module is displayed.
3	Buttons below the icon	Start, stop, and reset buttons for AHF modules.

Table 5-4

The bottom section displays the real-time detailed electrical data of the system.

No.	Name	Definition
1	OUT I	Real-time output total compensated current amplitude of all AHF modules. A/B/C 3 phase (A)
2	Load Q	Load side real-time reactive current value. A/B/C 3 phase (A)
3	Load PF	Load side real-time power factor. A/B/C 3 phase
4	Grid PF	Grid side real-time power factor. A/B/C 3 phase
5	Ratio	Total load ratio of all AHF modules in real time. A/B/C 3 phase (%)
6	Grid THD	Grid side real-time THDI. A/B/C 3 phase (%)
7	Load THD	Load side real-time THDI. A/B/C 3 phase (%)
8	Load P	Real-time active power amplitude. (A)
9	Grid Q	Real-time reactive power amplitude. (A)
10	Voltage THD	System harmonic voltage distortion rate. (A)

Table 5-5

B.Detailed parameter interface: Displays the real-time electrical data of all administrative AHF modules.

Monitor>Detail

	Vdc	DcIfuc	V_Nen	Nenufluc	TempA	TempB	TempC	Frep	CT
MOD1	740V	0.9V	-0.6V	0.1V	47.0℃	49.0℃	48.0℃	49.97Hz	300:5
OFF	0.0V	0.0V	0.0V	0.0V	0.0℃	0.0℃	0.0℃	0.0Hz	300:5
OFF	0.0V	0.0V	0.0V	0.0V	0.0℃	0.0℃	0.0℃	0.0Hz	300:5
OFF	0.0V	0.0V	0.0V	0.0V	0.0℃	0.0℃	0.0℃	0.0Hz	300:5
OFF	0.0V	0.0V	0.0V	0.0V	0.0℃	0.0℃	0.0℃	0.0Hz	300:5
OFF	0.0V	0.0V	0.0V	0.0V	0.0℃	0.0℃	0.0℃	0.0Hz	300:5

	VgridA	VgridB	VgridC	LoadIA	LoadIB	LoadIC	LoadiA	LoadiB	LoadiC
MOD1	740V	0.9V	-0.6V	52.1A	52.5A	52.9A	-1.6A	-1.5A	-1.5A
OFF	0.0V	0.0V	0.0V	0.0A	0.0A	0.0A	0.0A	0.0A	0.0A
OFF	0.0V	0.0V	0.0V	0.0A	0.0A	0.0A	0.0A	0.0A	0.0A
OFF	0.0V	0.0V	0.0V	0.0A	0.0A	0.0A	0.0A	0.0A	0.0A
OFF	0.0V	0.0V	0.0V	0.0A	0.0A	0.0A	0.0A	0.0A	0.0A
OFF	0.0V	0.0V	0.0V	0.0A	0.0A	0.0A	0.0A	0.0A	0.0A

Next

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Figure 5-4

C.Parameter setting interface:Set the parameters of all AHF modules under the MCGS centralized monitoring controller.

Set>Detail

Save Quit

MOD1 ON	Order	3	5	7	9	11	MOD4 OFF	Order	0	0	0	0	0
740V 0V	Phase	6	10	14	18	22	0V 0V	Phase	0	0	0	0	0
	Ampli.	0	100	100	0	0		Ampli.	0	0	0	0	0
MOD2 OFF	Order	0	0	0	0	0	MOD5 OFF	Order	0	0	0	0	0
0V 0V	Phase	0	0	0	0	0	0V 0V	Phase	0	0	0	0	0
	Ampli.	0	0	0	0	0		Ampli.	0	0	0	0	0
MOD3 OFF	Order	0	0	0	0	0	MOD6 OFF	Order	0	0	0	0	0
0V 0V	Phase	0	0	0	0	0	0V 0V	Phase	0	0	0	0	0
	Ampli.	0	0	0	0	0		Ampli.	0	0	0	0	0

<< 1/2 >>

Figure 5-5

Click the "OFF" button after "Device 1" and "Device 2" on the left. When "OFF" is changed to "ON", the corresponding communication channel is successfully enabled. According to the actual number of modules connected to the system, the corresponding communication channel is enabled.

After the communication channel is successfully opened, the corresponding information of the rated capacity of the active harmonic filter "100A", the DC bus voltage "750V" and the filter parameter setting "times", "phase" and "amplitude" will be read.


Refer to Table 5-7, page 21, for parameter settings and definitions.

	MOD1	OFF	OFF	OFF	OFF	OFF
Mode	0	0	0	0	0	0
K_Q	100	0	0	0	0	0
CT Ratio	3000	0	0	0	0	0
CT_Positi.	1	0	0	0	0	0
Unbalance	0	0	0	0	0	0
Wave_Type	9345	0	0	0	0	0
Q/PF Tar.	990	0	0	0	0	0
Phase Off.	0	0	0	0	0	0
Closetloop	0	0	0	0	0	0
Priority	0	0	0	0	0	0
Model	AHF/150-0.4					

Auto Control Parameter	
UP%	60%
Down%	20%
Tsample	120S
Tduty	240h
Auto START/STOP Parameter	
START%	6%
STOP%	5%
Tsample	600S
ENABLE	0

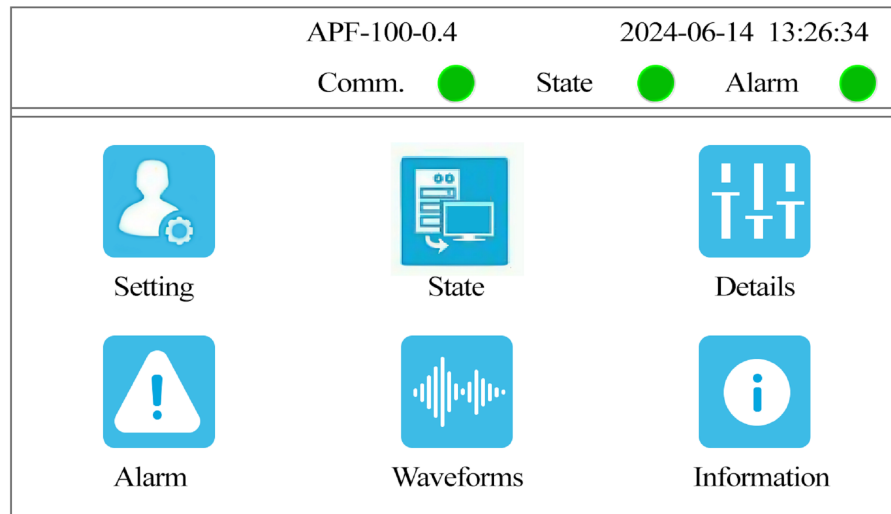
Figure 5-6

5.2 Single module touch screen OS (optional)

	Data Setting
<p>Please set the electrical parameters of the equipment strictly based on the site electrical environment data. Please be sure to confirm equipment operation mode, function selection and other parameters according to the site electrical environment parameters before putting them into use. Wrong parameter setting and function selection will cause a decrease in equipment efficiency! Equipment damage and failure! And the power supply and distribution system trip and other accidents!</p>	

A.Home page

The power is on after the external the wiring of AHF is confirmed, the LCD touch screen will be lit up and switch into monitoring interface.



Top portion of the screen display (Figure 5-7):

No.	Name	Definition
1	Model type	AHF-100-0.4-D (50A-0.4KV/0.69KV)
2	Communication and state	Communication:0/2 ; State:Stop/Running
3	Time	2024/06/14 13:26:34

Bottom of the screen (Figure 5-7):

No.	Function	Definition
1	Settings	For setting device parameters
2	State	Displays real-time electrical data of the system and operational data of the device
3	Details	Displays real-time harmonics and their current values for both load side and grid side of the three phases
4	Alarm	Displays real-time device alarm information, as well as history for alarms
5	Waveforms	Displays the waveforms of voltage and the waveforms of current before, during and after compensation of three phases.
6	Information	Displays real-time temperatures of device's internal critical components such as the IGBT.

Table 5-6

B.State monitoring interface

The state monitoring screen mainly displays the system electrical and the electrical parameters of the device operation.

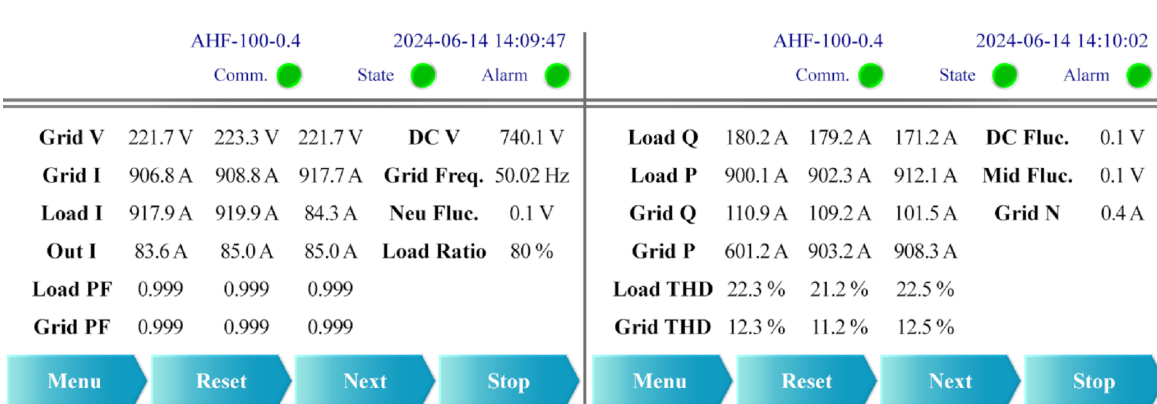


Figure 5-8

C.Setting

In the main menu interface of the device, you can choose to enter the device parameter setting interface to set the electrical parameters of the device and select the device function.

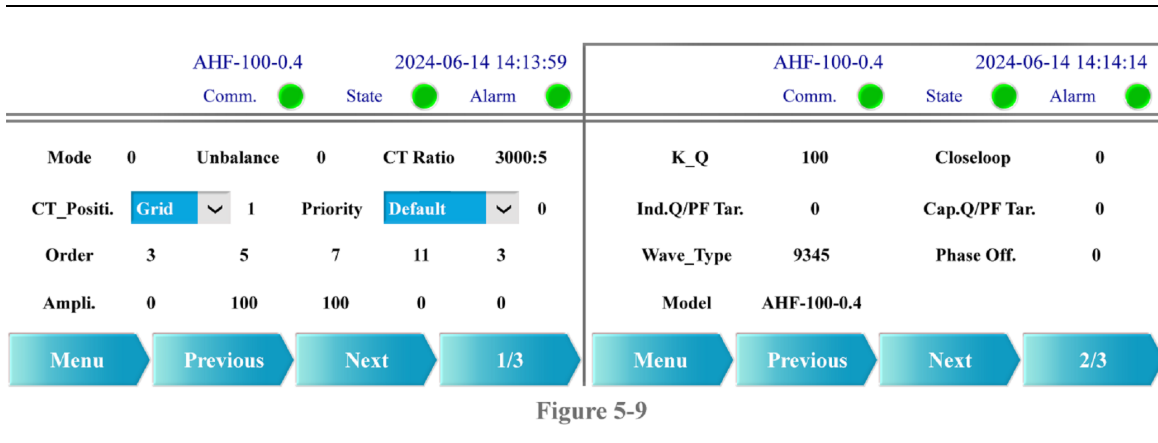


Figure 5-9

Setting option definition

Setting	Definition	Setting	Definition
Mode	<p>Device work mode.</p> <p>0: Full manual start mode, 1: Automatic start when power on.</p> <p>After the device run well, please set mode to 1, Once power failure, the device will restart automatically when power on.</p>	Unbalance	<p>Three-phase imbalance compensation output coefficient.</p> <p>0: No Compensation. 50: 50% Compensation. 100: 100% Compensation.</p>
CT Ratio	<p>Indicates external CT ratio.</p> <p>Directly enter the real primary value of the sampling CT in the setting column. (For example, if the sampling CT is 500:5, then enter 500 directly).</p>	CT_Positi. (CT Position)	<p>0: CT installed on the Load Side 1: CT installed on the Grid Side</p>
Priority	<p>Indicates the priority selection after full load. The factory default setting is 0.</p> <p>0: Compensate automatically 1: Reactive power compensation is priority. 2: Harmonic control is priority. 3: Unbalance is priority.</p>	Order	<p>Harmonic orders that need compensation (default setting is 3-13).</p> <p>For more than 13th order, please contact us.</p>

Ampli.	<p>The percentage of harmonic compensation.</p> <p>Choose the heaviest harmonic orders and set the value to 100</p>	Closetloop	<p>Coefficient for reactive power compensation.</p> <p>0: Open loop mode</p> <p>1: Close loop mode</p>
Cap. Q /PF Tar.	<p>Reactive power output target value when the load is capacitive.</p> <p>Capacitive PF Target Mode is power factor target mode. When the active power is stable and not small, we can use PF Target mode to make the Gird PF to meet the requirement; The setting value is $-999 \leq Q/PF Tar \leq -800$. SVG will regulate to reach the setting power factor. Our suggestion is 980 or 990.</p> <p>Q Mode is the remaining reactive current mode. When the active power is small, we can use Q mode to make the Gird Q to meet the requirement. The setting value is $-50 \leq Q/PFtar \leq 0$. It indicates SVG will work to reach the setting remaining reactive power value.</p>	Ind. Q/PF Tar.	<p>Reactive power output target value when the load is inductive.</p> <p>Inductive PF Target Mode is power factor target mode. When the active power is stable and not small, we can use PF Target mode to make the Gird PF to meet the requirement; The setting value is $800 \leq Q/PF tar \leq 999$. SVG will regulate to reach the setting power factor. Our suggestion is 980 or 990.</p> <p>Q Mode is the remaining reactive current mode. When the active power is small, we can use Q mode to make the Gird Q to meet the requirement. The setting value is $0 \leq Q/PFtar \leq 50$. It indicates SVG will work to reach the setting remaining reactive power value.</p>
K_Q	<p>Reactive Power Compensation Output Ratio.</p> <p>0: No compensation,</p> <p>100: 100% compensation.</p>	Phase Off.	<p>Phase lag correction for reactive power calculation. The factory default setting is 0.</p>
Wave_Type	(No need to set)	Model	(No need to set)

Table 5-7

5.3 Operation

5.3.1 Data inspection

After parameter setting, click the "Close" button to return to the main monitoring interface of the centralized monitoring controller.

Firstly, confirm the grid voltage and frequency displayed by the centralized controller, ensure that the relevant sampling data of the equipment is consistent with the reality, and that the grid current is consistent with the load current, as well as the grid THD is consistent with the load THD.

Secondly check "detailed data" interface for the measurement information of the system, and check the electrical data from the main interface of the centralized monitoring controller and the detailed information interface with the actual electrical data of the system to ensure the consistency of the data.

If the data display is abnormal, do not boot. Check the system parameter settings, power off the device, and check whether the external cable of the device is correct.

5.3.2 Start up

Be sure to confirm that the sampling data of the active harmonic filter device is normal on the centralized controller or the controller delivered with the module. Select device functions and set parameters according to the actual situation.

After confirming that the data is consistent, click the "Run" button below each device to start the device for harmonic control.

5.3.3 The compensation effect

After the device starts up normally with no fault alarms, view the main interface data.

The data on the main interface of centralized controller, the compensation current value will rise, Grid THD will have a corresponding drop. If the function of

reactive power compensation is turned on, the "Grid PF" will be increased accordingly if the equipment capacity is sufficient, and other data will remain the same as before the equipment is turned on.

Through the "Detail","waveform" and "Spectrum" data,view the harmonic content after compensation, and harmonic compensation effect.

After compensated by active harmonic filter, all the "load side" and "before compensation" relevant data should remain unchanged compared with that before the equipment starts up.The "grid-side" and "after-compensation" related data should be significantly lower than before the equipment was turned on.

5.4 Shut down

After confirming that there is no abnormal alarm information,if the filtering work is not needed,return to the centralized controller and stop the equipment compensation output.After entering the standby state, disconnect the AHF power inlet switch and shut down the equipment.

After the active harmonic filter is debugged and the equipment is shut down,be sure to check the below items.

a. AHF Power supply inlet switch is disconnected to ensure that the inlet contact of the main circuit of the equipment is not charged.

b. If there is no AHF operation plan for a short time, please hang the "No closing" sign on the obvious place.

c. Please make sure that the secondary side of the external current transformer of the AHF is in a short connection state to avoid the short circuit and personal injury accident caused by the open circuit of the secondary side of the current transformer.

Part 6:Site Commissioning

Step 1:Check if all wiring is correct(primary phase sequence,secondary side CT current transformer wiring per phase circuit should be S1connected to CT1,S2 connected to CT1N,confirm if 24V power supply and communication access between controller and module is correct).

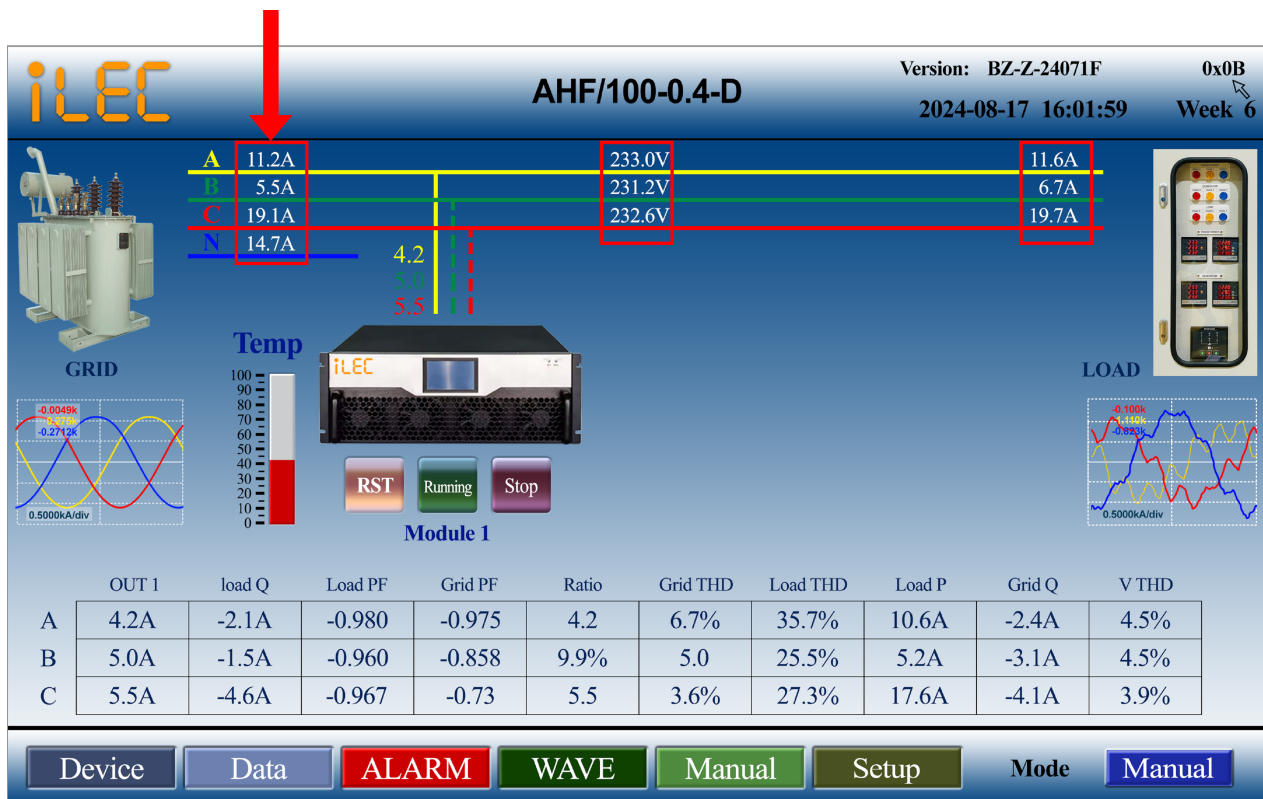
Step 2:There is dip switch at the left side of the terminal bar,set the module from top to bottom.

- ① The first module dials the 4 up
- ② The second module dials the 3 up
- ③ The third module dials 3 and 4 up
- ④ The fourth module dials 2 up
- ⑤ The fifth module dials 2 and 4 up
- ⑥ The sixth module dial 2 and 3 up



Step 3:The circuit breaker in the filter cabinet can be closed to power on the module in the cabinet, and the controller on the cabinet door will light up when the wiring is correct and the dialing is completed.

- ① Firstly, you will directly enter the main interface and observe whether the voltage and current is normal (load current and grid current need to be compared with the measurement meter of the system).



②Enter the parameter setting interface (password:9345).There are two pages for parameter setting.On the first page,open the channel of device 1 and device 2 (after device 1 and device 2,or there is red ON in English to indicate that the channel is open,and OFF to indicate that the channel is closed).After opening the first two channels,you will find that the amplitude corresponding to 5 and 7 times is 100,and the other times are 0.On the second page,the working mode,reactive power coefficient and unbalance coefficient are both 0,and the transformer ratio is the first value of the actual sampling transformer (for example,when the sampling transformer is 1000:5,input 1000 at the transformer ratio).The position 0 of the transformer represents the load side connection method.The value to be input is determined according to the actual access position on the site.The attached parameter setting picture is for reference.


③Click the red "save" button in right up corner exit return to the home page.

④Observe the parameters on the controller such as voltage and current again.When the parameters are consistent with the system,you can click the operation button of the module on the controller.At this time,the equipment will operate normally.Please continue to observe after operation,compare whether the THD of the power grid is reduced than before the equipment is put into operation,and observe the current,voltage and other data before entering the detailed data interface.

During data setting and operation, please take pictures of the data setting pages (three main interfaces: Home page, Detail data 1 and Detail data 2).If have any questions, please don't run the device and immediately contact our technical staff to confirm for support.

Data setting 1:

Set>Detail


Save
Quit 

MOD1 ON 740V 0V	Order	3	5	7	9	11	MOD4 OFF 0V 0V	Order	0	0	0	0	0
	Phase	6	10	14	18	22		Phase	0	0	0	0	0
	Ampli.	0	100	100	0	0		Ampli.	0	0	0	0	0
MOD2 OFF 0V 0V	Order	0	0	0	0	0	MOD5 OFF 0V 0V	Order	0	0	0	0	0
	Phase	0	0	0	0	0		Phase	0	0	0	0	0
	Ampli.	0	0	0	0	0		Ampli.	0	0	0	0	0
MOD3 OFF 0V 0V	Order	0	0	0	0	0	MOD6 OFF 0V 0V	Order	0	0	0	0	0
	Phase	0	0	0	0	0		Phase	0	0	0	0	0
	Ampli.	0	0	0	0	0		Ampli.	0	0	0	0	0

<< 1/2 >>

Data setting 2:

Set>Detail


Save
Quit 

	MOD1	OFF	OFF	OFF	OFF	OFF	Auto Control Parameter		
Mode	0	0	0	0	0	0	UP%	60%	
K_Q	100	0	0	0	0	0	Down%	20%	
CT Ratio	3000	0	0	0	0	0	Tsample	120S	
CT_Positi.	1	0	0	0	0	0	Tduty	240h	
Unbalance	0	0	0	0	0	0	Auto START/STOP Parameter		
Wave_Type	9345	0	0	0	0	0	START%	6%	
Q/PF Tar.	990	0	0	0	0	0	STOP%	5%	
Phase Off.	0	0	0	0	0	0	Tsample	600S	
Closeloop	0	0	0	0	0	0	ENABLE	0	
Priority	0	0	0	0	0	0			
Model	AHF/150-0.4								

<< 2/2 >>

*CT Ratio setting should take the CT primary value. The default secondary value is 5A.

Part 7: Maintenance

	Maintenance
<p>All equipment maintenance and trouble shoot should be conducted strictly based on instructions, and must be conducted after the power is off to avoid personal injury accidents.</p>	

a. All equipment maintenance and repair work must be carried out under the condition of power failure, please ensure that the main circuit switch of the equipment is disconnected, no person is in danger of electric shock, the equipment can be overhauled, and the power supply can be reconnected after all maintenance work is completed and checked.

b. Because the AHF adopts DC bus capacitor, all equipment maintenance work should conduct after cutting off the equipment power supply, need to wait for 10 minutes, to ensure that the DC bus capacitor discharge, before the demolition, maintenance operation.

c. Without permission, do not disassemble AHF module, to avoid personal injury and equipment failure accident, warranty label tear products are not within the scope of warranty.

d. Regular cleaning or replacement of the dust shell, it is recommended once a month to ensure that the equipment ventilation and heat dissipation is normal, to avoid overheating problems resulting in equipment compensation effect decline, equipment can not run normally.

e. Please ensure that the equipment nameplate label is complete and the display information is clear for later equipment maintenance time query reference.