450

AMC16Z Series AC Precision Power Distribution Monitoring System

Installation and Operation Instruction V1.2

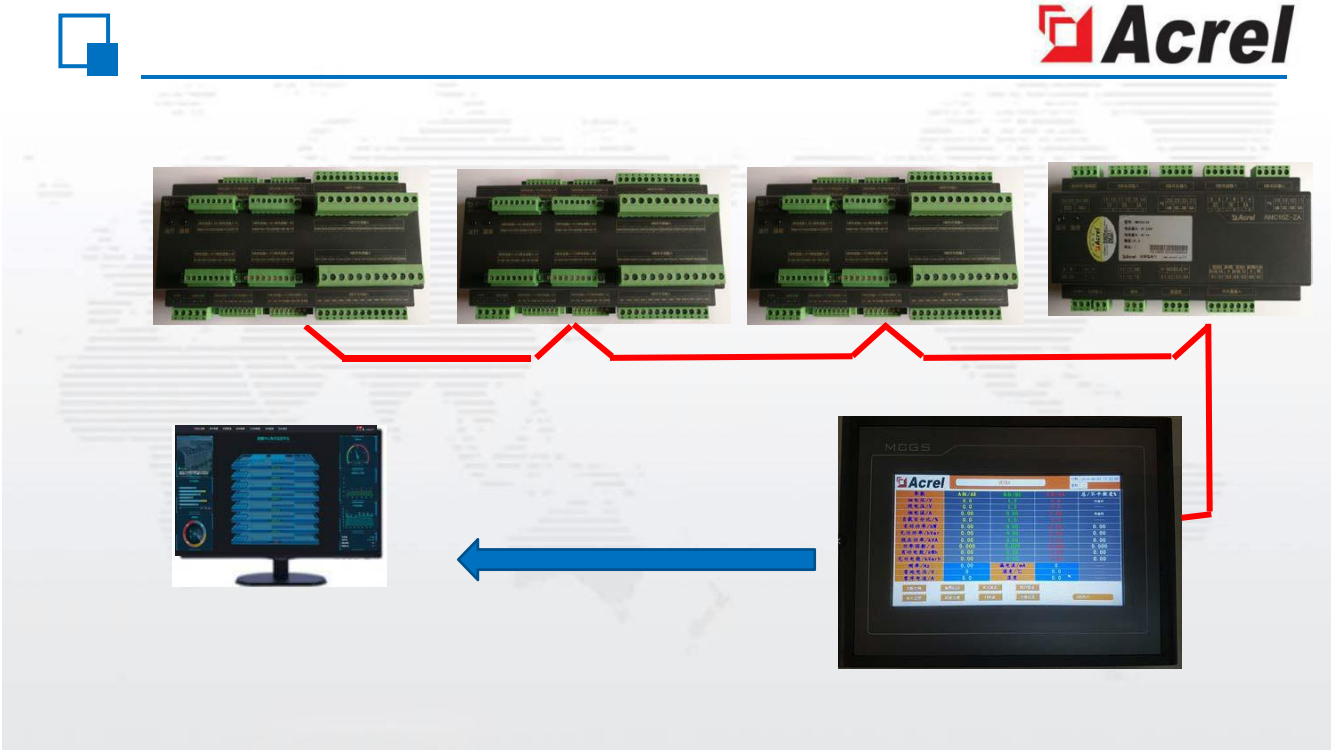
Acrel Co.,LTD

Declaration

The company reserves the rights to modify the specifications of the product described in this manual without prior notice. Please consult your local agent for latest specifications before ordering.

Content

1 Overview



With the rapid development of data centers, the energy management and power supply and design concerning with data center has already become a hot issue. High efficiency and reliability of power supply system solutions for data center is an effective way to improve the power consumption efficiency and reduce the equipment energy consumption. To realize the energy saving for data center, it is necessary to monitor every electrical load first. However, there are too many electrical load circuits in the data center, traditional measuring meters cannot meet the requirements of cost, volume, installation, construction and other aspects. Therefore, it is necessary to use multi-circuit monitoring devices that are suitable for centralized monitoring in data center.

Acrel AMC16Z series AC precision power distribution monitoring device is specially designed for data center server power management. The device is designed exquisite and can provide real-time monitoring for A+B two incoming and 96 outgoing circuits' all electric parameters, input and output switch and lightning arrester status, all alarm threshold of measuring channels can be set separately, line-crossing and limit-exceeding instantly trigger the audible and visual alarm, realizing the high integration of monitoring circuits in the volume of traditional meters.

2 Product model

Type	Function description
AMC16Z-ZA(-P24)	Monitor the full power parameters of A+B double-way three-phase AC input circuit, status of 6-way switch monitoring, 2-way alarm output, 2-way electric leakage monitoring, 1-way temperature and humidity detection, 1-way R3485 communication, phase sequence detection, DC24V independent auxiliary power supply.
AMC16Z-FA	Monitor the full power parameters of A+B double-way AC output of 24 shunt circuits, 1-way RS485 communication, phase adjustment.
AMC16Z-FAK24	Monitor the full power parameters and switch status of A+B double-way AC output of 24 shunt circuits, 1-way RS485 communication, phase adjustment.
AMC16Z-FAK48	Monitor the full power parameters and switch status of A+B double-way AC output of 48 shunt circuits, 1-way RS485 communication, phase adjustment.
AMC16Z-KA	Wet contact, monitor the switch status of A+B total 48 shunt circuits, 1-way RS485 communication.

AMC16Z-KD	Dry contact, monitor the switch status of A+B total 48 shunt circuits, 1-way RS485 communication.

3 Technical Parameter

AC Input Lines

Type		AMC16Z-ZA(-P24)
Measured parameters		Voltage, current, frequency, active power, reactive power, power factor, active electric energy, reactive electric energy
		Zero ground voltage, zero sequence current, total harmonic content (THD),2-63 harmonics, current and voltage unbalance degree, current K factor (KF), voltage crest factor (CF), telephone waveform factor (THFF), peak voltage, voltage and current sequence quantity, environmental temperature and humidity.
Busbar voltage	Rated	220VAC
	Measurement range	±20%
	Overload	Instant voltage 2 times/s
Current input circuit	Rated	Twice 5A
	Range	0～6A
	Overload	Duration 1.2 times, instantaneous 10 times/s
Temperature and humidity	Temperature range	-40℃～+99℃
	Humidity range	20%～90%
Input Frequency		45～60Hz
Measurement precision	Inlet wire	Voltage/current 0.2 Class, active power/electric energy 0.5 Class, reactive power/electric energy 1 Class
	Temperature	±1℃
	Humidity	±5%
Auxiliary power supply		AMC16Z-ZA: signal power supply (≤15W) AMC16Z-ZA-P24:DC24V independent auxiliary power supply
Environment	Temperature	Work: -15℃～55℃ Storage: -25℃～70℃
	Humidity	Relative humidity≤93%
	Altitude	≤2500m
Switch output		2-way 3A 250VAC/3A 30VDC
Switch input		6-way dry contact
Communication		RS485/Modbus-RTU
Installation method		DIN35mm guide rail or base plate installation
Protection degree		IP20
Pollution degree		2
Safety	Insulation	Insulation resistance between all the terminals and shell conductive parts not less than 100MΩ
	Withstand voltage	Circuit A voltage current signal, Circuit B voltage current signal, between the switch output and other terminals meeting AC2kV 1min, between the switch input and other terminals meeting AC0.5kV 1mim, leakage current should be less than 2mA, no breakdown or flashover.

Electromagnetic compatibility	Static interference immunity	Level 4
	Electrical fast transient burst immunity	Level 3
	Surge interference immunity	Level 4
	RF electromagnetic field radiation immunity	Level 3

AC Output Lines

Type		AMC16Z-FA
Measurement parameters		Voltage, current, frequency, active power, reactive power, power factor, active electric energy, reactive electric energy
		2-31 harmonics
Busbar voltage	Rated	220VAC
	Measurement range	±20%
	Overload	Instant voltage 2 times/s
Current output circuit	Rated	50mA
	Range	0.125～60mA
	Overload	Duration 1.2 times, instantaneous 10 times/s
Input Frequency		45～60Hz
Measurement	Outlet wire	Voltage/current, active power/electric energy 0.5 Class, reactive power/electric energy 1 Class
Auxiliary power supply		Powered by AMC16Z-ZA, DC 12-24V when used alone
Environment	Temperature	Work：-15℃～55℃ Storage：-25℃～70℃
	Humidity	Relative humidity≤93%
	Altitude	≤2500m
Communication		RS485/Modbus-RTU
Installation method		DIN35mm guide rail or base plate installation
Protection degree		Protection degree
Pollution degree		Pollution degree
Safety	Insulation	Insulation resistance between all the terminals and shell conductive parts not less than 100MΩ
	Withstand voltage	Circuit A voltage current signal, Circuit B voltage current signal, between other two terminals meeting AC2kV 1min, leakage current should be less than 2mA, no breakdown or flashover.
Electromagnetic compatibility	Static interference immunity	Level 4
	RF electromagnetic field radiation immunity	Level 3

Note: Rated input current at secondary side of AC outgoing line module is 50mA, default value of primary side current is 50A. Customers may set the transformation ratio on the upper computer or on the touch screen accordingly if the current transformers are different.

Type	AMC16Z-FAK24	AMC16Z-FAK48

Measurement parameters		Voltage, current, frequency, active power, reactive power, power factor, active electric energy, reactive electric energy, switch status
		2-31 harmonics
Busbar voltage	Rated	220VAC
	Measurement range	±20%
	Overload	Instant voltage 2 times/s
Current output circuit	Rated	50mA
	Range	0.125～60mA
	Overload	Duration 1.2 times, instantaneous 10 times/s
Input Frequency		45～60Hz
Measurement	Inlet wire	Voltage/current, active power/electric energy 0.5 Class, reactive power/electric energy 1 Class
Auxiliary power supply		Powered by AMC16Z-ZA, DC 12-24V when used alone
Environment	Temperature	Work：-15℃～55℃ Storage：-25℃～70℃
	Humidity	Relative humidity≤93%
	Altitude	≤2500m
Communication		RS485/Modbus-RTU
Installation method		DIN35mm guide rail or base plate installation
Protection degree		IP20
Pollution degree		2
Safety	Insulation	Insulation resistance between all the terminals and shell conductive parts not less than 100MΩ
	Withstand voltage	Circuit A voltage current signal, Circuit B voltage current signal, between other two terminals meeting AC2kV 1min, leakage current should be less than 2mA, no breakdown or flashover.
Electromagnetic compatibility	Static interference immunity	Level 4
	RF electromagnetic field radiation immunity	Level 3

Note: Rated input current of AMC16Z-FAK module secondary side is 50mA，default value of primary side current is 50A. Customers may set the transformation ratio on the upper computer or on the touch screen accordingly if the current transformers are different.

Active switching value module

Type		AMC16Z-KA
Input Frequency		45-60Hz
Auxiliary power supply		Powered by AMC16Z-ZA, DC 12-24V when used alone
Environment	Temperature	Work：-15℃～55℃ Storage：-25℃～70℃
	Humidity	Relative humidity≤93%
	Altitude	≤2500m
Switch input		48-way wet contact （AC 220V）

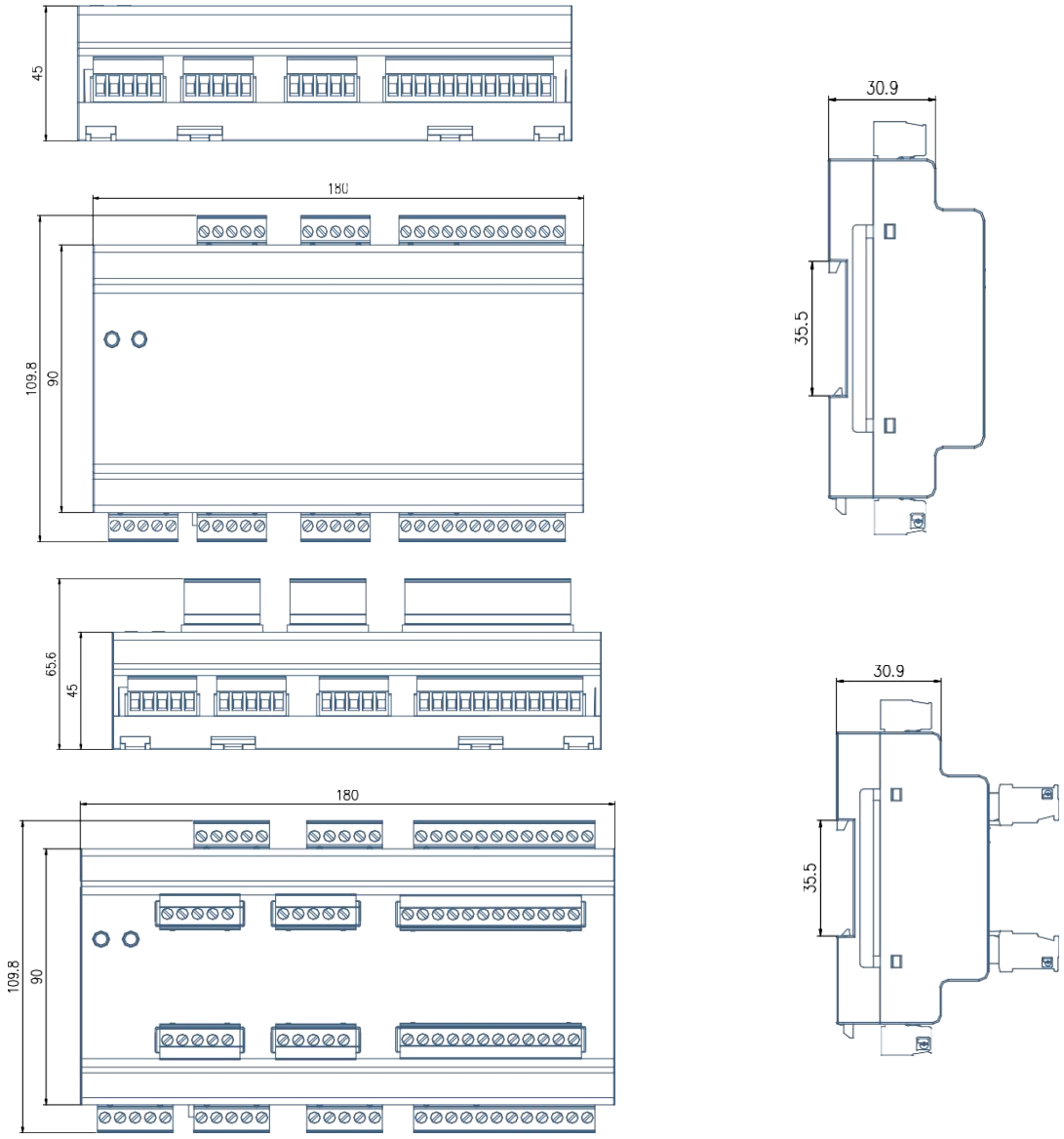
Communication		RS485/Modbus-RTU
Installation method		DIN35mm guide rail or base plate installation
Protection degree		IP20
Pollution degree		2
Safety	Insulation	Insulation resistance between all the terminals and shell conductive parts not less than 100MΩ
	Withstand voltage	Circuit A switch input signal, Circuit B switch input signal, between other two terminals meeting AC2kV 1min, leakage current should be less than 2mA, no breakdown or flashover.
Electromagnetic compatibility	Static interference immunity	Level 4
	RF electromagnetic field radiation immunity	Level 3

Reactive switching value module

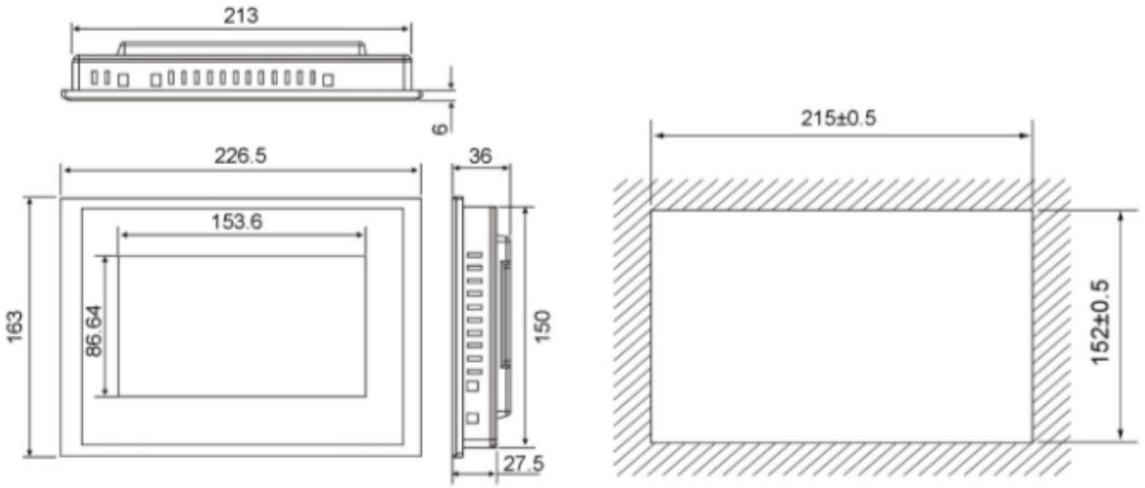
Type		AMC16Z-KD
Input Frequency		45～60HZ
Auxiliary power supply		Powered by AMC16Z-ZA, DC 12-24V when used alone
Environment	Temperature	Work：-15℃～55℃ Storage：-25℃～70℃
	Humidity	Relative humidity≤93%
	Altitude	≤2500m
Switch input		48-way dry contact
Communication		RS485/Modbus-RTU
Installation method		DIN35mm guide rail or base plate installation
Protection degree		IP20
Pollution degree		2
Safety	Insulation	Insulation resistance between all the terminals and shell conductive parts not less than 100MΩ
	Withstand voltage	Circuit A switch input signal, Circuit B switch input signal, between other two terminals meeting AC2kV 1min, leakage current should be less than 2mA, no breakdown or flashover.
Electromagnetic compatibility	Static interference immunity	Level 4
	RF electromagnetic field radiation immunity	Level 3

4 Outline Structure

AMC16Z series AC precision power distribution monitoring device Unit：mm



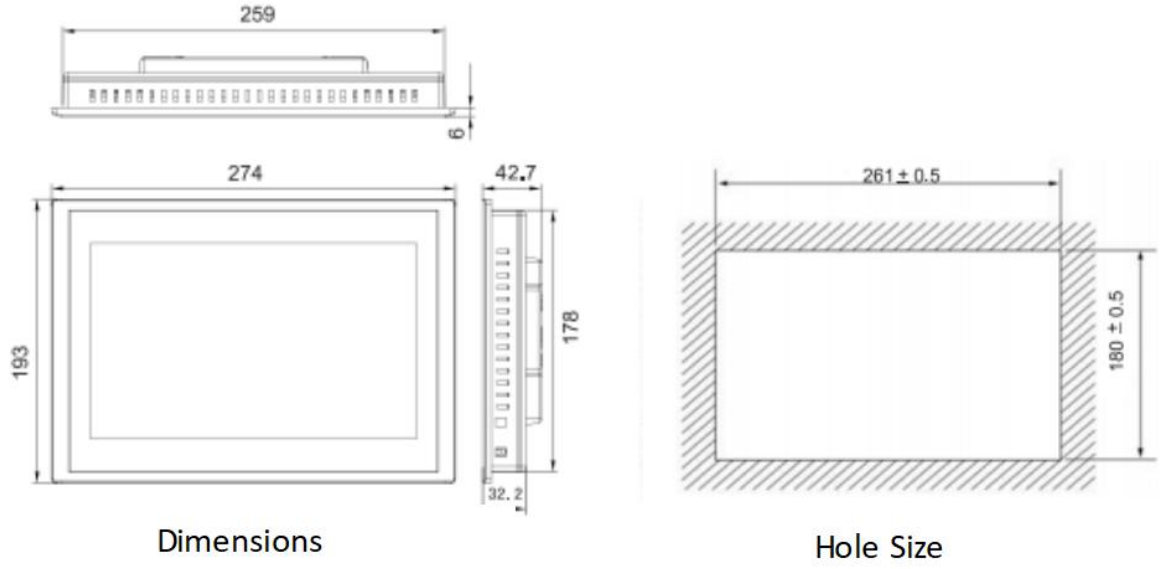
7 inch touch screen shape and installation



Dimensions

Hole Size

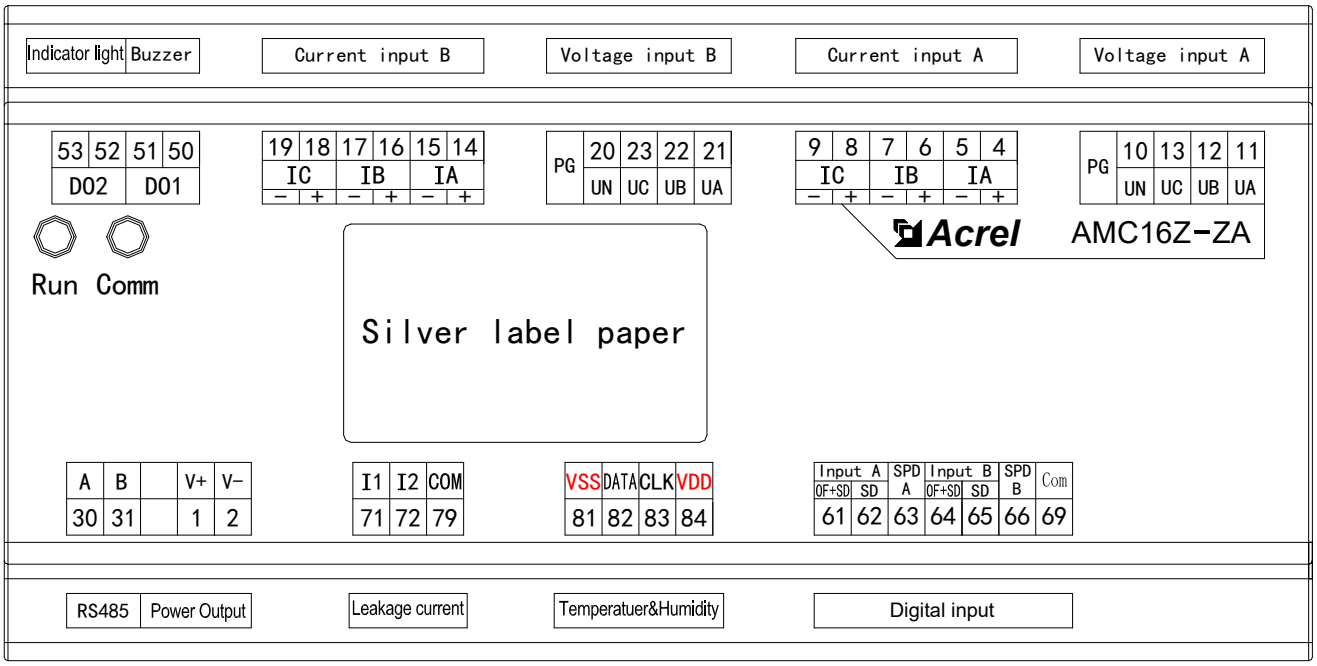
10 inch touch screen shape and installation



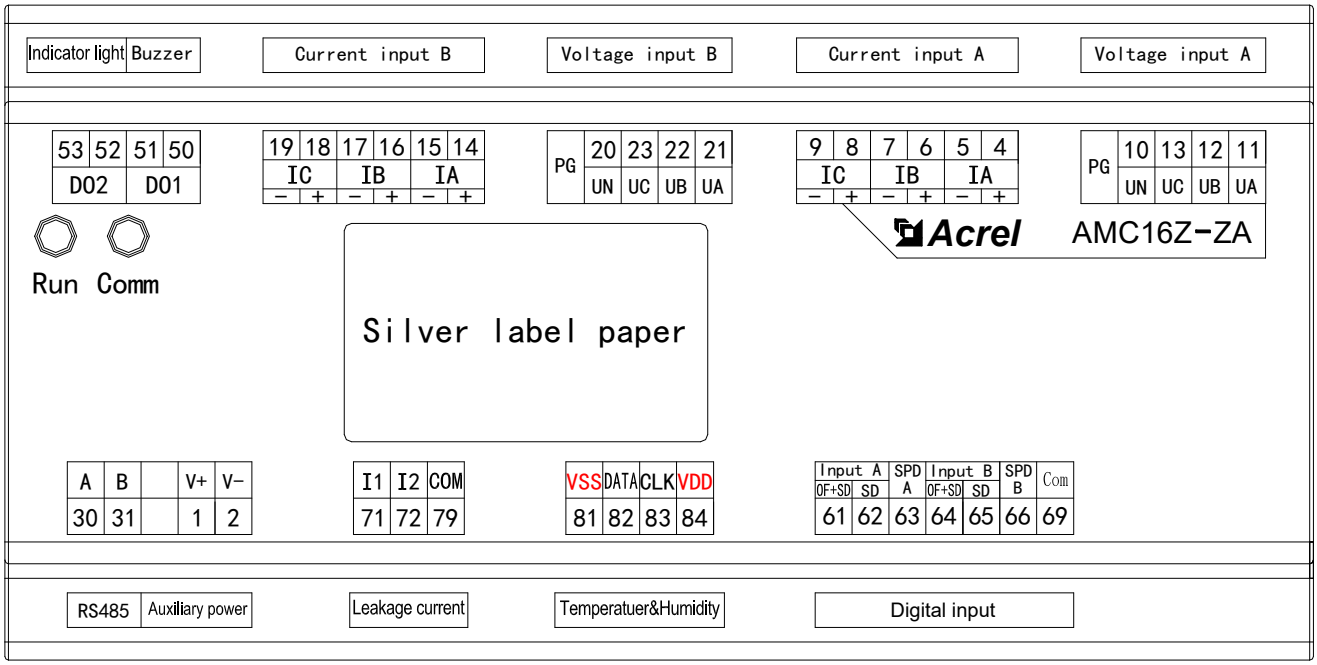
5 Module Wiring

5.1 AMC16Z-ZA、AMC16Z-ZA-P24

（1）AMC16Z-ZA



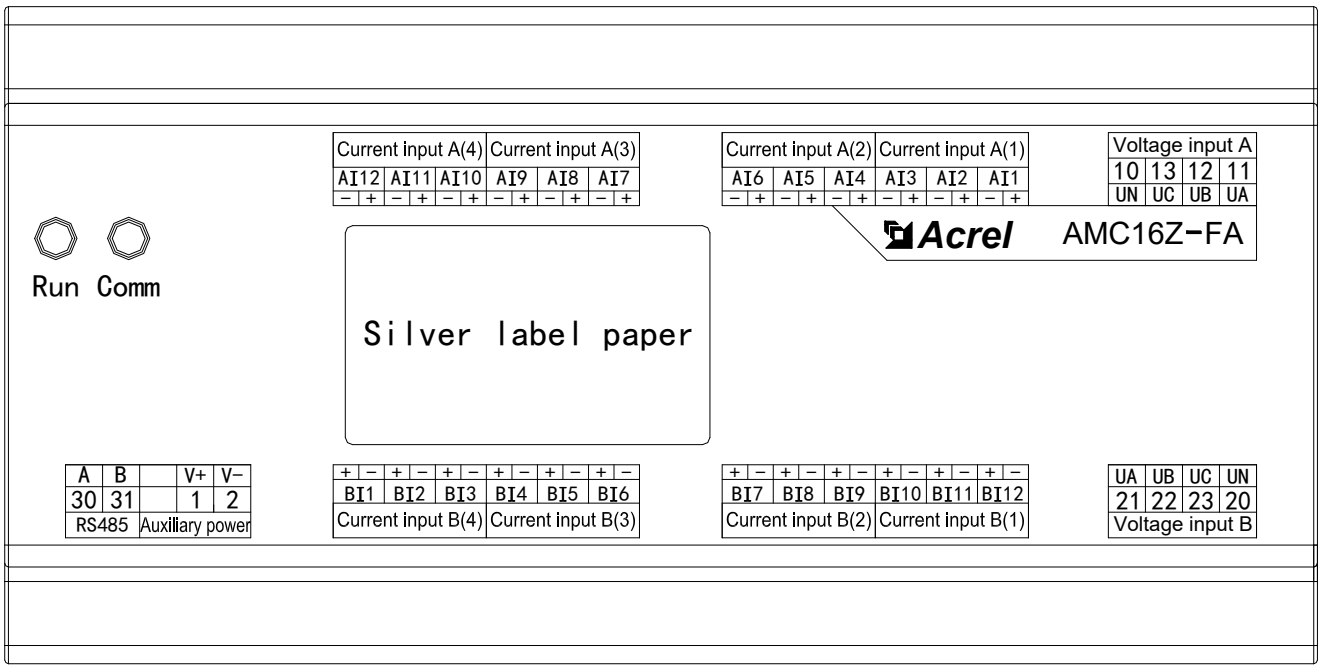
（2）AMC16Z-ZA-P24



Terminal No.	Definition	Explanation	Remark
1	V+	ZA: Power output； ZA-P24: Auxiliary power supply	Power supply to AMC16Z-FA，AMC16Z-FAK24，AMC16Z-FAK48，AMC16Z-KA，AMC16Z-KD and touch screen, it is prohibited to connect the power supply to other devices such as indicator lighter, buzzer;ZA-P24: powered by DC24V
2	V-		
4	IA+	Current input phase A	A-channel incoming line three-phase current input
5	IA-		
6	IB+	Current input phase B	
7	IB-		
8	IC+	Current input phase C	
9	IC-		
10	UN	AC voltage zero line	A-channel incoming line three-phase voltage input
11	UA	AC voltage phase A	
12	UB	AC voltage phase B	
13	UC	AC voltage phase C	
PG		Earth	
14	IA+	Current input phase A	B-channel incoming line three-phase current input
15	IA-		
16	IB+	Current input phase B	
17	IB-		
18	IC+	Current input phase C	
19	IC-		
20	UN	AC voltage zero line	B-channel incoming line three-phase voltage input
21	UA	AC voltage phase A	
22	UB	AC voltage phase B	
23	UC	AC voltage phase C	

PG		Earth	
30	A	RS485 communication	Connect to touch screen or RS485 hub
31	B		
50	DO1	Switch output	Connect to buzzer
51			
52	DO2		Connect to indicator light
53			
61	Inlet line A	Switch input	OF+SD
62			SD
63	Lightning A		Judge the status of circuit A lightning arrester
64	Inlet line B		OF+SD
65			SD
66	Lightning B		Judge the status of circuit B lightning arrester
69	Public terminal		Switching value common terminal
71	I1	Leakage	1st circuit leakage current
72	I2		2nd circuit leakage current
79	COM		Leakage common terminal
81	VSS	Temperature and humidity	Connect to WH-3 temperature and humidity sensor
82	DATE		
83	CLK		
84	VDD		

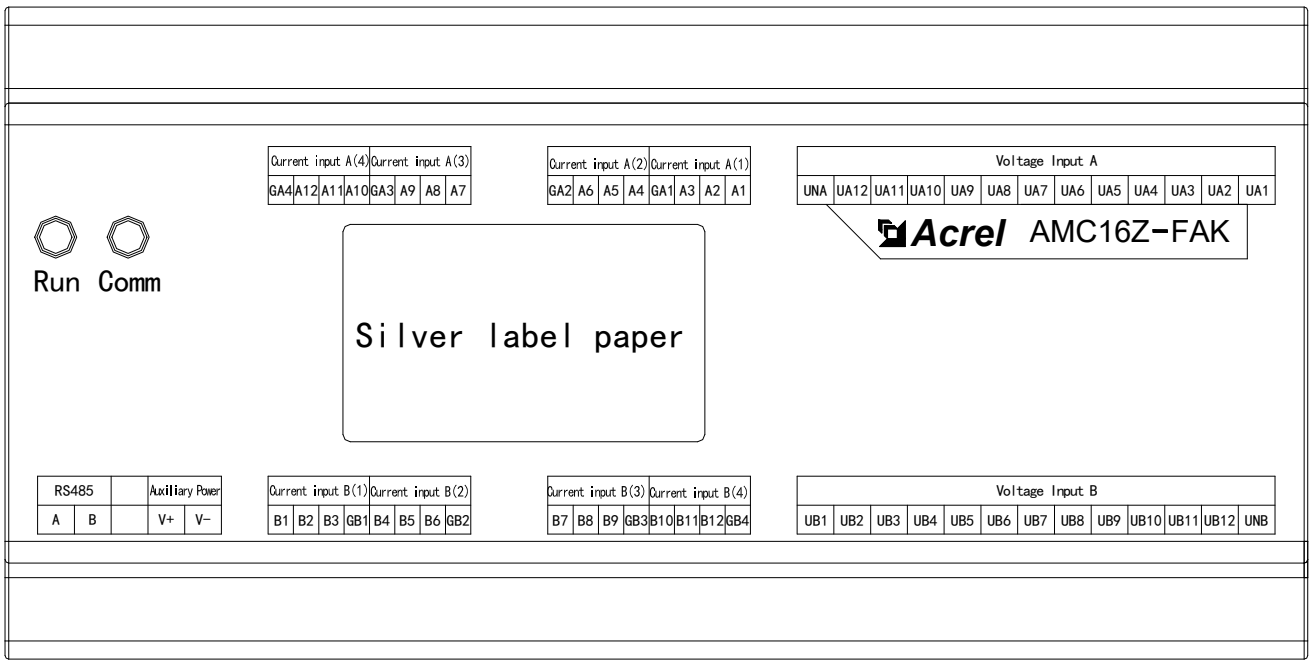
5.2 AMC16Z-FA



Terminal No.	Definition	Explanation	Remark
1	V+	Auxiliary power supply	Powered by AMC16Z-ZA or DC12-24V power supply
2	V-		
10	UN	A-channel AC voltage zero line	A-channel outgoing line three-phase voltage input
11	UA	A-channel AC voltage phase A	
12	UB	A-channel AC voltage phase B	
13	UC	A-channel AC voltage phase C	
20	UN	B-channel AC voltage zero line	B-channel outgoing line three-phase voltage input
21	UA	B-channel AC voltage phase A	
22	UB	B-channel AC voltage phase B	
23	UC	B-channel AC voltage phase C	
30	A	RS485 communication	Connect to touch screen or RS485 hub
31	B		
AI1+		A-channel current phase A（1）	1st group A-channel outgoing line three-phase current input
AI1-			
AI2+		A-channel current phase B（1）	
AI2-			
AI3+		A-channel current phase C（1）	
AI3-			
AI4+		A-channel current phase A（2）	2nd group A-channel outgoing line three-phase current input
AI4-			
AI5+		A-channel current phase B（2）	
AI5-			
AI6+		A-channel current phase C（2）	
AI6-			
AI7+		A-channel current phase A（3）	3rd group A-channel outgoing line three-phase current input
AI7-			
AI8+		A-channel current phase B（3）	
AI8-			
AI9+		A-channel current phase C（3）	
AI9-			
AI10+		A-channel current phase A（4）	4th group A-channel outgoing line three-phase current input
AI10-			
AI11+		A-channel current phase B（4）	
AI11-			
AI12+		A-channel current phase C（4）	
AI12-			
BI1+		B-channel current phase A（1）	1st group B-channel outgoing line three-phase current input
BI1-			
BI2+		B-channel current phase B（1）	
BI2-			
BI3+		B-channel current phase C（1）	
BI3-			
BI4+		B-channel current phase A（2）	2nd group B-channel outgoing line three-phase current input
BI4-			
BI5+		B-channel current	

BI5-	phase B（2）	
BI6+	B-channel current phase C（2）	
BI6-		
BI7+	B-channel current phase A（3）	3rd group B-channel outgoing line three-phase current input
BI7-		
BI8+	B-channel current phase B（3）	
BI8-		
BI9+	B-channel current phase C（3）	
BI9-		
BI10+	B-channel current phase A（4）	4th group B-channel outgoing line three-phase current input
BI10-		
BI11+	B-channel current phase B（4）	
BI11-		
BI12+	B-channel current phase C（4）	
BI12-		

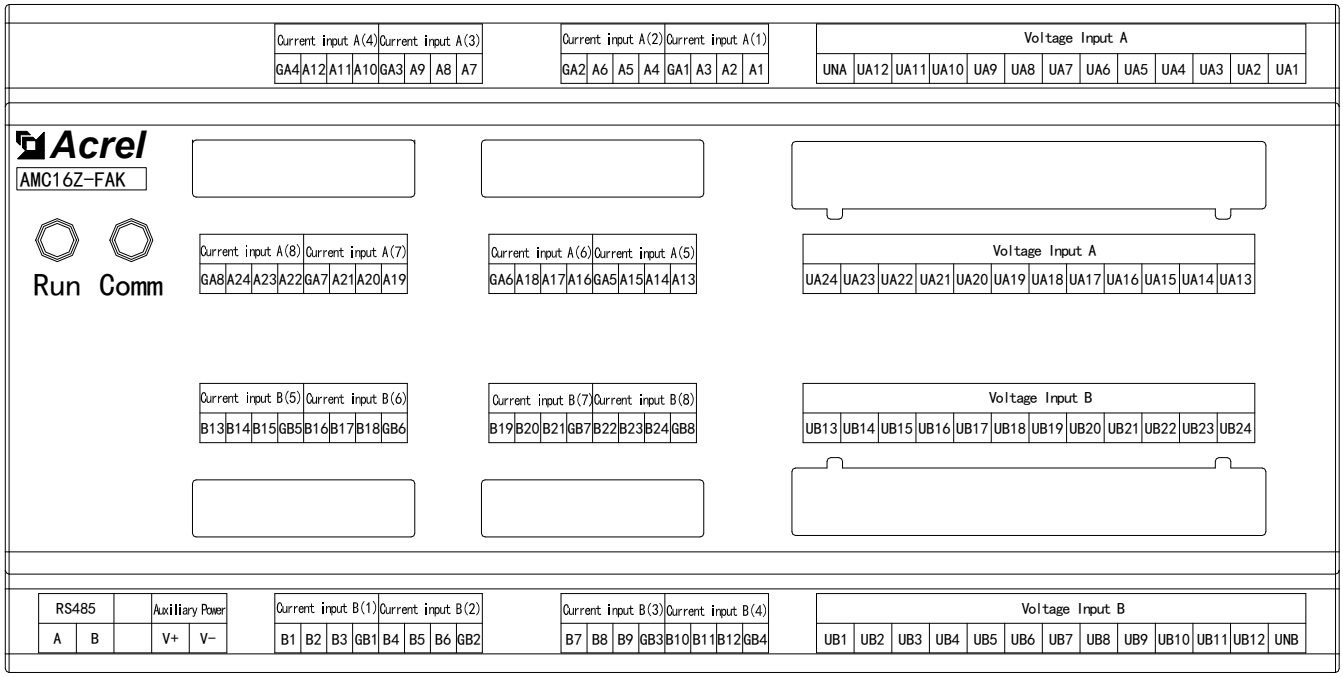
5.3 AMC16Z-FAK24



Terminal definition	Explanation	Remark
V+	Auxiliary power supply	Powered by AMC16Z-ZA or DC12-24V power supply
V-		
A	RS485 communication	Connect to touch screen or RS485 hub
B		
A1	A-channel current phase A positive（1）	1st group A-channel outgoing line three-phase current input
A2	A-channel current phase B positive（1）	
A3	A-channel current phase C positive（1）	
GA1	A-channel current negative common terminal （1）	
A4	A-channel current phase A positive（2）	2nd group A-channel outgoing line three-phase current input
A5	A-channel current phase B positive（2）	
A6	A-channel current phase C positive（2）	
GA2	A-channel current negative common terminal（2）	
A7	A-channel current phase A positive（3）	
A8	A-channel current phase B positive（3）	

A9	A-channel current phase C positive（3）	3rd group A-channel outgoing line three-phase current input
GA3	A-channel current negative common terminal（3）	
A10	A-channel current phase A positive（4）	4th group A-channel outgoing line three-phase current input
A11	A-channel current phase B positive（4）	
A12	A-channel current phase C positive（4）	
GA4	A-channel current negative common terminal（4）	
B1	B-channel current phase A positive（1）	1st group B-channel outgoing line three-phase current input
B2	B-channel current phase B positive（1）	
B3	B-channel current phase C positive（1）	
GB1	B-channel current negative common terminal（1）	
B4	B-channel current phase A positive（2）	2nd group B-channel outgoing line three-phase current input
B5	B-channel current phase B positive（2）	
B6	B-channel current phase C positive（2）	
GB2	B-channel current negative common terminal（2）	
B7	B-channel current phase A positive（3）	3rd group B-channel outgoing line three-phase current input
B8	B-channel current phase B positive（3）	
B9	B-channel current phase C positive（3）	
GB3	B-channel current negative common terminal（3）	
B10	B-channel current phase A positive（4）	4th group B-channel outgoing line three-phase current input
B11	B-channel current phase B positive（4）	
B12	B-channel current phase C positive（4）	
GB4	B-channel current negative common terminal（4）	
UA1	A-channel AC voltage phase A（1）	A-channel switch input
UA2	A-channel AC voltage phase B（1）	
UA3	A-channel AC voltage phase C（1）	
UA4	A-channel AC voltage phase A（2）	
UA5	A-channel AC voltage phase B（2）	
UA6	A-channel AC voltage phase C（2）	
UA7	A-channel AC voltage phase A（3）	
UA8	A-channel AC voltage phase B（3）	
UA9	A-channel AC voltage phase C（3）	
UA10	A-channel AC voltage phase A（4）	
UA11	A-channel AC voltage phase B（4）	
UA12	A-channel AC voltage phase C（4）	
UNA	A-channel AC voltage zero line	
UB1	B-channel AC voltage phase A（1）	B-channel switch input
UB2	B-channel AC voltage phase B（1）	
UB3	B-channel AC voltage phase C（1）	
UB4	B-channel AC voltage phase A（2）	
UB5	B-channel AC voltage phase B（2）	
UB6	B-channel AC voltage phase C（2）	
UB7	B-channel AC voltage phase A（3）	
UB8	B-channel AC voltage phase B（3）	
UB9	B-channel AC voltage phase C（3）	
UB10	B-channel AC voltage phase A（4）	
UB11	B-channel AC voltage phase B（4）	
UB12	B-channel AC voltage phase C（4）	
UNB	B-channel AC voltage zero line	

5.4 AMC16Z-FAK48

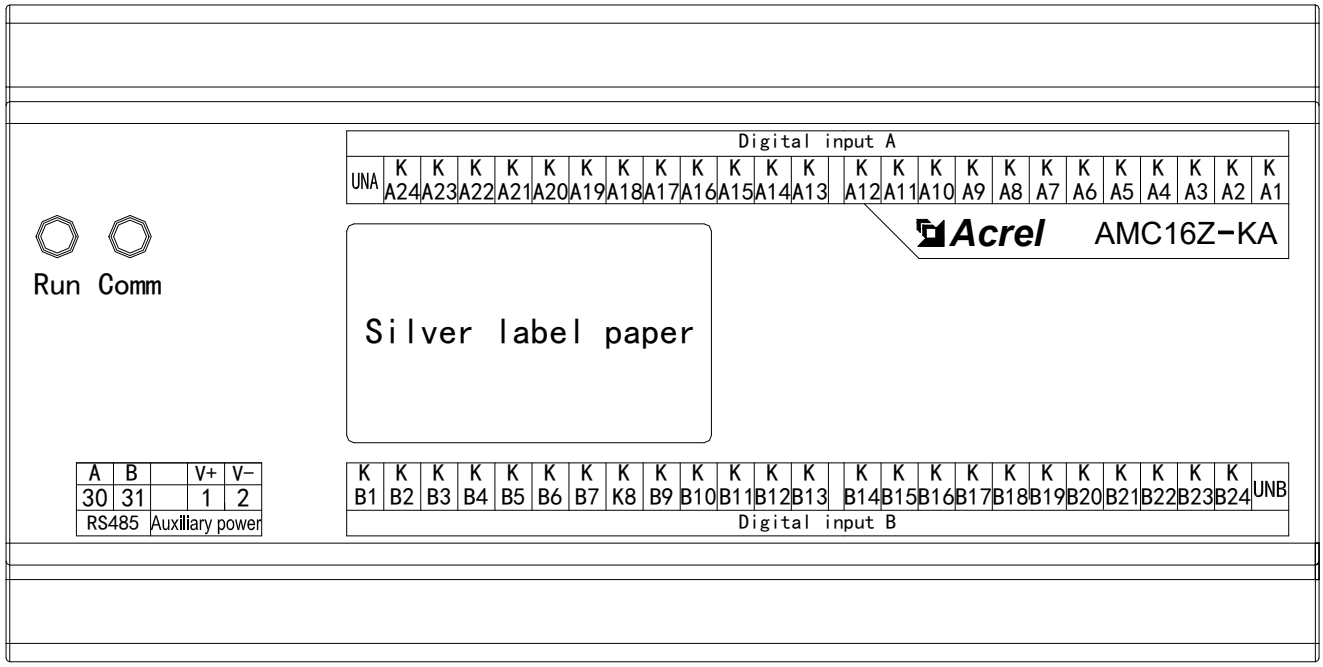


Terminal definition	Ecplanation	Remark
V+	Auxiliary power supply	Powered by AMC16Z-ZA or DC12-24V power supply
V-		
A	RS485 communication	Connect to touch screen or RS485 hub
B		
A1	A-channel current phase A positive（1）	1st group A-channel outgoing line three-phase current input
A2	A-channel current phase B positive（1）	
A3	A-channel current phase C positive（1）	
GA1	A-channel current negative common terminal（1）	
A4	A-channel current phase A positive（2）	2nd group A-channel outgoing line three-phase current input
A5	A-channel current phase B positive（2）	
A6	A-channel current phase C positive（2）	
GA2	A-channel current negative common terminal（2）	
A7	A-channel current phase A positive（3）	3rd group A-channel outgoing line three-phase current input
A8	A-channel current phase B positive（3）	
A9	A-channel current phase C positive（3）	
GA3	A-channel current negative common terminal（3）	
A10	A-channel current phase A positive（4）	4th group A-channel outgoing line three-phase current input
A11	A-channel current phase B positive（4）	
A12	A-channel current phase C positive（4）	
GA4	A-channel current negative common terminal（4）	
A13	A-channel current phase A positive（5）	5th group A-channel outgoing line three-phase current input
A14	A-channel current phase B positive（5）	
A15	A-channel current phase C positive（5）	
GA5	A-channel current negative common terminal（5）	
A16	A-channel current phase A positive（6）	6th group A-channel outgoing line three-phase current input
A17	A-channel current phase B positive（6）	
A18	A-channel current phase C positive（6）	
GA6	A-channel current negative common	

	terminal（6）	
A19	A-channel current phase A positive（7）	7th group A-channel outgoing line three-phase current input
A20	A-channel current phase B positive（7）	
A21	A-channel current phase C positive（7）	
GA7	A-channel current negative common terminal（7）	
A22	A-channel current phase A positive（8）	8th group A-channel outgoing line three-phase current input
A23	A-channel current phase B positive（8）	
A24	A-channel current phase C positive（8）	
GA8	A-channel current negative common terminal（8）	
B1	B-channel current phase A positive（1）	1st group B-channel outgoing line three-phase current input
B2	B-channel current phase B positive（1）	
B3	B-channel current phase C positive（1）	
GB1	B-channel current negative common terminal（1）	
B4	B-channel current phase A positive（2）	2nd group B-channel outgoing line three-phase current input
B5	B-channel current phase B positive（2）	
B6	B-channel current phase C positive（2）	
GB2	B-channel current negative common terminal（2）	
B7	B-channel current phase A positive（3）	3rd group B-channel outgoing line three-phase current input
B8	B-channel current phase B positive（3）	
B9	B-channel current phase C positive（3）	
GB3	B-channel current negative common terminal（3）	
B10	B-channel current phase A positive（4）	4th group B-channel outgoing line three-phase current input
B11	B-channel current phase B positive（4）	
B12	B-channel current phase C positive（4）	
GB4	B-channel current negative common terminal（4）	
B13	B-channel current phase A positive（5）	5th group B-channel outgoing line three-phase current input
B14	B-channel current phase B positive（5）	
B15	B-channel current phase C positive（5）	
GB5	B-channel current negative common terminal（5）	
B16	B-channel current phase A positive（6）	6th group B-channel outgoing line three-phase current input
B17	B-channel current phase B positive（6）	
B18	B-channel current phase C positive（6）	
GB6	B-channel current negative common terminal（6）	
B19	B-channel current phase A positive（7）	7th group B-channel outgoing line three-phase current input
B20	B-channel current phase B positive（7）	
B21	B-channel current phase C positive（7）	
GB7	B-channel current negative common terminal（7）	
B22	B-channel current phase A positive（8）	8th group B-channel outgoing line three-phase current input
B23	B-channel current phase B positive（8）	
B24	B-channel current phase C positive（8）	
GB8	B-channel current negative common terminal（8）	
UA1	A-channel AC voltage phase A（1）	1st group A-channel switch input
UA2	A-channel AC voltage phase B（1）	
UA3	A-channel AC voltage phase C（1）	
UA4	A-channel AC voltage phase A（2）	

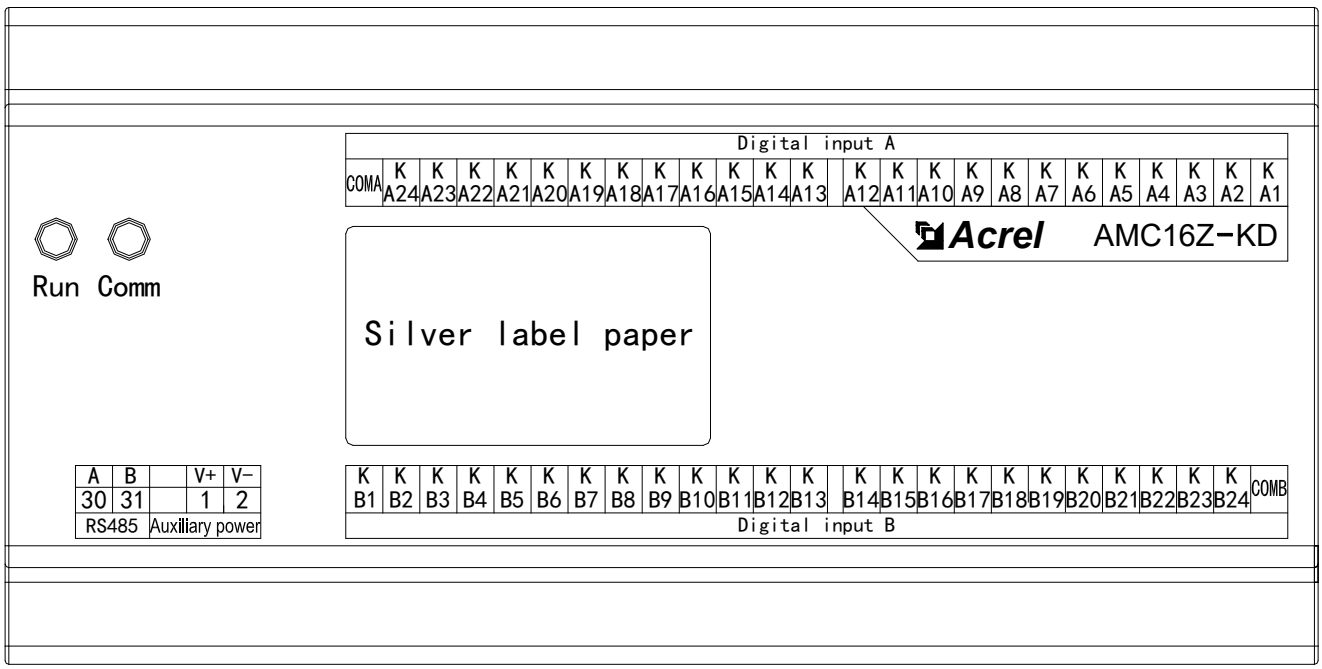
UA5	A-channel AC voltage phase B（2）	
UA6	A-channel AC voltage phase C（2）	
UA7	A-channel AC voltage phase A（3）	
UA8	A-channel AC voltage phase B（3）	
UA9	A-channel AC voltage phase C（3）	
UA10	A-channel AC voltage phase A（4）	
UA11	A-channel AC voltage phase B（4）	
UA12	A-channel AC voltage phase C（4）	
UNA	A-channel AC voltage zero line	
UA13	A-channel AC voltage phase A（5）	2nd group A-channel switch input
UA14	A-channel AC voltage phase B（5）	
UA15	A-channel AC voltage phase C（5）	
UA16	A-channel AC voltage phase A（6）	
UA17	A-channel AC voltage phase B（6）	
UA18	A-channel AC voltage phase C（6）	
UA19	A-channel AC voltage phase A（7）	
UA20	A-channel AC voltage phase B（7）	
UA21	A-channel AC voltage phase C（7）	
UA22	A-channel AC voltage phase A（8）	
UA23	A-channel AC voltage phase B（8）	
UA24	A-channel AC voltage phase C（8）	
UB1	B-channel AC voltage phase A（1）	1st group B-channel switch input
UB2	B-channel AC voltage phase B（1）	
UB3	B-channel AC voltage phase C（1）	
UB4	B-channel AC voltage phase A（2）	
UB5	B-channel AC voltage phase B（2）	
UB6	B-channel AC voltage phase C（2）	
UB7	B-channel AC voltage phase A（3）	
UB8	B-channel AC voltage phase B（3）	
UB9	B-channel AC voltage phase C（3）	
UB10	B-channel AC voltage phase A（4）	
UB11	B-channel AC voltage phase B（4）	
UB12	B-channel AC voltage phase C（4）	
UNB	B 路交流电压零线	
UB13	B-channel AC voltage phase A（5）	2nd group B-channel switch input
UB14	B-channel AC voltage phase B（5）	
UB15	B-channel AC voltage phase C（5）	
UB16	B-channel AC voltage phase A（6）	
UB17	B-channel AC voltage phase B（6）	
UB18	B-channel AC voltage phase C（6）	
UB19	B-channel AC voltage phase A（7）	
UB20	B-channel AC voltage phase B（7）	
UB21	B-channel AC voltage phase C（7）	
UB22	B-channel AC voltage phase A（8）	
UB23	B-channel AC voltage phase B（8）	
UB24	B-channel AC voltage phase C（8）	

5.5 AMC16Z-KA



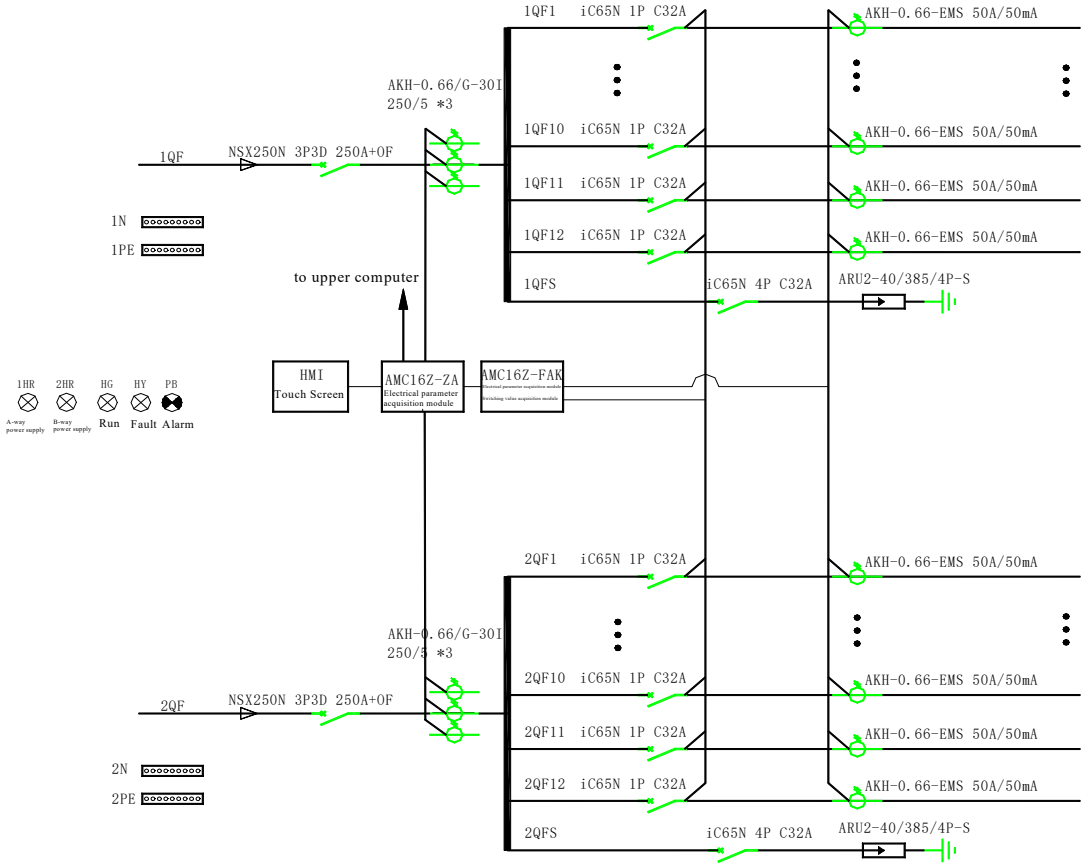
Terminal No.	Definition	Explanation	Remark
1	V+	Auxiliary power supply	Powered by AMC16Z-ZA or DC12-24V power supply
2	V-		
30	A	RS485 communication	Connect to touch screen or RS485 hub
31	B		
KA1-KA24		A-channel switch input	A-channel active switch input （24 lines）
UNA			
KB1-KB24		B-channel switch input	B-channel active switch input （24 lines）
UNB			

5.6 AMC16Z-KD

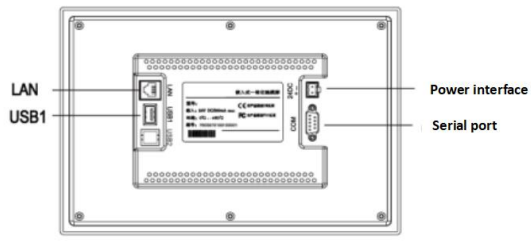


Terminal No.	Definition	Explanation	Remark
1	V+	Auxiliary power supply	Powered by AMC16Z-ZA or DC12-24V power supply
2	V-		
30	A	RS485 communication	Connect to touch screen or RS485 hub
31	B		
KA1-KA24		A-channel switch input	A-channel reactive switch input （24 lines）
COMA			
KB1-KB24		B-channel switch input	B-channel reactive switch input （24 lines）
COMB			

5.7 Typical primary wiring diagram



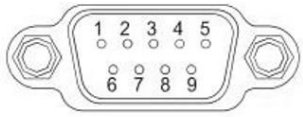
6 Touch screen



Serial port(DB9)	2×RS485
USB1	Main port, compatible with USB2.0 standard
LAN（RJ45）	Ethernet interface
Power interface	24V DC ±20%

Serial port（DB9）pin definition

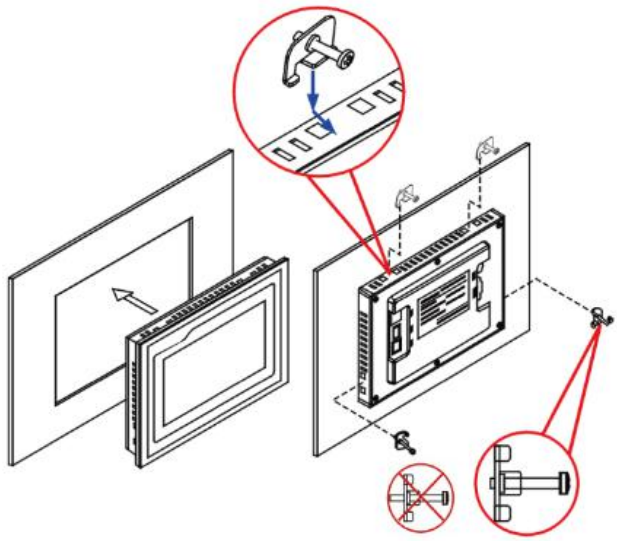
Serial port pin definition



Serial port pin definition

Interface	PIN	Pin definition
COM1	2	RS232 RXD
	3	RS232 TXD
	5	GND
COM2	7	RS485 +
	8	RS485 —
COM3	4	RS485 +
	9	RS485 —

6.1 Installation



6.2 Wiring

Power wiring

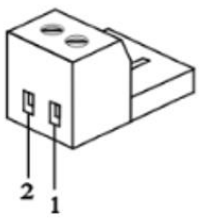
Step 1: After stripping the 24V power cord, insert it into the power plug terminal block

Step 2: Use a slotted screwdriver to lock the power plug screw

Step 3: Insert the power plug into the power socket of the product

Suggestion: Power supply with a diameter of 1.25 mm^2 (AWG 18) is adopted

Diagram and pin definition of power plug are as follows:

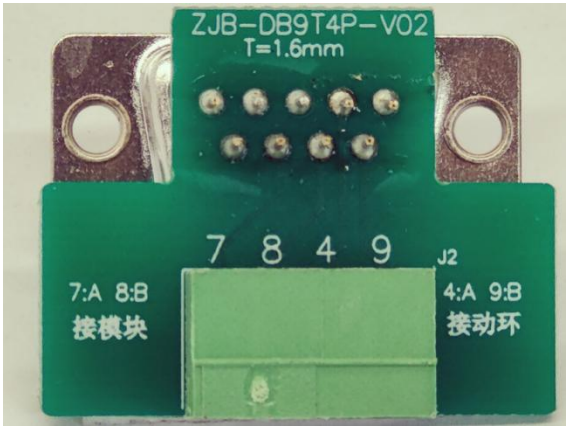


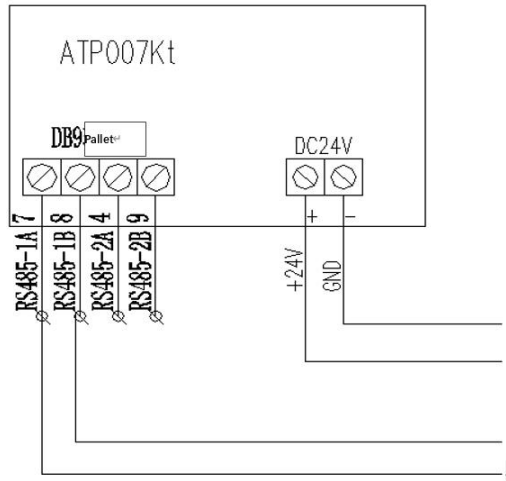
PIN	Definition
1	+
2	—

24VDC only! It is recommended to supply power independently, and the output power of the power supply is 15W

Communication wiring

There is a green adaptor board inside the factory configuration, among which （7-8）are downlinks（7 is connected to 485A;8 is connected to 485B）, connecting with 485 of the module，green, white（4-9）uplink（4 is connected to 485A;9 is connected to 485B）, used for rotating ring.





6.3 Precautions

1、If there is redundant switch power supply output power for the touch screen, it is recommended that the output power of DC24 should be above 15W;

2、Distinguish clearly the uplink and downlink on the adaptor of the communication wiring;

3、When users update the touch screen on their own, they should strictly obey the operation steps and not be confused;

4、After downloading the program, remove the USB flash disk containing the update package in time;

5、USB flash disk used for program updating must be FAT32 format.

7 Touch screen program operation

7.1 Parameter, function, operation detailed explanation

7.1.1 Main circuit parameters

As shown in the figure, the first interface is the main circuit parameters after starting the touch screen, if there are multiple incoming lines, one can click the button at the lower right corner to switch and view other incoming lines' parameters.

7.1.2 Subbranch circuit parameter

Click “Subbranch circuit parameter” on the main circuit parameter interface and enter.

If there are multiple rows of outgoing lines, first enter the corresponding main circuit parameter interface in the main circuit interface, then click “Subbranch circuit parameter”.

Acrel

A-Outlet

Date 2021-05-25 14:11:10

Week 二

L	Load	I/A	P/kW	Q/kVar	S/kVA	PF	EP/kWh	EQ/kVarh	U/V	Load	Limits
01	L01	0.00	0.00	0.00	0.00	0.000	0.00	0.00	0.0	0.0%	60A
02	L02	0.00	0.00	0.00	0.00	0.000	0.00	0.00	0.0	0.0%	60A
03	L03	0.00	0.00	0.00	0.00	0.000	0.00	0.00	0.0	0.0%	60A
04	L04	0.00	0.00	0.00	0.00	0.000	0.00	0.00	0.0	0.0%	60A
05	L05	0.00	0.00	0.00	0.00	0.000	0.00	0.00	0.0	0.0%	60A
06	L06	0.00	0.00	0.00	0.00	0.000	0.00	0.00	0.0	0.0%	60A
07	L07	0.00	0.00	0.00	0.00	0.000	0.00	0.00	0.0	0.0%	60A
08	L08	0.00	0.00	0.00	0.00	0.000	0.00	0.00	0.0	0.0%	60A
09	L09	0.00	0.00	0.00	0.00	0.000	0.00	0.00	0.0	0.0%	60A
10	L10	0.00	0.00	0.00	0.00	0.000	0.00	0.00	0.0	0.0%	60A
11	L11	0.00	0.00	0.00	0.00	0.000	0.00	0.00	0.0	0.0%	60A
12	L12	0.00	0.00	0.00	0.00	0.000	0.00	0.00	0.0	0.0%	60A
13	L13	0.00	0.00	0.00	0.00	0.000	0.00	0.00	0.0	0.0%	60A
14	L14	0.00	0.00	0.00	0.00	0.000	0.00	0.00	0.0	0.0%	60A
15	L15	0.00	0.00	0.00	0.00	0.000	0.00	0.00	0.0	0.0%	60A
16	L16	0.00	0.00	0.00	0.00	0.000	0.00	0.00	0.0	0.0%	60A
17	L17	0.00	0.00	0.00	0.00	0.000	0.00	0.00	0.0	0.0%	60A
18	L18	0.00	0.00	0.00	0.00	0.000	0.00	0.00	0.0	0.0%	60A

Main data Next

The meanings of titles from left to right are:

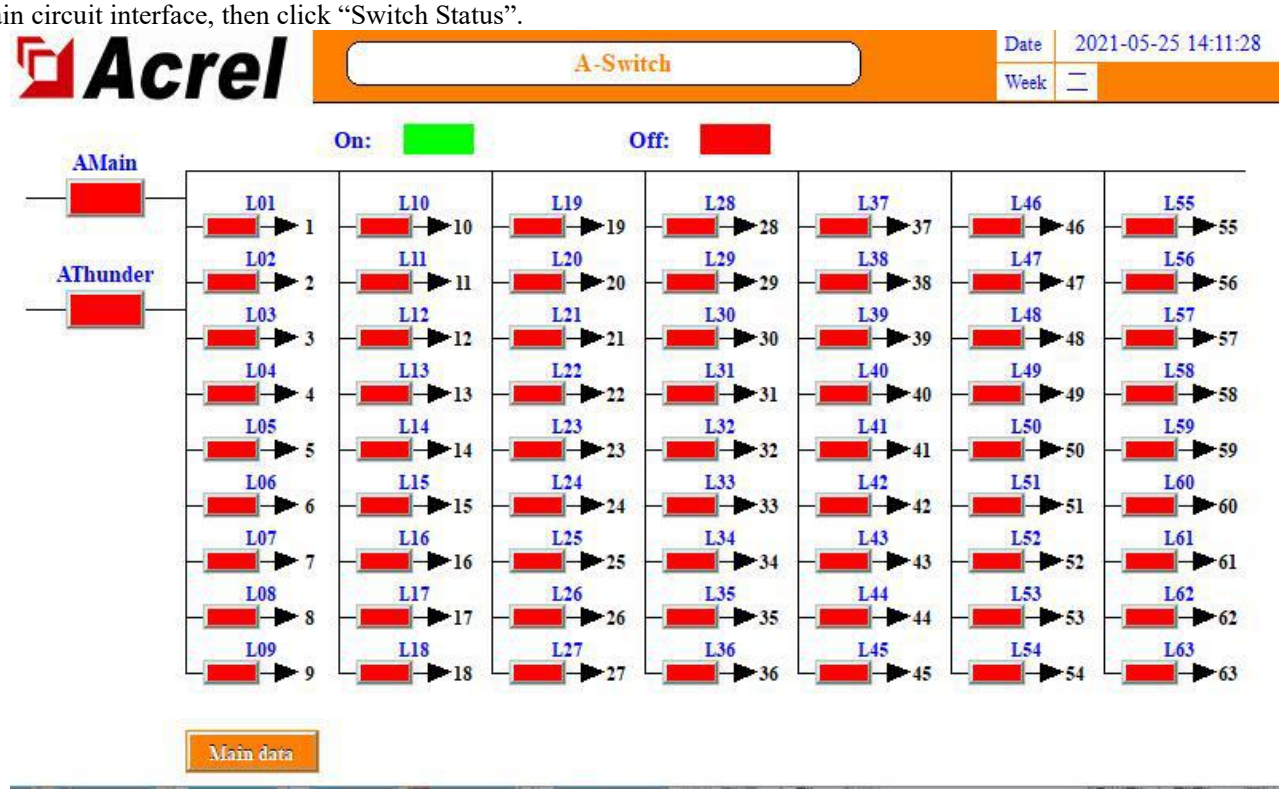
Branch serial number, circuit name/load name, current, active power, reactive power, apparent power, power factor, active electric energy, reactive electric energy, voltage, load rate, alarm limit value of primary overload current.

Among above, alarm limit value of primary overload current can be modified according to users’ own needs, refer to modifying method in “Parameter setting” below.

7.1.3 Switch status

Switch status interface is an intuitive switch display system diagram of the main and subbranch circuits, click “Switch Status” in the main circuit parameter interface and enter.

If there are multiple rows of outgoing lines, first enter the corresponding main circuit parameter interface in the main circuit interface, then click “Switch Status”.



7.1.3.1 Switch status of the main circuit

The leftmost column is the main circuit switch status, main circuits switch status is acquired by the main module （AMC16Z-ZA）, The words "main circuit" and "standby circuit" are OF+SD points, auxiliary contacts of the main circuit. Those marked with "lightning protection" are the lightning protector switch status. SD/switch opening status is not displayed.

Different users with different field wiring will cause different acquisition status of the corresponding module to the required fault status. The switch status of main circuit displayed on this interface is "red for fault, green for normal". If the user fails to comply with the test, it is necessary to check whether the switch alarm settings are set correctly as required in combination with the alarm information.

7.1.3.2 Subbranch switch status

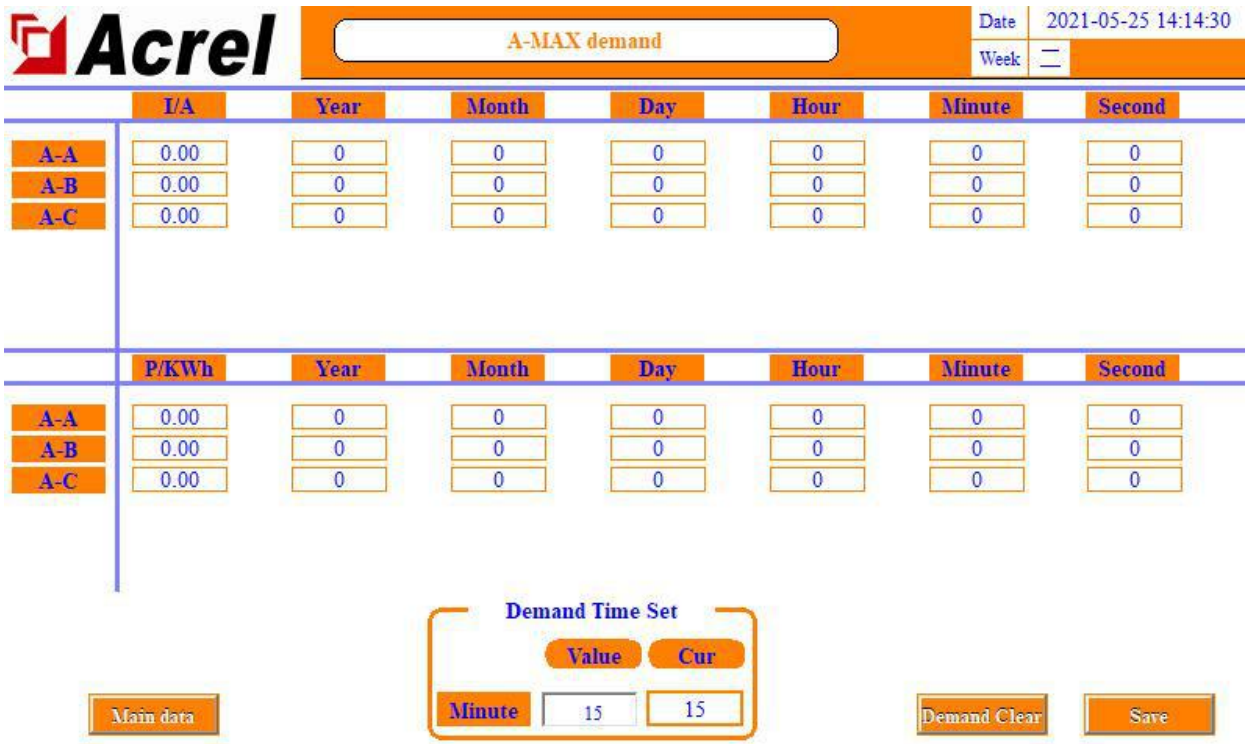
The right side of the main circuit switch status are all subbranch switch status, it is acquired by AMC16Z-FAK active acquisition green represents closed, red represents separated.

7.1.4 User login

Part of the functions require different permissions, If one needs to set alarm parameters, you can log in to the person in charge or Admin; if one needs to view the content management interface, to view order information such as software number, you need to log in to Admin. The login method is shown in the figure below.

7.1.5 Maximum demand

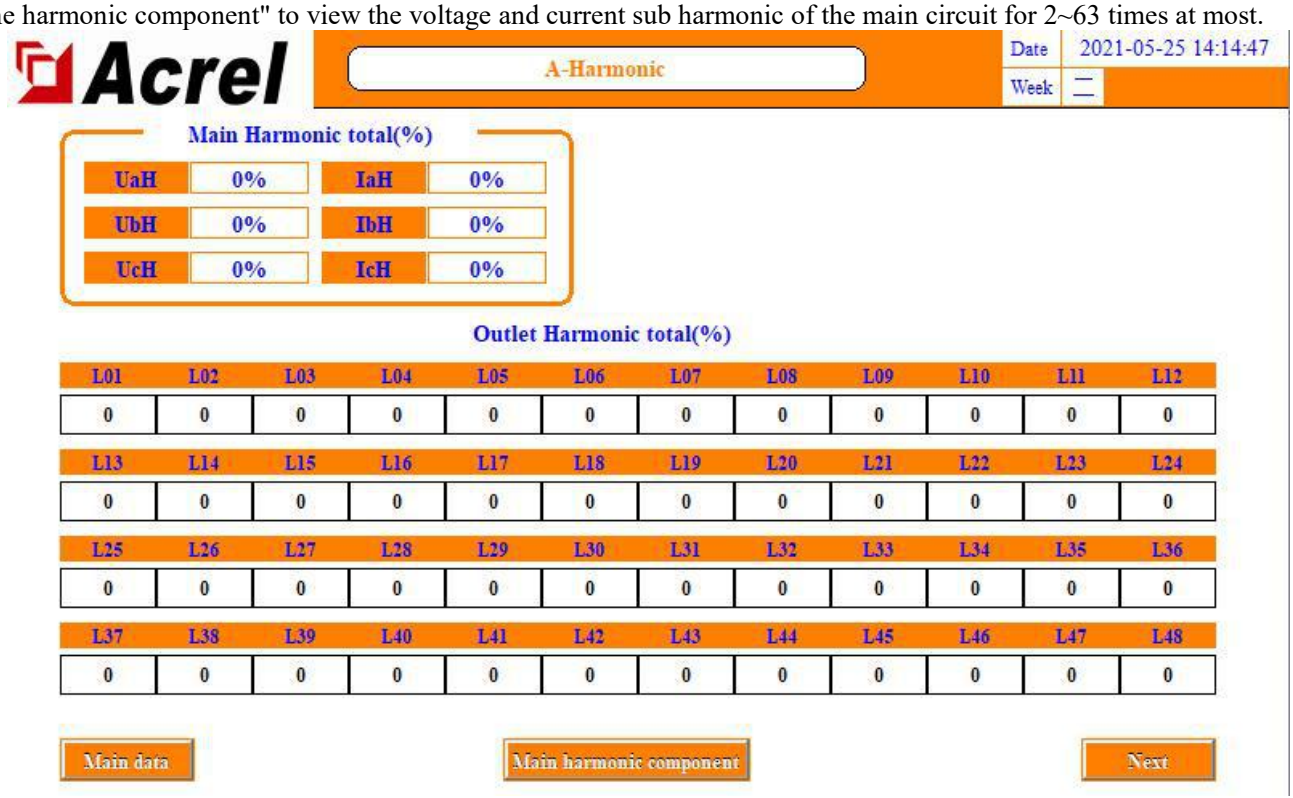
The maximum demand is the maximum of the historical average value of the current and power of the incoming line.



Able to set “Demand Time Setting” to adjust the frequency of the average statistics

7.1.6 Harmonic parameter

Click "Harmonic parameter" in the main circuit parameter interface to enter. One can view the total harmonics of the voltage and current of the main circuit, and the total harmonics of the current of each subbranch circuit. Click "Incoming line harmonic component" to view the voltage and current sub harmonic of the main circuit for 2~63 times at most.



7.1.7 Monthly electric energy

Click "Monthly Electric Energy" in the main circuit parameter interface to enter. One can view the monthly electric energy of each phase of the main circuit and the branch circuit. Drag the progress bar or click "Previous" or "Next" to view further. The displayed electric energy is the electric energy of the previous month. For example, 2015-05 represents the electric energy before May 1, 2015, that is, the electric energy of April.

To view the electric energy of a period of time, one can click "Electric Energy Query" button on this interface, input the start and end months according to the format sample, and enter "-" in the
symbol.

It should be noted that the termination time refers to the first day of the input month. If 2015-05 is entered, it represents May 1, 2015, that is, the electric energy in April and before is counted.

7.1.8 Parameter setting

Click “Parameter Setting” in the main circuit parameter interface.

7.1.8.1 Main circuit parameter setting

If there are multiple incoming lines, click the button at the lower right corner to switch and set the parameters of other incoming lines. The common parameters of multiple incoming lines can only be set on the first interface.

One can use the alarm function selectively according to their own needs. If an unwanted alarm is triggered, one can modify the alarm value to make the alarm disappear. For specific modification methods, refer to the following instructions.

After setting the parameters, you must click "Save Settings" to use them normally and save them after power failure.

7.1.8.1.1 Voltage alarm setting

One can set the voltage alarm value of each phase of the main incoming line in this part. The system has default values, which can be modified as needed.

Phase loss is that when the phase voltage is lower than the set parameter, the phase loss alarm will be triggered.

Undervoltage is that when the phase voltage is higher than the parameter set for phase loss and lower than the parameter set for undervoltage, the phase voltage undervoltage alarm will be triggered.

Overvoltage is that when the phase voltage is higher than the set parameter, the phase voltage overvoltage alarm will be triggered.

7.1.8.1.2 Incoming line overload alarm setting

One can set the load alarm value of each phase of the main incoming line in this part, which is divided into Section I and Section II.

The rated value has been preset according to the diagram when leaving the factory. The first section alarm value and the second section alarm value have been preset through the rated value algorithm. The first section alarm value=rated value * 60%, and the second section alarm value=rated value * 80%. If the diagram is unclear or the actual application changes, it can be modified by oneself.

When the phase current is greater than the set value, the section I/II overload alarm will be triggered. Note that when the section II overload is triggered, the section I alarm will not be triggered.

7.1.8.1.3 Current ratio setting

One can set the current transformation ratio CT value in this part. The parameters of this part are set according to the value of the transformer. The standard value of 50A/5A transformer is set as 10. If it is a 400A/5A transformer, the setting value is 80 (It should be 5A at the outgoing side).

It has been preset according to the diagrams when leaving the factory, and can be modified according to the above rules if there is any change.

7.1.8.1.4 Power overload setting

One can set the power alarm value in this part. The system will get a default value according to the preset load and voltage, which can be modified according to one’s own needs.

When the phase power is greater than the set parameters, the frequency overrun alarm will be triggered.

7.1.8.1.5 Three phase unbalance setting

One can set the alarm value of three-phase imbalance of incoming line current and voltage in this part.

When the current/voltage imbalance is greater than the set parameters, the current/voltage three-phase imbalance alarm will be triggered

7.1.8.1.6 Frequency alarm setting

One can set the frequency alarm value in this part. The system has default values, which can be modified as required.

Underfrequency is that when the frequency is less than the set parameter, an underfrequency alarm will be triggered.

Over frequency is that when the frequency is greater than the set parameter, the frequency overrun alarm will be triggered.

7.1.8.1.7 Zero ground voltage

In this part, when the zero ground voltage is greater than the set parameters, the zero ground voltage overrun alarm will be triggered.

7.1.8.1.8 Zero sequence current

In this part, when the zero sequence current is greater than the set parameters, the zero sequence current overrun alarm will be triggered.

7.1.8.1.9 Temperature

The setting in this part is that when the cabinet temperature is greater than the set parameters, the temperature overrun alarm will be triggered.

7.1.8.1.10 Humidity

The setting in this part is that when the humidity is greater than the set parameters, the humidity overrun alarm will be triggered.

7.1.8.1.11 Electric leakage

The setting in this part is that when the leakage current is greater than the set parameter, the leakage current overrun alarm will be triggered.

7.1.8.1.12 Outgoing line overload alarm setting

This part is set as the percentage of load alarm on the outlet side, which is classified into section I and section II, similar to 1.8.1.2. The default values are 60% and 80%. The overload alarm value is calculated with the load rating of

the outgoing line, that is, the overload of the first section of the outgoing line=the load rating of the outgoing line * 60%, and the overload of the second section of the outgoing line=the load rating of the outgoing line * 80%, which can be modified according to users' own needs.

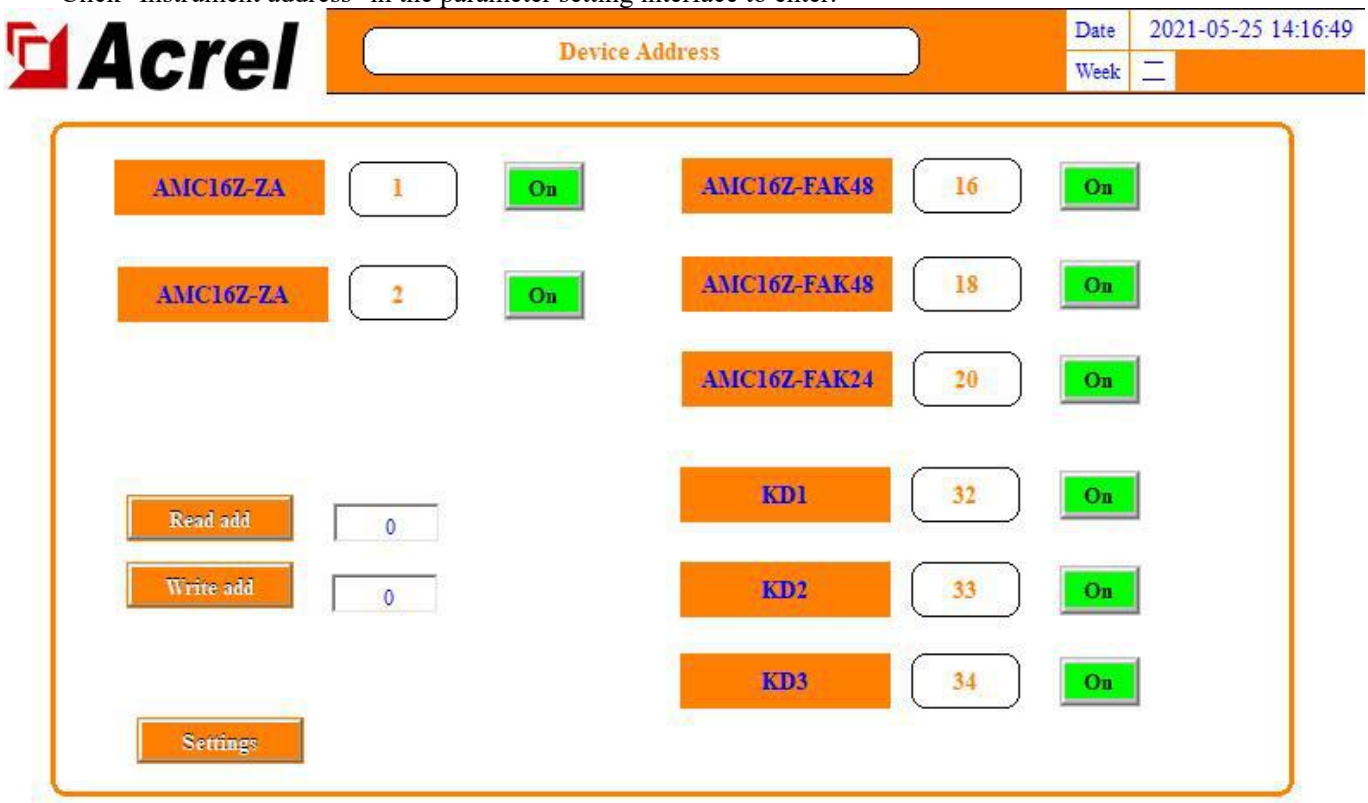
7.1.8.1.13 Forwarding data address

This part involves data forwarding, and users can modify the forwarding data address by themselves. See the following for details

7.1.8.2 Instrument address

The internal address of the instrument has been defaulted at the time of delivery. If there is a problem of communication failure, the cause of wiring can be eliminated, and the instrument address can be checked and modified through this function.

Click "Instrument address" in the parameter setting interface to enter.



As shown in the figure, in this part there is the correct address of the instrument. If the instrument address is not the marked address, or the instrument address is repeated, an error will be caused.

View the actual instrument address: first disconnect the communications of all modules, connect only the target instrument that needs to view the address, click "Read Address", and the address displayed on the right is the address of the instrument. (If the address of the instrument cannot be read while all module communications have been disconnected and the wiring is correct is ensured, further troubleshooting is required.)

Modify the actual instrument address: disconnect the communication of all modules, connect only the target instrument that needs to view the address, input the communication address of the instrument on the right side, and click "Write Address" to finish.

If there is a module that does not need to be used but the communication alarm of it cannot be shielded in the actual application, one can click the green switch button on this interface to stop the module. If it is to be put into use later, click again to enable the module.

7.1.8.3 Number of outgoing lines

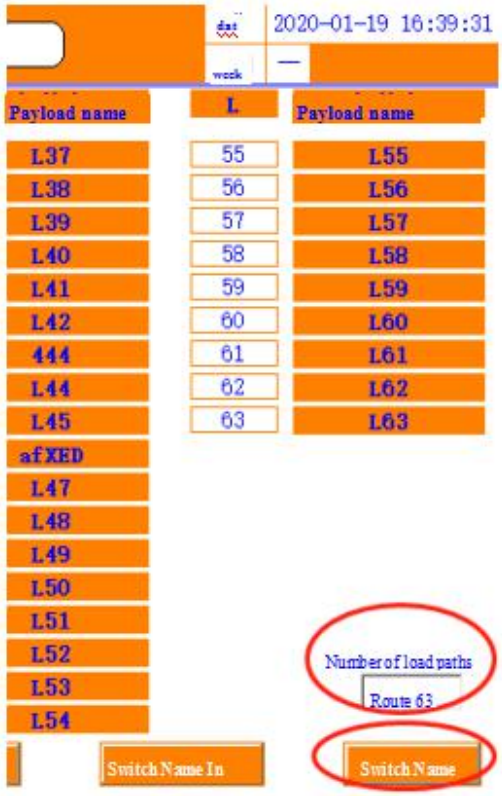
Click "Number of outgoing lines" in the parameter setting interface to enter. (If there are multiple outgoing lines, you need to go to the corresponding incoming line parameter setting interface and click "Number of outgoing lines" to enter.)

The function of this part is to adjust the number of outgoing lines, switch routes, switch names and load names.

7.1.8.3.1 Adjust the number of outgoing lines and switching lines

In the lower right corner of this interface, there is "Number of Load Routes". Enter a number in the lower input box, and the corresponding number will be displayed in the "Branch Parameters" interface. After modification, one needs to return to the "Parameter Setting" interface and click "Save Setting" to save after power failure.

Click the "Switch Name" at the lower right corner to modify the number of switches. After the same modification, the corresponding number of switches will be displayed in the "Switch Status" interface. After modification, you need to return to the "Parameter Setting" interface and click "Save Setting" to save after power failure.



7.1.8.3.2 Modify switch name and load name

There are two modification methods: one can directly click the label to modify, or one can use the USB flash disk to batch modify.

Batch modification:

First insert the USB flash disk behind the touch screen and click "Export Switch Name".

Open the USB drive information on the computer, and find the USB harddisk folder in the root directory. Find the content you want to change, and open the name corresponding to the modification serial number.

Then insert the USB flash disk into the back of the touch screen and click "Switch name import". At this time, the names of each circuit displayed in the "Branch Parameters" and "Switch Status" interfaces have been modified.

7.1.8.4 Electric energy clearing

Click "Electric Energy Reset" in the "Parameter Setting" interface, and the electric energy of ZA and FAK will be cleared Note that the communication line should be disconnected from the modules which do not need to be reset.

7.1.8.5 Time setting

Click "Set Time" in the "Parameter Setting" interface to modify the current time.

7.1.8.6 Load rating

Click "Load Rating" in the "Parameter Setting" interface to modify the load rating of each outgoing line, which has been preset according to the diagram when leaving the factory. If there is any change in the actual application, users can modify it themselves. After modification, return to the "Parameter Setting" interface and click "Save Setting".

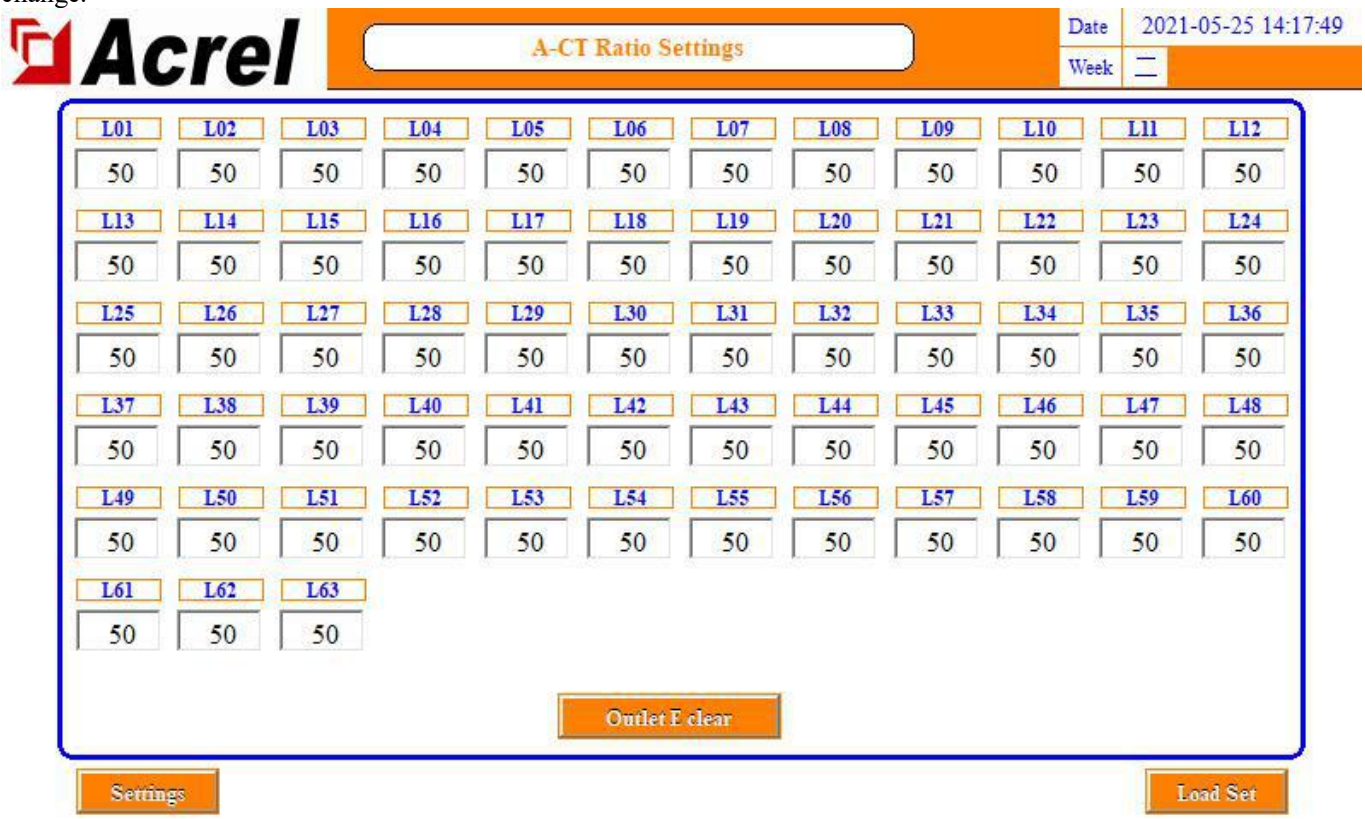
This data is used to calculate the alarm value in combination with the percentage of load alarm value of outgoing line section I and section II in the "Parameter Setting" interface. Section I alarm value will be displayed in the "Branch Parameter" interface.

7.1.8.7 CT rating

Click "CT rating" in the "Parameter setting" interface to modify the CT transformation ratio of each outgoing line and set it according to the primary value of the configured sensor. If the sensor is configured as 100A/50mA, it should be set to 100. If the outgoing line value is 20mA, the primary value multiplied by 2.5 shall be set.

It has been preset according to the drawings when leaving the factory, and can be modified according to the above rules if there is any change.

It has been preset according to the diagrams when leaving the factory, and can be modified according to the above rules if there is any
change.



Subbranch electric energy is cleared on the "CT rated" interface. Click to reset the electric energy data of each branch with one click.

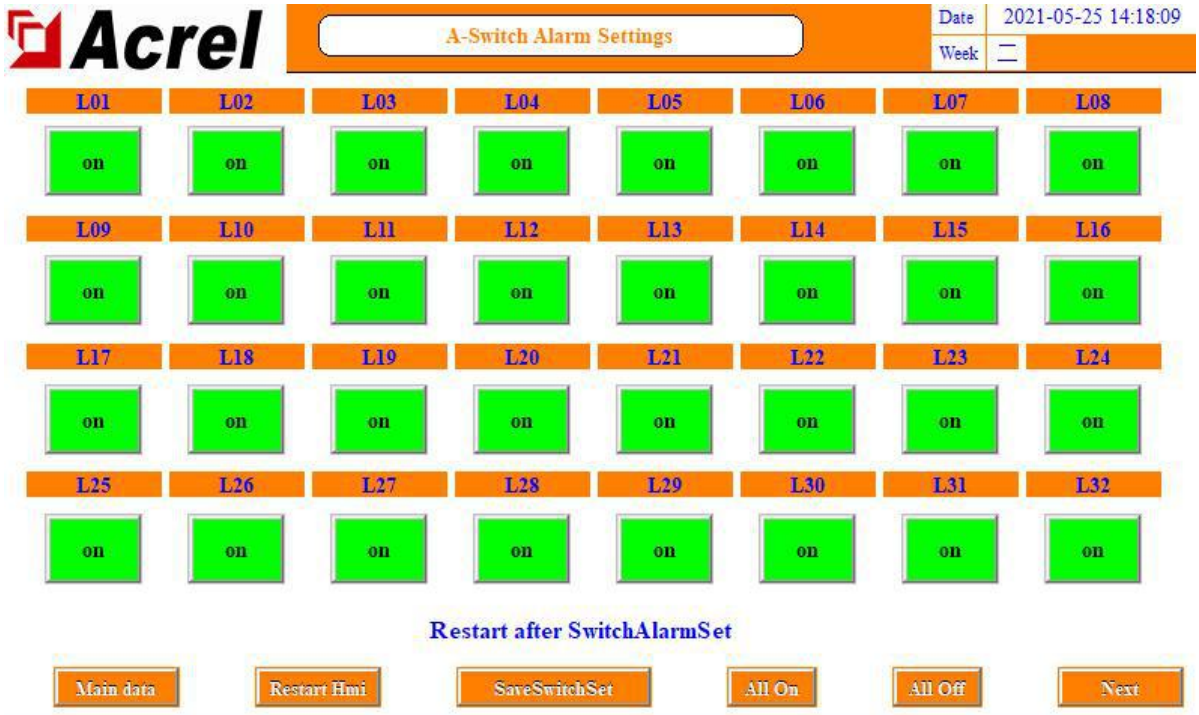
7.1.8.8 English version

Click "English" in the "Parameter Setting" interface to switch to the English version, and then click "Chinese" to switch back to the Chinese version.

7.1.8.9 Switch alarm setting

For switch alarm, click "Switch Alarm Setting" in the "Parameter Setting" interface to the switch alarm setting interface.

7.1.8.9.1 Subbranch switch alarm setting (active)



This part refers to the active detection switch status acquired by AMC16Z-FAK. It is a jump alarm, that is, the alarm can be triggered only when the switch is disconnected after detecting that it is normal. If a switch is not used but an alarm exists, one can click the switch alarm setting of the circuit to change "ON" to "OFF", and then click "ON" again if one wants to enable it.

Click "Save Switch Settings" after setting.

7.1.8.9.2 Subbranch SD alarm setting (passive)

Click the next page in the "Switch Alarm Setting" interface to the last page to set the "Normally Open" and "Normally Closed" of "Outgoing SD".

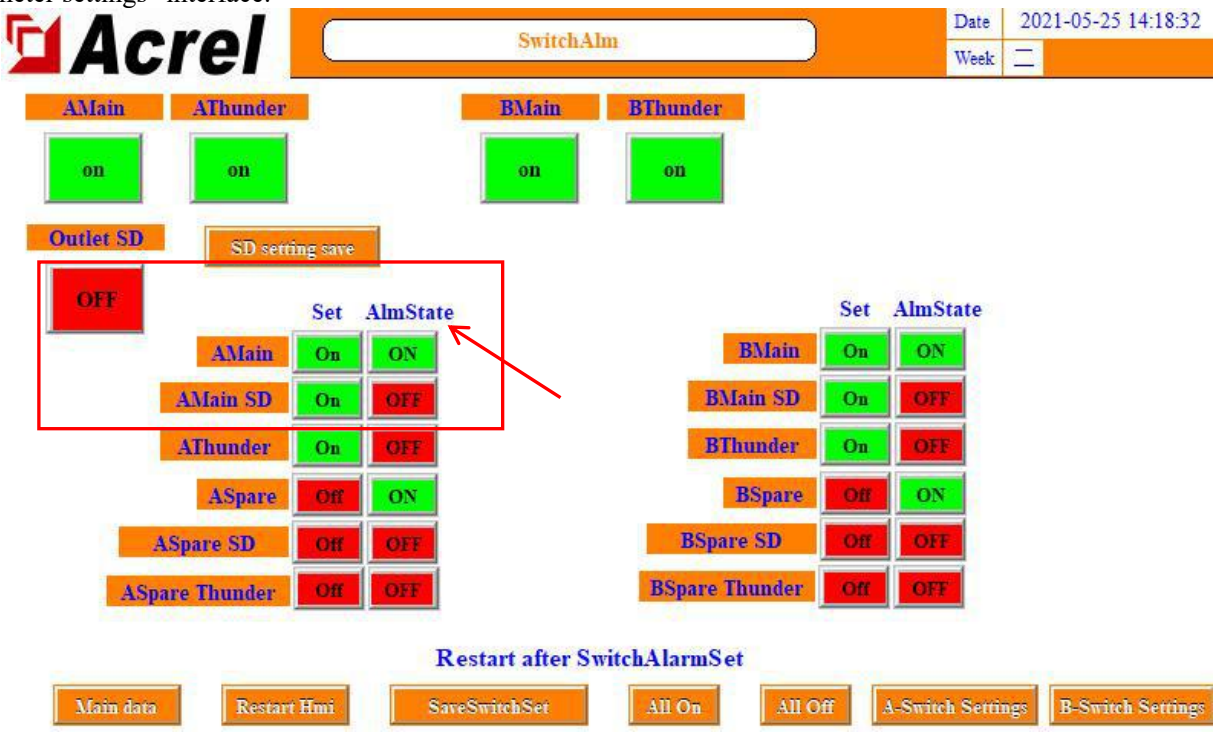
This part refers to the reactive detection switch status collected by AMC16Z-KD, which is a jump alarm. SD of the branch is controlled by this one key.

Normally closed: alarm when the circuit changes from access to open circuit.

Normally open: alarm when the circuit changes from open circuit to access.

The user selects normally open or normally closed according to the actual application, and the factory default is normally closed. If the user does not need to use SD alarm, the default is normally closed, which means no alarm.

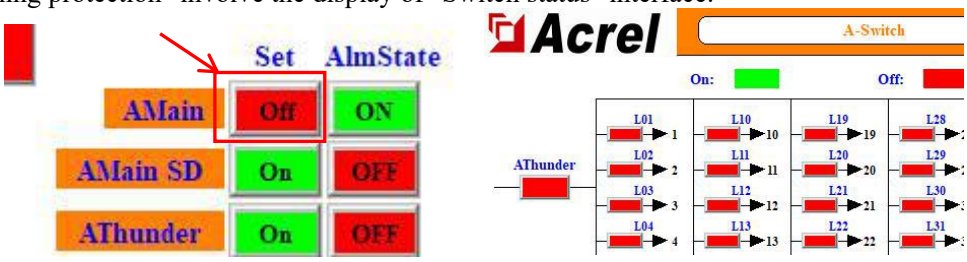
If there is any change, click "SD special save settings" on the right after setting, or click "Save settings" in the "Parameter settings" interface.



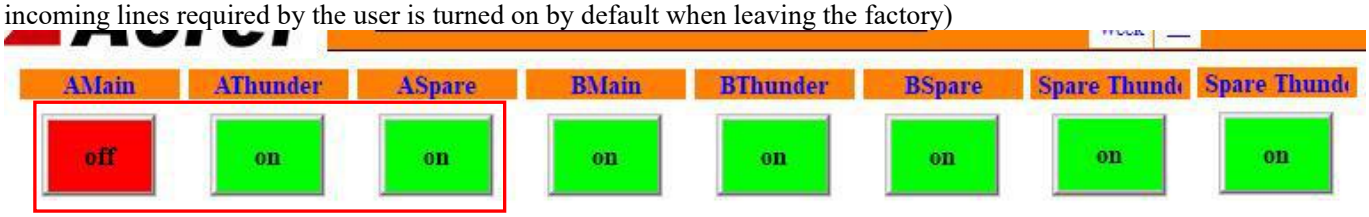
7.1.8.9.3 Alarm setting of main circuit switch (reactive)

Click the next page in the "Switch Alarm Setting" interface to the last page to set the switching point of ZA acquisition.

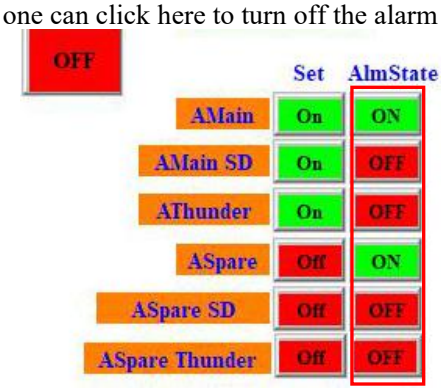
Labels containing the words "main circuit" and "standby circuit" are generally used as auxiliary contacts, and the rest are shown in the labels. "Main circuit", "Standby circuit", "Main circuit lightning protection" and "Standby circuit lightning protection" involve the display of "Switch status" interface.



A column of keys below "Use" controls whether the switch is put into use and displayed. If it is "Off", the alarm will not be triggered and the "Switch Status" interface will shield the display of the switch status. (The number of incoming lines required by the user is turned on by default when leaving the factory)



The button on the top of the interface controls whether the alarm is enabled. If one needs to display only the switch status, but do not enable the switch alarm, one can click here to turn off the alarm function.



A column of buttons below the "alarm state" controls the alarm logic as normally open or normally closed. "Main circuit" and "Standby circuit" are generally used as auxiliary contacts. "Normally closed" means that the circuit changes from open circuit to access, which causes an alarm. "Normally open" means that the circuit changes from access to open circuit, which causes an alarm. The logic of SD "tripping" and "lightning protection" is opposite to that of the main circuit switch. "Normally open" means that the circuit changes from open circuit to access, and "normally closed" means that the circuit changes from access to open circuit, and then alarms. The setting of normally open and normally closed involves the color identification displayed on the "Switch Status" interface.

The factory settings default to all switching points: alarm when the circuit changes from access to open circuit. The user can change the logic used according to the actual situation. Click "Save Switch Settings" to save the changes.

7.1.8.10 Internal management

The module information, order information, software number, user information, etc. used by the current system can be queried in the internal management interface. Refer to the forwarding section below for forwarding content.

Follow the steps in 1.4 to log into Admin. Click "Parameter Setting", and click "Internal Management" on the parameter setting interface to enter.

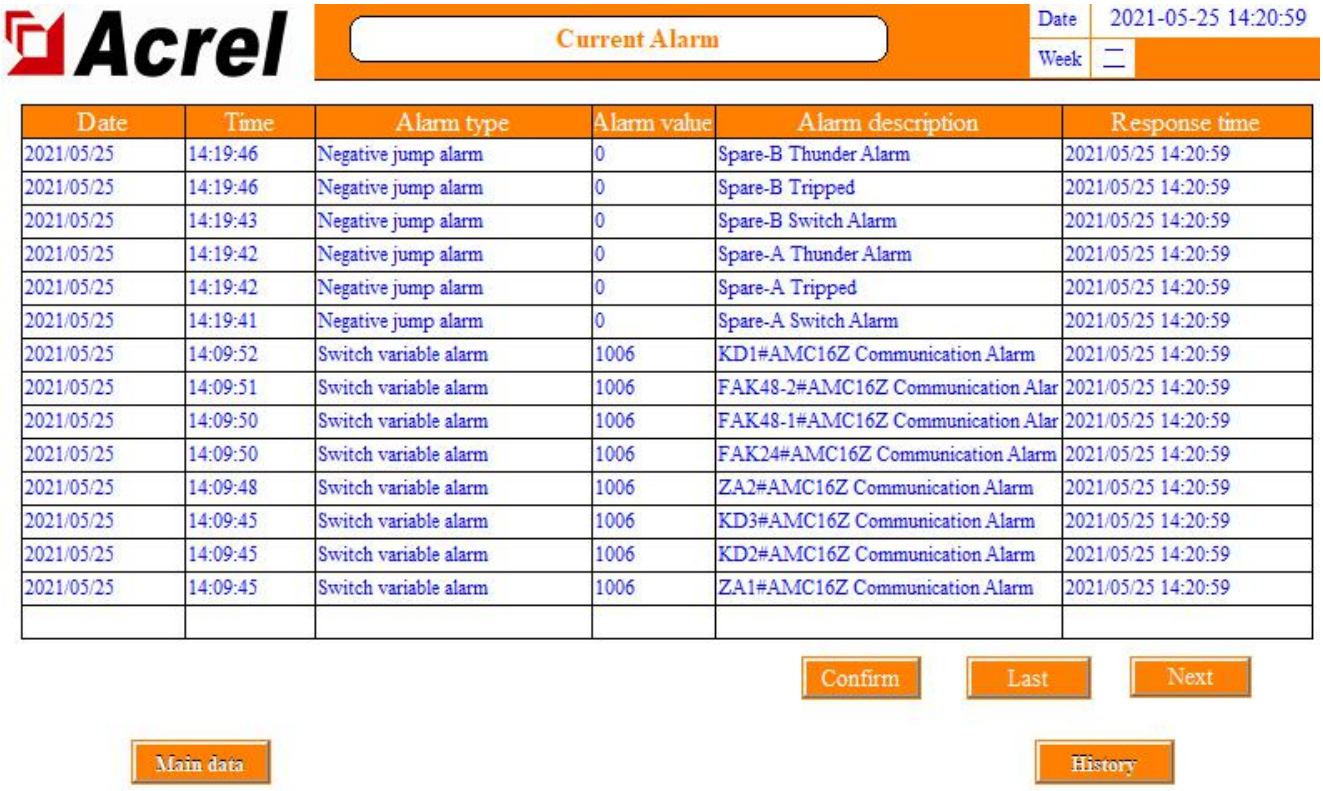
If there is a problem during use, users need to provide information on this page when contacting us.

7.1.9 Alarm information

7.1.9.1 Present alarm information

Click "Alarm information" in the "Main circuit parameter" interface to view the present alarm. Click "Alarm Silence" to confirm that the present alarm stops the buzzer and the alarm information does not disappear. At this time, if there is a new alarm, even if the new alarm disappears, the buzzer will not stop as long as there is an alarm entry in the present alarm information.

When there is an alarm, and then all of them are repaired and disappear, the system will automatically be silent.



Date	Time	Alarm type	Alarm value	Alarm description	Response time
2021/05/25	14:19:46	Negative jump alarm	0	Spare-B Thunder Alarm	2021/05/25 14:20:59
2021/05/25	14:19:46	Negative jump alarm	0	Spare-B Tripped	2021/05/25 14:20:59
2021/05/25	14:19:43	Negative jump alarm	0	Spare-B Switch Alarm	2021/05/25 14:20:59
2021/05/25	14:19:42	Negative jump alarm	0	Spare-A Thunder Alarm	2021/05/25 14:20:59
2021/05/25	14:19:42	Negative jump alarm	0	Spare-A Tripped	2021/05/25 14:20:59
2021/05/25	14:19:41	Negative jump alarm	0	Spare-A Switch Alarm	2021/05/25 14:20:59
2021/05/25	14:09:52	Switch variable alarm	1006	KD1#AMC16Z Communication Alarm	2021/05/25 14:20:59
2021/05/25	14:09:51	Switch variable alarm	1006	FAK48-2#AMC16Z Communication Alar	2021/05/25 14:20:59
2021/05/25	14:09:50	Switch variable alarm	1006	FAK48-1#AMC16Z Communication Alar	2021/05/25 14:20:59
2021/05/25	14:09:50	Switch variable alarm	1006	FAK24#AMC16Z Communication Alarm	2021/05/25 14:20:59
2021/05/25	14:09:48	Switch variable alarm	1006	ZA2#AMC16Z Communication Alarm	2021/05/25 14:20:59
2021/05/25	14:09:45	Switch variable alarm	1006	KD3#AMC16Z Communication Alarm	2021/05/25 14:20:59
2021/05/25	14:09:45	Switch variable alarm	1006	KD2#AMC16Z Communication Alarm	2021/05/25 14:20:59
2021/05/25	14:09:45	Switch variable alarm	1006	ZA1#AMC16Z Communication Alarm	2021/05/25 14:20:59

7.1.9.2 Historical alarm information

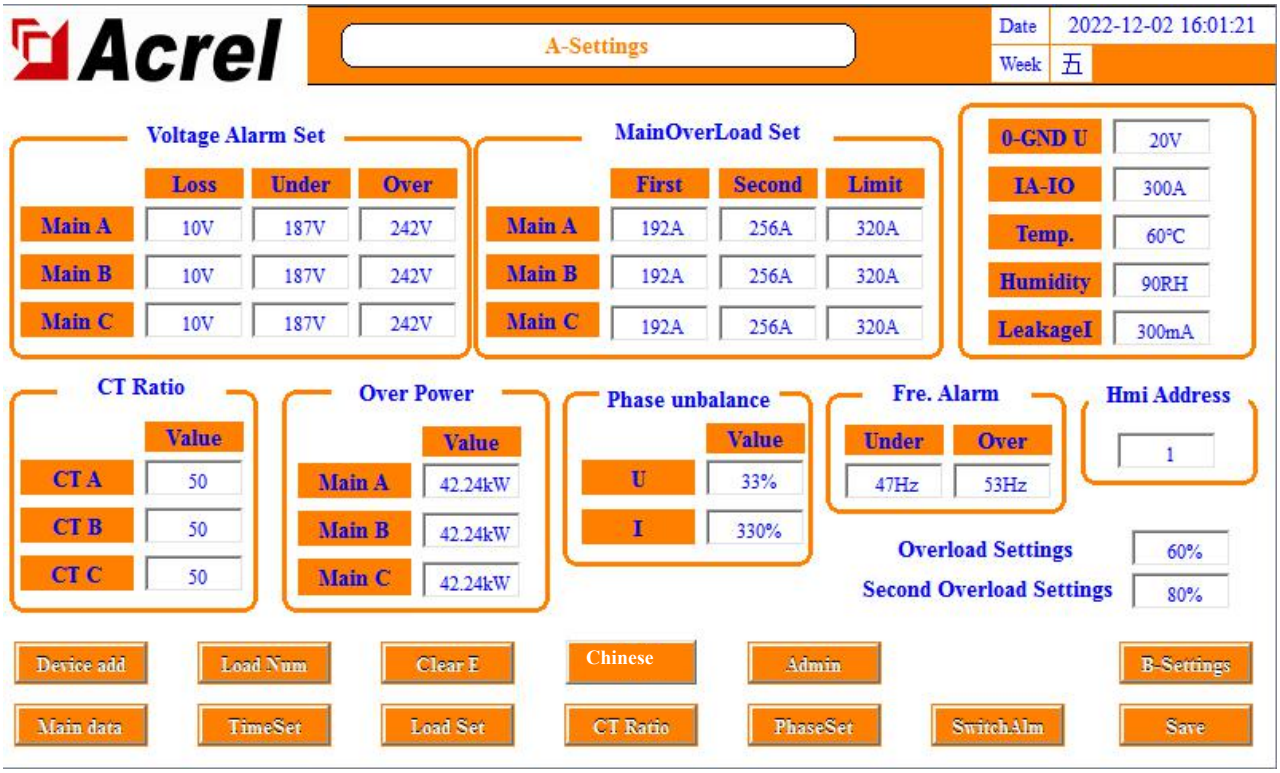
Click "Historical Alarm" in the "Present Alarm" interface to view historical alarms. Click "Clear Alarm" to clear all historical alarm entries. "Clear Alarms" has permission restrictions. Users need to log in to the person in charge or Admin to clear historical alarms.

Date	Time	Alarm type	Alarm value	Alarm description	End time
2021/05/25	14:19:46	Negative jump alarm	0	Spare-B Thunder Alarm	
2021/05/25	14:19:46	Negative jump alarm	0	Spare-B Tripped	
2021/05/25	14:19:43	Negative jump alarm	0	Spare-B Thunder Alarm	2021/05/25 14:19:44
2021/05/25	14:19:43	Negative jump alarm	0	Spare-B Switch Alarm	
2021/05/25	14:19:42	Negative jump alarm	0	Spare-A Thunder Alarm	
2021/05/25	14:19:42	Negative jump alarm	0	Spare-A Tripped	
2021/05/25	14:19:41	Negative jump alarm	0	Spare-A Switch Alarm	
2021/05/25	14:19:26	Negative jump alarm	0	A-Main Switch Alarm	2021/05/25 14:19:27
2021/05/25	14:09:52	Switch variable alarm	1006	KD1#AMC16Z Communication Alarm	
2021/05/25	14:09:51	Switch variable alarm	1006	FAK48-2#AMC16Z Communication Alar	
2021/05/25	14:09:50	Switch variable alarm	1006	FAK48-1#AMC16Z Communication Alar	
2021/05/25	14:09:50	Switch variable alarm	1006	FAK24#AMC16Z Communication Alarm	
2021/05/25	14:09:48	Switch variable alarm	1006	ZA2#AMC16Z Communication Alarm	
2021/05/25	14:09:45	Switch variable alarm	1006	KD3#AMC16Z Communication Alarm	
2021/05/25	14:09:45	Switch variable alarm	1006	KD2#AMC16Z Communication Alarm	

7.2 Data forwarding

7.2.1 RS485 communication

When the data is connected to the background monitoring system through the RS485 communication interface of the touch screen, the correct communication address should be set. The default communication address is 1, and the baud rate is 9600 (cannot be changed). The setting of the communication address is in the parameter setting interface. In the "forwarding data address" input box, change it to the corresponding address, and then click Save Settings, or the default address 1 will be restored after power failure. Note that the communication data format is 9600. n.8.1.



7.2.2 Ethernet communication (optional)

When the data is connected to the background monitoring system through the Ethernet port communication interface of the touch screen, the network address and port number should be set correctly. Note that the network address of the touch screen can be set on the internal management interface of the touch screen software. The port number of network communication is 502, which cannot be changed.

The background software acquisition touch screen interval is recommended to be greater than 500ms.

Revision record

Date	Old version	New version	Revision
2022.2.24		V1.0	1.First writing
2023.5.10	V1.0	V1.1	1.Add P24 model related content 2.Increase the overall size of the touch screen
2023.8.25	V1.1	V1.2	1.modify the FDK laser printing diagram and change the switch input to voltage input

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