453

ARCM300-DU Type
Smart Power Concentration Display Unit

Installation and Use Manual V1.0

Acrel Electric Co., Ltd.

Declaration

Acrel reserves the right to modify the product specifications herein without notification. Please consult the local agent about the latest specifications before placing a purchase order.

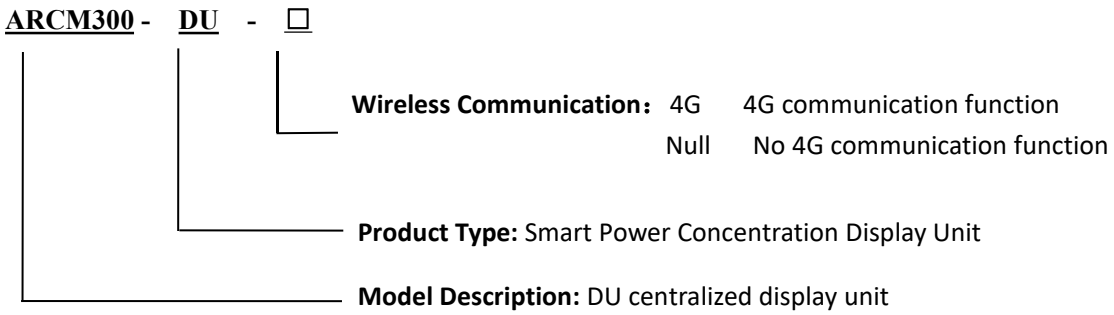
Content

1. Overview

The intelligent power centralized display unit is a monitoring device designed for TT and TN systems below 0.4kV. It has dot-matrix LCD display, single-circuit residual current monitoring, four-way temperature monitoring, two-way relay output, two-way switch input, one way RS485 communication and one way two bus communication. It can communicate with various integrated electrical fire monitoring devices, fault arc detectors and other equipment on the electricity site, and collect and forward data, so as to realize real-time monitoring and real-time feedback of electrical fire hazards on various electricity sites.

The product adopts advanced microcontroller technology, high integration, small size, easy installation, intelligent, digital, and networked. At the same time, the original RS485 communication is upgraded to GPRS wireless communication, which solves the problem of difficult on-site wiring. As an advanced intelligent and digital acquisition element, the intelligent device has been widely used in various control systems.

2. Product model

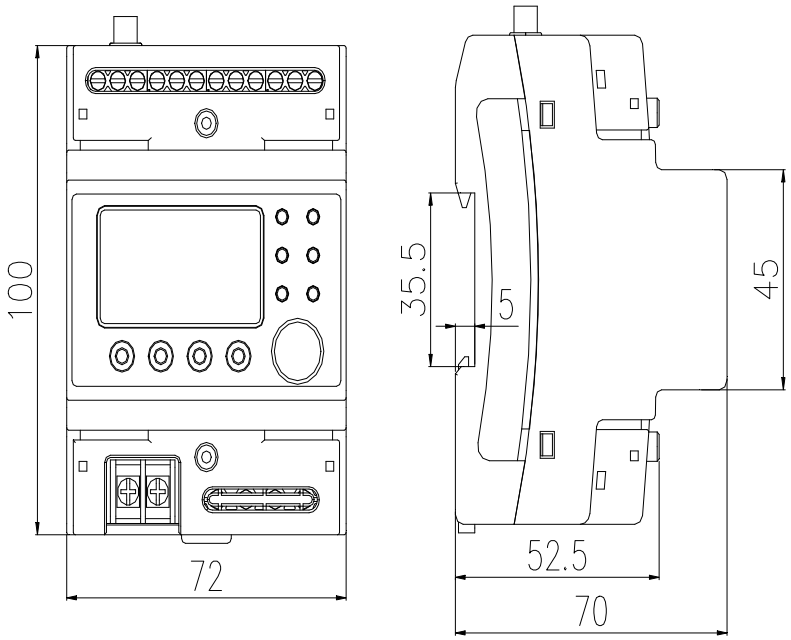


3. Technical parameter

Model		ARCM300-DU
Function		parameter
Auxiliary power	Rated voltage	AC220V
	Power consumption	Normal monitoring state≤5VA
Monitoring alarm	Residual current	Alarm setting value: 300~1000mA continuously adjustable
	Temperature	Alarm setting value: 45~140°C continuously adjustable, step size 1°C
Action delay time		Alarm time setting value: 0.1~60S continuously adjustable
Measurement accuracy		Residual current Class 1
Switch input		Two-way passive dry contact input mode: built-in power supply
Switch output		Two-way passive normally open contacts, contact capacity AC 220V/1A, DC 30V/1A
Communication		485 communication; Modbus-RTU protocol
		Two bus communication: downlink 32 monitoring units (detectors)
Record		20 fault, alarm and switch records
Network mode		GPRS communication (4G)

4. Installation and Wiring

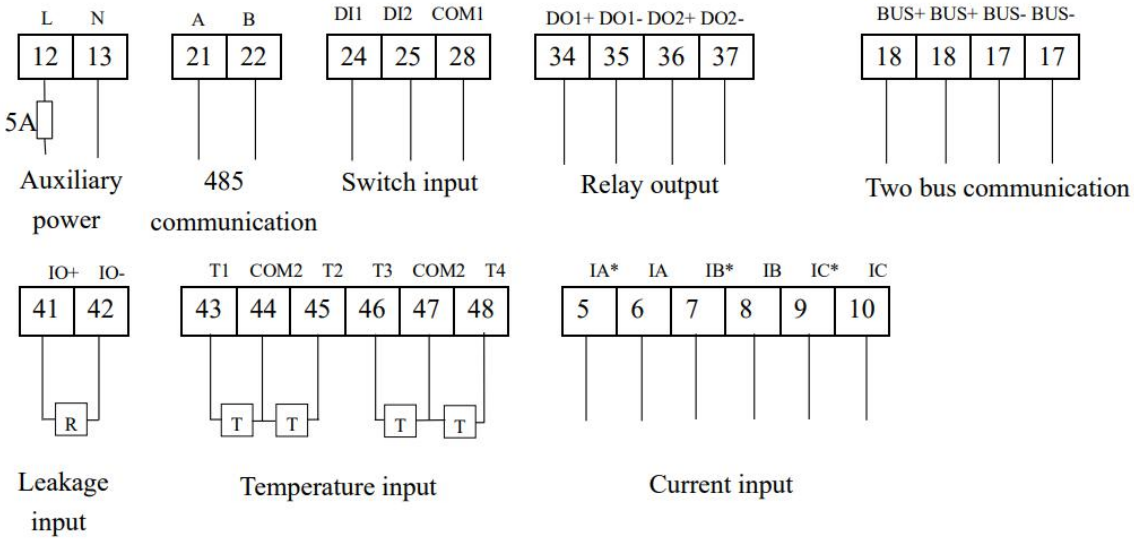
4.1. Dimensions (unit: mm)



4.2. Installation method

35mm rail installation, wall installation.

4.3. Wiring instruction



5. Definition of indicator lights and key operation

5.1. Description of measurement item

It can monitor the alarm situation of the slaves (fault arc sensor, integrated electrical fire monitoring device) under the two bus and make an alarm command. When the slave sends an alarm, the centralized display unit sends out an audible and visual alarm. It can monitor the residual current and temperature at the same time, and make an alarm command according to the size of the residual current and temperature. When the input signal reaches the alarm setting, an audible and visual alarm is issued.

5.2. Definition of indicator lights

● Operation indicator light (green): The meter is in normal operation: When the communication is not connected, the indicator light flashes, and the flashing frequency is about once every second. When the communication is connected normally, and only the communication data is received, the flashing frequency of the indicator light is about once every 2 seconds. When the communication is connected normally, and the data is received and sent, the indicator light flashes four times and turns off once.

●Silencer indicator light (green): When the meter is in the mute state, the indicator light is always on.

●Alarm indicator light (red): When the meter is in an alarm state, the indicator light is always on.

●Fault indicator light (yellow): When the meter is in fault, the fault indicator light is always on (the fault is the fault of the external circuit, not the fault of the meter itself).

●Status indicator light (green): When the meter is connected to the server, the indicator light is always on. When the meter is not connected to the server, the indicator light is off.

●Signal indicator light (red): The GPRS module works normally, and the indicator light flashes.

5.3. Button operation

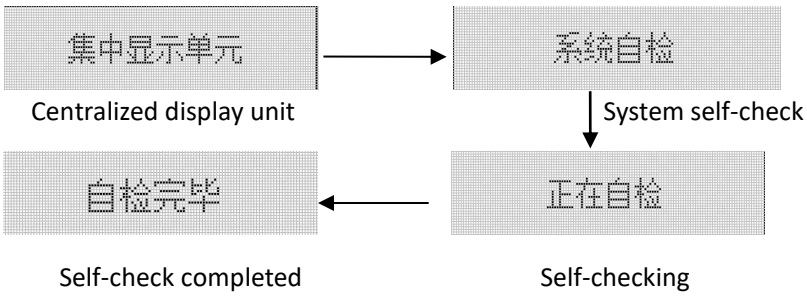
You can set the address and parameters of the meter by pressing the buttons, and you can also perform silencing, self-checking and reset operations on the meter by pressing the buttons. The centralized display unit online monitoring device has a total of 4 buttons, from left to right: MENU Button, ◂ /Mute Left Button, ▸/Reset Right Button and ↵ /Self-check Enter Button.

MENU Button	In non-programming mode: press this button to enter programming mode, the device prompts to enter a password, or returns to the previous menu; In programming mode: it is used to return to the previous menu, or exit the programming mode.
◂ Left Button ▸ Right Button	In non-programming mode: it is used to switch the display interface; long press the left button to realize the mute function; long press the right button to realize the reset function. In programming mode: it is used to switch the same level menu and shift the cursor.
↵Enter Button	In non-programming mode: long press the Enter button to realize the self-checking function; In programming mode: it is used to confirm the selection of menu items and enter the next level menu.

5.4. LCD Display

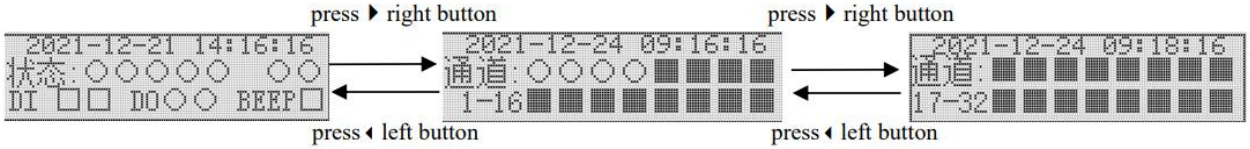
5.4.1. Power-on and self-check

The centralized display unit is powered on and performs self-check. The interface is displayed as shown in the figure below. All the indicator lights turn on at the same time, then turn off in sequence. The buzzer sounds and the operation indicator light flashes in the end. Then the centralized display unit monitoring device enters the normal monitoring state.



5.4.2. Master and Slave Module Status Pages

After completing the self-check, it will enter the master module status interface, and switch to the downlink module status interface by pressing ▸ button.



(1) Master module status (2) Downlink 1-16 loop status (3) Downlink 17-32 loop status

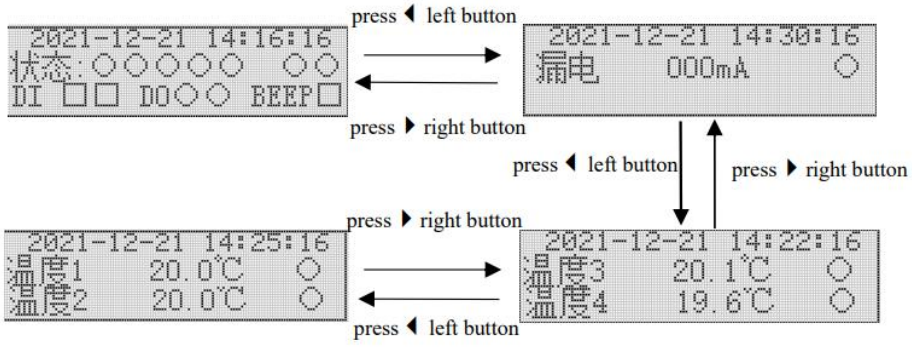
Note:

The definition table of each status symbol of the main module:

Status 1-5 Note: 1-Master module leakage status 2-5-Master module temperature status	○	●	◐	◑
	Normal	Alarm	Disconnection	Short Circuit
Status 6-7 Note: 6- Downlink fault status 7- Downlink alarm status	○		●	◐
	Normal		Fault	Alarm
DI1-2 Note: Left-DI1 Status Right-DI2 Status	□		■	
	Open		Closed	
DO1-2 Note: Left-DO1 Status Right-DO2 Status	○		●	
	Open		Closed	
BEEP	□		■	
	Open		Closed	
Channels 1-32	○	●	□	■
	Normal	Alarm	Disconnection	Close

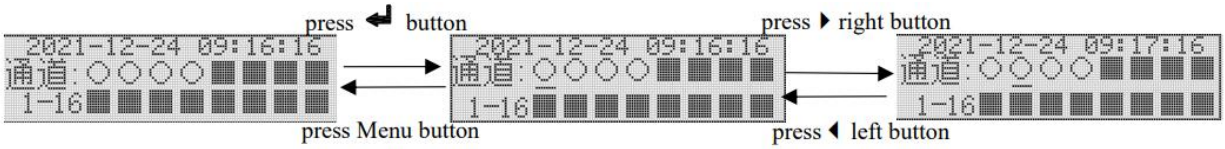
5.4.3. Real-time data interface

In the state of the master module, you can view the real-time data of leakage current and temperature of the master module by switching the page with the ◂ left button and ▸ right button.



5.4.4. Viewing and parameter setting from module data

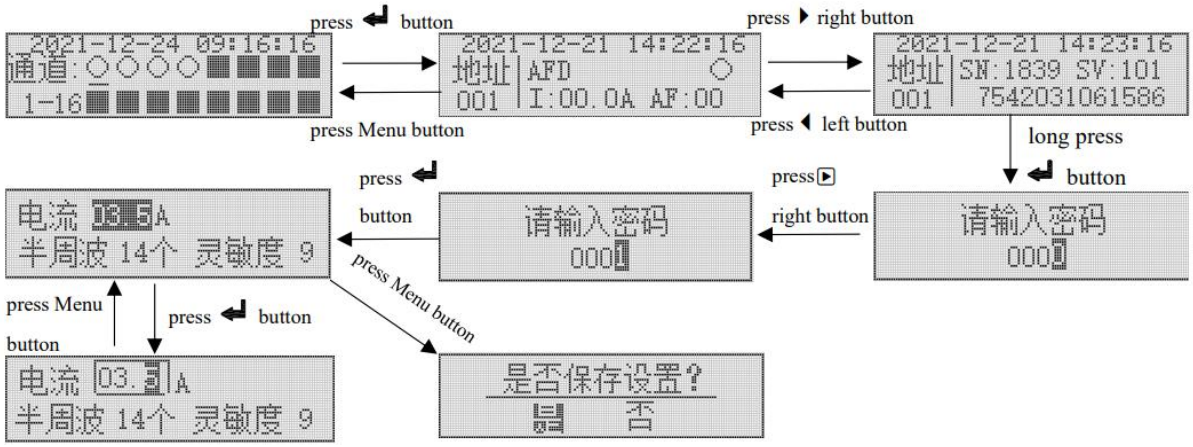
On the downlink module status page, you can use the ↵button to enter the channel selection page, and use the ◂ left button and ▸ right button to switch the selected channel.



Note: The slave modules in channels 1-32 can be arc fault sensors or integrated electrical fire detectors.

5.4.4.1. Smart power consumption centralized display unit from module ARCM/L data viewing and parameter setting

When the selected channel is connected to an arc fault sensor, press the ↵ button to enter and view the specific information of this module, including sensor alarm status, current, software number SN, software version number SV, and 14-digit unique code, etc.



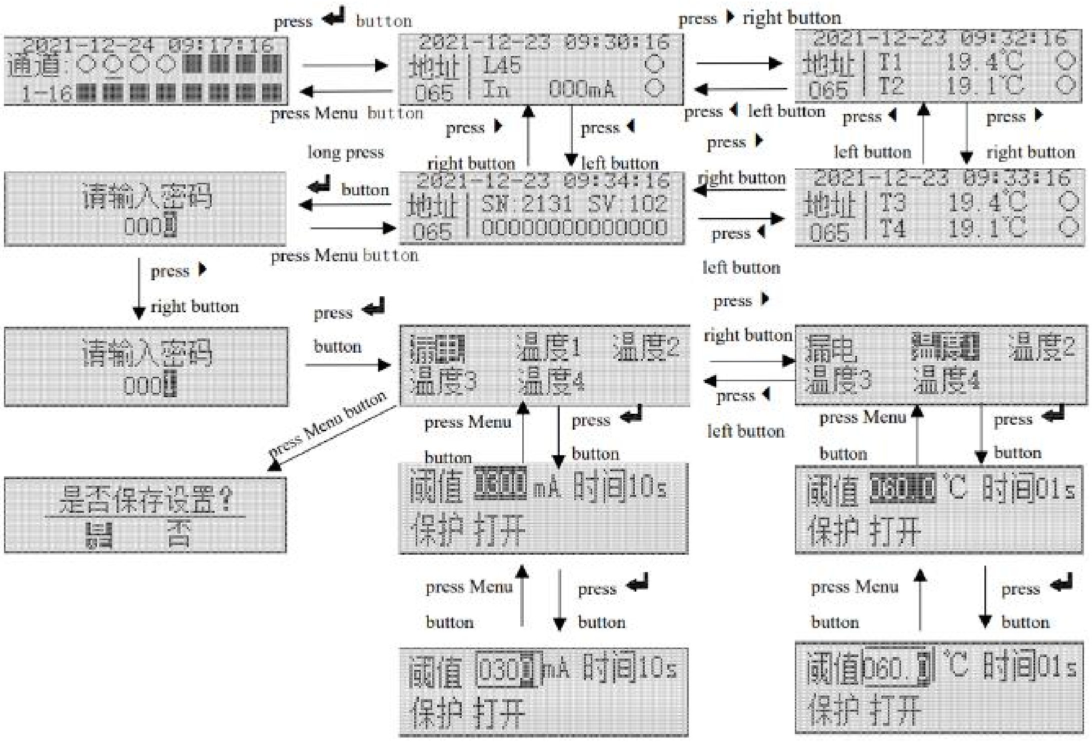
Note: 1) The initial password is 0001

2) Use ◂ left button and ▸ right button to change the value of current, half cycle and sensitivity, and press ↵button to confirm.

3) In the "Save setting" interface, press ◂ , ▸ to choose whether to save the data, then press ↵button to confirm and exit the settings interface.

5.4.4.2. Electrical fire slave module data viewing and parameter setting

When the selected channel is connected to an integrated electrical fire detector, you can press ↵button to enter and view the specific information of this module, including detector alarm status, residual current, temperature, software number SN, software version number SV and 14-bit unique code.



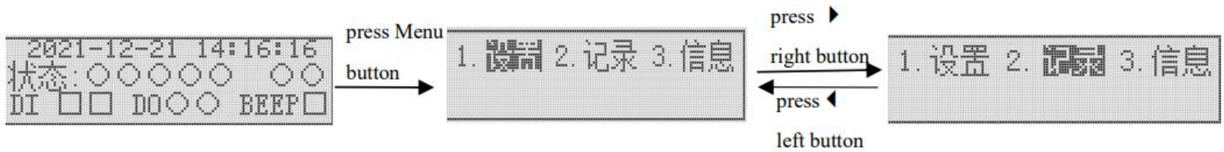
Note: 1) The initial password is 0001

2) Use ◀ left button and ▶ right button to change the threshold, time and protection settings, and press ↵ button to confirm.

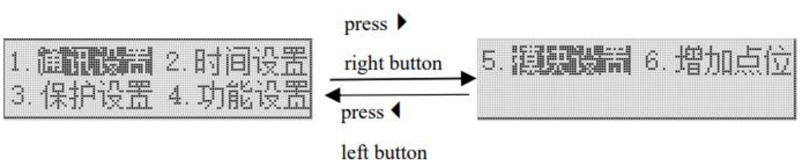
3) In the "Save setting" interface, you can press ◀ , ▶ to choose whether to save the data, then press ↵ button to confirm and exit the settings interface.

5.4.5. Setting interface

In the channel status display interface, press MENU button to enter the menu interface, and press ◀ , ▶ buttons to select setting, record, and information.



Select "1. Setting" and press ↵ button to enter the setting interface, then enter the password and press ↵ button to enter the setting page (default password: 0001), and press ◀ , ▶ buttons to select.



5.4.5.1. Communication setting

Select "1. Communication setting" and press ↵ button to set the communication for the online monitoring device of the centralized display unit, and switch the interface through ◀ , ▶ buttons.

Note:

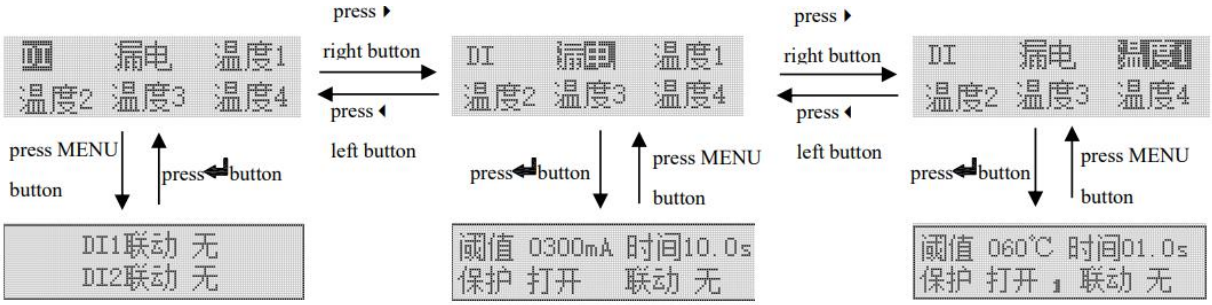
- Figure (1) can change the address and baud rate of centralized display unit;
- Figure (2) can change the timing interval and the port number of the uploading server;
- Figure (3) can change the IP address of the upload server.

5.4.5.2. Time setting

Select "2. Time setting" and press ↵button to set the time for the online monitoring device of centralized display unit.

5.4.5.3. Protection setting

Select "3. Protection setting" and press ↵button to set protection for each channel of online monitoring device of centralized display unit.

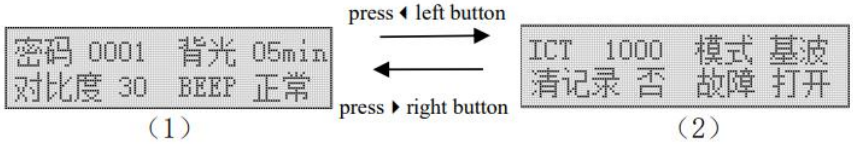


Note:

1、 The leakage, temperature and linkage can be modified or set through ◂ , ▸ buttons
2、 Linkage: It is used for switch value linkage. If DI1 is linked with DO1, when DI1 is closed, DO1 is also closed
3、 Leakage: It can detect the residual current in a short time, and alarm when it exceeds the threshold. The time and threshold can be adjusted according to the actual situation.
4、 Temperature: It can detect the temperature in a short period of time, and alarm when it exceeds the threshold. The time and threshold can be adjusted according to the actual situation.

5.4.5.4. Function setting

Select "4. Function setting" and press ↵button to set the function of online monitoring device of centralized display unit. Several pages under the function settings can be switched through ◂ , ▸ buttons. The parameters of each interface are explained as follows.



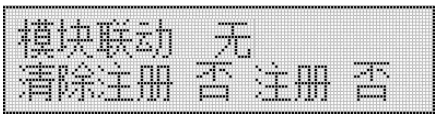
Note:

- The password in Figure (1) is the setting password, the default password can be modified. The backlight lighting time can be selected under the backlight option. The contrast ratio of the meter can be adjusted. BEEP can be selected as normal, alarm or off.
- The leakage current transformation ratio in Figure (2) can be adjusted, and the mode can be selected as fundamental wave or full wave. “Clear record” can select Yes option to clear the current event record. Fault can choose whether to open or not.

After completing the settings, you need to press ↵button to confirm, and then press Menu button to return to whether to save the setting interface. At this time, press ◂ , ▸ buttons to select whether to save the data, then press ↵button to confirm and exit the setting interface.

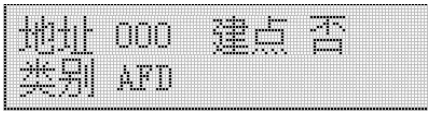
5.4.5.5. Module setting

Select "5. Module Setting" and press ↵button to link, register and clear the related settings of the module.



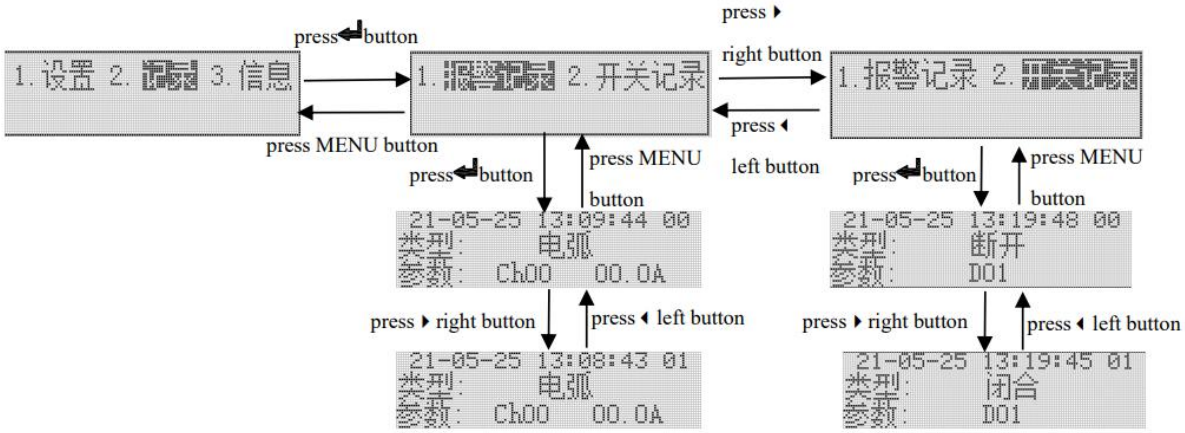
5.4.5.6. Add point

Select "6. Add point" and press ↵button to choose whether to create a new point or not, and set the address and type of the new point.



5.4.6. Event Logging

In the menu interface, use ◂ , ▸ buttons to select “2. Record” and press ↵button to enter the record interface.



Note:

1）The data "00" in the upper right corner of the alarm record represents the first data, and the subsequent alarm records can be "01, 02...39" (up to 40).

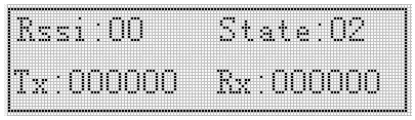
2）The data "00" in the upper right corner of the switch record represents the first data, and the subsequent alarm records can be "01, 02...59" (up to 60).

3）Press ◂ left button or ▸ right button to switch the interface of data record.

5.4.7. Information interface

In the menu interface, select "2. Record" by ◂ , ▸ buttons, and press ↵button to enter the recording interface.

Select "3. Information" to press ↵button to enter the information interface.



Information interface (1)

On the information interface (1), there are four values, and the meaning is as follows:

- RSSI: The current signal value is displayed after RSSI.
- State: State indicates the status of the current module. There are ten states from 0 to 9. The

meanings of numbers from 0 to 9 are as follows:

- 0 Initialization
- 1 Obtain the serial number of the IMEI
- 2 Check the SIM card number
- 3 Set the network mode
- 4 Wait for GPRS to attach
- 5 Check signal values
- 6 Set the networking mode
- 7 Connect to the server
- 8 The server has been connected
- 9 Disconnect the server

- TX: The number of sent data is displayed after TX.
- Rx: The number of reception data is displayed after RX.

Information interface (2)

On the information interface (2), IP address and port number connected to the server are displayed in the first line of the interface. The second line displays domain name (if no domain name is set).

Information interface (3)

On the information interface (3), the number next to CCID is the SIM card number. If the SIM card number is displayed in CCID, the SIM card is inserted properly. If the SIM card number is not displayed after CCID, as shown in (3), it indicates that the SIM card is not properly inserted or there is no SIM card in the meter.

Information interface (4)

On the information interface (4), the number below IMEI (WC) is the module serial number.

Information interface (5)

On the information interface (5), SN is the software number, V is the software version, and the sequence of alphanumeric combination after SER represents the meter number.

6. Function application

6.1. Arc monitoring

The number of arc of distribution line is monitored online. When the number of arc exceeds the set value, the fault arc sensor will send out light alarm and upload to the centralized display unit, which will send out sound and light alarm.

Parameter	Range
Linkage switch	None/DO1/DO2/DO1&2

Protection mode: Fault arc linkage can be set to none, DO1, DO2, DO1&2. When the linkage is in DO1/DO2/DO1&2 state, the corresponding action will be triggered when the fault arc alarm is detected.

6.2. Residual current monitoring and detection

Detect the residual current of the distribution line online. When the residual current exceeds the alarm set value and the duration exceeds the delay set value, it will perform the alarm operation. The alarm setting value $I_{\Delta n}$ can be set according to the normal leakage current of the line. The setting value should be no less than two times of the maximum normal leakage current of the protected electrical line and no more than 1000mA. For the place equipped with two or multi-level residual current protection, the residual current alarm set value of the upper level must be greater than the residual current alarm set value of the next level. And the delay of the upper level is greater than the delay of the lower level.

Parameter	Range	Step length
Residual current alarm setting value	20~1000mA	1mA
Action delay time	0.1~60.0S	0.1S
Protection mode	Off/On	
Linkage switch	None/DO1/DO2/DO1&2	

Protection mode: Residual current protection mode can be set to off or on, linkage can be set to none, DO1, DO2, DO1&2. When the protection mode is turned on and the linkage is in DO1/DO2/DO1&2 state, the corresponding action will be triggered when the residual current value exceeds the alarm value and the action delay is reached. If in the delay process, the residual current value is less than the residual current alarm set value, no action.

The default residual current alarm setting is 300mA, the action delay time is 10.0s, and the protection mode is off.

6.3. Temperature monitoring

Use a temperature sensor to monitor the temperature of the power distribution box, cables, or cable connections. When the temperature exceeds the setting value, it will delay a certain time and perform the operation of alarming or disconnecting the circuit breaker. The installation of temperature sensors must be fixed and stable to prevent short circuit caused by falls.

Parameter	Range	Step length
Temperature alarm setting value	45.0~140.0℃	1℃
Action delay time	0.1~60.0S	0.1S
Protection mode	Off/On	
Linkage switch	None/DO1/DO2/DO1&2	

Protection mode: Temperature protection mode can be set to off or on, linkage can be set to None, DO1, DO2, DO1&2. In the DO1/DO2/DO1&2 state of the protection mode and linkage switch, when the temperature exceeds the alarm value and reaches the action delay, the corresponding action will be triggered. If in the delay process, the temperature value drops to the temperature alarm set value, no action.

The factory default temperature alarm setting is 60℃, the action delay time is 1.0s, and the protection mode is off.

6.4. Fire linkage function

When there is a fire, the fire linkage system issues instructions, through the device to make the circuit breaker blurt out, forcibly cut off the power supply of non-fire equipment. After receiving the fire linkage signal, the device will make the corresponding protection action according to the relevant action Settings.

The factory default protection mode is disabled.

6.5. Self-checking function

The device has the function of self-check. On the home screen, long press ↵button to confirm, the system will enter the self-check state to check whether the device is in good condition.

6.6. Muffler function

In the fault or alarm state, switch to the master interface, long press ◂ button to mute and confirm, the alarm sound of the device will be eliminated.

6.7. Alarm reset (disarming alarm)

When the alarm occurs, the output state of the relay can be reset by pressing the button. If the alarm fault is not eliminated after the reset operation, the device will enter the fault alarm or trip state again.

6.8. Centralized monitoring

The centralized display unit receives the information of the module on the bus through the two-bus, sends out alarm signals and control instructions, and disconnects the fault line in time.

7. Communication protocol

7.1. Overview of Communication Protocol

The device uses modbus-RTU communication protocol, which defines in detail the check code, data sequence, etc., which are necessary for specific data exchange. The Modbus protocol uses a master-slave reply connection (half duplex) on one communication line, which means that signals travel in opposite directions on a single communication line. First, the signal from the main computer is addressed to a unique terminal device (slave machine), and then the reply signal from the terminal device is transmitted to the main computer in the opposite direction.

Modbus protocol only allows communication between the host (PC, etc.) and terminal devices, not data exchange between independent terminal devices, so that terminal devices do not occupy the communication line when they are initialized, but only respond to the query signal reaching the local machine. (Default communication Settings: Address 0001, baud rate 9600)

7.1.1. Transmission mode

The information is transferred asynchronously and in bytes. The communication information transmitted between the host and slave is in 11-bit format, including one start bit, eight data bits (the least significant bit is sent first), no parity bit, and one stop bit.

7.1.2. Information frame format

Address code	Function code	Data area	CRC check code
1 byte	1 byte	N bytes	2 bytes

Address code: The address code consists of one byte (8-bit binary code) at the beginning of the frame and ranges from 0 to 255 in decimal notation. These bits identify the address of the user-specified terminal device that will receive data from the connected host. The address of each terminal device must be unique, and only the terminal addressed will respond to the query containing that address. When a terminal sends back a response, the slave address data in the response tells the host which terminal is communicating with it.

Function code: The function code tells the addressable terminal what function to perform. The following table lists the function codes used in this series of devices, as well as their meanings and functions.

Function	Definition	Operation
03H	Read data register	Get the current binary value of one or more registers
10H	Preset multiregister	Set binary values to a series of multiple registers

Data area: The data area contains the data required by the terminal to perform specific functions or the data collected when the terminal responds to queries. The content of this data may be numerical values, reference addresses, or setting values. For example, the function code tells the terminal to read a register, and the data area needs to specify which register to start from and how many data to read. The embedded address and data varies according to the type and content of the slave machine.

CRC check code: The error check (CRC) field takes up two bytes and contains a 16-bit binary value. The CRC value is calculated by the transmission device and then appended to the data frame. The receiving device recalculates the CRC value when it receives the data and then compares it with the value in the RECEIVED CRC field. If the two values are not equal, an error occurs.

The process for generating a CRC is as follows:

1. Preset a 16-bit register 0FFFFH (all 1s), which is called CRC register.
2. Xor operation is performed between the 8 bits of the first byte in the data frame and the lower byte in the CRC register, and the result is stored back to the CRC register.
3. Move the CRC register one bit to the right, fill the highest bit with 0, and move the lowest out and detect.
4. If the lowest level is 0, repeat the third step (next shift); If the least significant is 1, xOR is applied to the CRC register with a preset fixed value (0A001H).
5. Repeat steps 3 and 4 until 8 shifts complete a full eight bits.
6. Repeat steps 2 through 5 for the next octet until all byte processing is complete.
7. The final CRC register value is the CRC value.

There is also a method of calculating CRC using preset tables, which is characterized by fast computation but requires large storage space. This method is not described here, see related resources.

7.2. Introduction to Function code

7.2.1. Function code 03H: Read register

This feature allows users to obtain data and system parameters collected and recorded by the device. There is no limit to how much data a host can request at a time, but the data cannot exceed the specified address range.

The following example reads 1 collected basic data from the centralized display unit at address 01 (2 bytes per address in the data frame). Take reading the current alarm state as an example (where the register address of the alarm state is 1000H), reading the alarm state as 01 means that the current meter sends an alarm.

Send from host		Send information
Address code		01H
Function code		03H
Starting address	High byte	10H
	Low byte	00H
Number of register	High byte	00H
	Low byte	01H
CRC Check code	Low byte	80H
	High byte	CAH

Return from slave		Return information
Address code		01H
Function code		03H
Number of bytes		02H
Register data	High byte	00H
	Low byte	01H
CRC Check code	Low byte	79H
	High byte	84H

7.2.2. Function code 10H: Write register

Function code 10H allows the user to change the contents of multiple registers. The time and date in the device can be written by this function code. A host can write up to 16 (32 bytes) of data at a time.

The following example is a device with preset address 01 with a date and time of 12:12:00 on 25/05/2021.

Monday to Sunday are replaced by 1 to 7.

Send from host		Send information
Address code		01H
Function code		10H
Starting address	High byte	11H
	Low byte	00H
Number of register	High byte	00H
	Low byte	03H
Number of bytes		06H
1100H Data to be written	High byte	15H
	Low byte	05H
1101H Write data	High byte	19H
	Low byte	0CH
1102H Data to be written	High byte	0CH
	Low byte	00H
CRC Check code	Low byte	BAH
	High byte	26H

Return to slave		Return information
Address code		01H
Function code		10H
Starting address	High byte	11H
	Low byte	00H
Number of register	High byte	00H
	Low byte	03H
CRC Check code	Low byte	85H
	High byte	34H

7.3. Address table of detector parameter

7.3.1. Address table of parameters related to meter alarm, starting address 0x1000:

Serial Number	Address offset	Parameter	Read and write	Numerical range	Type
1	0x1000	Sensor alarm status	R	Bit0 = 1：Alarm. Bit0 = 0：No alarm.	Word
2	0x1001	D0 association setting	R/W	B0-associated with D01; B1-associated with DO2 Bit0 = 1：DO1 associated Bit0 = 0：DO1 not associated Bit1 = 1：DO2 associated Bit1 = 0：DO2 not associated	Word
3	0x1002	D0 status	R/W	B0-D01；B1-DO2 Bit0 = 1：DO1 off Bit0 = 0：DO1 on Bit1 = 1：DO2 off Bit1 = 0：DO2 on	Word
4	0x1003 low order	DI1 association	R/W	B0-associated with D01; B1-associated with DO2 Bit0 = 1：DO1 associated Bit0 = 0：DO1 not associated Bit1 = 1：DO2 associated Bit1 = 0：DO2 not associated	Byte
	0x1003 high order	DI2 association	R/W	B0-associated with D01; B1-associated with DO2 Bit0 = 1：DO1 associated Bit0 = 0：DO1 not associated Bit1 = 1：DO2 associated Bit1 = 0：DO2 not associated	Byte

5	0x1004	DI status	R	B0-DI1；B1-DI2 Bit0 = 1：DI1 off Bit0 = 0：DI1 on Bit1 = 1：DI2 off Bit1 = 0：DI2 on	Word
6	0x1005	Buzzer switch setting	R/W	Buzzer switch; 0: off; 1: only alarm; 2: on.	Word
7	0x1006	Current alarm loop	R	1-249	Word
8	0x1007	Reset	R/W	The read value is 0; When 0x1234 is written, the alarm is cleared (reset).	Word
9	0x1008	Self-check	R/W	The read value is 0; When 0x4321 is written, self-check.	Word
10	0x1009	Silencer	R/W	The read value is 0; When 0x7259 is written, the sound is silenced.	Word
11	0x100A	Analog arc alarm	R/W	The read value is 0; When 0x1111 is written, simulate the arc alarm test.	Word
12~100	0x100B~0x1063	Reserved	——	——	——

7.3.2. Address table of parameters related to system setting information, starting address 0x1100:

Serial Number	Address offset	Parameter	Read and write	Numerical range	Type
1	0x1100high order	Year	R/W	00-99	Byte
	0x1100 low order	Month	R/W	1-12	Byte
2	0x1101high order	Day	R/W	1-31	Byte
	0x1101 low order	Hour	R/W	0-23	Byte
3	0x1102high order	Minute	R/W	00-59	Byte
	0x1102 low order	Second	R/W	00-59	Byte
4~10	0x1103~0x1109	Serial Number	R	14 characters make up the product number	Char
11	0x110A	software number	R	1950	Word
12	0x110B	software version number	R	110 (representing V1.10)	Word
13	0x110C	mailing address	R/W	1-247	Word
14	0x110D	Communication baud rate	R/W	4800,9600,19200,38400	Word
15	0x110E	password	R/W	1-9999	Word
16	0x110F	Backlight time	R/W	0-99 min, 0 means always on	Word
17	0x1110	LCD contrast	R/W	20-40, default 30	Word
18	0x1111	fault enable	R/W	0 off; 1 on	Word
19	0x1112	ICT	R/W	10-9999	Word
20	0X1113	Number of registered modules	R	Number of Downstream Modules	Word
21	0x1114	current signal value	R	0-99. 0 or 99 means no signal currently; In other cases, the larger the value, the better the signal	Word

22	0x1115	Wireless alarm or fault active reporting	R/W	0: not report; 1 report	Word
23	0x1116	Active upload time	R/W	Unit: s, step length:1s, default 120s	Word
24	0x1117	Server TCP port	R/W	0-65535	Word
25~26	0x1118~0x1119	Server IP address	R/W	4 bytes correspond to IPV4. When all are 0, the domain name mode is activated.	Byte
27~58	0x111A~0x1139	domain name	R/W	64 strings	Char
59	0x113A	debug mode	R/W	1: debug mode (485 invalid); 0: normal	Word
60	0x113B	server reconnect		The default is 3 times, and the server reconnects if the set value is exceeded.	Word
61	0x113C	Network-Adjusted time		Unit: day, default 1	Word

7.3.3. Address table of parameters related to leakage temperature, starting address 0x1200:

Serial Number	Address offset	Parameter	Read and write	Numerical range	Type
1	0x1200	Channel type	R	B0-B4,B0: leakage, B1-B4, temperature 1-4 Bit = 1: temperature Bit = 0: leakage	Word
2	0x1201	Channel disconnection status	R	B0-B4,B0: leakage, B1-B4, temperature 1-4 Bit = 1: disconnection Bit = 0: normal.	Word
3	0x1202	Channel short-circuit status	R	B0-B4,B0: leakage, B1-B4, temperature 1-4 Bit = 1: short circuit. Bit = 0: normal.	Word
4	0x1203	Alarm status	R	B0-B4,B0: leakage, B1-B4, temperature 1-4 Bit = 1: alarm. Bit = 0: normal.	Word
5	0x1204	Alert status	R	B0-B4,B0: leakage, B1-B4, temperature 1-4 Bit = 1: warning. Bit = 0: normal.	Word
6	0x1205	Leakage measurement value	R	leakage Unit: mA	Word
7-10	0x1206-0x1209	Temperature 1-4 measurements	R	temperature Unit: 0.1℃；	Word
11-21	0x120A-0x1214	Reserved	——	——	——
22	0x1215	Leakage alarm value	R	leakage Unit: mA	Word
23-26	0x1216-0x1219	Temperature 1-4 alarm value	R	temperature Unit: 0.1℃；	Word
27-37	0x121A-0x1224	Reserved	——	——	——
38	0x1225	DO1 association	R/W	B0-B4,B0: leakage, B1-B4, temperature 1-4 Bit = 1: associated with DO1. Bit = 0: not associated with DO1.	Word

39	0x1226	DO2 association	R/W	B0-B4,B0: leakage, B1-B4, temperature 1-4 Bit = 1: associated with DO2. Bit = 0: not associated with DO2.	Word
40	0x1227	Protection switch	R/W	B0-B4,B0: leakage, B1-B4, temperature 1-4 Bit = 1: on Bit = 0: off	Word
41	0x1228	Type of protection	R/W	0: valid value. 0xffff: fundamental wave	Word
42	0x1229	Leakage protection value	R/W	Leakage Unit: mA	Word
43-46	0x122A-0x122D	Temperature 1-4 protection value	R/W	Temperature Unit: 0.1℃；	Word
47-57	0x122E-0x1238	Reserved	——	——	——
58-62	0x1239-0x123D	Protection time	R/W	Unit: 0.1s	Word
63-100	0x123E-0x1263	Reserved	——	——	——

7.3.4. Address table of parameters related to module system information, starting at 0x1300:

Serial Number	Address offset	Parameter	Read and write	Numerical range	Type
1	0x1300high order	Module number	R	0-255	Byte
	0x1300 low order				Byte
2	0x1301high order				Byte
	0x1301 low order				Byte
3	0x1302high order				Byte
	0x1302 low order				Byte
4	0x1303	Software serial number	R	1XXX	Word
5	0x1304	Software Version number	R	100（representing V1.00）	Word
6	0x1305 high 8 bits	Address	R	1-249	Word
	0x1305 low 8 bits	Type	R	TYPE_AFD 190 MT_L45 150 MT_L80 151 MT_L100 152 MT_L18030 153 MT_L65 154 MT_L15050 155 MT_L22050 156 MT_L260100 157 MT_L30050 158	Word
7	0x1306	Enable signal	R	B8 Bit=0 off； Bit=1 on；	Word
8	0x1307high order	Module number	R	0-255	Byte
	0x1307 low order				Byte
9	0x1308high order				Byte
	0x1308 low order				Byte
10	0x1309high order				Byte
	0x1309 low order				Byte
11	0x130A	Software serial number	R	1XXX	Word
12	0x130B	Software Version number	R	100（representing V1.00）	Word
13	0x130C low 8 bits	Address	R	0-32	Word

14	0x130C high 8 bits	Type	R	TYPE_AFD 190 MT_L45 150 MT_L80 151 MT_L100 152 MT_L18030 153 MT_L65 154 MT_L15050 155 MT_L22050 156 MT_L260100 157 MT_L30050 158	Word
	0x130D	Enable signal	R	0 off; 1 on;	Word

Note: The preceding two module information parameters can be accessed at most 32 module information parameters. The address of the 32nd module information parameter register is 0x13D9 to 0x13df.

7.3.5. Address table of parameters related to slave module measurement, starting address 0x1400:

Serial Number	Address offset	Parameter	Read and write	Numerical range	Type
1	0x1400	Alarm status	R	B0：Arc fault Bit = 1：alarm Bit = 0：normal	Word
2-3	0x1401-0x1402	Reserved	——	——	——
4	0x1403	Current measured value	R	Unit: 0.1A	Word
5	0x1404	Arc measured value	R	0-99	Word
6-8	0x1405-0x1407	Reserved	——	——	——
9	0x1408	Current alarm value	R	Unit: 0.1A	Word
10	0x1409	Arc alarm value	R	0-99	Word
11-13	0x140A-0x140C	Reserved	——	——	——
14	0x140D	Alarm status	R	B0-B4,B0：leakage，B1-B4，temperature 1-4 Bit = 1：alarm Bit = 0：normal	Word
15	0x140E	Offline state	R	B0-B4,B0：leakage，B1-B4，temperature 1-4 Bit = 1：offline Bit = 0：normal	Word
16	0x140F	Short circuit state	R	B0-B4,B0：leakage，B1-B4，temperature 1-4 Bit = 1：short circuit Bit = 0：normal	Word
17-21	0x1410-0x1414	Measured value	R	Temperature unit: 0.1℃; Leakage unit: mA	Word
22-26	0x1415-0x1419	Alarm value	R	Temperature unit: 0.1℃; Leakage unit: mA	Word

Note: The above is the measurement parameter content of two modules. The register content of the fault arc module is subject to the first paragraph, and the register content of the electrical fire module is subject to the second paragraph. The remaining module measurement parameters can be accessed at most 32 module measurement parameters, and the address of the 32nd module measurement parameter register is 0x1593~ 0x159F.

7.3.6. Address table of parameters related to slave module alarm protection, starting address 0x1600:

Serial Number	Address offset	Parameter	Read and write	Numerical range	Type

1	0x1600	Protection current	R/W	Unit: 0.1A	Word
2-7	0x1601-0x1606	Reserved	——	——	——
8	0x1607	Half cycle	R/W	0-99	Word
9-10	0x1608-0x1609	Reserved	——	——	——
11	0x110A high order	sensitivity	R/W	1-9	Byte
	0x110A low order	Reserved	——	——	——
12-13	0x110B-0x110C	Reserved	——	——	——
14	0x160D	Leakage protection value	R/W	Leakage unit: mA	Word
15-18	0x160E-0x1611	Temperature 1-4 protection value	R/W	Temperature unit: 0.1℃；	Word
19-20+21 high 8 bits	0x1612-0x1613+ 0x1614high 8 bits	Protection type	R/W	B0-B4 Bit = 1：on Bit = 0：off	Byte
21 low 8 bits +22-23	0x164 low 8 bits+0x1615-0x1616	Protection time		Unit: 1s	Byte
24-26	0x1617-0x1619	Reserved	——	——	——

Note: The above are contents of alarm protection parameters of two modules. The register contents of fault arc module shall be subject to the first paragraph, and the register contents of electrical fire module shall be subject to the second paragraph. The remaining module alarm protection parameters can be accessed up to 32 module alarm protection parameters. The address of the 32nd module alarm protection parameter register is 0x1793~ 0x179F.

7.3.7. Alarm record related address table, starting address 0x1800:

Serial Number	Address offset	Parameter	Read and write	Numerical range	Type
1	0x1800high order	Alarm type	R	0：null；1：leakage；2：temperature；8：arc；	Byte
	0x1800low order	Reserved	——	——	Byte
2	0x1801high order	Alarm address	R	1-249；255 represents local；	Byte
	0x1801low order	Alarm arc; channel	R	Number of alarm arc; Alarm channel number	Byte
3	0x1802	alarm value	R	arc：unit 0.1A leakage：unit mA temperature: unit 0.1℃	Word
4	0x1803high order	year	R	00-99	Byte
	0x1803low order	month	R	1-12	Byte
5	0x1804high order	day	R	1-31	Byte
	0x1804low order	hour	R	0-23	Byte
6	0x1805high order	minute	R	00-59	Byte
	0x1805low order	second	R	00-59	Byte
7	0x1806high order	Alarm type	R	0：null；1：leakage；2：temperature；8：arc；	Byte
	0x1806low order	Reserved	——	——	Byte
8	0x1807high order	Alarm address	R	1-32；255 represents local；	Byte
	0x1807low order	Alarm arc; channel	R	Number of alarm arc; Alarm channel number	Byte
9	0x1808	alarm value	R	Arc: unit 0.1A Leakage: unit mA Temperature: unit 0.1℃	Word

10	0x1809high order	year	R	00-99	Byte
	0x1809low order	month	R	1-12	Byte
11	0x180Ahigh order	day	R	1-31	Byte
	0x180Alow order	hour	R	0-23	Byte
12	0x180Bhigh order	minute	R	00-59	Byte
	0x180Blow order	second	R	00-59	Byte

Note: The above are two alarm records, 0x1800-0x1805 are the latest alarm records, and the rest of the alarm records can access a maximum of 40 alarm records, and the address of the 40th alarm content register is 0x18Ea-0x18EF.

7.3.8. Switch record related address table, starting address 0x1A00:

Serial Number	Address offset	Parameter	Read and write	Numerical range	Type
1	0x1A00high order	event type	R	0xf0:DI on；0xf1:DI off 0x0f:DO on；0x1f:DO off	Byte
	0x1A00low order	channel	R	1，2	Byte
2	0x1A01high order	year	R	00-99	Byte
	0x1A01low order	month	R	1-12	Byte
3	0x1A02high order	day	R	1-31	Byte
	0x1A02low order	hour	R	0-23	Byte
4	0x1A03high order	minute	R	00-59	Byte
	0x1A03low order	second	R	00-59	Byte
5	0x1A04high order	event type	R	0xf0:DI on；0xf1:DI off 0x0f:DO on；0x1f:DO off	Byte
	0x1A04low order	channel	R	1，2	Byte
6	0x1A05high order	year	R	00-99	Byte
	0x1A05low order	month	R	1-12	Byte
7	0x1A06high order	day	R	1-31	Byte
	0x1A06low order	hour	R	0-23	Byte
8	0x1A07high order	minute	R	00-59	Byte
	0x1A07low order	second	R	00-59	Byte

Note: The previous two switch records, 0x1800-0x1803 are the latest event records, and the rest event records can access a maximum of 60 switch records. The address of the 60th switch content register is 0x1AEC to 0x1AEF.

8. Analysis of common instrument failure

- If the meter running indicator is not on, please check whether the power supply is properly connected;
- If the meter status indicator blinks, please check whether the meter is properly configured or whether the SIM is properly inserted;

9. Installation requirement

- This meter should be installed in a place with good wireless signal on site;
- This equipment must be installed by a qualified installer and the instructions for use must be read carefully before installation;
- When wiring, follow the wiring method in the instructions for use. After the wiring is completed, carefully check whether the wiring is correct, so as to avoid damage to the equipment and dangerous accidents after power-on;
- When installing or dismantling the instrument, please confirm that the working power supply, the busbar to be tested and the relevant part of the power supply have been cut off to avoid electric shock and cause danger and personal injury;
- Please follow the relevant specifications for wiring to avoid accidents such as short circuits and open circuits, and also facilitate future maintenance and repairs;
- The normal operation of the equipment depends on the correct installation, setting and operation.

Before installation, please read the relevant contents of the installation, setting and operation in detail to ensure the normal operation of the device.

Headquarters: Acrel Co., LTD.

Address: No.253 Yulv Road Jiading District, Shanghai，China

TEL.: 0086-21-69158338　0086-21-69156052　0086-21-59156392　0086-21-69156971
Fax: 0086-21-69158303
Web-site: www.acrel-electric.com
E-mail: ACREL008@vip.163.com
Postcode: 201801

Manufacturer: Jiangsu Acrel Electrical Manufacturing Co., LTD.
Address: No.5 Dongmeng Road,Dongmeng industrial Park, Nanzha Street,Jiangyin City,Jiangsu Province,China

TEL：0086-510-86179966

Fax：0086-510-86179975

Web-site: www.jsacrel.com
Postcode: 214405
E-mail: sales@email.acrel.cn