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1. Introduction

Before software debugging, please confirm that the installation and wiring of the circuit breaker are correct. Please refer to the [Installation and Use Instructions] of the intelligent circuit breaker.

2. Function introduction

2.1 Communication function

The intelligent control module has RS-485 communication interface, supports MODBUS bus protocol, and can realize telemetry and telecontrol according to the protocol requirements in the appendix.

Product type	Communication interface	Power supply type	Interface Type	Communication protocol	Communication address	Communication rate/bps
M series/C series	RS-485	External DC12V	External terminal	MODBUS	1 ~ 247(Default1)	4800,9600(Default), 14400,19200
C-P	RS-485	Self powered	External terminal	MODBUS	1 ~ 247(Default1)	4800,9600(Default), 14400,19200

Note: When multiple intelligent circuit breakers are connected in series to read data at the same time, the communication address needs to be changed to ensure that each circuit breaker has an independent communication address. The default communication address of the factory product is 1.

2.2 DIP switch function

Control instruction	Implementation of dial switch	
	Manual status	Automatic status
Remote closing	If it is not closed, it can be manually opened and closed	Closing, manual opening and closing
Remote opening	If it is not closed, it can be manually opened and closed	Closing, manual opening and closing

Forced opening	Opening, manual closing is not allowed	Opening, manual closing is not allowed
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Note: To change the communication address, turn the dial switch to manual mode.

2.3 Indicator function

Indicator status	Explanation
The red light is always on	Opening
Red light flashing	Fault alarm and trip
The green light is always on	Closing
Green light flashing	Overvoltage and undervoltage recovery, auto reclosure waiting for closing
Red and green flashing alternately	Manual mode
The indicator light is off	DV12V power supply is not connected; Control module is abnormal

2.4 Manual/automatic leakage self check function (only products with L support this function)

Orange T button is a test button. Press it once a month to test whether the leakage protection function is normal. When the circuit breaker is connected to the circuit, press the test button. If the leakage protection is normal, the circuit breaker trips; If the leakage protection fails, press the test button, the circuit breaker will not trip, and the circuit breaker needs to be replaced.

The circuit breaker has the remote self inspection function, which can send the remote leakage self inspection command through RS485, and automatically reclose within 5s after the self inspection trip; The platform or APP can also realize monthly periodic self inspection.

2.5 Overvoltage protection

2.5.1 AC overvoltage protection

Parameter setting	Setting range	Factory setting value
Action value	260V~290V	270V
Alarm threshold	230V~270V	260V
Protection mode	Do not handle/Alarm/Trip/Alarm+Trip	Tripping operation
Trip time	3s~15s	6s
Overvoltage recovery	190V~253V, 30s automatic closing	

2.5.2 DC overvoltage protection

Parameter setting	Setting range	Factory setting value
Action value	113%Un~136%Un	123%Un
Alarm threshold	105%Un~136%Un	118%Un
Protection mode	Do not handle/Alarm/Trip/Alarm+Trip	Tripping operation
Trip time	3s~15s	6s
Overvoltage recovery	85%Un ~110%Un, 30s automatic closing	

2.6 Undervoltage protection

2.6.1 AC undervoltage protection

Parameter setting	Setting range	Factory setting value
Action value	30V~180V	165V
Alarm threshold	30V~230V	180V
Protection mode	Do not handle/Alarm/Trip/Alarm+Trip	Tripping operation
Trip time	0.6s~6s	3s
Undervoltage recovery	190V~253V, 30s automatic closing	

2.6.2 DC undervoltage protection

Parameter setting	Setting range	Factory setting value
Action value	13%Un~78%Un	75%Un
Alarm threshold	13%Un~83%Un	82%Un
Protection mode	Do not handle/Alarm/Trip/Alarm+Trip	Tripping operation
Trip time	0.6s~6s	3s
Undervoltage recovery	85%Un ~110%Un, 30s automatic closing	

2.7 Monitoring function

Monitoring parameters	Degree of accuracy
Leakage current monitoring	±1mA
Current monitoring	0.5degree
Voltage monitoring	0.5degree

Power monitoring	1 degree
Electricity monitoring	1 degree
Temperature monitoring	±5°C

2.8 Overload protection function

The overload long time delay protection adopts the inverse time limit protection mode, which is generally used to protect the line overload. This protection is based on the effective value of current. The time current characteristic curve is described as follows:

$$t=(2I_r/I)^2 \cdot t_r,$$

In the equation, I is the effective value of the actual current of the line;

I_r is the setting current value;

t_r is the setting time.

Parameter setting	Setting range	Factory setting value
Action value	110% I_r ~140% I_r	125% I_r
Alarm threshold	90% I_r ~125% I_r	113% I_r
Protection mode	Do not handle/Alarm/Trip/Alarm+Trip	Tripping operation
Trip time(2* I_r)	3s~30s	15s
Automatic recovery	无	

2.9 Leakage protection (only products with L support this function)

Parameter setting	Setting range	Factory setting value
Action value	-----	50% $I_{\Delta n}$ ~100% $I_{\Delta n}$
Alarm threshold	20% $I_{\Delta n}$ ~60% $I_{\Delta n}$	50% $I_{\Delta n}$
Protection mode	Trip/Alarm+Trip	Tripping operation
Trip time	----	----
Automatic recovery	无	

2.10 Overpower protection

Parameter setting	Setting range	Factory setting value
Action value	5%P~300%P	150%P
Alarm threshold	5%P~300%P	110%P
Protection mode	Do not handle/Alarm/Trip/Alarm+Trip	Do not handle
Trip time	6s~60s	30s
Automatic recovery	N/A	

2.11 Temperature protection

Parameter setting	Setting range	Factory setting value
Action value	30°C~100°C	80°C
Alarm threshold	30°C~100°C	75°C
Protection mode	Do not handle/Alarm/Trip/Alarm+Trip	Do not handle
Trip time	6s~60s	30s
Automatic recovery	N/A	

2.12 Terminal temperature protection (only supported by M-T products)

Parameter setting	Setting range	Factory setting value
Action value	30°C~120°C	100°C
Alarm threshold	30°C~120°C	85°C
Protection mode	Do not handle/Alarm/Trip/Alarm+Trip	Do not handle
Trip time	6s~60s	30s
Automatic recovery	无	

2.13 Timed opening and closing

This function requires communication on (default off). Two timed tasks are set in the circuit breaker by day. Task parameters include: hour and minute selection, task on/off selection (including opening/closing selection), and single cycle selection.

Single time control: only one action can be performed. After the action is completed, the task will be automatically closed. You need to restart the task to continue regular control.

Cycle control: the time of day arrives, the timing is controlled, and the cycle is continuous every day.

The system time of the circuit breaker needs to be modified to the real-time . Please refer to the attachment communication protocol for details on how to modify it.

2.14 Automatic reclosing function

1.This function of M series needs to be enabled by communication (closed by default), and CP series products are enabled by default.Enable the reclosing function. After the circuit breaker trips (excluding overvoltage and undervoltage tripping), delay 10 s for the first reclosing; After that, if the circuit breaker trips within 15min and delays for 60s, the second reclosure will be performed; Then if the circuit breaker trips within 15min and delays for 300s, conduct the third reclosure; If there is no tripping after 15min after each closing, it is deemed that the closing is successful, and the reclosing times and time are reset; If the reclosing time reaches 3 times and the reclosing is still not successful, the product will be considered as a permanent fault of the load system and will not reclose automatically. After the fault of the load system is eliminated, turn the manual automatic switch to manual and then to automatic, and then reset the reclosing times and time (or power the circuit breaker back to the original state).

2.The M series starts the reclosing function, the circuit breaker is powered on in the automatic state when it is opened, and the automatic closing is performed with a delay of 10s; If the circuit breaker is powered on in the closing state, the circuit

breaker will remain in the closing state. By default, the CP product will not automatically switch on when it is powered on. The power on and switch on function can be enabled through communication.

When the reclosing function is not enabled, there is no other status that can automatically recover the closing except the self recovery of overvoltage and undervoltage fault and the recovery of remote self inspection.

2.15 Remaining electricity (charge control) function

This function needs to be turned on by communication (turned off by default). After this function is turned on, the value of the remaining electricity decreases with the amount of electricity used. When the remaining electricity is 0, the circuit breaker trips, prompting the remaining electricity to trip. When the residual power is less than or equal to the alarm threshold, the alarm indication of insufficient residual power will be prompted. After the residual power trips, the switch can only be closed remotely instead of manually.

Restore to normal state: write the value to the residual power register, or turn off the residual power function and then switch on.

2.16 Phase loss protection function

This function needs to be enabled by communication (closed by default). Phase failure protection refers to three-phase voltage imbalance protection. The action value is the percentage of the minimum phase voltage and the maximum phase voltage in the three phases. If the open phase protection action value is set to 70%, when the three-phase voltages are respectively 170V, 200V, 250V, $170V/250V=0.68 < 0.7$, the equipment will trip for protection within the corresponding time. When three-phase voltage is 180V, 200V and 250V respectively, $180V/250V=0.72 > 0.7$, the equipment will not trip.

3. Instructions

3.1 Communication tools

- 1.USB to RS485 serial port cable
- 2.Computer serial port debugging tool software

3.2 Communication commissioning steps

- 1.Power on the DC12V power supply of the circuit breaker, and plug the USB interface of the serial port line into the computer;
- 2.Open the serial port debugging software, select the port to use, the baud rate is 9600 by default, the data bit is 8 by default, the check bit is none by default, the stop bit is 1, and connect the serial port;

3. After connecting the serial port, send the MODBUS RTU format instruction (hexadecimal);

Remote opening and closing operation: take communication address 1 as an example (the default address of the product is 1)

M-Series:

1P/1PN/1PNL/2P sends closing command: 01 06 01 d0 00 01 48 0F

Receive instructions: 01 06 01 d0 00 01 48 0F

1P/1PN/1PNL/2P Send opening command: 01 06 01 d0 00 04 88 0C

Receive instructions: 01 06 01 d0 00 04 88 0C

3P/3PN/3PNL/4P sends closing command: 01 06 02 50 00 01 49 A3

Receive instructions: 01 06 02 50 00 01 49 A3

3P/3PN/3PNL/4P Send opening command: 01 06 02 50 00 04 89 A0

Receive instructions: 01 06 02 50 00 04 89 A0

C/C-P Series:

sends closing command: 01 06 01 d0 00 01 48 0F

Receive instructions: 01 06 01 d0 00 01 48 0F

Send opening command: 01 06 01 d0 00 04 88 0C

Receive instructions: 01 06 01 d0 00 04 88 0C

3.3 Description of communication protocol

1. MODBUS RTU Instruction format introduction: (all instruction formats are hexadecimal)

Use the 03/04 function code to read data:

Address	Function code	Register address (High byte comes first)	Number of registers (High byte comes first)	CRC check (Low byte comes first)
1byte	1byte	2bytes	2bytes	2bytes

Return to data parsing format:

Address	Function code	Number of bytes	Reply data (High byte comes first)	CRC check (Low byte comes first)
1byte	1byte	1byte	Number of registers*2bytes	2bytes

Use the 06 function code to modify data:

Address	Function code	Register address (High byte comes first)	Number of registers (High byte comes first)	CRC check (Low byte comes first)
1byte	1byte	2bytes	2bytes	2bytes

Return to data parsing format:

Address	Function code	Register address (High byte comes first)	Data (High byte comes first)	CRC check (Low byte comes first)
1byte	1byte	2bytes	2bytes	2bytes

Use the 10 function code to continuously modify multiple data:

Address	Function code	Register address (High byte comes first)	Number of bytes	Data (High byte comes first)	CRC check (Low byte comes first)
1byte	1byte	2bytes	1byte	Number of registers*2bytes	2bytes

Return to data parsing format:

Address	Function code	Register address (High byte comes first)	Number of registers (High byte comes first)	CRC check (Low byte comes first)
1byte	1byte	2bytes	2bytes	2bytes

2. Some examples of instructions

M Series 1P/1PN/1PNL/2P			
Read operation			
Read all power parameters	01 04 00 10 00 0C F1 CA	Read all statistical parameters	01 04 00 30 00 0B B1 C2
Read current	01 04 00 10 00 02 70 0E	Read trip times	01 04 00 30 00 01 31 C5
Read the leakage current	01 04 00 12 00 01 91 CF	Read the number of overload trips	01 04 00 31 00 01 60 05
Read voltage	01 04 00 13 00 02 80 0E	Read the number of remote self tests	01 04 00 38 00 01 B0 07
Read temperature	01 04 00 15 00 01 20 0E	Read the number of leakage trips	01 04 00 33 00 01 C1 C5
Read active power	01 04 00 16 00 02 90 0F	Read the number of undervoltage trips	01 04 00 34 00 01 70 04
Read energy	01 04 00 18 00 02 F1 CC	Read the number of overvoltage trips	01 04 00 35 00 01 21 C4
Read frequency	01 04 00 1A 00 01 10 0D	Read the number of temperature trips	01 04 00 36 00 01 D1 C4
Read fault type	01 04 00 1B 00 01 41 CD	Read total alarm times	01 04 00 39 00 01 E1 C7
Read overload protection parameters	01 03 01 70 00 05 85 EE	Read the circuit breaker protection status	01 04 00 00 00 01 31 CA
Read undervoltage protection parameters	01 03 01 75 00 04 54 2F	Read circuit breaker alarm status	01 04 00 01 00 01 60 0A
Read overvoltage protection parameters	01 03 01 79 00 04 94 2C	Read the circuit breaker pre trip flag	01 04 00 02 00 01 90 0A
Read the first fault record	01 04 00 40 00 09 31 D8	Read the breaker trip flag	01 04 00 03 00 01 C1 CA
Read the first alarm record	01 04 00 F0 00 09 30 3F	Read the circuit breaker switch status	01 04 00 07 00 01 80 0B
Write operation (0-do not process 1-alarm 2-trip 3-alarm+trip)			
Enable overload protection	01 06 01 74 00 03 88 2D	Turn off overload protection	01 06 01 74 00 00 C8 2C
	01 06 01 74 00 02 49 ED		
	01 06 01 74 00 01 09 EC		
Enable AC undervoltage protection	01 06 01 78 00 03 48 2E	Turn off AC undervoltage protection	01 06 01 78 00 00 08 2F
	01 06 01 78 00 02 89 EE		
	01 06 01 78 00 01 C9 EF		

Enable AC overvoltage protection	01 06 01 7C 00 03 09 EF	Turn off AC overvoltage protection	01 06 01 7C 00 00 49 EE
	01 06 01 7C 00 02 C8 2F		
	01 06 01 7C 00 01 88 2E		
Turn on residual power protection	01 06 01 9A 00 01 69 D9	Turn off residual power protection	01 06 01 9A 00 00 A8 19
	01 06 01 9A 00 02 29 D8		
	01 06 01 9A 00 03 E8 18		
Turn on temperature protection	01 06 01 84 00 03 88 1E	Turn off temperature protection	01 06 01 84 00 00 C8 1F
	01 06 01 84 00 02 49 DE		
	01 06 01 84 00 01 09 DF		
Enable over power protection	01 06 01 8A 00 01 68 1C	Turn off the over power protection	01 06 01 8A 00 00 A9 DC
	01 06 01 8A 00 02 28 1D		
	01 06 01 8A 00 03 E9 DD		
Remote closing	01 06 01 D0 00 01 48 0F	Remote opening	01 06 01 D0 00 04 88 0C
Modify mailing address	01 06 01 56 00 02 E9 E7 (Turn the dial switch to manual status, and then send the command to address 2)		
Modify the circuit breaker time	01 10 01 50 00 03 06 59 30 16 20 07 22 2A 5B(The modification time is 16:30:59, July 20, 22)		
M Series 3P/3PN/3PNL/4P			
Read operation			
Read all power parameters	01 04 00 10 00 28 F1 D1	Read all statistical parameters	01 04 00 80 00 0B B0 25
Read phase A current	01 04 00 20 00 02 70 01	Read trip times	01 04 00 80 00 01 30 22
Read phase B current	01 04 00 22 00 02 D1 C1	Read the number of overload trips	01 04 00 81 00 01 61 E2
Read phase C current	01 04 00 24 00 02 31 C0	Read the number of phase loss trips	01 04 00 88 00 01 B1 E0
Read phase A voltage	01 04 00 18 00 02 F1 CC	Read the number of leakage trips	01 04 00 83 00 01 C0 22
Read phase B voltage	01 04 00 1A 00 02 50 0C	Read the number of undervoltage trips	01 04 00 84 00 01 71 E3
Read phase C voltage	01 04 00 1C 00 02 B0 0D	Read the number of overvoltage trips	01 04 00 85 00 01 20 23
Read phase A active power	01 04 00 10 00 02 70 0E	Read the number of temperature trips	01 04 00 86 00 01 D0 23
Read phase B active power	01 04 00 12 00 02 D1 A1	Read alarm times	01 04 00 89 00 01 E0 20
Read phase C active power	01 04 00 14 00 02 31 CF	Read the circuit breaker protection status	01 04 00 00 00 01 31 CA
Read phase A active electric energy	01 04 00 2C 00 02 B0 02	Read circuit breaker alarm status	01 04 00 01 00 01 60 0A
Read phase B active electric energy	01 04 00 2E 00 02 11 C2	Read the circuit breaker pre trip flag	01 04 00 02 00 01 90 0A
Read phase C active electric energy	01 04 00 30 00 02 71 C4	Read the breaker trip flag	01 04 00 03 00 01 C1 CA
Read switch status	01 04 00 3B 00 01 40 07	Read overload protection parameters	01 03 02 21 00 04 15 BB

Read the setting current	01 03 02 03 00 01 75 B2	Read undervoltage protection parameters	01 03 02 25 00 04 54 7A
Read rated voltage	01 03 02 05 00 01 95 B3	Read the first fault record	01 04 00 A0 00 10 F1 E4
Write operation (0-do not process 1-alarm 2-trip 3-alarm+trip)			
Enable overload protection	01 06 02 24 00 01 09 B9	Turn off overload protection	01 06 02 24 00 00 C8 79
	01 06 02 24 00 02 49 B8		
	01 06 02 24 00 03 88 78		
Open undervoltage protection	01 06 02 28 00 01 C9 BA	Close undervoltage protection	01 06 02 28 00 00 08 7A
	01 06 02 28 00 02 89 BB		
	01 06 02 28 00 03 48 7B		
Enable overvoltage protection	01 06 02 2C 00 01 88 7B	Turn off overvoltage protection	01 06 02 2C 00 00 49 BB
	01 06 02 2C 00 02 C8 7A		
	01 06 02 2C 00 03 09 BA		
Enable over power protection	01 06 02 40 00 01 48 66	Turn off the over power protection	01 06 02 40 00 00 89 A6
	01 06 02 40 00 02 08 67		
	01 06 02 40 00 03 C9 A7		
Enable temperature protection	01 06 02 34 00 01 08 7C	Turn off temperature protection	01 06 02 34 00 00 C9 BC
	01 06 02 34 00 02 48 7D		
	01 06 02 34 00 03 89 BD		
Open phase failure protection	01 06 02 44 00 01 09 A7	Close phase failure protection	01 06 02 44 00 00 C8 67
	01 06 02 44 00 02 49 A6		
	01 06 02 44 00 03 88 66		
Open auto reclosure	01 06 02 3C 00 01 89 BE	Close auto reclosure	01 06 02 3C 00 00 48 7E
Turn on residual power protection	01 06 02 4E 00 01 29 A5	Turn off residual power protection	01 06 02 4E 00 00 E8 65
	01 06 02 4E 00 02 69 A4		
	01 06 02 4E 00 03 A8 64		
Remote closing	01 06 02 50 00 01 49 A3	Remote opening	01 06 02 50 00 04 89 A0
Modify mailing address	01 06 02 06 00 02 E9 B2(Turn the dial switch to manual status, and then send the command to address 2)		
C/CP Series			
Read operation			
Read the circuit breaker protection status	01 04 00 00 00 01 31 CA	Read L voltage (3PN-A phase voltage)	01 04 00 13 00 02 80 0E
Read the circuit breaker pre trip flag	01 04 00 02 00 01 90 0A	Read B voltage (3PN)	01 04 00 16 00 02 90 0F
Read the breaker trip flag	01 04 00 03 00 01 C1 CA	Read C voltage (3PN)	01 04 00 18 00 02 F1 CC
Read circuit breaker type	01 04 00 04 00 01 70 0B	Read undervoltage protection parameters	01 03 01 75 00 04 54 2F
Read manual and automatic status	01 04 00 05 00 01 21 CB	Read overvoltage protection parameters	01 03 01 79 00 04 94 2C
Read switch status	01 04 00 07 00 01 80 0B	Read the software version number	01 03 01 d1 00 01 D5 CF

Write operation (0-do not process 1-alarm 2-trip 3-alarm+trip)			
Open undervoltage protection	01 06 01 75 00 02 18 2D	Close undervoltage protection	01 06 01 75 00 00 99 EC
Turn on overvoltage protection	01 06 01 79 00 02 D8 2E	Turn off overvoltage protection	01 06 01 79 00 00 59 EF
Remote closing	01 06 01 D0 00 01 48 0F	Remote opening	01 06 01 D0 00 04 88 0C
Modify mailing address	01 06 01 56 00 02 E9 E7(Turn the dial switch to manual status, and then send the command to address 2)		

4. Common faults and solutions

1. When sending the correct command without reply: confirm whether the serial port line corresponds to the circuit breaker 485A, 485B interface is correct (note: the communication port and the power port cannot be connected reversely, otherwise the 485 communication device will be burnt and cannot communicate!);

2. When the circuit breaker address is uncertain: the broadcast address 00 can be used to send instructions to read the circuit breaker address:

M-1P series/C series/C-P series: 00 03 01 56 00 01 64 37

M-3P series: 00 03 02 06 00 01 64 62

3. When sending the opening and closing command and the circuit breaker does not act, confirm whether the circuit breaker body dial switch is in the "automatic" position;

4. The reply data of multiple circuit breakers connected at the same time is disordered: it needs to be modified to different communication addresses, and each circuit breaker has its own unique communication address;

5. In case of failure to modify the communication address of the circuit breaker:

confirm that only one product is connected to the line and the body dial switch is in the "Manual" position, and then send the address modification command;

6. Send command reply error code:

No.	Function code	Exception code	Reason
1	03	83	The function code is used incorrectly or the data is written incorrectly. Please refer to the communication protocol to use the correct command!
2	04	84	
3	06	86	
4	10	90	

7. After sending the switch on, it keeps on opening and closing, unable to stop the machine: the power supply is insufficient, which leads to the failure of normal closing, and the power supply that meets the power requirements can be used (standby power consumption is 1.2W/set, and the maximum power of opening and closing action is 15W per set);

8. The product with leakage protection does not act or is delayed when the test button is pressed: it must be connected to mains power;

9. When the circuit breaker is not connected with voltage and load, the indicator light flashes red for alarm: the red light flashes for alarm or fault status, and it is necessary to confirm the cause of the alarm indicator position and fault indicator position of the equipment first. If there is no voltage, it is also an undervoltage alarm;

10. When the circuit breaker trips, no new record is generated after reading the fault record: because the short-circuit protection (instantaneous protection) and leakage protection act instantaneously, the fault record cannot be recorded.

5. Appendices

5.1 M series 1P/1PN/1PNL/2P communication protocol

Modbus Rtu communication variable point table					
Address	Variable meaning	Data type	Function code	Convert Format	Unit
Bit flag area					
0x0000	Circuit breaker protection status bit	Unsigned type	0x04	Bit0: alarm indication Bit1: pre trip indication Bit2: Trip indication Bit3: communication offline (used by the intelligent network to close the cloud)	/
0x0001	Circuit breaker alarm bit	Unsigned type	0x04	See Note 1	/
0x0002	Circuit breaker pre trip bit	Unsigned type	0x04	See Note 2	/
0x0003	Breaker tripping bit	Unsigned type	0x04	See Note 3	/
0x0004	Circuit breaker type	Unsigned type	0x04	1:1P, 2:1PN, 3:1PNL,12:2P	/
0x0005	Manual and automatic information	Unsigned type	0x04	0: Automatic 1: Manual	/
0x0006	Opening and closing times	Unsigned type	0x04	Y	Time
0x0007	Switch status	Unsigned type	0x04	0: Open 1: Close 2: Opening (manual closing is not allowed after opening)	/
0x0008	Rated current of circuit breaker In	Unsigned type	0x04	Y	A
Electric parameter area					
0x0010	Current	Float type	0x04	Y	A
0x0011					
0x0012	Leakage current (only supported by M-series circuit breaker 1PNL)	Unsigned type	0x04	Y/100	mA
0x0013	Voltage (circuit breaker 1PN, 1PNL support)	Float type	0x04	Y	V
0x0014					
0x0015	Temperature	Signed type	0x04	Y	
0x0016	Active power (supported by circuit breaker 1PN and 1PNL)	Float type	0x04	Y	W
0x0017					
0x0018	Active energy (circuit breaker 1PN, 1PNL support)	Float type	0x04	Y	kWh
0x0019					

0x001A	Frequency (valid when the voltage is greater than 30V, supported by circuit breaker 1PN and 1PNL)	Unsigned type	0x04	Y/100	Hz
0x001B	Fault type	Unsigned type	0x04	Remark 3	/
0x001C	Power factor (circuit breaker 1PN, 1PNL support)	Unsigned type	0x04	Y/1000	/
0x001D	Switch status	Unsigned type	0x04	0: Open 1: Close 2: Opening (manual closing is not allowed after opening)	/
0x001E-0x0021	Circuit breaker ID No	Unsigned character type	0x04		/
0x0022	Current (L-pole current - for 2P products)	Float type	0x04	Y	A
0x0023					
0x0024	L terminal temperature (valid when terminal temperature monitoring function is turned on)	Signed type	0x04	Y (NTC failure when the value is 151)	°C
0x0025	N terminal temperature (valid when terminal temperature monitoring function is turned on)	Signed type	0x04	Y (NTC failure when the value is 151)	°C
0x0026	NTC short circuit or short circuit fault (only supported by APM chip)	Unsigned type	0x04	Bit0: phase L terminal NTC fault Bit1: N-phase terminal NTC fault	/
0x0027	Terminal temperature monitoring switch	Unsigned type	0x04	1: Open; Non 1: Closed	/
0x0028-0x0029	Residual electric energy	Float type	0x04/0x10	Y range:(0-800 000)	kWh
Statistical parameter area					
0x0030	Total number of trips	Unsigned type	0x04	Y	次
0x0031	Overload trip times	Unsigned type	0x04	Y	次
0x0032	Number of short circuit trips	Unsigned type	0x04	Y	次
0x0033	Leakage tripping times (only supported by 1PNL of M series)	Unsigned type	0x04	Y	次
0x0034	Number of undervoltage trips (supported by 1PN and 1PNL)	Unsigned type	0x04	Y	次
0x0035	Number of overvoltage trips (supported by 1PN and 1PNL)	Unsigned type	0x04	Y	次
0x0036	Number of temperature trips	Unsigned type	0x04	Y	次
0x0037	Number of other trips	Unsigned type	0x04	Y	次
0x0038	Trip times of remote self-test	Unsigned	0x04	Y	次

	(only supported by 1PNL)	type			
0x0039	Total alarm times	Unsigned type	0x04	Y	次
0x003A	Opening and closing times	Unsigned type	0x04	Y	次
Fault recording area					
0x0040	Trip reason	Unsigned type	0x04	See Note 3	/
0x0041	Trip current (within 120A)	Unsigned type	0x04	Y	A
0x0042	Leakage current during tripping (only supported by 1PNL of M series, within 70mA)	Unsigned type	0x04	Y/100	mA
0x0043	Voltage when tripping (1PN, 1PNL support, less than 450V)	Unsigned type	0x04	Y	V
0x0044	Temperature at tripping(100°C)	Unsigned type	0x04	Y	°C
0x0045	Trip time (min (low byte), s (high byte))	Unsigned type	0x04	BCD code format	/
0x0046	Trip time (day (low byte), hour (high byte))	Unsigned type	0x04	BCD code format	/
0x0047	Trip time (year (low byte), month (high byte))	Unsigned type	0x04	BCD code format	/
0x0048	Record the number of trips	Unsigned type	0x04	Y	/
0x0049-0x0051	Same format as above	Same format as above	0x04	Article 2 Fault record	/
0x0052-0x005A	Same format as above	Same format as above	0x04	Article 3 Fault record	/
0x005B-0x0063	Same format as above	Same format as above	0x04	Article 4 Fault record	/
0x0064-0x006C	Same format as above	Same format as above	0x04	Article 5 Fault record	/
0x006D-0x0075	Same format as above	Same format as above	0x04	Article 6 Fault record	/
0x0076-0x007E	Same format as above	Same format as above	0x04	Article 7 Fault record	/
0x007F-0x0087	Same format as above	Same format as above	0x04	Article 8 Fault record	/
0x0088-0x0090	Same format as above	Same format as above	0x04	Article 9 Fault record	/
0x0091-0x0099	Same format as above	Same format as above	0x04	Article 10 Fault record	/
Alarm record area					
0x00F0	Alarm reason	Unsigned type	0x04	See Note 1	/
0x00F1	Current during alarm (within 120A)	Unsigned type	0x04	Y/10	A
0x00F2	Leakage current in alarm (only supported by 1PNL of	Unsigned type	0x04	Y/100	mA

	M series, within 70mA)				
0x00F3	Voltage at alarm (1PN, 1PNL support, less than 450V)	Unsigned type	0x04	Y/10	V
0x00F4	Temperature at alarm (100 °C)	Unsigned type	0x04	Y	V
0x00F5	Alarm time (minute (low byte), second (high byte))	Unsigned type	0x04	BCD code format	/
0x00F6	Alarm time (day (low byte), hour (high byte))	Unsigned type	0x04	BCD code format	/
0x00F7	Alarm time (year (low byte), month (high byte))	Unsigned type	0x04	BCD code format	/
0x00F8	Record alarm times	Unsigned type	0x04	Y	/
0x00F9-0x0101	Same format as above	Same format as above	0x04	Article 2 Alarm record	/
0x0102-0x010A	Same format as above	Same format as above	0x04	Article 3 Alarm record	/
0x010B-0x0113	Same format as above	Same format as above	0x04	Article 4 Alarm record	/
0x0114-0x011C	Same format as above	Same format as above	0x04	Article 5 Alarm record	/
0x011D-0x0125	Same format as above	Same format as above	0x04	Article 6 Alarm record	/
0x0126-0x012E	Same format as above	Same format as above	0x04	Article 7 Alarm record	/
0x012F-0x0137	Same format as above	Same format as above	0x04	Article 8 Alarm record	/
0x0138-0x0140	Same format as above	Same format as above	0x04	Article 9 Alarm record	/
0x0141-0x0149	Same format as above	Same format as above	0x04	Article 10 Alarm record	/
System parameter area					
0x0150	Circuit breaker time (min (low byte), s (high byte))	Unsigned type	0x03/0x06/0x10	BCD code format	/
0x0151	Circuit breaker time (day (low byte), hour (high byte))	Unsigned type	0x03/0x06/0x10	BCD code format	/
0x0152	Circuit breaker time (year (low byte), month (high byte))	Unsigned type	0x03/0x06/0x10	BCD code format	/
0x0153	Setting current of circuit breaker I _r	Unsigned type	0x03/0x06/0x10	Y (Y range 6-125)	A
0x0154	Setting leakage current of circuit breaker I _{Δn}	Unsigned type	0x03/0x06/0x10	Y/100 (Y range 3000-30000 (3000))	mA
0x0155	Rated voltage of circuit breaker (220V)	Unsigned type	0x03/0x06/0x10	Y (Y range 10-400)	V
Communication parameter area					
0x0156	Circuit breaker communication address (default 1)	Unsigned type	0x03/0x06/0x10	Y(1-247)	/
0x0158	Baud rate of circuit breaker (default 9600)	Unsigned type	0x03/0x06/0x10	0:4800 2:14400 1:9600 3:19200	kbps

					Default is 1	
0x0159	bit0	Retain	0x03/0x06/0x10	0x03/0x06	Retain	/
	bit1-2	Parity bit (no parity by default)		0x03/0x06	0: No parity 1: Odd parity 2: Even parity is 0 by default	/
0x015B	Circuit breaker type		Unsigned type	0x03/0x06/0x10	1:1P, 2:1PN, 3:1PNL,12:2P	/
Processing mode of protection parameter definition area (0-close protection, 1-alarm, 2-trip, 3-alarm+trip)						
0x0171	AC overload protection	Action value(125%Ir)	Unsigned type	0x03/0x06/0x10	Y range (110-140, 125 by default) Do not modify this value for non professionals	%
0x0172		Alarm value(113% Ir)	Unsigned type	0x03/0x06/0x10	Y range (90-125, default 113) Non professionals are not allowed to modify this value	%
0x0173		Time coefficient (15s)	Unsigned type	0x03/0x06/0x10	Y *0.3 (Y range 10-100, default 50)Non professionals are not allowed to modify this value	s
0x0174		Handling mode (trip)	Unsigned type	0x03/0x06/0x10	Y (0-3, default 2)	/
0x0175	AC undervoltage protection	Action value(165V)	Unsigned type	0x03/0x06/0x10	Y range (30-180, default 165)	V
0x0176		Alarm value(180V)	Unsigned type	0x03/0x06/0x10	Y range (30-230, default 180)	V
0x0177	(Circuit breaker 1PN, 1PNL, 2P support)	Trip time(3s)	Unsigned type	0x03/0x06/0x10	Y*0.3 (Y range 2-20, default 10)	s
0x0178		Handling mode (trip))	Unsigned type	0x03/0x06/0x10	Y(0-3, default2)	/
0x0179	AC overvoltage protection (1PN, 1PNL, 2P support)	Action value(270V)	Unsigned type	0x03/0x06/0x10	Y range(260-290, default270)	V
0x017A		Alarm value(260V)	Unsigned type	0x03/0x06/0x10	Y range(230-270, default260)	V
0x017B		Trip time(6s)	Unsigned type	0x03/0x06/0x10	Y*0.3(Yrange10-50, default20)	s
0x017C		Handling mode (trip))	Unsigned type	0x03/0x06/0x10	Y (0-3, default2)	/
0x017D	Leakage protection	Action value	Unsigned type	0x03	Y	%
0x017E	(The action parameters cannot be modified)	Alarm value(50%*IΔn)	Unsigned type	0x03/0x06/0x10	Y(20-60, default50)	%
0x017F		Leakage type	Unsigned	0x03	0: AC type 1: S type 2: A	/

			type		type	
0x0180	temporarily, and the modification is invalid. It is only supported by 1PNL of M series and needs to be added)	Handling mode (trip))	Unsigned type	0x03	Y (2-3, default2)	/
0x0181	Temperature protection	Action value(80°C)	Signed type	0x03/0x06/0x10	80(30-100, default80)	°C
0x0182		Alarm value(75°C)	Signed type	0x03/0x06/0x10	75(30-100, default75)	°C
0x0183		Trip time(30s)	Unsigned type	0x03/0x06/0x10	Y*0.3 (Yrange20-200, default100)	s
0x0184		Processing method (closed)	Unsigned type	0x03/0x06/0x10	Y (0-3, default0)	/
0x0187	Overpower protection (1PN, 1PNL, 2P support)	Action value (150% PRated)	Signed type	0x03/0x06/0x10	150(5-300, default150) P rated= Rated voltage * setting current If rated voltage (register 0x155)=220V Setting current (register 0x153)=10A P rated=220V * 10A=2200W	%
0x0188		Alarm value(110%P rated)	Signed type	0x03/0x06/0x10	Y(5-300, default110)	%
0x0189		Trip time(30s)	Unsigned type	0x03/0x06/0x10	Y*0.3(Yrange20-200, default100)	s
0x018A		Processing method (closed)	Unsigned type	0x03/0x06/0x10	Y (0-3, default0)	/
0x018B	Leakage remote self check reclosing	Reclosing time(5s)	Unsigned type	0x03/0x06/0x10	Y(Yrange0-60, default5) 0 indicates non reclosing	s
0x018D	Terminal temperature protection	Action value(100°C)	Signed type	0x03/0x06/0x10	80(30-120, default100)	°C
0x018E		Alarm value(85°C)	Signed type	0x03/0x06/0x10	85(30-120, default85)	°C
0x018F		Trip time(30s)	Unsigned type	0x03/0x06/0x10	Y*0.3(Yrange20-200, default100)	s
0x0190		Processing method (closed)	Unsigned type	0x03/0x06/0x10	Y (0-3, default0)	/
0x0191	Timing	Hour and minute	Unsigned	0x03/0x0	BCD code format	/

	function 1	selection (hour low byte, minute high byte)	type	6/0x10		
0x0192		Single cycle selection	Unsigned type	0x03/0x0 6/0x10	Y (0-1, default0), 0 means single time, 1 means cycle, single means no control after one time, and cycle means repeated control every day	/
0x0193		Processing method (closed)	Unsigned	0x03/0x0 6/0x10	Y (0-2, default0), 0 means to close the task, 1 means to open, 2 means to close	/
0x0194		Hour and minute selection (hour low byte, minute high byte)	Unsigned type	0x03/0x0 6/0x10	BCD code format	/
0x0195	Timing function 2	Single cycle selection	Unsigned type	0x03/0x0 6/0x10	Y (0-1, default0), 0 means single time, 1 means cycle, single means no control after one time, and cycle means repeated control every day	/
0x0196		Processing method (closed)	Unsigned	0x03/0x0 6/0x10	Y (0-2, default0), 0 means to close the task, 1 means to open, 2 means to close	/
0x0197- 0x0198		Reserve				/
0x0199	Remaining electricity	Alarm value(1000)	Unsigned type	0x03/0x0 6/0x10	Y range(1-10000)	kWh
0x019A	(Arrearage trip)	Handling method(0)	Unsigned type	0x03/0x0 6/0x10	Y (After the action, the charge control cannot be closed manually, and the power supply cannot be restored)	/
0x019B	Auto reclosing function	Prohibition and enabling	Unsigned type	0x03/0x0 6/0x10	Y(0-1) (Yrange0-1, default0) 0 inhibit 1 enable automatic reclosing	/
0x019C	DC undervolta ge protection	Action value(75%Un)	Unsigned type	0x03/0x0 6/0x10	Yrange(13-78, default75)	%
0x019D		Alarm value(82%Un)	Unsigned type	0x03/0x0 6/0x10	Yrange(13-83, default82)	%
0x019E	(DC products only)	Trip time(3s)	Unsigned type	0x03/0x0 6/0x10	Y*0.3(Yrange2-20, default10)	s
0x019F		Handling mode (trip))	Unsigned type	0x03/0x0 6/0x10	Y(0-3, default2)	/
0x01A0	DC overvoltage protection	Action value(123%Un)	Unsigned type	0x03/0x0 6/0x10	Y range(113-136, default123)	%
0x01A1	(DC products only))	Alarm value(118%Un)	Unsigned type	0x03/0x0 6/0x10	Y range(105-136, default118)	%
0x01A2		Trip time(6s)	Unsigned	0x03/0x0	Y*0.3(Yrange10-50,	s

			type	6/0x10	default20)	
0x01A3		Handling mode (trip))	Unsigned type	0x03/0x06/0x10	Y (0-3, default2)	/
Factory parameter area						
0x01D0	Control command		Unsigned type	0x03/0x06/0x10	0x01: Closing 0x04: opening 0x03: Forced opening 0x05: Restore address, power and fault records 0x06: Clear power and remaining power 0x08: Clear residual power 0x11: Remote leakage self check 0x800: Clear fault record and alarm record	/
0x01D1	Software version number		Unsigned type	0x03	Y/10 (e.g. 235 represents 2.3.5)	/

Note1

No.	Tag No	Meaning	No.	Tag No	Meaning
1	bit0	Overload alarm indication	9	bit8	L terminal temperature alarm indication
2	bit1	Reserve	10	bit9	N terminal temperature alarm indication
3	bit2	Leakage alarm indication (only supported by 1PNL of M series)	11	bit10	Residual power alarm (insufficient residual power)
4	bit3	Undervoltage alarm indication	12	bit11	Voltage loss alarm indication (voltage is 0)
5	bit4	Overvoltage alarm indication	13	bit12	Reserve
6	bit5	Temperature alarm indication	14	bit13	Reserve
7	bit6	External alarm indication	15	bit14	Reserve
8	bit7	Overpower alarm indication	16	bit15	Reserve

Note2

No.	Tag No	Meaning	No.	Tag No	Meaning
1	bit0	Overload pre trip	9	bit8	L terminal temperature pre trip

		indication			indication
2	bit1	Reserve	10	bit9	N terminal temperature pre trip indication
3	bit2	Reserve	11	bit10	Reserve
4	bit3	Undervoltage pre trip indication	12	bit11	Reserve
5	bit4	Overvoltage pre trip indication	13	bit12	Reserve
6	bit5	Temperature pre trip indication	14	bit13	Reserve
7	bit6	External pre trip indication	15	bit14	Reserve
8	bit7	Overpower trip pre indication	16	bit15	Reserve

Note3

No.	Tag No	Meaning	No.	Tag No	Meaning
1	bit0	Overload trip indication	9	bit8	Self inspection flag indication: 3 - remote self inspection, 0 - no self inspection
2	bit1	Instantaneous trip indication (only supported by 1PNL of M series)	10	bit9	
3	bit2	Leakage trip indication (only supported by 1PNL of M series)	11	bit10	Overpower indication
4	bit3	Undervoltage trip indication	12	bit11	L terminal temperature trip indication
5	bit4	Overvoltage trip indication	13	bit12	N terminal temperature trip indication
6	bit5	High overvoltage trip indication	14	bit13	Residual power trip (insufficient residual power) indication Reserve
7	bit6	Temperature trip indication	15	bit14	Reserve
8	bit7	External trip indication	16	bit15	Reserve

5.2 M series 3P/3PN/3PNL/4P communication protocol

Address	Variable meaning	Data type	Function code	Convert Format	Unit
Bit sign area					
0x0000	Circuit breaker protection status bit	Unsigned type	0x04	Bit0: alarm indication Bit1: pre trip indication Bit2: Trip indication Bit3: communication offline (used by the intelligent network to close the cloud)	/
0x0001	Circuit breaker alarm bit	Unsigned type	0x04	Refer to Note1	/

0x0002	Circuit breaker pre trip bit	Unsigned type	0x04	Refer to Note2	/
0x0003	Breaker tripping bit	Unsigned type	0x04	Refer to Note3	/
0x0004	Equipment type	Unsigned type	0x04	4:3P, 5:3PN, 6:3PNL 16:4P	/
0x0005	Manual and automatic information	Unsigned type	0x04	0: Automatic 1: Manual	/
0x0006	Opening and closing times	Unsigned type	0x04	Y	/
0x0007	Switch status	Unsigned type	0x04	0: Open 1: Close 2: Opening (manual closing is not allowed after opening)	/
0x8 ~ 0x9	Effective value of phase A current	Unsigned long type	0x04	Y/1000	A
0xA ~ 0xB	Effective value of phase B current	Unsigned long type	0x04	Y/1000	A
0xC ~ 0xD	Effective value of phase C current	Unsigned long type	0x04	Y/1000	A
0xE	Rated current of circuit breaker I _n	Unsigned type	0x04	Y	A
0x0F	Breaker tripping bit 2	Unsigned type	0x04	Bit0: residual power trip Bit1: Overpower fault	/
Electric parameter area					
0x10 ~ 0x11	Phase A active power (starting address Hi is in front, Lo is behind) (this electrical parameter is not available for equipment 3P)	Signed long type	0x04	Y/1000	W
0x12 ~ 0x13	Phase B active power (equipment 3P does not have this electrical parameter)	Signed long type	0x04	Y/1000	W
0x14 ~ 0x15	Phase C active power (equipment 3P does not have this electrical parameter)	Signed long type	0x04	Y/1000	W
0x16 ~ 0x17	Phase closing active power	Signed long type	0x04	Y/1000	W
0x18 ~ 0x19	Effective value of phase A voltage (U _{ab} for equipment 3P)	Unsigned long type	0x04	Y/1000	V
0x1A ~ 0x1B	Effective value of phase B voltage (U _{ac} for equipment 3P)	Unsigned long type	0x04	Y/1000	V
0x1C ~ 0x1D	Effective value of phase C voltage (U _{bc} for equipment 3P)	Unsigned long type	0x04	Y/1000	V
0x1E ~ 0x1F	Three phase voltage vector and effective value (equipment 3P does not have this electrical parameter)	Unsigned long type	0x04	Y/1000	V

0x20 ~ 0x21	Effective value of phase A current	Unsigned long type	0x04	Y/1000	A
0x22 ~ 0x23	Effective value of phase B current	Unsigned long type	0x04	Y/1000	A
0x24 ~ 0x25	Effective value of phase C current	Unsigned long type	0x04	Y/1000	A
0x26 ~ 0x27	Three phase current vector and effective value (equipment 3P does not have this electrical parameter)	Unsigned long type	0x04	Y/1000	V
0x0028	Phase A power factor (no such electrical parameter for equipment 3P)	Signed type	0x04	Y/1000	/
0x0029	Phase B power factor (equipment 3P does not have this electrical parameter)	Signed type	0x04	Y/1000	/
0x002A	Phase C power factor (no such electrical parameter for equipment 3P)	Signed type	0x04	Y/1000	/
0x002B	Phase closing power factor	Signed type	0x04	Y/1000	/
0x2C ~ 0x2D	Phase A active energy (equipment 3P does not have this electrical parameter)	Unsigned long type	0x04	Y/1000	kWh
0x2E ~ 0x2F	Phase B active energy (equipment 3P does not have this electrical parameter)	Unsigned long type	0x04	Y/1000	kWh
0x30 ~ 0x31	Phase C active energy (equipment 3P does not have this electrical parameter)	Unsigned long type	0x04	Y/1000	kWh
0x32 ~ 0x33	Phase closing active energy	Unsigned long type	0x04	Y/1000	kWh
0x0034	Frequency	Unsigned type	0x04	Y/100	Hz
0x0035	Voltage angle between Ua and Ub (no such electrical parameter for equipment 3P)	Unsigned type	0x04	Y/10	Degree
0x0036	Voltage angle between Ua and Uc (no such electrical parameter for equipment 3P)	Unsigned type	0x04	Y/10	度
0x0037	Voltage angle between Ub and Uc (no such electrical parameter for equipment 3P)	Unsigned type	0x04	Y/10	度
0x0038	Leakage current monitoring (only supported by device 3PNL)	Unsigned type	0x04	Y/10	mA
0x0039	Temperature value	Signed type	0x04	Y/10	°C
0x003A	Fault trip type	Unsigned type	0x04	See Note 3	/
0x003B	Switch status	Unsigned type	0x04	0: Open 1: Close	/

				2: Opening (manual closing is not allowed after opening)	
0x003C-0x003F	Equipment ID No	Unsigned character type	0x04		/
0x0040-0x0041	Effective value of N-phase current (only supported by 4P products)	Unsigned long type	0x04	Y/1000	A
0x0042	Terminal A temperature (valid when the terminal temperature monitoring function is turned on)	Signed type	0x04	Y (NTC failure when the value is 151)	°C
0x0043	Terminal B temperature (valid when the terminal temperature monitoring function is turned on)	Signed type	0x04	Y (NTC failure when the value is 151)	°C
0x0044	C terminal temperature (valid when terminal temperature monitoring function is turned on)	Signed type	0x04	Y (NTC failure when the value is 151)	°C
0x0045	N terminal temperature (valid when terminal temperature monitoring function is turned on)	Signed type	0x04	Y (NTC failure when the value is 151)	°C
0x0046	Real time flag bit of terminal temperature protection pre trip (valid when terminal temperature monitoring function is turned on)	Unsigned type	0x04	Bit0: Phase A terminal overtemperature pre trip Bit1: Phase B terminal overtemperature pre trip Bit2: Phase C terminal overtemperature pre trip Bit3: N-phase terminal overtemperature pre trip Bit4: chip overtemperature pre trip	/
0x0047	Real time flag bit of terminal temperature protection tripping (valid when terminal temperature monitoring function is turned on)	Unsigned type	0x04	Bit0: Phase A terminal overtemperature trip Bit1: Phase B terminal overtemperature trip Bit2: Phase C terminal overtemperature trip Bit3: N-phase terminal overtemperature trip Bit4: chip overtemperature trip	/
0x0048	Real time flag bit of terminal temperature	Unsigned type	0x04	Bit0: Phase A terminal overtemperature alarm	/

	protection alarm (valid when terminal temperature monitoring function is turned on)			Bit1: Phase B terminal overtemperature alarm Bit2: Phase C terminal overtemperature alarm Bit3: N-phase terminal over temperature alarm Bit4: chip over temperature alarm	
0x0049	Terminal temperature monitoring switch	Unsigned type	0x04	1: Open; Non 1: Closed	/
0x004B-0x004C	Residual electric energy	Unsigned long type	0x04/0x10	Y/1000(Pay attention to conversion) Y range:(0-800 000000)	kWh
Statistical parameter area					
0x0080	Trip times	Unsigned type	0x04	Y	Time
0x0081	Overload trip times	Unsigned type	0x04	Y	Time
0x0082	Number of instantaneous trips	Unsigned type	0x04	Y	Time
0x0083	Leakage tripping times (not available for 3P equipment)	Unsigned type	0x04	Y	Time
0x0084	Number of undervoltage trips (not available for equipment 3P)	Unsigned type	0x04	Y	Time
0x0085	Number of overvoltage trips (not available for equipment 3P)	Unsigned type	0x04	Y	Time
0x0086	Number of temperature trips	Unsigned type	0x04	Y	Time
0x0087	Reserve	Unsigned type	0x04	Y	Time
0x0088	Number of phase failure tripping	Unsigned type	0x04	Y	Time
0x0089	Total number of alarms	Unsigned type	0x04	Y	Time
0x008A	Total opening and closing times	Unsigned type	0x04	Y	Time
Fault recording area					
0x00A0	Fault trip reason	Unsigned type	0x04	Refer to Note3	/
0x00A1	Phase A current when tripping	Unsigned type	0x04	Y/10	A
0x00A2	Phase B current during tripping	Unsigned type	0x04	Y/10	A
0x00A3	Phase C current during tripping	Unsigned type	0x04	Y/10	A
0x00A4	Phase A voltage during tripping (Uab for equipment 3P)	Unsigned type	0x04	Y/10	A
0x00A5	Phase B voltage during tripping (Uac for equipment 3P)	Unsigned type	0x04	Y/10	A

0x00A6	Phase C voltage when tripping (Ubc for equipment 3P)	Unsigned type	0x04	Y/10	A
0x00A7	Leakage current during tripping (not available for 3P equipment)	Unsigned type	0x04	Y/10	mA
0x00A8	Temperature at tripping	Signed type	0x04	Y/10	V
0x00A9	Trip time(Minutes, seconds)	Unsigned type	0x04	BCD code format	/
0x00AA	Trip time(Day, hour)	Unsigned type	0x04	BCD code format	/
0x00AB	Trip time(Year, month)	Unsigned type	0x04	BCD code format	/
0x00AC	Record times	Unsigned type	0x04	Y	/
0x00AD	N-phase current when tripping (only supported by 4P products)	Unsigned type	0x04	Y/10	/
0x00AE	Terminal temperature protection tripping phase	Unsigned type	0x04	Bit0: Phase A terminal overtemperature trip Bit1: Phase B terminal overtemperature trip Bit2: Phase C terminal overtemperature trip Bit3: N-phase terminal overtemperature trip Bit4: chip overtemperature trip	/
0x00AF	Fault trip reason 2	Unsigned type	0x04	Bit0: residual power trip Bit1: Overpower fault	/
0XB0 ~ 0XBF	Same format as above	Same format as above	0x04	Article 2 Fault record	/
0XC0 ~ 0xCF	Same format as above	Same format as above	0x04	Article 3 Fault record	/
0XD0 ~ 0xDF	Same format as above	Same format as above	0x04	Article 4 Fault record	/
0XE0 ~ 0xEF	Same format as above	Same format as above	0x04	Article 5 Fault record	/
0XF0 ~ 0xFF	Same format as above	Same format as above	0x04	Article 6 Fault record	/
0X100 ~ 0x10F	Same format as above	Same format as above	0x04	Article 7 Fault record	/
0X110 ~ 0x11F	Same format as above	Same format as above	0x04	Article 8 Fault record	/
0X120 ~ 0x12F	Same format as above	Same format as above	0x04	Article 9 Fault record	/
0X130 ~ 0x13F	Same format as above	Same format as above	0x04	Article 10 Fault record	/
Alarm record area					
0x0150	Alarm reason	Unsigned type	0x04	Refer to Note1	/
0x0151	Current when phase A alarm	Unsigned type	0x04	Y/10	A
0x0152	Current when phase B alarm	Unsigned type	0x04	Y/10	A

0x0153	Current when phase C alarm	Unsigned type	0x04	Y/10	A
0x0154	Voltage at phase A alarm (Uab for equipment 3P)	Unsigned type	0x04	Y/10	V
0x0155	Voltage at phase B alarm (Uac for equipment 3P)	Unsigned type	0x04	Y/10	V
0x0156	Voltage at phase C alarm (Ubc for device 3P)	Unsigned type	0x04	Y/10	V
0x0157	Leakage current during alarm (not available for 3P equipment)	Unsigned type	0x04	Y/10	mA
0x0158	Temperature at alarm	Signed type	0x04	Y/10	V
0x0159	Alarm time (min, sec)	Unsigned type	0x04	BCD code format	/
0x015A	Alarm time (day, hour)	Unsigned type	0x04	BCD code format	/
0x015B	Alarm time (year, month)	Unsigned type	0x04	BCD code format	/
0x015C	Record times	Unsigned type	0x04	Y	/
0x015D	Current in case of N-phase alarm (only supported by 4P products)	Unsigned type	0x04	Y/10	/
0x015E	Terminal temperature protection alarm phase	Unsigned type	0x04	Bit0: Phase A terminal overtemperature alarm Bit1: Phase B terminal overtemperature alarm Bit2: Phase C terminal overtemperature alarm Bit3: N-phase terminal over temperature alarm Bit4: chip over temperature alarm	/
0x015F	Spare				/
0X160 ~ 0x16F	Same format as above	Same format as above	0x04	Article 2 Alarm record	/
0X170 ~ 0x17F	Same format as above	Same format as above	0x04	Article 3 Alarm record	/
0X180 ~ 0x18F	Same format as above	Same format as above	0x04	Article 4 Alarm record	/
0X190 ~ 0x19F	Same format as above	Same format as above	0x04	Article 5 Alarm record	/
0X1A0 ~ 0x1AF	Same format as above	Same format as above	0x04	Article 6 Alarm record	/
0X1B0 ~ 0x1BF	Same format as above	Same format as above	0x04	Article 7 Alarm record	/
0X1C0 ~ 0x1CF	Same format as above	Same format as above	0x04	Article 8 Alarm record	/
0X1D0 ~ 0x1DF	Same format as above	Same format as above	0x04	Article 9 Alarm record	/
0X1E0 ~ 0x1EF	Same format as above	Same format as above	0x04	Article 10 Alarm record	/
System parameter area					

0x0200	Circuit breaker time (min, s)		Unsigned type	0x03/0x06/0x10	BCD code format	/
0x0201	Circuit breaker time (day, hour)		Unsigned type	0x03/0x06/0x10	BCD code format	/
0x0202	Circuit breaker time (year, month)		Unsigned type	0x03/0x06/0x10	BCD code format	/
0x0203	Setting current of circuit breaker I _r		Unsigned type	0x03/0x06/0x10	Y(Yrange6-100)	A
0x0204	Rated leakage current of circuit breaker I Δ N (30mA) (not applicable to 3P equipment)		Unsigned type	0x03/0x06/0x10	Y/10(Yrange300-3000(300))	mA
0x0205	Rated voltage of circuit breaker (220V)		Unsigned type	0x03/0x06/0x10	Y(Yrange30-400)	V
0x0206	Circuit breaker communication address (1)		Unsigned type	0x03/0x06/0x10	Y(1-247)	V
0x0208	Baud rate		Unsigned type	0x03/0x06/0x10	Y(0:4800 1:9600 2:14400 3:19200default为 1)	/
0x0209	bit0	Stop bit	Unsigned type	0x03/0x06/0x10	0:1 bit stop bit 1:2 bit stop bit	/
	bit1-2	Parity bit				
0x020B	Equipment type		Unsigned type	0x03/0x06/0x10	4:3P, 5:3PN, 6:3PNL, 16:4P	/
Handling method in protection parameter definition area (0-close protection, 1-alarm, 2-trip, 3-alarm+trip)						
0x0221	overload protection	Action value(125%I _r)	Unsigned type	0x03/0x06/0x10	Y (Yrange:110-140(125) Non professionals are not allowed to modify this value)	%
0x0222		Alarm value(113% I _r)	Unsigned type	0x03/0x06/0x10	Y (Yrange:90-125(113) Non professionals are not allowed to modify this value)	%
0x0223		Time coefficient (15s)	Unsigned type	0x03/0x06/0x10	Y*0.5 (Yrange:6-60(30))	s
0x0224		Handling method(2)	Unsigned type	0x03/0x06/0x10	Y(Yrange:0-3(2))	/
0x0225	Under voltage protection	Action value(165V)	Unsigned type	0x03/0x06/0x10	Y (Yrange:30-180(165) It is recommended that Action value be 10V-20V lower than Alarm value) (Action value and Alarm value of device 3P * (380/220))	V
0x0226		Alarm value(180V)	Unsigned type	0x03/0x06/0x10	Y (Yrange:30-230(180))	V
0x0227		Trip time(3s)	Unsigned type	0x03/0x06/0x10	Y*0.02 (Yrange:30-300(150)(Note :suggest to use 0.6-6s))	s
0x0228		Handling	Unsigned	0x03/0x06	Y(Yrange:0-3(2))	/

		method(2)	type	/0x10	Device 3Pdefault turned off, set to 0	
0x0229	Overvoltage protection	Action value(270V)	Unsigned type	0x03/0x06 /0x10	Y(Yrange:260-290(270))	V
0x022A		Alarm value(260V)	Unsigned type	0x03/0x06 /0x10	Y(Yrange:230-270(260)) (Action value and Alarm value * of device 3P (380/220))	V
0x022B		Trip time(6s)	Unsigned type	0x03/0x06 /0x10	Y*0.02(Yrange:150-750(300))(Note: suggest to use 3-15s))	s
0x022C		Handling method(2)	Unsigned type	0x03/0x06 /0x10	Y(Yrange:0-3(2)) Device 3Pdefault turned off, set to 0	/
0x022D	Leakage protection (action parameters cannot be modified temporarily, modification is invalid, only supported by 3PNL of the device)	Action value	Unsigned type	0x03	Y(70)	%
0x022E		Alarm value(10mA)	Unsigned type	0x03/0x06 /0x10	Y(Yrange:20-60(33))	%
0x022F		Trip time	Unsigned type	0x03	*20	ms
0x0230		Handling method(2)	Unsigned type	0x03	Y	/
0x0231	Temperature protection	Action value(80°C)	Signed type	0x03/0x06	Y*0.1 (Yrange:300-1000(800))	°C
0x0232		Alarm value(75°C)	Signed type	0x03/0x06 /0x10	Y*0.1 (Yrange:300-1000(750))	°C
0x0233		Trip time(30s)	Unsigned type	0x03/0x06 /0x10	Y*0.5 (Yrange:12-120(60)(6-60s))	s
0x0234		Handling method(0)	Unsigned type	0x03/0x06 /0x10	Y 0-3(0)	/
0x0237	Terminal temperature protection	Action value(100°C)	Signed type	0x03/0x06 /0x10	Y(Yrange:30-120(100))	/
0x0238		Alarm value(85°C)	Signed type	0x03/0x06 /0x10	Y(Yrange:30-120(85))	/
0x0239		Trip time(30s)	Unsigned type	0x03/0x06 /0x10	Y*0.5 (Yrange:12-120(60)(6-60s))	/
0x023A		Processing method (closed)	Unsigned type	0x03/0x06 /0x10	Y (Yrange:0-3, default0)	/
0x023B	Leakage remote self check and reclosing	Reclosing time(5s)	Unsigned type	0x03/0x06 /0x10	Y(Yrange:0-60(5)) 0 represents non-closing	s
0x023C	Automatic reclosing function	Prohibit and enable	Unsigned type	0x03/0x06 /0x10	Y(0-1) (Yrange0-1, default0) 0 inhibit 1 enable automatic reclosure	/
0x023D	Over power	Action value(150% P	Signed	0x03/0x06	Y(5-300, default150)	%

	protection	rated)	type	/0x10	3PN, 3PNL, 4P: P-rated=rated voltage * set current * 3 If the rated voltage (register 0x205)=220V P-rated=rated voltage * set current * 3 If the rated voltage (register 0x205)=220V Setting current (register 0x203)=10A P-rated=220V * 10A * 3=6600W 3P products: P-rated=rated voltage * set current * 1.732 * 2 If the rated voltage (register 0x205)=220V Setting current (register 0x203)=10A P-rated=220V*1.732*10A* 2=7600W	
0x023E		Alarm value(110%P rated)	Signed type	0x03/0x06 /0x10	Y(5-300, default110)	%
0x023F		Trip time(30s)	Unsigned type	0x03/0x06 /0x10	Y*0.5 (Yrange:12-120(60) Actual:Y*0.5=6-60s,default t30s)	s
0x0240		Processing method (closed)	Unsigned type	0x03/0x06 /0x10	Y(0-3, default0)	/
0x0241	Phase loss protection	Action value(70%)	Unsigned type	0x03/0x06 /0x10	Yrange:5-90(70)	%
0x0242		Alarm value(80%)	Unsigned type	0x03/0x06 /0x10	Yrange:10-90(80)	%
0x0243		Trip time(10s)	Unsigned type	0x03/0x06 /0x10	Yrange:1-120(20) (*0.5s, time: 0.5s-60s)	s
0x0244		Handling method(0)	Unsigned type	0x03/0x06 /0x10	Yrange:0-3(0)-default close	/
0x0245	Timing function 1	Minute/hour selection	Unsigned type	0x03/0x06 /0x10	BCD code format(Minute : high byte, hour: low byte) Example: 3016 represents 16:30	/
0x0246		Single cycle selection	Unsigned type	0x03/0x06 /0x10	Y (0-1, default0), 0 represents single time, 1 represents loop, single time represents control	/

					once and no longer control, loop represents repeated control every day	
0x0247		Processing method (closed)	No symbol	0x03/0x06 /0x10	Y (0-2, default0), 0 indicates closing this task, 1 indicates opening, and 2 indicates closing	/
0x0248	Timing function 2	Minute/hour selection (high byte for minutes, low byte for hours)	Unsigned type	0x03/0x06 /0x10	BCD code format	/
0x0249		单次循环选择	Unsigned type	0x03/0x06 /0x10	Y (0-1, default0), 0 represents single time, 1 represents loop, single time represents control once and no longer control, loop represents repeated control every day	/
0x024A		Processing method (closed)	No symbol	0x03/0x06 /0x10	Y (0-2, default0), 0 indicates closing this task, 1 indicates opening, and 2 indicates closing	/
0x024B-0x024C	Remaining battery protection (Arrears trip)	Reserve	Reserve	Reserve	Reserve	/
0x024D		Alarm value(1000)	Unsigned type	0x03/0x06 /0x10	Y range(1-10000)	kWh
0x024E		Handling method(0)	Unsigned type	0x03/0x06 /0x10	Y (After the action, it cannot be manually closed due to cost control, and cannot be restored even after power outage)	/
Factory parameter area						
0x0250	Control command	Unsigned type	0x03/0x06 /0x10	0x01: Closing 0x04: Opening 0x03: Forced opening 0x05: Restore address, battery level, and fault records 0x06: Clear battery and remaining battery 0x08: Clear remaining battery 0x11: Remote leakage self check 0x1000: Clear fault records 0x2000: Clear alarm	/	

				records	
0x0251	Software version number	Unsigned type	0x03	Y/10: For example, 235 represents 2.3.5	/

Note1

No.	Tag Number	Meaning	No.	Tag Number	Meaning
1	bit0	A-phase overload alarm indication	9	bit8	B-phase undervoltage alarm indication
2	bit1	B-phase overload alarm indication	10	bit9	C-phase undervoltage alarm indication
3	bit2	C-phase overload alarm indication	11	bit10	A-phase overvoltage alarm indication
4	bit3	N-phase overload alarm indication	12	bit11	B-phase overvoltage alarm indication
5	bit4	Reserve	13	bit12	C-phase overvoltage alarm indication
6	bit5	Reserve	14	bit13	Temperature alarm indication
7	bit6	Leakage alarm indication	15	bit14	Reserve
8	bit7	A-phase undervoltage alarm indication	16	bit15	No phase alarm indication

Note2

No.	Tag Number	Meaning	No.	Tag Number	Meaning
1	bit0	A-phase overload pre trip indication	9	bit8	B-phase undervoltage pre trip indication
2	bit1	B-phase overload pre trip indication	10	bit9	C-phase undervoltage pre trip indication
3	bit2	C-phase overload pre trip indication	11	bit10	A-phase overvoltage pre trip indication
4	bit3	N-phase overload pre trip indication	12	bit11	B-phase overvoltage pre trip indication
5	bit4	Reserve	13	bit12	C-phase overvoltage pre trip indication
6	bit5	Reserve	14	bit13	Temperature pre trip indication
7	bit6	Leakage pre trip indication	15	bit14	Reserve
8	bit7	A-phase undervoltage	16	bit15	Phase loss pre trip indication

		pre trip indication			
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Note3

No.	Tag Number	Meaning	No.	Tag Number	Meaning
1	bit0	A-phase overload trip indication (Equipment 4P: A-phase or N-phase overload trip indication)	9	bit8	B-phase undervoltage trip indication
2	bit1	B-phase overload trip indication	10	bit9	C-phase undervoltage trip indication
3	bit2	C-phase overload trip indication	11	bit10	A-phase overvoltage trip indication
4	bit3	A-phase Instantaneous trip indication	12	bit11	B-phase overvoltage trip indication
5	bit4	B-phase Instantaneous trip indication	13	bit12	C-phase overvoltage trip indication
6	bit5	C-phase Instantaneous trip indication	14	bit13	Temperature trip indication
7	bit6	Leakage tripping indication	15	bit14	Remote self-test indication
8	bit7	A-phase undervoltage trip indication	16	bit15	No phase trip indication

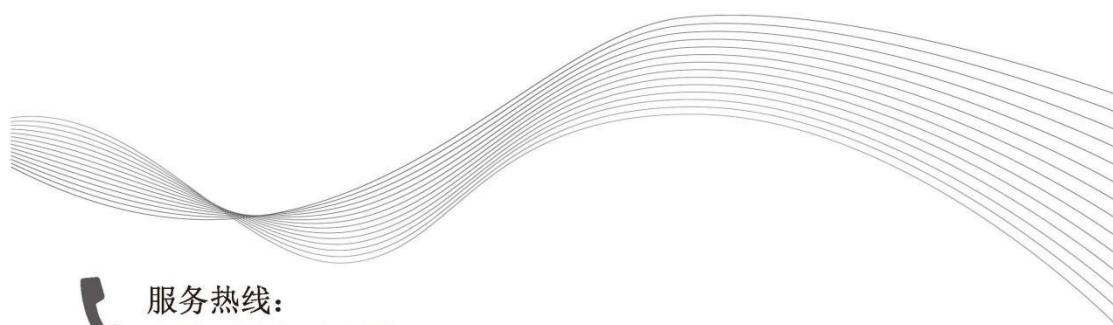
5.3 C/CP Communication protocol

Modbus-Rtu communication variable point table					
Address	Meaning of variables	Data type	Function code	Convert format	Unit
Bit marker area					
0x0000	Circuit breaker protection status bit (only supported for circuit breaker CP models)	Unsigned type	0x04	Bit1: Pre trip indication Bit2: Trip indication	/
0x0002	Circuit breaker pre trip flag (only supported for circuit breaker CP models)	Unsigned type	0x04	Bit0: L (Phase A) overvoltage pre trip indication Bit1: L (Phase A) undervoltage pre trip indication Bit2: B overvoltage pre trip indication Bit3: B undervoltage pre trip indication Bit4: C overvoltage pre trip indication	/

				Bit5: C undervoltage pre trip indication	
0x0003	Circuit breaker trip flag (only supported for circuit breaker CP models)	Unsigned type	0x04	Bit0: L (phase A) overvoltage trip indication Bit1: L (phase A) undervoltage trip indication Bit2: B overvoltage trip indication Bit3: B undervoltage trip indication Bit4: C overvoltage trip indication Bit5: C undervoltage trip indication	/
0x0004	Circuit breaker type	Unsigned type	0x04	8:CP-1PN/1PNL, 9:YR-1PN/1PNL, 10:C 18:CP-3PN/3PNL 19:YR-3PN/3PNL	/
0x0005	Manual and automatic information	Unsigned type	0x04	0: Automatic 1: Manual	/
0x0006	Opening and closing times (only supported by APM circuit breakers CP and C, not for power-off storage)	Unsigned type	0x04	Y	Time
0x0007	Switch status	Unsigned type	0x04	0: Open 1: Close	/
0x0008	Rated current of circuit breaker In (only supported by APM circuit breakers CP and C)	Unsigned type	0x04	Y	A
Electrical parameter zone					
0x0013	L voltage (only supported by circuit breaker CP-1PN/1PNL)	Float type	0x04	Y	V
0x0014					
0x0016	B-phase voltage (only supported by circuit breaker CP-3PN/3PNL)	Float type	0x04	Y	V
0x0017					
0x0018	C-phase voltage (only supported by circuit breaker CP-3PN/3PNL)	Float type	0x04	Y	V
0x0019					
0x001B	Fault Type	Unsigned type	0x04	Bit0: L (phase A) overvoltage trip indication Bit1: L (phase A) undervoltage trip indication	/

				Bit2: B overvoltage trip indication Bit3: B undervoltage trip indication Bit4: C overvoltage trip indication Bit5: C undervoltage trip indication		
0x001D	Switch status	Unsigned type	0x04	0: Open 1: Close 2: Opening (cannot be manually closed after opening)	/	
0x001E-0x0021	Circuit breaker ID number (only supported by APM circuit breakers CP and C)	Unsigned character type	0x04		/	
System parameter area						
0x0155	Rated voltage of circuit breaker (220V) (only supported by APM circuit breakers CP and C)	Unsigned type	0x03	Y	V	
Communication parameter area						
0x0156	Circuit breaker communication address (default1)	Unsigned type	0x03/0x06	Y(1-247)	/	
0x0158	Circuit breaker baud rate (default9600) (only APM circuit breakers CP and C support modification)	Unsigned type	0x03/0x06	0:4800 1:9600 2:14400 3:19200 default 为 1	kbps	
0x0159	bit0	Reserve	Unsigned type	0x03/0x06	Reserve	/
	bit1-2	Parity check bit (default has no checksum and cannot be modified)		0x03	0:无校验	/
0x015B	Circuit breaker type (ST version does not support modification, APM version matches hardware, customer modification is not recommended)	Unsigned type	0x03/0x06	8:CP-1PN/1PNL, 9:YR-1PN/1PNL, 10:C 18:CP-3PN/3PNL 19:YR-3PN/3PNL	/	
Protection parameter definition area Handling method (0-close protection, 1-alarm, 2-trip, 3-alarm+trip)						
0x0175	Undervoltage protection (Only supported for circuit)	Action value(165V)	Unsigned type	0x03/0x06	Yrange(30-180, default165)	V
0x0176		Reserve	Reserve	Reserve	Reserve	/
0x0177		Trip time(3s)	Unsigned type	0x03/0x06	Y*0.02 (Yrange2-20, default10)	s

0x0178	breaker CP models, ST-CP only supports Action value and time modification)	Handling method(2)	Unsigned type	0x03/0x06	Y(0-3, default2)	/
0x0179	Overvoltage protection (Only supported for circuit breaker CP models, ST-CP only supports Action value and time modification n)	Action value(270V)	Unsigned type	0x03/0x06	Y range(260-290, default270)	V
0x017A		Reserve	Reserve	Reserve	Reserve	/
0x017B		Trip time(6s)	Unsigned type	0x03/0x06	Y*0.3(Yrange10-50, default20)	s
0x017C		Handling method(2)	Unsigned type	0x03/0x06	Y(0-3, default2)	/
Factory parameter area						
0x01D0	Control command		Unsigned type	0x03/0x06	1: Closing; 4: Opening; 3: Forced opening	/
0x01D1	Software version number		Unsigned type	0x03	Y/10 (e.g. 235 represents 2.3.5)	/



服务热线:

400 600 1502

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