470

AMC200(L) AC Multi-loop Intelligent Power Collection and Monitoring Device

Installation Instruction V1.1

Acrel Co., LTD

Declaration

The company reserves the right to modify the product specifications described in the manual without prior notice. Before placing an order, please consult your local distributor for the current specifications of this product.

Catalog

1 Overview

AMC200(L) AC multi-loop intelligent power acquisition and monitoring device is mainly used for the measurement of full electrical parameters of multiple loops, and can access the current input of up to 8 three-phase loops or 24 single-phase loops at the same time. Can measure voltage and current, power, power factor and other parameters.

2 Product Type and Function

2.1 Meter Type and Function

Table 1 Meter model functions

Meter Type	Basic Function
AMC200L-4E3	Can access 4 three-phase AC circuits at the same time, can directly measure the voltage, current, power, power factor and other parameters, 6 switching input (2 active, 4 passive), 2 switching output, 1 RS485, 4 NTC temperature, 1 temperature and humidity measurement, with liquid crystal display
AMC200L-8E3	Can access 8 three-phase AC circuits at the same time, can directly measure the voltage, current, power, power factor and other parameters, 6 switching input (2 active, 4 passive), 2 switching output, 1 RS485, 4 NTC temperature, 1 temperature and humidity measurement, with liquid crystal display

2.2 Product Detail Function

1、maximum 8 three-phase or 24 single-phase circuit full electric parameter measurement, current transformer external;

2、monitor the phase voltage/current, zero sequence current, frequency;

3、monitor the phase power, total power (active power, reactive power, apparent);

4、monitoring each phase power factor, total power factor, four-quadrant power statistics;

5、 the use of simplified Chinese characters LCD display, with historical power data and historical alarm information storage function:

a. By default, historical data is saved once a day at 0 o 'clock. Each channel and each item of data (total active power, total active power, and three-phase current) can be stored 1000 times.

b. The interval for storing historical data onsite is 15 minutes. Each channel and each item of data (total active energy, total active power, three-phase current)can be stored 5000 times.

c. 24 pieces of historical electricity data are stored on the monthly meter reading day.

d. Historical alarms are stored in real-time mode. A maximum of 500 historical alarms can be stored.

6、support over voltage, over current, phase break, DI linkage alarm output;

7、four passive switching input, two active switching input, two switching output;

8、standard RS485 communication, optional Modbus-RTU protocol or YD/T 1363 protocol;

9、support 4G communication or NB communication;

10、one loop temperature and humidity measurement, 4 loops　NTC measurement;

3 Matching Transformer

The current transformer is a crystal connector, and the primary current ranges from 50A to 600A. If the current transformer is different, customers can modify the current ratio through the instrument interface or communication according to the actual use. The transformer is shown in Figure 1, Figure 2;supporting current transformer as shown in Table 2.

Figure 1

The total length is 1+0.5M, and in the 0.5M section, it is divided into three lines: red, green, and yellow. Among them, yellow is phase A, green is phase B, and red is phase C. The connection terminal with the instrument adopts the network cable port, and the definition of the terminal is as follows:

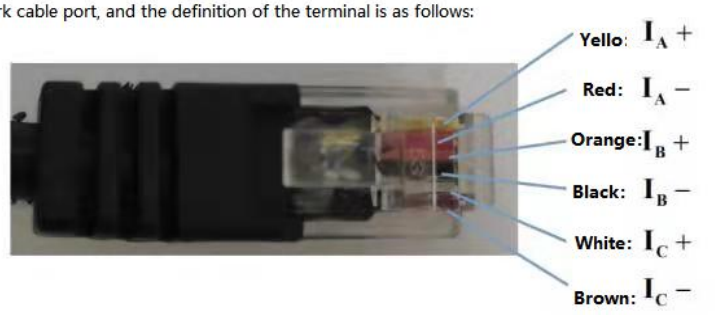


Figure 2

Table 2 AMC200(L) matching current transformer

Type	Ratio	Wire length	Accuracy	Installation method
AKH-0.66/W-9NY 50A/20mA	50A/20mA	（1+0.2）m	0.2 Class	Closed type, RJ interface
AKH-0.66/K-Φ10N 50A/20mA	50A/20mA	（1+0.2）m	0.5 Class	Split type, RJ interface
AKH-0.66 Z-3/*Φ15Y(1/0.5) 100A/50mA	100A/50mA	（1+0.5）m	0.2 Class	Closed type, trinity, RJ interface
AKH-0.66/W-12NY 100A/50mA	100A/50mA	（1+0.2）m	0.2 Class	Closed type, RJ interface
AKH-0.66/K-Φ16N 100A/50mA	100A/50mA	（1+0.2）m	0.5 Class	Split type, RJ interface
AKH-0.66/W-20Y 200A/50mA	200A/50mA	（1+0.5）m	0.2 Class	Closed type, RJ interface
AKH-0.66/K-Φ24N 200A/50mA	200A/50mA	（1+0.5）m	0.5 Class	Split type, RJ interface
AKH-0.66/W-20Y(1/0.5) 250A/50mA	250A/50mA	（1+0.5）m	0.2 Class	Closed type, RJ interface
AKH-0.66/W-30NY 250A/50mA	250A/50mA	（1+0.5）m	0.2 Class	Closed type, RJ interface
AKH-0.66/K-Φ24N 250A/50mA	250A/50mA	（1+0.5）m	0.5 Class	Split type, RJ interface
AKH-0.66-TD-Φ60-NY	400A/50mA	（1+0.5）m	0.2 Class	Closed type, RJ interface
AKH-0.66/K-Φ36N 400A/50mA	400A/50mA	（1+0.5）m	0.5 Class	Split type, RJ interface
AKH-0.66-TD-Φ60-NY	600A/50mA	（1+0.5）m	0.2 Class	Closed type, RJ interface
AKH-0.66/K-Φ36N 600A/50mA	600A/50mA	（1+0.5）m	0.5 Class	Split type, RJ interface

Note: Special transformers can be contacted for specific consultation.

4 Technical Parameter

Table 3 Technical Parameters

Technical Parameter			Technical Indicator
Input	Frequency		45～65Hz;
	Voltage		Rating: AC 3×220V/380V;
			Overload: 1.2 times rated (continuous); 2 times rating value/1 second;
			Power consumption: ≤0.5VA (per channel);
	Current		Rating: AC xxxA/50mA, need external transformer;
			Overload: 1.2 times rated (continuous); 10 times rating value /1 second;
			Power consumption: ≤0.5VA (per channel);
Function	Pulse Output		Output mode: open collector optocoupler pulse (default 400imp/kWh);
	Communication		Modbus-RTU or YD/T 1363 protocol(use in China);Baud rate 1200～38400;
	Switch	Input	4 dry contact inputs and 2 active wet contact inputs (AC 220V).

		Output	Output mode: relay normally open contact output; Contact capacity: AC 250V/3A or DC 30V/3A;
	NTC Temperature Measurement		Temperature: -20~100℃ (accuracy ±2℃);
	Temp&Humidity Measurement		Temperature: -20~100℃ (accuracy ±2℃); Humidity: 20-90%RH (accuracy ±5%RH)
Measurement accuracy			Frequency 0.05Hz, voltage and current 0.5 level, active power 1 level;
Auxiliary power supply			AC/DC 85 ~ 265V; Power consumption ≤10VA;
Security	Power Frequency Withstand Voltage		>AC 2kV/1min；
	Insulation Resistance		Input and output end to the housing>100MΩ;
Environment			Operating temperature: -20℃ ~ +60℃; Storage temperature: -40℃ ~ +70℃; Relative humidity: ≤95% no condensation; Altitude: ≤2500m;
Electromagnetic compatibility			Surge (impact) immunity test level 4
			Electrostatic discharge immunity test level 3
			Electrical fast transient pulse group immunity test level 3

5 Dimensions and Wiring Instructions

5.1 Overall Dimension (Unit：mm)

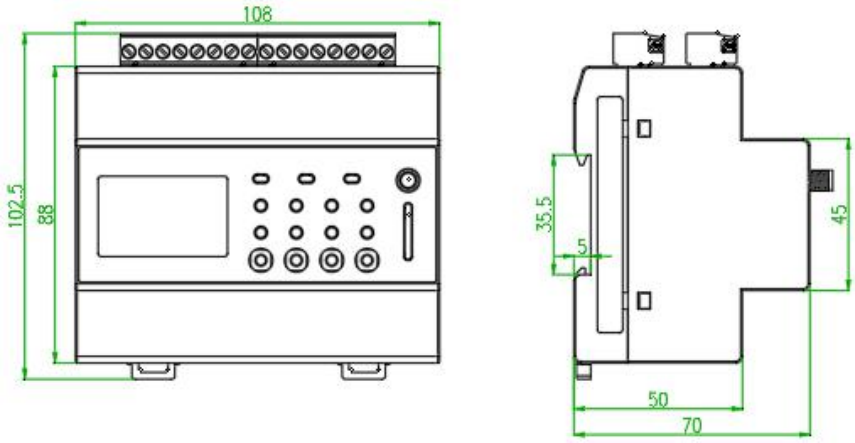


Figure 3 AMC200(L) Outline-Dimensions

5.2 Installation Mode

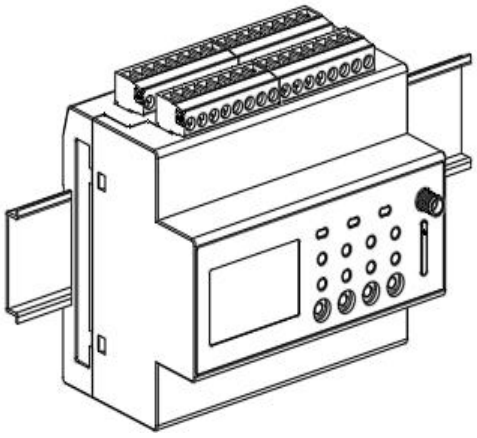


Figure 4 AMC200(L) installation mode

5.3 Wiring

The following pictures describe the wiring terminals and connections

AMC200L-4E3 AMC200L-8E3

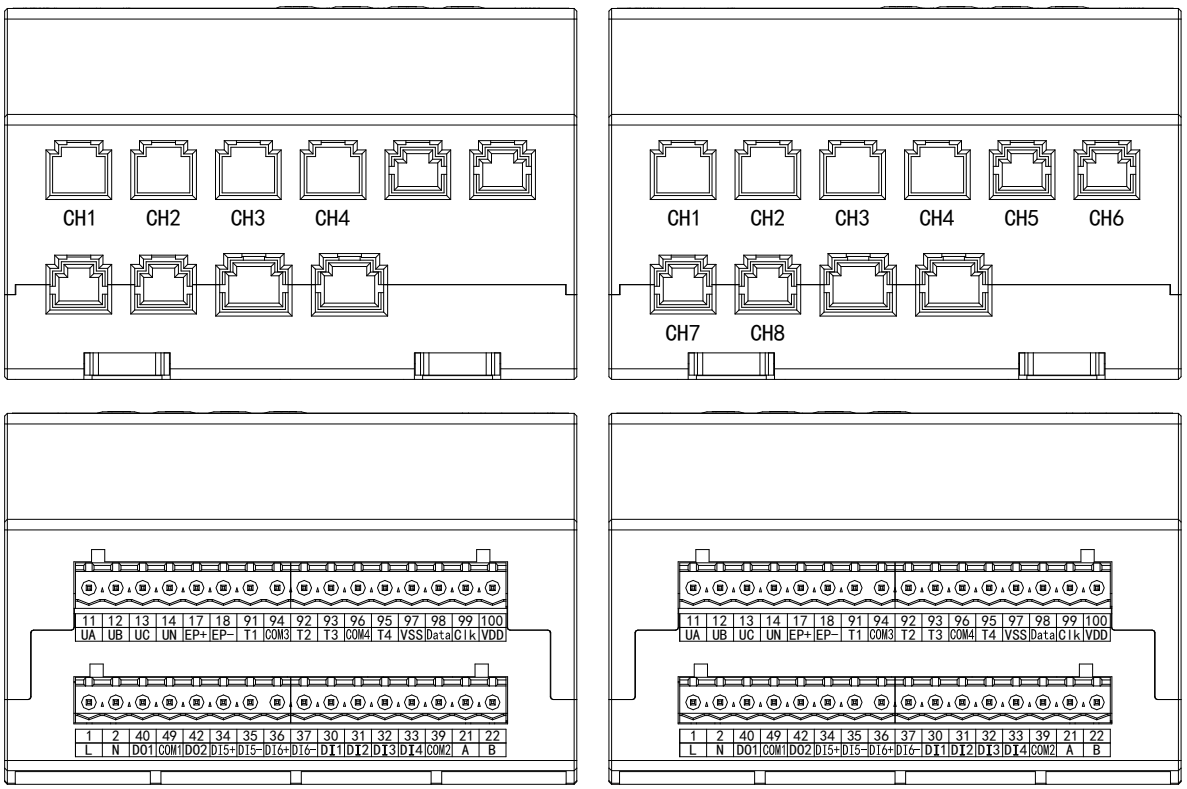


Figure 5 AMC200(L) AC terminal diagram

Table 4 Description of wiring terminals

Terminal Number	Definition	Specification	Remark
1	L	Auxiliary power supply	AC/DC 85-265V
2	N		
11	UA	Voltage Input	AC 3*220V/380V
12	UB		
13	UC		
14	UN		
17	EP+	Pulse Output	Pulse Constant:400imp/kwh
18	EP-		
21	A	Communication	RS485 communication
22	B		
30	DI1	Switch Input	Passive dry contact input
31	DI2		
32	DI3		
33	DI4		
39	COM2		
34	DI5+	**Active switching input**	**AC 220V mains or oil engine signal access**
35	DI5-		

36	DI6+		
37	DI6-		
40	D01	Replay Output	Normally open contact output; Contact capacity: AC 250V/3A DC 30V/3A；
42	DO2		
49	COM1		
91	T1	NTC Temperature Measurement	Temperature measuring range -20-100℃ (accuracy ±2℃)
94	COM3		
92	T2		
93	T3		
96	COM4		
95	T4		
97	VSS	Temp&Humidity Measurement	Temperature: -20-100℃ (accuracy ±2℃) Humidity: 20-90%RH (accuracy ±5%RH)
98	Data		
99	Clk		
100	VDD		
	CH1-CH8	Current Loop Numbers	CHx represents a three-phase current loop, AMC200L-4E3 is connected to a maximum of 4 three-phase loops; AMC200L-8E3 access up to 8 three-phase circuits;

Wiring mode (The following figure takes four circuits as an example)

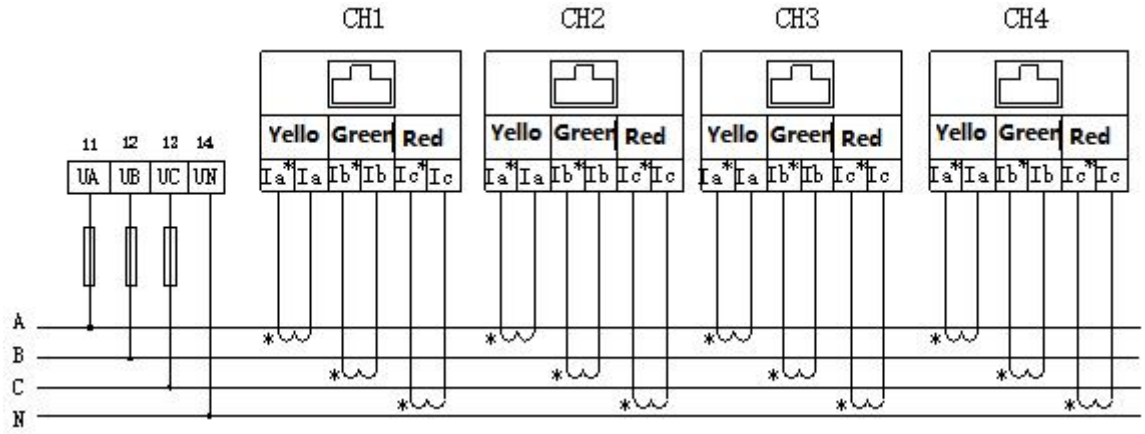


Figure 6 Three-phase four-wire voltage and current direct access

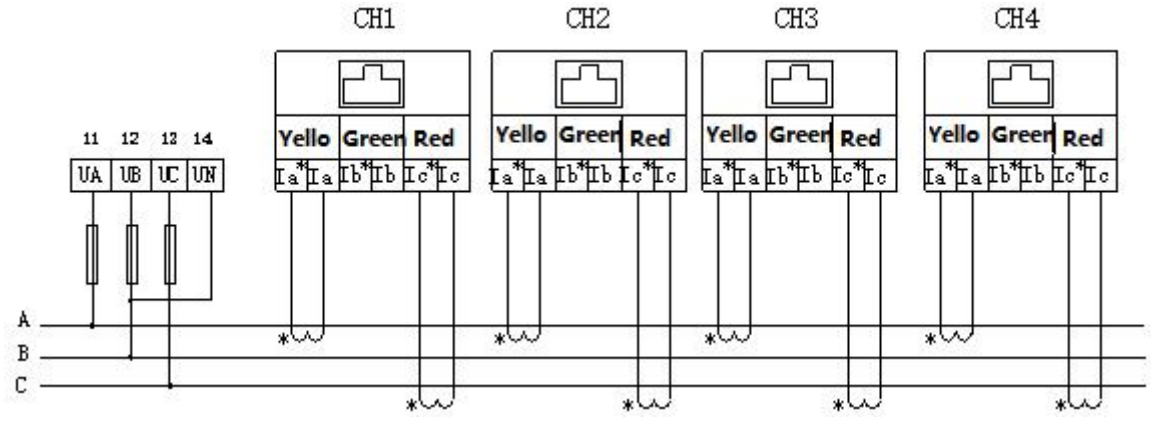


Figure 7 Direct access of three-phase three-wire voltage and current

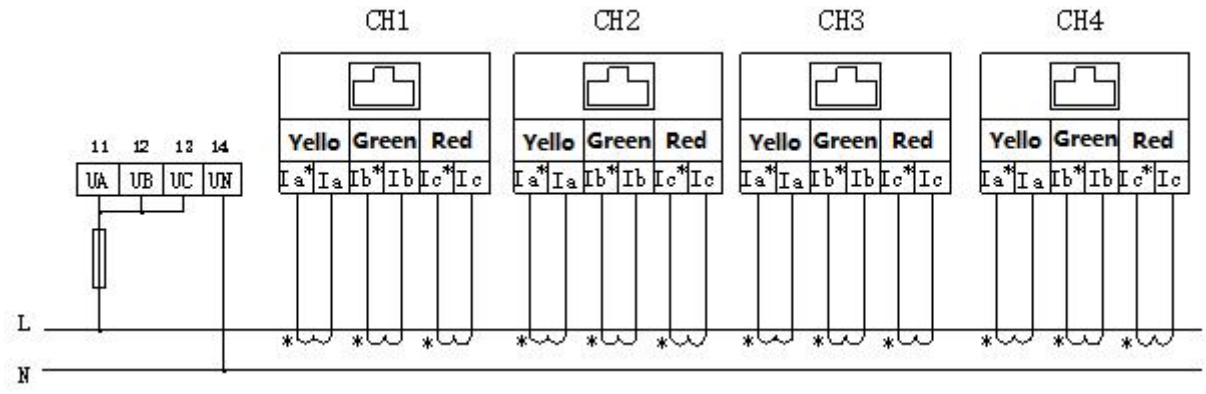
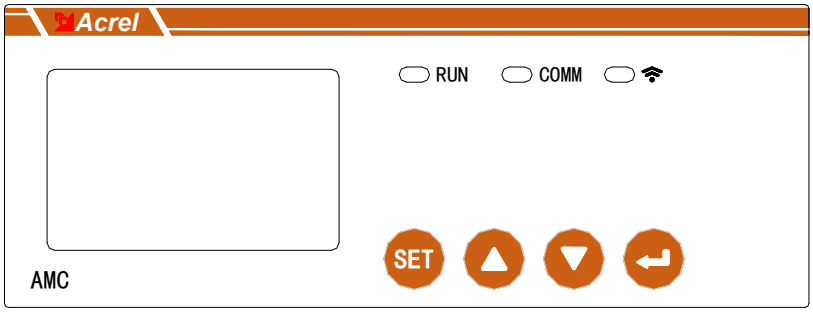


Figure 8 Single-phase voltage and current direct access

6 Operation Direction

6.1 Description of Panel and Key Functions

6.1.1 Panel Description

AMC200L-□E3	

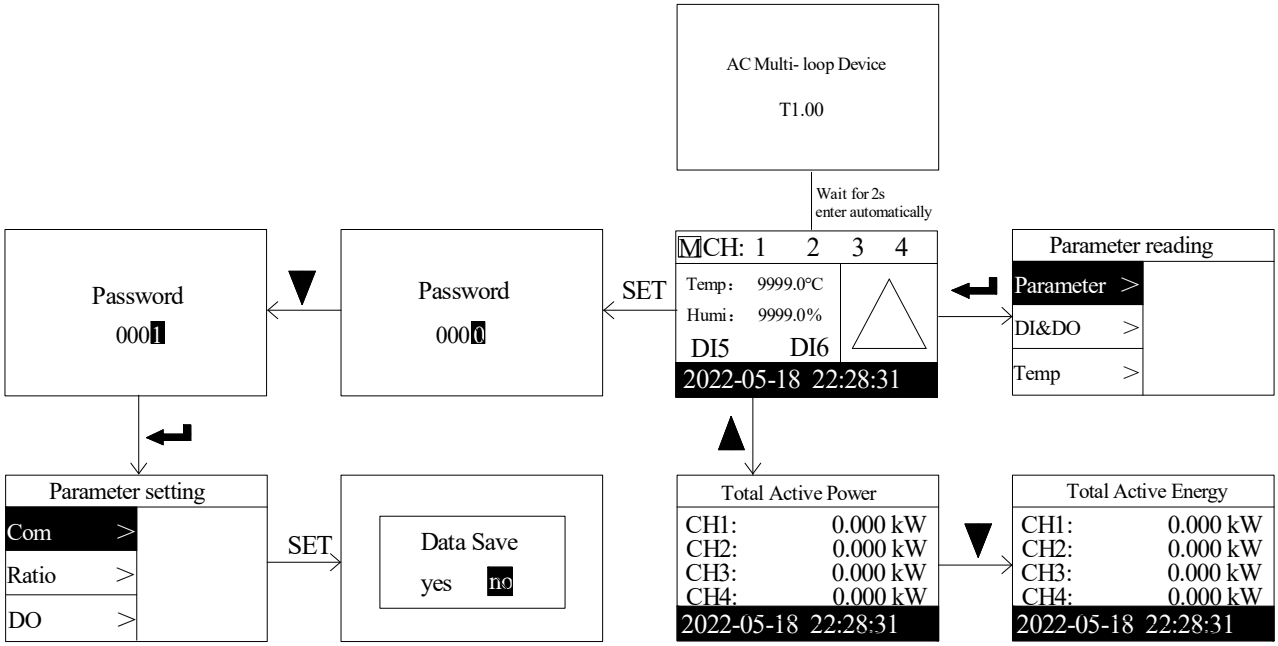
6.1.2 Button Function Description (for meters with LCD models)

SET KEY(SET)	In the measurement mode, press this key to enter the parameter setting mode, and the instrument prompts you to enter the password PASS. After entering the correct password (0001), you can set the parameter of the instrument. In parameter mode, press this key to save data or not to return to the upper-level menu.
Up KEY(▲)	In measurement mode, it is used to switch display items; In parameter setting mode, it is used to select menu items and switch bits of parameters.
Down KEY(▼)	In measurement mode, it is used to switch display items; In parameter setting mode, it is used to select menu items and increase the value of each digit.
Enter KEY(↵)	In measurement mode, it is used to view parameters; In parameter setting mode, it is used to confirm the selection of menu items and the modification of parameters.

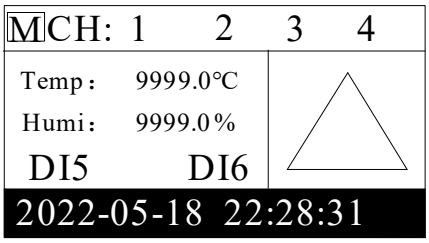
Note: The difference between the AMC200L-4E3 interface and the AMC200L-8E3 interface is that the current circuit has a maximum of four channels (CH1-CH4) and eight channels (CH1-CH8). The following describes the four channels in 6.2-6.4.

6.2 Boot Operation and Display Instructions

After power-on, the startup interface displays as an AC multi-loop device; After 2 seconds, the circuit automatically enters to the main interface: (1) Press the SET key to enter the password screen, press the key to enter the password 0001, press Enter to enter the parameter setting screen (Parameter setting options are described in 6.4), press the SET key to enter the data saving screen, you can switch the cursor to select whether to save. (2) Press the up key to enter the parameter display interface of total active power; (3) Press the down key to enter the parameter display interface of total active power; (4) Press Enter to enter the main interface (main interface measurement options will be specified in 6.3). The operation flow chart is shown in the figure below.



See the following figure for the description of the first screen



CH1-CH4： four circuit

（1： When displayed as white text on a black background,it indicates power display ）

M： means the selected protocol；

M:Modbus,T:Tower YD/T1363

After inserting the temperature and humidity module,the measured values of temperature and humidity will be displayed

⚠： Exclamation mark will be displayed when alarming

Modbus display as DI5、DI6，

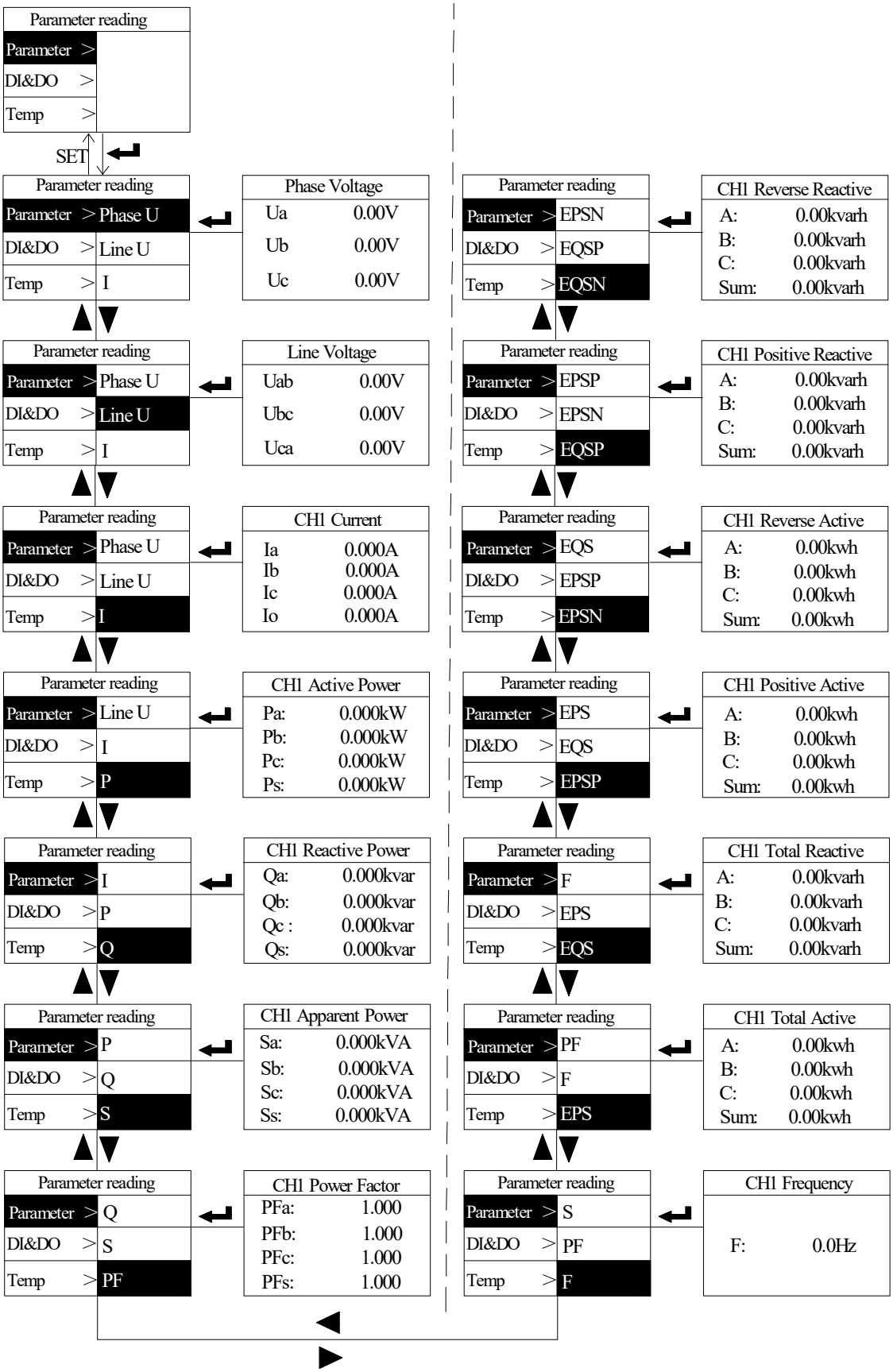
Tower YD/T1363 display as oil engine,mains power

（DI5： When there are white characters on a black background, it means that there is a signal in the active input ）

6.3 Parameter Measurement Interface Description

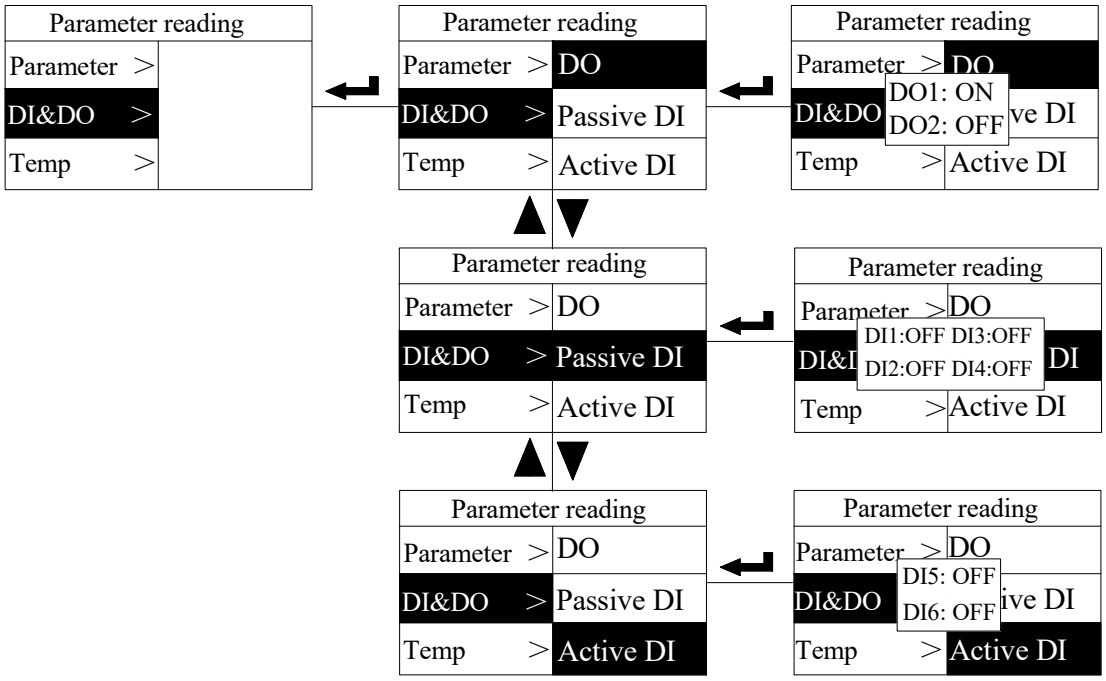
6.3.1 Parameter Interface Description

The main interface is displayed. the cursor is on the parameter screen by default.Press Enter to view the power parameter screen. The power parameter column contains phase voltage, line voltage, current, active power, reactive power, apparent power, power factor, frequency, total active power, total reactive power, forward active power, reverse active power, forward reactive power, reverse reactive power (you can view the specific information of each parameter by the enter key and the up and down key, the default display is the first way).



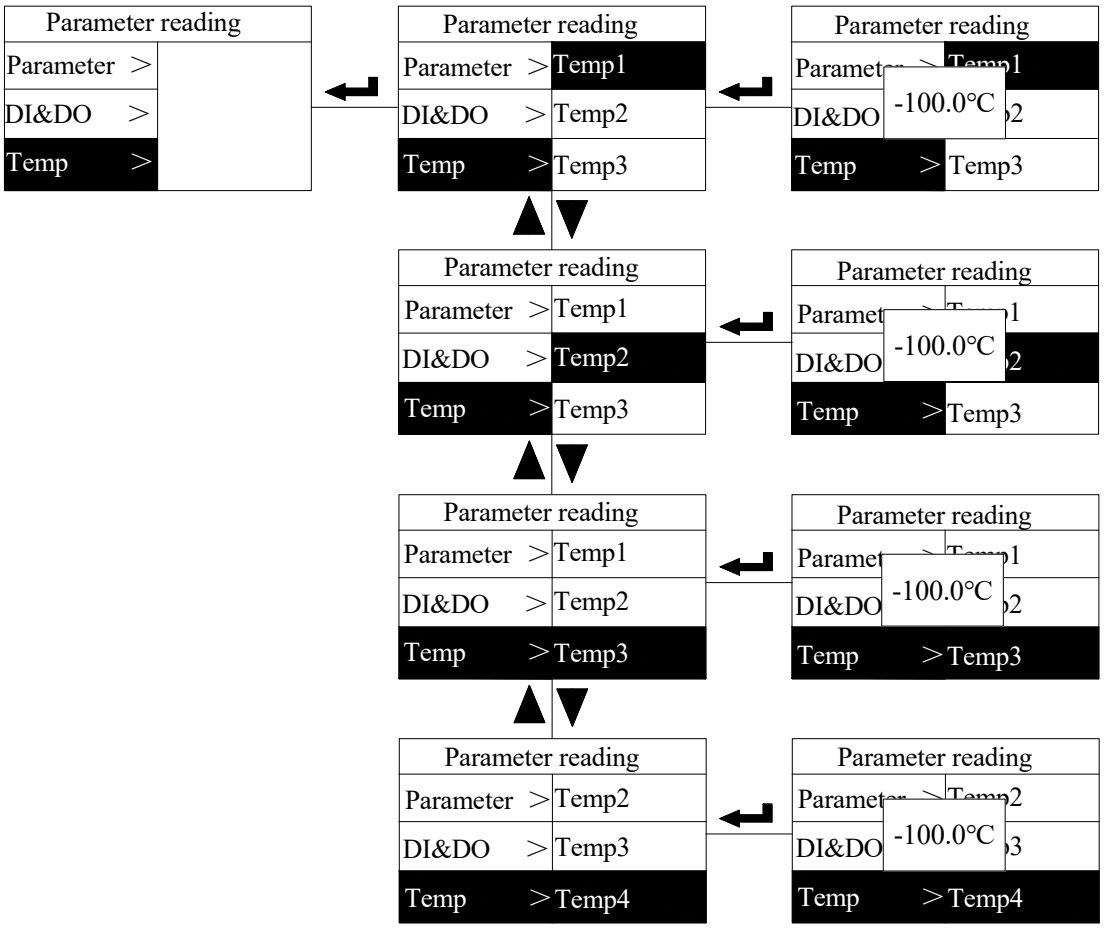
6.3.2 DI&DO Interface Description

Press the up key or down key to move the cursor to the DI&DO interface. Press Enter key to view DO, passive DI, active DI three categories. Press Up/down key and Enter key to pop up the corresponding window, which is the data record of the DO1,DO2,DI1-DI4.



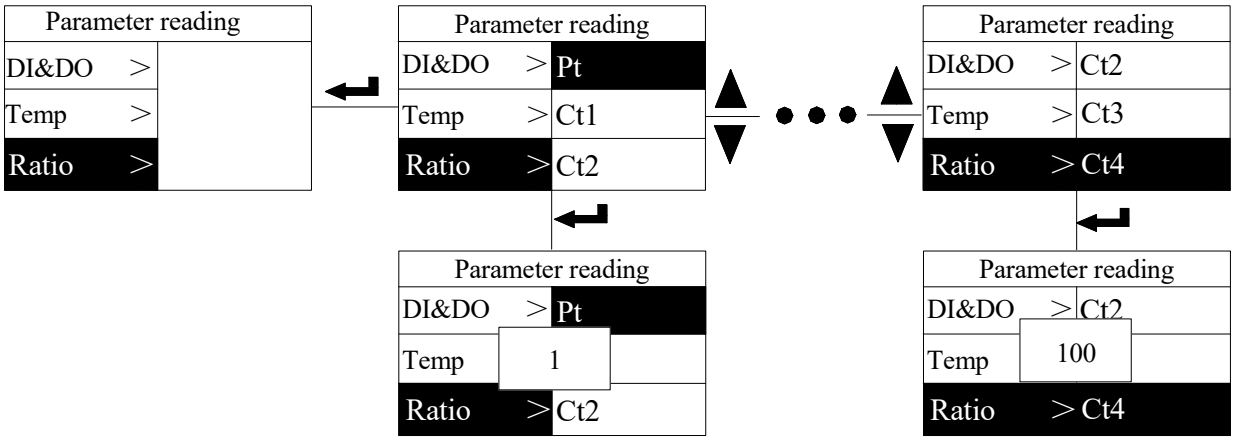
6.3.3 Temperature Display Interface Description

Press the up or down key to move the cursor to the temp interface. Press Enter to view the four categories of temp 1 to temp 4. Press Enter to view the specific temperature value. When the probe is not connected, the temperature is displayed as -100℃, and when the probe is short-circuited, the temperature is displayed as 200℃.



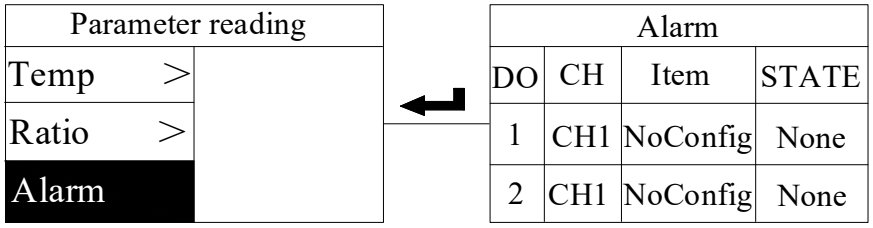
6.3.4 Ratio Interface Description

Press the up or down key to move the cursor to the ratio interface. Press Enter to view the Pt,Ct1-Ct4, and press Enter to view each ratio. The default voltage ratio is "1" and the default current ratio is "100".



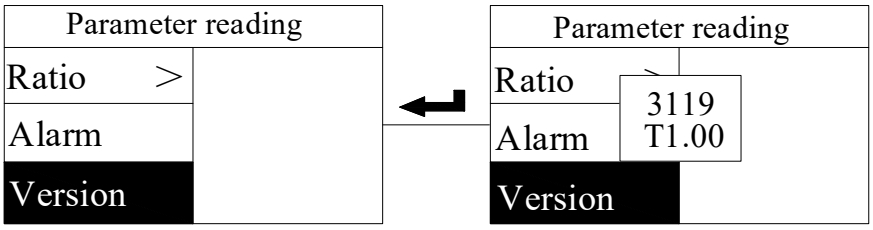
6.3.5 Alarm Information Interface Description

Press the up or down key to move the cursor to the alarm information screen, and press Enter to view the real-time alarm information of the DO.



6.3.6 Version Information Interface Description

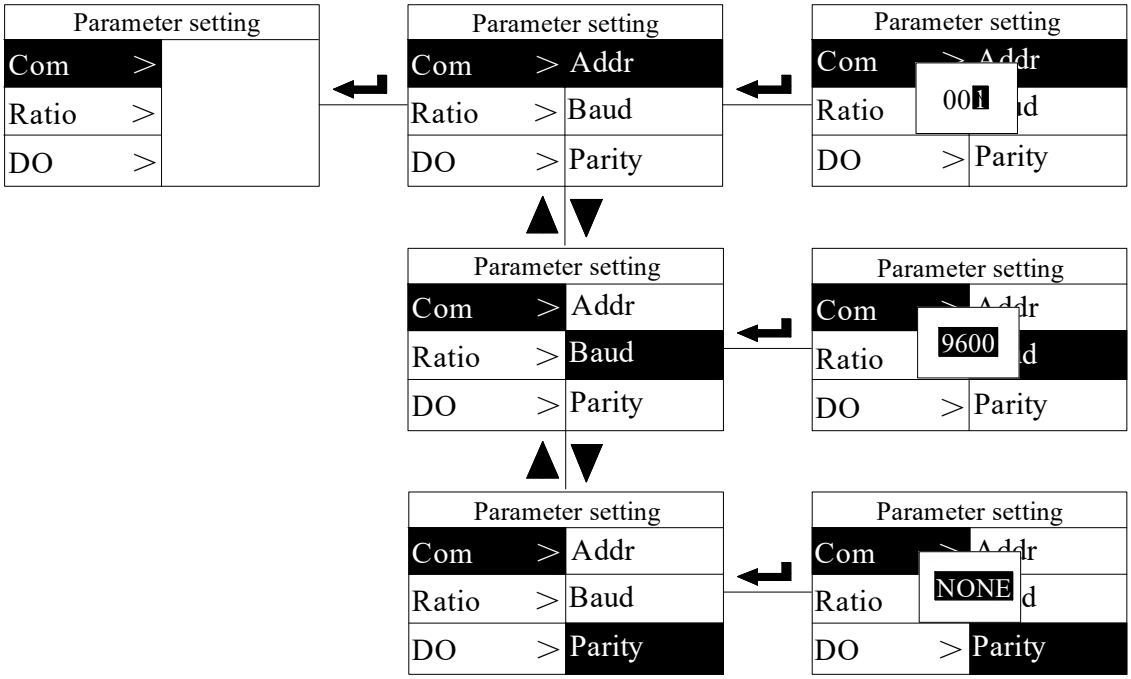
Press the up or down key to move the cursor to the version information screen. Press Enter to directly view the program number and version information.



6.4 Parameter Settings Interface Description

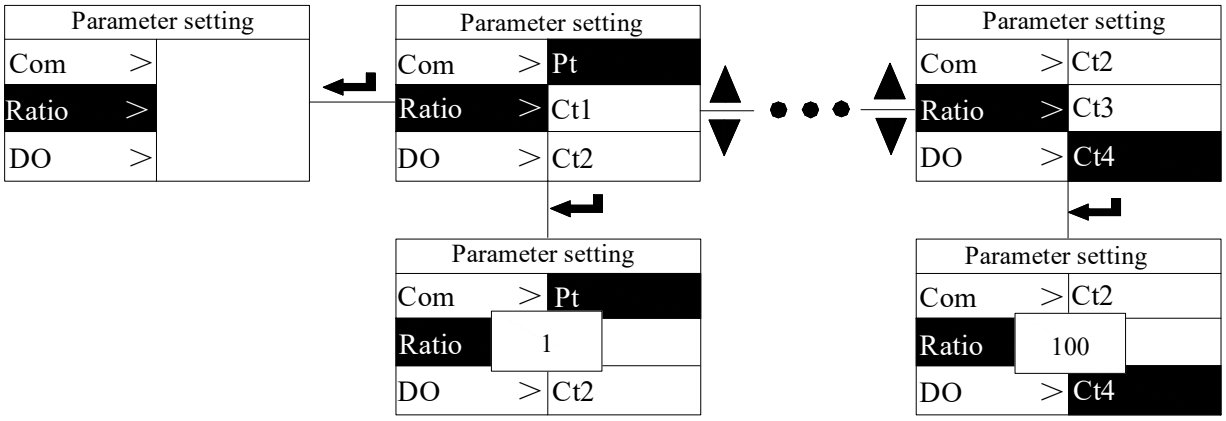
6.4.1 Communication Parameter Setting

Enter the parameter setting interface, the cursor stops in the communication setting by default, press Enter to see the address, baud rate, check bit three categories, then press Enter will pop up all kinds of configurable parameter interface; Press the up/down key to switch the Settings of the address, baud rate, and parity bit. The address can be set to 1-247. The baud rate can be set to 1200, 2400, 4800, 9600, 19200, 38400; The parity bit can be set to EVEN(even), ODD(odd), or NONE(none).



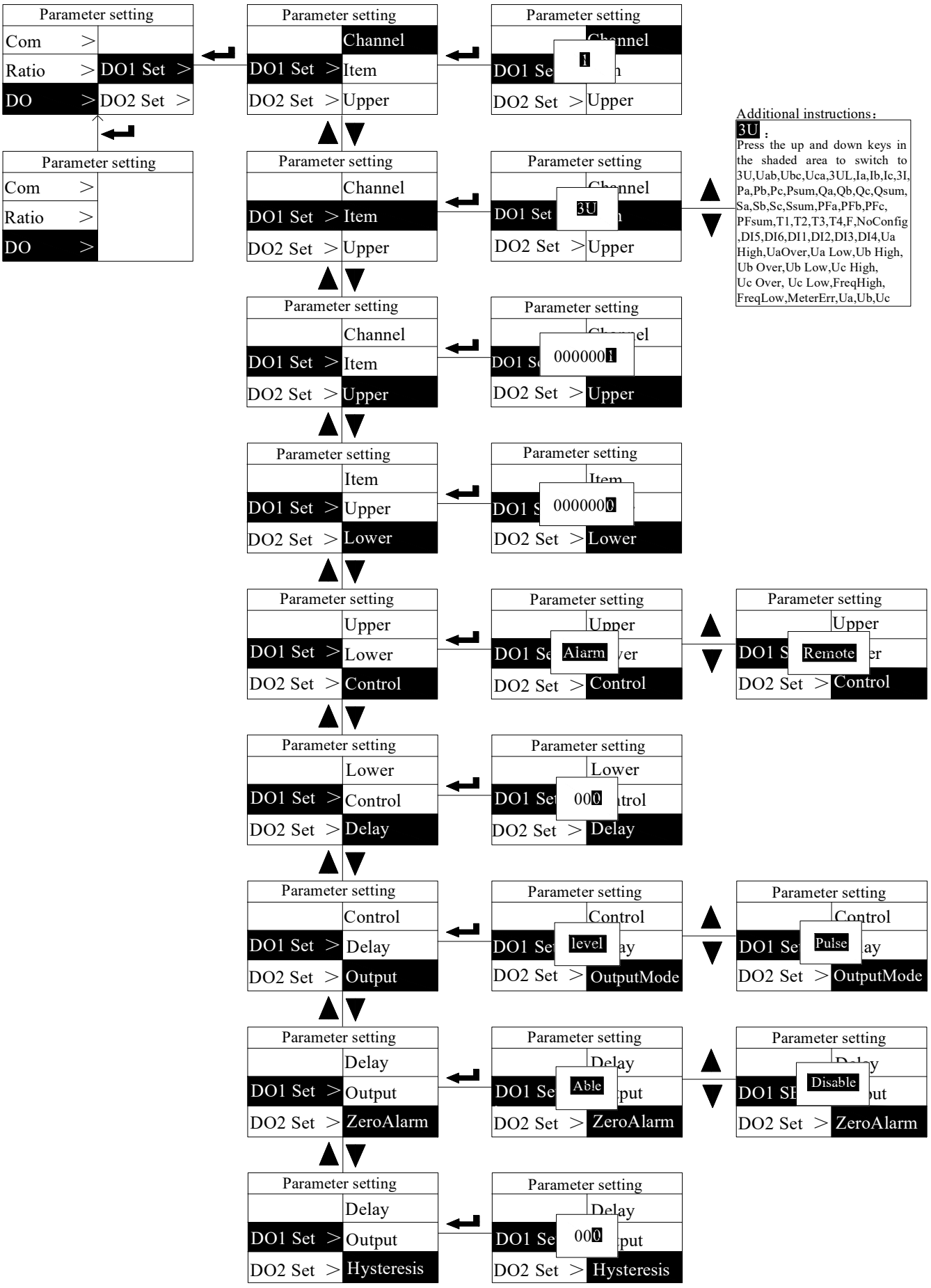
6.4.2 Ratio Parameter Setting

Press the up key or down key, move the cursor to the ratio setting, press the Enter key to see the Pt,Ct1-Ct4 five categories, then press the enter key will pop up all kinds of configurable parameters. The default voltage ratio is 1, which represents phase voltage AC 200V and line voltage AC 380V. **The current ratio can be set based on primary current. For example, the transformer specification is 200A/50mA and the current ratio is 200. The transformer specification is 50A/20mA and the current ratio is 125.**



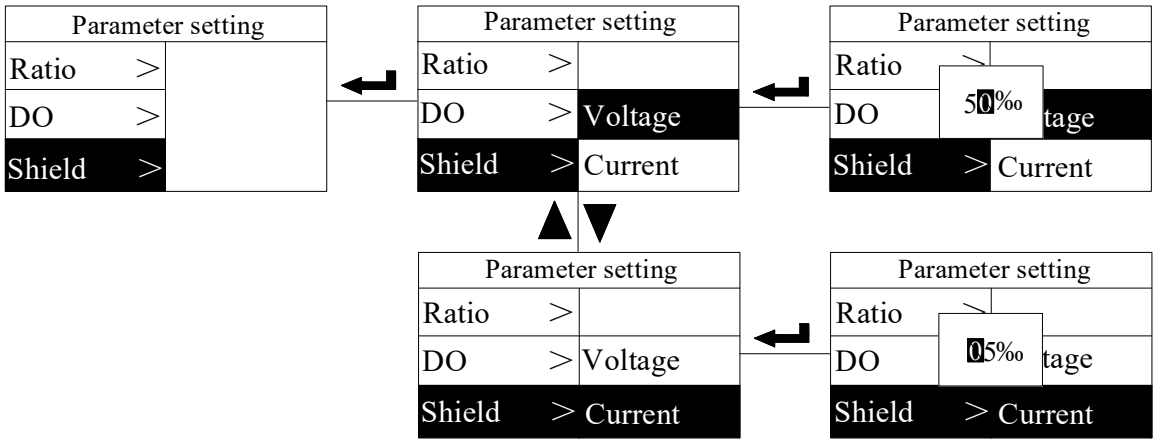
6.4.3 DO Parameter Setting

Press up or down key, move the cursor to DO setting, press Enter key to see DO1 set, DO2 set, press Enter key will pop up all kinds of configurable parameters such as channel, item, alarm upper limit, alarm lower limit, DO control, alarm delay, output mode, zero alarm enable, hysteresis. The parameters for DO1 and D02 are the same. DO mode can be set to remote control and alarm; The output can be set to both level (0 or 1) and pulse ⎍⎍⎍; Delay can be set to 1-999; The upper limit of alarm can be set to 204, the lower limit of alarm can be set to 105; All alarm options can be found in the supplementary instructions.


Parameter setting
Com >
Ratio >
DO >
DO1 Set >
DO2 Set >
Channel
Item
Upper
Lower
Control
Delay
Output
Hysteresis
ZeroAlarm
OutputMode
1
3U
000000
0
Alarm
Remote
level
Pulse
Able
Disable
000
Additional instructions:
3U :
Press the up and down keys in the shaded area to switch to 3U,Uab,Ubc,Uca,3UL,Ia,Ib,Ic,3I, Pa,Pb,Pc,Psum,Qa,Qb,Qc,Qsum, Sa,Sb,Sc,Ssum,PFa,PFb,PFc, PFsum,T1,T2,T3,T4,F,NoConfig ,DI5,DI6,DI1,DI2,DI3,DI4,Ua High,UaOver,Ua Low,Ub High, Ub Over,Ub Low,Uc High, Uc Over, Uc Low,FreqHigh, FreqLow,MeterErr,Ua,Ub,Uc

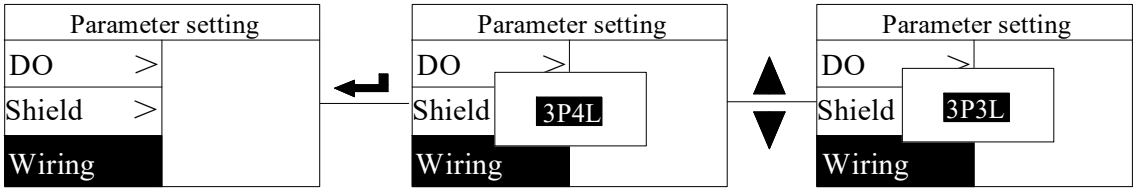
6.4.4 Shield Parameter Setting

Press the up or down key, move the cursor to the shield, and press Enter to see two categories of voltage and current.Then press the Enter key to set the voltage shield value to 50 ‰ by default,and the current shield value to 5 ‰ by default.



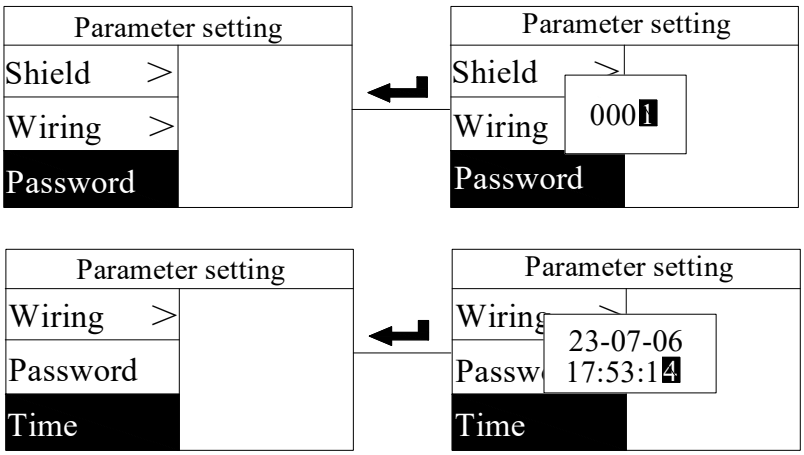
6.4.5 Wiring Method Setting

Press the Up key or down key, move the cursor to the wiring mode, press the Enter key to display the configurable mode window, press the left and right keys to switch the Settings of 3P4L(three-phase four-wire) and 3P3L(three-phase three-wire) wiring modes.



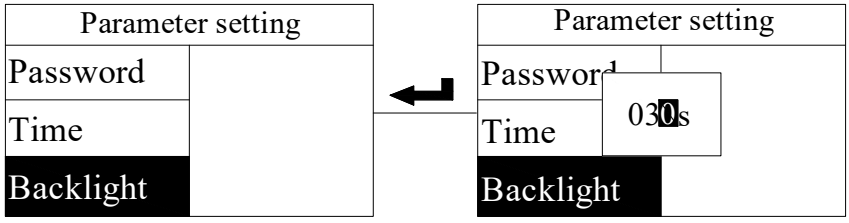
6.4.6 Password and Time Setting

Press the up key or down key to move the cursor to the password setting or time setting, and press Enter to enter the password setting or time setting interface. The password can be set to 1-9999, and the time can be set to the year, month, day, minute and second by the up or down key.



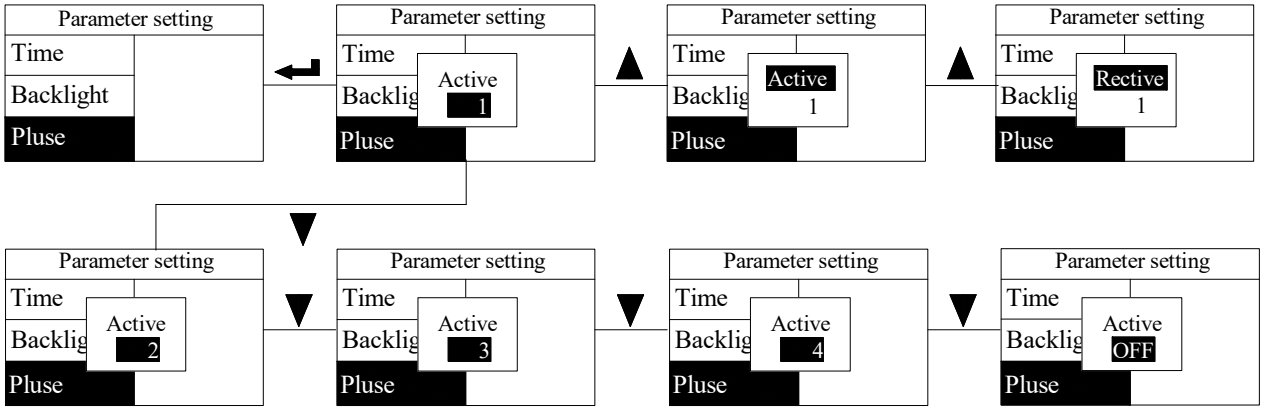
6.4.7 Backlight Time Setting

Press the up or down key to move the cursor to the backlight time, and press Enter to enter the backlight time setting interface. The backlight time can be set to 0-300s. "0" indicates that the backlight time is steady on.



6.4.8 Pulse Select Setting

Press the up or down key, move the cursor to pulse selection, press Enter to enter the pulse selection screen, you can set active pulse, reactive pulse, 1-4 indicates the pulse of a certain loop.



7 Communication Description

ADD	decimal	Content	Data Type	Byte	RE/WR	Unit	Remark
0	0	ADD	uint16_t	2	R/W		1-247
1	1	Baud	uint16_t	2	R/W		0：1200；1：2400； 2：4800； 3：9600； 4：19200；5：38400；
2	2	Check Bit	uint16_t	2	R/W		0: none 1: odd 2: even
3	3	Type	uint16_t	2	R/W		0：AMC300L_4E3;1:AMC300L_4E3_4G 2:AMC300L_4E3_NB;3:AMC300L_6E3 ; 16：AMC200_4E3；17： AMC200_4E3_4G；18： AMC200_4E3_NB；19：AMC200_8E3； 20：AMC200_8E3_4G；21： AMC200_8E3_NB；22：AMC200L_4E3； 23：AMC200L_4E3_4G；24： AMC200L_4E3_NB；25： AMC200L_8E3；26： AMC200L_8E3_4G；27： AMC200L_8E3_NB；
4	4	Wiring Method	uint16_t	2	R/W		0:3P4L 1: Reserve 2:3P3L
5	5	Channel number	uint16_t	2	R		4:4 loops 6:6 loops; 8:8 loops
6	6	Onsite storage interval	uint16_t	2	R/W	Minute	Default:15 minutes
7	7	Time	uint16_t	2	R/W		Hex Example: 0x00 0x15 -> 0x00 Give up 21 years

8	8		uint16_t	2	R/W		Hex example: 0x01 0x03-> January 3rd
9	9		uint16_t	2	R/W		Hex example: 0x03 0x15-> Wednesday at 21 o'clock
A	10		uint16_t	2	R/W		Hex example: 0x01 0x03-> One minute, three seconds
B	11	Protocol selection	uint16_t	2	R/W		0: Modbus 1: Tower protocol Default: Modbus
C	12	Page countdown	uint16_t	2	R/W	Second	Default: 180 seconds Maximum 65536 seconds
D	13	Voltage zero shield value	uint16_t	2	R/W		Example: 3 represents 3 thousandths and the range is thousandths (3-99)
E	14	Current zero shield value	uint16_t	2	R/W		Example: 3 represents 3 thousandths and the range is thousandths (3-99)
F	15	Home current display	uint16_t	2	R/W		1: The home page displays the first current
10	16	DO1 alarm upper limit	uint32_t	2	R/W		DO1 alarm upper limit value>0
11	17						
12	18	DO1 alarm lower limit	uint32_t	2	R/W		DO1 alarm upper limit value ≥ 0
13	19						
14	20	System password	uint16_t	2	R/W		1-9999
15	21	Meter reading day	uint16_t	2	R/W		Hex such as: 0x15 0x02 -> 02:00 on the 21st
16	22	Meter number	uint32_t	2	R/W		
17	23						
18	24	DO2 alarm upper limit	uint32_t	2	R/W		DO1 alarm upper limit value > 0
19	25						
1A	26	DO2 alarm lower limit	uint32_t	2	R/W		DO1 alarm upper limit value ≥ 0
1B	27						
1C	28	Backlight time	uint16_t	2	R/W	Second	The default is 30 seconds and the range is (0-300)
1D	29	Pulse constant	uint16_t	2	R/W		Default: 400
1E	30	Pulse selection	uint16_t	2	R/W		Low 8 bits: pulse selection; 0: close pulse output 1-8 which specific pulse output High 8 bits: pulse mode selection; 0: active pulse; 1: reactive pulse
1F	31	Rated Voltage	uint16_t	2	R	V	Default: 220V
20	32	Rated Current	uint16_t	2	R	A	Default: 100A
21	33	Rated Frequency	uint16_t	2	R	Hz	Default: 50Hz
22	34	DI1-6 status	uint16_t	2	R		1: closed 0: open bit0:DI5 ;bit1:DI6 bit2:DI1 bit3:DI2 ;bit4:DI3 bit5:DI4
23	35	DO1-2 status	uint16_t	2	R		1: closed 0: open bit0:DO1 ;bit8:DO2
24	36	DO1-2 control	uint16_t	2	W		1: closed 0: open bit0:DO1 ;bit8:DO2

25	37	DO1_TOWER configuration	uint32_t	4	R/W		bit0:DI5;bit1:DI6;bit2:DI1; bit3:DI2 ;bit4:DI3;bit5:DI4 bit6: Ua voltage is too high; bit7: Ua voltage is too high; bit8: Ua voltage is too low; bit9: Ub voltage is too high; bit10: Ub voltage is too high; bit11: Ub voltage is too low; bit12: Uc voltage is too high; bit13: Uc voltage is too high; bit14: Uc voltage is too low; bit15: frequency is too high; bit16: frequency is too low ; bit17: smart meter failure bit18: reserved; bit19: output (0: pulse 1: level); bit20: remote control or alarm mode selection (0: remote control 1: alarm) bit21-bit30: pulse width (s)
26	38						
27	39	DO2_TOWER configuration	uint32_t	4	R/W		bit0:DI5;bit1:DI6;bit2:DI1; bit3:DI2 ;bit4:DI3;bit5:DI4 (Priority bit0 is the highest) bit0:DI5;bit1:DI6;bit2:DI1; bit3:DI2 ;bit4:DI3;bit5:DI4 bit6: Ua voltage is too high; bit7: Ua voltage is too high bit8: Ua voltage is too low bit9: Ub voltage is too high; bit10: Ub voltage is too high bit11: Ub voltage is too low bit12: Uc voltage is too high; bit13: Uc voltage is too high bit14: Uc voltage is too low bit15: frequency is too high; bit16: frequency is too low bit17: smart meter failure bit18: reserved; bit19: output (0: pulse 1: level); bit20: remote control or alarm mode selection (0: remote control 1: alarm) bit21-bit30: pulse width (s)
28	40						
29	41	PT ratio	uint16_t	2	R/W		
2A	42	CT1	uint16_t	2	R/W		
2B	43	CT2	uint16_t	2	R/W		
2C	44	CT3	uint16_t	2	R/W		
2D	45	CT4	uint16_t	2	R/W		
2E	46	CT5	uint16_t	2	R/W		

2F	47	CT6		uint16_t	2	R/W		
30	48	CT7		uint16_t	2	R/W		
31	49	CT8		uint16_t	2	R/W		
32	50	Print log flag		uint16_t	2	R/W		1: On; 0: Off
33	51	IP		uint16_t	2	R/W		Example: 0x23 0x70 0x1A 0x1E means IP: 112.35.30.26
34	52							
35	53	Port		uint16_t	2	R/W		Example: 0x1ADF means port number: 6879
36	54	RSSI		uint16_t	2	R		Signal value
37	55	Link 1 tag		uint16_t	2	R		Connect to Acrel Fire Cloud Platform flag 1: Link 0: Not connected
38	56	Switch status	Grid loop power supply status	uint16_t	2	R		00H: Power on; 01H: Power off; 02H: not configured
39	57		Grid loop switch status	uint16_t	2	R		00H: close; 01H: open; 02H: not configured
3A	58		Engine loop power supply status	uint16_t	2	R		00H: Power on; 01H: Power off; 02H: not configured
3B	59		Engine LOOP switch status	uint16_t	2	R		00H: close; 01H: open; 02H: not configured
3C	60	Gateway Serial ID	SN	char	20	R/W		The SN number is 14 digits and the last 6 digits are reserved Default: acrel000000001000000 The high bit in the register is followed by the low bit; example: the sixteen-bit data stored in register 60 is 0x636
3D	61							
3E	62							
3F	63							
40	64							
41	65							
42	66							
43	67							
44	68							
45	69							
46	70	Reserve						
47	71	Clear data		uint16_t	2	W		Clear power: 0x6601: the first channel 0x6602: the second channel and so on; 0x66FF: all Clear historical data: 0x7701: 15-minute historical data 0x7702: Daily zero-hour historical data; 0x7703: Alarm historical data 0x7704: Meter reading day historical data; 0x7705: Monthly frozen historical data 0x77FF: all
48	72		AC voltage	uint32_t	4	R/W	V	Default: 265

49	73	Electrical parameter threshold	high threshold					
4A	74		AC voltage ultra-high threshold	uint32_t	4	R/W	V	Default:275
4B	75							
4C	76		AC current low Threshold	uint32_t	4	R/W	V	Default:175
4D	77							
4E	78		AC frequency input upper limit	uint32_t	4	R/W	Hz	Default:55
4F	79							
50	80		AC frequency input lower limit	uint32_t	4	R/W	Hz	Default:45
51	81							
52	82	Temperature	Temperature T1	uint16_t	2	R	℃	NTC miss connection display -100°C short connection display -200°C
53	83		Temperature T2	uint16_t	2	R	℃	NTC miss connection display -100°C short connection display -200°C
54	84		Temperature T3	uint16_t	2	R	℃	NTC miss connection display -100°C short connection display -200°C
55	85		Temperature T4	uint16_t	2	R	℃	NTC miss connection display -100°C short connection display -200°C
56	**86**	**Tempearture and humidity**	**Temperature**	**float**	**4**	**R**	**℃**	**Unconnected display 9999°C**
57	**87**							
58	**88**		**Humidity**	**float**	**4**	**R**	**%**	**Missed show 9999%**
59	**89**							
5A	90	Software	Software Number	uint16_t	2	R		Hex such as: 0x07 0x1F -> 1823
5B	91		Version number	uint16_t	2	R		Hex such as: 0x00 0x64 ->V100
5C	92	DO1_Modbus Configuration_1		uint16_t	2	R/W		(Priority bit0 is the highest) bit0:UA; bit1:UB; bit2:UC; bit3:Umax; bit4:UAB; bit5:UBC; bit6:UCA; bit7:U`max; bit8:IA; bit9:IB; bit10:IC; bit11:Imax; bit12:PA; bit13:PB; bit14:PC; bit15:Psum;
5D	93	DO1_Modbus configuration_2		uint16_t	2	R/W		(Priority bit0 is the highest) bit0:QA; bit1:QB; bit2:QC; bit3:Qsum; bit4:SA; bit5:SB; bit6:SC; bit7:Ssum; bit8:PFA; bit9:PFB; bit10:PFC;

							bit11:PFsum; bit12:T1; bit13:T2; bit14:T3; bit15:T4;
5E	94	DO1_Modbus Configuration_3	uint16_t	2	R/W		bit0:F; bit1: zero alarm enable; bit2: reserved; bit3: reserved; bit4-bit11: alarm hysteresis; bit12-bit15: loop number;
5F	95	DO2_Modbus Configuration_1	uint16_t	2	R/W		(Priority bit0 is the highest) (Priority bit0 is the highest) bit0:UA; bit1:UB; bit2:UC; bit3:Umax; bit4:UAB; bit5:UBC; bit6:UCA; bit7:U`max; bit8:IA; bit9:IB; bit10:IC; bit11:Imax; bit12:PA; bit13:PB; bit14:PC; bit15:Psum;
60	96	DO2_Modbus Configuration_2	uint16_t	2	R/W		(Priority bit0 is the highest) bit0:QA; bit1:QB; bit2:QC; bit3:Qsum; bit4:SA; bit5:SB; bit6:SC; bit7:Ssum; bit8:PFA; bit9:PFB; bit10:PFC; bit11:PFsum; bit12:T1; bit13:T2; bit14:T3; bit15:T4;
61	97	DO2_Modbus configuration_3	uint16_t	2	R/W		bit0:F; bit1: zero alarm enable; bit2: reserved; bit3: reserved; bit4-bit11: alarm hysteresis; bit12-bit15: loop number;

Loop 1-2 telemetry data

ADD	Decimal	Content		Data Type	Byte	RE/WR	Unit	Remark
6A	106	First Loop	AB line AC voltage Uab	float	4	R	V	
6B	107							
6C	108		BC line AC voltage Ubc	float	4	R	V	
6D	109							
6E	110		CA line AC voltage Uca	float	4	R	V	
6F	111							
70	112		A phase AC voltage Ua	float	4	R	V	
71	113							
72	114		B phase AC voltage Ub	float	4	R	V	

73	115							
74	116		C phase AC voltage Uc	float	4	R	V	
75	117							
76	118		A phase AC current Ia	float	4	R	A	
77	119							
78	120		B Phase AC current Ib	float	4	R	A	
79	121							
7A	122		C Phase AC current Ic	float	4	R	A	
7B	123							
7C	124		Zero sequence current Io	float	4	R	A	
7D	125							
7E	126		Total power factor PF	float	4	R		
7F	127							
80	128		A phase power factor PFa	float	4	R		
81	129							
82	130		B phase power factor PFb	float	4	R		
83	131							
84	132		C phase power factor PFc	float	4	R		
85	133							
86	134		Frequency F	float	4	R	Hz	
87	135							
88	136		Total active power psum	float	4	R	kW	
89	137							
8A	138		A Phase active power pa	float	4	R	kW	
8B	139							
8C	140		B Phase active power pa	float	4	R	kW	
8D	141							
8E	142		C Phase active power pa	float	4	R	kW	Phase A apparent power
8F	143							
90	144		Total reactive power qsum	float	4	R	kvar	
91	145							
92	146		A phase reactive power qa	float	4	R	kvar	
93	147							
94	148		B phase reactive power qb	float	4	R	kvar	
95	149							
96	150		C phase reactive power qc	float	4	R	kvar	
97	151							
98	152		Total apparent power	float	4	R	kVA	
99	153							
9A	154		A phase apparent power	float	4	R	kVA	
9B	155							
9C	156		B phase apparent power	float	4	R	kVA	
9D	157							

9E	158		C phase apparent power	float	4	R	kVA	
9F	159							
A0	160		Total active energy eps	float	4	R	kWh	
A1	161							
A2	162		A phase total active energy epa	float	4	R	kWh	
A3	163							
A4	164		B phase total active energy epb	float	4	R	kWh	
A5	165							
A6	166		C phase total active energy epc	float	4	R	kWh	
A7	167							
A8	168		Total reactive energy eqs	float	4	R	kvarh	
A9	169							
AA	170		A phase total reactive energy eqa	float	4	R	kvarh	
AB	171							
AC	172		B phase total reactive energy eqb	float	4	R	kvarh	
AD	173							
AE	174		C phase total reactive energy eqc	float	4	R	kvarh	
AF	175							
B0	176		Forward total active energy epsp	float	4	R	kWh	
B1	177							
B2	178		Forward A phase total active energy epap	float	4	R	kWh	
B3	179							
B4	180		Forward B phase total active energy epbp	float	4	R	kWh	
B5	181							
B6	182		Forward C phase total active energy epcp	float	4	R	kWh	
B7	183							
B8	184		Reverse total active energy epsn	float	4	R	kWh	
B9	185							
BA	186		Reverse phase A total active energy epan	float	4	R	kWh	
BB	187							
BC	188		Reverse phase B total active energy epbn	float	4	R	kWh	
BD	189							
BE	190		Reverse phase C total active energy epcn	float	4	R	kWh	
BF	191							
C0	192		Forward total reactive energy eqsp	float	4	R	kvarh	
C1	193							
C2	194		Forward A-phase total reactive energy eqap	float	4	R	kvarh	
C3	195							
C4	196		Forward B-phase total reactive energy eqbp	float	4	R	kvarh	
C5	197							
C6	198		Forward C-phase total reactive energy eqcp	float	4	R	kvarh	
C7	199							
C8	200		Reverse total reactive energy eqsn	float	4	R	kvarh	
C9	201							

CA	202		Reverse A phase total reactive energy eqan	float	4	R	kvarh	
CB	203							
CC	204		Reverse B phase total reactive energy eqbn	float	4	R	kvarh	
CD	205							
CE	206		Reverse C phase total reactive energy eqcn	float	4	R	kvarh	
CF	207							
D0	208	Second Loop	AB line AC voltage Uab	float	4	R	V	
D1	209							
D2	210		BC line AC voltage Ubc	float	4	R	V	
D3	211							
D4	212		CA line AC voltage Uca	float	4	R	V	
D5	213							
D6	214		A phase AC voltage Ua	float	4	R	V	
D7	215							
D8	216		B phase AC voltage Ub	float	4	R	V	
D9	217							
DA	218		C phase AC voltage Uc	float	4	R	V	
DB	219							
DC	220		Phase A AC current Ia	float	4	R	A	
DD	221							
DE	222		Phase B AC current Ib	float	4	R	A	
DF	223							
E0	224		Phase C AC current Ic	float	4	R	A	
E1	225							
E2	226		Zero sequence current Io	float	4	R	A	
E3	227							
E4	228		Total power factor PF	float	4	R		
E5	229							
E6	230		A phase power factor PFa	float	4	R		
E7	231							
E8	232		Phase B power factor PFb	float	4	R		
E9	233							
EA	234		C phase power factor PFc	float	4	R		
EB	235							
EC	236		Frequency F	float	4	R	Hz	
ED	237							
EE	238		Total active power	float	4	R	kW	
EF	239							
F0	240		A phase active power	float	4	R	kW	
F1	241							
F2	242		B phase active power	float	4	R	kW	
F3	243							
F4	244		C phase active power	float	4	R	kW	
F5	245							

F6	246		Total reactive power	float	4	R	kvar	
F7	247							
F8	248		A phase reactive power	float	4	R	kvar	
F9	249							
FA	250		B phase reactive power	float	4	R	kvar	
FB	251							
FC	252		C phase reactive power	float	4	R	kvar	
FD	253							
FE	254		Total apparent power	float	4	R	kVA	
FF	255							
100	256		A phase apparent power	float	4	R	kVA	
101	257							
102	258		B phase apparent power	float	4	R	kVA	
103	259							
104	260		C phase apparent power	float	4	R	kVA	
105	261							
106	262		Total active energy eps	float	4	R	kWh	
107	263							
108	264		A phase total active energy epa	float	4	R	kWh	
109	265							
10A	266		B phase total active energy epb	float	4	R	kWh	
10B	267							
10C	268		C phase total active energy epc	float	4	R	kWh	
10D	269							
10E	270		Total reactive energy eqs	float	4	R	kvarh	
10F	271							
110	272		A phase total reactive energy eqa	float	4	R	kvarh	
111	273							
112	274		B phase total reactive energy eqb	float	4	R	kvarh	
113	275							
114	276		C phase total reactive energy eqc	float	4	R	kvarh	
115	277							
116	278		Forward total active energy epsp	float	4	R	kWh	
117	279							
118	280		Forward A phase total active energy epap	float	4	R	kWh	
119	281							
11A	282		Forward B phase total active energy epbp	float	4	R	kWh	
11B	283							
11C	284		Forward C phase total active energy epcp	float	4	R	kWh	
11D	285							
11E	286		Reverse total active energy epsn	float	4	R	kWh	
11F	287							
120	288		Reverse phase A total active energy epan	float	4	R	kWh	
121	289							

122	290		Reverse phase B total active energy epbn	float	4	R	kWh	
123	291							
124	292		Reverse phase C total active energy epcn	float	4	R	kWh	
125	293							
126	294		Forward total reactive energy eqsp	float	4	R	kvarh	
127	295							
128	296		Forward A-phase total reactive energy eqap	float	4	R	kvarh	
129	297							
12A	298		Forward B-phase total reactive energy eqbp	float	4	R	kvarh	
12B	299							
12C	300		Forward C-phase total reactive energy eqcp	float	4	R	kvarh	
12D	301							
12E	302		Reverse total reactive energy eqsn	float	4	R	kvarh	
12F	303							
130	304		Reverse A phase total reactive energy eqan	float	4	R	kvarh	
131	305							
132	306		Reverse B phase total reactive energy eqbn	float	4	R	kvarh	
133	307							
134	308		Reverse C phase total reactive energy eqcn	float	4	R	kvarh	
135	309							

Loop 3-4 Telemetry Data

ADD	Decimal	Content		Data Type	Byte	RE/WR	Unit	Remark
136	310	Third Loop	AB line AC voltage Uab	float	4	R	V	
137	311							
138	312		BC line AC voltage Ubc	float	4	R	V	
139	313							
13A	314		CA line AC voltage Uca	float	4	R	V	
13B	315							
13C	316		A phase AC voltage Ua	float	4	R	V	
13D	317							
13E	318		B phase AC voltage Ub	float	4	R	V	
13F	319							
140	320		C phase AC voltage Uc	float	4	R	V	
141	321							
142	322		A phase AC current Ia	float	4	R	A	
143	323							
144	324		B Phase AC current Ib	float	4	R	A	
145	325							
146	326		C Phase AC current Ic	float	4	R	A	
147	327							
148	328		Zero sequence current Io	float	4	R	A	
149	329							
14A	330		Total power factor PF	float	4	R		

14B	331							
14C	332		A phase power factor PFa	float	4	R		
14D	333							
14E	334		B phase power factor PFb	float	4	R		
14F	335							
150	336		C phase power factor PFc	float	4	R		
151	337							
152	338		Frequency F	float	4	R	Hz	
153	339							
154	340		Total active power psum	float	4	R	kW	
155	341							
156	342		A Phase active power	float	4	R	kW	
157	343							
158	344		B Phase active power	float	4	R	kW	
159	345							
15A	346		C Phase active power	float	4	R	kW	
15B	347							
15C	348		Total reactive power qsum	float	4	R	kvar	
15D	349							
15E	350		A phase reactive power	float	4	R	kvar	
15F	351							
160	352		B phase reactive power	float	4	R	kvar	
161	353							
162	354		C phase reactive power	float	4	R	kvar	
163	355							
164	356		Total apparent power	float	4	R	kVA	
165	357							
166	358		A phase apparent power	float	4	R	kVA	
167	359							
168	360		B phase apparent power	float	4	R	kVA	
169	361							
16A	362		C phase apparent power	float	4	R	kVA	
16B	363							
16C	364		Total active energy eps	float	4	R	kWh	
16D	365							
16E	366		A phase total active energy epa	float	4	R	kWh	
16F	367							
170	368		B phase total active energy epb	float	4	R	kWh	
171	369							
172	370		C phase total active energy epC	float	4	R	kWh	
173	371							
174	372		Total reactive energy eqs	float	4	R	kvarh	
175	373							
176	374		A phase total reactive energy eqa	float	4	R	kvarh	

177	375							
178	376		B phase total reactive energy eqb	float	4	R	kvarh	
179	377							
17A	378		C phase total reactive energy eqc	float	4	R	kvarh	
17B	379							
17C	380		Forward total active energy epsp	float	4	R	kWh	
17D	381							
17E	382		Forward A phase total active energy epap	float	4	R	kWh	
17F	383							
180	384		Forward B phase total active energy epbp	float	4	R	kWh	
181	385							
182	386		Forward C phase total active energy epcp	float	4	R	kWh	
183	387							
184	388		Reverse total active energy epsn	float	4	R	kWh	
185	389							
186	390		Reverse phase A total active energy epan	float	4	R	kWh	
187	391							
188	392		Reverse phase B total active energy epbn	float	4	R	kWh	
189	393							
18A	394		Reverse phase C total active energy epcn	float	4	R	kWh	
18B	395							
18C	396		Forward total reactive energy eqsp	float	4	R	kvarh	
18D	397							
18E	398		Forward A-phase total reactive energy eqap	float	4	R	kvarh	
18F	399							
190	400		Forward B-phase total reactive energy eqbp	float	4	R	kvarh	
191	401							
192	402		Forward C-phase total reactive energy eqcp	float	4	R	kvarh	
193	403							
194	404		Reverse total reactive energy eqsn	float	4	R	kvarh	
195	405							
196	406		Reverse A phase total reactive energy eqan	float	4	R	kvarh	
197	407							
198	408		Reverse B phase total reactive energy eqbn	float	4	R	kvarh	
199	409							
19A	410		Reverse C phase total reactive energy eqcn	float	4	R	kvarh	
19B	411							
19C	412	Forth Loop	AB line AC voltage Uab	float	4	R	V	
19D	413							
19E	414		BC line AC voltage Ubc	float	4	R	V	
19F	415							
1A0	416		CA line AC voltage Uca	float	4	R	V	
1A1	417							
1A2	418		A phase AC voltage Ua	float	4	R	V	

1A3	419							
1A4	420		B phase AC voltage Ub	float	4	R	V	
1A5	421							
1A6	422		C phase AC voltage Uc	float	4	R	V	
1A7	423							
1A8	424		Phase A AC current Ia	float	4	R	A	
1A9	425							
1AA	426		Phase B AC current Ib	float	4	R	A	
1AB	427							
1AC	428		Phase C AC current Ic	float	4	R	A	
1AD	429							
1AE	430		Zero sequence current Io	float	4	R	A	
1AF	431							
1B0	432		Total power factor PF	float	4	R		
1B1	433							
1B2	434		A phase power factor PFa	float	4	R		
1B3	435							
1B4	436		B phase power factor PFb	float	4	R		
1B5	437							
1B6	438		C phase power factor PFc	float	4	R		
1B7	439							
1B8	440		Frequency F	float	4	R	Hz	
1B9	441							
1BA	442		Total active power	float	4	R	kW	
1BB	443							
1BC	444		A phase active power	float	4	R	kW	
1BD	445							
1BE	446		B phase active power	float	4	R	kW	
1BF	447							
1C0	448		C phase active power	float	4	R	kW	
1C1	449							
1C2	450		Total reactive power	float	4	R	kvar	
1C3	451							
1C4	452		A phase reactive power	float	4	R	kvar	
1C5	453							
1C6	454		B phase reactive power	float	4	R	kvar	
1C7	455							
1C8	456		C phase reactive power	float	4	R	kvar	
1C9	457							
1CA	458		Total apparent power	float	4	R	kVA	
1CB	459							
1CC	460		A phase apparent power	float	4	R	kVA	
1CD	461							
1CE	462		B phase apparent power	float	4	R	kVA	

1CF	463							
1D0	464		C phase apparent power	float	4	R	kVA	
1D1	465							
1D2	466		Total active energy eps	float	4	R	kWh	
1D3	467							
1D4	468		A phase total active energy epa	float	4	R	kWh	
1D5	469							
1D6	470		B phase total active energy epb	float	4	R	kWh	
1D7	471							
1D8	472		C phase total active energy epc	float	4	R	kWh	
1D9	473							
1DA	474		Total reactive energy eqs	float	4	R	kvarh	
1DB	475							
1DC	476		A phase total reactive energy eqa	float	4	R	kvarh	
1DD	477							
1DE	478		B phase total reactive energy eqb	float	4	R	kvarh	
1DF	479							
1E0	480		C phase total reactive energy eqc	float	4	R	kvarh	
1E1	481							
1E2	482		Forward total active energy epsp	float	4	R	kWh	
1E3	483							
1E4	484		Forward A phase total active energy epap	float	4	R	kWh	
1E5	485							
1E6	486		Forward B phase total active energy epbp	float	4	R	kWh	
1E7	487							
1E8	488		Forward C phase total active energy epcp	float	4	R	kWh	
1E9	489							
1EA	490		Reverse total active energy epsn	float	4	R	kWh	
1EB	491							
1EC	492		Reverse phase A total active energy epan	float	4	R	kWh	
1ED	493							
1EE	494		Reverse phase B total active energy epbn	float	4	R	kWh	
1EF	495							
1F0	496		Reverse phase C total active energy epcn	float	4	R	kWh	
1F1	497							
1F2	498		Forward total reactive energy eqsp	float	4	R	kvarh	
1F3	499							
1F4	500		Forward A-phase total reactive energy eqap	float	4	R	kvarh	
1F5	501							
1F6	502		Forward B-phase total reactive energy eqbp	float	4	R	kvarh	
1F7	503							
1F8	504		Forward C-phase total reactive energy eqcp	float	4	R	kvarh	
1F9	505							
1FA	506		Forward C-phase total reactive energy eqcp	float	4	R	kvarh	

1FB	507							
1FC	508		Reverse A phase total reactive energy eqan	float	4	R	kvarh	
1FD	509							
1FE	510		Reverse B phase total reactive energy eqbn	float	4	R	kvarh	
1FF	511							
200	512		Reverse C phase total reactive energy eqcn	float	4	R	kvarh	
201	513							

Loop 5-6 Telemetry Data

ADD	Decimal	Content		Data Type	Byte	RE/WR	Unit	Remark
202	514	Fifth Loop	AB line AC voltage Uab	float	4	R	V	
203	515							
204	516		BC line AC voltage Ubc	float	4	R	V	
205	517							
206	518		CA line AC voltage Uca	float	4	R	V	
207	519							
208	520		A phase AC voltage Ua	float	4	R	V	
209	521							
20A	522		B phase AC voltage Ub	float	4	R	V	
20B	523							
20C	524		C phase AC voltage Uc	float	4	R	V	
20D	525							
20E	526		A phase AC current Ia	float	4	R	A	
20F	527							
210	528		B Phase AC current Ib	float	4	R	A	
211	529							
212	530		C Phase AC current Ic	float	4	R	A	
213	531							
214	532		Zero sequence current Io	float	4	R	A	
215	533							
216	534		Total power factor PF	float	4	R		
217	535							
218	536		A phase power factor PFa	float	4	R		
219	537							
21A	538		B phase power factor PFb	float	4	R		
21B	539							
21C	540		C phase power factor PFc	float	4	R		
21D	541							
21E	542		Frequency F	float	4	R	Hz	
21F	543							
220	544		Total active power	float	4	R	kW	
221	545							
222	546		A Phase active power	float	4	R	kW	

223	547							
224	548		B Phase active power	float	4	R	kW	
225	549							
226	550		C Phase active power pa	float	4	R	kW	
227	551							
228	552		Total reactive power qsum	float	4	R	kvar	
229	553							
22A	554		A phase reactive power qa	float	4	R	kvar	
22B	555							
22C	556		B phase reactive power	float	4	R	kvar	
22D	557							
22E	558		C phase reactive power	float	4	R	kvar	
22F	559							
230	560		Total apparent power	float	4	R	kVA	
231	561							
232	562		A phase apparent power	float	4	R	kVA	
233	563							
234	564		B phase apparent power	float	4	R	kVA	
235	565							
236	566		C phase apparent power	float	4	R	kVA	
237	567							
238	568		Total active energy eps	float	4	R	kWh	
239	569							
23A	570		A phase total active energy epa	float	4	R	kWh	
23B	571							
23C	572		B phase total active energy epb	float	4	R	kWh	
23D	573							
23E	574		C phase total active energy epc	float	4	R	kWh	
23F	575							
240	576		Total reactive energy eqs	float	4	R	kvarh	
241	577							
242	578		A phase total reactive energy eqa	float	4	R	kvarh	
243	579							
244	580		B phase total reactive energy eqb	float	4	R	kvarh	
245	581							
246	582		C phase total reactive energy eqc	float	4	R	kvarh	
247	583							
248	584		Forward total active energy epsp	float	4	R	kWh	
249	585							
24A	586		Forward A phase total active energy epap	float	4	R	kWh	
24B	587							
24C	588		Forward B phase total active energy epbp	float	4	R	kWh	
24D	589							
24E	590		Forward C phase total	float	4	R	kWh	

24F	591		active energy epcp					
250	592		Reverse total active energy epsn	float	4	R	kWh	
251	593							
252	594		Reverse phase A total active energy epan	float	4	R	kWh	
253	595							
254	596		Reverse phase B total active energy epbn	float	4	R	kWh	
255	597							
256	598		Reverse phase C total active energy epcn	float	4	R	kWh	
257	599							
258	600		Forward total reactive energy eqsp	float	4	R	kvarh	
259	601							
25A	602		Forward A-phase total reactive energy eqap	float	4	R	kvarh	
25B	603							
25C	604		Forward B-phase total reactive energy eqbp	float	4	R	kvarh	
25D	605							
25E	606		Forward C-phase total reactive energy eqcp	float	4	R	kvarh	
25F	607							
260	608		Reverse total reactive energy eqsn	float	4	R	kvarh	
261	609							
262	610		Reverse A phase total reactive energy eqan	float	4	R	kvarh	
263	611							
264	612		Reverse B phase total reactive energy eqbn	float	4	R	kvarh	
265	613							
266	614		Reverse C phase total reactive energy eqcn	float	4	R	kvarh	
267	615							
268	616	Sixth Loop	AB line AC voltage Uab	float	4	R	V	
269	617							
26A	618		BC line AC voltage Ubc	float	4	R	V	
26B	619							
26C	620		CA line AC voltage Uca	float	4	R	V	
26D	621							
26E	622		A phase AC voltage Ua	float	4	R	V	
26F	623							
270	624		B phase AC voltage Ub	float	4	R	V	
271	625							
272	626		C phase AC voltage Uc	float	4	R	V	
273	627							
274	628		A phase AC current Ia	float	4	R	A	
275	629							
276	630		B phase AC current Ib	float	4	R	A	
277	631							
278	632		C phase AC current Ic	float	4	R	A	
279	633							
27A	634		Zero sequence current Io	float	4	R	A	

27B	635							
27C	636		Total power factor PF	float	4	R		
27D	637							
27E	638		A phase power factor PFa	float	4	R		
27F	639							
280	640		B Phase power factor PFb	float	4	R		
281	641							
282	642		C phase power factor PFc	float	4	R		
283	643							
284	644		Frequency F	float	4	R	Hz	
285	645							
286	646		Total active power	float	4	R	kW	
287	647							
288	648		A phase active power	float	4	R	kW	
289	649							
28A	650		B phase active power	float	4	R	kW	
28B	651							
28C	652		C phase active power	float	4	R	kW	
28D	653							
28E	654		Total reactive power	float	4	R	kvar	
28F	655							
290	656		A phase reactive power	float	4	R	kvar	
291	657							
292	658		B phase reactive power	float	4	R	kvar	
293	659							
294	660		C phase reactive power	float	4	R	kvar	
295	661							
296	662		Total apparent power	float	4	R	kVA	
297	663							
298	664		A phase apparent power	float	4	R	kVA	
299	665							
29A	666		B phase apparent power	float	4	R	kVA	
29B	667							
29C	668		C phase apparent power	float	4	R	kVA	
29D	669							
29E	670		Total active energy eps	float	4	R	kWh	
29F	671							
2A0	672		A phase total active energy epa	float	4	R	kWh	
2A1	673							
2A2	674		B phase total active energy epb	float	4	R	kWh	
2A3	675							
2A4	676		C phase total active energy epc	float	4	R	kWh	
2A5	677							
2A6	678		Total reactive energy eqs	float	4	R	kvarh	

2A7	679							
2A8	680		A phase total reactive energy eqa	float	4	R	kvarh	
2A9	681							
2AA	682		B phase total reactive energy eqb	float	4	R	kvarh	
2AB	683							
2AC	684		C phase total reactive energy eqc	float	4	R	kvarh	
2AD	685							
2AE	686		Forward total active energy epsp	float	4	R	kWh	
2AF	687							
2B0	688		Forward A phase total active energy epap	float	4	R	kWh	
2B1	689							
2B2	690		Forward B phase total active energy epbp	float	4	R	kWh	
2B3	691							
2B4	692		Forward C phase total active energy epcp	float	4	R	kWh	
2B5	693							
2B6	694		Reverse total active energy epsn	float	4	R	kWh	
2B7	695							
2B8	696		Reverse phase A total active energy epan	float	4	R	kWh	
2B9	697							
2BA	698		Reverse phase B total active energy epbn	float	4	R	kWh	
2BB	699							
2BC	700		Reverse phase C total active energy epcn	float	4	R	kWh	
2BD	701							
2BE	702		Forward total reactive energy eqsp	float	4	R	kvarh	
2BF	703							
2C0	704		Forward A-phase total reactive energy eqap	float	4	R	kvarh	
2C1	705							
2C2	706		Forward B-phase total reactive energy eqbp	float	4	R	kvarh	
2C3	707							
2C4	708		Forward C-phase total reactive energy eqcp	float	4	R	kvarh	
2C5	709							
2C6	710		Reverse total reactive energy eqsn	float	4	R	kvarh	
2C7	711							
2C8	712		Reverse A phase total reactive energy eqan	float	4	R	kvarh	
2C9	713							
2CA	714		Reverse B phase total reactive energy eqbn	float	4	R	kvarh	
2CB	715							
2CC	716		Reverse C phase total reactive energy eqcn	float	4	R	kvarh	
2CD	717							

Loop 7-8 telemetry data

ADD	Decimal	Content		Data Type	Byte	RE/WR	Unit	Remark
2EE	750	Sevent	AB line AC voltage Uab	float	4	R	V	

2EF	751	h Loop						
2F0	752		BC line AC voltage Ubc	float	4	R	V	
2F1	753							
2F2	754		CA line AC voltage Uca	float	4	R	V	
2F3	755							
2F4	756		A phase AC voltage Ua	float	4	R	V	
2F5	757							
2F6	758		B phase AC voltage Ub	float	4	R	V	
2F7	759							
2F8	760		C phase AC voltage Uc	float	4	R	V	
2F9	761							
2FA	762		A phase AC current Ia	float	4	R	A	
2FB	763							
2FC	764		B phase AC current Ib	float	4	R	A	
2FD	765							
2FE	766		C phase AC current Ic	float	4	R	A	
2FF	767							
300	768		Zero sequence current Io	float	4	R	A	
301	769							
302	770		Total power factor PF	float	4	R		
303	771							
304	772		A phase power factor PFa	float	4	R		
305	773							
306	774		B phase power factor PFb	float	4	R		
307	775							
308	776		C phase power factor PFc	float	4	R		
309	777							
30A	778		Frequency F	float	4	R	Hz	
30B	779							
30C	780		Total active power	float	4	R	kW	
30D	781							
30E	782		A Phase active power	float	4	R	kW	
30F	783							
310	784		B phase active power	float	4	R	kW	
311	785							
312	786		C phase active power	float	4	R	kW	
313	787							
314	788		Total reactive power	float	4	R	kvar	
315	789							
316	790		A phase reactive power	float	4	R	kvar	
317	791							
318	792		B phase reactive power	float	4	R	kvar	
319	793							
31A	794		C phase reactive power	float	4	R	kvar	

31B	795							
31C	796		Total apparent power	float	4	R	kVA	
31D	797							
31E	798		A phase apparent power	float	4	R	kVA	
31F	799							
320	800		B phase apparent power	float	4	R	kVA	
321	801							
322	802		C phase apparent power	float	4	R	kVA	
323	803							
324	804		Total active energy eps	float	4	R	kWh	
325	805							
326	806		A phase total active energy epa	float	4	R	kWh	
327	807							
328	808		B phase total active energy epb	float	4	R	kWh	
329	809							
32A	810		C phase total active energy epc	float	4	R	kWh	
32B	811							
32C	812		Total reactive energy eqs	float	4	R	kvarh	
32D	813							
32E	814		A phase total reactive energy eqa	float	4	R	kvarh	
32F	815							
330	816		B phase total reactive energy eqb	float	4	R	kvarh	
331	817							
332	818		C phase total reactive energy eqc	float	4	R	kvarh	
333	819							
334	820		Forward total active energy epsp	float	4	R	kWh	
335	821							
336	822		Forward A phase total active energy epap	float	4	R	kWh	
337	823							
338	824		Forward B phase total active energy epbp	float	4	R	kWh	
339	825							
33A	826		Forward C phase total active energy epcp	float	4	R	kWh	
33B	827							
33C	828		Reverse total active energy epsn	float	4	R	kWh	
33D	829							
33E	830		Reverse phase A total active energy epan	float	4	R	kWh	
33F	831							
340	832		Reverse phase B total active energy epbn	float	4	R	kWh	
341	833							
342	834		Reverse phase C total active energy epcn	float	4	R	kWh	
343	835							
344	836		Forward total reactive energy eqsp	float	4	R	kvarh	
345	837							
346	838		Forward A-phase total	float	4	R	kvarh	

347	839		reactive energy eqap					
348	840		Forward B-phase total reactive energy eqbp	float	4	R	kvarh	
349	841							
34A	842		Forward C-phase total reactive energy eqcp	float	4	R	kvarh	
34B	843							
34C	844		Reverse total reactive energy eqsn	float	4	R	kvarh	
34D	845							
34E	846		Reverse A phase total reactive energy eqan	float	4	R	kvarh	
34F	847							
350	848		Reverse B phase total reactive energy eqbn	float	4	R	kvarh	
351	849							
352	850		Reverse C phase total reactive energy eqcn	float	4	R	kvarh	
353	851							
354	852	Eighth Loop	AB line AC voltage Uab	float	4	R	V	
355	853							
356	854		BC line AC voltage Ubc	float	4	R	V	
357	855							
358	856		CA line AC voltage Uca	float	4	R	V	
359	857							
35A	858		A phase AC voltage Ua	float	4	R	V	
35B	859							
35C	860		Phase B AC voltage Ub	float	4	R	V	
35D	861							
35E	862		C phase AC voltage Uc	float	4	R	V	
35F	863							
360	864		A phase AC current Ia	float	4	R	A	
361	865							
362	866		B phase AC current Ib	float	4	R	A	
363	867							
364	868		C phase AC current Ic	float	4	R	A	
365	869							
366	870		Zero sequence current Io	float	4	R	A	
367	871							
368	872		Total power factor PF	float	4	R		
369	873							
36A	874		A phase power factor PFa	float	4	R		
36B	875							
36C	876		B Phase power factor PFb	float	4	R		
36D	877							
36E	878		C phase power factor PFc	float	4	R		
36F	879							
370	880		Frequency F	float	4	R	Hz	
371	881							
372	882		Total active power	float	4	R	kW	

373	883						
374	884	Total active power	float	4	R	kW	
375	885						
376	886	B phase active power	float	4	R	kW	
377	887						
378	888	C phase active power	float	4	R	kW	
379	889						
37A	890	Total reactive power	float	4	R	kvar	
37B	891						
37C	892	A phase reactive power	float	4	R	kvar	
37D	893						
37E	894	B phase reactive power	float	4	R	kvar	
37F	895						
380	896	C phase reactive power	float	4	R	kvar	
381	897						
382	898	Total apparent power	float	4	R	kVA	
383	899						
384	900	A phase apparent power	float	4	R	kVA	
385	901						
386	902	B phase apparent power	float	4	R	kVA	
387	903						
388	904	C phase apparent power	float	4	R	kVA	
389	905						
38A	906	Total active energy eps	float	4	R	kWh	
38B	907						
38C	908	A phase total active energy epa	float	4	R	kWh	
38D	909						
38E	910	B phase total active energy epb	float	4	R	kWh	
38F	911						
390	912	C phase total active energy epc	float	4	R	kWh	
391	913						
392	914	Total reactive energy eqs	float	4	R	kvarh	
393	915						
394	916	A phase total reactive energy eqa	float	4	R	kvarh	
395	917						
396	918	B phase total reactive energy eqb	float	4	R	kvarh	
397	919						
398	920	C phase total reactive energy eqc	float	4	R	kvarh	
399	921						
39A	922	Forward total active energy epsp	float	4	R	kWh	
39B	923						
39C	924	Forward A phase total active energy epap	float	4	R	kWh	
39D	925						
39E	926	Forward B phase total active	float	4	R	kWh	

39F	927		energy epbp					
3A0	928		Forward C phase total active energy epcp	float	4	R	kWh	
3A1	929							
3A2	930		Reverse total active energy epsn	float	4	R	kWh	
3A3	931							
3A4	932		Reverse phase A total active energy epan	float	4	R	kWh	
3A5	933							
3A6	934		Reverse phase B total active energy epbn	float	4	R	kWh	
3A7	935							
3A8	936		Reverse phase C total active energy epcn	float	4	R	kWh	
3A9	937							
3AA	938		Forward total reactive energy eqsp	float	4	R	kvarh	
3AB	939							
3AC	940		Forward A-phase total reactive energy eqap	float	4	R	kvarh	
3AD	941							
3AE	942		Forward B-phase total reactive energy eqbp	float	4	R	kvarh	
3AF	943							
3B0	944		Forward C-phase total reactive energy eqcp	float	4	R	kvarh	
3B1	945							
3B2	946		Reverse total reactive energy eqsn	float	4	R	kvarh	
3B3	947							
3B4	948		Reverse A phase total reactive energy eqan	float	4	R	kvarh	
3B5	949							
3B6	950		Reverse B phase total reactive energy eqbn	float	4	R	kvarh	
3B7	951							
3B8	952		Reverse C phase total reactive energy eqcn	float	4	R	kvarh	
3B9	953							

Loop alarm information

ADD	Decimal	Content		Data type	Byte	RE/WR	Unit	Remark
2CE	718	First Loop	A phase AC voltage Ua+ B phase AC voltage Ub	uint16_t	1	R		Phase voltage warning description 00H: normal 01H: Below the lower limit 02H: Above upper limit (too high) 03H: above upper limit (super high) 04H: phase loss Description of frequency alarm 00H: normal 01H: Below the lower limit 02H: above upper limit SPD warning description
2CF	719		C phase AC voltage Uc+ input frequency	uint16_t	1	R		
2D0	720		SPD fault + SPD circuit breaker disconnected	uint16_t	1	R		
2D1	721		Smart Meter Failure	uint16_t	1	R		
2D2	722	Second Loop	A Phase AC voltage Ua+ B phase AC voltage Ub	uint16_t	1	R		
2D3	723		C phase AC voltage Uc+ input frequency	uint16_t	1	R		
2D4	724		SPD fault + SPD circuit breaker disconnected	uint16_t	1	R		
2D5	725		Smart Meter Failure	uint16_t	1	R		

2D6	726	Third Loop	A Phase AC voltage Ua+ B phase AC voltage Ub	uint16_t	1	R		00H: normal E2H: SPD failure Description of the alarm for disconnection of the circuit breaker of the lightning arrester 00H: normal 05H: switch off Smart Meter Fault Warning Description 00H: normal E3H: Smart Meter Failure
2D7	727		C phase AC voltage Uc+ input frequency	uint16_t	1	R		
2D8	728		SPD fault + SPD circuit breaker disconnected	uint16_t	1	R		
2D9	729		Smart Meter Failure	uint16_t	1	R		
2DA	730	Forth Loop	A Phase AC voltage Ua+ B phase AC voltage Ub	uint16_t	1	R		
2DB	731		C phase AC voltage Uc+ input frequency	uint16_t	1	R		
2DC	732		SPD fault + SPD circuit breaker disconnected	uint16_t	1	R		
2DD	733		Smart Meter Failure	uint16_t	1	R		
2DE	734	Fifth Loop	A Phase AC voltage Ua+ B phase AC voltage Ub	uint16_t	1	R		
2DF	735		C phase AC voltage Uc+ input frequency	uint16_t	1	R		
2E0	736		SPD fault + SPD circuit breaker disconnected	uint16_t	1	R		
2E1	737		Smart Meter Failure	uint16_t	1	R		
2E2	738	Sixth Loop	A Phase AC voltage Ua+ B phase AC voltage Ub	uint16_t	1	R		
2E3	739		C phase AC voltage Uc+ input frequency	uint16_t	1	R		
2E4	740		SPD fault + SPD circuit breaker disconnected	uint16_t	1	R		
2E5	741		Smart Meter Failure	uint16_t	1	R		
2E6	742	Seventh Loop	A Phase AC voltage Ua+ B phase AC voltage Ub	uint16_t	1	R		
2E7	743		C phase AC voltage Uc+ input frequency	uint16_t	1	R		
2E8	744		SPD fault + SPD circuit breaker disconnected	uint16_t	1	R		
2E9	745		Smart Meter Failure	uint16_t	1	R		

2EA	746	Eighth Loop	A Phase AC voltage Ua+ B phase AC voltage Ub	uint16_t	1	R		
2EB	747		C phase AC voltage Uc+ input frequency	uint16_t	1	R		
2EC	748		SPD fault + SPD circuit breaker disconnected	uint16_t	1	R		
2ED	749		Smart Meter Failure	uint16_t	1	R		

8 Common Troubleshooting

Analysis and troubleshooting of common faults

Fault content	Analysis	Remark
No display after power on	Check whether the power supply voltage is within the working voltage range	
Incorrect readings such as voltage, current and energy	Check whether the voltage-to-current ratio setting is correct Check whether the wiring mode setting is consistent with the actual Check whether the voltage transformer and current transformer are in good condition	
Incorrect power or power factor	Check whether the wiring mode setting is consistent with the actual Check whether the voltage and current phase sequence is correct Check if the wiring is correct	
Communication is abnormal	Check whether the address, baud rate, check digit, etc. in the communication settings are consistent with the host computer Check whether the RS485 converter is normal Check that the instrument is using the correct protocol The communication terminal is connected in parallel with a resistance of more than 120 ohms Check if the wiring is correct	

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