DZ81-MS3UI7E3
Power Meter
User Manual
V2.0

Heyuan Intelligence Technology Co., Ltd

IMPORTANT DECLARATIONS

Please read this manual carefully before the product is operated. And once you start operating the meter, you'll be considered to have read this manual and accept all our terms. Heyuan shall not be responsible or liable for any damages or injuries caused by improper meter installation and/or operation.

Attention: the following symbols in this manual refer to meanings as follows

 **Electric Shock Symbol: Carries information about procedures which must be followed to reduce the risk of electric shock and danger to personal health**

 Safety Alert Symbol: Carries information about circumstances which if not considered may result in injury or death

The meter must be installed and operated by one who has experience with high-voltage devices or has qualifications. Please connect the meter to correct voltage before operating the meter. Please install and use the meter according to the user manual. Heyuan shall not be responsible or liable for any damages or injuries caused without following the instructions in the user manual.

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Contents

Chapter 1 Meter Overview

DZ81-MS3UI7E3 is an advanced, smart networked energy meter. It is widely used in power distribution sites, energy management systems and intelligent monitoring systems of different industries. Measuring all parameters: three phase/line voltage, three phase current, active power, reactive power, power factor, frequency, multi-tariff, total active/reactive energy etc. It has 4-channel digital inputs and supports standard Modbus RTU communication protocol.

Display: LED Display

Chapter 2 Specifications

2.1 Input Voltage

Reference Voltage: 3×220V Voltage Range: 0~1.2Un

2.2 Input Current

Measuring Range: 1‰In~6In Starting Current: 1‰In Secondary Current of CT: 1(5)A

2.3 Frequency Measurement

Frequency Measuring Range: 45~65Hz

2.4 Accuracy

Voltage/Current Accuracy Class: 0.2%
Energy Accuracy Class: Class 0.5S
Power Factor: 0.1%
Frequency: ±0.01Hz

2.5 Communication

RS485/Modbus-RTU Communication Protocol Baud Rate: 2400~9600bps (programmable)

Remark: DZ81-MS3UI7E3 is equipped with asynchronous half-duplex RS485 communication interfaces. The address number can be modified. DZ81-MS3UI7E3 adopts Modbus RTU communication protocol to communicate. The terminals are 485A and 485B. The communication connection should use shielded twisted wire covered with copper net. In addition, the RS485 interfaces can also be used for device maintenance and upgrading. The communication default values are as follows

Communication Default Value				
Address	Baud Rate	Data Bits	Stop Bits	Parity
001	9600bps	8	1	No

2.6 Power Supply

Power Supply: AC85~265V/ DC85 ~ 300V DC Power Consumption: <3VA

Power-line Connection Terminals: L/+ and N/-

Remark: Terminals for the power supply are (L/+, N/-). If the quality of power is poor or there is an EMI problem, it's recommended to equip an EMC filter in the auxiliary power supply loop to increase resistance to interference.

2.7 Working Condition

Operating Temperature: -20℃ ~ +70℃ Storage Temperature: -40℃ ~ +80℃

Relative Humidity: 20% ~ 90%(non-condensing)

2.8 Pulse Output

Pulse Constant: 6400imp/kWh

2.9 Input Voltage

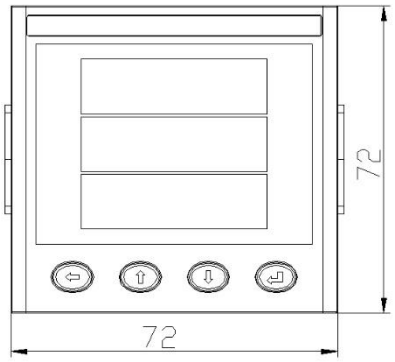
Input voltage should not be over rated input voltage. Otherwise, PT should be taken into account. Please make sure input voltage be in accordance with input current, that is the phase number should be same. Otherwise, value error will occur.

2.10 Input Current

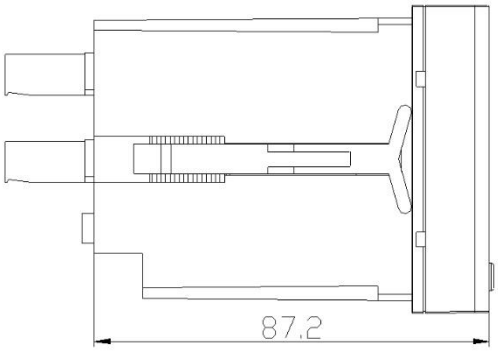
The rated input current is 5A. If current is over 5A, external CTs should be used. When opening the meter or changing current wiring, please make sure that the primary circuit is powered off.

Chapter 3 Dimension & Installation

3.1 External Dimension (unit: mm)

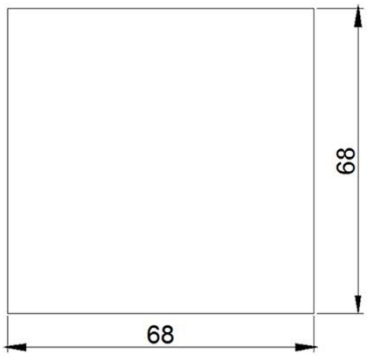


Front View



Side View

3.2 Cutout Size (unit: mm)



Cutout Size

Model No.	Dimension(mm)			Cut-out Size	
MS3UI7E3	L.	W.	H.	L.	W.
	72	72	87.2	68	68

3.3 Installation Method

This series of products should be installed in a dry and dust free environment, and avoid exposing to excessive heat, radiation and high electrical noise source. The meters can be installed into a

standard panel of switch cabinet.

A. Remove the clips from the meter and insert the meter into the panel from the front side. Make sure that the screen is at the front of the panel.

B. Install clips on the back side of the meter and fix tightly to ensure the meter is affixed to the panel.

Chapter 4 Terminals

QE-	QE+	PE-	PE+	NC	485B	485A	NC	N/-	L/+
1	2	3	4	5	6	7	8	9	10
Energy Pulse Output					RS485 Communication			Power Supply	

Upper Row of Terminals

Ua	Ub	Uc	Un	Ia	Ia*	Ib	Ib*	Ic	Ic*
21	22	23	24	25	26	27	28	29	30
Voltage Input				Current Input					

Lower Row of Terminals

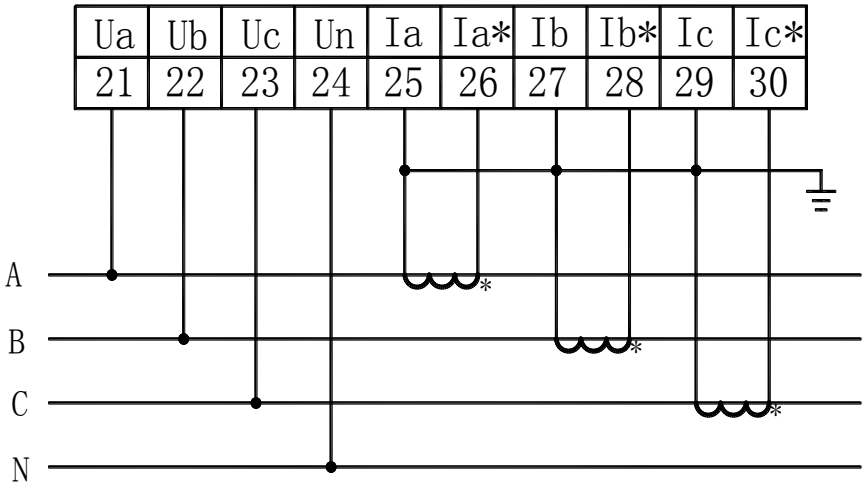
DICOM	DI1	DI2	DI3	DI4	NC	NC	NC	NC	NC
11	12	13	14	15	16	17	18	19	20
Digital Input									

Extended Terminals

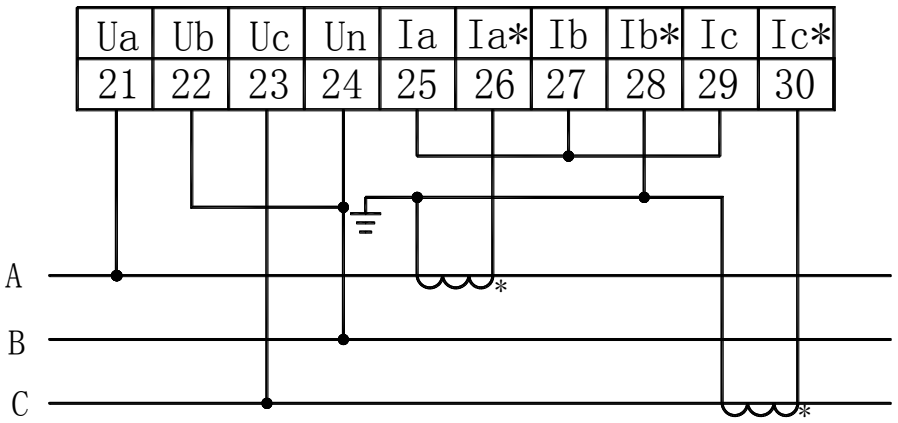
Chapter 5 Typical Wiring

5.1 Voltage and Current Wiring Instruction

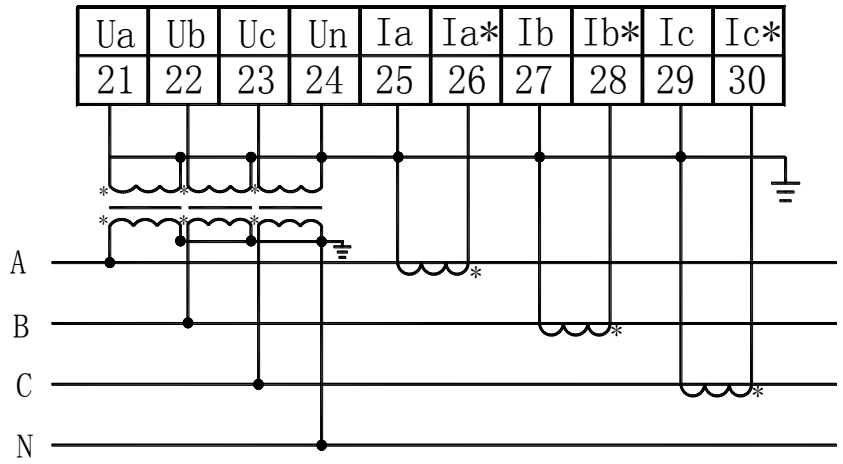
A. Three-phase Four-wire Wiring Mode in Low Voltage



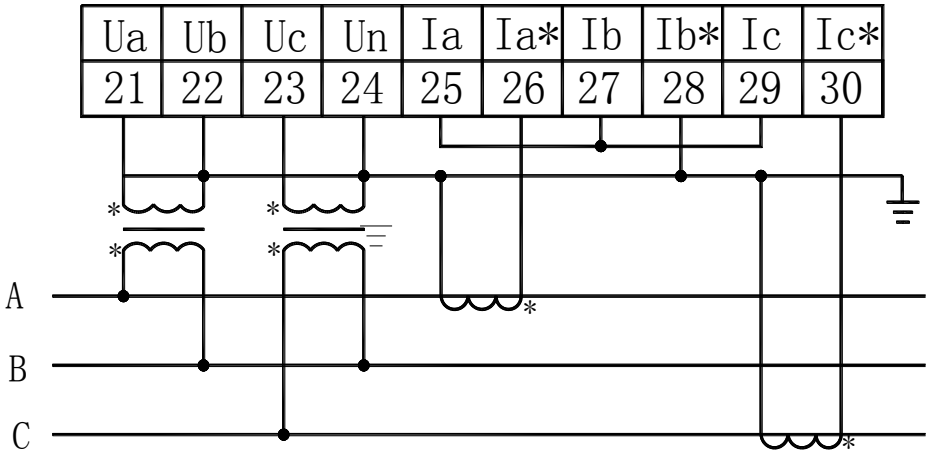
B. Three-Phase Three-Line Wiring Mode in Low Voltage



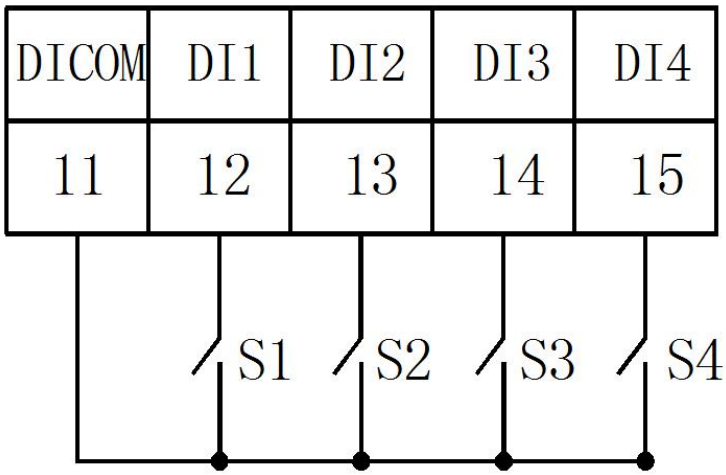
C. Three-Phase Four-Line Wiring Mode in High Voltage



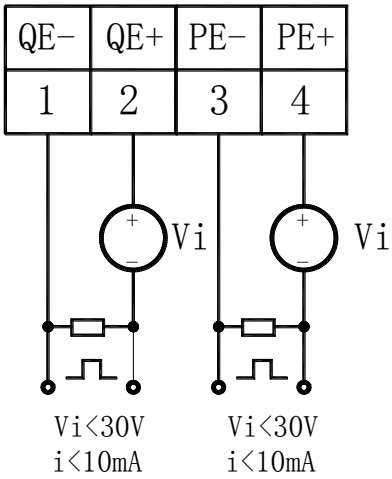
D. Three-Phase Three-Line Wiring Mode in High Voltage



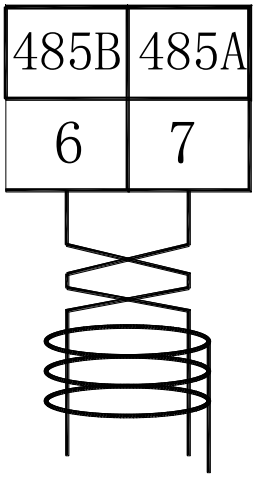
5.2 Digital Input Wiring



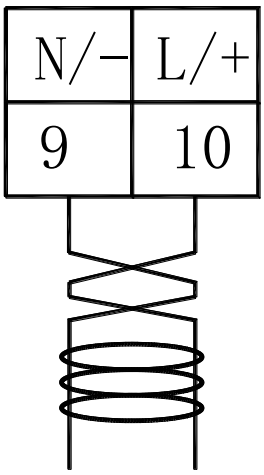
5.3 Energy Pulse Wiring Mode



5.4 RS485 Communication Interface



5.5 Power Supply

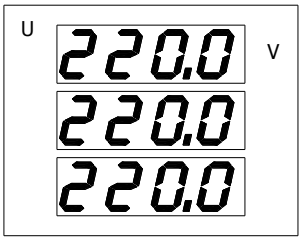


Chapter 6 Meter Display

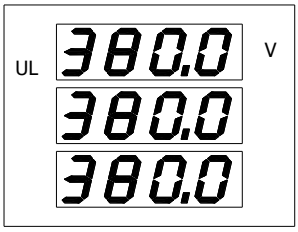
There are four buttons on the front panel, labeled left shift button "⇦", plus button "P", button "⇧", minus button "⇩" and confirm button "↵" from left to right. It can be used for reading different real-time data and setting parameters though the four buttons.

6.1 Parameters Display

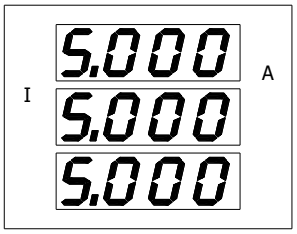
6.1.1 Press button "↵", it will cyclically display the values of phase voltage, line voltage, current and digital inputs.



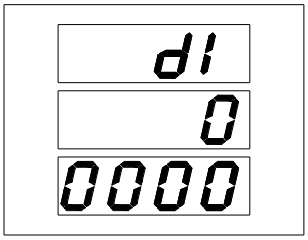
Phase Voltage



Line Voltage

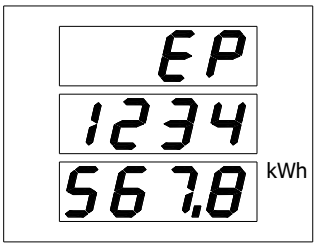


Current

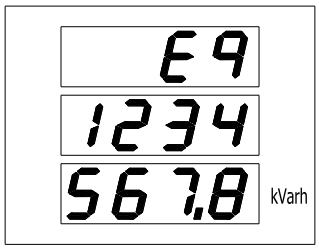


Digital Inputs

6.1.2 Press button "⇩", it will cyclically display the values of energy parameters, including total active energy values and total reactive energy values. In interfaces below, the Ep: 1234567.8kWh, Eq: 1234567.8kVarh.

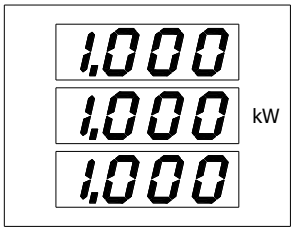


Active Energy

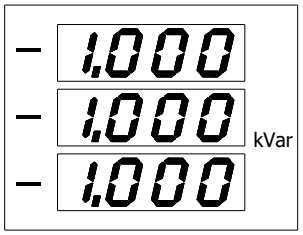


Reactive Energy

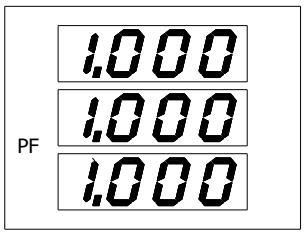
6.1.3 Press button "⇧", it will cyclically display the values of active power, reactive power, power factor and frequency.



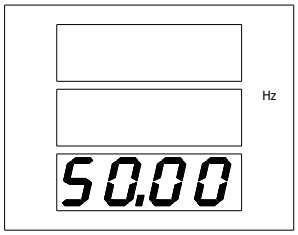
Active Power



Reactive Power



Power Factor



Frequency

Chapter 7 Meter Operation

7.1 System Parameter Setting

Press "⇦" and "↵" simultaneously at any display interface of metering data, it will enter the parameter setting interface.

At the setting mode:

The button "⇦" is used for digital shift. Press button "⇦" each time to shift one digit left, which will flash at the same time.

The button "⇧" is used to plus 1. Press button "⇧" each time and the flashing digit plus 1. If the

flashing digit is 9, press button "⇧" and the digit will become 0.

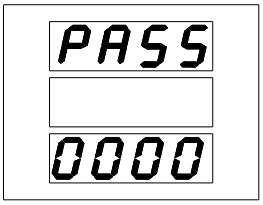
The button "⇩" is used to minus 1. Press button "⇩" each time and the flashing digit minus 1. If the flashing digit is 0, press button "⇩" and the digit will become 9.

The button "↵" is used to confirm the setting and switch to the next setting interface. When switching to last interface, press button "↵" again to switch back to the password setting interface.

Press button "⇦" and "↵" simultaneously at any setting interface, it will exit the setting interface and switch back to the parameter display interface.

7.2 Parameters Setting Steps

7.2.1 Password Inquiry Interface



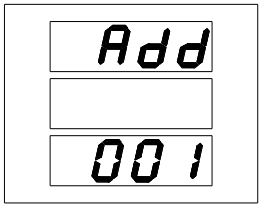
Press buttons "⇦" and "↵" simultaneously, it will enter "PASS" (password inquiry) interface. The default password is "0000". The methods of entering password are as follows

Step 1. Press button "⇧" or button "⇩" to change value of the first digit, which ranges from 0 to 9.

Step 2. Press button "⇦" to shift digits left.

Step 3. Repeat step 1 and step 2 until the last digit. Change and confirm. If the password is correct, confirm and enter communication address interface.

7.2.2 Communication Address Setting Interface



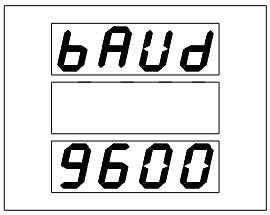
This interface displays the present communication address, whose value ranges from 1 to 247. The default address is "001" The setting methods are as follows.

Step 1. Press button "⇧" or button "⇩" to change value of the first digit, which ranges from 0 to 9.

Step 2. Press button “⇦” to shift digits left.

Step 3. Repeat step 1 and step 2 until the last digit. After setting, press button “↵” to confirm and enter baud rate setting interface.

7.2.3 Baud Rate Setting Interface

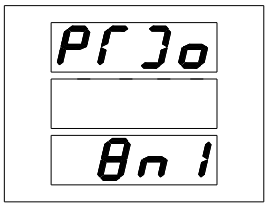


The baud rate can be set as 9600, 4800, 2400 and 1200. The default baud rate is “9600”. The setting methods are as follows.

Step 1. Press button “⇧” or button “⇩” to change baud rate until choose the needed one.

Step 2. After setting, press button “↵” to confirm and enter parity check setting interface.

7.2.4 Parity Check Setting Interface

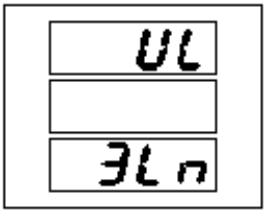


The parity check can be set as and “8n1”, “8e1” and “8e1”. “8n1” refers to no parity, 8 data bits and 1 stop bit. “8e1” refers to even parity, 8 data bits and 1 stop bit. “8o1” refers to odd parity, 8 data bits and 1 stop bit. The setting methods are as follows.

Step 1. Press button “⇧” or button “⇩” to change parity check until choose the needed one.

Step 2. After setting, press button “↵” to confirm and enter voltage wiring mode setting interface.

7.2.5 Voltage Wiring Mode Setting Interface

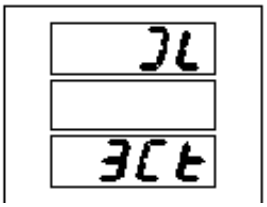


There are 2 options for the voltage wiring modes, i.e. “3Ln” referring to 3-phase 4-wire wiring mode; and “2LL” referring to 3-phase 3-wire wiring mode. The setting methods are as follows.

Step 1. Press button "⇧" or button "⇩" to change voltage wiring mode until choose the needed one.

Step 2. After setting, press button "↵" to confirm and enter current wiring mode setting interface.

7.2.6 Current Wiring Mode Setting Interface



There are 2 options for the current wiring modes, i.e. "3C" referring to 3 CTs used for current wiring; "2C" referring to 2 CTs used for current wiring to calculate phase B current in three-phase balanced environment (some model numbers don't support this option). The setting methods are as follows.

Step 1. Press button "⇧" or button "⇩" to change current wiring mode until choose the needed one.

Step 2. After setting, press button "↵" to confirm and enter PT ratio setting interface.

After setting, press button "↵" to confirm and enter "F5" interface.

7.2.7 PT Ratio Setting Interface

This interface displays the present PT ratio, whose value ranges from 1 to 9999. The setting methods are as follows.

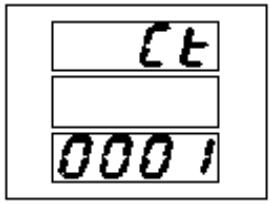
Step 1. Press button "⇧" or button "⇩" to change value of the first digit, which ranges from 0 to 9.

Step 2. Press button "⇦" to shift digits left.

Step 3. Repeat step 1 and step 2 until the last digit. Change and confirm.

Step 2. After setting, press button "↵" to confirm and enter CT ratio setting interface.

7.2.8 CT Ratio Setting Interface



This interface displays the present CT ratio, whose value ranges from 1 to 9999. The setting methods are as follows.

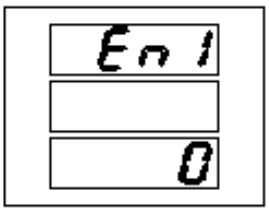
Step 1. Press button "⇧" or button "⇩" to change value of the first digit, which ranges from 0 to 9.

Step 2. Press button "⇦" to shift digits left.

Step 3. Repeat step 1 and step 2 until the last digit. Change and confirm.

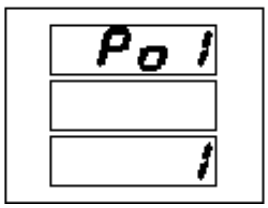
Step 2. After setting, press button "⏎" to confirm and enter password inquiry interface.

7.2.9 Energy Ratio Switch Setting Interface



Enter password inquiry interface, input password "1111" and enter energy ratio switch setting interface. "1" referring to open state of the energy ratio switch, which means the energy value on the energy interface is the real primary energy value. "0" referring to closed state of the energy ratio switch, which means the energy value on the energy interface is the secondary energy value through CTs. Open primary energy value display and close secondary energy value display. After setting, press button "⏎" to confirm and enter decimal place setting interface.

7.2.10 Decimal Place Setting Interface



This interface displays the energy decimal places, which can be set as 1, 2 or 3 places. After setting, press button "⏎" to confirm and enter voltage display interface.

Setting examples:

If the PT ratio is 10kV/400V, the PT ratio will be 25, that is to divide 10,000 by 400.

Remark: The product of PT ratio and CT ratio is not more than 300,000.

Chapter 8 System Parameters

8.1 Basically Measured Parameters Zone (Function Code 03 Read)

Address (DEC)	Address (HEX)	Category	Parameter	Default	Value Range
4096	1000	Phase Voltage	phase A voltage	magnifying 100 times	0 ~ 65535
4097	1001		phase B voltage	magnifying 100 times	0 ~ 65535
4098	1002		phase C voltage	magnifying 100 times	0 ~ 65535
4099	1003		phase voltage mean value	magnifying 100 times	0 ~ 65535
4100	1004		zero sequence voltage	magnifying 100 times	0 ~ 65535
4101	1005	Line Voltage	line voltage(A-B)	magnifying 100 times	0 ~ 65535
4102	1006		line voltage(B-C)	magnifying 100 times	0 ~ 65535
4103	1007		line voltage(C-A)	magnifying 100 times	0 ~ 65535
4104	1008		line voltage mean value	magnifying 100 times	0 ~ 65535
4105	1009	Current	phase/line Current of phase A	magnifying 1000 times	0 ~ 65535
4106	100A		phase/line Current of phase B	magnifying 1000 times	0 ~ 65535
4107	100B		phase/line Current of phase C	magnifying 1000 times	0 ~ 65535
4108	100C		phase/line Current mean value	magnifying 1000 times	0 ~ 65535
4109	100D		zero sequence current	magnifying 1000 times	0 ~ 65535
4110	100E	Active Power	active power of phase A	magnifying 1000 times	-32768 ~ 32767
4111	100F		active power of phase B	magnifying 1000 times	-32768 ~ 32767
4112	1010		active power of phase C	magnifying 1000 times	-32768 ~ 32767
4113	1011		total three-phase active power	magnifying 1000 times	-32768 ~ 32767

4114	1012	Reactive Power	reactive power of phase A	magnifying 1000 times	-32768 ~ 32767
4115	1013		reactive power of phase B	magnifying 1000 times	-32768 ~ 32767
4116	1014		reactive power of phase C	magnifying 1000 times	-32768 ~ 32767
4117	1015		total three-phase reactive power	magnifying 1000 times	-32768 ~ 32767
4118	1016	Apparent Power	apparent power of phase A	magnifying 1000 times	-32768 ~ 32767
4119	1017		apparent power of phase B	magnifying 1000 times	-32768 ~ 32767
4120	1018		apparent power of phase C	magnifying 1000 times	-32768 ~ 32767
4121	1019		total three-phase apparent power	magnifying 1000 times	-32768 ~ 32767
4122	101A	Power Factor	power factor of phase A	magnifying 1000 times	-1000 ~ 1000
4123	101B		power factor of phase B	magnifying 1000 times	-1000 ~ 1000
4124	101C		power factor of phase C	magnifying 1000 times	-1000 ~ 1000
4125	101D		total three-phase power factor	magnifying 1000 times	-1000 ~ 1000
4126	101E	Frequency	Frequency	magnifying 100 times	0 ~ 65535
4127	101F	Unbalance Factor	Voltage Unbalance Factor	magnifying 100 times	0 ~ 65535
4128	1020		Current Unbalance Factor	magnifying 100 times	0 ~ 65535

8.2 Basically Set Parameters Zone (Function Code 03 Read)

Address (DEC)	Address (HEX)	Category	Parameter	Default	Value Range
8192	2000	Basic Parameters	password protection (protection of basic parameters)	0	0～9999
8193	2001		meter communication address	1	1～247

8194	2002		serial port baud rate	3	0:1200, 1:2400, 2:4800, 3:9600
8195	2003		serial port parity check	0	0:(N,8,1)，1:(o,8,1)，2:(e,8,1)
8196	2004		voltage wiring mode	0	0：3LN，1：2LL
8197	2005		current wiring mode	0	0：3CT，1：2CT
8198	2006		PT	1	1~9999
8199	2007		CT	1	1～9999
8200	2008		backlight time(NC)	10	5～20(0)
8201	2009		spare	--	0
8202	200A		spare	--	0
8203	200B		monthly energy transferred time	1	1～31
8204	200C		energy ratio switch	0	0:closed 1：open
8205	200D		energy decimal places	1	1~3
The product of PT ratio and CT ratio is not more than 300,000.					

8.3 Real-time Clock Zone (Function Code 0x10 Write; Function Code 03/04 Read)

Address (DEC)	Address (HEX)	Category	Parameter	Default	Value Range
12800	3200	Time	Year	2000	2000～2099
12801	3201		Month	1	1～12
12802	3202		Date	1	1～31
12803	3203		Hour	0	0～23
12804	3204		Minute	0	0～59
12805	3205		Second	0	0～59
12806	3206		Millisecond	0	0～999
Remark： 1.Set time with function code 0x10 (write). Read time of the meter with function code 03/04 (read). In order to prevent the occurrence of February 31st, the "Time" must be set with the command 10H. Otherwise it will be invalid. The clock chip will automatically turn milliseconds to zero. So milliseconds can be read-only.					

8.4 Real-time Energy Zone (Function Code 03/04 Read)

Address (DEC)	Address (HEX)	Category	Parameter	Default	Value Range
16384	4000	Total Real-time Energy	Total Active Energy	0	0～99999999.9
16385	4001				
16386	4002		Import Active Energy	0	0～99999999.9
16387	4003				
16388	4004		Export Active Energy	0	0～99999999.9
16389	4005				
16390	4006		Total Reactive Energy	0	0～99999999.9
16391	4007				
16392	4008		Import Reactive Energy	0	0～99999999.9
16393	4009				
16394	400A		Export Reactive Energy	0	0～99999999.9
16395	400B				

Remark:
1. The registers for peak-period, off-peak period and shoulder-period energies refer to those for sharp-period energy.
2. Total real-time energy supports function code 04. Multi-tariff real-time energy doesn't support function code 04 but function code 03.

The following parameters are not listed. If necessary, please contact Heyuan to get them.

Address		Parameter Name
DEC	HEX	
4352-4560	1100-11DO	Harmonic Parameters Zone
8448-8477	2100-211D	Multi-tariff Period Setting Zone
16640-17369	4100-43D9	Multi-tariff Historical Energy Zone

Chapter 9 After-sales Service

Product Warranty

1. The product warranty period is one year.
2. The company is responsible for free maintenance or exchange within one-year warranty period.
3. The cost of the components and freight shall be charged for improper meter installation and/or operation.
4. Over the warranty period, part of the maintenance cost according to actual situation will be charged.

Service Guarantee

1. Product technical consulting and quality complaints will be replied within 12 hours.
2. Solutions for quality complaints will be provided within 24 hours.
3. Except statutory holidays and force majeure.

Chapter 10 Contact Us

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