ESS

Electrical solutions

Three Phase Multifunction Table

Instruction Manual

1. Product Brief introduction

The three-phase multi-function meter is designed for the electric power intelligent monitoring and electric energy metering needs of electric power system, industrial and mining enterprises, public facilities, intelligent buildings and so on, high-precision measurement of all common power parameters in three-phase grid: three-phase voltage, three-phase current, active power, reactive power, apparent power, frequency, power factor, and with 485 communication functions。

2. Technical parameter

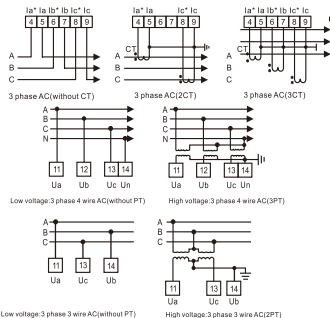| Item			Parameter
Wiring			3 phase 4 lines/3 phase 3 lines
Signal input	Voltage	Measurement range	AC(20~500)V
		Over load	Continuous: 1.2 multiple, instantaneous: 2 multiple/1s
		Power consumption	＜1VA（per phase）
	Current	Measurement range	AC(10mA~5A)
		Over load	Continuous: 1.2 multiple, instantaneous: 10 multiple/5s
		Power consumption	＜0.4VA（per phase）
Frequency			45~65Hz
Power supply			AC/DC 60~280V, ≤5VA
Communication			RS485 communication interface, physical layer isolation. Meet the international standard of MODBUS-RTU agreement Communication speed 1200~38400 Test type N81,E81,O81
Swithcing Input/Output			Passive dry contact
Measurement class			Power: 0.5 Frequency: ±0.2Hz Active power: 1.0 Reactive power: 2.0
Display mode			LED display, LCD display
Environment			Working temperature: −10~+45℃ Storage temperature: −25~+50℃ Relative humidity: ＜85%RH
Safety			Isolation:resistance of Signal input, power source and output terminal to cover＞100MΩ Withstand Voltage:Signal Input/power supply , Power Supply/Signal output :AC 2kV, Signal Input/Signal Output:1kV

3. Installation and Wiring
3.1 Size(mm)

Panel Size(mm): 96×96   Hole Size(mm): 91×91   Depth(mm): 38
Panel Size(mm): 80×80   Hole Size(mm): 76×76   Depth(mm): 38
Panel Size(mm): 72×72   Hole Size(mm): 67×67   Depth(mm): 38

3.2 Wiring terminal function

Power supply	1,2	AC/DC60～280V ≤5VA
Current signal	4,5,6,7,8,9	No.4,6,8 are the terminal of current signal input No.5,7,9 are the terminal of current signal output
Voltage signal	11,12,13,14	Three phase Voltage signal input is Ua, Ub,Uc,Un
RS485	58,59	A, B terminal
Switching input	70,71	1 loops of switching input, 70 is the common terminal

3 phase AC(without CT)   3 phase AC(2CT)   3 phase AC(3CT)

Low voltage:3 phase 4 wire AC(without PT)   High voltage:3 phase 4 wire AC(3PT)

Low voltage:3 phase 3 wire AC(without PT)   High voltage:3 phase 3 wire AC(2PT)

Note: The meter is provided with two kinds of wiring modes, please make sure the actual wiring is same to the set wiring in the meter.
The wiring diagram and technical parameter printed on the product shall be prevailed.

4. Programme operation

Under programming status, digital interface adopts layered structure menu type ,meter supply three lines digital display.

No.1 line is first layer menu information.

No.2 line is second layer menu information,

No.3 line is third layer menu information.

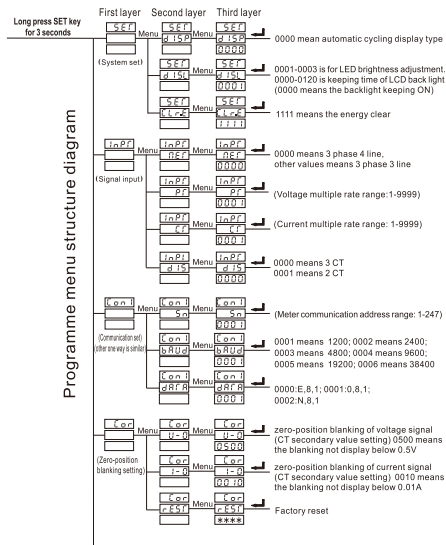For example: No.1 line: INPT means signal input.

No.2 line:CT current ratio   No. 3 line: 5 means the CT value. CT value=25/5A=5.

Parameter setting can be customized according to requirements.

No.1 layer	No.2 layer	No.3 layer	Description
System set "SET"	Display Disp	0000-0014	0000 means automatic cyclingdisplay
	DISL	0001~0003 or 0000~0120	0001-0003 is for LED brightness adjustment 0000-0120 is keeping time of LCD back light
	Energy clear CLr.E	1111	1111 means the energy clear, other values are invalid
Signal input INPT	Wiring mode NET	0000 or other values	0000 means 3 phase 4 line, other values means 3 phase 3 line
	Voltage transformation ratio PT	1 ~ 9999	PT value= PT primary value/ secondary value
	Current transformation ratio CT	1 ~ 9999	CT value= PT primary value/ secondary value
Communication set CONi (i is 1~2)	address SN	1 ~ 247	Meter address range: 1-247
	Communication speed BAUD	0001 ~ 0006	0001为1200； 0002为2400； 0003为4800； 0004为9600； 0005为19200； 0006为38400
	Data format DATA	0000 ~ 0002	0000:E,8,1； 0001:0,8,1； 0002:N,8,1；

Note: The above menu is applied to the product with complete function.If you find there is no such menu in the product or the menu is not working, It means the product not supporting the function.
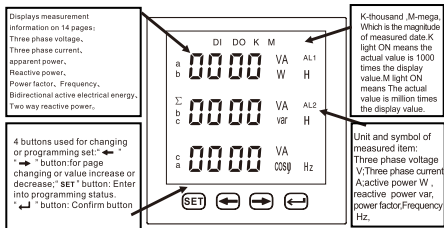
Programming step

Long press SET key for 3 seconds

First layer   Second layer   Third layer

SET / d ISP / SET d ISP / SET d ISP 0000 → 0000 mean automatic cycling display type

(System set)

SET d ISL / SET d ISL / SET d ISL 0001 → 0001-0003 is for LED brightness adjustment. 0000-0120 is keeping time of LCD back light (0000 means the backlight keeping ON)

SET CLr.E / SET CLr.E 1111 → 1111 means the energy clear

InPt nEt / InPt nEt / InPt nEt 0000 → 0000 means 3 phase 4 line, other values means 3 phase 3 line

(Signal input)

InPt Pt / InPt Pt 000 1 → (Voltage multiple rate range:1-9999)

InPt Ct / InPt Ct 000 1 → (Current multiple rate range: 1-9999)

InPt d IS / InPt d IS 0000 → 0000 means 3 CT 0001 means 2 CT

Con Sn / Con Sn / Con Sn 000 1 → (Meter communication address range: 1-247)

(Communication set other one way is similar)

Con bAud / Con bAud / Con bAud 000 1 → 0001 means 1200；0002 means 2400； 0003 means 4800；0004 means 9600； 0005 means 19200；0006 means 38400

Con dAtA / Con dAtA / Con dAtA 0000 → 0000:E,8,1；0001:0,8,1； 0002:N,8,1

Cor U-0 / Cor U-0 / Cor U-0 0500 → zero-position blanking of voltage signal (CT secondary value setting) 0500 means the blanking not display below 0.5V

(Zero-position blanking setting)

Cor I-0 / Cor I-0 / Cor I-0 00 10 → zero-position blanking of current signal (CT secondary value setting) 0010 means the blanking not display below 0.01A

Cor rESt / Cor rESt **** → Factory reset

Programme menu structure diagram

Operation instruction:

(a) After revised the data of third layer (or option), need press "↵" button to back the second menu then the setting take effect.

(b) The wiring method can be revised refer to the actual wiring mode.

(c) Under normal condition, the label of product have remarked the model parameter and factory setting parameter. The user can reset the parameters according to the requirements.

(d) After revise the value , through "←" button and "→" button to increase or decrease , through **SET** button to move.
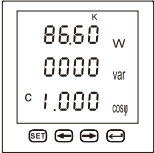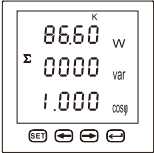
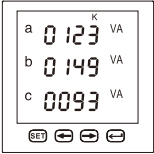## 5. Panel explain and measurement information display (1) Panel instructions

Displays measurement information on 14 pages:
Three phase voltage,
Three phase current,
apparent power,
Reactive power,
Power factor, Frequency,
Bidirectional active electrical energy,
Two way reactive power,

K-thousand ,M-mega, Which is the magnitude of measured date.K light ON means the actual value is 1000 times the display value.M light ON means The actual value is million times the display value.

DI DO K M

0000 VA AL1
     W   H

0000 VA AL2
     var H

0000 VA
     cosφ Hz

4 buttons used for changing or programming set:"←"
"→" button:for page changing or value increase or decrease;" **SET** " button: Enter into programming status.
"↵" button: Confirm button

Unit and symbol of measured item:
Three phase voltage V;Three phase current A;active power W , reactive power var, power factor;Frequency Hz,

SET ← → ↵

(2) The contents of displayed page

Page	Content	Explanation
DISP=1 three phase voltage	a 5774 V b 5774 V c 5774 V **SET** ← → ↵	Separately display the voltage Ua, Ub, Uc (3 phase 4 line), positive active energy. In left Fig Ua=5774V Ub=5774V Uc=5774V

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Page	Content	Explanation
DISP=2 three phase voltage	a 10.00 V b 10.00 V c 10.00 V **SET** ← → ↵	Separately display the voltage Uab, Ubc, Uca (line voltage), In left Fig Uab=10kV Ubc=10kV Uca=10kV
DISP=3 three phase current	a 5.000 A b 5.000 A c 5.000 A **SET** ← → ↵	Display 3-phase current Ia, Ib, Ic, the unit is A. In left Fig Ia=5A Ib=5A Ic=5A
DISP=4 A phase separation Active Power Reactive power Power factor	a 86.60 K W 0000 var 1.000 cosφ **SET** ← → ↵	Show a phase separation Active Power Pa Reactive power Qa Power factor PFa Left Pa=86.6kW Qa=0var PFa=1.0

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Page	Content	Explanation
DISP=5 B phase separation Active Power Reactive power Power factor	**86.60** K W b **0000** var **1.000** cosψ SET ⬅ ⬅ ⬅	Show b phase separation Active Power Pb Reactive power Qb Power factor PFb Left Pb=86.6kW Qb=Ovar PFb=1.0
DISP=6 C phase separation Active Power Reactive power Power factor	**86.60** K W **0000** var c **1.000** cosψ SET ⬅ ⬅ ⬅	Show c phase separation Active Power Pc Reactive power Qc Power factor PFc Left Pc=86.6kW Qc=Ovar PFc=1.0
DISP=7 Three phases total Active Power Reactive power Power factor	**86.60** K W Σ **0000** var **1.000** cosψ SET ⬅ ⬅ ⬅	Display three phase total Active Power P Reactive power Q Power factor PF Left P=86.6kW Q=Ovar PF=1.0

Page	Content	Explanation
DISP=8 A□B□C Three phase Apparent Power	a **0123** K VA b **0149** VA c **0093** VA SET ⬅ ⬅ ⬅	Display the apparent power separately Sa、Sb、Sc Left Sa=123VA Sb=149VA Sc=93VA
DISP=9 Three phases total Apparent Power	K Σ **0365** VA SET ⬅ ⬅ ⬅	Display three phase total Apparent Power S Left S=365VA
DISP=10 Frequency	**50.00** Hz SET ⬅ ⬅ ⬅	The left diagram shows the present power grid frequency is 50.00Hz
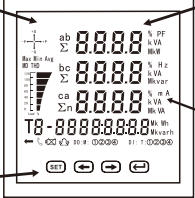
Page	Content	Explanation
DISP=11 Positive active energy	K uh-0 W H 3650 20.50 [SET]	The left image shows the value of positive active power, The 2nd row is the higher 4 bits, The 3rd row is the lower 4bits, to form a complete 8–bit value, The left chart shows the value of positive active power :365020.50kW h.
DISP=12 Negative active energy	K uh-1 W H 3650 20.50 [SET]	The left image shows Negative active energy values, The 2nd row is the higher 4 bits, The 3rd row is lower 4 bits, to form a complete 8 bit value。 The left chart shows the negative active power value is 365020.50kW h.
DISP=13 Positive reactive power	K uAh0 var H 3650 20.50 [SET]	The left image shows the positive reactive energy values, The 2nd row is the higher 4 bits, The 3rd row is the lower 4 bits, to form a complete 8–bit value The left chart shows the value of positive reactive power 365020.50kvarh.

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Page	Content	Explanation
DISP=14 Reverse reactive power	K uAh1 var H 3650 20.50 [SET]	The left panel shows the reverse reactive power values,The 2nd row digital tube is 4 bits high, Row 3 is four places lower, Form an 8-bit value。 The left–hand chart shows the value of reverse reactive power 365020.50kvarh.

（2）Panel description(LCD liquid crystal display)

Four rows of figures display the measured information：Three phase voltage，Three phase current， apparent power， Reactive power， Power factor， Frequency， Out， Access；The rest of the entry， Bidirectional active electrical energy，Two way reactive power，Demand。
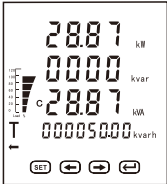
K-thousand ,M-mega, Which is the magnitude of measured date.K light ON means the actual value is 1000 times the display value.M light ON means The actual value is million times the display value.

4 buttons used for changing or programming set：" ◄ "、" ► " button:for page changing or value increase or decrease;" SET " button: Enter into programming status. " ◄┘ " button: Confirm button
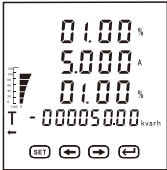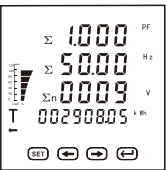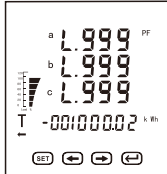
Unit and symbol of measured item： Three phase voltage V;Three phase current A;active power W , reactive power var, power factor,Frequency Hz,

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Page	Content	Explanation
DISP=1 three phase voltage Positive active energy	a 5774 v b 5774 v c 5774 v T 0029080.5 kWh [SET] ← → ↵	Separately display the voltage Ua, Ub, Uc (3 phase 4 line), positive active energy. In left Fig Ua=5774V Ub=5774V Uc=5774V Positive active energy =2908,05kWh
DISP=2 three phase voltage Negative active energy	ab 10.00 kV bc 10.00 kV ca 10.00 kV -001000.02 kWh [SET] ← → ↵	Separately display the voltage Uab, Ubc, Uca (line voltage), negative active energy. In left Fig Uab=10kV Ubc=10kV Uca=10kV Negative active energy =1000.02kWh
DISP=3 three phase current Positive reactive energy	a 5.000 A b 5.000 A c 5.000 A T 000050.00 kvarh [SET] ← → ↵	Display 3-phase current Ia, Ib, Ic, the unit is A. Positive reactive energy In left Fig Ia=5A Ib=5A Ic=5A Positive reactive energy =50.00kvarh

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Page	Content	Explanation
DISP=4 Total active power Total reactive power Total apparent power Negative reactive power	Σ 86.60 kW Σ 0000 kvar Σ 86.60 kVA T - 00100.08 kvarh [SET] ← → ↵	Total active power =86.60kW Total reactive power =0000kvar Total apparent power =86.60kVA Negative reactive power =100.08kvarh
DISP=5 A phase active power A phase reactive power A phase appar ent power Positive active power	a 28.87 kW 0000 kvar 28.87 kVA T 0029080.5 kWh [SET] ← → ↵	A phase active power =28.87kW A phase reactive power =0000kvar A phase apparent power =28.87kVA Positive active power =2908.05kWh
DISP=6 B phase active power B phase reactive power B phase apparent power Negative active power	28.87 kW b 0000 kvar 28.87 kVA T -001000.02 kWh [SET] ← → ↵	B phase active power =28.87kW B phase reactive power =0000kvar B phase apparent power =28.87kVA Negative active power =1000.02kWh

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Page	Content	Explanation
DISP=7 C phase active power C phase reactive power C phase apparent power Positive reactive power	28.87 kW 0000 kvar C 28.87 kVA T 000050.00 kvarh	C phase active power =28.87kW C phase reactive power =0000kvar C phase apparent power =28.87kVA Positive reactive power =50.00kvarh
DISP=8 Current Unbalance Average current Voltage Unbalance	01.00 % 5.000 A 01.00 % T - 00005.00 kvarh	Displayed in left Fig Current Unbalance:1% Average current=5A Voltage Unbalance:1% Negative Reactive Energy =50.00kvarh
DISP=9 Three phase total power factor, Frequency, Average Voltage	Σ 1.000 PF Σ 50.0 Hz Σn 0009 V T 002908.05 k Wh	Displayed in left Fig Three phase total power factor =1.000 Frequency=50Hz Average Voltage=9V positive active energy =2908.05kWh

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Page	Content	Explanation
DISP=10 Power factor for each phase	a L.999 PF b L.999 c L.999 T -001000.02 k Wh	Displayed in left Fig A phase power factor =0.999 B phase power factor =0.999 C phase power factor =0.999 Negative active energy =1000.02kWh

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Three phase AC current/voltage meter User Manual

ESS
Electrical solutions

1、Product Introduction

The three−phase AC current/voltage meter is designed for power systems, industrial and mining enterprises, public facilities, and intelligent large

Designed for the needs of intelligent power monitoring and energy metering in Xiamen and other occasions, capable of high−precision measurement of three−phase

All commonly used power parameters in the power grid: three−phase voltage, three−phase current, frequency, and equipped with 485 communication.

2、Technical Parameter

Project			Parameters
Signal input		Connection	Three phase three wire/three phase four wire
	Voltage	range	100V、380V
		overload	Continuous: 1.2x, instantaneous: 2x/1S
		consumption	< 1VA (per phase)
	Current	range	AC(10mA ~ 5A)
		overload	Continuous: 1.2x, instantaneous: 10x/5S
		consumption	<1VA
		Frequency	(45 ~ 65)Hz
Power supply			AC/DC60 ~ 280V、 ≤5VA
Communication			Rs485 communication interface, physical layer isolation MODBUS−RTU protocol that meets international standards Communication speed 1200~38400 Verification methods N81, E81, 081
Accuracy			Electric parameters: 0.5 class, frequency: ± 0.2Hz
Display method			LED digital tube display, LCD liquid crystal display
Environment			Working temperature: −10~+45 ℃ Storage temperature: −25~+50 ℃ Relative humidity: < 85% RH
Security			Insulation: input, power supply, and output terminals have a resistance to the shell greater than 100M Ω Withstand voltage: input/power: 2kV, power/output: 2kV, Input/output: 1kV

3、Installation and wiring

3.1 Size (mm)

Face frame size 96 * 96, opening size 91 * 91, cabinet entry depth 38

Face frame size 80 * 80, opening size 76 * 76, cabinet entry depth 38

Face frame size 72 * 72, opening size 67 * 67, cabinet entry depth 38

3.2 Functional Description of Wiring Terminals

Power supply	1,2	AC/DC60～280V、 ≤5VA
Current signal	4,5,6,7,8,9	4,6,8 are the three–phase current input terminals 5,7,9 are the three–phase current output terminals
voltage signal	11,12,13,14	Respectively for three–phase voltage input Ua, Ub, Uc, Un
RS485	58,59	Respectively A and B

Instructions for use

(a) 1 and 2 are auxiliary power supplies for instrument operation. Please ensure that the power supply is suitable for this series of products to prevent damage to the products.

(b) 4, 6, and 8 are the incoming terminals of the current transformer, with * indicating the incoming terminals of the current.

(c) Three phase three wire connection method: In a three phase three wire network, the B phase current does not need to be connected, and Ub is connected to terminal 14. The specific wiring can refer to 3.3 wiring.

(d) For detailed use of wiring terminals, please connect according to the wiring diagram on the specific product casing.

3.3 Wiring (see Figure 1 and Figure 2)

Three phase AC (without CT)

Three phase AC (2CT)

Three phase AC (3CT)

Low voltage: three–phase four wire AC (without PT)

High voltage: three–phase four wire AC (3PT)

Figure 1

Low voltage: three–phase three wire AC (without PT)

High voltage: three–phase three wire AC (2PT)
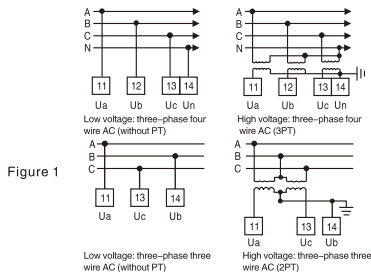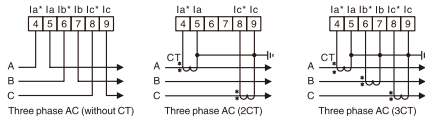
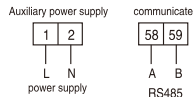Auxiliary power supply

power supply

communicate

RS485

Figure 2

Attention: Two wiring methods can be set inside the instrument, and the actual wiring method and the setting method inside the instrument must be consistent, otherwise the measurement data of the instrument will be inaccurate. The specific wiring method shall be based on the product's random wiring diagram.

4、Programming Operations

In programming mode, the digital display interface adopts a hierarchical menu structure, and the instrument The table provides three rows of numerical displays: The first row is the first layer of menu information; The second row i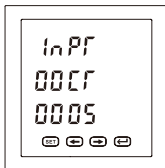s the second layer of menu information; The third row is the third layer of menu information; As shown in the following figure:

Layer 1: INPT signal input, Layer 2: CT current ratio Layer 3: 5 represents the current CT value, Set the current specification CT value to 25/5A=5.

The organizational structure of the digital display interface menu is as follows, and users can choose appropriate setting parameters according to their actual situation.

Tier 1	Tier 2	Tier 3	Describe
System settings SET	Page display DISP	0000 ~ 0003	0000 indicates automatic cycle display mode
	Backlight display time DISL	0001 ~ 0003 or 0000 ~ 0120	0001~0003 are LED digital tube brightness adjustments / 0000~0120 are LCD backlight displays / Hold time (0000 is the backlight always on)
Signal input INPT	Wiring method NET	0000 or other values	0000 represents three–phase four wire / Other values represent three–phase three wire
	Voltage ratio PT	1 ~ 9999	PT value=primary/secondary value of transformer
	Current ratio CT	1 ~ 9999	CT value=primary/secondary value of transformer
Communication settings CONi(i is 1~2)	Mailing address SN	1 ~ 247	Instrument address range: 1~247
	Communication speed BAUD	0001 ~ 0006	0001or1200； 0002or2400； 0003or4800； 0004or9600； 0005or19200； 0006or38400
	Communication check bit DATA	0000 ~ 0002	0000:E,8,1； 0001:0,8,1； 0002:N,8,1；

Note: The above menu items are all functional menu items. If the user finds that some menu items in the menu are missing or ineffective compared to the above table during use, it indicates that the product selected by the user does not support this function.

4.1 Programming steps

Press and hold
the SET key for
3 seconds

first stage   second stage   third stage

SET | SEE | SET | SEE | SET | SEE
System settings   d ISP   0000

0000 mean automatic cycling
display type

SET | SEE | SET | SEE
d ISL   d ISL   000 I

LED brightness adjustment.
keeping time of LCD back light

InP⌐ | SET | InP⌐ | SET | InP⌐
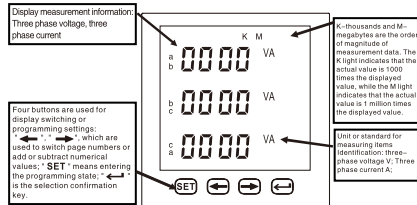Signal input   ⌐EF   0000

0000 means 3 phase 4 line
other values means 3 phase 3 line.

InP⌐ | SET | InP⌐ | SET | InP⌐
        P⌐   000 I

1~9999: Voltage multiple rate
range:1~9999

InP⌐ | SET | InP⌐ | SET | InP⌐
        C⌐   000 I

1~9999: Current multiple rate
range: 1~9999

InP⌐ | SET | InP⌐ | SET | InP⌐
        d IS   d IS

CT wiring method selection
3CT: 0000 means 3 CT
2CT: 0001 means 2 CT

Con I | SET | Con I | SET | Con I
Communication set   Sn   000 I

Meter communication address
range: 1~247

Con I | SET | Con I | SET | Con I
        bAUd   000 I

0001 means 1300,0002 means 3100
0003 means 4800,0004 means 9600

Con I | SET | Con I | SET | Con I
        dAtA   000 I

0000 means E, 8, 1; 0001 means 0, 8, 1;
0002 means N, 8 ,1

Co⌐ | SET | Co⌐ | SET | Co⌐
Zero-position   U-0   0500
blanking setting

zero-position blanking of voltage signal
(CT secondary value setting) 0500 means
the blanking not display below 05V

Co⌐ | SET | Co⌐ | SET | Co⌐
        I-0   00 I0

zero-position blanking of current signal
(CT secondary value setting)0010 means
the blanking not display below 0.01A

Co⌐ | SET | Co⌐ | SET | Co⌐
        ⌐ESI   ****

factory reset

Programming Menu Schematic

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5、Panel Description and Measurement Information Display

5.1 Digital display

Display measurement information:
Three phase voltage, three
phase current

Four buttons are used for
display switching or
programming settings:
"←","→", which are
used to switch page numbers or
add or subtract numerical
values;"SET" means entering
the programming state;"↵"
is the selection confirmation
key.

K—thousands and M—
megabytes are the order
of magnitude of
measurement data. The
K light indicates that the
actual value is 1000
times the displayed value,
while the M light
indicates that the actual
value is 1 million times
the displayed value.

Unit or standard for
measuring items
Identification: three—
phase voltage V; Three
phase current A;

6、Transportation and storage

6.1 The transportation and unpacking of products should not be subjected to strong impact. They should be transported and stored in accordance with the provisions of GB/T 25480–2010 "Basic Environmental Conditions and Test Methods for Transportation and Storage of Instruments and Meters", and placed according to the requirements on the packaging box.

6.2 Store the product in its original packaging, with a storage environment temperature of −25 ℃~+50 ℃ and an average relative humidity of no more than 85%. The storage environment should be free of corrosive gases and should be moisture–proof.

6.3 The product should be stored in the warehouse and placed on a shelf, with a stacking height of no more than 6 boxes for unpacking

Afterwards, the stacking height of a single packaged product shall not exceed 10 pieces.

6.4 Shell caused by severe impact or falling from high altitude during transportation, use, and installation

When there are obvious signs of damage, please do not power up the corresponding meter and contact the supplier as soon as possible.

7、Company commitment

Within 18 months from the date of production of the product, during normal customer storage, transportation, maintenance, and use,

If the company seal is intact and not removed, it cannot be used normally due to manufacturing issues with the product

Provide "three guarantees" service during usage.

—07—

Version No:2305

Single phase AC current/voltage meter User Manual

ESS
Electrical solutions

1、Product Introduction

A single–phase AC current/voltage meter is designed for the intelligent monitoring and energy metering needs of power systems, industrial and mining enterprises, public facilities, intelligent buildings, and other occasions. It can measure voltage and current parameters in single–phase power grids with high accuracy and is equipped with a 1–channel communication interface.

2、Technical Parameter

project			Parameters	
Connection			single phase	
INPUT	voltage	range	AC：100V、380V、600V	
		overload	Continuous: 1.2 times Instantaneous: 2 times	
		consumption	＜1VA	
	current	range	AC：1A、5A	
		overload	Continuous: 1.2 times Instantaneous: 2 times	
		consumption	＜1VA	
	Frequency		(45～65)Hz	
Power supply			AC/DC60～280V、≤5VA	
Communication			RS485 communication interface, physical layer isolation MODBUS–RTU protocol that meets international standards Communication speed 1200~38400 Verification methods N81, E81, 081	
Measurement level			Electric quantity: 0.5, frequency: ±0.2Hz	
Display method			LED digital tube display, LCD liquid crystal display	
environment			Working temperature: –10~+45℃ Storage temperature: –25~+55℃ Relative humidity: ＜85% RH	
Security			Insulation: Resistance of input, power supply, and output terminals to the housing ＞100MΩ Withstand voltage: input/power: 2kV, power/output: 2kV, input/output: 1kV	

3、Installation and wiring

3.1 Size (mm)

Face frame size 96 * 96, opening size 91 * 91, cabinet entry depth 38
Face frame size 80 * 80, opening size 76 * 76, cabinet entry depth 38
Face frame size 72 * 72, opening size 67 * 67, cabinet entry depth 38

### 3.2 Functional Description of Wiring Terminals

Power supply	1,2	AC/DC60～280V、≤5VA
current signal	4,5	4 is the current input terminal
voltage signal	11,14	11 represents the high end of the voltage and 14 represents the low end of the voltage
RS485	58,59	Respectively A and B

Instructions for use

(a) 1 and 2 are auxiliary power supplies for instrument operation. Please ensure that the power supply is suitable for this series of products to prevent damage to the products.
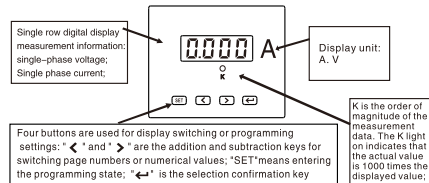
(b) 4 represents the incoming terminal of the current transformer, and the terminal marked with * represents the incoming terminal of the current.
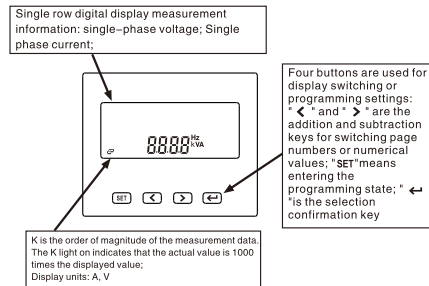
3.3 Wiring diagram

AC current connection   AC voltage connection

Auxiliary power supply   communicate

power supply   RS485

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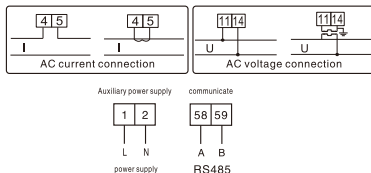
4、Panel Description and Measurement Information Display

4.1 LED digital tube display

Single row digital display measurement information: single–phase voltage; Single phase current;

Display unit: A. V

Four buttons are used for display switching or programming settings: " ◁ " and " ▷ " are the addition and subtraction keys for switching page numbers or numerical values; "SET"means entering the programming state; " ↵ " is the selection confirmation key

K is the order of magnitude of the measurement data. The K light on indicates that the actual value is 1000 times the displayed value;

4.2 LCD display

Single row digital display measurement information: single–phase voltage; Single phase current;

Four buttons are used for display switching or programming settings: " ◁ " and " ▷ " are the addition and subtraction keys for switching page numbers or numerical values; "SET"means entering the programming state; " ↵ "is the selection confirmation key

K is the order of magnitude of the measurement data. The K light on indicates that the actual value is 1000 times the displayed value; Display units: A, V

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4.3 Page Display Content

page	content	illustrate
DISP=1 voltage	220.0 v	voltage=220.0V
DISP=2 current	5.000 A	current=5.000A

5、 Programming Operations

In programming mode, the digital display interface adopts a hierarchical menu structure, and the instrument provides a single row of digital display:

The first level is the first level of menu information;

The second level is the second level menu information;

The third level is the third level of menu information.

As shown in the following figure:

Level 1: INPT signal input
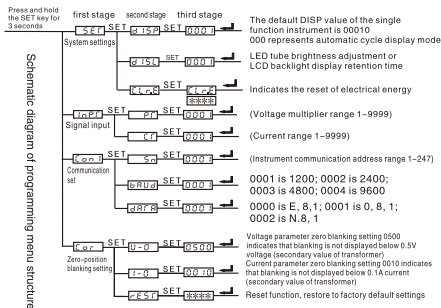
Level 2: CT current ratio

Level 3: 5 current CT value, set to current specification CT=25/5A=5.

InPr A →SET→ 00Cr A →SET→ 0005 A

The organizational structure of the digital display interface menu is as follows, and users can choose appropriate setting parameters according to their actual situation.

Tier 1	Tier 2	Tier 3	Describe
System settings SET	Page Display DISP	0001	The default DISP value of the single function instrument is 0001
	Brightness/backlight display time DISL	0001~0003 or 0000~0120	0001~0003 are LED tube brightness adjustment 0000~0120 is the LCD backlight display holding time (0000 is the backlight always on)
Signal input INPT	Voltage ratio PT	1 ~ 9999	PT value=primary/secondary value of transformer
	Current ratio CT	1 ~ 9999	CT value=primary/secondary value of transformer
communication CONL	address SN	1 ~ 247	Instrument address range: 1~247
	Communication speed BAUD	0001 ~ 0006	0001 is 1200; 0002 is 2400; 0003 is 4800; 0004 is 9600; 0005 is 19200; 0006 is 38400;
	Communication check bit DATA	0000 ~ 0002	0000:E,8,1; 0001:0,8,1; 0002:N,8,1;

5.1 Programming steps

Schematic diagram of programming menu structure

Press and hold the SET key for 3 seconds

first stage / second stage / third stage

System settings
SET — d I SP — SET — 0000 — The default DISP value of the single function instrument is 00010
000 represents automatic cycle display mode

SET — d I SL — SET — 000 — LED tube brightness adjustment or LCD backlight display retention time

SET — CLoC — SET — CLoC — Indicates the reset of electrical energy

Signal input
I nP E — SET — P E — SET — 000 — (Voltage multiplier range 1~9999)

SET — C E — SET — 000 — (Current range 1~9999)

Communication set
Conn — SET — Sn — SET — 000 — (Instrument communication address range 1~247)

SET — bAud — SET — 000 — 0001 is 1200; 0002 is 2400; 0003 is 4800; 0004 is 9600

SET — dAE A — SET — 000 — 0000 is E, 8,1; 0001 is 0, 8, 1; 0002 is N,8, 1

Zero–position blanking setting
Eor — SET — U-0 — SET — 0500 — Voltage parameter zero blanking setting 0500 indicates that blanking is not displayed below 0.5V voltage (secondary value of transformer)

SET — I-0 — SET — 00 I0 — Current parameter zero blanking setting 0010 indicates that blanking is not displayed below 0.1A current (secondary value of transformer)

SET — CE SE — SET — Reset function, restore to factory default settings

Operating instructions:
(a) After changing the data (or options) of the third level menu, press "↵"
The key must be pushed back to the second level menu to take effect.
(b) The wiring method can be modified according to the actual on–site wiring method.
(c) In general, the label behind the instrument already indicates the class of the instrument
Type parameters, users can also reprogram and set the instrument according to actual needs.
(d) When changing values, use the "◀" and "▶" keys to increase or decrease
Small, shift through the "SET" key.
6.2 Example of alarm setting:

6、Transportation and storage

6.1 The transportation and storage of instruments should be in accordance with Chapter 4 of GB/T 25480–2010 "Basic Environmental Conditions and Test Methods for Transportation and Storage of Instruments and Meters". The storage environment temperature should be between –25 ℃ and+50 ℃, with a relative humidity not exceeding 85%, and the harmful substances in the air should not be sufficient to cause corrosion of the instruments.
6.2 The product should be stored in the warehouse and placed on a shelf with a stacking height of no more than 6 boxes. After unpacking, the stacking height of a single packaged product should not exceed 10.
6.3 Please do not power on the meter and contact the supplier as soon as possible when there are obvious signs of damage to the casing caused by severe impact or falling from a height during transportation, use, and installation.

7、Company commitment

7.1 Within 24 months from the date of production of the product, if the customer's normal storage, transportation, maintenance, and use, and the company's seal is intact and not removed, and the product cannot be used normally due to manufacturing issues, the "three guarantees" service shall be provided.

RS485 Protocol

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1. Protocol

1.1 Physical layer

1.1.1 RS485 communication port, asynchronous half-duplex mode;

1.1.2 Communication speed 1200-38400bps can be set, factory default 9600dps;

1.1.3 Byte transfer format: 1 bit for initial bit, 8 bit for data bits, odd-even check
(N81, E81, 081 can be selected), factory default N81.

1.2 Digital communication protocol

The meter is provided with serial asynchronism half-duplex RS485 communication port, adopt MODBUS-RTU protocol, various data can be transferred through communication line. One line can connect 32pcs meter at the same time, each meter can set different communication address. The communication terminal number of different series meters is different. communication should be connected by the shielded twisted-pair cable with copper network, and the diameter not less than 0.5mm^2.When wiring, keep the communication wire away from strong electric cables or other strong electric field, T type network Wiring is recommended (see Fig.1),Star-type or other wring is not recommended.
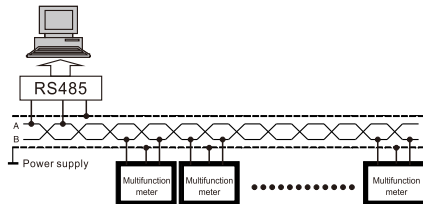

Fig.1