7.4 DI(External switch input)addredd area: 02H read

Table 14

	Object	Data range	Data type	Attribute
00H	DI1	0=OFF, 1=ON	bit	R
01H	DI2		bit	R
02H	DI3		bit	R
03H	DI4		bit	R

7.5 DO(Internal relay output)address area:01H read,05H write

Table 13

	Object	Data range	Data type	Attribute
00H	OUT1	0=OFF, 1=ON When the internal relay is used for PC control, the corresponding Chx(x=1~4) should be set as oFF.	bit	R/W
01H	OUT2		bit	R/W
02H	OUT3		bit	R/W
03H	OUT4		bit	R/W

7.6 Explanation:

7.6.1 Data type

bit: 1 binary bit, data range 0~1

integer: 16-bit signed integer, negative numbers are represented by complement£data range -32768~32767;

word£16-bit unsigned integer, data range 0~65535

Dword:32-bit unsigned integer, data range 0~4294967296

7.6.2 Attribute: R: read only, R/W: read and write

7.6.3 Output menu£The Lx, Hx, dFx menu address with note "*", the parameters according to the setting of Chx(x~1Ħ4) should be solved as following:

Voltage object: parameter value=communication value÷10 (V)

Current object: parameter value=communication value÷1000 (A)

Frequency object: parameter value=communication value÷100 (Hz)

Power object: parameter value=communication value (W, var, VA)

Power factor object: parameter value=communication value÷1000

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CNAOB®

Harmonic Multifunctional Network Power Instrument Manual V17.1

Chapter 1. General Introduction

Multifunctional network electric power meter (hereinafter referred to as instrument) can be used to measure the all common electrical parameters (voltage, current, frequency, power, power factor, electric energy) and can be added the functions of switch input (DI), alarm output (DO) , analog outputs, communication, or electric energy pulse output .

Chapter 2. Technical Parameters

Table 1

Technical parameters			Index
Input	Network		Three-phase three-wire, three-phase four- wire
	Voltage	Rated value	AC 100V or AC400V
		Over load	Consistent：1.2 times instantaneous：2 times
		Consumption	<0.5VA/phase
		Impedance	>5kΩ/V
	Current	Rated value	AC 1A or 5A
		Over load	Consistent：1.2 times instantaneous：10 times
		Impedance	<20mΩ/phase
	Frequency		45~65Hz
Output	Electric energy pulse	Output mode	Open-collector optical coupling pulse output
		Pulse constant	10000 imp/kWh 10000 imp/kvarh
	Communication	Output mode	RS485
		Protocol	MODBUS-RTU
	Analog	Output mode	voltage: DC 0-5V, 1-5V current: DC 0-20mA, 4-20mA
		Load	voltage：≥1k current≤300Ω
	Alarm DO	Output mode	normally open contact of relay
		Contact rating	2A/250VAC 2A/30VDC
	switch input DI	Input mode	Passive contact
Measuring accuracy	Voltage, current		class 0.2
	Frequency		±0.05Hz
	Power		class 0.5
	Power factor		class 0.5
	Electric energy		active class 0.5, reactive class 0.2 (only for reference, not for meterage)
Aux.power supply	Scope		AC/DC 85~264V or AC 220V±15%
	Consumption		<5VA
Safety	Withstand voltage	Input and Power	>2kV 50Hz 1min
		Input and output	>2kV 50Hz 1min
		Output and Power	>2kV 50Hz 1min
	Insulating resistance		Any two of input, output, source, casing>20MΩ
Work environment	Temperature		-10~50℃
	Humidity		≤85%RH,free of wet and gas corruption

Chapter 3. Model and Definition

AB－EH □ □ □ Y □

- Switching input (economy type) :
  No: no Switch input KR2: 2-Switch input KR4: 4-Switch input
- Stroke segment LCD
- Functions:
  No: no outputs L: 2-channel relay K: 4-channel relay C: 2-channel analog
  B: 4-channel analog T: Rs485 U: 2-channel relay+RS485 S: 4-channel relay+RS485
  A: 2-channel analog+RS485 D: 4-channel analog+RS485
  M: 2-channel relay+2-channel analog N: 2-channel relay+2-channel analog+RS485
- Shape:
  2: 120X120mm 3: 80X80mm 7: 72X72mm 9: 96X96mm G: 88X72mm
- Meter type:
  E: Multifunctional network power instrument
- Product series no.:
  Harmonic Multifunctional Network Power Instrument

Chapter 4 Installment and connection

4.1 Shape and cutout hole dimension(unit:mm)

Table 2

Instrument shape	Panel dimension		Case dimension			Hole cutout dimension	
	W	H	W	H	D	W	H
120×120	120	120	110	110	80	112	112
80×80	80	80	75	75	80	76	76
72×72	72	72	67	67	80	68	68
96×96	96	96	91	91	80	92	92
Slideway type : long 88 × wide 72 × high 60							

4.2 Method of installation

According to the instrument dimension, choose the corresponding hole cutout dimension from the table above, make a hole in the installation screen, insert the instruments into the hole, place the two clamping pieces into the clamping holder and push and tighten them by hand.

4.3 Terminal arrangement and function declaration of instrument

(Note: If it is not the same with the wiring schema of the instrument case, please accord to the one of instrument case)

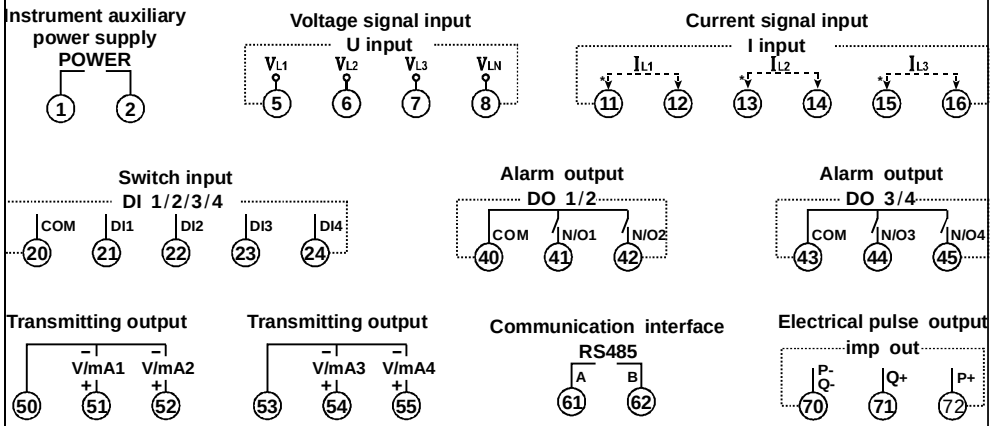


Table 13

Address (Hexadecimal)	Measuring value	Explanations	Data type	Attribute
46H	Max.value of A-phase voltage	Voltage value =communication value×Pt÷10 Unit: V when 3-phase 3-wire, the max. and min. value correspond to the line voltage; when 3-phase 4-wire, the max. and min. value correspond to the phase voltage	integer	R
47H	Max.value of A-phase voltage		integer	R
48H	Max.value of B-phase voltage		integer	R
49H	Min.value of C-phase voltage		integer	R
4AH	Min.value of B-phase voltage		integer	R
4BH	Min.value of C-phase voltage		integer	R
4CH	Max.value of A-phase current	Current value =communication value×Ct÷1000 Unit: A Unit£kWh、kvarh	integer	R
4DH	Max.value of B-phase current		integer	R
4EH	Max.value of C-phase current		integer	R
4FH	Min.value of A-phase current		integer	R
50H	Min.value of B-phase current		integer	R
51H	Min.value of C-phase current		integer	R
52H(High 16 bits) 53H(Low 16 bits)	Positive active electric energy	The instrument is default with primary side electric energy. Primary side electric energy value =(high 16-bit communication value×65536 +low 16-bit communication value)÷10 If you need the secondary side electric energy, please tell us when ordering secondary side electric energy value =(high 16-bit communication value×65536 +low 16-bit communication value)÷1000 Unit of electric energy: kWh, kvarh The high and low bit should be written once when presetting each electric energy It will clear automatically when the electric energy >99999999.9kWh/kvarh	Dword	R/W
54H(High 16 bits) 55H(Low 16 bits)	Negative active electric energy		Dword	R/W
56H(High 16 bits) 57H(Low 16 bits)	Positive reactive electric energy		Dword	R/W
58H(High 16 bits) 59H(Low 16 bits)	Negative reactive electric energy		Dword	R/W
5AH	Total harmonic distortion rate of A phase voltage	Harmonic data =communication value ÷ 10, unit: %	integer	R
5BH, 5CH	Odd and even harmonic distortion rate of A phase voltage		integer	R
5DH～70H	2nd~21th. harmonic percentages of A phase voltage		integer	R
71H	Total harmonic distortion rate of B phase voltage		integer	R
72H, 73H	Odd and even harmonic distortion rate of B phase voltage		integer	R
74H～87H	2nd~21th. harmonic percentages of B phase voltage		integer	R
88H	Total harmonic distortion rate of C phase voltage		integer	R
89H、8AH	Odd and even harmonic distortion rate of C phase voltage		integer	R
8BH～9EH	2nd~21th. harmonic percentages of C phase voltage		integer	R
9FH	Total harmonic distortion rate of A phase current		integer	R
A0H、A1H	Odd and even harmonic distortion rate of A phase current		integer	R
A2H～B5H	2nd.~21th. harmonic percentages of A phase current		integer	R
B6H	Total harmonic distortion rate of B phase current		integer	R
B7H、B8H	Odd and even harmonic distortion rate of B phase current		integer	R
B9H～CCH	2nd.~21th. harmonic percentages of B phase current		integer	R
CDH	Total harmonic distortion rate of C phase current		integer	R
CEH、CFH	Odd and even harmonic distortion rate of C phase current		integer	R
D0H～E3H	2nd.~21th. harmonic percentages of C phase current		integer	R

7.2 Extended interface address area:03H/04H read, 06H/10H write

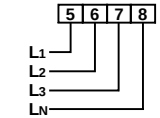
Table 12

Address (Hexadecimal)	Parameter	Explanations	Data type	Attribute
21H	Extended interface	To read this register, it will return the software version no. (Version No=communication value÷10) write in 5100, the instrument will be reset and restarted write in 5170, it will clear all the electric energy data write in 5175, it will reset all the max./min.value write in 5177, it will clear all the demand data	integer	R/W

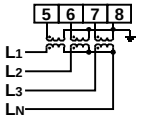
7.3 Electrical parameters address area: 03H/04H read, 10H write

Table 13

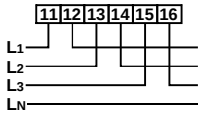
Address (Hexadecimal)	Measuring value	Explanations	Data type	Attribute
22H	AB line voltage	Voltage value= communication value×Voltage ratio Pt÷10 Unit:V when 3-phase 3-wire, 25H~27H voltage value are fixed as 0	integer	R
23H	BC line voltage		integer	R
24H	CA line voltage		integer	R
25H	A-phase voltage		integer	R
26H	B-phase voltage		integer	R
27H	C-phase voltage		integer	R
28H	A-phase current	Current value= communication value× current ratio Ct÷1000 Unit:A	integer	R
29H	B-phase current		integer	R
2AH	C-phase current		integer	R
2BH	Frequency	Frequency value =communication value ÷100 Unit:Hz	word	R
2CH	Total active power	Power value= communication value×Pt×Ct Unit:W, var or VA	integer	R
2DH	Total reactive power		integer	R
2EH	Total apparent power		integer	R
2FH	Total power factor	Power factor value = communication value ÷ 1000	integer	R
30H	A-phase active power	Power value= communication value×Pt×Ct Unit:W, var or VA when 3-phase 3-wire, 33H~38H power value are fixed as 0	integer	R
31H	B-phase active power		integer	R
32H	C-phase active power		integer	R
33H	A-phase reactive power		integer	R
34H	B-phase reactive power		integer	R
35H	C-phase reactive power		integer	R
36H	A-phase apparent power		integer	R
37H	B-phase apparent power		integer	R
38H	C-phase apparent power		integer	R
39H	A-phase power factor	Power factor value = communication value ÷ 1000 when 3-phase 3-wire, 39H~3BH power factor value are fixed as 0	integer	R
3AH	B-phase power factor		integer	R
3BH	C-phase power factor		integer	R
3CH	Voltage average value	Voltage value=communication value×Pt ÷10 Unit: V	integer	R
3DH	Current average value	Current value =communication value×Ct÷1000 Unit:A	integer	R
3EH	Current positive active demand value	Power value =communication value×Pt×Ct Unit: W, var, VA	integer	R
3FH	Current negative active demand value		integer	R
40H	Current positive reactive demand value		integer	R
41H	Current negative reactive demand value		integer	R
42H	Max. positive active demand value		integer	R
43H	Max. negative active demand value		integer	R
44H	Max. positive reactive demand value		integer	R
45H	Max. negative reactive demand value		integer	R



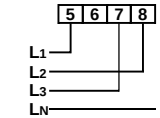
Voltage input directly (nEt=n3.4)



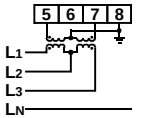
Voltage input via PT (nEt=n3.4)



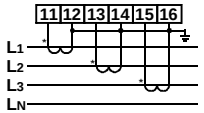
Input directly



Voltage input directly (nEt=n3.3)



Voltage input via PT (nEt=n3.3)

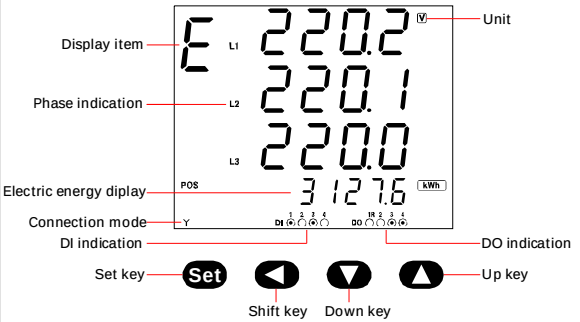


Input via current transformer

Terminal description:
POWER:Auxiliary power supply input terminal, AC/DC 85~264V or AC 220V±15%
U input: A, B, C three-phase AC voltage signal input port
I input: A, B, C three-phase AC current signal input port and I* is current inlet wire.
DI input : external switching value input port (with +14V power supply internal)
imp out: energy pulse output, open collector voltage VCC≤48V,current Iz≤20mA
OUT1~4: 1~4th channel of relay or transmitting output port
RS485: communication output port

Chapter 5. Programming and usage

5.1 Panel description



No display item: electrical parameters
E: Electric energy parameters
d: average, Max. Min. demand value
L1, L2, L3: A phase, B phase, C phase
L1-2, L2-3, L3-1: AB phase, BC phase, CA phase
Σ : total
MAX : maximum
MIN : Minimum
AVE : average
CUR : current
Y : 3-phase 4-wire
△ : 3-phase 3-wire
⊓⊔ : communication status
POS : positive
NEG : negative
MENU : programming status
DI : switching input
DO : switching output
○ : DI、DO is OFF status
◉ : DI、DO is ON status
R : DO can be used for PC control

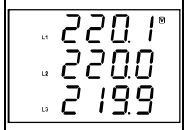
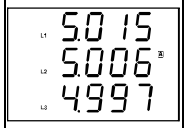
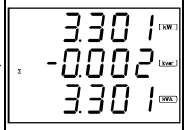
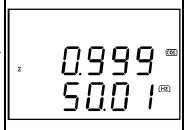
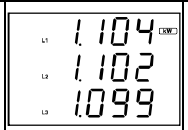
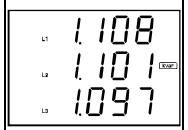
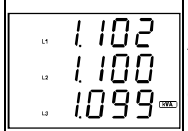
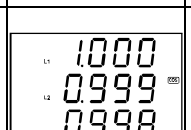
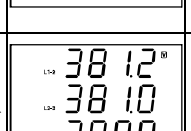
5.2 Key Functions

SET KEY: Under the measuring display status, it will display "codE" by pressing SET key for 2s, enter the right password(default 0) and press SET key again to enter the programmable mode of main menu.
Under the programming mode, it is for saving of the modified parameter values and enter the next menu.
SHIFT KEY: Under the measuring display status, it will display "codE" by pressing this key for 2s, enter the right password(default 0) and press SET key again to enter the programmable mode of the output menu(invalid if without output functions).
Under the measuring display status, it will shift between the display items(no display item, E or d) by pressing SHIFT key one time.
Under the programming mode, this key is used to move the cursor to the left one.
DOWN KEY: Under the measuring display mode, it is to enter the previous display interface. And it will display the version number when pressing this key for 2s.
under the programming mode, it is used for depression of parameter value or enter the previous menu.
UP KEY: Under the measuring display mode, it is to enter the next display interface and it will display "codE" by pressing this key for 2s, enter the right password(default 0) and press SET key again to enter the programming mode of the clear menu and reset menu.
Under the programming mode, it is used for progressive increase of parameter value or enter the next menu;

5.3 Explanations of display mode diSP

By setting the diSP programming menu you can select the following 10 kinds of display modes.
When there is no display items, it will return to the DiSP set display mode if 30s after switching the display interface manually.

Table 3

diSP menu Parameter/code		Demonstration	Description
0	CYC		Automatic cycle shows the following 9 interface
1	U-LN		Display the each phase voltage, the left picture shows: A-phase voltage: 220.1V B-phase voltage: 220.0V C-phase voltage: 219.9V It will be instead of interface 9 when 3-phase 3-wire
2	I		Display the each phase current, the left picture shows: A-phase curent: 5.015A B-phase curent: 5.006A C-phase curent: 4.997A
3	P95t		Display the total active power, total reactive power and total apparent power, the left picture shows: Total active power: 3.301kW Total reactive power: -0.002kvar Total apparent power: 3.301kVA
4	PFtF		Display the total power factor and frequency, the left picture shows: Total power factor: 0.999 Frequency: 50.01Hz The signal bit of total power factor and total active power are the same.
5	P		Display the each phase active power, the let picture shows: A-phase active power: 1.104kW B-phase active power: 1.102kW C-phase active power: 1.099kW
6	q		Display the each phase reactive power, the left picture shows: A-phase reactive power: 1.108kvar B-phase reactive power: 1.101kvar C-phase reactive power: 1.097kvar It won't display this interface when 3 phase 3-wire
7	S		Display the each phase apparent power, the left picture shows: A-phase apparent power: 1.102kVA B-phase apparent power: 1.100kVA C-phase apparent power: 1.099kVA It won't display this interface when 3 phase 3-wire
8	PF		Display the each phase power factor, the left picture shows: A-phase power factor: 1.000 B-phase power factor: 0.999 C-phase power factor: 0.998 The signal bit of each phase power factor and each phase active power are the same. It won't display this interface when 3 phase 3-wire
9	U-LL		Display the phase line voltage, the left picture shows: AB line voltage:381.2V BC line voltage:381.0V CA line voltage:380.9V

Chapter 7. Communication information

The instrument is provided with RS485 communication interface, adopt MODBUS-RTU communication protocol. And the provided function codes are as following:

Table 10

Function code (Hexadecimal)	Definition	Explanation
01H	read DO status	to get the ON/OFF status of internal relay
02H	read DI status	to get the ON/OFF status of external switch
03H/04H	read register	to get n (n≥1) continuous register data
05H	control DO	to change the ON/OFF status of one internal relay
06H	write single register	to change one register data
10H	write several continuous registers	to change n (n≥1) continuous register data

7.1 Menu parameter address area: 03H/04H read, 06H/10H write

Table 11

Address (Hexadecimal)	Corresponding menu	Setting range	Data type	Attribute
00H	Display mode diSP	0~5/0 ~ 9	integer	R/W
01H	Cycle time interval t	10~100(t=Communication value÷10)	integer	R/W
02H	Display object of electric energy Eobj	0~4	integer	R/W
03H	Start-up mode of the max. and min. value and backlight lighting time bLt	0~2999	integer	R/W
04H	Demand value cycle d.t	5~60	integer	R/W
05H	Input network nEt	0~1	integer	R/W
06H	Voltage transformer ratio Pt	10~30000(Pt=Communication value÷10)	integer	R/W
07H	Current transformer ratio Ct	1~9999 or 1~2000	integer	R/W
08H	Communication address Addr	1~247	integer	R/W
09H *	Communication baud rate bAud	0~4	integer	R/W
0AH *	Communication data format PAr	0~3	integer	R/W
0BH *	Programming password codE	0~9999	integer	R/W
0CH	Alarm or transmitting object of channel 1 Ch1	0~32	integer	R/W
0DH	Alarm or transmitting lower limit of channel 1 L1	-9999~9999	integer	R/W
0EH *	Alarm or transmitting higher limit of channel 1 H1	-9999~9999	integer	R/W
0FH *	Alarm return difference of channel 1 dF1 or the transmitting output correction value of channel 1 Sc1	0~9999/±1.000	integer	R/W
10H *	Alarm output delay of channel 1 or Do1 output pulse width dt1	0~30000(dt1=communication value÷10)	integer	R/W
11H	Alarm or transmitting object of channel 2 Ch2	0~32	integer	R/W
12H	Alarm or transmitting lower limit of channel 2 L2	-9999~9999	integer	R/W
13H *	Alarm or transmitting higher limit of channel 2 H2	-9999~9999	integer	R/W
14H *	Alarm return difference of channel 2 dF2 or the transmitting output correction value of channel 2 Sc2	0~9999/±1.000	integer	R/W
15H *	Alarm output delay of channel 2 or Do2 output pulse width dt2	0~30000(dt2=communication value÷10)	integer	R/W
16H	Alarm or transmitting object of channel 3 Ch3	0~32	integer	R/W
17H	Alarm or transmitting lower limit of channel 3 L3	-9999~9999	integer	R/W
18H *	Alarm or transmitting higher limit of channel 3 H3	-9999~9999	integer	R/W
19H *	Alarm return difference of channel 3 dF3 or the transmitting output correction value of channel 3 Sc3	0~9999/±1.000	integer	R/W
1AH *	Alarm output delay of channel 3 or Do3 output pulse width dt3	0~30000(dt3=communication value÷10)	integer	R/W
1BH	Alarm or transmitting object of channel 4 Ch4	0~32	integer	R/W
1CH	Alarm or transmitting lower limit of channel 4 L4	-9999~9999	integer	R/W
1DH	Alarm or transmitting higher limit of channel 4 H4	-9999~9999	integer	R/W
1EH	Alarm return difference of channel 4 dF4 or the transmitting output correction value of channel 4 Sc4	0~9999/±1.000	integer	R/W
1FH	Alarm output delay of channel 4 or Do4 output pulse width dt4	0~30000(dt4=communication value÷10)	integer	R/W
20H	Transmitting output specifications Sdt	0~1	integer	R/W

Table 8

Mode of entering the program	Menu characters	Setting range	Description
Output menu (Pree SHIFT key for 2s)	dt3	0.0~3000s	Alarm output delay of channel 3 or Do3 output pulse width dt3
	CH4	See table 7	Alarm or transmitting object of channel 4 Ch4
	L4	-9999~9999	Alarm or transmitting lower limit of channel 4 L4
	H4	-9999~9999	Alarm or transmitting higher limit of channel 4 H4
	dF4 Sc4	0~9999 -1.000~1.000	Alarm return difference of channel 4 dF4 Transmitting output 20mA of channel 4 or the correction value corresponding 5V Sc4 (mA/V)
	dt4	0.0~3000s	Alarm output delay of channel 4 or Do4 output pulse width dt4
	Sdt	0-20 0-5 4-20 1-5	Transmitting output specifications Sdt 0: 0-20mA/0-5V 1:4-20mA/1-5V
Reset menu (Pree UP key for 2s)	rSt.L	YES no	YES: reset the max./min. value no: do not reset
	CLr.d	YES no	YES: reset the demand value no: do not reset
	CLr.E	YES no	YES: reset the electric energy no: do not reset

Note : The decimal positions of L1~4, H1~4, dF1~4 will change upon Ch1~4

5.9 Alarm or transmitting object list

Table 9

NO.	Object	Description	NO.	Object	Description	NO.	Object	Description	NO.	Object	Description
0	oFF	no outputs	9	Ic	C-phase current	18	PA	A-phase reactive power	27	AVGU	Voltage average value
1	Uab	AB line voltage	10	FrEQ	Frequency	19	Pb	B-phase reactive power	28	AVG I	Current average value
2	Ubc	BC line voltage	11	Pt	Total ractive power	20	Pc	C-phase reactive power	29	tdPP	Current positive active demand value
3	Uca	CA line voltage	12	Qt	Total reactive power	21	SA	A-phase apparent power	30	tdPn	Current negative active demand value
4	UA	A-phase voltage	13	St	Total apparent power	22	Sb	B-phase apparent power	31	tdQP	Current positive reactive demand value
5	Ub	B-phase voltage	14	PFt	Total power factor	23	Sc	C-phase apparent power	32	tdQn	Current negative reactive demand value
6	Uc	C-phase voltage	15	PA	A-phase active power	24	PFA	A-phase power fator			
7	IA	A-phase current	16	Pb	B-phase active power	25	PFb	B-phase power fator			
8	Ib	B-phase current	17	Pc	C-phase active power	26	PFc	C-phase power fator			

5.10 Programming description of alarm or transmitting output

The setting value of L1~4, H1~4, dF1~4 are calculated according to the formula 1.

Setting value = Expected primary side value ÷ Transformer ratio ·····(formula 1)

For example£The instrument with input network 3-phase 4-wire, input specification 220V, 400/5A, Set the 4-channel of switch outputs respectively as A-phase voltage, A-phase current, A-phase active power and frequency. And if you want to realize the over range alarm of 180V~240V, 100A~360A, 50kW~100kW, 48Hz~52Hz. The setting method is as following:

1. Set the Ch1~Ch4 respectively as UA, IA?, PA and FrEq
2. Set the L1~L4 respectively as 180.0, 1.250, 625, 48.00
3. Set the H1~H4 respectively as 240.0, 4.500, 1250, 52.00
4. Set the dF1~dF4 respectively as 0
5. Set the dt1~dt4 respectively as 0

Realize: When A-phase voltage is lower than 180V or higher than 240V, the relay of OUT1 port is closed, conversely it will be open;
When A-phase current is lower than 100A or higher than 360A, the relay of OUT2 port is closed, conversely it will be open;
When A-phase active power is lower than 50kW or higher than 100kW, the relay of OUT3 port is closed, conversely it will be open;
When the frequency is lower than 48Hz or higher than 52Hz, the relay of OUT4 port is closed, conversely it will be open;

Chapter 6. Cautions

6.1 Please confirm the input network, input specifications, functional configuration are consistent with the actual demand before using the instrument.

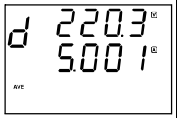
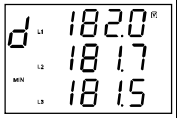
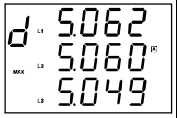
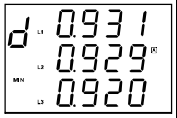
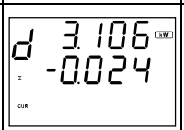
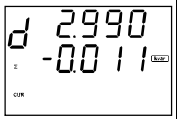
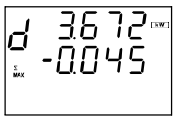
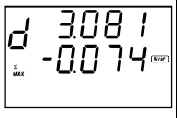
6.2 Please confirm if the instrument power supply, input signal and each terminal wiring are correct and reliable before applying the power.

6.3 The instrument should not be rapped, knocked and vibrate excessively and its using environment should meet the technical requirements.

5.4 Explanations of average, Max/Min, demand value display interface

When the display item is d, it will return to the diSP set display mode if 30s after switching the display interface manually.

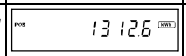
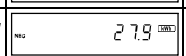
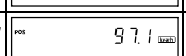
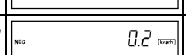
Table 4

NO.	Demonstration	Description
1		Display the average value of voltage and current, the left picture shows: average value of voltage:220.3V average value of current:5.001A It is the average value of line voltage when 3-phase 3-wire
2		Display the max. value of each phase voltage, the left picture shows: Max. value of A-phase voltage: 231.9V Max. value of B-phase voltage: 231.6V Max. value of C-phase voltage: 232.1V It is the max. value of line voltage when 3-phase 3-wire
3		Display the min. value of each phase voltage, the left picture shows: Min. value of A-phase voltage: 182.0V Min. value of B-phase voltage: 181.7V Min. value of C-phase voltage: 181.5V It is the min. value of line voltage when 3-phase 3-wire
4		Display the max. value of each phase current, the left picture shows: Max. value of A-phase current: 5.062A Max. value of B-phase current: 5.060A Max. value of C-phase current: 5.049A
5		Display the min. value of each phase current, the left picture shows: Min. value of A-phase current£0.931A Min. value of B-phase current£0.929A Min. value of C-phase current£0.920A
6		Display the current positive/negative active demand value, the left picture shows: Current positive active demand value:3.106kW Current negative active demand value:-0.024kW
7		Display the current positive/negative reactive demand value, the left picture shows: Current positive reactive demand value£2.990kvar Current negative reactive demand value£-0.011kvar
8		Display the max. positive/negative active demand value, the left picture shows: Max. positive active demand value£3.672kW Max. negative active demand value£-0.045kW
9		Display the max. positive/negative reactive demand value, the left picture shows: Max. positive reactive demand value£3.081kvar Max. negative reactive demand value£-0.074kvar

5.5 Explanations of display mode Eobj

By setting the Eobj programming menu you can select the following 5 kinds of display modes. When the display item is E, it will return to the Eobj set display mode if 30s after switching the display interface manually.

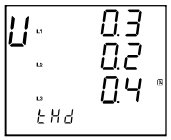
Table 5

Eobj menu Parameter/code		Demonstration	Description
0	oFF		It don't show the electric energy
1	PoSP		The left picture shows: Positive active electric energy: 1312.6kWh
2	nEgP		The left picture shows: Negative active electric energy£27.9kWh
3	PoSq		The left picture shows: Positive reactive electric energy£97.1kvarh
4	nEgq		The left picture shows: Negative reactive electric energy£0.2kvarh

5.6 Voltage harmonic display

When the display item is U, it can switch the display object below manually.

Table6

NO.	Demonstration	Description
1~23		The left picture shows: Total harmonic distortion rate of A phase voltage: 0.3% Total harmonic distortion rate of B phase voltage: 0.2% Total harmonic distortion rate of C phase voltage: 0.4%

Prompt character description：

THd：total harmonic distortion

THd－odd：Total odd harmonic distortion

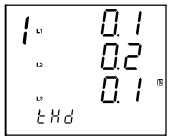
THd－EUEN：Total even harmonic distortion

Hr－2～21：2nd～21th harmonic percentages

5.7 Current harmonic display

When the display item is I, it can switch the display object below manually.

Table 7

NO.	Demonstration	Description
1~23		The left picture shows: Total harmonic distortion rate of A phase current: 0.1% Total harmonic distortion rate of B phase current: 0.2% Total harmonic distortion rate of C phase current: 0.1%

The prompt character description is the same with above

5.8 Menu Structure

Under the measuring value display mode, it can enter the corresponding programming mode by holding to press the SET, SHIFT or UP key for 2s.

Under the programming mode, it will return to the measuring value display mode if holding to press the SET key for 2s or no key operation for 120s

Table 8

Mode of entering the program	Menu characters	Setting range	Description
Main menu (Pree SET key for 2s)	diSP	CYC U-LN I PQSt PFtF P q S PF U-LL	Display mode diSP nET = n3.3 0: CYC Cycle display 1:U-LL Line voltage of each phase 2: I Current of each phase 3: PqSt Total active/reactive /apparet power 4: PFTF Total power factor, frequency 5: P Active power of each phase nET = n3.4 0: CYC Cycle display 1:U-LN Phase voltage 2: I Current of each phase Total active/reactive /apparet power 4: PFTF Total power factor, frequency 5: P Active power of each phase 6: q Reactive power of each phase 7: S Apparent power of each phase 8: PF Power factor of each phase 9: U-LL Line voltage of each phase
	t	1.0~10.0s	Cycle time interval t
	Eobj	oFF PoSP nEgP PoSq nEgq	Display object of electric energy Eobj 0: oFF do not display electric energy 1: PoSP Positive active electric energy 2: nEgP Negative active electric energy 3: PoSq Positive reactive electric energy 4: nEgq Negative reactive electric energy
	bLt	0~2999min	Start-up mode of the max. and min. value and backlight lighting time bLt The first bit for setting the start-up mode of the max. and min. value: 0:Start automatically when power on for 1min 1:Start automatically when power on for 1min and reset the current max. and min.value 2:need to manually start after power on The last 3 bits are for setting the backlight lighting time: 0: Continuous lit,unit: min
	dt	5~60min	Demand interval d.t(sliding time1min)
	nEt	n3.3 n3.4	Input network nEt 0:n3.3 3-phase 3-wire 1: n3.4 3-phase 4-wire
	Pt	1.0~3000	Voltage transformer ratio Pt (primary value of PT/secondary value)
	Ct	1~9999(*/1A) 1~2000(*/5A)	Current transformer ratio Ct (primary value of CT/secondary value)
	Addr	1~247	Communication address Addr(default: 1)
	bAud	1200 9600 2400 19.2E 4800	Communication baud rate bAud(default: 9600) 0: 1200 1: 2400 2: 4800 3: 9600 4: 19200
	PAr	n8.2 n8.1 o8.1 E8.1	choose the communication parity mode PAr (default as 0:n8.2 when out of factory) 0: n8.2, no parity, 8 data bits, 2 stop bits 1: n8.1, no parity, 8 data bits,1 stop bit 2: o8.1, odd parity, 8 data bits,1 stop bit 3: E8.1, even parity, 8 data bits,1 stop bit
	codE	0~9999	Programming password codE(default: 0)
Output menu (Pree SHIFT key for 2s)	CH1	See table 7	Alarm or transmitting object of channel 1 Ch1
	L1	-9999~9999	Alarm or transmitting lower limit of channel 1 L1
	H1	-9999~9999	Alarm or transmitting higher limit of channel 1 H1
	dF1 Sc1	0~9999 -1.000~1.000	Alarm return difference of channel 1 dF1 Transmitting output 20mA of channel 1 or the correction value corresponding 5V Sc1 (mA/V)
	dt1	0.0~3000s	Alarm output delay of channel 1 or Do1 output pulse width dt1
	CH2	See table 7	Alarm or transmitting object of channel 2 Ch2
	L2	-9999~9999	Alarm or transmitting lower limit of channel 2 L2
	H2	-9999~9999	Alarm or transmitting higher limit of channel 2 H2
	dF2 Sc2	0~9999 -1.000~1.000	Alarm return difference of channel 2 dF2 Transmitting output 20mA of channel 2 or the correction value corresponding 5V Sc2 (mA/V)
	dt2	0.0~3000s	Alarm output delay of channel 2 or Do2 output pulse width dt2
	CH3	See table 7	Alarm or transmitting object of channel 3 Ch3
	L3	-9999~9999	Alarm or transmitting lower limit of channel 3 L3
	H3	-9999~9999	Alarm or transmitting higher limit of channel 3 H3
	dF3 Sc3	0~9999 -1.000~1.000	Alarm return difference of channel 3 dF3 Transmitting output 20mA of channel 3 or the correction value corresponding 5V Sc3 (mA/V)