KP-3100Three Phase High Precision

Energy Reference Meter

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1. Introduction

KP-3100 three phase energy reference meter is a high precious Three phase energy reference meter, it uses the advanced technology and latest electronic components available in the world, and use high speed DSP as the main processor to ensure the accuracy and long time stability.

1.1 Features and main function

1) voltage input: 40V—480V.
2) current input: 0.01A—120A.
3) CT work scope: 50%-120%
4) Test Mode: 3p3w watt 3p4w watt
   3p3w Var 3p3w Var
5) Communication : RS232C Communication port

2. Technical specification

1) voltage input: 40V—480V(60/120/240/480).
2) current input: 0.01A—120A.
   (100/50/25/10/5/2.5/1/0.5/0.25/0.1/0.05/0.025)
3) CT work scope: 50%-120%
4) Test Mode: 3p3w watt 3p4w watt
   3p3w Var 3p3w Var
5) Communication : RS232C Communication port
6) Fout: $f_H=C_H \cdot p/3600$ (H_z)

   $f_L=f_H/10000$ (H_z)

   Output mode: TTL
7) meter constant table:

Table 1: C_H(P/kwh)

	100A	50A	25A	10A	5A	2.5A
480V	8×10^5	1.6×10^6	3.2×10^6	8×10^6	1.6×10^7	3.2×10^7
240V	1.6×10^6	3.2×10^6	6.4×10^6	1.6×10^7	3.2×10^7	6.4×10^7
120V	3.2×10^6	6.4×10^6	1.28×10^7	3.2×10^7	6.4×10^7	1.28×10^8
60V	6.4×10^6	1.28×10^7	2.56×10^7	6.4×10^7	1.28×10^8	2.56×10^8

	1A	0.5A	0.25A	0.1A	0.05A	0.025A
480V	8×10^7	1.6×10^8	3.2×10^8	4×10^8	8×10^8	1.6×10^9
240V	1.6×10^8	3.2×10^8	6.4×10^8	8×10^8	1.6×10^9	3.2×10^9
120V	3.2×10^8	6.4×10^8	1.28×10^9	1.6×10^9	3.2×10^9	6.4×10^9
60V	6.4×10^8	1.28×10^9	2.56×10^9	3.2×10^9	6.4×10^9	1.28×10^{10}

$C_L=C_H/10000$

8) accuracy: 0.02% / 0.05%

	Class 0.05
active power(energy)	0.05%
Reactive power(energy)	0.05%

9) Display

Display parameters: U(V)/I(A)/P(Watt)/S(VA)/Q(var)/
Pf (-1.0000—1.0000)/ θ(0°—360°)/F(HZ)

10) Power supply: 220V±10%、50Hz/60 Hz
11) Power Consumption: 15VA
12) Warm UP time: < 30min
13) Working environment:
Temperature: 5℃—40℃
Humidity: ≤85%
14) Size: 482mm×420mm×140mm
15) Weight: 7kg

3. Outlook

3.1 Front panel

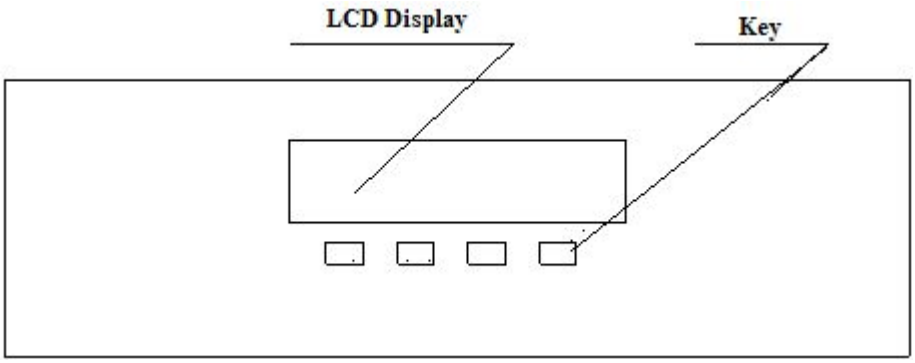
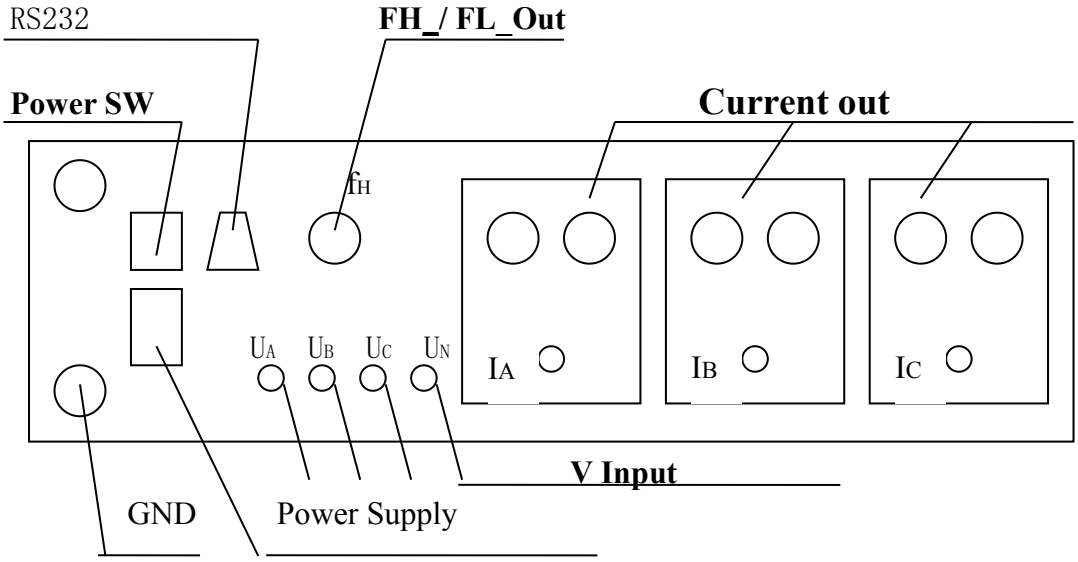


Figure 1: Front panel

3.2 Back panel



Mention: Before turn on power supply for reference meter, user should connect Voltage input/Current Input/RS232 Communication cable correctly.

4. Embed software user manual

4.1 Definition of Keyboard and Symbol of Display Unit

MODEL : Function Keys

▲ : Select Keys

: Select Keys

▼ : Enter.

U：Voltage.

I：Current.

P：Active Power.

S：Apparent Power(VA).

Q：Reactive Power.

Pf：Power factor.

θ：Angle between U&I.

F：Frequency(HZ).

4.2 Turn On

Turn on power for reference meter, After 15 seconds, meter's main cover will display as below:

U1: 0.00000	Ia: 0.00000	F: 0.00000
U2: 0.00000	Ib: 0.00000	Pf: 0.00000
U3: 0.00000	Ic: 0.00000	Θ: 0.000000
∑P:0.00000	∑Q:0.00000	∑S:0.00000

Figure 3: Main cover

4.3 Test mode select

Press key ‘model’ will enter mode select function, cover will display as below:

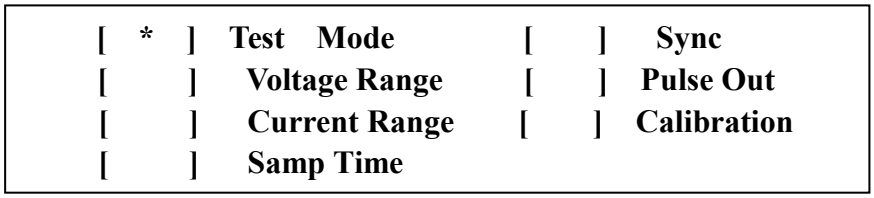


Figure 4: Test mode select cover

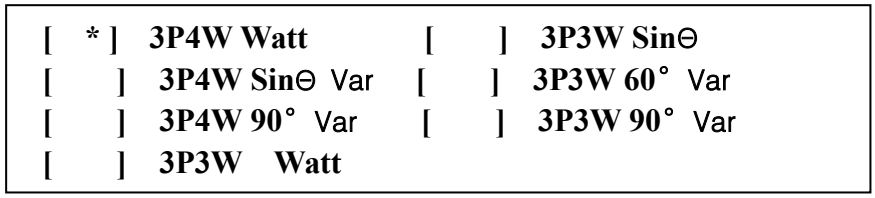


Figure 5: Test mode select cover

4.4 Voltage range select

Press key “model” will enter voltage range select function, cover will display as below:

Figure 6: Voltage range select cover

Use ‘▲ or ▼ ’ to select voltage range, Enter will confirm and return.

4.5 Current range select

Press key ‘model’ will enter current range select function, cover will display as below:

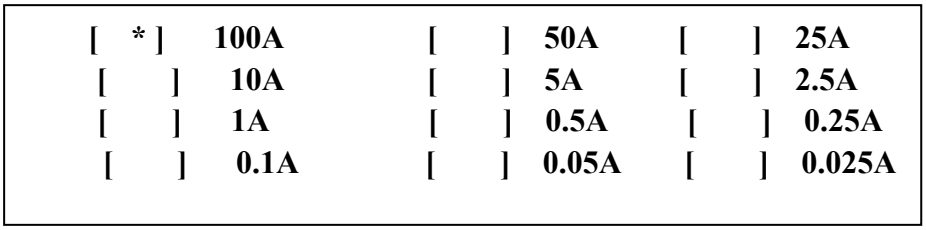


Figure 7: Current range select cover

Use ▲ or ▼ ’ to select current range, Enter will confirm and return.

4.6 Alarm information

When input voltage is over the selected voltage range, meter will display alarm information as below:

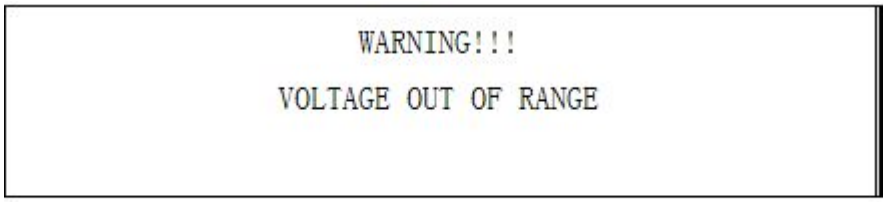


Figure 8: Voltage alarm

When input current is over the selected current range, meter will display alarm information as below:

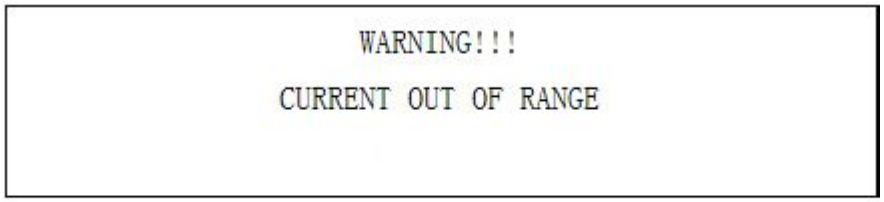


Figure 9: Current alarm

5. Communication protocol

5.1 Communication settings

settings: 9600,n,8,1 .

5.2 Pin definition of RS232 Port

Pin No	Mean
1	Null
2	RXD
3	TXD
4	Null
5	GND
6	Null
7	Null
8	Null
9	Null

5.3 Order list

5.3.1 Voltage range select

Send:

Order Code	Para	EOF
UB	X	0D(HEX)

X=0，480V
X=1，240V
X=2，120V
X=3，60V

Answer：

Answer Code	Para	EOF
UBACK		3B(HEX)

5.3.2 Current range select

Send:

Order Code	Para	EOF
IB	0,X	0D(Hex)

X=0，100A

X=1，50A

X=2，25A

X=3，10A

X=4，5A

X=5，2.5A

X=6，1A

X=7，0.5A

X=8，0.25A

X=9，0.1A

X=A，0.05A

X=B，0.025A

Answer：

Answer Code	Para	EOF
IBACK		3B(Hex)

5.3.3 Test mode select

Send:

Order Code	Para	EOF
MS	X	0D(Hex)

X=0，active power.

X=1, reactive power.

Answer：

Answer Code	Para	EOF
MSACK		3B(HEX)

5.3.4 Test result readout

Send:

Order Code	Para	EOF
DT	0	0D(Hex)

Answer：

Answer Code	Para	EOF
MSACK	Test result(below)	3B(HEX)

Test result format is described as below:
Test result include 15 parameters, every parameter is combined with identify code and real data.

Identify code	Data(ASC)	unit	mean	comment
A	XXXXXXXX	V	Voltage	Voltage
B	0000000000			resverd
C	0000000000			resverd
D	XXXXXXXX	A	current	Current
E	0000000000			resverd
F	0000000000			resverd
G	XXXXXXXX	W	Active Power	Active Power
H	XXXXXXXX	VA	Apparent	Apparent
I	XXXXXXXX	VA	ReactivePowe	ReactivePowe
J	XXXXXXXX		PF	PF
K	XXXXXXXX	°	Angle U&I	Angle U&I
L	XXXXXXXX	Hz	Frequency	Frequency
M	X		V range	V range
N	X		I range	I range
O	X		Test Mode	Test Mode

Every real data's data length is 10 asc code. If data is positive number, then the previous 6 number is integer, and the last 4 number is decimal. For example :

Voltage real data : 0002208888

Means: Voltage = 220.8888(v)

If data is negative number, then the asc code 'n' means minus. previous 6 number is integer, and the last 4 number is decimal. For example :

Active Power real data : 00n2208888

Means: Active Power = -220.8888(Watt)

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