

Denki

Multifunction Network Electric Power Meter Instruction Book

User Manual v1.0

Thank you to choose our product Multifunction monitor meter, please read this instruction book carefully as below point :

CAUTION

- ◆ This device must be installation and maintain by professional;
- ◆ Before to do this device inside or outside operation,must cut input signal and power source;
- ◆ To always use fit voltage detect device to confirm meter each parts without voltage;
- ◆ Supply this device's electric parameter must in rated range;

Undermentioned condition will result to device damage or device work in abnormal;

- ◆ Auxiliary power source voltage over range
- ◆ Distribute system frequency over range
- ◆ Current,voltage input poles incorrect
- ◆ With electric pull out communication plug
- ◆ No according requirement to connect terminal



Please don't touch the terminals
when the meter is in operation!

Product according the standard:GB/T22264. 7-2008

www.jpprogress.com www.dehutech.com ,E-mail: jppe_sales@hotmail.com

Catalog

I . Product brief	1
1. 1 standard	1
1. 2 General	1
2. Function introduce	2
3. Technical parameter	2
4. Installation and connection	4
4. 1 Meter dimension	4
4.2 Installation sketch	5
4.3 Connection Terminal function	5
4.4 wiring	6
5. programme operation	9
6. Panel explain and measure information display	13
6.1 96 x 96、120x 120 LCD display	13
6.2 80 x 80 LCD	18
6.3 48 x 48、80 x 80、96x96、120x120 LED special display	25
7. Communication protocol	31
8. Function output	38
8. 1 Energy meter and pulse output	38
8.2 switch capacity and transmission mould	38
9. ordinary problem and solution	42

I . Product brief

1. 1 Standard

Reference standard

GB/T 17883-1999 0.2S class and 0.5S stillness type AC active electric meter

GB/T 17882-1999 2 class and 3 stillness type AC reactive electric meter

DL/T 614-1997 multifunction electric power meter

GB/T13850-1998 AC energy transfer as analog quantity or digital signal's electric measure transmitted.

Perform Standard:

GB/T 22264.1-2008 install type digital display electric measure meter No.1 part: Define and General Requirement.

GB/T 22264.2-2008 install type digital display electric measure meter No.2 part: Current meter and voltage meter's special requirement

GB/T 22264.3-2008 install type digital display electric measure meter No.3 part: Power meter and reactive power meter's special requirement

GB/T 22264.4-2008 install type digital display electric measure meter No.4 part: frequency meter's special requirement

GB/T 22264.5-2008 install type digital display electric measure meter No.5 part: phase meter and power factor meter's special requirement

GB/T 22264.7-2008 install type digital display electric measure meter No.7 part: Define and General requirement

GB/T 22264.8-2008 install type digital display electric measure meter No.8 part: command test way

1. 2 General

Multifunction monitor meter

Multifunction monitor meter with high ability and precision power parameter,in real time measure,harmonic measure,positive and negative active power/reactive power electric energy measure,Time-sharing count,fix time mark,power quality analyse,real time wave display,event record,demand and so on function, and with configure abundance input output ports to monitor and control local device status, and integration RS-485 communication port,integration with each kinds intelligent distribute system and power energy manage system,share abundance monitor data and power quality data.

Multifunction with best competitive,can direct instead of general power transmitted, measure meter,power energy measure meter and relative auxiliary unit,have widely application,like energy manage system,power monitor system,industry and mining enterprise,public place,intelligent building and switch board those power net system.

II . Function introduce(see the table.1)

table.1

Measure function		Remark
Real time measure	Three phase voltage	Basic function
	Three phase current	
	Power, Frequency, power factor	
Electric energy measure	Active power	expand function
	Reactive power	
	Two way measure	
demand	UIPQ	
Power pulse	dry contact point	
Transmitted output	4~20mA/0~5V	
Switch input	dry contact point	
Relay output	AC250V5A remote/alarm	
Leakage current detection	Zerosequencecurrent	
Communication	RS485 Port MODBUS-RTU	
Display type	Special display board, LCD display	

III. Technical parameter(see table .2)

table .2

		parameter
Signal input	Connection	Three phase four wires/three phase three wires
	Measurement range	380V/100V
	Over load	continuous:1.2 multiple instantaneous:2 multiple
	Power consumption	<1VA
	Measurement range	5A/1A
	Over load	continuous:1.2 multiple instantaneous:2 multiple
	Power consumption	<1VA
	Frequence	45~65Hz

Power source	AC/DC 85~265 V <5VA
Energy pulse	Dry power opticalcoupler collector output fixed pulse width recording $80\text{mS} \pm 20\%$
Communication	Rs485 communication port,physical layer isolation. According international standard MODBUS-RTU agreement Communication speed 1200~9600 Test type N81、E81、081
Analog output	0/4~20mA or 0~5/10V Transmitted output Programme set transmitted item and relative value
relay output	Programme remote/ alarm relay output Capacity 5A/250VAC 5A/30VDC Programme alarm energy,switch input,analog input or remote way
Remote Switch	Remote switch input measure,dry contact input Program relate alarm output
Measure class	Energy: 0. 5S: frequency: $\pm 0. 1\text{Hz}$ Actitive Power: 0. 5S Reactive Power: 1S
Display	Special display,LCD display
Evernionment	Working temperature: -10~55°C Save temperature:-20~75°C Relative Humidity: <80%RH
Safe	Isolation:Signal,power source,output terminal crust resistance >5M Ω Withstand:Signal input,power source,between output crust resistance >AC2KV

IV. Installation and connection

4.1 Meter dimension(see table .3)

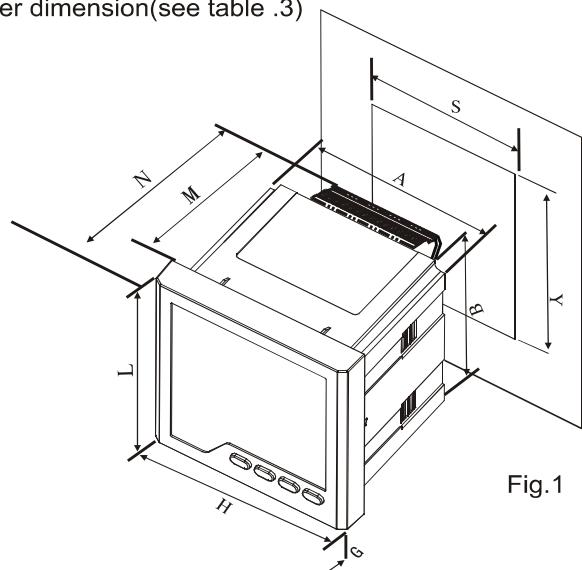


Fig.1

Installation dimension $A \times B$
open dimension: $S \times Y$
Panel dimension: $L \times H$ (unit mm)

Table 3

Outline dimension ($L \times H$) Unit (mm)	Board assemble dimension ($A \times B$) Unit (mm)	Open dimension ($S \times Y$) Unit (mm)	Total length (N) (mm)	Depth (M) (mm)
120×120	110×110	111×111	93	78
96×96	91×91	92×92	93	78
80×80	75×75	76×76	93	78
80×80	67×67	68×68	93	78
48×48	44×44	45×45	90	84

4.2 Installation sketch(see fig.2)

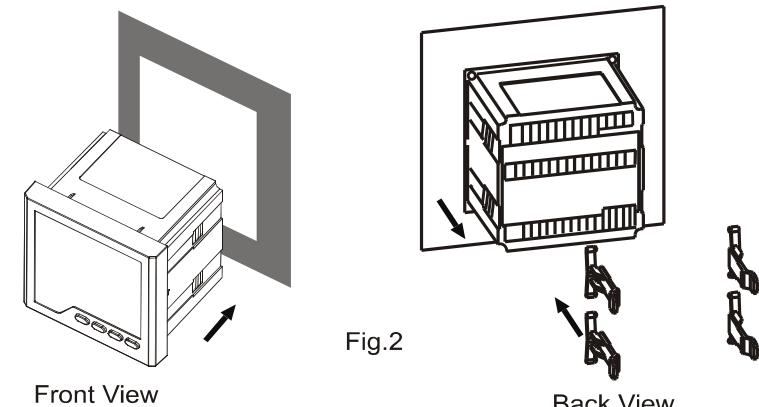


Fig.2

Front View

Back View

4.3 Connection Terminal function(see Table.4)

Table.4

Power Source	1, 2	AC/DC85~265V, AC220V
Current signal	4, 5, 6, 7, 8, 9	4,6,8 is three phase current input terminal
Voltage signal	11, 12, 13, 14	Separate is three phase voltage input UA、UB、UC、UN
Relay output	15—22	4 ways relay output
Transmitted output	30—34	4 way 4-20mA transmitted output,30 public terminal
Energy Pulse	47, 48, 49, 50	47,49 is dry power output positive port,connect exterior power source positive port
No.2 way	55, 56	Separate is A+、B-
No.1 way	58, 59	Separate is A+、B-
Switch input	70—81	11 way switch input,70 is public terminal
Residual current sample input	83—90	83 is public,84-90 is signal input port
Fireprotection	91—97	91,92 is release,93-94 is fire protection input, 95-97 is fire protection deedback

Use explain:

- (a)1.2 is meter auxiliary power source in work,please ensure supply power source use in this series product,to avoiding damage product.
- (b)4,6,8 is current transformer's input terminal,with*code mean is current's input terminal.
- (c) three phase three wires connection:in three phase three wires network,Current of B phase no need connection,UB connect to NO.14 terminal,the detail connection as per 4.4 wiring.
- (d)Detail connection port use,please according detail product crust's diagram to connection.

4.4 wiring

4.4 .1 Below introduce three kinds basic function of low voltage network diagram

1)Basic energy measure + switch capacity input+analog transmited output(see fig.3)

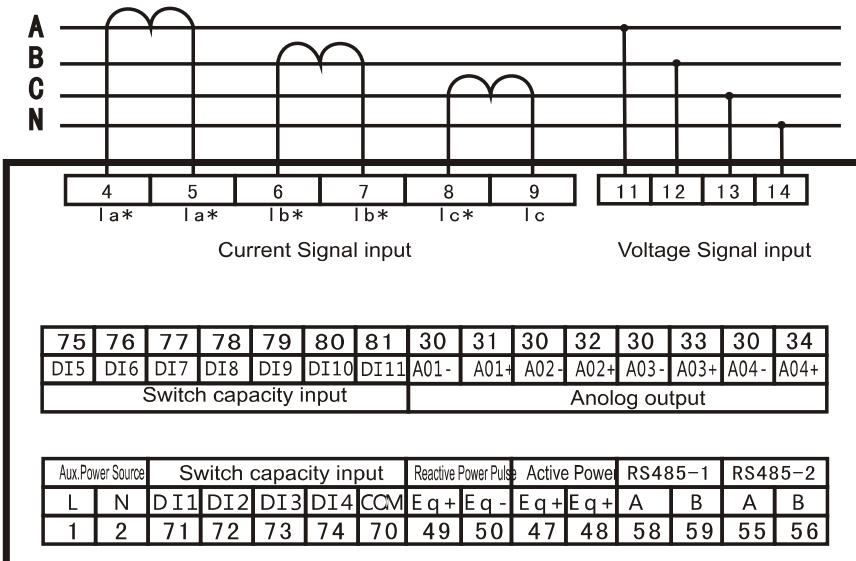


Fig.3

2)Basic energy measure + switch capacity input+switch capacity output(see fig.4)

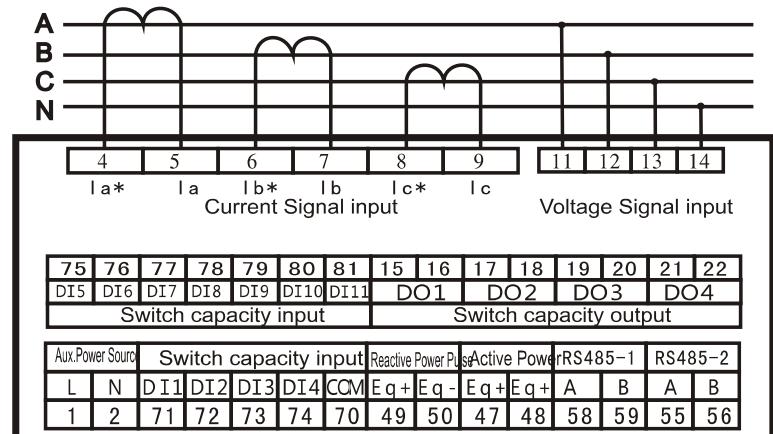


Fig.4

3)Basic energy measure + switch capacity input+Fire fight monitor(see fig.5)

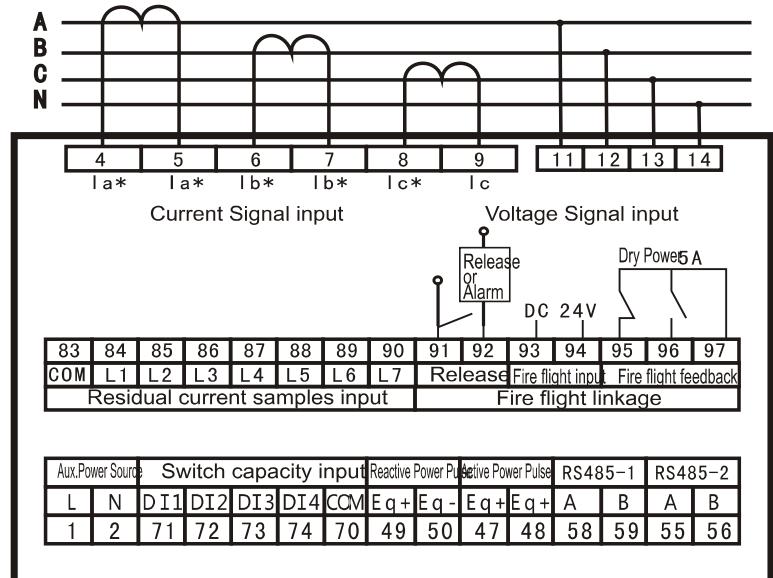
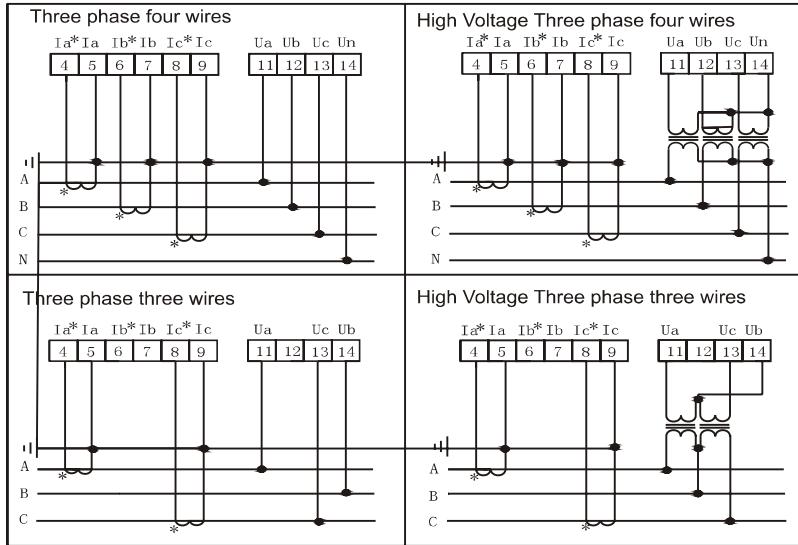


Fig.5

4.4 .2 Input Signal Wiring(See fig.6)



4.4 .2 Input Signal Wiring(See fig.6)

Connection wiring explain:

- (a)Voltage input:Input voltage no over product's rated voltage(100V or 400V),or else should consider use PT,To easy in maintain,suggest use the terminal block.
- (b)Current input:Standard rated input current is 5A,over 5A's condition should use exterial CT.If use other meter on the CT,connection should adopt serial type,before moving product current input wiring,must first cut CT first loop or short connect secondard loop,to easy in maintain,suggest use the terminal block.
- (c)Meter can work in three phase four wires or three phase three wires type,user should according present use condition choose relative connection.As usual,in no center line status,use three phase three wires type,in have center line status,use three phase four wires type.Three phase three wires can install 2 pcs CT(A and C phase),three phase four wires should install 3 pcs CT(If only 2 CT,can consist other one phase current).
Notice:In meter can set two kinds connection type,practice wiring type and inside set type must in consistent.or else the measure data is no exact in meter.

The detail wiring type,pulse constant those technical parameter according to product diagram.

V . programme operation

In programme status,digital interface adopt layers structure menu type,meter supply three lines number display(Fig.7)

No.1 line is First layer menu information;

No.2 line is second layer menu information;

No.3 line is third layer menu information;

Ie: The right fig.7 show: No.1 layer:INPT signal input,No.2 layer:CT current change rated, No.3 layer:5 current CT value,mean set is current specification CT value=25/5A=5.

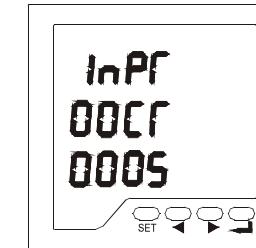


Fig.7

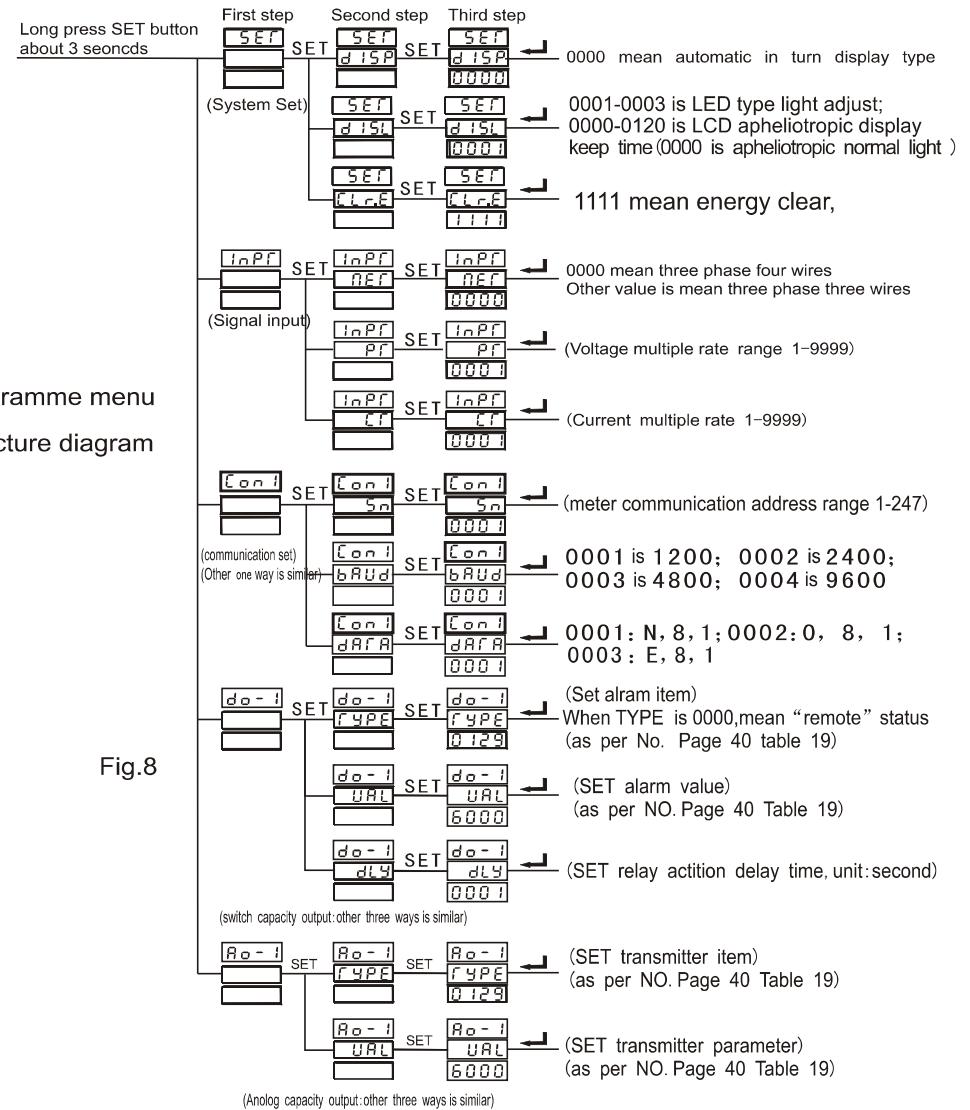
Table.5

	No.1 Layer	No.2 Layer	No.3 Layer	Describe
System SET	Display DISP	0000-0017	0000 mean automatic in turn display(Each board connect see Table 6,7,8)	
				0001-0003 is LED type light adjust; 0000-0120 is LCD aphelotropic display keep time(0000 is aphelotropic normal light)
	D ISL	0001-0003 或 0000-0120	1111	1111 mean energy clear, other value invalidation
Energy Clear DATA CLr. E				

Signal Input INPT	Wiring type NET	0000 or other value	0000 mean three phase four wires Other value is mean three phase three wires
	Voltage transformation ratio PT	1~9999	PT value=mutual inductor primary value/second value
	Current transformation ratio CT	1~9999	CT value=mutual inductor primary value/second value
Communication Set CON i (i is 1~2)	Address SN	1~247	meter address range1~247
	Communication speed BAUD	0001~0004	0001 is 1200; 0002 is 2400; 0003 is 4800; 0004 is 9600
	Data format DATA	0001~0003	0001 : N, 8, 1 ; 0002 : 0, 8, 1 ; 0003 : E, 8, 1
Relay output Set DO-i (i is 1~4)	Choose alarm item or close alarm (refer to 8.2 relay output)	Set alarm item's specific threshold value	Choose alarm item, and Set relative threshold value (when alarm item is switch capacity, no need set threshold value), once meet alarm condition, switch output make
Transmited output Set A0-i (i is 1~4)	Choose transmitter item or close transmitter (refer to 8.2 transmitter output)	Set transmitter item's full scale value	Choose transmitter item's and relative energy parameter (namely 0~20mA, 4~20mA, 4~12~20mA) ie set to "A0-1" "TYPE"0135"UAL"5000 is mean when A phase current 0~5A relative first way 4~20mA's transmitter output signal

Notice: The above menu item is belong to complete functions item, if user in use process found menu have some item less or useless, mean user choose the product no support this function.

Programme Set Steps(see fig.8)



Operation explain:

- (a) After revised the third layer menu's data(or option), need press "⬅" button to back the second menu then have effect.
- (b) wiring type can according present practice wiring type to revise.
- (c) in normal condition, the sticker of meter back have remark this meter model parameter and leave factory set parameter, user can according the practice demand to reset programme set.
- (d) After revise value, through "⬅" button and "➡" button increase or decrease, through "SET" button to move.

VI. Panel explain and measure information display

6. 1 96X96、120X120 LCD Display (see fig. 9)

(1) Panel explain

If in display change over no relative information(or relative information useless) mean this model without this function

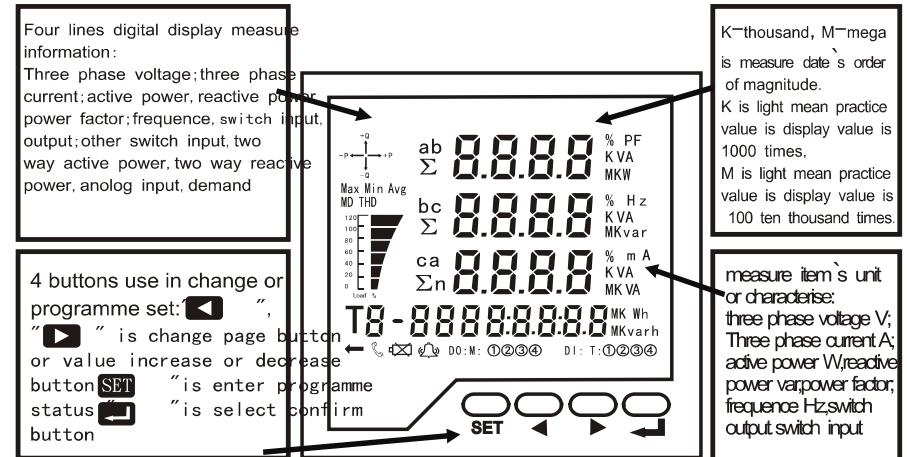


Fig. 9

(2) Board display content(see table 6)

Board	Content	Explain
DISP=1	<p>a 5774 v b 5774 v c 5774 v</p> <p>T 00290805 K Wh</p> <p>SET ← →</p>	<p>Separate display voltage Ua,Ub,Uc (in three phase four wires), forward active kilowatt-hour.</p> <p>In left Fig. Ua=5774V Ub=5774V Uc=5774V Forward active power kilowatt-hour =2908,05kWh</p>

Table 6

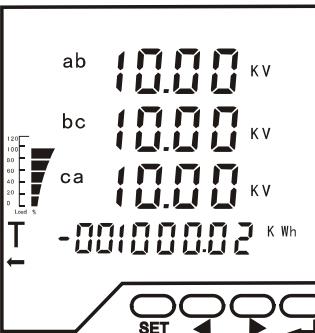
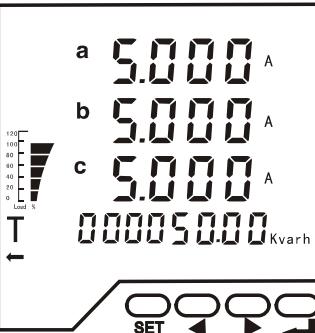
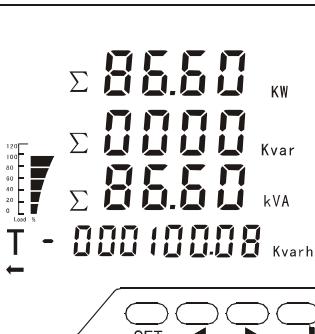
DISP=2 Three phase voltage reverse active power kilowatt-hour		Separate display voltage U_{ab} , U_{bc} , U_{ca} (wires voltage), reverse active kilowatt-hour. In left fig.: $U_{ab}=10\text{ kV}$ $U_{bc}=10\text{ kV}$ $U_{ca}=10\text{ kV}$ reverse active kilowatt-hour. $=1000.02\text{ kWh}$
DISP=3 Three phase current forward reactive power kilowatt-hour		Display 3 phase current I_a, I_b, I_c unit is A,forward reactive kilowatt-hour. In left fig. $I_a=5\text{ A}$ $I_b=5\text{ A}$ $I_c=5\text{ A}$ forward reactive kilowatt-hour. $=50.00\text{ Kvarh}$
DISP=4 Total active power Total reactive power Total apparent power Reverse reactive power		Total active power $=86.60\text{ kW}$ Total active power $=0000\text{ Kvar}$ Total apparent power $=86.60\text{ kVA}$ Reverse reactive power $=100.08\text{ Kvarh}$

Table 6

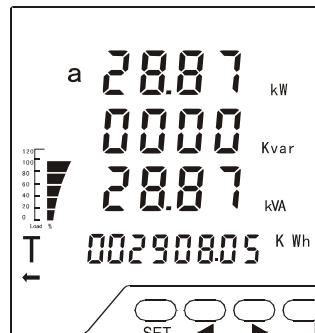
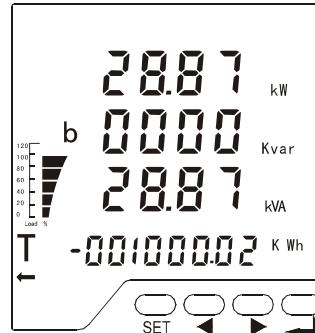
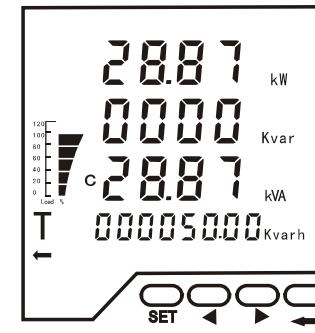
DISP=5 A phase active power A phase reactive power A phase apparent power Forward active power		A phase active power $=28.87\text{ kW}$ A phase reactive power $=0000\text{ Kvar}$ A phase apparent power $=28.87\text{ kVA}$ Forward active power $=2908.05\text{ kWh}$
DISP=6 B phase active power B phase reactive power B phase apparent power Reserve active power		B phase active power $=28.87\text{ kW}$ B phase reactive power $=0000\text{ Kvar}$ B phase apparent power $=28.87\text{ kVA}$ Reserve active power $=1000.02\text{ kWh}$
DISP=7 C phase active power C phase reactive power C phase apparent power Forward reactive power		C phase active power $=28.87\text{ kW}$ C phase reactive power $=0000\text{ Kvar}$ C phase apparent power $=28.87\text{ kVA}$ Forward reactive power $=50.00\text{ Kvarh}$

Table 6

<p>DISP=8 Average current Zero Sequence Current</p>	<p>Avg 5.000 A n 0.006 A T - 0.0005000 Kvarh SET</p>	<p>In left Fig. display Average current =5A Zero Sequence Current=0.006A</p>
<p>DISP=9 Three phase total power factor, frequency, voltage unbalancedness</p>	<p>Σ 1.000 PF Σ 50.00 Hz Σn 0.009 V T 002908.05 kWh SET</p>	<p>In left fig. display Three phase total power factor=1.000 frequency=50Hz voltage unbalancedness=9V forward phase active kilowatt-hour = 2908.05kWh</p>
<p>DISP=10 split phase power factor</p>	<p>a 0.999 PF b 0.999 c 0.999 T -0.00100002 kWh SET</p>	<p>In left diagram a phase split phase power factor = 0.999 b phase split phase power factor = 0.999 c phase split phase power factor = 0.999 Reverse phase active kilowatt-hour = 1000.02kWh</p>
<p>DISP=11 Residual current</p>	<p>0000 0000 1 009 mA SET</p>	<p>In left fig. display Residual current value: 10.09mA</p>
<p>DISP=12 From 1 way to 12 way switch input information</p>	<p>0000 1101 0000 DI SET</p>	<p>First line:1-4 way channel communication Second Line:5-8 way channel communication Third line:9-12 way channel communication In left fig. display:No.5 way,No.6 way.No.8 way channel communication,pyjer channel didn't make</p>
<p>DISP=13 From 1 way to 4 way switch output information</p>	<p>0000 1011 0000 DO SET</p>	<p>In left fig. The second lines is effect information; The 1st way,3 rd way,4th way is channel make, the 2nd way is channel didn't make</p>

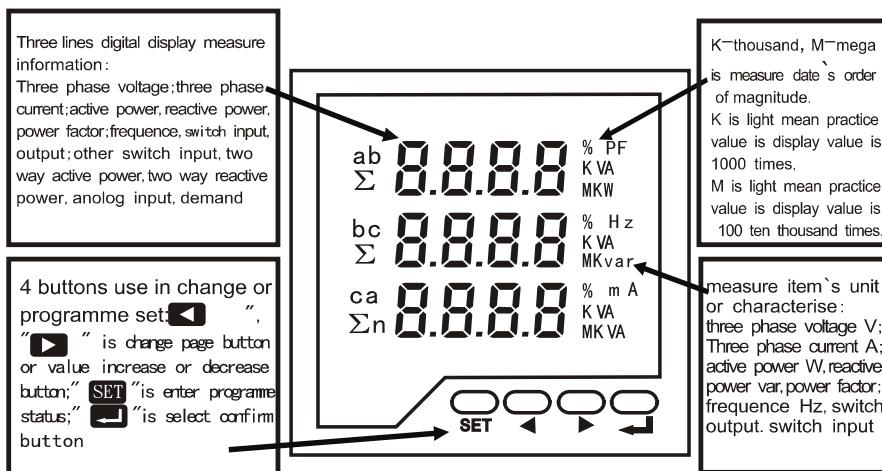
Table 6

Table 6

6.2 80X80 LCD Display (see fig. 10)

(1) Panel explain

If in display change over no relative information (or relative information useless) mean this model without this function



(2) Board display content(see table 7)

Board	Content	Explain
DISP=1 Three phase voltage	a 5774 v b 5774 v c 5774 v	Separate display voltage Ua, Ub, Uc (in three phase four wires). In left Fig. Ua=5774V Ub=5774V Uc=5774V

Table 7

DISP=2	ab 10.00 KV bc 10.00 KV ca 10.00 KV	Three phase voltage reverse active power kilowatt-hour. In left fig.: Uab=10kV Ubc=10kV Uca=10kV
DISP=3	a 5.000 A b 5.000 A c 5.000 A	Display 3 phase current Ia,Ib,Ic unit is A, In left fig.: Ia=5A, Ib=5A, Ic=5A.
DISP=4	Σ 86.60 KW 00.00 Kvar 86.60 kVA	Total active power =86.60kW Total active power =0000Kvar Total apparent power =86.60kVA

Table 7

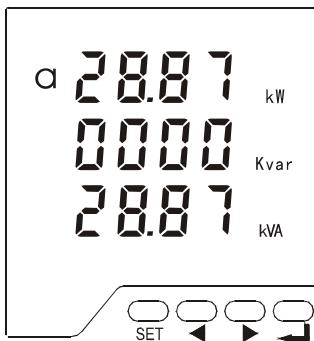
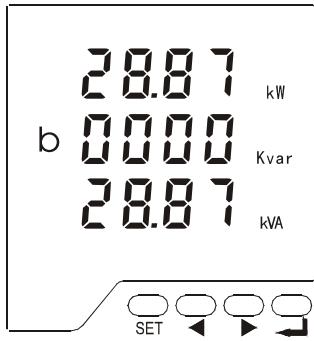
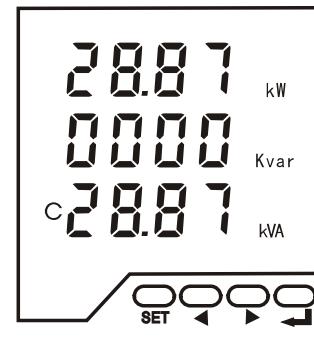
DISP=5 A phase active power A phase reactive power A phase apparent power		A phase active power =28. 87kW A phase reactive power =0000Kvar A phase apparent power =28. 87kVA
DISP=6 B phase active power B phase reactive power B phase apparent power		B phase active power =28. 87kW B phase reactive power =0000Kvar B phase apparent power =28. 87kVA
DISP=7 C phase active power C phase reactive power C phase apparent power		C phase active power =28. 87kW C phase reactive power =0000Kvar C phase apparent power =28. 87kVA

Table 7

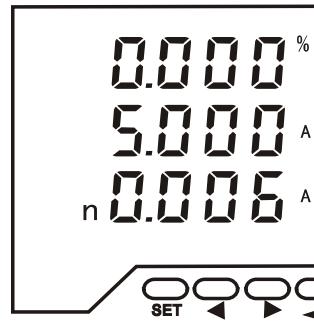
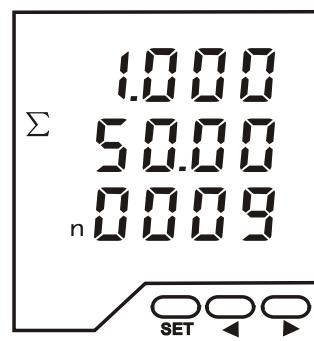
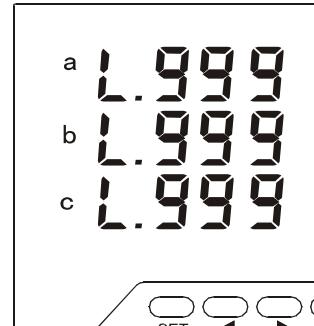
DISP=8 Average current Zero Sequence Current		In left Fig. display Average current =5A Zero Sequence Current=0.006A
DISP=9 Three phase total power factor, frequency, voltage unbalance ness		In left fig. display Three phase total power factor=1.000 frequency=50Hz voltage unbalancedness=9V
DISP=10 split phase power factor		In left diagram a phase split phase power factor =0. 999 b phase split phase power factor =0. 999 c phase split phase power factor =0. 999

Table 7

DISP=11 Forward Active Power energy		In left fig. show forward active power energy value, The second row number show top 4 bit. The third row number is down 4 bit, consist by one 8 bit value. In left fig. show forward active value is 356020.50kWh.
DISP=12 Reverse Active Power energy		In left fig. show Reverse active power energy value, The second row number show top 4 bit. The third row number is down 4 bit, consist by one 8 bit value. In left fig. show Reverse active value is 356020.50kWh.
DISP=13 Forward Reactive Power energy		In left fig. show Forward reactive power energy value, The second row number show top 4 bit. The third row number is down 4 bit, consist by one 8 bit value. In left fig. show forward reactive value is 356020.50kvarh.
DISP=14 Reverse Reactive Power energy		In left fig. show reverse reactive power energy value, The second row number show top 4 bit. The third row number is down 4 bit, consist by one 8 bit value. In left fig. show reverse reactive value is 356020.50kvarh.
DISP=15 Residual current		In left fig. display Residual current value: 10.09mA
DISP=16 From 1 way to 12 way switch input information		First line: 1-4 way channel communication Second Line: 5-8 way channel communication Third line: 9-12 way channel communication In left fig. display: No.5 way, No.6 way, No.8 way channel communication, other channel didn't make

Table 7

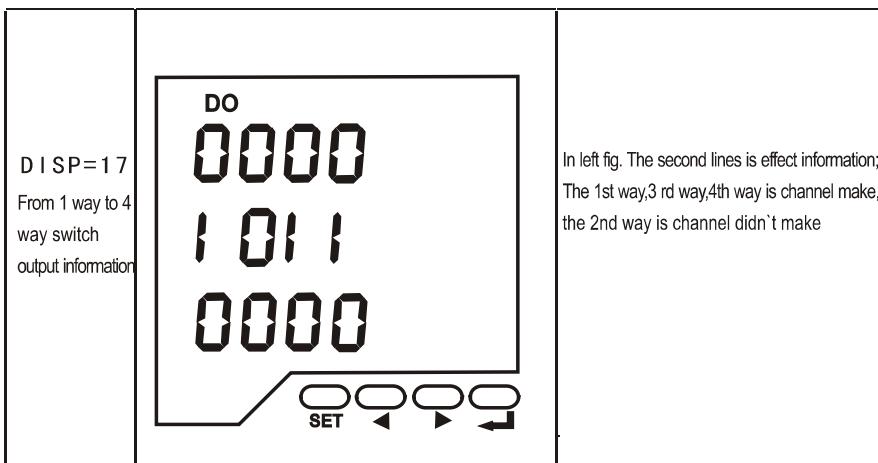


Table 7

6. 3 48X48、80X80、96X96、120X120 LED special Display board(see table 8)

(1) Panel explain

If in display change over no relative information (or relative information useless) mean this model without this function

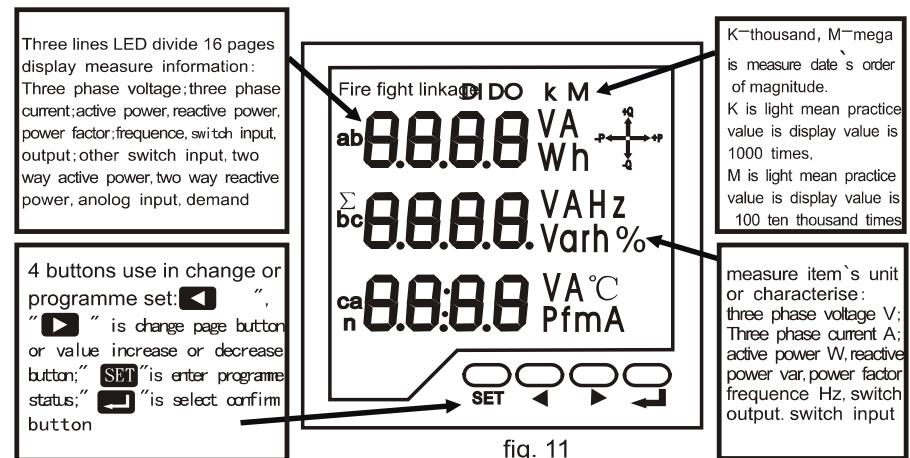


fig. 11

(2) Board display content(see table 7)

Board	Content	Explain
DISP=1 Three phase voltage	a 5774 V b 5774 V c 5774 V	Separate display voltage Ua, Ub, Uc (in three phase four wires), In left Fig. Ua=5774V Ub=5774V Uc=5774V

Table 8

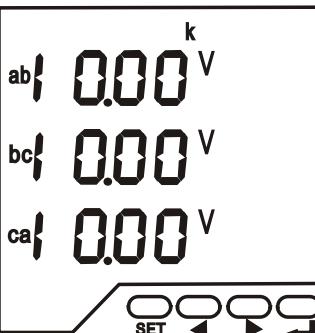
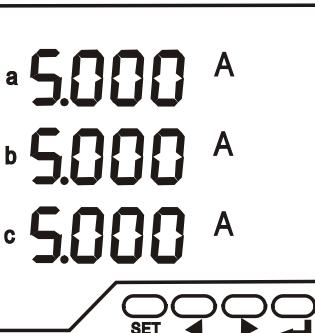
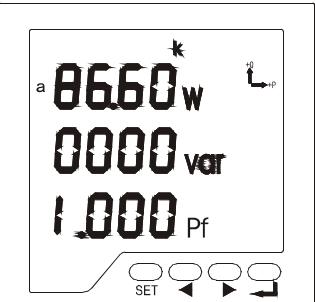
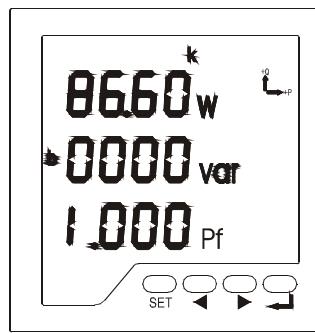
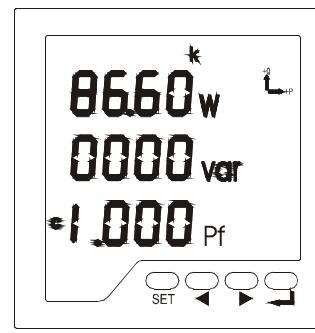
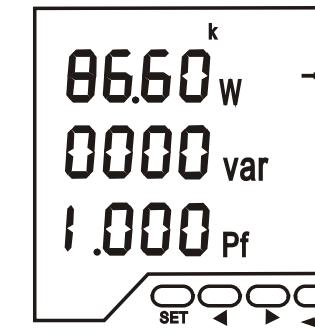
DISP=2 Three phase voltage		Separate display voltage Uab, Ubc, Uca (wires voltage), reverse active kilowatt-hour. In left fig.: Uab=10kV Ubc=10kV Uca=10kV
DISP=3 Three phase current		Display 3 phase current Ia,Ib,Ic unit is A, In left fig.: Ia=5A、 Ib=5A、 Ic =5A。
DISP=4 A phase split phase Active power Reactive power Power Factor		A phase split phase Active power Pa Reactive power Qa Power Factor PFa In left fig Pa=86.6kW, Qa=0var , PFa=1.0
DISP=5 B phase split phase Active power Pb Reactive power Qb Power Factor PFb In left fig Pb=86.6kW, Qb=0var , PFb=1.0		B phase split phase Active power Pb Reactive power Qb Power Factor PFb In left fig Pb=86.6kW, Qb=0var , PFb=1.0
DISP=6 C phase split phase Active power Pc Reactive power Qc Power Factor PFc In left fig Pc=86.6kW, Qc=0var , PFc=1.0		C phase split phase Active power Pc Reactive power Qc Power Factor PFc In left fig Pc=86.6kW, Qc=0var , PFc=1.0
DISP=7 Three phase total Active power P Reactive power Q Power Factor PF In left fig P=86.6kW, Q=0var , PF=1.0		Three phase total Active power P Reactive power Q Power Factor PF In left fig P=86.6kW, Q=0var , PF=1.0

Table 8

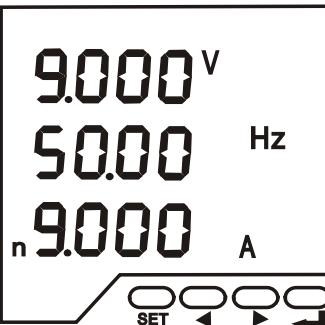
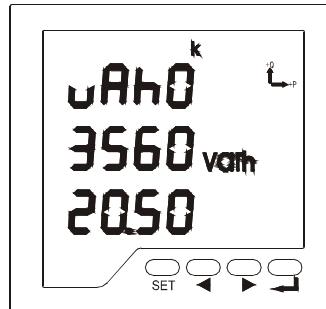
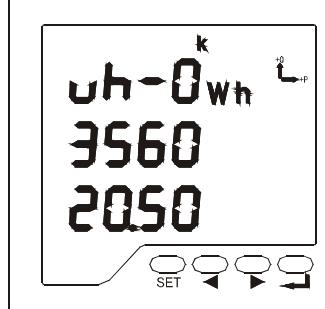
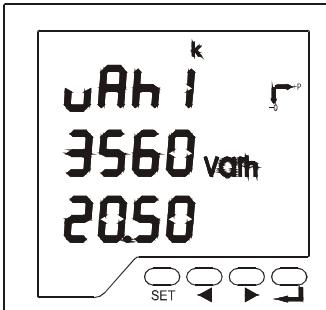
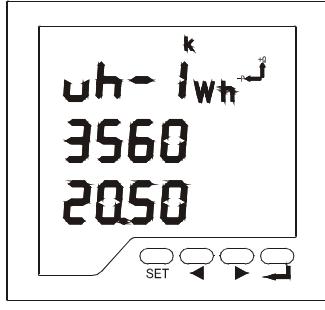
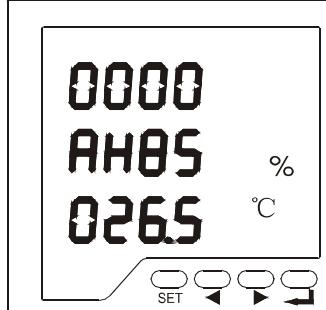
DISP=8 Voltage unbalancedness Frequency,current unbalancedness		In left fig.show: Voltage unbalancedness $U_{THD}=9\%$, Frequency $F=50\text{Hz}$, Current unbalancedness $I_{THD}=9\text{A}$	DISP=11 Forward Reactive power energy		In left fig.show Forward reactive power energy value. The second row number show top 4 bit. The third row number is down 4 bit, consist by one 8 bit value. In left fig.show Forward reactive value is 356020.50kvarh.
DISP=9 Forward Active power energy		In left fig.show Forward active power energy value The second row number show top 4 bit. The third row number is down 4 bit, consist by one 8 bit value. In left fig.show Forward active value is 356020.50kWh.	DISP=12 Reverse Reactive power energy		In left fig.show Reverse reactive power energy value, The second row number show top 4 bit. The third row number is down 4 bit, consist by one 8 bit value. In left fig.show Reverse reactive value is 356020.50kvarh.
DISP=10 Reverse Active power energy		In left fig.show Reverse active power energy value The second row number show top 4 bit. The third row number is down 4 bit, consist by one 8 bit value. In left fig.show Reverse active value is 356020.50kWh.	DISP=13 Environment Humidity Environment Temperature		In left fig.show Environment Humidity $RH=85\%$; Environment Temperature 26.5°C

Table 8

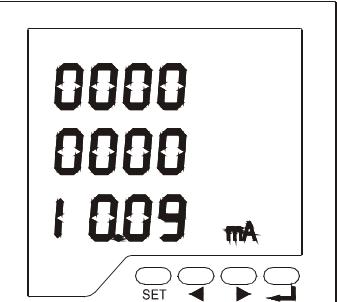
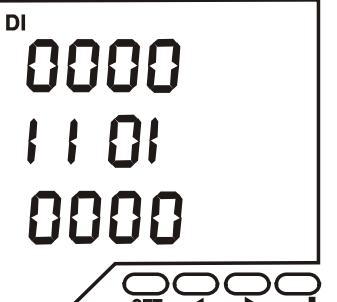
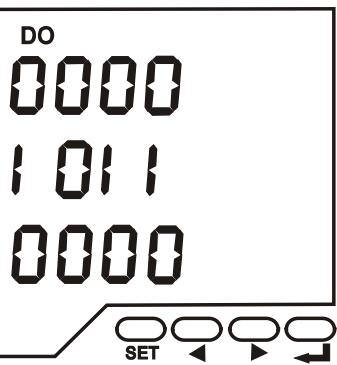
DISP=14 Residual current		In left fig. show Residual current value 10.09mA
DISP=15 From 1 way to 12 way switch input information		First line:1-4 way channel communication Second Line:5-8 way channel communication Third line:9-12 way channel communication In left fig. display:No.5 way,No.6 way.No.8 way channel communication,other channel didn't make
DISP=16 From 1 way to 4 way switch output information		In left fig. The second lines is effect information The 1st way,3rd way,4th way is channel make, the 2nd way is channel didn't make

Table 8

VII. Communication protocol

7.1 physical layer

7.1.1 RS485 communication port.asynchronism semiduplex model;

7.1.2 communication speed 1200-9600bps can set,factory default 2400bps;

7.1.3 byte carry formate:1 bit is first bit,8 bit data bit,parity test(N81,E81,081) can choose,leave factory default E81.

7.2 Digital communication protocol:

meter supply serial asynchronism semiduplex RS 485 communication port,adopt MODBUS-RTU agreement,each kinds data information both carry in communication circuit.In one line circuit can connect more 32pcs network electric meter at same time,each pcs network meter both can set different communication address.different series meter's communication connection terminal number is different.communication connect should use with copper net's STP,stubs size no less 0.5mm2.In wiring should take the communication wire distance strong electric cables or other strong electric field,recommend adopt T type network's connection tye(see fig.12),no suggest adopt Y-delta or other connection.

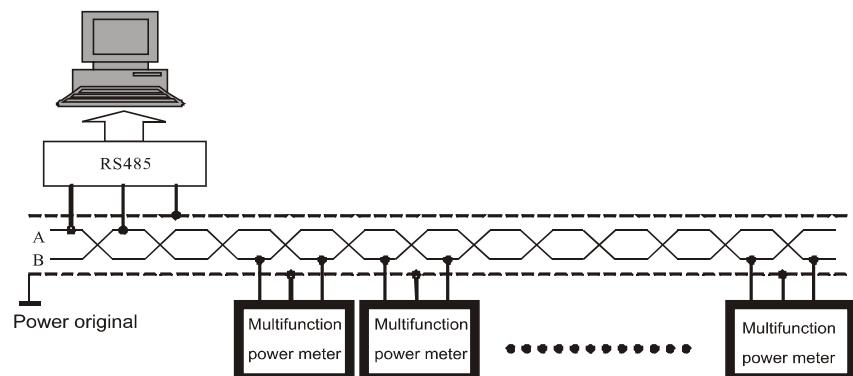


Fig.12