PA/PZ666 - □S Series Three Phase Digital Ammeter/Voltmeter
User Manual

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User Manual

1. Overview

1.1 Application

PA/PZ666 –□ Series ammeter and voltmeter (hereinafter referred to as meters) are mainly used for real-time measurement and display of single-phase AC or DC current and voltage in electrical circuits. It is widely used in low-voltage distribution incoming switch cabinet, feeder switch cabinet, etc. it is designed for power monitoring of power system, communication industry, construction industry, etc. it integrates measurement, communication, alarm and transmission.

It meets the following technical standards:

GB / T 22264.1 Mounted digital display electrical measuring meters- Part 1: definitions and general requirements.

GB / T 22264.2 Mounted digital display electrical measuring meters-Part 2: Particular requirements for ammeters and voltmeters.

GB / T 22264.8　Mounted digital display electrical measuring meters-Part 8: Recommended test methods.

1.2 Features

1) Modular structure design, SMT production process;

2) The display range of voltage and current measurement can be set freely;

3) Switch output function (relay alarm);

4) Analog output (transmission);

5) Communication function (RS485), ModBus-RTU communication protocol;

1.3 Naming rules
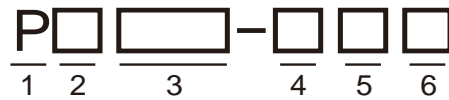
① Product code: Chint digital panel meter

② Group code: A: ammeter Z: voltmeter

③ Registration code: 666

④ Panel size code:

2：72mm×72mm   3：96mm×96mm   4：48mm×48mm

⑤ Signal input category:

None: single phase AC signal input

⑥ Auxiliary function option:

None: linear power supply, no auxiliary function

T: Switching power supply, RS485 communication function

1.4 Environmental

Specified working temperature range: - 10 ℃ ~ + 45 ℃.

Limit of working temperature range: - 25 ℃ ~ + 70 ℃.

Relative humidity: annual average < 93%, no condensation, no corrosive gas place.

Atmospheric pressure: 86kPa ~ 106kPa.

2. Working principle

Modular structure design, auxiliary function optional. Fixed by fixed clamp, easy to install and universal. MCU samples the input signal in real time, processes and displays the sampling results, outputs the upper and lower limits of the measured value according to the parameter values programmed by the selected function module and keyboard, and outputs the measured power data through remote transmission, and communicates with the host computer through RS485 interface to realize networking.
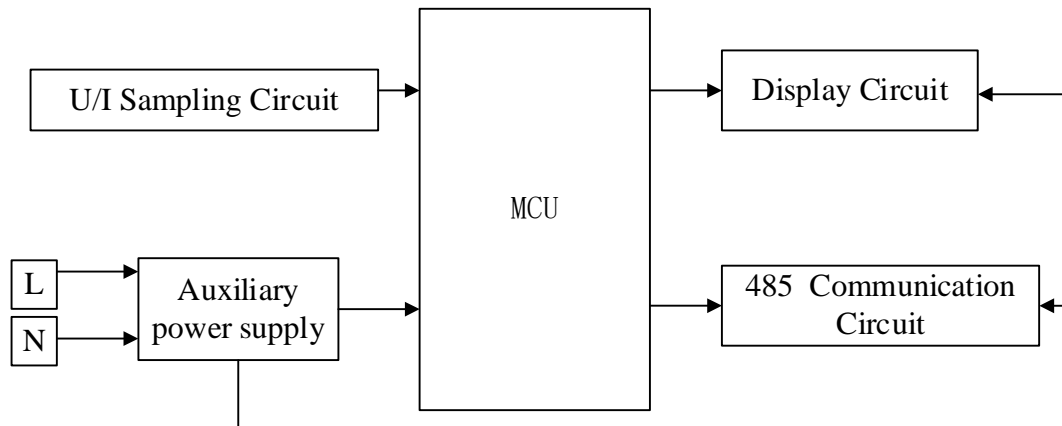
Figure 1 Working principle diagram

3. Basic Specifications

Table 1 Technical parameters

Technical parameter			Values
Accuracy level			Class 0.5
input	Voltmeter	Rating	AC 450V
		Overload	Duration: 1.2 times, instantaneous: 2 times/1s
		Power consumption	< 1VA (per phase)
	Ammeter	Rating	AC 5A
		Overload	Duration: 1.2 times, instantaneous: 10 times/5s
		Power consumption	< 0.5va (per phase)
	Frequency		45Hz～65Hz
output	communication		RS-485 communication interface, ModBus-RTU communication protocol, baud rate 1200, 2400, 4800, 9600, 19200 can be set.
	Display mode		LED display, the highest resolution is 0.1V for voltmeter, 0.001A for ammeter, unit automatic switching, decimal point automatic shift.
	Display range		Voltmeter AC 0 ～ 9999kV Ammeter AC 0 ～ 9999kA If the display range is out of range, the overflow sign "‾‾‾" will be displayed.
Power Supply	Range		Linear power supply AC220 V ± 10%, 50 Hz / 60 Hz,
	Power consumption		Active power consumption ≤ 3W, apparent power consumption ≤ 15VA

Table 2 electromagnetic compatibility and safety

Security	AC withstand voltage	The voltage between the terminals larger than 40V and the terminals smaller than 40V can withstand AC withstand voltage of AC 2kV / 5mA / 1min
	Pulse voltage	The voltage between the terminals larger than 40V and the terminals smaller than 40V can withstand $\pm$ 4kV 1.2/50 μ s pulse voltage (10 times per polarity)
	Insulation resistance	Input and output terminals to case > 100MΩ
	Outage data retention time	Over 10 years
Electromagnetism compatible	Electrostatic discharge immunity	GB/T 17626.2 class 4 (air discharge 15kV)
	Radio frequency electromagnetic field immunity	GB/T 17626.3 class 3 (10V/m)
	Electrical fast transient burst immunity	GB/T 17626.4 class 3 (2kV/5kHz)
	Surge immunity	GB/T 17626.5 class 4 (power supply line 4kV, voltage line 2kV)
	Conducted disturbance immunity of RF field induction	GB/T 17626.6 class 3 (150kHz-80mHz, 10V)
	Attenuation oscillation wave immunity	GB/T 17626.12 class 3 (common mode 2.5kV, differential mode 1kV)
	Radio interference suppression	GB/T 9254 class B

4. Functions

4.1 Display function

Digital tube display

When this light is on, it means A /V.
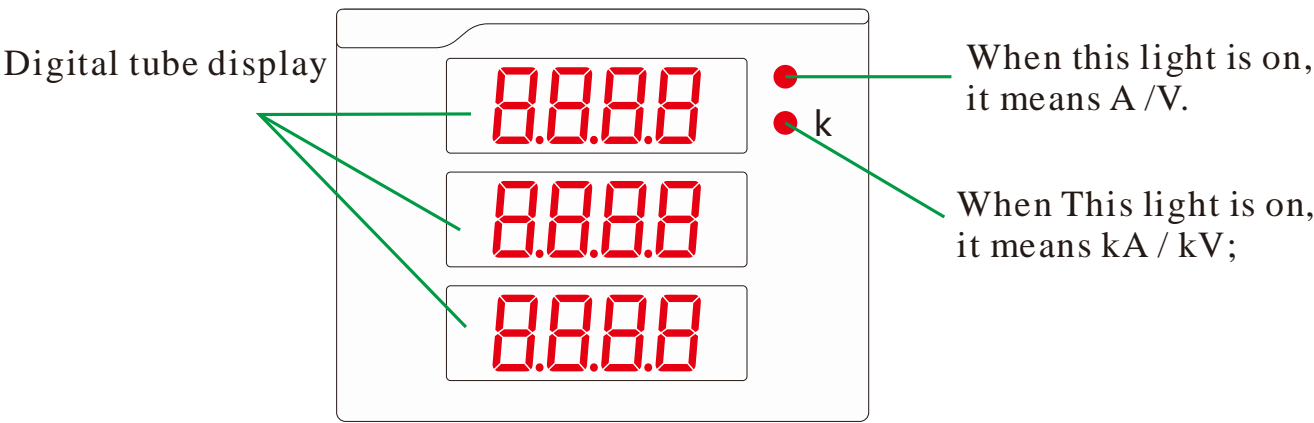
When This light is on, it means kA / kV;

Figure 2 shows

4.2 Programming function

4.2.1 Programming operation flow

Key Description: "SET" key means "OK", or "cursor shift" (when inputting numbers), "ESC" key means "exit", "$\boxed{\vee}$"Key means "minus", "$\boxed{\wedge}$"The key means "plus". Enter the password (default 701) to enter the submenu item of "system settings".
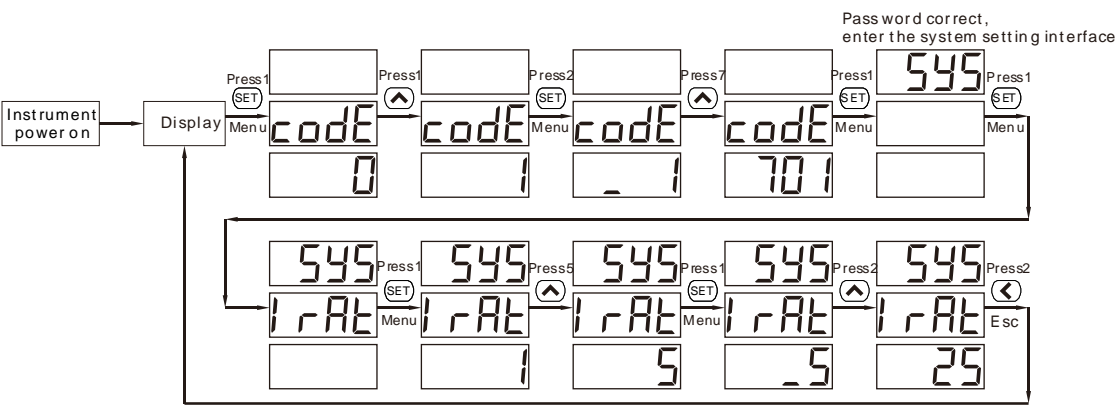

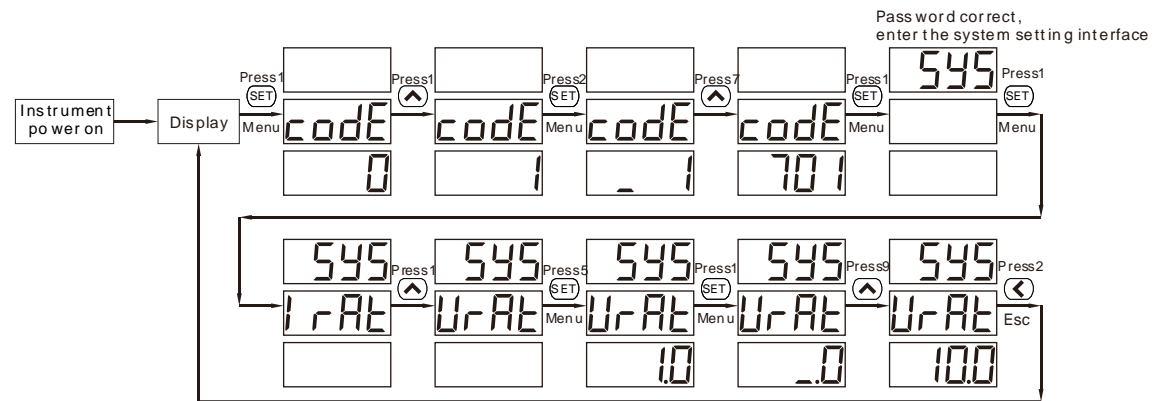Figure 3 Current ratio setting (example changing current ratio to 25)

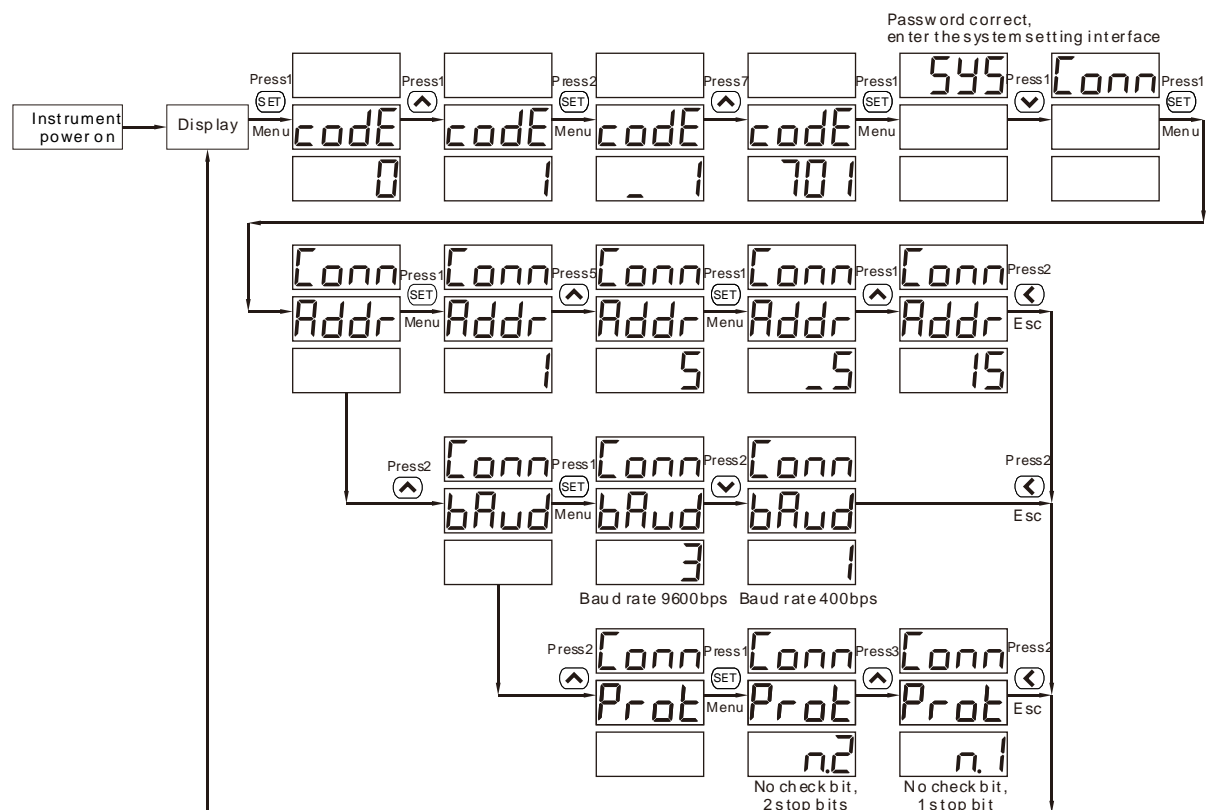Figure 4 Voltage ratio setting (example changing voltage ratio to 10.0)

Figure 5 Communication parameter setting

4.2.2 Programming parameter

Table 3 Programming parameters

Tier 1 menu	Tier 2 menu	set range	Description
5Y5	IrAt	1～9999	Current ratio: Used to set the input loop current ratio. When the current is connected to the line through the transformer, IrAt = rated current of primary circuit / rated current of secondary circuit; When the current is directly connected to the line, IrAt should be set to 1.
	UrAt	0.1～999.9	Voltage ratio: Used to set the input circuit voltage ratio. When the voltage is connected to the line through the transformer, UrAt = rated voltage of primary circuit / rated voltage of secondary circuit; When the voltage is directly connected to the line, UrAt should be set to 1.
Conn	Prot		Must be the same as the host settings 1: 8N2, 8 data bits, no check, 2 stop bits; 2: 8N1, 8 data bits, no check, 1 stop bit; 3: 8E1, 8 data bits, even check, 1 stop bit; 4: 8O1, 8 data bits, odd check, 1 stop bit;
	Addr	1～247	Communication address: Set the local communication address of the instrument, and the address shall not be the same as other slave addresses in the whole communication bus.
	bAud		Communication baud rate: 1.200: the baud rate of communication is 1200bps 2.400: communication baud rate is 2400bps 4.800: communication baud rate is 4800bps 9.600: the baud rate of communication is 9600bps 19.20: the baud rate of communication is 19200bps Must be the same as the host settings.

4.3 Communication function

This instrument provides standard RS-485 communication interface and MODBUS_RTU communication protocol (see Appendix). The parameter information that can be read or modified by communication is as follows:

Table 4 Communication description

Parameter address	Parameter code	Parameter description	Data type	Data length Word	Read write properties
Keyboard parameters (see programming parameter description for specific functions, actual value of parameters with (*) = communication parameter value × 0.1)					
0000H	Prot	Odbus RTU communication mode word, data is 1:8N2, 2:8N1, 3:8E1, 4:8O1;	16Bit signed	1	R/W
0001H	IrAt	Current transformer multiplication irat: (ammeter only)	16Bit signed	1	R/W
	UrAt	Current transformer multiplication URAT: (voltmeter only) (*)	16Bit signed	1	R/W
0018H	Addr	Address addr	16Bit signed	1	R/W
0019H	bAud	Baud rate of communication bAud	16Bit signed	1	R/W
001AH	DO	Alarm output status of single relay: bit0-bit3 corresponds to alarm output status of 1-3 lower limit single relay respectively, with "0" indicating relay contact is off, and "1" indicating relay contact is on. When ALxP (x = 1, 2, 3) is 0, bit0-bit2 can be written (remote control mode).	16Bit signed	1	R
001BH	FREQ	Frequency value	16Bit signed	1	R
001CH	URMSA(IR MSA)	A phase voltage or current value When measuring the line voltage, it is the voltage value of Uab	16Bit signed	1	R

		Voltage unit V ($\times 0.1$V) Current unit a ($\times 0.001$A)			
001DH	**URMSB(IRMSB)**	B phase voltage or current value When measuring the line voltage value, it is the Ubc voltage value Voltage unit V ($\times 0.1$V) Current unit a ($\times 0.001$A)	16Bit signed	1	R
001EH	**URMSC(IRMSC)**	Voltage or current value of phase C Uca voltage is used to measure the line voltage Voltage unit V ($\times 0.1$V) Current unit a ($\times 0.001$A)	16Bit signed	1	R

Electricity data conversion, all power data read out by communication are secondary values, excluding transformation ratio. Negative numbers are represented by complementary codes. The specific conversion method is shown in the table below:

Table 5 The specific conversion method

Parameter name	Conversion formula	Company	Parameter item
Voltage	U = URMSA$\times$(UrAt$\times$0.1)$\times$0.1	V	Ua, Uab,
	U = URMSB$\times$(UrAt$\times$0.1)$\times$0.1	V	Ub, Ubc
	U = URMSC$\times$(UrAt$\times$0.1)$\times$0.1	V	Uc, Uca
electric current	I = IRMSA$\times$IrAt$\times$0.001	A	Ia
	I = IRMSB$\times$IrAt$\times$0.001	A	Ib
	I = IRMSC$\times$IrAt$\times$0.001	A	Ic
frequency	F = FREQ$\times$0.01	Hz	F

Note 1: when the voltage transformer magnification is 1, read the URAT data of the voltage transformer magnification register as 10.

5. Installation dimensions

Table 6 Installation dimensions

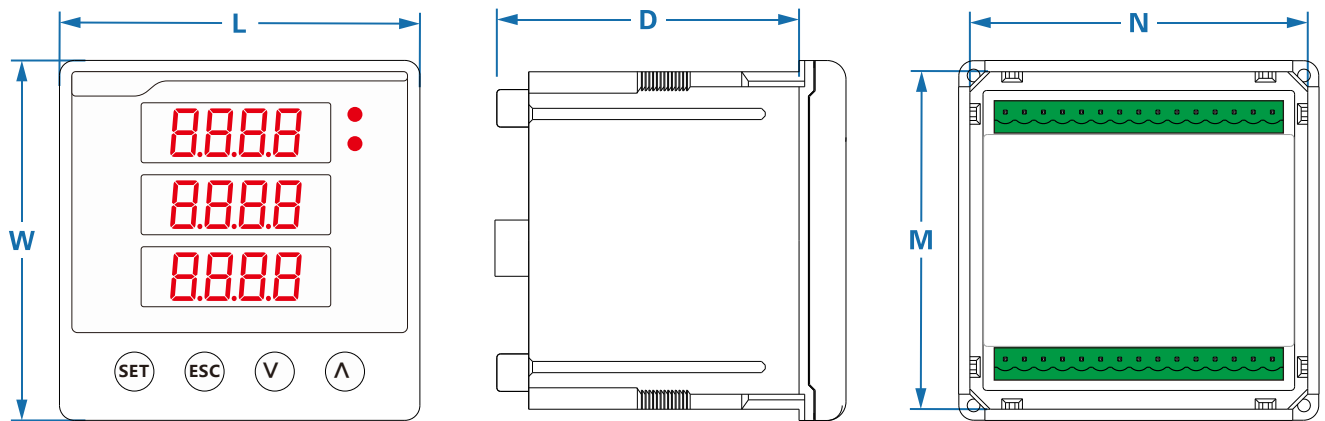| Model	Panel dimension (L $\times$W)	Main part dimension (length M $\times$ width N $\times$ depth D)	Hole spacing dimension (length $\times$ width)
P□666-2	72mm$\times$72mm	66mm$\times$66mm$\times$92mm	68mm$\times$68mm
P□666-3	96mm$\times$96mm	90mm$\times$90mm$\times$84mm	92mm$\times$92mm

Figure 6   Dimension diagram

6. Installation guide

6.1 Installation inspection

1) Before installation, check whether the model and specification of the product marked on the package box are consistent with the real object. If not, please contact the supplier;

2) Check whether the shell of the product in the packing box is damaged. If there is any damage, please contact the supplier;

6.2 Installation steps

The installation mode is embedded installation, and the fixed mode is fixed clip type.The specific operation is as follows:

1) On the fixed distribution board, select a suitable place to open an installation hole with the same size as the opening of the installed instrument;

2) Take out the instrument and clamp, and insert the instrument into the installation hole of the power distribution panel;

3) Push the retainer into the instrument slot from the back to the front until the instrument is fixed on the mounting plate.
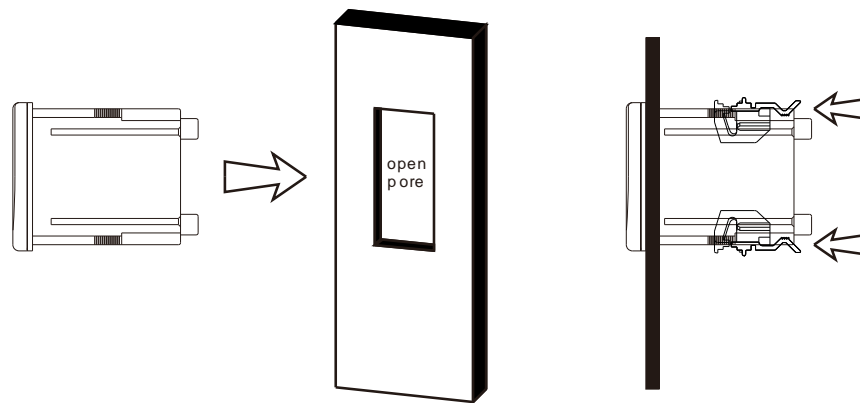
Figure 7 Installation drawing

6.3 Typical wiring

The input signal and auxiliary power supply must be cut off before the instrument wiring operation.Before power on, check whether the instrument wiring is correct and consistent with the wiring diagram on the instrument shell.
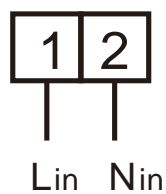
6.3.1 Auxiliary power supply

Figure 8 auxiliary power supply

1Terminal 2 and terminal 2 are auxiliary power input.Terminal block
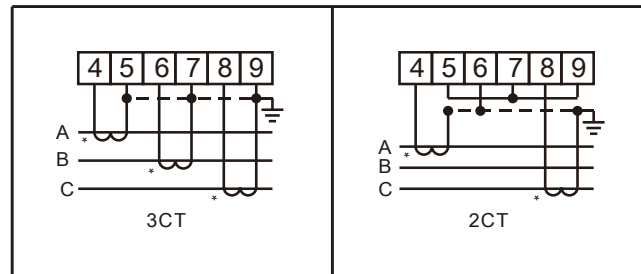
6.3.2 Signal input
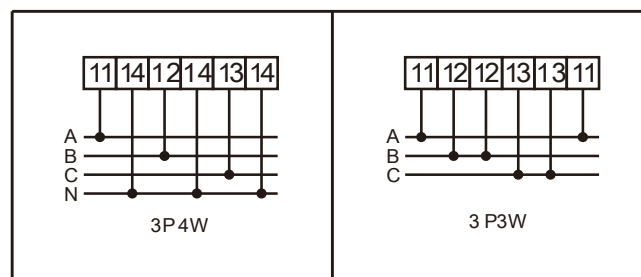

Figure 9 current signal input

Figure 10 voltage signal input

Current signal line: terminal 4 is connected to IA * (high end of phase a current input), terminal 5 is connected to IA (low end of phase a current output), terminal 6 is connected to IB * (high end of phase B current input), terminal 7 is connected to IB (low end of phase B current output), terminal 8 is connected to IC * (high end of phase C current input), and terminal 9 is connected to IC (low end of phase C current output).

Voltage signal line (three-phase four wire): terminal 11 is connected to phase a voltage UA, terminal 12 is connected to phase B voltage UB, terminal 13 is connected to phase C voltage UC, and terminal 14 is connected to zero line UN.

Voltage signal line (three-phase three wire): terminal 11 is connected to phase a voltage UA, terminal 13 is connected to phase C voltage UC, and terminal 14 is connected to phase B voltage UB.

The input signal shall not be higher than the nominal input value of the instrument, otherwise

the AC voltage shall be connected through PT and the AC current shall be connected through CT.
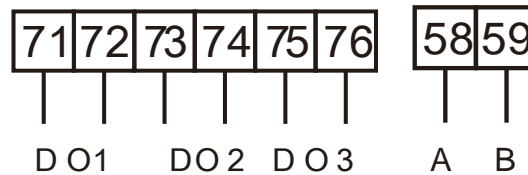
6.3.3 Auxiliary function port

Figure 11 auxiliary function port

The type and quantity of auxiliary functions depend on the specific model, and the wiring diagram of the instrument shell shall prevail.

7. Common troubleshooting

Table 6 Common troubleshooting

Fault phenomenon	Cause analysis	Exclusion method	remarks
The instrument cannot be powered on	Wrong wiring	Check: check whether the wiring is consistent with the wiring diagram; use a multi-meter to measure whether the voltage of the auxiliary power supply is within the nominal range of the instrument.	When checking the relevant lines, make sure that the signal current, voltage and auxiliary power supply are disconnected to ensure personal safety.
Communication failure	The setting of communication address, baud rate and check mode of upper computer is inconsistent with the table;	Check: check whether the setting of the upper computer is consistent with the communication setting information of the instrument, such as communication address, baud rate and verification mode. If there is no problem with the setting, add a matching resistance on the bus (510 ohm is recommended).	

If you can't solve the problem according to the above method, please contact our customer service.

8. Transportation and storage

The instruments and accessories should be stored in a ventilated and dry place under the packaging conditions to avoid being affected by damp and corrosive gas. The limit ambient temperature for storage is -40 ℃～+70℃. The relative humidity is not more than 85%.

The packaging of instruments meets the requirements of GB / T 13384-2008 general technical conditions for packaging of mechanical and electrical products. The ambient temperature requirements for conventional storage and transportation meet the requirements of GB/T 25480-2010 basic environmental conditions and test methods for transportation and storage of instruments.

Package completeness of single product, including:1）1 instrument; 2) operation manual; 3) desiccant bag; 4) certificate.

9. Warranty and service

Within 18 months from the date of delivery, if the quality problem is found, the manufacturer shall repair or replace the instrument free of charge under the condition that the user complies with the requirements of the manual and the lead seal of the manufacturer is in good condition.

———————————

Dear customers:

Please help us to do one thing, when the product is at the end of its life, in order to protect our environment, please do a good job in recycling the product or its parts and materials.For materials that cannot be recycled, please handle them well.Thank you very much for your cooperation and support.

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