



电力仪表选型手册

简介

BRIEF INTRODUCTION

上海安科瑞电气有限公司座落于嘉定高新工业园区，东临沪嘉高速，交通便捷。其产品以智能电力仪表、软件为主，其它电器产品为辅，是一家集科研、生产、销售为一体的综合性电器公司。

公司主要产品包括：电力仪表、电量传感器、电动机保护器、温湿度控制器、配电监控软件等五大类组成，其中电力仪表有CL系列数显电测表，PZ系列可编程智能电测表、ACR系列网络电力仪表，DT系列嵌入式安装电能表，ARC系列功率因数控制仪等。产品已广泛应用于冶金、石化、电力、建筑、市政、环保、国防、水利等行业，并与电器成套一起出口国外，产生了较大的社会和经济效益。

公司现有员工160人，其中大专以上学历科技人员占58.5%。公司设有专门的技术研发中心，具有了一支年轻的产品开发队伍。配备了瑞士TRANSLANT2000电磁兼容测试仪、日本爱斯佩克温湿度控制箱等先进试验设备，制定了系统软件、通讯协议安全可靠运行测试规范。并与复旦大学单片机中心、上海电器科学研究所低压分所组成为产学研联合体。

公司从2003年起共申请以专利为主的知识产权28项。2005年公司投入了350万元，从上海电科所引进了具有自主知识产权的ARD3系列智能型电动机保护器，该产品属于“第四代”低压电器，为公司的可持续性发展打下了基础。

公司主要产品均通过上海市计量测试技术研究院型式试验并取得证书，并取得了上海市质量技术监督局制造计量器具许可证书。企业全面通过ISO9001质量管理体系，以“严谨务实，持续改进；追求客户满意，树立安科瑞品牌”为质量方针，本着“自主创新、科技强国”的理念，与社会各界朋友真诚合作，以电力仪表为基础，逐步发展为以智能化低压电器为主体的高科技企业。

安科瑞电气，作为您值得信赖的合作伙伴，随时为您提供最优质的服务。

Shanghai Acrel Co., Ltd. is located in the high and new-technology industrial park of Jiading, facing Hujia freeway in the east, with the advantage of fairly convenient traffic. This is a comprehensive electrical apparatus company, integrating R&D, production, sales into one body, giving first place to its leading product intelligent power meter and software, it develop other products to meet the needs of customer.

Company's main products include: five group products i.e. electric power meters, electric energy transmitters, electric motor protective devices, temperature & humidity controllers, monitoring software for power distribution. Within the electric power meters, there are CL series digital display electric measuring meters, PZ series programmable embedded electric energy meters, ARC series power factor controller instrument. Its products have been widely used in many industries such as metallurgical, petrochemical, power, architecture, municipal construction, environmental protection, national defence, water conservancy etc. Its products have been selecting to export abroad along with electrical complete equipment producing large social efficiency and economic benefit.

This company has a workforce of 160, the technical personnel with educational background above Junior college is over 58.5 % of the entire personnel. This company has separate technical research and development center with a group of young technical developing people, fitted with advanced equipment of Swiss TRANSLANT 2000 electromagnetic compatibility test set, Japan ESPS temperature and humidity control box etc., establishing system software, test specifications for communication protocol safety reliability running, forming the combo of factory, university and research institute with Fudan university singlechip center, Low voltage division of SEARI.

Since 2003, applying for 28 items intellectual property; in 2005, 3.5 million RMB is invested, introducing advanced "Fourth Generation" low voltage electrical apparatus of Series ARD3 Intelligent Motor Protector from SEARI, lay a solid foundation for company's consecutive development.

Type test of company's main product passed the test of Shanghai Measurement and Test Technological Institute, and obtain the license of producing measuring apparatus, which is given by the quality technical supervision department of Shanghai. This enterprise has roundly passed the certification of ISO 9001 Quality Management System, taking "Preciseness Practice; Consecutive improving; Pursue satisfactory of customer; Creating Acrel brand" as quality policy, based on mindset of "Independent creation; Build up country by science and technology"; sincere co-operation with friends of all walks of life, based on power meters, grow gradually into a hi-tech enterprise with intelligent low voltage electrical apparatus as leading products.

As your trustworthy cooperant associate, Acrel offers good service to you at any time.

声明 Statement

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- 1 CL系列数显电测表
Series CL digital display electric measurement meters
- 13 PZ系列可编程智能电测表
Series PZ programmable intelligent electric measurement meters
- 25 ARC系列功率因数自动补偿控制仪
Series ARC power factor automatic compensator meter
- 33 ACR系列网络电力仪表
Series ACR network electric power meters
- 57 DT系列嵌入式安装电能表
Series DT embedded electric energy meters
- 65 附件
Accessory
- 70 注意事项
Attention for all meters



CL系列数显电测表

- 单项电量测量，直接替代指针表
- 精度等级：0.2或0.5级
- 简明设计、调校方便
- 多种外形选择，48方型、96B槽型、96方型、72方型、80方型、16槽型、42方型、46槽型、满足不同柜体电气回路的要求

1. CL系列数显电测表

1.1 概述 General

CL系列数显电测表可与互感器、分压器、分流器、电量变送器等配套使用，对电网中的电压、电流、功率、功率因数、相位角、频率等电参量测量，采用数字、光柱等方式显示，部分产品还带有4-20mA或0-5V模拟信号输出。该系列产品具有精度高，隔离性强，性能稳定，抗振动等优点，可直接替代原有指针式仪表，产品符合GB/T13978-1992。

Series CL digital display electric measurement meters can be matched with transformer, bleeder, current shunt divider, electrical parameters transmitter to measure electric parameters such as voltage, current, power, power factor, phase angle, frequency, and display in form of numeral or LED bar. Some of products contain 4-20mA or 0-5V analog output. This series products has advantages of high accuracy, better isolation, stable performance, anti-vibration, so it can directly replace previous pointer instruments. It meets the requirements of National standard GB/T13978-1992.

1.2 型号说明 Type explanation

CL □ □ □ / □

辅助代号:T-表示真有效值测量 M-表示模拟量输出 空白-表示平均值测量
Auxiliary code: T-true RMS measurement M-analog output Blank-measuring for the mean

显示方式:1-单排数码(一般省略) 2-双排数码
3-三排数码 4-数码加光柱
Display mode: 1-single number (omitted generally) 2-double numbers
3-three numbers 4-number+LED bars

功能代号: AI-交流电流 DI-直流电流 AV-交流电压 DV-直流电压
F-频率 PF-功率因数 P-有功功率 Q-无功功率
D-功率因数角

Function code: AI-AC current DI-DC current AV-AC voltage DV-DC voltage
F-frequency PF-power factor P-active power Q-reactive power
D-power factor angle

仪表外形
Outline of meters

外形代号 Outline code	面框尺寸(mm) Panel dimension	外形代号 Outline code	面框尺寸(mm) Panel dimension
16槽形 (Rectangular)	160 × 80	42方形 (Square)	120 × 120
80方形 (Square)	80 × 80	46槽形 (Rectangular)	120 × 60
72方形 (Square)	72 × 72	48方形 (Square)	48 × 48
96B槽形 (Rectangular)	96 × 48	96方形 (Square)	96 × 96

数显电测表
Digital display electric measurement meters

1.3 技术指标 Technical data

技术参数 Technical parameters		指标 Value
输入 Input	标称值 Normal value	电压(Voltage) 100V、220V、380V AC, 0~1200V DC; 电流(Current) 1A、5A AC, 0~10A DC
	过载 Overload	电流:持续1.2倍,瞬时10倍/1秒;电压:持续1.2倍,瞬时2倍/1秒 Current: continual 1.2 times, instantaneous 10 times / 1s; Voltage: continual 1.2 times, instantaneous 2 times / 1s
	阻抗 Impedance	一般电流端(Commonly current edge) $\leq 0.1 \Omega$, 电压端(Voltage edge) $\geq 1M \Omega$
	频率 Frequency	45~65Hz、400Hz $\pm 5\%$
精度等级 Accuracy class		0.5、0.2
显示范围 Indication range		-19999~19999
模拟量输出 Analog output		一路(single): 4~20mA、0~20mA、0~5V
电源 Power supply	电压范围 Voltage range	AC、DC, 85~290V
	功耗 Power consumption	<3VA
绝缘电阻 Insulation resistance		$\geq 100M \Omega$
工频耐压 Isolation voltage		2kV/1min 交流有效值(AC RMS)
平均无故障工作时间 MTBF		$\geq 50000h$
环境 Environment	温度 Temperature	工作(Work): -10~+55℃, 存储(Storage): -25~+70℃
	湿度 Humidity	$\leq 90\%RH$, 不结露, 无腐蚀性气体场所 (In the place without dew and corrosive gas)
	海拔 Altitude	$\leq 2000m$

1.4 产品规格 Product specification

■ 48方形数显表 / 48 square digital display meters

- CL48-AI 交流电流表
AC current meters
- CL48-DI 直流电流表
DC current meters
- CL48-AV 交流电压表
AC voltage meters
- CL48-DV 直流电压表
DC voltage meters



■ 96B槽形(96×48)数显表 / 96B rectangular (96×48) digital display meters

- CL96B-AI 交流电流表
AC current meters
- CL96B-DI 直流电流表
DC current meters
- CL96B-AV 交流电压表
AC voltage meters
- CL96B-DV 直流电压表
DC voltage meters
- CL96B-P 三相有功功率表
Three-phase active power meters
- CL96B-Q 三相无功功率表
Three-phase reactive power meters
- CL96B-F 频率表
Frequency meters
- CL96B-PF 功率因数表
Power factor meters
- CL96B-D 功率因数角度表
Power factor angle meters

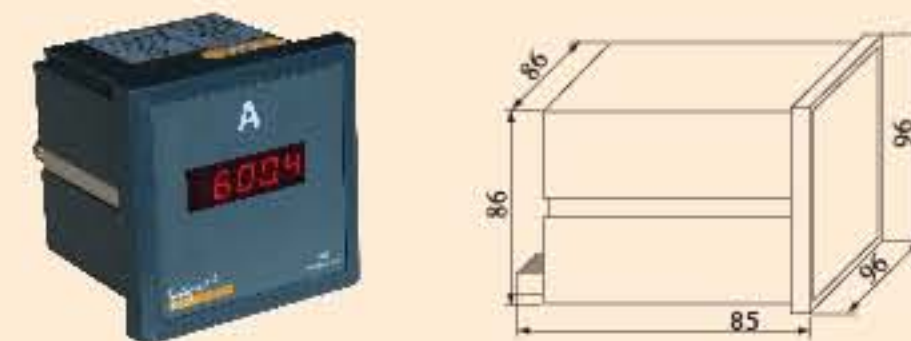


■ 96B槽形(96×48)数显变送表 / 96B rectangular (96×48) transmit and digital display meters

- CL96B-AI/M 交流电流变送表
AC current transmit and display meters
- CL96B-AV/M 交流电压变送表
AC voltage transmit and display meters

■ 96方形数显表 / 96 square digital display meters

- CL96-AI 交流电流表
AC current meters
- CL96-DI 直流电流表
DC current meters
- CL96-AV 交流电压表
AC voltage meters
- CL96-DV 直流电压表
DC voltage meters
- CL96-P 三相有功功率表
Three-phase active power meters
- CL96-Q 三相无功功率表
Three-phase reactive power meters
- CL96-F 频率表
Frequency meters
- CL96-PF 功率因数表
Power factor meters
- CL96-D 功率因数角度表
Power factor angle meters



■ 96方形数显变送表 / 96 square transmit and digital display meters

- CL96-AI/M 交流电流变送表
AC current transmit and display meters
- CL96-AV/M 交流电压变送表
AC voltage transmit and display meters

■ 96方形三相数显表 / 96 square three-phase transmit and digital display meters

同时能测量三相电流或三相电压
Display three-phase current or three-phase voltage simultaneously

- CL96-AI3 三相电流表
Three-phase current meters
- CL96-AV3 三相电压表
Three-phase voltage meters



■ 96方形三相数显变送表 / 96 square three-phase transmit and digital display meters

- CL96-AI3/M 三相电流变送表
Three-phase current transmit and display meters
- CL96-AV3/M 三相电压变送表
Three-phase voltage transmit and display meters

注: 该系列仪表变送输出仅为一路, 输出对应一般默认为第一路。
Note: The series meters' output is just one way, the output corresponds to the first way commonly.

■ 72方形数显表 / 72 square digital display meters

- CL72-AI 交流电流表
AC current meters
- CL72-DI 直流电流表
DC current meters
- CL72-AV 交流电压表
AC voltage meters
- CL72-DV 直流电压表
DC voltage meters
- CL72-P 三相有功功率表
Three-phase active power meters
- CL72-Q 三相无功功率表
Three-phase reactive power meters
- CL72-F 频率表
Frequency meters
- CL72-PF 功率因数表
Power factor meters
- CL72-D 功率因数角度表
Power factor angle meters



■ 72方形数显变送表 / 72 square transmit and digital display meters

- CL72-AI/M 交流电流变送表
AC current transmit and display meters
- CL72-AV/M 交流电压变送表
AC voltage transmit and display meters

■ 72方形三相数显表 / 72 square three-phase digital display meters

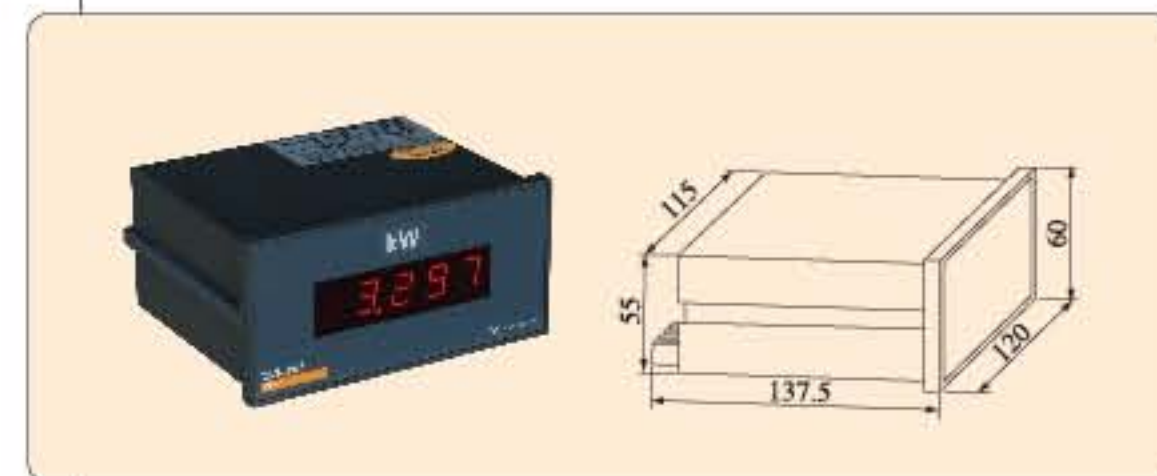
同时能测三相电流或三相电压, 也可同时测量二相电流一相电压
Display three-phase current or voltage simultaneously or double-phase current and single-phase voltage.

- CL72-AI3 三相电流表
Three-phase current meters
- CL72-AV3 三相电压表
Three-phase voltage meters
- CL72-I2V 三相电流电压表
Three-phase current & voltage meters



■ 46槽形数显表 / 46 rectangular digital display meters

- CL46-AI 交流电流表
AC current meters
- CL46-DI 直流电流表
DC current meters
- CL46-AV 交流电压表
AC voltage meters
- CL46-DV 直流电压表
DC voltage meters
- CL46-P 三相有功功率表
Three-phase active power meters
- CL46-Q 三相无功功率表
Three-phase reactive power meters
- CL46-F 频率表
Frequency meters
- CL46-PF 功率因数表
Power factor meters
- CL46-D 功率因数角度表
Power factor angle meters

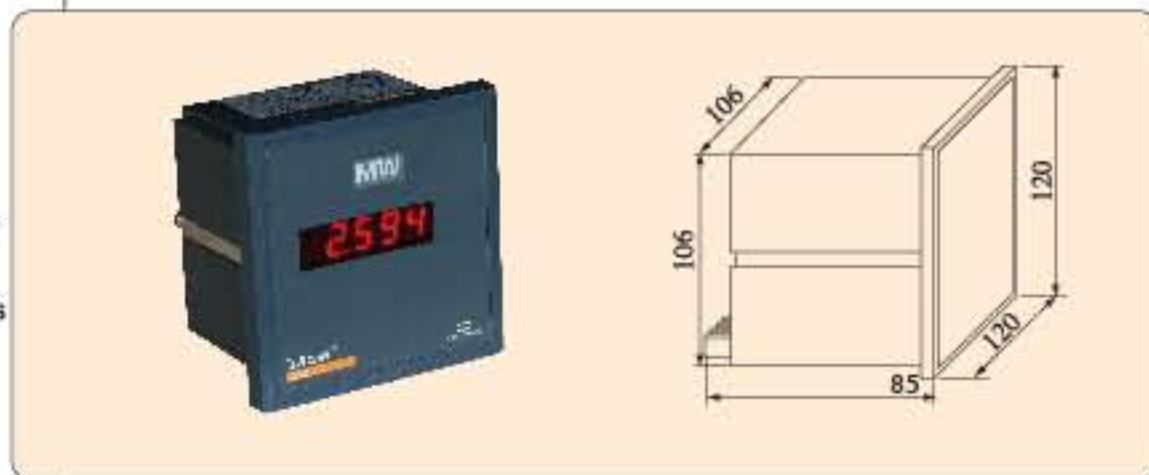


■ 46槽形数显变送表 / 46 rectangular transmit and digital display meters

- CL46-AI/M 交流电流变送表
AC current transmit and display meters
- CL46-AV/M 交流电压变送表
AC voltage transmit and display meters

■ 42方形数显表 / 42 square digital display meters

- CL42-AI 交流电流表
AC current meters
- CL42-DI 直流电流表
DC current meters
- CL42-AV 交流电压表
AC voltage meters
- CL42-DV 直流电压表
DC voltage meters
- CL42-P 三相有功功率表
Three-phase active power meters
- CL42-Q 三相无功功率表
Three-phase reactive power meters
- CL42-F 频率表
Frequency meters
- CL42-PF 功率因数表
Power factor meters
- CL42-D 功率因数角度表
Power factor angle meters



■ 42方形数显变送表 / 42 square transmit and digital display meters

- CL42-AI/M 交流电流变送表
AC current transmit and display meters
- CL42-AV/M 交流电压变送表
AC voltage transmit and display meters

■ 42方形三相数显表 / 42 square three-phase digital display meters

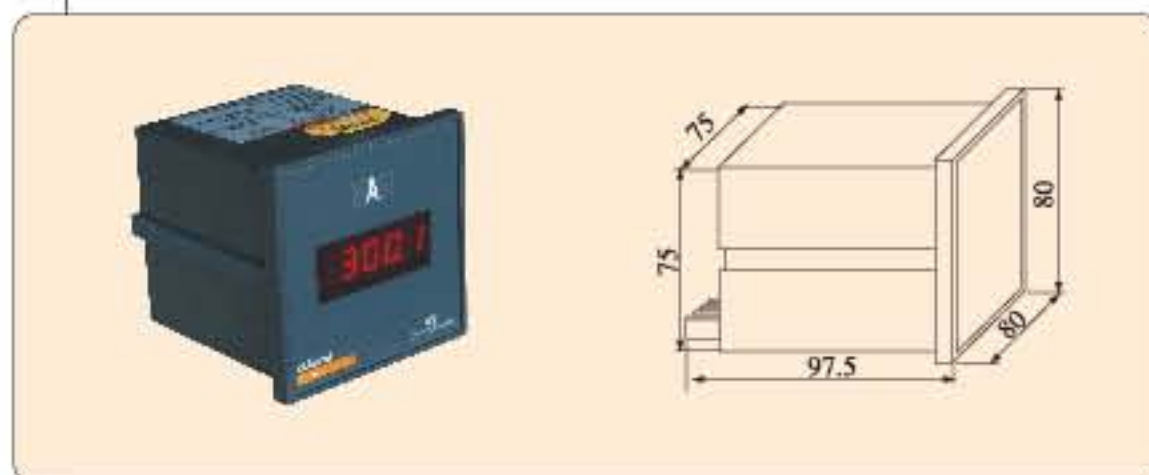
能同时测量三相电流或三相电压
Displays three-phase current or voltage simultaneously

- CL42-AI3 三相电流表
Three-phase current meters
- CL42-AV3 三相电压表
Three-phase voltage meters



■ 80方形数显表 / 80 square digital display meters

- CL80-AI 交流电流表
AC current meters
- CL80-DI 直流电流表
DC current meters
- CL80-AV 交流电压表
AC voltage meters
- CL80-DV 直流电压表
DC voltage meters
- CL80-P 三相有功功率表
Three-phase active power meters
- CL80-Q 三相无功功率表
Three-phase reactive power meters
- CL80-F 频率表
Frequency meters
- CL80-PF 功率因数表
Power factor meters
- CL80-D 功率因数角度表
Power factor angle meters



■ 80方形数显变送表 / 80 square transmit and digital display meters

- CL80-AI/M 交流电流变送表
AC current transmit and display meters
- CL80-AV/M 交流电压变送表
AC voltage transmit and display meters

■ 80方形三相数显表 / 80 square three-phase digital display meters

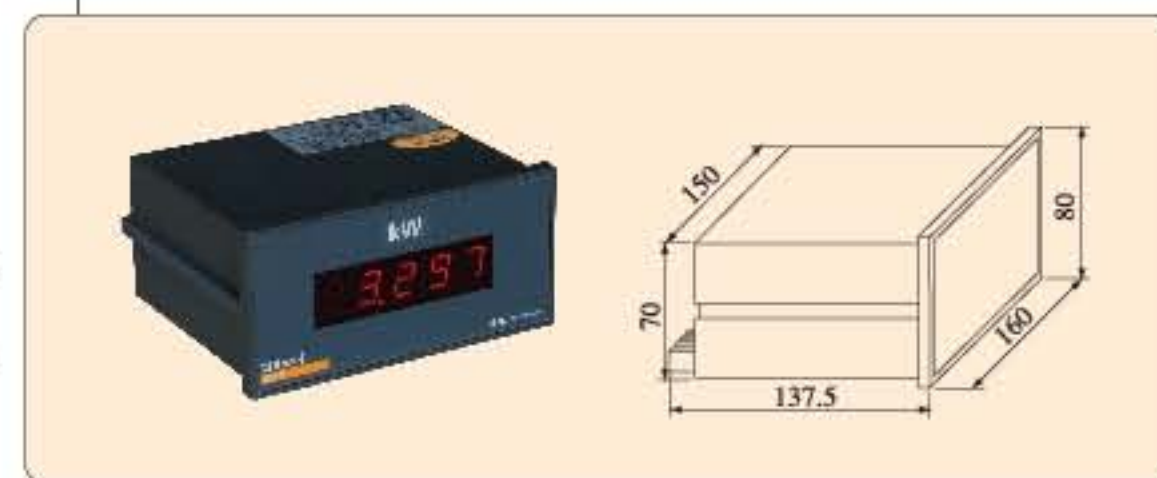
同时能测三相电流或三相电压，也可同时测量二相电流一相电压
Display three-phase current or voltage or double-phase current and single-phase voltage simultaneously.

- CL80-AI3 三相交流电流表
Three-phase AC current meters
- CL80-AV3 三相交流电压表
Three-phase AC voltage meters
- CL80-I2V 三相电流电压表
Three-phase Current & voltage meters



■ 16槽形数显表 / 16 rectangular digital display meters

- CL16-AI 交流电流表
AC current meters
- CL16-DI 直流电流表
DC current meters
- CL16-AV 交流电压表
AC voltage meters
- CL16-DV 直流电压表
DC voltage meters
- CL16-P 三相有功功率表
Three-phase active power meters
- CL16-Q 三相无功功率表
Three-phase reactive power meters
- CL16-F 频率表
Frequency meters
- CL16-PF 功率因数表
Power factor meters
- CL16-D 功率因数角度表
Power factor angle meters



16槽形数显变送表 / 16 rectangular transmit and digital display meters

- CL16-AI/M 交流电流变送表
AC current transmit and display meters
- CL16-AV/M 交流电压变送表
AC voltage transmit and display meters

注：CL系列仪表除作一次、二次仪表使用外，还可作为“三次”仪表，测量0-5V、0-75mV或4-20mA、0-20mA等信号，显示对应的电压、电流、功率、转速或压力、温度等参数。

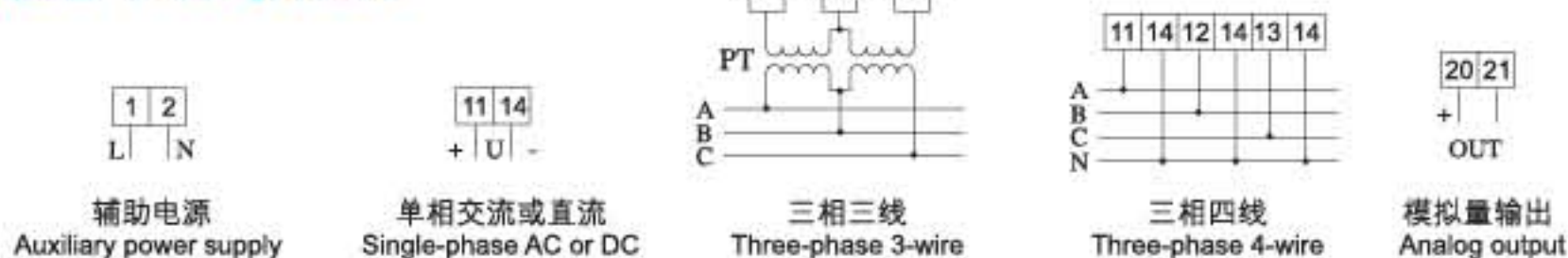
Note: Except for measuring high voltage or current through transformer and low voltage or current directly, series CL digital display meters is also designed for measuring signals such as 0-5V, 0-75mV, 4-20mA, or 0-20mA, and displaying parameters such as voltage, current, power, rotate speed or pressure, temperature and so on.

1.5 接线图 Wiring diagram

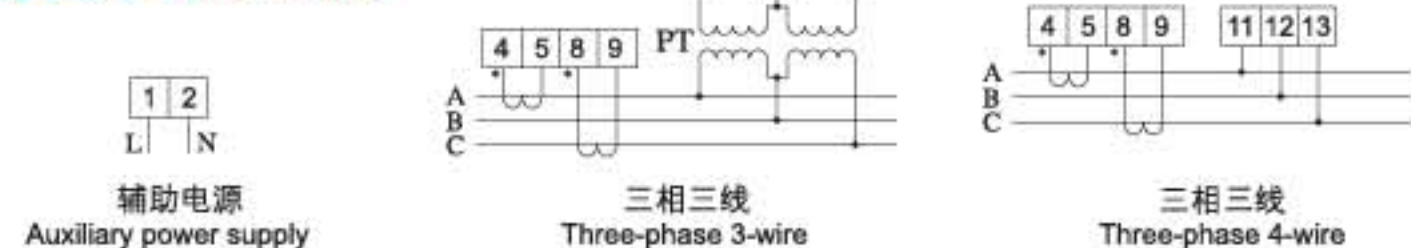
■ 电流表 / Current meters



■ 电压表 / Voltage meters



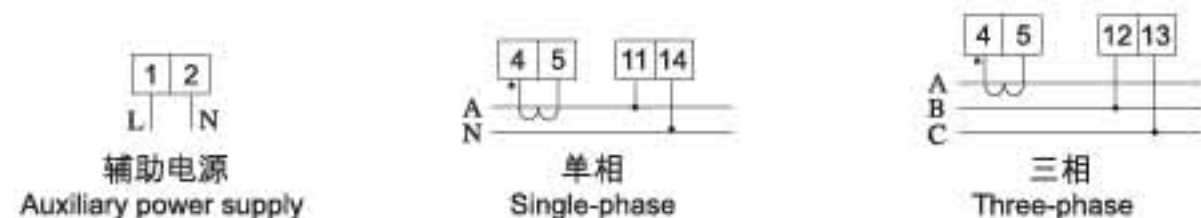
■ 功率表 / Power meters



■ 频率表 / Frequency meters



■ 功率因数表及功率因数角度表 / Power factor meters and power factor angle meters



注：“*”为电流进线端
Note: * is current input terminal

1.6 外形及开孔尺寸 Outline and trepanning dimension

单位 Unit: mm

仪表外形 Meters' outline	面框尺寸 Panel dimension	壳体尺寸 Dimension of case	开孔尺寸 Trepanning dimension	进深* Depth
48方形 (Square)	48×48	42.5×42.5	44.5×44.5	82
96B槽形 (Rectangular)	96×48	90×43	91×44	131
96方形 (Square)	96×96	86×86	88×88	85
72方形 (Square)	72×72	66×66	67×67	91
46槽形 (Rectangular)	120×60	115×55	116×56	131
42方形 (Square)	120×120	106×106	108×108	85
80方形 (Square)	80×80	75×75	76×76	91
16槽形 (Rectangular)	160×80	150×70	152×72	133

**：指仪表进入电器柜内部的长度，包括伸出的端子部分。

** is the length that meters reach into the cubicle including the extended terminal.

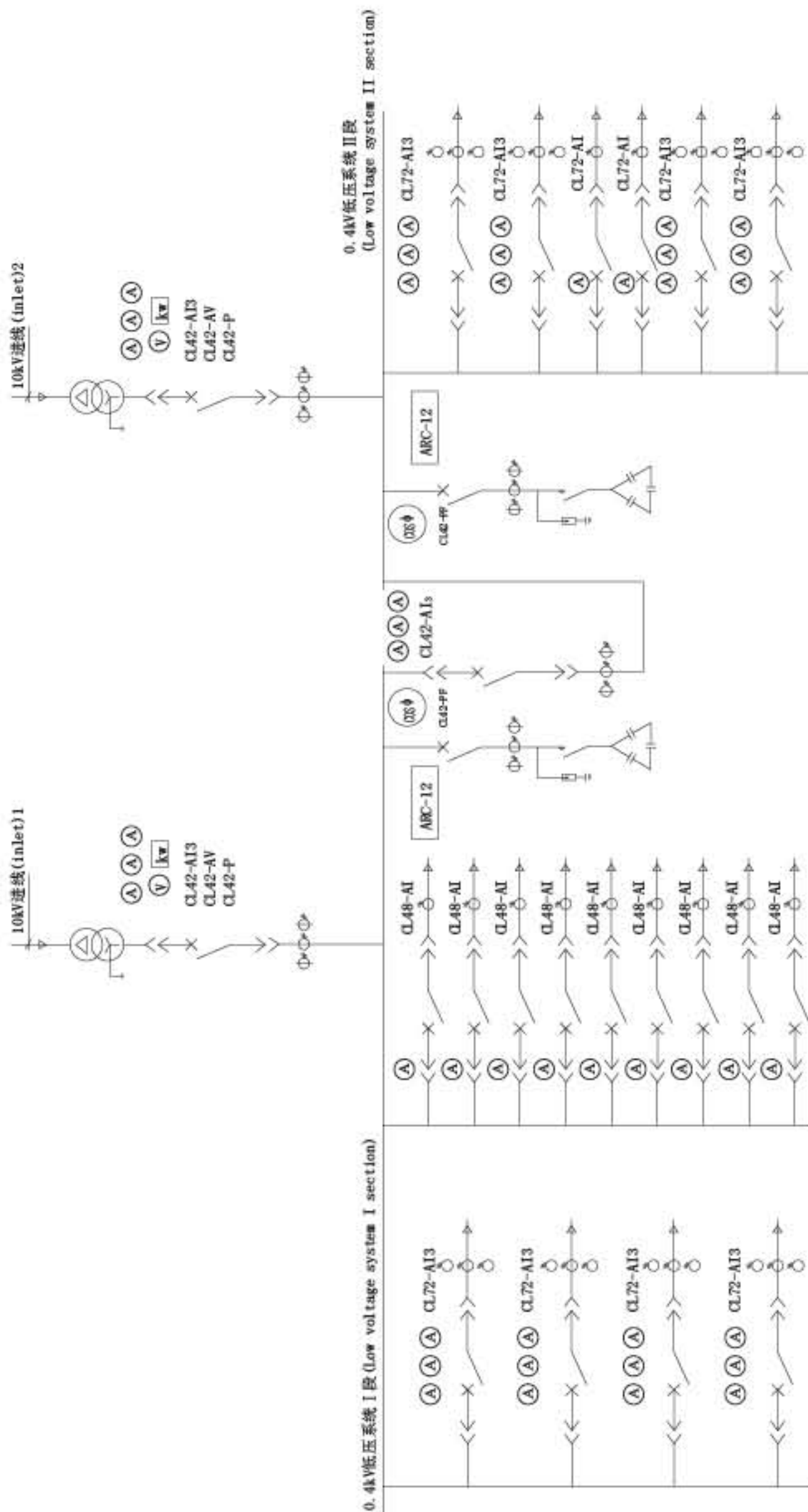
1.7 调校 Calibration

打开仪表前面板，即可进行调校。

- 调零
信号输入端短路后，加辅助电源，调节“zero”电位器，使数显为零。
- 调满刻度
输入端加标称信号后，加辅助电源，调节“span”电位器，使数显为标称值。

Open the front panel of meters, then the adjustment and calibration may be carried out.

- Zero adjust
Short the signal input end, add auxiliary power supply, and then adjust zero potentiometer to let digital display zero.
- Full scale calibration
Add auxiliary power supply after adding nominal signal to input end, adjust span potentiometer to make digital display nominal value



配电柜回路 Power distributing cabinet circuit	数显表型号 Digital panel meters type	尺寸 (mm) dimension	功能 (Function)	
进线回路 Inlet circuit	CL42-AI3	面框 (Panel frame) 120 X 120	三相电流 (Three-phase current)	
	CL42-AV		电压 (voltage)	
	CL42-P		三相有功功率 (Three-phase active power)	
电容补偿回路 Capacitance compensation circuit	CL42-PF	开孔 (Cutout) 108 X 108	功率因数 (Power factor)	
	ARC-6 (12) 功率因数控制仪 Power factor controller		6~12路电容器投切 (6~12ways capacitor switching)	
母联回路 Bus connecting circuit	CL42-AI3		三相电流 (Three-phase current)	
出线回路 Outlet	小抽屉 small drawer	CL48-AI	开孔 (Cutout) 44.5 X 44.5	单相电流 (Single-phase current)
		CL72-AI3	开孔 (Cutout) 67 X 67	三相电流 (Three-phase current)
	大抽屉 big drawer	CL96-AI	面框 (Panel frame) 96 X 96	单相电流 (Single-phase current)
		CL96-AI3	开孔 (Cutout) 88 X 88	三相电流 (Three-phase current)

优点: 与指针表相比, 显示直观、精度高, 可直接互换;

Advantages: comparing with the pointer meter, more visual, higher precision, may be exchanging directly.

缺点: 性价比低, 不能组网。

Shortcoming: lower cost performance, can not be networking.

1.9 订货范例 Order examples

例 E.g. 1: 型号 Type: CL42-P
 辅助电源 Auxiliary power supply: AC220V / 50Hz
 输入 Input: AC100A / 5A, 35kV / 100V

例 E.g. 2: 型号 Type: CL16-Q
 辅助电源 Auxiliary power supply: DC220V
 输入 Input: 4~12~20 mA
 显示 Display: -866 kvar~0~866 kvar



PZ系列可编程智能电测表

- 单项电量测量，变比可任意设置
- 模拟量4-20mA、0-5V输出
- 越限报警继电器输出
- 开关量输入/输出
- 通讯RS485/Modbus协议
- 功能模块化组合、可选
- 配套PZ单电量测控管理系统软件，可实现低压配电低成本的智能化、网络化监控管理方案

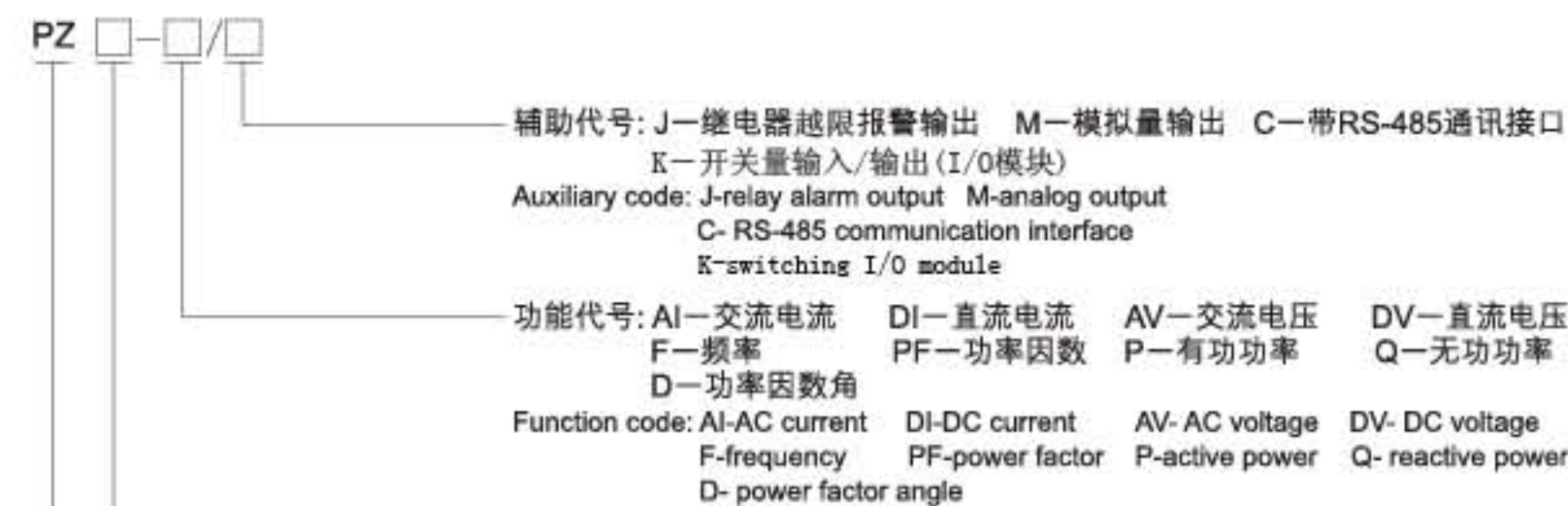
2. PZ系列可编程智能电测表

2.1 概述 General

该系列仪表采用交流采样技术，能分别测量电网中的电流，电压，功率，功率因数等电参数，可通过面板薄膜开关设置倍率。带RS-485通讯接口，采用Modbus协议；也可将电量信号转换成标准的直流模拟信号输出；或带2路继电器报警输出。

Adopting A.C. Sampling this series meters can measure electrical parameters of the net such as current, voltage, power, power factor etc. and set ratio through key on panel. It contains RS-485 communication interface, adopts Modbus protocol. It is designed to transform electrical parameters signal into standard DC analog signal Output, or alarm output with 2 relays.

2.2 型号说明 Type explanation



仪表外形
Outline of meters

外形代号 Outline code	面板尺寸 (mm) Panel dimension	开孔尺寸 (mm) Trepanning dimension
96B槽形 (Rectangular)	96 × 48	91 × 44
96方形 (Square)	96 × 96	88 × 88
16槽形 (Rectangular)	160 × 80	152 × 72
46槽形 (Rectangular)	120 × 60	116 × 56
42方形 (Square)	120 × 120	108 × 108
80方形 (Square)	80 × 80	76 × 76
72方形 (Square)	72 × 72	67 × 67

可编程智能电测表
Programmable intelligent electric measurement meters

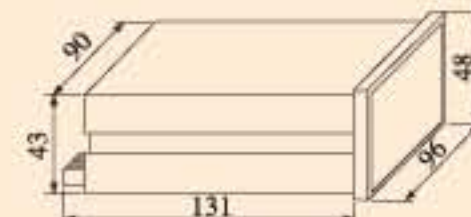
2.3 技术指标 Technical data

技术参数 Technical parameters		指标 Value
输入 Input	标称值 Normal value	电压(Voltage)110V、220V、380V, 电流(Current)1A、5A或由客户指定(Or ordered by customer)
	过载 Overload	电流:持续1.2倍,瞬时10倍/1秒;电压:持续1.2倍,瞬时2倍/1秒 Current: continual 1.2 times, instantaneous 10 times / 1s; Voltage: continual 1.2 times, instantaneous 2 times / 1s
	频率 Frequency	45~65Hz或直流(DC)
精度等级 Accuracy class		0.5、0.2
输出 Output	变送 Transmit	4-20mA、0-20mA、0-5V等(and so on)
	通讯 Communication	RS485 Modbus协议(Protocol), 1位起始位(Start bit), 8位数据位(Data bit), 1位停止位(Stop bit), 2400/4800/9600bps
	报警 Alarm	2路无源继电器; 1A/30V DC, 1A/220V AC; 高、低、 上升沿、下降沿方式, 回滞量可任意设置 2-way passive relay; 1A/30V DC, 1A/220V AC; high, low, rising edge, falling edge mode, hysteresis coefficient can be set any value
	显示 Display	LED显示(display), 范围(range in)-9999~9999, 倍率任意设置, 报警指示(ratio can be set any value, alarm display)
	开关量输入/输出 Switching input/output	2DI/2DO
电源 Power supply	电压范围 Voltage range	AC、DC, 85~290V
	功耗 Power consumption	<5VA
绝缘电阻 Insulation resistance		≥100MΩ
工频耐压 Isolation voltage		电源/输入/输出之间(Between power supply / input / output) 2KV/1min (交流有效值AC RMS)
平均无故障工作时间 MTBF		≥50000h
环境 Environment	温度 Temperature	工作(Work): -10~+55℃, 存储(Storage): -25~+70℃
	湿度 Humidity	≤93%RH, 不结露, 无腐蚀性气体场所 (In the place without dew and corrosive gas)
	海拔 Altitude	≤2000m

2.4 产品规格 Product specification

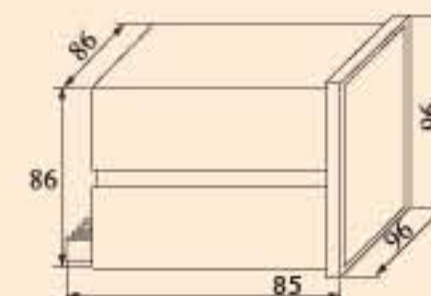
■ 96B槽形智能表 / 96B rectangular intelligent meters

- PZ96B-AI/□ 交流电流表
AC current meters
- PZ96B-DI/□ 直流电流表
DC current meters
- PZ96B-AV/□ 交流电压表
AC voltage meters
- PZ96B-DV/□ 直流电压表
DC voltage meters
- PZ96B-P/□ 三相有功功率表
Three-phase active power meters
- PZ96B-Q/□ 三相无功功率表
Three-phase reactive power meters
- PZ96B-PF/□ 功率因数表
Power factor meters
- PZ96B-D/□ 功率因数角度表
Power factor angle meters



■ 96方形智能表 / 96 square intelligent meters

- PZ96-AI/□ 交流电流表
AC current meters
- PZ96-DI/□ 直流电流表
DC current meters
- PZ96-AV/□ 交流电压表
AC voltage meters
- PZ96-DV/□ 直流电压表
DC voltage meters
- PZ96-P/□ 三相有功功率表
Three-phase active power meters
- PZ96-Q/□ 三相无功功率表
Three-phase reactive power meters
- PZ96-PF/□ 功率因数表
Power factor meters
- PZ96-D/□ 功率因数角度表
Power factor angle meters



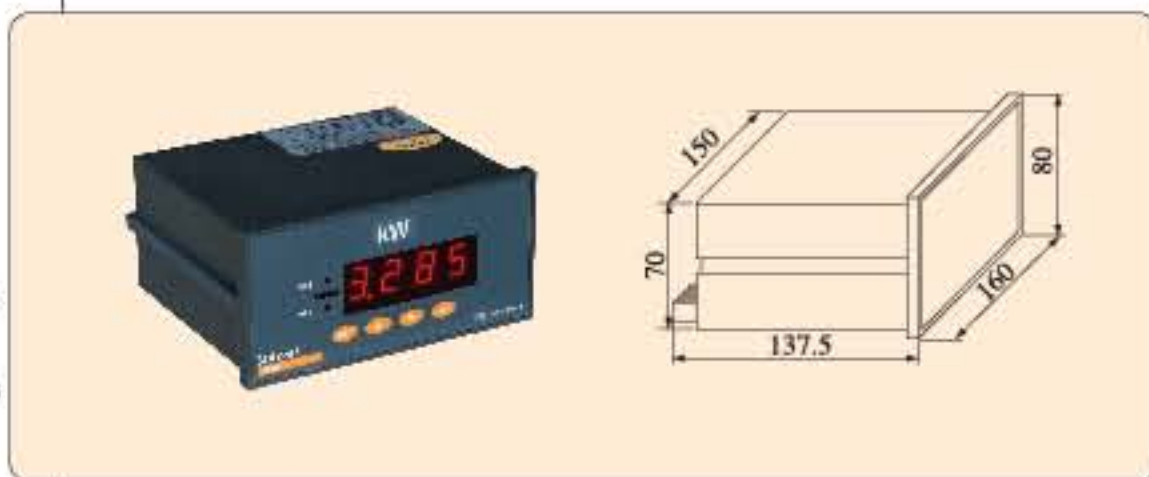
■ 96方形智能三相表 / 96 square intelligent three-phase meters

- PZ96-AI3/□ 三相电流表
Three-phase current meters
- PZ96-AV3/□ 三相电压表
Three-phase voltage meters



■ 16槽形智能表 / 16 rectangular intelligent meters

- PZ16-AI/□ 交流电流表
AC current meters
- PZ16-DI/□ 直流电流表
DC current meters
- PZ16-AV/□ 交流电压表
AC voltage meters
- PZ16-DV/□ 直流电压表
DC voltage meters
- PZ16-P/□ 三相有功功率表
Three-phase active power meters
- PZ16-Q/□ 三相无功功率表
Three-phase reactive power meters
- PZ16-PF/□ 功率因数表
Power factor meters
- PZ16-D/□ 功率因数角度表
Power factor angle meters



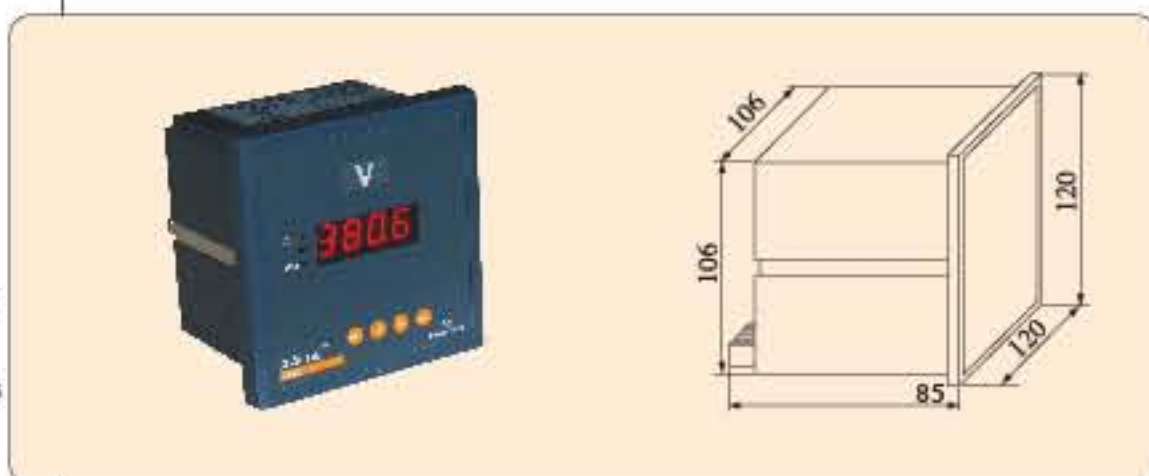
■ 46槽形智能表 / 46 rectangular intelligent meters

- PZ46-AI/□ 交流电流表
AC current meters
- PZ46-DI/□ 直流电流表
DC current meters
- PZ46-AV/□ 交流电压表
AC voltage meters
- PZ46-DV/□ 直流电压表
DC voltage meters
- PZ46-P/□ 三相有功功率表
Three-phase active power meters
- PZ46-Q/□ 三相无功功率表
Three-phase reactive power meters
- PZ46-PF/□ 功率因数表
Power factor meters
- PZ46-D/□ 功率因数角度表
Power factor angle meters



■ 42方形智能表 / 42 square intelligent meters

- PZ42-AI/□ 交流电流表
AC current meters
- PZ42-DI/□ 直流电流表
DC current meters
- PZ42-AV/□ 交流电压表
AC voltage meters
- PZ42-DV/□ 直流电压表
DC voltage meters
- PZ42-P/□ 三相有功功率表
Three-phase active power meters
- PZ42-Q/□ 三相无功功率表
Three-phase reactive power meters
- PZ42-PF/□ 功率因数表
Power factor meters
- PZ42-D/□ 功率因数角度表
Power factor angle meters



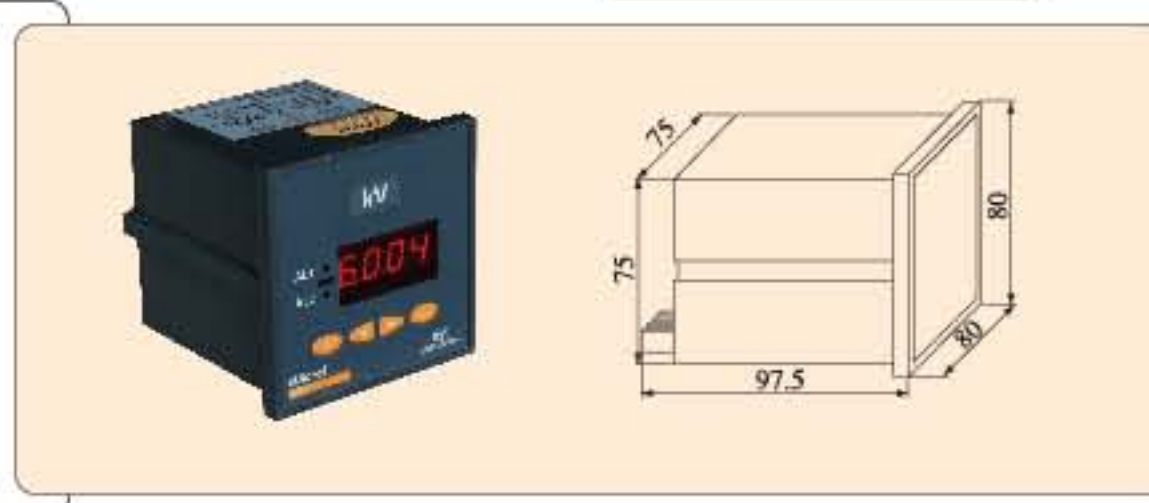
■ 42方形智能三相表 / 42 Square intelligent three-phase meters

- PZ42-AI3/□ 三相电流表
Three-phase current meters
- PZ42-AV3/□ 三相电压表
Three-phase voltage meters



■ 80方形智能表 / 80 square intelligent meters

- PZ80-AI/□ 交流电流表
AC current meters
- PZ80-DI/□ 直流电流表
DC current meters
- PZ80-AV/□ 交流电压表
AC voltage meters
- PZ80-DV/□ 直流电压表
DC voltage meters



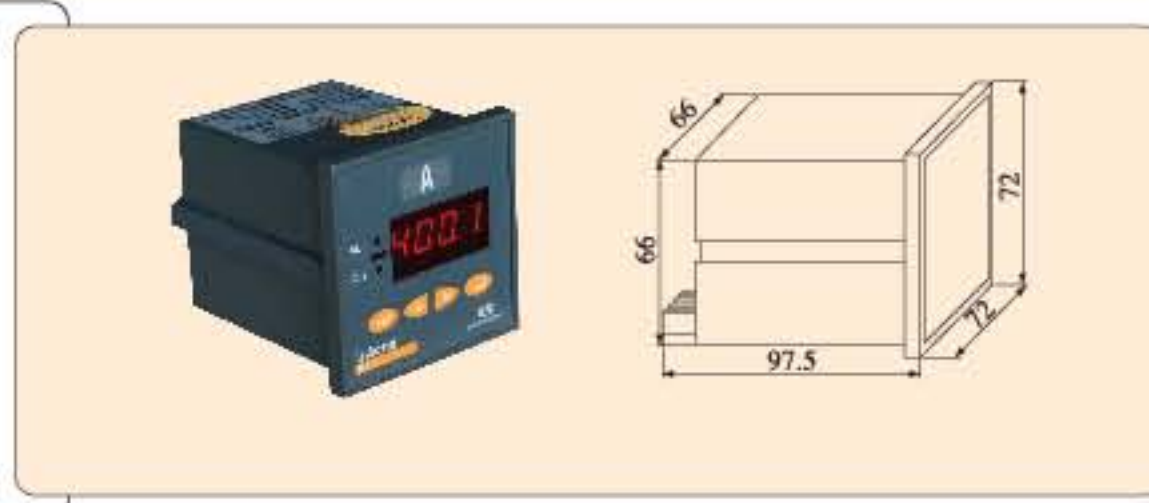
■ 80方形智能三相表 / 80 square intelligent three-phase meters

- PZ80-AI3/□ 三相电流表
Three-phase current meters
- PZ80-AV3/□ 三相电压表
Three-phase voltage meters



■ 72方形智能表 / 72 square intelligent meters

- PZ72-AI/□ 交流电流表
AC current meters
- PZ72-DI/□ 直流电流表
DC current meters
- PZ72-AV/□ 交流电压表
AC voltage meters
- PZ72-DV/□ 直流电压表
DC voltage meters



■ 72方形智能三相表 / 72 Square intelligent three-phase meters

- PZ72-AI3/□ 三相电流表
Three-phase current meters
- PZ72-AV3/□ 三相电压表
Three-phase voltage meters



2.5 编程框图 Programming block diagram

■ 仪表共设: SET, ←, →, ↵ 四个按键

There are four buttons in meters, such as SET, ←, →, ↵

- ← 键: 左移键, 用于功能选择或数字输入时数位选择;
Left shift key, used for function selecting or changing digital position when digital input;
- 键: 右移键, 用于功能选择或数字输入时改变数值;
Right shift key, used for function selecting or changing value when digital input;

SET 键: 主菜单键, 用于菜单向上一级移动或操作忽略;
SET: Main menu key, used for menu moving backward or ignoring operation;

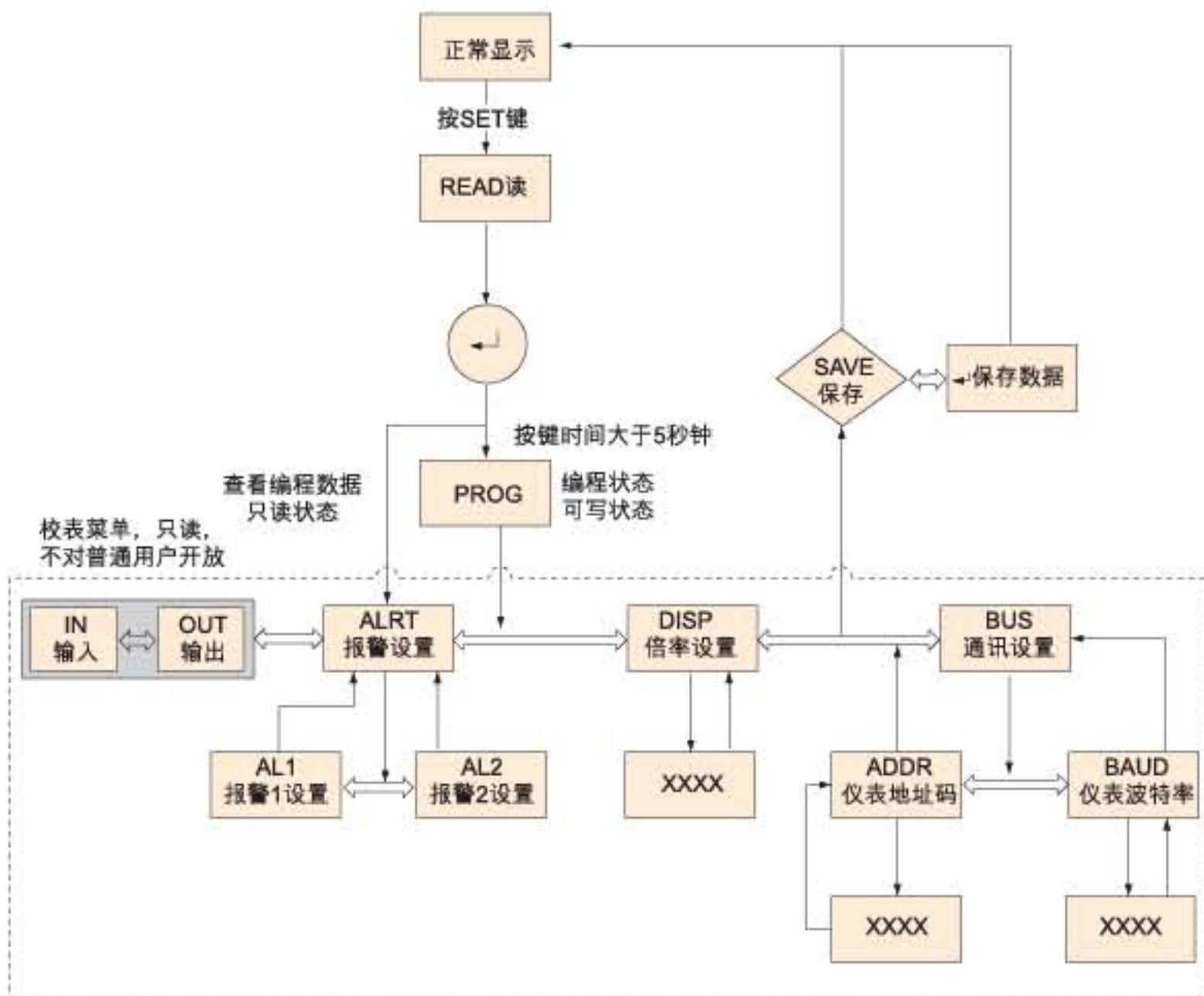
- ↵ 键: 确认键, 用于进入下一层菜单或操作确认。
Confirm key, used for entering next menu or confirming operation.

■ PZ系列编程有两种方式: 只读(READ)和可写(PROG), 具体流程见框图。

Two modes are adopted in Series PZ program: READ and PROG. Material flows are available in diagram.

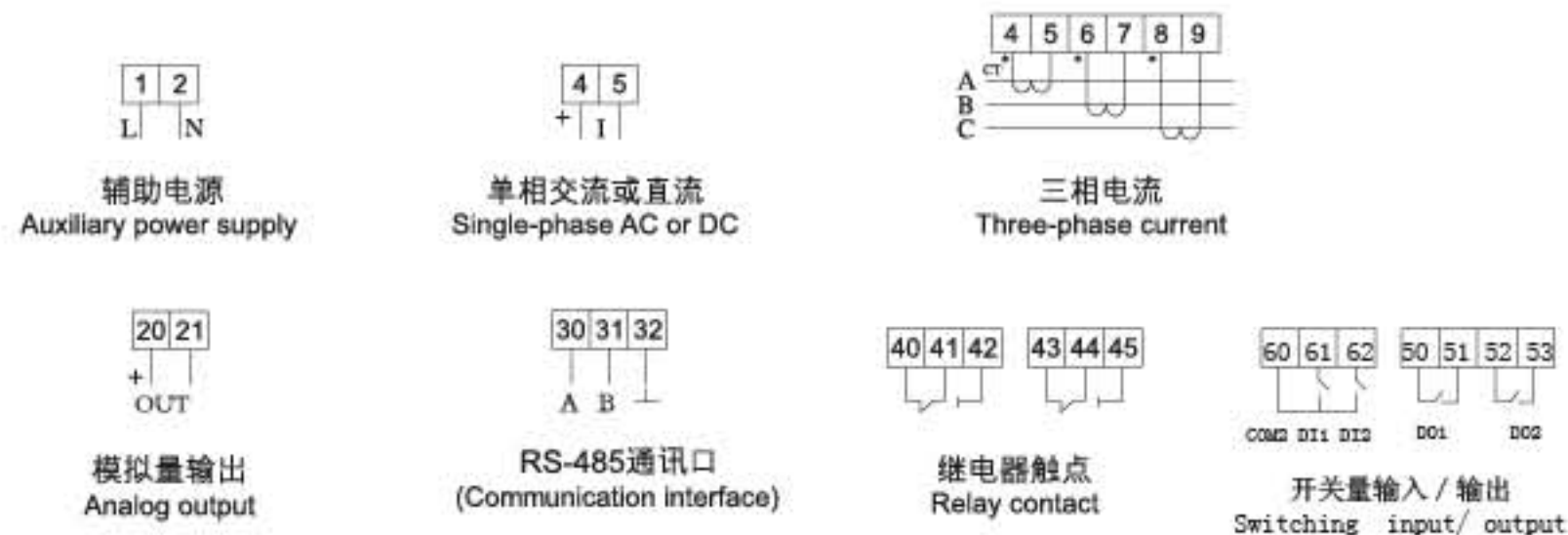
注意 Notes:

- 编程模式退出时会出现SAVE, 这时如确实要保存则按 ↵ 键, 如不需要保存则按SET键。
It appears SAVE when exiting program mode. Press ↵ when it need save, or press SET.
- 查看数据时, 只需要在SET键后按一下 ↵ 键即可: 如长时间按住 ↵ 键则会进入编程模式。
While checking data, press ↵ after pressing SET. Enter program mode when pressing ↵ for long times.
- 在编程模式中, 修改数据后要按 ↵ 键才有效。
In program mode, it is effective to press ↵ after changing data.

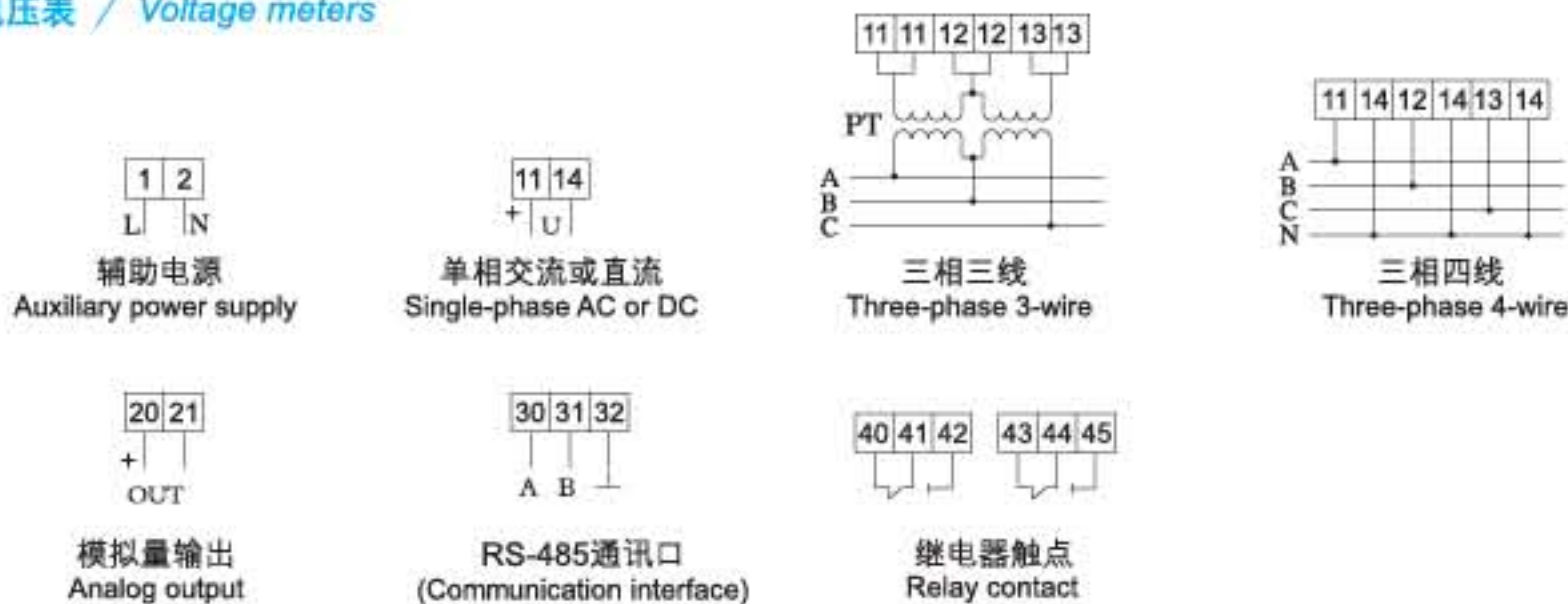


2.6 接线图 Wiring diagram

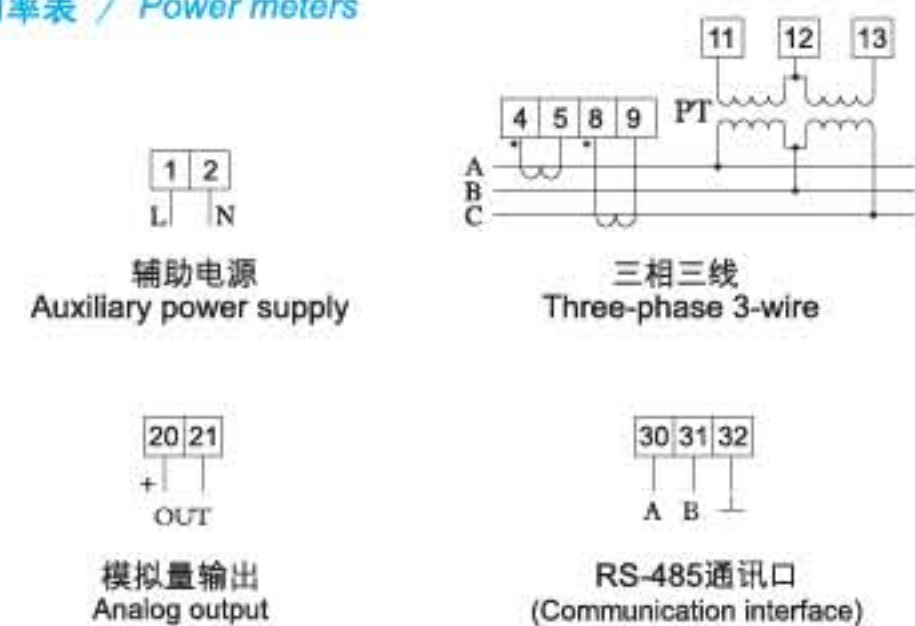
■ 电流表 / Current meters



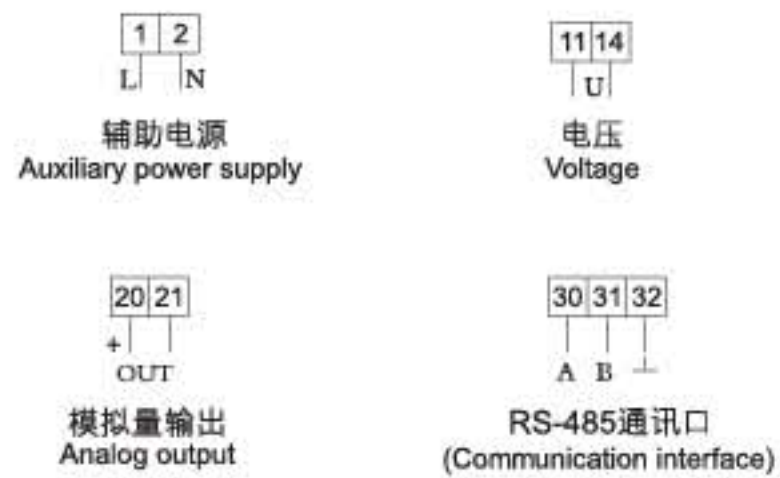
■ 电压表 / Voltage meters



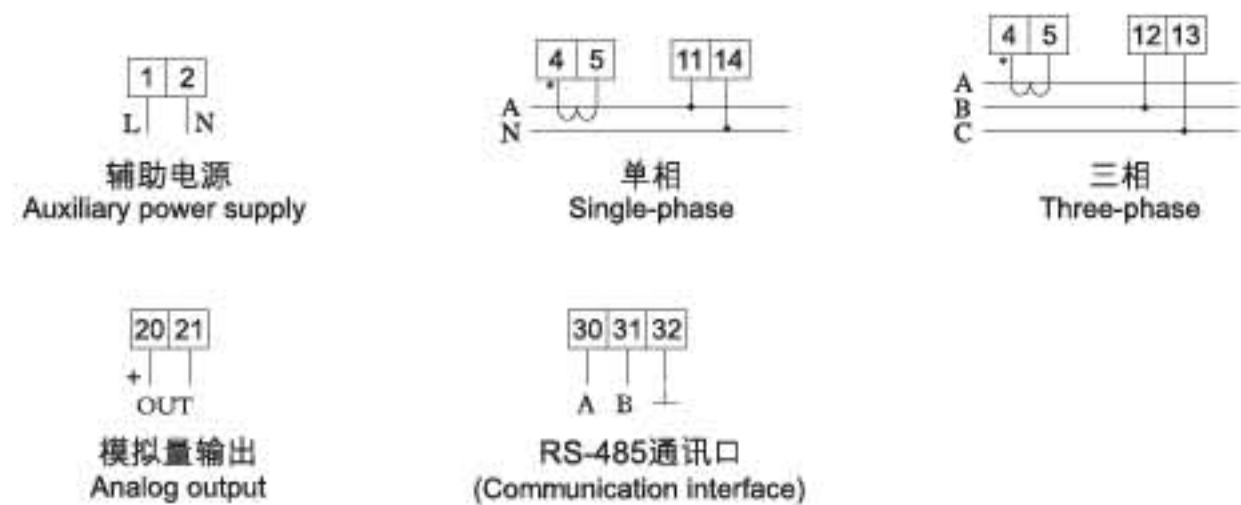
■ 功率表 / Power meters



■ 频率表 / Frequency meters



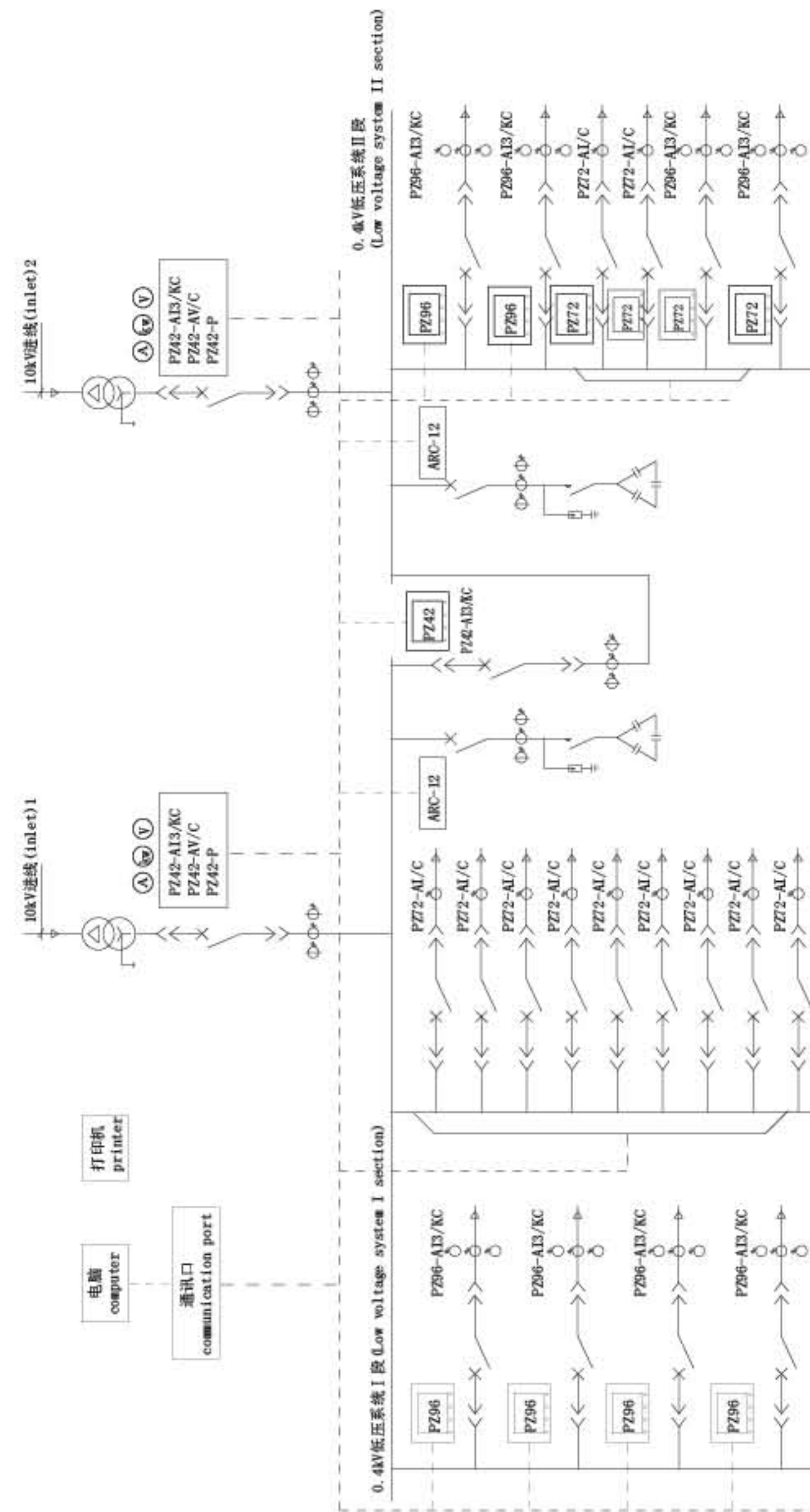
■ 功率因数表及功率因数角度表 / Power factor meter and power factor angle meter



注：一般情况下，需要模拟量输出、通讯接口或继电器输出时，可选其中一项，具体接线参照随机接线图。图中“*”号表示为电流进线端。

Note: Generally, one of analog output, RS-485 communication interface, Relay output can be chosen if necessary. Wiring mode refers to wiring chart on the meter. In the diagram, * is current input ends.

2.7 典型应用方案 Typical application scheme



配电柜回路 Power distributing cabinet circuit	数显表型号 Digital panel meters type	尺寸 (mm) dimension	功能(function)
进线回路 inlet circuit	PZ42-AI3/KC	面框(panel frame)120 X 120 开孔(cutout)108 X 108	3I、I/O 模块(module)、RS-485
	PZ42-AV/C		V、RS-485
	PZ42-P/C		KW、RS-485
电容补偿回路 capacitance compensation circuit	ARC-6(/12)功率因数控制仪 power factor controller		6~12 路电容器投切, RS-485 6~12ways capacitor switching
母联回路 bus connecting circuit	PZ42-AI3/KC		3I、I/O 模块(module)、RS-485
出线回路 outlet	PZ96-AI3/KC	面框(panel frame)96 X 96	3I、I/O 模块(module)、RS-485
	PZ96-AI/C	开孔(cutout)88 X 88	I、I/O 模块(module)、RS-485
	PZ72-AI/C	面框(panel frame)72 X 72 开孔(cutout)67 X 67	I、RS-485

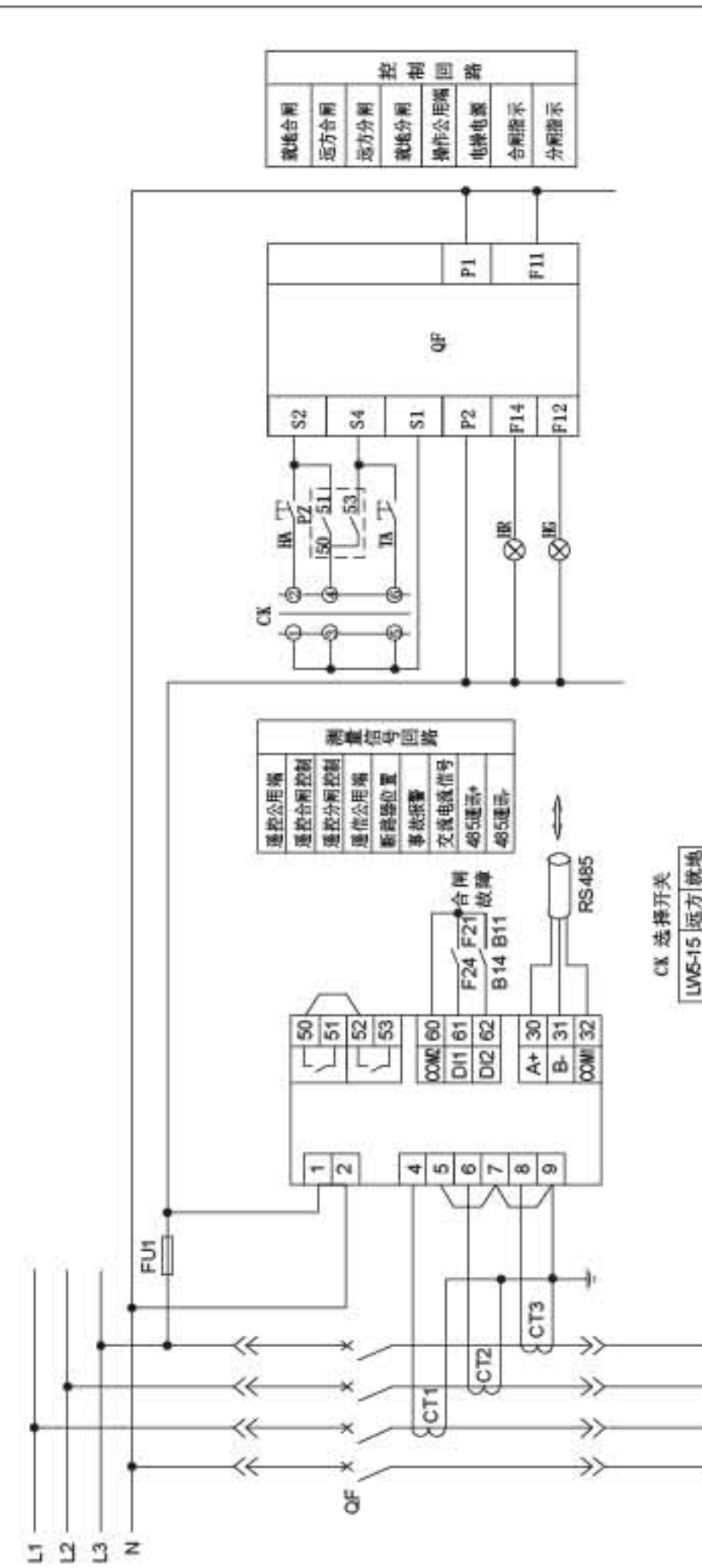
优点: 低成本的低压开关柜智能化方案。
Advantages: Low cost intelligent solution for low voltage switchgear
缺点: 单电量测量。
Measuring only for single electric parameter

2.8 订货范例 Order example

客户订货时, 应写明所需的产品型号、输入信号及输出值等相关内容。
When ordering, customer should specify the type, input signal and output of products and other relevant content.

例 E.g.1: 型号 Type: PZ16-AI/M
输入 Input: 100A/5A
辅助电源 Auxiliary power supply: AC220V/50Hz
模拟量输出 Analog output: 4~20mA

2.9 PZ仪表与塑壳开关配合实现“三通”



序号	代号	元件	型号规格	数量	备注
1	FU1	熔断器	RF-2.50 10A	1	
2	HG, HR	信号灯	HG-1500616/2	2	红绿
3	CK	转换开关	LW5-1500616/2	1	
4	HA, TA	按钮	HA2-5A15, 145	2	红绿
5	CT1-CT3	电流互感器	AMB-0.66-100/30I4000/5A	3	
6	PZ42	智能表	PZ42-AI3/KC	1	
7	QF	塑壳断路器	CM1-163/3 ip=100A 配D2电动操作机构	1	220V

CK 选择开关

LW5-15	远方就地
N0016/2	45° 45°
1-2	X
3-4	X
5-6	X

说明:
1. 本图例用于PZ42-AI3/KC与CM1塑壳断路器(配D2电动操作机构), 可实现塑壳开关的智能化测控。
2. PZ42可测量一回线路的三相电流参数。
3. PZ42具有2路开关量光耦输入, 2路继电器控制输出, RS485通讯口/MODBUS协议。
4. 具有综合显示功能, 外型尺寸: 120X120X85mm, 开孔尺寸: 108X108mm。

设计	审核	日期
设计	审核	日期
设计	审核	日期

塑壳开关与PZ仪表的典型应用

2.10 安科瑞PZ 单电量测控管理系统V1.0

2.10 Acrel PZ single electric parameter measuring and controlling management system V1.0

2.10.1 系统综述 System summarizing

该系统可对配电出线回路中的PZ可编程电测仪表所采集的电流、电压、功率、功率因素、频率等单项电参量和开关量输入、继电器输出状态进行实时数据遥测，并在该系统特定用户界面下进行分析、显示及设置或遥控处理。

This system is suitable used in the power distribution output circuit to real time remote measure the single electric parameter such as current, voltage, power, power factor, frequency etc. which collecting by PZ programmable electric parameter measuring meter, the switching input status, the relay output status, to analyze, display, set or remote treat with the specific datum under the

2.10.2 系统特点

Features:

前台人机交互界面

- 适合客户要求的交互界面
- 实时监测显示
- 合、分闸状态显示和强制操作

Front human computer interaction interface

- interaction interface to cater for user's request
- real time monitoring display
- Status display for closing, opening and forced operation



自主通讯管理设置

- PC 串口自主选择
- 通信协议选择
- 通讯波特率自主选择

Self-reliance communication management

- PC serial port self-reliance selection
- Communication protocol selection (selecting MODBUS)
- Communication baud rate self-reliance selection



多级权限用户管理

- 密码登录后台，保证设置安全
- 高权限对低权限管理，分级操作
- 修改密码功能

User's management with multi-level authority

- Password registered on back ground to ensure security
- Higher authority administrate lower authority, ranking operation
- Capable of revising passwords

报警异常事件存储

- 断相报警实时显示
- 通讯异常记录存储
- 合、分闸操作记录

Memory of alarming and abnormal event

- Phase loss alarming display in real time
- Memory of communication abnormal record
- Operation record for closing, opening



开放后台信息操作

- 增删改用电单位信息
- 增删改开关柜信息
- 增删改连接仪表信息

Open back ground information operation

- Additions, deletions and revisions of information of electricity users
- Additions, deletions and revisions of information of switchgear
- Additions, deletions and revisions of information of connecting meters

3. ARC功率因数自动补偿控制仪

3.1 概述 General

ARC系列功率因数自动补偿控制仪是低压配电系统补偿无功功率的专用控制器，可以与多种等级电压在400V以下型号的静电容屏配套使用。输出路数有6、8、10、12路四种规格。产品符合JB/T9663-1999国家标准，具有功能完善、运行稳定可靠、控制精度高等特点。

ARC Series Power Factor Automatic Compensator Meter is a special controller used for compensating reactive power in low voltage power distribution, matching with static capacitor panel for various voltage ratings up to 400 V.

It has four models of 6,8,10, 12 ways. Meeting the requirements of JB/T9663-1999 National Standard, this product has features of perfect functions, running smoothly and reliably, higher control precision.

3.2 型号说明 Type explanation



3.3 使用条件 Operational condition

- * 海拔高度不超过2500米
- * 周围环境温度为-25℃~60℃，24小时的平均温度不高于40℃
- * 空气的相对湿度在25℃时不大于85%
- * 周围环境无腐蚀性气体，无导电尘埃，无易燃易爆介质存在
- * 工作的电网电压波动幅度不得大于±20%
- * 安装地点无剧烈震动、无雨雪侵蚀

- * Altitude does not exceeding 2500m.
- * Ambient temperature is -25℃~60℃, the average temperature for 24-hour does not higher than 40℃
- * At 25℃,the relative humidity does not higher than 85%
- * No causticity gas, conductive dust, flammable medium is existent in working place.
- * The fluctuating of operational mains voltage does not greater than ±20%
- * No vigorous shock in mounted place, without intruding of rain and snow.

3.4 技术参数 Technical parameters

基本参数 Basic Parameters

额定工作电压 Rated operational voltage	交流220V或380V AC 220V or 380V
本机消耗功率 Power consumption	≤5W
电压取样信号 Voltage sampling signal	U _w 相, 交流0~380V U _w phase, AC 0~380V
电流取样信号 Current sampling signal	I, 交流0~5A, 输入阻抗≤0.1Ω AC, input impedance
投切模式 Mode for on-off	循环投切, 先投的先切, 先切的先投 Circling on/off, first cut the first on, first on the first cut
介电强度 dielectric strength	交流AC 3000V/min 50Hz
工作制 Working duty	连续工作 continuous
输出触点容量 Capacity of output contact	继电器交流AC relay 220V/2A, 晶体管直流 DC transistor 12V/20mA
净重 Net weight	约 approximate 1.0kg

参数整定范围 Parameter setting range

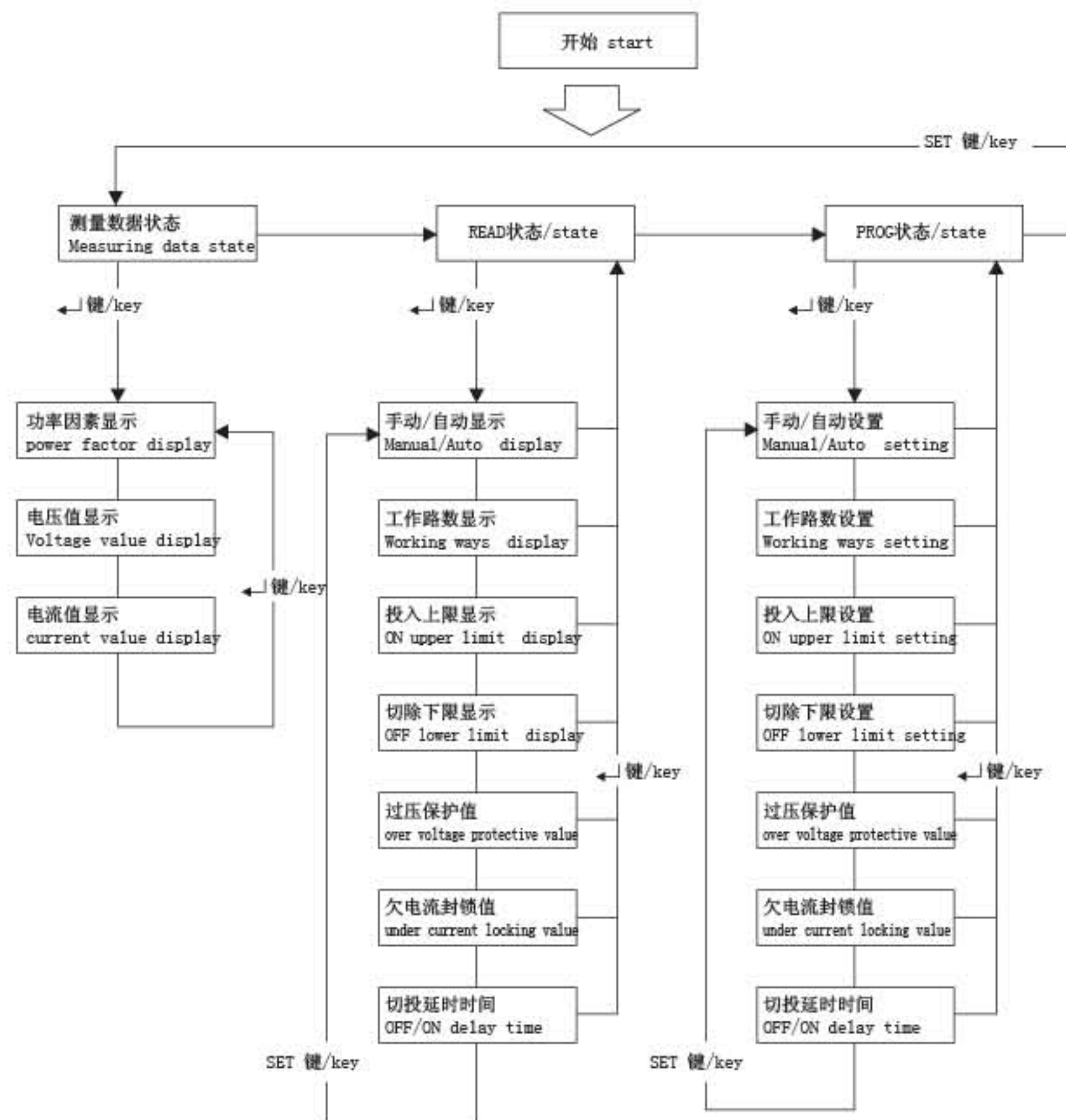
	出厂整定 Delivery setting	整定范围 Setting range	备注 Note
工作模式 Working mode	自动 Auto	手动、自动 Auto, manual	循环切换 Circling on/off
投入点 Switching on point	滞后0.95 Lag 0.95	滞后0.85~滞后0.98 Lag 0.85~lag 0.98	区间任意可调 Interval adjusting at will
切除点 Switching off point	滞后0.95 Lag 0.95	滞后0.95~超前0.95 Lag 0.95~advance 0.95	区间任意可调 Interval adjusting at will
过压保护 Over voltage protection	433V	230V~450V	区间任意可调 Interval adjusting at will
欠电流锁定 Under voltage locking	0.30A	0.10A~0.50A	区间任意可调 Interval adjusting at will
投切延时 On/off delay	20S	10S~200S	区间任意可调 Interval adjusting at will
许可工作路数 Permissible working ways	12路 ways	6~12路 ways	区间任意可调 Interval adjusting at will

显示范围与显示精度 Display range and display precision

	显示范围 Range	显示精度 Precision	备注 Note
电压显示 Voltage	U0~U999	1V	
电流显示 Current	A0.00~A9.99	0.01A	电流值无变比, 直接显示 If no current changing, display directly
功率因数 Power factor	L0.00~H0.00	0.01	电流滞后电压时加L, 否则加H Current lag-voltage adding L, otherwise, adding H

3.5 操作指南 Guidance for operation

流程指示框图 Flow chart block diagram





编号 No.	名称 Name	功能 Function
1	电源指示 Power display	指示系统的工作电源 Indicating system operational power
2	运行指示 Running display	系统正常运行时闪动 Flashing indicate the system is in normal running
3	主显示 Main display	显示数据 Data displaying
4	投切指示 ON/OFF display	指示当前每路开关的投切 Indicate the currently ON/OFF of switch of each way
5	状态指示 State display	指示当前系统工作情况 Indicate the currently system working condition
6	设定指示 Setting display	指示设定项目, 仅适用于设定模式 Indicate the set item, only for setting mode
7	功能按键 Function key	选择操作菜单 Select operating menu
8	上升按键 Upswing key	设定数据上升, 仅适用于设定模式 Setting value upswing, only for setting mode
9	下降按键 Downswing key	设定数据下降, 仅适用于设定模式 Setting value downswing, only for setting mode
10	确定按键 Confirming key	进入下一级或返回上一级菜单 Turn into the next menu or return back to the last menu

在正常显示状态下, 单次按动功能按键, 系统将在正常显示—查看工作参数—设置工作参数—正常显示的顺序切换, 同时主显示也将测量数据显示—“READ”—“PROG”—测量数据显示的顺序切换显示。

在正常显示模式下, 单按动确定按键, 可按顺序查看: 功率因数显示—电压显示—电流显示—功率因数显示。

在主显示上显示“READ”时, 单次按动确定按键, 系统将进入工作参数查看状态, 此时按动功能按键, 系统按“手动/自动”—“工作路数”—“投入上限”—“切除下限”—“过压保护电压值”—“欠电流封锁值”—“投切延时时间”—“手动/自动”的顺序切换, 设定指示当前内容, 主显示则显示对应的参数, 在此状态中, 若单次按动确定按键, 系统将返回到上一级菜单, 同时主显示也显示“READ”

在主显示上显示“PROG”时, 单次按动确定按键, 系统将进入工作参数设定状态, 此时按动功能按键, 系统按“手动/自动”—“工作路数”—“投入上限”—“切除下限”—“过压保护电压值”—“欠电流封锁值”—“投切延时时间”—“手动/自动”的顺序切换, 设定指示当前内容, 主显示则显示对应的参数, 在此状态中, 若单次按动确定按键, 系统将返回到上一级菜单, 同时保存已修改的参数, 主显示也显示“PROG”。当需要修改某一项内容的参数时, 在对应的状态下按动上升按键, 对应的参数将上升, 按下下降按键, 对应的参数将下降。

在查看工作参数与设定工作参数状态下, 若连续30秒没有任何按键按下, 系统将返回到测量数据显示状态, 显示当前的功率因数。

Under normal display status, press the function key for single times, the system is switching as per following sequence: normal display—examining working parameter—set working parameter—normal display, at the same time, the sequence of the main display: measurement data display—“READ”—“PROG”—measurement data display.

Under normal display status, press the confirm key for single times, the examining sequence: power factor display—voltage display—current display—power factor display.

When “READ” is displaying on the main display, press the confirm key for single times, the system is entering into the working parameter examining status. Pressing the function key, the switching sequence of the system as: Manual/Auto—working ways—upper limit ON—Lower limit OFF—voltage value for over voltage protection—locking value for under current—time delay for ON/OFF—Manual/Auto to set and indicate existing content, the main display indicate the corresponding parameter, under this condition, if the confirm key is pressed for single stroke, the system will return back to the last menu, while the main display indicate the “READ”

When “PROG” is displaying on the main display, press the confirm key for single times, the system is entering into the working parameter setting status. Pressing the function key, the switching sequence of the system as: Manual/Auto—working ways—upper limit ON—Lower limit OFF—voltage value for over voltage protection—locking value for under current—time delay for ON/OFF—Manual/Auto to indicate existing content, the main display indicate the corresponding parameter, under this condition, if the confirm key is pressed for single stroke, the system will return back to the last menu, while the revised parameters were stored, main display also indicate the “PROG”. When revising certain content, as per the corresponding status, press the upswing key, the parameter will be increasing, press the downswing key, the parameter will be decreasing.

Under states of examining working parameter and setting working parameter, if no key is pressed for consecutive 30 seconds, the system will return back to measurement data display status to indicate the existing power factor.

状态指示 Status indication

- * 手动指示: 指示当前系统处于手动工作状态, 在正常显示模式下, 可按动上升或下降按键来增加或减少电容的投入路数。
- * 自动指示: 指示当前系统处于自动工作状态, 此时电容的投切将由系统自动完成, 上升与下降按键无效。
- * 超前指示: 指示当前的测量电流超前于电压
- * 滞后指示: 指示当前的测量电流滞后于电压
- * 欠流指示: 指示当前的测量电流小于系统设定的电流封锁值。时若系统处于自动模式, 对外部电容的投切将保持, 且不随功率因数的变化而变化, 主要用于防止投切震荡
- * 过压指示: 指示当前的测量电压大于系统设定的保护电压。时若系统处于自动模式, 则对外部的电容将按顺序逐次切除所有已投入的电容。当测量电压大于保护电压10V以上时, 无论在手动模式还是自动模式, 系统将一次全部切除所有已投入的电容, 用以保护电容。

- * Manual indication: Indicate that the existing system is in Manual operating state, under the normal display mode, the upswing key or downswing key can be pressed to increase or decrease the switching-on capacitor ways.
- * Auto indication: Indicate that the existing system is in Auto operating state, the ON/OFF of capacitor ways will be finished automatically, under this display mode, the upswing key or downswing key is disabled.
- * Lead indication: Indicate that the existing measuring current lead up voltage
- * Lag indication: Indicate that the existing measuring current lag behind voltage
- * Under current indication: Indicate that the existing measuring current is less than the current locking value set by system. If the system is in Auto mode, the ON/OFF of external capacitor will be kept in and independent from variable power factor, mainly used for preventing the switching fluctuation.
- * Over voltage indication: Indicate that the existing measuring voltage is greater than the protective voltage set by system. If the system is in Auto mode, the switching-on external capacitor should be cut-off one by one according to the specified sequence. If measured voltage is greater than the protective voltage over 10V, whether the system is in Manual mode or Auto mode, all

3.6 外形与尺寸 Outline and dimensions



3.7 接线图 Wiring diagram



3.8 订货范例 Order examples

例: 型号 ARC-12/J
 辅助电源 AC220V或380V 50Hz
 输入 AC380V 100A/5A
 功率因数控制 0.85~0.92

example: Type ARC-12/J
 Auxiliary power AC220V or 380V 50HZ
 input AC380V 100A/5A
 Power factor controlling 0.85~0.92



ACR系列网络电力仪表

- 多电量采集，单、三相I、U、P、Q、Hz、 $\cos\phi$ 、 E_p 、 E_q 等34项
- 模拟量，I/O模块，电能脉冲、电能分时计费、RS485/Modbus（双通讯口），谐波分析功能，可选
- 多种外形选择，LED/LCD显示
- 配套ACR多电量测控管理系统软件，可实现电能节能管理，建筑小区电力监控、配电盘智能监控、变电站自动化

4. ACR系列网络电力仪表

4.1 ACR网络电力仪表 ACR network electric power meter

4.1.1 概述 General

■ 简介 / Summary

ACRXXXE网络电力仪表，是针对电力系统、工矿企业、公共设施、智能大厦的电力监控需求而设计的网络电力仪表。它能测量所有的常用电力参数，如三相电流、电压，有功、无功功率，电度等。由于该电力仪表还具备完善的通信联网功能，所以我们称之为网络电力仪表。它非常适合于实时电力监控系统。

ACRXXXE具有极高的性价比，可以直接取代常规电力变送器及测量仪表。作为一种先进的智能化、数字化的前端采集元件，该系列网络仪表已广泛应用于各种控制系统、SCADA系统和能源管理系统中。

ACRXXXE network electric power meter is designed to monitor and control the electric power system, suitable for industrial and mining establishments, public facilities, intelligent building. It can measure electric power parameters in common use, such as three-phase current, voltage, active and reactive power, kwh value and so on. Due to its perfect communication online function, we call it network electric power meter. It is specially fit for real time electricity supervisory system.

Because of its extra price performance ratio, it can replace general electric power transmitter and measurement meter directly. As an advanced intelligent digital front end collection element, it has been diffusely applied in diversified control system, SCADA system and energy sources management system.

4.1.2 型号说明 Type explanation

■ 特点 / Feature

ACREL公司集多年电力测量产品设计之经验，采用现代微处理器技术和交流采样技术设计而成了该系列网络电力仪表。产品的设计充分考虑了成本效能比、易用性和可靠性，有以下特点：

ACREL Company concentrated many years experience for power measurement product design, adopting modern microprocessor technique and AC sampling technique, considering to the root cost efficiency ratio, easy and reliability usage to design this series of network electric power meters with distinguishing features as follows:

- * 可直接从电流、电压互感器接入信号；
Switch on signal from current, voltage transformer directly;
- * 可任意设定PT/CT变比；
Set PT/CT transformation ratio at will;
- * 仪表显示可滚动；
The display of meter may be rolling;
- * 多块仪表可设置不同地址；
Several meters can be set different address;
- * 可通讯接入SCADA、PLC系统中；
Switch on SCADA, PLC system for communication;
- * 发光二极管显示，可视度高；
LED display, high visual degree;
- * 方便安装，接线简单，工程量小；
Installation convenient, wiring simple, little amount of works;
- * 可与业界绝大多数PLC相连(Modicon, GE, Siemens);
Connect to mostly PLC(Modicon, GE, Siemens);
- * 可与业界多种软件通讯(Intouch, Fix, Citec, 组态王等);
Communication with multi-kind software(Intouch, Fix, Citec, King explorer and so on);
- * 仪表采用专用掉电保护电路，在掉电情况下，电能保存不丢失，恢复电源后，电能继续走字。
The meter adopts special protection circuit, when losing electric, electric energy record can be saved, after restoring electric power the meter keeps running continuously.

应用 / Application

该系列网络电力仪表的应用领域非常广泛而且便于系统集成。凡是有电力供应的地方都有它们的用武之地，特别是在对电力品质、电力安全有较高要求的场合以及有自动化需要的场合。它适用于如下领域，并且已有众多成功应用经验。

- ★能源管理系统
Energy sources management system
- ★变电站自动化
Automation of substation
- ★配电网自动化
Automation of power distribution network
- ★小区电力监控
Monitor and control for power supply of residence
- ★工业自动化
Industry automation
- ★智能建筑
Intelligent building
- ★智能型配电盘、开关柜
Intelligent distribution panel, switch cabinet

The application of this series of meters is very extensive and convenient for system integration, it is widely used in all the place where electric power is supplied, especially suitable for the occasion that need high requirements for power quality, power security and automation. There are much proved successful experience to apply this product in following occasions:



功能 / Function

ACREL公司集多年的专业经验，推出了网络电力仪表。它是采用现代微处理器技术和交流采样技术设计而成。每个仪表可测量多种参数，作为远端监控系统(SCADA)的前端；可联网使用，亦可单独使用。

网络电力仪表采用异步半双工RS485的通讯接口和Modbus-RTU通讯协议，以满足您的自动化通信系统，使用低成本的屏蔽双绞线配线即可构造一可靠的通讯网络。不管是在微弱之照度下，亦或是完全漆黑的情况下高亮度发光LED显示器都会为您提供清晰的数据显示。

对于该网络电力仪表的使用者来说，可以轻易地在短时间内学会本机四键式操作法，该电力仪表提供多窗口式显示功能，可让使用者同时读取多项电力参数。

ACREL Company concentrated many years experience for specialized product design, adopting modern microprocessor technique and AC sampling technique, to develop this series meters. Each meter could measure many parameter. As front end of SCADA, it is able to work online or separately.

The meter adopts asynchronous half duplex RS485 communication interface and Modbus-RTU communication protocol so as to meet your automation communication system, and it use low cost STP wiring to construct a reliable communication network. Either in feebleness illumination or in absolute darkness, the high light LED display can offer clear data for you.

The users of this meter could easily learn the four keys operation in a short time. It supply multi-windows display function, users can read several electric power parameter at the same time.

4.1.3 选型表 Selection table

型号 Type	功能 Function	测量参数 Measurement parameter	精度 Accuracy class	通讯 Communication	主要尺寸 (mm) Boundary dimension	其他 Others
ACR72E		单相U、I、COS ⁻¹ 、 kw、kvar、Hz、kwh、kvarh	无功电度1级 Reactive 1 其它0.5级 (Others 0.5)	RS485/ Modbus	面框(Panel) 72 × 72 开孔(Trepanning) 67 × 67	电能脉冲输出LED显示 Electric power pulse output LED display
ACR800E					面框(Panel) 80 × 80 开孔(Trepanning) 76 × 76	电能脉冲输出 LED显示 Electric power pulse output LED display
ACR200E		有功电度 Active electric energy 无功电度 Reactive electric energy	有功0.5级 (Active 0.5) 无功1级 (Reactive 1)	RS485/ Modbus	面框(Panel) 96 × 96 开孔(Trepanning) 88 × 88	
ACR300E					面框(Panel) 120 × 120 开孔(Trepanning) 108 × 108	
ACR400E					面框(Panel) 144 × 144 开孔(Trepanning) 133 × 133	
ACR801E				RS485/ Modbus	面框(Panel) 80 × 80 开孔(Trepanning) 76 × 76	电能脉冲输出 LED显示 Electric power pulse output LED display
ACR210E		三相电流 Three-phase current 有功电度 Active electric energy	0.5级	RS485/ Modbus	面框(Panel) 96 × 96 开孔(Trepanning) 88 × 88	
ACR310E					面框(Panel) 120 × 120 开孔(Trepanning) 108 × 108	
ACR410E					面框(Panel) 144 × 144 开孔(Trepanning) 133 × 133	
ACR802E					面框(Panel) 80 × 80 开孔(Trepanning) 76 × 76	电能脉冲输出 LED显示 Electric power pulse output LED display
ACR220E		三相电流、电压、频率、功率、 功率因数、电度等 Three-phase current, voltage frequency, power, power factor, energy	无功电度1级 Reactive 1 其它0.5级 (Others 0.5)	RS485/ Modbus	面框(Panel) 96 × 96 开孔(Trepanning) 88 × 88	
ACR320E					面框(Panel) 120 × 120 开孔(Trepanning) 108 × 108	
ACR420E					面框(Panel) 144 × 144 开孔(Trepanning) 133 × 133	

4.1.4 通用技术条件 General technical condition

技术参数 Technical parameter		指标 Value	
输入 Input	网络 Network	单相、三相三线、三相四线 Single-phase 3-phase 3-wire, 3-phase 4-wire	
	电压 Voltage	额定值 Rated value	AC100V, 220V, 400V
		过负荷 Overload	1.2倍持续, 瞬时2倍/30秒 1.2 times continual, instantaneous: 2 times / 30s
		功耗 Power consumption	<0.8VA
		阻抗 Impedance	>200kΩ
	电流 Current	额定值 Rated value	AC 1A, 5A
		过负荷 Overload	1.2倍持续, 瞬时: 20倍/1秒 1.2 times continual, instantaneous: 20 times/1s
		功耗 Power consumption	<0.2VA
		阻抗 Impedance	<0.1Ω
	频率 Frequency	50±5Hz, 60±5Hz	
输出(可选) Output(optional)	电能脉冲 Electric energy pulse	2路脉冲输出 2 pulse output	
	通讯 Communication	RS-485 / Modbus-RTU波特率4800、9600可设定 RS-485 / Modbus-RTU baud rate 4800、9600 can be set	
电源 Power supply	范围 Range	AC, DC80~270V	
	功耗 Power consumption	< 4VA	
工频耐压 Isolation voltage		2kv/1min交流有效值 (AC RMS at 50Hz)	
抗干扰性能 Anti-interference performance		符合(Meet) GB6162	
环境 Environment	温度 Temperature	工作(Work): -10~+55℃, 存储(Storage): -25~+70℃	
	湿度 Humidity	≤95%RH, 不结露, 无腐蚀性气体场所 (In the place without dew and corrosive gas)	
	海拔 Altitude	≤2000m	



4.1.5 产品规格 Product specification

(1) ACR72E 多功能电力仪表 ACR72E Multi-function electric power meters

■ 特点 / Feature

- ★ 测量单相电压、电流、功率、频率、功率因数、电度
Measurement of single-phase voltage, current, power, frequency, power factor, electric energy
- ★ 测量精度: 无功电度1级, 其它0.5级
Measuring precision: 1 class for reactive electric energy, 0.5 class for others.
- ★ RS485通讯接口, Modbus-RTU通讯协议
RS485 communication port, Modbus-RTU communication protocol
- ★ LED显示
LED display
- ★ 2路电能脉冲输出
2-ways electric energy pulse output



■ 外形尺寸 / Outline dimension (mm)



■ 接线方式 / Wiring



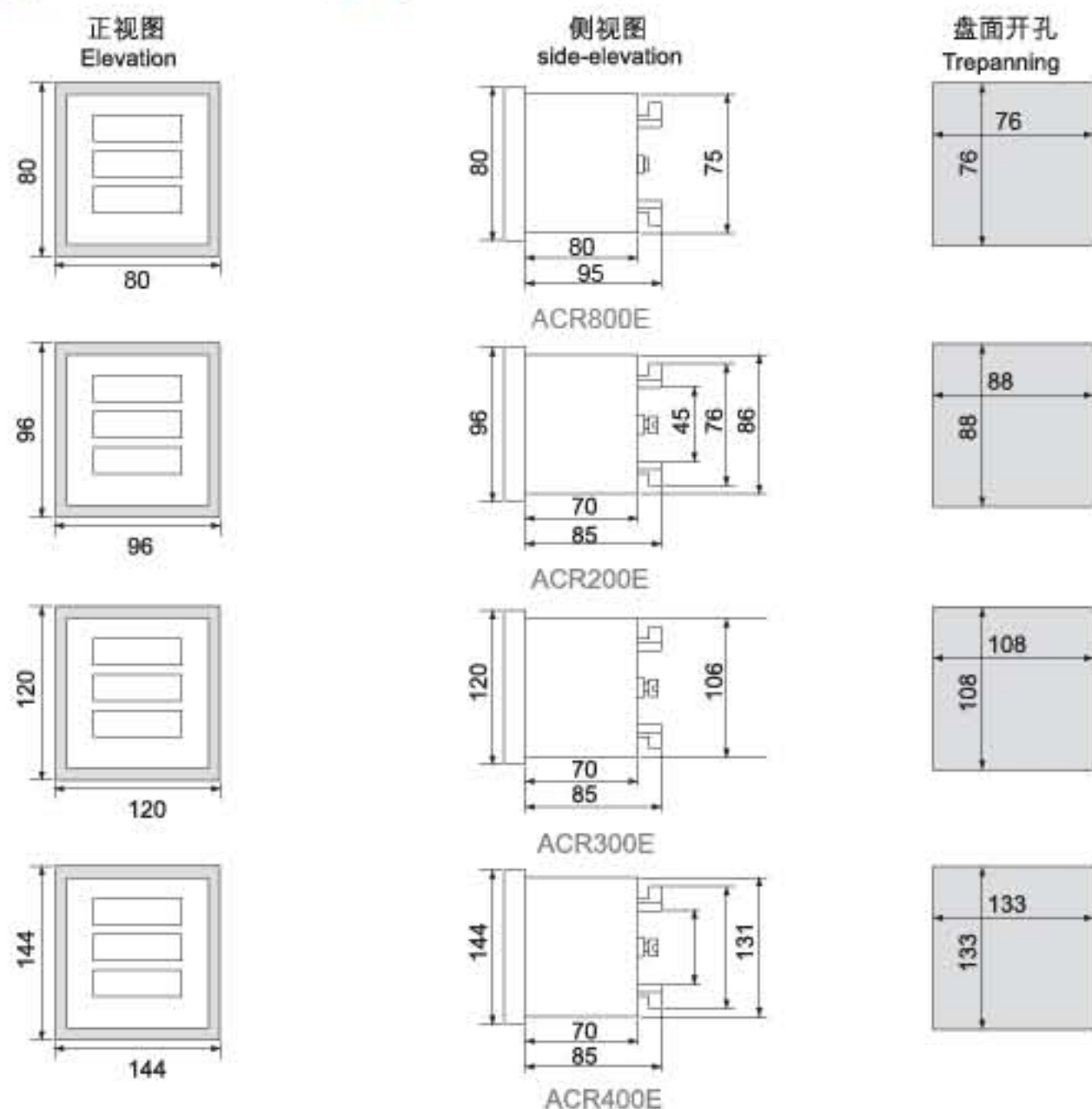
(2) ACR800E、ACR200E、ACR300E、ACR400E网络电能表 ACR800E、ACR200E、ACR300E、ACR400E Network electric power meters

■ 特点 / Feature

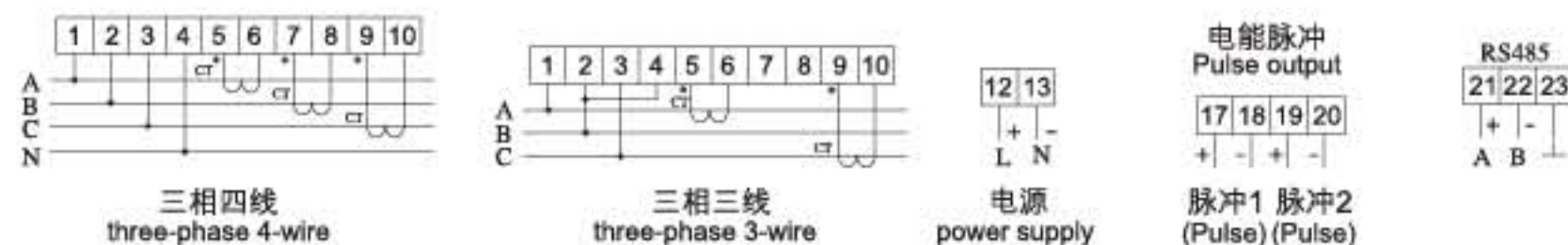
- * 有功电度(+、-), 无功电度(C、L)测量
(+, -) Active energy, (C, L) reactive energy measurement
- * 测量精度: 有功电度0.5级, 无功电度1级
Accuracy: active energy 0.5 class, reactive energy 1 class.
- * RS485通讯接口, ModbusRTU通讯协议
RS485 communication interface, Modbus RTU protocol
- * LED显示
LED display
- * 2路电能脉冲输出
2 electric power pulse output



■ 外形尺寸 / Outline dimension (mm)



■ 接线方式 / Wiring



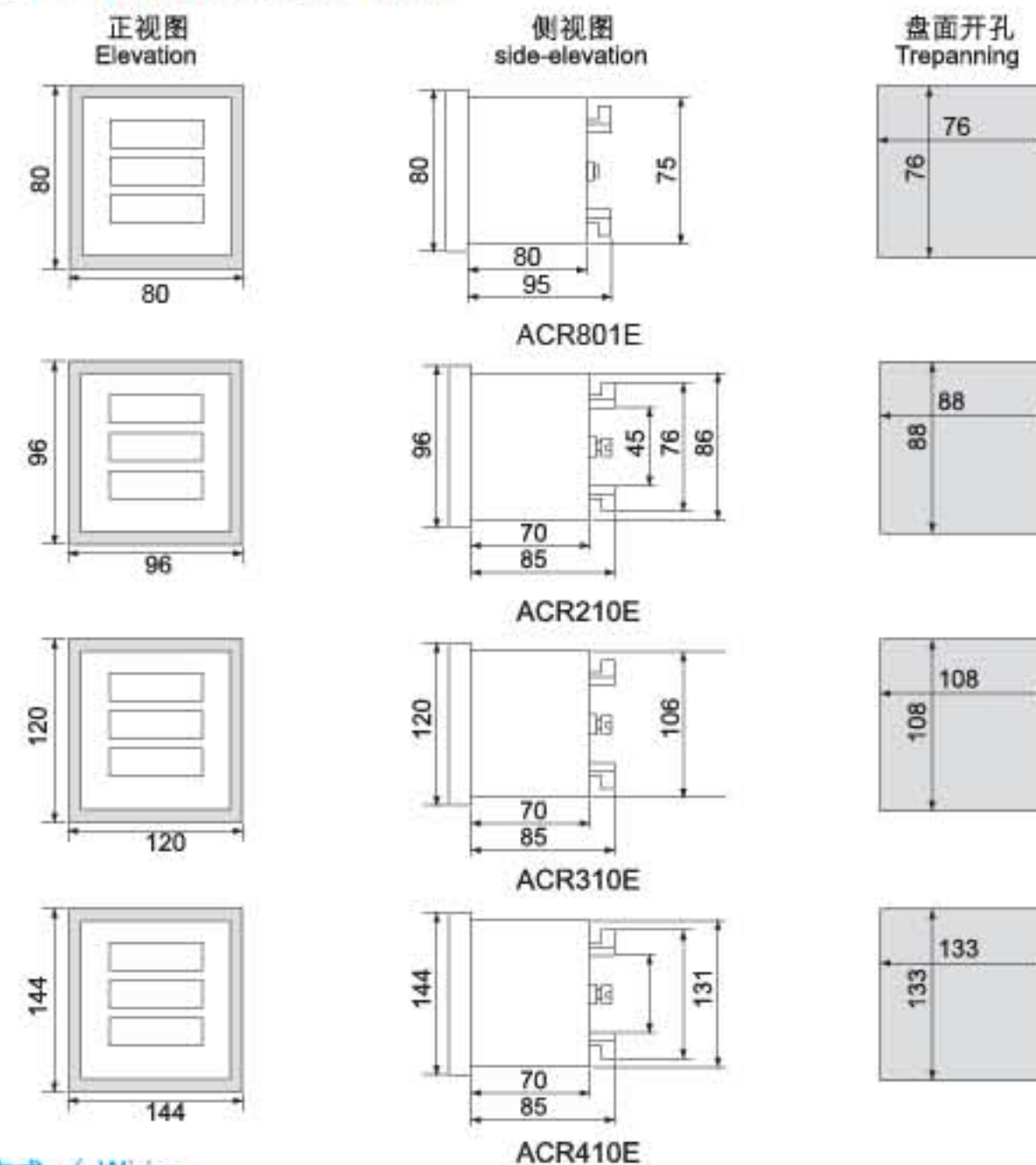
(3) ACR801E、ACR210E、ACR310E、ACR410E 多功能电力仪表 ACR801E、ACR210E、ACR310E、ACR410E multi-function electric energy meters

■ 特点 / Feature

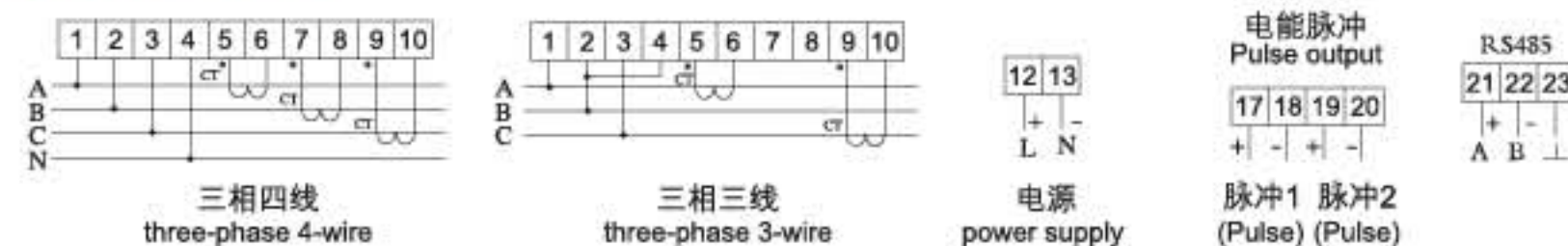
- * 测量三相电流、有功电度
Measure three-phase current, active electric energy
- * 测量精度: 0.5级
Accuracy: 0.5 class
- * RS485通讯接口, Modbus-RTU通讯协议
RS485 communication interface, Modbus-RTU protocol
- * LED显示
LED display
- * 2路电能脉冲输出
2 electric energy pulse output



■ 外形尺寸 / Outline dimension (mm)



■ 接线方式 / Wiring



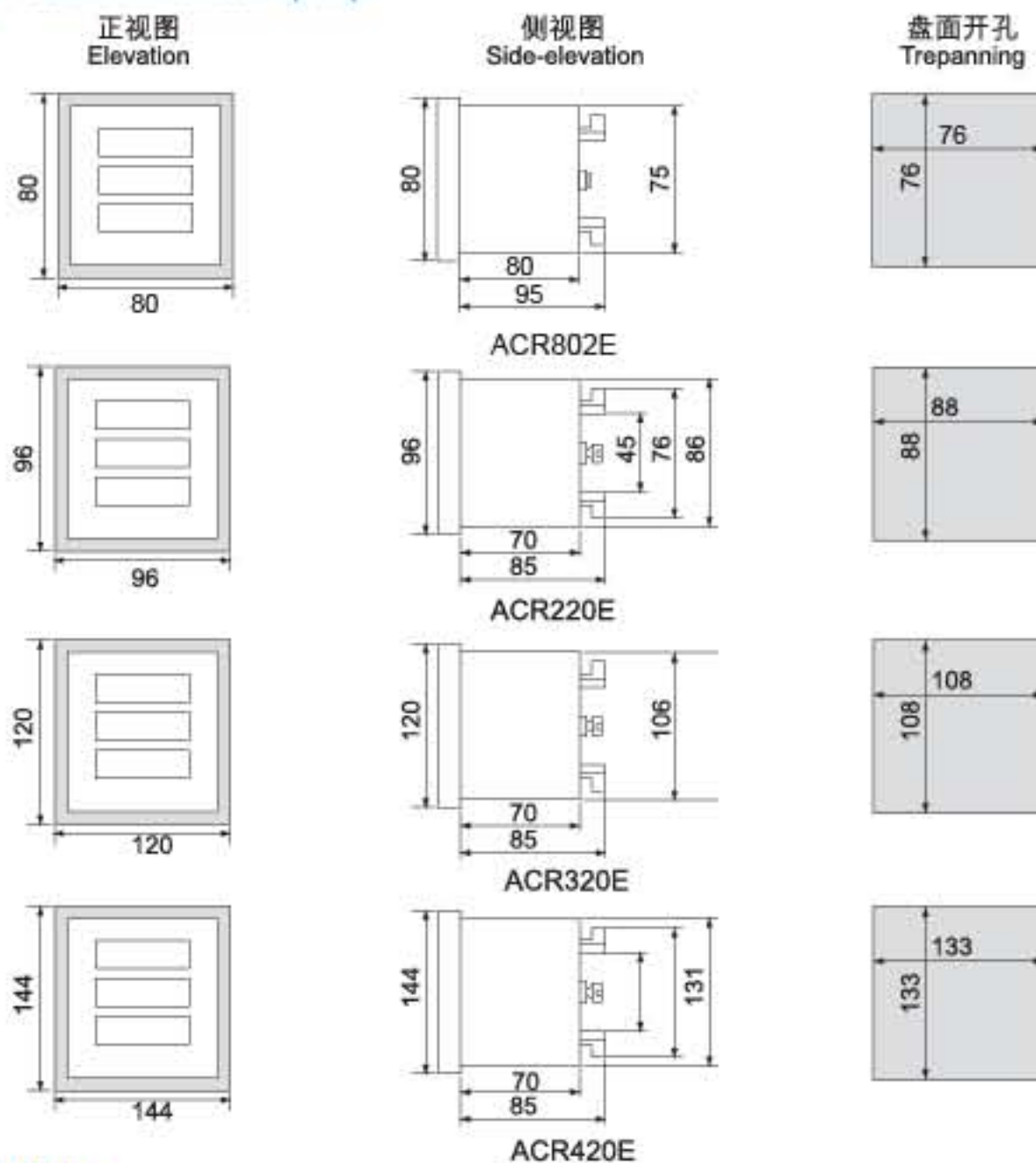
(4) ACR802E、ACR220E、ACR320E、ACR420E多功能电力仪表
ACR802E、ACR220E、ACR320E、ACR420E multi-function electric energy meters

■ 特点 / Feature

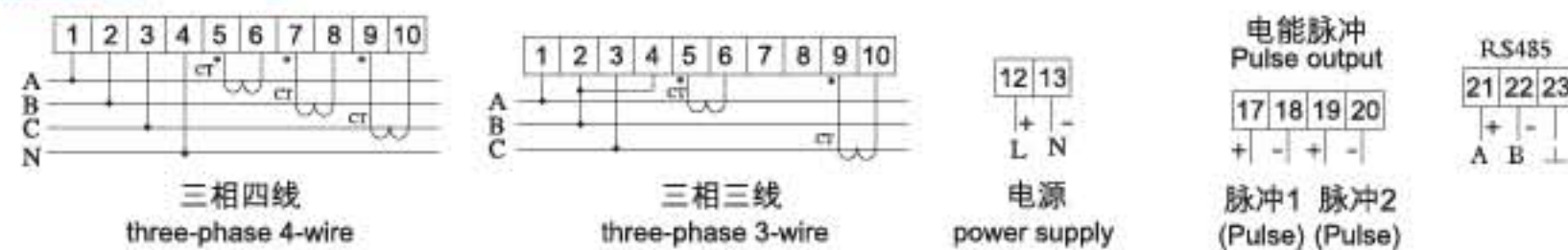
- * 测量三相电压、电流、功率、频率、功率因数、电度等;
Measure three-phase voltage, current, power, frequency, power factor, electric energy and so on;
- * 测量精度: 无功电度1级, 其它0.5级
Accuracy: Reactive electric energy 1 class, others 0.5 class
- * RS485通讯口, Modbus-RTU通讯协议
RS485 communication interface, Modbus-RTU protocol
- * LED显示
LED display
- * 2路电能脉冲输出
2 electric energy pulse output



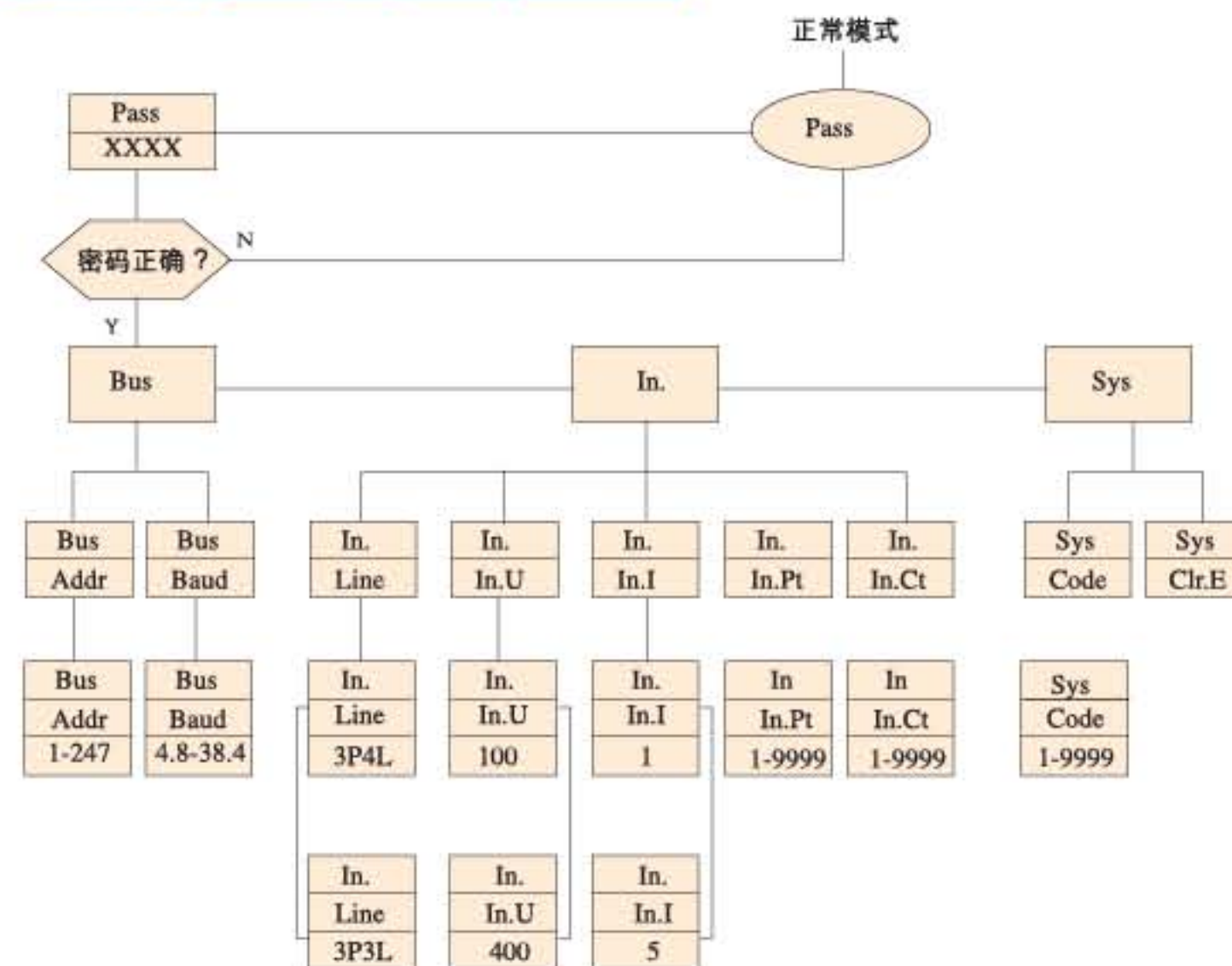
■ 外形尺寸 / Outline dimension (mm)



■ 接线方式 / Wiring



4.1.6 用户编程流程图 User's programming flow chart



4.1.7 字符注解 Character comment

字符 Character	文字说明 Letter comment	字符 Character	文字说明 Letter comment
PASS	密码 Password	In.U	输入电压范围 range of input voltage
BUS	通讯 Communication	In.I	输入电流范围 range of input current
Addr	地址 Address	In.PT	电压倍率 voltage ratio
Baud	波特率 Baud rate	In.CT	电流倍率 current ratio
In	输入设置 Input setup	SYS	系统设置 system setup
Line	接线方式 Wiring mode		
3P4L	三相四线 Three-phase 4-wire	Code	设置密码 setting code
3P3L	三相三线 Three-phase 3-wire	CLr.E	电能清零 electric energy clear

4.1.8 编程说明 Program explanation

■ 通讯设置 / Communication setup

仪表地址 Meters address: (Addr) (1-247);
 通讯波特率 Communication baud rate: (Baud) (4.800、9.600、19.20、38.40) kbps
 输入网络 Nput network: (Line) (三相三线 three-phase 3-wire, 三相四线 three-phase 4-wire)

■ 输入设置 / Input setup

输入电压范围 Input voltage range: (In.U) (100V、400V)
 输入电流范围 Input current range: (In.I) (1A、5A)
 电压变比 Voltage transformation ratio: (In.PT) (1-9999)
 电流变比 Current transformation ratio: (In.CT) (1-9999)

■ 系统设置 / System setup

密码设置 Code setup: (Code) (0001-9999)
 电能清零 Electric power clear: (Clr.E)
 (电能计数复位清零 Clear energy counter)

4.1.9 使用注意 Notice for use

- 当忘记密码时, 可使用万能密码“0008”进入系统;
When code is lost, omnipotence code “0008” can be used to enter system;
- 当使用左、右方向键修改数字时, 可采用组合按键(同时按下回车键和左或右方向键)来实现百位数字的减少或者增加;
When using left、right shift button change value, combination button (press enter key and left or right key at the same time) could realize the decreasing or increasing hundred bits of data.
- 系统设置完成后, 仪表会询问是否存盘, 按回车键表示存盘退出, 按“SET”键直接退出, 所设参数无效。
After completing system setup, meter will ask if it need save. Press enter key to save and exit. Press “SET” to exit directly, the parameters is ignored.

4.1.10 订货范例 Order example

例 E.g: 型号 Type: ACR200E
 输入 Input: 380V、100A/5A、50Hz
 电网 Electric network: 三相四线 three-phase 4-wire
 输出 Output: 两路脉冲 2 pulse
 通讯 Communication: RS-485/Modbus-RTU

4.2 ACR测控电力仪表 ACR measuring and controlling electric power meters
4.2.1 选型表 Selection table

型号 Type	功能 Function	测量参数 Measurement Parameter	精度 Accuracy	开关量 Switching	通讯 Communication	主要尺寸 (mm) Boundary Dimension	其它 Others
ACR100K		三相电流、电压 Three-phase Current, voltage				面框 Panel 96×96 开孔 Trepanning 88×88	
ACR220EK		三相电流、电压、功率、 频率、功率因数、电度等 Three-phase Current, voltage, Power, frequency, Power factor kwh value etc	无功电度 Reactive kwh value	2DI/2DO			
ACR320EFK		三相电流、电压、功率、 功率因数、频率、 分时电能计量、时钟 Three-phase Current, voltage, Power, Power factor, frequency, part-time electric energy measuring, clock	1.0级(class) 其它电量 0.5级 Other electrical parameters 0.5 class	4DI/2DO	RS485/ Modbus	面框 Panel 120×120 开孔 Trepanning 108×108	时钟脉冲输出 2路电能脉冲输出 2路模拟量输出(可选) Clock pulse output 2 electric energy pulse output 2 analog output (optional)
ACR420EK		三相电流、电压、功率、 功率因数、频率、电能 Three-phase Current, voltage, Power, Power factor, frequency, electric energy		6DI/2DO		面框 Panel 144×144 开孔 Trepanning 133×133	2路电能脉冲输出 2路模拟量输出(可选) 2 electric energy pulse output 2 analog output (optional)

4.2.2 产品规格 Product specification

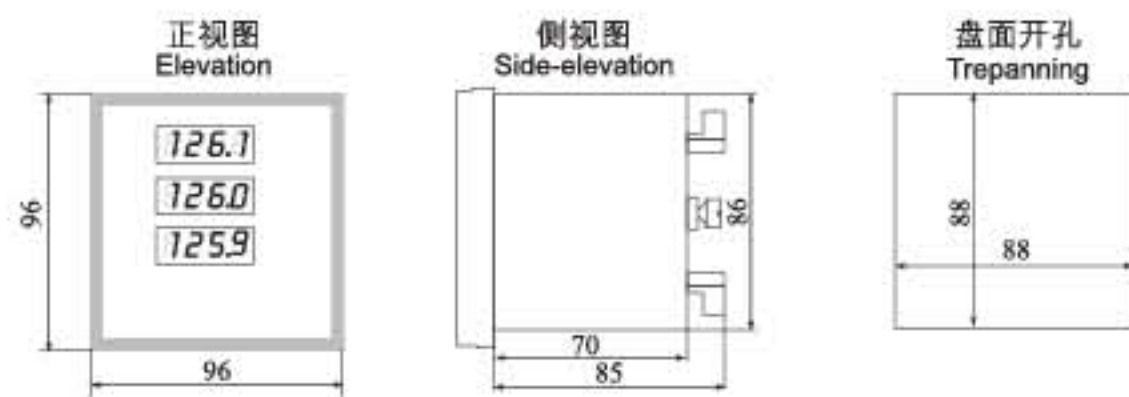
(1) ACR100K电力仪表
ACR 100K electric power meters

■ 特点 / Characteristic

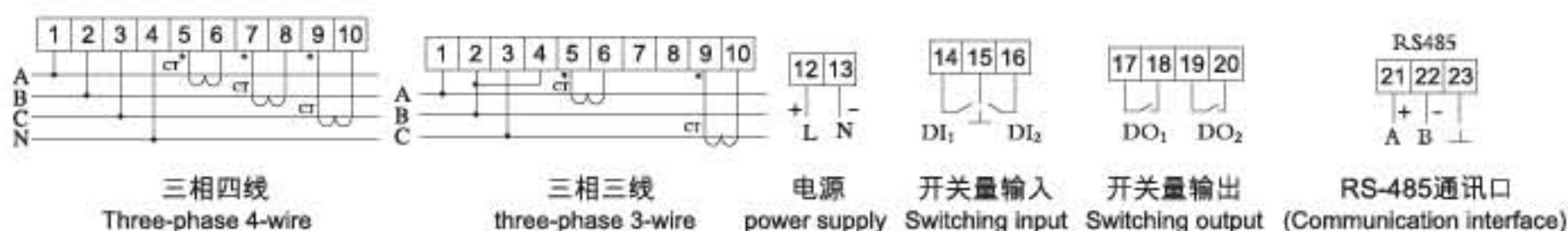
- * 可直接从电流、电压互感器接入信号;
Switch on signal from current, voltage transformer directly;
- * 可任意设定PT、CT变比;
Set PT/CT transformation ratio at will;
- * 可测量三相电压、电流;
Measure three-phase voltage, current;
- * 测量精度0.5级;
Precision of measurement: 0.5 class;
- * RS485通讯接口、Modbus-RTU通讯协议;
RS 485 communication interface, Modbus-RTU protocol;
- * 数码管显示, 可视度高;
LED Display, high visual degree;
- * 两路开关量DI1、DI2输入;
2 switching: DI1, DI2 input;
- * 两路开关量DO1、DO2输出(继电器);
2 switching: DO1, DO2 output (relay);



■ 外形尺寸 / Outline dimension 单位(unit): mm



■ 接线方式 / Connection mode



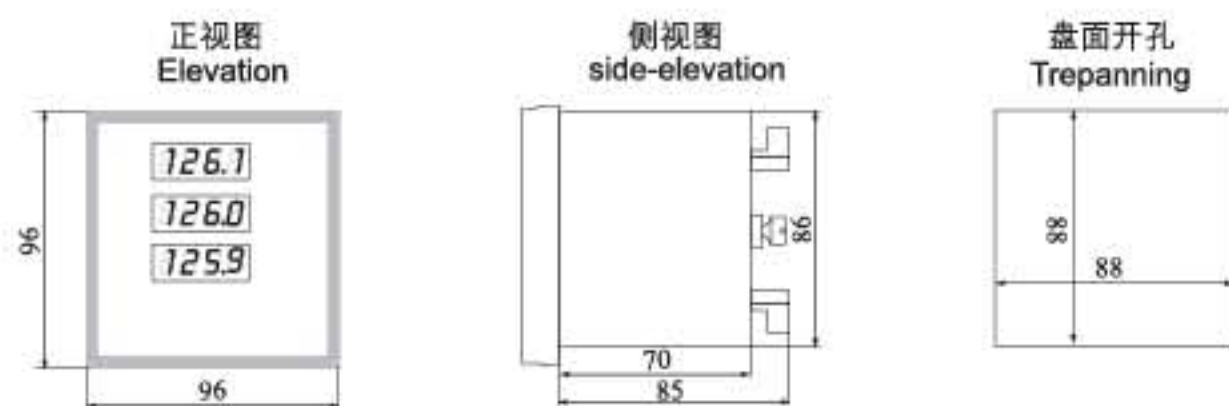
(2) ACR 220EK多功能电力仪表 ACR 220EK multifunction electric power meters

■ 特点 / Feature

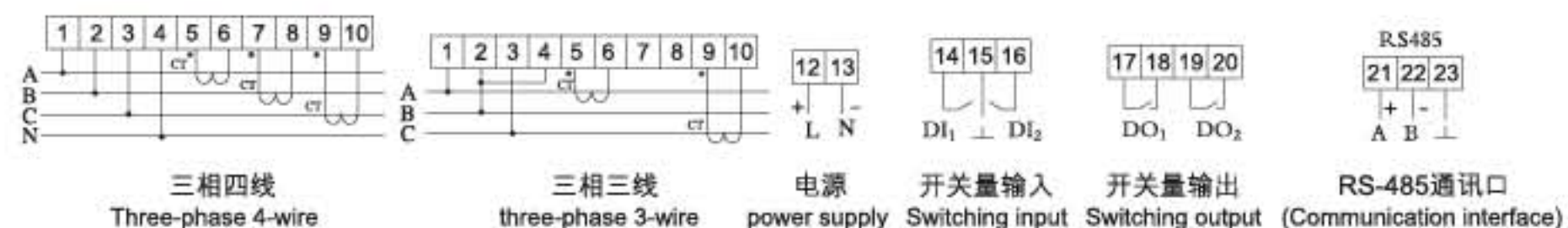
- * 可直接从电流、电压互感器接入信号;
Switch on signal from current, voltage transformer directly;
- * 可任意设定PT、CT变比;
Set PT/CT transformation ratio at will;
- * 可测量三相电压、电流、有功功率、无功功率、频率、功率因素、电度等;
Measure three-phase voltage, current, active power, reactive power, frequency, power factor, energy etc.;
- * 测量精度有功电度0.5级, 无功电度1级, 其它电度0.5级;
Precision of measurement: active energy 0.5 class, reactive energy 1.0 class, Other electrical parameters 0.5 class;
- * RS485通讯接口、Modbus-RTU通讯协议;
RS 485 communication interface, Modbus-RTU protocol;
- * 数码管显示, 可视度高;
Display with digital LED, high visual degree;
- * 两路开关量DI1、DI2输入;
2 switching: DI1, DI2 input;
- * 两路开关量DO1、DO2输出(继电器);
2 switching: DO1, DO2 output (relay);
- * 仪表采用专用掉电保护电路, 在掉电情况下, 电能保存不丢失, 回复电源后, 电能继续走字。
The meter adopts special protection circuit, when losing electric, electric energy record can be saved, after restoring electric power the meter keeps running continuously.



■ 外形尺寸 / Outline dimension 单位(unit): mm



■ 接线方式 / Wiring



(3) ACR 320 EFK带开关量复费率多功能表 ACR 320 EFK multifunction meter with switching I/O and multi-rate

● 功能 Function

能够测量所有常用的电力参数(如三相电流, 电压, 有功、无功功率、功率因数, 频率), 以及分时电能计量, 并且具有4路开关量输入和2路继电器输出, 可实现本地或远程的“遥信”和“遥控”功能, 另外还具有2路电能脉冲及2路模拟量(可选)输出。

Measurement of all the typical electric parameters (such as three phase current, voltage, active power, reactive power, power factor, frequency), and part time electric energy measurement. 4-way switching input and 2 relay output to implement functions of remote signaling and telecontrol locally or remotely, 2 electrical energy pulse and 2 analog (optional) output.

● 输入电压范围 Range of input voltage

额定值: 100V或400V AC
过负荷: 1.2倍额定值(连续); 2倍额定值/30秒;
测量形式: 真有效值;
负荷: 小于0.8VA

Rated voltage: 100V or 400V AC;
Overload: 1.2 rating (continuous); 2 rating / 30s;
Measurement: True RMS;
Load: < 0.8VA

● 输入电流范围 Range of input current

额定值: 1A或5A AC;
过负荷: 1.2倍额定值(连续); 100A/1秒;
测量形式: 真有效值;
负荷: 小于0.2VA;

Rated current: 1A or 5A AC;
Overload: 1.2 rating (continuous); 100A/1s;
Measurement: True RMS;
Load: < 0.2VA

● 输入频率范围 Range of frequency input

50±5Hz、60±5Hz

● 测量精度 Measuring accuracy

电流、电压、功率、有功电能: 0.5级;
无功电能: 1级;
频率: 0.01Hz;
温度漂移系数: 100ppm/°C (0-50°C)

Current, voltage, power, active electrical energy: 0.5 class;
Reactive electrical energy: 1.0 class;
Frequency: 0.01Hz;
Temperature drift figure: 100ppm/°C (0-50°C)

● 通讯 Communication

RS 485接口;
波特率: 4800, 9600, 19200, 38400bps可选择;
Modbus-RTU协议。

RS 485 interface;
Baud rate: 4800, 9600, 19200, 38400bps selectable;
Modbus-RTU protocol.



(4) ACR 420 EK带开关量多功能表 ACR 420 EK multifunction meter with switching

● 适用环境 Applicable environment

工作温度: $-10^{\circ}\text{C} \sim +55^{\circ}\text{C}$
 储存温度: $-20^{\circ}\text{C} \sim +70^{\circ}\text{C}$
 相对湿度: 5%~95%不结露

Operating temperature: $-10^{\circ}\text{C} \sim +55^{\circ}\text{C}$
 Storage temperature: $-20^{\circ}\text{C} \sim +70^{\circ}\text{C}$
 Relative humidity: 5%~95% without dew

● 安全性 Safety

设备耐压: 各输入对输出回路、输入对输入回路以及输出对输出回路之间大于2kV AC;
 绝缘强度: 输入、输出端对机壳 >5兆欧。

Isolation voltage: Above 2kV AC between each input and output circuit, input and input circuit, output and output circuit;
 Insulating strength: Above 5MΩ between input, output end and enclosure.

● 外形尺寸 Outline dimension

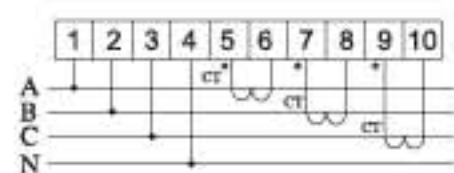
ACR 320 EFK的外形尺寸: $120 \times 120 \times 85(\text{mm})$
 Outline dimension of ACR 320 EFK: $120 \times 120 \times 85(\text{mm})$



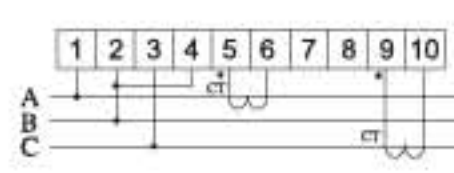
● 电源 Power supply

80~270V AC或(or) 100~350V DC
 功率(power consumption): <4VA

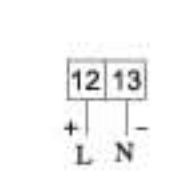
● 接线方式 Wiring



三相四线
Three-phase 4-wire



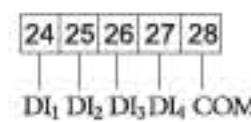
三相三线
Three-phase 3-wire



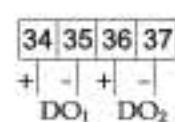
电源
Power supply



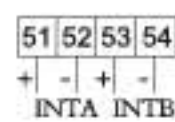
电能脉冲输出
Pulse output
脉冲1 脉冲2
(Pulse) (Pulse)



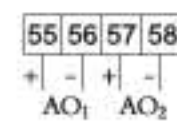
开关量输入
Switching input



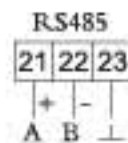
开关量输出
Switching output



时钟脉冲
Clock pulse



模拟量输出
Analog output



RS485
A B ⊥

● 功能 Function

能够测量所有常用的电力参数(如三相电流,电压,有功、无功功率、功率因数,频率)以及四象限电能计量,并具有6路开关量输入和2路继电器输出可实现本地或远程的“遥信”和“遥控”功能,另外还具有2路电能脉冲及2路模拟量(可选)输出。

Measurement of all the typical electric parameters (such as three phase current, voltage, active power, reactive power, power factor, frequency), and four-quadrant energy. 6 switching input and 2 relay output to implement functions of remote signaling and telecontrol locally or remotely. 2 of electrical energy pulse and 2 of analog (optional) output.

● 输入电压范围 Range of voltage input

额定值: 100V或400V AC
 过负荷: 1.2倍额定值(连续); 2倍额定值 / 30秒;
 测量形式: 真有效值;
 负荷: 小于0.8VA

Rated voltage: 100V or 400V AC;
 Overload: 1.2 rating (continuous); 2 rating / 30s;
 Measurement: True RMS;
 Load: < 0.8VA

● 输入电流范围 Range of current input

额定值: 1A 或 5A AC;
 过负荷: 1.2倍额定值(连续); 100A / 1秒;
 测量形式: 真有效值;
 负荷: 小于0.2VA;

Rated current: 1A or 5A AC;
 Overload: 1.2 rating (continuous); 100A / 1s;
 Measurement: True RMS;
 Load: < 0.2VA

● 输入频率范围 Range of frequency input

$50 \pm 5\text{Hz}$, $60 \pm 5\text{Hz}$

● 测量精度 Measuring accuracy

电流、电压、功率、有功电能: 0.5级;
 无功电能: 1级;
 频率: 0.01Hz;
 温度漂移系数: 100ppm / $^{\circ}\text{C}$ (0-50 $^{\circ}\text{C}$)

Current, voltage, power, active electrical energy: 0.5 class;
 Reactive electrical energy: 1.0 class;
 Frequency: 0.01Hz;
 Temperature drift figure: 100 ppm / $^{\circ}\text{C}$ (0-50 $^{\circ}\text{C}$)

● 通讯 Communication

RS 485接口;
 波特率: 4800, 9600, 19200, 38400bps可选择;
 Modbus - RTU协议。

RS 485 interface;
 Baud rate: 4800, 9600, 19200, 38400bps selectable;
 Modbus - RTU protocol.

● 适用环境 Applicable environment

工作温度: $-10^{\circ}\text{C} \sim +55^{\circ}\text{C}$
 储存温度: $-20^{\circ}\text{C} \sim +70^{\circ}\text{C}$
 相对湿度: 5%~95%不结露

Operating temperature: $-10^{\circ}\text{C} \sim +55^{\circ}\text{C}$
 Storage temperature: $-20^{\circ}\text{C} \sim +70^{\circ}\text{C}$
 Relative humidity: 5%~95% without dew

● 安全性 Safety

设备耐压: 各输入对输出回路、输入对输入回路以及输出对输出回路之间大于2kV AC;
绝缘强度: 输入、输出端对机壳 > 5兆欧。

Isolation voltage: Above 2kV AC between input / output / power supply .
Insulating strength: Above 5 MΩ between input, output and enclosure.

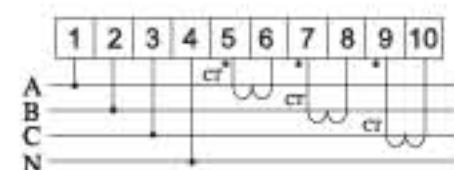
● 外形尺寸 Outline dimension

ACR 420 EFK的外形尺寸: 144 × 144 × 85 mm
Outline dimension of ACR 420 EFK: 144 × 144 × 85 mm

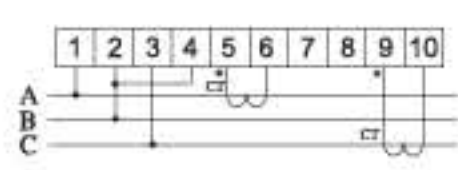
● 电源 Power supply

80~270 V AC或(or) 100~350V DC
功率(power consumption): < 4VA

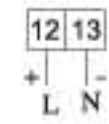
● 接线方式 Wiring



三相四线
three-phase 4-wire



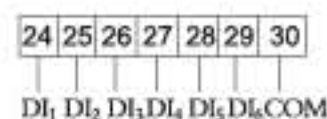
三相三线
three-phase 3-wire



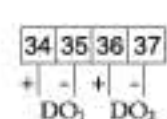
电源
power supply



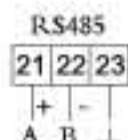
电能脉冲
Pulse output
脉冲1 脉冲2
(Pulse) (Pulse)



开关量输入
Switching input



开关量输出
Switching output



RS485
A B

(5) ACR72EL 多功能电力仪表

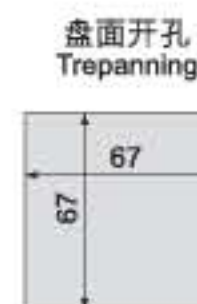
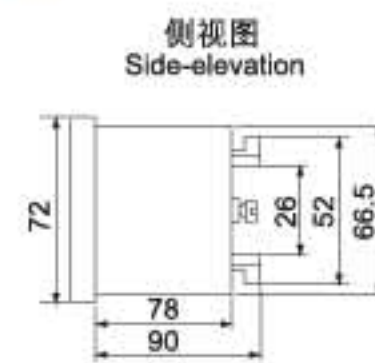
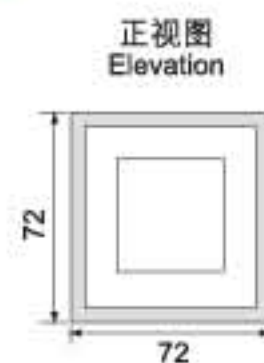
ACR72EL Multi-function electric power meters

■ 特点 / Feature

- ★ 测量单相电压、电流、功率、频率、功率因数、电度
Measurement of single-phase voltage, current, power, frequency, power factor, electric energy
- ★ 测量精度: 无功电度1级, 其它0.5级
Measuring precision: 1 class for reactive electric energy, 0.5 class for others.
- ★ RS485通讯接口, Modbus-RTU通讯协议
RS485 communication port, Modbus-RTU communication protocol
- ★ LCD显示
LCD display
- ★ 2路电能脉冲输出
2-ways electric energy pulse output

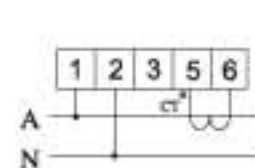


■ 外形尺寸 / Outline dimension (mm)



ACR72EL

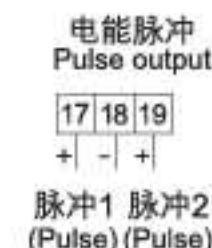
■ 接线方式 / Wiring



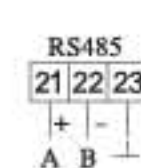
单相



电源
power supply



电能脉冲
Pulse output
脉冲1 脉冲2
(Pulse) (Pulse)



RS485
A B

(6) ACR320EL液晶显示多功能复费率表

ACR320EL LCD Multi-function Multi-rate Watthour Meter



● 功能 Function

能够测量所有常用的电力参数(如三相电流、电压,有功、无功功率,功率因数,频率),具备6个时段4种费率分时电能计量功能,并且具有4路开关量输入和3路继电器输出,可实现本地或远程的“遥信”和“遥控”功能,另外还具有2路电能脉冲及4路模拟变送输出。

This meter is suitable used for measuring many electric parameters such as three-phase current, three-phase voltage, active power, reactive power, power factor, frequency; have features of electric energy measuring with 6-time interval and 4-rate, "remote signaling" and "remote control" in local or distance with 4 ways switching output and 3 ways relay output, 2 ways electric energy pulse output and 4-ways analog transmitter output.

● 输入电压范围 Range of input voltage

额定值: 100V或400VAC;
过负荷: 1.2倍额定值(连续); 2倍额定值/30秒;
测量形式: 真有效值(True-RMS);
负荷: 小于0.8VA

Rating: 100V or 400 VAC;
Overload: 120% rating (continuous); 200% rating for 30 s;
Measuring form: True-RMS
Load: less than 0.8 VA

● 输入电流范围 Range of input current

额定值: 1A或5A AC;
过负荷: 1.2倍额定值 (连续); 100A/1秒;
测量形式: 真有效值 (True-RMS);
负荷: 小于0.2VA

Rating: 1 A or 5 A AC;
Overload: 120% rating (continuous); 100 A for 1 s;
Measuring form: True-RMS
Load: less than 0.2 VA

● 输入频率范围 Range of frequency input

50±5Hz、60±5Hz

● 测量精度 Measuring accuracy

电流、电压、功率、有功电能: 0.5级;
无功电能: 1级;
频率: 0.01Hz;
温度漂移系数: 100PPM/℃ (0-50℃)

Current, voltage, power, active electric energy: 0.5 class;
Reactive electric energy: 1 class;
Frequency: 0.01 Hz;
Temperature drift figure: 100PPM / °C (0-50 °C)

● 通讯 Communication

RS485接口;
波特率: 4800、9600、19200、38400bps可选择;
MODBUS-RTU 协议。

RS485 communication port
Baud rate: 4800, 9600, 19200, 38400bps optional
Modbus-RTU protocol

● 适用环境 Applicable environment

工作温度: -10℃~+55℃
储存温度: -20℃~+70℃
相对湿度: 5%~95%不结露

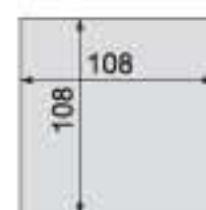
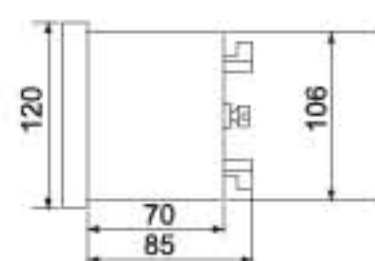
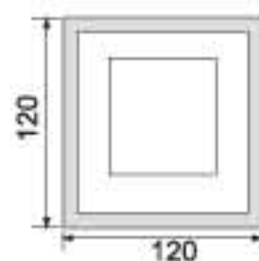
Operating temperature: -10 °C ~ +55 °C
Storage temperature: -20 °C ~ +70 °C
Relative humidity: 5%~95% without dew

● 安全性 Safety

设备耐压: 各输入对输出回路、输入对输入回路以及输出对输出回路之间大于2KVAC
绝缘强度: 输入、输出端对机壳>5兆欧

Voltage withstand of equipment: Greater than 2kV AC between input circuit to output circuit, input circuit to input circuit, output circuit to output circuit;
Insulating strength: Greater than 5 mega ohm between input end to enclosure, output end to enclosure

● 外形尺寸 Outline dimension

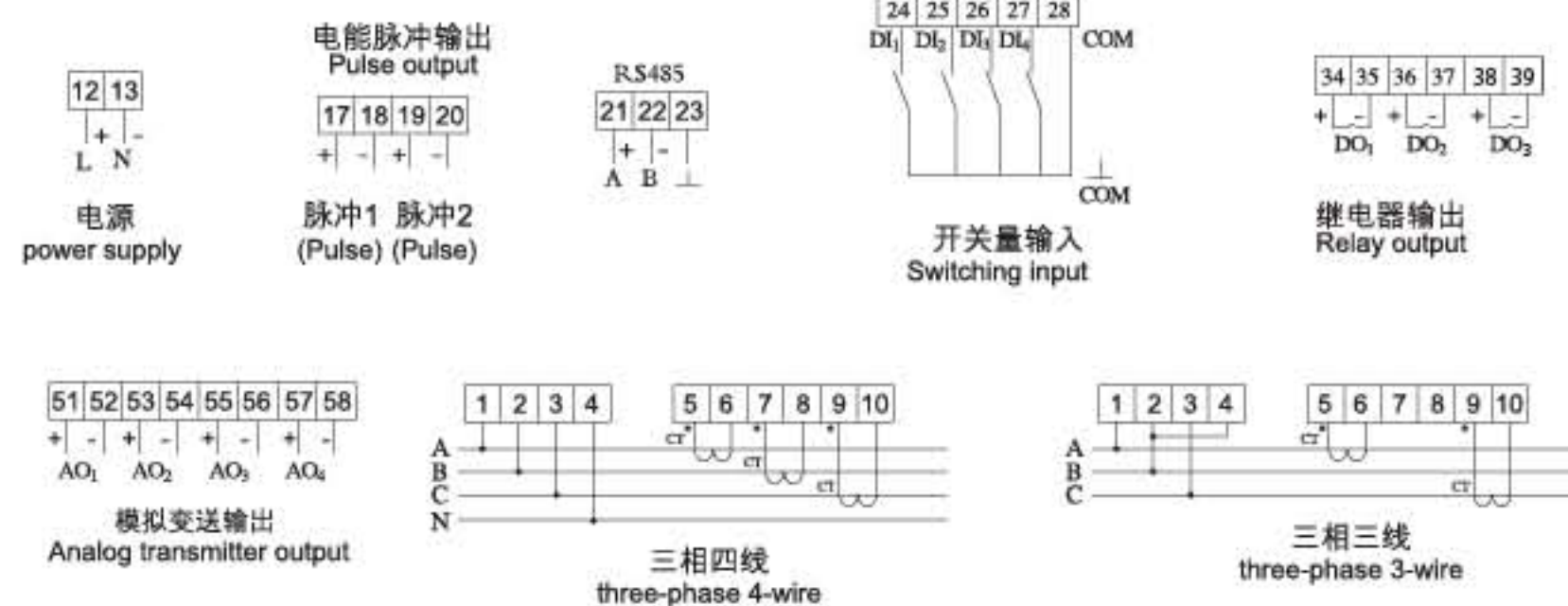


ACR320EL

● 电源 Power supply

80—270V AC或(or) 100—350V DC
功率(power consumption): <4VA

● 接线方式 Wiring



网络电力仪表方案 Network electric power meter scheme

多电量测量、I/O、RS-485，可配专用低压配电软件

Multi-electrical parameters measurement, I/O, RS-485, matched with special software for low voltage power distribution

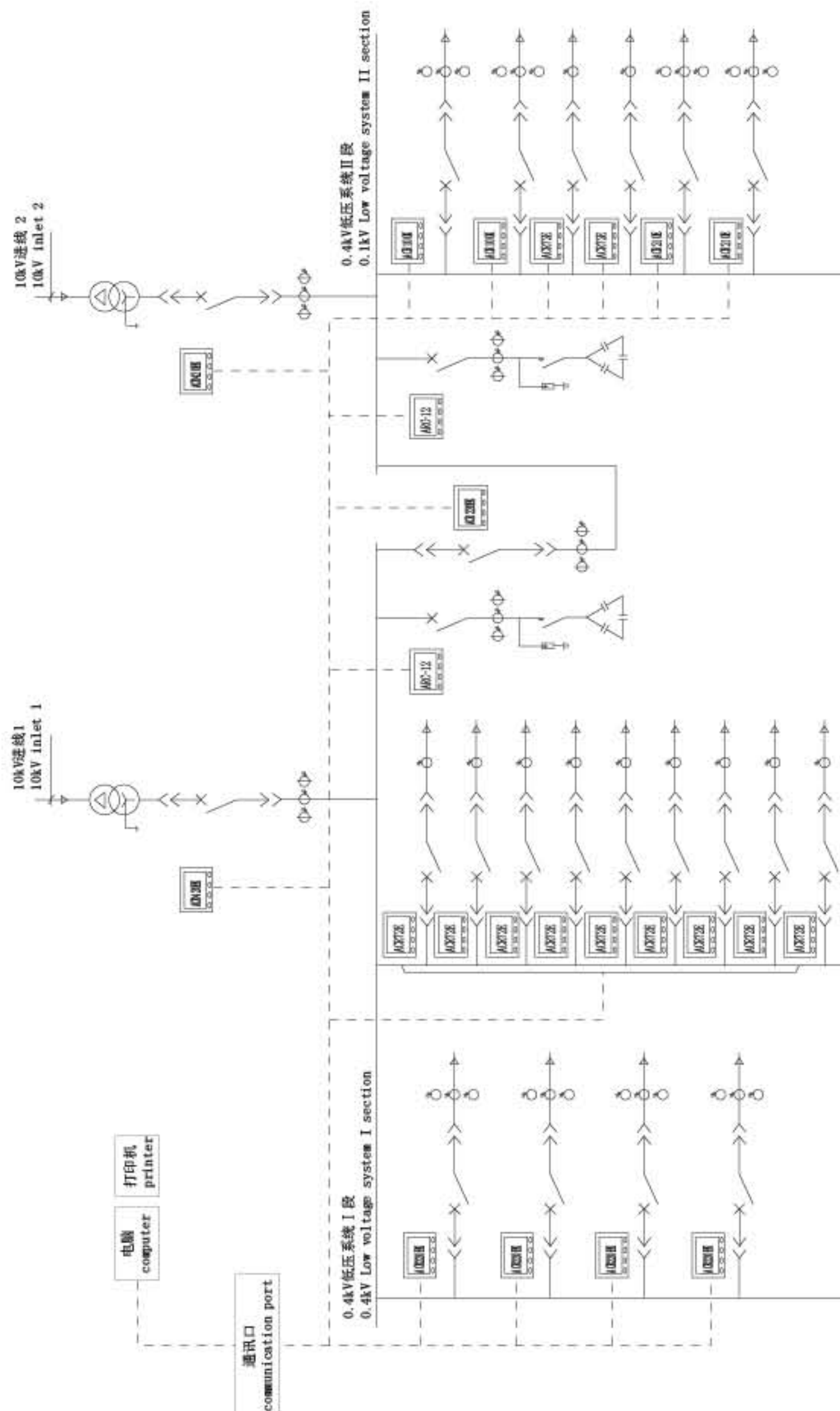
开关柜回路 Switchgear circuit	网络仪表型号 network meters type	尺寸 dimension (mm)	功能 function
进线回路 inlet circuit	ACR320E	面框 120 X 120 开孔 cutout 108 X 108	全部电量测量、RS485 measuring all electrical parameters
	ACR420Ek	面框 panel frame 144 X 144 开孔 function 133 X 133	全部电量测量、 6DI/2DO、RS485
电容补偿回路 capacitance compensation circuit	ARC-6(12)-C 功率因数控制仪 power factor controller	面框 120 X 120 开孔 function 108 X 108	6~12 路电容器投切、 RS485 6~12ways capacitor switching
母联回路 bus connecting circuit	ACR220EK	面框 panel frame 96 X 96 开孔 function 88 X 88	全部电量测量、 2DI/2DO、RS-485 measuring all electrical parameters
出线回路 outlet	重要回路 important circuit ACR220EK		全部电量测量、 2DI/2DO、RS-485 measuring all electrical parameters
	一般回路 general circuit ACR100K		3I、3V、2DI/2DO、 RS485
单相回路 single-phase circuit ACR72E	面框 panel frame 72 X 72 开孔 function 67 X 67	单相 (single-phase) I、V、Kwh、 Kvarh、cos ² 、Kw、 Kvar、RS485	

优点：可实现低压配电智能化，网络化；

Advantages: The intelligentization and networklization for low voltage power distribution can be realized.

缺点：成本较高

The use cost is higher



4.4安科瑞ACR 多电量测控管理系统V1.0

4.4 Acrel ACR multi-electric parameter measuring and controlling management system V1.0

4.4.1 系统综述(System summarizing):

该系统可对配电网中连接的ACR网络电力仪表所采集的单/三相电流、电压、有/无功功率、功率因素、频率、正/反向有/无功电度等多项电参量和开关量输入、继电器输出、断路器(开、合、脱扣)状态进行实时数据遥测,并在该系统特定用户界面下进行分析、显示及设置或遥控处理。

This system is suitable used in the power distribution network to real time remote measure the multiple electric parameter such as single/ three-phase current, voltage, active/ reactive power, power factor, frequency, forward/reverse, active/reactive electric energy etc. which collecting by ACR network electric power meter, the switching input status, the relay output status, circuit breaker (opening, closing, tripping) status to analyze, display, set or remote treat with the specific datum

系统特点:

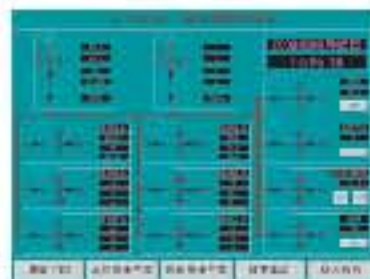
Features:

前台人机交互界面

Front human computer interaction interface

- 适合客户要求的交互界面
- 实时监测显示
- 合、分闸状态显示和强制操作

interaction interface to cater for user's request
real time monitoring display
Status display for closing, opening and forced operation



开放后台信息操作

Open back ground information operation

- 增删改用电单位信息
- 增删改开关柜信息
- 增删改连接仪表信息

Additions, deletions and revisions of information of electricity users
Additions, deletions and revisions of information of switchgear
Additions, deletions and revisions of information of connecting met



多级权限用户管理

User's management with multi-level authority

- 密码登录后台, 保证设置安全
- 高权限对低权限管理, 分级操作
- 修改密码功能

Password registered on back ground to ensure security
Higher authority administrate lower authority, ranking operation
Capable of revising passwords

自主通讯管理设置

Self-reliance communication management

- PC串口自主选择
- 通讯协议选择 (本公司仪表通讯协议为MODBUS)
- 通讯波特率自主选择

PC serial port self-reliance selection
Communication protocol selection (selecting MODBUS)
Communication baud rate self-reliance selection



报警异常事件存储

Memory of alarming and abnormal event

- 断相报警实时显示
- 通讯异常记录存储
- 合、分闸操作记录

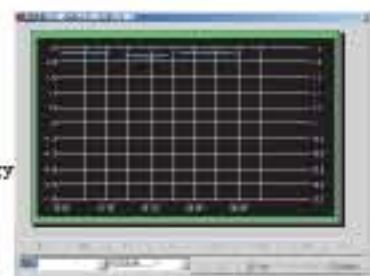
Phase loss alarming display in real time
Memory of communication abnormal record
Operation record for closing, opening

实时历史趋势曲线

Real time history trend curve

- 客户要求的电参量的实时曲线
- 正/反向有/无功电度的历史趋势
- 按要求查看各个时段

Electric parameter real time curve requested by customer
History trend about forward/reverse, active/reactive electric energy
Look over the requested period of time one by one



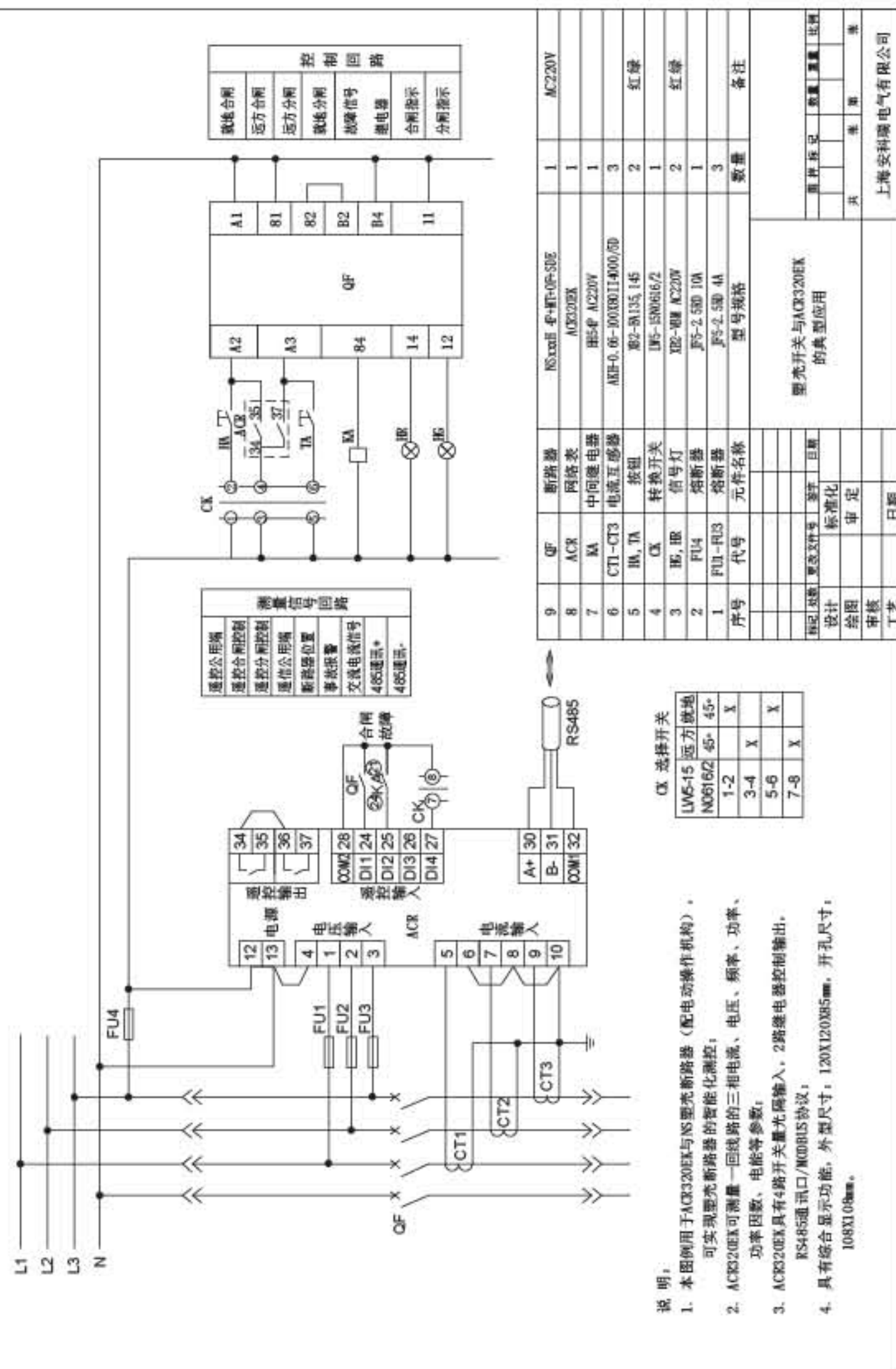
报表管理设置功能

Setting function of report form management

- 满足客户需求的各种报表
- 自动生成日、周、月、年报
- 用户指定的报表

Providing various report forms needed by customer
Developing daily report, weekly report, monthly report, yearly report automatically
Report form specified by customer

4.5 ACR320EK与塑壳开关配合实现“三通”





DT系列嵌入式安装电能表

- 计度器显示电度值，寿命长不死机，电能数据不丢失
- 精度：有功电度0.5或1.0级，无功电度2.0级
- 解决了GCK、GCS、MNS等抽出式低压柜出线回路中安装电能表的难题
- 应用于工矿企业、建筑大楼、物业小区内部电能测量、考核

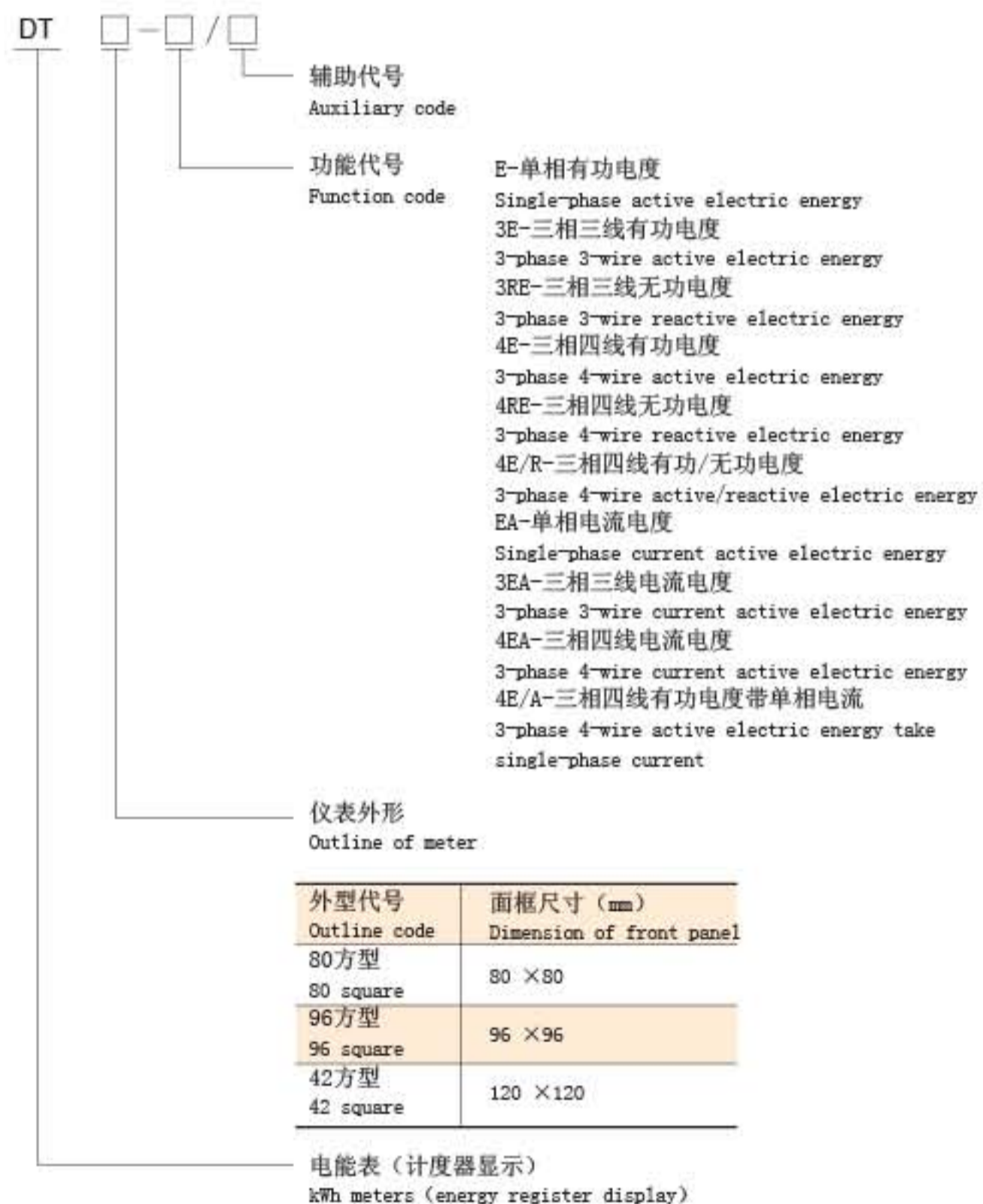
5. DT系列嵌入式安装电能表

5.1 概述 General

该系列电能表采用先进的电能计量芯片，结合机械式计度器的优点设计而成；产品具有精度高，可靠性强，寿命长，体积小等优点；解决了GCK、GCS、MNS等抽出式低压柜出线回路中安装电能表的难题，可广泛应用于工矿企业、建筑大楼、物业小区内部电能测量、考核、管理。符合GB/T15283-94标准。

The meter combines advanced electric energy measuring chip with the virtue of mechanical energy counter, with advantages of high accuracy, better reliability, long service life, compactness, have settled the difficulty of installing electric power meters in outlet circuit of the GCK, GCS, MNS draw-out low voltage Switchgear. It is widely used in the industrial and mining establishments, building, residence zone property for electric measurement, examination, management. It meets the requirements of GB/T15283-94.

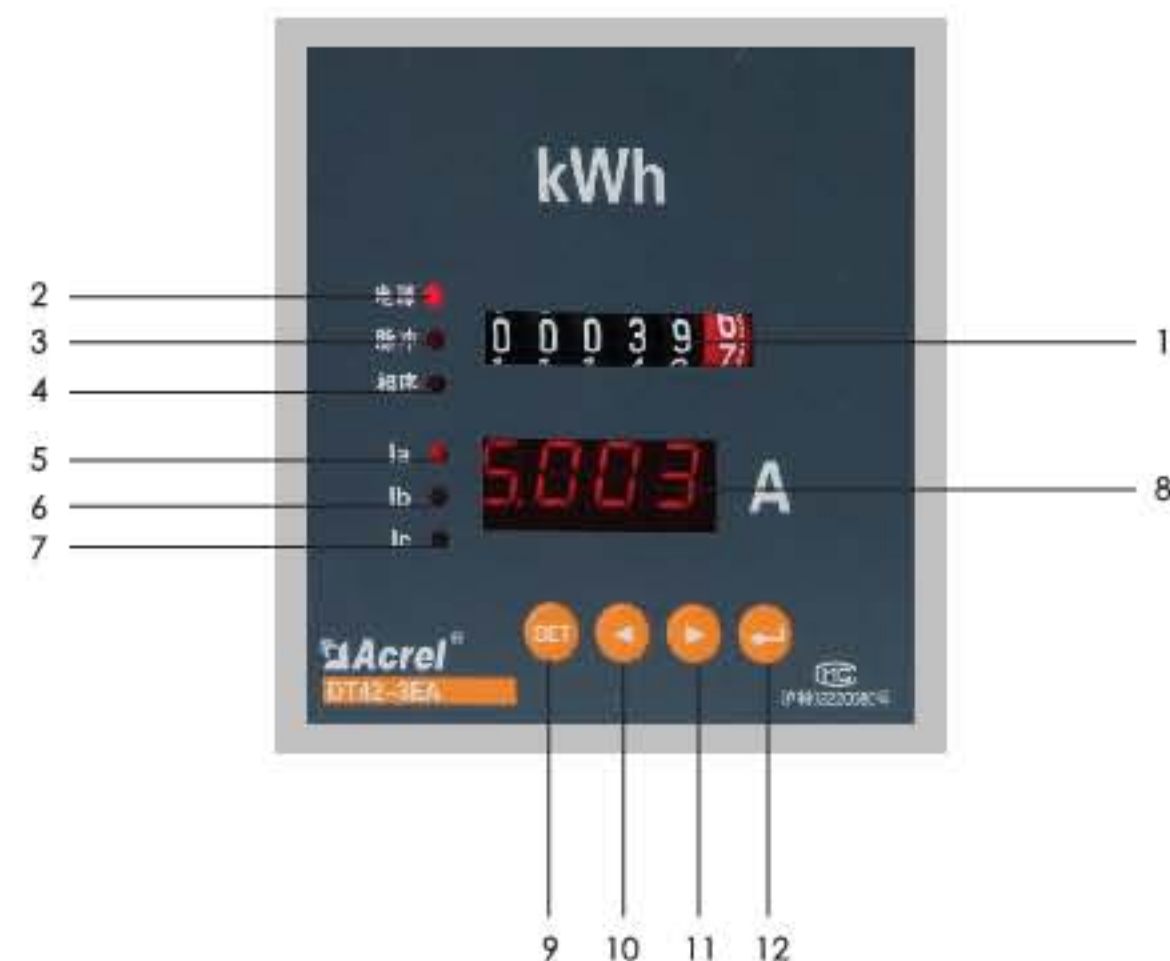
5.2 型号说明 Type explanation



5.3 技术指标 Technical data

技术参数 Technical parameters		指标 Value	
输入 Input	标称值 Normal value	电压(Voltage) 100V、220V、380V, 电流(Current) 1A、5A	
	过载 Overload	持续1.2倍, 瞬时电流10倍/5秒; 瞬时电压2倍/30秒 Continual 1.2 times, Instantaneous current 10 times/5s; Instantaneous voltage 2 times/30s	
	频率 Frequency	50±5Hz、60±Hz	
显示 Display		计度器显示0~99999.9kWh Energy counter display 0~99999.9kWh	
精度等级 Accuracy class		有功电度0.5级、1级, 无功电度2级 Active energy 0.5, 1, reactive energy 2	
脉冲输出 Pulse output	单相 Single-phase	6400imp/kWh	
	三相 3-phase	1600imp/kWh	
辅助电源 Power supply	电压范围 Voltage range	AC 85V~265V DC 100V~350V	
	功耗 Power consumption	< 3V	
绝缘电阻 Insulation resistance		≥ 100MΩ	
工频耐压 Isolation voltage		电源/输入/输出 端口之间AC 2kV/1min Between power supply/input/output AC 2kV/1min	
环境 Environment	温度 Temperature	工作温度 Work temperature	-15℃~+55℃
		贮存温度 Storage temperature	-25℃~+70℃
	湿度 Humidity	相对湿度 < 90% Relative humidity < 90	
	海拔 Altitude	≤ 2500m	

5.4 图例说明 Diagram explanation

 以DT42-4EA 电表为例
Example as DT42-4EA energy meters


编号 Number	名称 Name	状态示例 State	功能说明 Function explanation
1	计度器显示 register display	00000.4 指示灯点亮	显示电能, (6位有效数字, 红色位为小数位) Energy register display, (6 bit significant figure, The red digit is decimal fraction digit)
2	电源 power	指示灯点亮 Light on	电源正常时长亮 lightening when the power supply is normal
3	脉冲 pulse	指示灯点亮 Light on	有电流电压信号输入时闪烁 sparkling when the voltage and current signal input
4	相序 phase sequence	指示灯点亮 Light on	输入电流电压信号正常时不亮, 当输入信号的 电流和电压之间的相位角大于90°时长亮 lights-out when the input voltage and current signal is normal, and lightening when the phase angle between the voltage and current is large

5	la	指示灯点亮 Light on	该指示灯亮,则表示LED数码管显示的是A相电流 If this pilot lamp is lightening, the phase A current is displayed by the 4-LED
6	lb	指示灯点亮 Light on	该指示灯亮,则表示LED数码管显示的是B相电流 If this pilot lamp is lightening, the phase B current is displayed by the 4-LED
7	lc	指示灯点亮 Light on	该指示灯亮,则表示LED数码管显示的是C相电流 If this pilot lamp is lightening, the phase C current is displayed by the 4-LED
8	LED	0000	4位数码显示电流值 4-digit LED display of current
9	SET	按键按下 Press	选择操作功能或返回上一级菜单 Choose operation function or return previous manu
10	左方向键 Left	按键按下 Press	查看数据或数字量增减 Check data or the fluctuation of digital quantity
11	右方向键 Right	按键按下 Press	查看数据或数字量增减 Check data or the fluctuation of digital quantity
12	ENTER键	按键按下 Press	确定功能或进入下一级菜单 Choose operation function or enter next manu

5.5 产品规格 Product Specification

- **80方型电能表/80 square electric energy meters**
DT80-E 单相有功电能表
Single-phase active electric energy meters
DT80-3E 三相三线有功电能表
3-phase 3-wire active electric energy meters
DT80-3RE 三相三线无功电能表
3-phase 3-wire reactive electric energy meters
DT80-4E 三相四线有功电能表
3-phase 4-wire active electric energy meters
- **96方型电能表/96 square electric energy meters**
DT96-E 单相有功电能表
Single-phase active electric energy meters
DT96-3E 三相三线有功电能表
3-phase 3-wire active electric energy meters
DT96-3RE 三相三线无功电能表
3-phase 3-wire reactive electric energy meters
DT96-4E 三相四线有功电能表
3-phase 4-wire active electric energy meters
DT96-4RE 三相四线无功电能表
3-phase 4-wire reactive electric energy meters



- DT96-EA 单相有功电度电流表
Single-phase active electric energy and single-phase current electric energy meters
- DT96-4E/A 三相四线有功电度电流表
3-phase 4-wire active electric energy and single-phase current electric energy meters



■ 42方型电能表/42 square electric energy meters

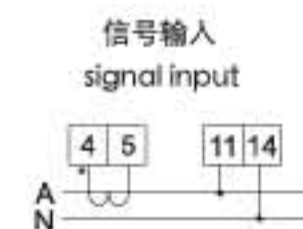
- DT42-3E 三相三线有功电能表
3-phase 3-wire active electric energy meters
- DT42-3RE 三相三线无功电能表
3-phase 3-wire reactive electric energy meters
- DT42-4E 三相四线有功电能表
3-phase 4-wire active electric energy meters
- DT42-4RE 三相四线无功电能表
3-phase 4-wire reactive electric energy meters
- DT42-4E/R 三相四线有功/无功电能表
3-phase 4-wire active and 3-phase 4-wire reactive electric energy meters
- DT42-3EA 三相三线有功电度电流表
3-phase 3-wire active electric energy and 3-phase current electric energy meters
- DT42-4EA 三相四线有功电度电流表
3-phase 4-wire active electric energy and 3-phase current electric energy meters

5.6 外型及开孔尺寸 Dimensions for outline and cutout

仪表型号 Meters code	面框尺寸 Dimension of front panel	开孔尺寸 Trepanning dimension	进深 Depth
DT80	80×80	76×76	91
DT96	96×96	88×88	85
DT42	120×120	108×108	85

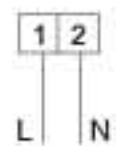
5.7 接线方式 Wiring type

单相接法
Single-phase

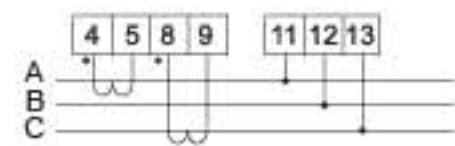


三相三线接法
3-phase 3-wire

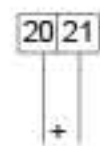
辅助电源
power supply



信号输入
signal input

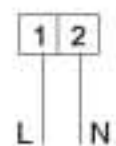


脉冲输出
Pulse output

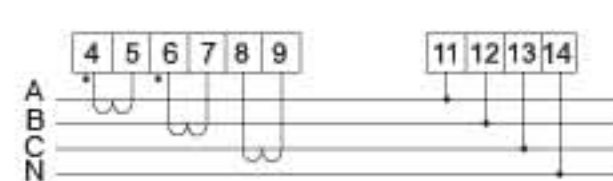


三相四线接法
3-phase 4-wire

辅助电源
power supply



信号输入
signal input



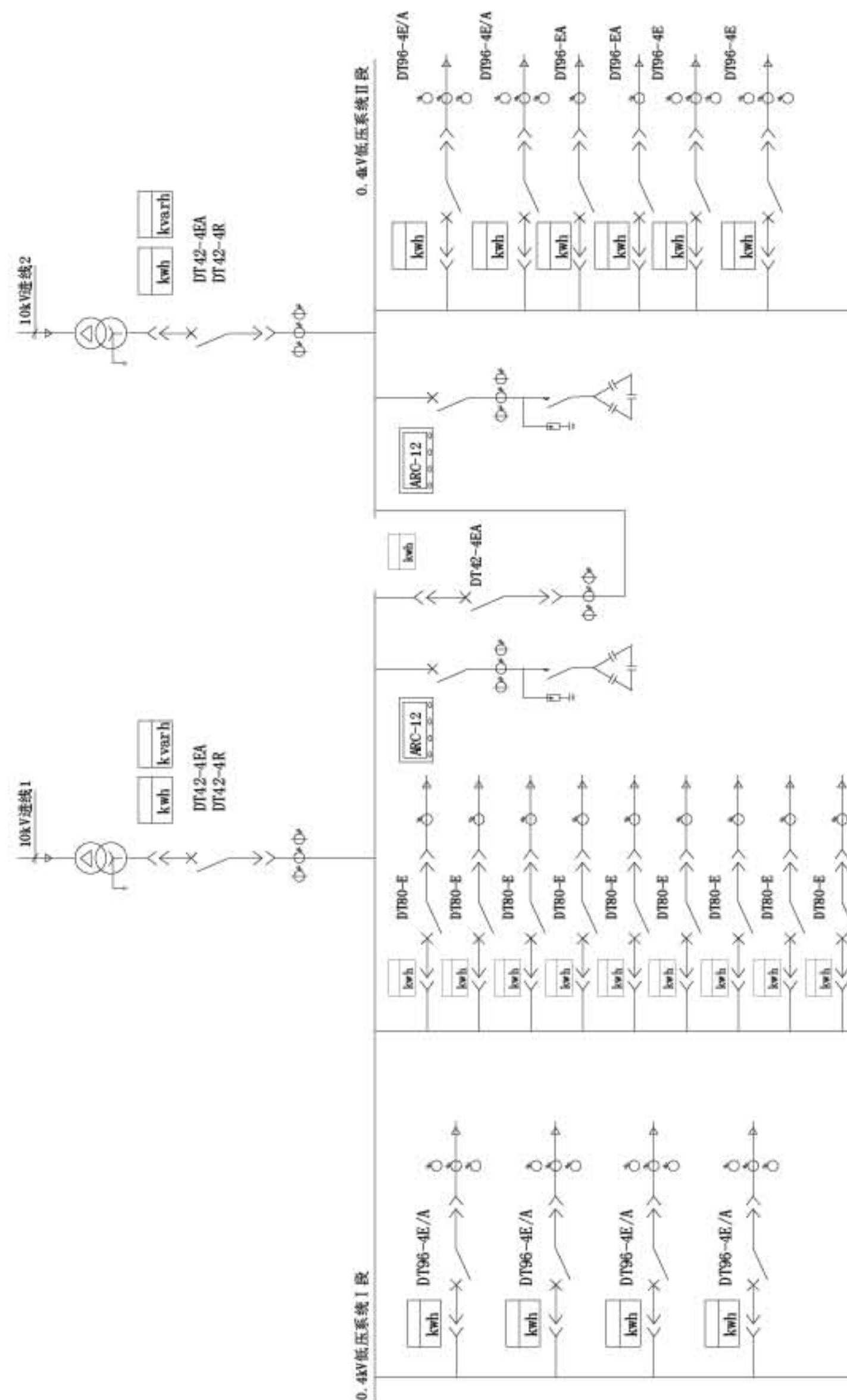
脉冲输出
Pulse output



5.8 注意事项 Notice proceeding

- 1、由于计量三相三线电能时，仪表采用的是分相电能值的算术累加，因此必须确保信号线接入的绝对正确，否则将引起计量的误差：
Due to measure the 3-phase 3-wire electric energy, the meter is counting the electric energy by add each phase electric energy, so make sure the right of the input single, or it will be make error of metric.
- 2、仪表的脉冲输出是用于校表或者接脉冲计数器：
The pulse output from the meters is used for checking the meter or connect with the pulse register ,users may do without this function in the factual use.
- 3、此电能表只能用于企业内部考核。
The meter only used for checking inside of the corporation.

5.9 典型应用 Typical application scheme



配电柜回路 Electric loop	仪表型号 Digital panel meters type	功能说明 Function	
进线 In	DT42-4EA	Ia、Ib、Ic切换显示 (switch display)、kwh	
	DT42-4R	kVarh	
联络 Liaison	DT42-4EA	Ia、Ib、Ic切换显示 (switch display)、kwh	
出线 Out	照明 Illuminate	DT96-E (或or DT80-E)	单相、kWh
		DT96-EA	单相、kWh、I
		DT96-4E/A	三相、kWh、Ia
	电动机或其他 Electromotor or other	DT96-4E	三相、kWh
		DT96-4E/A	三相、kWh、Ia

优点: 企业内部电能考核的低成本方案, 安装方便, 电能数据不丢失。

Virtue: Low cost scheme for checking the electric energy inside of the corporation, convenient for installation.

缺点: 不能实行网络化管理。

Defect: Can't managed by network.

5.10 订货范例 Order examples

例E.g. 型号 Type: DTS0-3E
 辅助电源 Auxiliary power supply: 220V/50Hz
 输入 Input: PT 1.5kV/100V CT 100A/5A
 脉冲输出 Pulse output: 1600imp/kWh

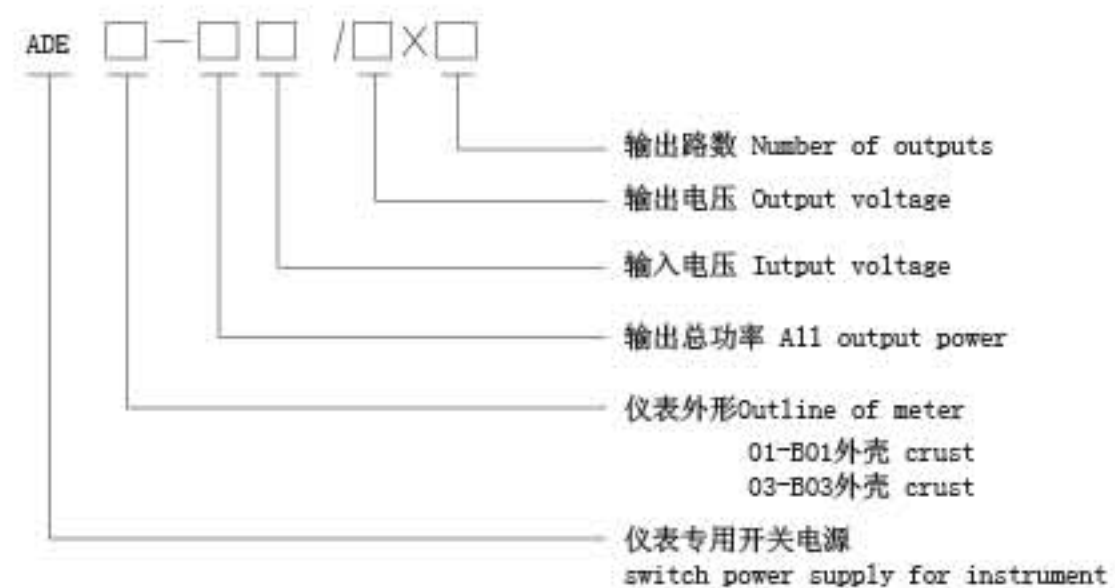
注: 二次满负荷下的功率为 $100V \times 5A \times \sqrt{3} = 866W$, 折算到一次侧时, 功率为 $866W \times 1500/100 \times 100/5 = 259800W$; 同理, 该电能表显示为二次侧电能, 需一次值时, 应乘上PT、CT变比值。

Note: Secondary full load power is $100V \times 5A \times \sqrt{3} = 866W$, converting to primary side power is $866W \times 1500/100 \times 100/5 = 259800W$; in a similar way, the electric energy meters display secondary electric power, once primary side value is needed, PT, CT ratio should be multiplied.

6. 附件

6.1 开关电源 Switch power supply

6.1.1 型号说明 Type explanation



6.1.2 技术指标 Technical data

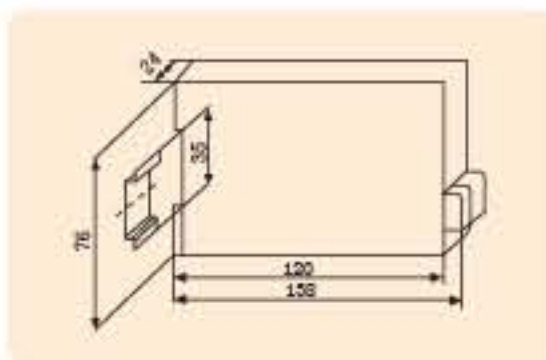
技术参数 Technical parameters		指标 Value	
输入 Input	电压voltage	AC 85V~265V、DC 100V~350	
	频率frequency	50/60Hz	
	过压保护 over vltage Protection	压敏电阻 Varistors	
输出 Output	电压voltage	DC 24V	
	电流current	B01	B03
		150mA	200mA
	路数Numbe	4	3
	最大功率 Power max	15W	
	纹波 Ripple	<50mVs	
	过载保护 over loading Protection	短路保护 Short circuit protection	
	负载调整率 Rate of load regulatng	1%	
并联工作 Parallel connection working	可以yes		
隔离 Insulate	输入-输出之间 Between output-Input	2000V AC	

	各路输出之间 Between each output	2000V AC
环境 Enviroment	工作温度 Work temperature	-10℃~+60
	存储温度 Storage temperature	-25℃~+70
	湿度 Humidity	≤90%RH, 不结露, 无腐蚀性场合 In the place without dew and corrosive gas
	海拔 Altitude	≤2000
效率 Efficiency		75%
状态显示 State display		红色 LED Red LED
安装 Setting		DIN35mm 导轨式安装
平均故障时间		≥50000

6.1.3 产品规格 Product Specification

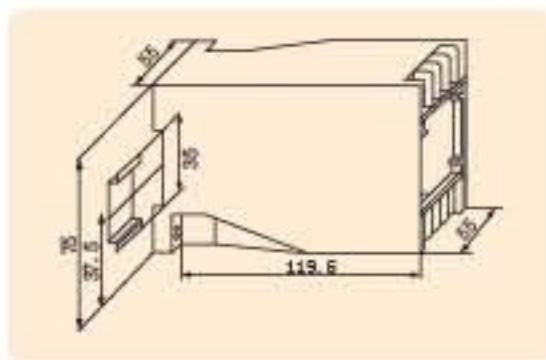
■ B01外型开关电源/B01 exterior switch power supply ADE01-15 AC220V/24V×4

AC 220V 输入 4路DC24V输出
Input AC220V 4 number output DC24V



■ B03外型开关电源/ B03 exterior switch power supply ADE03-15 AC220V/24V×3

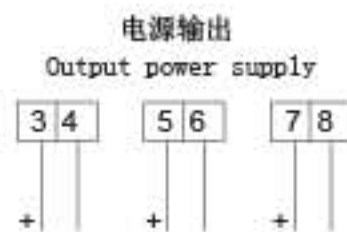
AC 220V 输入 3路DC24V输出
Input AC220V 3 number output DC24V



ADE03-15 AC380V/24V×3

AC 380V 输入 3路DC24V输出
Input AC380V 3 number output DC24V

6.1.4 接线方式 Wiring type



6.1.5 注意事项 Notice proceeding

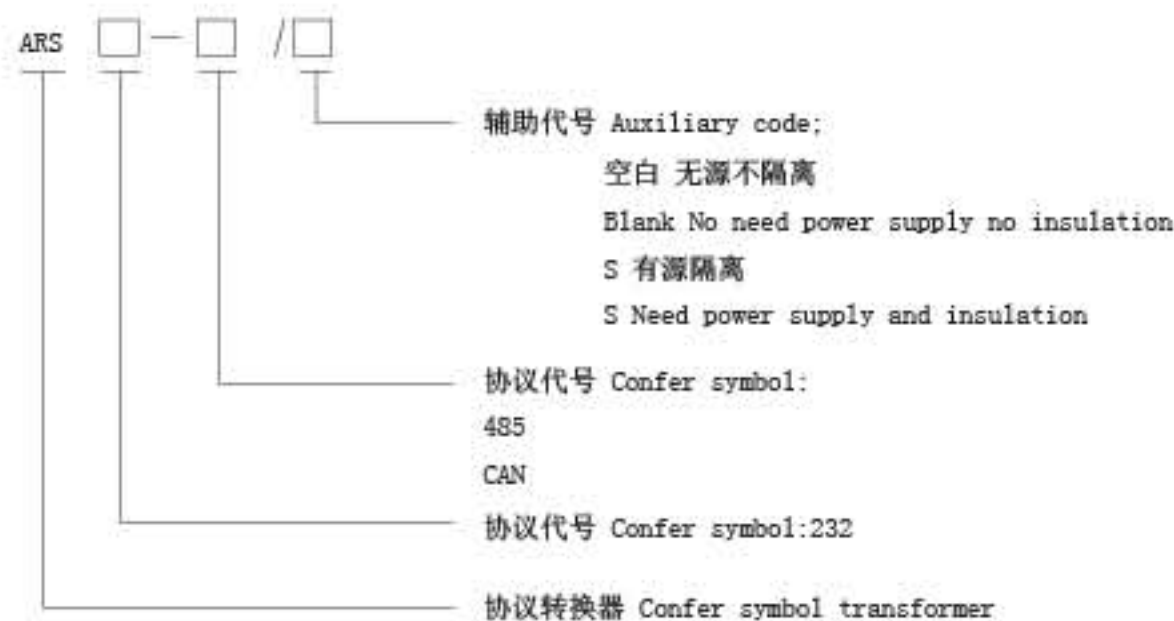
本多路输出开关电源的输出各路之间均为隔离的, 每路可单独为仪表供电, 但在多路使用时, 必须保证主输出上有负载。
Each output is insulated on this several output switch power supply, each output can supply power for meters, but must be sure that the mainoutput is used when each output are used.

6.1.6 订货范例 Order examples

例E.g. 型 号 Type: ADE01-15 AC220V/24V×4
 输入电压 Input voltage: AC 85V~220V/50Hz
 输出电压 Output voltage: DC 24V
 输出路数 Output number: 4
 输出总功率 Total output power: 15W

6.2 ARS-232/485 转换器 Transmitter

6.2.1 型号说明 Type explanation

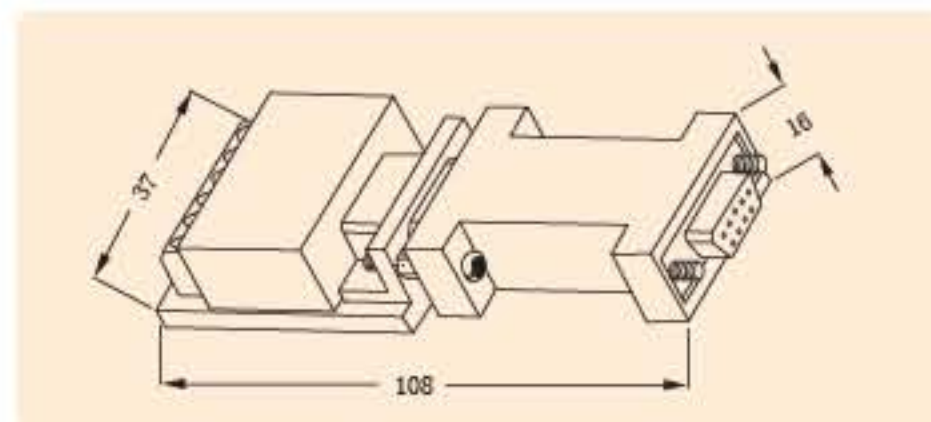


6.2.2 技术指标 Technical

技术参数 Technical parameters	指标 Value		
输入电源 Input power	有源隔离 Need power supply and insulation	DC+4.8V~+5.3V	
	无源不隔离 No need power supply no insulation	不需外加电源 No need power supply	
通讯速率 Communication speed	300bps~115200bps 自适应		
隔离耐压 Insulation	AC 2000V	不隔离 no insulation	
带载能力 Load ability	最大128节点 Max 128 node		
环境 Environment	温度 Temperature	工作温度 Work temperature	-10° C~+45° C
	湿度 Humidity	相对湿度≤90% Relative humidity	-25° C~+70° C
	海拔 Altitude	≤2500m	

6.2.3 产品规格 Product Specification

- ARS-232/485
无源不隔离型232转485
No need power supply, no insulation 232-485
- ARS-232/485S
有源隔离型232转485
Need power supply and insulation 232-485
- ARS-232/CAN
有源隔离型232转CAN
Need power supply and insulation 232-CAN



6.2.4 接线方式 Wiring type



6.2.5 注意事项 Notice proceeding

ARS-232/485一般不需外接电源，但外加电源可以增加驱动能力。
ARS-232/485 no need power supply ,but it may in addition power supply into increase the load ability

6.2.6 订货范例 Order examples

例E.g. 型 号 Type: ARS-232/485S
 输入电压 Input voltage: DC +5V
 转换信号 Exchange signal: 232-485

7 注意事项 Attention for all meters

- 仪表校对应有专业人员操作
- 除非电压互感器 (PT) 有足够功率, 否则不能使用PT输出 (100V) 同时做为辅助电源
- CT回路中的电流接线端子螺钉务必拧紧, 保证引线接触可靠, 以免产生事故
- 测量功率、相位、电能等参数时, 应注意输入电流信号的方向是否一致, 否则会导致计量不准
- 当输入标称电压超过380V时, 需另配电压互感器PT (二次电压100V); 超过500V DC 时, 则另配5mA定值电阻
- 当输入表称电流超过5A AC时, 需另配电流互感器CT (二次电流5A); 超过5A DC时, 则另配75mV分流器

- Calibration of meters should be operated by professional
- Using PT output (100V) as auxilinal power supply, only when PT has enough power
- Current connection terminal in CT circuit must be tightende up. Lead wire contact shall be reliable to avoid accident
- Pay attention to the diretion conformance of input current signal while power, phase, electric energy are measured to keep correct meteting
- When input nominal voltage exceeds 380V AC, PT is used (100V secondary voltage); when exceeds 500V DC, 5mA fixe value resistance is need
- When input nominal current exceeds 5A AC, CT is used (5A secondary current); when exceeds 5A DC, 75mV current divider is need

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