Wide Plus

Intelligent digital / light column display controlling instrument

OPERATING MANUAL

WIDE PLUS PRECISION INSTRUMENTS CO.,LTD.

NO:S001110418

CONTENT

1.Brief introduction of product

This series products have adopted surface packageing technology, which has greatly improved anti-interference capability, and have display, control, transmision communication functions and universual signal input. Through changing inner parameter can realize the switch of any signal type in table 1. They are widely used in many fields such as electric power, metallurgy, chemicals, petrochemicals, papermaking, printing and dyeing, brewage, tobacco, and space base and so on.

2.Main technical parameters

2.1 Type and code for input signal see table 1:

Code	Type	Measuring range	Resolution	Equip sensor /transmitter	Input impedance
01	B	400～1800℃	1℃	Pt-rhodium $_{30}$ Pt-rhodium$_6$ thermocouple	⩾1MΩ
02	S	0～1600℃	1℃	Pt-rhodium $_{10}$ —Pt thermocouple	
03	K	0～1300℃	1℃	Nichromenickel Si thermocouple	
04	E	0～1000℃	1℃	Nichrome Cuni thermocouple	
05	T	0～320.0℃	0.1℃	Cu Cuni thermocouple	
06	J	0～1200℃	1℃	Fe Cuni thermocouple	
07	Wre 3-25	0～2300℃	1℃	Wre3 Wre25 thermocouple	
08	Pt100	-200～650℃	1℃	Pt thermo resistance R_0=100	⩾10kΩ
09	Pt100.1	－199.9～320.0℃	0.1℃	Pt thermo resistance R_0=100	
10	Cu50	－50.0～150.0℃	0.1℃	Cu thermo resistance R_0=50	
11	0～20mV	－1999～9999	Highest μ	Pressure sensor	⩾1MΩ
12	4～20mA		Highest μ	DDZ－III transmitter	⩽250Ω
13	0～10mA		Highest μ	DDZ－II transmitter	
14	1～5V		Highest	DDZ－III transmitter	⩾4.7MΩ
15	0～5V		Highest	DDZ－II transmitter	
16	0～20mA		Highest μ	DDZ－II transmitter	⩽250Ω
17	30～350Ω		Highest 2.6mΩ	remote pressure gauge	⩾10kΩ
18	Special signal	Specified by user (please supply signal type, division number or corresponding formula)			
19	4～20mA evolution	－1999～9999	Highest μ	DDZ－III flow transmitter	⩽250Ω
20	0～10mA evolution		Highest μ	DDZ－II flow transmitter	
21	1～5V evolution		Highest	DDZ－III flow transmitter	⩾4.7MΩ
22	0～5V evolution		Highest	DDZ－II flow transmitter	

Note: if choose 0~10V signal input, can not switch to 1~5V signal input.

2.2 Measuring accuracy: digital display ±0.5%FS±1 character;
light column 1%FS1 line

2.3 Temperature compensation scope: 0 50

2.4 Ambient condition: working temperature0 50 , relative humidity 85%.
Avoid using in occasions with corrosion and flammable gas

2.5 Display mode: single/double screen four-digit digital display + LED state indication+ light column display (can be choosen)

2.6 Switch quantity output: every output point can be set to upper/lower limit control or alarm and with return difference arbitrarily

Relay output: Contact capacity (resistive load): AC220V/5A; DC24V/5A

Silicon controlled rectifier zero-crossing trigger pulse output(SCR): can trigger 600V/100A silicon controlled rectifier

Solid state relay control signal output(SSR): output DC 9V/30mA

SCR zero-crossing trigger pulse output: BCR 600V/5A

2.7 Analog quantity output:

DC 0 10mA output, load resistance 1.5k

DC 4 20mA output, load resistance 750

DC 0 5V output, load resistance 250K

DC 1 5V output, load resistance 250K

2.8 Communication output: standard serial communication interface RS-485 or RS-232, Baud rate: 1200 9600bps, user set freely

2.9 Feed output: DC24V, load 30mA

2.10 Power supply mode:

Linear power AC 190 240V, power 5W, weight 420g

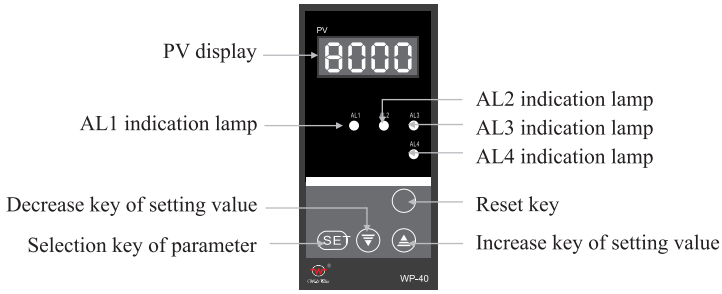
AC/DC power 90 260V, power 4W, weight 260g

AC/DC power 20 30V, power 4W, weight 260g

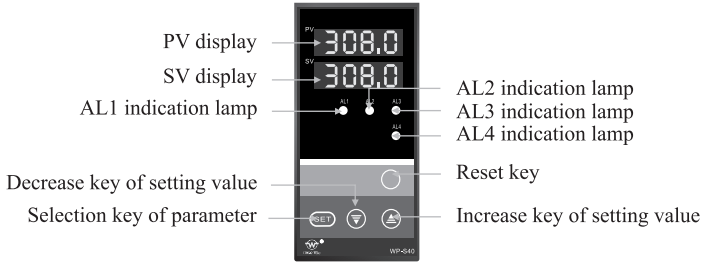
3. Operation

3.1Explanation of the instrument panel

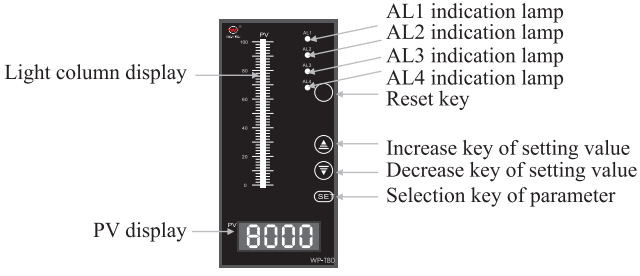
3.1.1single-screen display (take 48×96 for example)



3.1.2double-screen display (take 48×96 for example)



3.1.3single-screen and single light column display (take 80×160 for example)



3.1.4 Explanation of each parts for instrument, see table 2:

Name		Content
Display	PV display	Display measured value Under parameter setup state, it shows parameter symbol or setting value
	SV display	Display control target value Under parameter setup state, it shows parameter setting value
	Light column display	It displays corresponding percentage of measured value
Operation key	SET selection key of parameter setup	Setting value which had been modified may be recorded. The mode of parameter setup may be changed in order. May change display or set parameter mode
	▼ Decrease key of setting value	When modifying set value, it is used to decrease value. Pressed continuously, it will automatically quick subtract 1
	▲ Increase key	When modifying set value, it is used to increase value. Pressed continuously, it will automatically quick add 1.
	Reset key	For clear program (self-check), (the panel does not mark)
Indicating lamp	AL1	When first control or alarm is ON, red lamp lights.
	AL2	When second control or alarm is ON, green lamp lights.
	AL3	When third control or alarm is ON, red lamp lights.
	AL4	When fourth control or alarm is ON, green lamp lights.

3.2 Engineering parameter setup (first-level parameter)

Under the display state of PV measured value display, presses SET key, the instrument will enter engineering parameter setup state. Only when CLK =00 or 132, engineering parameter can be modified. Press SET key to confirm after first-level and secondary parameter is modified. Please notice that the instrument parameter have some place not give show because of instrument′s different functions. Engineering parameter setup see table 3:

Symbol	Name	Setting range	Explanation
CLK	Set parameter lock	CLK=00, 132	Unlock(set engineering parameter can be modified)
		CLK≠00, 132	Lock (set engineering parameter cannot be modified)
		CLK=132	Enter users parameter (secondary parameter) setup

Symbol	Name	Setting range	Explanation	
AL1	The first control or alarm value	-1999~9999	Ex-factory setting value 200	AL1, AL2, AL3, Al4 control / alarm mode is set by SL2, SL3, Sl4, Sl5 respectively, see table 4
AL2	The second control or alarm value	-1999~9999	Ex-factory setting value 100	
AL3	The third control or alarm value	-1999~9999	Ex-factory setting value 150	
AL4	The fourth control or alarm value	-1999~9999	Ex-factory setting value 50	
AH1	The first control or alarm return difference value	0 9999	Ex-factory setting value 2	
AH2	The second control or alarm return difference value	0 9999	Ex-factory setting value 2	
AH3	The third control or alarm return difference value	0 9999	Ex-factory setting value 2	
AH4	The fourth control or alarm return difference value	0 9999	Ex-factory setting value 2	
DIP	Choose the SV display content (double-screen display instrument)	DIP=0	Display division number	Ex-factory setting value 2
		DIP=1	Display AL1 setting value	
		DIP=2	Display AL2 setting value	
		DIP=3	Display AL3 setting value	
		DIP=4	Display AL4 setting value	
		DIP=5	Display all value alternately	

Note 1: Lower limit control or alarm: output when the PV is below the setting value, stop output when the PV is above the setting value + return difference value. Upper limit control or alarm: output when the PV is above the setting value, stop output when PV value is below the setting value－return difference value.

Note 2: As the different alarm number, the settings which alternately display each setting value may have corresponding modification.

3.3 Users parameter setup (secondary parameter)

Warning! Non-engineering design personnel are not allowed to modify the following parameters, or it will make the instrument control mistake!

Under the display state of PV measured value display, presses SET key to set CLK=132, first press SET does not release and press increase key again, after 5 seconds, can enter into users parameter setup. Users parameter setup are as table 4:

Symbol	Name	Setting range	Explanation	
SL0	Input division number	0～22	Choose type for instrument input division number, see table 1	
SL1	Set PV/SV decimal point	SL1=0	No decimal point	
		SL1=1	Dicimal point located at " the ten′s place " (display ＸＸＸ.Ｘ)	
		SL1=2	Dicimal point located at " the hundred′s place " (display ＸＸ.ＸＸ)	
		SL1=3	Dicimal point located at " the thousand′s place " (display Ｘ.ＸＸＸ)	
SL2	First control or alarm mode	SL2=0	No control or alarm	Ex-factory sets 2
		SL2=1	Lower limit control or alarm	
		SL2=2	Upper limit control or alarm	
SL3	Second control or alarm mode	SL3=0	No control or alarm	Ex-factory sets 1
		SL3=1	Lower limit control or alarm	
		SL3=2	Upper limit control or alarm	
SL4	Third control or alarm mode	SL4=0	No control or alarm	Ex-factory sets 2
		SL4=1	Lower limit control or alarm	
		SL4=2	Upper limit control or alarm	
SL5	Fourth control or alarm mode	SL5=0	No control or alarm	Ex-factory sets 1
		SL5=1	Lower limit control or alarm	
		SL5=2	Upper limit control or alarm	
SL6	Choose cold-compensation	SL6=0	Internal cold-compensation	Ex-factory sets 0
		SL6=1	External cold compensation	
SL7	Flash alarm	SL7=0	No flash alarm	Ex-factory sets 0
		SL7=1	Have flash alarm	
SL8	Choose alarm function	Units place=0	No alarm delay function	Ex-factory sets 24
		Units place =1～9	Alarm delay 0.5×setting value (second), then output	
		Ten′s place=0	When sensor is power off, control or alarm according to primary setup mode.	
		Ten′s place=1	When sensor is power off, control or alarm would retain their state.	
		Ten′s place=2	When sensor is power off relieves control or alarm output	
DE	Communication instrument device number	0～254	Device number should be unique in the same communication network, ex-factory sets 2	
BT	Instrument communication band rate setup	BT=2	Band rate is 1200bps	When communication, baud rate of upper level machine and lower level machine should be set to accord. Ex-factory sets 3
		BT=3	Band rate is 2400bps	
		BT=4	Band rate is 4800bps	
		BT=5	Band rate is 9600bps	

Symbol	Name	Setting range	Explanation	
Pb1	Display value zero offset	Full range	Set zero offset quantity of displayed value, Ex-factory sets 0	
KK1	Display range scale	0～1.999 times	Set the scale of display range, Ex-factory sets 1.000 times	
Pb3	Transmission output zero offset	0～100.0	Set zero offset of transmission output (see table 7)	
KK3	Transmission output range scale	0～1.200 times	Set range scale of transmission output (see table 7)	
OUL	Lower limit of transmission output range	Full range	Set lower limit of transmission output,ex-factory setting value is the same as SLL	
OUH	Upper limit of transmission output range	Full range	Set upper limit of transmission output,ex-factory setting value is the same as SLH	
PVL	Set lower limit of flash alarm	Full range	When measured value is below the setting value, measured value flashes. There is this function when SL7=7, ex-factory value is the same as SLL	
	Set lower limit of light column display	Full range	Set lower limit range value of light column display (light column table)	
PVH	Set upper limit of flash alarm	Full range	When measured value is above the setting value, measured value flashes. There is this function when SL7=1, ex-factory value is the same as SLH	
	Set upper limit of light column display	Full range	Set upper limit range value of light column display (light column table)	
SLL	Lower limit of measuring range	Full range	Set lower limit range of input signal	Except resistance and couple type
SLH	Upper limit of measuring range	Full range	Set upper limit range of input signal	
SLU	Measured small signal removal	0～100.0%	SLU is the percentage of measuring signal range, It is used only when measured signal extracts. As measured value is less than range (%), it displays 0.	

3.4 Operating method

3.4.1 Switching of input signal: modify users parameter SL0, see table 1 for details.

3.4.2 Set of PV/SV decimal point: modify user parameters SL1, see table 4, PV/SV decimal point of thermocouple, thermo resistance cannot be set, decimal point of the Pt100.0 and Cu50 is fixed to be one place, others have not decimal point. Standard signal can be set.

3.4.3 Set of lower limit control or alarm value: set ALX value to be start point of lower limit value, ALX+AHX is stop point of lower limit value (X means

1, 2, 3, 4, below is alike), see table 3.

3.4.4 Set of upper limit control or alarm value: set ALX value to be stop point of upper limit value, ALX-AHX is start point of upper limit value, see table 3.

3.4.5 Set of upper/lower limit control mode: modify user parameters SL2 ～SL5, the detail see table 4.

3.4.6 Set of internal/external cold-compensation and light column display: modify user parameter SL6, see table 4, if users choose external cold compensation it should be connected Cu 50 sensor

3.4.7 Control/alarm state set when a sensor was disconnected: modify user parameter SL8, see table 4. Control or alarm output according to primary setting mode when the ten′ s place of SL8 setting value is 0, that is when the instrument shows 0H, upper limit has output, when it shows 0L, lower limit has output; The instrument will keep disconnection state when it displays 1, that is when the instrument display Err it will remain initial control or alarm; the instrument will remove control or alarm output when it is 2, that is, when instrument displays Err it has not control or alarm output.

3.4.8 Set of device number and baud rate: Instrument's device number should be unique in the RS485 communication. Band rate of upper level machine and lower level machine should be accord, see table 4 for user parameter DE and BT.

3.4.9 Set of transmission output range: modify user parameter OUL and OUH, see table 4, its span should be less than or equal to display range. When sensor was disconnected, displays 0H means transmitting output maximum or displays 0L means output minimum.

3.4.10 Set Upper and lower limit of light column display: See table 4 for user parameter PVL and PVH.

3.4.11 Set measured small signal removal: in the field of measuring flow, when flow is smaller, measured value undulation is bigger, and error is bigger. usual method is small signal removal. User parameter (table 4) SLU meanings shows % of range, that is, when (measured value ÷ range)×% ≤SLU setting value, the instrument shows 0. Instrument has small signal

removal function only when it with evolution function.

3.4.12 Methods to return to measure state:

- ●Manual return: Under parameter setting mode, pressing SET key for 5 seconds the instrument will automatically return to measured value display state.
- ●Automatic return: Under parameter setting mode, does not press any key for 30 seconds, the instrument will automatically return to measured value display state.
- ●Reset return: Under parameter setting state, pressing RESET key, the instrument will enter measured value display after self-check again.

3.4.13 Display content of thermo-resistance, thermocouple disconnection instrument: when the ten′ s place of SL8 pararmeter is 0, instrument display OL or OH; when the ten′ s place of SL8 is not 0, instrument display Err.

4. Installation and operation

This instrument adopts standard cassette-inserted type structure, please gently push it into the dial.

4.1 Outline and open dimension (unit: mm)

Outline dimension: $96 \times 48 \times 115$mm
open dimension: $92^{+0.7}_{0} \times 45^{+0.7}_{0}$mm

Outline dimension: $48 \times 96 \times 115$mm
open dimension: $45^{+0.7}_{0} \times 92^{+0.7}_{0}$mm

Outline dimension: $72 \times 72 \times 115$mm
open dimension: $68^{+0.7}_{0} \times 68^{+0.7}_{0}$mm

Outline dimension: $48 \times 48 \times 115$mm
open dimension: $45^{+0.6}_{0} \times 45^{+0.6}_{0}$mm

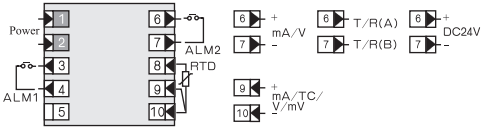
Outline dimension: $160 \times 80 \times 115$mm
open dimension: $152^{+0.7}_{0} \times 76^{+0.7}_{0}$mm

Outline dimension: $80 \times 160 \times 115$mm
open dimension: $76^{+0.7}_{0} \times 152^{+0.7}_{0}$mm

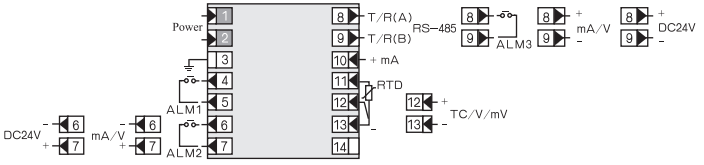
Outline dimension: $96 \times 96 \times 115$mm
open dimension: $92^{+0.7}_{0} \times 92^{+0.7}_{0}$mm

4.2 Wiring (Subject to enclosed wiring diagram)

4.2.1 48×48 wiring diagram



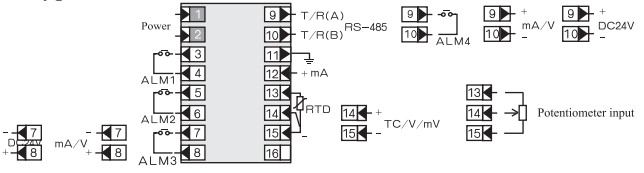
4.2.2 72×72 series wiring diagram



Note: when there is communication, transmitting output is at 6 and 7 terminals, when there is not communication, transmitting output is at 8 and 9 terminals.

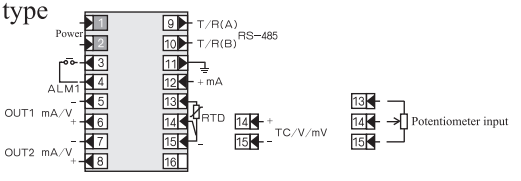
4.2.3 96×48, 48×96 wiring diagram

Universal type



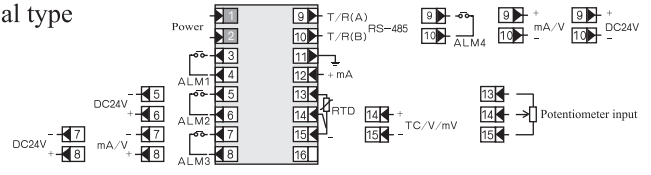
Note: when there is communication, transmitting output is at 7 and 8 terminals, when there is not communication, transmitting output is at 9 and 10 terminals.

Double transmission type

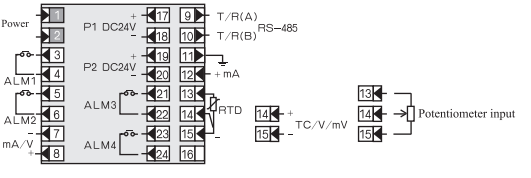


4.2.4 96×96 wiring diagram

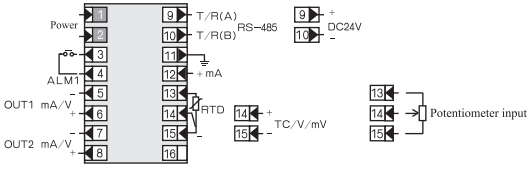
Universal type



Multi-function type

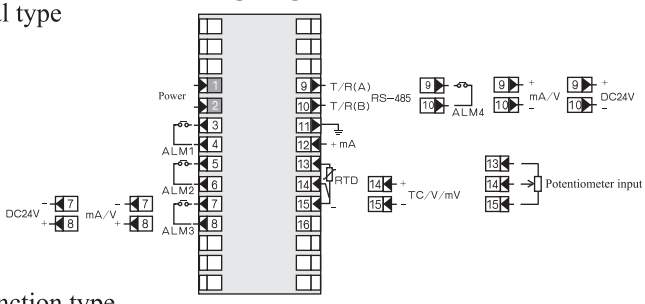


Double transmission type

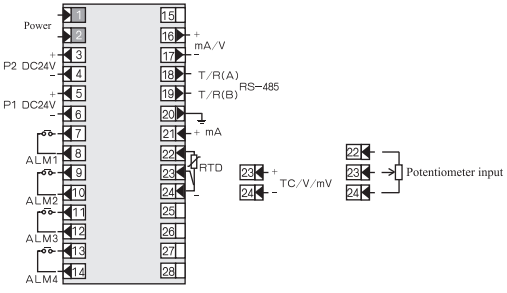


4.2.5 160×80, 80×160 wiring diagram

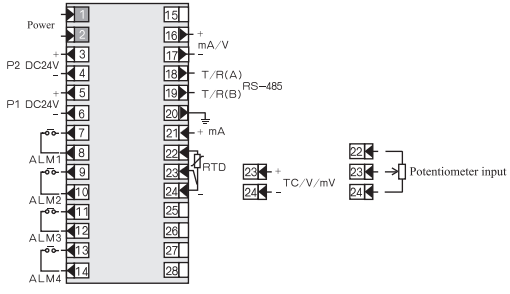
Universal type



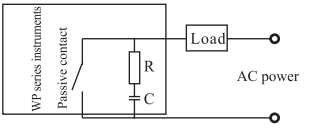
Multi-function type



Double transmission type

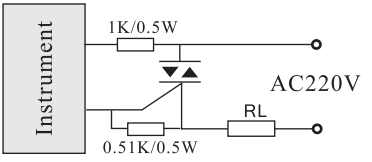


★ Note: In order to absorb the peak interference of induction load, relay passive contact output of WP series instruments is connected with RC network at the two ends of contact. As the following figure, when load current is small (such as ⩽ 20mA), if abnomal situations arising, can remove the resistance or capacitance in the RC network to eliminate abnormal situations.



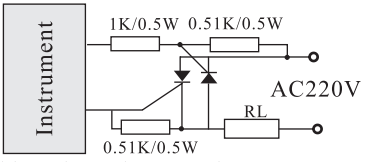
4.2.6 Control/alarm output is wiring of SCR, SSR and SCR zero-crossing trigger pulse

a.Wiring of bidirectional controlled rectifier (BCR).



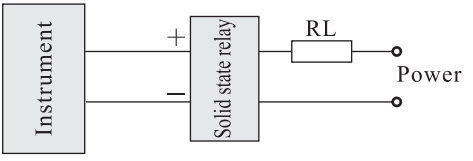
Note: SCR should be adopted protective measures

b.Wiring of two reversed parallel triggered by SCR

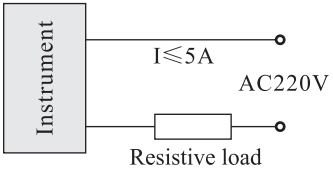


Note: SCR should be adopted protective measures.

c.Wiring of SSR control solid state relay



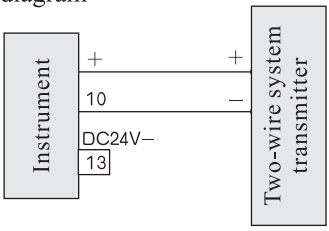
d.Wiring of SCR zero-crossing trigger pulse output



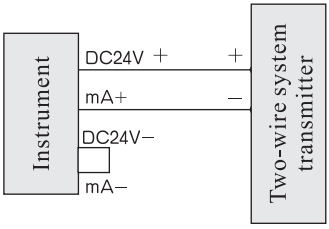
Note: please refer to enclosed wiring diagram for the concrete connection terminal.

4.2.7 Wiring of feed and two-wire system transmitter

a.72×72 wiring diagram



b.96×48, 48×96, 96×96, 160×80, 80×160 wiring diagram



5.Modification of transmission output signal

Short-circuit ring which is designed on the transmission output board may chang the output of current or voltage according to method of table 6. User parameters may be set by method of table 7, Pb3 and KK3 may change the upper/lower range of output signal.

Table 6

	DC current output	DC voltage output
Short-circuiting ring state	 I V	 I V
Signal output end voltage, resistance	voltage: 20～30V resistance: infinite	voltage: 0～10V resistance: 250～500Ω or infinite

Signals Pb13, Pb23, Kk13, Kk23 output different ranges may be set according to the following table:

Table 7

	0～10mA	4～20mA 1～5V	0～20mA 0～5V/0～10V
Pb13、Pb23	0.0	20.0	0.0
KK13、KK23	0.500	1.000	1.000

6. Calibration of display transmit measure

6.1 Calibration of display range: When error exists between H/L limit display range and actual range, range can be adjusted by modifing Pb1 and KK1, the details are as the following method:

KK1= scheduled range ÷ display range × initial Kk1
(scheduled range: SLH-SLL)

Pb1= lower limit of scheduled range—lower limit of display range × Kk1 +initial Pb1

For example: a DC current 4～20mA input instrument, measuring rang is 200～1000Kpa, while calibration, find that when input 4mA, displays -202, when input 4mA, displays 1008. (Initial Pb1=0, initial KK1=1)

According to the formula:

KK1=scheduled range ÷ display range × initial KK1
= [1000- (-200)] ÷ [1008-(-202)] × 1
= 1200÷1210×1≈0.992

Pb1= lower limit of scheduled range-lower limit of display range×KK1+ initial Pb1= -200- (-202×0.992) + 0= 0.384≈0.4

Set: Pb1=0.4, KK1=0.992

6.2 Calibration of transmission range: When error exist between H/L limit transmission output and actual range, range can be adjusted by modifying Pb3 and KK3, the details are as the following method:

KK3= scheduled output range ÷ actual output range × initial KK3
(Scheduled output range: OUH-OUL)

Pb3 = scheduled lower limit output-actual lower limit output × Kk3 + initial Pb3

For example : A DC current signal 4～20mA input instrument, measuring range is -200～1000Kpa, transmission output is 4～20mA; While calibration, find that the instrument display is very accurate; when input 4mA and 20mA, the instrument output 3.9mA and 20.1mA respectively, set initial instrument Pb3=20.0, KK3=1.000.

According to the formula:

KK3=scheduled output range ÷ actual output range × initial Kk3
= (20-4)÷(20.1-3.9)×1.000
= 16÷16.2×1=0.988

Pb3= scheduled lower limit output-actual lower limit output × Kk3 + initial Pb3
= 4-3.9×0.988 +20.0 =20.1

Set: Pb3=20.1, Kk3=0.988

Note: Before calibrating transmission output, first ensure that the display is correct or not, Pb1, Pb3 modified value precise to one digit behind decimal point.

7. Maintenance and guarantee of quality

7.1 Under the normal condition, special maintenance is unnecessary for the instrument; please notice to damp-proof.

7.2 For the failures caused by the quality problem of the products, implement " three guarantees " within 18 months after leaving the factory.

8 . Enclosed accessories

8.1 One operating manual

8.2 One copy of examination certificate and maintenance card

8.3 A set of fixed buckles (except 160×80, 80×160 outline instrument)

8.4 Various unit's tags label, each one sheet.

8.5 With communication instrument and one testing floppy disk

9. Type spectrum table for intelligent digital/light column display controlling instrument

Model												Explanation
WP-	□□	□	□□	□	—□	□□	—□	□	□	—□		
Outline feature	C											Single-screen horizontal type display
	S											Single-screen vertical type display
	D											Double screen horizontal type display
	DS											Double screen vertical type display
	T											Single-screen single light column vertical type display
	TX											Single-screen single light column horizontal type display
Outline dimension		3										48×48mm
		4										96×48mm、48×96mm
		7										72×72mm
		8										160×80mm、80×160mm(may select light column)
		9										96×96mm(may select light column)
Control action			01									Measure display
			03									Measure display with upper/lower limit control/alarm
			04									Display with four limits control/alarm(arbitrarily combination)
Communication mode				0								No communication interface
				1								RS-232Ccommunication interface, Modbus protocol
				2								RS-232C communication interface, WP protocol
				7								RS-485 communication interface, Modbus protocol
				8								RS-485 communication interface, WP protocol
Output mode					0							No output
					1							Relay output
					2							(4～20)mA output
					3							(0～10)mA output
					4							(1～5)V output
					5							(0～5)V output
					6							SCR zero-across trigger pulse output
					7							SSR controlled signal output
					8							Special specification transmission output
Input type						□□						See " input type table "
The first alarm							N					No control/alarm
							H					Is high limit alarm
							L					Is lower limit alarm
The second alarm								N				No control/alarm(can be omitted)
								H				Is high limit alarm
								L				Is lower limit alarm
Feed output									P			DC24 V feed output
Supply power mode												AC220 V linear power (may be omitted)
										T		AC (90～265) V switch power supply
										W		DC24 V power supply

★ Model for example: WP-C801-00-08-N
WP-C403-01-12-HL
WP-T804-81-08-2H2L

★ Note: Only need to set the secondary parameter if modifying input signal, see table 1, if users have no special requirement, then the instrument does not have input signal of (30～350)Ω.

★ Note 1: Outline dimension 48×48mm, may choose alarm + transmission + 485 communication + feed functions , which cannot be more than 2 functions; such as, may choose upper limit alarm + lower limit alarm or select communication + transmission, or choose alarm + transmission etc.(below the same); can not choose at the same time transmission and feed; no double screen display; no (22~26)VAC/DC power supply.

★ Note 2: Outline dimension 72×72mm, choose alarm + transmission+485 communication +feed , which cannot be more than 3 functions; There could not choose at the same time transmission and feed;

★ Note 3: two channels transmitting output, only have one alarm, no feed output; there is not (22～26)V AC/DC power supply.

Model example: Some project needs a control temperature instrument with the following functions: single-screen display, the communication mode with upper level machine is RS-485, convert the field temperature into standard DC (4～20)mA signal output, additionally with two relay control output, sensor is K type thermocouple, outline dimension is 96×96mm.
Selected model is: WP-C903-82-03-HL-T

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