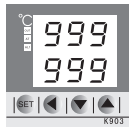


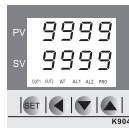
K900 Series Micro-computer AI PID controller

User's Manual V1. 5

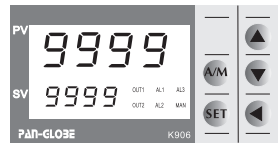
Thank you for your purchasing K Series controller. This manual describes mainly on some of the important notes during the installation as well as the harness. Please read carefully the operation procedure of this product before putting into operation. Keeping this manual handy at any time will be helpful in mastering the usage.



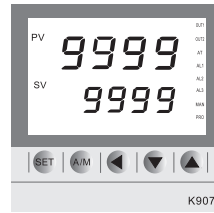
K903



K904



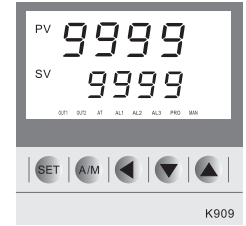
K906



K907



K908

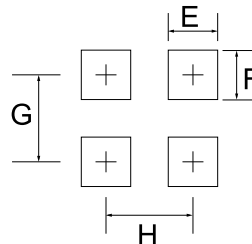
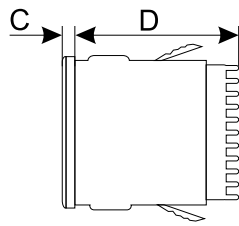
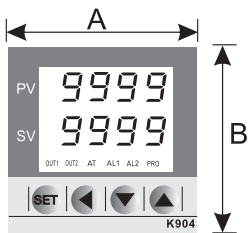


K909

1 Notes

- ⚠ Danger:**
1. Danger! Electric shock!
 2. Don't touch AC power connecting terminals when gauges power ON to avoid electric shock!
 3. Make sure power OFF when harnessing the gauges.
- ⚠ Warnings:**
1. Make sure the connectivity in correct position before power ON to avoid gauges damaged.
 2. Make sure the conformity of voltage between power supply and gauges spec. (AC85-265V or 24V) to avoid gauges damaged.
 3. Make sure the (Input, Output, Alarm) wiring to the correct terminals of function
 4. Please use M3 threaded screws to fasten the terminal connections at torque of max. 8Kg.
 5. Avoid installing the gauges near to the interference of high frequency, high corrosive gases, high temp. or high humidity places.
 6. Make sure the power supply wiring far away from driving power source and high power carrying cables.
 7. When extension cord required by the heat resistance (RTD) as sensor should apply the same wire with less resistance.

2 Dimension and pits pitch



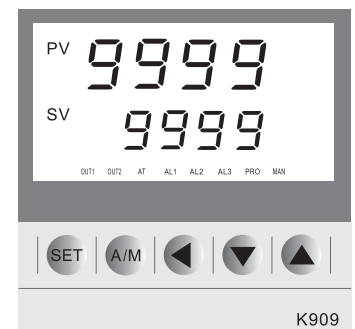
Model	Dimension				Opening		Pitch	
	A	B	C	D	E	F	G	H
K903	48	48	6	100	45	45	60	60
K904	48	48	6	100	45	45	60	60
K906	96	48	14	80	91	45	70	111
K907	72	72	14	80	69	69	94	89
K908	48	96	14	80	45	91	116	65
K909	96	96	14	80	91	91	116	111

⚠ Notes

While fixing controller, in order to bend its equipped locker for attaching controller to electric cabinet closely, please first push its equipped locker toward inside in hand, if it doesn't work, use screw driver to help.

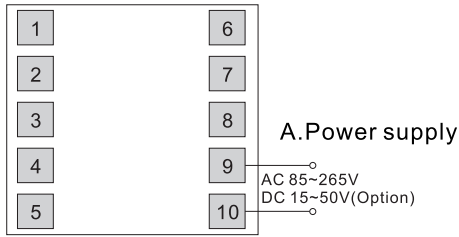
3 Operation panel and function keys

Symbol	Item	Function
PV	Prove value (PV)/display parameter name	Display input value from sensor/parameter name (in red, 7-step)
SV	Setting value (SV) Display	Display set value/display the current value of the parameter (in green, 7-step)
SET	Setting key	In setting parameter, confirm setting In switching parameter display, confirm switching
A/M	Auto/manual	Switch auto output (PID algorithm)/manual output mode
◀	Digit locator	Locate the digit (at thousand, hundred, tens)
▼	Decrease key	Decrease setting value
▲	Increase key	Increase setting value
OUT1	OUT1 indicator in action	Indicator lit in green when OUT1 in action
OUT2	OUT2 indicator in action	Indicator lit in green when OUT2 in action
AT	Auto algorithm indicator	Indicator lit in orange when in auto algorithm calculation
AL1	Alarm1 indicator in action	Indicator lit in red when in alarm1 in action
AL2	Alarm2 indicator in action	Indicator lit in red when in alarm2 in action
AL3	Alarm3 indicator in action	Indicator lit in red when in alarm3 in action
MAN	Manual mode indicator	Indicator lit in orange when in manual mode
PRO	Slope running indicator	Flash indicator in orange when slope in calculation

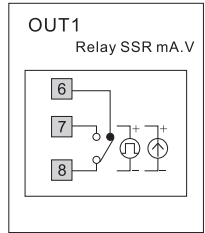


4 Wiring diagram(terminals function refer to the labels in rear gauge)

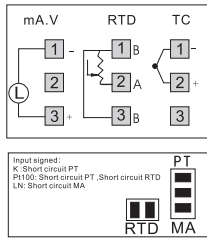
K903/K904



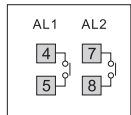
B. Output of control



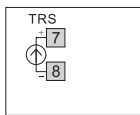
C. Input



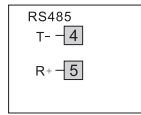
D. Alarm



E. Transmit output

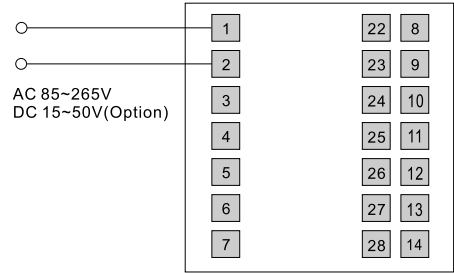


F. Communication

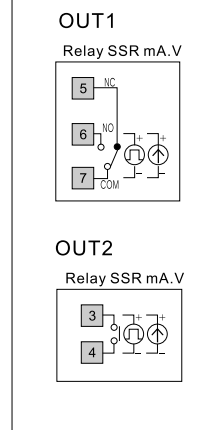


A. Power supply

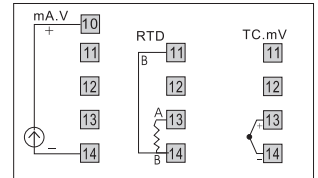
K907



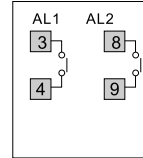
B. Output of control



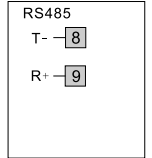
C. Input



D. Alarm

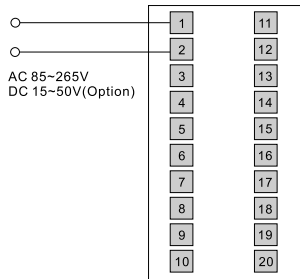


F. Communication

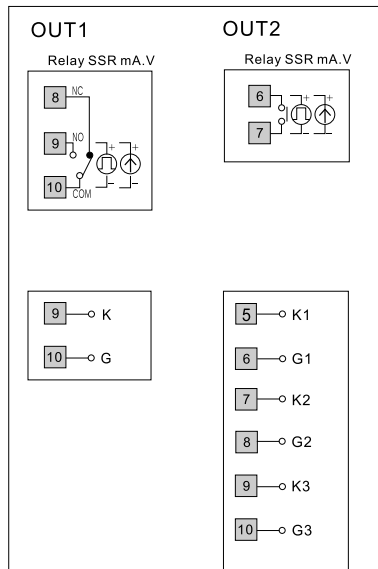


K906 / K908

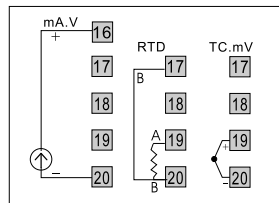
A. Power supply



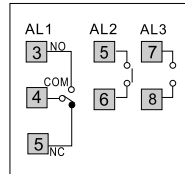
B. Output of control



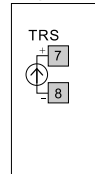
C. Input



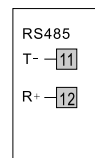
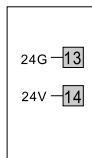
D. Alarm



E. Transmit output

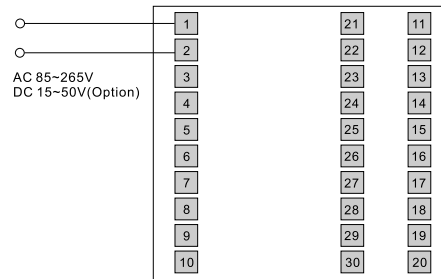


F. Aux. power supply G. Communication

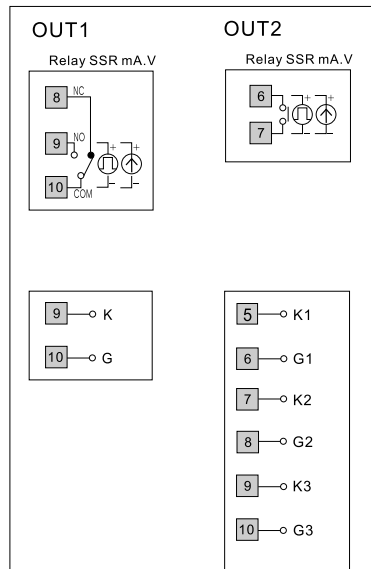


K909

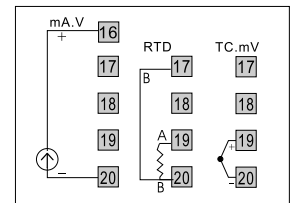
A. Power supply



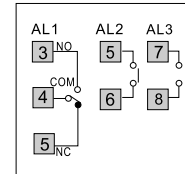
B. Output of control



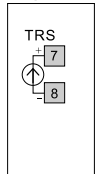
C. Input



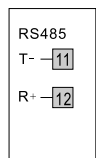
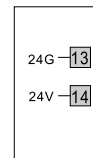
D. Alarm

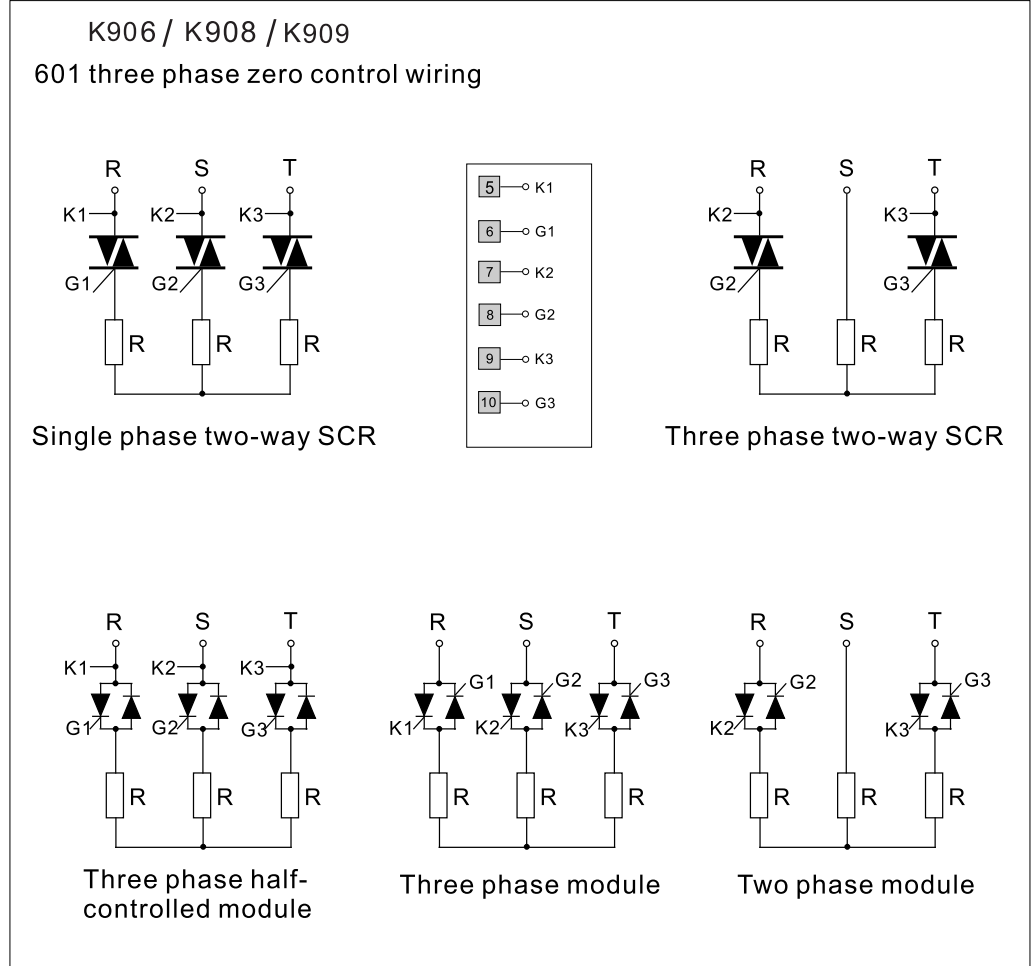
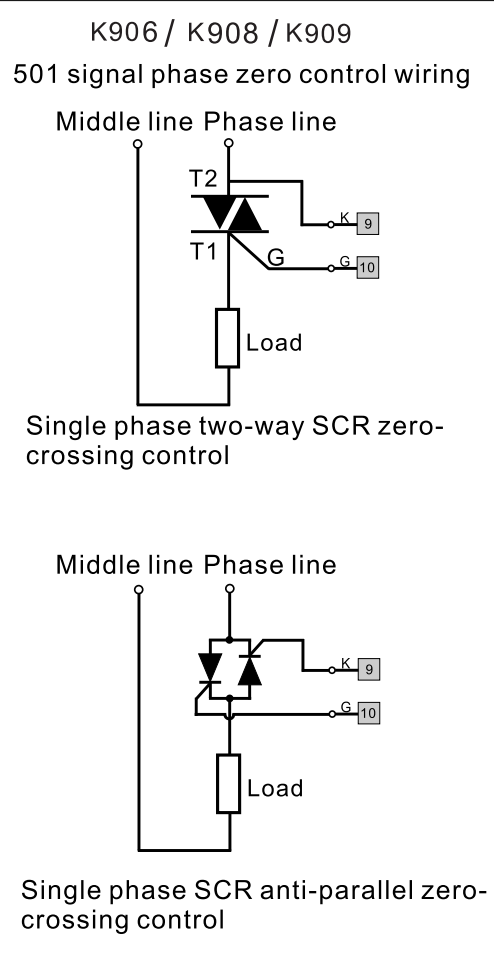


E. Transmit output



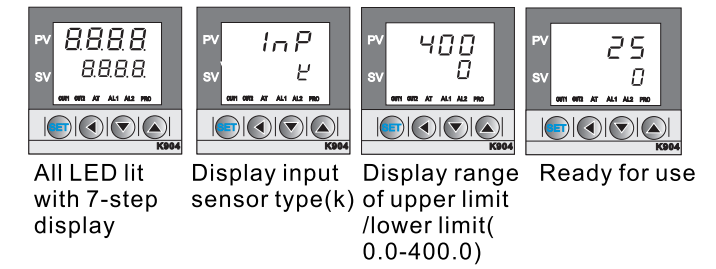
F. Aux. power supply G. Communication



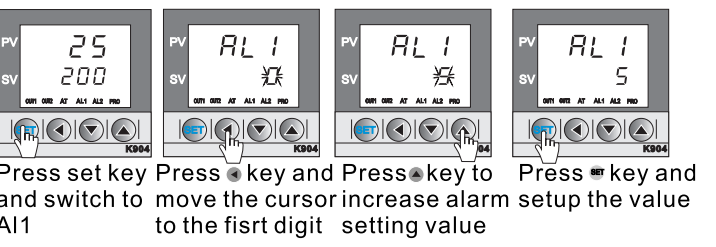


5 Operation procedure

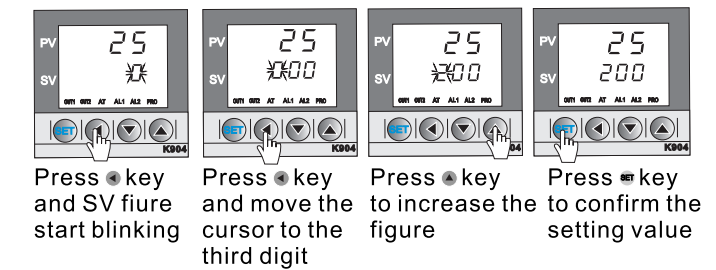
1. Power ON The controller will proceed in following order



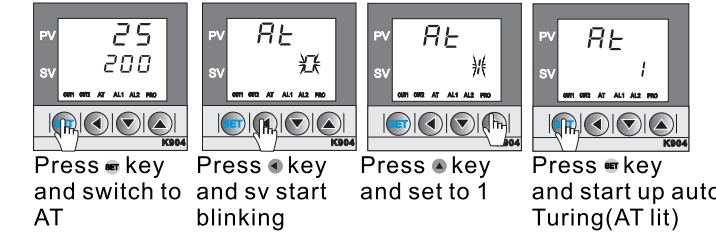
4. Setting alarm Ex. Alarm set to 5 (alarm 1 alert when PV>5)



2. Setting SV Ex. SV=200, shown as follows in order from left to right



3. Auto tuning To optimize the PID parameter in obtaining better controlling effect, shown as follows in order from left to right

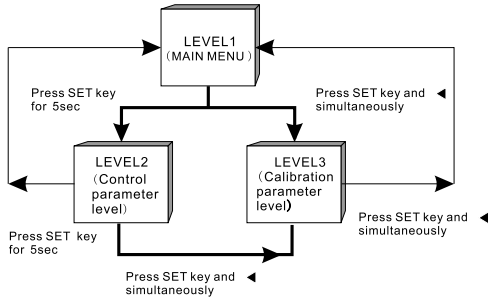


5. Alarm mode table

Code	Graphic example	Code	Graphic example
Ad=0	Deviation high alarming Alarm alerting area	Ad=5	Out of range alarming Alarm alerting area
Ad=1	Deviation low alarming Alarm alerting area	Ad=6	Deviation low alarming skip 1st time Alarm alerting area
Ad=2	Absolute value high alarming Alarm alerting area	Ad=7	Absolute value low alarming, skip 1st time Alarm alerting area
Ad=3	Absolute value low alarming Alarm alerting area	Ad=9	Absolute value low alarming, skip 1st time Alarm alerting area
Ad=4	In range alarming Alarm alerting area	Ad=10	Out of range alarming skip 1st time Alarm alerting area

6 Recommended parameters for each hierarchy

Hierarchy diagram *The system will return to LEVEL1 (MAIN MENU) if no key has been pressed within 60 sec



7 Error messages

Symbol	Description	Action
UUU1	Sensor interrupted, reverse pole or over-range with input signal higher than USP	Check if input signal error check if input signal range correct
-000	Input signal lower than LSP	Check if input signal correct
EE	Thermocouple failed in room temp. Compensation	Check if diode of temp. Compensation correct
UUUU	Thermocouple loop open (broken)	Check if thermocouple loop broken
UUU2	Thermocouple reverse pole	Check if the thermocouple in correct connection

8 Input signal type

Type	Symbol	Range
Thermocouple	K	0~1370 °C / 0~2192 °F
	J	0~1200 °C / 0~2192 °F
	E	0~1000 °C / 0~1832 °F
	T	0~600 °C / 0~999 °F
	R	0~1760 °C / 0~3216 °F
	S	0~1760 °C / 0~3216 °F
	B	0~1820 °C / 0~3308 °F
	N	0~1200 °C / 0~2192 °F
Heat Resistant Signal	Pt100	-199.9 ~ 600 °C / -199.9 ~ 999 °F
	Cu50	-199.9 ~ 600 °C / -199.9 ~ 999 °F
Linear Signal	LN	Various linear signal: 4-20mA, 1-5V, 0-5V, 0-50mV, 0-1V etc

LEVEL1	Main menu	LEVEL2	Control Parameter	LEVEL3	Calibration parameter
Power on	Function self-Check All Indicators lit	P	1st group in proportion %P=0 for ON/OFF switch	InP	Main input, refer to signal input type table
Self-check		2		Y	
InP	Declare input signal type	↓SET		↓SET	
400	Declare input signal range	I	1st group in integrated time (sec) I=0 for integrate time switch	LSP	Setting lower limit
25	Display PV/SV value (set SV)	200		0	
oUt	Real-time display output value	↓SET		↓SET	
0		d	1st differential time (sec) D=0 for differential switch	USP	Setting upper limit
0		40		400	
oUt		oUd	0: heating 1: cooling	RnL	Main input, 0 calibration (default)
0		0		00	
AL	Auto algorithm 1: autose 2: none	HYS	1st group output feedback setting	RnH	Main input, full scale adjustment (default)
0		1		1000	
AL1	Set 1st alarm value	CYt	1st group working cycle (sec) 0: mA; 1: SSR output others: relay output	CF	0: °C 1: F
5		010		↓SET	
AL2	Set 2nd alarm value	HY1	Alarming 1 lag setting	SFt	Main input filtering constant
0		1		030	
AL3	Set 3rd alarm value	Ad1	1st alarm mode selection (ref. Mode selection)	DP	Decimal position selection
0		000		0000	
GAP	Cooling interval SV1=SV+GAP	HY2	Alarming 2 lag setting	CLo	Main current control, 0 calibration
00		1		000	
LEVEL2		Ad2	2nd alarm mode selection (ref. Mode selection)	CHo	Main current control, full scale adjustment
		000		1000	
		HY3	Alarming 3 lag setting	tC	Thermocouple cold end temp setting (default)
		1		250	
		Ad3	3rd alarm mode selection (ref. Mode selection)	tL	Thermocouple cold end constant setting (default)
		000		4000	
		P1	2nd group in proportion %P1=0 for ON/OFF switch	tRH	Thermocouple cold end constant setting (default)
		10		0	
		↓SET		↓SET	
		d1	2nd group integrated time (sec) I1=0 for integrate OFF	tRH	Transfer the output PV URV setting
		1200		400	
		↓SET		↓SET	
		d1	2nd differential time (sec) D1=0 for differential OFF	P15	Room temp. compensation (main input quantity tuning) (decimal synchronized to DP)
		300		0	
		↓SET		↓SET	
		Ct1	2nd group working cycle (sec) 0: mA; 1: SSR output others: relay output	bAd	Transmission rate 1: 9600 2: 19200
		004		↓SET	
		oUL	Output lower limit setting	AdD	Communication port
		00		000	
		↓SET		↓SET	
		oUH	Output upper limit setting	SrE	Dehumidifying temp. setting SRT=0, inactive
		1000		0	
		↓SET		↓SET	
		ARn	0: manual permitted 1: manual prohibited Date LOCK 000: all parameters editable 010: Level2, level3 all parameters not editable	CL1	Aux. control OUT2 current output, 0 calibration
		0		AAA	
		↓SET		↓SET	
		LCH	Aux. control OUT2 current output, full scale adjustment	CH1	Aux. control OUT2 current output, full scale adjustment
		000		1000	
		↓SET		↓SET	
		tH	Aux. control OUT2 function selection: 0: out2 as cold/hot coherent control 1: out2 as PV transmission control 2: out2 as SV transmission output	000	
		000		↓SET	
		LEVEL3		↓SET	
				LEVEL1	

9 Specifications

Standard parts

Model	K903	K904	K906	K907	K908	K909
Dimension	48×48mm	48×48mm	48×96mm	72×72mm	96×48mm	96×96mm
Power supply	AC85-265V,DC24V(sensor)					
Frequency	50/60Hz					
Power rating	approx.4VA	approx.4VA	approx.4VA	approx.4VA	approx.4VA	approx.4VA
Memory	Power interruption memory backup E ² PROM					
Input	Probed signal input,sampling rate:150ms,display accuracy:0.5%ofFS					
	Thermocouple(TC)	K, J, R, S, B, E, N, T, W,				
	Heat resistant(RTD)	PT100 CU50				
	Liner current(mA)	4~20mA, 0~20mA				
	Liner voltage(mv.v)	0~1V, 0~5V, 0~10V, 1~5V, 2~10V, -10~10mV, 0~10mV, 0~20mV, 0~50mV, 10~50mV				
	Decimal position	0000, 000.0, 00.00, 0.000				
1st set output	Output control(heat mode or cool mode selectable)					
	Relay	5A,220V,electrical lift cycle:>100,000cyclesin rating loading				
	Voltage pulse	SSR drive use,ON:24V,OFF:0V,max.loading:20mA				
	Liner current(mA)	4-20mA,0-20mA,max,loading resistance: 900Ω				
	Liner voltage(V)	0-5V,1-10V,1-5V,2-10V,max.loading :20mA				
2nd alarm	Applicable to heating/colling double output control					
	Relay	5A,220V,electrical lift cycle:100,000 cycle in rating loading				
	Voltage pulse	SSR drive use,ON:24V,OFF:0V,max.loading:20mA				
	Liner current(mA)	4-20mA,0-20mA,max,loading resistance:560ohm				
	Liner voltage(v)	0-5V,1-10V,1-5V,2-10V,max.loading :20mA				
1st alarm	5A,220V,electrical lift cycle:100,000 cycle in rating loading					
2nd alarm	5A,220V,electrical lift cycle:100,000 cycle in rating loading					
3rd alarm	5A,220V,electrical lift cycle:100,000 cycle in rating loading					
Control method	PID,P,PI,PD,ON/OFF(P=0)					
PID setting range	P:0-200%,I:0-3600sec,D:0-900sec					
Insulation	Loop control(control output,alarm,transmit output)completely separated from input loop					
Insulation resistance	Main loop-shell(groud) DC500V>10M ohm,control loop-shell(groud)DC500V>10M ohm					
Pressure resistance	Main loop-shell(groud) 1500V1min.,control loop-shell(groud)1000V 1min					
Operation temp	0-50C					
Operation humidity	0-85%RH					
Transmit output	Transmittable:PV/SV					
	Liner current(mA)	4-20mA,0-20mA,max,loading resistance:560ohm				
	Liner voltage(v)	0-5V,1-10V,1-5V,2-10V,max.loading :20mA				
Communication	ModBus RTU					
	Transmittable speed:9600,19200					
Weight	K903/K904:Approx.150g K906/907/908:Approx.225g K909:Approx.300g					

10 Advanced operation

Manual/auto no disturbance switch

Press A/M key until MAN indicator lit to enter into manual mode. The current SV value as shown is the output percentage, and PV value is the detected value. Use ◀ and ▶ keys to revise the output percentage level. Press A/M again until MAN indicator goes off to enter into auto mode. The SV value as shown displays the pre-set value, while PV displays the detected value.

Note: manual/auto mode is switchable at any time, any condition.

Constant temperature time alarm set

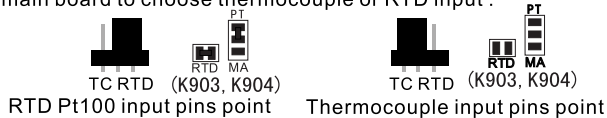
It is a very practical alarm set. alarm mode is 9 and any alarm output can set this function. For example, set AL1 output as this function and RDI=9, RLI=30. when PV=SV, AL1 alarm light on (alarm relay no action) and controller immediately began to count 30 minutes (AL1) later. constant temperature time set over when alarm relay close.

Note: It is usually applied in some system in which it is kept for a while after heating to set temperature!

Change input signal type

Thermocouple(K,J,E,T,R ,S,B,N)and resistor(PT100)both have been calibrated before outside factory,thus free switch between them is accessible according to change both internal short joint position and parameter set.

Hardware part:Pull out the instrument circuit board. And there are pins on main board to choose thermocouple or RTD input .



Software part :Enter Level3,and according to <<Signal input type table >>to modify "INP" than change signal input change is realized.

Soft start-up and ramp temperature raise function(optional)

For some situation requiring soft start-up and control temperature raise speed,this can be reached through de-humidity and ramp parameter set. For example.set $t_{rL}=50, t_{rH}=15, r_{PP}=60, r_{\Delta T}=1$.After reopen the instrument, it operates like this:in temperature below 50 degree,output is fixed at 15%;when over 50 degree,controller temperature will raise with speed 60 degree per second until $PV=SV$.

Note:It usually is applied in hot runner system or situation in which too high temperature can not be allowed.

SSR continuous control output(optional)

It is for further improving precision of the solid-state relays,phase/three phase SCR zero control and achieving the function of continuous control ,shortening cycle of load control and output cycle,preventing current meter swinging up and down,as well as improving temperature control accuracy.

Press SET and ◀ key,at the same time to enter LEVEL3,and then touch SET key several times,to find CRL if which in "0" state,mean it doesn't use the output function,and in "1" state means it operates;then,press set key to find CCY mode(output set cycle,unit "seconds" ,set range 50-250ms)

Note:When choosing single or three single SCR zero control instrument, this function be added.if it is solid state controller,this function is optional

Transmitter output and communication function(optional)

Controller can transmit PV value signal to recorder and data logger with 4-20mA signal in range (t_{rL}, t_{rH}). Two set isolated 4-20mA signal at maximum can be allowed to transmit as signal isolator. Communication is RS485 joint point and format Modbus RTU,directly connecting PLC or human machine system

11 Order code

Name	Code	Basic model	Code	Main control output	Code	2nd group output	Code	Alarming	Code	Transmitting output	Code	Input signal	Code
Valuing type	K	DIN48x48	04	No output	0	None	0	None	0	None	0	Thermocouple	1
procedure type	AK	DIN48x96	06	Relay connector output	1	Relay connector output	1	1 set alarm	1	MV value 4-20mA transmitting output	1	Heat resistance RTD	2
Multigroup and Multistage type	AKM	DIN72x72	07	SSR trigger signal	2	SSR trigger signal	2	2 set alarm	2	SV value 4-20mA transmitting output	2	4-20mA	3
Master control type	MK	DIN96x48	08	4-20mA output	3	4-20mA output	3	3 set alarm	3	PV value 4-20mA transmitting output	3	Other linear input	A
Sub- control type	SK	DIN96x96	09	1 SCR zero-crossover	5	1 SCR zero-crossover	5			MV value 20-4mA transmitting output	4		
				3 SCR zero-crossover	6	Other linear ampere/voltage	A			SV value 20-4mA transmitting output	5		
				Other linear ampere/voltage	A					PV value 20-4mA transmitting output	6		
Communication	Code	Waterproof and dustproof	Code	Aux.power output	Code	Power supply	Code						
None	0	None	0	None	0	AC85-265V	0						
Rs485	3	Have	1	DC24V	1	24VPower supply	1						
ModBus	4												