

1.Main features

- New generation of high-end controller, large window, high contrast LCD and easy to read white PV display, which improves the visibility of all angles and achieve long-distance visibility.
- Built-in waterproof sealing ring and externally mounted waterproof sealing ring make the front panel have good waterproof performance.
- Plastic handle waterproof button, the button operating surface strong, scratch-resistant and wear-resistant, operation feel clear and smooth.
- Economic type, simple operation, practical function, specially designed for temperature control.
- Common thermocouple and RTD input type can be selected through software parameter settings.
- The measurement accuracy reaches 0.25% level. The measurement error caused by temperature drift and time drift is eliminated by using digital correction and self-calibration technology.
- Advanced "FUZZY+PID" ai intelligent control mode, no overshoot and with the function of auto tuning (AT) and self-adaptation.
- Can provide most two way alarm output, and can implement a variety of alarm methods.
- The °C or °F temperature unit can be selected via software parameter settings.
- High-efficiency and high-reliability switching power supply, global universal voltage range AC100~240V or AC/DC12~24V.
- The anti-jamming performance meets the requirements of electromagnetic compatibility (EMC) under harsh industrial conditions.

2.Technical Specification

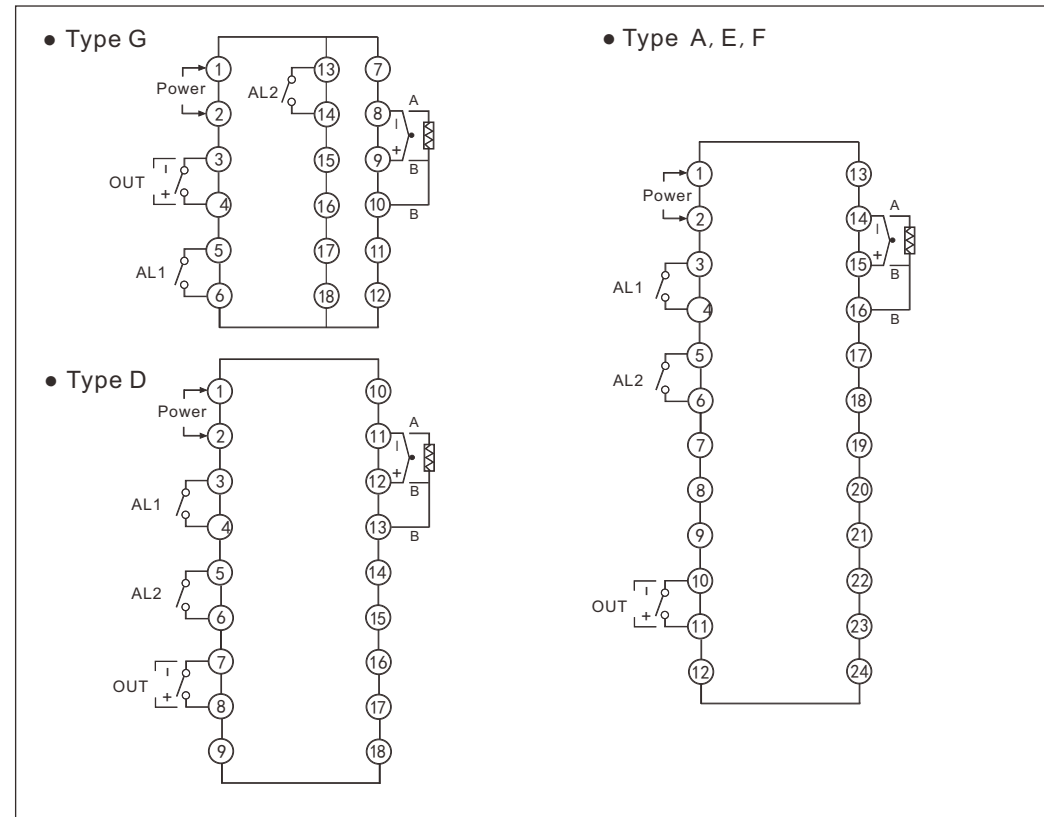
Panel type		G	D	A	E	F
Panel size mm (width × height)		48×48	72×72	96×96	48×96	96×48
Hole size mm (width × height)		45 ^{+0.6} × 45 ^{+0.6}	68 ^{+0.6} × 68 ^{+0.6}	92 ^{+0.6} × 92 ^{+0.6}	45 ^{+0.6} × 92 ^{+0.6}	92 ^{+0.6} × 45 ^{+0.6}
Power supply voltage		AC100~240V 50/60HZ or AC/DC12-24V				
Range of allowable voltage variation		85% ~ 110% of rated supply voltage				
Power consumption		About 5VA at AC100 ~ 240V and 3.5VA at 12-24V				
Display mode		7-segment negative LCD liquid crystal display, PV White SV green light indicator orange light				
Input specifications and measuring range		Thermocouple: K (-50~ 1300℃), E (0~800℃), J (0~1000℃), N (0~1300℃) Thermal resistance: Pt100 (-200~ 600℃)				
The number of decimal places		0(None) , 0.0(1 decimal point)(set by DP parameter)				
Measurement accuracy		0.25 grade (when the thermal resistance and thermocouple are input and the cold end is compensated by copper resistance or freezing point) , 0.25% FS ± 2.0 ° C (when the thermocouple is input and the cold end is compensated by the internal components of the instrument)				
Sampling period		80ms (when digital filter parameter INF = 0) , display response time ≤0.5 seconds				
Control mode		On/OFF bit adjustment, PID + FUZZY artificial intelligence adjustment algorithm				
Control output	Relay contact output	3A/250VAC Resistive Load, 5A/30VDC resistive load				
	SSR drive voltage output	12VDC/50mA (To Drive SSR relay)				
	SCR contactless output	1A/240V resistive load, only suitable for AC100 ~ 240V power supply				
Electromagnetic compatibility		IEC61000-4-4(electrical fast transient pulse group) , ± 4KV/5KHz; IEC61000-4-5(surge) , 4KV				
Isolation withstand voltage		The power supply, relay contacts and signal terminals are ≥2300VDC each other, and the isolated weak current signal terminals are ≥600VDC each other				
Operating Ambient		Temperature:-10~+60℃, Humidity: 25~85%				
Storage temperature		Temperature:-25~+70℃, Humidity: 25~85%				

3.Ordering Code Definition

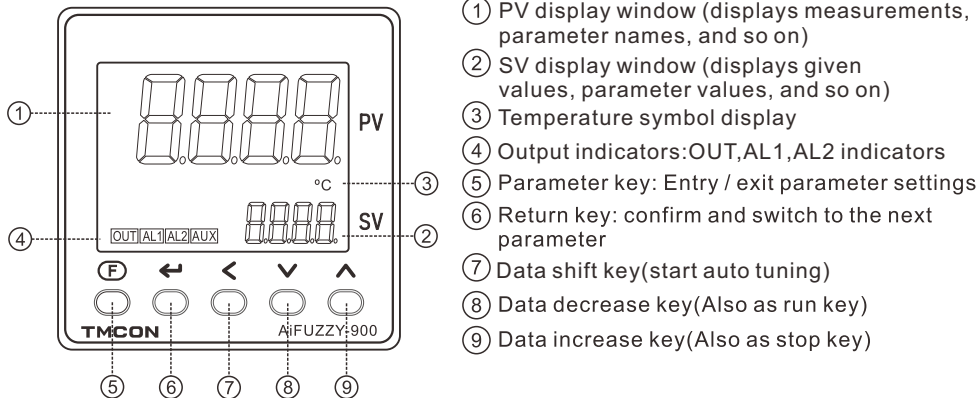
AiFUZZY-903 – ① ② ③ – ④

①		②		③	
Code	Dimensions (width × height)	Code	OUT(Master output)	Code	ALM(Alarm)
G	48×48mm	N	None	N	None
D	72×72mm	R	Relay output	1	1 way relay output (AL1)
A	96×96mm	Q	Relay (driving voltage DC12V)	2	2 way relay output (AL1+AL2)
E	48×96mm (vertical)	W1	Thyristor contactless normally open		
F	96×48mm (horizontal)	W2	Thyristor contactless normally closed		
		K1	One-way thyristor zero-crossing trigger		
④					
Code	Power supply				
Blank	AC100~240V				
D	AC/DC12~24V				

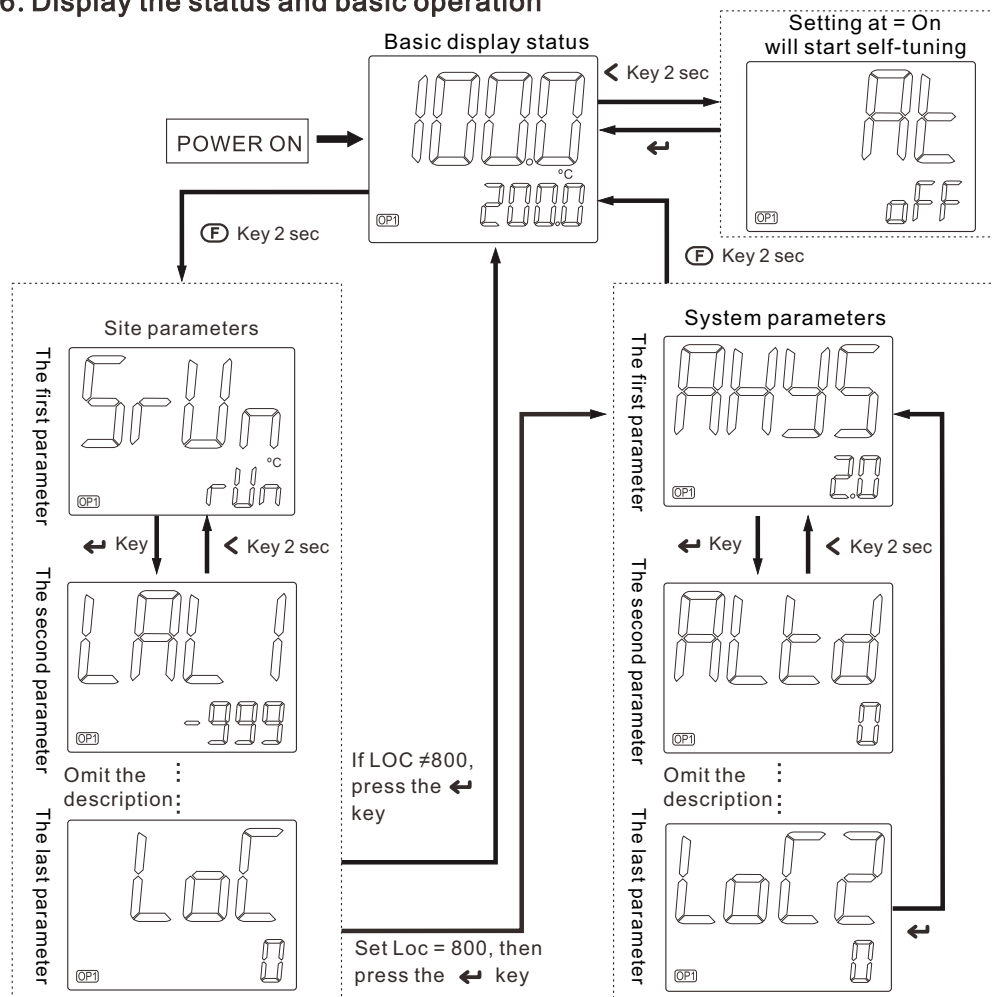
4. Wiring diagram.



5. Front Panel Description



6. Display the status and basic operation



- **System parameter setting**

In the basic display state, press and hold **(F)** key 2 seconds, Enter the field parameters, set the LOC = 800, Then press the **↵** button to confirm and enter the system parameter setting state. **←**, **↓**, **↑** Key can directly modify the parameter values. Press the **↓** key to reducing the data, press the **↑** key to increase the data, Waiting to modify the value of the decimal point will flash (like a cursor). press key and hold, you can quickly increase / decrease in value, And the speed will be automatically accelerated. also press the **←** key to move to modify the data location (cursor), the operation is more efficient. **↵** Key can be stored to modify parameter values and display the next parameter, press and hold **←** key 2 seconds, and can return to the previous parameter; press and hold **(F)** key 2 seconds can immediately exit the parameter setting state.

●Set Value Setting

In the basic display state, press **←** , **▼** , **▲** key can directly modify the given value.

- “At” PID Parameter auto-tuning

The optimal PID control parameters can be determined by the auto-tuning controller, thereby obtaining precise control:

Press **←** and hold for 2 seconds, the At parameter appears, "At" parameter "OFF" is set to "ON" and then press the **←** KEY to confirm instrument can start the implementation of the auto-tuning. Given function, the instrument in the basic display state display will flash the word "At", the instrument after 2 oscillation cycle ON-OFF control can automatically calculate the PID parameters. If you want to advance to give up auto-tuning, "At" parameter "ON" is set to "OFF" and then press **←** key to confirm.

*Given tuning parameter values obtained are not identical, to perform auto-tuning function, should be first given value set in The most commonly used value or middle value, if the system is good insulation properties of the furnace, the given value should be set in the system uses the maximum, and then Execute the start of the operation of auto-tuning function. Reasons to learn, auto-tuning after the initial use, the effect may not be the best, you need a period of time (usually the same time auto-tuning control) before they can get the best results.

*Do not operate the controller or interrupt the power supply during the auto-tuning process.

7.Parameter list and function

7.1 Field parameters

Press **F2** 2 seconds to enter the site parameter settings

Code	Name	Description	Range
<i>SRUN</i>	Running state	run the control state. Stop: Stop State, SV window shows flashing display“StoP”	(Ex-factory value run.)
<i>HAL1</i>	AL1 high limit alarm value	“HAL1” is the absolute value alarm or deviation value alarm, by “ALtd” parameter definition. When the value set to Max. will disable this function.(3200)	-999~3200
<i>LAL1</i>	AL1 low limit alarm value	“LAL1” is the absolute value alarm or deviation value alarm, by “ALtd” parameter definition. When the value set to Min. will disable this function.(-999)	(ex-factory value, upper limit: 3200 lower limit: -999)
<i>HAL2</i>	AL2 high limit alarm value	“HAL2” is the absolute value alarm or deviation value alarm, by “ALtd” parameter definition. When the value set to Max. will disable this function.(3200)	
<i>LAL2</i>	AL2 low limit alarm value	“LAL2” is the absolute value alarm or deviation value alarm, by “ALtd” parameter definition. When the value set to Min. will disable this function.(-999)	
<i>LOC</i>	Password lock	Set LOC = 800, then press (F) key to input system parameters.	

7.2 System parameter

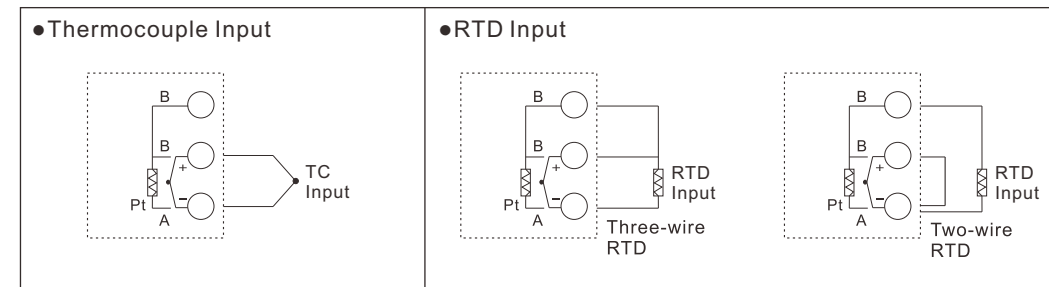
Set Loc = 800, then press the **Ⓔ** key to enter the following system parameters

<i>RHY5</i>	Alarm hysteresis	Avoid frequent alarm on-off action because of the fluctuation of PV	0~2000 (Ex-factory value 2.0)
<i>ALtd</i> (ALtd)	Alarm mode	ALtd=0 , AL1 is the deviation value alarm,AL2 is the absolute value alarm. ALtd=1 , AL1 and AL2 is the absolute value alarm. ALtd=2 , AL1 and AL2 is the deviation value alarm.	0~2 (Ex-factory value 1)
<i>CntL</i> (CntL)	Control mode	onoF: on-off control. For situation not requiring high precision. FPId: advanced artificial intelligence "FUZZY+PID"control.	(Ex-factory value FPId)
<i>orEV</i> (orEV)	Selection of heating refrigeration	onr: Reverse acting. Increase in measured variable causes a decrease in the output, such as heating control. ond: Direct acting. Increase in measured variable causes an increase in the output, such as refrigerating control.	(Ex-factory value onr)
<i>P</i>	Proportional band	Proportional band in FPId control. Instead of percentage of the measurement range, the unit is the same as PV. Generally, optimal P, I, D and CP can obtained by auto tuning. They can also be manually inputted if you already know the correct values.	1~3200 (Ex-factory value 25.0)
<i>I</i>	Integration time	The integration time of the FPID adjustment, the unit is sec, and the integral action is canceled when I=0.	1~9999 (Ex-factory value 200)
<i>d</i>	Differential time	The differential time of the FPID adjustment , the unit is 0.1 sec, and the differential effect is canceled when d=0.	0~3200 (Ex-factory value 50.0)
<i>CP</i>	Control cycle	CP reflect the instrument operator to adjust the speed, the size of the CP that affect the control accuracy. With SSR, SCR output control cycle preferable to shorter, usually 0.5-3.0 Sec. The relay switch output is generally in 15-40 sec. When the output relay switches , the CP will be limited to 3 sec, And self-tuning At will automatically set the CP as the appropriate value, taking into account the control accuracy And mechanical switch life. When the control mode CntL = onoF, the action of the CP as an output disconnect or power-on output ON Delay time.	0.2~300.0 (Ex-factory value relay output 15.0 SSR output 2.0)
<i>HYS</i>	Control hysteresis	HYS is used for ON-OFF control to avoid frequent on-off action of relay. For a reverse acting (heating) system, when PV > SV, output turns off; when PV<SV-HYS, output turns on. For a direct acting (cooling) system, when PV<SV, output turns off; when PV>SV+HYS, output turns on.	0~200.0 (Ex-factory value 2.0)
<i>Int</i> (Int)	Input Signal	Selection of input Types for thermocouples or RTD P, E, J, n, Pt100	(Ex-factory value K)
<i>dP</i>	Decimal point	0 : no decimal. 0.0: one decimal place.	(Ex-factory value 0)
<i>Sc</i>	Input Shift Adjustment	SC is used to shift input to compensate the error caused by transducer, input signal, or auto cold junction compensation of thermocouple.PV after compensation=PV before compensation + Sc It is generally set to 0. The incorrect setting will cause measurement inaccurate.	-199.9~+400.0 (Ex-factory value 0)
<i>InF</i>	PV input filter	The value of InF will determine the ability of filtering noise. When a large value is set, the measurement input is stabilized but the response speed is slow. Generally, it can be set to 1 to 3. If great interference exists, then you can increase parameter "InF"gradually to make momentary fluctuation of measured value less than 2 to 5. When the instrument is being metrological verified, "InF" s can be set to 0 or 1 to shorten the response time.	0~40 (Ex-factory value 2)
<i>dU</i>	Temperature unit selection	°C: celsius equals °F: fahrenheit equals	(Ex-factory value °C)

<i>SVL</i>	Low limit of SV	Minimum value that SV is allowed to be.	-999~3200 (Ex-factory value -999)
<i>SVH</i>	High limit of SV	Maximum value that SV is allowed to be.	-999~3200 (Ex-factory value 999)
<i>LOC2</i>	Password lock2	LOC2=0: Unlocking, no locking function. LOC2=1: AT self-tuning parameter cannot be set. LOC2=2: Field parameters cannot be set. LOC2=3: SV setting value cannot be set LOC2 =4: AT self-tuning, The current field parameter and SV setting values can not be set	0~4 (Ex-factory value 0)

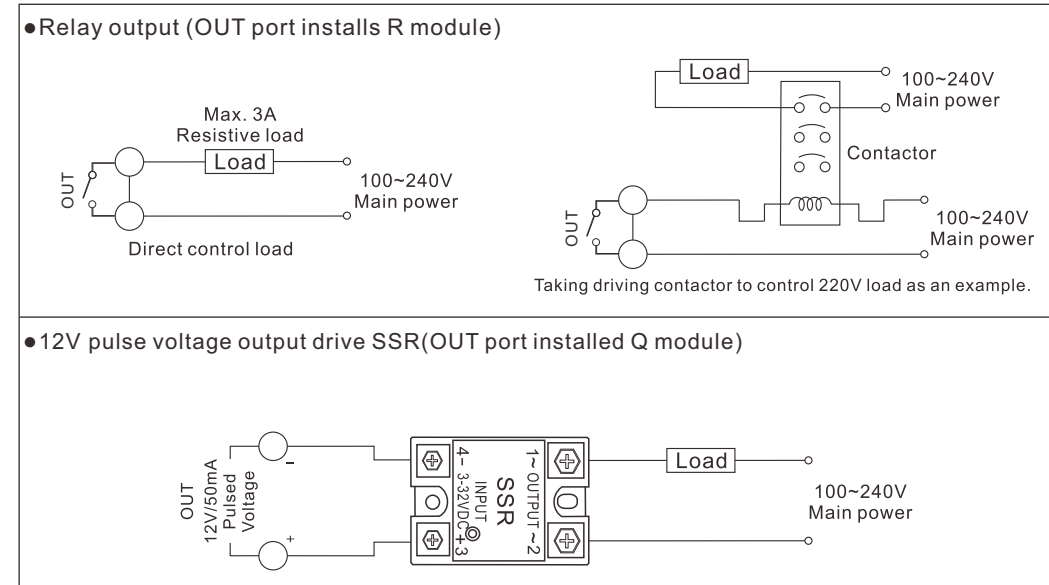
8. Partial application wiring method

8.1 The wiring method of the input signal



* If the input wiring error, sensor damage, over-range or Int settings and input sensor types are inconsistent, there will be "orAL" warning flicker, After these faults need to be eliminated, the PV can measure the display normally.

8.2 Main control output wiring method



9.Dimensions (in mm) and installation instructions

