FT3403 Economic Type Digital Temperature Controller

1.Main features

●DIN48×48mm, 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 0.3% 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

size	Panel size: 48x48mm, opening size: 45x45mm
Installation mode	Embedded Installation and Guideway Installation
Indication method	7-segment digital LCD display and individual indicators
Power supply voltage	AC100~240V (-15%, +10%) 50-60HZ,or AC/DC12-24V(-15%, +10%)
Power consumption	Approx. 5.2 VA at 100 to 240 VAC, Approx. 3 VA at 12 to 24 VDC
Input specification and scope	Thermocouple:K(-50~+1300℃), E(0~800℃), J(0~1000℃), N(0~1300℃), RTD:Pt100(-200~+600℃)
Measurement accuracy	0.3% FS ± 1measurement unit(RTDs and thermocouple input use external copper resistance compensation or ice point compensation cold end), 0.3%FS + 2 degrees(Thermocouple Input use instrument internal components temperature compensation cold end)
Decimal point	0 (none), 0.0 (1 decimal point) (set by dP parameter)
Response time	80mS(when digital filter parameter InF=0),Display response time≤0.5Sec
Control mode	ON-OFF(one-stop) control mode, "FUZZY+PID" artificial intelligent control
Relay output	3A/250VAC 5A/30VDC
SSR voltage output	12VDC/50mA(Used to drive SSR)
Triac no contact output (Built in SSR output)	1A/240VAC(It can directly control the Max 1A AC100~240V electric heating tube, or control the high current load by controlling the AC contactor)
EMC	±4KV/5KHz according to IEC61000-4-4; 4KV according to IEC61000-4-5
Isolation withstanding voltage	Between power, relay contact or signal terminals≥2300VDC, between isolated electroweak terminals≥600V

Operating Ambient	Temperature: -10～+60°C , Humidity: 25～85%RH
Storage temperature	Temperature: -25～+70°C , Humidity: 25～85%RH

3.Ordering Code Definition

FT3403 — ① ② — ③ ④

①

Code	OUT(Master output)
N	None
R	Relay output
Q	SSR voltage output
T	TRIAC no contact normally open output (Built in SSR output)

②

Code	ALM(Alarm)
N	None
1	1 way relay output (AL1)
2	2 way relay output (AL1+AL2)

③

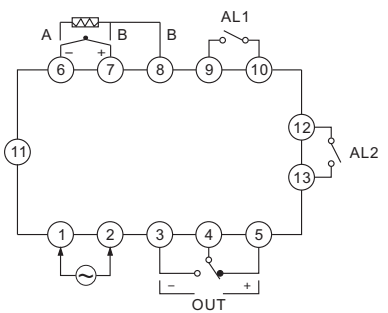
Code	Terminal connection
Blank	Screw terminals
C	Contact pin(11 pin)

④

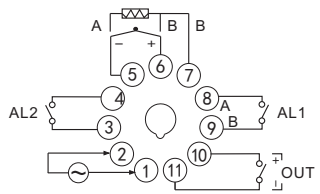
Code	Power supply
Blank	AC100~240V
D	AC/DC12-24V

4. Wiring diagram.

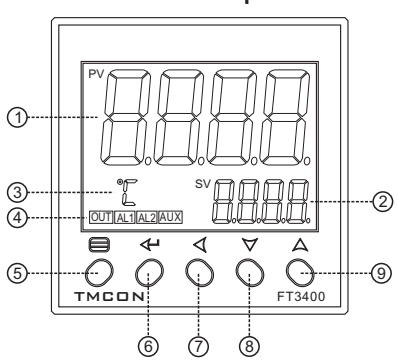
●Screw terminals type wiring diagram



●Contact pin type wiring diagram

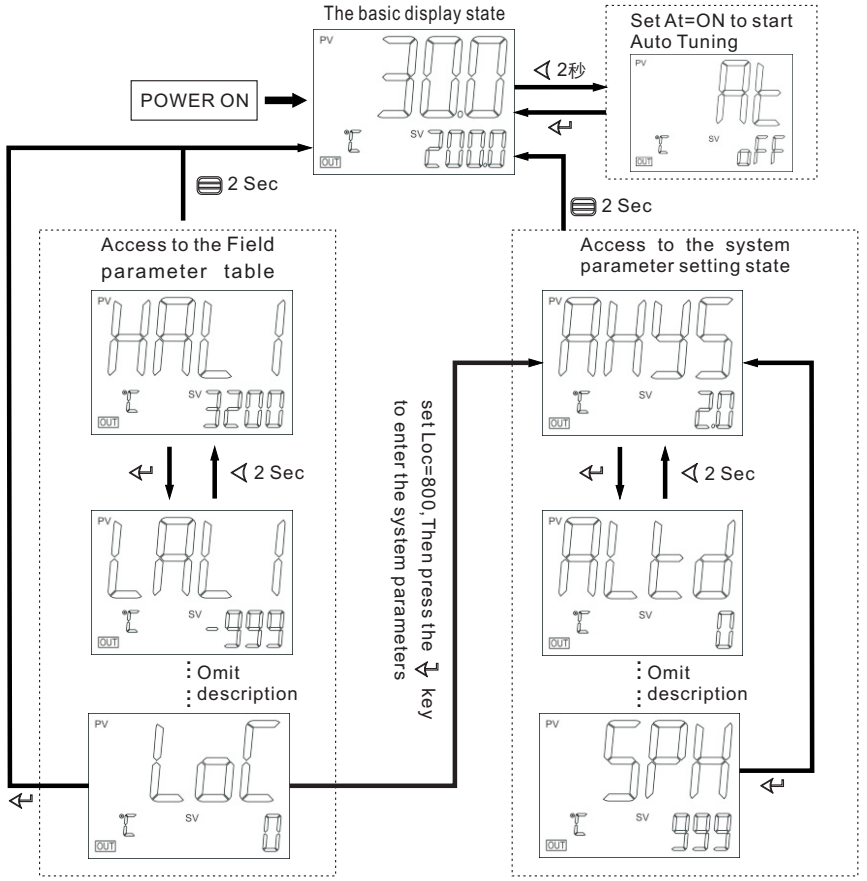


5. Front Panel Description



① PV first display:display measurement value, parameter name, etc.
② SV second display:display a set value, parameter value, etc.
③ Temperature unit.
④ Output indicators:OUT ,AL1,AL2,AUX indicators.
⑤ Parameter key: Entry / exit parameter settings.
⑥ Return key: confirm and switch to the next parameter.
⑦ Data shift key.
⑧ Data decrease key(Also as run key).
⑨ Data increase key(Also as stop key).

6. Display the status and basic operation



●System parameter setting

In the basic display state, press and hold 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 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

In the basic display state, press and hold key 2 seconds, Enter the field parameters,

Code	Name	Description	Range
HAL 1	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
LAL 1	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)	
HAL2	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)	
LAL2	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)	
SrUn	Running state	run:Run control state StoP:Stop state, No.2 display flashing display "StoP".	
Loc	Password lock	LOC=0: Allow modification of field parameters and set value. LOC=7000: Not allowed to modify the set value. LOC=8000: Not allowed to modify the field parameters. LOC=9000: Not allowed to modify the set value and field parameters. LOC ≠ 7000, 8000, 9000 will automatically be 0. Set LOC = 800, then press A key to input system parameters.	0~9999

7.2 system parameter

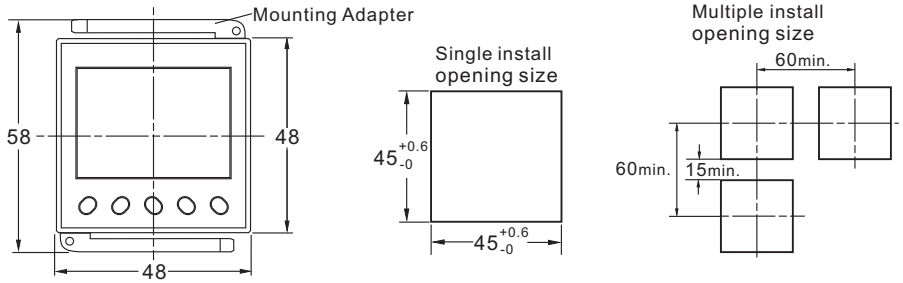
In the field parameters,set Loc=800,Then press the key to enter the system parameters.

AHYS	Alarm hysteresis	Avoid frequent alarm on-off action because of the fluctuation of PV	0~2000
ALtd (ALtd)	Alarm mode	ALtd=0 , AL1is 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

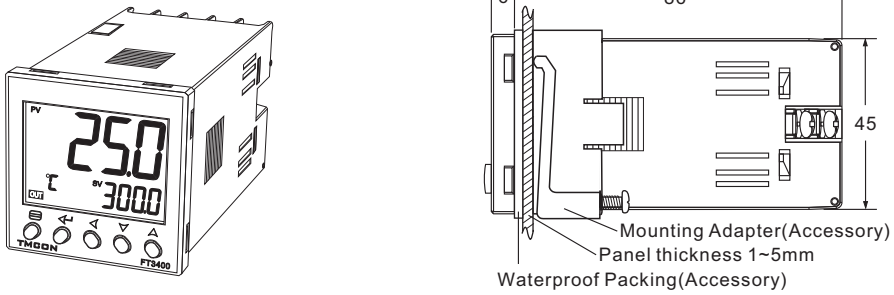
CntL (CntL)	Control mode	onoF: on-off control. For situation not requiring high precision. FPId: advanced artificial intelligence “FUZZY+PID”control.	
orEv (orEV)	Selection of heating refrigeration	onr: Reverse acting. Increase in measured variable causes a decrease in the output, such as heating control. ond: Direct acting. Increase in measured variable causes an increase in the output, such as refrigerating control.	
P	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.*P initial value:20.	1~3200
I	Integration time	The integration time of the FPID adjustment, the unit is sec, and the integral action is canceled when I=0. *I initial value:200.	1~9999
d	Differential time	The differential time of the FPID adjustment , the unit is 0.1 sec, and the differential effect is canceled when d=0. *d initial value:50.0.	1~3200
CP	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
HYS	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
Int (Int)	Input Signal	Selection of input Types for thermocouples or RTD : K,E,J,N,Pt（Pt100）	
dP	Decimal point	0 :no decimal. 0.0:one decimal place.	
Sc	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
InF	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
dU	Temperature unit selection	°C：celsius equals °F：fahenheit equals	
SPL	Low limit of SV	Minimum value that SV is allowed to be.	-999~ 3200
SPH	High limit of SV	Maximum value that SV is allowed to be.	

8.Dimensions (in mm) and installation instructions

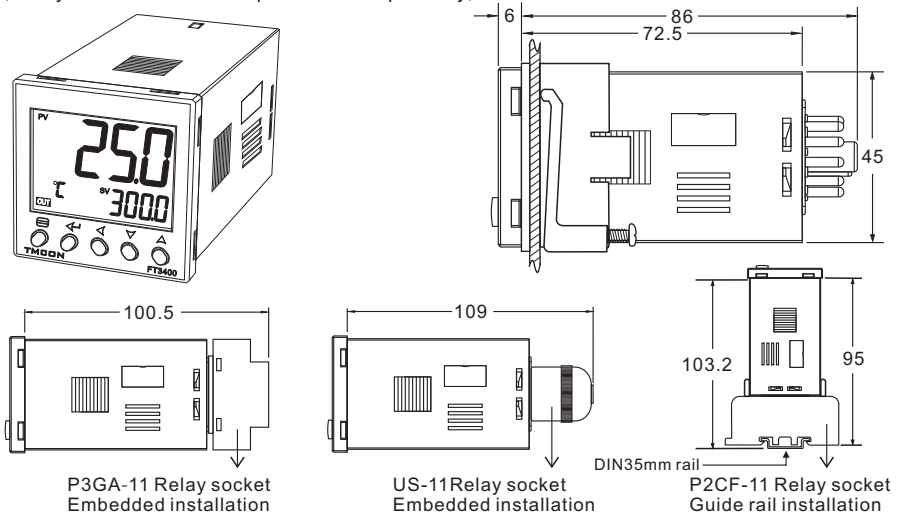
●Panel size and opening size



●Screw terminal type （Embedded installation）



●Contact pin type (11 pin) （Embedded or rail installation）
（Relay sockets need to be purchased separately）

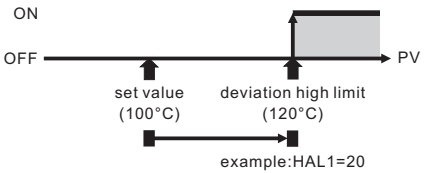


9.Alarm schematic diagram

The following schematic diagram takes AL1 alarm output as an example.

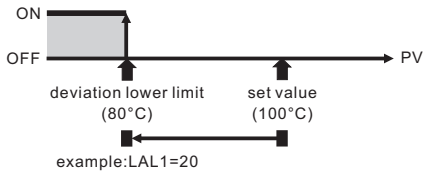
●When alarm mode ALtd = 0 or ALtd = 2, HAL1 and LAL1 will be deviation values alarm , which can realize deviation high limit alarm, deviation lower limit alarm, deviation high-lower limit alarm:

AL1 realizes deviation high limit alarm:



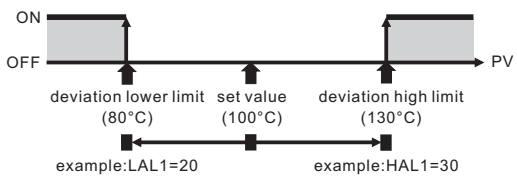
*Must set LAL1=-999 to close the deviation lower limit.

AL1 realizes deviation lower limit alarm:



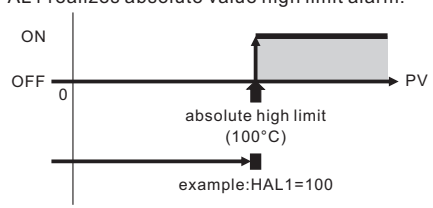
*Must set LAL1=3200 to close the deviation high limit.

AL1 realizes deviation high-lower limit alarm:



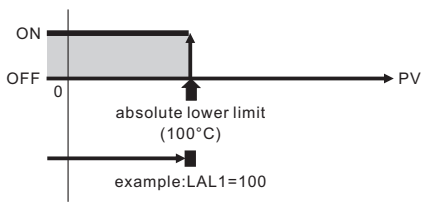
●When alarm mode ALtd = 1, HAL1 and LAL1 will be absolute value alarm , which can realize absolute high limit alarm, absolute lower limit alarm, absolute high-lower limit alarm:

AL1 realizes absolute value high limit alarm:



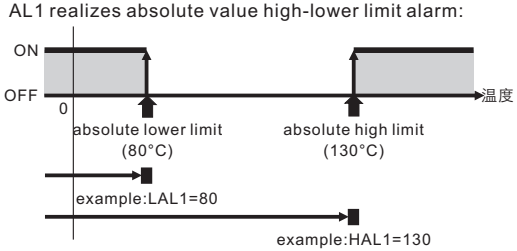
*Must set LAL1=-999 to close the absolute lower limit.

AL1 realizes absolute value lower limit alarm:



*Must set LAL1=3200 to close the absolute high limit.

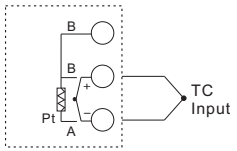
AL1 realizes absolute value high-lower limit alarm:



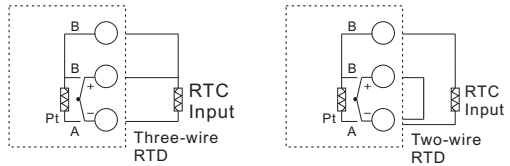
10. Partial application wiring method

10.1 The wiring method of the input signal

●Thermocouple Input



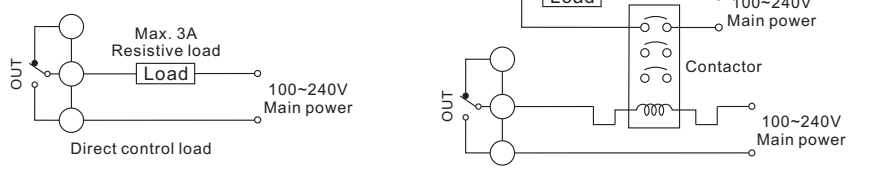
●RTDs Input



* 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.

10.2 Main control output wiring method

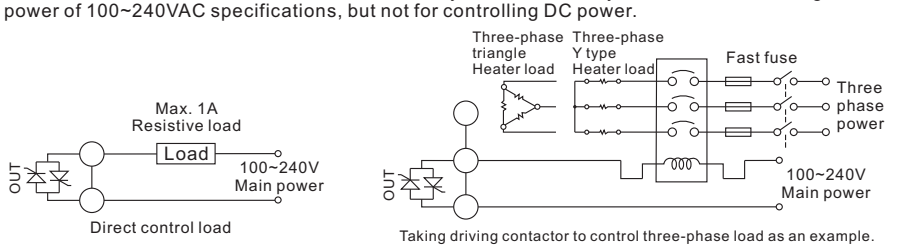
●Relay output (OUT port installs R module)



Taking driving contactor to control 220V load as an example.

●Thyristor No contact switch output (built-in SSR output)(OUT port installs T module)

T are new types of no contact switch module which apply the advanced technology of “burn proof” and zero crossing conduction. It can replace the relay contact switch. Compared to the relay contact output module, T have longer life and lower interference. They can be largely lower the interference spark of the equipment, and greatly improve the stability and reliability of the system. The drive element of the contactless switch is a thyristor, so it is only suitable for controlling AC power of 100~240VAC specifications, but not for controlling DC power.



Taking driving contactor to control three-phase load as an example.

●12V pulse voltage output drive SSR (OUT port installed Q module)