



## TC4 Series temperature controller introduction

Read the instruction manual before usage, for right Application and maintenance.

### Wiring warning

As to prevent damage or destroy, choose the proper fuse for power line and input/output lines for avoiding electric current shock.

### Atmospheres power supply

As to prevent damage or destroy, turn on the current after all connection work finished.

### No using the machine in flammable gas storage areas

For flameproof, explosionproof, or preventing machine damaged or destroyed, No using in flammable gas storage and steam discharging areas.

### No changing default instrument srtinge

As to prevent damage or destroy, changing default instrument settings is absolutely prohibited.

## Summarize

TC4 series industrial adjusting Apparatus/temperature controller is design of Switch Power Supply Using in microprocessor Multi-functional Intelligent Adjuster. With the special Switched Mode power Supply technology and surface mount technology(SMT). Consequently, the product is a small fine and credibility and stabilization, The unique self diagnostic function, The self-adjusting Function and intelligent control of the Instrument make user to obtain good results byshirtleeve operation.

### Main features:

Thermocouple, hot resistance, analog quantity, etc. Multi-signals are free to input, range setting free.

Software can dial to the zero and full scale derent position. Cold side particular temperature measuring. param etric amplifier auto constant-zero. Display accuracy is superior to 0.5%FS. combining relevant optimization technique, reliability theory, traditional PID method and fuzzy mathematics into an organic whole make control fast and smoothly and automatic tuning PID parameters of Control System.

Optional output: relay contact, logic level, silicon-controlled rectifier single-phase, triphase zero-crossing edge or trigger phase shifter, analog quantity and have another 2circuits equip defined flash warning contact output.

## The key technical index

- 1.Accuracy of measurement: ±0.5%FS
- 2.Compensating error of cold side is: ±2°C (The software corrects the data for 0-50°C Cfluctuations in temperature)
- 3.Resolution: 14Bit
- 4.Sampling period: 0.5Secretary
- 5.Power supply: AC100-240V, 50/60Hz
- 6.Control mode: Adopt industrial and PID Parameters of Control System, Temperature Control, responsible faster, Start modulation smaller, accuracy higher than traditional PID
- 7.Insulation resistance: >50MΩ (500VDC)
- 8.Insulation strength: 1500VAC/1 min
- 9.Power Loss: <10VA
- 10.Environmental conditions: 0-50°C, 30-85%RH non-corrosive gas occasions.

## Model Number Definition

Model ID

TC4 □ - □ □ □ - □

①Size (see Table 1)

②Main output

R: RELAY contact output (RELAY)

Q: Voltage pulse output (SSR)

8: Electric current output (4-20mA)

③Alarm output

0: Alarm free

1: Group 1 alarm

2: Group 2 alarm

④Input type

TC: thermocouple

Rt: hot resistance

⑤Additional function

4: Electric current output (4-20mA) (Converter transmission)

RS485: 485 communication

Type	false top frame(W×H)	shell (W×H×D)	open pore size(W×H)
S	48×48	48×48×75	45±1×45±1
H	48×96	48×96×75	45±1×92±1
W	96×48	96×48×75	92±1×45±1
M	72×72	72×72×75	68±1×68±1
L	96×96	96×96×75	92±1×92±1

Table (2) Input the signal with measure the degree scope

	Input	Range	code	Range	code	Range	code
Thermocouple	K	0-200°C	K01	0-400°C	K01	0-600°C	K01
		0-800°C	K04	0-1000°C	K05	0-1200°C	K06
		0-1372°C	K07	0-100°C	K13	0-300°C	K14
	J	0-200°C	J01	0-400°C	J02	0-600°C	J03
		0-800°C	J04	0-1000°C	J05	0-1200°C	J06
		0-1600°C	R01	0-1769°C	R02	0-1350°C	R04
	S#1	0-1600°C	S01	0-1769°C	S02	—	—
	B#1	400-1800°C	B01	400-1769°C	B02	—	—
	E	0-800°C	E01	0-1000°C	E02	—	—
	N	0-1200°C	N01	0-1300°C	N02	—	—
T#2	-199.9-400°C	T01	-199.9-100°C	T02	-100.0-200.0°C	T03	
	0-350°C	T04	—	—	—	—	
	-199.9-649.0°C	D01	-199.9-200.0°C	D02	-100-50.0°C	D03	
	-100-100°C	D04	-100-200.0°C	D05	0.0-50.0°C	D06	
Hot resistance	Pt100	0.0-100°C	D07	0.0-200.0°C	D08	0.0-300.0°C	D09
		0.0-500°C	D10	—	—	—	
		-199.9-649°C	P01	-199.9-200.0°C	P02	-100-50.0°C	P03
	Cu50	-100-100°C	P04	-100-200.0°C	P05	0.0-50.0°C	P06
		0.0-100°C	P07	0.0-200.0°C	P08	0.0-300.0°C	P09
		0.0-500°C	P10	—	—	—	
Standard signal	0-5VDC	0.0-100°C					
	1-5VDC	0.0-100°C					
	0-20mA#3	0.0-100°C					
	4-20mA#3	0.0-100°C					

- #1 within 0-399°C limits, accuracy security can not be given
- #2 within-199.9-100°C limits, accuracy security can not be given
- #3 Between input terminals need a 250Ω resistance

## Installation

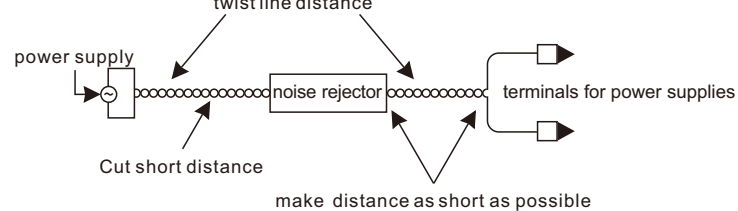
Attentions

1. Instrument fixed environment follow
  - Atmospheric pressure: 86-106KPa
  - Ambient temperature: 0-50°C
  - Relative humidity: 30-85%RH
2. Pay attentions to situations follow befor Instrument fixed
  - Rapid changes in humidity have possibilities of dew
  - Corrosive gas, flammable gas
  - Structure of the Subject been impacted when quaking directly
  - Pollution by water, oil, chemicals, smog or steam
  - Excessive sediment of dust, salt, metal dust
  - Don't get in a draught by air-condition directly
  - Irradiate with sunshine
  - Area of thermal radiation collection

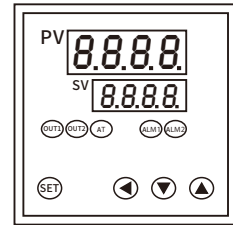
## Connection

Attentions

1. Should use a correspond compensation, when thermocouple input
  2. Should use three low-resistance lines, same sectional area, material, and length, when hot resistance input
  3. Input signal lines have to far away from power cord, load line, avoiding noise disturbing
  4. Usually, power cord will not be disturbed, if disturbed by noise, have to use rejector Should
- Attention following when use noise rejector:
- (1) Cut short twist line distance, as short as possible
  - (2) Fix noise rejector on instrument board and ground leading, keep the distance between noise rejector andinstrument terminal as short as possible
  - (3) Do not fox fuze and switch on fan-out of rejector, if you do will fall effect of rejector using down
  - (4) Relay output need 5-6S set-up time after power-on. Parallel connection delayed relay, when as an outside loop-coupled signal
  - (5) Do not overclose the bolt of terminal. Moreover choose appropriate lug of terminal



## Name of panel and functions of parts



NO	Layers	Context help
1	PV	measurde value/mode value
2	SV	set value/mode context value
3	OUT1	output 1 pilot lamp
4	OUT2	output 2 pilot lamp
5	AT	PID auto demo pilot lamp
6	AL1	alarm 1 pilot lamp
7	AL2	alarm 2 pilot lamp
8	▲	multiply key
9	▼	reduce key
10	◀	shift key
11	SET	setting/mode

## Operatin Process

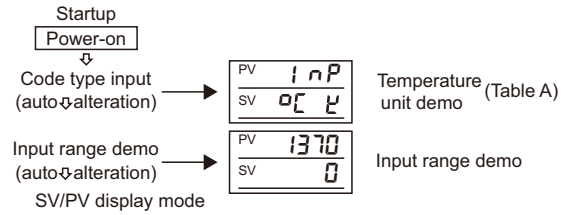


Table A

Demo	℃	ℳ	r	S	b	E	n	f	Pf	CU	oñ	ñ'	ñR	'''	
Input type	Thermocouple (TC)									Hot resistance	RTD	voltage/electric current			
	K	J	R	S	B	E	N	T	Pt100	Cu50	oM	mM	mA	V	

Mode Setting:

When SV/PV dome normal, press“SET”make SV demo glimmered, then press “◀” set the temperature coordination number in need, and then press“SET”again make instrument display normal SV/PV demo.

Parameter setting mode parameter be used for alarm setting, PID constant so on. In normal display, Press“SET”for 3S, parameter set conditions will be diplayed in PV demo and there are counterpoints in SV demo. press“SET”inturn parameters following are displayed:

Attentions:As the prduct has demo reversion function,Main Display mode will be backed in 30S,when the opeators setted parameters,but do not return to main display mode,as result,settled parameters can not be saved. Read context following before use or setting parameters. In chart following parameters not ba shown when there is nont functional equivalent in instrument.

Symbol	name	explain	enactment range	factory default
	PV/SV	measured value/setting value	gamut	
AL1	AL1	alarm setting 1	gamut	
AL2	AL2	alarm setting 2	gamut	
ATU	ATU	PID	0:OFF 1:ON	0
P	P	proportional band(*1)	0-gamut,ON/OFF control,in setting value 0	30
I	I	integration time(s)	0-3600s, no integral action in setting value 0	240
D	D	rate time(s)	0-3600s, no differential action in setting value 0	60
Ar	Ar	reference value(*2)	Auto Set after AT	25
T	T	work period(s)	time scale period 1-100s	(*3)
OH	OH	master control rest as bandwidth	1-100 units same as (PV) (next difference)	2
OHH	OHH	master control rest as bandwidth	1-100 units same as (PV) (previous difference)	0
tSL	tSL	Lower limit of current transmission range	gamut	0
tSH	tSH	Upper limit of current transmission range	gamut	400
SC	SC	PV value correct	-200-200unit same with PV	0
LCK	LCK	Datalock(*4)	0000-0111	0000

- When p≠0, instrument controlled by PID, I, D values setting are required. Set on PID function o “AT”, achieve the best control.When p=0, controlled by ON/OFF, OH value setting to control backlash is in need.
- \*2It is reference value inside manually set is not necessary, “AT”will autose, after PID.
- \*3Relay connection output 20S, voltage impulse/Set on control thyatron output trigger is in need/control thyatron output 25
- \*4Datalock(LCK)
- 1.When LCK=0000, all of prameters can be revamped
  - 2.When LCK=0001, Data can not be revamped, exceptSV, AL1, AL2
  - 3.When LCK=0011, Data can not be revamped, exceptSV
  - 4.When LCK=0111, all of parmeters can not be revamped

## Fault information cue

Infotmation	Explain	Remedy
Err	Fault instrument	overhaul
oooo	Input broken,reverse connection or input range overstep	Check the fault information
uuuu	Input broken,reverse connection or input range overstep	Check the fault information

## Technical parameters mode settings

Instrument in due form, enter and find parameter of datalock“LCK”, according to settted mode, and set code is“1000”and press“SET”to make it confirmation..Press key of “SET”and “◀” at the same time for 3S “God=0000” is displayed in PV demo, and press “SET” in turn parameter following will be shown:

Symbol	Set value	Explain	Range ability		
SL1	0 0 0 0	K	0-1370°C		
	0 0 0 1	J	0-1200°C		
	0 0 1 0	R	0-1769°C		
	0 0 1 1	S	0-1769°C		
	0 1 0 0	B	0-1820°C		
	0 1 0 1	E	0-800°C		
	0 1 1 0	N	0-1300°C		
	0 1 1 1	T	-200-400°C-199.9-400.0°C		
	1 0 0 0	Pt100	-200-650°C-199.9-650.0°C		
	1 0 0 1	Cu50	-50-150°C-50.0-150.0°C		
SL2	1 0 1 0	0-400Ω	-1999°C-9999°C		
	1 0 1 1	0-50mV	-1999°C-9999°C		
	1 1 0 0	0-20mA	-1999°C-9999°C		
	1 1 0 1	0-5V(0-10V)	-1999°C-9999°C		
	0 0 0 0	omit			
	SL3	0 0 0 0	omit		
		SL4	0 0 0 0	Function of alarm1 notset	
			0 0 1	Maximum deviation alarm	Alert type selectivity of alarm1
			0 1 0	Maximum/minimum deviation alarm	
			0 1 1	Value of Process alarm	
1 0 1			Maximum deviation alarm		
1 1 0			Alarm(innerregional alarm)		
1 1 1		Minimum of value of Process alarm			
0		No alert status	Alert status type selectivity of alarm1		
1		Alert status			
SL5	0 0 0 0	Function of alarm 2 settings	idem		
SL6		0	Positive action control(refrigeration)	selectivity of master control actons	
		1	Negative action control(calefaction)		
		0	Master control time scale output		Output type selectivity of master control
		1	Master control continuous output(4-20mA)		
SL7		0	Exciter alarm	Exciter alarm/ No exciter alarm1	
		1	No exciter alarm		
		0	Exciter alarm	Exciter alarm/ No exciter alarm2	
		1	No exciter alarm		
	SL8	0 0 0 0	omit		
SL9	0 0 0 0	omit			
SL10	0 0 0 0	omit			
SL11	0 0 0 0	omit			

“God=0001” is displayed in PV demo,and press “SET” in turn parameter following will be shown:

Symbol	Default	Explain	Setting range
SLH	in concordance with order	Set value of measurement range of Min.	idem
SLL	in concordance with order	Set value of measurement range of Min.	idem
PdP	0	scale	0-3
oH	20N2.0	AT PID outputbandwidth failure to actuate	0-100 ON 0.0-100.0
RH1	20N2.0	Alarm1 output bandwidth failure to actuate	0-100 ON 0.0-100.0
RH2	20N2.0	Alarm2 output bandwidth failure to actuate	0-100 ON 0.0-100.0
dF	1	Constant of digital filter	0-100

Maintains and conservation of insrument

As quality Problems lead to product broken, the firm is responsible for it and overhauled free, since date of purchase for 18 months, But incorrect use of default result in instrument broken, the firm will will act accordingly fee charging to repair. Also, participating dealers back their work with a lifetime service guarantee. The made-up instrument should be stored in the well ventilate and noncorrosive gas situation.