TC series temperature controller introduction

Read the instruction manual before usage,for right Application and maintenance.
(Before usage read the opreation guide carefully for use machine correctly.)

Wiring warming

• 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 destroied,No using in flammable gas storage and steam discharging areas.

No changing default Instrument Settinge

• As to prevent damage or destroy, changing default Instrument Settings is absolutely prohibited.

Summarize

TC□□□ series industrial adjusting Apparatus/temperature controller is design of Switch Power Supply Using in microprocessor Multi-functional Intelligent Adjustor.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-adjustisng Function and intelligent control of the Instrument make user to obtain good results byshirtsleeve 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 to0.5%FS.combining relevant optimization technique,reliability theory, troditional 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 shiffer,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: ±2℃ (The software corrects the data for 0~50℃ Cfluctuations in temperature)
3、Resolution: 14Bit
4、Sampling period: 0.5 Secretary
5、Power supply: AC85-AC265V 50Hz
6、Control mode: Adopt industrial and PID Parameters of Control System, Temperature Control, responsible faster, Start modulation smaller, accuracy higher than troditionalPID.
7、Insulation resistance:>50MΩ (500VDC)
Insulation strength:1500V AC/min
8、Power Loss<10VA
9、Environmental conditions: 0~50℃,30~85%RH noncorrosive gas area

Model Number Definition

Tablel length wide height (L W H) unit :mm

Type	false top frame(W×H)	shell(L×W×H)	open pore size(W×H)
TC4S	48×48	44×44×100/78	(44+1)×(44+1)
TC4H	48×96	44×92×100/78	(44+1)×(92+1)
TC4M	72×72	68×68×100/78	(92+1)×(44+1)
TC4L	96×96	92×92×100/78	(92+1)×(92+1)

Main output:

1.Relay contact output

1.SSR output

Table2 Input the signal with measure the degree scope

	Iuput	measuring range	code	measuring range	code	measuring range	code
Thermocouple	K	0~200℃	K01	0~400℃	K02	0~600℃	K03
		0~800℃	K04	0~1000℃	K05	0~1200℃	K06
		0~1372℃	K07	0~100℃	K13	0~300℃	K14
	J	0~200℃	J01	0~400℃	J02	0~600℃	J03
		0~800℃	J04	0~1000℃	J05	0~1200℃	J06
	R#1	0~1600℃	R01	0~1769℃	R02	0~1350℃	R04
	S#1	0~1600℃	S01	0~1769℃	S02	–	–
	B#1	400~1800℃	B01	0~1769℃	B02	–	–
	E	0~800℃	E01	0~1000℃	E02	–	–
	N	0~1200℃	N01	0~1300℃	N02	–	–
	T#2	–199.9~400.0℃	T01	–199.9~100.0℃	T02	–100.0~200.0℃	T03
		0~350℃	T04	–	–	–	–
Hotresistance	Pt100	–199.9~649.0℃	D01	–199.9~200.0℃	D02	–100~50.0℃	D03
		–100~100℃	D04	–100–200.0℃	D05	0.0~50.0℃	D06
		0.0~100℃	D07	0.0–200.0℃	D08	0.0~300.0℃	D08
		0.0~500℃	D10	0.0~400.0℃	D20	–	–
	Cu50	–199.9~649.0℃	P01	–199.9–200.0℃	P02	–100~50.0℃	P03
		–100~100℃	P04	–100–200.0℃	P05	0.0~50.0℃	P06
		0.0~100℃	P07	0.0–200.0℃	P08	0.0~300.0℃	P09
		0.0~500℃	P10	0.0~400.0℃	P20		
Standard signal	0~5VDC	0.0~100℃	401				
	1~5VDC	0.0~100℃	601				
	0~20mA#3	0.0~100℃	701				
	4~20mA#3	0.0~100℃	801				

#1within 0~399℃ limits,accuracy security can not be given

#2within -199.9~100℃ limits,accuracy security can not be given

#3Between input terminals need a250Ω resistance.

Installation

Attentions

1: Instrument fixed environment follow
- Atmospheric pressure:86~106kPa
- Ambient temperature:0~50
- Relative humidity:45~85%RH

2: pay attentions to situations follow before 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

Installation instructions

1.Create shape of a rectangle on surface for instrument installation,according to size of board.

2.The distance between shapes of a rectangle around should be>25mm, the distance betw een shapes of a rectangle top and bottom should be>30mm,when Multi-Instrument installed.

3.To set insturument in shape of a rectangle on surface.

4.Insert mounting bracket in mounting hole of the instrument

5.push-on mounting bracket make instrument fixed on board and screw cap down.

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:

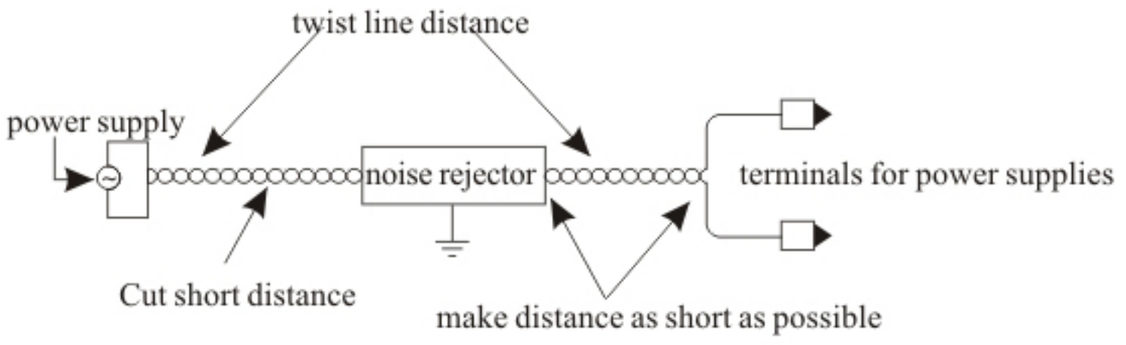
1)Cut short twist line distance,as short as possible

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 need5~6S 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	ALM	alarm 1 pilot lamp
7	MODE	setting/mode
8		multiply key
9		reduce key
10		shift key

Operation Process

Startup

Power-on

Code type input (auto⇩alteration) → PV 1nP / SV 0C E — Temperature unit demo (Table A)

Input range demo (auto⇩alteration) → PV 1372 / SV 0 — Input range demo

SV/PV display mode

Table A

Demo	E	J	r	S	b	E	n	r	Pr	CU	oM	mV	mA	V
Input type	Thermocouple(TC)								Hot resistance(RID)		voltage/electric current			
	K	J	R	S	B	E	N	T	Pt100	Cu50	oM	mV	mA	V

Mode Setting:

WhenSV/PV dome normal,press “SET” makeSV 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” for3S,parameter set conditions will be diplaied in PV demo and there are counterpoints in SV demo.press “SET” inturn parameters following are displaied:

Attentions:As the prduct has demo reversion function,Main Display mode will be backed in 30S,when the opreators setted parameters, but do not return to main display mode, as result, setted parameters can not be saved.

Read context following before use or setting parameters.

In chart following parameters not be shown when threre is not functional equivalent in instrument.

Symbol	name	explain	enactment range	factory default
	PV/SV	measured value/setted 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	1-100unit same with PV	2
SC	SC	PV value correct	-200--200 unit same with PV	0
LCK	LCK	Datalock (*4)	0000-0111	0000

When p≠0, instrument controled by PID, I, D values setting are required, Set on PID function o “AT” ,achieve the best control. When p=0, controled by ON/OFF, OH value setting to control backlash is in need.

*2It is reference value inside manually set is not necessary, “AT” will autoset, after PID.

*3Relay connection output 20S,voltage impulse/Set on control thyratron output trigger is in need/control thyratron 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 prameters 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 setted 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 displaied in PV demo, and press “SET” in turn parameter following will be shown:

Symbol	Set value				Explain	Range ability
SL 1	0	0	0	0	K	0–1372℃
	0	0	0	1	J	0–1200℃
	0	0	1	0	R	0–1769℃
	0	0	1	1	S	0–1769℃
	0	1	0	0	B	0–1820℃
	0	1	0	1	E	0–800℃
	0	1	1	0	N	0–1300℃
	0	1	1	1	T	–200–400℃–199.9–400.0℃
	1	0	0	0	Pt100	–200–650℃–199.9–650.0℃
	1	0	0	1	Cu50	–50–150℃–50.0–150.0℃
	1	0	1	0	0–400Ω	–1999℃–9999℃
	1	0	1	1	0–50mV	–1999℃–9999℃
	1	1	0	0	0–20mA	–1999℃–9999℃
	1	1	0	1	0–5v(0–10V)	–1999℃–9999℃
SL 2	0	0	0	0	omit	
SL 3	0	0	0	0	omit	
SL 4		0	0	0	Function of alarml notset	
		0	0	1	Maximum deviation alarm	Alert type selectivity of alarml
		0	1	0	Maximum /minimum deviation alarm	
		0	1	1	Value of Process alarm	
		1	0	1	Minimum 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 alarml
	1				Alert status	
SL 5	0	0	0	0	Function of alarm2 settings	idem
SL 6				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)	
SL 7				0	Exciter alarm	Exciter alarm/ No exciter alarm1
				1	No exciter alarm	
			0		Exciter alarm	Exciter alarm/ No exciter alarm 2
			1		No exciter alarm	
SL 8	0	0	0	0	omit	
SL 9	0	0	0	0	omit	
SL10	0	0	0	0	omit	
SL11	0	0	0	0	omit	

“GOD=0001” is displaied 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
PGdP	0	scale	0–3
oH	2 ON 2.0	AT PID output bandwidth failure to actuate	0–100 ON 0.0–100.0
AH1	2 ON 2.0	Alarm1 output bandwidth failure to actuate	0–100 ON 0.0–100.0
AH2	2 ON 2.0	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 overhaulin 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.