

BERM

2段显示型PID温度控制器 TC□A SERIES

使用说明书

CE



非常感谢您选择 BERM 的产品
为了您的安全, 请在使用前阅读以下内容

※‘注意安全’是为了安全正确地使用该产品, 以防止危险事故的发生, 请遵守以下内容。

※注意安全可分为“警告”与“注意”两个部分, 其意思如下:

警告 如违反此项, 可能导致严重伤害或死亡。

注意 如违反此项, 可能导致轻度伤害或产品损坏。

※操作说明书中的符号说明如下

△特殊条件下可能会发生意外或危险

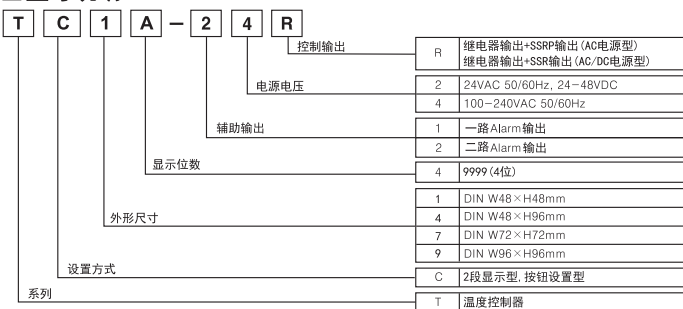
警告

- 用于对人身及财产上影响大的机器(如:核能控制、医疗器械、船舶、车辆、铁路、航空、易燃装置、安全装置、防火/防盗装置)时, 请务必加装双重安全保护装置。
否则可能会引起火灾, 人身伤亡或财产损失。
- 使用时必须要安装面板。
否则有触电危险。
- 通电状态下请勿进行检修作业。
否则有触电危险。
- 接线时请先确认端子号再进行接线。
否则可能引起火灾。
- 除本公司维修人员外不得改造本产品。
否则会导致触电或火灾。

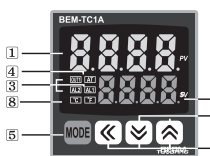
注意

- 请勿在室外使用该产品。
否则会缩短该产品的使用寿命或发生触电事故。
- 电源输入端和继电器输出端接线时, 请使用AWG 20 (0.50mm²) 规格的线缆, 拧螺丝的扭矩保持在0.74N·m 0.90N·m。
接触不良时有可能引起火灾。
- 请在额定规格范围内使用该产品。
否则会缩短该产品的寿命, 有火灾隐患。
- 请使用小于继电器触电允许容量的负载。
否则会造成绝缘不良, 触点粘合, 继电器损坏, 火灾等。
- 清洁时请勿用水或有机溶剂, 应用毛布擦拭。
否则会引起触电或火灾。
- 在易燃易爆, 潮湿, 阳光直射, 热辐射, 振动等场所应避免使用该产品。
否则可能引起火灾或爆炸。
- 请勿使灰尘或线缆残渣进入产品内部。
否则可能会引起火灾或损坏产品。
- 请确认端子的极性后, 正确连接热电偶配线。
否则可能会引起火灾或爆炸。
- 为了达到强化绝缘的目的, 请使用能确保强化绝缘以上的电源装置。

型号说明



各部位名称



- 当前值(PV)显示(红色)
运行模式下显示当前测定值(PV), 设置模式下显示内部参数名。
- 设定值(SV)显示(绿色)
运行模式下显示控制目标的设定值(SV), 设置模式下显示该参数的当前设定值。
- 控制/报警输出指示灯
- OUT: 控制输出(Main Control Output)ON时点亮。
- SSR: 控制驱动输出方式的周期/相位控制时, 操作量超过3.0%时点亮。(AC电源型除外)
- AL1/AL2: Alarm1, Alarm2报警输出ON时点亮。
- 自整定指示灯: 执行自整定时, AT灯以1秒为周期闪烁。
- OK键: 用于进入参数组设置, 返回运行模式, 切换参数组, 保存设定值。
- 方向键: 用于进入设定值更改模式或移动位数, 往上/下更改数值。
- 功能键
- 同时按下3秒将启动[DI-K]数字输入键功能(运行/停止, 报警清除, 自整定)设定。
- 温度单位(C/F)指示灯: 显示当前的温度单位。

规格

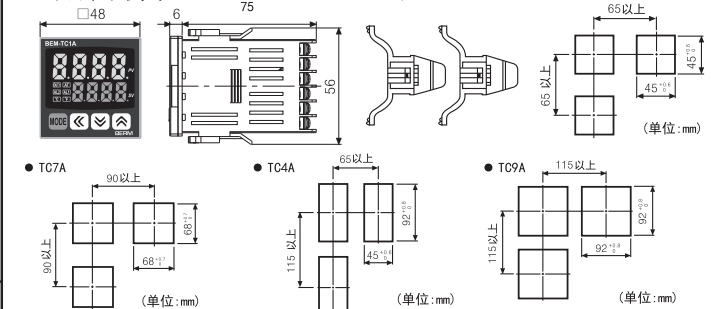
系列	TC1A	TC4A	TC7A	TC9A
电源	AC电源型	100-240VAC 50/60Hz		
电压	AC/DC电源型	24VAC 50/60Hz, 24-48VDC		
允许电压范围	额定电压的90%~110%			
消耗功率	5VA以下(100-240VAC 50/60Hz, 24VAC 50/60Hz) 3W以下(24-48VDC)			
显示方式	7段LED(PV: 红色, SV: 绿色)			
字符尺寸	PV(W×H) 7.0×15.0mm	9.5×20.0mm	7.0×14.6mm	11.0×22.0mm
尺寸	SV(W×H) 5.0×9.5mm	7.5×15.0mm	6.0×12.0mm	7.0×14.0mm
输入类型	热电阻 DPT100Ω, Cu50Ω (允许单根电线阻抗5Ω 以下) 热电阻 K(CA), J(IC), L(IC), T(CC), R(PR), S(PR)			
精度	热电阻 (※1) 常温(23℃±5℃)时: (PV±0.5%或±1℃较大者)±1位 常温以外: (PV±0.5%或±2℃较大者)±1位			
控制精度	热电阻 (※1) 常温(23℃±5℃)时: (PV±0.5%或±3℃较大者)±1位 200℃以上时 (PV±0.5%或±2℃较大者)±1位 热电阻 L(IC), 热电阻 Cu50Ω (PV±0.5%或±2℃较大者)±1位			
输出	继电器 250VAC 3A 1a SSR 12VDC ±2V 20mA以下			
报警输出	AL1, AL2继电器: 250VAC 1A 1a			
控制方式	ON/OFF, P, PI, PD, PID控制			
控制精度	1~100℃ / 0.1~50.0℃			

(※1): ○ 常温(23℃±5℃)
● 热电阻 R, S 在 200℃ 以下时 (PV ± 0.5% 或 ± 3℃ 中较大者) ± 1 位
200℃ 以上时 (PV ± 0.5% 或 ± 2℃ 中较大者) ± 1 位
● 热电阻 L (IC), 热电阻 Cu50Ω (PV ± 0.5% 或 ± 2℃ 中较大者) ± 1 位
○ 常温以外
● 热电阻 R, S 在 200℃ 以下时 (PV ± 1.0% 或 ± 6℃ 中较大者) ± 1 位
200℃ 以上时 (PV ± 0.5% 或 ± 5℃ 中较大者) ± 1 位
● 热电阻 Cu50Ω (PV ± 0.5% 或 ± 3℃ 中较大者) ± 1 位

系列	TC1A	TC4A	TC7A	TC9A
比例带(P)	0.1-999.9%			
积分时间(I)	0-999.9秒			
微分时间(D)	0-999.9秒			
控制周期(T)	0.5-120.0秒			
手动复位	0.0-100.0%			
采样周期	100ms			
耐电压	AC电源型 2000VAC 50/60Hz 1分钟(输入端子与电源端子之间)	AC/DC电源型 1000VAC 50/60Hz 1分钟(输入端子与电源端子之间)		
耐振动	5~55Hz(周期1分钟)振幅0.75mm X, Y, Z各方向2小时			
继电器寿命	OUT: 500万次以上, AL1/2: 500万次以上			
绝缘阻抗	100MΩ以上(500VDC为基准)			
抗干扰	干扰模拟器方波干扰(脉冲宽度1μs±2kV R相, S相)			
记忆保存	约10年(使用非易失性半导体存储方式)			
环境温度	-10~50℃(未结冰状态)			
储存温度	-20~40℃(未结冰状态)			
环境湿度	35%~85%RH, 存储: 35%~85%RH			
绝缘类型	双重绝缘或强化绝缘(标识: □, 检测输入部分与电源部分之间的介电强度AC电源型: 2kV, AC/DC电源型: 1kV)			
认证	CE			
重量	约100g	约133g	约124g	约179g

※上述重量不包含外包装。

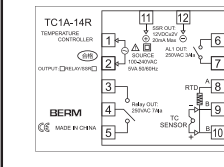
外形尺寸图



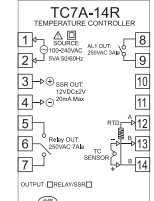
连接图

※TC□A系列内置主要控制输出, 继电器输出和SSRP输出方式, 用户可根据需要选择, AC/DC电源型产品的输出方式为继电器输出和SSRP输出, 无SSRP输出方式。

TC1A



TC7A/4A/9A



报警模式

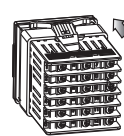
模式	名称
A0_	无报警
A1_	偏差上限报警
A2_	偏差下限报警
A3_	偏差上, 下限报警
A4_	偏差上, 下限逆报警
A5_	绝对值上限报警
A6_	绝对值下限报警
SbR	传感器断线报警
LbR	加热器断线报警

参数组2设定

参数	出厂设置	出厂设置
输入传感器	I n-1	TC RH
温度单位	Unit	°C
输入偏差修正	I n-b	0.000
输入数字滤波	AI n-F	0.001
使用温度范围下限	L-Su	-0.50
使用温度范围上限	H-Su	12.00
控制输出动作	o-F	HE R
控制方式	C-A	PI d
控制输出类型	o-U	L-LY
SSR控制输出类型	S5-A	S5-n
控制周期	t	0.200
AL1报警模式	AL-1	AL 1R
AL2报警模式	AL-2	AL 2R
报警输出滞后时间	ALH-S	0.010
LEA检测时间	Lb-t	0.000
LEA检测精度	Lb-R	0.002
功能键功能	dl-E	S5-oP
断线时, 控制操作量	E-A	0.000
锁键设定	Lo-C	o-F

产品安装方法

TC1A (48×48mm) 系列



出厂设置

参数组1设定

参数	出厂设置
SV设定值	0
AL1报警温度	AL 1 12.50
AL2报警温度	AL 2 12.50
自整定	AI
比例带	P 0.100
积分时间	I 0.000
微分时间	d 0.000
手动复位	r-E
滞后值设定	H5 0.02

BERM

Two segment display PID temperature controller
TC□A SERIES

OPERATION INSTRUCTIONS



Thank you very much for choosing **BERM** products
 For your safety, please read the following before use

※ "Pay attention to safety" is to use the product safely and correctly to prevent dangerous accidents. Please observe the following contents.

※ Attention to safety can be divided into two parts: warning and attention

⚠ WARNING Failure to do so may result in serious injury or injury.

⚠ NOTICE Failure to do so may result in minor injury or product damage.

※ The symbols in the operating instructions are as follows

⚠ Accidents or dangers may occur under special conditions

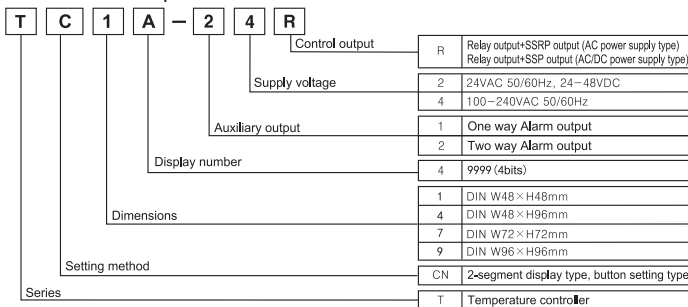
⚠ WARNING

- When it is used for machines that have great impact on personal and property (such as nuclear power plant, medical devices, ships, vehicles, railways, aviation, inflammable devices, safety devices, disaster prevention / anti-theft devices), double safety protection devices must be installed. Otherwise, it may cause fire, personal injury or property loss.
- The panel must be installed when using. Otherwise, there is a risk of electric shock.
- Do not carry out maintenance work under power on state. Otherwise, there is a risk of electric shock.
- Please confirm the terminal number before wiring. Otherwise, it may cause fire.
- The product shall not be modified except for the maintenance personnel of the company. Otherwise, electric shock or fire may be caused.

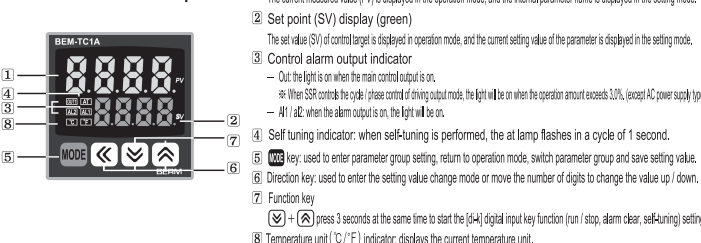
⚠ NOTICE

- Do not use the product outdoors. Otherwise, the service life of the product may be shortened.
- When wiring the power input terminal and relay output terminal, please use AWG 20 (0.50mm²) cable, and keep the screw tightening torque between 0.74N · m ~ 0.90N · M. Poor contact may cause fire. Please use the product within the rated specifications. Otherwise, the service life of the product will be shortened and there will be fire hazard.
- Please use the load less than the allowable capacity of the relay for electric shock. Otherwise, it will cause poor insulation, contact adhesion, poor contact, relay damage, fire, etc.
- Do not use water or maling solvent when cleaning, but wipe with towel. Otherwise, contact or fire may be caused.
- Avoid using the product in inflammable, explosive, humid, direct sunlight, thermal radiation, vibration and other places. Otherwise, the ash may cause fire or explosion.
- Do not allow dust or cable residue to enter the product interior. Otherwise, it may cause fire or damage to the product.
- Please connect the thermocouple wiring correctly after confirming the polarity of the terminal. Otherwise, it may cause fire or explosion.
- In order to achieve the purpose of strengthening insulation, please use the power supply device that can ensure the strengthened insulation above.

■ Model description



■ Name of each part



■ Specifications

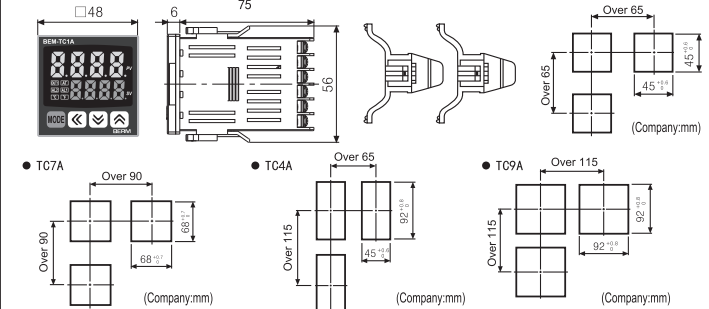
SERIES	TC1A	TC4A	TC7A	TC9A
Power supply	100-240VAC 50/60Hz			
Voltage	24VAC 50/60Hz, 24-48VDC			
Allowable voltage range	90% ~ 110% of rated voltage			
Power consumption	Below 5VA (100-240VAC 50/60Hz, 24VAC 50/60Hz) Below 3W (24-48VDC)			
Display mode	7segment LED (PV: Red, SV: Green)			
Character	PV(W×H)	7.0×15.0mm	9.5×20.0mm	7.0×14.6mm
Size	SV(W×H)	5.0×9.5mm	7.5×15.0mm	6.0×12.0mm
				7.0×14.0mm
Input type	Thermal resistance DP1100Ω, Cu50Ω (Allowable single wire impedance Below 5Ω)			
	Thermocouple K(CA), J(IC), L(IC), T(CC), R(PR), S(PR)			
Input range	Thermal resistance (※1) At room temperature (23 ± 5 °C): (PV ± 0.5% or ± 1 °C) ± 1 bit Outside normal temperature: (PV ± 0.5% or ± 2 °C) ± 1 bit			
Output type	Relay 250VAC 3A 1a			
	S S R Below 12VDC ± 2V 20mA			
Alarm output	A11, A12 relay: 250VAC 3A 1A			
Control Mode	ON/OFF, P, PI, PD, PID CONTROL			
Control Accuracy	1 ~ 100 °C / 0.1 ~ 50.0 °C			

- (※1): ① Normal atmospheric temperature (23°C±5°C)
 ② Thermocouple R, s below 200 °C (PV ± 0.5% or ± 3 °C) ± 1 bit
 Above 200 °C (PV ± 0.5% or ± 2 °C) ± 1 bit
 ③ Thermocouple L (IC), thermal resistance cu50 Ω (PV ± 0.5% or ± 2 °C) ± 1 bit
 ④ Outside normal temperature
 ⑤ Thermocouple R, s below 200 °C (PV ± 1.0% or ± 6 °C) ± 1 bit
 Above 200 °C (PV ± 0.5% or ± 5 °C) ± 1 bit
 ⑥ Thermal resistance cu50 Ω (PV ± 0.5% or ± 3 °C) ± 1 bit

SERIES	TC1A	TC4A	TC7A	TC9A
Proportional band (P)	0.1 ~ 999.9 °C			
Integral time (I)	0 ~ 9999 S			
Differential time (D)	0 ~ 9999 S			
Control period (T)	0.5 ~ 120.0 S			
Manual reset	0.0 ~ 100.0%			
Sampling period	100ms			
Withstand voltage	AC power supply type 2000vac 50 / 60Hz 1 min (between input terminal and power supply terminal) DC power supply type 1000VAC 50 / 60Hz 1 min (between input terminal and power supply terminal)			
Vibration resistance	5 ~ 55Hz (cycle 1 minute) amplitude 0.75mm x, y, z direction 2 hours			
Relay life	Mechanics OUT: 500 More than 10000 times, AL1 / 2: more than 5 million times Electrical OUT: 20 More than 10000 times (250VAC 3A resistive load), AL1 / 2: more than 30000 times (250VAC 1A resistive load)			
Insulation impedance	Above 100M Ω (500VDC as reference)			
Anti-interference	Square wave interference of jamming simulator (pulse width 1 μs) ≤ 2Kv, R phase, S phase			
Memory preservation	About 10 years (using nonvolatile semiconductor storage)			
Ambient temperature	-10~50 °C (not frozen)			
Storage temperature	-20~60 °C (not frozen)			
Ambient humidity	35-85%RH, Storage: 35-85%RH			
Insulation type	Double insulation or enhanced insulation (identification) □ detect the dielectric strength between the input part and the power supply part. AC power supply type: 20kV / 60 power supply type: 10kV			
Authentication				
Weight	About 100g	About 133g	About 124g	About 179g

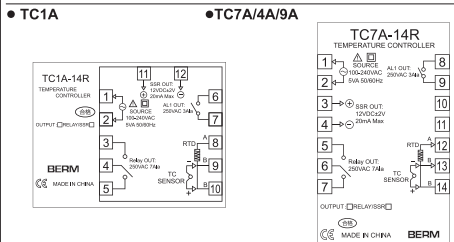
※ The above weight does not include the outer packing.

■ Outline dimension drawing



■ Connection diagram

※ TC□A series is built-in main control output, relay output and SSRP output mode, which can be selected by users according to needs.
 The output modes of AC / DC power supply products are relay output and SSR output, without SSRP output mode.



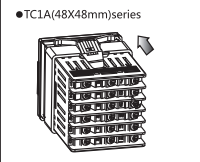
● Alarm mode

Mode	Name
$\overline{R} \overline{n} \overline{0} \overline{-}$	No alarm
$\overline{R} \overline{n} \overline{1}$	Deviation upper limit alarm
$\overline{R} \overline{n} \overline{2}$	Deviation lower limit alarm
$\overline{R} \overline{n} \overline{3}$	Upper and lower limit of deviation alarm
$\overline{R} \overline{n} \overline{4}$	Upper and lower limit of deviation reset alarm
$\overline{R} \overline{n} \overline{5}$	Absolute value upper limit alarm
$\overline{R} \overline{n} \overline{6}$	Absolute value lower limit alarm
$\overline{S} \overline{b} \overline{R}$	Sensor disconnection alarm
$\overline{L} \overline{b} \overline{R}$	Heater disconnection alarm

● Parameter group 2 setting

Parameter	Factory settings
Input sensor	I n t e R C R M
Temperature unit	Unit t °C
Input bias correction	I n t b 0000
Input digital filtering	A n F 000.0
Lower limit of service temperature range	L - S v -05.0
Upper limit of service temperature range	H + S v 120.0
Control output action	a r b H E R D
Control mode	C - r d P I d
Control output type	o u t r e y
SSR control output type	S S A r S b n d
Control period	t 020.0
AL1 Alarm mode	AL - 1 R n J R
AL2 Alarm mode	AL - 2 R n Z R
Alarm output hysteresis value	A H S 0.0
LBA monitoring time	L b R t 000.0
LBA detection width	L b R b 000.0
Function key function	d l - t S t o P
Function key function	E r A u 000.0
Lock key setting	L o C o F F

■ Product installation method

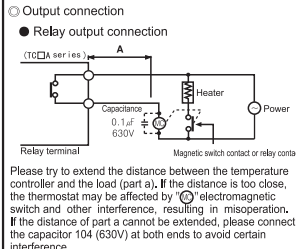
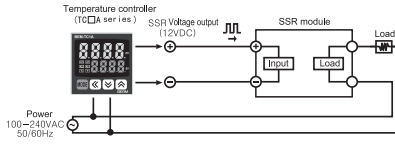


■ Factory settings

● Parameter group 1 setting

Parameter	Factory settings
SV set point	- 0
AL1 alarm temperature	RL 1 125.0
AL2 alarm temperature	RL 2 125.0
Self tuning	Rt o F F
Proportional band	P 0 10.0
Integral time	i 000.0
Differential time	d 000.0
Manual reset	r E t 050.0
Hysteresis setting	H S 0 00.0

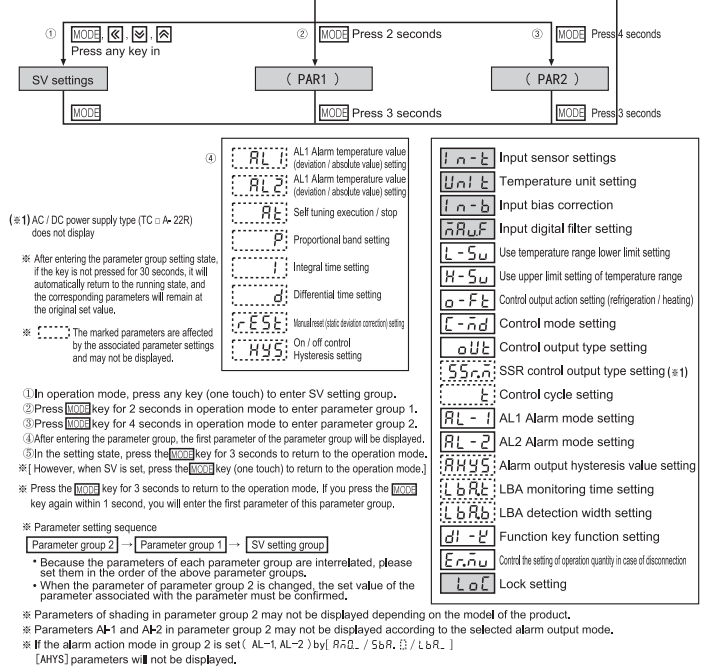
- In parameter group 2, select one of the standard on / off control [stnd], cycle control [CYC], and phase control [PHAS] for SSR. M parameter setting. Note: zero trigger SSR should be connected in cycle control (random trigger SSR is also applicable), and random trigger SSR should be connected in phase control in order to use cycle control [cyc] and phase control [PHAS].



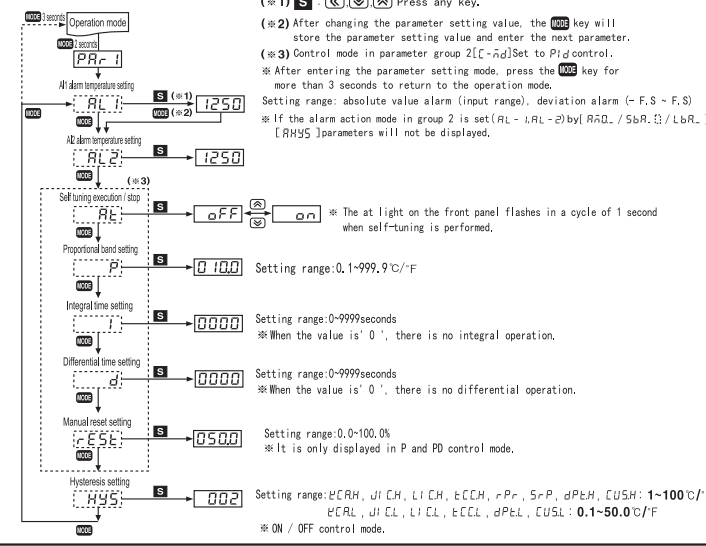
Input specifications and application scope

Input sensor	Display	Input range (°C)	Input range (°F)	
(ThermoCouple)	K (CA)	℄CRH	-50 ~ 1200	-58 ~ 2192
		℄CAL	-50.0 ~ 999.9	-58.0 ~ 999.9
	J (IC)	℄JCH	-30 ~ 800	-22 ~ 1472
		℄JCL	-30.0 ~ 800.0	-22.0 ~ 999.9
	L (IC)	℄LCH	-40 ~ 800	-40 ~ 1472
		℄LCL	-40.0 ~ 800.0	-40 ~ 999.9
(RTD)	T (CC)	℄TCH	-50 ~ 400	-58 ~ 752
		℄TCL	-50.0 ~ 400.0	-58.0 ~ 752.0
	R (PR)	℄RPr	0 ~ 1700	32 ~ 3092
	S (PR)	℄SPr	0 ~ 1700	32 ~ 3092
	DP100Ω	℄dPEH	-100 ~ 400	-148 ~ 752
		℄dPEL	-100.0 ~ 400.0	-148.0 ~ 752.0
	℄CUSH	-50 ~ 200	-58 ~ 392	
	℄CUSL	-50.0 ~ 200.0	-58.0 ~ 392.0	

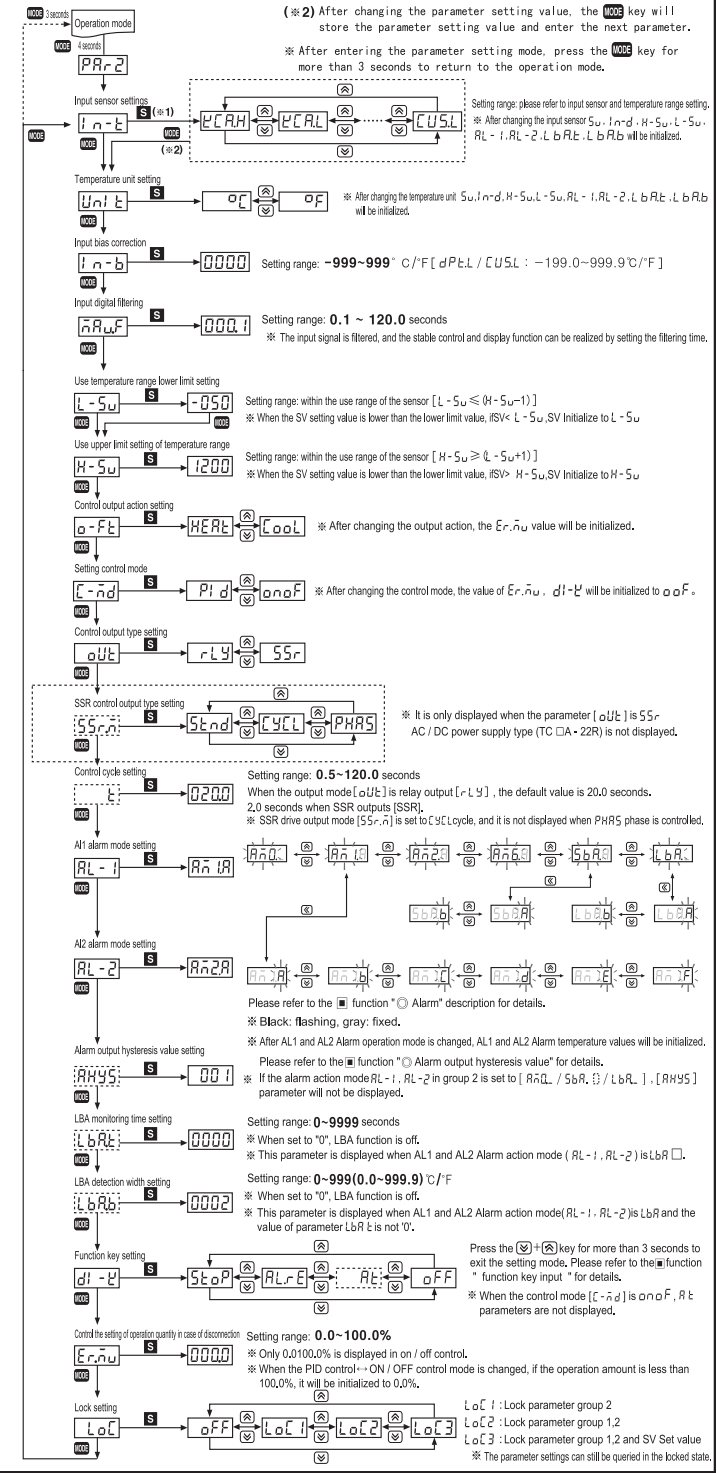
Parameter group setting



Parameter group 1 setting

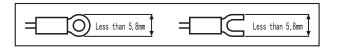


Parameter group 2 setting



Matters Needing Attention

- In order to avoid interference, please separate the signal line from the power line and high voltage line.
- Please use m3 terminal to connect AC power.
- In order to provide / cut off the power supply for the product, please use the power switch or circuit breaker.
- The power switch or circuit breaker shall be installed near the user for easy control.
- This product is specially used for temperature control. Please do not use it as voltmeter or ammeter.
- When using 3-wire RTD sensor to connect the extension wire, please note that the material, diameter and length of the extension wire are consistent with the sensor wiring, otherwise the temperature deviation will occur.
- If the power line, signal line and other high-voltage lines and power lines of the product cannot be far away, please add a filter at the power input end of the thermostat, and select the shielded wire for the signal line.
- Keep away from high frequency interference equipment (such as high frequency welding machine, high frequency sewing machine, large capacity SCR controller, high power motor, etc.).
- When providing detection input signal, if "SHR" or "LLL" is displayed, the detection input may be faulty, please disconnect the power supply and check the circuit.
- Please install and use this product in the following environment:
 ① Indoor
 ② Pollution degree 2
 ③ Installation below 2000m
 ④ Installation category II



错误处理

Display	Explain	Handle
oPE n	Flashing when sensor is disconnected or disconnected	Check input sensor status
HHHH	When the input of the measuring sensor exceeds the upper limit of the temperature range, it flashes	When the input returns to the related temperature range, it will be cleared automatically
LLLL	Flicker when the input of the measuring sensor is lower than the lower limit of the temperature range	