E5CS-U OMRON
数字式温度控制仪

Chinese 使用说明书

感谢您购买欧姆龙E5CS-U数字式温度控制仪。为了您更好的使用这一产品，该手册描述了其功能、特性以及应用方法。
请在使用该产品时注意以下事项。
- 使用该产品的人必须具备足够的电气系统知识。
- 在使用该产品前应通读并理解本手册以确保能够正确使用。
- 妥善保管该手册以确保在需要时可以随时查阅。

OMRON CORPORATION

CS7 2162665-6A

安全注意事项

●警告符号的要点

⚠ 警告 表示潜在的危险情况，如不加以防止，很可能导致轻度或中度的人身伤害，或财产损坏。在使用该产品前应仔细阅读本手册。

●警告符号

⚠ 警告	
当电源带电时，不要接触端子。 这样做很可能会因为电击导致轻度伤害。	⚠
不允许金属碎片、导线线头或者安装时产生的细小的金属屑进入设备。这样做很可能导致电击、火灾或误动作。	🚫
不要将该产品用于有易燃易爆气体的场合。否则有可能因为爆炸而造成轻度伤害。	
绝对不要拆卸、改装以及修理该产品或接触任何内部元件。有时会发生轻微的电击、火花或误动作。	
注意－火灾或触电的危险 a) 该产品为UL列表的开放型过程控制设备，必须安装在能够防止火花进出的机壳中。 b) 在使用两个以上断电开关的情况下，维修前请先断开所有开关，确保本产品处于断电状态。 c) 信号输入为SELV，有限能量。 d) 注意：为了减少火灾或触电的危险，不要将不同的2类回路的输出互联。	⚠
如果输出继电器超过了预期的使用寿命，有时会发生触点熔化和燃烧。始终要注意输出继电器的应用环境，并在额定负载及预期寿命以内使用。输出继电器的预期寿命随着输出负载以及开关条件的变化而变化。	
使用0.50N・m的力矩拧紧端子螺丝。松动的螺丝可能导致火灾。	
如果设定与受控系统不匹配，则会产生意外动作，从而导致设备损坏或事故。请按如下所述设定温度控制仪。 ・设定温度控制仪的参数，使之与受控系统相匹配。 ・更改任何开关设定前，请切断温度控制仪的电源。 开关设定只有在接通电源时才可读取。 ・操作温度控制仪前，应确保控制模式选择开关中的INT开关置于OFF位置。	❗
温度控制器误动作很可能造成控制操作失效或阻止报警输出，导致财产损失。为了在温度控制器发生误动作时确保安全，应采取适当的安全措施，如使用单独的线路安装监控设备。	

使用的适用性

欧姆龙不负责遵守任何使用该产品进行集成的用户产品的标准、章程或规则。采取一切必要的步骤来决定该产品对采用该产品的系统、机器和设备的适用性。了解并遵守一切使用该产品的禁止行为。如果应用该产品的系统在设计上不能保证有效处理对生命、财产的危害，不要在这样的系统上使用该产品。在整套装备或系统中适当使用和安装欧姆龙产品。参见产品目录中有关保证和免责事项。

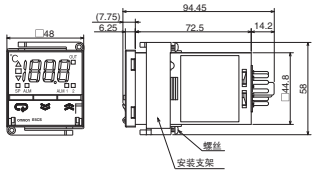
安全使用注意事项

请务必遵守下述注意事项，以防止动作失败、误动作或者对产品的性能和功能产生负面影响。若不遵守注意事项，可能会导致意外事故。
1) 该产品只被设计为室内使用。不要在以下任何地方使用或存放该产品。
   - 直接受加热设备热辐射的地方。
   - 有液体或油气飞溅的地方。
   - 阳光直射的地方。
   - 灰尘较多或有腐蚀性气体（特别是硫化物气体和氨气）的地方。
   - 温度剧烈变化的地方。
   - 结冰和结露的地方。
   - 有震动或大的冲击的地方。
2) 在额定的温度和湿度范围内使用/存储该设备。必要时应采取强制冷却。
3) 允许热量散发，不要填塞该产品周围的空间。
   不要堵塞产品的通风孔。
4) 使用规定尺寸（M3.5，小于或等于 7.2mm 宽）的接线端子进行接线。使用标有 AWG24 ～ AWG18（相当于横截面积 0.205 ～ 0.832mm²）的铜绞线或实心电缆连接裸线和端子块。（剥线长度 5 到 6mm。）
   一个端子内最多插入两根相同型号尺寸的导线或接线端子。
5) 按端子的极性进行正确的接线。
   必须确保I/O端子配线正确无误。
6) 不用的端子不要接线。
7) 电压输出（控制输出）未与内部电路进行电气绝缘。使用接地温度传感器时，请勿将任何控制输出端子接地。否则会产生有害的电流通路，从而导致测量误差。
8) 在控制器与可以产生高频和浪涌的设备之间应保持足够远的距离。
   将高压或大电流导线与其它导线隔离，在端子接线时避免与电源线共端或并联。
9) 在额定负载和供电电源下使用该产品。
10) 使用开关或继电器触点以确保在两秒内将电源升为额定电压。如果电压是逐渐上升的，电源可能无法复位或者发生输出误动作。
11) 使用PID操作（自整定）时，应在接通温度控制仪电源的同时或之前接通负载侧的电源。
12) 设计系统（如控制面板）时，请考虑在接通电源后对控制器的输出进行设定存在2秒钟的延时。
13) 在该产品的附近应该有开关或者断路器。开关或者断路器应该在操作者便于够到的地方，并且有明显的断开标志。
14) 在接通电源到开始实际操作前应确保温度控制器进行30分钟以上的预热，以保证正确的温度显示。
15) 确保铂电阻温度计的类型与温度控制仪中设定的输入类型一致。
16) 延长热电偶的导线时，请务必使用与热电偶类型相匹配的补偿导线。请勿在铂电阻温度计上延长导线。请仅使用低阻值导线（每条线路5Ω 以下），并确保三根导线的阻值相同。
17) 静电会损坏内部元件。使用温度控制仪前，请务必通过触摸接地金属来释放静电。从机壳中拉出温度控制仪时，请勿用手触摸电子元件或电路板上的导线图案。操作时应抓住温度控制仪前面板的边缘。
18) 不要使用油漆稀释剂或同类化学品清洁该产品。使用标准等级的酒精。
19) 筛选并废置零部件时，请务必使用合适的工具。

■配线

尺寸规格

E5CS-U （mm）

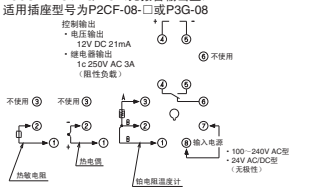


在包装内有：
- 主单元
- 安装支架
- 用户手册
- °C/°F标签、规格记录标签*1

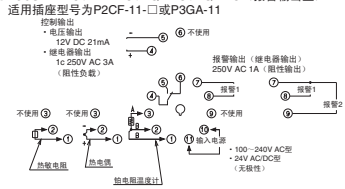
*1 更换显示单元时，应将新的°C/°F标签覆盖在先前的°C/°F标签上。请将设定值记录在规格记录标签上，以便在设定时参照。

端子连线

●E5CS-R□U、-Q□U（无报警输出型）
适用插座型号为P2CF-08-□或P3G-08

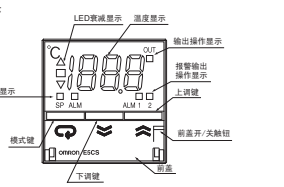


●E5CS-R1□U、-R2□U、-Q1□U、-Q2□U（报警输出型）
适用插座型号为P2CF-11-□或P3G-11



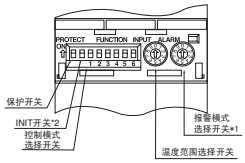
前部位各名称

●显示



温度显示
显示当前温度、设定温度、报警设定温度或是输入变化值。
LED衰减显示
▲：当当前温度与设定温度之间的差大于+1% FS（TC/Pt多输入模式时为+0.25%）时灯亮。
■：当当前温度与设定温度之间的差在±1% FS（TC/Pt多输入模式时为±0.25%）以内时灯亮。
▼：当当前温度与设定温度之间的差小于-1% FS（TC/Pt多输入模式时为-0.25%）时灯亮。
执行自调节（ST）或自动调节（AT）时，温度显示将闪烁。
输出操作显示
OUT：控制输出显示
控制输出动作ON时，灯亮；控制输出动作OFF时，灯灭。
报警输出操作显示
•ALM1：报警1表示
报警1功能ON的时，灯亮。
•ALM2：报警2表示
报警2功能ON的时，灯亮。
模式显示
SP：当设置温度显示时，灯亮。
ALM：当报警设置温度显示时，灯亮。
模式键
切换显示：当前值、设定值、报警值和输入变化值。
上调键/下调键
当按压上调键时，当前值、设定值、报警值和输入变化值会随之增加；
当按压下调键时，当前值、设定值、报警值和输入变化值会随之减小。

●开关
通过推压前面板右侧的前盖开/关触钮来打开前盖。
请仅在设定开关时而非其它操作过程中打开前盖。



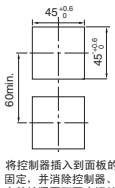
*1 无报警输出型产品不配备报警模式选择开关。
*2 INIT开关始终处于OFF 位置。

●保护开关
- 保护开关上调到 ON 时，不能使用上调键及下调键并能防止设定错误。
- 但是，保护开关上调 ON 时模式键仍可以使用。（显示仍能在当前温度、设定温度、报警温度和输入变化值之间的选择。）
- 默认值是“OFF”。

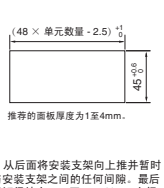
安装

●平行安装（面板切断）

单个安装（mm）



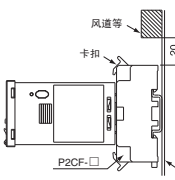
并排安装（不防水）（mm）



推荐的面板厚度为1至4mm。

- 将控制器插入到面板的孔中。从后面将安装支架向上推并暂时固定，并消除控制器、面板与安装支架之间的任何间隙。最后交替拧紧两颗固定螺丝，使扭矩保持在0.29至0.39 N・m之间。有关安装状态，请参阅尺寸规格图。
- 安装多台温度控制仪时，请确保温度控制仪产生的热量不会导致环境温度超出规定值。
- 紧贴式并排安装仅可在一个方向（水平或垂直方向）上实现。

●表面安装
如果在垂直方向上安装多台温度控制仪，应在安装插座的上下方各留出20mm左右的空隙。



自我诊断功能

如果发生错误，温度显示会有所显示。
请检查错误类型，并按下列内容处理。

显示	异常内容	现象	处理	控制输出 相反	控制输出 正常
FFF	上溢 *1、*2	• 温度上升至预设温度范围以上。 • 对于热敏电阻型产品，则说明传感器短路。	请确认输入接线、断路、短路及输入种类	OFF	ON
- - -	下溢 *1、*2	• 温度下降至预设温度范围以下。 • 对于热敏电阻型产品，则说明传感器断线。		ON	OFF
FFF（闪烁）	传感器错误 *1、*3	• 温度上升超过温出温度。 • 热电偶或铂电阻发生错误。 • 热电偶/铂电阻多输入模式：温度传感器在设定温度范围以外的高温情况下发生故障。		OFF	OFF
- - -（闪烁）		• 温度上升低于下溢温度。 • 热电偶的极性（正极或负极）相反。 • 铂电阻发生错误。 • 热电偶/铂电阻多输入模式：温度传感器在设定温度范围以外的低温情况下发生故障。		OFF	OFF
E!!	储存错误	储存发生故障	在纠正输入错误以后，可再次打开电源	OFF	OFF

输入在控制范围内超过显示范围（-99~1999）时，小于-99时显示---；大于1999时显示+++。
在以下情况下，控制输出和报警输出会操作正常。
*1 报警输出（仅限报警输出型）
- 当FFF 显示（闪烁）时，报警输出会作为一个不正常的高温报警输出。
- 当 - - - 显示（闪烁）时，报警输出会作为一个不正常的高温报警输出。
- 当E!! 显示时，报警输出会被关闭。

*2 仅在显示当前温度的情况下，才会显示出错信息。
而在显示预设温度、报警预设温度或输入切换值期间，将不显示出错信息。
“上溢”和“下溢”不适用于TC/Pt多输入型产品。
*3 热敏电阻型产品不提供传感器错误检测功能。

⚠符合EN/IEC标准

这是一种A类产品。在住宅区中会导致无线电干扰，所以要求用户采取适当的措施减少干扰。

⚠符合安全标准

在输入电源、继电器输出之间以及其他端子之间提供了强化绝缘。

规格

供电电压	100～240V AC型 50/60Hz 24V AC型 50/60Hz/24V DC型
工作电压范围	额定电压的85～110%
功率消耗	约5VA（100～240V AC） 约3VA（24V AC）/约2W（24V DC）
指示精度 （环境温度：23°C）	热电偶类型 （显示值的±1.0%或者±2°C中的较大值） 最大±1位数 铂电阻温度计型 （显示值的±0.5%或者±1°C中的较大值） 最大±1位数 热敏电阻型 1.0% FS 最大±1位数
控制输出	继电器输出：250V AC 3A（阻性负载） 电压输出：12V DC 21mA 继电器电气寿命：100,000次工作
控制方法	ON/OFF或2路PID控制
报警输出	继电器输出：250V AC 1A（阻性负载） 继电器电气寿命：100,000次工作
环境温度	-10～55°C （避免结冰或结露）
环境湿度	25～85%
存储温度	-25～65°C （避免结冰或结露）
高度	最高2,000米
推荐保险丝	T2A 250V AC，时延，低熔断含量
重量	约110 g（仅包含主单元）
防护等级	前面板：IP50，密封等级2（根据IEC60529标准）， 后壳：IP20， 端子：IP00
安装环境	安装种类II，污染等级 2（IEC61010-1）
内存保护	非挥发内存 （写次数：1,000,000次，环境温度25°C）
端子	现场配线端子 （附带P2CF-08或P2CF-11）
通用连接插座 （单独订购）	非报警输出型用插座（8针）： P2CF-08、P2CF-08-E和P3G-08 报警输出型用插座（11针）： P2CF-11、P2CF-11-E和P3GA-11

■制造商
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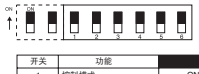
OMRON Corporation

■操作手册

设定

步骤一 设定开关的操作模式

●控制模式选择开关



开关	功能	OFF	ON
1	控制模式	ON/OFF 控制	2-PID控制
2	控制周期	20秒	2秒
3	正/逆动作选择	逆动作	正动作
4	温度输入偏移	不能使用	可使用
5	输入类型	热电偶：K、J 铂电阻温度计：JPt100 多输入：热电偶	热电偶：K、L 铂电阻温度计：Pt100 多输入：铂电阻温度计
6	°C/°F选择	°C	°F

- 所有开关的默认状态为OFF。
- 当选择开/关控制时，滞后量为0.1%量程。
- 当选择2-PID时，PID参数会通过自调自动设置到最适宜的控制状态。
- 当输入变化不显示时，输入变化值也会有所影响（如当显示输入变化不能使用时）。
- 不使用输入变化就把它的值调节至H0，默认设置为H0。
- 若使用热敏电阻型产品，则开关5的设定不会影响运行。

●报警模式选择开关

开关值	报警类型	报警输出
0,9	没有报警功能	没有输出
1	偏离上/下限	
2	偏离上限	
3	偏离下限	
4	偏离上/下范围	
5	偏离上/下限待机序列ON	
6	偏离上限待机序列ON	
7	偏离下限待机序列ON	
8	绝对值上限	

* 对于报警开关值 1 到 7，设定报警值（X）从设定点开始背离。
对于报警开关值 8，设定报警值（Y）从0°C/°F 到绝对值。
* 默认值是“2”（下限）。
* 报警 2 仅支持上限报警。

●温度范围选择开关

・热电偶型
（E5CS-□KJU）

输入	设定值	设定范围 °C	设定范围 °F
K	0	0～200	0～200
	1	0～300	0～300
	2	0～400	0～400
	3	0～500	0～500
	4	0～600	0～600
	5	0～999	0～999
J, L	6	0～200	0～999
	7	0～300	0～300
	8	0～400	0～400
	9	0～500	0～500

* 默认值是“2”。

・铂电阻温度计型
（E5CS-□PU）

输入	设定值	设定范围 °C	设定范围 °F
JPt100, Pt100	0	-50～50	-50～50
	1	0.0～50.0	0.0～50.0
	2	-20～80	-20～80
	3	0.0～99.9	0.0～99.9
	4	0～200	0～200
	5	0～300	0～300
	6	0～400	0～400
	7	0～300	0～600
	8	0～400	0～800
	9	0.0～199.9	0.0～199.9

* 默认值是“3”。

・热敏电阻型
（E5CS-□GU）

输入	设定值	设定范围 °C	设定范围 °F
G	0	-50～50	-50～100
	1	0～100	0～200
	2	50～150	100～300
	3	100～200	200～400
	4	150～300	300～600
	5	-50～50	-50～100
	6	0～100	0～200
	7	50～150	100～300
	8	100～200	200～400
	9	150～300	300～600

* 默认值是“1”。

・热电偶/铂电阻温度计（多输入）
（E5CS-□TU）
控制模式选择开关5: OFF

输入	设定值	设定范围 °C	设定范围 °F
K	0	-99～1300	-99～1999
	1	0.0～199.9	0.0～199.9
J	2	-99～850	-99～1500
	3	0.0～199.9	0.0～199.9
L	4	-99～850	-99～1500
T	5	-99～400	-99～700
	6	0.0～199.9	0.0～199.9
U	7	-99～400	-99～700
N	8	-99～1300	-99～1990
R	9	0～1700	0～1990

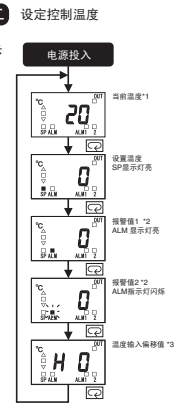
控制模式选择开关5: ON

输入	设定值	设定范围 °C	设定范围 °F
Pt100	0	-99～850	-99～1500
	1	0.0～199.9	0.0～199.9
	2	-99～99	-99～99
	3	0～200	0～200
	4	0～400	0～400
JPt100	5	-99～500	-99～900
	6	0.0～199.9	0.0～199.9
	7	-99～99	-99～99
	8	0～200	0～200
	9	0～400	0～400

* 默认值是“0”。

步骤二 设定控制温度

●温度显示



*1 要开启AT（自动调节），请同时按住上调键及下调键2秒以上直到温度显示开始显示。
*2 仅在报警模式下显示。
当报警模式选择开关设置到0或9时，没有报警温度显示。
报警2仅支持上限报警。
*3 当控制模式选择开关4设置为OFF时，输入变化值不显示。

E5CS-U
Temperature Controller

OMRON

English Instruction Manual

Thank you for purchasing the OMRON E5CS-U Temperature Controller. This manual describes the functions, performance, and application methods needed for optimum use of the product.
Please observe the following items when using the product.
- This product is designed for use by qualified personnel with a knowledge of electrical systems.
- Before using the product, thoroughly read and understand this manual to ensure correct use.
- Keep this manual in a safe location so that it is available for reference whenever required.

OMRON Corporation

Safety Precautions

●Key to Warning Symbols

⚠CAUTION	Indicates a potentially hazardous situation which, if not avoided, is likely to result in minor or moderate injury or property damage. Read this manual carefully before using the product.

●Warning Symbols

⚠ CAUTION	
Do not touch the terminals while power is being supplied. Doing so may occasionally result in minor injury due to electric shock.	⚠
Do not allow pieces of metal, wire clippings, or fine metallic shavings or filings from installation to enter the product. Doing so may occasionally result in electric shock, fire, or malfunction.	
Do not use the product where subject to flammable or explosive gas. Otherwise, minor injury from explosion may occasionally occur.	⃠
Never disassemble, modify, or repair the product or touch any of the internal parts. Minor electric shock, fire, or malfunction may occasionally occur.	
CAUTION - Risk of Fire and Electric Shock a) This product is UL listed as Open Type Process Control Equipment. It must be mounted in an enclosure that does not allow fire to escape externally. b) More than one disconnect switch may be required to de-energize the equipment before servicing. c) Signal inputs are SELV, limited energy. d) Caution: To reduce the risk of fire or electric shock, do not interconnect the outputs of different Class 2 circuits.	⚠
If the output relays are used past their life expectancy, contact fusing or burning may occasionally occur. Always consider the application conditions and use the output relays within their rated load and electrical life expectancy. The life expectancy of output relays varies considerably with the output load and switching conditions.	
Tighten the terminal screws to 0.50 N·m. Loose screws may occasionally result in fire.	
Unexpected operation may result in equipment damage or accidents if the settings are not appropriate for the controlled system. Set the Temperature Controller as follows: · Set the parameters of the Temperature Controller so that they are appropriate for the controlled system. · Turn the power supply to the Temperature Controller OFF before changing any switch setting. Switch settings are read only when the power supply is turned ON. · Make sure that the INIT switch in the control mode selector switches is turned OFF before operating the Temperature Controller.	❗
A malfunction in the Digital Controller may occasionally make control operations impossible or prevent alarm outputs, resulting in property damage. To maintain safety in the event of malfunction of the Temperature Controller, take appropriate safety measures, such as installing a monitoring device on a separate line.	

Suitability for Use

OMRON shall not be responsible for conformity with any standards, codes, or regulations that apply to the combination of the products in the customer's application or use of the product. Take all necessary steps to determine the suitability of the product for the systems, machines, and equipment with which it will be used. Know and observe all prohibitions of use applicable to this product.
NEVER USE THE PRODUCTS FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCT IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM. See also product catalog for Warranty and Limitation of Liability.

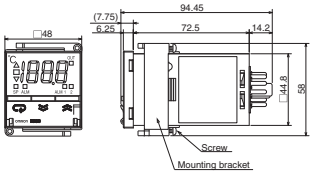
Precautions for Safe Use

Be sure to observe the following precautions to prevent operation failure, malfunction, or adverse affects on the performance and functions of the product. Not doing so may occasionally result in unexpected events.
1) The product is designed for indoor use only. Do not use the product outdoors or in any of the following locations.
· Places directly subject to heat radiated from heating equipment.
· Places subject to splashing liquid or oil atmosphere.
· Places subject to direct sunlight.
· Places subject to dust or corrosive gas (in particular, sulfide gas and ammonia gas).
· Places subject to intense temperature change.
· Places subject to icing and condensation.
· Places subject to vibration and large shocks.
2) Use/store within the rated temperature and humidity ranges. Provide forced-cooling if required.
3) To allow heat to escape, do not block the area around the product.
Do not block the ventilation holes on the product.
4) Use specified size (M3.5, width 7.2 mm or less) crimped terminals for wiring. To connect bare wires to the terminal block, use copper braided or solid wires with a gage of AWG24 to AWG18 (equal to a cross-sectional area of 0.205 to 0.832 mm²). (The stripping length is 5 to 6 mm.). Up to two wires of same size and type, or two crimped terminals can be inserted into a single terminal.
5) Be sure to wire properly with correct polarity of terminals.
Do not wire any of the I/O terminals incorrectly.
6) Do not wire the terminals which are not used.
7) The voltage output (control output) is not electrically isolated from the internal circuits. When using a grounded temperature sensor, do not connect any of the control output terminals to ground. Otherwise unwanted current paths will cause measurement errors.
8) Allow as much space as possible between the controller and devices that generate a powerful high-frequency or surge. Separate the high-voltage or large-current power lines from other lines, and avoid parallel or common wiring with the power lines when you are wiring to the terminals.
9) Use this product within the rated load and power supply.
10) Make sure that the rated voltage is attained within two seconds of turning ON the power using a switch or relay contact. If the voltage is applied gradually, the power may not be reset or output malfunctions may occur.
11) When using PID operation (self-tuning), turn ON the power supply to the load at the same time or before turning the power supply to the Temperature Controller ON.
12) Design system (control panel, etc) considering the 2 second of delay that the controller's output to be set after power ON.
13) A switch or circuit breaker should be provided close to this unit. The switch or circuit breaker should be within easy reach of the operator, and must be marked as a disconnecting means for this unit.
14) Make sure that the Controller has 30 minutes or more to warm up after turning ON the power before starting actual control operations to ensure the correct temperature display.
15) Be sure that the platinum resistance thermometer type and the input type set on the Temperature Controller are the same.
16) When extending the thermocouple lead wires, always use compensating conductors suitable for the type of thermocouple. Do not extend the lead wires on a platinum resistance thermometer. Use only low-resistance wire (5 Ω max. per line) for lead wires and make sure that the resistance is the same for all three wires.
17) Static electricity can damage internal components. Always touch grounded metal to discharge any static electricity before handling the Temperature Controller. When drawing out the controller from the case, do not touch the electronic components or patterns on the board with your hand. Hold the Temperature Controller by the edge of the front panel when handling it.
18) Do not use paint thinner or similar chemical to clean with. Use standard grade alcohol.
19) Use tools when separating parts for disposal.

■ Mounting

Dimensions

E5CS-U (mm)

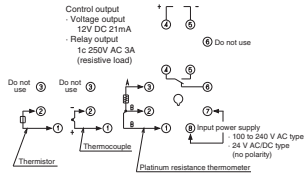


In the pack:
-Main unit
-Mounting bracket
-Instruction manual
-°C/°F labels, Specifications entry label *1

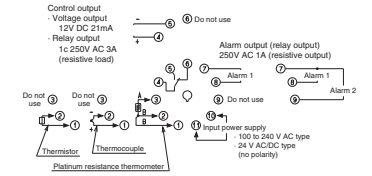
*1 When changing the display unit, attach the °C/°F label over the previous °C/°F label. Enter the settings on the specifications entry label and use it to manage the settings.

Terminal Layout

●E5CS-R□U, -Q□U (No alarm output type)
Suitable socket is P2CF-08-□ or P3G-08

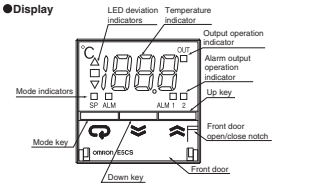


●E5CS-R1□U, -R2□U, -Q1□U, -Q2□U (Alarm output type)
Suitable socket is P2CF-11-□ or P3GA-11



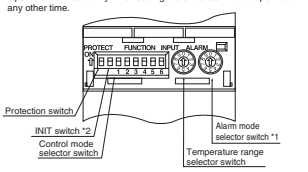
Names of Front Parts

●Display



Temperature indicator
The present temperature, set temperature, alarm set temperature, or input shift value is displayed.
LED deviation indicators
▲ : Lit when the difference between the present temperature and the set temperature is larger than +1% FS (+0.25% FS for TC/Pt multi-input models).
■ : Lit when the difference between the present temperature and the set temperature is within ±1% FS (±0.25% FS for TC/Pt multi-input models).
▼ : Lit when the difference between the present temperature and the set temperature is smaller than -1% FS (-0.25% FS for TC/Pt multi-input models).
ST or AT will flash on the temperature indicator when self-tuning or auto-tuning is being performed.
Output operation indicator
OUT: Control output indicator
Lit when the output function is ON; not lit when the output function is OFF.
Alarm output operation indicator
ALM1: Alarm 1 indicator
Lit when the alarm 1 function is ON.
ALM2: Alarm 2 indicator
Lit when the alarm 2 function is ON.
Mode indicators
SP: Lit when the set temperature is displayed.
ALM: Lit when the alarm set temperature is displayed.
Mode key
Switches the display between the present temperature, set temperature, alarm set temperature, and input shift value.
Up key / Down key
The set temperature, alarm set temperature, or input shift value will increase when the Up Key is pressed. The set temperature, alarm set temperature, or input shift value will decrease when the Down Key is pressed.

●Switch
Pull forward on the front door open/close notch on the right of the front panel to open the front door.
Open the front door only when setting the switches. Do not open it at any other time.

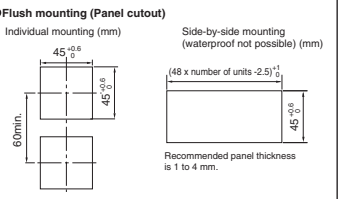


*1 There is no alarm mode selector switch on models without an alarm.
*2 The INIT switch is always OFF.

●Protection switch
· The protection switch can be turned ON to disable the Up and Down keys and prevent setting mistakes.
· The Mode key, however, will operate even when the protection switch is ON (i.e., the display can be switched between the present temperature, set temperature, alarm set temperature, and input shift value).
· The default is "OFF".

Installation Diagrams

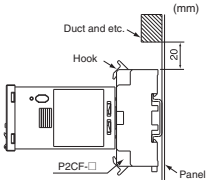
●Flush mounting (Panel cutout)



· Insert the controller through the hole in the panel. Push the mounting bracket on from the rear and fasten temporarily, removing any gap between the controller, panel and mounting bracket. Finally, secure two fixing screws alternately keeping the torque to between 0.29 to 0.39 N·m.
Refer to the dimension diagram for the mounting status.
· When mounting more than one Temperature Controller, be sure that the heat generated by the Temperature Controllers does not cause the ambient temperature to exceed the specified value.
· Close side-by-side mounting is possible in one direction only, either

●Surface mounting

When mounting plural units in vertical arrangement, leave space of approx. 20 mm above and below the mounting socket.



SELF-DIAGNOSTIC FUNCTION

If an error occurs, it will be displayed on the temperature display.
Check the type of error and correct the error accordingly.

Display	Error	Meaning	Action	Control output Reverse	Control output Normal
FFF	Overflow *1, *2	· The temperature has risen beyond the set temperature range. · With Thermistor types, the sensor is shorted.	Check the wiring of inputs, disconnections, shorts and input type.	OFF	ON
- - -	Underflow *1, *2	· The temperature has fallen below the set temperature range. · With Thermistor types, the sensor is disconnected.		ON	OFF
FFF (flashing)	Sensor error *1, *3	· The temperature has risen beyond the overflow temperature. · The thermocouple or platinum resistance thermometer has failed. · TC/Pt multi-input modes: A temperature sensor error has occurred at a temperature higher than the set temperature range.		OFF	OFF
- - - (flashing)		· The temperature has fallen below the underflow temperature. · The polarity (positive and negative) of thermocouple has been reversed. · The platinum resistance thermometer has failed. · TC/Pt multi-input modes: A temperature sensor error has occurred at a temperature higher than the set temperature range.		OFF	OFF
Eii	Memory error	Memory has failed.	Alter the correction of input error, turn the power OFF then back ON again.	OFF	OFF

If the input value exceeds the display limit (-99 to 1999), though it is within the control range, CCC will be displayed under -99 and JJJ above 1999.
Under these conditions, control output and alarm output will operate normally.
*1 Alarm output (Models with alarm output type only)
· The alarm output will operate as an abnormally high temperature alarm output when FFF is displayed (flashes).
· The alarm output will operate as an abnormally low temperature alarm output when - - - is displayed (flashes).
· The alarm output will turn OFF when Eii is displayed.
*2 Errors are displayed only when the present temperature is being displayed.
Errors will not be displayed if the set temperature, alarm set temperature, or input shift value is displayed.
Overflow and underflow are not applicable to TC/Pt multi-input models.
*3 Sensor error detection function is not provided for thermistor type.

⚠Conformance to EN/IEC Standards

This is a class A product. In residential areas it may cause radio interference, in which case the user may be required to take adequate measures to reduce interference.

⚠Conformance to Safety Standards

Reinforced insulation is provided between input power supply, relay outputs, and between other terminals. ⧈

Specifications

Power supply voltage	100 to 240V AC type 50/60Hz 24V AC type 50/60Hz / 24V DC type
Operating voltage range	85 to 110% of the rated voltage
Power consumption	Approx. 5VA (100 to 240V AC) Approx. 3VA (24V AC) / Approx. 2W (24V DC)
Indication accuracy (Ambient temperature:23°C)	Thermocouple type (±1.0% of indication value or ±2°C, which is greater) ±1 digit max. Platinum resistance thermometer type (±0.5% of indication value or ±1°C, which is greater) ±1 digit max. Thermistor type 1.0% FS ±1 digit max.
Control output	Relay output: 250V AC 3A (resistive load) Voltage output: 12V DC 21mA Electrical life of relay: 100,000 operations
Control method	ON/OFF or 2-PID control
Alarm output	Relay output: 250V AC 1A (resistive load) Electrical life of relay: 100,000 operations
Ambient temperature	-10 to 55°C (Avoid freezing or condensation)
Ambient humidity	25 to 85%
Storage temperature	-25 to 65°C (Avoid freezing or condensation)
Altitude	Max. 2,000m
Recommended fuse	T2A 250V AC,time-lag, low-breaking capacity
Weight	Approx.110g (main unit only)
Degree of protection	Front panel: IP50, Enclosure Category 2 (as per IEC60529), Rear case: IP20, Terminal section: IP00
Installation environment	Installation category II, pollution degree 2 (as per IEC61010-1)
Memory protection	Non-volatile memory (Number of write operations: 1,000,000)
Terminal	Filed wiring terminal (with P2CF-08 or P2CF-11)
Applicable Connection Sockets (Order Separately)	Sockets for no Alarm (8-pin): P2CF-08, P2CF-08-E, and P3G-08 Sockets for Alarm (11-pin): P2CF-11, P2CF-11-E, and P3GA-11

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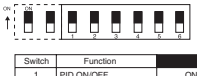
■ Operation

Setting

Step1 Set the operating specifications with the switches.

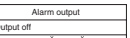
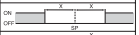
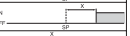
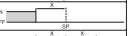
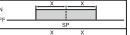
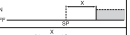
●Control mode selector switch



Switch	Function	OFF	ON
1	PID ON/OFF	ON/OFF control	2-PID control
2	Control period	20 seconds	2 seconds
3	Forward/reverse operation	Reverse	Normal
4	Input shift	Disable	Enable
5	Thermometer replacement	Thermocouple: K, J Platinum resistance thermometer: JPt100 Multi-input: Thermocouple	Thermocouple: K, L Platinum resistance thermometer: Pt100 Multi-input: Platinum resistance thermometer
6	Selection	°C	°F

· All switches are OFF by default.
· Hysteresis is 0.2% FS (0.1% FS for TC/Pt multi-input models) when ON/OFF control is selected.
· The PID parameters are automatically set for optimum control by ST (self-tuning) when 2-PID control is selected.
· The input shift values will be effective even when the input shift is not displayed (i.e., when displaying the input shift is disable).
To disable the input shift, set the input shift value to H0. The default setting is H0.
· The setting of switch 5 will not affect operation if a thermistor model is used.

●Alarm mode selector switch

SW No.	Alarm type	Alarm output
0,9	No alarm function	Output off
1	Deviation upper/lower limit	
2	Deviation upper limit	
3	Deviation lower limit	
4	Deviation upper/lower range	
5	Deviation upper/lower limit standby sequence ON	
6	Deviation upper limit standby sequence ON	
7	Deviation lower limit standby sequence ON	
8	Absolute value upper limit	

* For alarms 1 to 7, set the alarm value (X) to the deviation from the set point. For alarm 8, set the alarm value (Y) to the absolute value from 0°C/°F.
* The default is "2" (Deviation upper limit).
* The only type of alarm supported for alarm 2 is an upper limit alarm.

●Temperature range selector switch

· Thermocouple type (E5CS-□KJU)

Input	Setting	Setting range °C	Setting range °F
K	0	0 to 200	0 to 200
	1	0 to 300	0 to 300
	2	0 to 400	0 to 400
	3	0 to 500	0 to 500
	4	0 to 600	0 to 600
	5	0 to 999	0 to 999
J, L	6	0 to 200	0 to 999
	7	0 to 300	0 to 300
	8	0 to 400	0 to 400
	9	0 to 500	0 to 500

* The default is "2".

· Platinum resistance thermometer type (E5CS-□PU)

Input	Setting	Setting range °C	Setting range °F
JPt100, Pt100	0	-50 to 50	-50 to 50
	1	0.0 to 50.0	0.0 to 50.0
	2	-20 to 80	-20 to 80
	3	0.0 to 99.9	0.0 to 99.9
	4	0 to 200	0 to 200
	5	0 to 300	0 to 300
	6	0 to 400	0 to 400
	7	0 to 300	0 to 600
	8	0 to 400	0 to 800
	9	0.0 to 199.9	0.0 to 199.9

* The default is "3".

· Thermistor type (E5CS-□GU)

Input	Setting	Setting range °C	Setting range °F
G	0	-50 to 50	-50 to 100
	1	0 to 100	0 to 200
	2	50 to 150	100 to 300
	3	100 to 200	200 to 400
	4	150 to 300	300 to 600
	5	-50 to 50	-50 to 100
	6	0 to 100	0 to 200
	7	50 to 150	100 to 300
	8	100 to 200	200 to 400
	9	150 to 300	300 to 600

* The default is "1".

· Thermocouple/platinum resistance thermometer (multi-input) (E5CS-□TU)

Control mode selector switch No.5: OFF

Input	Setting	Setting range °C	Setting range °F
K	0	-99 to 1300	-99 to 1999
	1	0.0 to 199.9	0.0 to 199.9
J	2	-99 to 850	-99 to 1500
	3	0.0 to 199.9	0.0 to 199.9
L	4	-99 to 850	-99 to 1500
T	5	-99 to 400	-99 to 700
	6	0.0 to 199.9	0.0 to 199.9
U	7	-99 to 400	-99 to 700
N	8	-99 to 1300	-99 to 1990
R	9	0 to 1700	0 to 1990

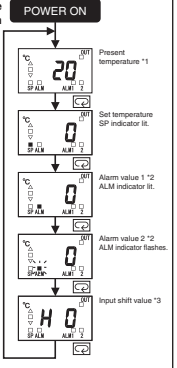
Control mode selector switch No.5: ON

Input	Setting	Setting range °C	Setting range °F
Pt100	0	-99 to 850	-99 to 1500
	1	0.0 to 199.9	0.0 to 199.9
	2	-99 to 99	-99 to 99
	3	0 to 200	0 to 200
	4	0 to 400	0 to 400
JPt100	5	-99 to 500	-99 to 900
	6	0.0 to 199.9	0.0 to 199.9
	7	-99 to 99	-99 to 99
	8	0 to 200	0 to 200
	9	0 to 400	0 to 400

* The default is "0".

Step2 Set the control temperature.

●Temperature indication



*1 To start AT (auto-tuning), press and hold the Up and Down keys simultaneously for at least 2 seconds while the temperature is displayed on the temperature indicator.
*2 Displayed only for models with alarms.
When alarm mode selector switch is set to 0 or 9, no alarm temperature is displayed.
The only type of alarm supported for Alarm 2 is an upper limit alarm.
*3 Input shift value is not displayed when pin 4 of control mode selector switch is set to OFF.