



# E5CN-U OMRON Temperature controller

UK/USA Instruction Manual

Thank you for purchasing the OMRON E5CN-U temperature controller. Read this manual carefully before using the controller and always keep it close at hand while the controller is in use.

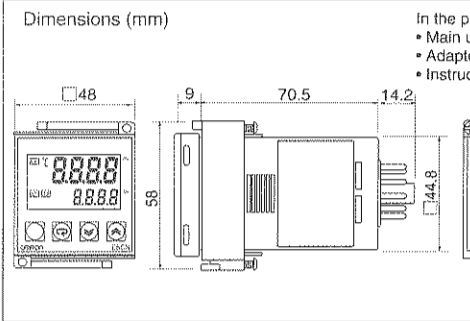
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For detailed operating instructions, please refer to the E5CN User's Manual.  
Significance of WARNINGS and CAUTIONS

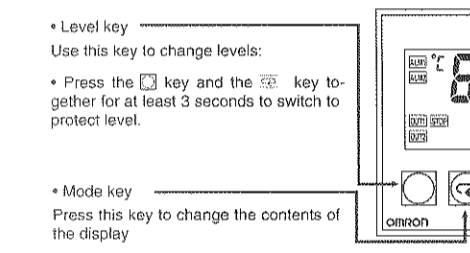
**CAUTION** Indicates information that, if not heeded, could result in relatively serious or minor injury, damage to the product, or faulty operation.

## Wiring

Dimensions Surface mounting Installation Connections



In the pack:  
• Main unit  
• Adapter  
• Instruction manual



## Operation menu

Input type	Input	Setting	Setting range
Platinum resistance thermometer	Pt100	0	-200 to 850 (°C) / -300 to 1500 (°F)
		1	-199.9 to 500.0 (°C) / -199.9 to 900.0 (°F)
		2	0.0 to 100.0 (°C) / 0.0 to 210.0 (°F)
		3	-199.9 to 500.0 (°C) / -199.9 to 900.0 (°F)
Thermocouple	K	0	-200 to 1300 (°C) / -300 to 2300 (°F)
		1	-20.0 to 500.0 (°C) / 0.0 to 900.0 (°F)
		2	-100 to 850 (°C) / -100 to 1500 (°F)
		3	-20 to 400.0 (°C) / 0.0 to 750.0 (°F)
		4	-200 to 400 (°C) / -300 to 700 (°F)
		17	-199.9 to 400.0 (°C) / -199.9 to 700.0 (°F)
		5	0 to 600 (°C) / 0 to 1100 (°F)
		6	-100 to 850 (°C) / -100 to 1500 (°F)
		7	-200 to 400 (°C) / -300 to 700 (°F)
		18	-199.9 to 400.0 (°C) / -199.9 to 700.0 (°F)
		8	-200 to 1300 (°C) / -300 to 2300 (°F)
		9	0 to 1700 (°C) / 0 to 3000 (°F)
		10	0 to 1700 (°C) / 0 to 3000 (°F)
		11	100 to 1800 (°C) / 300 to 3200 (°F)
		12	0 to 90 (°C) / 0 to 190 (°F)
		Thermosensor ES1A	ES1A
14	0 to 165 (°C) / 0 to 320 (°F)		
Analog input	0 to 50mV	15	0 to 260 (°C) / 0 to 500 (°F)
		16	-199.9 to 999.9, -199.9 to 999.9

\* Default = "0"

## Alarms

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

\*1: Upper and lower limits can be set for parameters 1, 4 and 5 to provide for different types of alarm. These are indicated by the letter "L" and "H".  
\* Default = "2"

## Error display (trouble shooting)

When an error has occurred, the No.1 display alternately indicates error codes together with the current display item.

No.1 display	Meaning	Action	Status at error
SErr (S.Err)	Input error *2	Check the wiring of inputs, disconnections, shorts and input type.	Control OFF Alarm ON
AErr (A.Err)	A/D converter error *2	After the correction of input error, turn the power OFF then back ON again. If the display remains the same, the controller must be replaced. If the display is restored to normal, then a probable cause can be external noise affecting the control system. Check for external noise.	Control OFF Alarm OFF
E111 (E111)	Memory error	Turn the power OFF then back ON again. If the display remains the same, the controller must be replaced. If the display is restored to normal, then a probable cause can be external noise affecting the control system. Check for external noise.	Control OFF Alarm OFF

If the input value exceeds the display limit (-199.9(-199.9) to 999.9(999.9)), though it is within the control range, [cccc] will be displayed under -199.9(-199.9) and [2222] above 999.9(999.9). Under these conditions, control output and alarm output will operate normally.  
Refer to "E5CN User's Manual" for details of control range.  
\*2: Error shown only for "Process value / Set point". Not shown for other status.

## CAUTION

- Do not touch terminals when voltage is applied.
- Electric shock hazard
- Do not allow metal fragments or lead wire scraps to fall inside this product. This may cause electric shock, fire or malfunction.
- Do not use this product where subject to flammable or explosive gas. Doing so may cause explosion.
- Never disassemble, repair or modify the product. This may cause electric shock, fire or malfunction.
- CAUTION - Risk of Electrical Shock
  - a) Devices are Open Type, Listed Process Control Equipment and must be mounted in an enclosure.
  - 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 risk of fire or Electrical shock, Do not interconnect the outputs of different Class 2 circuits.
- The life expectancy of the output relay varies considerably according to its output relay within its rated load and electrical life expectancy, if the output relay is used beyond its life expectancy, its contacts may become fused or burned.
- Use copper wire only 24-14 AWG stranded or solid. Torque screws to 0.5 N·m or 4.5 lb-in.
- Correctly set the settings on the temperature controller matched to the control target. If the settings are not compatible with the control target, the product may operate in an unexpected manner, resulting in damage to the product or an accident.
- WARNING: To reduce the risk of fire of electric shock, install in a controlled environment relatively free of contaminants.
- To maintain safety in the event of malfunction of the temperature controller, we recommend taking safety measures, for example, installing an excessive temperature rise prevention alarm on a separate line. If malfunction prevents control, this may result in a major accident. Do not touch terminals when voltage is applied.

## PRECAUTIONS IN USING THE PRODUCT

- When the product is used under the circumstances or environment below, ensure adherence to limitations of the ratings and functions. Also, take countermeasures for safety precautions such as fail-safe installations.
  - Use under circumstances or environment which are not described in the instruction manual.
  - Use for nuclear power control, railway, aircraft, vehicle, incinerator, medical equipment, entertainment equipment, safety device etc...
  - Use for applications where death or serious property damage is possible and extensive safety precautions are required.

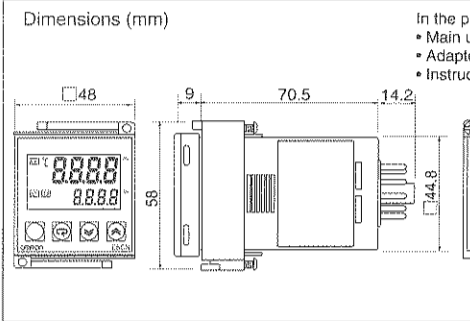
## NOTICE

- Do not use this product in following places:
  - 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.
- Use/store within the rated temperature and humidity ranges. Provide forced-cooling if required.
- To allow heat to escape, do not block the area around the product. Do not block the ventilation holes on the product.
- Be sure to wire properly with correct polarity of terminals.
- Do not wire the terminals which are not used.
- 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.
- Use this product within the rated load and power supply.
- Make sure that the rated voltage is attained within two seconds of turning the power ON.
- Make sure the controller has 30 minutes or more for warm up.
- When executing self-tuning, turn the load and the unit ON simultaneously, or turn the load ON before you turn the controller ON.
- 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.
- Cleaning: Do not use paint thinner or the equivalent. Use standard grade alcohol to clean the product.

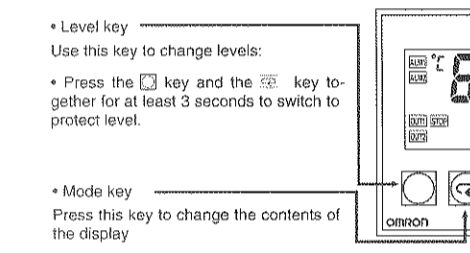
## Specifications

Power supply voltage	100-240VAC type 24V AC/DC type
Operating frequency	50-60Hz
Operating voltage range	85 to 110% of the rated voltage
Power consumption	Approx. 6VA (AC100-240V) Approx. 3VA (AC24V) Approx. 2W (DC24V)
Indication accuracy	Thermocouple: (±1% of indication value or ±2 °C, which is greater) ±1 digit max. Platinum resistance thermometer: (±0.5% of indication value or ±1 °C, which is greater) ±1 digit max. Analog input: ±0.5% FS ±1 digit max.
Control output 1	Relay output: SPDT 250 VAC, 3A(resistive load) Voltage output: 12 VDC, 21 mA Current output: 4 to 20 mA DC, load: 600 Ω max. Electrical life of relay: 100,000 operations ON/OFF or 2-PID control
Control method	Relay output: SPST-NO, 250 VAC 1 A(resistive load), electrical life of relay: 100,000 operations -10 to 55°C (Avoid freezing or condensation) RH 25 to 85% -25 to 65°C (Avoid freezing or condensation) Max. 2,000m T2A, 250V AC, lime-lag, low-breaking capacity Approx. 110g (main unit only) Setup category II, pollution degree 2 (as per IEC61010-1)
Alarm output (control output 2)	
Ambient temperature	
Ambient humidity	
Storage temperature	
Altitude	
Recommended fuse	
Weight	
Installation environment	

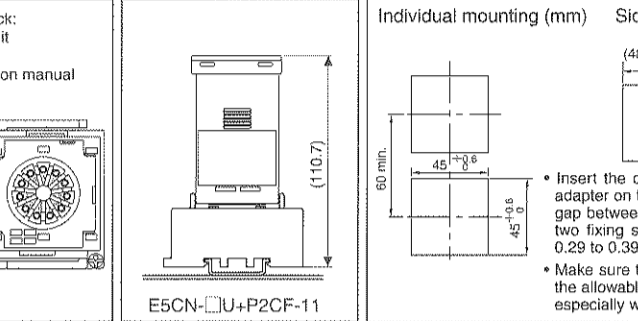
## Dimensions



In the pack:  
• Main unit  
• Adapter  
• Instruction manual



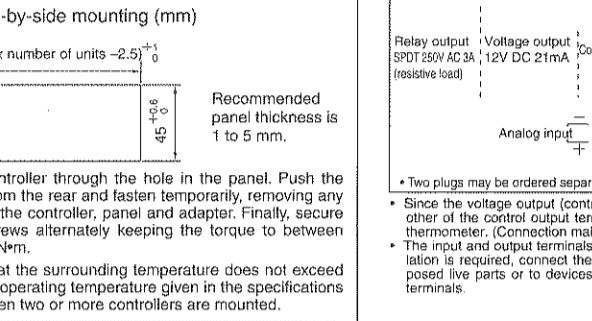
## Surface mounting



Recommended panel thickness is 1 to 5 mm.

- Insert the controller through the hole in the panel. Push the adapter on from the rear and fasten temporarily, removing any gap between the controller, panel and adapter. Finally, secure two fixing screws alternately keeping the torque to between 0.29 to 0.39 N·m.
- Make sure that the surrounding temperature does not exceed the allowable operating temperature given in the specifications especially when two or more controllers are mounted.

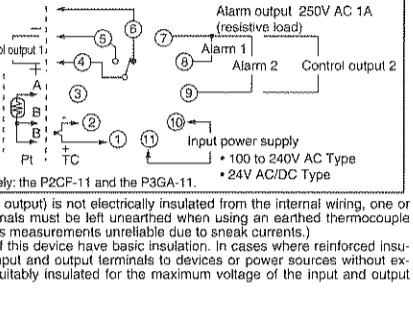
## Installation



Recommended panel thickness is 1 to 5 mm.

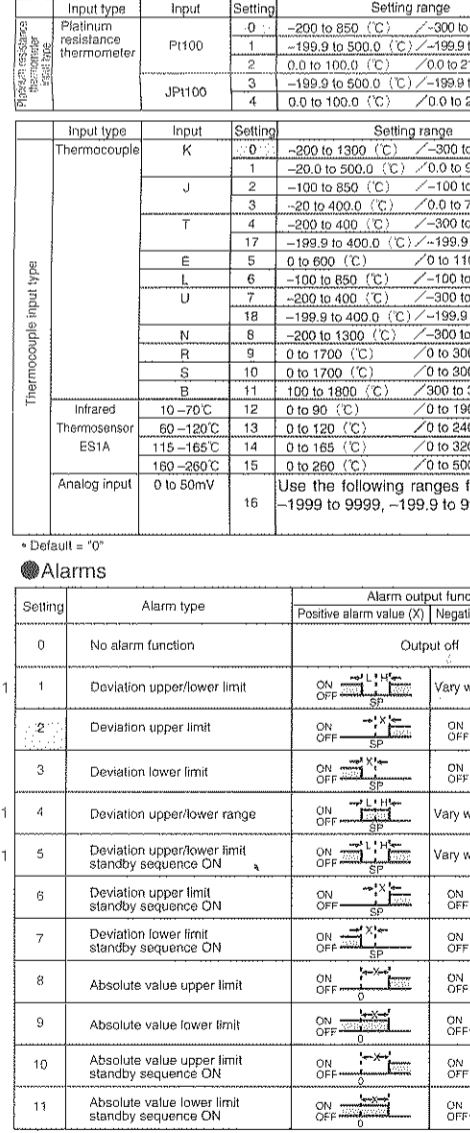
- Insert the controller through the hole in the panel. Push the adapter on from the rear and fasten temporarily, removing any gap between the controller, panel and adapter. Finally, secure two fixing screws alternately keeping the torque to between 0.29 to 0.39 N·m.
- Make sure that the surrounding temperature does not exceed the allowable operating temperature given in the specifications especially when two or more controllers are mounted.

## Connections



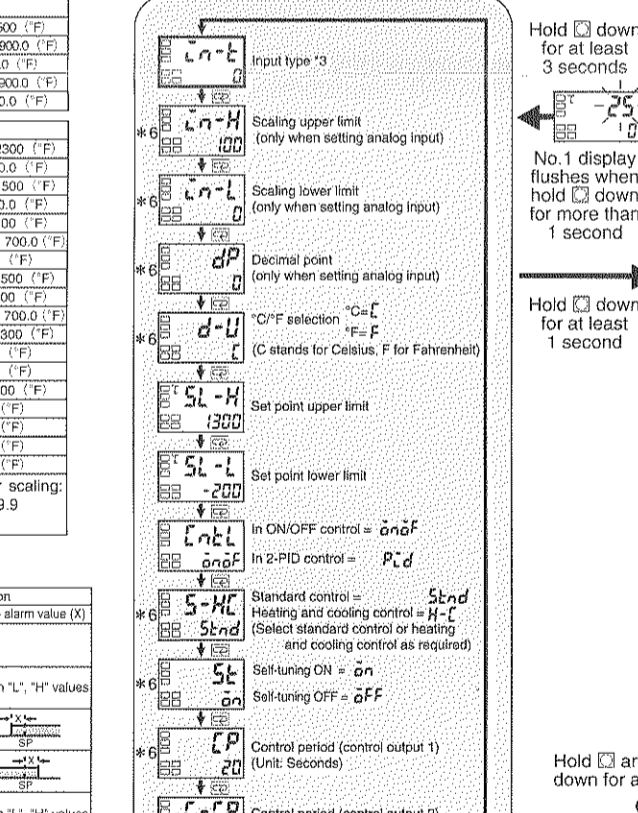
- Two plugs may be ordered separately: the P2CF-11 and the P3GA-11.
- Since the voltage output (control output) is not electrically insulated from the internal wiring, one of other of the control output terminals must be left unattached when using an earthed thermocouple thermometer. (Connection makes measurements unreliable due to sneak currents.)
- The input and output terminals of this device have basic insulation. In cases where reinforced insulation is required, connect the input and output terminals to devices or power sources without exposed live parts or to devices suitably insulated for the maximum voltage of the input and output terminals.

## Initial setting level



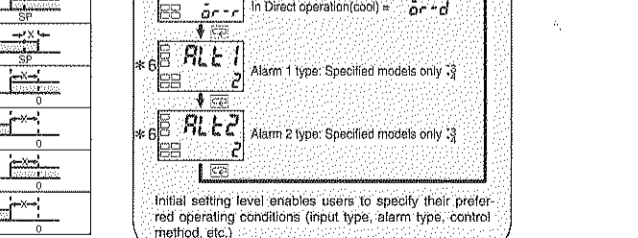
\*3: Refer to the adjoining tables for details of input types and alarm types.

## Operation level



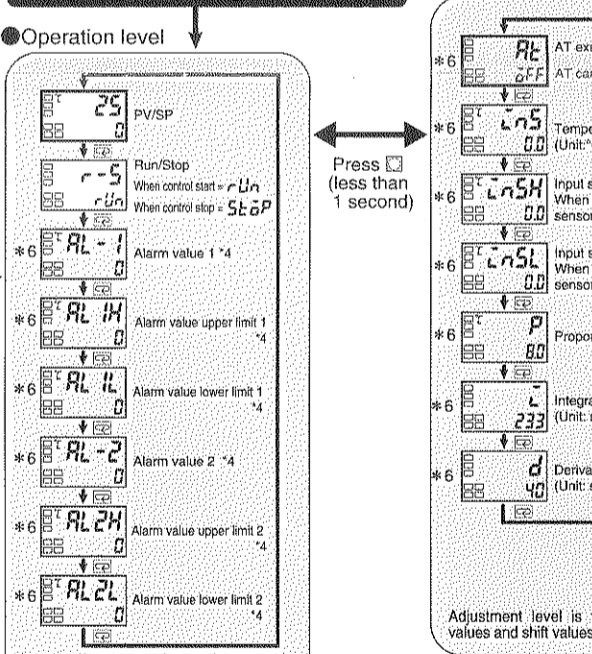
Operation level should normally be used during operations.

## Protect level



Restricts which settings can be displayed or changed, and restricts change by key operation.

## Adjustment level



- \*4: Applicable only to models with alarm functions
- \*5: Operation is stopped when moved to the initial setting level. (control/alarm are both stopped.)
- \*6: The grayed-out setting items may not be displayed according to the models and setting.

## Protection function

Protection function, to prevent unwanted settings, restricts the setting items to be used or designates if operation of the key is valid or invalid.

## Operation / Adjustment protection

The following table shows the relationship between settings and protect limits related to Operation level and Adjustment level.

Level	Set value	0	1	2	3
Operation level	Process value	○	○	○	○
	Set point	○	○	○	○
	Others	○	○	○	○
Adjustment level		○	○	○	○

Default setting: 0

## Initial setting/Communications protection

This protect level restricts movement to the initial setting level, communications setting level and advanced function setting level.

Set value	Initial setting level	Communications setting level	Advanced function setting level
0	○	○	○
1	○	○	○
2	○	○	○

Default setting: 1

- : Change to other levels possible
- : Can be displayed
- ×: Can not be displayed and change to other levels not possible

## Setting change protection

Setting changes by key operation are restricted.

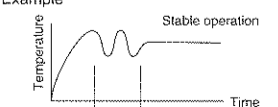
- OFF "OFF": Setting can be changed by key operation
- ON "ON": Setting cannot be changed by key operation (Protect level settings can all be changed.)

## Other functions

In addition to the aforementioned, there are alarm hysteresis, automatic return of display mode and others in the advanced setting level.

Refer to "E5CN User's Manual" for details.

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Run time for auto-tuning varies with the thermal capacity of the control system.