

# Temperature Controller E5C2



## DIN-sized (48 x 48 mm) Temperature Controller with Analog Setting

- Compact, low-cost Temperature Controller.
- Incorporates proportional control and reset adjustment function.
- Consecutive mounting possible using mounting adapter.
- Incorporates a plug-in socket, thus allows to DIN-track and flush mounting.

⚠ Refer to *Safety Precautions for All Temperature Controllers*.



## Ordering Information

### Temperature Controllers

#### Standard Models

Indication method		No indication		
Control mode		ON/OFF		
Input	Output	Relay		
Thermo-couple	K (CA)	0 to 200	E5C2-R20K	E5C2-R20K-W
		0 to 300	E5C2-R20K	E5C2-R20K-W
		0 to 400	E5C2-R20K	--
		0 to 600	E5C2-R20K	--
		0 to 800	E5C2-R20K	E5C2-R20K-W
		0 to 1000	E5C2-R20K	E5C2-R20K-W
		0 to 1200	E5C2-R20K	E5C2-R20K-W
	J (IC)	0 to 200	E5C2-R20J	E5C2-R20K-W
		0 to 300	E5C2-R20J	E5C2-R20K-W
		0 to 400	E5C2-R20J	E5C2-R20K-W
Control mode		Proportional		
Input	Output	Relay		
Thermo-couple	K (CA)	0 to 200	E5C2-R40K	E5C2-R40K-W
		0 to 300	E5C2-R40K	E5C2-R40K-W
		0 to 400	E5C2-R40K	--
		0 to 600	E5C2-R40K	--
		0 to 800	E5C2-R40K	--
		0 to 1000	--	--
		0 to 1200	--	E5C2-R40K-W
	J (IC)	0 to 200	--	E5C2-R40J-W
		0 to 300	--	E5C2-R40J-W
		0 to 400	--	E5C2-R40J-W

Indication method		No indication		
Control mode		ON/OFF		
Input	Output	Relay		
Input/standard scale (°C)	Resistance Thermometer	Platinum resistance thermometer Pt100	-50 to 50	E5C2-R20P-D
			-20 to 80	E5C2-R20P-D
			0 to 50	E5C2-R20P-D
			0 to 100	E5C2-R20P-D
			0 to 200	E5C2-R20P-D
			0 to 300	E5C2-R20P-D
			0 to 400	E5C2-R20P-D
	Thermistor	THE (replaceable element)	-50 to 50	E5C2-R20G
			0 to 100	E5C2-R20G
			50 to 150	E5C2-R20G
		100 to 200	E5C2-R20G	
		150 to 300	E5C2-R20G	

### Accessories (Order Separately)

#### Protective Cover

Type	Model
Hard Protective Cover	Y92A-48B

#### Sockets

Name	Model
Front Connecting Socket	P2CF-08
Back Connecting Socket	P3G-08
Front Connecting Socket with Finger Protection	P2CF-08-E
Protective Cover (for finger protection)	Y92A-48G

## Model Number Legend

E5C2-       -    
           1    2    3    4

### 1. Control Outputs

R: Relay

### 2. Control Method

20: ON-OFF control

40: Proportional control

### 3. Input

K: K-type thermocouple

J: J-type thermocouple

P-D: Platinum resistance thermometer (Pt100)

G: Thermistor with replaceable element

### 4. Temperature Scale

Blank: Degrees C

W: Both Degrees C and Degrees F

**Note:** A functional explanation is provided here for illustration, but models are not necessarily available for all possible combinations. Refer to *Ordering Information* when ordering.

Examples

- Relay control output, ON/OFF control, type-K thermocouple input: E5C2-R20K
- Relay control output, proportional control, thermocouple input: E5C2-R40P-D

## Temperature Ranges

Input					Thermocouple						Resistance Thermometer						Thermistor										
					K (CA) Chromel vs. alumel			J (IC) Iron vs. constantan			Platinum resistance thermometer Pt100						Thermistor (replaceable element)										
Setting method	Indication method	Control mode	Output	Minimum scale division (°C)	Standard scale (°C)												Thermistor nominal resistance										
					5	10	10	20	20	25	25	5	10	10	2	2	1	2	5	10	10	2	2	2	2	2	
Analog setting	No indication	ON/OFF	Relay	Model	E5C2-R20K						E5C2-R20J						E5C2-R20P-D						E5C2-R20G				
		Proportional (P)	Relay	Model	E5C2-R40K						---						---						---				

## Specifications

### Ratings

Supply voltage	100 to 240 VAC 50/60 Hz
Operating voltage range	90% to 110% of rated supply voltage
Power consumption	Approx. 3.6 VA
Input	Thermocouple (with sensor burnout detection circuit), platinum resistance thermometer, or thermistor with replaceable element
Control method	ON/OFF or proportional control
Setting method	Analog setting
Indication method	No indication
Control output	Relay output: SPDT, 3 A at 250 VAC, resistive load (switching capacity: 330 VA)
Ambient operating temperature	-10°C to 55°C (with no icing or condensation)
Ambient operating humidity	45% to 85%

**Note:** Do not use an inverter output as the power supply. (Refer to *Safety Precautions for All Temperature Controllers.*)

### Characteristics

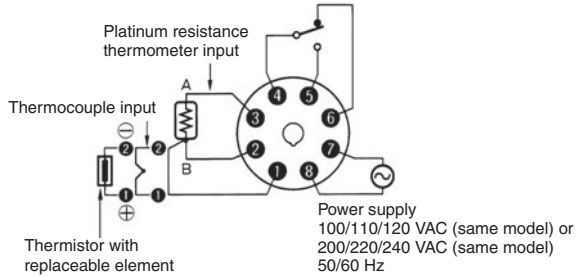
Setting accuracy	±2% FS max.
Hysteresis	Approx. 0.5% FS (fixed)
Proportional band	3% FS (fixed)
Control period	Approx. 20 s
Reset range	5 ±1% FS min. (See note 1.)
Insulation resistance	20 MΩ min. (at 500 VDC)
Dielectric strength	2,000 VAC, 50/60 Hz for 1 min between charged terminals and uncharged metallic parts
Vibration resistance	Malfunction: 10 to 55 Hz, 0.15-mm single amplitude for 10 min each in X, Y, and Z directions Destruction: 16.7 Hz, 2-mm double amplitude for 2 hrs each in X, Y, and Z directions
Shock resistance	Malfunction: 147 m/s <sup>2</sup> , 3 times each in 6 directions Destruction: 294 m/s <sup>2</sup> , 3 times each in 6 directions
Life expectancy	Electrical: 100,000 operations min. (3 A at 110 VAC, resistive load)
Weight	Approx. 100 g (with flush-mounting adapter)
Degree of protection	Front panel: IEC standard IP40 (See note 2.) Terminals: IEC standard IP00
Applicable Socket	P2CF-08 (order separately), P3G-08 (order separately)
Applicable Protective Cover	Y92A-48B (order separately)

- Note:**
1. No reset function is incorporated by any E5C2 model with ON/OFF control. The reset function is used to correct offset for proportional control. If there is an offset below the set value, turn the reset adjustment clockwise.
  2. A special Watertight Cover is used to achieve this degree of protection (IP66, NEMA4). Refer to Y92A-□□N.

## ■ Connections

### Connecting the Input

- Connect a thermocouple, the E52-THE□ Thermistor (replaceable element) or a platinum resistance thermometer to terminals 1 (positive) and 2 (negative) on the E5C2 as shown in the following illustration.



- On the E52-□□1D, the lead wires are thermocouple element wires, making them difficult to solder because solder will not stick to them easily. Remove the crimp terminal and polish the ends before attempting to solder them.

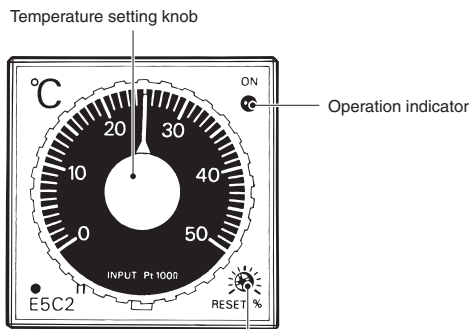
### Output

- If the load circuit is a heating control system, be sure to connect the load to terminals 4 and 5. If the load circuit is a cooling control system, be sure to connect the load to terminals 4 and 6.
- We recommend using an external relay to extend the electrical life of internal relays when driving a large capacity load. This is particularly important when the output relay is switched frequently (e.g., with proportional control).

### Power Supply

- If a single power supply is used for the E5C2 and the load, the supply voltage of the power supply may vary greatly when the load is open or closed if the capacity of the power supply is not large enough. Make sure that the capacity of the power supply is large enough so that the supply voltage range will be always from 90% to 110% of the rated supply voltage.
- The E5C2 operates at either 50 or 60 Hz.

## Nomenclature



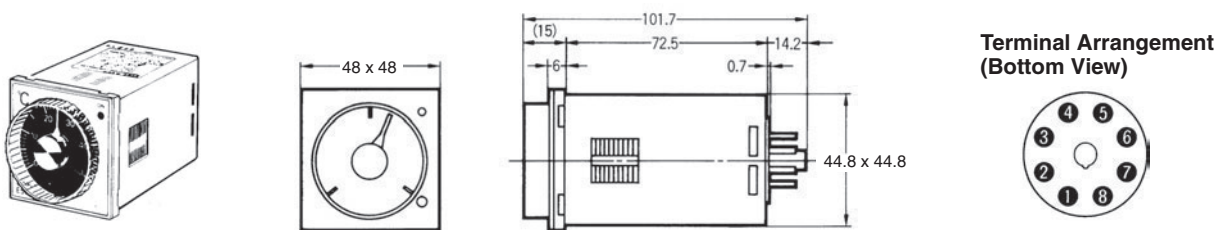
RESET adjustment shaft  
No reset function is incorporated by any E5C2 model with ON/OFF control.

### Operation Indicator

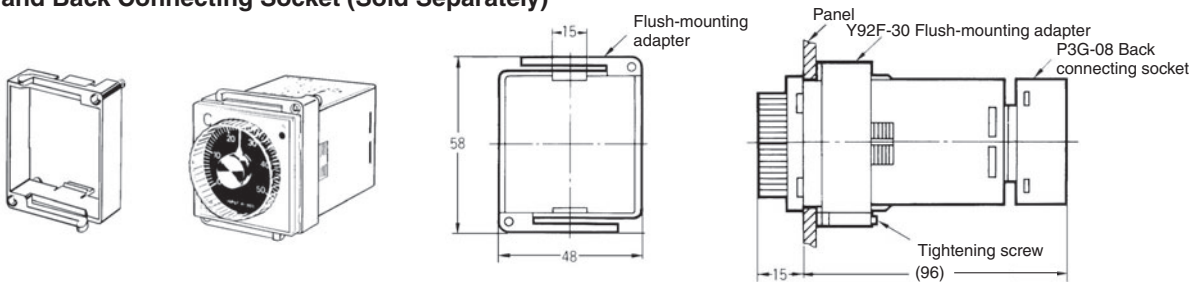
Indicator	Output	
	NO contacts (4 and 5)	NC contacts (4 to 6)
Red Lit	ON	OFF
Not lit	OFF	ON

# Dimensions

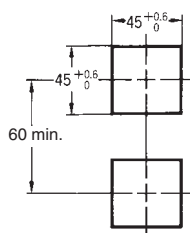
Note: All units are in millimeters unless otherwise indicated.



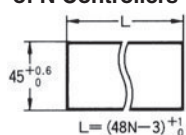
## Dimensions with Flush-mounting Adapter (Accessory), and Back Connecting Socket (Sold Separately)



### Panel Cutout



### Side-by-side Mounting of N Controllers



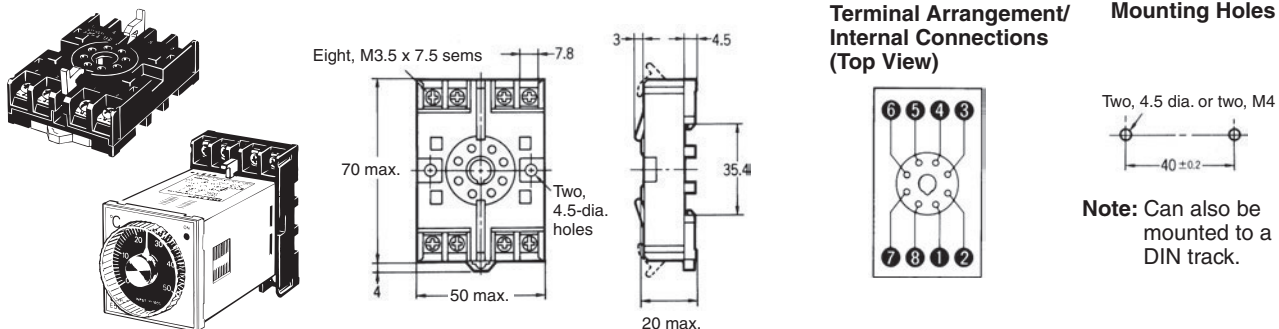
Qty.	2	3	4	5	6
L	93 <sup>+1</sup> <sub>0</sub>	141 <sup>+1</sup> <sub>0</sub>	189 <sup>+1</sup> <sub>0</sub>	237 <sup>+1</sup> <sub>0</sub>	285 <sup>+1</sup> <sub>0</sub>

- Note: 1. Recommended panel thickness is 1 to 4 mm.
- 2. Close side-by-side mounting is possible (in a single direction).

## Accessories (Order Separately)

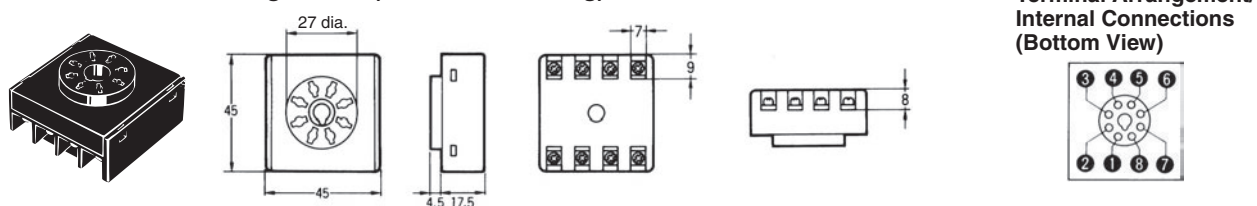
### Connection Sockets

#### P2CF-08 Front Connecting Socket



Note: A finger-protection model (P2CF-08-E) is also available.

#### P3G-08 Back Connecting Socket (for Flush Mounting)




Note: A Protective Cover for finger protection (Y92A-48G) is also available.

## Hard Protective Cover

A Hard Protective Cover (Y92A-48B) is available. It can be used in the following cases.

- To protect the setting section, against dust and dirt
- To prevent accidentally changing settings by touching the front of the Controller.
- To protect the Controller from water drips

Appearance	
Model	Y92A-48B

## Applicable Thermistor

Connect a Thermistor with a replaceable element (E52-THE5A, E52-THE6D, or E52-THE6F) to the E5C2-R20G. Refer to E52 for details.

## Safety Precautions

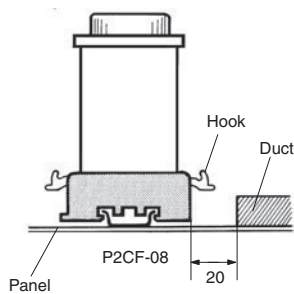
Refer to *Safety Precautions for All Temperature Controllers*.

### ■ Correct Use

#### Mounting

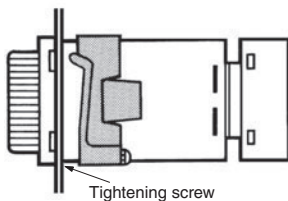
##### Track Mounting (E5C2 with P2CF-08)

When mounting two or more E5C2 models with track-mounting sockets, leave a space of approximately 20 mm on both sides of the sockets where hooks are located.

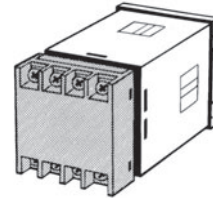


##### Flush Mounting

Insert E5C2 into the square hole of the panel and insert an adapter from the back so that there will be no space between E5C2 and the panel. Then, secure the E5C2 with a screw.

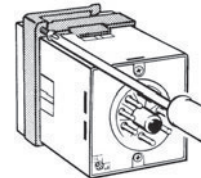


The P3G-08 can be wired in the same way as the P2CF-08.



#### Dismounting

If flush mounted, loosen the screw of the adapter and disengage the hooks for dismounting.



#### Temperature Setting

Do not turn the temperature setting knob of the E5C2 with excessive force, otherwise the stopper of the knob may break.

#### Others

- Do not remove the housing of the E5C2, otherwise the housing may break.
- To clean the surface of the E5C2, use a soft cloth wet with neutral detergent or alcohol. Do not use any organic solvent, such as paint thinner or benzene, strong acid or strong alkali to clean the surface of the E5C2, otherwise the surface of the E5C2 will become damaged.