

Temperature Controller

E5CB (48 × 48 mm)



Ideal for heater control, these Temperature Controllers offer the highest control performance at surprisingly low cost!

Easy to Read with One of the Largest Character Displays Anywhere.

- Improved visibility with character height of approx. 16 mm.
- Depth beyond front panel: Only 60 mm.
- Fewer parameters for simple setup.
- Faster sampling at 250 ms.
- High reliability with a three-year warranty.

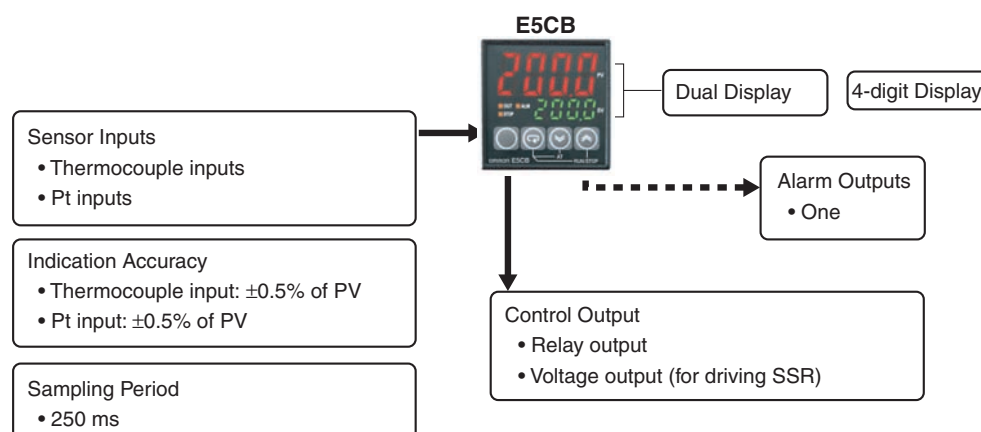


48 × 48 mm

For the most recent information on models that have been certified for safety standards, refer to your OMRON website.

Refer to *Safety Precautions* on page 9.

Main I/O Functions



Model Number Structure

Model Number Legend

E5CB- 1

1 2 3 4

1. Control Output

R: Relay output: 250 VAC, 3 A

Q: Voltage output (for driving SSR): 12 VDC, 21 mA

2. Alarm

1: Relay output: 250 VAC, 1 A (resistive load)

3. Sensor type

TC: Thermocouple (K, J, T, R, or S)

P: Platinum resistance thermometer (Pt100)

4. Power Supply Voltage

Blank: 100 to 240 VAC

D: 24 VAC/VDC

E5CB

Ordering Information

Temperature Controllers

Size	Power supply voltage	Input type	Alarm output	Control output	Model
E5CB 48 × 48 mm	100 to 240 VAC	Thermocouple	1	Relay output	E5CB-R1TC
		Platinum resistance thermometer			E5CB-R1P
		Thermocouple		Voltage output (for driving SSR)	E5CB-Q1TC
		Platinum resistance thermometer			E5CB-Q1P
	24 VAC/VDC	Thermocouple		Relay output	E5CB-R1TCD
		Platinum resistance thermometer			E5CB-R1PD
		Thermocouple		Voltage output (for driving SSR)	E5CB-Q1TCD
		Platinum resistance thermometer			E5CB-Q1PD

Accessories (Order Separately)

Terminal Cover

Model	E53-COV19
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Note: If you use the E53-COV19 Terminal Cover, you will not be able to connect two crimp terminals to the same terminal on the terminal block.

Front Cover

Type	Model
Hard Front Cover	Y92A-48B
Soft Front Cover	Y92A-48D

USB-Serial Conversion Cable

Model	E58-CIFQ2
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Mounting Adapter (Included)

Model	Y92F-49
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Adapter

Model	Y92F-45
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Note: 1. Use this Adapter when the Front Panel has already been prepared for the E5B□.
2. Only black is available.

Watertight Cover

Model	Y92A-48N
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DIN Track Mounting Adapter

Model	Y92F-52
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Waterproof Packing (Included)

Model	Y92S-P6
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Unit Seal

Model	Y92S-L2
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Specifications

Ratings

Power supply voltage		100 to 240 VAC 50/60 Hz, 24 VAC 50/60 Hz, or 24 VDC
Operating voltage range		85% to 110% of rated supply voltage
Power consumption		Approx. 3.5 VA (100 to 240 VAC) Approx. 3.5 VA (24 VAC) Approx. 2.5 W (24 VDC)
Sensor input		Models with thermocouple inputs Thermocouple: K, J, T, R, or S (JIS C 1602-1995, IEC60584-1) Models with platinum resistance thermometer inputs Platinum resistance thermometer: Pt100 (JIS C 1604-1997, IEC60751)
Control output	Relay output	SPST-NO, 250 VAC, 3 A (resistive load), electrical life: 100,000 operations, minimum applicable load: 5 V, 10 mA
	Voltage output (for driving SSR)	Output voltage: 12 VDC +25%/–15% (PNP), max. load current: 21 mA, with short-circuit protection circuit
Alarm output	Relay output	SPST-NO, 250 VAC, 1 A (resistive load), electrical life: 100,000 operations, minimum load: 5 V, 10 mA
Control method		ON/OFF control or 2-PID control (with auto-tuning)
Setting method		Digital setting using front panel keys
Indication method		7-segment digital display and individual indicators Character height: 16.2 mm (PV)
Other functions		Temperature input shift, run/stop, protection functions, etc.
Ambient operating temperature		–10 to 55°C (with no condensation or icing)/With a three-year guarantee: –10 to 50°C
Ambient operating humidity		25% to 85%
Storage temperature		–25 to 65°C (with no condensation or icing)

Input Ranges

Models with Thermocouple Inputs

Model (temperature input)	Set value	Input type	Range	
			°C	°F
TC input	0	K	–200 to 1,300	–300 to 2,300
	1		–20.0 to 500.0	0.0 to 900.0
	2	J	–100 to 850	–100 to 1500
	3		–20.0 to 400.0	0.0 to 750.0
	4	T	–200 to 400	–300 to 700
	5		–199.9 to 400.0	–199.9 to 700.0
	6	R	0 to 1,700	0 to 3,000
	7	S	0 to 1,700	0 to 3,000

Default setting: 0

Applicable standards (K, J, T, R, S): JIS C1602-1995 and IEC 60584-1

Platinum Resistance Thermometer Input

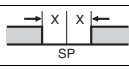
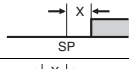
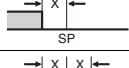
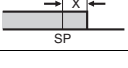
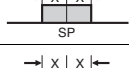
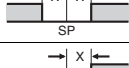
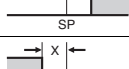
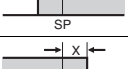
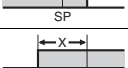
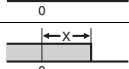
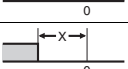
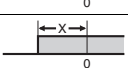
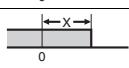
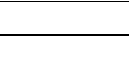
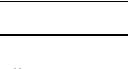
Model (temperature input)	Set value	Input type	Range	
			°C	°F
Pt input	8	Pt100	–200 to 850	–300 to 1500
	9		–199.9 to 500.0	–199.9 to 900.0

Default setting: 8

Applicable standards (Pt100): JIS C1604-1997 and IEC 60751

Alarm Types

Select alarm types out of the 11 alarm types listed in the following table.

Setting	Alarm type	Positive alarm value (X)	Negative alarm value (X)	Deviation alarm/absolute value alarm
0	No alarm	Output OFF		
1	Upper/lower limit	ON OFF 	Always ON	Deviation alarm
2	Upper limit	ON OFF 	ON OFF 	Deviation alarm
3	Lower limit	ON OFF 	ON OFF 	Deviation alarm
4	Upper/lower range	ON OFF 	Always OFF	Deviation alarm
5 (See note 2.)	Upper/lower limit standby sequence ON	ON OFF 	Always OFF	Deviation alarm
6 (See note 2.)	Upper limit standby sequence ON	ON OFF 	ON OFF 	Deviation alarm
7 (See note 2.)	Lower limit standby sequence ON	ON OFF 	ON OFF 	Deviation alarm
8	Absolute value upper limit	ON OFF 	ON OFF 	Absolute value alarm
9	Absolute value lower limit	ON OFF 	ON OFF 	Absolute value alarm
10 (See note 2.)	Absolute value upper limit standby sequence ON	ON OFF 	ON OFF 	Absolute value alarm
11 (See note 2.)	Absolute value lower limit standby sequence ON	ON OFF 	ON OFF 	Absolute value alarm
12	Do not set.			

Note: 1. The default is 2.

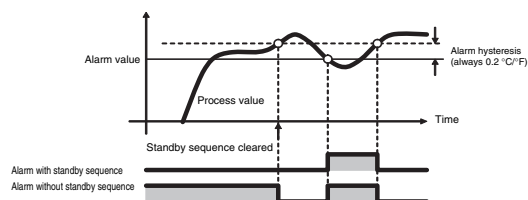
2. Alarms with a Standby Sequence

The alarm is blocked until the first safe-state is reached.

Unwanted alarm during start-up are prevented.

Example: Deviation Lower Limit Standby Sequence ON

The standby sequence is cleared when the alarm OFF condition has been met.



The standby sequence is started again when any of the following conditions is met.

- Operation is started (power is turned ON or operation is switched from stop to run).
- The alarm value is changed.
- The temperature input offset is changed.
- The set point is changed.

Characteristics

Indication accuracy		Thermocouple: (See note 1.) ($\pm 0.5\%$ of indicated value or $\pm 1^\circ\text{C}$, whichever is greater) ± 1 digit max. Platinum resistance thermometer: ($\pm 0.5\%$ of indicated value or $\pm 1^\circ\text{C}$, whichever is greater) ± 1 digit max.
Influence of temperature (See note 2.)		R and S thermocouple inputs: ($\pm 1\%$ of PV or $\pm 10^\circ\text{C}$, whichever is greater) ± 1 digit max.
Influence of voltage (See note 2.)		K, J, and T thermocouple inputs: ($\pm 1\%$ of PV or $\pm 4^\circ\text{C}$, whichever is greater) ± 1 digit max.
Influence of EMS. (at EN 61326-1)		Platinum resistance thermometer inputs: ($\pm 1\%$ of PV or $\pm 2^\circ\text{C}$, whichever is greater) ± 1 digit max.
Hysteresis		0.1 to 999.9 (in units of 0.1) $^\circ\text{C}/^\circ\text{F}$
Proportional band (P)		0.1 to 999.9 (in units of 0.1) $^\circ\text{C}/^\circ\text{F}$
Integral time (I)		0 to 3999 s (in units of 1 s)
Derivative time (D)		0 to 3999 s (in units of 1 s)
Control period		0.5, 1 to 99 s (in units of 1 s)
Alarm setting range		-1999 to 9999 (decimal point position depends on input type)
Input sampling period		250 ms
Affect of signal source resistance		Thermocouple: $0.1^\circ\text{C}/\Omega$ max. (100 Ω max.) (See note 3.) Platinum resistance thermometer: $0.6^\circ\text{C}/\Omega$ max. (10 Ω max.)
Insulation resistance		20 M Ω min. (at 500 VDC)
Dielectric strength		2,800 VAC, 50 or 60 Hz for 1 min (between terminals with different charge)
Vibration resistance	Malfunction	10 to 55 Hz, 20 m/s ² for 10 min each in X, Y, and Z directions
	Destruction	10 to 55 Hz, 20 m/s ² for 2 hrs each in X, Y, and Z directions
Shock resistance	Malfunction	200 m/s ² , 3 times each in X, Y, and Z directions
	Destruction	300 m/s ² , 3 times each in X, Y, and Z directions
Weight		Controller: Approx. 100 g, Mounting Bracket: Approx. 10 g
Degree of protection		Front panel: IP66 Rear case: IP20, Terminals: IP00
Memory protection		Non-volatile memory (number of writes: 100,000 times)
Conformed standards	Certified standards	UL 61010-1, CSA C22.2 No. 1010-1
	Applicable standards	EN61326, EN61010-1, IEC61010-1 VDE0106, Part 100 (Finger protection), when the terminal cover is mounted.
EMC		EMI Emission Enclosure: Emission AC Mains: EMS Immunity ESD: Immunity RF-interference: Immunity Burst: Conduction Disturbance Immunity Immunity Surge: Immunity Voltage Dip/Interrupting: EN61326-1 (See note 4.) EN55011 Group1 Class A EN55011 Group1 Class A EN61326-1 (See note 4.) EN61000-4-2 EN61000-4-3 EN61000-4-4 EN61000-4-6 EN61000-4-5 EN61000-4-11

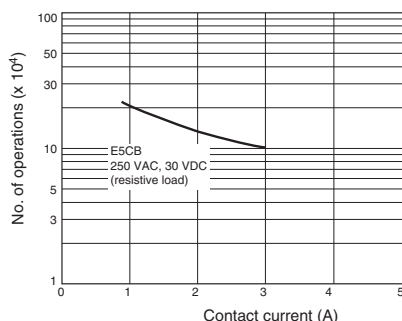
Note: 1. The indication accuracy of K and T thermocouples at a temperature of -100°C max. is $\pm 2^\circ\text{C} \pm 1$ digit maximum. The indication accuracy of the R and S thermocouples at a temperature of 200°C max. is $\pm 3^\circ\text{C} \pm 1$ digit max.

2. Conditions: Ambient temperature: -10 to 23 to 55°C , Voltage range: -15% to $\pm 10\%$ of rated voltage

3. R, and S sensors: $0.2^\circ\text{C}/\Omega$ max. (100 Ω max.)

4. Industrial electromagnetic environment (EN/IEC 61326-1 Table 2)

Electrical Life Expectancy Curve for Relays (Reference Values)



USB-Serial Conversion Cable Specifications

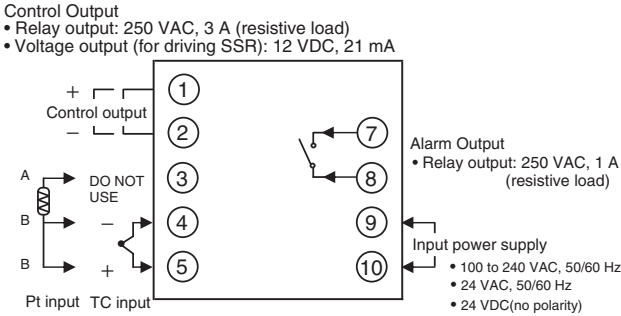
Applicable OS	Windows XP/Vista/7/8.1/10
Applicable software	Thermo Mini
Applicable models	E5CB Series
USB interface standard	USB specification 1.1
DTE speed	38,400 bps
Connector Specifications	Computer: USB (Type A plug) Temperature Controller: Special serial connector
Power supply	Bus power (supplied from the USB host controller)
Power supply voltage	5 VDC
Current consumption	450 mA max.
Output voltage	4.7 $\pm$ 0.2 VDC (Supplied from USB-Serial Conversion Cable to the Temperature Controller.)
Output current	250 mA max. (Supplied from USB-Serial Conversion Cable to the Temperature Controller.)
Ambient temperature	0 to 55°C (with no condensation or icing)
Ambient humidity	10% to 80%
Storage temperature	-20 to 60°C (with no condensation or icing)
Storage humidity	10% to 80%
Altitude	2,000 m max.
Weight	Approx. 120 g

Note: 1. A high-power port is used for the USB port.
2. A driver must be installed on the computer. Refer to the *Instruction Manual* included with the Cable for the installation procedure.

External Connections

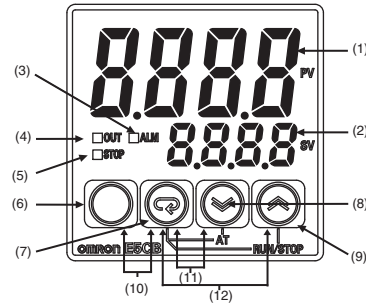
- A voltage output (control output) is not electrically insulated from the internal circuits. When using a grounding thermocouple, do not connect any of the control output terminals to ground. If the control output terminals are connected to ground, errors will occur in the measured temperature values as a result of leakage current.

E5CB



Nomenclature

E5CB

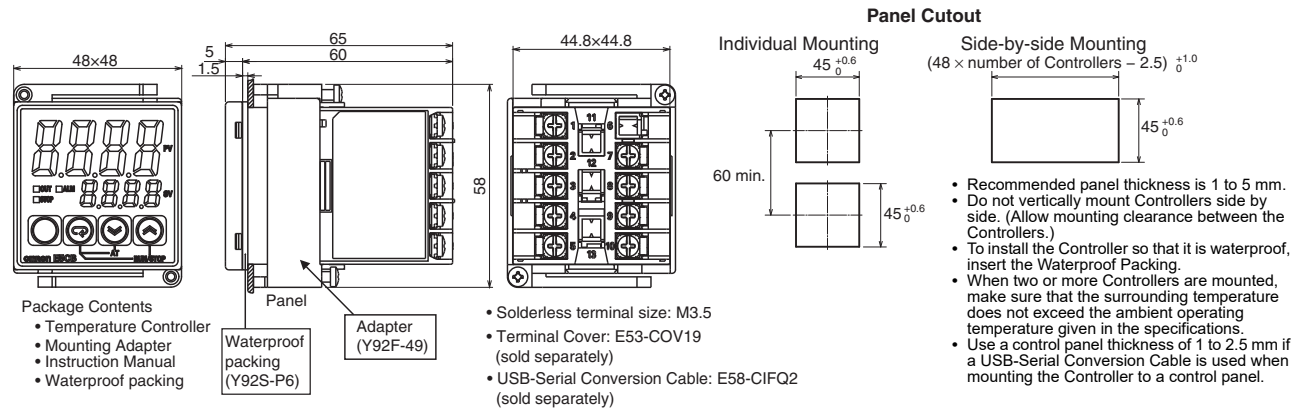


- | | | | |
|-------------------|--|----------------|--|
| (1) Display No. 1 | Displays the process value (PV) or parameter. | (10) [] + [] | Press these keys for at least 3 seconds in Operation Level or Adjustment Level to go to Protect Level. |
| (2) Display No. 2 | Displays the set point (SP) or parameter setting. | | Press these keys for at least 1 second in Protect Level to return to Operation Level. |
| (3) ALM | Lit while the alarm is ON. Not lit while the alarm is OFF. | (11) [] + [] | Press these keys for at least 2 seconds to start or stop autotuning.*1 |
| (4) OUT | Lit while the control output is ON. Not lit while the control output is OFF. | (12) [] + [] | Press these keys for at least 2 seconds to start or stop operation.*2 |
| (5) STOP | Not lit during operation. Lit while operation is stopped. | | |
| (6) [] | Level Key: Changes the setting level. | | |
| (7) [] | Mode Key: Changes the parameter within the setting level. | | |
| (8) [] | Down Key: Reduces the setting. | | |
| (9) [] | Up Key: Increases the setting. | | |
- *1: These keys are disabled when starting and stopping autotuning has been disabled with operation control key protection.
- *2: These keys are disabled when starting and stopping operation has been disabled with operation control key protection.

Dimensions

(Unit: mm)

E5CB

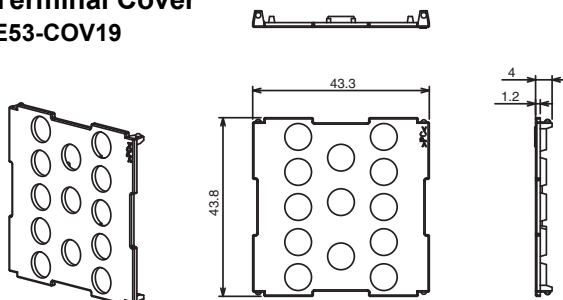


The Support Software port is on the top of the Temperature Controller.
This port is used to connect the Temperature Controller to a personal computer.
The E58-CIFQ2 USB-Serial Conversion Cable is required to make the connection.
For details on connection methods, refer to the *E58-CIFQ2 USB-Serial Conversion Cable Instruction Manual*.
*Do not leave the USB-Serial Conversion Cable connected while using the Temperature Controller.

E5CB

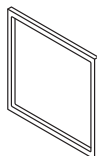
Accessories (Order Separately)

Terminal Cover E53-COV19



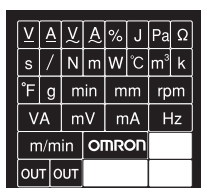
Note: You cannot use the following Terminal Covers: E53-COV10 and E53-COV17. If you use the E53-COV19 Terminal Cover, you will not be able to connect two crimp terminals to the same terminal on the terminal block.

Waterproof Packing Y92S-P6



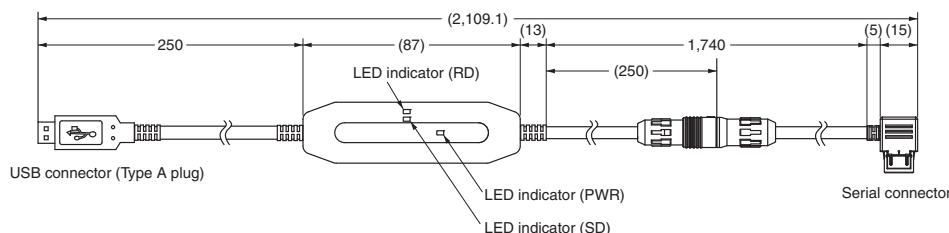
Order the Waterproof Packing separately if it becomes lost or damaged. The Waterproof Packing can be used to achieve an IP66 degree of protection. (Deterioration, shrinking, or hardening of the waterproof packing may occur depending on the operating environment. Therefore, periodic replacement is recommended to ensure the level of waterproofing specified in IP66. The time for periodic replacement depends on the operating environment. Be sure to confirm this point at your site. Consider one year a rough standard. OMRON shall not be liable for the level of water resistance if the customer does not perform periodic replacement.) The Waterproof Packing does not need to be attached if a waterproof structure is not required.

Unit Labels Y92S-L2



The Unit Labels for the Digital Panel Meter are used. Use either the °C or °F label from the sheet.

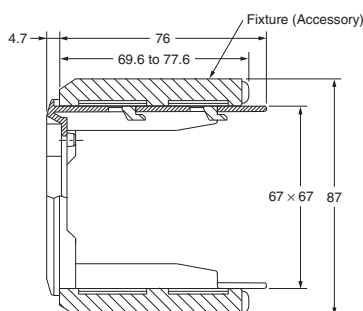
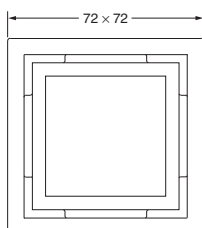
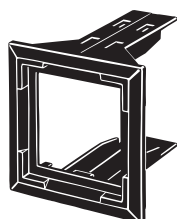
USB-Serial Conversion Cable E58-CIFQ2



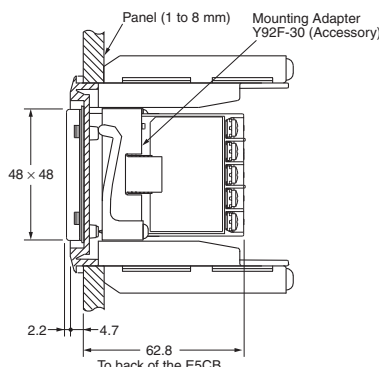
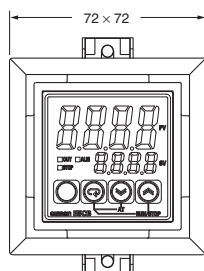
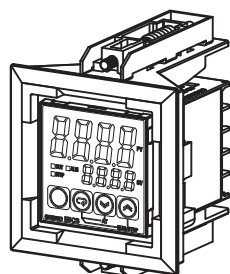
Adapter

- Note:**
1. Use this Adapter when the Front Panel has already been prepared for the E5B□□.
 2. Only black is available.
 3. You cannot use the E58-CIFQ2 USB-Serial Conversion Cable if you use the Y92F-45 Adapter. To use the USB-Serial Conversion Cable to make the settings, do so before you mount the Temperature Controller in the panel.
 4. You cannot use this Adapter together with the Y92F-49 Adapter that is provided with the E5CB Temperature Controller.

Y92F-45



Mounted to E5CB



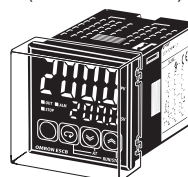
Front Covers

Front Covers are available.

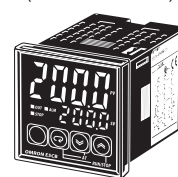
Use them in the following cases.

- To protect the setting panel from dust and dirt
- To prevent inadvertently touching the setting panel and accidentally changing the settings
- To help protect the front panel from water drops
- To help protect the Temperature Controller from static electricity

Y92A-48B
(Hard Front Cover)



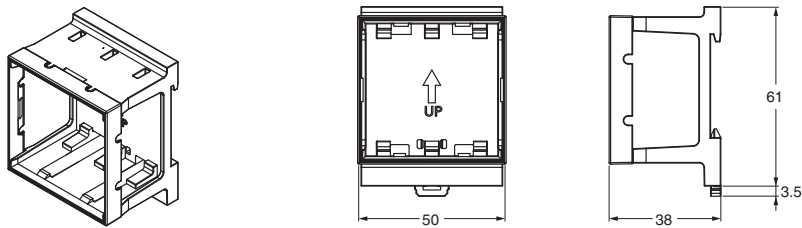
Y92A-48D
(Soft Front Cover)



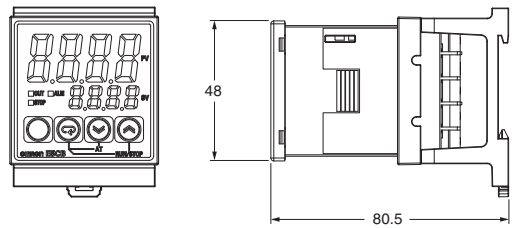
- Note:**
1. The Y92A-48B Front Cover is made from hard plastic. It must be removed to change the settings. The Y92A-48D Front Cover is made from PVC. You can press the front of the Front Cover to change the settings. However, the Front Cover makes it more difficult to change the settings. Confirm applicability in advance.
 2. The Soft Front Cover may deteriorate, shrink, or harden due to the application environment. We recommend replacing it periodically.
 3. Due to material properties, the product surface may become cloudy white. If this causes any issues during use, please wipe it with isopropyl alcohol or similar before using.

DIN Track Mounting Adapter

Y92F-52 **Note:** This Adapter cannot be used together with the Terminal Cover.
Remove the Terminal Cover to use the Adapter.



Mounted to E5CB



Watertight Cover

Y92A-48N

