

# Digital Temperature Controller

# E5EC/E5EC-B/E5AC

(48 × 96 mm/96 × 96 mm)

**Large White PV Display That's Easier to Read.  
Easy to Use, from Model Selection to  
Setup and Operation.**

**Models with Push-In Plus Terminal  
Blocks Added to 48 × 96-mm Lineup.**

- A white LCD PV display with a height of approx. 18 mm for the E5EC/E5EC-B and 25 mm for the E5AC improves visibility.
- High-speed sampling at 50 ms.
- With 48 x 96-mm Controllers, you can select between screw terminal blocks or Push-In Plus terminal blocks to save wiring work.
- Short body with depth of only 60 mm. (Screw Terminal Blocks)
- Easy connections to a PLC with programless communications. Use component communications to link Temperature Controllers to each other.
- Tool ports are provided both on the top panel and the front panel. Set up the Controller without wiring the power supply by connecting to the computer with a Communications Conversion Cable (sold separately). Setup is easy with the CX-Thermo (sold separately).



\* CSA conformance evaluation by UL.



48 × 96 mm  
Screw Terminal  
Blocks  
E5EC

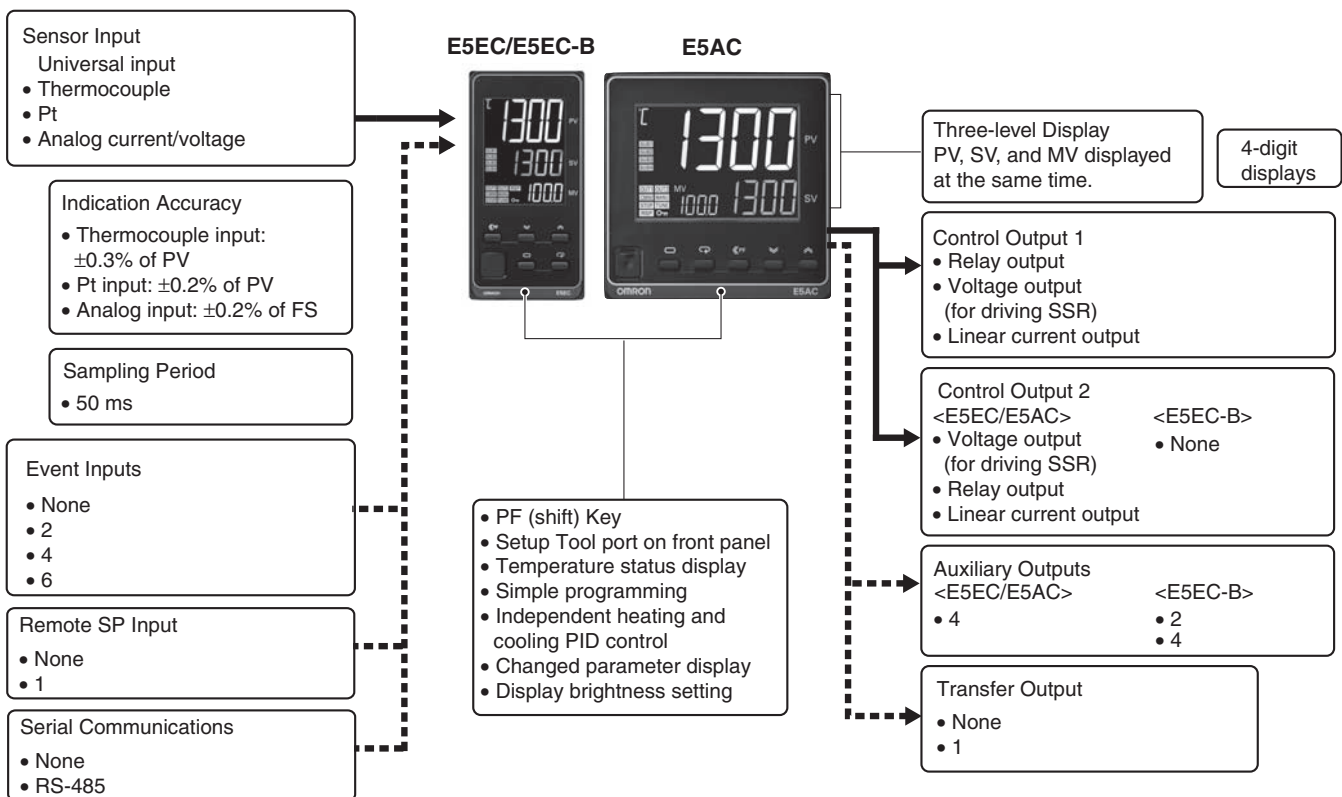
48 × 96 mm  
Push-In Plus  
Terminal  
Blocks  
E5EC-B

96 × 96 mm  
Screw Terminal  
Blocks  
E5AC

Refer to your OMRON website for the most recent information on applicable safety standards.

**Refer to Safety Precautions on page 122.**

## Main I/O Functions



This datasheet is provided as a guideline for selecting products.

Be sure to refer to the following manuals for application precautions and other information required for operation before attempting to use the product.

E5□C Digital Temperature Controllers User's Manual (Cat. No. H174)

E5□C Digital Temperature Controllers Communications Manual (Cat. No. H175)

## Model Number Legend and Standard Models

### Model Number Legend

#### Models with Screw Terminal Blocks

**E5EC-□□ 4 □ 5 M-□□□□** (Example: E5EC-RX4A5M-000)

(1) (2) (3) (4) (5) (6)

**E5AC-□□ 4 □ 5 M-□□□□** (Example: E5AC-RX4A5M-000)

(1) (2) (3) (4) (5) (6)

Model	(1)	(2)	(3)	(4)	(5)	(6)	Meaning	
	Control outputs 1 and 2	No. of auxiliary outputs	Power supply voltage	Terminal type	Input type	Options	Control output 1	Control output 2
E5EC							48 × 96 mm	
E5AC							96 × 96 mm	
*2	RX						Relay output	None
	QX						Voltage output (for driving SSR)	None
	CX						Linear current output	None
	QQ						Voltage output (for driving SSR)	Voltage output (for driving SSR)
	QR						Voltage output (for driving SSR)	Relay output
	RR						Relay output	Relay output
	*2 CC						Linear current output	Linear current output
	*2 CQ						Linear current output	Voltage output (for driving SSR)
	PR						Position-proportional relay output	Position-proportional relay output
			*3 4					4 (auxiliary outputs 1 and 2 with same common and auxiliary outputs 3 and 4 with same common)
			A				100 to 240 VAC	
			D				24 VAC/DC	
				5			Screw terminal blocks (with cover)	
					M		Universal input	

Option selection conditions *1	Control outputs 1 and 2					HB alarm and HS alarm	Communications	Event inputs	Remote SP Input	Transfer output
	For RX, QX, QQ, QR, RR, or CQ	For CX or CC	For PR							
	Selectable	Selectable	Selectable			000	---	---	---	---
		Selectable	Selectable			004	---	RS-485	2	---
		Selectable				005	---	---	4	---
	Selectable					009	2 (for 3-phase heaters)	RS-485	2	---
	Selectable					010	1	---	4	---
	Selectable					011	1	---	6	Provided. Provided.
		Selectable				013	---	---	6	Provided. Provided.
		Selectable	Selectable			014	---	RS-485	4	Provided. Provided.

\*1. The options that can be selected depend on the type of control output.

\*2. The control output cannot be used as a transfer output.

\*3. A model with four auxiliary outputs must be selected.

**Note:** Draw-out-type models of the E5EC and E5AC are available. Ask your OMRON representative for details.

## Heating and Cooling Control

### Using Heating and Cooling Control

#### (1) Control Output Assignment

If there is no control output 2, an auxiliary output is used as the cooling control output.

If there is a control output 2, the two control outputs are used for heating and cooling.

(It does not matter which output is used for heating and which output is used for cooling.)

#### (2) Control

If PID control is used, you can set PID control separately for heating and cooling.

This allows you to handle control systems with different heating and cooling response characteristics.

## Model Number Legend

Models with Push-In Plus Terminal Blocks

E5EC-□□ □□ B M -□□□ (Example: E5EC-RX4ABM-000)

(1) (2) (3) (4) (5) (6)

Model	(1)	(2)	(3)	(4)	(5)	(6)	Meaning						
	Control outputs 1 and 2	No. of auxiliary outputs	Power supply voltage	Terminal type	Input type	Options							
E5EC							48 × 96 mm						
							Control output 1			Control output 2			
*1	RX						Relay output			None			
*2	QX						Voltage output (for driving SSR)			None			
*2	CX						Linear current output *3			None			
		2					2 independent points						
		4					4 (auxiliary outputs 1 and 2 with same common and auxiliary outputs 3 and 4 with same common)						
			A				100 to 240 VAC						
			D				24 VAC/DC						
				B			Push-in plus terminal blocks						
					M		Universal input						
							HB alarm and HS alarm	Communications	Event inputs	Remote SP Input	Transfer output		
							000	---	---	---	---		
*1							004	---	RS-485	2	---		
*2							008	1	RS-485	2	---		
*2							010	1	---	4	---		
*2							011	1	---	6	Provided.	Provided.	
*1							014	---	RS-485	4	Provided.	Provided.	

\*1. Option 004 and 014 cannot be selected if RX or QX is selected for the control output.

\*2. Option 008, 010 and 011 cannot be selected if CX is selected for the control output.

\*3. The control output cannot be used as a simple transfer output.

## Heating and Cooling Control

### Using Heating and Cooling Control

(1) Control Output Assignment

An auxiliary output is used as the cooling control output.

(2) Control

If PID control is used, you can set PID control separately for heating and cooling.

This allows you to handle control systems with different heating and cooling response characteristics.

## Optional Products (Order Separately)

### USB-Serial Conversion Cable

Model
E58-CIFQ2

### Communications Conversion Cable

Model
E58-CIFQ2-E

**Note:** Always use this product together with the E58-CIFQ2. This Cable is used to connect to the front-panel Setup Tool port.

### Terminal Covers (for E5EC/E5AC)

Model
E53-COV24 (3pcs)

**Note:** The Terminal Covers E53-COV24 are provided with the Digital Temperature Controller.

### Waterproof Packing

Applicable Controller	Model
E5EC/E5EC-B	Y92S-P9
E5AC	Y92S-P10

**Note:** This Waterproof Packing is provided with the Digital Temperature Controller.

### Waterproof Cover

Applicable Controller	Model
E5EC/E5EC-B	Y92A-49N
E5AC	Y92A-96N

### Front Port Cover

Model
Y92S-P7

**Note:** This Front Port Cover is provided with the Digital Temperature Controller.

### Mounting Adapter

Model
Y92F-51 (2pcs)

**Note:** This Mounting Adapter is provided with the Digital Temperature Controller.

### Current Transformers (CTs)

Hole diameter	Model
5.8 mm	E54-CT1
5.8 mm	E54-CT1L *
12.0 mm	E54-CT3
12.0 mm	E54-CT3L *

\* Lead wires are included with these CTs. If UL certification is required, use these CTs.

### CX-Thermo Support Software

Model
EST2-2C-MV4

**Note:** CX-Thermo version 4.5 or higher is required for the E5EC/E5AC.

CX-Thermo version 4.65 or higher is required for the E5EC-B. CX-Thermo version 4.67 or higher is required for the E5CC-B linear current output type.

For the system requirements for the CX-Thermo, refer to information on the EST2-2C-MV4 on the OMRON website ([www.ia.omron.com](http://www.ia.omron.com)).

# E5EC/E5EC-B/E5AC

## Specifications

### Ratings

<b>Power supply voltage</b>		A in model number: 100 to 240 VAC, 50/60 Hz D in model number: 24 VAC, 50/60 Hz; 24 VDC
<b>Operating voltage range</b>		85 to 110% of rated supply voltage
<b>Power consumption</b>	<b>E5EC/ E5EC-B</b>	Models with option selection of 000: 6.6 VA max. at 100 to 240 VAC, and 4.1 VA max. at 24 VAC or 2.3 W max. at 24 VDC All other models: 8.3 VA max. at 100 to 240 VAC, and 5.5 VA max. at 24 VAC or 3.2 W max. at 24 VDC
	<b>E5AC</b>	Models with option selection of 000: 7.0 VA max. at 100 to 240 VAC, and 4.2 VA max. at 24 VAC or 2.4 W max. at 24 VDC All other models: 9.0 VA max. at 100 to 240 VAC, and 5.6 VA max. at 24 VAC or 3.4 W max. at 24 VDC
<b>Sensor input</b>		Temperature input Thermocouple: K, J, T, E, L, U, N, R, S, B, C/W, or PL II Platinum resistance thermometer: Pt100 or JPt100 Infrared temperature sensor (ES1B): 10 to 70°C, 60 to 120°C, 115 to 165°C, or 140 to 260°C Analog input Current input: 4 to 20 mA or 0 to 20 mA Voltage input: 1 to 5 V, 0 to 5 V, or 0 to 10 V
<b>Input impedance</b>		Current input: 150 Ω max., Voltage input: 1 MΩ min. (Use a 1:1 connection when connecting the ES2-HB-N/THB-N.)
<b>Control method</b>		ON/OFF or 2-PID control (with auto-tuning)
<b>Control output</b>	<b>Relay output</b>	SPST-NO, 250 VAC, 5 A (resistive load), electrical life: 100,000 operations, minimum applicable load: 5 V, 10 mA (reference value)
	<b>Voltage output (for driving SSR)</b>	Output voltage: 12 VDC ±20% (PNP), max. load current: 40 mA, with short-circuit protection circuit (The maximum load current is 21 mA for models with two control outputs.)
	<b>Linear current output</b>	4 to 20 mA DC/0 to 20 mA DC, load: 500 Ω max., resolution: approx. 10,000
<b>Auxiliary output</b>	<b>Number of outputs</b>	E5EC/E5AC: 4 E5EC-B: 2 or 4 (depends on model)
	<b>Output specifications</b>	SPST-NO. relay outputs, 250 VAC, Models with 2 outputs: 3 A (resistive load), Models with 4 outputs: 2 A (resistive load), Electrical life: 100,000 operations, Minimum applicable load: 10 mA at 5 V (reference value)
<b>Event input</b>	<b>Number of inputs</b>	2, 4 or 6 (depends on model)
	<b>External contact input specifications</b>	Contact input: ON: 1 kΩ max., OFF: 100 kΩ min.
		Non-contact input: ON: Residual voltage: 1.5 V max., OFF: Leakage current: 0.1 mA max. Current flow: Approx. 7 mA per contact
<b>Transfer output</b>	<b>Number of outputs</b>	1 (only on models with a transfer output)
	<b>Output specifications</b>	Current output: 4 to 20 mA DC, Load: 500 Ω max., Resolution: Approx. 10,000 Linear voltage output: 1 to 5 VDC, load: 1 kΩ min., Resolution: Approx. 10,000
<b>Remote SP input</b>		Current input: 4 to 20 mA DC or 0 to 20 mA DC (input impedance: 150 Ω max.) Voltage input: 1 to 5 V, 0 to 5 V, or 0 to 10 V (input impedance: 1 MΩ min.)
<b>Potentiometer input *</b>		100 Ω to 10 kΩ
<b>Setting method</b>		Digital setting using front panel keys
<b>Indication method</b>		11-segment digital display and individual indicators Character height: E5EC/E5EC-B: PV: 18.0 mm, SV: 11.0 mm, MV: 7.8 mm E5AC: PV: 25.0 mm, SV: 15.0 mm, MV: 9.5 mm Three displays Contents: PV/SV/MV, PV/SV/Multi-SP, or PV/SV/Remaining soak time, etc Numbers of digits: 4 digits each for PM, SV, and MV displays
<b>Multi SP</b>		Up to eight set points (SP0 to SP7) can be saved and selected using the event inputs, key operations, or serial communications.
<b>Bank switching</b>		None
<b>Other functions</b>		Manual output, heating/cooling control, loop burnout alarm, SP ramp, other alarm functions, heater burnout (HB) alarm (including SSR failure (HS) alarm), 40% AT, 100% AT, MV limiter, input digital filter, self tuning, robust tuning, PV input shift, run/stop, protection functions, extraction of square root, MV change rate limit, logic operations, temperature status display, simple programming, moving average of input value, and display brightness setting
<b>Ambient operating temperature</b>		-10 to 55°C (with no condensation or icing), For 3-year warranty: -10 to 50°C with standard mounting (with no condensation or icing)
<b>Ambient operating humidity</b>		25 to 85%
<b>Storage temperature</b>		-25 to 65°C (with no condensation or icing)
<b>Altitude</b>		2,000 m max.
<b>Recommended fuse</b>		T2A, 250 VAC, time-lag, low-breaking capacity
<b>Installation environment</b>		Overvoltage category II, Pollution Degree 2 (EN/IEC/UL 61010-1)

\* This function is not supported by the E5EC-B. Refer to *Model Number Legend* on page 42.