

# E5CN/E5CN-U (48 x 48 mm)

CSM\_E5CN\_E5CN-U\_DS\_E\_5\_9

## New 48 x 48-mm Basic Temperature Controller with Enhanced Functions and Performance. Improved Indication Accuracy and Preventive Maintenance Function.



- Indication Accuracy  
 Thermocouple input:  $\pm 0.3\%$  of PV (previous models:  $\pm 0.5\%$ )  
 Pt input:  $\pm 0.2\%$  of PV (previous models:  $\pm 0.5\%$ )  
 Analog input:  $\pm 0.2\%$  FS (previous models:  $\pm 0.5\%$ )
- New E5CN-U Models (Plug-in Models) with analog inputs and current outputs.
- A PV/SV-status display function can be set to automatically alternate between displaying the status of the Temperature Controller (auto/manual, RUN/STOP, and alarms) and the PV or SV.
- Preventive maintenance for relays in the Temperature Controller using a Control Output ON/OFF Counter.



48 x 48-mm E5CN

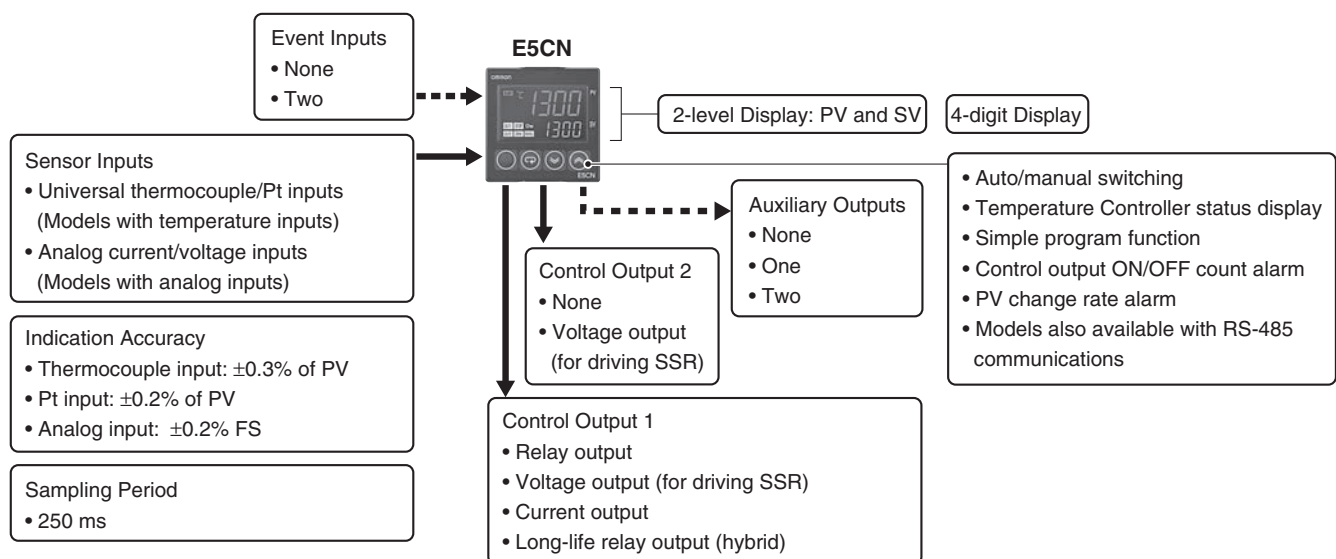
48 x 48-mm E5CN-U

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

Refer to *Safety Precautions for E5□N/E5□N-H*.

Refer to *Operation for E5□N/E5□N-H* for operating procedures.

## Main I/O Functions

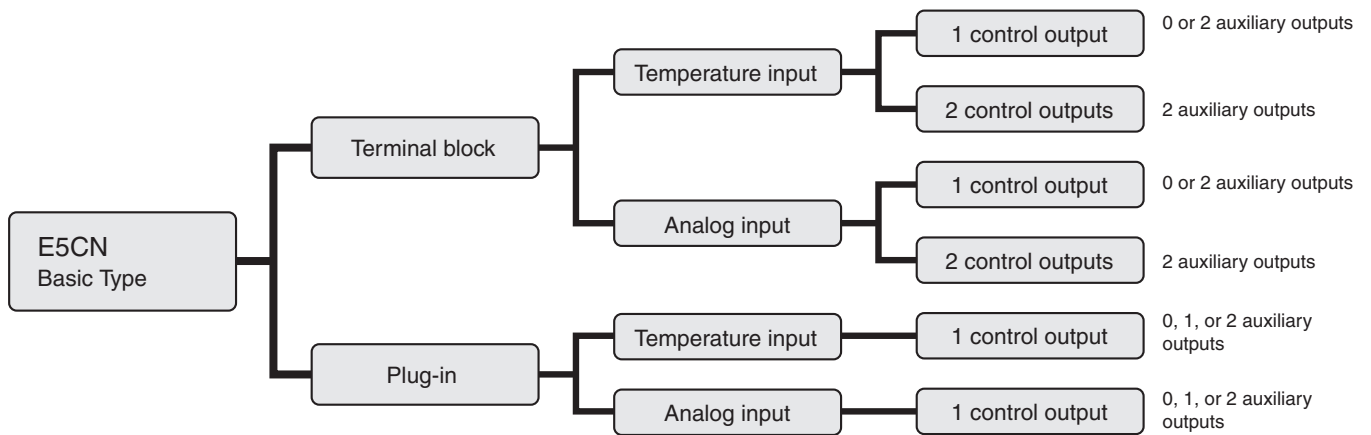


This data sheet is provided as a guideline for selecting products. Be sure to refer to the following user manuals for application precautions and other information required for operation before attempting to use the product.

E5CN/E5AN/E5EN/E5GN Digital Temperature Controllers User's Manual Basic Type (Cat. No. H156)

E5CN/E5AN/E5EN/E5GN Digital Temperature Controllers Communications Manual Basic Type (Cat. No. H158)

## Lineup



**Note:** Models with one control output and one or two auxiliary outputs and models with two control outputs can be used for heating/cooling control.

## Model Number Structure

### Model Number Legend

#### Controllers

E5CN-      M    -  -500

1 2 3 4 5 6 7

#### 1. Control Output 1

- R: Relay output
- Q: Voltage output (for driving SSR)
- C: Current output
- Y: Long-life relay output (hybrid) \*1

#### 2. Auxiliary Outputs \*2

- Blank: None
- 2: Two outputs

#### 3. Option

- M: Option Unit can be mounted.

#### 4. Input Type

- T: Universal thermocouple/platinum resistance thermometer
- L: Analog current/voltage input

#### 5. Power Supply Voltage

- Blank: 100 to 240 VAC
- D: 24 VAC/VDC

#### 6. Case Color

- Blank: Black
- W: Silver

#### 7. Terminal Cover

- 500: With terminal cover

#### Option Units

E53-CN      

1 2 3 4

#### 1. Applicable Controller

- CN: E5CN or E5CN-H

#### 2. Function 1

- Blank: None
- Q: Control output 2 (voltage for driving SSR)
- P: Power supply for sensor

#### 3. Function 2

- Blank: None
- H: Heater burnout/SSR failure/Heater overcurrent detection (CT1)
- HH: Heater burnout/SSR failure/Heater overcurrent detection (CT2)
- B: Two event inputs
- 03: RS-485 communications
- H03: Heater burnout/SSR failure/Heater overcurrent detection (CT1) + RS-485 communications
- HB: Heater burnout/SSR failure/Heater overcurrent detection (CT1) + Two event inputs
- HH03: Heater burnout/SSR failure/Heater overcurrent detection (CT2) + RS-485 communications

#### 4. Version

- N2: Applicable only to models released after January 2008

**Note: 1.** Not all combinations of function 1 and function 2 specifications are possible for Option Units (E53-      ).

**2.** Estimates can be provided for coatings and other specifications that are not given in the datasheet. Ask your OMRON representative for details.

\*1. Always connect an AC load to a long-life relay output. The output will not turn OFF if a DC load is connected because a triac is used for switching the circuit. For details, check the conditions in *Ratings*.

\*2. Auxiliary outputs are contact outputs that can be used to output alarms or results of logic operations.

## Ordering Information

### Controllers with Terminal Blocks

Size	Case color	Power supply voltage	Input type	Auxiliary outputs	Control output 1	Model
1/16 DIN 48 × 48 × 78 (W × H × D)	Black	100 to 240 VAC	Thermocouple or Resistance thermometer	None	Relay output	E5CN-RMT-500
					Voltage output (for driving SSR)	E5CN-QMT-500
					Current output	E5CN-CMT-500
				2	Relay output	E5CN-R2MT-500
					Voltage output (for driving SSR)	E5CN-Q2MT-500
					Current output	E5CN-C2MT-500
		24 VAC/VDC	Thermocouple or Resistance thermometer	None	Relay output	E5CN-RMTD-500
					Voltage output (for driving SSR)	E5CN-QMTD-500
					Current output	E5CN-CMTD-500
				2	Relay output	E5CN-R2MTD-500
					Voltage output (for driving SSR)	E5CN-Q2MTD-500
					Current output	E5CN-C2MTD-500
	Silver	100 to 240 VAC	Analog (current/voltage)	None	Relay output	E5CN-RML-500
					Voltage output (for driving SSR)	E5CN-QML-500
					Current output	E5CN-CML-500
				2	Relay output	E5CN-R2ML-500
					Voltage output (for driving SSR)	E5CN-Q2ML-500
					Current output	E5CN-C2ML-500
		24 VAC/VDC	Analog (current/voltage)	2	Long-life relay output (hybrid)	E5CN-Y2ML-500
					Relay output	E5CN-R2MLD-500
					Voltage output (for driving SSR)	E5CN-Q2MLD-500
				2	Current output	E5CN-C2MLD-500
					Relay output	E5CN-RMT-W-500
					Voltage output (for driving SSR)	E5CN-QMT-W-500
100 to 240 VAC	Thermocouple or Resistance thermometer	None	Current output	E5CN-CMT-W-500		
			Relay output	E5CN-R2MT-W-500		
			Voltage output (for driving SSR)	E5CN-Q2MT-W-500		
		2	Current output	E5CN-C2MT-W-500		
			Long-life relay output (hybrid)	E5CN-Y2MT-W-500		
			Relay output	E5CN-R2MTD-W-500		
24 VAC/VDC	2	Voltage output (for driving SSR)	E5CN-Q2MTD-W-500			
		Current output	E5CN-C2MTD-W-500			

**Note:** Models with analog inputs do not have temperature unit indicators.

### Option Units

One of the following Option Units can be mounted to provide the E5CN with additional functions.

Functions					Model (See Note 2.)
Communications RS-485	3-phase heater burnout/SSR failure/Heater overcurrent detection				E53-CNHH03N2
	Heater burnout/SSR failure/Heater overcurrent detection	Event inputs			E53-CNHB2
Communications RS-485			Control output 2 (Voltage for driving SSR)		E53-CNQ03N2
		Event inputs		External power supply for ES1B	E53-CNPBN2
	Heater burnout/SSR failure/Heater overcurrent detection			External power supply for ES1B	E53-CNPHN2
Communications RS-485				External power supply for ES1B	E53-CNP03N2
Communications RS-485	Heater burnout/SSR failure/Heater overcurrent detection				E53-CNH03N2
Communications RS-485					E53-CN03N2
		Event inputs			E53-CNBN2
	Heater burnout/SSR failure/Heater overcurrent detection		Control output 2 (Voltage for driving SSR)		E53-CNQH2
	3-phase heater burnout/SSR failure/Heater overcurrent detection		Control output 2 (Voltage for driving SSR)		E53-CNQH2N2
		Event inputs	Control output 2 (Voltage for driving SSR)		E53-CNQB2

**Note: 1.** Option Units cannot be used for plug-in models.

These Option Units are applicable only to models released after January 2008.

- 2.** If models with heater burnout detection are used together with the E5CN-C□ Temperature Controller and control output 1 (current output) is assigned to the heating control output, heater burnout detection will be disabled.

## Model Number Structure

### Model Number Legend (Plug-in-type Controllers)

E5CN-□□□□U  
1 2 3 4

#### 1. Output Type

- R: Relay output
- Q: Voltage output (for driving SSR)
- C: Current output

#### 2. Number of Alarms

- Blank: No alarm
- 1: One alarm
- 2: Two alarms

#### 3. Input Type

- T: Universal thermocouple/platinum resistance thermometer
- L: Analog Input

#### 4. Plug-in type

- U: Plug-in type

## Ordering Information

### Plug-in-type Controllers

Size	Case color	Power supply voltage	Input type	Auxiliary outputs	Control output 1	Model
1/16 DIN	Black	100 to 240 VAC	Thermocouple or resistance thermometer	None	Relay output	E5CN-RTU
					Voltage output (for driving SSR)	E5CN-QTU
					Current output	E5CN-CTU
				1	Relay output	E5CN-R1TU
					Voltage output (for driving SSR)	E5CN-Q1TU
					Current output	E5CN-C1TU
				2	Relay output	E5CN-R2TU
					Voltage output (for driving SSR)	E5CN-Q2TU
					Current output	E5CN-C2TU
		Analog (current/voltage)	1	Relay output	E5CN-R1LU	
				Voltage output (for driving SSR)	E5CN-Q1LU	
				Current output	E5CN-C1LU	
			2	Relay output	E5CN-R2LU	
				Voltage output (for driving SSR)	E5CN-Q2LU	
				Current output	E5CN-C2LU	
		24 VAC/VDC	Thermocouple or resistance thermometer	None	Relay output	E5CN-RTDU
					Voltage output (for driving SSR)	E5CN-QTDU
					Current output	E5CN-CTDU
1	Relay output			E5CN-R1TDU		
	Voltage output (for driving SSR)			E5CN-Q1TDU		
	Current output			E5CN-C1TDU		
2	Relay output			E5CN-R2TDU		
	Voltage output (for driving SSR)			E5CN-Q2TDU		
	Current output			E5CN-C2TDU		

**Note:** Models with analog inputs do not have temperature unit indicators.

## Accessories (Order Separately)

### USB-Serial Conversion Cable

Model
E58-CIFQ1

### Terminal Cover

Connectable models	Model
Terminal block models	E53-COV17

**Note:** The Terminal Cover comes with the E5CN-□□□-500 models.

### Waterproof Packing

Model
Y92S-P8

**Note:** The Waterproof Packing is included with the Controller only for models with terminal blocks.

### Current Transformers (CTs)

Hole diameter	Model
5.8 dia.	E54-CT1
12.0 dia.	E54-CT3

### Adapter

Connectable models	Model
Terminal block models	Y92F-45

**Note:** Use this Adapter when the panel has been previously prepared for the E5B□.

### DIN Track Mounting Adapter

Model
Y92F-52

### Sockets (for Plug-in Models)

Type	Model
Front-connecting Socket	P2CF-11
Front-connecting Socket with Finger Protection	P2CF-11-E
Back-connecting Socket	P3GA-11
Terminal Cover for Back-connecting socket with Finger Protection	Y92A-48G

### Front cover

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

### CX-Thermo Support Software

Model
EST2-2C-MV4

## Specifications

### Ratings

<b>Power supply voltage</b>		No D 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>E5CN</b>	100 to 240 VAC: 7.5 VA (max.) (E5CN-R2T at 100 VAC: 3.0 VA) 24 VAC/VDC: 5 VA/3 W (max.) (E5CN-R2TD at 24 VAC: 2.7 VA)	
	<b>E5CN-U</b>	100 to 240 VAC: 6 VA (max.) 24 VAC/VDC: 3 VA/2 W (max.) (models with current output: 4 VA/2 W)	
<b>Sensor input</b>		Models with temperature inputs Thermocouple: K, J, T, E, L, U, N, R, S, B, 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 Voltage input: 0 to 50 mV	
		Models with analog inputs 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.)	
<b>Control method</b>		ON/OFF control or 2-PID control (with auto-tuning)	
<b>Control outputs</b>	<b>Relay output</b>	E5CN	SPST-NO, 250 VAC, 3 A (resistive load), electrical life: 100,000 operations, minimum applicable load: 5 V, 10 mA
		E5CN-U	SPDT, 250 VAC, 3 A (resistive load), electrical life: 100,000 operations, minimum applicable load: 5 V, 10 mA
	<b>Voltage output (for driving SSR)</b>	E5CN E5CN-U	Output voltage: 12 VDC ±15% (PNP), max. load current: 21 mA, with short-circuit protection circuit
	<b>Current output</b>	E5CN	4 to 20 mA DC/0 to 20 mA DC, load: 600 Ω max., resolution: approx. 10,000
	<b>Long-life relay output</b>	E5CN	SPST-NO, 250 VAC, 3 A (resistive load), electrical life: 1,000,000 operations, load power supply voltage: 75 to 250 VAC (DC loads cannot be connected.), minimum applicable load: 5 V, 10 mA, leakage current: 5 mA max. (250 VAC, 60 Hz)
<b>Auxiliary outputs</b>	<b>Number of outputs</b>	1 or 2 max. (Depends on the model.)	
	<b>Output specifications</b>	Relay output: SPST-NO, 250 VAC, 3 A (resistive load), electrical life: 100,000 operations, minimum applicable load: 5 V, 10 mA	
<b>Event inputs</b>	<b>Number of inputs</b>	2	
	<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>External power supply for ES1B</b>		12 VDC ±10%, 20 mA, short-circuit protection circuit provided	
<b>Setting method</b>		Digital setting using front panel keys	
<b>Indication method</b>		11-segment digital display and individual indicators (7-segment display also possible) Character height: PV: 11 mm, SV: 6.5 mm	
<b>Multi SP</b>		Up to four set points (SP0 to SP3) can be saved and selected using event inputs, key operations, or serial communications.	
<b>Bank switching</b>		Not supported	
<b>Other functions</b>		Manual output, heating/cooling control, loop burnout alarm, SP ramp, other alarm functions, heater burnout detection (including SSR failure and heater overcurrent detection), 40% AT, 100% AT, MV limiter, input digital filter, self-tuning, temperature input shift, run/stop, protection functions, control output ON/OFF counter, extraction of square root, MV change rate limit, logic operations, PV/SV status display, simple program, automatic cooling coefficient adjustment	
<b>Ambient operating temperature</b>		-10 to 55°C (with no condensation or icing), for 3-year warranty: -10 to 50°C	
<b>Ambient operating humidity</b>		25% to 85%	
<b>Storage temperature</b>		-25 to 65°C (with no condensation or icing)	