Temperature Controllers

E5CSL/E5CWL/E5EWL

The Simple and New Temperature Controller is Released that Easily Achieves the Temperature Control.

- Easy to Read (Character Height E5CSL: 21.7 mm, E5CWL: 16.2 mm (PV), E5EWL: 20 mm (PV)).
- Depth beyond front panel: Only 60 mm.
- Fewer parameters for simple setup.
- Faster sampling at 250 ms.

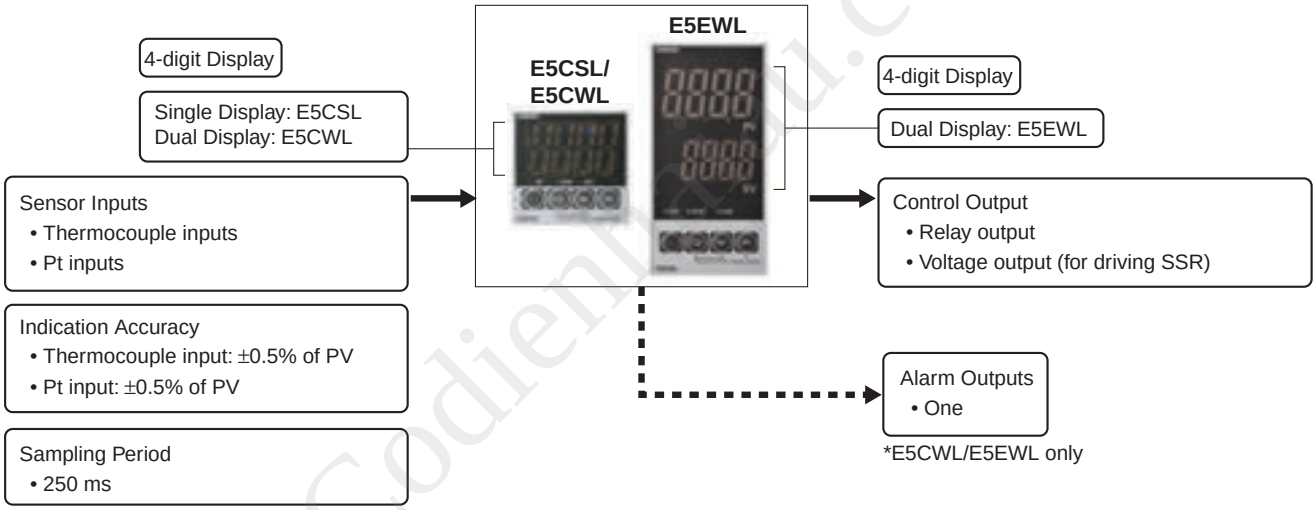
Note: Refer to Precautions on page 9.

48 × 48 mm
E5CSL

48 × 48 mm
E5CWL

48 × 96 mm
E5EWL

Main I/O Functions



Model Number Structure

Model Number Legend

E5CSL-□□
1 2

1. Control Output
R: Relay output: 250 VAC, 3 A
Q: Voltage output (for driving SSR): 12 VDC, 21 mA
2. Sensor type
TC: Thermocouple (K, J, T, R, or S)
P: Platinum resistance thermometer (Pt100)

E5CWL-□1□
1 2 3

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)

E5EWL-□1□
1 2 3

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)

Ordering Information

E5CSL

Size	Power supply voltage	Input type	Alarm output	Control output	Model
1/16 DIN 48 × 48 × 60 (W × H × D)	100 to 240 VAC	Thermocouple	None	Relay output	**E5CSL-RTC**
		Resistance thermometer			**E5CSL-RP**
		Thermocouple		Voltage output (for driving SSR)	**E5CSL-QTC**
		Resistance thermometer			**E5CSL-QP**

E5CWL

Size	Power supply voltage	Input type	Alarm output	Control output	New model
1/16 DIN 48 × 48 × 60 (W × H × D)	100 to 240 VAC	Thermocouple	1	Relay output	**E5CWL-R1TC**
		Resistance thermometer			**E5CWL-R1P**
		Thermocouple		Voltage output (for driving SSR)	**E5CWL-Q1TC**
		Resistance thermometer			**E5CWL-Q1P**

E5EWL

Size	Power supply voltage	Input type	Alarm output	Control output	New model
1/8 DIN 48 × 96 × 60 (W × H × D)	100 to 240 VAC	Thermocouple	1	Relay output	**E5EWL-R1TC**
		Resistance thermometer			**E5EWL-R1P**
		Thermocouple		Voltage output (for driving SSR)	**E5EWL-Q1TC**
		Resistance thermometer			**E5EWL-Q1P**

Accessories (Order Separately)

Terminal Cover

Model	E53-COV19

Front Panel (for E5CSL/E5CWL)

Model	E53-COV20

Note: 1. This Front Panel accessory is required to attach the Y92A-48B or Y92A-48D.
2. This Front Panel accessory is only the frame. It does not include the plastic cover.

Adapter

Model	Remarks
Y92F-45	• Use this Adapter when the Front Panel has already been prepared for the E5B□. • Only black is available. • Order separately.
Y92F-49	• Use for E5CSL/E5CWL only. • Provided with E5CSL/E5CWL.
Y92F-51	• Use for E5EWL only. • Provided with E5EWL.

Specifications

Ratings

Power supply voltage		100 to 240 VAC, 50/60 Hz
Operating voltage range		85% to 110% of rated supply voltage
Power consumption		3.5 VA
Sensor input		Models with thermocouple inputs Thermocouple: K, J, T, R, or S
		Models with platinum resistance thermometer inputs Platinum resistance thermometer: Pt100
Control output	**Relay output**	SPST-NO, 250 VAC, 3 A (resistive load), electrical life: 100,000 operations, minimum 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 (See note.)		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: E5CSL: 21.7 mm, E5CWL: 16.2 mm (PV), E5EWL: 20 mm (PV)
Other functions		Temperature input shift, run/stop, protection functions, etc.
Ambient operating temperature		–10 to 55°C (with no icing or condensation)
Ambient operating humidity		25% to 85%
Storage temperature		–25 to 65°C (with no icing or condensation)

Note: E5CWL/E5EWL only

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

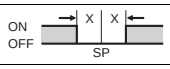
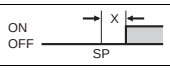
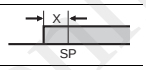
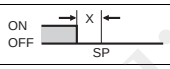
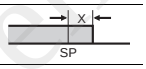
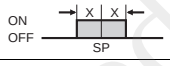
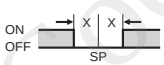
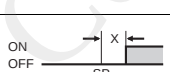
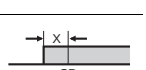
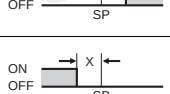
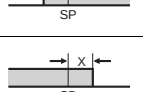
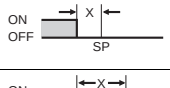
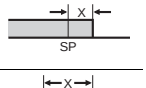
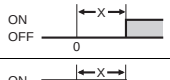
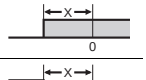
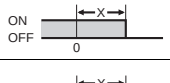
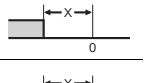
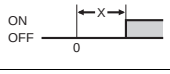
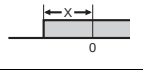
Models with Resistance Thermometer Inputs

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

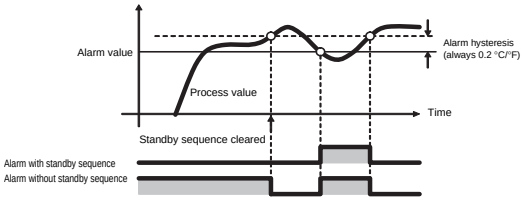
Default setting: 8
Applicable standards (Pt100): JIS C1604-1997 and IEC 60751

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

Note: 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.

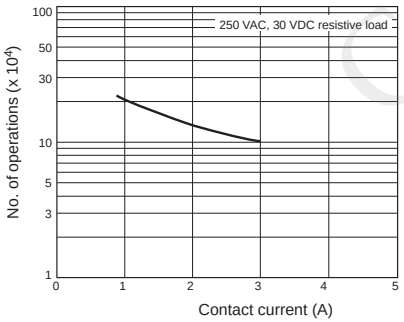
- Operation is started (power is turned ON or operation is switched from stop to run).
- The alarm value is changed.
- The temperature input offset is changed.
- The set point is changed.

Characteristics

Indication accuracy		Thermocouple: (See note 1.) (±0.5% of indicated value or ±1°C, whichever is greater) ±1 digit max. Platinum resistance thermometer: (±0.5% of indicated value or ±1°C, whichever is greater) ±1 digit max.
Influence of temperature		R and S thermocouple inputs: (±1% of PV or ±10°C, whichever is greater) ±1 digit max. K, J, and T thermocouple inputs: (±1% of PV or ±4°C, whichever is greater) ±1 digit max. Platinum resistance thermometer inputs: (±1% of PV or ±2°C, whichever is greater) ±1 digit max.
Influence of voltage		
Influence of EMS. (at EN61326-1)		
Hysteresis		0.1 to 999.9 (in units of 0.1) °C/°F
Proportional band (P)		0.1 to 999.9 (in units of 0.1) °C/°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)
Sampling period		250 ms
Affect of signal source resistance		Thermocouple: 0.1°C/Ω max. (100 Ω max.) (See note 2.) Platinum resistance thermometer: 0.6°C/Ω max. (10 Ω max.)
Insulation resistance		20 MΩ min. (at 500 VDC)
Dielectric strength		2,300 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**	100 m/s^2 min., 3 times each in X, Y, and Z directions
	Destruction	300 m/s^2 min., 3 times each in X, Y, and Z directions
Weight	**E5CSL/E5CWL**	Controller: Approx. 100 g, Mounting Bracket: Approx. 10 g
	E5EWL	Controller: Approx. 150 g, Mounting Bracket: Approx. 10 g
Degree of protection		Front panel: IP50 Rear case: IP20, Terminals: IP00
Memory protection		Non-volatile memory (number of writes: 100,000 times)
Conformed standards		EN61326-1 (See note 3.), EN61010-1, IEC61010-1 VDE0106 Part 100 (Finger protection), when the terminal cover is mounted.
EMC		Emission Enclosure: EN55011 Group1 Class A Emission AC Mains: EN55011 Group1 Class A Immunity ESD: EN61000-4-2 Immunity RF-interference: EN61000-4-3 10 V/m Immunity Conducted Disturbance: EN61000-4-6 3 V Immunity Burst: EN61000-4-4 Immunity Surge: EN61000-4-5 Immunity Voltage Dip/Interrupting: EN61000-4-11

Note: 1. The indication accuracy of K and T thermocouples at a temperature of −100°C max. is ±2°C ±1 digit maximum. The indication accuracy of the R and S thermocouples at a temperature of 200°C max. is ±3°C ±1 digit max.
2. R, and S sensors: 0.2°C/Ω max. (100 Ω max.)
3. Industrial electromagnetic environment (EN/IEC 61326-1 Table 2)

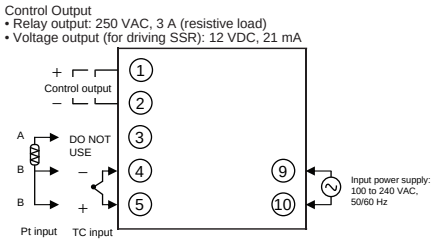
Electrical Life Expectancy Curve for Relays (Reference Values)



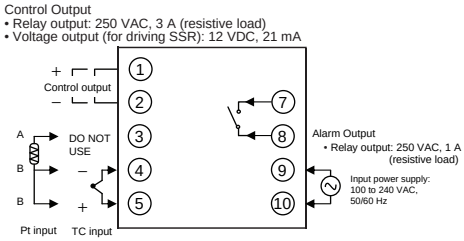
External Connections

- 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.

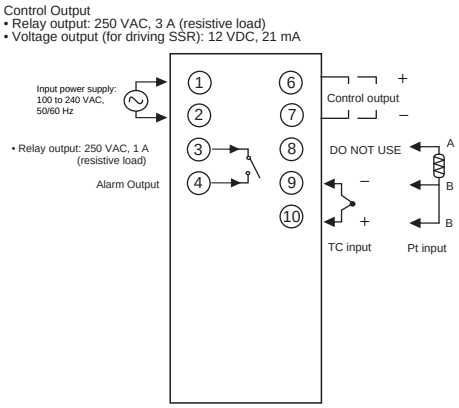
E5CSL



E5CWL

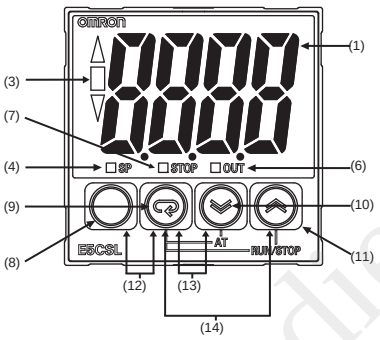


E5EWL

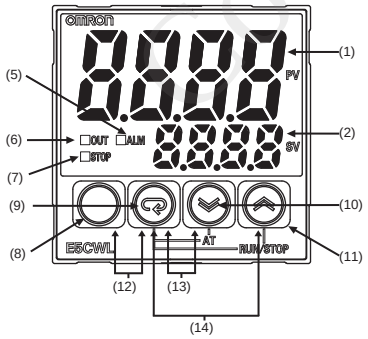


Nomenclature

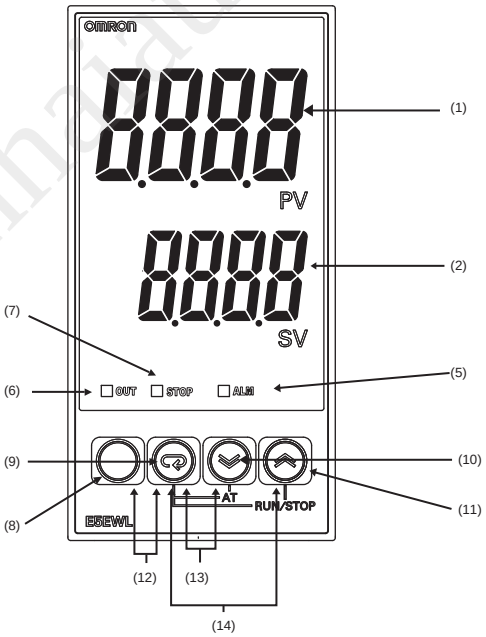
E5CSL



E5CWL



E5EWL



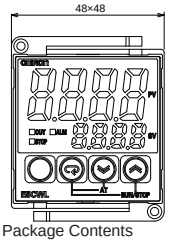
(1) Display No. 1	Displays the process value (PV) or parameter. For the E5CSL/E5EWL, the set point or parameter setting is also displayed.
(2) Display No. 2	Displays the set point (SP) or parameter setting.
(3) Deviation Indicators	Show the relation between the process value and the set point. ▲Lit: The process value is more than 5°C/°F higher than the set point. ▼Lit: The process value is more than 5°C/°F lower than the set point. ■Lit: The process value is within 5°C/°F of the set point. The relevant deviation indicator will flash during autotuning.
(4) SP	Lit while the set point is displayed on display No. 1 (E5CSL only).
(5) ALM	Lit while the alarm is ON. Not lit while the alarm is OFF.
(6) OUT	Lit while the control output is ON. Not lit while the control output is OFF.
(7) STOP	Not lit during operation. Lit while operation is stopped.
(8)	Level Key: Changes the setting level.
(9)	Mode Key: Changes the parameter within the setting level.
(10)	Down Key: Reduces the setting.
(11)	Up Key: Increases the setting.
(12) +	Press these keys for at least 3 seconds in Operation Level or Adjustment Level to go to Protect Level. Press these keys for at least 1 second in Protect Level to return to Operation Level.
(13) +	Press these keys for at least 2 seconds to start or stop autotuning.*1
(14) +	Press these keys for at least 2 seconds to start or stop operation.*2

*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.

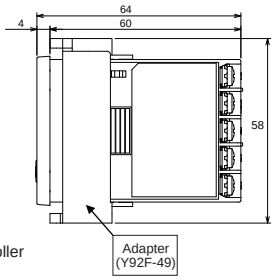
Dimensions

(Unit: mm)

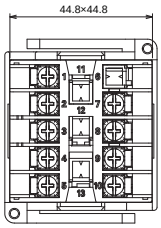
E5CSL/E5CWL



Package Contents
- Temperature Controller
- Adapter
- Instruction Manual

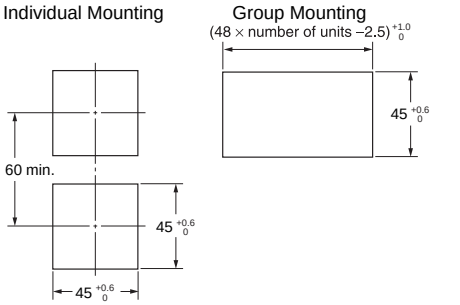


*The dimensions are the same for the E5CSL.



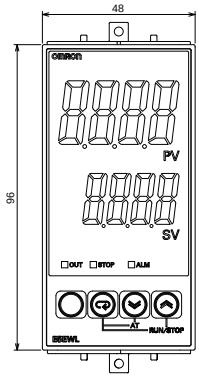
- Solderless terminal size: M3.5
- Terminal Cover: E53-COV19 (sold separately)
- Front Panel: E53-COV20 (sold separately)

Panel Cutout

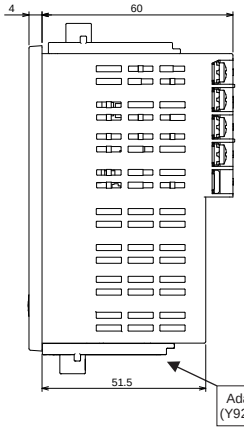


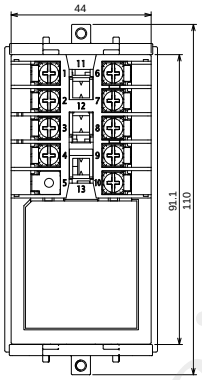
- Recommended panel thickness is 1 to 5 mm.
- Group mounting is not possible in the vertical direction. (Maintain the specified mounting space between Controllers.)
- When two or more Controllers are mounted, make sure that the surrounding temperature does not exceed the ambient operating temperature given in the specifications.

E5EWL



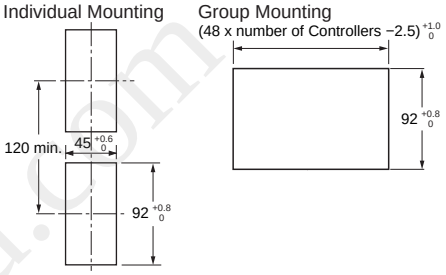
Package Contents
- Temperature Controller
- Adapter
- Instruction Manual





- Solderless terminal size: M3.5
- Terminal Cover: E53-COV19 (sold separately)

Panel Cutout



- Recommended panel thickness is 1 to 5 mm.
- Group mounting is not possible in the vertical direction. (Maintain the specified mounting space between Controllers.)
- Balance the two mounting screws on the upper and lower parts of the adapter and tighten them with a torque of 0.2 N·m (recommended value). Excessive screw tightening torque may damage the product.
- When two or more Controllers are mounted, make sure that the surrounding temperature does not exceed the ambient operating temperature given in the specifications.

Operation

Parameter Operations