

**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).



(E5EC/AC) (E5EC-B)

* CSA conformance evaluation by UL.



48 × 96 mm
Screw Terminal
Blocks
E5EC

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

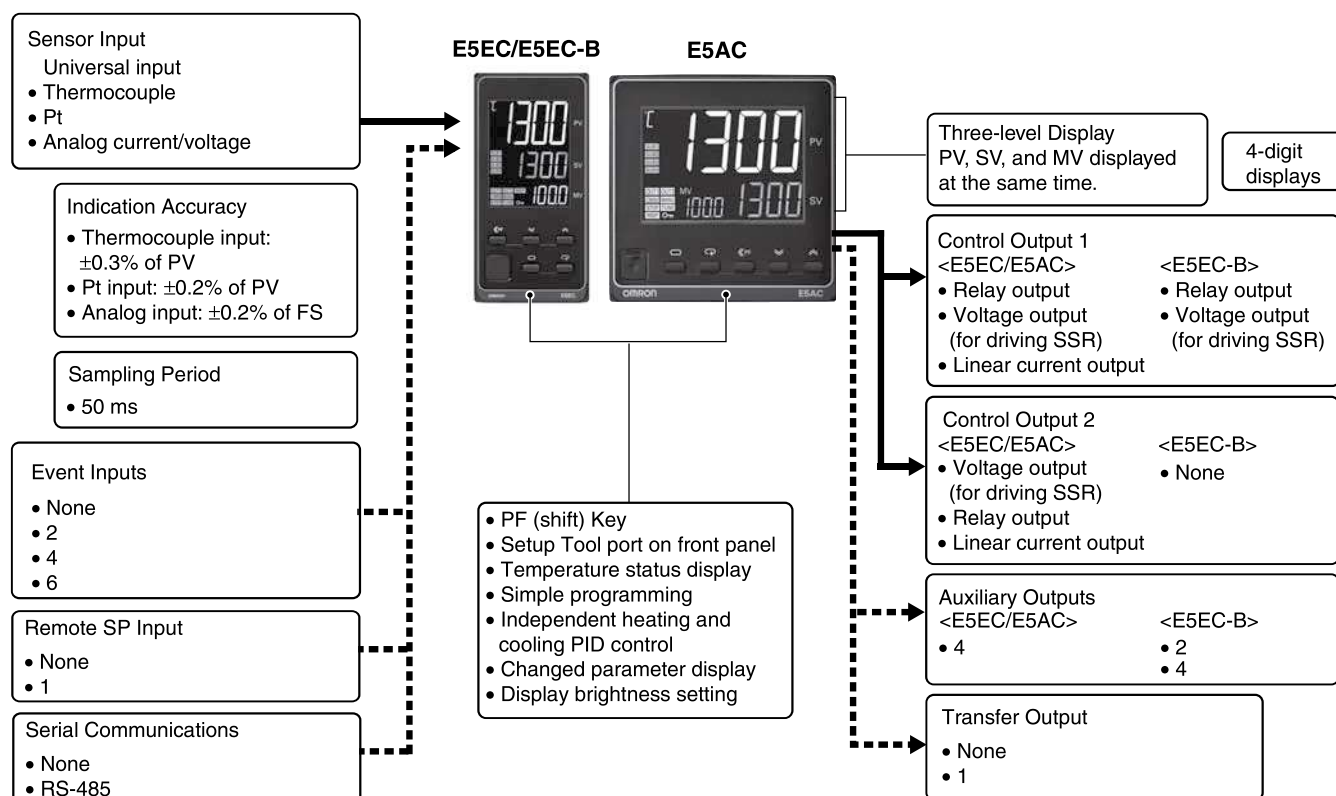
96 × 96 mm
Screw Terminal
Blocks
E5AC

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



Refer to Safety Precautions on page 108.

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

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		
	RX						Relay output			None		
	QX						Voltage output (for driving SSR)			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	---	---	---	---	---	---
						008	1	RS-485	2	---	---	---
						010	1	---	4	---	---	---
						011	1	---	6	Provided.	Provided.	---

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
12.0 mm	E54-CT3

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

E5EC/E5EC-B/E5AC

Specifications

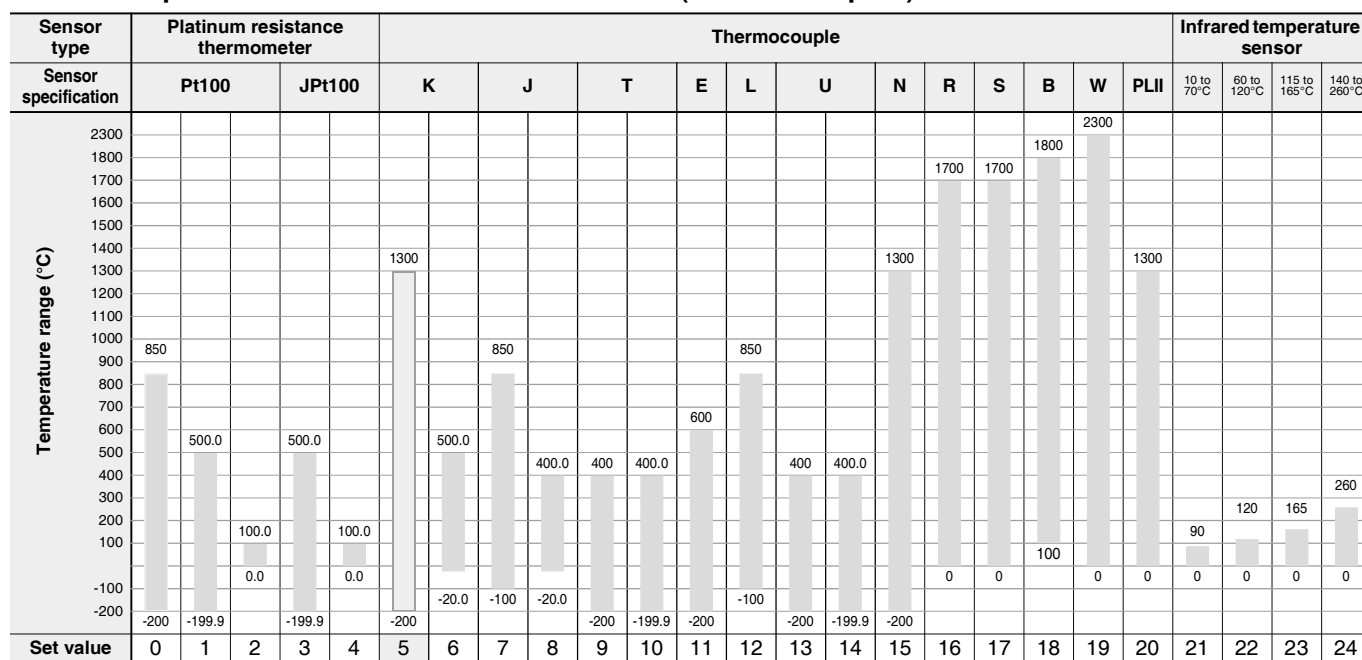
Ratings

Power supply voltage		A in model number: 100 to 240 VAC, 50/60 Hz D in model number: 24 VAC, 50/60 Hz; 24 VDC
Operating voltage range		85 to 110% of rated supply voltage
Power consumption	E5EC/ E5EC-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
	E5AC	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
Sensor input		Temperature input 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 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
Input impedance		Current input: 150 Ω max., Voltage input: 1 MΩ min. (Use a 1:1 connection when connecting the ES2-HB/THB.)
Control method		ON/OFF or 2-PID control (with auto-tuning)
Control output	Relay output	SPST-NO, 250 VAC, 5 A (resistive load), electrical life: 100,000 operations, minimum applicable load: 5 V, 10 mA (reference value)
	Voltage output (for driving SSR)	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.)
	Linear current output *	4 to 20 mA DC/0 to 20 mA DC, load: 500 Ω max., resolution: approx. 10,000
Auxiliary output	Number of outputs	E5EC/E5AC: 4 E5EC-B: 2 or 4 (depends on model)
	Output specifications	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)
Event input	Number of inputs	2, 4 or 6 (depends on model)
	External contact input specifications	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
Transfer output	Number of outputs	1 (only on models with a transfer output)
	Output specifications	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
Remote SP input		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.)
Potentiometer input *		100 Ω to 10 kΩ
Setting method		Digital setting using front panel keys
Indication method		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
Multi SP		Up to eight set points (SP0 to SP7) can be saved and selected using the event inputs, key operations, or serial communications.
Bank switching		None
Other functions		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
Ambient operating temperature		−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)
Ambient operating humidity		25 to 85%
Storage temperature		−25 to 65°C (with no condensation or icing)
Altitude		2,000 m max.
Recommended fuse		T2A, 250 VAC, time-lag, low-breaking capacity
Installation environment		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 38.

Input Ranges

Thermocouple/Platinum Resistance Thermometer (Universal inputs)



The applicable standards for the input types are as follows:

K, J, T, E, N, R, S, B: JIS C 1602-1995, IEC 60584-1

L: Fe-CuNi, DIN 43710-1985

U: Cu-CuNi, DIN 43710-1985

W: W5Re/W26Re, ASTM E988-1990

JPt100: JIS C 1604-1989, JIS C 1606-1989

Pt100: JIS C 1604-1997, IEC 60751

PL II: According to Platinel II electromotive force charts from BASF (previously Engelhard)

Analog input


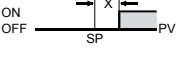
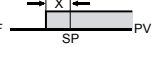
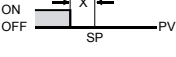
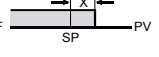
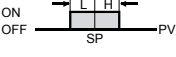
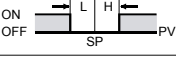
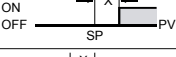
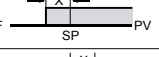
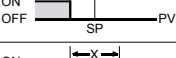
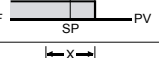
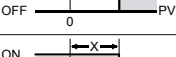
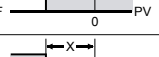
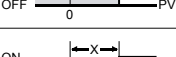
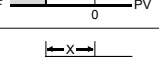
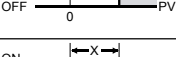
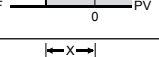
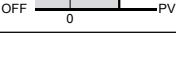
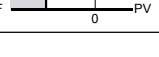
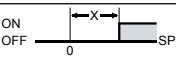
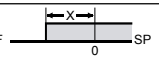
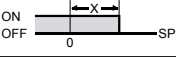
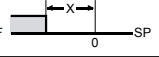
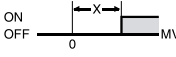
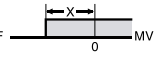
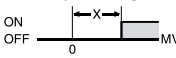
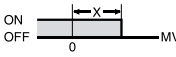
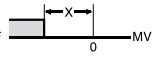
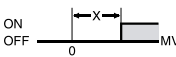
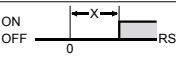
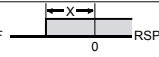
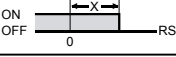
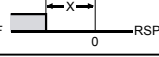
Input type	Current		Voltage		
Input specification	4 to 20 mA	0 to 20 mA	1 to 5 V	0 to 5 V	0 to 10 V
Setting range	Usable in the following ranges by scaling: -1999 to 9999, -199.9 to 999.9, -19.99 to 99.99 or -1.999 to 9.999				
Set value	25	26	27	28	29

Alarm Types

Each alarm can be independently set to one of the following 19 alarm types. The default is 2: Upper limit. (see note.)

Auxiliary outputs are allocated for alarms. ON delays and OFF delays (0 to 999 s) can also be specified.

Note: In the default settings for models with HB or HS alarms, alarm 1 is set to a heater alarm (HA) and the Alarm Type 1 parameter is not displayed.
To use alarm 1, set the output assignment to alarm 1.

Set value	Alarm type	Alarm output operation		Description of function
		When alarm value X is positive	When alarm value X is negative	
0	Alarm function OFF	Output OFF		No alarm
1	Upper- and lower-limit *1	ON OFF 	*2	Set the upward deviation in the set point for the alarm upper limit (H) and the lower deviation in the set point for the alarm lower limit (L). The alarm is ON when the PV is outside this deviation range.
2 (default)	Upper-limit	ON OFF 	ON OFF 	Set the upward deviation in the set point by setting the alarm value (X). The alarm is ON when the PV is higher than the SP by the deviation or more.
3	Lower-limit	ON OFF 	ON OFF 	Set the downward deviation in the set point by setting the alarm value (X). The alarm is ON when the PV is lower than the SP by the deviation or more.
4	Upper- and lower-limit range *1	ON OFF 	*3	Set the upward deviation in the set point for the alarm upper limit (H) and the lower deviation in the set point for the alarm lower limit (L). The alarm is ON when the PV is inside this deviation range.
5	Upper- and lower-limit with standby sequence *1	ON OFF 	*4	A standby sequence is added to the upper- and lower-limit alarm (1). *6
6	Upper-limit with standby sequence	ON OFF 	ON OFF 	A standby sequence is added to the upper-limit alarm (2). *6
7	Lower-limit with standby sequence	ON OFF 	ON OFF 	A standby sequence is added to the lower-limit alarm (3). *6
8	Absolute-value upper-limit	ON OFF 	ON OFF 	The alarm will turn ON if the process value is larger than the alarm value (X) regardless of the set point.
9	Absolute-value lower-limit	ON OFF 	ON OFF 	The alarm will turn ON if the process value is smaller than the alarm value (X) regardless of the set point.
10	Absolute-value upper-limit with standby sequence	ON OFF 	ON OFF 	A standby sequence is added to the absolute-value upper-limit alarm (8). *6
11	Absolute-value lower-limit with standby sequence	ON OFF 	ON OFF 	A standby sequence is added to the absolute-value lower-limit alarm (9). *6
12	LBA (alarm 1 type only)	-		*7
13	PV change rate alarm	-		*8
14	SP absolute-value upper-limit alarm	ON OFF 	ON OFF 	This alarm type turns ON the alarm when the set point (SP) is higher than the alarm value (X).
15	SP absolute-value lower-limit alarm	ON OFF 	ON OFF 	This alarm type turns ON the alarm when the set point (SP) is lower than the alarm value (X).
16	MV absolute-value upper-limit alarm *9	Standard Control ON OFF 	Standard Control ON OFF 	This alarm type turns ON the alarm when the manipulated variable (MV) is higher than the alarm value (X).
		Heating/Cooling Control (Heating MV) ON OFF 	Heating/Cooling Control (Heating MV) Always ON	
17	MV absolute-value lower-limit alarm *9	Standard Control ON OFF 	Standard Control ON OFF 	This alarm type turns ON the alarm when the manipulated variable (MV) is lower than the alarm value (X).
		Heating/Cooling Control (Cooling MV) ON OFF 	Heating/Cooling Control (Cooling MV) Always ON	
18	RSP absolute-value upper-limit alarm *10	ON OFF 	ON OFF 	This alarm type turns ON the alarm when the remote SP (RSP) is higher than the alarm value (X).
19	RSP absolute-value lower-limit alarm *10	ON OFF 	ON OFF 	This alarm type turns ON the alarm when the remote SP (RSP) is lower than the alarm value (X).

Characteristics

Indication accuracy (at the ambient temperature of 23°C)		Thermocouple: (±0.3% of indication value or ±1°C, whichever is greater) ±1 digit max. *1 Platinum resistance thermometer: (±0.2% of indication value or ±0.8°C, whichever is greater) ±1 digit max. Analog input: ±0.2% FS ±1 digit max. CT input: ±5% FS ±1 digit max. Potentiometer input: ±5% FS ±1 digit max.
Transfer output accuracy		±0.3% FS max.
Remote SP Input Type		±0.2% FS ±1 digit max.
Influence of temperature *2		Thermocouple input (R, S, B, W, PL II): (±1% of indication value or ±10°C, whichever is greater) ±1 digit max. Other thermocouple input: (±1% of indication value or ±4°C, whichever is greater) ±1 digit max. *3
Influence of voltage *2		Platinum resistance thermometer: (±1% of indication value or ±2°C, whichever is greater) ±1 digit max. Analog input: ±1%FS ±1 digit max.
Influence of EMS. (at EN 61326-1)		CT input: ±5% FS ±1 digit max. Remote SP input: ±1% FS ±1 digit max.
Input sampling period		50ms
Hysteresis		Temperature input: 0.1 to 999.9°C or °F (in units of 0.1°C or °F) Analog input: 0.01% to 99.99% FS (in units of 0.01% FS)
Proportional band (P)		Temperature input: 0.1 to 999.9°C or °F (in units of 0.1°C or °F) Analog input: 0.1 to 999.9% FS (in units of 0.1% FS)
Integral time (I)		Standard, heating/cooling, or Position-proportional (Close): 0 to 9999 s (in units of 1 s), 0.0 to 999.9 s (in units of 0.1 s) Position-proportional (Floating): 1 to 9999 s (in units of 1 s), 0.1 to 999.9 s (in units of 0.1 s)*4
Derivative time (D)		0 to 9999 s (in units of 1 s), 0.0 to 999.9 s (in units of 0.1 s) *4
Proportional band (P) for cooling		Temperature input: 0.1 to 999.9°C or °F (in units of 0.1°C or °F) Analog input: 0.1 to 999.9% FS (in units of 0.1% FS)
Integral time (I) for cooling		0 to 9999 s (in units of 1 s), 0.0 to 999.9 s (in units of 0.1 s) *4
Derivative time (D) for cooling		0 to 9999 s (in units of 1 s), 0.0 to 999.9 s (in units of 0.1 s) *4
Control period		0.1, 0.2, 0.5, 1 to 99 s (in units of 1 s)
Manual reset value		0.0 to 100.0% (in units of 0.1%)
Alarm setting range		-1999 to 9999 (decimal point position depends on input type)
Influence of signal source resistance		Thermocouple: 0.1°C/Ω max. (100 Ω max.) Platinum resistance thermometer: 0.1°C/Ω max. (10 Ω max.)
Insulation resistance		20 MΩ min. (at 500 VDC)
Dielectric strength		3,000 VAC, 50/60 Hz for 1 min between terminals of different charge
Vibration	Malfunction	10 to 55 Hz, 20 m/s ² for 10 min each in X, Y, and Z directions
	Resistance	10 to 55 Hz, 20 m/s ² for 2 hrs each in X, Y, and Z directions
Shock	Malfunction	100 m/s ² , 3 times each in X, Y, and Z directions
	Resistance	300 m/s ² , 3 times each in X, Y, and Z directions
Weight		E5EC/E5EC-B: Controller: Approx. 210 g, Adapter: Approx. 4 g × 2 E5AC: Controller: Approx. 250 g, Adapter: Approx. 4 g × 2
Degree of protection		Front panel: IP66, Rear case: IP20, Terminals: IP00
Memory protection		Non-volatile memory (number of writes: 1,000,000 times)
Setup Tool		E5EC/E5AC: CX-Thermo version 4.5 or higher E5EC-B: CX-Thermo version 4.65 or higher
Setup Tool port		E5EC/E5EC-B/E5AC top panel: An E58-CIFQ2 USB-Serial Conversion Cable is used to connect to a USB port on the computer.*5 E5EC/E5EC-B/E5AC front panel: An E58-CIFQ2 USB-Serial Conversion Cable and E58-CIFQ2-E Conversion Cable are used together to connect to a USB port on the computer.*5
Standards	Approved standards	cULus: UL 61010-1/CSA C22.2 No.61010-1, Korean wireless regulations (Radio law: KC Mark) (Some models only.) *6, Lloyd's standards *7
	Conformed standards	EN 61010-1 (IEC 61010-1)
EMC		EMI Radiated Interference Electromagnetic Field Strength: EN 55011 Group 1, class A Noise Terminal Voltage: EN 55011 Group 1, class A EMS: ESD Immunity: EN 61326-1 *8 Electromagnetic Field Immunity: EN 61000-4-2 Burst Noise Immunity: EN 61000-4-3 Conducted Disturbance Immunity: EN 61000-4-4 Surge Immunity: EN 61000-4-6 Voltage Dip/Interrupting Immunity: EN 61000-4-5 EN 61000-4-11

*1. The indication accuracy of K thermocouples in the -200 to 1,300°C range, T and N thermocouples at a temperature of -100°C max., and U and L thermocouples at any temperatures is ±2°C ±1 digit max. The indication accuracy of the B thermocouple at a temperature of 400°C max. is not specified. The indication accuracy of B thermocouples at a temperature of 400 to 800°C is ±3°C max. The indication accuracy of the R and S thermocouples at a temperature of 200°C max. is ±3°C ±1 digit max. The indication accuracy of W thermocouples is (±0.3% of PV or ±3°C, whichever is greater) ±1 digit max. The indication accuracy of PL II thermocouples is (±0.3% of PV or ±2°C, whichever is greater) ±1 digit max.

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

*3. K thermocouple at -100°C max.: ±10°C max.

*4. The unit is determined by the setting of the Integral/Derivative Time Unit parameter.

*5. External communications (RS-485) and USB-serial conversion cable communications can be used at the same time.

*6. Refer to your OMRON website for the most recent information on applicable models.

*7. Refer to information on maritime standards in *Shipping Standards* on page 110 for compliance with Lloyd's Standards.

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

USB-Serial Conversion Cable

Applicable OS	Windows XP/Vista/7/8/10 *1
Applicable software	E5EC/E5AC: CX-Thermo version 4.5 or higher E5EC-B: CX-Thermo version 4.65 or higher
Applicable models	E5□C-T Series, E5□C Series, and E5CB Series
USB interface standard	Conforms to USB Specification 2.0.
DTE speed	38,400 bps
Connector specifications	Computer: USB (type A plug) Digital Temperature Controller: Special serial connector
Power supply	Bus power (Supplied from USB host controller.) *2
Power supply voltage	5 VDC
Current consumption	450 mA max.
Output voltage	4.7±0.2 VDC (Supplied from USB-Serial Conversion Cable to the Digital Temperature Controller.)
Output current	250 mA max. (Supplied from USB-Serial Conversion Cable to the Digital Temperature Controller.)
Ambient operating temperature	0 to 55°C (with no condensation or icing)
Ambient operating 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

Windows is a registered trademark of Microsoft Corporation in the United States and/or other countries.

*1. CX-Thermo version 4.65 or higher runs on Windows 10.

*2. Use a high-power port for the USB port.

Note: A driver must be installed on the computer. Refer to the *Instruction Manual* included with the Cable for the installation procedure.

Communications Specifications

Transmission line connection method	RS-485: Multidrop
Communications	RS-485 (two-wire, half duplex)
Synchronization method	Start-stop synchronization
Protocol	CompoWay/F, or Modbus
Baud rate *	9600, 19200, 38400, or 57600 bps
Transmission code	ASCII
Data bit length *	7 or 8 bits
Stop bit length *	1 or 2 bits
Error detection	Vertical parity (none, even, odd) Block check character (BCC) with CompoWay/F or CRC-16 Modbus
Flow control	None
Interface	RS-485
Retry function	None
Communications buffer	217 bytes
Communications response wait time	0 to 99 ms Default: 20 ms

* The baud rate, data bit length, stop bit length, and vertical parity can be individually set using the Communications Setting Level.

Communications Functions

Programless communications *1	<p>You can use the memory in the PLC to read and write E5□C parameters, start and stop operation, etc. The E5□C automatically performs communications with PLCs. No communications programming is required. Number of connected Digital Temperature Controllers: 32 max. (Up to 16 for the FX Series)</p> <p>Applicable PLCs</p> <ul style="list-style-type: none"> OMRON PLCs <ul style="list-style-type: none"> CS Series, CJ Series, or CP Series Mitsubishi Electric PLCs <ul style="list-style-type: none"> MELSEC Q Series, L Series, or FX Series (compatible with the FX2 or FX3 (excluding the FX1S)) KEYENCE PLCs <ul style="list-style-type: none"> KEYENCE KV Series
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Component Communications *1	When Digital Temperature Controllers are connected, set points and RUN/STOP commands can be sent from the Digital Temperature Controller that is set as the master to the Digital Temperature Controllers that are set as slaves. Slope and offsets can be set for the set point. Number of connected Digital Temperature Controllers: 32 max. (including master)
Copying *2	When Digital Temperature Controllers are connected, the parameters can be copied from the Digital Temperature Controller that is set as the master to the Digital Temperature Controllers that are set as slaves.

MELSEC is a registered trademark of Mitsubishi Electric Corporation.
KEYENCE is a registered trademark of Keyence Corporation.

*1. A Temperature Controller with version 1.1 or higher is required.

A Temperature Controller with version 2.1 or higher is required for the FX Series or the KV Series.

*2. Both the programless communications and the component communications support the copying.

Current Transformer (Order Separately) Ratings

Dielectric strength	1,000 VAC for 1 min
Vibration resistance	50 Hz, 98 m/s ²
Weight	E54-CT1: Approx. 11.5 g, E54-CT3: Approx. 50 g
Accessories (E54-CT3 only)	Armatures (2) Plugs (2)

Heater Burnout Alarms and SSR Failure Alarms

CT input (for heater current detection)	Models with detection for singlephase heaters: One input Models with detection for singlephase or three-phase heaters: Two inputs
Maximum heater current	50 A AC
Input current indication accuracy	±5% FS ±1 digit max.
Heater burnout alarm setting range *1	0.1 to 49.9 A (in units of 0.1 A) Minimum detection ON time: 100 ms *3
SSR failure alarm setting range *2	0.1 to 49.9 A (in units of 0.1 A) Minimum detection OFF time: 100 ms *4

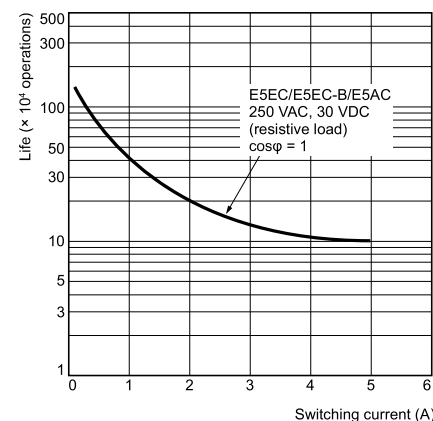
*1. For heater burnout alarms, the heater current will be measured when the control output is ON, and the output will turn ON if the heater current is lower than the set value (i.e., heater burnout detection current value).

*2. For SSR failure alarms, the heater current will be measured when the control output is OFF, and the output will turn ON if the heater current is higher than the set value (i.e., SSR failure detection current value).

*3. The value is 30 ms for a control period of 0.1 s or 0.2 s.

*4. The value is 35 ms for a control period of 0.1 s or 0.2 s.

Electrical Life Expectancy Curve for Relays (Reference Values)



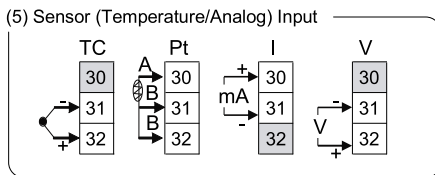
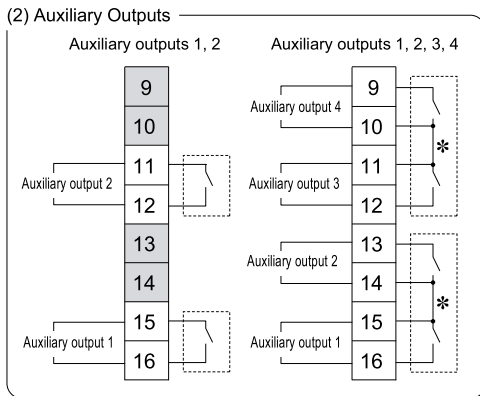
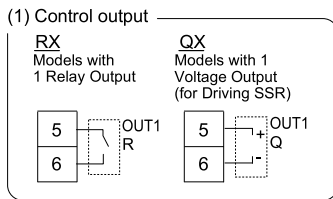
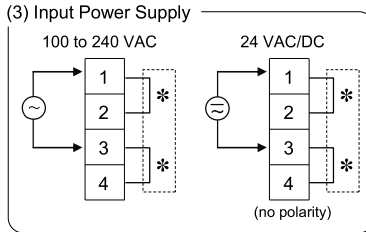
E5EC-B (Push-In Plus Terminal Blocks)

E5EC-□□□□ B M - □□□□
 (1) (2) (3) (4) (5) (6)
 ↑
 Terminal type

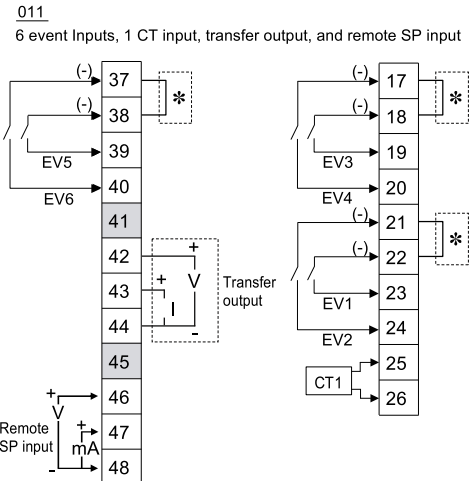
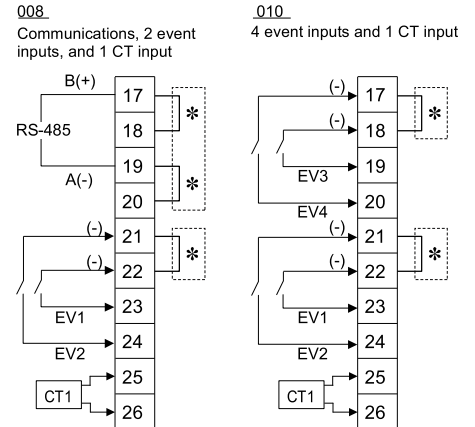
Control output 1
 Relay output
 250 VAC, 5 A
 (resistive load)
 Voltage output
 (for driving SSR)
 12 VDC, 40 mA

Auxiliary outputs 1, 2, 3, 4
 Relay output
 Model with 2 auxiliary
 outputs: 250 VAC, 3 A
 (resistive load)
 Models with 4 auxiliary
 outputs: 250 VAC, 2 A
 (resistive load)

The E5EC is set for a K-type thermocouple (input type = 5) by default. An input error (5ERR) will occur if the input type setting does not agree with the temperature sensor. Check the input type.



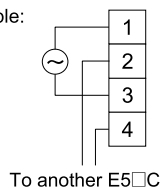
(6) Options



Use no-voltage inputs for the event inputs.
 The polarity for non-contact inputs is given in parentheses.

- Note:**
- The application of the terminals depends on the model.
 - Do not wire the terminals that are shown with a gray background.
 - When complying with EMC standards, the cable that connects the sensor must be 30 m or less. If the cable length exceeds 30 m, compliance with EMC standards will not be possible.
 - Refer to *Wiring Precautions for E5□C-B (Controllers with Push-In Plus Terminal Blocks)* on page 116 for wire specifications and wiring methods.
 - Common terminals are indicated with asterisks (*). You can use the input power supply and communications common terminals for crossover wiring. Do not exceed the maximum number of Temperature Controllers given below if you use crossover wiring for the input power supply.
 100 to 240 VAC Controllers: 16 max.
 24 VAC/VDC Controllers: 8 max.

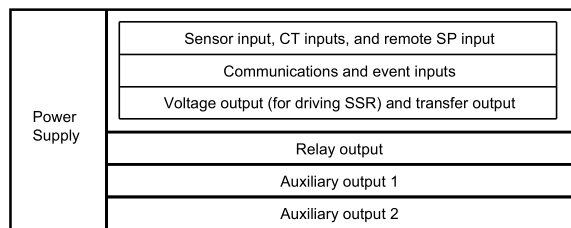
Wiring Example:

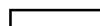
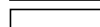


E5EC/E5EC-B/E5AC

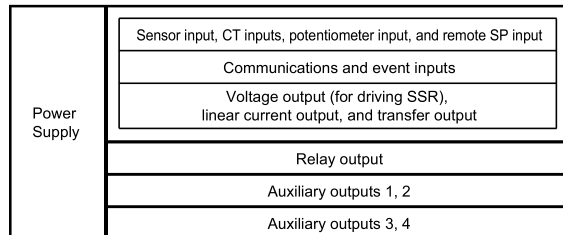
Isolation/Insulation Block Diagrams



Models with 2 Auxiliary Outputs



 : Reinforced insulation
 : Functional isolation

Models with 4 Auxiliary Outputs

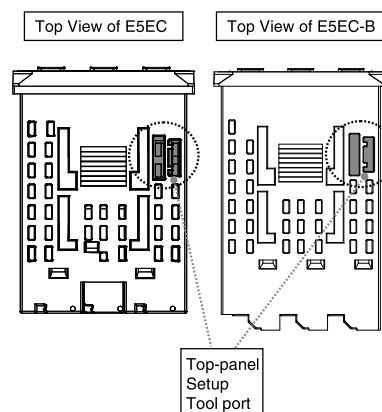
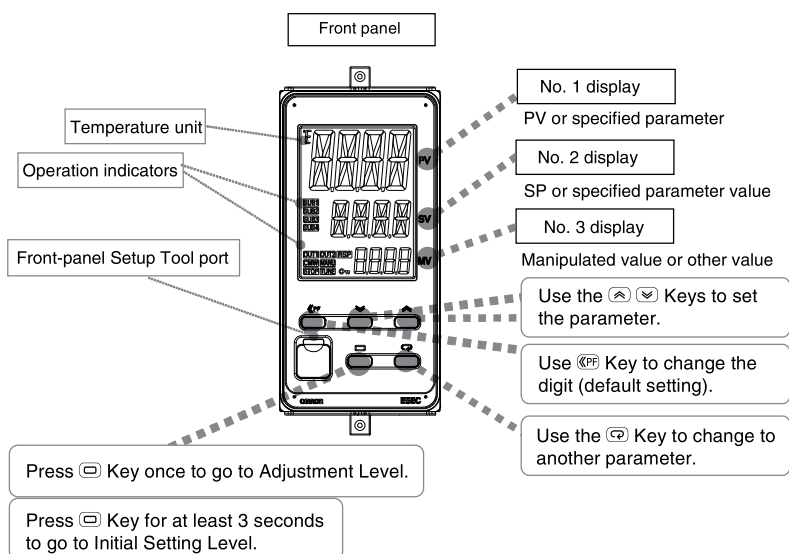


 : Reinforced insulation
 : Functional isolation

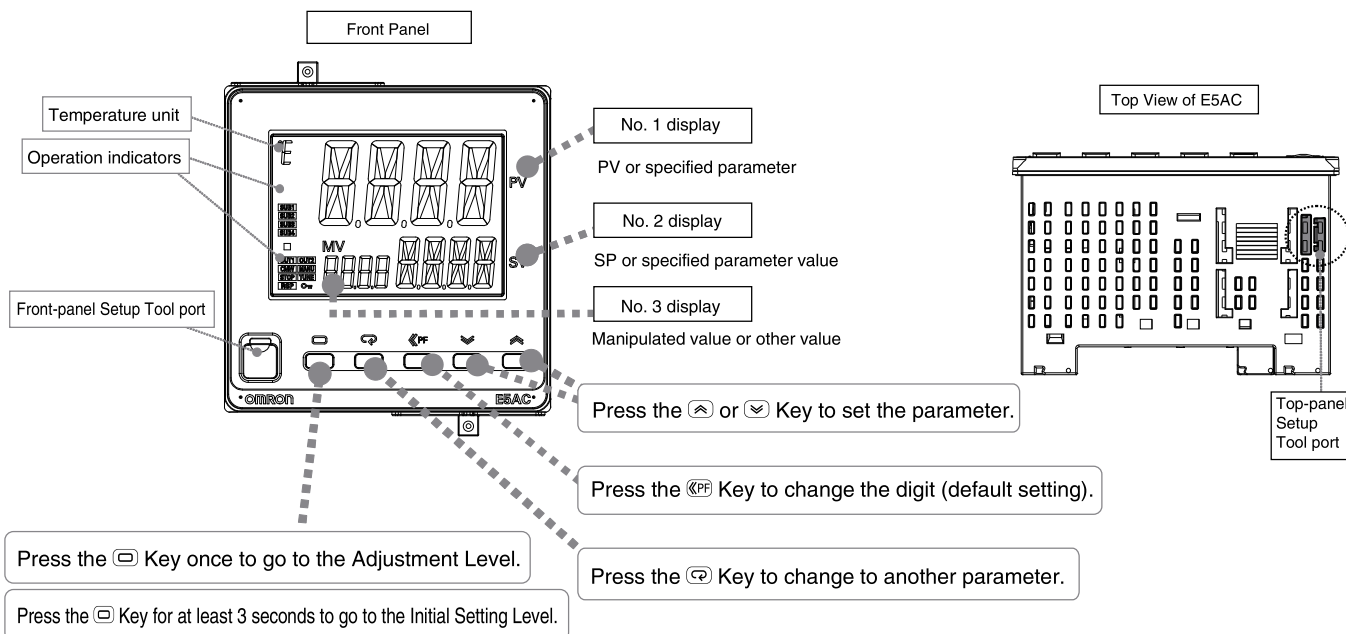
Note: Auxiliary outputs 1 to 2 and 3 to 4 are not insulated.

Nomenclature

E5EC/E5EC-B



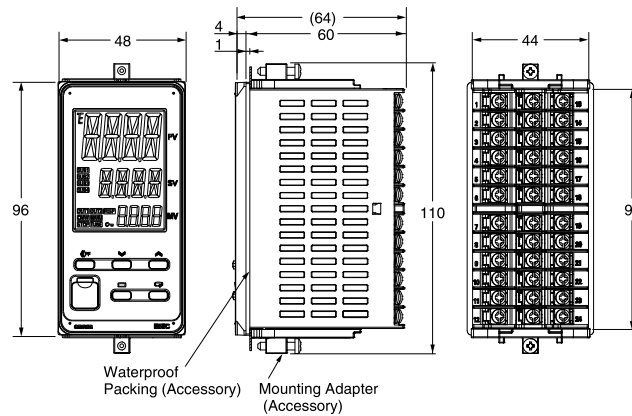
E5AC



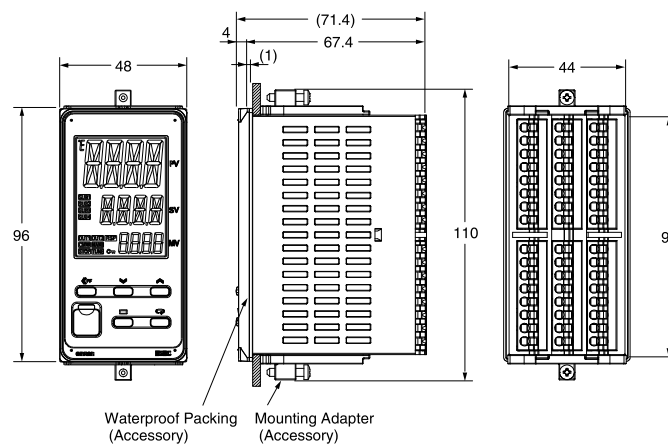
Dimensions

Controllers

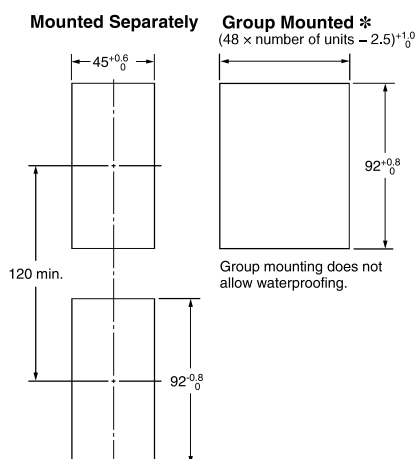
E5EC



E5EC-B



- Setup Tool ports are provided as standard feature. Use these ports to connect a computer to the Digital Temperature Controller. The E58-CIFQ2 USB-Serial Conversion Cable is required to connect to the port on the top panel. The E58-CIFQ2 USB-Serial Conversion Cable and E58-CIFQ2-E Communications Conversion Cable are required to connect to the port on the front panel. (You cannot leave either port connected constantly during operation.)



- Recommended panel thickness is 1 to 8 mm.
- Group mounting is not possible in the vertical direction. (Maintain the specified mounting space between Controllers.)
- To mount the Controller so that it is waterproof, insert the waterproof packing onto the Controller.
- When two or more Controllers are mounted, make sure that the surrounding temperature does not exceed the allowable operating temperature specified in the specifications.

* E5EC:

Selections for Control Outputs 1 and 2: QQ, QR, RR, CC, PR, or CQ
If you also specify 011, 013, or 014 for the option selection and use group mounting, the ambient temperature must be 45°C or less. Maintain the following spacing when more than one Digital Controller is installed at an ambient temperature of 55°C.

