Digital Temperature Controller
E5EC/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.
A Complete Range of I/O Capacities, Functions, and Performance.
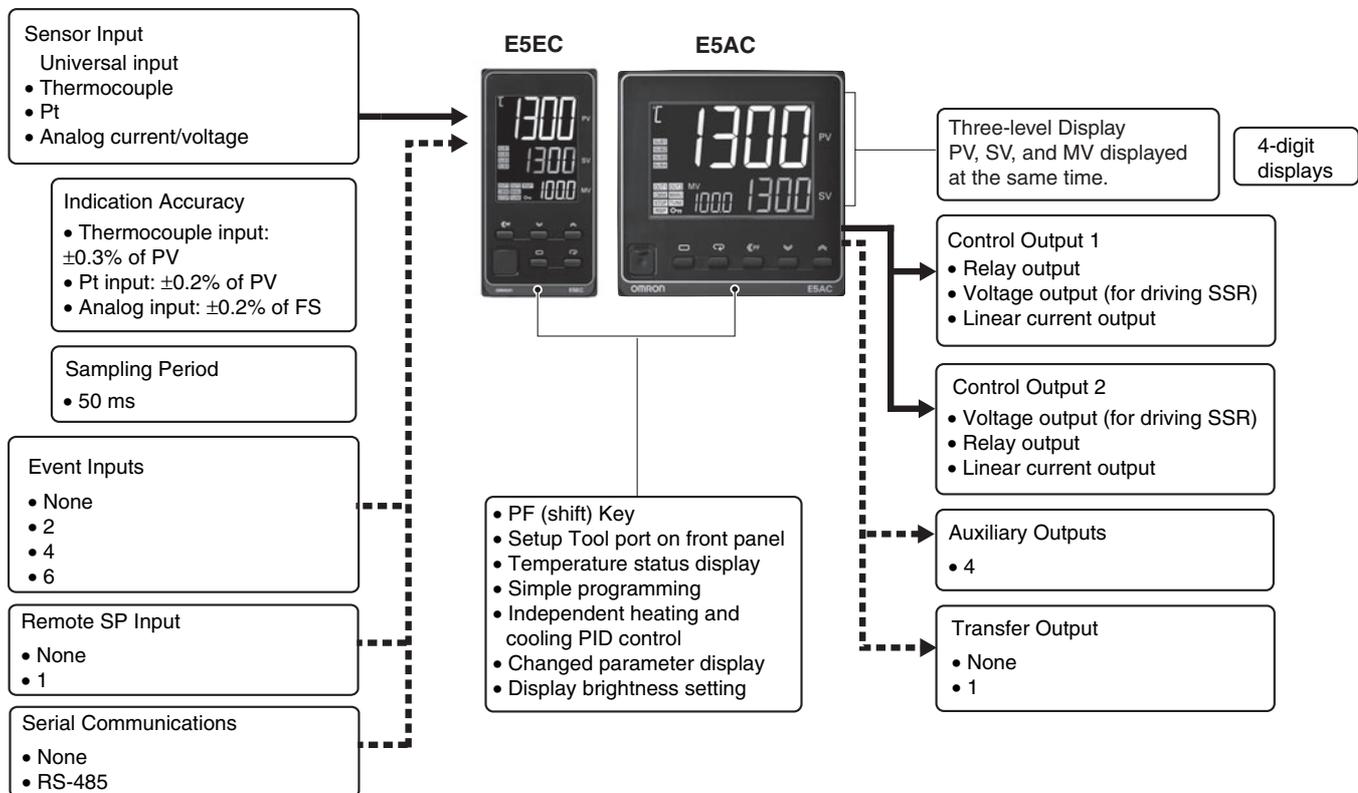## Handles More Applications.

- A white LCD PV display with a height of approx. 18 mm for the E5EC and 25 mm for the E5AC improves visibility.
- 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).
- High-speed sampling at 50 ms.
- Models are available with up to 4 auxiliary outputs, up to 6 event inputs, a transfer output, and a remote SP input to cover a wide range of applications.
- Short body with depth of only 60 mm.
- Easy connections to a PLC with programless communications. Use component communications to link Temperature Controllers to each other.
- The new position-proportional control models allow you to control valves as well.

48 × 96 mm E5EC　　**96 × 96 mm E5AC**

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

⚠ **Refer to Safety Precautions on page 104.**

Main I/O Functions

Sensor Input

Universal input
- Thermocouple
- Pt
- Analog current/voltage

Indication Accuracy
- Thermocouple input: ±0.3% of PV
- Pt input: ±0.2% of PV
- Analog input: ±0.2% of FS

Sampling Period
- 50 ms

Event Inputs
- None
- 2
- 4
- 6

Remote SP Input
- None
- 1

Serial Communications
- None
- RS-485

E5EC　　**E5AC**

- PF (shift) Key
- Setup Tool port on front panel
- Temperature status display
- Simple programming
- Independent heating and cooling PID control
- Changed parameter display
- Display brightness setting

Three-level Display
PV, SV, and MV displayed at the same time.

4-digit displays

Control Output 1
- Relay output
- Voltage output (for driving SSR)
- Linear current output

Control Output 2
- Voltage output (for driving SSR)
- Relay output
- Linear current output

Auxiliary Outputs
- 4

Transfer Output
- None
- 1

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 Terminals

E5EC-☐☐ **4** ☐ **5** **M** -☐☐☐ (Example: E5EC-RX4A5M-000)
　　①　②③④⑤　⑥

E5AC-☐☐ **4** ☐ **5** **M** -☐☐☐ (Example: E5AC-RX4A5M-000)
　　①　②③④⑤　⑥

Model		① Control outputs 1 and 2	② No. of auxiliary outputs	③ Power supply voltage	④ Terminal type	⑤ Input type	⑥ Options	Meaning	
E5EC								48 × 96 mm	
E5AC								96 × 96 mm	
								Control output 1	**Control output 2**
	RX							Relay output	None
	QX							Voltage output (for driving SSR)	None
*2	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 terminals (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.

Heating and Cooling Control

I　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.

E5EC/E5AC

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

Model
E53-COV24 (3pcs)

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

Waterproof Packing

Applicable Controller	Model
E5EC	**Y92S-P9**
E5AC	**Y92S-P10**

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

Waterproof Cover

Applicable Controller	Model
E5EC	**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. For the system requirements for the CX-Thermo, refer to information on the EST2-2C-MV4 on the OMRON website (www.ia.omron.com).
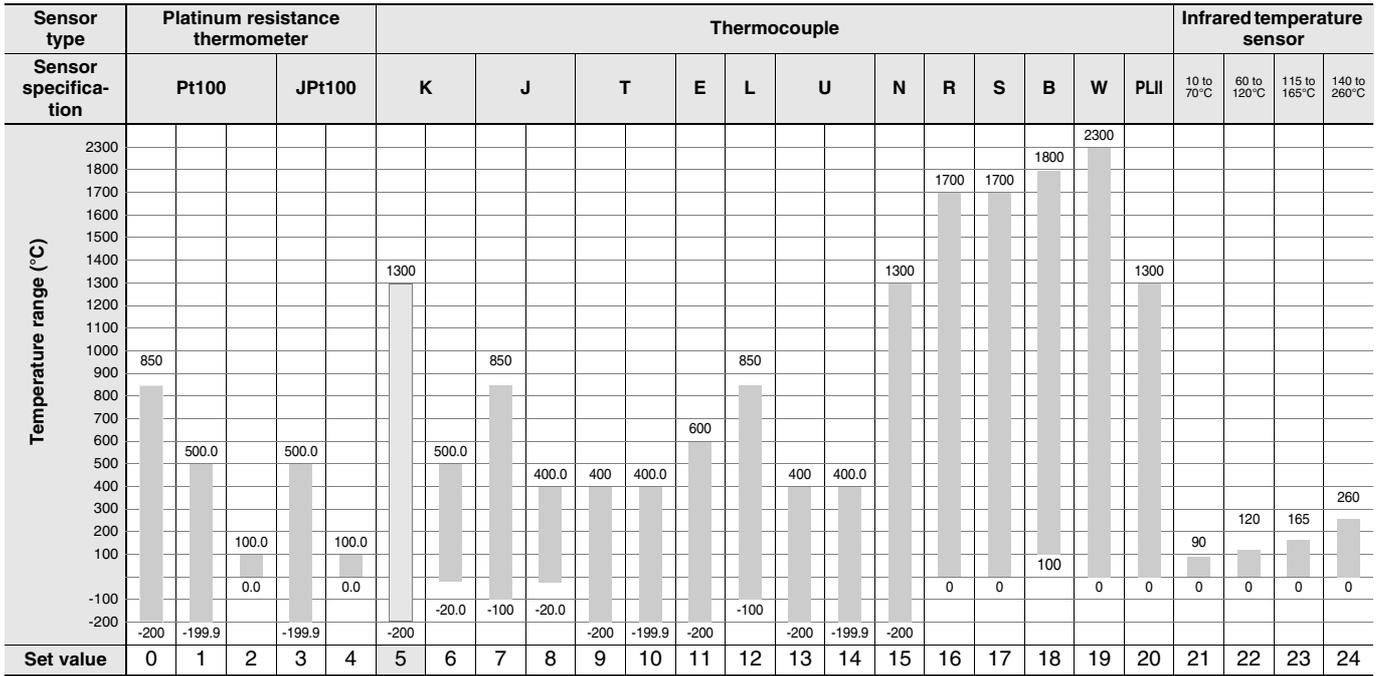
Specifications

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**	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**	4
	Output specifications	SPST-NO. relay outputs, 250 VAC, 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: 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 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		Installation Category II, Pollution Degree 2 (IEC 61010-1 compliant)

E5EC/E5AC

Input Ranges

●Thermocouple/Platinum Resistance Thermometer (Universal inputs)

Sensor type	Platinum resistance thermometer		Thermocouple													Infrared temperature sensor			
Sensor specification	Pt100	JPt100	K	J	T	E	L	U	N	R	S	B	W	PLII	10 to 70°C	60 to 120°C	115 to 165°C	140 to 260°C
Max. temperature	850	500.0 / 100.0	1300	850 / 500.0	400 / 400.0	600	850	400 / 400.0	1300	1700	1700	1800	2300	1300	90	120	165	260
Min. temperature	-200 / -199.9 / 0.0	-199.9 / 0.0	-200 / -20.0	-100 / -20.0	-200 / -199.9	-200	-100	-200 / -199.9	-200	0	0	100	0	0	0	0	0	0
Set value	0 / 1 / 2	3 / 4	5 / 6	7 / 8	9 / 10	11	12	13 / 14	15	16	17	18	19	20	21	22	23	24

Shaded settings are the default settings.

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

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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		*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			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			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		*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	*5	*4	A standby sequence is added to the upper- and lower-limit alarm (1). *6
6	Upper-limit with standby sequence			A standby sequence is added to the upper-limit alarm (2). *6
7	Lower-limit with standby sequence			A standby sequence is added to the lower-limit alarm (3). *6
8	Absolute-value upper-limit			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			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			A standby sequence is added to the absolute-value upper-limit alarm (8). *6
11	Absolute-value lower-limit with standby sequence			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			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			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 Heating/Cooling Control (Heating MV)	Standard Control Heating/Cooling Control (Heating MV) Always ON	This alarm type turns ON the alarm when the manipulated variable (MV) is higher than the alarm value (X).
17	MV absolute-value lower-limit alarm *9	Standard Control Heating/Cooling Control (Cooling MV)	Standard Control Heating/Cooling Control (Cooling MV) Always ON	This alarm type turns ON the alarm when the manipulated variable (MV) is lower than the alarm value (X).
18	RSP absolute-value upper-limit alarm *10			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			This alarm type turns ON the alarm when the remote SP (RSP) is lower than the alarm value (X).

*1 With set values 1, 4 and 5, the upper and lower limit values can be set independently for each alarm type, and are expressed as "L" and "H."

*2. Set value: 1, Upper- and lower-limit alarm
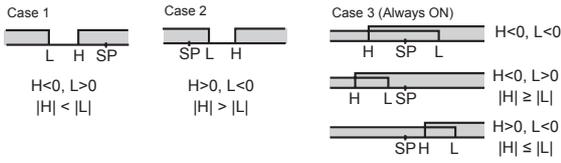
*3. Set value: 4, Upper- and lower-limit range
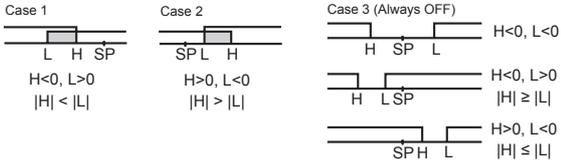
*4. Set value: 5, Upper- and lower-limit with standby sequence

For Upper- and Lower-Limit Alarm Described Above *2

• Case 1 and 2
Always OFF when the upper-limit and lower-limit hysteresis overlaps.

• Case 3: Always OFF

*5. Set value: 5, Upper- and lower-limit with standby sequence
Always OFF when the upper-limit and lower-limit hysteresis overlaps.

*6. Refer to the *E5□C Digital Temperature Controllers User's Manual* (Cat. No. H174) for information on the operation of the standby sequence.

*7. Refer to the *E5□C Digital Temperature Controllers User's Manual* (Cat. No. H174) for information on the loop burnout alarm (LBA). This setting cannot be used with a position-proportional model.

*8. Refer to the *E5□C Digital Temperature Controllers User's Manual* (Cat. No. H174) for information on the PV change rate alarm.

*9. When heating/cooling control is performed, the MV absolute upper limit alarm functions only for the heating operation and the MV absolute lower limit alarm functions only for the cooling operation.

*10. This value is displayed only when a remote SP input is used. It functions in both Local SP Mode and Remote SP Mode.

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.
Influence of voltage *2	Other thermocouple input: (±1% of indication value or ±4°C, whichever is greater) ±1 digit max. *3 Platinum resistance thermometer: (±1% of indication value or ±2°C, whichever is greater) ±1 digit max. Analog input: ±1%FS ±1 digit max. 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/s² for 10 min each in X, Y, and Z directions
	Resistance	10 to 55 Hz, 20 m/s² for 2 hrs each in X, Y, and Z directions
Shock	**Malfunction**	100 m/s², 3 times each in X, Y, and Z directions
	Resistance	300 m/s², 3 times each in X, Y, and Z directions
Weight	**E5EC**	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	CX-Thermo version 4.5 or higher
Setup Tool port	E5EC/E5AC top panel: An E58-CIFQ2 USB-Serial Conversion Cable is used to connect to a USB port on the computer.*5 E5EC/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**	UL 61010-1, Korean Radio Waves Act (Act 10564)
	Conformed standards	EN 61010-1 (IEC 61010-1): Pollution Degree 2, overvoltage category II, Lloyd's standards *6
EMC		EMI EN61326 Radiated Interference Electromagnetic Field Strength: EN 55011 Group 1, class A Noise Terminal Voltage: EN 55011 Group 1, class A EMS: EN 61326 ESD Immunity: EN 61000-4-2 Electromagnetic Field Immunity: EN 61000-4-3 Burst Noise Immunity: EN 61000-4-4 Conducted Disturbance Immunity: EN 61000-4-6 Surge Immunity: EN 61000-4-5 Voltage Dip/Interrupting Immunity: 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 information on maritime standards in *Shipping Standards* on page 106 for compliance with Lloyd's Standards.

USB-Serial Conversion Cable

Applicable OS	Windows XP/Vista/7/8
Applicable software	CX-Thermo version 4.5 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.)*
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

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* 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]	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) Applicable PLCs OMRON PLCs CS Series, CJ Series, or CP Series Mitsubishi Electric PLCs MELSEC Q Series, L Series, or FX Series (compatible with the FX2 or FX3 (excluding the FX1S)) KEYENCE PLCs KEYENCE KV Series

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)
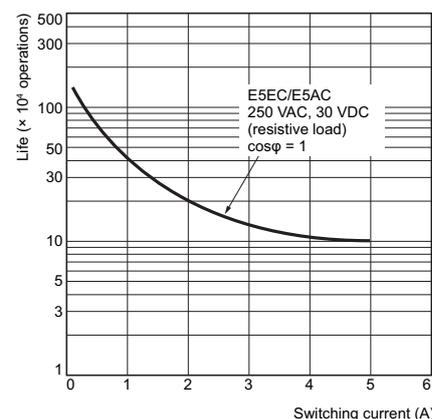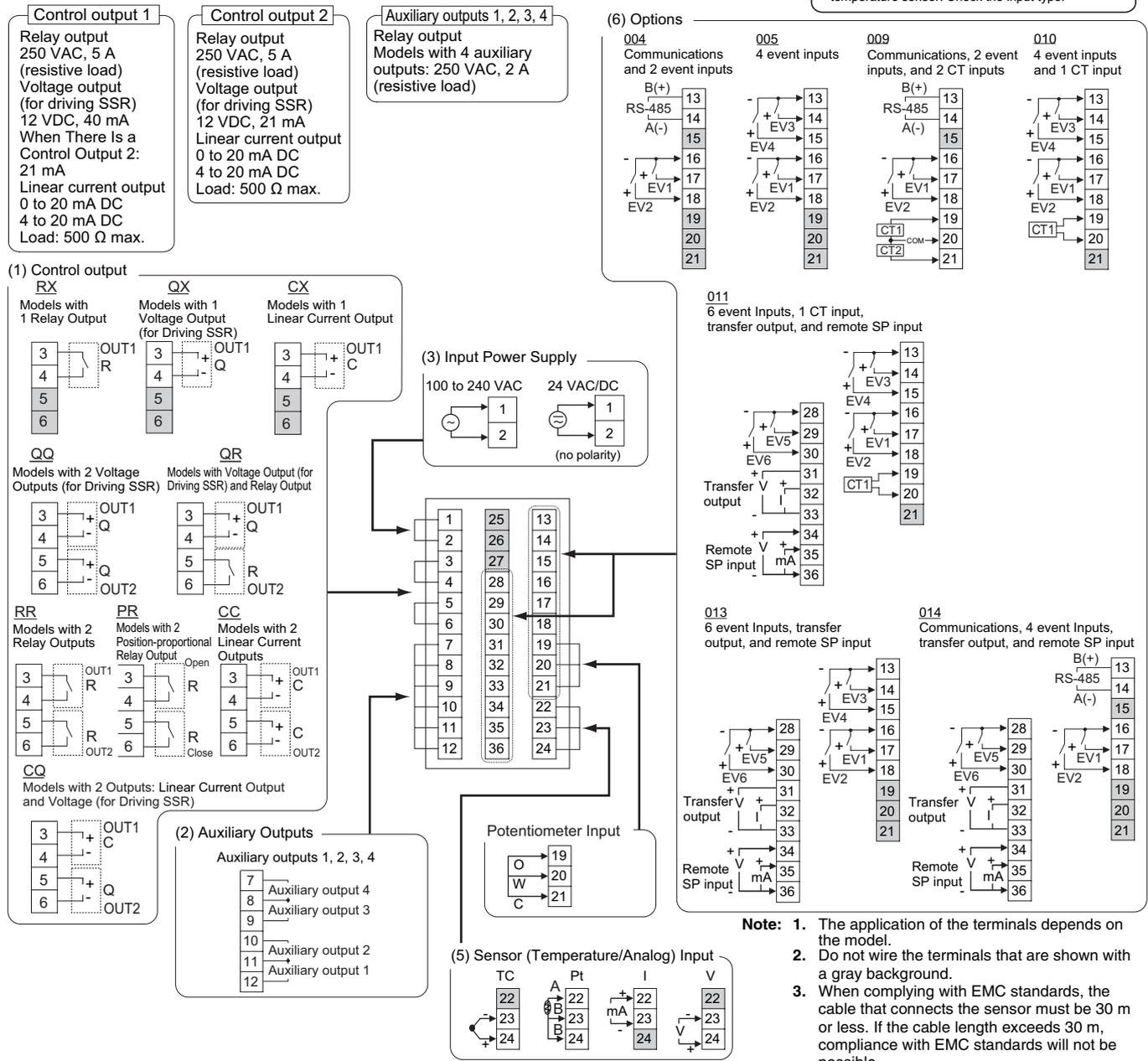
External Connections

E5EC/E5AC

E5EC-☐☐ 4 ☐ 5 M - ☐☐☐   E5AC-☐☐ 4 ☐ 5 M - ☐☐☐
(1) (2) (3) (4)(5) (6)   (1) (2) (3) (4)(5) (6)
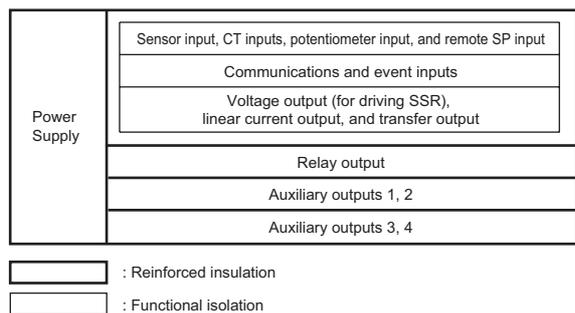
Terminal type   Terminal type

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

Control output 1
Relay output
250 VAC, 5 A (resistive load)
Voltage output (for driving SSR)
12 VDC, 40 mA
When There Is a Control Output 2: 21 mA
Linear current output
0 to 20 mA DC
4 to 20 mA DC
Load: 500 Ω max.

Control output 2
Relay output
250 VAC, 5 A (resistive load)
Voltage output (for driving SSR)
12 VDC, 21 mA
Linear current output
0 to 20 mA DC
4 to 20 mA DC
Load: 500 Ω max.

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

(6) Options

004 Communications and 2 event inputs

005 4 event inputs

009 Communications, 2 event inputs, and 2 CT inputs

010 4 event inputs and 1 CT input

(1) Control output

RX — Models with 1 Relay Output

QX — Models with 1 Voltage Output (for Driving SSR)

CX — Models with 1 Linear Current Output

(3) Input Power Supply
100 to 240 VAC   24 VAC/DC (no polarity)

QQ — Models with 2 Voltage Outputs (for Driving SSR)

QR — Models with Voltage Output (for Driving SSR) and Relay Output

RR — Models with 2 Relay Outputs

PR — Models with 2 Position-proportional Relay Output

CC — Models with 2 Linear Current Outputs

CQ — Models with 2 Outputs: Linear Current Output and Voltage (for Driving SSR)

011 6 event Inputs, 1 CT input, transfer output, and remote SP input

013 6 event Inputs, transfer output, and remote SP input

014 Communications, 4 event Inputs, transfer output, and remote SP input

(2) Auxiliary Outputs
Auxiliary outputs 1, 2, 3, 4
7
8   Auxiliary output 4
9   Auxiliary output 3
10 Auxiliary output 2
11 Auxiliary output 1
12

Potentiometer Input
O 19
W 20
C 21

(5) Sensor (Temperature/Analog) Input
TC   Pt   I   V

Note:
1. The application of the terminals depends on the model.
2. Do not wire the terminals that are shown with a gray background.
3. 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.
4. Connect M3 crimped terminals.

Isolation/Insulation Block Diagrams
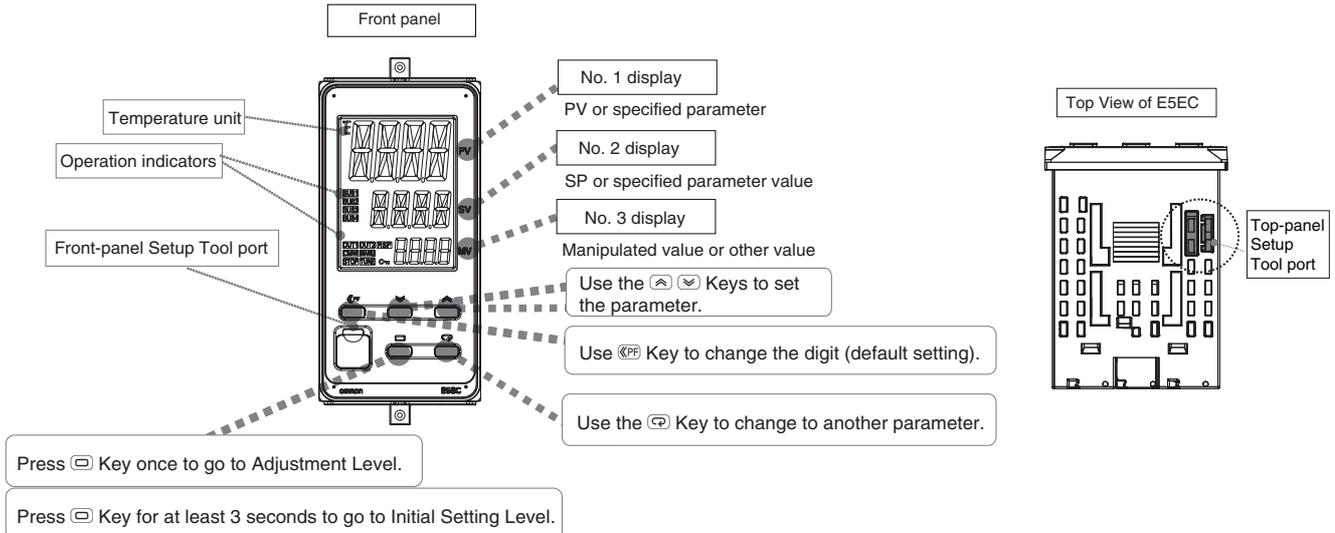
Models with 4 Auxiliary Outputs

Power Supply	Sensor input, CT inputs, potentiometer input, and remote SP input
	Communications and event inputs
	Voltage output (for driving SSR), linear current output, and transfer output
	Relay output
	Auxiliary outputs 1, 2
	Auxiliary outputs 3, 4

☐ : Reinforced insulation
☐ : Functional isolation

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

E5EC/E5AC

Nomenclature

E5EC

Front panel

Temperature unit

Operation indicators

Front-panel Setup Tool port

No. 1 display

PV or specified parameter

No. 2 display

SP or specified parameter value

No. 3 display

Manipulated value or other value

Use the ⊼ ⊻ Keys to set the parameter.

Use ⟨PF Key to change the digit (default setting).

Use the ⊙ Key to change to another parameter.

Press ⊡ Key once to go to Adjustment Level.

Press ⊡ Key for at least 3 seconds to go to Initial Setting Level.

Top View of E5EC

Top-panel Setup Tool port

E5AC

Front Panel

Temperature unit

Operation indicators

Front-panel Setup Tool port

No. 1 display

PV or specified parameter

No. 2 display

SP or specified parameter value

No. 3 display

Manipulated value or other value

Press the ⊼ or ⊻ Key to set the parameter.

Press the ⟨PF Key to change the digit (default setting).

Press the ⊙ Key to change to another parameter.

Press the ⊡ Key once to go to the Adjustment Level.

Press the ⊡ Key for at least 3 seconds to go to the Initial Setting Level.

Top View of E5AC

Top-panel Setup Tool port

OMRON

E5AC

96 x 96

(64)
4
60
1

91 x 91

110

91

Waterproof
Packing (Accessory)

Mounting Adapter
(Accessory)

The Setup Tool ports are on the front and top of the Digital Temperature Controller.
It is used to connect the Temperature Controller to the computer to use the Setup Tool.
The E58-CIFQ2 USB-Serial Conversion Cable is required to make the connection.
Refer to the instructions that are provided with the USB-Serial Conversion Cable for the connection procedure.

Note: Do not leave the USB-Serial Conversion Cable connected when you use the Temperature Controller.

Mounted Separately

$92^{+0.8}_{0}$

120 min.

$92^{+0.8}_{0}$
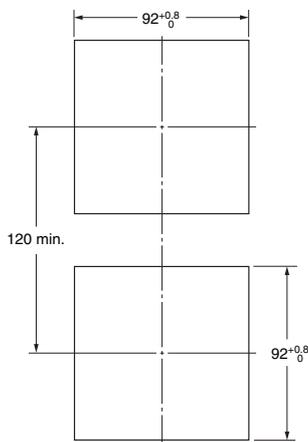
Group Mounted *
(96 × number of units − 3.5)$^{+1.0}_{0}$

$92^{+0.8}_{0}$
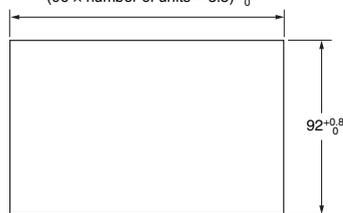
Group mounting does not
allow waterproofing.

• 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.
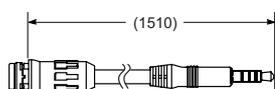
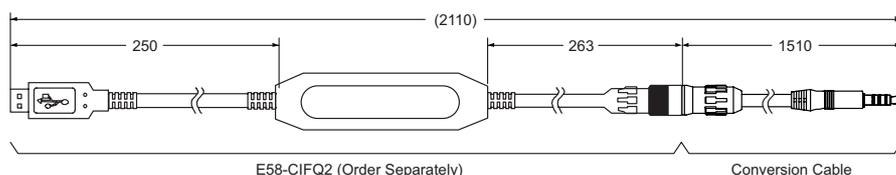# Accessories (Order Separately)

● USB-Serial Conversion Cable
E58-CIFQ2

(2110)

250   263   1510

LED (RD)

USB connector
(type A plug)

LED (PWR)

LED (SD)
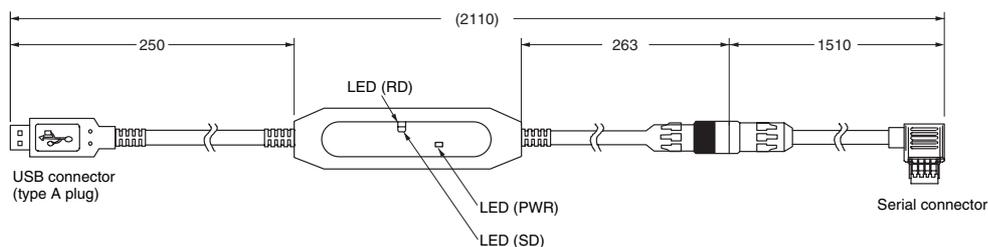
Serial connector

● Conversion Cable
E58-CIFQ2-E

Conversion Cable

Connecting to the E58-CIFQ2 USB-Serial Conversion Cable

(1510)

(2110)

250   263   1510

E58-CIFQ2 (Order Separately)   Conversion Cable

Note: Always use this product together with the E58-CIFQ2.

● Terminal Covers
E53-COV24 (Three Covers provided.)

2 3.8

10

91
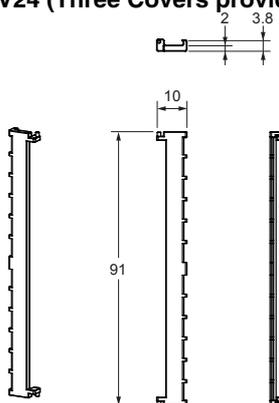
● Waterproof Packing
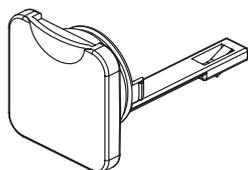### Y92S-P9 (for DIN 48 × 96)

Y92S-P10 (for DIN 96 × 96)
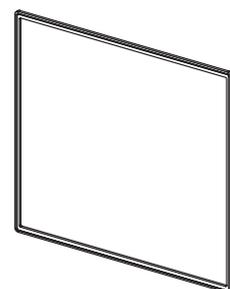
The Waterproof Packing is provided with the Temperature Controller.
Order the Waterproof Packing separately if it becomes lost or damaged.
The degree of protection when the Waterproof Packing is used is IP66.
Also, keep the Port Cover on the front-panel Setup Tool port of the E5EC/E5AC securely closed.
To maintain an IP66 degree of protection, the Waterproof Packing and the Port Cover for the front-panel Setup Tool port must be periodically replaced because they may deteriorate, shrink, or harden depending on the operating environment.
The replacement period will vary with the operating environment.
Check the required period in the actual application.
Use 3 years or sooner as a guideline.
If a waterproof structure is not required, then the Waterproof Packing does not need to be installed.

● Setup Tool Port Cover for top panel
Y92S-P7

Order this Port Cover separately if the Port Cover on the front-panel Setup Tool port is lost or damaged. The Waterproof Packing must be periodically replaced because it may deteriorate, shrink, or harden depending on the operating environment.

● Mounting Adapter
Y92F-51 (Two Adapters provided.)
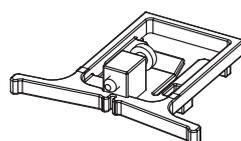
One pair is provided with the Controller.
Order this Adapter separately if it becomes lost or damaged.