Digital Temperature Controller (Simple Type)

E5EC-800/E5EC-B-800/E5AC-800 (48 × 96 mm/96 × 96 mm)

Large White PV Display That's Easier to Read.
Easy to Use, from Model Selection to Setup and Operation.
Models with Push-In Plus Terminal Blocks Added to 48 × 96-mm Lineup.

- A white LCD PV display with a height of approx. 18 mm for the E5EC/E5EC-B-800 and 25 mm for the E5AC-800 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.

* CSA conformance evaluation by UL.

48 × 96 mm Screw Terminal Blocks E5EC-800

48 × 96 mm Push-In Plus Terminal Blocks E5EC-B-800

96 × 96 mm Screw Terminal Blocks E5AC-800

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

Refer to Safety Precautions on page 62.

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

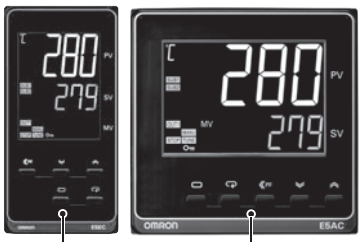
Sampling Period
- 50 ms

Serial Communications
- None
- RS-485

Event Inputs

<E5EC-800/E5AC-800>	<E5EC-B-800>
• None	• None
• 2	• 2
• 4	

E5EC-800/E5EC-B-800 **E5AC-800**



- PF (shift) Key
- Temperature status display
- Independent heating and cooling PID control
- Changed parameter display

Dual displays: PV/SV | 4-digit displays

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

Control Output 2
- None
- Relay output

Auxiliary Outputs

<E5EC-800>	<E5AC-800>	<E5EC-B-800>
• None	• None	• 2
• 2	• 1	
	• 2	
	• 3	

Model Number Legend and Standard Models

Model Number Legend

●Models with Screw Terminal Blocks

E5EC-800 48 × 96 mm

Control output 1	Control output 2	Auxiliary output	Communications	Heater burnout	Event inputs	Power supply voltage	Model
Relay output	-	Two	-	-	-	100 to 240 VAC	**E5EC-RX2ASM-800**
Voltage output	-						**E5EC-QX2ASM-800**
Linear current output	-						**E5EC-CX2ASM-800**
Relay output	Relay output						**E5EC-RR2ASM-800**
Voltage output	Relay output						**E5EC-QR2ASM-800**
Linear current output	Relay output						**E5EC-CR2ASM-800**
Relay output	-					24 VAC/VDC	**E5EC-RX2DSM-800**
Voltage output	-						**E5EC-QX2DSM-800**
Linear current output	-						**E5EC-CX2DSM-800**
Relay output	Relay output						**E5EC-RR2DSM-800**
Voltage output	Relay output						**E5EC-QR2DSM-800**
Linear current output	Relay output						**E5EC-CR2DSM-800**
Relay output	Relay output		RS-485	One	Two	100 to 240 VAC	**E5EC-RR2ASM-808**
Voltage output	Relay output						**E5EC-QR2ASM-808**
Relay output	Relay output					24 VAC/VDC	**E5EC-RR2DSM-808**
Voltage output	Relay output						**E5EC-QR2DSM-808**
Relay output	Relay output		-		Four	100 to 240 VAC	**E5EC-RR2ASM-810**
Voltage output	Relay output						**E5EC-QR2ASM-810**
Relay output	Relay output					24 VAC/VDC	**E5EC-RR2DSM-810**
Voltage output	Relay output						**E5EC-QR2DSM-810**
Linear current output	Relay output		RS-485	-	Two	100 to 240 VAC	**E5EC-CR2ASM-804**
Linear current output	Relay output					24 VAC/VDC	**E5EC-CR2DSM-804**
Relay output (Open)*	Relay output (Close)*	-	-	-	-	100 to 240 VAC	**E5EC-PR0ASM-800**
Relay output (Open)*	Relay output (Close)*	Two					**E5EC-PR2ASM-800**
Relay output (Open)*	Relay output (Close)*		RS-485		Two		**E5EC-PR2ASM-804**

* Position proportional control model.

Note: Draw-out-type models of the E5EC-800 are available. Ask your OMRON representative for details.

●Models with Push-In Plus Terminal Blocks

E5EC-B-800 48 × 96 mm

Control output 1	Control output 2	Auxiliary output	Communications	Heater burnout	Event inputs	Power supply voltage	Model
Relay output	-	Two	-	-	-	100 to 240 VAC	**E5EC-RX2ABM-800**
Voltage output	-						**E5EC-QX2ABM-800**
Linear current output	-						**E5EC-CX2ABM-800**
Relay output	Relay output						**E5EC-RR2ABM-800**
Voltage output	Relay output						**E5EC-QR2ABM-800**
Linear current output	-		RS-485		Two		**E5EC-CX2ABM-804**
Relay output	Relay output			One			**E5EC-RR2ABM-808**
Voltage output	Relay output						**E5EC-QR2ABM-808**

E5AC-800 48 × 96 mm

Control output 1	Control output 2	Auxiliary output	Communications	Heater burnout	Event inputs	Power supply voltage	Model
Relay output	-	One	-	-	-	100 to 240 VAC	**E5AC-RX1ASM-800**
Voltage output	-						**E5AC-QX1ASM-800**
Linear current output	-						**E5AC-CX1ASM-800**
Relay output	-	Three					**E5AC-RX3ASM-800**
Voltage output	-						**E5AC-QX3ASM-800**
Linear current output	-						**E5AC-CX3ASM-800**
Relay output	-	One				24 VAC/VDC	**E5AC-RX1DSM-800**
Voltage output	-						**E5AC-QX1DSM-800**
Linear current output	-						**E5AC-CX1DSM-800**
Relay output	-	Three					**E5AC-RX3DSM-800**
Voltage output	-						**E5AC-QX3DSM-800**
Linear current output	-						**E5AC-CX3DSM-800**
Relay output	-		RS-485	One	Two	100 to 240 VAC	**E5AC-RX3ASM-808**
Voltage output	-						**E5AC-QX3ASM-808**
Relay output	-					24 VAC/VDC	**E5AC-RX3DSM-808**
Voltage output	-						**E5AC-QX3DSM-808**
Relay output	-		-		Four	100 to 240 VAC	**E5AC-RX3ASM-810**
Voltage output	-						**E5AC-QX3ASM-810**
Relay output	-					24 VAC/VDC	**E5AC-RX3DSM-810**
Voltage output	-						**E5AC-QX3DSM-810**
Linear current output	-		RS-485	-	Two	100 to 240 VAC	**E5AC-CX3ASM-804**
Linear current output	-					24 VAC/VDC	**E5AC-CX3DSM-804**
Relay output (Open)*	Relay output (Close)*	-	-	-	-	100 to 240 VAC	**E5AC-PR0ASM-800**
Relay output (Open)*	Relay output (Close)*	Two					**E5AC-PR2ASM-800**
Relay output (Open)*	Relay output (Close)*		RS-485		Two		**E5AC-PR2ASM-804**

* Position proportional control model.
Note: Draw-out-type models of the E5AC-800 are available. Ask your OMRON representative for details.

Heating and Cooling Control

●Using Heating and Cooling Control

① Control Output Assignment
If there is no control output 2, an auxiliary output is used as the cooling control output.
If there is a control output 2, the two control outputs are used for heating and cooling.
(It does not matter which output is used for heating and which output is used for cooling.)
② Control
If PID control is used, you can set PID control separately for heating and cooling.
This allows you to handle control systems with different heating and cooling response characteristics.

Optional Products (Order Separately)

Terminal Covers (for E5EC-800/E5AC-800)

Model
E53-COV24 (3pcs)

Waterproof Packing

Applicable Controller	Model
E5EC-800/ E5EC-B-800	Y92S-P9
E5AC-800	Y92S-P10

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

Waterproof Cover

Applicable Controller	Model
E5EC-800/ E5EC-B-800	Y92A-49N
E5AC-800	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 (Two Adapters are included.)

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

Current Transformers (CTs)

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

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

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-800/ E5EC-B-800**	Models with option selection of 800: 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-800	Models with option selection of 800: 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, C/W, or PL II Platinum resistance thermometer: Pt100 or JPt100 Infrared temperature sensor (ES1B): 10 to 70°C, 60 to 120°C, 115 to 165°C, or 140 to 260°C Analog input Current input: 4 to 20 mA or 0 to 20 mA Voltage input: 1 to 5 V, 0 to 5 V, or 0 to 10 V
Input impedance			Current input: 150 Ω max., Voltage input: 1 MΩ min. (Use a 1:1 connection when connecting the ES2-HB-N/THB-N.)
Control method			ON/OFF control 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, 10mA (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-800: 0 or 2 (depend on model), E5EC-B-800: 2 E5AC-800: 0, 1, 2 or 3 (depend on model)
	Output specifications		SPST-NO relay outputs, 250 VAC, 3 A (resistive load), Electrical life: 100,000 operations, Minimum applicable load: 10 mA at 5V (reference value)
Event input	**Number of inputs**		E5EC-800/E5AC-800: 2 or 4 (depend on model), E5EC-B-800: 2
	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
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-800/E5EC-B-800: PV: 18.0 mm, SV: 11.0 mm, MV: 7.8 mm E5AC-800: PV: 25.0 mm, SV: 15.0 mm, MV: 9.5 mm
Multi SP			Up to eight set points (SP0 to SP7) can be saved and selected using 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, PV input shift, run/stop, protection functions, temperature status display, moving average of input value, FB moving average*
Ambient operating temperature			-10 to 55°C (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)

* There are no optional functions for the E5EC-B-800. Refer to Model Number Legend on page 22.

Input Ranges (Universal inputs)

●Thermocouple/Platinum Resistance Thermometer

Sensor type	Platinum resistance thermometer					Thermocouple															Infrared temperature sensor			
Sensor specification	Pt100			JPt100		K		J		T		E	L	U		N	R	S	B	C/W	PLII	10 to 70°C	60 to 120°C	115 to 165°C	140 to 260°C
Temperature range (°C)	850 / -200	500.0 / -199.9	100.0 / 0.0	500.0 / -199.9	100.0 / 0.0	1300 / -200	500.0 / -20.0	850 / -100	400.0 / -20.0	400 / -200	400.0 / -199.9	600 / -200	850 / -100	400 / -200	400.0 / -199.9	1300 / -200	1700 / 0	1700 / 0	1800 / 100	2300 / 0	1300 / 0	90 / 0	120 / 0	165 / 0	260 / 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 1602-2015, IEC 60584-1
L: Fe-CuNi, DIN 43710-1985
U: Cu-CuNi, DIN 43710-1985
C/W: W5Re/W26Re, JIS C 1602-2015, 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)

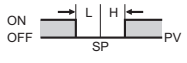
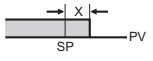
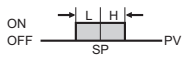
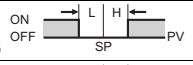
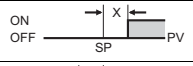
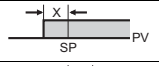
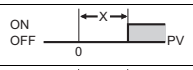
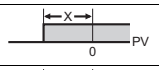
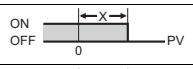
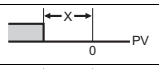
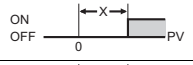
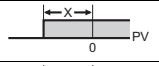
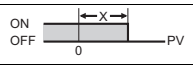
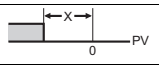
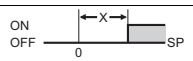
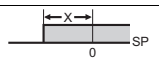
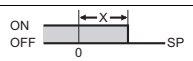
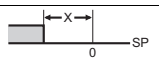
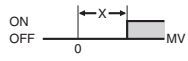
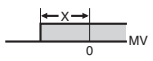
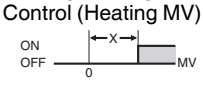
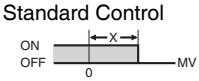
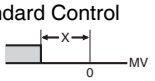
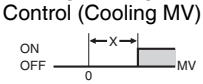
●Analog input

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 type

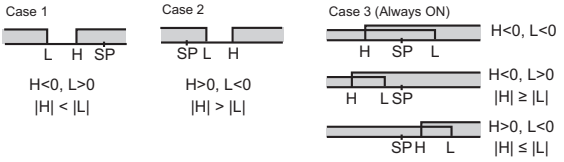
Each alarm can be independently set to one of the following 19 alarm types. The default is 2: Upper limit. (see note.)
Auxiliary outputs are allocated for alarms. ON delays and OFF delays (0 to 999 s) can also be specified.

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.

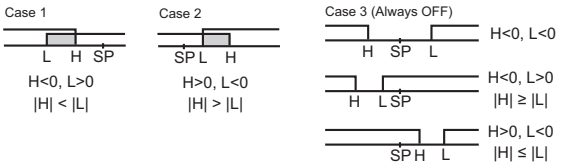
Set value	Alarm type	Alarm output operation		Description of function
		When alarm value X is positive	When alarm value X is negative	
0	Alarm function OFF	Output OFF		No alarm
1	Upper- and lower-limit *1		*2	Set the upward deviation in the set point for the alarm upper limit (H) and the lower deviation 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 	Standard Control 	This alarm type turns ON the alarm when the manipulated variable (MV) is higher than the alarm value (X).
		Heating/Cooling Control (Heating MV) 	Heating/Cooling Control (Heating MV) Always ON	
17	MV absolute value lower limit alarm *9	Standard Control 	Standard Control 	This alarm type turns ON the alarm when the manipulated variable (MV) is lower than the alarm value (X).
		Heating/Cooling Control (Cooling MV) 	Heating/Cooling Control (Cooling MV) Always ON	

*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 PV change rate alarm. 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.

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.
Influence of temperature *2			Thermocouple input (R, S, B, C/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 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.
Influence of voltage *2			
Influence of EMS. (at EN 61326-1)			
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)
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)
Affect 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-800/ E5EC-B-800**	Controller: Approx. 210 g, Adapter: Approx. 4 g × 2
		E5AC-800	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)
Standards	**Approved standards**		cULus: UL 61010-1/CSA C22.2 No.61010-1, Korean wireless regulations (Radio law: KC Mark) (Some models only.) *5, Lloyd's standards *6, EAC
	Conformed standards		EN 61010-1 (IEC 61010-1), RCM
EMC			EMI: EN 61326-1 *7 Radiated Interference Electromagnetic Field Strength: EN 55011 Group 1, class A Noise Terminal Voltage: EN 55011 Group 1, class A EMS: EN 61326-1 *7 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 1300°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 C/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. Refer to your OMRON website for the most recent information on applicable models.
*6. Refer to information on maritime standards in *Shipping Standards* on page 65 for compliance with Lloyd's Standards.
*7. Industrial electromagnetic environment (EN/IEC 61326-1 Table 2)

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

*1 The baud rate, data bit length, stop bit length, and vertical parity can be individually set using the Communications Setting Level.
*2 Modbus is a registered trademark of Schneider Electric.

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 Temperature Controllers: 32 max. (Up to 16 for the FX Series) Applicable PLCs OMRON PLCs CS Series, CJ Series, CP Series, NJ Series, or NX1P MELSEC Q Series, L Series, FX3 Series, or iQ-R Series 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

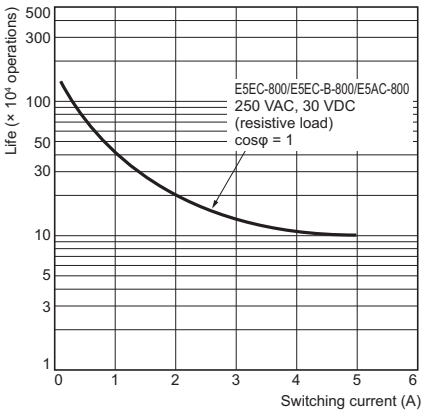
	E54-CT1 E54-CT3	E54-CT1L E54-CT3L
Dielectric strength	1,000 VAC for 1 min	1,500 VAC for 1 min
Vibration resistance	50 Hz, 98 m/s^2	
Weight	E54-CT1: Approx. 11.5 g, E54-CT3: Approx. 50 g	E54-CT1: Approx. 14 g, E54-CT3: Approx. 57 g
Accessories	E54-CT3 Only Armatures (2) Plugs (2)	None

Heater Burnout Alarms and SSR Failure Alarms

CT input (for heater current detection)	Models with detection for single-phase heaters: One input
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

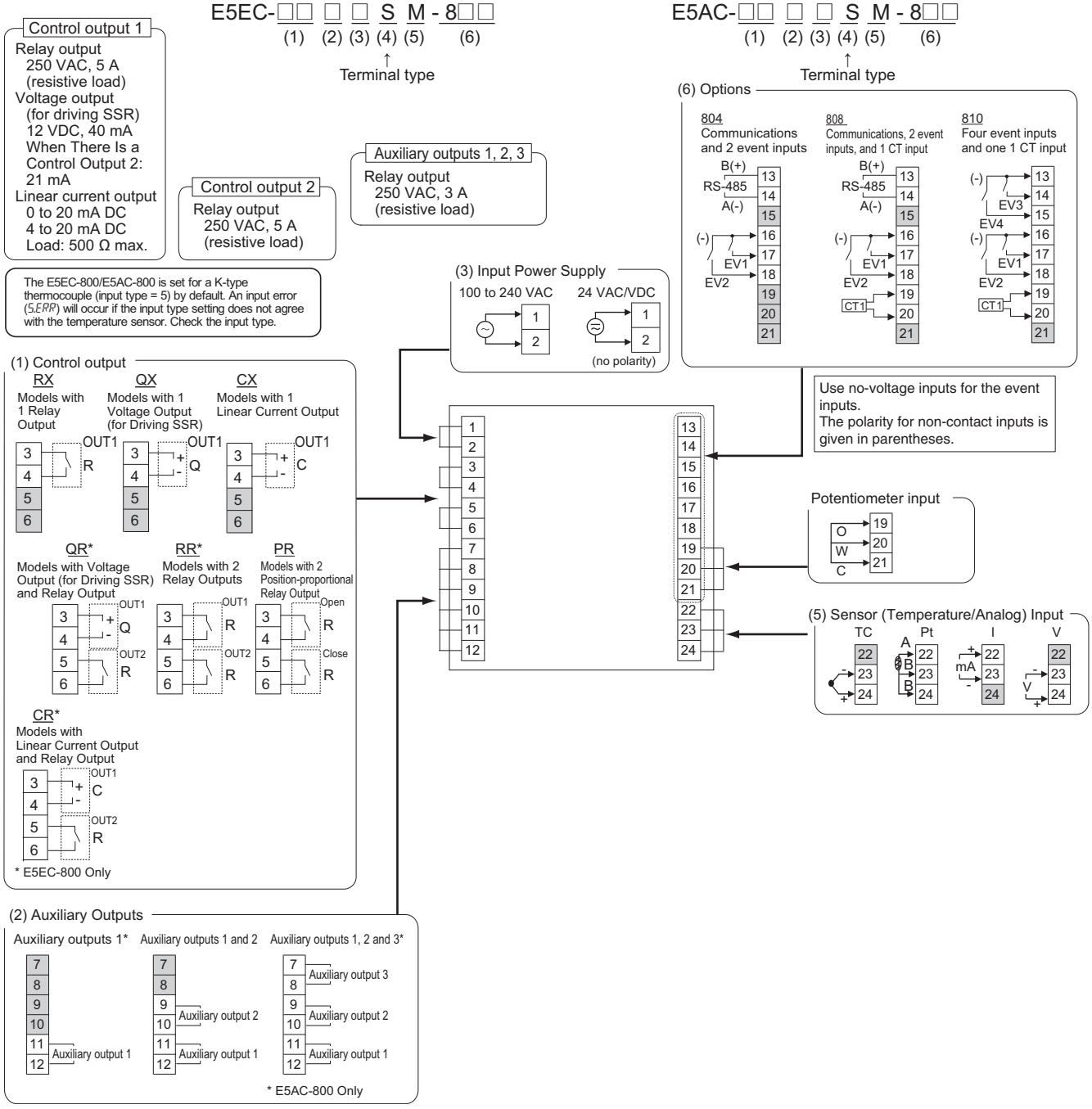
*1. For heater burnout alarms, the heater current will be measured when the control output is ON, and the output will turn ON if the heater current is lower than the set value (i.e., heater burnout detection current value).
*2. For SSR failure alarms, the heater current will be measured when the control 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 Control Output Relays (Reference Values)



External Connections

E5EC/E5AC-800 (Screw Terminal Blocks)



Note: 1. The application of the terminals depends on the model.

2. Do not wire the terminals that are shown with a gray background.

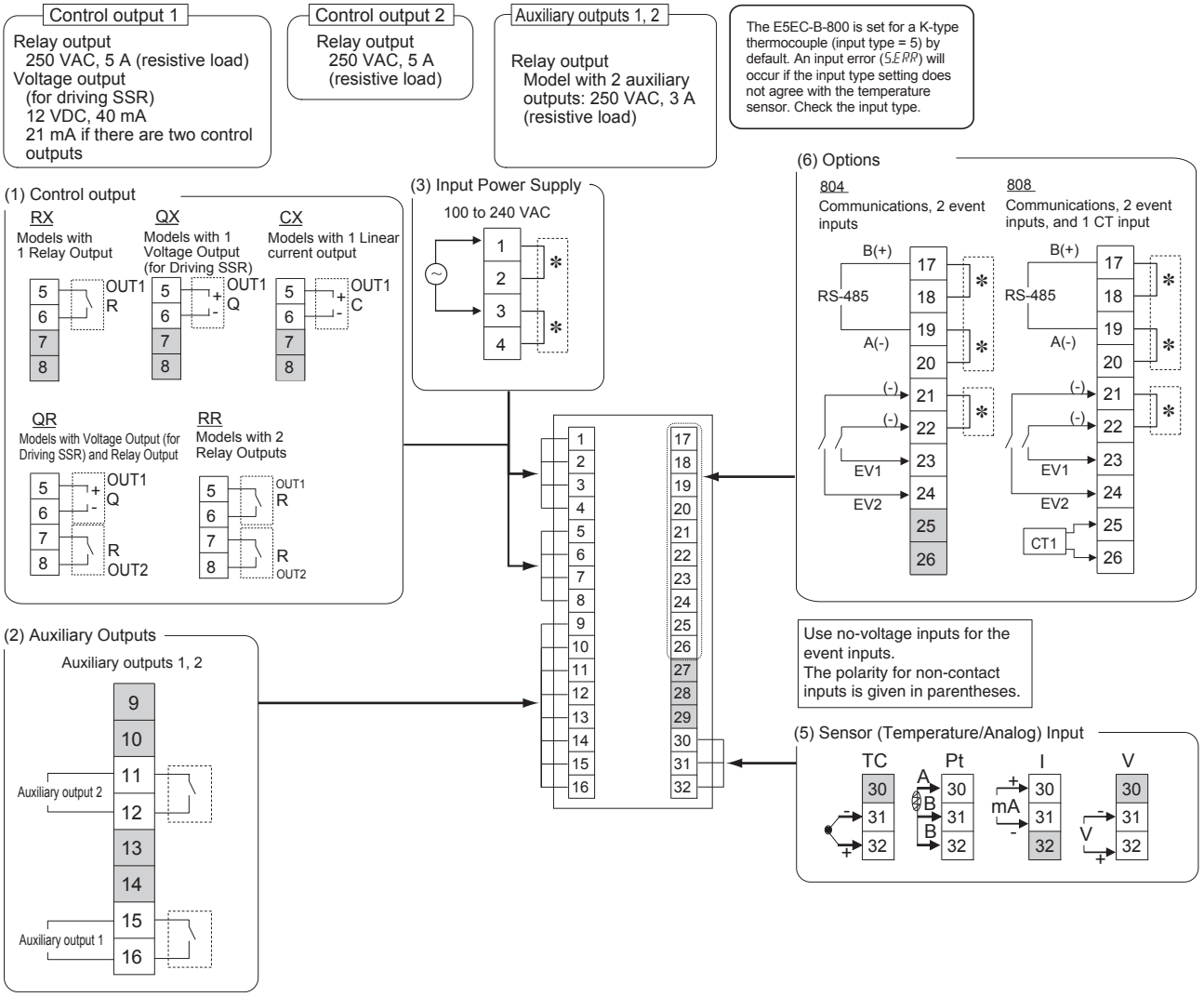
3. When complying with EMC standards, the cable that connects the sensor must be 30 m or less. If the cable length exceeds 30 m, compliance with EMC standards will not be possible.

4. Connect M3 crimped terminals.

5. Due to UL Listing requirements, use the E54-CT1L or E54-CT3L Current Transformer with the factory wiring (internal wiring). Use a UL category XOBA or XOBA7 current transformer that is UL Listed for field wiring (external wiring) and not the factory wiring (internal wiring).

E5EC-B-800 (Push-In Plus Terminal Blocks)

E5EC-□□ 2 A B M - 8□□
(1) (2) (3) (4) (5) (6)
↑
Terminal type



Note: 1. The application of the terminals depends on the model.

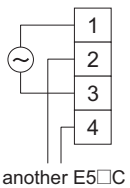
2. Do not wire the terminals that are shown with a gray background.

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. Refer to *Wiring Precautions for E5□C-B (Controllers with Push-In Plus Terminal Blocks)* on page 72 for wire specifications and wiring methods.

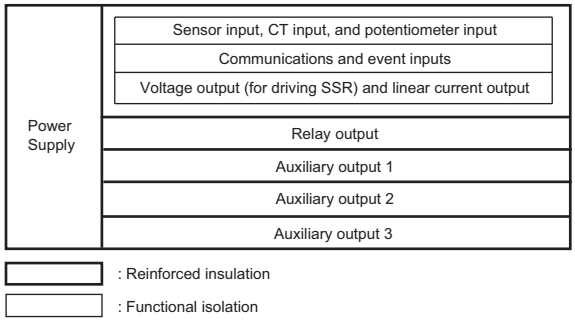
5. Common terminals are indicated with asterisks (✻). You can use the input power supply and communications common terminals for crossover wiring. Do not exceed the maximum number of Temperature Controllers given below if you use crossover wiring for the input power supply.
100 to 240 VAC Controllers: 16 max.

Wiring Example:



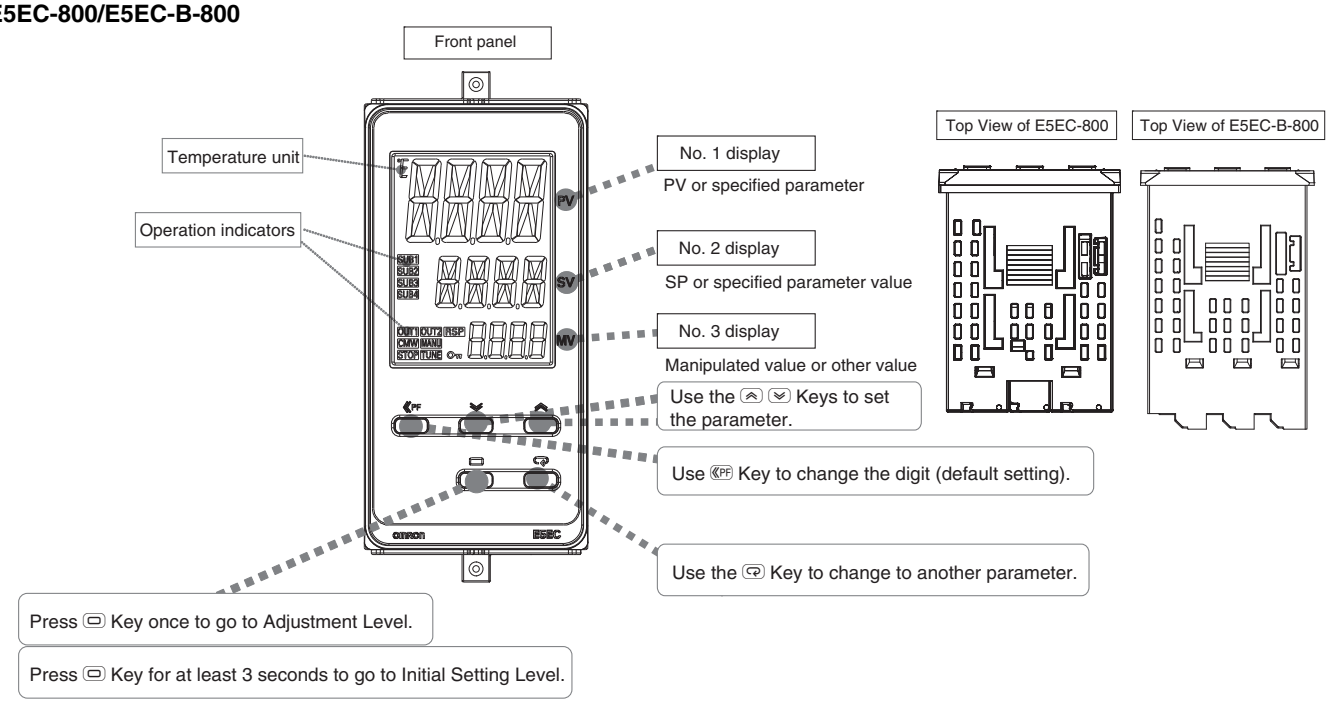
6. Due to UL Listing requirements, use the E54-CT1L or E54-CT3L Current Transformer with the factory wiring (internal wiring). Use a UL category XOBA or XOBA7 current transformer that is UL Listed for field wiring (external wiring) and not the factory wiring (internal wiring).

Isolation/Insulation Block Diagrams

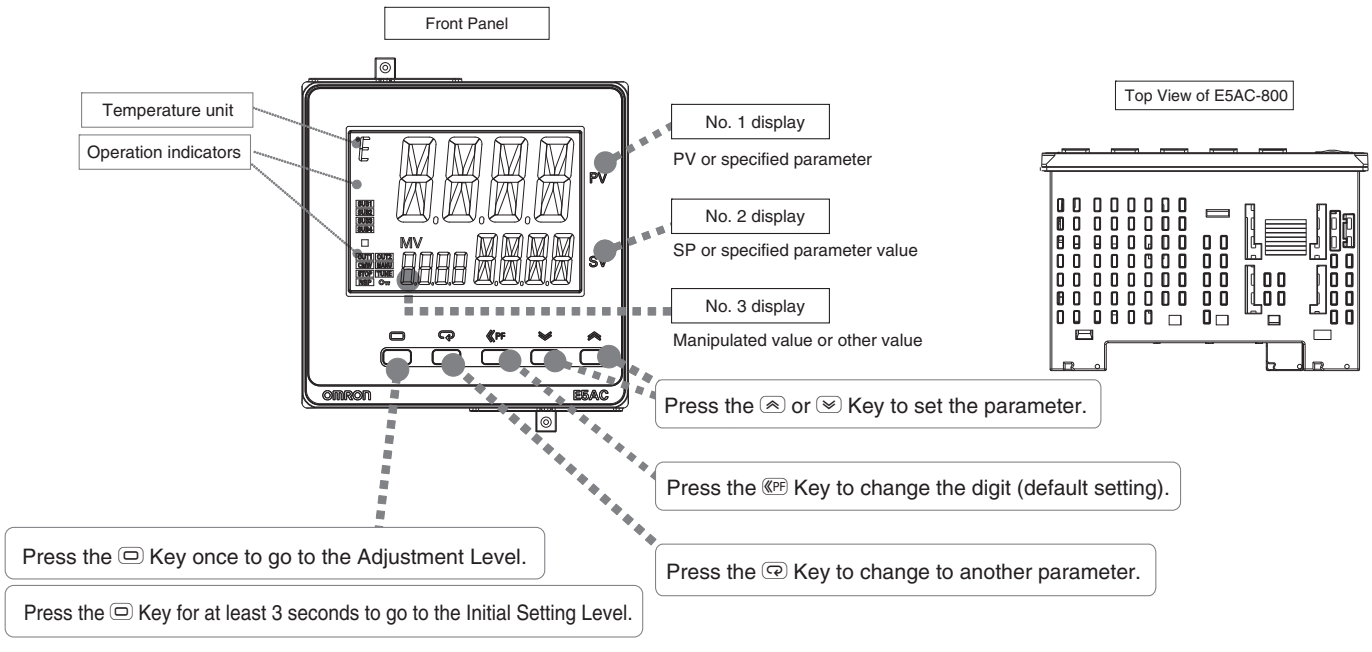


Nomenclature

E5EC-800/E5EC-B-800



E5AC-800

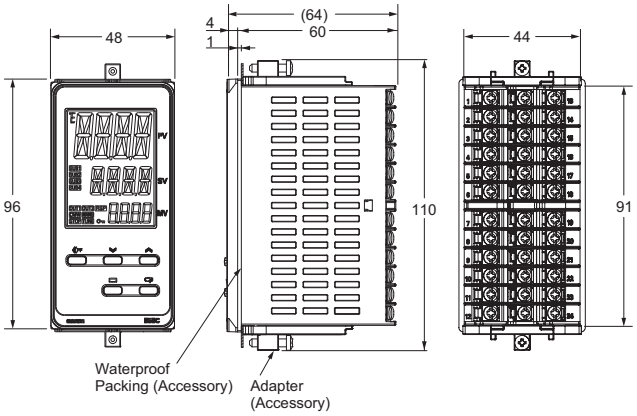


Dimensions

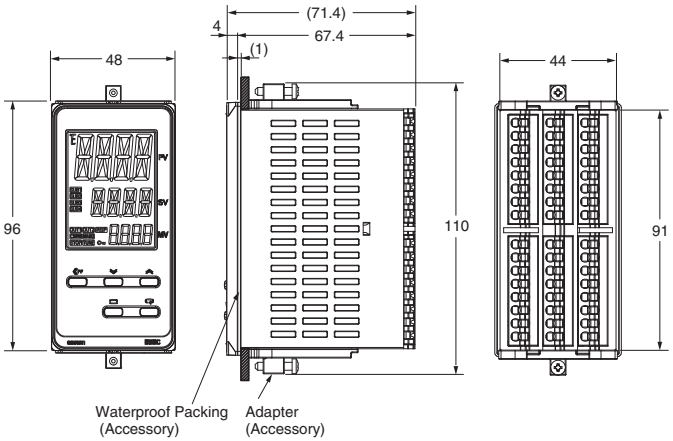
(Unit: mm)

Controllers

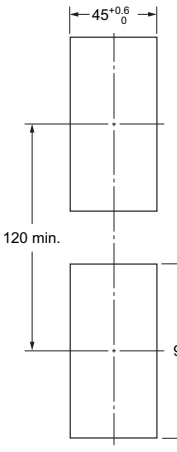
E5EC-800



E5EC-B-800

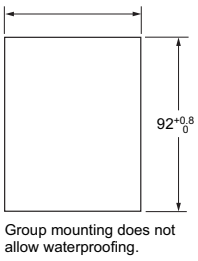


Mounted Separately



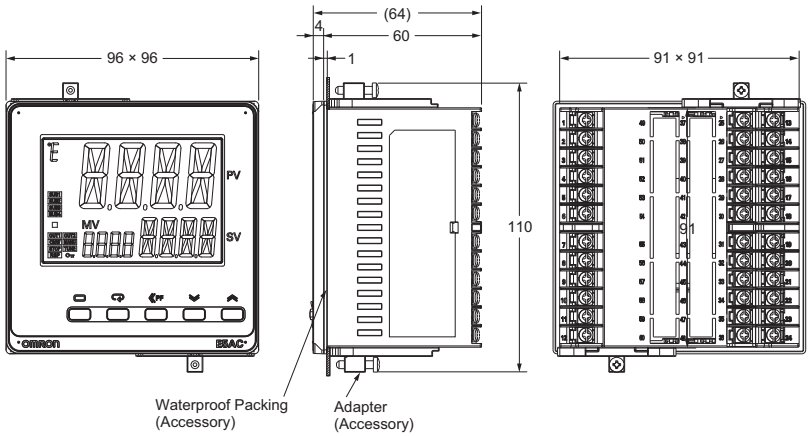
Group Mounted

(48 × number of units − 2.5)+1.0 0

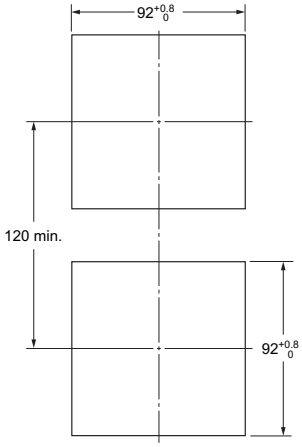


- Recommended panel thickness is 1 to 8 mm.
- Group mounting is not possible in the vertical direction. (Maintain the specified mounting space between Controllers.)
- To mount the Controller so that it is waterproof, insert the waterproof packing onto the Controller.
- When two or more Controllers are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

E5AC-800

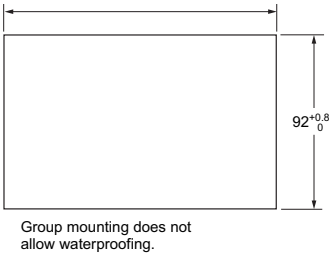


Mounted Separately



Group Mounted

(96 × number of units − 3.5)$^{+1.0}_{0}$

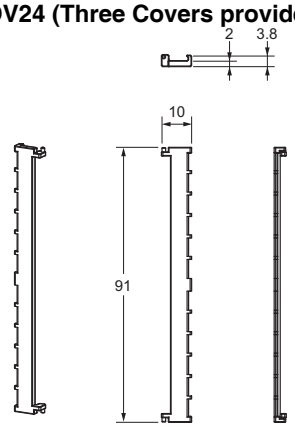


Group mounting does not allow waterproofing.

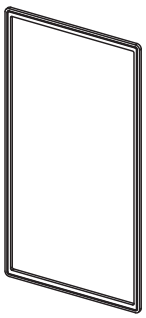
- Recommended panel thickness is 1 to 8 mm.
- Group mounting is not possible in the vertical direction. (Maintain the specified mounting space between Controllers.)
- To mount the Controller so that it is waterproof, insert the waterproof packing onto the Controller.
- When two or more Controllers are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

Accessories (Order Separately)

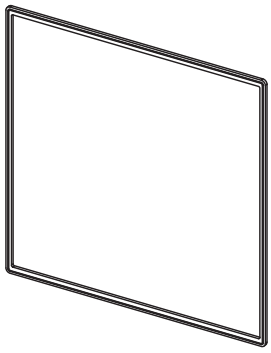
● Terminal Covers
E53-COV24 (Three Covers provided.)



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

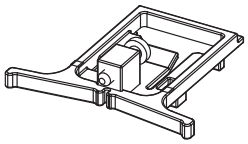


Y92S-P10 (for DIN 96 × 96)



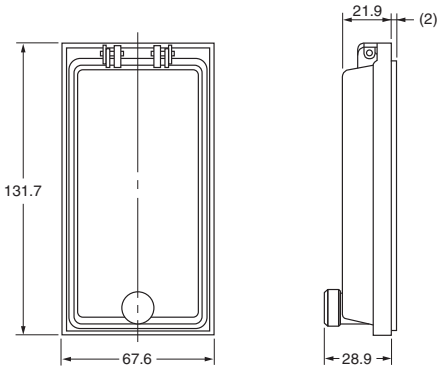
The Waterproof Packing is provided with the Temperature Controller.
Order the Waterproof Packing separately if it becomes lost or damaged.
The degree of protection when the Waterproof Packing is used is IP66.
To maintain an IP66 degree of protection, the Waterproof Packing and the Port Cover for the 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.

● Mounting Adapter
Y92F-51
(Two Adapters provided.)

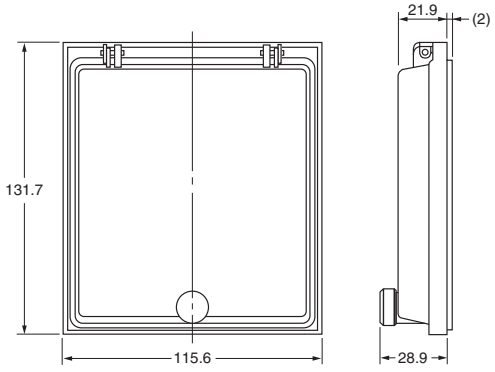


One pair is provided with the Controller.
Order this Adapter separately if it becomes lost or damaged.

● Watertight Cover
Y92A-49N (48 × 96)

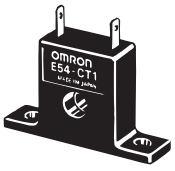


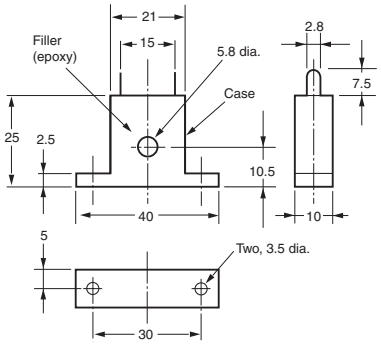
● Watertight Cover
Y92A-96N (96 × 96)



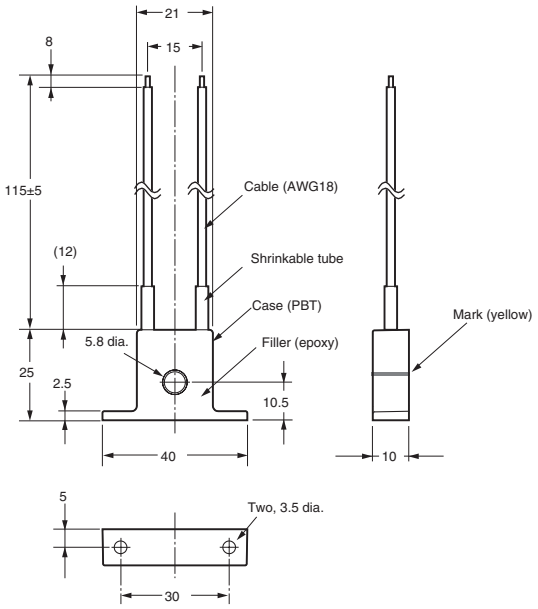
● Current Transformers

E54-CT1



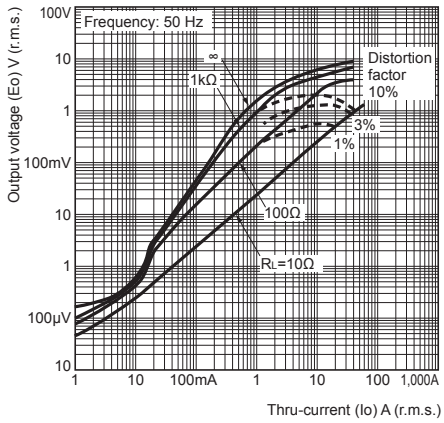


E54-CT1L

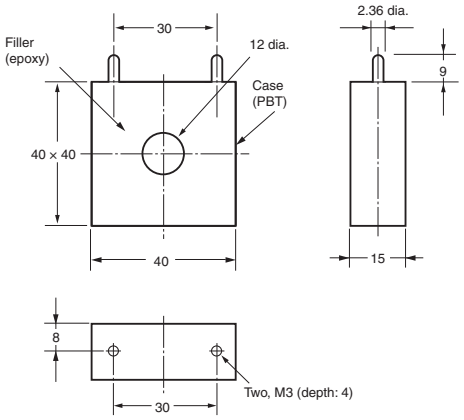


Thru-current (Io) vs. Output Voltage (Eo) (Reference Values)
E54-CT1 or E54-CT1L

Maximum continuous heater current: 50 A (50/60 Hz)
Number of windings: 400±2
Winding resistance: 18±2 Ω

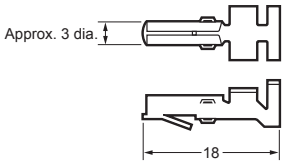


E54-CT3

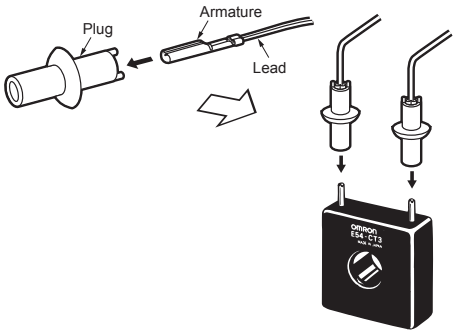


E54-CT3 Accessories

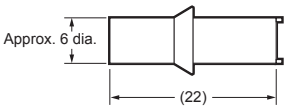
- **Armature**



Connection Example

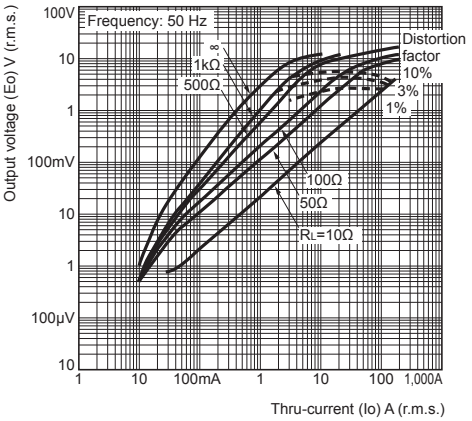


- **Plug**



Thru-current (Io) vs. Output Voltage (Eo) (Reference Values) E54-CT3 or E54-CT3L

Maximum continuous heater current: 120 A (50/60 Hz)
(Maximum continuous heater current for an OMRON Digital Temperature Controller is 50 A.)
Number of windings: 400±2
Winding resistance: 8±0.8 Ω



E54-CT3L