Chipsmall

Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of "Quality Parts,Customers Priority,Honest Operation,and Considerate Service",our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!

Contact us

Digital Limit Controllers
E5□C-600 Factory Mutual Approved

Large White PV Display That's Easier to Read.
Easy to Use, from Model Selection to Setup and Operation.
New Plug-in Models that are Convenient for Maintenance and Replacement as replacing limit controllers is possible without changing wiring.
New Models that Mount to DIN Track and are Ideal for HMI/PLC Connections.
Programmable Models Support a Wide Range of Applications.
Digital Limit Controller Functions as a Limit Controller or a Temperature controller based on parameter setup.

Digital Limit Controllers

| E5□C-600 Series |

| E5CC-600 E5CC-U-600 | DIN 48 × 48 mm page 2 |

| E5DC-600 | 22.5 mm wide Mounts to DIN Track page 19 |
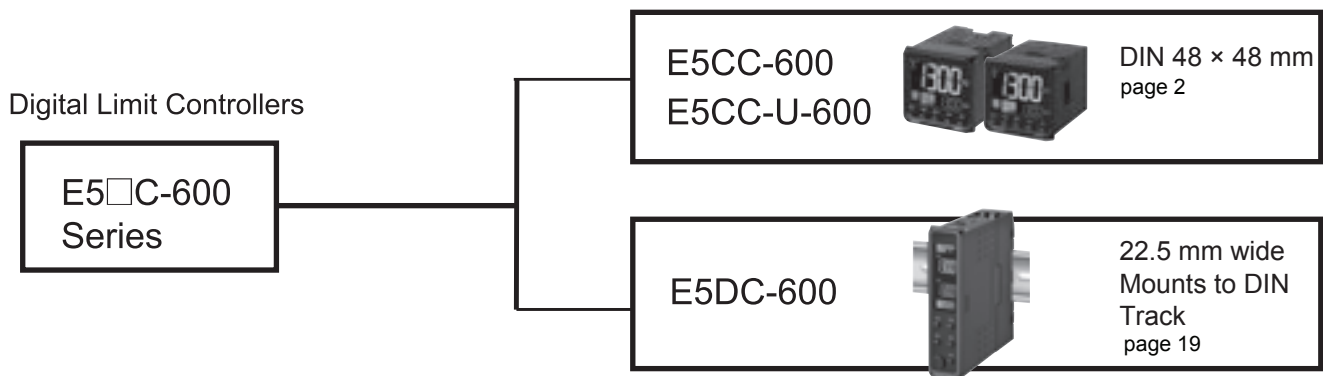
What is a Temperature Limit Controller?

As defined by Factory Mutual, "It is an automatic supervising device used with other equipment to protect against abnormal temperatures by operating electrical contacts in the event of primary temperature controlling equipment failure. The primary application involves protection against an excessive temperature that may otherwise result in a fire hazard. A temperature limit switch that protects against an abnormally low temperature is also considered in the interest of property conservation."

In a typical "High Limit" application, the user sets the limit set point (SP) a few degrees below the temperature that would cause an unsafe condition. If the set point is reached the FM Limit Switch output relay contact opens to shutdown the heat source. The relay will not automatically reset after the temperature goes below the set point value. The operator must manually either push the "Reset" button or activate a remote reset switch.

Factory Mutual and FM Global

FM Global is an international property insurance and loss-prevention engineering leader with research and testing resources dedicated to minimizing the loss of insured manufacturing property. Its research group, the Factory Mutual Research Corporation (FMRC), investigates the most effective practices for preventing and minimizing fire and other types of industrial losses. Factory Mutual laboratories test and approve two broad categories of devices and materials:
1. Those used to control or prevent property damage.
2. Those that would present a serious hazard if not properly designed

FM Approvals
FM Approvals certifies industrial and commercial products and services for thousands of companies worldwide. When a product or service meets FM Approvals' standards, it is issued the FM APPROVED mark to signify it will perform as expected and support property loss prevention.

E5CC/E5CC-U-600 (48× 48 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.

- The white PV display with a height of 1 5.2 mm improves visibility.
- High-speed sampling at 50 ms.
- Models are available with up to 3 auxiliary outputs, up to 2 event inputs, and transfer output to cover a wide range of applications.
- E5CC: Short body with depth of only 60 mm.
- 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).
- Easy connections to a PLC with programless communications. Use component communications to link Temperature Controllers to each other.
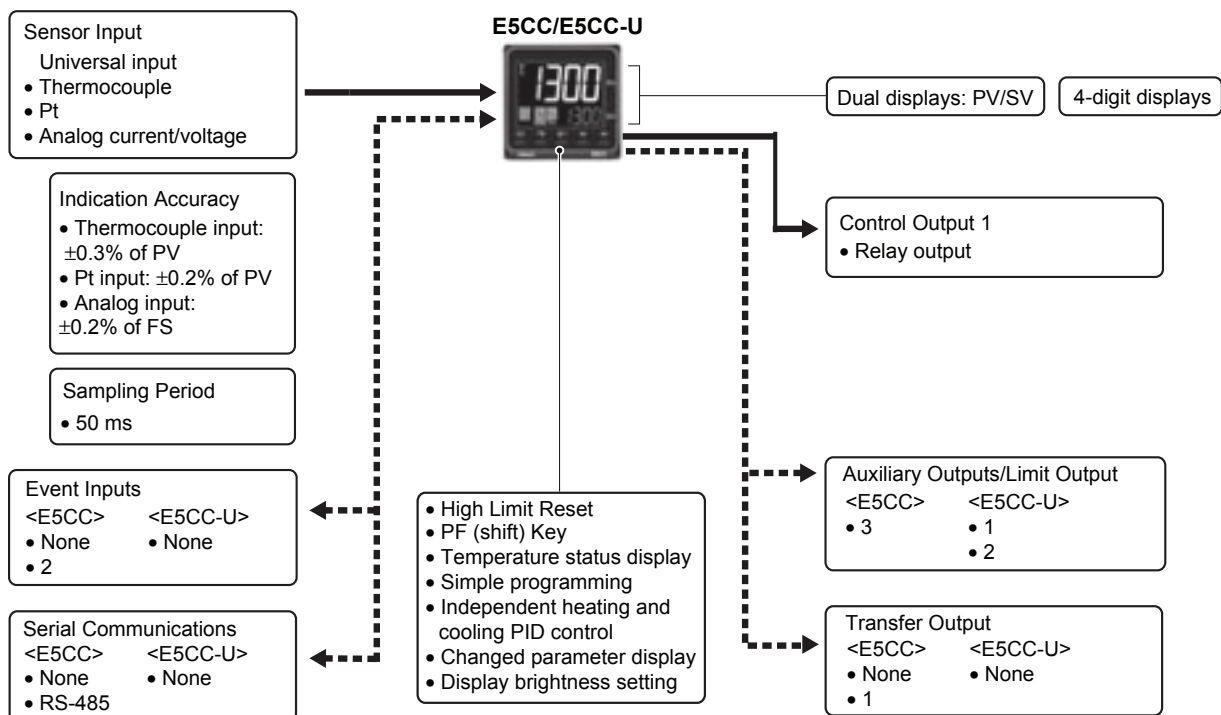- Conforms to FM (Factory Mutual) standards (FM3545/3810).

**48 × 48 mm
E5CC**

**48 × 48 mm
E5CC-U**

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

⚠ Refer to Safety Precautions on page 43.

Main I/O Functions

Sensor Input
 Universal input
- Thermocouple
- Pt
- Analog current/voltage

E5CC/E5CC-U

Dual displays: PV/SV   4-digit displays

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

Control Output 1
- Relay output

Sampling Period
- 50 ms

Event Inputs	
<E5CC>	<E5CC-U>
• None	• None
• 2	

- High Limit Reset
- PF (shift) Key
- Temperature status display
- Simple programming
- Independent heating and cooling PID control
- Changed parameter display
- Display brightness setting

Auxiliary Outputs/Limit Output	
<E5CC>	<E5CC-U>
• 3	• 1
	• 2

Serial Communications	
<E5CC>	<E5CC-U>
• None	• None
• RS-485	

Transfer Output	
<E5CC>	<E5CC-U>
• None	• 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) E5☐C
   Temperature High/Low Limit Controller Set up Instruction Sheet (Cat. No. (H32I).

Model Number Legend and Standard Models

Model Number Legend

●Models with Screw Terminals

E5CC-	R	X	3	---	5	M	6	---	---
	1		2	3	4	5	6		

Model	1 Control Outputs 1 and 2	2 Number of auxiliary outputs	3 Power supply voltage	4 Terminal type	5 Input type	6 Options	Meaning			
E5CC							**48 x 48 mm (1/16 DIN size)**			
							Control output 1		**Control output 2**	
	RX						Relay output		None	
		3					3 (one common)			
			A				100 to 240 VAC			
			D				24 VAC/VDC			
				5			Screw terminals			
					M		Universal input			

	HB alarm and HS alarm	Communi-cations	Event Inputs	Transfer output
600	---	---	---	---
601	1	---	2	---
603	2 (for 3-phase heaters)	RS-485	---	---
606	---	---	2	Provided

E5CC Ordering Information

AC Versions	DC Versions
E5CC-RX3A5M-600	E5CC-RX3D5M-600
E5CC-RX3A5M-601	E5CC-RX3D5M-601
E5CC-RX3A5M-603	E5CC-RX3D5M-603
E5CC-RX3A5M-606	E5CC-RX3D5M-606

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.

Model Number Legend

Plug-in Models (-U):

E5CC-	R	W	---	---	U	M	0	600	0
	1		2	3	4	5		6	

Model	1 Control Outputs 1 and 2	2 Number of auxiliary outputs	3 Power supply voltage	4 Terminal type	5 Input type	6 Options	Meaning			
E5CC							**48 x 48 mm (1/16 DIN size)**			
							Control output 1		**Control output 2**	
	RW						Relay output (SPDT)		None	
		1					1			
		2					2 (One common)			
			A				100 to 240 VAC			
			D				24 VAC/VDC			
				U			Plug-in model			
					M		Universal input			
							HB alarm and HS alarm	Communi-cations	Event Inputs	Transfer output
						600	---	---	---	---

E5CC-U Ordering Information

AC Versions
E5CC-RW1AUM-600
E5CC-RW2AUM-600

DC Versions
E5CC-RW1DUM-600
E5CC-RW2DUM-600

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

Terminal Covers (for E5CC)

Model
E53-COV17
E53-COV23 (3pcs)

Note: The Terminal Covers E53-COV23 are provided only with E5CC Controllers. The E53-COV10 cannot be used.
Refer to page 28 for the mounted dimensions.

Waterproof Packing

Model
Y92S-P8

Note: The Waterproof Packing is provided only with E5CC Controllers.
The E5CC-U cannot be waterproofed even if the Waterproof Packing is attached.

Current Transformers (CTs)

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

Adapter

Model
Y92F-45

Note: Use this Adapter when the panel has already been prepared for an E5B☐ Controller.

Waterproof Cover

Model
Y92A-48N

Mounting Adapter

Model
Y92F-49

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

DIN Track Mounting Adapter

Model
Y92F-52

Sockets (for E5CC-U)

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

Front Covers

Type	Model
Hard Front Cover	**Y92A-48H**
Soft Front Cover	**Y92A-48D**

CX-Thermo Support Software

Model
EST2-2C-MV4

Note: CX-Thermo version 4.5 or higher is required for the E5CC. CX-Thermo version 4.61 or higher is required for the E5CC-U. For the system requirements for the CX-Thermo, refer to information on the EST2-2C-MV4 on the OMRON website (www.ia.omron.com).
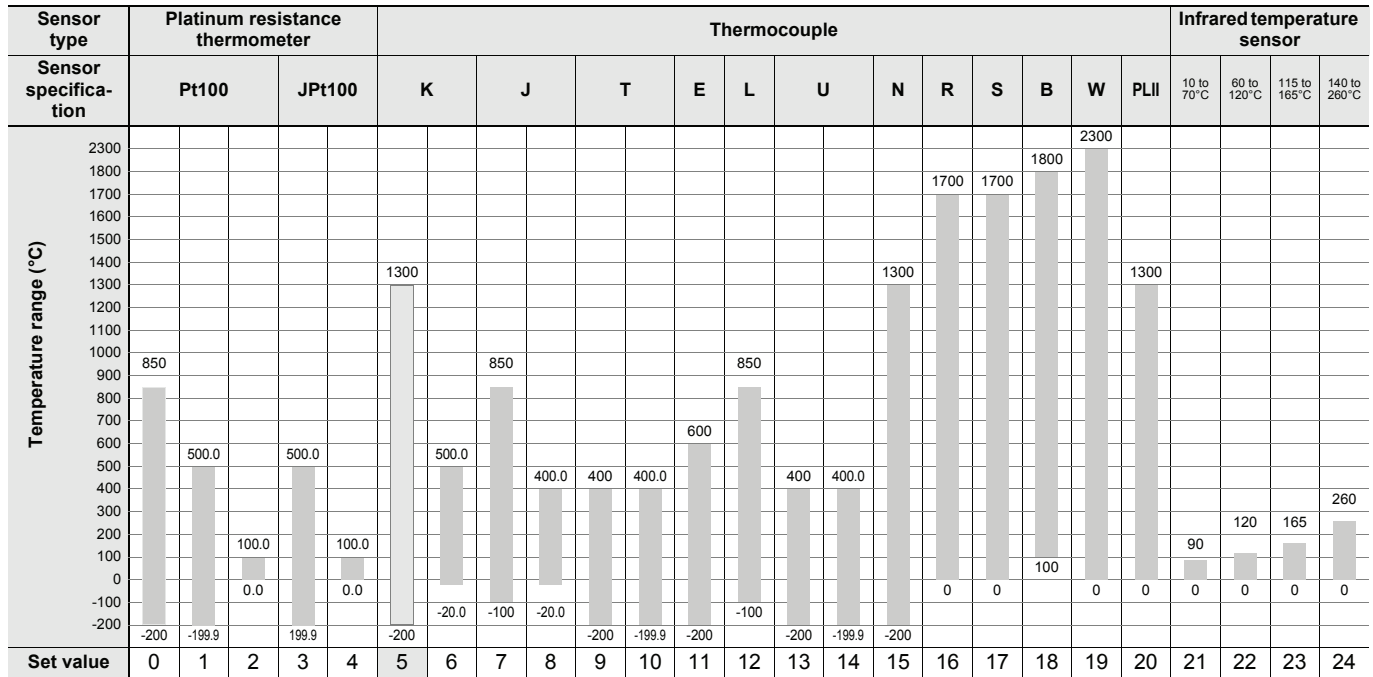
E5CC/E5CC-U

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	Models with option selection of 000:5.2 VA max. at 100 to 240 VAC, and 3.1 VA max. at 24 VAC or 1.6 W max. at 24 VDC All other models: 6.5 VA max. at 100 to 240 VAC, and 4.1 VA max. at 24 VAC or 2.3 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, 0 to 10 V,or 0 to 50 mV (The 0 to 50 mV range applies to the E5CC-U only for those manufactured in May 2014 or later.)	

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 control or 2-PID control (with auto-tuning)	
Control output	Relay output	E5CC: SPST-NO, 250 VAC, 3 A (resistive load), electrical life: 100,000 operations, minimum applicable load: 5 V, 10 mA (reference value) E5CC-U: SPDT, 250 VAC, 3 A (resistive load), electrical life: 100,000 operations, minimum applicable load: 5 V, 10 mA (reference value)
Auxiliary/ Limit Output	Number of outputs	E5CC: 3 E5CC-U: 1 or 2 (depends on model)
	Output specifications	SPST-NO relay outputs, 250 VAC, Models with 1 or 2 outputs: 3 A (resistive load), or Models with 3 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 (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
Setting method	Digital setting using front panel keys	
Indication method	11-segment digital display and individual indicators Character height: PV: 15.2 mm, SV: 7.1 mm	
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	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, 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)	

* There are no optional functions for the E5CC-U. Refer to *Model Number Legend* and *List of Models.*

OMRON

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

Temperature range (°C), by Set value:

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

▢ 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	0 to 50 mV*
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	30
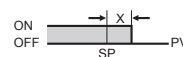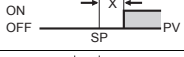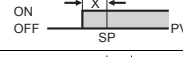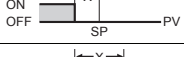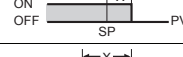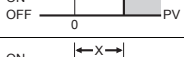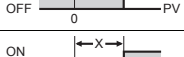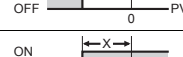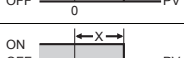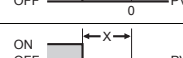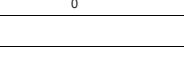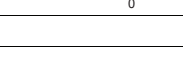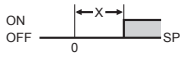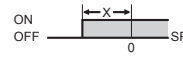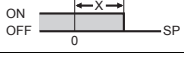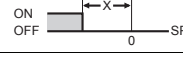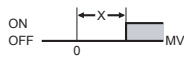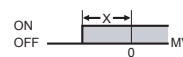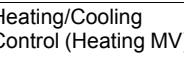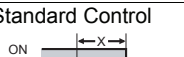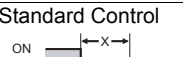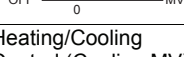
* The range applies to the E5CC-U only for those manufactured in May 2014 or later.

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.

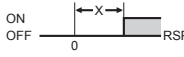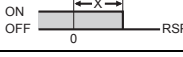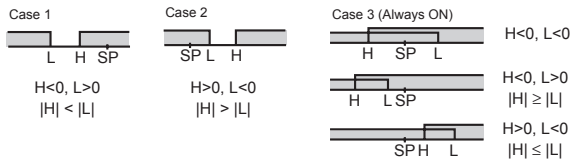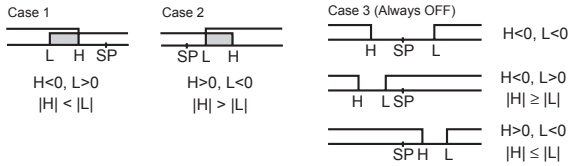| Set value	Alarm type	Alarm output operation		Description of function
		When alarm value X is positive	When alarm value X is negative	
0	Alarm function OFF	Output OFF		No alarm
1	Upper- and lower-limit *1	(L H around SP)	*2	Set the upward deviation in the set point for the alarm upper limit (H) and 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	(X above SP)	(X above SP)	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	(X below SP)	(X below SP)	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	(L H around SP)	*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	(L H around SP) *5	*4	A standby sequence is added to the upper- and lower-limit alarm (1). *6
6	Upper-limit with standby sequence	(X above SP)	(X above SP)	A standby sequence is added to the upper-limit alarm (2). *6
7	Lower-limit with standby sequence	(X below SP)	(X below SP)	A standby sequence is added to the lower-limit alarm (3). *6
8	Absolute-value upper-limit	(X from 0, PV)	(X from 0, PV)	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	(X from 0, PV)	(X from 0, PV)	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	(X from 0, PV)	(X from 0, PV)	A standby sequence is added to the absolute-value upper-limit alarm (8). *6
11	Absolute-value lower-limit with standby sequence	(X from 0, PV)	(X from 0, PV)	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	(X from 0, SP)	(X from 0, SP)	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	(X from 0, SP)	(X from 0, SP)	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 (X from 0, MV) / Heating/Cooling Control (Heating MV) (X from 0, MV)	Standard Control (X from 0, MV) / 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 (X from 0, MV) / Heating/Cooling Control (Cooling MV) (X from 0, MV)	Standard Control (X from 0, MV) / 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	(X from 0, RSP)	(X from 0, RSP)	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	(X from 0, RSP)	(X from 0, RSP)	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

Case 1   Case 2   Case 3 (Always ON)

L   H   SP   SP   L   H   H   SP   L   H<0, L<0

H<0, L>0   H>0, L<0   H   L   SP   H<0, L>0

$|H| < |L|$ $|H| > |L|$ $|H| \geq |L|$

SP   H   L   H>0, L<0

$|H| \leq |L|$

*3   Set value: 4, Upper- and lower-limit range

Case 1   Case 2   Case 3 (Always OFF)

L   H   SP   SP   L   H   H   SP   L   H<0, L<0

H<0, L>0   H>0, L<0   H   L   SP   H<0, L>0

$|H| < |L|$ $|H| > |L|$ $|H| \geq |L|$

SP   H   L   H>0, L<0

$|H| \leq |L|$

*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).

*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.
Remote SP input is supported only for the E5CC.

Characteristics

Indication accuracy **(at the ambient temperature of 23°C)**	E5CC 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. E5CC-U Thermocouple: (±1% of indication value or ±2°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.
Transfer output accuracy	±0.3% FS max.
Influence of temperature *3	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. *4
Influence of voltage *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	50 ms
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)	0 to 9999 s (in units of 1 s), 0.0 to 999.9 s (in units of 0.1 s) *5
Derivative time (D)	0 to 9999 s (in units of 1 s), 0.0 to 999.9 s (in units of 0.1 s) *5
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) *5
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) *5
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 Ωmax.) 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	E5CC: Controller: Approx. 120 g, Adapter: Approx. 10 g E5CC-U: Controller: Approx. 100 g, Adapter: Approx. 10 g
Degree of protection	E5CC: Front panel: IP66, Rear case: IP20, Terminals: IP00 E5CC-U: Front panel: IP50, Rear case: IP20, Terminals: IP00
Memory protection	Non-volatile memory (number of writes: 1,000,000 times)
Setup Tool	E5CC: CX-Thermo version 4.5 or higher E5CC-U: CX-Thermo version 4.61 or higher
Setup Tool port	E5CC/E5CC-U top panel: An E58-CIFQ2 USB-Serial Conversion Cable is used to connect to a USB port on the computer. *6
Standards **Approved standards**	FM3545/3810, UL 61010-1*7, KOSHA certified (some models) *8, Korean Radio Waves Act (Act 10564)
Conformed standards	EN 61010-1 (IEC 61010-1): Pollution Degree 2, overvoltage category II, Lloyd's standards *9
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.
*3 Ambient temperature: -10°C to 23°C to 55°C, Voltage range: -15% to 10% of rated voltage
*4 K thermocouple at -100°C max.: ±10°C max.
*5 The unit is determined by the setting of the Integral/Derivative Time Unit parameter.
*6 External communications (RS-485) and USB-serial conversion cable communications can be used at the same time.
*7 The E5CC-U plug-in model is certified for UL listing only when used together with the OMRON P2CF-11 or P2CF-11-E Socket. The P3GA-11 is not certified for UL listing.
*8 Access the following website for information on certified models. *http://www.ia.omron.com/support/models/index.html*
*9 Refer to information on maritime standards in *Shipping Standards* on page 45 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 (Version 4.61 or higher is required for the E5CC-U.)
Applicable models	E5□C-T Series, E5□C Series, and E5CB Series
USB interface standard	Conforms to USB Specification 2.0.
DTE speed	38400 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

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

* 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 single-phase 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).
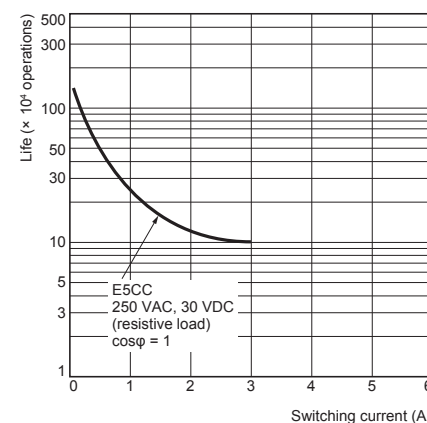*2 For SSR failure alarms, the heater current will be measured when the control output is OFF, and the output will turn ON if the heater current is higher than the set value (i.e., SSR failure detection current value).
*3 The value is 30 ms for a control period of 0.1 s or 0.2 s.
*4 The value is 35 ms for a control period of 0.1 s or 0.2 s.
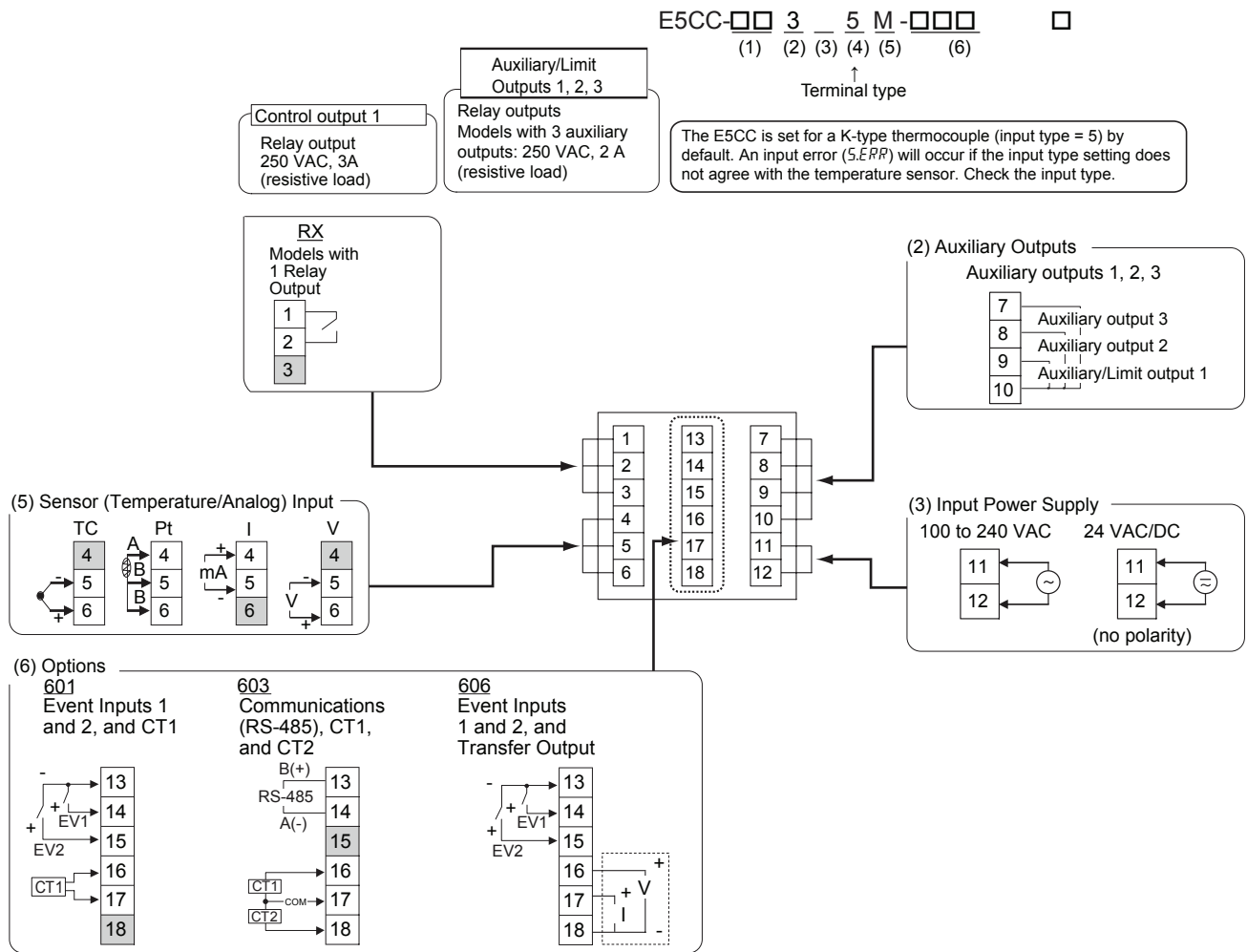
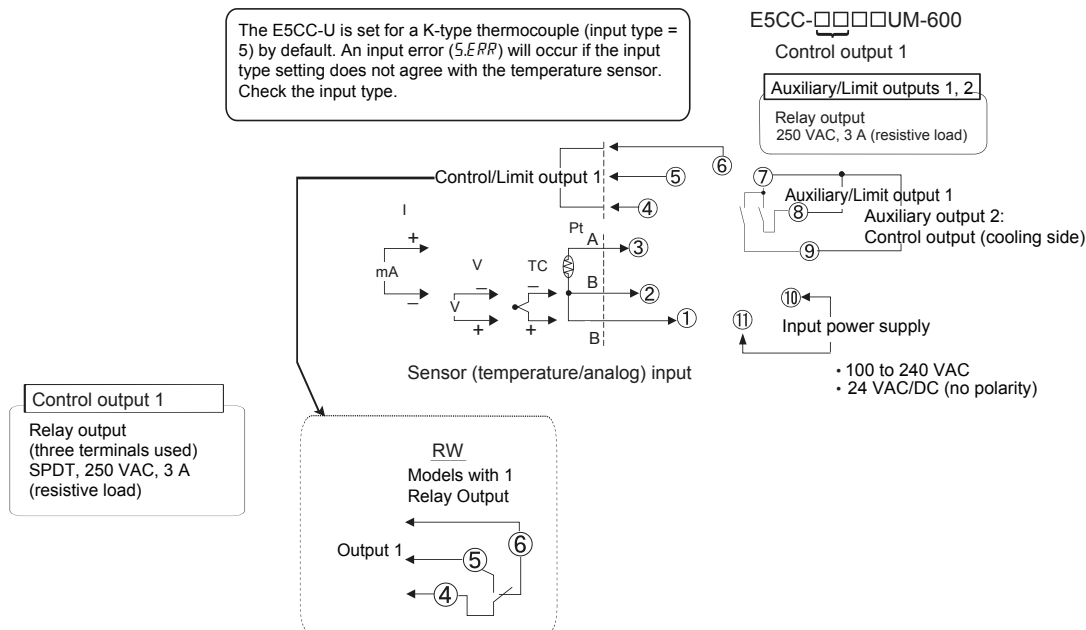## Electrical Life Expectancy Curve for Relays (Reference Values)

E5CC/E5CC-U

External Connections

E5CC

E5CC-☐☐ 3 _ 5 M -☐☐☐   ☐
(1) (2) (3) (4) (5)   (6)

Terminal type

Control output 1
Relay output
250 VAC, 3A
(resistive load)

Auxiliary/Limit Outputs 1, 2, 3
Relay outputs
Models with 3 auxiliary outputs: 250 VAC, 2 A (resistive load)

The E5CC 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.

RX
Models with 1 Relay Output

| 1 |
| 2 |
| 3 |

(2) Auxiliary Outputs
Auxiliary outputs 1, 2, 3

7	Auxiliary output 3
8	Auxiliary output 2
9	Auxiliary/Limit output 1
10	

(5) Sensor (Temperature/Analog) Input

TC | Pt | I | V

4	A 4	+ 4	4
5	B 5	mA 5	5
6	B 6	- 6	V 6

1	13	7
2	14	8
3	15	9
4	16	10
5	17	11
6	18	12

(3) Input Power Supply

100 to 240 VAC | 24 VAC/DC

| 11 | ~ | 11 | ≂ |
| 12 | | 12 | |

(no polarity)

(6) Options

601
Event Inputs 1 and 2, and CT1

| 13 |
| 14 | EV1 |
| 15 |
| 16 |
| 17 | CT1 |
| 18 |

603
Communications (RS-485), CT1, and CT2

13	B(+)
14	RS-485 A(-)
15	
16	CT1
17	COM
18	CT2

606
Event Inputs 1 and 2, and Transfer Output

| 13 |
| 14 | EV1 |
| 15 |
16	+
17	V
18	I -

E5CC-U

The E5CC-U 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.

E5CC-☐☐☐☐UM-600

Control output 1

Auxiliary/Limit outputs 1, 2
Relay output
250 VAC, 3 A (resistive load)

Control/Limit output 1
⑤
⑥
④

I
mA
V
TC
Pt A ③
B ②
B ①

Sensor (temperature/analog) input

⑦ Auxiliary/Limit output 1
⑧ Auxiliary output 2:
⑨ Control output (cooling side)

⑩
⑪ Input power supply
• 100 to 240 VAC
• 24 VAC/DC (no polarity)

Control output 1
Relay output
(three terminals used)
SPDT, 250 VAC, 3 A
(resistive load)

RW
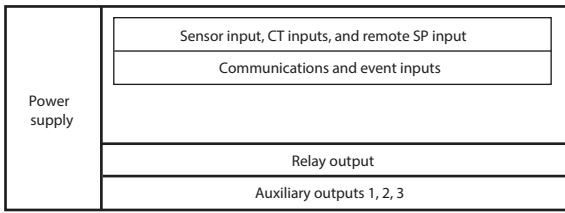Models with 1 Relay Output

Output 1
⑤ ⑥
④

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 30m or less.
      If the cable length exceeds 30 m, compliance with EMC standards will not be possible.
   4. Connect M3 crimped terminals.
      Connect M3.5 crimped terminals for the E5CC-U.

OMRON

Isolation/Insulation Block Diagrams

• E5CC
Models with 3 Auxiliary Outputs

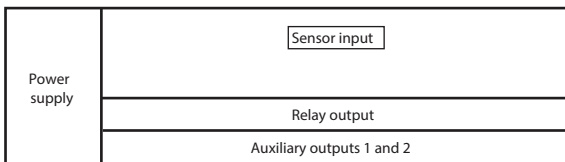| Power supply	Sensor input, CT inputs, and remote SP input
	Communications and event inputs
	Relay output
	Auxiliary outputs 1, 2, 3

	: Reinforced insulation
	: Functional isolation

Note: Auxiliary outputs 1 to 3 are not insulated.

• E5CC-U
Models with 2 Auxiliary Outputs

Power supply	Sensor input
	Relay output
	Auxiliary outputs 1 and 2

	: Reinforced insulation
	: Functional isolation

Nomenclature

E5CC
E5CC-U
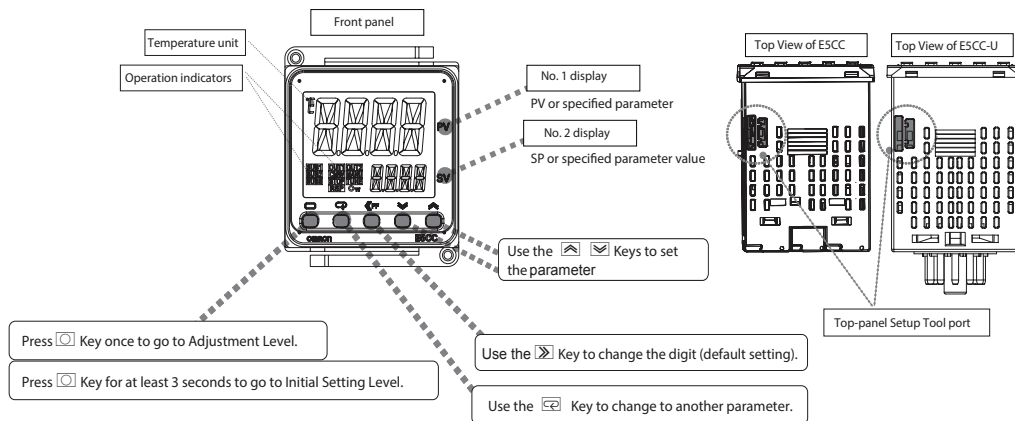
Front panel

Temperature unit

Operation indicators

Top View of E5CC

Top View of E5CC-U

No. 1 display

PV or specified parameter

No. 2 display

SP or specified parameter value

Use the ⌃ ⌄ Keys to set the parameter

Top-panel Setup Tool port

Press ▢ Key once to go to Adjustment Level.

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

Use the ≫ Key to change the digit (default setting).

Use the ⟲ Key to change to another parameter.

Dimensions

Controllers

E5CC

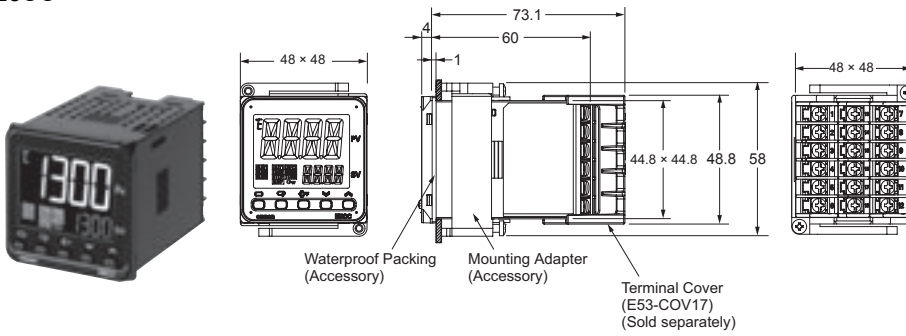Waterproof Packing (Accessory)
Mounting Adapter (Accessory)
Terminal Cover (E53-COV17) (Sold separately)
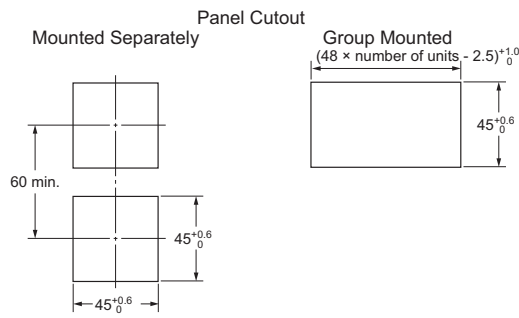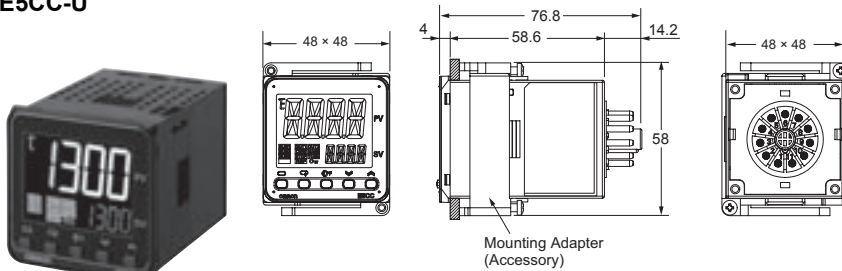
The Setup Tool port is on the top of the Temperature Controller.
It is used to connect the Temperature Controller to the computer to use the Setup Tool.
The E58-CIFQ2 USB-Serial Conversion Cable is required to make the connection.
Refer to the instructions that are provided with the USB-Serial Conversion Cable for the connection procedure.

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

Panel Cutout

Mounted Separately

Group Mounted
$(48 \times \text{number of units} - 2.5)^{+1.0}_{0}$

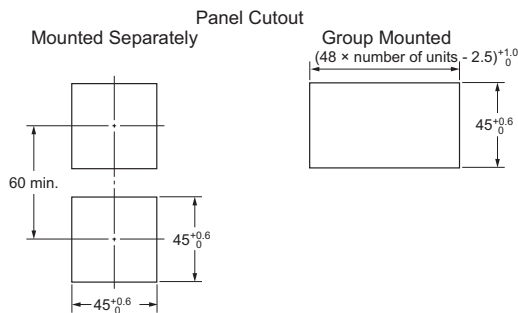$45^{+0.6}_{0}$

60 min.

$45^{+0.6}_{0}$

$45^{+0.6}_{0}$

• Recommended panel thickness is 1 to 5 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.
• Use a control panel thickness of 1 to 3 mm if the Y92A-48N and a USB-Serial Conversion Cable are used together.

E5CC-U

Mounting Adapter (Accessory)

The Setup Tool port is on the top of the 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.

Panel Cutout

Mounted Separately

Group Mounted
$(48 \times \text{number of units} - 2.5)^{+1.0}_{0}$

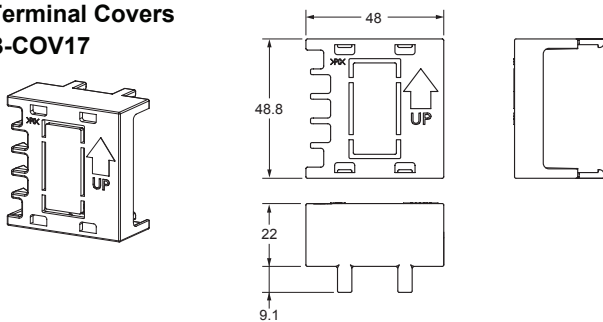$45^{+0.6}_{0}$

60 min.

$45^{+0.6}_{0}$

$45^{+0.6}_{0}$

• Recommended panel thickness is 1 to 5 mm.
• Group mounting is not possible in the vertical direction. (Maintain the specified mounting space between Controllers.)
• When two or more Controllers are mounted, make sure that the surrounding temperature does not exceed the allowable operating temperature specified in the specifications.
• Use a control panel thickness of 1 to 3 mm if the Y92A-48N and a USB-Serial Conversion Cable are used together.
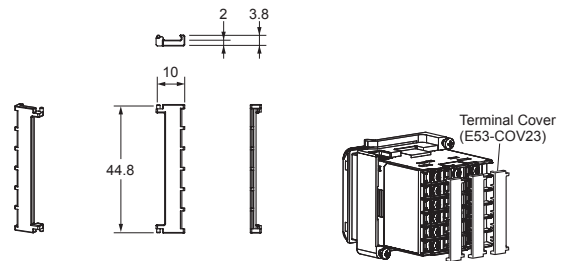
Accessories (Order Separately)
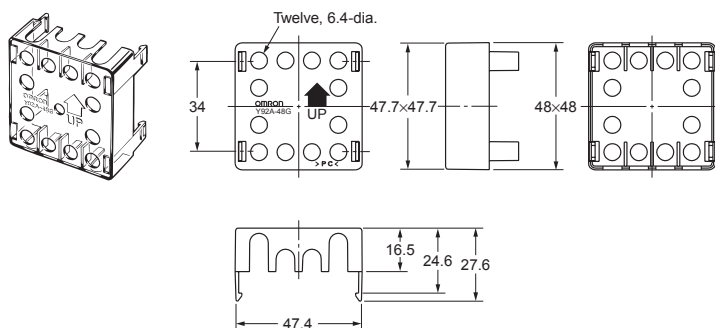
● **USB-Serial Conversion Cable**
E58-CIFQ2

(2110)

250 263 1510

LED (RD)

USB connector
(type A plug)

LED (PWR)

LED (SD)

Serial connector
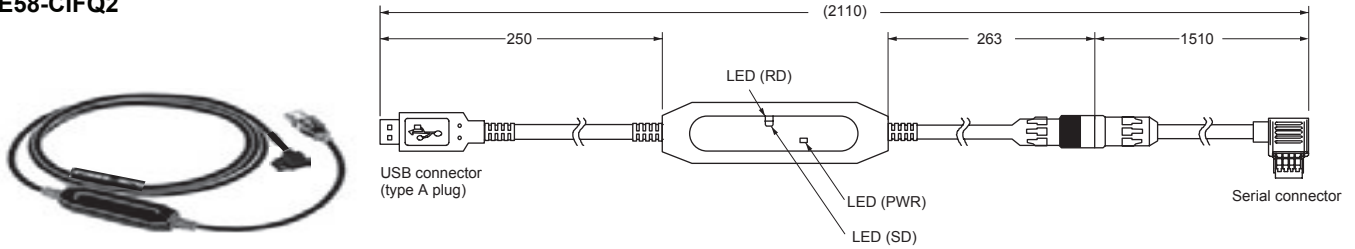
● **Terminal Covers**
E53-COV17

48

48.8

UP

22

9.1

UP

● **Terminal Covers**
E53-COV23 (Three Covers provided.)

2 3.8

10

44.8

Terminal Cover
(E53-COV23)

● **Terminal Cover (for the P3GA-11 Back-connecting Socket)**
Y92A-48G

Twelve, 6.4-dia.

34

UP

47.7×47.7

48×48

16.5 24.6 27.6

47.4

Note: You can attach the P3GA-11 Back-connecting Socket for finger protection.
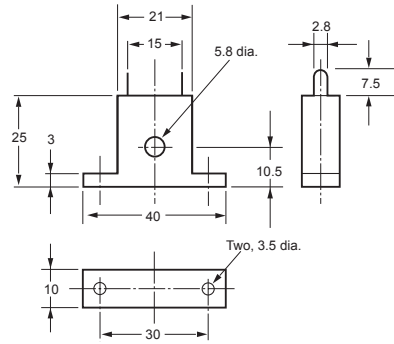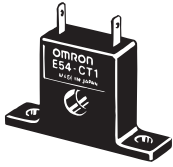
● **Waterproof Packing**
Y92S-P8 (for DIN 48 × 48)
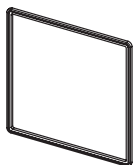
The Waterproof Packing is provided only with the E5CC.
Order the Waterproof Packing separately if it becomes lost or damaged.
The Waterproof Packing can be used to achieve an IP66 degree of protection.
(Deterioration, shrinking, or hardening of the waterproof packing may occur depending on the operating environment. Therefore, periodic replacement is recommended to ensure the level of waterproofing specified in IP66. The time for periodic replacement depends on the operating environment. Be sure to confirm this point at your site.
Consider three years as a rough standard.)
The Waterproof Packing does not need to be attached if a waterproof structure is not required.
The E5CC-U cannot be waterproofed even if the Waterproof Packing is attached.

E5CC/E5CC-U

● **Current Transformers**

E54-CT1

E54-CT3

E54-CT3 Accessories

• **Armature**

Approx. 3 dia.

18

• **Plug**

Approx. 6 dia.
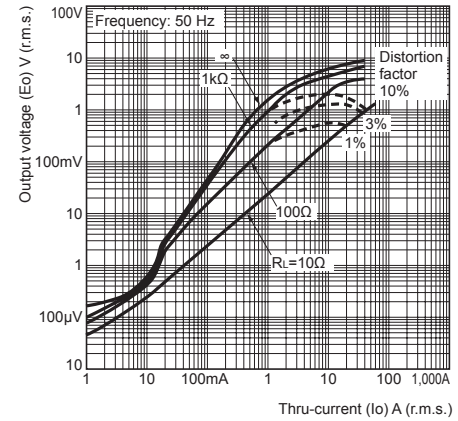
(22)

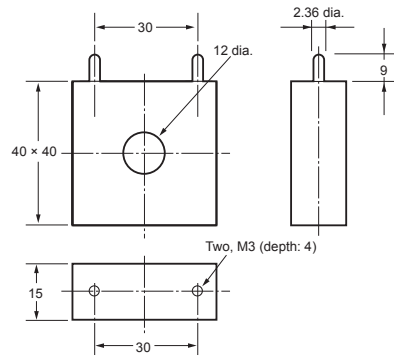**Connection Example**

Plug

Armature

Lead

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

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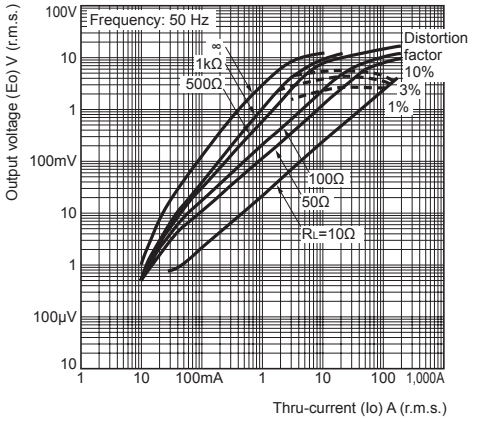Number of windings: 400±2
Winding resistance: 18±2 Ω

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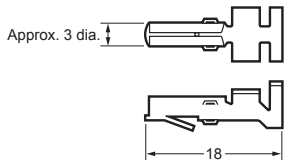**E54-CT3**

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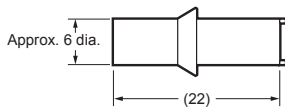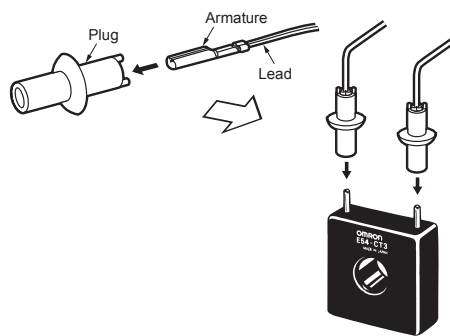Number of windings: 400±2
Winding resistance: 8±0.8 Ω

OMRON

● **Adapter**

Y92F-45   Note: 1. Use this Adapter when the Front Panel has already been prepared for the E5B☐.
      2. Only black is available.
      3. You cannot use the E58-CIFQ2 USB-Serial Conversion Cable if you use the Y92F-45 Adapter. To use the USB-Serial Conversion Cable to make the settings, do so before you mount the Temperature Controller in the panel.

Fixture (Accessory)
4.7   76
69.6 to 77.6
72 × 72
67 × 67 87

Mounted to E5CC
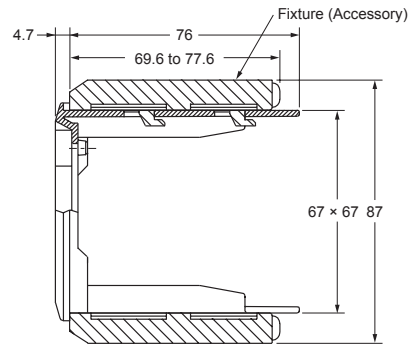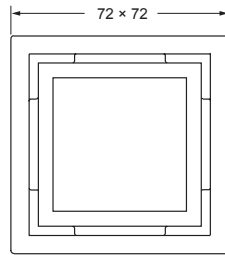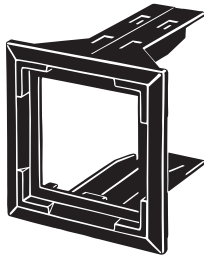
Panel (1 to 8 mm)   Mounting Adapter Y92F-30 (Accessory)
72 × 72
48 × 48
2.2   4.7
62.8
To back of the E5CC

● **DIN Track Mounting Adapter**

Y92F-52   Note: This Adapter cannot be used together with the Terminal Cover.
      Remove the Terminal Cover to use the Adapter.

UP
61
3.5
50   38
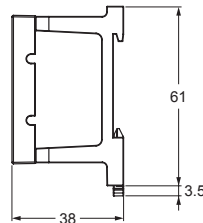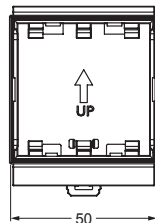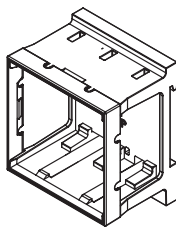
This Adapter is used to mount the E5CC to a DIN Track.
If you use the Adapter, there is no need for a plate to mount in the panel or to drill mounting holes in the panel.

Mounted to E5CC

48
80.5

E5CC/E5CC-U
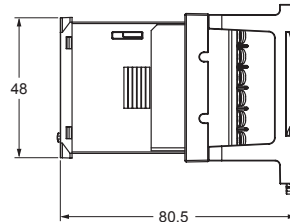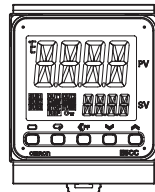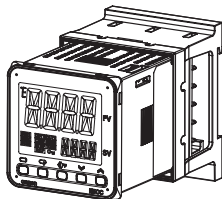
● Watertight Cover
Y92A-48N
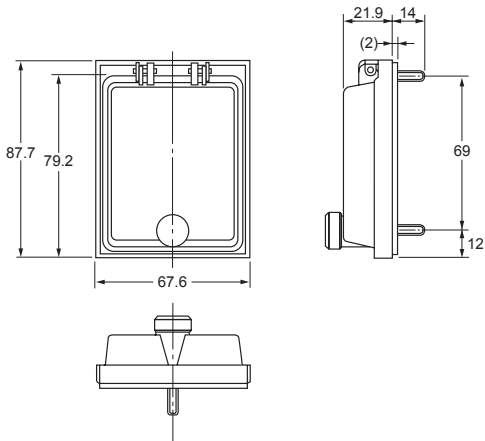
● Mounting Adapter
Y92F-49
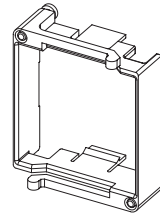
The Mounting Adapter is provided with the Temperature Controller.
Order this Adapter separately if it becomes lost or damaged.

● Protective Cover
Y92A-48D

Note: This Protective Cover cannot be used if the Waterproof Packing is installed.
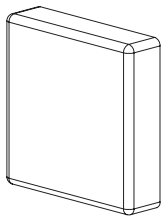
This Protective Cover is soft type.
It is able to operate the controller with using this cover.

● Protective Cover
Y92A-48H
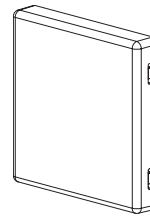
This Protective Cover is hard type.
Please use it for the mis-operation prevention etc.

● E5CC-U Wiring Socket

Front-connecting Socket
P2CF-11

Eleven, M3.5 × 7.5 sems screws
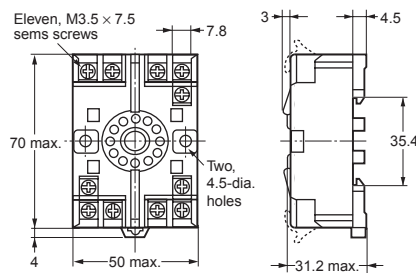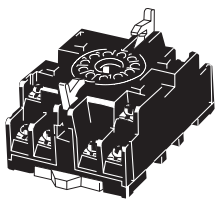
Terminal Layout/Internal Connections (Top View)

Mounting Holes

Two, 4.5 dia. mounting holes

40±0.2
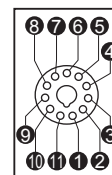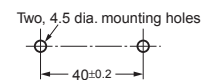
Note: Can also be mounted to a DIN track

Note: 1. A model with finger protection (P2CF-11-E) is also available.
2. You cannot use the P2CF-11 or P2CF-11-E together with the Y92F-45.

Back-connecting Socket
P3GA-11

Eleven, M3.5 sems screws
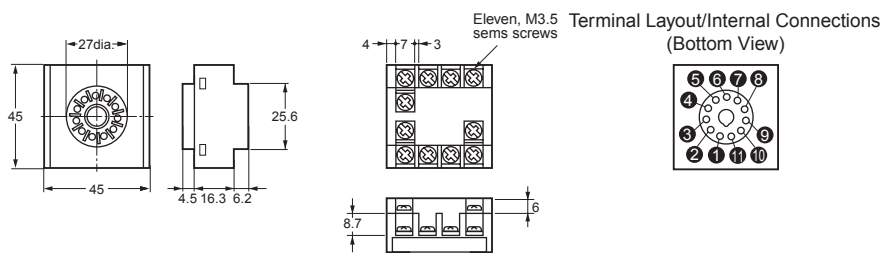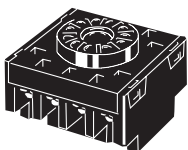
Terminal Layout/Internal Connections (Bottom View)
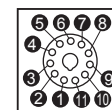
Note: 1. Using any other sockets will adversely affect accuracy. Use only the specified sockets.
2. A Protective Cover for finger protection (Y92A-48G) is also available.
3. You cannot use the P3GA-11 together with the Y92F-45.

E5DC-600 (22.5 mm Wide for DIN Track-mounting)

The E5DC Mounts to DIN Track and Is Ideal for Connections to HMIs and PLCs. It provides the Same Easy Operation and Advanced Performance as the Rest of the E5□C Series.

- A slim body at 85 x 22.5 mm (D x W) that fits into narrow control panels and mounts to DIN track.
- Removable terminal block for easy replacement to simplify maintenance.
- High-speed sampling at 50 ms for applications with high-speed temperature increases.
- Easy connections to a PLC with programless communications.
- Set up the controller without wiring the power supply by connecting to the computer with a Communication Conversion Cable (sold separately).
- Setup is easy with CX-Thermo software (sold separately)
- Models are available with up to 2 auxiliary outputs and 2 event inputs to compete basic functions.
- A white PV display (8.5 mm high) is easy to read when setting up, checking alarms, and making settings in a control panel.
- Conforms to FM (Factory Mutual) standards (FM3545/3810).

**E5DC
22.5 mm Wide, and
DIN Track-mounting Type**

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

⚠ **Refer to *Safety Precautions* on page 45.**

Main I/O Functions
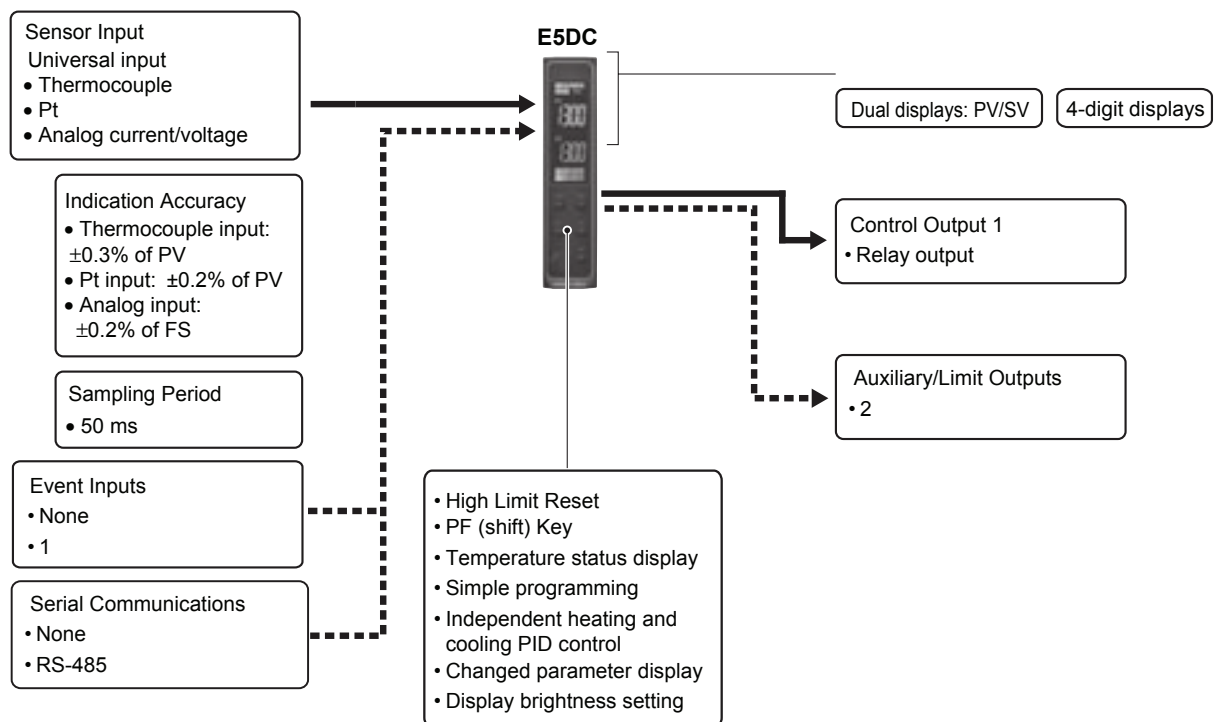
Sensor Input
Universal input
- Thermocouple
- Pt
- Analog current/voltage

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
- 1

Serial Communications
- None
- RS-485

E5DC

Dual displays: PV/SV   4-digit displays

Control Output 1
- Relay output

Auxiliary/Limit Outputs
- 2

- High Limit Reset
- PF (shift) Key
- Temperature status display
- Simple programming
- Independent heating and cooling PID control
- Changed parameter display
- Display brightness setting

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 Controller User's Manual (Cat. No. H174)
E5□C Digital Temperature Controller Communications Manual (Cat. No. H175)
E5□C Temperature High/Low Limit Controller Set up Instruction Sheet (Cat. No. H32I)

E5DC

Model Number Legend and Standard Models

Model Number Legend
● Models with Screw Terminals)

E5DC-	R	X	2	---	S	M	6	---	---
	1		2	3	4	5		6	

Model	1 Control Outputs 1 and 2	2 Number of auxiliary outputs	3 Power supply voltage	4 Terminal type	5 Input type	6 Options	Meaning			
E5DC							**22.5 mm wide and mounts to DIN Rail**			
							Control output 1			
	RX						Relay output			
		2					2 (one common)			
			A				100 to 240 VAC			
			D				24 VAC/VDC			
				S			Screw terminals			
					M		Universal input			
							HB alarm and HS alarm	Communi-cations	Event Inputs	Transfer output
						600	---	---	---	---
						602	1	RS-485	---	---
						617	1	---	1	---

E5DC Ordering Information

AC Versions	DC Versions
E5DC-RX2ASM-600	E5DC-RX2DSM-600
E5DC-RX2ASM-602	E5DC-RX2DSM-602
E5DC-RX2ASM-617	E5DC-RX2DSM-617

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.

OMRON

Optional Products (Order Separately)

Terminal Unit

Model
E5DC-SCT1S

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.

Current Transformers (CTs)

Hole diameter	Model
5.8 mm	E54-CT1
12.0 mm	E54-CT3

Mounting Adapter

Model
Y92F-53 (2pcs)

Short Bars

Model
Y92S-P11 (4 pcs)

CX-Thermo Support Software

Model
EST2-2C-MV4

Note: CX-Thermo version 4.6 or higher is required for the E5DC.
For the system requirements for the CX-Thermo, refer to
information on the EST2-2C-MV4 on the OMRON website
(www.ia.omron.com).

End Plate

Model
PFP-M

Spacer

Model
PFP-S

DIN Tracks

Model
PFP-100N
PFP-50N

Unit Labels

Model
Y92S-L2

End Cover

Model
Y92F-54

E5DC

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	4.9 VA max. at 100 to 240 VAC, and 2.8 VA max. at 24 VDC or 1.5 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 control or 2-PID control (with auto-tuning)	
Control output	**Relay output**	SPST-NO, 250 VAC, 3 A (resistive load), Electrical life: 100,000 operations, Minimum applicable load: 5 V, 10 mA (reference value)
Auxiliary/ Limit Output	**Number of outputs**	2
	Output specifications	SPST-NO relay outputs: 250 VAC, 2 A (resistive load), Electrical life: 100,000 operations, Minimum applicable load: 10 mA at 5 V (reference value)
Event input	**Number of inputs**	1　(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
Setting method	Digital setting using front panel keys	
Indication method	11-segment digital displays and individual indicators Character height: PV: 8.5 mm, SV: 8.0 mm	
Multi SP	Up to eight set points (SP0 to SP7) can be saved and selected using the event inputs, key operations, or serial communications.*1	
Bank switching	None	
Other functions	Manual output, heating/cooling control, loop burnout alarm, SP ramp, other alarm functions, heater burn-out (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, MV change rate limit, logic operations, temperature status display, simple programming, moving average of input val-ue, display brightness setting, and work bit message*2	
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)	

*1　Only two set points are selectable for event inputs.
*2　Usage is possible for the Digital Temperature Controllers manufactured in July 2014 or later.

OMRON

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	850 / 500.0 / 100.0	500.0 / 100.0	1300 / 500.0	850 / 400.0	400 / 400.0	600	850	400 / 400.0	1300	1700	1700	1800	2300	1300	90	120	165	260
Min	-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

Temperature range (°C)

▭ 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

Alarm Types

Each alarm can be independently set to one of the following 17 alarm types. The default is 2: Upper limit. (See note.)
Auxiliary outputs are allocated to alarms. ON delays and OFF delays (0 to 999 s) can also be specified.
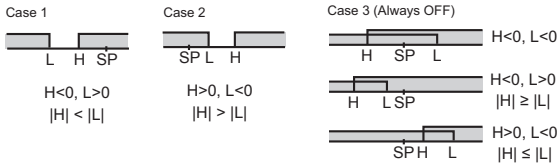
Note: In the default settings for models with HB or HS alarms, alarm 1 is set to a heater alarm (HA) and the Alarm Type 1 parameter is not displayed.
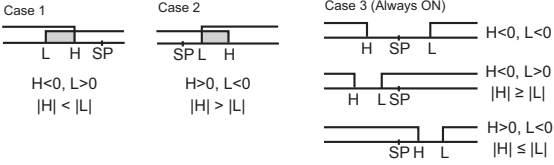To use alarm 1, set the output assignment to alarm 1.

Set value	Alarm type	Alarm output operation When alarm value X is positive	Alarm output operation When alarm value X is negative	Description of function
0	Alarm function OFF	Output OFF		No alarm
1	Upper- and lower-limit *1	ON OFF, L H, SP, PV	*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, X, SP, PV	ON OFF, X, SP, PV	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, X, SP, PV	ON OFF, X, SP, PV	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, L H, SP, PV	*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, L H, SP, PV *5	*4	A standby sequence is added to the upper- and lower-limit alarm (1). *6
6	Upper-limit with standby sequence	ON OFF, X, SP, PV	ON OFF, X, SP, PV	A standby sequence is added to the upper-limit alarm (2). *6
7	Lower-limit with standby sequence	ON OFF, X, SP, PV	ON OFF, X, SP, PV	A standby sequence is added to the lower-limit alarm (3). *6
8	Absolute-value upper-limit	ON OFF, X, 0, PV	ON OFF, X, 0, PV	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, X, 0, PV	ON OFF, X, 0, PV	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, X, 0, PV	ON OFF, X, 0, PV	A standby sequence is added to the absolute-value upper-limit alarm (8). *6
11	Absolute-value lower-limit with standby sequence	ON OFF, X, 0, PV	ON OFF, X, 0, PV	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, X, 0, SP	ON OFF, X, 0, SP	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, X, 0, SP	ON OFF, X, 0, SP	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, X, 0, MV / Heating/Cooling Control (Heating MV): ON OFF, X, 0, MV	Standard Control: ON OFF, X, 0, MV / 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: ON OFF, X, 0, MV / Heating/Cooling Control (Cooling MV): ON OFF, X, 0, MV	Standard Control: ON OFF, X, 0, MV / 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).

*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

Case 1	Case 2	Case 3 (Always OFF)
L H SP	SP L H	H SP L $\quad$ H<0, L<0
H<0, L>0	H>0, L<0	H L SP $\quad$ H<0, L>0 $\quad \lvert H\rvert \geq \lvert L\rvert$
$\lvert H\rvert < \lvert L\rvert$	$\lvert H\rvert > \lvert L\rvert$	SP H L $\quad$ H>0, L<0 $\quad \lvert H\rvert \leq \lvert L\rvert$

*3 Set value: 4, Upper- and lower-limit range

Case 1	Case 2	Case 3 (Always ON)
L H SP	SP L H	H SP L $\quad$ H<0, L<0
H<0, L>0	H>0, L<0	H L SP $\quad$ H<0, L>0 $\quad \lvert H\rvert \geq \lvert L\rvert$
$\lvert H\rvert < \lvert L\rvert$	$\lvert H\rvert > \lvert L\rvert$	SP H L $\quad$ H>0, L<0 $\quad \lvert H\rvert \leq \lvert L\rvert$

*4 Set value: 5, Upper- and lower-limit with standby sequence
For Upper- and Lower-Limit Alarm Described Above at *2
- In cases 1 and 2 above, the alarm is <u>always OFF</u> if the upper- and lower-limit hysteresis overlaps.
- In case 3, the alarm is <u>always OFF</u>.

*5 Set value: 5, Upper- and lower-limit alarm with standby sequence
The alarm is <u>always OFF</u> if upper- 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 LBA.

*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-value upper-limit alarm functions only for the heating operation and the MV absolute-value lower-limit alarm functions only for the cooling operation.