Digital Temperature Controller
E5CC/E5EC/E5AC/E5DC

The new standard in temperature control is higher in every respect
E5CC (48 × 48 mm) / E5EC (48 × 96 mm) / E5AC (96 × 96 mm)
E5DC (22.5 mm Wide, and DIN Track-mounting Type)

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.
New Models That Mount to DIN Track and Are Ideal for HMI/PLC Connections.

48 × 48 mm	48 × 96 mm	96 × 96 mm	22.5 mm Wide, and DIN Track-mounting Type
E5CC	**E5EC**	**E5AC**	**E5DC**

Digital Temperature Controller
E5CC (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 15.2 mm improves visibility.
- High-speed sampling at 50 ms.
- Models are available with up to 3 auxiliary outputs, up to 4 event inputs, a transfer output, and a remote SP input to cover a wide range of applications.
- Short body with depth of only 60 mm.
- 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.
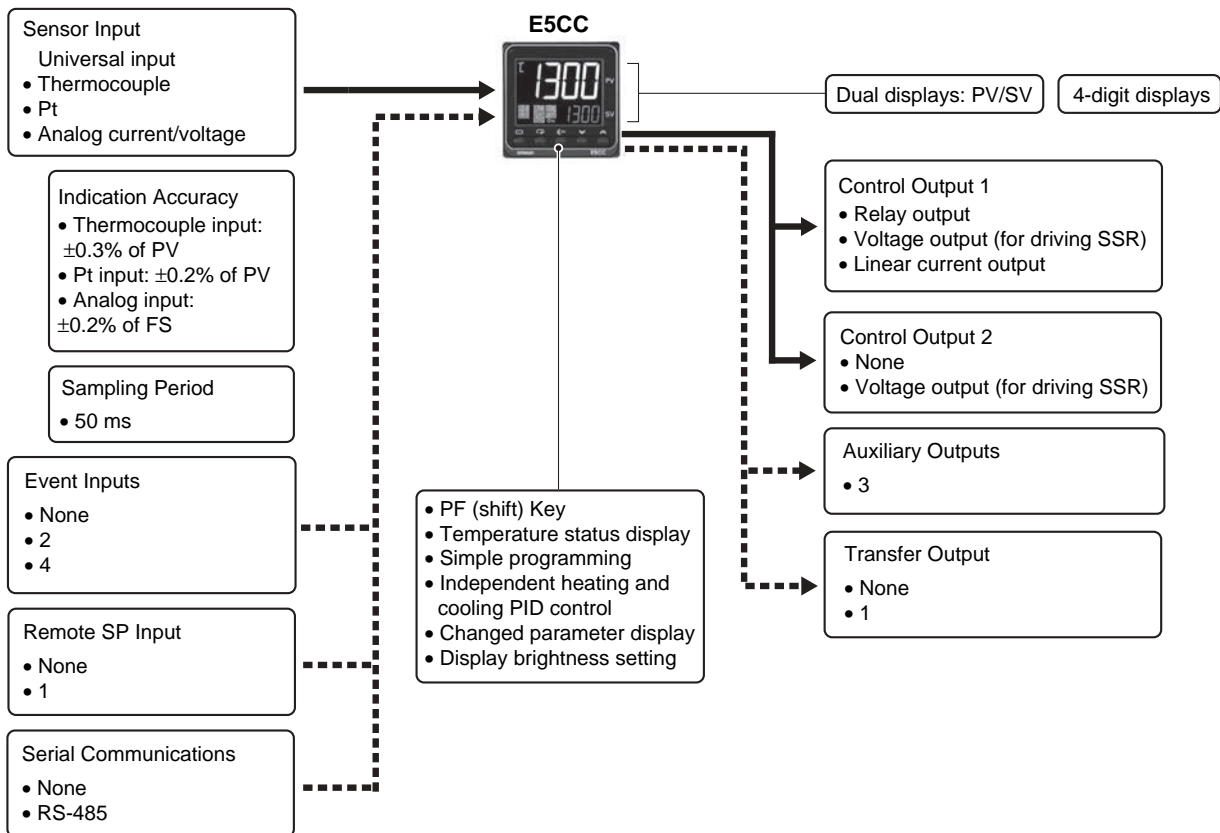
48 × 48 mm
E5CC

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

⚠ Refer to Safety Precautions on page 50.

Main I/O Functions

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

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

Sampling Period
- 50 ms

Event Inputs
- None
- 2
- 4

Remote SP Input
- None
- 1

Serial Communications
- None
- RS-485

E5CC

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

Dual displays: PV/SV | 4-digit displays

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

Control Output 2
- None
- Voltage output (for driving SSR)

Auxiliary Outputs
- 3

Transfer Output
- None
- 1

This datasheet is provided as a guideline for selecting products.
Be sure to refer to the following manuals for application precautions and other information required for operation before attempting to use the product.
E5☐C Digital Temperature Controllers User's Manual (Cat. No. H174)
E5☐C Digital Temperature Controllers Communications Manual (Cat. No. H175)

Model Number Legend and Standard Models

Model Number Legend
E5CC-☐☐ ☐ ☐ ☐ ☐-☐☐☐ (Example: E5CC-RX3A5M-000)
①   ② ③ ④ ⑤   ⑥

Model	① Control outputs 1 and 2	② No. of auxiliary outputs	③ Power supply voltage	④ Terminal type	⑤ Input type	⑥ Options	Meaning	
E5CC							**48 × 48 mm**	
							Control output 1	**Control output 2**
*1 *3	RX						Relay output	None
	QX						Voltage output (for driving SSR)	None
	CX						Linear current output *2	None
	QQ						Voltage output (for driving SSR)	Voltage output (for driving SSR)
	CQ						Linear current output *2	Voltage output (for driving SSR)
		3					3 (one common)	
			A				100 to 240 VAC	
			D				24 VAC/DC	
				5			Screw terminals (with cover)	
					M		Universal input	

		HB alarm and HS alarm	Communications	Event inputs	Remote SP Input	Transfer output
	000	---	---	---	---	---
*1	001	1	---	2	---	---
*1	003	2 (for 3-phase heaters)	RS-485	---	---	---
*3	004	---	RS-485	2	---	---
	005	---	---	4	---	---
	006	---	---	2		Provided.
	007	---	---	2	Provided.	---

*1. Options with HB and HS alarms (001 and 003) cannot be selected if a linear current output is selected for the control output.
*2. The control output cannot be used as a transfer output.
*3. Option 004 can be selected only when "CX" is selected for the control outputs.

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.

E5CC

Optional Products (Order Separately)

USB-Serial Conversion Cable

Model
E58-CIFQ2

Terminal Covers

Model
E53-COV17
E53-COV23

Note: The E53-COV10 cannot be used.
Refer to page 12 for the mounted dimensions.

Waterproof Packing

Model
Y92S-P8

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

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

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

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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, 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 *
	Voltage output (for driving SSR)	Output voltage: 12 VDC ±20% (PNP), max. load current: 21 mA, with short-circuit protection circuit
	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**	3
	Output specifications	SPST-NO relay outputs, 250 VAC, Models with 3 outputs: 2 A (resistive load), Electrical life: 100,000 operations, Minimum applicable load: 10 mA at 5 V
Event input	**Number of inputs**	2 or 4 (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	Contact output: 4 to 20 mA DC, load: 500 Ω max., resolution: approx. 10,000 Linear voltage output: 1 to 5 VDC, load: 1 kΩ max, resolution: Approx. 10,000
Setting method		Digital setting using front panel keys
Remote SP input		Current input: 4 to 20 mA DC or 0 to 20 mA DC (input impedance: 150 Ω max.) Voltage input: 1 to 5 V, 0 to 5 V, or 0 to 10 V (input impedance: 1 MΩ min.)
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 event inputs, key operations, or serial communications.
Bank switching		None
Other functions		Manual output, heating/cooling control, loop burnout alarm, SP ramp, other alarm functions, heater burnout (HB) alarm (including SSR failure (HS) alarm), 40% AT, 100% AT, MV limiter, input digital filter, self tuning, robust tuning, PV input shift, run/stop, protection functions, extraction of square root, MV change rate limit, simple calculations, 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 no condensation or icing)
Ambient operating humidity		25% to 85%
Storage temperature		-25 to 65°C (with no condensation or icing)

* You cannot select a relay output or linear current output for control output 2.

E5CC

Input Ranges

●Thermocouple/Platinum Resistance Thermometer (Universal inputs)

Input type	Platinum resistance thermometer				Thermocouple													Infrared temperature sensor			
Name	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) 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
Temperature range (°C) 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
Setting number	0	1	2	3 / 4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24

▢ Shaded settings are the default settings.

The applicable standards for the input types are as follows:

K, J, T, E, N, R, S, B: JIS C 1602-1995, IEC 60584-1
L: Fe-CuNi, DIN 43710-1985
U: Cu-CuNi, DIN 43710-1985
W: W5Re/W26Re, ASTM E988-1990

JPt100: JIS C 1604-1989, JIS C 1606-1989
Pt100: JIS C 1604-1997, IEC 60751
PL II: According to Platinel II electromotive force charts from BASF (previously Engelhard)

●Analog input

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

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Alarm Outputs

Each alarm can be independently set to one of the following 19 alarm types. The default is 2: Upper limit. (see note.)
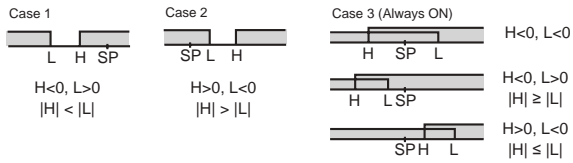Auxiliary outputs are allocated for alarms. ON delays and OFF delays (0 to 999 s) can also be specified.
Note: In the default settings for models with HB or HS alarms, alarm 1 is set to a heater alarm (HA) and the Alarm Type 1 parameter is not displayed.
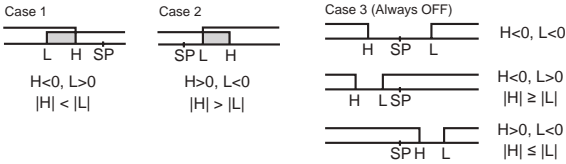To use alarm 1, set the output assignment to alarm 1.

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

E5CC

*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)

Case 1: L H SP — H<0, L>0 |H| < |L|

Case 2: SP L H — H>0, L<0 |H| > |L|

Case 3 (Always ON):
H SP L — H<0, L<0
H L SP — H<0, L>0 |H| ≥ |L|
SP H L — H>0, L<0 |H| ≤ |L|

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

Case 1: L H SP — H<0, L>0 |H| < |L|

Case 2: SP L H — H>0, L<0 |H| > |L|

Case 3 (Always OFF):
H SP L — H<0, L<0
H L SP — H<0, L>0 |H| ≥ |L|
SP H L — H>0, L<0 |H| ≤ |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.

Characteristics

Indication accuracy (at the ambient temperature of 23°C)	Thermocouple: (±0.3% of PV or ±1°C, whichever is greater) ±1 digit max. *1 Platinum resistance thermometer: (±0.2% of PV or ±0.8°C, whichever is greater) ±1 digit Analog input: ±0.2% FS ±1 digit max. CT input: ±5% FS ±1 digit max.
Transfer output accuracy	±0.3% FS max.
Remote SP Input Type	±0.2% FS ±1 digit max.
Influence of temperature *2	Thermocouple input (R, S, B, W, PL II): (±1% of PV or ±10°C, whichever is greater) ±1 digit max.
Influence of voltage *2	Other thermocouple input: (±1% of PV or ±4°C, whichever is greater) ±1 digit max. *3 Platinum resistance thermometer: (±1% of PV 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) *4
Derivative time (D)	0 to 9999 s (in units of 1 s), 0.0 to 999.9 s (in units of 0.1 s) *4
Proportional band (P) for cooling	Temperature input: 0.1 to 999.9°C or °F (in units of 0.1°C or °F) Analog input: 0.1% to 999.9% FS (in units of 0.1% FS)
Integral time (I) for cooling	0 to 9999 s (in units of 1 s), 0.0 to 999.9 s (in units of 0.1 s) *4
Derivative time (D) for cooling	0 to 9999 s (in units of 1 s), 0.0 to 999.9 s (in units of 0.1 s) *4
Control period	0.1, 0.2, 0.5, 1 to 99 s (in units of 1 s)
Manual reset value	0.0 to 100.0% (in units of 0.1%)
Alarm setting range	-1999 to 9999 (decimal point position depends on input type)
Influence of signal source resistance	Thermocouple: 0.1°C/Ω max. (100 Ωmax.) Platinum resistance thermometer: 0.1°C/Ω max. (10 Ω max.)
Insulation resistance	20 MΩ min. (at 500 VDC)
Dielectric strength	2,300 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
Vibration 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
Shock Resistance	300 m/s², 3 times each in X, Y, and Z directions
Weight	Controller: Approx. 120 g, Mounting Bracket: Approx. 10 g
Degree of protection	Front panel: IP66, Rear case: IP20, Terminals: IP00
Memory protection	Non-volatile memory (number of writes: 1,000,000 times)
Setup Tool	CX-Thermo version 4.5 or higher
Setup Tool port	E5CC top panel: An E58-CIFQ2 USB-Serial Conversion Cable is used to connect to a USB port on the computer. *5
Standards Approved standards	UL 61010-1, CSA C22.2 No. 611010-1 (evaluated by UL), KOSHA certified (some models) *6, Korean Radio Waves Act (Act 10564)
Standards Conformed standards	EN 61010-1 (IEC 61010-1): Pollution level 2, overcurrent category II, Lloyd's standards *7
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 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 W thermocouples is (±0.3% of PV or ±3°C, whichever is greater) ±1 digit max. The indication accuracy of PL II thermocouples is ±0.3% of PV or ±2°C, whichever is greater, ±1 digit max.

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

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

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

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

*6 Access the following website for information on certified models. *http://www.ia.omron.com/support/models/index.html*

*7 Refer to information on maritime standards in *Shipping Standards* on page 52 for compliance with Lloyd's Standards.

USB-Serial Conversion Cable

Applicable OS	Windows 2000, XP, Vista, or 7
Applicable software	CX-Thermo version 4.5 or higher
Applicable models	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	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*	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. Applicable PLCs 　OMRON PLCs 　　SYSMAC CS Series, CJ Series, or CP Series 　Mitsubishi Electric PLCs 　　MELSEC Q Series or L Series
Communications between components*	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. Number of connected Digital Temperature Controllers: 32 max. (including master)
	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)

MELSEC is a registered trademark of Mitsubishi Electric Corporation.

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

Current Transformer (Order Separately) Ratings

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

Heater Burnout Alarms and SSR Failure Alarms

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

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

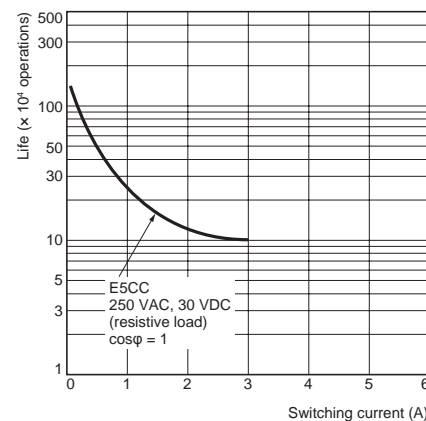*2 For SSR failure alarms, the heater current will be measured when the control output is OFF, and the output will turn ON if the heater current is higher than the set value (i.e., SSR failure detection current value).

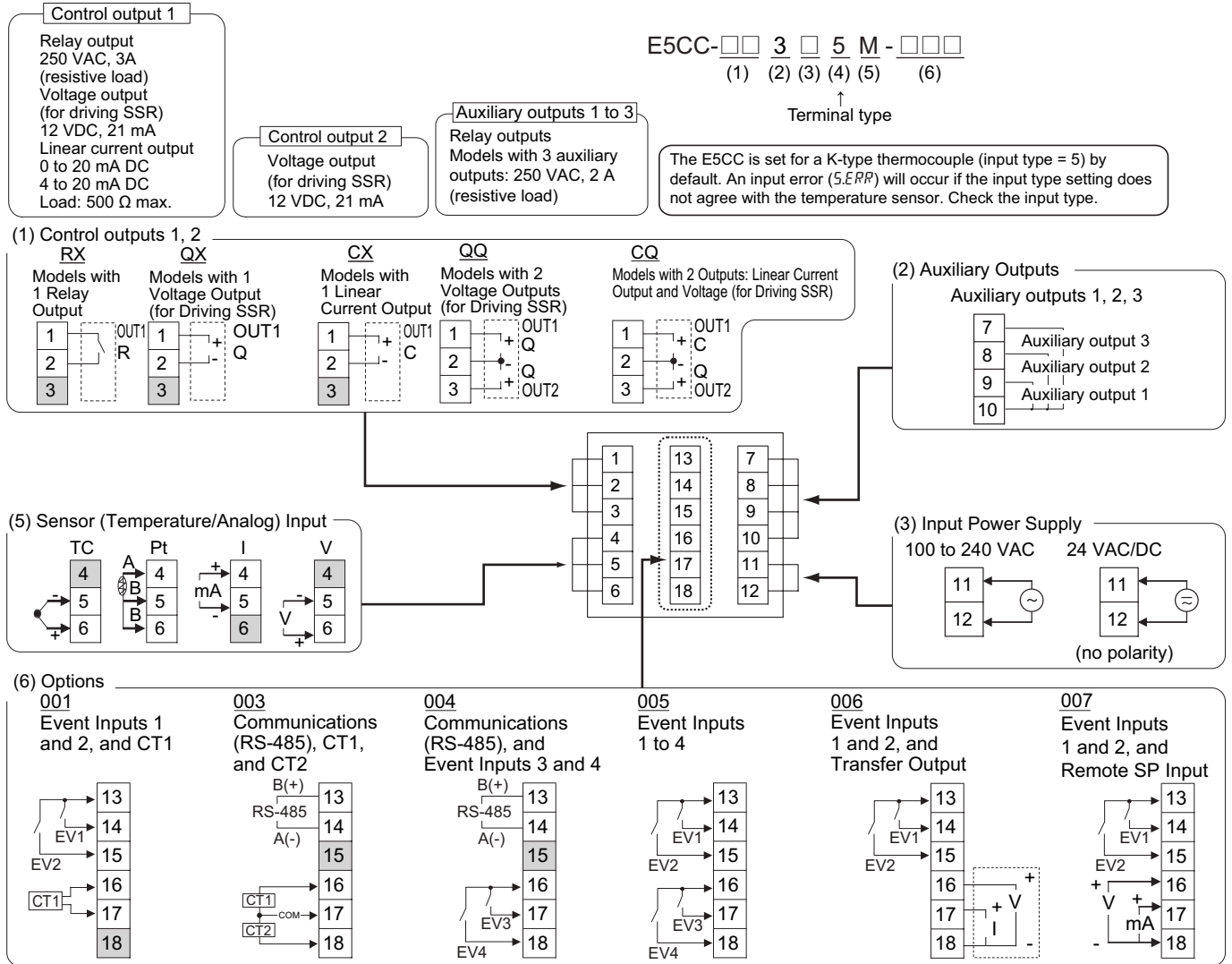*3 The value is 30 ms for a control period of 0.1 s or 0.2 s.

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

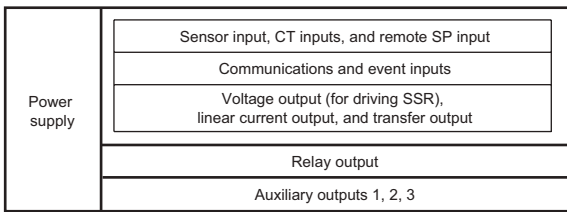## Electrical Life Expectancy Curve for Relays (Reference Values)

External Connections

E5CC

Control output 1
Relay output
250 VAC, 3A
(resistive load)
Voltage output
(for driving SSR)
12 VDC, 21 mA
Linear current output
0 to 20 mA DC
4 to 20 mA DC
Load: 500 Ω max.

Control output 2
Voltage output
(for driving SSR)
12 VDC, 21 mA

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

E5CC-□□ 3 □ 5 M - □□□
(1) (2) (3) (4) (5) (6)

↑
Terminal type

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.

(1) Control outputs 1, 2

RX — Models with 1 Relay Output — OUT1 R — 1 2 3
QX — Models with 1 Voltage Output (for Driving SSR) — OUT1 Q — 1 2 3
CX — Models with 1 Linear Current Output — OUT1 C — 1 2 3
QQ — Models with 2 Voltage Outputs (for Driving SSR) — OUT1 Q, OUT2 Q — 1 2 3
CQ — Models with 2 Outputs: Linear Current Output and Voltage (for Driving SSR) — OUT1 C, OUT2 Q — 1 2 3

(2) Auxiliary Outputs
Auxiliary outputs 1, 2, 3
7 — Auxiliary output 3
8 — Auxiliary output 2
9 — Auxiliary output 1
10

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

(5) Sensor (Temperature/Analog) Input
TC — 4 5 6
Pt — A B B — 4 5 6
I — mA + - — 4 5 6
V — V - + — 4 5 6

(3) Input Power Supply
100 to 240 VAC — 11 12 (~)
24 VAC/DC — 11 12 (≈)
(no polarity)

(6) Options

001 — Event Inputs 1 and 2, and CT1 — EV1, EV2, CT1 — 13 14 15 16 17 18

003 — Communications (RS-485), CT1, and CT2 — B(+) RS-485 A(-), CT1, CT2, COM — 13 14 15 16 17 18

004 — Communications (RS-485), and Event Inputs 3 and 4 — B(+) RS-485 A(-), EV3, EV4 — 13 14 15 16 17 18

005 — Event Inputs 1 to 4 — EV1, EV2, EV3, EV4 — 13 14 15 16 17 18

006 — Event Inputs 1 and 2, and Transfer Output — EV1, EV2, + V I - — 13 14 15 16 17 18

007 — Event Inputs 1 and 2, and Remote SP Input — EV1, EV2, + V + mA - — 13 14 15 16 17 18

Note: 1. The application of the terminals depends on the model.
    2. Do not wire the terminals that are shown with a gray background.
    3. When complying with EMC standards, the cable that connects the sensor must be 30 m or less.
       If the cable length exceeds 30 m, compliance with EMC standards will not be possible.
    4. Connect M3 crimped terminals.

Isolation/Insulation Block Diagrams

Models with 3 Auxiliary Outputs

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

☐ : Reinforced insulation
☐ : Functional isolation

Note: Auxiliary outputs 1 to 3 are not insulated.