Digital Temperature Controller (Simple Type)

E5CC-800 (48 × 48 mm)

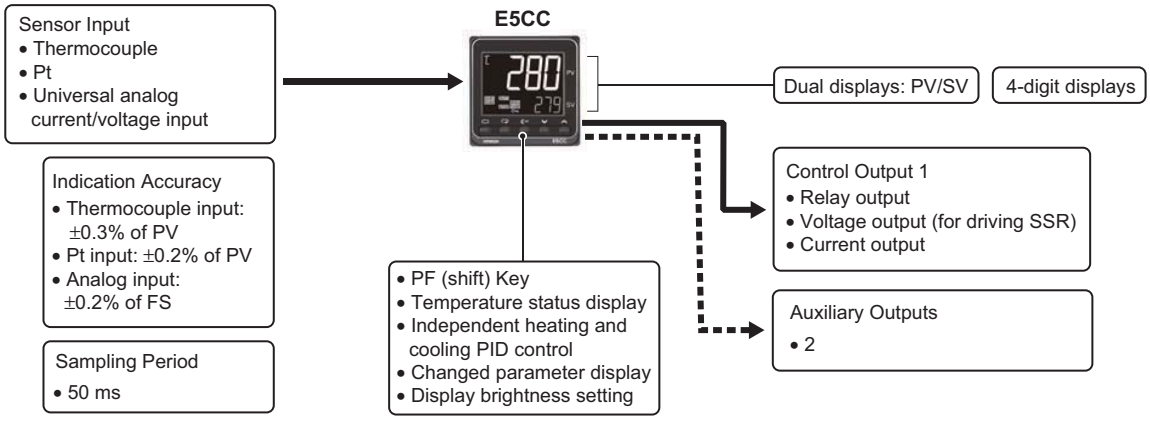
Large White PV Display That's Easier to Read. Easy to Use, from Model Selection to Setup and Operation. A Complete Range of I/O Capacities, Functions, and Performance. Handles More Applications.

- The white PV display with a height of 15.2 mm improves visibility.
- Only 48 × 48 mm (C size) and provides five keys.
  As easy to operate as 48 × 96 mm (E size) models.
- High-speed sampling at 50 ms.
- Short body with depth of only 60 mm.

48 × 48 mm
E5CC

⚠ Refer to Safety Precautions on page 29.

Main I/O Functions



Model Number Legend and Standard Models

Model Number Legend

E5CC 48x48mm

Control output 1	Auxiliary output	Communications	Heater burnout	Event inputs	Power supply voltage	Model
Relay output	Two	-	-	-	100 to 240 VAC	**E5CC-RX2ASM-800**
Voltage output						**E5CC-QX2ASM-800**
Current output						**E5CC-CX2ASM-800**
Relay output					24 VAC/VDC	**E5CC-RX2DSM-800**
Voltage output						**E5CC-QX2DSM-800**
Current output						**E5CC-CX2DSM-800**
Relay output			One	Two	100 to 240 VAC	**E5CC-RX2ASM-801**
Voltage output						**E5CC-QX2ASM-801**
Relay output					24 VAC/VDC	**E5CC-RX2DSM-801**
Voltage output						**E5CC-QX2DSM-801**
Relay output		RS-485		-	100 to 240 VAC	**E5CC-RX2ASM-802**
Voltage output						**E5CC-QX2ASM-802**
Relay output					24 VAC/VDC	**E5CC-RX2DSM-802**
Voltage output						**E5CC-QX2DSM-802**
Current output			-	Two	100 to 240 VAC	**E5CC-CX2ASM-804**
Current output					24 VAC/VDC	**E5CC-CX2DSM-804**

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)

Terminal Covers

Model
E53-COV17
E53-COV23

Note: The E53-COV10 cannot be used.
Refer to page 10 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

Note: This Cover complies with IP66 and NEMA 4X waterproofing.
Front panel: IP66 protection.

Mounting Adapter

Model
Y92F-49

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

Front Covers

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

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		5.2 VA max. at 100 to 240 VAC, and 3.1 VA max. at 24 VDC or 1.6 W max. at 24 VDC
Sensor input		Models with temperature inputs Thermocouple: K, J, T, E, L, U, N, R, S, B, W, or PL II Platinum resistance thermometer: Pt100 or JPt100 Infrared temperature sensor: 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
	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**	2
	Output specifications	N.O. relay outputs, 250 VAC, Models with 2 outputs: 3 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
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 event inputs, key operations, or serial communications.
Other functions		Manual output, heating/cooling control, loop burnout alarm, SP ramp, other alarm functions, 40% AT, 100% AT, MV limiter, input digital filter, self tuning, PV input shift, run/stop, protection functions, extraction of square root, MV change rate limit, temperature status display, 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)

Input Ranges (Universal inputs)

●Thermocouple/Platinum Resistance Thermometer

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)	-200 to 850	-199.9 to 500.0	0.0 to 100.0	-199.9 to 500.0	0.0 to 100.0	-200 to 1300	-20.0 to 500.0	-100 to 850	-20.0 to 400.0	-200 to 400	-199.9 to 400.0	-200 to 600	-100 to 850	-200 to 400	-199.9 to 400.0	-200 to 1300	0 to 1700	0 to 1700	100 to 1800	0 to 2300	0 to 1300	0 to 90	0 to 120	0 to 165	0 to 260
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:

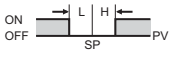
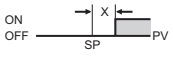
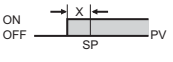
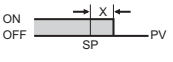
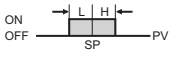
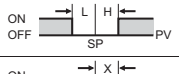
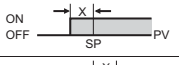
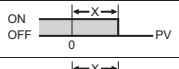
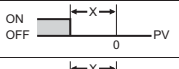
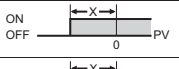
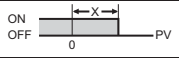
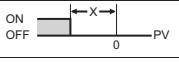
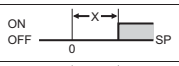
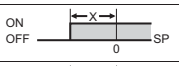
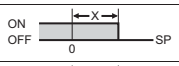
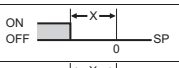
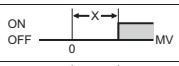
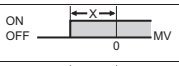
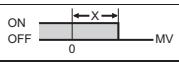
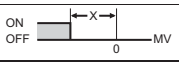
K, J, T, E, N, R, S, B: JIS C 1602-1995, IEC 60584-1
L: Fe-CuNi, DIN 43710-1985
U: Cu-CuNi, DIN 43710-1985
W: W5Re/W26Re, ASTM E988-1990
JPt100: JIS C 1604-1989, JIS C 1606-1989
Pt100: JIS C 1604-1997, IEC 60751
PL II: According to Platinel II electromotive force charts from BASF (previously Engelhard)

●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

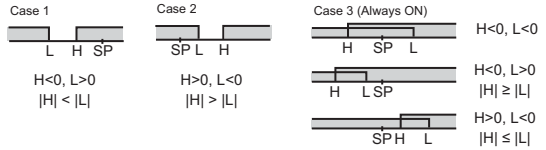
Alarm Outputs

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.

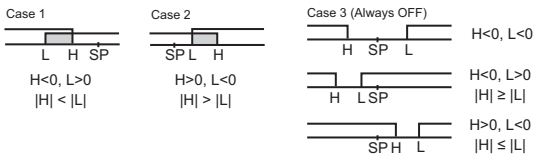
Set value	Alarm type	Alarm output operation		Description of function
		When alarm value X is positive	When alarm value X is negative	
0	Alarm function OFF	Output OFF		No alarm
1	Upper- and lower-limit *1		*2	Set the deviation in the set point by setting the alarm upper limit (H) and alarm lower limit (L). The alarm is ON when the PV is outside this deviation range.
2	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 deviation in the set point by setting the alarm upper limit (H) and 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			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			This alarm type turns ON the alarm when the set point (SP) is smaller than the alarm value (X).
16	MV absolute value upper limit *9			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 *9			This alarm type turns ON the alarm when the manipulated variable (MV) is smaller than the alarm value (X).

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

*2 Set value: 1, Upper- and lower-limit alarm



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



*4 Set value: 5, Upper- and lower-limit with standby sequence
For Upper- and Lower-Limit Alarm Described Above *2
- Case 1 and 2
Always OFF when the upper-limit and lower-limit hysteresis overlaps.
- Case 3: Always OFF

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

*6 Refer to the E5CC/E5EC Digital Controllers User's Manual (Cat. No. H174) for information on the operation of the standby sequence.

*7 Refer to the E5CC/E5EC Digital Controllers User's Manual (Cat. No.H174) for information on the loop burnout alarm (LBA).

*8 Refer to the E5CC/E5EC Digital 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.

C aracteristics

ndication accuracy (at t e ambient temperature of 23 C)		Thermocouple: (±0.3% of indicated value or ±1°C, whichever is greater) ±1 digit max. *1 Platinum resistance thermometer: (±0.2% of indicated value or ±0.8°C, whichever is greater) ±1 digit Analog input: ±0.2% FS ±1 digit max. CT input: ±5% FS ±1 digit max.
nfluence of temperature 2		Thermocouple input (R, S, B, W, PL II): (±1% of PV or ±10°C, whichever is greater) ±1 digit max. 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.
nfluence of voltage 2		
nput sampling period		50 ms
Hysteresis		Temperature input: 0.1 to 999.9°C or °F (in units of 0.1°C or °F) *4 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) *4 Analog input: 0.1% to 999.9% FS (in units of 0.1% FS)
ntegral time ( )		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) *4 Analog input: 0.1% to 999.9% FS (in units of 0.1% FS)
ntegral time ( ) 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)
Affect of signal source resistance		Thermocouple: 0.1°C/Ω max. (100 Ωmax.) Platinum resistance thermometer: 0.1°C/Ω max. (10 Ω max.)
nsulation resistance		20 MΩ min. (at 500 VDC)
Dielectric strengt		2,300 VAC, 50 or 60 Hz for 1 min (between terminals with different charge)
Vibration	**resistance**	10 to 55 Hz, 20 m/s^2 for 10 min each in X, Y, and Z directions
	Malfunction	10 to 55 Hz, 20 m/s^2 for 2 hrs each in X, Y, and Z directions
Destruction	**S ock resistance**	100 m/s^2, 3 times each in X, Y, and Z directions
	Malfunction	300 m/s^2, 3 times each in X, Y, and Z directions
Weig t		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)
Standards	**Approved standards**	UL 61010-1, CSA C22.2 No. 611010-1 (evaluated by UL)
	Conformed standards	EN 61010-1 (IEC 61010-1): Pollution level 2, overcurrent category II, Lloyd's standards *6
EMC		EMI: EN61326 Radiated Interference Electromagnetic Field Strength: EN 55011 Group 1, class A Noise Terminal Voltage: EN 55011 Group 1, class A EMS: EN 61326 ESD Immunity: EN 61000-4-2 Electromagnetic Field Immunity: EN 61000-4-3 Burst Noise Immunity: EN 61000-4-4 Conducted Disturbance Immunity: EN 61000-4-6 Surge Immunity: EN 61000-4-5 Voltage Dip/Interrupting Immunity: EN 61000-4-11

*1 The indication accuracy of K thermocouples in the -200 to 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°Cmax. is not specified. The indication accuracy of B thermocouples in the 400 to 800°Crange 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 “EU” stands for Engineering Unit and is used as the unit after scaling. For a temperature sensor, the EU is °C or °F.
*5 The unit is determined by the setting of the Integral/Derivative Time Unit parameter.
*6 Refer to information on maritime standards in *Shipping Standards* on page 31 for compliance with Lloyd's Standards.

Communications Specifications

Transmission line connection method	RS-485: Multipoint
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.

Current Transformer (Order Separately) Ratings

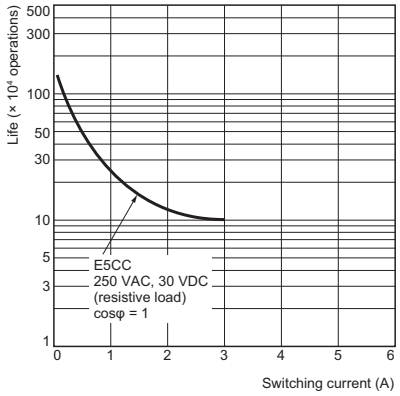
Dielectric strength	1,000 VAC for 1 min
Vibration resistance	50 Hz, 98 m/s^2
Weight	E54-CT1: Approx. 11.5 g, E54-CT3: Approx. 50 g
Accessories (E54-CT3 only)	Armatures (2) Plugs (2)

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

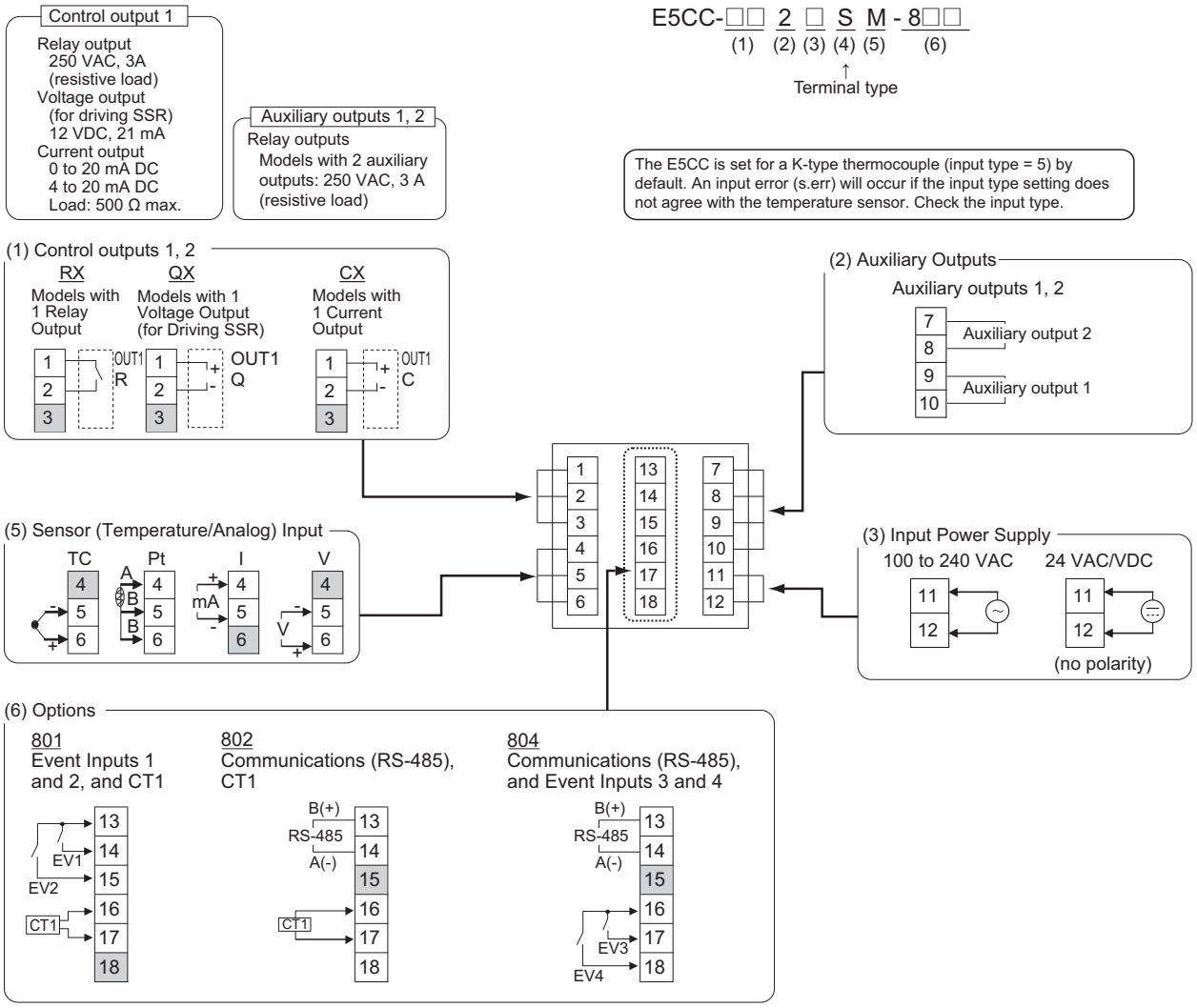
*1 For heater burnout alarms, the heater current will be measured when the control output is ON, and the output will turn ON if the heater current is lower than the set value (i.e., heater burnout detection current value).
*2 For SSR failure alarms, the heater current will be measured when the control 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-800

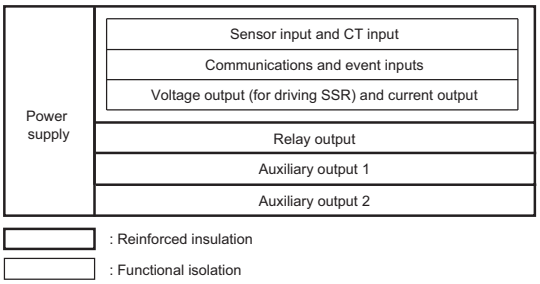


Note: 1 The application of the terminals depends on the model.
2 Do not wire the terminals that are shown with a gray background.
3 When complying with EMC standards, the cable that connects the sensor must be 30 m or less. If the cable length exceeds 30 m, compliance with EMC standards will not be possible.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

E5CC-800

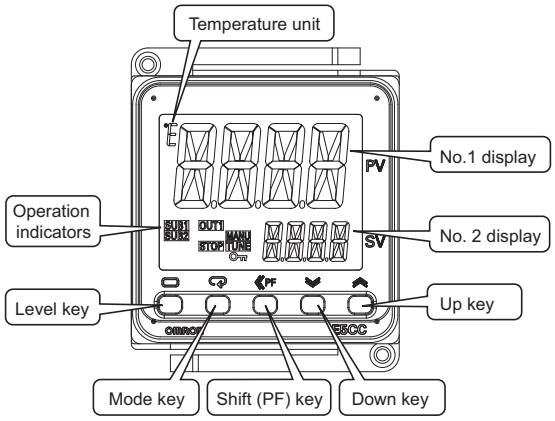
solation nsulation lock Diagrams

Models wit 2 Auxiliary Outputs

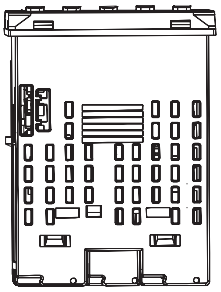


Nomenclature

E5CC



Top View

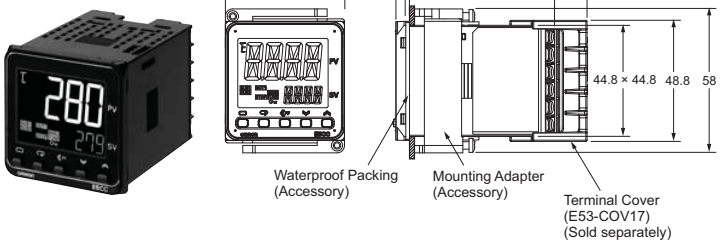


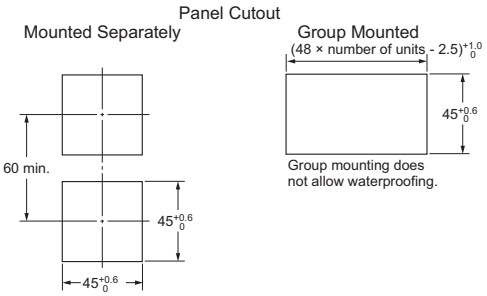
Dimensions

(Unit: mm)

Controllers

E5CC





Recommended panel thickness is 1 to 5 mm.

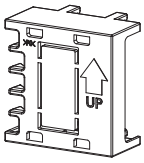
roup mounting is not possible in the vertical direction. Maintain the specified mounting space between Controllers.

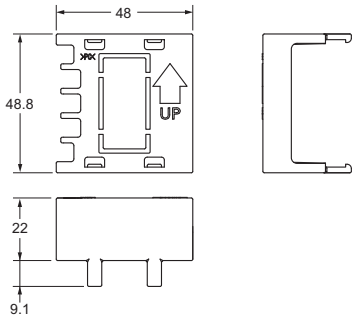
To mount the Controller so that it is waterproof, insert the waterproof packing onto the Controller.

When two or more Controllers are mounted, make sure that the surrounding temperature does not exceed the allowable operating temperature specified in the specifications.

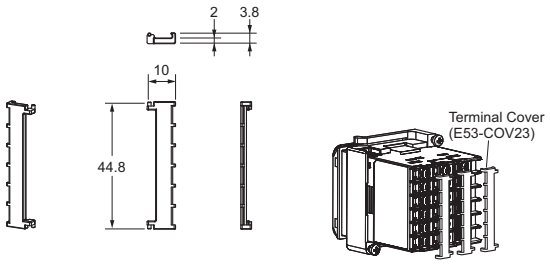
Accessories (Order Separately)

● **Terminal Covers**
E53-COV17

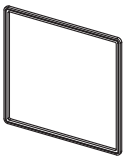




● **Terminal Covers**
E53-COV23 (T ree Covers provided)



● **Waterproof Packing**
Y92S-P8 (for D N 48 × 48)
(Provided wit t e Controller)

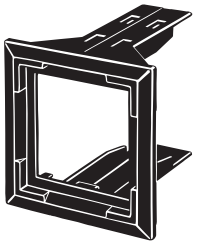


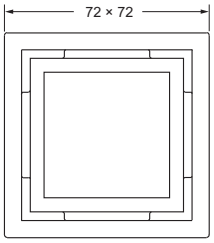
Order the Waterproof Packing separately if it becomes lost or damaged.
The Waterproof Packing can be used to achieve an IP66 degree of protection.
Deterioration, shrinking, or hardening of the waterproof packing may occur depending on the operating environment. Therefore, periodic replacement is recommended 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 a rough standard. OMRON shall not be liable for the level of water resistance if the customer does not perform periodic replacement.
The Waterproof Packing does not need to be attached if a waterproof structure is not re uired.

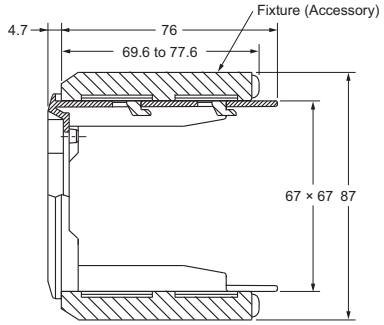
● Adapter

Y92F-45

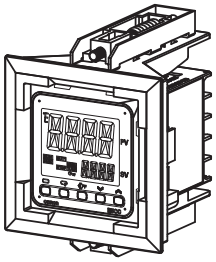
Note: 1 Use this Adapter when the Front Panel has already been prepared for the E5B□.
2 Only black is available.

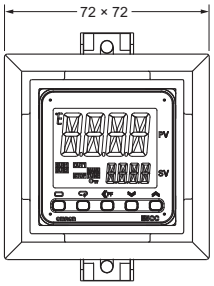


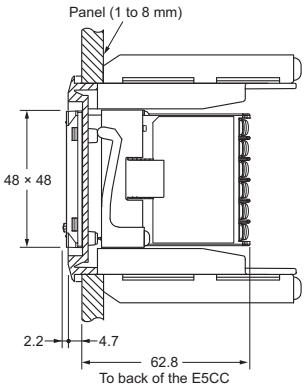




Mounted to E5CC

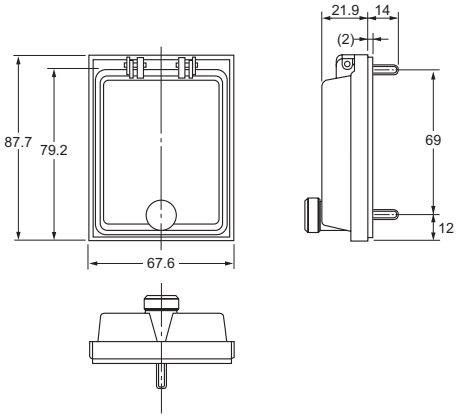






● Watertig t Cover

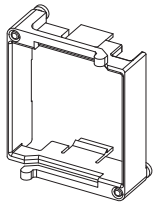
Y92A-48N



● Mounting Adapter

Y92F-49

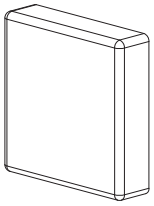
(Provided wit t e Controller)



Order this Adapter separately if it becomes lost or damaged.

● Protective Cover

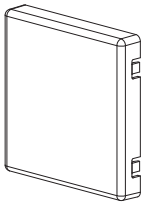
Y92A-48D



This Protective Cover is soft type. It is able to operate the controller with using this cover.

● Protective Cover

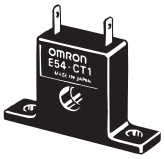
Y92A-48H

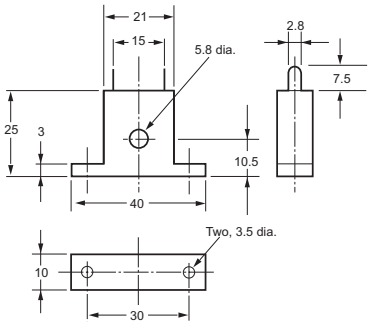


This Protective Cover is hard type. Please use it for the mis-operation prevention etc.

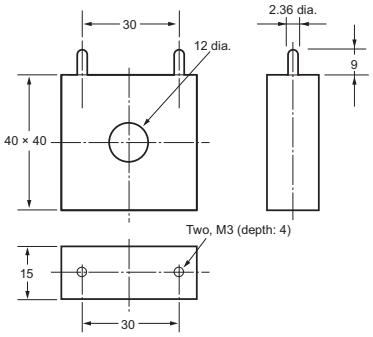
● Current Transformers

E54-CT1



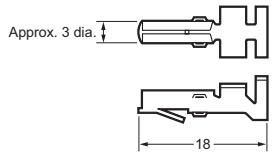


E54-CT3

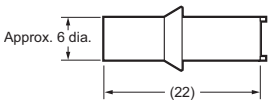


E54-CT3 Accessory

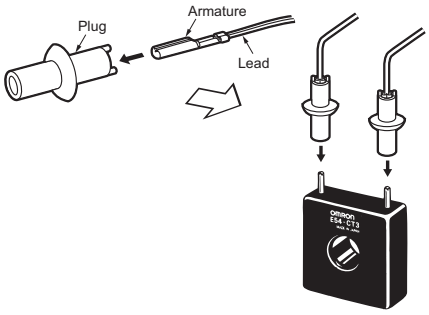
Armature



Plug



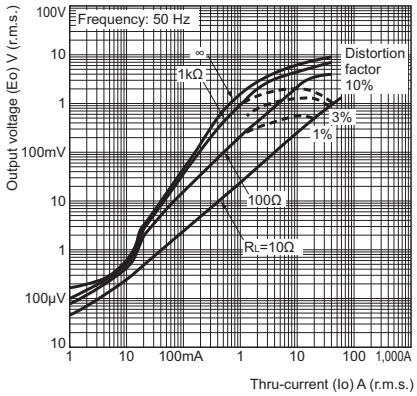
Connection Example



T ru-current (o) vs Output Voltage (Eo) (Reference Values)

E54-CT1

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



T ru-current (o) vs Output Voltage (Eo) (Reference Values)

E54-CT3

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