Easy operation and high performance in a compact 1/32 DIN Panel Mount body

* UL CERTIFIED * IC CCC CE
* CSA conformance

- A compact body of 48 × 24 × 90 mm (W × H × D) that is ideal for small equipment, laboratory instruments, and others.
- White PV display with a height of 10.5 mm for high visibility even with the compact body.
- Removable terminal block to simplify maintenance. Select from screw terminal blocks or screwless clamp terminal blocks for the wiring method.
- High-speed sampling at 50 ms.
- Easy connections to a PLC with programless communications.
- 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).
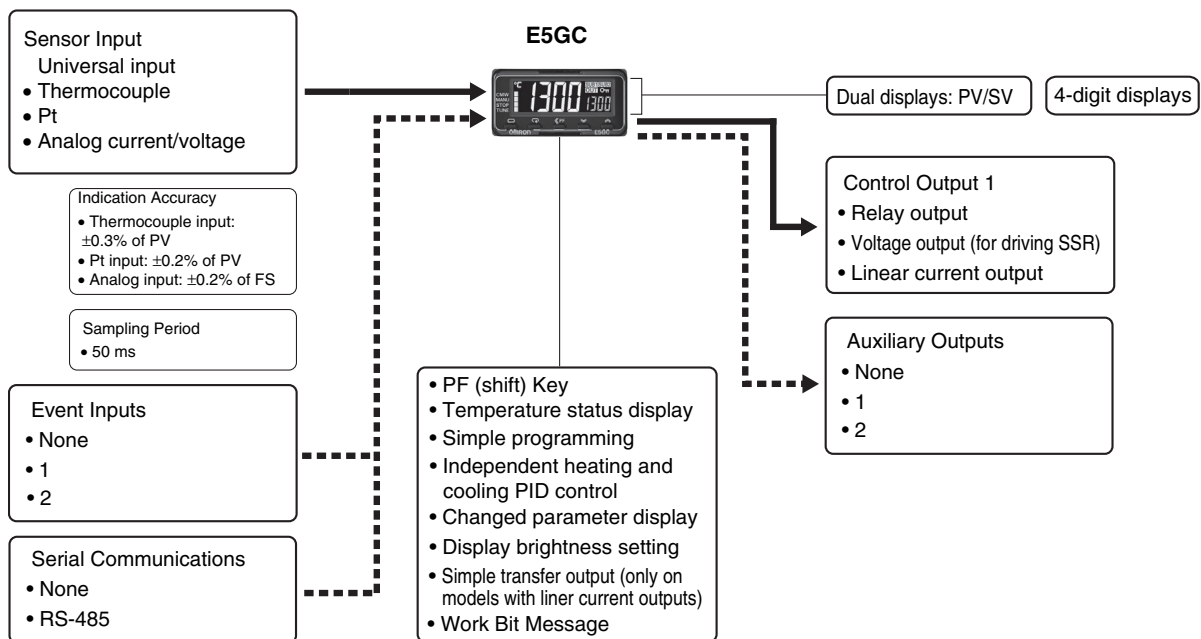
48 × 24 mm Models with Screw Terminal Blocks E5GC- □6

48 × 24 mm Models with Screwless Clamp Terminal Blocks E5GC- □C

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

⚠ **Refer to *Safety Precautions* on 122.**

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
- 2

Serial Communications
- None
- RS-485

E5GC

Dual displays: PV/SV | **4-digit displays**

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

Auxiliary Outputs
- None
- 1
- 2

- PF (shift) Key
- Temperature status display
- Simple programming
- Independent heating and cooling PID control
- Changed parameter display
- Display brightness setting
- Simple transfer output (only on models with liner current outputs)
- Work Bit Message

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

E5GC-☐☐ ☐ ☐ ☐ **M-**☐☐☐ **(Example: E5GC-RX1A6M-015)**
   ①   ② ③ ④ ⑤   ⑥

Model	①Control outputs 1 and 2	②No. of auxiliary outputs	③Power supply voltage	④Terminal type	⑤Input type	⑥Options	Meaning		
E5GC							48 × 24 mm		
								Control output 1	**Control output 2**
	RX							Relay output	None
	QX							Voltage output (for driving SSR)	None
*1	**CX**							Linear current output	None
		*2 **0**						None	
		1						1	
		2						2	
			A					100 to 240 VAC	
			D					24 VAC/DC	
				6				Screw terminal blocks (with cover)	
				C				Screwless clamp terminal blocks *6	
					M			Universal input	
								HB alarm and HS alarm	**Communications**	**Event inputs**
						000	---	---	---
						015	---	RS-485	---
					*3	**016**	---	---	1
					*3, *4	**023**	1	---	---
					*5	**024**	---	---	2

*1. The control output can be used as a simple transfer output.
*2. Only option 000 can be selected if an auxiliary output is zero.
*3. Option 016 and 023 can be selected only if two auxiliary outputs are selected.
*4. Option with HB and HS alarms (023) cannot be selected if a linear current output is selected for the control output.
*5. Option 024 can be selected only if one auxiliary output is selected.
*6. The specifications are different for Temperature Controllers with Push-In Plus terminal blocks. Refer to *Precautions when Wiring* on page 131.

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.

E5GC

Optional Products (Order Separately)

USB-Serial Conversion Cable

Model
E58-CIFQ2

Communications Conversion Cable

Model
E58-CIFQ2-E

Note: Always use this product together with the E58-CIFQ2. This Cable is used to connect to the bottom-panel Setup Tool port.

Current Transformers (CTs)

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

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

Mounting Adapter

Model
Y92F-53 (2pcs)

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

Waterproof Packing

Model
Y92S-P12

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

Draw-out Jig

Model
Y92F-55

CX-Thermo Support Software

Model
EST2-2C-MV4

Note: CX-Thermo version 4.62 or higher is required for the E5GC. For the system requirements for the CX-Thermo, refer to information on the EST2-2C-MV4 on the OMRON website (www.ia.omron.com).

Terminal Covers (for E5GC-□6)

Model
E53-COV27

Note: This Terminal Covers is provided with the Digital Temperature Controller.

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		5.9 VA max. at 100 to 240 VAC, and 3.2 VA max. at 24 VAC or 1.8 W max. at 24 VDC

Sensor input		Temperature input
		   Thermocouple: K, J, T, E, L, U, N, R, S, B, C/W, or PL II
		   Platinum resistance thermometer: Pt100 or JPt100
		   Infrared temperature sensor (ES1B): 10 to 70°C, 60 to 120°C, 115 to 165°C, or 140 to 260°C
		Analog input
		   Current input: 4 to 20 mA or 0 to 20 mA
		   Voltage input: 1 to 5 V, 0 to 5 V, or 0 to 10 V

Input impedance		Current input: 150 Ω max., Voltage input: 1 MΩ min. (Use a 1:1 connection when connecting the ES2-HB-N/THB-N.)
Control method		ON/OFF control or 2-PID control (with auto-tuning)
Control output	**Relay output**	SPST-NO, 250 VAC, 2 A (resistive load), electrical life: 100,000 operations, minimum applicable load: 5 V, 10 mA (reference value)
	Voltage output (for driving SSR)	Output voltage 12 VDC ±20% (PNP), max. Load current: 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**	1 or 2 (depends on model)
	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 or 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
Setting method		Digital setting using front panel keys
Indication method		11-segment digital displays and individual indicators Character height: PV: 10.5 mm, SV: 5.0 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. ✻
Bank switching		None
Other functions		Manual output, heating/cooling control, loop burnout alarm, SP ramp, other alarm functions, heater burnout (HB) alarm (including SSR failure (HS) alarm), 40% AT, 100% AT, MV limiter, input digital filter, self tuning, robust tuning, PV input shift, run/stop, protection functions, extraction of square root, MV change rate limit, logic operations, temperature status display, simple programming, moving average of input value, display brightness setting, simple transfer output, and work bit message
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		Overvoltage category II, Pollution Degree 2 (EN/IEC/UL 61010-1)

✻ There are up to four event inputs.

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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	C/W	PLII		10 to 70°C	60 to 120°C	115 to 165°C	140 to 260°C
Max (°C)	850	500.0	100.0	500.0	100.0	1300	850	400.0	400	400.0	600	850	400	400.0	1300	1700	1700	1800	2300	1300	90	120	165	260
Min (°C)	-200	-199.9	0.0	-199.9	0.0	-200	-20.0	-100	-20.0	-200	-199.9	-200	-100	-200	-199.9	-200	0	0	100	0	0	0	0	0	0
Set value	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24

Shaded settings are the default settings.

The applicable standards for the input types are as follows:

K, J, T, E, N, R, S, B: JIS C 1602-2015, IEC 60584-1
L: Fe-CuNi, DIN 43710-1985
U: Cu-CuNi, DIN 43710-1985
C/W: W5Re/W26Re, JIS C 1602-2015, ASTM E988-1990

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

Analog input

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

Alarm 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		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	[diagram: 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	[diagram: ON/OFF, X, SP, PV]	[diagram: 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	[diagram: ON/OFF, X, SP, PV]	[diagram: 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	[diagram: 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	*5 [diagram: ON/OFF, L H, SP, PV]	*4	A standby sequence is added to the upper- and lower-limit alarm (1). *6
6	Upper-limit with standby sequence	[diagram: ON/OFF, X, SP, PV]	[diagram: ON/OFF, X, SP, PV]	A standby sequence is added to the upper-limit alarm (2). *6
7	Lower-limit with standby sequence	[diagram: ON/OFF, X, SP, PV]	[diagram: ON/OFF, X, SP, PV]	A standby sequence is added to the lower-limit alarm (3). *6
8	Absolute-value upper-limit	[diagram: ON/OFF, X, 0, PV]	[diagram: 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	[diagram: ON/OFF, X, 0, PV]	[diagram: 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	[diagram: ON/OFF, X, 0, PV]	[diagram: 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	[diagram: ON/OFF, X, 0, PV]	[diagram: 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	[diagram: ON/OFF, X, 0, SP]	[diagram: 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	[diagram: ON/OFF, X, 0, SP]	[diagram: 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 [diagram: ON/OFF, X, 0, MV] — Heating/Cooling Control (Heating MV) [diagram: ON/OFF, X, 0, MV]	Standard Control [diagram: 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 [diagram: ON/OFF, X, 0, MV] — Heating/Cooling Control (Cooling MV) [diagram: ON/OFF, X, 0, MV]	Standard Control [diagram: 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).

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∗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

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|
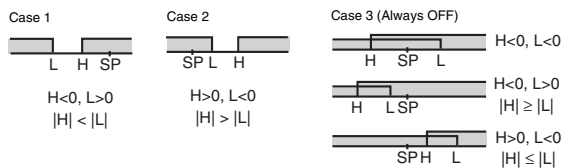
∗3. Set value: 4, Upper- and lower-limit range

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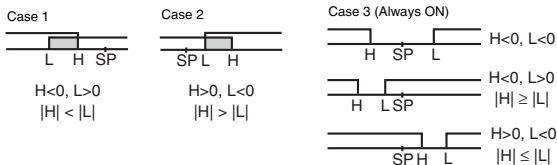
∗4. Set value: 5, Upper- and lower-limit with standby sequence
For Upper- and Lower-Limit Alarm Described Above at *2
- In cases 1 and 2 above, the alarm is <u>always OFF</u> if the upper- and lower-limit hysteresis overlaps.
- In case 3, the alarm is <u>always OFF</u>.

∗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.

Characteristics

Indication accuracy (at the temperature of 23°C)	Thermocouple: (±0.3 % of indication value or ±1°C, whichever is greater) ±1 digit max.∗1 Platinum resistance thermometer: (±0.2 % of indication value or ±0.8°C, whichever is greater) ±1 digit max. Analog input: ±0.2% FS ±1 digit max. CT input: ±5% FS ±1 digit max.	
Simple transfer output accuracy	±0.3% FS max.∗2	
Influence of temperature ∗3	Thermocouple input (R, S, B, C/W, PL II): (±1% of indication value or ±10°C, whichever is greater) ±1 digit max. Other thermocouple input: (±1% of indication value or ±4°C, whichever is greater) ±1 digit max. ∗4 Platinum resistance thermometer: (±1% of indication value or ±2°C, whichever is greater) ±1 digit max. Analog input: ±1% FS ±1 digit max. CT input: ±5% FS ±1 digit max.	
Influence of voltage ∗3		
Influence of EMS. (at EN 61326-1)		
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	−1,999 to 9,999 (decimal point position depends on input type)	
Influence of signal source resistance	Thermocouple: 0.1°C/Ω max. (100 Ω max.), Platinum resistance thermometer: 0.1°C/Ω max. (10 Ω max.)	
Insulation resistance	20 MΩ min. (at 500 VDC)	
Dielectric strength	100 to 240 VAC: 3,000 VAC, 50/60 Hz for 1 min between terminals of different charge 24 VAC/DC: 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
	Resistance	10 to 55 Hz, 20 m/s² for 2 hr 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	Controller: Approx. 80 g, Mounting Adapter: Approx. 4 g × 2	
Degree of protection	Front panel: IP66, Rear case: IP20, Terminals: IP00	
Memory protection	Non-volatile memory (number of writes: 1,000,000 times)	
Setup Tool	CX-Thermo version 4.62 or higher	
Setup Tool port	E5GC side panel: An E58-CIFQ2 USB-Serial Conversion Cable is used to connect a USB port on the computer. ∗6 E5GC bottom panel: An E58-CIFQ2 USB-Serial Conversion Cable and E58-CIFQ2-E Conversion Cable are used together to connect a USB port on the computer. ∗6	
Standards	**Approved standards**	cULus: UL 61010-1/CSA C22.2 No.61010-1, Korean wireless regulations (Radio law: KC Mark) (Some models only.) ∗7, EAC
	Conformed standards	EN 61010-1 (IEC 61010-1), RCM
EMC	EMI: EN61326-1 ∗8 Radiated Interference Electromagnetic Field Strength: EN55011 Group 1, class A Noise Terminal Voltage: EN55011 Group 1, class A EMS: EN61326-1 ∗8 ESD Immunity: EN61000-4-2 Electromagnetic Field Immunity: EN61000-4-3 Burst Noise Immunity: EN61000-4-4 Conducted Disturbance Immunity: EN61000-4-6 Surge Immunity: EN61000-4-5 Voltage Dip/Interrupting Immunity: EN61000-4-11	

∗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 temperature is ±2°C ±1 digit max. The indication accuracy of B thermocouples 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 R and S thermocouples at a temperature of 200°C max. is ±3°C ±1 digit max. The indication accuracy of C/W thermocouples is (±0.3% of PV or ±3°C, whichever is greater) ±1 digit max.
The indication accuracy of PLII thermocouples is (±0.3% of PV or ±2°C, whichever is greater) ±1 digit max.
∗2. However, the precision between 0 and 4 mA for a 0 to 20 mA output is ±1% FS 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 serial communications (RS-485) and USB-Serial Conversion Cable communications can be used at the same time.
∗7. Refer to your OMRON website for the most recent information on applicable models.
∗8. Industrial electromagnetic environment (EN/IEC 61326-1 Table 2)

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USB-Serial Conversion Cable

Applicable OS	Windows XP/Vista/7/8/10 *1
Applicable software	CX-Thermo version 4.62 or higher
Applicable models	E5□C-T Series, E5□C Series, and E5CB Series
USB interface standard	Conforms to USB Specification 2.0
DTE speed	38,400 bps
Connector specifications	Computer: USB (Type A plug) Digital Temperature Controller: Special serial connector
Power supply	Bus power (Supplied from the USB host controller) *2
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.

*1. CX-Thermo version 4.65 or higher runs on Windows 10.
*2. 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 *	9,600, 19,200, 38,400, or 57,600 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 with 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 Digital Temperature Controllers: 32 max. (Up to 16 for the FX Series) Applicable PLCs
	OMRON PLCs — CS Series, CJ Series, CP Series, NJ Series, or NX1P
	Mitsubishi Electric PLCs — MELSEC Q Series, L Series, FX3 Series, or iQ-R Series
	KEYENCE PLCs — KEYENCE KV Series

Component Communications	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 *	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.

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KEYENCE is a registered trademark of Keyence Corporation.
* Both the programless communications and the component communications support the copying.

Current Transformer (Order Separately) Ratings

	E54-CT1 E54-CT3	E54-CT1L E54-CT3L
Dielectric strength	1,000 VAC for 1 min	1,500 VAC for 1 min
Vibration resistance	50 Hz, 98 m/s²	
Weight	E54-CT1: Approx. 11.5 g E54-CT3: Approx. 50 g	E54-CT1L: Approx. 14 g E54-CT3L: Approx. 57 g
Accessories	E54-CT3 Only Armatures (2) Plugs (2)	None

Heater Burnout Alarms and SSR Failure Alarms

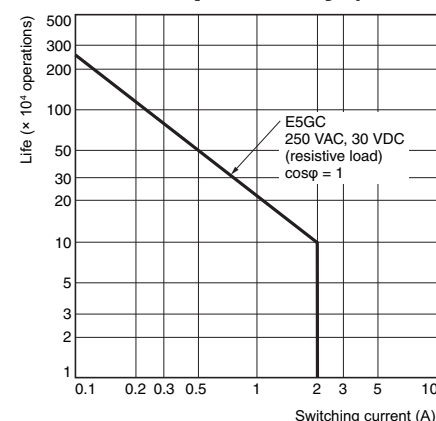|	
CT input (for heater current detection)	Models with detection for single-phase heaters: One input
Maximum heater current	50 A AC
Input current indication accuracy	±5% FS ±1 digit max.
Heater burnout alarm setting range *1	0.1 to 49.9 A (in units of 0.1 A) Minimum detection ON time: 100 ms *3
SSR failure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

*1. For heater burnout alarms, the heater current will be measured when the control output is ON, and the output will turn ON if the heater current is lower than the set value (i.e., heater burnout detection current value).
*2. For SSR failure alarms, the heater current will be measured when the control output is OFF, and the output will turn ON if the heater current is higher than the set value (i.e., SSR failure detection current value).
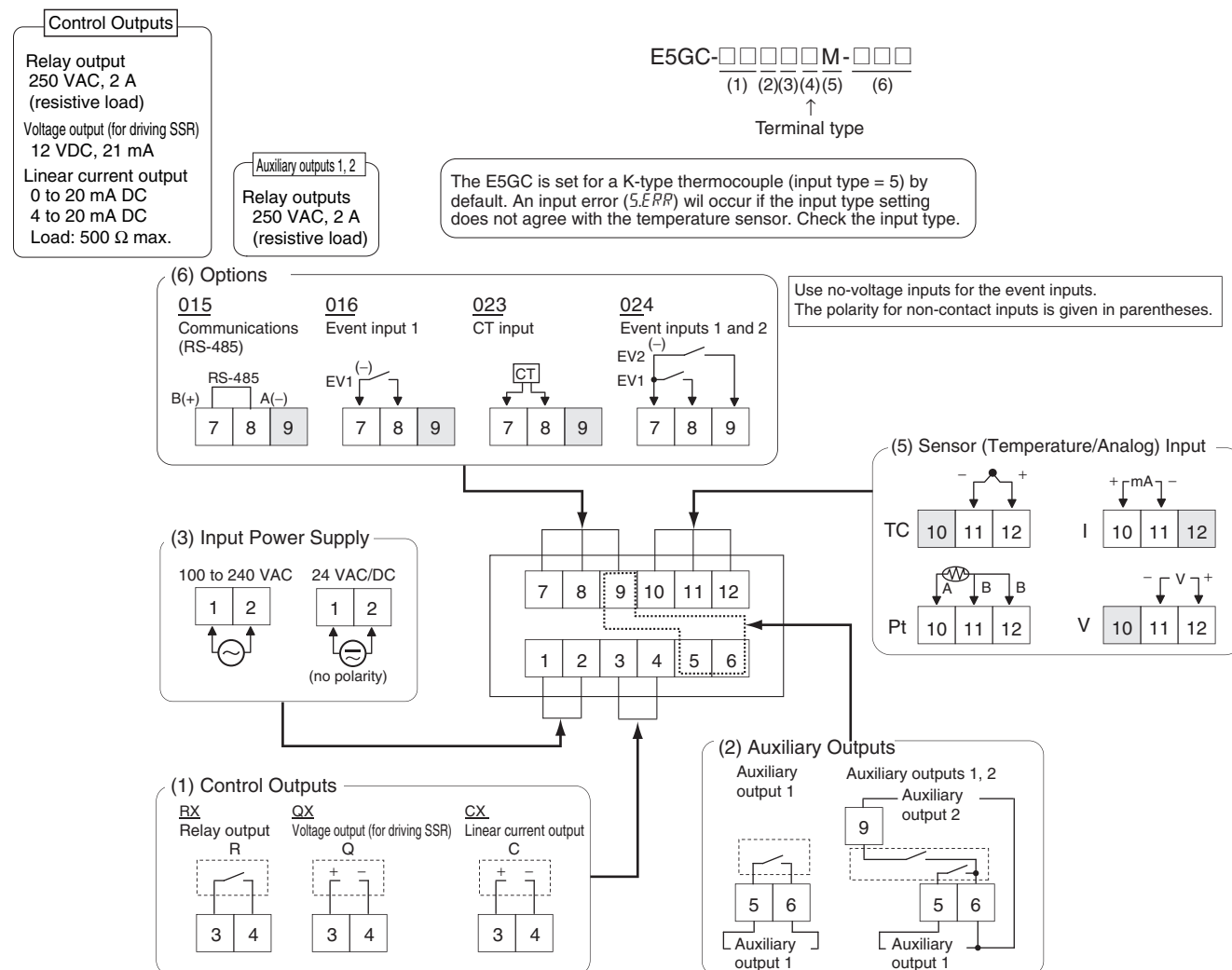*3. The value is 30 ms for a control period of 0.1 s or 0.2 s.
*4. The value is 35 ms for a control period of 0.1 s or 0.2 s.

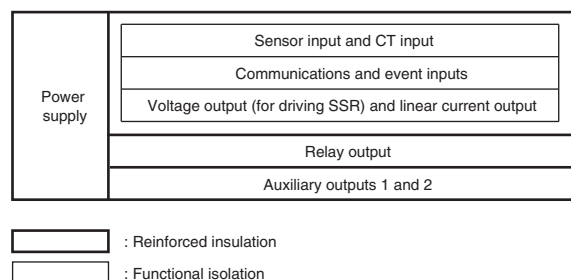## Electrical Life Expectancy Curve for Control Output Relay (Reference Values)

External Connections

E5GC

Control Outputs

Relay output
250 VAC, 2 A
(resistive load)

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

Linear current output
0 to 20 mA DC
4 to 20 mA DC
Load: 500 Ω max.

Auxiliary outputs 1, 2

Relay outputs
250 VAC, 2 A
(resistive load)

E5GC-□□□□M-□□□
(1) (2)(3)(4)(5) (6)
↑
Terminal type

The E5GC is set for a K-type thermocouple (input type = 5) by default. An input error (5.ERR) wil occur if the input type setting does not agree with the temperature sensor. Check the input type.

(6) Options

Use no-voltage inputs for the event inputs.
The polarity for non-contact inputs is given in parentheses.

015 Communications (RS-485)
RS-485
B(+) A(−)
| 7 | 8 | 9 |

016 Event input 1
EV1 (−)
| 7 | 8 | 9 |

023 CT input
CT
| 7 | 8 | 9 |

024 Event inputs 1 and 2
EV2 (−)
EV1
| 7 | 8 | 9 |

(5) Sensor (Temperature/Analog) Input

TC
| 10 | 11 | 12 |

I
| 10 | 11 | 12 |

Pt
| 10 | 11 | 12 |

V
| 10 | 11 | 12 |

(3) Input Power Supply

100 to 240 VAC
| 1 | 2 |

24 VAC/DC
| 1 | 2 |
(no polarity)

| 7 | 8 | 9 | 10 | 11 | 12 |
| 1 | 2 | 3 | 4 | 5 | 6 |

(2) Auxiliary Outputs

Auxiliary output 1
| 5 | 6 |
Auxiliary output 1

Auxiliary outputs 1, 2
Auxiliary output 2
| 9 |
| 5 | 6 |
Auxiliary output 1

(1) Control Outputs

RX Relay output
R
| 3 | 4 |

QX Voltage output (for driving SSR)
Q
| 3 | 4 |

CX Linear current output
C
| 3 | 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 30 m or less.
If the cable length exceeds 30 m, compliance with EMC standards will not be possible.
4. Connect M3 crimped terminals.
5. Due to UL Listing requirements, use the E54-CT1L or E54-CT3L Current Transformer with the factory wiring (internal wiring).
Use a UL category XOBA or XOBA7 current transformer that is UL Listed for field wiring (external wiring) and not the factory wiring (internal wiring).

Isolation/Insulation Block Diagrams

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

: Reinforced insulation
: Functional isolation

Note: Auxiliary outputs 1 to 2 are not insulated.

E5GC

Terminal Block Appearance

E5GC-□6
Controllers with Screw Terminal Blocks (M3 Screws)

E5GC-□C
Controllers with Screwless Clamp Terminal Blocks
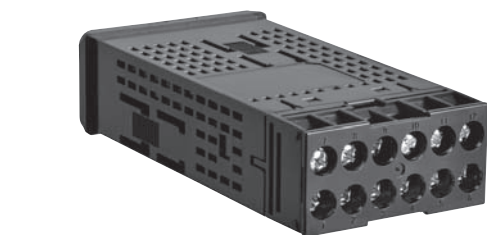
Controllers with Screw Terminal Blocks
- Terminal type: Forked or round crimped terminals
- Tightening torque for all terminals: 0.43 to 0.58 N·m

5.8 mm max.

5.8 mm max.
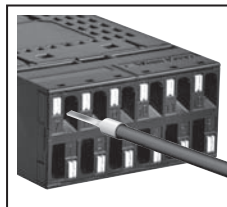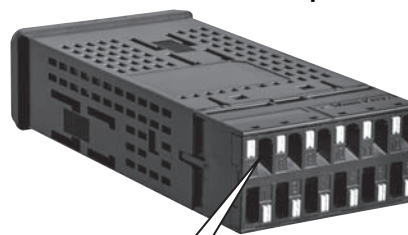
Controllers with Screwless Clamp Terminals Blocks
- Wire stripping length: 8 to 12 mm
- Ferrules: 8 to 12 mm

0.8 to 1.4 mm

8 to 12 mm

8 to 12 mm
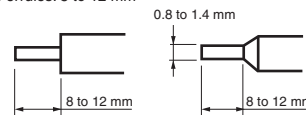
Wires: AWG24 to AWG18 (equal to a cross-sectional area of 0.21 to 0.82 mm^2) braided or solid wires

Note: Refer to *Precautions When Wiring E5GC (Controllers with Screwless Clamp Terminal Blocks)* on page 132 for information on wiring Controllers with screwless clamp terminal blocks.

Nomenclature

E5GC

Front panel

Temperature unit

No. 1 display

PV or specified parameter

No.2 display

SP or specified parameter value

Left Side View of the E5GC

Left-panel Setup Tool port

Bottom View of E5GC

Operation indicators

Press ▢ Key once to go to Adjustment Level.

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

Use the ⊙ Key to change to another parameter.

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

Use the ⌃ ⌄ Keys to set the parameter.

Bottom-panel Setup Tool port

Dimensions

Controllers

E5GC-□6
Controllers with Screw Terminal Blocks

Waterproof Packing (Accessory, Y92S-P12 (also available for ordering separately))
Mounting Adapter (Accessory, Y92F-53 (also available for ordering separately))
Terminal Cover (Accessory, E53-COV27 (also available for ordering separately))

63.6
48
24
4
90
1
40.8
22
44.8
22

- Use two Mounting Adapters, either on the top and bottom or on the right and left.
- Setup Tool ports are provided as standard feature. Use these ports to connect a computer to the Digital Temperature Controller. The E58-CIFQ2 USB-Serial Conversion Cable is required to connect to the port on the side panel. The E58-CIFQ2 USB-Serial Conversion Cable and E58-CIFQ2-E Communications Conversion Cable are required to connect to the port on the bottom panel. (You cannot leave either port connected constantly during operation.)
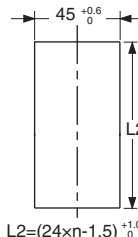
Mounted Separately   Horizontally Group Mounted

L1

$22.2^{+0.3}_{0}$

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

$22.2^{+0.3}_{0}$

$L1=(48 \times n-2.5)^{+1.0}_{0}$

n: Number of mounted Controllers (2 ≤ n ≤ 6)

To mount the Temperature Controller so that it is waterproof, insert the Waterproof Packing onto the Temperature Controller. Group mounting does not allow waterproofing.

- To install the Temperature Controller, insert it into a square hole in a panel with a thickness of 1 to 8 mm, and then insert the enclosed adapter so that it locks into the grooves on the top and bottom or on the left and right of the rear case.
- Tighten the two mounting screws on the top and bottom or on the right and left of the Mounting Adapters alternately little by little to maintain a balance, and tighten them to a torque of between 0.29 and 0.39 N·m.
- When two or more Temperature Controllers are mounted, make sure that the surrounding temperature does not exceed the allowable operating temperature range given below.
    Horizontal group mounting: −10 to 55°C
- Use Temperature Controllers with Screwless Clamp Terminal Blocks for vertical group mounting.

E5GC-□C
Controllers with Screwless Clamp Terminal Blocks
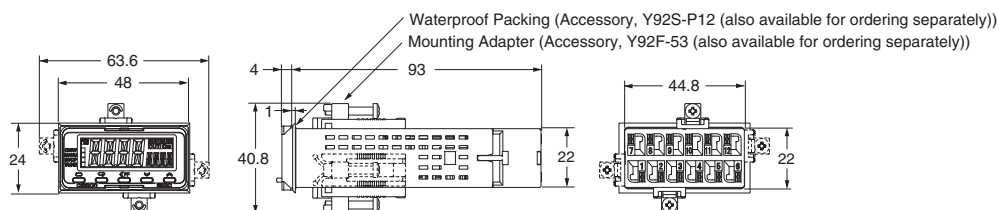
Waterproof Packing (Accessory, Y92S-P12 (also available for ordering separately))
Mounting Adapter (Accessory, Y92F-53 (also available for ordering separately))

63.6
48
24
4
93
1
40.8
22
44.8
22

- Use two Mounting Adapters, either on the top and bottom or on the right and left.
- Setup Tool ports are provided as standard feature. Use these ports to connect a computer to the Digital Temperature Controller. The E58-CIFQ2 USB-Serial Conversion Cable is required to connect to the port on the side panel. The E58-CIFQ2 USB-Serial Conversion Cable and E58-CIFQ2-E Communications Conversion Cable are required to connect to the port on the bottom panel. (You cannot leave either port connected constantly during operation.)
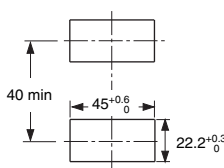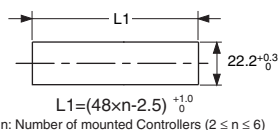
Mounted Separately   Horizontally Group Mounted   Vertically Group Mounted

L1 $45^{+0.6}_{0}$

$22.2^{+0.3}_{0}$

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

$22.2^{+0.3}_{0}$

$L1=(48 \times n-2.5)^{+1.0}_{0}$

n: Number of mounted Controllers (2 ≤ n ≤ 6)

L2

$L2=(24 \times n-1.5)^{+1.0}_{0}$

To mount the Temperature Controller so that it is waterproof, insert the Waterproof Packing onto the Temperature Controller. Group mounting does not allow waterproofing.

- To install the Temperature Controller, insert it into a square hole in a panel with a thickness of 1 to 8 mm, and then insert the enclosed adapter so that it locks into the grooves on the top and bottom or on the left and right of the rear case.
- Tighten the two mounting screws on the top and bottom or on the right and left of the Mounting Adapters alternately little by little to maintain a balance, and tighten them to a torque of between 0.29 and 0.39 N·m.
- When two or more Temperature Controllers are mounted, make sure that the surrounding temperature does not exceed the allowable operating temperature range given below.
    Horizontal group mounting: −10 to 55°C
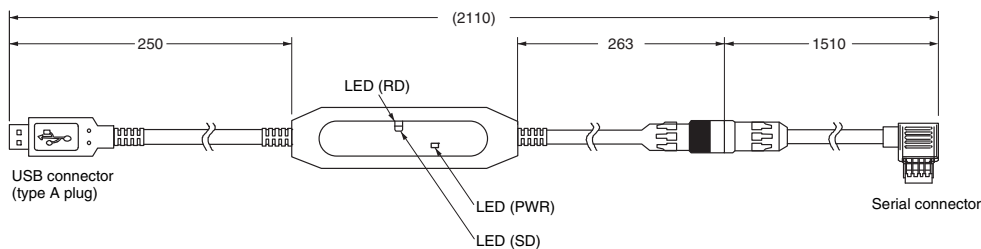   Vertical group mounting of two Controllers: −10 to 45°C
    Vertical group mounting of three or more Controllers: −10 to 40°C
- If you use vertical group mounting, you cannot draw out the interior body of the Controller.

E5GC

Accessories (Order Separately)
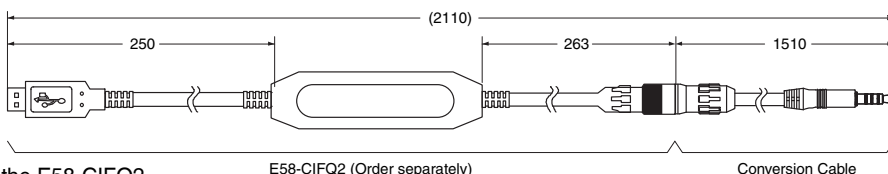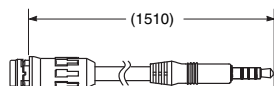
USB-Serial Conversion Cable
E58-CIFQ2

USB connector (type A plug)

LED (RD)
LED (PWR)
LED (SD)

Serial connector

(2110)
250
263
1510

Conversion Cable
E58-CIFQ2-E

Conversion Cable

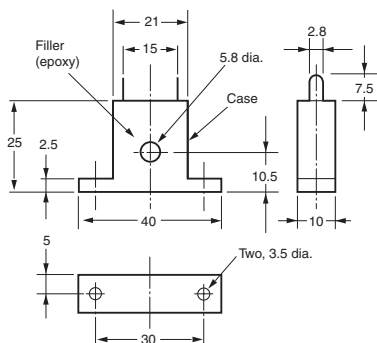Connecting to the E58-CIFQ2 USB-Serial Conversion Cable

(1510)

(2110)
250
263
1510

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

E58-CIFQ2 (Order separately)
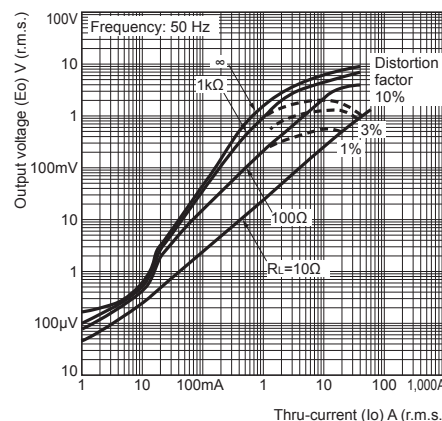
Conversion Cable

Current Transformers

E54-CT1

Filler (epoxy)
Case

21
15
5.8 dia.
2.8
7.5
25
2.5
10.5
40
10
Two, 3.5 dia.
5
30

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

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

Output voltage (Eo) V (r.m.s.)

Frequency: 50 Hz
∞
1kΩ
Distortion factor
10%
3%
1%
100Ω
R_L=10Ω

100V
10
1
100mV
10
1
100μV
10

1   10   100mA   1   10   100 1,000A

Thru-current (Io) A (r.m.s.)

E54-CT1L

8
21
15
Cable (AWG18)
115±5
(12)
Shrinkable tube
Case (PBT)
5.8 dia.
Filler (epoxy)
Mark (yellow)
25
2.5
10.5
40
10
Two, 3.5 dia.
5
30

Ramco Innovations   800-328-6236   www.ramcoi.com

E54-CT3

Filler (epoxy)
30
12 dia.
Case (PBT)
40 × 40
40
2.36 dia.
9
15

8
30
Two, M3 (depth: 4)
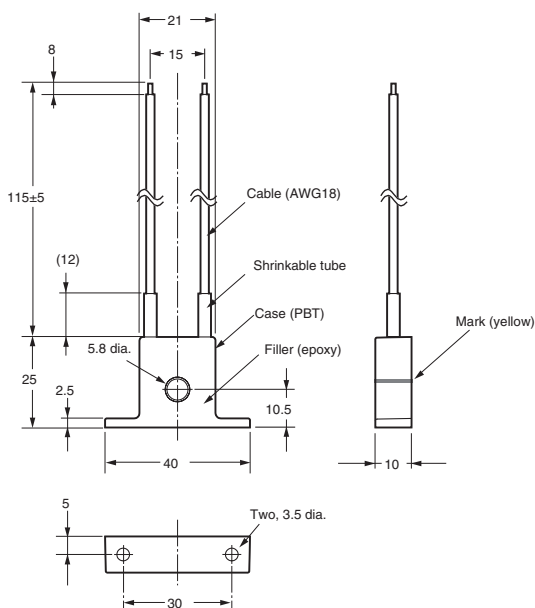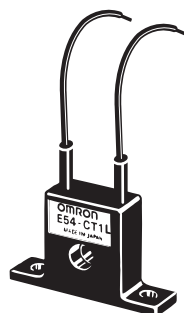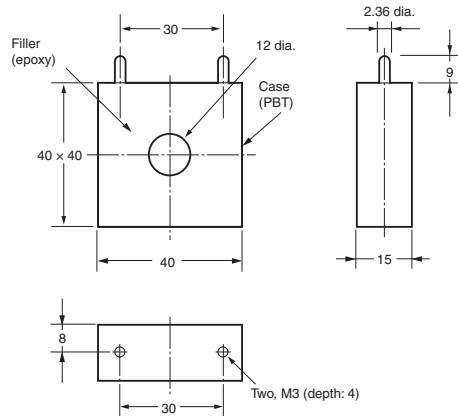
E54-CT3 Accessories
• **Armature**

Approx. 3 dia.
18

Connection Example

Plug
Armature
Lead

• **Plug**

Approx. 6 dia.
(22)
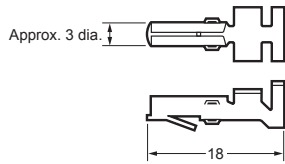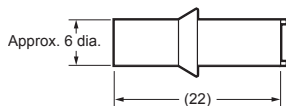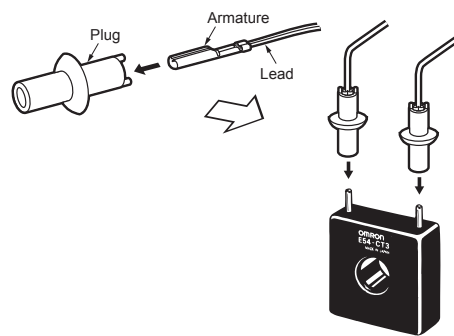
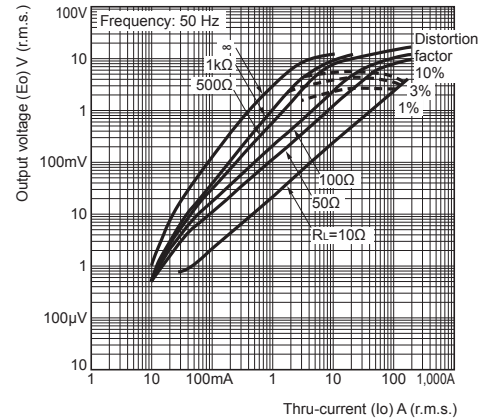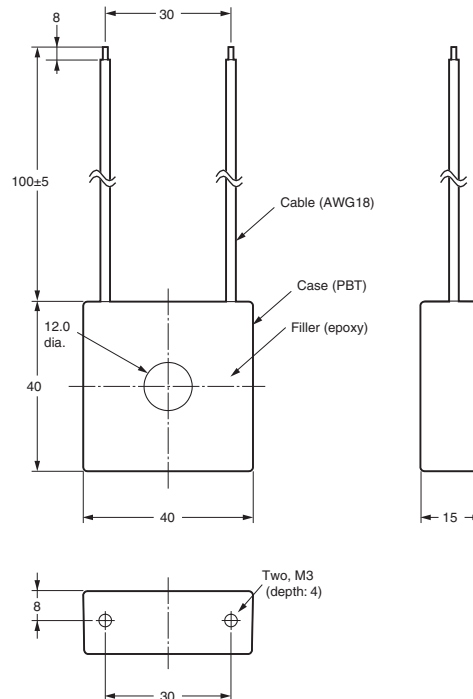**Thru-current (Io) vs. Output Voltage (Eo) (Reference Values)**
E54-CT3 or E54-CT3L

Maximum continuous heater current: 120 A (50/60 Hz)
(Maximum continuous heater current for an OMRON Digital Temperature Controller is 50 A.)

Number of windings:	400±2
Winding resistance:	8±0.8 Ω

Output voltage (E_o) V (r.m.s.)

100V
10
1
100mV
10
100µV
10

Frequency: 50 Hz
∞
1kΩ
500Ω
Distortion factor
10%
3%
1%
100Ω
50Ω
R_L=10Ω

1   10   100mA   1   10   100   1,000A

Thru-current (Io) A (r.m.s.)

E54-CT3L

8
30
100±5
Cable (AWG18)
Case (PBT)
12.0 dia.
Filler (epoxy)
40
40
15

Two, M3 (depth: 4)
8
30

E5GC

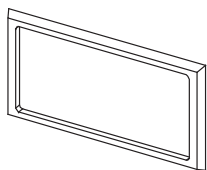## Mounting Adapter
Y92F-53 (Two provided.)

One pair is provided with the Temperature Controller. Order the Mounting Adapter separately if it becomes lost or damaged.
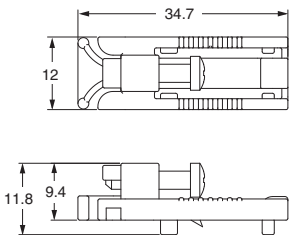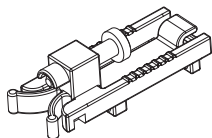
Waterproof Packing
Y92S-P12

The Waterproof Packing is provided with the Temperature 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.)
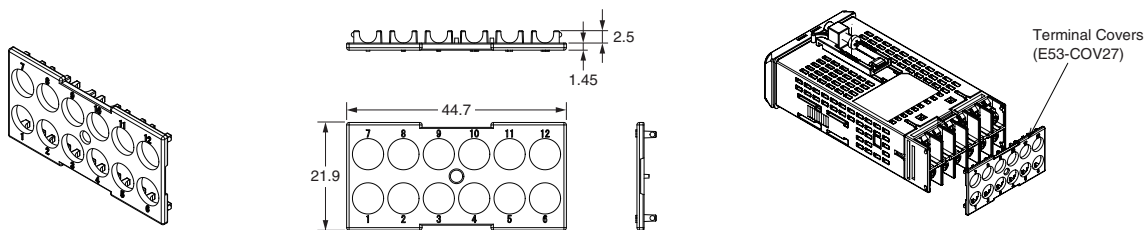
Draw-out Jig
Y92F-55

Use this Draw-out Jig to remove the interior body of the Digital Temperature Controller from the case to perform maintenance without removing the terminal wiring.
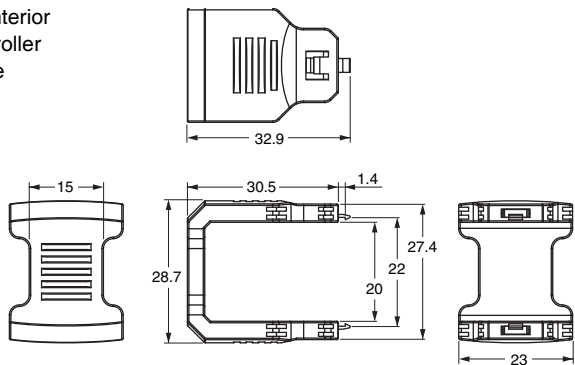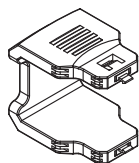
Terminal Covers
E53-COV27

The Terminal Covers is provided with the Digital Temperature Controller. Order the Terminal Covers separately if it becomes lost or damaged.

Terminal Covers (E53-COV27)

OMRON

MEMO