

Digital Temperature Controller

E5GC (48 × 24 mm)

Easy Operation and High Performance of the E5□C Series in a Compact 48 × 24-mm Body

- 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).



* CSA conformance evaluation by UL.



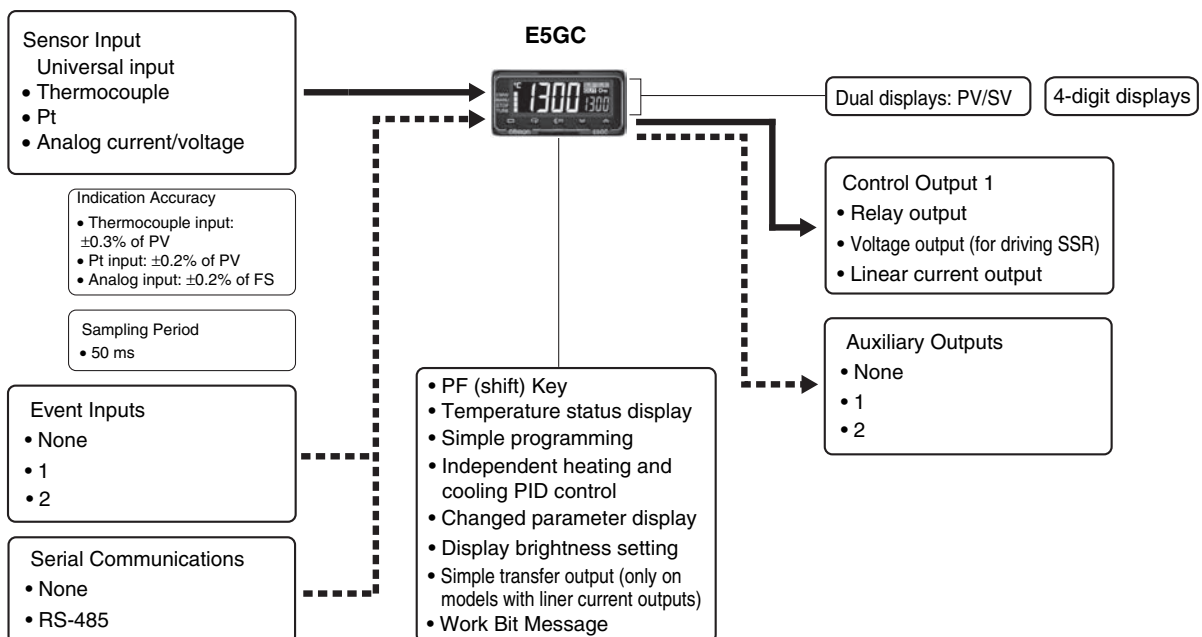
48 × 24 mm Models with Screw Terminal Blocks E5GC-□6

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



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 | ① | ② | ③ | ④ | ⑤ | ⑥ | Meaning | | |
|-------|-------------------------|--------------------------|----------------------|---------------|------------|---------|------------------------------------|-------------------------|---------------------|
| | Control outputs 1 and 2 | No. of auxiliary outputs | Power supply voltage | Terminal type | Input type | Options | | | |
| 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.

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

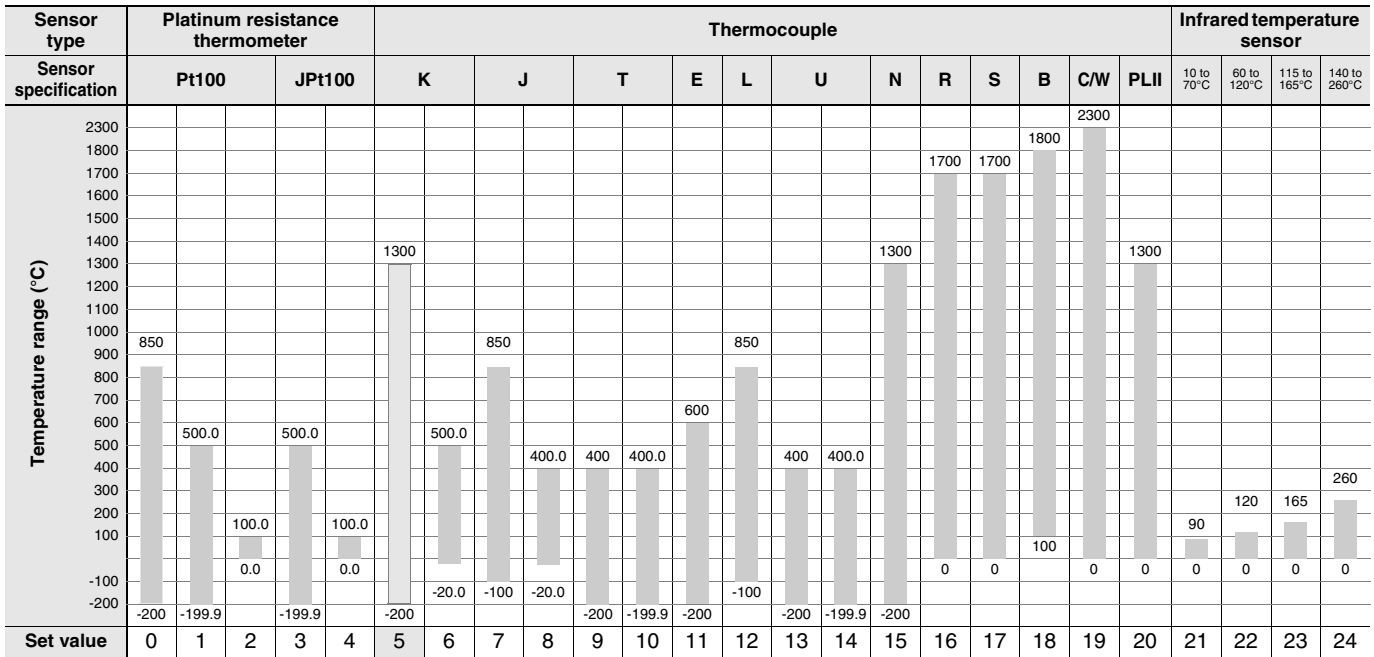
Ratings

| | | |
|--------------------------------------|--|---|
| 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.

Input Ranges

Thermocouple/Platinum Resistance Thermometer (Universal inputs)



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

JPt100: JIS C 1604-1989, JIS C 1606-1989

L: Fe-CuNi, DIN 43710-1985

Pt100: JIS C 1604-1997, IEC 60751

U: Cu-CuNi, DIN 43710-1985

PL II: According to Platinel II electromotive force charts from BASF (previously Engelhard)

C/W: W5Re/W26Re, JIS C 1602-2015, ASTM E988-1990

Analog input




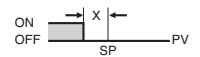
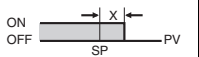
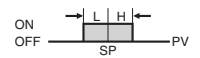
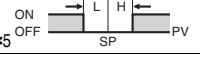
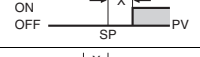
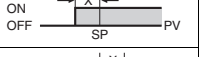
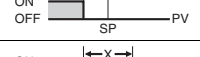
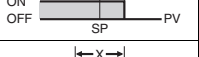
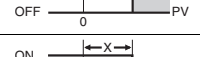
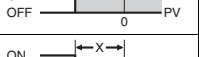
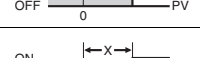
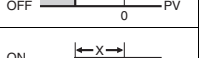
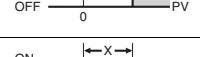

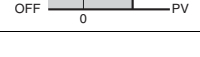
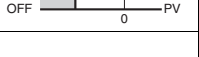
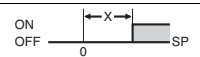
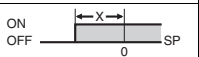
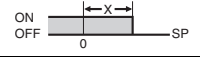
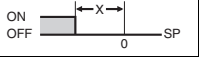
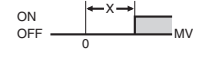
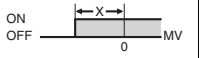
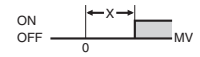
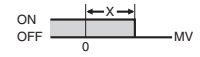

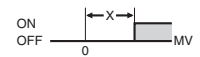
| Input type | Current | | Voltage | | |
|---------------------|---|------------|----------|----------|-----------|
| Input specification | 4 to 20 mA | 0 to 20 mA | 1 to 5 V | 0 to 5 V | 0 to 10 V |
| Setting range | Usable in the following ranges by scaling: -1999 to 9999, -199.9 to 999.9, -19.99 to 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.)

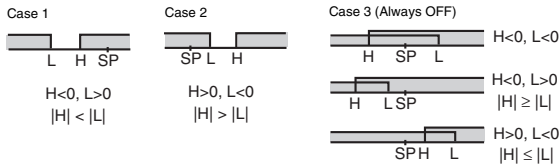
Auxiliary outputs are allocated to alarms. ON delays and OFF delays (0 to 999 s) can also be specified.

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.

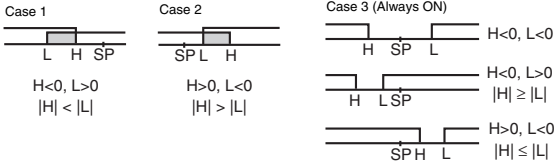
| Set value | Alarm type | Alarm output operation | | Description of function |
|-------------|--|---|---|--|
| | | When alarm value X is positive | When alarm value X is negative | |
| 0 | Alarm function OFF | Output OFF | | No alarm |
| 1 | Upper- and lower-limit *1 |  | *2 | Set the upward deviation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

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

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



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



*4. Set value: 5, Upper- and lower-limit with standby sequence For Upper- and Lower-Limit Alarm Described Above at *2

- In cases 1 and 2 above, the alarm is always OFF if the upper- and lower-limit hysteresis overlaps.
- In case 3, the alarm is always OFF.

*5. Set value: 5, Upper- and lower-limit alarm with standby sequence The alarm is always OFF if upper- and lower-limit hysteresis overlaps.

*6. Refer to the *E5GC Digital Temperature Controllers User's Manual* (Cat. No. H174) for information on the operation of the standby sequence.

*7. Refer to the *E5GC Digital Temperature Controllers User's Manual* (Cat. No. H174) for information on the LBA.

*8. Refer to the *E5GC 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: ($\pm 0.3\%$ of indication value or $\pm 1^\circ\text{C}$, whichever is greater) ± 1 digit max.*1 Platinum resistance thermometer: ($\pm 0.2\%$ of indication value or $\pm 0.8^\circ\text{C}$, whichever is greater) ± 1 digit max. Analog input: $\pm 0.2\%$ FS ± 1 digit max. CT input: $\pm 5\%$ FS ± 1 digit max. | |
| Simple transfer output accuracy | $\pm 0.3\%$ FS max.*2 | |
| Influence of temperature *3 | Thermocouple input (R, S, B, C/W, PL II): ($\pm 1\%$ of indication value or $\pm 10^\circ\text{C}$, whichever is greater) ± 1 digit max. Other thermocouple input: ($\pm 1\%$ of indication value or $\pm 4^\circ\text{C}$, whichever is greater) ± 1 digit max. *4 Platinum resistance thermometer: ($\pm 1\%$ of indication value or $\pm 2^\circ\text{C}$, whichever is greater) ± 1 digit max. | |
| Influence of voltage *3 | Analog input: $\pm 1\%$ FS ± 1 digit max. CT input: $\pm 5\%$ FS ± 1 digit max. | |
| 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/s ² for 10 min each in X, Y and Z directions |
| | Resistance | 10 to 55 Hz, 20 m/s ² for 2 hr each in X, Y, and Z directions |
| Shock | Malfunction | 100 m/s ² , 3 times each in X, Y, and Z directions |
| | Resistance | 300 m/s ² , 3 times each in X, Y, and Z directions |
| Weight | 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: Radiated Interference Electromagnetic Field Strength: EN61326-1 *8 Noise Terminal Voltage: EN55011 Group 1, class A EMS: ESD Immunity: EN61326-1 *8 Electromagnetic Field Immunity: EN61000-4-2 Burst Noise Immunity: EN61000-4-3 Conducted Disturbance Immunity: EN61000-4-4 Surge Immunity: EN61000-4-5 Voltage Dip/Interrupting Immunity: EN61000-4-6 | |

*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 $\pm 2^\circ\text{C} \pm 1$ 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 $\pm 3^\circ\text{C}$ max.

The indication accuracy of R and S thermocouples at a temperature of 200°C max. is $\pm 3^\circ\text{C} \pm 1$ digit max. The indication accuracy of C/W thermocouples is ($\pm 0.3\%$ of PV or $\pm 3^\circ\text{C}$, whichever is greater) ± 1 digit max.

The indication accuracy of PLII thermocouples is ($\pm 0.3\%$ of PV or $\pm 2^\circ\text{C}$, whichever is greater) ± 1 digit max.

*2. However, the precision between 0 and 4 mA for a 0 to 20 mA output is $\pm 1\%$ 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.: $\pm 10^\circ\text{C}$ 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)

USB-Serial Conversion Cable

| | |
|--------------------------------------|--|
| Applicable OS | Windows XP/Vista/7/8/8.1/10 *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 | <p>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)</p> <p>Applicable PLCs</p> <p>OMRON PLCs CS Series, CJ Series, CP Series, NJ Series, or NX1P</p> <p>Mitsubishi Electric PLCs MELSEC Q Series, L Series, FX3 Series, or iQ-R Series</p> <p>KEYENCE PLCs KEYENCE KV Series</p> | |
|-----------------------------------|--|--|

| | |
|---------------------------------|--|
| Component Communications | <p>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.</p> <p>Slope and offsets can be set for the set point.</p> <p>Number of connected Digital Temperature Controllers: 32 max. (including master)</p> |
| Copying * | <p>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.</p> |

MELSEC is a registered trademark of Mitsubishi Electric Corporation. 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/s ² | |
| 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 |

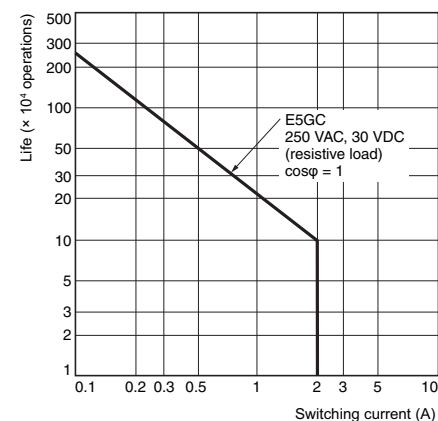
*1. For heater burnout alarms, the heater current will be measured when the control output is ON, and the output will turn ON if the heater current is lower than the set value (i.e., heater burnout detection current value).

*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.

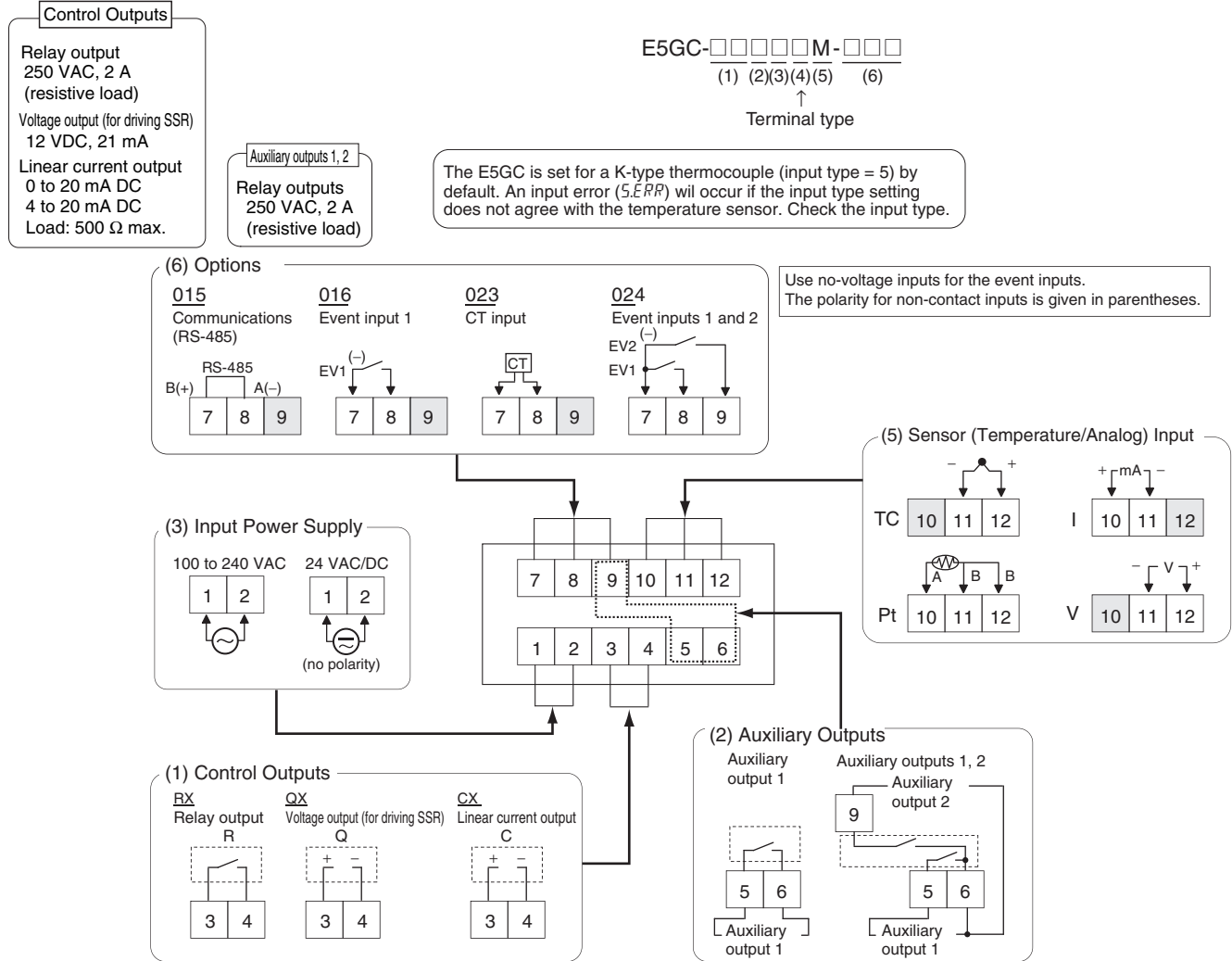
*4. The value is 35 ms for a control period of 0.1 s or 0.2 s.

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



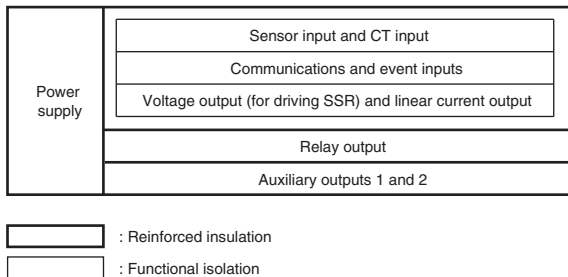
External Connections

E5GC



- 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

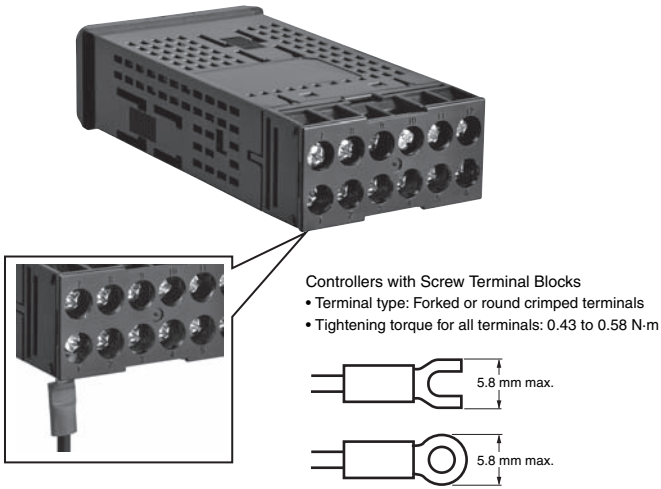


Note: Auxiliary outputs 1 to 2 are not insulated.

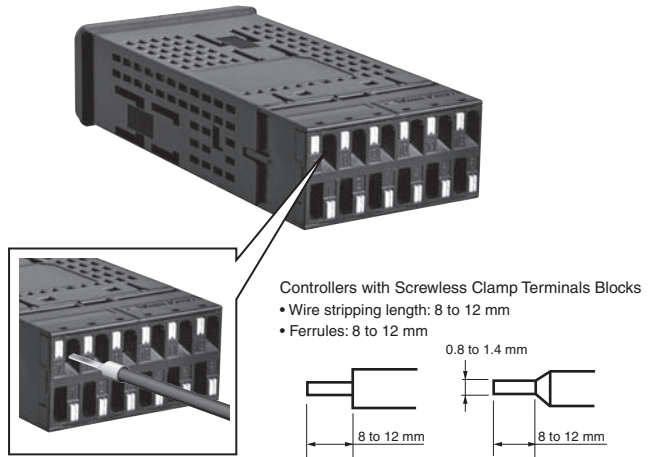
E5GC

Terminal Block Appearance

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



E5GC-□C
Controllers with Screwless Clamp Terminal Blocks

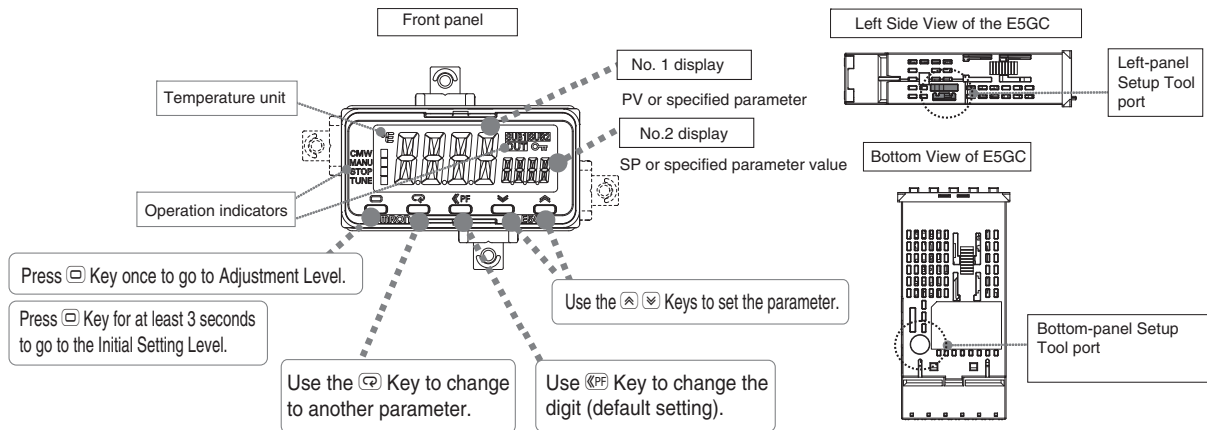


Wires: AWG24 to AWG18 (equal to a cross-sectional area of 0.21 to 0.82 mm²) braided or solid wires

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

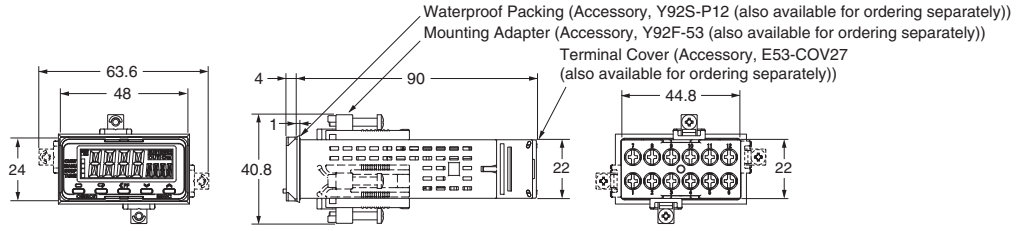
E5GC



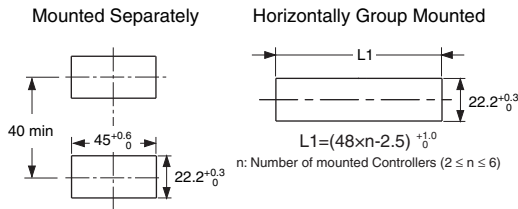
Dimensions

Controllers

E5GC-□6 Controllers with Screw Terminal Blocks



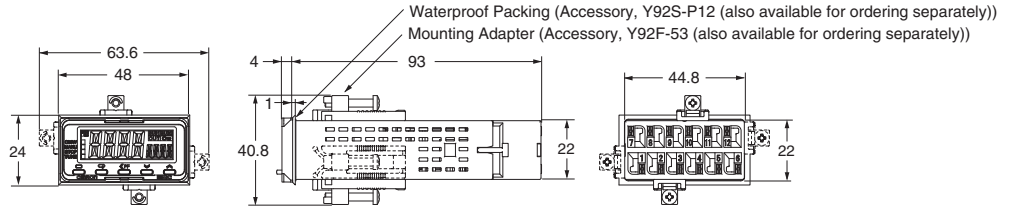
- Use two Mounting Adapters, either on the top and bottom or on the right and left.
- Setup Tool ports are provided as standard feature. Use these ports to connect a computer to the Digital Temperature Controller. The E58-CIFQ2 USB-Serial Conversion Cable is required to connect to the port on the side 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.)



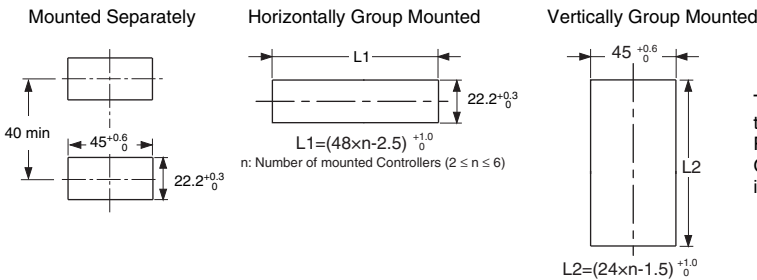
To mount the Temperature Controller so that it is waterproof, insert the Waterproof Packing onto the Temperature Controller. Group mounting does not allow waterproofing.

- 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



- 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.)



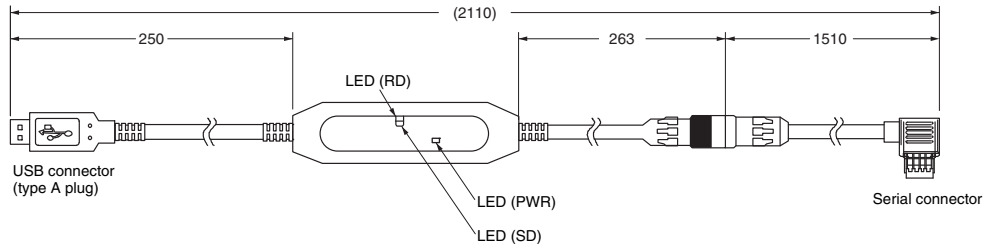
To mount the Temperature Controller so that it is waterproof, insert the Waterproof Packing onto the Temperature Controller. Group mounting does not allow waterproofing.

- 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)

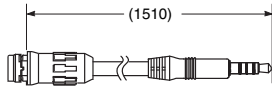
USB-Serial Conversion Cable E58-CIFQ2



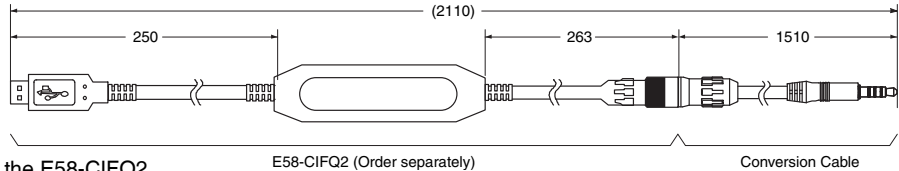
Conversion Cable

E58-CIFQ2-E

Conversion Cable



Connecting to the E58-CIFQ2 USB-Serial Conversion Cable



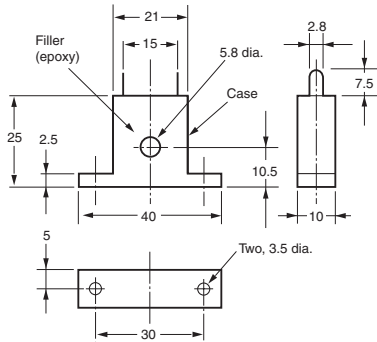
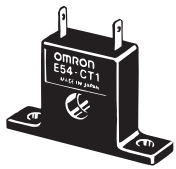
Note: Always use this product together with the E58-CIFQ2.

E58-CIFQ2 (Order separately)

Conversion Cable

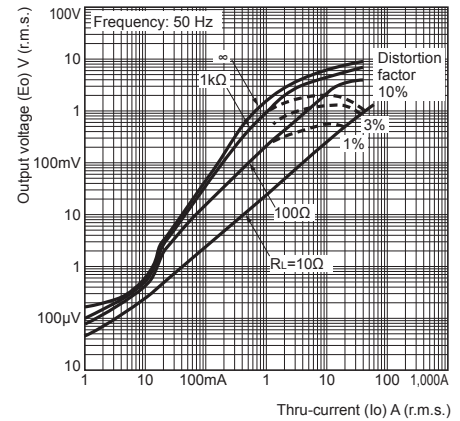
Current Transformers

E54-CT1

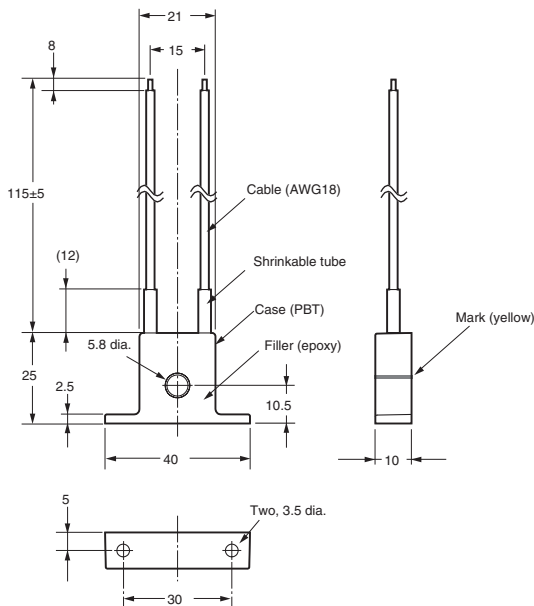


Thru-current (I_o) vs. Output Voltage (E_o) (Reference Values) E54-CT1 or E54-CT1L

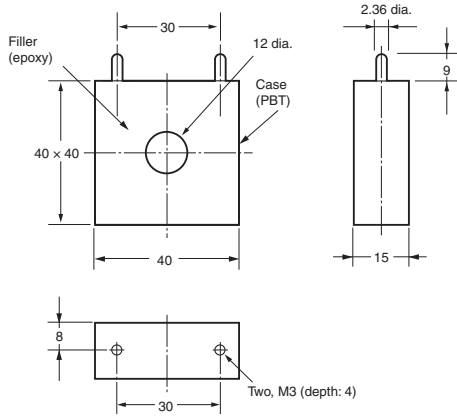
Maximum continuous heater current: 50 A (50/60 Hz)
Number of windings: 400±2
Winding resistance: 18±2 Ω



E54-CT1L

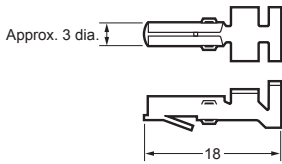


E54-CT3

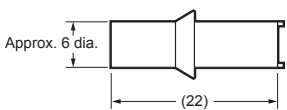


E54-CT3 Accessories

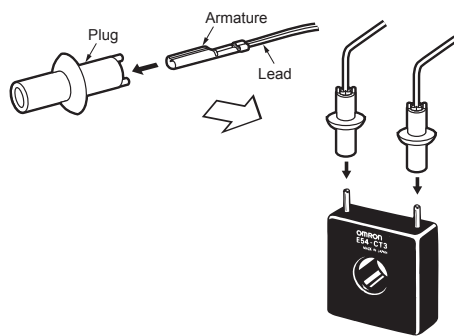
• **Armature**



• **Plug**

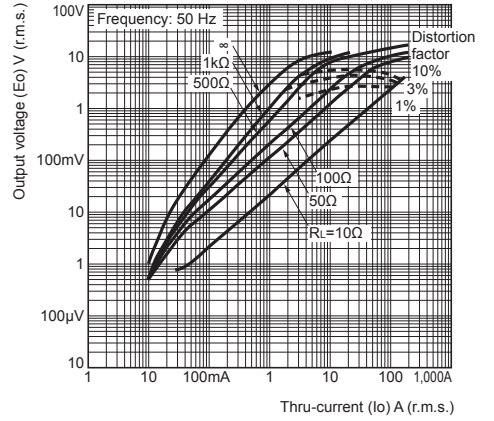


Connection Example

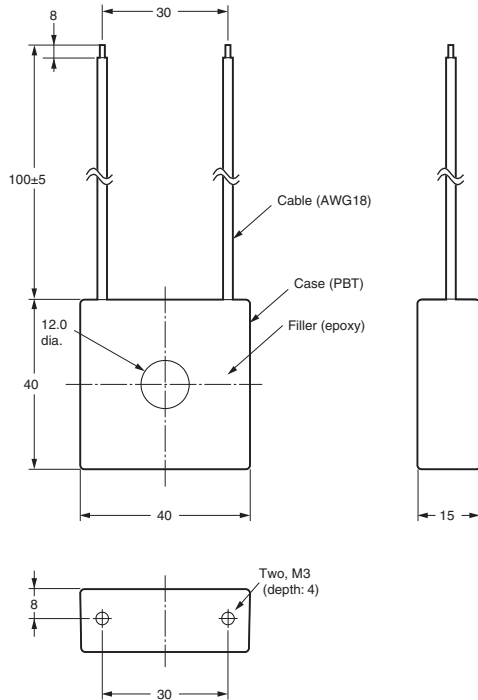


**Thru-current (I_o) vs. Output Voltage (E_o)
(Reference Values)
E54-CT3 or E54-CT3L**

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: $8 \pm 0.8 \Omega$

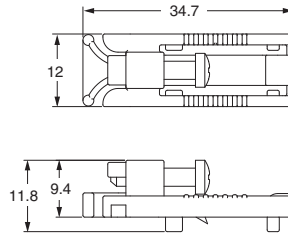
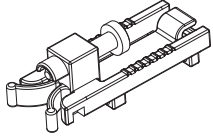


E54-CT3L

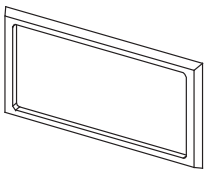


Mounting Adapter Y92F-53 (Two provided.)

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



Waterproof Packing Y92S-P12



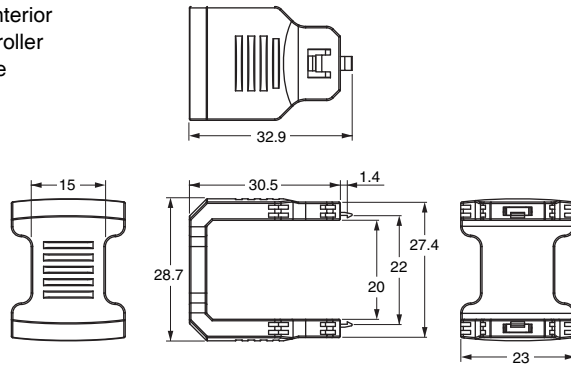
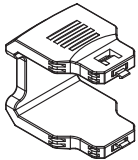
The Waterproof Packing is provided with the Temperature Controller. Order the Waterproof Packing separately if it becomes lost or damaged.

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.)

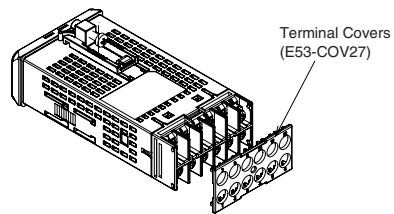
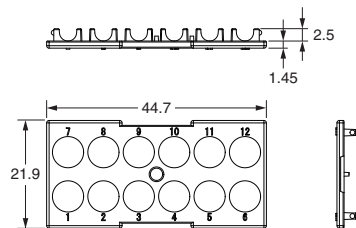
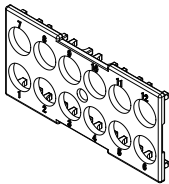
Draw-out Jig Y92F-55

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)