Basic-type Digital Temperature Controller

E5GN (48 x 24 mm)

CSM_E5GN_DS_E_5_1

New 48 x 24-mm Basic Temperature Controller with Enhanced Functions and Performance. Improved Indication Accuracy and Preventive Maintenance Function.

E5GN
Models with Screw Terminal Blocks
48 × 24 mm

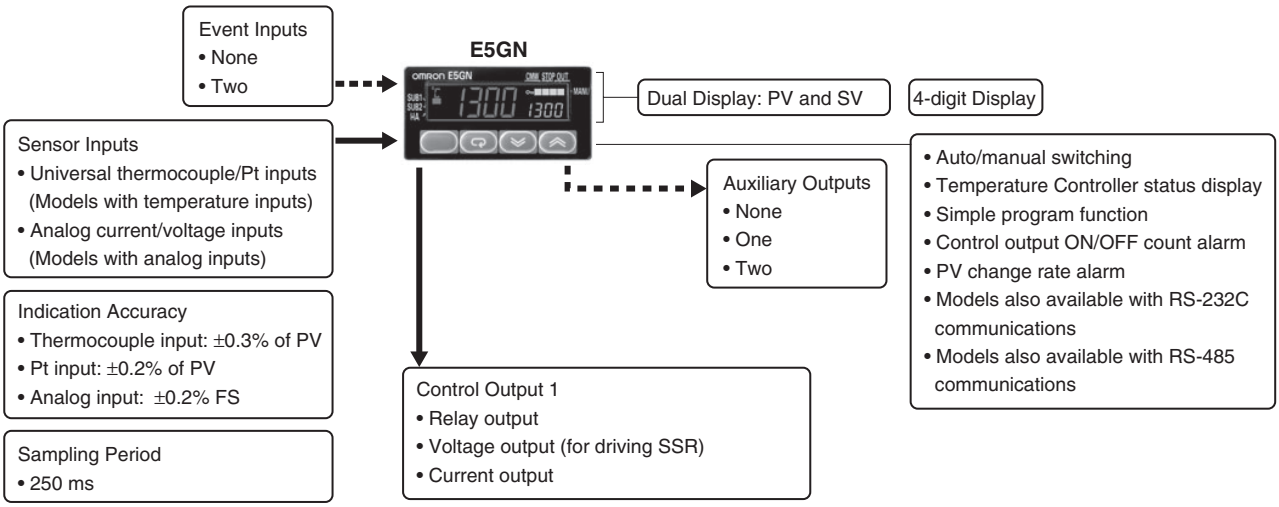
E5GN--□-C
Models with Screwless Clamp Terminal Blocks
48 × 24 mm

- Indication Accuracy
  Thermocouple input: ±0.3% of PV (previous models: ±0.5%)
  Pt input: ±0.2% of PV (previous models: ±0.5%)
  Analog input: ±0.2% FS (previous models: ±0.5%)
- Models are available with screw terminal blocks or screwless clamp terminal blocks.
- A PV/SV-status display function can be set to automatically alternate between displaying the status of the Temperature Controller (auto/manual, RUN/STOP, and alarms) and the PV or SV.
- Preventive maintenance for relays in the Temperature Controller using a Control Output ON/OFF Counter.
- Switch the PV display between three colors.
- Compatible with Support Software (CX-Thermo version 4.2 or higher).
- Eleven-segment displays.
- Models are available with one or two alarm outputs.

⚠ Refer to *Safety Precautions for E5□N/E5□N-H.*

Refer to *Operation for E5□N/E5□N-H* for operating procedures.

Main I/O Functions

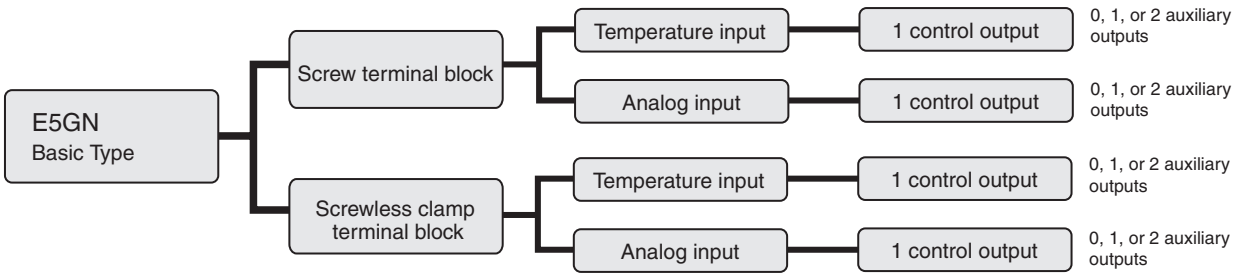


This datasheet is provided as a guideline for selecting products. Be sure to refer to the following user manuals for application precautions and other information required for operation before attempting to use the product.

E5CN/E5AN/E5EN/E5GN Digital Temperature Controllers User's Manual Basic Type (Cat. No. H156)

E5CN/E5AN/E5EN/E5GN Digital Temperature Controllers Communications Manual Basic Type (Cat. No. H158)

Lineup



Note: Models with one control output and one or two auxiliary outputs can be used for heating/cooling control.

Model Number Structure

Model Number Legend

Controllers

E5GN-□□□□□-□-□-□
1 2 3 4 5 6 7 8

1. **Control Output 1**
   R: Relay output
   Q: Voltage output (for driving SSR)
   C: Linear current output

2. **Auxiliary Outputs**
   Blank: None
   1: One output
   2: Two outputs

3. **Option**
   Blank: None
   01: RS-232C communications
   03: RS-485 communications
   B: Two event inputs
   H: Heater burnout/Heater short/Heater overcurrent detection (CT1)

4. **Input Type**
   T: Universal thermocouple/platinum resistance thermometer input
   L: Analog current/voltage input

5. **Power Supply Voltage**
   Blank: 100 to 240 VAC
   D: 24 VAC/VDC

6. **Terminal Type**
   Blank: Models with screw terminal block
   C: Models with screwless clamp terminal block

7. **Case Color**
   Blank: Black

8. **Communications Protocol**
   Blank: None
   FLK: CompoWay/F serial communications

Note: Models cannot be made for all combinations of options that are possible in the model number legend. Confirm model availability in *Ordering Information* before ordering.

✻ Auxiliary outputs are relay outputs that can be used for output alarms or processing results.

Supply Voltage Suffixes for Ordering

For 100 to 240 VAC, add a "AC100240" suffix.
For 24 VAC/VDC models, add a "ACDC24" suffix.

Ordering Information

Controllers with Screw Terminal Blocks

Models with Temperature Inputs

Models with One Control Output and a 100 to 240-VAC Power Supply (Add AC100240 to the Model number.)

Case color	Control output	Control mode ✻1	No. of auxiliary outputs	Detection of heater burnout, SSR failure, and heater overcurrent	No. of event inputs	Transfer output ✻2	Communi-cations	Previous model		New model
								Thermocou-ple input	Resistance thermome-ter input	
Black	Relay output	Standard	---	---	---	---	---	E5GN-RTC	E5GN-RP	**E5GN-RT**
		Standard or heating/ cooling	1					E5GN-R1TC	E5GN-R1P	**E5GN-R1T**
					2			---	---	**E5GN-R1BT**
					---		RS-232C	---	---	**E5GN-R101T-FLK**
							RS-485	E5GN -R03TC-FLK	E5GN -R03P-FLK	**E5GN-R103T-FLK**
			2	Detection for single-phase heaters			---	---	---	**E5GN-R2T**
								---	---	**E5GN-R2HT**
				---	2			---	---	**E5GN-R2BT**
					---		RS-485	---	---	**E5GN-R203T-FLK**
	Voltage output (for driving SSR)	Standard	---	---	---	---	---	E5GN-QTC	E5GN-QP	**E5GN-QT**
		Standard or heating/ cooling	1					E5GN-Q1TC	E5GN-Q1P	**E5GN-Q1T**
					2			---	---	**E5GN-Q1BT**
					---		RS-232C	---	---	**E5GN-Q101T-FLK**
							RS-485	E5GN -Q03TC-FLK	E5GN -Q03P-FLK	**E5GN-Q103T-FLK**
			2	Detection for single-phase heaters			---	---	---	**E5GN-Q2T**
								---	---	**E5GN-Q2HT**
				---	2			---	---	**E5GN-Q2BT**
					---		RS-485	---	---	**E5GN-Q203T-FLK**
	Current output	Standard or heating/ cooling	1	---	---	Transfer output using control output	---	---	---	**E5GN-C1T**
					2			---	---	**E5GN-C1BT**
					---		RS-232C	---	---	**E5GN-C101T-FLK**
							RS-485	---	---	**E5GN-C103T-FLK**

✻1. If heating/cooling control mode is used, an auxiliary output is used as a control output for the cooling side. The number of auxiliary outputs that can be used will decrease by one. Also, the signal for the control output for the cooling side will be a relay output.

✻2. A current control output can be used as the transfer output. In that case, an auxiliary output is used as the control output. (This is not possible for models without an auxiliary output.) The control output will be a relay output. The number of auxiliary outputs that can be used will decrease by one.

Models with One Control Output and a 24-VAC/VDC Power Supply (Add ACDC24 to the Model number.)

Case color	Control output	Control mode ✻1	No. of auxiliary outputs	Detection of heater burnout, SSR failure, and heater overcurrent	No. of event inputs	Transfer output ✻2	Communi-cations	Previous model		New model
								Thermocou-ple input	Resistance thermome-ter input	
Black	Relay output	Standard	---	---	---	---	---	E5GN-RTC	E5GN-RP	**E5GN-RTD**
		Standard or heating/ cooling	1					E5GN-R1TC	E5GN-R1P	**E5GN-R1TD**
					2			---	---	**E5GN-R1BTD**
					---		RS-232C	---	---	**E5GN -R101TD-FLK**
							RS-485	E5GN -R03TC-FLK	E5GN -R03P-FLK	**E5GN -R103TD-FLK**
			2				---	---	---	**E5GN-R2TD**
				Detection for single-phase heaters				---	---	**E5GN-R2HTD**
				---	2			---	---	**E5GN-R2BTD**
					---		RS-485	---	---	**E5GN -R203TD-FLK**
	Voltage output (for driving SSR)	Standard	---	---	---	---	---	E5GN-QTC	E5GN-QP	**E5GN-QTD**
		Standard or heating/ cooling	1					E5GN-Q1TC	E5GN-Q1P	**E5GN-Q1TD**
					2			---	---	**E5GN-Q1BTD**
					---		RS-232C	---	---	**E5GN-Q101TD-FLK**
							RS-485	E5GN -Q03TC-FLK	E5GN -Q03P-FLK	**E5GN -Q103TD-FLK**
			2				---	---	---	**E5GN-Q2TD**
				Detection for single-phase heaters				---	---	**E5GN-Q2HTD**
				---	2			---	---	**E5GN-Q2BTD**
					---		RS-485	---	---	**E5GN -Q203TD-FLK**
	Current output	Standard or heating/ cooling	1	---	---	Transfer output using control output	---	---	---	**E5GN-C1TD**
					2			---	---	**E5GN-C1BTD**
					---		RS-232C	---	---	**E5GN -C101TD-FLK**
							RS-485	---	---	**E5GN -C103TD-FLK**

✻1. If heating/cooling control mode is used, an auxiliary output is used as a control output for the cooling side. The number of auxiliary outputs that can be used will decrease by one. Also, the signal for the control output for the cooling side will be a relay output.

✻2. A current control output can be used as the transfer output. In that case, an auxiliary output is used as the control output. (This is not possible for models without an auxiliary output.) The control output will be a relay output. The number of auxiliary outputs that can be used will decrease by one.

Models with Analog Inputs

Models with One Control Output and a 100 to 240-VAC Power Supply (Add AC100240 to the Model number.)

Case color	Control output	Control mode ✻1	No. of auxiliary outputs	Detection of heater burnout, SSR failure, and heater overcurrent	No. of event inputs	Transfer output ✻2	Communi-cations	Previous model		New model
								Thermocou-ple input	Resistance thermome-ter input	
Black	Relay output	Standard or heating/ cooling	1	---	---	---	RS-485	---	---	**E5GN-R103L-FLK**
	Voltage output (for driving SSR)							---	---	**E5GN-Q103L-FLK**
	Current output					Transfer output using control output	---	---	---	**E5GN-C1L**

Note: Models with analog inputs do not display the temperature unit.

✻1. If heating/cooling control mode is used, an auxiliary output is used as a control output for the cooling side. The number of auxiliary outputs that can be used will decrease by one. Also, the signal for the control output for the cooling side will be a relay output.

✻2. A current control output can be used as the transfer output. In that case, an auxiliary output is used as the control output. (This is not possible for models without an auxiliary output.) The control output will be a relay output. The number of auxiliary outputs that can be used will decrease by one.

Models with One Control Output and a 24-VAC/VDC Power Supply (Add ACDC24 to the Model number.)

Case color	Control output	Control mode ✻1	No. of auxiliary outputs	Detection of heater burnout, SSR failure, and heater overcurrent	No. of event inputs	Transfer output ✻2	Communi-cations	Previous model		New model
								Thermocou-ple input	Resistance thermome-ter input	
Black	Relay output	Standard or heating/ cooling	1	---	---	---	RS-485	---	---	**E5GN-R103LD-FLK**
	Voltage output (for driving SSR)							---	---	**E5GN -Q103LD-FLK**
	Current output					Transfer output using control output	---	---	---	**E5GN-C1LD**

✻1. If heating/cooling control mode is used, an auxiliary output is used as a control output for the cooling side. The number of auxiliary outputs that can be used will decrease by one. Also, the signal for the control output for the cooling side will be a relay output.

✻2. A current control output can be used as the transfer output. In that case, an auxiliary output is used as the control output. (This is not possible for models without an auxiliary output.) The control output will be a relay output. The number of auxiliary outputs that can be used will decrease by one.

Controllers with Screwless Clamp Terminal Blocks

Models with Temperature Inputs

Models with One Control Output and a 100 to 240-VAC Power Supply (Add AC100240 to the Model number.)

Case color	Control output	Control mode ✻1	No. of auxiliary outputs	Detection of heater burnout, SSR failure, and heater overcurrent	No. of event inputs	Transfer output ✻2	Communications	Previous model		New model
								Thermocouple input	Resistance thermometer input	
Black	Relay output	Standard	---	---	---	---	---	E5GN-RTC	E5GN-RP	**E5GN-RT-C**
		Standard or heating/cooling	1					E5GN-R1TC	E5GN-R1P	**E5GN-R1T-C**
					2			---	---	**E5GN-R1BT-C**
					---		RS-232C	---	---	**E5GN -R101T-C-FLK**
							RS-485	E5GN -R03TC-FLK	E5GN -R03P-FLK	**E5GN -R103T-C-FLK**
			2				---	---	---	**E5GN-R2T-C**
				Detection for single-phase heaters			---	---	---	**E5GN-R2HT-C**
				---	2		---	---	---	**E5GN-R2BT-C**
					---		RS-485	---	---	**E5GN -R203T-C-FLK**
	Voltage output (for driving SSR)	Standard	---	---	---	---	---	E5GN-QTC	E5GN-QP	**E5GN-QT-C**
		Standard or heating/cooling	1					E5GN-Q1TC	E5GN-Q1P	**E5GN-Q1T-C**
					2			---	---	**E5GN-Q1BT-C**
					---		RS-232C	---	---	**E5GN -Q101T-C-FLK**
							RS-485	E5GN -Q03TC-FLK	E5GN -Q03P-FLK	**E5GN -Q103T-C-FLK**
			2				---	---	---	**E5GN-Q2T-C**
				Detection for single-phase heaters			---	---	---	**E5GN-Q2HT-C**
				---	2		---	---	---	**E5GN-Q2BT-C**
					---		RS-485	---	---	**E5GN -Q203T-C-FLK**
	Current output	Standard or heating/cooling	1		---	Transfer output using control output	---	---	---	**E5GN-C1T-C**
					2			---	---	**E5GN-C1BT-C**
					---		RS-232C	---	---	**E5GN -C101T-C-FLK**
							RS-485	---	---	**E5GN -C103T-C-FLK**

✻1. If heating/cooling control mode is used, an auxiliary output is used as a control output for the cooling side. The number of auxiliary outputs that can be used will decrease by one. Also, the signal for the control output for the cooling side will be a relay output.

✻2. A current control output can be used as the transfer output. In that case, an auxiliary output is used as the control output. (This is not possible for models without an auxiliary output.) The control output will be a relay output. The number of auxiliary outputs that can be used will decrease by one.

Models with One Control Output and a 24-VAC/VDC Power Supply (Add ACDC24 to the Model number.)

Case color	Control output	Control mode ✻1	No. of auxiliary outputs	Detection of heater burnout, SSR failure, and heater overcurrent	No. of event inputs	Transfer output ✻2	Communications	Previous model		New model
								Thermocouple input	Resistance thermometer input	
Black	Relay output	Standard	---	---	---	---	---	E5GN-RTC	E5GN-RP	**E5GN-RTD-C**
		Standard or heating/cooling	1					E5GN-R1TC	E5GN-R1P	**E5GN-R1TD-C**
					2			---	---	**E5GN-R1BTD-C**
					---		RS-232C	---	---	**E5GN -R101TD-C-FLK**
							RS-485	E5GN -R03TC-FLK	E5GN -R03P-FLK	**E5GN -R103TD-C-FLK**
			2				---	---	---	**E5GN-R2TD-C**
				Detection for single-phase heaters				---	---	**E5GN-R2HTD-C**
				---	2			---	---	**E5GN-R2BTD-C**
					---		RS-485	---	---	**E5GN -R203TD-C-FLK**
	Voltage output (for driving SSR)	Standard	---	---	---	---	---	E5GN-QTC	E5GN-QP	**E5GN-QTD-C**
		Standard or heating/cooling	1					E5GN-Q1TC	E5GN-Q1P	**E5GN-Q1TD-C**
					2			---	---	**E5GN-Q1BTD-C**
					---		RS-232C	---	---	**E5GN -Q101TD-C-FLK**
							RS-485	E5GN -Q03TC-FLK	E5GN -Q03P-FLK	**E5GN -Q103TD-C-FLK**
			2				---	---	---	**E5GN-Q2TD-C**
				Detection for single-phase heaters				---	---	**E5GN-Q2HTD-C**
				---	2			---	---	**E5GN-Q2BTD-C**
					---		RS-485	---	---	**E5GN -Q203TD-C-FLK**
	Current output	Standard or heating/cooling	1	---	---	Transfer output using control output	---	---	---	**E5GN-C1TD-C**
					2			---	---	**E5GN-C1BTD-C**
					---		RS-232C	---	---	**E5GN -C101TD-C-FLK**
							RS-485	---	---	**E5GN -C103TD-C-FLK**

✻1. If heating/cooling control mode is used, an auxiliary output is used as a control output for the cooling side. The number of auxiliary outputs that can be used will decrease by one. Also, the signal for the control output for the cooling side will be a relay output.

✻2. A current control output can be used as the transfer output. In that case, an auxiliary output is used as the control output. (This is not possible for models without an auxiliary output.) The control output will be a relay output. The number of auxiliary outputs that can be used will decrease by one.

Models with Analog Inputs

Models with One Control Output and a 100 to 240-VAC Power Supply (Add AC100240 to the Model number.)

Case color	Control output	Control mode ✻1	No. of auxiliary outputs	Detection of heater burnout, SSR failure, and heater overcurrent	No. of event inputs	Transfer output ✻2	Communi cations	Previous model		New model
								Thermocou-ple input	Resistance thermome-ter input	
Black	Current output	Standard or heating/ cooling	1	---	---	Transfer output using control output	---	---	---	**E5GN-C1L-C**

Note: Models with analog inputs do not display the temperature unit.

✻1. If heating/cooling control mode is used, an auxiliary output is used as a control output for the cooling side. The number of auxiliary outputs that can be used will decrease by one. Also, the signal for the control output for the cooling side will be a relay output.

✻2. A current control output can be used as the transfer output. In that case, an auxiliary output is used as the control output. (This is not possible for models without an auxiliary output.) The control output will be a relay output. The number of auxiliary outputs that can be used will decrease by one.

Models with One Control Output and a 24-VAC/VDC Power Supply (Add ACDC24 to the Model number.)

Case color	Control output	Control mode ✻1	No. of auxiliary outputs	Detection of heater burnout, SSR failure, and heater overcurrent	No. of event inputs	Transfer output ✻2	Communi cations	Previous model		New model
								Thermocou-ple input	Resistance thermome-ter input	
Black	Current output	Standard or heating/ cooling	1	---	---	Transfer output using control output	---	---	---	**E5GN-C1LD-C**

✻1. If heating/cooling control mode is used, an auxiliary output is used as a control output for the cooling side. The number of auxiliary outputs that can be used will decrease by one. Also, the signal for the control output for the cooling side will be a relay output.

✻2. A current control output can be used as the transfer output. In that case, an auxiliary output is used as the control output. (This is not possible for models without an auxiliary output.) The control output will be a relay output. The number of auxiliary outputs that can be used will decrease by one.

Accessories (Order Separately)

USB-Serial Conversion Cable

Model
E58-CIFQ1

Waterproof Packing

Model
Y92S-32

Current Transformers (CTs)

Hole diameter	Model
5.8 dia.	**E54-CT1**
12.0 dia.	**E54-CT3**

CX-Thermo Support Software

Model
EST2-2C-MV4

Note: The E5GN is supported by CX-Thermo version 4.2 and higher.

Specifications

Ratings

Power supply voltage		No D 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	**E5GN Screw terminal block**	100 to 240 VAC: 5.5 VA (max.) 24 VAC/VDC: 3 VA/2 W (max.)
	E5GN-□-C Screwless clamp terminal block	100 to 240 VAC: 5.5 VA (max.) 24 VAC/VDC: 3 VA/2 W (max.)
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 Voltage input: 0 to 50 mV
		Models with analog inputs 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.)
Control method		ON/OFF control or 2-PID control (with auto-tuning)
Control outputs	**Relay output**	SPST-NO, 250 VAC, 2 A (resistive load), electrical life: 100,000 operations, minimum applicable load: 5 V, 10 mA
	Voltage output (for driving SSR)	Output voltage: 12 VDC ±15% (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 outputs	**Number of outputs**	1 or 2 max. (Depends on the model.)
	Output specifications	Relay output: SPST-NO, 250 VAC, 2 A (resistive load), electrical life: 100,000 operations, minimum applicable load: 5 V, 10 mA
Event inputs	**Number of inputs**	2
	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 (7-segment display also possible) Character height: PV: 7.5 mm, SV: 3.6 mm
Multi SP		Up to four set points (SP0 to SP3) can be saved and selected using event inputs, key operations, or serial communications.
Bank switching		Not supported
Other functions		Manual output, heating/cooling control, loop burnout alarm, SP ramp, other alarm functions, heater burnout detection, 40% AT, 100% AT, MV limiter, input digital filter, self-tuning, temperature input shift, run/stop, protection functions, control output ON/OFF counter, extraction of square root, MV change rate limit, logic operations, PV/SV status display, simple program, automatic cooling coefficient adjustment
Ambient operating temperature		−10 to 55°C (with no condensation or icing), for 3-year warranty: −10 to 50°C
Ambient operating humidity		25% to 85%
Storage temperature		−25 to 65°C (with no condensation or icing)

Input Ranges

Thermocouple/Platinum Resistance Thermometer (Universal Inputs)

Input Type	Platinum resistance thermometer					Thermocouple														Infrared temperature sensor				Analog input
Name	Pt100			JPt100		K		J		T		E	L	U		N	R	S	B	W	PL II	10to 70°C	60to 120 °C	115 to 165 °C	140 to 260 °C	0 to 50 mV
Temperature range (°C)	850 / –200	500.0 / –199.9	100.0 / 0.0	500.0 / –199.9	100.0 / 0.0	1300 / –200	500.0 / –20.0	850 / –100	400.0 / –20.0	400 / –200	400.0 / –199.9	600 / –200	850 / –100	400 / –200	400.0 / –199.9	1300 / –200	1700 / 0	1700 / 0	1800 / 100	2300 / 0	1300 / 0	90 / 0	120 / 0	165 / 0	260 / 0	Usable in the following ranges by scaling: –1999 to 9999 or –199.9 to 999.9
Setting number	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	24	25	19	20	21	22	23

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 584-1

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 751

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

Models with Analog Inputs

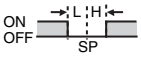
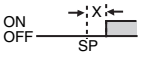
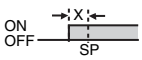
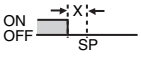
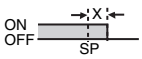
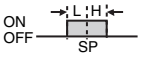
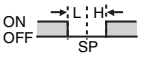
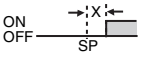
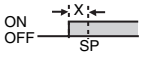
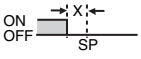
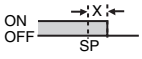
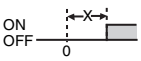
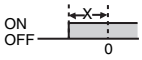
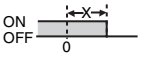
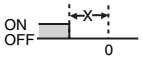
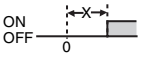
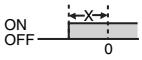
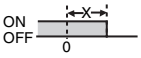
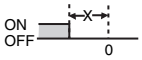
Input Type	Current		Voltage		
Input specification	4 to 20 mA	0 to 20 mA	1 to 5 V	0 to 5 V	0 to 10 V
Setting range	Usable in the following ranges by scaling: –1999 to 9999, –199.9 to 999.9, –19.99 to 99.99 or –1.999 to 9.999				
Setting number	0	1	2	3	4

Shaded settings are the default settings.

Alarm Outputs

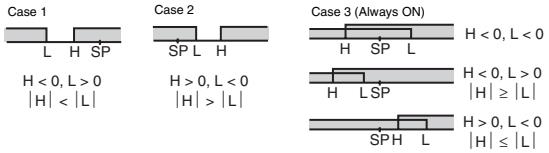
Each alarm can be independently set to one of the following 13 alarm types. The default is *2: Upper limit.*
Auxiliary outputs are allocated for alarms. ON delays and OFF delays (0 to 999 s) can also be specified.

Note: For models with heater burnout, SSR failure, and heater overcurrent detection, alarm 1 will be an OR output of the alarm selected from the following alarm types and the alarms for heater burnout, SSR failure, and heater overcurrent. To output only a heater burnout alarm, SSR failure alarm, and heater overcurrent alarm for alarm 1, set the alarm type to 0 (i.e., no alarm function).

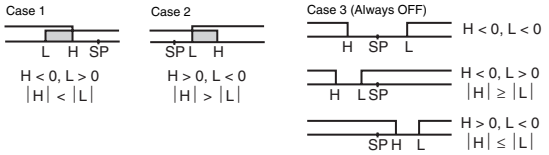
Set value	Alarm type	Alarm output operation		Description of function
		When alarm value X is positive	When alarm value X is negative	
0	Alarm function OFF	Output OFF		No alarm
1 ✻1	Upper- and lower-limit		✻2	Set the deviation in the set point by setting the alarm upper limit (H) and alarm lower limit (L).
2	Upper-limit			Set the upward deviation in the set point by setting the alarm value (X).
3	Lower-limit			Set the downward deviation in the set point by setting the alarm value (X).
4 ✻1	Upper- and lower-limit range		✻3	Set the deviation in the set point by setting the alarm upper limit (H) and alarm lower limit (L).
5 ✻1	Upper- and lower-limit with standby sequence	 ✻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

✻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

- 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 *E5CN/E5AN/E5EN/E5GN Digital Temperature Controllers User's Manual Basic Type* (Cat. No. H156) for information on the operation of the standby sequence.

✻7. Refer to the *E5CN/E5AN/E5EN/E5GN Digital Temperature Controllers User's Manual Basic Type* (Cat. No. H156) for information on the loop burnout alarm (LBA).

✻8. Refer to the *E5CN/E5AN/E5EN/E5GN Digital Temperature Controllers User's Manual Basic Type* (Cat. No. H156) for information on the PV change rate alarm.

Characteristics

Indication accuracy		Thermocouple: ✻1 (±0.3% of indicated value or ±1°C, whichever is greater) ±1 digit max. Platinum resistance thermometer input: (±0.2% of indicated 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.
Influence 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: ✻3 (±1% of PV or ±4°C, whichever is greater) ±1 digit max. Platinum resistance thermometer input: (±1% of PV or ±2°C, whichever is greater) ±1 digit max. Analog input: (±1%FS) ±1 digit max.
Influence of voltage ✻2		
Input sampling period		250 ms
Hysteresis		Models with thermocouple/platinum resistance thermometer input (universal input): 0.1 to 999.9 EU (in units of 0.1 EU) ✻4 Models with analog input: 0.01 to 99.99% FS (in units of 0.01% FS)
Proportional band (P)		Models with thermocouple/platinum resistance thermometer input (universal input): 0.1 to 999.9 EU (in units of 0.1 EU) ✻4 Models with analog input: 0.1 to 999.9% FS (in units of 0.1% FS)
Integral time (I)		0 to 3999 s (in units of 1 s)
Derivative time (D)		0 to 3999 s (in units of 1 s) ✻5
Control period		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 Ω max.) Platinum resistance thermometer: 0.1°C/Ω max. (10 Ω max.)
Insulation resistance		20 MΩ min. (at 500 VDC)
Dielectric strength		2,300 VAC, 50 or 60 Hz for 1 min (between terminals with different charge)
Vibration resistance	**Malfunction**	10 to 55 Hz, 20 m/s² for 10 min each in X, Y, and Z directions
	Destruction	10 to 55 Hz, 0.75-mm single amplitude for 2 hrs each in X, Y, and Z directions
Shock resistance	**Malfunction**	100 m/s², 3 times each in X, Y, and Z directions
	Destruction	300 m/s², 3 times each in X, Y, and Z directions
Weight		Controller: Approx. 90 g, Mounting Bracket: Approx. 10 g
Degree of protection		Front panel: IP66, Rear case: IP20, Terminals: IP00
Memory protection		Non-volatile memory (number of writes: 1,000,000 times)
Setup Tool		CX-Thermo version 4.2 or higher
Setup Tool port		Provided on the side of the E5GN. Connect this port to the computer when using the Setup Tool. An E58-CIFQ1 USB-Serial Conversion Cable is required to connect the computer to the port on the side of the E5GN. ✻6
Standards	**Approved standards**	UL 61010-1, CSA C22.2 No. 1010-1
	Conformed standards	EN 61010-1 (IEC 61010-1): Pollution level 2, overcurrent category II
EMC		EMI: EN 61326 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 Power Frequency Magnetic Field Immunity: EN 61000-4-8 Voltage Dip/Interrupting Immunity: EN 61000-4-11

✻1. The indication accuracy of K thermocouples in the −200 to 1300°C range, T and N thermocouples at a temperature of −100°C max., and U and L thermocouples at any temperatures is ±2°C ±1 digit max. The indication accuracy of the B thermocouple at a temperature of 400°C max. is not specified. The indication accuracy of B thermocouples in the 400 to 800°C range 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° 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. When robust tuning (RT) is ON, the differential time is 0.0 to 999.9 (in units of 0.1 s).
✻6. External serial communications (RS-232C or RS-485) and cable communications for the Setup Tool can be used at the same time.

USB-Serial Conversion Cable

Applicable OS	Windows 2000, XP, or Vista
Applicable software	CX-Thermo version 4 or higher
Applicable models	E5AN/E5EN/E5CN/E5CN-U/E5AN-H/ E5EN-H/E5CN-H/E5GN
USB interface standard	Conforms to USB Specification 1.1.
DTE speed	38400 bps
Connector specifications	Computer: USB (type A plug) Temperature Controller: Setup Tool port (on bottom of Controller)
Power supply	Bus power (Supplied from USB host controller.)
Power supply voltage	5 VDC
Current consumption	70 mA
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. 100 g

Note: A driver must be installed in the personal computer. Refer to installation information in the operation manual for the Conversion Cable.

Communications Specifications

Transmission line connection method	RS-485: Multipoint RS-232C: Point-to-point
Communications	RS-485 (two-wire, half duplex), RS-232C
Synchronization method	Start-stop synchronization
Protocol	CompoWay/F, SYSWAY, or Modbus
Baud rate	1200, 2400, 4800, 9600, 19200, 38400, or 57600 bps
Transmission code	ASCII
Data bit length ✻	7 or 8 bits
Stop bit length ✻	1 or 2 bits
Error detection	Vertical parity (none, even, odd) Frame check sequence (FCS) with SYSWAY Block check character (BCC) with CompoWay/F or CRC-16 Modbus
Flow control	None
Interface	RS-485, RS-232C
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, SSR Failure Alarms, and Heater Overcurrent Alarms

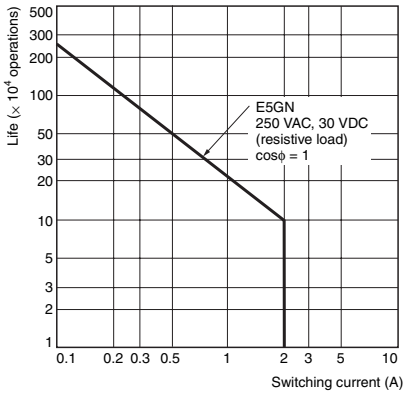
CT input (for heater current detection)	Models with detection for single-phase heaters: One input
Maximum heater current	50 A AC
Input current indication accuracy	±5% FS ±1 digit max.
Heater burnout alarm setting range ✻1	0.1 to 49.9 A (in units of 0.1 A) Minimum detection ON time: 100 ms
SSR failure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

✻1. For heater burnout alarms, the heater current will be measured when the control output is ON, and the output assigned to the alarm 1 function 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 assigned to the alarm 1 function will turn ON if the heater current is higher than the set value (i.e., SSR failure detection current value).

✻3. For heater overcurrent alarms, the heater current will be measured when the control output is ON, and the output assigned to the alarm 1 function will turn ON if the heater current is higher than the set value (i.e., heater overcurrent detection current value).

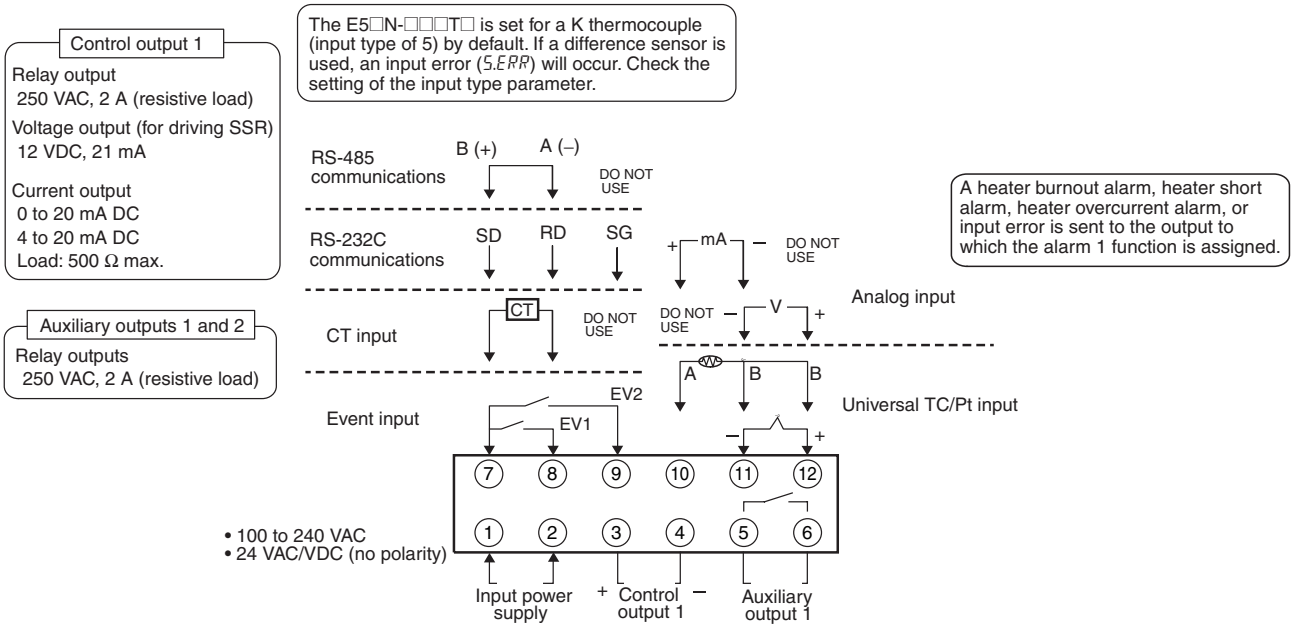
Electrical Life Expectancy Curve for Relays (Reference Values)

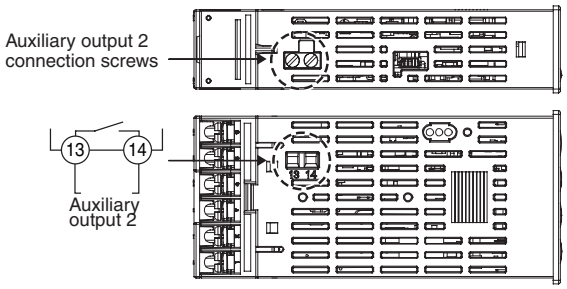


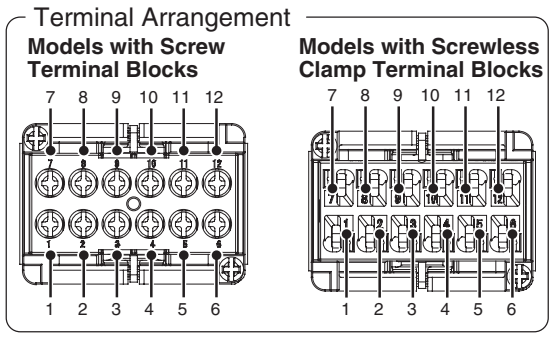
External Connections

- A voltage output (control output, for driving SSR) is not electrically insulated from the internal circuits. When using a grounding thermocouple, do not connect any of the control output terminals to ground. (If the control output terminals are connected to ground, errors will occur in the measured temperature values as a result of leakage current.)

E5GN Controllers

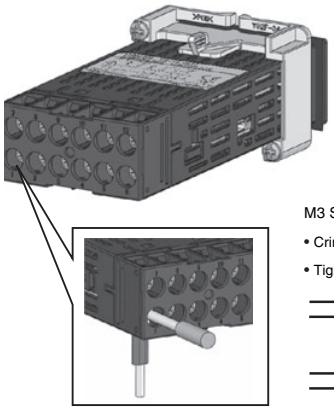




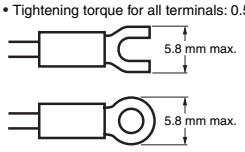


Wiring

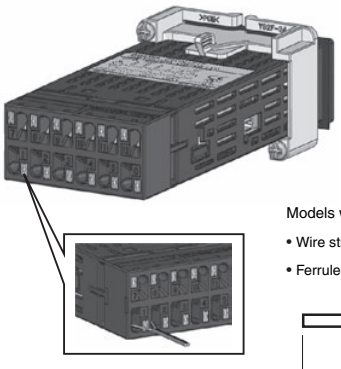
E5GN
Models with Screw Terminal Blocks (M3 Screws)



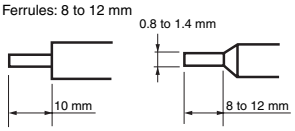
M3 Screw Terminal Blocks
- Crimp terminal shape: Forked or round
- Tightening torque for all terminals: 0.5 N·m



E5GN-□-C
Models with Screwless Clamp Terminal Blocks



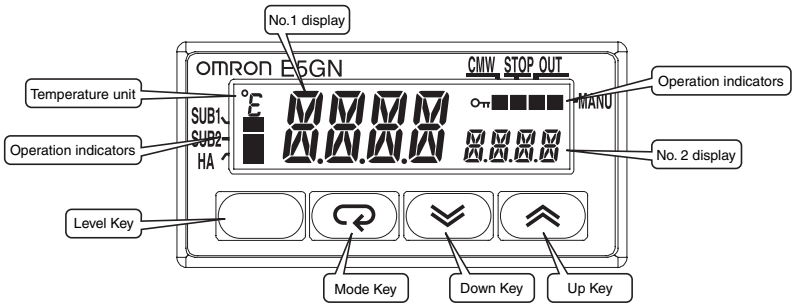
Models with Screwless Clamp Terminal Blocks
- Wire stripping: 10 mm
- Ferrules: 8 to 12 mm



Nomenclature

E5GN

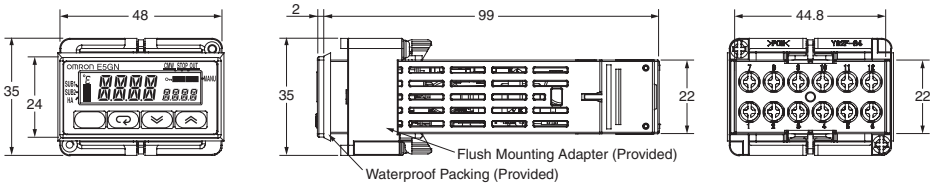
The front panel is the same for the E5GN.



Dimensions

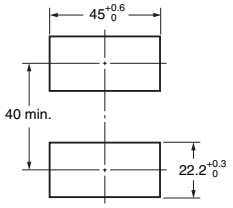
(Unit: mm)

E5GN
Models with Screw Terminal Blocks

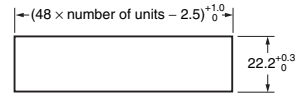


Panel Cutout

Mounted Separately



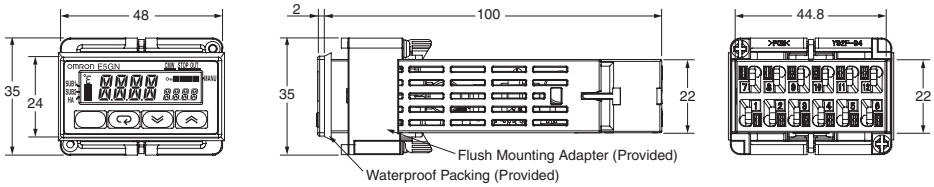
Group Mounted



Group mounting does not allow waterproofing.

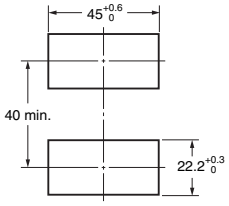
- Recommended panel thickness is 1 to 5 mm.
- Group mounting is not possible in the vertical direction. (Maintain the specified mounting space between Controllers.)
- To mount the Controller so that it is waterproof, insert the waterproof packing onto the Controller.
- When two or more Controllers are mounted, make sure that the surrounding temperature does not exceed the allowable operating temperature specified in the specifications.

E5GN-□-C
Models with Screwless Clamp Terminal Blocks

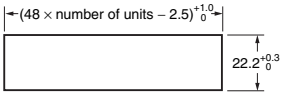


Panel Cutout

Mounted Separately



Group Mounted

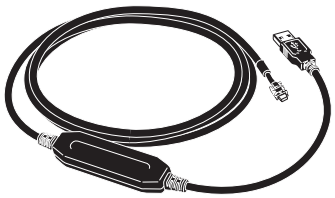


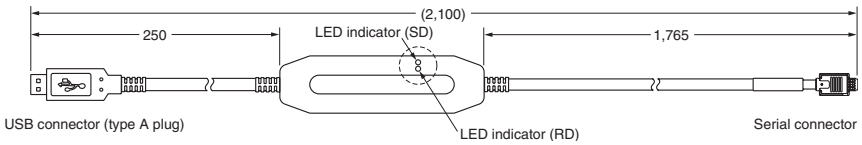
Group mounting does not allow waterproofing.

- Recommended panel thickness is 1 to 5 mm.
- Group mounting is not possible in the vertical direction. (Maintain the specified mounting space between Controllers.)
- When two or more Controllers are mounted, make sure that the surrounding temperature does not exceed the allowable operating temperature specified in the specifications.

Accessories (Order Separately)

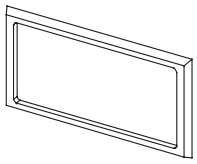
USB-Serial Conversion Cable
E58-CIFQ1





Waterproof Packing

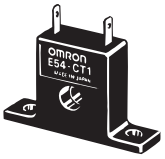
Y92S-32 (for DIN 48 × 24)

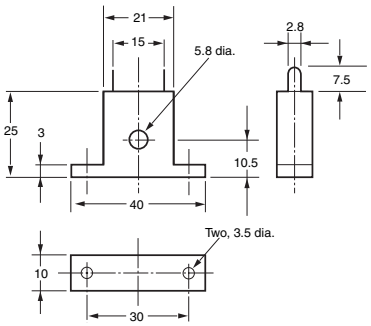


Order the Waterproof Packing separately if it becomes lost or damaged.
The Waterproof Packing can be used to achieve an IP66 degree of protection.
(Deterioration, shrinking, or hardening of the waterproof packing may occur depending on the operating environment. Therefore, periodic replacement is recommended 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 one year 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 required.

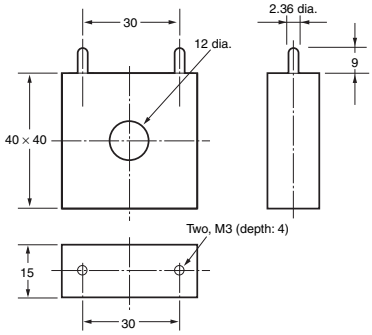
Current Transformers

E54-CT1



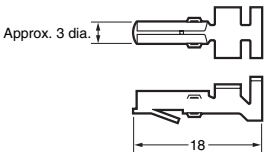


E54-CT3

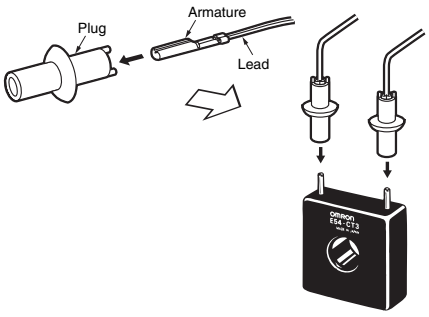


E54-CT3 Accessory

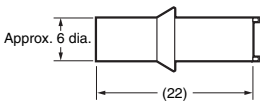
- **Armature**



Connection Example

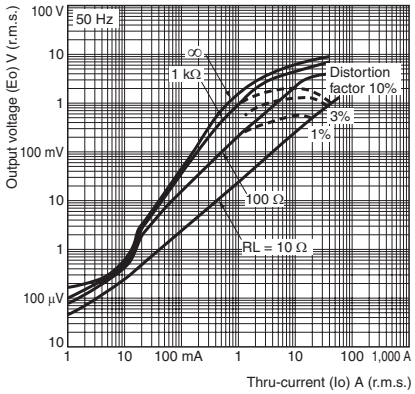


- **Plug**



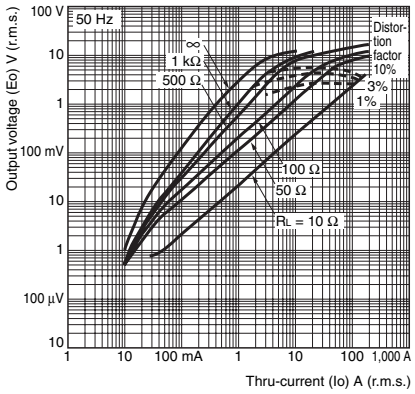
E54-CT1
Thru-current (Io) vs. Output Voltage (Eo) (Reference Values)

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



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

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



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   (iii) Energy control systems, combustion systems, railroad systems, aviation systems, medical equipment, amusement machines, vehicles, safety equipment, and installations subject to separate industry or government regulations.
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Note: This datasheet is provided as a guideline for selecting products. Do not use this document to operate the Unit.

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

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Schaumburg, IL USA • 847.843.7900 • 800.556.6766 • www.omron247.com

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