

Digital Temperature Controllers

E5GN

CSM_E5GN_DS_E_2_1

Compact and Intelligent Temperature Controllers

1/32 DIN with Communications Function

- Various temperature inputs: Thermocouple, platinum resistance thermometer, infrared temperature sensor, and analog inputs.
- Auto-tuning and self-tuning available. Auto-tuning is possible even while self-tuning is being executed.
- Heating or heating/cooling control is available.
- Water-resistant construction (NEMA4X: equivalent to IP66).
- Conforms to UL, CSA, and IEC safety standards as well as CE marking.
- CompoWay/F communications protocol supported.



Refer to *Safety Precautions for All E5□N Models*.



48(W) x 24(H) x 100(D) mm



Refer to *E5CN/E5CN-U/E5EN/E5AN/E5GN Operation for operating procedures*.

Model Number Structure

Model Number Legend

E5GN- -FLK
 1 2 3 4 5

1. Control output

- R: Relay
- Q: Voltage (for driving SSR)

2. Number of alarms

- Blank: No alarm
- 1: One alarm

3. Communications

- Blank: No communications function
- 03: RS-485

4. Input type

- TC: Thermocouple
- P: Platinum resistance thermometer

5. CompoWay/F serial communications

- FLK: CompoWay/F serial communications

Note: A functional explanation is provided here for illustration, but models are not necessarily available for all possible combinations. Refer to *Ordering Information* on page 2 when ordering.

Examples

- Voltage output, without alarm, thermocouple input: E5GN-QTC
- RS-485 communications: E5GN-□03□-FLK

Note: Be sure to read the precautions for correct use and other precautions in the following user's manuals before using the Digital Controller.

E5GN Digital Temperature Controller User's Manual (Cat. No. H101)

E5CN/E5EN/E5AN/E5GN Digital Temperature Controller Communications Functions User's Manual (Cat. No. H135)

A PDF version of the user's manuals can be downloaded from the following website:

OMRON Industrial Web <http://www.fa.omron.co.jp>

Ordering Information

■ Standard Models

Size	Power supply voltage	No. of alarm points	Functions	Control output	Thermocouple model	Platinum resistance thermometer model
1/32 DIN 48(W) x 24(H) x 100(D) mm	100 to 240 VAC	---	---	Relay	E5GN-RTC	E5GN-RP
				Voltage (for driving SSR)	E5GN-QTC	E5GN-QP
		1 (see note 1.)	Heating/cooling control selectable	Relay	E5GN-R1TC	E5GN-R1P
				Voltage (for driving SSR)	E5GN-Q1TC	E5GN-Q1P
	24 VAC/VDC	---	---	Relay	E5GN-RTC	E5GN-RP
				Voltage (for driving SSR)	E5GN-QTC	E5GN-QP
1 (see note 1.)	Heating/cooling control selectable	Relay	E5GN-R1TC	E5GN-R1P		
		Voltage (for driving SSR)	E5GN-Q1TC	E5GN-Q1P		

Note 1. If the heating/cooling function is used, ALM1 will be used for control output and so alarm output will not be available.

2. Control output 2 for heating/cooling control is relay output.
3. Specify the power supply specifications when ordering.

■ Communication Models

Size	Power supply voltage	Communication function	Control output	Thermocouple model	Platinum resistance thermometer model
1/32 DIN 48(W) x 24(H) x 100(D) mm	100 to 240 VAC	RS-485	Relay	E5GN-R03TC-FLK	E5GN-R03P-FLK
			Voltage (for driving SSR)	E5GN-Q03TC-FLK	E5GN-Q03P-FLK
	24 VAC/VDC		Relay	E5GN-R03TC-FLK	E5GN-R03P-FLK
			Voltage (for driving SSR)	E5GN-Q03TC-FLK	E5GN-Q03P-FLK

Note: Specify the power supply specifications when ordering.

■ Accessories (Order Separately)

Rubber Packing

Model
Y92S-32

Note: · Rubber Packing is included with the Controller.

- Use the model number above to order a replacement if the Rubber Packing becomes lost or damaged.
(Depending on the operating environment, the deterioration, contraction, or hardening of the Rubber Packing may occur. Therefore, periodic replacement is recommended to ensure the waterproof level.)
- The Rubber Packing does not need to be mounted if a waterproof structure is not required.

Specifications

■ Ratings

Item	Power supply voltage	100 to 240 VAC, 50/60 Hz (See note.)	24 VAC, 50/60 Hz/24 VDC
Operating voltage range		85% to 110% of rated supply voltage	
Power consumption		7 VA	4 VA/2.5 W
Sensor input		Thermocouple: K, J, T, E, L, U, N, R, S, B Platinum resistance thermometer: Pt100, JPt100 Infrared temperature sensor: 10 to 70°C, 60 to 120°C, 115 to 165°C, 160 to 260°C Voltage input: 0 to 50 mV	
Control output	Relay output	SPST-NO, 250 VAC, 2 A (resistive load), electrical life: 100,000 operations	
	Voltage output	12 VDC ±15% (PNP), max. load current: 21 mA, with short-circuit protection circuit	
Alarm output		SPST-NO, 250 VAC, 1 A (resistive load), electrical life: 100,000 operations	
Control method		2-PID or ON/OFF control (with autotuning)	

Item	Power supply voltage	100 to 240 VAC, 50/60 Hz (See note.)	24 VAC, 50/60 Hz/24 VDC
Setting method	Digital setting using front panel keys		
Indication method	7-segment digital display and single-lighting indicator Character height: PV: 7.0 mm; SV: 3.5 mm		
Other functions	Multi-SP, SP ramp, MV limiter, input digital filter, self-tuning, temperature input shift, RUN/STOP, protection, etc.		
Ambient temperature	-10 to 55°C (with no condensation or icing)		
Ambient humidity	25% to 85%		
Storage temperature	-25 to 65°C (with no condensation or icing)		

Note: The output frequency of some inverters is given as 50/60 Hz in the output specifications, but internal heat buildup in the Temperature Controller can cause smoking and burning. Do not use the output from an inverter as the power supply.

■ Input Ranges

Platinum Resistance Thermometer Input/Thermocouple Input

Platinum resistance thermometer input																					
Input type	Platinum resistance thermometer																				
Name	Pt100		JPt100																		
Temperature range	1800	1700	1600	1500	1400	1300	1200	1100	1000	900	800	700	600	500	400	300	200	100	0	-100	-200
Set value	0	1	2	3	4																

Thermocouple input																																						
Input type	Thermocouple											Infrared Temperature Sensor			Analog input																							
Name	K	J	T	E	L	U	N	R	S	B	10 to 70°C	60 to 120°C	115 to 165°C	140 to 260°C	0 to 50 mV																							
Temperature range	1800	1700	1600	1500	1400	1300	1200	1100	1000	900	800	700	600	500	400	300	200	100	0	-100	-200	1300	850	400	400	400	600	850	400	400	1700	1700	1800	70	120	165	260	Usable in the following ranges by scaling: -1999 to 9999 or -199.9 to 999.9
Set value	0	1	2	3	4	17	5	6	7	18	8	9	10	11	12	13	14	15	16																			

Applicable standards by input type are as follows:

K, J, T, E, N, R, S, B: JIS C1602-1995, IEC584-1

L: Fe-CuNi, DIN 43710-1985

U: Cu-CuNi, DIN 43710-1985

JPt100: JIS C1604-1989, JIS C1606-1989

Pt100: JIS C1604-1997, IEC751

Shaded ranges indicate default settings.

■ Characteristics

Indication accuracy	Thermocouple: ($\pm 0.5\%$ of indicated value or $\pm 1^\circ\text{C}$, whichever greater) ± 1 digit max. (See note 1.) Platinum resistance thermometer: ($\pm 0.5\%$ of indicated value or $\pm 1^\circ\text{C}$, whichever greater) ± 1 digit max. Analog input: $\pm 0.5\%$ FS ± 1 digit max. CT input: $\pm 5\%$ FS ± 1 digit max.	
Influence of temperature (See note 3.)	R, S, and B thermocouple inputs: ($\pm 1\%$ PV or $\pm 10^\circ\text{C}$, whichever is greater) ± 1 digit max. Other thermocouple inputs: ($\pm 1\%$ PV or $\pm 4^\circ\text{C}$, whichever is greater) ± 1 digit max. * K thermocouple at -100°C max.: $\pm 10^\circ\text{C}$ max. Platinum resistance thermometer inputs: ($\pm 1\%$ PV or $\pm 2^\circ\text{C}$, whichever is greater) ± 1 digit max. Analog inputs: ($\pm 1\%$ FS) ± 1 digit max.	
Hysteresis	0.1 to 999.9 EU (in units of 0.1 EU) (See note 2.)	
Proportional band (P)	0.1 to 999.9 EU (in units of 0.1 EU) (See note 2.)	
Integral time (I)	0 to 3999 s (in units of 1 s)	
Derivative time (D)	0 to 3999 s (in units of 1 s)	
Control period	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)	
Sampling period	500 ms	
Influence of signal source resistance	Thermocouple: $0.1^\circ\text{C}/\Omega$ max. (100 Ω max.) Platinum resistance thermometer: $0.4^\circ\text{C}(0.8^\circ\text{F})/\Omega$ max. (10 Ω max.)	
Insulation resistance	20 M Ω min. (at 500 VDC)	
Dielectric strength	2000 VAC, 50 or 60 Hz for 1 min (between different charging terminals)	
Vibration resistance	Malfunction: 10 to 55 Hz, 20 m/s ² for 10 min each in X, Y and Z directions	
	Destruction: 10 to 55 Hz, 0.75-mm amplitude for 2 hours each in X, Y and Z directions	
Shock resistance	Malfunction: 100 m/s ² , 3 times each in X, Y, and Z directions	
	Destruction: 300 m/s ² , 3 times each in X, Y, and Z directions	
Weight	Approx. 90 g	Mounting bracket: approx. 10 g
Degree of protection	Front panel: NEMA4X for indoor use (equivalent to IP66), rear case: IP20, terminals: IP00	
Memory protection	EEPROM (non-volatile memory) (number of writes: 100,000)	
EMC	ESD Immunity: EN61000-4-2: 4 kV contact discharge 8 kV air discharge Electromagnetic Immunity: EN61000-4-3: 10 V/m (amplitude-modulated, 80 MHz to 1 GHz) Burst Noise Immunity: EN61000-4-4: 2 kV power line 1 kV I/O signal line Surge Immunity: EN61000-4-5: 1 kV normal mode (power line, output line (relay output)) 2 kV common mode (power line, output line (relay output)) Conducted Disturbance Immunity: EN61000-4-6: 3 V (0.15 to 80 MHz) Voltage Dip/Interrupting Immunity: EN61000-4-11: 0.5 cycle, 100% (rated voltage) Radiated Interference Electromagnetic Field Strength: EN61326 Class A Noise Terminal Voltage: EN61326 Class A	
Approved standards	UL3121-1, CSA22.2 No. 142, E.B.1402C Conforms to EN50081-2, EN50082-2, EN61010-1 (IEC61010-1) Conforms to VDE0106/part 100 (Finger Protection), when the terminal cover is mounted.	

Note 1. The indication of K thermocouples in the -200 to 1300°C range, and T and N thermocouples at a temperature of -100°C or less, and U and L thermocouples at any temperature is $\pm 2^\circ\text{C} \pm 1$ digit maximum. The indication of B thermocouples at a temperature of 400°C or less is unrestricted.

The indication of R and S thermocouples at a temperature of 200°C or less is $\pm 3^\circ\text{C} \pm 1$ digit maximum.

2. "EU" stands for Engineering Unit and is used as the unit after scaling. For a temperature sensor, the EU is $^\circ\text{C}$ or $^\circ\text{F}$.

3. Conditions: Ambient temperature: -10°C to 23°C to 55°C , Voltage range: -15% to $+10\%$ of rated voltage

■ Communications Specifications

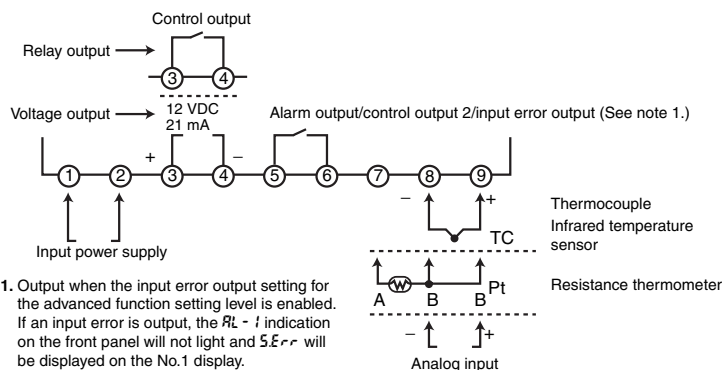
Transmission path connection	Multiple points
Communications method	RS-485 (two-wire, half duplex)
Synchronization method	Start-stop synchronization
Baud rate	1,200/2,400/4,800/9,600/19,200 bps
Transmission code	ASCII
Data bit length (see note.)	7 or 8 bits
Stop bit length (see note.)	1 or 2 bits
Error detection	Vertical parity (none, even, odd) Frame check sequence (FCS): with SYSWAY Block check character (BCC): with CompoWay/F
Flow control	Not available
Interface (see note.)	RS-485
Retry function	Not available
Communications buffer	40 bytes

Note: The baud rate, data bit length, stop bit length, or vertical parity can be individually set using the communications setting level.

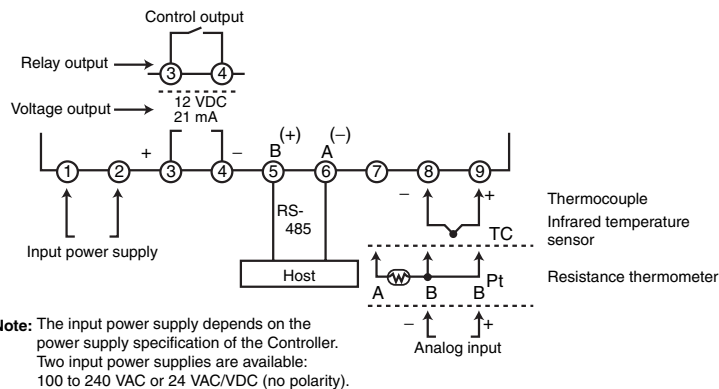
Wiring Terminals

- The voltage output (control output) is not electrically insulated from the internal circuits. When using a grounding thermocouple, do not connect the control output terminals to the ground. If the control output terminals are connected to the ground, errors will occur in the measured temperature values as a result of leakage current.
- Standard insulation is applied to the power supply I/O sections. If reinforced insulation is required, connect the input and output terminals to a device without any exposed current-carrying parts or to a device with standard insulation suitable for the maximum operating voltage of the power supply I/O section.

E5GN Basic Model

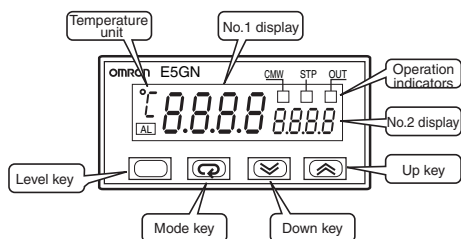


E5GN Model with Communications



Nomenclature

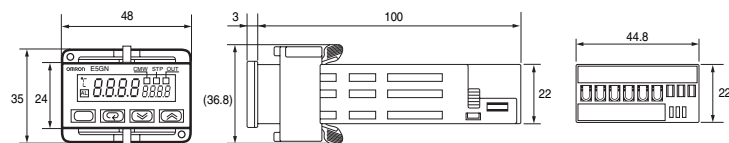
E5GN



Dimensions

Note: All units are in millimeters unless otherwise indicated.

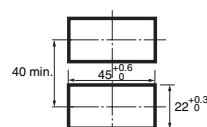
E5GN



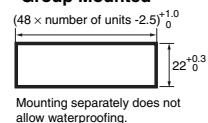
Note: When carrying out maintenance on the E5GN, only the terminal plate can be drawn out with the terminal leads still attached.

Panel Cutout

Mounted Separately



Group Mounted



- The recommended panel thickness is 1 to 5 mm.
- Insert the Controller through the hole in the panel from the front and push the adapter on from the rear. Push the adapter up to the back of the panel ensuring that the controller is pushed all the way in, removing any gap between the Controller, panel, and adapter. Finally, use the two screws on the adapter to secure the unit in place.
- To mount the E5GN so that it is waterproof, insert the rubber packing onto the E5GN.
- When two or more E5GN Controllers are mounted, make sure that the surrounding temperature does not exceed the allowable operating temperature given in the specifications.

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.

To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

In the interest of product improvement, specifications are subject to change without notice.

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