OMRON

Digital Temperature Controllers

E5CN-U

- Plug-in models (11-pin)
- Standard models and models with alarm output are available.
- Operating procedures are the same as for the E5CN.

Note: The outline specifications of the E5CN-U are provided in this datasheet. For detailed operations and further information, refer to the *E5CN/E5GN Datasheet (H107-E1)* and *E5CN Operation Manual (H100-E1)*.

This product was manufactured at OMRON Okayama. OMRON Okayama has obtained approvals from international certification bodies for its quality system and environmental management system.

Ordering Information

■ E5CN-U Models

Size	Power supply voltage	Output	Sensor input	No. of alarm outputs	Model number
1/16 DIN	100 to 240 VAC	Relay	Thermocouple	0	E5CN-RTCU AC100-240
		Voltage for SSR	Thermocouple	0	E5CN-QTCU AC100-240
		Relay	Platinum resistance thermometer	0	E5CN-RPU AC100-240
		Voltage for SSR	Platinum resistance thermometer	0	E5CN-QPU AC100-240
		Relay	Thermocouple	1	E5CN-R1TCU AC100-240
		Voltage for SSR	Thermocouple	1	E5CN-Q1TCU AC100-240
		Relay	Platinum resistance thermometer	1	E5CN-R1PU AC100-240
		Voltage for SSR	Platinum resistance thermometer	1	E5CN-Q1PU AC100-240
	24 VAC/VDC	Relay	Thermocouple	0	E5CN-RTCU AC/DC24
		Voltage for SSR	Thermocouple	0	E5CN-QTCU AC/DC24
		Relay	Platinum resistance thermometer	0	E5CN-RPU AC/DC24
		Voltage for SSR	Platinum resistance thermometer	0	E5CN-QPU AC/DC24
		Relay	Thermocouple	1	E5CN-R1TCU AC/DC24
		Voltage for SSR	Thermocouple	1	E5CN-Q1TCU AC/DC24
		Relay	Platinum resistance thermometer	1	E5CN-R1PU AC/DC24
		Voltage for SSR	Platinum resistance thermometer	1	E5CN-Q1PU AC/DC24

Specifications

■ Input Ranges

Platinum Resistance Thermometer Input/Thermocouple Input

	Platinum resistance thermometer input				
Input type	Platinum resistance thermometer				
Name	Pt100			JPt100	
Temperature range/unit	850 (–200)	500.0 (–199.9)	100.0 (0.0)	500.0 (–199.9)	100.0 (0.0)
Set value	0	1	2	3	4

	Thermocouple input																
Input type	Thermocouple												ES1A Non-contact Temperature Sensor				Analog input
Name	K		J		T	E	L	U	N	R	S	B	K10 to 70°C	K60 to 120°C	K115 to 165°C	K160 to 260°C	0 to 50 mV
Temperature range/unit	1300 (–200)	500.0 (–20.0)	850 (–100)	400.0 (–20.0)	400 (–200)	600 (0)	850 (–100)	400 (–200)	1300 (–200)	1700 (0)	1700 (0)	1800 (100)	70 (0)	120 (0)	165 (0)	260 (0)	Usable in the following ranges by scaling: –19999 to 9999 or –199.9 to 999.9
Set value	0	1	2	3	4	5	6	7	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
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.

Note: The ES1A Non-contact Temperature Sensor will be available soon.

■ Ratings

Supply voltage		100 to 240 VAC, 50/60 Hz	24 VAC, 50/60 Hz/24 VDC
Operating voltage range		85% to 110% of rated supply voltage	
Power consumption	**E5CN-U**	6 VA	3 VA/2 W
Sensor input		Thermocouple: K, J, T, E, L, U, N, R, S, B Platinum resistance thermometer: Pt100, JPt100 Non-contact temperature sensor: K10 to 70°C, K60 to 120°C, K115 to 165°C, K160 to 260°C Voltage input: 0 to 50 mV	
Control output	**Relay output**	SPDT, 250 VAC, 3A (resistive load), electrical life: 100,000 operations	
	Voltage output	12 VDC (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	
Setting method		Digital setting using front panel keys	
Indication method		7-segment digital display and single-lighting indicator	
Other functions		According to Controller model	
Ambient temperature		–10 to 55°C (with no condensation or icing)	
Ambient humidity		25% to 85% relative humidity	
Storage temperature		–25 to 65°C (with no condensation or icing)	

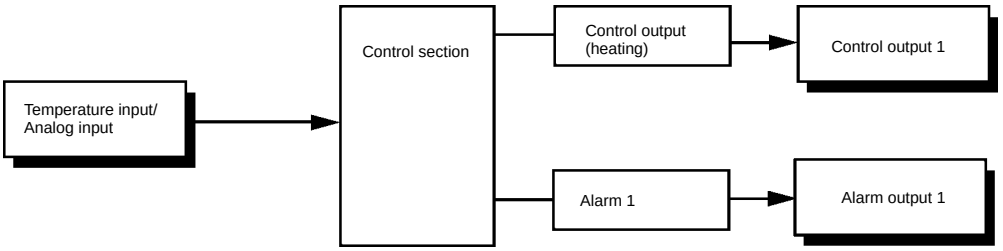
■ Characteristics

Indication accuracy	Thermocouple: (±0.5% of indicated value or ±1°C, whichever greater) ±1 digit max. (see note) Platinum resistance thermometer: (±0.5% of indicated value or ±1°C, whichever greater) ±1 digit max. Analog input: ±0.5% FS±1 digit max. CT input: ±5% FS±1 digit max.	
Hysteresis	0.1 to 999.9 EU (in units of 0.1 EU)	
Proportional band (P)	0.1 to 999.9 EU (in units of 0.1 EU)	
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	
Insulation resistance	20 MΩ min. (at 500 VDC)	
Dielectric strength	2000 VAC, 50 or 60 Hz for 1min (between different charging terminals)	
Vibration resistance	10 to 55 Hz, 10 m/s^2 for 2 hours each in X, Y and Z directions	
Shock resistance	300 m/s^2, 3 times each in 3 axes, 6 directions (relay: 100 m/s^2)	
Weight	Approx. 110 g	Mounting bracket: Approx. 10g
Protective structure	Front panel: IP50, rear case: IP20, terminals: IP00	
Memory protection	EEPROM (non-volatile memory) (number of writes: 100,000)	
EMC	Emission Enclosure: EN55011 Group 1 class A Emission AC Mains: EN55011 Group 1 class A Immunity ESD: EN61000-4-2: 4 kV contact discharge (level 2), 8 kV air discharge (level 3) Immunity RF-interference: ENV50140: 10 V/m (amplitude modulated, 80 MHz to 1 GHz) (level 3), 10 V/m (pulse modulated, 900 MHz) Immunity Conducted Disturbance: ENV50141: 10 V (0.15 to 80 MHz) (level 3) Immunity Burst: EN61000-4-4: 2 kV power-line (level 3), 2 kV I/O signal-line (level 4)	
Approved standards	UL3121-1, CSA22.2 No. 14, E.B.1402C Conforms to EN50081-2, EN50082-2, EN61010-1 (IEC1010-1) Conforms to VDE0106/part 100 (Finger Protection), when the terminal cover is mounted.	

Note: 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 ±2°C±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 ±3°C±1 digit maximum.

Installation

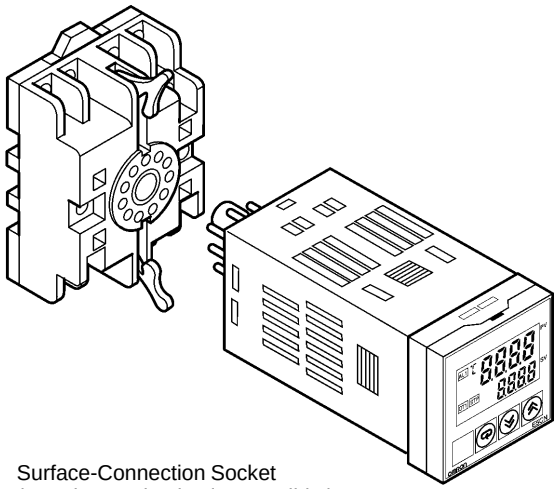
■ I/O Configuration



Note: The alarm output is available only with E5CN-□1□□U models.

■ Mounting

Purchase the P2CF-11 or P3GA-11 Connection Socket separately.



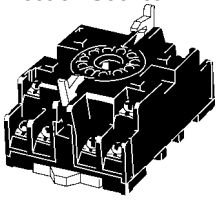
Surface-Connection Socket
(Panel mounting is also possible.)

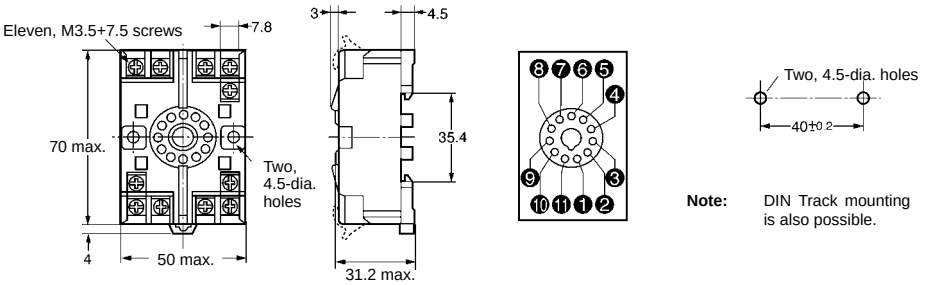
Mounting on a Mounting Panel

1. Insert the E5CN-U into a mounting hole in the panel.
2. Push in the adapter from the terminal side until it comes in contact with the panel and temporarily secure the body.
3. Tighten the two fixing screws on the adapter. Tighten them alternately to a maximum torque of 0.29 to 0.39 N • m (2.9 to 3.9 kgf • cm).

■ Connection Sockets for Wiring E5CN-U

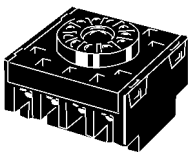
P2CF-11 Front-surface Connection Socket

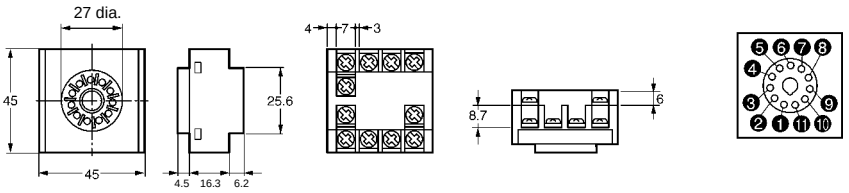




Note: DIN Track mounting is also possible.

P3GA-11 Rear-surface Connection Socket

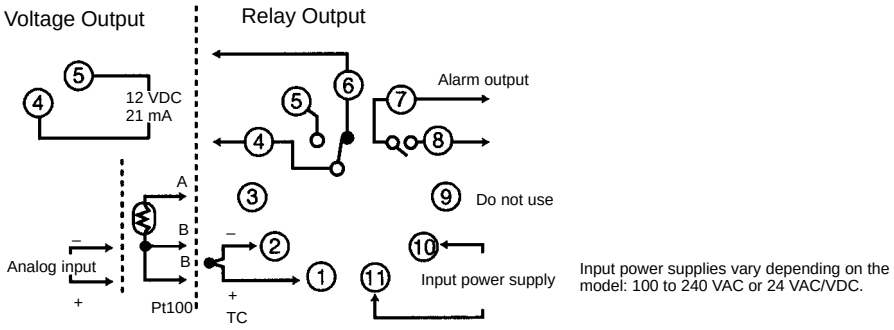




Note: Do not use other sockets. Doing so will affect the performance of the Controllers.

Wiring Terminals

■ Terminal Arrangement



Note: P2CF-11 or P3GA-11 Connection Socket must be purchased separately.

■ Wiring Precautions

- Separate input leads and power lines to protect the E5CN-U and its lines from external noise.
- Use AWG28 or larger twisted-pair cable.

■ Wiring

Power Supply

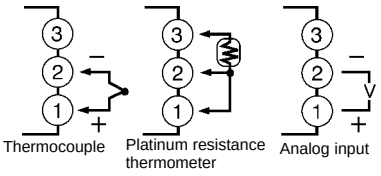
Connect the power supply between terminals 10 and 11. The following table shows the specifications.

Power supply	E5CN-U
100 to 240 VAC 50/60 Hz	6 VA
24 VAC 50/60 Hz	3 VA
24 VDC (no polarity)	2 W

Standard insulation is used in 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.

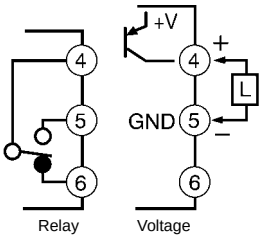
Input

Connect terminals 1 to 3 as shown in the following diagram depending on the input device.



Control Output

The control output is provided on terminals 4 to 6. The internal equivalent circuit for each output type is shown in the following diagram.



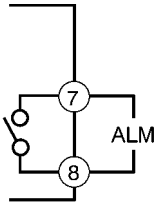
Specifications for each output type are as shown in the following table.

Output type	Specifications
Relay	3 A, 250 VAC, electrical life: 100,000 operations
Voltage (PNP)	PNP, 21 mA, 12 VDC (with short-circuit protection)

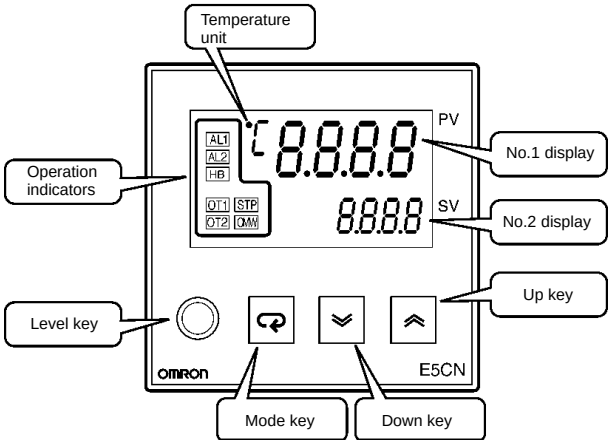
The voltage output (control output) is not electrically insulated from the internal circuit. When using a grounding thermocouple, do not ground the control output terminals. (If the terminals are grounded, errors will occur in the measured temperature as a result of leakage current.)

Alarm Output

The alarm output is provided on terminals 7 and 8. The internal equivalent circuit is shown in the following diagram. Use as Temperature Controller model that provides an alarm output: E5CN-□1□U.



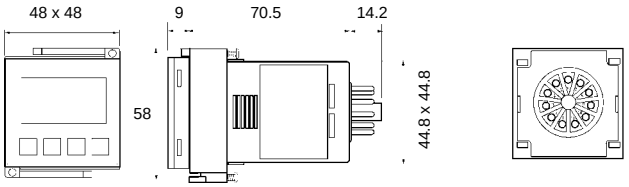
Nomenclature



Dimensions

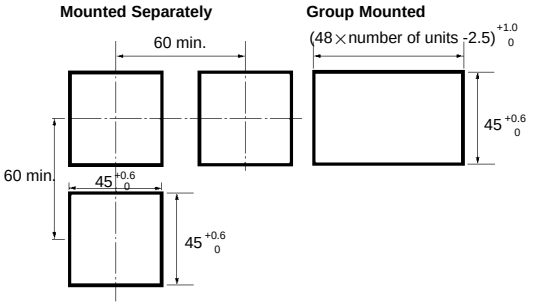
Note: All units are in millimeters unless otherwise indicated.

■ E5CN-U



- To mount, insert the body into a square hole in the panel, insert the adapter from behind, push it in to reduce the clearance between the body and panel as much as possible, and then tighten the screws.
- The recommended panel thickness is 1 to 5 mm.

Panel Cutouts



- Group mounting is not possible in the vertical direction. Maintain the specified mounting space between Controllers when they are group mounted.
- When two or more E5CN-Us are mounted, make sure that the surrounding temperature does not exceed the allowable operating temperature specified 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.

Cat. No. H109-E1-1 **In the interest of product improvement, specifications are subject to change without notice.**

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Printed in Japan
1098-1M (1098)