

Temperature Controllers

E5CS

CSM_E5CS_DS_E_5_3

Simple Functions in DIN 48 × 48 mm-size Plug-in Temperature Controllers



- Easy setting using DIP switch.
- Models with two alarms added to Series, ideal for applications requiring alarms.
- Universal-input (thermocouple/platinum resistance thermometer) models also available.
- Clearly visible digital display with character height of 13.5 mm.
- RoHS compliant.



Refer to *Safety Precautions for All Temperature Controllers*.

For the most recent information on models that have been certified for safety standards, refer to your OMRON website.

Refer to *E5CS/E5CSV Operation for operating procedures*.

Model Number Structure

■ Model Number Legend

Plug-in Models

E5CS- U-W

1 2 3 4 5 6

1. Control Outputs

R: Relay
Q: Voltage for driving SSR

2. Alarm Outputs

Blank: No alarm
1: 1 alarm
2: 2 alarms

3. Input

KJ: Thermocouple
P: Platinum resistance thermometer
G: Thermistor
T: Thermocouple/platinum resistance thermometer (universal-input)

4. Power Supply Voltage

Blank: 100 to 240 VAC
D: 24 VAC/VDC

5. Terminal Shape

U: Plug-in

6. Case Color

W: Light gray

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

Examples

- Relay control output, without alarm, thermocouple input, plug-in construction, light gray case: E5CS-RKJU-W
- Relay control output, one alarm output, platinum resistance thermometer input, plug-in construction, light gray case: E5CS-R1PU-W

Ordering Information

■ List of Models

**Case Color: Light Gray, Thermocouple or Platinum Resistance Thermometer,
Power Supply Voltage: 100 to 240 VAC**

Size	Type	Control modes	Alarms	Outputs	Model with thermocouple	Model with platinum resistance thermometer
E5CS-U 48 × 48 mm	Plug-in	ON/OFF or PID	0	Relay	E5CS-RKJU-W	E5CS-RPU-W
				Voltage (for driving SSR)	E5CS-QKJU-W	E5CS-QPU-W
			1	Relay	E5CS-R1KJU-W	E5CS-R1PU-W
				Voltage (for driving SSR)	E5CS-Q1KJU-W	E5CS-Q1PU-W

**Case Color: Light Gray, Thermocouple or Platinum Resistance Thermometer,
Power Supply Voltage: 24 VAC/VDC**

Size	Type	Control modes	Alarms	Outputs	Model with thermocouple	Model with platinum resistance thermometer
E5CS-U 48 × 48 mm	Plug-in	ON/OFF or PID	0	Relay	E5CS-RKJDU-W	E5CS-RPDU-W
				Voltage (for driving SSR)	E5CS-QKJDU-W	---
			1	Relay	E5CS-R1KJDU-W	E5CS-R1PDU-W
				Voltage (for driving SSR)	E5CS-Q1KJDU-W	---

Case Color: Light Gray, Thermistor or Universal-input, Power Supply Voltage: 100 to 240 VAC

Size	Type	Control modes	Alarms	Outputs	Model with thermistor	Model with universal-input (thermocouple and platinum resistance thermometer)
E5CS-U 48 × 48 mm	Plug-in	ON/OFF or PID	0	Relay	E5CS-RGU-W	E5CS-RTU-W
				Voltage (for driving SSR)	E5CS-QGU-W	E5CS-QTU-W
			1	Relay	E5CS-R1GU-W	E5CS-R1TU-W
				Voltage (for driving SSR)	E5CS-Q1GU-W	E5CS-Q1TU-W
			2 (See note.)	Relay	---	E5CS-R2TU-W
				Voltage (for driving SSR)	---	E5CS-Q2TU-W

Note: There is no alarm output 2 mode switch. The default setting for alarm output 2 is for the upper limit alarm mode. To change the setting, change the alarm type for alarm output 2 in initial setting level 5. For details, refer to the "E5CSV/E5CS-U Digital Temperature Controller User's Manual" (Cat. No. H140-E1-01).

Case Color: Light Gray, Thermistor, Power Supply Voltage: 24 VAC/VDC

Size	Type	Control modes	Alarms	Outputs	Model with thermistor
E5CS-U 48 × 48 mm	Plug-in	ON/OFF or PID	0	Relay	E5CS-RGDU-W
			1		E5CS-R1GDU-W

■ Accessories (Order Separately)

Socket without Alarm (8 Pins)

Type	Model
Front Connecting Socket	P2CF-08
Back Connecting Socket (flush mounting)	P3G-08
Front Connecting Socket (with finger protection)	P2CF-08-E
Finger Safe Terminal Cover for P3G	Y92A-48G

Socket with Alarm (11 Pins)

Type	Model
Front Connecting Socket	P2CF-11
Back Connecting Socket (flush mounting)	P3GA-11
Front Connecting Socket (with finger protection)	P2CF-11-E
Finger Safe Terminal Cover for P3G	Y92A-48G

Protective Cover

Type	Model
Hard Protective Cover	Y92A-48B

Specifications

■ 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		100 to 240 VAC: 5 VA 24 VAC: 3 VA, 24 VDC: 2 W
Sensor input		Thermocouple: K, J, L Platinum resistance thermometer: Pt100, JPt100 Thermistor: E52-THE□□ Universal-input (thermocouple/platinum resistance thermometer): K, J, L, T, U, N, R, Pt100, JPt100
Control output	Relay output	SPDT, 250 VAC, 3 A (resistive load)
	Voltage output (for driving the SSR)	12 VDC, 21 mA (with short-circuit protection circuit)
Control method		ON/OFF or 2-PID (with automatic PID parameter setting function)
Alarm output		SPST-NO, 250 VAC, 1A (resistive load)
Setting method		Digital setting using front panel keys
Indication method		7-segment digital display (character height: 13.5 mm) and deviation indicators
Other functions		• Setting change prohibit (key protection) • Input shift • Temperature unit change (°C/°F) • Direct/reverse operation • Temperature range, Sensor switching (K/J/L, Pt100/JPt100) • Switching is performed between a thermocouple and platinum resistance thermometer for universal-input models. • Control period switching • 8-mode alarm output • Sensor error detection (excluding thermistor models)
Ambient operating temperature		–10 to 55°C (with no condensation or icing); with 3-year guarantee: –10 to 50°C
Ambient operating humidity		25% to 85%
Storage temperature		–25 to 65°C (with no condensation or icing)

Note: Do not use an inverter output as the power supply. (Refer to *Safety Precautions for All Temperature Controllers*.)

■ Characteristics

Setting accuracy		Thermocouple (See note 1.): (±1% of indication value or ±2°C, whichever is greater) ±1 digit max.
Indication accuracy (ambient temperature of 23°C)		Platinum resistance thermometer (See note 2.): (±0.5% of indication value or ±1°C, whichever is greater) ±1 digit max. Thermistor (See note 3.): (1% FS of indication value) ±1 digit max.
Influence of temperature		R thermocouple inputs: (±2% of PV or ±10°C, whichever is greater) ±1 digit max.
Influence of voltage		Other thermocouple inputs: (±2% of PV or ±4°C, whichever is greater) ±1 digit max.
Influence of EMS. (at EN 61326-1)		Platinum resistance thermometer inputs: (±1% of PV or ±2°C, whichever is greater) ±1 digit max. Thermistor: (±2% FS) ±1 digit max.
Hysteresis (for ON/OFF control)		0.2% FS (0.1% FS for universal-input (thermocouple/platinum resistance thermometer) models)
Proportional band (P)		1 to 999°C (automatic adjustment using auto-tuning/self-tuning)
Integral time (I)		1 to 1,999 s (automatic adjustment using auto-tuning/self-tuning)
Derivative time (D)		1 to 1,999 s (automatic adjustment using auto-tuning/self-tuning)
Alarm output range		Absolute-value alarm: Same as the control range Other: 0 to input setting range full scale (°C or °F) Alarm hysteresis: 0.2°C or °F (fixed)
Control period		2/20 s
Sampling period		500 ms
Insulation resistance		20 MΩ min. (at 500 VDC)
Dielectric strength		2,000 VAC, 50/60 Hz for 1 min between current-carrying terminals of different polarity
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 single amplitude for 2 hr each in X, Y, and Z directions
Shock resistance	Malfunction	100 m/s ² min., 3 times each in six directions
	Destruction	300 m/s ² min., 3 times each in six directions
Life expectancy	Electrical	100,000 operations min. (relay output models)
Weight		Approx. 110 g (Controller only)
Degree of protection		Front panel: Equivalent to IP50, Enclosure Category 2 (IEC 60529), Rear case: IP20; Terminals: IP00
Memory protection		EEPROM (non-volatile memory) (number of writes: 1,000,000)
EMC		EMI Radiated: EN 55011 Group 1 Class A EMI Conducted: EN 55011 Group 1 Class A Radiated Electromagnetic Field Immunity: EN 61000-4-2: 4 kV contact discharge (level 2) 8 kV air discharge (level 3) RF-interference Immunity: EN 61000-4-3: 10 V/m (80-1000 MHz, 1.4-2.0 GHz amplitude modulated) (level 3) 10 V/m (900 MHz pulse modulated) Conducted Disturbance Immunity: EN 61000-4-6: 3 V (0.15 to 80 MHz) (level 2) Noise Immunity (First Transient Burst Noise): EN 61000-4-4 Burst Immunity: 2 kV power-line (level 3), 1 kV I/O signal-line (level 3) Surge Immunity: EN 61000-4-5: Power line: Normal mode 1 kV; Common mode 2 kV Output line (relay output): Normal mode 1 kV; Common mode 2 kV Voltage Dip/Interrupting Immunity: EN 61000-4-11 0.5 cycle, 100% (rated voltage)
Approved standards		UL 61010-1 (listing) CSA C22.2 No.1010-1
Conformed standards		EN 61326-1 (See note 4.), EN 61010-1, IEC 61010-1

Note: 1. The following exceptions apply to thermocouples.

- U, L: ±2°C ±1 digit max.
 - R: ±3°C ±1 digit max. at 200°C or less
2. The following exception applies to platinum resistance thermometers.
- Input set values 1 for E5CS-U: 1% FS ±1 digit max.
3. The following exceptions apply to thermistors.
- When the unit setting is °C, temperature indication ranges exceeding the set temperature range ±10% FS may not be accurate.
 - When the unit setting is °F, the temperature range for the input setting numbers 4 and 9 (609 to 630°F) and temperature indication ranges exceeding the set temperature range -5% FS to +10% FS may not be accurate.
4. Industrial electromagnetic environment (EN/IEC 61326-1 Table 2)