

Digital Controller E5EK-AA2-DRT

A Digital Controller That Conforms to DeviceNet

- Conforms to DeviceNet, thus communicates with Programmable Controllers with no program required.
- High-performance range of 0.1% FS (Pt input: -100.0°C to 100.0°C)
- Configurator (sold separately) ensures easy initial settings.



Ordering Information

Size	Communication	Model
E5EK 48 x 96 mm	DeviceNet (CompoBus/D)	E5EK-AA2-DRT

- Note:**
1. The heater burnout alarm will be available if the ON/OFF Output Unit is applied to heat control.
 2. If using both control outputs 1 and 2, two Control Output Units are required.
 3. A CT is not provided with the E5EK-AA2-DRT. If using the heater burnout alarm, be sure to order the E5EK-AA2-DRT together with the CT.

Control Output Unit (Sold Separately)

Item	ON/OFF					Linear			
	Relay	SSR (See note.)	Voltage			Current		Voltage	
Model	E53-R	E53-S	E53-Q	E53-Q3	E53-Q4	E53-C3	E53-C3D	E53-V34	E53-V35

Note: The E53-S has no zero-cross function.

Note: Use the High-resolution Output Unit for the E5EK-AA2-DRT. The E53-C Current Output Unit for E5□X cannot be used.

Terminal Cover

Model	E53-COV08
Applicable model	E5EK

Current Transformer (CT) (Sold Separately)

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

Note: Be sure to order the CT along with the Control Output Unit if the heater burnout alarm of the E5EK-DRT is required.

Models with Test Result Sheet

If a test result sheet is required for the model, place the order in the following way.

Model Number

Order using the following example.

E5EK-AA2-DRT-K

Add a hyphen and the suffix "K" to the end of the model number.

■ Input Voltage and Current Ranges

Platinum Resistance Thermometer vs. Thermocouple

Input Factory-set to K (set number 2).	Platinum resistance thermometer		Thermocouple													Current		Voltage					
	JPt 100	Pt 100	K	J	T	E	L	U	N	R	S	B	W (WR6 5.26)	PLII	(mA)	(V)							
	650.0	650.0	1300	850	400.0	400.0	600	850	400.0	400.0	1300	1700	1700	1800	2300	1300	20 to 4	20 to 0	5 to 1	5 to 0	10 to 0		
	-199.9	-199.9	-200	0.0	-100	0.0	-199.9	-100	0.0	-199.9	-200	0.0	0.0	100	0.0	0.0	17	18	19	20	21		
Set number	0	1	22	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Depends on scaling or decimal point				
Minimum setting unit (Target or alarm value)	0.1°C		1°C	0.1°C	1°C	0.1°C	1°C	0.1°C	1°C	0.1°C	1°C												

Specifications

■ Ratings

Power supply voltage (See note 2.)	100 to 240 VAC 50/60 Hz, 24 VAC/VDC
Permissible voltage fluctuation range	85 to 110% of power supply voltage
Power consumption	15 VA (100 to 240 VAC), 12 VA (24 VAC), 8 W (24 VDC)
Input	Thermocouple: K, J, T, E, L, U, N, R, S, B, W, and PL II Platinum resistance thermometer: JPt 100, Pt 100 Current input ranges: 4 to 20 mA and 0 to 20 mA Voltage input ranges: 1 to 5 V, 0 to 5 V, and 0 to 10 V
Input impedance	Current input: 150 Ω Voltage input: 1 MΩ min. (When connecting the ES2-HB, use a 1-to-1 configuration.)
Auxiliary output	SPST-NO, 3 A at 250 VAC (resistive load)
Control method	ON/OFF or 2-PID (with auto-tuning) (See note 3.)
Setting method	Digital setting with front panel keys
Indicator	7-segment digital LED indicators with a height of 14 mm for PV and a height of 9.5 mm for SV
Control output	Output Unit: Refer to <i>Characteristics</i> . Be sure to connect the Output Unit (sold separately) when using these control outputs.
Relay output	
Voltage output	
Linear voltage output	
Current output	
Remote SP input	Current input: 4 to 20 mA (at input impedance of 150 Ω)
CT input	Connect the E54-CT1 or E54-CT3
Other functions	Manual output, heating and cooling control, SP limiter, loop break alarm, SP ramp, MV limit, MV change rate limit, input digital filter, input shift, RUN/STOP, and protector
Ambient temperature	Operating: -10°C to 55°C (with no icing) Under three-year guarantee terms: -10°C to 50°C Storage: -25°C to 65°C (with no icing)
Ambient humidity	Operating: 35% to 85%

- Note:**
- In order to satisfy FCC Class A, which conforms to EN50081-2 standards for terminal noise voltage, apply TDK's ZCB2206-11, ZCB2203-M, or an equivalent noise filter to the AC power line.
 - There is a model with 100 to 240 VAC specifications and a model with 24 VAC/VDC specifications. Unless the required model is specified, the model with 100 to 240 VAC specifications will be ordered.
 - The E5EK-AA2-DRT is not equipped with a fuzzy self-tuning function.

■ Characteristics

Indication accuracy	Thermocouple: $\pm 0.3\%$ of $\pm 1^\circ\text{C}$ of the indicated value, whichever is larger, ± 1 digit max. (See note 1.) Platinum resistance thermometer: $\pm 0.2\%$ or $\pm 0.8\%$ of the indicated value, whichever is larger, ± 1 digit max. (See note 2.) Analog input: $\pm 0.2\% \pm 1$ digit max.
Hysteresis	0.01% to 99.99% FS (0.01% increments)
Proportional band	0.1% to 999.9% FS (0.1% increments)
Integral time	0 to 3,999 s (1-s increments)
Derivative time	0 to 3,999 s (1-s increments)
Control period	1 to 99 s (1-s increments)
Manual reset value	0.0 to 100.0% (0.1% increments)
Alarm set range	-1,999 to 9,999 or -199.9 to 999.9 (Decimal position varies with the type of input and decimal point position setting.)
Sampling period	Temperature input: 250 ms Current or voltage input: 100 ms (See note 3.) Auxiliary input: 1 s (See note 4.)
Insulation resistance	20 M Ω at 500 VDC
Dielectric strength	2,000 VAC at 50/60 Hz for 1 min between charged terminals different in polarity.
Vibration resistance	Malfunction: 10 to 55 Hz with 20 m/s ² in X, Y, and Z directions for 10 min. Destruction: 10 to 55 Hz with a single amplitude of 0.75 mm in X, Y, and Z directions for 2 h.
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. 300 g Mounting Bracket: Approx. 65 g
Degree of protection	Front: NEMA4 for indoor use (conforming to IP66) Rear casing: IP20 Terminal block: IP00
Memory protection	Nonvolatile memory (Data can be written 1,100,000 times)

- Note: 1.** An accuracy of $\pm 2^\circ\text{C} \pm 1$ digit applies to K (-200°C to 1,300°C), T, and N at -100°C or below and U and L instead. There are no specifications for B at 400°C or below.
An accuracy of $\pm 3^\circ\text{C} \pm 1$ digit applies to R and S at 200°C or below.
An accuracy of $\pm 0.3\%$ or $\pm 3^\circ\text{C}$ of the indicated value, whichever is larger, ± 1 digit max. applies to W.
An accuracy of $\pm 0.3\%$ or $\pm 2^\circ\text{C}$ of the indicated value, whichever is larger, ± 1 digit max. to PL II.
- 2.** An accuracy of $\pm 0.1\%$ FS ± 1 digit max. applies to Pt at a range between -100.0°C and 100.0°C.
- 3.** A sampling period of 250 ms applies if CT or remote SP input is allocated.
- 4.** The auxiliary input means CT or remote SP input.

■ Output Unit (Sold Separately) Ratings

Item	Model	Rating/specification	
ON/OFF	Relay	E53-R 250 VAC 5 A (resistive load)	
	SSR	E53-S 75 to 250 VAC 1 A (resistive load)	
	Voltage	E53-Q	12 VDC, 40 mA, NPN
		E53-Q3	24 VDC, 20 mA, NPN
E53-Q4		24 VDC, 20 mA, PNP	
Linear	Current	E53-C3	4 to 20 mA (Load: 600 Ω max.); Resolution: 1/2,600
		E53-C3D	0 to 20 mA (Load: 600 Ω max.); Resolution: 1/2,600
	Voltage	E53-V34	0 to 10 VDC (Load: 1 k Ω max.); Resolution: 1/2,600
		E53-V35	0 to 5 VDC (Load: 1 k Ω max.); Resolution: 1/2,600

■ CT (Sold Separately) Ratings

Dielectric strength	1,000 VAC for 1 min
Vibration resistance	50 Hz with 98 m/s ²
Weight	E54-CT1: Approx. 11.5 g E54-CT3: Approx. 50 g
Accessories (only E54-CT3)	Armature (2), plug (2)

■ DeviceNet Communications Specifications

Communications power supply voltage	11 to 25 VDC
Unit power supply voltage	85 to 264 VDC, 20.4 to 26.4 VAC/VDC
Power consumption	Communications: 30 mA max. Internal circuit power supply: 15 VA (100 to 240 VAC) 12 VA (24 VAC) 8 W (24 VDC)
Max. number of I/O points	16 input words (52 bytes); 16 output words (32 bytes); variable

Note: This product has been tested at the test laboratory of a third-party organization authorized by the ODVA and has been certified to conform to the ODVA's conformance software versions 2.0 to 1.00. For details on Object specifications, refer to the *E5EK Digital Controller User's Manual* (H085).

■ Performance Characteristics of Heater Burnout Alarm

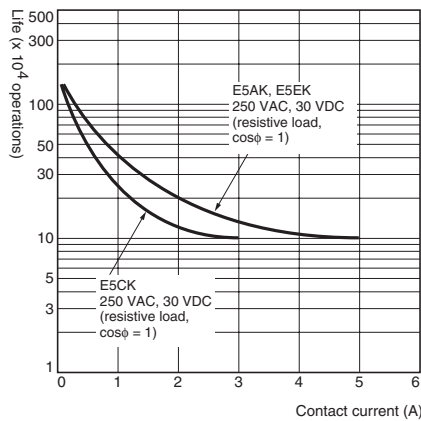
Maximum heater current	Single-phase 50 A AC (See note 1.)
Indication accuracy for heater current	±5% FS ±1 digit max.
Setting range for heater burnout alarm	0.1 to 49.9 A (0.1-A units) (See note 2.)
Minimum detection ON time	190 ms (See note 3.)

Note: 1. For burnout detection of 3-phase heaters, use the K2CU-F□□A-□GS (with gate input terminal).

2. If the heater burnout alarm is set to 0.0 A, it will always be OFF, and if it is set to 50.0 A, it will always be ON.

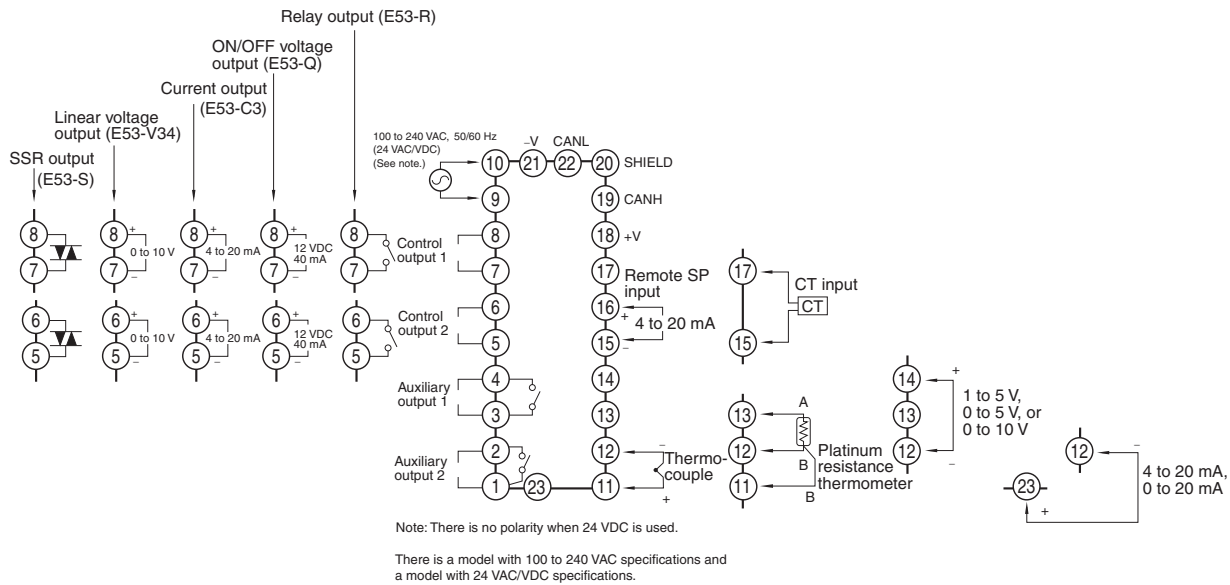
3. If the ON time for control output is less than 190 ms, heater burnout will not be detected and heater current will not be measured.

■ Relay Electrical Life Curve (Reference Values)



Operation

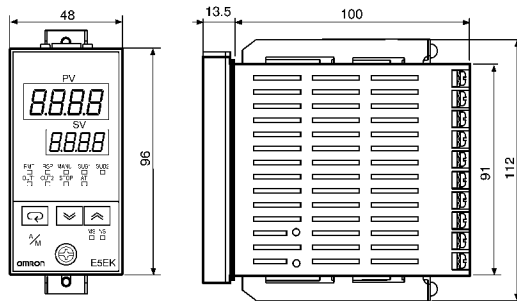
Wiring Terminals



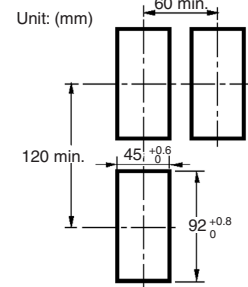
Dimensions

Note: All units are in millimeters unless otherwise indicated.

E5EK-AA2-DRT



Panel Cutout Dimensions



- The panel thickness must be 1 to 8 mm.
- Do not mount the Units closely together horizontally or vertically. Keep the distances between adjacent Units.

Precautions

For details on precautions and other information required to use this product, be sure to refer to the following manuals: *E5EK Digital Controller User's Manual (H085)* and *DeviceNet Operation Manual (W267)*. These manuals are not provided with this product. They must be obtained separately.