

Appendix A

Specifications

E5ZE Ratings

Item	Specification
Power supply voltage	24 VDC
Allowable power supply range	85% to 110% of power voltage
Power consumption	15 W + 20% max. at rated voltage
Sensor inputs	Thermocouple: K, J, R, S, T, E, B, N, L, U, W, PL II Platinum resistance thermometer: Pt100, JPt100 (Rated current: 1 mA, 8 points)
CT inputs	E54-CT1 or E54-CT3
Measurement unit	0.1 A, 8 points
Max. heater current	50 A (single-phase AC)
Control outputs	Voltage output (with short-circuit protecting function) ON: 12 ± 1.2 VDC OFF: 0.5 VDC max. Max. load current: 30 mA DC per point Current output Rated output range: 4 ^{+0/-0.6} to 20 ^{+2/-0} mA Max. load resistance: 600 Ω
Alarm outputs	Cooling control output: 8 points Temperature alarm: Two points (one for alarm 1 and one for alarm 2) for total output of each control point HB alarm (heater burnout detection): One point for total output of each control point HS alarm (SSR failure detection): One point for total output of each control point Temperature controller error output (memory, set value, or hardware error): One point All of the above are NPN open collector outputs Max. voltage imposition: 30 VDC Max. load current: 50 mA ON residual voltage: 2 VDC max. OFF leakage current: 1 mA max.
Memory bank designation input	No-voltage contact signal input: ON contact resistance: 1 kΩ max. OFF contact resistance: 100 kΩ max. Transistor open collector input: ON residual voltage: 2 VDC max. OFF leakage current: 1 mA max.
No. of input control points	8 inputs and 8 control points, 3 memory bank designation inputs
Setting method	Through communications
Indication method	No indication. Process values are output through communications.
Output operation	Direct and reverse operation
Adjustment mode	ON/OFF control Hybrid of 2-PID control and fuzzy control Manual operation
Auto-tuning	Limit cycle method
Memory bank	No. of banks: 8 for each control point Designation method: Through communications or using contact input

Item	Specification
Ambient operating temperature	–10 to 55 °C (0 to 55 °C for the E5ZE-8□□□D1□B) (with no icing or condensation)
Ambient operating humidity	35% to 85% RH
Storage temperature	–25 to 65 °C (with no icing or condensation)
Storage humidity	35% to 95% (with no condensation)

Communications Ratings

Serial Communications

Communications interface	RS-232C	RS-422	RS-485
Transmission method	Serial communications		
Terminal	Data processing terminal		
Communications method	Half-duplex		
Connecting method	25-pin D-sub connector	5-pole terminal block (with M3 screws)	
Transmission line configuration	3-wire	4-wire	2-wire
Transmission line type	Direct line	Multi-drop line	
Synchronization method	Start-stop synchronization (asynchronous)		
Baud rate	2,400/4,800/9,600/19,200 bps		
Transmission code	ASCII		
No. of stop bits	2		
Parity	Even parity		
Character length	7 bits		
Error detection	Vertical parity and FCS (frame check sequence)		
Communications unit no.	0 to F (hexadecimal)		
Transmission and reception switching time	---	20 ms max.	
Max. cable length	15 m	500 m in total	
No. of controllers connected in parallel	---	16 (excluding host system)	

CompoBus/D Communications

Item	Specification
Power supply voltage	24 VDC
Allowable voltage fluctuation range	11 to 25 VDC (supplied through communications connector)
Current consumption	24 VDC at 45 mA max.
No. of Remote I/O words	14 input words, 9 output words
Message communications function	FINS messages

E5ZE Characteristics

Item		Specification				
Measurement range		–20°C (lower limit of the setting range) to 20°C (upper limit of the setting range) –40°F (lower limit of the setting range) to 40°F (upper limit of the setting range)				
Setting range	Setting unit		1		0.1	
			Celsius	Fahrenheit	Celsius	Fahrenheit (See note 2.)
	Thermocouple	K	–200 to 1,300°C	–300 to 2,300°F	–200.0 to 1,300.0°C	–300.0 to 2,300.0°F
		J	–100 to 850°C	–100 to 1,500°F	–100.0 to 850.0°C	–100.0 to 1,500.0°F
		R	0 to 1,700°C	0 to 3,000°F	0.0 to 1,700.0°C	0.0 to 3,000.0°F
		S	0 to 1,700°C	0 to 3,000°F	0.0 to 1,700.0°C	0.0 to 3,000.0°F
		T	–200 to 400°C	–300 to 700°F	–200.0 to 400.0°C	–300.0 to 700.0°F
		E	0 to 600°C	0 to 1,100°F	0.0 to 600.0°C	0.0 to 1,100.0°F
		B	100 to 1,800°C	300 to 3,000°F	100.0 to 1,800.0°C	300.0 to 3,000.0°F
		N	0 to 1,300°C	0 to 2,300°F	0.0 to 1,300.0°C	0.0 to 2,300.0°F
		L	–100 to 850°C	–100 to 1,500°F	–100.0 to 850.0°C	–100.0 to 1,500.0°F
		U	–200 to 400°C	–300 to 700°F	–200.0 to 400.0°C	–300.0 to 700.0°F
		W/Re5-26	0 to 2,300°C	32 to 4,100°F	0.0 to 2,300.0°C	0.0 to 4,100.0°F
		PL-II	0 to 1,300°C	0 to 2,300°F	0.0 to 1,300.0°C	0.0 to 2,300.0°F
	Platinum resistance thermometer	Pt 100	–100 to 500°C	–100 to 900°F	–100.0 to 500.0°C	–100.0 to 900.0°F
		JPt 100	–100 to 500°C	–100 to 900°F	–100.0 to 500.0°C	–100.0 to 900.0°F
Measurement accuracy		Thermocouple: ±0.3% of the process value or ±2°C, whichever is larger ±1 digit max. ±0.3% of the process value or ±3.6°F, whichever is larger ±1 digit max. Platinum resistance thermometer: ±0.3% of the process value or ±0.8°C, whichever is larger ±1 digit max. ±0.3% of the process value or ±1.5°F, whichever is larger ±1 digit max.				
Setting accuracy		There is no difference between the setting accuracy and measurement accuracy.				
Guaranteed setting accuracy range		Same as the setting range.				
Influence of conductor resistance		Thermocouple: ±0.1°C/Ω or ±0.2°F/Ω max. Platinum resistance thermometer: ±1.0°C/Ω or ±1.8°F/Ω max. per line				
Input shift		–99.9 to 99.9°C/°F (in units of 0.1°C/°F)				
Hysteresis		0.0 to 99.9°C/°F for ON/OFF control only (in units of 0.1°C/°F)				
Cooling coefficient		0.0 to 10.0 (in units of 0.1)				
Proportional band (P constant)		0.0° to 999.9°C/°F (in units of 0.1°C/°F) Cooling proportional band: Proportional band x Cooling factor				
Integral time (I constant)		0 to 3,999 s (in units of 1 s) (cannot be set for heating and cooling independently)				
Derivative time (D constant)		0 to 3,999 s (in units of 1 s) (cannot be set for heating and cooling independently)				
Control period		1 to 99 s (in units of 1 s) Cooling control period: 1 to 99 s (in units of 1 s)				
Sampling period		200 ms for 8 control points				

Item		Specification		
Dead band/overlap band		-999 to 999°C/°F (in units of 1°C/°F)		
Upper-limit output value		ON/OFF pulse type: (Lower-limit output value + 0.1)% to 100.0% (in units of 0.1%) Linear output type: (Lower-limit output value + 0.1)% to 105.0% (in units of 0.1%)		
Lower-limit output value		ON/OFF pulse type: 0.0% to (Upper-limit output value - 0.1)% (in units of 0.1%) Linear output type: -5.0% to (Upper-limit output value - 0.1)% (in units of 0.1%)		
Output value change rate limit		0.0% to 100.0% per sampling period (200 ms approx.) in units of 0.1%		
Alarm output setting range	Setting unit		1	0.1 (See note 2)
	Alarm mode	Upper- and lower-limit (See note 1)	0° to 9,999°C/°F	0.0° to 9,999.9°C/°F
		Upper-limit (See note 1)	-999° to 9,999°C/°F	-999.9° to 9,999.9°C/°F
		Lower-limit	-999° to 9,999°C/°F	-999.9° to 9,999.9°C/°F
		Upper- and lower-limit range	0° to 9,999°C/°F	0.0° to 9,999.9°C/°F
		Absolute-value up-per-limit (See note 1)	-999° to 9,999°C/°F	-999.9° to 9,999.9°C/°F
		Absolute-value lower-limit (See note 1)	-999° to 9,999°C/°F	-999.9° to 9,999.9°C/°F
		HB and HS alarm	-999° to 9,999°C/°F	-999.9° to 9,999.9°C/°F
CT input measurement range		0.0 to 55.0 A AC(in units of 0.1 A)		
CT input measurement accuracy		±5% FS ± 1 digit max. (between 0.0 to 50.0 A)		
HB and HS alarm setting range		0.0 to 50.0 A (in units of 0.1 A)		
HB and HS alarm setting accuracy		There is no difference between the CT input measurement accuracy and HB and HS alarm setting accuracy.		
HB alarm min. detection ON time		Control output must be continuously ON for 100 ms min.		
HS alarm min. detection OFF time		Control output must be continuously OFF for 100 ms min.		
Fuzzy strength		0% to 99% (in units of 1%)		
Fuzzy scale 1		0.2 to 999.9°C/°F (in units of 0.1°C/°F)		
Fuzzy scale 2		0.02 to 99.99°C/s or °F/s (in units of 0.01°C/s or °F/s)		
Insulation resistance		20 MΩ min. between the FG terminal and all input terminals (at 500 VDC)		
Dielectric strength		500 VAC for 1 minute between the FG terminal and all input terminals		
Vibration resistance		Malfunction: Vibration frequency: 10 to 55 Hz Acceleration: 15 m/s ² Direction and time: 8 min each in X, Y, and Z directions Destruction: Vibration frequency: 10 to 55 Hz Acceleration: 20 m/s ² Direction and time: 8 min each in X, Y, and Z directions		

Item	Specification
Shock resistance	Malfunction: Max. acceleration: 150 m/s ² Direction: 3-axis, 6 directions Times: 18 times in total Destruction: Max. acceleration: 200 m/s ² Direction: 3-axis, 6 directions Times: 18 times in total
Enclosure rating	IP00
Dimensions	E5ZE-8 □□□□□-E (without casing): 169.5 x 192 x 58 mm E5ZE-8 □□□□□B-E (with casing): 173.5 x 230 x 65 mm E5ZE-8 □□□□D1□B (CompoBus/D): 173.5 x 253 x 65 mm
Set value backup	Lithium battery
Set value backup period	10 years min. provided that the ambient temperature is within the normal room temperature
Weight	Without casing: Approx. 900 g With casing: Approx. 1,700 g (including 2 mounting brackets)

- Note**
- These alarm mode settings include the standby sequence.
 - When CompoBus/D is used to set the alarm settings, the upper limit is 3,000.0 °C/°F (in units of 0.1)
 - The applicable standards for the temperature sensor input types are as follows:

K, J, T, E, R, S, B:	JIS C1602-1981
L:	Fe-CuNi, DIN 43710-1985
U:	Cu-CuNi, DIN 43710-1985
N:	Nicrosil-NisiL, IEC584-1, 1977; Amendment No. 1, 1989
W:	W5Re/W26Re, ASTM E988-1990
PL II:	According to PLATINEL II Electromotive Force Table by ENGELHARD
JPt100:	JIS C 1604-1989, JIS C1606-1989
Pt100:	JIS C 1604-1989, JIS C1606-1989 IEC 751