OMRON

Multipoint Temperature Controller
E5ZD

One-board Multipoint Temperature Controller which can be Built into Communications Equipment

• A high-speed scanning operation of 0.5 s max. is possible.
• Detecting heater burnout and open- and short-mode SSR failures.
• Non-contact sensor input selection method assures high reliability and long life.
• Models with the suffix M incorporate connectors, thus assuring efficient operation.
• Heating- and cooling-output model is available.
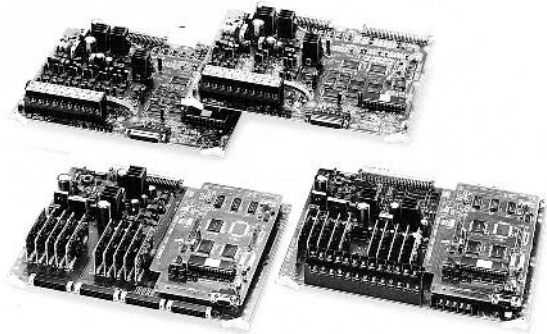
Model Number Structure

■ Model Number Legend

E5ZD - ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ - E
　　　　1　2　3　4　　5　　6　7

1. No. of points
  4: 4 points
  6: 6 points
  8: 8 points
2. Standard, Heating and Cooling, or Fuzzy Control
  A: Standard control
  V: Heating and cooling control
  F: Fuzzy control
3. Heater Burnout Detection
  H: Available
  A: Not available
4. Communications
  01: RS-232C
  02: RS-422
  03: RS-485
5. Sensor Input
  KJ: Thermocouple (K and J type)
  P: Platinum resistance thermometer
6. Wiring
  M: Connector type
7. Language
  E: English

Ordering Information

■ Temperature Controllers

Standard Models

Sensor input connection	No. of control points	Heater-burnout detection	Communications	Thermocouple	Resistance thermometers
Terminal block	4	No	RS-232C	E5ZD-4A01KJ-E	E5ZD-4A01P-E
			RS-422	E5ZD-4A02KJ-E	E5ZD-4A02P-E
			RS-485	E5ZD-4A03KJ-E	E5ZD-4A03P-E
		Yes	RS-232C	E5ZD-4H01KJ-E	E5ZD-4H01P-E
			RS-422	E5ZD-4H02KJ-E	E5ZD-4H02P-E
			RS-485	E5ZD-4H03KJ-E	E5ZD-4H03P-E
	6	No	RS-232C	E5ZD-6A01KJ-E	E5ZD-6A01P-E
			RS-422	E5ZD-6A02KJ-E	E5ZD-6A02P-E
			RS-485	E5ZD-6A03KJ-E	E5ZD-6A03P-E
		Yes	RS-232C	E5ZD-6H01KJ-E	E5ZD-6H01P-E
			RS-422	E5ZD-6H02KJ-E	E5ZD-6H02P-E
			RS-485	E5ZD-6H03KJ-E	E5ZD-6H03P-E
	8	No	RS-232C	E5ZD-8A01KJ-E	E5ZD-8A01P-E
			RS-422	E5ZD-8A02KJ-E	E5ZD-8A02P-E
			RS-485	E5ZD-8A03KJ-E	E5ZD-8A03P-E
		Yes	RS-232C	E5ZD-8H01KJ-E	E5ZD-8H01P-E
			RS-422	E5ZD-8H02KJ-E	E5ZD-8H02P-E
			RS-485	E5ZD-8H03KJ-E	E5ZD-8H03P-E
Connector	8	Yes	RS-422	E5ZD-8H02KJM-E (see note)	E5ZD-8H02PM-E
			RS-485	E5ZD-8H03KJM-E (see note)	E5ZD-8H03PM-E

Heating- and Cooling-output Models

Sensor input connection	No. of control points	Heater-burnout detection	Communications	Thermocouple	Resistance thermometers
Terminal block	4	No	RS-232C	E5ZD-4VA01KJ-E	E5ZD-4VA01P-E
			RS-422	E5ZD-4VA02KJ-E	E5ZD-4VA02P-E
			RS-485	E5ZD-4VA03KJ-E	E5ZD-4VA03P-E
		Yes	RS-232C	E5ZD-4VH01KJ-E	E5ZD-4VH01P-E
			RS-422	E5ZD-4VH02KJ-E	E5ZD-4VH02P-E
			RS-485	E5ZD-4VH03KJ-E	E5ZD-4VH03P-E
	6	No	RS-232C	E5ZD-6VA01KJ-E	E5ZD-6VA01P-E
			RS-422	E5ZD-6VA02KJ-E	E5ZD-6VA02P-E
			RS-485	E5ZD-6VA03KJ-E	E5ZD-6VA03P-E
		Yes	RS-232C	E5ZD-6VH01KJ-E	E5ZD-6VH01P-E
			RS-422	E5ZD-6VH02KJ-E	E5ZD-6VH02P-E
			RS-485	E5ZD-6VH03KJ-E	E5ZD-6VH03P-E
	8	No	RS-232C	E5ZD-8VA01KJ-E	E5ZD-8VA01P-E
			RS-422	E5ZD-8VA02KJ-E	E5ZD-8VA02P-E
			RS-485	E5ZD-8VA03KJ-E	E5ZD-8VA03P-E
		Yes	RS-232C	E5ZD-8VH01KJ-E	E5ZD-8VH01P-E
			RS-422	E5ZD-8VH02KJ-E	E5ZD-8VH02P-E
			RS-485	E5ZD-8VH03KJ-E	E5ZD-8VH03P-E

Fuzzy-control Models

Sensor input connection	No. of points	Heater-burnout detection	Communications	Thermocouple	Resistance thermometers
Terminal block	8	No	RS-232C	E5ZD-8FA01KJ-E	E5ZD-8FA01P-E
			RS-422	E5ZD-8FA02KJ-E	E5ZD-8FA02P-E
			RS-485	E5ZD-8FA03KJ-E	E5ZD-8FA03P-E
		Yes	RS-232C	E5ZD-8FH01KJ-E	E5ZD-8FH01P-E
			RS-422	E5ZD-8FH02KJ-E	E5ZD-8FH02P-E
			RS-485	E5ZD-8FH03KJ-E	E5ZD-8FH03P-E
Connector	8	Yes	RS-422	E5ZD-8FH02KJM-E (see note)	E5ZD-8FH02PM-E
			RS-485	E5ZD-8FH03KJM-E (see note)	E5ZD-8FH03PM-E

Note: A Terminal Block for thermocouple input is required when connecting a thermocouple to the E5ZD-8H02KJM-E, E5ZD-8H03KJM-E, E5ZD-8FH02KJM-E or E5ZD-8FH03KJM-E.

■ Terminal Blocks

Type	Model
For thermocouple input	E54-TR011 (4-point input)
For I/O	XW2B-20G4, XW2B-20G5

■ Current Transformers (CT)

Hole diameter	Model
5.8 mm	E54-CT1
12.0 mm	E54-CT3

Note: The above CTs are not provided with the E5ZD.

■ Recommended Power Supply

S82J Switching Power Supply

Construction	Capacity	Output current	Model
		24 VDC	**100 to 240 VAC input**
Open-frame	25 W	1.1 A	S82J-02524A
	50 W	2.1 A	S82J-05024A
	100 W	4.5 A	S82J-10024A
Covered	25 W	1.1 A	S82J-02524D
	50 W	2.1 A	S82J-05024D
	100 W	4.5 A	S82J-10024D

■ Cable, Relay Terminal, Connector Terminal Conversion Unit, and Connectors

Cable

Length	Model
2,000 mm	G79-200C

I/O Relay Terminal

Classification	I/O points	Internal I/O circuit common	Rated voltage	Model
Output	16 points	NPN correspondence (+ common)	12, 24 VDC	G7TC-OC16-1

Note: The G7TC-OC16-1 is an UL- and CSA-approved model.

Connector Terminal Conversion Unit

Number of pins	Model
20	XW2B-20G5

Connectors (CN1, CN2/CN301, CN302)

Lead Wires	IDC Connector (64-contact)
Flat Cable	DIN Flat Cable Connector (64-contact)

Specifications

■ Ratings

Power supply voltage	24 VDC
Operating voltage range	90% to 110% of rated supply voltage
Power consumption	E5ZD-4/-6□□□-E:Approx. 15 W E5ZD-8□□□-E: Approx. 20 W E5ZD-8□H□□M-E: Approx. 17 W
Input	Thermocouple (K/J) or platinum resistance thermometer (Pt100/JPt100)
Current Transformer input	Connect a exclusive Current Transformer (E54-CT1 or E54-CT3)
Control points	4, 6, or 8 points
Control outputs	E5ZD-4/-6□□□-E Voltage: 40 mA, 12 VDC max. Open collector (NPN):50 mA, 30 VDC max. E5ZD-8□□□-E Voltage: 30 mA, 12 VDC max. Open collector (NPN):50 mA, 30 VDC max. E5ZD-8□H□□M-E Open collector (NPN):50 mA, 30 VDC max. E5ZD-4/-6V□□□-E Heating-control output Voltage: 40 mA, 12 VDC max. Open collector (NPN):50 mA, 30 VDC max. Cooling-control output Open collector (NPN):50 mA, 30 VDC max. E5ZD-8V□□□-E Heating-control output Voltage: 30 mA, 12 VDC max. Open collector (NPN):50 mA, 30 VDC max. Cooling-control output Open collector (NPN):50 mA, 30 VDC max.
Alarm outputs	Open collector (NPN), 50 mA, 30 VDC max.
Control modes	E5ZD-8F□□□-E:ON/OFF control or hybrid of fuzzy and 2-PID control with feed-forward circuitry (with auto-tuning) Other models: ON/OFF control or 2-PID control with feed-forward circuitry (with auto-tuning)
Number of memory banks	8
Memory bank designation inputs	Contact: ON: 1 kΩ max., OFF: 100 kΩ min. No-contact: ON: Residual voltage of 2 V max., OFF: Leakage current: 1 mA max.
Ambient temperature	Operating: −10°C to 55°C (with no icing) Storage: −25°C to 65°C (with no icing)
Ambient humidity	Operating: 35% to 85% (with no condensation)

■ Input Ranges

Input		Thermocouples		Platinum resistance thermometers	
		K (CA) Chromel vs. alumel/ J (IC) Iron vs. constantan		JPt100/Pt100	
Range	°C	0 to 400	0 to 600	−100.0 to 200.0	0 to 500
	°F	0 to 700	0 to 1,100	−100.0 to 390.0	0 to 930
Resolution (°C/°F)		1		0.1	1

Note: The temperature range of the E5ZD is factory set to a range of 0°C to 400°C (K(CA)) or −100.0°C to 200.0°C (JPt100) before shipping. Use the DIP switches of the E5ZD to change the temperature range.

■ Temperature Controller Characteristics

Measurement accuracy	±0.5% FS ±1 digit max.
Hysteresis	Heating side: 0.0°C/°F to 99.9°C/°F Cooling side: 0.0°C/°F to 99.9°C/°F (see note 1)
Proportional band	Heating side: 0.0°C/°F to 999.9°C/°F Cooling side: Cooling coefficient x proportional band on the heating side (see note 1)
Integral time	0 to 3,999 s (for both heating and cooling)
Derivative time	0 to 3,999 s (for both heating and cooling)
Cooling coefficient	0.0 to 10.0 (see note 1)
Dead band/overlap band	−999°C/°F to 999°C/°F (see note 1)
Control period	Heating side: 1 to 99 s Cooling side: 1 to 99 s (see note 1)
Fuzzy intensity	0% to 99% (see note 2)
Fuzzy scale 1	0.2°C/°F to 999.9°C/°F (see note 2)
Fuzzy scale 2	0.02°C/°F to 99.99°C/s or °F/s (see note 2)
Alarm output setting range (alarms 1 and 2)	−999°C/°F to 1,999°C/°F (in units of 1°C/°F) −999.9°C/°F to 1,999.9°C/°F (in units of 0.1°C/°F)
Sampling period	E5ZD-4□□□□-E: 0.4 s for 4 points E5ZD-6□□□□-E: 0.5 s for 6 points E5ZD-8□□□□-E: 0.5 s for 8 points
Input shift range	−99.9°C/°F to 99.9°C/°F
Insulation resistance	20 MΩ min. (at 500 VDC) between terminal block and sensor input terminal
Dielectric strength	500 VAC, 50/60 Hz for 1 min between terminal block and sensor input terminal
Memory protection	Non-volatile memory, 10 yrs., max. number of writes: 10,000
Weight	E5ZD-4/-6□□□□-E: Approx. 550 g E5ZD-8□□□□-E: Approx. 800 g E5ZD-8□H□□M-E: Approx. 650 g

Note: 1. For heating- and cooling-output models only.
 2. For fuzzy-control models only.

■ Heater Burnout and SSR Failure Detection Characteristics (Heater Burnout (HB) and Heater Short-circuit (HS) Alarm Functions)

Max. heater current	50 A, single-phase
Input current monitoring accuracy	±5% FS ±1 digit max. (between 0 and 50 A)
Heater burnout detection level setting range	0.1 to 50.0 A (in units of 0.1 A) (see note 1)
HS alarm detection current	0.5 A min.
HB alarm min. ON detection time	0.2 s (see note 2)
HS alarm min. OFF detection time	0.2 s (see note 3)

Note: 1. Heater burnout detection is canceled when the level is set to 0.0 A.
 2. Heater burnout detection and heater current measurement will not be made when control output is not ON for at least 0.2 seconds.
 3. Heater short-circuit detection will not be made when control output is not OFF for at least 0.2 seconds.

■ Current Transformer Ratings

Hole diameter	E54-CT1: 5.8 dia.; E54-CT3: 12 dia.
Max. continuous heater current	50 A
Dielectric strength	1,000 VAC for 1 min
Vibration resistance	50 Hz (approx. 10G)
Weight	E54-CT1: approx. 11.5 g, E54-CT3: approx. 50 g
Accessories (E54-CT3)	Contacts: 2, Plugs: 2

■ Communications Specifications

Item	RS232C, RS422	RS485
Transmission method	4-wire, half-duplex	2-wire, half-duplex
Synchronization method	Start-stop synchronization	
Baud rate	150/300/600/1,200/2,400/4,800/9,600 bps	
Transmission code	ASCII (7-bit)	
Communications	Set value, process value, set alarms 1 and 2, alarm modes 1 and 2, hysteresis, proportional band, integral time, derivative time, input shift, MV, Auto-tuning (AT) start/stop, direct value and reverse operating mode, heater burnout detection setting, control start/stop, control memory bank, set value initialization, non-volatile memory set value transfer, status (see note 4), cooling coefficient, fuzzy intensity.	

Note: 1. The maximum total cable length must not exceed the following limits.
RS-422: 500 m, RS-232C: 15 m, RS-485: 200 m

2. Recommended connectors:
RS-485, RS-422: XM2□D Sub Connector (9 pin)
RS-232C: XM2□D Sub Connector (25 pin)

3. A maximum of 16 Temperature Controllers can be connected to one host computer using serial communications (RS-422 or RS-485).
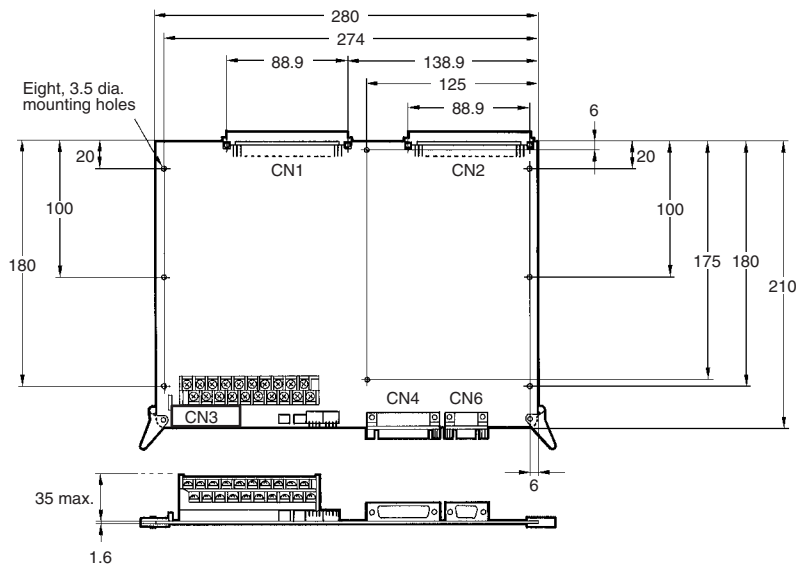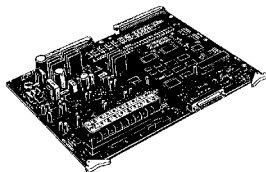
4. The following table indicates the possible status of the E5ZD.

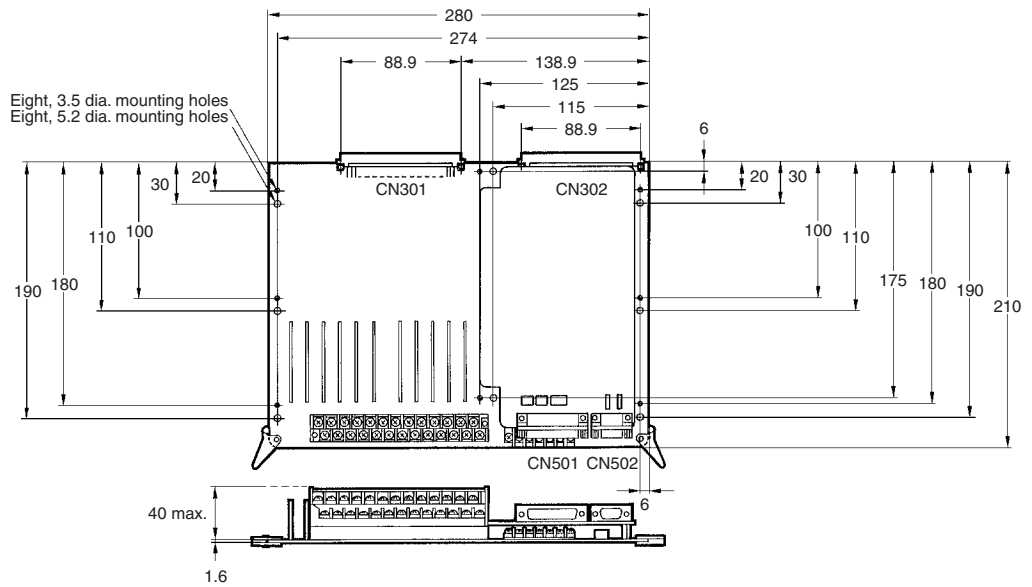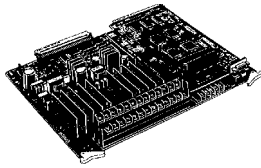| Function	Bit status 1	0	Function	Bit status 1	0
Control	Controlled	Not controlled	Sensor error	Abnormal	Normal
Control operation	Direct operation	Reverse operation	Abnormal output status of temperature controller	ON	OFF
Auto-tuning	Executing	Not executing	Output status of alarm 1	ON	OFF
Heater current overflow	Abnormal	Normal	Output status of alarm 2	ON	OFF
Measured temperature underflow	Abnormal	Normal	Output status of HB alarm	ON	OFF
Measured temperature overflow	Abnormal	Normal	Output status of HS alarm	ON	OFF

Dimensions

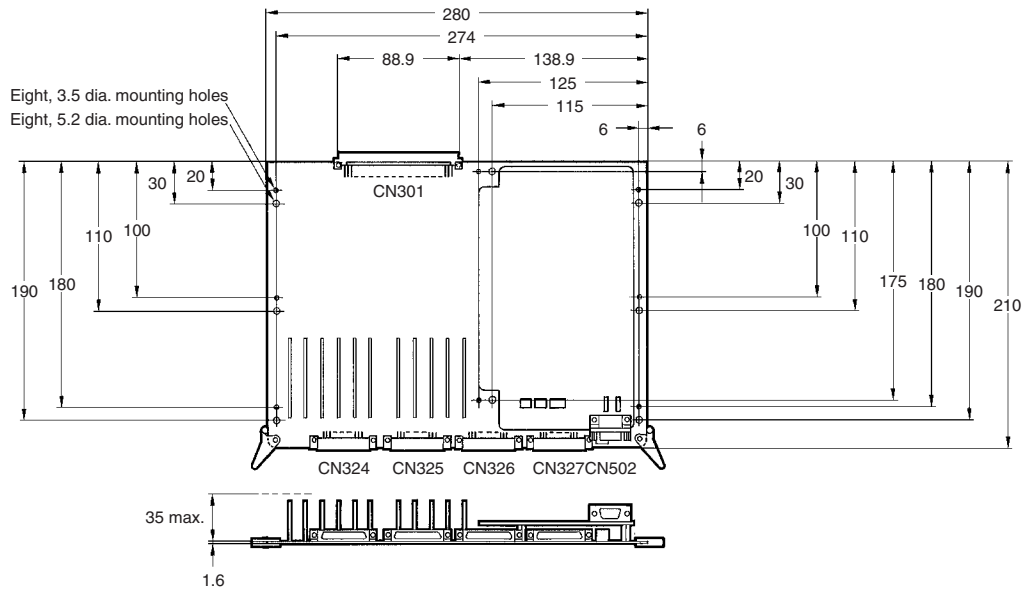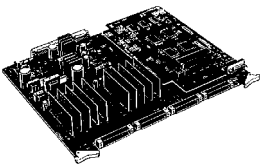**Note:** All units are in millimeters unless otherwise indicated.

E5ZD-4□□□-E/E5ZD-6□□□-E

E5ZD-8☐☐☐-E

Eight, 3.5 dia. mounting holes
Eight, 5.2 dia. mounting holes

280
274
88.9
138.9
125
115
88.9
6
20 30
CN301
CN302
30 20
110 100
100 110
190 180
175 180 190 210
40 max.
CN501 CN502
6
1.6

E5ZD-8H☐☐M-E

Eight, 3.5 dia. mounting holes
Eight, 5.2 dia. mounting holes

280
274
88.9
138.9
125
115
6
6
30 20
CN301
20 30
110 100
100 110
190 180
175 180 190 210
35 max.
CN324 CN325 CN326 CN327CN502
1.6

E54-TR011

Flat-cable connector
3.5
112.5
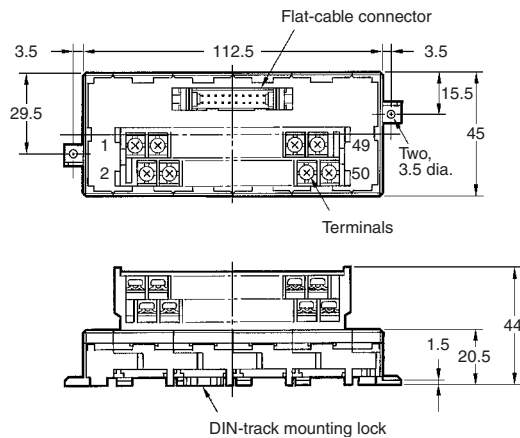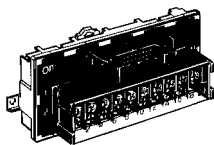3.5
29.5
15.5
45
1
49
2
50
Two, 3.5 dia.
Terminals
44
1.5
20.5
DIN-track mounting lock

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.