ZESTA
Industrial Thermal Technologies

DATASHEET
ZEL-C-0320

ZEL-C Series
Process and Temperature Controller



FEATURES

- ☑ Multi Color LCD Display
- ☑ 200 msec Sampling Rate
- ☑ Universal Input (T/C, RTD, mA, VDC)
- ☑ Fuzzy + PID Control and Auto-Tuning
- ☑ Soft-Start Function
- ☑ CT Inputs for Heater-Break Detection
- ☑ Bumpless Transfer
- ☑ 2 Event Inputs
- ☑ Bidirectional Menu Navigation
- ☑ Lockout Protection
- ☑ Approvals: UL, cUL, CE, RoHS, REACH, WEEE

Available From Stock

The Zesta ZEL-C series is the newest generation of low cost PID microprocessor-based controllers. Equipped with Fuzzy logic / PID control, this controller incorporates two bright easy-to-read LCD displays, indicating Process Value (PV) and Set Point value (SP).

Fuzzy Logic technology incorporated on this controller enables a process to reach a predetermined set point in the shortest time with minimum of overshoot during start up or external load disturbances.

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Process and Temperature Controller

SPECIFICATIONS



Model	C22	C62	C82	C83	C72	C42	R22

Power Supply	90 to 250 VAC, 47–63 Hz; 11 to 40 VDC / 20 to 28 VAC, 47–63 Hz
Power Consumption	C22/R22: 8VA, 4W maximum, C62: 10VA, 5W maximum, C72/C82/C83/C42: 12VA, 6W maximum

Signal Input				
Type	Thermocouple (J, K, T, E, B, R, S, N, L, U, P, C, D), RTD (PT100 (DIN), PT100 (JIS)), Current (mA), Voltage (Volts)			
Resolution	18 Bits			
Sampling Rate	5 Times / Second (200 ms)			
Maximum Rating	-2 VDC minimum, 12 VDC maximum			
Input Characteristics	**Type**	**Range**	**Accuracy @ 25℃**	**Input Impedance**
	J	-120 ℃ to 1,000.0 ℃ (-184 ℉ to 1,832 ℉)	± 2℃	2.2 MΩ
	K	-200 ℃ to 1,370.0 ℃ (-328 ℉ to 2,498 ℉)	± 2℃	2.2 MΩ
	T	-250 ℃ to 400.0 ℃ (-418 ℉ to 752 ℉)	± 2℃	2.2 MΩ
	E	-100 ℃ to 900.0 ℃ (-148 ℉ to 1,652 ℉)	± 2℃	2.2 MΩ
	B	0 ℃ to 1,820.0 ℃ (32 ℉ to 3,308 ℉)	± 2℃ (200℃ to 1,800 ℃)	2.2 MΩ
	R	0 ℃ to 1,767.8 ℃ (32 ℉ to 3,214 ℉)	± 2℃	2.2 MΩ
	S	0 ℃ to 1,767.8 ℃ (32 ℉ to 3,214 ℉)	± 2℃	2.2 MΩ
	N	-250 ℃ to 1,300.0 ℃ (-418 ℉ to 2,372 ℉)	± 2℃	2.2 MΩ
	L	-200 ℃ to 900.0 ℃ (-328 ℉ to 1,652 ℉)	± 2℃	2.2 MΩ
	U	-200 ℃ to 600.0 ℃ (-328 ℉ to 1,112 ℉)	± 2℃	2.2 MΩ
	P	0 ℃ to 1,395.0 ℃ (32 ℉ to 2,543 ℉)	± 2℃	2.2 MΩ
	C	0 ℃ to 2,300.0 ℃ (32 ℉ to 4,172 ℉)	± 2℃	2.2 MΩ
	D	0 ℃ to 2,300.0 ℃ (32 ℉ to 4,172 ℉)	± 2℃	2.2 MΩ
	PT100 (DIN)	-200 ℃ to 850.0 ℃ (-328 ℉ to 1,562 ℉)	± 0.4℃	1.3 KΩ
	PT100 (JIS)	-200 ℃ to 600.0 ℃ (-328 ℉ to 1,112 ℉)	± 0.4℃	1.3 KΩ
	mA	-3 mA to 27 mA	±0.05 %	2.5 Ω
	V	-1.3 VDC to 11.5 VDC	± 0.05%	1.5 MΩ
Temperature Eff ect	1.5 μV / ℃ for all inputs except mA input, 3.0 μV / ℃ for mA			
Sensor Lead Resistance Eff ect	Thermocouple : 0.2 μV / Ω; 3-wire RTD : 2.6℃ / Ω of Difference of Resistance of two leads; 2- wire RTD : 2.6 ℃ / Ω of Sum of Resistance of two leads			
Burn-out Current	200 nA			
Common Mode Rejection Ratio (CMRR)	120 dB			
Normal Mode Rejection Ratio (NMRR)	55 dB			
Sensor Break Detection	Sensor open for Thermocouple and RTD inputs, sensor short for RTD input, below 1 mA for 4–20 mA input, below 0.25 VDC for 1–5 VDC input, not available for other inputs			
Sensor Break Responding Time	Within 4 seconds for Thermocouple and RTD inputs, 0.1 second for 4–20 mA and 1–5 VDC inputs			

SPECIFICATIONS (Cont'd)



Model	C22	C62	C82	C83	C72	C42	R22
Remote Set Point Input							
Type	Linear Current, Linear Voltage						
Range	-3 mA to 27 mA, -1.3 VDC to 11.5 VDC						
Accuracy	± 0.05 %						
Remote Set Point Option	Not Available	Not Available	Available	Available	Available	Available	Not Available
Input Impedance	Current：2.5 Ω, Voltage：1.5 MΩ						
Resolution	18 Bits						
Sampling Rate	1.66 Times / Second						
Maximum Rating	280 mA maximum for Current Input, 12 VDC maximum forVoltage Input						
Temperature Effdc	± 1.5 µV / ℃ for Voltage Input, ± 3.0 µV / ℃ for Current Input						
Sensor Break Detection	Below 1 mA for 4–20 mA input, below 0.25 VDC for 1–5 VDC input, not available for other inputs						
Sensor Break Responding Time	0.1 Seconds						
Event Input							
Number of Event Input	1	2	6	6	2	6	2
Logic Low	-10 VDC minimum, 0.8 VDC maximum						
Logic High	2 VDC minimum, 10 VDC maximum						
Function	Refer to user manual						
CT Input							
CT Type	CT98-1						
Accuracy	± 5 % of Full Scale Reading, ± 1 digit maximum						
Input Impedance	294 Ω						
Measurement Range	0 to 50A VAC						
Output of CT	0 to 5 VDC						
CT Mounting	Screw Mounting						
Sampling Rate	1 Time / Second						
Output 1 / Output 2							
Type	Relay, Pulsed Voltage, Linear Voltage and Linear Current						
Relay Rating	2 A, 240 VAC, 200,000 Life Cycles for Resistive Load						
Pulsed Voltage	Source Voltage 5 VDC, Current Limiting Resistance 66 Ω						
Linear Output Resolution	15 Bits						
Linear Output Regulation	0.02 % for full load change						
Linear Output Settling Time	0.1 Second (Stable to 99.9 %)						
Isolation Breakdown Voltage	1,000 VAC						
Temperature Effect	±0.01% of Span/ ℃						
Load Capacity of Linear Output	Linear Current：500 Ω maximum, Linear Voltage：10 KΩ minimum						
Alarm							
Relay Type	Form A						
Maximum Rating	2 A, 240 VAC, 200,000 Life Cycles for Resistive Load						
Alarm Function	Dwell Timer, Deviation Low, Deviation High, Deviation Band Low, Deviation Band High, Process High, Process Low, Range Low, Range High, Range High Low, Heater Break, Heater Short, Profile End, Profile Holdback						
Alarm Mode	Latching, Holding, Normal, Latching / Holding, Set Point Holding						
Dwell Timer	0.1 to 4,553.6 Minutes						
Data Communication							
Interface	RS-485						
Protocol	Modbus RTU (Slave Mode)						
Address	1 to 247						
Baud Rate	2.8 KBPS to 115.2 KBPS						
Parity Bit	None, Even or Odd						
Stop Bit	1 or 2 Bits						
Data Length	7 or 8 Bits						
Communication Buffer	160 Bytes						
Analog Retransmission							
Output Signal	4–20 mA, 0–20 mA, 0–10 VDC						
Resolution	15 Bits						
Accuracy	± 0.05 % of Span ± 0.0025% / ℃						
Load Resistance	0 to 500 Ω for Current Output, 10 KΩ minimum forVoltage Output						
Output Regulation	0.01 % for full load change						
Output Setting Time	0.1 Second (Stable to 99.9 %)						
Isolation Breakdown	1,000 VAC minimum						
Integral Linearity Error	±0.005 % of Span						

SPECIFICATIONS (Cont'd)









Model	C22	C62	C82	C83	C72	C42	R22
Analog Retransmission							
Temperature Effect	±0.0025 % of Span / °C						
Saturation Low	0 mA or 0 VDC						
Saturation High	22.2 mA or 5.55 VDC,11.1 VDC minimum						
Linear Output Range	0–22.2mA (0–20mA / 4–20mA), 0–5.55 VDC (0–5VDC / 1 – 5VDC), 0 -11.1VDC (0– 10VDC)						
User Interface							
Keypad	4 Keys						
Display Type	4 Digit LCD Display						
Number of Display	2	2	3	3	3	3	2
Upper Display Size	0.4" (10 mm)	0.58" (15 mm)	0.7" (17.7 mm)	0.7" (17.7 mm)	0.58" (15 mm)	0.98" (25 mm)	0.31" (8 mm)
Lower Display Size	0.19" (4.8 mm)	0.3" (7.8 mm)	0.4" (11.2 mm)	0.4" (11.2 mm)	0.32" (8.3 mm)	0.55" (14 mm)	0.25" (6.5 mm)
Programming Port							
Interface	Micro USB						
PC Communication Function	Parameter Configuration and Firmware Upgrade						
Control Mode							
Output 1	Reverse (Heating) or Direct (Cooling) Action						
Output 2	PID cooling control, Cooling P band 50 ~ 300 % of PB, Dead band -36.0 ~ 36.0 % of PB						
ON-OFF	0.1~50.0°C (0.1~90.0°F) hysteresis control (P band = 0)						
P or PD	0 –100.0 % off set adjustment						
PID	Fuzzy logic modified Proportional band 0.1~500.0°C (0.1~900.0°F), Integral time 0-3,600 Seconds, Derivative time 0-360.0 Seconds						
Cycle Time	0.1 to 90.0 Seconds						
Manual Control	Heat (MV1) and Cool (MV2)						
Auto-tuning	Cold Start and Warm Start						
Failure Mode	Auto transfer to manual mode while sensor break or A –D Converter damage						
Ramping Control	0~500.0℃ (0~900.0℉) / Minute or 0~500.0℃ (0~900.0℉) / Hour Ramp Rate						
Digital Filter							
Function	First Order						
Time Constant	0, 0.2, 0.5, 1, 2, 5, 10, 20, 30, 60 Seconds Programmable						
Profiler							
Availability	No	No	Option	Option	Option	Option	No
No of Programs	N/A	N/A	4 / 2 / 1	4 / 2 / 1	4 / 2 / 1	4 / 2 / 1	N / A
Number of Segments / Program	N/A	N/A	4 / 8 / 16	4 / 8 / 16	4 / 8 / 16	4 / 8 / 16	N / A
Environmental and Physical Specifications							
Operating Temperature	-10℃ to 50℃						
Storage Temperature	-40℃ to 60℃						
Humidity	0 to 90 % RH (Non - Condensing)						
Altitude	2,000 Meters maximum						
Pollution	Degree II						
Insulation Resistance	20 MΩ minimum (@ 500 VDC)						
Dielectric Strength	2,000 V AC, 50 / 60 Hz for 1 Minute						
Vibration Resistance	10 to 55 Hz, 10 m / s^2 for 2 Hours						
Shock Resistance	200 m / s^2 (20 g)						
Molding	Flame Retardant Polycarbonate						
Mounting	Panel	Panel	Panel	Panel	Panel	Panel	DIN Rail
DIN Size	1/32	1/16	1/8	1/8	9/64	1/4	
Dimensions (W*H*D) (mm)	48*24*92	48*48*59	48*96*59	96*48*59	72*72*59	96*96*59	22.5*96*83
Depth Behind Panel (mm)	84	50	50	50	50	50	-
Cut Out Dimensions (mm)	45*22.2	45*45	45*92	92*45	68*68	92*92	-
Weight (grams)	120	160	220	220	190	290	160
Approval Standards							
Safety	UL61010-1, CSA 22.2 No.61010-1-12, EN61010-1 (IEC1010-1), RoHS, REACH						
Protective Class	IP50 for panel, IP20 for terminals and housing, all indoor use						
EMC	EN61326						

ORDERING INFORMATION

To order, complete the code number to the right with the information below:



ZEL-C22
(48mm X 24mm)



ZEL-R22
(22.5mm X 96mm)
DIN Rail Mount

ZEL - C22 - □□□□□
ZEL - R22 - □□□□□

Power Input:
4 = 90 to 250 VAC, 47–63Hz
5 = 11 to 40 VDC / 20 to 28VAC, 47–63Hz

Output 1:
1 = Form A Relay
2 = SSRD, 5 VDC / 30 mA
3 = Isolated 4–20 mA / 0–20 mA (OM98-3)
5 = Isolated 0–10 VDC (OM98-5)
C = SSRD, 14 VDC / 40 mA (OM94-7)

Output 2 / Alarm 1:
0 = None
1 = Form A Relay
2 = SSRD, 5 VDC / 30 mA
3 = Isolated 4–20 mA / 0–20 mA (OM98-3)
5 = Isolated 0–10 VDC (OM98-5)
C = SSRD, 14 VDC / 40 mA (OM94-7)

Option 1:
0 = None
1 = RS-485
2 = 1 Event Input (EI1)
3 = 1 CT Input (CT1)

Option 2:
0 = None
1 = Retransmit 4–20 mA / 0–20mA (OM98-3)
2 = Retransmit 0–10 VDC (OM98-5)
3 = Alarm 2 (Form A relay)
4 = 1 Event Input (EI2 only for R22)
5 = 1 CT Input (CT2 only for R22)

Accessories for All Models:
OM94-7 = 14 VDC / 40 mA SSR Drive Module
OM98-3 = Isolated 4–20 mA / 0–20 mA Analog Output Module
OM98-5 = Isolated 0–10 VDC Analog Output Module
CM98-3 = Isolated 4–20 mA / 0–20 mA Retransmission Module for all models except C22 & R22
CM98-5 = Isolated 0–10 VDC Retransmission Module for all models except C22 & R22
CT98-1 = Current Transformer 0–50 A
PA98-1 = USB Programming Adaptor
CC98-1 = Programming Port Cable (1.5 M)
ZEL-SET = Configuration Software

Related Products:
SNA10A = Smart Network Adaptor for third party software, which converts 255 channels of RS-485 or RS-422 to RS-232 Network

ORDERING INFORMATION

To order, complete the code number to the right with the information below:



ZEL-C62
(48mm X 48mm)

ZEL - C62 - □□□□□□□□□

Power Input:
- 4 = 90 to 250 VAC, 47–63Hz
- 5 = 11 to 40 VDC / 20 to 28VAC, 47–63Hz

Output 1:
- 1 = Form A Relay
- 2 = SSRD, 5 VDC / 30 mA
- 3 = Isolated 4–20 mA / 0–20 mA (OM98-3)
- 5 = Isolated 0–10 VDC (OM98-5)
- C = SSRD, 14 VDC / 40 mA (OM94-7)

Output 2 / Alarm 1:
- 0 = None
- 1 = Form A Relay
- 2 = SSRD, 5 VDC / 30 mA
- 3 = Isolated 4–20 mA / 0–20 mA (OM98-3)
- 5 = Isolated 0–10 VDC (OM98-5)
- C = SSRD, 14 VDC / 40 mA (OM94-7)

Alarm 2:
- 0 = None
- 1 = Form A Relay

Option 1:
- 0 = None
- 1 = RS-485

Option 2:
- 0 = None
- 1 = 2 Event Inputs
- 2 = 1 Event Input and 1 CT Input
- 3 = 2 CT Inputs

Option 3:
- 0 = None
- 1 = Retransmit 4–20 mA / 0–20mA (OM98-3)
- 2 = Retransmit 0–10 VDC (OM98-5)
- 3 = Alarm 3 (Form A Relay)

Option 4:
- 0 = None
- 1 = Terminal Cover

ORDERING INFORMATION

To order, complete the code number to the right with the information below:



ZEL-C82
(96mm X 48mm)



ZEL-C83
(48mm X 96mm)



ZEL-C72
(72mm X 72mm)



ZEL-C42
(96mm X 96mm)

ZEL - C82 - ☐☐☐☐☐☐☐☐☐☐
ZEL - C83 - ☐☐☐☐☐☐☐☐☐☐
ZEL - C72 - ☐☐☐☐☐☐☐☐☐☐
ZEL - C42 - ☐☐☐☐☐☐☐☐☐☐

Power Input:
4 = 90 to 250 VAC, 47–63Hz
5 = 11 to 40 VDC / 20 to 28VAC, 47–63Hz

Output 1:
1 = Form A Relay
2 = SSRD, 5 VDC / 30 mA
3 = Isolated 4–20 mA / 0–20 mA (OM98-3)
5 = Isolated 0–10 VDC (OM98-5)
C = SSRD, 14 VDC / 40 mA (OM94-7)

Output 2 / Alarm 1:
0 = None
1 = Form A Relay
2 = SSRD, 5 VDC / 30 mA
3 = Isolated 4–20 mA / 0–20 mA (OM98-3)
5 = Isolated 0–10 VDC (OM98-5)
C = SSRD, 14 VDC / 40 mA (OM94-7)

Alarm 2 to 3:
0 = None
1 = Form A Relay on Alarm 2
2 = Form A Relay on Alarm 2 to 3

Event Inputs:
0 = None
1 = 6 Event Inputs (2 Event Inputs for C72)

Option 1:
0 = None
1 = RS-485 and Remote Setpoint

Option 2:
0 = None
1 = 1 CT Input and Remote Setpoint
2 = 2 CT Inputs and Remote Setpoint

Option 3:
0 = None
1 = Retransmit 4–20 mA / 0–20 mA (CM98-3) and Remote Setpoint
2 = Retransmit 0–10 V (CM98-5) and Remote Setpoint
3 = Alarm 4 (Form A Relay) and Remote Setpoint
4 = Alarm 4 (Form A Relay), Retransmit 4–20 mA / 0–20mA (CM98-3) and Remote Setpoint
5 = Alarm 4 (Form A Relay), Retransmit 0–10 VDC (CM98-5) and Remote Setpoint (Unavailable for C72)

Option 4:
0 = None
1 = Terminal Cover
2 = Ramp & Soak Profiler
3 = Terminal cover and Ramp & Soak Profiler

Ontario (Head Office)
212 Watline Ave
Mississauga ON, L4Z 1P4
T: (905) 568-3100
F: (905) 568-3131

Québec
2337 rue Guénette
St. Laurent QC, H4R 2E9
T: (514) 334-4744
F: (514) 334-0834

Alberta
4754-14 Street NE
Calgary AB, T2E 6L7
T: (403) 291-1156
F: (403) 291-2630

British Columbia
55B Fawcett Road
Coquitlam BC, V3K 6V2
T: (604) 525-7071
F: (604) 525-7797

info@zesta.com
1-800-755-5418

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