

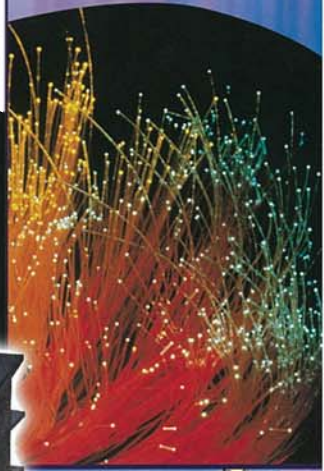
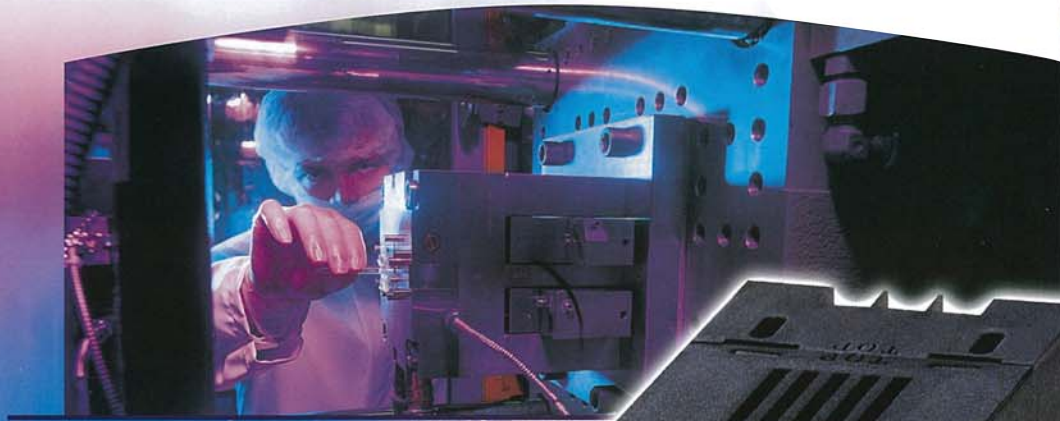
Zesta
Engineering
Limited



Temperature Controller

Auto-tune PID
Safe, Simple, Reliable

Temperature/Power Controllers



Features

- Easy-to-use
- Fuzzy modified PID heat & cool control
- Fast A-D sampling rate (5 times/sec)
- Universal input (PT100, thermocouple, current & voltage) with high accuracy 18-bit A-D
- Analog output (linear current or voltage) uses high accuracy 18-bit D-A
- RS-485 RS-232 interface
- Programming port provided on board
- Supports manual control & auto-tune function
- Wide variety of programmable alarm modes
- Operator lockout protection
- Bumpless transfer feature
- Soft-start ramp and dwell timer
- Bright display stabilized with digital filter
- SEL feature allows operator to rearrange the user menu
- UL/CSA/CE approval
- High performance with low cost



ISO 9001 2000

The Fuzzy Logic plus PID microprocessor-based controller series, incorporates two bright, easy to read 4-digit LED displays, indicating the process value and the set point value. The Fuzzy Logic technology enables the process to reach a predetermined set point in the shortest time, with minimum overshoot during power-up or an external load disturbance.

The ZEL-9100 is a 1/16 DIN size panel mount controller. The ZEL-4100 is a 1/4 DIN size panel mount controller while the ZEL-8100 is a 1/8 DIN size panel mount controller. These units may be powered by 11-26 VAC/VDC or 90-250 VAC supply. The base model incorporates a 2-amp control relay output as a standard. The second output may be configured as a cooling control, or as an alarm. Both outputs can be ordered with an AC triac, 5VDC logic, linear current or linear voltage to drive an external device such as an SSR. There are six types of alarms, plus a dwell timer that may be configured for a third output (relay form C only). The units are fully programmable for PT100 DIN & JIS RTDs as well as thermocouple types J, K, T, E, B, R, S, N, and L. In addition, the control accepts linear current and voltage inputs. The input signal is digitized using an 18-bit A to D converter. The high-speed sampling rate of the A to D converter allows precise control of rapidly changing processes.

Digital communications such as RS-485 or RS-232 are available as an additional option for models ZEL-9100, ZEL-8100 and ZEL-4100 controllers. The digital communication feature allows the units to be interfaced with supervisory control systems and software. A programming port is available for automatic configuration, calibration and testing without the need to access the control via the front keypad directly.

1.800.755.5418



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• Electrical Process Heaters • Temperature/Power Controllers • Control Panels • Temperature Sensors

Specifications

Power

90-250 VAC, 47-63 Hz, 12 VA, 5 W maximum
11-26 VAC / VDC, 12 VA, 5 W maximum

Signal Input

Resolution : 18 bits
Sampling Rate : 5 times / second
Maximum Rating : -2 VDC minimum, 12 VDC maximum (1 minute for mA input)
Temperature Effect : +/- 1.5 uV/°C for all inputs except mA input +/- 3.0 uV/°C for mA input
Sensor Break Detection :
Sensor open for TC, RTD and mV inputs,
Sensor short for RTD input,
below 1 mA for 4-20 mA input,
below 0.25 V for 1 - 5 V input,
unavailable for other inputs.

Characteristics

| Type | Range |
|----------------------|-------------------------------|
| J | -120°C-1000°C (-184°F-1832°F) |
| K | -200°C-1370°C (-328°F-2498°F) |
| T | -250°C-400°C (-418°F-752°F) |
| E | -100°C-900°C (-148°F-1652°F) |
| B | 0°C-1800°C (32°F-3272°F) |
| R | 0°C-1767.8°C (32°F-3214°F) |
| S | 0°C-1767.8°C (32°F-3214°F) |
| N | -250°C-1300°C (-418°F-2372°F) |
| L | -200°C-900°C (-328°F-1652°F) |
| PT100 ^{DM} | -210°C-700°C (-346°F-1292°F) |
| PT100 ^{JIS} | -200°C-600°C (-328°F-1112°F) |
| mV | -8 mV - 70 mV |
| mA | -3 mA - 27 mA |
| V | -1.3 V - 11.5 V |

Output 1 / Output 2

Relay Rating : 2 A/240 VAC, 200,000 cycles for resistive load.

Pulsed Voltage : Source Voltage 5 V, current limiting resistance 66Ω.

Linear Output Characteristics

| Type | Zero Tolerance | Span Tolerance | Load Capacity |
|---------|----------------|----------------|---------------|
| 4-20 mA | 3.6-4 mA | 20-21 mA | 500Ω max. |
| 0-20 mA | 0 mA | 20-21 mA | 500Ω max. |
| 0-5 V | 0 V | 5-5.25 V | 10 KΩ min. |
| 1-5 V | 0.9-1 V | 5-5.25 V | 10 KΩ min. |
| 0-10 V | 0 V | 10-10.5 V | 10 KΩ min. |

Triac (SSR) Output

Rating : 1 A / 240 VAC

Your Authorized Zesta Distributor Is :

Alarm

Alarm Relay : Form C, Max. rating 2 A/240 VAC, 200,000 cycles for resistive load.

Alarm Functions : Dwell timer, Deviation High / Low Alarm, Deviation Band High / Low Alarm, Process High / Low Alarm.

Alarm Mode : Normal, Latching, Hold, Latching / Hold.

Dwell Timer : 0.1 - 4553.6 minutes

Data Communication

Interface : RS-232 (1 unit), RS-485 (up to 247 units)

Protocol : Modbus Protocol RTU mode

Analog Retransmission

Output Signal : 4-20 mA, 0-20 mA, 0-5 V, 1-5 V, 0-10 V

Resolution : 15 bits

Accuracy : +/-0.05% of span +/-0.0025%/°C

Load Resistance : 0-500 ohms (for current output) 10 K ohms minimum (for voltage output)

Output Regulation : 0.01% for full load change

User Interface

Programming Port : For automatic setup, calibration and testing

Communication Port : Connection to PC for supervisory control

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 - 90.0 (°F) hysteresis control (P band = 0)

P or PD : 0 - 100.0 % offset adjustment

PID : Fuzzy logic modified

Proportional band 0.1 ~ 900.0°F.

Integral time 0 - 1000 seconds

Derivative time 0 - 360.0 seconds

Cycle Time : 0.1 - 90.0 seconds

Manual Control : Heat (MV1) and cool (MV2)

Auto-tuning : Cold start and warm start

Failure Mode : Auto-transfer to manual mode when sensor breaks or A-D converter damage

Ramping Control : 0 - 900.0°F/minute or 0 - 900.0°F/hour ramp rate

Digital Filter

Function : PV dampening

Time Constant : 0, 0.2, 0.5, 1, 2, 5, 10, 20, 30, 60 seconds programmable

Environmental & Physical

Operating Temperature : -10°C to 50°C

Storage Temperature : -40°C to 60°C

Humidity : 0 to 90 % RH (non-condensing)

Altitude : 2000 m maximum

Pollution : Degree 2

Insulation Resistance : 20 M ohms min. (at 500 VDC)

Dielectric Strength : 2000 VAC, 50/60 Hz for 1 minute

Vibration Resistance : 10 - 55 Hz, 10 m/s² for 2 hours

Shock Resistance : 200 m/s² (20 g)

Molding : Flame retardant polycarbonate

Dimensions :

ZEL-4100 ---96 mm(W) X 96 mm(H) X 65 mm(D), 53 mm depth behind panel

ZEL-7100 ---72 mm(W) X 72 mm(H) X 78.2 mm(D), 65 mm depth behind panel

ZEL-8100 ---48 mm(W) X 96 mm(H) X 80 mm(D), 65 mm depth behind panel

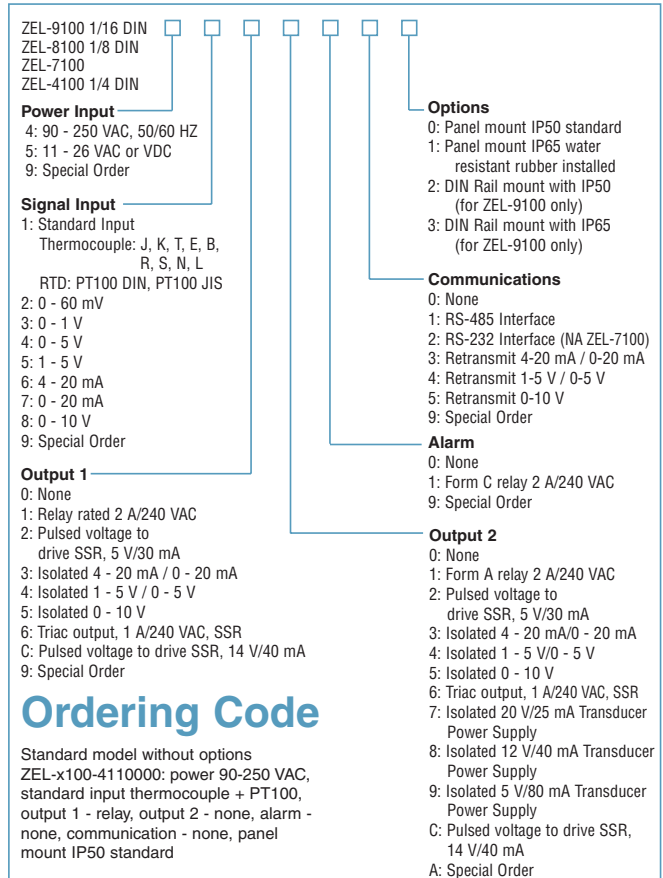
ZEL-9100 ---48 mm(W) X 48 mm(H) X 116 mm(D), 105 mm depth behind panel

Approval Standards

Safety : UL61010C-1 CSA C22.2 No. 24-93 EN61010-1 (IEC1010-1)

Protective Class : IP65 front panel with additional option, IP50 front panel without additional option, all indoor use, IP20 housing & terminals with protective cover.

EMC : EN61326



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