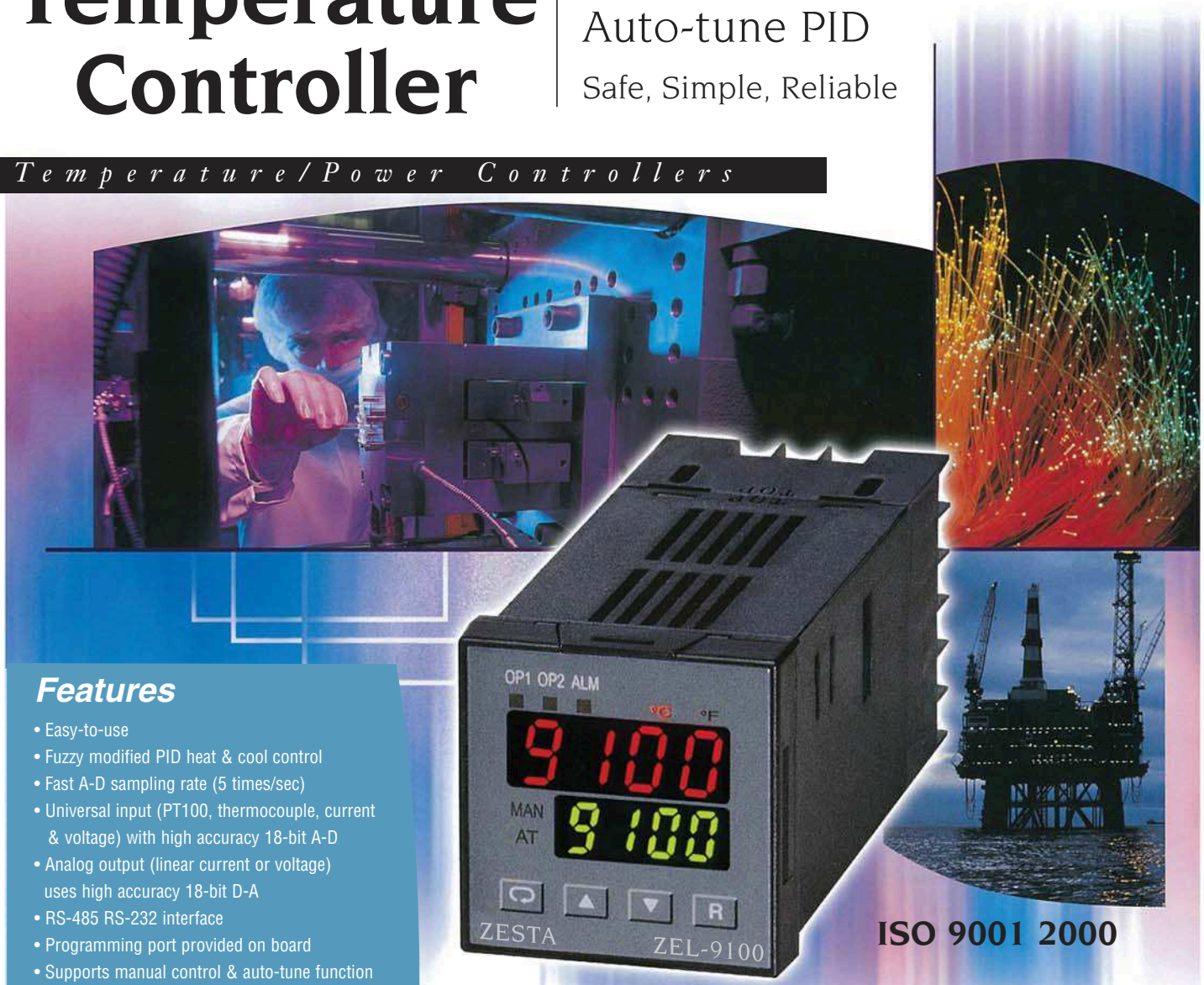
Zesta Engineering Limited

Temperature Controller

Auto-tune PID

Safe, Simple, Reliable

Temperature/Power Controllers



ISO 9001 2000

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

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.

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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)
PT100DIN	-210°C-700°C (-346°F-1292°F)
PT100JIS	-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

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.
Intergral 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

ZEL-9100 1/16 DIN
ZEL-8100 1/8 DIN
ZEL-7100
ZEL-4100 1/4 DIN

Power Input
4: 90 - 250 VAC, 50/60 HZ
5: 11 - 26 VAC or VDC
9: Special Order

Signal Input
1: Standard Input
Thermocouple: J, K, T, E, B, R, S, N, L
RTD: PT100 DIN, PT100 JIS
2: 0 - 60 mV
3: 0 - 1 V
4: 0 - 5 V
5: 1 - 5 V
6: 4 - 20 mA
7: 0 - 20 mA
8: 0 - 10 V
9: Special Order

Output 1
0: None
1: Relay rated 2 A/240 VAC
2: Pulsed voltage to drive SSR, 5 V/30 mA
3: Isolated 4 - 20 mA / 0 - 20 mA
4: Isolated 1 - 5 V / 0 - 5 V
5: Isolated 0 - 10 V
6: Triac output, 1 A/240 VAC, SSR
C: Pulsed voltage to drive SSR, 14 V/40 mA
9: Special Order

Options
0: Panel mount IP50 standard
1: Panel mount IP65 water resistant rubber installed
2: DIN Rail mount with IP50 (for ZEL-9100 only)
3: DIN Rail mount with IP65 (for ZEL-9100 only)

Communications
0: None
1: RS-485 Interface
2: RS-232 Interface (NA ZEL-7100)
3: Retransmit 4-20 mA / 0-20 mA
4: Retransmit 1-5 V / 0-5 V
5: Retransmit 0-10 V
9: Special Order

Alarm
0: None
1: Form C relay 2 A/240 VAC
9: Special Order

Output 2
0: None
1: Form A relay 2 A/240 VAC
2: Pulsed voltage to drive SSR, 5 V/30 mA
3: Isolated 4 - 20 mA/0 - 20 mA
4: Isolated 1 - 5 V/0 - 5 V
5: Isolated 0 - 10 V
6: Triac output, 1 A/240 VAC, SSR
7: Isolated 20 V/25 mA Transducer Power Supply
8: Isolated 12 V/40 mA Transducer Power Supply
9: Isolated 5 V/80 mA Transducer Power Supply
C: Pulsed voltage to drive SSR, 14 V/40 mA
A: Special Order

Ordering Code

Standard model without options
ZEL-x100-4110000: power 90-250 VAC, standard input thermocouple + PT100, output 1 - relay, output 2 - none, alarm - none, communication - none, panel mount IP50 standard

Your Authorized Zesta Distributor Is :

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