

Temperature Controls

Model TZ4 Temperature Controller
5 Models In Sizes From 1/16 to 1/4 DIN

*New
Lower Control
Prices!*



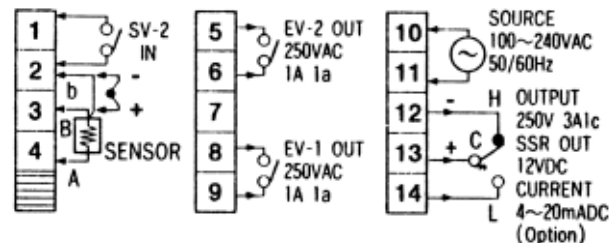
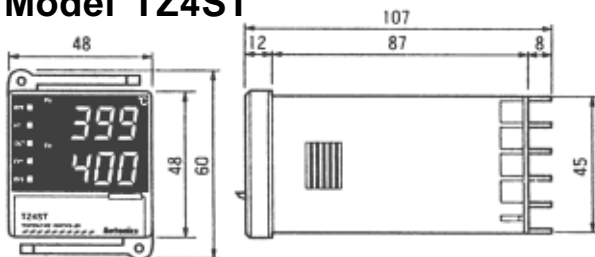
- Two Alarm Outputs Standard, Each with Nine Selectable Alarm Functions.
- Dual Display Process Value and Set Value.
- 2 Temperature Set Values.
- UL, C-UL Recognized.
- One Button Auto-Tuning.
- ON-OFF or PID Control.
- Programmable Input 15 Selections.
- Thermocouple, RTD, Voltage or Current Inputs.

- Selectable Fast or Slow Response PID.
- Slow Response Eliminates Overshoot.
- Programmable for Fahrenheit or Centigrade.
- Programmable for Heating or Cooling Control.
- Non-Volatile EEPROM Memory.
- Universal Voltage Input 100-240 VAC/DC.
- Relay, SSR Driver or Current Outputs.

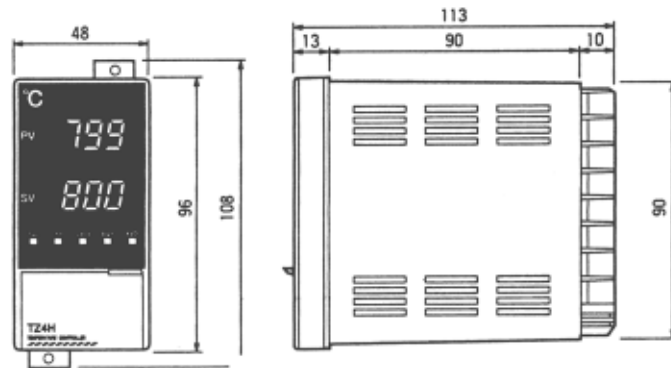
Operation: The TZ4 Series of PID controllers offer front panel selection of all operating functions except output type. Programming flexibility includes selection of a second temperature set value, sensor type, and all PID function parameters. Another unique selectable feature is a fast or slow PID response. When set in the slow response (PIDS) mode, very little, if any overshoot will occur. If selected, Auto-Tune control will monitor the system output response and after 3 response cycles will automatically calculate and replace the PID constants with optimal process control parameters. Two Independent alarm outputs, each with 9 alarm mode types, can be programmed for automatic or manual reset. If you desire ramp up or ramp down to set value, all models have that capability.

Dimensions & Wiring

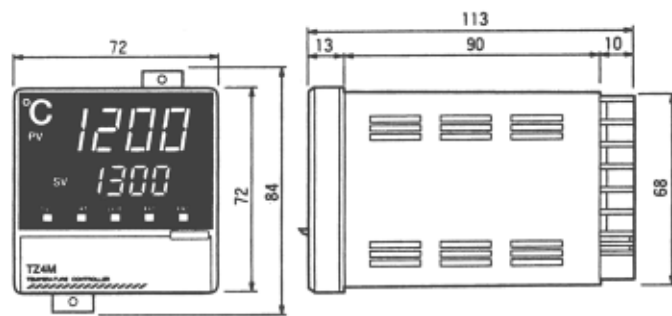
Model TZ4ST



Dimensions & Wiring Model TZ4H



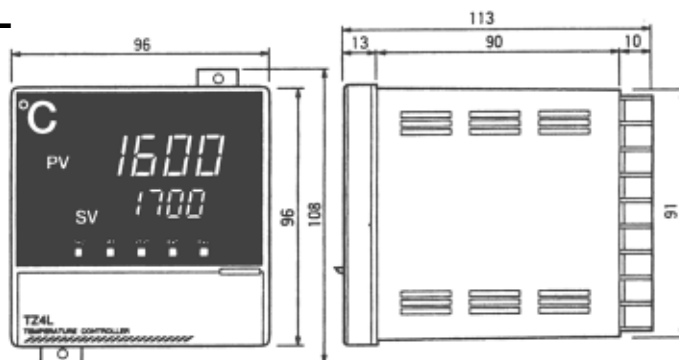
Model TZ4M



Model TZ4W



Model TZ4L



****TZ4 Ordering Details On Following Page****

Model TZ4 Specifications

Inputs:

- Thermocouple: J, K, R, E, T, S, N, W.
- 3-Wire RTD: DIN Pt 100, JIS Pt 100.
- Voltage: 1 to 5 VDC, 0 to 10 VDC.
- Current: 4 to 20mA DC.

Accuracy Setting & Indication

- $\pm 0.3\%$ of Full Scale ± 1 Digit.

Sampling Time

- 500 Milliseconds.

Operating Voltage

- 100 to 240 VAC, 50/60 Hz, 100 to 240 VDC.

Power Consumption

- 5 VA @ 120 VAC.

Setting Method

- Front Panel Keypad

Front Panel Displays

- Set Value - 4 Digit Green LED.
- Set Value 2 - Indication, Red LED.
- Process Value - 4 Digit Red LED
- Output Relay Indication - Red LED.
- Auto-Tune Indication - Red LED.
- Event 1 & 2 (Alarm) - Red LED.

Output

- Relay; SPDT, 3A @ 240 VAC Resistive.
- SSR Driver; 0-12 VDC, $\pm 2V$, 30mA Max.
- Current; 4-20mA, DC, <600 Ohms Max.

Alarm Outputs

- Relay; SPST, 1 A @ 240 VAC Resistive.

Memory

- Non-Volatile, 10 Year Retention.

Mounting

- Front Panel.

Termination

- Screw Rear-Mounted.

Operating Temperature

- -10 to + 50 °C.

Humidity

- 35% to 85% RH.

Programmable Functions:

- Input Sensor Type (15 Options).
- Reverse (Heating) or Direct (Cooling) Action.
- Upper/Lower Temp Limit Alarm Setting.
- Input Offset Compensation.
- Display Selection of °C or °F.
- Auto-Tuning.
- Proportional or ON/OFF Control.
- Integral Time.
- Derivative.
- Control Period Time.
- PID Response:
 - PIDF, Fast Response,
 - PIDS, Slow Response for Minimum Overshoot of Set Value.
- Event 1 (Alarm)
 - Selection of 9 Alarm Modes.
- Event 2 (Alarm)
 - Selection of 9 Alarm Modes.
- High and Low Temp Operation Limits.
- Keypad Lockout.

Model TZ4 - All Sizes

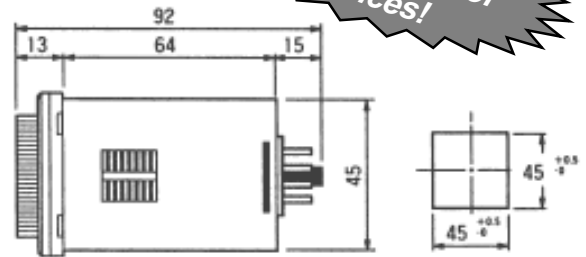
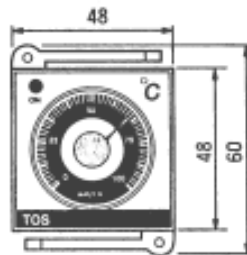
Part Number	Front Panel Size	Output Type	Price
TZ4ST-24R	48 x 48mm	Relay	122.95
TZ4ST-24S	48 x 48mm	SSR Driver Output	122.95
TZ4ST-24C	48 x 48mm	4-20mA	122.95
TZ4H-24R	48 x 96mm	Relay	142.95
TZ4H-24S	48 x 96mm	SSR Driver Output	142.95
TZ4H-24C	48 x 96mm	4-20mA	142.95
TZ4M-24R	72 x 72mm	Relay	139.95
TZ4W-24R	96 x 48mm	Relay	142.95
TZ4L-24R	96 x 96mm	Relay	149.95
TZ4L-24S	96 x 96mm	SSR Driver Output	149.95
TZ4L-24C	96 x 96mm	4-20mA	149.95



Temperature Controls

Model TOS Temperature Controller

**New
Lower Control
Prices!**



Operation:

The TOS, 1/16 DIN is one of the most commonly used temperature controls because of its low cost and operational simplicity.

Primarily employed in ON/OFF output applications, the unit is also available with proportional control if desired.

Operation of the TOS is extremely simple since all that is required, to have the unit function, is to set the dial to the required temperature and the control provides an output until the temperature setting is achieved. The unit has a hysteresis of 0.2 to 0.5% of full scale to provide consistent control. Output can be ordered in either relay contact (2A @ 250VAC) or output for solid state relay (12VDC, 20mA). This output flexibility plus selection of J or K thermocouple input provides a range of models to satisfy most application requirements.

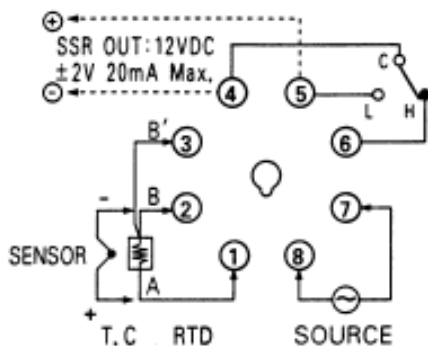
Features:

- Economical Control.
- 1/16 DIN, Analog Setting.
- Simple 8-Pin Plug-In Installation.
- Front Panel LED Indicates Output Status.
- J or K Thermocouple Input.
- Relay or SSR Driver Output.
- UL and C-UL Recognized.

Specifications:

- Input: Thermocouple J, K, or RTD.
- Operating Voltage: 100/240VAC, ±10%, 50/60Hz.
- Power Consumption: 2VA @ 120VAC.
- Setting Method: Dial Scale.
- Control Modes: ON/OFF/Proportional. (Programmable)
- Output: Relay - SPDT, 2A @ 250VAC
SSR - 12VDC ±2V, 20mA.
- Termination: 8 Pin Plug-In.
- Mounting: Front Panel 45mm x 45mm cut out.
- UL and C-UL Recognized.

Model TOS Temperature Control				
Part Number	Output	Sensor	Temp Range	Price
TOS-B4RJ6F	Relay	J	0-600F	47.95
TOS-B4RJ8F	Relay	J	0-800F	47.95
TOS-B4RJ4C	Relay	J	0-400C	47.95
TOS-B4RK6F	Relay	K	0-600F	47.95
TOS-B4RK8F	Relay	K	0-800F	47.95
TOS-B4RK4C	Relay	K	0-400C	47.95
TOS-B4RK8C	Relay	K	0-800C	47.95
TOS-B4SJ6F	SSR Driver	J	0-600F	47.95
TOS-B4SJ8F	SSR Driver	J	0-800F	47.95
TOS-B4SJ4C	SSR Driver	J	0-400C	47.95
TOS-B4SK6F	SSR Driver	K	0-600F	47.95
TOS-B4SK8F	SSR Driver	K	0-800F	47.95
TOS-B4SK4C	SSR Driver	K	0-400C	47.95
TOS-B4SK8C	SSR Driver	K	0-800C	47.95



* When ordering Model TOS controls also order 8 Pin Plug-In Socket.

Model TOS Sockets		
Part Number	Socket Description	Price
PG-08	8 Pin Socket for Panel Mount	5.00
PS-08	8 Pin Socket for Din Rail or Base	5.00

Model T3S Temperature Controller

Operation

The T3S, 1/16 Din is a popular temperature controller because it provides bold LED temperature readout and simple to set bi-directional pushbutton switches.

Operation of the T3S is extremely simple since all that is required is to set the bi-directional switch to the required temperature and the control provides an output until the temperature setting is achieved. Output can be ordered in either relay contact (2A @ 250VAC), output to drive a solid state relay (12VDC, 20mA), or (4 to 20mA). This output flexibility plus selection of J or K thermocouple or RTD input provides a range of models to satisfy many application requirements.

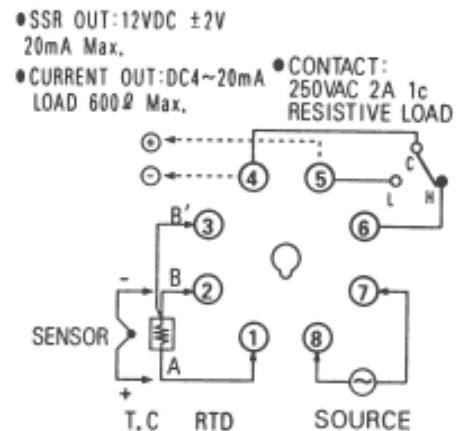
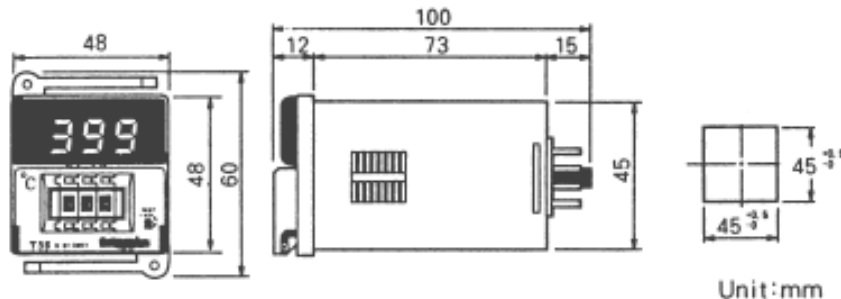
The economical control has an excellent accuracy factor and is extremely versatile with features like universal input power (100 to 240VAC, 50/60Hz.) and selectable ON-OFF or proportional control modes.



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Specifications

- Input: Thermocouple (J,K) or RTD.
- Operating Voltage: 100-240VAC, 50/60Hz.
- Power Consumption: 5 VA.
- Setting Method: Front Panel Pushbutton Switches.
- Display: LED.
- Control Modes: ON/OFF or Proportional-Selectable.
- ON-OFF Control: Hysteresis: 0.5% ±0.2% Full Scale Fixed.
- Proportional Control: Band: 3% Full Scale Fixed Period: 20 Seconds Fixed.
- Reset Function: Adjustable ±3% Full Scale.
- Outputs: Relay: SPDT, 2A, 250VAC. SSR Output: 12VDC ±2V, 20mA Max. Current Output: 4-20mA, 600 ohms.
- Mounting: Front Panel or Socket Mount.
- Termination: 8 Pin Plug-In.



Model T3S Temperature Controller				
Part Number	Output	Input	Temperature Range	Price
T3S-B4RJ4F	Relay	Type J Thermocouple	0 - 399° F	126.95
T3S-B4RJ8F	Relay	Type J Thermocouple	0 - 799° F	126.95
T3S-B4RK8F	Relay	Type K Thermocouple	0 - 799° F	126.95
T3S-B4RP2C	Relay	RTD; Pt 100 ohm	0 - 199° C	126.95
T3S-B4SJ4F	SS Relay Driver	Type J Thermocouple	0 - 399° F	126.95
T3S-B4SJ8F	SS Relay Driver	Type J Thermocouple	0 - 799° F	126.95
T3S-B4SK8F	SS Relay Driver	Type K Thermocouple	0 - 799° F	126.95
T3S-B4SP2C	SS Relay Driver	RTD; Pt 100 ohm	0 - 199° C	126.95
T3S-B4CP2C	Current, 4-20mA	RTD; Pt 100ohm	0 - 199° C	126.95

* When ordering Model T3S controls also order 8 Pin Plug-In Socket. See Below.

Model T3S Features

- Economical Digital Control.
- 1/16 DIN, 48mm x 48mm.
- ON-OFF or Proportional Control.
- J, K, Thermocouple or RTD Input.
- Relay, SS Relay Driver, or 4-20mA Output.
- Bold LED Temperature Display.
- Set Value Visible On Set Switches.
- LED Output Indication.
- Upscale Thermocouple Break.

Model T3S Sockets		
Part Number	Socket Description	Price
PG-08	8 Pin Socket for Panel Mount	5.00
PS-08	8 Pin Socket for Din Rail or Base	5.00

Temperature Controls

Tempco TEC-9300 1/16 DIN Temperature Controller

- 48mm x 48mm •
- Fuzzy Logic PID Heat & Cool •
- NEMA 4X/IP65 Front Panel •
- Universal Power Input •
- Auto Tuning of PID Parameters •

Base Price \$215.00

**Call BMS for Price Information
Ordering Information
Tempco TEC-9300**



TEC-9300 - - - - -
 1 2 3 4 5 6

Ordering Codes

<p>Box 1 Power Input 4 = 90-264 VAC 5 = 11-26 VAC/VDC 9 = Other</p>	<p>Box 4 Output 2 / Alarm 2 0 = None 1 = Relay: 2A/240VAC 2 = Pulse DC for SSR drive: 5 VDC (30 mA max) 3 = Isolated, 4-20 mA (default), 0-20mA 4 = Isolated, VDC, 1-5 (default), 0-5, 0-1 5 = Isolated, VDC, 0-10 6 = Triac-SSR output1A/240VAC 7 = Isolated 20V @ 25 mA DC, Output power supply 8 = Isolated 12V @ 40mA DC, Output power supply 9 = Isolated 5V @ 80mA DC, Output power supply C = Pulse DC for SS drive: 14 VDC (40 mA max) A = Other</p>
<p>Box 2 Signal Input - Universal, field programmable</p> <p>1 = Input 1- Universal input (factory default = t/c type J) Thermocouple: J, K, T, E, B, R, S, N, L RTD: PT100 DIN, PT100 JIS Current: 4-20mA, 0-20 mA Voltage: VDC, 0-1, 0-5, 1-5, 0-10</p> <p>Input 2- CT: 0-50AAC current transformer (factory default) Linear Input: 0-1V, 0-5V, 1-5V, 0-10V, 0-20mA, 4-20mA</p> <p>Input 3- Event Input, not available if RS-232 is specified</p> <p>9 = Other</p>	<p>Box 5 Alarm 1 0 = None 1 = Relay: 2A/240VAC (NO) 2 = Relay: 2A/240VAC (NC) 9 = Other</p>
<p>Box 3 Output 1 1 = Relay: 2A/240VAC 2 = Pulse DC for SSR drive: 5 VDC (30 mA max) 3 = Isolated, 4-20 mA (default), 0-20mA 4 = Isolated, VDC, 1-5 (default), 0-5, 0-1 5 = Isolated, VDC, 0-10 6 = Triac-SSR output1A/240VAC C= Pulse DC for SSR drive: 14 VDC (40 mA max) 9 = Other</p>	<p>Box 6 Communications 0 = Relay 1 = RS-485 Interface 2 = RS-232 Interface 3 = Retransmission 4-20mA (default), 0-20mA 4 = Retransmission 1-5 VDC (default), 0-5 VDC 5 = Retransmission 0-10 VDC 9 = Other</p>

Tempco TEC-9300 1/16 DIN Temperature Controller

Control Specifications

Power Input

Standard: 90-264 VAC, 47-63 Hz, 15 VA, 7W max
Optional: 11-26 VAC/VDC, 15 VA, 7W max

Signal Inputs

Input 1

Resolution: 18 bits Sampling Rate: 5 samples/sec
Accuracy: $\pm 0.24\%$ of span typical
Maximum Rating: -2 VDC min, 12 VDC max
Temperature Effect: $\pm 1.5\mu V/^{\circ}C$ for all inputs except mV
input $\pm 3.0\mu V/^{\circ}C$ for mV input
Sensor Lead Resistance Effect: T/C: $0.2\mu V/\text{ohm}$, 3-wire RTD
2.6 $^{\circ}C/\text{ohm}$ of resistance difference of two leads
Burn-out Current: 200nA

Common Mode Rejection Ratio (CMRR): 120dB
Normal Mode Rejection Ratio (NMRR): 55dB
Sensor Break Detection: Sensor open for T/C, RTD and
mV inputs: sensor short for RTD input; below 1 mA for 4-20 mA
input; below 0.25V for 1-5V input; unavailable for other inputs
Sensor Break Response Time: Within 4 seconds for T/C, RTD
and mV inputs; 0.1 seconds for 4-20 mA and 1-5 V inputs

Input 2

Resolution: 18 bits Sampling Rate: 1.66 times per second
Sensor Break Response Time: 0.5 seconds
Types: Current Transducer: 0 to 50 Amps
mA: -3 to 27 mA, V: -1.3 to 11.5 VDC

Input 3

Event Input Functions: Select 2nd setpoint and/or PID, disable
output 1 and/or output 2, remote lockout reset alarm 1 and/or
alarm 2
Logic Low: -10V min., 0.8V max.
Logic High: 2V min., 10V max.
External Pull-Down Resistance: 400K ohms max
External Pull-Up resistance: 1.5M ohms min

Output 1 or Output 2/Alarm 2

Relay Rating: 240 VAC, 2 Amp
Pulsed Voltage: Source voltage 5 V, Current limiting resistance
66 ohms

Type Tolerance	Zero Tolerance	Span Tolerance	Load
4-20 mA	3.6-4.0 mA	20-21 mA	500 ohms max
0-20 mA	0mA	20-21 mA	500 ohms max
0-5 VDC	0 VDC	5-5.25 VDC	10K ohms min
1-5 VDC	0.9-1.0 VDC	5-5.25 VDC	10K ohms min
0-10 VDC	0 VDC	10-10.5 VDC	10K ohms min

Resolution: 15 bit analog to digital converter
Isolation Breakdown Voltage: 1000 VAC

Solid State Relay (Triac) Output

Rating: 1A/240 VAC Inrush Current: 20A for 1 cycle
Min Load Current: 50mA rms
Max Off-state Leakage: 3mA rms
Max On-state Voltage: 1.5 VAC rms
Insulation Resistance: 1000 Megaohms min at 500 VDC
Dielectric Strength: 2500 VAC for 1 min

Alarm 1/Alarm 2

Alarm 1 Relay: Form A, (NO) Max rating: 240 VAC, 2 Amp
Alarm 1 Relay: Form A, (NC) Max rating: 240 VAC, 2 Amp
Alarm Functions:
Dwell Timer PV1-PC2 High/Low Alarm
Deviation Band High/Low Alarm Loop Break Alarm
PV2 High/Low Alarm Sensor Break Alarm
Alarm Mode: Normal, Latching, Hold, Latching/Hold
Dwell Timer: 0-6553.5 minutes

Data Communications

Interface: RS-232 (1 unit), RS-485 (up to 247 units)
Protocol: Modbus Protocol - RTU mode

User Interface

Dual 4-digit LED Display: 0.40" (10mm) Red Process Display
Keypad: 3 keys 0.31" (8mm) Green Setpoint Display
Programming Port: For automatic setup, calibration & testing

Control Mode

Output 1: Reverse (heating) or direct (cooling) action
Output 2: PID cooling control, cooling P band 1-255% of PB
On-Off: 0.1-100.0 $^{\circ}F$ Hysteresis control (P band=0)
P or PD: 0-100.0% offset adjustment
PID: Fuzzy logic modified
Proportional Band: 0.1-900 $^{\circ}F$ (500 $^{\circ}C$)
Integral: 0-1000 seconds Derivative: 0-360 seconds
Cycle Time: 0.1-100 seconds

Manual Control: Heat (MV1) and Cool (MV2)
Auto-tuning: Cold start and warm start
Failure Mode: Auto transfer to manual mode with sensor break or
A-D converter damage
Ramping Control: 0-900 $^{\circ}F/\text{min}$ or 0-900 $^{\circ}F/\text{hr}$ ramp rate
Power Limit: 0-100% for output 1 and output 2
Remote Setpoint: Programmable range for voltage or current input
Digital Filter: Time constant: settable from 0.2 to 60 seconds

Analog Retransmission

Analog Retransmission Functions: PV1, PV2, PV1-PV2, PV2-PV1,
Setpoint, MV1, MV2, PV-SV deviation value
Output Signal: 4-20/0-20mA, 0-1, 0-5, 1-5, 0-10 VDC
Accuracy: $\pm 0.05\%$ of span, $\pm 0.0025\%/^{\circ}C$

Environmental and Physical

Operating Temperature: 14 to 122 $^{\circ}F$ (-10 to 50 $^{\circ}C$)
Storage Temperature: -40 to 140 $^{\circ}F$ (-40 to 60 $^{\circ}C$)
Humidity: 0-90% RH, non-condensing
Dielectric Strength: 2000 VAC, 50/60 Hz for 1 minute
Dimensions: 2 x 2 x 3-1/2" (51 x 51 x 89 mm) HxWxD
Depth behind panel: 3" (75mm)
Panel Cutout: 1-25/32 x 1-25/32" (45 x 45 mm) HxD
Weight: 0.33 lb. (150 grams)

Approval Standards

Safety Standard: UL3121-1 and CSA: C22.2 No. 24-93
EN61010-1 (1EC1010-1)
Protective Class: Front panel: NEMA 4X/IP65
Housing and Terminals: IP20
EMC: EN61325

Model TEC-9300 is offered with the options listed in the worksheet on the previous page. Create an ordering code by filling in the boxes with the appropriate number and/or letter designation for your requirements and a part number will be assigned at the factory.

Standard lead time is Stock to 2 weeks.

Temperature Controls

Tempco TEC-220 1/32 DIN Temperature Controller

- 24mm x 48mm •
- Fuzzy Logic PID Heat & Cool •
- NEMA 4X/IP65 Front Panel •
- Universal Power Input •
- Auto Tuning of PID Parameters •



Base Price \$160.00

Call BMS for Price Information

Ordering Information

Tempco TEC-220

TEC-220 - ¹ - ² - ³ - ⁴ - ⁵ - ⁶

Ordering Codes

<p>Box 1 Power Input 4 = 90-264 VAC 5 = 11-26 VAC/VDC 9 = Other</p>	<p>Box 4 Output 2 / Alarm 2 0 = None 1 = Relay: 2A/240VAC 2 = Pulse DC for SSR drive: 5 VDC (30 mA max) 3 = Isolated, 4-20 mA (default), 0-20mA 4 = Isolated, VDC, 1-5 (default), 0-5, 0-1 5 = Isolated, VDC, 0-10 6 = Triac-SSR output1A/240VAC 7 = Isolated 20V @ 25 mA DC, Output power supply 8 = Isolated 12V @ 40mA DC, Output power supply 9 = Isolated 5V @ 80mA DC, Output power supply C = Pulse DC for SS drive: 14 VDC (40 mA max) A = Other</p>
<p>Box 2 Signal Input - Universal, field programmable for item 5 or 6 5 = Thermocouple: J*, K, T, E, B, R, S, N, L 0-60mV 6 = RTD: PT100 DIN, PT100 JIS 7 = 0-1 VDC 8 = 0-5*, 1-5 VDC A = 0-10 VDC B = 4-20*, 0-20mA 9 = Other *indicates default value</p>	<p>Box 5 Communications 0 = Relay 1 = RS-485 Interface 2 = RS-232 Interface 3 = Retransmission 4-20mA (default), 0-20mA 4 = Retransmission 1-5 VDC (default), 0-5 VDC 5 = Retransmission 0-10 VDC 9 = Other</p>
<p>Box 3 Output 1 1 = Relay: 2A/240VAC 2 = Pulse DC for SSR drive: 5 VDC (30 mA max) 3 = Isolated, 4-20 mA (default), 0-20mA 4 = Isolated, VDC, 1-5 (default), 0-5, 0-1 5 = Isolated, VDC, 0-10 6 = Triac-SSR output1A/240VAC C = Pulse DC for SSR drive: 14 VDC (40 mA max) 9 = Other</p>	<p>Box 6 Units 1 = °F on faceplate 2 = °C on faceplate</p>

Tempco TEC-220 1/32 DIN Temperature Controller

Control Specifications

Power Input

Standard: 90-250 VAC, 47-63 Hz, 10 VA, 5W max
Optional: 11-26 VAC/VDC, 10 VA, 5W max

Signal Inputs

Resolution: 18 bits
Sampling Rate: 5 samples/sec
Accuracy: $\pm 0.24\%$ of span typical
Maximum Rating: -2 VDC min, 12 VDC max
Temperature Effect: $\pm 1.5\mu V/^\circ C$ for all inputs except mV input $\pm 3.0\mu V/^\circ C$ for mV input
Sensor Lead Resistance Effect: T/C: $0.2\mu V/\text{ohm}$, 3-wire RTD $2.6^\circ C/\text{ohm}$ of resistance difference of two leads
Burn-out Current: 200mA
Common Mode Rejection Ratio (CMRR): 120dB
Normal Mode Rejection Ratio (NMRR): 55dB
Sensor Break Detection: Sensor open for T/C, RTD and mV inputs: sensor short for RTD input; below 1 mA for 4-20 mA input; below 0.25V for 1-5V input; unavailable for other inputs
Sensor Break Response Time: Within 4 seconds for T/C, RTD and mV inputs; 0.1 seconds for 4-20 mA and 1-5 V inputs

Output 1/Output 2

Relay Rating: 240 VAC, 2 Amp
Pulsed Voltage: Source voltage 5 V, Current limiting resistance 66 ohms

Linear Output - Characteristics:

Type	Tolerance	Zero Tolerance	Span Tolerance	Load
4-20 mA	3.6-4.0 mA	20-21 mA	500 ohms max	
0-20 mA	0mA	20-21 mA	500 ohms max	
0-5 VDC	0 VDC	5-5.25 VDC	10K ohms min	
1-5 VDC	0.9-1.0 VDC	5-5.25 VDC	10K ohms min	
0-10 VDC	0 VDC	10-10.5 VDC	10K ohms min	

Resolution: 15 bit analog to digital converter
Output Regulation: 0.02% for full load change
Output Settling Time: 0.1 sec. (stable to 99.9%)
Temperature Effect: $\pm 0.01\%$ of span/ $^\circ C$
Isolation Breakdown Voltage: 1000 VAC

Solid State Relay (Triac) Output

Rating: 1A/240 VAC
Inrush Current: 20A for 1 cycle
Min Load Current: 50mA rms
Max Off-state Leakage: 3mA rms
Max On-state Voltage: 1.5 VAC rms
Insulation Resistance: 1000 Megaohms min at 500 VDC
Dielectric Strength: 2500 VAC for 1 min

Output 2/Alarm 1 - Programmable

Alarm 1 Relay: Form A,(NO)
Max rating: 240 VAC, 2 Amp

Alarm Functions:

Deviation High/Low Alarm
Deviation Band High/Low Alarm
Process High/Low Alarm
Sensor Break Alarm
Alarm Mode: Normal, Latching, Hold, Latching/Hold
Dwell Timer: 0-4553.6 minutes

Data Communications

Interface: RS-232 (1 unit), RS-485 (up to 247 units)
Protocol: Modbus Protocol - RTU mode
Address: 1-247 Baud Rate: 0.3-38.4 Kbits/sec
Data Bits: 7 or 8 bits Parity Rate: None. Even or Odd
Stop Bit: 1 or 2 bits Communication Buffer: 160 bytes

User Interface

Single 4-digit LED Display: 0.4"/10mm Keypad: 3 keys
Programming Port: For automatic setup, calibration & testing

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 to 36.0% of PB
On-Off: 0.1-90.0 $^\circ F$ Hysteresis control (P band=0)
P or PD: 0-100.0% offset adjustment
PID: Fuzzy logic modified

Proportional Band: 0.1-900 $^\circ F$ (500 $^\circ C$)
Integral Time: 0-1000 seconds
Derivative Time: 0-360 seconds

Cycle Time: 0.1-90 seconds

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

Auto-tuning: Cold start and warm start

Failure Mode: Auto transfer to manual mode with sensor break or A-D converter damage

Ramping Control: 0-900 $^\circ F/\text{min}$ or 0-900 $^\circ F/\text{hr}$ ramp rate

Environmental and Physical

Operating Temperature: 14 to 122 $^\circ F$ (-10 to 50 $^\circ C$)
Storage Temperature: -40 to 140 $^\circ F$ (-40 to 60 $^\circ C$)
Humidity: 0-90% RH, non-condensing
Dielectric Strength: 2000 VAC, 50/60 Hz for 1 minute
Dimensions: 1-3/64 x 2 x 4-3/8" (26.5 x 50 x 110.5mm) HxWxD
Depth behind panel: 3-7/8" (98mm)
Panel Cutout: 7/8 x 1-25/32" (22 x 45mm) HxD
Weight: 0.26 lb. (120 grams)

Approval Standards

Safety Standard: UL61010C-1 and CSA: C22.2 No. 24-93
EN61010-1 (1EC1010-1)
Protective Class: Front panel: NEMA 4X/IP65
Housing and Terminals: IP20

EMC: EN61326

Model TEC-220 is offered with the options listed in the worksheet on the previous page. Create an ordering code by filling in the boxes with the appropriate number and/or letter designation for your requirements and a part number will be assigned at the factory.

Standard lead time is Stock to 2 weeks.

Temperature Controls

Tempco TEC-8100 1/8 DIN Temperature Controller



- 96mm x 48mm •
- Fuzzy Logic PID Heat & Cool •
- Optional NEMA 4X/IP65 Front Panel •
 - Universal Power Input •
 - Auto Tuning of PID Parameters •

Base Price \$195.00
Call BMS for Price Information
Ordering Information
Tempco TEC-8100

TEC-8100- - - - - - -
 1 2 3 4 5 6 7
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Ordering Codes

<p>Box 1 Power Input 4 = 90-250 VAC 5 = 11-26 VAC/VDC 9 = Other</p>	<p>Box 4 Output 2 / Alarm 2 0 = None 1 = Relay: 2A/240VAC 2 = Pulse DC for SSR drive: 5 VDC (30 mA max) 3 = Isolated, 4-20 mA (default), 0-20mA 4 = Isolated, VDC, 1-5 (default), 0-5, 0-1 5 = Isolated, VDC, 0-10 6 = Triac-SSR output1A/240VAC 7 = Isolated 20V @ 25 mA DC, Output power supply 8 = Isolated 12V @ 40mA DC, Output power supply 9 = Isolated 5V @ 80mA DC, Output power supply C = Pulse DC for SS drive: 14 VDC (40 mA max) A = Other</p>
<p>Box 2 Signal Input - Universal, field programmable for item 5 or 6 5 = Thermocouple: J*, K, T, E, B, R, S, N, L 0-60mV 6 = RTD: PT100 DIN*, PT100 JIS 7 = 0-1 VDC 8 = 0-5*, 1-5 VDC A = 0-10 VDC B = 4-20*, 0-20mA 9 = Other *indicates default value</p>	<p>Box 5 Alarm 0 = None 1 = Relay: 2A/240VAC, SPDT 9 = Other</p>
<p>Box 3 Output 1 1 = Relay: 2A/240VAC 2 = Pulse DC for SSR drive: 5 VDC (30 mA max) 3 = Isolated, 4-20 mA (default), 0-20mA 4 = Isolated, VDC, 1-5 (default), 0-5, 0-1 5 = Isolated, VDC, 0-10 6 = Triac-SSR output1A/240VAC C= Pulse DC for SSR drive: 14 VDC (40 mA max) 9 = Other</p>	<p>Box 6 Communications 0 = Relay 1 = RS-485 Interface 2 = RS-232 Interface 3 = Retransmission 4-20mA (default), 0-20mA 4 = Retransmission 1-5 VDC (default), 0-5 VDC 5 = Retransmission 0-10 VDC 9 = Other</p>
	<p>Box 7 NEMA 4X/IP65 1 = No 2 = Yes</p>

Tempco TEC-8100 1/8 DIN Temperature Controller

Control Specifications

Power Input

Standard: 90-250 VAC, 47-63 Hz, 12 VA, 5W max
Optional: 11-26 VAC/VDC, 12 VA, 5W max

Signal Inputs

Resolution: 18 bits
Sampling Rate: 5 samples/sec
Accuracy: $\pm 0.24\%$ of span typical
Maximum Rating: -2 VDC min, 12 VDC max
Temperature Effect: $\pm 1.5\mu V/^{\circ}C$ for all inputs except mV input $\pm 3.0\mu V/^{\circ}C$ for mV input
Sensor Lead Resistance Effect: T/C: $0.2\mu V/\text{ohm}$, 3-wire RTD $2.6^{\circ}C/\text{ohm}$ of resistance difference of two leads
Burn-out Current: 200nA
Common Mode Rejection Ratio (CMRR): 120dB
Normal Mode Rejection Ratio (NMRR): 55dB
Sensor Break Detection: Sensor open for T/C, RTD and mV inputs; sensor short for RTD input; below 1 mA for 4-20 mA input; below 0.25V for 1-5V input; unavailable for other inputs
Sensor Break Response Time: Within 4 seconds for T/C, RTD and mV inputs; 0.1 seconds for 4-20 mA and 1-5 V inputs

Output 1/Output 2

Relay Rating: 240 VAC, 2 Amp
Pulsed Voltage: Source voltage 5 V, Current limiting resistance 66 ohms

Linear Output - Characteristics:

Type	Tolerance	Zero Tolerance	Span Tolerance	Load
4-20 mA		3.6-4.0 mA	20-21 mA	500 ohms max
0-20 mA		0mA	20-21 mA	500 ohms max
0-5 VDC		0 VDC	5-5.25 VDC	10K ohms min
1-5 VDC		0.9-1.0 VDC	5-5.25 VDC	10K ohms min
0-10 VDC		0 VDC	10-10.5 VDC	10K ohms min

Resolution: 15 bit analog to digital converter
Output Regulation: 0.0% for full load change
Output Settling Time: 0.1 sec. (stable to 99.9%)
Temperature Effect: $\pm 0.01\%$ of span/ $^{\circ}C$
Isolation Breakdown Voltage: 1000 VAC

Solid State Relay (Triac) Output

Rating: 1A/240 VAC
Inrush Current: 20A for 1 cycle
Min Load Current: 50mA rms
Max Off-state Leakage: 3mA rms
Max On-state Voltage: 1.5 VAC rms
Insulation Resistance: 1000 Megaohms min at 500 VDC
Dielectric Strength: 2500 VAC for 1 min

Alarm 1 - Programmable

Alarm 1 Relay: Form A,(NO)
Max rating: 240 VAC, 2 Amp

Alarm Functions:

Deviation High/Low Alarm
Deviation Band High/Low Alarm
Process High/Low Alarm
Sensor Break Alarm
Alarm Mode: Normal, Latching, Hold, Latching/Hold
Dwell Timer: 0-4553.6 minutes

Data Communications

Interface: RS-232 (1 unit), RS-485 (up to 247 units)
Protocol: Modbus Protocol - RTU mode

Address: 1-247
Data Bits: 7 or 8 bits
Stop Bit: 1 or 2 bits
Baud Rate: 0.3-38.4 Kbits/sec
Parity Rate: None. Even or Odd
Communication Buffer: 160 bytes

User Interface

Dual 4-digit LED Display: 0.40" (10mm) Red Process Display
0.31" (8mm) Green Setpoint Display

Keypad: 4 keys

Programming Port: For automatic setup, calibration and testing

Control Mode

Output 1: Reverse (heating) or direct (cooling) action
Output 2: PID cooling control, cooling P band 50-300% of PB
On-Off: 0.1-90.0 $^{\circ}F$ Hysteresis control (P band=0)
P or PD: 0-100.0% offset adjustment

PID: Fuzzy logic modified
Proportional Band: 0.1-900 $^{\circ}F$ (500 $^{\circ}C$)
Integral Time: 0-1000 seconds
Derivative Time: 0-360 seconds

Cycle Time: 0.1-90 seconds

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

Auto-tuning: Cold start and warm start

Failure Mode: Auto transfer to manual mode with sensor break or A-D converter damage

Ramping Control: 0-900 $^{\circ}F$ /min or 0-900 $^{\circ}F$ /hr ramp rate

Environmental and Physical

Operating Temperature: 14 to 122 $^{\circ}F$ (-10 to 50 $^{\circ}C$)
Storage Temperature: -40 to 140 $^{\circ}F$ (-40 to 60 $^{\circ}C$)
Humidity: 0-90% RH, non-condensing
Dielectric Strength: 2000 VAC, 50/60 Hz for 1 minute
Dimensions: 3-3/4 x 1-7/8 x 3-1/8" (96 x 48 x 80) HxWxD
Depth behind panel: 2-9/16" (65mm)
Panel Cutout: 3-5/8 x 1-25/32" (92 x 45mm) HxW

Weight: 0.46 lb. (210 grams)

Approval Standards

Safety Standard: UL61010C-1 and CSA: C22.2 No. 24-93
EN61010-1 (1EC1010-1)
Protective Class: Front panel: IP50, Optional NEMA 4X/IP65
Housing and Terminals: IP20

EMC: EN61326

Model TEC-8100 is offered with the options listed in the worksheet on the previous page. Create an ordering code by filling in the boxes with the appropriate number and/or letter designation for your requirements and a part number will be assigned at the factory.

Standard lead time is Stock to 2 weeks.

Temperature Controls

Tempco TEC-404 & TEC-405 1/4 DIN Temperature Controller

Base Price \$145.00

Base Price \$205.00



- 96mm x 96mm •
- On-off or Time Proportional •
- Universal Power Input •
- Wide Selection of Output Options •
- Sensor Break Protection •
- Good Performance at a Very Low Price •

Call BMS for Price Information

Ordering Information

Tempco TEC-404 with Potentiometer Setpoint

TEC-404 - ¹ - ² - ³ - ⁴ - ⁵ - ⁶ - ⁷ - ⁸

Ordering Information

Tempco TEC-405 with Pushwheel Setpoint

TEC-405 - ¹ - ² - ³ - ⁴ - ⁵ - ⁶ - ⁷ - ⁸

Ordering Codes

Box 1 Power Input 4 = 90-264 VAC 5 = 20-32 VAC 50/60 Hz, 20-32 VDC 9 = Other	Box 4 Control Mode 1 = On-Off (used for valves and solenoids) 2 = Proportional (common for electric heaters)
Box 2 Signal Input 1 = Thermocouple: Type J 2 = Thermocouple: Type K 3 = RTD: 100 ohm PT, DIN 0.00385 4 = RTD: 100 ohm PT, JIS 0.00392 9 = Other	Box 5 Output 1 1 = Relay: 5A/240 VAC 2 = Pulse DC for SSR drive: 24 VDC (20 mA max) 3 = 4-20mA, linear (max load 500 ohms) 4 = 0-20 mA, linear (max load 500 ohms) 5 = 0-10 VDC, linear (min. impedance 500K ohms) 9 = Other
Box 3 Standard Range Code (TEC-404 Only) 4 = 0 to 300°C C = 50 to 550°F 6 = 0 to 600°C E = 50 to 850°F	Box 6 Output 2 0 = Not Available
Box 3 Standard Range Code (TEC-405 Only) X = 0 to 499°F C = 0 to 299°C V = 0 to 999°F E = 0 to 499°C W = 0 to 1999°F H = 0 to 999°C	Box 7 Alarm 0 = None 1 = Relay: 3A/240 VAC Deviation Alarm
	Box 8 Communication 0 = Not Available

Tempco TEC-404 & TEC-405 1/4 DIN Temperature Controller

Control Specifications

Power Input

Standard: 90-264 VAC, 50/60 Hz, 5 VA
Optional: 20-32 VAC 50/60Hz, 20-32 VDC, 5VA

Signal Inputs

Accuracy: ±1.0% of full scale at 77°F/25°C
Thermocouple: Type J or K
RTD: 3-wire PT100 DIN or JIS
Sampling Rate: 3 samples per second
Cold Junction Compensation: ±0.1°C/1°C
Common Mode Rejection Ratio (CMRR): 120dB
Normal Mode Rejection Ratio (NMRR): 60 dB
Sensor Break Protection: Upscale

Output 1

Relay Rating: 5 Amp, 240 VAC
SSR Drive: Pulsed DC, 24V at 20mA max
Current Loop: 4-20mA, 0-20mA, max load 500 ohms
Voltage: 0-10VDC, min load 500K ohms

Control

Proportional Band: 2.2% of span
ON-OFF Hysteresis: 1% of span
Cycle Time: 20 seconds for relay output
1 second for pulsed voltage output
0.02 seconds for linear current or voltage output

Control Action: Reverse action

Approval Standards

Safety Standard: UL3121-1
EN61326
Protective Class: Front Panel: IP30
Housing and Terminals: IP20

Adjustment

Setpoint: Single turn wirewound potentiometer (TEC-404)
Setpoint Resolution: 0.2% of span
Accuracy of Setpoint: ±2% of span
Repeatability of Setpoint: ±0.1% of span
Setpoint: 3-digit or 4-digit thumbwheel switch (TEC-405)
Manual Reset: Adjustable up to 2.6% of span
Setpoint Resolution: ±1 least significant digit
Accuracy of Setpoint: ±1% of span
Repeatability of Setpoint: ±1 least significant digit

Display

Single 4-digit LED Display: 0.56" 914mm) Red

Environmental and Physical

Operating Temperature: 32 to 122°F (0 to 50°C)
Humidity: 0 to 90% RH, non-condensing
Dielectric Strength: 2000 VAC, 50/60Hz for 1 minute
Vibration: 10-55Hz, amplitude 1 mm
Shock: 200m/s² (20g)
Dimensions: 3-3/4 x 3-3/4 x 2-9/16" (96 x 96 x 65mm) HxWxD
Depth Behind Panel: 2" (53mm)
Panel Cutout: 3-5/8 x 3-5/8" (92 x 92mm) HxW
Weight: 0.55 lb (250 grams)

TEC-404 Potentiometer Setpoint Stock & Common Part Numbers Power Input: 90-264 VAC, Proportional Mode					
Part Number	Signal Input	Temp Range	Output	Alarm	Price
TEC57401	J	50-850F	Relay	None	145.00
TEC57402	J	50-550F	Relay	None	145.00
TEC57403	K	50-850F	Relay	None	145.00
TEC57404	K	50-550F	Relay	Relay	175.00
TEC57405	RTD	50-550F	Relay	None	145.00
TEC57406	J	0-300C	Relay	None	145.00
TEC57407	J	0-600C	Relay	None	145.00
TEC57408	K	0-300C	Relay	None	145.00
TEC57409	K	0-600C	Relay	None	145.00

TEC-405 Pushwheel Setpoint Stock & Common Part Numbers Power Input: 90-264 VAC, Proportional Mode					
Part Number	Signal Input	Temp Range	Output	Alarm	Price
TEC57511	J	0-999F	Relay	None	205.00
TEC57512	J	0-499F	Relay	None	205.00
TEC57513	K	0-1999F	Relay	None	232.00
TEC57514	K	0-999F	Relay	None	205.00
TEC57515	J	0-499F	Relay	None	232.00
TEC57516	J	0-299F	Relay	None	232.00
TEC57517	K	0-999F	Relay	None	205.00
TEC57518	K	0-499F	Relay	None	232.00
TEC57519	RTD	0-999F	Relay	None	205.00
TEC57520	RTD	0-499F	Relay	None	232.00

Models TEC-404 and TEC-405 are offered with the options listed in the worksheet on the previous page. Create an ordering code by filling in the boxes with the appropriate number and/or letter designation for your requirements and a part number will be assigned at the factory. Standard lead time is Stock to 2 weeks.

Athena Legacy Series 16 Universal Temperature/Process Controller



The Athena Legacy 16 is a 1/16 DIN panel mounted, auto-tuning controller that can be used for precise control of a single loop with two independent outputs.

The controller accepts thermocouple, RTD, voltage or current input. RS-232 or RS-485 communications are available and two digital LED displays provide visual indication of various controller functions.

- User-Selectable Ramp to Setpoint •
- Bumpless Auto/Manual Transfer •
- NEMA 4X (IP65) Dust and Splash-Proof Front Panel •
- On/Off through Full PID Operation •
- Auto-Tuning, Heat or Cool •
- Adjustable Hysteresis & Heat/Cool Spread •
- Dual Output/Dual Alarm Capabilities •

Base Price \$210.00

Call BMS for Price Information

Ordering Information

Athena Legacy Series 1/16 DIN Temperature/Process Controller

XT16- - - -

Code	Input
JF = 'J' T/C	0 to 1400°F
JC = 'J' T/C	0 to 750°C
KF = 'K' T/C	0 to 2460°F
KC = 'K' T/C	0 to 1349°C
PF = 100 ohm RTD	-328 to 1562°F
PC = 100 ohm RTD	-200 to 850°C
DF = 100 ohm RTD	-199 to 450°F
DC = 100 ohm RTD	-100 to 225°C
Other inputs available - call for availability	

Code	Output 1 (Heating)
0	None
B	Relay, N.O.
E	0 to 20mA
F	4 to 20mA, 500 ohm max
G	4 to 20mA, 800 ohm max
P	Pulsed 20 Vdc or 35mA
S	Pulsed 20 Vdc or 17mA
T	Solid State Relay
V	0 to 5 Vdc
X	0 to 10 Vdc
Y	Relay, N.C.

Code	Output 2 (Cooling)
0	None
B	Relay, N.O.
E	0 to 20mA
F	4 to 20mA, 500 ohm max
G	4 to 20mA, 800 ohm max
P	Pulsed 20 Vdc or 35mA
S	Pulsed 20 Vdc or 17mA
T	Solid State Relay
V	0 to 5 Vdc
X	0 to 10 Vdc
Y	Relay, N.C.

Code	Standard Options
00	None
Alarms	
10	Dual SSR, N.O.
20	Dual Open Collector
21	Dual 24 Vdc
22	Dual SSR, N.C.
23	Relay, N.O.
Communications	
30	RS-232
Digital Input w/ Alarm	
40	Switch Closed
41	Switch Open
42	5 V Input
Aux Output/PV Retransmit	
60	4 to 20mA
61	1 to 5 V
62	0 to 20mA
63	0 to 5 V

Athena Legacy Series 16 Universal Temperature/Process Controller Technical Specifications

Operating Limits:

Ambient Temperature	32°F to 131°F
Relative Humidity	
Tolerance	90% Non-condensing
Line Voltage	100 to 250 VAC 125 to 300 VDC 24 VAC/DC optional
Power Consumption	Less than 6 VA

Performance:

Accuracy	±0.02% of full scale (± 0.10% typical)
Setpoint Resolution	1 count/0.1 count
Repeatability	±1.0 count
Temperature Stability	5 mV/°C maximum
TC Cold End Tracking	0.05°C/°C ambient
Noise Rejection	100 dB common mode 70 dB series mode
Process Sampling	10 Hz (100 ms)
Digital Filtering	Adjustable 0.1 to 10

Control Characteristics:

Setpoint Limits	Span of sensor
Alarms	Adjustable for high/low, selectable for process or deviation
Rate	0 to 900 sec
Reset	0 to 2400 sec
Cycle Time	0-200 ms, 1-120 sec
Gain	0 to 400
Gain Ratio	0 to 2.0 (0.1 increments)
Control Hysteresis	1 to 100 (on/off configuration)
Spread (Output 2)	0 to 100 (above setpoint)
Ramp to Setpoint	0 to 100 min
Auto-Tune	Operator initiated from front panel
Manual Control	Operator initiated from front panel

Inputs:

Thermocouple	B, C, E, J, K, N, NNM, R, S, T, Platinel II Maximum lead resistance 100 ohms for rated accuracy
RTD	Platinum 2- and 3-wire, 100 ohms at 0°C, (DIN curve standard .00385)
Linear	0-50 mV/10-50 mV, 0-20 mA/4-20 mA, 0-10 mV/0-50 mV, 0-100 mV, 0-1V/0.5 V, 0-10 V, 1-5 V

Outputs:

#1 Reverse-acting (Heating)	
#2 Direct-acting (Cooling)	
B	5 A/3A (120/240 VAC), N.O.
E	0-20 mA
F	4-20 mA, full output to load 500 ohm impedance maximum
G	4-20 mA, full output to load
P	20 VDC or 35 mA
S	20 VDC or 17 mA
T	1 a, Solid,-state relay
V	0 to 5 VDC
X	0-10 VDC
Y	1 A, N.C. relay

Alarm Outputs:

10	Alarm 1: Dual SSR, 24-240 VAC, 1 A, Alarm 2: 24 VAC only
20	Dual open collector, 24 V, 20 microamps
21	Dual 24 V, 20 mA
22	Alarm 1: Dual SSR, NC, 24-240 VAC, 1 A, Alarm 2: 24 VAC only
23	5 A/3 A (120/240 VAC), mechanical relay

Mechanical Characteristics:

Display	Dual, 4-digit 0.36" LED display Process: Orange Setpoint Value: Green
Numeric Range	-1999 to 9999
Front Panel	
Rating	NEMA 4X (IP65)
Front Panel	
Cutout	1.771" x 1.771" (45mm x 45mm)
Connections	Screw Terminals

Athena Legacy Series 18 and 19 Universal Temperature/Process Controller



The Athena Legacy 18 and 19 controllers are available as 1/8 DIN (18) vertical or 1/8 DIN (19) horizontal models. Both panel mounted, auto tuning controllers that can be used for precise control of a single loop with two independent outputs. The controller accepts thermocouple, RTD, voltage or current input. RS-232 or RS-485 communications are available and two digital LED displays provide visual indication of various controller functions.

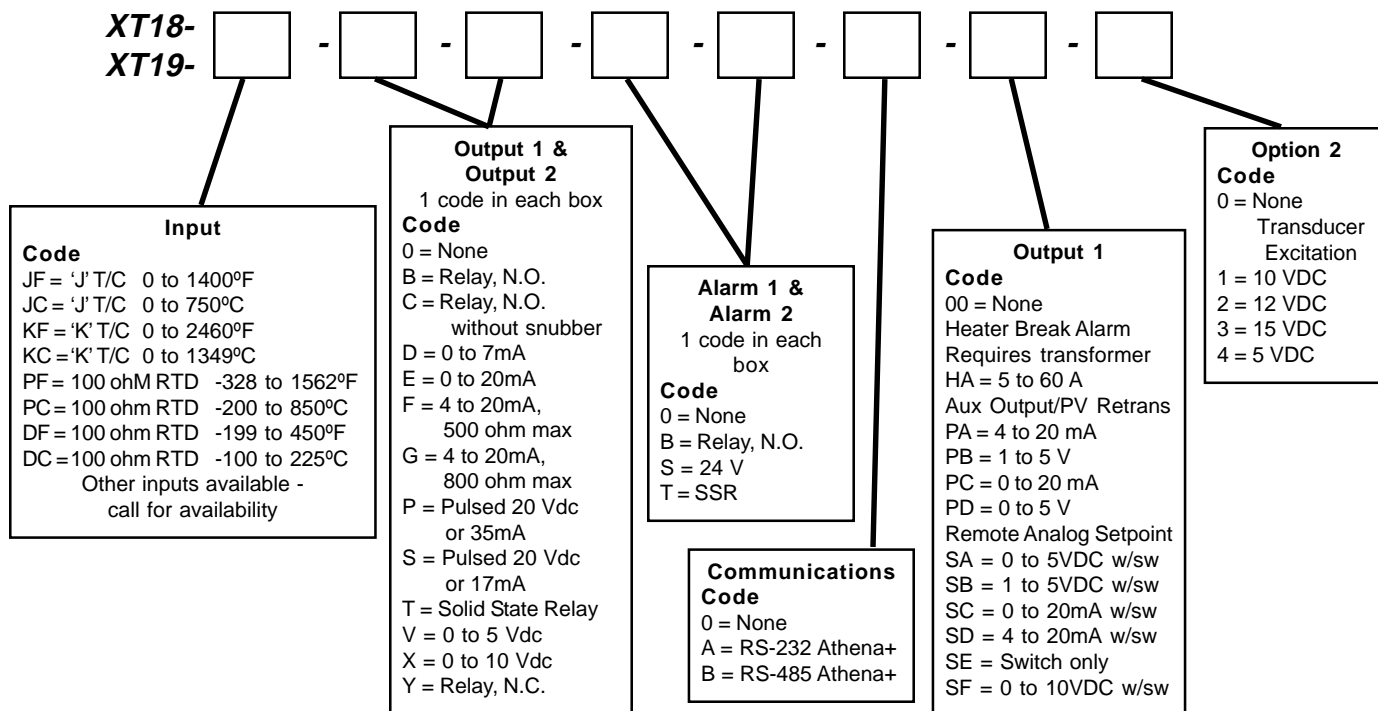
- User-Selectable Ramp to Setpoint •
- Bumpless Auto/Manual Transfer •
- NEMA 4X (IP65) Dust and Splash-Proof Front Panel •
- On/Off through Full PID Operation •
- Auto-Tuning, Heat or Cool •
- Adjustable Hysteresis & Heat/Cool Spread •
- Dual Output/Dual Alarm Capabilities •

Base Price \$315.00

Call BMS for Price Information

Ordering Information

Athena Legacy Series 1/8 DIN Temperature/Process Controller



Athena Legacy Series 18 and 19 Universal Temperature/Process Controller Technical Specifications

Operating Limits:

Ambient Temperature	32°F to 131°F
Relative Humidity	
Tolerance	90% Non-condensing
Line Voltage	100 to 250 VAC 125 to 300 VDC 24 VAC/DC optional
Power Consumption	Less than 6 VA

Performance:

Accuracy	±0.02% of full scale (± 0.10% typical)
Setpoint Resolution	1 count/0.1 count
Repeatability	±1.0 count
Temperature Stability	5 mV/°C maximum
TC Cold End Tracking	0.05°C/°C ambient
Noise Rejection	100 dB common mode 70 dB series mode
Process Sampling	10 Hz (100 ms)
Digital Filtering	Adjustable 0.1 to 10

Control Characteristics:

Setpoint Limits	Span of sensor
Alarms	Adjustable for high/low, selectable for process or deviation
Rate	0 to 900 sec
Reset	0 to 2400 sec
Cycle Time	0-200 ms, 1-120 sec
Gain	0 to 400
Gain Ratio	0 to 2.0 (0.1 increments)
Control Hysteresis	1 to 100 (on/off configuration)
Spread (Output 2)	0 to 100 (above setpoint)
Ramp to Setpoint	0 to 100 min
Auto-Tune	Operator initiated from front panel
Manual Control	Operator initiated from front panel

Inputs:

Thermocouple	B, C, E, J, K, N, NNM, R, S, T, Platinel II Maximum lead resistance 100 ohms for rated accuracy
RTD	Platinum 2- and 3-wire, 100 ohms at 0°C, (DIN curve standard .00385)
Linear	0-50 mV/10-50 mV, 0-20 mA/4-20 mA, 0-10 mV/0-50 mV, 0-100 mV, 0-1V/0.5 V, 0-10 V, 1-5 V

Outputs:

#1 Reverse-acting (Heating)	
#2 Direct-acting (Cooling)	
B	5 A/3A (120/240 VAC), N.O.
E	0-20 mA
F	4-20 mA, full output to load 500 ohm impedance maximum
G	4-20 mA, full output to load
P	20 VDC or 35 mA
S	20 VDC or 17 mA
T	1 a, Solid,-state relay
V	0 to 5 VDC
X	0-10 VDC
Y	1 A, N.C. relay

Alarm Outputs:

B	5 A/3 A (120/240 VAC), mechanical relay
S	24 V, 20 mA
T	SSR, N.C., 24-240 VAC

Mechanical Characteristics:

Display	Dual, 4-digit 0.36" LED display Process: Orange Setpoint Value: Green
Numeric Range	-1999 to 9999
Front Panel	
Rating	NEMA 4X (IP65)
Front Panel	
Cutout	3.622" x 1.771" (92mm x 45mm)
Connections	Screw Terminals

Athena Legacy Series 25 Universal Temperature/Process Controller



The Athena Legacy 25 is a 1/4 DIN panel mounted, auto-tuning controller that can be used for precise control of a single loop with two independent outputs.

The controller accepts thermocouple, RTD, voltage or current input. RS-232 or RS-485 communications are available and two digital LED displays provide visual indication of various controller functions.

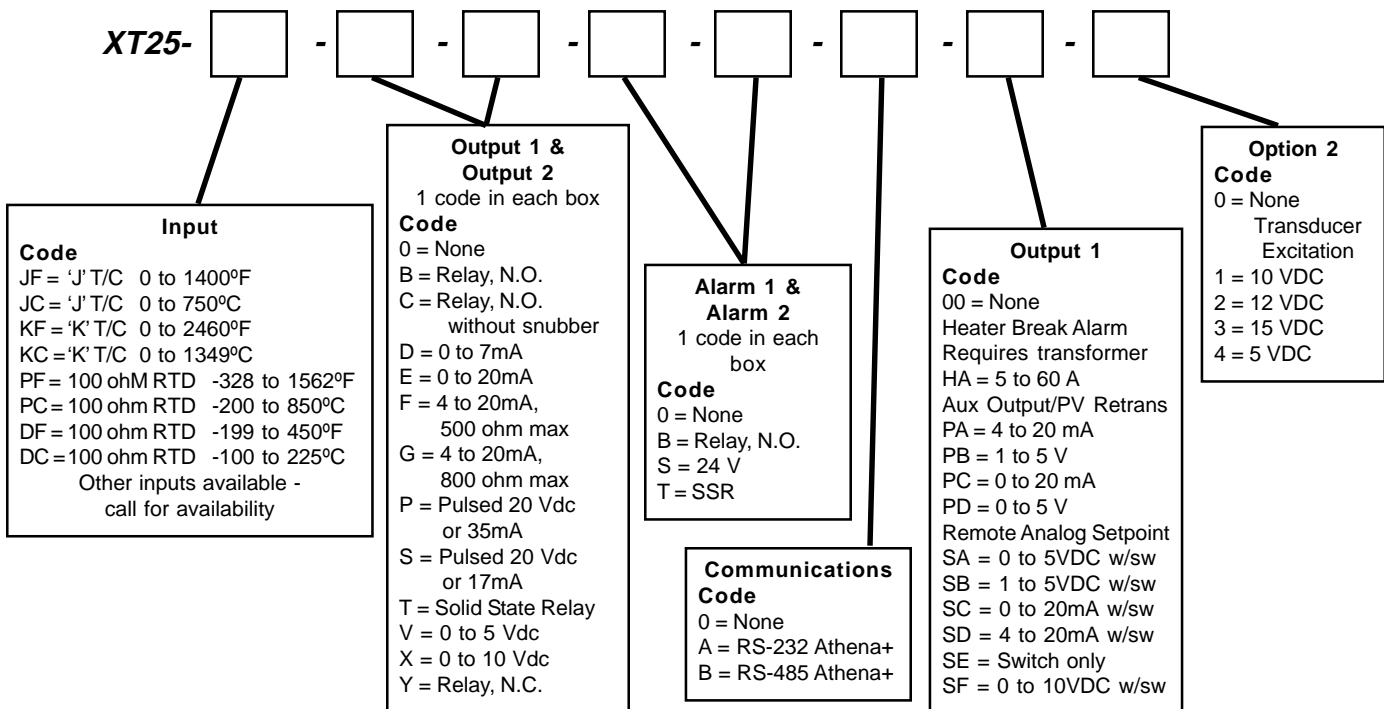
- User-Selectable Ramp to Setpoint •
- Bumpless Auto/Manual Transfer •
- NEMA 4X (IP65) Dust and Splash-Proof Front Panel •
- On/Off through Full PID Operation •
 - Auto-Tuning, Heat or Cool •
- Adjustable Hysteresis & Heat/Cool Spread •
- Dual Output/Dual Alarm Capabilities •

Base Price \$375.00

Call BMS for Price Information

Ordering Information

Athena Legacy Series 1/4 DIN Temperature/Process Controller



Athena Legacy Series 25 Universal Temperature/Process Controller
Technical Specifications

Operating Limits:

Ambient Temperature	32°F to 131°F
Relative Humidity	
Tolerance	90% Non-condensing
Line Voltage	100 to 250 VAC 125 to 300 VDC 24 VAC/DC optional
Power Consumption	Less than 6 VA

Performance:

Accuracy	±0.02% of full scale (± 0.10% typical)
Setpoint Resolution	1 count/0.1 count
Repeatability	±1.0 count
Temperature Stability	5 mV/°C maximum
TC Cold End Tracking	0.05°C/°C ambient
Noise Rejection	100 dB common mode 70 dB series mode
Process Sampling	10 Hz (100 ms)
Digital Filtering	Adjustable 0.1 to 10

Control Characteristics:

Setpoint Limits	Span of sensor
Alarms	Adjustable for high/low, selectable for process or deviation
Rate	0 to 900 sec
Reset	0 to 2400 sec
Cycle Time	0-200 ms, 1-120 sec
Gain	0 to 400
Gain Ratio	0 to 2.0 (0.1 increments)
Control Hysteresis	1 to 100 (on/off configuration)
Spread (Output 2)	0 to 100 (above setpoint)
Ramp to Setpoint	0 to 100 min
Auto-Tune	Operator initiated from front panel
Manual Control	Operator initiated from front panel

Inputs:

Thermocouple	B, C, E, J, K, N, NNM, R, S, T, Platinel II Maximum lead resistance 100 ohms for rated accuracy
RTD	Platinum 2- and 3-wire, 100 ohms at 0°C, (DIN curve standard .00385)
Linear	0-50 mV/10-50 mV, 0-20 mA/4-20 mA, 0-10 mV/0-50 mV, 0-100 mV, 0-1V/0.5 V, 0-10 V, 1-5 V

Outputs:

#1 Reverse-acting (Heating)	
#2 Direct-acting (Cooling)	
B	5 A/3A (120/240 VAC), N.O.
E	0-20 mA
F	4-20 mA, full output to load 500 ohm impedance maximum
G	4-20 mA, full output to load
P	20 VDC or 35 mA
S	20 VDC or 17 mA
T	1 a, Solid,-state relay
V	0 to 5 VDC
X	0-10 VDC
Y	1 A, N.C. relay

Alarm Outputs:

B	5 A/3 A (120/240 VAC), mechanical relay
S	24 V, 20 mA
T	SSR, N.C., 24-240 VAC

Mechanical Characteristics:

Display	Dual, 4-digit 0.36" LED display Process: Orange Setpoint Value: Green
Numeric Range	-1999 to 9999
Front Panel	
Rating	NEMA 4X (IP65)
Front Panel	
Cutout	3.622" x 1.771" (92mm x 45mm)
Connections	Screw Terminals

Temperature Controls



C91 Single Display, High Accuracy, Low Cost!

Fast input scan rates (5 per second), 18 bit input resolution and 15 bit output resolution as well as fuzzy modified PID control provide not only the highest accuracy, but temperature control minimizing over/under shoot while maintaining fast process response. The C91 control can be equipped with up to 2 control outputs that can be configured as two PID + fuzzy or single PID + fuzzy with alarm. A third output can be configured for RS232/485 Modbus communication. Standard software functionality includes Fuzzy Logic + PID, soft start ramp, lock out protection, bumpless transfer, user defined menu operation, timer function, and more.

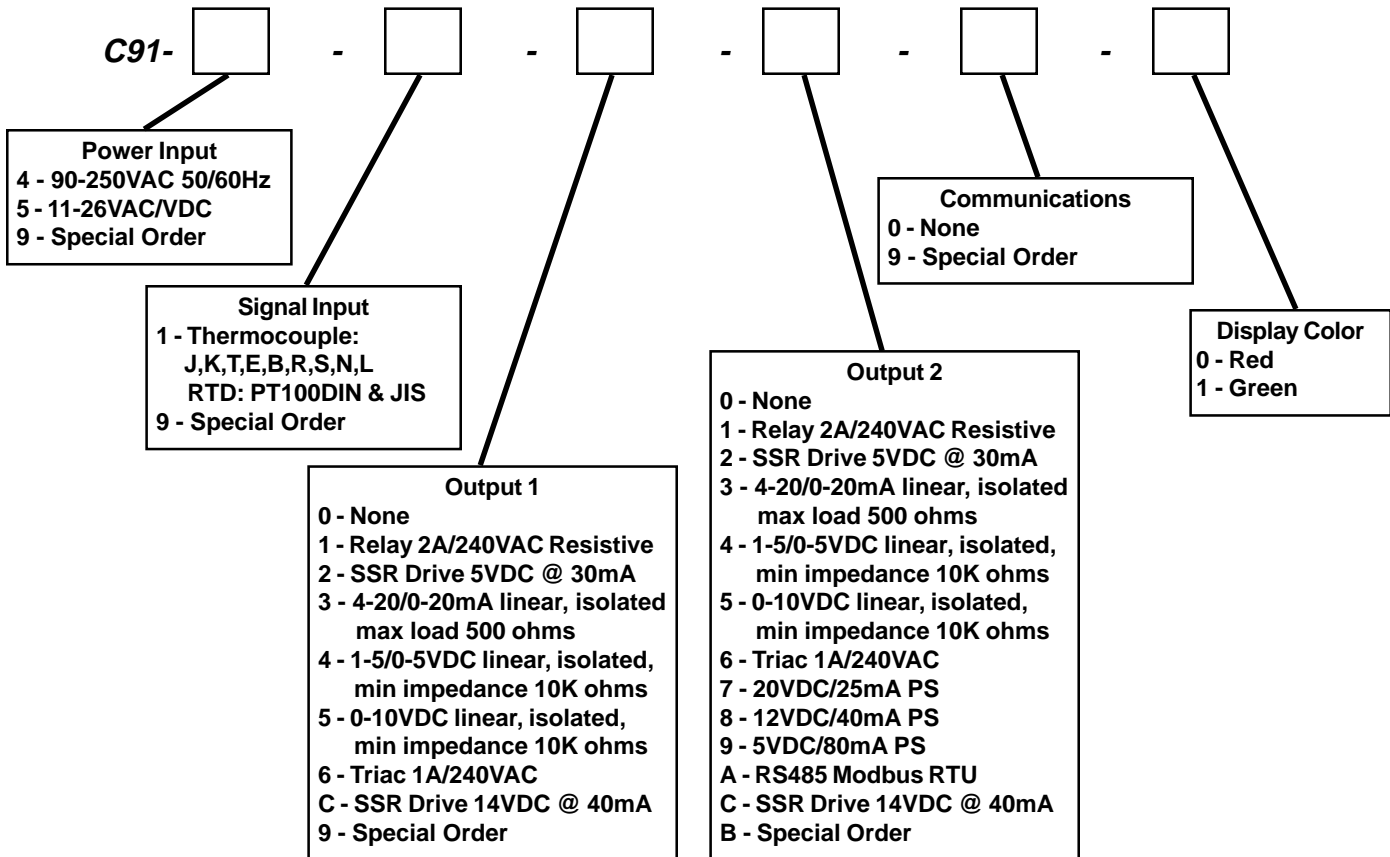
- **Fuzzy Logic Temperature Control** •
- **Up to Two Control Outputs** •
- **Red or Green LED Display** •
- **Variety of Alarm Modes** •

Base Price \$139.00

Call BMS for Price Information

Ordering Information

C91 1/16 DIN Temperature Control



C91 Single Display Temperature Controller Specifications

Power:

90-250VAC, 50/60Hz
11-26VAC/VDC

Input:

(18 Bit A/D Resolution)

Thermocouple:

Type J, K, T, E, B, R, S, N, L

RTD:

PT100 ohm RTD (DIN or JIS)

Range:

Per table in order manual

Accuracy:

Better than $\pm 0.25\%$ of span

Cold Junction Compensation:

0.1°C / °C ambient typical

Sensor Break:

Protection mode configurable

Common Mode Rejection:

120dB

Sample Rates:

5 times per second

Control:**Proportional Band:**

0.1 - 500°C (0.1 - 900°F)

Reset (Auto):

0-1000 seconds

Rate (Derivative):

0 - 360.0 seconds

Cycle Time:

0.1 - 900 seconds

Ramp Rate:

0 - 500° C/ minute or hour

Timer Dwell:

0 - 4553.6 minutes

On-Off:

with adjustable hysteresis (0.1 - 90.0°F)

Control Action:

Direct and Reverse

Operating Temperature:

-10 - 50°C

Humidity:

0 - 90% RH (non-condensing)

Insulation:

20M ohms minimum (500VDC)

Dielectric Strength:

2000VAC, 50/60Hz for 1 minute

Vibration:

10 - 55Hz, 10m/s² for 2 hours

Moldings:

Flame retardant polycarbonate

Dimensions:

1.89" (H) x 1.89" (W) x 3.7" (D)

Weight:

140 grams