



## 2104

### 1/4 DIN Temperature and Process Controller

- Dual PID & Fuzzy Logic Control
- Control Loop Protection
- Five Outputs-Control, Alarm or Event
- Universal Sensor Inputs: TC, RTD, Voltage and Current
- Switching Power Supply 100-240 Vac or 12-24 Vac/Vdc, 50/60 Hz
- NEMA 4X Front Panel
- 16 Segment Ramp/Soak Program
- Digital Communications with ChromaSoft™ Compatibility
- Isolated 12 Vdc Power Supply Option
- Operating Ambient up to 150°F
- Three Year Warranty



#### Description

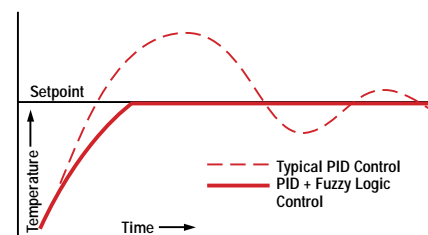
The Chromalox 2104 1/4 DIN Temperature and Process Controller is a low cost, high performance single loop controller that can be used for temperature, flow, pressure and level control applications. With universal sensor inputs and front panel operator setup, one 2104 controller can be easily field configured for a wide variety of applications, and simply reconfigured as application needs change. This makes it an exceptional choice for OEMs and distributors with multiple control needs, manufacturing facilities, testing facilities and testing applications.

#### Features

- Five (5) Possible Outputs for Single Output or Heat/Cool Control, plus up to three Alarm or Event Outputs.
- Universal Sensor Input accepts thermocouple, RTD or analog signals, provides 24 Vdc Output for loop power.
- Self-Tuning with Fuzzy Logic optimizes PID control and minimizes overshoot.
- Digital Input for remote switching of one of the following:
  - PID1/PID2
  - Remote/Local Setpoint
  - Main/Auxiliary Setpoint
  - Ramp/Soak Operation
  - Manual/Auto Control
  - Alarm Reset for Latching Alarms
- 16 Interval Ramp/Soak Program with guaranteed soak, 3 event outputs and looping.
- Programmable Analog Output and Remote Setpoint Input

- AUX Pushbutton and LED for front panel switching of:
  - PID1/PID2
  - Remote/Local Setpoint
  - Main/Auxiliary Setpoint
  - Ramp/Soak Operation
  - Manual/Auto Control
- Security Code Protection prevents unauthorized access.
- Setpoint Ramp Rate provides Soft Start at powerup, or on setpoint changes, to prevent uneven heating and overshoot.
- Control Loop Protection provides process protection from:
  - Open Sensor
  - Shorted Sensor
  - Sensor Reversed
  - Control Output Open or Shorted
  - Power Control Device Open or Shorted
  - Load Power Missing and Self Diagnostics.

#### Self-Tuning with Fuzzy Logic



## 2104 Controller (cont'd.)

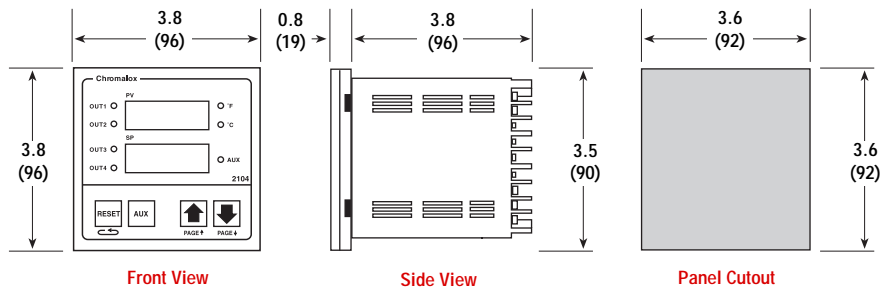
### Specifications

<b>Control Modes</b>	Automatic ..... On/Off, Proportional (P), PID, PID + Fuzzy Logic, Heat/Cool	
<b>Control Adjustments</b>	Control Setpoint ..... Sensor Range Setpoint Limits ..... Sensor Range Deadband ..... 1-100°F Proportional Band ..... Sensor Range Manual Reset ..... -99.9 to +99.9 Automatic Reset ..... 0-99.99 repeats/min. Rate ..... 0-500 sec. Output Cycle Time ..... 0.0-60.0 sec. Output Limit ..... 0-100% Open Sensor/Out of Range Output ... 0-100% Display Offset ..... -100 to +100°F	
<b>Heat/Cool Adjustments</b>	Output Offsets ..... 0-100% Prop. Band Cooling Medium ..... Air, Water or Oil	
<b>Alarm Adjustments</b>	Setpoints ..... High and Low Settings for each Alarm Output Alarm Types ..... Absolute: High, Low and High/Low ..... Tracking: + Deviation, - Deviation and +/- Deviation Relay Action ..... Latching or Non-Latching, Energized or De-Energized Alarm Deadband ..... Adjustable, 0-100°F	
<b>Control/Alarm Outputs</b>	Total of five (5) Control/Alarm outputs possible Relay ..... Relay-Form A contacts, 1 Amp at 120/230 Vac (resistive load) Solid State Relay Drive ..... 24 Vdc nominal at 40 mA Triac ..... 1 Amp continuous, 10 Amp in-rush, at 120 or 230 Vac Current/Voltage ..... 4-20 mA into 0-800Ω, field changeable to 1-5 Vdc	
<b>Output #5 (Optional)</b>	Relay-NO. Form C contact, 5A at 120 or 2.5A at 230 Vac	
<b>Sensor Input Specifications</b>	Range °F	Range °C
J T/C .....	-100 to +1400	-73 to +760
K T/C .....	-300 to +2400	-184 to +1316
T T/C .....	-350 to +750	-212 to +399
E T/C .....	-100 to +1100	-73 to +593
R T/C .....	0-3200	-18 to +1760
S T/C .....	0-3200	-18 to +1760
B T/C .....	50-3300	10-1816
100Ω Pt RTD (α = 0.00385) .....	-200 to +1000	-128 to +538
RTD (0.1° res.) .....	-99.9 to +899.9	-73.3 to +482.2
4-20mA .....	-500 to +5000 (programmable)	
0-5 Vdc .....	-500 to +5000 (programmable)	
1-5 Vdc .....	-500 to +5000 (programmable)	
<b>Ramp/Soak Programming</b>	Intervals ..... 16 intervals Loops ..... 1 loop, 0-255 times or continuous Event Outputs ..... Up to 3 Guaranteed Soak Differential ..... Off, 1°F to sensor span Time Units ..... Seconds, Minutes, Hours (1 second to 99.99 hours/segment)	
<b>Remote Setpoint Input</b>	Input Signal ..... 4-20 mA or 1-5 Vdc, Field Selectable	
<b>Digital Input</b>	Accepts dry-contact closure	
<b>Analog Output Option</b>	Assignable Functions ..... Process Variable      Output #1 Command ..... Active Setpoint      Output #2 Command Output Signal ..... 4-20 mA into 0-800Ω load, 1-5 Vdc into 100KΩ or greater load ..... Selectable via DIP switch Range ..... Programmable for retransmission of Process Variable and Active Setpoint	
<b>Isolated DC Power Supply Option</b>	12 Vdc, 50mA Max	
<b>Digital Communications (Optional)</b>	RS-232 ..... Single drop, isolated RS-422/485 ..... Multi-drop, isolated, field selectable by switch Baud Rates ..... 1200, 2400, 4800, 9600, 19200 Protocols ..... ASCII Line, Computer Interface	
<b>Instrument Power</b>	100-240 Vac, +10%, -15%; 12-24 Vac/Vdc, ± 10%; 50-60 Hz	
<b>Operating Environment</b>	32-150°F (0-65°C) ambient temperature, relative humidity < 95%, non-condensing	

## 2104

### 1/4 DIN Temperature and Process Controller (cont'd.)

#### Dimensions



All Dimensions in Inches (mm)

#### Ordering Information

Complete the Model Number using the Matrix provided.

#### In Stock:

Model	PCN
2104-R0000	306510
2104-R0100	306528
2104-R0110	307045
2104-R0120	307053
2104-R0010	306536
2104-R0130	306595
2104-R0150	307192
2104-R0101	307168
2104-T0000	306552
2104-T0100	306560
2104-A0000	306579
2104-A0100	306587
2104-A0130	306608
2104-A0140	307150
2104-RR000	307176
2104-RR100	306616
2104-TT100	306544
2104-TT150	307205
2104-AR100	307061
2104-ST110	307184

#### In Stock:

Model	PCN
<b>2104 Output Cards</b>	
0149-27106 Relay (SSR)	306624
0149-27105 Triac	306632
0149-27100 Analog(4-20ma)single	306640
0149-27097 Relay/Relay	306659
0149-27099 Triac/Triac	306667
0149-27098 SSR/SSR	306675
0149-27103 Analog/Relay	306683
0149-27104 Analog/Triac	306691
0149-27101 SSR/Relay	306704
0149-27102 SSR/Triac	306712

Model	Temperature and Process Controller
2104	Microprocessor-based 1/4 DIN Temperature Controller. Universal Sensor Input accepts Thermocouple, RTD, Current or Voltage Inputs with 24 Vdc Transmitter Power Supply. PID, ON/OFF and Fuzzy Logic Control Capability. One Digital Input, Analog Remote Setpoint, and 16 Segment Ramp/Soak Program.
<b>Code</b>	<b>Output #1 - Single Output Control</b>
RO	Relay/SSR Drive (jumper selectable) Relay-NO. Form A Contact, 1A at 120 or 230 Vac SSR Drive-24 Vdc at 40 mA
TO	Triac-1 Amp at 120 or 230 Vac
AO	Analog-4-20 mA or 1-5 Vdc, non-isolated
<b>Code</b>	<b>Outputs #1 &amp; #2 - Heat/Cool Control</b>
RR	Relay/Relay
TT	Triac/Triac
AA	Analog/Analog
SS	SSR Drive/SSR Drive
AR	Analog/Relay
AT	Analog/Triac
SR	SSR Drive/Relay
ST	SSR Drive/Triac
<b>Code</b>	<b>Outputs #3 &amp; #4 or Power Supply Option</b>
0	None
1	Dual Relay-Form A contact, 1A at 120 or 230 Vac with shared common terminal
7	Isolated Power Supply 12 Vdc, 50mA
<b>Code</b>	<b>Isolated Digital Communications, Output #5 (Alarm/Event Output) and Analog Output Option</b>
0	None
1	RS-422/485 Digital Communications and Output #5
2	RS-232 Digital Communications and Output #5
3	Analog Output Option
4	RS-422/485 Digital Communications, Output #5 and Analog Output Option
5	RS-232 Digital Communications with Output #5, and Analog Output Option
<b>Code</b>	<b>Power Supply</b>
0	100-240 Vac
1	12-24 Vac/Vdc

2104 - RO 1 1 0 Typical Model Number

Single Channel Controllers