

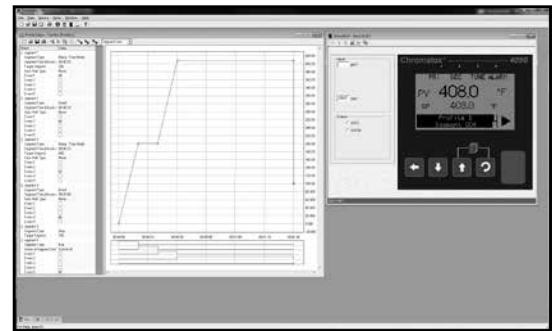
THE COMPONENT SOLUTION

Making it Right



Monitors & Overtemperature Controls

Chromalox makes it easy to protect expensive process equipment, products and processes. From multiple loop digital monitors to microprocessor-based 50 Series High Limit Controller with digital communications, to the space-saving, compact board level models, Chromalox has the right monitor or overtemperature controller for your application.



ChromaloxPro Software

Temperature & Process Controllers

With control options ranging from basic electromechanical thermostats to multi-loop, microprocessor-based temperature and process controllers, Chromalox has the exact degree of cost-effective product sophistication, or simplicity, that your application demands:

- 1/32, 1/16, 1/8 and 1/4 DIN Temperature and Process Controllers
- Single and Dual Loop Advanced Process Controllers
- Multi-Loop Controllers
- Non-Indicating Temperature Controls
- Thermostats
- OEM Engineering and Customization Capabilities

Standard Chromalox controllers are equipped with advanced features such as:

- Digital Communications
- Ramp/Soak
- Fuzzy Logic
- Self-Tuning Control



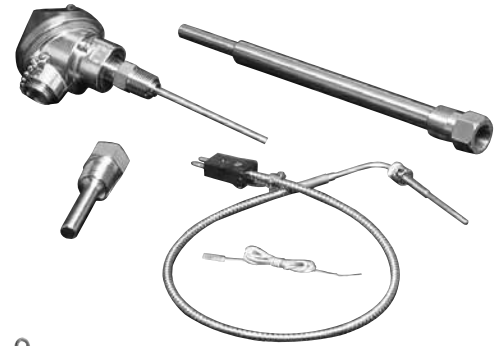
Cost-Effective Products

CONTROLS

Solid State Power Control Components

Chromalox offers a complete array of solid state power control components from efficient, cost-sensitive SSR's to full-featured advanced SCR's. Options such as parameter diagnostics, current limiting, multiple firing modes, soft start and communications ensure high precision control, system integrity and process stability:

- Zero-Crossover and Phase-Angle Fired
- 120 to 690 VAC
- 0 to 1200 Amps
- Single and 3-Phase Loads
- User Configurable Firing Models
- Current Limiting, Heater Break and Soft Start
- V, I, P Diagnostics
- Standard Industrial Communication Protocols



Your Single Source

Heat Trace Controls

Chromalox also offers a complete line of electronic heat trace controls and control panels.



Sensors & Accessories

As your single source for the essential control elements, Chromalox specifies and stocks all the accessories you need to complete your application – simply and reliably from one source:

- Thermocouples and RTDs
- Thermowells, Connection Hardware and Extension Wire
- Calibration Devices
- Indicating Meters, Timers and Recorders
- Electromechanical Contactors, Thermostats and Thermostatswitches.

Choose from integrated temperature controls, sensors and single or multi-loop control panels used for process temperature control and freeze protection applications. See section G in this catalog for more information about our complete line of heat trace products.



Control Panels

Integrating all the components – temperature controllers, overtemperature controllers and Power Controllers – into standard, off-the-shelf-panels, sets Chromalox apart from the competition. Chromalox stocks more standard power control panels, in different sizes and configurations than anyone in the industry. Choose from basic, single-circuit, low amperage contactor or SCR mini control panels to sophisticated, multiple circuit, higher amperage phase angle SCR control with full system diagnostics and several layers of process redundancy. Every panel is pre-engineered, field-proven and ready to install, and saves you the time and trouble of selecting, obtaining and assembling the various components. Select from pre-configured panels that include:

- NEMA 12, 7, 4X or 4 Enclosure
- 120-690 VAC
- 25 Amps - 1200 Amps
- Zero Cross or Phase Angle
- Process/Temperature Controller(s)
- Overtemperature Controller(s)
- SCR Power Controller(s) and Fusing
- Contactor(s)
- Hybrid Contactor with SCR Trim Control
- Pushbuttons, Switches, Indicators and Labeling Options
- Agency Approvals (UL, CSA, cUL)

Custom Panels & Control Systems

Drawing on nearly 100 years of experience, Chromalox has an expertise that comes from working with world-scale engineering groups such as Bechtel and Flour-Daniel, U.S. military shipboard systems and the most demanding research institutions. Chromalox has encountered and conquered the challenges of even the most specialized requirements. This experience translates to efficient, economical solutions for your system's applications.



*Medium Voltage SCR Control Panel
4,160 VAC • 2,500 kW*

The Essential Elements

Temperature & Process Controller Selection Guide

Controller	4081/4082	4080	6060	40 Series 4040, 8040, 6040	20 Series 8020, 6020
Description	Temperature & Process Controller	Temperature & Process Controller	Temperature & Process Controller	Temperature & Process Controller	Temperature & Process Controller
Control Loops	Single / Dual	Single	Single	Single	Single
Indication/Display	Graphical/Text LCD	Graphical/Text LCD	Upper: 4 digit Low: Hi-Res Text	Dual 4-Digit	Dual 4-Digit
Panel Cutout (DIN)	1/4	1/4	1/16	1/4, 1/8, 1/16	1/8, 1/16
Inputs Thermocouple	J,K,R,S,T,B,C,D,E,L,N,Pt RH 20%:40%	J,K,R,S,T,B,C,D,E,L,N,Pt RH 20%:40%	J,K,R,S,T,B,C,D,E,L,N,Pt RH 20%:40%	J,K,C,E,N,T,R,S,B & Pt RH 20% vs 40%	J,K,C,L,N,T,R,S,B & Pt RH 20% vs 40%
RTD	2 or 3 wire PT100, NI120	2 or 3 wire PT100, NI120	2 or 3 wire PT100, PT1000, KTY 11-6	2 or 3 wire PT100	2 or 3 wire PT100
Current, Voltage	0/4-20 mA, 0/10-50 mV, 0/1-5 V, 0/2-10 V, (0-100 mV and 2K Ω pot also on aux input), scaling -1999 to +9999	0/4-20 mA, 0/10-50 mV, 0/1-5 V, 0/2-10 V, (0-100 mV and 2K Ω pot also on Feature Option B input), scaling -1999 to +9999	0-20 mA, 4-20 mA, 0-5 V, 1-5 V, 0-10 V, 2-10 V, scaling -1999 to +9999	0-20 mA, 4-20 mA, 0-50 mV, 10-50 mV, 0-5 V, 1-5 V, 0-10 V, 2-10 V, scaling -1999 to +9999	0-20 mA, 4-20 mA, 0-50 mV, 10-50 mV, 0-5 V, 1-5 V, 0-10 V, 2-10 V, scaling -1999 to +9999
Digital	9 (+ 4 soft)	2	2 or 4	1	N
Outputs (Maximum)	9	9	6	3/5	3
Relay	Y	Y	Y	Y	Y
SSR Drive	Y	Y	Y	Y	Y
Triac/SSR	Y	Y	Y	Y	N
4-20mA	Y	Y	Y	Y	N
Number of Control Points	3	2	3	2	2
Number of Alarms¹	7	5	5	3	2
Number of Events¹	7	5	5	3	2
Agency Approvals	UL, cUL, CE	UL, cUL, CE	UL, cUL, CE	UL, cUL, CE	UL, cUL, CE
Operating Environment	NEMA 4X, IP66 (IP65 with USB)	NEMA 4X, IP66 (IP65 with USB)	NEMA 4X, IP65	NEMA 4X / IP66	NEMA 4X, IP65
Control Modes Limit	N	N	N	N	N
ON/OFF	Y	Y	Y	Y	Y
Proportional (w/ manual reset)	Y	Y	Y	Y	Y
PID	Y (5 sets)	Y	Y	Y	Y
Auto Tune PID	Y	Y	Y	Y	Y
Valve Drive w/Feedback	Y	Y	Y	Y	N
Ramp and Soak	Y	Y	Y	N	N
Programs X Segments	64 X 255	64 X 255	16 X 16	-	-
Ramp to Set Point	Y	Y	Y	Y	Y
Control Action	Heat, Cool Heat/Cool, Valve Actuator	Heat, Cool Heat/Cool, Valve Actuator	Heat, Cool Heat/Cool	Heat, Cool Heat/Cool	Heat, Cool Heat/Cool
Other	Loop / Heater Break Alarm, Cascade, Ratio, Gain Scheduling, Valve Motor Drive	Loop / Heater Break Alarm, Valve Motor Drive	Loop / Heater Break Alarm	Valve Motor Drive, Heater Break Alarm	-
Remote Setpoint	Y	Y	Y	Y	N
Retransmit Output	Y	Y	Y	Y	N
Communications (Modbus unless otherwise specified)	RTU/RS485 & TCP/Ethernet, USB Data Port	RTU/RS485 & TCP/Ethernet, USB Data Port	RTU/RS485	RTU/RS485	RTU/RS485
See Page	H-7	H-11	H-15	H-18	H-21

¹ Some outputs are field selectable as Alarms or Events.

Temperature & Process Controller Selection Guide

Controller	2110	3204	ETR-3400	300D/300B	1040
Description	Temperature Controller	Temperature & Process Controller	Temperature & Process Controller	Temperature Controller	Temperature & Process Controller
Control Loops	Single	Single	Single	Single	1 - 32 / System
Indication/Display	Single 4-Digit	Single 4-Digit	Single 4-Digit	Set Point Dial/Non Indicating	N/A
Panel Cutout (DIN)	1/4	1/32	1/32	DIN Rail	DIN Rail Mount
Inputs Thermocouple	J,K	J,K,T,E,B,R,S,N	J,K,T,E,B,R,S,N	J,K	J,K,E,L,N,T,R,S,B & Pt RH 20% vs 40%
RTD	PT100	PT100	PT100	PT100	3 wire PT100, NI120
Current, Voltage	-	4-20mV, 0-20mV and 4-20mA*, 0-20mA* *requires 1-Ohm resistor	4-20mA, 0-20mA 0-1, 0-5, 1-5 or 0-10Vdc	-	0/4-20 mA, 0/10 to 50 mV, 0/1-5 V, 0/2-10 V, scaling -32000 to +32000; Heater Current: 0 to 50mA/60mA Scaleable 0.1 to 100AAC
Digital	N	-	1	-	N
Outputs (Maximum)	2	3	3	1	Up to 48
Relay	Y (20 Amps)	Y	Y	Y	Y
SSR Drive	Y (10 Amps)	Y	Y	N	Y
Triac/SSR	Y	Y	Y	N	N
4-20mA	N	Y	Y	N	Y
Number of Control Points	1	2	2	1	
Number of Alarms¹	1	1	2 (1 out Vdc)	N	Up to 16
Number of Events¹	-	-	-	0	Up to 16
Agency Approvals	UL, cUL	UL, cUL, CE	UL, CSA, CE	UL, CUL	UL, cUL, CE
Operating Environment	NEMA 4X	NEMA 4X	NEMA 4X	NEMA 1	IP20
Control Modes Limit	N	Y	N	N	N
ON/OFF	Y	Y	Y	Y	Y
Proportional (w/ manual reset)	Y	Y	Y	Y	N
PID	Y (PI Only)	Y	Y	N	Y
Auto Tune PID	N	Y	Y	N	Y
Valve Drive w/Feedback	N	N	N	N	Y
Ramp and Soak	N	Y	Y	N	N
Programs X Segments	-	1 X 2	2	-	-
Ramp to Set Point	-	Y	Y	-	Y
Control Action	Heat	Heat, Cool Heat/Cool	Heat, Cool Heat/Cool	Heat	Heat, Cool Heat/Cool
Other	High Current Output	-	Differential Input Loop / Heater Break	Sensor Break	Heater Break Alarm
Remote Setpoint	N	N	Y	N	
Retransmit Output	N	N	Y	N	Y
Communications (Modbus unless otherwise specified)	N	RTU/RS485, RS232	RTU/RS485	N	RTU/RS485, TCP/IP, DeviceNet, Ethernet/IP, Profibus
See Page	H-25	H-27	H-30	H-33	H-34

¹ Some outputs are field selectable as Alarms or Events.

Temperature & Process Controller Selection Guide

Controller	3340 / 3380	CX224	50 Series 4050, 6050	LIMIT
Description	Temperature & Process Controller	Monitor	High/Low Limit	High Limit
Control Loops	Four / Eight	Twelve	Single	Single
Indication/Display	Dual 4-Digit	LED	Dual 4-Digit	Set Point Dial Non-Indicating
Panel Cutout (DIN)	1/4	Special Front Panel Mount	1/4 & 1/16 (1/8 available)	Back Panel Mount
Inputs Thermocouple	J,K,E,T,R,S,B,N,PLII,U,LW5Re/W26Re	J,K,E,T	J,K,C,L,N,T,R,S,B & Pt RH 20% vs 40%	J,K
RTD	PT100	Pt, Ni, Cu	3 wire PT100	PT100
Current, Voltage	0-5, 0-10, 1-5 Vdc	4-20 mA	0-20 mA, 4-20 mA, 0-50 mV, 10 to 50 mV, 0-5 V, 1-5 V, 0-10 V, 2-10 V, scaling -1999 to +9999	0-20 mA, 4-20 mA, 0-5 V, 1-5 V, 2-10 V, 0-10 V
Digital	Up to 5	0	1	Reset
Outputs (Maximum)	11	5	3	1
Relay	Y	Y	Y	Y
SSR Drive	Y	Y	Y	N
Triac/SSR	Y	N	Y	N
4-20mA	Y	N	Y	N
Number of Control Points	4 / 8	0	1	0
Number of Alarms¹	Up to 7 / Up to 3	12	3	1
Number of Events¹		0	1	0
Agency Approvals	UL, cUL, CE	UL	UL, cUL, CE	UL, cUL, FM
Operating Environment	IP65	NEMA 4	NEMA 4X, IP66	
Control Modes Limit	N	N	Y	Y
ON/OFF	Y	N	N	N
Proportional (w/ manual reset)	Y	N	N	N
PID	Y	N	N	N
Auto Tune PID	Y	N	N	N
Valve Drive w/Feedback	N	N	N	N
Ramp and Soak	N	N	N	N
Programs X Segments	-	-	-	-
Ramp to Set Point	Y	N	N	N
Control Action	Heat, Cool Heat/Cool	Limit/Alarm	Limit/Alarm	-
Other	Heater Break, Multi-Memory Area	Differential Input Heater Break	-	3PH/Heater Break Memory Area
Remote Setpoint	N		N	
Retransmit Output	N	N	Y	
Communications (Modbus unless otherwise specified)	RTU/RS485/422/232	RTU/RS485, RS232	RTU/RS485	N
See Page	H-38	H-42	H-44	H-47

¹ Some outputs are field selectable as Alarms or Events.

4081 & 4082

Advanced Temperature & Process Controller 1 & 2 Loop

- 1/4 DIN Format
- Up to 9 Outputs
- Up to 7 Programmable Event Outputs: Absolute, Deviation, Rate of Change, Sensor Break, Recorder Memory, Power
- Reinforced Safety Isolation from Outputs and Inputs
- Several Inputs
 - 2 Analog
 - Remote Setpoint
 - 9 Digital
- Profiling Option
 - 64 Programs Using 255 Segments
 - Ramp, Dwell, Hold, Loop, Join, End & Repeat
- Data-Logging Option (Data, Alarms & Events)
- Real Time Clock
- USB Port To Access Files
- Large Graphical / Text LCD Display
 - Trend View
 - Color Change LED Backlight On Alarm
 - Configurable User-Menu Structure
- Simplified Programming Wizard
- Cascade Control
- Ratio Control
- Valve Motor Control
- 2nd Universal Input also For Monitoring
- Modbus RS485 & Modbus TCP Ethernet
- ChromaloxPro™ Configuration Software
- Multiple Language Option
- UL, cUL, CE and RoHS₂

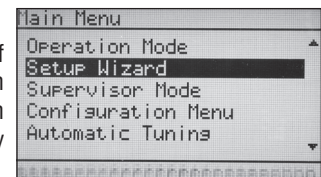


Description

The Chromalox 4081 (Single Loop) and 4082 (Dual Loop) are affordable temperature and process controllers with advanced functionality including profiling and data-logging options. They both incorporate a graphic/text LCD display and are designed to improve user efficiency with many features integrated to reduce startup time, simplify operation and minimize downtime.

Improved Process Visibility

One of the key factors in maintaining and improving operation of a system is to have high visibility of the process. The LCD screen displays clear real-text messages, removing ambiguity that can be caused by mnemonic codes on LED displays used in many products. The 4082 has two independent loop displays.

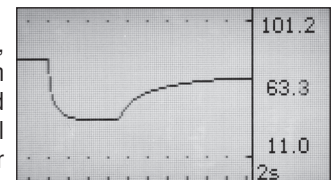


Simplified Operation

Operators can improve efficiency and reduce the possibility of errors by creating an optimized menu structure for screen navigation. The configuration tool is used to provide operators with the specific parameters needed in the order desired. Security is assured with password protection on supervisor and configuration parameter access levels.

A Complete & Compact Control Solution

Advanced process and temperature control, such as cascade, valve and ratio control, extensive profiling capability, high visibility alarms and data-logging functions are all packaged within a single 1/4 DIN product. The integrated control, dual loop capability and monitoring functions translate into fewer system control components. This reduces wiring, shrinks the panel footprint and compresses installation time, resulting in a lower system cost.



Minimize Setup Time

Time is money. Constantly referring to instruction manuals increases startup time and can lead to confusion. A number of tools are available with the 4081/4082 to simplify the configuration process: An easy setup wizard; on-screen help; ChromaloxPro™ software for on or offline programming; and secure local configuration with a memory stick via the optional front access USB port.

4081 & 4082 Advanced Temp. & Process Controller *(cont'd.)*

Features

Advanced Process Control

- Easy setup wizard for quick configuration
- Universal input for T/C, RTDs & Linear DC signals
- Up to 9 output options including Triac & Linear DC
- Up to 9 Digital inputs
- Configurable menus
- Pre-tune and self-tune function
- RS485 Modbus or Ethernet option
- USB port for local files access
- Master-slave config for multi-zone apps

Profiling Functionality

- 255 segments used within 64 programs
- Ramp, dwell, hold, loop or jump to other profile
- User-defined text profile names
- Delayed or day/time profile start
- Detailed overview of profile status
- Up to 7 event outputs
- Bar graph profile and segment trend progress

Integrated Data-Logging Option

- Historic data for analysis or reporting
- Trend view and alarm indication
- Export data files via front USB or comms
- Log PV's, SP's or alarms (including min, max & ave)
- Run/Stop or FIFO (first in-first out) recording
- Logging time intervals from 1s to 30m

Real text display with graphics

- Easy to read green/red LCD display
- Screen color can be set to change on alarm
- Multi-language option
- Custom splash-screen on startup
- Graphical trend view
- LED indication of heat, cool, auto-tuning and alarms

ChromaloxPro Configuration Suite

Save time with the ChromaloxPro software configuration tools.

- Change parameter settings
- PID tuning
- Offline simulation tools – reduce risk
- Visibility of live process data
- Fine-tune settings for optimum performance
- Back-up all settings for quick reconfiguration

Customize 4081 & 4082 for your process

- Optimized menu structure – simplify operation
- Modify text labels to match system operation
- Create a company contact page

Specifications

FEATURES

Control Types	1 or 2 control loops, each with PID or VMD (3-point stepping PID control). Two internally linked cascade loops, each with PID or VMD (3-point stepping PID control). One ratio loop for combustion control
VMD Feedback	Second input can provide valve position feedback or flow indication
Tuning Types	Pre-tune, auto-pretune, self-tune or manual tuning, with up to 5 PID sets stored internally
Auto/Manual Control	Selectable with 'bumpless' transfer when switching between auto and manual control
Output Configuration	Up to 9 for control, alarms, profiler event outputs, 24VDC transmitter power supply & retransmission.
Alarms	Up to 7 alarms selectable as process high, process low, deviation & band, plus sensor break and loop alarms. Logical OR alarm outputs, % recorder memory used, control power high/low unused.
HMI	Display: 160 x 80 pixel, monochrome graphic LCD with a dual color (red/green) backlight; 4 button operation; 4 LEDs to Indicate heat, cool, auto-tuning and alarm
PC Configuration	ChromaloxPro configuration and commissioning software

INPUT

Thermocouple	J, K, R, S, T, B, C, D, E, L, N, PtRh 20%:40%
RTD	3 wire PT100, NI120
DC Linear	0 -20 mA, 4-20 mA, 0-50 mV, 10-50 mV, 0-5 V, 1-5 V, 0-10 V, 2-10 V (0-100 mV and 2K Ω pot also on aux-B input) scaling -1999 to 9999
Accuracy	±0.1% of input range ± 1 LSD, Thermocouple CJC, (Aux Input : ±0.25% of input range ± 1 LSD)
Sampling rate	Process input 10 per second, Aux input : 4 per second
Sensor break	Detected within 2 seconds, control goes to user preset power value.
Digital inputs	Functions: setpoint select, control output, enable/disable, auto/manual control, profiler run/hold/abort, data-logger start/stop Volt free contact or DC voltage: open contact / 2 to 24 VDC signal = Logic high, closed contact / -0.6 to 0.8 VDC signal = Logic low

OUTPUTS

Relay	Single relay: 2 A resistive SPDT at 120/240 VAC, >500,000 operations Dual & Quad relay: 2 A resistive SPST at 120/240 VDC, >200,000 operations (dual) or >500,000 operations (quad)
SSR Driver	Voltage >10V into 500Ω min

4081 & 4082 Advanced Temp. & Process Controller *(cont'd.)*

Specifications (continued)

Triac	Operating voltage: 20 to 280 Vrms (47 to 63 Hz), Rating 0.01 to 1 A @ 25°C
Linear DC	Ranges: 0-5 V, 0-10 V, 1-5 V, 2-10 V, 0-20 mA & 4-20 mA (selectable) ±0.25% of range (mA@250Ω, V@2kΩ)
Transmitter PSU.....	Power rating 24 V nominal (19 to 28 VDC) into 910Ω min (option to use DC linear output as 0-10 V adjustable Tx PSU)
Communications.....	RS232 via RJ11 cable, (configuration only) RS485 - Modbus RTU master or slave, Ethernet - Modbus TCP slave (10 base-T or 100 base-T), Ver 1.1/2.0 USB host for memory stick

PROFILER

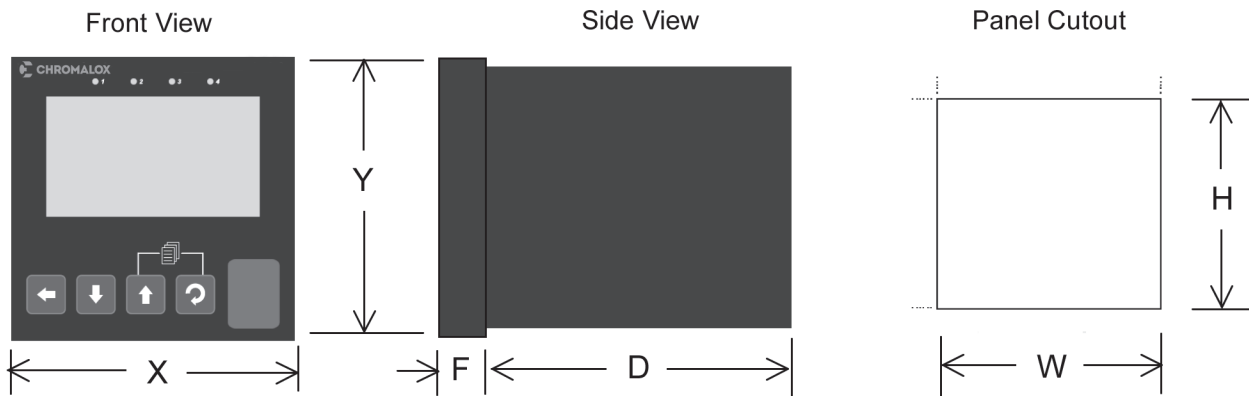
Memory	255 segments can be freely allocated in up to 64 programs
Segment types	Ramp (rate or time), dwell (soak), hold (manual guaranteed soak or real-time profiling), loop (to previous segment), join another profile, end or repeat sequence
Control.....	Run, hold, abort, profile select, jump to next segment, delayed profile start, real-time clock profile start.

DATA-LOGGER

Data record options	PV (Process variable), max and min PV between samples, actual SP (setpoint), output power, alarm & event status, power on/off
Record modes.....	FIFO (circular buffer) or run-then-stop (fixed buffer)
Recording Interval	1, 2, 5, 10, 15, 30 sec or 1, 2, 5, 10, 15, 30 min
Control.....	Manual; serial comms; digital input; synchronized with profile; PV rate of change; log on alarm

ENVIRONMENTAL

Standards	UL, cUL, CE, RoHS2. EMI - EN61326, Safety EN61010-1 & UL61010C-1 Pollution degree 2, Installation category II; RoHS2 2011/65/EU
Protection	Front Panel: NEMA 4, IP66 (IP65 with USB fitted). Behind panel IP20
Temperature & RH	0 to 55°C (-20 to 80°C Storage), 20% to 95% RH Non-Condensing



Model	X	Y	F	D	W	H
4081 & 4082	3.78" (96 mm)	3.78" (96 mm)	0.39" (10 mm)	4.61" (117 mm)	3.62" (92 mm)	3.62" (92 mm)

Accessories

Description	Part Number
ChromaloxPro Configuration Software	0149-50092
Universal S/W Converter & PC Cable 20/40/50/60/80 Series	0149-50086
Cable Only - 40/50/80 Series to Universal Adapter	0149-50088
Snubber	0149-01305

4081 & 4082 Advanced Temp. & Process Controller *(cont'd.)*

Model	Advanced Temperature & Process Controller										
4081	1 Control Loop										
4082	2 Control Loops										
Code	Unit Type										
C	Controller										
U	Controller with USB Port										
R	Controller/Recorder with USB Port & Real Time Clock										
Code	Profiler Option										
0	Not Fitted										
P	Profiler										
Code	Output 1										
0	None										
R	*Relay (2 Amp resistive at 240 VAC, SPDT, Form C)										
S	SSR (0/10 VDC, 500Ω Minimum load)										
A	*Analog (Linear DC: 0-20mA, 4-20mA, 0-5V, 0-10V, 2-10V)										
T	*Triac (0.01 to 1 Amp AC, 20 to 280Vrms, 47 to 63Hz)										
Codes	Output 2 & Output 3 (Choose the Appropriate Code for Each)										
Out 2	Out 3	Output Type									
0	0	None									
R	R	*Relay (2 Amp resistive at 240 VAC, SPDT, Form C)									
S	S	*SSR (0/10 VDC, 500Ω Minimum load)									
T	T	*Triac (0.01 to 1 Amp AC, 20 to 280Vrms, 47 to 63Hz)									
M	M	*Dual Relay Output - 2 Amp resistive, 240 VAC, SPST, Form A, norm. open, comm. term.									
W	W	*Dual SSR Output - Non Isolated, 0/10 VDC, 500 Ω Minimum load									
P	P	*Isolated Power Supply 24 VDC, 910 Ω Minimum (Only 1 Power Supply Supported)									
Code	Base Outputs										
1	1X Relay										
2	1X Relay & 1X Analog										
3	2X Relay & 1X Analog										
4	2X Relay & 2X Analog										
Code	Feature Option A										
0	None										
1	RS485 (ModBus/RTU) Digital Comms										
2	Digital Input (Voltage Free or TTL Input)										
3	Remote Setpoint - Analog Input A										
4	Ethernet Port - ModBus TCP Slave										
Code	Auxiliary Input										
0	None										
2	¹ Universal Input (Avail. on Single Loop Controllers Only)										
Code	Feature Option C										
0	None										
1	Multiple Digital Inputs (1 - 8 Digital Inputs)										
Code	Power Supply										
0	100 - 240V AC										
1	24 - 48V AC/DC										
4082-	R	P	S	R	R -	2	4	0	1	0	Typical Model Number

Order Table Notes:

- ¹ Only available on Single Loop Models.
- * Reinforced 240V safety isolation from inputs and other outputs

Technical Notes:

- 1. Quick Start manuals are shipped with the controller. Full installation and instruction manuals are available online at www.chromalox.com

4081 & 4082 Advanced Temperature & Process Controller *(cont'd.)*

Features

Advanced Process Control

- Easy setup wizard for quick configuration
- Universal input for T/C, RTDs & Linear DC signals
- Up to 9 output options including Triac & Linear DC
- Up to 9 Digital inputs
- Configurable menus
- Pre-tune and self-tune function
- RS485 Modbus or Ethernet option
- USB port for local files access
- Master-slave config for multi-zone apps

Profiling Functionality

- 255 segments used within 64 programs
- Ramp, dwell, hold, loop or jump to other profile
- User-defined text profile names
- Delayed or day/time profile start
- Detailed overview of profile status
- Up to 7 event outputs
- Bar graph profile and segment trend progress

Integrated Data-Logging Option

- Historic data for analysis or reporting
- Trend view and alarm indication
- Export data files via front USB or comms
- Log PV's, SP's or alarms (including min, max & ave)
- Run/Stop or FIFO (first in-first out) recording
- Logging time intervals from 1s to 30m

Real text display with graphics

- Easy to read green/red LCD display
- Screen color can be set to change on alarm
- Multi-language option
- Custom splash-screen on startup
- Graphical trend view
- LED indication of heat, cool, auto-tuning and alarms

ChromaloxPro Configuration Suite

Save time with the ChromaloxPro software configuration tools.

- Change parameter settings
- PID tuning
- Offline simulation tools – reduce risk
- Visibility of live process data
- Fine-tune settings for optimum performance
- Back-up all settings for quick reconfiguration

Customize 4081 & 4082 for your process

- Optimized menu structure – simplify operation
- Modify text labels to match system operation
- Create a company contact page

Specifications

FEATURES

Control Types	1 or 2 control loops, each with PID or VMD (3-point stepping PID control). Two internally linked cascade loops, each with PID or VMD (3-point stepping PID control). One ratio loop for combustion control
VMD Feedback	Second input can provide valve position feedback or flow indication
Tuning Types	Pre-tune, auto-pretune, self-tune or manual tuning, with up to 5 PID sets stored internally
Auto/Manual Control	Selectable with 'bumpless' transfer when switching between auto and manual control
Output Configuration.....	Up to 9 for control, alarms, profiler event outputs, 24VDC transmitter power supply & retransmission.
Alarms	Up to 7 alarms selectable as process high, process low, deviation & band, plus sensor break and loop alarms. Logical OR alarm outputs, % recorder memory used, control power high/low unused.
HMI	Display: 160 x 80 pixel, monochrome graphic LCD with a dual color (red/green) backlight; 4 button operation; 4 LEDs to indicate heat, cool, auto-tuning and alarm
PC Configuration.....	ChromaloxPro configuration and commissioning software

INPUT

Thermocouple	J, K, R, S, T, B, C, D, E, L, N, PtRh 20%:40%
RTD	3 wire PT100, NI120
DC Linear	0 -20 mA, 4-20 mA, 0-50 mV, 10-50 mV, 0-5 V, 1-5 V, 0-10 V, 2-10 V (0-100 mV and 2K Ω pot also on aux-B input) scaling -1999 to 9999
Accuracy	$\pm 0.1\%$ of input range ± 1 LSD, Thermocouple CJC, (Aux Input : $\pm 0.25\%$ of input range ± 1 LSD)
Sampling rate	Process input 10 per second, Aux input : 4 per second
Sensor break	Detected within 2 seconds, control goes to user preset power value.
Digital inputs	Functions: setpoint select, control output, enable/disable, auto/manual control, profiler run/hold/abort, data-logger start/stop Volt free contact or DC voltage: open contact / 2 to 24 VDC signal = Logic high, closed contact / -0.6 to 0.8 VDC signal = Logic low

OUTPUTS

Relay	Single relay: 2 A resistive SPDT at 120/240 VAC, >500,000 operations Dual & Quad relay: 2 A resistive SPST at 120/240 VDC, >200,000 operations (dual) or >500,000 operations (quad)
SSR Driver	Voltage >10V into 500 Ω min

4081 & 4082 Advanced Temperature & Process Controller *(cont'd.)*

Specifications *(continued)*

Triac	Operating voltage: 20 to 280 Vrms (47 to 63 Hz), Rating 0.01 to 1 A @ 25°C
Linear DC	Ranges: 0-5 V, 0-10 V, 1-5 V, 2-10 V, 0-20 mA & 4-20 mA (selectable) $\pm 0.25\%$ of range (mA@250 Ω , V@2k Ω)
Transmitter PSU.....	Power rating 24 V nominal (19 to 28 VDC) into 910 Ω min (option to use DC linear output as 0-10 V adjustable Tx PSU)
Communications.....	RS232 via RJ11 cable, (configuration only) RS485 - Modbus RTU master or slave, Ethernet - Modbus TCP slave (10 base-T or 100 base-T), Ver 1.1/2.0 USB host for memory stick

PROFILER

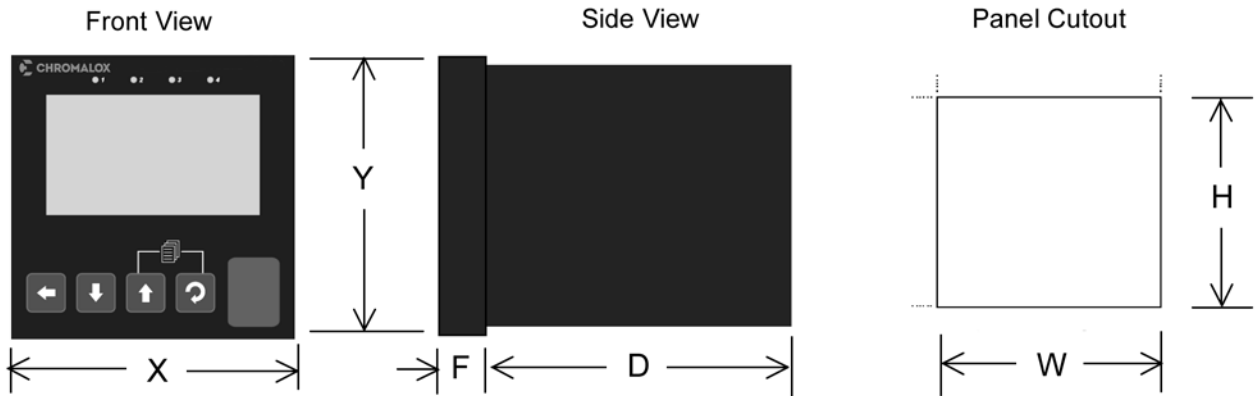
Memory	255 segments can be freely allocated in up to 64 programs
Segment types	Ramp (rate or time), dwell (soak), hold (manual guaranteed soak or real-time profiling), loop (to previous segment), join another profile, end or repeat sequence
Control.....	Run, hold, abort, profile select, jump to next segment, delayed profile start, real-time clock profile start.

DATA-LOGGER

Data record options	PV (Process variable), max and min PV between samples, actual SP (setpoint), output power, alarm & event status, power on/off
Record modes.....	FIFO (circular buffer) or run-then-stop (fixed buffer)
Recording Interval	1, 2, 5, 10, 15, 30 sec or 1, 2, 5, 10, 15, 30 min
Control.....	Manual; serial comms; digital input; synchronized with profile; PV rate of change; log on alarm

ENVIRONMENTAL

Standards	UL, cUL, CE, RoHS2. EMI - EN61326, Safety EN61010-1 & UL61010C-1 Pollution degree 2, Installation category II; RoHS2 2011/65/EU
Protection	Front Panel: NEMA 4, IP66 (IP65 with USB fitted). Behind panel IP20
Temperature & RH	0 to 55°C (-20 to 80°C Storage), 20% to 95% RH Non-Condensing



Model	X	Y	F	D	W	H
4081 & 4082	3.78" (96 mm)	3.78" (96 mm)	0.39" (10 mm)	4.61" (117 mm)	3.62" (92 mm)	3.62" (92 mm)

Accessories

Description	Part Number
ChromaloxPro Configuration Software	0149-50092
Universal S/W Converter & PC Cable 20/40/50/60/80 Series	0149-50086
Cable Only - 40/50/80 Series to Universal Adapter	0149-50088
Snubber	0149-01305

4081 & 4082 Advanced Temperature & Process Controller *(cont'd.)*

Model	Advanced Temperature & Process Controller											
4081	1 Control Loop											
4082	2 Control Loops											
	Code	Unit Type										
	C	Controller										
	U	Controller with USB Port										
	R	Controller/Recorder with USB Port & Real Time Clock										
	Code	Profiler Option										
	0	Not Fitted										
	P	Profiler										
	Code	Output 1										
	0	None										
	R	*Relay (2 Amp resistive at 240 VAC, SPDT, Form C)										
	S	SSR (0/10 VDC, 500Ω Minimum load)										
	A	*Analog (Linear DC: 0-20mA, 4-20mA, 0-5V, 0-10V, 2-10V)										
	T	*Triac (0.01 to 1 Amp AC, 20 to 280Vrms, 47 to 63Hz)										
	Codes	Output 2 & Output 3 (Choose the Appropriate Code for Each)										
	Out 2	Out 3	Output Type									
	0	0	None									
	R	R	*Relay (2 Amp resistive at 240 VAC, SPDT, Form C)									
	S	S	*SSR (0/10 VDC, 500Ω Minimum load)									
	T	T	*Triac (0.01 to 1 Amp AC, 20 to 280Vrms, 47 to 63Hz)									
	M	M	*Dual Relay Output - 2 Amp resistive, 240 VAC, SPST, Form A, norm. open, comm. term.									
	W	W	*Dual SSR Output - Non Isolated, 0/10 VDC, 500 Ω Minimum load									
	P	P	*Isolated Power Supply 24 VDC, 910 Ω Minimum (Only 1 Power Supply Supported)									
	Code	Base Outputs										
	1	1X Relay										
	2	1X Relay & 1X Analog										
	3	2X Relay & 1X Analog										
	4	2X Relay & 2X Analog										
	Code	Feature Option A										
	0	None										
	1	RS485 (ModBus/RTU) Digital Comms										
	2	Digital Input (Voltage Free or TTL Input)										
	3	Remote Setpoint - Analog Input A										
	4	Ethernet Port - ModBus TCP Slave										
	Code	Auxiliary Input										
	0	None										
	2	¹ Universal Input (Avail. on Single Loop Controllers Only)										
	Code	Feature Option C										
	0	None										
	1	Multiple Digital Inputs (1 - 8 Digital Inputs)										
	Code	Power Supply										
	0	100 - 240V AC										
	1	24 - 48V AC/DC										
4082-	R	P	S	R	R	-	2	4	0	1	0	Typical Model Number

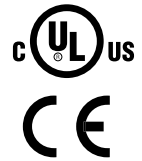
Order Table Notes:

¹ Only available on Single Loop Models.

*Reinforced 240V safety isolation from inputs and other outputs

Technical Notes:

1. Quick Start manuals are shipped with the controller. Full installation and instruction manuals are available online at www.chromalox.com



4080

Advanced Temperature & Process Controller



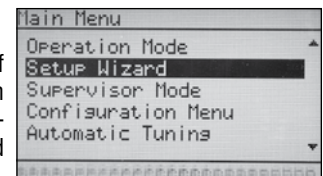
- 1/4 DIN Format
- **Up to 9 Outputs: Control, Alarms, Profiler Events, Retransmit & 24 VDC Transmitter Power Supply**
- **Up to 5 Programmable Event Outputs: Process High/Low, Deviation & Band, Sensor Break, Loop**
- **Reinforced Safety Isolation from Outputs and Inputs**
- **Profiling Option**
 - 64 Programs Using 255 Segments
 - Ramp, Dwell, Hold, Loop, Join, End & Repeat
- **Data-Logging Option (Data, Alarms & Events)**
- **Real Time Clock**
- **USB Port To Access Files**
- **Large Graphical / Text LCD Display**
 - Trend View
 - Color Change LED Backlight On Alarm
 - Configurable User-Menu Structure
- **Simplified Programming Wizard**
- **Ratio Control**
- **Valve Motor Control**
- **2nd Universal Input also For Monitoring**
- **Modbus RS485 & Modbus TCP Ethernet**
- **ChromaloxPro Configuration Software**
- **Multiple Language Option**
- **Standards: UL, cUL and CE**

Description

The Chromalox 4080 is an affordable temperature and process controller with advanced functionality including profiling and data-logging options. The 4080 incorporates a graphic/text LCD display and is designed to improve user efficiency with many features integrated to reduce startup time, simplify operation and minimize downtime.

Improved Process Visibility

One of the key factors in maintaining and improving operation of a system is to have high visibility of the process. The LCD screen on the 4080 displays clear real-text messages, removing ambiguity that can be caused by mnemonic codes on LED displays used in many products.

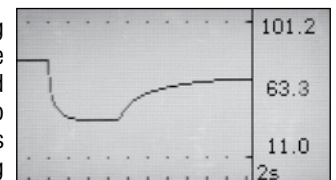


Simplified Operation

Operators can improve efficiency and reduce the possibility of errors by creating an optimized menu structure for screen navigation. The 4080 configuration tool is used to provide operators with the specific parameters needed in the order desired. Security is assured with password protection on supervisor and configuration parameter access levels.

A Complete & Compact Control Solution

Advanced process and temperature control, extensive profiling capability, high visibility alarms and data-logging functions are all packaged within a single 1/4 DIN product. The integrated control and monitoring functions of the 4080 translates into fewer system control components. This reduces wiring, shrinks the panel footprint and compresses installation time, resulting in a lower system cost.



Minimize Setup Time

Time is money. Constantly referring to instruction manuals increases startup time and can lead to confusion. A number of tools are available with the 4080 to simplify the configuration process: An easy setup wizard; on-screen help; ChromaloxPro™ software for on or offline programming; and secure local configuration with a memory stick via the optional front access USB port.

4080 Advanced Temperature & Process Controller *(cont'd.)*

Features

Advanced Process Control

- Easy setup wizard for quick configuration
- Universal input for T/C, RTDs & Linear DC signals
- Up to 9 output options including Triac & Linear DC
- Digital input
- Configurable menus
- Pre-tune and self-tune function
- RS485 Modbus or Ethernet option
- USB port for local files access
- Master-slave config for multi-zone apps

Profiling Functionality

- 255 segments used within 64 programs
- Ramp, dwell, hold, loop or jump to other profile
- User-defined text profile names
- Delayed or day/time profile start
- Detailed overview of profile status
- Up to 5 event outputs
- Bar graph profile and segment progress

Integrated Data-Logging Option

- Historic data for analysis or reporting
- Trend view and alarm indication
- Export data files via front USB or comms
- Log PV's, SP's or alarms (including min, max & ave)
- Run/Stop or FIFO (first in-first out) recording
- Logging time intervals from 1s to 30m

Real text display with graphics

- Easy to read green/red LCD display
- Screen color can be set to change on alarm
- Multi-language option
- Custom splash-screen on startup
- Graphical trend view
- LED indication of heat, cool, auto-tuning and alarms

ChromaloxPro Configuration Suite

Save time with the ChromaloxPro software configuration tools.

- Change parameter settings
- PID tuning
- Offline simulation tools – reduce risk
- Visibility of live process data
- Fine-tune settings for optimum performance
- Back-up all settings for quick reconfiguration

Customize 4080 for your process

- Optimized menu structure – simplify operation
- Modify text labels to match system operation
- Create a company contact page

Specifications

FEATURES

Control types.....	Full PID with pre-tune, auto-pretune, self-tune or manual tuning, heat only or heat and cool
Auto manual.....	Selectable with 'bumpless' transfer when switching between auto and manual control
Output configuration	Up to 9 for control, alarms, profiler event outputs, 24 VDC transmitter power supply & retransmission.
Alarms	Up to 5 alarms selectable as process high, process low, deviation & band, plus sensor break and loop alarms. Logical OR alarm outputs.
HMI	Display: 160 x 80 pixel, monochrome graphic LCD with a dual color (red/green) backlight; 4 button operation; 4 LEDs to Indicate heat, cool, auto-tuning and alarm
PC configuration	ChromaloxPro configuration and commissioning software

INPUT

Thermocouple	J, K, R, S, T, B, C, D, E, L, N, PtRh 20%:40%
RTD	3 wire PT100, NI120
DC Linear	0 -20 mA, 4-20 mA, 0-50 mV, 10-50 mV, 0-5 V, 1-5 V, 0-10 V, 2-10 V (0-100 mV and 2K Ω pot also on aux-B input) scaling -1999 to 9999
Accuracy	±0.1% of input range ± 1 LSD, Thermocouple CJC, (Aux Input : ±0.25% of input range ± 1 LSD)
Sampling rate	Process input 10 per second, Aux input : 4 per second
Sensor break	Detected within 2 seconds, control goes to user preset power value.
Digital inputs	Functions: setpoint select, control output, enable/disable, auto/manual control, profiler run/hold/abort, data-logger start/stop Volt free contact or DC voltage: open contact / 2 to 24 VDC signal = Logic high, closed contact / -0.6 to 0.8 VDC signal = Logic low

OUTPUTS

Relay	Single relay: 2 A resistive SPDT at 120/240 VAC, >500,000 operations Dual & Quad relay: 2 A resistive SPST at 120/240 VDC, >200,000 operations (dual) or >500,000 operations (quad)
SSR Driver	Voltage >10V into 500Ω min
Triac	Operating voltage: 20 to 280 Vrms (47 to 63 Hz), Rating 0.01 to 1 A @ 25°C
Linear DC	Ranges: 0-5 V, 0-10 V, 1-5 V, 2-10 V, 0-20 mA & 4-20 mA (selectable) ±0.25% of range (mA@250Ω, V@2kΩ)

4080 Advanced Temperature & Process Controller *(cont'd.)*

Specifications *(continued)*

Transmitter PSU.....	Power rating 24 V nominal (19 to 28 VDC) into 910Ω min (option to use DC linear output as 0-10 V adjustable Tx PSU)
Communications.....	RS232 via RJ11 cable, (configuration only) RS485 - Modbus RTU master or slave, Ethernet - Modbus TCP slave (10 base-T or 100 base-T), Ver 1.1/2.0 USB host for memory stick

PROFILER

Memory	255 segments can be freely allocated in up to 64 programs
Segment types	Ramp (rate or time), dwell (soak), hold (manual guaranteed soak or real-time profiling), loop (to previous segment), join another profile, end or repeat sequence
Control.....	Run, hold, abort, profile select, jump to next segment, delayed profile start, real-time clock profile start.

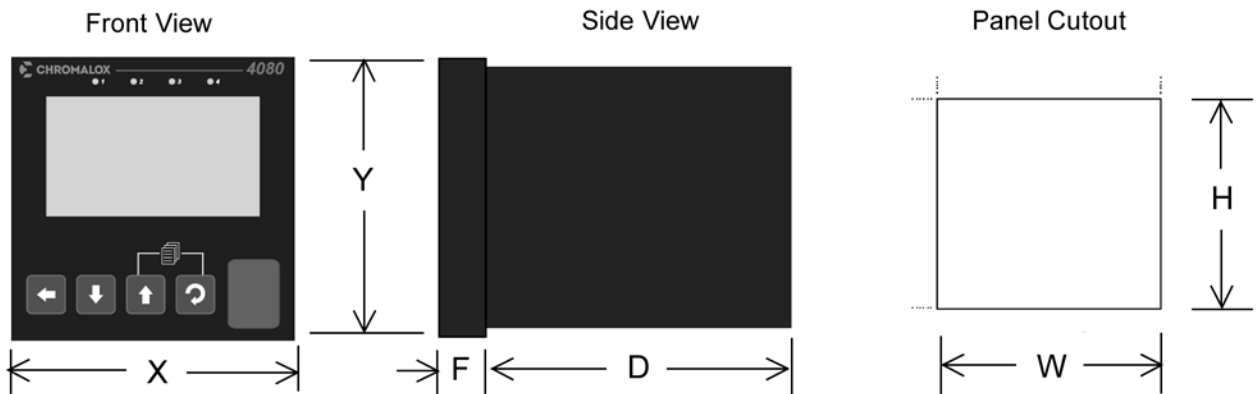
DATA-LOGGER

Data record options	PV (Process variable), max and min PV between samples, actual SP (setpoint), output power, alarm & event status, power on/off
Record modes.....	FIFO (circular buffer) or run-then-stop (fixed buffer)
Recording Interval	1, 2, 5, 10, 15, 30 sec or 1, 2, 5, 10, 15, 30 min
Control.....	Manual; serial comms; digital input; synchronized with profile; PV rate of change; log on alarm

ENVIRONMENTAL

Standards	CE, UL, cUL. EMI - EN61326, Safety EN61010-1 & UL61010C-1 Pollution degree 2, Installation category II
Protection	Front Panel: NEMA 4, IP66 (IP65 with USB fitted). Behind panel IP20
Temperature & RH	0 to 55°C (-20 to 80°C Storage), 20% to 95% RH Non-Condensing

Model	X	Y	F	D	W	H
4080	3.78" (96mm)	3.78" (96mm)	0.39" (10mm)	4.61" (117mm)	3.62" (92mm)	3.62" (92mm)



Accessories

Model	Description	Part Number
4080	ChromaloxPro Configuration Software & Cable	0149-50061
	Snubber	0149-01305

4080 Advanced Temperature & Process Controller *(cont'd.)*

Model Advanced Temperature & Process Controller

4080 1/4 DIN

Code **Unit Type**

C Controller
U Controller with USB Port
R Controller/Recorder with USB Port & Real Time Clock

Code **Profiler Option**

0 Not Fitted
P Profiler

Code **Output 1**

0 None
R *Relay (2 Amp resistive at 240 VAC)
S *SSR (0/10 VDC, 500Ω Minimum load)
A *Analog (0-10V, 0-20mA, 0-5V, 2-10V, 4-20mA)
T *Triac (1 Amp AC)

Codes **Output 2 & Output 3 (Choose the Appropriate Code for Each)**

Out 2 **Out 3** **Output Type**

0	0	None
R	R	*Relay (2 Amp resistive at 240 VAC)
S	S	*SSR (0/10 VDC, 500Ω Minimum load)
A	A	*Analog (0-10V, 0-20mA, 0-5V, 2-10V, 4-20mA)
T	T	*Triac (1 Amp AC)
M	M	*Dual Relay Output - 2 Amp 240 VAC, (X2), Form A, normally open, comm term
W	W	*Dual SSR Output - Non Isolated, (X2), 0/10 VDC, 500Ω Minimum load
P	P	*Isolated Power Supply 24 VDC, 910Ω Minimum

Code **Output 4**

0 None
1 *4 Relay Output - 2 Amp 240 VAC, Form A, norm. open, NOT comm term

Code **Feature Option A**

0 None
1 RS485 (ModBus/RTU) Digital Comms
2 Digital Input (Voltage Free or TTL Input)
3 ¹Remote Setpoint - Manual Set (RSP) Analog Input A
4 Ethernet Port - ModBus TCP Slave

Code **Feature Option B**

0 None
1 ¹Enhanced Remote Setpoint Input & Digital Input

Code **Feature Option C**

0 None

Code **Power Supply**

0 100 - 240V AC
1 24 - 48V AC/DC

4080- U P S S R - 0 1 0 0 0 Typical Model Number

Order Table Notes:

¹ Between Feature Options A&B, only one Remote Setpoint may be selected.

Technical Notes:

1. Quick Start manuals are shipped with the controller. Full installation and instruction manuals are available online at www.chromalox.com
 *Reinforced 240V safety isolation from inputs and other outputs

6060 1/16 DIN Temperature & Process Controller



- Universal Input
- Supplemental Analog Input
- Up to 4 Digital Inputs
- 6 Outputs
- Heat/Cool Operation
- 2- and 3-Point Control
- Heater, Control Loop and Sensor Alarms
- Self-Tuning Startup
- Capable of 16 Profiles, 16 Segments Each
- Built-in Transmitter Power Supply
- Modbus RTU/RS485
- ChromaloxPro Configuration Software
- cULus, CE

Description

Small in size but packed with features and flexibility, the Chromalox 6060 single-loop temperature and process controller is a great choice for precise, cost-effective temperature control for a variety of applications, simple and complex.

Features and Flexibility for a Sophisticated Level of Control – Among its many integrated features are two PID sets to ensure reliable control over a wide set point range and separate PID for heat and cool strategies for optimized control and stability. Extensive flexibility is offered with one universal input and one optional input, up to 4 digital inputs, 6 outputs, RS485 communications, and a built-in profiler capable of creating 16 profiles with up to 16 segments each. Manual control is enhanced by the ability to make frequently used functions available at a keystroke.

Capability and Convenience Further Enhanced by ChromaloxPro Configuration Software – ChromaloxPro™ configuration software is available to make parameter setup easier and faster. It also enables simulation to test the settings before applying them.

Robust Control Functionality – A range of different temperature control functionality includes:

- On/Off
- PID Heat Only (2-point control)
- Heat/Cool (3-point control)
- VMD (3-point stepping control)

Non-linear cooling strategies are also available, which is especially popular for oil, water, and fan cooling applications.

Self-Tuning Ramps to Setpoint without Overshooting – Self-tuning during startup determines the optimum process parameters for rapid line-out to setpoint. At power on, changing a set value, or during an external disturbance, the controller uses a three-point controller configuration to make an adaptation attempt whereby the “cooling” parameters are determined separately. This ensures that performance is optimized to the process. Oscillation is not required and deviation of the process value is minimal.

Applications

- Industrial Ovens and Furnaces
- Boiler and Steam Processes
- Heat Treatment
- Plastics, Extrusion, and Rubber
- Packaging
- Chiller and Refrigeration Systems
- Laboratory and Test Equipment
- Food and Beverage

6060 1/16 DIN Temperature & Process Controller *(cont'd.)*

Frequently Used Functions Available at the Push of a Key

Operation can be customized by configuring frequently used functions to be controlled by the F (function) key on the front panel. This simplifies manual operation and speeds up the management of the controller.

Special Functions for Even Greater Control

Startup Circuit Function for Slow Heat-Up. This function initially controls and stabilizes heat-up to a startup setpoint (SP.st) that is kept constant during a startup holding time. Subsequently the process is controlled to the main setpoint (SP). If a disturbance reduces the process value, the startup circuit is activated again.

This function is particularly useful for high-performance resistive heating elements with magnesium oxide (MgO) insulation. They must be heated slowly to remove any humidity which improves heater performance. Using the startup circuit function can aid their lifetime.

Boost Function

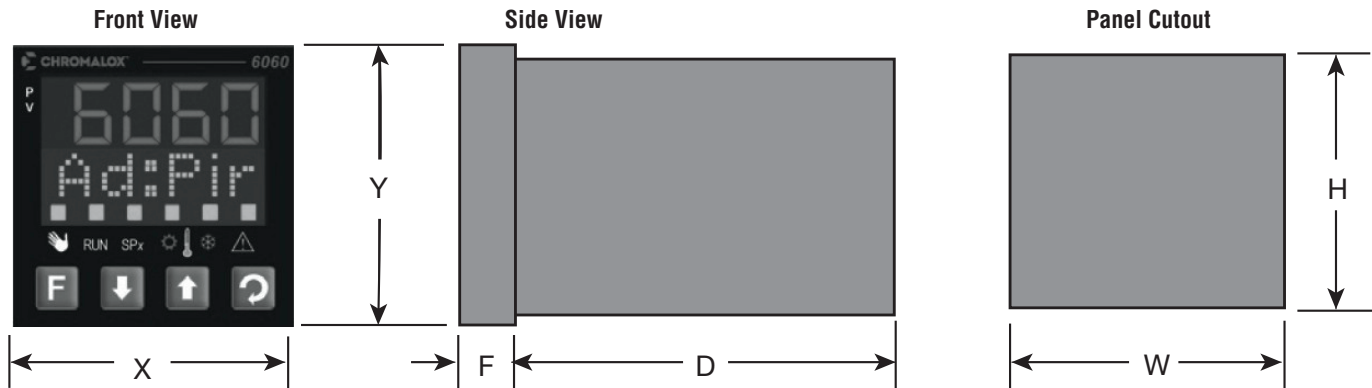
The boost function is for programming the controller to increase heat for a limited duration at startup or cyclically. This is ideal for processes where a short-term increase of heat is required to clear “frozen” material from clogged die nozzles for example.

ModBus Master Function

This function allows the Chromalox 6060 controller to serve as a master to other connected controllers acting as slaves, transmitting user-specified signals or parameters cyclically. Examples of possible applications include:

- Setpoint shifting relative to the setpoint adjusted in the slave
- Matching of control parameters, limit contacts, etc.
- Limiting the output value (override control)

Model	X	Y	F	D	W	H
6060	1.89" (48mm)	1.89" (48mm)	0.35" (9mm)	4.35" (110mm)	1.77" (45mm)	1.77" (45mm)



Accessories

Description	Part Number
ChromaloxPro Configuration Software Only (60 & 80 Series)	0149-50092
Universal Converter & PC Cable 20/40/50/60/80 Series	309112
Cable Only - 60 Series (6060) to Universal Converter	309147
Snubber (0149-01305)	314448
Current Transformer for Heater Break Alarm (HBA): 0 - 25 Amp	0149-50071
Current Transformer for Heater Break Alarm (HBA): 0 - 50 Amp	0149-50072
Current Transformer for Heater Break Alarm (HBA): 0 - 100 Amp	0149-50073

Stocked Items

Description	Part Number
6060-PSRA10	315002
6060-PRRR10	315101

6060

1/16 DIN Temperature & Process Controller *(cont'd.)*

Model 60 Series 1/16 DIN Temperature and Process Controller

6060 Combination 4 Digit 7-Segment & LCD Text Display on two rows, Universal Input, Up to 6 Outputs, up to 4 Digital Inputs (2: Volt-Free Standard, 2: TTL Optional), Auto or Manual Tuning, Heat/Cool Operation, Ramp to Setpoint and 16 x16 Programs with up to 4 events, Transmitter power supply or Heater Break/ Remote Setpoint, Optional Features: Configuration Software, ModBus RS485 Communications. Operating Temperature: 32° to 140°F (0° to 60°C). IEC IP65 front panel protection, removable screw terminal block. UL/cUL, CE. 2-Year Warranty

Code Base Option

P Transmitter Power Supply
H ¹Heater Current (0-30mA ac) / Remote Setpoint (0/4-20mA dc)

Code Output 1

R Relay (2 Amp resistive at 240 VAC, SPDT, Form C)
S SSR (0/10 VDC, 500 Ω Minimum load)
W Dual SSR Output - Non Isolated, 0/10 VDC, 500 Ω Minimum load
A Analog (Linear DC: 0-20mA, 4-20mA, 0-5V, 0-10V, 2-10V)

Code Output 2

0 None
R Relay (2 Amp resistive at 240 VAC, SPDT, Form C)
M Dual Relay Output - 2 Amp 240 VAC, Form A (X 2)
S SSR (0/10 VDC, 500 Ω Minimum load)
W Dual SSR Output - Non Isolated, 0/10 VDC, 500 Ω Minimum load

Code Output 3

0 None
R Relay (2 Amp resistive at 240 VAC, SPDT, Form C)
S SSR (0/10 VDC, 500 Ω Minimum load)
W Dual SSR Output - Non Isolated, 0/10 VDC, 500 Ω Minimum load
A Analog (Linear DC: 0-20mA, 4-20mA, 0-5V, 0-10V, 2-10V)
1 ²RS485 (ModBus/RTU) Digital Comms

Code Feature Option A

0 None
1 ²RS485 (ModBus/RTU) Digital Comms
2 Dual Isolated Digital Input (TTL Input)

Code Power Supply

0 100 - 240VAC
1 24VAC, 18-30Vdc

6060- P W M A 0 0 Typical Model Number

Order Table Notes:

¹If Choosing Heater Current Setup, This Requires 1 On/Off Type Output from above (R, S, W or M) & 1 Current Transformer ordered separately.

²Between Output 3 and Feature Option A, only one RS485 ModBus Code may be selected.

Technical Notes: Quick Start Manuals are shipped with the Controller. Full Installation & Instruction Manuals are available on line at www.chromalox.com

6040/8040/4040 Temperature & Process Controllers

- Universal Input
- Jumperless Configuration
- Auto Detected Hardware
- Process & Loop Alarms
- ModBus Communications
- Auto or Manual Tuning
- Heat/Cool Operation
- Up to 3 Outputs
- Optional 24 VDC Transmitter Power Supply
- Ramping Setpoint
- Adjustable Hysteresis
- Valve Motor Drive Position
- Heater Break Alarm Function
- Remote/Dual Setpoint Options
- Security Options
- Available in 1/16, 1/8 & 1/4 DIN Sizes
- Optional Configuration Software
- UL, cUL, CE & CSA
- 3 Year Warranty



Description

Whether you have to manage temperature, flow, valve positioning or pressure, the Chromalox 40 Series Temperature & Process Controllers provide you with a comprehensive feature list and the flexibility to meet your most demanding process needs.

Application needs change over time, but that doesn't mean that you'll need to change your controller. The Chromalox 40 series modular card design provides the owner with the flexibility to alter the functionality with ease. Expansion from 1 to 3 outputs, as well as communications and remote setpoint is easily accomplished and automatically recognized by the firmware.

The optional ChromaWare™ configuration software allows the owner to program multiple units efficiently and store parameter settings for later use.

The 40 Series Controllers are an ideal complement in both design and esthetics to its cousin, the Chromalox 50 Series Limit Controllers.

Features

- Universal Input
- Full PID with Pre-tune, Self-tune, Manual tuning, or On-Off control. Heat only or Heat & Cool
- Auto Detected Hardware

- Process & Loop Alarms
- ModBus Communications
- Auto or Manual Tuning
- Heat/Cool Operation
- Ramping Setpoint
- Valve Motor Drive Position Option
- Heater Break Alarm Function Option
- Alarm 1 & 2 Types:
 - Process high/Process low
 - SP deviation, Band
 - Logical OR / AND
 - Also 1 loop alarm for process control security.
 - Process alarms have adjustable hysteresis.
- 24 VDC Output for loop power
- PC Configuration Software
- Remote Setpoint Input:
 - 0 to 20mA, 4 to 20mA, 0 to 5V, 1 to 5V, 0 to 10V or 2 to 10V.
 - Scaleable -1999 to 9999.
 - Local/Remote setpoint selected from front panel
- Output Configuration:
 - Up to 3 possible, for control, alarm, 24 VDC transmitter power supply or retransmit of process value or Setpoint

Accessories

Models	Description	Part Number
40 & 50 Series	ChromaWare Configuration Software	0149-50060
	Cable for Configuration Software	0149-50062
	Snubber	0149-01305

Stocked Items

DIN Size	Part Number	PCN	DIN Size	Part Number	PCN
1/16	6040-R00000	314616	1/16	6040-RRR001	314659
1/16	6040-S00000	314720	1/8	8040-R00000	314544
1/16	6040-RR0000	314624	1/4	4040-ARR000	314528
1/16	6040-SR0000	314632	1/4	4040-R00000	314704
1/16	6040-RRR000	314640	1/4	4040-RRR000	314510

6040/8040/4040 Temperature & Process Controllers *(cont'd.)*

Specifications

FEATURES

- Control Types Full PID with Pre-tune, Self-tune, manual tuning, or On-Off control. Heat only or heat & cool
- Auto/Manual Selectable from front panel or via digital input, with bumpless transfer
- Output Configuration Up to 3 possible, for control, alarm, 24 VDC transmitter power supply or retransmit of process value or setpoint
- Alarm 1 & 2 Types Process high, process low, SP deviation, band, logical OR / AND. Also 1 loop alarm for process control security. Process alarms have adjustable hysteresis.
- Human Interface 4 button operation, dual 4 digit 10mm & 8mm high (6040, 8040) and 13mm & 10mm high (4040) LED displays, plus 5 LED indicators
- PC Configuration Off-line configuration from PC serial port to dedicated config socket (comms option not required). ChromaWare Configuration Software for Windows 98 or higher.

INPUT

- Thermocouple J, K, C, R, S, T, B, E, N & PtRh20%vsPtRh40%.
- RTD 3 Wire PT100, 50Ω per lead maximum (balanced)
- DC Linear 0 to 20mA, 4 to 20mA, 0 to 50mV, 10 to 50mV, 0 to 5V, 1 to 5V, 0 to 10V, 2 to 10V. Scaleable -1999 to 9999, with adjustable decimal point
- Impedance >10MΩ for Thermocouple and mV ranges, 47KΩ for V ranges and 5Ω for mA ranges
- Accuracy ±0.1% of input range ±1 LSD (T/C CJC better than 1°C)
- Sampling 4 per second, 14 bit resolution approximately
- Sensor Break Detection <2 seconds (except zero based DC ranges), control O/P's turn off, high alarms activate for T/C and mV ranges, low alarms activate for RTD, mA or V ranges

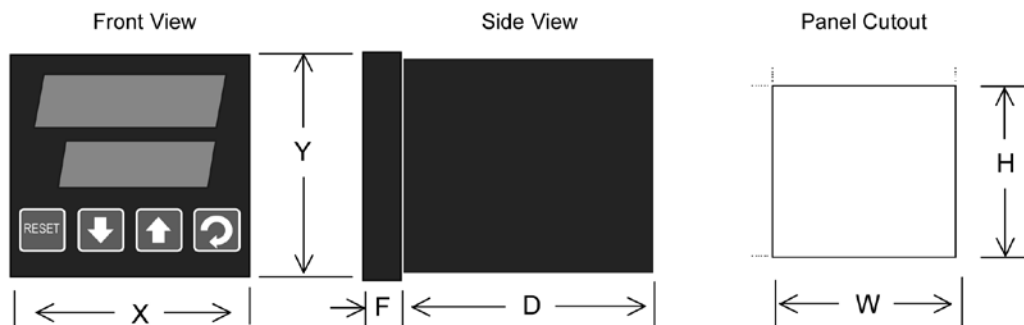
OUTPUTS & OPERATIONS

- Control & Alarm Relays Contacts SPDT 2 Amp resistive at 240V AC, >500,000 operations
- Control SSR Driver Outputs Drive capability >10V DC in 500Ω minimum
- Triac Outputs 0.01 to 1 Amp AC, 20 to 280Vrms, 47 to 63Hz
- DC Linear Outputs 0 to 20mA, 4 to 20mA into 500Ω max, 0 to 10V, 2 to 10V, 0 to 5V into 500Ω min. Control outputs have 2% over/under drive applied. Accuracy ±0.25% at 250Ω (degrades linearly to 0.5% for increasing burden to specified limits)
- Transmitter Power Supply Output 24 VDC (nominal) into 910Ω minimum to power external devices
- Communications 2 Wire RS485, 1200 to 19200 Baud, Modbus protocol
- Digital Input Selects between 2 setpoints or Auto/Manual control. Volt free or TTL input
- Remote Setpoint Input 0 to 20mA, 4 to 20mA, 0 to 5V, 1 to 5V, 0 to 10V or 2 to 10V. Scaleable -1999 to 9999. Local/Remote setpoint selected from front panel

OPERATING & ENVIRONMENTAL

- Temperature & RH 0 to 55°C (-20 to 80°C storage), 20% to 95% RH non-condensing
- Power Supply 100 to 240V 50/60Hz 7.5VA (optional 20 to 48V AC 7.5VA/22 to 65V DC 5 watts)
- Front Panel Protection NEMA 4, IEC IP66 (Behind panel protection is IP20)
- Standards CE, CSA, UL & cUL recognized

Model	X	Y	F	D	W	H
6040	1.89" (48mm)	1.89" (48mm)	0.35" (9mm)	4.33" (110mm)	1.77" (45mm)	1.77" (45mm)
8040	1.89" (48mm)	3.78" (96mm)	0.39" (10mm)	3.94" (100mm)	1.77" (45mm)	3.62" (92mm)
4040	3.78" (96mm)	3.78" (96mm)	0.43" (11mm)	3.94" (100mm)	3.62" (92mm)	3.62" (92mm)



6040/8040/4040

Temperature & Process Controllers *(cont'd.)*

Model 40 Series Temperature & Process Controller

6040	1/16 DIN	Dual 4-Digit Display, Universal Input, Auto-Detect Hardware, Up to 3 or 5 Outputs, Auto or Manual Tuning, Heat/Cool Operation, Ramp to Setpoint. Optional Features: Valve Motor Drive Position, Heater Break Alarm, Remote/Dual Setpoint, Modbus
8040	1/8 DIN	
4040	1/4 DIN	RTU/RS485 Communications, 0 to 55°C Operating Temperature, IP66. Three Year Warranty.

Code Output 1

0	None
R	Relay (2 Amp resistive at 240 VAC)
S	SSR (0/10 VDC, 500Ω Minimum load)
A	Analog (0-10V, 0-20mA, 0-5V, 2-10V, 4-20mA)
T	Triac (1 Amp AC)

Code Output 2

0	None
R	Relay (2 Amp resistive at 240 VAC)
S	SSR (0/10 VDC, 500Ω Minimum load)
A	Analog (0-10V, 0-20mA, 0-5V, 2-10V, 4-20mA)
T	Triac (1 Amp AC)
M	⁴ Dual Relay Output - 2 Amp, Form A

Code Output 3

0	None
R	Relay (2 Amp resistive at 240 VAC)
S	SSR (0/10 VDC, 500Ω Minimum load)
A	Analog (0-10V, 0-20mA, 0-5V, 2-10V, 4-20mA)
P	Isolated Power Supply 24 VDC (910Ω min)
M	⁴ Dual Relay Output - 2 Amp, Form A (Not available on the 6040 model)

Code Feature Option A

0	None
1	RS485 Digital Communications
2	Digital Input (Voltage Free or TTL Input)
3	³ Remote Setpoint - Manual Set (Not available if H is selected in Feature Option B)

Code Feature Option B

0	None
1	³ Enhanced Remote Setpoint Input & Digital Input - (Not available on the 6040 model)
V	¹ Valve Motor Drive Position
W	^{1,3} Valve Motor Drive Position & Remote Setpoint - (Not available on the 6040 model)
H	² Heater Break Alarm Function (Available ONLY on 6040 model)
9	Other Special Firmware

Code Power Supply

0	100 - 240V AC
1	24 - 48V AC/DC

4040- S R A 0 0 0 Typical Model Number

Order Table Notes:

- ¹Requires 2 Identical On/Off Outputs from above (2X R, S, T or 1X M)
- ²Requires 1 On/Off Output from above (R, S or T) & a Current Transformer
- ³Between Feature Options A&B, only one Remote Setpoint may be selected
- ⁴Only available when V or W is selected in Feature Option B.

Current Transformers for HBA Function

Current Rating	Part Number
0 - 25 Amp	0149-50071
0 - 50 Amp	0149-50072
0 - 100 Amp	0149-50073

6020 & 8020 Temperature & Process Controllers

- 1/16 & 1/8 DIN Sizes
- 2 or 3 Outputs (SSR Drive/Relay)
- Extremely Quick Setup
- Thermocouple, RTD & Linear DC Inputs
- PID or ON/OFF Control
- Large Dual 4-Digit Display
- Modbus RTU/RS485
- Configuration Software
- Low Supply Voltage Version
- Latching/Non-latching Alarms: Process Hi/Lo, Band, Deviation, Loop
- Sensor Break Detection
- Shallow Panel Depth (67mm/2.6")
- IP65 Protection
- UL, cUL, CE
- 3 Year Warranty



Description

The Chromalox 20 Series temperature controllers are very cost effective, extremely fast to configure and offer the most common standard process control features. These controllers have impressively large and bright dual 4-digit LED displays, 3 LED output/event indicators, 3 large tactile input buttons and they occupy only 2.6" (67mm) behind the panel. Controller design choices include 1/16 and 1/8 DIN sizes, 2 or 3 outputs, Modbus RTU/RS485 digital communications and standard or low supply voltages.

Ready, Set, Control...

The controller setup has been greatly simplified to the point where you will be up and running in less than 60 seconds. The Chromalox 20 Series units are factory programmed with the most common parameter value settings found in process heating applications. Separate default setting profiles exist for both SSR Drive output and Relay output units. Simply enter the process temperature setpoint and you are controlling your process. Of course, should you wish to change any settings, the 20 Series controller provides efficient, user-friendly navigation throughout all programming menus.

Additional Features

Some features that you may not expect to find on the 20 Series units include Sensor Break Detection, Modbus RTU/RS485 Communications and Process, Band, Deviation and Loop alarms which may be either latching or non-latching.

Traditional Applications

- Packaging
 - Testing
 - General Heat Processes
 - Food and Beverage
 - Kilns & Ovens
 - Fluid Baths
 - Autoclaves
 - Food Processing
 - Thermal Bonding & Sealers
 - Micro-brewing
 - Incubators
 - Warming / Chilled Cabinets
 - Heat Presses
 - Tempering
 - Plastic & Rubber Extrusion
- And many more...

6020 & 8020 Temperature & Process Controllers *(cont'd.)*

Configuration Software

The **20 Series Configurator** is an extremely intuitive programming tool which facilitates the cloning of multiple controllers and fast parameter file uploads and downloads to and from the controller or PC. The Configurator program

includes a Setup Wizard which removes the guesswork by methodically walking you through the most basic wiring, input considerations and programming requirements.



Stocked Items

Part Number	PCN
6020-SR000	307619
6020-RR000	307627
6020-RRR00	307635
6020-SR001	307643
6020-RR001	307660
6020-RRR01	307678
6020-SR010	307715
6020-RR010	307723
6020-RRR10	307731
6020-SR011	307774
6020-RR011	307782
6020-RRR11	307790
8020-SR000	307838
8020-RR000	307846
8020-SR001	307854
8020-RR001	307900
8020-SR010	307918
8020-RR010	309104

Accessories

Description	PCN
Universal Converter & PC Cable For Configuration Software	309112
Cable From Universal Converter to Controller - 20 Series Only	309120
Snubber	314448

6020 & 8020 Temperature & Process Controllers *(cont'd.)*

Specifications

Universal Input	
Thermocouple Calibration:	±0.25% of full range, ±1LSD (±1°C for Thermocouple CJC). BS4937, NBS125 & IEC584.
PT100 Calibration:	±0.25% of full range, ±1LSD. BS1904 & DIN43760 (0.00385Ω/Ω/°C).
DC Calibration:	±0.2% of full range, ±1LSD.
Sampling Rate:	4 per second.
Impedance:	>10MΩ resistive, except DC mA (5Ω) and V (47kΩ).
Sensor Break Detection:	Thermocouple, RTD, 4 to 20mA, 2 to 10V and 1 to 5V ranges only. Control outputs turn off.
Isolation:	Isolated from all outputs (except SSR driver) by at least BASIC isolation. Universal input must not be connected to operator accessible circuits if relay outputs are connected to a hazardous voltage source. Supplementary insulation or input grounding would then be required. Isolated from Mains Power Input by basic isolation.

Outputs

Relays (Optional)

Contacts:	SPST Form A relay; current capacity 2A at 250VAC.
Lifetime:	>150,000 operations at rated voltage/current, resistive load.
Isolation:	Basic Isolation from universal input and SSR outputs.

SSR Drivers (Optional)

Drive Capability:	SSR drive voltage >10V at 20mA
Isolation:	Not isolated from universal input or other SSR driver outputs.

Serial Communications (Optional)

Physical:	RS485, at 1200, 2400, 4800, 9600, 19200 or 38400 bps.
Protocols:	Modbus RTU.
Isolation:	Basic safety isolation from Universal input and SSR. Basic safety isolation to Mains and Relay Circuits.

Operating Conditions

Usage	For indoor use only, mounted in suitable enclosure
Ambient Temperature:	0°C to 55°C (Operating), -20°C to 80°C (Storage).
Relative Humidity:	20% to 95% non-condensing.
Altitude	<2000m
Supply Voltage and Power:	100 to 240VAC ±10%, 50/60Hz, 7.5VA (for standard powered version), or 24VAC +10/-15% 50/60Hz 7.5VA or 24VDC +10/-15% 5W (for low voltage version)

Environmental

Standards:	CE, UL, cUL
EMI:	Complies with EN61326 (Susceptibility and Emissions).
Safety Considerations:	Complies with EN61010-1
Front Panel Sealing:	Front to IP65 when correctly mounted, Rear of panel to IP20.

Physical

Front Bezel Size:	1/16 Din = 48 x 48 mm, 1/8 Din = 48 x 96 mm
Depth Behind Panel:	67mm with sealing gasket fitted.
Display:	Dual 4-Digit, 7-Segment LED
Display Height	1/8 DIN: 18.0 mm (Both Rows); 1/16 DIN: 18.0 mm (Top), 10.2 mm (Bottom)
Weight:	0.20kg maximum

6020 & 8020

Temperature & Process Controllers

(cont'd.)

20 Series 1/16 & 1/8 DIN Temperature Controller

20 Series Temperature Controller

1/16 & 1/8 DIN Temperature Controller. Universal Input, PID Control with Auto or Manual Tuning, Up to 3 Outputs (Relay or SSR Drive), Dual Large 4-Digit, 7-Segment LED Display, Heat/Cool Operation, Latching/Non-Latching Alarms and Configuration Software. Options: ModBus RTU/RS485 Digital Communications, Low Voltage Supply. Operating Temperature: 32°-131°F (0°-55°C), IEC IP65 front panel protection. CE, UL, CUL & 3-Year Warranty.

Model

6020 1/16 DIN

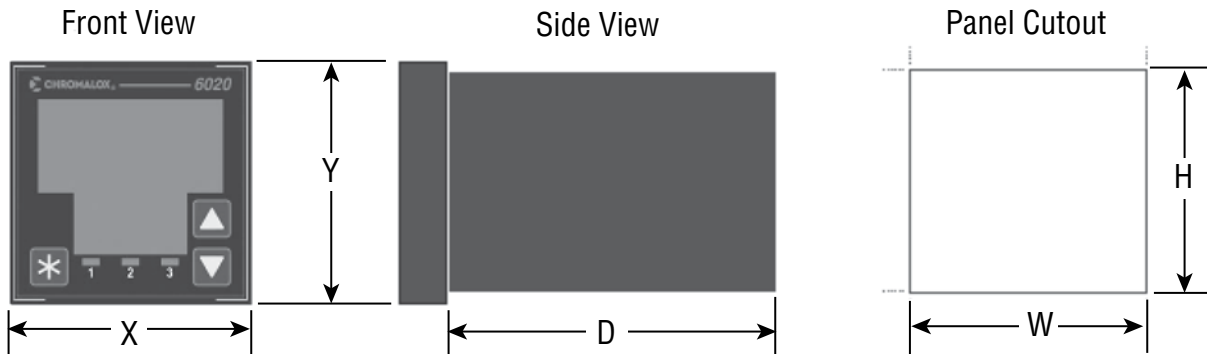
8020 1/8 DIN

Code		Output 1	Output 2
R	R	Relay	Relay
S	R	SSR	Relay
S	S	SSR	SSR
Code		Output 3	
0		None	
R		Relay	
Code		Digital Communications	
0		None	
1		ModBus RTU/RS485 Digital Communication	
Code		Power Supply	
0		100 to 240 VAC 50/60Hz	
1		24 VDC/AC +10%/-15%, AC 50/60 Hz	

6020 -	S	R	R	0	0	Typical Model Number
---------------	----------	----------	----------	----------	----------	-----------------------------

Relay: SPST Form A, 2A at 250 VAC
 SSR: >10 VDC @ 20 mA

Model	X	Y	D	W	H
6020	1.89" (48mm)	1.89" (48mm)	2.64" (67mm)	1.77" (45mm)	1.77" (45mm)
8020		3.78" (96mm)			3.62" (92mm)



2110 1/4 DIN Temperature Controller



- Easy Three-Step Setup
- High Current Output Option
 - 10 Amp Solid State Relay
 - 20 Amp Mechanical Relay
- Plug-In Output Cards
- J, K Thermocouple, or RTD Selectable Inputs, °F or °C Indication
- Alarm Relay Output Option
- NEMA 4X Front Panel
- Compact 1/4 DIN Design 4" Depth

Description

The Chromalox 2110 Temperature controller offers simple setup, flexibility and control features in an attractive, compact design that both OEMs and users will find cost effective. The 2110 is housed in a rugged, plastic 1/4 DIN package that only requires four inches behind the mounting surface. Straightforward operation and easy-to-use control features are major strengths of the 2110 controller.

Easy Three-Step Setup: The 2110 delivers exceptional process temperature control. Your process is up and running after three easy setup steps: 1) Select the sensor and control type, 2) Hook up the system and 3) Select the desired temperature.

Full Feature Outputs: A total of six output functions further extend the applications flexibility of the 2110 controller:

- 1 Amp Relay
- 20 Amp Relay
- Solid State Relay Drive
- 1 Amp Solid State Relay
- 5 Amp Solid State Relay
- 10 Amp Solid State Relay

The 2110 features a variety of output cards including High Current options of a 10 Amp Solid State Relay or 20 Amp Mechanical Relay. These outputs can directly control many cartridge or strip heaters, eliminating the need for a remote contactor or solid state relay. For larger three-phase loads, the 2110 can drive a remote device with the Pilot Duty Relay or Solid State Relay Drive outputs.

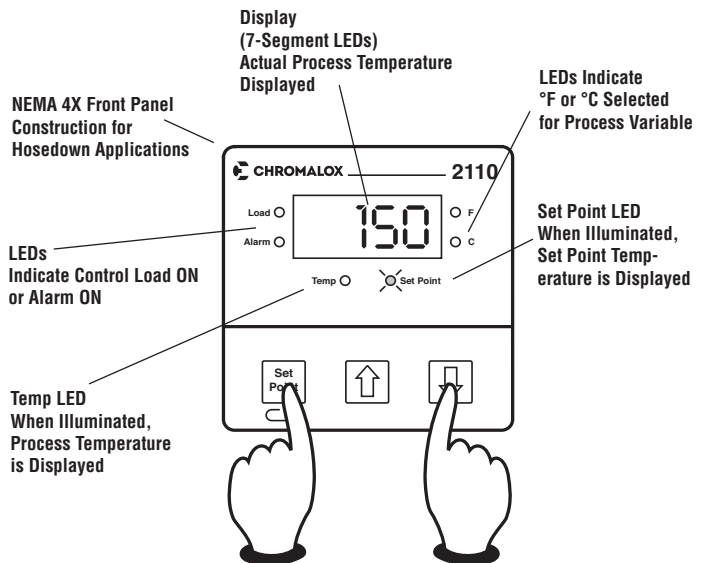
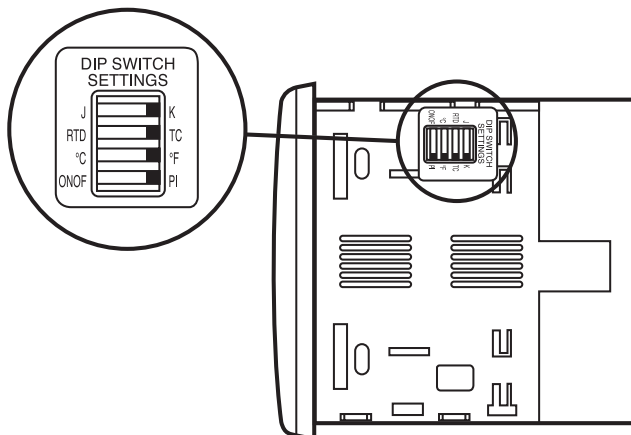
The optional Alarm Output gives you a non-latching, normally de-energized, 5 Amp relay output for over or under temperature protection of critical process temperatures.

Packaging with the User in Mind: The 2110 features a NEMA 4X front panel with tactile feedback push buttons. The buttons allow even the heaviest gloved hand to easily configure this controller. Large, bright LED's provide an easy-to-read interface at a distance.

Flexibility: Output cards are plug-in modules that are field replaceable. The switch-selectable control modes include On-Off or Proportional-Integral (PI).

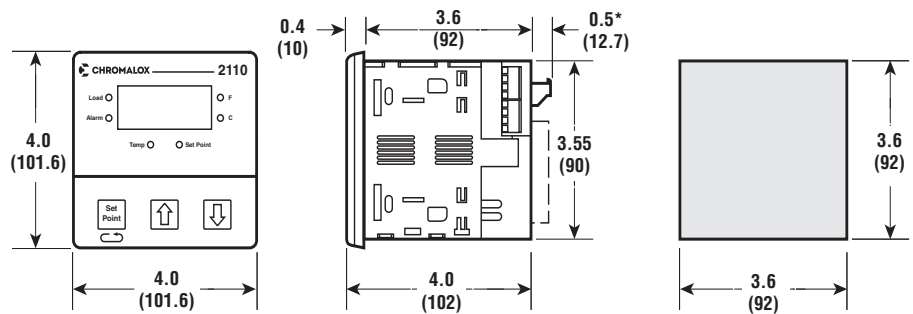
Simple Sensor & Control Selection

Locate the input selection DIP switch on the bottom of the 2110 controller and simply select °F or °C. Thermocouple (TC) or RTD, the Thermocouple type (J or K), and PI (Proportional-Integral) or onof (on-off) control.



2110 1/4 DIN Temperature Controller *(cont'd.)*

Mounting Dimensions (Inches)



* With alarm option or S2 output

Specifications

Control Modes

ON/OFF
PI—Proportional with integral

Control Adjustments

Proportional Band Sensor range
Automatic Reset 0.0 to 99.9
repeats/minute
Cycle Time 0.1 to 60.0 seconds
On/Off Deadband 1 to 100°F
Set Point Upper Limit Sensor range
Set Point Lower Limit Sensor range
Output Limit 0 to 100%

Alarm Adjustments

Type Absolute High
or Low
Set Point Sensor range
Alarm Dead Band 0 to 100°F

Control/Alarm Outputs

Relay (R1) 1 Amp Form A,
120/240 VAC
Relay (R3) 20 Amp Form A
120/240 VAC
resistive loads at
30 sec. cycle time
20 Amps, 500,000
Operations
15 Amps, 1 Million
Operations

10 Amps, 5 Million
Operations
5 Amps, 5 Million
Operations
Solid State Relay Drive (V0) 24 VDC at 40mA
Solid State Relay (S0) 1A Triac
Solid State Relay (S1) 5A, up to 240 VAC
at 40°C
Solid State Relay (S2) 10A, up to 240
VAC at 40°C
Alarm Form C, Relay 5
Amps at 120 VAC,
2.5A at 240 VAC
Sensor Input Switch selectable
J, K Thermocouple
or RTD
Input Update Rate Four samples per
second

Input Specifications	Range°F	Range°C
J TC	-100 to 1,400°F	-73 to 760°C
K TC	-100 to 2,400°F	-73 to 1,316°C
100Ω Pt RTD (a=.00385)	-200 to 1,000°F	-128 to 538°C

Readout Stability

J and K TC +/-1°F per 10°F
change in
ambient temp.
RTD +/-0.5°F per 10°F
change in
ambient temp.

Open Sensor and
Out-of-Range Conditions Displays "SEnS",
Control output 0%

Instrument Power 100 to 240 VAC
input +10%, -15%
Less than 10 VA

Operating Environment 0 to 65°C (32
to 150°F)

Enclosure Material ABS plastic rated
for 0 to 175 °F

Front Panel NEMA 4X
construction

Influence of Line
Voltage Variation +/-0.1% of sensor
span per 10%
change in nominal
line voltage

Accuracy at 77°F Ambient
0.2%span ±1 LSD

Ordering Information

Complete the Model Number using the Matrix provided.

In Stock:

Model	PCN
2110 1/4 DIN Controller Single Output	
2110-R1000 1 Amp Relay	317016
2110-R3000 20 Amp Relay	317024
2110-V0000, SSR Drive	317032
2110-S1000, 5 Amp SSR	317059
2110-S2000, 10 Amp SSR	317067
Dual Output	
2110-R1100, 1 Amp Relay Alarm	317075
2110-R3100, 20 Amp Relay Alarm	317083
2110-V0100 SSR Drive Alarm	317091
2110-S1100 5 Amp SSR Alarm	317112
2110-S2100 10 Amp SSR Alarm	317120

Model

2110 1/4 DIN Controller, with Selectable Thermocouple or RTD Inputs

Code Control Output

R1 Relay, 1 Amp Form A, 120/240 VAC
R3 Relay, 20 Amp Form A, 120/240 VAC
V0 Solid State Relay Drive, 24 VDC @ 40mA
S0 Solid State Relay, 1 Amp, up to 240 VAC
S1 Solid State Relay, 5 Amp, up to 240 VAC, at 40°C
S2 Solid State Relay, 10 Amp, up to 240 VAC, at 40°C

Code Alarm output (Kit Option)

0 No Alarm
1 Form "C" Relay, 5 Amp at 120 VAC, 2.5 Amps at 240 VAC

Code

0 Add to Complete Part Number

Code Power Supply

0 100-240 VAC

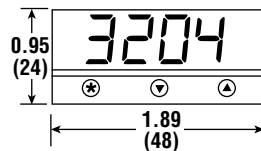
2110 - R3 1 0 0 Typical Model Number

3204 1/32 DIN Temperature Controller

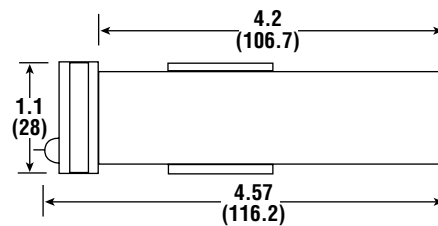
- Ultra-Compact 1/32 DIN Size
- Dual Outputs for Heat, Cool and Alarm
- User Selectable Sensor and Process Inputs
- Autotune PID
- Single Ramp/Soak
- NEMA 4X (Front Panel)
- IP66
- Large 4 Digit Display
- Program Security
- RS-232/ RS-485 Digital Communications Option



Dimensions



Front View



Side View

All Dimensions in Inches (mm)

Description

The 3204 control provides full auto-tuning PID control in a compact 1/32 DIN package, making it an excellent choice where panel space is a premium. The large 4-digit display, several temperature and process control options, a rugged design and efficient programming capabilities make the 3204 ideal for use in several demanding applications such as plastics, packaging, heat treating and life sciences. Input options include 9 different thermocouples, 100 Pt RTD or 0-20 or 4-20 mV or mA linear process. Each of the two outputs can be programmed as heat control, cool control or

alarm output. Select from Relay and SSR Drive output combinations. The 3204 also offers either RS-232 or RS-485 Modbus/RTU communications for remote management needs. Auto tuning functions calculate dependable PID parameters for optimal control of the process. The single ramp to setpoint feature enhances process control capability. NEMA 4X/IP66 front panel withstands harsh environments and applications where the unit might come in contact with water or corrosives.

3204 1/32 DIN Temperature Controller *(cont'd.)*

Specifications

Control Modes	Field Selectable, On/Off, PID		
Control Adjustments	Control Setpoint	Instrument Range	
	Proportional Band	25% of span, adjustable for each output	
	Automatic Reset	0.1 to 60 min. or Off	
	Rate	1-200 seconds or Off	
	Output Cycle Time	0.1-81 seconds	
	Approach Control	0.5 to 5 x Proportional Band	
Outputs			
Output #1	One Heat, Cool or Alarm Output		
	Relay	Normally open SPST contact rated 2 Amps at 250 VAC	
	SSR Drive	5 VDC, +0, -15%, 15 mA, non isolated	
Output #2	One Heat, Cool or Alarm Output		
	Relay	Normally open SPST contact rated 1 Amps at 250 VAC	
	SSR Drive	5 VDC, +0, -15%, 15 mA, non isolated	
Alarm Features			
Functions	Field Selectable Process, Devation, Band		
Types	Field Selectable High/Low, Inhibit on Start up, Latching		
Input Specifications			
Input Sampling	10 times per second		
Sensor Type		Range* °F	C
Thermocouple	J	32 to 1472	0 to 800
	K	-58 to 2192	-50 to 1200
	T	-273 to 482	-200 to 250
	E	32 to 1112	0 to 600
	R	32 to 2912	0 to 1600
	S	32 to 2912	0 to 1600
	N	-58 to 2192	-50 to 1200
	B	32 to 3272	0 to 1800
	L	32 to 1472	0 to 800
RTD	100 Ohm Pt	-273 to 752	-200 to 400
Linear Voltage	0-20 mV, 4-20 mV		
Linear Amperage	0-20 mA, 4-20 mA (must use 1Ω resistor)		
Instrument Power	90-264 VAC, 50/60 Hz or 12 to 24 VAC/VDC		
Operating Environment	32-130°F (0-50°C) with relative humidity 90% or less (non-condensing)		
Physical Specifications	1/32 DIN, 1.89 (48) x 0.95 (24) x 3.98 (102) Max. Panel Thickness 0.39 (10)		

3204 1/32 DIN Temperature Controller (*cont'd.*)

Ordering Information

Complete the model number using the matrix provided.

Model	3204 1/32 DIN Auto Tuning PID Controller				
3204	Compact 1/32 DIN AutoTune PID controller with the following standard features: User selectable inputs (thermocouple, RTD or 0-20, 4-20 mV or mA** linear process inputs), dual outputs for heat, cool and alarm; single ramp & soak program, latching alarm and limit control capability, with user program security levels. Also, NEMA 4X / IEC IP66 front panel; large 4-digit display. Optional features include RS-485 or RS-232 ModBus RTU digital communications. 3 year warranty. Approvals: UL, cUL, CE				
	Code	Outputs 1 and 2, Control Output or Alarm			
	11*	Two Relay Outputs: Output 1: 2 Amps at 250 VAC. Output 2: 1 Amp at 250 VAC. Both resistive loads			
	71	Two Outputs: Output 1: Solid State Relay Drive, 5 VDC, 15 mA. Output 2: Relay, 1 Amp at 250 VAC			
	77	Two Solid State Relay Drive Outputs: 5 VDC, 15mA (X 2)			
		Code			
		0	Add to complete model number		
		9	Special Configuration		
			Code	Options	
			0	None	
			1	RS-485 ModBus/RTU Digital Communications Interface	
			2	RS-232 ModBus/RTU Digital Communications Interface	
				Code	Power Supply
				0	90-264 VAC
				1	12-24 VDC/AC +/-20%
3204 -	71	0	0	0	Typical Model Number

*2 Relay Output Code "11" is not available with the 12-24 VDC/AC Power supply option

**0-20 mA or 4-20 mA input signal requires 1 resistor. See accessories.

Stocked Items

Model	PCN
3204-11000	305090
3204-71000	305082
3204-77000	305103
3204-71001	305146
3204-77001	305162
3204-11010	305120
3204-71010	305111
3204-77010	305138
3204-11020	305189
3204-71020	305170
3204-77020	305197

Accessories

Description	PCN
Resistor, 1Ω (2% tolerance)	305630

ETR-3400

1/32 DIN Temperature Controller with Smarter Logic®



- Automatic Tuning of PID Parameters
- Universal Sensor Input
- Selectable Set Point or Process Value Display
- Analog Input for Remote Set Point Adjustment
- Event Input
- Loop Break Alarm
- Heater Break Alarm
- 5 Per Second Sample Rate
- Digital Communications
- NEMA 4X/IP65
- 3 Year Warranty

Description

The ETR-3400 with **Smarter Logic** offers extensive features that are rarely available on a 1/32 DIN controller. In addition to universal field selectable inputs, **auto tuning of PID parameters** and a selection of various control outputs, this controller has an additional analog input and an event input, an analog output or digital communications and other software features which make this controller a stand out among 1/32 DINs.

Flexible Second Input:

The control sensor input is the primary input. The second input can be set up as a CT (current transformer) input to monitor the actual heater current and alarm if a heater is lost. The second input can also be used as a remote set point, or this input can make the controller a differential controller via a temperature transmitter (the difference in temperature between input 1 and 2).

Event Input:

The event input can be used for various functions: selecting between set point 1 and set point 2, between PID1 and PID2 parameters, resetting the alarms, disabling outputs, or locking out the operator parameters.

Analog Retransmit:

This analog output can retransmit to a PLC or recorder the Process value, input 2 value, the difference between input 1 and 2, the set point, the output 1 or 2 value, or the deviation between the set point and Process variable.

Other Features:

- The bumpless transfer on a sensor break continues to switch the output at the same percentage to prevent a possibly damaging change in output
- Sensor sample rates of 5 times per second allow controlling processes such as pressure and flow.
- NEMA 4X front panel rating can be used in applications requiring washing with a direct spray.
- Up to 3 outputs provide flexibility.
- Dwell Timer is excellent for cooking or other batch applications.
- Digital Communications permits networking with other controllers and computers.

External Lockout Code

- Prevents accidental or unauthorized changes

Set Point/Process Parameter Display

- Process display updated 5 times per second
- Menu and error codes
- Output Percentage
- Calibration parameter
- Selectable set point or process value

Output 1 Indicator

Output 2 Indicator

Alarm 1 Indicator

Non-Volatile Memory

Retains process parameters when power is off



Scroll Key

Up Key

Down Key

NEMA 4X Front Panel

- Water and corrosion proof

Automatic Tuning

- Eliminates complicated and time consuming manual tuning procedures
- Smarter Logic practically eliminates overshoot and temperature variations.
- Universal Input
- Analog Input for remote set point adjustments
- Heater Break alarm
- Serial Communications or analog retransmission of process value

SINGLE CHANNEL

ETR-3400

1/32 DIN Temperature Controller with Smarter Logic® (cont'd.)

Control Specifications

UNIVERSAL INPUT SELECTIONS

Display in temperature or engineering units
Input Set 1

- Input 1:** Thermocouple - J,K,T,E,B,R,S,N,L
RTD-PT 100 DIN, PT100 JIS
Current or Voltage - 4-20mA,
0-20mA, 0-1V, 0-5V, 1-5V and 0-10V
- Input 2:** Analog input 4-20mA, 0-20mA,
0-1V, 0-5V, 1-5V and 0-10V
CT for heater break
Event input

CONTROL FEATURES

- Temperature Range:** Selectable
- Set Point:** Full range adjustable
- Control Modes:**
All Models can be configured as:
- On/off, Proportional (P)
 - Proportional w/manual reset
 - Proportional/Integral (PI)
 - Proportional Derivative (PD)
 - Proportional/Integral/Derivative (PID)

Heating and Cooling

- Proportional Band:** 0-900°F (0-482°C)
- Integral (Reset):** 0-1000 Seconds
- Derivative (Rate):** 0-360 Seconds
- Ramp Rate:** 0-99.9°F (0-55.5°C)/Minute
- Dwell Timer:** 0-430 minutes
- Anti-Reset (Wind-up):** Inhibits integral action outside proportional band
- Cooling:** Adjustable dead band from -199.9 to +199°F/-110.0 - +111.0°C
- Manual Mode:** Configurable or automatic transfer to open loop control and secondary output

Heating or Cooling

- Cycle Time:** 0.1 to 100.0 seconds
- Sensor Break Protection:** Configurable status of control and secondary outputs

Control Action: Selectable - Direct action for cooling; reverse action for heating

POWER

- Supply Voltage:** 90-264 VAC, 50/60Hz; 20-23 VAC/VDC optional
- Consumption:** Less than 15VA
- Data Retention:** 10 Years (EEPROM)

OUTPUTS

- Main output with 2 optional independent secondary outputs
- Relay:** SPST relay rated 2A, 240V maximum resistive load,
- Pulsed Voltage:** 5V/30mA SSR Drives (Code 2)
14V/40mA SSR Drives (Code C)
- Current:** 4-20mA/0-20mA
- Voltage:** Isolated 0-10V, minimum impedance 500K ohms
- Triac:** 1A/240 VAC
- Secondary Output (A1):** 5V/30mA SSR Drives (Code 2)
14V/40mA SSR Drives (Code C)
- Secondary Output (A2):** Form A Relay - 2A/240 VAC
Alarm functions: Dwell timer, Deviation hi/low alarm, PV1 High/Low alarm, PV2 High/Low alarm, PV1 or PV2 High Low alarm, PV1- PV2 High Low alarm, Loop break alarm, Sensor Break alarm
- Alarm Mode:** Normal, latching, hold, latching/hold
- Communications:** RS-485, RS-232 serial
- Analog Output:** 4-20mA/0-20mA. 1-5V/0-5V analog retransmission of set point, output % and deviation

INDICATION

- 4-Digit red .4" LED Process Value Display
- Selectable Decimal Placement:** For normal or high resolution display.
Example: 0000; 000.0; 00.00; or 0.000
- °F/°C:** Selectable with 2 LED indicators
- Sample Rate:** 5 Samples/second

SPECIFICATIONS

- Accuracy:** ±0.1% of span, ± least significant digit
- Control Stability:** ±0.15% (typical) of full scale
- Cold Junction Compensation:** 0.1°C/°C
- External Resistance:** 100 ohms, maximum
- Common Mode Rejection:** 120dB
- Normal Mode Rejection:** 60dB
- Input Impedance:** 10M ohms
- Operating Temperature for Rated Accuracy:** 14-122°F (-10 - 50°C)
- Humidity:** 0-90% RH (non-condensing)
- Insulation:** 20M ohm minimum (500VDC)
- Breakdown:** 2000 VAC, 50/60Hz, 1 minute
- Vibration:** 10 - 55Hz, amplitude 1mm
- Shock:** 200m/s² (20 grams)
- Dimensions:** 1-7/8"W x 15/16"H x 4-5/16"D (48mmW x 24mmH x 110mmD)
Depth behind panel: 3-7/8" (76mm)
Panel Cutout: 7/8"x1-25/32" (22X45mm)
Weight: 4oz. (113 grams)

ETR-3400

1/32 DIN Temperature Controller with Smarter Logic® (cont'd.)

Ordering Information

Complete the model number using the matrix provided.

Accessories

CC94-1	RS-232 Interface Cable (2M)
CT94-1	Current Transformer for CT Input/Heater Break Option
SNA10A	Smart Network Adaptor for Third Party Software. Converts one channel of RS-485 or RS-422 to RS-232 Network.
SNA10B	Smart Network Adapter for ETR-Net Software. Converts 255 channels of RS-485 or RS-422 to RS-232 Network.

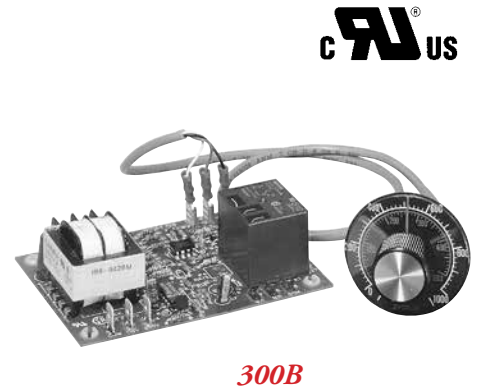
Model	Microprocessor based temperature controller with Smarter Logic®						
ETR-3400	1/32 DIN; universal field selectable inputs; PID autotuning; selection of various control outputs; additional analog and event inputs; analog or digital communications						
Code	Power Input						
4	90-264 VAC, 50/60 Hz						
5	11-26 VAC or VDC						
Code	Signal Input						
1	Standard Input						
	Input 1 - Universal input Thermocouple J,K,T,E,B,R,S,N,L RTD: PT100 DIN, PT100 JIS Current: 4-20mA, 0-20mA Voltage: 0-1V, 0-5V, 1-5V, 0-10V						
	Input 2 - CT: 0-50 Amp, AC Current Transformer*** Analog Input: 4-20mA, 0-20mA, 0-1V, 0-5V, 1-5V, 0-10V						
	Input 3 - Event Input (EI)**						
Code	Output 1						
1	Relay rated 2A/240 VAC						
2	Pulsed voltage to drive SSR, 5V/30mA						
3	Isolated 4 - 20mA/0 - 20mA						
4	Isolated 1 - 5/0 - 5V*						
5	Isolated 0 - 10V						
6	Triac Output 1A/240 VAC						
C	SSR Drive 14V/40mA						
Code	Output 2/Alarm 2						
0	None						
1	Form A Relay 2A/240 VAC						
2	Pulsed voltage to drive SSR, 5V/30mA						
3	Isolated 4 - 20mA/0 - 20mA*						
4	Isolated 1 - 5/0 - 5V*						
5	Isolated 0 - 10V						
6	Triac Output 1A/240 VAC						
7	Isolated 20V/25mA DC Output Power Supply						
8	Isolated 12V/40mA DC Output Power Supply						
9	Isolated 5V/80mA DC Output Power Supply						
C	SSR Drive 14V/40mA						
Code	Alarm 1						
1	5V Logic Output						
Code	Communications						
0	None						
1	RS-485 Interface						
2	RS-232 Interface**						
3	Retransmit 4 - 20mA 0 - 20mA*						
4	Retransmit 1 - 5V/0 - 5V*						
5	Retransmit 0 - 10V						
ETR-3400	4	1	1	1	1	1	Typical Model Number

* Range set by front keyboard
 ** Alternative between RS-232 and Event Input
 *** Order CT94-1 if Heater Break Function is required

SINGLE CHANNEL

300 300D & 300B Temperature Controllers

- 300D - Enclosed with Integral Set Point Dial
- 300B - Open Board with Remote Set Point Knob
- On/Off or Proportional Controller
- Sub-panel or DIN Rail Mounting
- 10 Amp Control Relay
- Power On & Load LED Indication (300D)



Description

The 300 Series Controllers are rugged, reliable and very economical for precise process control. These controllers are designed for general purpose industrial and commercial temperature control.

The fully enclosed 300D can be either mounted directly to the surface or DIN rail mounted.

The open board 300B mounts to the subpanel, and has a remote dial for front panel mounting.

These controllers also have a 10Amp NO relay contact. Switching 2400W at 240 VAC, single phase allows the 300 Series to directly control a small strip or cartridge heater...eliminating the expense of a contactor and the cost of wiring the contactor.

Specifications

Input

J Thermocouple Dual Scale 0-1000°F (0-500°C)
K Thermocouple Dual Scale 0-2000°F (0-1000°C)
Cold Junction Compensation
Sensor Break: Output de-energizes (contacts open)
Accuracy: Typically better than 0.5% of span:

Output

Relay SPDT 10 Amps@240 VAC (300D)
Relay SPST 20 Amps@240 VAC (300B)

Control Mode:

Proportional

Proportional Band 2.5% of span
Cycle Time 20 seconds

On/Off

Dead band 0.5% of span

Dimensions:

300D: 5.625" H X 2.75" W X 2.75" D
300B: 3" H X 4.28" W X 1.675" D

Line Voltage:

115/230 VAC, 10%,
50-60Hz field selectable

Ambient Operating Condition:

32-130°F (0-55°C), 0-90 RH,
noncondensing

Weight:

.75 lbs. (320gr)

Ordering Information

Model	PCN	Control	Temperature Range	Input Type	Power	Stock
300D-20200	329703	On/Off	0-1000-°F(0-500°C)	J T/C	120/240 VAC	S
300D-20300	329711	On/Off	0-2000-°F(0-1000°C)	K T/C	120/240 VAC	NS
300D-30100	329728	Proportional	0-1000-°F(0-500°C)	J T/C	120/240 VAC	NS
300B-30400	329736	Proportional	0-1000-°F(0-500°C)	J T/C	120/240 VAC	NS

1040

DIN Rail Multiple Loop Temperature & Process Controller

- Compact DIN Rail-Mount System
- 4 Fieldbus Communication Port Options
- 1-, 3-, or 4-Loop Configurations per Module
- Heater Break Alarm Feature
- Hot Swap with Auto-Detection and Configuration
- Detachable Modules Optimized for Easy Maintenance and Wiring
- Windows* PC Configuration Software
- Loop Enable/Disable
- Detects Broken Process Sensor Input
- Optional Configuration Software
- UL, cUL & CE
- 3 Year Warranty



Description

The Chromalox 1040 is a DIN-rail-mounted multiloop PID control system that can operate in a stand-alone system or in a PLC environment. Its simplicity is based on its modular construction: one communications module and any combination of up to 8 control modules. With numerous state-of-the-art control features and 100 ms realtime scan rates, reliable single-loop control performance and integrity are never sacrificed.

The communications module is a supervisory module connected directly to the DIN rail. It provides power to the control modules and contains a back-up of the system configuration data. It also manages the communications with external devices.

The control modules are independently managed by the communications module. They are connected to the DIN rail via an interconnect module that provides power and communications from the communications module.

The communications module is available in any of four different protocol options: ModBus, DeviceNet, PROFIBUS and ModBus/TCP.

The control modules are available with 1, 3, and 4 loops. Therefore, using from one to a full complement of 8 control modules, any number of loops—from 1 to 32—can be achieved. If more than 32 loops are required, multiple systems can be linked together.

Heater break inputs are available on 1- and 3-loop modules.

With the Chromalox 1040 control system only the loops required need to be purchased.

Advantages

- Space Saving Footprint
- Reduced Installation Time and Cost
- Rapid, Easy Setup
- Improved Performance vs. PLC/PC
- True, Simple Integration into Existing Control Systems
- Rapid Hot-Swap and Auto Configure
- Minimize Risk of Loss or Damage

1040

DIN Rail Multiple Loop Temperature & Process Controller

(cont'd.)

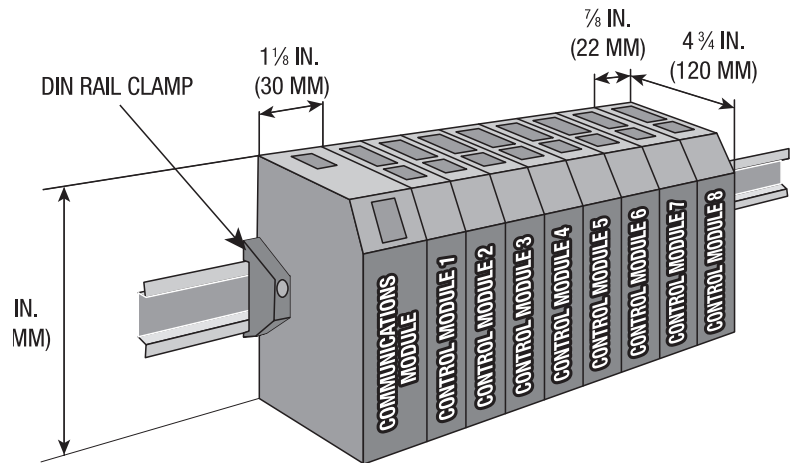
Communication Module	
Configuration Port	Chromalox PC configuration protocol for connection to the Chromalox 1040 configuration software.
ModBus Port	Connects to a ModBus RTU fieldbus system.
Protocol	ModBus RTU on a RS485 physical layer.
Configuration	Data rate: 4800, 9600, 19200. Parity: none, even or odd. Configured using the Chromalox 1040 configuration software.
DeviceNet Port	Connects to a DeviceNet fieldbus system.
Protocol	DeviceNet Class 2 slave device.
Configuration	Data Rate 125 kbps, 250 kbps, or 500 kbps. MAC ID 0 to 63 (Defaults 125 kbps, ID 63). Configured using the Chromalox 1040 configuration software, via the configuration port .
PROFIBUS Port	Connects to a PROFIBUS fieldbus system.
Protocol	PROFIBUS DP slave device.
Configuration	Data Rate automatically detected by communication modules from 9.6 kbps, 19.2 kbps, 45.4 kbps, 93.75 kbps, 187.5 kbps, 500 kbps, 1.5 Mbps, 3 Mbps, 6 Mbps, and 12 Mbps.
Profibus Address	0 -126 (Default = 126). Configured using the Chromalox 1040 configuration software, via the configuration port.
ModBus/TCP Port	Connects to a ModBus/TCP fieldbus system.
Mounting	DIN rail mounting via supplied interconnect module. Fits DIN standard EN50022, DIN46277-3.
Protocol	ModBus TCP/IP slave device.
Configuration	10/100 Base T, user-definable IP address. Configured using the Chromalox 1040 configuration software via the configuration port.
Operating Environmental	
Temperature & RH	32° to 131°F (0° to 55°C), -4° to 176°F (-20° to 80°C) storage, 30% to 90% RH non-condensing.
Power Supply	18 to 30 Vdc (inc ripple). 25 W max.
Protection	IEC IP20. Designed for installation in an enclosure sealed against dust and moisture.
Approvals and Certifications	EMC: Certified to EN61326-1:2006. Safety: Complies with EN61 010-1:2010. UL & cUL. Has received ODVA Declaration of Conformity for DeviceNet.

1040

DIN Rail Multiple Loop Temperature & Process Controller *(cont'd.)*

Loop Control Module	
Process Input	One, three or four loops, temperature or DC process input. Type and scale user selectable.
Temperature	Thermocouple Types: B,N,E,J,R,K,S,L,T. RTD Types: 3-wire PT100, NI 120.
Measuring Accuracy	0 to 20 mA 4 to 20 mA, 0 to 50 mV, 10 to 50 mV, 0 to 5 V, 1 to 5 V, 0 to 10 V, 2 to 10 V. Scaleable -32000 to +32000.
Input Sample Rate	10 Hz (100 msec) for all loops
Heater Break Alarm	Optional, Compares actual heater current to nominal. Alarms for High/low current or S/C output
Heater Current Input	0 to 50 mA, 0 to 60 mA, Sinusoidal rms, from current transformer. Scaleable 0.1 to 100 A ac.
Outputs	
Relay Outputs	Contact Type: Single pole single throw (SPST). Rating: 2 A resistive @120/240 VAV Lifetime: >500,000 operations at rated voltage/current
SSR Drive Outputs	Drive Capability: 12 Vdc nominal (10 Vdc minimum), at up to 20 mA
Linear Output	Optional. Resolution: 8 bits in 250 msec, (10 bits in 1 second typical). Accuracy +0.25% (mA into 250 ohm load, V into 2 kohm load). Degrading linearity to +0.5% for increasing burden to maximum drive capacity (500 ohm).
Output Usage	Any output can be assigned as any control or alarm output for any of the loops in the loop control module.
Environmental Specifications	
Supply Voltage	Powered by the communications module within its operating condition
Temperature & RH	32° to 131°F (0° to 55°C), -4° to 176°F (-20° to 80°C) storage, 30% to 90% RH non-condensing.
Dimensions	7/8 In. (22mm) W, 3-7/8In. (100mm) H, 4-3/4 In. (120mm) D.
Weight	0.33 lb (0.15 kg).
Mounting	DIN rail mounting via supplied interconnect module. Fits DIN standard EN50022.

1040 DIN Rail Multiple Loop Temperature & Process Controller *(cont'd.)*



Communication Module

Part Number	Communication Platform
1040-M B	ModBus RTU/RS485
1040-D N	DeviceNET
1040-P B	Profibus
1040-M T	ModBus TCP/IP

Loop Control Module

Part Number	Loop Description	
	Inputs	Outputs
1040-120000	1 Universal	2 SSR/Relay (Selectable)
1040-120010	1 Universal	2 SSR/Relay (Selectable), 1 Linear or 3 SSR/Relay (Selectable)
1040-120011	1 Universal, 1 Heater Break	2 SSR/Relay (Selectable), 1 Linear or 3 SSR/Relay (Selectable)
1040-300601	3 Universal, 1 Heater Break	6 Relay
1040-306001	3 Universal, 1 Heater Break	6 SSR
1040-304000	3 Universal, 1 Heater Break	3 SSR, 3 Relay
1040-400600	4 Universal	6 Relay
1040-406000	4 Universal	6 SSR
1040-404200	4 Universal	4 SSR, 2 Relay

Accessories

Part Number	Description
0149-50082	Configuration Software, Cable & Manual
0149-50071	Current Transformer for Heater Break Alarm (HBA) 0 - 25 A
0149-50072	Current Transformer for Heater Break Alarm (HBA) 0 - 50 A
0149-50073	Current Transformer for Heater Break Alarm (HBA) 0 - 100 A

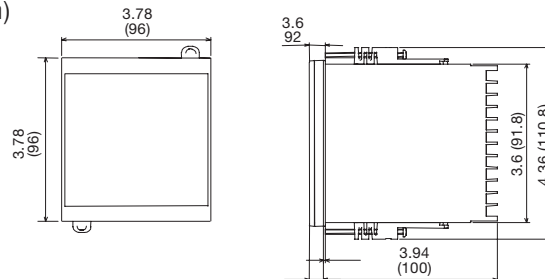
3300 Series Multiloop Controller

- 3340: 4 Loops of Autotuning PID Heat, Cool or Heat/Cool Control
- 3380: 8 Loops of Autotuning PID Heat or Cool Control
- Up to 11 Total Outputs, 4 or 8 for Control, Others for Alarm
- Thermocouple, RTD or Analog Inputs
- Outputs, Relay, SSR Drive, Triac or Analog
- Heater Breakdown Option with CT Inputs
- Communications Option with MODBUS Protocol Compatible with SpecView Software
- IP65



Dimensions

Units Inches (mm)



Stocked Items

3340

Part Number	PCN
3340-1R04100000	317884
3340-1V04100000	317905

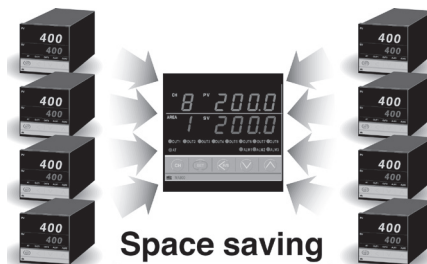
3380

Part Number	PCN
3380-1RR4100000	317770
3380-4RR4100000	317788
3380-1TT4100000	317809
3380-4TT4100000	317817
3380-1VV4100000	317825
3380-1VV4111000	317841
3380-1VV4100060	317868

Features

Space and Time Savings:

The 3340/3380 can control up to a maximum of 8 channels in a compact 1/4 DIN package. The 1/4 DIN controller reduces panel size and panel cut-outs. By increasing zone density, the 3340/3380 can now make PID temperature control for 3 to 8 zones affordable in a multi-loop form factor, aiding designers of control equipment to save labor costs, installation costs, electric panel size, and operation cost.



Space saving

In comparison to other multi-loop packages, the 3340/3380 has a straight forward user interface that does not require a PLC programmer or other support hardware to operate. The display, push-buttons, outputs and software are integrated in this single multi-loop package.

Although all inputs are scanned at least once per second, the display of the 3340/3380 will display the temperatures of each channel on an adjustable scan rate so the operator can view all channels without touching any pushbuttons.

Heater Break Alarm:

Alarm 2 can be ordered as a Heater Break Alarm. For loads with multiple heaters this feature alarms when individual heaters fail. This provides maintenance of a process before the problem becomes critical.

Multi-Memory Area:

Temperature set point, PID constants, alarm set point, ramp to set point rate, channel used/unused for each loop can be stored in a "memory area". The eight memory area allows for quick changes to alternate processes or products. The memory area can be selected via the front faceplate or digital inputs.

MULTI-LOOP CONTROLLERS

3300 Series Multiloop Controller (cont'd.)

Specifications

Control Modes: PID with Autotuning, PID Heat/Cool with Autotuning (3340 only), Air or water cooling selectable, PI, PD, P or On/Off Selectable

Control Adjustments:

Control Set Point	Input Span
Set Point Limits	Within Span High and Low
Dead band	2 degrees or .2% factory setting (default), Adjustable up to full span
Proportional Band (P)	Input Span (PB=0 selects On/Off control)
Cool Proportional Band	1-1000% of the Heat Proportional Band
Integral (I)	1 to 3600sec (0= Off)
Derivative (D)	1 to 3600 sec (0=Off)
Anti reset windup	1 to 100% of Proportional Band (0 turns off Integral)
Heat Cycle Time	1-100 sec (no setting for current output)
Cool Cycle Time	1-100 sec (no setting for current output)
H/C Overlap Deadzone	-Span to +Span (within -1999 to +1999), Minus setting Overlap
Ramp Rate	0 to span/minute (0=off)
PV bias	-span to +span (within -1999 to 9999)

Alarm Adjustments:

Alarm Type	High Process, Low Process, Deviation Low, High, High-Low, Band; Loop Break Alarm, Heater Break Alarm FAIL – Automatic alarm on controller failure
Alarm Inhibit/Hold	Inhibit on: Power Up, From STOP to RUN, Set point Changes, Memory area changes
Ranges	Process Alarm: Input span, Deviation Alarm: -span to +span
Alarm Differential	2 degrees (temperature input), 0.2%(Voltage input)default, Adjustable to span
Loop Break Alarm	Off, 0.1 to 200.0 minutes, dead band: 0 to span, LBA output is allocated to Alarm 1
Heater Break Alarm	Requires external current transformers (CT) Input Range 0-30A or 0-100A Display Range 0.0 to 100.0A Accuracy ±5% of input value or ±2A HBA is allocated to Alarm 2

Control Outputs (up to 8)

Relay	NO Form A contact, 3A (resistive) at 250 VAC, 300,000 cycles or more at rated load
SSR drive(Voltage Pulse)	12VDC, 20mA max
Triac	0.5A @ 40C or less
Current	0 to 20mA into 0 to 600Ω 4 to 20mA into 0 to 600Ω

Alarm Outputs

Relay	3 Relays, NO Form A contact, 1A (resistive) at 250 VAC Out 5-8 on 3340 can be used as alarms, 3A at 250 VAC via Alarm 3 settings
Electrical Life	300,000 cycles or more at rated load

General

Environment	IP65 Protection (Optional)
Power Consumption	Up to 20VA
Ambient temperature	0° to 50°C (32° to 122°F)
Ambient Humidity	45 to 85% non-condensing
Weight	1.2 lb. (560g)

3300 Series Multiloop Controller (cont'd.)

Sensor Inputs:	Thermocouple, RTD or Voltage
Input Update Rate	0.5sec (3340), 1 sec (3380)
Input Break Action	Upscale: Thermocouple and RTD, Downscale: Voltage input
Input Filter	1-100 sec. Time constant 0=off, First order digital filter

Thermocouple

Type	Max Range °F	Max Range °C	Accuracy
J	0 to 2192 -199.9 to 999.9	0-1200 -199.9 to 999.9	±0.3% of reading + 1 digit or ±2°C(4°F) Accuracy under -100C not guaranteed
K	0 to 2502 -199.9 to 999.9	0 to 1372 -199.9 to 800.0	±0.3% of reading + 1 digit or ±2°C(4°F) Accuracy under -100C not guaranteed
E	0 to 1820	0 to 1000	±0.3% of reading + 1 digit or ±2°C(4°F)
T	-199.9 to 752.0	-199.9 to 400.0	±0.3% of reading + 1 digit or ±2°C(4°F) Accuracy under -100C not guaranteed
R	0 to 3216	0 to 1769	±0.3% of reading + 1 digit or ±2°C(4°F) Accuracy 0 to 399C not guaranteed
S	0 to 3216	0 to 1769	±0.3% of reading + 1 digit or ±2°C(4°F) Accuracy 0 to 399C not guaranteed
B	0 to 3308	0 to 1820	±0.3% of reading + 1 digit or ±2°C(4°F) Accuracy 0 to 399C not guaranteed
N	0 to 2372 0.0 to 999.9	0 to 1300 0.0 to 800.0	±0.3% of reading + 1 digit or ±2°C(4°F)
PLII	0 to 1390	0 to 2534	±0.3% of reading + 1 digit or ±2°C(4°F)
W5Re/W26Re	0 to 4000	0 to 2320	±0.3% of reading + 1 digit or ±2°C(4°F)
U	-199.9 to 999.9	-199.9 TO 600.0	±0.3% of reading + 1 digit or ±2°C(4°F) Accuracy under -100C not guaranteed
L	0 to 1600	0 to 800	±0.3% of reading + 1 digit or ±2°C(4°F)

RTD non-isolated

Type	Max Range °F	Max Range °C	Accuracy
100Ω PLT IEC or JIS	-199.9 to 999.9	-199.9 to 649.0	±0.3% of reading + 1 digit or ±0.8°C(1.6°F)

Voltage non-isolated

Type	Adjustable Range	Accuracy
0-10, 0-5, 1-5 VDC	-1999 to 9999 (0.0 to 100.0 default) Decimal Point in 1/10, 1/100, 1/1000	±0.3% of reading + 1 digit

Digital Input (Optional)

Number of input	5 inputs
Rating	Non-voltage contact input, Open: 500k or more, Close: 10 or less
Function	Run (close) Stop(open), Memory area selection, 3 inputs binary (0-7), Data Set

Communications (Optional)

Hardware	RS232C 3 wire single drop RS-422 4 wire multi-drop, up to 31 units RS-485 2 wire multi-drop, up to 31 units
Protocol	Modbus
Baud Rate	2400,4800,9600,19200 bps
Software	Compatible with ChromaSoft SpecView

Accessories

Part Number	PCN	Description
700462222	339135	Current Transformer, 0-30.0Aac for Heater Break Option
700462223	339143	Current Transformer, 0-100.0Aac for Heater Break Option
700562224	339151	Control Relay module for outputs 1-8
700462225	339160	SSR driver module for outputs 1-8
0149-01305	314448	Snubber

3300 Series Multiloop Controller *(cont'd.)*

Ordering Information

Model

3340 Four Loop Autotuning PID Controller

3380 Eight Loop Autotuning PID Controller

Code	Input
1	Thermocouple J, K, R, S, B, E, PLII, N, T, U, L
3	Analog VDC 0-5, 0-10, 1-5 VDC
4	RTD, 100 ohm Plt
Code	Control Output 1-4, Heat or Cool
R	Relay 3 amp, 250 VAC
V	SSR drive, 12 VDC at 20mA
T	Triac, 0.5 A
7	0-20mA up to 600ohms
8	4-20mA up to 600ohms
Code	Output 5-8, Alarm or Cooling Control (3340), Heat or Cool (3380)
0	No outputs (3340 only)
R	Relay 3 amp, 250 VAC
V	SSR drive, 12 VDC
T	Triac, 0.5 A
7	0-20mA up to 600ohms
8	4-20mA up to 600ohms
Code	Instrument Power
3	24 VAC/VDC
4	100-240 VAC
Code	Alarm 1
1	Relay, 1A, 250 VAC
Code	Alarm 2
0	No alarm
1	Relay, 1A, 250 VAC
2	Heater Break Alarm, 0-30A Single Phase Input ¹
3	Heater Break Alarm, 0-100A Single Phase Input ¹
4	Heater Break Alarm, 0-30A Three Phase Input (3340 only) ¹
5	Heater Break Alarm, 0-100A Three Phase Input (3340 only) ¹
Code	Alarm 3
0	No alarm
1	Relay, 1A, 250 VAC
Code	Contact In
0	None
1	5 Digital Inputs ²
Code	Digital Communications ²
0	None
6	RS-485/RS-422 Modbus
8	RS 232 - Modbus
Code	None
0	None

3340- 1 V R 4 1 0- 0 0 6 0 **Typical Model Number**

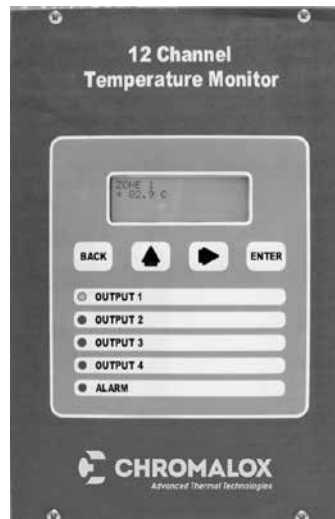
NOTE: Each alarm output is common to all channels.

¹Heater break is not available when the control output is 0-20mA or 4-20 mA.

² On 3380 heater break alarm and communications/contact input cannot be specified on the same 3380 controller.

CX224 12-Channel Temperature Monitor

- Prevent Costly Damage to Motors, Generators, Transformers and Other Equipment
- Monitor Up to 12 Inputs
- Variety of Inputs: RTD, Thermocouple, 4 to 20 mA, in any Combination
- Program Via Front Panel & RS485 or RS232 (Modbus Protocol)
- Power Loss Protection
- 24 Independent Trip Points (2 Per Channel)
- 5 Outputs (Relays or Logic)
- Logic Outputs can be Used With External SSRs
- Programmable Deadband (Hysteresis)
- Rugged Steel Enclosure
- Can be Used as a 4-Channel On/Off Controller
- Display High, Low, or Any Valid Zones
- Self Calibrating
- Password Protected Areas Allow Supervisory Control and Monitoring of Trip Points



Description

The CX224 consists of a 12-Channel Temperature Monitor and ChromaSoft™ CX224 Software. It is the next generation in temperature monitoring equipment from Chromalox designed to meet the needs of electric machinery protection. The 12-channel scanning capability, standard RS485/RS232 interface and Windows-compatible software utility for system configuration and data logging provide overtemperature and undertemperature protection and critical feedback to safeguard expensive machinery.

Custom Options

- Difference between two channels
- Average reading of several channels
- Other input types

Software

CX224 Software Features:

- Compatibility with Microsoft® Windows® operating system
- User-friendly configuration program
- Save unlimited set-up configurations
- Commission mode to test configurations before implementation
- Continuously displayed measurement and relay status of all 12 channels
- Data logging
- Data graphing for trend analysis

CX224 12-Channel Temperature Monitor (cont'd.)

Specifications

Input: 1 to 12 RTDs (2 or 3-wire), thermocouples, or 4 to 20 mA current loops. Accepts any combination of input types.

Standard Input Types:

- RTD:**
- 200 to 700°C: PA (Platinum/100 Ω/0.00392 Ω/Ω/°C)
 - 200 to 700°C: PB (Platinum/100 Ω/0.00391 Ω/Ω/°C)
 - 200 to 850°C: PD/PE (Platinum/100 Ω/0.00385 Ω/Ω/°C)
 - 200 to 600°C: PF (Platinum/1000 Ω/0.00385 Ω/Ω/°C)
 - 80 to 260°C: NA (Nickel/120 Ω/0.00672 Ω/Ω/°C)
 - 100 to 260°C: CA (Copper/10 Ω/0.00427 Ω/Ω/°C)

Thermocouple (grounded models require TI241):

- 270 to 1000°C: Type E
- 200 to 1200°C: Type J
- 270 to 1150°C: Type K
- 270 to 400°C: Type T

4 to 20 mA current loop: Pressure (PSI, Bar), Humidity (%), Temperature (°F, °C), Vibration (G), and process variable (mA, VDC)

Note: 4 to 20 mA inputs must be linear with respect to the measured variable.

Input Scan Rate: 1.5 seconds maximum.

Input Fault Detection:

Options for ignoring, sounding alarm, or tripping relays associated with the failed sensor. Other zones are unaffected.

Output: 24 independent trip points (2 per channel): 5 relays, one relay is intended for use as an alarm function (but can be configured as a trip point), and one internal audible alarm. Alarm may be programmed to sound when selected relays trip. Logic output option is available for controlling external SSRs or sending a signal to another device.

Relays: Form C, SPDT 10 A @ 250 VAC/24 VDC resistive load; 10 A make current; 2500 VA breaking capacity, ¼ HP at 120 VAC motor load.

Trip point Hysteresis (deadband):

Programmable from 0 to 20 (°C or °F).

Display: 20x4 line backlit LCD. 0.1°C or 0.1°F resolution. Front panel LEDs indicate relay and alarm status

Accuracy: 2°C (3°F) in 0 to 60°C (32 to 158°F) ambient, over entire range of the input

Supply Power: 85 to 240 VAC @ 50/60 Hz. or 110 to 370 VDC, 5 watts max.

Power Loss Protection:

Trip points and program parameters stored in non-volatile memory. Normal operation resumes when power is restored.

Keyboard: 4 membrane type keys with audible feedback.

Serial Interface:

RS485 or RS232 (Modbus protocol).

Programming:

Programmable from front panel or via RS485 or RS232 interface using Modbus protocol. PC software is included for data logging, commissioning, and configuration. Program settings may be password protected

Firmware Fault Protection:

Watchdog resets microprocessor if it fails to perform program sequence

Enclosure: Steel case; NEMA 4 front panel Ambient Temperature Rating: 0 to 60°C (32 to 158°F)

Connections: Terminal blocks at rear accept wires to AWG 12

Leadwire Resistance Compensation:

Up to 30 Ω per leadwire for RTDs, with no effect on reading

Dimensions: 7.5x11.5x2" (191x292x51 mm)

Mounting: Panel mount enclosure. Cutout size of 6.8x10.6" (173x269 mm)

Weight: 3.8 lbs. (1.72 kg.)

Agency Approvals: UL: 508

Stocked Items

Part Number	PCN
CX224-A1A	309913
CX224-A1B	309921

Ordering Information

Complete the model number using the matrix provided.

Accessories

Part Number	Description
AC102734	Communications package. Includes isoated RS232 to RS485 converter, power supply for converter, 6' (1.8 m) serial cable and DB25 to DB9 Adapter
TI241	8-Channel thermocouple isolator. Electrically isolates grounded thermocouples for use with CX224

CX224 12-Temperature Monitor

Code	Power supply
A	85-240 VAC @ 50/60 Hz / 110-370 VDC
Code	Output
1	Relays
2	Logic (5 VDC)
Code	Interface
A	RS232
B	RS485
CX224 - A 1 A	Typical Model Number

The CX224 monitor comes complete with CX224 software.

6050 & 4050 DIN Limit Controllers

- Universal Input
- Jumperless Configuration
- Auto Detected Hardware
- Standard 5A Latching Limit Relay
- Up to 3 Outputs
- 1/16 & 1/4 DIN Sizes
- Windows PC Configuration Software
- Retransmit Process Value or Limit Setpoint
- Process Alarms
- Optional MODBUS (RS-485) Communications
- Optional digital input and remote reset
- Optional 10V SSR Driver Output
- Optional 24 VDC Transmitter Power Supply
- UL, cUL, CE, CSA & FM Approved
- 3 Year Warranty



Description

The Chromalox 50 Series Limit Controllers provide you with a comprehensive feature list and the flexibility to meet your most demanding process needs. This series is affordable, easy-to-use and adaptable to simplify all aspects of limit control.

This fail-safe protection device may be used to prevent damage to equipment or products. It will shut down a process when the preset parameter threshold is realized. The controller cannot be reset until the process has returned to an acceptable parameter condition.

The 50 Series Limit Controller maintains the maximum (High Limit Action) or minimum (Low Limit Action) process variable value since the last reset occurred. Additionally the controller records the accumulated time for which the limit has been exceeded since this parameter was last reset.

The 50 Series Limit Controllers are an ideal complement in both design and esthetics to its cousin, the Chromalox 40 Series Temperature/ Process Controllers.

Features

- User-friendly functionality
- High/Low Limit Alarm
- Universal Input
- Digital Inputs
- Intuitive ChromaWare™ Configuration Software
- Easy to use HMI
- Jumperless and auto-hardware detection configurations
- 24 VDC transmitter power supply
- Dual, red over green, 7 segment LED
- 10 VDC SSR Drive Output
- 4 digit upper and lower displays
- MODBUS communication
- Plug-in output modules
- Process Alarms
- Outputs 2 and 3 are user-selectable and customizable for each application
- Output Options:
 - Relay, SSR Driver, DC linear, Triac, 24 VDC transmitter power supply, Retransmit PV or Limit Trip Setpoint
- Remote reset for digital input option

6050 & 4050 DIN Limit Controllers (cont'd.)

Specifications

FEATURES

- Human Interface 4 button operation, dual 4 digit 10mm & 8mm high (6050) and 13mm & 10mm high (4050) LED displays, plus 4 LED indicators
- PC Configuration Off-line configuration from PC serial port to dedicated config socket (comms option not required). ChromaWare Configuration Software for Windows 98 or higher.

INPUT

- Thermocouple J, T, K, E, N, B, R, S, C; Pt Rh20% vs. Pt 40% Rh
- RTD 3-wire, PT100
- DC Linear 0 to 20mA, 4 to 20mA, 0 to 50mV, 10 to 50mV, 0 to 5V, 1 to 5V, 0 to 10V, 2 to 10V. Scaleable -1999 to 9999, with adjustable decimal point
- Impedance >10M ohm for the thermocouple and mV ranges, 47k ohm for V ranges and 5 ohm for mA ranges
- Accuracy $\pm 0.1\%$ of input range ± 1 LSD (T/C CJC better than 1°C)
- Sampling 4 per second, 14 bit resolution
- Sensor Break Detection <2 seconds (except zero based DC ranges), limit output opens, low alarms activate for RTD, mA or V ranges

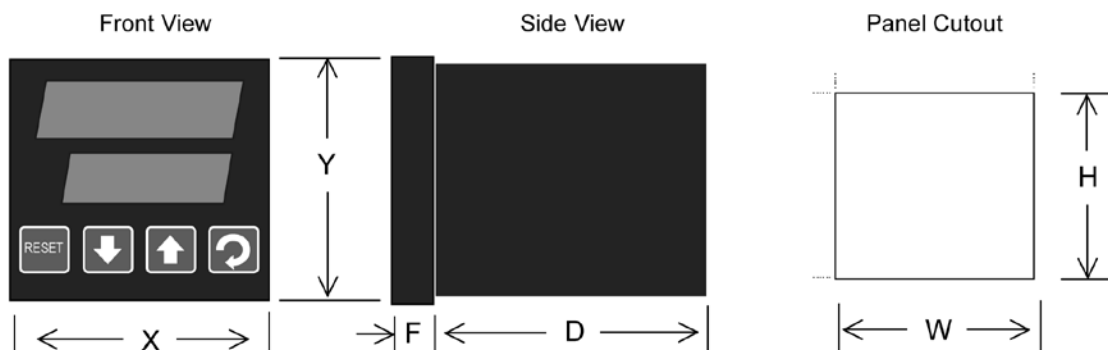
OUTPUTS & OPERATIONS

- Configuration Output 1 (limit relay) fixed; outputs 2 and 3 (alarm relay) are user-selectable and customized based on desired application; Process Alarm: Reverse or direct. Choose from the following output types:
- Max # of Outputs 3 for alarm, 24 VDC transmitter power supply or retransmit of process value/limit trip setpoint
- Limit Relay Fixed, SPDT; 240 VAC 5A resistive; Lifetime >100,000 operations at rated voltage/current
- Alarm Relays Optional SPDT; 240 VAC 2A resistive; Lifetime >500,000 operations at rated voltage/current. Modes (Alarm 1 and 2): High/Low, Band, Deviation, logical OR/AND
- Control SSR Driver Outputs Optional drive capability: >10 VDC nominal into 500 ohm minimum
- Triac Outputs Optional 0.01 to 1A AC, 20 to 280Vrms, 47-63 Hz (Limit 2)
- DC Linear Outputs Optional 0-20mA, 4-20mA into 500 ohm max; 0-10V, 1-5V, 2-10V, 0-5V into 500 ohm min; Outputs have 2% over/under drive applied; Accuracy $\pm 0.25\%$ (mA into 250 ohm load, V into 2k ohm load); degrading linearity to $\pm 0.5\%$ for increasing burden to specified limits
- Transmitter Power Supply Optional 24 VDC (Limit 1)
- Communications 2 Wire RS485, 1200 to 19200 Baud, Modbus protocol
- Digital Input Selects between 2 setpoints or Auto/Manual control. Volt free or TTL input
- Remote Setpoint Input 0 to 20mA, 4 to 20mA, 0 to 5V, 1 to 5V, 0 to 10V or 2 to 10V. Scaleable -1999 to 9999. Local/Remote setpoint selected from front panel

OPERATING & ENVIRONMENTAL

- Temperature & RH 0 to 55°C (-20 to 80°C storage), 20% to 95% RH non-condensing
- Power Supply 100 to 240V 50/60Hz 7.5VA (optional 20 to 48V AC 7.5VA/22 to 65V DC 5 watts)
- Protection Front Panel: NEMA 4, IEC IP66 Behind Panel: IP20
- Standards FM, CE, CSA, UL & cUL recognized

Model	X	Y	F	D	W	H
4050	3.78" (96mm)	3.78" (96mm)	0.43" (11mm)	3.93" (100mm)	3.62" (92mm)	3.62" (92mm)
6050	1.89" (48mm)	1.89" (48mm)	0.35" (9mm)	4.33" (110mm)	1.77" (45mm)	1.77" (45mm)



6050 & 4050 DIN Limit Controllers (cont'd.)

Model	50 Series DIN Limit Controller					
6050	1/16 DIN					
4050	1/4 DIN					
	Code	Output 1				
	1	Relay - SPDT, 5A resistive at 120/240 VAC				
		Code	Output 2			
		0	None			
		R	Relay (2 Amp resistive at 240 VAC)			
		S	SSR (0/10 VDC, 500Ω Minimum load)			
		A	Analog (0-10V, 0-20mA, 0-5V, 2-10V, 4-20mA)			
		T	Triac (1 Amp AC)			
		Code	Output 3			
		0	None			
		R	Relay (2 Amp resistive at 240 VAC)			
		S	SSR (0/10 VDC, 500Ω Minimum load)			
		A	Analog (0-10V, 0-20mA, 0-5V, 2-10V, 4-20mA)			
		P	Isolated Power Supply 24 VDC (910Ω min)			
		Code	Feature Option A			
		0	None			
		1	RS485 Digital Communications			
		2	Digital Input (Voltage Free or TTL Input)			
		Code	Power Supply			
		0	100 - 240V AC			
		1	24 - 48V AC/DC			
4050-	1	S	A	0	0	Typical Model Number

Stocked Items

DIN Size	Part Number	PCN
1/16	6050-10000	314683
1/16	6050-1R000	314691
1/4	4050-1R000	314667

Accessories

Models	Description	Part Number
40 & 50 Series	ChromaWare Configuration Software	0149-50060
	Cable for Configuration Software	0149-50062
	Snubber	0149-01305



LIMIT Controller

Temperature Limit Control

- Protects Processes and Equipment from Excessive Temperatures
- DIN Rail and Sub-Panel Mounting
- J & K Thermocouple or RTD Input
- Terminals Provided for Remote Pushbutton Reset
- Latching, Normally Energized, 3 Amp Relay Output



Description

The LIMIT protects expensive heaters and sensitive materials from damaging over temperature conditions. It is designed for industrial and commercial applications that require high temperature protection.

The LIMIT features a Form C latching, manually resettable relay output that de-energizes whenever the sensed temperature exceeds the set point temperature.

The DIN Rail mounting feature allows quick installation without drilling or extra hardware. Slots are also provided for direct panel mounting.

Two methods are provided to reset an alarm condition. (1) The Limit alarm has a reset pushbutton on the unit and (2) reset terminals are provided for resetting the alarm from a remote pushbutton.

Features

- J & K Thermocouple or RTD Input
- Terminals Provided for Remote Pushbutton Reset
- Latching, Normally Energized, 3 Amp Relay Output

Specifications

Power Input: 120 VAC or 24 VAC $\pm 15\%$, 50/60Hz, 3VA max. standard

Control Output: SPDT Relay rated 3.8 Amps Res. and 1.5 Amps Pilot Duty 120 VAC. 100,000 cycles (UL rated). 30 VDC, 6 Amps (not UL rated)

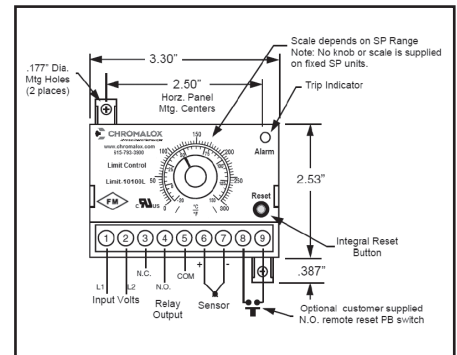
Control Mode: Latching with Manual Reset or power off.

Field Terminations: Screw Terminals with wire clamping plates and touch safe shield.

Sensor Break Protection: Contacts 4 and 5 open for thermocouple or RTD break.

Ambient Operating Temperature:

Dimensions (Inches)



Depth = 2 1/2" (63.5 mm)

Ordering Information

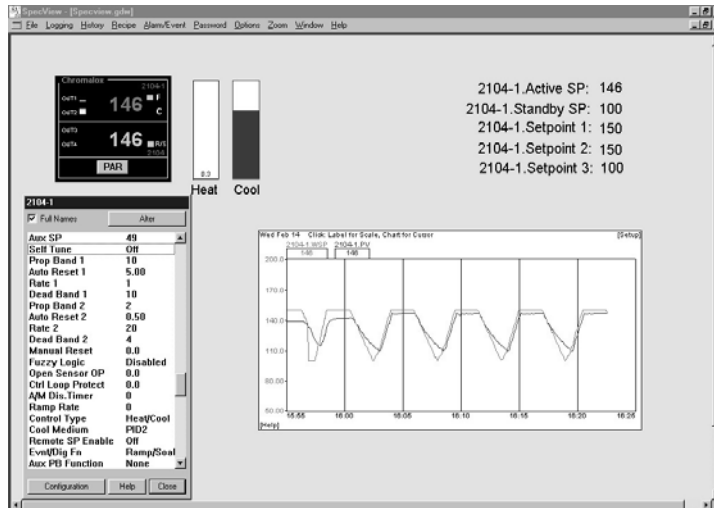
Model	PCN	Temperature Range	Input Type	Input Power
LIMIT-10100L	309200	0 to 1400°F / -20 to 760°C	J T/C	120 VAC
LIMIT-10200L	309219	0 to 2300°F / -20°C to 1260°C	K T/C	120 VAC
LIMIT-10400L	309243	0 to 850°F / -20°C to 455°C	RTD	120 VAC
LIMIT-10101L	309235	0 to 1400°F / -20°C - 760°C	J T/C	24 VAC

Custom Controllers

Custom temperature ranges and fixed set point units are available to meet your specific application needs.

ChromaSoft® SpecView Plus

- Communicates with Multiple Chromalox Controllers
- “Instrument Views” Automatically Created for Graphical Screen
- Access to all Controller Parameters
- Easy Graphics Tools for Custom Screens Including Bitmap Import and OLE
- Trend Charts - Unlimited Number of Pens and Data Logging
- Up to 9 Simultaneous Communications Ports
- Alarm Monitoring and Time Stamping
- Dynamic Data Exchange (DDE) - Option



Graphic Display Screen with 2104 Instrument View

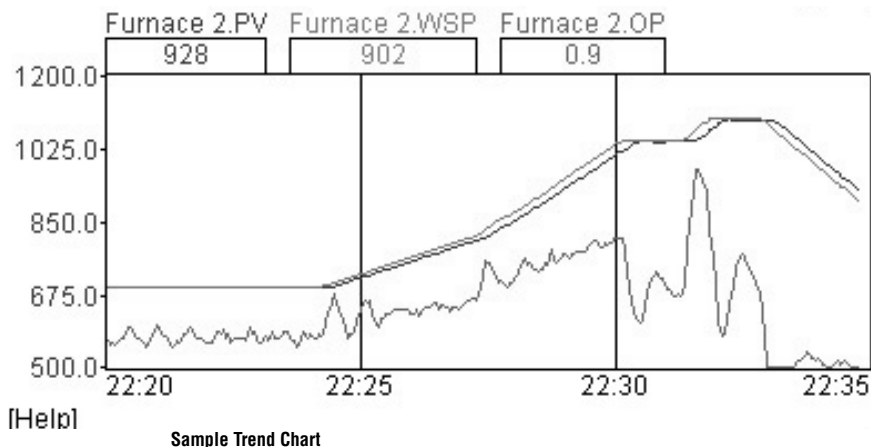
ChromaSoft SpecView communicates with multiple Chromalox 2104, 1604, 3101, 2030, 3380 and 2120 legacy controllers from a single computer via RS485 or RS232 comm port. Additional Chromalox Controllers will be communicating with ChromaSoft SpecView. See chromalox.com for updated information. This flexible Windows based package allows an operator to view and change any controller parameter from the computer. Using this package the operator can also monitor and record any controller parameter, logging data for future evaluation.

Set up is quick and simple. The operator can design and build a GDS (Graphical Display Screen) in less than an hour. Each Controller has an already designed “Instrument View”, which can be added to the GDS with a couple of key strokes. The Instrument View looks like the controller and displays the process variable, set point and has functional pushbuttons. If the process has multiple controllers or the

operator wants to view several instruments on one screen, the instruments can be added to a single GDS. Multiple screens can separate different functions. It's the operator's choice.

Another feature of the GDS set up is the “Trend Chart” utility. An operator can quickly build a trend chart with multiple variables and scales on a single chart or build multiple charts on a single screen. The trend chart can later be quickly reviewed using the “Historical Replay” option or the data can be exported to a 3rd party data base program.

Other features of the Graphical Display Screens are bar graphs, recipe storage and downloading, user defined pushbuttons, and alarm logging. ChromaSoft Windows is a simple solution for set up and data logging of Chromalox Controllers with digital communications.



ChromaSoft® SpecView Plus (cont'd.)

Ordering Information

Complete the Model Number using the Matrix provided.

Multi-port Option is ideal if ChromaSoft SpecView is communicating with multiple controllers. With this option the program can use up to 9 communications ports. SpecView can communicate to as many as 255 controllers per comm port. However, for communication speed considerations, it is recommended that no more than 30 controllers connect to a single communications port. If ChromaSoft is communicating with a 1604 and one of the other Chromalox controllers (2104 or 3101) the multi-port option will be needed. The 1604 uses a different communications protocol than the other controllers.

Historical Replay Option allows the operator to quickly review data on a trend chart. The operator can "fast forward" as fast as 240x the original speed to quickly identify excursions or problems.

Strategy Controller Option is a powerful feature that allows the user to automate opera-

tions. Typical applications include: turning on an output based on an event, setting multiple set points from a master, cascade control, etc.

Remote Computer Option

Many applications require operating SpecView on a computer other than the one connected to the instruments. Required functions include remote monitoring and adjustment of instruments. In a typical networked situation the **Local** computer is connected to the instruments. The **Remote** computer(s) may be in the same building or in another country.

Using SpecView Remote Option connection can be made in 3 possible ways:

1. Over a Local Area Network (LAN).
2. By using Modem dial-up between computers.
3. By making the Local computer available

Model

Soft ChromaSoft® Specview

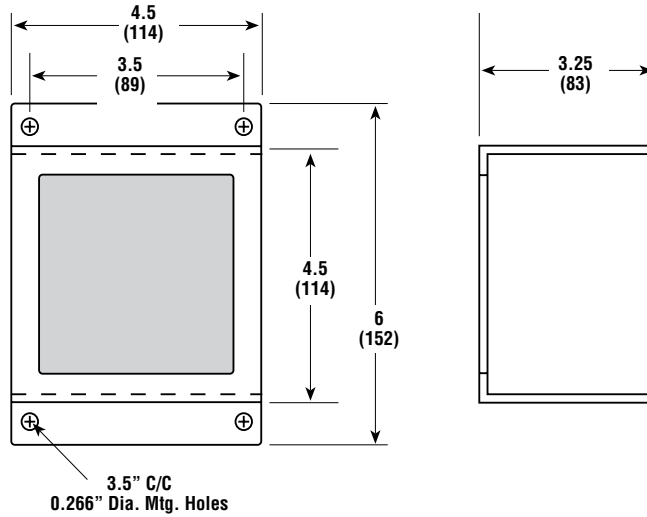
Code	Configuration & Historical Replay Option
MO	Multiple Instrument
MH	Multiple Instrument with Historical Replay
Code	Communications Options
0	None
P	Multi-Port option (up to 9 Communications Ports)
Code	Strategy Controller Option
0	None
S	Strategy Control Option
Code	Dynamic Data Exchange
0	None
D	Dynamic Data Exchange Options
Code	Remote Computer Option*
00	None
XX	01-99 Additional Simultaneous Users
Code	Special Driver
0	None
P	Driver for Model 2120 Ramp/Soak Controller

Soft- MH 0 0 0 - 00 0 Typical Model Number

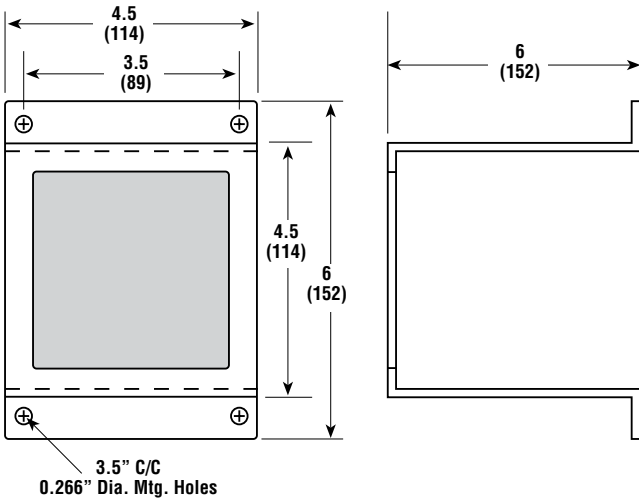
Windows and Microsoft are registered trademarks of Microsoft Corporation.

*To order, specify number of simultaneous users. If 01 is ordered, only one computer can be connected at a time, although multiple computers can have access.

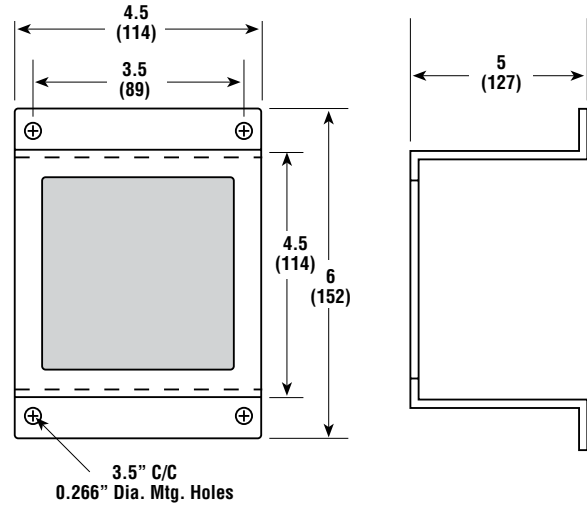
1/4 DIN Accessories 1/4 DIN Mounting Brackets



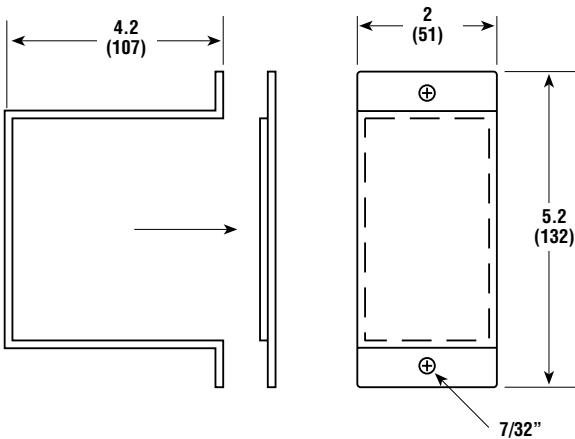
Surface Mounting
Part No. 0006-12081 PCN 309307



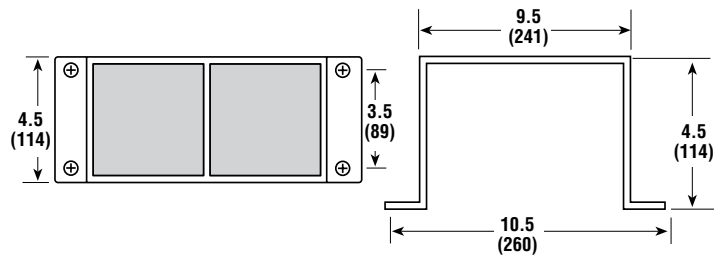
Surface Mounting
Part No. 0006-12072 PCN 309315



Surface Mounting
Part No. 0006-12151 PCN 317980



Side Mounting
1/4 DIN Instruments
Part No. 0006-12034 PCN 313904



Surface Mounting for 2 Controllers
Part No. 0006-12157 PCN 339098

1/8 & 1/16 DIN Mounting Adapter Kits

- Convert 1/4 DIN Mounting Hole Cutouts
- Pre-drilled, Easy to Install
- 4 Screws and Nuts Included

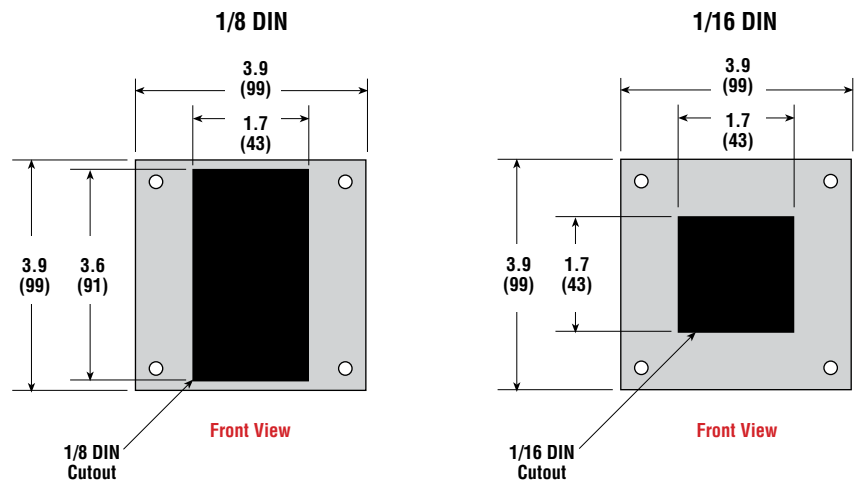
Description

The 1/8 and 1/16 DIN Mounting Adaptor Kits allow you to easily convert an existing 1/4 DIN panel cutout for mounting an 1/8 or 1/16 DIN instrument.

Ordering Information

Description	Part Number	PCN
1/4 to 1/8 DIN Mounting Adapter Kit	0006-12136	306931
1/4 to 1/16 DIN Mounting Adapter Kit	0006-12137	306923

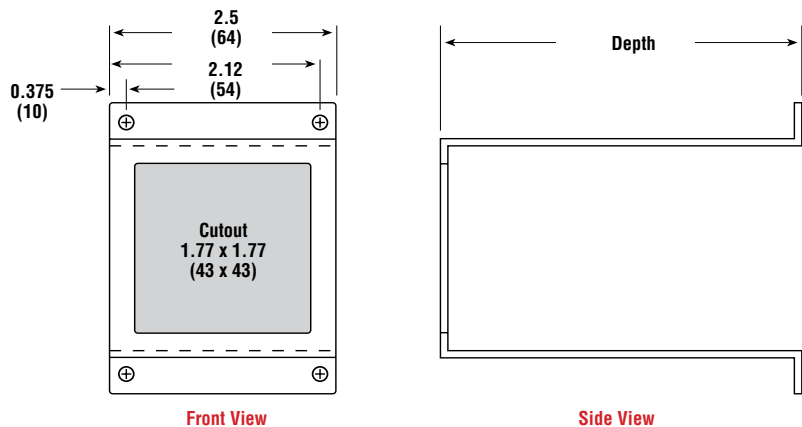
Dimensions



All Dimensions in Inches (mm)

1/16 DIN Surface Mounting Brackets

Dimensions



All Dimensions in Inches (mm)

Ordering Information

Description	Depth (In, mm)	Part Number	PCN
Surface Mounting Bracket	4.38 (111)	0006-12155	305200
Mounting Bracket	5.13 (130)	0006-12154	305218

CONTROLLER ACCESSORIES

ENC Series

ENC 4

Instrument Enclosures

- NEMA 4X, Fiberglass Enclosures with DIN cutouts or Door Window
- Prepunched Sub-Panel for Window Design Enclosures



The NEMA 4X fiberglass enclosures have hinged front covers to allow for easy mounting and wiring. When the controller is installed according to factory recommendations the NEMA rating of the controller is maintained.

Description

The ENC series of enclosures are simple boxes with either cutouts or with window covers for mounting 1/16 DIN or 1/4 DIN Controllers. (Controllers not included.)

The ENCs with cutouts allow the operator to easily access the controller pushbuttons. The ENC enclosure with window covers ensure protection for the controllers.

Enclosures with Cutouts

Model	Description	Stock Status	PCN
ENC4-QTR01	One 1/4 DIN Cutout, 8"H x 6.5"W x 6"D	S	317913
ENC4-SIX01	One 1/16 DIN Cutout 8"H x 6.5"W x 6"D	NS	317921
ENC4-SIX02	Two 1/16 DIN Cutouts, 8"H x 6.5"W x 6"D	NS	317930
ENC4-QTR02	Two 1/4 DIN Cutouts, 12"H x 10"W x 6"D	S	317948



NEMA 4X fiberglass enclosure with hinged door window and pre-drilled sub-panel for either single or double 1/4 DIN Mounting Brackets. Brackets are ordered separately (see accessory table below.)

Model	Description	Stock Status	PCN
ENC4-QTRW0 ENC4-SIX01	NEMA 4X 12"H x 10"W x 6"D Subpanel predrilled for single or dual 1/4 DIN mounting brackets	S	317365

Mounting Brackets for ENC 4 Enclosures with Windows

Model	Description	Stock Status	PCN
0006-12151*	Single 1/4 DIN Mounting Bracket	S	317980
0006-12157**	Double 1/4 DIN Mounting Bracket	S	339098

* 0006-12151 requires 1/4 x 20 bolts; not supplied.

** 0006-12157 requires 8/332 screws; not supplied

ENC Series

ENC 7

Instrument Enclosures

(cont'd.)

- NEMA 7/4, Explosion Proof Enclosure
- Suitable for 1/4 & 1/16 DIN Controllers under 5.5" in Depth



Description

The ENC series of enclosures are simple boxes with window covers for mounting 1/16 DIN or 1/4 DIN Controllers. (*Controllers not included.*) The NEMA 7/4 enclosures are rugged sand-cast aluminum designed for NEC Class I, Division I & Division II, Groups B, C, & D and Class II, Division I & Division II, Groups E,

F, & G. Includes a 5" Window, breather/drain valve, and (3) each 1/2"NPT conduit openings. ENC7s are suitable for one 1/4 DIN controller or up to (2) 1/16 DIN controllers. Mounting Plates are ordered separately (see accessory table below).

Model	Description	Stock Status	PCN
ENC7-QTRW0	NEMA 7/4 8"H x 8"W x 8"D*	NS	317964

* 1/4 and 1/16 DIN Mounting Plates Sold Separately

Mounting Plates for ENC 7 Enclosures

Model	Description	Stock Status	PCN
0006-12179	1/4 DIN Mounting Plate	NS	339100
0006-12177	1/16 DIN Mounting Plate	NS	339119
0006-12178	Dual 1/16 DIN Mounting Plate	NS	339127

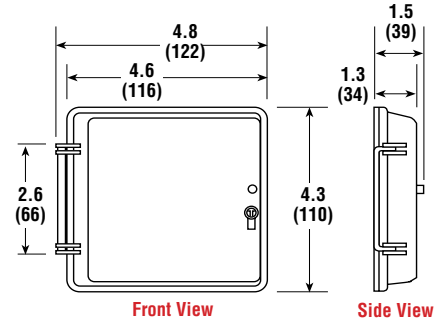
Splash Guard Instrument Cover

Protects 1/4 DIN Panel Mounted Instruments Against:

- Mechanical Damage
- Unauthorized Operation
- Dust and Splashwater



Dimensions



Features

- High impact strength, high temperature plastic
- Heat Resistant up to 266°F (130°C)
- Protection to DIN 40050, dust-tight and splashproof IP54
- Supplied with 2 keys
- Use with 1/4" DIN models

Ordering Information

Description	Part Number	PCN
Splash-Guard	0148-00012	314421

All Dimensions in Inches (mm)
Note: Controllers not included.

Super Splash Guard Instrument Cover Model 0076-12034

NEMA 4 Protection

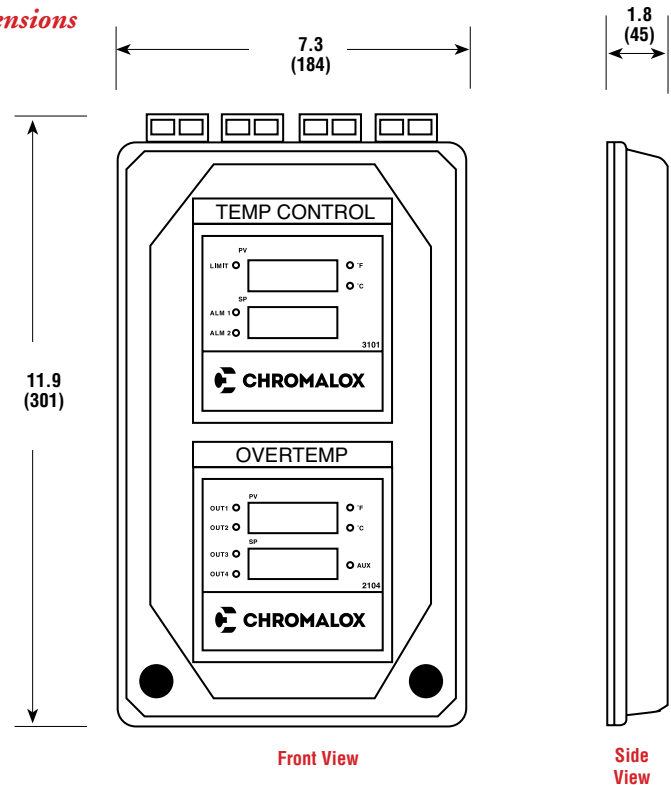
Protects Two 1/4 DIN Panel Mounted Instruments Against:

- Mechanical Damage
- Unauthorized Operation
- Dust and Splashwater

Features

- High impact strength, high temperature plastic
- Heat Resistant up to 266°F (130°C)
- NEMA 4 Protection
- Supplied with 2 keys

Dimensions



All Dimensions in Inches (mm)
Note: Controllers not included.

Ordering Information

Description	Part Number	PCN
Splash-Guard	0076-12034	321939

SCR Selection Guide

SCR Power Controller	CTF/CTF-Xtra	MiniMax 1	MiniMax 2	MiniMax 3	MiniMax 1P
Single Phase	Y	Y			Y
3-Phase/2-Leg	Y*		Y		
3-Phase/3-Leg	Y*			Y	
Mounting	DIN, Rear Panel	Rear Panel	Rear Panel	Rear Panel	Rear Panel
Firing • On/Off	Y	Y	Y	Y	
• Proportional	Y	Y (DOT)	Y (DOT)	Y (DOT)	
• Phase Angle	Y				Y
Line Voltage (VAC)	120-480, 120-600, 120-690/120-480	120-600	120-600	120-600	120-600
Current Load (Amps)	25-250/25-60	30-75	30-75	30-75	30-75
Inputs On/Off Control	5-30 VDC; PWM- Pulse Width Modulation	5-32 VDC; 120, 240 VAC, Dry Contact	5-32 VDC; 120, 240 VAC, Dry Contact	5-32 VDC; 120, 240 VAC, Dry Contact	
Proportional /Phase Angle Control	0-20 mA, 4-20mA, 0-5/10V, 1kΩ-10kΩ Potentiometer	4-20 mA, 0-5 VDC, 1-5 VDC, 0-10 VDC, Remote Manual Adjust, Auto/Man	4-20 mA, 0-5 VDC, 1-5 VDC, 0-10 VDC, Remote Manual Adjust, Auto/Man	4-20 mA, 0-5 VDC, 1-5 VDC, 0-10 VDC, Remote Manual Adjust, Auto/Man	0/1-5, 0/4-20, 0/10- 50 mA; 0-5, 0-10 VDC
Remote/Manual Adjust	Y	Option	Option	Option	Option
Current Limit & Soft Start	Y				Y
Zero/Gain Adjust					Y
Line Voltage Regulation	Y				Y
Heatsink Isolation		Y	Y	Y	Y
Full Isolation					
Heatsink Thermostat / Electronic Sensor	Y	Y	Y	Y	Y
Shorted SCR Detection	Y	Option	Option	Option	
Touch Safe Option	Y				
Integral I2T	Y (CTF-Xtra IGBT)	Y	Y	Y	Y
Communications • RS485	Y				
Feedback (Diagnostics) • Voltage	Y				
• Current	Y				Y
• Power	Y				
Agency Approvals	UL, cUL, CE, TÜV	UL/cUL, CE, Demko	UL/cUL, CE, Demko	UL/cUL, CE, Demko	UL/cUL
See Page	H-61 to H-66	H-67	H-69	H-71	H-73

* May be grouped with additional CTF's or CS1's to achieve 3-phase control

SCR Selection Guide *(cont'd.)*

SCR Power Controller	MaxPac I	MaxPac II	MaxPac III	MaxPac IP	CS1/CS3	SSR
Single Phase	Y			Y	Y (CS1)	Y
3-Phase/2-Leg		Y				Y
3-Phase/3-Leg			Y		Y (CS3)	Y
Mounting	Rear Panel	Rear Panel	Rear Panel	Rear Panel	DIN, Rear	DIN, Rear
Firing • On/Off	Y	Y	Y		Y	Y
• Proportional	Y (DOT)	Y (DOT)	Y (DOT)		Y	Y
• Phase Angle				Y		Y
Line Voltage (VAC)	120-600	120-600	120-600	120-600	24-600	42-600
Current Load (Amps)	100-1200	100-1200	100-1200	100-1200	25-120/25-55	15-75
Inputs On/Off Control	5-32 VDC; 120, 240 VAC, Dry Contact	5-32 VDC; 120, 240 VAC, Dry Contact	5-32 VDC; 120, 240 VAC, Dry Contact		VAC, VDC	VAC, VDC, 4-20mA
Proportional /Phase Angle Control	4-20 mA, 0-5 VDC, 1-5 VDC, 0-10VDC, Remote Manual Adjust, Auto/Man	4-20 mA, 0-5 VDC, 1-5 VDC, 0-10VDC, Remote Manual Adjust, Auto/Man	4-20 mA, 0-5 VDC, 1-5 VDC, 0-10VDC, Remote Manual Adjust, Auto/Man	0/1-5, 0/4-20, 0/10-50 mA; 0-5, 0-10 VDC		
Remote/Manual Adjust	Option	Option	Option	Option	N	N
Current Limit & Soft Start				Y		Soft Start
Zero/Gain Adjust				Y		
Line Voltage Regulation				Y		
Heatsink Isolation	Y	Y	Y	Y		
Full Isolation	Y	Y	Y	Y	Y	Y
Heatsink Thermostat / Electronic Sensor	Y	Y	Y		Y	
Shorted SCR Detection	Option	Option	Option		Y	
Touch Safe Option	Option	Option	Option	Option	Y	
Integral I2T	Option	Option	Option	Option		
Communications • RS485						
Feedback (Diagnostics) • Voltage						
• Current						
• Power						
Agency Approvals	UL/cUL, CE, Demko	UL/cUL, CE, Demko	UL/cUL, CE, Demko	UL/cUL	UL, cUL, CE	UL, cUL, CE
See Page	H-75	H-78	H-81	H-84	H-87	H-91

* May be grouped with additional CTF's or CS1's to achieve 3-phase control

CTF

Advanced Single Phase SCR Power Controller

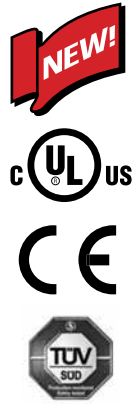
- 25 A to 250 A
- 480 Vac, 600 Vac & 690 Vac
- User Configurable Firing Modes: Zero Cross (Fixed Cycle, Burst Firing (DOT) & Half Single Cycle) or Phase angle
- Analog Control Inputs: 0-5 Vdc, 0-10 Vdc, 0-20 mA, 4-20 mA & Potentiometer from 1kΩ to 10kΩ
- Digital Input: 5-30 V or PWM (Pulse Width Modulation)
- Total or Partial Load Interrupt Alarm (Heater Break)
- Current Alarms - SCR Short Circuit, Full or Partial Interrupt & Load
- Modbus RTU/RS485 Communications
- Soft Start, Current limit, V, I, P feedback
- Master Controller for 2 or 3-Leg/3-phase loads (zero crossing)
- Powerful C-PWR Configuration Software
- UL, CUL, CE, TÜV Marking



CTF
25 A - 120 A



CTF
150 A - 250 A



Description

The CTF microprocessor-based advanced SCR power controller is designed to control all types of industrial heater loads ranging from 25A to 250A and up to voltages of 480Vac, 600Vac and 690Vac in several different configurations. Powerful system parameter diagnostics, multiple firing mode options, control mode versatility and on-board Modbus communications make the CTF an ideal choice for almost any process power control application.

Whether you have traditional resistive heaters, elements with low thermal inertia, medium/short-wave IR lamps or transformer-coupled loads, the CTF offers several zero crossing (fixed cycle time, burst fire (DOT) and half single cycle) and phase angle firing modes to properly and precisely manage these types of loads.

The CTF runs complete diagnostics of temperature, current (including full or partial load interrupt), voltage, and power and offers programmable soft start-up and current limiting controls to keep your system safe and reliable while extending the heater life.

The configurable control input accepts analog and digital signals, including 0-10V, 0/4-20mA, potentiometer, logic, and PWM (pulse width modulation).

On its own, the CTF manages single phase loads. However, it is designed to also be the master controller in 2- & 3-Leg, 3-phase load configurations with one or two CTFs or CS1s as the slave(s).

The CTF also features the powerful and detailed C-PWR configuration software, which allows you to run trends, save historical data and read or write device parameters quickly and easily. Configurations may be saved locally for later retrieval or sent across a network for cloning of other units. This significantly reduces mistakes and system setup time.

Applications

- Thermoforming
- Plastic extrusion lines
- Injection molding
- Heat treatment
- Industrial ovens / furnaces
- Mold & dye heating/cooling
- HVAC
- Packaging
- Chemical processing
- Textile production
- Rubber vulcanization equipment
- Driers, incubators and autoclaves
- Pharmaceutical processes
- Rapid resistive load switching

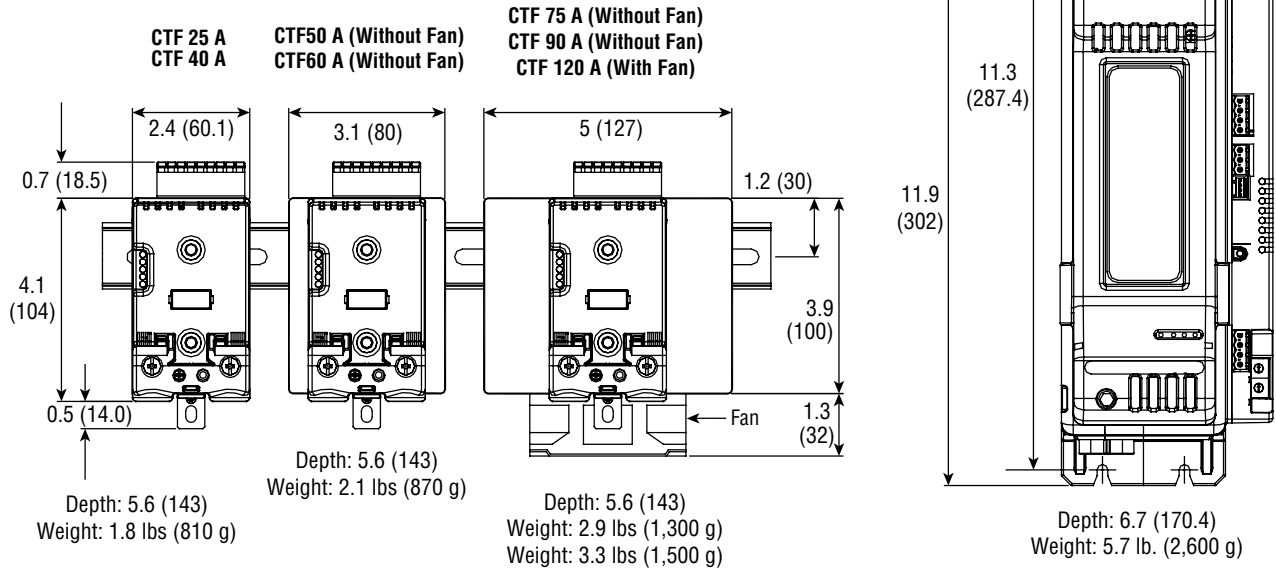


CTF

Advanced Single Phase SCR Power Controller

(cont'd.)

CTF Dimensions, In. (mm)



General Ratings

Maximum Rated Voltage	480 Vac	600 Vac	690 Vac
Work Voltage Range	90 - 530 VAC	90 - 660 Vac	90 - 760 Vac
Non Repetitive Voltage	1200 Vp	1600 Vp	1600 Vp
Rated Frequency	50/60Hz auto-synchronization		

CTF Model	CTF-025	CTF-040	CTF-050	CTF-060	CTF-075	CTF-090	CTF-120	CTF-150	CTF-200	CTF-250
Rated Current, AC51 - AC55b Resistive Load (@ 40°C continuous service)	25 A	40 A	50 A	60 A	75 A	90 A	120 A	150 A	200 A	250 A
Rated current AC56A permitted trigger modes: ZC, BF/DOT with DT (Delay Trigger), PA with softstart (@ Tamb = 40 °C)	20 A	32 A	40 A	50 A	60 A	75 A	100 A	125 A	160 A	200 A
Maximum Surge Current (t = 10 ms) A	400 A	520 A	520 A	1150 A	1150 A	1500 A	1500 A	5000 A	8000 A	8000 A
Maximum I ² t for fusing (blowout) A ² s	450	1,800	1,800	6,600	6,600	11,200	11,200	125,000	320,000	320,000
Critical dV/dt Off-state (minimum)	1,000 V/μs									
Nominal Impulse Voltage	4 KV									
Nominal SCCR	5 KA									

CTF

Advanced Single Phase SCR Power Controller *(cont'd.)*

Ordering Information

To Order — Complete the Model Number using the Matrix provided.

Model CTF SCR Power Controller

CTF

Code Current @ 104°F (40°C) Ambient, Continuous Service

025	25 Amps	090	90 Amps
040	40 Amps	120	120 Amps
050	50 Amps	150	150 Amps
060	60 Amps	200	200 Amps
075	75 Amps	250	250 Amps

Code Voltage

48-	480 V
60-	600 V
69-	690 V (Only for Models ≥ 150 A)

Code Control Options

0	None
1	Current Limit
2	Current Limit and Feedback V.I.P.

Code Heater Break Alarm

0	None
1	Heater Break Alarm (Partial/Total Load)

Code Fusing

0	None
1	Internal (for current sizes ≥ 150 A)

Code Communications

0-	None
M-	Modbus RTU/RS485

Code Signal Control

1	10 V (Default)
2	5 V/Potentiometer
3	0-20 mA
4	4-20 mA
5	PWM/Digital Input

The shaded settings are user selectable only with the C-PWR configuration Software

Code Trigger Modes

B	Burst Fire (DOT) (Default)
Z	Zero Cross
H	Half Single Cycle
P	Phase Angle

Code Function Type

M	Master (Default)
2	Slave (2-Leg)
S	Slave (3-Leg)

CTF- 075 60- 2 1 0 0- 1 B M Typical Model Number

Accessories

Description	PCN
Communication Cable, USB to TTL	309171
Communication Cable, USB to RS485	309180

CTF-Xtra

Advanced Single Phase SCR Power Controller with Electronic Resettable Fuse

- 25 A to 60A
- 100-480 VAC
- Integral Over Current Fault Protection
- User Configurable Firing Modes: Zero Cross (Fixed Cycle, Burst Firing (DOT) & Half Single Cycle) or Phase angle
- Analog Control Inputs: 0-5 Vdc, 0-10 Vdc, 0-20 mA, 4-20 mA & Potentiometer from 1 k Ω to 10 k Ω
- Digital Input: 5-30 V or PWM (Pulse Width Modulation)
- Current Alarms - SCR Short Circuit, Full or Partial Interrupt & Load (Heater Break)
- Modbus RTU/RS485 Communications
- Soft Start, Current limit, V, I, P feedback
- Master Controller for 2 or 3-Leg/3-phase loads (zero crossing)
- Powerful C-PWR Configuration Software
- UL, CUL, CE, TÜV Marking



CTF-Xtra 25 A - 60 A



Description

The CTF-Xtra microprocessor-based advanced SCR power controller is designed to control all types of industrial heater loads ranging from 25 A to 60 A and up to 480 Vac in several different configurations. Integral programmable over-current fault protection, powerful system parameter diagnostics, multiple firing mode options, control mode versatility and on-board Modbus communications make the CTF-Xtra an ideal choice for almost any process power control application.

Whether you have traditional resistive heaters, elements with low thermal inertia, medium/short-wave IR lamps or transformer-coupled loads, the CTF-Xtra offers several zero crossing (fixed cycle time, burst fire (DOT) and half-single cycle) and phase angle firing modes to properly and precisely manage these types of loads.

The "Xtra" is an on-board over-current fault protection feature which eliminates the need for extra-rapid fuses, reduces machine downtime and the cost of replacing failed fuses. In applications susceptible to intermittent short-circuits and overloads, the CTF-Xtra power controller can be programmed to restore power automatically when the fault has cleared, preventing complete process shutdown and maintaining production. Alternatively, power can be manually restored, locally or remotely. To prevent system damage in the event that the fault is not effectively cleared, A soft-start ramp is applied when the current is restored.

The CTF-Xtra runs complete diagnostics of temperature, current (including full or partial load interrupt/heater break), voltage, and power and offers programmable soft start-up and current limiting controls to keep your system safe and reliable while extending the heater life.

The configurable control input accepts analog and digital signals, including 0-20 mA, 4-20 mA, 0-5 VDC, 0-10 VDC, potentiometer, logic, and PWM (pulse width modulation).

On its own, the CTF-Xtra manages single phase loads. However, it is designed to also be the master controller in 2- & 3-Leg, 3-phase load configurations with one or two CTF-Xtras as the slave(s).

The CTF-Xtra also features the powerful and detailed C-PWR configuration software, which allows you to run trends, save historical data and read or write device parameters quickly and easily. Configurations may be saved locally for later retrieval or sent across a network for cloning of other units. This significantly reduces mistakes and system setup time.

Applications

- Thermoforming
- Plastic extrusion lines
- Injection molding
- Heat treatment
- Industrial ovens / furnaces
- Mold & dye heating/cooling
- HVAC
- Packaging
- Chemical processing
- Textile production
- Rubber vulcanization equipment
- Driers, incubators and autoclaves
- Pharmaceutical processes
- Rapid resistive load switching

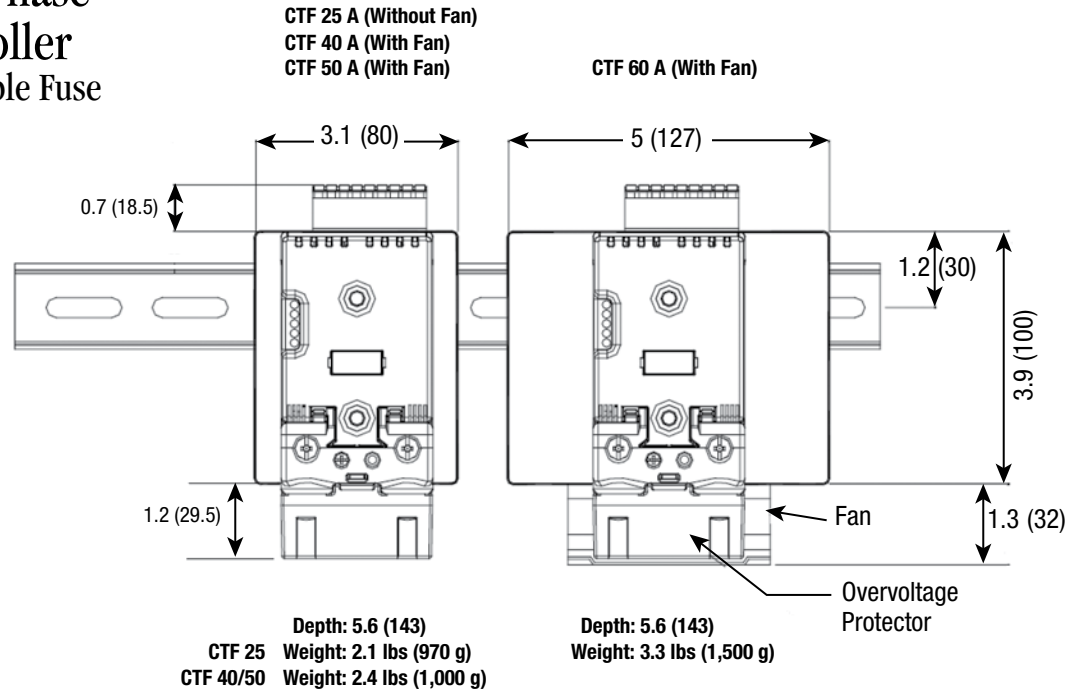


CTF-Xtra

Advanced Single Phase
SCR Power Controller
with Electronic Resettable Fuse

(cont'd.)

CTF-Xtra Dimensions, In. (mm)



General Ratings

Maximum Rated Voltage	480 VAC
Work Voltage Range	90 - 530 VAC
Non Repetitive Voltage	1200 Vp
Rated Frequency	50/60Hz auto-synchronization

CTF-Xtra Model	CTF-025	CTF-040	CTF-050	CTF-060
Rated Current, AC51 - AC55b Resistive Load (@ 40°C continuous service)	25 A	40 A	50 A	60 A
Rated current AC56A permitted trigger modes: ZC , BF/DOT with DT (Delay Trigger), PA with softstart (@ Tamb =40°C)	20 A	32 A	40 A	50 A
Over current fault protection	This function eliminates the need for an external extra-rapid fuse to protect the device. In case of load short-circuit, the internal device is instantaneously switched off and the alarm status is signaled.			
Critical dV/dt Off-state (minimum)	1,000 V/μs			
Nominal Impulse Voltage	4 KV			
Nominal SCCR	5KA / 480 V WARNING: Maximum permissible inductance loop impedance is 500 μH			

CTF-Xtra Advanced Single Phase SCR Power Controller with Electronic Resettable Fuse

(cont'd.)

Ordering Information

To Order — Complete the Model Number using the Matrix provided.

Model	Product Overview
CTF	The CTF-Xtra Series industrial SCR power controller is designed to control 1-phase loads or be the master control for 3 phase line with 2-Leg or 3-leg 3-phase loads or 3 phase line with 3 single phase loads. CTF-Xtra Standard features: Several zero cross firing modes or phase angle firing, integral programmable electronic fuse, operational voltage rating up to 480Vac. Optional features: Total and partial load interrupt alarm, and Modbus RTU/RS485. Approvals: CE, TÜV, UL Listed in USA & Canada .
	Code Current @ 104°F (40°C) Ambient, Continuous Service
	025 25 Amps
	040 40 Amps
	050 50 Amps
	060 60 Amps
	Code Voltage
	48- 480 V
	Code Control Options
	0 None
	1 Current Limit
	2 Current Limit and Feedback V.I.P.
	Code Heater Break Alarm
	1 Heater Break Alarm (Partial/Total Load)
	Code Fusing
	2 Electronic Resettable Fuse
	Code Communications
	0- None
	M- Modbus RTU/RS485
	Code Signal Control
	1 10 V (Default)
	2 5 V/Potentiometer
	3 0-20 mA
	4 4-20 mA
	5 PWM/Digital Input
	Code Trigger Modes
	B Burst Fire (DOT) (Default)
	Z Zero Cross
	H Half Single Cycle
	P Phase Angle
	Code Function Type
	M Master (Default)
	2 Slave (2-Leg)
	S Slave (3-Leg)
CTF-	050 48- 2 1 2 0- 1 B M Typical Model Number

The shaded settings are user selectable only with the C-PWR configuration Software

Accessories

Description	PCN
Communication Cable, USB to TTL	309171
Communication Cable, USB to RS485	309180

CFW

Advanced Modular SCR Power Controller

- 40A—600A Models Available
- 480Vac, 600Vac, and 690Vac Options
- 1P, 3P 2-Leg, or 3P 3-Leg
- 100KA SCCR Rating
- Zero Cross (Fixed Cycle, Burst Fire, Half Single Cycle) and Phase Angle Firing Capability
- Current Limiting
- Multiple Analog Input Options Including 0-5V, 0-10V, 0-20mA, 4-20mA, PWM and Potentiometer
- Analog Retransmit
- V, V2, I, I2, P Feedback Control
- Built In Fusing
- Total and Partial Interrupted Load Alarm
- Default Modbus RS-485 Communications
- Communication Expansion Slot Capable of Profibus, Modbus TCP/RTU, Realtime Ethernet IP, EtherCat, CanOpen, ProfiNet
- Optional Add On Keyboard For Programming and Monitoring
- Optional Built In PID Control
- C-PWR PC Configuration Software
- SCR Overtemperature and Shorted SCR Alarm
- UL, cUL, CE Marking



Description

The CFW Series Advanced SCR Power Controller offers modular single phase, three phase 2-Leg, or three phase 3-Leg power control from 40A to 600A. All models feature Zero Cross and Phase Angle firing capability making the CFW extremely versatile in the industry. Multiple input options are featured, including 0-5V, 0-10V, 0-20mA, 4-20mA, PWM, and 1Kohm to 10Kohm potentiometer signal. Programmable analog outputs are included to allow retransmission of critical process details.

Communications

Modbus RTU/RS485 communications are outfitted by default, but with PLC's and integrated networks being commonplace, the CFW can host a number of additional fieldbus communications including Modbus TCP, Profibus, ProfiNet, Ethernet IP, DeviceNet, EtherCat, and CANopen. Each of these fieldbus cards can be installed at time of order or outfitted at a later date. This makes it extremely easy to adapt the CFW to any host network.

Complete Process Control Package

In addition to the integration of PID control and power control, the CFW offers a full suite of diagnostic and monitoring capabilities to make this the most versatile controller Chromalox has to offer. Full thermal and electrical monitoring allows users to anticipate failures and malfunctions so corrective steps can be taken in a timely manner.

With each zone outfitted with an independent current transformer, full diagnostics can be performed from loop break alarm, heater break, SSR short circuit, input opening or short circuit, and even over temperature alarm

Applications

- Packaging
 - Thermoforming
 - Heat treatment
 - Mold & dye heating/cooling
 - HVAC
 - Chemical Processing
 - Textile production
 - Multizone Furnaces
 - Dryers
 - Industrial Ovens
- And many more...



CFW

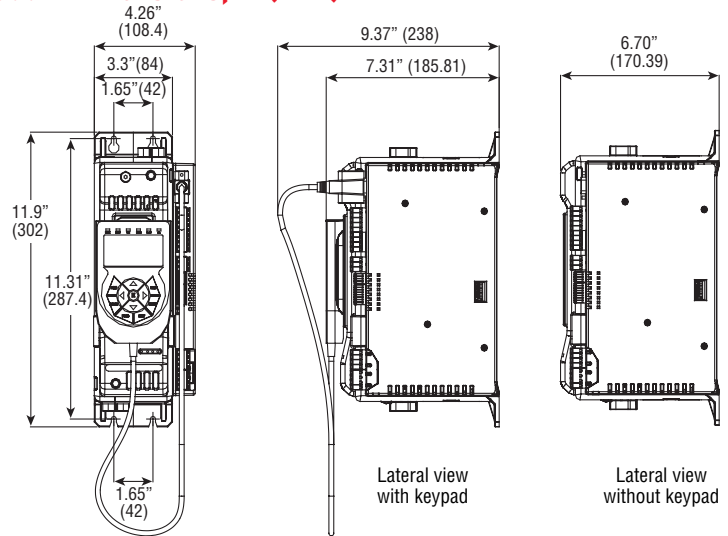
Advanced Modular SCR Power Controller *(cont'd.)*

Weights Lbs (kg)

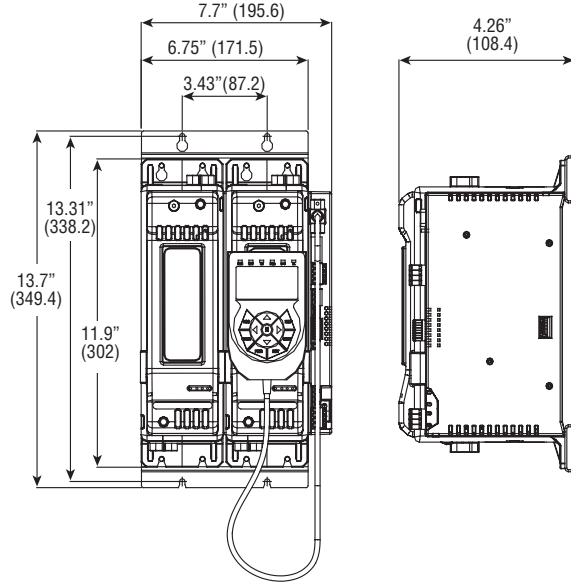
Model	Amps	Weight Lbs (kg.)
CFW1	40/60/100	4.85 (2.2kg)
CFW2	40/60/100	9.25 (4.2kg)
CFW3	40/60/100	13.67 (6.2kg)
CFW1	150/200/250/300	5.73 (2.6kg)
CFW2	150/200/250/300	11.0 (5.0kg)
CFW3	150/200/250/300	16.3 (7.4kg)

CFW 40A—300A Dimensions, In (mm)

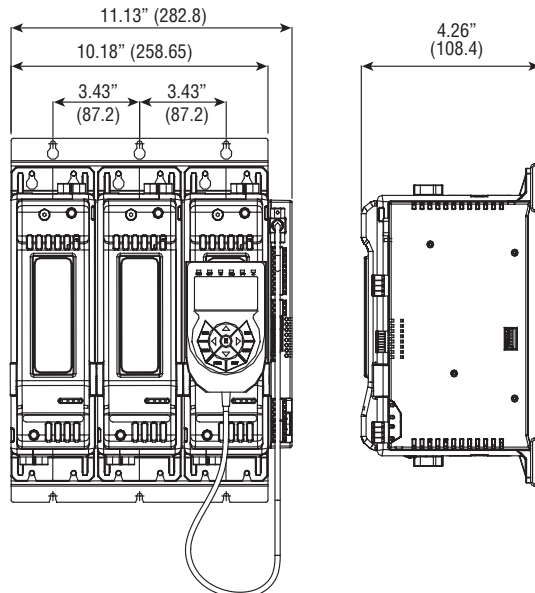
CFW1



CFW2



CFW3



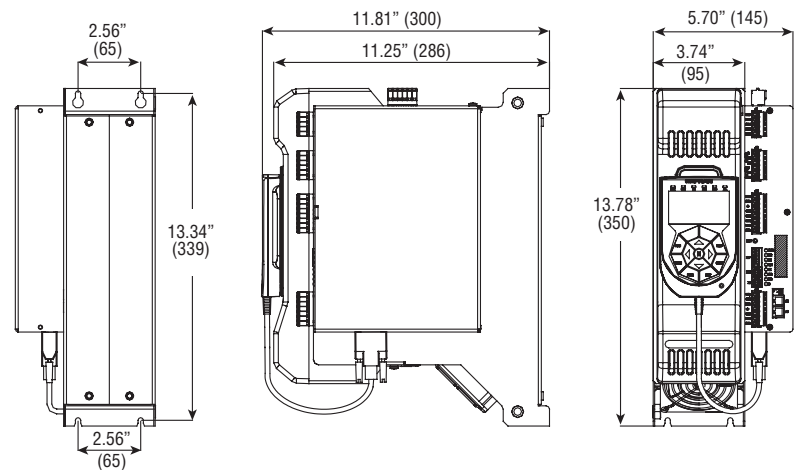
CFW Advanced Modular SCR Power Controller *(cont'd.)*

Weights Lbs (kg)

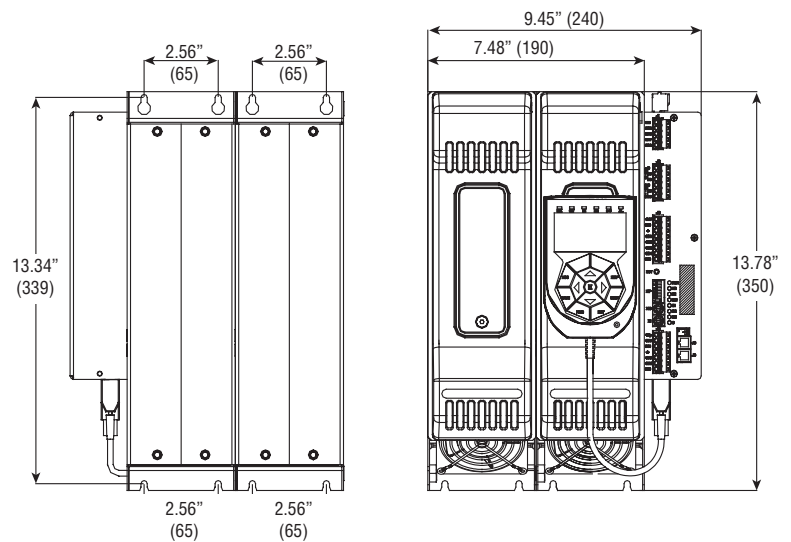
Model	Amps	Weight Lbs (kg.)
CFW1	400	17.63 (8 Kg)
CFW2	400	34.17 (15.5 Kg)
CFW3	400	49.60 (22.5 Kg)
CFW1	500/600	24.25 (11kg)
CFW2	500/600	46.30 (21kg)
CFW3	500/600	68.34 (31kg)

CFW 400A—600A Dimensions, In (mm)

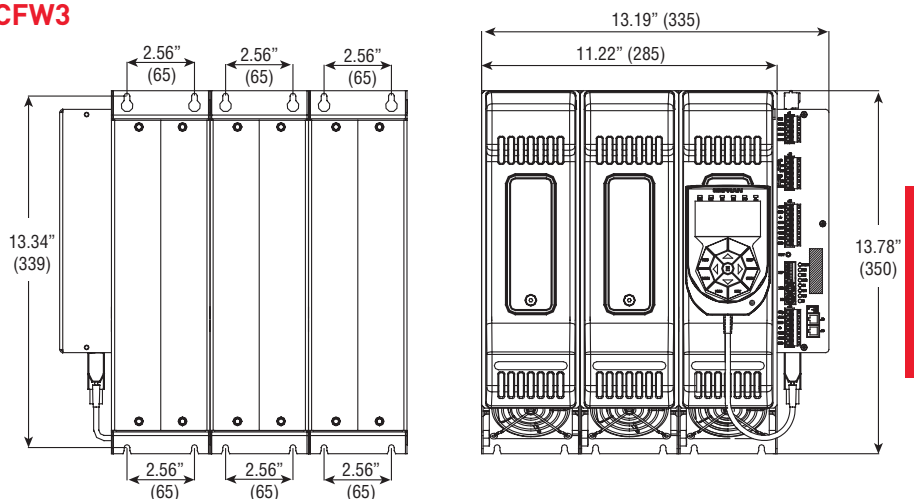
CFW1



CFW2



CFW3



SCR COMPONENTS

CFW

Advanced Modular SCR Power Controller *(cont'd.)*

Technical Data

Voltage	
Nominal Voltage	480Vac (max range 90-530Vac), 600Vac (max range 90-660Vac), 690Vac (max range 90-760Vac)
Frequency	Nominal 50-60Hz
Non-repetitive Voltage	1200 Vpk (480V models) / 1600 Vpk (600 & 690 Vac)
Control Analog Inputs	
Voltage	0-5 Vdc, 0-10Vdc (impedance > 100 kohm)
Current	0-20mA, 4-20mA (impedance 125 ohm)
Potentiometer	1-10 Kohm (auto-fed by 5V from CFW)
Digital Inputs	
Range	5-30V max 7mA
PWM Input Control	0.03 – 100Hz
PID Inputs	
Sampling Time	60msec
Accuracy	0.2% FS +/- Scale points 25°C
Thermal Drift	< 100ppm/C scale points.
Thermocouples	Type J, K, S, R, T, custom
RTD	PT100 / Max Resistance 20ohm
Selectable Temperature	°C/°F
Voltage	0-60mV, 12-60mV, Ri > 1Mohm / 0-1V, 0.2-1V, Ri > 1Mohm custom linearization at 32 sections
Current	0-20mA, 4-20mA, Ri = 50ohm custom linearization at 32 sections
TC AUX Inputs	
Sampling Time	480msec
Accuracy	1% F.S. +/- scale point 25°C
Thermocouples	Type J, K, S, R, T, custom
Voltage	0-60mV, 12-60mV, Ri > 1Mohm
Voltage Line Range	
Range	90V Nominal Product
Frequency	50/60Hz
Accuracy	1% F.S. with neutral connected / 2% F.S. without neutral connected
Voltage Load Range	
Accuracy	1% F.S. with load voltage measurement option (VLOAD option) / 2% F.S. without option VLOAD
Current Load Range	
Accuracy	2% F.S. at room temperature of 25°C
Sampling Time	0.25msec
Measurement Of External Current Transformer (400-600A Models Only)	
Input F.S.	5A rms
Input Impedance	16mohm
Accuracy	2% F.S. at room temperature of 25°C
Sampling Time	0.25msec

CFW Advanced Modular SCR Power Controller *(cont'd.)*

RS485 Serial (PORT 1)	
Connector	Double RJ10
Protocol	Modbus RTU RS485
Baud Rate	Configurable from 1200 Baud to 115000 Baud
Node Address	Pair of rotary-switches
Dip Switch	For insertion of line termination resistance. Isolation 1500V
Fieldbus (PORT 2)	
Modbus RTU	115Kbps
CANopen	10K-1Mbps
Profibus DP	9.6-12Mbps
Ethernet IP/Modbus TCP	10/100Mbps
EtherCAT	10/100Mbps
PROFINET	10/100Mbps
Isolation HV Output	
Rated Isolation Voltage	Input/Output 4000Vac
CFW 40	
Nominal Current	40Arms @ 40°C in continuous service
Non-repetitive Overcurrent	t = 10ms: 1,400A
I ² T For Blowout	10,000 A ² s
dV/dt Critical	1,000 V/us
CFW 60	
Nominal Current	60Arms @ 40°C in continuous service
Non-repetitive Overcurrent	t = 10ms: 1,500A
I ² T For Blowout	12,000 A ² s
dV/dt Critical	1,000 V/us
CFW 100	
Nominal Current	40Arms @ 40°C in continuous service
Non-repetitive Overcurrent	t = 10ms: 1,900A
I ² T For Blowout	18,000 A ² s
dV/dt Critical	1,000 V/us
CFW 150	
Nominal Current	150Arms @ 40°C in continuous service
Non-repetitive Overcurrent	t = 10ms: 5,000A
I ² T For Blowout	125,000 A ² s
dV/dt Critical	1,000 V/us
CFW 200	
Nominal Current	200Arms @ 40°C in continuous service
Non-repetitive Overcurrent	t = 10ms: 8,000A
I ² T For Blowout	320,000 A ² s
dV/dt Critical	1,000 V/us
CFW 250	
Nominal Current	250Arms @ 40°C in continuous service
Non-repetitive Overcurrent	t = 10ms: 8,000A
I ² T For Blowout	320,000 A ² s
dV/dt Critical	1,000 V/us

CFW Advanced Modular SCR Power Controller *(cont'd.)*

CFW 300	
Nominal current	300 Arms @ 40°C in continuous service.
Non-repetitive overcurrent	t=10ms: 8000 A
I ² t for blowout	320000 A ² s
dV/dt critical	1000V/μs
CFW 400	
Nominal Current	400Arms @ 50°C in continuous service
Non-repetitive Overcurrent	t = 10ms: 15,000A
I ² T For Blowout	1,125,000 A ² s
dV/dt Critical	1,000 V/us
CFW 500	
Nominal current	500 Arms @ 50°C n continuous service.
Non-repetitive overcurrent	t=10ms: 15.000 A
I ² t for blowout	1.125.000 A ² s
dV/dt critical	1000V/μs
CFW 600	
Nominal Current	600Arms @ 50°C in continuous service
Non-repetitive Overcurrent	t = 10ms: 15,000A
I ² T For Blowout	1,125,000 A ² s
dV/dt Critical	1,000 V/us
Thermal Dissipation	
Pdissipation (W)	I_Load_Arms*1.3V (For models with integrated fuse, refer to fuse table for additional dissipation)
LED	
Quantity	8 LED Indicators (All are configurable via software. Default configuration as follows)
Run (Green)	RUN state of the CPU ERROR (Red) error
DI1 (Yellow)	DI1 Digital Input State
DI2 (Yellow)	DI2 Digital Input State
O1 (Yellow)	Out 1 Main Input State
O2 (Yellow)	Out 2 Main Input State
O3 (Yellow)	Out 3 Main Input State
Button (Yellow)	State Key Heater Break
Power Supply (40-300A Models) - Externally Supplied	
CPU Power Supply	24Vdc +/- 10%, Max 10VA
Cooling Fan Power Supply	24Vdc +/- 10% (For each module), Input @ 24Vdc Max 500mA
Power Supply (400-600A Models) - Externally Supplied	
CFW1 Power Supply	24Vdc +/- 10%, Max 38W
CFW2 Power Supply	24Vdc +/- 10%, Max 66W
CFW3 Power Supply	24Vdc +/- 10%, Max 94W
Ambient Conditions	
Working Temperature	0-50°C (reference derating curve)
Storage Temperature	-20°C to 85°C
Max Relative Humidity	85+ UR Non-condensing
Max Altitude	2000m above sea level
Installation Requirements	Installation Category 2, Pollution Level 2, Double Isolation
Installation	Panel with screws

CFW Advanced Modular SCR Power Controller *(cont'd.)*

Ordering Information

To Order — Complete the Model Number using the Matrix provided.

Model CFW Advanced Modular SCR Power Controller											
CFW1	Single Phase										
CFW2	Three Phase, 2-leg										
CFW3	Three Phase, 3-leg										
Code Current @ 104°F (40°C) Ambient, continuous service											
040	40 Amps	200	200 Amps	500	500 Amps						
060	60 Amps	250	250 Amps	600	600 Amps						
100	100 Amps	300	300 Amps								
150	150 Amps	400	400 Amps								
Code Nominal Voltage											
48	480 Vac ¹										
60	600 Vac ¹										
69	690 Vac ³										
Code Input 1: Analog Process Input + PID											
0	None										
1	TC/RTD/Linear input (60mV) ¹										
Code Inputs 2 - 5: Auxiliary Analog Inputs											
0	None										
1	4 TC/Linear input (60mV) ¹										
Code Control Options											
0	None										
1	Current Limit and P, I, V Monitoring										
2	Current limit and feedback control V,I,P										
3	Current limit and feedback control V,I,P + V Load input										
4	Current limit and feedback control V,I,P+ Vload input; CT external inputs ²										
Code Auxiliary Output											
0	None			A	4 Direct analog outputs ¹						
R	4 Relays			T	4 Triac outputs ¹						
D	4 Digital outputs			W	3 Analog outputs 12 bit 0-10V, 4-20mA ²						
Code Diagnostic/Alarm option											
1	Partial or Total Load Failure Alarm (HB) & Shorted SCR Detection										
Code Fusing											
0	None										
1	Internal										
Code Communications											
00	None			EP	Ethernet IP						
MR	Modbus RTU/RS485			ET	Modbus TCP/IP						
PB	Profibus DP			PS	Profinet w/ Stack Protocol 3.12.0.5						
CN	CANopen			ES	EtherCAT w/ Stack Protocol 4.7.0.3						

CFW1- 040 48- 0 0 2 R 0- 0 MR Typical Model Number

¹Not available on models with rated current >=400A

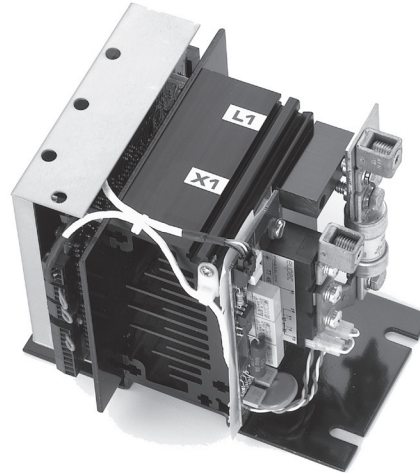
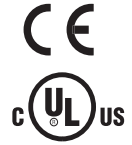
²Not available on models with rated current <=250A

³UL only recognizes up to 600V

Accessories

Description	PCN
Communication Cable, USB to RS485	309180
CFW-OP Operator Terminal	307109

MiniMax 1 Single Phase SCR Power Pak



- 120-600 VAC @ 30-75 Amp
- Automatic 50/60HZ Line Sensing

User Adjustable Firing Modes Include:

- On/Off Control Inputs:
120VAC, 240VAC, 5-32 VDC Dry Contact Closure
- Proportional Zero Cross or DOT Firing Power Control

Inputs:

- 4-20mA, 0-5 VDC, 1-5 VDC, 0-10 VDC
- Remote Manual Adjust, Remote Auto Manual Switch
- Flexible I/O Power Wiring
- Shorted SCR Detection (option)
- Easy Customer Interface
- Remote Stop
- Electronically Protected with Temperature Warning and Shutdown System
- Compact Size and Construction
- dv/dt Transient Voltage Protection
- MOV Protection
- DOT Fired with Single or Three Cycle Resolution (Jumper selectable)

Description

The MiniMax Series is specifically designed for the OEM market. The plug-in options, flexible I/O power wiring, space saving footprint, I²t fusing and universal approvals make it an excellent candidate for your product.

The Chromalox Model MiniMax 1 Single Phase Solid State SCR Power Controller is a highly versatile power pak with optional plug-in Shorted SCR Detection Boards. Firing modes can be switched between On/Off and proportional Zero Cross or DOT Firing power control at any time based on process needs.

Chromalox' exclusive DOT (Demand Oriented Transfer) firing switches the fewest number of cycles to provide the most precise zero cross-over control. At 50% output the unit's output alternates between one electrical cycle on and one cycle off. At 51% the output continues with one cycle on / one cycle off and gradually integrates one extra "on" cycle for the additional one percent. With the exception of phase angle firing, DOT firing is the most precise method of SCR control. DOT firing is preferred in many applications because phase angle firing creates unwanted RFI. DOT is excellent for applications where consistent heater/process temperature control is critical.

Electrical Features

- SCRs PIV 1500V Minimum (1400 Volts on 600 Volt model)
- Isolated Semiconductor Power Blocks are used on all Current Ratings
- I²t Fusing

Safety Features

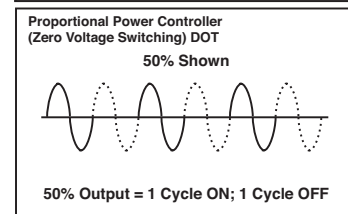
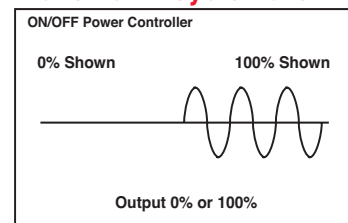
Personnel Safety

- Ground Potential Heat Sink
- SCR to Heat Sink Isolation

Equipment/Process Safety

- Input to Output Isolation
- dv/dt Transient Voltage Protection
- I²t Fusing for SCR Protection
- Remote Stop
- Optional Shorted SCR Detection
- MOV

Wave Form Cycle Rate



Applications

- Resistive Heaters
- Electric Ovens
- Furnaces
- Kilns
- Environmental Chambers

Mechanical Features

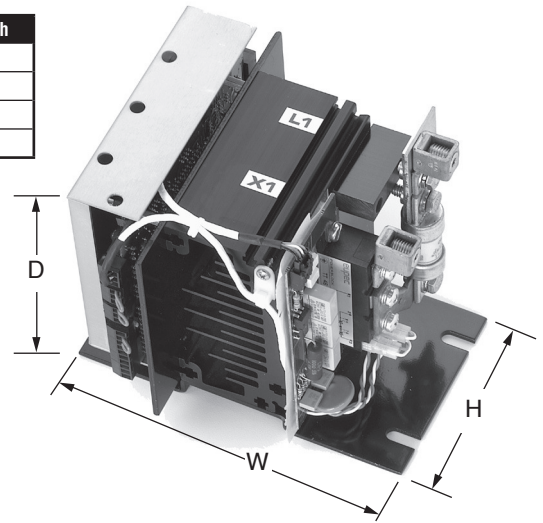
- LED Indication of Firing
- Customer Control Connections are made on a Plug-In Screw Type Terminal Block
- Optional Remote Manual Adjust and Auto/Manual Switch
- Heatsink Mounted Temperature Sensor

MiniMax 1 Single Phase SCR Power Pak *(cont'd.)*

Mounting Dimensions

MiniMax 1 Open

Amps	Height H	Width W	Depth D
30	6.25	7.5	6
50	6.25	7.5	6.5
75	6.25	9.5	7.5



Ordering Information

Complete the model number using the matrix provided.

- 1) SCR fusing is for semiconductor protection only, not wire protection.
- 2) Fuses are supplied loose for 575/600 VAC applications.
- 3) Potentiometer supplied loose for customer mounting.

Note:
Storage Temperature 14°F to 158°F (-10°C to 70°C).

CE application requires filters.

Chromalox Part Numbers

0005-60055 — Line filter, single phase, 230 VAC

0005-60057 — Line filter, 120-230 VAC

CE application requires filter.

Model SCR Power Pack

Mmax 1 Single Phase SCR Power Controller Complete with Lugs and I²T Fusing^{1, 2}

Code Control Configuration

- 5** Proportional Control, DOT Zero-Crossover Firing, Command Input Signals: 4-20mA, 0-5VDC, 1-5VDC (via Modbus RTU/485 only), 0-10VDC, Remote 0-1000 OHM Potentiometer w/Manual Override, Modbus RTU/RS485 Communications. RTD Heat Sink Temperature Sensor with Two Set-Points, Automatic Line Sensing 50/60HZ, Remote Permissive Shutdown Input, Form "C" Dry Contact Alarm Output, Staged Heating w/Digital Calibration Zero / Span Adjustments(4-8mA, 8-12mA, 12-16mA, 16-20mA(via Modbus RTU/RS485 only), LED Diagnostics: Command Input, Main/Trigger Boards Running, SCR Status per Phase, Diagnostic Kit via Modbus RTU/RS485: Highest Heat Sink Temperature, Last Heat Sink Temperature, Highest and Lowest Ambient Temperature, Line Frequency Monitoring, Third Party Certifications: UL, cUL, CE, DEMKO (650A and below).

Code Current at 50°C (122°F) Ambient

- 01** 30 Amp
02 50 Amp
03 75 Amp

Code Line Voltage

- 1** 120 - 480 VAC
2 575/600 VAC²
3 50/60 Hz *For CE, 50 Hz Limited to 400V

Code Instrument Power (10 Va Required)

- 1** 120 to 240 VAC 50/60Hz

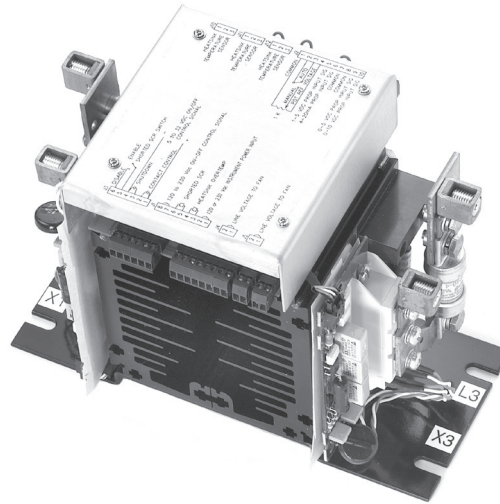
Code Remote Manual Adjust/Auto Manual Switch³

- 0** None
1 Pot with 0 - 100% dial and local/Remote Switch, Single Turn 1K ohm Potentiometer (Proportional control only)

Mmax 1 - 5 01 1 1 0 Typical Model Number

MiniMax 2

Three Phase, 2-Leg SCR Power Pak



- 120-600 VAC @ 30-75 Amp
- Automatic 50/60HZ Line Sensing

User Adjustable Firing Modes Include:

- On/Off Control Inputs:
120VAC, 240VAC, 5-32 VDC Dry Contact Closure
Proportional Zero Cross or DOT Firing Power Control

Inputs:

4-20mA, 0-5 VDC, 1-5 VDC, 0-10 VDC

Remote Manual Adjust,
Remote Auto Manual Switch

- Flexible I/O Power Wiring
- Shorted SCR Detection (option)
- Easy Customer Interface
- Remote Stop
- Electronically Protected with Temperature Warning and Shutdown System
- Compact Size and Construction
- dv/dt Transient Voltage Protection
- MOV Protection
- DOT Fired with Single or Three Cycle Resolution (Jumper selectable)

Applications

- Resistive Heaters
- Electric Ovens
- Furnaces
- Kilns
- Environmental Chambers

Description

The MiniMax Series is specifically designed for the OEM market. The plug-in options, flexible I/O power wiring, space saving footprint, I²t fusing and universal approvals make it an excellent candidate for your product.

The MiniMax 2 is a Solid State, highly versatile power pak with optional plug-in and Shorted SCR Detection Boards. Firing modes can be switched between On/Off and proportional Zero Cross or DOT Firing power control at any time based on process needs.

Chromalox' exclusive DOT (Demand Oriented Transfer) firing switches the fewest number of cycles to provide the most precise zero cross-over control. At 50% output the unit's output alternates between three electrical cycles on and three cycles off. At 51% the output continues with three cycles on / three cycles off and gradually integrates three extra "on" cycle for the additional one percent. With the exception of phase angle firing, DOT firing is the most precise method of SCR control. DOT firing is preferred in many applications because phase angle firing creates unwanted RFI. DOT is excellent for applications where consistent heater/process temperature control is critical.

Mechanical Features

- LED Indication of Firing
- Customer Control Connections are made on a Plug-In Screw Type Terminal Block
- Optional Remote Manual Adjust and Auto/Manual Switch
- Heatsink Mounted Temperature Sensor

Electrical Features

- PIV 1200V Min at 480 VAC PIV 1500V Min at 600 VAC
- Isolated Semiconductor Power Blocks are used on all Current Ratings

Safety Features

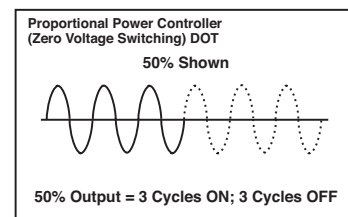
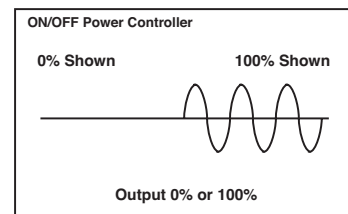
Personnel Safety

- Ground Potential Heat Sink
- SCR to Heat Sink Isolation

Equipment/Process Safety

- Input to Output Isolation
- dv/dt Transient Voltage Protection
- I²t Fusing for SCR Protection
- Remote Stop Input
- Optional Shorted SCR Detection

Wave Form Cycle Rate

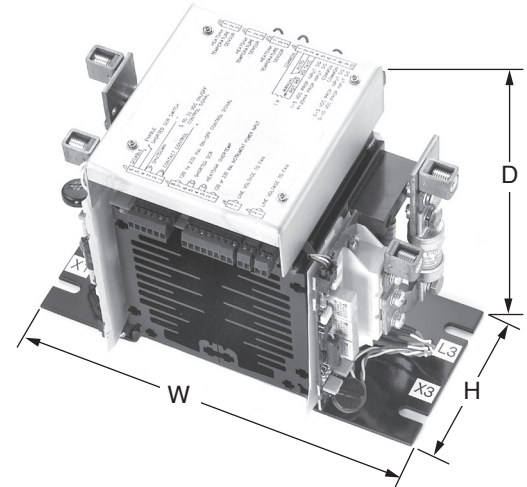


MiniMax 2 Three Phase, 2-Leg SCR Power Pak *(cont'd.)*

Mounting Dimensions

MiniMax 2 Open

Amps	Height H	Width W	Depth D
30	6.25	9.5	7.25
50	6.25	9.5	7.25
75	5	14	9.5



Ordering Information

Complete the model number using the matrix provided.

Model	SCR Power Pak
Mmax2	3 Phase SCR Power Controller complete with Lugs and I2T Fusing ^{1,2}
Code	Control Configuration
5	Proportional Control, DOT Zero-Crossover Firing, Command Input Signals: 4-20mA, 0-5VDC, 1-5VDC (via Modbus RTU/485 only), 0-10VDC, Remote 0-1000 OHM Potentiometer w/Manual Override, Modbus RTU/RS485 Communications, RTD Heat Sink Temperature Sensor with Two Set-Points, Automatic Line Sensing 50/60HZ, Remote Permissive Shutdown Input, Form "C" Dry Contact Alarm Output, Staged Heating w/Digital Calibration Zero / Span Adjustments (4-8mA, 8-12mA, 12-16mA, 16-20mA (via Modbus RTU/RS485 only)), LED Diagnostics: Command Input, Main/Trigger Boards Running, SCR Status per Phase, Diagnostic Kit via Modbus RTU/RS485: Highest Heat Sink Temperature, Last Heat Sink Temperature, Highest and Lowest Ambient Temperature, Line Frequency Monitoring, Third Party Certifications: UL, cUL, CE, DEMKO (650A and below).
	Code Current at 50°C (122°F) Ambient
	01 30 Amp
	02 50 Amp
	03 75 Amp
	Code Line Voltage
	1 120 - 480 VAC
	2 575/600 VAC ²
	3 50/60 Hz * For CE, 50 Hz Limited to 400V
	Code Instrument Power (10 Va Required)
	1 120 to 240VAC 50/60Hz
	Code Remote Man. Adjust/Auto Man. Switch³
	0 None
	1 Pot with 0-100% dial and local/Remote Switch, Single Turn 1K ohm Potentiometer (Proportional control only)
Mmax 2 -	5 01 1 1 0 Typical Model Number

Note:
Storage Temperature 14°F to 158°F (-10°C to 70°C).

CE Application requires filters.

Chromalox Part Numbers

0005-60056 — Line filter, three phase, 440 VAC

0005-60057 — Line filter, 120-230 VAC

CE application requires filter.

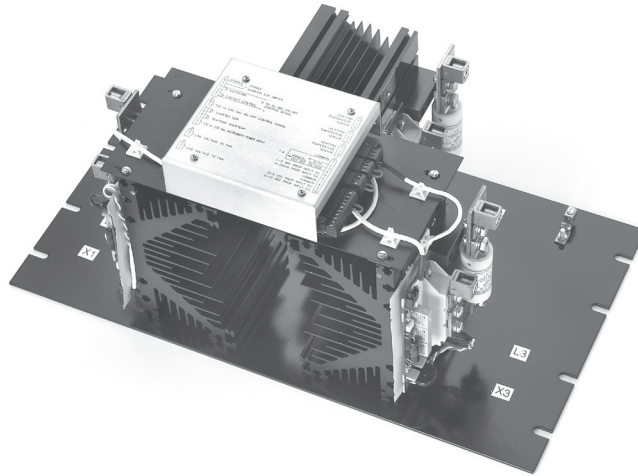
1) SCR fusing is for semiconductor protection only, not wire protection.

2) Fuses are supplied loose for 575/600 VAC applications.

3) Potentiometer supplied loose for customer mounting.

MiniMax 3

Three Phase, 3-Leg Power Pak



- 120-600 VAC @ 30-75 Amp
- * Automatic 50/60HZ Line Sensing

User Adjustable Firing Modes Include:

- On/Off Control Inputs:
120VAC, 240VAC, 5-32 VDC Dry Contact Closure
Proportional Zero Cross or DOT Firing Power Control

Inputs:

4-20mA, 0-5 VDC, 1-5 VDC, 0-10 VDC

Remote Manual Adjust,
Remote Auto Manual Switch

- Flexible I/O Power Wiring
- Shorted SCR Detection (option)
- Easy Customer Interface
- Remote Stop
- Electronically Protected with Temperature Warning and Shutdown System
- Compact Size and Construction
- dv/dt Transient Voltage Protection
- MOV Protection
- Six SCR Full Converter
- MOV Protection
- Three Phase Delta, 3-Wire Wye or 4-Wire Wye Connected Loads
- DOT Fired with Single or Three Cycle Resolution (Jumper selectable)

Applications

- Resistive Heaters
- Electric Ovens
- Furnaces
- Kilns
- Environmental Chambers

Description

The MiniMax Series is specifically designed for the OEM market. The plug-in options, flexible I/O power wiring, space saving footprint, I²t fusing and universal approvals make it an excellent candidate for your product.

The Chromalox Model MiniMax 3 is a Solid State, highly versatile power pak with optional plug-in Shorted SCR Detection Boards. Firing modes can be switched between On/Off and proportional Zero Cross or DOT Firing power control at any time based on process needs.

Chromalox' exclusive DOT (Demand Oriented Transfer) firing switches the fewest number of cycles to provide the most precise zero cross-over control. At 50% output the unit's output alternates between three electrical cycles on and three cycles off. At 51% the output continues with three cycles on / three cycles off and gradually integrates three extra "on" cycle for the additional one percent. With the exception of phase angle firing, DOT firing is the most precise method of SCR control. DOT firing is preferred in many applications because phase angle firing creates unwanted RFI. DOT is excellent for applications where consistent heater/process temperature control is critical.

Mechanical Features

- LED Indication of Firing
- Customer Control Connections are made on a Plug-In Screw Type Terminal Block
- Optional Remote Manual Adjust and Auto/Manual Switch
- Heatsink Mounted Temperature Sensor

Electrical Features

- PIV 1200V Min at 480 VAC PIV 1500V Min at 600 VAC
- Isolated Semiconductor Power Blocks are used on all Current Ratings

Safety Features

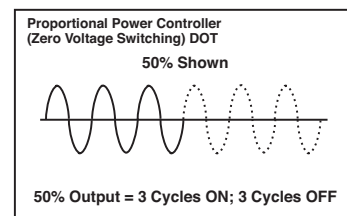
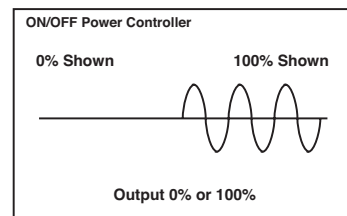
Personnel Safety

- Ground Potential Heat Sink
- SCR to Heat Sink Isolation

Equipment/Process Safety

- Input to Output Isolation
- dv/dt Transient Voltage Protection
- I²t Fusing for SCR Protection
- Remote Stop
- Optional Shorted SCR Detection

Wave Form Cycle Rate

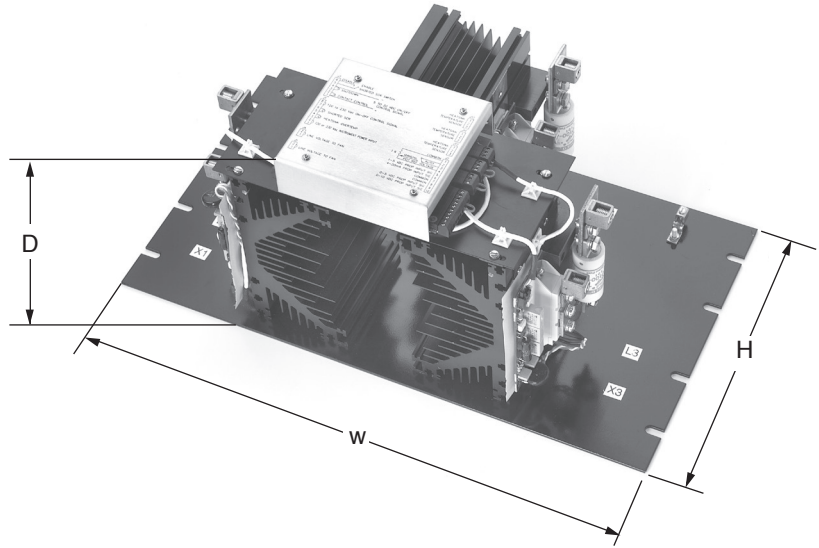


MiniMax 3 Three Phase, 3-Leg Power Pak (cont'd.)

Mounting Dimensions

MiniMax 3 Open

Amps	Height H	Width W	Depth D
30	10	14	7.75
50	10	14	7.75
75	10	14	9.5



Ordering Information

Complete the model number using the matrix provided.

- 1) SCR fusing is for semiconductor protection only, not wire protection.
- 2) Fuses are supplied loose for 575/600 VAC applications.
- 3) Potentiometer supplied loose for customer mounting.

Note:
Storage Temperature 14°F to 158°F (-10°C to 70°C).

CE Application requires filters.

Chromalox Part Numbers

0005-60056 — Line filter, three phase, 440 VAC

0005-60057 — Line filter, 120-230 VAC

CE application requires filter.

Model SCR Power Pak

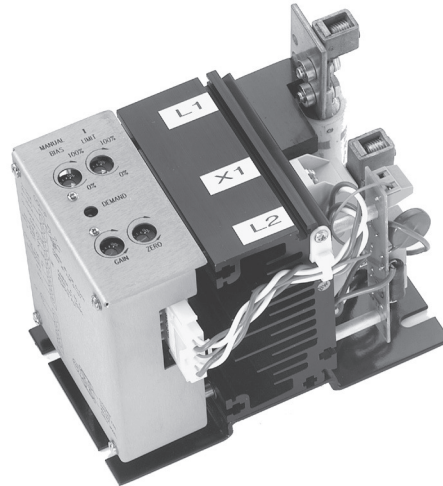
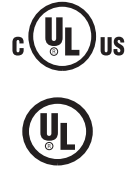
Mmax3 3 Phase, 3 Leg Power Controller Complete with Lugs and I²T Fusing

Code	Control Configuration
5	Proportional Control, DOT Zero-Crossover Firing, Command Input Signals: 4-20mA, 0-5VDC, 1-5VDC (via Modbus RTU/485 only), 0-10VDC, Remote 0-1000 OHM Potentiometer w/Manual Override, Modbus RTU/RS485 Communications. RTD Heat Sink Temperature Sensor with Two Set-Points, Automatic Line Sensing 50/60HZ, Remote Permissive Shutdown Input, Form "C" Dry Contact Alarm Output, Staged Heating w/Digital Calibration Zero / Span Adjustments(4-8mA, 8-12mA,12-16mA,16-20mA(via Modbus RTU/RS485 only), LED Diagnostics: Command Input, Main/Trigger Boards Running, SCR Status per Phase, Diagnostic Kit via Modbus RTU/RS485: Highest Heat Sink Temperature, Last Heat Sink Temperature, Highest and Lowest Ambient Temperature, Line Frequency Monitoring, Third Party Certifications: UL, cUL, CE, DEMKO (650A and below).
Code	Current at 50°C (122°F) Ambient
01	30 Amp
02	50 Amp
03	75 Amp
Code	Line Voltage
1	120 - 480 VAC
2	575/600 VAC ²
3	50/60 Hz For CE, 50 Hz Limited to 400V
Code	Instrument Power (10 Va Required)
1	120 to 240 VAC 50/60Hz
Code	Remote Manual Adjust/Auto Manual Switch
0	None
1	Pot with 0-100% dial and local/Remote Switch, Single Turn 1K ohm Potentiometer (Proportional control only)

Mmax3- 5 01 1 1 0 Typical Model Number

MiniMax 1P

Single Phase SCR Power Pak



- 120-600 VAC @ 30-75 Amp
- Phase Angle Firing
- Isolated Control Circuit Inputs:
0-5mA, 0-20mA,
0-50mA, 1-5mA
4-20mA, 10-50mA
0-5 VDC, 0-10 VDC
- Flexible I/O Power Wiring
- Optional Current Limit
- Easy Customer Interface
- Remote Shutdown
- Soft Start
- Line Voltage Compensation
- Compact Size and Construction
- dv/dt Transient Voltage Protection
- MOV Protection

Applications

- Resistive Heaters
- Electric Ovens
- Furnaces
- Kilns

Description

The MiniMax Series is specifically designed for the OEM market. The current limit, soft start option, flexible I/O power wiring, space saving footprint, I²t fusing with UL and cUL approvals make it an excellent candidate for your product.

The Chromalox Model MiniMax 1P utilizes Phase Angle firing to modulate power to an inductive or resistive load. Phase Angle control has the advantage of proportioning every cycle thereby providing very fine resolution of power. Fast responding loads in which the resistance changes as a function of temperature are excellent candidates for Phase Angle control. The MiniMax Soft Start feature assures that the load power is gradually increased from zero to the value set by the command signal in the event of a power interruption. In addition to the Soft Start feature, optional Current Limit is used to protect the load, fuses, SCR controller, and the total system from large surge currents that could occur at startup. Chromalox MiniMax offers separate and adjustable Zero, Gain, Manual Bias, and Current Limit potentiometers for ease of calibration. Screw type plug-in connectors for input signals, remote shutdown, and optional Remote Manual Bias are standard for easy customer interface.

Mechanical Features

- LED Indication of Firing
- Customer Control Connections are made on a Plug-In Screw Type Terminal Block
- Optional Remote Manual Adjust
- Heatsink Mounted Temperature Thermostat NC
- Built-In Power Distribution

Electrical Features

- SCRs PIV 1500V Minimum (1400 Volts on 600 Volt model)
- Isolated Semiconductor Power Blocks are used on all Current Ratings
- Optional I²t Fusing

Safety Features

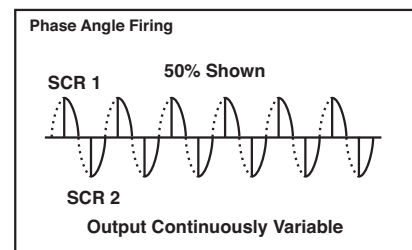
Personnel Safety

- Ground Potential Heat Sink
- SCR to Heat Sink Isolation

Equipment/Process Safety

- Input to Output Isolation
- dv/dt Transient Voltage Protection
- I²t Fusing for SCR Protection
- Remote Shutdown
- MOV
- Current Limit
- Soft Start

Wave Form Cycle Rate



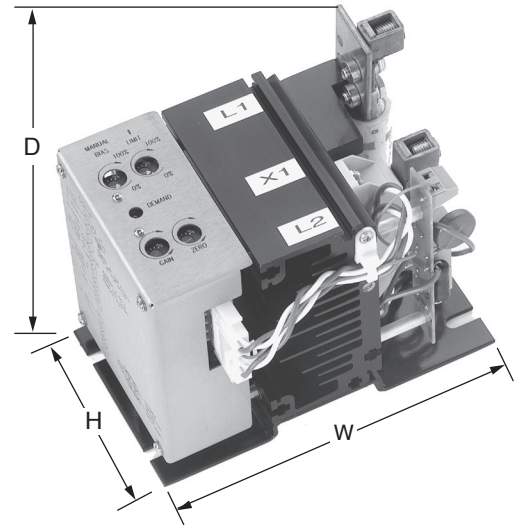
MiniMax 1P

Single Phase SCR Power Pak (cont'd.)

Mounting Dimensions

MiniMax 1P Open

Amps	Height	Width	Depth
30	5	7.5	6
50	5	7.5	6.5
75	5	9.5	7.5



Ordering Information

Complete the model number using the matrix provided.

Model	1P Power Pak
Mmax 1P	Single Phase SCR Power Controller Complete with Lugs and I ² T Fusing ^{1,2}
Code	Control Configuration
1	Phase Angle Control (Accepts: 1-5/0-5mA, 4-20/0-20mA, 10-50/0-50mA)
2	Phase Angle Control with Current Limit
Code	Current at 50°C (122°F) Ambient
01	30 Amp
02	50 Amp
03	75 Amp
Code	Voltage
1	120 VAC
2	208 VAC
3	240 VAC
4	277 VAC
5	480 VAC
6	575/600 VAC ²
Code	Remote Manual Adjust/Auto Manual Switch³
0	None
1	Pot with 0-100% dial and local/Remote Switch, Single Turn 1K ohm Potentiometer
Mmax 1P -	2 01 1 1 Typical Model Number

- 1) SCR fusing is for semiconductor protection only, not wire protection.
- 2) Fuses are supplied loose for 575/600 VAC applications.
- 3) Potentiometer supplied loose for customer mounting.

Note:

Storage temperature 14°F to 158°F (-10°C to 70°C).
SCR units calibrated for 4-20mA input.

MaxPac I Single Phase SCR Power Pak

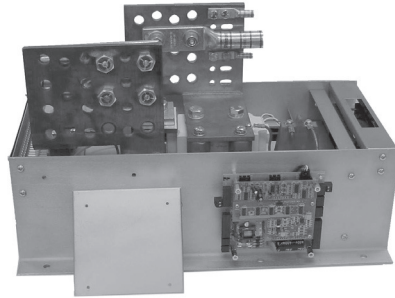
- 120-600 VAC @ 100-1200 Amp
- Automatic 50/60HZ Line Sensing

User Adjustable Firing Modes Include:

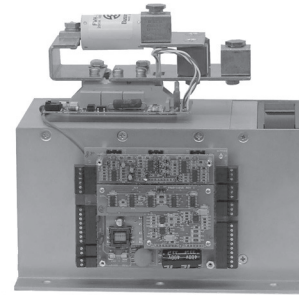
- On/Off Control Inputs:
120VAC, 240VAC, 5-32 VDC Dry Contact Closure
 - Proportional Zero Cross or DOT Firing Power Control
- Inputs:
- 4-20mA, 0-5 VDC, 1-5 VDC, 0-10 VDC
- Flexible I/O Power Wiring
 - Built-In Power Distribution
 - Shorted SCR Detection (Option)
 - Easy Customer Interface
 - Remote Stop
 - Electronically Protected with Temperature Warning and Shutdown System
 - Compact Size and Construction
 - Touch-Safe (Option on 100 to 650 Amp Models)
 - dv/dt Transient Voltage Protection
 - MOV Protection
 - Single or Three Cycle Resolution (Jumper Selectable)

Applications

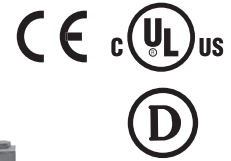
- Resistive Heaters
- Electric Ovens
- Furnaces
- Kilns
- Environmental Chambers



Touch Safe
*Shown without cover



Open Design



Description

The MaxPac Series is specifically designed for the OEM market. The plug-in options, flexible I/O power wiring, space saving footprint, optional lug kits, I²t fusing and universal approvals make it an excellent candidate for your product.

The Chromalox Model MaxPac I Single Phase Solid State SCR Power Controller is a highly versatile power pak with optional plug-in Shorted SCR Detection Boards. Firing modes can be switched between On/Off and proportional Zero Cross or DOT Firing power control at any time based on process needs.

Chromalox's exclusive DOT (Demand Oriented Transfer) firing switches the fewest number of cycles to provide the most precise zero cross-over control. At 50% output the unit's output alternates between one electrical cycle on and one cycle off. At 51% the output continues with one cycle on / one cycle off and gradually integrates one extra "on" cycle for the additional one percent. With the exception of phase angle firing, DOT firing is the most precise method of SCR control. DOT firing is preferred in many applications because phase angle firing creates unwanted RFI. DOT is excellent for applications where consistent heater/process temperature control is critical.

Mechanical Features

- LED Indication of Firing
- Customer Control Connections are made on a Plug-In Screw Type Terminal Block
- Optional Remote Manual Adjust and Auto/Manual Switch
- Heatsink Mounted Temperature Sensor
- Built-In Power Distribution

Electrical Features

- SCRs PIV 1200V Minimum (1500 Volts on 600 Volt model)
- Isolated Semiconductor Power Blocks are used on all Current Ratings up to 650 Amps
- UL 508 for units 650 Amps and under

Safety Features

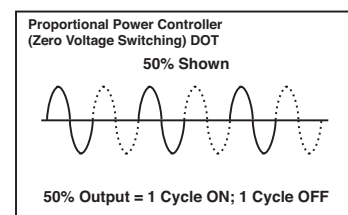
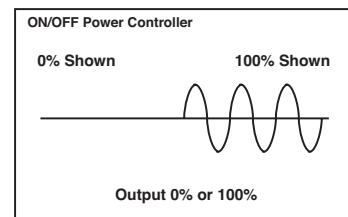
Personnel Safety

- Ground Potential Heat Sink up to 650 Amps
- SCR to Heat Sink Isolation up to 650 Amps
- Touch-Safe Option
- CE Compliance; Line filters are required

Equipment/Process Safety

- Input to Output Isolation
- dv/dt Transient Voltage Protection
- Optional I²t Fusing
- Remote Stop
- Optional Shorted SCR Detection
- MOV

Wave Form Cycle Rate



MaxPac I Single Phase SCR Power Pak *(cont'd.)*

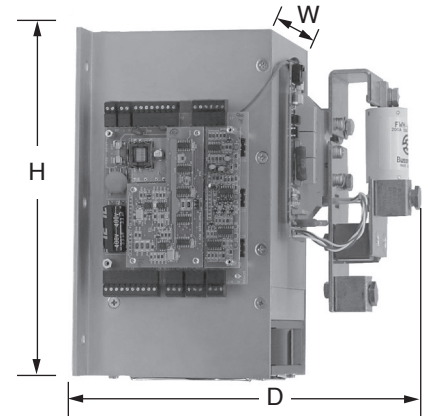
Mounting Dimensions

MaxPac I Open

Amps	Width	Height	Depth
100	7.75	9.75	10
150	7.75	9.75	10
200	7.75	9.75	10
300	7.75	9.75	10
400	9.5	14.75	11
550	11	17.75	11
650	11	17.75	11
800	17	27	17
1000	17	27	17
1200	17	27	17

MaxPac I Closed

Amps	Width	Height	Depth
100	9.5	14.75	11.8
150	9.5	14.75	11.8
200	9.5	14.75	11.8
300	9.5	14.75	11.8
400	9.5	14.75	11.8
550	11	17.75	11.8
650	11	17.75	11.8



Ordering Information

Complete the model number using the matrix provided.

Model	SCR Power Pack																																				
MXPC I	Single Phase SCR Power Pack																																				
Code	Control Configuration																																				
5	Proportional Control, DOT Zero-Crossover Firing, Command Input Signals: 4-20mA, 0-5VDC, 1-5VDC (via Modbus RTU/485 only), 0-10VDC, Remote 0-1000 OHM Potentiometer w/Manual Override, Modbus RTU/RS485 Communications. RTD Heat Sink Temperature Sensor with Two Set-Points, Automatic Line Sensing 50/60HZ, Remote Permissive Shutdown Input, Form "C" Dry Contact Alarm Output, Staged Heating w/Digital Calibration Zero / Span Adjustments(4-8mA, 8-12mA,12-16mA,16-20mA (via Modbus RTU/RS485 only), LED Diagnostics: Command Input, Main/Trigger Boards Running, SCR Status per Phase, Diagnostic Kit via Modbus RTU/RS485: Highest Heat Sink Temperature, Last Heat Sink Temperature, Highest and Lowest Ambient Temperature, Line Frequency Monitoring, Third Party Certifications: UL, cUL, CE, DEMKO (650A and below).																																				
	<table border="1"> <thead> <tr> <th>Code</th> <th>Current at 50°C (122°F)</th> </tr> </thead> <tbody> <tr><td>01</td><td>100 Amp Open Design</td></tr> <tr><td>02</td><td>100 Amp Touch Safe Design</td></tr> <tr><td>03</td><td>150 Amp OpenDesign</td></tr> <tr><td>04</td><td>150 Amp Touch Safe Design</td></tr> <tr><td>05</td><td>200 Amp OpenDesign</td></tr> <tr><td>06</td><td>200 Amp Touch Safe Design</td></tr> <tr><td>07</td><td>300 Amp OpenDesign</td></tr> <tr><td>08</td><td>300 Amp Touch Safe Design</td></tr> <tr><td>09</td><td>400 Amp OpenDesign</td></tr> <tr><td>10</td><td>400 Amp Touch Safe Design</td></tr> <tr><td>11</td><td>550 Amp OpenDesign</td></tr> <tr><td>12</td><td>550 Amp Touch Safe Design</td></tr> <tr><td>13</td><td>650 Amp OpenDesign</td></tr> <tr><td>14</td><td>650 Amp Touch Safe Design</td></tr> <tr><td>15</td><td>800 Amp OpenDesign</td></tr> <tr><td>16</td><td>1000 Amp OpenDesign</td></tr> <tr><td>17</td><td>1200 Amp OpenDesign</td></tr> </tbody> </table>	Code	Current at 50°C (122°F)	01	100 Amp Open Design	02	100 Amp Touch Safe Design	03	150 Amp OpenDesign	04	150 Amp Touch Safe Design	05	200 Amp OpenDesign	06	200 Amp Touch Safe Design	07	300 Amp OpenDesign	08	300 Amp Touch Safe Design	09	400 Amp OpenDesign	10	400 Amp Touch Safe Design	11	550 Amp OpenDesign	12	550 Amp Touch Safe Design	13	650 Amp OpenDesign	14	650 Amp Touch Safe Design	15	800 Amp OpenDesign	16	1000 Amp OpenDesign	17	1200 Amp OpenDesign
Code	Current at 50°C (122°F)																																				
01	100 Amp Open Design																																				
02	100 Amp Touch Safe Design																																				
03	150 Amp OpenDesign																																				
04	150 Amp Touch Safe Design																																				
05	200 Amp OpenDesign																																				
06	200 Amp Touch Safe Design																																				
07	300 Amp OpenDesign																																				
08	300 Amp Touch Safe Design																																				
09	400 Amp OpenDesign																																				
10	400 Amp Touch Safe Design																																				
11	550 Amp OpenDesign																																				
12	550 Amp Touch Safe Design																																				
13	650 Amp OpenDesign																																				
14	650 Amp Touch Safe Design																																				
15	800 Amp OpenDesign																																				
16	1000 Amp OpenDesign																																				
17	1200 Amp OpenDesign																																				
MXPC I-	5 03 (Continued on next page)																																				

Note: CE approval for all units, line filters required. UL Listed for units 650 amps and under.

CONTROLS

MaxPac I Single Phase SCR Power Pak (cont'd.)

Ordering Information (cont'd.)

Complete the model number using the matrix provided.

Crimp Lug Chart		
Chromalox #	Panduit #	Conductor Size
0135-10002	LCD8-14A-L	#8 AWG
0135-10003	LCD6-14A-L	#6 AWG or #6 Weld
0135-10004	LCD4-14A-L	#4 AWG or #4 Weld
0135-10005	LCD2-56B-Q	#2 AWG
0135-10006	LCD1-56C-E	#1 AWG or #2 Weld
0135-10007	LCD1/0-12-X	#1/0 AWG or #1 Weld
0135-10008	LCD2/0-12-X	#2/0 AWG or #1/0 Weld
0135-10009	LCD3/0-12-X	#3/0 AWG or #2/0 Weld
0135-10010	LCD4/0-12-X	#4/0 AWG or #3/0 Weld
0135-10011	LCD250-12-X	250 MCM or #4/0 Weld
0135-10012	LCD300-12-X	300 MCM
0135-10013	LCD350-12-6	350 MCM
0135-10014	LCD400-12-6	400 MCM
0135-10015	LCD500-12-6	500 MCM

Model **SCR Power Pack**

MXPC 1 Single Phase SCR Power Pack

Code Line Voltage

1	120 VAC - 480 VAC
2	575/600 VAC
3	50/60 Hz

* For CE, 50 Hz Limited to 400V

Code Instrument Power (100 Va Required)

1	120 VAC 50/60 Hz
2	230 VAC 50/60 HZ

Code Compression Lug Kits (Open Design up to 300 Amps)
For Other Ranges See Crimp Lug Chart

L0	None (Select for all Touch Safe Design and for over 300 Amp Open Design)
L1	100-150 Amp PAK (#2 - 4/0)/connection
L2	200-300 Amp PAK (1/0 - 500mcm)/connection

Code Fusing Option ⁽¹⁾

F00	None
For 500 VAC Applications, Select One	
F01	100-150 Amp PAK (200 Amp Fuse)
F02	200 Amp PAK (250 Amp Fuse)
F03	300 Amp PAK (400 Amp Fuse)
F04	400 Amp PAK (500 Amp Fuse)
F05	550 Amp PAK (700 Amp Fuse)
F06	650 Amp PAK (800 Amp Fuse)
F07	800 Amp PAK (1000 Amp Fuse)
F08	1000 Amp PAK (1200 Amp Fuses)
F09	1200 Amp PAK (Two 1000 Amp Fuses)

For 575/600 VAC Applications, Select One ⁽²⁾

F10	100 Amp PAK (125 Amp Fuse)
F11	150 Amp PAK (175 Amp Fuse)
F12	200 Amp PAK (250 Amp Fuse)
F13	300 Amp PAK (400 Amp Fuse)
F14	400 Amp PAK (500 Amp Fuse)
F15	550 Amp PAK (700 Amp Fuse)
F16	650 Amp PAK (800 Amp Fuse)
F17	800 Amp PAK (1000 Amp Fuse)
F18	1000 Amp PAK (1200 Amp Fuse)
F19	1200 Amp PAK (Two 1000 Amp Fuses)

Remote Manual Adjust/Auto Manual Switch

0	None
1	Pot with 0 - 100% dial and Local/Remote Switch(2) Single Turn 1KΩ Potentiometer

1) SCR Fusing is for semiconductor protection only, not wire protection.

2) Supplied Loose for Customer Mounting.

Note:

Storage Temperature 14°F to 158°F (-10°C to 70°C). CE application requires filters.

Chromalox Part Numbers

0005-60056 - Line filter, single phase, 440 VAC
0005-60057 - Line filter, 120-230 VAC

(cont'd.) 1 1 L1 F01 1 Typical Model Number

Current Rating	Open Design		Closed Design	
	Input Bus	Output Bus	Input Bus	Output Bus
100, 150, 200, 300	1 Crimp Lug / Phase	1 Crimp Lug / Phase	3 / Phase*	3 / Phase*
400	3 / Phase*	10 / Phase*	3 / Phase*	10 / Phase*
550, 650	4 / Phase*	12 / Phase*	4 / Phase*	12 / Phase*
800, 1200	4 / Phase*	12 / Phase*	N/A	N/A

* Accepts up to this number of NEMA standard lugs (See Crimp Lug Chart)

MaxPac II

Three Phase, 2-Leg SCR Power Pak

- 120-600 VAC @ 100-1200 Amp
- Automatic 50/60HZ Line Sensing

User Adjustable Firing Modes Include:

- On/Off Control Inputs: 120VAC, 240VAC, 5-32 VDC Dry Contact Closure
- Proportional Zero Cross or DOT Firing Power Control

Inputs:

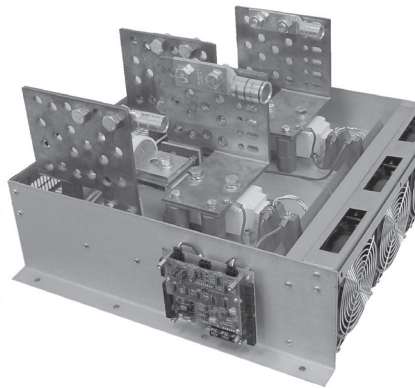
4-20mA, 0-5 VDC, 1-5 VDC, 0-10 VDC

Remote Manual Adjust, Remote Auto Manual Switch

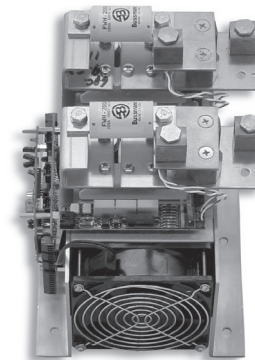
- Flexible I/O Power Wiring
- Built-In Power Distribution
- Shorted SCR Detection (Option)
- Easy Customer Interface
- Remote Stop
- Electronically Protected with Temperature Warning and Shutdown System
- Compact Size and Construction
- Touch-Safe (Option on 100 to 650 Amp Models)
- dv/dt Transient Voltage Protection
- MOV Protection
- Single or Three Cycle Resolution (Jumper selectable)

Applications

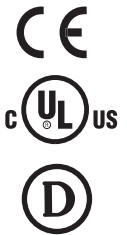
- Resistive Heaters
- Electric Ovens
- Furnaces
- Kilns
- Environmental Chambers



Touch Safe Design
Shown without cover



Open Design



Description

The MaxPac Series is specifically designed for the OEM market. The plug-in options, flexible I/O power wiring, space saving footprint, optional lug kits, I²t fusing and universal approvals make it an excellent candidate for your product.

The MaxPac II is a Solid State, highly versatile power pak with optional plug-in Shorted SCR Detection Boards. Firing modes can be switched between On/Off and proportional Zero Cross or DOT Firing power control at any time based on process needs.

Chromalox's exclusive DOT (Demand Oriented Transfer) firing switches the fewest number of cycles to provide the most precise zero cross-over control. At 50% output the unit's output alternates between three electrical cycles on and three cycles off. At 51% the output continues with three cycles on / three cycles off and gradually integrates three extra "on" cycle for the additional one percent. With the exception of phase angle firing, DOT firing is the most precise method of SCR control. DOT firing is preferred in many applications because phase angle firing creates unwanted RFI. DOT is excellent for applications where consistent heater/process temperature control is critical.

Mechanical Features

- LED Indication of Firing
- Customer Control Connections are made on a Plug-In Screw Type Terminal Block
- Optional Remote Manual Adjust and Auto/Manual Switch
- Heatsink Mounted Temperature Sensor
- Built-In Power Distribution

Electrical Features

- PIV 1200V Min at 480 VAC PIV 1500V Min at 600 VAC
- Isolated Semiconductor Power Blocks are used on all Current Ratings up to 650 Amps

Safety Features

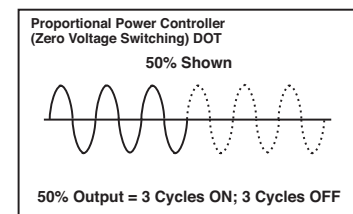
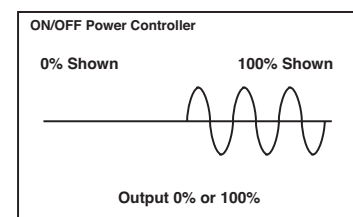
Personnel Safety

- Ground Potential Heat Sink up to 650 Amps
- SCR to Heat Sink Isolation up to 650 Amps
- Touch-Safe Option
- UL 508 Listed for units 650 Amps and under
- CE Approval for all units with line filters required.

Equipment/Process Safety

- Input to Output Isolation
- dv/dt Transient Voltage Protection
- Optional I²t Fusing
- Remote Stop
- Optional Shorted SCR Detection

Wave Form Cycle Rate



CONTROLS

MaxPac II

Three Phase, 2-Leg SCR Power Pak *(cont'd.)*

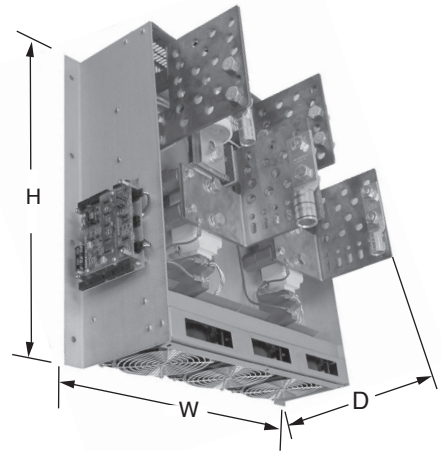
Mounting Dimensions

MaxPac II Open

Amps	Width	Height	Depth
	W	H	D
100	9	9.75	10
150	9	9.75	10
200	9	9.75	10
300	13	14.75	10
400	16	14.75	11
550	19	17.75	11
650	19	17.75	11
800	27	27	17
1000	27	27	17
1200	27	27	17

MaxPac II Closed

Amps	Width	Height	Depth
	W	H	D
100	16	14.75	11.8
150	16	14.75	11.8
200	16	14.75	11.8
300	16	14.75	11.8
400	16	14.75	11.8
550	19	17.75	11.8
650	19	17.75	11.8



Ordering Information

Complete the model number using the matrix provided.

Model SCR Power Pack

MXPC II 3 Phase SCR Power Pack

Code Control Configuration

5 Proportional Control, DOT Zero-Crossover Firing, Command Input Signals: 4-20mA, 0-5VDC, 1-5VDC (via Modbus RTU/485 only), 0-10VDC, Remote 0-1000 OHM Potentiometer w/Manual Override, Modbus RTU/RS485 Communications. RTD Heat Sink Temperature Sensor with Two Set-Points, Automatic Line Sensing 50/60HZ, Remote Permissive Shutdown Input, Form "C" Dry Contact Alarm Output, Staged Heating w/Digital Calibration Zero / Span Adjustments(4-8mA, 8-12mA, 12-16mA, 16-20mA(via Modbus RTU/RS485 only), LED Diagnostics: Command Input, Main/Trigger Boards Running, SCR Status per Phase, Diagnostic Kit via Modbus RTU/RS485: Highest Heat Sink Temperature, Last Heat Sink Temperature, Highest and Lowest Ambient Temperature, Line Frequency Monitoring, Third Party Certifications: UL, cUL, CE, DEMKO (650A and below).

Code Current at 50°C (122°F)

Code	Current	Design
01	100 Amp	Open Design
02	100 Amp	Touch Safe Design
03	150 Amp	OpenDesign
04	150 Amp	Touch Safe Design
05	200 Amp	OpenDesign
06	200 Amp	Touch Safe Design
07	300 Amp	OpenDesign
08	300 Amp	Touch Safe Design
09	400 Amp	OpenDesign
10	400 Amp	Touch Safe Design
11	550 Amp	OpenDesign
12	550 Amp	Touch Safe Design
13	650 Amp	OpenDesign
14	650 Amp	Touch Safe Design
15	800 Amp	OpenDesign
16	1000 Amp	OpenDesign
17	1200 Amp	OpenDesign

Note: CE approval, for all units with line filters required. UL Listed for units 650 amps and under.

MXPC II- 5 03 (Continued on next page)

CONTROLS

MaxPac II Three Phase, 2-Leg SCR Power Pak *(cont'd.)*

Ordering Information (cont'd.)

Complete the model number using the matrix provided.

Crimp Lug Chart		
Chromalox #	Panduit #	Conductor Size
0135-10002	LCD8-14A-L	#8 AWG
0135-10003	LCD6-14A-L	#6 AWG or #6 Weld
0135-10004	LCD4-14A-L	#4 AWG or #4 Weld
0135-10005	LCD2-56B-Q	#2 AWG
0135-10006	LCD1-56C-E	#1 AWG or #2 Weld
0135-10007	LCD1/0-12-X	#1/0 AWG or #1 Weld
0135-10008	LCD2/0-12-X	#2/0 AWG or #1/0 Weld
0135-10009	LCD3/0-12-X	#3/0 AWG or #2/0 Weld
0135-10010	LCD4/0-12-X	#4/0 AWG or #3/0 Weld
0135-10011	LCD250-12-X	250 MCM or #4/0 Weld
0135-10012	LCD300-12-X	300 MCM
0135-10013	LCD350-12-6	350 MCM
0135-10014	LCD400-12-6	400 MCM
0135-10015	LCD500-12-6	500 MCM

Model	SCR Power Pack					
MXPC II	3 Phase SCR Power Pack					
Code	Line Voltage					
1	120 VAC - 480 VAC					
2	575/600 VAC					
Code	Instrument Power (100 Va Required)					
1	120 VAC 50/60 Hz					
2	230 VAC 50/60 HZ					
Code	Compression Lug Kits (Open Design up to 300 Amps) For Other Ranges See Crimp Lug Chart					
L0	None (Select for all Touch Safe Design and for over 300 Amp Open Design)					
L1	100-150 Amp PAK (#2 - 4/0)/connection					
L2	200-300 Amp PAK (1/0 - 500mcm)/connection					
Code	Fusing Option ⁽¹⁾					
F00	None					
For <500 VAC Applications, Select One						
F01	100-150 Amp PAK (200 Amp Fuse)					
F02	200 Amp PAK (250 Amp Fuse)					
F03	300 Amp PAK (400 Amp Fuse)					
F04	400 Amp PAK (500 Amp Fuse)					
F05	550 Amp PAK (700 Amp Fuse)					
F06	650 Amp PAK (800 Amp Fuse)					
F07	800 Amp PAK (1000 Amp Fuse)					
F08	1000 Amp PAK (1200 Amp Fuses)					
F09	1200 Amp PAK (Two 1000 Amp Fuses)					
For 575/600 VAC Applications, Select One ⁽²⁾						
F10	100 Amp PAK (125 Amp Fuse)					
F11	150 Amp PAK (175 Amp Fuse)					
F12	200 Amp PAK (250 Amp Fuse)					
F13	300 Amp PAK (400 Amp Fuse)					
F14	400 Amp PAK (500 Amp Fuse)					
F15	550 Amp PAK (700 Amp Fuse)					
F16	650 Amp PAK (800 Amp Fuse)					
F17	800 Amp PAK (1000 Amp Fuse)					
F18	1000 Amp PAK (1200 Amp Fuse)					
F19	1200 Amp PAK (Two 1000 Amp Fuses)					
Remote Manual Adjust/Auto Manual Switch						
0	None					
1	Pot with 0 - 100% dial and Local/Remote Switch(2) Single Turn 1KΩ Potentiometer					
(cont'd.)	2	1	L1	F01	1	Typical Model Number

- 1) SCR Fusing is for semiconductor protection only, not wire protection.
- 2) Supplied Loose for Customer Mounting.

Note:

Storage Temperature 14°F to 158°F (-10°C to 70°C). CE application requires filters.

Chromalox Part Numbers

0005-60056 - Line filter, three phase, 440 VAC
0005-60057 - Line filter, 120-230 VAC

Current Rating	Open Design		Closed Design	
	Input Bus	Output Bus	Input Bus	Output Bus
100, 150, 200, 300	1 Crimp Lug / Phase	1 Crimp Lug / Phase	3 / Phase*	3 / Phase*
400	3 / Phase*	10 / Phase*	3 / Phase*	10 / Phase*
550, 650	4 / Phase*	12 / Phase*	4 / Phase*	12 / Phase*
800, 1200	4 / Phase*	12 / Phase*	N/A	N/A

* Accepts up to this number of NEMA standard lugs (See Crimp Lug Chart)

MaxPac III Three Phase, 3-Leg Power Pak

- 120-600 VAC @ 100-1200 Amp
- Automatic 50/60HZ Line Sensing

User Adjustable Firing Modes Include:

- On/Off Control Inputs: 120VAC, 240VAC, 5-32 VDC Dry Contact Closure
- Proportional Zero Cross or DOT Firing Power Control

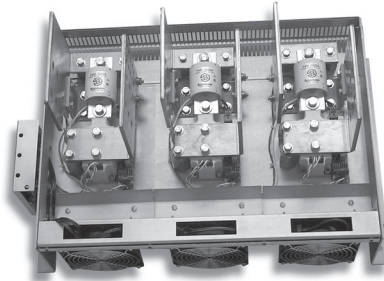
Inputs:

- 4-20mA, 0-5 VDC, 1-5 VDC, 0-10 VDC Remote Manual Adjust, Remote Auto Manual Switch

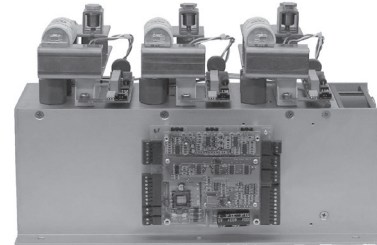
- Flexible I/O Power Wiring
- Built-In Power Distribution
- Shorted SCR Detection (option)
- Easy Customer Interface
- Remote Stop
- Electronically Protected with Temperature Warning and Shutdown System
- Compact Size and Construction
- Touch-Safe (option on 100 to 650 Amp models)
- dv/dt Transient Voltage Protection
- MOV Protection
- Six SCR Full Converter
- MOV Protection
- Three Phase Delta, 3-Wire Wye or 4-Wire Wye Connected Loads
- Single or Three Cycle Resolution (Jumper selectable)

Applications

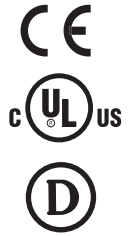
- Resistive Heaters
- Electric Ovens
- Furnaces
- Kilns
- Environmental Chambers



Touch Safe Design
Shown without cover



Open Design



Description

The MaxPac Series is specifically designed for the OEM market. The plug-in options, flexible I/O power wiring, space saving footprint, optional lug kits, I²t fusing and universal approvals make it an excellent candidate for your product.

The Chromalox Model MaxPac III is a Solid State, highly versatile power pak with optional plug-in Shorted SCR Detection Boards. Firing modes can be switched between On/Off and proportional Zero Cross or DOT Firing power control at any time based on process needs.

Chromalox's exclusive DOT (Demand Oriented Transfer) firing switches the fewest number of cycles to provide the most precise zero cross-over control. At 50% output the unit's output alternates between three electrical cycles on and three cycles off. At 51% the output continues with three cycles on / three cycles off and gradually integrates three extra "on" cycle for the additional one percent. With the exception of phase angle firing, DOT firing is the most precise method of SCR control. DOT firing is preferred in many applications because phase angle firing creates unwanted RFI. DOT is excellent for applications where consistent heater/process temperature control is critical.

Mechanical Features

- LED Indication of Firing
- Customer Control Connections are made on a Plug-In Screw Type Terminal Block
- Optional Remote Manual Adjust and Auto/Manual Switch
- Heatsink Mounted Temperature Sensor
- Built-In Power Distribution

Electrical Features

- PIV 1200V Min at 480 VAC PIV 1500V Min at 600 VAC
- Isolated Semiconductor Power Blocks are used on all Current Ratings up to 650 Amps

Safety Features

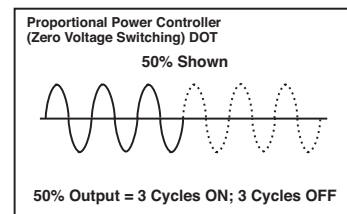
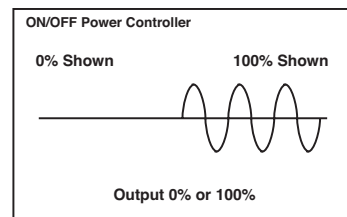
Personnel Safety

- Ground Potential Heat Sink up to 650 Amps
- SCR to Heat Sink Isolation up to 650 Amps
- UL 508 Listed for units 650 Amps and under
- CE Approval for all units with line filters required.

Equipment/Process Safety

- Input to Output Isolation
- dv/dt Transient Voltage Protection
- Optional I²t Fusing
- Remote Stop
- Optional Shorted SCR Detection

Wave Form Cycle Rate



MaxPac III Three Phase, 3-Leg Power Pak *(cont'd.)*

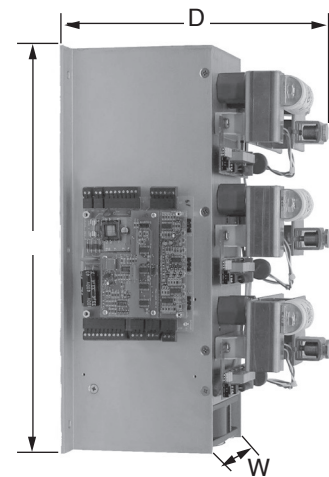
Mounting Dimensions

MaxPac III Open

Amps	Width	Height	Depth
	W	H	D
100	9	14.75	10
150	9	14.75	10
200	9	14.75	10
300	22.75	14.75	10
400	22.75	14.75	11
550	27	17.75	11
650	27	17.75	11
800	33	27	17
1000	33	27	17
1200	33	27	17

MaxPac III Closed

Amps	Width	Height	Depth
	W	H	D
100	22.75	14.75	11.8
150	22.75	14.75	11.8
200	22.75	14.75	11.8
300	22.75	14.75	11.8
400	22.75	14.75	11.8
550	27	20	17.75
650	27	20	17.75



Ordering Information

Complete the model number using the matrix provided.

Model SCR Power Pack

MXPC III 3 Phase 3-Leg Power Pack

Code Control Configuration

5 Proportional Control, DOT Zero-Crossover Firing, Command Input Signals: 4-20mA, 0-5VDC, 1-5VDC (via Modbus RTU/485 only), 0-10VDC, Remote 0-1000 OHM Potentiometer w/Manual Override, Modbus RTU/RS485 Communications, RTD Heat Sink Temperature Sensor with Two Set-Points, Automatic Line Sensing 50/60HZ, Remote Permissive Shutdown Input, Form "C" Dry Contact Alarm Output, Staged Heating w/Digital Calibration Zero / Span Adjustments(4-8mA, 8-12mA, 12-16mA, 16-20mA(via Modbus RTU/RS485 only), LED Diagnostics: Command Input, Main/Trigger Boards Running, SCR Status per Phase, Diagnostic Kit via Modbus RTU/RS485: Highest Heat Sink Temperature, Last Heat Sink Temperature, Highest and Lowest Ambient Temperature, Line Frequency Monitoring, Third Party Certifications: UL, cUL, CE, DEMKO (650A and below).

Code Current at 50°C (122°F)

Code	Current	Design
01	100 Amp	Open Design
02	100 Amp	Touch Safe Design
03	150 Amp	OpenDesign
04	150 Amp	Touch Safe Design
05	200 Amp	OpenDesign
06	200 Amp	Touch Safe Design
07	300 Amp	OpenDesign
08	300 Amp	Touch Safe Design
09	400 Amp	OpenDesign
10	400 Amp	Touch Safe Design
11	550 Amp	OpenDesign
12	550 Amp	Touch Safe Design
13	650 Amp	OpenDesign
14	650 Amp	Touch Safe Design
15	800 Amp	OpenDesign
16	1000 Amp	OpenDesign
17	1200 Amp	OpenDesign

Note: CE approval for all units, line filters required. UL Listed for units 650 amps and under.

MXPC III- 5 04 (Continued on next page)

CONTROLS

MaxPac III Three Phase, 3-Leg Power Pak (cont'd.)

Ordering Information (cont'd.)

Complete the model number using the matrix provided.

Crimp Lug Chart		
Chromalox #	Panduit #	Conductor Size
0135-10002	LCD8-14A-L	#8 AWG
0135-10003	LCD6-14A-L	#6 AWG or #6 Weld
0135-10004	LCD4-14A-L	#4 AWG or #4 Weld
0135-10005	LCD2-56B-Q	#2 AWG
0135-10006	LCD1-56C-E	#1 AWG or #2 Weld
0135-10007	LCD1/0-12-X	#1/0 AWG or #1 Weld
0135-10008	LCD2/0-12-X	#2/0 AWG or #1/0 Weld
0135-10009	LCD3/0-12-X	#3/0 AWG or #2/0 Weld
0135-10010	LCD4/0-12-X	#4/0 AWG or #3/0 Weld
0135-10011	LCD250-12-X	250 MCM or #4/0 Weld
0135-10012	LCD300-12-X	300 MCM
0135-10013	LCD350-12-6	350 MCM
0135-10014	LCD400-12-6	400 MCM
0135-10015	LCD500-12-6	500 MCM

Model **SCR Power Pack**

MXPC III 3 Phase Six SCR Power Pack

Code **Line Voltage**

1	120 VAC - 480 VAC
2	575/600 VAC
3	50/60 Hz *For CE, 50 Hz Limited to 400V

Code **Instrument Power (100 Va Required)**

1	120 VAC 50/60 Hz
2	230 VAC 50/60 HZ

Code **Compression Lug Kits (Open Design up to 300 Amps)**

For Other Ranges See Crimp Lug Chart

L0	None (Select for all Touch Safe Design and for over 300 Amp Open Design)
L1	100-150 Amp PAK (#2 - 4/0)/connection
L2	200-300 Amp PAK (1/0 - 500mcm)/connection

Code **Fusing Option ⁽¹⁾**

F00	None
For < 500 VAC Applications, Select One	
F01	100-150 Amp PAK (200 Amp Fuse)
F02	200 Amp PAK (250 Amp Fuse)
F03	300 Amp PAK (400 Amp Fuse)
F04	400 Amp PAK (500 Amp Fuse)
F05	550 Amp PAK (700 Amp Fuse)
F06	650 Amp PAK (800 Amp Fuse)
F07	800 Amp PAK (1000 Amp Fuse)
F08	1000 Amp PAK (1200 Amp Fuses)
F09	1200 Amp PAK (Two 1000 Amp Fuses)

For 575/600 VAC Applications, Select One ⁽²⁾

F10	100 Amp PAK (125 Amp Fuse)
F11	150 Amp PAK (175 Amp Fuse)
F12	200 Amp PAK (250 Amp Fuse)
F13	300 Amp PAK (400 Amp Fuse)
F14	400 Amp PAK (500 Amp Fuse)
F15	550 Amp PAK (700 Amp Fuse)
F16	650 Amp PAK (800 Amp Fuse)
F17	800 Amp PAK (1000 Amp Fuse)
F18	1000 Amp PAK (1200 Amp Fuse)
F19	1200 Amp PAK (Two 1000 Amp Fuses)

Remote Manual Adjust/Auto Manual Switch

0	None
1	Pot with 0 - 100% dial and Local/Remote Switch [®] Single Turn 1K Ω Potentiometer

(cont'd.) **1 1 L1 F02 1 Typical Model Number**

1) SCR Fusing is for semiconductor protection only, not wire protection.

2) Supplied Loose for Customer Mounting.

Note:

Storage Temperature 14°F to 158°F (-10°C to 70°C). CE application requires filters.

Chromalox Part Numbers

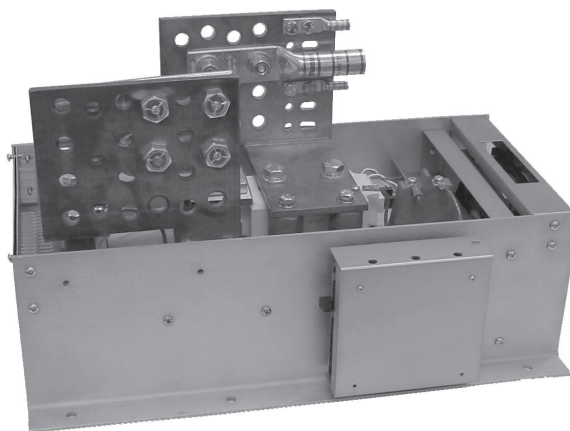
0005-60056 - Line filter, three phase, 440 VAC
0005-60057 - Line filter, 120-230 VAC

Current Rating	Open Design		Closed Design	
	Input Bus	Output Bus	Input Bus	Output Bus
100, 150, 200, 300	1 Crimp Lug / Phase	1 Crimp Lug / Phase	3 / Phase*	3 / Phase*
400	3 / Phase*	10 / Phase*	3 / Phase*	10 / Phase*
550, 650	4 / Phase*	12 / Phase*	4 / Phase*	12 / Phase*
800, 1200	4 / Phase*	12 / Phase*	N/A	N/A

* Accepts up to this number of NEMA standard lugs (See Crimp Lug Chart)



MaxPac IP Single Phase SCR Power Pak



Touch Safe Design (Shown without Cover)

- 120-600 VAC @ 100-1200 Amp
- Phase Angle Firing
- Isolated Control Circuit Inputs:
0-5mA, 0-20mA,
0-50mA, 1-5mA
4-20mA, 10-50mA
0-5 VDC, 0-10 VDC
- Flexible I/O Power Wiring
- Built-In Power Distribution
- Optional Current Limit
- Easy Customer Interface
- Remote Shutdown
- Soft Start
- Compact Size and Construction
- Touch-Safe (option on 100 to 650 Amp models)
- dv/dt Transient Voltage Protection
- MOV Protection

Applications

- Resistive Heaters
- Electric Ovens
- Furnaces
- Kilns

Description

The MaxPac Series is specifically designed for the OEM market. The current limit, soft start option, flexible I/O power wiring, space saving footprint, optional lug kits, I²t fusing, UL and cUL approvals make it an excellent candidate for your product.

The Chromalox Model MaxPac IP utilizes Phase Angle firing to modulate power to an inductive or resistive load. Phase Angle control has the advantage of proportioning every cycle thereby providing very fine resolution of power. Fast responding loads in which the resistance changes as a function of temperature are excellent candidates for Phase Angle control. The MaxPac Soft Start feature assures that the load power is gradually increased from zero to the value set by the command signal in the event of a power interruption. In addition, the Soft Start feature, optional Current Limit is used to protect the load, fuses, SCR controller, and the total system from large surge currents that could occur at startup. Chromalox MaxPac offers separate and adjustable Zero, Gain, Manual Bias, and Current Limit potentiometers for ease of calibration. Screw type plug-in connectors for input signals, remote shutdown, and optional Remote Manual Bias are standard for easy customer interface.

Mechanical Features

- LED Indication of Firing
- Customer Control Connections are made on a Plug-In Screw Type Terminal Block
- Optional Remote Manual Adjust
- Heatsink Mounted Temperature Thermostat
- Built-In Power Distribution

Electrical Features

- SCRs PIV 1200V Minimum on 480 V (1500 Volts on 600 Volt model)
- Isolated Semiconductor Power Blocks are used on all Current Ratings up to 650 Amps

Safety Features

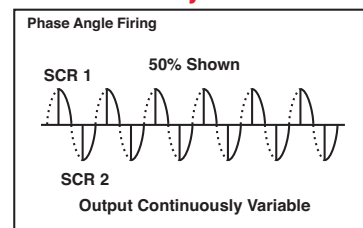
Personnel Safety

- Ground Potential Heat Sink up to 650 Amps
- SCR to Heat Sink Isolation up to 650 Amps
- Touch-Safe Option
- UL 508 for units 650 Amps and under

Equipment/Process Safety

- Input to Output Isolation
- dv/dt Transient Voltage Protection
- Optional I²t Fusing
- Remote Shutdown
- MOV
- Current Limit
- Soft Start

Wave Form Cycle Rate



CONTROLS

MaxPac IP Single Phase SCR Power Pak *(cont'd.)*

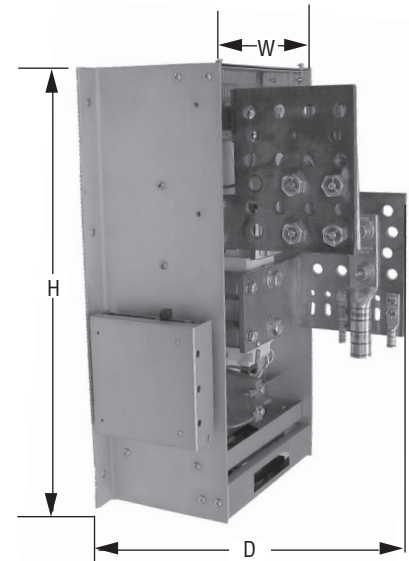
Mounting Dimensions

MaxPac IP Open

	Width	Height	Depth
Amps	W	H	D
100	7.75	9.75	10
150	7.75	9.75	10
200	7.75	9.75	10
300	7.75	9.75	10
400	9.5	14.75	11
550	11	17.75	11
650	11	17.75	11
800	17	27	17
1000	17	27	17
1200	17	27	17

MaxPac IP Closed

	Width	Height	Depth
Amps	W	H	D
100	9.5	14.75	11.8
150	9.5	14.75	11.8
200	9.5	14.75	11.8
300	9.5	14.75	11.8
400	9.5	14.75	11.8
550	11	17.75	11.8
650	11	17.75	11.8



Ordering Information

Complete the model number using the matrix provided.

Model SCR Power Pack

MXPC IP Single Phase SCR Power Pack

Code	Control Configuration
1	Phase Angle Control (Accepts: 0-5mA, 0-20mA, 0-50mA, 1-5mA, 4-20mA, 10-50mA, 0-5 VDC, 0-10 VDC)
2	Phase Angle Control with Current Limit
Code	Current at 50°C (122°F)
01	100 Amp Open Design
02	100 Amp Touch Safe Design
03	150 Amp OpenDesign
04	150 Amp Touch Safe Design
05	200 Amp OpenDesign
06	200 Amp Touch Safe Design
07	300 Amp OpenDesign
08	300 Amp Touch Safe Design
09	400 Amp OpenDesign
10	400 Amp Touch Safe Design
11	550 Amp OpenDesign
12	550 Amp Touch Safe Design
13	650 Amp OpenDesign
14	650 Amp Touch Safe Design
15	800 Amp OpenDesign
16	1000 Amp OpenDesign
17	1200 Amp OpenDesign

MXPC IP- 2 03 (Continued on next page)

Note: UL Listed for units 650A and below.

MaxPac IP Single Phase SCR Power Pak (cont'd.)

Ordering Information (cont'd.)

Complete the model number using the matrix provided.

Crimp Lug Chart		
Chromalox #	Panduit #	Conductor Size
0135-10002	LCD8-14A-L	#8 AWG
0135-10003	LCD6-14A-L	#6 AWG or #6 Weld
0135-10004	LCD4-14A-L	#4 AWG or #4 Weld
0135-10005	LCD2-56B-Q	#2 AWG
0135-10006	LCD1-56C-E	#1 AWG or #2 Weld
0135-10007	LCD1/0-12-X	#1/0 AWG or #1 Weld
0135-10008	LCD2/0-12-X	#2/0 AWG or #1/0 Weld
0135-10009	LCD3/0-12-X	#3/0 AWG or #2/0 Weld
0135-10010	LCD4/0-12-X	#4/0 AWG or #3/0 Weld
0135-10011	LCD250-12-X	250 MCM or #4/0 Weld
0135-10012	LCD300-12-X	300 MCM
0135-10013	LCD350-12-6	350 MCM
0135-10014	LCD400-12-6	400 MCM
0135-10015	LCD500-12-6	500 MCM

Model **SCR Power Pack**

MXPC IP Single Phase SCR Power Pack

Code	Voltage
1	120 VAC
2	208 VAC
3	240 VAC
4	277 VAC
5	480 VAC
6	575/600 VAC

Code	Fan Power (100 Va Required)
1	120 VAC 50/60 Hz
2	230 VAC 50/60 HZ

Code	Compression Lug Kits (Open Design up to 300 Amps) For Other Ranges See Crimp Lug Chart
L0	None
L1	100-150 Amp PAK (#2 - 4/0)/connection
L2	200 - 300 Amp PAK 1(1/0 - 500mcm)/connection

Code	Fusing Option ⁽¹⁾
F00	None For < 500 VAC Applications, Select One
F01	100-150 Amp PAK (200 Amp Fuse)
F02	200 Amp PAK (250 Amp Fuse)
F03	300 Amp PAK (400 Amp Fuse)
F04	400 Amp PAK (500 Amp Fuse)
F05	550 Amp PAK (700 Amp Fuse)
F06	650 Amp PAK (800 Amp Fuse)
F07	800 Amp PAK (1000 Amp Fuse)
F08	1000 Amp PAK (1200 Amp Fuses)
F09	1200 Amp PAK (Two 1000 Amp Fuses)
For 575/600 VAC Applications, Select One ⁽²⁾	
F10	100 Amp PAK (125 Amp Fuse)
F11	150 Amp PAK (175 Amp Fuse)
F12	200 Amp PAK (250 Amp Fuse)
F13	300 Amp PAK (400 Amp Fuse)
F14	400 Amp PAK (500 Amp Fuse)
F15	550 Amp PAK (700 Amp Fuse)
F16	650 Amp PAK (800 Amp Fuse)
F17	800 Amp PAK (1000 Amp Fuse)
F18	1000 Amp PAK (1200 Amp Fuse)
F19	1200 Amp PAK (Two 1000 Amp Fuses)

Remote Manual Adjust/Auto Manual Switch	
0	None
1	Pot with 0 - 100% dial
	Single Turn 1KΩ Potentiometer

(cont'd.) 1 1 L1 F01 1 Typical Model Number

1) SCR Fusing is for semiconductor protection only, not wire protection.

2) Supplied Loose for Customer Mounting.

Note:

Storage Temperature 14°F to 158°F (-10°C to 70°C). SCR units calibrated for 4-20mA input.

Current Rating	Open Design		Closed Design	
	Input Bus	Output Bus	Input Bus	Output Bus
100, 150, 200, 300	1 Crimp Lug / Phase	1 Crimp Lug / Phase	3 / Phase*	3 / Phase*
400	3 / Phase*	10 / Phase*	3 / Phase*	10 / Phase*
550, 650	4 / Phase*	12 / Phase*	4 / Phase*	12 / Phase*
800, 1200	4 / Phase*	12 / Phase*	N/A	N/A

* Accepts up to this number of NEMA standard lugs (See Crimp Lug Chart)

C4

Advanced Multi-Loop SCR Power Controller

- DIN Rail or Panel Mount
- 30, 60, and 80KW Solid State Relays (Higher Amperages Possible With C4X)
- 4 Main Universal Inputs
- 4 Heat/Cool Independent PID Loops
- 4 Main Outputs Internally Wired to SSR
- 4 Configurable Output Options Including Relay, Logic, TRIAC, Continuous
- Current Transformers on Each Loop
- 2 Configurable Relay Alarm Output
- 2 Digital Inputs
- Zero Cross Firing
- Load Connections in Single Phase, Dualphase, and Three Phase
- Standard ModBus RTU Communication
- 8 Optional Fieldbus Communications Including Modbus RTU, Modbus/TCP, Profibus, Profinet, Ethernet IP, DeviceNet, EtherCat, and CANopen Available
- Powerful C-PWR Configuration Software
- Optional Fuse Holder With Fast Acting Fuses For 30KW and 60KW models
- Compact Footprint
- UL, cUL, CE Marking



Description

The C4 Series Multiple Zone SCR Power Controller manages both single phase and 3-phase industrial heating load applications which require zero cross firing modes. Load options include up to 4 independently controlled single phase loads or two 3-phase/2-Leg load or one 3-phase/3-leg load (with or without an additional single phase load).

The controller features four universal main process inputs, two digital inputs, and two configurable alarm outputs as standard to accommodate a variety of process needs. When more flexibility is required, the C4 controller can be customized with four analog inputs, and up to four configurable outputs.

Despite the four independent zones, the C4 still boasts a compact footprint, with options for either DIN rail mounting or direct panel mount.

Communications

Modbus RTU/RS485 communications are outfitted by default, but with PLC's and integrated networks being commonplace, the C4 can host a number of additional fieldbus communications including Modbus TCP, Profibus, ProfiNet, Ethernet IP, DeviceNet, EtherCat, and CANopen. Each of these fieldbus cards can be installed at time of order or outfitted at a later date. This makes it extremely easy to adapt the C4 to any host network.

Complete Process Control Package

While the C4 includes diverse process control capability, it also features efficient thermal and electrical monitoring, allowing users to anticipate failures and malfunctions so corrective steps can be taken in a timely manner.

With each zone outfitted with an independent current transformer, full diagnostics can be

performed from loop break alarm, heater break, SSR short circuit, input opening or short circuit, and even over temperature alarm.

The C4 also features the powerful and detailed C-PWR configuration software, which allows you to run trends, save historical data and read or write device parameters quickly and easily. Configurations may be saved locally for later retrieval or sent across a network for cloning of other units. This significantly reduces mistakes and system setup time.



Applications

- Packaging
 - Extrusion
 - Thermoforming
 - Injection molding
 - Heat treatment
 - Mold & dye heating/cooling
 - HVAC
 - Chemical Processing
 - Textile production
 - Multizone Furnaces
- And many more...

C4

Advanced Multi-Loop SCR Power Controller *(cont'd.)*

C4-OP Local Programming Interface

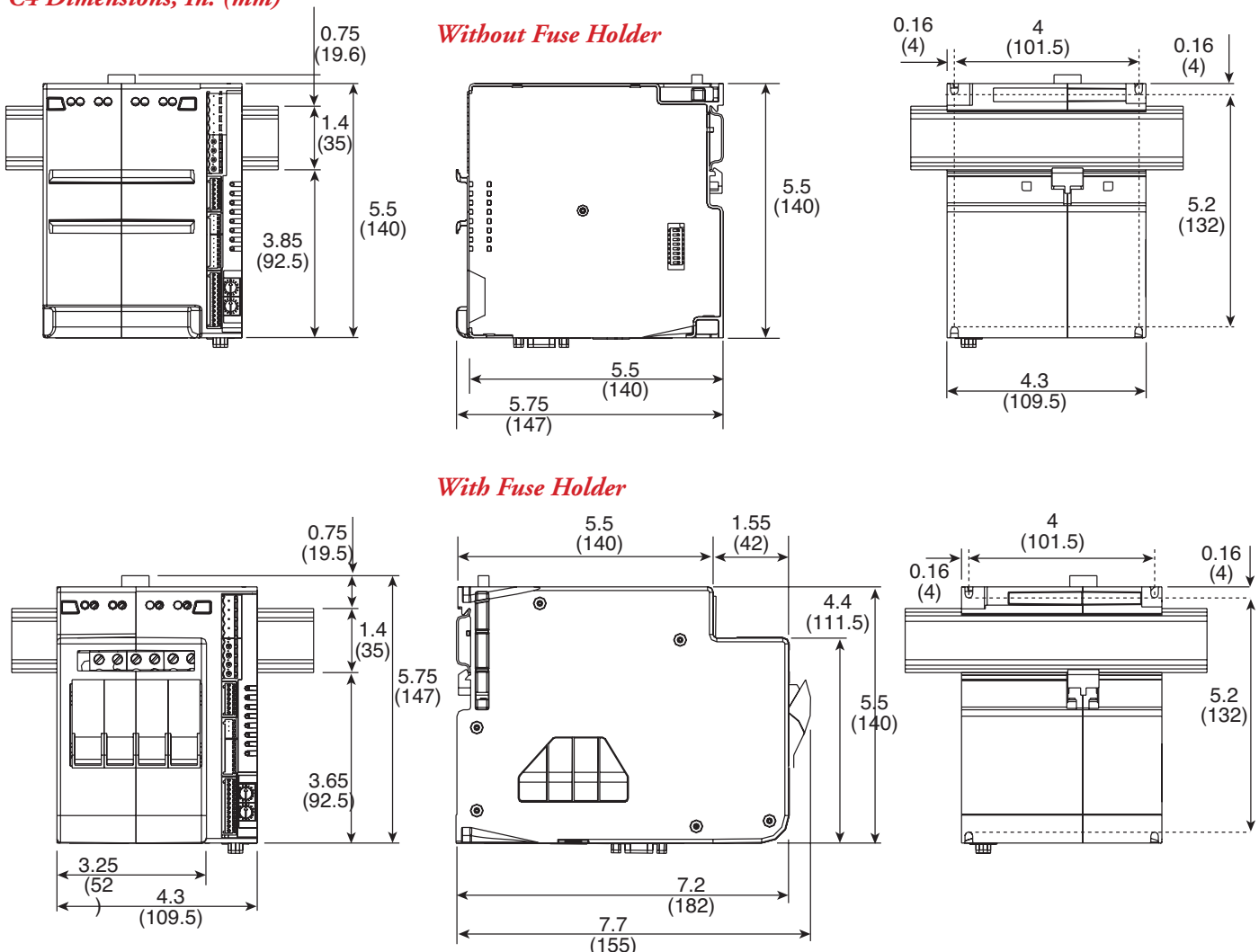
The C4-OP local interface display is a great tool to use when remote programming or monitoring isn't enough. It is comprised of a Lexan membrane, IP65 display, including three 4-digit displays, and a 2-digit display. A total of 6 function keys allow navigation through the C4-OP software menus and adjustment of process parameters on the spot.



Its built-in memory gives users the ability to save complete configurations for up to ten C4 family devices, which can then be uploaded to a PC for seamless integration with the C-PWR software. The opposite is also true if users prefer to download C-PWR settings on to the C4-OP, making this controller an ideal addition for routine plant maintenance where local programming and monitoring is necessary.

With no external power requirements, the C4-OP is powered directly from the C4 host device and can either be DIN rail mounted, or installed directly on the front panel of the enclosure where permanent installations are required. With its minimal footprint, the C4-OP continues the compact trend of the C4 family.

C4 Dimensions, In. (mm)



C4

Advanced Multi-Loop SCR Power Controller (*cont'd.*)

Electrical Specifications

Size	Current (Amp)	Voltage (Vac)			Power	
	Max Per Channel	Range	Nominal	Working	Total	Single Channel
30 (4 x 16A)	16	24...530	480	110	7.0	1.7
				230	14.7	3.6
				400	25.6	6.4
				480	30.7	7.6
60 (4 x 30A)	30	24...530	480	110	13.2	3.3
				230	27.6	6.9
				400	48.0	12.0
				480	57.6	14.4
80 (4 x 40A)	40	24...530	480	110	17.6	4.4
				230	36.8	9.2
				400	64.0	16.0
				480	76.8	19.2

1) For amperages in excess of 40A, refer to C4X

Specifications

Power	
Thermocouple	J, K, R, S, T
RTD	3 Wire PT100
DC Linear	0 to 20mA, 4 to 20mA, 0 to 60mV, 12 to 60mV, 0 to 1V, 0.2 to 1V
Accuracy	Thermocouple $\pm 0.2\%$ of full range ± 1 LSD. PT100 $\pm 0.2\%$ of full range, ± 1 LSD, Linear $\pm 0.2\%$ of full range, ± 1 LSD
Sampling	120msec the four inputs
Impedance	>1M Ω resistive, except DC mA (50 Ω) and Thermoresistance (20 Ω)
Selectable Range	$^{\circ}$ C/ $^{\circ}$ F
Digital Input	PNP, 24VDC, 8mA (isol. 3500V)
CT Input	50mAac, 50/60Hz, 10 Ω
CT Sampling	60msec, 1% of full range ± 1 LSD
Outputs 1-4	
Function	Default heating control. Outputs connected to solid state relay
Outputs 5-8	
Connector	J1
Relay	NO, max 3A, 250V/30VDC, $\cos\phi = 1$, resistive load
Logic	24Vdc, 35mA
Voltage	0 to 10V, 2 to 10V, max 25mA Short Circuit Protection
Current	0 to 20mA, 4 to 20mA, 500 Ω max
Insulation	3500V
TRIAC	230V/4A AC51, 1A for four, 2A for two
Outputs 9-10	
Connector	J1
Relay	NO, max 5A, 30 Vdc, $\cos\phi = 1$,
Operating Conditions	
Protection	IP20
Work/Storage Temperature	32 - 122 $^{\circ}$ F (0 - 50 $^{\circ}$ C) / -4 - 158 $^{\circ}$ F (-20 - 70 $^{\circ}$ C)
Ambient Conditions	20-85% UR not condensing
Installation	DIN EN50022 RAIL / Panel Mount with Screws
Weight	Without Fuses = 1200g / With Fuses = 1600g

C4

Advanced Multi-Loop SCR Power Controller *(cont'd.)*

Ordering Information

To Order — Complete the Model Number using the Matrix provided.

Model C4 SCR Power Controller						
C4	Code Current Per Loop @ 40°C (104°F) Ambient, continuous service (110 Vac to 480 Vac)³					
	164	16 Amps/Loop				
	304	30 Amps/Loop				
	404	40 Amps/Loop				
		Code Auxiliary Outputs				
		O	None			
		R	Relay			
		D	Logic			
		A	Analog			
		T	Triac			
			Code Auxiliary Inputs			
			2	4 Current Transformers		
		4	4 Current Transformers plus 4 Linear Inputs ¹			
			Code Fusing			
			O	None		
			F	Fuse Holder & Extra rapid fuses ²		
				Code Second Fieldbus Option		
				00	None	
				MR	Modbus RTU (RS485)	
				ET	Modbus TCP/Ethernet	
				ER	Ethernet IP, Real Time ¹	
				PB	Profibus DP	
				PN	ProfiNET ¹	
				EC	EtherCAT ¹	
				CN	CANopen	
				DN	DeviceNet	
				EM	Euromap 66	
C4-	304	D	4-	F	00	Typical Model Number

¹Not available with EC, PN & ER Fieldbus Codes.

²Not available with 404 Current Code

³For higher amperages, refer to C4X

Accessories

Description	PCN
Communication Cable, USB to TTL	309171
Communication Cable, USB to RS485	309180

C4-IR

Advanced Multi-Loop SCR Power Controller

- DIN Rail or Panel Mount
- 30, 60, or 80KW Solid State Relay (Higher Amperages are Possible with C4X)
- 4 Main Universal Inputs
- 4 Heat/Cool Independent PID Loops
- 4 Main Outputs Internally Wired to SSR
- 4 Configurable Output Options Including Relay, Logic, TRIAC, Continuous
- Current Transformers on each Loop
- 2 Configurable Relay Alarm Output
- 2 Digital Inputs
- Zero Cross, Burst Firing, Half Single Cycle, and Phase Angle Firing Modes
- Load Connections in Single Phase, Dualphase, and Three Phase
- Standard ModBus RTU Communication
- 8 Optional Fieldbus Communications Including Modbus RTU, Modbus/TCP, Profibus, Profinet, Ethernet IP, DeviceNet, EtherCat, and CANopen Available
- Powerful C-PWR Configuration Software
- Optional Fuse Holder with Fast Acting Fuses for 30KW and 60KW models
- Compact Footprint
- UL, cUL, CE Marking



Description

The C4-IR Series Multiple Zone SCR Power Controller manages both single phase and 3-phase industrial heating load applications which require zero cross, burst firing, half single cycle, and phase angle firing modes. Load options include up to 4 independently controlled single phase loads or two 3-phase/2-Leg load or one 3- phase/3-leg load (with or without an additional single phase load).

The controller features four universal main process inputs, two digital inputs, and two configurable alarm outputs as standard to accommodate a variety of process needs. When more flexibility is required, the C4-IR controller can be customized with four analog inputs, and up to four configurable outputs.

Despite the four independent zones, the C4-IR still boasts a compact footprint, with options for either DIN rail mounting or direct panel mount.

Communications

Modbus RTU/RS485 communications are outfitted by default, but with PLC's and integrated networks being commonplace, the C4-IR can host a number of additional fieldbus communications including Modbus TCP, Profibus, ProfiNet, Ethernet IP, DeviceNet, EtherCat, and CANopen. Each of these fieldbus cards can be installed at time of order or outfitted at a later date. This makes it extremely easy to adapt the C4-IR to any host network.

Complete Process Control Package

While the C4-IR includes diverse process control capability, it also features efficient thermal and electrical monitoring, allowing users to anticipate failures and malfunctions so corrective steps can be taken in a timely manner.

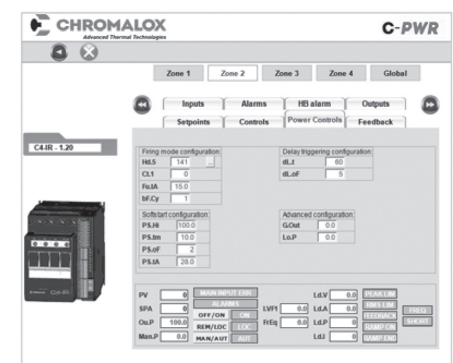
With feedback from current transformers on each zone, full diagnostics of current, voltage, and temperature can be performed including loop break alarm, heater break, SSR short circuit, input opening or short circuit, and even over temperature alarm.

The C4-IR also features the powerful and detailed C-PWR configuration software, which allows you to run trends, save historical data and read or write device parameters quickly and easily. Configurations may be saved locally for later retrieval or sent across a network for cloning of other units. This significantly reduces mistakes and system setup time.

Applications

- Thermoforming
- Hot runners for injection presses
- Fiber Weaving
- Wood-working machines
- Heat treatment
- Glass hardening furnaces

And many more...



C4-IR

Advanced Multi-Loop SCR Power Controller (*cont'd.*)

C4-OP Local Programming Interface

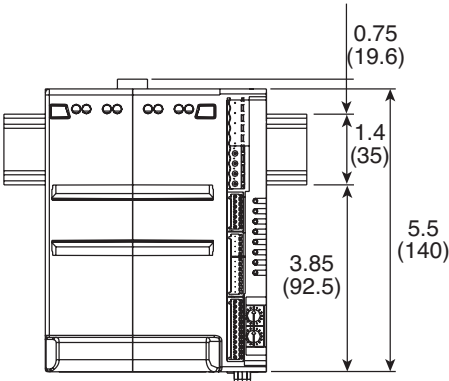
The C4-OP local interface display is a great tool to use when remote programming or monitoring isn't enough. It is comprised of a Lexan membrane, IP65 display, including three 4-digit displays, and a 2-digit display. A total of 6 function keys allow navigation through the C4-OP software menus and adjustment of process parameters on the spot.



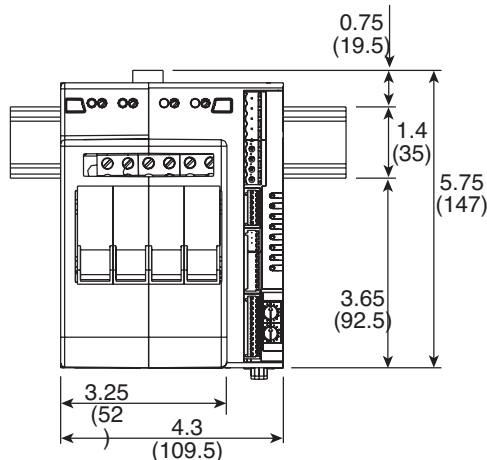
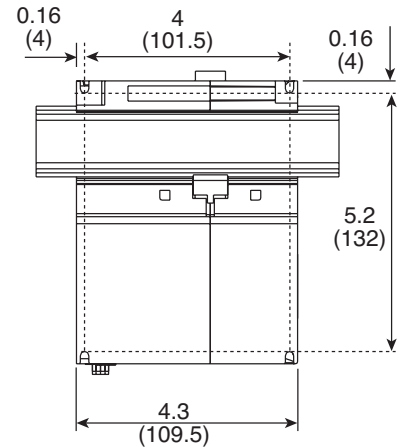
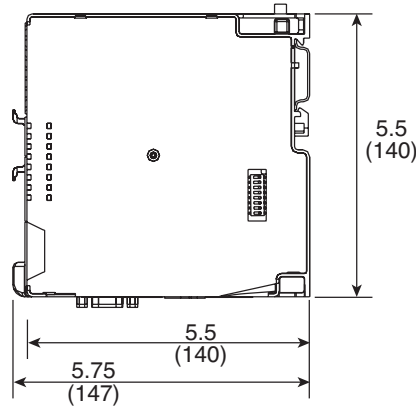
Its built-in memory gives users the ability to save complete configurations for up to ten C4 family devices, which can then be uploaded to a PC for seamless integration with the C-PWR software. The opposite is also true if users prefer to download C-PWR settings on to the C4-OP, making this controller an ideal addition for routine plant maintenance where local programming and monitoring is necessary.

With no external power requirements, the C4-OP is powered directly from the C4 host device and can either be DIN rail mounted, or installed directly on the front panel of the enclosure where permanent installations are required. With its minimal footprint, the C4-OP continues the compact trend of the C4 family.

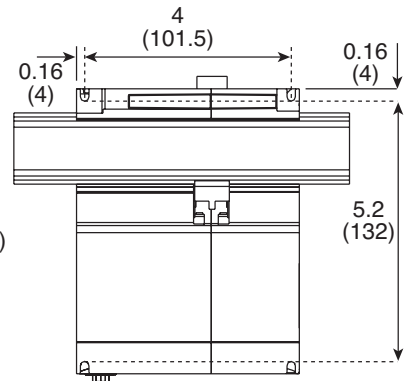
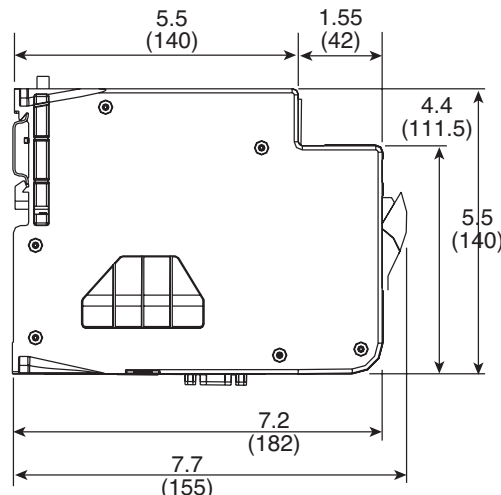
C4-IR Dimensions, In. (mm)



Without Fuse Holder



With Fuse Holder



C4-IR

Advanced Multi-Loop SCR Power Controller (*cont'd.*)

Electrical Specifications

Size	Current (Amp)	Voltage (Vac)			Power	
	Max Per Channel	Range	Nominal	Working	Total	Single Channel
30 (4 x 16A)	16	24...530	480	110	7.0	1.7
				230	14.7	3.6
				400	25.6	6.4
				480	30.7	7.6
60 (4 x 30A)	30	24...530	480	110	13.2	3.3
				230	27.6	6.9
				400	48.0	12.0
				480	57.6	14.4
80 (4 x 40A)	40	24...530	480	110	17.6	4.4
				230	36.8	9.2
				400	64.0	16.0
				480	76.8	19.2

1) For amperages in excess of 40A, refer to C4X

Specifications

Power	
Thermocouple	J, K, R, S, T
RTD	3 Wire PT100
DC Linear	0 to 20mA, 4 to 20mA, 0 to 60mV, 12 to 60mV, 0 to 1V, 0.2 to 1V
Accuracy	Thermocouple $\pm 0.2\%$ of full range ± 1 LSD. PT100 $\pm 0.2\%$ of full range, ± 1 LSD, Linear $\pm 0.2\%$ of full range, ± 1 LSD
Sampling	120msec the four inputs
Impedance	>1M Ω resistive, except DC mA (50 Ω) and Thermoresistance (20 Ω)
Selectable Range	$^{\circ}$ C/ $^{\circ}$ F
Digital Input	PNP, 24VDC, 8mA (isol. 3500V)
CT Input	50mAac, 50/60Hz, 10 Ω
CT Sampling	60msec, 1% of full range ± 1 LSD
Outputs 1-4	
Function	Default heating control. Outputs connected to solid state relay
Outputs 5-8	
Connector	J1
Relay	NO, max 3A, 250V/30VDC, $\cos\phi = 1$, resistive load
Logic	24Vdc, 35mA
Voltage	0 to 10V, 2 to 10V, max 25mA Short Circuit Protection
Current	0 to 20mA, 4 to 20mA, 500 Ω max
Insulation	3500V
TRIAC	230V/4A AC51, 1A for four, 2A for two
Outputs 9-10	
Connector	J1
Relay	NO, max 5A, 30 Vdc, $\cos\phi = 1$,
Operating Conditions	
Protection	IP20
Work/Storage Temperature	32 - 122 $^{\circ}$ F (0 - 50 $^{\circ}$ C) / -4 - 158 $^{\circ}$ F (-20 - 70 $^{\circ}$ C)
Ambient Conditions	20-85% UR not condensing
Installation	DIN EN50022 RAIL / Panel Mount with Screws
Weight	Without Fuses = 1200g / With Fuses = 1600g

C4-IR

Advanced Multi-Loop SCR Power Controller (*cont'd.*)

Ordering Information

To Order — Complete the Model Number using the Matrix provided.

Model C4-IR SCR Power Controller						
C4-IR						
Code	Current Per Loop @ 40°C (104°F) Ambient, continuous service (110 Vac to 480 Vac) ³					
164	16 Amps/Loop					
304	30 Amps/Loop					
404	40 Amps/Loop					
Code	Auxiliary Outputs					
0	None					
R	Relay					
D	Logic					
A	Analog					
T	Triac					
Code	Auxiliary Inputs					
0	None					
4	4 Linear Inputs ¹					
Code	Fusing					
0	None					
F	Fuse Holder & Extra rapid fuses ²					
Code	Second Fieldbus Option					
00	None					
MR	Modbus RTU (RS485)					
ET	Modbus TCP/Ethernet					
ER	Ethernet IP, Real Time ¹					
PB	Profibus DP					
PN	ProfiNET ¹					
EC	EtherCAT ¹					
CN	CANopen					
DN	DeviceNet					
EM	Euromap 66					
C4-IR-	304	D	4-	F	00	Typical Model Number

¹Not available with EC, PN & ER Fieldbus Codes.

²Not available with 404 Current Code

³For higher amperages, refer to C4-IRX

Accessories

Description	PCN
Communication Cable, USB to TTL	309171
Communication Cable, USB to RS485	309180

CS Series Power Controllers CS1 & CS3

- Industrial Solid State Relays
- Single and Three-Phase Load Designs
- DIN Rail Mounted
- Conservative Thermal Design
- Up to 120 Amp Ratings - CS1
- Up to 3x55 Amp Ratings - CS3
- Up to 600 VAC Operational Voltage
- Integrated Heatsink
- Zero Crossover Switching to Minimize Electronic Noise
- AC & DC Voltage Input Signals
- Alarms for Load/Line Interrupt
- Overtemperature Alarm
- Digital PNP Alarm Output Signal for Logic-Gated Devices
- UL / cUL
- CE Marked
- LED Status Indicator
- IP20 Touch Protection Cover



Description

The CS Series of solid state relays are an ideal, low cost power control solution for switching resistive loads found applications in such as furnaces, ovens, heat treating, injection molding, thermoforming, press platens, commercial food equipment, semiconductor, lighting and drying, just to name a few.

The CS Series power controllers feature a rugged, industrial design, touch-safe exterior and conservative, continuous service amperage ratings at 40°C ambient. They are available in both AC and DC Voltage logic input command signals and employ zero crossover firing (gated to turn on and off at zero voltage), which keeps unwanted RFI (Radio Frequency Interference) to a minimum. Each controller comes complete with integrated heat sink, SCR thermal protection with LED indication and has USA & Canadian UL component recognition and CE conformity. Optional alarms are available for over temperature as well as load and line interrupt conditions. The CS1 offers a digital PNP alarm output signal for logic-gated devices such as PLCs.

The CS1 Series controller manages single phase loads up to 120 Amps and up to 600 VAC.

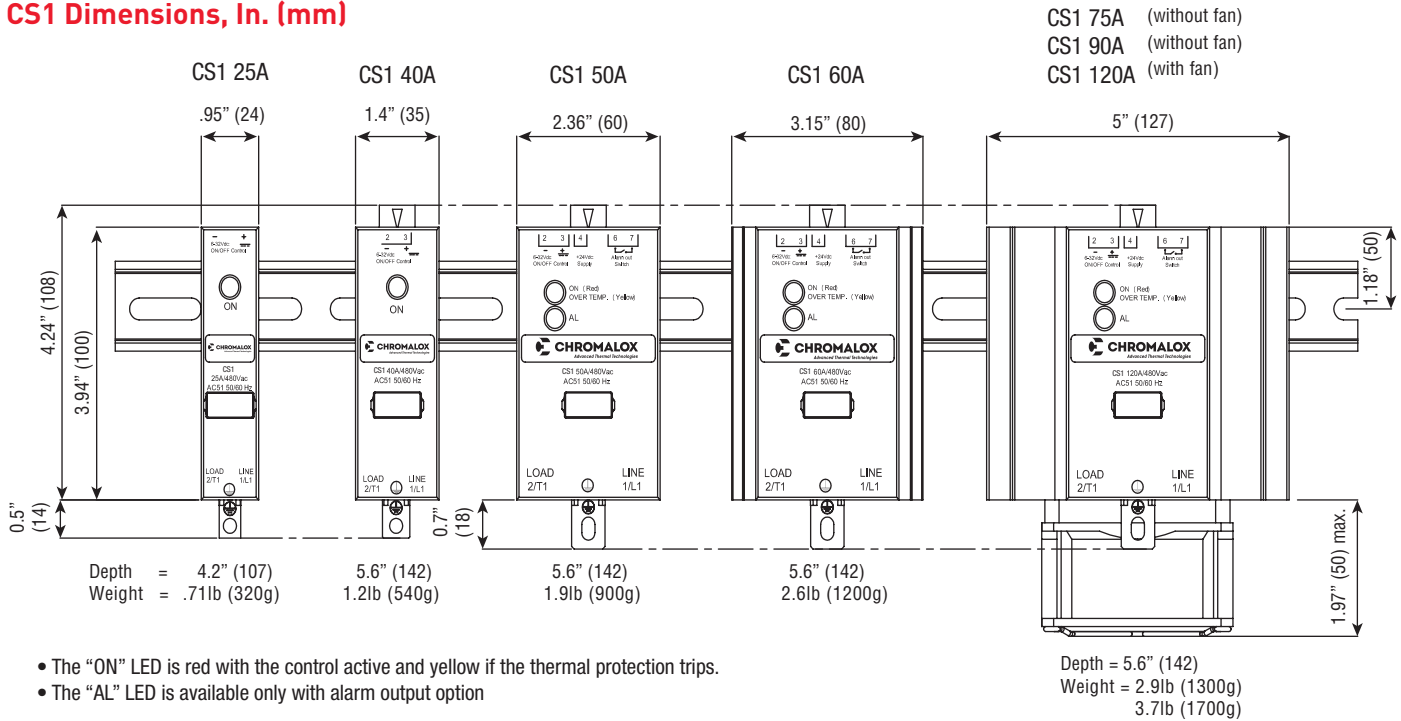
The CS3 Series controller manages three phase, 3 leg loads up to 55 Amps and up to 600 VAC.

Applications

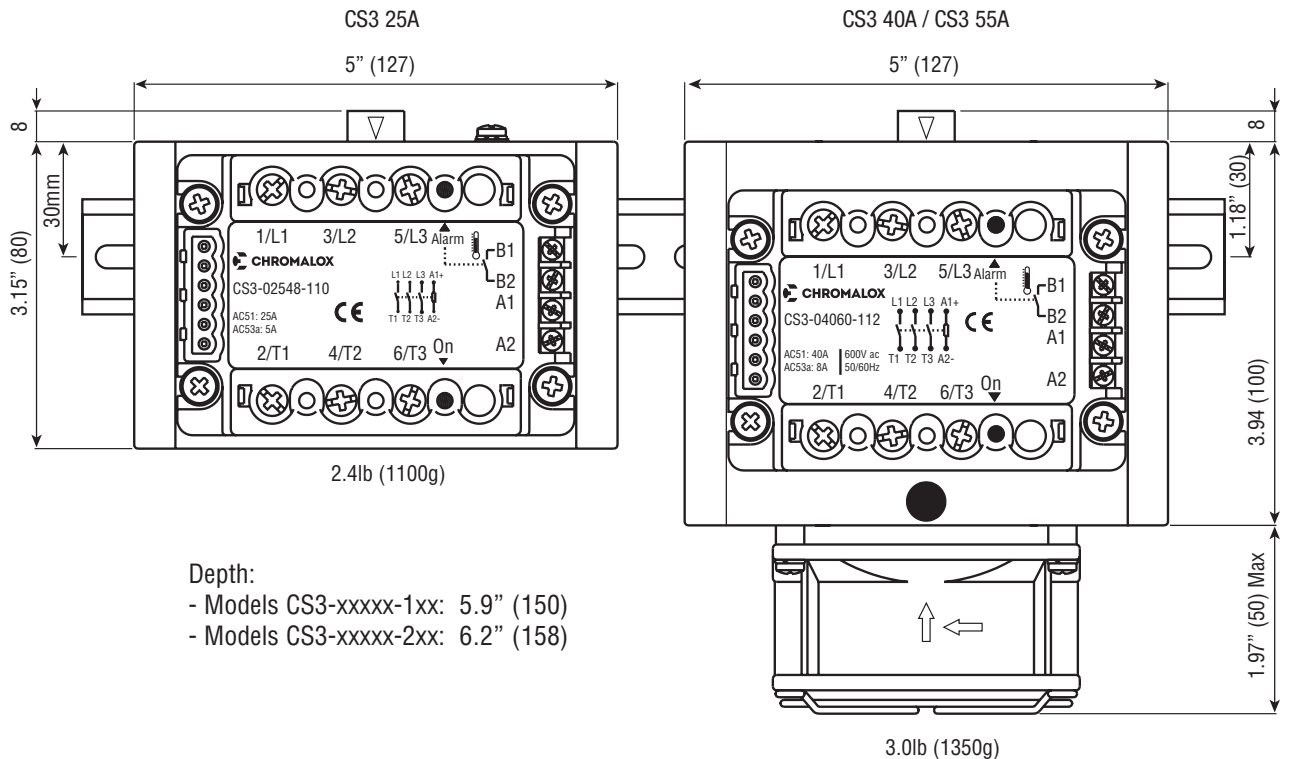
- Thermoforming
- Plastic extrusion lines
- Injection molding
- Heat treatment
- Industrial ovens / furnaces
- Mold & dye heating/cooling control
- HVAC
- Packaging
- Textile production
- Rubber vulcanization equipment
- Driers, incubators and autoclaves
- Pharmaceutical and chemical processes
- Rapid resistive heat load switching

CS Series Power Controllers CS1 & CS3 (cont'd.)

CS1 Dimensions, In. (mm)



CS3 Dimensions, In. (mm)



SCR COMPONENTS

CS Series Power Controllers CS1 & CS3

(cont'd.)

Ordering Information

To Order — Complete the Model Number using the Matrix provided.

Stocked Items

Model Number	PCN
CS1-02560-100	316515
CS1-02560-200	316523
CS1-04060-100	316531
CS1-04060-200	316540
CS1-05060-100	316558
CS1-05060-200	316566
CS1-07560-100	316574

Model	Single Phase, Solid State Relay Power Controller - DIN Rail Mount
CS1	The CS1 Series are DIN Rail mounted, single-phase solid state relays with integrated heatsink for switching resistive loads in industrial applications. Standard features: Zero-voltage turn-on, LED input status indicator, internal over voltage protection (MOV), integrated SCR thermal protection with LED indication ¹ , two logic input control signals, operating voltage up to 600 VAC. Optional features: ¹ Solid state switch or PNP Digital Signal alarm output during over-heated or interrupted line/load condition. Approvals: CE, UL, cUL
	Code Current @ 104°F (40°C) Ambient, Continuous Service
	025 25 Amps
	040 40 Amps
	050 50 Amps
	060 60 Amps
	075 75 Amps
	090 90 Amps
	120 120 Amps (requires fan choice from below)
	Code Voltage
	48 480 VAC (Range: 24 - 530 VAC)
	60 600 VAC (Range: 24 - 660 VAC)
	Code Input Control Signal
	1 6 - 32 VDC
	2 20 - 260 VAC/DC
	Code Alarm Output (Note: Alarms only available on ≥ 50 Amp Models)
	0 None
	1 Solid State Relay Switch (normally open)
	2* Solid State Relay Switch (normally closed)
	3* Digital Logic PNP Output (normally open)
	4* Digital Logic PNP Output (normally closed)
	Code Fan (120 Amp Version Only)
	0 No Fan (select for all models < 120 Amp)
	1** Fan (230 VAC Power Supply Requirement)
	2** Fan (120 VAC Power Supply Requirement)
	3** Fan (24VDC Power Supply Requirement)
CS1-	050 48- 1 1 0 Typical Model Number

²External 24 VDC Power Supply is required to power the alarms

¹ Available only on models ≥ 50 Amps

² Some models may accept 24 VDC or 24 VAC. See optional Alarm Wiring details in manual

* Available only for models with 6-32 VDC input control signal

** Fan requires customer supplied voltage.

The following Chromalox Process Controllers offer a suitable 24 VDC power supply for the alarm option:

40 Series: 6040 / 8040 / 4040

50 Series: 6050 / 4050

60 Series: 6060

80 Series: 4080 / 4081 / 4082

CS Series

Power Controllers CS1 & CS3 *(cont'd.)*

Ordering Information

To Order — Complete the Model Number using the Matrix provided.

Stocked Items

Model Number	PCN
CS3-02560-100	316582
CS3-02560-200	316590
CS3-04060-102	316603
CS3-04060-202	316611
CS3-05560-102	316620
CS3-05560-202	316638

Model	3-Phase, 3-Leg Solid State Relay Power Controller - DIN Rail Mount						
CS3	The CS3 Series are DIN Rail mounted 3-phase, 3-leg solid state relays with integrated heatsink for switching resistive loads in industrial applications. Standard features: Zero-voltage turn-on, LED input status indicator, IP20 touch protection, two different input control signal choices, integrated SCR thermal protection with LED signal indication, operating voltage up to 600 VAC. Optional features: Alarms for over temperature protection and load/line interruption* conditions. Approvals: CE, UL, cUL						
	Code Current @ 104°F (40°C) Ambient, Continuous Service						
	025	25 Amps					
	040	40 Amps					
	055	55 Amps					
	Code Voltage						
	48	480 VAC					
	60	600 VAC					
	Code Input Control Signal						
	1	5 - 32 VDC					
	2	20 - 260 VAC/DC					
	Code Alarm Options						
	0	None					
	1	Thermal Protection					
	2*	Interrupted Load or Line & Thermal Protection					
	Code Fan (For 40A & 55A Versions Only)						
	0	No Fan (25 Amp only)					
	1**	Fan (230 VAC Power Supply Requirement)					
	2**	Fan (120 VAC Power Supply Requirement)					
	3**	Fan (24VDC Power Supply Requirement)					
CS3	-	040	48-	1	1	2	Typical Model Number

* Available ONLY with Input Control Signal Code 2
 ** Fan requires customer supplied voltage.

The following Chromalox Process Controllers offer a suitable 24 VDC power supply for the alarm option:
 40 Series: 6040 / 8040 / 4040
 50 Series: 6050 / 4050
 60 Series: 6060
 80 Series: 4080 / 4081 / 4082

External 24V Power Supply is Required to Power the Alarms

SSR Series

Power Controllers

SSR, SSR1, SSR1P, SSR2 & SSR3



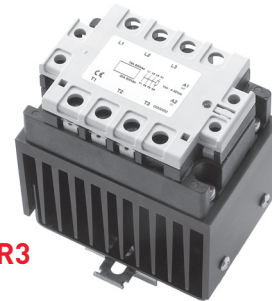
SSR



SSR2



SSR1/SSR1P



SSR3

- Conservative Thermal Design
- 15 - 75 Amp Ratings
- 42-600 VAC Operational Voltage
- Single and Three Phase Offering
- Zero Cross and Phase Angle Fired
- Control Inputs:
4.5-32 VDC
24-265 VAC/24-190 VDC
4-20/0-20 mA
- Din Rail Mount on SSR1, SSR1P, SSR2, SSR3 and SSR3P
- UL Recognized and CSA Approved
- CE Marked
- LED Status Indicator
- IP20 Touch Protection Cover

Description

The Chromalox SSR family line of solid state relays are an ideal low cost power control solution for furnace/oven, heat treating, plastics, food, semiconductor, lighting, and drying applications just to name a few.

The SSR line of power controllers are a complete package. They feature a rugged design, touch safe exterior, back-to-back SCR design, ambient ratings of 40°C, and are DIN rail mount.

The benefits from the Chromalox SSR line are quick and low cost installation, reduced panel space, increased heater life due to fast cycling, and easy replacements for mechanical contactors.

When using any of the SSR's to switch greater than 65 amps, 4 awg wire is required. Lug PN0013-40282 (PCN 389984) can accept a 4 awg wire and can be ordered.

SSR Series

These units are rated for 25, 50 and 75 amps with operational voltages up to 600 VAC. The series is zero-fired single phase control with 4.5 - 32 VDC and 24 - 265 VAC / 24 - 190 VDC control signals.

SSR1, SSR2 and SSR3 Series

These units are rated for 10, 15, 25, 35, 40, 50, 70 and 75 amps with operational voltages up to 600 VAC.

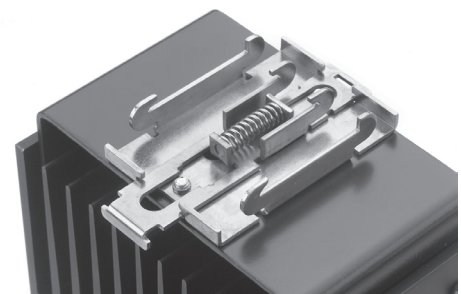
The series is zero-fired single phase, three-phase two leg and three-phase three leg control. The control signal can be 4.5 - 32 VDC, or 24 - 265 VAC / 24 - 190 VDC.

SSR1P Series

These units are rated for 35, 50 and 70 amps with operational voltages up to 600 VAC. The series is phase-angle fired single-phase and three-phase three leg design. The control signal can be 4 - 20 mA or 0 - 20 mA.

Applications:

- Mercury Relay Replacement
- Electric Ovens
- Plastics Machinery
- Packaging Equipment
- Food and Beverage Processing Equipment
- Platen Heater
- Extruders
- Resistance Heating
- Contactor Replacement



DIN Rail Mount

SSR Series Power Controllers SSR, SSR1, SSR1P, SSR2 & SSR3 *(cont'd.)*

Heat Sink Mounting Dimensions

Heat Sink w/o Fan		Amps									
Compatible solid state relay	15	25	30	35	40	45	50	65	70	75	
SSR1/SSR1P	-	Fig. B	-	Fig. A	-	-	Fig. A	-	Fig. C	Fig. C	
SSR2	-	Fig. C	-	-	-	-	-	-	-	-	
SSR3	Fig. C	Fig. C	Fig. C	-	-	-	-	-	-	-	
Heat Sink w/Fan		Amps									
Compatible solid state relay	15	25	30	35	40	45	50	65	70	75	
SSR1/SSR1P	-	-	-	-	-	-	-	-	-	-	
SSR2	-	-	-	-	-	-	Fig. D	-	-	Fig. D	
SSR3	-	-	-	-	-	Fig. E	-	Fig. E	-	-	

	Dimensions		
	H/in. (mm)	W/in. (mm)	D/in. (mm)
Fig. A	4.05 (103)	3.54 (90)	4.29 (109)
Fig. B	4.05 (103)	1.77 (45)	4.29 (109)
Fig. C	3.22 (82)	4.64 (118)	4.80 (122)
Fig. D	5.70 (145)	4.80 (122)	4.92 (125)
Fig. E	5.70 (145)	4.80 (122)	4.92 (125)
Fig. F	2.25 (57)	1.75 (44)	1.125 (28)

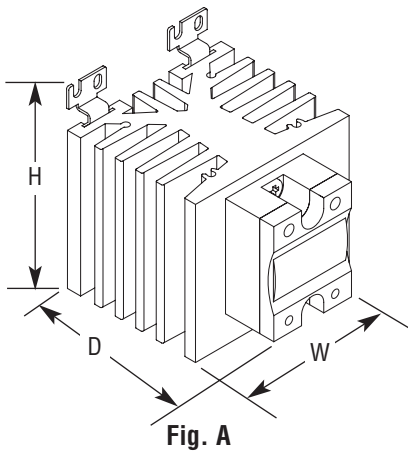


Fig. A

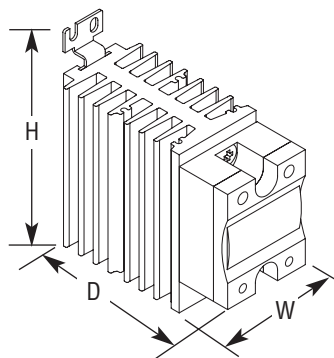


Fig. B

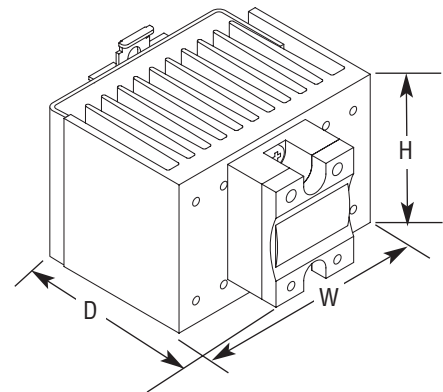


Fig. C

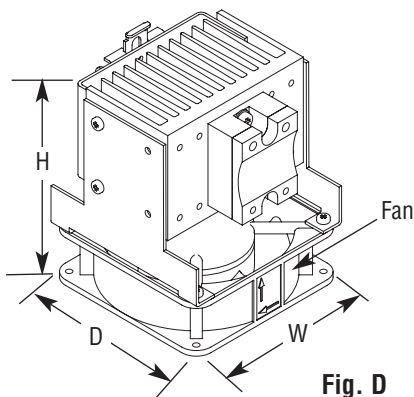


Fig. D

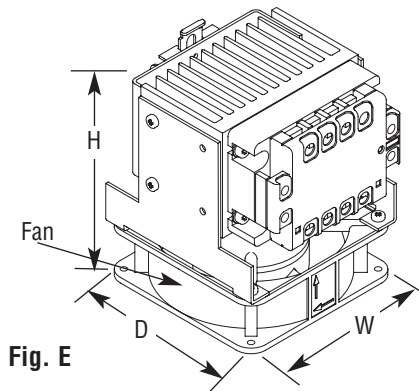


Fig. E

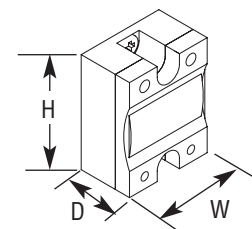


Fig. F
(SSR without heatsink)

SSR Series Power Controllers SSR, SSR1, SSR1P, SSR2 & SSR3 *(cont'd.)*

Ordering Information

Complete the model number using the matrix provided.

In Stock

Model	PCN
SSR-251	305744
SSR-501	305752
SSR-751	305760
SSR-252	305779
SSR-502	305787
SSR-752	305795
SSR1-251	305808
SSR1-351	305824
SSR1-501	305840
SSR1-751	305867
SSR1-502	305859
SSR1P-2511	305883
SSR1P-3511	305904
SSR1P-2521	305891
SSR1P-5021	305939

Accessories

Solid State Relay Driver LM-2	
Model	PCN
0135-28144	341260
Lug for Loads greater than 65 Amps	
Model	PCN
0013-40282	389984
Vari-Watt Power Controller	
Model	PCN
0113-10237	339768

Note: For use with SSR, SSR1 and SSR2 Series

MODEL Solid State Relay Power Controller

SSR The SSR series are industrial single-phase relays for switching resistive loads. Chromalox SSR series offers the following standard features: Zero-voltage turn-on, LED status indicator, IP20 touch protection clip-on cover, two input ranges, operational rating up to 600 VAC, self-lifting terminals, dv/dt protection, CE mark, UL and CSA approvals.

CODE Current @ 25°C (77°F) Ambient, 42 - 600 VAC Minimum Heat Sink Required:

25	25 Amp	RO = 2.5°C/Watt
50	50 Amp	RO = 0.95°C/Watt
75	75 Amp	RO = 0.80°C/Watt

CODE Input Control Voltage

1	4.5 - 32 VDC
2	24 - 265 VAC / 24 - 190 VDC

SSR 25 1 Typical Model Number

Note: See SSR Accessories Table for additional options. Thermstrate 0029-00640 (PCN 389976)

MODEL Single-Phase Solid State Relay with Heat Sink

SSR1 The SSR1 series are industrial single-phase relays mounted on heat sinks for switching high current resistive loads. Chromalox SSR1 series offers the following standard features: 40°C Ambient Rating, Zero-voltage turn-on, LED status indicator, IP20 touch protection clip-on cover, two input ranges, operational rating up to 600 VAC, self-lifting terminals, dv/dt protection, DIN rail mount, CE mark, UL and CSA approvals.

CODE Current @ 40°C (104°F) Ambient, 42 - 600 VAC

25	25 Amp
35	35 Amp
50	50 Amp
75	75 Amp

CODE Input Control Voltage

1	4.5 - 32 VDC
2	24 - 265 VAC / 24 - 190 VDC

SSR1 25 1 Typical Model Number

Note: See SSR Accessories Table for additional options.

MODEL Single-Phase, Phase Fired Solid State Relay with Heat Sink

SSR1P The SSR1P series are industrial single-phase relays mounted on heat sinks for switching high current resistive and inductive loads. Chromalox SSR1P series offers the following standard features: 40°C Ambient Rating, Phase-Angle control, variable intensity LED-indication according to the input current, IP20 touch protection clip-on cover, self-lifting terminals, dv/dt protection, integral snubber network, DIN rail mount, CE mark, UL and CSA approvals.

CODE Current @ 40°C (104°F) Ambient

25	25 Amp
35	35 Amp
50	50 Amp
70	70 Amp

CODE Voltage

1	120 - 230 VAC
2	410 - 600 VAC

CODE Input Control Signal

1	4 - 20 mA
---	-----------

SSR1P 25 1 1 Typical Model Number

Note: See SSR Accessories for additional options.

SSR Series Power Controllers SSR, SSR1, SSR1P, SSR2 & SSR3 *(cont'd.)*

Ordering Information

Complete the model number using the matrix provided.

In Stock

Model	PCN
SSR2-251	339282
SSR2-501	339303
SSR2-751	339320
SSR2-252	339290
SSR2-502	339311
SSR3-251	339362
SSR3-301	339389
SSR3-651	339426
SSR3-302	339397
SSR3-652	339434

MODEL Three Phase 2-Leg Solid State Relay with Heat Sink

SSR2 The SSR2 series are industrial three-phase 2-leg relays mounted on heat sinks for switching high current resistive loads. Chromalox SSR2 series offers the following standard features: 40°C Ambient Rating, Zero-voltage turn-on, LED status indicator, IP20 touch protection clip-on cover, two input ranges, operational rating up to 600 VAC, self-lifting terminals, dv/dt protection, DIN rail mount, CE mark, UL and CSA approvals.

CODE Current @ 40°C (104°F) Ambient, 42 - 600 VAC

25	25 Amp
50	50 Amp Fan Cooled (120 VAC Required for Fan)
75	75 Amp Fan Cooled (120 VAC Required for Fan)

CODE Input Control Voltage

1	4.5 - 32 VDC
2	24 - 265 VAC / 24 - 190 VDC

SSR2 25 1 Typical Model Number

Note: See SSR Accessories Table on page H-86 for additional options.

MODEL Three-Phase 3-Leg Solid State Relay with Heat Sink

SSR3 The SSR3 series are industrial three-phase 3-leg relays mounted on heat sinks for switching resistive loads. Chromalox SSR3 series offers the following standard features: 40°C Ambient Rating, Zero-voltage turn-on, LED status indicator, IP10 back-of-hand protection, 2 input ranges, operational rating up to 600 VAC, self-lifting terminals, dv/dt protection, DIN rail mount, CE mark, UL and CSA approvals.

CODE Current @ 40°C (104°F) Ambient, 42 - 600 VAC

15	15 Amp
25	25 Amp
30	30 Amp
45	45 Amp Fan Cooled (120 VAC Required for Fan)
65	65 Amp Fan Cooled (120 VAC Required for Fan)

CODE Input Control Voltage

1	4 - 32 VDC
2	24 - 275 VAC / 24 - 50 VDC

SSR3 25 1 Typical Model Number

Note: See SSR Accessories Table on page H-86 for additional options.

SSR Accessories Table

SSR Series	PCN									
	15 Amps	25 Amps	30 Amps	35 Amps	40 Amps	45 Amps	50 Amps	65 Amps	70 Amps	75 Amps
SSR Thermstrate (Thermal Conductor)	0029-00640	0029-00640	0029-00640	0029-00640	0029-00640	0029-00640	0029-00640	0029-00640	0029-00640	0029-00640

Vari-Watt Power Controller



- **Allows Manual Control of Heaters using SSR Solid State Relays**
- **Converts Analog, Digital or Potentiometer Signals to Trigger SSRs or a contactor**
- **DOT Switches On and Off Zero-Crossover SSR's to Accurately Control Heat**
- **Load Management Feature Evenly Distributes Output Over Up to 4 Outputs**
- **Auto/Manual Feature**

Features

- Select from 3 analog control inputs of 4-20ma, 0-5 VDC or 0-10 VDC to drive up to 4 SSRs. The SSR's will fire in succession and evenly distribute the power draw via the Vari-watt's Load Management Feature.
- The Vari-Watt can accept a digital input of a 4-12 VDC 1 sec time proportion signal from a controller, and convert it to a 15sec cycle time 240 VAC output for a contactor or a distributed output with Load Management to up to 4 SSR's.
- Auto/Manual Control – A jumper or contact closure allows the user to select between Manual Control using the 1K Pot or Auto Control using either the 4-20ma, 0-5 VDC or 0-10 VDC control inputs.
- Robust Circuitry – Specially protected components reduce the effect of external harmonics on the power line.

Description

The NEW Vari-watt Power controller accepts a control signal input and produces output signals that can drive up to 4 Zero-Crossover Solid State Relays or a Contactor. The signal to the solid state relays implements Chromalox

DOT firing which allows for switching as accurate as every 3 cycles (50msec). In addition, the 4 outputs evenly distribute power using the Vari-Watt's Load Management Feature.

Specifications

Control Signal Input

Analog	4-20mA (200 Ohms impedance) 0-5 VDC (10K Ohms) 0-10 VDC (20K Ohms)
Digital	4-12 VDC (1 Sec. time Proportional)

Auto/ Manual Transfer Input:

Contact Closure
Closed Manual Mode (1K Pot)
Open Auto Mode (4-20ma, 0-5 VDC, or 0-10 VDC)

Outputs:

0.5A Optically isolated 240 VAC switch
Cycle Time: 15 seconds
Quantity 4 of 12 VDC solid state relay drive (50mA each)

Power Requirements

95-250 VAC

Dimensions

5.1" x 3.5"

Mounting

Board Level product suitable for DIN Rail Mounting (35mm)

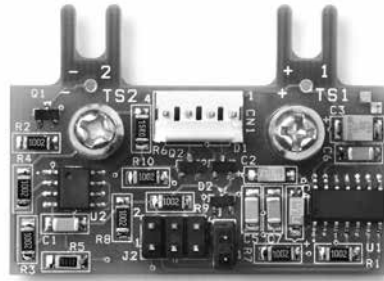
Ordering Information – In Stock

Description	PCN	Part No.
New Vari-Watt Controller	339768	0113-10237
Remote 10K Potentiometer with Auto Manual Switch	313947	0135-27000



LM-2 Solid State Relay Driver for SSR Series

- Easily Mounted Directly to Terminals
- Single & 3-Phase 2-Leg Configurations
- Accepts 4-20mA Control Signal
- Power Supply not Required
- For Use with Chromalox SSR Series Controllers



Description

The LM-2 (0135-28144) module accepts a 4 - 20 mA control signal and converts it to a 4.5 - 32 VDC time proportional control signal. Power supply is not required. The LM-2 is powered by the 4 - 20 mA loop. The LM-2 Module supports single and three-phase 2-leg power control configurations.

The LM-2 module mounts directly to the input terminals labeled A2(-) and A1(+) of the solid state relay. Screw terminals are provided on the LM-2 module for the 4 - 20 mA control signal. The solid state relay's load is connected to terminals L1 and T1.

Once the connections are made the LM-2 module and solid state relays provide a time proportional zero-fired control signal to the load.

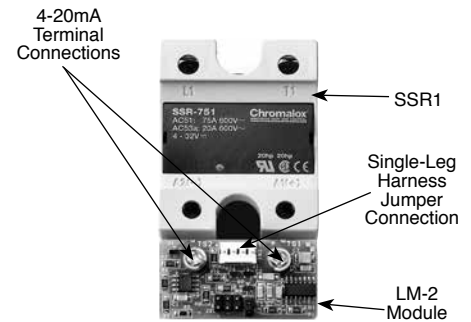
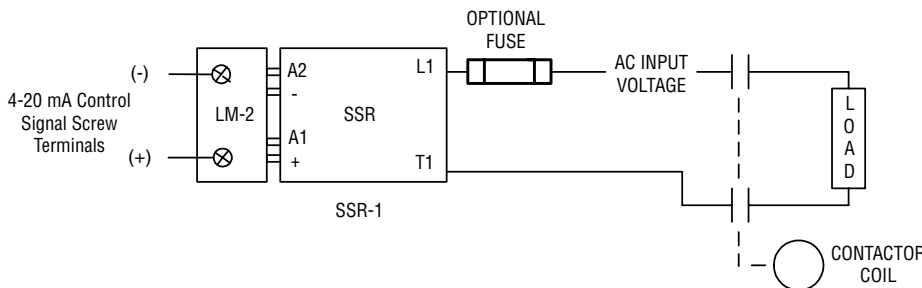
Specifications

Input 4 - 20 mA
 Time Base 3 Cycle Resolution
 Compliance Voltage Requirement 6.4 VDC (320 ohms @ 20 mA)
 Span & Linearity Better than 2%
 Ambient Temperature 32 - 104°F
 Dimensions 1.25"W x 1.75"L x .75"D

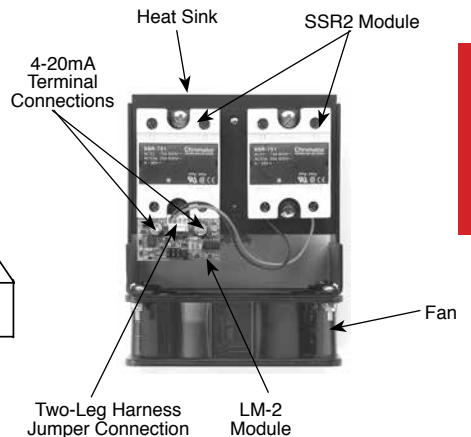
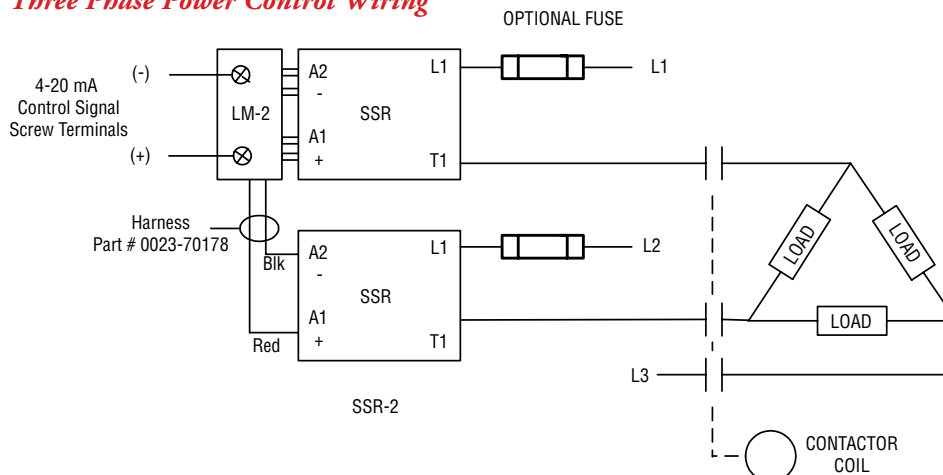
Stock PCN Chart

Model	PCN
0135-28144	341260

Single Phase Power Control Wiring



Three Phase Power Control Wiring



SCR COMPONENTS

Max VI Multi-Zone Power Controller

- Conservative Thermal Design
- Isolated Bonded Fin Heatsink
- 25 - 75 Amp ratings
- 42 - 600 VAC operational voltage
- Zero Cross and Phase Fired
- Control Inputs:
 - 4 - 32 VDC
 - 24 - 275 VAC
 - 24 - 190 VDC
 - 4 - 20mA
- Self-Lifting Terminals
- LED Status Indicator
- IP20 Touch Protection Cover
- Single Phase
 - Zero Fire and Phase Control
- Three Phase, 2-Leg
 - Zero Fire Only
- Three Phase, 3-Leg
 - Zero Fire Only



Description

The Chromalox MAX VI Multi-Zone SCR Power Controller consists of (6) SCR's mounted on a highly efficient, fan cooled heatsink. The MAX VI heatsink features an all-metal bonded-fin design. Bonded-fin heatsinks have up to three times the cooling area of a conventional aluminum extrusion and therefore can dissipate more heat. Additionally, bonded-fin heatsinks offer a much smaller footprint. The MAX VI offers the flexibility for (6) Single Phase Zero-Cross or Phase Fired Controllers. Additionally, the Zero-Cross mode can be configured into (3) Three Phase 2-leg controllers, or (2) Three Phase 3-leg controllers. The MAX VI offers current ratings of 25, 50, and 75 amps at 40°C and Voltage ratings up to 600 VAC.

The MAX VI unit is fan cooled and provides up to 450 Amps of control power with a footprint dimension of 14.75" L x 9" W x 6.5" D. The MAX VI easily bolts to a chassis plate and all load wiring can dress down one side of the heatsink and all control wiring can dress down the other side. Each SCR incorporates a LED status indicator and IP20 touch protection removable cover.

The benefits from Chromalox MAX VI SCR controller are quick and low cost installation, reduced panel space, increased heater life due to fast cycling, and easy replacements for mechanical and mercury contactors.

Applications

- Electric Ovens
- Plastics Machinery
- Packaging Equipment
- Food and Beverage Processing Equipment
- Platen Heaters
- Transformer coupled loads
- Resistance Heating
- Contactor Replacement
- Mercury Relay Replacement

Max VI Multi-Zone Power Controller *(cont'd.)*



Specifications

Control Modes: Single Phase, Three-Phase 2-Leg or Three-Phase 3-Leg Zero-cross, On/Off or Time Proportional, Phase Angle Single Phase Only

Command Signals: On/Off:
4.5 - 32 VDC
24 - 265 VAC
24 - 190 VDC
Linear:
4 - 20mA

Line Voltage: 42 - 600 VAC
Zero-Cross Mode; 230 or 600 VAC Phase Angle Mode

Line/Load Self Lifting Terminals. Connections: Output terminals can handle cables up to #6AWG

Load Current: 25, 50, 75 Amps @ 40°C (104°F)

Cooling: Forced Air, Fan Cooled 120 VAC, 17 VA. Terminal provided for separate fan power

Mounting: Panel Mount, any orientation.

Weight: 11.5kg (12 lbs.)

Model **MAXVI** Multi-Zone Power Controller

MAXVI

The MAX VI Multi-Zone SSR power pak consists of (6) SSR's mounted on a highly efficient, fan cooled heatsink. The MAX VI can be configured as (6) single-phase, (3) three-phase 2-leg or (2) three-phase 3-leg controllers. MAX VI offers On/Off, Time Proportional, and Single-Phase, Phase Fired configurations. The Chromalox MAX VI offers the following standard features: 40°C Ambient Rating, Zero-Voltage Turn-On or Phase Angle Fired designs, LED Status Indicator, IP20 Touch Protection, Operational Ranges up to 600 VAC, Self-Lifting Terminals, and dv/dt protection.

Code Current @ 40°C (104°F) Ambient

Code	Current	Per SSR	Total
25	25 Amp	Per SSR	150 Amp Total
50	50 Amp	Per SSR	300 Amp Total
75	75 Amp	Per SSR	450 Amp Total

Code Input Control Voltage

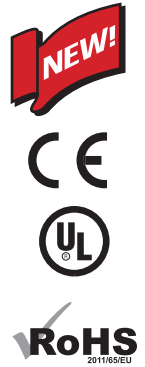
1	4.5 - 32 VDC (DC logic Zero Cross Fired)
2	24 - 265 VAC or 24 - 190 VDC (AC/DC logic Zero Cross Fired)
3	4 - 20 mA, 7.6 VDC Minimum (Time Proportioning Single Phase Zero Cross Fired)
4	4 - 20 mA, 15.2 VDC Minimum (Time Proportioning Three Phase 2-Leg Zero Cross Fired)
5	4 - 20 mA (Single Phase, Phase Angle Fired 90-280 VAC)
6	4 - 20 mA (Single Phase, Phase Angle Fired 330-660 VAC)

MAXVI 25 1 Typical Model Number

Note: Fan Requires 120 VAC Power

ProtoAir IIoT Product Gateway C2i™

- IIoT Gateway Compatible with All Chromalox IIoT Enabled Products
- Fully Integrated Cloud Platform
- Remotely Access and Monitor Entire Chromalox Portfolio Anywhere
- Remote Troubleshooting from Chromalox Service Personnel
- LAN or BACnet Connectivity Options Available for Local Storage and Control
- Synchronize with 3rd Party Cloud Platforms with RESTful API
- SMS or Email Event Notification
- Customizable Dashboards
- Asset Mapping for Quick Reference of Location, System Health and Connectivity Status
- Wired, Wireless and Cellular Capabilities



Description

The Chromalox IIoT Gateway can be installed with any Chromalox IIoT enabled product to provide seamless real time connectivity to the cloud platform. Through the cloud platform users can customize their dashboard for quick access of critical system information or analytics. Asset mapping for global tracking of system location, health, and connection status can be referenced from anywhere to alleviate the unknown of remote monitoring.

Remote Troubleshooting

With approved access, Chromalox service technicians can even perform remote troubleshooting to save time and money. Locations that do not permit cloud based services can still benefit from the Chromalox IIoT gateway through its local LAN or BACnet connectivity options, permitting up to 30 days of on site storage along with one year of web storage for trend analysis. Even 3rd party Cloud based services can be used with the Chromalox IIoT gateway through RESTful API.

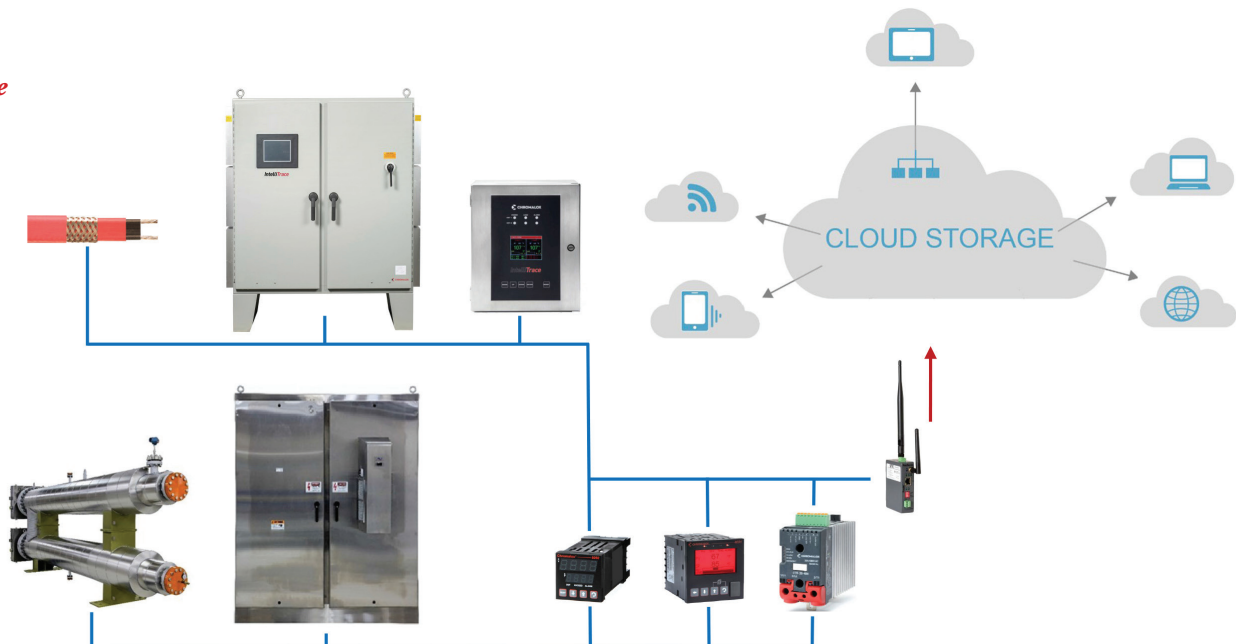
IIoT Enabled Products

Chromalox IIoT enabled products stretch across all of our product segments, and feature any device with Ethernet or Modbus capability which includes heat trace panels and controls, standalone temperature and power controls, and our Direct Connect Technology platform. The Chromalox IIoT Gateway is one common device that can be used across your entire Chromalox product portfolio.

Connectivity

The Chromalox IIoT Gateway has a number of different connectivity options which includes hard wired to local network behind firewall, hard wired with internet access to the cloud, WIFI with internet access to cloud, and Cellular access via separately purchased SIM card. Over 140 communication protocols are supported for connection to any BMS or automation protocol, so no matter what connection option is needed, Chromalox has an IIoT Gateway to fit.

Example

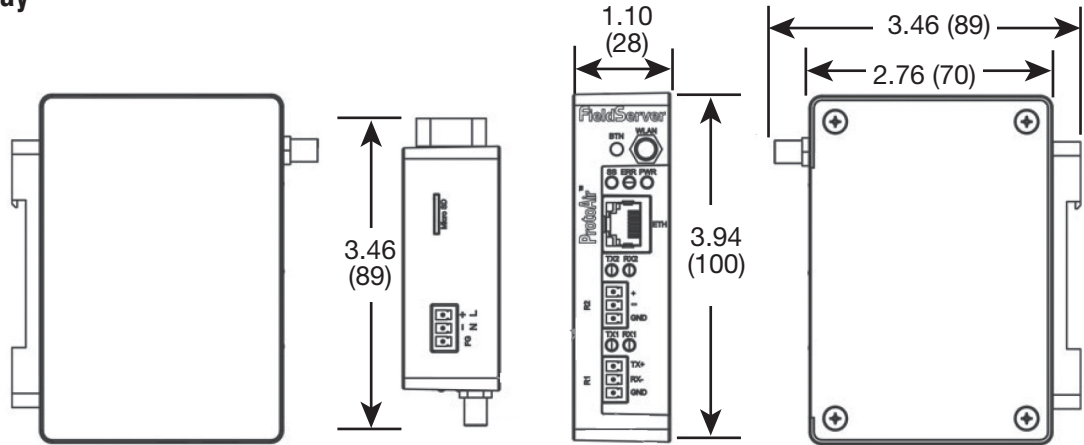


ProtoAir

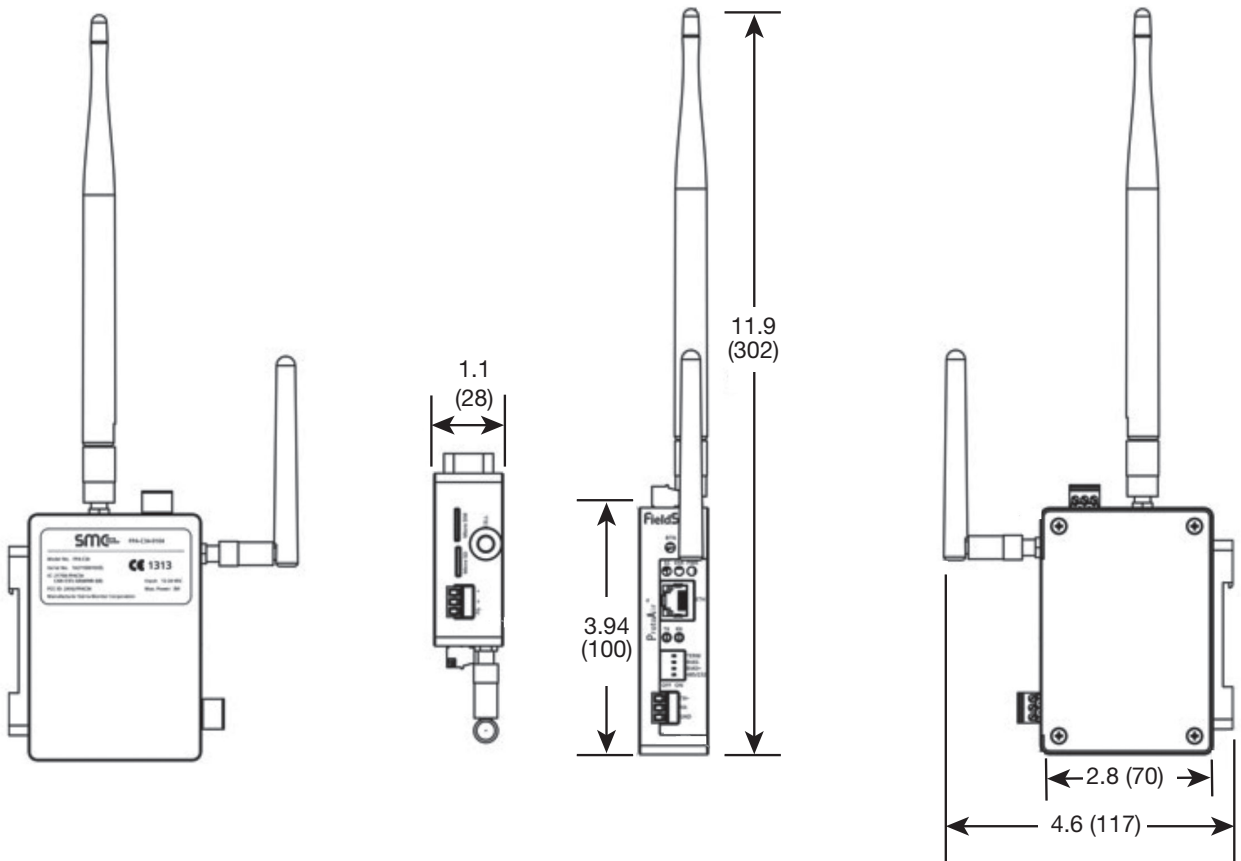
IIoT Product Gateway (cont'd.)

Dimensions In. (mm)

Local Network Gateway



Cellular Network Gateway



ProtoAir IIoT Product Gateway (*cont'd.*)

Specifications

Electrical Specifications	ProtoAir	ProtoAir Cell
Electrical Connections	One 3-pin Phoenix connector with: RS-485 (Tx+ / Rx- / gnd) One 3-pin Phoenix connector with: Power port (+ / - / Frame-gnd) One Ethernet 10/100 BaseT port	One 3-pin Phoenix connector with: RS-485 (Tx+ / Rx- / gnd) One 3-pin Phoenix connector with: Power port (+ / - / Frame-gnd) One Ethernet 10/100 BaseT port
Power Requirements	Input Voltage: 12-24VDC or 24VAC Power Rating: 2.5 Watts W44 Current draw: @ 12V, 240 mA	Input Voltage: 12-24VDC Power Rating: 2.5 Watts C34 Current draw: @ 12V, 670 mA
Approvals	CE and FCC Class B & C Part 15, UL 60950, WEEE Compliant, IC Canada, RoHS Compliant, PTCRB and CTIA	CE and FCC Class B & C Part 15, TUV approved UL 60950, IC Canada, RoHS Compliant, PTCRB and CTIA
Physical Dimensions	4 x 1.1 x 2.7 in (10.16 x 2.8 x 6.8 cm)	4 x 1.1 x 2.7 in (10.16 x 2.8 x 6.8 cm)
Weight	0.4 lbs (0.2 Kg)	0.4 lbs (0.2 Kg)
Operating Temperature	-20°C to 70°C (-4°F to 158°F)	-20°C to 70°C (-4°F to 158°F)
Humidity	10-95% RH non-condensing	10-95% RH non-condensing
Wi-Fi 802.11 b/g/n	Frequency: 2.4 GHz Channels: 1 to 11 (inclusive) Antenna Type: SMA Encryption: TKIP, WPA & AES	Frequency: 2.4 GHz Channels: 1 to 11 (inclusive) Antenna Type: SMA Encryption: TKIP, WPA & AES
Cellular 1F	Not Applicable	Features: 3G & GPS Antenna Type: SMA HSDPA: Up to 21.0 Mbps HSUPA: Up to 5.76 Mbps

Stocked Items

Part Number	PCN	Description
ProtoAir	390416	Local Network Wired/Wireless Gateway
ProtoAir Cell	390424	Cellular Network Wireless Gateway

Panel Selection Guide

Low Current SCRs (<110A)

Model Number	4214	4224	4168	4268	4532	4534	4537
Mounting	Wall	Wall	Wall	Wall	Wall	Wall	Wall
Power Control	SSR	SSR	SCR with External Heat Sink	SCR with External Heat Sink	SCR	SCR	SCR
Disconnect	OPTION	OPTION	OPTION	OPTION	STD	STD	STD
Shut down Device	Contactora	Contactora	Contactora	Contactora	Contactora	Contactora	Contactora
Load Fusing			OPTION	OPTION			
Voltage	120 - 600	120 - 600	120 - 600	120 - 600	120-480	120-480	120-480
Max. Current (@40°C)	30	30	65	65	90	30	45
Environment	NEMA 4/12	NEMA 4/12	NEMA4/12	NEMA 4/12	NEMA 1(2)	NEMA 4	NEMA 7
Temp Control	6040	6040	6040, 4040 or 4080	6040, 4040 or 4080	6040, 4040 or 4080	6040, 4040 or 4080	6040, 4040 or 4080
Overtemp Control	6050	6050	6050 or 4050	6050 or 4050	6050 or 4050	6050 or 4050	6050 or 4050
Phase	Single	3 Phase,2-leg	Single	3 Phase,2-leg	3 Phase,2-leg	3 Phase,2-leg	3 Phase,2-leg
Circuits	1	1	1	1	1	1	1
Options	Main Disconnect, Ground Fault Monitor, Enclosure Heater	Main Disconnect, Ground Fault Monitor, Enclosure Heater	Main Disconnect, Ground Fault Monitor, Enclosure Heater	Main Disconnect, Ground Fault Monitor, Enclosure Heater	Ground Fault Monitor, Control Pot Input	Ground Fault Monitor, Enclosure Heater, Control Pot Input	Ground Fault Monitor, Enclosure Heater, NEMA 4 Gasket
Agency Approvals	UL,cUL	UL,cUL	UL,cUL	UL,cUL	UL,cUL	UL,cUL	
Page	H-105	H-105	H-107	H-107	H-110	H-110	H-110

High Current SCRs (30 to 1200A)

Model Number	4131	4132	4133	4232/33	4235	4236	IntelliPANEL
Mounting	Wall	Wall	Wall	Wall or Floor Mount	Wall	Wall	Wall or Floor Mount
Power Control	MaxPac	MaxPac	MaxPac	MaxPac	SCR with External Heat Sink	SCR with External Heat Sink	MaxPac
Disconnect				STD	STD	STD	STD
Shut down Device				Shunt Trip	Shunt Trip	Shunt Trip	Shunt Trip
Load Fusing				OPTION	STD	STD	OPTION
Voltage	120-600	120-600	120-600	208-600	208-600	208-600	208-600
Max. Current (1)	650	650	650	1200	432	432	1200
Environment	NEMA 1(2)	NEMA 1(2)	NEMA 1(2)	NEMA 1(2)	NEMA 4	NEMA 4X	NEMA 1
Temp Control				4040 or 4080	4040 or 4080	4040 or 4080	Touch Screen
Overtemp Control				4050 (up to 3)	4050 (up to 3)	4050 (up to 3)	6050 (up to 3)
Phase	Single Phase	3 Phase, 2-leg	3 Phase, 3-leg	3 Phase, 2-leg, 3-leg	3 Phase, 2-leg	3 Phase, 2-leg	3 Phase, 2-leg, 3-leg
Circuits	1	1	1	1 or 2 SCRs, up to 10 ckts	Up to 6	Up to 6	Up to 16
Options	Multimeter, Shorted SCR Detection, Ground Fault Monitor	Multimeter, Shorted SCR Detection, Ground Fault Monitor	Multimeter, Shorted SCR Detection, Ground Fault Monitor	Multimeter, Shorted SCR Detection, Ground Fault Monitor, Floor Stand Kit	Multimeter, Shorted SCR Detection, Ground Fault Monitor, Floor Stand Kit	Multimeter, Shorted SCR Detection, Ground Fault Monitor, Floor Stand Kit	Communications, Shut Down Contactors
Agency Approvals	UL,cUL	UL,cUL	UL,cUL	UL,cUL	UL,cUL	UL,cUL	UL,cUL, CE
Page	H-103	H-103	H-103	H-114	H-114	H-114	H-119

(1)All current ratings at 40°C external to enclosure

(2) Ventilating NEMA 12 enclosure derates panel to NEMA 1

Panel Selection Guide *(cont'd.)*

Contactor

Model Number	4464	4466	4468	4463	4477	4432	4436
Mounting	Wall	Wall	Wall	Wall	Wall	Wall	Wall
Power Control	Contactor	Contactor	Contactor	Contactor	Contactor	Contactor, Optional 1 Ckt SSR	Contactor, Optional 1 Ckt SSR
Disconnect	OPTION	OPTION	OPTION	STD	STD	STD	STD
Shut down Device	Contactor	Contactor	Contactor	Contactor	Ckt. Breaker	Contactor	Contactor
Load Fusing	OPTION	OPTION	OPTION				
Voltage	120-480	120-480	120-480	240, 480	240, 480	208-480	208-480
Max. Current (1)	100	100	100	40/zone	75	576	576
Environment	NEMA 4X (304 SS)	NEMA 4 (Painted Steel)	NEMA 4X (Fiberglass®)	NEMA 4X	NEMA 7/4	NEMA 12,4	NEMA 4X
Temp Control	6040 or 4040	6040 or 4040	6040 or 4040	6040	6040 or 4040	4040	4040
Overtmp Control	6050 or 4050	6050 or 4050	6050 or 4050		6050 or 4050	4050	4050
Phase	3 Phase	3 Phase	3 Phase	3 Phase	3 Phase	3 Phase	3 Phase
Circuits	1	1	1	4 Zones	1	6	6
Options	Enclosure Heater	Enclosure Heater	Enclosure Heater		Enclosure Heater, Ground Fault Monitor, Enclosure View Window	Enclosure Heater, Multimeter, Stepper, Ground Fault Monitor, "Z" Air Purge Kit	Enclosure Heater, Multimeter, Stepper, Ground Fault Monitor, "Z" Air Purge Kit
Agency Approvals	UL,cUL	UL,cUL	UL,cUL	UL,cUL	UL,cUL	UL,cUL	UL,cUL
Page	H-124	H-124	H-124	H-126	H-130	H-127	H-127

Heat Trace Controls & Panels

Model Number	DTS-HAZ, DTS-HAZ-DC	ITC1, ITC2	ITAS-6/36	ITAS-EXT-6/36	ITLS-6/36
Mounting	Pipe or Wall	Wall	Wall or Floor	Wall or Floor	Wall & Floor
Power Control	SSR	SSR	SSR	SSR	SSR
Voltage	100-277	100-277	120-600	120-600	120-600
Max Current (1)	30 Amps per Circuit	40 Amps per Circuit	40 Amps per Circuit	40 Amps per Circuit	40 Amps per Circuit
Environment	NEMA 4X	NEMA 4X	NEMA 4 or NEMA 4X	NEMA 4 or NEMA 4X	NEMA 4 or NEMA 4X
Temp Control	Integral Controller	IntelliTRACE®	IntelliTRACE® Controller	Controlled by ITAS Base Controller	IntelliTRACE®
Phase	1 Phase	1 Phase	1 & 3 Phase	1 & 3 Phase	1 & 3 Phase
Circuits	1	1 or 2	6,12,18,24,30,36	6,12,18,24,30,36	6,12,18,24,30,36
Standard Features	Soft Start, AC or DC Alarm, Programmable Setpoint, Hi/Lo Temp. & Large Display	Soft Start, Temp., Current, Ground Fault & Sensor Monitoring & Alarms, Communications, 1 or 2 RTD inputs/Ckt, Large TFT Display	Temperature, GFEP & Current Monitoring & Alarms, Soft Start	Temperature, GFEP & Current Monitoring & Alarms, Soft Start	Temperature, GFEP & Current Monitoring & Alarms, Soft Start
Options	Wall Mounting	Ethernet IP, Wireless Communications	Main Disconnect, Enclosure Heater	Main Disconnect, Enclosure Heater	Customizable I/O Mapping, Multiple Sensor Inputs per Circuit, Main Disconnect, Enclosure Heater
Agency Approvals	UL, cUL, CE, ATEX, IECEx	UL, cUL, CE	UL, cUL (CE Optional)	UL, cUL (CE Optional)	UL, cUL (CE Optional)
Page	H-133	H-135	H-138	H-138	H-138

CONTROL SYSTEMS

Panel Selection Guide *(cont'd.)*

Heat Trace Controls & Panels *(cont'd.)*

Model Number	ITLS-EXT-6/36	ITASC1D2-6/36	ITASC1D2-EXT-6/36	ITLSC1D2-6/36	ITLSC1D2-EXT-6/36
Mounting	Wall & Floor	Wall or Floor	Wall or Floor	Wall or Floor	Wall or Floor
Power Control	SSR	SSR	SSR	SSR	SSR
Voltage	120-600	120-600	120-600	120-600	120-600
Max Current (1)	40 Amps per Circuit	40 Amps per Circuit	40 Amps per Circuit	40 Amps per Circuit	40 Amps per Circuit
Environment	NEMA 4 or NEMA 4X	NEMA 4 or NEMA 4X (Class I, Div. 2)	NEMA 4 or NEMA 4X (Class I, Div. 2)	NEMA 4 or NEMA 4X (Class I, Div. 2)	NEMA 4 or NEMA 4X (Class I, Div. 2)
Temp Control	Controlled by ITLS Base Controller	IntelliTRACE® Controller	Controlled by ITASC1D2 Base Controller	IntelliTRACE® Controller	Controlled by ITLSC1D2 Base Controller
Phase	1 & 3 Phase	1 & 3 Phase	1 & 3 Phase	1 & 3 Phase	1 & 3 Phase
Circuits	6,12,18,24,30,36	6,12,18,24,30,36	6,12,18,24,30,36	6,12,18,24,30,36	6,12,18,24,30,36
Standard Features	Temperature, GFEP & Current Monitoring & Alarms, Soft Start	Temperature, GFEP & Current Monitoring & Alarms, Soft Start	Temperature, GFEP & Current Monitoring & Alarms, Soft Start	Temperature, GFEP & Current Monitoring & Alarms, Soft Start	Temperature, GFEP & Current Monitoring & Alarms, Soft Start
Options	Customizable I/O Mapping, Multiple Sensor Inputs per Circuit, Main Disconnect, Enclosure Heater	Main Disconnect, Enclosure Heater	Main Disconnect, Enclosure Heater	Customizable I/O Mapping, Multiple Sensor Inputs per Circuit, Main Disconnect, Enclosure Heater	Customizable I/O Mapping, Multiple Sensor Inputs per Circuit, Main Disconnect, Enclosure Heater
Agency Approvals	UL, cUL (CE Optional)	UL, cUL (CE Optional)	UL, cUL (CE Optional)	UL, cUL (CE Optional)	UL, cUL (CE Optional)
Page	H-138	H-147	H-147	H-147	H-147

Heat Trace Controls & Panels *(cont'd.)*

Model Number	FPAS	FPLS	FPASM	FPLSM
Mounting	Wall	Wall	Wall	Wall
Power Control	Contactors	Contactors	Contactors	Contactors
Voltage	120, 208, 240, 277	120, 208, 240, 277	120, 208, 240, 277	120, 208, 240, 277
Max Current (1)	100/225	100/225	100/225	100/225
Environment	NEMA 4 or Optional NEMA 4X	NEMA 4 or Optional NEMA 4X	NEMA 4 or Optional NEMA 4X	NEMA 4 or Optional NEMA 4X
Temp Control	6040 (Optional)		6040 (Optional)	
Phase	1, 3 Phase	1, 3 Phase	1, 3 Phase	1, 3 Phase
Circuits	120, 208, 240 VAC Load Voltage Systems: 12, 20, 30 or 40 Circuits 277 VAC Load Voltage Systems: 18, 30 or 42 Circuits		120, 208, 240 VAC Load Voltage Systems: 12, 20, 30 or 40 Circuits 277 VAC Load Voltage Systems: 18, 30 or 42 Circuits	
Standard Features	Ground Fault Monitor, Individual Circuit Breakers	Ground Fault Monitor, Individual Circuit Breakers	Ground Fault Monitor, Individual Circuit Breakers, Sentinel Monitoring System	Ground Fault Monitor, Individual Circuit Breakers, Sentinel Monitoring System
Options	Enclosure Heater, Disconnect Switch, Temperature Controller, Z-Purge System for Class I, Div 2.	Enclosure Heater, Disconnect Switch, Z-Purge System for Class I, Div 2.	Enclosure Heater, Disconnect Switch, Temperature Controller, Z-Purge System for Class I, Div 2.	Enclosure Heater, Disconnect Switch, Z-Purge System for Class I, Div 2.
Agency Approvals	UL, cUL	UL, cUL	UL, cUL	UL, cUL
Page	H-161	H-161	H-161	H-161



4130 Series MaxPac SCR Power Controllers in an Enclosure

- **MaxPac Series SCR Power Controllers in an Enclosure**
- **Allows Addition of SCR to a System Without Rearranging Existing Equipment**
- **Rugged NEMA 1 or NEMA 12 Construction Enclosures***
- **Enclosure Ventilated and Fan Cooled to be Installed in Ambient of 40°C (104°F) with SCR at 100% Output**

*NEMA 12 Available with additional venting measures. Consult Factory.

Ordering Information

Complete the Model Number using the Matrix provided.

Note: Additional control panel options available. See pages H-143 to H-145.

¹ For information on the SCR component, see MaxPac I in the Controls Section, tabbed SCR Component

Description

The 4130 Series panels provide a simple-to-install solution for adding an SCR to an existing heater control system. The panels are a Chromalox model MaxPac I, MaxPac II or MaxPac III in an enclosure. Since SCRs generate heat,

the panel is ventilated and fan cooled to allow the selected MaxPac controller to operate at 100% output with an ambient of 40°C (104°F).

Model

4131 Single Phase Zero Fired SCR Power Control Panel

Panel Configuration

cUL and UL Listed Single Phase SCR Power Control Panel. Features: Factory pre-wired for quick installation, NEMA 1 or NEMA 12 rated Enclosure for Indoor Applications, Forced Air Cooling, Heat-Sink Overtemperature Lamp, Terminal Block for customer supplied 120 VAC Control Power. Options Include: Ground Fault Monitor, Shorted SCR Detection, Multimeter: Combination Ammeter with Current Transformer and Voltmeter with Potential Transformer.

Code Current @ 40°C (104°F) Ambient

		SCR Component ¹	Enclosure Dimensions
01	100 Amp	MXPCI-3-02-1-1-L0-F01-0	(24"H x 24"W x 16"D)
03	150 Amp	MXPCI-3-04-1-1-L0-F01-0	(24"H x 24"W x 16"D)
05	200 Amp	MXPCI-3-06-1-1-L0-F02-0	(24"H x 24"W x 16"D)
07	300 Amp	MXPCI-3-08-1-1-L0-F03-0	(36"H x 30"W x 16"D)
09	400 Amp	MXPCI-3-10-1-1-L0-F04-0	(36"H x 30"W x 16"D)
11	550 Amp	MXPCI-3-12-1-1-L0-F05-0	(36"H x 30"W x 16"D)
13	650 Amp	MXPCI-3-14-1-1-L0-F06-0	(36"H x 30"W x 16"D)

Code Voltage

1	120 - 480 VAC
2	575/600 VAC

Code Ground Fault Sensing Option

0	None
1	Ground Fault Monitor & Shutdown includes Illuminated Reset Switch

Code Options

0	None
3	Shorted SCR Detection
4	Multimeter (Volts & Current)
6	Multimeter (Volts & Current) & Shorted SCR Detection

4131- 03 1 1 3 Typical Model Number

Technical Notes:

Ventilated NEMA 12 Enclosure Derates Enclosure to NEMA 1. Consult Factory for 575 VAC Applications and Pricing

4130 Series MaxPac SCR Power Controllers in an Enclosure *(cont'd.)*

Ordering Information

Complete the Model Number using the Matrix provided.

Note: Additional control panel options available. See pages H-143 to H-145.

² For information on the SCR component, see MaxPac II (4132) or MaxPac III in the Controls Section, tabbed SCR Component

*NEMA 12 Available with additional venting measures. Consult Factory.

Model

4132 Three Phase Two-Leg Zero Fired SCR Power Control Panel

Panel Configuration

cUL and UL Listed Three Phase SCR Power Control Panel. Features: Factory pre-wired for quick installation, NEMA 1 or NEMA 12 rated Enclosure for Indoor Applications, Forced Air Cooling, Heat-Sink Overtemperature Lamp, Terminal Block for customer supplied 120 VAC Control Power. Options Include: Ground Fault Monitor, Shorted SCR Detection, Multimeter: Combination Ammeter with Current Transformer & Voltmeter with Potential Transformer.

Code Current @ 40°C (104°F) Ambient

Code	Current @ 40°C (104°F) Ambient	SCR Component ²	Enclosure Dimensions
01	100 Amp	MXPCII-3-02-1-1-LO-F01-0	(36"H x 30"W x 16"D)
03	150 Amp	MXPCII-3-04-1-1-LO-F01-0	(36"H x 30"W x 16"D)
05	200 Amp	MXPCII-3-06-1-1-LO-F02-0	(36"H x 30"W x 16"D)
07	300 Amp	MXPCII-3-08-1-1-LO-F03-0	(36"H x 30"W x 16"D)
09	400 Amp	MXPCII-3-10-1-1-LO-F04-0	(36"H x 30"W x 16"D)
11	550 Amp	MXPCII-3-12-1-1-LO-F05-0	(36"H x 30"W x 16"D)
13	650 Amp	MXPCII-3-14-1-1-LO-F06-0	(36"H x 30"W x 16"D)

Code Voltage

1	120 - 480 VAC
2	575/600 VAC

Code Ground Fault Sensing/Interrupt Option

0	None
1	Ground Fault Monitor & Shutdown includes Illuminated Reset Switch

Code Options

0	None
3	Shorted SCR Detection
4	Multimeter (Volts & Current)
6	Multimeter (Volts & Current) and Shortened SCR Detection

4132- 03 1 1 0 Typical Model Number

Model

4133 Three Phase Three-Leg Zero Fired SCR Power Control Panel

Panel Configuration

cUL and UL Listed Three Phase SCR Power Control Panel. Features: Factory pre-wired for quick installation, NEMA 1 or NEMA 12 rated Enclosure for Indoor Applications, Forced Air Cooling, Heat-Sink Overtemperature Lamp, Terminal Block for customer supplied 120 VAC Control Power. Options Include: Ground Fault Monitor, Shorted SCR Detection, Ammeter with Phase Selector Switch, and Voltmeter with Phase Selector Switch.

Code Current @ 40°C (104°F) Ambient

Code	Current @ 40°C (104°F) Ambient	SCR Component ²	Enclosure Dimensions
01	100 Amp	MXPCIII-3-02-1-1-LO-F01-0	(36"H x 30"W x 16"D)
03	150 Amp	MXPCIII-3-04-1-1-LO-F01-0	(36"H x 30"W x 16"D)
05	200 Amp	MXPCIII-3-06-1-1-LO-F02-0	(36"H x 30"W x 16"D)
07	300 Amp	MXPCIII-3-08-1-1-LO-F03-0	(36"H x 30"W x 16"D)
09	400 Amp	MXPCIII-3-10-1-1-LO-F04-0	(36"H x 30"W x 16"D)
11	550 Amp	MXPCIII-3-12-1-1-LO-F05-0	(48"H x 36"W x 16"D)
13	650 Amp	MXPCIII-3-14-1-1-LO-F06-0	(48"H x 36"W x 16"D)

Code Voltage

1	120 - 480 VAC
2	575/600 VAC

Code Ground Fault Sensing/Interrupt Option

0	None
1	Ground Fault Monitor & Shutdown includes Illuminated Reset Switch

Code Options

0	None
3	Shorted SCR Detection
4	Multimeter (Volts & Current)
6	Multimeter (Volts & Current) and Shortened SCR Detection

4133- 03 1 1 0 Typical Model Number