MaxPac™ II

Three Phase, 2-Leg SCR Power Pak

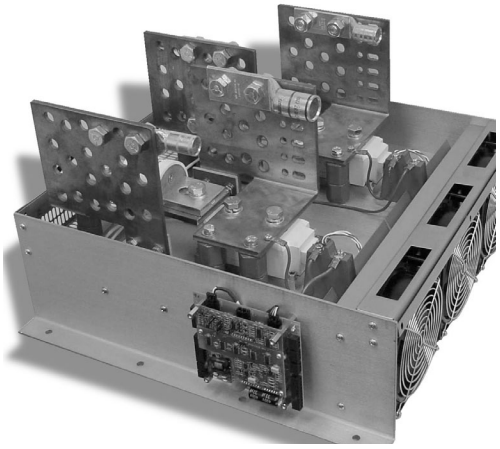
Features:

- 120-575 Vac @ 100-1200 Amp
- Zero Cross-Over Firing
- Isolated Control Circuit
  - On/Off Control Inputs:
    120 Vac, 240 Vac, 5-32 Vdc
    Dry Contact Closure
  - Proportional (DOT firing) Inputs:
    4-20 mA, 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 Shutdown
- 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)

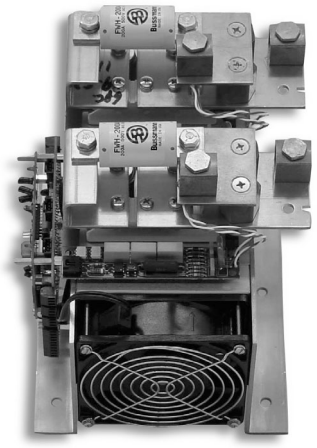
CE c UL us

ISO 9001 APPROVED • CERT. NO. A3164

Chromalox®
PRECISION HEAT AND CONTROL



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, I^2t fusing and universal approvals make it an excellent candidate for your product.

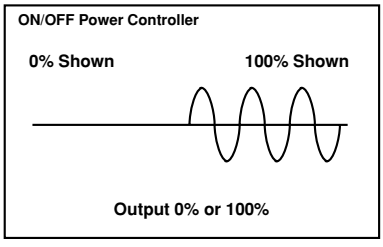
Typical Applications:

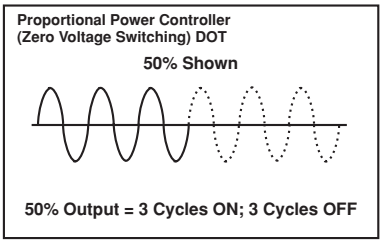
- Resistive Heaters
- Electric Ovens
- Furnaces
- Kilns
- Environmental Chambers

The MaxPac II is a solid state, highly versatile power pak with optional plug-in proportional Firing and Shorted SCR Detection Boards. Firing techniques include "ON/OFF Power Control" (Contactor) and "Proportional Power Control" (Zero Voltage Switching, DOT fire).

Chromalox's exclusive DOT (Demand Oriented Transfer) firing switches the fewest number of cycles to provide the most precise zero crossover 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" cycles 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.

Wave Form Cycle Rate



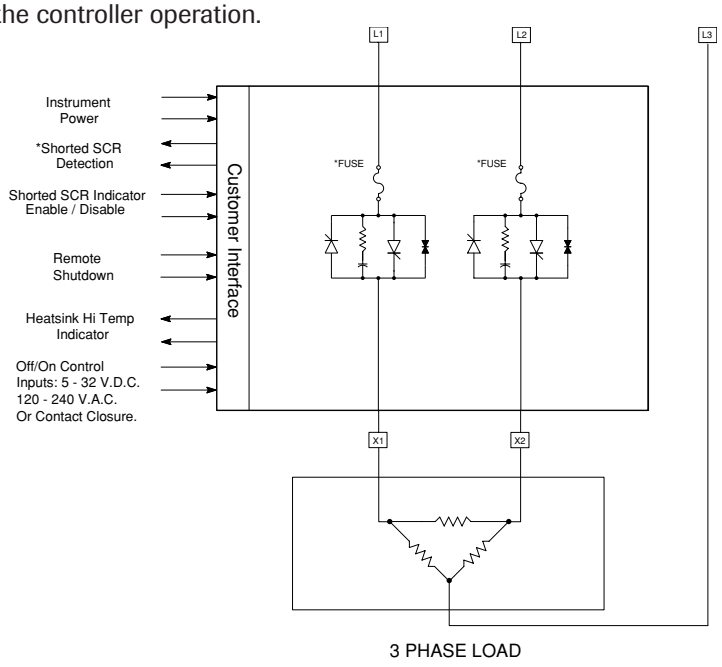


MaxPac™ II Power Pak

Solid State SCR Power Controls for Two Types of Applications

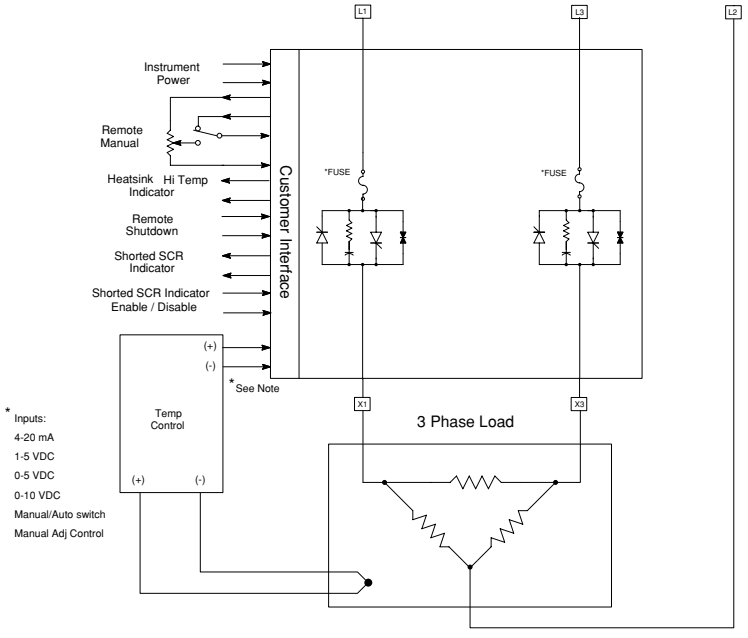
ON/OFF Control (Solid State Contactor)

Capable of directly replacing a three-phase mechanical contactor for maintenance-free operation or can be used in conjunction with PID control. With true zero voltage switching RFI (Radio Frequency Interference) is virtually eliminated. The MaxPac II provides LEDs for visual indication of the controller operation.



Proportional Power Controller

This proportional power controller utilizes the “Zero Voltage Switching” technique to modulate power for a wide range of resistive loads. The unit accepts a Remote Auto/Manual Switch and Potentiometer Control Kit (optional). Output power modulation is accomplished by Chromalox’s exclusive Demand Oriented Transfer (DOT) system which virtually eliminates RFI. Thermal cycling and heater degradation are minimized with the system’s fast response time.



MaxPac™ II Power Pak

Specifications

Control Inputs
Accepts all of the following as standard:

On/Off Control
Signal Input

120 Vac ±10%
230 Vac ±10%
5-32 Vdc
Contact Closures

Proportional Control

Signal Input	Input Impedance
4-20 mA	250 Ohms
1-5 Vdc	10k Ohms or greater
0-5 Vdc	10k Ohms or greater
0-10 Vdc	10k Ohms or greater

Optional Remote Manual Adjust
Auto/Manual Switch

Instrument Power ..... 120 or 230 Vac 50/60 Hz

Output Voltage ..... 0-99% RMS line voltage (Eo=Vsupply -1.5V SCR forward drop)

Resolution (Prop.) ..... Better than 0.1%

Line Voltage ..... 60-575 Vac

Load Current Rating 100, 150, 200, 300, 400 550, 650, 800, 1000, 1200A

Ambient Temperature ..... 0-50˚C (32-122˚F)

SCR Capability ..... Dielectric withstand capability 1500V RMS min.

Surge Rating ..... Typically fifteen (15) times nominal RMS rating for 8.3 milliseconds

Isolation ..... SCR's isolation 2500V Input-output isolation 1500V

Heatsink ..... Ground potential up to 650 amps

High Temperature Indicator Output ..... MOSFET Output 100 mA @ supply voltage

Shorted SCR Indicator Output ..... MOSFET Output 100 mA @ supply voltage

Mechanical Features

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

Electrical Features

- Unit will Operate with 1 or 3 Phase loads and any Phase Sequence
- Balanced or Severely Unbalanced Loads including open Delta
- Optional I^2t Fusing
- PIV 1200V Min at 480 Vac
  PIV 1400V Min at 575 Vac
- Isolated Semiconductor Power Blocks are used an all Current Ratings up to 650 Amps

Safety Features

Personnel Safety

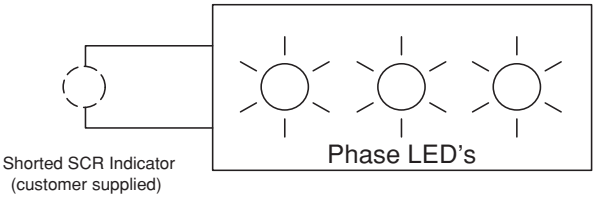
- Ground Potential Heat Sink up to 650 Amps
- SCR to Heat Sink Isolation up to 650 Amps
- Optional Touch-Safe Design

Equipment/Process Safety

- Input to Output Isolation
- Transient Overvoltage Protection, (dv/dt)
- I^2t Fusing (optional)
- Remote Shutdown Input
- Shorted SCR Detection (optional)

Shorted SCR Detection Option

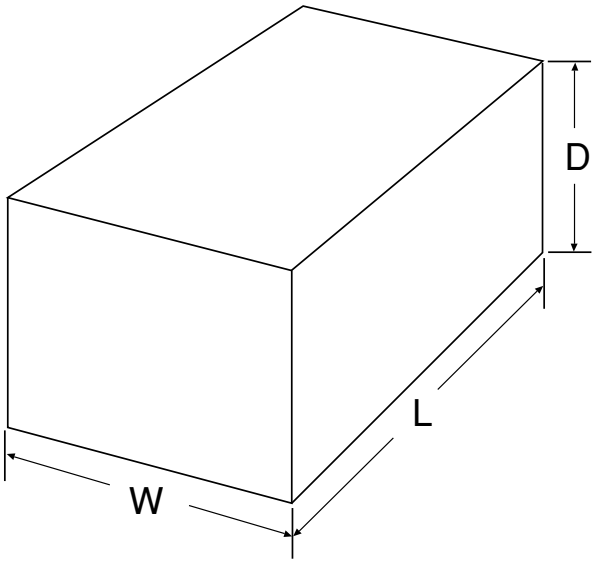
The MaxPac II, with the shorted SCR detection circuit, will monitor the output of the SCRs. If one fails shorted, the output will be activated and the LED on the circuit board will light. The LED indicates which phase has the shorted SCR.



Mounting Dimensions

MaxPac II Open

	Width	Length	Depth
Amps	W	L	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

	Width	Length	Depth
Amps	W	L	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

Enclosure Options

The MaxPac II can be installed in an enclosure by itself (see Model 4132), as part of a standard panel design (see Model 4232) or as part of a complete custom control system. Chromalox's UL panel shop and engineering staff can design, document and build a system to meet your power control requirements.

Ordering Information

Model	SCR Power Pack
MXPC II	3 Phase SCR Power Pack

Code	Control Configuration
1	On/Off Control Standard (Accepts: 120 Vac, 240 Vac, 5-32 Vac, Dry Contact Closure)
2	On/Off Control with Shorted SCR Detection
3	Proportional Control, DOT Firing (Accepts: 4-20 mA, 1-5 Vdc, 0-5 Vdc, 0-10 Vdc)
4	Proportional Control DOT with Shorted SCR Detection

Code	Current at 50˚C (122˚F)	
01	100 Amp	Open Design
02	100 Amp	Touch Safe Design
03	150 Amp	Open Design
04	150 Amp	Touch Safe Design
05	200 Amp	Open Design
06	200 Amp	Touch Safe Design
07	300 Amp	Open Design
08	300 Amp	Touch Safe Design
09	400 Amp	Open Design
10	400 Amp	Touch Safe Design
11	550 Amp	Open Design
12	550 Amp	Touch Safe Design
13	650 Amp	Open Design
14	650 Amp	Touch Safe Design
15	800 Amp	Open Design
16	1000 Amp	Open Design
17	1200 Amp	Open Design

Code	Line Voltage
1	120 Vac - 480 Vac
2	575 Vac

Code	Instrument Power
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 1 (#2 - 4/0)/connection
L2	200-300 Amp PAK 1 (1/0 - 500mcm)/connection

MXPC II -	3	04	2	1	L1	(Continued on next page)

Ordering Information (Continued)

MXPC II

Fusing Option (1)

For < 500 Vac Applications, Select One

F00 None
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 575Vac 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(1)

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

MXPC II -	**3**	**04**	**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 14ºF to 158ºF (-10ºC to 70ºC).
CE Application requires filters.

Chromalox Part Numbers

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

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

Note: NEMA standard two hole copper crimp lugs only.