

4230 Series

SCR Control Panels



- SCR-Zero Crossover Control
- 100 to 1200 Amps
- Louvered, Fan Cooled Enclosures
- Main Disconnect Switch with Shunt Trip
- 208-600 Volt
- Control Power Transformer
- 4232 NEMA 1 or NEMA 12
 - 2 Leg, 3 Phase
 - MaxPac II DOT Fired SCR
 - Shorted SCR Detection Option
 - SCR/Load Fusing
- 4233 NEMA 1 or NEMA 12
 - 3 Leg, 3 Phase
 - MaxPac III DOT Fired SCR
 - Shorted SCR Detection Option
 - SCR/Load Fusing
- 4235/36 NEMA 4 or 4X
 - 2 Leg, 3 Phase
 - Up to 6 Circuits
 - Load Management Option
 - Z Purge Option

Description

The 4230 Series of SCR Power Control Panels offers convenient, economical control of resistive loads and capabilities beyond the smaller, more compact 4530 series. An additional 46 Standard Options increase the application flexibility of the 4230 Series. These pre-engineered, pre-wired panels require only sensor, load and power supply connections - and totally eliminate the need to design your panel, specify and purchase separate components, and assemble them into a functioning power control system.

SCR power control efficiently and accurately proportions power to the resistive heating load. Unlike traditional contactor control, SCR's deliver:

- Reduced Power Cost
- Extended Heater Life
- Less Maintenance
- Improved Process Products
- Stable Process Temperature

4232/4233 Features

- Zero-crossover Distributed Fired SCR (DOT) with I²T fusing for SCR Protection
- Fan Cooling
- Load Fusing for Up to 16 Circuits
- Shunt Trip Disconnect

4235/4236 Features

- NEMA 4 and 4X Enclosures for Hosedown and Corrosive applications. (External Heatsinks Cool the SCRs)
- Up to 6 SCR Circuits
- Load Fusing Protects SCRs and Load

- Load Management Option: Distributes Firing of SCRs to Even Out the Demand. Great for Systems Using Generators.
- Z Purge Pressurization System for Class 1, Div. 2. Group C, D Environments

Common Features

- Ammeter and Voltmeter Combination
- Temperature Controller
- Overtemperature Controller with manual reset
- Ground Fault Monitor
- Fused Control Power Transformer
- Manual Disconnect Switch
- Power "ON" Pilot Lamp
- Automatic Shutdown Device for Overtemperature Protection
- Remote Shutdown Interlock Terminals
- Enclosure Heater with Anti-Condensation and Instrument Protection for Ambient Temperatures as low as 0°F
- Drawings for Record
- Installation and Operation Manual

Custom Panel Capability

In addition to the pre-engineered and field-proven standard control panels presented in this catalog, Chromalox has over 60 years of *custom power control systems* expertise. Working with world-scale engineering firms, military shipboard systems and the most demanding research institutes, Chromalox has encountered and conquered the challenges of even the most specialized requirements. This experience translates to efficient, economical solutions for virtually any heating and power control application.



4232

3-Phase, 2 Leg SCR Control Panels

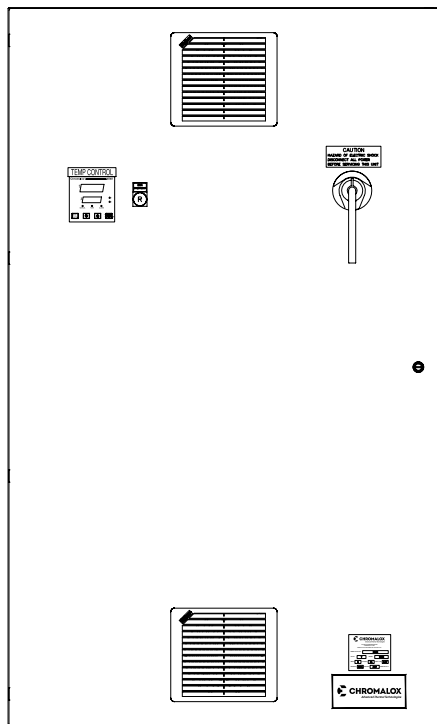
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Ordering Information

Complete the Model Number using the Matrix provided.

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



*Ground Fault detection requires grounded supply.

Technical Notes:

- ¹ Includes Chromalox Load Management Module
- ² Load Fuse Current Rating Reflects 125% of Actual Load Amps.
- ³ Panel Codes 15, 16, and 17 (Maximum Sixteen Circuits of Load Fusing)
- *Specify Number of Circuits (Maximum Eight Circuits of Load Fusing).
- *NEMA 12 available with additional venting measures. Consult factory.

Model

4232 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, Step-down Transformer with Primary & Secondary Fusing for 120 volt Control Circuit, NEMA 1 or NEMA 12 rated Enclosure for Indoor Applications, Forced Air Cooling, Main Magnetic Disconnect Switch with Shunt Trip Feature, Heat-Sink Overtemperature Lamp. Options Include: Process and Hi-Limit Controllers, Ground Fault Monitor, Sub-Circuit Fusing for Heater Load, Shorted SCR Detection, Multimeter (Amps & Volts) with Phase Selector Switch and Floor Stand Kit.

Code	Current @ 40°C (104°F) Ambient	SCR Component	Enclosure Dim. (HxWxD)
02	100 Amp	MXPCII-3-02-1-1-L0-F01-0	(60" x 36" x 12")
03	150 Amp	MXPCII-3-04-1-1-L0-F01-0	(60" x 36" x 12")
06	200 Amp	MXPCII-3-06-1-1-L0-F02-0	(60" x 36" x 12")
08	300 Amp	MXPCII-3-08-1-1-L0-F03-0	(60" x 36" x 12")
10	400 Amp	MXPCII-3-10-1-1-L0-F04-0	(72" x 36" x 12")
12	550 Amp	MXPCII-3-12-1-1-L0-F05-0	(72" x 36" x 12")
14	650 Amp	MXPCII-3-14-1-1-L0-F06-0	(72" x 36" x 12")
15 ¹	800 Amp	(2) MXPCII-3-10-1-1-L0-F04-0	(72" x 72" x 12") Floor Mount
16 ¹	1000 Amp	(2) MXPCII-3-12-1-1-L0-F05-0	(72" x 72" x 12") Floor Mount
17 ¹	1200 Amp	(2) MXPCII-3-14-1-1-L0-F06-0	(72" x 72" x 12") Floor Mount

Code	Voltage
1	208 VAC
2	240 VAC
3	380 VAC

Code	Process Controller Options
0	None
1	4040-AR0000 1/4 DIN SSR, Relay
2	4040-ARA110 1/4 DIN SSR, Relay, Retransmit, RS485, Remote Setpoint
3	4080-COARA-04000 1/4 DIN Graphic Display, SSR, Relay, Retransmit, Ethernet

Code	Overtemperature Controller Options
0	None
1	One 4050-1R000 1/4 DIN Fixed 5A Relay, Relay
2	Two 4050-1R000 1/4 DIN Fixed 5A Relay, Relay
3	Three 4050-1R000 1/4 DIN Fixed 5A Relay, Relay
4	One 4050-1RA10 1/4 DIN Fixed 5A Relay, Relay, Retransmit, RS485
5	Two 4050-1RA10 1/4 DIN Fixed 5A Relay, Relay, Retransmit, RS485
6	Three 4050-1RA10 1/4 DIN Fixed 5A Relay, Relay, Retransmit, RS485

Code	Ground Fault Sensing/Interrupt & Shorted SCR Detection Option
0	None
1	Shorted SCR Detection
2	Ground Fault Monitor & Shutdown, Illuminated Reset Switch(code 02-14)*
3	Ground Fault Monitor & Shutdown, Illuminated Reset Switch(code 15,16,17)
4	Ground Fault Monitor & Shorted SCR Detection(code 02-14)
5	Ground Fault Monitor & Shorted SCR Detection(code 15,16,17)

Code	Options
0	None
4	Multimeter (Volts & Current)

Code	Load Fusing Option ^{2,3} (*) No. of Circuits
9000	None
9010(*)	8 Amps/ Circuit (10 Amp fuse)
9015(*)	12 Amps/ Circuit (15 Amp fuse)
9020(*)	16 Amps/ Circuit (20 Amp fuse)
9025(*)	20 Amps/ Circuit (25 Amp fuse)
9030(*)	24 Amps/ Circuit (30 Amp fuse)
9035(*)	28 Amps/ Circuit (35 Amp fuse)
9040(*)	32 Amps/ Circuit (40 Amp fuse)
9045(*)	36 Amps/ Circuit (45 Amp fuse)
9050(*)	40 Amps/ Circuit (50 Amp fuse)
9060(*)	48 Amps/ Circuit (60 Amp fuse)
9070(*)	56 Amps/ Circuit (70 Amp fuse)
9080(*)	64 Amps/ Circuit (80 Amp fuse)
9090(*)	72 Amps/ Circuit (90 Amp fuse)
9100(*)	80 Amps/ Circuit (100 Amp fuse)
9110(*)	88 Amps/ Circuit (110 Amp fuse)
9125(*)	100 Amps/ Circuit (125 Amp fuse)
9150(*)	120 Amps/ Circuit (150 Amp fuse)
9175(*)	140 Amps/ Circuit (175 Amp fuse)
9200(*)	160 Amps/ Circuit (200 Amp fuse)



4232- 03 5 1 1 0 0 - 9025(5) Typical Model Number

4233 3-Phase, 3 Leg SCR Control Panels (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.

Technical Notes:

¹Includes Chromalox Load Management Module.

² Panel Codes 15, 16 and 17 have Floor Stands Standard.

Ventilated NEMA 12 Enclosure Derates Enclosure to NEMA 1.

Louvres and Fans are available upon request to maintain NEMA 12 rating.

Load Fuse Current Rating Reflects 125% of Actual Load Amps.

*NEMA 12 available with additional venting measures. Consult factory

Model

4233 Three Phase, Three-Leg Zero Six SCR Fired SCR Power Control Panel

Panel Configuration: cUL and UL Listed Three Phase SCR Power Control Panel. Features: Factory pre-wired for quick installation, Step-down Transformer with Primary & Secondary Fusing for 120 volt Control Circuit, NEMA 1 or NEMA 12 rated Enclosure for Indoor Applications, Forced Air Cooling, Main Magnetic Disconnect Switch with Shunt Trip Feature, Heat-Sink Overtemperature Lamp. Options Include: Process and Hi-Limit Controllers, Ground Fault Monitor, Sub-Circuit Fusing for Heater Load, Shorted SCR Detection, Multimeter (Amps & Volts) with Phase Selector Switch and Floor Stand Kit.

Code	Current @ 40°C (104°F) Ambient	SCR Component	Enclosure Dim. (HxWxD)
02	100 Amp	MXPCII-3-02-1-1-L0-F01-0	(60" x 36" x 12")
03	150 Amp	MXPCII-3-04-1-1-L0-F01-0	(60" x 36" x 12")
06	200 Amp	MXPCII-3-06-1-1-L0-F02-0	(60" x 36" x 12")
08	300 Amp	MXPCII-3-08-1-1-L0-F03-0	(60" x 36" x 12")
10	400 Amp	MXPCII-3-10-1-1-L0-F04-0	(72" x 36" x 12")
12	550 Amp	MXPCII-3-12-1-1-L0-F05-0	(72" x 36" x 12")
14	650 Amp	MXPCII-3-14-1-1-L0-F06-0	(72" x 36" x 12")
15 ¹	800 Amp (2)	MXPCII-3-10-1-1-L0-F04-0	(72" x 72" x 12") Floor Mount
16 ¹	1000 Amp (2)	MXPCII-3-12-1-1-L0-F05-0	(72" x 72" x 12") Floor Mount
17 ¹	1200 Amp (2)	MXPCII-3-14-1-1-L0-F06-0	(72" x 72" x 12") Floor Mount

Code	Voltage
1	208 VAC 4 415 VAC
2	240 VAC 5 480 VAC
3	380 VAC 6 575/600 VAC

Code	Process Controller Options
0	None
1	4040-AR0000 1/4 DIN SSR, Relay
2	4040-ARA110 1/4 DIN SSR, Relay, Retransmit, RS485, Remote Setpoint
3	4080-COARA-04000 1/4 DIN Graphic Display, SSR, Relay, Retransmit, Ethernet

Code	Overtemperature Controller Options
0	None
1	One 4050-1R000 1/4 DIN Fixed 5A Relay, Relay
2	Two 4050-1R000 1/4 DIN Fixed 5A Relay, Relay
3	Three 4050-1R000 1/4 DIN Fixed 5A Relay, Relay
4	One 4050-1RA10 1/4 DIN Fixed 5A Relay, Relay, Retransmit, RS485
5	Two 4050-1RA10 1/4 DIN Fixed 5A Relay, Relay, Retransmit, RS485
6	Three 4050-1RA10 1/4 DIN Fixed 5A Relay, Relay, Retransmit, RS485

Code	Ground Fault Sensing/Interrupt & Shorted SCR Detection Option
0	None
1	Shorted SCR Detection
2	Ground Fault Monitor & Shutdown, Illum. Reset Switch (Code 02-14)
3	Ground Fault Monitor & Shutdown, Illum. Reset Switch (Code 15, 16, 17)
4	Ground Fault Monitor & Shorted SCR Detection (Code 02-14)
5	Ground Fault Monitor & Shorted SCR Detection (Code 15, 16, 17)

Code	Options
0	None
4	Multimeter (Volts & Current)

Code	Load Fusing Option ^{3,4} (*Number of Circuits)
9000	None
9010(*)	8 Amps/Circuit (10 Amp Fuse)
9015(*)	12 Amps/Circuit (15 Amp Fuse)
9020(*)	16 Amps/Circuit (20 Amp Fuse)
9025(*)	20 Amps/Circuit (25 Amp Fuse)
9030(*)	24 Amps/Circuit (30 Amp Fuse)
9035(*)	28 Amps/Circuit (35 Amp Fuse)
9040(*)	32 Amps/Circuit (40 Amp Fuse)
9045(*)	36 Amps/Circuit (45 Amp Fuse)
9050(*)	40 Amps/Circuit (50 Amp Fuse)
9060(*)	48 Amps/Circuit (60 Amp Fuse)
9070(*)	56 Amps/Circuit (70 Amp Fuse)
9080(*)	64 Amps/Circuit (80 Amp Fuse)
9090(*)	72 Amps/Circuit (90 Amp Fuse)
9100(*)	80 Amps/Circuit (100 Amp Fuse)
9110(*)	88 Amps/Circuit (110 Amp Fuse)
9125(*)	100 Amps/Circuit (125 Amp Fuse)
9150(*)	120 Amps/Circuit (150 Amp Fuse)
9175(*)	140 Amps/Circuit (175 Amp Fuse)
9200(*)	160 Amps/Circuit (200 Amp Fuse)



4233- 03 5 1 1 0 0 - 9025(5) Typical Model Number

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SCR Control Panels

(cont'd.)

Ordering Information

Complete the Model Number using the Matrix provided.

*Floor Mount

Technical Notes:

¹ Code 0: Up to Two Circuits Maximum.

² Load Fuse Current Rating Reflects 125% of Actual Load Amps.

³ Ground Fault detection requires grounded supply.



Model

4235 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, Step-down Transformer with Primary & Secondary Fusing for 120 volt Control Circuit, NEMA 4 rated Enclosure for Indoor/Outdoor Applications with External Heat Sinks, Main Magnetic Disconnect Switch with Shunt Trip Feature, and Sub-Circuit Fusing. Options Include: Process Controllers, Hi-Limit Controllers, Load Management Module, Ground Fault Monitor, Multimeter (Amps & Volts) with Phase Selector Switch, Enclosure Heater and Type "Z" Purge Pressurization System

Code Current @ 40°C (104°F) Ambient with no Solar Load

	Circuits	Max. Amps/Ckt	Total Amps	Fuse Amps/Ckt ²	Enclosure Dimensions
124	1	24	24	30	(24"H x 24"W x 10"D)
148	1	48	48	60	(24"H x 24"W x 10"D)
172	1	72	72	90	(24"H x 24"W x 10"D)
224	2	24	48	30	(24"H x 24"W x 10"D)
248	2	48	96	60	(36"H x 30"W x 10"D)
272	2	72	144	90	(36"H x 30"W x 10"D)
324	3	24	72	30	(36"H x 30"W x 10"D)
348	3	48	144	60	(48"H x 36"W x 10"D)
372	3	72	216	90	(48"H x 36"W x 10"D)
424	4	24	96	30	(48"H x 36"W x 10"D)
448	4	48	192	60	(48"H x 36"W x 10"D)
472	4	72	288	90	(60"H x 36"W x 10"D)
524	5	24	120	30	(48"H x 36"W x 10"D)
548	5	48	240	60	(48"H x 36"W x 10"D)
572	5	72	360	90	(62"H x 60"W x 12"D)
624	6	24	144	30	(60"H x 36"W x 10"D)
648	6	48	288	60	(60"H x 36"W x 10"D)
672	6	72	432	90	(62"H x 60"W x 12"D)

Code Voltage

1	208 VAC
2	240 VAC
3	380 VAC
4	415 VAC
5	480 VAC
6	575/600 VAC

Code Process Controller Options

0	¹ Customer supplied SSR drive signal (12-24 VDC @ 120 mA)
1	4040-SR0000 1/4 DIN SSR, Relay
2	Customer supplied 4-20mA Input to Load Management Module
3	4040-SR0000 1/4 DIN SSR, Relay & Load Management Module
4	4040-SRA110 1/4 DIN SSR, Relay, Retransmit, RS485, Remote Setpoint
5	4040-SRA110 1/4 DIN SSR, Relay, Retransmit, RS485, Remote Setpoint & Load Management Module
6	4080-COSRA-04000 1/4 DIN Graphic Display, SSR, Relay, Retransmit, Ethernet
7	4080-COSRA-04000 1/4 DIN Graphic Display, SSR, Relay, Retransmit, Ethernet & Load Management Module

Code Overtemperature Controller Options

0	None
1	One 4050-1R000 1/4 DIN Fixed 5A Relay, Relay
2	Two 4050-1R000 1/4 DIN Fixed 5A Relay, Relay
3	Three 4050-1R000 1/4 DIN Fixed 5A Relay, Relay
4	One 4050-1RA10 1/4 DIN Fixed 5A Relay, Relay, Retransmit, RS485
5	Two 4050-1RA10 1/4 DIN Fixed 5A Relay, Relay, Retransmit, RS485
6	Three 4050-1RA10 1/4 DIN Fixed 5A Relay, Relay, Retransmit, RS485

Code Ground Fault Sensing/Interrupt, Enclosure Heater and "Z" Purge Pressurization Option

0	None
1	Ground Fault Monitor & Shutdown incl. Illum. Reset Switch ³
2	Enclosure Heater
3	"Z" Purge Pressurization System
4	Ground Fault Monitor & Cabinet Heater
5	Ground Fault Monitor and "Z" Purge System
6	Ground Fault Monitor, Cabinet Heater and "Z" Purge System
7	Enclosure Heater and "Z" Purge System

Code Options

0	None
4	Multimeter (Volts & Current)

4235- 624 5 3 1 0 0 Typical Model Number



CONTROL SYSTEMS

4236

SCR Control Panels

(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.

*Floor Mount

Technical Notes:

¹ Code 0: Up to Two Circuits Maximum.

² Load Fuse Current Rating Reflects 125% of Actual Load Amps.

³ Ambient rating based on all sides of enclosure dissipating heat

⁴ Ground Fault detection requires grounded supply. Control Panel UL and cUL rated for NEMA 4.

Model

4236 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, Step-down Transformer with Primary & Secondary Fusing for 120 volt Control Circuit, NEMA 4X rated Enclosure for Indoor/Outdoor Applications with External Heat Sinks, Main Magnetic Disconnect Switch with Shunt Trip Feature, and Sub-Circuit Fusing. Options Include: Process Controllers, Hi-Limit Controllers, Load Management Module, Ground Fault Monitor, Multimeter (Amps & Volts) with Phase Selector Switch, Enclosure Heater and Type "Z" Purge Pressurization System.

Current @ 35°C (95°F) Ambient with no Solar Load³

Code	Circuits	Max. Amps/Ckt	Total Amps	Fuse Amps/Ckt ²	Enclosure Dimensions
124	1	24	24	30	(24"H x 24"W x 10"D)
148	1	48	48	60	(24"H x 24"W x 10"D)
172	1	72	72	90	(24"H x 24"W x 10"D)
224	2	24	48	30	(24"H x 24"W x 12"D)
248	2	48	96	60	(36"H x 30"W x 12"D)
272	2	72	144	90	(36"H x 30"W x 12"D)
324	3	24	72	30	(36"H x 30"W x 12"D)
348	3	48	144	60	(48"H x 36"W x 12"D)
372	3	72	216	90	(48"H x 36"W x 12"D)
424	4	24	96	30	(48"H x 36"W x 12"D)
448	4	48	192	60	(48"H x 36"W x 12"D)
472	4	72	288	90	(60"H x 36"W x 12"D)
524	5	24	120	30	(48"H x 36"W x 12"D)
548	5	48	240	60	(48"H x 36"W x 12"D)
572	5	72	360	90	(62"H x 60"W x 12"D)
624	6	24	144	30	(60"H x 36"W x 12"D)
648	6	48	288	60	(60"H x 36"W x 12"D)
672	6	72	432	90	(62"H x 60"W x 12"D)

Code Voltage

1	208 VAC
2	240 VAC
3	380 VAC
4	415 VAC
5	480 VAC
6	575/600 VAC

Code Process Controller Options

0	*Customer supplied SSR drive signal (12-24VDC @ 120 mA)
1	4040-SR0000 1/4 DIN SSR, Relay
2	Customer supplied 4-20mA Input to Load Management Module
3	4040-SR0000 1/4 DIN SSR, Relay & Load Management Module
4	4040-SRA110 1/4 DIN SSR, Relay, Retransmit, RS485, Remote Setpoint
5	4040-SRA110 1/4 DIN SSR, Relay, Retransmit, RS485, Remote Setpoint & Load Management Module
6	4080-COSRA-04000 1/4 DIN Graphic Display, SSR, Relay, Retransmit, Ethernet
7	4080-COSRA-04000 1/4 DIN Graphic Display, SSR, Relay, Retransmit, Ethernet & Load Management Module

Code Overtemperature Controller Options

0	None
1	One 4050-1R000 1/4 DIN Fixed 5A Relay, Relay
2	Two 4050-1R000 1/4 DIN Fixed 5A Relay, Relay
3	Three 4050-1R000 1/4 DIN Fixed 5A Relay, Relay
4	One 4050-1RA10 1/4 DIN Fixed 5A Relay, Relay, Retransmit, RS485
5	Two 4050-1RA10 1/4 DIN Fixed 5A Relay, Relay, Retransmit, RS485
6	Three 4050-1RA10 1/4 DIN Fixed 5A Relay, Relay, Retransmit, RS485

Code Ground Fault Sensing/Interrupt, Enclosure Heater and "Z" Purge Pressurization Option

0	None
1	Ground Fault Monitor & Shutdown incl. Illum. Reset Switch ⁴
2	Cabinet Heater
3	"Z" Purge Pressurization System
4	Ground Fault Monitor & Cabinet Heater
5	Ground Fault Monitor and "Z" Purge System
6	Ground Fault Monitor, Cabinet Heater and "Z" Purge System
7	Cabinet Heater and "Z" Purge System

Code Options

0	None
4	Multimeter (Volts & Current)

4236- 624 5 3 1 0 0 Typical Model Number

