



CONTROL CONCEPTS

6•PAK™ Model 1600-PM6-01

Features

- 6 Positions of 70 Amp Control in 14.5" x 7.5" of Panel Space
- 6 Single Phase Zero-Cross Controllers or 6 Single Phase Phase-Angle Controllers or Three 2-Leg Zero-Cross Controllers or Two 3-Leg Zero-Cross Controllers
- Isolated Heatsink and Command Signals
- Compact Size

Description

The Model 1600-PM6-01 6•PAK™ is a compact, highly efficient, fan-cooled heatsink with positions for up to six SSR modules. These modules are available for zero-cross or phase-angle control of single phase or three phase loads. Current ratings from 10 to 70 Amps and voltage ratings from 120 to 575 Vac are available with each SSR module.

Zero-Cross and Phase-Angle control may be intermixed on the 6•PAK™ heatsink. Likewise, single or three-phase control and differing current levels may be intermixed on the 6•PAK™ heatsink.

A wide variety of configurations and control options are possible.

6•PAK™ Mounting

The fan cooled 6•PAK™ assembly may be mounted in any orientation and provides up to 420 Amps of control in an area measuring 14.5 inches by 7.5 inches. The maximum depth of the 6•PAK™ is 8.0 inches. The compact size of the 6•PAK™ saves valuable enclosure space, reducing overall system cost.

2•PAK™ Extension

The 6•PAK™ can be extended to 8 or 10 zones providing up to 700 Amps of control, using one or two 2•PAK™ extender units.

The 6•PAK™ fan is capable of cooling the additional heatsinks. Up to 10 zones of control fits in 22.5 inches. Order # 1600-PM2-01.

3•PAK™ Extension

The 6•PAK™ can be extended to 9 zones providing up to 630 Amps of control, using a 3•PAK™ extender unit. The 6•PAK™ fan is capable of cooling the additional heatsink. Up to 9 zones of control fits in 20.5 inches. Order # 1600-PM3-05.

(Description continued on page 2.)

Single or Three Phase
Phase-Angle or Zero-Cross
SCR Power Controllers



Applications

- Multi - Zone Control
- Transformer Coupled Loads
- Electric Ovens, Furnaces, and Kilns
- Contactor Replacement
- Resistance Heating
- T-3 Lamps
- UL Component Recognition:
SCRs & Circuits

Description (cont.)

Configuration and Control Options

The 6•PAK™ can be configured to control the power applied to 6, single phase loads by zero-cross or phase-angle operation.

The 6•PAK™ can provide 2-leg, zero-cross control to three, 3-phase loads, or it can provide 3-leg, zero-cross control to two, 3-phase loads.

By using an inside-delta configuration, the 6•PAK™ can control the phase-angle power applied to two, 3-leg, three-phase loads.

The 6•PAK™ can combine zero-cross and phase-angle control on the same heatsink. Control of single phase and three phase loads can also be combined on the same heatsink. Add to this the large selection of available SCR modules that offer a wide variety of control circuits and command signals, and the 6•PAK™ becomes a highly versatile piece of equipment. This versatility, coupled with the significant reduction in panel space required, makes the 6•PAK™ an ideal choice for multiple point SCR control installations.

Compatible SCR Control Circuits

Firing circuits providing Zero-Cross control include:

- 1020 4/20mA Loop Powered Control.
- 1021A 0/5Vdc, 0/10Vdc, potentiometer, or 4/20mA.
- 1021B 1021A features plus Sync-Guard™.
- 1023 4/20mA, time proportioned, 1-10 sec. cycle time.
- 1026 For Solid State A.C. Commands.

Solid State Modules are available for use as direct replacements for mechanical contactors.

- 1651 4 to 32 volts D.C. Logic Commands.
- 1651A 120 to 240 volts A.C. Logic Commands.

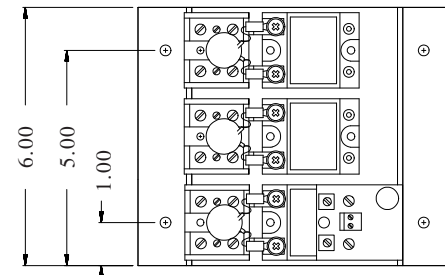
Phase-angle, single-phase circuits available for use with the 6•PAK™ include the following:

- 1022 0/5 or 0/10 Volt or potentiometer Commands.
- 1025 4/20mA Command

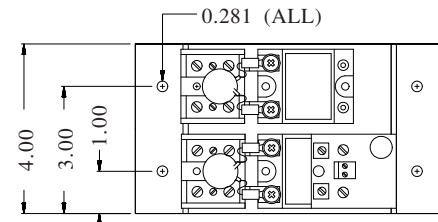
Specifications and features of the individual circuit boards and SCR's remain unchanged when mounted on the 6•PAK™. These features include continuous full current rating up to 55° C, ambient, diagnostic LED's, RMS line voltage compensation, missing cycle detection and soft start, the selection of voltage, current, or potentiometer command signals, and electrical isolation of the input/output/heatsink.

Transformer(s) may be required, depending on the control circuit(s). Consult factory for information.

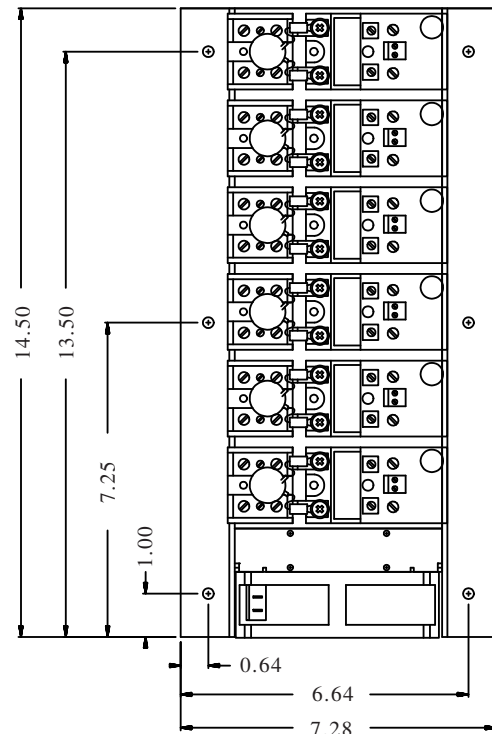
Dimensions



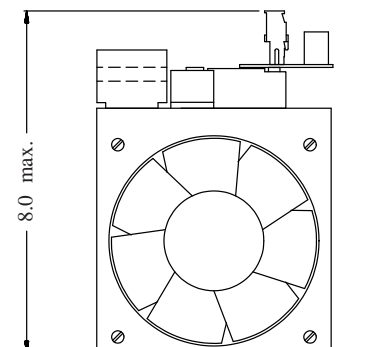
3•PAK™



2•PAK™



6•PAK™ (top view)

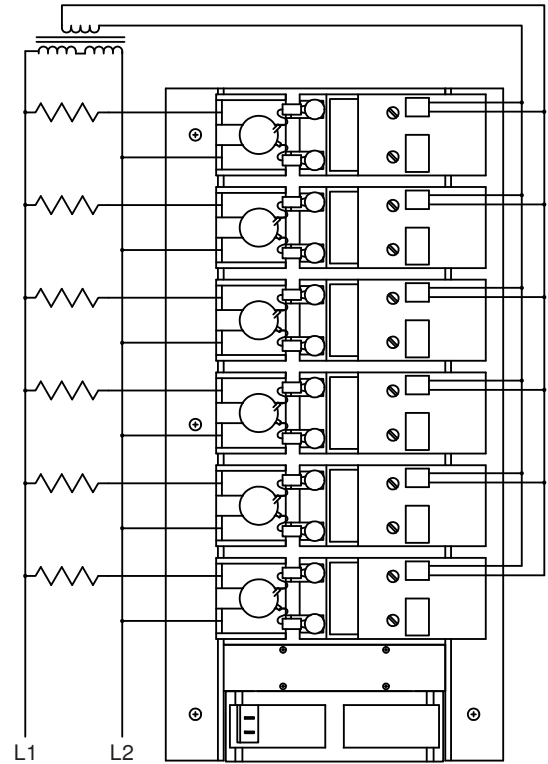


6•PAK™ (end view)

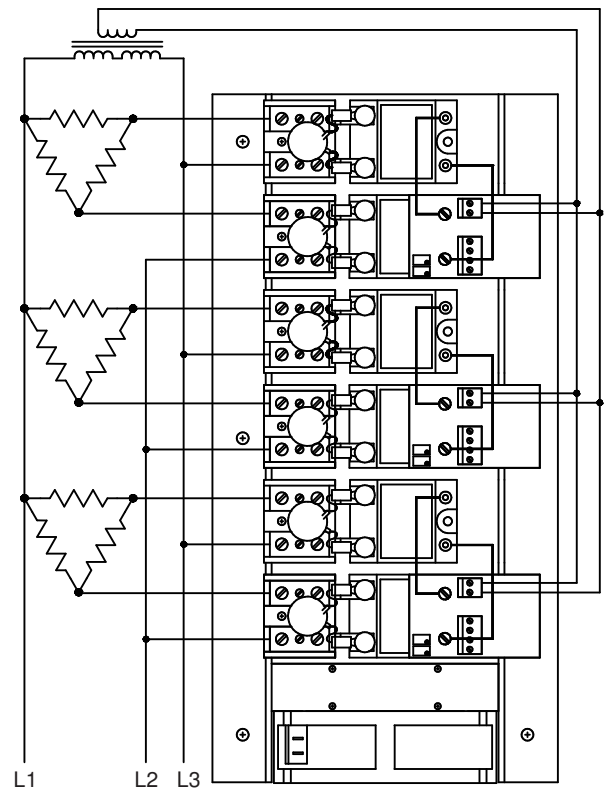
Specifications

Control Mode(s)	Single phase or three phase, phase-angle or zero-cross, on/off, distributive or time proportioning control of the RMS load voltage or load power	
Command Signals	SIGNAL	IMPEDANCE
	0-5 Vdc	100 K Ohms
	0-10 Vdc	200 K Ohms
	Potentiometer.	200 K Ohms
	4/20 mA	350 Ohms Max.
	4/32 Vdc	
	120/240 Vac	
Control Range	0 to 97% of line voltage for phase angle. 0 to 100% of line voltage for zero cross.	
Linearity	RMS load voltage or power is linear with respect to the command signal.	
Zero and Span	Factory preset. User adjustable over a range of $\pm 20\%$ of span.	
Isolation	Dielectric strength, input to output and load voltage to heatsink: 2500V(RMS)	
Mounting	Panel mount, any orientation. 2-PAK™ and 3-PAK™ extensions utilize the 6-PAK™ fan for cooling. Extensions mount flush to end of 6-PAK™.	
Line Voltage	120, 240, 480, and 575 Vac +10%, -20%, 50/60 Hz. Other voltages available.	
Line/Load Connections	Compression lugs accept #2 to #14 Copper or #2 to #8 Aluminum.	
Load Current	Models available with current ratings of 10, 20, 30, 40 or 70 Amps RMS.	
dv/dt and Transient Voltage	200 volts/microsecond minimum. Uses a dv/dt snubber and a metal oxide varistor (MOV).	
6-PAK™ Cooling	Forced air, fan cooled. 120 Vac, 30 VA or 240 Vac, 30 VA. Terminals are provided for fan power connection.	
Additional Cooling	A separate fan kit is available for use with stand-alone 2-PAK™ or 3-PAK™ controllers rated over 40 Amps.	
Weight	6-PAK™	15.0 pounds
	2-PAK™ extension	4.5 pounds
	3-PAK™ extension	6.0 pounds
Temperature	Operating: 0 to +55°C (+32 to +131°F) Storage: -40 to +80°C (-40 to +176°F)	
Heat Dissipation	1.5 Watts per amp of load current for each position on the heatsink.	
Fusing	Special semiconductor fuses are not required. Class T fuses are recommended to protect controller and load. Fuse kits are ordered separately.	

Wiring



Six Single Phase, Zero-Cross or Phase-Angle Loads



3 Three Phase, Two-Leg Control, Zero-Cross Loads

Ordering Information

1600-PM6-01 = 6-PAK™ controller.

1600-PM6-01/(#) 165X-XX-XX-USD/(#) 102X-FC-CS

Number of control positions (SCR modules) installed. _____

Type of Control: 1651=Zero-Cross, 1652=Phase-Angle.* _____

Voltage Rating: 12=120V, 24=240V, 48=480V, 57=575V.
Other Voltages Available. _____

Current Rating: 10, 20, 30, 40, or 70 Amps. _____

Compression Lug Line/Load "USD" Connector. _____

Number of Firing Cards (circuit boards) installed. _____

Type of Firing Circuit: 1020, 1021A, 1021B, 1022, 1023, 1025, 1026.* _____

Command Signal: 4/20mA, 0/5V, 0/10V, Potentiometer. Varies with firing circuit. _____

Other commands may be available.

*Types of control positions and/or firing cards may be mixed on same heatsink if required. Consult factory.

Options available:

240Vac Fan, consult factory.

87°C Normally Closed Thermostat, order # TS87C

To specify a two position extension, order # 1600-PM2-01/(2)165X-XX-XX-USD/(2)102X-FC-CS.

To specify a three position extension, order # 1600-PM3-05/(3)165X-X-X-USD/(3)102X-FC-CS.

A fan kit is available for using the 2-PAK™ or the 3-PAK™ as stand alone controllers.

To order Control Concepts fan kit use number; PK\F41 for 120Vac or PK\F42 for 240Vac.

Accessories

Transformers providing 24 Vac are required to power all circuit cards except the 1020, 1024 1024A and 1026. Multiple zero-cross circuits may be supplied from a common transformer and the transformer does not have to be in phase with the controller and load. Multiple phase-angle controllers can also be supplied from a common transformer, however the transformer must be powered from the same phase as is the controller and load. Allow 3VA per circuit.

PART NUMBER	VA RATING	INPUT VOLTAGE	OUTPUT VOLTAGE
14020-0006-1024	6 VA	120 Vac	24 Vac
14024-0006-3024	6 VA	240 Vac	24 Vac
14025-0025-0024	25 VA	480 Vac	24 Vac
14023-0025-0024	25 VA	600 Vac	24 Vac
14020-0030-0024	30 VA	120/240 Vac	24 Vac
14026-0050-0024	50 VA	208/240/277/380/480 Vac	24 Vac

A thermal switch may be added to the heatsink. Two wiring terminals are provided for connecting the thermal switch to external monitoring equipment. The thermal switch is a normally closed type and is specified by adding TS87C to the end of the model number.

Fuse kits are available in one, two, and three pole configurations. Fuse kits are ordered as separate items and require field mounting and wiring. Control Concepts recommends the use of Class "T" fuses to protect the SCR and the load.

A fan kit is available to use with the 2-PAK™ or the 3-PAK™ as a compact stand-alone two or three leg controller. Order PK\F41.

Complementary Products

Control Concepts, Inc., with a full range of standard and custom SCR power controllers and signal conditioners, has the expertise to meet your specific industrial power control needs. The models 5020 and 5021 signal conditioners are used to convert average or RMS load current to a voltage or mA signal. The models 5030 and 5031 are a command signal limiter and a command signal ramp control. The models 5330 and 5340 are three phase signal conditioners that convert load current to a voltage signal or load voltage to a voltage signal.

All of Control Concepts products are covered by a limited two year warranty.

Call us for answers, products, and delivery schedules that work.

Manufactured by



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