

6•PAK™

Model 1600-PM6-01

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

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
- Three 2-Leg Zero-Cross Controllers
- Two 3-Leg Zero-Cross Controllers
- Isolated Heatsink and Command Signals

Description

The Model 1600-PM6-01 6•PAK™ is a compact, highly efficient, fan-cooled heatsink with positions for up to six SCR 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 SCR module.

Zero-Cross and Phase-Angle control may be intermixed on the same 6•PAK™ heatsink. Likewise, single or three-phase control and differing current levels may be intermixed on the same 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. The 6•PAK™ solves the problem of too little space for too much control, in both new and retrofit installations.



Applications

- Multi - Zone Control
- Transformer Coupled Loads
- Electric Ovens, Furnaces, and Kilns
- Contactor Replacement
- Resistance Heating
- T-3 Lamps

2•PAK™ Extension

The 6•PAK™ heatsink, and the number of control positions, can be increased through the use of the 1600-PM2-01 2•PAK™ extension. Each fan-cooled 6•PAK™ can accommodate up to two of these extensions, providing ten points of 70 Amp control in a single 22.5 inch long package.

Configuration and Control Options

The 6•PAK™ can be configured to control the power applied to six single phase loads by zero-cross or phase-angle operation. The 6•PAK™ can provide three phase 2-leg zero-cross control to three loads or it can provide three phase 3-leg zero-cross control to two loads. For three phase phase-angle applications, by wiring the SCR modules inside-delta, the 6•PAK™ can control the 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 for a 6•PAK™, makes the 6•PAK™ an ideal choice for multiple point SCR control installations.

Compatible SCR Control Circuits

Zero-Cross control circuits available for use with the 6•PAK™ include the following:

- 1020 4/20mA Loop Powered Control.
- 1021A Voltage Commands, Line Voltage Compensation.
- 1023 Time Proportioning Control.
- 1031 4/20mA Command, Line Voltage Compensation.

The 6•PAK™ is available without control circuits as a direct replacement for mechanical contactors. These models are:

- 1024 D.C. Logic Commands.
 - 1024A A.C. Logic Commands.
- Or, with a circuit for use with solid state signals:
- 1026 Solid State A.C. Commands.

Three phase 2-leg or 3-leg versions of the zero-cross models can also be configured.

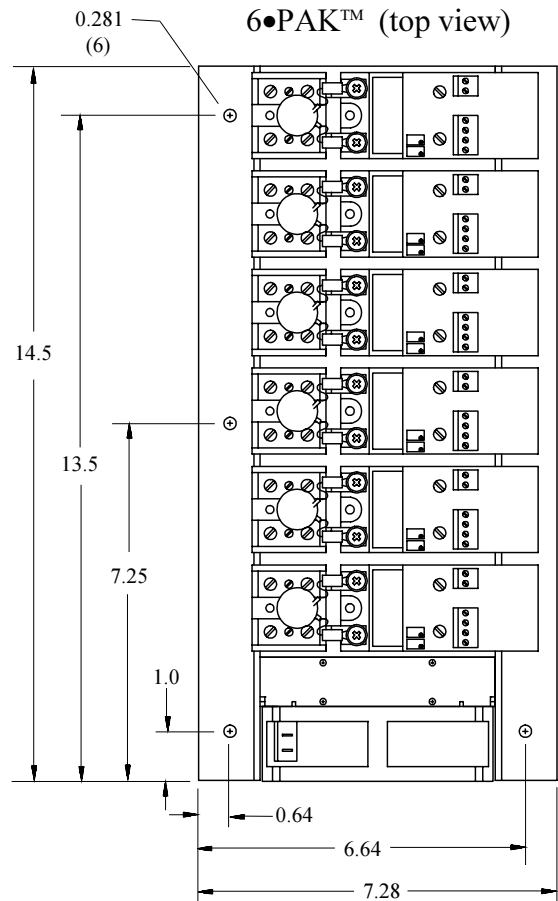
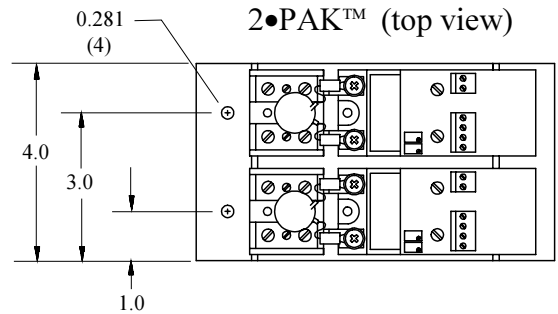
Phase-Angle circuits available for use with the 6•PAK™ include the following:

- 1022 Voltage Commands, Line Voltage Compensation.
- 1025 4/20mA Command, Line Voltage Compensation.

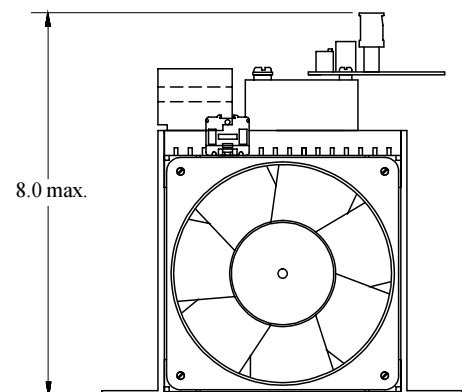
Specifications and features of the individual circuit boards and SCRs remain unchanged when mounted on the 6•PAK™. These features include continuous full current rating up to 55 degrees C ambient, diagnostic LEDs, RMS line voltage compensation, missing cycle detection and soft start, the selection of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

Dimensions

(inches)



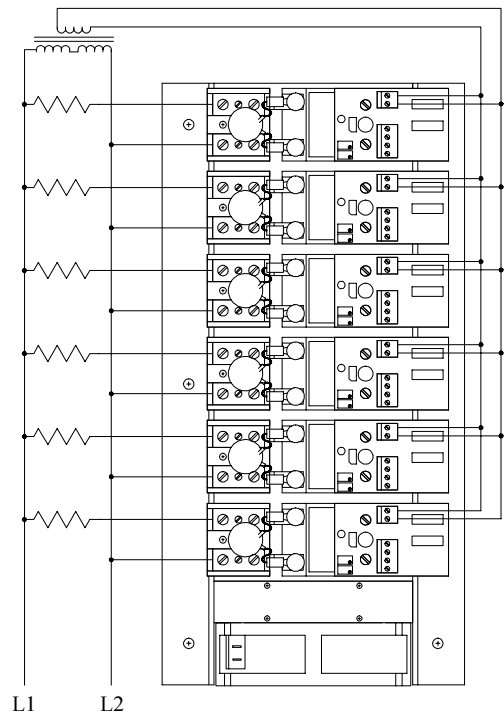
6•PAK™ (end view)



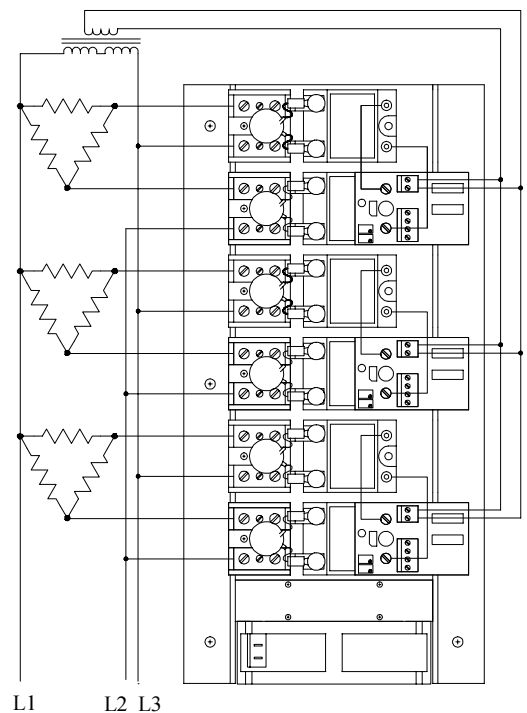
Specifications

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 0-5Vdc 0-10Vdc 1-20K Pot. 4/20mA 3/32 Vdc 120/240 Vac	IMPEDANCE 100K Ohms 200K Ohms 200K Ohms 350 Ohms Max.
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 20% of span.	
Isolation	Dielectric strength, input/output and load voltage/heatsink: 2500V(RMS)	
Mounting	Panel mount, any orientation. 2•PAK™ extension utilizes the 6•PAK™ fan for cooling. Mount flush to 6•PAK™ end.	
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).	
Cooling	Forced air, fan cooled. 120 Vac, 30 VA or 240 Vac, 30 VA. Terminals provided for required separate fan power connection.	
Weight	6•PAK™ 2•PAK™ extension	15 pounds. 4.5 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 controlled current for each position on the heatsink.	
Fusing	Special semiconductor fuses are not required. Class T fuses are recommended to protect controller and load.	

Wiring



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



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

Ordering Information

6•PAK™

1600-PM6-01/(6) 1652-48-70-USD/(6) 1025-FC-4/20mA

1600-PM6-01 6•PAK™

Options available: 87 Degree C Normally Closed Thermostat; 240Vac Fan.

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 Card: 1020, 1021A, 1022, 1023, 1025, 1026, 1031.

Command Signal: 4/20mA, 0/5V, 0/10V, Potentiometer. Other commands available.

2•PAK™

The 2•PAK™ extension uses the same part numbering format as the 6•PAK™. To specify a two position extension, per the ordering example above, the model number becomes: 1600-PM2-01/(2) 1652-48-70-USD/(2) 1025-FC-4/20mA.

Accessories

One or more transformers may be required for each 6•PAK™ installation. Transformers are ordered and installed as separate items. The transformer(s) provide circuit board power. When using phase-angle control, the transformer provides the proper phase timing as well. Phase-angle control requires at least one transformer per phase controlled. Multiple control circuits can be powered from the same transformer. Allow 3 VA per circuit. No transformer is required when using 1020, 1024, 1024A, or the 1026 control. Transformers available:

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 model number.

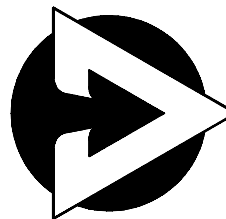
Fuse kits are available in one, two, and three pole configurations. Fuse kits are ordered as separate items and require mounting and wiring. Control Concepts recommends the use of Class "T" fuses to protect the SCR and the load.

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 full two year warranty.

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



**CONTROL
CONCEPTS**

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