

# 103 Series Model A and B SCR Power Controller System

Heat Sink Outside Panel – 2 Piece, Type 3R, 4, 4X, 12 Construction

The 103 Series SCR Power Controller System is a Solid-State, Zero-Cross Fired, Proportional Control system intended for use as a temperature regulating device for electric heating systems. 103 Series Model A SCR Power Controllers consist of a heat sink, one or two solid-state relays, and an Input Board provided as integral to a single SCR Power Controller Assembly. Model B SCRs consist of a SCR Power Controller Assembly without an input board. The 103 Series Model A SCR Power Controller switches line voltage 0-100% linearly with respect to a field-provided input signal and can operate independently or can provide control for up to a maximum of four 103 Series Model B SCR Power Controllers. The 103 Series is uniquely designed to allow the thermal heat sink to be mounted outside the electrical control panel if used within approved operating temperatures.

The factory installed Input Board on the 103 Series Model A is powered from a 24VAC power source and is used to convert a field provided 0-10VDC, 4-20mA, 2200Ohm, or 1350hm input control signal to a pulsed 24VDC output signal with a 1 second time base. A single 0-10VDC signal can be provided to multiple 103 Series Model A Units if more than a total of five power controllers are needed (contact factory for specific application requirements). As a typical example of Model A operation, if an input control signal of 5VDC is provided, the Input Board will output 24VDC at 0.5 seconds ON and 0.5 seconds OFF to control each SCR Power Control Assembly in the System. Refer to “Typical Wiring” included in this document for connection details.

**Approvals:**

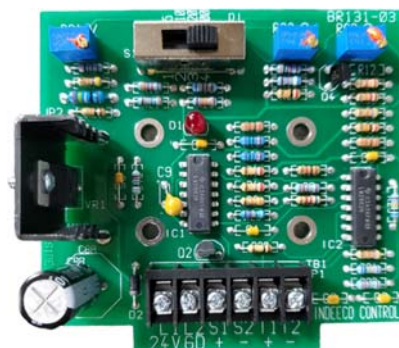


SCR Power Controller Assembly

**Input Board (Integral with Model A Only)**

File E52105 Guide XAPX2/8, Investigated to UL 60730-1/CSA E60730-1

Approved as Operational Control for Indoor Equipment  
Type 1 Action, Incorporated Control, Electronically Operated,  
Software Class A, for use in grounded equipment.  
Overvoltage Category III, Pollution Degree 3  
SCCR ratings available up to 100kA (see pg. 3)  
Suitable for Type 3R, 4, 4X or 12 when field mounted to steel,  
stainless steel, or aluminum panel per instructions.



**Specifications:**

Storage Temp: -4°F to 158°F

Operating Temp: **CASE 1**

-4°F to 158°F; area surrounding relay and input board

-4°F to 80°F; area surrounding heat sink fins

**CASE 2**

-4°F to 104°F; area surrounding relay, input board, and heat sink fins

Input Board Power: Model A units require 24VAC Class 2 PELV, 10VA minimum power to the input board.

Input Board Signal: 0-10VDC, 47KΩ input impedance

4-20mA, 250Ω input impedance

1350hm and 2200Ohm

(signal is selectable at input board)

Model A Input Terminal: Barrier type terminal block suitable for 18-22AWG copper wire

Model B Input Terminal: 6-32 (Standard Relay) or M3 (600V SCCR Relay)

Controller Input Voltage: 4-32VDC Per Relay, voltage provided by Model A Input board

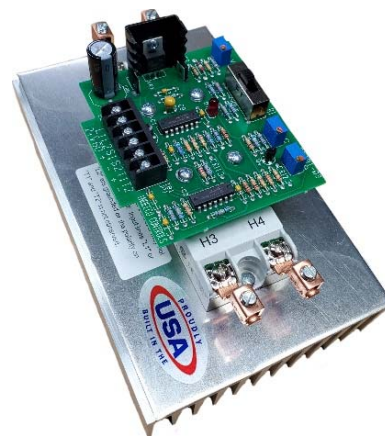
Controller Line Terminal: Solderless Type Lug suitable for 6-14AWG copper wire

Controller Line Voltage: 48-600VAC, 47 to 65 Hertz

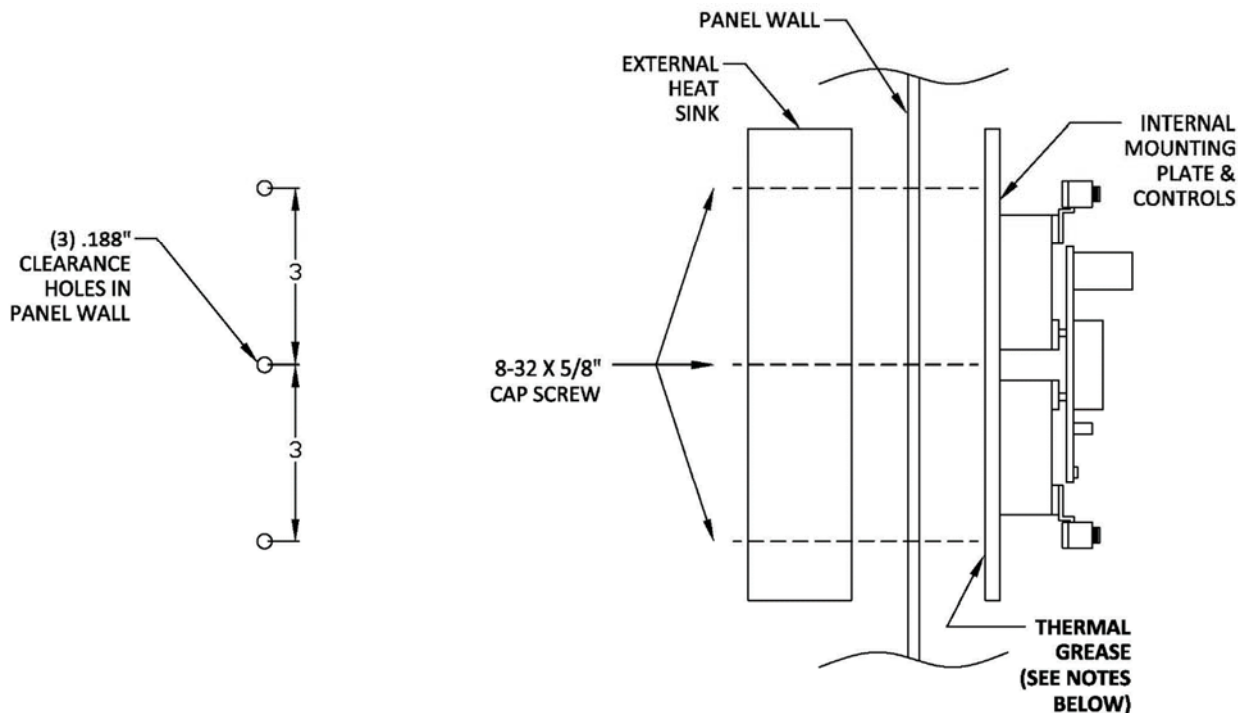
**1 Model A Unit can drive up to 4  
Model B controllers with 24VDC  
(Pulsed), 1 second time base.**

**Dimensional Information**  
(SCR Power Controller Assembly)

| Phase  | Amps   | Length (in.) | Width (in.) | External Height (in.) | Internal Height (in.) |
|--------|--------|--------------|-------------|-----------------------|-----------------------|
| 1 or 3 | 10 -50 | 8.00         | 5.00        | 1.75                  | 2.88<br>Model A       |
|        |        |              |             |                       | 1.94<br>Model B       |



**Mounting and Panel Wall Drilling Information**



**Note:** Kit P/N 103-1901 required for field installation, see order info below. All instructions must be followed in order to maintain the required environmental rating.

These controls are UL rated for Type 3R, 4, 4X, and 12 applications when mounted using the following procedure. In order to maintain the appropriate Type rating the enclosure must have the proper ratings and may be made of steel, stainless steel, or aluminum.

- The exterior heat sink fins must be in a vertical up orientation when the enclosure is in the intended mounting position.
- The surface of the interior mounting plate, opposite side of the power relays, **must be completely covered with thermal heat transfer grease**, Thermalloy Inc. Thermalcote Part No. 251. This must be done before mounting the plate to the inside surface of the enclosure.
- The three heat sink mounting screws used to attach the external heat sink to the internal heat sink mounting plate are mounted through three 3/16 in. holes and must be tightened to a torque value of 15 to 20 in.-lb. Note that heat transfer grease is not required between the external heat sink and the enclosure surface.
- For Type 3R, 4, 4X, and 12 installations; after mounting, the external heat sink must be sealed with Recognized G.E. RTV-108 silicone rubber adhesive sealant by applying a bead of material around the perimeter of the heat sink where it meets the enclosure and by covering the heads of the three mounting screws.

## Specification of Part Number for SCR Power Controller Assembly

103- \_\_\_\_\_ - \_\_\_\_\_ - \_\_\_\_\_ - \_\_\_\_\_

Model Phase Max VAC Max Amps Input Code \*SCCR kA  
 (A or B) (1 or 3) (480 or 600) (10,20,30,40,50) (A,C,E,L, I) (See Correlation Table: blank, -100KA or -065KA )

**Example: 103-A3-480-50I-100KA**

### Input Code Table for Part Numbering (only applicable for Model A Assemblies)

| Input Code | Input Description                   | Input Reference Full Off | Input Reference Full On |
|------------|-------------------------------------|--------------------------|-------------------------|
| A          | 2200 ohm                            | 2150 ohms                | 2250 ohms               |
| C          | 135 ohm                             | 20 ohms                  | 120 ohms                |
| E          | 4-20mA                              | 5.6 mA                   | 18.4 mA                 |
| L          | 0-10VDC                             | 1.0 VDC                  | 9.0 VDC                 |
| I          | Input selection not factory pre-set |                          |                         |

*Contact Factory for other required inputs*



*Example switch setting at 2200 ohm*

### (\*) SCCR Correlation Table for Part Numbering

| *SCCR kA      | Relay Type | Max VAC Line Volts | Max Amps       | SCCR Rating          | SCCR Maximum Fuse Amp Rating and Type |
|---------------|------------|--------------------|----------------|----------------------|---------------------------------------|
| Not Specified | Standard   | 600                | 10,20,30,40,50 | 5kA @ 600V (default) | Not Specified (un-marked)             |
| -100KA        | Standard   | 480                | 10,20,30,40,50 | 100kA @ 480V         | 100A, Class J                         |
| -065KA        | 600V SCCR  | 600                | 50 **          | 65kA @ 600V          | 80A J 600V or 60A (HSJ 60)            |

*\*\* Consult factory for max amps 10, 20, 30, or 40.*

### Typical Ordering Information

Each order should include one 103 Series Model A and, if necessary, one to four 103 Series Model B SCR Power Controller Assemblies

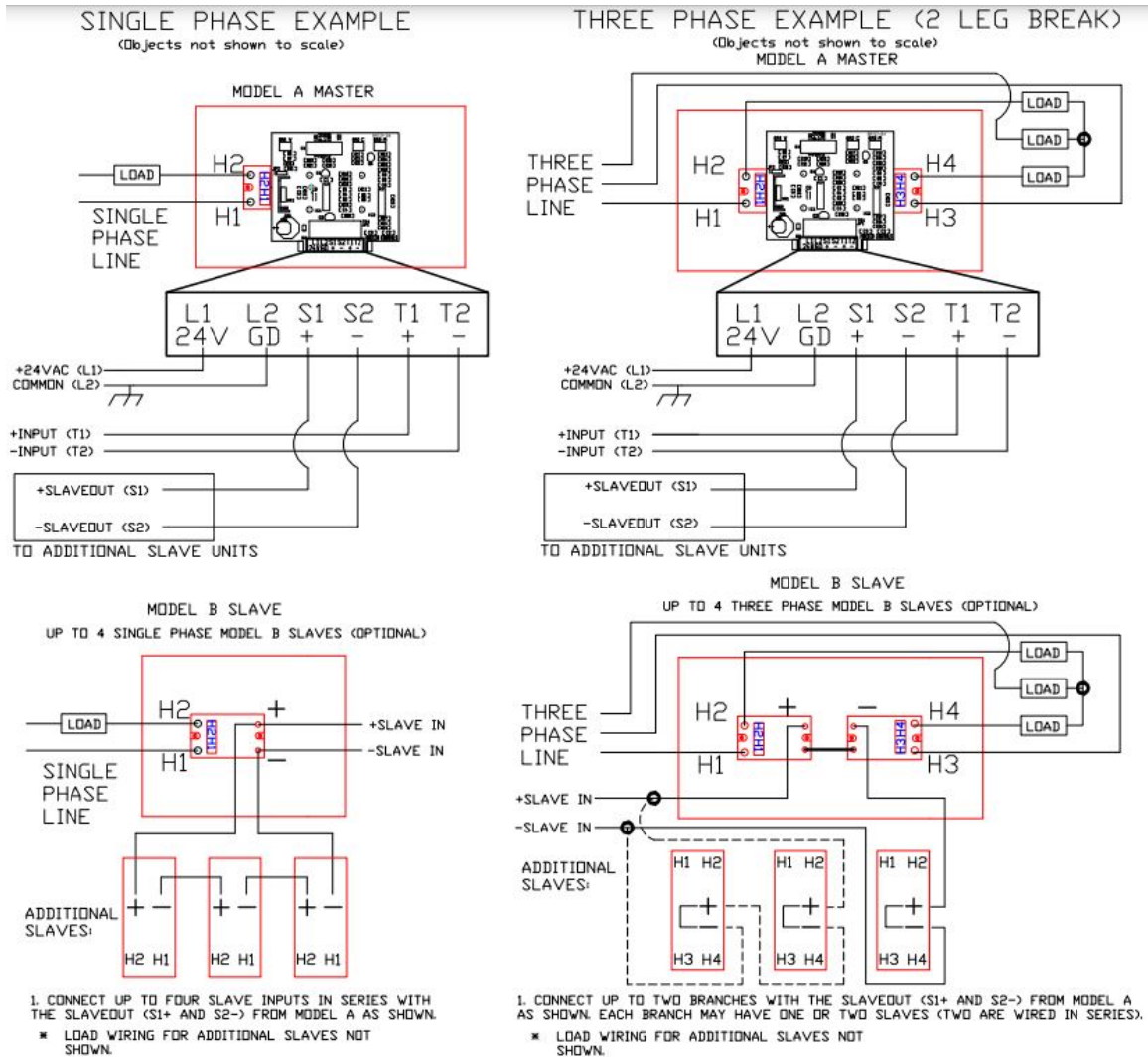
|       |                                                    |                           |
|-------|----------------------------------------------------|---------------------------|
| QTY 1 | Model A SCR Power Controller Assembly              | Item 103-A3-480-50I-100KA |
| QTY 4 | Model B SCR Power Controller Assembly              | Item 103-B3-480-50-100KA  |
| QTY 5 | Field Install Kit (one per 103 Series SCR ordered) | Item 103-1901             |

## Typical Wiring: 1 Phase & 3 Phase Power Controllers

All electrical connections should be in accordance with the National Electrical Code and/or Canadian Electric Code and other applicable local codes. See wiring diagrams for typical connections. In all cases, 24 VAC power for the control circuit is connected to L1 and L2 terminals, sensor input is connected to T1 and T2 terminals and Slave driver output is connected to S1 and S2 terminals.

**Model A = Master SCR (Input Connections at Input Board)**

**Model B = Slave SCR (Input Connections at relay terminals)**



**NOTE:** All 103 Series Model A (Master) have L2 and T2 electrically connected on the input board.

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