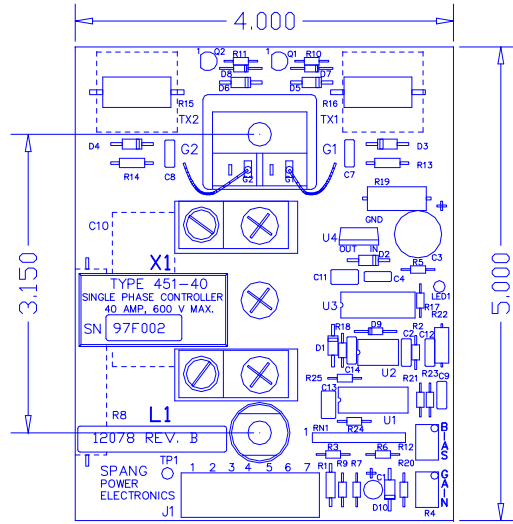


## INSTALLATION

**OUTLINE:** The outline and mounting dimensions of the TYPE 451-60 AC Controller are shown in Figure 1, below.



**FIGURE 1: OUTLINE AND MOUNTING**

**MOUNTING:** The type 451-60 controller is supplied as a modular assembly, and is intended to be mounted in a customer supplied enclosure. The mounting holes are 1/4" in diameter, and the use of a 10-32 UNF machine screw, with a flat washer and a lock washer is recommended. For most applications, the heat transfer through the base of the module into a steel or aluminum panel (with paint removed and a thermal compound applied) will provide adequate cooling. A mounting torque of about 44 lb. in.  $\pm$  15% is recommended.

**SAFETY:** When possible, the control common (connector J1 pins 2 and 7) should be tied to earth ground. This should be a single point ground in order to avoid the possibility of noise being generated by circulating ground currents.

### CAUTION

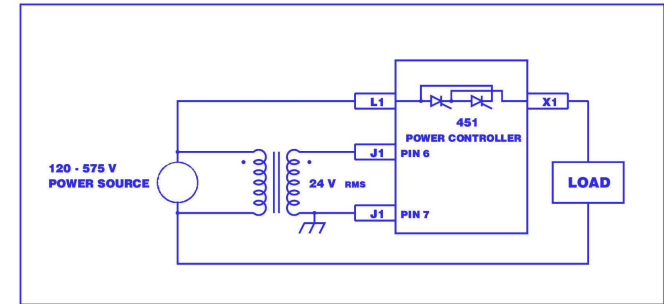
**DANGEROUSLY HIGH VOLTAGES ARE PRESENT WHEN POWER IS APPLIED TO THE UNIT, WHETHER THE CONTROLLER IS OPERATING OR NOT. ALLOW AT LEAST 1 MINUTE AFTER POWER IS REMOVED BEFORE CONNECTING OR DISCONNECTING WIRES, OR OTHERWISE COMING IN CONTACT WITH INTERNAL CIRCUITRY.**

## WIRING CONNECTIONS - POWER

The controller power input is connected to terminal L1. The load is connected from terminal X1 to the return side of the power source. See Figure 2 for a typical connection diagram. A power source rated between 120 - 575 V, 1 $\phi$ , 50/60 Hz capable of supplying the required load current (up to 60 A RMS) is required. Wire size should be determined by the applicable wiring codes for the specific installation. The terminals will accept wire gauges of 2 - 14 AWG, with a strip length of 3/8" recommended. It is expected that 4 AWG wire will typically be used, with an appropriate breaker or fuse provided.

## WIRING CONNECTIONS - CONTROL POWER

The control power input is connected to J1, terminals 6 and 7. A 24 VAC isolated power source, which is in phase with the main power source, must be used. See Figure 2 for a typical connection diagram.



**FIGURE 2: TYPICAL CONNECTION DIAGRAM**

## WIRING CONNECTIONS - CONTROL

Figure 3 shows a typical method of connecting the control signals to the 451-60. In this typical setup, a Remote / Local switch or relay is used to select which input signal is used. In the Local position, a 10K potentiometer is used to generate a 0 - 5 VDC control signal, and the voltage output from the 4 - 20 mA source (J1 pin 5) is disconnected. In the remote position, a 4 - 20 mA source is used to generate the control signal, which is connected to J1 pin 3, and the 10K potentiometer is disconnected.

On / off control may be realized by connecting a switch between J1 pin 4 and J1 pin 7. The unit will be held off when this switch is closed.

If the controls are located at some distance from the unit (i.e. if they are not in the door of the enclosure) shielded cable should be used. Wire size is not important, other than it should be between 12 and 28 AWG to fit the connectors.

## OWNER'S MANUAL

### TYPE 451-60 SINGLE PHASE AC CONTROLLER

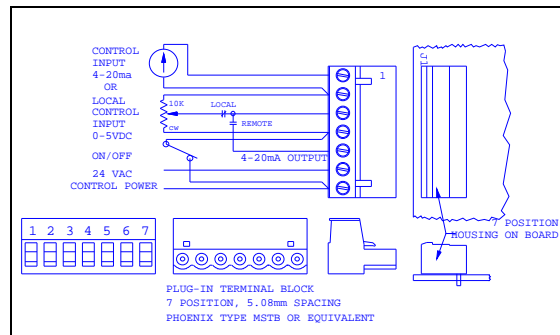


FIGURE 3: TYPICAL CONTROL WIRING

The normal system set up adjustments are described below.

**R12: BIAS**

Potentiometer R12 adds an offset, or “bias” voltage to the input control signal. Its range is about 0-11 volts, or the entire normal control range. Turning R12 clockwise will raise the output voltage across the entire input range.

**R4: GAIN**

Potentiometer R4 “scales” the input control signal, before the bias voltage is added. It may be adjusted to multiply the input signal by a number from 0 to 1. Turning P6 clockwise will increase the “gain” of the circuit, producing a larger voltage for a given control signal.

**SERVICE:** Customers requiring service or application assistance may contact:

Customer Service Department

Spang Power Electronics

5241 Lake Street

Sandy Lake, PA 16145-0457

phone: 724-376-7515

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45160UM

12/13/2004

Revised:

#### SPECIFICATIONS - ELECTRICAL

<b>POWER INPUT:</b>	LINE VOLTAGE:	115 - 575 V, $\pm 10\%$ , 50 / 60 Hz.
	LINE CURRENT:	60 Amps maximum.
	INPUT POWER:	23,000 Watts maximum.
<b>CONTROL POWER INPUT:</b>	VOLTAGE:	24 V, $\pm 10\%$ , 50 or 60 Hz.
	CURRENT:	260 mA maximum @ 26.4V.
	POWER:	7 Watts maximum.
<b>OUTPUT:</b>	VOLTAGE:	0 - 575 V, 50/60 Hz.
	CURRENT:	60 Amp maximum.
	POWER:	23,000 Watts maximum.
<b>PERFORMANCE:</b>	LOSSES:	$\leq 60$ Watts at 575V, 60 A
<b>CONTROL INPUTS:</b>	0 - 5 VDC:	J1 pin 3 ( + ) to pin 2 (common). Input impedance $\approx 200k$ .
	10K POTENTIOMETER.:	J1 pin 4 (cw), J1 pin 3 (wiper), J1 pin 2 (ccw).
	4 - 20 mA:	J1 pin 1 ( + ) to pin 2 ( - ). Input impedance $\approx 300 \Omega$ . To use this input jumper J1 pin 5 to J1 pin 3.
	ON / OFF:	J1 pin 4 to J1 pin 7 (common). Shorting pin 4 to pin 7 will inhibit the output.
	24 VAC:	J1 pin 6 to pin 7 (common). Provides logic power and phase reference for the controller. This must be in phase with the power terminals L1 to X1.

#### SPECIFICATIONS - MECHANICAL

<b>PHYSICAL DATA:</b>	ASSEMBLY TYPE:	Isolated case power module with printed circuit board attached.
	DIMENSIONS:	5" Long x 4" Wide x 2.2" high. (127 mm x 102 mm x 56 mm).
	MOUNTING CENTERS:	3.15" (80 mm).
	MOUNTING MEANS:	Two 1/4" (6.4 mm) diameter holes.
	WEIGHT:	0.7 lb. (0.32 kg) (approximately).
	CONNECTIONS, POWER:	Pressure type, accepts #2 - #14 AWG wire. Strip length = 3/8" - 1/2".
	CONNECTIONS, CONTROL:	Pressure type plug connector, rated 300 V, 10 Amp. Accepts #28 - #12 AWG wire. Recommended strip length = 0.27".
<b>ENVIRONMENTAL:</b>		
	OPERATING TEMPERATURE:	0° C - 50° C air temperature.
	RELATIVE HUMIDITY:	10 % to 90 % relative humidity.