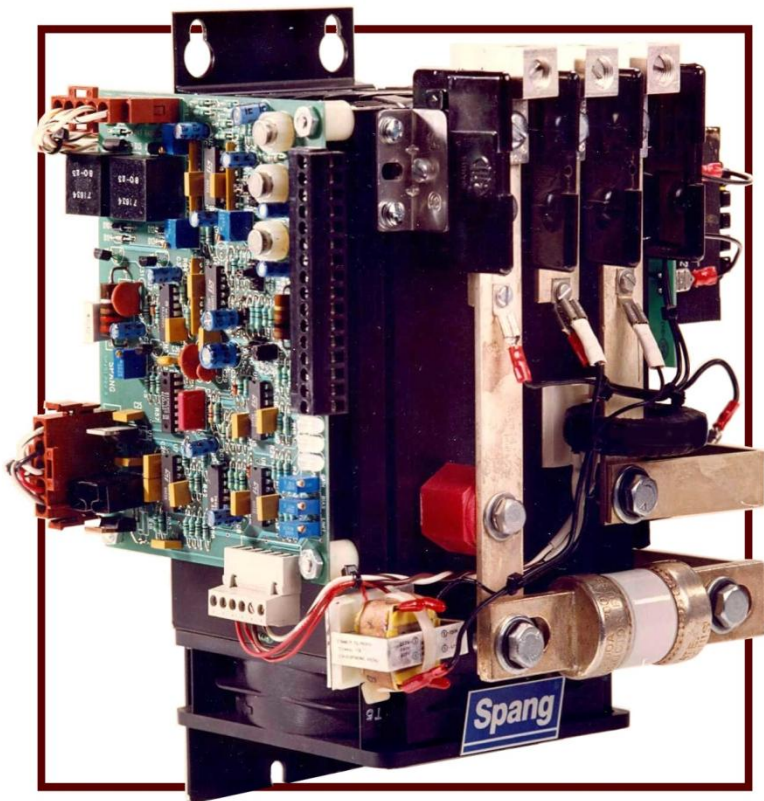


751 SERIES POWER CONTROL UNITS **Single Phase, Phase Angle SCR Controller**



STANDARD FEATURES

- Four models of regulation – voltage, current, power or open loop.
- Four modes of limiting – voltage, current, power or none.
- Diagnostic indication of lockout, limit, and gate signal.
- East mounting – easy service access.
- Quick-change I2t fusing system.
- Completely self-contained – No separate voltage required for standard voltages.
- Accepts all standard control signals.
- Silver plated all-copper bus bar.
- Gate signal lockout.
- Standard ratings designed for 50°C maximum ambient.
- Immunity to line distortion.
- Stepless control for proportional electric power.

Compact, Economical, Reliable Control of Single Phase AC Power.

Primarily used to control dynamic resistive, or transformer-coupled loads:

- Electric Furnaces
- Electric Ovens and Heaters
- Vibratory Feeders
- Extrusion and Forming Equipment

General Description

The 751 Series are general purpose single phase SCR Power Control Units, offering economical phase angle power control in a compact package. The latest advances in integrated circuit technology and power semiconductors have made this possible while maintaining high quality and reliability.

The firing circuit utilizes BIPO-LAR integrated circuits and digital logic to ensure immunity from power line distortions. State of the art Large Scale Integration (LSI) allows for a compact design with improved reliability.

The 751 Series utilize isolated power modules through the 200A frame size. The power module contains two SCRs connected in inverse parallel to control one line of a single phase load. Above the 200A frame size, a disc (hockey puck) style SCR device is used. The disc style contains one SCR. To control one line of a single phase load, two disc style SCR devices are required to create the inverse parallel circuit. For all sizes, the second line is connected through the controller to the load.

These general purpose units offer the most frequently used options as standard equipment. The features that are an integral part of this unit are:

- 1) Four different modes of regulation – voltage, current, power, or open loop
- 2) Four different modes of limiting – voltage, current, power, or none
- 3) Visual indication of firing, limiting, and inhibit
- 4) Semiconductor fusing
- 5) Two-piece terminal blocks located on top of the unit for easy installation and service
- 6) Internal transducers for monitoring voltage, current and power
- 7) Current source transducers (1ma) for increased accuracy
- 8) Convenient mounting of unit and power connecting
- 9) Integral CT and PT for regulation
- 10) Accepts feedback signal from user-supplied current and potential transformers if desired

These features allow the user to customize the PCU to suit the load or process right on site. Additionally, it allows the user the flexibility to change his process at any time in the future without purchasing different hardware.

Phase Angle Firing Advantages

- Conventional voltmeters and ammeters can be used for instrumentation over 0 to 100% voltage range
- Infinitely variable output
- Operation into dynamic loads (i.e., transformers)

Specifications

Input Voltage

The 751 Series units are available in a wide range of operating voltages (120, 208, 277, 380, 415, 480 & 575VAC). See Ordering Information.

Input Frequency

All units are capable of either 50Hz or 60Hz operation without modification or adjustment.

Connections

UL listed compression terminals are provided for both power and control connections.

Ambient

All ratings are designed for 50°C maximum operating temperature. For operation at higher temperatures (to 65°C maximum), some derating is necessary; please consult factory.

Input Signals

0-5, 2-12, 4-20, 10-50ma or 0-10V inputs (all standard temperature controller outputs) or a manual potentiometer. See Control Connections.

Adjustments

High resolution, 20 turn potentiometers are provided for all adjustments.

- a. Gain adjustments provide full output for 50% to 200% standard control signal
- b. Bias adjustment for manual control to 100% output

Voltage Protection

- a. Transient voltage suppression is provided by an R-C snubber network and metal oxide varistor (MOV) which clamps high voltage spikes to within the PRV rating of the semiconductors.
- b. Standard PRV ratings: 120-575 volt units – 1200 volts

Reference Supply

A 12 volt DC regulated reference supply is available from the firing circuit for connection to a remote potentiometer, from which the Power Control Unit can be controlled manually. This supply is regulated to within $\pm 1/2\%$ for line voltage variations. Maximum current rating from this reference source is 10 milliamperes.

Cooling

The 30 and 50 amp current sizes are convection cooled. Larger sizes are forced-air cooled by integral cooling fans.

TIP (Soft Start)

An integral soft start ramp is provided on all 751 Series units. Upon initial energization, gate firing is inhibited for a short dead time to allow for circuit stabilization. After this time the SCR output is ramped in response to the input control signal. The Transformer Inrush Protection (TIP) feature allows smooth, reliable control into the primary of the transformer, thus eliminating nuisance fuse blowing due to high inrush currents which can occur if power is applied too rapidly to a transformer.

Limits and Regulation

The 751 Series provides a choice of three types of limit control and three modes of regulation as standard equipment. Each type is easily field-selectable by simply moving the appropriate shunt on the control amplifier circuit board. Any combination of regulation or limit is possible, including no limit and open loop.

Limits

1. **Current limit** – senses RMS current and limits output. Current limit adjustment is from 5% to over 100% of rating by a potentiometer on the firing circuit.
2. **Voltage limit** – senses RMS voltage and limits output. Voltage limit adjustment is from 5% to over 100% of rating by a potentiometer on the firing circuit.
3. **Watt limit** – senses both RMS current and voltage to limit the output kva to a preset value. Watt limit adjustment is from 5% to 100% of rating by a potentiometer on the firing circuit.

Regulation

1. **Voltage regulation** – maintains output voltage to $\pm 1\%$ for line voltage fluctuations of +10% to -15% of nominal and provides an RMS output voltage that is linear to the control signal within $\pm 1\%$ from 0 to 100% output.
2. **Current regulation** – compensates for both line and load fluctuations and provides constant RMS current proportional to the control signal. Current regulation is $\pm 1\%$ of setpoint.
3. **Watt regulation** – regulates output kilowatts to within $\pm 1\%$ of the setpoint.

Indication

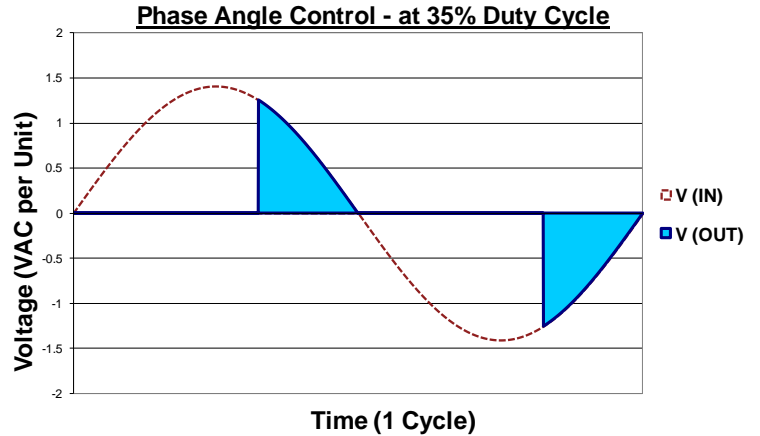
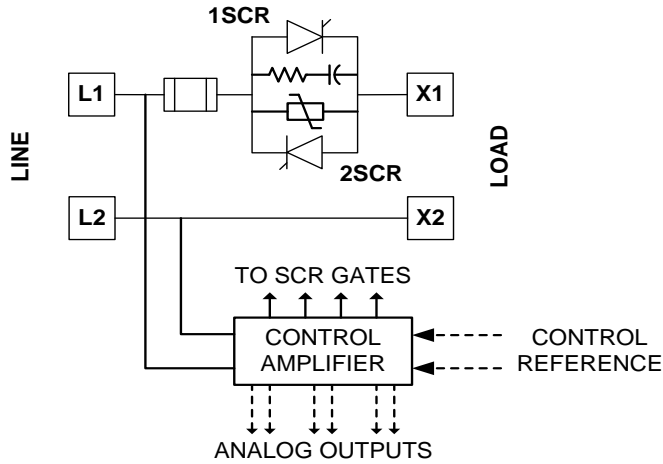
Three LED indicators are located on the side of the circuit board above the gain, bias, and limit potentiometers. These LEDs indicate the status of SCR unit by giving a visual indication of the operation.

LED1 is a bicolor device that shows if the SCR unit output is being limited. Normally this device should show a green indication- no limiting action is taking place (the control signal is less than the setpoint of the limit). A yellow or orange color indicates that the firing angle is beginning to be limited (the control signal is approaching the setpoint of the limit.) A red color indicates that the unit is hard into a limit (the control signal is far greater than the setpoint of the limit).

LED2 is a bicolor device that shows a normal operating condition when green or an intentional disabling of the SCR gates. This "lockout" condition is present when Terminals 3 and 4 of the TB1 are shorted together and the LED2 glows red. LED2 also glows red on initial power up of the unit and then changes to green after 1.5 to 2 seconds.

LED3 is a bicolor device that indicates the presence of a gate signal to the SCRs. At any firing angle this LED will glow orange if gate signals are being sent to the SCRs. This indication allows for an easy bias adjustment by just observing this LED while adjusting the potentiometer.

Electrical Schematic & Control Method



Control Connections

Control Connections			
DC Control Signal	Input Control Terminal Points	Shunt Position	Input Impedance
0-5 ma	5 (+) - 6 (-)	5 ma	1000 ohms
2-12 ma	5 (+) - 6 (-)	12 ma	400 ohms
4-20 ma	5 (+) - 6 (-)	20 ma	250 ohms
10-50 ma	5 (+) - 6 (-)	50 ma	100 ohms
0-10 V or Manual	9 (+) - 10 (-)	Manual	200K ohms
Contact Closure	8 and 9		Close Contact to turn PCU on
Manual Control: End of Pot Slider of Pot	8 and 10 9	Manual	Connect a 10k Ω 2Watt Potentiometer
Lockout (External shutdown contact)	3 and 4		Close Contact to turn PCU off
Watt transducer output (0-1ma)	11 and 10		
Voltage transducer output (0-1ma)	13 and 14		
Current transducer output (0-1ma)	15 and 16		

Ordering Information

E : 120V Line
C : 208V Line
D : 240V Line
J : 277V Line
F : 380V Line
K : 415V Line
G : 480V Line
H : 575V Line

0 : No Temperature Switch
1 : N.O. Temp Switch*
2 : N.C. Temp Switch*

A : No Regulation
B : Current Regulation
C : Voltage Regulation
D : Power Regulation

Amps	Size Code
30	300
50	500
100	101
175	171
200	201
400	401
600	601
1000	102

7 5 1

Size Code

A : No Over-Current Shutdown
B : Over-Current Shutdown

A : No Limit
B : Current Limit
C : Voltage Limit
D : Power Limit

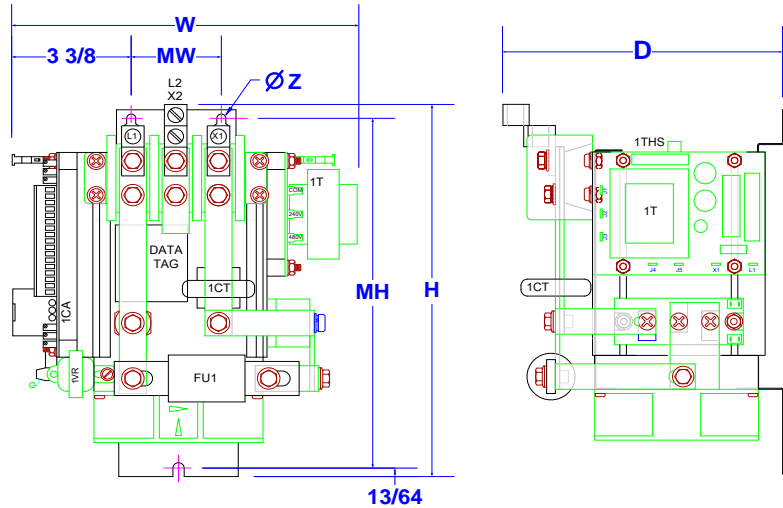
* Forced-air cooled units only. Not applicable to convection cooled units.
 For convection cooled units (30 & 50 Amp), select option zero (0).

Physical Dimensions

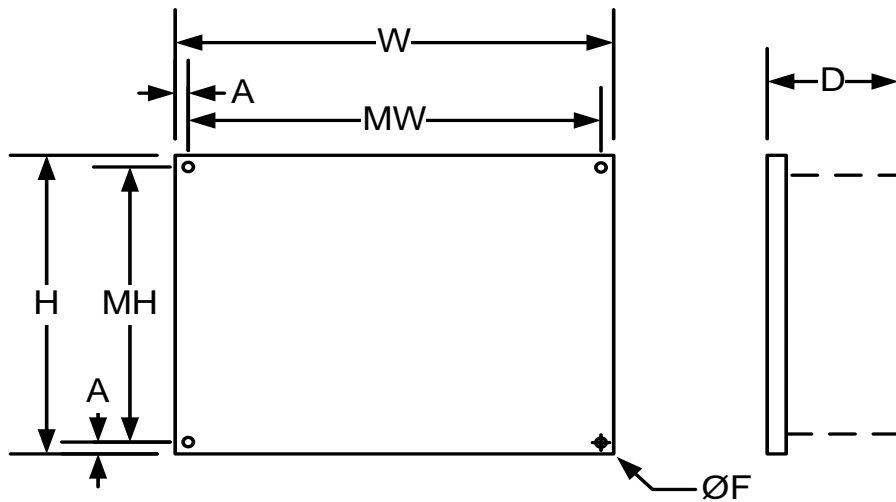
PHYSICAL DIMENSIONS

30 - 200 Amp

Dimensions	
Height (H)	11
Width (W)	10
Depth (D)	8
Mounting Height (MH)	$8 \frac{21}{64}$
Mounting Width (MW)	$2 \frac{1}{32}$
Mtg. Hole Diameter (Z)	$\frac{1}{4}$



400 - 1000 Amp



CHASSIS DIMENSIONS

Amperage	W	MW	H	MH	A	D	F
400 Amp	15	13 1/2	20	18 1/2	3/4	12	1/2
600 Amp	15	13 1/2	20	18 1/2	3/4	12	1/2
1000 Amp	18	16 1/2	26	24 1/2	3/4	14 3/4	1/2

NOTE: All dimension listed in inches.
 Consult SPE for application currents above 1000AAC.