

Power

CONTROLS

1 ϕ AND 3 ϕ

athenacontrols.com



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NOTE:
These Devices Are for Use
with Resistive Loads Only.

SERIES 19 and 39

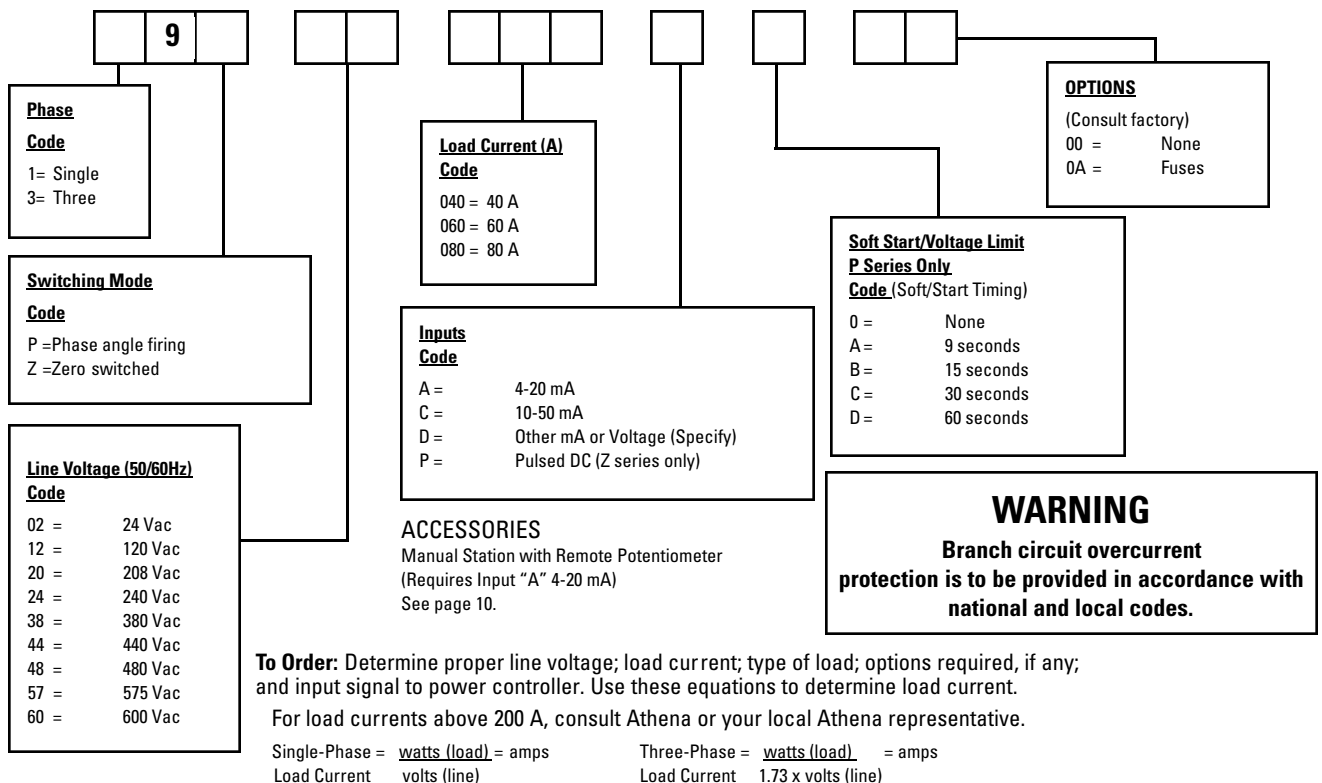
SCR Power Controllers Zero-Switched or Phase-Angle Fired

(Resistive Loads Only)

- Extends Heater Life- Eliminates Thermal Shock
- Optically Isolated
- Capacity up to 80 Amps
- Diagnostic Indicators
- Self-Synchronizing to Line Frequency
- Isolated Heat Sinks
- Compact Design
- Full Protection Against Line Voltage Spikes



Ordering Information





SERIES 19 & 39 SCR POWER CONTROLLERS

SPECIFICATIONS

Supply Voltage:	24 to 600 Vac
Frequency:	50-60 Hz
Current Rating:	40, 60 and 80 A
Control Signal	
Isolation:	2500 Vac
Transient Voltage	
Protection:	MOV and RC suppression
Ambient Temperature Range:	32° to 122°F (0° to 50°C) for listed current rating
Load:	Resistive. 3-phase- 3 wire Delta or Ungrounded Wye 19Z/19P-1 phase, 1 line control 39Z-3 phase, 2 lines controlled 39P-3 phase, 3 lines controlled
Diagnostic Indicators:	Shorted or open SCR reversed signal input (mA/V)

ZERO VOLTAGE SWITCHED CONTROLLERS

The 19Z and 39Z SCR controllers are zero crossover fired, high-power solid state switching devices. Zero firing eliminates the RFI generation associated with mechanical relays. With zero voltage firing, the output appears as bursts of full sine waves of line voltage which provides excellent regulation to the load.

PHASE ANGLE FIRED CONTROLLERS

The 19P and 39P phase angle fired controllers turn each SCR on for a controlled portion of a half-cycle of the line voltage. The effective load voltage is determined by the portion of the line voltage delivered which is proportional to the input control signal. Additionally, the voltage is regulated as the line voltage changes.

DIMENSIONS

MODEL #	Height	Width	Depth
19Z	7.0"	4.75"	4.0"
19P	7.0"	4.75"	4.0"
39Z	7.0"	9.62"	4.0"
39P	7.0"	14.37"	4.0"

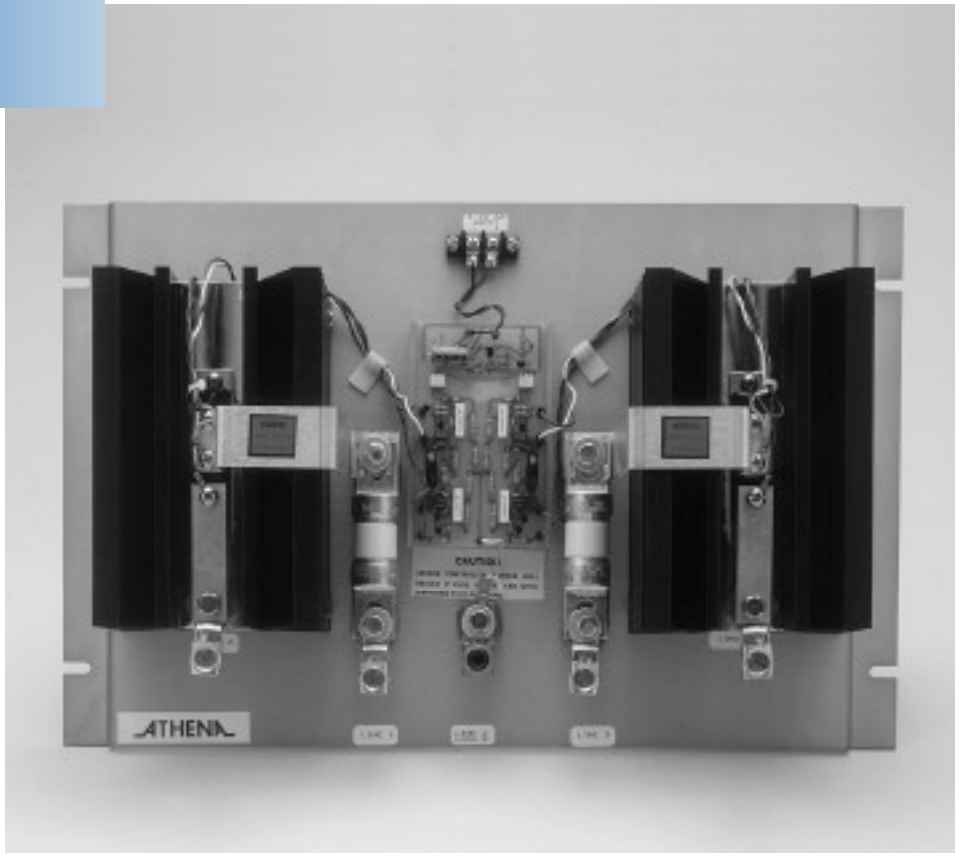
NOTES: = IF FUSES ARE ADDED TO UNIT, ADD 3 1/4" OVERALL DEPTH IS 4"

SERIES 91 & 93

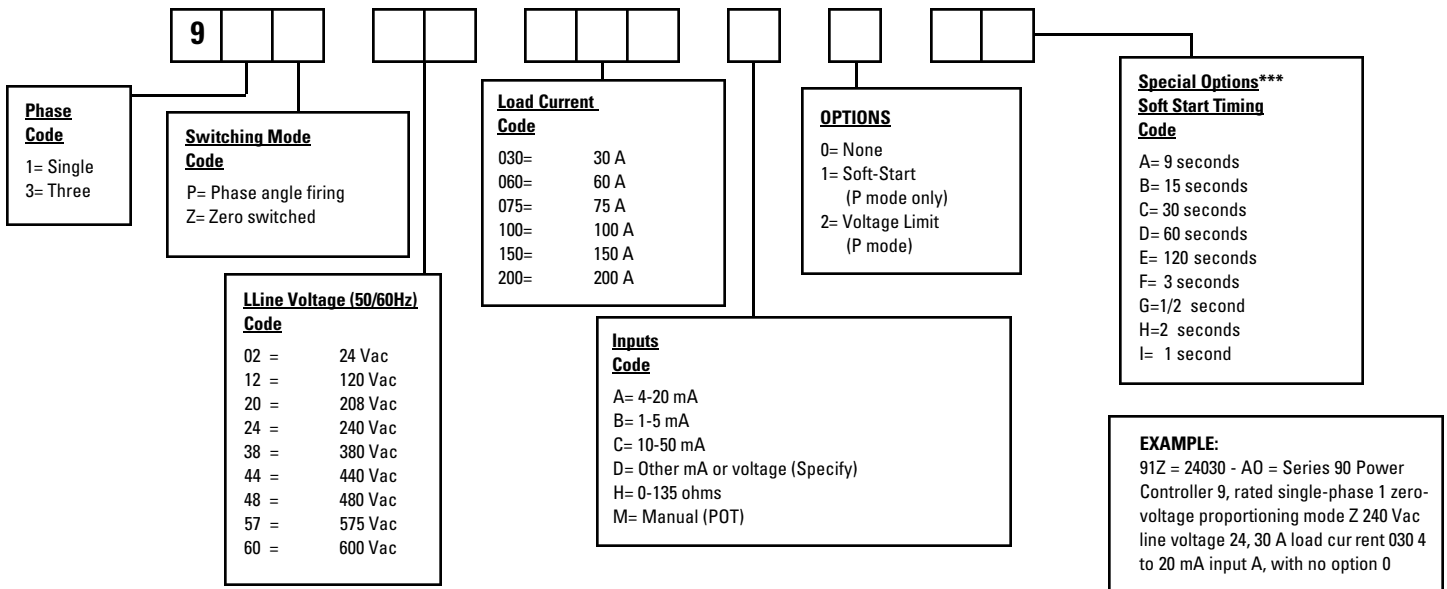
Phase-Angle Fired or Zero-Switched SCR Power Controls for Electrically Heated Processes

(Resistive Loads Only)

- High Efficiency - Power Conservation at Setpoint
- No Maintenance - All Solid State Components
- No Relay Noise - Contact Arc Noise Eliminated
- Extends Heater Life - Eliminates Thermal Shock
- Stable Process Temperature Cuts Product Waste
- All Terminals Are Push-on or Screw Type Components, for Ease of Connection
- New Lower Profile Heatsink Design Provides Additional Space Savings
- I²T Fuse Protection



Ordering Information



To Order: Determine proper line voltage; load current; type of load; options required, if any; and input signal to power controller. Use these equations to determine load current.

For load currents above 200 A, consult Athena or your local Athena representative.

Single-Phase = $\frac{\text{watts (load)}}{\text{volts (line)}} = \text{amps}$

Three-Phase = $\frac{\text{watts (load)}}{1.73 \times \text{volts (line)}} = \text{amps}$

** Not Available on 3 Phase, Phase Angle Units (93P)

*** Soft Start Timing Available on Phase Angle Only (91P & 93P)



SERIES 91 & 93 SCR POWER CONTROLLERS

SPECIFICATIONS

Use With:	Any Athena "F" output temperature controller, and all other milliamp output controllers.
Supply Voltage:	120/208/240; 380/440/480/575 Vac: 1 or 3 phase. Phase connections not critical on 3-phase units
Frequency:	50-60 Hz
Ambient Temperature:	32° to 122°F (0° to 50°C) for listed power ratings.
Cooling:	Convection to 200 A
Input:	4 to 20 mA standard (minimum voltage requirement-10V) All inputs electrically isolated via optical coupling (See above for additional inputs)
Protection:	Sub-cycle, current-limiting fuse. Transient voltage suppression.
Load:	Resistive. 3-phase - 3-wire wye or delta.

IMPORTANT:

Proper selection of your Athena solid-state power controller will ensure many years of trouble free and precise temperature control.

SERIES 91 AND 93 POWER CONTROLLERS

are designed to proportion electric power to resistive loads only. Some resistive loads exhibit high inrush currents: e.g., quartz lamps with tungsten elements. Power controllers used to drive these loads must be ordered with soft-start option 1 (specify time in seconds), available only with 91P or 93P controllers.

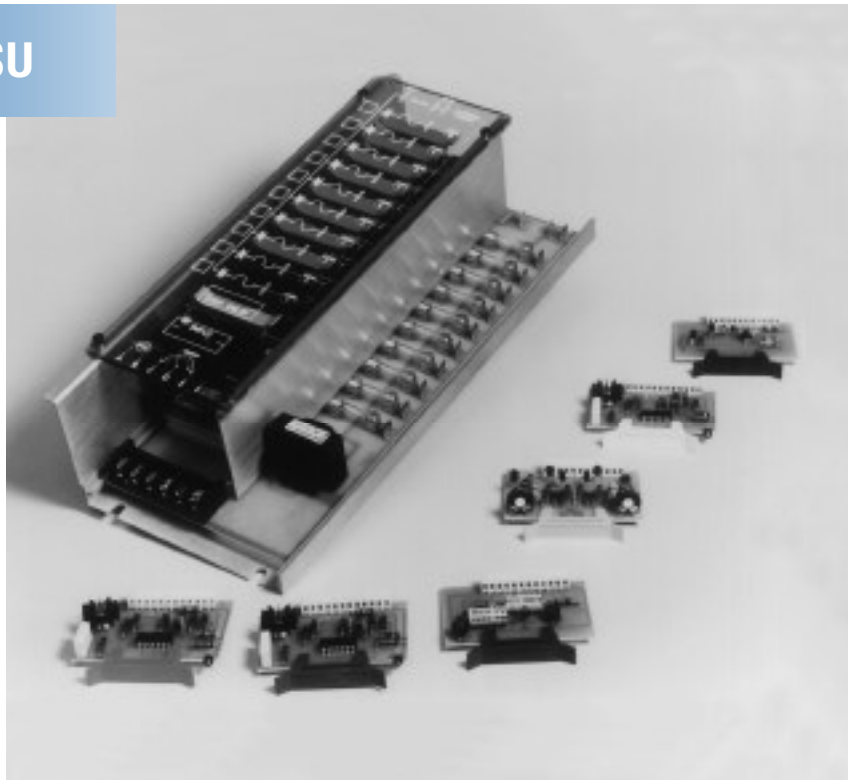
DIMENSIONS

Output Current (A)	Dimensions HxWxD (in)	Output Current (A)	Dimensions HxWxD (in)	Output Current (A)	Dimensions HxWxD (in)
91P & 91Z		93Z		93P	
30	12¼ x 10¼ x 4	30	8¾ x 19 x 4	30	14 x 19 x 4
60	12¼ x 10¼ x 4	60	8¾ x 19 x 4	60	14 x 19 x 4
75	12¼ x 10¼ x 6	75	12¼ x 19 x 6	100	17½ x 19 x 6
100	12¼ x 10¼ x 6	100	12¼ x 19 x 6	150	19¼ x 24 x 10
150	17 x 13 x 10	150	17½ x 19 x 10	200	19¼ x 24 x 10
200	17 x 13 x 10	200	17½ x 19 x 10		

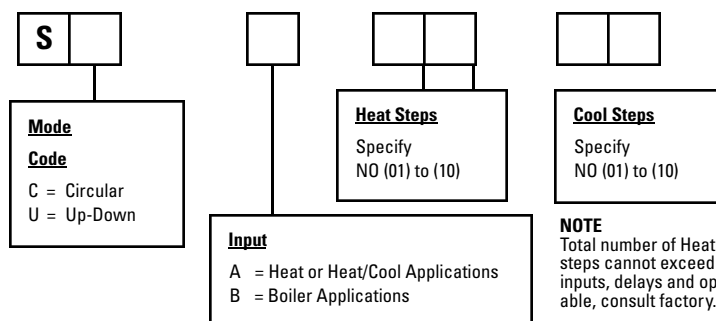
SERIES SC and SU

Solid-State Staging Controllers

- Solid-State Output Stages
- Up-Down or Circular Mode
- Optically Isolated Input
- Logic Status Lights
- Field Changeable, Plug-in Circuit Boards
- Versatile Current, Voltage, or Resistance Input
- 10-Stage Capacity
- Fused Output Stages



Ordering Information



NOTE
Total number of Heat and Cool steps cannot exceed 10. Other inputs, delays and options available, consult factory.

Example:
SUA-08-02 – Series (S) staging controller (U) up-down mode (A) 4-20 mA, or 135 , 10 seconds standard input, (8) heat stages, (2) cool stages.

Determine desired mode of operation, i.e., circular, up-down, type of input to stager and number of steps to be switched.

CIRCULAR MODE: Recommended for heating only application.

UP-DOWN MODE: Required for heating/cooling applications and priority load sequencing.





SERIES SC & SU SOLID-STATE STAGING CONTROLLERS

SPECIFICATIONS

Power Requirements:	120 V, 50/60 Hz, ($\pm 10\%$, to $\pm 20\%$ Vac) 4 VA plus total VA of all devices staged, i.e., contactor coil VA
Output Capability:	1 amp per step continuous; 10 amps per step inrush
Signal Input (Terminals A-B):	mA dc; 4-20 mA standard for 1-5 Vdc; 60 mA and 9 V maximum input. "A" configuration
Signal Input (Terminals C-D-E):	135 slide-wire or potentiometer; 100 to 1000V acceptable. "A" configuration
Signal Isolation:	1500 volts from power and ground
Time Delay:	Adjustable 2 to 12 seconds per step; automatic slow down near balance
Cycling:	Adjustable from differential to time proportioning
Ambient Temperature:	32° to 131°F (0° TO 55° C)

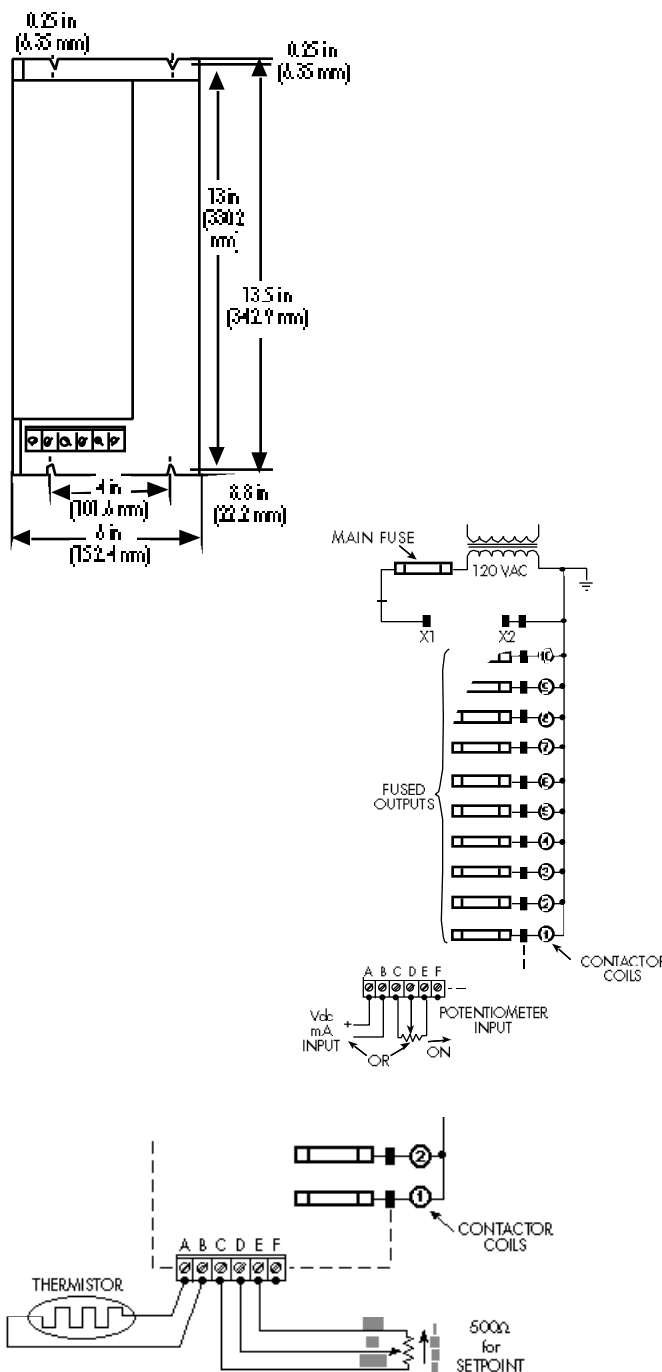
All specifications subject to change.

TYPE A INPUT (FOR HEAT OR HEAT/COOL APPLICATIONS)

Series SC and SU Staging controllers are multi-purpose units designed for maximum flexibility and serviceability. Standard units are designed for pilot duty sequencing of multiple stages of heating or heating and cooling applications. Series SCA and SUA controllers require 4-20 mA dc signals from a temperature controller or a slide-wire potentiometer. All input signals to the Series SC and SU controllers are optically isolated.

TYPE B INPUT (FOR BOILER APPLICATION)

The Series SC and SU Staging Controllers, when ordered with Type "B" input card, require no driver or temperature controller input signal. The "B" input card (field interchangeable with "A" type) makes the staging controller a complete thermistor sensing temperature controller with a multi-stage output. Input is from a thermistor probe connected to terminals A-B and temperature setting potentiometer across C-D-E. A special feature of this unit is that output power is off for "open" or shorted process sensor. High accuracy is obtained by using narrow setpoint spans. Available ranges: 50-180°F or 100-200°F

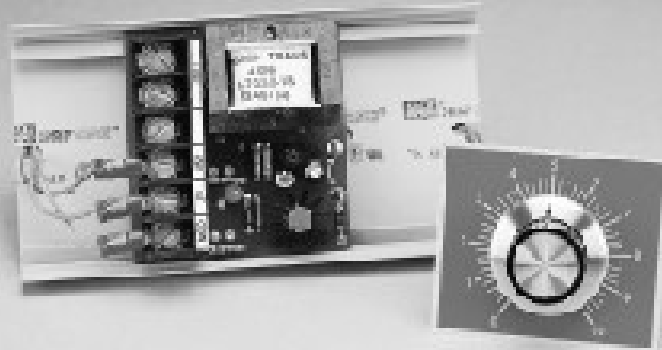


SERIES 90

Manual Station Temperature Controller

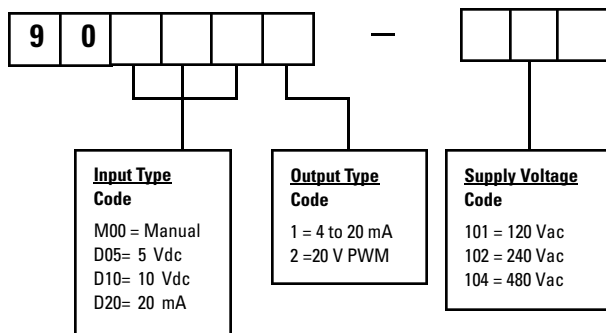
- *Low-Cost Open Loop Control*
- *Fully Variable 4-20 mA or 20 V Pulse Width Modulation (PWM) Output*

The Series 90 manual station allows users to manually set an output level on SCR power controllers, proportional valves, and other final control mechanisms. The unit includes circuit board, mounting track, dial potentiometer with 48" leads, scale, knob, and female contacts.



Remote Setpoint Potentiometer (optional)

Ordering Information



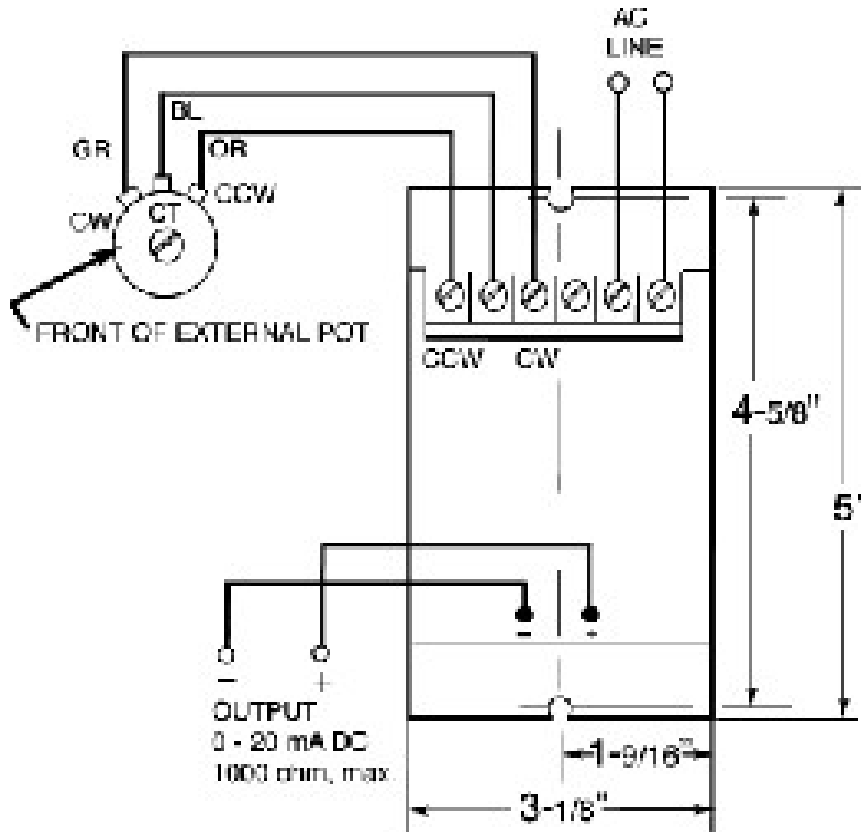


SERIES 90 MANUAL STATION TEMPERATURE CONTROLLER

SPECIFICATIONS

Power:	120, 240, or 480 V +10% -15%, 50/60 Hz
Input:	0-135 ohm minimum, 0-1000 ohm maximum potentiometer (500-ohm potentiometer supplied with 48" leads)
Ambient Temperature:	32 to 131° F (0° to 55°C)
Dimensions:	
Unit:	5" L x 3.25" W x 2" H (12.7 cm L x 8.26 cm W x 5.1 cm H)
Scale Plate:	2.75" W x 2.375" H (6.98 cm W x 6.03 cm H)

Specifications subject to change without notice.



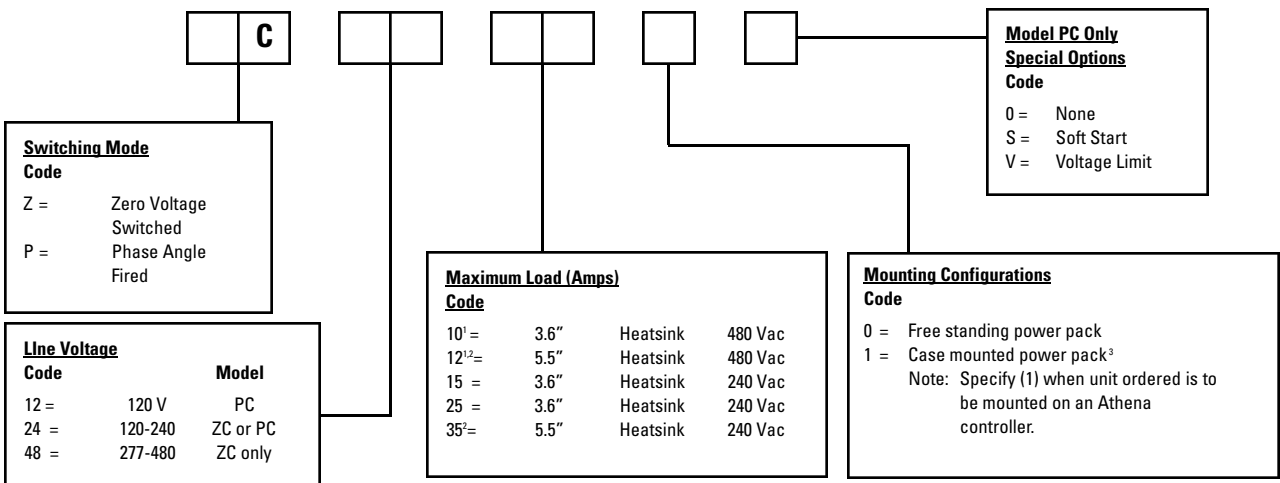
SERIES ZC & PC

Solid-State Contactors for Control of Resistive Heating Loads

- Extends Heater Life – Reduces Thermal Shock
- All Solid-State Design – No Maintenance Required
- Soft-Start and Voltage Limit (Optional on PC)
- Zero Voltage or Phase Angle-Fired
- Full Power Rating at 120° F (49° C) Ambient Temperature



Ordering Information



Example: Model ZC-2425-1-a controller with a zero voltage switching mode; a line voltage of 120-240 V; a maximum load (amps) of a 3.6" heatsink, 240 Vac; and a case-mounted power pack configuration.

CAUTION Possible fire hazard. Because these controls or associated equipment may not always fail safe, an approved temperature and/or pressure safety control should be used for safe operation.

NOTES:

¹ Only 480 Vac available. None higher. ZC only.

² Panel mounting only.

³ Not available on 35 A model



SERIES ZC & PC SOLID-STATE CONTACTORS

Inputs
(minimum voltage):

3 V input signal, minimum, is needed. Standard Athena "S" or "F" output controllers can energize up to three units in series. Model ZC- 3-32 Vdc pulsed voltage, optically isolated from output (2500 V). Requires Athena output type "S". Model PC- 4-20 mA proportional current, optically isolated from output (2500 V). Requires Athena output type "F".

Ambient Temperature: 120°F (49° C) maximum for rated amperes.

Output Ampere Rating: Resistive loads only. 277-480 Vac is ZC Unit Only.

Note: For greater ampere loads, consult factory.

Nominal Rating Max.						
Model	Supply Voltage	3.6" Heat Sink	5.5" Heat Sink	Peak Surge	Voltage Drop	Max. Leakage
ZC	120-240	15 A	N/A	250 A	1.6 V	15 mA
	120-240	25 A	35 A	650 A	1.6 V	15 mA
	277-480	10 A	12 A	150 A	3.2 V	1 mA
PC	120	15 A	N/A	310	5.0 V	10 mA
	120/240	25 A	35 A	310	8.0/5.0 V	10 mA

OPTIONS AVAILABLE FOR PC UNITS ONLY:

Soft-Start
Option: 0 to maximum output within 30 seconds standard. Consult factory for slower or faster turn-on times.

Voltage Limit
Option: Output limit is adjustable from 35% to 95% of line input voltage.

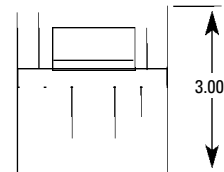
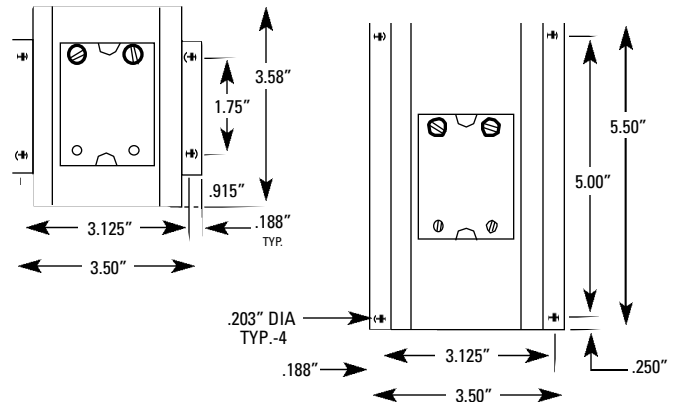
ZERO VOLTAGE SWITCHING

Series ZC contactors offer zero voltage switching for EMI/RFI free operation. A time proportional 3-32 Vdc input signal is required to energize these contactors (use with Athena "S" output controller).

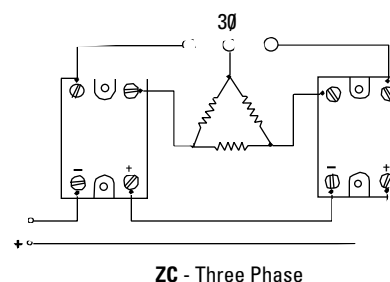
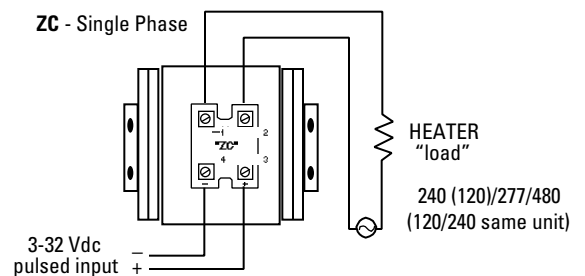
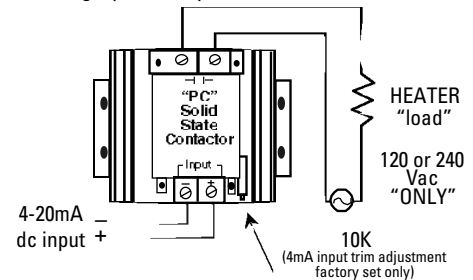
PHASE ANGLE-FIRED SWITCHING

Phase angle-fired switching provides continuously variable voltage output by governing the point of turn-on (firing) of each half cycle of the full AC sine wave. Low mass heating elements such as heating lamps and hot wires are recommended applications. Use with Athena "F" output (4-20 mA) controller.

Phase angle firing allows for two options not available with ZC solid state contactors. Soft-Start provides slow turn on for high inrush loads, such as quartz lamps and Tungsten elements. Voltage limit restricts load current by capping the



PC (single phase only)



NOTES

NOTES

ALSO FROM ATHENA CONTROLS...

Universal Digital Controllers



Custom Control Solutions



Vintage Controllers



Analog Controllers



Hot Runner Controllers



Tudor™ Temperature Sensors



Power Handlers

