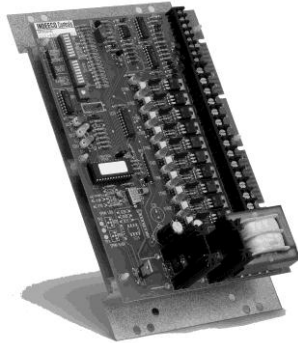


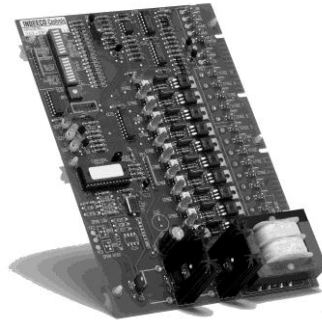


# S95 Series Step Controls

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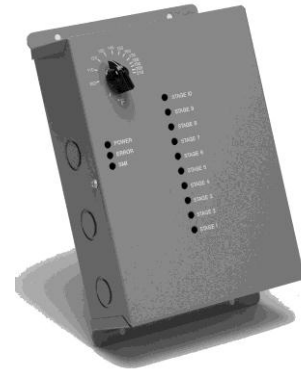
201 Series



202 Series



204 Series



205 Series

## Operation

The S95 Series step controls can be used to replace earlier models of M72 Series, S71 Series, S81 Series and S92 Series step controls. Contact the factory for additional information and cross-referencing.

Common applications are HVAC duct heaters, process air heaters and boilers. Features include status leds and diagnostics. A test mode will cycle the selected stages, testing the load wiring, contactors and stage operation. A vernier control is available, which results in more precise control than is possible with a standard step control. A separate power controller provides proportional control (0-100% load), in between the switching of step control stages. Two different control modes and switching schemes can be selected, per the following:

**Dead Band Control:** Typically used by older model step controls. When the input signal is within the input range, the stages do not change. Above the input range, stages are added. Below the input range, stages are removed.

**Proportional Control:** The total number of stages ON, including the optional vernier stage, is linear with respect to the input range. For example, a 5.0VDC signal to a 0-10VDC input will result in half of the stages being ON. The vernier control operates 0-100% between stages.

**Progressive Switching:** Even wear on stages is achieved by turning ON stages 1 to 10 in order, then starting over with stage 1. When removing stages, the first stage ON is the first stage OFF.

**Linear Switching:** Stage 1 is the first stage to be turned ON and the last stage turned OFF.

For example: 1,2,3,4,5 ON then 5,4,3,2,1 OFF.

## Specifications

- UL Recognized: File E52105 Guide XAPX2
- Storage Temp: 0° to 186°F
- Operating Temp: 0°F to 167°F
- Line Voltage: 120/240VAC +/-10%, 12VA max
- Frequency: 47 to 63 Hertz
- Input Impedance: 250Ω (mA), 33KΩ (VDC)
- Input Wire Range: 18-22 AWG, copper only
- Input Quick Connects: 0.25" x 0.032" male

- Stage Outputs: Pilot-duty triacs
- Stage Ratings: 120/240VAC, 90VA max
- Stage Terminal Block: 12-22 AWG, copper only
- Stage Quick Connects: 0.25" x 0.032" male
- Selectable Time Delay: 5 seconds - 10 minutes
- Vernier Output: 12VDC pulse, 0.5 VA max.
- Slaves Allowed: 1 per 10 stage master
- Slave Cable: 30" ribbon-cable, supplied with unit

### **Catalog and Part Numbers: 201 & 204 Series**

**2 0 1 - S 9 5**

**Mounting & Series**

201 = metal plate  
204 = NEMA 1 enclosure

Typically used for new products and to replace earlier models of M72, S71, S81 and S92 Series.

**M 1 0**

**Type**

M = master  
S = slave

**Stages**

05 = 5 stages\*  
10 = 10 stages

**2**

**Terminals**

2 = terminal blocks

**E**

**Input Code**

A = 2200 ohm  
C = 135 ohm  
E = 4-20mA  
L = 0-10VDC  
V = adjustable VDC  
blank = slave

**Note:** Standard masters have 4 field-selectable inputs: A, C, E and L ( S input code). The input code determines the switch position before shipment from the factory.

\* The 05=5 stage unit is no longer available.

### **Catalog and Part Numbers: 202 Series**

**2 0 2 - S 9 5**

**Mounting & Series**

Six snap-in nylon standoffs. Typically used in INDEECO electric duct heaters and process air heaters.

**M 1 0**

**Type & Stages**

M = master  
S = slave

05 = 5 stages\*  
10 = 10 stages

**2S**

**Terminals**

2 = terminal blocks  
1 = QC (obsolete)

**Input Code**

S = (see note)

**I**

**Control**

I = fixed for linear control regardless of dip switch setting.

**Note:** Masters have selectable inputs: A (2200 ohm), C (135 ohm), E (4-20mA), L (0-10VDC)  
Slaves do not have an input nor control code.

\* The 05=5 stage unit is no longer available.

### **Catalog and Part Numbers: 205 Series**

**2 0 5 - S 9 5**

**Mounting & Series**

NEMA 1 enclosure with setpoint adjuster in lid.

**Requires 310 Series thermistor sensor.**

**M 1 0**

**Type**

M = master

**Stages**

05 = 5 stages\*  
10 = 10 stages

**2A**

**Terminals**

2 = terminal blocks

**Input Code**

A = 2200 ohms

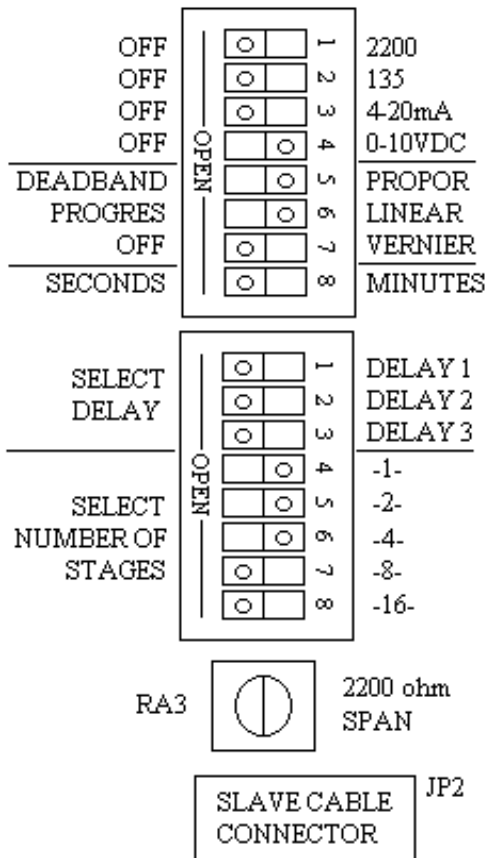
**21**

**Temperature Range**

21 = 0-100° F  
41 = 50-150° F  
43 = 50-180° F  
47 = 100-210° F  
51 = 120-250° F  
55 = 150-250° F

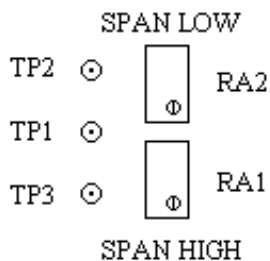
\* The 05=5 stage unit is no longer available.

## Setup and Diagnostics



- POWER (RED)
- ERROR (YELLOW)
- SMI (GREEN)

CONTROL MODE    JP1 TEST MODE



**WARNING:** Remove 120/240 VAC power to the step control and stages before changing any settings. Changes take effect when power is restored.

- 1) Turn on 1 of 4 inputs. Set remaining inputs to OFF.
- 2) Select DEADBAND or PROPORTIONAL control.
- 3) Select PROGRESSIVE or LINEAR switching.
- 4) Select the VERNIER control mode if the optional power controller is used, otherwise set to OFF.
- 5) Select the time delay between stages (see table).
- 6) Select the number of stages by adding up the total. For example, 10 stages would be -2- and -8-.
- 7) Potentiometer RA3 is used for 2200 ohm inputs only. The span can be adjusted from  $\pm 200$  ohm (fully clockwise) to  $\pm 20$  ohms (fully counter-clockwise).

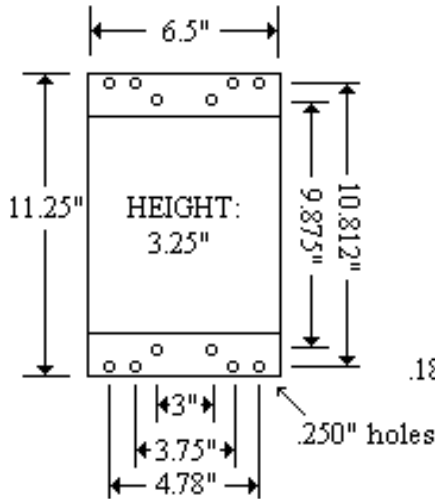
Delay in Seconds	Switch Set To:			Delay in Minutes
	Delay 1	Delay 2	Delay 3	
5	No	No	No	1
10	Yes	No	No	2
15	No	Yes	No	3
20	Yes	Yes	No	4
30	No	No	Yes	5
40	Yes	No	Yes	7
50	No	Yes	Yes	9
60	Yes	Yes	Yes	(1 sec)

The POWER led is ON when 120/240VAC power is applied to the control. The ERROR led is ON when the input or stage switches are set incorrectly or jumper JP1 is set for test mode (see **Operation**). When JP1 is set to control mode, the step control functions normally. The SMI led is OFF when the input signal is below the input range and ON when above the input range. It flashes when the input signal is within the selected input range. Individual STAGE leds (not shown) are ON when the triac output is energized.

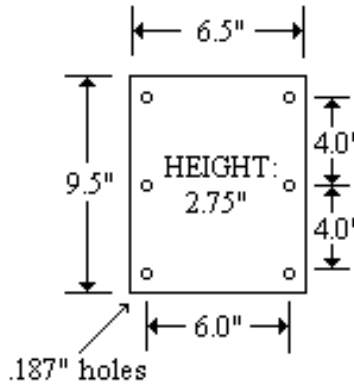
Units with the V input code have an adjustable VDC input range. Attach a DC voltmeter to TP1 (-) and TP3 (+). Adjust RA1 to the upper VDC range. Move the meter from TP3 (+) to TP2 (+). Adjust RA2 to the lower VDC range. The HIGH input range must be at least 2.0VDC greater than the LOW input range.

**Physical Dimensions:** 201 Series mounting holes match older S71 & M72 Series.

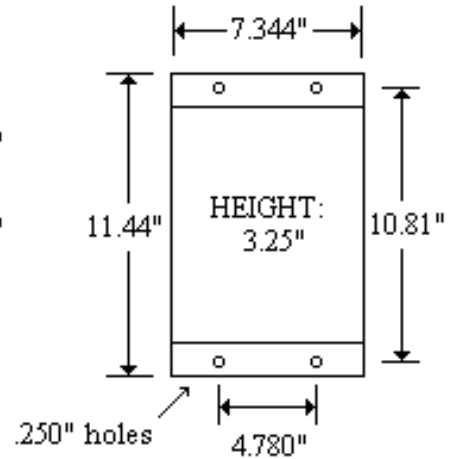
**201 Series  
metal mounting plate**



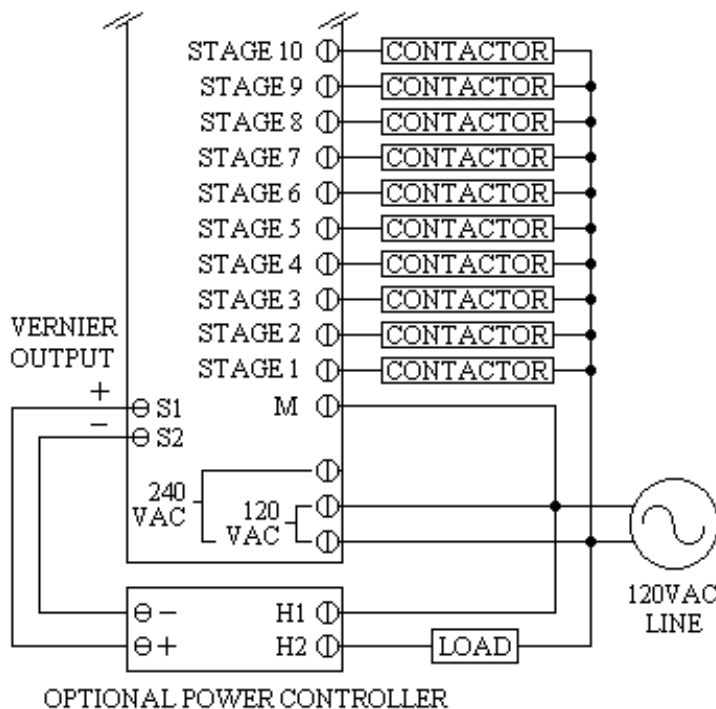
**202 Series  
nylong standoffs**



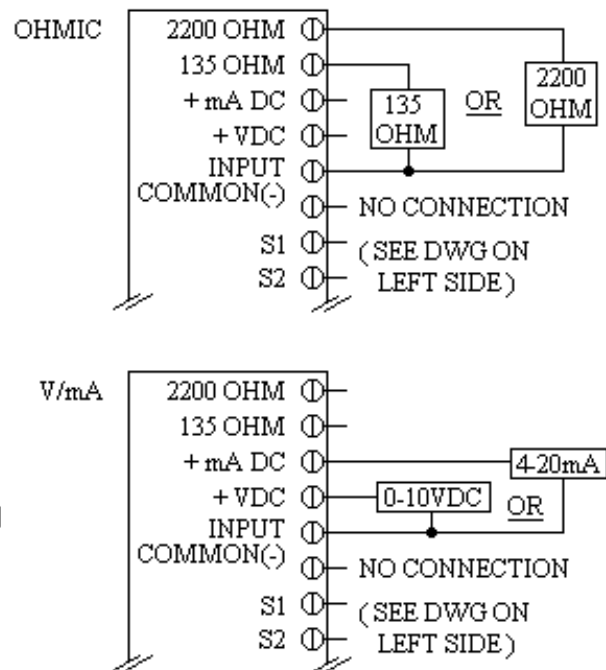
**204/205 Series  
NEMA 1 enclosure**



**Wiring Diagram: Outputs**



**Wiring Diagrams: Inputs**



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