



A Reliable Tool For All Basic Temperature Control Applications

The Series 93 is a microprocessor-based control with single input, dual output. It has a feature set that includes heat/cool auto tune, ramp to set point, versatile alarms and percent power limit. Optional hardware features include red or green displays, universal low and high voltage power supply, CE compliance and a NEMA 4X rating.

The Series 93 is a 1/16 DIN temperature controller tested to meet NEMA 4X (IP65) standards for water and corrosion resistance (optional). This is ideal for applications such as food processing, packaging, medical instruments and where equipment needs to be cleaned frequently. The front panel can be hosed or wiped down without damage to the controller.

The compact size of the controller allows more flexibility in applications where space is a problem, such as bench top equipment.

The Series 93 also has many of our standard features, such as dual digital display, accuracy at ± 0.1 percent of span, a wide operating environment from 0 to 65°C at 115V~(ac) line voltage power, easy setup with operator friendly prompts.

The Series 93 is backed by a three-year warranty.

Features

- Dual display
- Dual outputs
- NEMA 4X (IP65) certified (BSEN)
- Universal inputs
- Ramp to set point
- Percentage power limiting
- Lock-out facility
- ± 0.1 percent accuracy

Benefits

- Displays set point and actual
- Provides heat/cool capacity
- Offers water and dust resistance
- Offers wide range of sensor inputs
- Controls temperature rise
- Avoids stressing components
- Offers high security
- Offers excellent range accuracy

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Specifications

Control Mode

- Microprocessor-based, user selectable control modes
- Single input, dual output
- Ramp to set point: 0 to 9999 degrees or units per hour
- Heat and cool auto tune

Agency Approvals

- UL, C-UL, CE

Operator Interface

- Sealed membrane front panel
- Dual, 4-digit red or green displays
- Advance, Increment, Decrement, and Infinity keys

Accuracy

- Calibration accuracy and sensor conformity: $\pm 0.1\%$ of span, $\pm 1^\circ\text{C}$ @ $77^\circ\text{F} \pm 5^\circ\text{F}/25^\circ\text{C} \pm 3^\circ\text{C}$ ambient and rated line voltage
- Accuracy span: 1000°F/540°C minimum
- Temperature stability: $\pm 0.2^\circ\text{F}/^\circ\text{F}$ or $\pm 0.1^\circ\text{C}/^\circ\text{C}$ rise in ambient maximum
- Voltage stability: $\pm 0.01\%$ of span per percent of rated line voltage

Sensors/Inputs

- Thermocouple, grounded or ungrounded sensors
- RTD 2- or 3-wire, platinum, 100 ohm @ OC calibration to DIN curve (0.00385 ohm/ohm/°C) or JIS curve (0.003916ohm/ohm/°C); user selectable
- Process, 4-20mA—(dc) @ 5ohm, or 0-5V—(dc) @ 10kohm input impedance
- Sensor break protection de-energizes control output to protect system or selectable bumpless transfer to manual operation
- °F or °C or process units display, user selectable

Input Range

Specified temperature ranges represent the controller's operational span.

- Thermocouple
 - Type J 32 to 1382°F or 0 to 750°C
 - Type K -328 to 2282°F or -200 to 1250°C
 - Type N 32 to 2282°F or 0 to 1250°C
 - Type S 32 to 2642°F or 0 to 1450°C
 - Type T -328 to 662°F or -200 to 350°C
- RTD Resolution (DIN or JIS)
 - 1° -328 to 1292°F or -200 to 700°C
 - 0.1° -199.9 to 999.9°F or -128.8 to 537.7°C
- Process
 - 4-20mA(dc) @ 5ohm, or -999 to 9999 units
 - 0-5V—(dc) @ 10kohm, or -999 to 9999 units

Output 1 (Direct or reverse acting for control)

- Electromechanical relay
- Switched dc
- 4-20mA

- Solid-state relay

Output 2 (Direct or reverse acting control or alarm)

- Electromechanical relay
- Switched dc
- Solid-state relay

Output Specifications

- Electromechanical relay, Form C, 5A @ 120/240V~(ac) or 30V—(dc) maximum, rated resistive load, without contact suppression.
- Switched dc signal provides a non-isolated minimum turn on voltage of 3V—(dc) into a minimum 500ohm load, maximum on voltage not greater than 12V (dc) into an infinite load.
- 4-20mA (dc) non-isolated 0-800ohm load
- Solid-state relay, Form A, 0.5A @ 24V~(ac) min. to 265V—(ac) max. Opto-isolated, without contact suppression. Off state output impedance is 31 Mohm.

Output Configurations

Output 1 Selections:

- On-off: P, PI, PD, PID, heat or cool action
- Adjustable switching differential: 1 to 99°F/i to 55°C
- Proportional band: 1 to 999°F/0 to 55°C or 0 to 999.9% of span
- Integral: 0 (off) or 0.1 to 99.9 minutes per repeat
- Reset: 0 (on) or 0.01 to 9.99 repeats per minute
- Rate/derivative: 0 (off) or 0.01 to 9.99 minutes
- Cycle time: 0.1 to 999.9 seconds

Output 2 Selections:

- Control with action opposite that of Output 1 (reverse or direct)
- Process or deviation alarm with flashing alarm message
- Process or deviation alarm without alarm message
- Alarm with separate high and low set points
- Hysteresis: 1 to 9999° or units switching differential

Line Voltage/Power

- 100-240V~(ac) (85-264V~(ac); 50/60Hz $\pm 5\%$)
- 12-24V(ac/dc) (10-26°z(ac/dc); 50/60Hz $\pm 5\%$)
- Power consumption 5VA maximum
- Data retention upon power failure via non-volatile memory

Operating Environment

- 32 to 149°F/O to 65°C at 115V—(ac) line voltage power
- 32 to 140°F/O to 60°C at 230V~(ac) line voltage power
- 0 to 90% RH, non-condensing
- Storage temperature: -40° to 185°F/-40° to 70°C

Terminals

- Size 6 universal head screw terminals accepts 20-14 gauge wire

Dimensions

Height	2.1"	53mm
Width	2.1"	53mm
Overall Depth	4.7"	119 mm
Behind panel depth	4.1"	104mm
Weight	0.5 lbs	0.2 kg

Ordering Information

9 3 - 1 - 0 0

Series 93
 Microprocessor-based
 ½ DIN, single input, dual output
 4-digit displays

Nema 4X (IP65) Option
 A = Without NEMA 4X (IP65) Rating
 B = With NEMA 4X (IP65) Rating

CE Option
 A = Non CE Compliant
 B = CE Compliant

Output 1
 C = Switched dc output, non-isolated
 D = Electromechanical relay, Form C, 5A, without contact suppression^{①③}
 F = Process, 4-20mA—(dc), non-isolated
 K = Solid state relay, Form A, 0.5A, without contact suppression^③

Output 2
 A = None
 C = Switched dc output, non-isolated
 D = Electromechanical relay, Form C, 5A, without contact suppression^{①③}
 K = Solid state relay, Form A, 0.5A, without contact suppression^③

Line Voltage/Power
 0 = 100-240V~(ac) (high voltage)
 1 = 12-24V~(ac/dc) (low voltage)

Display
 Upper/Lower
 RR = Red/Red
 RG = Red/Green
 GR = Green/Red
 GG = Green/Green

^① Electromechanical relays are not recommended for PID control. They are warranted only for 100,000 contact closures.
^② To effect NEMA 4X (IP65) rating requires a minimum mounting panel thickness of 0.06 inch (1.5 mm) and surface finish not rougher than 0.000032 inch (0.000812 mm).
^③ Switching inductive loads (relay coils, etc.) requires using an RC suppressor.