

# TEMPERATURE CONTROLLERS

## 7ES 1/8 DIN 4-Digit Dual Display Temperature Controller with Actuator Output

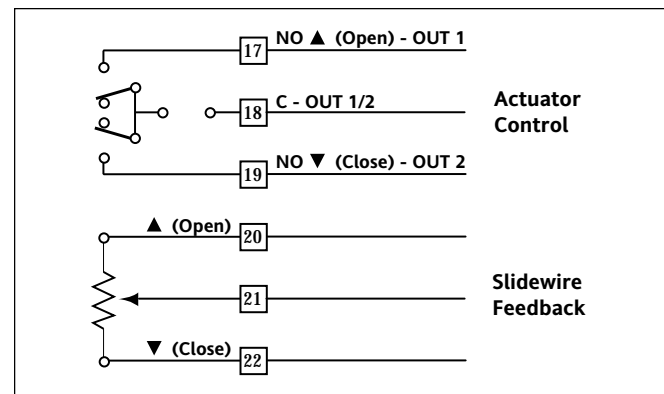
### Features:

- Universal Input (7 T/C, RTD, mV, V, mA)
- PID and Smart AT Autotuning
- NEMA 4X, IP65
- Open/Close Actuator or Servomotor Control
- Algorithms for Heat or Heat/Cool Control
- Up to 4 Outputs, 3 Independent Alarms
- Up to 3 Logic Inputs for Function Select
- Control Output Disable Function
- Optional Digital Communications

The full-featured 7ES is designed for customers requiring 3-wire valve positioning with slidewire feedback and a full suite of advanced functions. The NEMA 4X rated 7ES is configurable for valve positioning or PID control with Smart AT auto or adaptive tuning, universal inputs, up to 4 outputs, and up to 3 independent alarms. The 7ES has a bright dual display for process temperature and setpoint, and 10 LED beacons to enhance operator information. OP1 and OP2 are interlocked relays for adjusting actuator position based on a slidewire feedback potentiometer. Alternately, OP1 can be used as a time proportioned relay output (heat) and OP2 the same (cool) or an alarm. OP3 and optional OP4 can be configured as alarms. Alarms can be process high/low, deviation or band, direct or reverse, with masking and programmable automatic or manual reset.



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### Specifications:

**Control Modes:** PID with Smart AT Autotuning  
**Supply Voltage:** 100-240 Vac (+10%, -15%), 50/60 Hz  
**Operating Ambient:** 0-50°C, 20-85% RH non-condensing  
**Inputs:** T/C Types J, K, L, N, R, S & T (°C, °F); Pt 100 3W RTD (°C, °F) Ranges: See Table H, page 1-21; mA<sub>dc</sub>, mV<sub>dc</sub>, V<sub>dc</sub>

**Feedback**  
**Potentiometer Input:** 100 to 10k Ω

**Logic Inputs (3):** for setpoint select (SP, SP2), Auto/Man or Rev/Dir and Local/Remote. Requires contacts rated at 0.5 mA, 5 V<sub>dc</sub> minimum

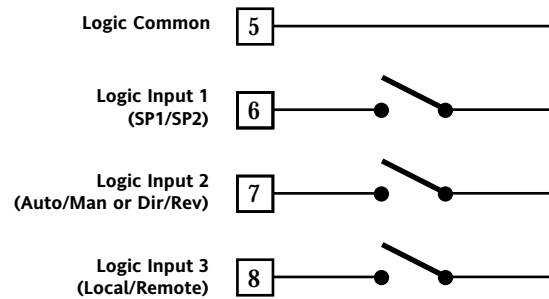
### Output Ratings:

- Output 1: Relay, 3A/250V, SPST, NO, Resistive Actuator Output linked to OP2 (Open/Close) or Time Proportioning (Heat)  
Output 2: Relay, 3A/250V, SPST, NO, Resistive Actuator Output linked to OP1 (Open/Close) or Time Proportioning (Cool) or Alarm 1  
Output 3: Relay, 3A/250V, SPST, NO, Resistive Alarm 2 and Alarm 3 (Logically OR'ed)

**Mounting:** Panel Mount

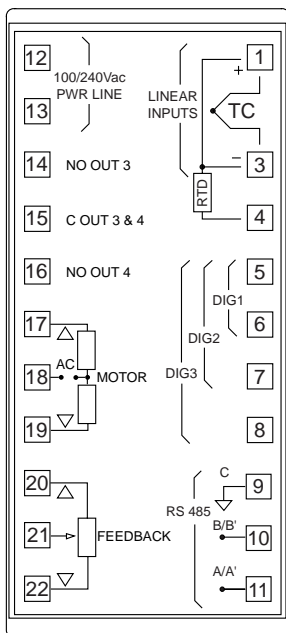
## A Variety of Standard and Optional Features

Among the 7ES's standard features are bumpless auto/manual transfer, password security, alarm standby and Auto Comp sensor break, which freezes the controller output in the event of a detected sensor break. The 7ES also has an "output off" function which disables the control output, allowing the instrument to operate as an indicator but return smoothly to control when the output is again enabled. The 7ES is equipped with 3 logic inputs. Logic Input 1 is used to transfer between SP1 and SP2 by step or ramp (2 rates). Logic Input 2 can be configured to select Auto/Manual or Reverse/Direct control action. Logic Input 3 selects between Local/Remote (computer) operation. Optional RS-485 digital communications with Modbus®, JBUS or proprietary Barber-Colman protocol is available for computer supervision.



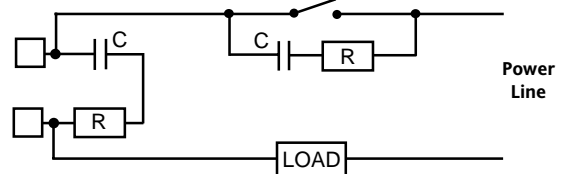
## Terminal Connections and Mounting:

7ES



### Wiring

Do not run input wires with power cabling. Ground shields at one point only. Use compensating cable for thermocouple wiring. Non-isolated logic outputs depend on the SSR for isolation. Relay outputs are internally protected by a varistor. When inductive loads (such as mercury contactors) are used, or external switches are connected in series with internal contacts, high voltage transients may affect performance of the instrument. In this case it is recommended to install an additional RC snubber network across the contacts as shown. Contact Barber-Colman.



External Switch in Series with the Internal Contact  
Snubber Part Number: CZ140398

### Mounting

Dimensions: 48W x 96H x 89D mm  
Cutout: 45W (-0, +0.6) x 92H (-0, +0.8) mm  
125 mm min. center-to-center vertical spacing  
60 mm min. center-to-center horizontal spacing  
Weight: 400 gm max.

## Ordering Codes:

Model	Input	Control	Outputs 1 & 2	Output 3	Options	Power Supply	Reserved	
7ES	-	9	3	2	1	-	3	000

Input	Control	Outputs 1 & 2	Output 3
9 T/C Type J, K, L, N, R, S & T (°C, °F) Pt100 3W RTD (°C, °F)* 0 to 20 mAdc & 4 to 20 mAdc 0 to 60 mVdc & 12 to 60 mVdc 0 to 5 Vdc & 1 to 5 Vdc 0 to 10 Vdc & 1 to 10 Vdc	3 PID & Smart AT	2 Two interlocked SPST relays (open/close) programmable as actuator control outputs or time proportioning outputs	1 SPST Relay (Control/Alarm)
	Options	Power Supply	
	2 Relay (Alarm) 3 Relay (Alarm) plus RS-485	3 100 to 240 Vac	

\* Ranges - See Table H, page 1-21