

# TEMPERATURE CONTROLLERS

## 7EF and 7HF 1/8 DIN 4-Digit Dual Display Temperature Controllers

### Features:

- Universal Input (6 T/C, RTD, mV, V, mA)
- PID and Smart AT Autotuning
- NEMA 4X, IP65
- Algorithms for Heat or Heat/Cool Control
- Up to 4 Outputs, 3 Independent Alarms
- Setpoint Select from External Contact
- Control Output Disable Function
- Optional Heater Breakdown Alarm
- Optional Digital Communications

Designed for equipment manufacturers who demand tight process control and a full suite of advanced features, the 7EF/7HF offers outstanding performance as a 4-digit 1/8 DIN controller in a choice of vertical and horizontal format. Identical in features, the 7EF and 7HF are configurable for heat or heat/cool PID controllers with Smart AT auto or adaptive tuning, universal inputs, up to 4 outputs and up to 3 independent configurable alarms. They are ideal for demanding applications such as laboratory furnaces and ovens, autoclaves and chambers where 4 digits are required. The 7EF/7HF have bright dual displays for process temperature and setpoint and 10 LED



7HF



7EF

beacons for operating status. Three outputs can be programmed as heating + 2 alarms or heating/cooling + 1 alarm. Optional OP4 can be configured as Alarm 3 or as the heater breakdown alarm. Alarms can be process, deviation or band type, direct or reverse, with masking and programmable automatic or manual reset. Both units have 2 setpoints, selectable by a logic input. Transfer between setpoints can be step or ramp (2 selectable ramp rates). Optional RS-485 digital communications are available for connection to supervisory computers. A NEMA 4X front panel allows these instruments to work in severe environments.

### Specifications:

<b>Control Modes:</b>	PID with Smart AT Autotuning
<b>Supply Voltage:</b>	100-240 Vac (+10%, -15%), 50/60 Hz
<b>Operating Ambient:</b>	0-50°C, 20-85% RH non-condensing
<b>Inputs:</b>	T/C Types J, K, L, N, R & S (°C, °F); Pt 100 3W RTD (°C, °F) Ranges: See Table F, page 1-21; mAdc, mVdc, Vdc
<b>Current Transformer Input:</b>	(Heater Breakdown Detection) 10 Ω impedance, 50 mA ac max.
<b>Logic Input:</b>	for setpoint select (SP1 or SP2), requires contact rated at 0.5 mA, 5 Vdc minimum

**Serial Communications:** EIA RS-485 Modbus®, JBUS

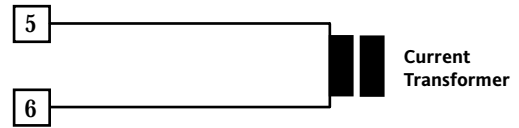
### Output Ratings:

<b>Output 1:</b>	Relay, 3A/250V, SPDT, NO/NC, Resistive Time Proportioning Heating Logic SSR (unisolated) Logic Level 1: 14 Vdc ±20% @ 20 mA max. (700 Ω min.) 24 Vdc max. ±20% @ 1mA Logic Level 0: Less than 0.5 Vdc Time Proportioning Heating
<b>Output 2:</b>	Relay, 2A/250V, SPST, Resistive Time Proportioning Cooling, Alarm 1
<b>Output 3:</b>	Relay, 2A/250V, SPST, Resistive Alarm 1, Alarm 2 or Heater Breakdown
<b>Output 4:</b>	Relay, 2A/250V, SPST, Resistive Optional Alarm 2, Alarm 3 or Heater Breakdown

**Mounting:** Panel Mount

### A Variety of Standard and Optional Features

Among the 7EF/7HF standard features are bumpless auto/manual transfer, password security and Auto Comp™ sensor break. An alarm standby feature allows masking of alarm conditions until the PV reaches the low alarm threshold. The 7EF/7HF also have 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 optional Heater Breakdown Detection feature allows measurement of the load by a current transformer, displaying the full scale load current, and signaling an alarm condition to an alarm OP when the current is below a programmed threshold.

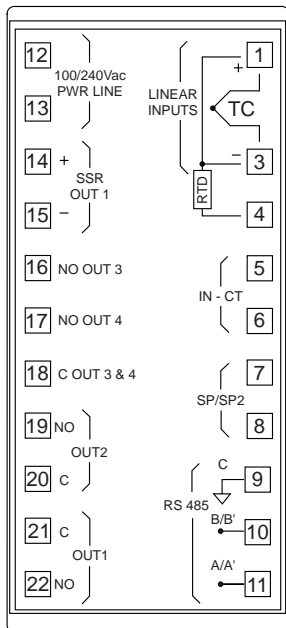


CT Part Number: 7ER-Rx000-0000  
 x = 1 (10A); x = 2 (25A); x = 4 (50A); x = 5 (100A)

Heater Breakdown Detection

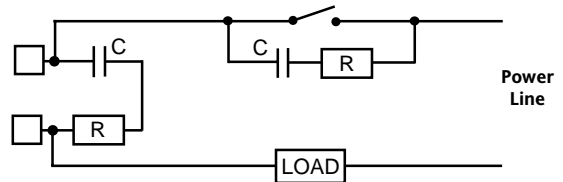
## Terminal Connections and Mounting:

### 7EF



### 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

Same Terminal Numbers  
 for Horizontal 7HF

### Mounting 7EF

Dimensions: 48W x 96H x 116D 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

### Mounting 7HF

Dimensions: 96W x 48H x 116D mm  
 Cutout: 92W (-0, +0.8) x 45H (-0, +0.6) mm  
 60 mm min. center-to-center vertical spacing  
 125 mm min. center-to-center horizontal spacing

Weight: 400 gm max.

## Ordering Codes:

Model	Input	Control	Output 1	Outputs 2 & 3	Options	Power Supply	Reserved
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Model	Input	Control	Output 1	Outputs 2 & 3
7EF Vertical Mount 7HF Horizontal Mount	9 T/C Type J, K, L, N, R & S (°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	1 Jumper Selectable SPDT Relay or SSR Drive (Heating)	1 SPST Relay (Cooling/Alarm) and SPST Relay (Alarm/Hbd)

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

Options	Power Supply
1 None 2 Relay (Alarm) plus Hbd Input* 3 Relay (Alarm) plus RS-485 4 Relay (Alarm) plus RS-485 & Hbd Input*	3 100 to 240 Vac

\*Order current transformer separately.