

## ETR-3000

### 1/32 DIN Temperature Controller with Smarter Logic®



- 24mm x 48mm
- Single Display
- Low Cost
- Smarter Logic for Superior Control
- Universal Sensor Input
- Bumpless Transfer
- Security Lockout
- Automatic Tuning of PID Parameters
- Digital Communications
- °F or °C Selectable
- NEMA 4X/IP65 Water and Corrosion Resistant Front Panel
- UL, CE Agency Approvals
- 3 Year Warranty
- Programming Port

#### Description

The ETR-3000 is a 1/32 DIN, low-cost temperature controller. Housed inside of a case formed of a single mold, this model packs a lot of features into its small footprint. The ETR-3000 samples one of 17 process input types at 5 times per second providing quick, responsive control. A menu of more than 40 parameter choices placed into various security groups creates a high level of flexibility while still user friendly. The SEL function allows the user to select frequently accessed parameters and move them to the front of the program providing instant access. Simple one

touch auto-tuning will adjust the controller to respond according to individual process characteristics. All parameters are retained in a nonvolatile memory when the power is shut off. A NEMA 4X front panel is featured for applications requiring wash-down, such as in the food processing industry.

#### External Lockout Code

- Select from 4 different levels of parameter lockout

#### Status Indicators

- Indicate output and alarm condition  
CON: Control Output  
ALM: Alarm Output

#### Pushbuttons

- For ease of control set-up

#### Non-Volatile Memory

Retains process parameters when power is off

#### Automatic Tuning

- Eliminates complicated and time consuming manual tuning procedures
- Smarter Logic continuous decision making practically eliminates temperature variations and initial overshoot

#### Process Value Display (PV)

- Process display updated 5 times per second
- Menu and error codes
- Display shift function allows adjustable display

#### NEMA 4X Front Panel

- Water and corrosion proof



## ETR-3000

### 1/32 DIN Temperature Controller with Smarter Logic® (cont'd.)

#### Specifications

90-264 VAC, 47-63 Hz, 10 VA, 5W maximum  
11-26 VAC / VDC, 10VA, 5W maximum

#### SIGNAL INPUT

**Resolution:** 18 bits  
**Sampling Rate:** 5 times / second  
**Maximum Rating:** -2 Vdc minimum, 12 Vdc maximum (1 minute for mA input)  
**Temperature Effect:** ±1.5 uV/ °C for all inputs except mA input, ± 3.0 uV/ °C for mA input

#### Sensor Lead

**Resistance Effect:** T/C: 0.2uV/ohm  
**3-wire RTD:** 2.6°C/ohm of resistance difference of two leads  
**2-wire RTD:** 2.6°C/ohm of resistance sum of two leads

#### Burn-out Current:

200 nA

#### Common Mode Rejection

**Ratio (CMRR):** 120dB

#### Normal Mode Rejection

**Ratio (NMRR):** 55dB

#### Sensor Break

**Detection:** Sensor open for TC, RTD and mV inputs, Sensor short for RTD input, below 1 mA for 4-20 mA input, below 0.25V for 1 - 5 V input, unavailable for other inputs.

#### Sensor Break

**Responding Time:** Within 4 seconds for TC, RTD and mV inputs, 0.1 second for 4-20 mA and 1 - 5 V inputs.

#### Relay Rating:

2A / 240 VAC, life cycles 200,000 for resistive load

#### Pulsed Voltage:

5V/30mA SSR Drives (Code 2)  
14V/40mA SSR Drives (Code C)

#### LINEAR OUTPUT CHARACTERISTICS

| Type    | Zero Tolerance | Span Tolerance | Load Capacity |
|---------|----------------|----------------|---------------|
| 4-20 mA | 3.8-4 mA       | 20-21 mA       | 500 max.      |
| 0-20 mA | 0 mA           | 20-21 mA       | 500 max.      |
| 0-5 V   | 0 V            | 5-5.25 V       | 10 K min.     |
| 1-5 V   | 0.95-1 V       | 5-5.25 V       | 10 K min.     |
| 0-10 V  | 0 V            | 10-10.5 V      | 10 K min.     |

#### LINEAR OUTPUT

**Resolution:** 15 bits  
**Output Regulation:** 0.02% for full load change  
**Output Settling Time:** 0.1 sec. (stable to 99.9%)  
**Isolation Breakdown Voltage:** 1000 VAC  
**Temperature Effect:** ±0.01 % of SPAN / °C  
**Triac (SSR) Output Rating:** 1A / 240 VAC  
**Inrush Current:** 20A for 1 cycle  
**Min. Load Current:** 50 mA rms  
**Max. Off-state Leakage:** 3 mA rms  
**Max. On-state Voltage:** 1.5 V rms  
**Insulation Resistance:** 1000 Mohms min. at 500 Vdc  
**Dielectric Strength:** 2500 VAC for 1 minute

#### ALARM ( OUTPUT 2 )

**Alarm Relay:** Form A, Max. rating 2A/240VAC, life cycles 200,000 for resistive load  
**Alarm Functions:** Dwell timer, Deviation High/Low Alarm, Deviation Band High/Low Alarm, Process High/Low Alarm  
**Alarm Mode:** Normal, Latching, Hold, Latching / Hold.  
**Dwell Timer:** 0.1-4553.6 minutes

#### DATA COMMUNICATION

**Interface:** RS-232 (1 unit), RS-485 (up to 247 units)  
**Protocol:** Modbus Protocol RTU mode  
**Address:** 1 - 247  
**Baud Rate:** 2.4 ~ 38.4 Kbits/sec  
**Data Bits:** 7 or 8 bits  
**Parity Bit:** None, Even or Odd  
**Stop Bit:** 1 or 2 bits  
**Communication Buffer:** 160 bytes

#### USER INTERFACE

**Single 4-digit LED Displays:** 10 mm (ETR-3000)  
**Keypad:** 3 keys (ETR-3000)  
**Programming Port:** For automatic setup, calibration and testing  
**Communication Port:** Connection to PC for supervisory control

#### CONTROL MODE

**Output 1:** Reverse (heating) or direct (cooling) action  
**Output 2:** PID cooling control, cooling P band 50 ~ 300% of PB, dead band 36.0 ~ 36.0% of PB  
**ON-OFF:** 0.1 - 90.0 (°F) hysteresis control (P band = 0)  
**P or PD:** 0 - 100.0 % offset adjustment

**PID:** Fuzzy logic modified Proportional band 0.1 ~ 900.0°F. Integral time 0 - 1000 seconds Derivative time 0 - 360.0 seconds  
**Cycle Time:** 0.1 - 90.0 seconds  
**Manual Control:** Heat (MV1) and Cool (MV2)  
**Auto-Tuning:** Cold and warm start  
**Failure Mode:** Auto-transfer to manual mode while sensor break or A-D converter damage  
**Ramping Control:** 0 - 900.0°F / minute or 0 - 900.0°F / hour ramp rate

#### DIGITAL FILTER

**Function:** First order  
**Time Constant:** 0, 0.2, 0.5, 1, 2, 5, 10, 20, 30, 60 seconds programmable

#### ENVIRONMENTAL & PHYSICAL

**Operating Temperature:** -10°C to 50°C  
**Storage Temperature:** -40°C to 60°C  
**Humidity:** 0 to 90 % RH (non-condensing)  
**Insulation Resistance:** 20 Mohms min. (at 500 VDC)  
**Dielectric Strength:** 2000 VAC, 50/60 Hz for 1 minute  
**Vibration Resistance:** 2 10 - 55 Hz, 10 m/s for 2 hours  
**Shock Resistance:** 2 200 m/s (20 g)  
**Moldings:** Flame retardant polycarbonate  
**Mounting:** panel mount, cutout 7/8 x 1-25/32" (22 X 45 mm)  
**Weight:** 120 grams

#### APPROVAL STANDARDS

**Safety:** UL61010C-1 CSA C22.2 No. 24-93 EN61010-1 (IEC1010-1)  
**Protective Class:** NEMA 4X (IP65) front panel for C21, IP30 front panel for C91, all indoor use, IP 20 housing and terminals  
**EMC:** EN61326

## ETR-3000

### 1/32 DIN Temperature Controller with Smarter Logic® (cont'd.)

#### Ordering Information

Complete the model number using the matrix provided.

#### Accessories

| Part Number | Description   |
|-------------|---|
| CC94-1      | RS-232 Interface Cable (2M)   |
| CT94-1      | Current Transformer for CT Input/ Heater Break Option   |
| SNA10A      | Smart Network Adaptor for Third Party Software. Converts one channel of RS-485 or RS-422 to RS-232 Network. |

|              |   |
|--------------|---|
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**Model** **Microprocessor based temperature controller with Smarter Logic®**  
**ETR-3000** 1/32 DIN; universal field selectable inputs; PID autotuning; selection of various control outputs; additional analog and event inputs; analog or digital communications

#### Code Power Input

**4** 90-264Vac, 50/60 Hz  
**5** 11-26Vac or Vdc

#### Code Signal Input

**1** Standard Input  
 Universal input Thermocouple J,K,T,E,B,R,S,N,L  
 RTD: PT100 DIN, PT100 JIS  
 Current: 4-20mA, 0-20mA  
**4** Linear Voltage or currents such as 4-20mA (Please specify)

#### Code Output 1

**1** Relay rated 2A/240Vac  
**2** Pulsed voltage to drive SSR, 5V/30mA  
**3** Isolated 4 - 20mA/0 - 20mA  
**4** Isolated 1 - 5/0 - 5V\*  
**5** Isolated 0 - 10V  
**6** Triac Output 1A/240Vac  
**C** SSR Drive 14V/40mA

#### Code Output 2/Alarm 2

**0** None  
**1** Form A Relay 2A/240Vac  
**2** Pulsed voltage to drive SSR, 5V/30mA  
**3** Isolated 4 - 20mA/0 - 20mA  
**4** Isolated 1 - 5/0 - 5V  
**5** Isolated 0 - 10V  
**6** Triac Output 1A/240Vac  
**7** Isolated 20V/25mA Transducer Power Supply  
**8** Isolated 12V/40mA Transducer Power Supply  
**9** Isolated 5V/80mA Transducer Power Supply  
**C** SSR Drive 14V/40mA

#### Code Communications

**0** None  
**1** RS-485 Interface  
**2** RS-232 Interface  
**3** Retransmit 4 - 20mA / 0 - 20mA  
**4** Retransmit 1 - 5V/0 - 5V  
**5** Retransmit 0 - 10V

#### Code Display Color

**0** Red  
**1** Green

ETR-3000 - 4 1 2 1 0 1 Typical Model Number