

## 1601E 1/16 DIN Temperature Controller

- Built-in Programming Port for Remote for OEM Fast Configuration
- Programming w/o Internal Hardware Switch
- SMART Self-Tuning with Fuzzy Logic
- Heat, Cool or Heat/Cool Control Capability
- Universal Inputs TC, RTD
- Soft Start Power Limiting on Power-Up
- 3-Year Warranty
- NEMA 4, IP65 Front Face



### Description

The fully field configurable Chromalox model 1601E 1/16 DIN controller combines advanced hardware design and sophisticated electronic control technology into a compact, reliable 1/16 DIN package.

### Easy to Install and Operate

The 1601E plug-in design requires only panel cutout, instrument mounting, setpoint adjustment to set up. Additional parameters are programmed via the front pushbuttons or via the Configuration Port.

### Configuration Port

Each 1601E has a Configuration Port for remote set up of the controller. This feature allows the 1601E to be programmed from a PC without any connections for power.

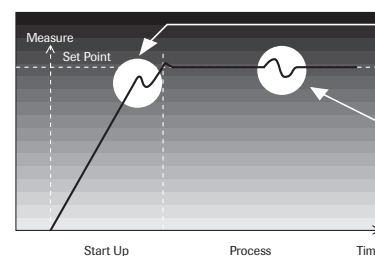
### Special Control Features

- Heat/Cool Control Features Selection of Cooling Medium and Overlap
- Soft Start-Timed Output Power Limit on Start-Up. Allows a “warm up period” to protect the process and avoid thermal shock on start up
- Control Output “Turn Off” Via Pushbuttons if used during setup or controller becomes a monitor
- Programmable offset of Process Temperature

### SMART Self-Tuning

The model 1601E meets the application needs of operators with or without skills in temperature processes and PID control. SMART self-tuning automatically adjusts the controller to rapidly respond to all process changes. Sophisticated control features include:

- Start-up and continuous in-process tuning
- Continuous self-tuning without artificial upset
- Proven maximum suppression of overshoot



**During Start-Up** the SMART self-tuning function calculates the control parameters to optimize the rise to setpoint.

**During Process** SMART updates the control parameters as needed to respond to setpoint changes or a log change.

### Applications

- Rubber production, polymerization and synthetic fiber plants
- Packaging and packing equipment
- Extrusion lines, coextrusion lines, plastic films and injection presses
- Fermentation equipment, reactors for chemical and pharmaceutical industries
- Food industries
- Environmental chambers and refrigeration

## 1601E 1/16 DIN Temperature Controller *(cont'd.)*

### General Specifications

|   |   |
|---|---|
| <b>Front protection:</b>  | IP 65 and NEMA 4X for indoor locations (when panel gasket is installed)                               |
| <b>Dimensions:</b>  | 1.9" (48mm) x 1.9" (48mm) x 4.13" (105mm) (DIN 43700)   |
| <b>Power supply:</b>  | -100V to 240V AC 50/60Hz (-15% to + 10% of the nominal value); -24V AC/DC (±10% of the nominal value) |
| <b>Accuracy:</b>  | ± 0.3% f.s.v. ±1 digit @ 25°C ambient   |
| <b>Common mode rejection ratio:</b>                               | 120 dB at 50/60Hz   |
| <b>Normal mode rejection ratio:</b>                               | 60 dB at 50/60Hz  |
| <b>Electromagnetic compatibility:<br/>and safety requirements</b> | CE directives 89/336/EEC, EN-50081-2 and EN-50082-2<br>directives 73/23/EEC and 93/68/EEC EN61010-1   |
| <b>Cold junction compensation error:</b>                          | 0.1 °C/°C change in ambient   |
| <b>Temperature:</b>   | from 0 to 50 °C   |
| <b>Storage temperature:</b>                                       | from -20 to +85 °C  |
| <b>Humidity:</b>  | from 20% to 85% RH, non condensing  |

### Input Specifications

#### Thermocouples

|  |   |
|--|---|
| <b>Burn out:</b>                         | upscale on open input circuit detection (wires or sensor) |
| <b>Cold junction:</b>                    | automatic compensation from 0 and 50 °C ambient           |
| <b>Cold junction compensation error:</b> | 0.1 °C/°C change in ambient                               |

| TC | °C       | °F       |
|----|----------|----------|
|    | 1601E    | 1601E    |
| L  | 0 / 900  | 0 / 1652 |
| J  | 0 / 1000 | 0 / 1832 |
| K  | 0 / 1370 | 0 / 2498 |
| N  | 0 / 1400 | 0 / 2552 |
| T  | 0 / 400  | 0 / 752  |

### RTD

**Type:** 100 Ω RTD, 3 wire  
**STANDARD RANGES TABLE:**

| RTD type | °C           | °F          |
|----------|--------------|-------------|
|          | 1601E        | 1601E       |
| PT 100   | -200 / 800   | -328 / 1472 |
| 3 wire   | -199.9 / 400 | —           |

### Control Action

|                                |   |
|--------------------------------|---|
| <b>Algorithm:</b>              | PID + SMART   |
| <b>Types:</b>                  | - one control output (heating)<br>- two control outputs (heating and cooling)<br>relay or SSR |
| <b>Output types:</b>           | from 1.0% (heating) or 1.5% (heating and cooling) to 100% of the input span                   |
| <b>Proportional band:</b>      | (in On/Off control): from 0.1% to 10.0% of the input span                                     |
| <b>Hysteresis (dead band):</b> | from 1 second to 20 minutes   |
| <b>Integral time:</b>          | from 0 to 10 minutes  |
| <b>Derivative time:</b>        | - one control output, from 0 to 100% of the output range                                      |
| <b>Integral preload:</b>       | - two control outputs, from -100% to 100% of the output range                                 |
| <b>Heating cycle time:</b>     | from 1 to 200 seconds   |
| <b>Cooling cycle time:</b>     | from 1 to 200 seconds   |
| <b>Relative cooling gain:</b>  | from 0.20 to 1.00   |
| <b>Overlap/dead band:</b>      | from - 20% to 50% of PB   |

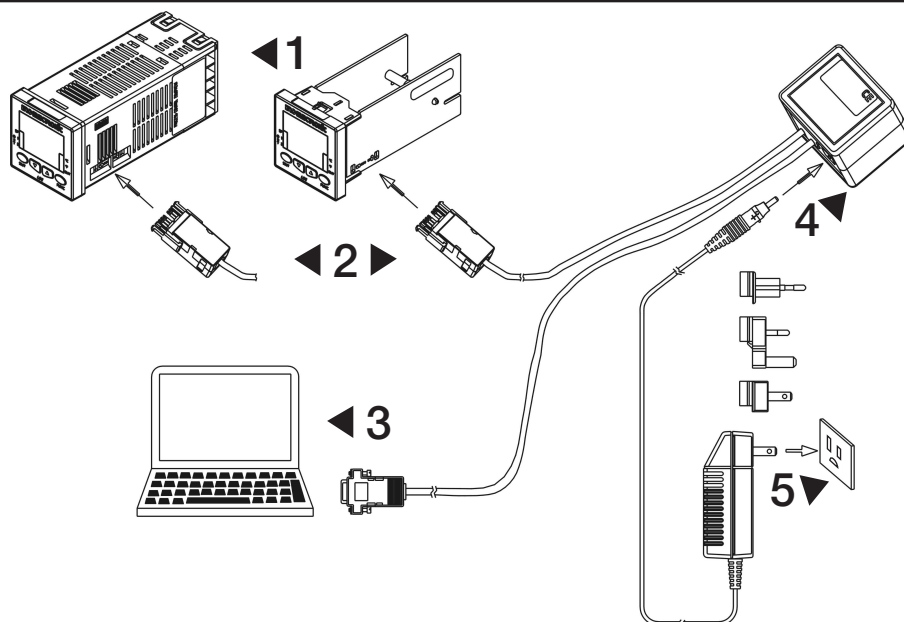
### Output 1 and 2

|                             |   |
|-----------------------------|---|
| <b>Output 1 - Relay</b>     | <b>Relay:</b> SPDT 3A @ 250VAC on resistive load            |
| <b>Output 1 - SSR Drive</b> | <b>Type:</b> nonisolated<br>14VDC @ 20 mA max. 24VDC @ 1 mA |
| <b>Output 2 - Relay</b>     | <b>Relay:</b> SPST 2A @ 250VAC on resistive load            |

### Alarm

|                        |   |
|------------------------|---|
| <b>Action:</b>         | direct or reverse (normally de-energized or normally energized)   |
| <b>Alarm function:</b> | field selectable<br>Process - High or Low, input range<br>Band Alarm - inside or outside, 0-500 units<br>Deviation Alarm - High or Low, -199 to 500 units |
| <b>Reset:</b>          | Automatic or Manual, Non-Latching or Latching   |
| <b>Inhibit:</b>        | Enable or Disable, Inhibits on Power Up and Set Point changes   |
| <b>Hysteresis:</b>     | 0.1 to 10.0% of input span  |

## 1601E Configuration Port & Kit



The 1601E can be connected to the remote Configuration Kit, CNFG-10000. This method of configuration is ideal for OEM's for quick setup and for resellers to easily program a controller for the specific needs of a customer.

### Setup is simple:

1. Remove the 1601E from the shipping box or from the case.
2. Snap the push pin connector into the side of the 1601E.
3. Connect the 9 pin connector to the PC's RS232 port.
4. Connect the Power Supply.
5. Download the setup.

The controller doesn't need power. WIRING is Not required. The configuration software can download all the parameter. Special setups can be saved for future downloads.

The Configuration Kit CNFG-10000 consists of the following:

- Configuration Software Windows Based CDROM
- Hardware Connection Assembly
- Power Supply with Standard Wall Plug

The Hardware Connection Assembly has a 9 Pin RS232 connector for hook up to a PC COM Port, a specially designed connector for connection to the 1601E Configuration Port and a connection for the power supply.

### Ordering Information

Complete the model number using the matrix provided.

### Accessories

| Part Number | PCN    | Description              |
|-------------|--------|--------------------------|
| CNFG-10000  | 317614 | Remote Configuration Kit |
| 0149-01305  | 314448 | Snubber                  |

### In Stock

| Model       | PCN    |
|-------------|--------|
| 1601E-11030 | 317534 |
| 1601E-61030 | 317542 |

| Model       | 1/16 DIN Temperature Controller  |   |   |   |   |                      |
|-------------|--|---|---|---|---|----------------------|
| 1601E       | SMART Self-Tuning, Field Selectable Thermocouple or RTD Inputs, Nema 4X faceplate 4 digit single display |   |   |   |   |                      |
| <b>Code</b> | <b>Output 1 - Heat or Cool</b>   |   |   |   |   |                      |
| 1           | Relay SPDT, 3A, 250VAC, resistive load   |   |   |   |   |                      |
| 6           | SSR drive, 14Vdc at 20mA   |   |   |   |   |                      |
| <b>Code</b> | <b>Output 2 - Cool or Alarm</b>  |   |   |   |   |                      |
| 0           | None   |   |   |   |   |                      |
| 1           | Relay SPST, 2A, 250VAC, resistive load   |   |   |   |   |                      |
| <b>Code</b> | 0 Add to complete part number  |   |   |   |   |                      |
| <b>Code</b> | <b>Power Supply</b>  |   |   |   |   |                      |
| 3           | 100 - 240VAC   |   |   |   |   |                      |
| 5           | 24 VAC or VDC  |   |   |   |   |                      |
| <b>Code</b> | 0 Add to complete part number  |   |   |   |   |                      |
| 1601E -     | 1  | 1 | 0 | 3 | 0 | Typical Model Number |