

# PID Controllers Temperature and Process Controls T2000P

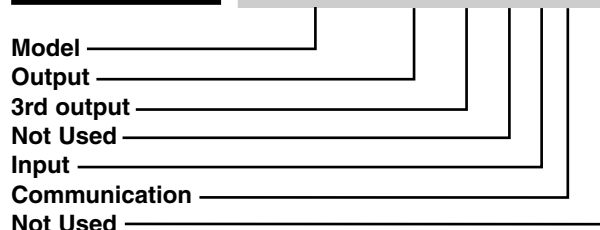


- 1/16 DIN
- NEMA 4X
- Programmable Process controller
- Autotune automatically sets PID parameters
- Multiple ramp/soak: Upto 31 programs, 126 segments
- Inputs: Thermocouple, RTD,  
Analog (0-20mA, 0-5VDC, 0-10VDC)
- Outputs: SSR voltage pulse, relay,  
Analog (0-20mA, 0-5VDC, 0-10VDC)
- 3rd relay output standard
- RS232 or RS485
- MODBUS RTU protocol
- Three year warranty

## Product Description

Programmable profiling temperature and process controller. Easy to view dual 4 digit display readout. Constructed in a rugged NEMA4X waterproof housing (front panel only) in the popular 1/16 DIN size. Various inputs from temperature sensors to analog process inputs and various combinations of outputs including analog outputs and a 3rd relay output standard.

## Ordering Key T2016P2 SR R X T 2 XX



## Type Selection

Type Selection

| Model   | Outputs   | 3rd Output                | Not used           | Input   | Communication  | Not use             |
|---------|---|---------------------------|--------------------|---|--|---------------------|
| T2016P2 | <b>SR:</b> 6VDC pulse & 2A relay output<br><b>RR:</b> 2 - 2A relay outputs<br><b>SS:</b> 2 - 6VDC pulse outputs<br><b>CR:</b> 4-20mA & 2A relay output<br><b>CS:</b> 4-20mA & 6VDC pulse output<br><b>LR:</b> 0-5VDC & 2A relay output<br><b>LS:</b> 0-5VDC & 6VDC pulse output<br><b>HR:</b> 0-10VDC & 2A relay output<br><b>HS:</b> 0-10VDC & 6VDC pulse output | <b>R:</b> 2A relay output | <b>X:</b> not used | <b>T:</b> TC-B,E,J,K,L,N,R,S,T & RTD<br><b>C:</b> 4-20mA input<br><b>L:</b> 0-5VDC input<br><b>H:</b> 0-10VDC input | <b>X:</b> None<br><b>2:</b> RS232<br><b>4:</b> RS485 | <b>XX:</b> not used |

## General Specifications

|                       |  |
|-----------------------|--|
| <b>Power supply</b>   | 100-240VAC +/- 10%, 50-60Hz  |
| <b>Display</b>        |  |
| Upper display reading | 4 digit high brightness green LED 10mm high  |
| Lower display         | 4 digit high brightness red LED 9mm high   |
| Output indicators     | LED output indicators – flashing SP1 square green<br>LED output indicators – SP2 round red |
| <b>Keypad</b>         | 3 full travel elastomeric pushbuttons  |
| <b>Approvals</b>      | UL, CUL, CE  |

## Input Specifications

| Thermocouple |                               |
|--------------|-------------------------------|
| B            | 32 to 3275°F (0 to 1800°C)    |
| E            | 32 to 1112°F (0 to 600°C)     |
| J            | 32 to 1472°F (0 to 800°C)     |
| K            | -58 to 2192°F (-50 to 1200°C) |
| L            | 32 to 1472°F (0 to 800°C)     |
| N            | -58 to 2192°F (-50 to 1200°C) |
| R            | 32 to 2912°F (0 to 1600°C)    |

## Input Specifications (cont'd)

|                              |   |
|------------------------------|---|
| <b>Thermocouple (cont'd)</b> |   |
| S                            | 32 to 2912°F (0 to 1600°C)  |
| T                            | -273 to 482°F (-200 to 250°C)   |
| Standards                    | IPTS/68/DIN 43710   |
| CJC rejection                | 20:1 (0.05°C) typical   |
| External resistance          | 100W maximum  |
| <b>(RTD)</b>                 |   |
| Pt100/RTD (2 or 3 wire)      | -273 to 752°F (-200 to 400°C)   |
| Standards                    | DIN 43760 (100W 0°C/138.5W 100°C Pt)  |
| Bulb current                 | 0.2 mA maximum  |
| <b>Analog process input</b>  | 0 to 50mV, +/- 0.1%<br>0-20mA, 4-20mA, +/- 0.1%<br>0-5V, +/- 0.1%, 0-10V, +/-0.1% |

## Specifications for Both Thermocouples and RTDs

|                         |   |
|-------------------------|---|
| Calibration accuracy    | +/- 0.25% maximum +/- 1°C                                 |
| Sampling frequency      | Input 10Hz, CJC 2 sec.                                    |
| Common mode rejection   | Negligible effect up to 140db, 240V, 50-60Hz              |
| Series mode rejection   | 60db, 50-60Hz   |
| Temperature coefficient | 150ppm/(C maximum)  |
| Reference conditions    | 22C +/- 2°C, rated voltage after 15 minutes settling time |

### Output Devices (maximum of two outputs)

|                                |  |
|--------------------------------|--|
| SSd (solid state relay driver) | 6 VDC, 20mA<br>non-isolated  |
| Relay                          | Form A SPST, 2A/250VAC<br>resistive load   |
| Analog Output                  | 4-20mA 500Ω max<br>+/- 0.1% full scale typical<br>0-5Vdc 10mA (500Ω min)<br>+/- 0.1% full scale typical<br>0-10Vdc 10mA (1KΩ min)<br>+/- 0.1% full scale typical |

### Housing Specifications

|                      |  |
|----------------------|--|
| <b>Environmental</b> |  |
| Safety               | UL873, EN61010, CSA 22.2 No. 1010.1-92 |
| Humidity             | Maximum 95%                            |
| Altitude             | Up to 2000m                            |

### Housing Specifications (cont'd)

|                                  |   |
|----------------------------------|---|
| Installations                    | Categories II and III                     |
| Pollution                        | Degree II                                 |
| Protection                       | NEMA 4X (IP66)                            |
| EMC emission                     | EN50081-1, FCC Rules 15 subpart J Class A |
| EMC immunity                     | EN50082-2                                 |
| Ambient                          | 32 to 122°F (0 to 50°C)                   |
| Moldings                         | Flame retardant polycarbonate             |
| <b>Instrument body</b>           |   |
| Model T2016P2                    | 1.76 x 1.76" (44.8 x 44.8mm)              |
| Overall length                   | 4.57" (116mm)                             |
| <b>Weight</b>                    |   |
| T2016P2                          | 6.4 ounces                                |
| <b>Dimensions (front fascia)</b> |   |
| Model T2016P2                    | 2.0 x 2.0" (51 x 51mm)<br>includes gasket |
| Sleeve length                    | 4.2" (106.7mm)<br>includes gasket         |

### Programmer Functionality

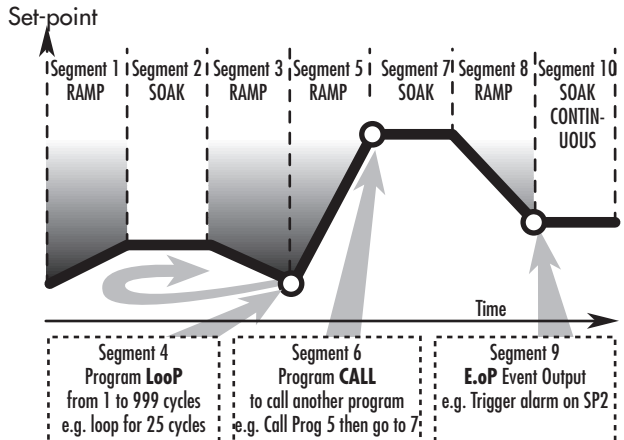
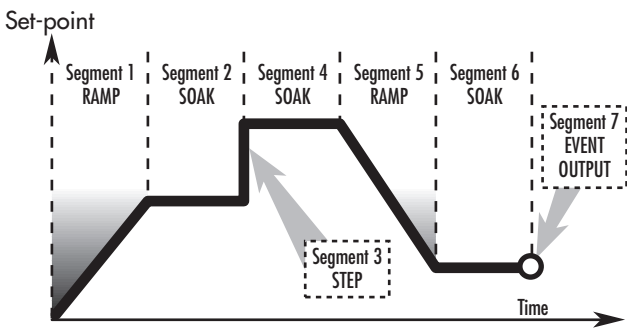
- Up to 31 programs (profiles)
  - Up to 126 segments
  - Unlimited use of event outputs via the 2nd and 3rd outputs
  - Copy/Paste/Edit/Delete functions to simplify program building
  - Call another program as a sub-program segment
  - Up to 999 program loop cycles, or continuous loop cycling
  - Hold back function, to ensure the next segment is not started until the last segment reaches the set-point
  - 3 power fall recovery options, (Hold, Continue or Reset)
  - Front panel interrogation of the program position
  - Memory usage Indication during programming.
- (note: program capacity is a memory function and different types of segment use more/less memory).

### Memory Allocation Table

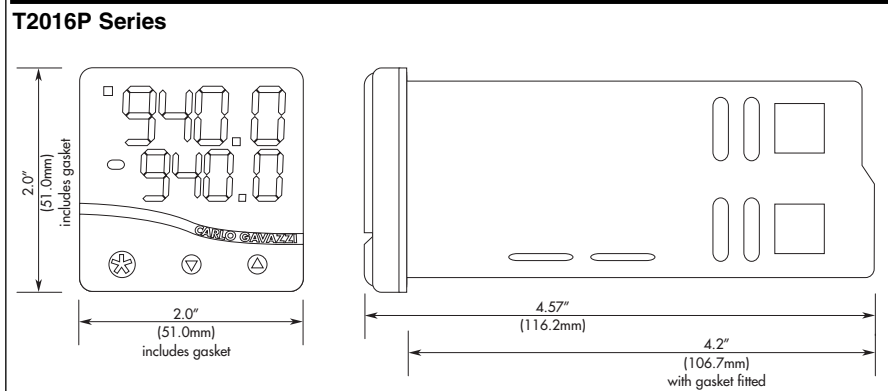
| Function           | Memory Usage |
|--------------------|--------------|
| Ramp               | 4 Bytes      |
| Ramp with Holdback | 5 Bytes      |
| Soak               | 2 Bytes      |
| Step               | 3 Bytes      |
| Loops (1 -3)       | 1 Byte       |
| Loop (4+)          | 2 Bytes      |
| Call               | 1 Byte       |
| Event Output       | 1 Byte       |
| Program Header     | 1 Byte       |

- Examples**  
Max. capacity; 351 Bytes, 126 segments per program, 31 programs
- Example 1**  
(349 Bytes) One program of 116 segments (58 ramps, 58 soaks)
- Example 2**  
(340 Bytes) 4 programs of 28 segments (14 ramps, 14 soaks)

### Profile of a single program



### Dimensions



### Wiring Diagram

