

2408

MODEL



Setpoint Programming Controller

- High stability control
- Up to four programs
- 16 ramp/dwell segments
- Up to 8 event outputs
- PDSIO® master setpoint retransmission
- Heating and cooling
- Customized operator interface
- Heater current display
- Load diagnostics
- Multiple alarms on a single output
- One-shot tuner with overshoot inhibition
- Adaptive tuning
- Auto/manual button
- EIA-485 communications
- Plug-in from front
- IP 65 panel sealing
- Compliant with European EMC and low voltage safety directives

The 2408 is an advanced setpoint programming temperature or process controller, with self and adaptive tuning, in a 1/8 DIN size [1.89x3.78x5.91in (48x96x150mm)]. It will store one or four programs of 16 segments each. Up to eight programmable outputs can be set in each segment to trigger external events. Two digital inputs are included as standard and can be used to run, hold and reset the program. Parallel operation of several programmers can be performed with synchronization chosen at the end of any desired segments. The 2408 has a modular hardware construction which will accept up to three plug-in I/O modules, a fixed alarm relay and two communications modules. The outputs can be configured for heating, cooling, alarms or motorized valve control. It is fully configurable on-site.

PDSIO® master setpoint transmission

PDSIO® can be used to digitally transmit the setpoint profile to a number of slave Series 2000 controllers. If any slave zone departs from the required setpoint by more than a pre-settable amount, a signal from any slave can be transmitted back to the master causing the program to freeze until the error is corrected. Digital accuracy is preserved using PDSIO®.

Precise control

An advanced PID control algorithm gives stable 'Straight-line' control of the process. A one-shot tuner is provided to set up the initial PID values and to calculate the overshoot inhibition parameters. In addition an adaptive tuner will handle processes with continually changing characteristics. Power feedback employs power control techniques which stabilize the controlled temperature against supply voltage fluctuations on electrically heated loads. Dedicated cooling algorithms ensure optimum control on fan, water and oil cooled systems.

Universal input

A universal input circuit with an advanced analog to digital convertor samples the input at 9Hz and continuously corrects it for drift. This gives high stability and rapid response to process changes. High noise immunity is achieved by rejection of 50/60Hz pick-up and other sources of noise. Sensor diagnostics are also provided. The input covers all thermocouple types, Pt100 RTD and linear millivolts or milliamps. Input filtering from 1.0 to 999.9 seconds is included.



EUROTHERM
CONTROLS



Customized operation

Custom LEDs provide a bright, clear display of the process value and setpoint. Tactile push buttons ensure positive operation. Access to other parameters is simple and easy to understand and can be customized to present only those parameters that need to be viewed or adjusted. All other parameters are locked away under password protection. Front panel auto/manual and run/hold buttons are provided.

PDSIO® Load diagnostics

PDSIO® (Pulse Density Signaling Input/Output) is a major innovation in the

2408. When used in combination with a Eurotherm TE10S solid state contactor (SSC), it allows the logic output of a 2408 to transmit the power demand signal and simultaneously read back load fault alarms on the same pair of wires. These alarms will flash as messages on the controller front panel and can trip the alarm relay. Two alarm conditions will be detected: one, an SSC failure, indicating an open or short circuit condition in the SSC; two, a heater circuit failure, indicating either fuse failure, heater open circuit or line supply absent.

Alarms

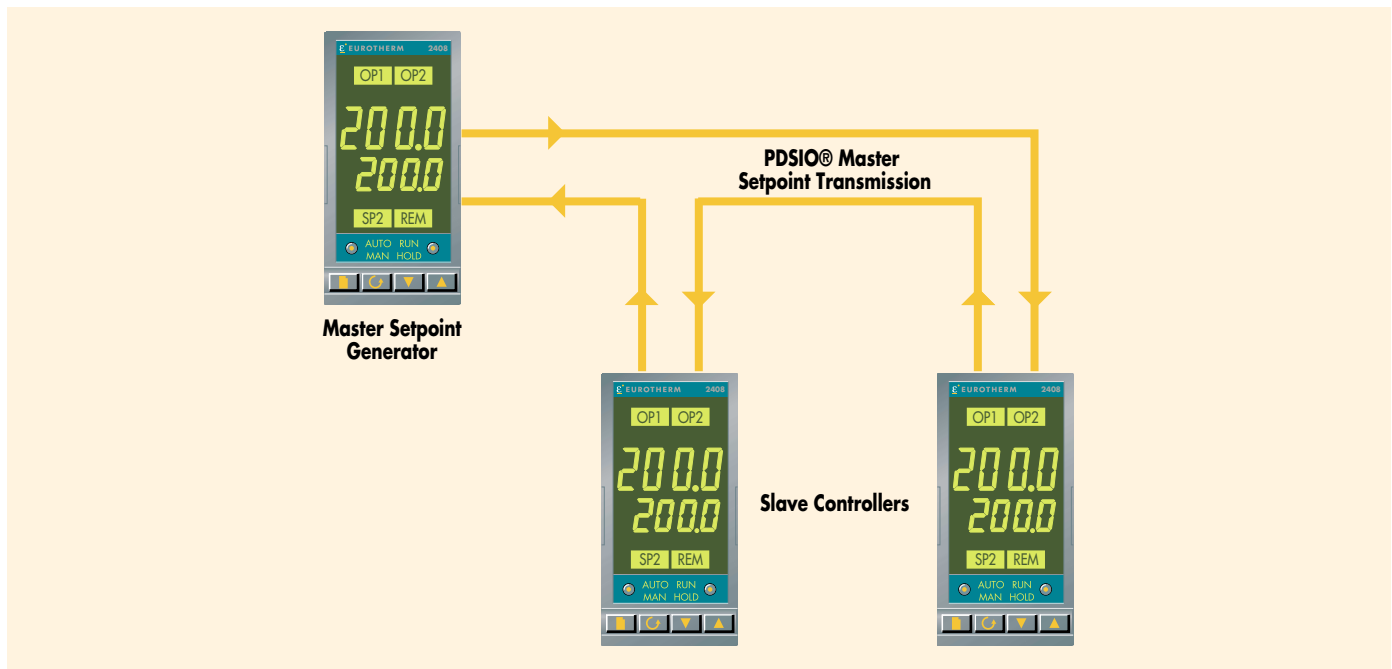
Up to four process alarms can be combined onto a single output. They can be full scale high or low, deviation from setpoint, rate of change or load failure alarms. Alarm messages are flashed on the main display. Alarms can be configured as latching or non-latching and also as 'blocking' type alarms which means they will become active only after entering a safe state.

Digital communications

EIA-485 serial communications is available with industry-standard protocols including: Modbus®, Eurotherm Bisynch, and SPI*.

**Please consult factory for availability.*

PDSIO® Setpoint Transmission



Sensor inputs and display ranges (Temperature scales conform to the ITS90 standard)

| Standard Sensor Inputs | Celsius | | Fahrenheit | |
|--|---------|------|------------|------|
| | Min | Max | Min | Max |
| J thermocouple | -210 | 1200 | -350 | 2192 |
| K thermocouple | -200 | 1372 | -325 | 2500 |
| T thermocouple | -200 | 400 | -325 | 750 |
| L thermocouple | -200 | 900 | -325 | 1650 |
| N thermocouple | -250 | 1300 | -420 | 2370 |
| C thermocouple - W5%Re/W26%Re (Hoskins) | 0 | 2319 | 32 | 4200 |
| R thermocouple | -50 | 1768 | -60 | 3200 |
| S thermocouple | -50 | 1768 | -60 | 3200 |
| B thermocouple | 0 | 1820 | 32 | 3310 |
| Platinell II thermocouple | 0 | 1369 | 32 | 2500 |
| RTD/PT100DIN 43760 | -200 | 850 | -325 | 1560 |
| Custom Sensor Inputs (Replaces type C thermocouple) | | | | |
| E thermocouple | -270 | 1000 | -450 | 1830 |
| Ni/Ni18%Mo thermocouple | 0 | 1100 | 32 | 2012 |
| Pt10%Rh/Pt40%Rh thermocouple | 200 | 1800 | 392 | 3272 |
| Pt20%Rh/Pt40%Rh thermocouple | 0 | 2000 | 32 | 3632 |
| W/W26%Re (Englehard) thermocouple | 0 | 2000 | 32 | 3632 |
| W/W26%Re (Hoskins) thermocouple | 0 | 2010 | 32 | 3650 |
| W5%Re/W26%Re (Englehard) thermocouple | 10 | 2300 | 50 | 4172 |
| W5%Re/W26%Re (Bucose) thermocouple | 0 | 2000 | 32 | 3632 |
| D thermocouple - W3%Re/W25%Re | 0 | 2400 | 32 | 4352 |
| Linear Inputs | -999 | 9999 | | |

2408 TECHNICAL SPECIFICATION

Inputs

| | | |
|----------------------------|-------------------------------------|---|
| General | Range | ± 100mV and 0 to 10Vdc (auto ranging) |
| | Sample rate | 9Hz (110mS) |
| | Calibration accuracy | 0.2% of reading, ±1 LSD or ±1°C/F |
| | Resolution | <1µV for ± 100mV range, <0.2mV for 10Vdc range |
| | Linearization accuracy | No discernable error |
| | Zero drift with ambient temperature | < 0.1µV per °C for ±100mV range, 0.1mV per °C on 10Vdc range |
| | Gain drift with ambient temperature | < 0.004% of reading per °C |
| | Input filter | 1.0 to 999.9secs |
| | Zero and span offset | User adjustable over the fully display range |
| | Thermocouple | Types |
| Cold junction compensation | | Automatic compensation typically >30 to 1 rejection of ambient temperature change External references 32, 113 and 122°F (0, 45 and 50°C) |
| RTD/PT100 | Type | 3-wire, Pt100 DIN43760 |
| | Bulb current | 0.2mA |
| | Lead compensation | No error for 22 ohms in all 3 leads |
| Process | Range | ±100mV, 0 to 20mA or 0 to 10Vdc (All configurable between limits) |
| | Type | Linear, Square root or custom 8 point |
| | Application | Process value, remote setpoint, setpoint trim, power limit. Value pos. slidewire 100 to 1000Ω |
| Digital | Type | Single and triple input: Contact closure or 24Vdc logic input |
| | Application | Manual select, 2nd setpoint, 2nd PID, keylock, setpoint rate limit enable, Program run, hold, reset, synchronization and fast run |

Outputs

| | | |
|---------------------|---------------------|--|
| Relay | Rating: 2-pin relay | Min: 12V, 100mA dc Max: 2A, 264Vac resistive (single and dual modules available) |
| | Rating: change-over | Min: 6V, 1mA dc Max: 2A, 264Vac resistive |
| | Application | Heating, cooling, alarms or program event |
| Logic | Rating | 18Vdc at 24mA (isolated and non-isolated versions are available) |
| | Application | Heating, cooling, alarms or program event PDSIO® mode 1: Logic heating with load failure alarm PDSIO® mode 2: Logic heating with load/SSC failure alarm and load current display |
| | | 1A, 30 to 264Vac resistive (single and dual modules available) |
| Triac | Rating | 1A, 30 to 264Vac resistive (single and dual modules available) |
| | Application | Heating, cooling or program event |
| Analog | Range | 0 to 20mA (into 600Ω max) or 0 to 10Vdc (Isolated and non-isolated versions are available) |
| | Application | Heating, cooling or process output. PV retransmission or setpoint retransmission |
| Transmitter supply | Rating | 24Vdc at 20mA |
| Strain gauge supply | | 10Vdc Minimum bridge resistance: 300Ω |

Communications

| | | |
|---------|-----------------------|---|
| Digital | Transmission standard | EIA-485 at 1200, 2400, 4800, 9600, 19,200 baud |
| | Protocols | Modbus® or Eurotherm Bisynch |
| PDSIO® | Setpoint input | Setpoint input from master PDSIO® controller. Holdback to master controller |
| | Setpoint output | Master setpoint retransmission to slave PDSIO® controllers |

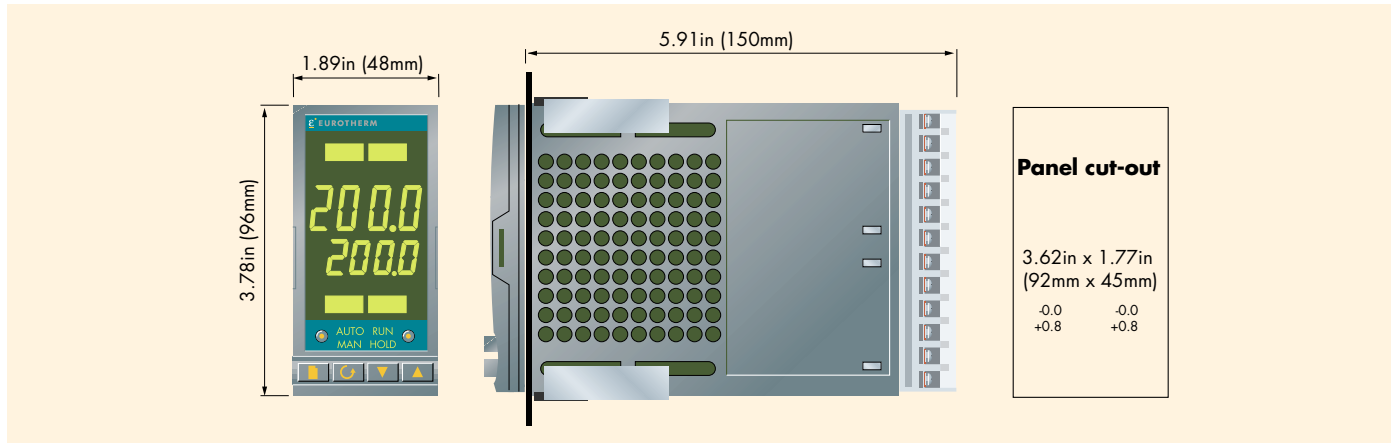
Control functions

| | | |
|----------------------|------------------------------|---|
| Control | Modes | PID or PI with overshoot inhibition, PD, P only or On/Off |
| | Application | Heating, cooling or process output |
| | Auto/manual | Bumpless transfer or forced manual output |
| | Setpoint rate limit | 0.01 to 99.99 degrees or display units per second, minute or hour |
| | Cooling algorithms | Linear; Water (non-linear); Fan (minimum on time), Oil, proportional only |
| Tuning | One-shot tune | Automatic calculation of PID and overshoot inhibition parameters |
| | Adaptive tune | Continuous assessment of the PID values |
| | Automatic droop compensation | Automatic calculation of manual reset value when using PD control |
| Alarms | Types | Full scale high or low. Deviation high, low, or band. Rate of change |
| | Modes | Latching or non-latching. Normal or blocking action Up to four process alarms can be combined onto a single output |
| Setpoint programming | Program size | One, four, or 20 programs of 16 segments each |
| | Event outputs | Up to eight – relay, logic or triac |

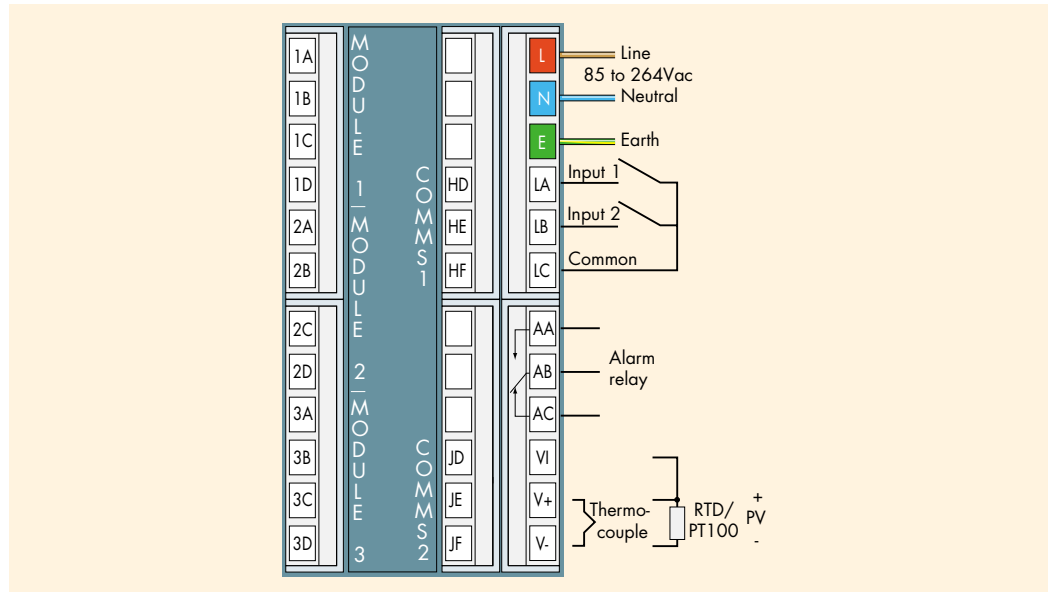
General

| | | | |
|---------|-------------------------------|--|--|
| General | Display | Dual, 4 digit x 7 segment high intensity LED | |
| | Dimensions and weight | 1.89W x 3.78H x 5.91D in (48W x 96H x 150Dmm) 14.11oz (400g) | |
| | Supply | 85 to 264Vac, 48 to 62Hz. 10watts max | |
| | Temperature and RH | Operating: 32 to 131°F (0 to 55°C), RH: 5 to 90% non-condensing. Storage: 14 to 158°F (-10 to 70°C) | |
| | Panel sealing | IP 65 | |
| | Electromagnetic compatibility | Meets generic emissions standard EN50081-2 for industrial environments Meets general immunity requirements of EN50082-2(95) for industrial environments | |
| | Safety standards | EN61010, installation category 2 (voltage transients must not exceed 2.5kV) | |
| | Atmospheres | Electrically conductive pollution must be excluded from the cabinet in which this controller is mounted. This product is not suitable for use above 6,562ft (2000m) or in corrosive or explosive atmospheres without further protection. | |
| | | | |
| | | | |

2408 Rear Terminal Connections and Outline Dimensions



Modules 1, 2 and 3 are plug-in modules. They can be any one of the types shown in the ordering code below.



Ordering Code

| Basic Product | Function | Supply Voltage | Module 1 | Module 2 | Module 3 | Alarm 1 | Comms 1* | Comms 2* | Manual |
|---------------|-----------------------------------|-----------------|-------------------------|-------------------------|-------------------------|-----------------------|-----------------------------------|-----------------------------------|---------------|
| 2408 | CP Single Programmer | VH 85 - 264 Vac | XX Not used | XX Not used | XX Not used | XX Not used | XX Not used | XX Not used | XXX No Manual |
| | P4 Four Programs | | R2 Relay: 2 pin | R2 Relay: 2 pin | R2 Relay: 2 pin | RF Relay: change over | EIA-485: | M6 PDSIO® SP input unconfigured | ENG English |
| | CM 20 Programs | | R4 Relay: change over | R4 Relay: change over | R4 Relay: change over | | Modbus® | M7 PDSIO® SP retrans unconfigured | FRA French |
| | VP Valve Positioner Programmer | | L2 Logic: non-isolated | L2 Logic: non-isolated | TK Triple contact input | | EI Bisynch | | GDR German |
| | VC Valve Positioner Four Programs | | L4 Logic: isolated | L4 Logic: isolated | TL Triple logic input | | PDSIO®: | ITA Italian | |
| | VM Valve Positioner 20 Programs | | T2 Triac | T2 Triac | TP Triple logic output | | M7 Setpoint Retrans. unconfigured | | |
| | | | D2 DC: non-isolated | D2 DC: non-isolated | RR Dual (relay+relay) | | EIA-232: | | |
| | | | D4 DC: isolated | D4 DC: isolated | D5 Remote DC input | | Modbus® | | |
| | | | RR Dual (relay+relay) | RR Dual (relay+relay) | VS VP slide wire input | | EI Bisynch | | |
| | | | TT Dual (triac+triac) | TK Triple contact input | D6 DC retransmission | | EIA-422: | | |
| | | | LR Dual (logic+relay) | TL Triple logic input | L2 Logic non-isolated | | Modbus® | | |
| | | | LT Dual (logic+triac) | TP Triple logic output | T2 Triac | | EIA-232: | | |
| | | | TK Triple contact input | D6 DC retransmission | | | Modbus® | | |
| | | | TL Triple logic input | | | | EI Bisynch | | |
| | | | TP Triple logic output | | | | | | |

The above ordering code specifies only the hardware build. The input type and output control functions must be configured on-site to suit a particular application. If preconfiguration is required, ask for details on the full ordering code.

**Please consult factory for availability.*

Informações sobre programação
www.soliton.com.br - e-mail: soliton@soliton.com.br

SOLITON CONTROLES INDUSTRIAIS LTDA

Rua Alfredo Pujol, 1010 - Santana - São Paulo - SP.

Tel:11 - 6950-1834 / Fax: 11 - 6979-8980 - e-mail: vendas@soliton.com.br

© Copyright Eurotherm Controls Inc. 1997
All rights strictly reserved. No part of this document may be stored in a retrieval system, or any form or by any means without prior written permission from Eurotherm Controls Inc. Every effort has been taken to ensure the accuracy of this specification. However, in order to maintain our technological lead we are continuously improving our products which could, without notice, result in amendments or omissions to this specification. We cannot accept responsibility for damage, injury, loss or expenses resulting therefrom.