

# 2404 2408

MODELS



## Controller/Programmer Specification Sheet

- **High stability control**
- **Up to twenty programs**
- **16 segments**
- **Heating and cooling**
- **Customisable operation**
- **Heater current display**
- **Multiple alarms on a single output**
- **DC retransmission**
- **Digital communications**
  - **Modbus RTU**
  - **Profibus DP network**
  - **DeviceNet® network**

The 2404/2408 is a versatile, high stability temperature or process controller, with self and adaptive tuning, in 1/4 DIN and 1/8 DIN sizes. It comes with a standard 8 segment setpoint programmer, with options for one, four or twenty programs of 16 segments each.

It has a modular hardware construction which accommodates a wide range of plug-in modules. It will accept up to three I/O modules and two communication modules. Two digital inputs and an optional alarm relay are included as part of the fixed hardware build. The hardware is configurable for heating, cooling, alarms and other functions. A transmitter power supply option is available, as is a 5 or 10V transducer supply option. The 2404/2408 is fully configurable on-site.

The 16 segment programmer can have up to 8 programmable outputs which can be set in each segment to trigger external events. The two digital inputs can be used to run, hold and reset the program. Parallel operation of several programmers can be performed with synchronisation chosen at the end of any desired segments.

### 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. On electrically heated loads, power feedback is used to stabilise the output power and hence the controlled temperature against supply voltage fluctuations. Dedicated cooling algorithms ensure optimum control of fan, water and oil cooled systems.

### Universal input

A universal input circuit with an advanced analogue 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 will accept all standard thermocouples, the Pt100 resistance thermometer and linear millivolts, milliamps or DC volts.

## Customisable operation

A custom LED display provides a bright, clear display of the process value and setpoint. Tactile push buttons ensure positive operation. Dedicated buttons provide for auto/manual and program run/hold capabilities. Access to other parameters is simple and easy to understand and can be customised to present only those parameters that need to be viewed or adjusted. All other parameters are locked away under password protection.

## Alarms

Up to four 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 they have first entered a safe state.

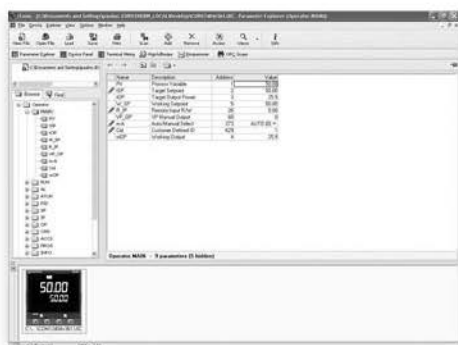
## Digital communications

2404/2408 controllers are available with a wide range of communications options. EIA485 2 wire, EIA232, EIA422 4 wire. Profibus DP or Eurotherm<sup>®</sup> proprietary PDS communications modules are available, offering Modbus RTU, Profibus DP (24xxf), DeviceNet, Eurotherm Bisynch or PDSIO protocols.

## iTools configuration editor

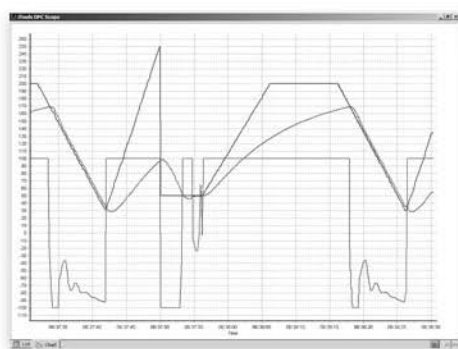
Although 2404/2408 controllers are easily and fully configurable via the front panel, iTools configuration software offers an easy to use PC configuration tool.

iTools has the built-in ability to save or clone instrument configurations ensuring full back up of any engineering effort.



## OPC Scope

OPC Scope is a separate utility that allows trending, data logging and Dynamic Data Exchange (DDE). It is an OPC explorer program that can connect to any OPC server that is in the Windows registry.



Both data logging and trending are available and the user can trend and view live data, with a scaleable time axis between 1 minute and 1 month. This utility also offers a Historical Review mode and data can be logged onto the PC hard disk, from which it may be retrieved and analysed in an Excel spreadsheet.

## SPECIFICATION

### General

#### Environmental performance

Temperature limits	Operation: 0 to 55°C Storage: -10 to 70°C
Humidity limits	Operation: 5 to 90% RH non condensing Storage: 5 to 90% RH non condensing
Panel sealing:	IP65
Altitude:	<2000 metres
Atmospheres:	Not suitable for use in explosive or corrosive atmosphere

#### Electromagnetic compatibility (EMC)

Emissions and immunity: BS EN61326

Suitable for domestic, commercial and light industrial as well as heavy industrial. (Domestic/light (Class B) emissions. Industrial environmental immunity.

Under industrial immunity conditions the instrument will not deviate by more than an additional amount equal to the published tolerance.

#### Electrical safety

BS EN61010

Installation cat. II; Pollution degree 2

#### INSTALLATION CATEGORY II

The rated impulse voltage for equipment on nominal 230V mains is 2500V.

#### POLLUTION DEGREE 2

Normally, only non-conductive pollution occurs. Occasionally, however, a temporary conductivity caused by condensation shall be expected

### Physical

Panel mounting	2408: 1/8 DIN 2404: 1/4 DIN
Weight	2408: 440g max. 2404: 670g max.
Panel cut-out dims.	2408: 45W x 92Hmm (-0.0 +0.8) 2404: 92W x 92Hmm (-0.0 +0.8)
Panel depth	Both: 148mm

### Operator interface

Type:	Dual 7 segment LED up to 2 decimal places
Display	2408: Upper 12mm Lower 10mm 2404: Upper 21mm Lower 10mm
Status beacons:	OP1, OP2, SP2, REM
Status indicators:	Auto, manual, run, hold
Access levels:	Operator, full access, Edit, config. Password protected

### Power requirements

Supply voltage:	85 to 264Vac, 48 to 62 Hz, 2404 16W max. 2408 13W max. 24Vac, -15%, +10% 24Vdc, -15% +20% ±5% ripple voltage
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#### Inrush current

High Voltage (VH):	30A duration <100µs
Low Voltage (VL):	15A duration <100µs

### Approvals

CE, cUL listed (file E57766), Gost  
Suitable for use in Nadcap and  
AMS2750D applications under System  
Accuracy Test calibration conditions

### Communications

No of ports:	2 modules can be fitted
Slot allocation:	PDSIO remote setpoint or retransmission J comms port

#### Serial communications option

Protocols:	Modbus RTU Slave Profibus DP (24XXf only) Ei-Bisynch (818 style mnemonics)
Isolation:	264Vac, double insulated
Transmission standard:	EIA232, EIA485, CAN (DeviceNet), Profibus (24XXf only)

**JEV**  
VACUUM  
INSTRUMENTS





## Main process variable input

Calibration accuracy:	<±0.2% of reading ±1LSD
Sample rate:	9Hz (110ms)
Isolation:	264Vac double insulation
Input filter:	Off to 999.9. Default 1.6s
Zero offset:	User adjustable over full range
User calibration:	2-point gain & offset
Functions:	Includes process input, remote setpoint, power limit

### Thermocouple

Range:	-100mV to +100mV
Types:	K, J, N, R, S, B, L, T, C, PL2, custom
Resolution (µV):	<3.3µV @ 1.6s filter time
Effective resolution:	15.9 bits
Linearisation accuracy:	<0.2% of reading
Cold junction compensation:	>30:1 rejection of ambient change External reference of 0°C, 45°C and 50°C <±1°C at 25°C ambient

Cold junction accuracy:

### Resistance thermometer

Range:	0-400Ω (-200°C to +850°C)
Resistance thermometer types:	3-wire Pt100 DIN 43760
Resolution (°C):	<±0.08°C with 1.6sec filter
Effective resolution:	13.7 bits
Linearity error:	<0.033% (best fit straight line)
Calibration error:	<±0.4°C + 0.15% of reading in °C
Drift with temperature:	<±(0.015°C + 0.005% of reading in °C) per °C
Common mode rejection:	<0.00085°C/V (maximum of 264Vrms)
Series mode rejection:	<0.240°C/V (maximum of 280mV pk-pk)
Lead resistance:	0Ω to 22Ω, matched lead resistance
Input impedance:	100MΩ
Bulb current:	300µA

### 100mV range

Range:	-100mV to +100mV
Resolution (µV):	<3.3µV with 1.6s filter time
Effective resolution:	15.9 bits
Linearity error:	<0.033% (best fit straight line)
Calibration error:	<±10µV, ± 0.2% of measurement at 25°C
Drift with temperature:	<±0.2µV + 0.004% of reading per °C
Common mode rejection:	>146dB (maximum of 264Vrms)
Series mode rejection:	>90dB (maximum of 280mV pk-pk)
Input impedance:	>100MΩ

### 10 Volts range

Range:	0V to +10.0V
Resolution (µV):	<300µV with 1.6sec filter
Effective resolution:	15.4 bits
Linearity error:	<0.033% (best fit straight line)
Calibration error:	<±(0.4°C + 0.15% of reading in °C)
Drift with temperature:	<± 0.1mV + 0.02% of reading per °C
Common mode rejection:	>145dB (maximum of 264Vrms)
Series mode rejection:	>92dB (maximum of 5V pk-pk)
Input impedance:	>69kΩ

### Notes

- (1) Calibration accuracy quoted over full ambient operating range and for all input linearisation types
- (2) Contact Eurotherm for details of availability of custom downloads for alternative sensors

## Digital input (LA and LB)

Isolation:	Not isolated from each other. 264Vac double insulation from the PSU and communication
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### Input

Rating	Voltage level: Closed 0 to <11Vdc Open >13 to 24Vdc
Contact closure:	Open >28kΩ Closed <100Ω
Functions:	Includes program control, alarm acknowledge, SP2 select, manual, keylock, RSP select, standby

### AA Relay

Type:	Form C (changeover)
Rating:	Min 1mA @ 1Vdc, Max 2A @ 264Vac resistive 1,000,000 operations with external snubber
Isolation:	264Vac double insulation
Functions:	Alarms, events, status

## DC Input module (Isolated)

Calibration accuracy:	<±0.2% of reading ±1LSD
Sample rate:	9Hz (110ms)
Isolation:	264Vac double insulation
Input filter:	Off to 999.9. Default 1.6s
Zero offset:	User adjustable over full range
User calibration:	2-point gain & offset
Functions:	Includes process input, remote setpoint, power limit

### Thermocouple

Range:	-100mV to +100mV
Types:	K, J, N, R, S, B, L, T, C, PL2, custom
Resolution (µV):	<3.3µV @ 1.6s filter time
Effective resolution:	15.9 bits
Linearisation accuracy:	<0.2% of reading
Cold junction compensation:	>30:1 rejection of ambient change External reference of 0°C, 45°C and 50°C <±1°C at 25°C ambient

Cold junction accuracy:

### Resistance thermometer

Range:	0-400Ω (-200°C to +850°C)
Resistance thermometer types:	3-wire Pt100 DIN 43760
Resolution (°C):	<±0.08°C with 1.6sec filter
Effective resolution:	13.7 bits
Linearity error:	<0.033% (best fit straight line)
Calibration error:	<±0.4°C + 0.15% of reading in °C
Drift with temperature:	<±(0.015°C + 0.005% of reading in °C) per °C
Common mode rejection:	<0.00085°C/V (maximum of 264Vrms)
Series mode rejection:	<0.240°C/V (maximum of 280mV pk-pk)
Lead resistance:	0Ω to 22Ω, matched lead resistance
Input impedance:	100MΩ
Bulb current:	300µA

### 100mV range

Range:	-100mV to +100mV
Resolution (µV):	<3.3µV with 1.6s filter time
Effective resolution:	15.9 bits
Linearity error:	<0.033% (best fit straight line)
Calibration error:	<±10µV, ± 0.2% of measurement at 25°C
Drift with temperature:	<±0.2µV + 0.004% of reading per °C
Common mode rejection:	>146dB (maximum of 264Vrms)
Series mode rejection:	>90dB (maximum of 280mV pk-pk)
Input impedance:	>100MΩ

### 10 Volts range

Range:	-3.0V to +10.0V
Resolution (µV):	<300µV with 1.6sec filter
Effective resolution:	15.4 bits
Linearity error:	<0.033% (best fit straight line)
Calibration error:	<±(0.4°C + 0.15% of reading in °C)
Drift with temperature:	<± 0.1mV + 0.02% of reading per °C
Common mode rejection:	>145dB (maximum of 264Vrms)
Series mode rejection:	>92dB (maximum of 5V pk-pk)
Input impedance:	>69kΩ

## Potentiometer input

Type:	Single channel
Resistance:	100Ω to 15kΩ
Excitation:	0.5Vdc supplied by module
Isolation:	264Vac double insulation
Functions:	Includes valve position and remote setpoint

## Analogue control output

Type:	Single channel
Rating:	0-20mA <600Ω 0-10Vdc >500Ω
Accuracy:	±2.5%
Resolution:	10 bits
Isolation:	264Vac double insulation

## Analogue retransmission output

Type:	Single channel
Rating:	0-20mA <600Ω 0-10Vdc >500Ω
Accuracy:	±0.5%
Resolution:	11 bits
Isolation:	264Vac double insulation

### Logic input modules

Module types:	Triple contact closure, triple logic level
Isolation:	No channel isolation. 264Vac double insulation from other modules and system
Rating:	Voltage Level: Open -3 to 5Vdc @ <=0.4mA Closed 10.8 to 30Vdc @ 2.5mA
Contact closure:	Open >28kΩ Closed <100Ω
Functions:	Includes program control, alarm acknowledge, SP2 select, manual, keylock, RSP select, standby

### Logic output modules

Module types:	Single channel, triple channel
Isolation:	No channel isolation. 264Vac double insulation from other modules and system
Rating	Single: 12Vdc @ 24mA, source Triple: 12Vdc @ 9mA, source
Functions:	Includes control outputs, alarms, events, status

### Relay modules

Module types:	Single channel Form A, Single channel Form C, dual channel Form A
Isolation:	264Vac double insulation
Rating:	Min 100mA @ 12Vdc, Max 2A @ 264Vac resistive Min 400,000 (max load) operations with external snubber
Functions:	Includes control outputs, alarms, events, status

### Triac modules

Module types:	Single channel, dual channel
Isolation:	264Vac double insulation
Rating:	<1A @ 30-264Vac resistive
Functions:	Includes control outputs, alarms, events, status

### Transmitter PSU module

Type:	Single channel
Isolation:	264Vac double insulation
Rating:	24Vdc @ 20mA

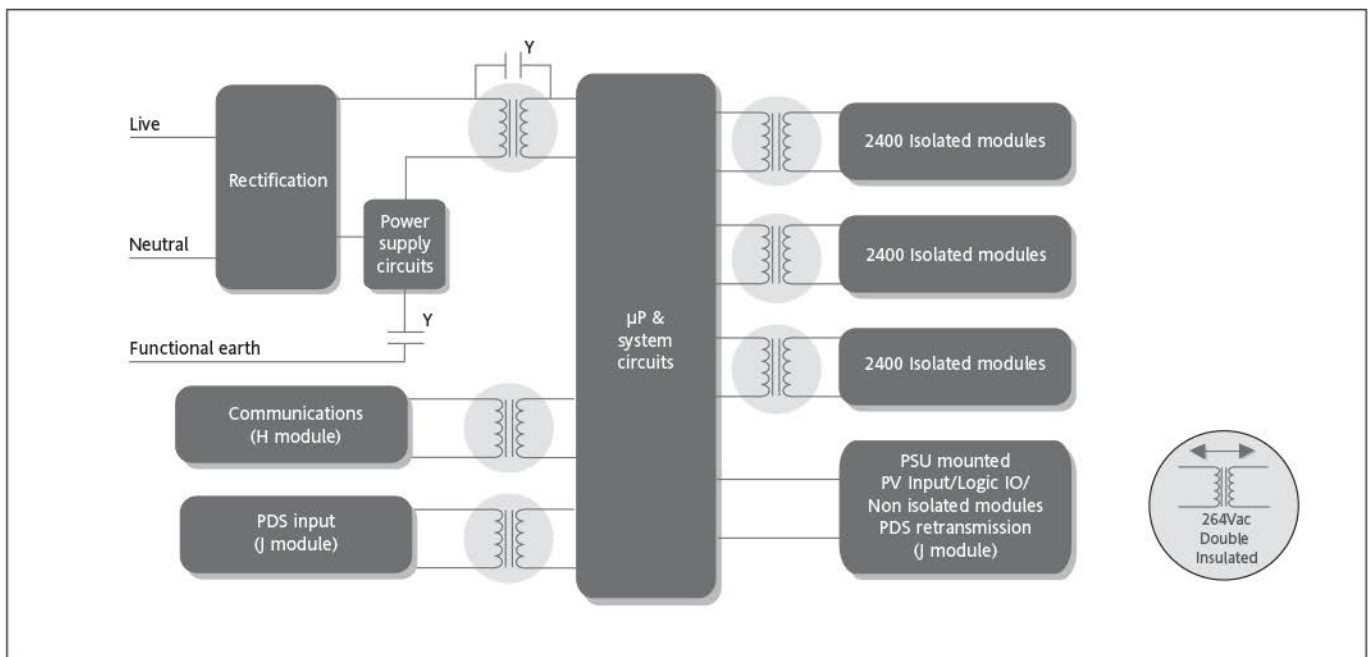
### Transducer PSU module

Type:	Single channel
Isolation:	264Vac double insulation
Bridge voltage:	Software selectable 5Vdc or 10Vdc
Bridge resistance:	300Ω to 15kΩ
Internal shunt resistor:	30.1Ω @0.25%, used for calibration of 350Ω bridge at 80%

### Software features

<b>Control loop</b>	
Control types:	PID, OnOff, VP, Dual VP
Cooling types:	Linear, fan, oil, water
Modes:	Auto, manual, forced manual
Overshoot inhibition:	High and low cutbacks
Number of PID sets:	2, selectable on PV
Control options:	Supply voltage compensation, feedforward, output tracking, OP power limiting, SBR safe output
Setpoint options:	Remote SP with trim, SP rate limit, 2nd Setpoint, tracking modes
<b>Setpoint programmer</b>	
Program function:	Standard 1, 8 segment Optional 1, 4 or 20, 16 segment 8 with 16 segment programmer
Events:	Ramp rate, Ramp time, dwell, call, step
Segment types:	Run, Hold, Reset, RunHold, RunReset, ResetRun, Adv Seg, Skip Seg
Digital inputs:	Process value, setpoint
Servo action:	Continue, ramp, reset
Power failure modes:	Holdback, inputs
Other functions:	
<b>Process alarms</b>	
Number:	4
Type:	High, low, devhi, devlo, devband
Latching:	None, auto, manual, event
Other features:	Blocking

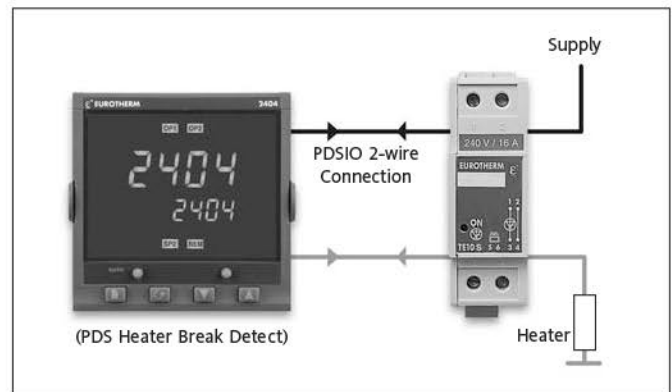
## Isolation diagram



## PDSIO load diagnostics

PDSIO (Pulse Density Signalling I/O) is a major innovation in the 2404/2408. When used in combination with a Eurotherm TE10 solid state relay (SSR), it allows the logic output of a 2404/2408 to transmit the power demand signal and simultaneously read back load fault alarms. These alarms will be flashed as messages on the controller front panel.

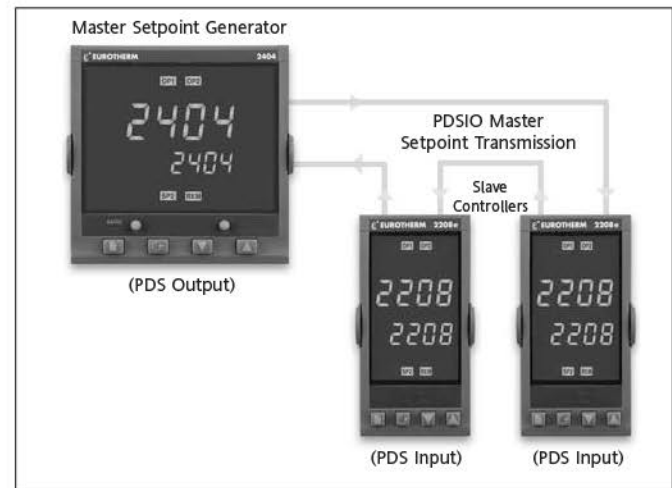
Two alarm conditions will be detected, either SSR failure indicating an open or short circuit condition in the SSR and heater circuit failure indicating either fuse failure, heater open circuit or line supply absent.



## PDSIO master setpoint transmission

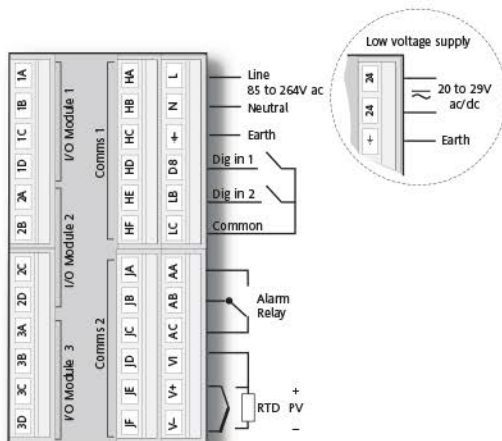
PDSIO can be used to digitally transmit the setpoint profile to a number of slave Series 2000 controllers.

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.

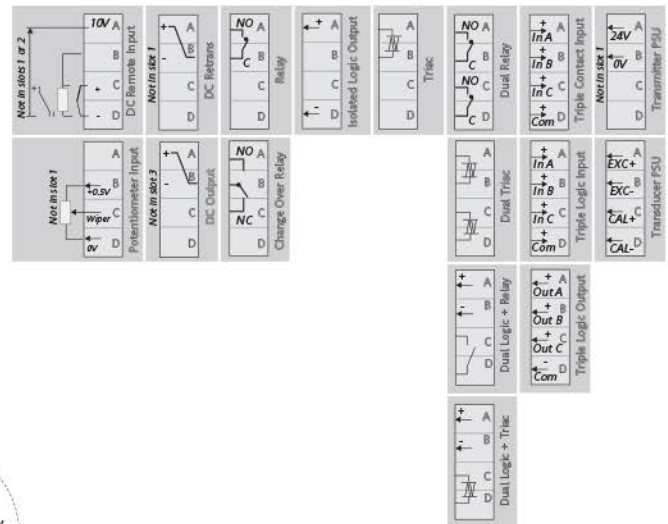
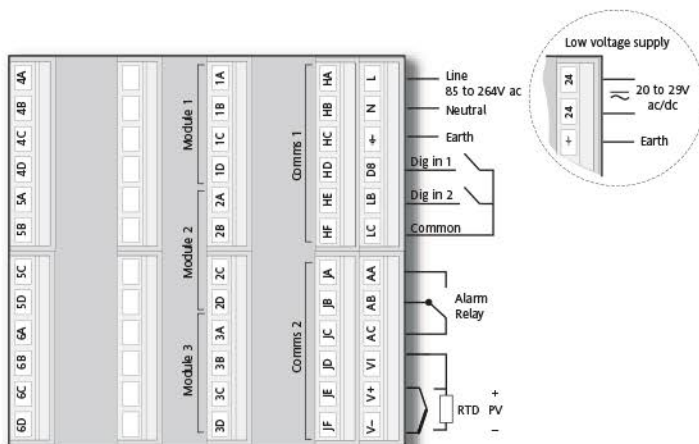


## Rear terminal connections

2408



2404





## Hardware coding

Model Number	Function	Supply Voltage	Module 1	Module 2	Module 3	Alarm Relay	10amp Output	Comms 1	Comms 2	Manual
							Omit for 2408			

2408

2404

Model Number
Panel size
2408 48x96mm
2404 96x96mm
Profibus units
2408f 48x96mm
2404f 96x96mm

Function (2408)
PID control
CC Controller only
CG 1x 8 seg Prog
CP 1x16 seg Prog
P4 4x16 seg Prog
CM 20x16 seg Prog (note 1)
On/Off Control
NF Controller only
NG 1x8 seg Prog
NP 1x16 seg Prog
N4 4x16 seg Prog
NM 20x16 seg Prog (note 1)
Motorised valve control
VC Valve positioner
VG 1x8 seg Prog
VP 1x16 seg Prog
V4 4x16 seg Prog
VM 20x16 seg Prog (note 1)

Function (2404)
PID control
CC Controller only
CG 1x 8 seg Prog
CP 1x16 seg Prog
P4 4x16 seg Prog
CM 20x16 seg Prog (note 1)
On/Off Control
NF Controller only
NG 1x8 seg Prog
NP 1x16 seg Prog
N4 4x16 seg Prog
NM 20x16 seg Prog (note 1)
Motorised valve control
VC Valve positioner
VG 1x 8 seg Prog
VP 1x16 seg Prog
V4 4x16 seg Prog
VM 20x16 seg Prog (note 1)

Supply Voltage
VH 85-264Vac
VL 20-29Vac/dc

Module 1
XX Not fitted
Relay: 2-pln
R2 Fitted unconfigured
RH Heating output
RU Valve raise output
Relay: change over
R4 Fitted unconfigured
YH Heating output
RP Valve raise (note 6)
Or alarm 1 from table A
Logic: (Non-Isolated)
L2 Fitted unconfigured
LH Heating output
M1 PDS Heater break detect (note 2)
M2 PDS Current monitoring (note 3)
Logic: (Isolated)
LO Single logic OP
Triac
T2 Fitted unconfigured
TH Heating output
TU Valve raise output
DC control (Isolated)
D4 Fitted unconfigured
H6 0-20mA heating
H7 4-20mA heating
H8 0-5V heating
H9 1-5V heating
HZ 0-10V heating
Digital I/O (unconfig'd)
TK Triple contact input
TL Triple logic input
TP Triple logic output
Dual relay
RR Fitted unconfigured
RD Heat + cool
RM VP raise & lower OPs
Dual triac
TT Fitted unconfigured
TD Heat + cool
TM VP raise & lower OPs
Logic+relay
LR Fitted unconfigured
LD Heat + cool
QC Mode 2 + cool
Logic+triac
LT Fitted unconfigured
GD Heat & cool
QD Mode 2 + cool
Transducer PS
G3 5Vdc transducer PSU
G5 10Vdc transducer PSU

Table A: alarm codes
FH High alarm
FL Low alarm
DB Dev. band alarm
DL Dev. low alarm
DH Dev. high alarm

Module 2
XX Not fitted
Relay: 2-pln
R2 Fitted unconfigured
RC Cooling output
RW Valve lower output
Relay: change over
R4 Fitted unconfigured
YC Cooling output
RL Valve lower (note 6)
PO Program event 1 (note 7)
PE Program END output
Or alarm 2 from table A
Dual relay
RR Fitted unconfigured
PP Program events 1 & 2 (note 7)
Logic: (Non-Isolated)
L2 Fitted unconfigured
LC Cooling output
Logic: (Isolated)
LO Single logic OP
Triac
T2 Fitted unconfigured
TC Cooling output
TW Valve lower output
DC control (Isolated)
D4 Fitted unconfigured
C6 0-20mA cooling
C7 4-20mA cooling
C8 0-5V cooling
C9 1-5V cooling
CZ 0-10V cooling
Digital I/O (unconfig'd)
TK Triple contact input
TL Triple logic input
TP Triple logic output
Power supply
MS 24Vdc transmitter
DC retrans. (Isolated)
Select from Table B
Potentiometer Input
VU Fitted unconfigured
VS Valve position feedback
VR Setpoint input
Transducer PS
G3 5Vdc transducer PSU
G5 10Vdc transducer PSU

Table B: DC retransmission
D6 Fitted unconfigured
First character
V- PV retrans
S- Setpoint retrans
O- Output retrans
Z- Error retrans
Second character
-1 0-20mA
-2 4-20mA
-3 0-5V
-4 1-5V
-5 0-10V

Module 3
XX Not fitted
Relay: 2-pln
R2 Fitted unconfigured
Relay: change over
R4 Fitted unconfigured
PO Program event 4 (note 7)
PE Program END output
Or alarm 3 from table A
Logic: (Non-Isolated)
L2 Fitted unconfigured
Logic: (Isolated)
LO Single logic OP
Triac
T2 Fitted unconfigured
Dual relay
RR Fitted unconfigured
PP Program event 4 & 5 (note 7)
Digital I/O (unconfig'd)
TK Triple contact input
TL Triple logic input
TP Triple logic output
Power supply
MS 24Vdc transmitter
DC remote Input
D5 Fitted unconfigured
W2 4-20mA setpoint
W5 0-10V setpoint
WP Second PV input
DC retrans. (Isolated)
Select from Table B
Potentiometer Input
VU Fitted unconfigured
VS Valve position feedback
VR Setpoint input

Alarm relay
XX Not fitted
Alarm 4 relay
RF Fitted unconfigured
Table A alarm options plus:
RA Rate of change alarm
PDS Alarms
LF Heater break detect
HF Current monitoring heater break
SF Current monitoring SSR failure
PO Program event 7 (note 7)
PE Program END output

10amp Output
XX Not fitted

Comms 1
XX Not fitted
2 wire, EIA485
Y2 Fitted unconfigured
YM Modbus protocol
YE Bi-Synch protocol (note 1)
BA232
A2 Fitted unconfigured
AM Modbus protocol
AE Bi-Synch protocol (note 1)
4 wire EIA422
F2 Fitted unconfigured
FM Modbus protocol
FE Bi-Synch protocol (note 1)
PDS Output
M7 Fitted unconfigured
PT PV retrans
TS Setpoint retrans
OT Output retrans
Profibus Module
PB Profibus (note 6)
DeviceNet
DN DeviceNet

Comms 2
XX Not fitted
PDS Input
M6 Fitted unconfigured
RS Setpoint input
PDS Output
M7 Fitted unconfigured
PT PV retrans
TS Setpoint retrans
OT Output retrans

Manual
XXX No manual
ENG English
FRA French
GER German
NED Dutch
SPA Spanish
SWE Swedish
ITA Italian

### 2404/2408 Accessories

Handbook	HA025132
Communications handbook	HA026230
Profibus DP handbook	HA026290
2.49Ω precision resistor	SUB24/2R49.1

Sensor Input	Setpoint Min	Setpoint Max	Display Units	Digital Input 1	Digital Input 2	Control	Power	Options Cooling	Buttons	Program
	note 4	note 4								

Sensor Input	Setpoint Min	Setpoint Max	Display Units	Digital Input 1 & 2	Options
<b>Standard Sensor Inputs</b>			C Celsius F Fahrenheit K Kelvin X Linear input	XX Disabled AM Manual select SR Remote SP select S2 Second setpoint BH Integral hold AC Alarm acknowledge RP SP rate limit enabled RN Run program HO Hold program RE Reset program RH Run/hold prog KL Keylock NT Run/Reset TN Reset/Run HB Program holdback P2 Second PID ST One shot tune enable AT Adaptive tune enable FA Select full access level RB Simulates UP button LB Simulates DOWN button SB Simulates SCROLL button PB Simulates PAGE button B1 Least sig. BCD digit B2 2nd BCD digit B3 3rd BCD digit B4 4th BCD digit B5 5th BCD digit B6 Most significant digit SY Standby-all O/Ps OFF SC Prog synchronisation SG Skip segment (without changing SP) PV Select PV2 AG Advance to end of segment(& step to target SP) MS CTX (mode 5) Input 2 only	<b>Control action</b> XX Reverse acting (standard) DP Direct acting <b>Power feedback</b> XX Enabled on logic, relay & triac heating PD Feedback disabled <b>Cooling options</b> XX Linear cooling CF Fan cooling CW Water cooling CL Oil cooling CO On/Off cooling <b>Front panel buttons</b> XX Enabled MD Auto/manual disabled MR Auto/man & run/hold disabled RD Run/hold disabled <b>Programmer time units</b> XX Dwell & ramp in mins HD Dwell time in hours HR Ramp rate in units/hrs HT Ramp/dwell hours
J J Thermocouple	Min -210	Max 1200			
K K Thermocouple	-200	1372			
T T Thermocouple	-200	400			
L L Thermocouple	-200	900			
N N Thermocouple-Nicrosil/Nisil	-250	1300			
R R Thermocouple-Pt/Pt13%Rh	-50	1700			
S S Thermocouple-Pt/Pt10%Rh	-50	1768			
B B Thermocouple-Pt/Pt30%Rh -6%Rh	0	1820			
P Platinel II Thermocouple	0	1369			
Z RTD/PT100 DIN 43760	-200	850			
<b>Factory Downloaded Input</b>					
C C Thermocouple - W5%Re/W26%Re (Hoskins)	Min 0	Max 2319			
D D Thermocouple - W3%Re/W25%Re	0	2399			
E E Thermocouple	-250	1000			
1 Ni/Ni18%Mo Thermocouple	0	1399			
2 Pt20%Rh/Pt40%Rh Thermocouple	0	1870			
3 W/W26%Re (Engelhard) Thermocouple	0	2000			
4 W/W26%Re (Hoskins) Thermocouple	0	2010			
5 W5%Re/W26%Re (Engelhard) Thermocouple	10	2300			
6 W5%Re/W26%Re (Bucose) Thermocouple	0	2000			
7 Pt10%Rh/Pt40%Rh Thermocouple	200	1800			
8 Exergen K80 I.R. pyrometer	-45	650			
<b>Process Inputs (Scaled to setpoint min and max)</b>					
F -100 to +100mV linear	Min -1999	Max 9999			
Y 0 to 20mA linear (note 4)	-1999	9999			
A 4 to 20mA linear (note 4)	-1999	9999			
W 0 to 5Vdc linear	-1999	9999			
G 1 to 5Vdc linear	-1999	9999			
V 0 to 10Vdc linear	-1999	9999			

Note 1.  
Not available with Profibus controllers

Note 2.  
PDS heater break detect will transmit the power demand to a TE10S Solid State Relay and read back a heater break alarm.

Note 3.  
PDS current monitoring will transmit the power demand signal to a TE10S Solid State Relay and read back load current and open and short circuit alarms.

Note 4.  
Setpoint limits: Include the decimal position required in the displayed value. Up to one for temperature inputs, up to two for process inputs.

Note 5.  
An external 1% current sense resistor is supplied as standard. If greater accuracy is required, a 0.1% 2.49Ω can be ordered as part no. SUB2K/249R.1.

Note 6.  
Only available with Profibus controller.

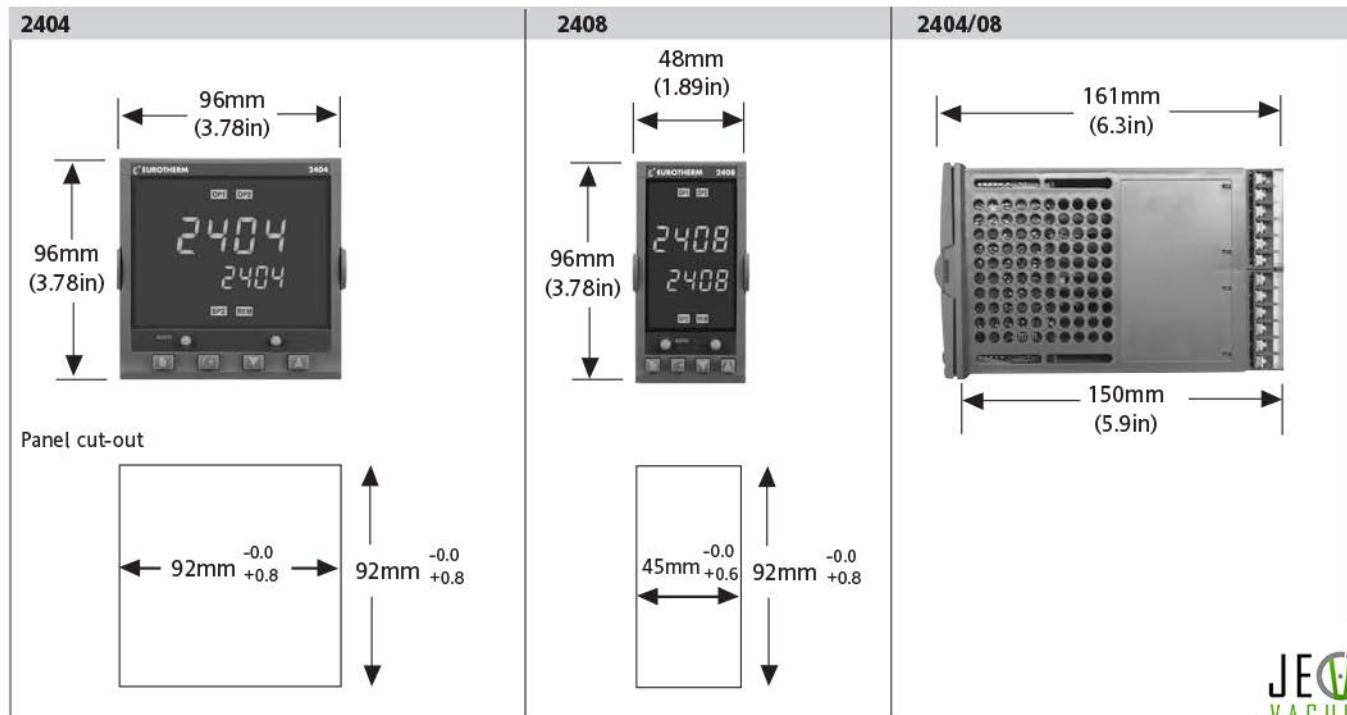
Note 7.  
Not available with 8 segment programmer

## Example ordering code

2408 - CC - VH - LH - RC - FL - FH - YM - TS - K - 0 - 1000 - C - AM - S2 - XX - XX - XX - MD - XX

2408, PID Controller, 85 to 264Vac, Logic heating, Relay cooling, Low alarm relay, High alarm relay, RS485, Modbus comms, PDSIO setpoint retrans, Type K thermocouple, 0 to 1000°C, Auto/manual select, 2nd setpoint select, Manual button disabled.

## Dimensional details



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