Instrumentation Systems & Services Ltd

invensys EUROTHERM

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

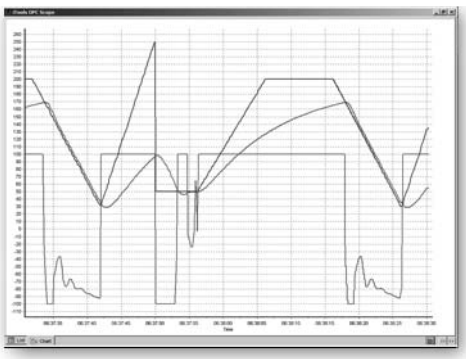
2404/2408 controllers are available with a wide range of communications options. EIA485 2 wire, EIA232, EIA422 4 wire. Profibus DP or Eurotherm® proprietary PDS communications modules are available, offering Modbus RTU, Profibus DP (24xxf), DeviceNet, Eurotherm Bisynch or PDSIO protocols.

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
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-Bisync (818 style mnemonics)
Isolation:	264Vac, double insulated
Transmission standard:	EIA232, EIA485, CAN (DeviceNet), Profibus (24XXf only)

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
Cold junction accuracy:	<±1°C at 25°C ambient

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:	<0.000085°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

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
Cold junction accuracy:	<±1°C at 25°C ambient

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:	<0.000085°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

Control loop

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

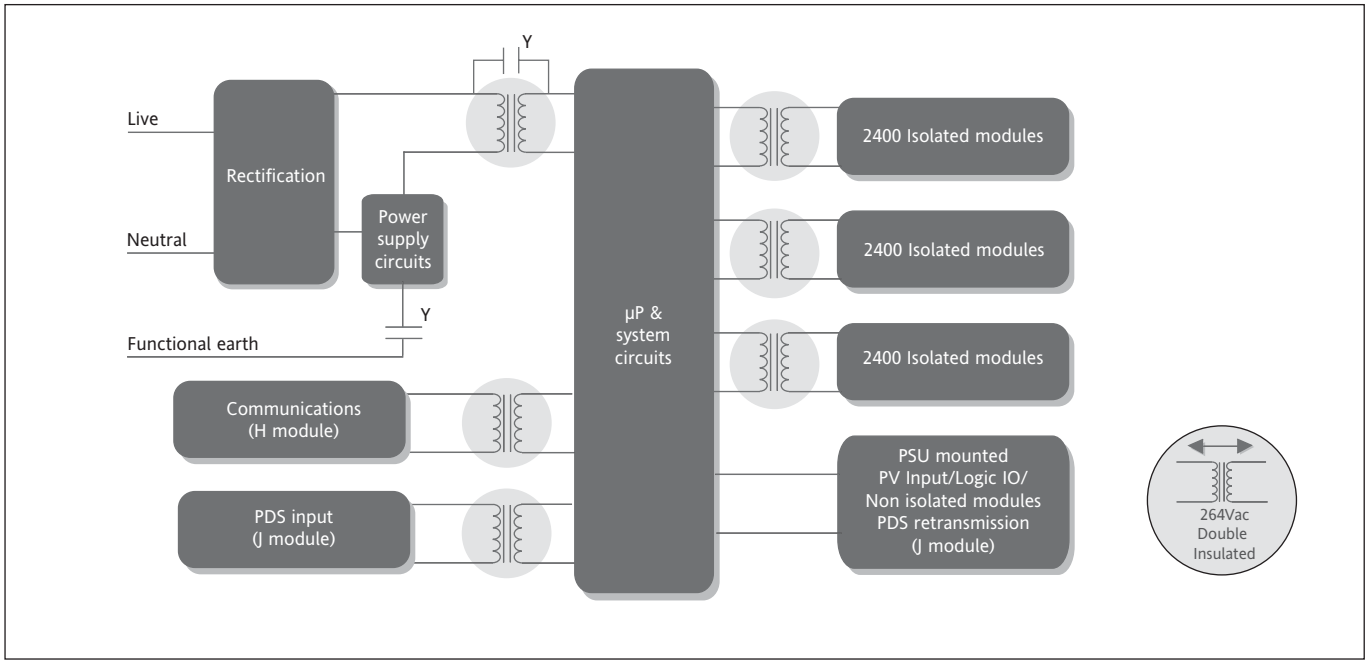
Setpoint programmer

Program function:	Standard 1, 8 segment Optional 1, 4 or 20, 16 segment
Events:	8 with 16 segment programmer
Segment types:	Ramp rate, Ramp time, dwell, call, step
Digital inputs:	Run, Hold, Reset, RunHold, RunReset, ResetRun, Adv Seg, Skip Seg
Servo action:	Process value, setpoint
Power failure modes:	Continue, ramp, reset
Other functions:	Holdback, inputs

Process alarms

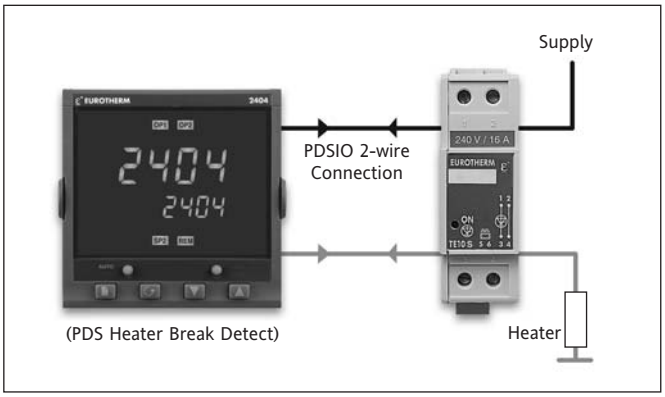
Number:	4
Type:	High, low, devhi, devlo, devband
Latching:	None, auto, manual, event
Other features:	Blocking

Isolation diagram



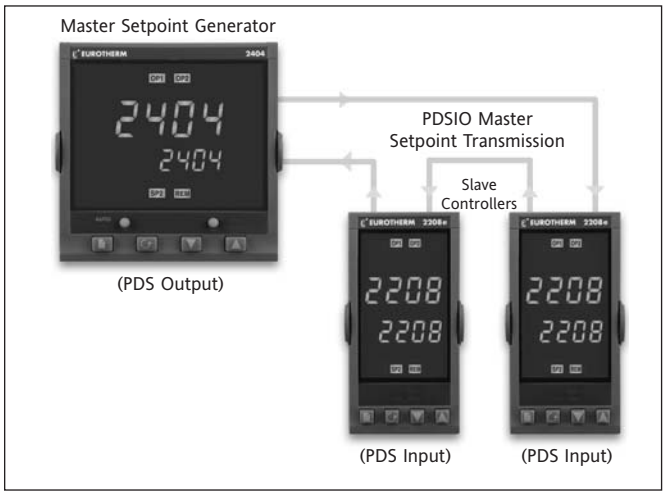
PDSIO load diagnostics

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.



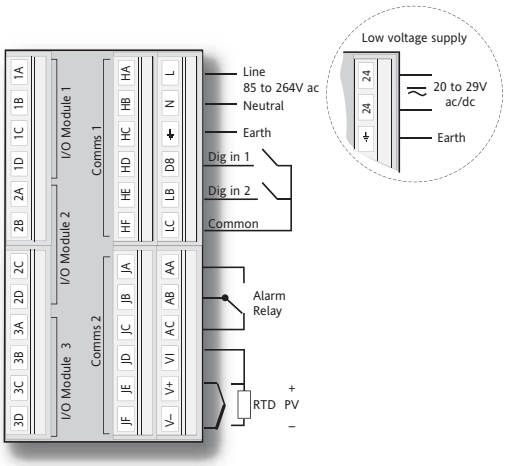
PDSIO master setpoint transmission

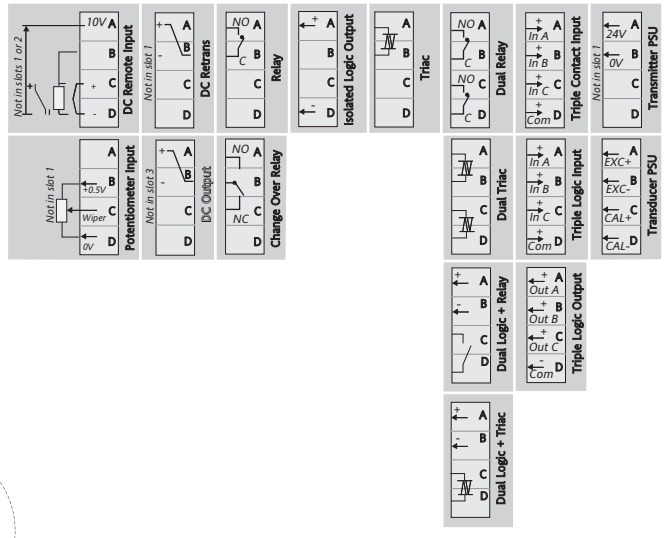
PDSIO can be used to digitally transmit the setpoint profile to a number of slave Series 2000 controllers.
If any slave zone departs from the required setpoint by more than a pre-settable amount, a signal grom any slave can be transmitted back to the master causing the program to freeze until the error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



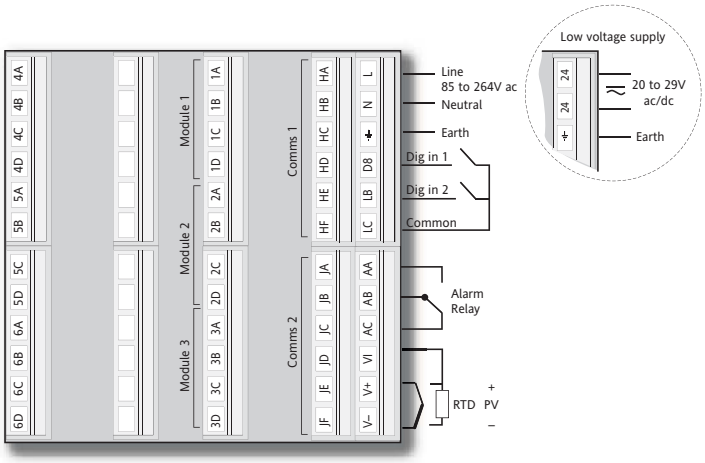
Rear terminal connections

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-pin
- **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-pin
- **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 retran. (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-pin
- **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 retran. (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** EI-Bisynch protocol (note 1)

EIA232
- **A2** Fitted unconfigured
- **AM** Modbus protocol
- **AE** EI-Bisynch protocol (note 1)

4 wire EIA422
- **F2** Fitted unconfigured
- **FM** Modbus protocol
- **FE** EI-Bisynch 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

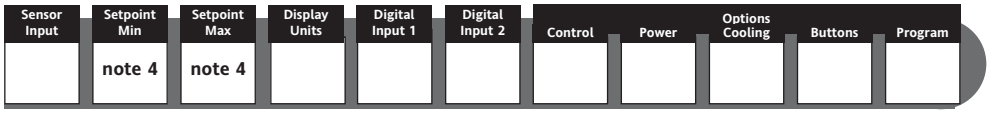
PDS Output
- **M7** Fitted unconfigured
- **PT** PV retrans
- **TS** Setpoint retrans
- **OT** Output retrans

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

	Standard Sensor Inputs	Min	°C	Max
J	J Thermocouple	-210		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
	Factory Downloaded Input	**Min**	**°C**	**Max**
C	C Thermocouple - W5%Re/W26%Re (Hoskins)	0		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 (Englehard) 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
	Process Inputs (Scaled to setpoint min and max)	**Min**	**°C**	**Max**
F	-100 to +100mV linear	-1999		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

Display Units	
C	Celsius
F	Fahrenheit
K	Kelvin
X	Linear input

Digital Input 1 & 2	
XX	Disabled
AM	Manual select
SR	Remote SP select
S2	Second setpoint
EH	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)
M5	CTX (mode 5) Input 2 only

Options	
Control action	
XX	Reverse acting (standard)
DP	Direct acting
Power feedback	
XX	Enabled on logic, relay & triac heating
PD	Feedback disabled
Cooling options	
XX	Linear cooling
CF	Fan cooling
CW	Water cooling
CL	Oil cooling
CO	On/Off cooling
Front panel buttons	
XX	Enabled
MD	Auto/manual disabled
MR	Auto/man & run/hold disabled
RD	Run/hold disabled
Programmer time units	
XX	Dwell & ramp in mins
HD	Dwell time in hours
HR	Ramp rate in units/hrs
HT	Ramp/dwell hours

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

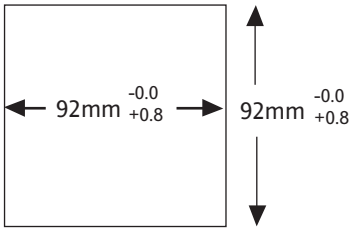
2408 - CC - VH - LH - RC - FL - FH - YM - TS - K - 0 - 1000 - C - AM - S2 - XX - XX - XX - MD - XX

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 to1000°C, Auto/manual select, 2nd setpoint select, Manual button disabled.

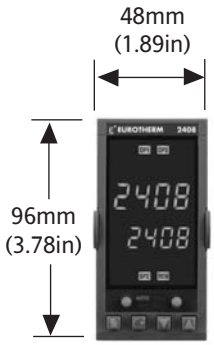
Dimensional details

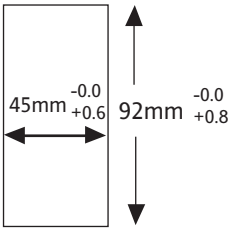
2404

Panel cut-out

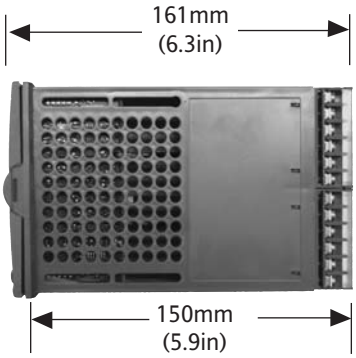


2408





2404/08



Part No. HA026553 Issue 4

2408, 2404 Specification Sheet

Printed on recycled paper in England 01.07