2408f 2404f

MODELS

The First Profibus High Performance Controller

Model 2408*f*
1/8 DIN (48 x 96mm)

Model 2404*f*
1/4 DIN (96 x 96mm)

Profibus-DP, PID Controllers

Ideal for:

- **Plastic extrusion**
- **Wire extrusion**
- **Baking conveyor ovens**
- **Packaging lines**
- **Conveyor furnaces**

Connection to PLCs and PC supervisory packages is made easy with the 2408*f* and 2404*f* Profibus-DP controllers. Available in 1/8 DIN and 1/4DIN panel sizes, they provide independent front-end control of temperature and other process variables without any compromise in performance.

Unlike other products, the design is not a gateway, but uses a direct connection to the microprocessor bus of the controller, thereby ensuring the most efficient possible communications.

A Windows configurator sets up the controller parameters that are mapped into the PLC registers. This allows the ladder logic or control program to read and write to the controller as though it were an internally fitted module.

High stability control with an extensive range of control options are the attributes of the 2408*f* and 2404*f* One-shot and continuously adaptive tuning optimises control performance without the need for specialist knowledge or training.

A modular build accommodates a range of plug-in I/O modules.

Features include:
· Up to four internally stored setpoint programs
· Analogue retransmission
· Remote setpoint
· Two PV inputs for differential, max, min or transfer control
· Cascade, ratio and feedforward control options.

Features:

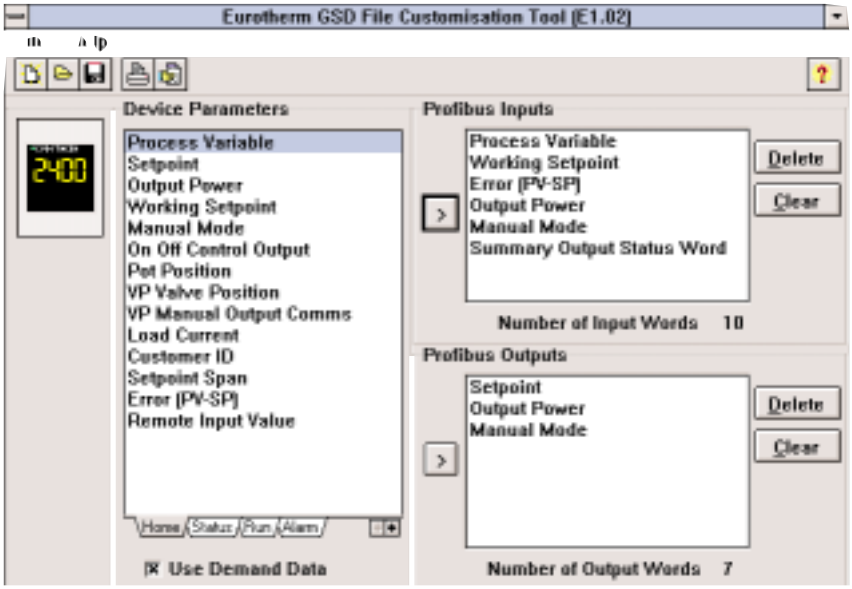
Advanced PID control	Accurate control, independent of PLC scan times
Single loop integrity	Greater fault tolerance. Simple fault finding
Physical distribution	Reduced wiring cost
Local operator display	Operator monitoring and standby control
No PID programming in PLC	Faster, lower cost design, installation and maintenance
PID does not consume PLC processing time	Enhanced system performance
Direct interface to temperature sensors	Less hardware cost. Higher accuracy
Plug-in from front	Rapid replacement - reducing downtime
Three year warranty	Low ownership cost

CE

EUROTHERM CONTROLS

Profibus-DP PID Controllers

Windows configurator



What does it do?

It creates a 'GSD' file which defines the inputs and outputs that the PLC or supervisory package will be able to talk to. The GSD file is imported into a Master Profibus configuration tool which in-turn produces a file that is downloaded into the PLC or supervisory package.

How do I use it?

Click on the tabs at the bottom of the device parameter window to select a parameter page. Then use the mouse to drag a required parameter into either the Profibus input or output lists.

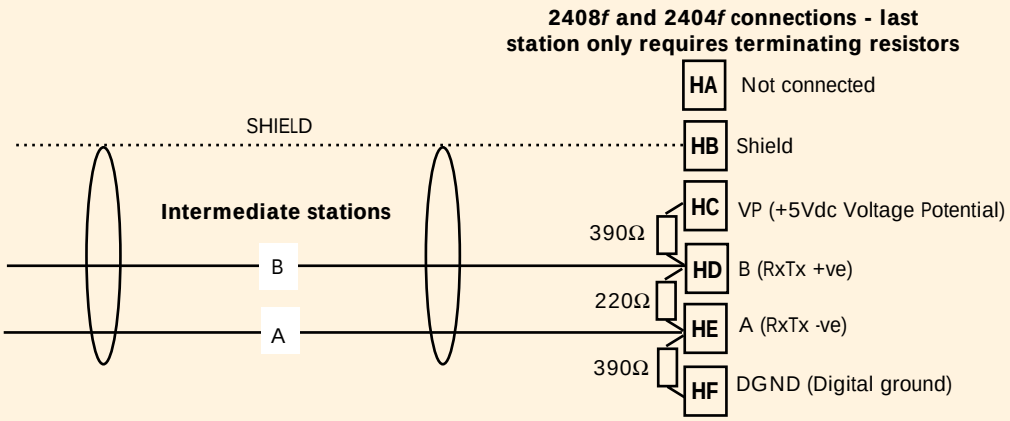
How many parameters can I select?

Up to 117, total of inputs and outputs per controller.

What can I run it on?

Windows 3.1, or Windows 95, or Windows NT.

Wiring

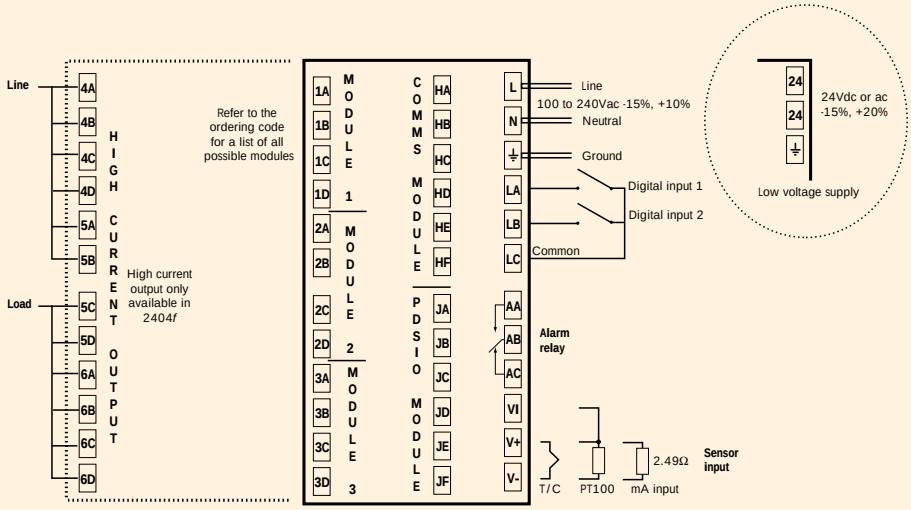


Key technical features

Physical medium:	2-wire, RS485
Network Topology:	Linear bus, with active bus termination on both ends Stub lines permitted if <6.6m in length
Protocol:	Profibus-DP intelligent slave
Baud rate:	Up to 1.5Mb/s
Number of stations:	32 per network segment. Up to 127 with repeaters

Baud rate: Kbits/sec	9.6	19.2	93.75	187.5	500	1500
Distance (m):	1200	1200	1200	1000	400	200

Electrical Connections



Technical Specification

Process value inputs

Low level range	-100 to + 100mV
High level range	0-20mA or 0-10Vdc
Sample rate	9Hz
Resolution	<2µV for low level inputs <0.2mV for high level inputs
Linearity	Better than 0.2°C ±1LSD
Calibration accuracy	±1°C or ±0.2% of reading, whichever is greater
User calibration	Low and high offsets can be applied
Input filtering	OFF to 999.9 seconds
Thermocouple types	Refer to the ordering code sensor input table
Cold Junction compensation	In automatic mode, >30 to 1 rejection of ambient temperature change OR external 0°C, 45°C, 50°C references
3-wire Pt100 input	Bulb current: 0.3mA. Up to 22ohm in each lead without error
Potentiometer input	330 to 15Kohm
Analogue input functions	Process value, remote setpoint, setpoint trim, external power limit, feedforward input, Valve position feedback
Second process value input functions	Select min, select max, derived value, transfer to 2nd PV

Digital inputs (Isolated except for fixed digital inputs 1 & 2)

Contact closure inputs	Open circuit voltage: 24 to 30Vdc Short circuit current: 24 to 29mA Off state: <100ohms input resistance On state: >28Kohm input resistance
Logic inputs (Current sinking)	Off state: -3 to 5Vdc @ <-0.4mA On state: 10.8 to 30Vdc @ 2.5mA
Digital input functions	Refer to the ordering code

Digital outputs

Relay rating	2A, 264Vac resistive
Single logic output*	18Vdc, 20mA (non-isolated)
Triple logic output	12Vac, 8mA per channel (isolated)
Triac	1A, 264Vac resistive (isolated)
High current output	Rating: 10amp, 264Vac resistive (2404f only) (isolated)
Digital output functions	Refer to the ordering code

Analogue outputs

Range	0-20mA, 0-10VDC (isolated)
Resolution	1 part in 10,000 for analogue retrans. 1 part in 7,000 for DC control outputs
Analogue output functions	Refer to the ordering code
Transmitter supply	20mA, 24Vdc

Control functions

Control modes	On/Off, PID or motorised valve control, with or without a feedback potentiometer
Cooling algorithms	Linear, water, fan, oil
Tuning	One-shot and continuous adaptive tuning
Number of PID sets	Two
Auto manual control	Bumpless transfer or forced manual output available
Setpoint rate limit	Display units per sec, per min or per hour

Alarms

Number of alarms	Four
Alarm types	High, low, deviation high, deviation low, deviation band, rate of change.
Alarm modes	Latching or non-latching. Blocking. Energised or de-energised in alarm

Setpoint programming

Number of programs	Up to four
Segments per prog	16
Event outputs	Up to eight

Communications (All modules are isolated)

Profibus	High speed, RS485. Up to 1.5Mb/s
Modbus ®	RS232, 2-wire RS485 and 4-wire RS485 modules

PDSIO

Slave input (isolated)	Remote setpoint with holdback to master
Master output*	Retransmission of setpoint, process value or output

General

Display range	Four digits with up to two decimal places
Supply	100 to 240Vac -15%, +10% 48 to 62Hz, OR 24Vdc or ac -15%, +20%. 10W max.
Operating ambient	0 to 55°C and 5 to 95% RH non-condensing
Storage temperature	-10 to +70°C
Panel sealing	IP54
Dimensions (mm)	2408f: 48W x 96H x 150D 2404f: 96W x 96H x 150D
EMC standards	EN50081-2 & EN50082-2 generic standards for industrial environments
Safety standards	Meets EN61010, installation category II, pollution degree 2
Atmospheres	Not suitable for use above 2000m or in explosive or corrosive atmospheres.

* These inputs or outputs are not isolated from the main process value input.

Ordering Code

2408*f* 2404*f*	1	2	3	4	5	6	7	8	9	10

1 Function

PID Controller	
CC	Controller
CG	1 x 8 seg program
CP	1 x 16 seg program
P4	4 x 16 seg program
On/Off Controller	
NF	Controller
NG	1 x 8 seg program
NP	1 x 16 seg program
N4	4 x 16 seg program
Motorised valve control	
VC	Controller
VG	1 x 8 seg program
VP	1 x 16 seg program
V4	4 x 16 seg program

2 Supply Voltage

VH	85 to 264Vac
VL	20 to 29Vac/dc

3 Module 1

XX	None
Relay: change-over	
R4	Fitted unconfigured
YH	Heating output
RP	Valve raise output
Or select Alarm 1 from table A	
Logic	
L2	Fitted unconfigured
LH	Heating output
M1	PDSIO mode 1
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	0-5Vdc heating
H9	1-5Vdc heating
HZ	0-10Vdc heating
Triple I/O Modules	
TK	Triple contact input
TL	Triple logic input
TP	Triple logic output
Dual relay + relay	
RR	Fitted unconfigured
RD	Heating + cooling
RM	Valve raise and lower
Dual triac + triac	
TT	Fitted unconfigured
TD	Heating + cooling
TM	Valve raise and lower
Dual logic + relay	
LR	Fitted unconfigured
LD	Heating + cooling
Dual logic + triac	
LT	Fitted unconfigured
GD	Heating + cooling

4 Module 2

XX	None
Relay: change-over	
R4	Fitted unconfigured
YC	Cooling output
RL	Valve lower output
PO	Program event 1
PE	Program end output
Or select Alarm 2 from table A	
Dual relay + relay	
RR	Fitted unconfigured
PP	Program events 1 & 2
Logic	
L2	Fitted unconfigured
LC	Cooling output
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	0-5Vdc cooling
C9	1-5Vdc cooling
CZ	0-10Vdc cooling
Triple I/O Modules	
TK	Triple contact input
TL	Triple logic input
TP	Triple logic output
MS	24Vdc transmitter supply
DC	**Retransmission**
Select from table B	
Potentiometer input	
VU	Fitted unconfigured
VS	Valve position feedback
VR	Remote setpoint input

5 Module 3

XX	None
Relay: change-over	
R4	Fitted unconfigured
PO	Program event 4
PE	Program end output
Or select Alarm 3 from table A	
Dual relay + relay	
RR	Fitted unconfigured
PP	Program events 4 & 5
Other modules	
L2	Logic unconfigured
T2	Triac unconfigured
TK	Triple contact input
TL	Triple logic input
TP	Triple logic output
MS	24Vdc transmitter PSU
DC remote input	
D5	Fitted unconfigured
W1	0 to 20mA setpoint*
W2	4 to 20mA setpoint*
W5	0 to 10V setpoint
WP	Second PV input*
Potentiometer input	
VU	Fitted unconfigured
VS	Valve position feedback
VR	Remote setpoint input
DC	**Retransmission**
Select from table B	

6 Alarm Relay

XX	None
RF	Unconfigured
RA	Rate of change
LF	PDSIO load failure
HF	PDSIO heater failure
SF	PDSIO SSR failure
PO	Program event 7
PE	Program end output
Or select Alarm 4 from table A	

7 10A output

XX	None
R6	Fitted unconfigured
RH	PID heating

8 Comms module

XX	Not fitted
Profibus module	
PB	High speed EIA-485
Modbus ® modules	
AM	EIA-232
FM	4-wire, EIA-485
YM	2-wire EIA-485

Table A: Alarm relay functions

FH	High alarm
FL	Low alarm
DB	Deviation band
DL	Low dev. alarm
DH	High dev. alarm

9 PDSIO module

XX	None
PDSIO input	
M6	Fitted unconfigured
RS	Setpoint input
PDSIO output	
M7	Fitted unconfigured
PT	PV retransmission
TS	Setpoint retrans
OT	Output retrans

10 Manual

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

Table B: DC retransmission

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

Configuration

11	12	13	14	15	1	17	18	19	20	21

11 Sensor Input / 12 13 Setpoint Min/Max

		°C			°F	
Thermocouples						
J	Type J	-210	to	1200	340	to 2192
K	Type K	-200	to	1372	-325	to 2500
T	Type T	-200	to	400	-325	to 750
L	Type L	-200	to	900	-325	to 1650
N	Type N	-250	to	1300	-418	to 2370
R	Type R	-50	to	1768	-58	to 3200
S	Type S	-50	to	1768	-58	to 3200
B	Type B	-0	to	1820	32	to 3308
P	Platinell II	0	to	1369	32	to 2496
Resistance thermometer						
Z	Pt100	-200	to	850	-325	to 1562
Factory downloaded inputs						
C	Type C - W5%Re/W26%Re	0	to	2319	32	to 4200
D	Type D - W3%Re/W25%Re	0	to	2399	32	to 4350
E	E Thermocouple	-200	to	999	-325	to 1830
1	Ni/Ni18%Mo	0	to	1399	32	to 2550
2	Pt20%Rh/Pt40%Rh	0	to	1870	32	to 3398
3	W/W26%Re (Englehard)	0	to	2000	32	to 3632
4	W/W26%Re (Hoskins)	0	to	2010	32	to 3650
5	W5%Re/W26%Re (Englehard)	10	to	2300	50	to 4172
6	W5%Re/W26%Re (Bucose)	0	to	2000	32	to 3632
7	Pt10%Rh/Pt40%Rh	200	to	1800	32	to 3632
8	Exegen K80 I.R. pyrometer	-45	to	650		
Process inputs (linear) Note: will be scaled to setpoint min and max						
F	-100 to +100mV	Scaleable -1999 to 9999				
Y	0 to 20mA*	Scaleable -1999 to 9999				
A	4 to 20mA*	Scaleable -1999 to 9999				
W	0 to 5Vdc	Scaleable -1999 to 9999				
G	1 to 5Vdc	Scaleable -1999 to 9999				
V	0 to 10Vdc	Scaleable -1999 to 9999				

14 Units

C	°C
F	°F
K	Kelvin
X	Linear input

15 16 Logic inputs 1 & 2

XX	Disabled	FA	Select full access level
AM	Manual select	RB	Simulates pressing
SR	Remote setpoint select	LB	Simulates pressing
S2	Second setpoint select	SB	Simulates pressing
EH	Integral hold	PB	Simulates pressing
AC	Alarm acknowledge	B1	Least sig. BCD digit
RP	Setpoint rate limit enable	B2	2nd BCD digit
RN	Run program	B3	3rd BCD digit
HO	Hold program	B4	4th BCD digit
RE	Reset program	B5	5th BCD digit
RH	Run/hold program	B6	Most sig. BCD digit
NT	Run/Reset program	SY	Standby - ALL ops OFF
TN	Reset/Run program	SC	Program synch.
HB	Prog. holdback enable	SG	Skip seg. without changing setpoint
KL	Keylock	PV	Select PV2
P2	PID2 select	AG	Advance to end of seg. & step to target SP
ST	One-shot tune enable	M5	CTX mode 5 (Input 2 only)
AT	Adaptive tune enable		

17 Control Options

XX	None
DP	Direct acting PID control

18 Heating Options

XX	None
PD	Power feedback disabled

19 Cooling Options

XX	None
CF	fan cooling
CW	Water cooling
CL	Oil cooling
CO	On/off cooling

20 Panel buttons

XX	None
MD	Auto/man button disabled
RD	Run/hold button disabled
MR	Auto/manual & run/hold disable

21 Program Options

XX	None
HD	Dwell time in hrs
HR	Ramp rate in units/hour (mins is standard)

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

Windows® configuration software

PROF - ENG	English
- FRA	French
- GER	German
- ITA	Italian
- NED	Dutch
- SPA	Spain
- SWE	Swedish

Profibus communications manual

Part no. HA026290/ENG

EUROTHERM CONTROLS LIMITED
UK SALES OFFICE
Eurotherm Controls Limited
Faraday Close, Durrington
Worthing, West Sussex BN13 3PL
Telephone Sales: (01903) 695888
Technical: (01903) 695777
Service: (01903) 695444
Fax (01903) 695666

http://www.eurotherm.co.uk
Sales and support in over 30 countries worldwide
Eurotherm Controls Limited
Export Dept.,
Faraday Close, Durrington, Worthing
West Sussex, BN13 3PL
Telephone (01903) 268500
Fax (01903) 265982
Telex 87114 EUROWG G