

EUROTHERM® FLEXIBLE SOLUTIONS

2000

SERIES CONTROLLERS...



'Best in class' Industrial Control

Ultimate performance

Built on our experience of design and applications knowledge spanning more than 40 years, the Eurotherm® 2000 series brings you performance you can rely on and accuracy you can trust.

At the same time no other range of controllers makes operation so easy. Menu driven operation provides easy intuitive and constant access to all the controller functions.

2100 Range

Internal timer

- a 5 mode timer suitable for simple time based profiling applications

Universal input

- 9 different thermocouples, PT100, DC linear and a downloadable custom curve

Three internal alarms

- configurable as High, Low, Deviation and Deviation High or Low alarms

Two outputs

- 1 relay and 1 logic (can be used as a relay with an external module)

2116



2132



Suitable for

small ovens
chillers
sterilisers
trace heating
heat sealing

2200 Range

Four outputs

- up to 4 outputs including 2 modular with many options including DC outputs

Communication protocols

- Modbus RTU, EI-Bisynch, DeviceNet®

Dwell timer

- simple ramp dwell profile applications

Four internal alarms

- configurable as High, Low, Deviation, Deviation High, Deviation Low, High and Low current alarms

2216e



2204e



2208e



Suitable for

cold stores
ovens and furnaces
plastic extrusion
packaging machines
food and brewing applications

Customisable to your control requirements

Every 2000 Series controller can be tailored to provide the control solution you need. Modular design and easy, on-site configuration matches application requirements and gives you a temperature and process control solution that's ready to run the first time you switch it on.

The 2000 Series provides control strategies ranging from simple ON/OFF to PID with advanced overshoot protection, providing

the best control for the widest range of applications including valve positioning.

Within the 2000 Series there is also the 2500 Modular Controller and the 2604/2704 Controllers which, with their enhanced functionality and multiloop capability, offer a powerful addition to the range. Please consult Eurotherm sales for more information on these products.

2400 Range

2416



Modular

- up to 4 outputs of which 3 are modular with many different options within the different modules

Modules

- up to 16 different types of module are available

Communication protocols

- Modbus RTU, EI-Bisynch, DeviceNet, Profibus DP

Programming

- up to 20, 16 segment programs (4 in the 2416) are available with 8 digital event outputs

Four internal alarms

- configurable as High, Low, Deviation, Deviation High or Low, high and Low Current alarms high and low output, high and low input 2, High and low setpoint and one Rate of change alarm

2408



Suitable for

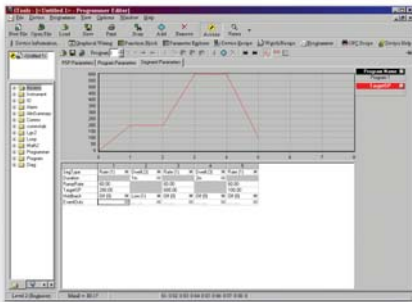
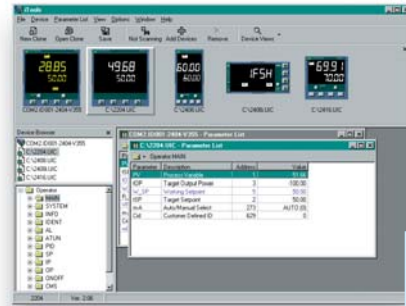
single and multi-zone furnaces
kilns
environmental chambers
simple ratio
humidity
chemical and pharmaceutical applications
glass furnaces and lehrs

2404



Reduced installation and commissioning time

iTools configuration software enables you to store and clone controller configurations, as well as commission your process control system. This facility significantly reduces installation and commissioning time while improving the security of the process. Eurotherm's advanced customer sensor linearisation tool also provides for the download of special sensor response characteristics to the controller.

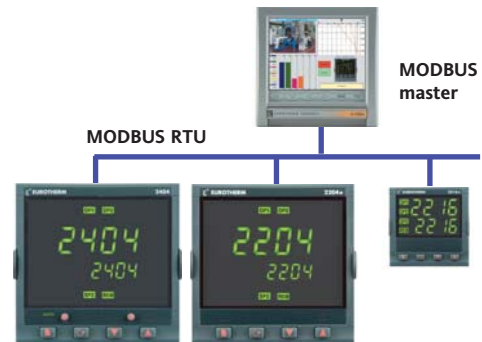


Easy setpoint programming

From a simple ramp and dwell to a 16 segment program with event outputs, the 2000 Series provides a powerful platform for setpoint profiling. Programs can be edited from the instrument HMI and for the 2400 instruments, using iTools Setpoint Program Editor.

Communications

The 2000 Series uses industry standard protocols such as Modbus RTU, DeviceNet or Profibus DP to communicate with supervisory systems and PLCs over EIA232, EIA485 (2 wire) or EIA422(4 wire). This carries the information and overall control into the supervisory system while maintaining local access to the local equipment ensuring overall plant integrity in all situations.



Secure and user friendly operation

The 2000 Series has password protected levels of access - customisable to provide access to only the parameters the operator requires to ensure secure operation.

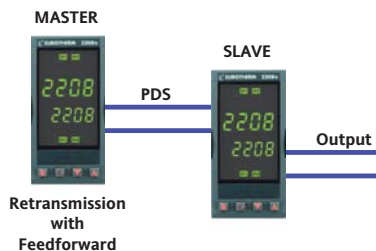
With each parameter selectable as hidden, read only, or read/write, this provides the ultimate in customisable interfaces for extremely user friendly operation.

Real-world applications

From fixed build to modular construction, Eurotherm's flexible 2000 Series offers a truly versatile solution to all your requirements.

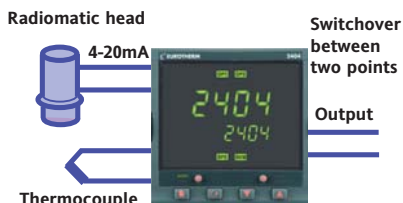


CASCADE CONTROL



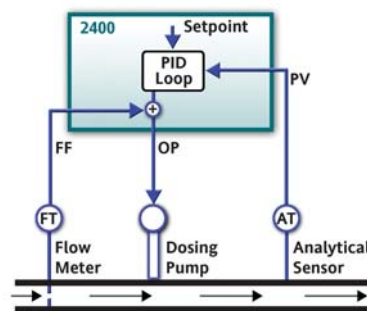
Using Eurotherm's setpoint retransmission over PDS communications it is possible to use two 2400 controllers as a cascade control system with the output of the first (or master controller) forming the setpoint of the second (or slave controller). Eurotherm's advanced algorithms enable the use of either setpoint or PV feedforward to limit the slave setpoint - for example $\pm 10\%$ of the master setpoint or PV.

DERIVED INPUTS



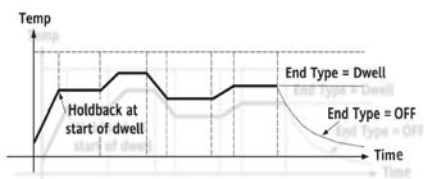
Sometimes it is desirable to control depending on two inputs, with either the highest, lowest, a function of the two, or switching between the two at some point, resulting in the PV for the control loop. For example, an application could consist of a thermocouple for up to 800°C and a Radiomatic head for 700°C to 1400°C. Typically when below 740°C the thermocouple provides the PV. When between 740°C and 780°C the controller switches gently from the thermocouple to the Radiomatic head. Then above 780°C the Radiomatic head provides the PV.

FEEDFORWARD



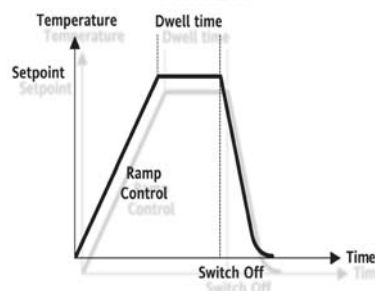
Feedforward is a control technique used to compensate for future disturbances or process changes. It provides an offset on the controller PID calculation to ensure that corrective action is taken to prevent the measured PV being disturbed. A typical application is additive dosing. By measuring the flow rate upstream from the dosing pump it is possible to use the feedforward feature of the 2400 to achieve an output proportional to the fluid flow rate. This means that the dosing rate immediately tracks any changes in flow rate and so prevents any possibility of dangerous over dosing.

PROGRAMMER



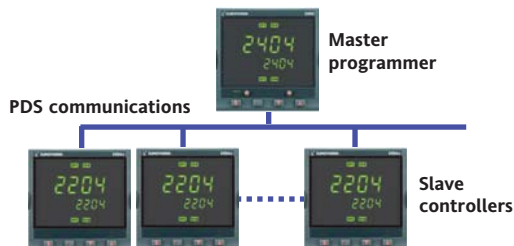
Many applications need to vary temperature, or other process values, with time. The setpoint is varied by using a setpoint program. The program is stored as a series of segments which can be ramps, dwells etc. All 2400 controllers have an 8 segment program as standard. They have optionally up to 20 off 16 segment programs each with 8 digital events. The 2400 is ideal for furnace, environmental chamber and autoclave applications that require greater flexibility.

5 MODE TIMER






The 5 mode timer in the 2100 may be used to control batch operations, e.g. food, ovens, sterilisers, fryers. An ideal application would be single dwell at the end of either a controlled ramp rate or natural approach to setpoint without the need for an additional timing device.

PDS SETPOINT RETRANSMISSION




In 2000 Series controllers it is possible to use the PDS communication link to send a setpoint from one controller to a network of slave devices - providing the economical creation of multi-zone temperature control solutions.

Selection guide

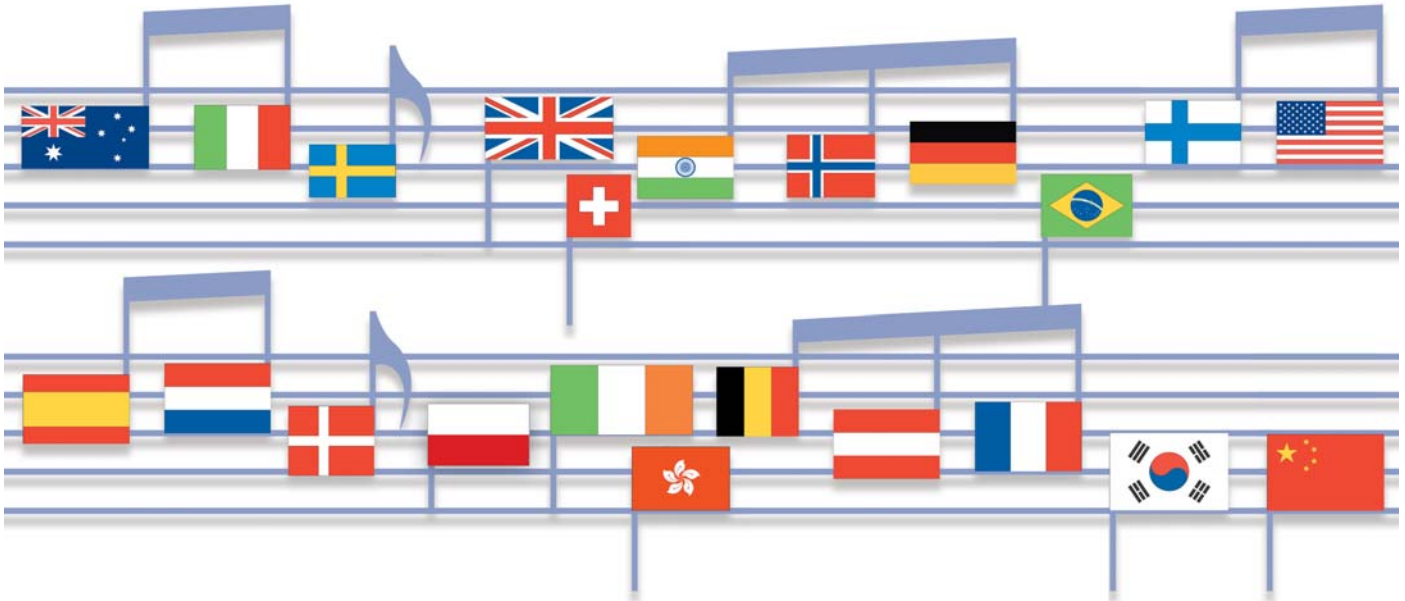
	2100		
	 2132	 2116	 2216e
Panel Sizes	1/32 (24mm x 48mm)	1/16 (48mm x 48mm)	1/16 (48mm x 48mm)
IP Rating	IP65	IP65	IP65
Display Type	4 Digit LED	4 Digit LED	Dual 4 Digit LED
Supply Voltage	85 - 264Vac, 24Vac/dc	85 - 264Vac, 24Vac/dc	85 - 264Vac
Input Types	TC, RTD, mV, mA, V	TC, RTD, mV, mA, V	TC, RTD, mV, mA, V
PV Accuracy	0.25% of reading \pm 1LSD	0.25% of reading \pm 1LSD	0.25% of reading \pm 1LSD
Control Types	On/Off, PID	On/Off, PID	On/Off, PID, VP
Output Types	Logic, relay	Logic, relay	Logic, relay, triac, DC
No of Alarms	3	3	4
Alarm Types	Hi, Lo, Dev, DevHi, DevLo	Hi, Lo, Dev, DevHi, DevLo	Hi, Lo, Dev, DevHi, DevLo, Hi Current, Lo Current
Setpoint Programmer	Timer mode 1	Timer mode 1	Setpoint ramp +dwell
Max Analogue IO	Input	1	1
	Output	0	0
Max Digital IO	Input	1	1
	Output	2	2
Heater Failure Detection	Yes	Yes	Yes
Load Current Monitor			Yes
iTools Configurable	Yes*	Yes*	Yes
Downloadable Custom Input	Yes*	Yes*	Yes
Slave Communications			Yes
Timer	Yes	Yes	Dwell
Profibus DP			
DeviceNet			Yes
EI-Bisynch (for legacy installation)			Yes
PDS Retransmission			Yes

* Requires 2000 Series Configuration Station

2200e		2400		
				
2208e	2204e	2416	2408	2404
1/8 (48mm x 96mm)	1/4 (96mm x 96mm)	1/16 (48mm x 48mm)	1/8 (48mm x 96mm)	1/4 (96mm x 96mm)
IP65	IP65	IP65	IP65	IP65
Dual 4 Digit LED	Dual 4 Digit LED	Dual 4 Digit LED	Dual 4 Digit LED	Dual 4 Digit LED
85 - 264Vac, 24Vac/dc	85 - 264Vac, 24Vac/dc	85 - 264Vac, 24Vac/dc	85 - 264Vac, 24Vac/dc	85 - 264Vac, 24Vac/dc
TC, RTD, mV, mA, V	TC, RTD, mV, mA, V	TC, RTD, mV, mA, V	TC, RTD, mV, mA, V	TC, RTD, mV, mA, V
0.25% of reading ±1LSD	0.25% of reading ±1LSD	0.2% of reading ±1LSD	0.2% of reading ±1LSD	0.2% of reading ±1LSD
On/Off, PID, VP	On/Off, PID, VP	On/Off, PID VP, VPB	On/Off, PID VP, VPB	On/Off, PID VP, VPB
Logic, relay, triac, DC	Logic, relay, triac, DC	Logic, relay, triac, DC	Logic, relay, triac, DC	Logic, relay, triac, DC
4	4	4	4	4
Hi, Lo, Dev, DevHi, DevLo, Hi Current, Lo Current	Hi, Lo, Dev, DevHi, DevLo, Hi Current, Lo Current	Hi, Lo, Dev, DevHi, DevLo, Hi Current, Lo Current, Hi IP2, Lo IP 2, Hi OP, Lo OP, Hi SP, Lo SP, Rate of change,	Hi, Lo, Dev, DevHi, DevLo, Hi Current, Lo Current, Hi IP2, Lo IP 2, Hi OP, Lo OP, Hi SP, Lo SP, Rate of change, CT open or short circuit	Hi, Lo, Dev, DevHi, DevLo, Hi Current, Lo Current, Hi IP2, Lo IP 2, Hi OP, Lo OP, Hi SP, Lo SP, Rate of change, CT open or short circuit
Setpoint ramp +dwell	Setpoint ramp +dwell	1x8 seg, 1x16seg, 4x16seg	1x8 seg, 1x16seg, 4x16seg, 20x16seg (not 2408f)	1x8 seg, 1x16seg, 4x16seg, 20x16seg (not 2404f)
1	1	1	2	2
1	1	3	3	3
3	3	0	11	11
4	4	3	10	10
Yes	Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes	Yes
Dwell	Dwell		Yes	Yes
Yes	Yes		Yes	Yes
Yes	Yes		Yes	Yes
Yes	Yes		Yes	Yes

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