2408 2404

MODELS

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

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

Furnace & Kiln atmosphere controllers

The 2408 and 2404 Atmosphere Controllers provide accurate display and control of the carbon level in steel hardening furnaces or ceramic glazing kilns.

They connect directly to a zirconia probe which measures the % oxygen in the furnace. The carbon level is calculated from the oxygen reading and temperature of the probe. An optional third analogue input can continuously measure the CO or H content to correct the carbon reading or dewpoint calculation.

The controllers are compatible with probes from the following manufacturers:

- Drayton
- Accucarb
- AACC
- SSI
- Macdui
- Bosch Lambda

In addition to carbon level the controllers can be configured to measure and control either:

- The % oxygen or log oxygen
- Dewpoint in °C or °F
- The probe millivolt

Advanced control algorithms ensure accurate, stable control.

A range of Plug-in Modules are used to provide control, retransmission and alarm outputs. The control outputs can be mA or volts; time proportioning relay, logic or triac; or raise/lower outputs to a motorised valve.

A probe clean output is available to force compressed air through the probe at regular intervals to blow off soot deposits.

A sooting alarm will warn if carbon deposits build up to a level that can cause false readings.

Probe health is monitored by measuring the time it takes the probe reading to recover from a self-clean operation.

High speed Modbus® or Profibus communications, allow supervision by a computer or easy integration into Programmable Control Systems. (PLC's)

Ideal for:

- **Carburising furnaces**
- **Ceramic glazing kilns**

Features:

- **Direct connection to most types of Zirconia probe**
- **Control of Carbon potential, % Oxygen or Dewpoint**
- **CO or Hydrogen compensation input**
- **PID control**
- **Valve positioning control**
- **Sooting and probe health alarms**
- **Probe clean output**
- **Retransmission output**
- **Profibus-DP or Modbus communications**
- **Two point calibration of probe EMF, probe temp and calculated PV**

EUROTHERM CONTROLS

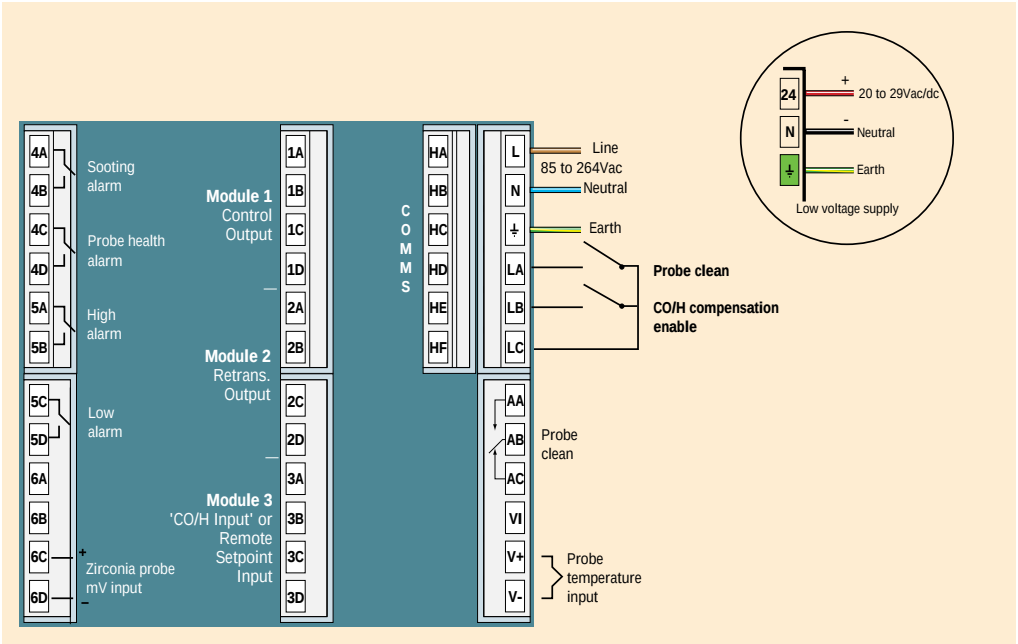
Product data

Connections

Three versions of the controller are available:

Version ES0278

Version ES0278 offers PID or Motorised Valve control, five standard relay outputs, optional Modbus or Profibus communications and an optional CO input for continuous correction of the carbon potential calculation. This unit is only available in a 1/4DIN panel size.

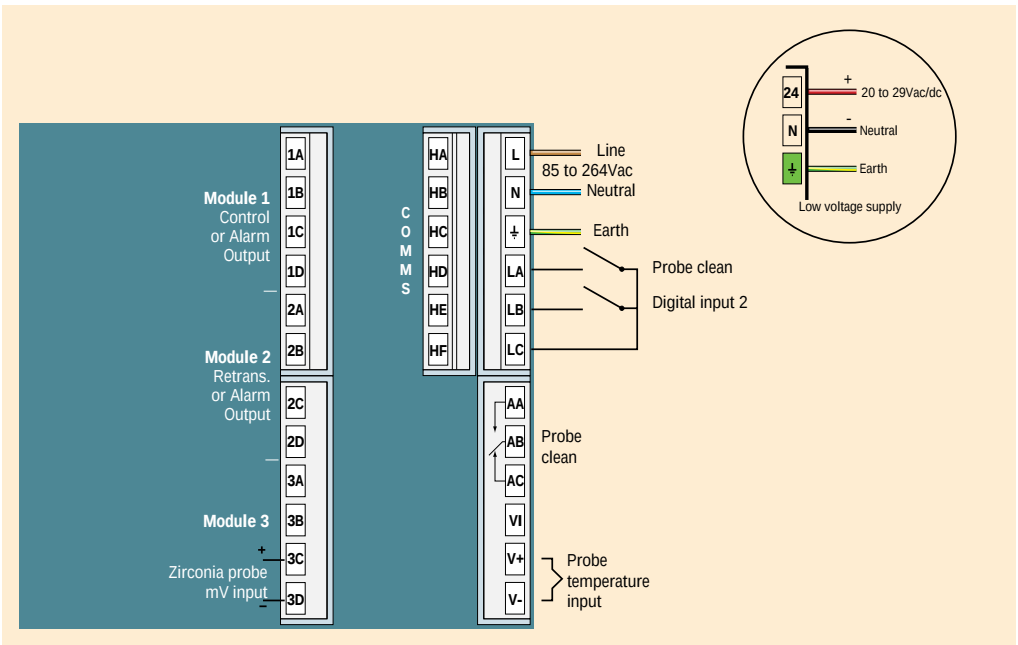


Note: All inputs and outputs are provided as standard except Modules 1, 2, 3 and the comms module which must be specified in the ordering code.

Version ES0209 and ES0288

Version ES0209 offers PID control*, two module slots and optional Modbus or Bisynch communications. This unit is available in either an 1/8 or 1/4DIN panel size. (* For Motorised Valve control select model ES0278).

Version ES0288 has the same features as ES0209 with the option of Profibus communications instead of Bisynch.



Note: Modules 1, 2 and the comms module are optional and must be specified in the ordering code.

Ordering code

Model Number	Function	Supply Voltage	Module 1	Module 2	Module 3	Alarm Relay	10amp Output	Comms 1	Comms 2	Manual	Version
						RF	XX		XX		

Model Number

2408	1/8DIN version ES0209
2404	1/4DIN version ES0209
Profibus units	
2404f	1/4DIN version ES0278
2408f	1/8DIN version ES0288
2404f	1/4DIN version ES0288

Function

ES0278 options*	
CC	PID Controller
NF	On/Off Controller
VC	Valve Positioner
ES0209 and ES0288 options*	
CC	PID Controller
NF	On/Off Controller
P4	PID controller with 4x16 segment program
N4	On/Off Controller with 4x16 segment program

* Must be consistent with selection in 'Version' field.

Supply Voltage

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

Module 1

XX	Not fitted
Relay, Logic or triac control modules	
RH	Relay enrich output
LH	Logic enrich output
TH	Triac enrich output
Change over relay module	
YH	Enrich output
FH	Full scale high alarm
FL	Full scale low alarm
DB	Deviation band alarm
DL	Deviation low alarm
DH	Deviation high alarm
DC Control module	
H1	0-20mA
H2	4-20mA
H3	0-5V
H4	1-5V
H5	0-10V
Dual relay module	
RD	Enrich + dilute outputs
RM	Valve raise and lower outputs
Dual triac module	
TD	Enrich + dilute outputs
TM	Valve raise and lower outputs

Module 2

XX	Not fitted
Relay, Logic or triac control modules	
RC	Relay dilute output
LC	Logic dilute output
TC	Triac dilute output
Change over relay module	
YC	Dilute output
FH	Full scale high alarm
FL	Full scale low alarm
DB	Deviation band alarm
DL	Deviation low alarm
DH	Deviation high alarm
PO	Program event 1
PE	Program end output
DC Retrans module	
First character	
V-	PV retransmission
S-	Setpoint retrans.
Z-	Error retransmission
Second character	
-1	0-20mA
-2	4-20mA
-3	0-5V
-4	1-5V
-5	0-10V
Position feedback module	
VS	Potentiometer valve position feedback

Module 3

Version ES0278	
XX	Module not fitted
D5	CO input
W2	4-20mA remote setpoint input
W5	0-10Vdc remote setpoint input
Version ES0209 & ES0288	
D5	Probe mV input

Comms

XX	Not fitted
Modbus protocol	
AM	RS232
FM	RS485/422 4-wire
YM	RS485 2-wire
Profibus comms (ver ES0278 & ES0288)	
PB	RS485
Bisynch protocol (version ES0209 only)	
AE	RS232
FE	RS485/422 4-wire
YE	RS485 2-wire

Manual

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

Version

ES0278	1/4DIN unit with extended I/O and profibus comms
ES0209 and ES0288	1/8 or 1/4DIN unit with two module slots

Technical Specification

Process value display

No. of digits	Four with up to 2 decimal places
Process value	Configurable as Carbon potential, % oxygen, Log oxygen, Dewpoint in °C or °F, or Probe mV
Sample rate	9Hz
PV filtering	0-99.9 seconds
User calibration	Zero offset and gain adjustment can be applied

Analogue inputs

Zirconia probe input	-200 to +1800mV, >100MΩ input impedance
Probe types	Drayton, Accucarb, AACC, SSI, Macdui and Bosch
Probe temp. input	Thermocouple types J, K, T, L, N, R, S, B and Platinel II Automatic CJC compensation or external 0°C or 50°C reference CJC rejection ratio: typically >30 to 1 rejection of ambient temperature change
CO/H input	Configurable between 0-20mA and 0-10Vdc

Digital output ratings

Relay	2A, 264Vac resistive. Minimum operating current and volts: 100mA, 12Vdc
Triac	1A, 264Vac resistive
SSR (Logic) drive	20mA @ 18Vdc

Analogue outputs

Range	Isolated, 0-20mA (into 600Ω max) or 0-10Vdc
Resolution	1 part in 7,000 for both control and retransmission outputs

Digital inputs

Rating	Contact closure or open collector input. Switching current and voltage 10mA, 24Vdc
Input functions	Probe clean initiate. Auto/manual select. Setpoint rate limit enable. External gas correction enable.

Control

Version ES0209 and ES0288	On/Off or PID or PI or PD control
Version ES0278	On/Off or PID or PI or PD or motorised valve control.(Available with or without potentiometer position feedback)
Auto/manual	Bumpless transfer or forced output
Tuning	One-shot and adaptive tuning available
Gain scheduling	Two sets of PID values can be selected on PV

Alarms

Max. number	Four
Alarm types	Software configurable: Full scale high and low. Deviation high, low and band One rate of change alarm Sooting and Probe health alarms
Alarm modes	Software configurable: Latching, non-latching, blocking Energised or de-energised in alarm

Communications

Profibus-DP	RS485 2-wire, (version ES0278 and ES0288)
Modbus	RS232, RS422/485 4-wire, RS485 2-wire
EI Bisynch	RS232, RS422/485 4-wire, RS485 2-wire, (version ES0209 only)
Baud rates	Modbus or Bisynch 1200, 2400, 4800, 9600, 19,200 Profibus, up to 1.5Mbits/second

General

Supply	85-264Vac, 48-62Hz or 20-29Vac/dc
Power	15watts max
Panel sealing	IP54
Temperature	Operating 0-55°C, storage -10 to +70°C
Humidity	Operating and storage 5-95% non-condensing
Dimensions	1/8DIN controller 48W x 96H x 152D mm 1/4DIN controller 96W x 96H x 152D mm
Weight	600g max.
Safety standard	Meets EN61010, installation category 2.
EMC standards	Meets generic emissions standard EN50081-2 and immunity standard EN50082-2 for industrial environments
Atmosphere	This product is not suitable for use above 2000m and in corrosive or explosive atmospheres

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