



ICOMB SERIES

COMBUSTION CONTROL

- ZIRCONIUM OXIDE PROBE ZO₂-3I/E
- COMBUSTION MONITOR OXM
- OXYGEN "TRIM" CONTROLLER OXR
- COMPLETE SYSTEMS

Combustion and monitoring systems with zirconium oxide probes, for residual oxygen measurement in the flue gas of power plants.

- Energy savings;
- Norm compliance;
- Safety;
- Pollution reduction;
- Increase Boilers lifetime;
- Quick installation;
- Low maintenance.

APPLICATION FIELDS

- MUNICIPAL POWER PLANTS
- INDUSTRIAL POWER PLANTS
- COGENERATION
- BIOMASS POWER PLANTS
- DISTRICT HEATING PLANTS

ENERGY SAVING

Starting from combustion theory...

In figure 1, it is possible to identify the optimal combustion zone where the high efficiency matches the minimum pollution values thanks to the correct air/fuel ratio.

Modifying the boiler load, the air/fuel ratio is changed dynamically as shown in fig.2

Through continuous oxygen content monitoring in the flue gas and boiler load, it is possible to keep the burner in the optimal combustion zone to ensure better performance and lower pollution levels.

Fig. 1 - Characteristics combustion curves

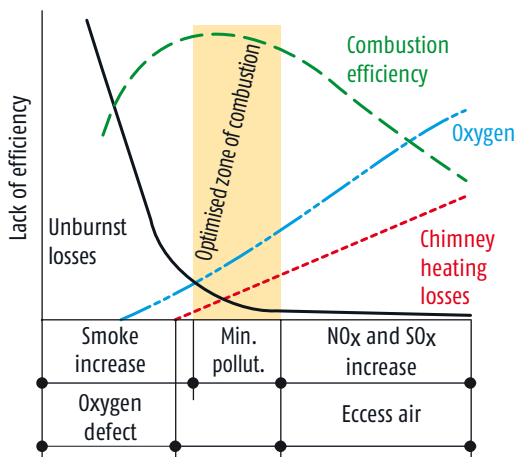
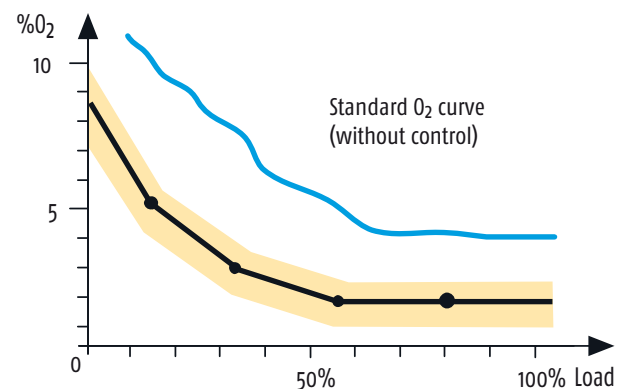


Fig. 2 - %O₂ correction curve as function of boiler load



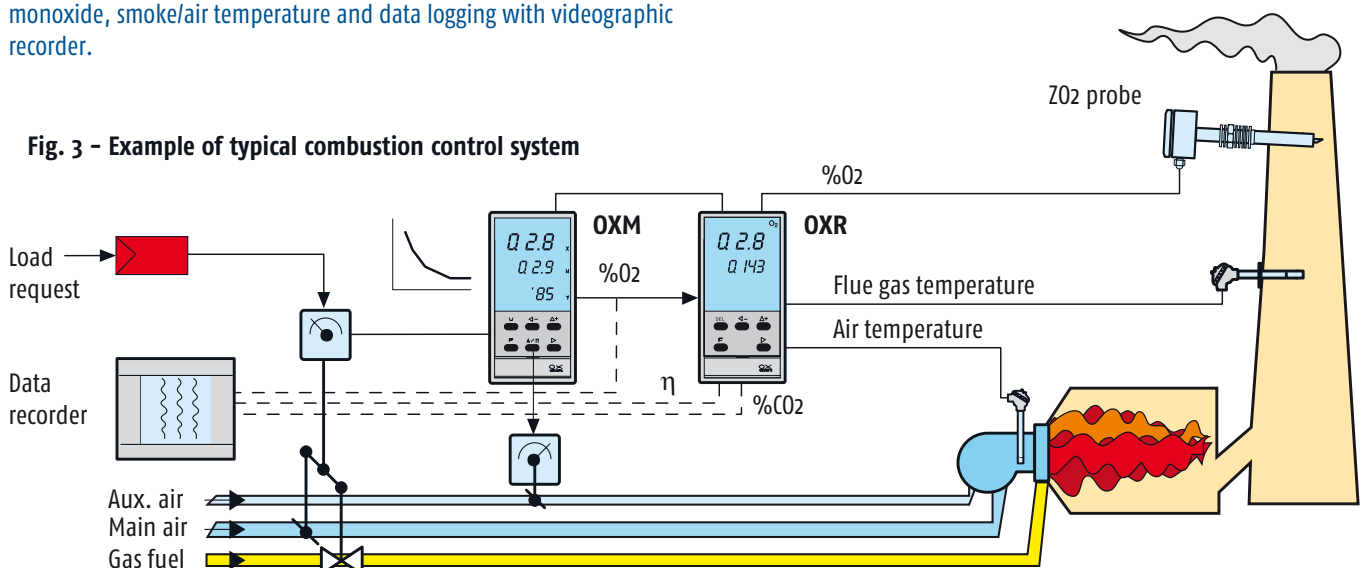
... to systems

The ICOMB systems check minute by minute the combustion process with simple solutions that require minimal maintenance, and provide a rapid return on investment.

Available solutions ensure versatility including measures of carbon monoxide, smoke/air temperature and data logging with videographic recorder.

Ascon TecnoLogic has a qualified staff for commissioning, after-sales and maintenance service.

Fig. 3 - Example of typical combustion control system



LAWS AND REGULATIONS

Various pollution control standards have been developed over the years.

The environmental conservation directives regulate the flue gas emissions that municipal and industrial plants generate into the atmosphere.

The flue gas oxygen content has always been an important reference parameter.

This is the main measurement of ICOMB systems for combustion monitoring and control. In addition, the systems may measure and record other combustion parameters such as carbon monoxide and flue gases temperature.

Therefore, the ICOMB systems are a useful tool to help your plant compliant with environmental regulations.



COMPONENTS

Oxygen measurement

- Z02-3I-300/500** In-situ zirconium oxide probe with integrated electronics;
Z02-3E-300/500 In-situ zirconium oxide probe with external electronics;
Z02-3E-C100 Extractive zirconium oxide probe with external electronics.

Monitoring and Control

- OXM** Oxygen monitor for efficiency, air excess and CO₂%;
OXR Oxygen "Trim" controller for flue gas oxygen content according to the load changes.

Measurement of air/flue gases temperature

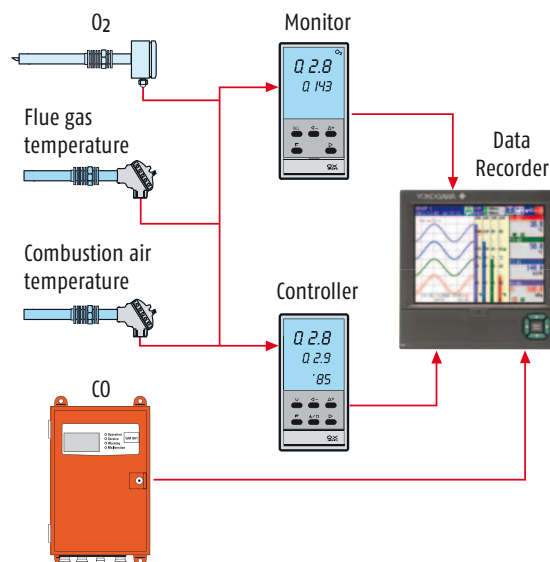
- RF1** PT100 Probe for measuring the flue gas temperature;
RF1 PT100 Probe for measuring the combustion air temperature.

Carbon monoxide measurement

- ZCO** Infrared NDIR analyzer for in-situ carbon monoxide measurement.

Data recording

- RX** Multi-channel paperless recorder.



INTEGRATED SYSTEMS

Ascon TecnoLogic offers a wide range of complete solutions for single or multiple boilers.

Our systems are the right answer for those who are looking for a pre-assembled plant which is able to ensure an easy installation and a simplified management.

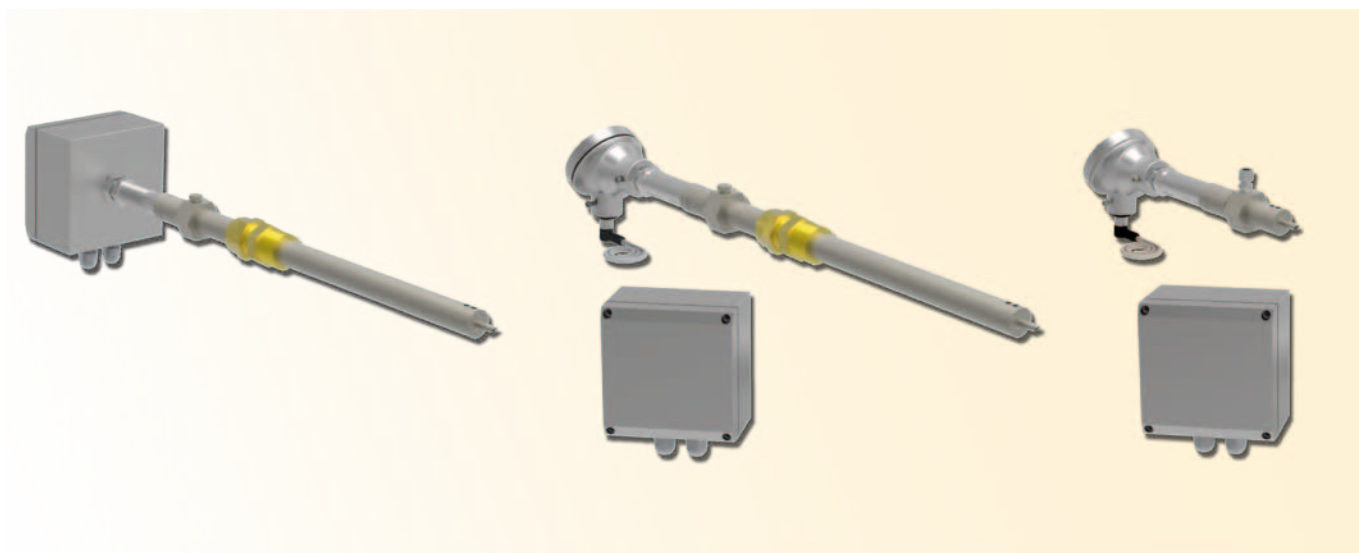
Each system consists of some probes to be installed in the field and a panel which integrates several functions like display and recording data.

ADVANTAGES

- Single ordering code;
- Simple installation;
- Quick start up;
- Efficient after-sales assistance;
- Planned maintenance.



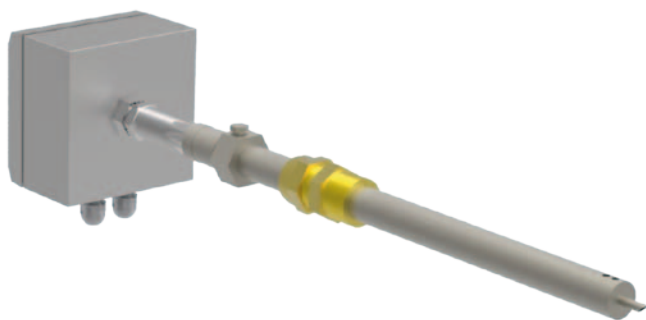
ZO₂ PROBES



TECHNICAL DATA

Measurement type	Direct and continuous oxygen content measurement in wet flue gas	
Sensor		Heated zirconium oxide ZrO ₂
Flue gases temperature	Up to 600°C	
Probe material	AISI 316	Stainless Steel AISI 316
Process connection	1" NPT	With 1" NPT sliding nipple
Head protection degree	IP66	
Ambient temperature	-20... +55°C	
Weight	2... 3 kg	
Power supply	24VDC ±5%	
Current consumption	1.2 A max.	
Output	4... 20mA	Active or passive output, non isolated. Adjustable with jumpers
Measuring range O ₂ %	0.3... 25%	
Accuracy	±1% FS	In the range 1.4... 20.9 % O ₂
Output range 4... 20mA	0... 20.9% 0... 25%	Adjustable with keys
Response time	<5 seconds	
Heating Up time	15 minutes	Standard heating time
Calibration	20.9%	Trimmer calibration in ambient air
Calibration Interval	12 months	
Error indicator	Relay SPDT, NC+NO	Red LED lit (on the electronic board) and relay intervention when: <ul style="list-style-type: none"> • Oxygen % <0.3% • Probe disconnected • Probe failure • Heater failure • Power supply failure
Sensor heating up time	<15s	Automatic temperature control
Pluggable screw connectors		Power supply 0... 24V Output 4... 20mA Failure contacts Probe cabling (5 wires)
Operator interface		2 LEDs (green and red) + 3 buttons
Remote probe connection for models: ZO ₂ -3E, ZO ₂ -3E-C100		With supplied cable (3 mt.)

Z02-3I PROBE



In-situ zirconium oxide probe for direct and continuous measurement of residual oxygen percentage in the flue gas. Equipped with integrated electronic card, it directly generates a linear 4... 20 mA output with active or passive output selectable by jumpers.

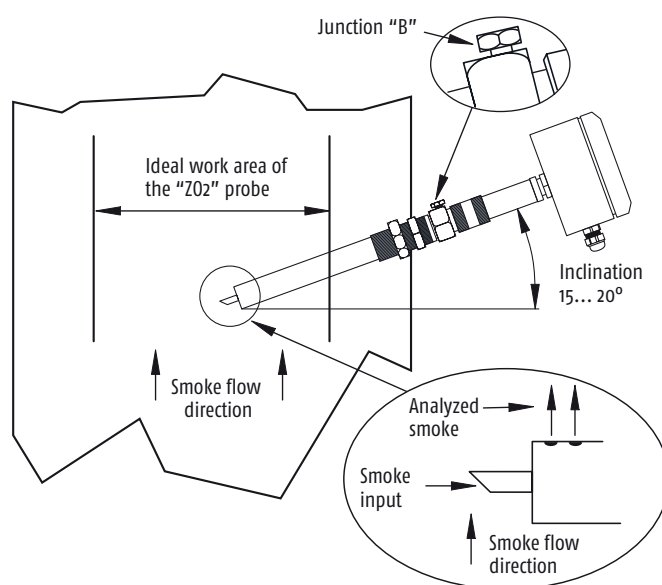
Main functions of the electronic card are:

- Management of the sensor and the built in heater;
- Range settings;
- Calibration;
- Signal output adjustment.

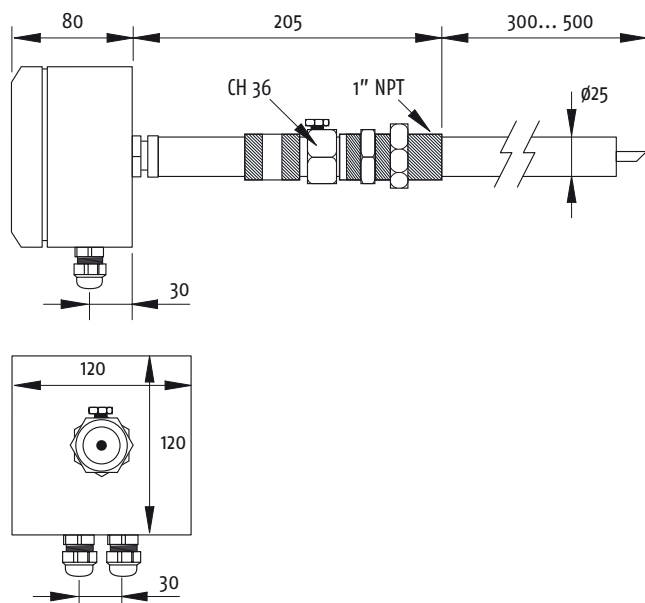
How to order

Z02-3I-300	Zirconium oxide probe with integrated electronics Probe length = 300 mm
Z02-3I-500	Zirconium oxide probe with integrated electronics Probe length = 500 mm

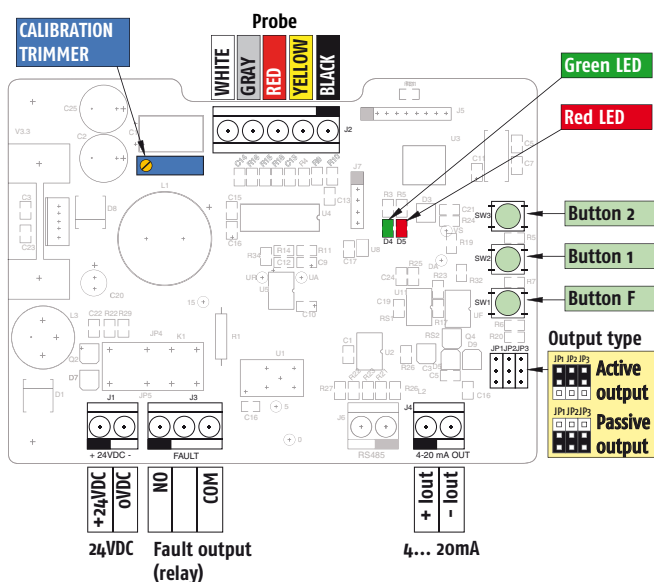
Usage



Dimensions (mm)



Electrical connections



ZO2-3E PROBE



In-situ zirconium oxide probe for direct and continuous measurement of residual oxygen percentage in the flue gas within harsh environments where high temperatures and /or vibrations can damage on-board electronics.

Equipped with external electronic card, it directly generates a linear 4... 20 mA output with active or passive output selectable by jumpers. The probe is supplied with the cable to connect the separate unit.

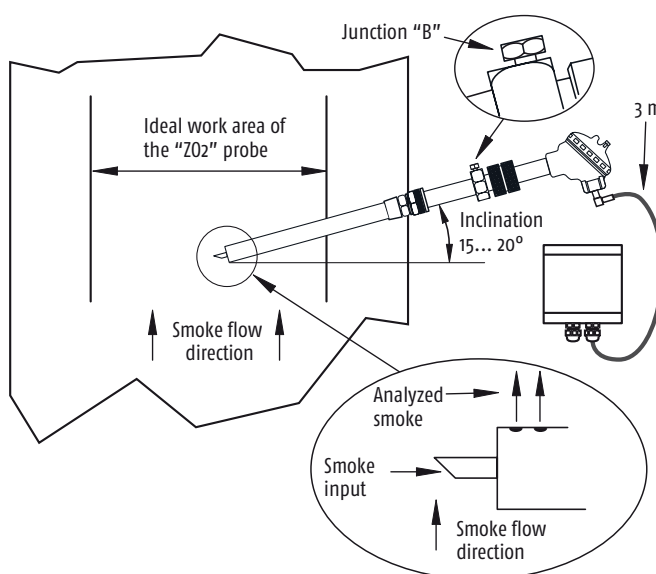
Main functions of the electronic card are:

- Management of the sensor and the built in heater;
- Range settings;
- Calibration;
- Signal output adjustment.

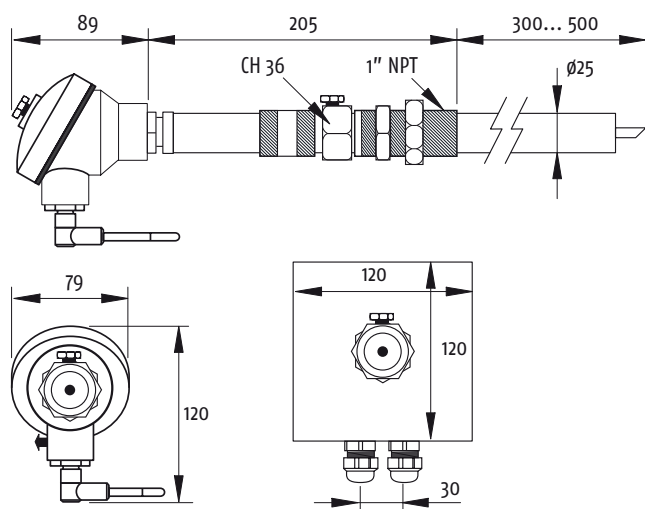
How to order

ZO2-3E-300	Zirconium oxide probe with external electronics Probe length = 300 mm
ZO2-3E-500	Zirconium oxide probe with external electronics Probe length = 500 mm

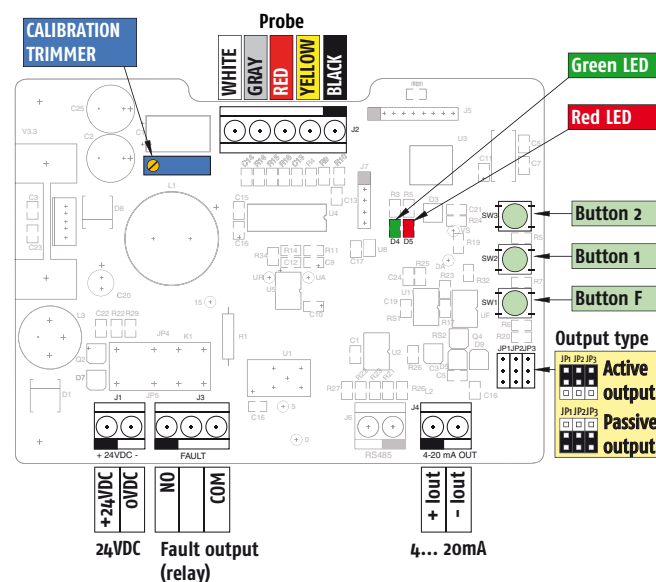
Usage



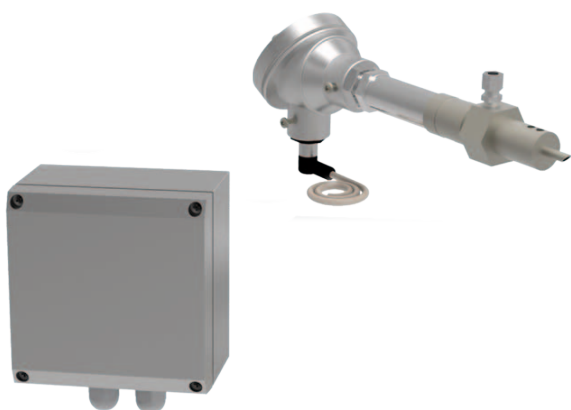
Dimensions (mm)



Electrical connections



Z02-3E-C100 PROBE



Extractive zirconium oxide probe for direct and continuous residual oxygen percentage measurement in the flue gas under critical process conditions.

Equipped with external electronic card, it directly generates a linear 4... 20 mA output with active or passive output selectable by jumpers. The probe is supplied with the cable to connect the separate unit.

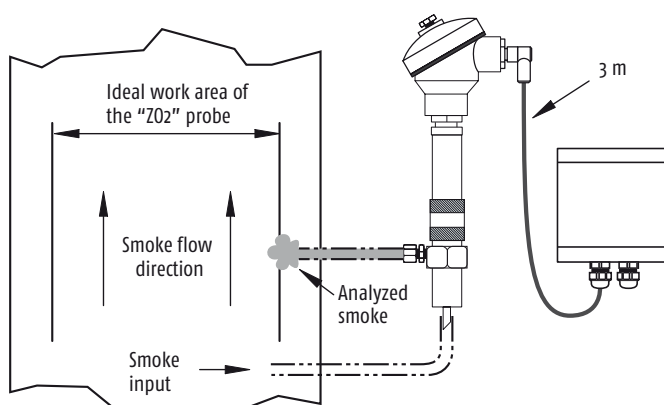
Main functions of the electronic card are:

- Management of the sensor and the built in heater;
- Range settings;
- Calibration;
- Signal output adjustment.

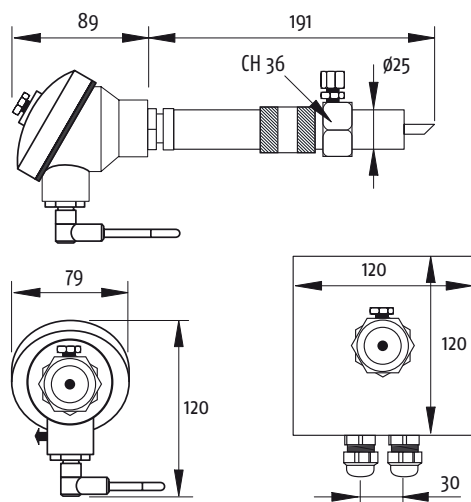
How to order

Z02-3E-C100 | Extractive zirconium oxide probe with external electronics

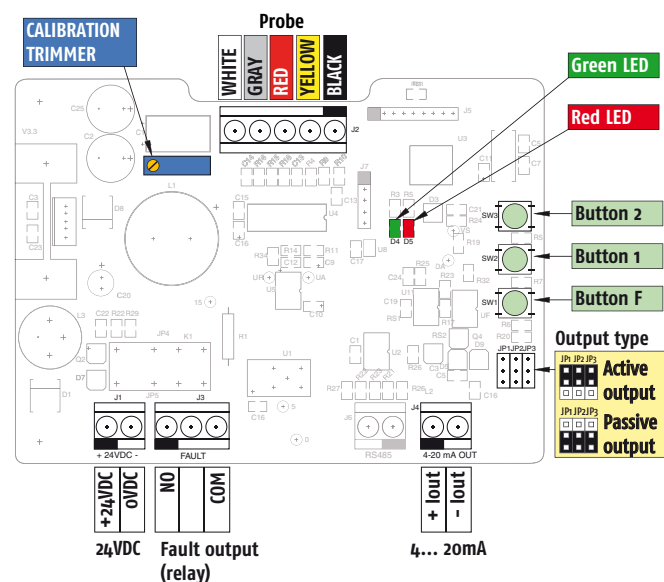
Usage



Dimensions (mm)



Electrical connections



OX SERIES MONITOR AND CONTROLLER



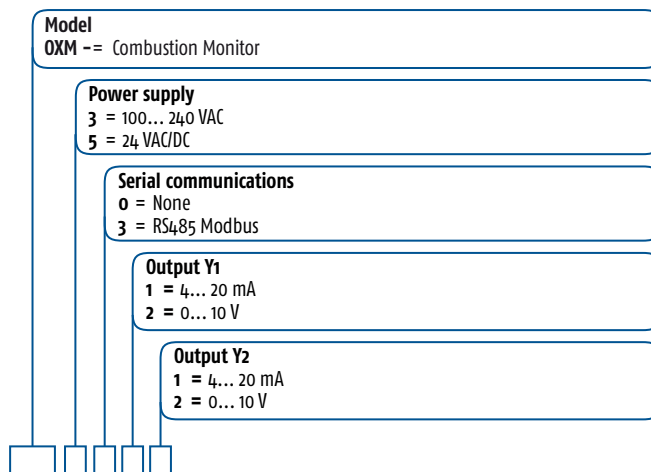
TECHNICAL DATA

	OXM	OXR
Main analogue input	mV from the Z02 probe (0.2 % ± 1 digit) or 4... 20 mA linearised with range 0.0... 20.9%	
Auxiliary analogue inputs	2 x 4... 20 mA from air and flue gases temperature	4... 20 mA boiler load
Main analogue output	4... 20 mA/0... 10 V settable for: O2%, fgT, Air temp, CO2%, η , λ	4... 20 mA/0... 10 V control output
Auxiliary analogue output		4... 20 mA/0... 10 V per O2%
Digital inputs and related functions	3 digital inputs: Hold, Fail, fuel switching	4 configurable digital outputs: Hold, Fail, fuel switching, stored SP recall, Auto/man
Alarm outputs	2 NO relay, 250 Vac/5 A configurable	3 NO relay, 250 Vac/5 A configurable 1 NO relay, 250 Vac/5 A (failure)
Serial communications (optional)	RS485 (2 wires) Modbus, J Bus, BaudRate 9600 max.	
Power supply	100... 240 Vac, 50/60 Hz or 16... 28 Vac, 50/60Hz and 20...30 Vdc	
Current consumption	4 VA	
Ambient temperature	0... 50°C	
Ambient humidity	35... 85% RH	
EMC	IEC801-2, 801-3, 801-4: level 4	
Mounting	Front panel mounting	
Front panel protection degree	IP 54 Standard (IP65 with optional kit)	
Dimensions	48 x 96 x 150 mm	

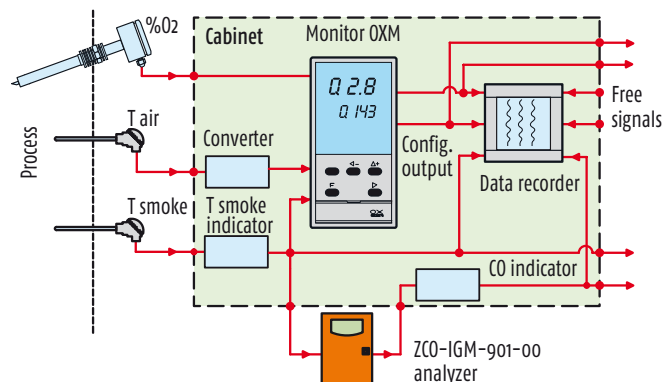
OXM COMBUSTION MONITOR



How to order



Application example

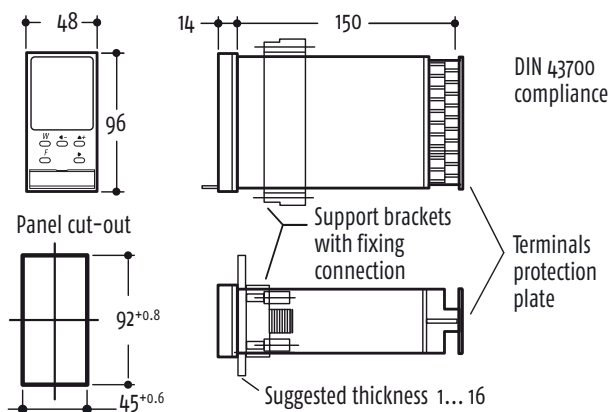


Acquiring the measurement of residual oxygen in the flue gas, the monitor calculates:

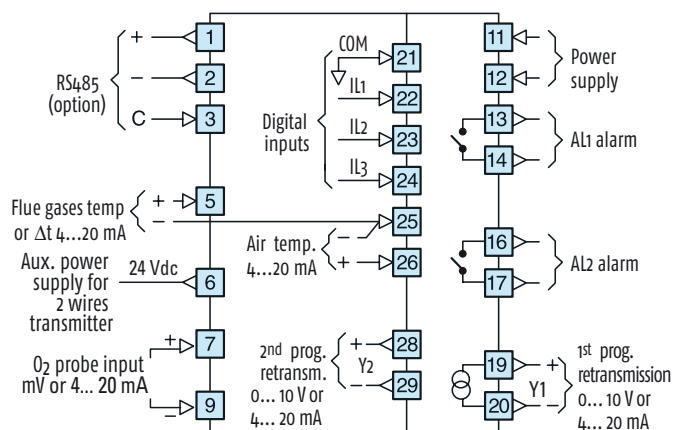
- h** Efficiency;
- I** Air excess;
- %CO₂** Carbon dioxide.

It is possible continuously calculate the combustion process in terms of safety and energy saving.

Dimensions (mm)



Electrical connections



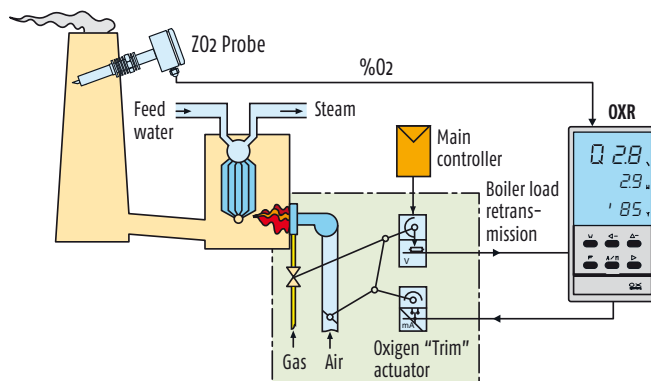
OXM OXYGEN "TRIM" CONTROLLER



How to order

Model OXR - = Oxygen "TRIM" controller
Power supply 3 = 100... 240 VAC 5 = 24 VAC/DC
Serial communications 0 = None 3 = RS485 Modbus
Output Y1 1 = 4... 20 mA 2 = 0... 10 V
Output Y2 1 = 4... 20 mA 2 = 0... 10 V

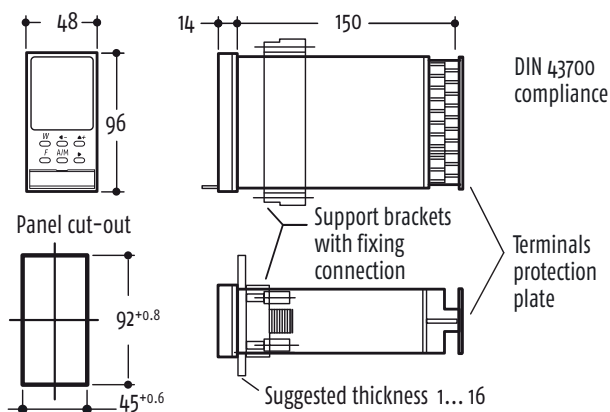
Application example



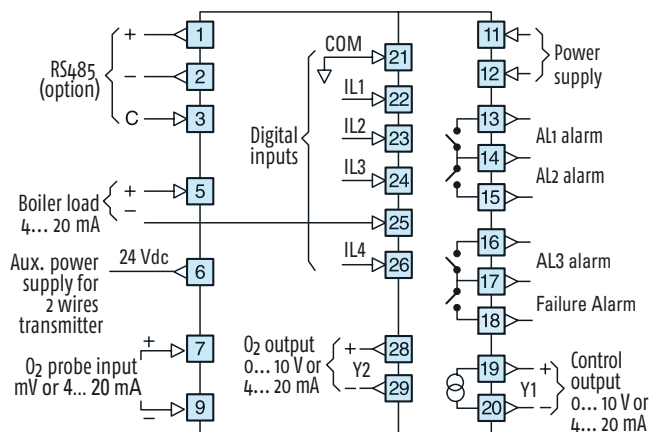
The oxygen "trim" controller continuously optimizes the air/fuel ratio acting on the air quantity adjustment according to load. This optimization is related to the oxygen content in the flue gas. This enables to save fuel consumption reducing the chimney flue heat loss and guarantees more energy transfer in the combustion chamber.

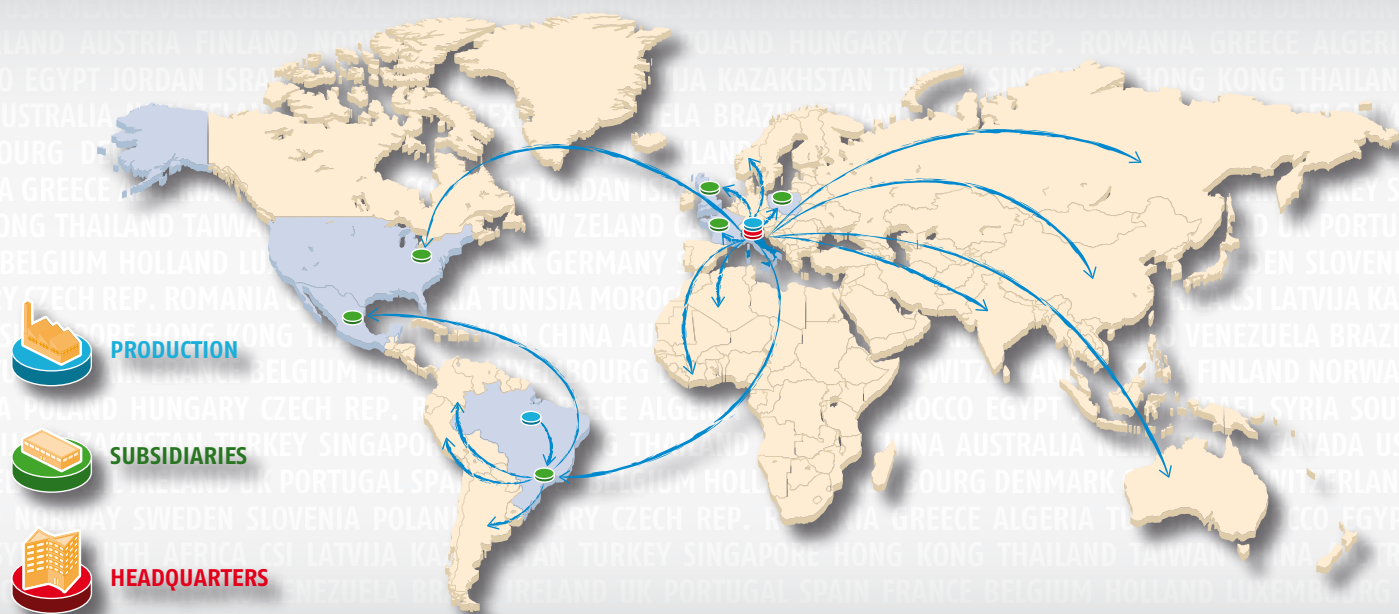
It is possible to select, up to 2 curves of 4 segments each (depending on fuel characteristics) to perform a corrective action during the load changes.

Dimensions (mm)



Electrical connections





Ascon Tecnologic s.r.l.
viale Indipendenza, 56 · 27029 Vigevano (PV) Italy
tel +39 0381 69 871 · fax +39 0381 69 87 30

info@ascontecnologic.com
www.ascontecnologic.com

Ascon Tecnologic France
BP 76 · 77202 – Marne La Vallée Cedex 1 – France
tel +33 1 64 30 62 62 · fax +33 1 64 30 84 98
info@ascontecnologic.fr
www.ascontecnologic.com/fr

Ascon Tecnologic – North America
1111 Brookpark Road
OH 44109, Cleveland – USA
tel. +1 216 485 8350 ext. 229
info@ascontec-na.com
www.ascontecnologic.com/en

Ascon Polska Sp. z o.o.
KOCHCICE ul. Kochanowicka 43
42-713 Kochanowice – Poland
tel +48 34 35 33 619 · fax +48 34 35 33 884
info@ascon.pl
www.ascon.pl

Coelmatic Ltda
Rua Clélia 1810 – Lapa
Sao Paulo · SP – CEP 05042-001 – Brazil
tel. +55 11 2066 3211 · fax +55 11 3046 8601
info@coel.com.br
www.coelmatic.com.br

Coelmatic SAPI de CV
Dr. Pedro Noriega #1099, Col Terminal
Monterrey · NL CP 64570 – Mexico
tel. +52 81 8104 1012
info@coelmatic.com.mx
www.coelmatic.com.mx



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