



*Gas Analysers & Integrated Systems  
for Process Gas Analysis*

## Thermoparamagnetic Oxygen Analyser

# 8863



### Main Applications

- Inertizing
- Centrifuges and reactors feed gases
- Chemical and petrochemical industry
- Pharmaceutical industry
- Solvents recovery
- Fertilizers
- Biogas and landfill gas
- Oxygen control in ovens and furnaces
- Oxygen control in steel plants
- .... and many others

### Features

- Accuracy better than 1% of full scale
- Parts contacted by gas in selected materials to resist the attack of aggressive substances
- Temperature controlled sensing unit
- Fast response time
- Excellent long term stability
- Very easy maintenance thanks to modular construction
- Practically indestructible
- IP65 protection
- Versions for safe area or in Explosion-Proof housing for hazardous area Zone 1 / Zone 21
- Powerful microprocessor based control unit

# Sensing Unit

## The Measure

The 8863 thermoparamagnetic Oxygen analyzer allows the selective analysis of the oxygen concentration in process gases taking advantage of the evident Oxygen paramagnetic property that makes it attracted by a magnetic field. This particular feature of the Oxygen is the base of the selectivity of this measuring principle.

## High Accuracy

The 8863 is an high accuracy analyzer (class of accuracy better than 1%). For this reason the inner sensing unit is temperature controlled in order to be completely insensitive to ambient temperature variations.

## Extremely Rugged

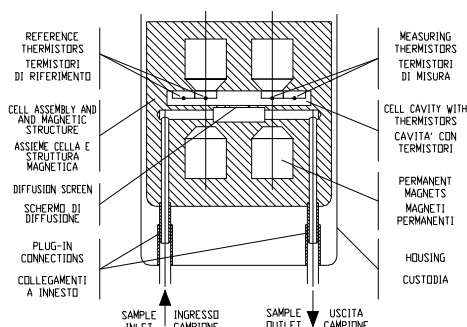
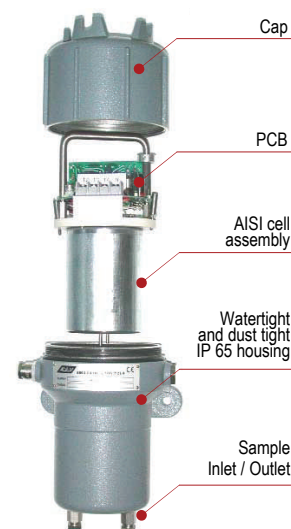
The model 8863 is specifically designed for continuous measurements in the most heavy duty applications. The sensing unit of is housed in a rugged IP65 housings, configurable for safe or hazardous area with the highest protection mode:

**II 2 GD EEx-d IIC T6, IP65 T 85°C, T<sub>amb</sub> -10...+50°C**

There are no inner moving parts; installation position and eventual vibrations don't alter the accuracy and stability of the measure.

## Very Easy Maintenance

Modular construction makes maintenance extremely easy. It's enough to unscrew the cap of the housing to have access to inner sensing unit that can be removed only by disconnecting 3 wires and unscrewing 2 screws.



## Cell Assembly

The Cell Block assembly is made of stainless steel and contains the cell cavity and pole pieces which produce two powerful magnetic fields in the cavity. Associated with each field is a thermistor pair, consisting of a measuring thermistor and reference thermistor. The measuring thermistor is mounted in the cavity within its respective magnetic zone; the corresponding reference thermistor is mounted in the cavity just outside its magnetic zone. A sample inlet port and a sample outlet port are arranged to permit a portion of the flowing sample to diffuse into the cavity, where it comes under the influence of thermal gradients and magnetic fields. The effect of the resulting thermo-magnetic action on the thermistors provides the measuring means.

# Specifications...

## ...Performance

### Accuracy:

± 1% of span (output signal).

### Repeatability:

± 0.3% of span (short term).

### Reproducibility:

24 hours: ± 1% of span.

### Response Time (max. 2000 cc/min flow rate)

Initial, less than 1 sec.

90% of step-change: less than 1 minute.

### Drift:

Zero: max. ± 1% of span per week

Span: max ± 1% of span per week (without autocalibration).

### Ambient Temperature Influence:

± 0.002% O<sub>2</sub> per °C or ± 0.02% of span per °C, whichever is greater.

### Atmospheric Pressure Influence:

± 0.18 % of reading per hPa

### Sample Flow Rate Influence:

less than 0.5% of span over flow range of 100 to 1000 cc/min.

### Line Voltage Influence:

max. 0.02% of span, for each 1% change of power voltage.

### Gas Interference:

less than ± 0.01% O<sub>2</sub> reading per 1% CO<sub>2</sub> (up to 50% CO<sub>2</sub>, max.);

± 0.07% O<sub>2</sub> reading per 1% H<sub>2</sub> (up to 10% H<sub>2</sub>, max.);

± 0.007% O<sub>2</sub> reading per 1% H<sub>2</sub>O;

± 0.75% of span per 1% SO<sub>2</sub>.

## ...Operative

### Sample Requirements

Sample Flow Rate: 250 ÷ 1000 cc/min.

Sample Pressure: 3000 Pa minimum (with filter and flow meter).

### Linearization:

within 1% of span

### Range:

see suffix C on the ordering information

### Ambient Requirements

Relative Humidity: 90% maximum.

Operation Temperature: -10 to +50 °C (14 to 122 °F).

Temperature controlled: at 50°C

Storage Temperature: 70° C (158 °F) max.

### Power Requirements:

24 ÷ 30 Vdc, 40 VA directly or from power supply energized with 115 Vac ± 10 Vac or 230 Vac ± 20 Vac

### Pneumatic Connections:

¼" or 6 mm OD tubing (compression fittings supplied)

### Wiring Connections:

General purpose housing: 2 openings for G 3/8" (PG 13 cable grip).

Explosion proof housing: 2 openings for GK 1/2" (cable grip or conduit).

## ...Physical

### Material Contacting Sample Gas:

AISI 316, AISI 303, Chromel, Platinum-Iridium, Teflon, Viton (Buna, others), Glass. Optional Hastelloy® C276

### Weight:

7 kg in Standard housing

8,5 Kg. EEx-d housing

### Dimensions:

150 x 150 x 290 mm (standard housing);

180 x 155 x 325 mm (explosion proof housing)

**Finish:** Epoxy grey textured enamel

**Protection:** IP65 (watertight and dust tight)

## Version for hazardous area

**II GD EEx-d IIC T6 IP65 T85°C T<sub>amb</sub> -10...+50°C**



Designed in accordance to directive ATEX 94 / 9 / CE

Certificate number:  
**CESI 03 ATEX 130**

# M702 Control Unit

## Description

Powerful microprocessor-based system (keyboard configurable) allowing selection of range, type of alarms, set point and it can receive 3 analogical input signals (2 of them can be used for cross sensitivity compensation or special functions).

On request, a system to perform zero and/or full scale autocalibration can be provided.

Optional RS232C output can directly drive a printer with selectable timing and baud rate. Isolated current output is standard. The unit can be housed in a compact Noryl DIN case for panel mounting (standard), in a IP 65 case with clear front door for wall mounting or in explosion proof housing for mounting in classified area.

## Display

It provides a continuous readout indication of the requested variable in engineering units (e.g. %), of alarms set point and alarms condition.

## Single or dual alarm

A single alarm (high or low) or dual alarms (1 high and 1 low, 2 high or 2 low) can be provided as option. Each alarm consists of: 1) a keyboard configurable alarm threshold; 2) a LED, which is lit when an alarm is detected; 3) a relay contact that can be used to actuate an external signal or to start a shutdown process device.



## Auxiliary Functions

Other options with diagnostic and calibration fault contacts are available (contact Adev technical office).

## Advantages of a modular construction

Control and sensing unit split, gives the customer the possibility to select the preferred mounting configuration, optimizing costs.

It will be possible to have the control unit in fields (both in safe or hazardous area) but also remote it in control room. This solution could be preferred in hazardous areas application when local visualization is not needed. Moreover, in case of failure, sensing and control can be separately repaired or replaced, reducing to the minimum the plant stop.

## Other versions

The model 8863 can be provided for rack 19" mounting or configured for laboratory use in half-rack 19" dimension; with both the solutions, sensing and control unit are integrated into a smart aluminum case.

Refer to [model 4400 O<sub>2</sub>](#).



Transportable / Laboratory version



Rack 19" version

# Technical Specifications

## Inputs

Input signals: 3 adjustable and linearizable from 10 mV with accuracy better than 1:10000  
Scanning time: 0,5 seconds  
Conversion type: double ramp  
Resolution: 1/20000  
Input impedance: 100 Mohm typical  
Isolation between channels: none

## Alarms

Contact rating: N.O./N.C. 1 A @ 250 Vac (define the alarm contact condition -soldering type- at order. Refer to suffix E).  
Set: programmable on 100% of range  
Relay status: normally triggered / not triggered  
Number of alarms: 2 on concentration. Wrong calibration and fault alarms available.  
Threshold: high or low to be selected at order; field adjustable by soldering jumpers. Refer to suffix D1 and D2.

## Serial interface

Standard: RS 232 C  
Check lines: CTS  
Speed: 9600, 4800, 2400, 1200, 600, 300 baud/sec.  
Parity: even, odd, none  
Isolation: 1500 V

## Analogical output

Output: 4-20 mA isolated proportional to 100% of range on maximum load of 500  $\Omega$   
Total Range (over range): 3.6 - 24 mA  
Resolution: 1/3800  
Isolation: 1500 V  
Uploading time: 1 second

## Printing messages

Periodical printing: programmable in hours, min.  
Alarm printing: automatic printing  
Printing message: year, month, day, hour, minutes, % (Ch1), temperature (Ch2, Ch3), alarm 1 status, alarm 2 status

## Ranges of variables

Read out in engineering units, in accordance to customer specification.

## Ambient requirements

Working temperature: 0  $\pm$  50  $^{\circ}$ C  
Storage temperature: -10  $\pm$  +75  $^{\circ}$ C  
Humidity: 10  $\pm$  90% without condense

## Power Supply:

220/110 Vac; 50/60 Hz; 5 VA

## Physical specification

Dimensions: 96 x 96 x 185 mm.  
Weight: about 0,5 Kg.  
Mounting: panel cut out

## Clock

Clock type: Gregorian  
Back-up: by means of lithium battery  
Battery life: 1 year in case of power supply absence. Accuracy: 1 second/month

## Explosion-proof housing

Protection mode:  
II 2 GD EEx d IIC T6 IP65 T<sub>amb</sub> -20  $\pm$  +60  $^{\circ}$ C  
for hazardous area ZONE 1 / ZONE 21

## Installation:

Wall or panel  
Dimensions:  
240 x 240 x 300 mm

Adjustable without opening the housing

3 Gk 3/4" holes



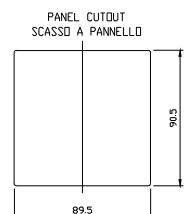
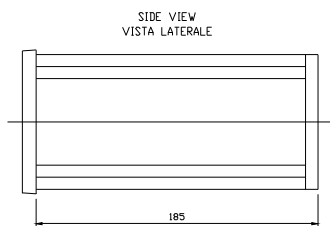
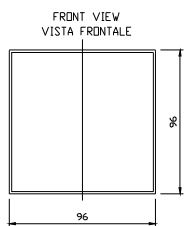
## IP65 housing

Installation:  
Wall or panel

Dimensions:  
265 x 241 x 312 mm  
Clear front door



# Dimensional Specifications



Control unit dimensions

A5103600

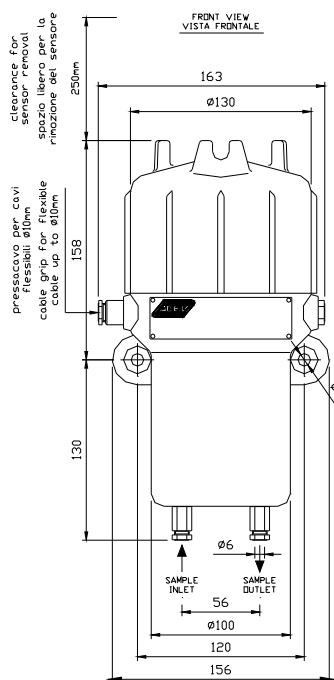
## Conformity to European Normative

In accordance to Low Voltage directive 2006/95/EC

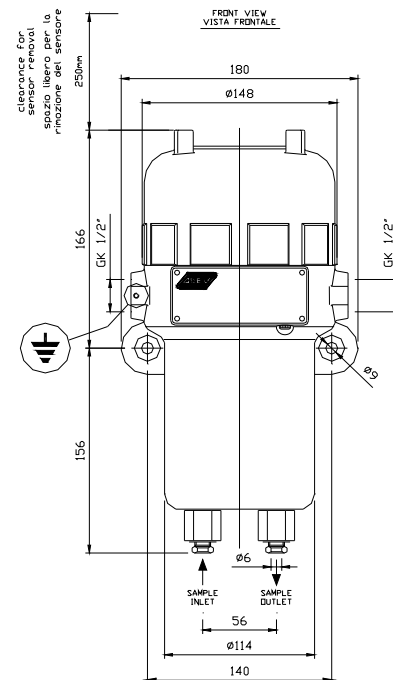
In accordance to EMC directive 2004/108/EC:

- EN 61000-6-2
- EN 61000-6-3
- EN 50270

In accordance to directive ATEX 94/9/EC



Sensing unit dimensions in General Purpose housing



Sensing unit dimensions in Explosion-Proof housing

## Ordering 8863



### Suffix A - Line voltage

- 0 24 Vdc (only sensing)
- 2 230 V 50/60 Hz
- 4 115 V 50/60 Hz

### Suffix B - Stream composition

- 1 Standard background gases (N<sub>2</sub>, combustion gases)
- 2 Corrosive background gases (cell and housing in Hastelloy® C276)
- 9 On specification

### Suffix C - Range

- 002 0-2%
- 005 0-5%
- 007 0-7,5%
- 010 0-10%
- 015 0-15%
- 020 0-20%
- 025 0-25%
- 125 15-25%
- 230 20-30%
- 992 Double range
- 999 On specification

### Suffix D1 - Alarm threshold

- 0 None
- 1 1 low alarm
- 2 1 high alarm
- 3 1 high alarm + 1 low alarm
- 4 2 low alarms
- 5 2 high alarms
- 9 On specification

### Suffix D2 - Wrong calibration and fault alarms

- 0 None
- 1 Wrong calibration alarm shared with an alarm threshold
- 2 Fault alarm shared with an alarm threshold
- 3 Wrong calibration alarm on dedicated relay
- 4 Fault alarm on dedicated relay
- 5 Wrong calibration alarm shared with fault alarm
- 9 On specification

### Suffix E - Alarm contacts

- 0 None
- 1 Closed in alarm condition
- 2 Open in alarm condition

### Suffix F - Serial output

- 0 NO
- 1 RS 232 C + internal clock

### Suffix G - Sensing unit

- 1 IP65 housing for sensing unit \_ standard
- 2 Explosion-proof housing for sensing unit
- 9 On specification

### Suffix H - Autocalibration

- 0 NO
- 1 Autocalibration
- 2 Autocalibration + autocalibration start inlet free contact
- 3 Autocalibration + autocalibration start inlet free contact with calibration in progress free contact
- 4 calibration in progress free contact (for manual calibration)

### Suffix I1- Control unit

- 0 Without control unit and power supplier
- 1 M702 (standard)
- 2 EC2001
- 9 On specification

### Suffix I2- Control unit configuration

- 0 Not used (select only combined with suffix I1 = 0)
- 1 Provided loose for mounting in a cut out 89,5 x 90,5 mm
- 2 Mounted & wired in IP65 housing (power supplier included)
- 3 Mounted & wired in Ex housing (power supplier included)
- 9 On specification



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