



*Gas Analysers & Integrated Systems
for Process Gas Analysis*

Paramagnetic Oxygen Analyser

P8863



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

- Extremely fast response time
- Insensitive to the presence of interfering gases in the background
- 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
- Excellent long term stability
- Very easy maintenance thanks to modular construction
- 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 P8863 paramagnetic 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.

The advantages of an Oxygen measurement based on this measuring principle are the **extremely fast response time** and the **minimum interference due to the presence of other gases into the background**.

High Accuracy

The P8863 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.

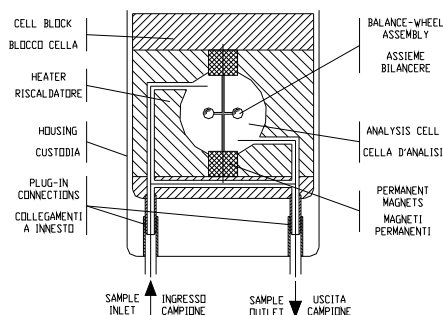
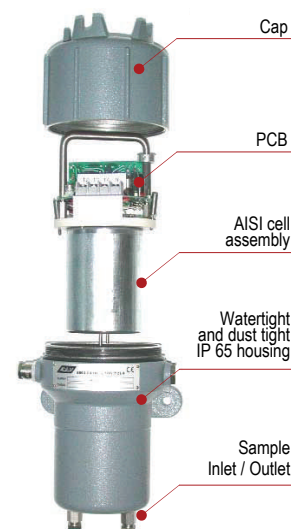
Versions for Safer and Hazardous Area (ATEX)

The model P8863 is specifically designed for continuous measurements in the most heavy duty applications. The sensing unit 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_{amb} -10...+50°C

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. The magneto-dynamic cell consists of two nitrogen-filled quartz spheres arranged in the form of a dumb-bell. A single turn coil of platinum wire is placed around the dumb-bell which is suspended in a symmetrical non-uniform magnetic field. At its center the dumb-bell bears a small mirror. When the surrounding gas contains Oxygen the spheres are pushed out of the magnetic field caused by the relatively strong Para magnetism of Oxygen. The force on the dumb-bell is corrected by a current through the coil which is controlled by a photo-detection system via a light beam and the mirror on the dumb-bell. The feedback current, required to compensate the torque acting on the dumb-bell will be proportional to the Oxygen concentration in the gas sample through the cell.

Specifications...

...Performance

Accuracy:

± 1% of span (output signal).

Repeatability:

± 0.3% of span (short term).

Reproducibility:

24 hours: ± 1% of span.

Response Time (max. 1000 cc/min flow rate)

Initial, less than 1 sec.

95% of step-change: less than 3 seconds.

Drift:

Zero: max. ± 1% of span per week

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

T_{Amb}. Influence (with temperature controller):

± 0.002% O₂ per °C or ± 0.02% of span per °C, whichever is greater

T_{Amb}. Influence (without temperature controller):

Zero: < ± 0.05% O₂ per °C

Span: < ± 0.25% of reading per °C

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.

...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 Vac, 50 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, Platinum, Platinum-Iridium, Viton (Buna, others), Glass, PPS filled with PTFE

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_{amb} -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

P8863 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 P](#)



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 Ω
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_{amb} -20 \div +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

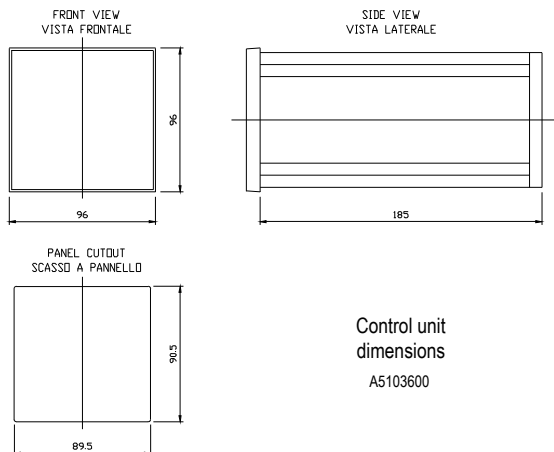


IP65 housing

Installation:
Wall or panel

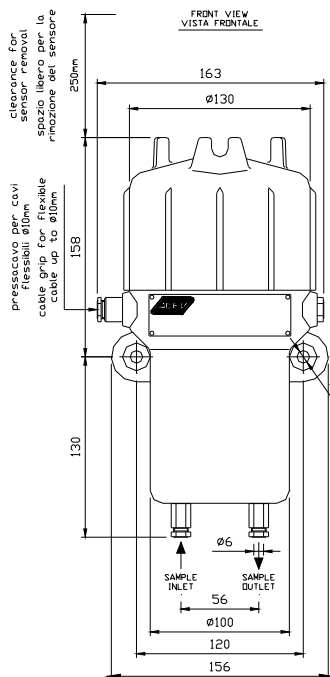
Dimensions:
265 x 241 x 312 mm
Clear front door

Dimensional Specifications

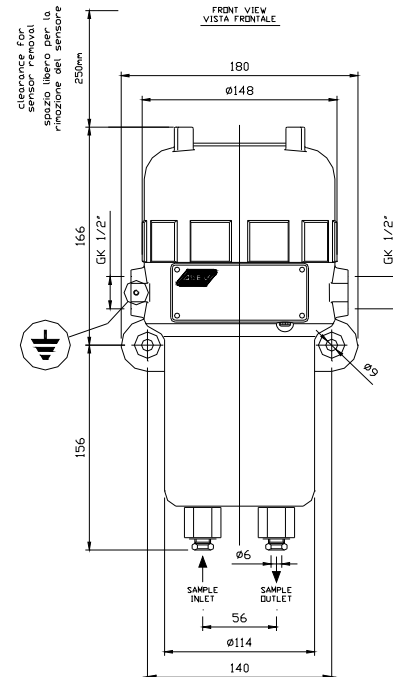


Conformity to European Normative
 In accordance to Low Voltage directive 2006/95/EC
 In accordance to EMC directive 2004/108/EC:
 - EN 61000-6-2
 - EN 61000-6-3
 - EN 50270

In accordance to directive ATEX 94/9/EC



Sensing unit dimensions in General Purpose housing



Sensing unit dimensions in Explosion-Proof housing

Ordering P8863



Suffix A - Line voltage

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

Suffix B - Stream composition

- 1 Standard background gases (N₂, combustion gases)
- 2 Not aggressive background gases
- 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%
- 100 0-100%
- 125 15-25%
- 230 20-30%
- 901 90-100%
- 951 95-100%
- 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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All specifications are subjected to variations for products improvement without notice.

