

# 8864

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Data sheet

2018

Rugged Zirconia analyser for  
Oxygen measurements in  
combustion & inert gas

## Oxygen Analyser

For measurement in  
ppm and % range



The 8864 is an extractive Zirconia analyser that is typically employed for general purpose Oxygen analysis in % or for extremely accurate low ppm Oxygen measurements in pure gas, air separators, Nitrogen generators and others.

The weatherproof and explosion proof 8864 is designed for field installation in the most severe conditions, minimizing the sample conditioning requirements.

The instrument features a special Zirconium Oxide sensor with reference to the solid state (micro-pod technology) eliminating the need for a reference air flow.

# Technical Specification

## 8864 Zirconia Analyser

### Performance Specification

Accuracy	with control unit: $\pm 1\%$ of span or $\pm 1$ ppm (whichever is worse) transmitter: $\pm 2\%$ of span or $\pm 0.05\%$ O <sub>2</sub> (whichever is worse)
Repeatability	$\pm 0.5\%$ of span (short term).
Linearity	better than $\pm 1\%$ of full scale
Response Time	Initial < 0.1 sec.; 90%: < 1 sec. (with max. 1500 cc/min. flow rate)
Drift	Zero: max. $\pm 1\%$ of span per week Span: negligible
Ambient Temp. Influence	max. $\pm 0.06\%$ of reading per °C
Atm. Pressure Influence	1% of reading per 1% change in ambient pressure
Flow Rate Influence	less than 0.5% of span over flow range of 250 to 1000 cc/min.
Line Voltage Influence	max. 0.02% of span, for each 1% change of power voltage.
Gas Interference	combustible gases + O <sub>2</sub> reduce the measure

### Operative Specification

Sample Requirements	Flow Rate: 250 ÷ 1000 cc/min. Pressure: 3000 Pa minimum (with filter and flow meter).
Range	Refer to ordering information
Output	Standard 8864 sensor output: logarithmic 50 mV/decade functioning as input of control unit that operates calculation, linearization and retransmits the isolated output current.  Transmitter version: 4-20 mA proportional to ordered range; max. load 500 $\Omega$ (or 350 $\Omega$ with galvanically insulated module)
Diagnostic NV Logical Output (non-valid)	Logical Non Valid output from relay free contact. Normally supplied in fail safe condition (triggered relay and closed contact if not in alarm). Can be modified in field
Relative Humidity	90% maximum.
Operation Temperature	-10 ÷ +50°C (14 to 122 °F).
Temperature controlled	at 720°C
Storage Temperature	+70°C (158 °F) max.
Power Requirements	22 ÷ 30 Vac, 50 VA from dedicated power supplier.
Pneumatic Connections	1/4" or 6 mm OD tubing (compression fittings supplied)
Wiring Connections	General purpose: 2 openings for G 3/8" (PG 13 cable grip). Ex-Proof: 2 openings for G <sub>K</sub> 1/2" (cable grip or conduit).



### Key Applications

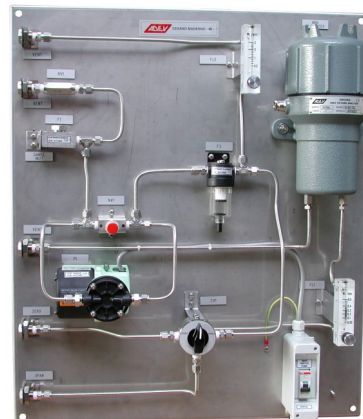
- Gas production industry (purity monitoring of N<sub>2</sub>, Ar, He, CO<sub>2</sub>)
- Air Separators
- Nitrogen Generators
- Heat treatments
- Mixers
- Welding Gas
- Combustion Gas
- Endothermic Generators
- Any application for ppm or % O<sub>2</sub> measurement in inert gas or combustion gas



### Sampling System

The 8864 needs an external sampling system able to deliver an almost clean sample gas to the analyser at the proper temperature, pressure and flow rate.

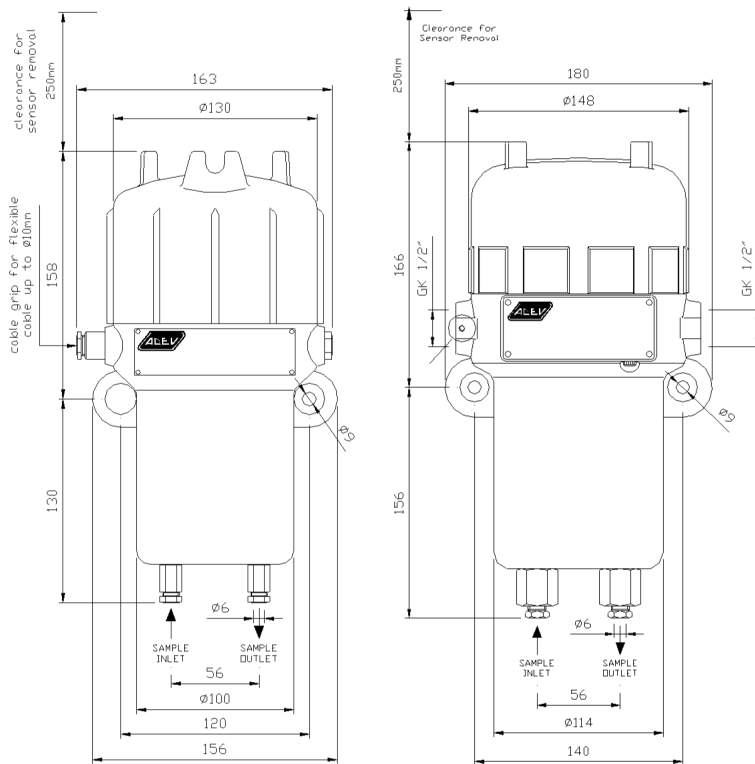
ADEV has a wide experience in process and can provide the 8864 analyser combined with a sample and condition system designed for the specific application requirements. Contact ADEV for details



## Physical Specification

Wet Parts Materials	316SS, Anticorodal, Platinum-Iridium, Tefzel, Viton, Zirconia, Alumina
Dimensions	150 x 150 x 290 mm (general purpose) 180 x 155 x 325 mm (explosion proof)
Weight	7 kg in general purpose housing 8,5 kg. in explosion proof housing
Finish	Epoxy grey textured enamel
Protection	IP 65 (watertight and dust tight)

## Outline Dimensions



General Purpose

Explosion Proof

### High Accuracy

The 8864 is an high accuracy analyzer with the inner sensing unit is temperature controlled in order to be completely insensitive to ambient temperature variations.

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.

## Output Signal & Resolution

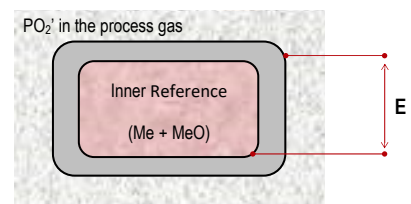
The 8864 is available as 4-20 mA transmitter (with ranges 0-5 / 10 / 25% O<sub>2</sub> Full Scale) or it can have a low level logarithmic output that operates as input for one of the ADEV control units.

## Measuring Principle

The measuring principle on which the analysis is based is linked to the use of Zirconium oxide which, at high temperatures, can behave like a solid state electrolyte, developing an electromotive force on two electrodes placed in contact with different O<sub>2</sub> concentrations (partial pressures), proportional to the temperature in Kelvin degrees (°K) and the logarithm of the ratio between the two pressures PO<sub>2</sub>' and PO<sub>2</sub>" in accordance with Nernst's well-know ratio:

$$E = RT/nF(Lg PO_2' / PO_2'')$$

where: R = Perfect gas constant (8,31 Joule/degree bulk)  
F = Faraday's constant  
T = Absolute temperature in °Kelvin  
n = 4



## No Need of Air Reference Flow

The inner sensing element is based on a proprietary ADEV technology (micro-pod) and features a solid state reference that completely eliminate the need of a reference air flow, making the instrument very easy and practical to use in field.



## ATEX

ATEX certification for Zone 1 / Zone 21. Protection mode:



II 2 G D

Ex db IIC T6 Gb

Ex tb IIIC T85°C Db IP65

## Certificates

ATEX Certificate Number CESI 03 ATEX 130

## European Compliance

- Complies with Low Voltage Directive 2014/35/EU
- Complies with EMC Directive 2014/30/EU
- Complies with Directive ATEX 2014/34/EU



# Ordering

Oxygen Analyser	8864	...	...	...	...	...
<b>Stream Gas</b>						
Combustion gas		1				
Inert gas		2				
Heat treatment atmosphere		3				
<b>Range (with 4-20 mA output) *</b>						
0-5%			05			
0-10%			10			
0-25%			25			
Other (with log output) **			99			
<b>Housing</b>						
General purpose IP65				G		
Explosion Proof (ATEX)				X		
<b>Output Signal</b>						
50 mV/decade logarithmic output **					1	
4-20 mA output ***					2	
Special					9	
<b>Options</b>						
None						0
Diagnostic in fail safe mode on the NV output						1
Special						9

\* Contact ADEV for other ranges

\*\* With the low level logarithmic output 50 mV/decade from sensing, acquired by a device able to manage the signal accordingly to Nernst's Law, it is possible to measure whichever O<sub>2</sub> variation over 26 decades.

\*\*\* Zero & Span calibration performed by trimmers inside the housing

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