

# MiniProbe

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Data sheet

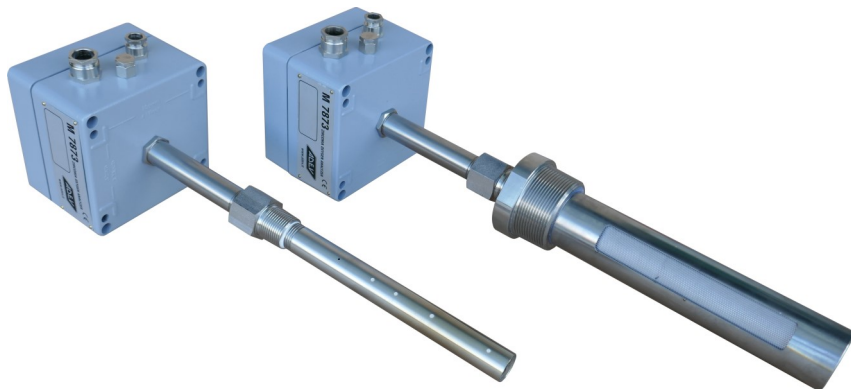
**SIL2**

IEC 61508

Fit small & medium sized  
boilers, biomass plants, dryers  
and furnace applications

## Zirconia Probe

for O<sub>2</sub> measurement  
in flue gas up to 700°C



The MiniProbe M7873 is a compact analyser that merges the benefits of a small size with high performance and best temperature limits, typical of bigger process analysers.

The instrument features a special zirconia sensor (Micro-Pod) with reference to the solid state that eliminates the need of reference air.

The simple and functional design is the result of a long applicative experience.

Potentially critical solutions have been avoided such as internal welds, critical couplings and separation of the reference atmospheres from the measurement atmospheres.

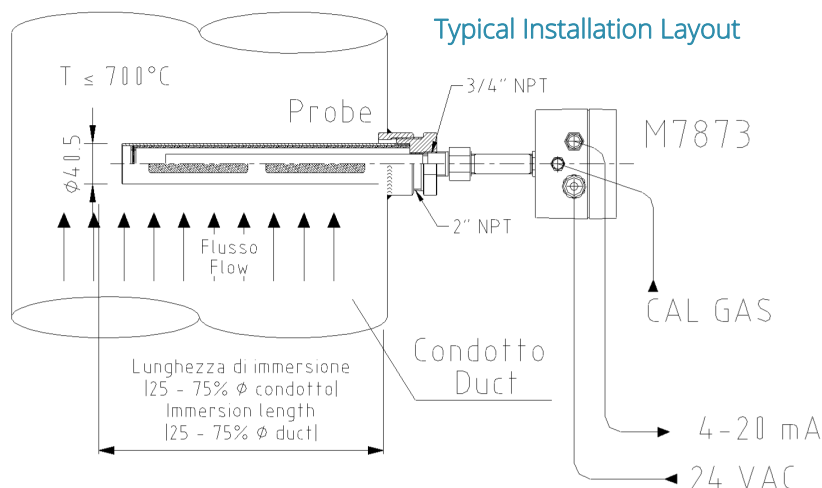


## Technical Specification

Accuracy	0.1% O <sub>2</sub> below 5% or 2% of reading above 5%
Repeatability	± 1% of reading (short term)
Output Resolution	0.01% O <sub>2</sub>
Response Time	Sensor: 0.1 sec. ; Overall system < 5 sec.
Flue Gas Temperature	up to 700°C (on request up to 800°C)
Insertion Length	100 / 200 / 300 mm
Process Connection	3/4" NPT-F or 2" NPT-F with installation and protection tube
Ambient Temp. Influence	Probe: max ± 0.005% of reading per °C. External head: max. 0.06% of reading per °C
Atm. Pressure Influence	1% of reading per 1% change in ambient pressure.
Probe Head Protection	IP65
Head Temperature	-5°C...+55°C
Weight	Probe: 1 Kg. ; Installation tube: 1 Kg.
Wiring Connections	N°2 cable glands for cables max. 13 mm and inner terminal strip
Pneumatic Connections	Calibration inlet: 1/8" NPT-F
Measuring Principle	Zirconium Oxide (Zirconia). Micro-pod sensor technology with no need of reference air
Humidity	0...90% non condensing
Analog Output	1 x 4-20 mA linear output proportional to range; max. load 500 Ω (or 350 Ω with galvanically insulated module) or logarithmic 50 mV/decade *
Ranges	0-5 / 0-10 / 0-25% O <sub>2</sub> (to select at order)
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 **
Power Supply	24 VAC ± 10%, 50/60 Hz, 50 VA

\* Output from probe when connected to a remote ADEV control unit

\*\* Mandatory for probe SIL2 compliant



## Features

### Extreme Roughness

- Rugged materials contacting the process gas
- Usable in flue gas up to 700°C, either continuously or cyclically
- Don't suffer damage or deformation
- Installation and protection tube makes the probe suitable for high dust flue gas

### Installation and Protection Tube

The MiniProbe can be equipped with a rugged AISI protection tube with an integral filter to ensure:

- Effective protection from dust & abrasion
- No direct sticking of dirty material on the sensor
- Easier installation

### Easy to Use

- Direct insertion into the duct or pipe
- Possibility to verify the calibration without removing the probe from process

### Made in ADEV

Completely designed and manufactured by ADEV, Italian leading company with more than 30 years of experience in combustion processes.

### European Compliance

- Low Voltage Directive 2014/35/EU
- EMC Directive 2014/30/EU



### SIL 2

MiniProbe M7873 is SIL2 compliant in accordance to normative IEC/EN 61508 : 2010 (parts 1 to 7)

## Key Applications

- ✓ Boilers using any type of fuel  
*Natural gas, LPG, light oils, heavy oils, diesel and biomass*
- ✓ Biomass Plants
- ✓ Furnaces
- ✓ Low Temperature Incinerators
- ✓ Biological Muds Dryers (safety)
- ✓ H<sub>2</sub>O measurement in drying processes  
*Textile, Pulp&Paper, Tissue, Wood, Con-*



# Micro-Pod Sensor

## State-of-the-art zirconia technology for combustion control

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:

$$E = RT / nF (\text{Lg } PO_2' / PO_2'')$$

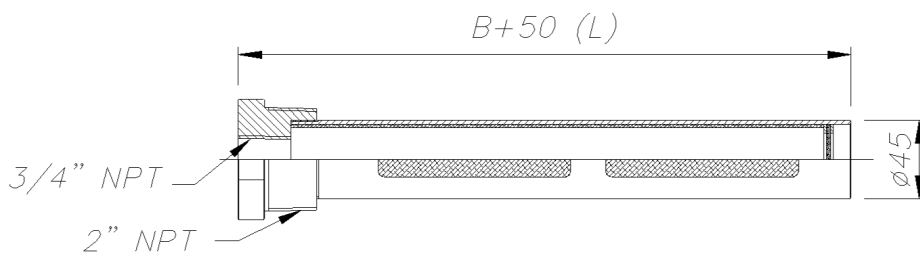
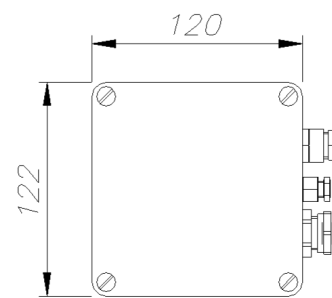
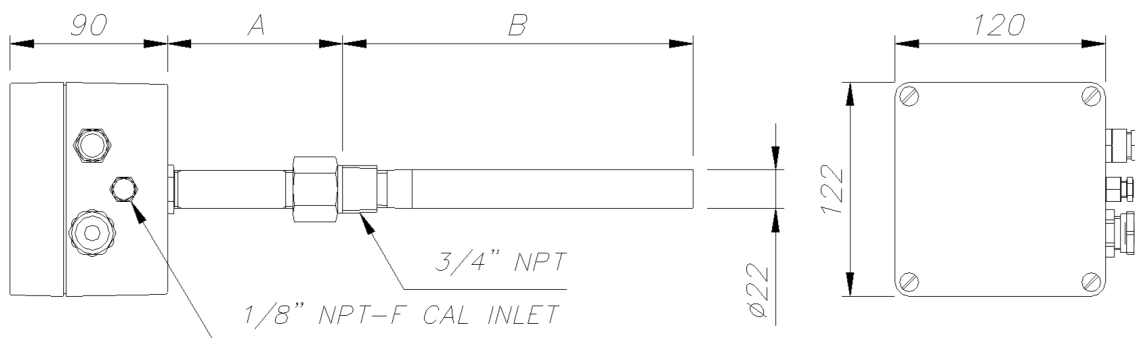
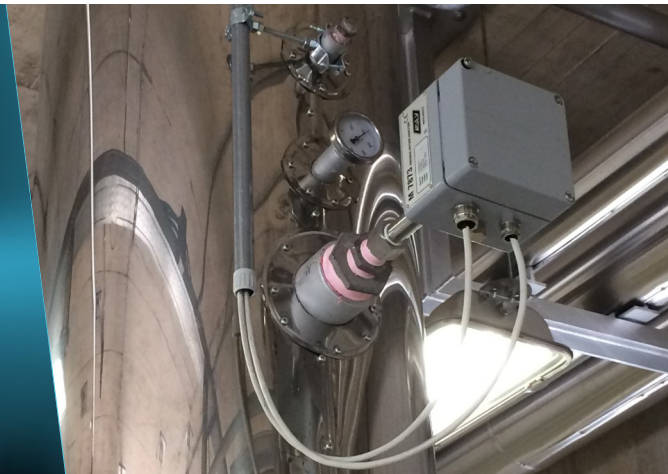
The inner sensing element is a based on a proprietary ADEV technology (micro-pod) and features a solid state reference that completely eliminate the need of a reference air flow, making the instrument very easy and practical to use in field.



- ✓ No reference air
- ✓ Sensor on the tip
- ✓ No gas circulation

MiniProbe M7873 is the only SIL 2 compliant Zirconia in situ analyser able to ensure a reliable O<sub>2</sub> measure in safety-demanding applications such as biological mud dryers

Also available with bypass cell for extractive applications



Dimensions		
Probe Quote A	Probe Quote B	Length with tube
100 mm	100 mm	150 mm
200 mm	200 mm	250 mm
300 mm	300 mm	350 mm

**Quote A** can be set to withdraw the probe head (with electronics inside) from hot external surface of the duct

**Quote B** is the insertion length into the duct

# Ordering

Zirconia Probe	M7873	...	...	...	...	...	...	...	...	...		
<b>Quote A</b>												
100 mm		1										
200 mm		2										
300 mm		3										
<b>Quote B</b>												
100 mm			1									
200 mm			2									
300 mm			3									
Special			9									
<b>Range (with 4-20 mA output) *</b>												
0-5%				05								
0-10%				10								
0-25%				25								
Other (with log output) **				99								
<b>Output Signal</b>												
50 mV/decade logarithmic output **					1							
4-20 mA output ***						2						
Special							9					
<b>Mounting</b>												
3/4" NPT thread without installation tube								0				
2" NPT installation & protection tube 100 mm									1			
2" NPT installation & protection tube 200 mm										2		
2" NPT installation & protection tube 300 mm											3	
Special												9
<b>Calibration Circuit</b>												
None										0		
Calibration circuit											1	
<b>Galvanic Insulation Module</b>												
None											0	
Standard galvanic insulation module											G	
SIL2 galvanic insulation & splitter module											S	
<b>Non-Valid Output</b>												
None											XX	
Diagnostic in fail safe mode on the NV output ****											NV	
<b>Safety Integrity Level</b>												
Non-SIL											N	
SIL2 compliant accordingly to IEC 61508											S	

\* Contact ADEV for other ranges

\*\* Output from probe when connected to a remote ADEV control unit

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

\*\*\*\* Mandatory for probe SIL2 compliant

# Contacts



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