

MiniProbe

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Data sheet

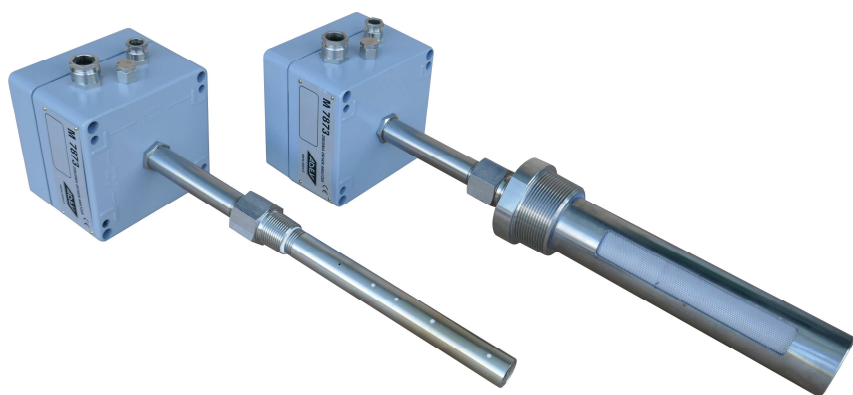
SIL2

IEC 61508

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

Zirconia Probe

for O₂ 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% O2 below 5% or 2% of reading above 5%
Repeatability	± 1% of reading (short term)
Output Resolution	0.01% O2
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% O2 (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

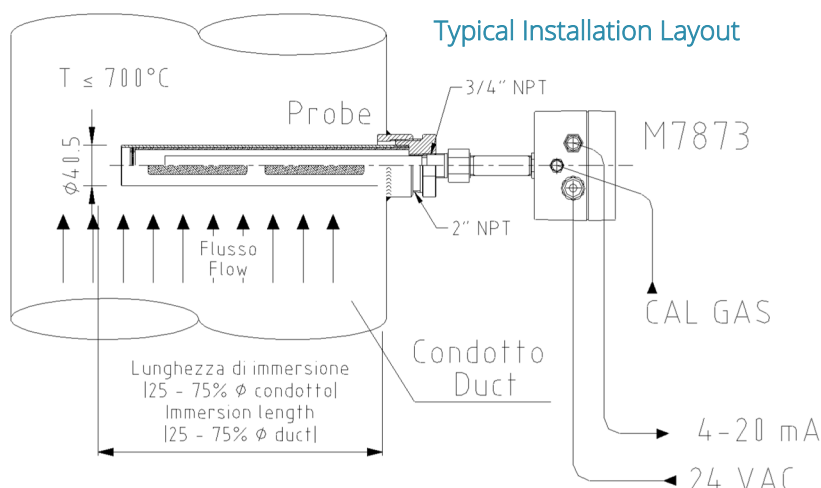
- Low Voltage Directive 2014/35/EU
- EMC Directive 2014/30/EU



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)



H₂O measurement in drying processes
Textile, Pulp&Paper, Tissue, Wood, Concrete



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_2 concentrations (partial pressures), proportional to the temperature in Kelvin degrees ($^{\circ}K$) and the logarithm of the ratio between the two pressures PO_2' and PO_2'' in accordance with Nernst's well-know ratio:

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

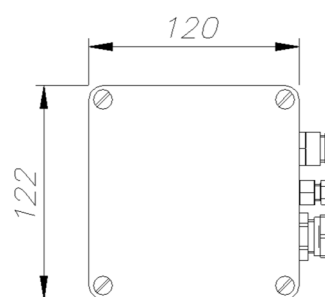
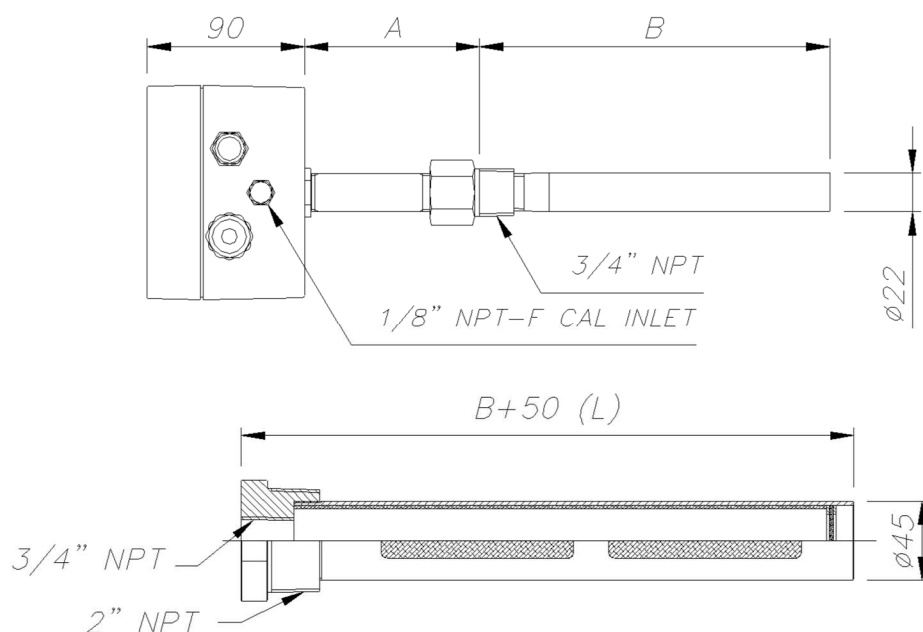
The inner sensing element is based on a proprietary ADEV technology (micro-pod) and features a solid state reference that completely eliminate the need of a reference air flow, making the instrument very easy and practical to use in field.



- ✓ 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_2 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
Quote A										
100 mm		1								
200 mm		2								
300 mm		3								
Quote B										
100 mm			1							
200 mm			2							
300 mm			3							
Special			9							
Range (with 4-20 mA output) *										
0-5%				05						
0-10%				10						
0-25%				25						
Other (with log output) **				99						
Output Signal										
50 mV/decade logarithmic output **					1					
4-20 mA output ***						2				
Special							9			
Mounting										
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
Calibration Circuit										
None								0		
Calibration circuit									1	
Galvanic Insulation Module										
None									0	
Standard galvanic insulation module									G	
SIL2 galvanic insulation & splitter module									S	
Non-Valid Output										
None										XX
Diagnostic in fail safe mode on the NV output ****										NV
Safety Integrity Level										
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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