

7873

Data sheet

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2018

Fit medium & big sized boilers,
power plants and heavy duty
combustion processes

Zirconia Probe

for O₂ measurement
in flue gas up to 700°C



The 7873 Zirconia probe is a rugged in situ analyser, suitable for Oxygen measure in flue gas up to 700°C. Designed to be directly inserted into the smokestack or flue duct.

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

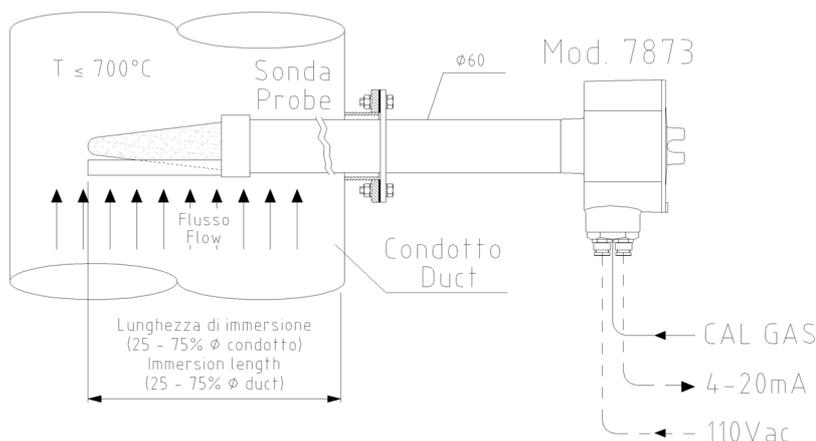
Available up to 2 meters long, the construction of this probe, makes it ideal for heavy duty applications in power plants, incinerators and fired-boilers using low quality fuels such like heavy oils and coal.

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	300 / 450 / 1000 / 1500 / 2000 mm
Process Connection	Flange type
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 300/450 mm: 9 Kg. ; Probe 1000 mm: 10 Kg.; Probe 1500 mm: 11 Kg. ; Probe 2000 mm: 13 Kg.
Wiring Connections	N°2 cable glands for cables max. 10 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 filed
Power Supply	117 VAC ± 10%, 50/60 Hz, 350 VA

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

Typical Installation Layout



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, avoiding abrasion and sticking of dirty material.
- Different types of filter mesh and deflector plate to put against gas flow to limit the dust impact on the sensor



Ceramic fiber mesh
Suitable for non-sticking dust and moderate flow rate applications

Ceramic mesh

Suitable for high dust, sticking particulate and high flow rate that may generate abrasive effect.



No Critical Parts

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

Easy to Use and Service

- Direct insertion into the smokestack or duct
- Possibility to check the calibration without removing the probe from process
- All components parts easily accessible and field serviceable.
- Sensor assembly replaceable without removal of the probe from its mounting.

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



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:

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

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

Best Flue Gas analyser to ensure Oxygen measure in demanding industrial applications



Installation & Protection Tube

More Protection, Easier Installation

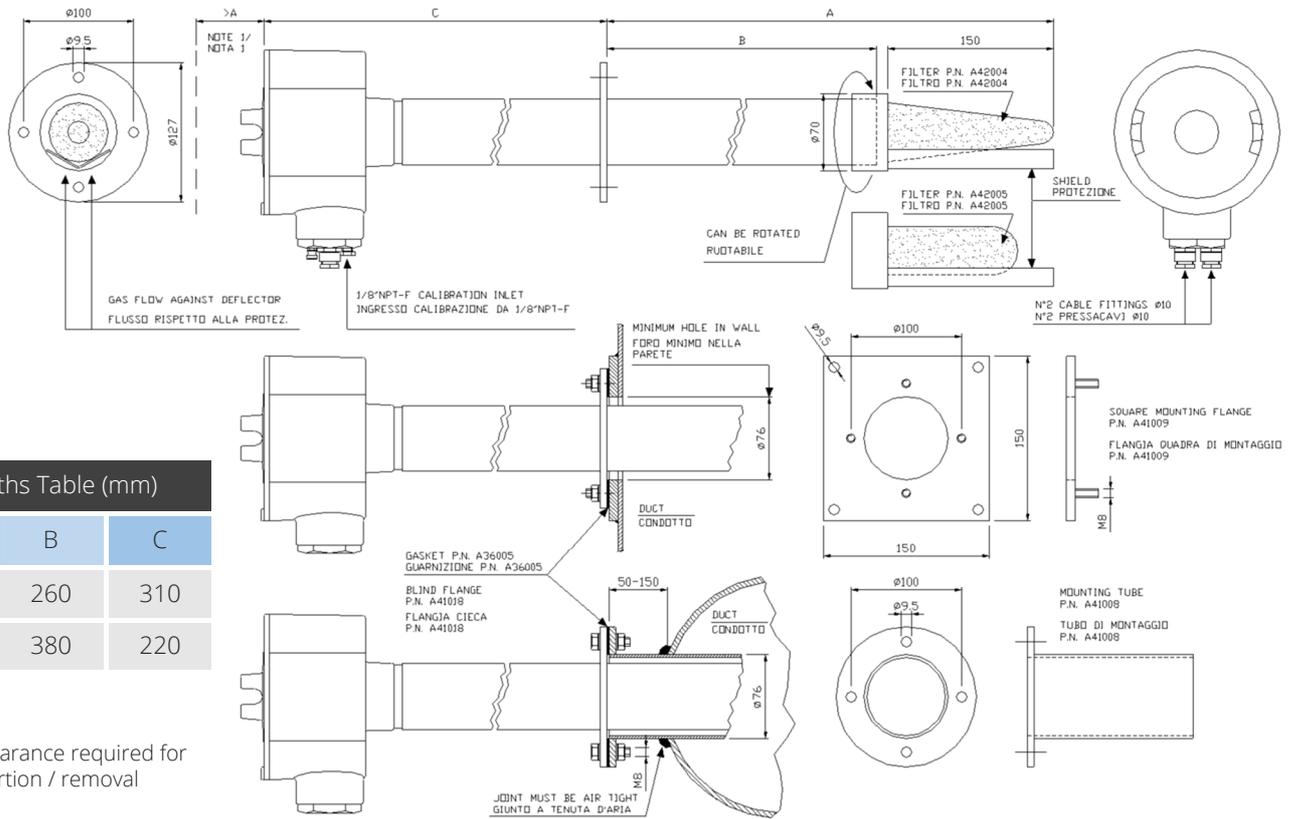
Installation and protection tube is a very rugged SS tube with flange. Its function is to protect the probe from direct impact of dust and particulate that could be present into the duct and that, due to the speed, could have an effect of abrasion. The tube also protects the probe from corrosion caused by chemical substances. The tube also make the probe mounting easier as it's fixed on the duct wall and serves the purpose of support and spacer (if necessary).



Anti-Acid Treatment

Anti-acid treatment is an original ADEV solution consisting of a coating with acid-resistant material, applied on both inner and outer metallic tubes, where acid condensate may happens. The treatment is suggested in case of applications with fuels like coal or heavy oils that generates consistent amount of sulphur components in the flue gas that, condensing in the cold parts, may easily generate corrosion phenomena.

Dimensional Layout of 7873 Probes 300 / 450 mm

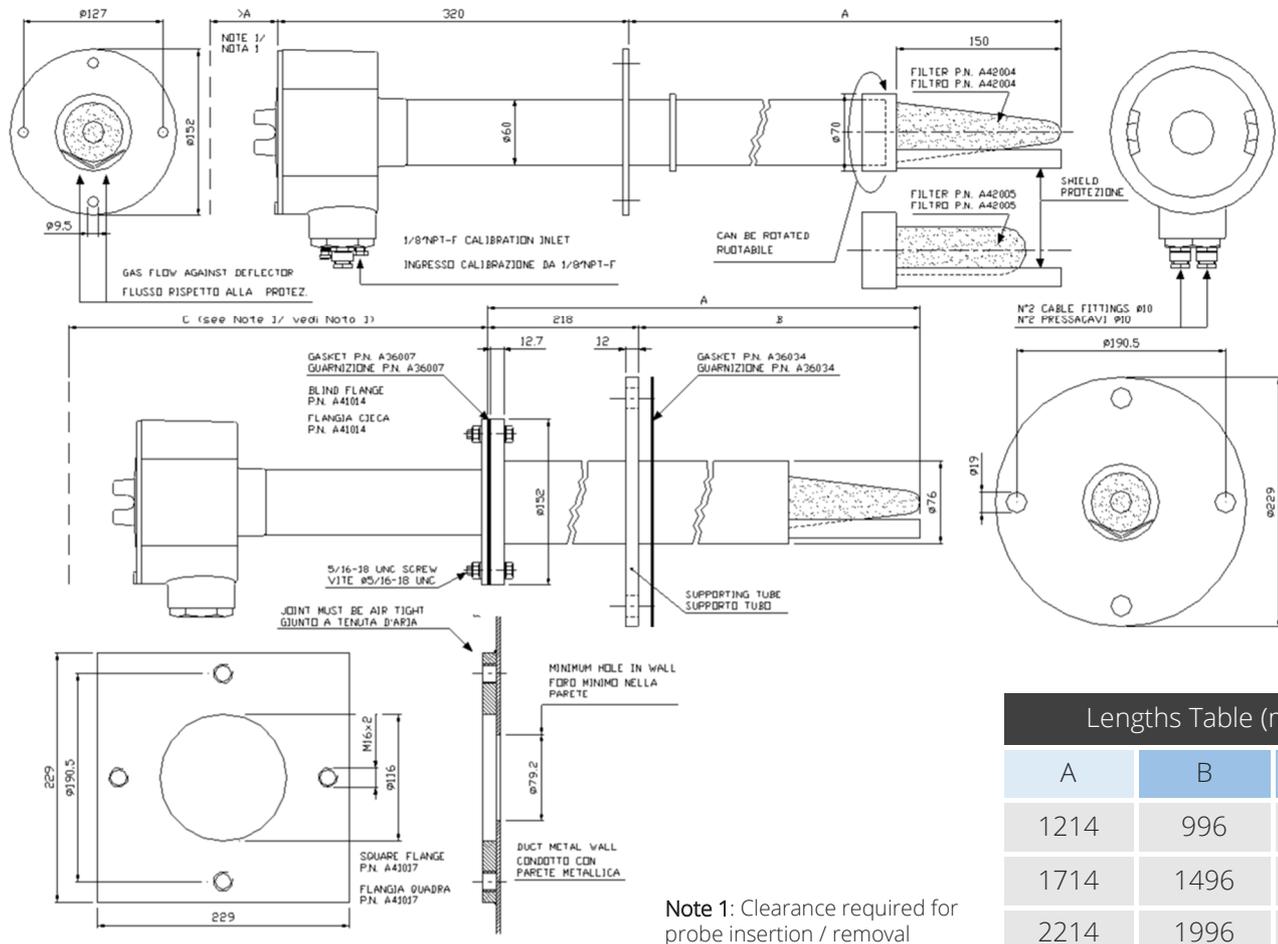


Lengths Table (mm)

A	B	C
420	260	310
540	380	220

Note 1: Clearance required for probe insertion / removal

Dimensional Layout of 7873 Probes 1000 / 1500 / 2000 mm



Lengths Table (mm)

A	B	C
1214	996	1700
1714	1496	2200
2214	1996	2700

Note 1: Clearance required for probe insertion / removal



Ordering

Zirconia Probe	7873
Nominal Insertion Length									
300 mm		30							
450 mm		45							
1000 mm		10							
1500 mm		15							
2000 mm		20							
Special		99							
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					
Filtering Element (on the tip)									
Ceramic fibre filter (standard)					0				
High retention ceramic filter					1				
Special					9				
Mounting									
Flange mounting without installation tube						00			
Installation & protection tube 300 mm						30			
Installation & protection tube 450 mm						45			
Installation & protection tube 1000 mm						10			
Installation & protection tube 1500 mm						15			
Installation & protection tube 2000 mm						20			
Special						99			
Galvanic Insulation Module									
None							0		
Standard galvanic insulation module							G		
Non-Valid Output									
None								XX	
Diagnostic in fail safe mode on the NV output								NV	
Anti-Acid Treatment									
None									0
Anti-Acid treatment on inner & outer tubes (protection against corrosion)									1

* 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

Ordering Example

Zirconia Probe	7873	10	25	2	1	10	0	NV	1
Nominal Insertion Length: 1000 mm									
Range (with 4-20 mA output): 0-25%									
Output Signal: 4-20 mA output									
Filtering Element (on the tip): High retention ceramic filter									
Mounting: Installation & protection tube 1000 mm									
Galvanic Insulation Module: none									
Non-Valid Output: Diagnostic in fail safe mode on the NV output									
Anti-Acid treatment on inner & outer tubes (protection against corrosion)									

Contacts

Applications

- ✓ Industrial boilers using any type of fuel:
Natural gas, LPG, light oils, heavy oils, diesel, coal, biomass
- ✓ Utility Boilers
- ✓ Recovery Boilers
- ✓ Low Temperature Incinerators
- ✓ Power plants
- ✓ Cement Kilns
- ✓ Industrial furnaces
- ✓ Other combustion processes where flue gas up to 700°C (special up to 800°C)



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