



Scientific Oxygen Probe

SIRO₂ C700 DS Probe

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SIRO₂ C700 DS Probe

DS Probe Features

- Probe head
- Reference air
- Stainless steel sheath support



- Electrical connections

Description

The DS scientific probe is gas tight and incorporates a SIRO₂ C700 all ceramic oxygen sensor. The DS probe comes with an optional ceramic sheath for extended life and additional protection. The probe design is specifically intended for small apertures into furnaces. It is used for measurement and control of oxygen sensitive environments at high temperatures. The sensor operates *in situ*, and measures oxygen concentration in real time, without the need for expensive gas sampling, or gas extraction equipment. The probe comes standard with an R-type thermocouple.

Features

- Specific for O₂
- High O₂ sensitivity and selectivity
- High dynamic range of detection
- High temperature of operation
- Rapid responses
- *In situ* measurement
- Solid state electronic component – rugged sensor
- No power consumed for operation under all conditions
- No bias required to operate
- Available up to 1400 mm

Applications

- Fuel combustion efficiency control
- Furnace gas analysis
- Waste management systems
- Temperature and oxygen control of kilns
- Carburising (heat treating) furnace control
- Potters' kilns
- Annealing furnaces
- Large and small electric kilns
- Flue gas analysis
- O₂ levels at high temperatures
- CO₂ harsh environments
- Technical ceramic kiln systems
- Industrial applications
- Metal heat treatment processes
- Molten systems (single use only)
- Copper reverberator

Specifications

Thermal				
Parameter	Minimum	Typical	Maximum	Unit
Operating temperature [†]	600	1200	1650	°C
Operating temperature	1112	2192	3002	°K
Control head operating temperature	—	60	80	°C
Ramp rate	—	—	400	°C/hour
Storage	5	20	50	°C

Electrical				
Parameter	Minimum	Typical	Maximum	Unit
Output voltage range*	2.0	1130	1400	mV @ T ≥ 700 °C
Output impedance	1.00	2.00	10.00	kΩ @ T ≥ 700 °C
Response time	10	20	10000	ms @ T ≥ 700 °C
Offset Error @ 700 °C **	1	2	—	mV @ pO ₂ = pO ₂

Measurement Range				
Parameter	Minimum	Typical	Maximum	Unit
O ₂ Atmosphere	10 ⁻²⁴	—	1	pO ₂ @ 700 °C
O ₂ Atmosphere	10 ⁻¹²	—	1	pO ₂ @ 1300 °C
Gas tight - pressure tested (psi)	450 (65)	500 (72.5)	600 (87)	kpa (psi)
Reference air	—	10	20	mL/min

Probe Mechanical				
Parameter	Minimum	Typical	Maximum	Unit
Sensor outer diameter	7.86	8.00	8.15	mm
Mechanical mount	—	1/2	—	inch - BSP
Cut length	300	—	1400	mm ±3 mm
Weight	0.5	—	1.5	kg

Sheath Mechanical Ceramic				
Parameter	Minimum	Typical	Maximum	Unit
Outer Diameter	14.9	15.0	15.5	mm
Cut length	300	—	1400	mm ±3 mm
Weight	1	—	3	kg

Electrical Connections			
Description	Pin No	Type	Wiring (internal)
Thermocouple positive leg	1	Output	Black (thermocouple +)
Thermocouple negative leg	2	Output	Red (thermocouple -)
Sensor internal (reference) connection	3	Output	Blue (O ₂ sense-reference)
Sensor external (sense) connection	4	Output	Grey (O ₂ sense-chamber)

Connector type				
Mating connector	Manufacturer	Part Number	Supplier	Supplier code
4 Pin female XLR Cannon	Neutrik	NC4MXX	Mouser	568-NC4MXX

† Continuous use of sensor above 1300 °C reduces the lifetime of the sensor.

* Absolute maximum output voltage without damage to the sensor for the given atmosphere of 10-24 oxygen concentration. The sensor will provide an output response above 1130 mV, however lifetime cannot be guaranteed under these operating conditions.

** Offset error should be subtracted from the voltage reading during measurements for high accuracy applications. Also, note that this offset value is temperature dependent.

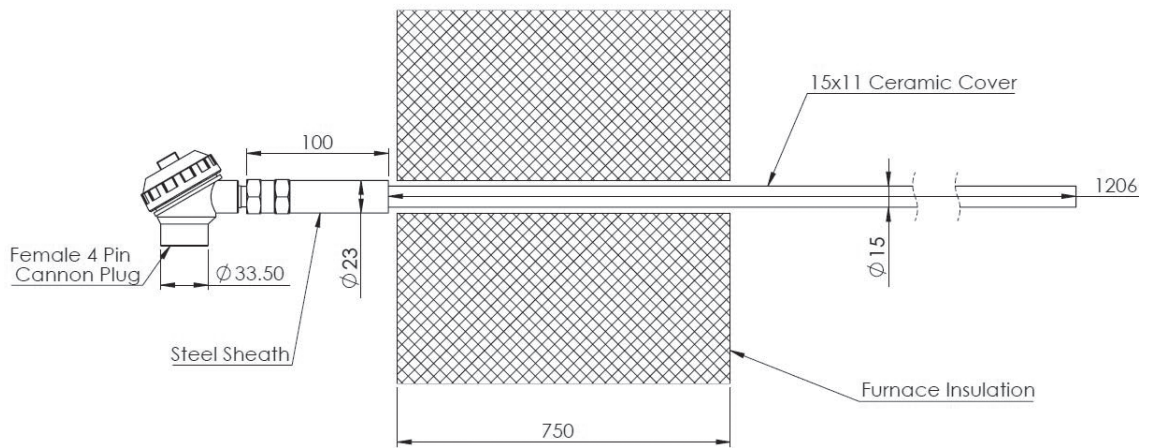
The probe can be installed anywhere in the kiln or furnace if used at temperatures below 1100°C. For operating temperatures above 1100°C, the probe should hang vertically, to avoid bending.

Installation

Probe handling is critical to ensure all seals remain intact.

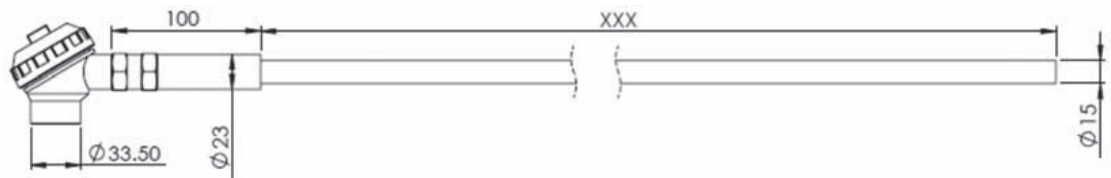
The standard DS probe may be handled by the probe head.

The ceramic sheathed DS probe must be handled by the ceramic sheath with no weight or force applied to the connector head assembly. Two hands should be applied at the quarter mid-points of the ceramic sheath. Carefully insert the probe into the furnace aperture. Once the probe has been inserted the instrument interface cable and reference air may then be connected. The DS-1200-R-CS is shown below installed into a furnace having a wall thickness of 750 mm. This probe design has been tested and found to enter an aperture of $17 \text{ mm} \pm 0.1 \text{ mm}$ over $750 \text{ mm} \pm 0.1 \text{ mm}$.



Ordering information

Probe lengths (XXX) are specified from the end of their stainless-steel fixing to the tip of the ceramic sheath.



This probe can be ordered in a range of different sizes in steps of 100 mm, and with two different thermocouples. The probe part number has the following format.

DS - 0300 - R - CS

—	•	Ceramic sheath	CS for Ceramic sheath NS for no sheath
—	•	Thermocouple	R for R-type thermocouple K for K-type
—	•	Probe length	0300 for 300 mm 0400 for 400 mm ... 1400 for 1400 mm