AUSTRALIAN OXYTROL SYSTEMS

General Oxygen Probe

$SIRO_2$ CP Probe

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$SIRO_2$ CP Probe

1 CP Probe Features

- Probe head
- Reference air
- Stainless steel sheath support

- Electrical connections

2 Description

The CP General probe incorporates a $SIRO_2$ all ceramic oxygen sensor. The CP 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 with a K- or R-type thermocouple.

Features

- Specific for O_2
- High O_2 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 1350 mm

Applications

- Fuel combustion efficiency control
- Furnace gas analysis
- Temperature and oxygen control of kilns
- Potters' kilns
- Large and small electric kilns
- O_2 levels at high temperatures
- CO_2 harsh environments
- Technical ceramic kiln systems
- Industrial applications
- Molten systems (single use only)
- Copper reverberator

3 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	–	–	–	kpa (psi)
Reference air	1	10	20	mL/min
Probe Mechanical				
Parameter	Minimum	Typical	Maximum	Unit
Sensor outer Diameter	7.86	8.00	8.15	mm
Length	300	–	1350	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
Probe length	300	–	1350	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				
Mating connector	Manufacturer	Part Number		
4 Pin male XLR Cannon	Switchcraft	QG4M		

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

†† Under some conditions, an output voltage of 1650 mV may be observed. Readings above 1400 mV or greater than 1600 degrees may result in erroneous readings. 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.

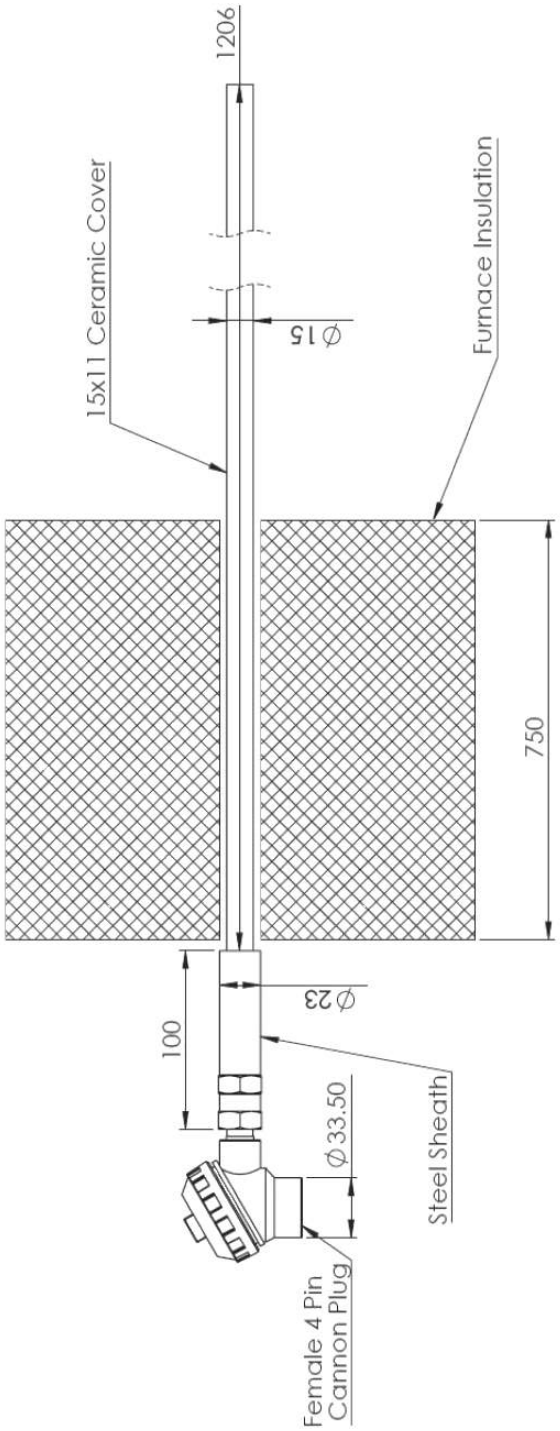
** Offset error should be subtracted from the voltage reading during measurements for high accuracy applications. Also, note that this offset value is temperature dependent.

The sensor within a 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 sag and loss of internal electrical contact. When hanging vertically, the installer must provide appropriate insulation around the probe entry point, to ensure probe head does not overheat.

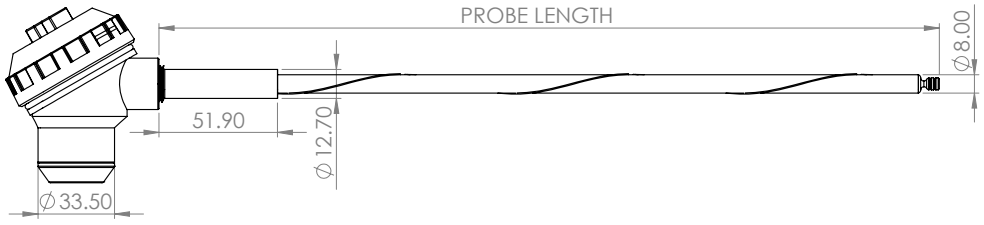
4 Installation

The standard CP probe must not be handled by the probe head.

The ceramic sheathed CP probe must be handled by the ceramic sheath with no weight or force applied to the 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 CP-1200-K-FLS is shown below installed into a furnace having a wall thickness of 750 mm.



5 Ordering information



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.

CP - 0300 - K - FLS

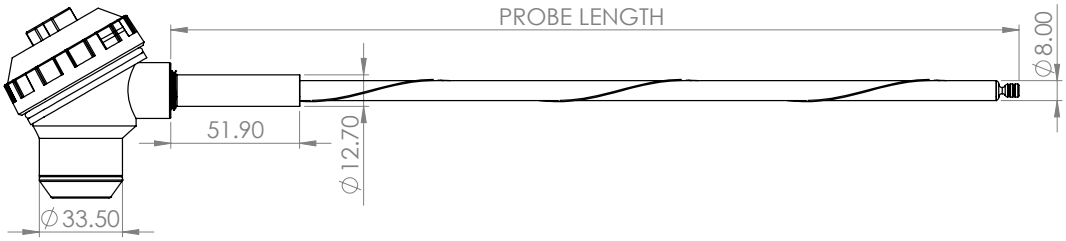
Sheath option
FLS for Full-length Ceramic Sheath
SCS for Short Ceramic Sheath
SSS for Short Stainless Sheath
M16 for No Sheath with an M16 thread
NSH for No Sheath

Thermocouple
R for R-type thermocouple
K for K-type thermocouple
X for no thermocouple

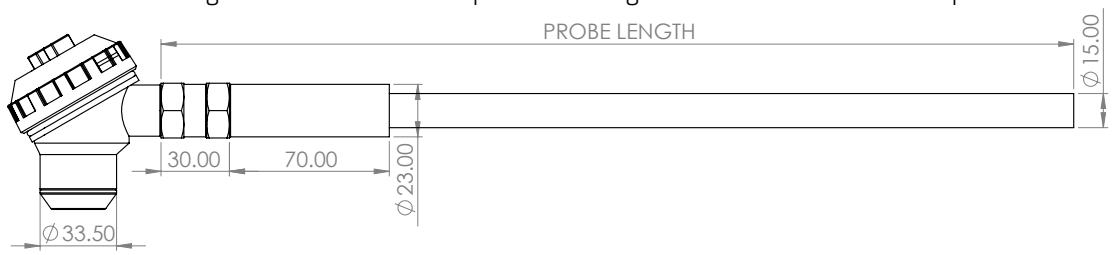
Probe length
0300 for 300 mm
0400 for 400 mm
...
1400 for 1400 mm

5.1 Fitting and sheath options

NSH – Has no ceramic sheath. Appropriate for small furnace openings.



FLS – Comes with a full-length ceramic sheath running the entire length of the probe. The ceramic sheath provides a measure of protection to the sensor tip from direct exposure to corrosive and high velocity gases, reducing overall wear. This option provides some protection from particulates associated with wood firing.A 1" BSPT or NPT compression fitting is available for this sheath option.



M16 – Has no ceramic sheath and comes with an M16 thread. Providing that the furnace has an M16 aperture thread, the probe can be mounted directly to the furnance, without any additional fittings.