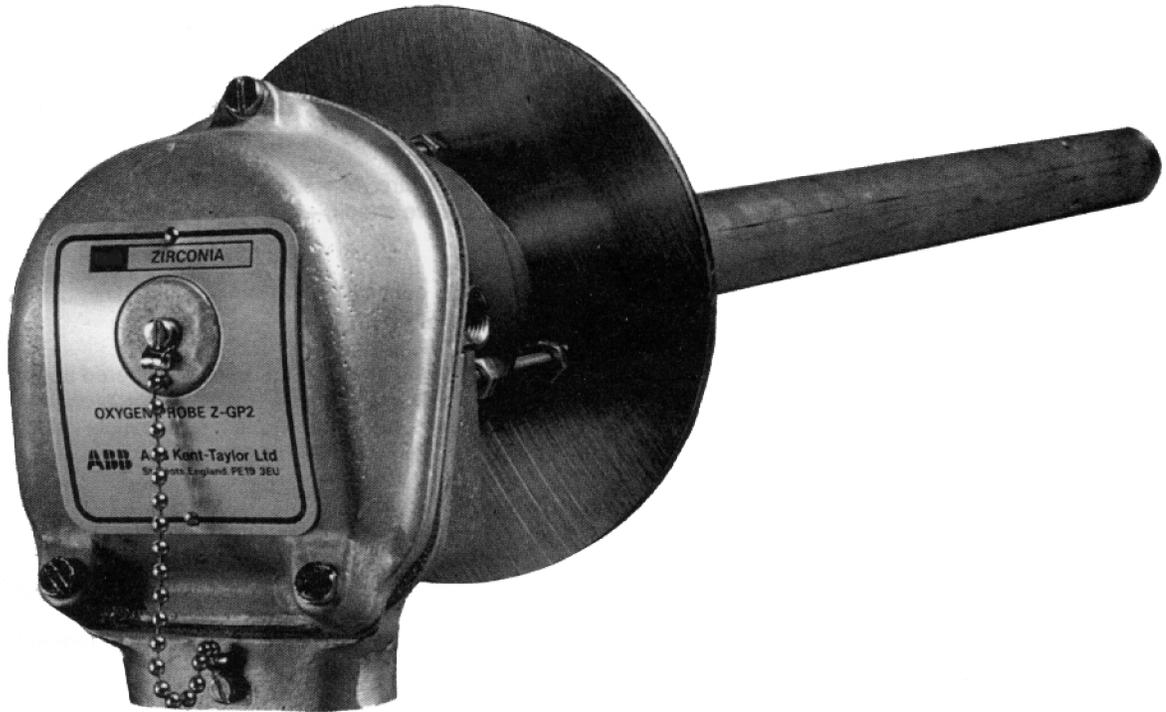


# General Purpose Oxygen Probe

Type ZGP2



- For measurement of O<sub>2</sub> in a variety of processes
- In situ measurement – no sampling system required
- Virtually instantaneous response to changes in gas conditions
- Low maintenance costs
- Test gas facility incorporated for in situ checking of probes
- Integral thermocouple fitted for automatic temperature compensation

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ABB Instrumentation



## Introduction

SUNSTAR传感与控制 <http://www.sensor-ic.com/> TEL:0755-83376549 FAX:0755-83376182 E-MAIL: szss20@163.com

The ZGP2 Zirconia Oxygen Probe is designed to measure oxygen in oxidizing, and some reducing, furnace atmospheres. When used in conjunction with an appropriate electronics unit the probe output voltage may be converted to a signal related either to oxygen concentration or oxidizing potential terms i.e. %O<sub>2</sub>, ppm O<sub>2</sub>, kilocalories or millivolts.

Concentration terms are usually applicable to measurements in oxidizing atmospheres and potential terms are used for reducing atmospheres.

Atmospheres which are strongly reduced and which may have free carbon present are best monitored using the ZCS2 Carbon Sensor Probe.

The probe provides a true measurement of the atmospheric conditions in situ and permits continuous and accurate measurement over a wide temperature range without frequent maintenance associated with external sampling systems. It also eliminates 'equilibrium shift', common to other systems in which gas samples are cooled before measurement, and has a fast response to changes in atmosphere enabling rapid corrective action to be taken when necessary.

The probe comprises a ceramic detector housed in a protective sheath. A thermocouple is fitted within the probe to enable the process temperature to be monitored or for automatic temperature compensation to be provided. The sheath material may be either aluminous porcelain (recommended for oxidizing atmospheres) or Incoloy 800 (recommended for reducing atmospheres) for use at maximum temperatures of 1250°C and 1000°C respectively. Special sheaths are available for use up to 1400°C. A connector head (protected to IP54 or IP56) facilitates connection of the cell output, thermocouple and reference air connections.

## Principle of Operation

The probe comprises a ceramic detector cell housed in a protective sheath. A thermocouple is fitted within the probe to enable the process temperature to be monitored or for automatic temperature compensation to be provided. A connector head facilitates connection of the cell output, thermocouple and reference air connections.

The sheath material may be:

### *Ceramic (aluminous porcelain)*

for oxidizing atmospheres at temperatures up to 1250°C where limited amounts of corrosive chemicals are present

### *Recrystallized alumina (special order)*

for reducing/oxidizing atmospheres at temperatures up to 1400°C and where corrosive chemicals are present

### *Metal (Incoloy 800)*

for reducing/oxidizing atmospheres at temperatures up to 850°C when horizontally mounted and up to 1000°C for vertically mounted

A calibration gas inlet port is provided to enable the probe to be checked using test gas mixtures without removing it from the process.

Reference air [500 to 1000ml/min (1 to 2ft<sup>3</sup>/hr)] is required for accurate operation and can be supplied from an ABB mains powered pump unit or a flow regulator unit.

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## Specification

### Temperature range

600 to 1250°C (1112 to 2282°F).

### Measuring range

Refer to 'Operating Limits' diagram. The lower limit of operation, determined by the onset of electronic conduction in the solid electrolytic is dependent on temperature. As a guide the following limits are given for 1% electronic conduction but in practice it may be possible to measure at even lower oxygen potential levels without introducing significant errors.

Temperature		Minimum O <sub>2</sub>	Minimum O <sub>2</sub> Potential		
Concentration	Output				
(°C)	(°F)	(Kcals)	(bars)	(psi)	mV
600	1112	-145	10 <sup>-36</sup>	145 <sup>-36</sup>	1532
900	1652	-132	10 <sup>-25</sup>	145 <sup>-25</sup>	1391
1200	2192	-117	10 <sup>-17</sup>	145 <sup>-17</sup>	1228

### Response rate

< 42s to 63% of final value, < 47s to 90% of final value.

### Reference air

Clean oil free air. Flow rate 500 to 1000ml/minute (1 to 2ft<sup>3</sup>/hr).

### Construction

Solid electrolyte – stabilized zirconia oxide.  
Protective sheath – aluminous porcelain or Incoloy 800.

### Mounting

Vertical or horizontal 42mm (1.65in) minimum hole diameter as drawing below.

### Connecting cable

2-core copper, overall screened for probe output. 2-core compensating cable to suit thermocouple fitted (NiCr/NiAl or Pt/Pt 13% Rh).

### Thermocouple

Pt/Pt 13% Rh – Pt2 BS4937 type R [600 to 1250°C (1112 to 2282°F)].

NiCr/NiAl – Pt4 BS4937 type K [600 to 900°C (1112 to 1652°F)].

Other types of THC can be supplied on request.

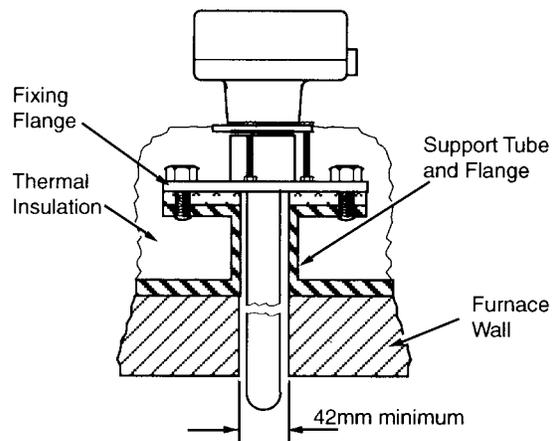
### Insertion length

556mm or 953mm (22in or 37.5in).

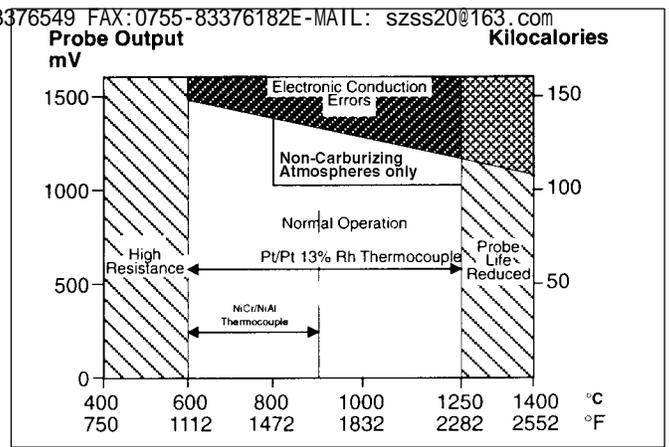
### Weight

2.5kg nett (600mm probe) [5.5lb (22in probe)]

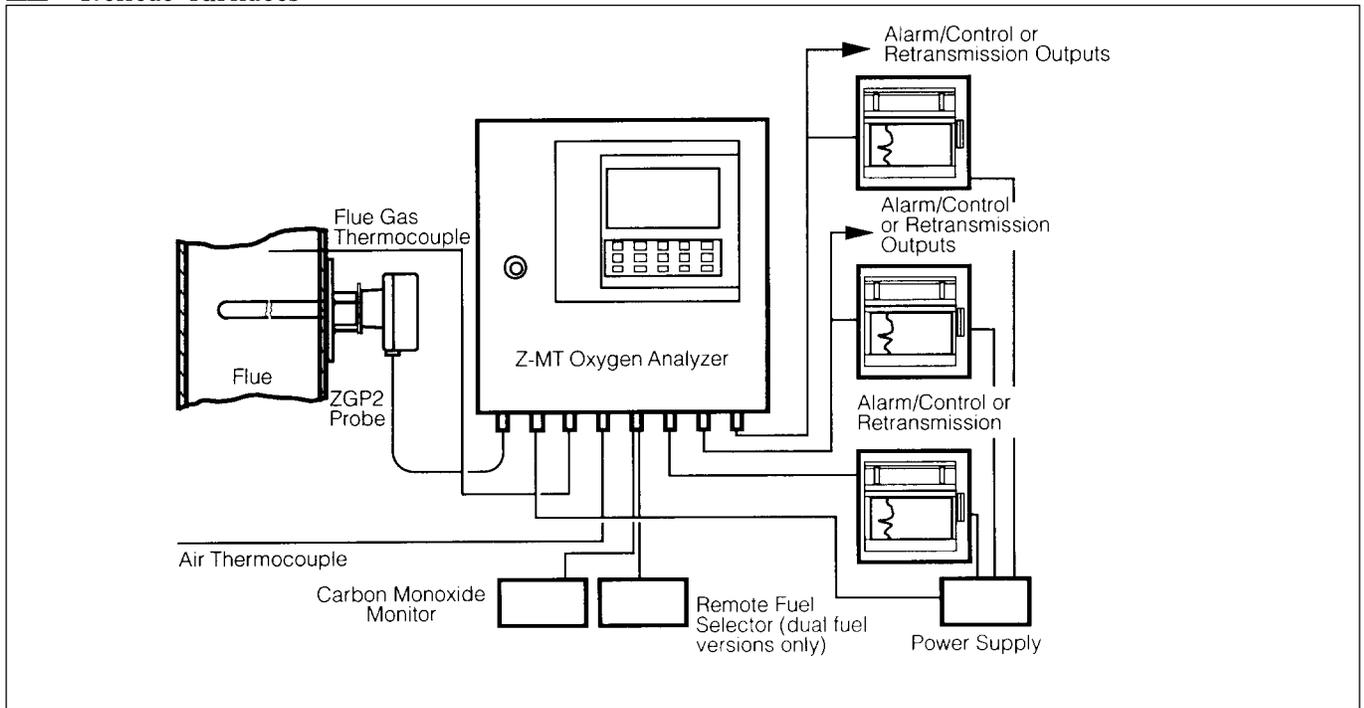
2.8kg nett (1000mm probe) [6.2lb (37.5in probe)].



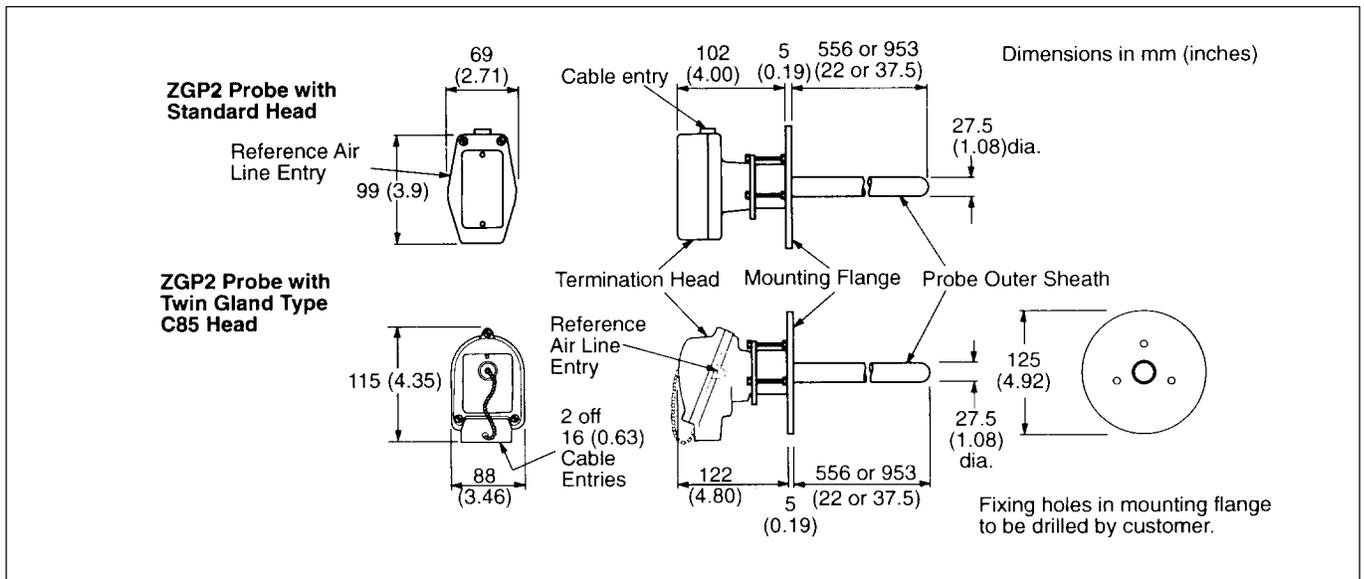
- Annealing furnace atmosphere monitoring
- Sintering of metals
- Ferrite sintering
- Combustion measurement and control in soaking pits
- Other combustion processes where the flue gas temperature is in excess of 600°C (1112°F)
- Whiteheart malleablizing
- Reheat furnaces



Operating Limits



Schematic Wiring



Dimension Drawing

Code No.	Description
	<b>BASE NUMBER - 1st thru 4th characters</b>
<b>ZGP2</b>	General Purpose Oxygen Probe
	<b>PROBE LENGTH - 5th character</b>
1	24 in. (600 mm)
2	38 in. (1000 mm)
9	Special
	<b>THERMOCOUPLES - 6th character</b>
1	Pt/Pt 13% Rh T/C Type R
2	NiCr/NiAl Type K
	<b>SHEATH - 7th character</b>
1	Aluminous Porcelain (standard)
2	Incoloy 800
3	Recrystallized aluminum
9	Special
	<b>FITTING - 8th character</b>
1	Flange
	<b>CONNECTOR HEAD - 9th character</b>
0	Standard (NEMA 4)
1	Twin Gland Type C95 Head (NEMA 6)
	<b>ZGP221110 Sample Catalog Number</b>

### Accessories

<b>CABLE</b>	
YBM 1178	Screened output cable (PVC sheath)
YBM 0614	High temperature resistant output cable ( Silicone rubber sheath)
E35	Thermocouple compensating cable (for use with type K thermocouples)
E37	Thermocouple compensating cable (for use with type R thermocouples)



The Company's policy is one of continuous product improvement and the right is reserved to modify specifications contained herein without notice.

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