

ABB MEASUREMENT & ANALYTICS | DATA SHEET

AZ100 series

Zirconia oxygen analyzer
for small boiler applications



Measurement made easy

Economic, efficient and environmentally friendly combustion control

Ideal for small gas/oil fired boilers

Cost-effective solution

- for OEM outlets with a quick return on end-user investment

Continuous on-line measurement

- at less than the price of a spot check portable instrument

Provides EN14001 performance data

- at an affordable price

NEMA 4X / IP66 protection

- for the probe

Linear or logarithmic ranges

- 0 to 5 % up to 0 to 25 % linear
- 2 decades logarithmic from 0.01 to 25 %

Comprehensive diagnostics and built-in software protection

- ensures security and confidence in operation

Introduction

The AZ100 Zirconia Oxygen Analyzer is a versatile system designed primarily for the OEM boiler and burner controls market.

The system is a low-temperature type designed to work in process temperatures up to 800 °C (1472 °F) and with a maximum sensor mounting flange temperature of 400 °C (752 °F).

The analyzer provides oxygen computation, with readout and retransmission, based on the probe mV output signal. The output signal (E mV) is Nernstian in form and follows the equation:

$$E (mV) = 0.0496T(\log_{10} P_0 / P_1) \pm CmV$$

Where: T = Absolute temperature

P₀ = Reference O₂ partial pressure

P₁ = Sample O₂ partial pressure

C = Cell constant (mV zero offset)

0.0496 = Faraday's gas constant

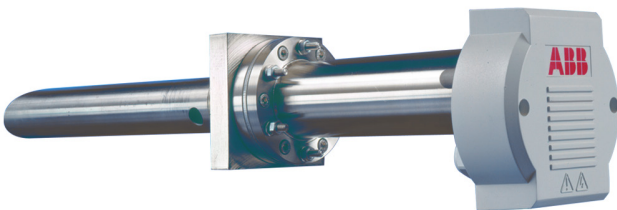
Probe design

The probe uses the proven and innovative ABB electrode and cell design technology which has been so reliable in other ABB zirconia probe designs.

The flexible probe design gives a range of intake tube lengths to suit all applications and an optional filter/flame arrester making it safe for use where groups IIB and IIC gases may occur in the process being measured. The probe has options of male thread NPT or BSPT mountings. As with all previous ABB designs of low temperature probes, the AZ100 probe is site-serviceable.

As the sensor housing is located on the outside of the duct wall, diffusion of reference air into the sensor housing is sufficient; thus eliminating the need for an air pump or instrument air supply.

The reference air diffuses into the housing through a porous membrane which restricts entry to air only and maintains the IP66 (NEMA 4X) protection.



Transmitter design





The transmitter has, as standard, high/low alarm relays and a single linear or logarithmic isolated retransmission. Display features include %O₂, cell temperature, heater control output, cell mV, alarm set points, calibration sequence diagnostics and output settings.

At system startup the transmitter controls the level of power to the mains-powered heater within the probe to eliminate the risk of thermal shock to the sensor.

Based on the proven 4600 Series of transmitters, the AZ100 transmitters are environmentally protected to NEMA 4X (IP65)*, and meet the requirements EN61326 for industrial locations.

The AZ100 transmitters have a green, backlit LCD display and four tactile membrane switches for operation and programming. The measured value display is a 5-digit, 7-segment LCD, while the information display is a 16-character, single line, dot-matrix.

The information display can be user-programmed for display in English, French, German or Spanish.

The  switch enables movement from the 'Operating Page' to the oxygen calibration sequence. Use of the appropriate security code allows further access to the pages for 'Setup Outputs' and 'Electrical Calibration'. The  switch is used to select the various programming pages, while the  and  switches change the programmable values.

* Refer to **Specification – Transmitter** for full details.

Specification – transmitter

Display

Measured value

5-digit x 7-segment, backlit LCD

Information

16-character, single-line, dot-matrix, backlit LCD

Parameters

- % O₂ (0 to 25 %)
- Cell temperature
- Cell mV
- Two alarm set points
- Alarm 2 can be configured as a general alarm for any of the following:
 - THC open circuit + check THC open circuit, short circuit or reversed
 - Cell warming up
 - Calibration failed
 - Cell stability check
 - Power failure

Accuracies

Oxygen concentration (display and retransmission)

≤3 % of reading or ±0.1% O₂ (whichever is the greater)

Display resolution

±1 digit

Environmental data

Operating temperature limits

- –5 to 55 °C (23 to 131 °F) all functions
- –20° to 70 °C (–4 to 158 °F) retransmission

Storage temperature

–25 to 75° C (–13 to 131° F)

Operating humidity limits

Up to 95 % RH non-condensing

Power supply

Voltage requirements

- 100 to 130 V, 200 to 260 V 50 / 60 Hz
- Nom. 115 / 230 V AC 50 / 60 Hz

Power consumption (total system)

- 113 VA at start up (sensor)
- 6 VA at start up (transmitter)
- 47 VA operational

Insulation

Mains to earth (line to ground) 2 kV RMS

Outputs and set points

No. of relays

Two

Relay contacts

Single pole changeover

Rating 3 A 250 V AC

3 A 250 V DC

Loading (non-inductive) 750 VA 30 W

Loading (inductive) 75 VA 3 W

Insulation

2 kV RMS contacts to earth (ground)

No. of alarm set points

Two

Set point adjustment

Programmable

Set point hysteresis

±1 % of set point (fixed)

Local set point annunciation

Red LED

Retransmission

One fully isolated retransmission output

- Linear output
 - Range 0 to 25 % O₂ programmable
 - Minimum span 5 %
- Logarithmic output
 - Range 0.1 to 25 % O₂ programmable
 - Minimum span any 2 decades in range

Output current

0 to 10 mA, 0 to 20 mA or 4 to 20 mA user-programmable

Resolution

0.1 % at 10 mA, 0.05 % at 20 mA

Max. load resistance

750 Ω (20 mA max.)

Output loop test

Output loop test at 0 %, 25 %, 50 %, 75 % and 100 % of output span

Mechanical data

Mounting options

- Wall-mount
- Post-mount
- Panel-mount

Protection to NEMA 4X (IP65)

- Wall / post mount transmitter
- Panel-mount transmitter (front only)

Overall dimensions

- Wall-mount transmitter:
160 wide x 214 high x 68 mm deep
(6.3 wide x 8.43 high x 2.68 in. deep)
- Panel-mount transmitter:
96 x 96 x 191 mm deep
(3.78 x 3.78 x 7.52 in. deep)

Weight

- Wall-mount transmitter 2.0 kg (4.4 lb)
- Panel-mount transmitter 1.5 kg (3.3 lb)
- Post-mount kit 1.5 kg (3.3 lb)

System Accuracy

Display

≤ 2 % of reading or ± 0.1 % O₂ (whichever is the greater),
for 30 °C (86 °F) ambient temperature change

Retransmission

≤ 3 % of reading or ± 0.1 % O₂ (whichever is the greater),
for 30 °C (86 °F) ambient temperature change

Error due to power supply variation

< 0.1 % O₂ for ± 10 % variation from normal supply voltage

Error due to flue wall temperature change

0.017 % of reading/°C (0.008 % of reading/°F)

* for 2 point calibration against certified test gases

Specification – Probe

Environmental data

Process gas temperature

–20 to 800 °C (–4 to 1472 °F)

Maximum sensor flange temperature

–400 °C (–752 °F)

Ambient air temperature

–20 to 70 °C (–4 to 158 °F)

Environmental protection

NEMA 4X / IP66 (hose down)

Electrical data

Signal cable

6-way, multicore, screened cable with copper conductors available in standard lengths of 25, 50 or 100 m (81.25, 162.5 or 325 ft.)

Thermocouple

NiCr/NiAl Pt.4 BS4937 Type K

Mechanical Data

Insertion lengths

200, 350, 500 or 650 mm (7.9, 13.8, 19.7 or 25.6 in.)

Response time

- 3s
- Time to t90 35s (typical)

Mountings

2 in. NPT, 2 in. BSPT or Adapter/ Standoff spool to suit the 0.4m ZFG2 mounting plate

Overall dimensions

See page 8

Weight

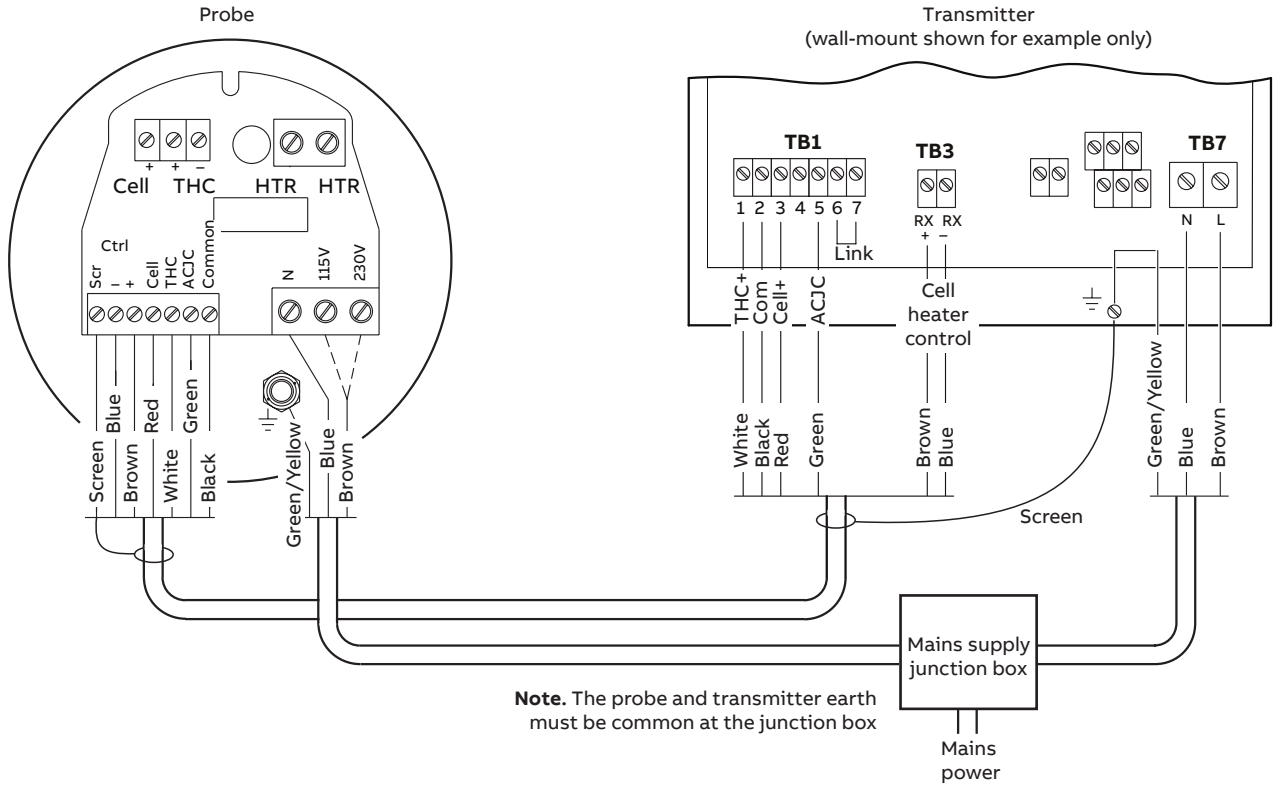
Probe complete with mounting flange and the following length intakes:

- 200 mm (7.9 in.) 4.8 kg (10.6 lb)
- 350 mm (13.8 in.) 5.1 kg (11.2 lb)
- 500 mm (19.7 in.) 5.4 kg (11.9 lb)
- 650 mm (25.6 in.) 5.7 kg (12.5 lb)

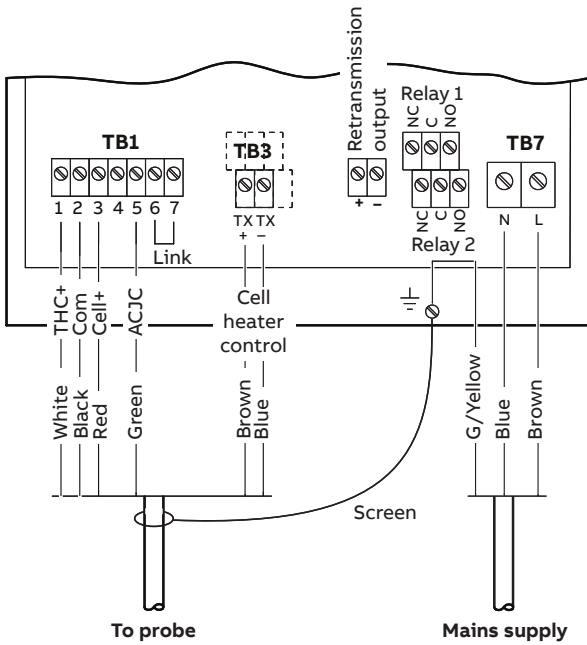
Serviceability

Site-serviceable (replaceable sensor / oven assembly, filter / flame arrester and intake tubes)

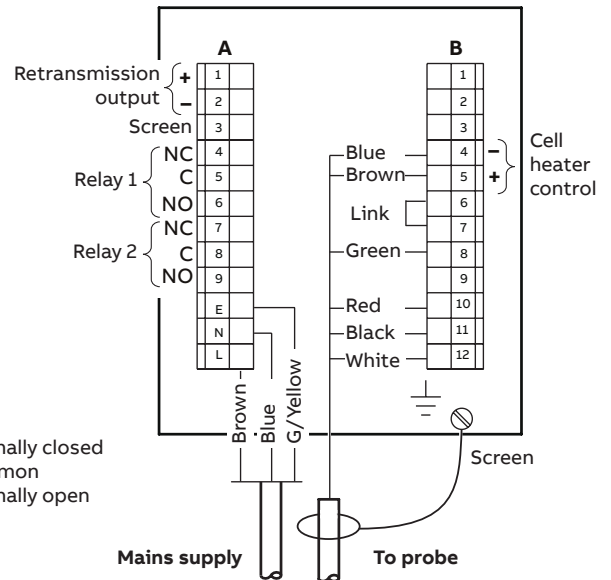
Electrical connections



Mains supply connections



Wall- /Pipe-mounted transmitter connections

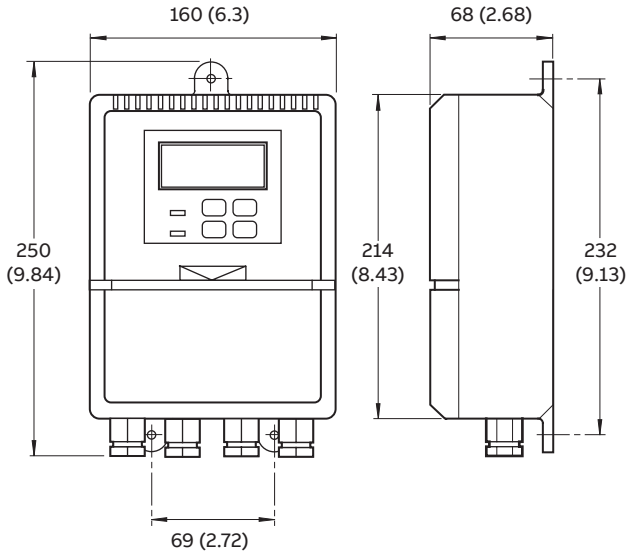


Panel-mounted transmitter connections

NC = normally closed
 C = common
 NO = normally open

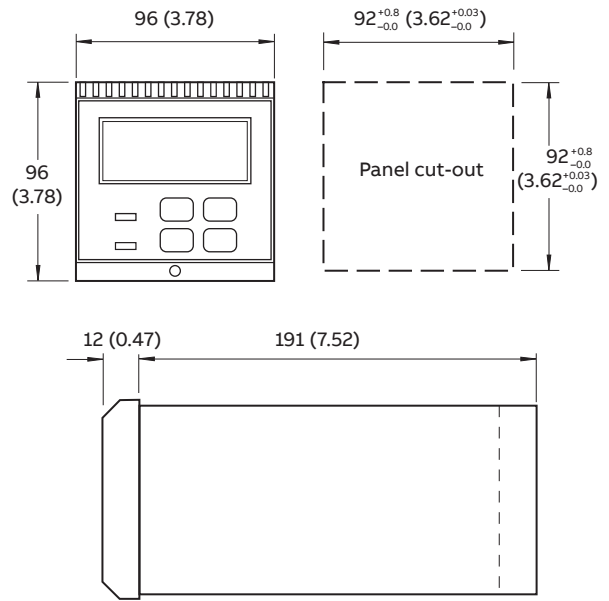
Overall dimensions

Dimensions in mm (in.)



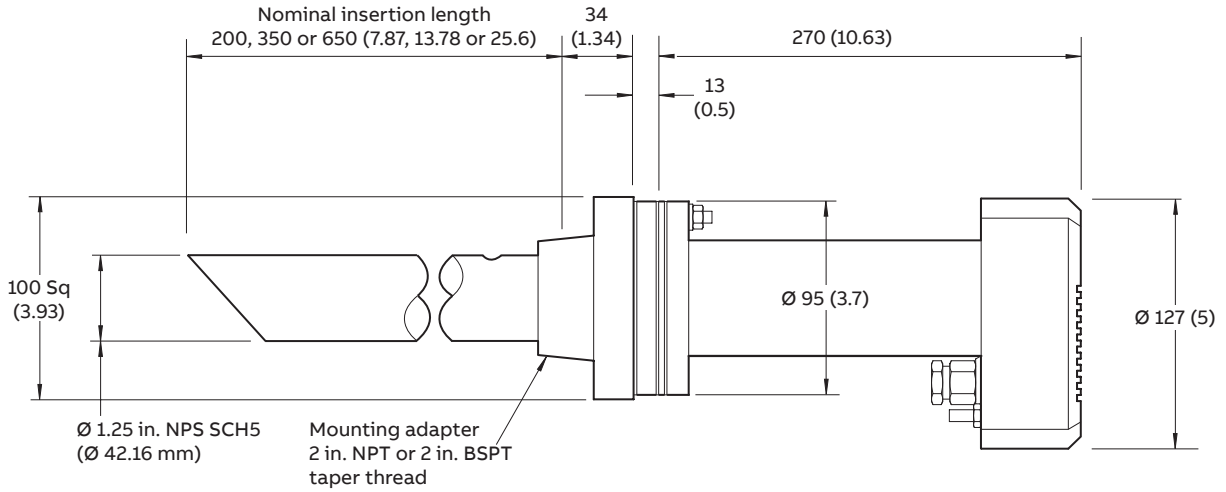
Wall-mount transmitter

Dimensions in mm (in.)



Panel-mount transmitter

Dimensions in mm (in.)



Probe

Ordering information

AZ100 series zirconia oxygen analyzer for small boiler applications	AZ1	X	X/	X	X	X	X	X	X
Probe									
Not required		0							
No purge with arrester		2							
Sample tube length									
200 mm (7.9 in.)			1						
350 mm (13.8 in.)			2						
500 mm (19.7 in.)			3						
650 mm (25.6 in.)			4						
Probe mount									
Not required				0					
2 in. NPT				1					
2 in. BSP				2					
Transmitter									
Not required					0				
230 V wall-mount					1				
230 V post-mount					2				
230 V panel-mount					3				
115 V wall-mount					4				
115 V post-mount					5				
115 V panel-mount					6				
Signal cable									
Not required						0			
10 m (32.8 ft.)						1			
25 m (82 ft.)						2			
50 m (164 ft.)						3			
100 m (328 ft.) (maximum)						4			
Approvals									
CE only								0	
Language									
English									1
German									2
French									3
Spanish									4
Configuration									
ABB (Standard)									0



Notes

ABB Limited**Measurement & Analytics**

Oldends Lane, Stonehouse
Gloucestershire, GL10 3TA
UK

Tel: +44 (0)1453 826 661

Fax: +44 (0)1453 829 671

ABB Inc.**Measurement & Analytics**

125 E. County Line Road
Warminster, PA 18974

USA

Tel: +1 215 674 6000

Fax: +1 215 674 7183

abb.com/measurement

We reserve the right to make technical changes or modify the contents of this document without prior notice. With regard to purchase orders, the agreed particulars shall prevail. ABB does not accept any responsibility whatsoever for potential errors or possible lack of information in this document.

We reserve all rights in this document and in the subject matter and illustrations contained therein. Any reproduction, disclosure to third parties or utilization of its contents – in whole or in parts – is forbidden without prior written consent of ABB.

© Copyright 2017 ABB.
All rights reserved.