Panametrics

Datasheet




# XMO2

## Panametrics smart oxygen analyzer

**Smart oxygen transmitter**

The XMO2 thermoparamagnetic oxygen transmitter is the most stable oxygen analyzer available on the market today. It represents the state of the art in oxygen measurement. With the XMO2 transmitter, reliable process oxygen measurement can be as easy as temperature or pressure measurement.

PANA056DS Rev. 10

## Features

- Measurement ranges from 0.01 percent to 100 percent $O_2$ in gases
- Explosion-proof and flameproof enclosure with weatherproof protection allows sensor to be remotely mounted at the measurement point
- Push-button, single or dual gas calibration
- Compact, rugged sensor design with no moving parts provides long term reliability and trouble-free operation
- Dual-bridge measurement circuit compensates for variations in background gas composition
- Unique dual-chamber, temperature-controlled cell design provides resistance to contamination and flow fluctuation
- Computer-enhanced accuracy of 1 percent of span and linearity of better than 0.5 percent of span

## Applications

An oxygen transmitter for use in:

- Inerting/blanketing liquid storage tanks
- Reactor feed gases
- Centrifuge gases
- Catalyst regeneration
- Solvent recovery
- Landfill gas
- Sewage wastewater digester gas
- Oxygen purity

## Top performance and ease of use

The XMO2 combines computer-enhanced, automatic oxygen signal compensation, fast-response software, real-time error detection and automated calibration with a proven thermoparamagnetic oxygen sensor to achieve unequaled performance and ease of use.

The compact, weatherproof, explosion-proof and flameproof XMO2 is specifically designed to be field installed at the process measurement point, thus minimizing sample-conditioning requirements while ensuring the best sample and the fastest possible response. With no moving parts, it is insensitive to mounting position or vibration, and it has excellent long-term reliability. The XMO2's dual-chamber oxygen cell design makes it resistant to contamination and flow variation.

## Automatic background gas compensation

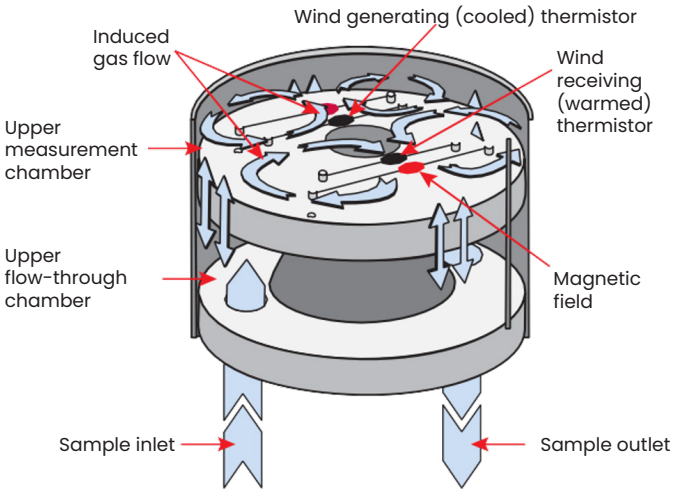
An onboard microprocessor gives the XMO2 the computing power to provide advanced online signal conditioning and digital communications via an RS232 interface and menu-driven software. Integrated signal-processing algorithms provide improved linearity and accuracy, and automatic compensation for background gas variations and/or atmospheric pressure effects. A fast-response software routine provides typical response time of less than 15 seconds. When recalibration does become necessary, it can be accomplished quickly and easily through software, with no potentiometers to adjust.

## Choice of enclosures and ranges

The XMO2 requires 24 VDC power and provides a 4 to 20 mA output signal with fully programmable zero and span settings. The output is proportional to oxygen concentration and internally compensated for background gas and/or atmospheric pressure variations. The weatherproof and explosion-proof options are available in a wide variety of measurement ranges.

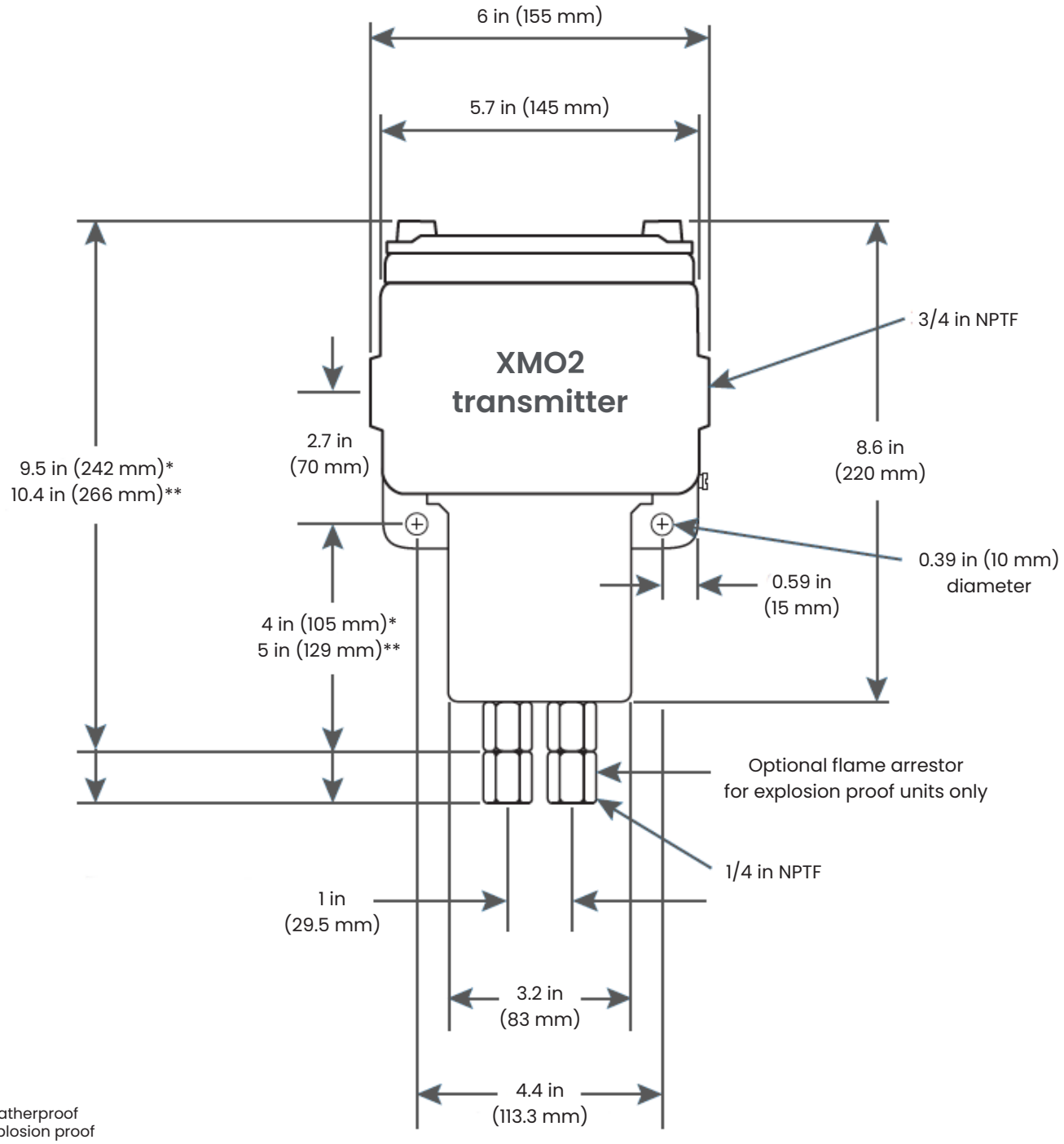
## XMO2 accessories

Panametrics provides a complete line of accessories for use with the XMO2. This includes sample systems custom-designed for specific applications, a 24 VDC power supply and a four-wire color-coded cable in lengths up to 4000 ft (1200 m). The XMO2 can also be interfaced with other Panametrics displays and analyzers, such as the TMO2D, XDP and moisture.IQ analyzers. The TMO2D and XDP displays provide microprocessor-based oxygen signal compensation for maximum accuracy, software-enhanced response and automatic calibration of the XMO2 transmitter.




Flow schematic of the XMO2 thermoparamagnetic oxygen measuring cell. Oxygens paramagnetic property causes an oxygen-containing gas sample to move within the magnetic field. The gas movement creates a "magnetic wind" that is sensed by the thermistor pairs. Oxygen concentration and background gas compensation are determined by the transmitters microprocessor.

## Dimensions




*Weatherproof
**Explosion proof

N4271 CE

# Technical Specifications

| | |
|---|---|
| **Accuracy** | • ±1% of span<br>• ±2% of span for 0 to 1% range<br>• ±0.2% O2 for 90 to 100% and 80 to 100% ranges |
| **Linearity** | ±0.5% of span |
| **Repeatability** | ±0.2% of span |
| **Measurement resolution** | 0.01 mA |
| **Zero stability** | ±1% of span per month (±2% for 0 to 1% range) |
| **Span stability** | ±0.4% of span per month (±0.8% for 0 to 1% range) |
| **Digital interfaces** | • 0% to 1%<br>• 0% to 2%<br>• 0% to 5%<br>• 0% to 10%<br>• 0% to 21%<br>• 0% to 25%<br>• 0% to 50%*<br>• 0% to 100%*<br>• 90% to 100%*<br>• 80% to 100%*<br>*Pressure compensation required |
| **Transmitter temperature** | • Standard: Controlled to 113°F (45°C)<br>• Optional: Controlled to 140°F (60°C) |
| **Pressure effect** | • ±0.2% of span per mm Hg (without atmospheric pressure compensation)<br>• Option available for atmospheric pressure compensation |
| **Required sample flow rate** | • Nominal: 1.0 SCFH (500 cc/min)<br>• Range: 0.1–2.0 SCFH (50–1000 cc/min) |
| **Sample flow rate effect** | Less than 1% of span for flow range of 0.1 to 2.0 SCFH (50 to 1000 cc/min) for weatherproof XMO2 with background gas compensation |
| **Response time, 90% step change** | • Standard: 70 seconds<br>• EN50104: 45 seconds<br>• Fast: 15 seconds |
| **Warm-up time** | 30 minutes |




The XMO2 output may be used as an input to the Panametrics moisture.IQ analyzer for simultaneous measurement and display of both moisture and oxygen content.

## Functional

| | |
|---|---|
| **Analog output** | 4 to 20 mA, isolated, 800 Ω maximum load, field programmable |
| **Digital output** | RS232, three-wire |
| **Power** | 24 VDC ±4 VDC, 1.2 A maximum |
| **Cable** | • Standard: 10 ft (3 m), four-wire<br>• Optional: Lengths up to 4000 ft (1200 m) available for current output |
| **Ambient temperature range (Sample conditions)** | • –4 to 104°F (–20 to 40°C), standard cell operating temperature of 113°F (45°C)<br>• 23 to 131°F (–5 to 55°C), optional cell operating temperature of 140°F (60°C) |
| **Maximum pressure** | 20 psig (1.38 barg) |

## Physical

| | |
|---|---|
| **Wetted sensor materials** | • Standard: 316 stainless steel, glass and Viton® O-rings<br>• Optional: Hastelloy® C276 and Chemraz® O-rings<br>• Optional: 316 Stainless steel, glass and Chemraz® O-Rings |
| **Dimensions** | • Weatherproof unit (h x diameter): 9.53 x 5.71 in. (242 x 145 mm)<br>• Explosion-proof/weatherproof unit (h x diameter): 10.47 x 5.71 in. (266 x 145 mm |
| **Weight** | 9.5 lb (4.3 kg) |
| **European compliance** | Complies with the 2014/30/EU EMC Directive and the 2014/68/EU PED Directive for DN<25 |
| **Environmental, transmitter** | • Weatherproof: Type 4X/IP66<br>• Explosion-proof: Class I, Division 1, Groups A,B,C&D, FM/CSA<br>• Flameproof:<br>ATEX : Ex II 2 GD Ex d IIc TC IP66<br>IECEX : Ex d IIc T6 IP 66 Class 1 Zone 1<br>ATEX compliance with EN50104 requires response-time calibration to EN50104 and constant control of sample-system pressure or pressure compensation of XMO2. |

# Ordering information - XMO2 Transmitter

**Model:**

XMO2 XMO2 Thermoparamagnetic Oxygen Transmitter, 4 to 20 mA output

**Enclosure:**

| | |
|---|---|
| **1** | Weatherproof enclosure |
| **2** | Explosion proof enclosure |
| **6** | Weatherproof with external dual calibration switches |
| **7** | Explosion proof with external dual calibration switches, design certified to ATEX only |
| **8** | Stainless steel explosion proof enclosure; design certified to IECEx/ATEX |
| **A** | Stainless steel explosion proof enclosure with external zero/span selector switch and calibration button; design certified to ATEX only |
| **X** | Without enclosure |
| **Y** | Without enclosure, with wiring for single external cal gas switch |
| **Z** | Without enclosure with wiring for external dual calibration switches |

Note: Options X, Y, and Z are spare parts, which require a 24 VDC power supply. Specify serial number of existing transmitter.

**CE Compliance:**

| | |
|---|---|
| **H** | Standard |
| **C** | CE compliants |

Note 1: For C=C and B=1, 3, or 6, one cable gland PN 419-215 is included for X4(10) power/output cable; Second cable gland for use with 704-668-12 RS232 cable must be ordered as a separate item.
Note 2: For C=C and B=2, 4, or 7, one cable gland PN 419-217 is included for Z4(10) power/output cable; Second cable gland for use with 704-1262-12 RS232 cable must be ordered as a separate item.

**Compensation/communication:**

| | |
|---|---|
| **3** | Background gas compensation only; IDM/Panaview user program |
| **4** | Atmospheric pressure and background gas compensation; IDM/Panaview user program |

**Wetted Material**

| | |
|---|---|
| **1** | Wetted materials of 316 Stainless Steel and Viton O-Rings |
| **2** | Wetted materials of Hastelloy C276 with Chemraz O-Rings |
| **3** | Wetted materials of 316 stainless steel with Chemraz O-rings |

**Special**

| | |
|---|---|
| **0** | None |
| **S** | Consult factory |

Note 1: Pressure compensation (XMO2 Option D= 4) required for 30% O2 or greater. Atmospheric pressure compensation is recommended for transmitters used in ambient air monitoring applications.
Note 2: For a transmitter operating at 20.9% oxygen the typical changes in atmospheric pressure of ±10 mmHg can result in changes of ±0.4% oxygen. Refer to the pressure effect specification.

**XMO2 - 1 - H - 3 - 1 - 0 (example part number)**

# Ordering information - XMO2 calibration

**Calibration:**

XCAL XMO2 calibration

**Range of oxygen output:**

| | |
|---|---|
| **1** | 0 to 1% oxygen |
| **2** | 0 to 2% oxygen |
| **3** | 0 to 5% oxygen |
| **4** | 0 to 10% oxygen |
| **5** | 0 to 21% oxygen |
| **6** | 0 to 25% oxygen |
| **7** | 0 to 50% oxygen |
| **8** | 0 to 100% oxygen |
| **A** | 90 to 100% oxygen |
| **B** | 80 to 100% oxygen |
| **S** | Special range |

**Compensation signal::**

| | |
|---|---|
| **1** | Background gas compensation only; standard $N_2/CO_2$ |
| **2** | Atmospheric pressure compensation only; standard range 700 to 800 mmHg |
| **3** | Background gas compensation only; special gas |
| **4** | Atmospheric pressure compensation only; special range |
| **5** | Standard background gas $N_2/CO_2$ and atmospheric pressure compensation; 700 to 800 mmHg, zero based ranges only |
| **7** | Calibrate at 0, 2, 10 and 21% O2 with $N_2$ and 14% $CO_2$ / 86% $N_2$ background gases |
| **S** | Special |

**Response:**

| | |
|---|---|
| **1** | Standard response (70 seconds) |
| **2** | Response to meet EN50104 (45 seconds) |
| **3** | Fast response (15 seconds) |

**Temperature control setpoint**

| | |
|---|---|
| **1** | 45°C temperature set point |
| **2** | 60°C temperature set point |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| XCAL | - | **5** | - | **1** | - | **1** | - | **1** | **(example part number)** |

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