

# TM2000

Oxygen Analyzer Quickly Responds to Process Change

**Thermox**<sup>®</sup>  
The right analyzer for your application

The TM2000 oxygen analyzer protects industrial processes by quickly responding to changes using an industry-proven zirconium oxide sensor. It operates within a wide operating range of 0.1 ppm to 100% oxygen, and can accurately respond from atmosphere to low ppm oxygen levels in just seconds. In addition, the TM2000 can detect excess combustibles process upsets in the presence of very low ppm oxygen readings. This unique benefit is particularly important in cryogenic gas generating processes, where the TM2000 can distinguish between an oxygen upset condition and an excess combustibles upset condition.

The TM2000 is supported by the state-of-the-art Series 2000 controller, with input and output electronic transient protection and a standard weatherproof housing. The controller can be housed separately from the sensor.

## KEY BENEFITS

- RS-485 serial communications, 0 - 20/4 - 20 mA current outputs, and digital alarms for systems integration.
- Save money on calibration gases by calibrating with percent gases, and then reading accurately in low ppm ranges.
- Modular design for easy upgrades and field service.
- User-friendly, menu driven software that includes helpful system status text messages allows you to begin using the TM2000 quickly. Advanced software diagnostics and on-line help further simplify the use of the TM2000.
- The zirconium oxide sensor will not fail to a zero oxygen reading, as with other sensor technologies. Therefore, your process is always protected.
- Optional sample bypass improves response times and keeps sensor inlet purged of dead volume.



## THE COMPANY

AMETEK, manufacturer of the Thermox product line, is a leading global producer of precision instruments, electro-mechanical devices and engineered industrial materials. The Thermox product line is backed by over 30 years experience. Thermox pioneered the industrial use of zirconium oxide to measure oxygen in 1967, and is supported by more than 80 sales representative and distributor organizations worldwide. The Thermox facility of AMETEK is ISO 9001 registered.

## APPLICATIONS

- Cryogenic gas generating systems
- Nitrogen purity systems
- Blanket gas analysis
- Inert gas purity
- Welding atmospheres
- Air separation
- Atmospheric oven control
- Glove box applications

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## CONTROL UNIT

### Display:

Four line by 20 character vacuum fluorescent. Displays combinations of oxygen (0.1 ppm O<sub>2</sub> to 100%, autoranging), time and date, cell temperature, user programmable text, thermocouple mV or cell mV. Password protection, programmable pressure compensation and context-sensitive help are also provided.

### Recorder Output:

Two isolated linear current outputs. Assign O<sub>2</sub>, cell temperature, thermocouple mV, or cell mV. Each output can be 4-20 mA, 0-20 mA, 20-4 mA, 20-0 mA, and is fully scalable. Hold or track during calibration and select degree of damping. Maximum load 1200 ohms.

### Alarms:

Two independent oxygen alarms, each high or low selectable. One alarm can be assigned as oxygen, calibrate or verify. Set relays to energize or deenergize on alarm. Contact rating max. 30 VA, 30 V max. non-inductive load.

### Diagnostics:

Watchdog timer and service alarms. System test for A/D, RAM, EEPROM and keypad. Display line 4 reserved for full text error and diagnostic messages. Twenty entry exception log for automatically detected system events.

### Communications:

RS-485, 2-way addressable

### System Compliance:

EMC Directive 89/336/EEC

- Immunity Standard, EN 50082-2, Heavy Industrial
- Emissions Standard, EN 55011, Equipment Class: Industrial, Scientific, Medical

Low Voltage Directive 73/23/EEC

- Safety requirement for electrical equipment for measurement, control, and laboratory use, EN 61010-1 (IEC 1010-1)

### Ambient Temperature:

-10° C to 50° C (14° F to 122° F)

### Enclosure:

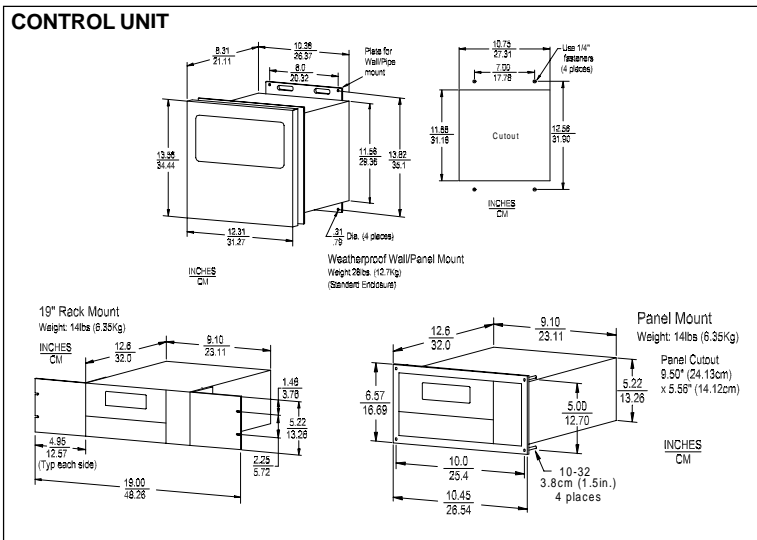
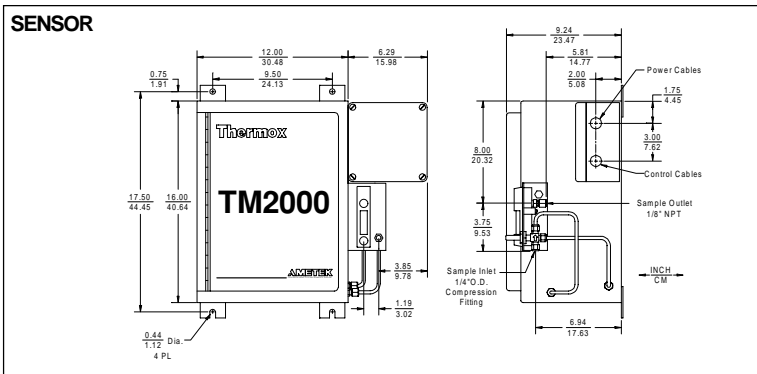
Choice of general purpose wall mount, general purpose 19" rack mount, general purpose panel mount, weatherproof NEMA 4 (IP 56) wall/panel mount, and stainless steel weatherproof NEMA 4X (IP 56) wall/panel mount. All are UL Listed for NEC Class I, Division 2 areas. Purged and explosion-proof versions also available.

### Calibration:

Store last calibration and verification data. Selectable calibration gas run time and process recovery time. Timed automatic calibration with optional remote calibration unit. Oxygen cell lifetime extender. Single gas verify that analyzer is within calibration limits with alarm.

### Power Requirements:

Nominal 95-230 VAC, ±10%, 47-63 Hz.



## SENSOR

**Operating Range:** 0.1 ppm O<sub>2</sub> to 100% O<sub>2</sub>

**Accuracy:** Percent: ± 1% of reading or .02% O<sub>2</sub> absolute, whichever is greater; ppm: ± 2% of reading or 0.5 ppm O<sub>2</sub> absolute, whichever is greater.

**Response Time:** less than 5 seconds at 0.6 l/min. (1.3 scfh) over one decade

**Repeatability: Percent:** ± 0.5% of reading or 0.1% O<sub>2</sub> absolute, whichever is greater; ppm: ± 0.5% of reading or 0.1 ppm O<sub>2</sub> absolute, whichever is greater.

**Ambient Temperature:** -18° C to 50° C (0° F to 122° F)

**Maximum Inlet Temperature:** 71° C (160° F)

**Sample Flow:** 0.1 to 1.0 l/min (0.2 to 2.1 scfh)

**Power Requirements:** 115 VAC ±10%, 50/60 Hz. 288 VA (230 VAC optional)

**Calibration Gas Flow Rate:** 0.1 to 1.0 l/min (0.2 to 2.1 scfh) (0.6 l/min recommended)

**Zero Gas:** From 0.1 ppm to 10% O<sub>2</sub>, balance N<sub>2</sub>

**Span Gas:** Minimum one decade above zero gas (10 times greater)