

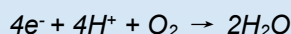
## Electrochemical Oxygen Analyzer

### Overview

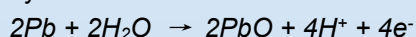
SMART Electrochemical trace/percent Oxygen Analyzer uses a Micro-Fuel Cell sensor, which can measure trace oxygen (ppm level) or percentage oxygen (% level), achieving high-precision and high-repeatability oxygen measurement. It is suitable for a variety of industrial process gas monitoring.

### Principle

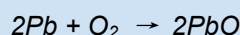
The core of the electrochemical oxygen analyzer is a micro fuel cell sensor, which works on the principle of selective electrochemical reduction of oxygen molecules. Oxygen diffuses into the sensor through a polytetrafluoroethylene (Teflon) membrane, where a reduction reaction occurs at the platinum-catalyzed cathode:



When the oxygen is reduced at the cathode, lead is simultaneously oxidized at the anode:



The overall reaction for the fuel cell is the SUM of the half reactions above:



The electrons released at the surface of the anode flow to the cathode surface when an external electrical path is provided. The current is proportional to the amount of oxygen reaching the cathode. It is measured and used to determine the oxygen concentration in the gas mixture.

If the total pressure increases, the rate that oxygen reaches the cathode through the diffusing membrane will also increase. The electron transfer, and therefore the external current, will increase, even though the oxygen concentration of the sample has not changed. It is therefore important that the sample pressure at the fuel cell (usually vent pressure) remain relatively constant between calibrations.

### Application

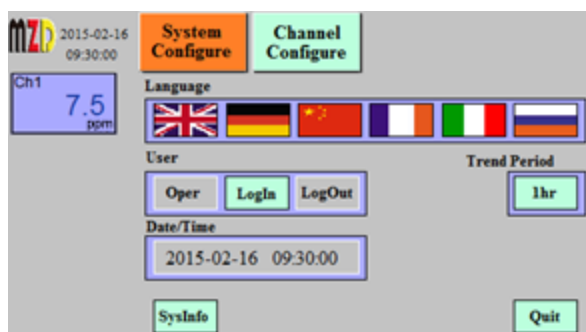
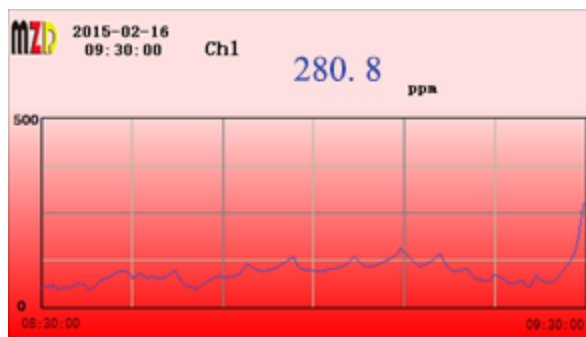
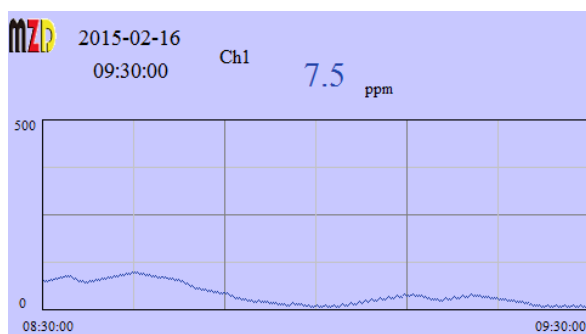
- Air separation and liquefaction
- Pure, gaseous hydrocarbon stream monitoring
- Emissions monitoring
- Protective atmosphere blanketing of primary liquid feedstocks and flammable liquids
- Process monitoring of gaseous monomers - vinyl chloride, propylene, butadiene, isoprene or ethylene
- Gas purity certification
- Semi conductor manufacturing



### Advantage

- ❖ Advanced micro fuel cell, suitable for ppm or percentage level detection.
- ❖ Suitable for most gas backgrounds.
- ❖ Insensitive to flow changes.
- ❖ Strong environmental adaptability, built-in temperature compensation technology.
- ❖ Strong anti-gas interference capability.
- ❖ Accurate and reliable measurement, good repeatability.
- ❖ Rugged and durable design.
- ❖ Quick installation and easy operation.
- ❖ The technology is mature, it is widely used, and its cost is relatively low.

## Trace/Percent Oxygen Analyzer



### Features

#### ❖ Quick and convenient

The navigation menu contains 6 languages, which can be operated easily.

#### ❖ Process safety

4.3" or 7" large size color LCD touch screen, convenient and safe touch operation and debugging

Large size screen with red flashing alarm, clearly visible from long distances and in dark areas

Alarm immediately, safe the process

#### ❖ Alarm event record

Real-time data curve display

Record function for up to 6,000 alarms

#### ❖ Expert calibration function

Multi-point calibration function up to 9 point

#### ❖ Powerful self-diagnosis function

Built-in heartbeat monitoring function and watchdog

Monitor the status of analyzer and sensors, and promptly remind customers to take necessary maintenance

High-standard hardware and software security and password protection

#### ❖ Powerful control function

High(low) limit control function

Optional: Timer control(automatic cleaning) function

Optional: analog PID control function

Optional: PWM control function

#### ❖ Flexible fieldbus communication functions for IOT4.0

Optional fieldbus MODBUS, HART, Foundation Fieldbus FF, PROFIBUS PA, PROFIBUS DP, etc.



## Electrochemical Oxygen Analyzer

### Parameters

|                                          |                                                                                              |               |                 |
|------------------------------------------|----------------------------------------------------------------------------------------------|---------------|-----------------|
| <b>Measuring principle</b>               | Electrochemical                                                                              |               |                 |
| <b>Display</b>                           | 4.3" or 7" industrial color touch screen                                                     |               |                 |
| <b>Language</b>                          | Multi-Language (English, German, Chinese, French, Italian, Russian or Customized)            |               |                 |
| <b>Range</b>                             | 0 ~ 1ppm up to 10000ppm or 0 ~ 1% up to 100%                                                 |               |                 |
| <b>Linearity</b>                         | 2% FS                                                                                        |               |                 |
| <b>Repeatability</b>                     | 1% FS                                                                                        |               |                 |
| <b>Sensitivity</b>                       | 1ppb or 0.01%                                                                                |               |                 |
| <b>Response Time (T90)</b>               | <10s                                                                                         |               |                 |
| <b>Sample gas temperature</b>            | 0 ~ 50°C                                                                                     |               |                 |
| <b>Gas pressure</b>                      | <1bar                                                                                        |               |                 |
| <b>Gas Flow</b>                          | 10 ~ 60NI/h                                                                                  |               |                 |
| <b>Analog Output(Galvanic)</b>           | 4~20mA, maximum load 500Ω                                                                    |               |                 |
| <b>Relay Output(Galvanic)</b>            | Relay (2A, 230V AC freely set alarm), System alarm                                           |               |                 |
| <b>Diagnosis function</b>                | Flow monitoring, Sensor and analyzer self-diagnosis, Heartbeat monitoring                    |               |                 |
| <b>Event Logger</b>                      | Internal Flash, up to 6,000 alarm records                                                    |               |                 |
| <b>Control function</b>                  | Optional Timer control function, PID, PWM                                                    |               |                 |
| <b>Calibration</b>                       | Expert calibration function, Multi-point calibration function up to 9 point                  |               |                 |
| <b>Communication</b>                     | RS485 MODBUS RTU, HART, Foundation Fieldbus FF, PROFIBUS PA, PROFIBUS DP, MODBUS TCP/IP, etc |               |                 |
| <b>Power</b>                             | 80~264V AC,1A or 19~28V DC,3A                                                                |               |                 |
| <b>Electrical protection</b>             | EMI / RFI CEI-EN55011 – 05/99                                                                |               |                 |
| <b>Ambient Temperature</b>               | 0 ~ 50°C                                                                                     |               |                 |
| <b>Storage and transport temperature</b> | -25 ~ 70°C                                                                                   |               |                 |
| <b>Ambient Humidity</b>                  | 0 ~ 100%RH                                                                                   |               |                 |
| <b>Diameter of connecting pipe</b>       | 6mm                                                                                          |               |                 |
| <b>Wall-mounted(1~2Channels)</b>         | ABS,Gray RAL7045                                                                             | 213x185x84mm  | IP65            |
|                                          | Aluminum,Gray                                                                                | 230x200x157mm | IP65, Exd IICT4 |
| <b>Laboratory Desktop(1~2Channels)</b>   | Aluminum,Black                                                                               | 250x144x184mm | IP40            |
| <b>Portable(1~2Channels)</b>             | ABS,Yellow                                                                                   | 420x325x180mm | IP67            |
| <b>19" Rack(1~6Channels)</b>             | Aluminu,natural-coloured                                                                     | 483x133x238mm | IP40            |



## Trace/Percent Oxygen Analyzer

### Overview

The Electrochemical oxygen analyzer is cost-effective and suitable for stable and continuous measurement of the trace/percentage oxygen content of most gases.

### Application

- Air separation and liquefaction
- Pure, gaseous hydrocarbon stream monitoring
- Emissions monitoring
- Protective atmosphere blanketing of primary liquid feedstocks and flammable liquids
- Process monitoring of gaseous monomers - vinyl chloride, propylene, butadiene, isoprene or ethylene
- Gas purity certification
- Semi conductor manufacturing



|                       |                                              |
|-----------------------|----------------------------------------------|
| Measuring principle   | Electrochemical                              |
| Display               | 1.8" industrial color LCD, 160*128Pixel      |
| Language              | English Menu                                 |
| LED Light             | Status LED Light (NAMUR NE107)               |
| Keypad                | Magnetic keypad                              |
| Range                 | 0 ~ 1ppm up to 10000ppm or 0 ~ 1% up to 100% |
| Linearity             | 2% FS                                        |
| Repeatability         | 1% FS                                        |
| Sensitivity           | 1ppb or 0.01%                                |
| Response Time (T90)   | <10s                                         |
| Diagnosis function    | Self-diagnosis, heart beat monitoring        |
| Analog Output         | 4~20mA                                       |
| Relay Output          | 3 Relays, NO, 5A 250VAC/30VDC                |
| Communication         | RS485, MODBUS RTU                            |
| Power                 | 19 ~ 28V DC Power, 1A                        |
| Gas Flow              | 10 ~ 60NI/h                                  |
| Gas pressure          | <1bar                                        |
| Process Connection    | 6mm pipe                                     |
| Ambient Temperature   | 0 ~ 50°C                                     |
| Ambient Humidity      | 0 ~ 100%RH                                   |
| Electrical protection | EMI / RFI CEI-EN55011 – 05/99                |
| Housing Material      | Aluminum and Stainless steel                 |
| Explosion-proof       | Exd IICT4 Controller optional                |

## Electrochemical Oxygen Analyzer

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**Note:**

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