Low Concentration Zirconia Oxygen Analyzer

OX400
Low Concentration Zirconia Oxygen Analyzer based on our long and field-proven experience

OX400

The OX400 is a highly accurate and reliable low concentration zirconia oxygen analyzer that is capable of measuring a wide range of concentrations, from 0-10 ppm up to 0-100 vol% O₂. This is the latest oxygen analyzer from Yokogawa, and its development was based on the company’s long experience and strong track record with this technology.

A proprietary new thin-film deposition technology was used in the zirconia sensor that creates a molecular bond between the zirconia element and the platinum layer. This prevents separation, enables a reduction in sensor size and ensures a high-speed response and long life.

Features

- Long life and high-speed response
  - Thanks to the use of Yokogawa’s proprietary new thin-film deposition technology, the sensor has three times the lifespan of those used in our earlier products.
  - A cylindrical sensor design facilitates the replacement of measurement gases, thereby helping to assure a high-speed response.

- High performance and high reliability
  - Superior repeatability and linearity even at low oxygen concentrations
  - Either pump or aspirator sampling can be selected, depending on the application.
  - Enhanced safety, various standards. (CE, C-Tick, cCSAus)

- Built-in functions and a variety of self-diagnosis functions
  - Comes with multi-selector, free-range, and pump on/off functions
  - A variety of self-diagnosis functions are provided that detect malfunctions such as heater temperature error, temperature sensor burnout, and sensor resistance value error.

- Superior maintainability
  - The sensor can be replaced on-site.
  - Compact and lightweight for easy installation.

Applications

- Oxygen concentration control in semiconductor-related diffusion and drying furnaces and in LCD manufacturing processes
- Oxygen concentration control in solder pot flow and reflow ovens, and glove boxes used in electronics manufacturing, and in gas production processes
- Oxygen concentration measurements to prevent dust explosions during powder transfer

Standard Specifications

- Measurement object: Oxygen concentrations in inert gases containing no flammable gas, silica, corrosive gas, or liquid (including water vapor)
- Measurement system: Zirconia system
- Sampling method: Selected from pump or aspirator or no suction device
- Pump and aspirator suction flow rate; approx. 1.0 l/min
- Preheat temperature range; 90 °C (max.)
- Preheat time; Within 20 min
- Response time; Within 10 sec
- Accuracy: ±1% of F.S. (90% response)
- Error, O₂ concentration alarm contact, range marker contact: ±2% of F.S.
- Repeatability: ±1% of F.S. (90% response)
- Total discharge flow: 10 l/min Max.
- Specified calibration: Three points; zero and span calibration may be set freely
- Single-point calibration: ±2 points; 10 ppm, 1000 ppm, Air
- Alarm functions: Heater unstable, sensor defect, electromotive force abnormal, asymmetry voltage error, calibration error, sensor resistance error, O₂ concentration upper/lower range over
- Calibration methods: 1 point, 2 points, zero and span calibration may be set freely
- Zero point adjustment: ±2 points, ±0.05 ppm, ±1 % of range
- Span point adjustment: ±2 points, ±0.05 ppm, ±1 % of range
- Pump and aspirator suction flow rate; approx. 1.0 l/min
- Preheat Zone: 90 °C (max.), 20 min
- Reflow Zone: 1000 °C (max.), 20 min
- Cooling Zone: 25 °C (max.), 20 min
- Measurement range: 0 – 10 ppm to 0 – 100 vol% O₂
- Measurement accuracy: ±1% of F.S.
- Output range: Auto range; 1 ppm (0 ppm to 10 ppm), 10 ppm (10 ppm to 100 ppm), 100 ppm (100 ppm to 1000 ppm), 1% (1% to 10%)
- Fixed range; 1 ppm (0 ppm to 10 ppm), 10 ppm (10 ppm to 100 ppm), 100 ppm (100 ppm to 1000 ppm), 1% (1% to 10%)
- Partial range; Lower or upper value of range can be set
- Alarm output: Primary output; 4 to 20 mA DC, current to voltage output: 0 to 10 V DC Secondary output; Select from 0 to 1, 0 – 5, 0 – 10 V DC
- Contact output; 5 outputs, Error, O₂ concentration alarm contact, range marker contact, multi-selector contact, switching flow, measuring flow
- Contact input; Pump and aspirator selection port, pump on/off
- Communication; RS-232, RS-485 Interface

For details, refer to General Specification, GS11M10B01-01E.
### Model and Codes

<table>
<thead>
<tr>
<th>Model</th>
<th>Suffix Code</th>
<th>Option Code</th>
<th>Description</th>
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<tbody>
<tr>
<td>OX400</td>
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<td></td>
<td>Low Concentration Oxygen Analyzer</td>
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<tr>
<td>Power Supply</td>
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<td>(Note 1)</td>
<td>G</td>
<td></td>
<td>100–120VAC, 50/60Hz</td>
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<td></td>
<td>D</td>
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<td>200–240VAC, 50/60Hz</td>
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<tr>
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<td>Built-in Pump</td>
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<td>A</td>
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<tr>
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<td>T</td>
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<td>Multi selector function</td>
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<tr>
<td></td>
<td>Filter</td>
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<td>Activated Carbon Filter</td>
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</table>

(Note 1) Power cable of two-pole with earthing plug is attached. Suffix code “D” of power cable can not be specified when “D” of power supply is specified. Power cable of “D” can be used in Japan, because another cable doesn’t conform to PSE marking.

(Note 2) When “R” of pipe connection is specified, K9643KH filter (Rc1/4) is attached, when “T” of pipe connection is specified, K9643KJ filter (1/4 NPT) is attached.

### External Dimensions

#### Panel mount type with built-in pump (OX400–P–M)

- **Unit:** mm
- **Mount:** 260
- **Frame:** 238
- **Screw:** 10 to 20
- **Ventilation holes:** 240 x 1
- **Seal:** 100.6
- **Panel Cutout:** 19.3

Notes on installation
- Make sure the bottom supports do not block the ventilation outlet on the bottom panel of the measuring instrument.
- Maintain at least 100 mm of free space around the measuring instrument in order to ensure adequate ventilation.
- Make sure the panel is at least 2 mm thick.

### Piping Diagram

- **Built-in pump (Sampling method [-P]):**
  - Sample gas
  - Pipe connection
  - Built-in pump
  - Throttle valve
  - Restriction
  - Filter
  - Heater
  - Oxygen sensor

- **Desktop type with built-in pump (OX400–P–M):**
  - Sample gas inlet
  - Rear
  - With multi selector function
  - Sample gas outlet

Notes on installation
- Hot air is discharged from the air outlet on the rear panel of the OX400.
- Maintain at least 100 mm of free space around the OX400 to ensure adequate ventilation.

VigilantPlant is Yokogawa’s automation concept for safe, reliable, and profitable plant operations. VigilantPlant aims to enable an ongoing state of Operational Excellence where plant personnel are watchful and attentive, well-informed, and ready to take actions that optimize plant and business performance.

Represented by: Vig-PMK-G NL-10E