

# Engineering Specifications

## Dissolved oxygen system Orbisphere 510 with G1200 sensor

### General

The dissolved oxygen analyzer shall consist of a transmitter, a luminescent oxygen sensor, a sampling device (flow chamber) with an entry for the calibration sample, and a built in barometer.

The analyzer is optimized to measure dissolved oxygen in the 0 – 600 ppb range with user selectable units, but shall also provide indicative measurement up to 20 ppm. The analyzer shall have been tested to work at radiation levels up to 1 Gy/h.

### Enclosure

The transmitter shall have a IP65 certified enclosure in stainless steel for wall or pipe mounting or aluminum for panel mounting.

The transmitter shall be ISO 9001-2000 manufactured, and comply with CE directives: electromagnetic compatibility standards: EN 61326: A1 & A2 and safety standard: EN 61010-1.

### Display

The analyzer shall have a color touch-screen display STN 320 x 240 pixels with CFL backlight

### Display information

Main screen shall display simultaneously the oxygen concentration, the sample temperature, a trend graph over the last 60 minutes. Information about the system status shall appear clearly on the main screen for system alarms, measurement alarms, or diagnostics information like calibration or service timer

Other display shall show diagnostics information or statistical data.

### User interface

The analyzer shall have a color touch-screen user interface. Transmitter software shall be available in a minimum of six languages (English, French, German, Spanish, Russian, and Italian) and additionally in Korean, Chinese or Japanese.

### Calibration modes

The analyzer shall have a single point zero calibration procedure that can be fully programmable to run automatically at user defined intervals or can be performed manually.

The instrument shall not require a high value calibration, but the possibility shall be available to calibrate with a second point against a known gas mixture, a known liquid sample, or by the introduction of a factory parameter.

### Calibration data

The analyzer shall have a calibration logbook, recording data of the last fifty calibrations.

Calibration records shall include date and time, operator name, operator ID, calibration mode, calibration coefficients (including temperature), signal standard deviation, fluorescence amplitude, calibration duration.

### Security

The analyzer shall have four password protected access levels for system calibration, programming and servicing.

1000 user actions shall be stored for traceability tracking.

### Alarms

The analyzer shall have 1 system alarm relay and 3 measurement relays by channel for oxygen concentration, temperature, or barometric pressure.

Each measurement relay shall be configurable for standard alarm levels, but shall also be customizable to have diagnostics information on calibration and service requirements.

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## Outputs

The analyzer shall have three isolated analog outputs. The output shall be configured in 0-20 or 4-20 mA. They can be assigned to represent the measured oxygen concentration, temperature, or barometric pressure. The user shall be able to configure any data scaling in linear, or tri-linear mode within the measuring range. Each output shall be configurable to report events such as calibration, calibration requirement, service requirement, thermal cutoff, any system or measurement alarm status.

The transmitter shall have two simulation possibilities of the analog outputs with current or measurement values, as well as the possibility to calibrate the output at 4 mA and 20 mA.

Measurement data (oxygen concentration, temperature, pressure), alarm status, and diagnostics information shall be sent continuously with RS485 or Profibus DP.

Stored measurement data, calibration reports, and user actions shall be retrievable through RS485, USB, and Ethernet.

Instrument configuration shall be transferable to other instrument through a USB memory stick.

## Diagnostic tools

Diagnostics information including system status, measurement alarm, and calibration or service requirements shall be available on the screen, through the relays, through the analog output, through the RS485, and through the Profibus DP.

A procedure shall be available to verify the system performance against a known oxygen sample.

The instrument configuration, calibration reports shall be available as text file through USB-A, USB-B, RS485 for easier remote diagnostics from the supplier service team.

A diagnostics window shall display the critical system parameters.

## Oxygen sensor

The sensor shall have a dissolved oxygen sensitivity as good as  $\pm 2\%$  of reading + 1 ppb, and a reproducibility of  $\pm 2.5\%$  of reading + 2 ppb.

The sensor shall measure dissolved oxygen via luminescent technology.

The oxygen measurement shall not be influenced by flow variations or presence of magnetite on the sensor head.

Service requirements shall be limited to a maximum yearly intervention.

## Model identification

The transmitter shall be ORBISPHERE model 510 transmitter associated with an ORBISPHERE G1200 luminescent oxygen sensor.