

## Optical Dissolved Oxygen Monitoring System

Dissolved Oxygen Monitor(s) shall be supplied for continuously monitoring D.O. concentrations in \_\_\_\_\_ (Specify Application and Location(s)). Dissolved oxygen systems shall consist of a D.O. sensor, an electronic monitor housed in a NEMA 4X enclosure suitable for wall, pipe, or panel mounting, and accessory mounting hardware as described below.

Dissolved oxygen sensors shall be of the optical type. Sensors shall use a fluorescent material that is susceptible to non-radiative quenching by interaction with dissolved oxygen. A light source of a given wavelength inside the sensor shall illuminate the fluorescent material, which absorbs the energy from the light source and reaches an excited state. The material then emits light at a different wavelength, which is sensed by a photodetector inside the sensor. Dissolved oxygen that diffuses into the fluorescent material "quenches" the reaction. The degree of quenching that occurs is directly proportional to dissolved oxygen concentration. The sensor assembly shall also contain a precision RTD temperature sensor to continuously measure sample temperature to allow temperature compensation of the measured oxygen value.

The Dissolved Oxygen Monitor electronic assembly shall be: **(select one version below)**

- A. A loop-powered 2-wire instrument providing an isolated 4-20 mA output proportional to dissolved oxygen into a maximum load of 500 ohms.
- B. A battery operated data logging monitor capable of operating from an internal battery. The monitor shall provide two 0-2.5 VDC outputs suitable for use by a data logger. The monitor shall operate for up to 4 days continuously on an alkaline battery and up to 10 days on a lithium battery.

The dissolved oxygen monitor electronic assembly shall provide a variety of functions as follows.

1. Provide user selectable display of PPM dissolved oxygen, process temperature, or PID % output on the main display. Main display variable shall be indicated with a minimum character height of 0.75" to allow easy readability up to 20 feet away.
2. Allow selection of operating ranges of 0-20 PPM, or 0-40 PPM. Display ranges shall be configurable by operators, or the monitor may be configured for Auto-Ranging. The auto-ranging function shall automatically switch to the display range that provides the best resolution for any given operating level.
3. Provide the ability to use the 4-20 mA output for PID control. Proportional, Integral, and Derivative functions shall be user adjustable, and also provide for output hold when needed.
4. Provide output hold and output simulate functions to allow for testing or remote receiving devices or to allow maintenance without disturbing control systems.
5. Diagnostic functions shall be incorporated into the transmitter. The 4-20 mA output shall be capable of being assigned to safely rise to 20 mA, fall to 4 mA, or be left alone, during diagnostic failures. Diagnostic error messages shall be displayed in clear language; no confusing error codes shall be displayed.

For each D.O. monitor supplied, a mounting kit shall be provided. Mounting assemblies shall attach to standard handrails and shall support the D.O. monitor above the handrail so that the LCD display is 4-5 feet off the grade level. Mounting supports shall be aluminum and all hardware to fasten the supports to the handrail and to fasten the monitor to the supports shall be supplied with the kit. All hardware shall be stainless steel.

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***Typical Specification******TS/Q45ODO Optical (03/14)***

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Mounting bracket assemblies shall be supplied to securely mount D.O. sensors to handrail as shown in the drawings. Mounting assemblies shall be aluminum with stainless steel hardware with sensors mounted directly to 1" aluminum or PVC pipe supplied by the contractor. Mounting assemblies shall be of a simple drop-on design to allow sensors to be lifted from the tank without the use of tools.

**The complete Dissolved Oxygen Monitor shall be Series Q45ODO Optical as manufactured by Analytical Technology, Inc. or approved equal.**

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