Dissolved Oxygen Monitoring System
Semaphore Product: T-BOX LT or T-BOX WM Wireless Monitor

Overview

A recent application for Semaphore's T-BOX RTU product line is monitoring of dissolved oxygen (DO) in the aquaculture, wastewater treatment and industrial boiler industries. Products such as the T-BOX Wireless Monitor are used in conjunction with immersion DO probes that are designed for continuous monitoring. The probes provide a 4 – 20 mA signal that represents the latest DO reading.

In aquaculture applications such as fish hatcheries, the oxygen level must be kept high in order to prevent the fish from suffocating. Among a number of wastewater applications, T-BOX has been applied to downstream measurements, which must be higher than a minimum level that is mandated by regulatory agencies. In boiler applications, on the other hand, the DO level must be low in order to prevent corrosion and scale build-up. The amount of oxygen a given volume of water can hold depends on the atmospheric pressure, water temperature and the amount of other substances dissolved in the water.

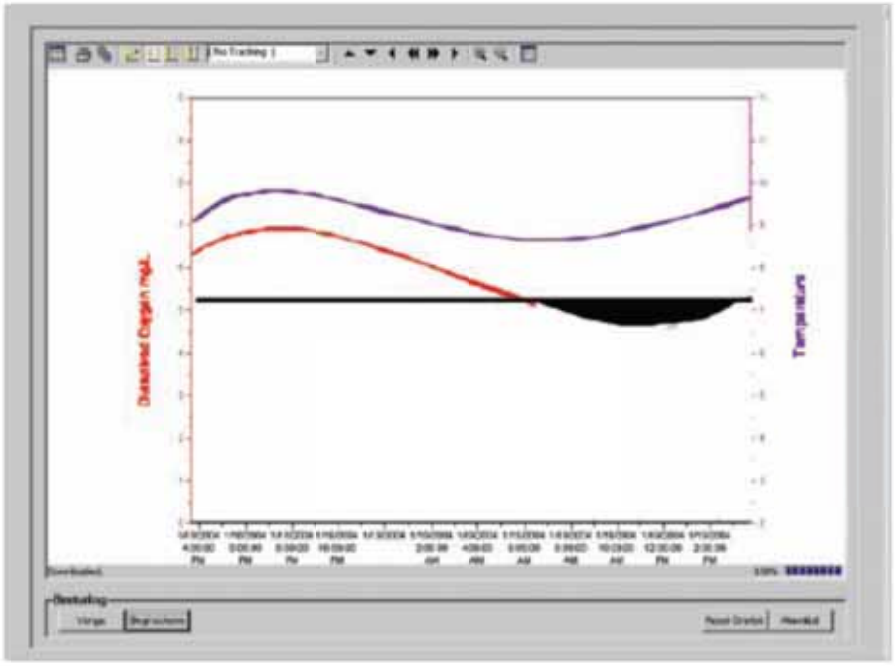
Key Requirements: These installations all require timely notification of DO readings that are outside of acceptable limits and of significant changes in the DO level, while minimizing the costs of communications. Instead of the continual polling that is characteristic of SCADA systems, T-BOX uses push technology to communicate only when necessary. Push technology best utilizes inexpensive, public networks and allows remote sites to operate on the least expensive plans.

The T-BOX alarm management system has been employed in all cases to inform users of low or high DO levels and escalates reporting if acknowledgement does not come through in a user-configured time.

Another requirement is for historical data logging. T-BOX records historical logs, which can be viewed and transmitted in tabular or trend graph formats. The historical reports include a trend of DO levels and related conditions such as temperature in order to meet the requirements of regulatory agencies.

A third requirement for remote locations is that the RTU be self-powered and, in fact, provide the power source for the DO probe. The T-BOX Wireless Monitor conserves energy by operating on a duty cycle and is battery-powered. In spite of its low-power operation, it includes an output that provides power to a 4 – 20 mA device such as a DO probe.

Finally, robust construction is necessary to operate, outdoors. Some installations may even find themselves temporarily under water. The T-BOX Wireless Monitor is available in an enclosure which completely provides protection from dust, water spray, and even temporary submersion. It has been tested to both IP67 and Nema 6 specifications.



Conclusion

For dissolved oxygen monitoring systems, T-BOX:

- Monitors the live reading and, optionally, related conditions such as temperature—if a temperature measurement is not included with the DO probe.
- Using push technology, notifies multiple recipients of alarms.
- Escalates alarm reports if not acknowledged.
- Efficiently uses public networks and minimizes transmissions by sending reports via e-mail, SMS text or FTP via IP only when required.
- Serves web pages, which comprise a very low-cost HMI for depiction of live and historical information.
- Generates historical reports and trends, which are used for regulatory agency auditing, record-keeping and system maintenance.
- Minimizes power draw in order to keep power systems costs as low as possible. The T-BOX Wireless Monitor can provide power to a 4 – 20 mA device but still operate using a single, lithium battery.
- Operates over a wide temperature range and is available in an IP67-tested housing, which allows installation in outdoor areas that also might be briefly submerged.