

Anglian Water cuts aeration calibration with ABB optical dissolved oxygen sensors



ABB's new generation of optical dissolved oxygen sensors deliver improved aeration performance for leading water company.

Measurement made easy

Introduction

Anglian Water Services Ltd has cut calibration of an aeration control system at its Coningsby Sewage Treatment Works by moving to ABB ADS430 Dissolved Oxygen sensors. The new solution cuts calibration intervals from three months to two years. It also improves accuracy and is easier to use and read than the previous sensors.

Keith Wilson, Senior ICA Technician for the site, was looking for a solution that would replace the existing ABB galvanic sensors. "Our existing sensors were coming to the end of their lives and we thought we would see what ABB's latest products had to offer. We also had an issue with galvanic sensors in that they had to be surface mounted in the tank. This caused bouncing which can result in inconsistent readings."

"Galvanic sensors also need frequent calibration."

Following a training day at an ABB facility, Keith decided to adopt the new ABB ADS430 optical dissolved oxygen sensor, part of the Aztec range of advanced digital sensors. Comprised of a sensor and multi-channel transmitter, ABB's optical dissolved oxygen sensor system uses optical measurement technology to give the highest levels of stability and accuracy for dissolved oxygen measurement.

The dissolved oxygen concentration is calculated and relayed to the transmitter. The resulting information is then used to fine-tune dissolved oxygen levels to match the requirements of the process. Unlike other optical dissolved oxygen systems, the sensor can be deployed for extended periods of time without a need for calibration.

Says Keith: "The optical sensors need very little maintenance. The galvanic sensors needed maintenance every three months to check their calibration, whereas the optical sensors require attention only every two years to change the Smart sensing caps."

"It is also easy to use. We can see easily if there is any deterioration in the sensing heads whereas previously we would need dedicated instrumentation technicians to determine sensor health. "The sensors give us high reliability at low cost and also give us a lot more information on trends."

"Since it was installed five months ago we have had no reason to call in ABB for any service issues. The operators find it simple to use and they have had no problems with the system," says Wilson

The application

Save energy and cut operating costs using the ADS430 optical DO system

ABB's Aztec 400 range of advanced digital sensors are designed for monitoring the key parameters in municipal and industrial water and wastewater treatment. Using Rugged Dissolved Oxygen (RDO®) optical technology, the ADS430 can provide accurate measurement of dissolved oxygen in the most demanding process environments, including high saline applications. The robust construction resists abrasion and photobleaching effects that limit the lifetime of other optical DO sensors.



ABB's ADS430 and AWT440 transmitter.

Featuring ABB's EZLink technology, the sensors offer plug-and-play measurement with ABB's latest digital transmitters to create the easiest-to-use and maintain monitoring systems on the market today. Consistent, reliable and accurate, they can help operators to realise significant savings through reduced energy consumption and maintenance.

The RDO technology, which has been approved by the U.S. Environmental Protection Agency (EPA), uses the dynamic luminescence quenching technique. Comprised of a sensor and multi-channel transmitter, it works on the frequency domain method and provides the highest levels of stability and accuracy for dissolved oxygen measurement.

The patented signal processing within the sensor enables it to respond to changes in process conditions up to five times faster than other optical systems, allowing maximum process savings through improved control.

No need for frequent maintenance

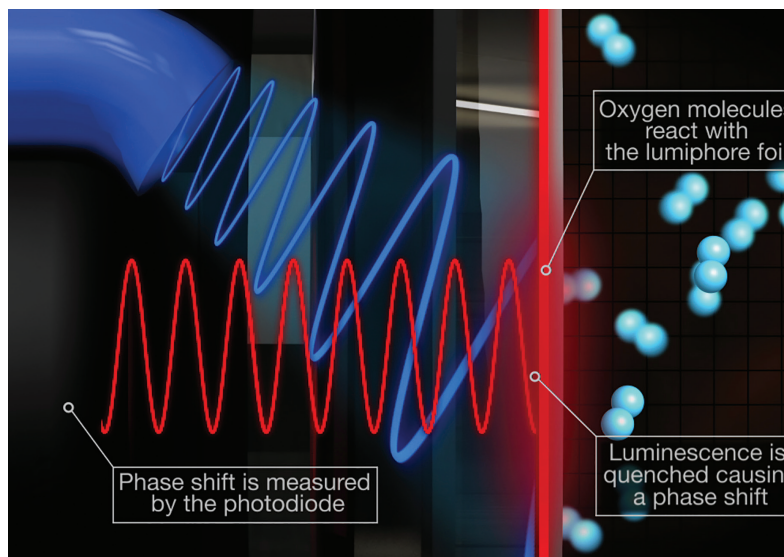
The robust design of the sensor enables it to withstand the problems that can affect conventional membrane-based sensors, such as abrasion, fouling or poisoning. Constructed from inert, non-corrosive materials, it is suitable for use in high salinity environments. The sensor lumiphore is not affected by photobleaching or stray light. The sensor itself is also immune to the effects of sulfides, sulfates, hydrogen sulfide, carbon dioxide, ammonia, pH, chloride and other interferences that can affect membrane-based sensors.

The use of the dynamic luminescence quenching principle means that the sensor is not susceptible to drift, removing the need for frequent maintenance.

When cleaning is necessary, it can be cleaned and redeployed without calibration, saving time and cost and eliminating disruption to measurement.

For high-fouling applications, the sensor can be automatically cleaned using ABB's auto-cleaning system. This system periodically injects a high pressure burst of air across the sensor surface to remove any fouling.

Maintenance savings can also be achieved through the ADS430's smart sensing cap with automatic setup. Called 'SmartCap', it comes pre-loaded with factory calibration coefficients, serial number, lifetime indication, and manufacture date which are automatically uploaded to the sensor, eliminating the time normally required for set-up.



The ADS430 uses the dynamic luminescence quenching technique to accurately measure dissolved oxygen levels in water

By automatically prompting the user when replacement is due, the SmartCap removes the risk of unexpected sensor failure.

The SmartCap is capable of up to 24 months of continuous operation, greatly reducing the requirement for maintenance. When the cap does need replacing, it will be as easy as the original installation – the calibration details will be pre-loaded and the transmitter will automatically recognise the new sensor.

Simple to install

A key benefit of the system is its simplicity. ABB's EZLink plug and play technology automatically connects the transmitter and sensor, with no need for wiring or complicated configuration.

Set-up is straightforward, with a user friendly HMI and clear menus making it easy to set parameters and view diagnostic information.

Cost effective and flexible

Available in two or four channel versions, the Aztec AWT440 universal transmitter can be connected to up to four ABB EZLink digital sensors, enabling monitoring at multiple points without purchasing and installing separate transmitters.

This capability allows four ADS430 DO sensors to be connected to a single transmitter. Alternatively, it can be combined with other sensors including ABB's new ATS430 Turbidity and TSS sensor to enable cost effective monitoring of multiple parameters using a single transmitter.

With a range of installation options, the ABB optical dissolved oxygen system can be used in a wide variety of applications, from large-scale municipal and industrial waste water treatment plants through to food and beverage production processes. Options include dip mount systems, floating ball systems and chain mount immersion systems for open tank and channel installations, as well as a flow-through system for panel mount systems.

Safe and secure data storage

All measured data is stored in the AWT440 transmitter's internal memory, together with event log and configuration data. In total, up to 300 days' worth of process data can be stored, in addition to the last 10 data log and event log files and eight configuration files within its internal memory.

The transmitter's event log files contain audit log, alarm log, diagnostic log and calibration log data that is time and date stamped, providing the operator with full audit trail capability.

Various options are available for remotely accessing data held within the transmitter. An Ethernet option enables measurement readings and active diagnostics data to be accessed via a PC. Profibus DP V1.0 or Modbus RS485 communications provide the added choice of accessing data via a distributed control network. The inclusion of SD and USB portals also enables users to securely store data on portable devices for transfer to a PC for analysis using ABB's DataManager Pro data review software.

See also:

- Watch the animation
<http://bit.ly/ADS430animation>
- Read the white paper – 'How the latest advances in dissolved oxygen sensor technology are delivering enhanced levels of accuracy and reliability'
<http://bit.ly/ADS430WhitePaper>
- Read the application guide – 'The advantages of optical dissolved oxygen sensors'
<http://bit.ly/ADS430ApplicGuide>

For more information, visit <http://bit.ly/ADS430> or contact your local sales representative.

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Animation



White Paper



Application Note



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