



# Water Quality Monitoring Station

## Water Analysis – easy and compact like never before

Whether your objective is to protect drinking water quality, perform environmental monitoring or to oversee of wastewater treatment processes, in-situ & online UV/Vis spectrometry can provide the solution. Online spectrometry, in the form of s::can spectrometer probes, has found its way into these and many other water monitoring and management applications. There are numerous approved standardised applications available and the range is continuously expanding due to the development of new spectral parameters. Additional sensors – e.g. for monitoring  $\text{NH}_4^+$ , DO, pH or EC – can be easily integrated into s::can monitoring systems to increase the range of applications even further. The Water Quality Monitoring Station, which is introduced here, provides a standardised and fully modular infrastructure that facilitates the operation of s::can sensors from a single simple and compact platform.



Figure 1: spectro::lyser™ in bypass installation.

## The Spectrometer Probe

The well proven core of all s::can™ monitoring systems is the fully submersible UV/Vis spectrometer probe (Figure 1), the spectro::lyser™. This instrument is suitable for use in a wide range of waters, from the cleanest drinking waters to heavily contaminated industrial process-streams. The spectro-photometric principles used in these probes allow the determination of multiple parameters from a single source: the UV/Vis absorption spectrum. Therefore, it is possible to use a single probe to measure multiple parameters including for example COD, COD-filtered, BOD, TOC, DOC, UV-254,  $\text{NO}_3^-$ ,  $\text{NO}_2^-$ , TSS and turbidity. The only change needed to switch between parameters is an update of the instrument's operating software, a change in the so-called global calibration. Such global calibrations have been prepared for many different applications and situations, examples being: WWTP influent and effluent, river water and drinking water. As the s::can™ spectrometer probes are highly reliable and robust, and because there are no moving parts in contact with the water, there are almost no operating costs. Maintenance consists primarily of cleaning the optical surfaces of the instrument, which can be done manually in clean water applications

(typical intervals being 1-6 months) or by a highly efficient automatic cleaning system using pressurised air in applications which require more frequent cleaning.

## A full Suite of Sensors for Online Monitoring

Besides the spectrometer probes, s::can also offers an extensive range of intelligent, low-maintenance sensors, and integrates these into an easy-to-use and cost-efficient digital environment. The optical dissolved oxygen sensor – oxii::lyser – and the ion selective ammonium and fluoride probes – ammo::lyser and fluor::lyser – are the most advanced systems in this range, which also includes digital pH, conductivity and ORP sensors. One thing all sensors have in common is the fact that there is no need for reagents or replacement parts, with the exception of ion selective membranes for the ion selective electrodes. Furthermore, interfaces for the integration of third party instruments are available in the control terminals, which are available in two configurations:

- the stainless steel "con::stat-III" is an industrial process control terminal with a large colour display and a touch panel allowing menu-driven, user-friendly operation and displaying monitored results over time. It can control all s::can sensors and any other digital (RS485) or analogue (4-20 mA) sensors connected to it. In addition, this terminal also allows the operation of distributed monitoring systems, either via telephone, radio, GSM, or GPRS telemetry.
- the compact "con::lyte" terminal, which can control up to 4 sensors, is available for less demanding applications and smaller budgets. This system is designed to transmit the parameter readings of these probes, recorded with a measuring interval of as short as 15 seconds, via 4-20 mA or RS485 interfaces to a PLC system.

## The Water Quality Monitoring Station

In principle, all s::can instruments are fully submersible and can be used in-situ. Where no space exists for in-situ operation, or where operational conditions such as access for maintenance, demand installation outside of the water operation in bypass setup is also possible. Examples where such a setup is common include drinking water distribution networks and industrial applications. Such installations always require the creation of infrastructure to operate the sensors which is a common source of problems. A water monitoring station has now been designed (Figure 2) to reduce infrastructure demands to a minimum, only power supply and a single water connection, and also to improve ease-of-use significantly. This station is modular, allowing combinations of all necessary sensors, and compact, allowing installation in confined spaces. The only environmental requirement is an enclosure to protect the systems from direct rain and water spray.

The Water Quality Monitoring Station can be customised by selecting the modules required to perform the monitoring task at hand. All stations contain at least the central module supporting the controller (either con::stat of con::lyte) together with a spectrometer probe (e.g. spectro::lyser™). This module also provides the interface to all additional sensors to be installed and the interfaces for all communication with external systems (SCADA, PLC, etc.). The fact that one controller is used to operate the entire station means that one software package with a standardised user interface, one remote access tool and a uniform data format are all that are necessary for all data streams. This reduces complexity to a minimum.

Additional station modules with sensors, sampling equipment and water

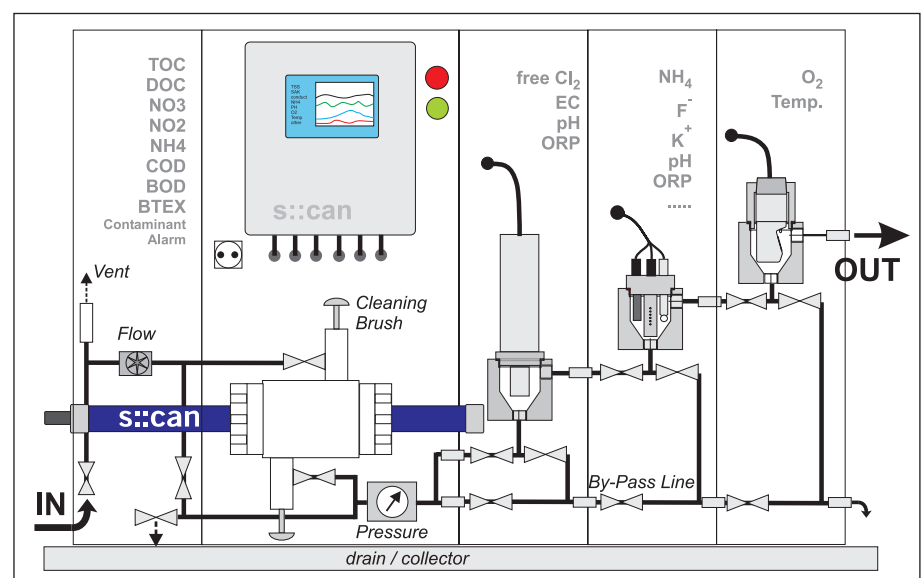


Figure 2: A schematic representation of a Water Quality Monitoring Station optimised for drinking water monitoring. It contains (from left to right) a con::stat control terminal together with a spectro::lyser™ (for turbidity, nitrate, TOC and DOC measurement), a free chlorine sensor, a fluor::lyser (fluoride) and an oxi::lyser (dissolved oxygen).



pre-treatment facilities can be added to this central module. All are connected to the same water supply, thus ensuring analysis of the same water quality by all sensors. Furthermore, all modules are connected via one bypass line, which allows servicing of any sensor without interrupting the flow of the others. The system operates with two pressure zones: pressurised (up to 8 bars) in the module with the spectro::lyser™, for optimal performance and minimisation of fouling; and with reduced pressure (1 bar) in all other modules.

### Typical Monitoring Station Configurations

Depending on the application, a combination of modules can be selected that allow the construction of a monitoring station with all the desired capabilities. Through the use of standardised components, maintenance is simple and fast. This modular system also allows the addition of new features as the need arises. For a typical drinking water monitoring

application a station of the following configuration can be employed:

- module 1 with con::stat and spectro::lyser™
- module 2 with a fluor::lyser, an ion selective sensor for fluorine
- module 3 with an oxi::lyser dissolved oxygen probe
- module 4 with a pH sensor
- module 5 with a free chlorine sensor
- module containing an autosampler for the collection of a sample for further analysis in case the monitoring station indicates abnormal water quality

For a typical wastewater application, a station of the following configuration can be employed:

- module designed to filter off unwanted solids
- module 1 with con::stat and spectro::lyser™
- module 2 with an ammo::lyser, an ion selective sensor for ammonium, potassium and pH
- module 3 with an oxi::lyser dissolved oxygen probe

- module 4 with a conductivity or redox sensor
- module zero for automatic calibration and zeroing of all sensors, triggered by the terminal
- module compressor for automatic cleaning of the system with pressurised air.

### Summary

The new Water Quality Monitoring Station is a full capability monitoring solution that is easy to configure, use and maintain because of its high degree of standardisation. Simple infrastructural facilities, i.e. power supply and water connection, are all that are required to get the system up and running. Its small footprint and flexible construction allow the complete system to be fitted into nearly any space with only minimal protection against the elements necessary.

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## Simultaneous Parameter Monitor

**Tethys Instruments** (France) announces the launch of its new generation of on-line water analyser UV400. Up to 12 parameters can be monitored simultaneously in one instrument. The new design gives an easy access to the flow cell(s) and to any part of the analyser. A USB port enables the download of the measurements and parameters with any USB key. The user-friendly colour touch screen interface gives an easy way to check and calibrate each parameter.

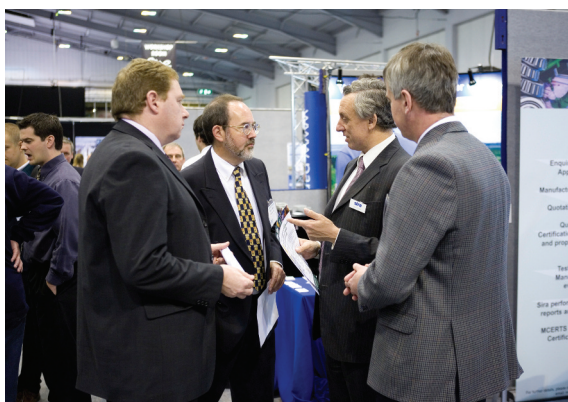
Based on UV spectroscopy for the main parameters (ammonia, COD, hydrocarbons and nitrate) it offers an unparalleled reliability and stability with an



extremely low operating cost. Thanks to large bore tubing and optical compensations, the measurements can be done directly on wastewater without filtering (even with activated sludge). A new flow cell design enables very high values of suspended solid (like paper mill wastewater) without risk of clogging. Phosphate is measured by standard colorimetric methods while pH, conductivity and dissolved oxygen are using standard external probes. A low range turbidity cylinder enables measurements down to very low values for drinking water applications. Different interfaces are available: RS485/MODBUS, RS232, GSM modem as well as analogue 4-20 mA outputs.

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## Prepare now for WWEM 2008



The organisers of **WWEM 2008** say that it will be even bigger and better than the 2006 water testing and monitoring event, with more exhibitors, more international visitors, and an even more comprehensive programme of Conferences and Workshops.

WWEM 2008 will take place at the Telford International Centre on 5th and 6th November 2008 and organiser Marcus Pattison warns that even though the event is a year away, many of the exhibition stands have already been sold.

Conference presentations will include an update on the Environment Agency's Modernising Regulations Agenda and the application of MCERTS to the water sector. This will include an update on the certification of flow meters, samplers, multiparameter meters, water quality monitors and possibly test kits and laboratory analysis.

The Agency's Paul Wiggins says, "Many manufacturers of monitoring instrumentation have either received MCERTS certificates or have products under test. The latest analytical water quality product to be certified is Emerson's online pH monitor, and the latest automatic samplers to be certified are from SIRCO Controls and Teledyne Isco. I would urge manufacturers to start planning for WWEM 2008 now, in order to avoid the inevitable rush of products that will need testing next Spring."

Further details on WWEM are available at [www.wwem.uk.com](http://www.wwem.uk.com).

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## Select Applikon Analytical for Robust and Accurate On-Line Analysis in all Wastewater Streams

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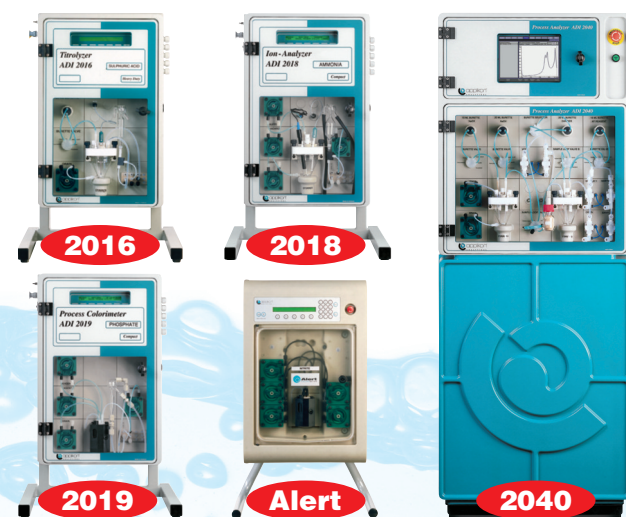
- Sulfides
- ( Total ) Cyanide
- ( Total ) Phenol
- ( Heavy ) Metals

### Environmental Load:

- Ammonia
- Nitrate
- Nitrite
- Fluoride
- ( Total ) Phosphate
- ( Total ) Nitrogen
- COD

### Other Parameters:

- Hardness
- Saturation index



### Applikon Analytical On-Line Analyzers

Analytical methods are conducted according to official standards (**DIN, ISO, ASTM**). Applikon's diverse sensing techniques (titration, colorimetry, ionchromatography and voltammetry) accomplish a wide measuring range spanning from micrograms per liter to percent levels.

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