

# Water Quality OnLine Drinking Water



- BOD
- COD
- BTX
- TOC
- DOC
- UV254
- NO<sub>3</sub>
- NO<sub>2</sub>
- NH<sub>4</sub>
- K<sup>+</sup>
- Free Chlorine
- F<sup>-</sup>
- TSS
- Turbidity
- Color
- pH
- ORP
- EC
- Temperature
- O<sub>2</sub>
- O<sub>3</sub>
- H<sub>2</sub>S
- AOC
- Fingerprints
- Contaminant Alarm

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## A warm welcome to s::can



DI Andreas Weingartner  
CEO and Owner  
s::can Messtechnik GmbH

You are holding in your hands the catalogue from s::can Messtechnik GmbH - the first complete catalogue of online instruments for water quality monitoring. What makes this catalogue so special? The same thing that makes s::can special: s::can is the only firm in the world that has given its heart and soul to online water quality measurement. Since our foundation, nothing else has come out of our development department, nothing else has come out of our production sites, so now nothing else goes into our catalogue. We only ever become involved in technologies that are in line with this focus. This focus is unique in the world.

We are of the opinion that the time has come for reliable, simple, intelligent and inexpensive submersible probes for online water quality monitoring.

## s::can Messtechnik GmbH

**Founded in Vienna, Austria in 1999,  
branches in the USA (Cambridge, MA),  
China (Shanghai) and in France (Bordeaux).**

### **Focus:**

Research, development and production of innovative measuring instruments for online water quality monitoring.

### **Mission:**

s::can offers a complete set of accurate, reliable, low-maintenance and inexpensive measuring instruments for comprehensive and time-resolved water quality monitoring. We consider online water quality monitoring the essential basis for the monitoring of any natural water bodies and for the economically and ecologically optimized operation of waste water treatment plants, drinking water works and industrial plants. Such monitoring and optimization can help minimise the emission of pollution and hazardous substances into the environment thus helping to secure optimum water quality for human consumption at best possible economic efficiency.

**s::can**  
Intelligent. Optical. Online.

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# Intelligent. Optical. OnLine.

## Our services & our guarantees

Whether it is a simple pH sensor or a complex spectral probe, s::can measuring instruments are intelligent and compatible with each other in s::can systems and with third-party systems. They can all communicate with all terminals, they can also be operated without a terminal and they can even be integrated directly into your control system without an extra terminal. They are always operated by the same software, viewed on the same display and installed, set up, calibrated and maintained in the same way. They have a comprehensive repertoire of self-diagnosis functions that are always executed automatically and they inform you immediately in plain language if deviations from optimum operation occur. All this is always done in the same way so that you only have to familiarise yourself once with the very intuitive s::can software and then you can operate all s::can instruments.

## Optical

Organically developed, constantly tried and tested, and often proven: Optical works best. It doesn't matter whether it is COD, TOC, NO<sub>3</sub>, NO<sub>2</sub>, TSS, turbidity, dissolved oxygen, or many others besides. Whenever an optical method is available, we use it; when not, we develop one. Optical methods are the most reliable, the simplest, have the lowest cost, and, above all, they are usually the most accurate.

If ever a measurement is impossible by optical methods, then we just use the best alternative method that comes closest to our focus. For example, in our ammo::lyser™ the ammonium is measured using a combination of electrodes which is acknowledged as the best to date for a pH and potassium compensated ammonium measurement. With the ammo::lyser™, we have also set the standards, won in practically all tests against comparable instruments and ensured that the ammo::lyser™ is now regularly used in the biggest projects everywhere in the world.

## OnLine & InSitu

We postponed the issue of this catalogue until our parameter range was complete, at least regarding typical applications in the areas of water, waste water, environmental monitoring, and industrial applications. We waited until we had developed an absolutely state of the art measuring instrument for each individual parameter. It is our firm conviction that each of those instruments cannot be bettered today in terms of performance, quality and cost. On top of this there are our fully modular compact measuring stations that combine these instruments into an organic whole. They present a complete solution whose modules the user only has to connect ("plug-and-measure") in order to receive at no extra cost a previously unheard of variety of immediately available information and parameters.

For instance the combination of the parameters COD-BOD-NO<sub>3</sub>-NH<sub>4</sub>-NO<sub>2</sub>-TSS-pH can be measured with only 2 s::can probes and 1 terminal, replacing an entire container of conventional cabinet analyzers and thereby revolutionizing water and waste water monitoring around the world.

We are proud of having created all this in less than 10 years and also to have set new standards in water monitoring along the way. For example, in 2000 when we brought our first spectro::lyser™ to the market we established online UV spectrometry in sensor format in the marketplace years ahead of the competition. Today, with well over 4,000 systems sold, we are the undisputed global market leader in this segment and can continue to call ourselves the technological leader.

# Our services & Our guarantees

## About our prices

Have you ever been annoyed with a cheap printer that you just bought, only to find that the first time you had to change the ink cartridge it cost almost as much as the printer itself? Unfortunately a similar trend can be detected in the sector of water quality measurement technology - but not at s::can. s::can does not try to make its profits from the sale of "consumables" such as reagents, consumable parts and the like, thereby hitting the customer with unexpected costs. s::can is not a "consumables company". The consumables strategy contradicts our principles of fairness in the customer relationship and the importance we ascribe to running an ecologically sustainable business. Our business is simpler. We make our living from the sale of our measuring instruments. Most of our instruments are designed in such a way that they need no consumables at all and, if they do (e.g. with ISE probes), then they are designed in such a way that the use of consumables is in the region of the technically feasible minimum, and the consumables required can be purchased in the smallest possible units at the most keenly calculated prices. The advantage is obvious. The operating costs of our instruments are typically close to zero or a small fraction of that of our competitors. In terms of "total cost of ownership", many of our instruments are already the best price to buy, and after 3 years or 5 years at the latest, all of our instruments are unrivalled economically. May we give you an estimated calculation for your application?

## Cost Guarantee - No surprises over many years

Within the framework of individual service contracts and for an annual fee we will be happy to give you a guarantee to cover all costs that might arise in the operation of our instruments, beyond our comprehensive standard guarantees. For 3 years, 5 years or even 10 years. Whenever you compare our instruments with the instruments of other manufacturers, ask the other manufacturer to give you a guarantee to cover the operating costs over lengthy periods. You will be amazed how much less expensive s::can measuring instruments are to operate.

## Quality Guarantee – No one can do more for optimum quality

The effort that we make in controlling quality in production is probably unique. Just visit us at our factory in Vienna, Austria, and we will be happy to show you our production plant and our QS system. As a result of our focus on allowing only reliable, simple and at the same time intelligent sensors be part of our measuring systems, we can give guarantees that were previously unheard of in our sector. For instance, we guarantee our optically operated sensors for up to 3 to 5 years. We give a minimum 2 year full guarantee on all other sensors – apart from consumables, but we can even cover those up to 100% within the Cost Guarantee.

## "CleanData" Guarantee - and you can focus on your own job

Within service contracts we will also be happy to give functionality and availability guarantees. That extends to the "CleanData" concept. Here our local partners handle the installation, setup, calibration and maintenance of your instruments and we send you regular reports about the instruments' performance, and can automatically give you service recommendations if you grant us remote access to the measuring system. Our "Support" department will even inform you about any special features of your application if that is what you want and is available to discuss the causes of any deviations. So you can keep your mind free of the measuring instrument, which is really a side issue for you, and dedicate yourself once more to your central tasks.

## Environmental Guarantee - Monitoring the environment, not polluting it

Our measuring instruments are constructed so as not to use any chemicals or leave any waste. Most s::can instruments operate for many years without consuming any replacement or spare parts. Virtually no environmentally harmful processes or chemicals are used in manufacture. Every one of our instruments and also our entire range of instruments leaves a truly negligible "ecological footprint" compared with traditional laboratory, quick test and analyzer technology.

Our services  
+ Our guarantees → = your benefit

# Water quality parameters

## Correlation with laboratory parameters

It is an understandable requirement of users and also of monitoring bodies with legal duties to check the accuracy of measurement of online sensors compared to standardised reference methods in the laboratory. This check is indispensable – but often not trivial – in particular with measurements that are intended to check the compliance to emission limits.

The total error of measurement results from a) representativity of sample taken, compared to the online sensor, b) changes in the sample as a result of transportation and storage and, c) lab analysis errors, easily adding up to as much as 20% of the true value. This is for sure greatly depending on the parameter and application, but occurs even when the work is done most cleanly. The online measurement value is very often higher than the laboratory value since part of the target substance is often lost during handling. We have documented many examples where, despite the use of quality-controlled reference methods, parameters such as BOD, COD, NO<sub>3</sub>-N, and TSS or TS were systematically 10 – 20% higher compared to laboratory measurements. These values were taken for calibration of the online sensor so as a result all the following measurements were too low by this percentage. Which might not be a major problem for process control, since all that matters there is good dynamics and stability, but is unacceptable for compliance monitoring. In our experience a correlation of 90% to 95% can normally be achieved between the online sensor and the laboratory, but just to achieve this takes a lot of specialist knowledge and experience, not least regarding sample taking and sample transportation. We are very happy to support our customers to achieve the best possible results with our comprehensive experience.

The pioneering (and currently world's only) international standard for assessing online measuring instruments for water quality monitoring is ISO 15839. We see this standard as a major step towards objective assessment of the quality of online water measurement instruments and we are already gradually moving to having all our instruments tested in this manner. As soon as approved research institutes are granted the authority to issue inspection certificates, we will show these in our specifications.

In recent years many countries have witnessed a change of paradigm towards the recognition of online methods and instruments often in acknowledgement of the tremendous operational advantages to be gained from continuously measuring dynamic values.

With more than 10 years of experience in the field of comparative studies, after over 100 technical commissionings and approvals, and with about a dozen tests always in progress in many countries of the world, s::can can offer you the best possible support in your comparative studies. We know what counts, even in the most varied applications that can occur in water management. Our feasibility studies and calibration reports are well known throughout the sector, are worked out meticulously and independently by the scientists in our "Support" department using recognized methods, and turned out to be critical several times because of the commitment of this department to quality and objectivity without the pressure to sell.

# Parameter overview

## "Why do we measure"

The goal of quality monitoring various natural waters and drinking waters is the reduction of harmful effects to our environment and our human health. This aim has to fulfil various guidelines that are defined in official ecological and drinking water quality regulations. Because of the continuous efforts to improve the quality of natural waters, to reduce the health risks of water consumers and to optimize the efficiency of drinking water treatment, the requirements for process technology and for quality control of water are ever increasing.

Therefore reliable monitoring stations that provide continuous data are an essential component in the drinking water supply and the environmental protection - both for the dynamic process control as well as for continuous monitoring of the water quality. In environmental monitoring as well as in drinking water production s::can monitoring stations have been in use for many years. Their technological and methodological quality standards have set new boundaries with regards to measurement performance and have often opened up completely new opportunities for drinking water security and environmental protection.

## "How do we measure"

All s::can instruments can be operated according to the "plug & measure" principle: With a simple plug connection, which provides power supply and data communication, the s::can sensors are connected to s::can terminals and are ready for use immediately. All s::can instruments are pre-calibrated ex works. The s::can terminals are equipped with the respective connectors (fully compatible interfaces) and the software for operation the s::can probes and sensors.

All s::can measurement systems consisting of standardised s::can products are ready for use without the need for complex initial procedures on site (no wiring, no long settings, no initial calibrations etc.). The "Plug & Measure" principle avoids complex installation procedures on site and thus does not only save time during initial operation, but also reduces avoidable errors.

Manufactured using highly resistant materials and tested according to the highest quality standards, s::can measurement instruments can be used in practically all types of water. The highly optimized design completely eliminates all moving parts in contact with the water. This reduces failures and maintenance dramatically.

Using standardised mounting devices, s::can spectrometer probes can be installed quickly and effortlessly, either submersed (InSitu) or in a flow through setup (by-pass, monitoring station).

All s::can instruments are intelligent - amongst others local calibrations are stored on the instruments and auto-diagnosis procedures are used to ensure best possible operation.

Suitable for a wide range of applications, ranging from very low up to very high concentrations, from sum parameters to measurement of single substances, from ultra pure water to industrial waste waters, s::can monitoring systems provide reliable and accurate readings. Even in such applications, that had remained impossible for other instruments.



# The s::can solution

## The spectrometer probe

Let's get out of the laboratory, and into the water. Away from the complicated and high-maintenance cabinet analyzers towards reliable and simple online technologies and, above all, submersible spectrometers. A "mega trend" for the future of water management? We are convinced of it. s::can spectrometer probes need practically no maintenance, are extremely robust and durable and keep measuring for years, 24 hours a day, to the complete satisfaction of the operators. The advantages are obvious and are described later in more detail for the individual measurement parameters.

	Spectrometric	Photometric	Cabinet analyser
Accuracy	★★★	*	★★★★
Stability (drift)	★★★★	★★★	★★
Calibration effort	★★★	★★	★★★★
Maintenance effort	★★★★★	★★★★	*
Purchase costs	★★★★	★★★★	*
Operating costs	★★★★★	★★★★	*

Comparison of various procedures for monitoring organic chemistry

## The spectrometer probe ...

- ... provides several crucial advantages over simple photometer probes:
- 1) Up to 8 major parameters can be measured at once. This flexibility also permits expansion of the range of parameters for future applications which you are probably not thinking of at all today.
  - 2) Measurement is incomparably more stable with regard to cross-sensitivities and therefore more accurate than photometer probes by entire orders of magnitude, especially in difficult applications.
  - 3) Even in special applications, there is almost always a spectral range that correlates well with the substance of interest. In the event of major changes in water composition, only a new spectral calibration is required.
  - 4) A large number of individual substances can also be identified against a fluctuating background matrix and separately quantified with the application of chemometric methods (e.g. BTX, phenols, solvents, flavouring agents etc.), which does not work at all with simple photometric probes.
  - 5) Distinguishing between total and dissolved substances is possible: s::can uses a sophisticated mathematical algorithm that permits this distinction to be made reliably and usually works even without calibration.
  - 6) The intelligent "spectral alarm" permits detection of deviations from a normal composition ("event detection") and provides an associated alarm signal. This method is now acknowledged and in use around the world, e.g. in drinking water and river water alarm systems and in industrial discharge monitoring.

## Conventional solutions

## The traditional cabinet analyzer

This type of instrument has been in use for about the last 30 years for measuring most chemical parameters. The advantage of such instruments was always with the manufacturers of consumables and not with the customers. These instruments can often be kept going only by means of comprehensive service contracts, they consume chemicals and spare parts, pollute the environment, and need considerable attention. Frequently they are so expensive and unreliable in operation that users just shut these instruments down again after some period of use.

## The simple photometric probe

... despite its disadvantages, is still in widespread use today, probably because for a long time there simply was no better replacement available for monitoring organic carbon compounds (by correlation with the UV absorption signal at 254 nm). It is also used for monitoring nitrate (e.g. by correlation at 220 nm). Since this probe can only ever measure one parameter, the optical filter would have to be changed to measure other substances, creating a great deal of work, and then the probe can in turn monitor only this one parameter: flexibility is very restricted..The measurement of COD can be rendered impossible simply by the discharge of a new industrial emitter into the sewage system. However, with clear water and completely stable water composition, good results can sometimes be achieved. With fluctuations in turbidity, a second wavelength must also be measured for compensation, still this does not work nearly as well as full spectral compensation (see picture). This alone lifts these sensors up to the price level of s::can spectral instruments .

Since these probes remain restricted to single parameter monitoring, a substantial cost disadvantage compared with a spectral probe arises. These simple probes are just not able to cope with matrix fluctuations and they often provide results that are not sufficiently correlated with the true concentration values, or with the reference method.

## The s::can solution

s::can spectral instruments capture the major proportion of organic carbon compounds (because they are chemo-physically similar to UV oxidation in a TOC analyzer), which as a general rule correlates excellently with the reference measurements. Recovery is estimated to be about 80% in domestic waste water. The correlation with other oxidative methods for TOC analysis is usually also good but, like all methods, it also has certain limits. Our experts can now almost always say from experience how good the expected correlation will be and help you with optimizing the results.

The comparison between laboratory COD or laboratory TOC and spectrometrically determined values should always be better than 90% depending on the distribution of your reference samples. If that does not work out or is not satisfactory straight away, please contact s::can Support (email: support@s-can.at).

For many applications the distinction between total COD and dissolved COD, or between TOC and DOC is of major importance. This distinction is based on a physically consistent description of the solids by a spectral algorithm that has now been proven in practice thousands of times. (See diagram on the next page).

In addition here comes another great advantage of spectrometry: Not only can one quantify any change of the concentration of total organic compounds, expressed by COD or TOC, but it is also possible to identify several differentiated groups of organics or even detect individual organic substances that cause this change. It is even possible to distinguish between "normal" and "abnormal" (mostly undesirable) organic composition in "event detection systems". The s::can spectrometer probe is now accepted by public authorities in many countries as a substitute measurement for COD or TOC, and this strong trend is continuing.

Spectral BOD as provided by s::can has nothing to do with the widely used simple correlation of BOD to UV254 that is used by other manufacturers but which seldom works reliably.

In principle it is not the respiration of the bacteria that is tracked - the standard measurement - but it is the easily digestible fraction of the organic compounds that is measured directly. To this end spectral algorithms were developed for various waters from thousands of samples, and these are based on the spectral integral of light absorption of biologically easily accessible chromophorous carbon compounds (e.g. proteins, acids etc.) in the wavelength range as pictured in the diagram on the next page.

It is always recommended that the BOD (as opposed to other spectral parameters) be calibrated on initialization of a measuring station by comparison with a reference method.

The comparison between laboratory BOD and spectrally-determined online values should be better than 85%. If that is not sufficient or does not work straight away, just contact s::can Support and together we will achieve a still better correlation by supporting you with the reference measurements and/or conduct a calibration specifically for you.

## Conventional solutions

The traditional measurement of COD is conducted after pulping the sample with oxidants of varying strength (and varying harm to the environment) such as dichromate (about 90% recovery efficiency in domestic waste water) or manganese III (about 80% recovery efficiency in domestic waste water). In the attempt to come as close as possible to the normative standards, laboratory methods were transferred to field analyzers and hardly changed. As these methods are not really practical in process and field applications, these analyzers are as a rule expensive to buy and operate, complicated, unreliable and harmful to the environment, and often still do not conform to the legal standards. The quality of measurement actually achieved is then mostly well below the given specification since very few users have the time to invest in these instruments to keep them operating reliably. But even if these instruments worked perfectly, their availability and the accuracy achieved are still well below that of spectral probes since it is not easy to gain control of the incidental and systematic errors that occur because of their complexity.

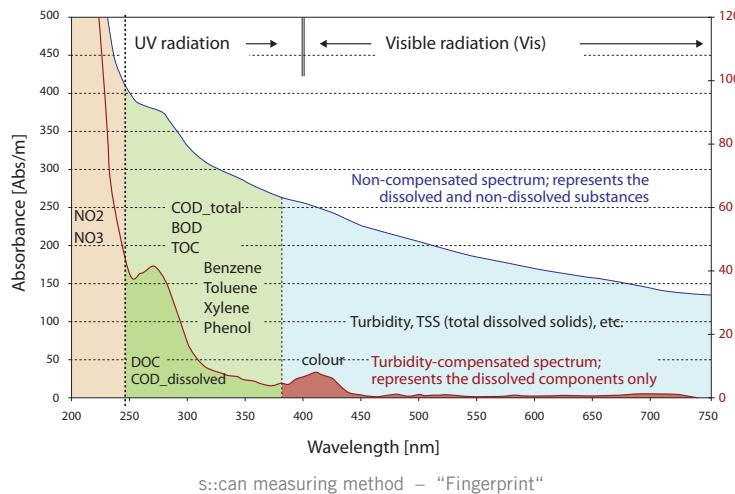
COD  
dissolved

It is not without reason that the replacement of COD cabinet analyzers is one of s::can's major areas of business.

TOC

Although BOD is a very interesting parameter, in particular for the modelling and layout of waste water treatment plants, it is difficult to sample, prepare and also to analyze. The main reason is clear. After all one is working here with living organisms that may behave quite differently depending on the water quality and experimental conditions thus a lot of scattering is introduced. BOD is normally measured by detecting the respiration of bacteria via oxygen content or indirectly via the gas pressure. Among other things, measurement in the low concentration range or in the presence of inhibitors regularly causes problems.

BOD cabinet analyzers in particular do not reflect BOD according to the standard and they must therefore first be compared themselves with the "true" BOD method and calibrated accordingly. The maintenance effort may be considerable, which is why BOD is rarely measured online with any enthusiasm.



## The s::can solution

**NO<sub>3</sub>-N** Depending on the method, a spectral probe measures the nitrate concentration with much greater accuracy and stability and greater freedom from cross-sensitivities than a simple photometric probe (see diagram below). So an s::can spectral probe, regardless of whether it is a nitro::lyser™, multi::lyser™ or spectro::lyser™, is already widely used as a reference for simple photometric or ISE probes.

The nitrate value is accurately measured and displayed by s::can spectral probes in many applications without calibration. The detection limit in some applications is in the region of 0.005 mg/l (!) and even in a heavily loaded SBR reactor at 15 g/l TS, it is still better than 0.2 mg/l. The recommended measurement path length for the latter highly concentrated waste water is just 0.5 mm and, despite this, accurate measurements are possible, as is reliable cleaning of the measurement gap.

The nitrate value measured by s::can spectral probes is extremely stable in respect to matrix fluctuations. Thus, for instance, an accurate nitrate value can be measured with one and the same instrument in most flows without local calibration and this is not disturbed by typical daily, weekly or seasonal fluctuations either.

The higher purchase price compared with ISE probes will pay for itself in no more than one or two years of operation, and the many subsequent years of operation are characterized by problem-free, practically free-of-charge measurement, free of worries.

You will soon no longer think about the nitro::lyser™ at all, while the measurement values, on the other hand, will become the basis of your day-to-day work which you take for granted.

## Conventional solutions

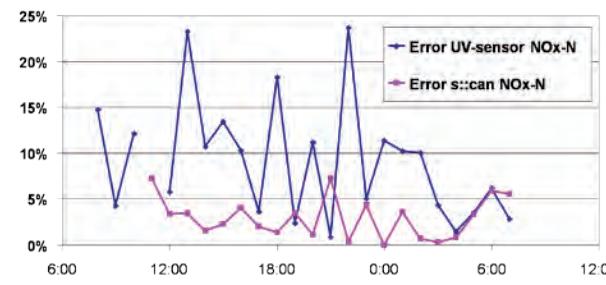
Nitrate is hardly ever measured these days with cabinet analyzers since these also create disadvantages (hydraulic sampling, reagent consumption, maintenance effort etc.) and, in any case, recognized alternative methods exist.

Optical probes have been successful and have found acceptance globally, so today there is generally no longer any real reason to use a cabinet analyzer for monitoring of nitrate.

Ion-selective (ISE) probes have also recently experienced a renaissance in nitrate measurement based on the lower purchase prices. However, by contrast with ammonium, the nitrate membranes available today are not so practical in use because they require more maintenance and are subject to more drift, re-calibration, and exchanges. In any event, today the ISE method is not suitable for WWTP compliance monitoring or even NO<sub>3</sub> monitoring in fresh waters because it is subject to strong drift especially visible at lower concentration levels. However, ISE probes are increasingly being offered as an alternative to control nutrient removal processes, often in combination with ammonium. The capital purchase price advantage compared with optical probes is striking only for a very short period. After just two years of operation the advantage is already lost because of the cost of consumables, and efforts required for calibration and electrode changing. After 10 years of operation, an ISE probe will have cost about two to three times as much in total as an optical probe, considering the total of maintenance hours and consumables.

Comparison of various methods for monitoring NO<sub>3</sub>-N

	Spectrometric	Photometric	ISE
Accuracy	★★★★★	★★★	★★
Stability (drift)	★★★★★	★★★	★
Calibration effort	★★★★★	★★★	★
Maintenance effort	★★★★★	★★★★	★★★
Purchase costs	★★	★★★	★★★
Operating costs	★★★★★	★★★★	★



© s::can Messtechnik GmbH

## The s::can solution

s::can has achieved a breakthrough and can offer nitrite measurement, also in combination with nitrate and COD in a single probe, which correlates perfectly with the reference methods.

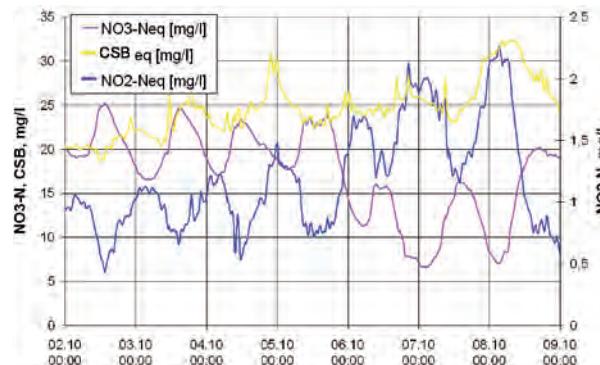
This opens up fundamentally new prospects both for treatment plant operators in their control and monitoring of nutrient removal, and for ecologists in their monitoring of the emission situation - NO<sub>2</sub>-N is a poison dangerous to fish. The presence and fluctuation of nitrite concentration are always very informative indicators of disturbances to biological processes, i.e. presence of inhibitors.

For the first time, the combination of COD or TOC, nitrate and nitrite in a single probe for the operation and control of a treatment plant (see adjacent diagram) allows complete and detailed interpretation of the nutrient removal process.

## Conventional solutions

Until recently nitrite was measured almost exclusively by laborious colorimetric methods using analyzer cabinets. Here for example azo dye is added and measurement is done photometrically after the reaction. The disadvantages already mentioned (mechanical sampling, reagent consumption, maintenance effort, environmental pollution, costs etc.) in principle also apply to nitrite analyzers. Because of this effort and expense the measurement of nitrite has not been widely used to date although many applications would benefit from the availability of this parameter..

NO<sub>2</sub>-N



## The ammo::lyser™ is a third generation ion-selective (ISE) probe.

It is not just the concentration of NH<sub>4</sub>-N in aqueous solution that is recorded but also the potassium concentration and the pH value thus allowing most interferences to be eliminated in a range of concentration of 0.1 to 1,000 mg/l. Optionally, a NO<sub>3</sub>-N electrode can be added at elevated concentration levels of NO<sub>3</sub>-N.

The expected effort and cost of installation, maintenance and consumables is considerably reduced with using the s::can ammo::lyser™, compared to cabinet analyzers and investment costs are also lower by an entire order of magnitude.

With regard to the controller terminal, software, compressed air cleaning and interfaces, the ammo::lyser™ is fully integrated into s::can measuring systems, so it is simply connected to existing s::can systems and it can start measuring – the s::can “plug-and-measure” principle.

The ammo::lyser™ has several core distinguishing features compared with the ISE ammonium probes of other manufacturers:

### Free of interference?

The ammo::lyser™ compensates fully for any interference with the ISE ammonium measurement. The superior features of the ammo::lyser™ are to be found in the use of the most highly-developed membranes and in the application of today's most advanced algorithms and calibration methods.

## Ammonium is today still often measured with conventional cabinet analyzers.

The disadvantages already mentioned (mechanical sampling, reagent consumption, maintenance effort, environmental pollution, costs etc.) in principle also apply to ammonium analyzers.

NH<sub>4</sub>-N

Here the potentiometric measurement principle is mostly used i.e. conversion into the gaseous phase as ammonia and measurement with a gas-sensitive NH<sub>3</sub> electrode. Lately, ammonium was also measured in the gaseous phase by the spectrometric method.

In both cases the conversion to the gaseous phase is achieved with effort, expense, uncertainty and some environmental pollution.

Following the great success of the s::can ammo::lyser™, users worldwide have once more found confidence in ISE technology. For example, in 2007 more than 100 sewage works were fitted out in England alone. As a result, other manufacturers have recently produced other ISE probes which show similarities with the s::can ammo::lyser™ in some cases.

However you should test and compare the original s::can ammo::lyser™ so that you can judge its superiority for yourself. Contact your s::can sales partner to arrange a test!

## The s::can solution

### Factory calibration?

With the introduction of innovative calibration methods and new chemometric models as well as with the storage of all data and models "on board" the ammo::lyser™, previously unattainable precise and accurate measurements ex factory have become possible without initializing calibration.

### Precise and accurate enough, even for compliance monitoring and fresh waters ?

The measurement performance of the ammo::lyser™ is unbeaten in all areas of applications, but in particular in applications with both low ammonium concentrations and high relative salt content with its potential for interference: this applies from nutrient removal control on WWTPs, compliance monitoring in WWTP effluents through to the monitoring of fresh water bodies . The s::can ammo::lyser™ has been able to come out ahead in all comparison tests to date – ask us for the details!

### Cleaning/rinsing integrated?

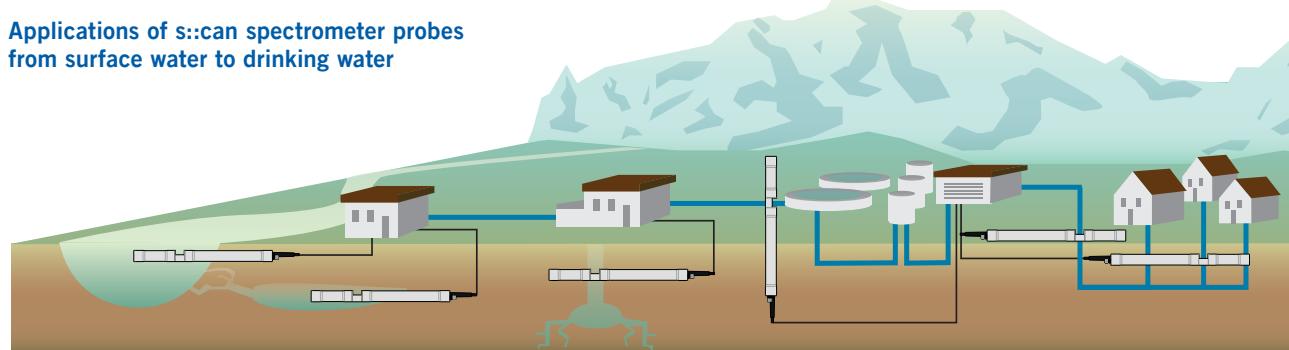
Connect to the local compressed air source and it's done. The proven automatic compressed air cleaning is always integrated ex works.

### Lowest operating costs?

The suggested infrequent exchange of individual membranes is easily possible with the s::can ammo::lyser™. In the aeration tank you normally only need to change the NH4 membrane once or twice a year. In WWTP effluents – for compliance monitoring – and in fresh waters the exchange might be wanted slightly more frequently.

The operating costs for the ammo::lyser™ are a fraction of those of other manufacturers since you can always exchange a single membrane and only when really needed

## Applications of s::can spectrometer probes from surface water to drinking water



#### River monitoring

- Alarm systems
- Early warning system
- Turbidity
- UV254 (280, 436 etc.)
- TOC
- DOC
- NO3-N
- Hydrocarbons
- NH4-N
- pH
- EC
- ORP
- O2

#### Monitoring of bank filtration

- Filter efficiency
- Monitoring of turbidity incl. colloids
- Alarms at specific and non-specific exceedance
- Turbidity
- TOC
- DOC
- NO3-N
- Hydrocarbons
- NH4-N
- pH
- EC
- O2
- NO2-N

#### Spring monitoring

- General suitability for drinking water
- Turbidity
- Alarms
- TOC
- DOC
- NO3-N
- Hydrocarbons
- NH4-N
- H2S
- pH
- EC
- O2
- BTX
- NO2-N

#### Monitoring, operation and control of the treatment plant

- Turbidity
- TOC
- DOC
- Ozone
- Change of OC at Oxidation
- Oxidation-products
- Filter efficiency
- Flocculants / turb. / OC
- NO3-N
- Various single substances
- Spectral tracing
- NH4-N
- F-
- Free Chlorine
- pH
- ORP

#### Monitoring of distribution network

- TOC
- DOC
- NO3
- Turbidity
- Hygienic risk
- Single substance alarm
- UV254
- Free Chlorine
- O2

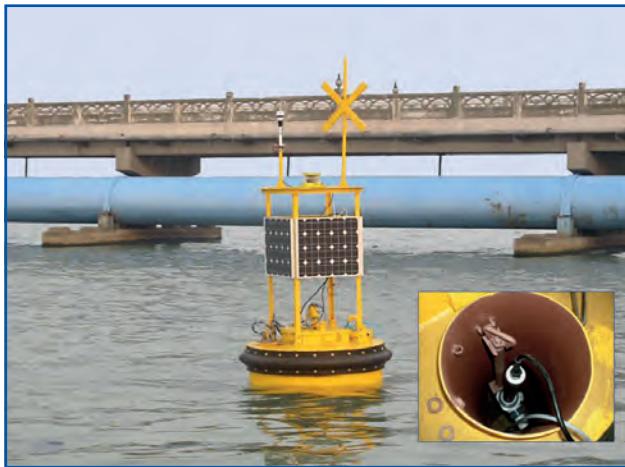




## Spectrometer Probes



spectro::lyser



carbo::lyser installed in a buoy

# Spectrometer probes

Spectrometer  
Probes

i::scan

Ionselective  
Probes

Physical Probes

Terminals

Software

System  
Configuration

Monitoring  
Stations

Spare Parts &  
Accessories

Services &  
Solutions

## "Why do we measure"

To quantify the concentration of organic substances in drinking water and natural waters usually sum parameters such as TOC, DOC or SAC are used. These sum parameters can be used because the total organics is composed of a multitude of substances.

As organic substances are on the one hand a source of food for micro-organisms and on the other hand they can be harmful themselves, their removal is an essential step in water treatment. The s::can carbo::lyser™ is used to continuously monitor the individual processes, such as adsorption and flocculation, used for removal of natural organics. Furthermore, the instrument is used in online alarm systems to monitor the drinking water distribution network. Typically, in both applications the turbidity, also provided by the carbo::lyser™, is used as an additional principal indicator for water quality.

The spectro::lyser™, which can measure the entire absorption spectrum, is used by many drinking water utilities worldwide as a pivotal component in their raw water monitoring. The spectro::lyser™ its capability to measure and analyze the absorption spectrum in its entirety allows the detection of a multitude of organic substances, and provide the best possible drinking water security when used to control ground, source and surface waters.

The benefits of using a spectro::lyser™ or multi::lyser™ are even higher as the much greater information content of the data provided by these instruments: two different fractions of the organics can be distinguished (TOC, DOC) and simultaneously the levels of turbidity, nitrate and color can be determined in a single measurement.

In ground water high nitrate concentrations are the primary source of public health risks. When producing drinking water from such sources it is necessary to reduce the nitrate concentration in the water. Here the nitro::lyser™ is used both in the control of such processes (for example mixing of water from different sources or InSitu nitrate removal) and in the monitoring of the raw water quality.

The spectro::lyser™ can go one step further and resolve nitrate and nitrite concentrations separately. As nitrite is extremely toxic for most aquatic organisms, this feature of the spectro::lyser™ allows the real-time detection of conditions that endanger the ecosystems in surface waters.

The spectrum of applications of the spectro::lyser™ in drinking water and natural waters is completed by online measurements of ozone (disinfection of drinking water), hydrogen sulphide (anoxic raw waters), disinfection by-product formation (drinking water) and single substances (for example benzene, toluene, xylene) in customer specific applications (e.g. contaminated ground water).

The use of "delta spectroscopy", the capability to determine many parameters simultaneously and the use of the spectral alarm software ana::larm makes the spectro::lyser™ an ideal tool for drinking water protection. As pivotal monitoring instrument in water quality stations the spectro::lyser™ detects potential threats to drinking water quality and security in real time.

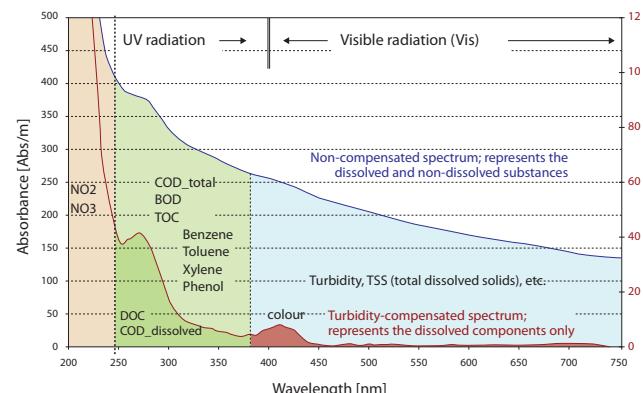


fig. 1 : "fingerprint" absorption spectra

# Spectrometer probes

## "How do we measure"

All s::can spectrometer probes are multi-parameter instruments that can measure multiple water quality parameters continuously (OnLine) and directly in the water without the need for complex and maintenance intensive sample pre-treatment.

The most important versions of the spectrometer probe are the nitro::lyser™ (nitrate and turbidity/solids), the uv::lyser (UV254 and turbidity/solids), the carbo::lyser™ (COD/TOC/UV254/DOC and turbidity/solids), the multi::lyser™ (nitrate and COD/TOC/UV254/DOC and turbidity/solids) and the versatile spectro::lyser™ (nitrate, solids/turbidity, total and dissolved organics).

As all s::can instruments the spectrometer probes can be operated according to the "plug & measure" principle. With a simple plug connection, which provides power supply and data communication, the s::can sensors are connected to an s::can terminal and are ready for use. All s::can spectrometer probes are pre-calibrated ex works - specific Global Calibrations are available for a large number of standardised applications. The "plug & measure" principle avoids complex installation procedures on site and thus does not only save time during initial operation, but also reduces avoidable errors.

The highly optimised design completely eliminates all moving parts in contact with the water as well as consumables. This reduces failures, spare part costs and maintenance dramatically. For s::can spectrometer probes we guarantee replacement of spare parts free of charge for the first three years after delivery (upon presenting the warranty card).

Using standardised mounting devices s::can spectrometer probes can be installed quickly and effortlessly, either submersed (InSitu) or in a flow through setup (Bypass, monitoring station).

s::can spectrometer probes utilise an automatic cleaning system that uses compressed air for removal of fouling. This system has proven highly efficient and reliable, even in untreated wastewater. Because of this, regular manual cleaning of the optical windows is not required, thus significantly reducing maintenance for the operator.

Like all other s::can instruments the s::can spectrometer probes are intelligent instruments - using software controlled procedures it is even possible to identify any fouling on the measuring windows.

The s::can spectrometer instruments are fully capable spectrometers in the shape of a probe. In the measuring section, which is positioned between emitting and receiving units, the emitted light passes through the medium to be analysed. Substances present in the medium located in between the measuring windows of the probe adsorb visible and UV light. Internally a second light beam is guided across a comparison pathway. This two beam setup (see figure 2) makes it possible to compensate, with each single measurement, any instrumental effects that could influence the quality of the measurement (e.g. ageing of the light source)

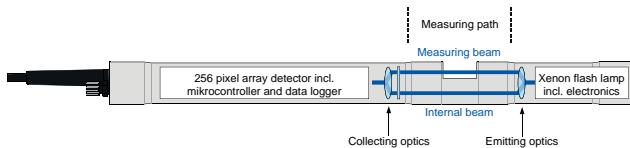


fig. 2: measuring path

s::can spectrometer probes record the complete absorbance spectrum between 220 and 720 nm (UV-Vis) or 220 - 390 nm (UV) resolving it into 256 wavelengths - the result is the "Fingerprint" (absorbance spectrum, see figure 1). Using the information contained in the fingerprint it is possible to monitor multiple parameters simultaneously and at the same time compensate these parameters for possible cross-sensitivities. The correlation with laboratory results reaches a quality that was unknown from the previously used simple optical instruments. Global Calibrations calculate the concentrations of multiple parameters from the Fingerprint and are available as application specific factory settings. Through the Global Calibrations each user benefits from many years of experience in applications similar to his own - in most cases no local calibration on site is required.

s::can spectrometer probes use no replaceable parts or consumables. Therefore, when operated properly there will be no costs for spare parts at all.

Its unrivalled measurement features in combination with the lowest possible total costs - initial cost and foreseeable operational costs - make the s::can spectrometer probe the most attractive solution available today.

# spectro::lyser™

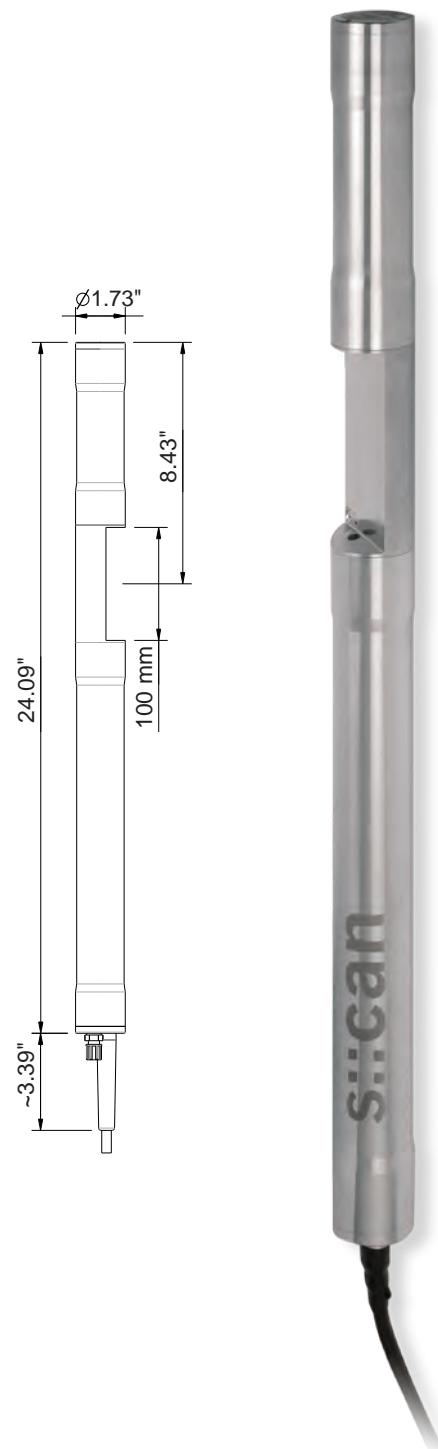
spectro::lyser™ UV monitors depending on the application an individual selection of: NO<sub>3</sub>-N, COD, BOD, TOC, DOC, UV254, NO<sub>2</sub>-N, BTX, fingerprints and spectral alarms, temperature and pressure

spectro::lyser™ UV-Vis monitors depending on the application an individual selection of TSS, turbidity, NO<sub>3</sub>-N, COD, BOD, TOC, DOC, UV254, color, BTX, O<sub>3</sub>, H<sub>2</sub>S, AOC, fingerprints and spectral alarms, temperature and pressure

- s::can plug & measure
- measuring principle: UV-Vis spectrometry over the total range (220-720 nm or 220-390 nm)
- multiparameter probe
- ideal for surface water, ground water, drinking water and waste water
- long term stable and maintenance free in operation
- factory precalibrated
- automatic cleaning with compressed air
- mounting and measurement directly in the media (InSitu) or in a flow cell (monitoring station)
- operation via s::can terminals & s::can software
- robust and precise adaption of optical path lengths to 35 mm, 15 mm, 5 mm, 2 mm, 1 mm or 0.5 mm possible
- easy mounting without clogging

## recommended accessories

part number	article name
A-005-s	Inserts for optical pathlength 5 mm, stainless steel
A-015-s	Inserts for optical pathlength 15 mm, stainless steel
B-32-xxx	s::can compressor
B-44	cleaning valve
B-61-1	cleaning agent
C-1-010-spectro	3.28 ft (1 m) connection cable for s::can spectrometer probes
D-315-xxx	con:cube
F-110-spectro	carrier s::can™ spectrometer probe
F-120-spectro	carrier s::can™ spectrometer probe
F-445-2	flow cell - for pathlength 100 mm
F-446-2	flow cell autobrush - for spectro::lyser™ pathlength 100 mm
S-11-xx-moni	moni::tool Software



technical specification	
measuring principle	UV-Vis spectrometry 220 - 720 nm UV spectrometry 220 - 390 nm
measuring principle detail	xenon flash lamp, 256 photo diodes
automatic compensation instrument	two beam measurement, complete spectrum
automatic compensation cross sensitivities	turbidity / solids / organic substances
precalibrated ex-works	all parameters
accuracy standard solution (>1 mg/l)	$\text{NO}_x\text{-N}$ : +/- 2% +1/OPL[mg/l]* COD-KHP: +/-2% +10/OPL[mg/l]* (* OPL ... optical pathlength in mm)
access to raw signals	access to spectral information
reference standard	distilled water
onboard memory	656 KB
integrated temperature sensor	-10 ... 50 °C
resolution temperature sensor	0.1 °C
integrated pressure sensor (optional)	0 ... 17.40/29.01/159.54 psi (0 ... 1.2/2/11 bar)
resolution pressure sensor	1:1000 of measuring range
integration via	con::nect con::cube
power supply	11 ... 15 VDC
power consumption (typical)	4.2 W
power consumption (max.)	20 W
interface connection to s::can terminals	MIL connector, IP68, RS485, 12 VDC
interface to third party terminals	con::nect incl. gateway modbusRTU
cable length	24.61 ft (7.5 m) fixed cable (-075) or 3.28 ft (1 m) fixed cable (-010)
cable type	TNPU jacket
housing material	stainless steel 1.4404
weight (min.)	7.50 lbs (incl. cable)
dimensions (diameter x length)	1.73 x 24.09 / 27.47"
operating temperature	0 ... 45 °C
storage temperature	-10 ... 50 °C
operating pressure	0 ... 43.51 psi (0 ... 3 bar)
high pressure specification	145.04 psi (10bar)
explosion proof specification (optional)	ATEX according to EN60079-0
installation / mounting	submersed or in a flow cell
flow velocity	3 m/s (max.), 9.843 fps (max.)
mechanical stability	30 Nm
protection class	IP68
automatic cleaning	media: compressed air permissible pressure: 58.02 ... 87.02 psi (4 ... 6 bar) air volume: 1.85 ... 5.28 US gal (3 ... 9 l) per cleaning duration: 1 ... 5 sec. per cleaning cleaning interval: every 1st to 10th measuring interval delay: 10 ... 30 sec.
conformity - EMC	EN 61326-1, EN 61326-2-3
conformity - safety	EN 61010-1
extended warranty (optional)	3 years



## ground water

	typical concentration ranges for this application											
	turbidity [NTU/FTU]	turbidity est [NTU/FTU]	NO <sub>3</sub> -N [mg/l]	NO <sub>2</sub> -N [mg/l]	TOC [mg/l]	DOC [mg/l]	UV254 [Abs/m]	UV254f [Abs/m]	color hazen-t [Hazen]	color hazen-f (Pt/Co) [Hazen]	H <sub>2</sub> S [mg/l]	part number
spectro::lyser™ UV (turbidity est, NO <sub>3</sub> -N, TOC, UV254, NO <sub>2</sub> -N)	min.	0	0	0	0		0					Sp2-035-p0-sNO-010 / -075 (incl. Global Calibration g2)
	max.	60	20	1	25		70					0
spectro::lyser™ UV-Vis (turbidity, NO <sub>3</sub> -N, TOC, DOC, H2S)	min.	0		0	0							Sp1-035-p0-sNO-010 / -075 (incl. Global Calibration g5)
	max.	150		20	25	20						20
spectro::lyser™ UV-Vis (turbidity, NO <sub>3</sub> -N, TOC, DOC, UV254, hazen)	min.	0		0	0	0			0	0		Sp1-035-p0-sNO-010 / -075 (incl. Global Calibration g7)
	max.	150		20	25	20	75		300	200		
spectro::lyser™ UV-Vis (turbidity, NO <sub>3</sub> -N, TOC, DOC, UV254, UV254f)	min.	0		0	0	0	0					Sp1-035-p0-sNO-010 / -075 (incl. Global Calibration g1)
	max.	150		20	25	20	75	50				

## surface water

	typical concentration ranges for this application											
	turbidity [NTU/FTU]	turbidity est [NTU/FTU]	NO <sub>3</sub> -N [mg/l]	NO <sub>2</sub> -N [mg/l]	TOC [mg/l]	DOC [mg/l]	UV254 [Abs/m]	UV254f [Abs/m]	color hazen-t [Hazen]	color hazen-f (Pt/Co) [Hazen]	part number	
spectro::lyser™ UV (turbidity est, NO <sub>3</sub> -N, TOC, UV254, NO <sub>2</sub> )	min.	0	0	0	0		0					Sp2-035-p0-sNO-010 / -075 (incl. Global Calibration r2)
	max.	80	10	4	25		70					
spectro::lyser™ UV (turbidity est, NO <sub>3</sub> -N, TOC, UV254, NO <sub>2</sub> )	min.	0	0	0	0		0					Sp2-015-p0-sNO-010 / -075 (incl. Global Calibration r2)
	max.	165	25	10	50		165					
spectro::lyser™ UV (turbidity est, NO <sub>3</sub> -N, TOC, UV254, NO <sub>2</sub> -N)	min.	0	0	0	0		0					Sp2-005-p0-sNO-010 / -075 (incl. Global Calibration r2)
	max.	500	70	30	150		500					
spectro::lyser™ UV-Vis (turbidity, NO <sub>3</sub> -N, TOC, DOC, UV254, UV254f, hazen-f, hazen-t)	min.	0		0	0	0	0	0	0	0		Sp1-035-p0-sNO-010 / -075 (incl. Global Calibration r1)
	max.	200		10	25	12	70	50	80	50		
spectro::lyser™ UV-Vis (turbidity, NO <sub>3</sub> -N, TOC, DOC, UV254, UV254f, hazen-f, hazen-t)	min.	0		0	0	0	0	0	0	0		Sp1-015-p0-sNO-010 / -075 (incl. Global Calibration r1)
	max.	465		25	50	30	165	100	165	115		
spectro::lyser™ UV-Vis (turbidity, NO <sub>3</sub> -N, TOC, DOC, UV254, UV254f, hazen-f, hazen-t)	min.	0		0	0	0	0	0	0	0		Sp1-005-p0-sNO-010 / -075 (incl. Global Calibration r1)
	max.	1400		70	150	90	500	300	500	350		

## drinking water

	typical concentration ranges for this application												
	turbidity [NTU/FTU]	turbidity est [NTU/FTU]	NO <sub>3</sub> -N [mg/l]	NO <sub>2</sub> -N [mg/l]	TOC [mg/l]	DOC [mg/l]	UV254 [Abs/m]	UV254f [Abs/m]	CLD [mg/l]	color hazen-t [Hazen]	color hazen-f (Pt/Co) [Hazen]	O <sub>3</sub> [mg/l]	part number
spectro::lyser™ UV (turbidity est, NO <sub>2</sub> -n, NO <sub>3</sub> -N, TOC, DOC, UV254)	min.	0	0	0	0	0	0						Sp2-100-p0-sNO-010 / -075 (incl. Global Calibration d2)
	max.	20	10	1	8	6	25						
spectro::lyser™ UV-Vis (turbidity, NO <sub>3</sub> -N, TOC, DOC, UV254, UV254f, CLD)	min.	0		0	0	0	0	0	0	0			Sp1-100-p0-sNO-010 / -075 (incl. Global Calibration d3)
	max.	50		7	10	6	25	15	8				
spectro::lyser™ UV-Vis (turbidity, NO <sub>3</sub> -N, TOC, DOC, UV254, UV254f, O <sub>3</sub> )	min.	0		0	0	0	0	0				0	Sp1-100-p0-sNO-010 / -075 (incl. Global Calibration d5)
	max.	50		10	8	6	25	15				10	
spectro::lyser™ UV-Vis (turbidity, NO <sub>3</sub> -N, TOC, DOC, UV254, UV254f, hazen-f, hazen-t)	min.	0		0	0	0	0	0	0	0	0		Sp1-100-p0-sNO-010 / -075 (incl. Global Calibration d7)
	max.	50		7	10	6	25	15		100	70		

# carbo::lyser™ II / III

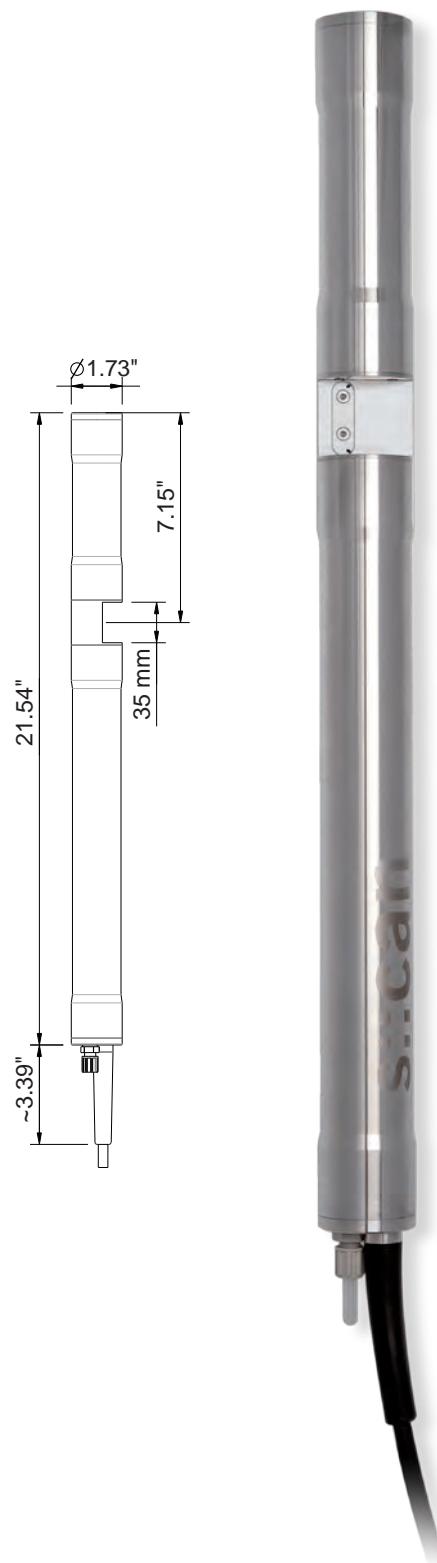
carbo::lyser™ II monitors TSS & UV254 or TSS & COD or TSS & BOD or Turbidity & TOC or Turbidity & DOC

carbo::lyser™ III monitors TSS & UV254 & UV254f or TSS & COD & BOD or Turbidity & TOC & DOC or TSS & COD & CODF

- s::can plug & measure
- measuring principle: UV-Vis spectrometry
- multiparameter probe
- long term stable and maintenance free in operation
- factory precalibrated
- automatic cleaning with compressed air
- mounting and measurement directly in the media (InSitu) or in a flow cell (monitoring station)
- operation via s::can terminals & s::can software
- automatic compensation of cross sensitivities
- ideal for surface water, ground water, drinking water and waste water
- robust and precise adaption of optical path lengths to 35 mm, 15 mm, 5 mm, 2 mm, 1 mm or 0.5 mm possible
- easy mounting without clogging

## recommended accessories

part number	article name
A-005-s	Inserts for optical pathlength 5 mm, stainless steel
A-015-s	Inserts for optical pathlength 15 mm, stainless steel
B-32-xxx	s::can compressor
B-44	cleaning valve
B-61-1	cleaning agent
C-1-010-spectro	3.28 ft (1 m) connection cable for s::can spectrometer probes
D-315-xxx	con::cube
D-319-xxx	con::lyte
F-110-spectro	carrier s::can™ spectrometer probe
F-120-spectro	carrier s::can™ spectrometer probe
F-445-1	flow cell - for pathlengths from 0.5 mm to 35 mm
F-446-1	flow cell autobrush - for spectro::lyser™ pathlength 35 mm
S-11-xx-moni	moni::tool Software



**technical specification**

measuring principle	UV-Vis spectrometry 220 - 720 nm	interface to third party terminals	con::nect incl. gateway modbusRTU
measuring principle detail	xenon flash lamp, 256 photo diodes	cable length	24.61 ft (7.5 m) fixed cable (-075) or 3.28 ft (1 m) fixed cable (-010)
automatic compensation instrument	two beam measurement, complete spectrum	cable type	TNPU jacket
automatic compensation cross sensitivities	turbidity / solids	housing material	stainless steel 1.4404
precalibrated ex-works	all parameters	weight (min.)	7.50 lbs (incl. cable)
accuracy standard solution (>1 mg/l)	$\text{NO}_3\text{-N}$ : +/- 3% +1/OPL[mg/l]* COD-KHP: +/-3% +10/OPL[mg/l]* (* OPL ... optical pathlength in mm)	dimensions (diameter x length)	1.73 x 21.45 / 24.09"
access to raw signals	no	operating temperature	0 ... 45 °C
reference standard	distilled water	storage temperature	-10 ... 50 °C
onboard memory	656 KB	operating pressure	0 ... 43.51 psi (0 ... 3 bar)
integrated temperature sensor	-10 ... 50 °C	high pressure specification	145.04 psi (10bar)
resolution temperature sensor	0.1 °C	installation / mounting	submersed or in a flow cell
integrated pressure sensor (optional)	0 ... 17.40/29.01/159.54 psi (0 ... 1.2/2/11 bar)	flow velocity	3 m/s (max.), 9.843 fps (max.)
resolution pressure sensor	1:1000 of measuring range	mechanical stability	30 Nm
integration via	con::lyte 2 con::lyte 4 con::nect con::cube	protection class	IP68
power supply	11 ... 15 VDC	automatic cleaning	media: compressed air permissible pressure: 58.02 ... 87.02 psi (4 ... 6 bar) air volume: 1.85 ... 5.28 US gal (3 ... 9 l) per cleaning duration: 1 ... 5 sec. per cleaning cleaning interval: every 1st to 10th measuring interval delay: 10 ... 30 sec.
power consumption (typical)	4.2 W	conformity - EMC	EN 61326-1, EN 61326-2-3
power consumption (max.)	20 W	conformity - safety	EN 61010-1
interface connection to s::can terminals	MIL connector, IP68, RS485, 12 VDC	extended warranty (optional)	3 years

**surface water**

		typical concentration ranges for this application					
		turbidity [NTU/FTU]	TOC [mg/l]	DOC [mg/l]	UV254 [Abs/m]	UV254f [Abs/m]	part number
carbo::lyser™ II (turbidity, DOC)	min.	0		0			C2-r005-p0-sNO-010 / -075
	max.	1400		75			
carbo::lyser™ II (turbidity, TOC)	min.	0	0				C2-r005-p0-sNO-010 / -075
	max.	1400	150				
carbo::lyser™ II (turbidity, UV254)	min.	0			0		C2-r005-p0-sNO-010 / -075
	max.	1400			500		
carbo::lyser™ II (turbidity, UV254f)	min.	0				0	C2-r005-p0-sNO-010 / -075
	max.	1400				300	
carbo::lyser™ III (turbidity, TOC, DOC)	min.	0	0	0			C3-r005-p0-sNO-010 / -075
	max.	1400	150	75			
carbo::lyser™ III (turbidity, UV254, UV254f)	min.	0			0	0	C3-r005-p0-sNO-010 / -075
	max.	1400			500	300	

**drinking water**

		typical concentration ranges for this application					
		turbidity [NTU/FTU]	TOC [mg/l]	DOC [mg/l]	UV254 [Abs/m]	UV254f [Abs/m]	part number
carbo::lyser™ II (turbidity, DOC)	min.	0		0			C2-d035-p0-sNO-010 / -075
	max.	150		10			
carbo::lyser™ II (turbidity, TOC)	min.	0	0				C2-d035-p0-sNO-010 / -075
	max.	150	20				
carbo::lyser™ II (turbidity, UV254)	min.	0			0		C2-d035-p0-sNO-010 / -075
	max.	150			70		
carbo::lyser™ II (turbidity, UV254f)	min.	0				0	C2-d035-p0-sNO-010 / -075
	max.	150				40	
carbo::lyser™ III (turbidity, TOC, DOC)	min.	0	0	0			C3-d035-p0-sNO-010 / -075
	max.	150	20	10			
carbo::lyser™ III (turbidity, UV254, UV254f)	min.	0			0	0	C3-d035-p0-sNO-010 / -075
	max.	150			70	40	

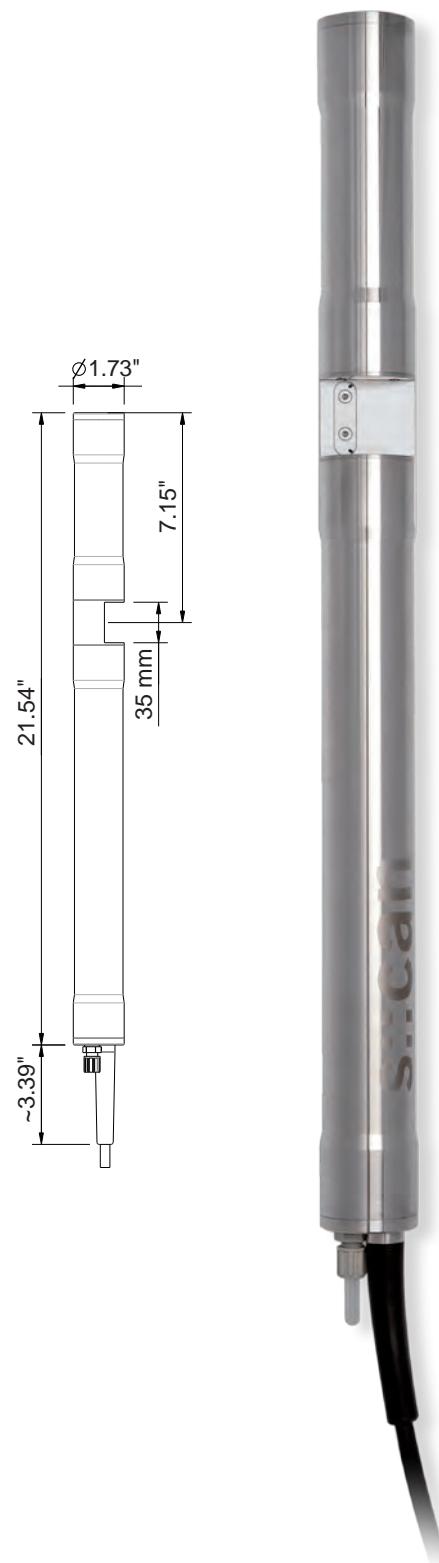
# color:lyser II

color:lyser II monitors turbidity & color (hazen standard)

- s::can plug & measure
- measuring principle: UV-Vis spectrometry
- multiparameter probe
- ideal for drinking water
- long term stable and maintenance free in operation
- factory precalibrated
- automatic cleaning with compressed air
- mounting and measurement directly in the media (InSitu) or in a flow cell (monitoring station)
- operation via s::can terminals & s::can software
- robust and precise adaption of optical path lengths to 35 mm, 15 mm, 5 mm, 2 mm, 1 mm or 0.5 mm possible
- easy mounting without clogging

## recommended accessories

part number	article name
A-005-s	Inserts for optical pathlength 5 mm, stainless steel
A-015-s	Inserts for optical pathlength 15 mm, stainless steel
B-32-xxx	s::can compressor
B-44	cleaning valve
B-61-1	cleaning agent
C-1-010-spectro	3.28 ft (1 m) connection cable for s::can spectrometer probes con::cube
D-315-xxx	carrier s::can™ spectrometer probe
F-110-spectro	carrier s::can™ spectrometer probe
F-120-spectro	carrier s::can™ spectrometer probe
F-445-1	flow cell - for pathlengths from 0.5 mm to 35 mm
F-446-1	flow cell autobrush - for spectro:lyser™ pathlength 35 mm
S-11-xx-moni	moni::tool Software



**technical specification**

measuring principle	UV-Vis spectrometry 220 - 720 nm	interface to third party terminals	con::nect incl. gateway modbusRTU
measuring principle detail	xenon flash lamp, 256 photo diodes	cable length	24.61 ft (7.5 m) fixed cable (-075) or 3.28 ft (1 m) fixed cable (-010)
automatic compensation instrument	two beam measurement, complete spectrum	cable type	PU jacket
automatic compensation cross sensitivities	turbidity / solids	housing material	stainless steel 1.4404
precalibrated ex-works	all parameters	weight (min.)	7.50 lbs (incl. cable)
accuracy standard solution (>1 mg/l)	NO <sub>3</sub> -N: +/- 3% +1/OPL[mg/l]* COD-KHP: +/-3% +10/OPL[mg/l]* (* OPL ... optical pathlength in mm)	dimensions (diameter x length)	1.73 x 21.45 / 24.09"
access to raw signals	no	operating temperature	0 ... 45 °C
reference standard	distilled water	storage temperature	-10 ... 50 °C
onboard memory	656 KB	operating pressure	0 ... 43.51 psi (0 ... 3 bar)
integrated temperature sensor	-10 ... 50 °C	high pressure specification	145.04 psi (10bar)
resolution temperature sensor	0.1 °C	installation / mounting	submersed or in a flow cell
integrated pressure sensor (optional)	0 ... 17.40/29.01/159.54 psi (0 ... 1.2/2/11 bar)	flow velocity	3 m/s (max.), 9.843 fps (max.)
resolution pressure sensor	1:1000 of measuring range	mechanical stability	30 Nm
integration via	con::lyte 2 con::lyte 4 con::nect con::cube	protection class	IP68
power supply	11 ... 15 VDC	automatic cleaning	media: compressed air permissible pressure: 58.02 ... 87.02 psi (4 ... 6 bar) air volume: 1.85 ... 5.28 US gal (3 ... 9 l) per cleaning duration: 1 ... 5 sec. per cleaning cleaning interval: every 1st to 10th measuring interval delay: 10 ... 30 sec.
power consumption (typical)	4.2 W	conformity - EMC	EN 61326-1, EN 61326-2-3
power consumption (max.)	20 W	conformity - safety	EN 61010-1
interface connection to s::can terminals	MIL connector, IP68, RS485, 12 VDC	extended warranty (optional)	3 years

**surface water**

		typical concentration ranges for this application			
		turbidity [NTU/FTU]	color hazen-t [Hazen]	color hazen-f (Pt/Co) [Hazen]	part number
color::lyser II (turbidity, hazen-f)	min.	0	0		T2-r005-p0-sNO-010 / -075
	max.	1400	500		
color::lyser II (turbidity, hazen-t)	min.	0		0	T2-r005-p0-sNO-010 / -075
	max.	1400		350	

**drinking water**

		typical concentration ranges for this application			
		turbidity [NTU/FTU]	color hazen-t [Hazen]	color hazen-f (Pt/Co) [Hazen]	part number
color::lyser II (turbidity, hazen-f)	min.	0		0	T2-d035-p0-sNO-010 / -075
	max.	200		70	
color::lyser II (turbidity, hazen-t)	min.	0	0		T2-d035-p0-sNO-010 / -075
	max.	200	100		

# multi::lyser™ II / III

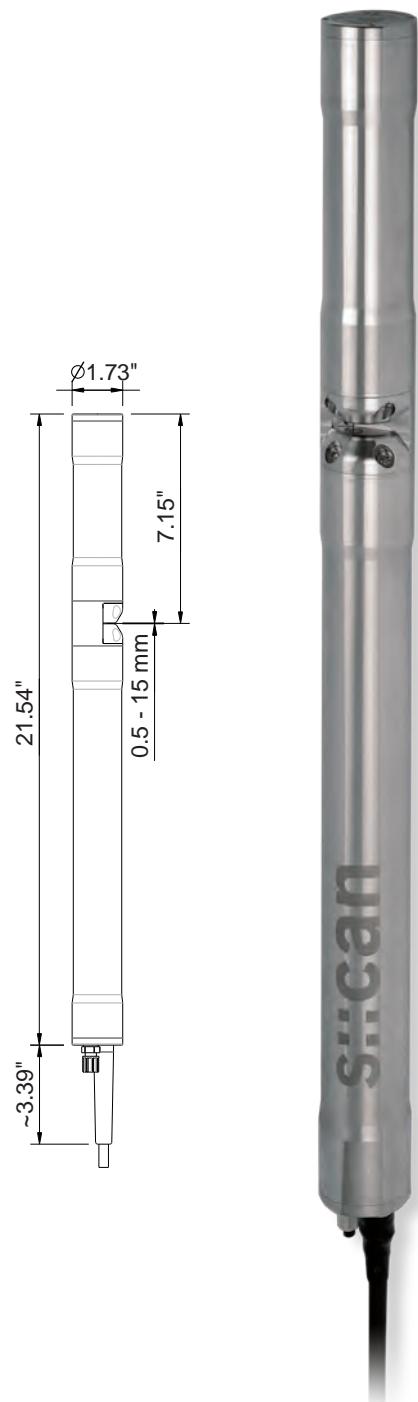
multi::lyser™ II monitors NO<sub>3</sub>-N & one organic parameter (COD, BOD, TOC, DOC or UV254)

multi::lyser™ III monitors turbidity / TSS & NO<sub>3</sub>-N & one organic parameter (COD, BOD, TOC, DOC or UV254)

- s::can plug & measure
- measuring principle: UV-Vis spectrometry
- multiparameter probe
- ideal for surface water, ground water, drinking water and waste water
- long term stable and maintenance free in operation
- factory precalibrated
- automatic cleaning with compressed air
- mounting and measurement directly in the media (InSitu) or in a flow cell (monitoring station)
- operation via s::can terminals & s::can software
- robust and precise adaption of optical path lengths to 35 mm, 15 mm, 5 mm, 2 mm, 1 mm or 0.5 mm possible
- easy mounting without clogging

## recommended accessories

part number	article name
A-005-s	Inserts for optical pathlength 5 mm, stainless steel
A-015-s	Inserts for optical pathlength 15 mm, stainless steel
B-32-xxx	s::can compressor
B-44	cleaning valve
B-61-1	cleaning agent
C-1-010-spectro	3.28 ft (1 m) connection cable for s::can spectrometer probes
D-315-xxx	con::cube
F-110-spectro	carrier s::can™ spectrometer probe
F-120-spectro	carrier s::can™ spectrometer probe
F-445-1	flow cell - for pathlengths from 0.5 mm to 35 mm
F-446-1	flow cell autobrush - for spectro::lyser™ pathlength 35 mm
S-11-xx-moni	moni::tool Software



**technical specification**

measuring principle	UV-Vis spectrometry 220 - 720 nm	interface to third party terminals	con::nect incl. gateway modbusRTU
measuring principle detail	xenon flash lamp, 256 photo diodes	cable length	24.61 ft (7.5 m) fixed cable (-075) or 3.28 ft (1 m) fixed cable (-010)
automatic compensation instrument	two beam measurement, complete spectrum	cable type	TNPU jacket
automatic compensation cross sensitivities	turbidity / solids / organic substances	housing material	stainless steel 1.4404
precalibrated ex-works	all parameters	weight (min.)	7.50 lbs (incl. cable)
accuracy standard solution (>1 mg/l)	NO <sub>3</sub> -N: +/- 3% +1/OPL[mg/l]* COD-KHP: +/-3% +10/OPL[mg/l]* (* OPL ... optical pathlength in mm)	dimensions (diameter x length)	1.73 x 21.45 / 24.09"
access to raw signals	no	operating temperature	0 ... 45 °C
reference standard	distilled water	storage temperature	-10 ... 50 °C
onboard memory	656 KB	operating pressure	0 ... 43.51 psi (0 ... 3 bar)
integrated temperature sensor	-10 ... 50 °C	high pressure specification	145.04 psi (10bar)
resolution temperature sensor	0.1 °C	installation / mounting	submersed or in a flow cell
integrated pressure sensor (optional)	0 ... 17.40/29.01/159.54 psi (0 ... 1.2/2/11 bar)	flow velocity	3 m/s (max.), 9.843 fps (max.)
resolution pressure sensor	1:1000 of measuring range	mechanical stability	30 Nm
integration via	con::lyte 2 con::lyte 4 con::nect con::cube	protection class	IP68
power supply	11 ... 15 VDC	automatic cleaning	media: compressed air permissible pressure: 58.02 ... 87.02 psi (4 ... 6 bar) air volume: 1.85 ... 5.28 US gal (3 ... 9 l) per cleaning duration: 1 ... 5 sec. per cleaning cleaning interval: every 1st to 10th measuring interval delay: 10 ... 30 sec.
power consumption (typical)	4.2 W	conformity - EMC	EN 61326-1, EN 61326-2-3
power consumption (max.)	20 W	conformity - safety	EN 61010-1
interface connection to s::can terminals	MIL connector, IP68, RS485, 12 VDC	extended warranty (optional)	3 years

**surface water**

		typical concentration ranges for this application							
		turbidity [NTU/FTU]	NO <sub>3</sub> -N [mg/l]	TOC [mg/l]	DOC [mg/l]	UV254 [Abs/m]	UV254f [Abs/m]	part number	
multi::lyser™ II (NO <sub>3</sub> -N, DOC)	min.	0	0		0			M2-r005-p0-sNO-010 / -075	
	max.	1400	70		75				
multi::lyser™ II (NO <sub>3</sub> -N, TOC)	min.	0	0	0				M2-r005-p0-sNO-010 / -075	
	max.	1400	70	150					
multi::lyser™ II (NO <sub>3</sub> -N, UV254)	min.	0	0			0		M2-r005-p0-sNO-010 / -075	
	max.	1400	70			500			
multi::lyser™ II (NO <sub>3</sub> -N, UV254f)	min.	0	0				0	M2-r005-p0-sNO-010 / -075	
	max.	1400	70				300		
multi::lyser™ III (turbidity, NO <sub>3</sub> -N, DOC)	min.	0	0		0			M3-r005-p0-sNO-010 / -075	
	max.	1400	70		75				
multi::lyser™ III (turbidity, NO <sub>3</sub> -N, TOC)	min.	0	0	0				M3-r005-p0-sNO-010 / -075	
	max.	1400	70	150					
multi::lyser™ III (turbidity, NO <sub>3</sub> -N, UV254)	min.	0	0			0		M3-r005-p0-sNO-010 / -075	
	max.	1400	70			500			
multi::lyser™ III (turbidity, NO <sub>3</sub> -N, UV254f)	min.	0	0				0	M3-r005-p0-sNO-010 / -075	
	max.	1400	70				300		

**drinking water**

		typical concentration ranges for this application							
		turbidity [NTU/FTU]	NO <sub>3</sub> -N [mg/l]	TOC [mg/l]	DOC [mg/l]	UV254 [Abs/m]	UV254f [Abs/m]	part number	
multi::lyser™ II (NO <sub>3</sub> -N, DOC)	min.	0	0		0			M2-d035-p0-sNO-010 / -075	
	max.	150	10		10				
multi::lyser™ II (NO <sub>3</sub> -N, TOC)	min.	0	0	0				M2-d035-p0-sNO-010 / -075	
	max.	150	10	20					
multi::lyser™ II (NO <sub>3</sub> -N, UV254)	min.	0	0			0		M2-d035-p0-sNO-010 / -075	
	max.	150	10			70			
multi::lyser™ II (NO <sub>3</sub> -N, UV254f)	min.	0	0				0	M2-d035-p0-sNO-010 / -075	
	max.	150	10				40		
multi::lyser™ III (turbidity, NO <sub>3</sub> -N, DOC)	min.	0	0	0	0			M3-d035-p0-sNO-010 / -075	
	max.	150	10		10				
multi::lyser™ III (turbidity, NO <sub>3</sub> -N, TOC)	min.	0	0	0				M3-d035-p0-sNO-010 / -075	
	max.	150	10	20					
multi::lyser™ III (turbidity, NO <sub>3</sub> -N, UV254)	min.	0	0			0		M3-d035-p0-sNO-010 / -075	
	max.	150	10			70			
multi::lyser™ III (turbidity, NO <sub>3</sub> -N, UV254f)	min.	0	0				0	M3-d035-p0-sNO-010 / -075	
	max.	150	10				40		

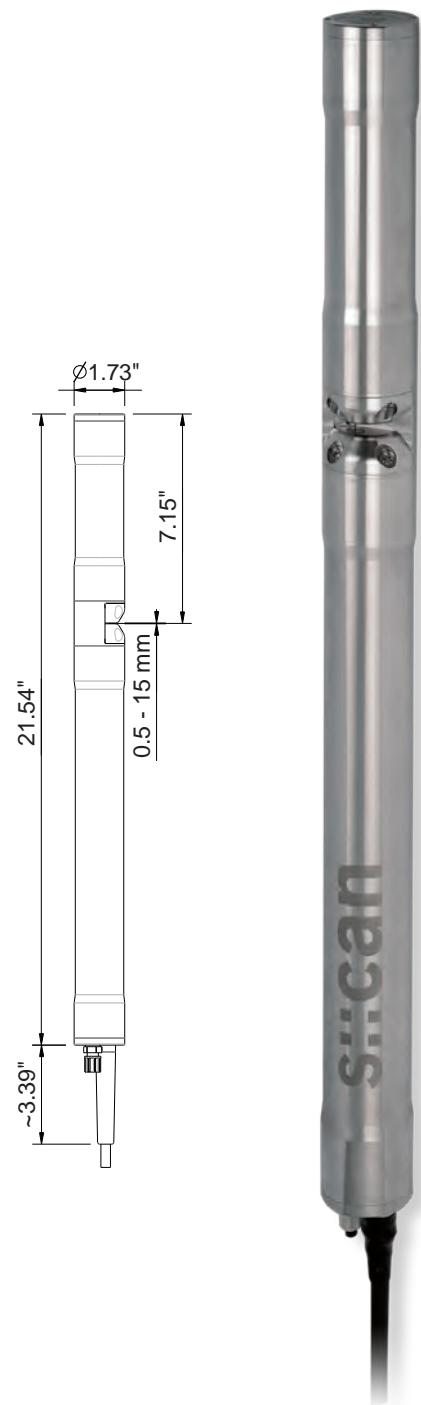
# nitro::lyser™ II

nitro::lyser™ II monitors TSS & NO<sub>3</sub>-N or turbidity & NO<sub>3</sub>-N

- s::can plug & measure
- measuring principle: UV-Vis spectrometry
- multiparameter probe
- ideal for surface water, ground water, drinking water and waste water
- long term stable and maintenance free in operation
- factory precalibrated
- automatic cleaning with compressed air
- mounting and measurement directly in the media (InSitu) or in a flow cell (monitoring station)
- operation via s::can terminals & s::can software
- robust and precise adaption of optical path lengths to 35 mm, 15 mm, 5 mm, 2 mm, 1 mm or 0.5 mm possible
- easy mounting without clogging

## recommended accessories

part number	article name
A-005-s	Inserts for optical pathlength 5 mm, stainless steel
A-015-s	Inserts for optical pathlength 15 mm, stainless steel
B-32-xxx	s::can compressor
B-44	cleaning valve
B-61-1	cleaning agent
C-1-010-spectro	3.28 ft (1 m) connection cable for s::can spectrometer probes
D-315-xxx	con::cube
F-110-spectro	carrier s::can™ spectrometer probe
F-120-spectro	carrier s::can™ spectrometer probe
F-445-1	flow cell - for pathlengths from 0.5 mm to 35 mm
F-446-1	flow cell autobrush - for spectro::lyser™ pathlength 35 mm
S-11-xx-moni	moni::tool Software



**technical specification**

measuring principle	UV-Vis spectrometry 220 - 720 nm	interface to third party terminals	con::nect incl. gateway modbusRTU
measuring principle detail	xenon flash lamp, 256 photo diodes	cable length	24.61 ft (7.5 m) fixed cable (-075) or 3.28 ft (1 m) fixed cable (-010)
automatic compensation instrument	two beam measurement, complete spectrum	cable type	TNPU jacket
automatic compensation cross sensitivities	turbidity / solids / organic substances	housing material	stainless steel 1.4404
precalibrated ex-works	all parameters	weight (min.)	7.50 lbs (incl. cable)
accuracy standard solution (>1 mg/l)	NO <sub>3</sub> -N: +/- 3% +1/OPL[mg/l]* COD-KHP: +/-3% +10/OPL[mg/l]* (* OPL ... optical pathlength in mm)	dimensions (diameter x length)	1.73 x 21.45 / 24.09"
access to raw signals	no	operating temperature	0 ... 45 °C
reference standard	distilled water	storage temperature	-10 ... 50 °C
onboard memory	656 KB	operating pressure	0 ... 43.51 psi (0 ... 3 bar)
integrated temperature sensor	-10 ... 50 °C	high pressure specification	145.04 psi (10bar)
resolution temperature sensor	0.1 °C	installation / mounting	submersed or in a flow cell
integrated pressure sensor (optional)	0 ... 17.40/29.01/159.54 psi (0 ... 1.2/2/11 bar)	flow velocity	3 m/s (max.), 9.843 fps (max.)
resolution pressure sensor	1:1000 of measuring range	mechanical stability	30 Nm
integration via	con::lyte 2 con::lyte 4 con::nect con::cube	protection class	IP68
power supply	11 ... 15 VDC	automatic cleaning	media: compressed air permissible pressure: 58.02 ... 87.02 psi (4 ... 6 bar) air volume: 1.85 ... 5.28 US gal (3 ... 9 l) per cleaning duration: 1 ... 5 sec. per cleaning cleaning interval: every 1st to 10th measuring interval delay: 10 ... 30 sec.
power consumption (typical)	4.2 W	conformity - EMC	EN 61326-1, EN 61326-2-3
power consumption (max.)	20 W	conformity - safety	EN 61010-1
interface connection to s::can terminals	MIL connector, IP68, RS485, 12 VDC	extended warranty (optional)	3 years

**surface water**

typical concentration ranges for this application				
		turbidity [NTU/FTU]	NO <sub>3</sub> -N [mg/l]	part number
nitro::lyser™ II (turbidity, NO <sub>3</sub> -N)	min.	0	0	N2-r005-p0-sNO-010 / -075
	max.	1250	70	

**drinking water**

typical concentration ranges for this application				
		turbidity [NTU/FTU]	NO <sub>3</sub> -N [mg/l]	part number
nitro::lyser™ II (turbidity, NO <sub>3</sub> -N)	min.	0	0	N2-d035-p0-sNO-010 / -075
	max.	150	10	

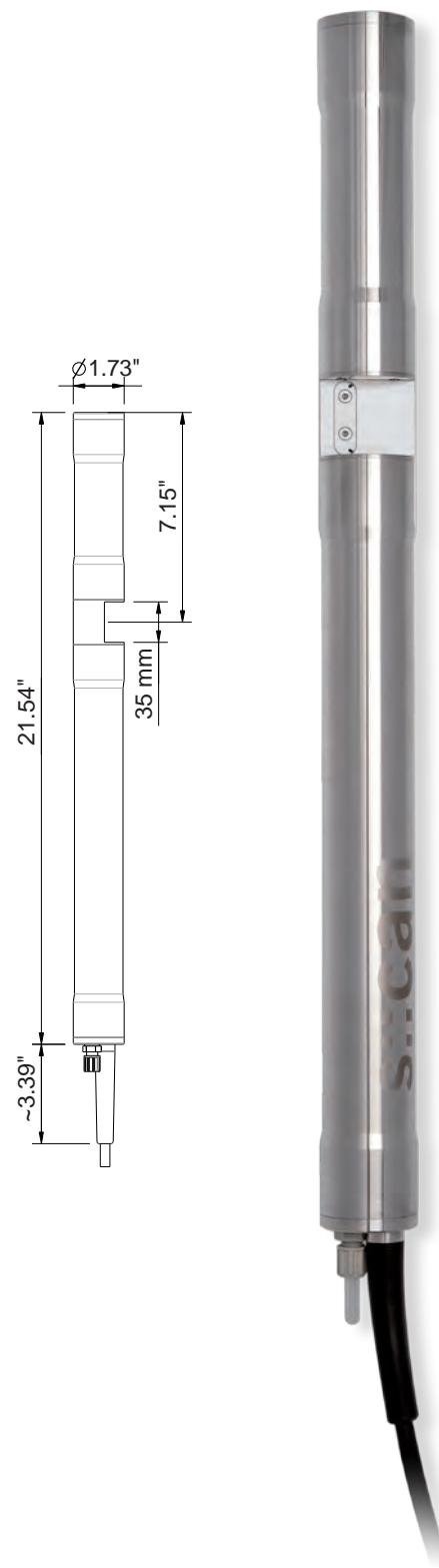
# ozo::lyser II

ozo::lyser II monitors turbidity & ozone

- s::can plug & measure
- measuring principle: UV-Vis spectrometry
- multiparameter probe
- ideal for drinking water
- long term stable and maintenance free in operation
- factory precalibrated
- mounting and measurement directly in the media (InSitu) or in a flow cell (monitoring station)
- operation via s::can terminals & s::can software
- robust and precise adaption of optical path lengths to 35 mm, 15 mm, 5 mm, 2 mm, 1 mm or 0.5 mm possible
- easy mounting without clogging

## recommended accessories

part number	article name
A-005-s	Inserts for optical pathlength 5 mm, stainless steel
A-015-s	Inserts for optical pathlength 15 mm, stainless steel
B-32-xxx	s::can compressor
B-44	cleaning valve
B-61-1	cleaning agent
C-1-010-spectro	3.28 ft (1 m) connection cable for s::can spectrometer probes
D-315-xxx	con::cube
F-110-spectro	carrier s::can™ spectrometer probe
F-120-spectro	carrier s::can™ spectrometer probe
F-445-1	flow cell - for pathlengths from 0.5 mm to 35 mm
F-446-1	flow cell autobrush - for spectro::lyser™ pathlength 35 mm
S-11-xx-moni	moni::tool Software



**technical specification**

measuring principle	UV-Vis spectrometry 220 - 720 nm	interface to third party terminals	con::nect incl. gateway modbusRTU
measuring principle detail	xenon flash lamp, 256 photo diodes	cable length	24.61 ft (7.5 m) fixed cable (-075) or 3.28 ft (1 m) fixed cable (-010)
automatic compensation instrument	two beam measurement, complete spectrum	cable type	TNPU jacket
automatic compensation cross sensitivities	turbidity / solids / organic substances	housing material	stainless steel 1.4404
precalibrated ex-works	all parameters	weight (min.)	7.50 lbs (incl. cable)
accuracy standard solution (>1 mg/l)	NO <sub>3</sub> -N: +/- 3% +1/OPL[mg/l]* COD-KHP: +/-3% +10/OPL[mg/l]* (* OPL ... optical pathlength in mm)	dimensions (diameter x length)	1.73 x 21.45 / 24.09"
access to raw signals	no	operating temperature	0 ... 45 °C
reference standard	distilled water	storage temperature	-10 ... 50 °C
onboard memory	656 KB	operating pressure	0 ... 43.51 psi (0 ... 3 bar)
integrated temperature sensor	-10 ... 50 °C	high pressure specification	145.04 psi (10bar)
resolution temperature sensor	0.1 °C	installation / mounting	submersed or in a flow cell
integrated pressure sensor (optional)	0 ... 17.40/29.01/159.54 psi (0 ... 1.2/2/11 bar)	flow velocity	3 m/s (max.), 9.843 fps (max.)
resolution pressure sensor	1:1000 of measuring range	mechanical stability	30 Nm
integration via	con::lyte 2 con::lyte 4 con::nect con::cube	protection class	IP68
power supply	11 ... 15 VDC	automatic cleaning	media: compressed air permissible pressure: 58.02 ... 87.02 psi (4 ... 6 bar) air volume: 1.85 ... 5.28 US gal (3 ... 9 l) per cleaning duration: 1 ... 5 sec. per cleaning cleaning interval: every 1st to 10th measuring interval delay: 10 ... 30 sec.
power consumption (typical)	4.2 W	conformity - EMC	EN 61326-1, EN 61326-2-3
power consumption (max.)	20 W	conformity - safety	EN 61010-1
interface connection to s::can terminals	MIL connector, IP68, RS485, 12 VDC	extended warranty (optional)	3 years

**drinking water**

		typical concentration ranges for this application		
		turbidity [NTU/FTU]	O <sub>3</sub> [mg/l]	part number
ozo::lyser II (turbidity, O <sub>3</sub> )	min.	0	0	02-d100-p0-sNO-010 / -075
	max.	50	10	

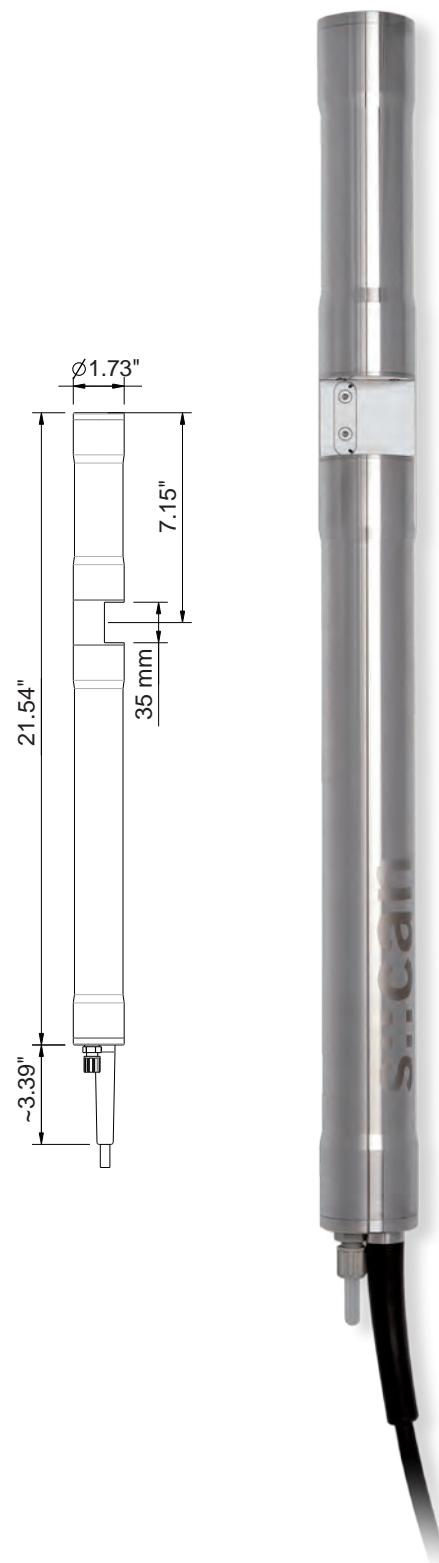
# uv::lyser II

uv::lyser II monitors turbidity & UV254 or TSS & UV254

- s::can plug & measure
- measuring principle: UV-Vis spectrometry
- multiparameter probe
- ideal for surface water, ground water, drinking water and waste water
- long term stable and maintenance free in operation
- factory precalibrated
- automatic cleaning with compressed air
- mounting and measurement directly in the media (InSitu) or in a flow cell (monitoring station)
- operation via s::can terminals & s::can software
- robust and precise adaption of optical path lengths to 35 mm, 15 mm, 5 mm, 2 mm, 1 mm or 0.5 mm possible
- easy mounting without clogging

## recommended accessories

part number	article name
A-005-s	Inserts for optical pathlength 5 mm, stainless steel
A-015-s	Inserts for optical pathlength 15 mm, stainless steel
B-32-xxx	s::can compressor
B-44	cleaning valve
B-61-1	cleaning agent
C-1-010-spectro	3.28 ft (1 m) connection cable for s::can spectrometer probes
D-315-xxx	con::cube
F-110-spectro	carrier s::can™ spectrometer probe
F-120-spectro	carrier s::can™ spectrometer probe
F-445-1	flow cell - for pathlengths from 0.5 mm to 35 mm
F-446-1	flow cell autobrush - for spectro::lyser™ pathlength 35 mm
S-11-xx-moni	moni::tool Software



**technical specification**

measuring principle	UV-Vis spectrometry 220 - 720 nm	interface to third party terminals	con::nect incl. gateway modbusRTU
measuring principle detail	xenon flash lamp, 256 photo diodes	cable length	24.61 ft (7.5 m) fixed cable (-075) or 3.28 ft (1 m) fixed cable (-010)
automatic compensation instrument	two beam measurement, complete spectrum	cable type	TNPU jacket
automatic compensation cross sensitivities	turbidity / solids	housing material	stainless steel 1.4404
precalibrated ex-works	all parameters	weight (min.)	7.50 lbs (incl. cable)
accuracy standard solution (>1 mg/l)	NO <sub>3</sub> -N: +/- 3% +1/OPL[mg/l]* COD-KHP: +/-3% +10/OPL[mg/l]* (* OPL ... optical pathlength in mm)	dimensions (diameter x length)	1.73 x 21.45 / 24.09"
access to raw signals	no	operating temperature	0 ... 45 °C
reference standard	distilled water	storage temperature	-10 ... 50 °C
onboard memory	656 KB	operating pressure	0 ... 43.51 psi (0 ... 3 bar)
integrated temperature sensor	-10 ... 50 °C	high pressure specification	145.04 psi (10bar)
resolution temperature sensor	0.1 °C	installation / mounting	submersed or in a flow cell
integrated pressure sensor (optional)	0 ... 17.40/29.01/159.54 psi (0 ... 1.2/2/11 bar)	flow velocity	3 m/s (max.), 9.843 fps (max.)
resolution pressure sensor	1:1000 of measuring range	mechanical stability	30 Nm
integration via	con::lyte 2 con::lyte 4 con::nect con::cube	protection class	IP68
power supply	11 ... 15 VDC	automatic cleaning	media: compressed air permissible pressure: 58.02 ... 87.02 psi (4 ... 6 bar) air volume: 1.85 ... 5.28 US gal (3 ... 9 l) per cleaning duration: 1 ... 5 sec. per cleaning cleaning interval: every 1st to 10th measuring interval delay: 10 ... 30 sec.
power consumption (typical)	4.2 W	conformity - EMC	EN 61326-1, EN 61326-2-3
power consumption (max.)	20 W	conformity - safety	EN 61010-1
interface connection to s::can terminals	MIL connector, IP68, RS485, 12 VDC	extended warranty (optional)	3 years

**surface water**

		typical concentration ranges for this application			
		turbidity [NTU/FTU]	UV254 [Abs/m]	UV254f [Abs/m]	part number
uv::lyser II (turbidity, UV254)	min.	0	0		U2-r005-p0-sNO-010 / -075
	max.	1400	500		
uv::lyser II (turbidity, UV254f)	min.	0		0	U2-r005-p0-sNO-010 / -075
	max.	1400		300	

**drinking water**

		typical concentration ranges for this application			
		turbidity [NTU/FTU]	UV254 [Abs/m]	UV254f [Abs/m]	part number
uv::lyser II (turbidity, UV254)	min.	0	0		U2-d035-p0-sNO-010 / -075
	max.	200	70		
uv::lyser II (turbidity, UV254f)	min.	0		0	U2-d035-p0-sNO-010 / -075
	max.	200		40	



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Probes

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Ionselective  
Probes

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Terminals

Software

System  
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Accessories

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Solutions

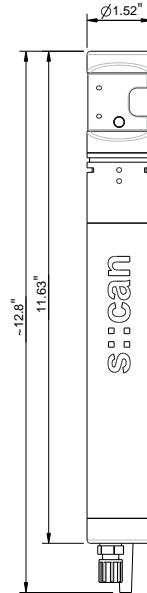
# i::scan

[i::scan\\_NTU/FTU monitors turbidity](#)  
[i::scan\\_NTU/FTU+color monitors turbidity and color](#)  
[i::scan\\_NTU/FTU+UV254 monitors turbidity and UV254](#)  
[i::scan\\_NTU/FTU+UV254+Color monitors turbidity, UV254 and color](#)  
[i::scan\\_NTU/FTU+TOC\\_eq monitors turbidity and TOC](#)  
[i::scan\\_NTU/FTU+TOC\\_eq+Color monitors turbidity, TOC and color](#)

- s::can plug & measure
- turbidity: measurement according to EPA 180.1 and ISO 7027, combined 180° and 90° scattering
- new light emitting technology
- no consumables
- no moving parts
- low power consumption (less than 1 W typical)
- dual-beam compensated optics
- optional automatic cleaning (compressed air InSitu or autobrush in flow cell)
- multiple versions for multiple applications
- long term stable, 100 % corrosion free
- plug connection or fixed cable
- 5000 hours maintenance free operation
- mounting and measurement directly in the media (InSitu) or in a flow cell (monitoring station)
- can be mounted directly in a mains pipe / pressure pipe
- operation via s::can terminals & s::can software

## recommended accessories

part number	article name
B-32-xxx	s::can compressor
D-315-xxx	con::cube
F-110-iscan	Carrier i::scan, for easy horizontal attachment
F-150-iscan	Pressure mounting for i::scan in-pipe installation
F-446-iscan	single flow-cell (by-pass fitting) AutoBrush, Pom-C (for i::scan)
F-446-iscan	i::scan flow-cell (by-pass setup), Pom-C, without cleaning
S-11-xx-moni	moni::tool Software



technical specification	
measuring principle	combined 180° absorption and 90° scattering turbidity: according to EPA 180.1 and ISO 7027
resolution	turbidity: 0.001 NTU/FTU color: 0.01 Hazen UV254: 0.015 Abs/m TOC: 0.01 mg/l
accuracy	turbidity submersed: 0.1 NTU/FTU or +/- 5 %* in flow cell: 0.02 NTU/FTU or +/- 2.5 %* color: 1 Hazen or +/- 2.5 %* TOC: 0.1 mg/l or +/- 2.5 %* UV254: 0.1 Abs/m or +/- 2.5 %* (*whichever is greater)
automatic compensation instrument	dual-beam and 180° path
precalibrated ex-works	all parameters
reference standard	distilled water
onboard memory	512 MB
integrated temperature sensor	-20 ... 70 °C
resolution temperature sensor	0.06 °C
integration via	con::cube con::lyte 1 con::lyte 2 con::lyte 4 con::nect
power supply	10 ... 18 VDC

surface water		typical concentration ranges for this application				
		turbidity [NTU/FTU]	TOC [mg/l]	UV254 [Abs/m]	color hazen-f (Pt/Co) [Hazen]	part number
i::scan_NTU/FTU	min.	0				Y01-1-r-000 / -075
	max.	800				
i::scan_NTU/FTU+Color	min.	0			0	Y02-1-r-000 / -075
	max.	800			70	
i::scan_NTU/FTU+TOC_eq	min.	0	0			Y05-3-r-000 / -075
	max.	800	25			
i::scan_NTU/FTU+TOC_eq+Color	min.	0	0		0	Y06-3-r-000 / -075
	max.	800	25		70	
i::scan_NTU/FTU+UV254	min.	0			0	Y03-2-r-000 / -075
	max.	800			60	
i::scan_NTU/FTU+UV254+Color	min.	0			0	Y04-2-r-000 / -075
	max.	800			60	

drinking water		typical concentration ranges for this application				
		turbidity [NTU/FTU]	TOC [mg/l]	UV254 [Abs/m]	color hazen-f (Pt/Co) [Hazen]	part number
i::scan_NTU/FTU	min.	0				Y01-1-d-000 / -075
	max.	800				
i::scan_NTU/FTU+Color	min.	0			0	Y02-1-d-000 / -075
	max.	800			70	
i::scan_NTU/FTU+TOC_eq	min.	0	0			Y05-3-d-000 / -075
	max.	800	25			
i::scan_NTU/FTU+TOC_eq+Color	min.	0	0		0	Y06-3-d-000 / -075
	max.	800	25		70	
i::scan_NTU/FTU+UV254	min.	0			0	Y03-2-d-000 / -075
	max.	800			60	
i::scan_NTU/FTU+UV254+Color	min.	0			0	Y04-2-d-000 / -075
	max.	800			60	

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## Ionselective Probes



ammo::lyser electrodes



ammo::lyser in aquarium

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- i::scan
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- Physical Probes
- Terminals
- Software
- System Configuration
- Monitoring Stations
- Spare Parts & Accessories
- Services & Solutions

# ISE-Probes



fig.1: ammo::lyser™ - electrodes

## "Why do we measure"

### ammo::lyser™

Due to human activities (primarily agriculture, industry and insufficient waste water treatment) many natural waters suffer from a surplus of nutrients which severely impairs water quality and ecology. Using the ammo::lyser™ the essential nutrient ammonium can be measured continuously and accurately down to the low concentrations encountered in natural waters.

Ammonium is always present in water in equilibrium with ammonia, the latter being especially toxic to fish even at very low concentrations. The equilibrium between ammonium and ammonia is pH driven. As the ammo::lyser™ provides pH together with ammonium it is used in natural waters as well as in fish farms to detect harmful conditions in real time.

When drinking water is disinfected with chloramines, formed In-Situ by reaction of chlorine with ammonium, a continuous ammonium measurement is critical for efficient control of the disinfection process - the ammo::lyser™ is capable to succeed also this application.

In addition, the ammo::lyser can be equipped with a ISE-nitrate electrode in order to be able to monitor the most common nitrogen parameters NO<sub>3</sub>-N and NH<sub>4</sub>-N simultaneously. Drinking water suppliers (source water quality) and also environmental agencies have already been using ammo::lysers for years now.

### fluor::lyser

The fluor::lyser is a version of the s::can ion selective probe that can be used for the online measurement of fluoride. It is used for continuous monitoring and online process control by water utilities that fluoridate their drinking water.

**s::can**  
Intelligent. Optical. Online.

# ISE-Probes

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## "How do we measure"

All s::can ISE probes are ion selective multiparameter probes that can measure multiple water quality parameters continuously (On-Line) and directly in the water without the need for complex and maintenance intensive sample pre-treatment.

All s::can ISE probes can be operated according to the "plug & measure" principle. With a simple plug connection, which provides power supply and data communication. The s::can sensors are connected to an s::can terminal and are ready for use. All s::can ISE probes are pre-calibrated ex works. The "plug & measure" principle avoids complex installation procedures on site and thus does not only save time during initial operation, but also reduces avoidable errors to a minimum.

The highly optimised design completely eliminates all moving parts in contact with the water. This reduces failures, spare part costs and maintenance dramatically.

Using standardised mounting devices, s::can ISE probes can be installed quickly and effortlessly, either submersed (InSitu) or in a flow through setup (Bypass, monitoring station).

s::can ISE probes utilise an automatic cleaning system that uses compressed air for removal of fouling. This system has proven highly efficient and reliable, even in untreated wastewater. Because of this, regular manual cleaning is not required, thus significantly reducing maintenance for the operator.

Like all other s::can instruments, s::can ISE probes are intelligent instruments and recognise and communicate all measurement related and technical issues as soon as they occur.

Although typically not or not often required, it is possible to adjust the calibration of the ammo::lyser™ to the actual matrix in which it is operated, in case deviations between online readings and reference analyses should be observed. Even the validation of the accuracy of the local calibration can be performed without taking the instrument out of the water.

The robust ion selective membrane has a typical lifetime of 6 months in applications with low NH4-N concentrations, e.g. in river water. In applications with higher ammonium loads, as in waste water influent, the typical lifetime of the membrane increases to as much as 1 to 2 years.

In order to compensate possible interferences online and automatically the ammo::lyser™ can measure potassium, pH and temperature all together with ammonium. In some applications substantial changes in these parameters can be observed, which interfere with the ammonium measurement. Thus online measurements are used to eliminate this influence and allow an ammonium measurement with the highest possible accuracy. The results of these additional sensors (see figure 1: ammo::lyser™ electrodes) can be displayed as well. When applying the ammo::lyser™ in waters of stable compositions or high concentrations of ammonium, the need to perform such compensations is much reduced. Under such circumstances the unique selectivity of the ammonium membrane is sufficient to achieve reliable measurement results.

Using the combination of innovative algorithms that model the Nernst equation and extensive compensation of possible interferences makes it possible to apply the ammo::lyser™ also in low concentration ranges (below 0.5 mg/L), throughout applications where ion selective sensors of other manufacturers do not function satisfactorily.

The durable membranes of the ammo::lyser™ can be exchanged individually when necessary - without the need to replace expensive electrodes or even complete cartridges. The unique non-porous, solid-state reference electrode ensures long lifetime in this way the regular costs for spare parts are reduced to a minimum.

Its unrivalled measurement features in combination with the lowest possible total costs - initial cost and foreseeable operational costs - make the s::can ISE probe the most attractive solution available today.

# ammo::lyser™ eco

ammo::lyser™ II eco: monitors NH<sub>4</sub>-N and temperature

ammo::lyser™ III eco+pH additionally monitors pH

ammo::lyser™ III eco+NO<sub>3</sub>-N additionally monitors NO<sub>3</sub>-N

ammo::lyser™ III eco+Cl- additionally monitors chloride

ammo::lyser™ IV eco+pH+NO<sub>3</sub>-N additionally monitors pH and NO<sub>3</sub>-N

ammo::lyser™ VI eco+pH+Cl- additionally monitors pH and chloride

- s::can plug & measure
- measuring principle: ISE (ionselective electrodes) - without potassium compensation
- multiparameter probe
- long term stable, factory precalibrated
- automatic cleaning with compressed air
- unique, non-porous / non-leaking reference electrode for technically unrivalled and consistent performance
- ISE refurbishment - the easy way to minimise maintenance
- easy & quick mounting and measurement directly in the media (InSitu) or in a flow cell (monitoring station)
- operation via s::can terminals & s::can software
- automatic temperature compensation and pH compensation possible
- ideal for surface water, ground water, drinking water and waste water
- minimal maintenance
- life time of ISE: typically 6 month (for applications <1mg/l NH<sub>4</sub>-N), resp. 1 to 2 years (for applications >1mg/l NH<sub>4</sub>-N)
- plug connection or fixed cable

## recommended accessories

part number	article name
B-44	cleaning valve
C-1-05-sensor	1.64 ft (0.5 m) connection cable for s::can physical probes
F-11-oxi-ammo	carrier oxi::lyser / soli::lyser / s::can ISE probes
F-45-ammo	flow cell for ammo::lyser™
F-45-process	process connection 1/4" G



technical specification	
measuring principle	ISE
measuring principle detail	NH <sub>4</sub> -N: ionophore membrane pH: non-porous reference electrode NO <sub>3</sub> -N: ionophore membrane Cl <sup>-</sup> : ionophore membrane
measuring range application	1 ... 1000 mg/l NH <sub>4</sub> -N and Cl <sup>-</sup> (factory precalibrated: 1 ... 100 mg/l NH <sub>4</sub> -N)
resolution	NH <sub>4</sub> -N: 0.02 ... 19.99 mg/l NH <sub>4</sub> -N: 20.0 ... 99.9 mg/l NH <sub>4</sub> -N: 100 ... 1000 mg/l T: 0.1 °C
accuracy	+/-3% of measuring range or +/-0.5mg/l NH4-N, whichever is greater
automatic compensation cross sensitivities	E-532-eco-xxx: temp E-532-eco-pH-xxx: temp, pH E-532-eco-NO <sub>3</sub> -N-xxx: temp E-532-eco-NO <sub>3</sub> -N-pH-xxx: temp, pH E-532-eco-CL-xxx: temp E-532-eco-CL-pH-xxx: temp, pH
precalibrated ex-works	all parameters
response time	60 sec.
integration via	con::cube con::lyte con::nect
power supply	10 ... 30 VDC
power consumption (typical)	0.72 W
interface connection to s::can terminals	sys plug, IP68, RS485, 12 VDC
cable length	24.61 ft (7.5 m) fixed cable (-075) or plug connection (-000)
cable type	PU jacket
housing material	stainless steel 1.4571, POM-C
weight (min.)	5.95 lbs
dimensions (diameter x length)	2.36 x 12.83"
operating temperature	0 ... 60 °C
operating pressure	0 ... 5.80 psi (0 ... 0.4 bar)
installation / mounting	submersed or in a flow cell
process connection	bayonet
flow velocity	0.01 m/s (min.), 0.033 fps (min.) 3 m/s (max.), 9.843 fps (max.)
automatic cleaning	media: compressed air permissible pressure: 29.01 ... 58.02 psi (2 ... 4 bar) air volume: 0.79 ... 2.38 US gal (3 ... 9 l) per cleaning duration: 4 ... 12 sec. per cleaning cleaning interval: 30 ... 120 min., depending on application delay: 10 ... 30 sec.
conformity - EMC	EN 50081-1, EN 50082-1, EN 60555-2, EN 60555-3
conformity - safety	EN 61010-1
storage temperature (electrode)	-5 ... 30 °C
storage temperature (sensor)	0 ... 60 °C
protection class (-000)	IP67
protection class (-075)	IP68

surface water		typical concentration ranges for this application					
		NH <sub>4</sub> -N [mg/l]	NO <sub>3</sub> -N [mg/l]	pH [pH]	Cl <sup>-</sup> [mg/l]	temperature [°C]	part number
ammo::lyser™ II eco (NH <sub>4</sub> -N, temp)	min.	0.1				0	E-532-eco-000 / -075
	max.	20				30	
ammo::lyser™ III eco+Cl- (NH <sub>4</sub> -N, temp, Cl <sup>-</sup> )	min.	0.1			0.1	0	E-532-eco-CL-000 / -075
	max.	20			200	30	
ammo::lyser™ III eco+NO <sub>3</sub> -N (NH <sub>4</sub> -N, temp, NO <sub>3</sub> -N)	min.	0.1	0.1			0	E-532-eco-NO <sub>3</sub> -N-000 / -075
	max.	20	200			30	
ammo::lyser™ III eco+pH (NH <sub>4</sub> -N, temp, pH)	min.	0.1		4		0	E-532-eco-pH-000 / -075
	max.	20		10		30	
ammo::lyser™ IV eco+Cl- (NH <sub>4</sub> -N, temp, Cl <sup>-</sup> , pH)	min.	0.1		4	0.1	0	E-532-eco-CL-pH-000 / -075
	max.	20		10	200	30	
ammo::lyser™ IV eco+NO <sub>3</sub> -N+pH (NH <sub>4</sub> -N, temp, NO <sub>3</sub> -N, pH)	min.	0.1	0.1	4		0	E-532-eco-NO <sub>3</sub> -N-pH-000 / -075
	max.	20	200	10		30	

drinking water		typical concentration ranges for this application					
		NH <sub>4</sub> -N [mg/l]	NO <sub>3</sub> -N [mg/l]	pH [pH]	Cl <sup>-</sup> [mg/l]	temperature [°C]	part number
ammo::lyser™ II eco (NH <sub>4</sub> -N, temp)	min.	0.02				0	E-532-eco-000 / -075
	max.	2				30	
ammo::lyser™ III eco+Cl- (NH <sub>4</sub> -N, temp, Cl <sup>-</sup> )	min.	0.02			0.1	0	E-532-eco-CL-000 / -075
	max.	2			100	30	
ammo::lyser™ III eco+NO <sub>3</sub> -N (NH <sub>4</sub> -N, temp, NO <sub>3</sub> -N)	min.	0.02	0.1			0	E-532-eco-NO <sub>3</sub> -N-000 / -075
	max.	2	200			30	
ammo::lyser™ III eco+pH (NH <sub>4</sub> -N, temp, pH)	min.	0.02		4		0	E-532-eco-pH-000 / -075
	max.	2		10		30	
ammo::lyser™ IV eco+Cl- (NH <sub>4</sub> -N, temp, Cl <sup>-</sup> , pH)	min.	0.02		4	0	0	E-532-eco-CL-pH-000 / -075
	max.	2		10	100	30	
ammo::lyser™ IV eco+NO <sub>3</sub> -N+pH (NH <sub>4</sub> -N, temp, NO <sub>3</sub> -N, pH)	min.	0.02	0.1	4		0	E-532-eco-NO <sub>3</sub> -N-pH-000 / -075
	max.	2	200	10		30	

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# ammo::lyser™ pro

ammo::lyser™ III pro monitors NH<sub>4</sub>-N and temperature  
(with potassium compensation)

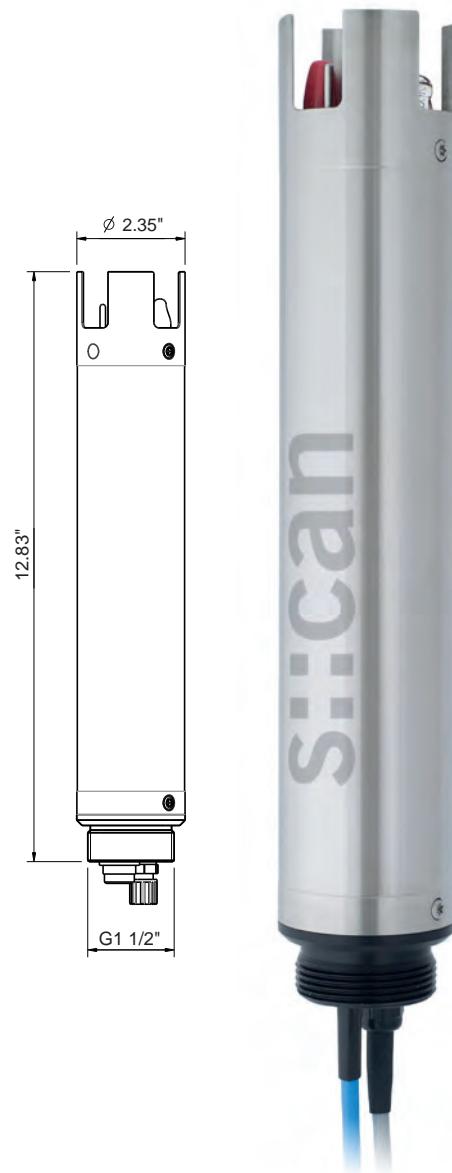
ammo::lyser™ IV pro+pH monitors NH<sub>4</sub>-N, temperature, pH (with  
potassium compensation)

ammo::lyser™ IV pro+NO<sub>3</sub>-N monitors NH<sub>4</sub>-N, temperature und NO<sub>3</sub>-N  
(with potassium compensation)

- s::can plug & measure
- measuring principle: ISE (ionselective electrodes) - with potassium compensation
- multiparameter probe
- long term stable, factory precalibrated
- automatic cleaning with compressed air
- easy & quick mounting and measurement directly in the media (InSitu) or in a flow cell (monitoring station)
- ISE refurbishment - the easy way to minimise maintenance
- unique, non-porous / non-leaking reference electrode for technically unrivalled and consistent performance
- operation via s::can terminals & s::can software
- automatic temperature and potassium compensation, pH compensation possible
- ideal for surface water, ground water, drinking water and waste water
- minimal maintenance
- life time of ISE: typically 6 month (for applications <1mg/l NH<sub>4</sub>-N), resp. 1 to 2 years (for applications >1mg/l NH<sub>4</sub>-N)
- plug connection or fixed cable

## recommended accessories

part number	article name
B-44	cleaning valve
C-1-05-sensor	1.64 ft (0.5 m) connection cable for s::can physical probes
F-11-oxi-ammo	carrier oxi::lyser / soli::lyser / s::can ISE probes
F-45-ammo	flow cell for ammo::lyser™
F-45-process	process connection 1/4" G



technical specification	
measuring principle	ISE
measuring principle detail	NH <sub>4</sub> -N: ionophore membrane K: ionophore membrane pH: non-porous reference electrode NO <sub>3</sub> -N: ionophore membrane
measuring range application	0.1 ... 1000 mg/l NH <sub>4</sub> -N (factory precalibrated: 0.1 ... 20 mg/l NH <sub>4</sub> -N)
resolution	NH <sub>4</sub> -N: 0.02 ... 19.99 mg/l NH <sub>4</sub> -N: 20.0 ... 99.9 mg/l NH <sub>4</sub> -N: 100 ... 1000 mg/l T: 0.1 °C
accuracy	+/-3% of measuring range or +/-0.1mg/l NH4-N, whichever is greater
automatic compensation cross sensitivities	E-532-pro-xxx: temp, K E-532-pro-pH-xxx: temp, pH, K E-532-pro-NO <sub>3</sub> -N-xxx: temp, K
precalibrated ex-works	all parameters
response time	60 sec.
integration via	con::lyte 1 con::lyte 2 con::lyte 4 con::nect con::cube
power supply	10 ... 30 VDC
power consumption (typical)	0.72 W
interface connection to s::can terminals	sys plug, IP68, RS485, 12 VDC
cable length	24.61 ft (7.5 m) fixed cable (-075) or plug connection (-000)
cable type	PU jacket
housing material	stainless steel 1.4571, POM-C
weight (min.)	5.95 lbs
dimensions (diameter x length)	2.36 x 12.83"
operating temperature	0 ... 60 °C
operating pressure	0 ... 5.80 psi (0 ... 0.4 bar)
installation / mounting	submersed or in a flow cell
process connection	bayonet
flow velocity	0.01 m/s (min.), 0.033 fps (min.) 3 m/s (max.), 9.843 fps (max.)
automatic cleaning	media: compressed air permissible pressure: 29.01 ... 58.02 psi (2 ... 4 bar) air volume: 0.79 ... 2.38 US gal (3 ... 9 l) per cleaning duration: 4 ... 12 sec. per cleaning cleaning interval: 30 ... 120 min., depending on application delay: 10 ... 30 sec.
conformity - EMC	EN 50081-1 EN 50082-1 EN 60555-2 EN 60555-3
conformity - safety	EN 61010-1
storage temperature (electrode)	-5 ... 30 °C
storage temperature (sensor)	0 ... 60 °C
protection class (-000)	IP67
protection class (-075)	IP68

surface water		typical concentration ranges for this application					
		NH <sub>4</sub> -N [mg/l]	NO <sub>3</sub> -N [mg/l]	K [mg/l]	pH [pH]	temperature [°C]	part number
ammo::lyser™ III pro (NH <sub>4</sub> -N, K, temp)	min.	0.1		0		0	E-532-pro-000 / -075
	max.	2		10		30	
ammo::lyser™ IV pro+NO <sub>3</sub> -N (NH <sub>4</sub> -N, NO <sub>3</sub> -N, K, temp)	min.	0.1	0	0		0	E-532-pro+NO <sub>3</sub> -N-000 / -075
	max.	2	200	10		30	
ammo::lyser™ IV pro+pH (NH <sub>4</sub> -N, pH, K, temp)	min.	0.1		0	4	0	E-532-pro+pH-000 / -075
	max.	2		10	10	30	

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# fluor:lyser II

fluor:lyser II monitors fluoride and temperature

- s::can plug & measure
- measuring principle: ISE (ionenselektive elektrodes)
- no cross sensitivities in typical drinking water applications
- multiparameter probe
- long term stable, factory precalibrated
- automatic cleaning with compressed air
- easy and quick mounting and measurement directly in the media (InSitu) or in a flow cell (monitoring station)
- operation via s::can terminals & s::can software
- ideal for drinking water
- minimal maintenance
- plug connection or fixed cable

## recommended accessories

part number	article name
B-44	cleaning valve
C-1-05-sensor	1.64 ft (0.5 m) connection cable for s::can physical probes
F-11-oxi-ammo	carrier oxi:lyser / soli:lyser / s::can ISE probes
F-45-ammo	flow cell for ammo:lyser™
F-45-process	process connection 1/4" G



technical specification	
measuring principle	ISE
measuring principle detail	F: ionophore membrane reference electrode
measuring range application	0.05 ... 1000 mg/l
automatic compensation instrument	temperature
potential interfering ions	OH- (at >pH8), Al3+, Ca2+, Fe3+, Si4+
precalibrated ex-works	all parameters
integration via	con::lyte 1 con::lyte 2 con::lyte 4 con::nect con::cube
power supply	10 ... 30 VDC
power consumption (typical)	0.72 W
interface connection to s::can terminals	sys plug, IP68, RS485, 12 VDC
cable length	24.61 ft (7.5 m) fixed cable (-075) or plug connection (-000)
cable type	PU jacket
housing material	stainless steel 1.4571, POM-C
weight (min.)	5.95 lbs
dimensions (diameter x length)	2.36 x 12.83"
operating temperature	0 ... 60 °C
storage temperature	0 ... 60 °C
installation / mounting	submersed or in a flow cell
process connection	G 1 1/2" outside
pH range	4.5 ... 7.5
protection class	IP68
automatic cleaning	media: compressed air permissible pressure: 29.01 ... 58.02 psi (2 ... 4 bar) air volume: 0.79 ... 2.38 US gal (3 ... 9 l) per cleaning duration: 4 ... 12 sec. per cleaning cleaning interval: 30 ... 120 min., depending on application delay: 10 ... 30 sec.
conformity - EMC	EN 50081-1 EN 50082-1 EN 60555-2 EN 60555-3
conformity - safety	EN 61010-1

drinking water				
typical concentration ranges for this application				
		F [mg/l]	temperature [°C]	part number
fluor::lyser II	min.	0.05	0	E-542-000 / -075
	max.	2	60	





# Physical Probes



flow cell with probe



oxi::lyser

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# Physical Probes

## "Why do we measure"

### **oxi::lyser™**

In drinking water applications the oxi::lyser™ is mainly used in early warning systems detecting problems in raw water quality: Reduced dissolved oxygen concentrations are often an indicator for harmful microbial or chemical contaminations of the water. Applied in natural waters or on fish farms the oxi::lyser™ can detect anaerobic conditions, which are life threatening aquatic organisms, and thus it helps to prevent ecological as well as economic damage.

### **pH::lyser**

Drinking water suppliers use the pH::lyser for the continuous process monitoring and control of chemical and physical treatment steps that are characterized by changes in pH, such as neutralization, flocculation or mixing of source waters. Furthermore, the pH::lyser is applied in early warning systems that monitor source water quality, both in ground and surface water.

### **redo::lyser**

In drinking water treatment the redo::lyser is used mainly for process monitoring and control of treatment steps that result in significant changes of the oxidation-reduction potential. Besides this, the redo::lyser is also applied as a component in early warning systems that monitor source water quality, both in ground and surface water.

### **condu::lyser**

The condu::lyser is used for quality control in drinking water production and distribution. From source to tap the electrical conductivity of the drinking water is an essential parameter indicating the level of salts dissolved and thus the purity of the water.

### **chlori::lyser**

When drinking water is disinfected through chlorination it is necessary to continuously control the actual free chlorine level. This is crucial in the first place to ensure efficient disinfection and secondly to prevent regrowth of microorganisms in the finished water. For these two tasks it is necessary to carefully process control the level of free chlorine, also in order to prevent the concentration of harmful disinfection byproducts that can be formed in the presence of chlorine.



fig.1: oxi::lyser™



fig.2: condu::lyser



fig.3: pH::lyser

# s::can

Intelligent. Optical. Online.

# Physical Probes

## "How do we measure"

Just as all other s::can instruments the s::can physical probes can be operated according to the "plug & measure" principle. With a simple plug connection, which provides power supply and data communication, the s::can probes are connected to an s::can terminal and are ready for use. All s::can probes are pre-calibrated ex works and do not require any conditioning before they can be used - all can be used continuously (OnLine) and directly in the water (InSitu). The "plug & measure" principle avoids complex installation procedures on site and thus does not only save time during initial operation, but also reduces avoidable errors.

The highly optimised design completely eliminates all moving parts in contact with the water. This reduces failures and maintenance dramatically.

Using standardised mounting devices s::can physical probes can be installed quickly and effortlessly, either submersed (InSitu) or in a flow through setup (by-pass, monitoring station).

Like all other s::can instruments s::can physical probes are intelligent instruments - amongst others local calibrations are stored on the probes and auto-diagnosis procedures are used to ensure best possible operation.

### **oxi::lyser™** (see fig.1)

is an optical multi-parameter probe that measures the concentration of dissolved oxygen and the temperature directly in the water. The oxi::lyser™ does not need a minimum flow to produce accurate readings and integrates the temperature measurement for On-Line correction. The sensing element, which uses the principle of fluorescence for the oxygen measurement, is neither affected nor damaged by direct exposure to sunlight. Under normal conditions, fouling of the sensing element will not affect the results. However, to be sure that fouling is kept to a minimum, the oxi::lyser™ can be cleaned automatically with compressed air. The oxi::lyser uses no replaceable parts or consumables. Therefore, when operated properly there will be no costs for spare parts at all. For the oxi::lyser™ we guarantee replacement of spare parts free of charge for the first three years after delivery (upon presenting the warranty card).

### **condu::lyser** (see fig.2)

is a multi-parameter probe that measures conductivity and temperature directly in the water. The condu::lyser does not require a minimum flow to produce accurate readings and uses the temperature to correct the conductivity measurement online. The 4-electrode measurement of the electrical conductivity produces results that are practically independent of possible fouling. The condu::lyser uses no replaceable parts or consumables. Therefore, when operated properly there will be no costs for spare parts at all.

### **pH::lyser** (see fig.3)

is a multi-parameter probe that measures the pH value and temperature directly in the water. The pH::lyser uses the temperature to correct the result of the pH measurement online. The non-porous, solid-state reference electrode ensures excellent pH readings and a long lifetime of the electrode.

### **redo::lyser**

is a probe that measures the oxidation-reduction potential (also known as redox potential) and temperature directly in the water. The non-porous, solid state reference electrode ensures excellent ORP readings and a long lifetime of the electrode.

### **chlori::lyser**

chlori::lyser monitors free or total chlorine - mounted in a flow cell setup. Due to the membrane covered amperometric measuring principle, flow and pH fluctuations of the water do not influence the measurement result. Additionally, the integrated temperature compensation and the special, third electrode completely eliminates potential interferences.

Their unrivalled measurement features in combination with the lowest possible total costs - initial cost and foreseeable operational costs - make s::can sensors the most attractive solution available today.

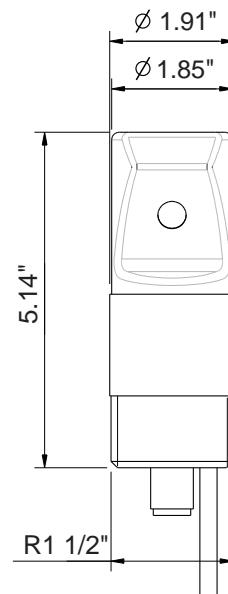
# oxi::lyser™

oxi::lyser™ monitors dissolved oxygen & temperature

- s::can plug & measure
- measuring principle: optical / fluorescence
- multiparameter sensor
- ideal for surface water, ground water, drinking water and waste water
- long term stable and maintenance free in operation
- factory precalibrated
- automatic cleaning with compressed air
- mounting and measurement directly in the media (InSitu) or in a flow cell
- no flow necessary
- operation via s::can terminals & s::can software
- minimal maintenance (no consumables)

## recommended accessories

part number	article name
B-44	cleaning valve
C-210-sensor	32.81 ft (10 m) extension cable for s::can physical probes and s::can ISE probes
F-11-oxi-ammo	carrier oxi::lyser / soli::lyser / s::can ISE probes
F-48-oxi	oxi::lyser or soli::lyser flow-cell (by-pass setup), PVC
D-315-xxx	con::cube
D-319-xxx	con::lyte



technical specification	
measuring principle	fluorescence
measuring range application	0 ... 25 mg/l O <sub>2</sub>
resolution	0.01 mg/l O <sub>2</sub>
accuracy	1% of reading
response time	60 sec.
reference standard	saturated sodium sulfite solution
integrated temperature sensor	0 ... 50 °C
resolution temperature sensor	0.2 °C
integration via	con::cube con::lyte 1 con::lyte 2 con::lyte 4 con::nect
power supply	6 ... 16 VDC
power consumption (max.)	0.32 W
interface connection to s::can terminals	sys plug, IP68, RS485, 12 VDC
cable length	10 m
housing material	CPVC, stainless steel, epoxy
weight (min.)	1.19 lbs
dimensions (diameter x length)	1.91 x 5.14"
operating temperature	0 ... 60 °C
storage temperature	0 ... 60 °C
operating pressure	0 ... 98.63 psi (0 ... 6.8 bar)
installation / mounting	submersed or in a flow cell
process connection	R 1 1/2"
pH range	2 ... 10
protection class	IP68
automatic cleaning	media: compressed air permissible pressure: 29.01 ... 65.27 psi (2 ... 4.5 bar) air volume: 1.32 ... 2.64 US gal (5 ... 10 l) per cleaning duration: 4 ... 12 sec. per cleaning cleaning interval: depending on application
conformity - EMC	EN 50081-2, EN55011
conformity - safety	EN 61000-4, EN61010-1
extended warranty (optional)	3 years

surface water				
typical concentration ranges for this application				
		O <sub>2</sub> [mg/l]	temperature [°C]	part number
oxi::lyser (O <sub>2</sub> , temp)	min.	0	0	E-501-075
	max.	25	50	

drinking water				
typical concentration ranges for this application				
		O <sub>2</sub> [mg/l]	temperature [°C]	part number
oxi::lyser (O <sub>2</sub> , temp)	min.	0	0	E-501-075
	max.	25	50	

# pH::lyser

pH::lyser eco monitors pH & temperature

pH::lyser pro: high temperature range

- s::can plug & measure
- measuring principle: unique, non-porous / non-leaking combined reference electrode for technically unrivalled and consistent pH performance
- multiparameter sensor
- ideal for surface water, ground water, drinking water and waste water
- long term stable and maintenance free in operation
- factory precalibrated
- mounting and measurement directly in the media (InSitu) or in a flow cell
- operation via s::can terminals & s::can software
- optional: automatic cleaning with compressed air
- plug connection or fixed cable

#### recommended accessories

part number	article name
C-1-05-sensor	1.64 ft (0.5 m) connection cable for s::can physical probes
D-315-xxx	con::cube
D-319-xxx	con::lyte
F-12-sensor	carrier s::can physical probes
F-45-four	flow cell for four s::can physical probes
F-46-four-iscan	i::scan flow cell for up to 3 additional s::can probes
F-45-sensor	flow cell for s::can sensor
S-11-xx-moni	moni::tool Software



<b>technical specification</b>				
measuring principle	potentiometric			
measuring principle detail	combined, non-porous reference electrode			
measuring range application	pro: 0 ... 14 pH eco: 2 ... 12 pH			
resolution	0.01 pH			
accuracy	0.1 pH			
automatic compensation instrument	temperature			
response time	30 sec.			
integrated temperature sensor	0 ... 90 °C			
integration via	con::cube con::lyte 1 con::lyte 2 con::lyte 4 con::nect			
power supply	9 ... 18 VDC			
power consumption (typical)	0.8 W			
power consumption (max.)	1 W			
interface connection to s::can terminals	sys plug, IP68, RS485, 12 VDC			
cable length	24.61 ft (7.5 m) fixed cable (-075) or plug connection (-000)			
cable type	PU jacket			
<b>surface water</b>				
		typical concentration ranges for this application		
		pH [pH]	temperature [°C]	part number
pH::lyser eco (pH, temp)	min. max.	4 10	0 50	E-514-2-000 / -075
<b>drinking water</b>				
		typical concentration ranges for this application		
		pH [pH]	temperature [°C]	part number
pH::lyser eco (pH, temp)	min. max.	5 9	0 50	E-514-2-000 / -075

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# redo::lyser

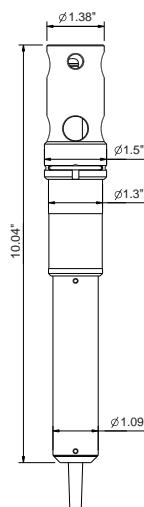
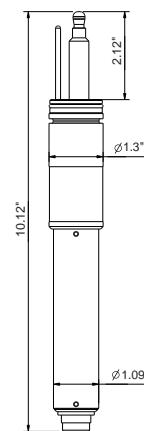
redo::lyser monitors ORP and temperature

redo::lyser pro: high temperature range

- s::can plug & measure
- measuring principle: unique, non-porous / non-leaking combined reference electrode for technically unrivalled and consistend ORP performance
- multiparameter sensor
- ideal for surface water, ground water and drinking water, also waste water
- long term stable and maintenance free in operation
- factory precalibrated
- mounting and measurement directly in the media (InSitu) or in flow cell
- operation via s::can terminals & s::can software
- plug connection or fixed cable

## recommended accessories

part number	article name
C-1-05-sensor	1.64 ft (0.5 m) connection cable for s::can physical probes
D-315-xxx	con::cube
D-319-xxx	con::lyte
F-12-sensor	carrier s::can physical probes
F-45-four	flow cell for four s::can physical probes
F-46-four-iscan	i::scan flow cell for up to 3 additional s::can probes
F-45-sensor	flow cell for s::can sensor
S-11-xx-moni	moni::tool Software



<b>technical specification</b>				
measuring principle	potentiometric	cable length	24.61 ft (7.5 m) fixed cable (-075)	
measuring principle detail	combined, non-porous reference electrode	or plug connection (-000)		
measuring range application	-2000 mV ... +2000 mV	housing material	stainless steel 1.4404/1.4401, POM-C	
resolution	1 mV	weight (min.)	0.88 lbs	
accuracy	10 mV	dimensions (diameter x length)	1.30 x 10.12"	
automatic compensation instrument	temperature	operating pressure	0 ... 145.04 psi (0 ... 10 bar)	
response time	30 sec.	installation / mounting	submersed or in a flow cell	
integrated temperature sensor	0 ... 90 °C	process connection	quick connect	
integration via	con::cube con::lyte 1 con::lyte 2 con::lyte 4 con::nect	flow velocity	0.01 m/s (min.), 0.033 fps (min.) 3 m/s (max.), 9.843 fps (max.)	
power supply	9 ... 18 VDC	conformity - EMC	EN 61326-1	
power consumption (typical)	0.8 W	conformity - safety	EN 61010-1	
power consumption (max.)	1 W	operating temperature (eco)	0 ... 70 °C	
interface connection to s::can terminals	sys plug, IP68, RS485, 12 VDC	operating temperature (pro)	0 ... 90 °C	
		storage temperature (electrode)	-5 ... 30 °C	
		storage temperature (sensor)	0 ... 60 °C	
		protection class (-000)	IP67	
		protection class (-075)	IP68	
<b>surface water</b>				
		typical concentration ranges for this application		
		Redox [mV]	temperature [°C]	part number
redo::lyser eco (ORP, temp)	min.	-1000	0	E-513-2-000 / -075
	max.	1000	60	
<b>drinking water</b>				
		typical concentration ranges for this application		
		Redox [mV]	temperature [°C]	part number
redo::lyser eco (ORP, temp)	min.	-500	0	E-513-2-000 / -075
	max.	500	50	

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# condu::lyser

condu::lyser monitors conductivity, temperature & salinity

- s::can plug & measure
- measuring principle condu::lyser: 4-electrode, direct-contact measurement
- multiparameter sensor
- ideal for surface water, ground water and drinking water, also waste water
- long term stable and maintenance free in operation
- factory precalibrated
- mounting and measurement directly in the media (InSitu) or in a flow cell
- operation via s::can terminals & s::can software
- plug connection or fixed cable

## recommended accessories

part number	article name
C-1-05-sensor	1.64 ft (0.5 m) connection cable for s::can physical probes
D-315-xxx	con::cube
D-319-xxx	con::lyte
F-12-sensor	carrier s::can physical probes
F-45-four	flow cell for four s::can physical probes
F-46-four-iscan	i::scan flow cell for up to 3 additional s::can probes
F-45-sensor	flow cell for s::can sensor
S-11-xx-moni	moni::tool Software



technical specification	
measuring principle	4-electrode, direct-contact
measuring range application	0 ... 500,000 µS/cm 2 ... 42 PSU
accuracy	1% of reading
automatic compensation instrument	temperature
integrated temperature sensor	-20 ... 130 °C
integration via	con::lyte 1 con::lyte 2 con::lyte 4 con::nect con::cube
power supply	7 ... 30 VDC
power consumption (typical)	0.06 W
power consumption (max.)	0.15 W
interface connection to s::can terminals	sys plug, IP68, RS485, 12 VDC
cable length	24.61 ft (7.5 m) fixed cable (-075) or plug connection (-000)
housing material	Stainless steel 1.4435, FDA-approved PEEK, FDA-approved EPDM, FKE, PMO-C
weight (min.)	0.53 lbs
dimensions (diameter x length)	1.30 x 9.33"
operating temperature (immersed)	-20 ... 60 °C
operating temperature (in flow cell)	-20 ... -110 °C
operating pressure	0 ... 84.12 psi (0 ... 5.8 bar)
installation / mounting	submersed or in a flow cell
process connection	quick connect
flow velocity	3 m/s (max.), 9.843 fps (max.)
conformity - EMC	EN 61326-1 EN 300328 V 1.7.1:2006 EN 301489-17 V2.1.1:2009 EN 301489-1 V 1.8.1:2008
conformity - safety	EN 61010-1
protection class (-000)	IP67
protection class (-075)	IP68

surface water		typical concentration ranges for this application			
		conductivity [µS/cm]	temperature [°C]	salinity [PSU]	part number
condu::lyser	min.	0	0	2	E-511-2-000 / -075
	max.	500000	60	15	

drinking water		typical concentration ranges for this application		
		conductivity [µS/cm]	temperature [°C]	part number
condu::lyser	min.	0	0	E-511-2-000 / -075
	max.	5000	50	

# chlori::lyser

chlori::lyser™ monitors free chlorine (Cl<sub>2</sub> + HOCl + OCl-) or total chlorine (free chlorine + combined chlorine)

- s::can plug & measure
- measuring principle: amperometric (membrane covered)
- ideal for drinking water
- long term stable and lowest maintenance in operation
- replacement of membrane only once a year
- readings stable even at high fluctuations of pH, temperature and flow
- compensates fluctuations of pH in an unmatched way pH range from 4 to 10 FCI; pH range from 4 to 12 TCI (<5% per pH between 6 and 10/12 pH, <1% at <6 pH)
- low cross sensitivity to many surfactants
- cross sensitivities to chlorine dioxide, ozone can be compensated by using readings from spectro::lyser™
- factory precalibrated
- mounting and measurement in a flow cell
- operation via s::can terminals & s::can software
- plug connection or fixed cable

## recommended accessories

part number	article name
C-1-05-sensor	1.64 ft (0.5 m) connection cable for s::can physical probes
D-315-xxx	con::cube
D-319-xxx	con::lyte
F-12-sensor	carrier s::can physical probes
F-45-four	flow cell for four s::can physical probes
F-46-four-iscan	i::scan flow cell for up to 3 additional s::can probes
F-45-sensor	flow cell for s::can sensor
S-11-xx-moni	moni::tool Software



technical specification	
measuring principle	amperometric
measuring principle detail	potentiostatic 3-electrode system
measuring range application	E-507-1: 0 ... 2 mg/L FCI E-507-2: 0 ... 10 mg/L FCI E-507-3: 0 ... 2 mg/L TCI E-507-4: 0 ... 10 mg/L TCI
resolution	0.001 mg/l (for 10mg/l ... 0.01 mg/l)
automatic compensation instrument	temperature
automatic compensation cross sensitivities	pH, flow
response time	2 min.
integration via	con::cube con::lyte 1 con::lyte 2 con::lyte 4 con::nect
power supply	9 ... 18 VDC
interface connection to s::can terminals	sys plug, IP68, RS485, 12 VDC
cable length	24.61 ft (7.5 m) fixed cable (-075) or plug connection (-000)
housing material	PVC, stainless steel
weight (min.)	0.66 lbs
dimensions (diameter x length)	1.30 x 10.89"
operating temperature	0 ... 45 °C
storage temperature	0 ... 45 °C
operating pressure	0 ... 14.50 psi (0 ... 1 bar)
installation / mounting	flow cell
process connection	quick connect
flow velocity	0.015 m/s (min.), 0.049 fps (min.) 0.06 m/s (max.), 0.197 fps (max.)
pH range	4 ... 10
conformity - EMC	EN 61326-1
conformity - safety	EN 61010-1
protection class (-000)	IP67
protection class (-075)	IP68

drinking water		typical concentration ranges for this application		
		free chlorine [mg/l]	total chlorine [mg/l]	part number
chlori::lyser (FCI)	min.	0		E-507-1-000 / -075
	max.	2		
chlori::lyser (FCI)	min.	0		E-507-2-000 / -075
	max.	10		
chlori::lyser (TCI)	min.		0	E-507-3-000 / -075
	max.		2	
chlori::lyser (TCI)	min.		0	E-507-4-000 / -075
	max.		10	

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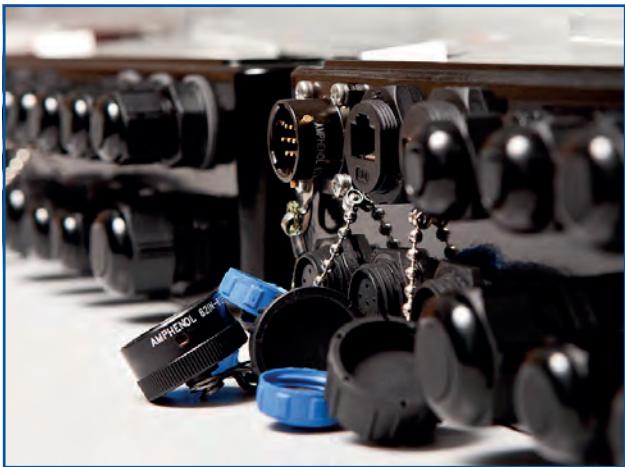
Services &amp; Solutions



**s::can**

Intelligent. Optical. Online.

# Terminals



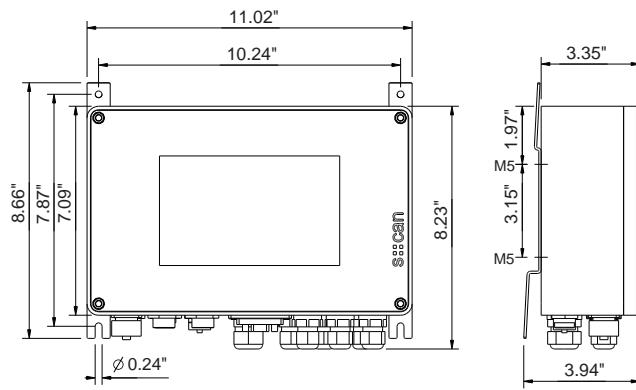
con::cube



con::lyte

# con::cube

- latest generation of s::can terminal
- high-performance, power efficient industrial PC based on newest Intel Atom technology and 4 GB onboard memory
- wide screen color graphical display (7") and touch screen
- highly intuitive use, touch-and-feel like a cell phone; iconographic drag-and-drop operation on several levels
- plug & play operation of 4 s::can probes standard; unlimited number of probes optional. Support for two external cleaning valves
- low power operation with less than 3 watt (@ 15 minutes measuring interval) for solar panel applications
- worldwide network connectivity thanks to quad-band WCDMA and dual-band EV-DO network connection technology
- WIFI interface integrated for remote control and data transfer
- highspeed 100 Mb/s ethernet interface for integration into larger networks
- easy data transfer via USB-stick
- process interface to SCADA via relay outputs, 4-20 mA, SDI-12, Modbus RTU/TCP and Profibus DP
- integration of third party sensors via 4-20 mA inputs, SDI-12 and Modbus RTU/TCP
- easily extendable with additional analog and digital I/Os utilizing eight available extension slots
- process software moni::tool pre-installed; additional software tools (e.g. data validation or event detection) optional
- display of concentration values, historians, optical spectra and all events in clear text
- easy configuration, calibration and administration of full s::can monitoring stations and networks



## standard accessories

part number	article name
S-11-04-moni	moni::tool - Basic s::can monitoring station software for 4 (8) parameters
S-11-08-moni	

technical specification			
integration of	1 x s::can spectrometer probe and 3 x s::can sensors or ISE probes	power supply	D-315-230: 100 ... 240 VAC D-315-024: 10 ... 30 VDC
display	VGA color-display 7" TFT (optional)	grounding	<0.5 Ohm to process media
function indicator	4 x LED	power consumption (typical)	10 W (no display, no analogue ports) 30 W (fully equipped)
operation via	integrated touch-screen (optional) Ethernet - Browser or VNC WIFI - Browser or VNC USB (keyboard, mouse) 3G modem (option)	power consumption (max.)	20 W (no display, no analogue ports) 60 W (fully equipped)
operating system	embedded XP	analog outputs	up to 8x2 x 4-20 mA
main memory	1 GB RAM	analog inputs	up to 8x2 x 4-20 mA
onboard memory	4 GB	outputs for automatic cleaning	2
interface connection to s::can spectrometric probes	1 x MIL, IP 68, RS485, 12 VDC	digital inputs	up to 7x2 x 24 VDC
interface connection to s::can sensors	3 x sys plug, IP 68, RS485, 12 VDC	relay outputs	4 x 2A (250 VAC)
interface to third party sensors	RS485 Modbus, SDI-12, up to 16 x 4-20mA input	system error relay	1 x 2A (250 VAC)
network connection	802.11n a/b/g WIFI 300Mb/s Ethernet LAN	dimensions (width x height x depth)	11.02 x 8.23 x 3.35"
interface to SCADA	Modbus RTU or TCP, Profibus DP (optional), SDI-12	housing material	aluminium alloy, powder coated
data transfer	via PC or USB stick	weight (min.)	4.41 lbs (no display) 6.61 lbs (incl. display)
remote control & data transfer	via Ethernet / XML protocol	operating temperature	-20 ... 50 °C
GSM/GPRS Modem	Global multi-mode connectivity 850/1900 MHz GSM/GPRS/EDGE - 850/900/1800/1900 MHz HSDPA/HSUPA/UMTS - 850/900/1900/2100 MHz	storage temperature	-20 ... 60 °C
		storage humidity	5 ... 90 %
		protection class	IP65
		conformity - EMC	EN 61326-1
		conformity - safety	EN 61010-1 UL 61010-1:2004 R10.08 CAN/CSA-C22.2 NO. 61010-1-04+GI1 (R2009)
		part number 24V	D-315-024
		part number 230V	D-315-230

recommended accessories	
part number	article name
C-31-eu	Optional 6.56 ft (2 m) power cable
C-31-us	Optional 6.56 ft (2 m) power cable
D-315-in-mA	2 analogue inputs (input module), provides 2 analogue inputs (4-20mA) for integration of 3rd party readings
D-315-in-relay	2 digital inputs (input module), provides 2 digital IN (5-24V) for integration of 3rd party readings
D-315-in-SDI12	SDI 12 (input module), provides SDI 12 for integration of 3rd party readings
D-315-out-mA	2 analogue outputs (output module), provides data transfer to PLC systems
D-315-out-Profibus	provides Profibus DPVO for data transfer to PLC systems
D-315-out-relay	4 digital outputs (output module), provides 4 configurable relay contacts 1A
D-315-out-SDI12	SDI 12 (output module), provides SDI 12 for data transfer to PLC systems
D-315-touch	Display and Touch Screen (input module), 7" VGA TFT display & touch for access to GUI
F-51	weather shield for s::can terminals
S-11-24-monit	moni::tool - Advanced s::can monitoring station software for 24 parameters
S-14-08-vali	vali::tool - s::can data validation software
S-14-24-vali	
D-315-antenna-pro	External, high range antenna option for con::cube, incl. 10 m extension cable

Spectrometer  
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ProbesPhysical  
Probes

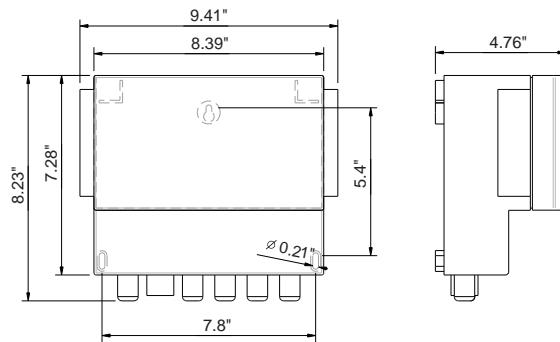
Terminals

Software

System  
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# con::lyte

- s::can terminal
- operation of up to 3 s::can sensors / probes (plug & measure)
- display up to 4 parameters
- setup and calibration of all s::can monitoring systems
- interface to SCADA via 4-20 mA analog outputs
- optional: gateway to modbusRTU
- relay outputs
- control of cleaning valves
- logbook available
- optional: integrated datalogger



## technical specification

display	LCD
function indicator	2 x LED
operation via	keypad
interface to PC	USB for software update and datalogger
interface to SCADA	4-20 mA, optional modbus RTU
power supply	type D-318-x-024: 9-36 VDC type D-318-x-230: 90-250 VAC (47-63Hz)
grounding	<0.5 Ohm to process media
power consumption (max.)	28 W
relay outputs	x 2A (250 VAC)
system error relay	1 x 2A (250 VAC)
dimensions (width x height x depth)	9.45 x 7.28 x 4.72"
housing material	PP
weight (min.)	3.09 lbs
operating temperature	-20 ... 50 °C
storage temperature	-20 ... 70 °C
protection class	IP65
conformity - EMC	EN 61326-1
conformity - safety	EN 61010-1

## recommended accessories

part number	article name
C-31-eu	Optional 6.56 ft (2 m) power cable
C-31-us	Optional 6.56 ft (2 m) power cable
C-40-sensor	adapter cable for additional ammo::lyser™ and s::can physical probes
D-319-logger	Datalogger option for con::lyte
D-319-out-mod-bus	Modbus/RTU (output module for con::lyte)
D-319-out-pro-fibus	Profibus (output module for con::lyte 2 and 4)
F-51	weather shield for s::can terminals

con::lyte 1 eco	
integration of	1 x s::can ISE probe or physical probe
interface connection to s::can sensors	1 x sys plug, IP 68, RS485, 12 VDC
analog outputs	1 x 4-20 mA
part number	230V

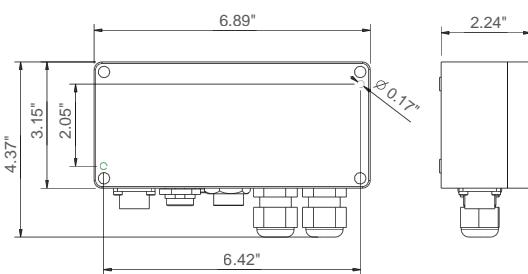
con::lyte 2	
integration of	1 x s::can spectrometer probe and 1 x s::can ISE probe or physical probe
interface connection to s::can spectrometric probes	1 x MIL, IP 68, RS485, 12 VDC
interface connection to s::can sensors	1 x sys plug, IP 68, RS485, 12 VDC
analog outputs	2 x 0/4-20 mA
outputs for automatic cleaning	2
part number 24V	D-319-2-024
part number 230V	D-319-2-230

con::lyte 4	
integration of	1 x s::can spectrometer probe and 2 x s::can ISE probes or physical probes
interface connection to s::can spectrometric probes	1 x MIL, IP 68, RS485, 12 VDC
interface connection to s::can sensors	2 x sys plug, IP 68, RS485, 12 VDC
analog outputs	4 x 0/4-20 mA
outputs for automatic cleaning	2
part number 24V	D-319-4-024
part number 230V	D-319-4-230

# con::nect

- s::can power supply including interface functionality
- operation of one s::can spectrometer probe and s::can sensor / ISE probe
- USB interface to PC/notebook
- RS485 interface to SCADA (modbusRTU integrated, profibusDP optional)
- essential for cable lengths over 123 ft (repeater functionality)
- control of cleaning valve (only for spectrometer probe)
- power supply for 12/24 VDC or 110/230 VAC



## technical specification

integration of	1 x s::can spectrometer probe and 1 x s::can ISE probe or physical probe
function indicator	2 x LED
operation via	via PC / notebook
interface connection to s::can spectrometric probes	1 x MIL, IP 68, RS485, 12 VDC
interface connection to s::can sensors	1 x sys plug, IP 68, RS485, 12 VDC
interface to PC	USB 2.0
interface to SCADA	RS485
data transfer	via PC
power supply	DC: 10 ... 36 V AC: 85-265 V (47-63Hz)

power consumption (max.)	14.5 W
outputs for automatic cleaning	1
dimensions (width x height x depth)	3.15 x 6.90 x 2.24" (w/o cable bushing)
housing material	aluminium alloy, powder coated
weight (min.)	1.32 lbs
operating temperature	-20 ... 50 °C
storage temperature	-20 ... 50 °C
protection class	IP65
conformity - EMC	EN 61326-1
conformity - safety	EN 61010-1
part number 24V	B-23-024
part number 230V	B-23-230

## recommended accessories

part number	article name
D-331-1	gateway to profibusDP
C-14	field case
S-03-CD	ana::pro - Advanced Process Software CD-ROM

## standard accessories

part number	article name
S-01	ana::lyte - Standard Process Software
B-32-230	s::can compressor
B-32-110	
B-32-012	
C-31-eu	Optional 6.56 ft (2 m) power cable





# Software



Spectrometer  
Probes

i::scan

Ionselective  
Probes

Physical Probes

Terminals

Software

System  
Configuration

Monitoring  
Stations

Spare Parts &  
Accessories

Services &  
Solutions

## moni::tool™

vali::tool ana::tool

A true software revolution that changes the face of water quality monitoring, data validation and event detection!

### Why use Monitoring Station Software?

The rising popularity of online sensors means that ever increasing amounts of data are collected. Online results increase the understanding of water quality, but the amount of data can be so enormous that it is impossible to manually verify and interpret the data. Automatic validation and event detection is therefore crucial to exploit the potential of online monitoring.

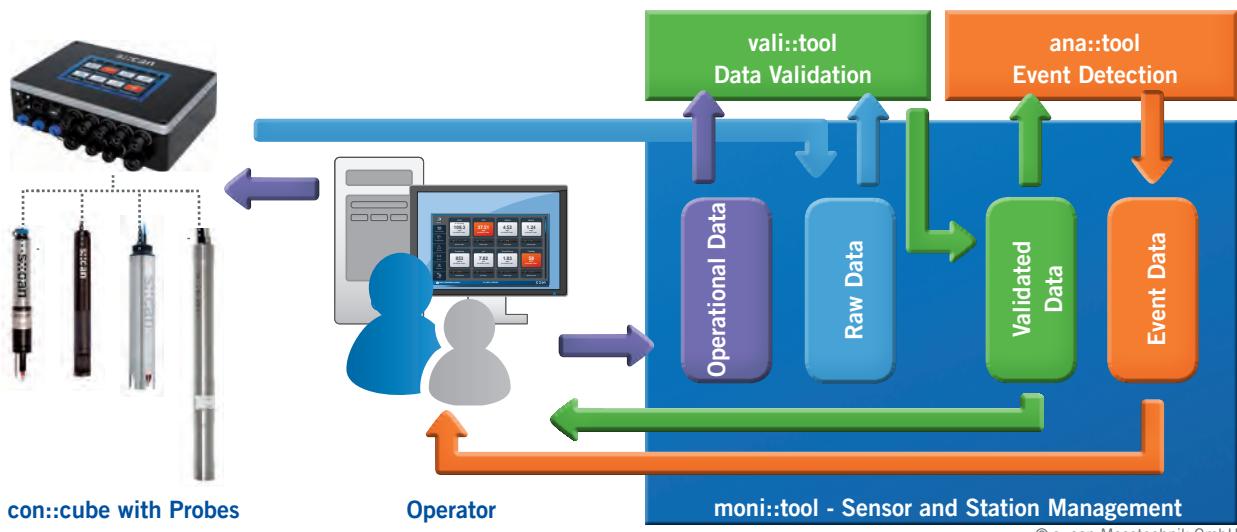
### What is special about moni::tool?

s::can has developed a modular software package to improve data availability and quality. The concept looks at the whole system: hardware, software and operator. Only this all enveloping approach can guarantee that operational control and / or event detection work reliably. Using raw, unvalidated information for control or event detection will result in a high false alarm rate or in poor sensitivity.

### The Modular Approach:

The s::can software package for water quality monitoring is split into three modules:

- **moni::tool™ - Sensor and Station Management**  
Provides management of probes and stations. It documents critical manipulations, from user login to maintenance and logbook keeping. It also has intuitive visualization tools to display all information in a clear and easy to understand format.
- **vali::tool - Data Validation**  
Automatically detects, marks and (optionally) corrects untrustworthy data. It ensures only high quality data are fed into the event detection module. It also provides the user with indications on sensor maintenance requirements, as well as automatic detection of malfunctions.
- **ana::tool - Event Detection**  
With ana::tool your existing simple water quality monitoring station morphs into a fail-safe EDS-system!

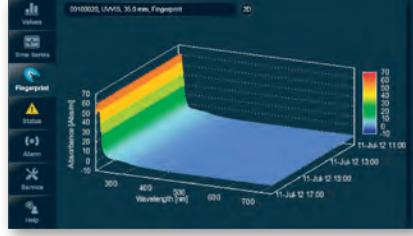


© s::can Messtechnik GmbH

## moni::tool™

# Sensor and Station Management

moni::tool™ is a revolutionary new platform for the management of an almost unlimited number of stations, online probes, analyzers and parameters. Intuitive operation - on site or remote - and reams of valuable features make moni::tool™ essential for state of the art sensor and station management.



**Want to try moni::tool?  
... visit [monitool.s-can.at!](http://monitool.s-can.at/)**

## moni::tool™ - Basic Features



- Management for an almost unlimited number of stations, probes and parameters
- Automatic installation of all s::can probes
- Open platform talks to any probe type (analog 0/4-20 mA, MODBUS RTU/ TCP, solid state), ideal to bring quality into your existing monitoring stations



- Impressive real-time zoomable, scrollable graphical visualization of all historical data including 3D-optical spectra
- Optimal display readability with Classic-, Day- and Night-Mode



- Easy customization of tools, devices and protocols
- Clear text help messages
- Available languages: English, German, Chinese, Spanish and Japanese



- Smart-phone-style, easy to use touch interface allows intuitive operation of sensor and station by non-expert staff
- Minimal user input necessary, Few input options = few input mistakes
- User management: Basic / Advanced / Expert user level



- Quality controlled and documented status management of probes and stations eliminates the need for paper log books
- Station and probe management for 100% transparent documentation



- Can be used in a small monitoring station as well as in the heart of a large central data collection system
- Large local database for collection and management of all incoming data



- Data Integration into any modern data exchange system
- Probes and stations can be accessed from any suitable device
- Can be run from any standard web browser e.g. via PC, Tablet, Notebook or Smart Phone



- Protected by a user-configurable firewall



- Automatic probe cleaning



- Any parameter input of any type of probe can be fed in - managed and analyzed in real time
- Multi sample function to calibrate all installed probes with minimal effort

## moni::tool™ - Additional Features

Spectrometer  
Probes

i:scan

Ionselective  
Probes

Physical Probes

Terminals

Software

System  
Configuration

Monitoring  
Stations

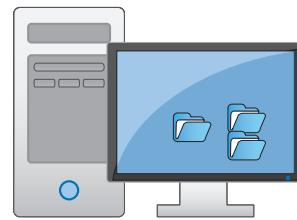
Spare Parts &  
Accessories

Services &  
Solutions

### Automatic File Transfer

#### Automatic File Transfer of all relevant measurements and results to ASCII format

- Customizable format data transfer + ASCII
- Import to any spreadsheet application (e.g. Excel)
- SSH-Transfer, FTP-Transfer and TML-Interface (XML-Based)



### Free Formula

#### Allows the creation of virtual parameters out of the measurement results from other parameters with a custom "free formula"

- Unlimited number of virtual parameters (limited only by type of moni::tool license)
- Possible usage of any parameter monitored (read value or corrected value) and also of single wavelengths from the spectral fingerprint
- An extensive range of mathematical operations can be performed, from basic arithmetics to higher mathematics (sin, log, exp, max, min and many more)
- The virtual parameters are treated like every other parameter (available in time series, can be exported, ...)



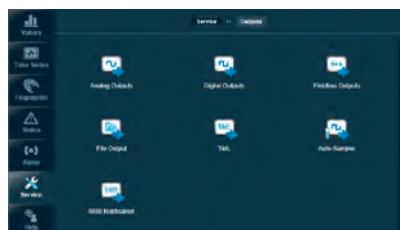
$$\begin{aligned} \text{Parameter 1} &= 4.52 \text{ mg/l} \\ \text{Parameter 2} &= 1.24 \text{ mg/l} \\ f(x) &= a + b^2 e^{x-a} \\ x &= b - 2a^y \end{aligned}$$



### SMS Notification

#### Send a SMS in case a configurable condition occurs. (This function uses the con::cube internal modem)

- Every digital output function can be used to trigger a SMS notification. Example conditions could be: The value of a parameter exceeds a set value or an event was detected
- The text of the SMS messages can be freely chosen



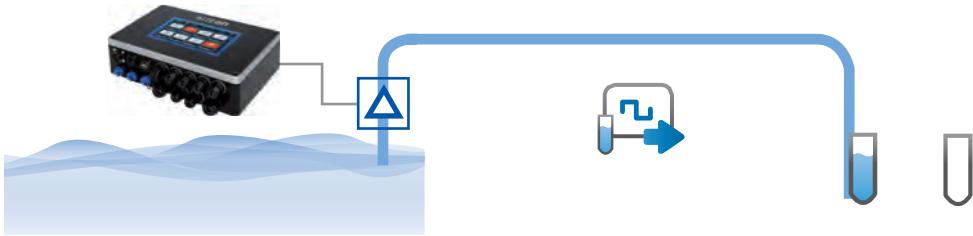
© s::can Messtechnik GmbH

## moni::tool™ - Additional Features

### Auto Sampler

#### Create your own Auto-Sampler!

- Complete and flexible sample system for up to 4 bottles despite less components
- Configurable conditions for taking samples
- Possibility to combine different conditions and to use delays
- Filling can be controlled either by a fill level detector or by setting a timer
- Solenoids & bottles can be ordered from s::can



### PLC Tools

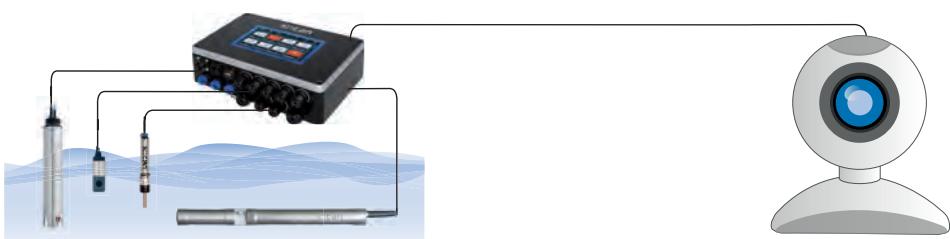
The PLC basic feature provides additional functionality for the digital outs and allows to use moni::tool & con::cube for process control

- Digital Out function Time Control
- Digital Out function Value Hysteresis downwards
- Digital Out function Pulsing
- Custom Bits: Use up to four digital inputs to add additional information to an analog parameter
- Other PLC functions under development

### Camera Integration

Connect a webcam to moni::tool and get snapshots and live stream of the site you are monitoring

- Effective surveillance against vandalism
- Snapshot images as well as live stream video possible
- Interval of the snapshot images can be freely customized
- Can be used with INSTAR and AXIS cameras



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## vali::tool

# Data Validation

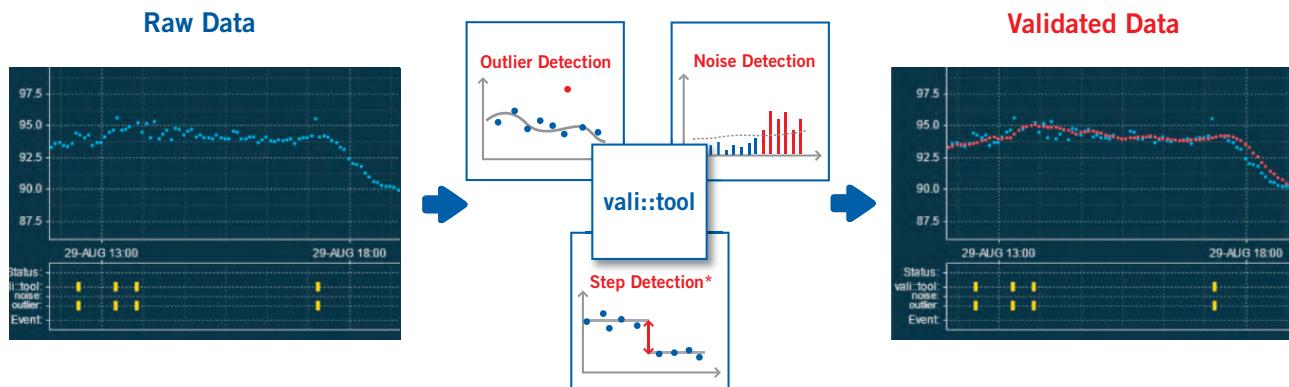
Automatic data validation makes sure that only unmarked, "clean" data are used for further analysis, training and alarms. Any non-event-related deviating data must be identified and marked before feeding them into the following event detection module.

## Why is Data Validation before Event Detection important?

vali::tool automatically detects, marks and (optionally) corrects untrustworthy data, not by using mean average - it detects outliers, noise and checks for discontinuous data. It ensures only high quality data are fed into the event detection module (ana::tool). It also provides the user with indications on sensor maintenance requirements, as well as automatic detection of malfunctions.

## How does vali::tool work?

The basic steps in the data validation are: outlier detection, noise detection and check for discontinuous data\*. The results of the data validation are presented as status information with the respective parameter and sensor. A station status symbol as well as a change in background color in the parameter display indicate that data quality is sub-optimal. Detailed notifications, including suggestions to remedy the issue or for maintenance, can be called up.



## vali::tool - Highlights

- Provides self-adaptive, self-controlled data validation in real time
- Ensures both sensitive and reliable alarm limits respectively setpoints for process control
- Analyzes noise, outliers and other combinations in real time to reliably detect any malfunction at an early stage
- Considers user interventions in real-time
- Application-specific training period considers normal fluctuations of individual water matrix and typical process dynamics
- Helps to dramatically reduce false alarm rates
- Configurable auto-correction of data based on threshold, outlier and noise analysis

\* Step Detection is not implemented, but will be in future vali::tool versions.

## ana::tool

# Event Detection for everyone

- Affordable for everyone
- Best available EDS
- Simple, easy to use and automatic

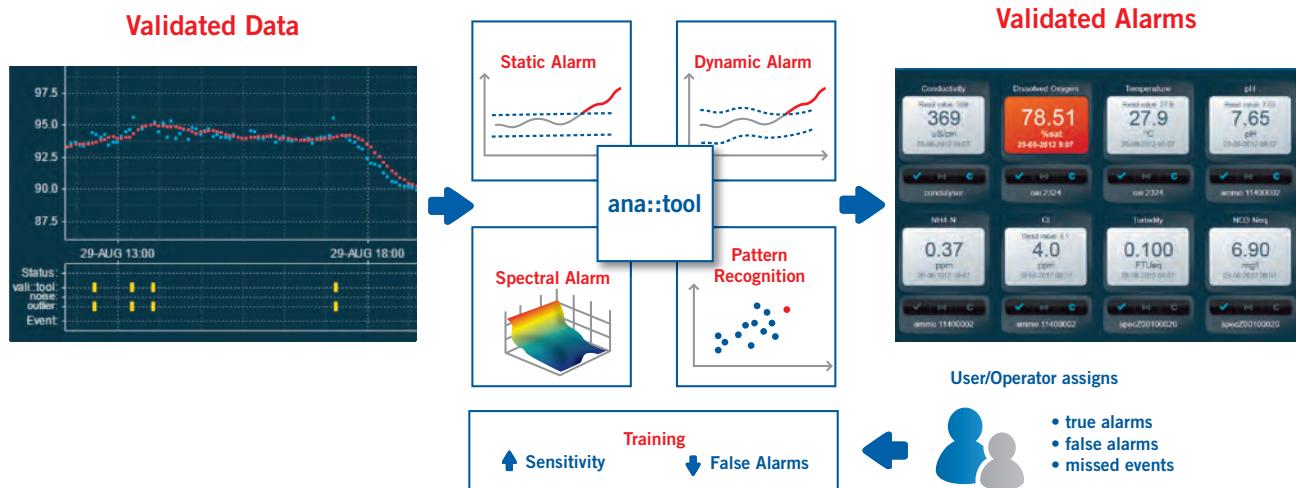
## ana::tool turns your monitoring station into an Event Detection System!

ana::tool identifies unknown and unusual conditions and enables operators to react timely to faults in the monitored system, determines normality of these data and triggers an alarm when a significant deviation from normality is detected.

### How does ana::tool work?

ana::tool evaluates measurement data that have been cleaned by the validation module. It identifies unknown and unusual conditions and enables operators to react timely to faults in the monitored system, determines normality of these data and triggers an alarm when a significant deviation from normality is detected. It combines Static Alarms, Dynamic Alarms, Pattern Recognition and Spectral Alarms.

Once an alarm is detected, the user has to provide feedback, so the system can learn what alarms are real and which ones represented normal changes in water quality. This will increase system performance over time. Gradual composition changes (e.g. seasonal variations) are accounted for by automatic training on a moving time window.



### ana::tool - Highlights

- Unmatched event detection tools based on proven algorithms for real-time event detection that use data streams from all connected probes separately and in combination
- The only software developed by the market leader to be specifically capable of exploiting the enormous information contained in UV spectra which provide the most sensitive and stable data source for event detection
- ana::tool is optimized for use of multi-dimensional spectral data, but will also work with single or multiple one-dimensional inputs
- So far the only one commercial software package that was tested and found suitable by US-EPA water security division
- All event information is automatically aggregated into a “traffic light” output and a “% deviation from normal” output. Furthermore, analogue and digital outputs as well as text notifications can be triggered
- Trains itself on any type of data streams coming in, and will learn automatically which data are useful for event detection, and which ones not

## moni::tool V2.0 License Options

	free*	S-11-04-monit	S-11-08-monit	S-11-24-monit	S-11-64-monit	S-11-free-formula	S-11-data-export	S-11-SMS	S-11-autosampler	S-11-basic-PLC	S-11-camera	S-14-vali	S-15-ana
Basic Features		●	●	●	●								
4 Parameters		●											
8 Parameters			●										
24 Parameters				●									
64 Parameters					●								
Automatic data transfer (via SSH, FTP, TML)						●							
Configurable mathematical formula							●						
SMS notification								●					
Auto sampler feature									●				
Basic PLC functionality (time control, pulsing, custom bits)										●			
Camera input											●		
vali::tool												●	
ana::tool (includes vali::tool)												●	●

\* The basic features for 4 parameters come free with every con::cube terminal

### Upgrade

S-19-subscription	s::can annual upgrade package for moni::tool
S-19-premium-subscription	s::can annual premium upgrade package for moni::too; remote updates and yearly upgrade, logfile analysis and basic report by s::can Support included (online access required, for end-users only)

### Services

#### data::care packages

S-18-data-4	data::care - quarterly data check and basic report (annual fee, online access required)
S-18-data-12	data::care - monthly data check and basic report (annual fee, online access required)
S-18-data-52	data::care - weekly data check and basic report (annual fee, online access required)
S-VPN-hosting	vpn::host - one year secure remote access from customer PC to con::cube via s::can VPN server

#### custom packages

S-12-custom-tab	Custom moni::tool TAB, individual screen within moni::tool, completely adapted to customers requirements and applications, price on request after exact specification
S-12-custom-formula	Custom formula, individual sophisticated mathematical formulas and algorithms, price on request after exact specification

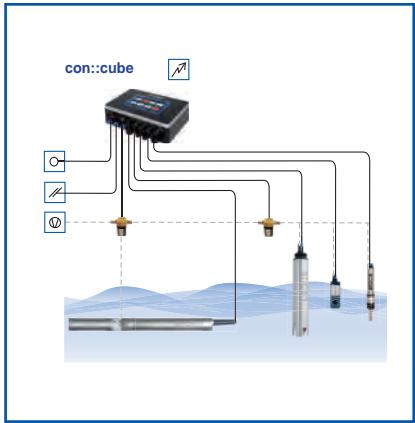
#### setup+training packages

A-vf?	vali::tool - setup & evaluation
A-af?	ana::tool - training & evaluation

### PC software

S-03-CD	ana::pro advanced process software CD-ROM, software optimized for operation via PC / notebook
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# System Configuration



Spectrometer  
Probes

i::scan

Ionselective  
Probes

Physical Probes

Terminals

Software

System  
Configuration

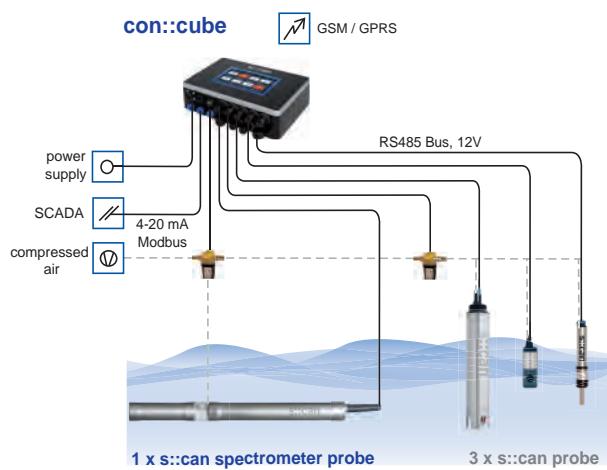
Monitoring  
Stations

Spare Parts &  
Accessories

Services &  
Solutions

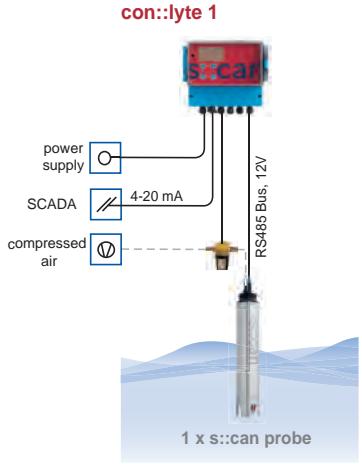
## plug & measure - system configuration for con::cube

- high-performance, power efficient industrial PC based on newest Intel Atom technology and 4 GB onboard memory
- wide screen color graphical display (7") and touch screen
- highly intuitive use, touch-and-feel like a cell phone; iconographic drag-and-drop operation on several levels
- plug & play operation of 4 s::can sensors standard; unlimited number of sensors optional. Support for two external cleaning valves
- low power operation with less than 3 watt (@ 15 minutes measuring interval) for solar panel applications
- worldwide network connectivity thanks to quad-band WCDMA and dual-band EV-DO network connection technology
- WIFI interface integrated for remote control and data transfer
- highspeed 100 Mb/s ethernet interface for integration into larger networks
- easy data transfer via USB-stick
- process interface to SCADA via relay outputs, 4-20 mA, SDI-12, Modbus RTU/TCP and Profibus DP
- integration of third party sensors via 4-20 mA inputs, SDI-12 and Modbus RTU/TCP
- easily extendable with additional analog and digital I/Os utilizing eight available extension slots
- process software moni::tool pre-installed; additional software tools (e.g. data validation or event detection) optional
- display of concentration values, historians, optical spectra and all events in clear text
- easy configuration, calibration and administration of full s::can monitoring stations and networks
- optional: operation in flow cell



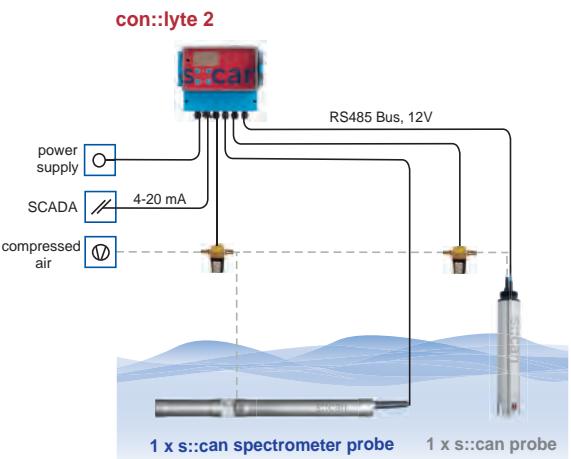
## plug & measure - system configuration for con::lyte 1

- cost efficient, stationary operation with con::lyte 1
- for connection of one s::can sensor or one s::can ISE probe
- unrivalled value for money, fixed price for complete system
- display of 1 parameter
- on-site operation
- interface to SCADA via 1 x 4-20 mA
- 1 adjustable relay output
- 1 system error relay
- control of 1 automatic cleaning valve
- power supply 24 VDC or 230 VAC
- OnLine & InSitu measurement
- optional: operation in flow cell
- optional: water quality monitoring station ex works



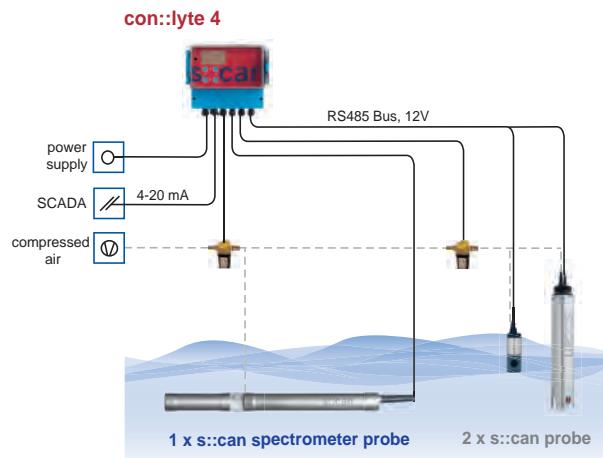
## plug & measure - system configuration for con::lyte 2

- cost efficient, stationary operation with con::lyte 2
- for connection of one s::can spectrometer probe and one s::can sensor or one s::can ISE probe
- unrivalled value for money, fixed price for complete system
- display of 2 parameters
- on-site operation
- interface to SCADA via 2 x 4-20mA
- 2 adjustable relay outputs
- 1 system error relay
- control of 2 automatic cleaning valves
- power supply 24 VDC or 230 VAC
- OnLine & InSitu measurement
- optional: operation in flow cell
- optional: water quality monitoring station ex works



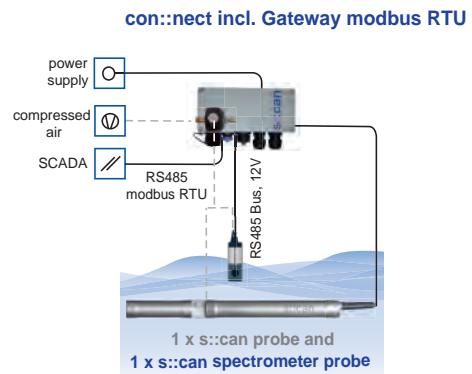
## plug & measure - system configuration for con::lyte 4

- cost efficient, stationary operation with con::lyte 4
- for connection of one s::can spectrometer probe and two s::can sensors or s::can ISE probes
- unrivalled value for money, fixed price for complete system
- display up to 4 parameters
- on-site operation
- interface to SCADA via 4 x 4-20mA
- 4 adjustable relay outputs
- 1 system error relay
- control of 2 automatic cleaning valves
- power supply 24 VDC or 230 VAC
- OnLine & InSitu measurement
- optional: operation in flow cell
- optional: water quality monitoring station ex works



## plug & measure - system configuration for con::nect PLC

- direct interface to SCADA (upon request)
- for connection of one s::can spectrometer probe and one s::can physical probe or one s::can ISE probe
- no further terminals necessary
- control of automatic cleaning valve (only spectrometer probe)
- power supply 12 VDC, 24 VDC or 230 VAC
- on-site operation via notebook (USB)
- optional: modular extensions available (gateway profibus DP, gateway 4-20 mA)
- OnLine & InSitu measurement
- optional: operation in flow cell
- optional: water quality monitoring station ex works



Spectrometer  
Probes

i::scan

Ionselective  
Probes

Physical Probes

Terminals

Software

System  
Configuration

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Spare Parts &  
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Services &  
Solutions



**s::can**

Intelligent. Optical. Online.

# Monitoring Stations



Monitoring station



Monitoring station

Spectrometer  
Probes

i::scan

Ionselective  
Probes

Physical Probes

Terminals

Software

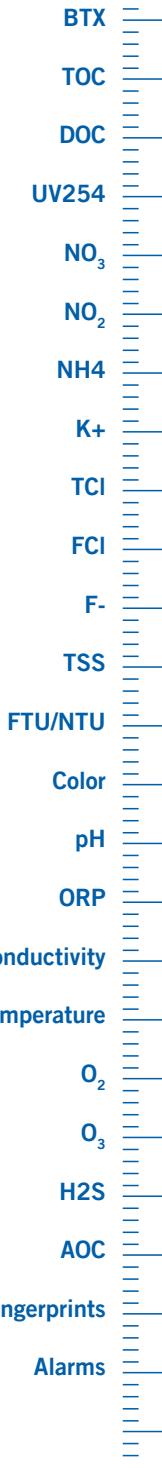
System  
Configuration

Monitoring  
Stations

Spare Parts &  
Accessories

Services &  
Solutions

# micro::station



The fully modular micro::station combines s::can instruments to a compact and versatile system. It presents a complete solution, as the user only has to connect water supply and -discharge ("plug & measure") in order to receive at no extra cost a previously unheard variety of immediately available information and parameters.

The s::can micro::station is designed for OnLine monitoring of water quality parameters in clean media, such as drinking water. The required components - spectro::lyser, s::can probes and controller - are factory assembled with all required flow cells, mounting fittings and pipework on a compact panel.

micro::station - the s::can solution for water analysis - compact and easy like never before.

## 1 Terminal

con::cube terminal with moni::tool software for data acquisition, data display and station control

## 2 Spectrometer probe

All s::can spectrometer probes are multi-parameter instruments that can measure a variety of water quality parameters

### Possible parameters:

AOC, BOD, BTX, COD, color, DOC, FTU/NTU, H<sub>2</sub>S, NO<sub>2</sub>-N, NO<sub>3</sub>-N, O<sub>3</sub>, TOC, TSS, UV254, fingerprints and spectral alarms, temperature and pressure

## 3 Flow cell for spectrometer probe

Including auto brush cleaning device to provide cleaning of the optical measuring windows

## 4 System tubing

Included in panel assembly; Material PA, inside diameter 6 mm, outside diameter 8 mm

## 5 Flow detector

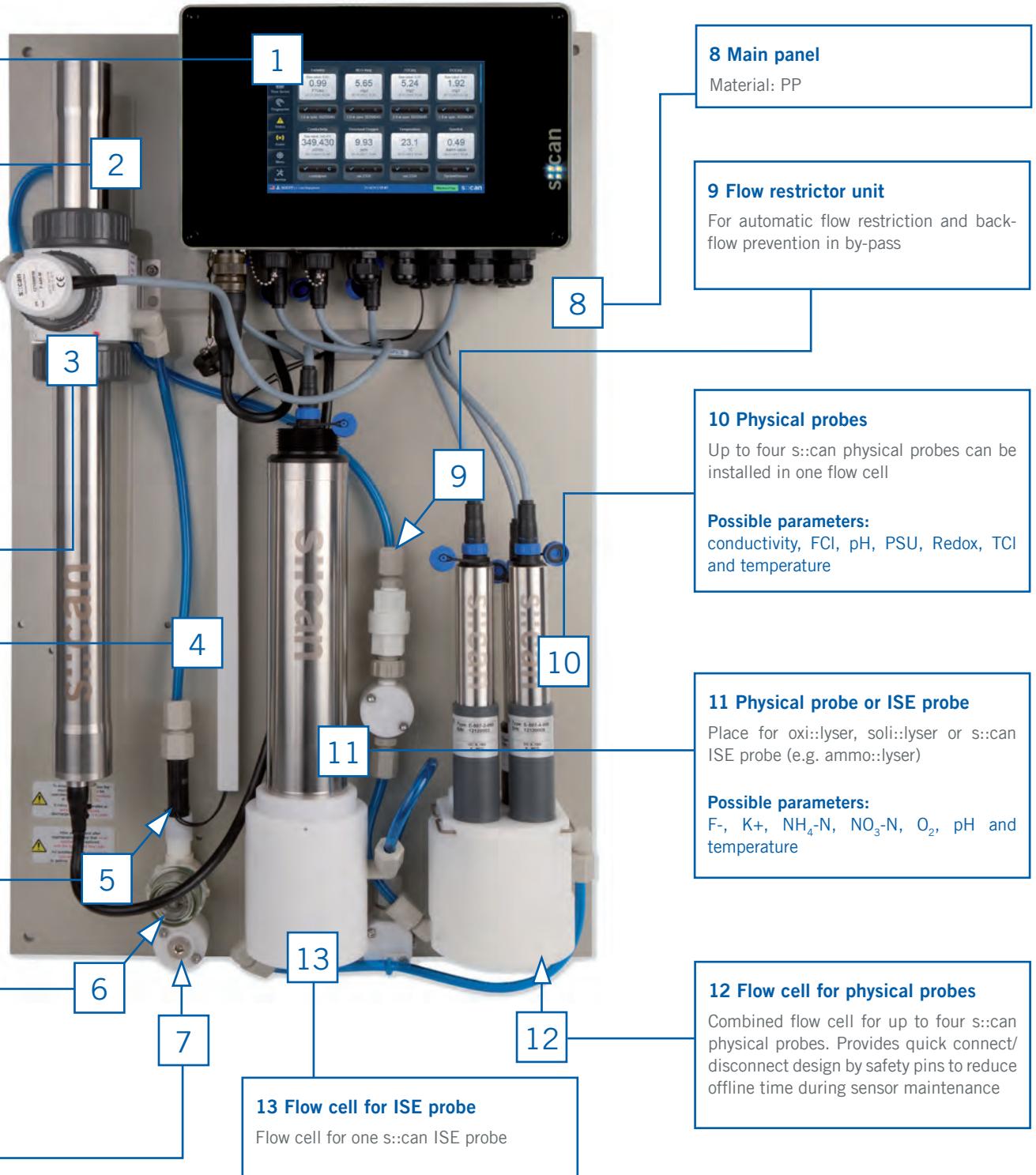
The flow detector is set to give an alarm if the flow rate decreases below a critical value

## 6 Inlet strainer

The inlet strainer ascertains that no coarse material enters the micro::station. 1/4" NPT, with screw cap for sieve removal/cleaning

## 7 Pressure transmitter (optional)

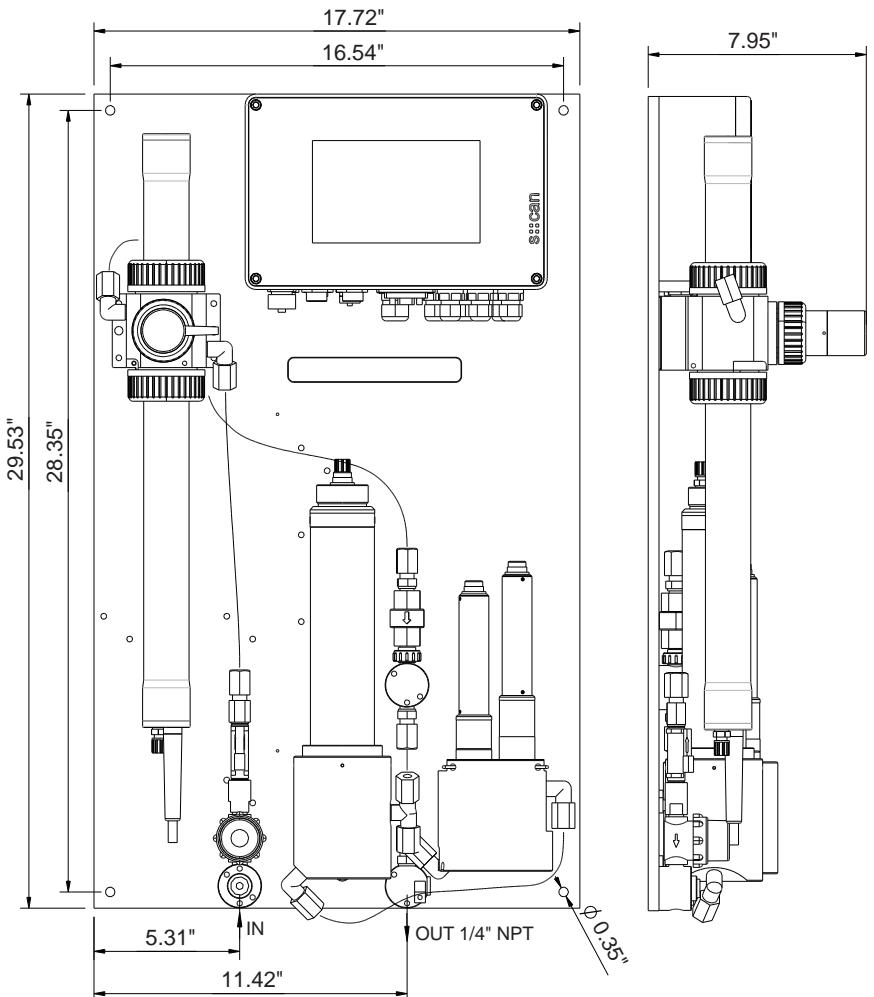
Mounting position for pressure transmitter



# micro::station

## Options for s::can micro::station

1 Terminal	con::cube con::lyte
2 Spectrometer probe	spectro::lyser carbo::lyser color::lyser multi::lyser nitro::lyser ozo::lyser uv::lyser
3 Flow cell for spectrometer probe	flow-cell (by-pass fitting), POM-C (for pathlengths from 1 mm to 35 mm) flow-cell (by-pass fitting), POM-C (for pathlength 100 mm) flow-cell (by-pass fitting) autobrush, POM-C (for pathlength 35 mm) flow-cell (by-pass fitting) autobrush, POM-C (for pathlength 100 mm)
4 System tubing	inside diameter 6 mm, outside diameter 8 mm
5 Flow detector	flow detector
6 Inlet strainer	inlet strainer
7 Pressure transmitter	pressure transmitter for micro::station (optional)
8 Main panel	system panel micro::station US system panel micro::station EU system panel micro::station add-on module EU system panel micro::station add-on module US
9 Flow restrictor unit	automatic flow restrictor unit flow adjustment valve
10 Physical probes	pH::lyser redo::lyser condu::lyser chlori::lyser
11 Physical probe or ISE probe	ammo::lyser eco ammo::lyser pro fluor::lyser oxi::lyser soli::lyser
12 Flow cell for physical probes	flow-cell for up to 4 s::can physical probes, POM-C s::can physical probe flow-cell (by-pass setup), POM-C
13 Flow cell for ISE probe or physical probe	ammo::lyser flow-cell (by-pass setup), POM-C oxi::lyser flow-cell



# nano::station

<b>TOC</b>	The fully modular nano::station combines s::can instruments to a super-compact and versatile system. It presents a complete solution, as the user only has to connect water supply and -discharge ("plug & measure") in order to receive at no extra cost a previously unheard variety of immediately available information and parameters.
<b>SAC</b>	
<b>UV254</b>	
<b>Color</b>	
<b>TCI</b>	
<b>FCI</b>	
<b>FTU/NTU</b>	
<b>Conductivity</b>	The s::can nano::station will revolutionize OnLine water quality monitoring: From very cost sensitive applications down to highly resolved "Smart Water Grids", in small unmanned plants, or even in single building protection.
<b>pH</b>	The required components - i::scan, s::can probes and s::can controller - are factory assembled with required flow cells, mounting fittings and pipework on a super-compact panel.
<b>ORP</b>	
<b>Temperature</b>	The nano::station - compact, precise and affordable!
<b>Alarms</b>	



nano::station with con::lyte

## 1 Terminal

With con::cube or con::lyte terminal. con::cube is equipped with moni::tool software for data acquisition, data display and station control

## 2 i::scan

One i::scan can be installed on every nano::station

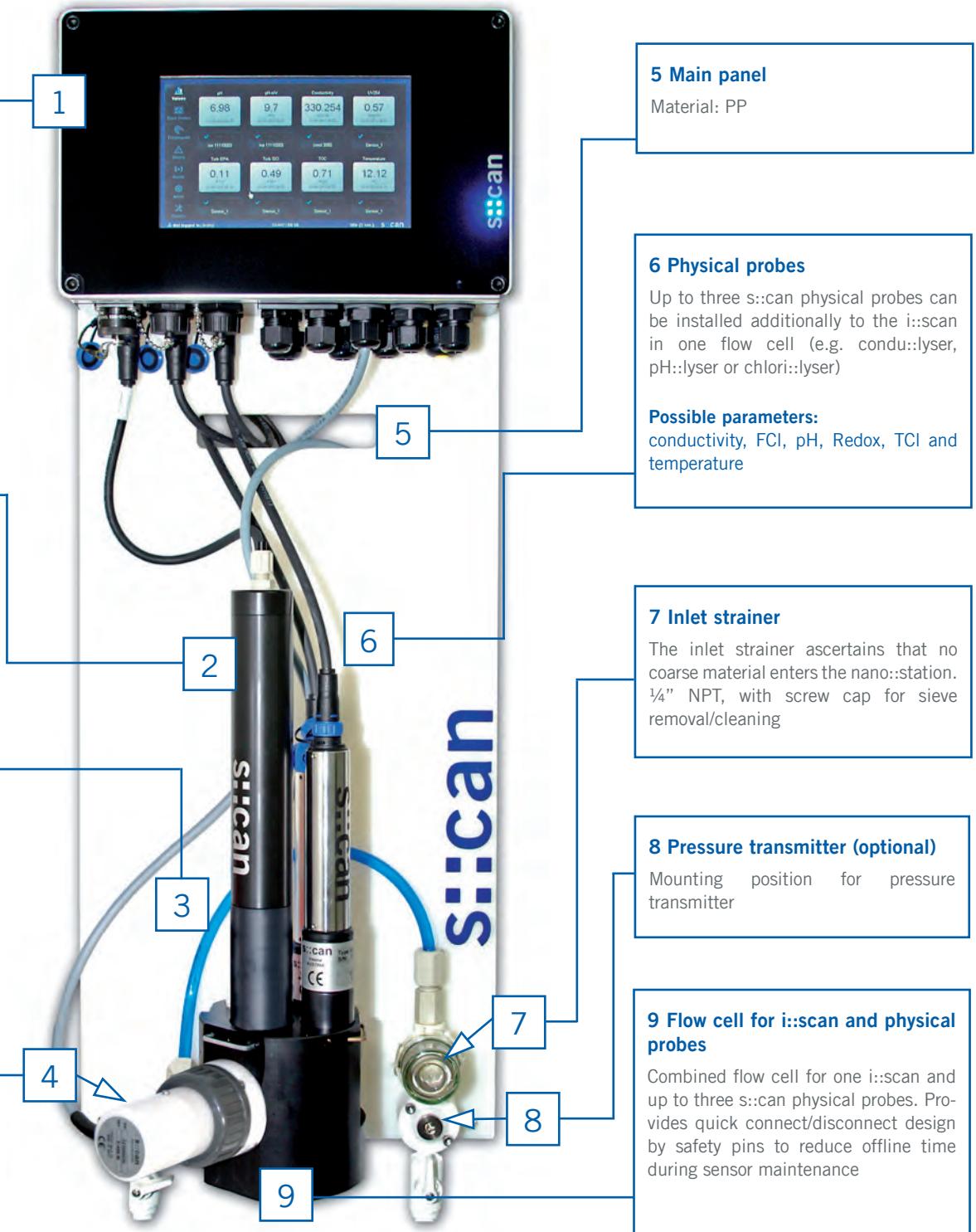
**Possible parameters:**  
color, FTU/NTU, UV254, TOC

## 3 System tubing

Included in panel assembly; Material PA, inside diameter 6 mm, outside diameter 8 mm

## 4 Autobrush for i::scan

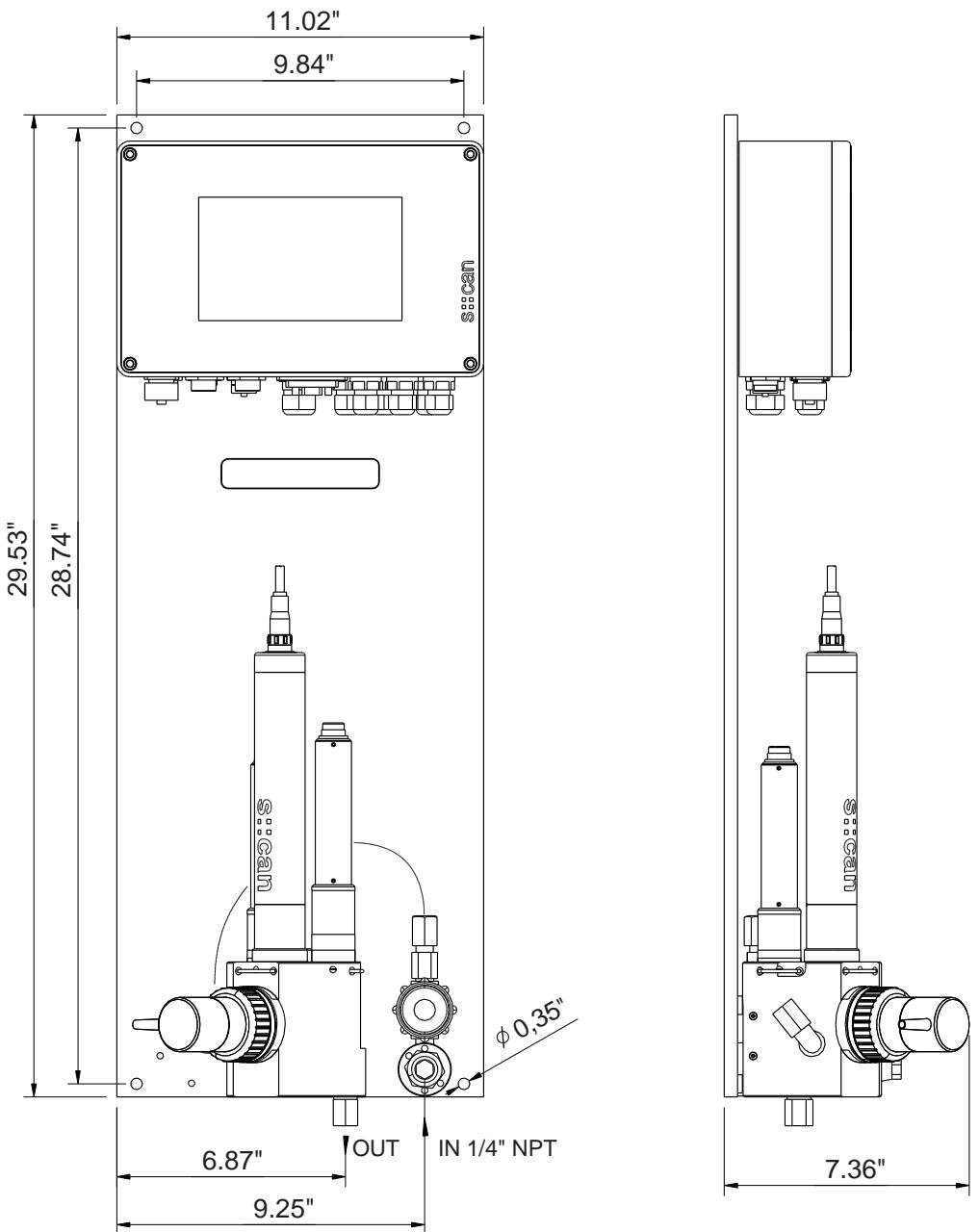
Provides automatic cleaning for i::scan



# nano::station

## Options for s::can nano::station

1 Terminal	con::cube con::lyte
2 i::scan	i::scan
3 System tubing	inside diameter 6 mm, outside diameter 8 mm
4 Flow restrictor unit	automatic flow restrictor unit flow adjustment valve
5 Autobrush	autobrush for i::scan
6 Main panel	system panel nano::station US system panel nano::station EU
7 Physical probes	pH::lyser redo::lyser condu::lyser chlori::lyser
8 Inlet strainer	inlet strainer
9 Pressure transmitter	pressure transmitter for nano::station (optional)
10 Flow cell for physical probes and i::scan	flow-cell for i::scan and up to 3 s::can physical probes, POM-C





# Spare Parts & Accessories



Reference electrode and ammonium electrode for ammo::lyser



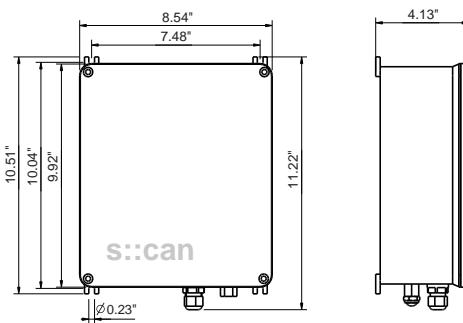
Insert for shortening pathlength

## S::can compressor

- provides compressed air for s::can spectrometer probes, oxi::lyser, soli::lyser and ammo::lyser™
- removal of fouling using compressed air
- aluminium housing IP65 for wall mounting
- optional 12 VDC or 230/110 VAC version available
- railing-mounting set available

### technical specification

power supply	type B32-230: 230 VAC type B32-110: 110 VAC type B32-012: 12 VDC
power consumption (typical)	100 W
assembling	ex works
dimensions (width x height x depth)	8.54 x 9.92 x 4.13"
weight (min.)	10.58 lbs
process connection	quick coupling DIN 7.2
operating temperature	0 ... 40 °C
operating pressure	0 ... 101.53 psi (0 ... 7 bar)
protection class	IP65
tank volume	0.13 US gal (0.5 l)
storage temperature	-20 ... 80 °C
part number	B-32-230 B-32-110 B-32-012



### recommended accessories

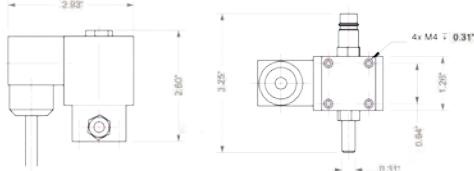
part number	article name
B-44	cleaning valve
C-31-eu	Optional 6.56 ft (2 m) power cable
C-31-us	Optional 6.56 ft (2 m) power cable

## cleaning valve

- supports automatic cleaning of measuring elements of von s::can spectrometer probes, oxi::lyser, soli::lyser and ammo::lyser™
- removal of fouling, sediments and clogging using compressed air or -water

### technical specification

cable length	2.4 m
assembling	ex works
dimensions (width x height x depth)	3.35 x 2.29 x 2.76"
weight (min.)	1.10 lbs
process connection	pressure side DIN 7.2 coupling, at sensor direction ID 3/8"
protection class	IP65
part number	B-44



## carrier s::can™ spectrometer probe

- for easy horizontal attachment of s::can spectrometer probes
- probe cable and pressure hose compatible
- mounting with pipe (AD 50 mm / 1.97")

### technical specification

housing material	PVC and POM-C
dimensions (diameter x length)	2.48 x 15.87"
weight (min.)	1.98 lbs
process connection	ID 50 mm (1.97")
installation / mounting	submersed
part number	F-110-spectro

### to be used for

spectro::lyser™
carbo::lyser™ II / III
multi::lyser™ II / III
nitro::lyser™ II
color::lyser II
ozo::lyser II
uv::lyser II

### recommended accessories

part number	article name
B-41-sensor	pressure connection replacement set oxi::lyser™ or ammo::lyser™ or soli::lyser
B-41-spectro	pressure connection replacement set s::can™ spectrometer probe



### recommended accessories

part number	article name
F-15	fixing adapter - stainless steel

## flow cell autobrush - for spectro::lyser™ pathlength 35 mm

- for proper and easy flow-through installation of s::can spectrometer probes
- for applications with frequent, automatic cleaning
- cleaning of optical windows with rotating brush without demounting of spectrometer probe

### technical specification

power supply	12 VDC
assembling	ex works
housing material	POM-C
dimensions (width x height x depth)	2.91 x 5.20 x 6.02"
weight (min.)	1.98 lbs
process connection	G 1/4"
installation / mounting	flow cell
operating temperature	0 ... 40 °C
operating pressure	0 ... 87.02 psi (0 ... 6 bar)
protection class	IP66
part number	F-446-1

### to be used for

spectro::lyser™
carbo::lyser™ II / III
multi::lyser™ II / III
nitro::lyser™ II
color::lyser II
ozo::lyser II
uv::lyser II



### recommended accessories

part number	article name
F-501-eco-us	System Panel micro::station US
F-501-eco-eu	System Panel micro::station EU
F-45-process	process connection 1/4" G

## flow cell autobrush - for spectro::lyser™ pathlength 100 mm

- for proper and easy flow-through installation of s::can spectrometer probes
- for applications with frequent, automatic cleaning
- cleaning of optical windows with rotating brush without demounting of spectrometer probes

### technical specification

power supply	12 VDC
assembling	ex works
housing material	POM-C
dimensions (width x height x depth)	2.91 x 7.72 x 6.02"
weight (min.)	3.31 lbs
process connection	G 1/4"
installation / mounting	flow cell
operating temperature	0 ... 40 °C
operating pressure	0 ... 87.02 psi (0 ... 6 bar)
protection class	IP66
part number	F-446-2

### to be used for

spectro::lyser™
carbo::lyser™ II / III
multi::lyser™ II / III
nitro::lyser™ II
color::lyser II
ozo::lyser II
uv::lyser II



### recommended accessories

part number	article name
F-501-eco-us	System Panel micro::station US
F-501-eco-eu	System Panel micro::station EU
F-45-process	process connection 1/4" G

## flow cell for four s::can physical probes

- for proper and easy flow-through installation of condu::lyser, chlori::lyser, redo::lyser and pH::lyser
- for applications without automatic cleaning in drinking water

### technical specification

housing material	POM-C
dimensions (diameter x length)	4.17 x 4.03"
weight (min.)	0.20 lbs
process connection	G 1/4", hose nozzle 7mm
installation / mounting	flow cell
operating temperature	0 ... 50 °C
operating pressure	0 ... 87.02 psi (0 ... 6 bar)
part number	F-45-four



### to be used for

condu::lyser  
redo::lyser  
pH::lyser  
chlori::lyser

### recommended accessories

part number	article name
F-501-eco-us	System Panel micro::station US
F-501-eco-eu	System Panel micro::station EU
F-45-process	process connection 1/4" G
F-45-flow-1	Automatic flow control unit
F-45-strain	Inlet strainer

## i::scan flow cell for up to 3 additional s::can probes

- for proper and easy flow-through installation of one i::scan and up to three s::can physical probes
- automatic cleaning with autobrush for i::scan available (optional)

### technical specification

housing material	POM-C
dimensions (diameter x length)	4.17 x 4.03"
weight (min.)	0.18 lbs (without autobrush)
process connection	G 1/4", hose nozzle 7mm
installation / mounting	flow cell
operating temperature	0 ... 50 °C
operating pressure	0 ... 87.02 psi (0 ... 6 bar)
part number	F-46-four-i::scan



### to be used for

condu::lyser  
redo::lyser  
pH::lyser  
chlori::lyser  
i::scan

### recommended accessories

part number	article name
F-501-eco-us	System Panel micro::station US
F-501-eco-eu	System Panel micro::station EU
F-45-process	process connection 1/4" G
F-45-flow-1	Automatic flow control unit
F-45-strain	Inlet strainer
F-446-m-i::scan	i::scan autobrush for F-46-flow cells

## Pressure mounting for i::scan in-pipe installation

- for proper and easy installation of one i::scan in a pressure pipe
- the i::scan can be mounted and demounted under pressure without interruption of the water flow

### technical specification

housing material	Stainless steel 1.4307/1.4301
dimensions (width x height x depth)	11.81 x 28.35 x 6.85"
weight (min.)	21.6 lbs
process connection	on fitting DN 65 (2 1/2") on pressure pipe
operating pressure	0 ... 145.04 psi (0 ... 10 bar)
part number	F-150-iscan

### to be used for

i::scan



## Simple mounting for i::scan in-pipe installation

- for proper and easy in-pipe installation of one i::scan (for 4" pipe)

### technical specification

housing material	POM and PP (saddle clamp)
dimensions (width x height x depth)	6.30 x 13.46 x 3.82 mm
weight (min.)	2.5 lbs
part number	F-140-iscan

### to be used for

i::scan



**Spectrometer infrastructure**

part number	article name
A-001-s	Inserts for optical pathlength 1 mm, stainless steel
A-002-s	Inserts for optical pathlength 2 mm, stainless steel
A-005-s	Inserts for optical pathlength 5 mm, stainless steel
A-015-s	Inserts for optical pathlength 15 mm, stainless steel
A-500-s	Inserts for optical pathlength 0.5 mm, stainless steel
A-035-s	Cleaning insert for optical pathlength 35 mm, stainless steel
E-412-035	Cell holder insert for 35 mm optical path length, V2 spectro::lyser
E-412-100	Cell holder insert for 100 mm optical path length, V2 spectro::lyser
E-421-1	multifunctional slide for pathlengths from 0.5 mm to 35 mm
E-421-2	multifunctional slide for pathlength 100 mm
E-431-1	multifunctional slide i::scan 35 mm
E-431-2	multifunctional slide i::scan 5 mm

**Sensors infrastructure**

part number	article name
E-507-1/2-EI	Free Chlorine elektrolyte (spare part)
E-507-1/2-SET	Free Chlorine membrane cap (spare part)
E-507-3/4-EI	Total Chlorine elektrolyte (spare part)
E-507-3-SET	Total Chlorine membrane cap (spare part)
E-507-4-SET	Total Chlorine membrane cap (spare part)
E-510-guard	Electrode protection shelter (spare part)
E-513-ORP	ORP & reference electrode for redo::lyser (spare part)
E-514-pH	pH & reference electrode for pH::lyser (spare part)
E-532-ise-K	potassium electrode for ammo::lyser™ (spare part, new)
E-532-ise-NH4	ammonium electrode for ammo::lyser™ (spare part, new)
E-532-ise-NO3	Nitrate electrode for ammo::lyser V1 (spare part, new)
E-532-ise-pH	pH electrode for ammo::lyser V1 (spare part, new)
E-532-ise-ref	reference electrode for ammo::lyser V1 (spare part, new)
E-532-tool	Tool for s::can ISE probes (spare part)
E-533-ise-Cl	Chloride electrode for ammo::lyser V2 (spare part, new)
E-532-STD-NH4	500 ml Ammonium standard solution 1000 mg/l NH4-N
E-532-STD-NO3	500 ml Nitrate standard solution 1000 mg/l NO3-N
E-513-200	500 ml Redox standard solution 200 mV
E-511-STD-500	500 ml Electrical Conductivity standard solution 500 µS/cm
E-532-STD-K	500 ml Potassium standard solution 1000 mg/l K
E-514-std	30 x 30 ml pH standard solutions 4,01 / 7,00 / 9,00 pH according to PTB and NIST
E-533-ise-K	Potassium electrode for ammo::lyser V2 (spare part, new)
E-533-ise-NH4	Ammonium electrode for ammo::lyser V2 (spare part, new)
E-533-ise-NO3	Nitrate electrode for ammo::lyser V2 (spare part, new)
E-533-ise-pH	pH electrode for ammo::lyser V2 (spare part, new)
E-533-ise-ref	reference electrode for ammo::lyser V2 (spare part, new)
E-542-ise-F	Fluoride electrode for fluor::lyser V1 (spare part, new)
E-543-ise-F	Fluoride electrode for fluor::lyser V2 (spare part, new)
E-632-ise	Refurbishment of ionselective electrodes for s::can ISE probes
E-632-ise-K	Refurbished Potassium electrode for ammo::lyser V1 (spare part, refurbished)
E-632-ise-NH4	Refurbished Ammonium electrode for ammo::lyser V1 (spare part, refurbished)
E-632-ise-NO3	Refurbished Nitrate electrode for ammo::lyser V1 (spare part, refurbished)
E-633-ise-K	Refurbished Potassium electrode for ammo::lyser V2 (spare part, refurbished)
E-633-ise-NH4	Refurbished Ammonium electrode for ammo::lyser V2 (spare part, refurbished)
E-633-ise-NO3	Refurbished Nitrate electrode for ammo::lyser V2 (spare part, refurbished)
E-642-ise-F	Refurbished Fluoride electrode for fluor::lyser V1 (spare part, refurbished)
E-643-ise-F	Refurbished Fluoride electrode for fluor::lyser V2 (spare part, refurbished)

**Cleaning & Pressure Devices**

part number	article name
B-32-service	Service kit for s::can compressed air supply
B-32-upgrade	Upgrade package for s::can compressor, possible at s::can factory only
B-41	s::can pressure connection set for V2 spectro::lyser and s::can sensors
B-41-sensor	pressure connection replacement set oxi::lyser™ or ammo::lyser™ or soli::lyser
B-43-2	10 x desiccant
B-45-V2	PVC clips (spare part for V2 spectro::lyser), set of 2
B-60-1	cleaning brush for pathlength < 15 mm
B-60-2	cleaning brush for pathlength < 2 mm
B-61-1	cleaning agent

Installation	
part number	article name
F-110-iscan	Carrier i:scan, for easy horizontal attachment
F-120-iscan	Carrier i:scan, for easy vertical attachment
F-130-iscan	Carrier i:scan, for easy 45° attachment
F-11-oxi-ammo	carrier oxi::lyser / soli::lyser / s::can ISE probes
F-120-spectro	carrier s::can™ spectrometer probe
F-12-sensor	carrier s::can physical probes
F-15	fixing adapter - stainless steel
F-445-1	flow cell - for pathlengths from 0.5 mm to 35 mm
F-445-2	flow cell - for pathlength 100 mm
F-446-brush	brush for flow-cell AutoBrush (spare part)
F-446-brush-iscan	brush for flow-cell AutoBrush i:scan (spare part)
F-446-iscan	single flow-cell (by-pass fitting) AutoBrush, Pom-C (for i:scan)
F-446-m	brush unit for flow-cell AutoBrush (spare part)
F-446-m-iscan	i:scan autobrush for F-46-flow cells
F-45-alarm	Flow detector unit
F-45-ammo	flow cell for ammo::lyser™
F-45-flow-1	Automatic flow control unit
F-45-oxi	flow cell for oxi::lyser™ and soli::lyser
F-45-process	process connection 1/4" G
F-45-sensor	flow cell for s::can sensor
F-45-strain	Inlet strainer
F-45-valve	Flow adjustment valve
F-46-iscan	i:scan flow-cell (by-pass setup), Pom-C, without cleaning
F-48-ammo	ammo::lyser flow-cell (by-pass setup), PVC
F-48-iscan	flow cell for i:scan (waste water), PVC
F-48-oxi	oxi::lyser or soli::lyser flow-cell (by-pass setup), PVC
F-48-process	process connection 1", PVC
F-48-sensor	s::can Sensor flow-cell (by-pass setup), PVC
F-48-spectro	s::can spectrometer flow-cell (by-pass setup), PVC
F-500-p	Pressure Sensor for Micro Station
F-500-pump	Drinking water pump for micro::station
F-500-service-set	Service set for micro::station
F-501-eco-eu	System Panel micro::station EU
F-501-eco-us	System Panel micro::station US
F-502-eco-eu	System Panel micro::station add-on module EU
F-502-eco-us	System Panel micro::station add-on module US
F-506-panel	System panel nano::station
F-508-panel	System panel waste water micro::station
F-51	weather shield for s::can terminals

Cables & Power Supply	
part number	article name
C-1-05-sensor	1.64 ft (0.5 m) connection cable for s::can physical probes
C-41-hub	Distribution box for additional sensors such as i:scan, sensors & ISE probes (3 x IP68 sys plug connections, RS485, 12 VDC)
C-14	field case
C-15	electronic battery charger (only 230 V AC)
C-210-sensor	32.81 ft (10 m) extension cable for s::can physical probes and s::can ISE probes
C-210-spectro	32.81 ft (10 m) extension cable for s::can™ spectrometer probes
C-220-sensor	20 m extension cable for s::can physical probes and s::can ISE probes
C-220-spectro	20 m extension cable for s::can™ spectrometer probes
C-230-spectro	30 m extension cable for s::can™ spectrometer probes
C-31-eu	Optional 6.56 ft (2 m) power cable
C-31-us	Optional 6.56 ft (2 m) power cable
C-40-sensor	adapter cable for additional ammo::lyser™ and s::can physical probes

Operation, Visualisation and Additional Interfaces	
part number	article name
D-315-antenna-plug	Internal antenna adapter cable and connector, option for con::cube
D-315-antenna-pro	External, high range antenna option for con::cube, incl. 10 m extension cable
D-315-touch	Display and Touch Screen (input module), 7" VGA TFT display & touch for access to GUI
D-315-cover	Blind cover for con::cube (without Display & Touch Screen)
D-315-3G	Gateway to 3G (output module), provides access to HSDPA/UMTS, Dual-band-EVDO/CDMA2000 or Quad-band EDGE/GPRS/GSM
D-315-out-Profibus	provides Profibus DPVO for data transfer to PLC systems
D-315-out-SDI12	SDI 12 (output module), provides SDI 12 for data transfer to PLC systems
D-315-out-mA	2 analogue outputs (output module), provides data transfer to PLC systems
D-315-out-relay	4 digital outputs (output module), provides 4 configurable relay contacts 1A
D-315-in-mA	2 analogue inputs (input module), provides 2 analogue inputs (4-20mA) for integration of 3rd party readings
D-315-in-SDI12	SDI 12 (input module), provides SDI 12 for integration of 3rd party readings
D-315-in-relay	2 digital inputs (input module), provides 2 digital IN (5-24V) for integration of 3rd party readings
D-319-out-modbus	Modbus/RTU (output module for con::lyte)
D-319-logger	Datalogger option for con::lyte
D-319-out-profibus	Profibus (output module for con::lyte 2 and 4)

Spectrometer  
Probes

i::scan

Ionselective  
Probes

Physical Probes

Terminals

Software

System  
ConfigurationMonitoring  
StationsSpare Parts &  
AccessoriesServices &  
Solutions





Spectrometer  
Probes

i::scan

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Software

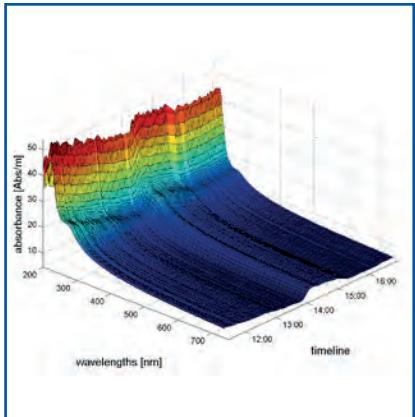
System  
Configuration

Monitoring  
Stations

Spare Parts &  
Accessories

Services &  
Solutions

# Services & Solutions



## 1 hour consulting, data handling

- 1 hour consulting, data handling

technical specification	
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part number	I-C
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## 1 hour service

- 1 hour service

technical specification	
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part number	I-S
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## 1 hour engineer, service on site

- 1 hour engineer, service on site

technical specification	
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part number	I-T
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## start up Deployment of one s::can monitoring system on site

- start up Deployment of one s::can monitoring system on site

technical specification	
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part number	I-I
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## feasibility study

- individual, substance specific spectral analysis by s::can Support
- prediction of substance-specific range & precision in distilled water
- considering possible background of solids
- recommendation of optical pathlength & possible standard applications, incl. scientific report
- no on-site sampling necessary
- background of solids required
- precondition for contamispec validation & parameter X

technical specification	
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part number	A-xf?
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## contamispec - detection limits of contaminants

- individual analysis of contaminants by s::can Support
- prediction of substance-specific range & precision in individual water matrix
- considering possible background of solids and dissolved substances, incl. scientific report
- no on-site sampling necessary
- structural relationship & chemical formula of substance required
- ana::tool - training & evaluation, feasibility study necessary

### technical specification

part number | A-ax?

## parameter X1

- individual local calibration by s::can Support
- based on chemometric methods (PCA/PLS)
- incl. statement of statistical quality
- s::can feasibility study A-xf? and validated laboratory results are precondition
- individual quotation from s::can Sales & individual clarification by s::can Support precondition

### technical specification

part number | A-x1?

## parameter X2

- individual local calibration by s::can Support
- based on chemometric methods (PCA/PLS)
- incl. statement of statistical quality
- s::can feasibility study A-xf? and validated laboratory results are precondition
- individual quotation from s::can Sales & individual clarification by s::can Support precondition

### technical specification

part number | A-x2?

## parameter OIW - oil in water

- individual local calibration by s::can Support
- based on chemometric methods (PCA/PLS)
- incl. statement of statistical quality
- s::can feasibility study A-xf? and validated laboratory results are precondition
- individual quotation from s::can Sales & individual clarification by s::can Support precondition

### technical specification

part number	A-x3?
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## assembly of s::can systems

- mounting of flow-cells on system panel
- mounting of terminals on system panel / weather shield
- mounting of additional components on system panel / weather shield
- wiring of autobrush / cleaning valve / pressure sensor / flow detector
- obligatory for s::can micro::station

### technical specification

part number	X-sys-ass
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## configuration of s::can systems

- initialisation of all s::can probes
- initialisation of autobrush / cleaning valve / pressure sensor / flow detector
- Check of system configuration
- initialisation of all parameters
- test certificate

### technical specification

part number	X-sys-config
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## complete instrumental check ammo::lyser™

- planned, preventative check of technical performance of s::can ammo::lyser™ by s::can Service
- visual check
- verification of communication and of configuration
- verification of electrodes
- verification of accuracy
- stability test
- replacement of membranes (ammonium & potassium)
- incl. test certificate and quotation if required

### technical specification

part number | X-01-ammo

## complete instrumental check s::can terminal

- planned, preventative check of technical performance of con::cube or con::lyte by s::can Service
- visual check
- performance check of all analog and digital interfaces
- verification of configuration
- verification of accuracy analog interfaces
- UpDate configuration & OS (if required)
- incl. test certificate and quotation if required

### technical specification

part number | X-01-con

## complete instrumental check s::can spectrometer probe

- planned, preventative check of technical performance of s::can spectrometer probes by s::can Service
- visual check and verification of optical windows
- verification of communication and of configuration
- new reference measurement
- comparison to status of initial delivery (incl. light source & detektor)
- verification of linearity (nitrate standard solution) and accuracy
- stability test
- UpDate default calibration, configuration & OS (if required)
- incl. test certificate and quotation if required

### technical specification

part number | X-01-spectro



# Sales Partners



- STATUS :: Headquarters, Representative Office Affiliate
- STATUS :: Exclusive Sales Partner
- STATUS :: Authorized Sales Partner



# s::can Partners

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	<b>STATUS</b>	Affiliate		<b>WEB</b>	
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	<b>STATUS</b>	Headquarter		<b>WEB</b>	
				<b>STATUS</b>	Exclusive Sales Partner
<b>CA</b>	<b>CANADA</b>	Aquatic Life Ltd. 34 Alexander Avenue	<b>CH</b>	<b>SWITZERLAND</b>	unimon GmbH Vorbühlstrasse 21, CH-8962 Bergdietikon
	<b>ADDRESS</b>	ROE 1LO Pinawa, MB		<b>CONTACT</b>	Ms. Martina Hofer + 41 43 444 95 56
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	<b>PHONE</b>	+1 / 204 / 753 20 82		<b>FAX</b>	info@unimon.ch
	<b>FAX</b>	aquatic@aquaticlife.ca		<b>EMAIL</b>	www.unimon.ch
	<b>EMAIL</b>	www.aquaticlife.ca		<b>WEB</b>	
	<b>WEB</b>			<b>STATUS</b>	Service Partner
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<b>■</b>	<b>STATUS :: Headquarters, Representative Office Affiliate</b>			<b>CONTACT</b>	Mr. Jaime Wilson Velandia +57 / 1 / 349 04 75
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- STATUS :: Exclusive Sales Partner**
- STATUS :: Authorized Sales Partner**
- STATUS :: Service Partner**

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<b>GB</b>	<b>UNITED KINGDOM</b>	PMA, Process Measurement & Analysis Ltd. Brook Mills House, Carr Lane, Slaithwaite, Huddersfield, West Yorkshire HD7 5BQ Mr. Chris Bristow +44 / 1484 / 84 37 08 +44 / 1483 / 84 36 89 sales@processmeasurement.uk.com www.processmeasurement.uk.com Exclusive Sales Partner	<b>IR</b>	<b>IRAN</b>	Padyab Tadzhiz Company No 14, North Ararat St, Seoul, Vanak Sq, Tehran Mr. Erfan Donyaii +98 / 21 / 880 312 69 +98 / 21 / 880 451 76 info@padyab.com www.padyab.com Exclusive Sales Partner
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# Unit Conversion Tables

**Temperature**

C	F
-25	-13
-20	-4
-15	5
-10	14
-5	23
0	32
5	41
10	50
15	59
20	68
25	77
30	86
35	95
40	104
45	113
50	122
55	131
60	140
65	149
70	158
75	167
80	176
85	185
90	194
95	203
100	212

**Volume**

I	US gal
1	0.2642
2	0.5284
3	0.7926
4	1.057
5	1.321
6	1.585
7	1.849
8	2.114
9	2.378
10	2.642
20	5.284

**Pressure**

Bar	mBar	PSI
0	0	0
0.0025	2.5	0.03626
0.4	400	5.8016
1	1000	14.504
2		29.008
3		43.512
4		58.016
5		72.52
5.8		84.1232
6		87.024
6.8		98.6272
7		101.528
8		116.032
9		130.536
10		145.04

**Flow Rate**

m/s	foot/sec
0.01	0.03281
3	9.8425
ml/min	US gallon/min
100	0.0264
250	0.0660
500	0.1321

l/h	US gallon/hour
30	7.9251
110	29.0589

**Weight**

kg	g	lbs
1	1	0.002
10	10	0.022
100	100	0.220
150	150	0.331
173	173	0.381
200	200	0.441
350	350	0.772
300	300	0.661
350	350	0.772
400	400	0.882
450	450	0.992
500	500	1.10
540	540	1.19
544	544	1.20
550	550	1.21
600	600	1.32
650	650	1.43
700	700	1.54
750	750	1.65
800	800	1.76
850	850	1.87
900	900	1.98
950	950	2.09
1.0	1000	2.20
1.1	1100	2.43
1.2	1200	2.65
1.3	1300	2.87
1.4	1400	3.09
1.5	1500	3.31
1.6	1600	3.53
1.7	1700	3.75
1.8	1800	3.97
1.9	1900	4.19
2.0	2000	4.41
2.1	2100	4.63
2.2	2200	4.85
2.3	300	5.07
2.4	2400	5.29
2.5	2500	5.51
2.6	2600	5.73
2.7	2700	5.95
2.8	2800	6.17
2.9	2900	6.39
3.0	3000	6.61
3.5	3500	7.72
4.0	4000	8.82
4.5	4500	9.92
5.0	5000	11.0
5.5	5500	12.1
6.0	6000	13.2
6.5	6500	14.3
7.0	7000	15.4
7.5	7500	16.5
8.0	8000	17.6
8.5	8500	18.7
9.0	9000	19.8
10.0	10000	22.0
15.0	15000	33.1
20.0	20000	44.1
22.0	22000	48.5
25.0	25000	55.1
30.0	30000	66.1

## Length

mm	cm	m	inches	inches / 1/16	feet
0.5	0.05	0.0005	0.0196	0	
1	0.1	0.001	0.0393	1/16	
2	0.2	0.002	0.0787	1/16	
3	0.3	0.003	0.1181	2/16	
4	0.4	0.004	0.1574	3/16	
4.8	0.48	0.0048	0.1889	3/16	
5	0.5	0.005	0.1968	3/16	
5.3	0.53	0.0053	0.2086	3/16	
6	0.6	0.006	0.2362	4/16	
7	0.7	0.007	0.2755	4/16	
8	0.8	0.008	0.3149	5/16	
9	0.9	0.009	0.3543	6/16	
10	1	0.01	0.3937	6/16	
12	1.2	0.012	0.4724	8/16	
15	1.5	0.015	0.5905	9/16	
18	1.8	0.018	0.7086	11/16	
20	2	0.02	0.7874	13/16	
24	2.4	0.024	0.9448	15/16	
25	2.5	0.025	0.9842	1	
25.3	2.53	0.0253	0.9960	1	
27	2.7	0.027	1.0629	1 1/16	
28	2.8	0.028	1.1023	1 2/16	
30	3	0.03	1.1811	1 3/16	
35	3.5	0.035	1.3779	1 6/16	
35.5	3.55	0.0355	1.3976	1 6/16	
36.6	3.66	0.0366	1.4409	1 7/16	
38	3.8	0.038	1.4960	1 8/16	
40	4	0.04	1.5748	1 9/16	
44	4.4	0.044	1.7322	1 12/16	
45	4.5	0.045	1.7716	1 12/16	
46.5	4.65	0.0465	1.8307	1 13/16	
47	4.7	0.047	1.8503	1 14/16	
50	5	0.05	1.9685	1 15/16	
51	5.1	0.051	2.0078	2	
52	5.2	0.052	2.0472	2 1/16	
55	5.5	0.055	2.1653	2 3/16	
57	5.7	0.057	2.2440	2 4/16	
58	5.8	0.058	2.2834	2 5/16	
59	5.9	0.059	2.3228	2 5/16	
60	6	0.06	2.3622	2 6/16	
60.3	6.03	0.0603	2.3740	2 6/16	
63	6.3	0.063	2.4803	2 8/16	
64	6.4	0.064	2.5196	2 8/16	
65	6.5	0.065	2.5590	2 9/16	
66	6.6	0.066	2.5984	2 10/16	
70	7	0.07	2.7559	2 12/16	
71	7.1	0.071	2.7952	2 13/16	
74	7.4	0.074	2.9133	2 15/16	
75	7.5	0.075	2.9527	2 15/16	
80	8	0.08	3.1496	3 2/16	
84	8.4	0.084	3.3070	3 5/16	
85	8.5	0.085	3.3464	3 6/16	
86	8.6	0.086	3.3858	3 6/16	
90	9	0.09	3.5433	3 9/16	
95	9.5	0.095	3.7401	3 12/16	
100	10	0.1	3.9370	3 15/16	
103	10.3	0.103	4.0551	4 1/16	
106	10.6	0.106	4.1732	4 3/16	
107	10.7	0.107	4.2125	4 3/16	
110	11	0.11	4.3307	4 5/16	
115	11.5	0.115	4.5275	4 8/16	
117	11.7	0.117	4.6062	4 10/16	
116	11.6	0.116	4.5669	4 9/16	
120	12	0.12	4.7244	4 12/16	
121	12.1	0.121	4.7637	4 12/16	
130	13	0.13	5.1181	5 2/16	
132	13.2	0.132	5.1968	5 3/16	
137	13.7	0.137	5.3937	5 6/16	
139	13.9	0.139	5.4724	5 8/16	
140	14	0.14	5.5118	5 8/16	
145	14.5	0.145	5.7086	5 11/16	
150	15	0.15	5.9055	5 14/16	
152	15.2	0.152	5.9842	6	
155	15.5	0.155	6.1023	6 2/16	
160	16	0.16	6.2992	6 5/16	
162	16.2	0.162	6.3779	6 6/16	
163	16.3	0.163	6.4173	6 7/16	
165	16.5	0.165	6.4960	6 8/16	

mm	cm	m	inches	inches / 1/16	feet
170	17	0.17	6.6929	6 11/16	
174	17.4	0.174	6.8503	6 14/16	
175	17.5	0.175	6.8897	6 14/16	
177	17.7	0.177	6.9685	6 15/16	
180	18	0.18	7.0866	7 1/16	
182	18.2	0.182	7.1653	7 3/16	
185	18.5	0.185	7.2834	7 5/16	
189	18.9	0.189	7.4409	7 7/16	
190	19	0.19	7.4803	7 8/16	
195	19.5	0.195	7.6771	7 11/16	
198	19.8	0.198	7.7952	7 13/16	
200	20	0.2	7.8740	7 14/16	
209	20.9	0.209	8.2283	8 4/16	
210	21	0.21	8.2677	8 4/16	
213	21.3	0.213	8.3858	8 6/16	
217	21.7	0.217	8.5433	8 9/16	
219	21.9	0.219	8.6220	8 10/16	
220	22	0.22	8.6614	8 11/16	
230	23	0.23	9.0551	9 1/16	
237	23.7	0.237	9.3307	9 5/16	
239	23.9	0.239	9.4094	9 7/16	
240	24	0.24	9.4488	9 7/16	
245	24.5	0.245	9.6456	9 10/16	
246	24.6	0.246	9.6850	9 11/16	
250	25	0.25	9.8425	9 13/16	
260	26	0.26	10.2362	10 4/16	
265	26.5	0.265	10.4330	10 7/16	
269	26.9	0.269	10.5905	10 9/16	
270	27	0.27	10.6299	10 10/16	
274	27.4	0.274	10.7874	10 13/16	
275	27.5	0.275	10.8267	10 13/16	
280	28	0.28	11.0236	11	
285	28.5	0.285	11.2204	11 4/16	
290	29	0.29	11.4173	11 7/16	
292	29.2	0.292	11.4960	11 8/16	
293	29.3	0.293	11.5354	11 9/16	
299	29.9	0.299	11.7716	11 12/16	
300	30	0.3	11.8110	11 13/16	
327	32.7	0.327	12.8740	12 14/16	1.07
333	33.3	0.333	13.1102	13 2/16	1.09
350	35	0.35	13.7795	13 12/16	1.15
363	36.3	0.363	14.2913	14 5/16	1.19
400	40	0.4	15.7480	15 12/16	1.31
450	45	0.45	17.7165	17 11/16	1.48
500	50	0.5	19.6850	19 11/16	1.64
510	51	0.51	20.0787	20 1/16	1.67
553	55.3	0.553	21.7716	21 12/16	1.81
565	56.5	0.565	22.2440	22 4/16	1.85
578	57.8	0.578	22.7559	22 12/16	1.90
600	60	0.6	23.6220	23 10/16	1.97
647	64.7	0.647	25.4724	25 8/16	2.12
700	70	0.7	27.5590	27 9/16	2.30
710	71	0.71	27.9527	27 15/16	2.33
750	75	0.75	29.5275	29 8/16	2.46
800	80	0.8	31.4960	31 8/16	2.62
828	82.8	0.828	32.5984	32 10/16	2.72
900	90	0.9	35.4330	35 7/16	2.95
988	98.8	0.988	38.8976	38 14/16	3.24
1000	100	1	39.3700	39 6/16	3.28
102	102	1.02	40.1574	40 3/16	3.35
		1.5	59.0551	59 1/16	4.92
		2	78.7401	78 12/16	6.56
		2.4	94.4881	94 8/16	7.87
		2.5	98.4251	98 7/16	8.20
		3	118.1102	118 2/16	9.84
		4	157.4803	157 8/16	13.12
		5	196.8503	196 14/16	16.40
		6	236.2204	236 4/16	19.69
		7	275.5905	275 9/16	22.97
		7.5	295.2755	295 4/16	24.61
		8	314.9606	314 15/16	26.25
		9	354.3307	354 5/16	29.53
		10	393.7007	393 11/16	32.81
		15	590.5511	590 9/16	49.21
		20	787.4015	787 6/16	65.62
		25	984.2519	984 4/16	82.02
		30	1181.1023	1181 2/16	98.43



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All units in inches unless otherwise stated.  
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