

in-tek IR Sensors and Systems

*On-line, real-time process measurement for beverage,
brewing, food and industrial alcohol production*

*°Brix / mIllIBrix / % TA
Alcohol by Weight
Carbon Dioxide*



*Multi-parameter sensors
Solid State - low maintenance
Choice of after-sales support packages
Environmental and contractual peace of mind
Choice of signal output type*



***B+S Process
Instruments***



B+S Process Instruments

In today's competitive world, the primary role of any manufacturing facility is to ensure that products are delivered on a timely basis, within cost and in accordance to the design specification. Failure to deliver on any of these points can not only result in a loss of profit but can in a worst case situation, cause a lucrative supply contract to be withdrawn.

For over ninety-five years, Bellingham + Stanley has been supplying laboratory refractometers to leading manufacturers of food, beverage and chemical products and in 1999, B+S Process Instruments was established in recognition of the need to automate process lines.

in-tek IR Sensors

The latest in-tek IR Series of on-line infrared sensors utilising ATR technology, includes single parameter versions for the measurement of dissolved sugars ($^{\circ}$ Brix), Carbon Dioxide (CO_2), Alcohol (ABW) or Organic Acids (%TA) for individual location within a process line, whilst in-tek multi-parameter Systems provide total quality and yield control from a single sensor unit specifically suited to the soft drinks industry for real time end-point evaluation. Unlike traditional spectrometers that use transmitted light, Attenuated Total Reflection (ATR) requires source penetration of just a few microns to obtain accurate absorption results, allowing consolidation of all optical components in to a single stainless steel sanitary 3-A housing for direct mounting to the product line using standard Varinline[®] valve body assemblies. On-line mounting eliminates the need for high maintenance mechanical pumps and difficult to clean bypass loops often associated with this type of measurement. Pre-determined narrow band-pass interference filters are critical to differentiate the sensor type within the series by matching the energy source to the absorption model of the chemical or product under test. The Sensor Control Module provides connection to plant controllers or computers using Ethernet connection, with other industrial interface types such as analogue 4-20mA, EtherNet and Profibus available as optional extras.



in-tek Brix

Typically $^{\circ}$ Brix is the term used throughout the food and beverage industry to express the amount of dissolved sugars in a product and it is often the critical measurement to ensure both product quality and yield expectancy. Operating at temperatures up to 120°C , the in-tek IR Brix offers real-time control in a wide range of applications from syrup blending in a confectionery plant to end-point quality control of juice lines. Additionally, unlike other measurement types, the in-tek Brix can be configured to measure in milliBrix allowing accurate measurement of low Brix dilutions such as hybrid diet beverages made up of sugar and artificial sweeteners.



in-tek TA

Pure diet beverages such as cola or lemonade contain no sugar resulting in a finished product of very low total solids. Common instruments such as refractometers or density meters that rely on total solid content as the measurement parameter are limited by their sensitivity and therefore struggle to control diet products effectively, leaving manufacturers to rely on wet-chemistry laboratory methods such as titration. The in-tek TA directly quantifies the organic acid within the beverage providing a specific control measurement that directly compares to the laboratory method. The in-tek TA may also be used to measure acid concentrations of orange, lemon and other acid containing juices.



in-tek CO2

Carbon dioxide is a common additive to beverages as a taste enhancer. Traditional Reeves Systems provide only an overall gas content and are both expensive and cumbersome to install on-line. Whilst systems incorporating semi-permeable membranes are also costly to maintain, once installed, the in-tek CO_2 uniquely provides real carbon dioxide content without being influenced by other gases such as nitrogen, offering further control to brewers. The in-tek CO_2 is also suited for use with sparkling wine and gaseous spring water.

in-tek Alcohol

As we look towards an environmentally sustainable future, new types and blends of fuel are emerging as safe, viable alternatives to fossil fuels. In some parts of the World, the use of ethanol in vehicle engines is commonplace and this has led to new and efficient distillation plants being constructed. The in-tek Alcohol is suited to such processes as a monitoring tool for quality assurance purposes as well as to provide key signals to Plant Controllers. Considering the special and potentially hazardous environments in which the in-tek Alcohol is likely to be sited, the instrument is available in an EXP rated format and may also be offered with an extended prism mounting allowing for remote location deep inside distillation vessels or tanks.

in-tek IR Systems

The in-tek Drink is the first solid-state-of-the-art beverage system to combine three measurement parameters in to a single on-line sensor, providing the soda manufacturer with accurate real-time results without the need for a high maintenance, pump driven and difficult to clean bypass stream. The combination of °Brix, CO₂ and REAL Titratable Acid measurement facilitates single point analysis of sugar AND artificial sweetener based product either as part of a filling machine product interface control loop or for end-point quality assurance verification when using optional PC software.

For manufacturers of common alcoholic beverages such as beer, wine, cider or even modern hybrid drinks that combine alcohol with high residual sugar substrates, the in-tek Brew offers similar configuration and performance advantages as the soda version but with Alcohol, °Plato (residual sugar) and CO₂ being the measurement emphasis, making it an ideal “all-in-one, end-point quality assurance tool.”



For further information about the in-tek Drink, in-tek Brew and other multi-parameter systems, please contact B+S Process Instruments or a recognised distributor.

Special Applications

Measurements discussed in this brochure specifically relate to the food and beverage industry. However, alternative uses of on-line infrared spectroscopy may also be possible, especially where it already plays a role in the laboratory. Additionally, the in-tek IR Series may be configured to work in EXP-rated environments, be fitted with cooling coils for high temperature use or even have the measurement prism flange extended for use in deeply submerged installations. Please contact B+S Process Instruments to discuss any alternative applications or requirements.

Installation and After Sales Service

Close co-operation between the customer and supplier is the key to ensuring trouble free installation and use. Right from the initial interest stage, B+S Process Instruments works closely with the client to identify the correct instrumentation for the job and provides ongoing installation and commissioning advice. This side-by-side approach continues throughout working life of the equipment via a choice of support packages.

1. Install the sensor directly on-line using industry standard Varinline® fittings. No need for high maintenance by-pass loops or pumps.
2. Make the electrical connections to and from the Sensor Control Module
3. Start to collect data using the provided PC software ready for product profiling if required.

Although it is possible to 'self commission' in-tek IR Sensors and Systems, B+S Process Instruments offer a full commissioning service, which is highly recommended for the first installation at any site. Being solid-state devices installed directly to the line, in-tek IR Sensors require little or no routine maintenance. However, in order to provide total peace of mind, B+S Process Instruments offer a number of after sales support packages either directly or through its network of authorised distributors. Service packages include extended warranty up to 5-years, 48 & 72-hour component replacement, on-site preventative maintenance, on-site performance verification and a 24-hour diagnostic and software support facility by way of GoToMeeting. All service packages are subject to additional charges and may not be available in all geographical locations.



- *Single parameter sensors*
- *Multi-parameter sensors*
- *Direct on-line measurement*
- *Real time results*
- *No moving parts*
- *No/Low maintenance*
- *Direct CIP/SIP*
- *3-A sanitary (IP68)*
- *NEMA/EXP housings*
- *Output interface options*
- *PC Software options*
- *Remote display options*
- *24 month warranty*
- *Support package options*



Sapphire prism shown in product flow

Varinline is a registered trademark of Tuchenhagen GmbH. B+S reserve the right to refuse to supply product or services to certain geographical locations or for applications that may not be deemed suitable for such measurement.

in-tek IR Sensors and Systems Specifications

Parameter	°Brix	%TA	%CO ₂	%ABW
Range				
1	0-20 °Brix	0-5 w/w	0-6 vol/vol	0-20 w/w eth/alc.
2	0-100 °Brix/Plato	0-100 w/w	0 - 12000 ppm	0-100 w/w eth/alc.
3	0-2000 milliBrix	USER SCALE	0 - 12000 mg/l	Mg/l or g/g
Resolution				
1	0.01 °Brix/Plato	0.01 w/w	0.01 vol/vol	0.01 w/w
2	0.1 milliBrix		1 ppm & 1 mg/l	
Accuracy				
1	±0.01 °Brix/Plato	±0.005 w/w	±0.02 vol/vol	±0.02 w/w eth/alc.
2	±1 milliBrix		±39.2 ppm & mg/l	
Repeatability				
1	0.008 (8-hr) °Brix/Plato	0.008 (8-hr)	0.008 (8-hr)	0.01 (8-hr)
2	8 (8-hr) milliBrix		40 vol & mg/l	
Reading Time (seconds)	0.5 to 30 (selectable)			

Temperature

Operating Temperature	-5 to 85°C (extended version to 120 °C - optional)
Ambient Temperature Range	-5 to 85°C
Cleaning Maximum Temperature	85 °C (CIP) / 120°C (SIP - optional)

Physical

Material	Stainless Steel 316L
Prism Material	Artificial Sapphire
Light Source	Infrared solid-state source (life 100,000+ hours MTTF)
Gasket Materials	EPDM (line/sensor) / PEEK (prism)
Ingress Protection / Hygiene	IP68 (NEMA 4) / Sanitary 3-A
Line Interface	Varinline® 1.5" to 4" (DN65 flange diameter)
Pressure	10 BAR Max.
Interface Options	Ethernet – standard (Analogue 4-20mA, EtherNet, Profibus – optional)



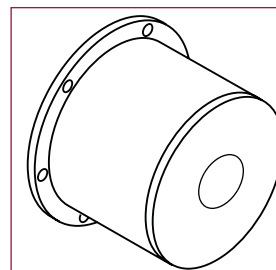
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Weights and Dimensions:

Sensor:

Dimensions: 50 (w) x 60 (d) mm
70mm (DN 65 flange dia.)
Nett Weight: 0.7 kg

Sensor Control Unit:

Dimensions: 223 (w) x 290 (h) x 140 (d) mm
Nett Weight: 2 kg

Gross Weight (Shipping) Sensor and Control Unit:

Dims: 300mm x 430mm x 520mm
Gross Weight: 9Kg

Bellingham+Stanley pursue a policy of continuous product development and improvement and, as such, information given on this Data Sheet may be updated or withdrawn without notice.



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