

LiquiSonic

Biotech applications



**Protein and agent
crystallization**

**Fermentor and
filter control**

**Alcohol, solvent,
nutrient, bio mass
concentrations**

**Phase interface
detection**



LiquiSonic Method

LiquiSonic is a high sophisticated inline/insitu analyzer for liquids. Using high advanced absolute sonic velocity and temperature measurement technology combined in a unique sensor design the system allows control and monitoring of concentrations and general process trends at different points of biotechnological as well as pharmaceutical processes. The use of **LiquiSonic** supplies the operator with real-time knowledge needed to optimise his process.

Another application is the patented insitu measurement of supersaturation and crystall concentration in crystallization processes.

A **LiquiSonic** system consists of one or more intelligent sensors and a controller which are connected with each other by a digital line.

Modern manufacturing technologies not only ensures precise measuring results, they also enables convenient operation of the device. This includes the simultaneous presentation of mass-concentration or crystall content and product temperature as well as product or recipe identifiers.

The data memory and event tracking capabilities according FDA 21 CFR Part 11 ensure together with user-defined password codes for various levels of system access security a maximum degree of process and application safety.

A multi channel real time chart and the non-volatile RAM card for configuration and process data allow easy system adaptation for different applications in lab- pilot- or production process scale.



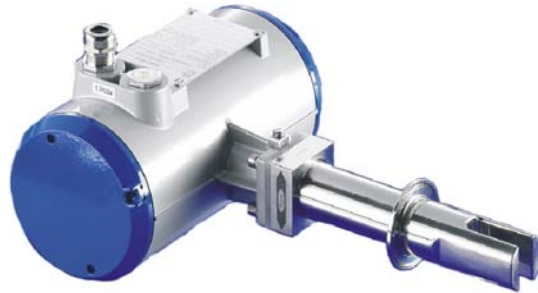
Multi purpose sensor with Tri-Clamp fitting



Controller 30

The **LiquiSonic** sensors are available in different designs and process fittings to be used in tubes and vessels. For installations in certified areas a explosion proved sensor design is available too. All sensors can be equipped with a electro polished finish and have an ultra - sanitary design without gaskets to handle the toughest process environments and typical CIP and SIP procedures.

All systems include inline validation capability to guarantee precise, traceable and reproducible results under every circumstance.



Immersion type sensor with Ex-approval



Tri-Clamp sensor with line adaptor



Immersion type sensor for reactors and vessels



Applications

Crystallization

Crystallization has become one of the most important operations in thermal process technology. The technology is used to generate defined solid phases (e.g. sweeteners, agents) or for purification purposes (e.g. proteins, citric acid, glucose, agents). Some of the targets, like separation, cleaning or concentration enrich make this technology one of the key operations in biotech and pharmaceutical industry.

Using a patented method, the **LiquiSonic** system calculates the degree of supersaturation from the sonic velocity to determine the optimal point to add the seeding substances. Furthermore, the system determines and calculates the following parameters:

- Difference between the saturation and actual temperature
- Supersaturating degree
- Crystal concentration
- Cooling rate
- Concentration of the mother solution

Fermentation

LiquiSonic allows insitu real time process monitoring in fermentation set-ups inclusive fermentor vessel. Real time monitoring eliminates the need for sampling, is eliminating volume loss and dilution errors in addition to reduce the risk of contamination.

Furthermore it allows automating of manual operations and helps to achieve a new level of productivity and process control:

- Biomass and cell density concentration
- Feed and recipe concentration control (solvents, alcohols, proteins and nutrients)
- Detection of abnormal process behaviour (wrong temperature control, missing feed, growth deviations)
- Precise determination of process end point, feed and harvest timing and induction phases
- Control of recovery streams
- Phase interface and gas bubble detection in multi-purpose paths

Filtration

With **LiquiSonic** inline monitoring capabilities the productivity, safety and performance of filtration systems like ultra filtration or reverse osmosis will be guaranteed.

The system will detect deviations in the retentate as well permeate path, filter breakthrough or the final purity of the permeate.

- Retentate and retentate recirculation concentration
- Filter breakthrough and malfunction
- Eliminating bulk collection for laboratory analysis
- Permeate actual and final concentration

Multi component analysis

Continuous information about the concentration of each main component is required for optimal control of biotech processes to ensure a high level of quality, efficiency and safety.

The **LiquiSonic** system combines the signals of several physical properties in a multi component blend. This method works without expensive sample devices and is maintenance free and very durable.

The signals of the different sensors will be processed in the **LiquiSonic** Controller 40 within a multidimensional model calculating the actual concentration of each component.

The **LiquiSonic** Controller 40 combines the sonic velocity with the following sensor technologies:

- Density
- Conductivity
- Refractive index

Miscellaneous

Inline concentration measurement with **LiquiSonic** offers a couple of further applications in your lab, batch or industrial process set-up to increase productivity and product quality, reduce operating costs and better process safety:

- Phase interface detection
- Control of solvent recovery
- Endpoint detector for HPLC



SensoTech

SensoTech has been primarily focused to the development, production, marketing and support of high performance in line analyzers for concentration, density or the monitoring of complex chemical reactions in liquid systems since 1989. During this time, we have an overall installation base of over 2000 devices worldwide. Our unique products offer optimized and cost saving solutions for virtually every kind of application.

Providing solid solutions to complex problems has been both the challenge and the cornerstone of our business. With our worldwide installations and an extensive range of innovative products, we offer affordable, efficient solutions that meet the exacting needs of our clients in the chemical industry, as well as in food and beverage production, the semiconductor industry, pharmaceutical and biotech plants, or in the iron and steel industry.

With **SensoTech**, you can be assured that you're on your way to controlling quality, reducing development costs, optimizing benchmark processes, and meeting standards, all in the most reliable and cost-effective manner.

What makes **SensoTech** valuable for you

- Proven Experience and Application Knowledge
- Superior Technology and Performance
- Extremely Tough, Reliable and Low Maintenance
- Unbeatable Warranties, Service & Support



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