LiquiSonic® Plato

Inline analytical technology for the beverage industry:

· lauter tun
· wort boiler
· wort cooler
· filtration
· blending
· filler
· °Plato, °Brix
· mixed drinks
· soft drinks

Increasing c

With high

Robust, ac

LiquiSonic®

quality, **saving resources: LiquiSonic®.**

-value, **innovative sensor technology.**

curate, **user-friendly.**

LiquiSonic® is an inline analytical system for determining the concentration in liquids directly in the running process and without delay. The device is based on high-precision measurement of the absolute sonic velocity and process temperature and thus allows the calculation and monitoring of concentrations.

Benefits for the user include:
· optimal plant control through online information about the state of the process
· maximization of efficiency of processes
· increasing of the product quality
· reduction of costs for laboratory measurements
· immediate detection of process failures
· saving of energy and material costs
· immediate detection of irruptions in the process water or process liquid
· reproducible measuring results

Using the latest digital signal processing technology ensures a highly accurate and fail-safe measurement of the absolute sonic velocity and the concentration.

In addition, integrated temperature sensors, a sophisticated sensor design and the know-how resulting from numerous series of measurements and many applications guarantee a high reliability of the system with a long lifetime.

Advantages of the measuring method are:
· absolute sonic velocity as a well-defined and retraceable physical value
· independent of color, conductivity and transparency of the process liquid
· installation directly into pipelines as well as tanks or vessels
· aseptic and bypass-free installation
· robust and completely metallic sensor design without gaskets or moving parts
· maintenance-free
· use at temperatures up to 200 °C
· high, drift-free measuring accuracy even with high concentration of gas bubbles
· connection of up to four sensors per controller
· forwarding of measuring results through fieldbus (Profibus DP, Modbus), analogue outputs, serial interface or Ethernet

Inline process analysis

Contents

1 Beer and beverage production

The LiquiSonic® measuring technology can be used in various stages of the brewing process and the beverage production for monitoring the product quality, minimizing the consumption of raw materials plus energy and increasing the product yield.

Typical processes and applications, in which the LiquiSonic® analyzers are applied, are visualized in the figure below.
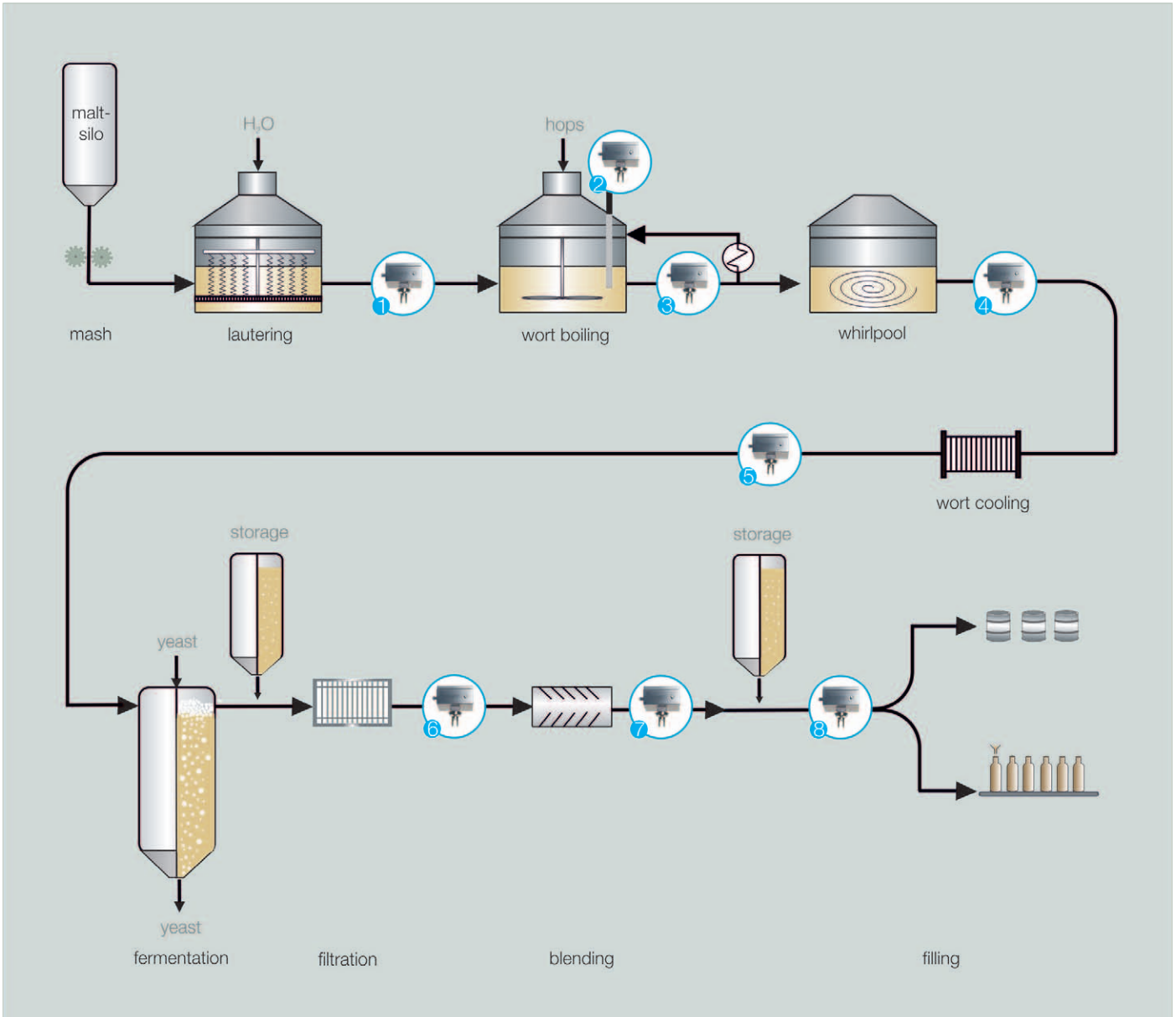
Measuring point	Installation	Measuring task
1	pipeline	monitoring of the lautering wort concentration and the initial extract in the wort boiler, detection of the sparge water point
2, 3	wort boiler	control of evaporation, monitoring of the wort
4	pipeline	monitoring of the wort concentration
5	pipeline	monitoring of the cold wort concentration and temperature
6	pipeline	separation of forerunnings and last runnings from the beer, exact dosing of forerunnings and last runnings in the unfiltered beer
7	pipeline	monitoring the blending process (such as High-Gravity-Brewing)
8	pipeline	wort monitoring during bottling, differentiation of different beer types

1.1 Lauter tun / mash filter

In the outlet of the lauter tun or the mash filter LiquiSonic® Plato is used in order to:

· control the lautering / mash filtering process,
· exactly determine the sparge water point,
· determine the medium extract content (initial extract in the wort boiler) by using of EXtrACT-Totalizer (option).

Your advantage:

· accurate determination of the initial extract concentration in the wort boiler
· reduction of the water consumption
· optimal use of lauter tun and efficient mash production
· reproducible wort production

1.2 Wort boiler

In the wort boiler LiquiSonic® Plato is used in order to:

· control the evaporation during the complete boiling process,
· determine precisely the final wort concentration to minimize the steam utilization.

The LiquiSonic® Plato system is easy to install and completely maintenance-free as it is a continuously measuring inline system not requiring any bypass installation compared to other measuring systems.

For boilers with internal heat exchanger a sensor is provided, which can be installed in the boiler directly. This sensor is of a special design minimizing the impact of deposits. Moreover, the sensor in the internal boiler can be equipped with a cleaning head.

For boilers with external heat exchanger the sensor is installed directly within the circulation pipe between the wort supply pump and the heat exchanger.

Your advantage:

· no maintenance-intensive and expensive bypass solutions as needed for density meters
· savings of rinse and cleaning cycles
· savings in energy consumption through targeted process interruption
· reproducible control of the boiling process

1.3 Wort cooler

In the outlet of the wort cooler LiquiSonic® Plato is used in order to:

· detect the wort, pre- and post- running beer,
· check the original gravity content before pitching yeast.

Your advantage:

· hygienic and bypass-free installation of LiquiSonic® at the outlet of the cooler
· additional monitoring of cooling temperature due to two integrated Pt1000 temperature sensors

1.4   Filtration

In the filtration unit LiquiSonic® Plato with two sensors is used in the unfiltrated and in the filtrated beer for:
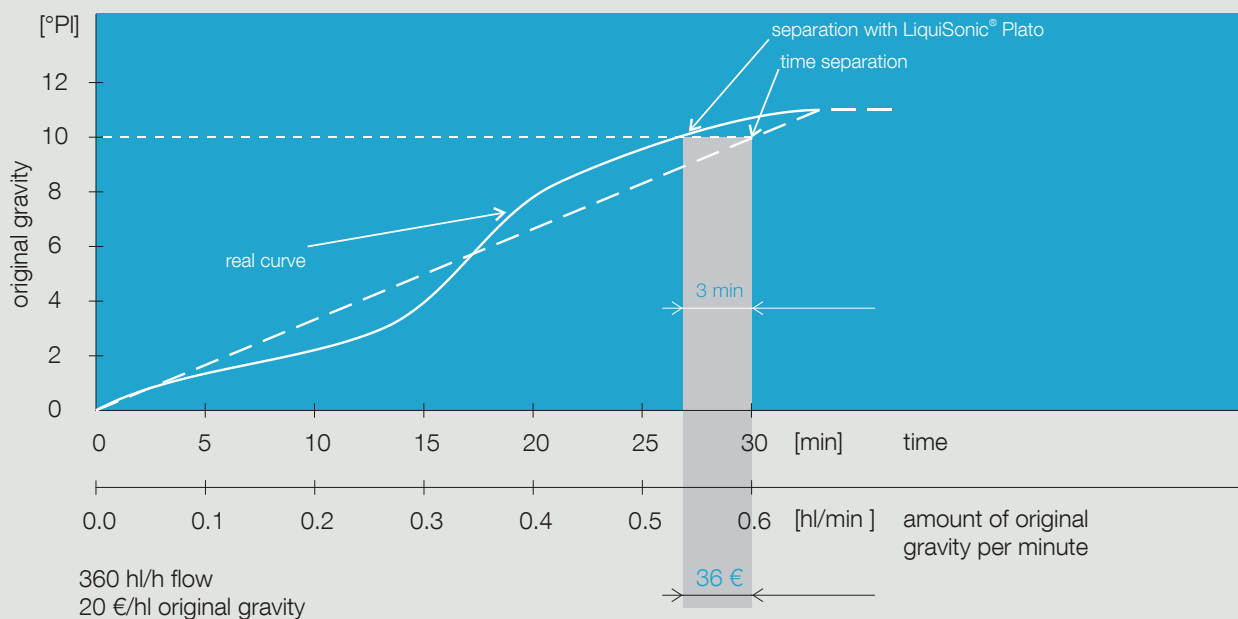
· automatic separation of forerunning and last running by setting defined switchpoints,
· control of the blending of the forerunning and last runnings and into the unfiltrate.

Your advantage:

The following diagram shows a possible real time chart. The time controlled filtration should be long enough to achieve the required minimum gravity. In this case a time frame 30 minutes was installed. A direct measurement of gravity shows, that the required gravity is already achieved 3 minutes earlier. Through an 80-pipe with 360 hectoliter of beer per hour flows approximately 0,6 hectoliter of gravity after 30 minutes. Supposed that a hectoliter of gravitiy costs 20 €, 3 minutes would mean a loss of 36 € per filtration. At 200 filtration cycles this corresponds to 7,200 € per year.
Thus it appears which advantages arising out of controlling by gravity in opposite to timing.

The advantage compared to the conductivity measurement is also obvious. The conductivity measurement determines the „conductivity", i.e. the content of ions in beer or brewing water. But the only criterion for the beer/water/beer interface detection can just be the original gravity, which can only be determined with high accuracy by LiquiSonic® Plato.

Cost saving by using LiquiSonic® Plato at beer filtration

- [°Pl] / original gravity axis: 0, 2, 4, 6, 8, 10, 12
- time axis [min]: 0, 5, 10, 15, 20, 25, 30
- amount of original gravity per minute [hl/min]: 0.0, 0.1, 0.2, 0.3, 0.4, 0.5, 0.6
- separation with LiquiSonic® Plato
- time separation
- real curve
- 3 min
- 36 €
- 360 hl/h flow
- 20 €/hl original gravity

1.5   Blending and filling

The measured original gravity - compensated through a fast and accurate temperature measurement - is directly applied as control signal to the blending control loop.

LiquiSonic® Plato guarantees:

· continuous monitoring of the original gravity during filling,
· documentation and logging of original gravity (ISO9000 and HACCP),
· separation of different brands and CIP liquids,
· continuous monitoring of blending,
· control of original gravity at High-Gravity Brewing.

LiquiSonic® Plato has an integrated process flow detector (chapter 2.1.11), which ensures highly precise measuring conditions even at low flows or during breaks of the beer flow. Reduced investment costs result from the possibility to use only one controller with four sensors for larger filling lines.

Your advantage:

· display of original wort concentration and temperature of beer
· documentation of concentration during the filling in a data memory
· warning at faulty filling (mismatch of brands etc.)
· control of the filler, if the actual wort concentration leaves a specified rage
· separation of forerunning and last running beer
· integrated process flow detector and "empty pipe" signal
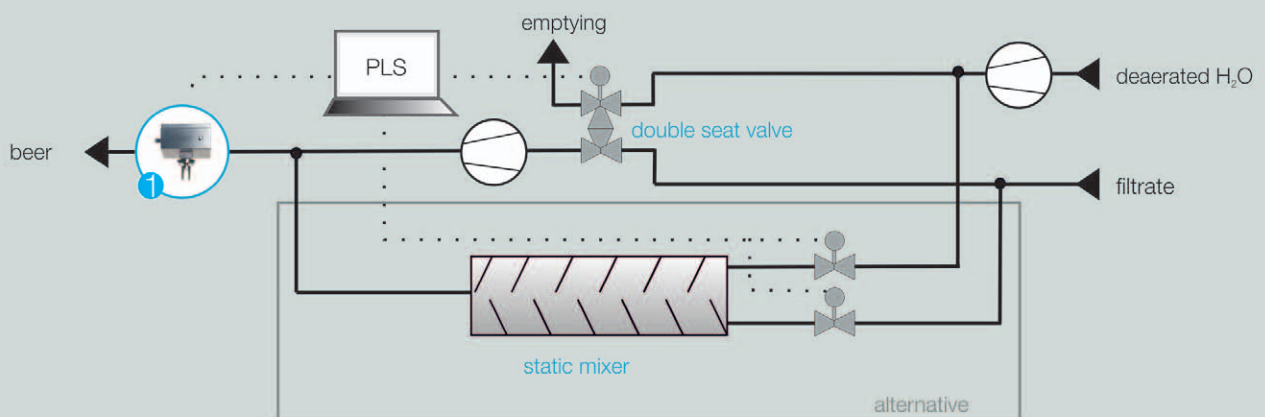
Measuring point	Installation	Measuring task
1	pipeline	monitoring the blending process

1.6   Mixed drinks

1.6.1   Blending

In the blending process of mixed drinks, LiquiSonic® is applied in the concentrate and after the mixer in order to:

· measure the initial concentration (premix),

· accurately adjust the target concentration (post-mix) during the dilution of the concentrate with water.

Your advantage:

· quality control of the concentrate

· signaling of drifts in the formulation

· targeted control of the respective product stream through the process control system
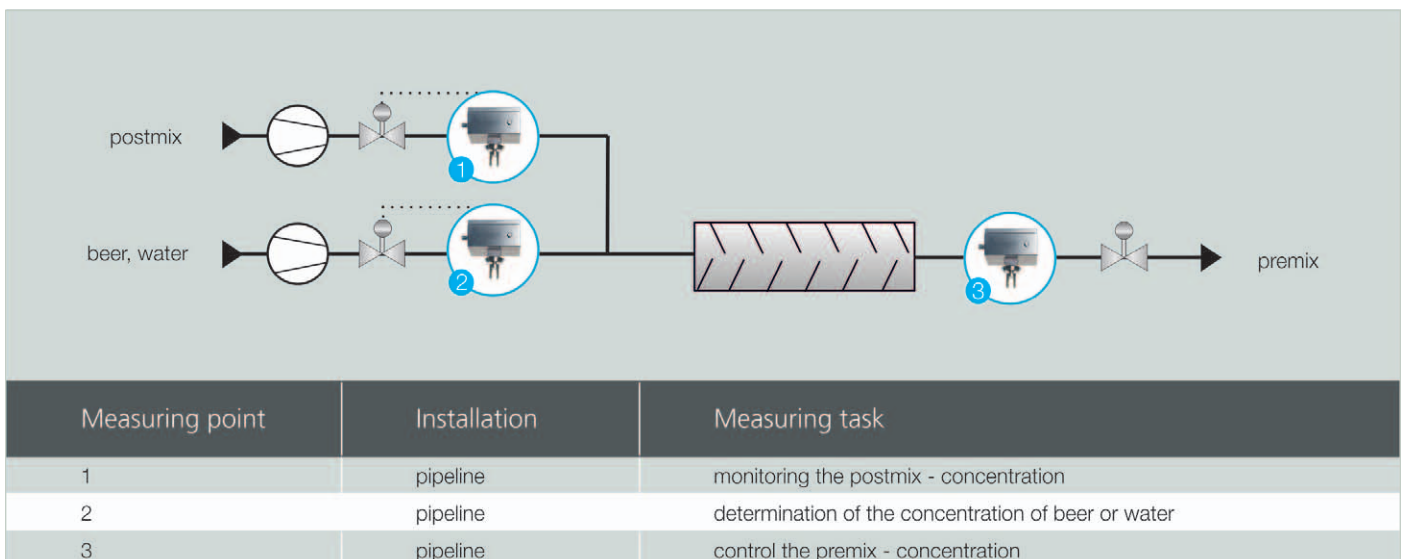
1.6.2   Filler

At the filling of mixed drinks, LiquiSonic® is applied in order to:

· constantly monitor the Brix content of the commodities during the filling

· accurately identify various types of products, pre- and post running processes as well as CIP-liquids,

· fully document the Brix content (ISO9000 und HACCP).

Your advantage:

· display of the Brix concentration and product temperature

· storage of the measured concentrations during the filling

· warning in the event of faulty fillings

· precise control of the filler concentration

· separation of pre- and post running processes

· maximum process safety in the context of a HACCP concept

· additional integrated functions, such as flow detection and „empty pipe line" detection

| Measuring point	Installation	Measuring task
1	pipeline	monitoring the postmix - concentration
2	pipeline	determination of the concentration of beer or water
3	pipeline	control the premix - concentration

2 LiquiSonic® Plato

The LiquiSonic® Plato system is an inline analytical system based on most advanced technologies. By the precise and temperature-compensated measurement of the absolute sonic velocity the concentration of different liquids, e.g. original gravity, extract or alcohol, can be detected.

Depending on the specific application, LiquiSonic® Plato consists of one or more intelligent sensors and one controller linked by a bus cable with each other. Investment costs are comparatively low, in particular, for a maximum of four sensors combined with only one controller suited for almost any distance between the individual measuring points.
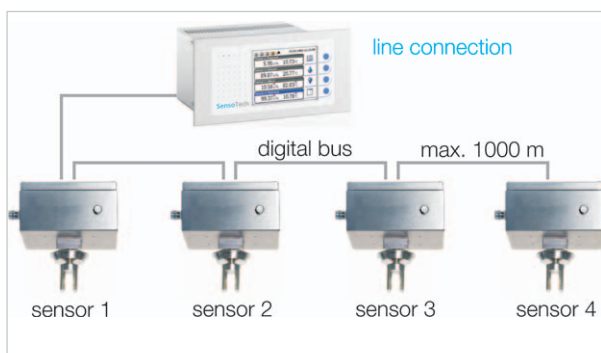
Controller with connection of maximum four sensors

Advanced production and calibration processes do not only enable highly accurate measurement results but also the extremely comfortable operability of the system.

Using the latest digital signal processing technology ensures a highly accurate and fail-safe measurement of the absolute sonic velocity and concentration. In addition, integrated temperature sensors, a sophisticated sensor design and the know-how resulting from numerous series of measurements and many applications guarantee a high reliability of the system with a long lifetime and minimum maintenance efforts.

2.1 Controller

The controller links the ultrasonic sensors. It provides the supply voltage and controls communication. The TFT screen serves to display the measurement values plus status information and to parameterize the system. Moreover, the controller is provided with analog and digital inputs and outputs as well as fieldbus interfaces to facilitate data exchange with process control systems or PC's.

Signal processing on the basis of the most advanced 32-bit microprocessor technology ensures high reliability of the system in addition to an intuitively operable Windows-oriented user interface.

Simple and intuitive controller operation

Backside of the controller with electrical connections

LiquiSonic® Plato 30 is the standard device with all functions. Up to four sensors can be connected with one controller. Several functions, like trend presentation or the data memory make this device to an efficient analyzer.

LiquiSonic® Plato 20 is the low budget version with only basic functions.

LiquiSonic® Plato 40 is the high-performance version for calculating the concentrations of extract and alcohol.

2.1.1 Presentation on the display

2.1.1.1 LiquiSonic® Plato 20 and 30

The controller has a large, illuminated color display.
Original gravity, beer temperature, brand names
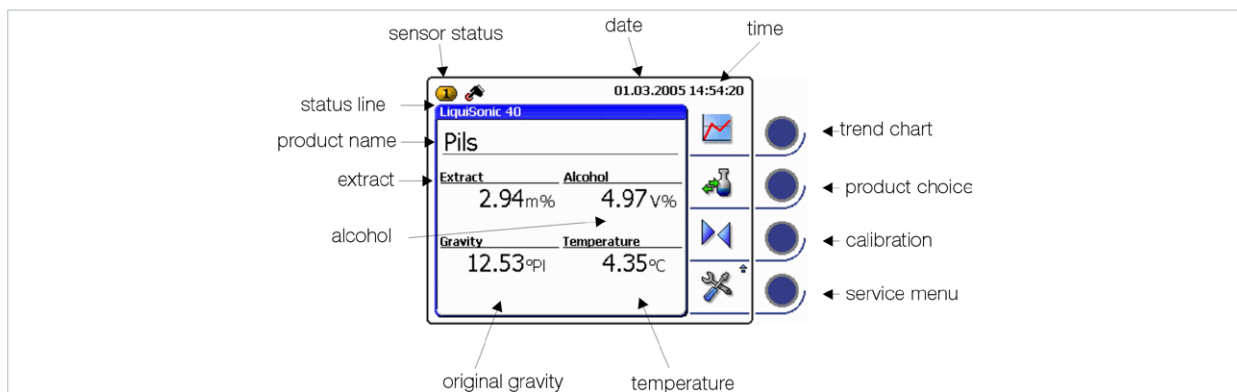and device status are steadily presented.
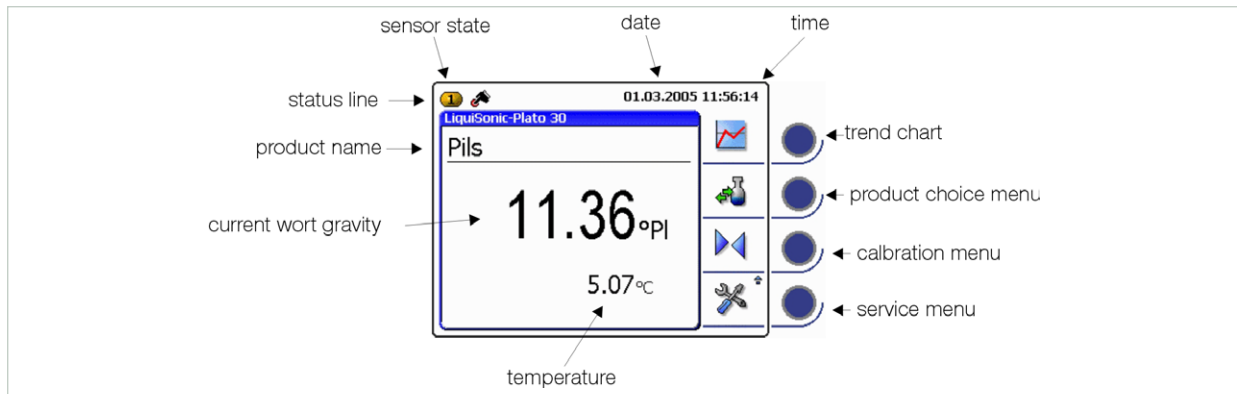
Controller display of LiquiSonic® Plato 30

2.1.1.2 LiquiSonic® Plato 40

The LiquiSonic® Plato 40 performs by using an
ultrasonic sensor and a process refractometer a
complete analysis of beer.
The display shows the following values:

· extract content [w%]

· alcohol content [Vol%]

· original gravity [°Pl]

· temperature [°C]

Controller display of LiquiSonic® Plato 40

The ultrasonic sensor and the refractometer are directly mounted in the main pipe. LiquiSonic® Plato 40 is a beer analyzer without bypass connection of the sensors. This has a lot of advantages during the CIP-process compared with a bypass-solution.
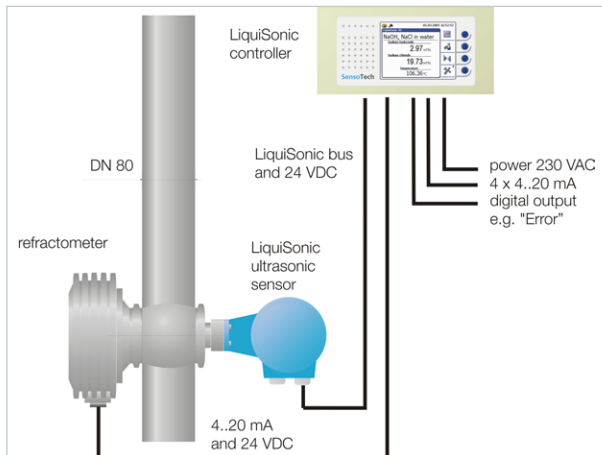

Schematic construction of a LiquiSonic® measuring point

2.1.2   Products and data set

The LiquiSonic® Plato is being delivered in a pre-calibrated condition. If the device is switched on, it displays the concentration at once. Nevertheless several parameters can be adapted like the product identifier or the contrast of the display, for instance.
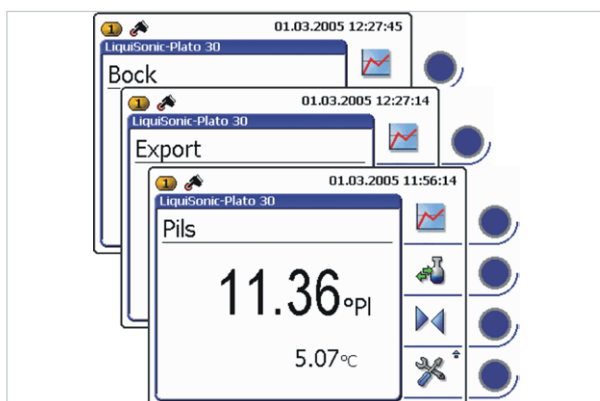

Controller display of different product types

Several product calibration sets can be choosen from a list box.
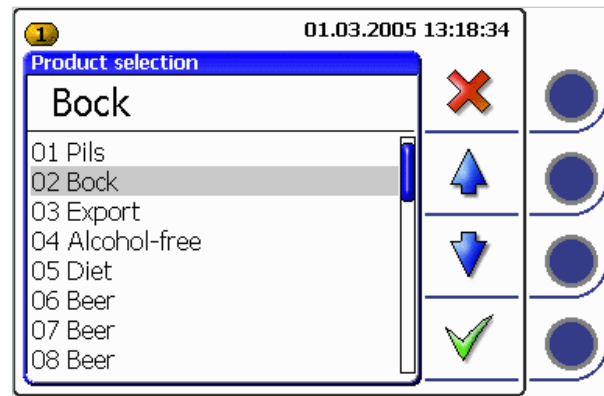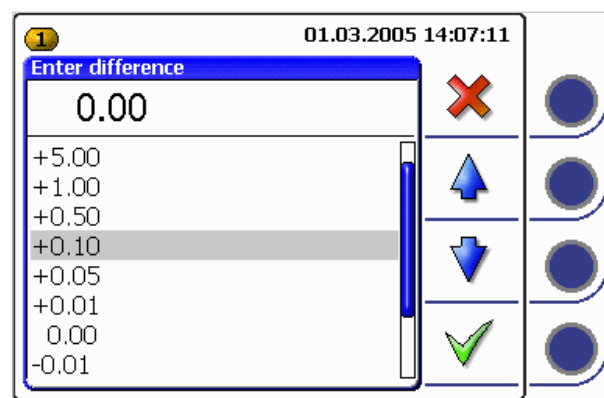

Listing of the product types in the controller
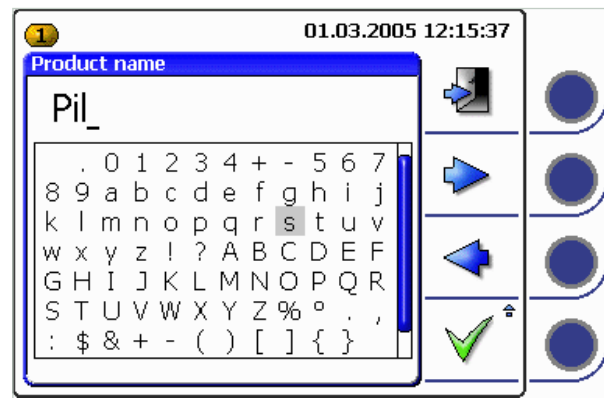

Navigation to adjust product names

The concentration calculation of each product type can be calibrated to achieve highest accuracy.

Controller display of calibration

2.1.3 Trend chart

Besides various other features the controller contains a trend chart feature. Start-up and shut-down processes can be observed comfortably. The trend chart is combined with an internal data memory which stores up to 15,000 data lines. So an observation of previous processes subsequently will be possible (the graph recording function).
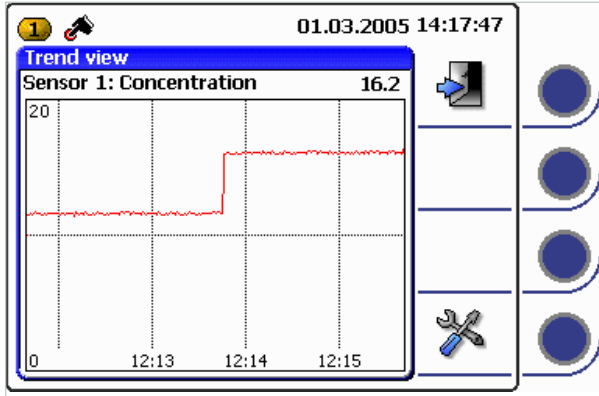
Controller display of the trend chart

2.1.4 Range control

For each sort of beer it is possible to define a range control for a specific measuring parameter. When crossing this range a previously defined action is performed. For example an output line can be assigned to stop the bottle filler.
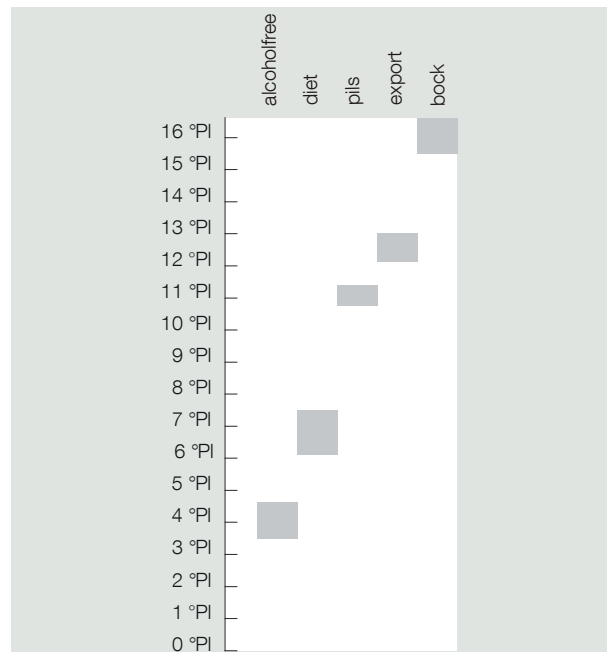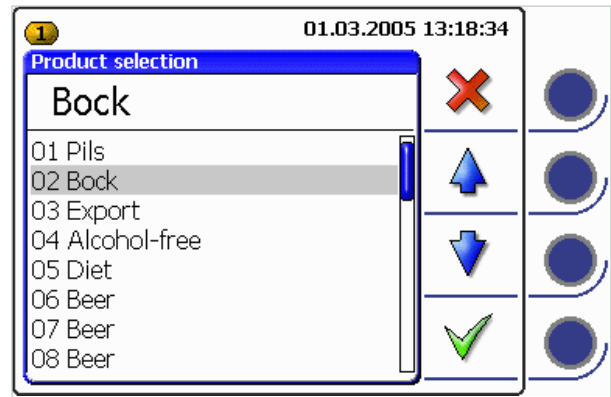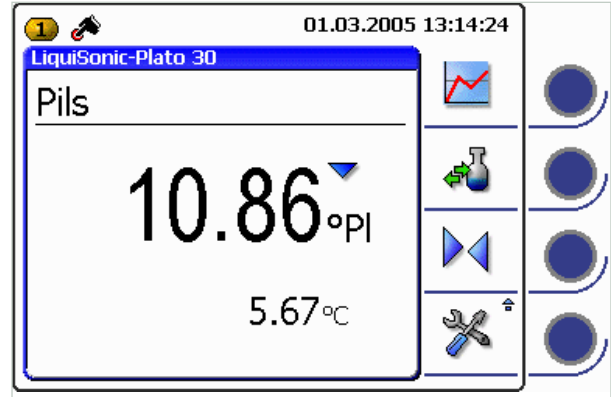
Product-specific range monitoring

2.1.5 CO_2 display and compensation
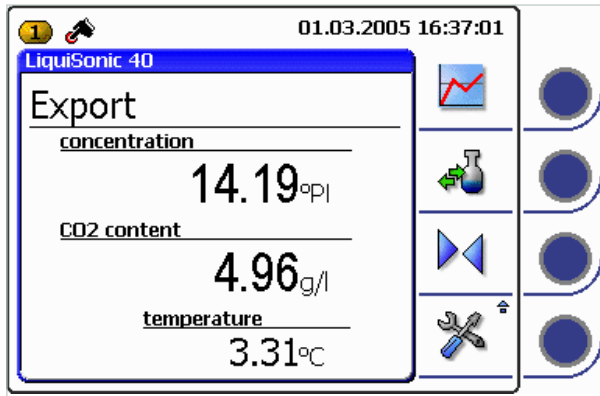
If the CO_2 content is measured with a sensor, then it is possible to show the value on the display and to compensate the calculation of original gravity. Nearly every on the market available CO_2 analyzer can be interfaced with the LiquiSonic® controller.

Display of the CO_2 content

2.1.6   Comfortable user interface

The controller can be operated without any pains. Since each operating step follows the intuition - no manual will be required. Even infrequently accessed parameters can be found easily.

Controller navigation

Operation is supported by simple icons.
The LiquiSonic® Plato is designed multilingual.
The operating language can be changed between German and English.

2.1.7   Monitoring of the CCP's

The gravity, the monitoring of the gravity and the calibration are critical points regarding the HACCP. That's why the controller has a comfortable user management. It is possible to define several user with different access right. This user management ensures, that only authorized users are able to calibrate the device.
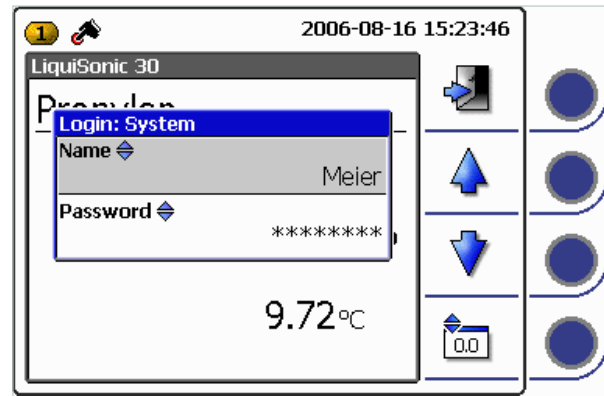
Controller display of user registration

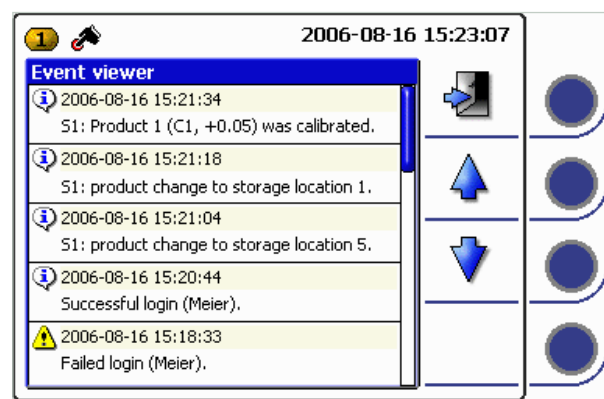The LiquiSonic® Plato 30 has the possibility to store important events into an event memory. The memory is readable by the interface and can be presented on the display. This is a comfortable documentation for the user access and the handling.
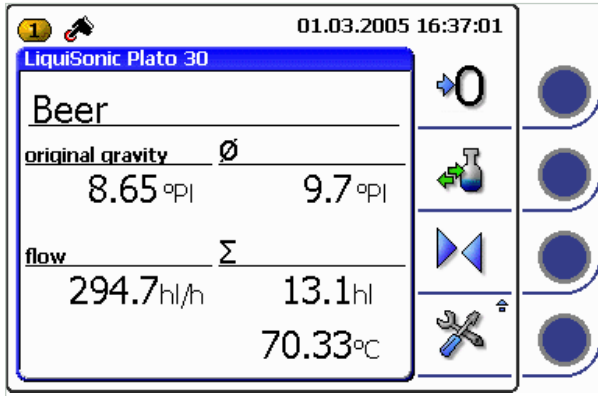

Event memory

2.1.8   EXtrACT-Totalizer

A special function for the lauter tun is the EXtrACT-Totalizer. This option allowed in combination with a flow meter additional the calculation of the average gravity (start gravity of the wort boiler) to optimize the gravity content for the boiling process.

Controller display when using EXtrACT-Totalizer

2.1.9   Inputs and outputs

The controller has a plug-in terminal on the back side. For service purposes the terminal strip can be completely removed. All controller inputs and outputs are isolated. The device has four analog outputs (AO), which can be configured according to your needs.

Example:
· original gravity
· beer temperature
· connection of a remote display

It is also possible to assign two outputs to the same measured value, that is differently scaled. This is required to inspect the whole measuring range for start-up and shut-down processes as well as to expand the range of operation.

Example:
· AO1: concentration 0..20 %
· AO2: concentration 10..12 % (point of operation)

The behavior of the analog outputs during an alert can be defined: either to keep the current value or to set the output to any given value.

The controller has independently adjustable, digital outputs, that can be assigned with the following statusinformation, for instance:
· alarm
· concentration outside the pre-defined range
· no beer in the pipe
· device is operated (service, calibration)

Using the signal „Service" and the trend chart presentation on a process control system, it is possible to recognize, when LiquiSonic® Plato is calibrated or a product is changed. For the chart below the calibration was performed at 11:25 a.m. and from 0:20 p.m. the pipe was empty.
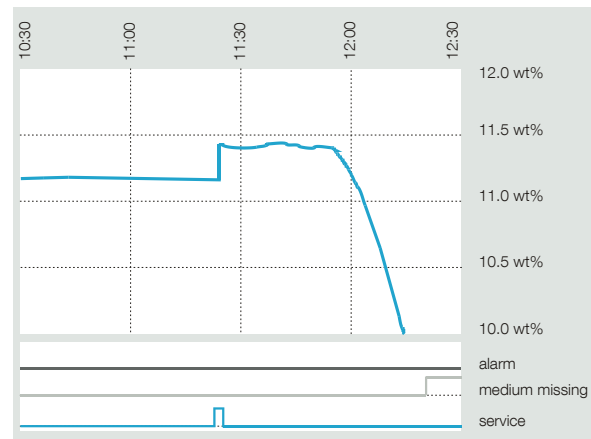
State signals of a process control system

LiquiSonic® Plato contains three digital inputs for an external change of product.
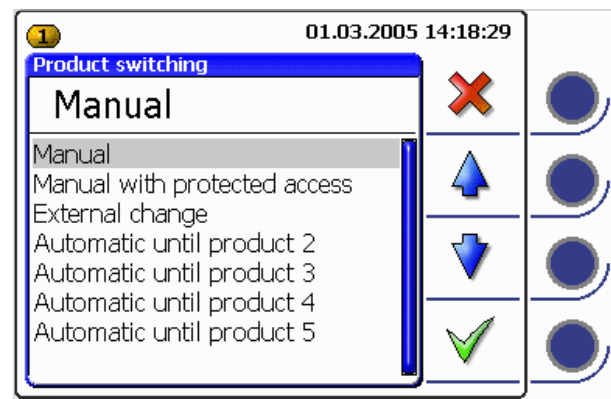
Adjustment of product change on the controller display

2.1.10 Profibus

The controller allowed a comfortable integration with the Profibus-interface in automation systems. In addition to the transmission of the measuring values it is possible to realize the product selection.

The integration into the PCS or into a PLC is very easy. Device data files (GSD file) are included to the delivery. This file contains all parameters being able to read and write and is available in different languages. The GSD file will be loaded into the project planning program. The parameters to be monitored can be selected from an offered list and can be integrated into the control software.

The controller is used in a PROFIBUS-PA network via a bus coupler, also known as converter or gateway.

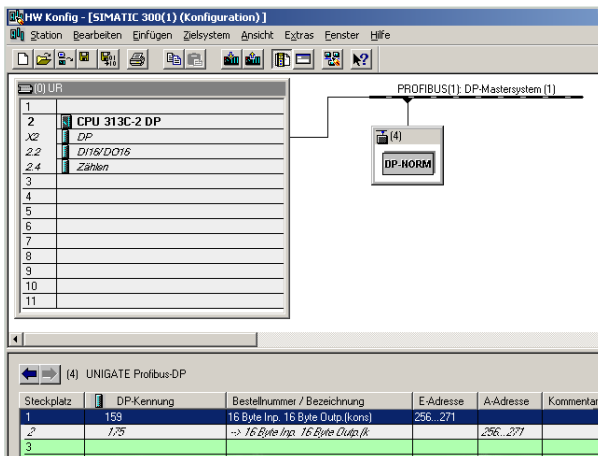Exemplary display of a configuration software for a process control system

2.1.11 Flow detector

LiquiSonic® Plato contains an integrated flow detector. This ensures that also at a slow beer flow, e.g. stop at the filler, the original gravity is measured in the correct way.
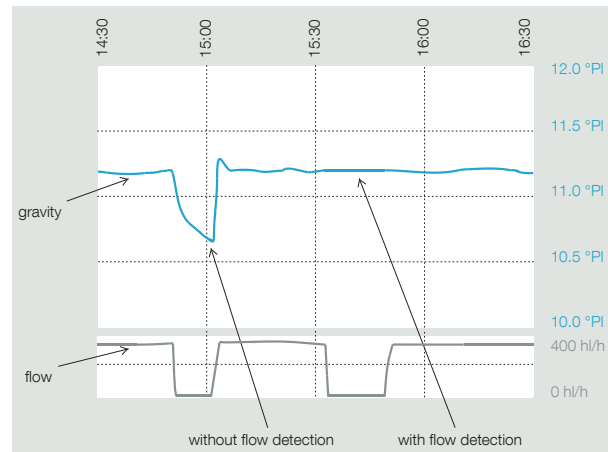
Change of concentration and flow as a function of time

2.1.12 Self-monitoring

LiquiSonic® includes an automatic self-monitoring. If an event has occurred, LiquiSonic® Plato gives a detailed text message. Thus all issues will be presented as messages on windows in an easily understandable way, e. g. connection to sensor interrupted (cable damages) or empty pipe.
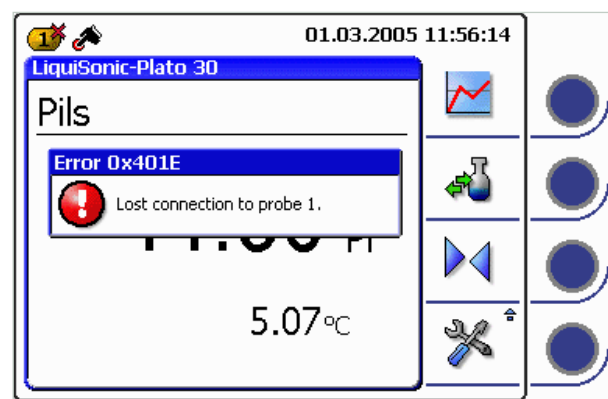
Alarm message concerning connection failure

All status information and issues are logged into a data memory.

2.1.13 Software SonicWork

SensoTech offers the software SonicWork, which enables an optimal configuration and data exchange of LiquiSonic® analyzers. With SonicWork the access to all configurations is open and the data memory can be read out with a PC or laptop.

Loading of product dataset
If the process changes, it can be necessary to pass a new product dataset for a certain product subsequently to measuring system being already in use.

Loading of device configurations
If the measuring task of LiquiSonic® being already in use changes, it is possible to adjust the device by loading a corresponding file to this task.

Reading-out of memory
Each LiquiSonic® controller contains an internal measured data memory, which stores up to 15,000 data-sets (lines) with respectively 32 measured values.
After deactivation of the device, these data remain available. When the data are read-out, they are available in a CSV format and can be further processed, if necessary.
The memory is read-out in the department of research and development, because it is an optimal tool to evaluate reactions, trials and productions.

Remote Control of controller
SonicWork enables the remote control of LiquiSonic® controller. With the integration of devices into a network (TCP/IP) or with the connection of a modem, the devices can be operated from any sites. The same range of functions can be used, as they are available for direct operation of the device.

Recording of process trends
With SonicWork, it is possible to display process trends. In doing so, different measured data can be visualized in real time during a laboratory measurement and these data can also be stored to the internal memory in addition.
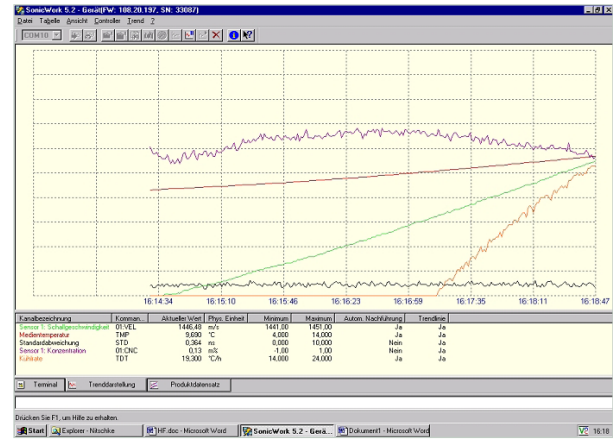
Trend chart via SonicWork

Calculation of product datasets
With the option „calculation of product datasets" of SonicWork, the customer receives an effective tool, with which he can react quickly and flexibly on product changes or changes of product measuring ranges concerning their concentration and temperature. Therefore, it is possible to self-calculate the product datasets. Nevertheless, the employees of SensoTech are available at any time to assist you for validation of your product datasets to achieve a maximum accuracy.
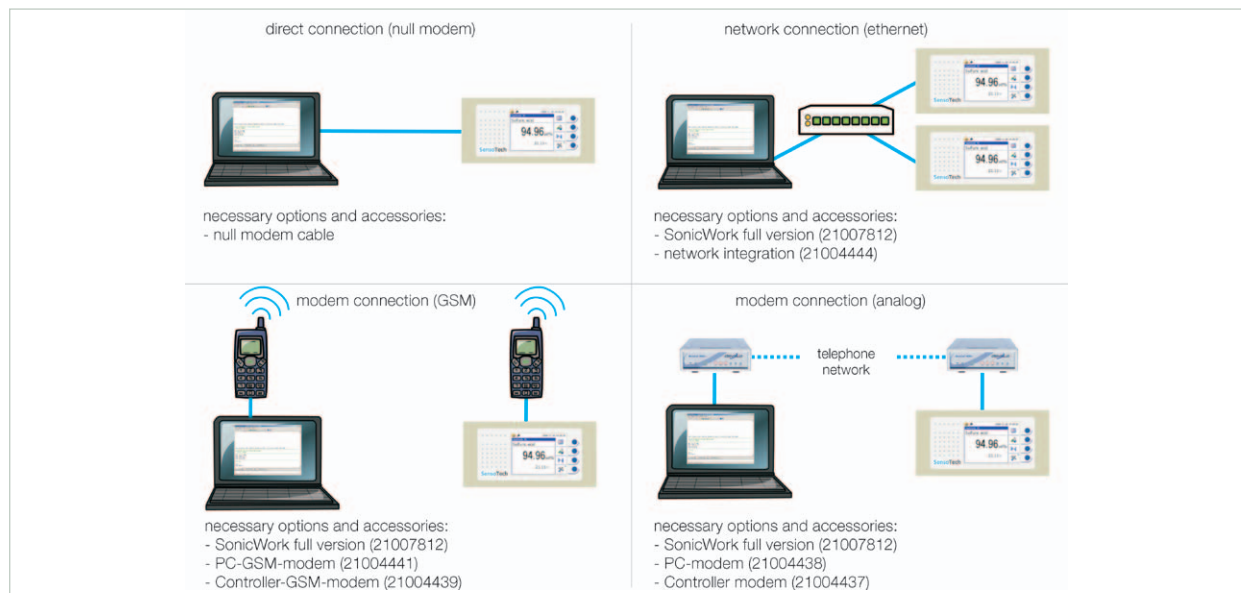
Connection paths with Sonic Work

2.1.14 Controller stainless steel housing

The controller is designed for the installation in control panels. In order to install the controller in the field, a stainless steel housing is available.

Controller stainless steel housing

material: stainless steel DIN 1.4301 (AISI 304)
protection degree: IP66 (NEMA 4X)
dimensions: 430 x 300 x 230 mm
window: VSG with 6 mm thickness
application: in areas with highly hygienic require-
ments like pharmaceutical and food industry, e.g.
breweries

2.1.15 Modem

With a modem, it is possible to communicate with the controller via a phone connection. In doing so, the controller and the computer are respectively connected with a modem.

This remote connection provides the following advantages:
· downloading new product datasets on controller
· reading out the controller logbooks, e.g. to record product data for unknown liquids
· monitoring of all system functions via remote access
· configuration of controller and sensor via remote access
· worldwide and fast customer support by our service

Typical versions are GSM Modem and the analog modem.

2.1.16 Technical data

display	TFT colour display, diagonal 5,7", 320 x 240 Pixel
operation	keypad, 4 keys
analog outputs	4...20 mA, isolated LiquiSonic® Plato 20: 2 x free configuration LiquiSonic® Plato 30 / 40: 4 x free configuration
digital outputs	electronical relay, isolated 1 x „alarm", 1 x „empty pipe" additional: LiquiSonic® Plato 20: 2 x free configuration LiquiSonic® Plato 30 / 40: 6 x free configuration
analog inputs	4...20 mA, isolated LiquiSonic® Plato 20: 1 x for CO_2-compensation LiquiSonic® Plato 30: 4 x for CO_2-compensation LiquiSonic® Plato 40: 4 x for connection of one refractometer / densitometer and CO_2-compensation
product switching	manual, external parallel, automatic
interface	RS-232, Ethernet, fieldbus (Modbus, Profibus), Compact-Flash-Slot
housing	panel housing dimensions front panel: 280 (w) x 138 (h) mm assembly depth: 245 mm material: stainless steel degree of protection: IP30, front IP65 weight: approx. 3.5 kg optional: 19" enclosure 3 HE, anodized alumnia, stainless stell housing IP65
power supply	115 - 230 VAC ±10 %, 50, 60 Hz optional: 24 VDC
power consumption	15 W (1 sensor) up to 37 W (4 sensors)
ambient temperature	0 to 40 °C
sensors	LiquiSonic® Plato 20: connection of 1 sensor LiquiSonic® Plato 30: connection of maximal 4 sensors LiquiSonic® Plato 40: connection of 1 sensor and 1 refractometer / densitometer connection to sensor via digital data transfer maximum cable length: 1,000 m

2.1.17 Comparison of variants

	LiquiSonic® Plato 20	LiquiSonic® Plato 30	LiquiSonic® Plato 40
article number	21007221	21007231	21007241
display of gravity and temperature	available	available	available
display of Alcohol / extract / wort			available
number of sensors per controller	1	4	1 sensor + 1 refractometer or densitometer
analog output for concentration	available	available	available
analog output for temperature	available	available	available
remote indication for analog outputs conc./ temperature		available	available
monitoring of gravitiy per kind of beer	available	available	available
state relay outputs	„alarm", „empty pipe", „service"	„alarm", „empty pipe", „service"	„alarm", „empty pipe", „service"
number of adjustable relay outputs	2	6	6
analog inputs for CO_2	available	available	available
display of CO_2-content	available	available	
product data sets	16	32 (optional 256)	32
product identifier editor		available	available
product data set selection	manual, external binary	manual, external binary, automatic	manual, external binary, automatic
calibration of several brands of beer and other products	available	available	available
real time trend chart		available	available
data memory (15,000 lines)		available	available
event presentation		available	available
user management	optional	optional	optional
multilanguage operation	available	available	available
19" controller housing	optional	optional	optional
Profibus DP-Interface	optional	optional	optional
serial interface	available	available	available
network integration (Ethernet)	optional	optional	optional
webserver	optional	optional	optional

2.2   Sensors

2.2.1   Functions

The sensor is an intelligent device and stores all necessary parameters. The sensor contains a factory calibration at delivery which can be applied immediately. A sensor exchange is possible without any recalibration or setting parameters.

The sensor contains the measurement of sonic velocity and temperature. The wetted parts are usually made of stainless steel 1.4571. The rugged and completely enclosed design does not need any gaskets or "windows" for process and is thus completely maintenance free.

Different additional functions integrated in sensor like flow stop monitoring and full/empty liquid monitoring in pipes increase the customer's benefit significantly. A special high power technology ensures stable measurement results, even at high portions of gas bubbles and strong signal attenuation by process liquid.

Sensor electronics is mounted in a closed stainless steel housing with IP68 degree of protection and enables the cleaning of process systems, for example, by high-pressure cleaner or steam.

Various types of sensors are available:
· Varivent flange
· APV flange
· dairy flange
· DIN flange
· Clamp flange

The sensor with separated electronic housing enables the space-saving integration in cramped installation situations as well as the protection of electronics at strong vibrations within the pipeline or high temperatures around the pipe system.

Due to the high hygienic requirements in the food industry, the LiquiSonic® sensors have an aseptic design. Some sensor types are also available with 3-A approval that certifies the hygienic construction and dead space.

The connection is performed in a clamp space by screw clamps. The connection between sensor and controller is layed out via bus-cable with a total length of 1,000 m. The LiquiSonic® Plato 30 controller can be connected with up to four LiquiSonic® sensors.

Immersion sensor Varivent with stainless steel housing

Immersion sensor Varivent with separated electonics

Immersion sensor Clamp 3" with 3-A certification

2.2.2   Technical data

|	
measuring principle	absolute sonic velocity as dimension for concentration of gravity and extract
accuracy	< 0,05 °Pl / °Brix
communication	digital data transfer
ranges of temperature	beer: -5 to 25 °C, gravity: 50 to 120 °C cleaning: up to 125 °C ambient: -10 to 40 °C
material	high-grade steel DIN 1.4571
degree of protection	IP68 (NEMA 6P)
supply	24 VDC ±15 % (provided by controller)
power input	6 W
cleaning	normal CIP-process

2.2.3   Connection setup of sensors

The connecting cable of LiquiSonic® between sensors and controller supplies the sensor as well exchanges the information and datas. The cable consists of the power wiring and a twisted paired-wire for the digital bus line. The cross sectional area of the utility cable depends on the length and the number of sensors.

The cable can be cutted to any length during the installation.

The following cable cross sectional areas result:

length of cable	1 sensor	2 sensors	4 sensors
100 m	2 x 0,22 mm²	2 x 0,50 mm²	2 x 0,75 mm²
200 m	2 x 0,50 mm²	2 x 0,75 mm²	2 x 1,50 mm²
400 m	2 x 0,75 mm²	2 x 1,00 mm²	2 x 2,50 mm²
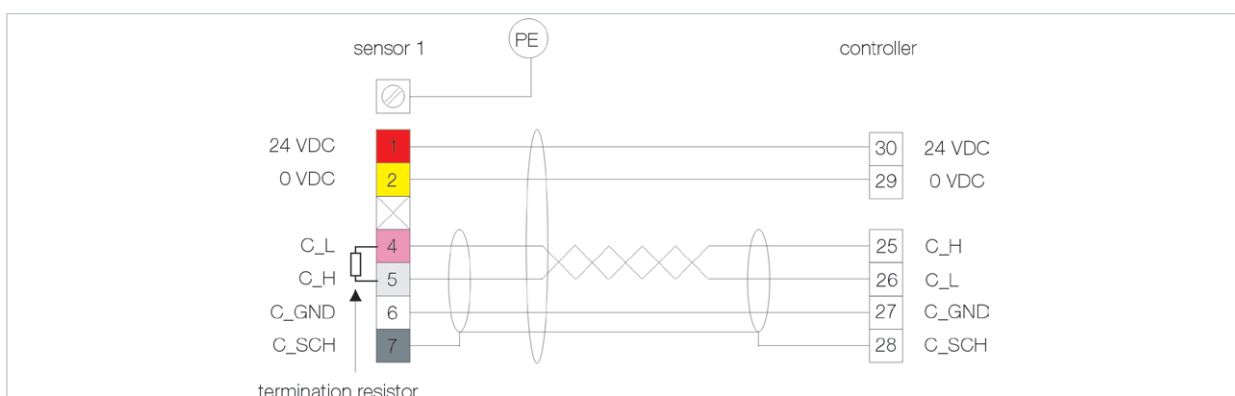
Connection between one sensor and one controller

3 References

For a long time SensoTech is member of the German Master Brewer Association Of The National Committee Saxony.

SensoTech has a partnership with the Technical University of Munich and The Research Center Weihenstephan for Brewing and Food Quality, with the goal to create a reference method for gravity detection.

In addition the LiquiSonic® analyzer is applied in many famous breweries and groups of breweries as well as companies of food industry including the following:

· Augustiner-Bräu Wagner
· Badische Staatsbrauerei Rothaus
· Birra Peroni
· Carlsberg
· Heineken
· Karlsberg Brewery
· König-Brewery
· Oettinger
· Radeberger Group
· TTL Taiwan Tobacco & Liquor Corporation
· Warsteiner Group

On demand we gladly will provide detailed information about our references.

4 Quality and support

Enthusiasm for technical progress is the driving force behind our company as we seek to shape the market of tomorrow. As our customer you are at the centre of all our efforts and we are committed to serving you with maximum efficiency.

We work closely with you to develop innovative solutions for your measurement challenges and individual system requirements. The growing complexity of application-specific requirements means it is essential to have an understanding of the relationships and interactions involved.


Creative research is another pillar of our company. The specialists in our research and development team provide valuable new ways to optimize product attributes, such as testing new types of sensor designs and materials or the sophisticated functionality of electronics, hardware and software components.

Our SensoTech quality management also only accepts the best production performance. We have been certified according to ISO 9001 since 1995. All device components pass various tests in different stages of production. The systems have all gone through an internal burn-in procedure. Our maxim: maximum functionality, resilience and safety.

This is only possible due to our employee`s efforts and quality awareness. Their expert knowledge and motivation form the basis of our success. Together we strive to reach a level of excellence that is second to none, with a passion and conviction in our work.

Customer care is very important to us and is based on partnerships and trust built up over time. As our systems are maintenance free, we can concentrate on providing a good service to you and support you with professional advice, in-house installation and customer training.

Within the concept stage we analyse the conditions of your situation on site and carry out test measurements where required. Our measuring systems are able to achieve high levels of precision and reliability even under the most difficult conditions. We remain at your service even after installation and can quickly respond to any queries thanks to remote access options adapted to your needs.
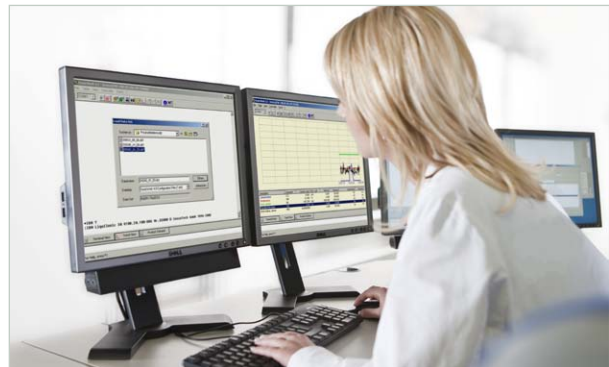
In the course of our international collaboration we have built up a globally networked team for our customers in order to provide advice and support in different countries. We value effective knowledge and qualification management. Our numerous international representatives in the important geographical markets of the world are able to refer to the expert knowledge within the company and constantly update their own knowledge by taking part in application and practice-oriented advanced training programs.

Customer proximity around the globe: an important element of our success worldwide, along with our broad industry experience.

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Systemtest H2O

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ndards **for process analysis.**

n, that **creates new solutions.**

osolute **spirit of development.**

SensoTech is a provider of systems for the analysis and optimization of process liquids. Since our establishment in 1990, we have developed into a leading supplier of process analyzers for the inline measurement of the concentration and density of liquids. Our analytical systems set benchmarks that are used globally.

Manufactured in Germany, the main principle of our innovative systems is to measure ultrasonic velocity and density in continuous processes. We have perfected this method into an extremely precise and remarkably user-friendly sensor technology. As well as the measurement of concentration and density, typical applications include phase interface detection or the monitoring of complex reactions such as polymerization and crystallization.

Our LiquiSonic® measurement and analysis systems ensure optimal product quality and maximum plant safety. Thanks to their efficient use of resources they also help to reduce costs and are deployed in a wide variety of industries such as chemical and pharmaceutical, steel, food technology, machinery and plant engineering, car manufacturing and more.

It is our goal to ensure that you maximize the potential of your manufacturing facilities at all times. SensoTech systems provide highly accurate and reproducible measuring results even under difficult process conditions. Inline analysis eliminates safety-critical manual sampling and is immediately available for your automation system. All parameters can also be adjusted with high-performance configuration tools, so that you can react quickly and easily to process fluctuations.

We provide excellent and proven technology to help improve your production processes, and we take a sophisticated and often novel approach to finding solutions. In your industry, for your applications – no matter how specific the requirements are. When it comes to process analysis, we set the standards.

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In liquids, we set the measure.