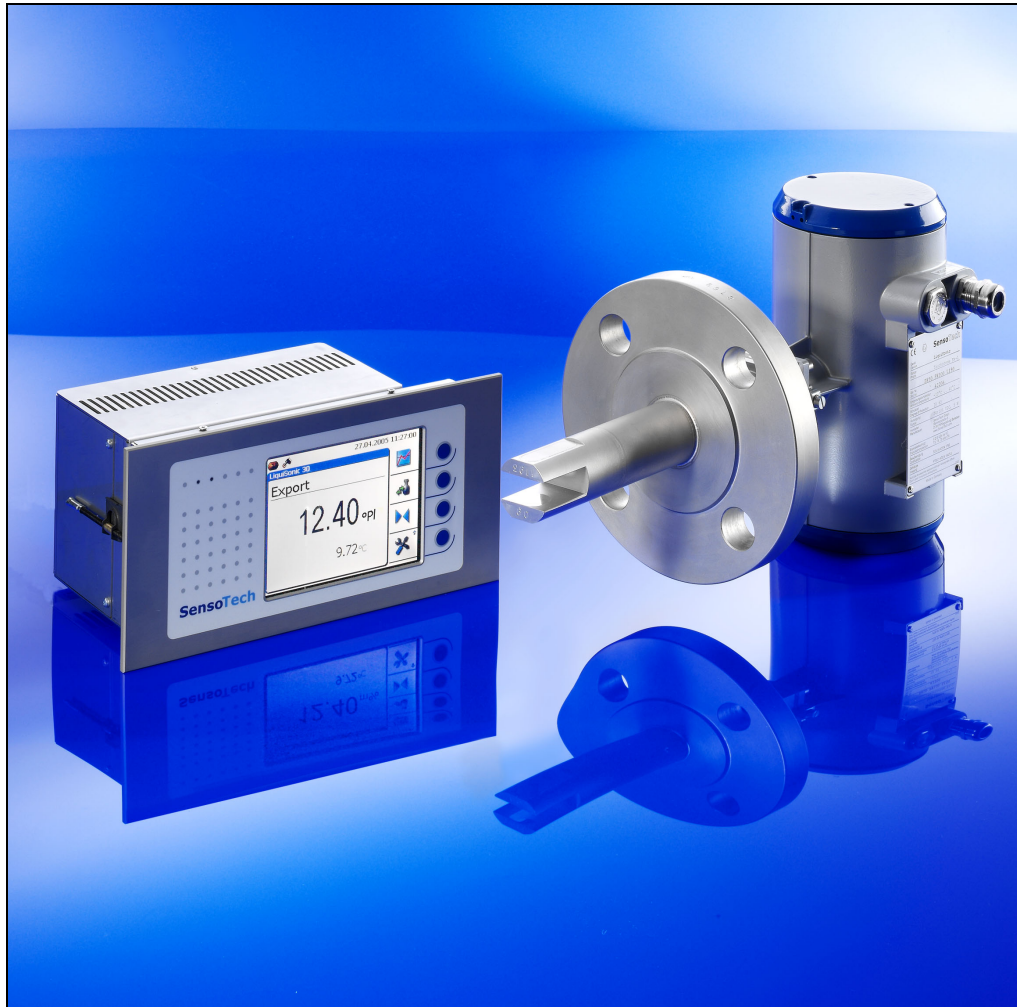


LiquiSonic-Plato

Inline concentration measurement



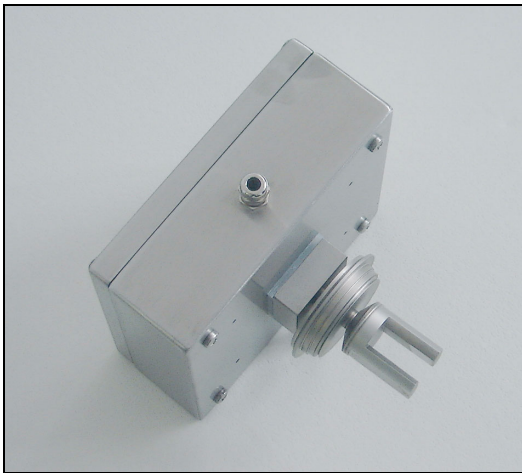
**Lauter tun
Wort boiler
Filtration
Blending
Packaging
Brix**

LiquiSonic-Plato

The **LiquiSonic-Plato** is a high sophisticated inline 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 at different points of the brewing process as well as in the beverage production.

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

Modern manufacturing technologies not only ensures precise measuring results, they also enables convenient operation of the device. This includes the simultaneous presentation of original gravity or brix value and product temperature as well as product or brand identifiers.

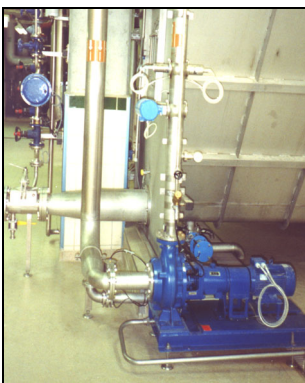
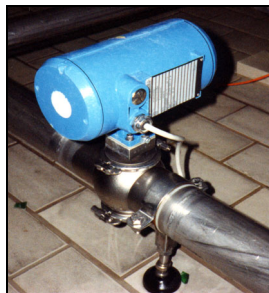


Sensor VARIVENT



Controller

The **LiquiSonic-Plato** can be used in many applications ranging from the brewing room to the packaging.



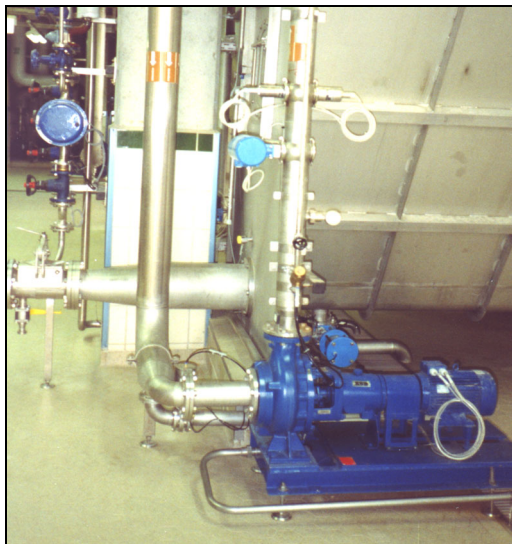
Applications

Lauter tun / mash filter

In outlet of the lauter tun or the mash filter the **LiquiSonic-Plato** is used

- to control the lautering/mash filtering process
- for accurate determination of the sparge water point
- to determine the averaged extract content (initial extract in the wort boiler) directly by combining with a flow meter. (see "lauter tun program")

Due to the complexity of the lautering process the results can be very different from brew to brew. The use of the LiquiSonic-Plato eliminates such fluctuations and stabilizes the results on the highest possible level.



Your advantage:

Accurate determination of the initial extract concentration in the wort boiler

Reducing of the water consumption

Optimal use of lauter tun and efficient mash production

Wort boiler

In the wort boiler the **LiquiSonic-Plato** is used to

- control the extract concentration during the complete boiling process
- determine precisely the final wort concentration to minimize the steam utilization.

The LiquiSonic-Plato is applied as a real inline device directly installed after the wort circulating pump, in the hop dosing system or directly in the wort boiler. For this application a sensor design with increased immersion length is available.



The influence of coatings is very low through a special sensor design. An additional purge head can be used to clean the sensor, when installed directly in the wort boiler.

Your advantage:

Reduction of intensive maintenance and expensive bypass solutions.

Saving additional rinsing and cleaning cycles.

Energy and stuff savings.

Reproducible control of the boiling process.

Filtration

In the filtration unit the **LiquiSonic-Plato** with two sensors is used for the unfiltered and in the filtered beer.

- Separation of first and last running: Automatic separation of first and last running by setting defined switchpoints.
- Control of the blending of the first and last runnings and into the unfiltrate

Your advantage:

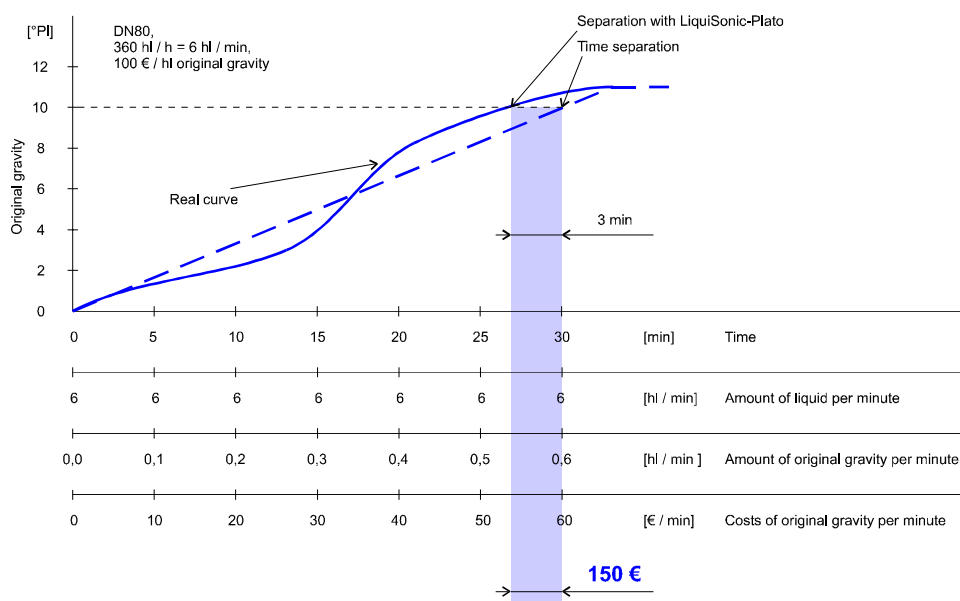
The following diagram shows a possible first running. The time controlled filtration should be long enough to achieve the required minimum gravity. In this case a time frame 30 minutes was installed.

A direct measurement of original gravity shows, that the required gravity is already achieved 3 minutes earlier.

Example:

A strainer with a 80-pipe will be started-up with 360 hectoliter per hour in 30 min. Supposed that a hectoliter of wort costs approx. 100 €, a retarded change from first running beer to beer would mean a loss of 150 € per filtration. At 200 filtration cycles this corresponds to 30,000 € per year.

Thus it appears which advantages arising out of controlling by gravity in opposite to timing.



The advantage in opposite to conductivity is obvious too. The conductivity sensor determines the conductivity, influenced only by the ion content of the brewing water. The unique criterion for separation of first and last running beer can be the original gravity only, which is determined with LiquiSonic – Plato.

Filler and Blending

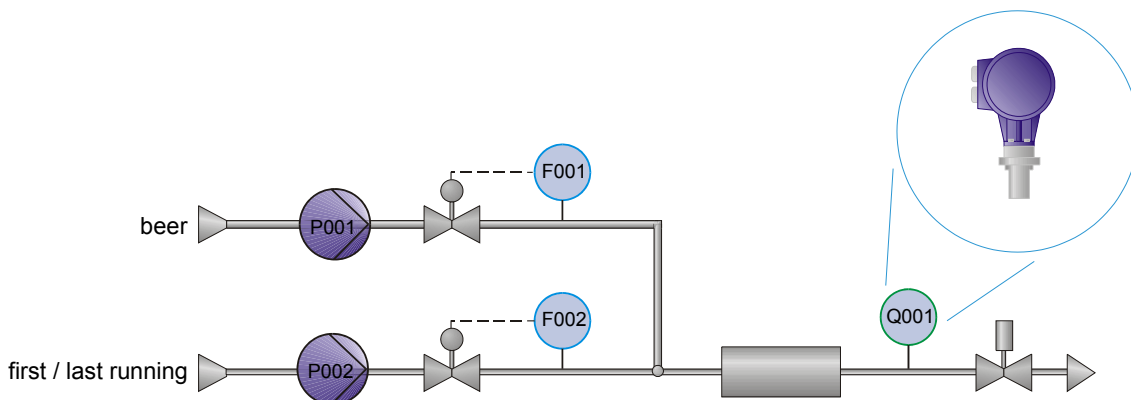
The measured original gravity - compensated through a fast and accurate temperature measurement - is directly applied as control signal to the blending control loop.

LiquiSonic-Plato guarantees:

- Continuous monitoring of the original gravity during filling.
- Documentation und logging of original gravity (ISO9000 und HACCP).
- Separation of different beers.
- Continuous monitoring of blending.
- control of original gravity at High-Gravity Brewing.

The **LiquiSonic-Plato** has an integrated process flow detector, 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 4 sensors as well as for larger filling lines.



Your advantage:

Display of original wort concentration and temperature of beer.

Documentation of concentration during the filling in a non-volatile data memory.

Warning at faulty filling (mismatch of brands etc.)

Control of the filler, if the actual wort concentration leaves a specified range.

Separation of first and last running beer.

Integrated process flow detector and "empty pipe" signal

Controller

Introduction

LiquiSonic-Plato 30 is the standard device with all functions. Up to 4 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 calculates the concentrations of extract and alcohol in the beer.

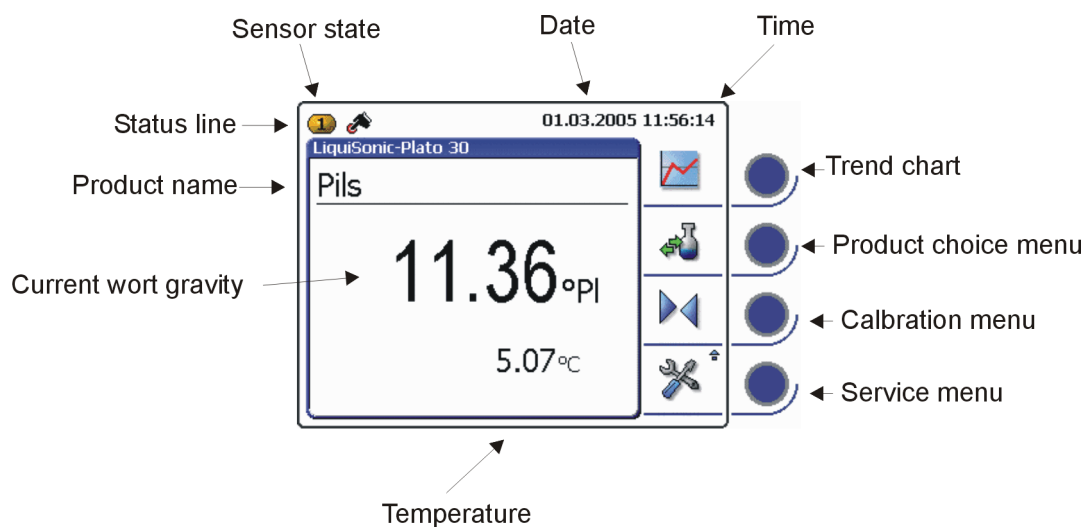


Controller



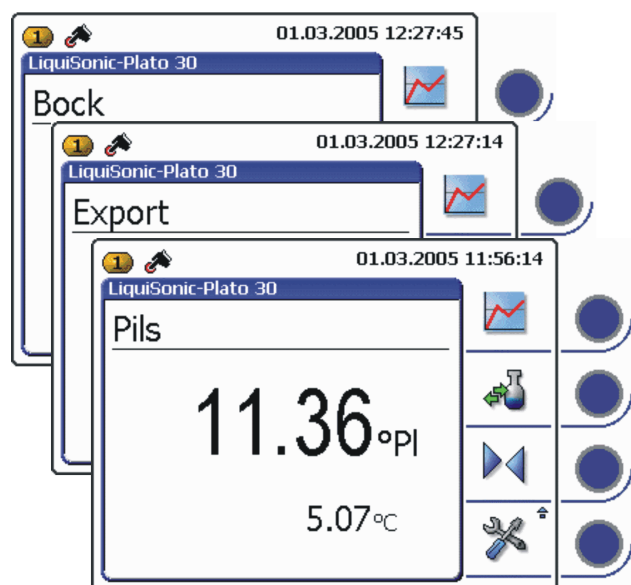
Presentation on the full-graphic display

The controller has a large, illuminated color display. Original gravity, beer temperature, brand names and device status are steadily presented.

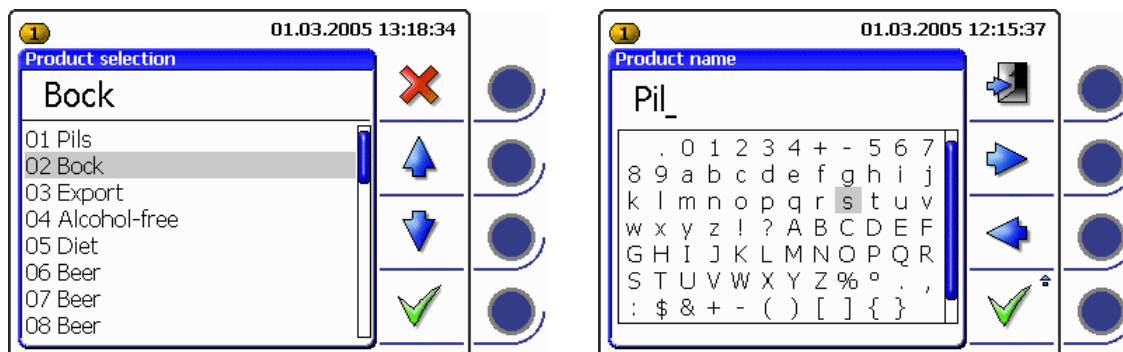


Products and data set

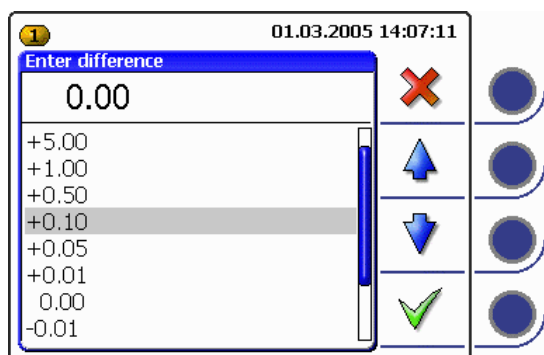
The **LiquiSonic-Plato** is being delivered in a precalibrated condition. If the device is switched on it displays the concentration at once. Nevertheless several parameters can be adapted like the product identifier or the contrast of the display, for instance.



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

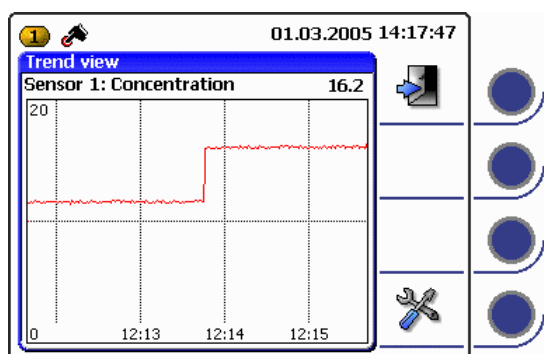


The **LiquiSonic-Plato** concentration calculation is comfortable to adjust. Water and product calibrations are done independently of each other. Calibration is executed directly in Plato units (e.g. +0.02 °Pl).



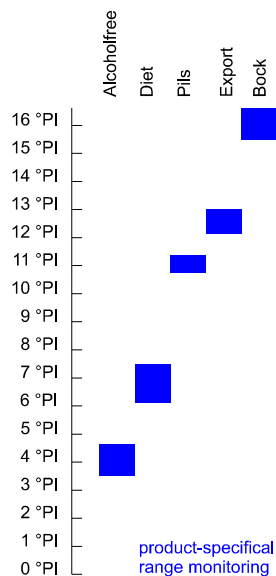
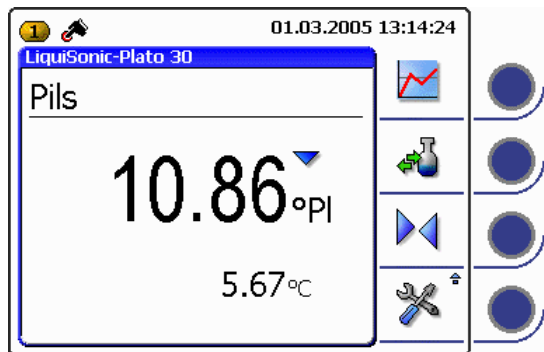
Trend chart

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).



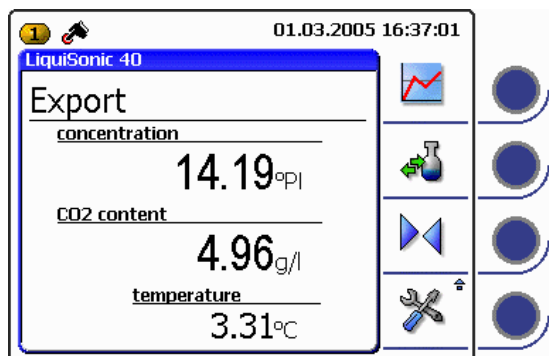
Range control

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.



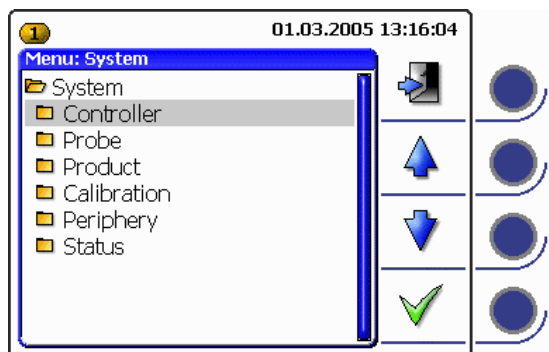
CO₂ display and compensation

If the CO₂ 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 CO₂ analyser can be interfaced with the LiquiSonic controller



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.

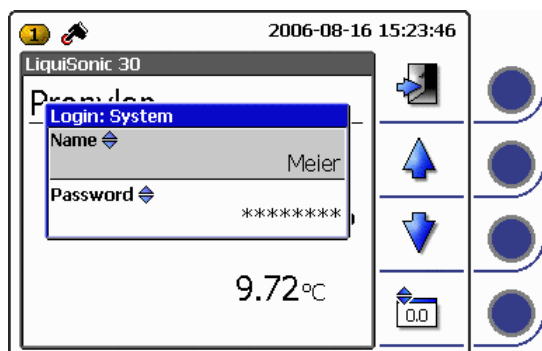


Operation is supported by simple icons. The **LiquiSonic-Plato** is designed multilingual. The operating language can be changed between German and English.

Functions of the starting-up process, like scaling of input and output, can be operated easily.

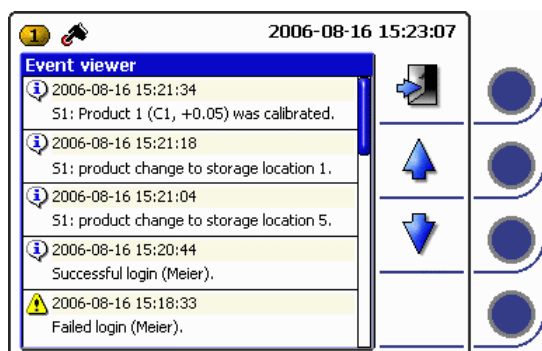
Monitoring of the CCP's

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 specific users are able to calibrate the device.



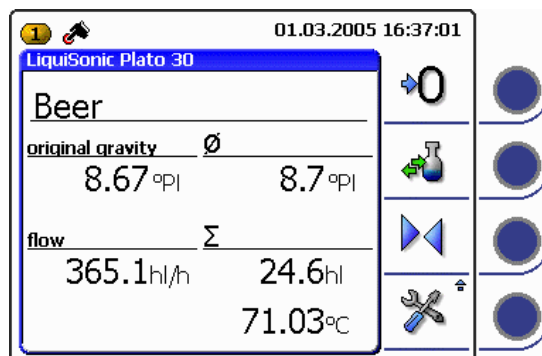
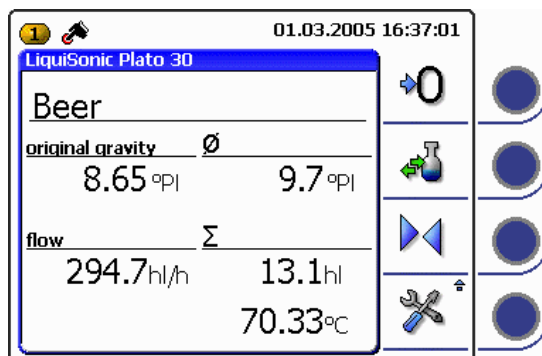
LiquiSonic-Plato 30 has the possibility to store important events into an event logbook. The logbook is readable by the interface and can be presented on the display.

This is a comfortable documentation for the user access and the handling. Who has when calibrate which product.



Lauter tun program

A special function for the lauter tun is the "lauter tun program". This option allowed in combination with a flow meter additional the calculation of the average gravity (start gravity of the wort boiler)

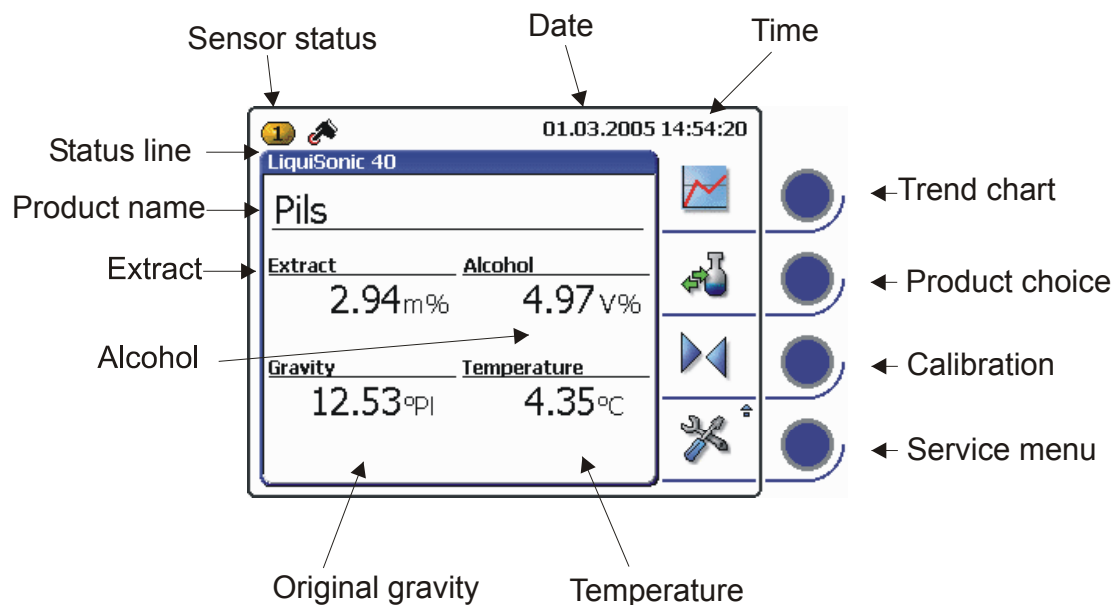


LiquiSonic-Plato 40 – Analysis in beer

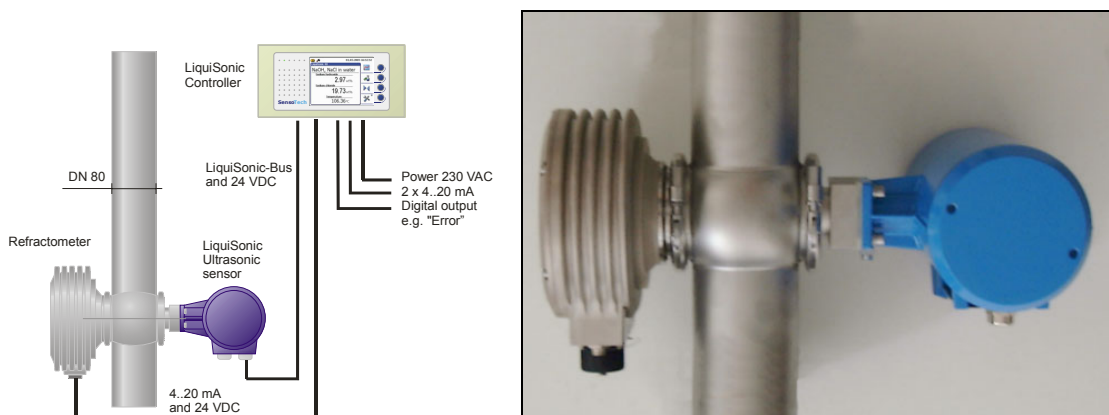
The **LiquiSonic-Plato 40** performs a complete analysis of the beer.

The display shows the following values

- extract content [w%]
- alcohol content [Vol%]
- original gravity [°Pl]
- temperature [°C]



The beer analyzer uses an ultrasonic and a process refractometer



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

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 which can be configured according to your needs, e.g. for:

- original gravity
- beer temperature
- connection of a remote display

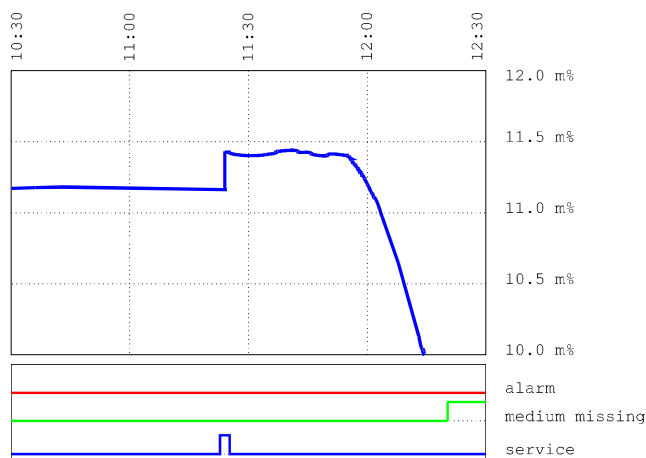
It is also possible to assign two outputs to the same measured value, that is differently scaled. This is required to inspect the whole measuring range for start-up and shut-down processes as well as to expand the range of operation:

e.g. AA1: concentration 0..20 %, AA2: concentration 10..12% (point of operation)

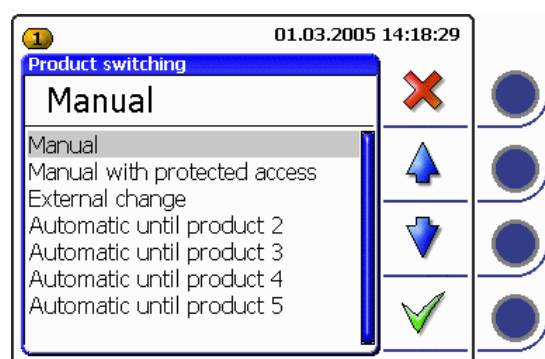
The behavior of the analog outputs during an alert can be defined: either to keep the current value or to set the output to any given value. The controller has independently adjustable digital outputs:

- state: alarm, error
- state: no beer in the pipe
- state: device is operated (service, calibration)
- freely adjustable thresholds

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

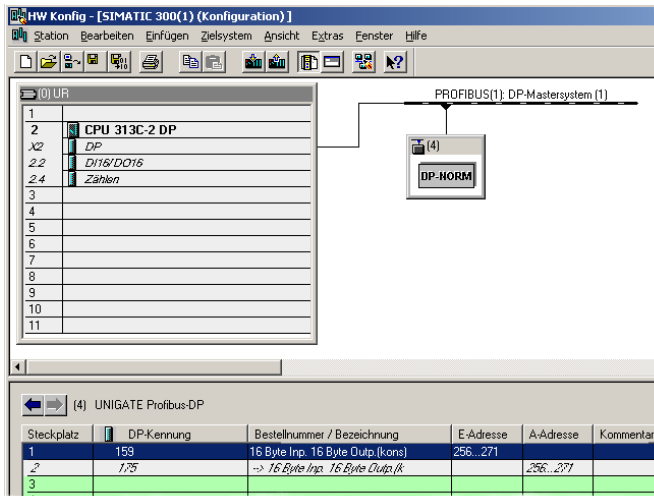


The **LiquiSonic-Plato** contains three digital inputs for an external change of product.



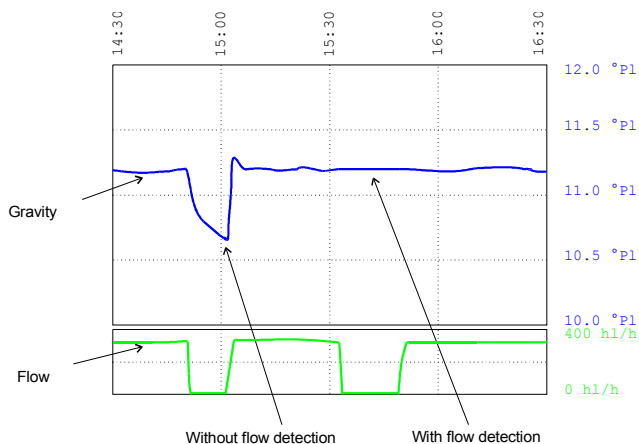
Profibus

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.



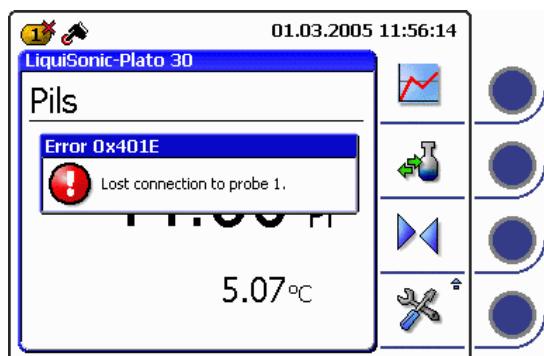
Flow detector

The **LiquiSonic-Plato** contains an integrated FLOW-detector. This ensures that also at a slow beer flow, e.g. the beer stops at the filler, the wort is measured in the correct way.

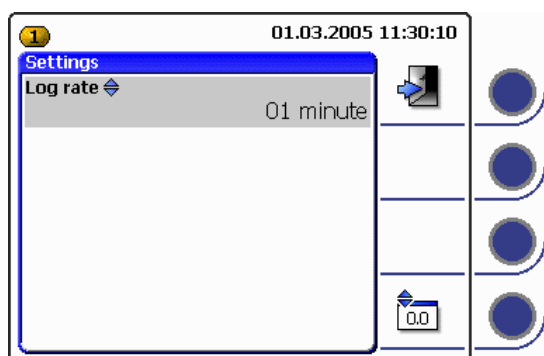


The **LiquiSonic-Plato** embodies an automatic self-surveillance. If an error has occurred **LiquiSonic-Plato** does not break down without a detailed error message, thus all errors will be presented as messages on windows in an easily understandable way, e. g.:

- Connection to sensor interrupted (cable damages)
- Empty pipe
- Concentration outside the pre-defined range
- Faulty calibration



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

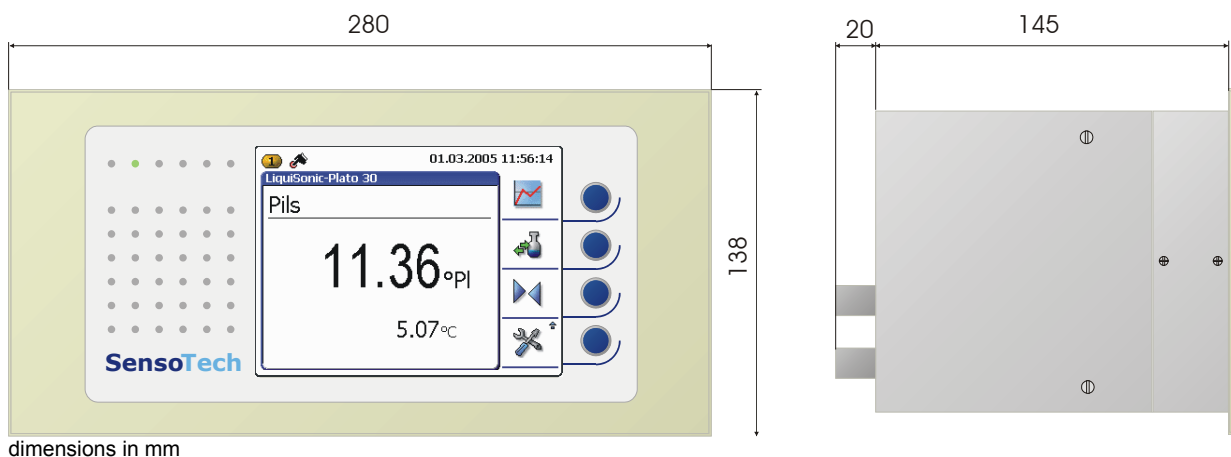


The data memory can be read out with a PC or laptop.



Technical data

Display	TFT 320 x 240 Pixel
operation	keypad, 4 keys
Analog output	4..20 mA, isolated LiquiSonic-Plato 30 / 40: 4 x free configuration
Digital output :	1 x „Alarm“, 1 x „empty pipe“ and : LiquiSonic-Plato 30 / 40: 4 x free configuration
Analog input	4..20 mA, potentially separated LiquiSonic-Plato 30: 4 x CO ₂ -compensation LiquiSonic-Plato 40: 1 x refractometer/densitometer
Product switching	manual, external parallel, external serial, automatic
Interface	RS-232
Housing	panel housing sector: 281 x 138 (h) mm assembly depth: 170 mm material: stainless steel degree of protection: IP 54 weight: approx. 3.5 kg optional 19" enclosure size: 3 HE, 84 TE material: stainless steel, alumnia degree of protection: IP 54 weight: approx. 4.5 kg
Power supply	110 - 230 VAC \pm 10%, 50 or 60 Hz, optional 24VDC
Power consumption	35 W
Ambient temperature	0 to 40 °C
Sensor connection	LiquiSonic-Plato 30 up to 4 sensors LiquiSonic-Plato 40 1 sensor and refractometer/densitometer connection to sensor up to a total length of 1,000 m





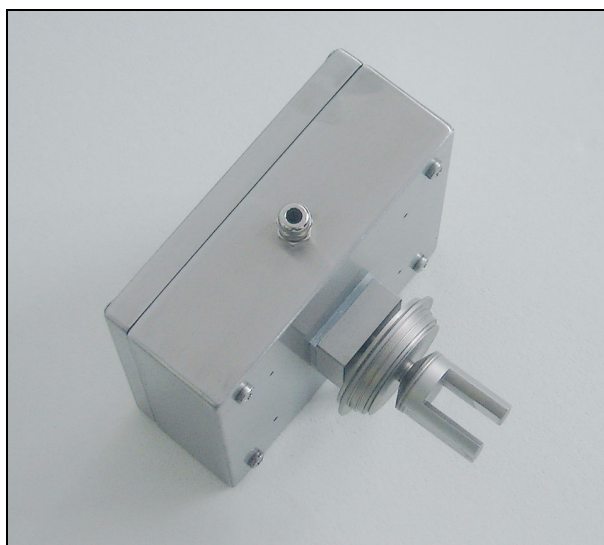
Sensor

Functions

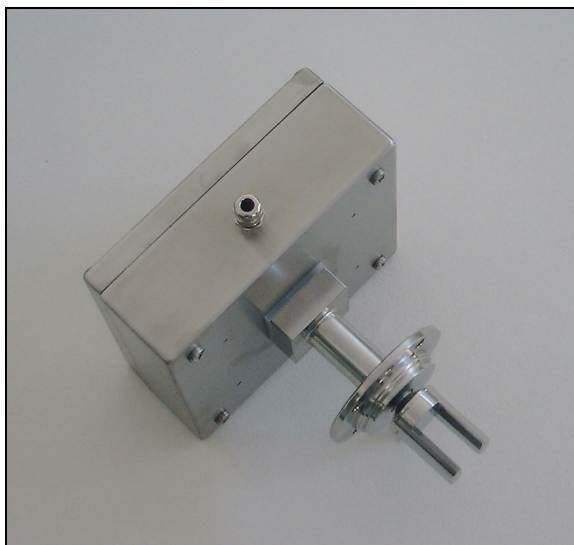
The sensor is an intelligent device and stores all necessary parameters. The sensor contains a factory calibration at delivery which can be applied immediately. A sensor exchange is possible without any recalibration or setting parameters.

The sensor has a robust industrial housing with the protection degree IP65 or IP67 (on request). The connection is performed in a clamp space by screw clamps. Sensors are available in several versions:

- sensor with VARIVENT flange
- sensor with APV flange



Immersion type sensor VARIVENT



Immersion type sensor APV

Technical data

Measuring principle	absolute sonic velocity
Accuracy	< 0.06 °PI after product calibration
Range of temperature	beer -5 to 25 °C cleaning: to 125 °C ambient: -5 to 40 °C
Material	high-grade steel 1.4571 [ANSI 316 (Ti)]
Degree of protection:	IP 65
Supply	24 VDC +/- 20 % (provided by controller)
Power input	6 W
Cleaning	normal CIP-process

Cable and connection setup to sensor controller

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:

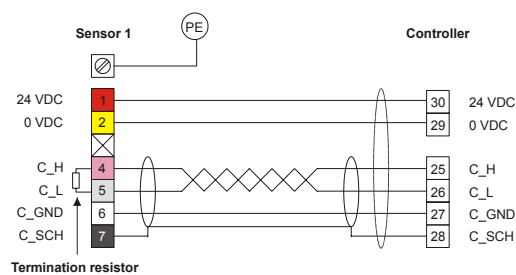
length of cable [m]	1 sensor	2 sensors	4 sensors
100	2x0,25 mm ²	2x0,5 mm ²	2x0,75 mm ²
200	2x0,5 mm ²	2x0,75 mm ²	2x1,5 mm ²
400	2x0,75 mm ²	2x1 mm ²	2x2,5 mm ²

The cable has to correspond to the specifications of RS-485. The following cable is recommended:

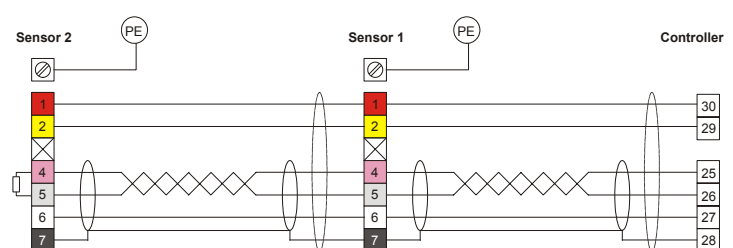
(2 x 0,25 mm² paired, 1 x 0,25 mm² Cu), shielded

This cable is available as a standard item . The cable can be cutted to any length during the installation.










































One sensor with one Controller



Several sensors with one controller



Types

	LiquiSonic-Plato 10	LiquiSonic-Plato 20	LiquiSonic-Plato 30	LiquiSonic-Plato 40
	OEM version			
Article number		21007221	21007231	21007241
Controller				
Display of gravity and temperature				
Display of Alcohol / extract / wort				
Number of sensors per controller		1	4	1 + refractometer
Analog output for concentration				
Analog output for temperature				
Remote indication for analog outputs conc./ temperature				
Monitoring of gravity per kind of beer				
State relay outputs		„Alert“, „empty pipe“, „Service“	„Alert“, „empty pipe“, „Service“	„Alert“, „empty pipe“, „Service“
Number of adjustable relay outputs		4	4	4
Analog inputs for CO ₂				
Display of CO ₂ -content				
Product data sets	1	16	32 opt 256	32
Product identifier editor				
Product dat set selection		manual, external serial, external binary	manual, external serial, external binary, automatic	manual, external serial, external binary
Calibration of several brands of beer and other products				
Real time trend chart				
Data memory (15,000 lines)				
Event presentation				
User management		optional	optional	optional
Multilanguage operation				
19" controller housing			optional	optional
PROFIBUS DP-Interface	optional		optional	optional

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