



LiquidSens

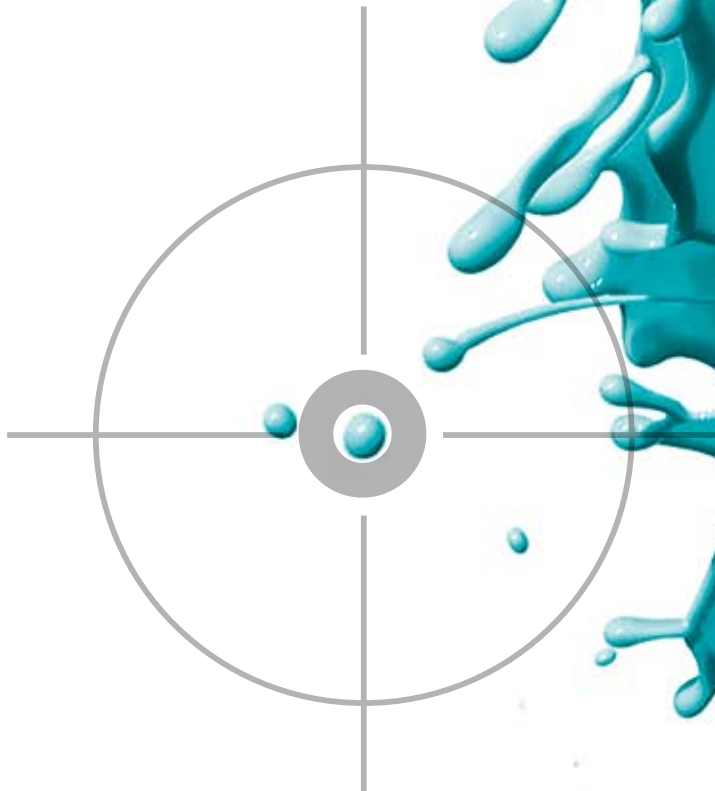
**...setting standards in liquid
measurement – smart and customised**

m/s

°C

%

g/cm³



SENSACTION

Five years of success: SensAction AG



The name SensAction has stood for precise liquid monitoring for more than five years. For us, no challenge is too great!

Every day, the dedicated employees at SensAction AG pursue but one objective – to monitor and analyse your liquids! We are highly motivated and technology is our passion.

Success story

For more than five years, our name has reflected a success story that stems from a fantastic idea, realised in new, innovative products. As the manufacturer of multi-sensors for measuring liquid concentrations, SensAction AG covers the entire production chain –

from R&D to manufacture and on to sales.

Our patented sensor solution sets new standards in the field of liquid concentration measurement. Thanks to the high commitment of our employees, the LiquidSens measuring system already enjoys considerable success on the market. We are continually expanding our



Whatever your liquid contains – LiquidSens can tell you precisely.

distribution structures and increasing our presence for our customers.

For us, competence and service along with consistent quality and performance are the central building blocks of a lasting and successful customer relationship. Moreover, since 2010 we have been certified according to DIN ISO 9001.

Furthermore, in 2011, we won the 'GründerChampions' business start-up prize in the 'ecological responsibility' category. The latest generation of LiquidSens products were awarded the Bavarian Innovation Prize in 2012, followed by the AMA Innovation Prize in the category 'Special prize for young companies' in 2013, as chosen by an expert selection panel.

With our technology, we are sure to find the right solution for you too!

Your 'Smart Sensor' that thinks for itself...



Liquid analysis in under three seconds – that is what SensAction AG is already famed for. Now you can analyse liquids with a single sensor – thanks to the use of our modular, extendable applications (apps): this system reflects the fundamental major advantage of LiquidSens: the SensAction AG's successful liquid analysis sensor. Your app is shaped by the challenges it is faced with.

No matter which industry your business is in, **LiquidSens** – the measuring system made by SensAction AG – is a reliable liquid analysis system for use in virtually any field. Whether you operate in the chemical or cleaning industry, the paint and coatings industry, the automobile industry, the pharmaceuticals and food sector or in process technology: **LiquidSens** analyses your liquids reliably and verifiably.

Liquids have an 'acoustic fingerprint'

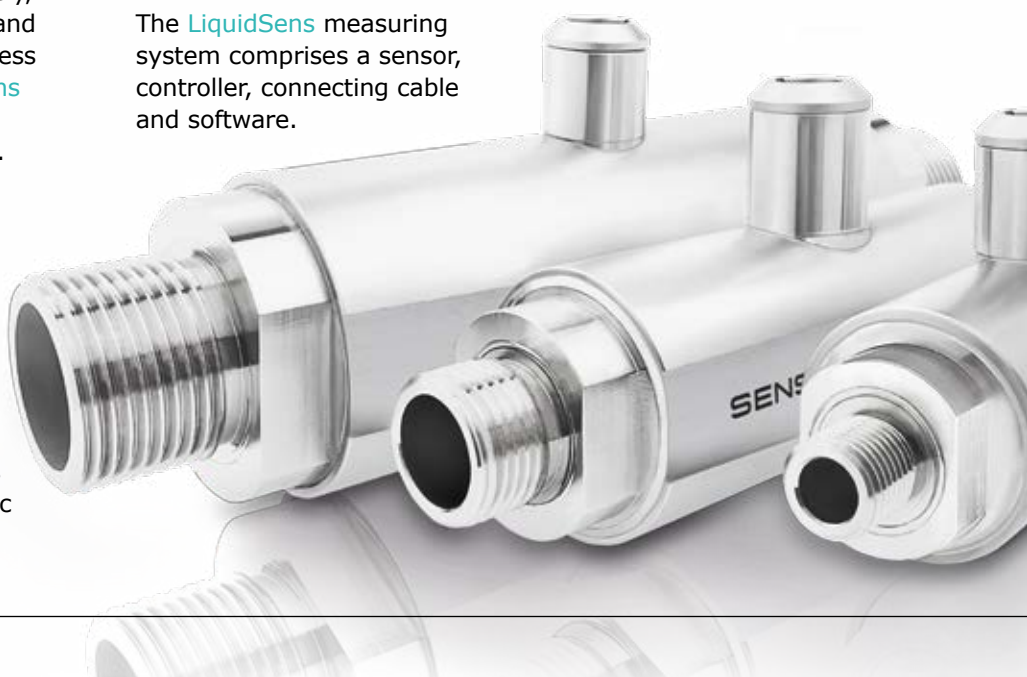
The measurement of liquids using the SensAction AG method is based on the respective liquid's characteristic 'acoustic fingerprint'.

LiquidSens recognises this fingerprint and uses it as the basis for precisely measuring the concentration and density of your liquids. Where required, it can also 'learn' – i.e. it can be fed with new 'fingerprints'.

Perfectly matched

The **LiquidSens** measuring system comprises a sensor, controller, connecting cable and software.

The individual components are developed in our internal R&D department. The production processes are also performed in-house, thus ensuring the continuous monitoring and constant high quality of our SensAction products.



Secure your processes

The simple and, above all, flexible employment of **LiquidSens** not only ensures that the consistencies of your liquids remain stable, but also provides you with a reliable means of verification. The test values obtained are stored in the controller for up to a year. You can also compile QA-compliant report documents using the **LiquidSens** viewer software.

LiquidSens puts a welcome cap on your investment requirements, because you only require one sensor for many applications/measurement variables. All you need is to install the required app, and your **LiquidSens** will recognise the parameters that you wish to include in your individual liquid measurement.

Flexibility of apps

Just like with a smartphone, you can add further parameters to your **LiquidSens** software, and your sensor will apply them consistently – simply smart. This enables you to measure, among other things, acoustic velocity, density, temperature, and application-specific concentration. The way your liquid is analysed is determined by the liquid itself. Just set **LiquidSens** to operate according to your needs. With our help, you no longer need different equipment to measure



Acoustic velocity:

Measuring range: 600 m/s to 2000 m/s

Measuring frequency: 10 Hz

Precision: 0.1 m/s



Temperature:

Measuring range: 0°C to 100°C

Measuring frequency: 1 Hz

Precision: 0.1 °C



Concentration:

Measuring range: 0% to 100%

Measuring frequency: 10 Hz

Precision: up to 0.01% (depending on application)



Density:

Measuring range: 0.7g/cm³ to 1.5g/cm³

Measuring frequency: 10 Hz

Precision: 0.01 g/cm³

different variables. This not only saves you space and instruction time but, naturally, also reduces costs.



"We have invented the SmartSensor for the benefit of our customers; it can 'think' for itself and is as flexible as you would expect a good 'employee' to be."

Stefan Rothballer
CEO of SensAction AG

The aim of both this brochure and the supplemental pages is to give you an overview of the possible uses of **LiquidSens** in your company and which processes can be simplified and rendered more effective. We invite you to take part in a genuine transparency offensive with regard to your liquids. **LiquidSens** monitors your liquids during the ongoing process, allowing you to assume ecological responsibility, thanks to the strict and continuous monitoring of your products' quality.

Once the unit has undergone one-time factory calibration, it is possible to install any number of media apps, even later on.



LiquidSens in comparison

What is it that makes LiquidSens stand out from the crowd of comparable products used for measuring acoustic velocity? See our 'test strip' below for a direct comparison:

+++ Very good ++ Moderate + Fair Not incl.

	LiquidSens	Clamp-On (SW*)	Fork method
Measuring precision:	+++	++	
Temperature compensation:	✓	✓	+
Flow compensation:	✓	✓	✓
Density compensation:	✓		
Stability when soiled:	+++	++	
Media tolerance:	+++	++	++
Process interference:	+++	+++	+
Space requirements:	+++	++	
Software flexibility:	+++	+++	
Costs:	++		++

Please contact us should you have any further questions.

(* SW = Shear wave principle)



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Sensor technology and individual flexibility

SensAction AG is an innovator in the field of sensor technology. We are happy to give you a glimpse into how SensAction AG's sensory systems function.

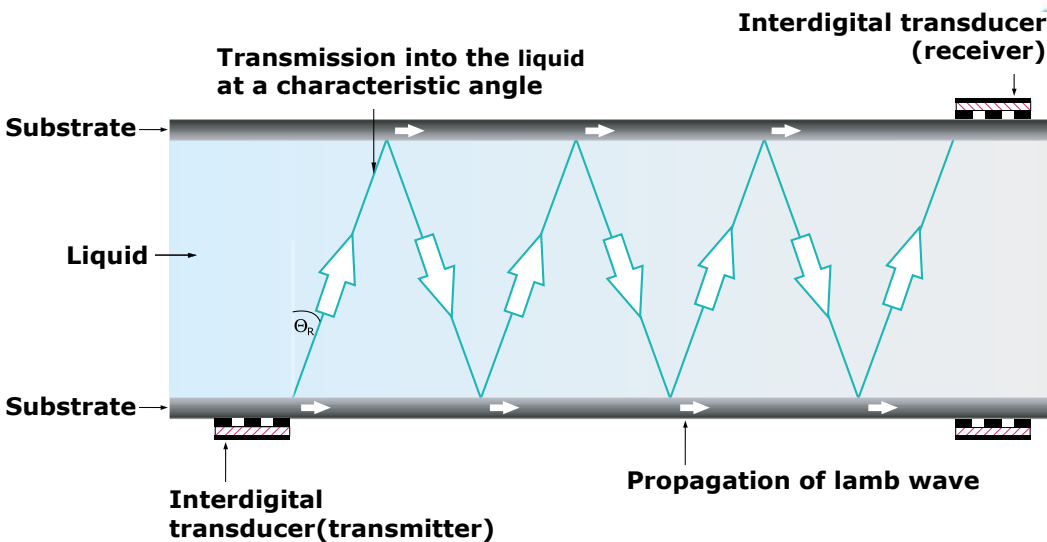
The core component of our **LiquidSens** sensors is a new kind of 'acoustic wave guide', which allows liquid concentration to be measured quickly and extremely precise using surface acoustic waves (SAW).

Measuring with the precision of acoustic waves

Surface acoustic waves, such as Rayleigh waves or Lamb waves, are high-frequency sound waves. These surface waves are excited by a piezoelectric interdigital transducer, and are propagated inside the wave guide.

By implementing a dual arrangement comprising one transducer functioning as a transmitter and another as a receiver, it is possible to perform a very precise evaluation of transmission times and amplitudes. When surface waves that have been excited in this way come into contact with a liquid, the waves are decoupled into the liquid and a mode conversion takes place at the Rayleigh angle.

The size of this angle depends on the relationship between the surface wave speed and the acoustic velocity of the liquid. While run durations are used for determining

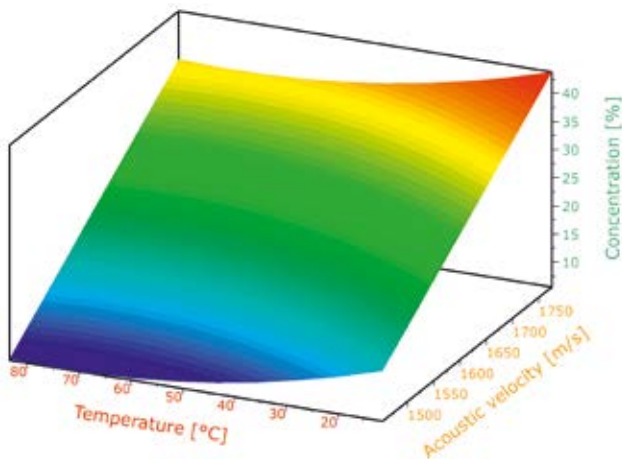
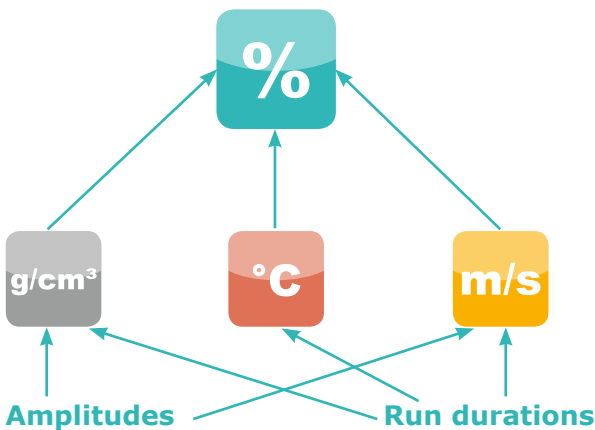


the acoustic velocity and temperature of the liquid, the simultaneous measurement of amplitude variations allows the characteristic acoustic impedance and the density of the fluid to be determined.

By combining these variables, it is possible to determine the composition of many substance mixtures (concentrations).

Sensitive – even to the smallest of changes

The measuring system monitors liquids throughout the entire production cycle. Even the smallest changes in concentration are detected and displayed by **LiquidSens**.



Your custom measuring system

Sensors

LiquidSens^{Liner}

Sensor for high-precision, contact-free online liquid monitoring directly in the flow. The sensor is available in the nominal widths DN 8, DN 15 and DN 25.



LiquidSens^{Probe}

Sensor for high-precision, contact-free online liquid monitoring directly in the tank and/or in the laboratory.



Specifications

Liner connections:

External thread, internal thread, flange

Probe connections:

External thread, hand-held probe, flange

Materials:

Stainless steel V4A 1.4571
Hastelloy C22

Operating temperature:
0...120 °C



Controller

LiquidSens^{Controller touch}

Processing unit and measuring transducer for LiquidSens sensors with **3.5" TFT touch display.**



LiquidSens^{Controller}

Processing unit and measuring transducer for LiquidSens sensors with **LED display.**



Specifications

Interfaces:

Analogue 4...20 mA

0...10 V

Switch contact

Digital Ethernet (Modbus)

Power supply:

24 V DC

Operating temperature:
0...50 °C



Cables

LiquidSens^{Cables}

For connecting the LiquidSens sensor to the LiquidSens controller.



Cable Lengths

Connecting cables are available in the following lengths:

1 metre
2 metre
5 metre
10 metre



Specifications

Cable connection:

8 pin, double-screened, insertable at each end, plug tested to IP68



Software

LiquidSens^{Software}

Clearly laid out visualisation of measured data.



You have the choice!

Measuring systems are individually configured using the intuitive user interface.

Choose from a range of three software packages.



Software packages

LiquidSens Viewer V2.0

Displays the current values of all measured variables

LiquidSens Viewer PRO V2.0

As LiquidSens Viewer V2.0
+ records values for creating new media data

LiquidSens Viewer V2.0 + SD

As LiquidSens Viewer PRO V2.0
+ read data from SD memory cards



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