



## Sensor solutions for laboratory automation

### Lab efficiency and safety

Sensor Solutions  
Motion Control  
Vision Technologies  
Process Instrumentation

# Welcome to Baumer

## Your strong partner for innovative sensor technology in laboratory automation



### International partnership

The Baumer Group is a premier supplier of sensors, encoders and vision solutions and employs about 2,000 people in 35 affiliated companies in 18 countries. Our market success spanning many years is based on the compiled expertise and know-how of the four product segments Sensor Solutions, Motion Control, Vision Technologies, and Process Instrumentation, creating an all-encompassing and innovative product portfolio. We stand by our customers as a reliable partner by international presence, innovative development work, profound application competence, and exceptionally high standards of support, service, and quality.


### Precision and quality

Quality is our commitment. The Baumer products master their application objectives with utmost reliability, pre-

cision, and competence by virtue of exceptionally high quality standards in development, manufacture, and installation service. Baumer applications have proved long-term high utility value in not only the laboratory automation market but in medical engineering, handling and robotics, and various mechanical engineering markets as well.

### Pioneering reliable sensor technology

The members of the Baumer Group are always setting new benchmarks – whether in miniturized designs or sensor performance. We anticipate our customers' needs and continuously complete our portfolio with practice-oriented products. By virtue of innovative pioneering and sophisticated technologies, the Baumer engineers create unique solutions to improve efficiency and system availability in the laboratory.



## Baumer – the industry expert

- Baumer is a premier supplier of sensors, encoders, and vision solutions in the laboratory automation and handling and robotics markets.
- High quality engineering and manufacturing standards ensure extended product lifetimes.
- Baumer products are well-known for their absolute reliability and precision.

## Baumer – innovative ingenuity

- The all-encompassing Baumer product portfolio is the basic foundation for cost-efficient and customer-configured solutions.
- Expertise and experience in sophisticated technologies create synergies for innovative products.
- Baumer customers benefit from our expert application know-how in all industries.

## Baumer – your global partner


- The Baumer Group is internationally active, operating in all important markets throughout the world.
- We ensure close customer collaboration at the source via a network of affiliates and distributors in many countries.
- Baumer products are available worldwide – and so are we. Anywhere and at any time for your support and on-site service.



# Baumer sensor solutions for laboratory automation


## Identification and traceability

The *VeriSens*® vision sensor with ID function allows the user to read and check codes (such as Barcodes, Matrix codes and printed characters) on test tubes or microplates. The identification function can be combined with further features for object properties control (e.g., presence detection). Thus various inspection jobs can be done simply and flexibly in one working step.

1		<p><b>VeriSens® vision sensor with ID function</b></p> <ul style="list-style-type: none"><li>■ Position, completeness and presence check</li><li>■ Reliable identification through powerful code reader</li><li>■ Checking of sequence of numbers and character strings</li><li>■ Simple and quick commissioning</li><li>■ Ethernet and web interface</li><li>■ Protection class up to IP 69K</li><li>■ High process stability with the Baumer FEX® contour processor</li></ul>
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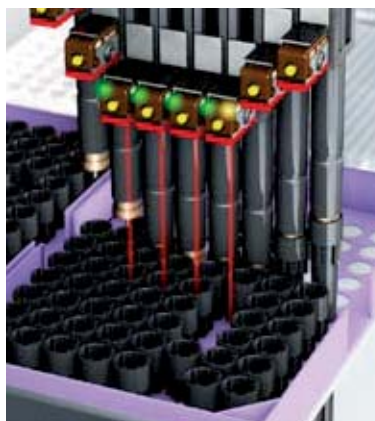
## Tip detection

The precise photoelectric as well as the ultrasonic sensors can be used to detect the type and quantity of the tips. This allows early error detection during sample processing.

2	<p><b>Tip detection with photoelectric and ultrasonic sensors</b></p> <ul style="list-style-type: none"><li>■ Distance measuring and discrete version</li><li>■ Compact housings</li><li>■ High resolution with up to 2 µm</li><li>■ Short response time &lt; 1 ms</li><li>■ Measurement range independently adjustable</li><li>■ Reliable detection of multicolored or transparent objects</li></ul>	
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Product identification (see box 1)



Tip detection (see box 2)



XYZ-Position sensing (see box 3)

### XYZ-Positioning

In sample processing a precise position of the liquid handling arm is very important. Absolute or incremental encoders are used to determine arm positioning information. The broad Baumer product portfolio provides reliable and approved solutions for these applications.

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#### Position sensing with encoders

- Incremental and absolute encoders
- Encoders in shaft, through-shaft and bearingless configurations
- Photoelectric and magnetic position sensing
- Various Ethernet and Fieldbus interfaces
- From high precision to high robust versions

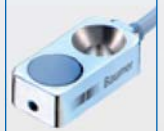
### Reference point registration

Proximity switches and precision switches are used for reference point registration when high precision and reliability are needed. Therefore Baumer can offer the ideal solution for these applications with very compact inductive and photoelectric sensors as well as My-Com® precision switches.

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#### Reference point registration – three measuring principles

- Extreme small size versions starting at 3 mm
- Rectangular and cylindrical housing type
- Response time < 0.5 ms
- High switching point repeatability
- Precision switch My-Com® with 1 µm repeat accuracy



### Labware detection

Laser sensors and vision sensors from Baumer can be used for automatic labware detection. This allows verification of proper labware and its positioning prior to the start of the sample process for the current programmed application.

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### Save detection and positioning

- Large spectrum of distance measuring laser sensors
- Detection of smallest objects and codings
- High resolution up to 2  $\mu\text{m}$
- Precision distance measuring up to 4 m
- Self-contained systems
- Compact housings

### Leakage monitoring

Early and fast detection of leakage in applications involving expensive or dangerous liquids can minimize cost and risk to personnel and equipment. Baumer offers a special leakage detection sensor which is exceptionally precise and reliable.

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### Leakage monitoring with photoelectric sensors

- Detection of minimum liquid amount of 1 ml
- Compact housings
- Easy sensor mounting
- Highly chemical resistant due to PFA material housing
- Self-contained sensor and fiber-optic version



### Liquid level measurement in microplates

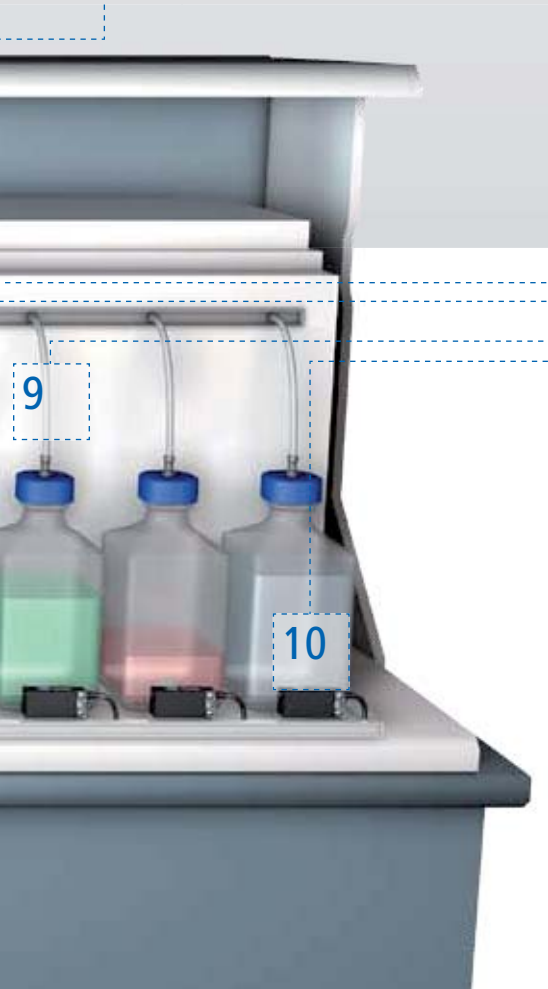
With the Series 09 ultrasonic sensor Baumer meets the challenge to measure the presence of liquid in very small containers (e.g., 96 and 384 microplates). This allows the user to precisely detect liquid level in each well after pipetting.

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### Liquid arrival check with ultrasonic sensors

- Precise liquid level measurement in even the smallest tanks up to a microliter
- High resolution and repeatability up to 0.1 mm
- Fast scanning of micro plates due to the 9 mm pitch
- Short response time of up to 7 ms
- Simplified mechanical integration thanks to multiple mounting options
- Serial, analog and digital interfaces for universal connectivity



Liquid level measurement (see box 7)



Liquid level monitoring (see box 10)



**Visualization and image processing**  
 Digital cameras are used in automated analysis of blood samples. Baumer's broad product offering includes special products for this type of application that provide high quality images for high quality analyses.

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**Digital cameras with the best image quality**

- Resolution of VGA up to 8 megapixel
- Brilliant color quality through the Baumer HQ Color technology
- Compact industry housing: 36 x 36 x 48 mm
- Simple software integration through Baumer-GAPI SDK
- Interfaces: GigE, CameraLink® or FireWire



**Flow control**

In critical applications the pipettes have to be cleaned periodically. Therefore Baumer offers a reliable photoelectric solution which is mounted directly to the tube. The non-contact sensor checks whether there is cleaning liquid flowing through the tube.

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**Flow control with photoelectric sensors**

- Non-contact fluid detection, independent of color and conductivity
- Simple mounting for tubes with a diameter from 3 mm
- High chemical resistance
- Easy installation without adjustment
- Self-contained sensor and fiber optic versions



**Liquid level monitoring**

In applications where periodic exchange or refill of tanks are required, liquid level monitoring is of critical importance. Baumer has the know-how in various sensor technologies for detecting liquids – from capacitive to photoelectric to ultrasonic sensors. The right solution for the right application.

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**Wide range of liquid level sensors**

- Reliable detection of various liquids
- Contact media or non-invasive media versions
- Compact housings and simple mounting processor
- Distance measuring and discrete version



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