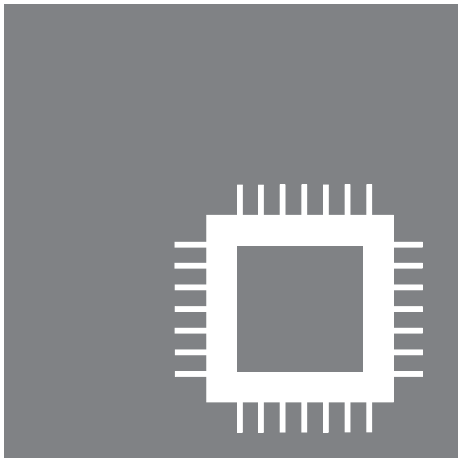
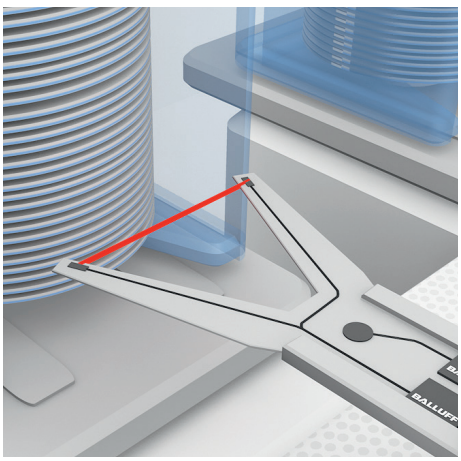
BALLUFF

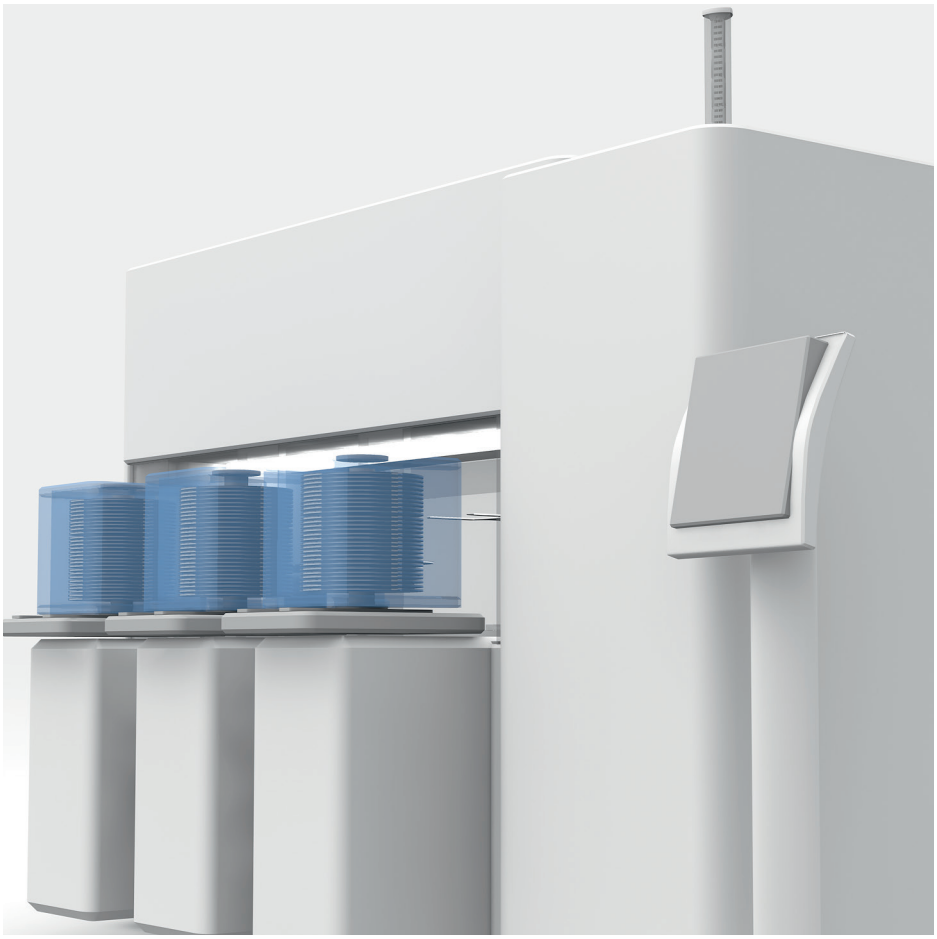
sensors worldwide

Solutions for the Semiconductor Industry

Compact, reliable, high-performance and precise







Comprehensive sensor expertise from a single source.
Solutions tailored to need

As the leading sensor specialist and system provider with more than 90 years of company tradition, Balluff GmbH has been a recognized partner in factory automation for decades. The global player has a strong presence with 61 sales branches and representative offices as well as nine production sites on all continents. The corporate headquarters in Neuhausen a.d.F. is located near Stuttgart.

Balluff masters the entire technological variety with various operating principles, including high-quality sensors and systems for position measurement and identification, as well as sensors for detecting objects and measuring fluids. The full-range assortment includes optimal network and connection technology and a comprehensive line of accessory products.

We offer innovative, first-class products tested in our own accredited laboratory, and maintain certified quality management in accordance with DIN EN 9001:2008. Our technology speaks for itself in international applications since it also meets regional standards.

Balluff stands for application-specific customer solutions, comprehensive services, individual consultation and prompt service. Our staff of more than 2750 employees is committed to providing outstanding service worldwide.

Sensors and Systems for Manufacturing Facilities and Equipment Builders in the Semiconductor Industry

Balluff solves customer-specific requirements

Semiconductors are the centerpiece of mobile communication. Smartphones, tablets and cloud computing have already fundamentally changed the ways we communicate. Virtual networking continues to move forward amid this framework.
This means more and more is demanded of semiconductor technology as well as from system manufacturers involved in semiconductor wafer processing and wafer management.

Semiconductor equipment makers have to provide reliable low yield wafer management during wafer processing.

Safeguarding highly complex, technologically demanding processes has become more important than ever before.

Balluff contributes to ensuring that systems for semiconductor manufacturing are efficient at every step and provide high availability thanks to customer-specific solutions and extremely reliable components.

Balluff Offers Customer-Specific Product Solutions

Semiconductor manufacturing equipment places high requirements on precision and miniaturization. The goal is particularly small designs in order to utilize expensive clean room space efficiently. This requires reliable, customized sensors.

As a full-range sensor specialist, Balluff offers decades of development and application experience with comprehensive expertise throughout the entire product life cycle. This expertise ensures timely product development to your specifications and individual requirements.

The right solutions – also for special requirements and new product developments
- Extending the housing
- Modular system design
- Integrated housing
- Technologies in individual housing designs

Systems and Service

Industrial Networking and Connectivity

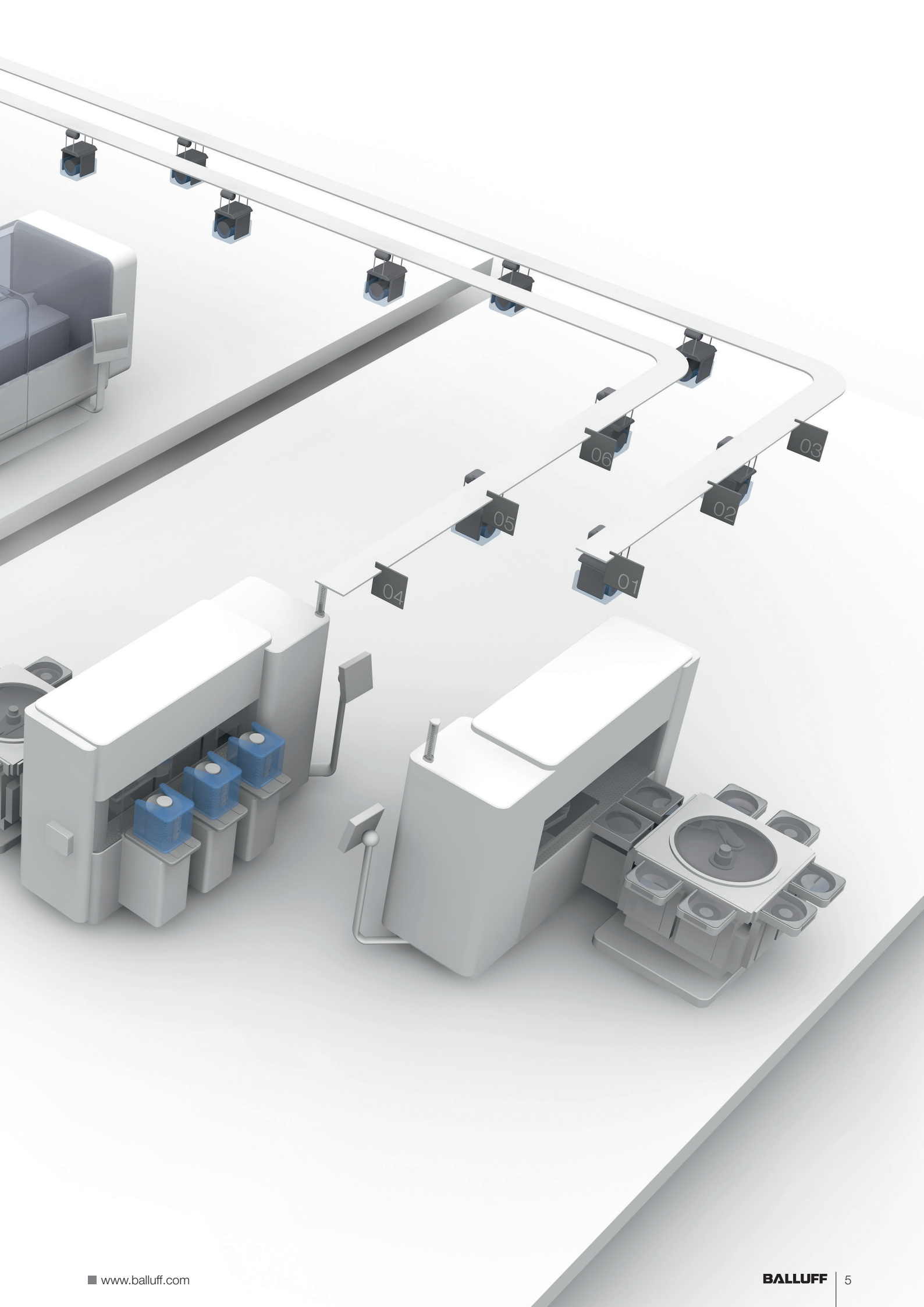
Industrial Identification

Object Detection

Linear Position Sensing and Measurement

Condition Monitoring and Fluid Sensors

Accessories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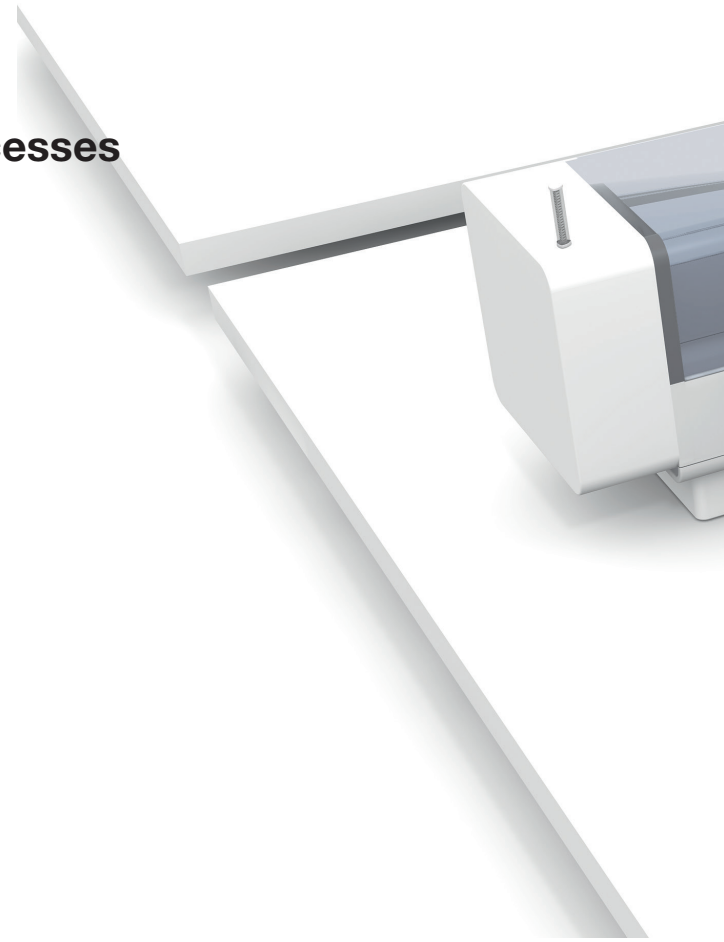
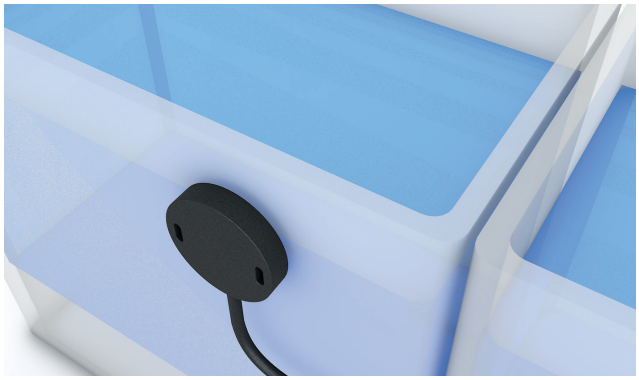
Fill Level and Leak Detection

Capacitive sensors safeguard processes in the semiconductor industry

Balluff capacitive sensors BCS are used for level detection. They measure all materials – even non-conductive ones such as liquids, granules and powders – in direct contact or through container walls. For the first time, our SmartLevel technology even makes it possible to detect concentrated acids and bases through plastic containers with walls up to 10 mm thick. SmartLevel sensors compensate for moisture, foam and deposits of all kinds as they work. Their simple installation and integration, even in existing systems, also reduce costs.





Contact-free detection of levels through container walls

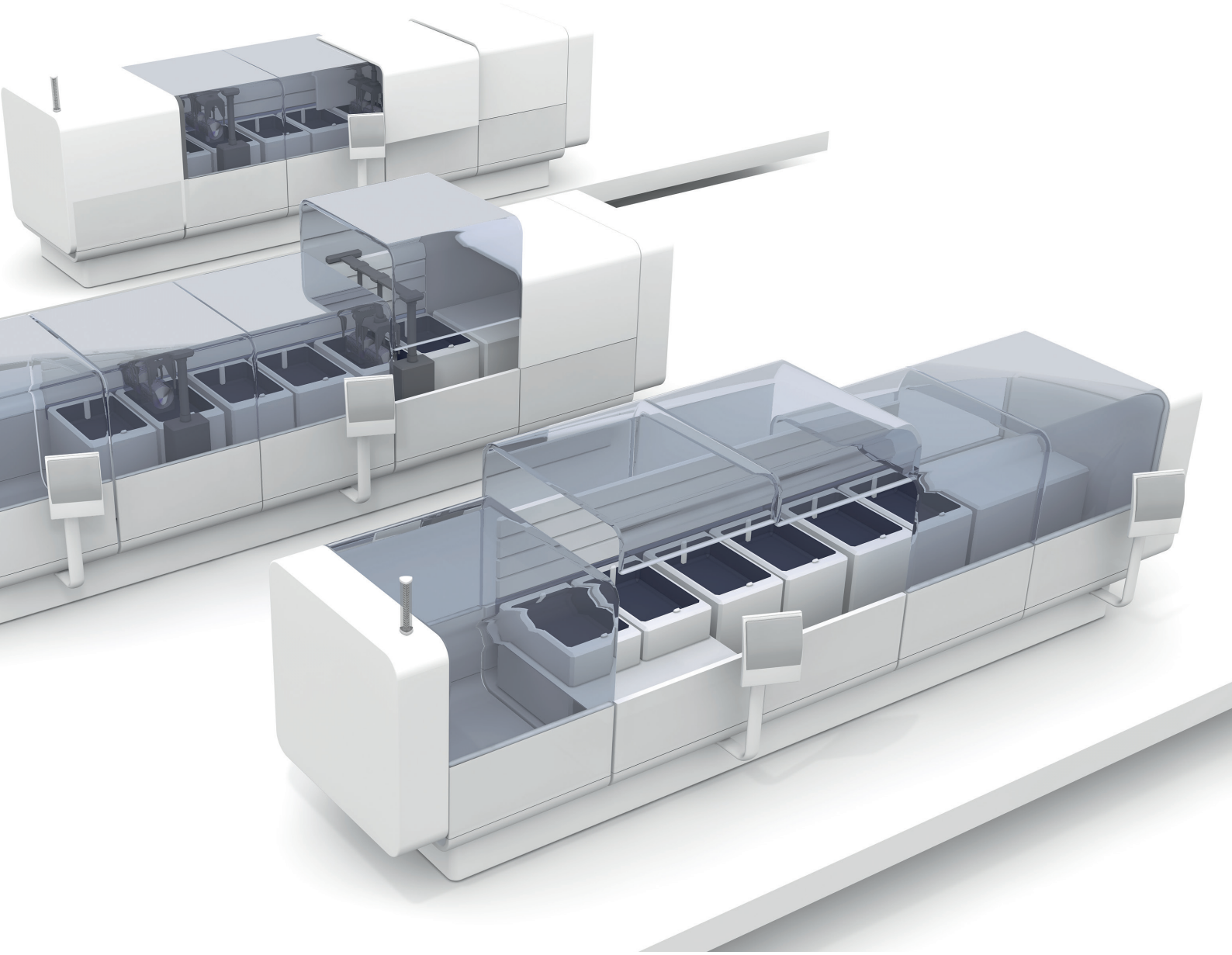
- Acids, bases and ultrapure water
- Walls up to 10 mm thick
- No bypasses required
- Reduction in installation and material costs
- Foam and deposit compensation using SmartLevel technology

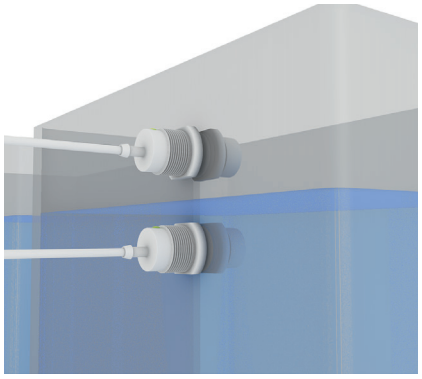
Example product
BCS D50TT05-..., 50-mm disc made of PTFE

Contact-free detection of levels at bypass pipes

- Acids, bases and ultrapure water
- Reduction in installation costs due to quick installation (using cable ties)
- Foam and deposit compensation using SmartLevel technology
- IO-Link variant on request

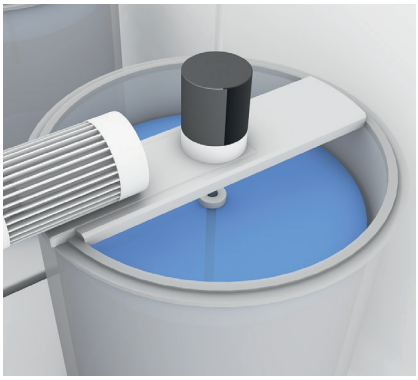
Sample products
BCS R08RR01-..., block style, PP housing (MicroBox)
BCS Q40BBAA-..., block style, PBT housing (MicroBox)





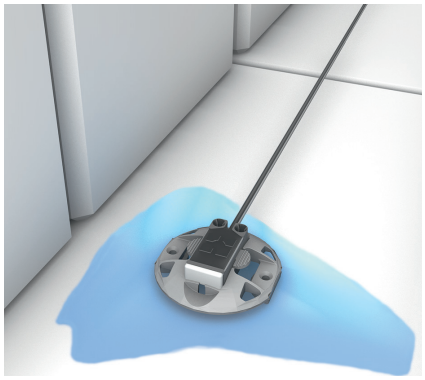
Detecting highly conductive process fluids
- Fill level measurement in contact with the media
- Non-flush mounting
- PTFE housing
- Foam and deposit compensation using SmartLevel technology

Example product
BCS M30TTH2-..., M30 cylinder design, non-flush, PTFE housing



Continuous detection of the fill level
- Highly accurate level measurement in the µm range (absolute)
- Ability to measure separating layers
- Stainless steel Micropulse transducer (PFA coating on request)
- Pressure-resistant

Example product
BTL7-...-K, float, PTFE housing



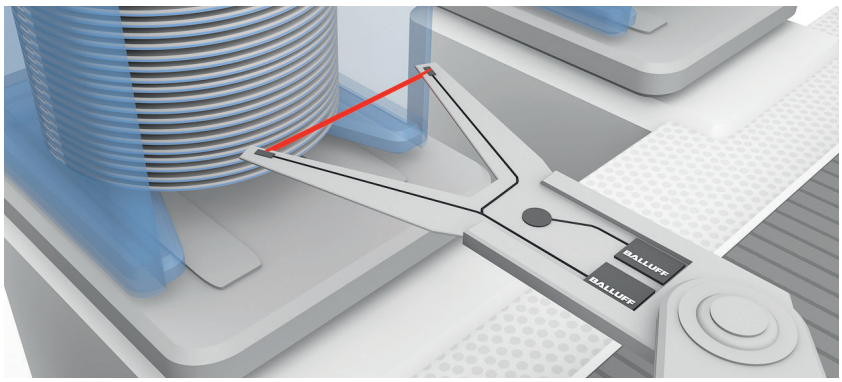
Leak monitoring of overflow chambers
- Simple mounting using supplied holder (2 mm spacing)
- Detects the smallest leak amounts
- IO-Link version available

Example product
BCS R08RRE-..., block style, PP housing (MicroBox)

Working with Wafers – Handling Step by Step

Reliable position detection between sensitive process steps

Balluff sensors ensure smooth wafer transport by robots in various process steps, such as lithography, dry etching and cleaning. Small form factors enable integration into the robot for example. This ensures reliable wafer detection even where space is at a premium.



Wafer presence check
Option 1

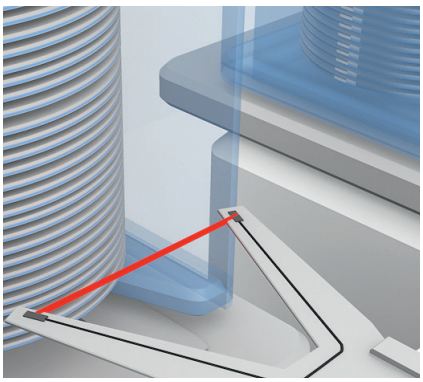
- Capacitive sensor, active surface: PTFE
- Perfect integration due to 2.5 mm component height
- Simple long-distance adjustment thanks to separate amplifier

Example product
Sensor: BCS D18T403-..., stainless steel disc, active surface made of PTFE
Amplifier: BAE SA-CS-001-PS

Option 2

- Photoelectric sensor
- Perfect integration due to 1.7 mm component height
- Simple long-distance adjustment thanks to separate amplifier

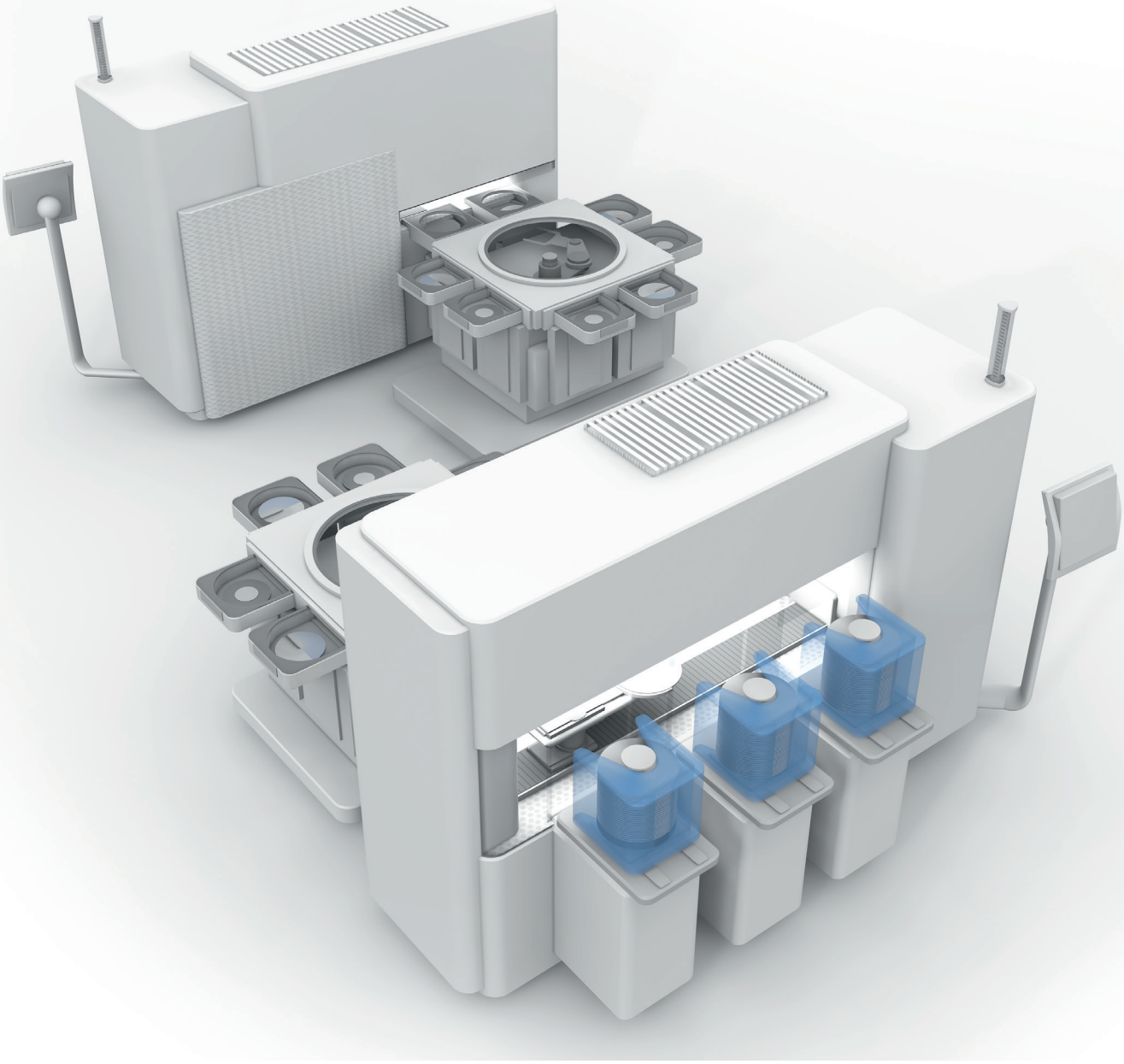
Example product
BOH DI-R006V-…, block style, stainless steel housing, vacuum-compatible, infrared light,
Amplifier: BAE SA-OH-035-PP-DV02

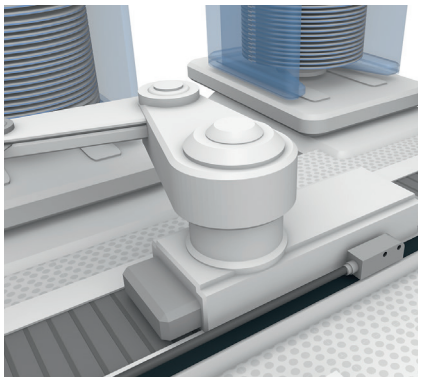


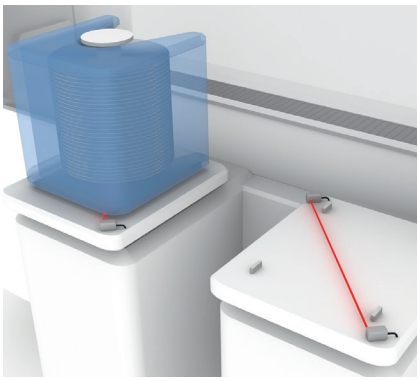
Wafter detection integrated in the end effector

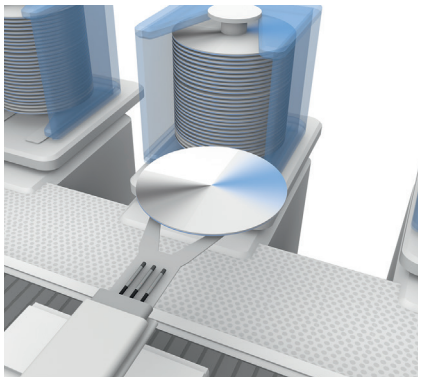
- High-precision wafer detection using a through-beam with micro-optics
- Highly exact light spot
- High-flex, extreme load capacity sensor cable

Example product
Sensor head: BOH TK-G02-…, 2-mm cylinder, stainless steel housing, red light (microSPOT)
Amplifier: BAE SA-OH-035-PP-DV02









High-precision linear position detection
- Precise (resolution down to 1 µm) and fast measurement system
- System accuracy of up to +/–7 µm
- Non-contact, wear-free operating principle
- Ideal for distances up to 48 m

Example product
Sensor head:
BML-S1H..., aluminum housing
Magnetic tape: BML-M02-A33-A3-..., rubber-ferrite/stainless steel

FOUP presence check with LED technology
- Flat design
- Senses multiple colores
- Individual focus

Example product
Through-beam:
BOH TK-R027-…, aluminum housing
Diffuse: BOH FK-Z001-…, nickel-plated brass housing, red light (microSPOT)
Amplifier: BAE SA-OH-035-PP-DV02

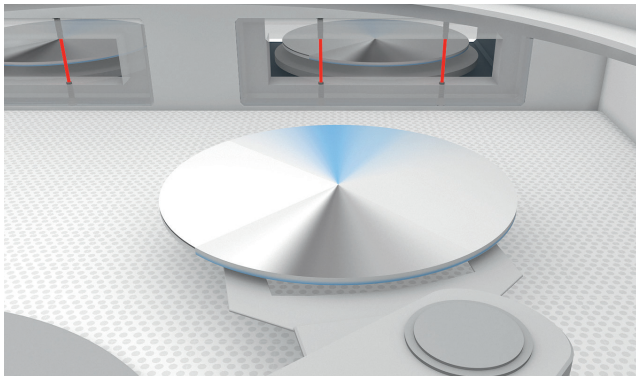
Position detection with inductive low-voltage sensors (NAMUR)
- Minimum self-heating thanks to low current consumption
- Ideal for continuous use
- Reliably detects cable breaks and short-circuits
- Sizes D4, D6,5, M5, M8 and 5x5

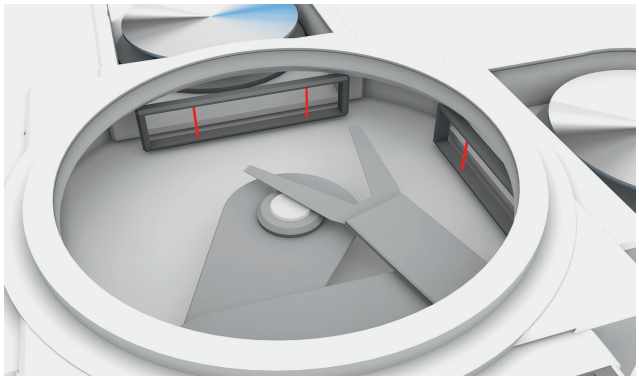
Example product
BES G04EC-…

Solutions for Vacuum Applications

High-precision photoelectric sensors

Sensors from Balluff with unique design features are ideal for direct use in high- and ultra-high vacuum as well as for ultra-finest vacuum. Balluff offers screw-in versions with a sealing function as well as sensors for installation in high-vacuum. Signals are brought out of the vacuum chamber via electrical cables using a feed-through.





Wafer centering with reference through-beam for the load-lock

Option 1

- Screw-in version, rugged stainless steel housing with sealing function
- Micro-optics with small light spot
- For vacuum applications down to $1x10^{-9}$ mbar
- External amplifier

Example product

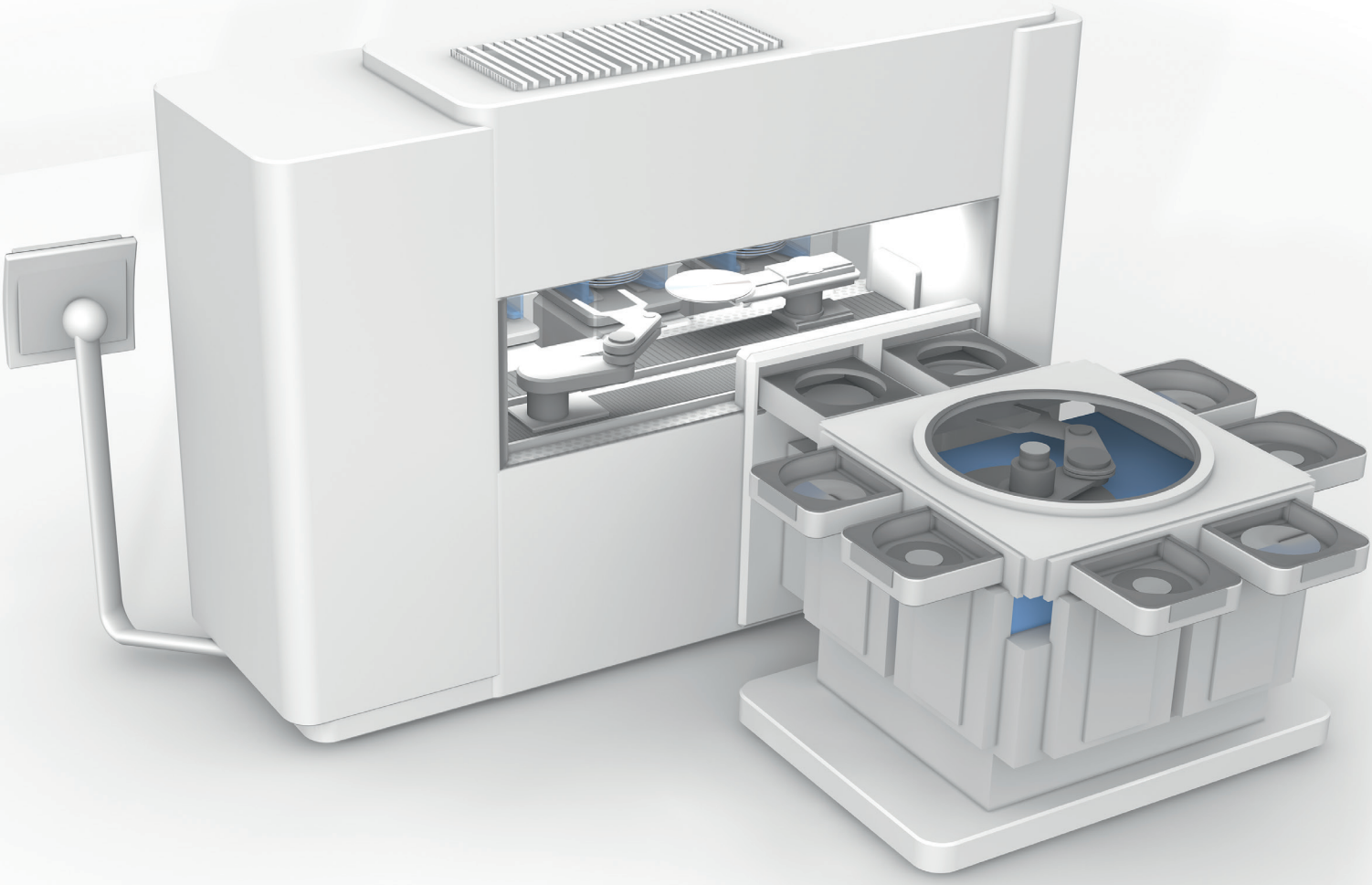
BOH TR-M06V-…, M6 cylinder, stainless steel housing, infrared light
Amplifier: BAE SA-OH-035-PP-DV02

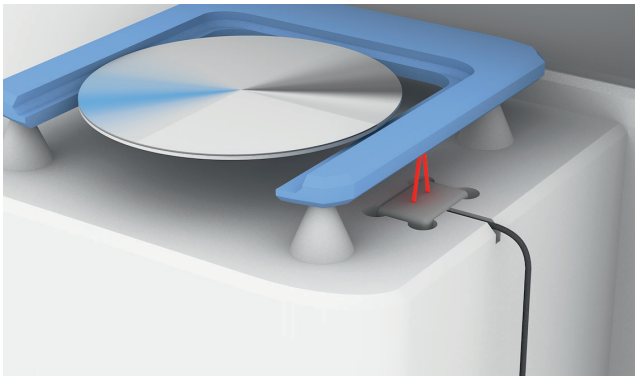
Option 2

- Integrated micro-optics for your individual frame
- For vacuum applications down to $1x10^{-9}$ mbar

Example product

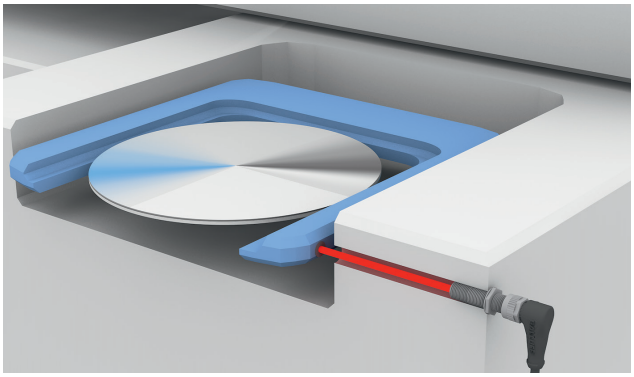
Diffuse or through-beam sensors BOH which are adapted to individual requirements





Presence and position detection of a wafer on blade
- Space-saving ultra-flat design (1.7 mm)
- No dead zone
- PTFE cable optimized for outgassing
- External amplifier

Example product
BOH DI-R006V-…, block style, stainless steel housing, infrared light
Amplifier: BAE SA-OH-035-PP-DV02



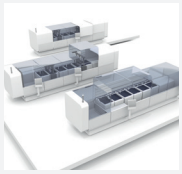
Presence checking through a narrow housing channel on the vacuum chamber
- Micro-optics with small light spot
- Rugged stainless steel housing with sealing function according to your design specifications
- For vacuum applications down to $1x10^{-9}$ mbar
- External amplifier

Example product
BOH TR-M06V-…, M6 cylinder, stainless steel housing, infrared light
Amplifier: BAE SA-OH-035-PP-DV02

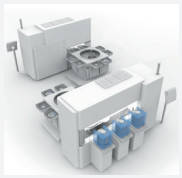
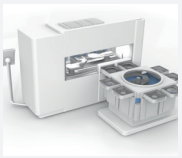
Product Selection

Suitable sensors for every application.

At www.balluff.com you can find detailed technical information after entering the product family or sample product.

	Application	Product family	Special properties	Housing material	Example product
Wet etching table, process technology					
	Level detection on plastic tanks	Capacitive sensors BCS	Contact-free sensing of acids, bases and ultrapure water SmartLevel technology: Foam and deposit compensation, flexible attachment (adhesives, screws, cable ties)	PTFE or PBT	BCS D50TT05-...
	Level sensing on bypass pipes	Capacitive sensors BCS	Contact-free sensing of acids, bases and ultrapure water SmartLevel technology: Foam and deposit compensation, flexible attachment (using cable ties)	PP PBT	BCS R08RR01-... BCS Q40BBAA-...
	Media-contacting level detection in tanks	Capacitive sensors BCS	Sensing of acids, bases and ultrapure water SmartLevel technology: Foam and deposit compensation	PTFE	BCS M30TTH2-...
	Media-contacting level detection in tanks	Micropulse transducers BTL	Contact-free measuring (measurement section protected in high-pressure resistant stainless steel pipe), highly accurate level measurement in the µm range (absolute), option of separating layer measurement, stainless steel Micropulse transducer (PFA coating on request), pressure-resistant	Measuring rod: Stainless steel (coatings on request) Float: Stainless steel housing (PTFE on request)	BTL7-...-K
	Leak monitoring of overflow chambers	Capacitive sensors BCS	Detecting the smallest leak amounts at the bottom of vats, chemical resistance	PP	BCS R08RRE-...

Subject to modification and errors. The specifications in the catalog and/or in the data sheets apply.

	Application	Product family	Special properties	Housing material	Example product
Wafer handling – Step by step					
	Wafer presence check	Capacitive sensors BCS	**Option 1** Extremely compact, 2.5 mm component height with 18 mm diameter, highly flexible 3-wire connection cable	Stainless steel/ PTFE	BCS D18T403-... + external amplifier
			Option 2 Extremely compact, 1.7 mm component height, simple remote adjustment with separate amplifier	Stainless steel housing	BOH DI-R006V-… + external amplifier
	Wafter detection integrated in the end effector	Photoelectric sensors BOH	High-precision wafer detection using a through-beam with micro-optics, Highly exact light spot, High-flex, extreme load capacity sensor cable	Stainless steel housing	BOH TK-G02-… + external amplifier
	High-precision linear position detection	Magnetically Coded Position and Angle Measurement System BML	Quick and precise (resolution down to 1 µm) measurement system System accuracy of up to +/–7 µm Contactless, wear-free operating principle, suitable for distances up to 48 m	Aluminum housing Rubber ferrite / stainless steel	BML-S1H... BML-M02-A33-A3-...
	FOUP presence check with LED technology	Photoelectric sensors BOH	Especially flat design Space-saving, individual focus, available as through-beam or diffuse type	Aluminum housing Brass housing	BOH TK-R027-… + external amplifier BOH FK-Z001-… + external amplifier
	Position detection with inductive low-voltage sensors (NAMUR)	Photoelectric sensors BES	Low current draw for minimal intrinsic heating, ideal for continuous use, reliably detects cable break and short circuits Sizes D4, D6,5, M5, M8 and 5x5		BES G04EC-…
Ultra-high vacuum – high-precision photoelectric sensors					
	Wafer centering with reference through-beam for the load-lock. For vacuum applications down to $1x10^{-9}$ mbar	Photoelectric sensors BOH	**Option 1** Screw-in version, rugged stainless steel housing with sealing function, micro-optics with small light spot	Stainless steel housing	BOH TR-M06V-… + external amplifier
			Option 2 Integrated micro-optics for your individual frame		Custom diffuse or through-beam sensors BOH
	Presence and position detection of a wafer on blade	Photoelectric sensors BOH	Ultra-flat component height (1.7 mm), no dead zone, PTFE cable optimized for outgassing	Stainless steel housing	BOH DI-R006V-… + external amplifier
	Presence checking through a narrow housing channel on the vacuum chamber	Photoelectric sensors BOH	Micro-optics with small light spot, Sealing function to your design specifications, for vacuum applications down to $1x10^{-9}$ mbar	Stainless steel housing	BOH DI-M06V-… + external amplifier

Customized Products

Take advantage of the optimum: Balluff services ensure the best solutions

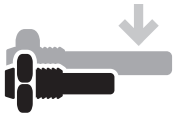
Order customized versions according to your requirements: from preassembly to engineering services. If you like, you can get catalog products from us – sensors, systems and accessories – adapted exactly to your specific requirements and custom designed. This opens up the best solutions for your application. Because we respond to your specifications.

About the process
A quick feasibility assessment is used as a basis. This involves determining your requirements, evaluating them and establishing whether they can be solved with standard products. Now you decide what you want to use and give the go-ahead for production. Samples are possible, if needed.

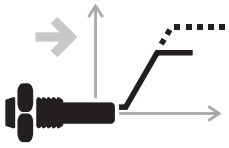
Commissioning is made faster by means of preinstalled, application-specific products. Test runs with downtime due to interruptions are a thing of the past. This increases the efficiency of your system. This takes the burden off you so that more time remains for your core business.

The benefits to you
- Quick and transparent feasibility assessment
- Solution for your application
- Customized products secure your competitive advantages
- Highest feasibility without compromises
- Takes the burden off you

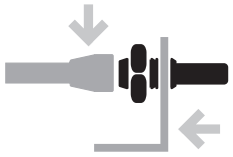
Do you need a special cable,
a certain cable length, or a special plug?
We modify our connection technology to suit your application.



Does your application require special housing designs?
Special coatings? Particular materials for extreme conditions?
Or special accessories? Tell us what you need. We will take care of production.



Ensuring quick startup
We support you with preassembly, accessories combined for a specific application and much more. Almost anything is possible. Contact us!

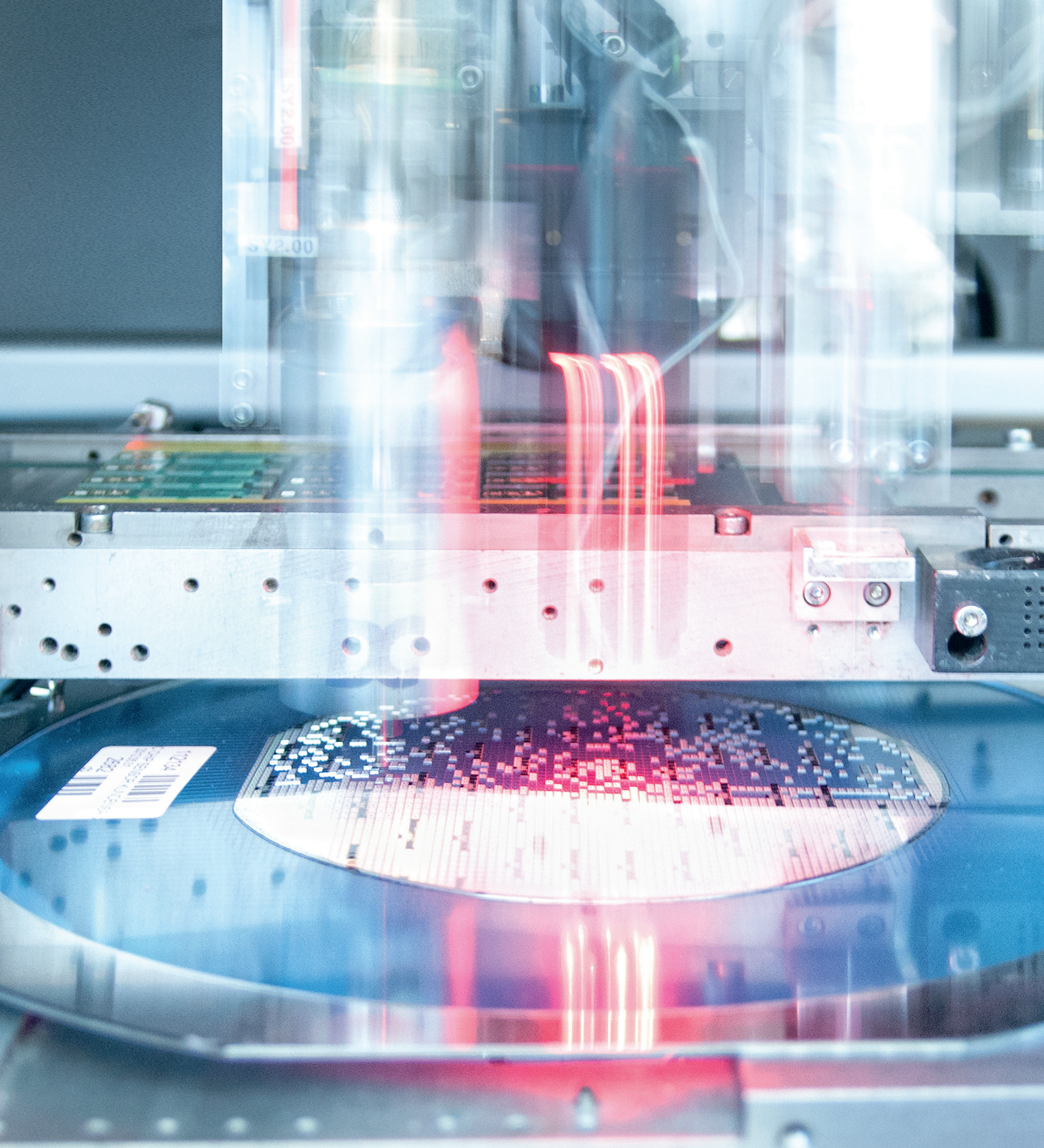


A well-functioning system concept requires the best possible design engineering.
Only customized electronics matched to the application enable full utilization of technical potential. This is why we make changes to the electronics to meet your requirements. Tell us your task. We offer solutions for implementation.

Example product

Task
In the semiconductor industry, inductive sensor solutions are required for detecting the positions of valves, membranes and other metallic parts. The sensor has to be resistant to acids and immune to failure. And the switching status has to be visible in areas operating in yellow light.

Solution
Inductive sensors ensure reliable valve position detection. The inductive sensor features a PTFE housing to protect it from acids. A red LED is encapsulated in the housing to indicate the switching status visually even in areas with yellow lighting. A PTFE cable rounds out the completely chemically resistant design. Ordering code: BES049C



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Systems and Service

Industrial Networking and Connectivity

Industrial Identification

Object Detection

Linear Position Sensing and Measurement

Condition Monitoring and Fluid Sensors

Accessories

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