Sensor solutions for the packaging industry

Industry guide for fillers and dispensers

Baumer
Passion for Sensors

We deliver innovation and guarantee quality for the packaging industry.

The Baumer Group is an internationally leading manufacturer of sensors, encoders and measuring instruments as well as automated image-processing components. As an owner-managed family business, we employ about 2600 staff worldwide in 38 subsidiaries and 19 countries. Our customers include small, highly specialized plant and machine construction companies, large industrial enterprises as well as affiliated groups operating on a global level.

This industry guide mainly focuses on manufacturers and operators of components, packaging machines and systems for beverages and liquid food. As a leading specialist in sensor technology, we support our customers not only in classic process technology, drive systems, position detection and quality assurance but also in aseptic filling in the food industry.

The Baumer Group has long been a reliable partner to the packaging industry. This commitment is underscored by Baumer hhs GmbH with more than 30 years of expertise in glue application, quality assurance and camera monitoring systems. With its software know-how for track & trace solutions, quality assurance, process automation and sorting applications, also QualiVision AG with over 10 years experience has firmly established itself in the packaging industry.
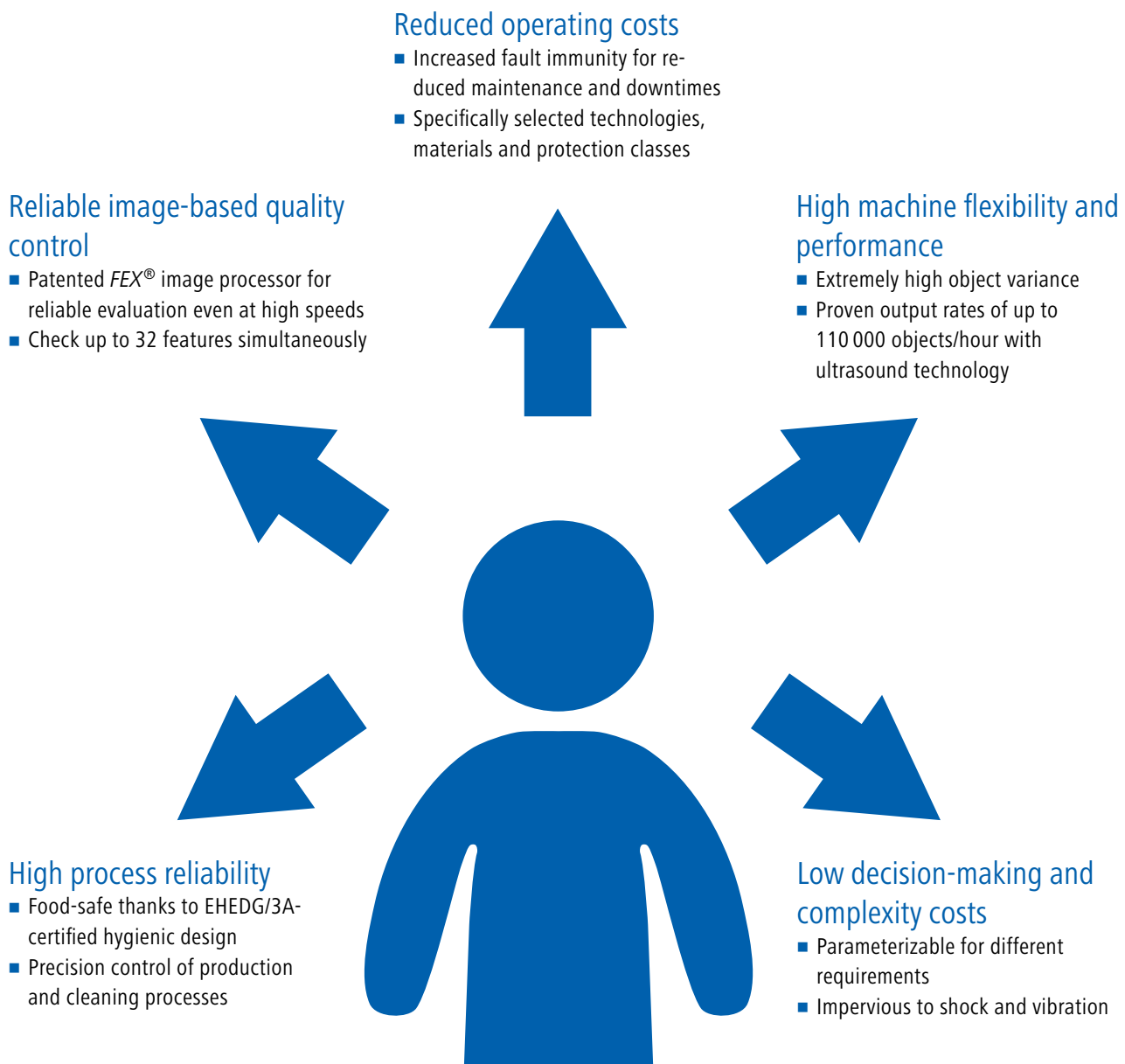
Contents.

Your benefits at a glance.

With our innovative process sensors, we facilitate reliable manufacturing and cleaning processes in the production of food and drinks. Intelligent process sensors allow machines to switch automatically to different types of packaging. With specifically selected technologies and additional information we reduce maintenance times and operating costs. Image-processing quality assurance enables individual production monitoring over the entire production and packaging process.

Reduced operating costs
- Increased fault immunity for reduced maintenance and downtimes
- Specifically selected technologies, materials and protection classes

Reliable image-based quality control
- Patented *FEX®* image processor for reliable evaluation even at high speeds
- Check up to 32 features simultaneously

High machine flexibility and performance
- Extremely high object variance
- Proven output rates of up to 110 000 objects/hour with ultrasound technology

High process reliability
- Food-safe thanks to EHEDG/3A-certified hygienic design
- Precision control of production and cleaning processes

Low decision-making and complexity costs
- Parameterizable for different requirements
- Impervious to shock and vibration

Approvals and certifications.

ATEX (ATmosphères EXplosibles)
ATEX is a directive of the European Union governing explosion protection. It includes the ATEX Product Directive 2014/34/EU and the ATEX Operating Directive 1999/92/EC.

FDA (U.S. Food & Drug Administration)
The US supervisory authority for food and drugs grants approvals for products and materials used in the food and pharmaceuticals industry.

3-A SSI (3-A Sanitary Standard, Inc.)
Is an independent, not-for-profit corporation in the USA. An inspector assesses compliance of a test sample based on design drawings and visual inspection.

EHEDG (European Hygienic Engineering & Design Group)
European not-for-profit consortium of users, suppliers and health authorities, which assesses the cleanability of hygiene components based on laboratory tests.

UL (Underwriters Laboratories)
UL tests products in accordance with applicable US safety standards.

Ecolab
Ecolab encompasses a material resistance test with cleaning agents and disinfectants.

WHG (Wasserhaushaltsgesetz)
The Water Resources Law (Wasserhaushaltsgesetz) regulates environmental protection and operational safety with the focus on substances hazardous to water.

IP 69K
The test criteria of protection class IP 69K in accordance with DIN 40050-9:1993 stipulate the prevention of water ingress in connection with the use of high-pressure and steam jet cleaning systems.

EAC (Eurasian Conformity)
Eurasian Conformity certifies a product in accordance with safety standards valid in Russia, Belarus and Kazakhstan.

CIP (Cleaning-in-Place)
Procedure for cleaning inner system components with liquid media with defined concentration, time and temperature without the need for disassembly.

SIP (Sterilization-in-Place)
Sterilization of inner system components without the need for disassembly, e.g. with steam pressure to remove micro organisms.

Baumer *SmartReflect* ® – light barrier with no reflector
An optical light barrier based on the *SmartReflect* ® principle detects objects irrespective of their shape, color and surface properties. With a detection range of up to 1000 mm transparent objects are also detected without a reflector.

Baumer *qTeach* ® – wear-free adjustment
The sensors can be taught-in just by touching them with any ferromagnetic tool. A blue LED provides clear visual feedback. To prevent user errors, *qTeach* ® locks automatically 5 minutes after energization.

Baumer *qTarget* ® – reduced setup and maintenance costs
The Baumer design ensures the light beam of the sensor is aligned with the mounting holes. This eliminates individual part tolerances, allowing the light beam to be aligned with consistent accuracy across the entire sensor range.

Baumer *OneBox Design* – flexibility in planning
The *OneBox Design* stands for a new Baumer enclosure design. The Baumer *NextGen* sensors within the series feature the same dimensions, through-holes and controls for all sensor principles and technologies.

Baumer *proTect+* – sealing concept for enhanced operational reliability
The added reliability is the result of a special design and the use of high-grade materials such as V4A stainless steel, liquid silicon rubber and polyamide. The sensors undergo a comprehensive test procedure involving high-pressure cleaning, immersion tests over 168 hours as well as temperature shock tests in water and air.

Product range from process through to packaging.

Hygiene, cleaning and rinsing applications

Temperature measurement

Pressure measurement

Level measurement

Flow measurement

Conductivity measurement

Inductive sensors

Ultrasonic sensors

Optical sensors

Vision sensors / Industrial cameras

Rotary encoders / angle sensors

Force / strain sensors

Wet and dry applications

Object detection

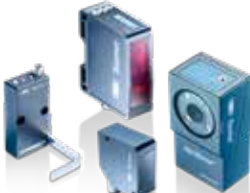## Distance measurement

2D / 3D sensors

Image processing / identification

Rotary encoders / angle sensors
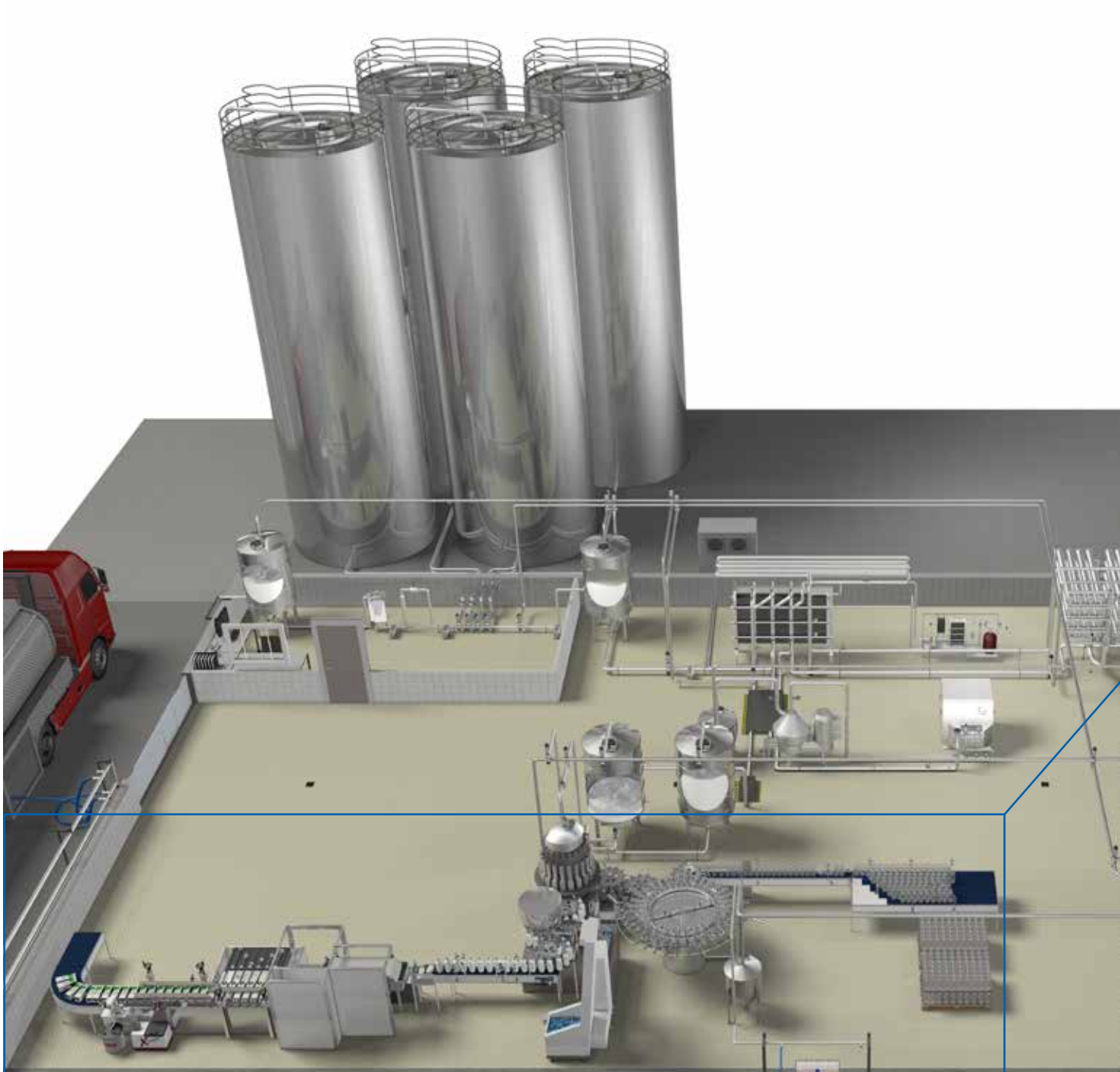
Process sensors
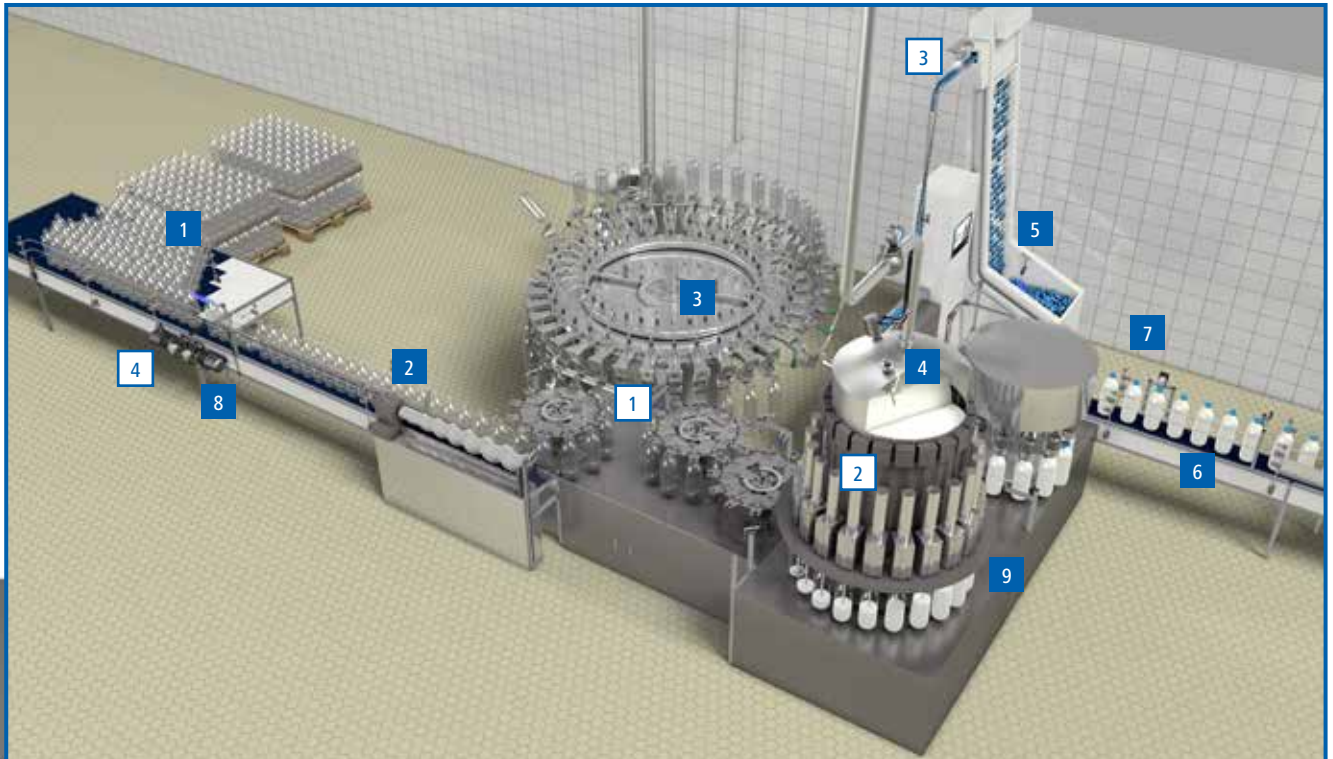
Format adjustment

Accessories

Sensor solutions for the entire production and packaging process.

The Baumer Group meets the specific requirements in the production and packaging process with a positive impact on food safety. The packaging process also needs to satisfy the demands for increased machine flexibility and performance. Machine manufacturers preferably implement our solutions with the aim of reducing complexity. In terms of industrial and customer requirements, the configuration of individual machine modules ensures that the part systems link up to create an optimum overall system.

Sensor solutions in the packaging process

1 Buffer station/buffer table monitoring – p. 10

2 Infeed monitoring – p. 12

3 Food safety: Disinfection in the rinsing process – p. 16

4 Process monitoring in machine tank – p. 18

5 Capper monitoring – p. 22

6 Outfeed station monitoring – p. 26

7 Quality control in production – p. 28

8 Drive systems synchronization – p. 32

9 Format adjustment – p. 34

Solution portfolio

1 Position sensors – p. 38

2 Process sensors – p. 76

3 Image processing / identification – p. 82

4 Rotary encoders / format adjustment – p. 84
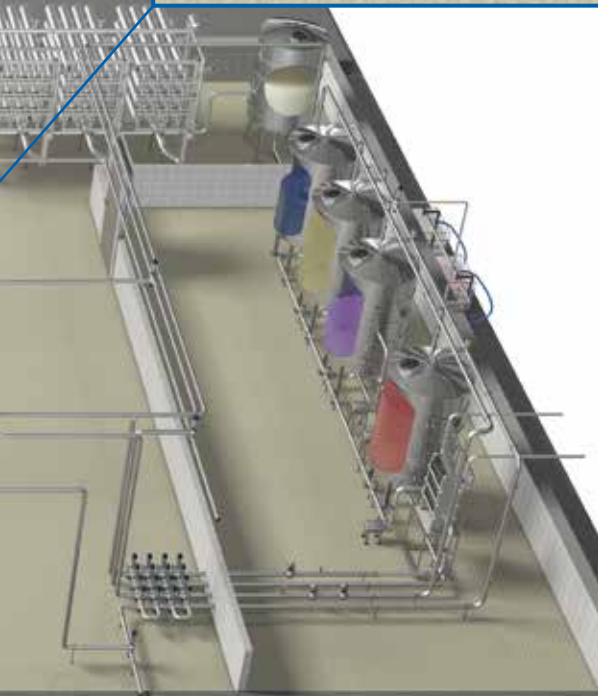
You will find more information on the production process of dairy products in the industry guide "Sensors for the Dairy Industry", everything about gluing systems under **www.baumerhhs.com** as well as information on software for automated quality assurance and track & trace solutions under **www.qualivision.ch**.
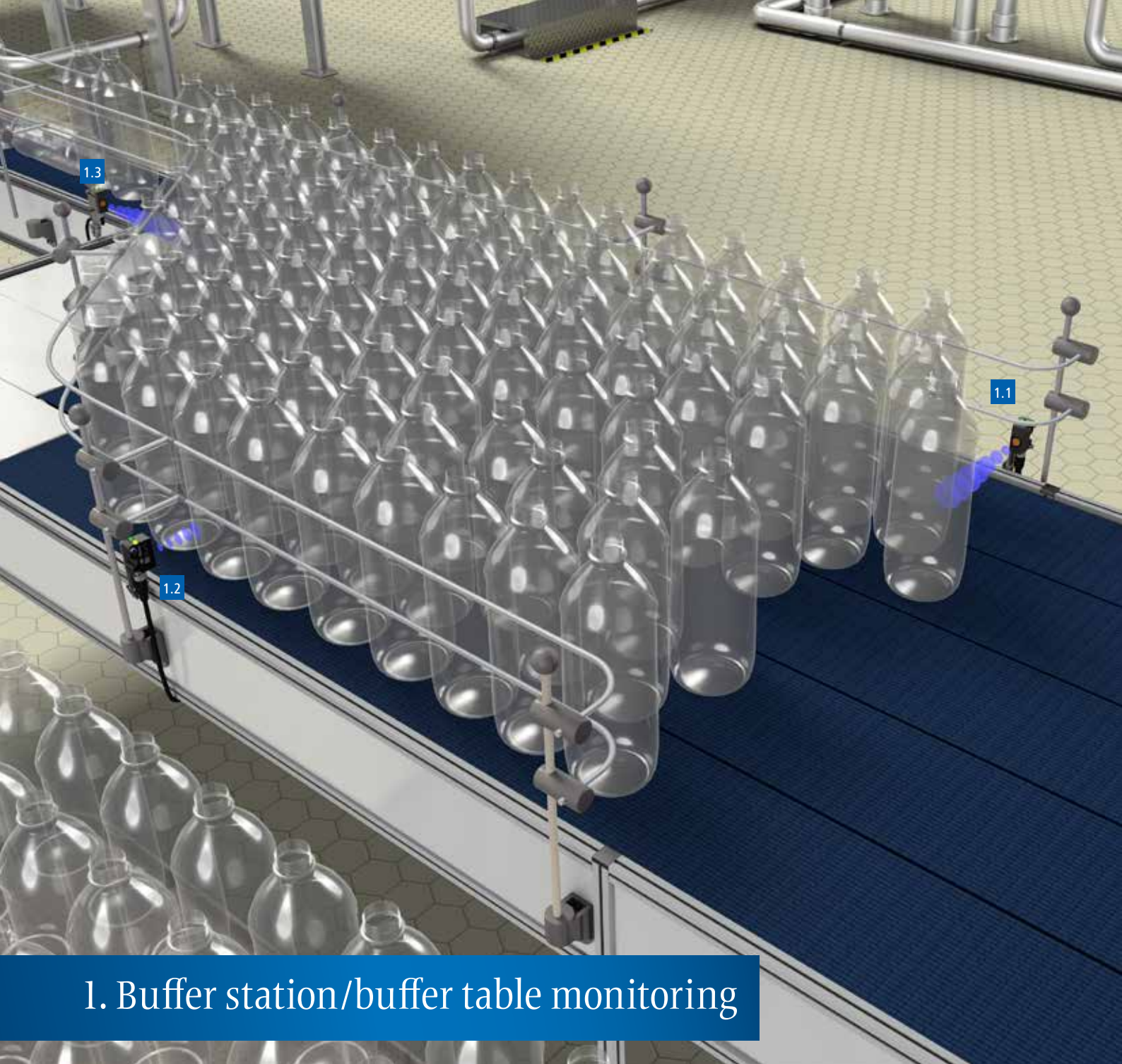
1. Buffer station/buffer table monitoring

Buffer tables are monitored by sensors in order for modern filling and packaging machines to achieve the greatest possible efficiency. Irrespective of the buffer capacity and container variance, Baumer sensors monitor the no-pressure backup of large quantities over the smallest possible area. This ensures system downtimes are reduced to a minimum.
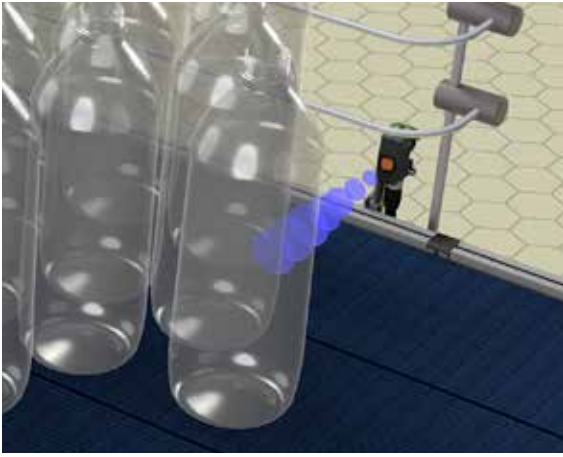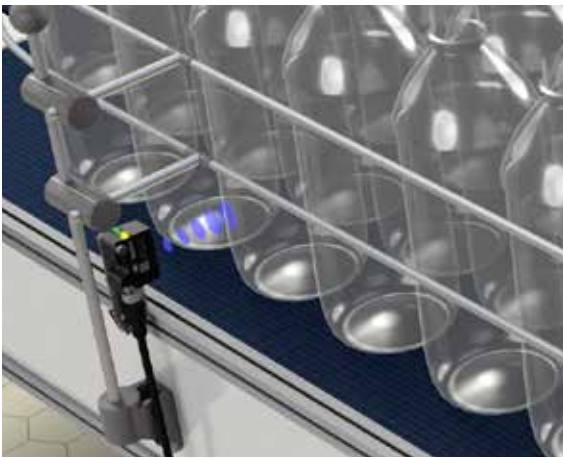
Buffer table full, filling no longer possible

Buffer table ready for filling
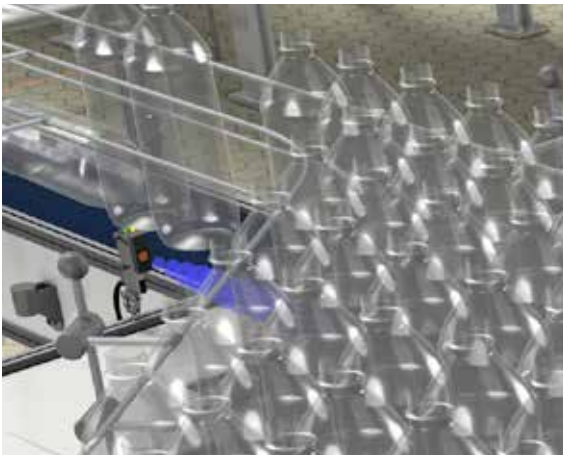
Buffer table emptying

Ultrasonic proximity switch for reliable detection

Ease of selection and planning – reducing costs
- Ultrasonic proximity switch for high packaging variance
- Detection range from 70 mm to 1000 mm

Reduced setup and maintenance times
- Fast adaptation to different applications by setting the sound beam width (e.g. narrow sound beam for individual objects and broad sound beam for groups of objects)
- Adjustable filter functions for an optimum between response time and repeatability
- Flexible adjustment of switching point with *qTeach*® or IO-Link
- Direct detection of packaging

IO-Link

UR18.PA0, p. 57
U500.PA0, p. 53
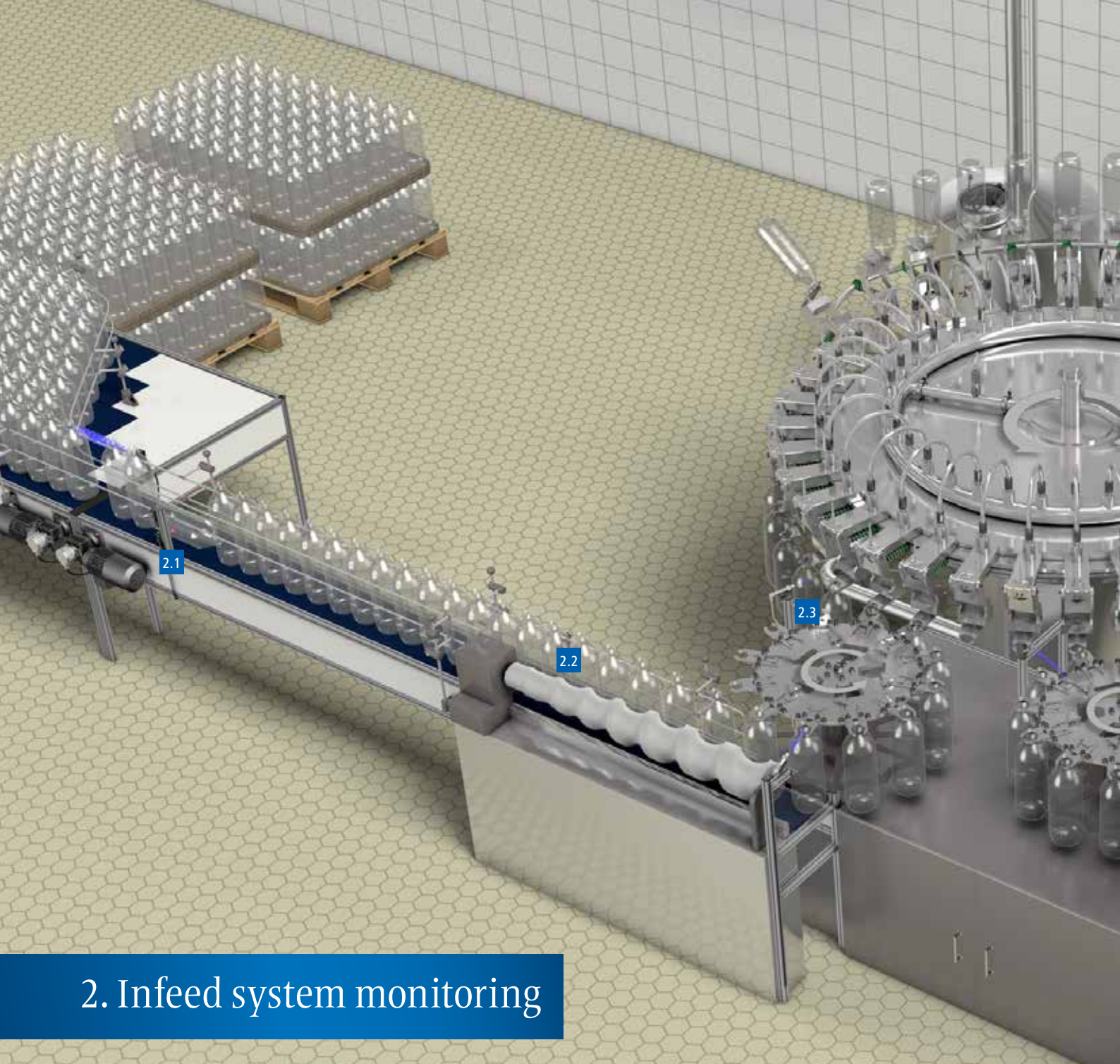
2. Infeed system monitoring

As soon as the mass flow from the buffer table forms an orderly line, the sensors monitor the position of the containers. A production output rate of more than 110 000 bottles or cans per hour is possible.
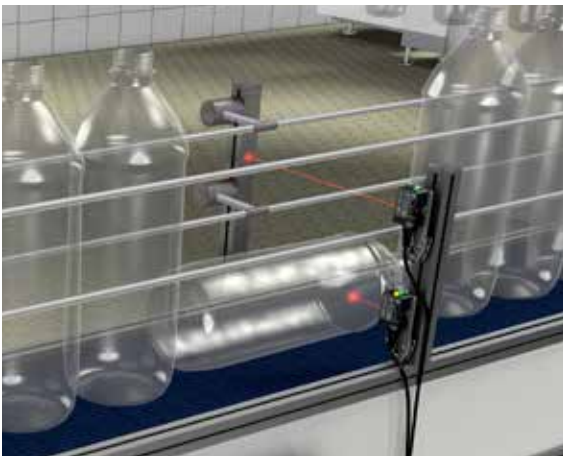
2.1 Container position monitoring

SmartReflect® – light barrier with no reflector for detecting transparent containers

Reduced production time and costs
- Visible light spot for quick sensor alignment
- No reflector necessary

High operational reliability
- Reliable barrier principle between sensor and machine part
- Suitable for objects of different color, surface finish or transparency
- High output rate thanks to fast response times and very small light spot
- Impervious to soiling thanks to plastic, stainless steel or hygiene design

Ease of selection and planning – reducing costs
- No need to clean or replace reflectors
- Extended detection range from 30 mm to 1000 mm for increased application options in the machine

IO-Link

O 500.SP.T, p. 43

Diffuse sensors with background suppression

High operational reliability
- Stable detection process due to immunity to background reflections
- High output rate thanks to fast response times and very small light spot
- Reliable light sensor principle

FHDK 10, p. 40

Inductive proximity switch –
rugged solution for metal containers

High operational reliability
- Unaffected by background reflections
- High positioning accuracy with a repeat accuracy of approx. 10 μm
- High machine output rates of up to 50 metal containers per second

Low maintenance and complexity costs
- Robust and wear-free "low cost"-solution
- Factor 1 – one sensor variant for different metal containers

IR12.P04F, p. 64
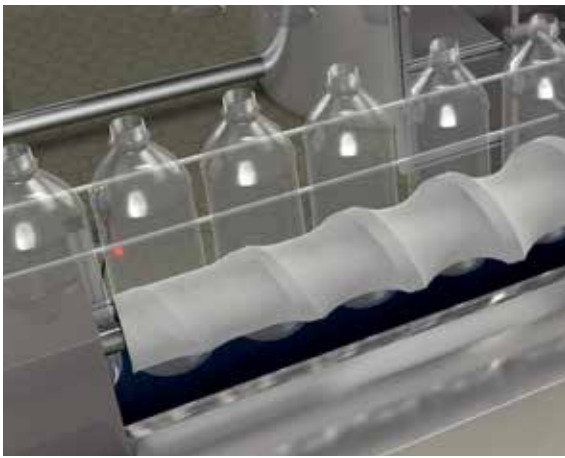
2.2 Monitoring container transfer to screw conveyor

SmartReflect® – light barrier with no reflector for detecting transparent containers

Shorter production and start-up times
- Visible light spot for fast sensor alignment
- No readjustment required thanks to optically aligned axis (*qTarget*)
- No reflector necessary

High operational reliability
- Barrier principle between sensor and machine part for maximum reliability
- High productivity and output rates thanks to small light spot for narrow packaging gaps
- Impervious to soiling thanks to plastic, stainless steel or hygiene design

IO-Link

O300.SP.T, p. 42
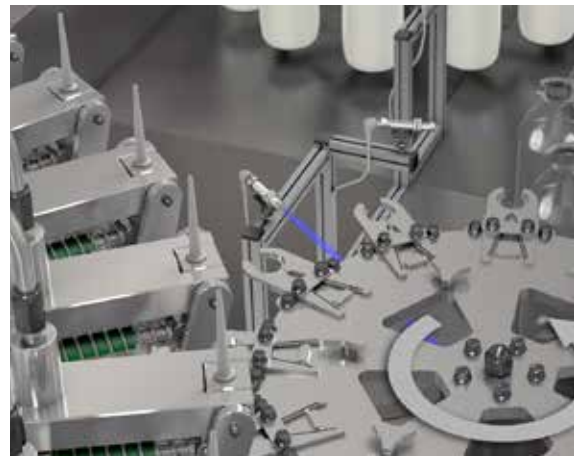
2.3 Monitoring container transfer from screw conveyor to capper

Ultrasonic retroreflective barrier with extremely short response time

High degree of reliability
- Extremely high packaging variance thanks to ultrasonic retroreflective barrier principle
- High machine availability with function reserves
- Impervious to aggressive liquids

High machine performance
- High machine productivity with proven output rates of up to 110 000 bottles / hour
- High positioning accuracy with a response time of 6 ms

Low costs
- No additional reflector necessary
- Low decision-making costs due to minimum gap between objects

UNAR 12, p. 54

Protection class IP 69K optically measuring sensors in hygienic design align rotation-asymmetric containers in the cleaning and rinsing area

High operational reliability
- Hygiene design for reliable detection in the hygiene zone
- High machine productivity with a response time of less than 3 ms

Low maintenance cost and high machine availability
- Resistant to cleaning agents (Ecolab tested)
- Intelligent functions such as localization of measuring range and averaging, maintenance status message and switching window adjustment

FADH 14, p. 49
FHDH 14, p. 45

Referencing:
Referencing machine's mechanical systems

After being switched on, the majority of packaging machines do not receive feedback on the absolute position of their mechanical systems. Referencing is therefore necessary in order to adjust the axes of the measuring systems and the positions of the mechanical systems. Referencing is concluded when the reference switch is tripped by the mechanical system. Due to the fact that the positioning accuracy of the machine also depends on the referencing, in this case we recommend the use of inductive sensors.

High positioning accuracy
- Sensor sampling rate up to 2 kHz
- Repeat accuracy of ±10 µm

High degree of flexibility in design and installation
- Enclosure length 30 mm
- Function irrespective of surface finish, soiling and liquid

Reference signal from inductive proximity switches
- IR12.P04F, p. 64
- IR30.D24L, p. 64
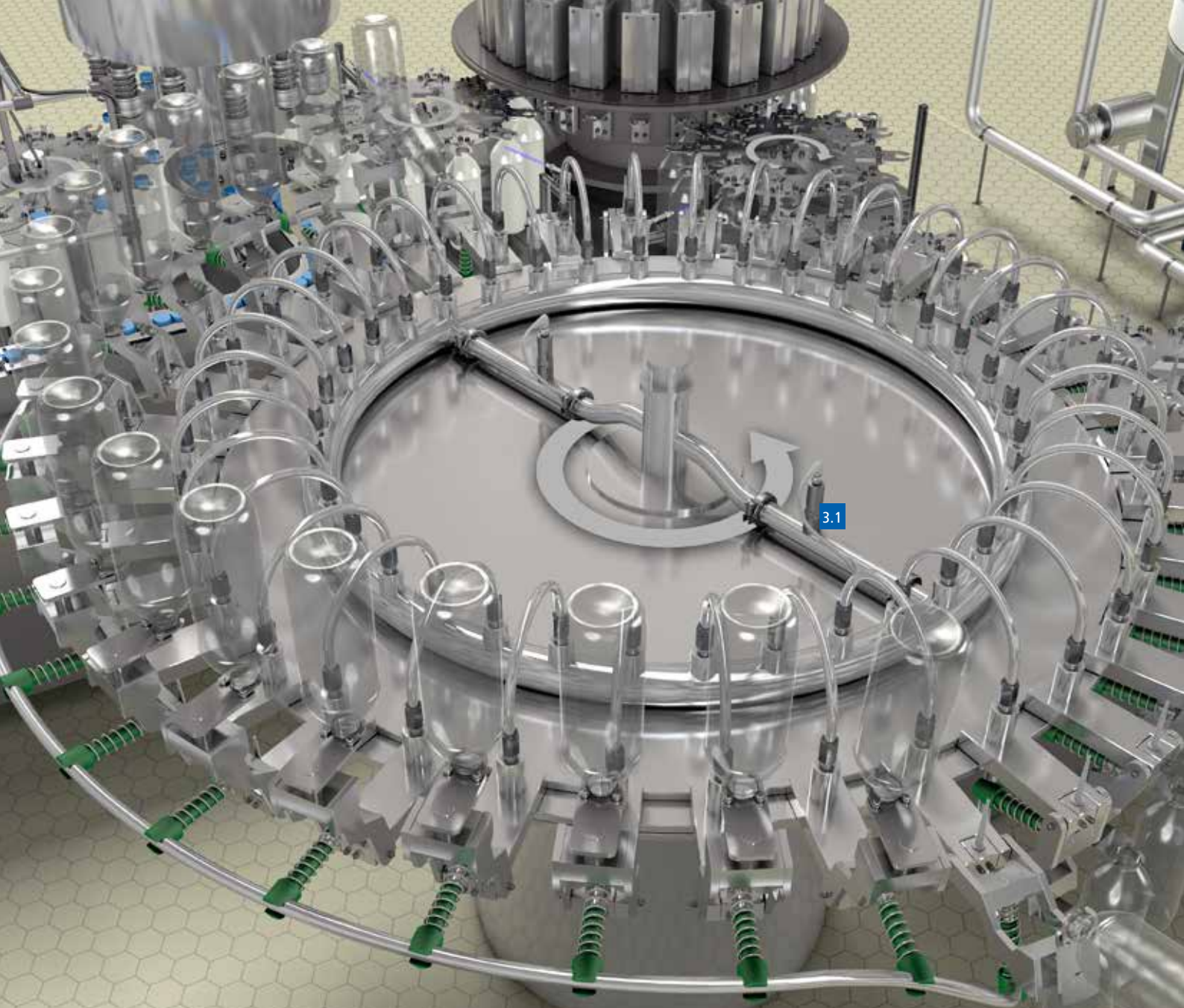
3.1

3. Food safety: Disinfection in rinsing process

In terms of reusable packaging such as bottles, ensuring high cleaning quality is a first step towards food safety. Measuring the flow rate and temperature in the rinsing process ensures reliable cleaning performance.

3.1 Disinfection in rinsing process

A calorimetric measuring principle is used to monitor flow rate and temperature

High process reliability
- Maintaining the defined flow rate and temperature for sterilization
- SIP-capable up to 150 °C, no time limit
- Flow measurement at media temperatures of up to 125 °C

Reduced complexity and installation time
- Parallel measurement of flow rate and temperature
- BHC process connection for all process variables
- Linearized and calibrated output signals

FlexFlow PF20H, p. 77
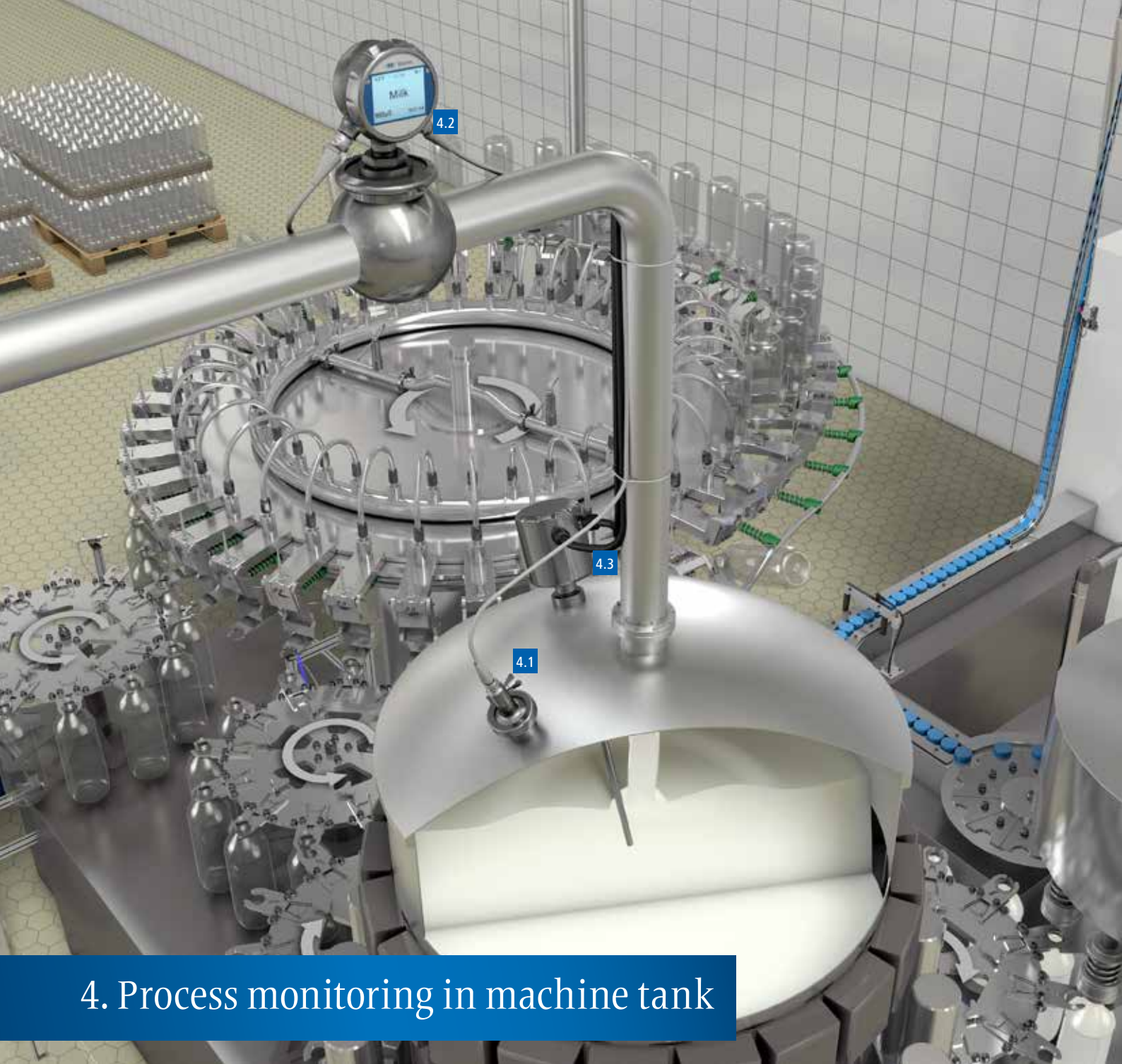
4. Process monitoring in machine tank

Food safety has top priority also when it comes to process monitoring in the machine tank. With hygienic flush process connections we guarantee outstanding cleanability while at the same time reducing the cleaning time.

4.1 Monitoring pressure in machine tank

Piezoresistive pressure measurement for absolute pressure, relative pressure and vacuum

Reliable design
- Precision and longterm stability for efficient process
- Suitable for demanding processes with frequent temperature fluctuations
- Sturdy sensor element secures machine availability even at peak pressures

PBMH, p. 76

4.2 Soiling monitoring

Inductive conductivity measurement for monitoring purity

High food safety
- Detection of minimal quantities of residual chemicals for high product quality
- Rapid temperature compensation
- EHEDG and 3-A certified hygiene design

CombiLyz® AFI4, p. 80
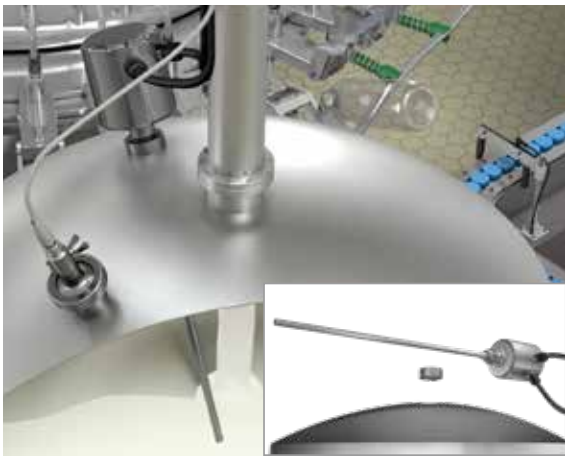
4.3 Level monitoring in machine tank

Continuous level measurement for liquid and viscous media with potentiometric measuring principle

Point level detection for liquid and free-flowing media with frequency sweep technology

High operational reliability
- Extremely short response time for fast level control
- Reliable filling even with small buffer tank

High operational reliability
- Foam detection or suppression
- No false signaling for adhesions
- Short response time of 100 ms
- Bright blue LED status indicator

Long service life
- Sturdy sensor tip made from PEEK
- Acid and alkaline resistant materials
- Resistant to temperature shock
- Enclosure protection class IP 69K

Easy installation and initial startup
- Comprehensive selection of process connections
- Retrofitable in existing process connections
- Remote setup and clone function

Certified design
- EHEDG and 3-A certified hygiene design
- ATEX approved
- WHG approved

LSP, p. 78

CleverLevel® LBFH, p. 79

Point level monitoring with capacitive technology

High degree of flexibility
- Also suitable for installation in plastic containers
- Media detection with direct contact or non-contact through container wall
- For conductive or non-conductive liquids
- For free-flowing products

CFAM 12, p. 71
CFAK 12, p. 70

Easy startup
- Fixed or adjustable sensing distance
- Simple measurement method

CFDK 25, p. 71
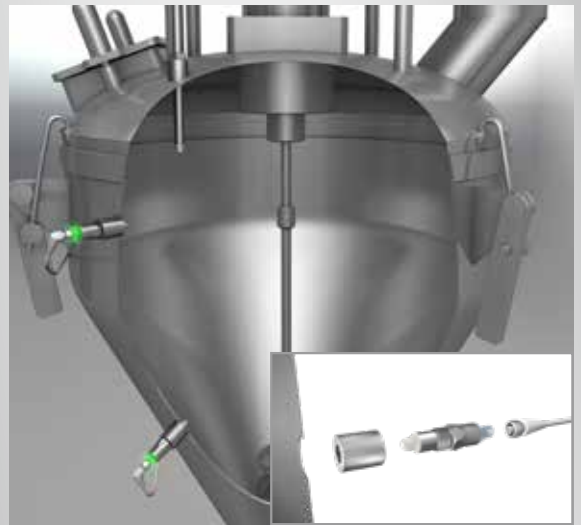
Point level monitoring for free-flowing products in metal tanks with frequency sweep technology and in plastic tanks with capacitive technology

Solution portfolio:
- *CleverLevel*® LBFH, p. 79
- CFAM 12, p. 71
- CFAK 12, p. 70
- CFDK 25, p. 71
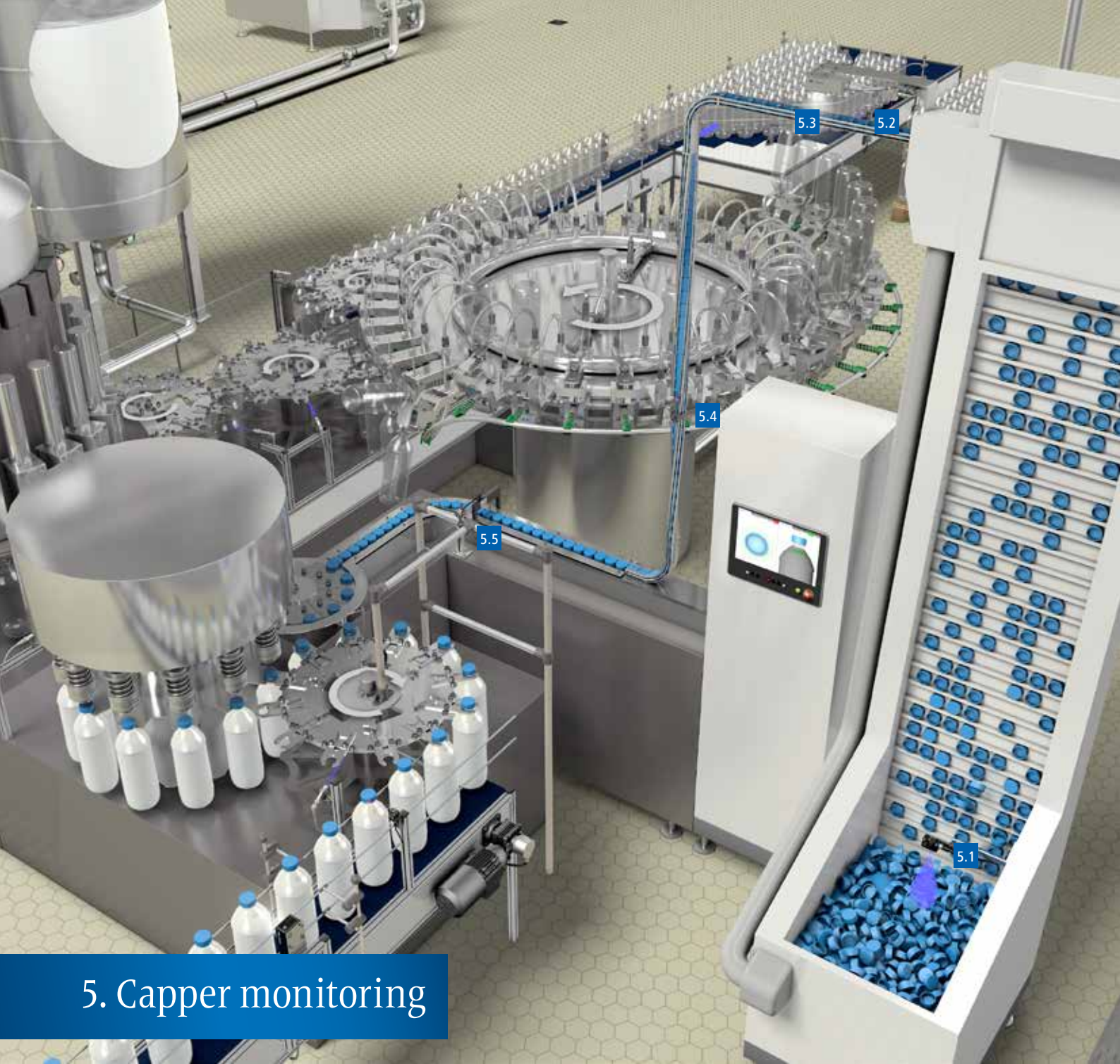
5. Capper monitoring

The demands placed on capping machines in terms of performance and flexibility are ever increasing. We support all types of closures for the most diverse requirements in the pharmaceuticals and cosmetics as well as the food and drink industries. This ensures hygienic standards are achieved, thus allowing these machines to also be used as aseptic cappers.

5.1 Cap level monitoring in the bin

Ultrasonic distance sensor with broad sound beam

High reliability and flexibility
- Reliable detection irrespective of the object properties thanks to ultrasonic retroreflective barriers
- Ultrasound technology enables the detection of different types of closures
- Extended detection range from 30 mm to 2000 mm
- No-wear teach function (*qTeach*®) ensures easy switching point setting
- Flexible adaptation to given conditions on site, sound beam width adjustment and averaging with IO-Link

Optical distance sensor with IO-Link

High reliability and flexibility
- Continuous distance measured values in IO-Link mode
- Transfer rate 230.4 kBaud (COM3), minimum cycle time 1.1 ms
- Extended detection range from 60 mm to 550 mm
- Matching light source (infrared LED, Baumer *PinPoint* LED or laser diode) for reliable level monitoring of different types of closures

◉ IO-Link

U500.DA0, p. 53
UNDK 30, p. 53

◉ IO-Link

O300.DL, p. 46
O500.DI, p. 43

5.2 Trigger sensor in wet and cleaning zone for vision sensor / industrial camera

SmartReflect® – light barrier with no reflector for detecting caps

Reduced production costs and times
- Visible light spot for easy sensor alignment
- No reflector necessary

High operational reliability
- High machine flexibility as different colors and shapes are reliably detected
- Immunity to background reflections ensures a stable detection process

Low service costs
- Enclosure protection class IP 68/IP 69K and *proTect+*
- Ecolab certified

⊘ **IO**-Link

O 300W.SP, p. 42
O 300H.SP, p. 42
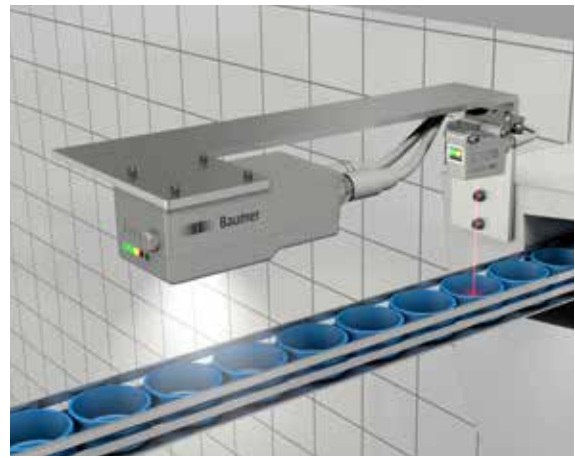
5.3 Quality control of screw caps with seal

Robust vision sensors and cameras in IP 69K design

High production reliability with *VeriSens®* vision sensors
- Patented *FEX®* contour detection down to 1/4 pixel accuracy
- Up to 6000 checks / minute
- Stainless steel enclosure of washdown design and protection class IP 69K (tested at 80 °C and 100 bar pressure)
- User-friendly sensor configuration in four simple steps

Reduced integration time and system cost with CX.I cameras
- Operating temperature range from −40 °C to +70 °C
- Four power outputs with up to 120 W (max. 48 V / 2.5 A) for direct lighting control
- IP 69K stainless steel housing in hygienic design

VeriSens®, p. 82
CX.I cameras, p. 83
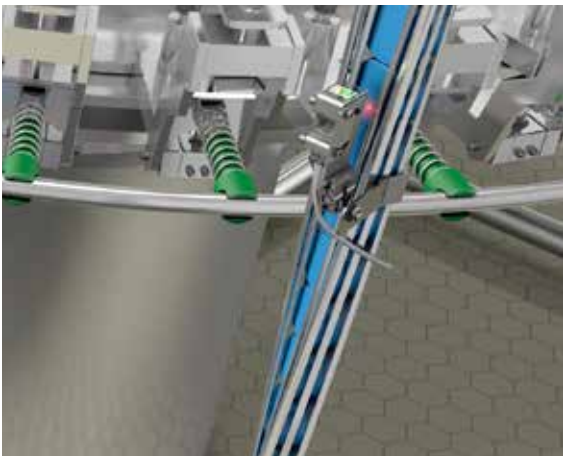
5.4 Cap infeed buffer full

Diffuse sensors with background suppression

Reduced production times and costs
- Visible light spot for easy sensor alignment
- No reflector necessary

High machine availability
- Reliable detection of different colors and shapes
- Unaffected by background reflections and extraneous light

IO-Link

FHDK 07, p. 40
O 200.GP, p. 40
O 300.GP, p. 42
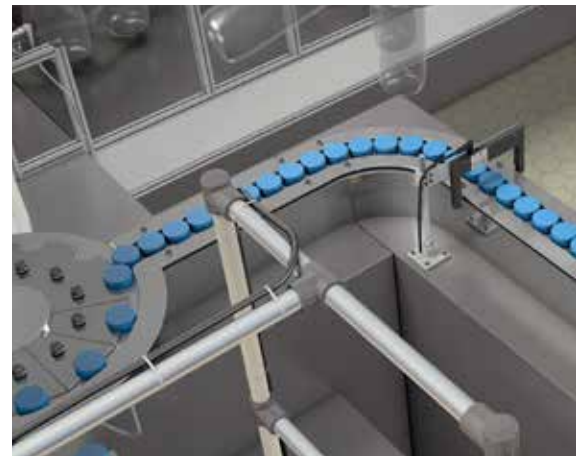
5.5 Preparing caps for takeup

Laser fork light barrier

Reduced installation and decision-making costs
- No alignment of transceiver necessary
- Fork width from 20 mm to 120 mm

High machine availability
- Through beam principle for secure detection process
- Unaffected by extraneous light < 100 kLux
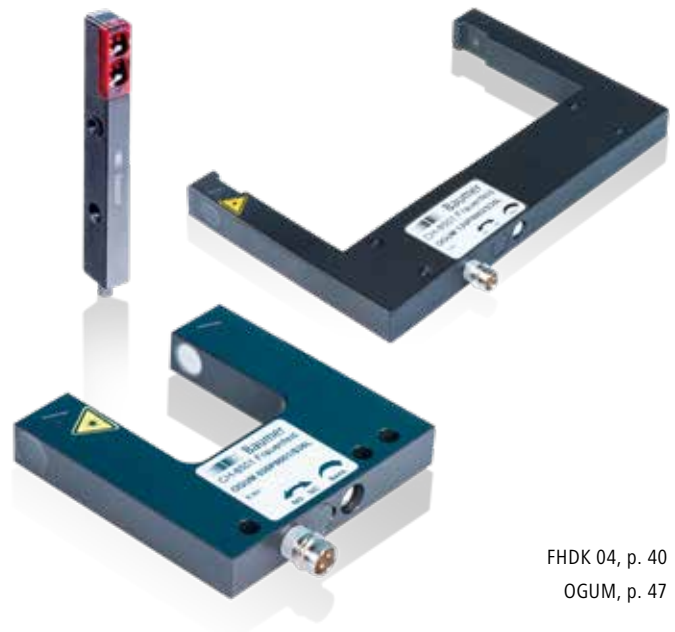
FHDK 04, p. 40
OGUM, p. 47

6.1
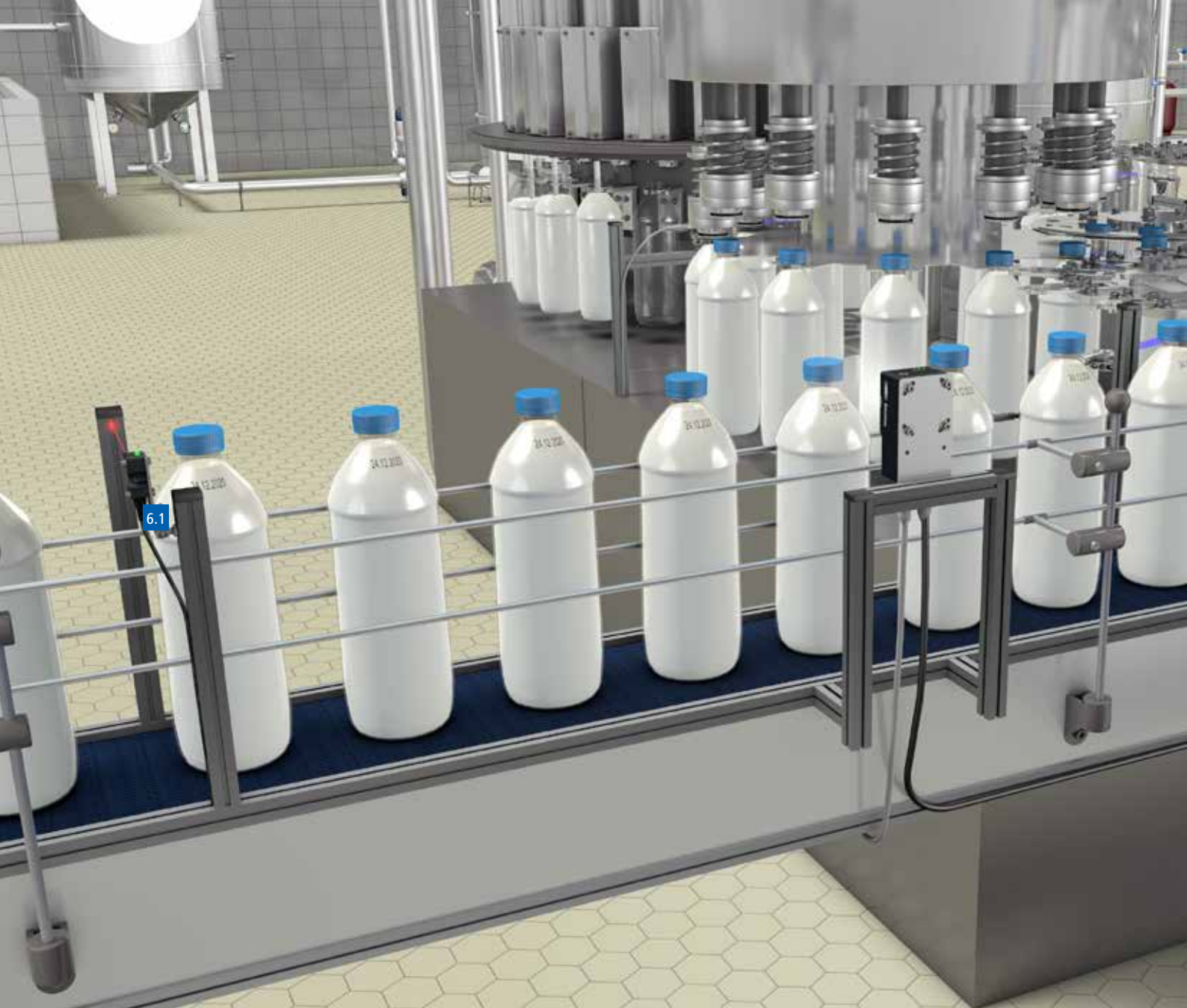
6. Outfeed station monitoring

With Baumer sensors in the outfeed station you have a wide range of options for checking production quality and display the results online during operation. A large number of features are checked simultaneously. Various customized recipes can of course be stored and called up as required.

Diffuse sensors with background suppression

High operational reliability
- Stable packaging process due to immunity to background reflections
- High output rate thanks to fast response times and very small light spot
- Reliable light sensor principle

FHDK 10, p. 40

6.1 Container exiting filling machine

SmartReflect® – light barrier with no reflector for detecting transparent containers

Reduced production time and costs
- Visible light spot for quick sensor alignment
- No reflector necessary

High operational reliability
- Barrier principle between sensor and machine part for maximum reliability
- High productivity and output rates thanks to small light spot for narrow packaging gaps
- Impervious to soiling thanks to plastic, stainless steel or hygiene design

Ease of selection and planning – reducing costs
- No need to clean or replace reflectors
- Extended detection range from 30 mm to 1000 mm for increased application options in the machine

Inductive proximity switch – rugged solution for metal containers

High operational reliability
- Unaffected by soiling
- High positioning accuracy with a repeat accuracy of ± 10 µm
- High machine output rates of up to 50 containers per second

Low maintenance and complexity costs
- Robust and wear-free low cost solution
- Factor 1 – One sensor variant for different metal containers

IR12.P04F, p. 64

◆ IO-Link

O300.SP.T, p. 42

Supplying secondary packaging

A position detection facility is required when the primary packaging is subsequently packed in crates. We recommend the use of an optical laser line sensor to reliably detect the large number of different types of crate.

O300.GP, p. 42

7. Quality control in production

High quality products also with maximum food safety in different packaging – these consumer requirements greatly influence the production processes and quality control. These factors in turn are used as the requirement profiles for our sensors. With our corresponding technologies we support the required flexibility in the most diverse machine applications.

7.1 Level monitoring in packaging

Ultrasonic distance sensor with extremely narrow sound beam

High quality assurance
- Linearized measuring range with 0.5 mm repeat accuracy
- Reliable ultrasonic retroreflective barrier principle

Reduced decision-making costs
- Up to 150 mm detection range for a diverse range of media
- Response times of less than 7 ms (measuring)
- Response times of 1.3 ms (switching)

**7.2** Trigger sensor for vision sensor / camera

Diffuse sensors with background suppression

Reduced production costs and times
- Visible light spot for easy sensor alignment
- No reflector necessary

High operational reliability
- High machine flexibility as different colors and shapes are reliably detected
- Immunity to background reflections and extraneous light ensures a stable detection process

IO-Link

O200.GP, p. 40
O300.GP, p. 42
FHDK 07, p. 40

UNDK 09, p. 52
UNAM 12, p. 56

7.3 Speed-independent triggering

Direct connection of incremental rotary encoder to the vision sensor / industrial camera for speed-independent quality control

High quality control reliability
- Virtually jitter-free rotary encoder signals allow precision camera triggering over the entire speed range
- Monolithic opto-ASIC with high integration density facilitates stable signals even under shock and vibration conditions in continuous operation
- Robust sealing concept for guaranteed high protection class IP 67

High degree of flexibility
- Flexible parameterization from 1 to 65536 pluses / revolution
- Selectable TTL or HTL output signal level

EIL580P, p. 84

7.4 Quality control of filled containers

Image processing and identification with vision sensor

High operational reliability
- Contour-based evaluation by *FEX*® image processor for stable quality control also with fluctuating surface properties
- Easy and reliable setup of color checks with *ColorFEX*® 3D color assistant
- Robust thanks to industrial design in rugged metal enclosure of protection class IP 67

High degree of flexibility
- No mechanical object alignment necessary thanks to automatic *FEXLoc*® 360 ° position tracking
- 22 different check tools are able to check up to 32 features per job
- Up to 255 jobs can be stored in the sensor with backup option via FTP server
- High-speed mode with up to 100 checks / minute
- XC series with interchangeable lenses, including patented modular IP 67 lens protection

EtherNet/IP

PROFI NET®
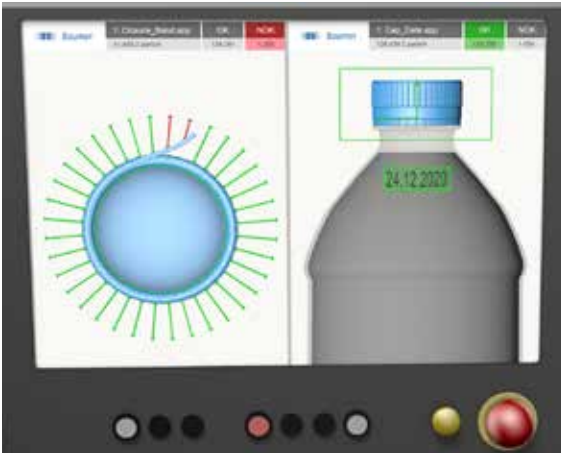
VeriSens®, p. 82

7.5 Live image quality assurance

Web interface with *MultiViewer* to display up to 16 *VeriSens*® on one screen

Reduced implementation time and costs
- Configurable web interface for application-specific operation and monitoring in only a few minutes
- No additional software costs
- Integrated *VeriFlash*® flash controller for reduced programming and integration expenditure
- Error image memory in sensor
- Integrated FTP client allows error images to be stored on a FTP server

VeriSens® Application Suite
Allows you to perform a test free of charge with product simulators.
Download: www.baumer.com/verisens/appsuite
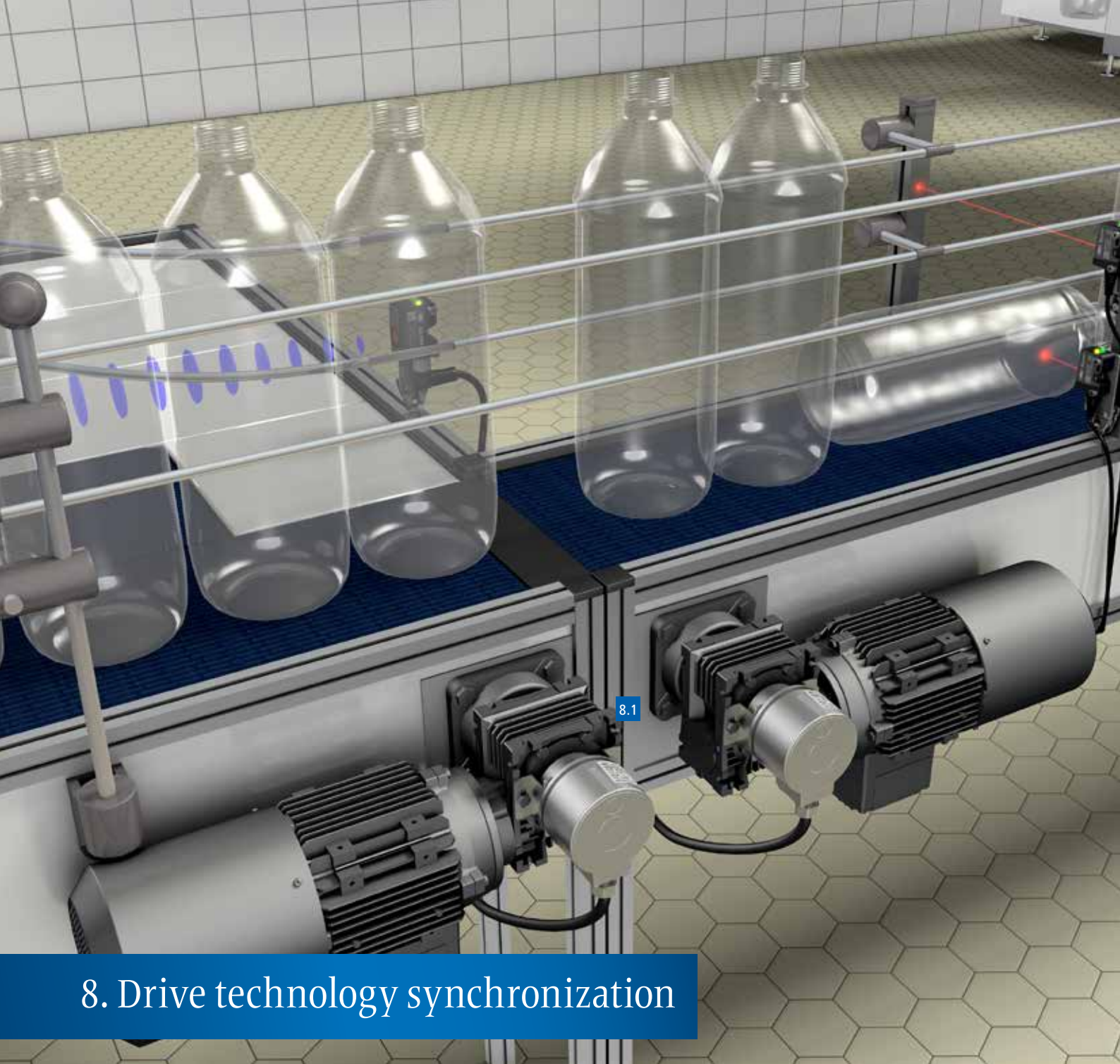
8. Drive technology synchronization

The drive technology uses stable signals from rotary encoders to ensure the containers run at a low noise level through the machine. This not only has a positive effect on machine performance but also reduces conveyor belt wear.
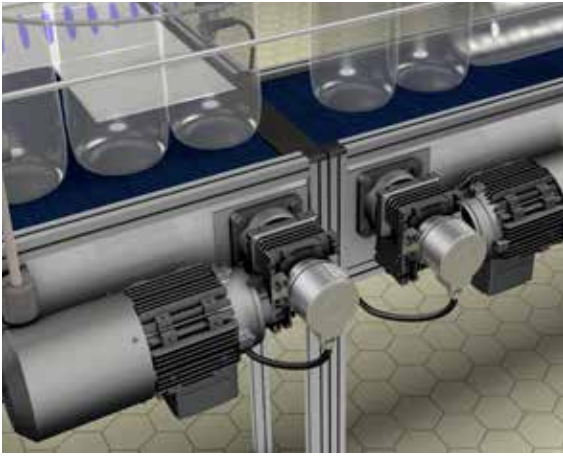
8.1 Buffer table and infeed conveyor synchronization

Incremental industrial rotary encoders with precise optical scanning

Reduced storage and startup costs
- Differing requirements parameterizable with only one rotary encoder variant from 1 to 65536 pulses / revolution
- Shorter startup times by simple reparameterization of the encoders on site with handheld programming tool
- All commonly used mechanical interfaces available

High operational reliability
- Immune to shock and vibration thanks to high integration density
- New optical sensor technology offers high signal and control performance

8.2 Master rotary filler axis

High control performance provided by absolute industrial rotary encoders

High system performance
- Synchronization of various machine modules with only rotary encoder and up to 5 precision incremental outputs of varying resolution
- High precision position and trigger signals with integrated error compensation and filtering of machine vibration
- Adjustable signal resolution for flexible adaptation to machine configuration
- Functionally reliable incremental signal for efficient setup
- Synchronous position output with ultra low jitter in ± 0.6 µs range with Powerlink
- Freely selectable position resolution without conversion in the PLC and Powerlink cross-traffic for ultra-precise synchronization of various axes

High operational reliability
- Safety first – Safe incremental rotary encoders with SIL2
- Reliable speed with standard square-wave signals simply integrated in existing architectures
- Simpler verification of safety functions thanks to certified conformity (IEC 61508)
- Long service life of rotary encoders ensured by statistical process checks and automated final inspections
- Absolute rotary encoder with 18 bit resolution and a repeat accuracy of ± 0.1 °

EIL580P, p. 84

EtherCAT.

PROFI NET®

EAL580, p. 87
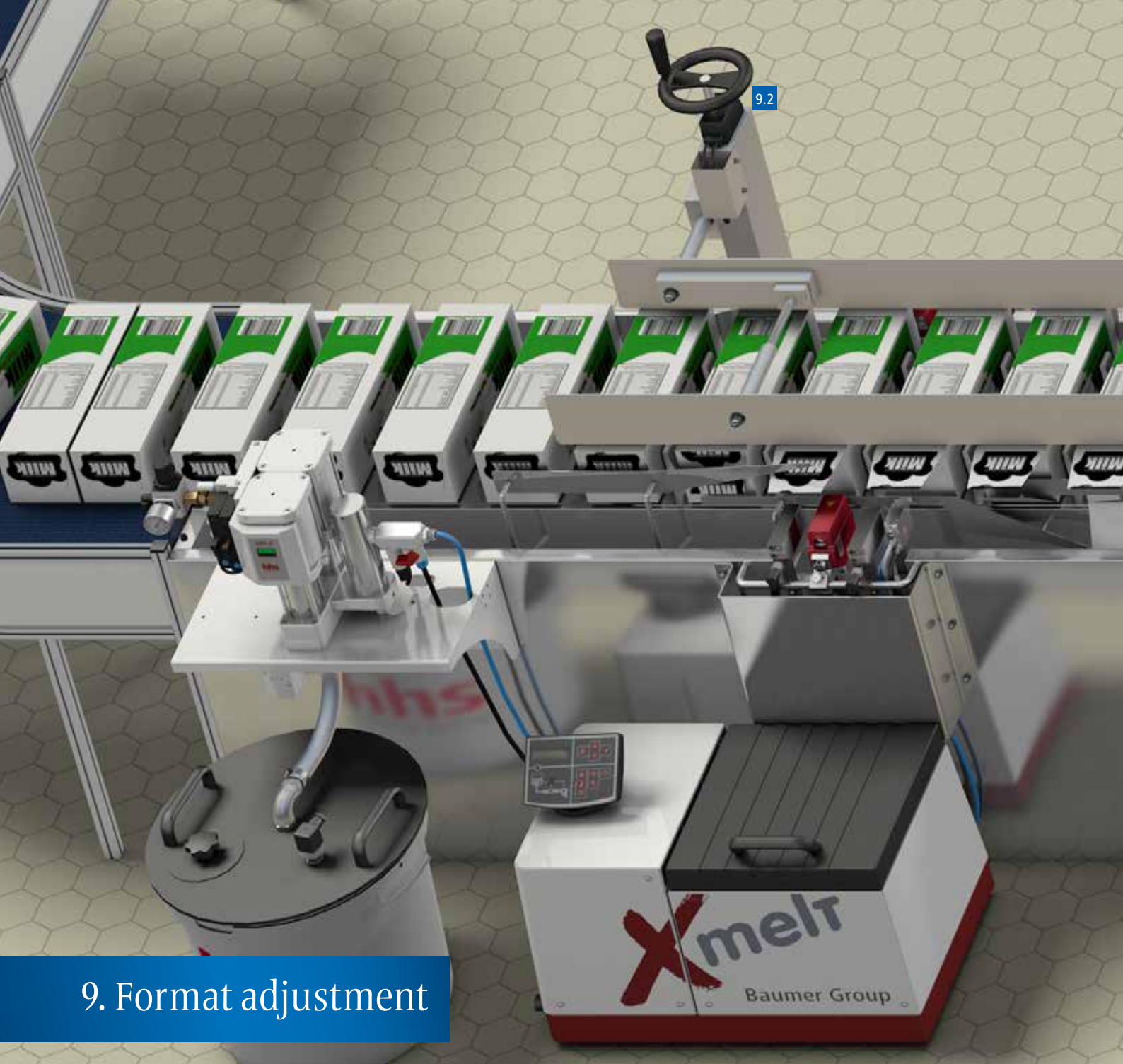
9. Format adjustment

Container sizes differ according to customer requirements. These mechanical adaptations are adjusted automatically in order to reduce the retooling times of the packaging machine. A format adjustment drive specifically developed for this purpose is able to position the mechanical systems accordingly. Convenient solutions are also available for manual adjustment.

9.1 Automatic adjustment of filler head referred to container height

Intelligent compact drive with BLDC motor, absolute multiturn rotary encoder and worm gear

Maximum availability and process reliability of the machine after format adjustment
- Automated adaptation to different container sizes
- No referencing necessary after starting up the machine

Easy to integrate in particularly compact machines
- Modular design with various gearboxes and connection variants
- Bevel gears with hollow shaft and torque support ensure easy replacement of handwheels
- The self-locking worm gear renders an additional stop brake unnecessary

Reduced integration and complexity costs
- PROFINET, PROFIBUS or CANopen® interface enable direct connection to the machine controller
- Manufacturer-independent application profiles, e.g. PROFIdrive, CiA402
- The drive directly provides diagnostic data relating to axis status

9.2 Manual adjustment of container guides

Spindle position display

Fast and error-free retooling
- Manual format adjustment with absolute multiturn rotary encoder with operator guidance
- Display of actual position and setpoint for fast, error-free retooling
- Communication with machine controller via RS485, PROFIBUS
- Memory controller N242 for recipe management

N150, p. 94
N242, p. 94

MSIA 68 bevel gear transmission
W3 PROFIBUS, p. 94

Contents – solution portfolio.

Image processing / identification

Rotary encoders / format adjustment

Machine modules – optical sensors

Product name	Buffer station/buffer table monitoring			Infeed system monitoring			Food safety: Disinfection in rinsing process	Process monitoring in machine tank		
	Buffer table full, filling no longer possible	Buffer table ready for filling	Buffer table emptying	Container position monitoring	Monitoring container transfer to screw conveyor	Monitoring container transfer from screw conveyor to capper	Disinfection in rinsing process [1]	Monitoring pressure in machine tank [2]	Soiling monitoring [3]	Level monitoring in machine tank [4]
Light barriers and light sensors										
O300H.GP				■	■	■				
O300W.GP				■	■	■				
O300H.SP				■	■	■				
O300.SP.T				■	■	■				
O300W.SP				■	■	■				
O300.RP	■	■	■	■	■					
O300.RP.T	■	■	■	■	■					
O300.ZR	■	■	■	■	■					
O200.GP	■	■	■	■	■	■				
FADH 14						■				
FHDK 07	■	■	■	■	■	■				
FHDK 04	■	■	■	■	■	■				
FHDK 10	■	■	■	■	■	■				
Fork / angle light barriers										
OGUM				■	■	■				
FGUM				■	■	■				
Optical sensors with laser line										
O300.SL				■						
O300.SP				■						
O300.GL				■						
O300.GP				■						
O300.GR				■						

[1] see PF20S, p. 77   [2] see PBMH, p. 76   [3] see *CombiLyz*®, p. 80   [4] see LSP, p. 78 and LBFH, p. 79 and CFAK, p. 70 and CFAM, p. 71   [5] see *VeriSens*®, p. 82

Capper monitoring					Outfeed station monitoring	Quality control in production					Drive technology synchronization		Format adjustment	
Cap level monitoring in the bin	Trigger sensor in wet and cleaning zone for vision sensor / camera	Quality control of screw caps with seal [5]	Cap infeed buffer full	Preparing caps for takeup	Container exiting filling machine	Level monitoring in packaging	Trigger sensor for vision sensor / camera	Speed-independent triggering [6]	Quality control of filled containers [7]	Live image quality assurance [7]	Buffer table and infeed conveyor synchronization [8]	Master rotary filler axis [9]	Automatic adjustment of filler head referred to container height [10]	Manual adjustment of container guides [11]
	■		■		■		■							
	■		■		■		■							
	■		■		■		■							
	■		■		■		■							
	■		■		■		■							
					■		■							
					■		■							
					■		■							
	■		■		■		■							
	■		■		■		■							
	■		■		■		■							
	■		■		■		■							
				■	■		■							
					■		■							

[6] see EIL580P, p. 84   [7] see *VeriSens®*, p. 82   [8] see EIL580P, p. 84   [9] see EAL580, p. 87   [10] see MSIA 68, p. 94   [11] see N150, p. 94

Light barriers and light sensors

Subminiature and miniature sensors

Unique reliable object detection and positioning with optical sensors

- Smart & Small – top performance in smallest designs
- Find the optimum solution quickly through large portfolio
- Easy to set up with clever teach-in function
- Laser sensors for detection tasks in the 0.01 mm range
- Extended functions and setting options via IO-Link

IO-Link

x = function principle y = light source	FHDK 04	FxDK 07 FxCK 07	FxDK 10 OxDK 10 (Laser)	O200.xy
features	■ Mounting in rails ■ Fix sensing distance	■ World's smallest adjustable sensor family	■ Different beam cones optimized for the application	■ V-optics and high-power mode for transparent / glossy objects
dimensions (B × H × T)	4 × 44.8 × 6.2 mm	8 × 16.2 × 10.8 mm	10.4 × 27 × 14 mm	8 × 21 × 14,1 mm
function principle (x) / ranges				
diffuse sensors with background suppression	30 mm / 50 mm (FHDK 14)	10 ... 60 mm (FHDK 07 / FHCK 07)	10 ... 130 mm (FHDK 10 / OHDK 10)	8 ... 120 mm (O200.Gy)
diffuse sensor with background suppression		20 ... 150 mm (FZDK 07 / FZCK 07)	3 ... 200 mm (FZDK 10 / OZDK 10)	
SmartReflect® light barriers without reflector		17 ... 45 mm (FNCK 07)		25 ... 180 mm (O200.SP)
SmartReflect® transparent				
retro-reflective sensors		800 mm (FPDK 07 / FPCK 07)	4 m (FPDK 10)	4 m (O200.Ry)
transparent detection without reflector				
through beam sensors		2.5 m (FSDK 07 / FSCK 07) (FEDK 07 / FECK 07)	10 m (FSDK 10 / FEDK 10) (OSDK 10 / OEDK 10)	6 m (O200.TR / O200.ER)
light source (y)				
standard LED (R)	■	■	■	■
pinPoint LED (P)				■
infrarot (I)				
laser (L)			■	
response time	< 0.5 ms	< 0.5 ms	< 0.5 ms < 0.05 ms (laser)	< 0,25 ms
output	push-pull	PNP NPN	push-pull PNP NPN	push-pull PNP NPN
connection types	cable 2 m flylead connector M8	cable 2 m flylead connector M8	cable 2 m connector M8 flylead connector M8	cable 2 m flylead connector M8
housing material	plastic	plastic	plastic	plastic
operating temperature	−10 ... +50 °C	−20 ... +50 °C	−25 ... +65 °C −10 ... +50 °C (laser)	−25 ... +50 °C
protection class	IP 65	IP 65	IP 65 / IP 67	IP 67

Standard sensors – rectangular and cylindrical

Unique reliable object detection and positioning with optical sensors

- Find the optimum solution quickly through large portfolio
- Easy to set up with clever teach-in function
- Laser sensors for detection tasks in the 0.01 mm range

Learn more:
www.baumer.com/opto

IO-Link

x = function principle y = light source	FxDK 14 OxDK 14 (laser)	FxDM 16 OxDM 16 (laser)	OR18.xy	FxAM 18
features	■ Sensors for transparent objects	■ Laser sensors for wafer detection	■ Setting via potentiometer, teach-in or *qTeach*	■ Compatible with glass fibre optics
dimensions (B × H × T)	14.8 × 43 × 31 mm	15.4 × 50 × 50 mm	M18	M18
function principle (x) / ranges				
diffuse sensors with background suppression	20 ... 500 mm (FHDK 14 / OHDK 14)	20 ... 600 mm (FHDM 16 / OHDM 16)	40 ... 200 mm (OR18.Gy)	
diffuse sensors with intensity difference	5 ... 600 mm (FZDK 14 / OZDK 14)	0 ... 400 mm (FZDM 16 / OZDM 16)	0 ... 800 mm (OR18.ZI)	60 ... 430 mm (FZAM 18)
SmartReflect® light barriers without reflector	50 ... 800 mm (FNDK 14)		55 ... 300 mm (OR18.SP)	
SmartReflect® transparent				
retro-reflective sensors	11 m (FRDK / FPDK / OPDK 14)	12 m (FPDM 16 / OPDM 16)	16 m (OR18.RR)	4 m (FPAM 18)
transparent detection without reflector			800 mm (OR18.RR.T)	
through beam sensors	15 m (FSDK 14 / FEDK 14) (OSDK 14 / OEDK 14)		60 m (OR18.TI / OR18.EI)	
light source (y)				
standard LED (R)	■	■	■	■
pinPoint LED (P)			■	
infrarot (I)			■	■
laser (L)	■	■	■	
response time	< 0.5 ms < 0.25 ms (laser)	< 1 ms < 0.05 ms (laser)	< 0.5 ms < 0.1 ms (laser)	< 1 ms
output	push-pull PNP NPN	PNP NPN 4 ... 20 mA	PNP NPN	PNP NPN
connection types	cable 2 m connector M8 flylead connector M12	cable 2 m connector M12	cable 2 m connector M12 flylead connector M12	cable 2 m connector M12
housing material	plastic	die-cast zinc	plastic brass nickel plated	brass nickel plated
operating temperature	−25 ... +65 °C −10 ... +50 °C (laser)	−25 ... +65 °C −10 ... +50 °C (laser)	−25 ... +55 °C −10 ... +55 °C (laser)	−25 ... +55 °C
protection class	IP 67	IP 67	IP 67	IP 67

Light barriers and light sensors

Standard with extra power – O300/O500

Unique portfolio with extra performance for your application

- Enhanced processor performance for reliable detection
- 2500 variants with seven sensor principles and four light sources
- Easy implementation and operation
- IO-Link – Industry 4.0 and IIoT-ready

O300.xy x = function principle y = light source	⊘ **IO**-Link **O300.xy**	⊘ **IO**-Link **O300W.xy**	⊘ **IO**-Link **O300H.xy**
features	■ Setting via wear-free *qTeach*® or IO-Link	■ Setting via wear-free *qTeach*® or IO-Link	■ Setting via wear-free magnetic *qTeach*® or IO-Link
dimensions (B × H × T)	12.9 × 32.3 × 23 mm	16.5 × 34.7 × 28.2 mm	16.5 × 34.6 × 28.7 mm
function principle (x) / ranges			
diffuse sensors background suppression (G)	30 ... 300 mm (O300.Gy)	30 ... 250 mm (O300W.Gy)	30 ... 250 mm (O300H.Gy)
diffuse sensors with intensity difference (Z)	10 ... 400 mm (O300.Zy)		
SmartReflect® light barriers without a reflector (S)	30 ... 300 mm (O300.Sy)	30 ... 300 mm (O300W.Sy)	30 ... 300 mm (O300H.Sy)
SmartReflect® transparent (Sy.T)	30 ... 300 mm (O300.SP.T)	30 ... 300 mm (O300W.SP.T)	30 ... 300 mm (O300H.SP.T)
diffuse sensors (R)	6 m (O300.Ry)	6 m (O300W.Ry)	6 m (O300H.Ry)
retro-reflective sensors (Ry. T)	4 m (O300.RP.T)	4 m (O300W.RP.T)	4 m (O300H.Ry.T)
through beam sensors (T / E)	15 m (O300.Ty / O300.Ey)	15 m (O300W.Ty / O300W.Ey)	15 m (O300H.Ty / O300H.Ey)
light source (y)			
standard LED (R)	■	■	■
pinPoint LED (P)	■	■	■
infrarot (I)	■		
laser (L)	■	■	■
response time	< 0.25 ms < 0.1 ms (laser)	< 0.25 ms < 0.1 ms (laser)	< 0.25 ms < 0.1 ms (laser)
output	push-pull PNP NPN	push-pull	push-pull
connection types	cable 2 m connector M8 flylead connector M8	connector M8	connector 2 m flylead connector M8
housing material	plastic	stainless steel, Ecolab-certified, FDA-compliant	stainless steel, Ecolab-certified, EHEDG-compliant, FDA-compliant
operating temperature	−25 ... +60 °C −10 ... +60 °C (laser)	−25 ... +60 °C −10 ... +60 °C (laser)	−25 ... +60 °C −10 ... +60 °C (laser)
protection class	IP 67	IP 68 / IP 69K *proTect+*	IP 68 / IP 69K *proTect+*

	⊘ **IO**-Link	⊘ **IO**-Link	⊘ **IO**-Link
O500.xy x = function principle y = light source	**O500.xy**	**O500W.xy**	**O500H.xy**
features	■ Setting via wear-free *qTeach®* or IO-Link	■ Setting via wear-free *qTeach®* or IO-Link	■ Setting via wear-free magnetic *qTeach®* or IO-Link
dimensions (B × H × T)	18 × 45 × 32 mm	20.2 × 47.2 × 37.2 mm	20.2 × 47.7 × 36.4 mm
function principle (x) / ranges			
diffuse sensors background suppression (G)	60 ... 550 mm (O500.Gy)	60 ... 400 mm (O500W.Gy)	60 ... 400 mm (O500H.Gy)
diffuse sensors with intensity difference (Z)	20 ... 600 mm (O500.Zy)		
SmartReflect® light barriers without a reflector (S)	60 ... 600 mm (O500.SP)	60 ... 600 mm (O500W.SP)	60 ... 600 mm (O500H.SP)
SmartReflect® transparent (Sy.T)	60 ... 1000 mm (O500.SP.T)	60 ... 1000 mm (O500W.SP.T)	60 ... 1000 mm (O500H.SP.T)
diffuse sensors (R)	8 m (O500.Ry)	8 m (O500W.Ry)	8 m (O500H.Ry)
retro-reflective sensors (Ry. T)	6 m (O500.RP.T)	6 m (O500W.RP.T)	6 m (O500H.RP.T)
through beam sensors (T / E)	40 m (O500.TR / O500.ER)	40 m (O500W.TR / O500W.ER)	40 m (O500H.TR / O500H.ER)
light source (y)			
standard LED (R)	■	■	■
pinPoint LED (P)	■	■	■
infrarot (I)	■		
laser (L)			
response time	< 0.25 ms	< 0.25 ms	< 0.25 ms
output	push-pull PNP NPN	push-pull	push-pull
connection types	cable 2 m connector M12	connector M12	cable 2 m connector M12
housing material	plastic	stainless steel, Ecolab-certified, FDA-compliant	stainless steel, Ecolab-certified, EHEDG-compliant, FDA-compliant
operating temperature	−25 ... +60 °C	−25 ... +60 °C	−25 ... +60 °C
protection class	IP 67	IP 68 / IP 69K *proTect*+	IP 68 / IP 69K *proTect*+

Light barriers and light sensors

Washdown design

- Robust stainless steel housing
- Long-term sealing thanks to *proTect+*
- IP 69K and Ecolab tested
- Different sizes and sensor principles
- Benefits by *SmartReflect*® light barrier without reflector

	IO-Link	**IO**-Link	**IO**-Link	**IO**-Link
x = function principle y = light source	FxDR 14	O300W.xy	O500W.xy	OR18W.xy
dimensions (B × H × T)	19.6 × 62.4 × 34.3 mm	16.5 × 34.7 × 28.2 mm	20.2 × 47.2 × 37.7 mm	M18
function principle (x) / ranges				
diffuse sensors with background suppression	50 ... 400 mm (FHDR 14)	30 ... 250 mm (O300W.GP / O300W.GL)	60 ... 400 mm (O500W.GP)	40 ... 120 mm (OR18W.GR)
diffuse sensors with intensity difference				0 ... 800 mm (OR18W.ZI)
SmartReflect® light barriers without reflector	50 ... 800 mm (FNDR 14)	30 ... 300 mm (O300W.SP / O300W.SL)	60 ... 600 mm (O500W.SP)	
SmartReflect® transparent	200 ... 800 mm (FNDR 14)	30 ... 300 mm (O300W.SP.T)	60 ... 1000 mm (O500W.SP.T)	
retro-reflective sensors	3 m (FPDR 14)	6 m (O300W.RP / O300W.RL)	8 m (O500W.RP)	4.5 m (OR18W.RR)
transparent detection without reflector		4 m (O300W.RP.T)	6 m (O500W.RP.T)	800 mm (OR18W.RR.T)
through beam sensors		15 m (O300W.TR / .TL) (O300W.ER / .EL)	40 m (O500W.TR / .TL) (O500W.ER / .EL)	20 m (OR18W.TI) (OR18W.EI)
contrast sensor	12.5 mm ± 2 mm (FKDR 14)			
light source (y)				
standard LED (R)	■	■	■	■
pinPoint LED (P)	■	■	■	
infrarot (I)				■
laser (L)		■		
response time	< 1 ms < 0.05 ms (contrast)	< 0.25 ms < 0.1 ms (laser)	< 0.25 ms	< 1 ms
output	push-pull	push-pull	push-pull	PNP NPN
connection types	connector M12	connector M8	connector M12	connector M12
housing material	stainless steel, Ecolab-certified, FDA-compliant	stainless steel, Ecolab-certified, FDA-compliant	stainless steel, Ecolab-certified, FDA-compliant	stainless steel, Ecolab-certified, FDA-compliant
operating temperature	−25 ... +60 °C	−25 ... +60 °C	−25 ... +60 °C	−25 ... +55 °C
protection class	IP 68 / IP 69K *proTect+*	IP 68 / IP 69K *proTect+*	IP 68 / IP 69K *proTect+*	IP 67 / IP 69K

Hygiene Design

- EHEDG certified, FDA-compliant, Ecolab tested
- Long-term sealing thanks to *proTect+*
- Different sizes and sensor principles
- Benefits through *SmartReflect®* light barrier without reflector

Learn more:
www.baumer.com/opto

x = function principle y = light source	◈ IO-Link **FxDH 14**	◈ IO-Link **O300H.xy**	◈ IO-Link **O500H.xy**
dimensions (B × H × T)	19.6 × 52.2 × 34.3 mm	16.5 × 34.6 × 28.7 mm	20.2 × 47.7 × 36.4 mm
function principle (x) / ranges			
diffuse sensors with background suppression	50 ... 400 mm (FHDH 14)	30 ... 250 mm (O300H.Gy)	60 ... 400 mm (O500H.Gy)
diffuse sensors with intensity difference			
SmartReflect® light barriers without reflector	50 ... 800 mm (FNDH 14)	30 ... 300 mm (O300H.Sy)	60 ... 600 mm (O500H.Sy)
SmartReflect® transparent	200 ... 800 mm (FNDH 14)	30 ... 300 mm (O300H.SP.T)	60 ... 1000 mm (O500H.SP.T)
retro-reflective sensors	3.5 m (FPDH 14)	6 m (O300H.Ry)	8 m (O500H.Ry)
transparent detection without reflector		4 m (O300H.RP.T)	6 m (O500H.RP.T)
through beam sensors		15 m (O300H.Ty) (O300H.Ey)	40 m (O500H.Ty) (O500H.Ey)
contrast sensor	12.5 m ± 2 mm (FKDH 14)		
light source (y)			
standard LED (R)	■	■	■
pinPoint LED (P)	■	■	■
infrarot (I)			
laser (L)		■	
response time	< 1 ms < 0.05 ms (contrast)	< 0.25 ms < 0.1 ms (laser)	< 0.25 ms
output	push-pull	push-pull	push-pull
connection types	connector 2 m flylead connector M12	connector 2 m flylead connector M8	connector 2 m flylead connector M12
housing material	stainless steel, Ecolab-certified, EHEDG-compliant, FDA-compliant	stainless steel, Ecolab-certified, EHEDG-compliant, FDA-compliant	stainless steel, Ecolab-certified, EHEDG-compliant, FDA-compliant
operating temperature	−30 ... +60 °C	−25 ... +60 °C −10 ... +60 °C (Laser)	−25 ... +60 °C
protection class	IP 68 / IP 69K *proTect+*	IP 68 / IP 69K *proTect+*	IP 68 / IP 69K *proTect+*

Light barriers and light sensors

Laser sensors

Precise control of fast processes and detection of very small objects

- Very precise object positioning to within 0.01 mm
- Detection of very small objects thanks to focused 0.1 mm laser spot
- Detection of fast objects thanks to short response times of < 0.1 ms
- The right shapes, sizes and sensor principles for your application

Learn more:
www.baumer.com/laser

	OxDK 14	IO-Link O300.xL	IO-Link O300W.xL	IO-Link O300H.xL
x = function principle				
features	■ Mechanical sensing distance adjustment	■ Setting via wear-free magnetic *qTeach®* or IO-Link	■ Setting via wear-free *qTeach®* or IO-Link	■ Setting via wear-free magnetic *qTeach®* or IO-Link
dimensions (B × H × T)	14.8 × 43 × 31 mm	12.9 × 32.3 × 23 mm	16.5 × 34.7 × 28.2 mm	16.5 × 34.6 × 28.7 mm
function principle (x) / ranges				
diffuse sensors background suppression	20 ... 350 mm (OHDK 14)	30 ... 300 mm (O300.GL)	30 ... 250 mm (O300W.GL)	30 ... 250 mm (O300H.GL)
diffuse sensors with intensity difference		10 ... 400 mm (O300.ZL)		
SmartReflect® light barriers without a reflector		30 ... 300 mm (O300.SL)	30 ... 300 mm (O300W.SL)	30 ... 300 mm (O300H.SL)
retro-reflective sensors	11 m (OPDK 14)	6 m (O300.RL)	6 m (O300W.RL)	6 m (O300H.RL)
retro-reflective sensors for transparent detection	5.2 m (OPDK 14)			
through beam sensors		75 m (O300.TL / O300.EL)	75 m (O300W.TL / O300W.EL)	75 m (O300H.TL / O300H.EL)
differential sensors				
laser class	2	1	1	1
response time up	< 0.15 ms	< 0.1 ms	< 0.1 ms	< 0.1 ms
output	PNP NPN	PNP NPN push-pull	push-pull	push-pull
housing material	plastic	plastic	stainless steel	stainless steel
operating temperature	−10 ... +50 °C	−25 ... +60 °C	−25 ... +60 °C	−25 ... +60 °C
protection class	IP 67	IP 67 IP 68 / IP 69K *proTect+*	IP 67 IP 68 / IP 69K *proTect+*	IP 67 IP 68 / IP 69K *proTect+*

Fork and angle sensors

- Quick response times up to 0.125 ms
- High repeat accuracy
- Robust metal housing
- Narrow parallel light beam
- Smallest detectable object 0.05 mm
- Different gap widths 20 … 158 mm
- Output PNP/NPN

Learn more:
www.baumer.com/fork-angle

	FGUM with	OGUM basic	OGUM	FGLM
category	Pulsed red LED Fork sensors	Laser Fork sensors	Laser Fork sensors	Angle sensors L profile
features	■ Potentiometer or Teach- in version ■ Narrow, virtually parallel light beam ■ Sensors can be mounted side-by-side	■ High resolution ■ Short response time ■ Sensors can be mounted side-by-side	■ Very high resolution ■ Extremely narrow laser light beam ■ Sensors can be mounted side-by-side ■ High repeat accuracy	■ Special L-type ■ Narrow, virtually parallel light beam ■ Sensors can be mounted side-by-side
type	U profile	U profile	U profile	L profile
fork widths	20 mm 30 mm 50 mm 80 mm 120 mm 170 mm	30 mm 50 mm 80 mm 120 mm	30 mm 50 mm 80 mm 120 mm	60 mm 100 mm 158 mm
object size	> 0.4 mm	> 0.1 mm	> 0.05 mm	> 0.5 mm
repeat accuracy	< 0.02 mm	< 0.02 mm	< 0.01 mm	< 0.06 mm
response / release time	< 0.125 ms	< 0.166 ms	< 0.166 ms	< 0.125 ms
connection types	connector M8	connector M12	connector M8	connector M8
housing material	die-cast zinc	aluminum	aluminum	die-cast zinc
operating temperature	−10 … +60 °C	+5 … +45 °C	+5 … +45 °C	−10 … +60 °C
protection class	IP 67	IP 67	IP 67	IP 67
specific features		■ laser class 1	■ laser class 1	

Photoelectric sensors

Optical sensors with analogue output

- Resolution up to 0.1 mm
- Measuring range up to 1000 mm
- Red LED or laser class 1
- Washdown and hygienic design
- IO-Link

⊗ **IO**-Link

	FADK 14 LED distance sensor
category	
features	■ Compact housing ■ Measuring distance 50 … 400 mm ■ Resolution up to 0.1 mm
dimensions	14.8 × 43 × 31 mm
measuring distance	50 … 400 mm
resolution	0,1 … 1 mm
response time	< 3 ms
output signal	4 … 20 mA 0 … 10 V
connection types	cable 2 m connector M12
housing material	plastic (ASA, MABS)
operating temperature	0 … +50 °C
protection class	IP 67

specific features	■ cost-effective solution
	  for simpler measuring
	  tasks

Robust stainless steel distance sensors

Sensors in Hygiene and Washdown design

- Stainless steel housing V4A
- *proTect+*® sealing concept
- Ecolab-tested and -certified
- EHEDG-compliant
- FDA-compliant materials

Learn more:
www.baumer.com/opto-distance

	⊘ IO-Link	⊘ IO-Link	
	FADR 14	**FADH 14**	**OADR 20**
features	■ Washdown design ■ Adjustable measuring range ■ Point source LED	■ Hygienic design ■ Adjustable measuring range ■ Point source LED	■ Washdown design ■ Adjustable measuring range ■ Laser beam ■ Laser point / Laser line
dimensions	19.6 × 62.4 × 33.8 mm	19.6 × 99.5 × 33.6 mm	20.3 × 65 × 50 mm
measuring distance	50 ... 400 mm	50 ... 400 mm	30 ... 600 mm
resolution	0.1 mm	0.1 mm	5 µm
response time	< 3 ms	< 3 ms	< 0.9 ms
output signal	4 ... 20 mA 0 ... 10 V	4 ... 20 mA 0 ... 10 V	4 ... 20 mA 0 ... 10 V
connection types	connector M12	cable 2 m flylead connector M12	connector M12
housing material	stainless steel 1.4404 (V4A)	stainless steel 1.4404 (V4A)	stainless steel 1.4404 (V4A)
operating temperature	0 ... +50 °C	0 ... +50 °C	0 ... +50 °C
protection class	IP 68 / IP 69K & *proTect+*	IP 68 / IP 69K & *proTect+*	IP 68 / IP 69K & *proTect+*
specific features	■ alarm output to signalize any incorrect measuring operation or out-of-range object ■ service status indicator when soiled	■ alarm output to signalize any incorrect measuring operation or out-of-range object ■ service status indicator when soiled	■ alarm output to signalize any incorrect measuring operation or out-of-range object ■ input for synchronizing measurements ■ laser diode can be switched on/off

Machine modules – ultrasonic sensors

Product name	Buffer station/buffer table monitoring			Infeed system monitoring			Food safety: Disinfection in rinsing process	Process monitoring in machine tank		
	Buffer table full, filling no longer possible	Buffer table ready for filling	Buffer table emptying	Container position monitoring	Monitoring container transfer to screw conveyor	Monitoring container transfer from screw conveyor to capper	Disinfection in rinsing process [1]	Monitoring pressure in machine tank [2]	Soiling monitoring [3]	Level monitoring in machine tank [4]
Ultrasonic sensors										
UNDK 09										
UNCK 09										
UNAM 12										
UNAR 12						■				
UNAR 18	■	■	■							■
URAR 18				■	■	■				
U500.DA0	■	■	■							■
U500.PA0	■	■	■							
U500.RA0	■	■								
U500.EA0	■	■	■							
U500.TA0	■	■	■							
UR18.DA0	■	■	■							■
UR18.PA0	■	■	■							
UR18.RA0	■	■	■	■	■	■				
UNDK 30	■	■	■							
UZDK 30	■	■	■							

[1] see PF20S, p. 77   [2] see PBMH, p. 76   [3] see *CombiLyz®*, p. 80   [4] see LSP, p. 78 and LBFH, p. 79 and CFAK, p. 70 and CFAM, p. 71   [5] see *VeriSens®*, p. 82

Capper monitoring					Outfeed station monitoring	Quality control in production					Drive technology synchronization		Format adjustment	
Cap level monitoring in the bin	Trigger sensor in wet and cleaning zone for vision sensor / camera	Quality control of screw caps with seal [5]	Cap infeed buffer full	Preparing caps for takeup	Container exiting filling machine	Level monitoring in packaging	Trigger sensor for vision sensor / camera	Speed-independent triggering [6]	Quality control of filled containers [7]	Live image quality assurance [7]	Buffer table and infeed conveyor synchronization [8]	Master rotary filler axis [9]	Automatic adjustment of filler head referred to container height [10]	Manual adjustment of container guides [11]
						■								
						■								
						■								
						■								
						■								
							■							
						■								
■						■								
					■		■							
■														

[6] see EIL580P, p. 84   [7] see *VeriSens*®, p. 82   [8] see EIL580P, p. 84   [9] see EAL580, p. 87   [10] see MSIA 68, p. 94   [11] see N150, p. 94

Ultrasonic sensors

Rectangular standard sensors

Undisturbed by difficult environmental conditions and varying object properties

- Sensing distances up to 2000 mm
- Reliable detection of high-reflective and transparent objects
- Tolerant of dust and dirt
- Versions with two separate switching outputs
- Adjustable response times ton/toff for throughbeam barriers

	UNCK / UNDK 09 URCK / URDK 09	UNDK 10 / URDK 10	UNDK 20 URDK 20 UEDK 20
features	■ High resolution ■ Minimal blind region ■ RS 232 ■ Various mounting options ■ Flat housing ■ Narrow sonic beam angle for detection in openings of up to 3 mm	■ Smallest ultrasonic sensor ■ Internal and external Teach-in ■ Very low weight: 4 g ■ Narrow sonic beam angle ■ Cable and flylead connector versions	■ Flat type ■ Internal and external Teach-in ■ Narrow and wide sonic beam angles ■ M8 connector
dimensions	8.6 × 82 × 24.5 mm	10.4 × 27 × 14 mm	20 × 42 × 15 mm
sensing range Sd / sensor principle			
proximity switch (UNxx / xx.PAO)	3 … 200 mm	10 … 200 mm	10 … 1000 mm
2 point proximity switch (UZxx)			
retro-reflective sensors (URxx / xx.RAO)	0 … 200 mm	0 … 200 mm	0 … 1000 mm
through beam sensors (UExx)			0 … 1000 mm
response time	< 0.5 mm	< 0.5 mm	< 0.5 mm
output	push-pull RS 232	NPN PNP	NPN PNP
connection types	cable 2 m connector M8	cable 2 m connector M8 flylead connector M8	connector M8
housing material	plastic	plastic	plastic
operating temperature	0 … +60 °C	−10 … +60 °C	−10 … +60 °C
protection class	IP 67	IP 67	IP 67

UNxx / xx.PAO = proximity switch
URxx / xx.RAO = retro-reflective sensors
UZxx = 2 point proximity switch
UExx = through beam sensors

IO-Link

UNDK 30 / URDK 30 UZDK 30 / UEDK 30	U500.PA0 / U500.RA0
■ Compact type ■ Large sensing range ■ Teach-in on the sensor ■ Potentiometer version ■ Narrow and wide sonic beam angles	■ IO-Link ■ Robust sensing element ■ 2 switching outputs (dual channel)
30 × 65 × 31 mm	18 × 45.1 × 32.2 mm
30 ... 1000 mm	70 ... 1000 mm
30 ... 2000 mm	70 ... 1000 mm
0 ... 2000 mm	0 ... 1000 mm
0 ... 700 mm	0 ... 2000 mm
< 0.5 mm	< 0.5 mm
NPN PNP	push-pull 2 × push-pull
cable 2 m connector M12	connector M12
plastic / die-cast zinc	plastic
−10 ... +60 °C	−25 ... +65 °C
IP 67	IP 67

Ultrasonic sensors

Application-specific ultrasonic sensors – high-speed / robust

- High-speed sensors
- Robust stainless steel sensors

	UNAM 12 High-speed	URAM 12 High-speed	UxAR 12 mit Parylene coating	UNAR 18 URAR 18
category	High-speed sensors		Robust stainless steel sensors, high chemical resistance	
features	■ Fastest ultrasonic sensor ■ External Teach-in	■ Fastest ultrasonic sensor ■ External Teach-in ■ Sensors with sonic nozzle for small openings	■ Miniature sensor for narrow designs ■ Patented all-round protection ■ FDA-compliant materials ■ Very short response time	■ M18 standard housing ■ FDA-compliant materials ■ Internal and external Teach-in
dimensions	M12	M12	M12	M18
sensing range Sd / sensor principle				
proximity switch (UNxx / xx.PAO)	0 ... 40 mm 10 ... 70 mm		30 ... 200 mm	60 ... 1000 mm
2 point proximity switch (UZxx)				
retro-reflective sensors (URxx / xx.RAO)		0 ... 40 mm 0 ... 70 mm	0 ... 200 mm	0 ... 400 mm
repeat accuracy	< 0.5 mm	< 1.5 mm	< 0.5 mm	< 0.5 mm
output	NPN PNP	NPN PNP	NPN PNP	NPN PNP
connection types	connector M12	connector M12	connector M12	connector M12
housing material	brass nickel plated	brass nickel plated	stainless steel	brass nickel plated stainless steel
operating temperature	–10 ... +60 °C	–10 ... +60 °C	0 ... +60 °C	–10 ... +60 °C
protection class	IP 67	IP 67	IP 67	IP 67

UNxx / xx.PAO = proximity switch
URxx / xx.RAO = retro-reflective sensors
UZxx = 2 point proximity switch
UExx = through beam sensors

Application-specific ultrasonic sensors – sonic nozzles / sensing distances

- Sensors with sonic nozzles
- Sensors with large sensing distances

Learn more:
www.baumer.com/ultrasonic

	UNDK 09	UNAM / URAM 12
category	with sonic nozzles	
features	■ High resolution ■ Minimal blind region ■ RS 232 ■ Various mounting options ■ Flat housing ■ Narrow sonic beam angle for detection in openings of up to 3 mm	■ Sonic nozzle for very narrow sonic beams ■ External Teach-in ■ Connector M12
dimensions	8.6 × 82 × 24.5 mm	M12
sensing range Sd / sensor principle		
proximity switch (UNxx / xx.PAO)	3 … 200 mm	5 … 400 mm
2 point proximity switch (UZxx)		
retro-reflective sensors (URxx / xx.RAO)	0 … 200 mm	0 … 70 mm
response time	< 0.5 mm	< 0.5 mm
output	push-pull RS 232	NPN PNP
connection types	cable 2 m flylead connector M8	connector M12
housing material	plastic	brass nickel plated
operating temperature	0 … +60 °C	−10 … +60 °C
protection class	IP 67	IP 67

Ultrasonic sensors

Precise ultrasonic distance sensors – cylindrical

Accurate distance measurement regardless of material, surface, color or transparency

- Small and light miniature sensors, e.g. for robotics
- Measurements in very small containers or openings
- Large measuring ranges up to 6000 mm
- Sturdy sensors also for demanding environments

	UNAM 12 UNAR 12	UNAM 12 with sonic nozzles	UNAM 18 UNAR 18
category	miniature	miniature	standard
features	■ Narrow and wide sonic beam angles ■ External Teach-in ■ M12 connector	■ External Teach-in ■ M12 connector ■ Beam columnator for very narrow sonic cone profile	■ Stainless steel housing V4A ■ Chemically resistant sensor front ■ FDA-compliant materials ■ Internal and external Teach-in ■ M12 connector
dimensions	M12	M12	M18
measuring distance	20 ... 400 mm	2 ... 82 mm	60 ... 1000 mm
response time	< 10 ms	< 1.3 ms	< 50 ms
resolution	< 0.5 mm	< 0.3 mm	< 0.3 mm
repeat accuracy	< 0.5 mm	< 0.5 mm	< 0.5 mm
output	0 ... 10 mA / 10 ... 0 mA 0 ... 10 V / 10 ... 0 V	0 ... 10 mA / 10 ... 0 mA 0 ... 10 V / 10 ... 0 V	4 ... 20 mA / 20 ... 4 mA 0 ... 10 V / 10 ... 0 V
connection types	connector M12	connector M12	connector M12
housing material	brass nickel plated	brass nickel plated	brass nickel plated stainless steel
operating temperature	−10 ... +60 °C	−10 ... +60 °C	−10 ... +60 °C
protection class	IP 67	IP 67	IP 67
specific features	■ with or w/o sonic nozzles		■ optional sonic deflection bracket mounting

Learn more:
www.baumer.com/ultrasonic-distance

UR18

standard

- IO-Link
- Robust sensing element
- Analog outputs with IO-Link

M18

70 ... 1000 mm

< 40 ms

< 0.3 mm

< 0.5 mm

4 ... 20 mA / 20 ... 4 m + push-pull
0 ... 10 V / 10 ... 0 V + push-pull

connector M12

stainless steel

−25 ... +70 °C
(+60 °C in current mode)

IP 67

Ultrasonic sensors

Precise ultrasonic distance sensors – rectangular

Accurate distance measurement regardless of material, surface, color or transparency

- Small and light miniature sensors, e.g. for robotics
- Measurements in very small containers or openings

IO-Link

	UNxK 09 URDK 09	UNDK 10	UNDK 20	UNDK 30
category	miniature	miniature	standard	standard
features	■ High resolution ■ Minimal blind region ■ RS 232 ■ Various mounting options ■ Flat housing ■ Narrow sonic beam angle for detection in openings of up to 3 mm	■ Smallest ultrasonic sensor ■ Internal and external Teach-in ■ Very low weight: 4 g ■ Narrow sonic beam angle ■ Cable and flylead connector versions	■ Flat type ■ Internal and external Teach-in ■ Narrow and wide sonic beam angles ■ M8 connector	■ Compact type ■ Large sensing range ■ Teach-in on the sensor ■ Potentiometer version ■ Narrow and wide sonic beam angles ■ Cable and connector versions
dimensions	8.6 × 48.8 × 57.5 mm	10.4 × 27 × 14 mm	20 × 42 × 15 mm	30 × 65 × 31 mm
measuring distance	3 ... 200 mm	20 ... 200 mm	20 ... 1000 mm	30 ... 2000 mm
response time	< 7 ms	< 15 ms	< 10 ms	< 10 ms
resolution	< 0.1 mm	< 0.3 mm	< 0.3 mm	< 0.3 mm
repeat accuracy	< 0.5 mm	< 0.5 mm	< 0.5 mm	< 0.5 mm < 1 mm
output	0 ... 10 V / 10 ... 0 V RS 232	0 ... 10 V / 10 ... 0 V	4 ... 20 mA / 20 ... 4 mA 0 ... 10 V / 10 ... 0 V	4 ... 20 mA / 20 ... 4 mA 0 ... 10 V / 10 ... 0 V
connection types	cable 2 m flylead connector M8	cable 2 m connector M8 flylead connector M8	connector M8	cable 2 m connector M12
housing material	plastic	plastic	plastic	polyester / die-cast zinc
operating temperature	0 ... +60 °C	−10 ... +60 °C	−10 ... +60 °C	−10 ... +60 °C
protection class	IP 67	IP 67	IP 67	IP 67
specific features	■ with or w/o sonic nozzles ■ cascadable in 9 mm grid	■ wide range of accessories and installation options	■ optional sonic deflection bracket	

IO-Link

U500

standard

- IO-Link
- Robust sensing element
- Analog outputs with IO-Link

18 × 45.1 × 32.2 mm

70 ... 1000 mm

< 40 ms

< 0.3 mm

< 0.5 mm

4 ... 20 mA / 20 ... 4 mA + push-pull
0 ... 10 V / 10 ... 0 V + push-pull

 connector M12

plastic

−25 ... +65 °C
(+60 °C in current mode)

IP 67

- wide range of accessories and
  installation options

Machine modules – inductive sensors

Product name	Buffer station/ buffer table monitoring with mechanical guides			Infeed system monitoring with metal containers				Food safety: Disinfection in rinsing process	Process monitoring in machine tank		
	Buffer table full, filling no longer possible	Buffer table ready for filling	Buffer table emptying	Container position monitoring	Monitoring container transfer to screw conveyor	Monitoring container transfer from screw conveyor to capper	Referencing machine's mechanical systems	Disinfection in rinsing process [1]	Monitoring pressure in machine tank [2]	Soiling monitoring [3]	Level monitoring in machine tank [4]
Inductive sensors											
IFRM 12	■	■	■	■	■	■	■				
IFRM 18	■	■	■	■	■	■	■				
IR30.P18S	■	■	■	■	■	■	■				
IR30.P24S	■	■	■	■	■	■	■				
IR12.D06L	■	■	■			■	■				
IR18.D08L	■	■	■			■	■				
IR30.D24L	■	■	■			■	■				
IR12.P04F	■	■	■	■	■	■	■				
IR18.P08F	■	■	■	■	■	■	■				
IFBR 11				■	■	■	■				
IFBR 17				■	■	■	■				
IFRR 12				■	■	■	■				
IFRR 18				■	■	■	■				

[1] see PF20S, p. 77   [2] see PBMH, p. 76   [3] see *CombiLyz*®, p. 80   [4] see LSP, p. 78 and LBFH, p. 79 and CFAK, p. 70 and CFAM, p. 71   [5] see *VeriSens*®, p. 82

Capper monitoring with metal lids (e.g. cans)					Outfeed station monitoring	Quality control in production with metal containers					Drive technology synchronization		Format adjustment	
Cap level monitoring in the bin	Trigger sensor in wet and cleaning zone for vision sensor / camera	Quality control of screw caps with seal [5]	Cap infeed buffer full	Preparing caps for takeup	Container exiting filling machine	Level monitoring in packaging	Trigger sensor for vision sensor / camera	Speed-independent triggering [6]	Quality control of filled containers [7]	Live image quality assurance [7]	Buffer table and infeed conveyor synchronization [8]	Master rotary filler axis [9]	Automatic adjustment of filler head referred to container height [10]	Manual adjustment of container guides [11]
			■	■	■		■							
			■	■	■		■							
			■	■	■		■							
			■	■	■		■							
			■	■	■		■							
			■	■	■		■							
■			■	■	■		■							
■			■	■	■		■							
■			■	■	■		■							
■			■	■	■		■							

[6] see EIL580P, p. 84   [7] see *VeriSens®*, p. 82   [8] see EIL580P, p. 84   [9] see EAL580, p. 87   [10] see MSIA 68, p. 94   [11] see N150, p. 94

Inductive proximity switches

Cylindrical inductive proximity switches for factory automation

The proven solution for safe, non-contact detection of metal objects

- Very small sensors with all integrated evaluation electronics and large sensing distance
- Sturdy, maintenance-free and durable
- Always the right sensor thanks to a wide variety of variants
- Millions of them in use - highest precision and guaranteed reliability thanks to over 40 years of experience

	IFRM 12 IR12.PxxS	IFRM 18 IR18.PxxS	IFRM 30 IR30.PxxS
category	Compact	Compact	Compact
dimensions	M12	M18	M30
housing length	from 30 mm	from 35 mm	from 35 mm
nominal sensing distance Sn	4 … 10 mm	8 … 15 mm	10 … 24 mm
switching frequency	to 2 kHz	to 500 Hz	to 500 Hz
output signal	PNP NPN	PNP NPN	PNP NPN
connection types	connector M8 connector M12 cable 2 m	connector M8 connector M12 cable 2 m	connector M12 cable 2 m
housing material	brass nickel plated	brass nickel plated	brass nickel plated
operating temperature	−25 … +75 °C	−25 … +75 °C 0 … +65 °C	−25 … +75 °C
protection class	IP 67	IP 67	IP 67
specific features	■ variants with antivalent output (NO & NC)	■ variants with antivalent output (NO & NC)	■ variants with antivalent output (NO & NC)

Application-specific inductive sensors – outdoor / high temperature

- Rugged Outdoor and Washdown sensors
- High shock and vibration resistance
- Sensors with extended temperature range up to 180 °C

Learn more:
www.baumer.com/inductive

Outdoor / Washdown	IFRM 12 / 18 Outdoor	IFRR 08 / 12 / 18 Washdown
features	■ Rugged stainless steel (V4A) or all-metal housing ■ IP 69K long-term seal – *proTect+* ■ High signal quality in an extended temperature range	
dimensions	M12 / M18	M8 / M12 / M18
nominal sensing distance Sn	6 … 12 mm	3 … 12 mm
switching frequency	0.4 … 2 kHz	0.5 … 3 kHz
housing material	brass nickel plated	stainless steel 1.4404 (V4A)
operating temperature	−40 … +80 °C	−40 … +80 °C
protection class	IP 67	IP 68 / IP 69K & *proTect+*
specific features		■ Ecolab-tested ■ FDA-compliant ■ Vibration resistance EN 61373: 2010 (category 3) ■ Shock resistance EN 61373: 2010 (category 3)

High temperature up to +180 °C	IFRM 06 / 08 / 12 High temperature up to +100 °C	IFRD 06 / 08 / 12 / 18 High temperature up to +100 °C Full metal housing (*DuroProx*)	IFRH 06 / 08 / 12 High temperature up to +180 °C with separated electronics
features	■ Sensors with extended temperature range up to 180 °C ■ Versions with integrated and separate evaluation electronics ■ High switching frequencies		
dimensions	ø 6.5 mm / M8 / M12	ø 6.5 mm / M8 / M12 / M18	M8 / M12 / M18
nominal sensing distance Sn	2 … 4 mm	2 … 6 mm	1.5 … 5 mm
switching frequency	2 … 5 KHz	100 … 150 Hz	1 … 4 kHz
housing material	stainless steel brass nickel plated	stainless steel 1.4404 (V4A)	stainless steel brass nickel plated
operating temperature	−25 … +100 °C	−25 … +100 °C	−25 … +180 °C
protection class	IP 67	IP 68 / IP 69K	IP 67

Inductive proximity switches

Application-specific inductive sensors - Large sensing distance / Factor 1

- Sensors with extended switching distance up to 24 mm
- Factor 1 sensors with the same switching distance on all metals

Large sensing distance	IR12.P06S IR12.P10S	IR18.P12S IR18.P15S	IR30.P18S IR30.P24S
category	Compact	Compact	Compact
features	■ Large installation tolerances ■ Enhanced protection against mechanical damage ■ Cylindrical designs from Ø6.5 mm to M30 ■ Flush and non-flush variants		
dimensions	M12	M18	M30
nominal sensing distance Sn	6 / 10 mm	15 / 18 mm	18 / 24 mm
switching frequency	1 kHz	400 Hz	500 Hz
housing material	brass nickel plated	brass nickel plated	brass nickel plated
operating temperature	−25 ... +75 °C	−25 ... +75 °C 0 ... +65 °C	−25 ... +75 °C
protection class	IP 67	IP 67	IP 67

Factor 1	IR12.P04F	IR18.P06F IR18.P08F
category	Compact	Compact
features	■ Detection of stainless steel, aluminum and non-ferrous metals with the same sensing distance ■ High switching frequencies up to 3 kHz	
dimensions	M12	M18
nominal sensing distance Sn	40 / 50 mm	50 / 60 mm
switching frequency	4 mm	6 / 8 mm
housing material	2 kHz	500 Hz
operating temperature	brass nickel plated	brass nickel plated
protection class	−25 ... +75 °C	−25 ... +75 °C
protection class	IP 67	IP 67

Application-specific inductive sensors - ATEX / Hygienic

- Sensors for the Ex-area (ATEX-certified)
- Stainless steel sensors in hygienic design, EHEDG-certified

Learn more:
www.baumer.com/inductive

ATEX	IFRM 06X IFRM 08X	IFRM 12	IFRM 12X IFRM 18X
category	Miniatur	Compact	Compact
features	■ For environments with flammable gas or dust ■ ATEX certified ■ High repeat accuracy < 0.01 mm ■ Compact design		
dimensions	ø 6.5 mm / M8	M12	M12 / M18
nominal sensing distance Sn	1.5 mm	4 mm	2 ... 8 mm
switching frequency	5 kHz	2 kHz	to 2 kHz
output circuit	NAMUR	PNP / NPN	NAMUR
operating temperature	−20 ... +60 °C	−25 ... +65 °C	−20 ... +60 °C
protection class	IP 67	IP 67	IP 67
approvals/certificates	ATEX 1G	ATEX 3D	ATEX 1G

Hygienic design	IFBR 06	IFBR 11	IFBR 17
category	Miniature	Compact	Compact
features	■ FDA compliant materials − EHEDG certified ■ High chemical resistance − Ecolab tested and LCP front cap ■ IP 68K long-term seal − *proTect+* ■ Flush and non-flush housings		
dimensions	ø 6.5 mm	ø 11 mm	ø 17 mm
nominal sensing distance Sn	3 mm	4 mm (flush) 6 mm (non-flush)	8 mm (flush) 12 mm (non-flush)
switching frequency	3 kHz	1 kHz	500 Hz
housing material	stainless steel 1.4404 (V4A)	stainless steel 1.4404 (V4A)	stainless steel 1.4404 (V4A)
operating temperature	−40 ... +80 °C, cleaning temperature to +100 °C	−40 ... +80 °C, cleaning temperature to +100 °C	−40 ... +80 °C, cleaning temperature to +100 °C
protection class	IP 68 / IP 69K & *proTect+*	IP 68 / IP 69K & *proTect+*	IP 68 / IP 69K & *proTect+*

Inductive distance sensors – *AlphaProx*®

Linearized characteristic curve and reduction factor 1

- Internal temperature compensation
- Easy integration into the controller
- Variants with an additional digital output
- Two to four times larger measuring range for aluminum
- Particularly suitable for measurements on non-ferromagnetic metals
- Adjustable measuring range limits (teach)

	IR12.DxxL	IR18.DxxL	IR18.DxxF
category	compact	compact	compact
features	■ Linearized characteristic curve ■ Adjustable measuring range ■ Linearized output calibration curves ■ External Teach-in	■ Linearized characteristic curve ■ Adjustable measuring range ■ Linearized output calibration curves ■ External Teach-in	■ Factor 1 ■ Same distance on all metals ■ Very high measurement sensitivity ■ Linearized output calibration curves ■ External Teach-in
dimensions	M12	M18	M18
housing length	60 mm	60 mm	60 mm
measuring distance Sd	0 ... 6 mm	0 ... 8 mm	0 ... 8 mm
resolution	3 µm	8 µm	20 µm
repeat accuracy	10 µm	15 µm	30 µm
response time	1 ms	1 ms	15 ms
output signal	4 ... 20 mA 0 ... 10 V	4 ... 20 mA 0 ... 10 V	0 ... 10 V
connection types	connector M12	connector M12	connector M12
housing material	brass nickel plated	brass nickel plated	brass nickel plated
operating temperature	−25 ... +75 °C	−25 ... +75 °C	−25 ... +75 °C
protection class	IP 67	IP 67	IP 67

Sturdy sensors / ATEX

Rugged stainless steel housing

- Rugged stainless steel sensors
- Outdoor and Washdown design
- Sensors for potentially explosive areas

Learn more:
www.baumer.com/inductive-distance

	IWRR 18	IWRM 12
category	Outdoor design Washdown design	ATEX
dimensions	M18	M12
housing length	60 mm	50 mm
measuring distance Sd	0 ... 7 mm	0 ... 4 mm
resolution	5 µm	1 µm
repeat accuracy	15 µm	10 µm
response time	2 ms	2 ms
output signal	4 ... 20 mA	4 ... 20 mA
connection types	connector M12	connector M12
housing material	stainless steel 1.4404 (V4A)	brass nickel plated
operating temperature	−40 ... +70 °C	−10 ... +50 °C
protection class	IP 68 / IP 69K & *proTect+*	IP 67
specific features	Ecolab-tested FDA-compliant	ATEX 2D

Machine modules – capacitive sensors

Product name	Buffer station/buffer table monitoring			Infeed system monitoring			Food safety: Disinfection in rinsing process	Process monitoring in machine tank		
	Buffer table full, filling no longer possible	Buffer table ready for filling	Buffer table emptying	Container position monitoring	Monitoring container transfer to screw conveyor	Monitoring container transfer from screw conveyor to capper	Disinfection in rinsing process [1]	Monitoring pressure in machine tank [2]	Soiling monitoring [3]	Level monitoring in machine tank [4]
Capacitive sensors										
CFAK 12										■
CFAM 12										■
CFAK 18										■
CFAM 18										■
CFDK 25										■

[1] see PF20S, p. 77   [2] see PBMH, p. 76   [3] see *CombiLyz®*, p. 80   [4] see LSP, p. 78 and LBFH, p. 79 and CFAK, p. 70 and CFAM, p. 71   [5] see *VeriSens®*, p. 82

Capper monitoring					Outfeed station monitoring	Quality control in production					Drive technology synchronization		Format adjustment	
Cap level monitoring in the bin	Trigger sensor in wet and cleaning zone for vision sensor / camera	Quality control of screw caps with seal [5]	Cap infeed buffer full	Preparing caps for takeup	Container exiting filling machine	Level monitoring in packaging	Trigger sensor for vision sensor / camera	Speed-independent triggering [6]	Quality control of filled containers [7]	Live image quality assurance [7]	Buffer table and infeed conveyor synchronization [8]	Master rotary filler axis [9]	Automatic adjustment of filler head referred to container height [10]	Manual adjustment of container guides [11]

[6] see EIL580P, p. 84   [7] see *VeriSens®*, p. 82   [8] see EIL580P, p. 84   [9] see EAL580, p. 87   [10] see MSIA 68, p. 94   [11] see N150, p. 94

Capacitive sensors

Capacitive proximity sensors in plastic housings

Proximity switch for non-contact detection of liquid as well as solid objects and bulk solids

- High switching distance up to 30 mm even through non-metallic walls
- Absolutely reliable even when interfered by ambient conditions, e.g. ambient light or dirt
- Absolutely reliable detection of objects such as wafers, PCBs, paper stacks or hot adhesives up to 200 °C

	CFAK 12 with cap	CFAK 12	CFAK 18	CFAK 22 Oil Level Switch
category	cylindrical	cylindrical	cylindrical	cylindrical
function				
detection of non-conductive media			■	■
fill level detection through container			■	
Liquids in direct contact	■	■	■	■
object detection / buld goods			■	
dimensions	M12	M12	M18	M22
housing length	39.5 mm	39 mm	63.5 mm	87 mm
nominal sensing distance Sn	0.1 mm	0.5 mm	2 ... 15 mm	
switching frequency	15 Hz	15 Hz	50 Hz	
output signal	PNP NPN	PNP NPN	PNP NPN	voltage output
connection types	cable 2 m connector M8	cable 2 m	cable 2 m	connector AMPSEAL 16 3-Pol
housing material	POM EPDM50	PBT	PBT	PA 10T/X
operating temperature	0 ... +50 °C	0 ... +70 °C	−25 ... +75 °C	−40 ... +85 °C
protection class	IP 67	IP 67	IP 67 / IP 65	IP 69K
specific features	■ liquid level sensor for wastewater		■ potentiometer	■ liquid level sensor for oil ■ media temperature +100 °C max.

	CFAK 30	CFDK 25	CFDK 30	CFAM 12	CFAM 18
	cylindrical	rectangular extremely flat	rectangular	cylindrical	cylindrical
	■		■	■	■
	■	■	■	■	■
	■				
	■		■	■	■
	M30	25 × 52.4 × 6 mm	30 × 65 × 18.5 mm	M12	M18
	72 mm			60 mm without connector 76 mm with connector M12	64 mm without connector 78.5 mm with connector M12
	5 … 30 mm	2 … 15 mm	4 … 15 mm	0.5 … 4 mm	2 … 8 mm
	50 Hz	35 Hz	50 Hz	50 Hz	50 Hz
	PNP NPN	push-pull	PNP NPN	PNP NPN	PNP NPN
	cable 2 m	cable 2 m flylead connector M8	cable 2 m connector M12	cable 2 m connector M12	cable 2 m connector M12
	PBT	PA 12	PBT	brass nickel plated	brass nickel plated
	−25 … +75 °C	−25 … +75 °C	−25 … +75 °C	−25 … +75 °C	−25 … +75 °C
	IP 67 / IP 65	IP 65	IP 65	IP 65	IP 65
	■ versions with fixed switching point ■ potentiometer	■ fixed sensing distance ■ flexible mounting options thanks to innovative mounting frame	■ potentiometer	■ potentiometer ■ flush mountable	■ potentiometer ■ flush mountable

Accessories

Cables & adapters	Cable socket unassembled	Cable socket	Male connector	Connecting cables
characteristics	■ M8 and M12 ■ Straight or angled ■ 3-, 4- and 5-pole versions	■ M5, M8, M9, M12 or 8 mm snap-in ■ 3- or 12-pole versions ■ Straight or angled ■ Screened or unscreened ■ Various sheath materials ■ Various lengths available up to 25 m	■ M8 ■ 3-pole versions ■ Straight ■ PUR sheath ■ Various lengths available up to 3 m	■ M8 or M12 ■ 3- or 4-pole versions ■ Straight or angled ■ PUR sheath ■ Various lengths available up to 10 m
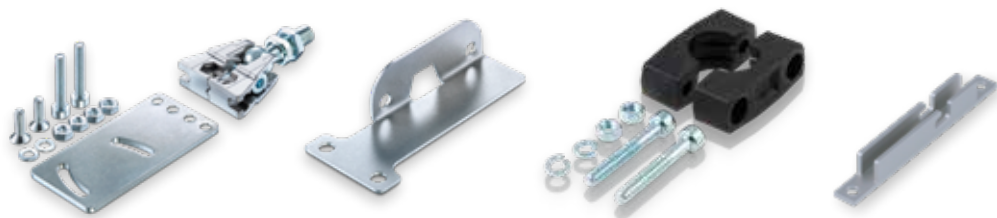
Mounting accessories	Mounting kits	Mounting bracket	Mounting bracket	Bracket for profiles
characteristics	■ Sensofix Mounting sets ■ Robust metal version ■ Mounting sets for various sensor types ■ Easy, flexible alignment	■ Matching mounting brackets available for various sensor types ■ High quality metal ■ Compatible with flexible Sensofix	■ Easy, fast mounting of smooth and cylindrical sensors ■ Available from ø 6.5 mm to ø 20 mm	■ Mounting adapter for diverse sensor types ■ e.g. for mounting in profiles, slots, cylinders, etc.

IO-Link

Testing and parameterization	Sensor test equipment	Teach-in Adapter	USB-IO-Link Master
characteristics	■ Display (V or mA) or. LED (PNP/NPN) reading ■ Sensor programming using integrated teach key ■ Connection option for plug-in power supply (available as accessory)	■ Sensor programming with teach-in pin ■ Teach-in using key ■ For sensors with M12 connection	■ Teach-in, parameterization and operation of IO-Link capable sensors

Accessories

Reflectors Lenses Apertures Glass	Reflectors	Reflective tapes	Apertures	Glass covers Filter Lens
characteristics	■ Self-adhesive or screw-mount reflectors ■ Circular or rectangular ■ All-metal reflectors ■ Ecolab certified types, resistant to cleaning agents	■ Self-adhesive tapes ■ Various widths and lengths	■ Apertures for various sensor types	■ For various sensor types

Beam columnators and deflector (Ultrasonic)	Beam columnators	Beam deflectors
characteristics	■ Replacement nozzles for sensors with sonic nozzles	■ Ideal for cramped spaces ■ Bends the sound 90°

Electronic pressure

Customization is our passion!
One of our strengths is customizing
products to your individual needs.

	PBMN flush	PP20H	PBMH hygienic	*CombiPress*® PFMH
Product highlights	■ Cavity-free process connection ■ Compact installation from G 1/2 A ■ Excellent temperature stability ■ CIP capability	■ All market typical hygienic connections ■ EHEDG & 3-A certified versions available ■ Condensate-proof measuring cell ■ IO-Link available ■ Space-saving installations from DN 25 on	■ Certified hygienic design ■ SIP / CIP capability ■ Excellent temperature stability	■ Certified hygienic design ■ SIP / CIP capability ■ High-precision and temperature stable ■ Touch display with tank illustration
Application examples	Vapor phase control, continuous level measurement, density measurement, pasty or crystallizing media	Process pressure in Food & Beverage, Continuous level monitoring, CIP cleaning processes (Clean In Place)	Controlling of CIP procedure, vapor phase control, continuous level measurement	Controlling of CIP procedure, filter monitoring, continuous level measurement
Measuring ranges	−1 … 0 bar to 0 … 400 bar	−1 … 40 bar	−1 … 0 bar to 0 … 40 bar	−1 … 0 bar to 0 … 60 bar
Process conditions	−40 … +125 °C −40 … +200 °C (with cooling neck)	−20 … 125 °C	−40 … +125 °C −40 … +200 °C (with cooling neck)	−40 … +125 °C −40 … +200 °C (with cooling neck)
Technology	Piezoresistive silicon	Piezoresistive silicon	Piezoresistive silicon	Piezoresistive silicon
Wetted parts material	AISI 316L (1.4404) AISI 316L (1.4435)	AISI 316L (1.4404) AISI 316L (1.4435)	AISI 316L (1.4404) AISI 316L (1.4435)	AISI 316L (1.4404) AISI 316L (1.4435)
Accuracy (max. measuring error)	≤ 0.1 % FS (NP ≥ 400 mbar) ≤ 0.25 % FS ≤ 0.5 % FS	± 0.5 % FS ± 1.0 % FS (0 … 0.4 bar)	≤ 0.1 % FS (NP ≥ 400 mbar) ≤ 0.25 % FS	≤ 0.1 % FS (NP ≥ 400 mbar) ≤ 0.25 % FS
Output signal	4 … 20 mA 0 … 10 V	4 … 20 mA, Programmable switch, IO-Link 1.1	4 … 20 mA 0 … 10 V	4 … 20 mA + HART® 2 × PNP switch
Proof pressure	3 × NP, max. 690 bar	> 3 × NP, max. 270 bar	> 3 × NP	> 3 × NP
Versatile options for process connection	G 1/2 A hygienic G1 A hygienic G 1/2 A ISO 228-1 with cone G 1/2 A DIN 3852-E with O-ring at the front G 1 A DIN 3852-E with O-ring at the front G 1/2 A DIN 3852-E 1/2-14 NPT	G 1/2 A DIN 3852-E G1 A hygienic G 1/2 A hygienic Tri-Clamp ø 50.5 Tri-Clamp ø 64 VARIVENT® DN 25 VARIVENT® DN 32 DIN 11851, DN 40, DN 50 DIN 11864-1-A, DN 40, DN50	BHC 3A DN 38 BHC 3A DN 76 Tri-Clamp ø 24.9 Tri-Clamp ø 34.0 Tri-Clamp ø 50.5 Tri-Clamp ø 64.0 DIN 11864-3-A (Aseptic Clamp), DN25, ø 50.5 VARIVENT® DN 25; 1" (Type F), ø 50 VARIVENT® DN 32 … 125; 1 1/2" … 6" (Type N), ø 68	BHC 3A DN 38 BHC 3A DN 76 Tri-Clamp ø 50.5 Tri-Clamp ø 64.0 VARIVENT® DN 32 … 125; 1 1/2" … 6" (Type N), ø 68
Electrical connection	M12, 4 pins DIN 43650 Shielded cable	M12, 4 pins M12, 5 pins	M12, 4 pins DIN 43650 Shielded cable	M12, 5 pins M12, 8 pins Cable gland, M16
Degree of protection	IP 65 , IP 67	IP 67, IP 69K	IP 65, IP 67	IP 67, IP 69K
Compliance and approvals	ATEX	3-A, EHEDG	ATEX, 3-A, EHEDG	ATEX, 3-A, EHEDG
Additional information	■ External programming of zero point and span with FlexProgram	■ External programming via IO-Link	■ External programming of zero point and span with FlexProgram	■ Internal setting of zero point ■ External programming with FlexProgram

Efficient and flexible.

 IO-Link   IO-Link

	FlexFlow PF20H	*FlexFlow* PF20S
Product highlights	■ Hygienic design ■ SIP / CIP capability ■ Flow and temperature measurement in a single sensor ■ Compact and robust ■ Two analogue outputs or IO-Link plus programmable output ■ No moving parts	■ Industrial process connections ■ Flow and temperature measurement in a single sensor ■ Compact and robust ■ Two analogue outputs or IO-Link plus programmable output ■ No moving parts
Application examples	Flow control, controlling of CIP procedure	Flow control, controlling of CIP procedure
Applicable media	Water Beverages Cleaning agents	Water Water-glycol mixture (max. 30 % glycol)
Process conditions	−25 … +150 °C 40 bar max.	−25 … +150 °C 100 bar max.
Measuring ranges	10 … 400 cm/s −25 … +125 °C	10 … 400 cm/s −25 … +125 °C
Versatile options for process connection	G 1/2 A hygienic BHC 3A DN 38 Tri-Clamp ø 34.0 Tri-Clamp ø 50.5 Tri-Clamp ø 64.0 DIN 11851 (dairy pipe connection), DN 25 DIN 11851 (dairy pipe connection), DN 40 DIN 11851 (dairy pipe connection), DN 50 VARIVENT® DN 25; 1" (Type F), ø 50 VARIVENT® DN 32 … 125; 1 1/2" … 6" (Type N), ø 68	G 1/2 A ISO 228-1 with cone Sealing cone M18 × 1.5 Compression fitting ø 6 mm
Wetted parts material	AISI 316L (1.4404)	AISI 316L (1.4404)
Output signal	Programmable switch IO-Link 1.1 4 … 20 mA 0 … 10 V	Programmable switch IO-Link 1.1 4 … 20 mA 0 … 10 V
Accuracy (max. measuring error)	≤ 2 % (FS)	≤ 2 % (FS)
Degree of protection	IP 67, IP 68, IP 69K	IP 67, IP 68, IP 69K
Compliance and approvals	cULus FDA	cULus

Level measurement

	LSP051.X	LSP056.X	LSKx2x	LSKx5x
Product highlights	■ Fast response time < 10 ms ■ Insensitive to foam, bubbles and sticky media ■ Top-, bottom- or side mounting	■ Fast response time < 10 ms ■ Insensitive to foam, bubbles and sticky media ■ Remote sensor with cable up to 5 m	■ Top- or side mounted ■ Adjustable rod length ■ PTFE coating for foamy media ■ Robust stainless steel connection head	■ Multipoint level detection ■ Adjustable rod length ■ PTFE coating for foamy media ■ Robust stainless steel connection head
Application examples	Controlling of filling machines, level regulation in deaerator tanks	Controlling of filling machines, level regulation in deaerator tanks	Point level detection in tanks, overfill protection	Multi point level detection in tanks, overfill protection
Process conditions	−20 … +140 °C Media conductivity > 50 µS	−20 … +140 °C Media conductivity > 50 µS	−20 … +140 °C	−20 … +140 °C
Measuring ranges	0 … 200 mm to 0 … 3000 mm	0 … 200 mm to 0 … 3000 mm	20 … 2000 mm	20 … 2000 mm
Versatile options for process connection	G1 A hygienic	G1 A hygienic	G 1/2 A hygienic	G1 A hygienic
Technology	Potentiometric	Potentiometric		
Wetted parts material	PEEK AISI 316L (1.4404)	PEEK AISI 316L (1.4404)	PEEK PTFE (with coating) AISI 316L (1.4404)	PEEK PTFE (with coating) AISI 316L (1.4404)
Accuracy (max. measuring error)	≤ 0.5 % FS	≤ 0.5 % FS		
Output signal	4 … 20 mA (galvanically isolated)	4 … 20 mA (galvanically isolated)	Electrode terminal PNP switch (with LKP100)	2 × … 4 × electrode terminal
Degree of protection	IP 67	IP 67	IP 67	IP 67
Compliance and approvals	3-A	3-A	3-A	3-A
Additional information	■ Adaptors for other hygienic connections available	■ Adaptors for other hygienic connections available	■ Adaptors for other hygienic connections available	■ Adaptors for other hygienic connections available ■ Evaluation unit DNGA-230.100 available as accessory

CleverLevel Switch
The clever alternative to vibrating forks.

Another Baumer INNOVATION

	CleverLevel® LBFS	CleverLevel® LFFS	CleverLevel® LBFI ⊘ IO-Link	CleverLevel® LBFH ⊘ IO-Link
Product highlights	▪ Certified hygienic design ▪ SIP / CIP capability ▪ Minimal insertion length ▪ Detects all kinds of media (solid, liquid, viscous, pasty) ▪ Compact and light weight ▪ LED display	▪ Certified hygienic design ▪ SIP / CIP capability ▪ Detects all kinds of media (solid, liquid, viscous, pasty) ▪ Bright, blue light on top when triggered ▪ Visible from long distance	▪ Compact and robust stainless steel housing ▪ On-site setting with qTeach ▪ Two adjustable switching outputs ▪ Multicolor LED display of switching statuses	▪ Certified hygienic design ▪ SIP / CIP capability ▪ Foam detection or suppression ▪ Problem solver for adhesions ▪ Two adjustable switching outputs ▪ 360° visible multicolor LED
Application examples	Point level detection in tanks, empty pipe monitoring, overfill protection, leakage detection, high temperature applications up to 200 °C	Point level detection in tanks, empty pipe monitoring, overfill protection, leakage detection	Point level detection in tanks, empty pipe monitoring, max. / min. level control, separation layer detection	Controlling of CIP procedure, point level detection in tanks, empty pipe monitoring, separation layer detection
Process conditions	−40 … +115 °C −40 … +200 °C (sliding connection)	−40 … +115 °C −40 … +200 °C (sliding connection)	−40 … +115 °C	−40 … +115 °C +135 °C max. (t < 1 h)
Versatile options for process connection	G 1/2 A hygienic G 1/2 A ISO 228-1 BSC G 3/4 A ISO 228-1 G 1 A ISO 228-1 G 1/2 A DIN 3852-E M18×1 ISO 261 / ISO 965 1/2-14 NPT 3/4-14 NPT G 1/2 A ISO 228-1 for reverse assembly (in-shell thread)	G 1/2 A hygienic BHC 3A DN 38	G 1/2 A hygienic G 1/2 A ISO 228-1 BSC 1/2-14 NPT	G 1/2 A hygienic
Output signal	PNP switch NPN switch	PNP switch NPN switch	2 × programmable switch IO-Link 1.1	2 × programmable switch IO-Link 1.1
Wetted parts material	PEEK AISI 316L (1.4404) AISI 304 (1.4301) (optional)	PEEK	PEEK AISI 316L (1.4404)	PEEK
Degree of protection	IP 67, IP 69K	IP 67	IP 67, IP 69K	IP 67, IP 69K
Compliance and approvals	ATEX 3-A EHEDG WHG EN50155 (railway) DNV-GL Lloyd's register CCS	ATEX 3-A EHEDG WHG EN50155 (railway) DNV-GL	ATEX cULus FDA	ATEX cULus 3-A EHEDG
Additional information	▪ M18 × 1 replaces a capacitive sensor directly ▪ Available with sliding connection 250 mm ▪ Hanging version for silos	▪ Available with sliding connection 100 mm and 250 mm		

Conductivity measurement

Innovative and compact.

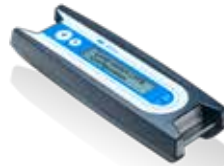|	*CombiLyz*® AFI4	*CombiLyz*® AFI5
Product highlights	■ Conductivity or concentration output ■ Fast internal temperature compensation ■ Fast response time ■ High accuracy ≤ 1 % ■ Programmable via touch screen or FlexProgram	■ Remote sensor with cable up to 10 m ■ Conductivity or concentration output ■ Fast internal temperature compensation ■ Fast response time ■ High accuracy ≤ 1 % ■ Programmable via touch screen or FlexProgram
Application examples	Concentration measurement, ingredients monitoring, phase separation	Concentration measurement, ingredients monitoring, phase separation
Process conditions	−20 … +140 °C +150 °C max. (t < 1 h)	−20 … +140 °C +150 °C max. (t < 1 h)
Measuring range	0 … 500 µS/cm to 0 … 1000 mS/cm	0 … 500 µS/cm to 0 … 1000 mS/cm
Versatile options for process connection	G1 A hygienic	G1 A hygienic
Wetted parts material	PEEK	PEEK
Output signal	4 … 20 mA + HART® (galvanically isolated)	4 … 20 mA + HART® (galvanically isolated)
Accuracy	≤ 1 % of selected range	≤ 1 % of selected range
Degree of protection	IP 67, IP 69K	IP 67, IP 69K
Compliance and approvals	3-A EHEDG	3-A EHEDG
Additional information	■ Adaptors for other hygienic connections available	■ Adaptors for other hygienic connections available

Your individual alarm system.

Red = take action   Green = ok

	CombiView® DFON	FlexProgrammer 9701	USB IO-Link Master
Product highlights	■ Large digits and illustration visible from long distance ■ Configurable via touch screen or FlexProgram ■ Backlight color change according to alarm settings ■ 3 configurable backlight colors	■ Easy configuring with menu control function ■ Data transfer from PC to device via USB ■ Configuration of a device on the spot without a PC ■ Robust plastic case with digital display and buttons ■ Rechargeable battery (USB) ■ Free FlexProgram updates from Baumer web site	■ Compatible with IO-Link Device Tool ■ Including power supply and USB cable
Application examples	Remote monitoring, value visualization, alerting	Sensor parameterization, setup duplication, data monitoring and logging	Integration of IO-Link sensors via USB
Supply voltage	Loop-powered	From USB-port	Wall power supply
Accuracy	0.1 % ± 1 digit		
Output signal	2 × PNP switch	Sensor interface	IO-Link 1.1
Ambient conditions	−30 … +80 °C	0 … +50 °C, rel. humidity < 90 %	
Degree of protection	IP 67	IP 42	
Software		FlexProgram	FlexProgram
		FDT / DTM based	IO-Link Device Tool
Compliance and approvals	ATEX		

Image processing / identification

VeriSens® vision sensors

- Intuitive configuration in just four steps
- Patented *FEX*® image processor for higher process stability
- *FEXLoc*® 360 ° part location saves object alignment effort
- *ColorFEX*® – reliable color differentiation made easy to everyone
- Easy-to-configure web interface

	VeriSens® CS100	VeriSens® ID100	VeriSens® ID510	VeriSens® XF700 / 800, also color
Feature checks	■ Presence and complete-ness check ■ Part recognition and part sorting ■ Checking part geom-etries ■ *FEXLoc*® 360° part location	■ Multi-code reader for 1D and 2D codes ■ Code quality identi-fication according to ISO / AIM	■ Multi reader for text and 1D / 2D codes (incl. GS1) ■ Reading of different fonts without training ■ Text verification (OCR / OCV), code quality control	■ Presence and complete-ness check ■ Part position and alignment check ■ Identification (XF800 only) ■ *FEXLoc*® 360° part location ■ Special color functions
Dimensions	53 × 99.5 × 38 mm	53 × 99.5 × 38 mm	53 × 99.5 × 38 mm	53 × 99.5 × 38 mm
Protection class	IP 67	IP 67	IP 67	IP 67
Resolution	752 × 480 px	752 × 480 px	752 × 480 px	752 × 480 px
Lens	10 mm / 16 mm	10 mm / 16 mm	12 mm	12 mm / 16 mm
Illumination	white / infrared	white	white / infrared	white / infrared
Speed	max. 50 inspections / s	max. 50 inspections / s	max. 50 inspections / s	max. 100 inspections / s
Communication: Digital inputs Digital outputs Setup Process interface	5 5 Ethernet	5 3 Ethernet TCP/UDP (Ethernet), RS485, PROFINET / EtherNet/IP™ (via gateway)	5 5 Ethernet TCP/UDP (Ethernet), PROFINET / EtherNet/IP™	5 5 Ethernet TCP/UDP (Ethernet), PROFINET / EtherNet/IP™
Special features	■ Configurable web interface	■ Password protection ■ Configurable web interface	■ Password protection ■ Configurable web interface	■ Coordinate conversion ■ Password protection ■ Configurable web interface

CX.I cameras in IP 65 / 67 or IP 69K design

- Precise inspection with resolutions up to 12 megapixel
- Fast image acquisition with high-sensitivity global shutter CMOS cameras
- Industrial camera design for reliable image evaluation with long-term stability

GiG**E**® VISION

GEN‹i›CAM

New   New

	VeriSens® XC700 / 800, also color*	*VeriSens*® XF105 / 205		VCXG-xxx.I / .I.XT (with housing base set IP 65 / 67 and tube)	VCXG-xxx.I / .I.XT (with housing base set IP 69K and tube)
Features	■ Presence and complete-ness check ■ Part position and alignment check ■ Identification (XC800 only) ■ *FEXLoc*® 360° part location ■ Special color functions	■ Presence and complete-ness check ■ Part position and alignment check ■ Identification (XF205 only) ■ *FEXLoc*® 360° part location		■ Extended operating temperature range from −40 °C to +70 °C (.XT models) ■ Industrial housing tolerates vibration up to 10 g and shock up to 100 g ■ 4 opto-decoupled power outputs with an output power of up to 120 W (max. 48 V / 2.5 A) ■ Exposure from 1 µs and up to 1000 fps with ROI	
Dimensions	53 × 99.5 × 49.8 mm (without lens / tube)	53 × 107.5 × 38 mm		Ø 65 × 123 mm	Ø 63 × 208 mm
Protection class	IP 67	IP 69K		IP 65 / 67	IP 69K
Resolution	640 × 480 px (1/4")* 1280 × 960 px (1/3")* 1600 × 1200 px (1/1.8")	752 × 480 px		1.3 MP: 1280 × 1024 px (1/2") 1.5 MP: 1440 × 1080 px (1/2.9") 2.3 MP: 1920 × 1200 px (2/3") 5 MP: 2448 × 2048 px (2/3") 12 MP: 4096 × 3000 px (1.1")	
Lens	changeable lens (C-mount)	10 mm / 16 mm		C-mount	
Illumination	*VeriFlash*® flash controller	white / infrared		External (integrated 4-channel lighting controller)	
Frame rate	max. 118 inspections / s (VGA)	max. 100 inspections / s		up to 94 fps	
Communication: Digital inputs Digital outputs Setup	5 5 Ethernet TCP/UDP (Ethernet), PROFINET / EtherNet/IP™	5 5 Ethernet TCP/UDP (Ethernet)		4 4 power outputs with up to 120 W (max. 48 V / 2.5 A) GigE	
Housing	■ Integrated *VeriFlash*® flash controller for external illuminaton ■ Free choice of lenses due to C-mount and modular tube system ■ CCD sensor with resolution of 0.3 MP* / 1.2 MP* / 2 MP ■ Configurable web interface	■ Coordinate conversion ■ Password protection ■ Configurable web interface		■ Hard-anodized IP 65 / 67 housing resistant to aggressive cleaners	■ IP 69K housing capable of high-pressure cleaning

Incremental encoders

Precise optical sensing.
Max. 5000 pulses per revolution.

- Solid shaft, blind or through hollow shaft
- Robust all-metal housing

OptoPulse® – the new benchmark for encoders

OptoPulse®

Features	■ Solid shaft with clamping flange	■ Solid shaft with synchro flange	■ Blind hollow shaft	■ Through hollow shaft
Product family	EIL580-SC - *OptoPulse®*	EIL580-SY - *OptoPulse®*	EIL580-B - *OptoPulse®*	EIL580-T - *OptoPulse®*

Sensing method	Optical			
Size (housing)	ø 58 mm			
Voltage supply	5 VDC ± 5 %, 8 … 30 VDC, 4.75 … 30 VDC			
Output stage				
- TTL/RS422	■	■	■	■
- HTL/push-pull	■	■	■	■
Output signals	A 90° B, N + inverted			
Shaft type				
- Solid shaft	ø 10 mm	ø 6 mm	–	–
- Blind hollow shaft	–	–	ø 8 … 15 mm	–
- Through hollow shaft	–	–	–	ø 8 … 15 mm
Connection				
- Flange connector M12, M23	Radial / axial			Radial
- Cable	Radial / axial / tangential			Radial / tangential
Pulses per revolution	100 … 5000			
Operating temperature	−40 … +85 °C (option: +100 °C)			
Protection	IP 65, IP 67			
Operating speed	≤ 12 000 rpm (IP 65) ≤ 6000 rpm (IP 67)		≤ 8000 rpm (IP 65) ≤ 6000 rpm (IP 67)	≤ 6000 rpm (IP 65) ≤ 3000 rpm (IP 67)
Max. shaft load	≤ 40 N axial, ≤ 80 N radial		–	–
Option	Square flange, programmable		Isolated hollow shaft, hybrid bearings, programmable	

OptoPulse®

The innovative optical sensing method utilized by *OptoPulse®* incremental encoders ensures ultra-high accuracy and consistently high signal quality throughout the entire temperature range. The heart of this technology is a monolithic OptoASIC with high integration density particularly conceived for high-precision encoders. Thanks to the limited number of discrete components, reliability in the application is decisively improved when it comes to shocks and vibrations.

V2A.
Max. 10 000 pulses per revolution.

- Size ø 58 ... 89 mm
- Square wave and sine signals

Features	■ Through hollow shaft ■ Max. 6000 pulses per revolution	■ Solid shaft with clamping flange ■ Max. 6000 pulses per revolution	■ Blind hollow shaft ■ Max. 6000 pulses per revolution	■ Blind hollow shaft ■ Max. 10 000 pulses per revolution ■ Sine waves per revolution 1024 ... 2048	
Product family	GE333	GE355	ITD21 A4 Y65	ITD 40 A4	ITD 42 A4 Y141

Sensing method	Optical				
Size (housing)	ø 58 mm			ø 89 mm	
Voltage supply	5 VDC ± 10 %, 4.75 ... 30 VDC, 10 ... 30 VDC		5 VDC ± 5 %, 8 ... 30 VDC		
Output stage					
- TTL/RS422	■	■	■	■	–
- HTL/push-pull	■	■	■	■	–
- SinCos 1 Vpp	–	–	–	–	■
Output signals	A 90° B, N + inverted			A, B, N + inv.	A, B, N
Shaft type					
- Solid shaft	–	ø 10 mm	–	–	–
- Blind hollow shaft	–	–	–	ø 20 ... 27 mm	–
- Through hollow shaft	ø 12 mm	–	ø 10 ... 14 mm	–	ø 20 ... 27 mm
Connection					
- Cable	Radial	Radial / axial	Radial	Radial	
Pulses per revolution	5 ... 6000	5 ... 6000	200 ... 6000	2000 ... 10 000	–
Sine waves per revolution	–	–	–	–	1024 ... 2048
Operating temperature	−25 ... +100 °C (5 VDC) −25 ... +85 °C (24 VDC)	−25 ... +85 °C	−20 ... +85 °C	−20 ... +70 °C	−20 ... +85 °C
Protection	IP 65	IP 67	IP 66	IP 67	
Operating speed	≤ 6000 rpm	≤ 10 000 rpm	≤ 3000 rpm	≤ 2500 rpm	
Max. shaft load	–	≤ 20 N axial, ≤ 40 N radial		–	
Material	Stainless steel: 1.4305	Stainless steel: 1.4305	Stainless steel: 1.4305	Stainless steel: 1.4305	Stainless steel 1.4305
Options	–	–	Cable with connector	Cable with connector	

Absolute encoders

Robust magnetic precise sensing.
Integrated interface.

- Solid shaft and blind hollow shaft
- Compact housing where space is tight
- Shock resistant up to 500 g
- Angular accuracy up to ± 0.15 °

PROFINET®
SSI
SAE J1939
CANopen

MAGRES

	New	New	New	New
Features	■ Solid shaft with clamping or synchro flange	■ Solid shaft with clamping or synchro flange ■ E1 compliant design ■ Corrosion protection C5-M	■ Blind hollow shaft	■ Blind hollow shaft ■ E1 compliant design ■ Corrosion protection C5-M
Product family	EAM580 - *MAGRES*	EAM580R - *MAGRES*	EAM580 - *MAGRES*	EAM580R - *MAGRES*

Interface				
- SSI	■	–	■	–
- Analog	–	■	–	■
- CANopen® / redundant	■ / –	■ / ■	■ / –	■ / ■
- CANopen® Lift	■	–	■	–
- SAE J1939	–	■	–	■
- Profinet	■	–	■	–

Function principle	Multiturn	Singleturn	Multiturn	Singleturn	Multiturn	Singleturn	Multiturn	Singleturn
Sensing method	Magnetic							
Size (housing)	ø 58 mm							
Voltage supply	4.5 … 30 VDC (CANopen, SAE J1939, SSI) 8 … 30 VDC / 14 … 30 VDC (Analog - depending on type) 10 … 30 VDC (Ethernet)							

Shaft type								
- Solid shaft	ø 6 mm, ø 10 mm				–			
- Blind hollow shaft	–				ø 12 mm, ø 14 mm, ø 15 mm			

Connection								
- Flange connector M12	Radial		Radial		Radial		Radial	
- Flange connector M23	Radial		–		Radial		–	
- Cable	Radial (0.14 mm²)		Radial (0.5 mm²)		Radial (0.14 mm²)		Radial (0.5 mm²)	
Total resolution¹⁾	≤ 32 bit	≤ 14 bit	≤ 32 bit	≤ 14 bit	≤ 32 bit	≤ 14 bit	≤ 32 bit	≤ 14 bit
Steps per turn	≤ 16384/14 bit	≤ 16384/14 bit	≤ 16384/14 bit	≤ 16384/14 bit	≤ 16384/14 bit	≤ 16384/14 bit	≤ 16384/14 bit	≤ 16384/14 bit
Number of turn	≤ 262144/18 bit	–	≤ 262144/18 bit	–	≤ 262144/18 bit	–	≤ 262144/18 bit	–
Absolute accuracy	Up to ± 0.25° (+25 °C)							
Operating temperature	−40 … +85 °C							
Protection	IP 65, IP 67		IP 67		IP 65, IP 67		IP 67	
Operating speed	≤ 6000 rpm							
Max. shaft load	≤ 40 N axial, ≤ 80 N radial							
Options	Additional incremental signals (SSI, CANopen®)		Additional incremental signals (SSI, CANopen®) Cable with Deutsch connector		Additional incremental signals (SSI, CANopen®)		Additional incremental signals (SSI, CANopen®) Cable with Deutsch connector	

Precise optical sensing.
Integrated interface.

- Resolution up to 13 bit per turn
- High accuracy up to ± 0.025 °
- Operating temperature down to −40 °C
- Additional incremental signals

ETHERNET **POWERLINK**

EtherCAT®

CANopen

PROFIBUS®

PROFINET®

EtherNet/IP®

DeviceNet®

Features	■ Solid shaft with clamping flange		■ Solid shaft with synchro flange		■ Blind hollow shaft		■ Through hollow shaft	
Interface	**Product family**							
- SSI or (SSI / incremental)	GM400	GA240	GM401	GA241	GXM2S	GXA2S	G0M2H	G0A2H
- CANopen®	GXP5W	GXU5W	GXP5W	GXU5W	GXP5S	−	G0P5H	−
- DeviceNet	GXP8W	−	GXP8W	−	−	−	−	−
- Profinet	EAL580-SC		EAL580-SY		EAL580-B		EAL580-T	
- EtherNet/IP	EAL580-SC		EAL580-SY		EAL580-B		EAL580-T	
- EtherCAT	EAL580-SC		EAL580-SY		EAL580-B		EAL580-T	

Function principle	Multiturn	Singleturn	Multiturn	Singleturn	Multiturn	Singleturn	Multiturn	Singleturn
Sensing method	Optical							
Size (housing)	ø 58 mm							
Voltage supply	10 ... 30 VDC							
Shaft type								
- Solid shaft	ø 10 mm		ø 6 mm		−		−	
- Blind hollow shaft	−		−		ø 10 ... 15 mm		−	
- Through hollow shaft	−		−		−		ø 10 ... 14 mm	
Connection	Flange connector M12, M23, M27, D-SUB or cable (depending on product and variant)							
Total resolution[1]	≤ 29 bit	≤ 13 bit	≤ 29 bit	≤ 13 bit	≤ 29 bit	≤ 13 bit	≤ 29 bit	≤ 13 bit
Steps per turn	≤ 8192/13 bit							
Number of turn	≤ 65536/16 bit	−	≤ 65536/16 bit	−	≤ 65536/16 bit	−	≤ 65536/16 bit	−
Absolute accuracy	± 0.025°							
Protection	IP 65				IP 54			
Operating temperature	−40 ... +85 °C (depending on product and variant)							
Operating speed	≤ 6000 rpm							
Max. shaft load	≤ 20 N axial, ≤ 40 N radial				−			
Options	Stainless steel, Offshore	−	−		−		Protection IP 65	

Absolute encoders

Precise optical sensing.
Integrated interface.

- High resolution up to 18 bit per turn
- High accuracy ± 0.01 °
- Operating temperature down to −40 °C
- Additional incremental signals

HighRes – up to 18 bit singleturn resolution

New   New

Features	■ Solid shaft with clamping flange ■ High resolution		■ Solid shaft with synchro flange ■ High resolution		■ Blind hollow shaft ■ High resolution		■ Through hollow shaft ■ High resolution	
Interface	**Product family**							
- SSI or (SSI / incremental)	GBM2W	GBA2W	GBM2W	GBA2W	GBM2S	GBA2S	GBM2H	GBA2H
- CANopen®	GBP5W	GBU5W	GBP5W	GBU5W	GBP5S	–	GBP5H	–
- Profinet	EAL580-SC		EAL580-SY		EAL580-B		EAL580-T	
- EtherNet/IP	EAL580-SC		EAL580-SY		EAL580-B		EAL580-T	
- EtherCAT	EAL580-SC		EAL580-SY		EAL580-B		EAL580-T	

Function principle	Multiturn	Singleturn	Multiturn	Singleturn	Multiturn	Singleturn	Multiturn	Singleturn
Sensing method	Optical							
Size (housing)	ø 58 mm							
Voltage supply	10 … 30 VDC							
Shaft type								
- Solid shaft	ø 10 mm		ø 6 mm		–		–	
- Blind hollow shaft	–		–		ø 10 … 15 mm		–	
- Through hollow shaft	–		–		–		ø 10 … 14 mm	
Connection	Flange connector M12, M23, D-SUB or cable (depending on product and variant)							
Total resolution[1]	≤ 32 bit	≤ 18 bit	≤ 32 bit	≤ 18 bit	≤ 32 bit	≤ 18 bit	≤ 32 bit	≤ 18 bit
Steps per turn	≤ 262144/18 bit							
Number of turn	≤ 16384/14 bit	–	≤ 16384/14 bit	–	≤ 16384/14 bit	–	≤ 16384/14 bit	–
Absolute accuracy	± 0.01°							
Protection	IP 65				IP 54 (IP 65 optional)		IP 54	
Operating temperature	−40 … +85 °C (depending on product and variant)							
Operating speed	≤ 6000 rpm							
Max. shaft load	≤ 20 N axial, ≤ 40 N radial				–			

1) depending on interface
2) on request

Precise optical sensing.
Modular bus cover.

- High resolution up to 18 bit per turn
- High accuracy ± 0.01 °
- Operating temperature down to −40 °C
- Additional incremental signals

HighRes – up to 18 bit singleturn resolution

Features	■ Solid shaft with clamping flange ■ High resolution		■ Solid shaft with synchro flange ■ High resolution		■ Blind hollow shaft ■ High resolution		■ Through hollow shaft ■ High resolution	
Product family	GBMMW	GBAMW	GBMMW	GBAMW	GBMMS	GBAMS	GBMMH	GBAMH

Interface								
- CANopen®	■		■		■		■	
- DeviceNet	■		■		■		■	
- Profibus-DP	■		■		■		■	
- Powerlink	■		■		■		−	

Function principle	Multiturn	Singleturn	Multiturn	Singleturn	Multiturn	Singleturn	Multiturn	Singleturn
Sensing method	Optical							
Size (housing)	ø 58 mm							
Voltage supply	10 ... 30 VDC							
Shaft type								
- Solid shaft	ø 10 mm		ø 6 mm		−		−	
- Blind hollow shaft	−		−		ø 12 ... 14 mm		−	
- Through hollow shaft	−		−		−		ø 12 ... 14 mm	
Connection	Bus cover with M12 or cable gland (depending on product and variant)							
Total resolution	≤ 31 bit	≤ 18 bit	≤ 31 bit	≤ 18 bit	≤ 31 bit	≤ 18 bit	≤ 31 bit	≤ 18 bit
Steps per turn	≤ 262144/18 bit		≤ 262144/18 bit		≤ 262144/18 bit		≤ 262144/18 bit	
Number of turn	≤ 8192/13 bit	−	≤ 8192/13 bit	−	≤ 8192/13 bit	−	≤ 8192/13 bit	−
Absolute accuracy	± 0.01°							
Protection	IP 54, IP 65						IP 54	
Operating speed	≤ 6000 rpm							
Operating temperature	−25 ... +85 °C							
Max. shaft load	≤ 20 N axial, ≤ 40 N radial				−		−	
Options	Incremental outputs Operating temperature −40 ... +85 °C						Protection IP 69K Stainless steel variant Operating temperature −40 ... +85 °C	

With SIL2 and SIL3 certification.
For quick implementation of your system concepts.

- Size ø 58 … 105 mm
- Square wave and sine signals

PL
SIL

Functional Safety

Features	■ Sine encoders ■ Through hollow shaft ■ SIL2/SIL3 approval	■ Incremental encoders ■ Solid shaft with clamping or synchro flange ■ SIL2 approval
Product family	ITD22H00 SIL	GI357

Sensing method	Optical	
Size (housing)	ø 58 mm	ø 58 mm
Voltage supply	5 VDC ± 10 %	24 VDC +20/−50 %
Output stage		
- TTL/RS422	–	■
- HTL/push-pull	–	■
- SinCos 1 Vpp	■	–
Output signals	A, B, N	A 90° B + inverted
Shaft type		
- Cone shaft 1:10	–	–
- Solid shaft	–	ø 6 mm / ø 10 mm
- Blind hollow shaft	–	–
- Through hollow shaft	ø 10, ø 12, ø 14 mm	–
Flange	–	Clamping or synchro flange
Connection		
- Terminal box	–	–
- Flange connector M12, M23	–	Radial, axial
- Cable	Tangential	–
Pulses per revolution	–	5 … 5000
Sine waves per revolution	1024, 2048	–
Operating temperature	−30 … +100 °C	−25 … +85 °C
Protection	IP 65	IP 54 (without shaft seal) IP 65 (with shaft seal)
Operating speed	≤ 6000 rpm	≤ 10 000 rpm
Max. shaft load	–	≤ 20 N axial, ≤ 40 N radial
Approval	SIL2 or SIL3 compliant in redundant use	SIL2 compliant to IEC 61508
Other	Suitable to safety speed switches GMM2xxS	

V2A and V4A.

- Size 58 mm
- SSI, fieldbus, real time EtherNet

EtherCAT. EtherNet/IP™ PROFI BUS®

CANopen® DeviceNet™ PROFI NET®

ETHERNET POWERLINK SSI SAE J1939

MAGRES hermetic

Features	■ Solid shaft with clamping flange ■ Integrated interfaces	■ Solid shaft with clamping or synchro flange ■ Through hollow shaft ■ Modular bus cover	■ Solid shaft with clamping flange ■ Hermetically sealed ■ Integrated interfaces	■ Solid shaft with clamping flange ■ Hermetically sealed ■ Modular bus cover
Product family	GE244	GE404	GEMMW	GEMMH	BMMV 58 - *MAGRES hermetic*	BMMV 58 flexible - *MAGRES hermetic*

Interface				
- SSI	■	–	■	–
- CANopen®	–	■	■	■
- DeviceNet	–	■	–	■ 1)
- Profibus-DP	–	■	■	■
- SAE J1939	–	■ 1)	–	■
- EtherCAT	–	■ 1)	–	■ 1)
- EtherNet/IP	–	■ 1)	–	■
- Powerlink	–	■ 1)	–	■ 1)
- Profinet	–	■ 1)	–	■
Function principle	Singleturn	Multiturn	Multiturn	Multiturn	Multiturn
Sensing method	Optical		Magnetic	
Size (housing)	ø 58 mm			
Voltage supply	10 ... 30 VDC			
Shaft type				
- Solid shaft	ø 10 mm	ø 6, ø 10 mm	–	ø 10 mm	
- Through hollow shaft	–	–	ø 12 ... 14 mm	–	–
Connection	M23 radial	Bus cover cable gland	Bus cover M12	
Total resolution	14 bit	26 bit	29 bit	≤ 29 bit	≤ 30 bit
Steps per turn	≤ 16384/14 bit	≤ 4096/12 bit	≤ 8192/13 bit	≤ 8192/13 bit	≤ 4096/12 bit
Number of turn	–	≤ 16384/14 bit	≤ 65 536/16 bit	≤ 65 536/16 bit	≤ 262 144/18 bit
Absolute accuracy	± 0.025°		± 1°	
Operating temperature	−25 ... 85 °C		−40 ... +85 °C	
Protection	IP 67		IP 68, IP 69 K	
Operating speed	≤ 6000 rpm			
Max. shaft load	≤ 20 N axial ≤ 40 N radial	≤ 20 N axial ≤ 40 N radial	–	≤ 120 N axial (combined), ≤ 280 N radial (combined) ≤ 270 N axial (single load)
Material	Stainless steel: 1.4305 / 1.4404	Stainless steel: 1.4305		

1) on request

Accessories

Mounting accessories for hollow shaft encoders

Matching accessories for
hollow shaft mount

- Stator couplings for ultra-precise mount with maximum installation flexibility
- Safe and easy anti-torsion spring washers and pins
- Torque supports for industry and HeavyDuty variants

Mounting accessories for solid shaft encoders

Matching accessories for
solid shaft mount

- Shaft couplings to link drive shaft and encoder shaft
- Mounting clamp to secure encoder flange
- Adaptor flange and mounting angle for quick and safe encoder mount
- Flange adaptor, for example to change a clamping flange into a synchro flange

Small and large measuring wheels

Measuring wheels – for any surface
the optimum grip

- Wheel material and surface profile depending on the application
- Circumference 20 or 50 cm
- For shaft diameters from 4 to 12 mm

Encoders and angular sensors

Several mechanical and electric interface concepts as well as increasingly demanding applications call for appropriate accessories. With Baumer you will always encounter the matching mounting accessories like torque supports, spring washers, connectors and cables.

Deployed in conjunction with incremental encoders, measuring wheels perform the task of length measurement or speed monitoring. Learn more at: www.baumer.com

Varied connectors and cables

Matching all encoders
and angular sensors

- Mating connector M12, M23, MIL and other standards
- Mating connector pre-assembled or for self-assembly
- Different cables, non-assembled

Programming and diagnostic tools

For encoder commissioning
and configuration

- Signal processing for interpolation, conversion, regenerating and as a switching relay, HTL, TTL, SinCos and fiber-optic
- Programming tools with GSD-/EDS-/XML files as well as instruction manuals, USB adatpor and PC software
- Testing equipment for incremental encoders for consistent monitoring of encoder data
- PC software for display and evaluation

Programmable resolution and signals

Cutting down on product variety, downtime, maintenance and inventory cost

- 1 ... 65 536 ppr programmable
- Pulse sequence and zero pulse programmable
- Easy programming by handheld tool or PC software
- Convenient programming of several encoders connected in series
- Automatic detection of neighboring devices
- On-screen diagnostics

Format adjustment

Designation	Article number	Application profile	Nominal voltage	Rated torque	Nominal speed	Max. torque	Operating temperature range	Protection class	Connector output
Compact drives for automated format adjustment									
MSIA 68 bevel gear transmission W3 CANopen®	10165384	CiA 402, CiA 305	24 V	4.0 Nm	100 rpm	10 Nm	−15…+65 °C (rating at +40 °C)	IP 54	axial
MSIA 68 bevel gear transmission W3 PROFIBUS	10165308	PROFIdrive	24 V	4.0 Nm	100 rpm	10 Nm	−15…+65 °C (rating at +40 °C)	IP 54	axial

Designation	Article number	Operating voltage	Measuring principle/function	Measuring range	Step count/ revolutions	Number of revolutions	Spindle pitch	Operating temperature range	Protection class	Type of enclosure	Connection	Dimensions
Spindle position display for manual format adjustment												
Manual format adjustment	N150	24 V	Absolute multiturn	−99.999… +999.99 mm, −9.999… +99.999 inch	1440	4096 / 12 bit	≤ 14 mm	−50… +50 °C	IP 50	Plug-on enclosure with hollow shaft	M8 connector/socket, 4-pin, Cable outlet (30/15 cm) with M8 connector/ socket, 4-pin, RS485 interface	37 × 75 × 45 mm
Memory controller	N242	24 V	Programming and memory unit, memory for 100 formats, max. 32 position displays (LCD)	none	none	none	−10… +50 °C	IP 65	Built-in enclosure with 10 digit and 8 function keys	Screw termi- nals, RS485 interface	144 × 144 × 116.5 mm

Baumer – the strong partner.

We at Baumer are close to our customers, understand their needs and provide the best solution. Worldwide customer service for Baumer starts with on-the-spot personal discussions and qualified consultation. Our application engineers speak your language and strive from the start, through an interactive problem analysis, to offer comprehensive and user-compatible solutions.

We are close to you across the globe.

The worldwide Baumer sales organizations guarantee short delivery times and readiness to supply. Many of our customers are directly linked via our electronic order system with the JIT logistics process.

A worldwide network coupled with the most modern communication techniques enable us to deliver information quickly and transparently to decision makers in all Baumer locations.

Closeness to the customer for Baumer means being available for your needs anywhere and at any time.

Worldwide presence.

Africa	America	Asia	Europe	Oceania
Algeria	Brazil	Bahrain	Austria	Australia
Cameroon	Canada	China	Belgium	New Zealand
Côte d'Ivoire	Colombia	India	Bulgaria	
Egypt	Mexico	Indonesia	Croatia	
Morocco	United States	Israel	Czech Republic	
Reunion	Venezuela	Japan	Denmark	
South Africa		Kuwait	Finland	
		Malaysia	France	
		Oman	Germany	
		Philippines	Greece	
		Qatar	Hungary	
		Saudi Arabia	Italy	
		Singapore	Malta	
		South Korea	Martinique	
		Taiwan	Netherlands	
		Thailand	Norway	
		UAE	Poland	
			Portugal	
			Romania	
			Russia	
			Serbia	
			Slovakia	
			Slovenia	
			Spain	
			Sweden	
			Switzerland	
			Turkey	
			United Kingdom	

For more information
about our worldwide
locations go to:
www.baumer.com/worldwide

Baumer
Passion for Sensors
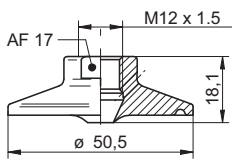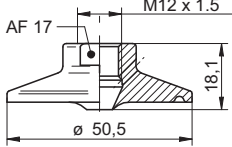
Baumer Group
International Sales
P.O. Box · Hummelstrasse 17 · CH-8501 Frauenfeld
Phone +41 (0)52 728 1122 · Fax +41 (0)52 728 1144
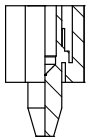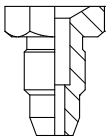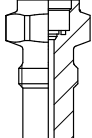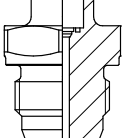sales@baumer.com · www.baumer.com
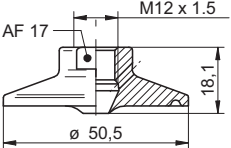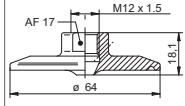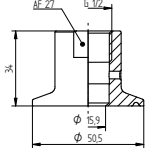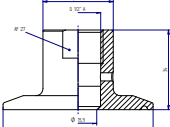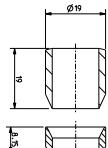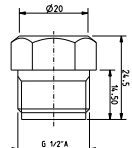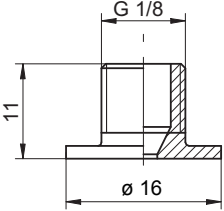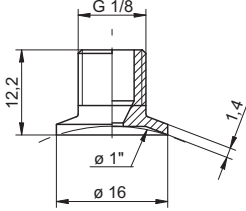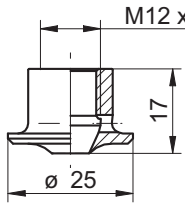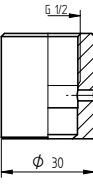
Represented by:

Baumer Hygienic Connection

Selection guide
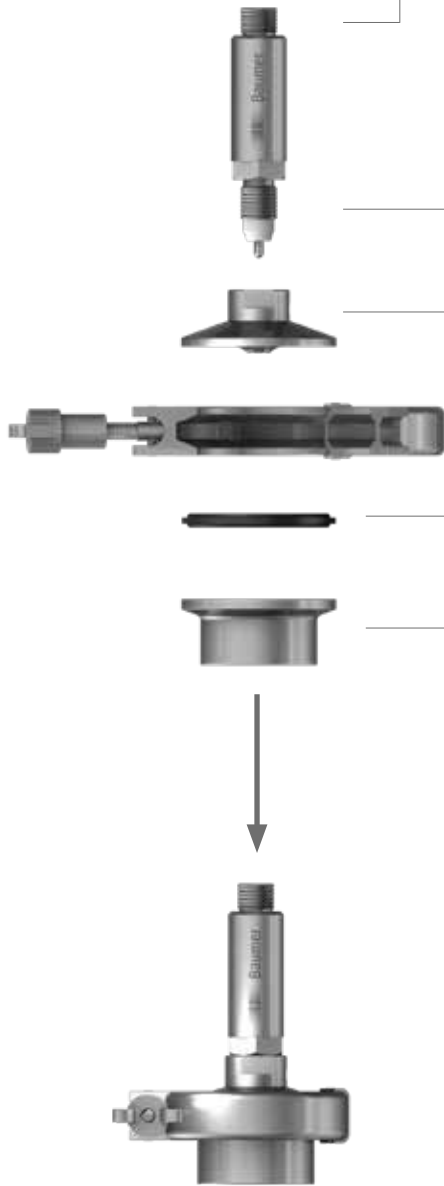
		TE2
Sensor		
Instrument connection	Description	M12×1.5 hygienic
	BCID	A02
Instrument connection	BCID	A02
Process connection	Description	M12×1.5 hygienic
	BCID	A02
Hygienic adapters	BCID	A02
	Description	M12×1.5 hygienic
Ordering key		ZPH1-2213
		AF 17 — M12 x 1.5 — 18.1 — ø 50,5
Process connection	Description	Tri-Clamp Ø 50.5
	BCID	C04
Mounting aids	BCID	C04
	Description	Tri-Clamp Ø 50.5
Ordering key		ZPX4-310
	BCID	C04
Gaskets and O-rings	BCID	C04
	Description	Tri-Clamp Ø 50.5
Ordering key		ZPX3-7234
	BCID	C04
Hygienic weld-in sleeves	BCID	C04
	Description	Tri-Clamp Ø 50.5
Ordering key		ZPX4-320
	Description	Universal use
	BCID	W_U_use

		Conductivity		Level							PBMN flush		
Sensor		AFI4	AFI5	LFFS		LBFS	LBFI	LBFH	LSP				
Instrument connection	Description												
		G1 A hygienic	G1 A hygienic	G 1/2 A hygienic	BHC 3A DN 38	G 1/2 A hygienic	G 1/2 A hygienic	G 1/2 A hygienic	G1 A hygienic	G 1/2 A hygienic	G1 A hygienic	BHC 3A DN 38
	BCID	A04	A04	A03	B01	A03	A03	A03	A04	A03	A04	B01

Instrument connection	BCID	A01		A02		A03		A04	
Process connection	Description	G 1/8 B male thread hygienic		M12×1.5 hygienic		G 1/2 A hygienic		G1 A hygienic	
	BCID	A01		A02		A03		A04	

Hygienic adapters	BCID	A02	A02	A03	A03
	Description	M12×1.5 hygienic	M12×1.5 hygienic	G 1/2 A hygienic	G 1/2 A hygienic
	Ordering key	ZPH1-2213	ZPH1-2216	ZPH3-3213	ZPH3-3216
Process connection	Description	Tri-Clamp Ø 50.5	Tri-Clamp Ø 50.5	Tri-Clamp Ø 64.0	Tri-Clamp Ø 50.5	Tri-Clamp Ø 50.5	Tri-Clamp Ø 64.0
	BCID	C03	C04	C05	C03	C04	C05

Mounting aids	BCID	A03		A03		
	Description	G 1/2 A hygienic with sliding connection		G 1/2 A hygienic with sliding connection		
	Ordering key	ZPX1-006		ZPX1-008		
	BCID	A03_Sliding		A03_Sliding		

Gaskets and O-rings	BCID	C04		C04
	Description	Tri-Clamp Ø 50.5		Tri-Clamp Ø 50.5
	Ordering key	ZPX3-7232		ZPX3-7234
	BCID	C04		C04

Hygienic weld-in sleeves	BCID	A01	A01	A02	A03
	Description	G 1/8 B male thread hygienic	G 1/8 B male thread hygienic	M12×1.5 hygienic	G 1/2 A hygi...
	Ordering key	ZPW2-122	ZPW2-125	ZPW2-222	ZPW3-32...
	Description	Ø 16 × 12.2 (Thin-walled tanks)	DN 25, Ø 16 (Pipes without collar)	Ø 25 × 17 (Thin-walled tanks)	Ø 30 × 34 (Thick-wa...
	BCID	W01	W02	W05	W21

■ A01 … A04   ■ B01 … B02   ■ C01 … C05   ■ D01 … D04   ■ H03 … H04   ■ S01 … S02   ■ V01 … V02

Pressure

PBMH / PFMH

	PBMH									PFMH								
BHC 3A DN 76	Tri-Clamp Ø 24.9	Tri-Clamp Ø 34.0	Tri-Clamp Ø 50.5	Tri-Clamp Ø 50.5	Tri-Clamp Ø 64.0	Varivent® (Type F), Ø 50	Varivent® (Type N), Ø 68	DIN 11864-3-A, DN25, Ø 50.5	BHC 3A DN 38	BHC 3A DN 76	Tri-Clamp Ø 50.5	Tri-Clamp Ø 64.0	Varivent® (Type N), Ø 68	G 1/2 A hygienic	G1 A hygienic	Tri-Clamp Ø 50.5	Tri-Clamp Ø 64.0
B02	C01	C02	C03	C04	C05	V01	V02	H41	B01	B02	C04	C05	V02	A03	A04	C03	C05

B01	B02	C01	C02	C03	C04

BHC 3A DN 38	BHC 3A DN 76	Tri-Clamp Ø 24.9	Tri-Clamp Ø 34.0	Tri-Clamp Ø 50.5	Tri-Clamp Ø …
B01	B02	C01	C02	C03	C04

A03	A03	A03	A03	A03	A03	A03
G 1/2 A hygienic	G 1/2 A hygienic	G 1/2 A hygienic	G 1/2 A hygienic	G 1/2 A hygienic	G 1/2 A hygienic	G 1/2 A hygienic
ZPH3-344F	ZPH3-324E	ZPH3-3221	ZPH3-3224	ZPH3-3225	ZPH1-3236	ZPH3-3254

Varivent®, Ø 50	Varivent®, Ø 68	DIN 11851, DN 25	DIN 11851, DN 40	DIN 11851, DN 50	SMS 1145, DN 51	DIN 11864-1-A, DN 40
V01	V02	D01	D03	D04	S02	H03

D03	D04	D05
DIN 11851 (dairy pipe connection), DN 40	DIN 11851 (dairy pipe connection), DN 50	DIN 11851 (dairy pipe connection), DN 65
ZPX4-440	ZPX4-540	ZPX4-740

D03	D04	D05

C05	C04
Tri-Clamp Ø 64.0	Tri-Clamp Ø 50.5
ZPX3-7262	ZPX3-7234

C05	C04

A03	A03	A03	A03	A03	A04
…ienic	G 1/2 A hygienic	G 1/2 A hygienic	G 1/2 A hygienic	G 1/2 A hygienic	G1 A hygienic
…1	ZPW3-322	ZPW2-324	ZPW2-326	ZPW2-327	ZPW2-521

…alled tanks)	Ø 45 × 34 (Thin-walled tanks)	Ø 35 × 34 (Inclined mounting)	DN 25 … 50, Ø 29 × 36.5 (Pipes with collar)	DN 65 … 150, Ø 30 × 36.5 (Pipes with collar)	Ø 50 × 23 (Thick-walle…
	W20	W30	W25	W26	W45

PP20H						(Y)Ted					TFRH				TER8	
DIN 11851, DN 40	DIN 11851, DN 50	Varivent® (Type F), Ø 50	Varivent® (Type N), Ø 68	DIN 11864-1-A, DN 40	DIN 11864-1-A, DN 50, female thread	Tri-Clamp Ø 50.5	Tri-Clamp Ø 50.5	Tri-Clamp Ø 64.0	G 1/2 A hygienic	BHC 3A DN 38	Tri-Clamp Ø 50.5	Tri-Clamp Ø 50.5	Tri-Clamp Ø 64.0	Varivent® (Type N), Ø 68	G 1/2 A hygienic	G 1/8 B male thread hygienic
D03	D04	V01	V02	H03	H14	C03	C04	C05	A03	B01	C03	C04	C05	V02	A03	A01

C05		D01		D03		D04		V
Ø 50.5	Tri-Clamp Ø 64.0	DIN 11851, DN 25		DIN 11851, DN 40		DIN 11851, DN 50		Variver
	C05	D01		D03		D04		V

A03	A03	A03	A04	A04	A04	A04	A
G 1/2 A hygienic	G 1/2 A hygienic	G 1/2 A hygienic	G1 A hygienic	G1 A hygienic	G1 A hygienic	G1 A hygienic	G1 A h
ZPH3-3255	ZPH1-32D3	ZPH1-32C0	ZPH1-5213	ZPH1-5216	ZPH1-524E	ZPH3-5222	ZPH3
DIN 11864-1-A, DN 50	BHC 3A DN 38	G1 A hygienic	Tri-Clamp Ø 50.5	Tri-Clamp Ø 64.0	Varivent® (Type N), Ø 68	DIN 11851, DN 32	DIN 1185
H04	B01	A04	C04	C05	V02	D02	D0

D01	S01	S02	
DIN 11851 (dairy pipe connection), DN 25	SMS 1145, DN 38	SMS 1145, DN 51	
ZPX4-140	ZPX4-330	ZPX4-630	
D01	S01	S02	

B02	V01	
BHC 3A DN 76	Varivent® DN 25; 1" (Type F), Ø 50	
ZPX2-223	ZPX2-823	
B02	V01	

A04	A04	A04	B01	
G1 A hygienic	G1 A hygienic	G1 A hygienic	BHC 3A DN 38	
ZPW2-531	ZPW2-526	ZPW2-527	ZPW2-621	
ed tanks)	Ø 50 × 23 (Thick-walled tanks)	DN 40 … 50, Ø 40 × 28 (Pipes with collar)	DN 65 … 150, Ø 41 × 28 (Pipes with collar)	Ø 55 × 32 (Thick-walled tanks)	DN 38, Ø 38 × 40 (Pipes with collar)
	W45	W40	W41	W65	W60

TE2						8155 Hygienic cable sensor	FlexFlow PF20H										
M12×1.5 hygienic	G 1/2 A hygienic	BHC 3A DN 38	Tri-Clamp Ø 24.9	Tri-Clamp Ø 50.5	Tri-Clamp Ø 50.5	G 1/8 B male thread hygienic	G 1/2 A hygienic	BHC 3A DN 38	Tri-Clamp Ø 34.0	Tri-Clamp Ø 50.5	Tri-Clamp Ø 64.0	DIN 11851, DN 25	DIN 11851, DN 40	DIN 11851, DN 50	Varivent® (Type F), Ø 50	Varivent® (Type N), Ø 68
A02	A03	B01	C01	C03	C04	A01	A03	B01	C02	C04	C05	D01	D03	D04	V01	V02

V01	V02		H03		H14		H41	
nt®, Ø 50	Varivent® (Type N), Ø 68		DIN 11864-1-A, DN 40		DIN 11864-1-A, DN 50, female thread		DIN 11864-3-A, DN25, Ø 50.5	
V01	V02		H03		H14		H41	

04	A04	A04	A04	A04	A04	A04
hygienic	G1 A hygienic	G1 A hygienic	G1 A hygienic	G1 A hygienic	G1 A hygienic	G1 A hygienic
-5224	ZPH3-5225	ZPH3-5227	ZPH1-5233	ZPH1-5236	ZPH3-5254	ZPH3-5255
1, DN 40	DIN 11851, DN 50	DIN 11851, DN 65	SMS 1145, DN 38	SMS 1145, DN 51	DIN 11864-1-A, DN 40	DIN 11864-1-A, DN 40
03	D04	D05	S01	S02	H03	H03

C05		B02		C04	B01
Tri-Clamp Ø 64.0		BHC 3A DN 76		Tri-Clamp Ø 50.5	
ZPX4-610		ZPX4-810		ZPX4-310	
C05		B02		C04	B01

V02		B01		C04
Varivent® DN 32 … 125; 1 1/2" … 6" (Type N), Ø 68		BHC 3A DN 38		Tri-Clamp Ø 50.5
ZPX2-323		ZPX2-123		ZPX3-B232
V02		B01		C04

B01		B02	C04
BHC 3A DN 38		BHC 3A DN 76	Tri-Clamp Ø 50.5
ZPW2-626		ZPW2-721	ZPX4-320

ISO 2037	BS 4825-1	3A ASTM A270	SMS 3008	Dutch Dairy	Ø 120 × 32 (Thick-walled tanks)	Universal use
P12	P21	P31	P41	P46	W70	W_U_use