Sensors for the dairy processing industry

Industry guide

Baumer
Passion for Sensors

Food safety and production effectiveness.

Competitiveness in the dairy processing industry decisively depends upon the degree of automation, the efficiency of production, the hygienic design, effective cleaning and, in the end, food safety. Like a balancing act, the dairy processing industry walks on a thin line between food safety and equipment efficiency. With a strong focus on the improvement of effectiveness and efficiency, sensors are playing an important role. Baumer develops sensors together with customers, for customers, in the industry to meet the special requirements.

Food safety is dependent on hygienic design and both the duration and intensity of the cleaning cycle. Radical hygienic design and installation of components and systems can reduce the time required for cleaning and thereby reduce the energy costs. Sustainability, the reduction of product waste and conservation are challenges that every processor has to face these days. Baumer has developed sensors that can detect different media, thereby avoiding spillage and contributing to the goal of sustainability.

As a longtime partner with the dairy industry, we offer a wide range of products to meet the international requirements of applications and industrial needs. Opposing requirements range from sophisticated sensor technologies for demanding hygienic areas, wet areas, dry areas and packaging machine operations; all with differing application scenarios to address.

Process competence and system solutions
With more than 40 years of food industry experience, Baumer has been significantly contributing towards reduced down time, increased system availability and improved product quality.

Failure-free production
This attention to product quality in Baumer's manufacturing is reflected in our robust hygienic process sensors and optimally matched installation and mounting accessories.

Baumer – your expert partner on-site
Your Baumer contacts have the expertise in your industry and its special requirements. With our global presence we can provide you an on site consultation.

Content.

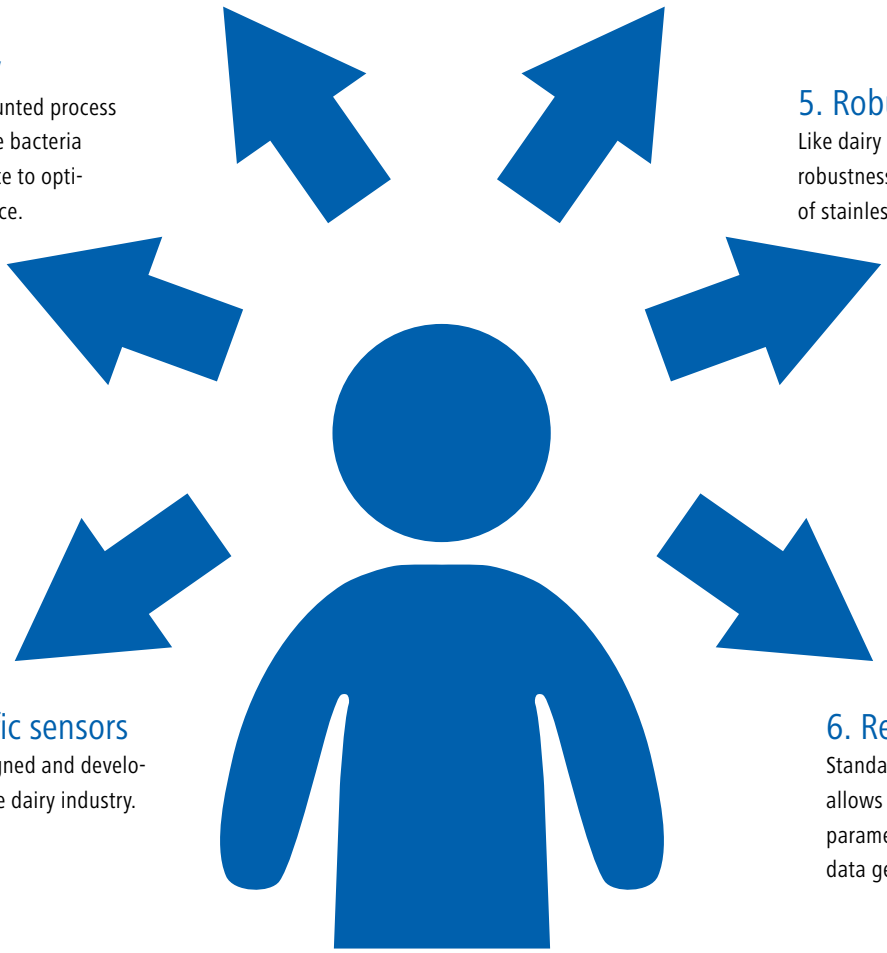
Your benefits at a glance.

From milk delivery to end of line packaging Baumer provides sensor solutions for every process and for every application. All our sensors are manufactured from stainless steel and meet the food safety standards required by the industry. Baumer invests heavily in research and development and works closely with our customers in the industry to ensure our products contribute to overall equipment effectiveness of operation without compromising food safety.

3. From processing to packaging
We offer hygienic sensors throughout your dairy manufacturing process.

4. Optimized process
Sensor accuracy and response time help increase throughput by enabling tighter production control.

2. Food Safety
Our unique flush mounted process connections minimize bacteria growth and contribute to optimized CIP performance.



5. Robust stainless steel
Like dairy manufacturers we prefer the robustness and hygienic capabilities of stainless steel.

1. Dairy specific sensors
Our sensors are designed and developed together with the dairy industry.

6. Ready for IoT
Standard IO-Link connectivity allows fast and easy sensor parametrization as well as digital data generation for IoT.

Hygienic design by Baumer.

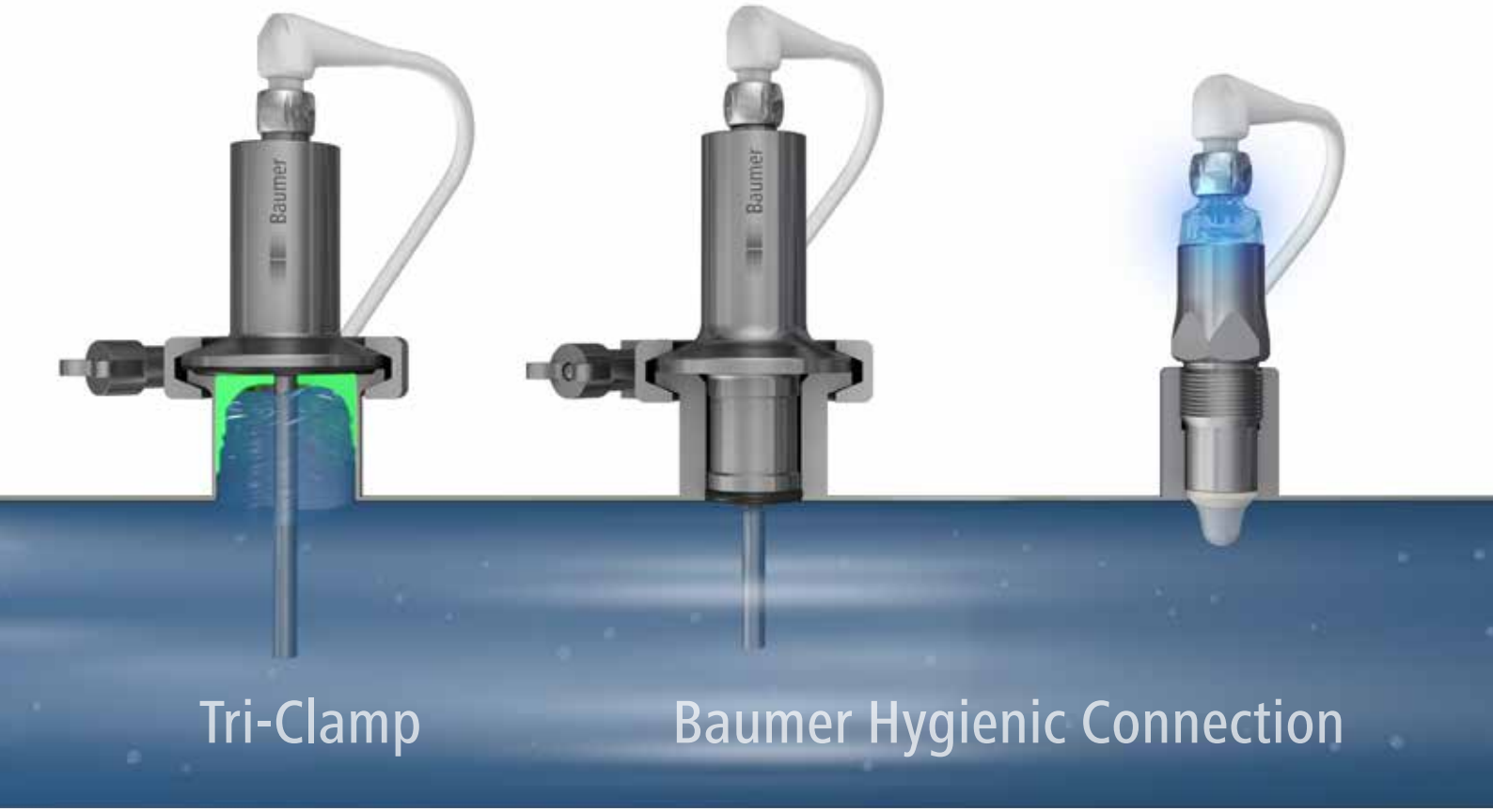
Baumer has more than 25 years experience in designing sensors for the dairy industry. We pride ourselves on being among industry leaders when it comes to innovative sensor solutions that bring true value to our customers. Hygienic requirements are becoming more and more stringent and we understand the challenges that both manufactures and machine builders in the dairy industry face. The Baumer Hygienic Connection (BHC) is an example on how clever design can help reduce bacteria contamination in your process and actively contribute towards food safety.

Problems

- Bacteria can hide and grow
- Air can remain in the green zone
- More water, chemicals and time for cleaning

Advantage

- Easily cleaned – no collection pockets
- Front flush position in the pipe
- Reduce water, chemicals and time for cleaning



Product portfolio from processing to packaging.

Food zone

Temperature measurement

Pressure measurement

Level measurement

Flow measurement

Conductivity measurement

Splash zone

Inductive sensors

Ultrasonic sensors

Optical sensors

Vision sensors

Motion sensors

Force / strain sensors

FDA · 3-A · Ex · IP 69K

ECOLAB · IP 69K · proTect · WD Washdown Design

Non food zone

Object detection

Distance measurement

2D / 3D sensors

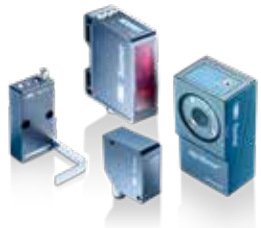


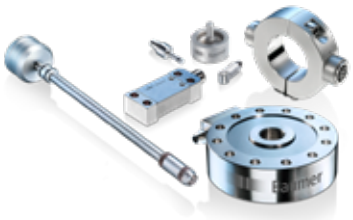
Image processing / identification

Rotary encoders / angle sensors

Inclination / accerelation sensors

Process sensors

Force / strain sensors



Format adjustment

Counters / displays

Accessories


2
1
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12
11

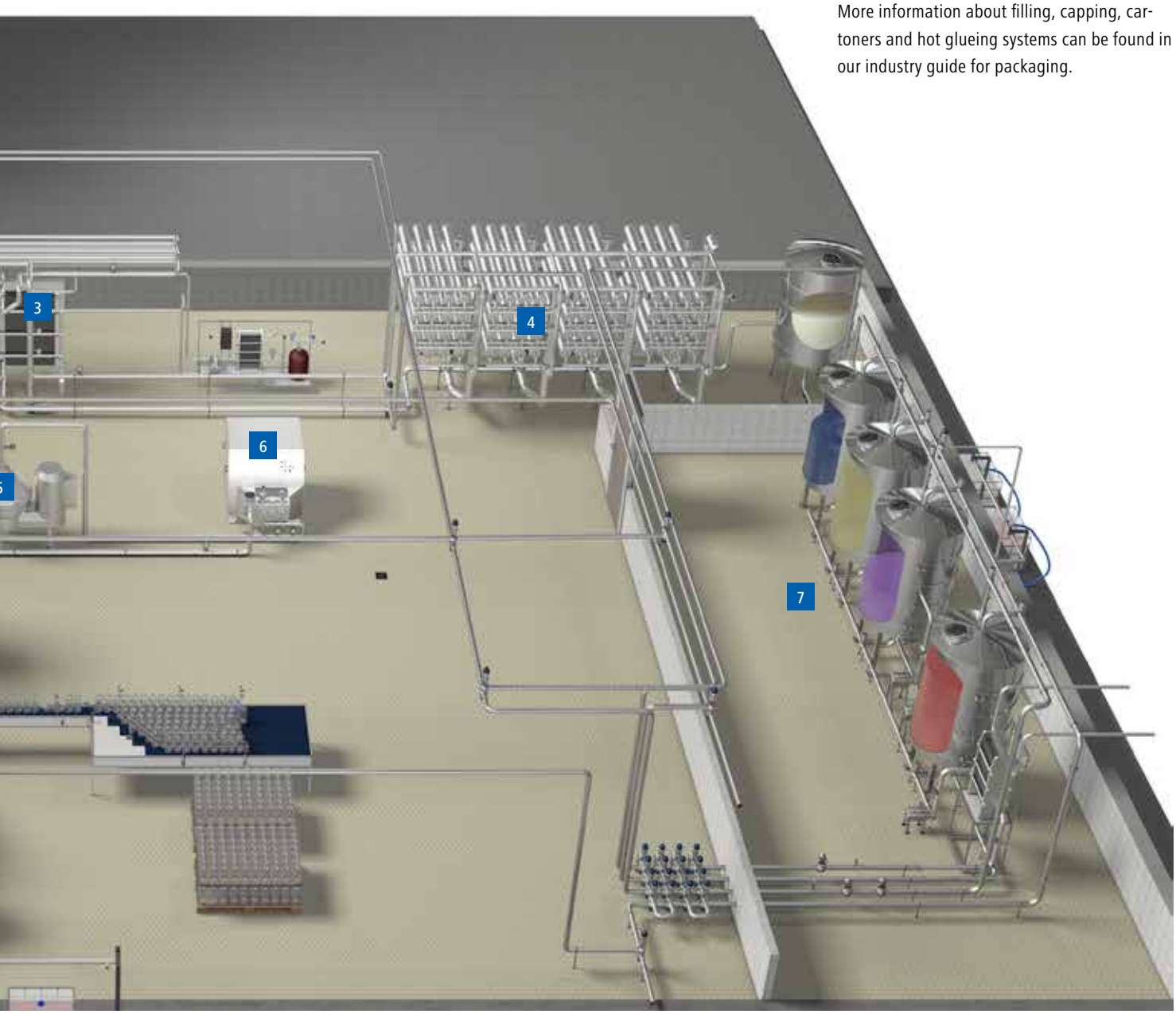
Dairy processing system overview.

Baumer is your sensor expert, for the whole production chain in the dairy processing environment. From milk receiving to packaging, the focus is food safety, effectiveness and long life cycle. This catalogue is a guide for experts and professionals within the industry and supplies solutions for dairy processing customers, machine builders and system integrators.

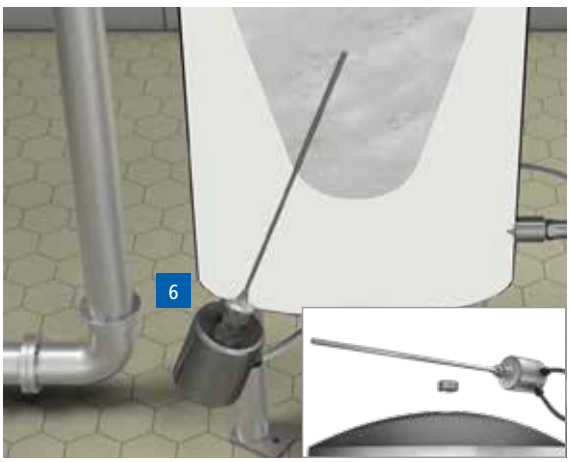
Processing

Packaging

More information about filling, capping, cartoners and hot glueing systems can be found in our industry guide for packaging.



Milk receiving area.



Foam and liquid overflow protection

CleverLevel® Sliding connection – page 35

Foaming can occur during the deaerating process. Therefore it can be difficult to detect and causing overflow or media getting into the vacuum cycle. The *CleverLevel*® with sliding connection can easily detect foam or liquid maintaining the correct flow level avoiding over flow and foam getting into the vacuum cycle creating problems and waste. With the robust field housing, it ensures a long life cycle in wet areas.

Fast continuous level control

LSP – page 38

In the deaerator tank, it is important to setup the process, that the milk surface is as large as possible in order to remove more air out of the milk. Controlling the speed of the pump is critical. The continuous level measurement sensor LSP with its fast response time can be used to maintain a level regulation in small vessels, where the levels are changing very quickly. This increases your effectiveness and reduces time during the deaeration process providing you potential cost savings.

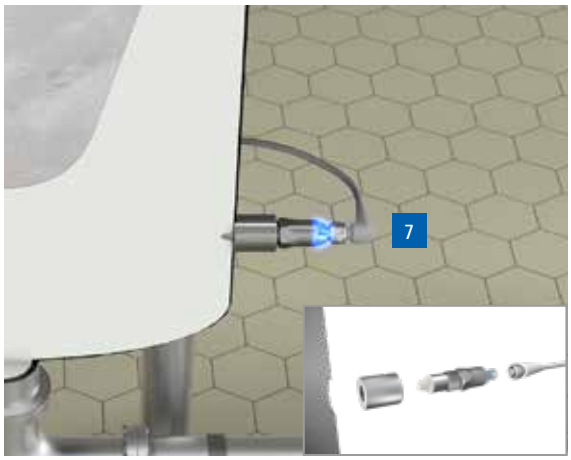
The following standard applications are not described here. For more information about possible solutions, please contact us directly at food@baumer.com.

1 Raw milk temperature monitoring – Temperature sensors, page 27–30

2 Continuous level adjustment – LSP, page 38

3 Pump dry run protection in the tank – *CleverLevel*®, page 35–37

4 Tank overflow protection – *CleverLevel*®, page 35–37



Pump dry run protection in the tank

CleverLevel® LBFH – page 37

To protect the pump from running dry and becoming damaged, we must detect the minimum level inside the tank and use this signal to stop the pump. The *CleverLevel*® can be used in all harsh environments and media. The *CleverLevel*® protects the pump from running dry during filling and emptying of the tank or pipe. Especially in processes where foam can occur the sensor must be able to distinguish if the media is just foam or liquid. Conventional vibrating fork sensors have problems detecting these conditions.

Storage tank level monitoring

CombiView® DFON (wall or pipe mount) – page 41

The DFON display can be used in the milk receiving area to show the level of the raw milk storage from the silo outside of the building. The large backlit touch screen allows the operator to view real time status easily from a distance. The hygienic robust IP 67 housing assures you're a long life cycle also in an wet and harsh environment.

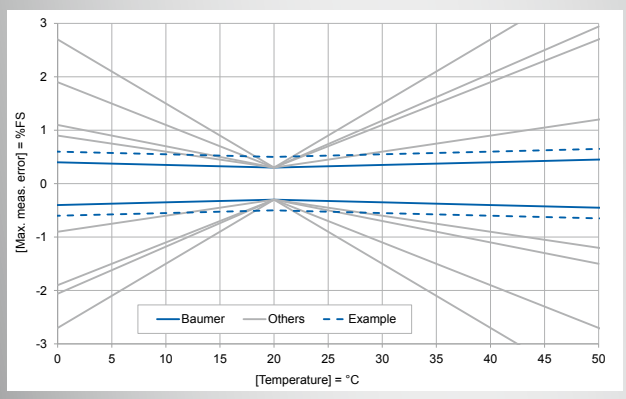
Raw milk storage.

Hydrostatic level measurement in the tank
CombiPress® PFMH, PBMH – page 31, 32

Outside storage is always influenced by ambient temperature, depending on weather conditions. With an accuracy of 0.1% FS and active temperature compensation, the *CombiPress*® outperforms most sensors in its class and ensures the same accurate measurement regardless of outdoor temperatures. This means less maintenance as no calibration is required to compensate for seasonal weather conditions. The robust stainless steel housing is sealed to IP 69K and ideal for outdoor installations. This ensures longer life and savings on your maintenance budget.

Temperature stability of PFMH & PBMH

In many cases, if the operating temperature deviates from the reference temperature (e.g. 20 °C) a temperature-stable sensor with lower initial accuracy is preferred over a less stable sensor with higher initial accuracy of ± 0.1% FS and a temperature stability of ± 0.06% FS / 10 K for the PBMH and ± 0.1% FS / 10 K for the PFMH. This includes the effect on the measuring span and the zero point; in accordance with the strongest accuracy statement, known as the "maximum error of measurement" (EN 61298-2).

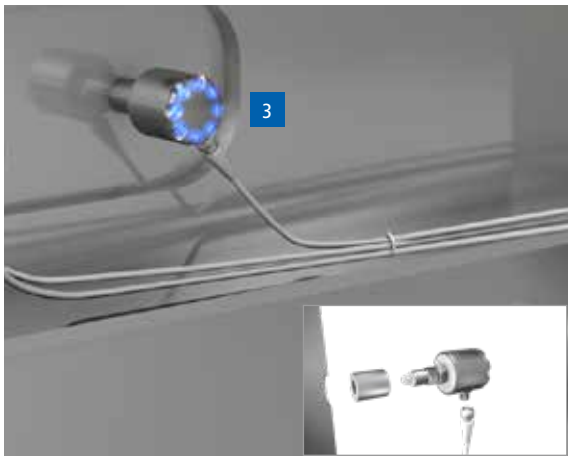


Temperature dependence of the maximum error of measurement

The following standard applications are not described here. For more information about possible solutions, please contact us directly at food@baumer.com.

2 Storage tank temperature monitoring – Temperature sensors, page 27–30

4 Overspill protection & maximum level control – *CleverLevel*®, page 35–37



Empty tank detection

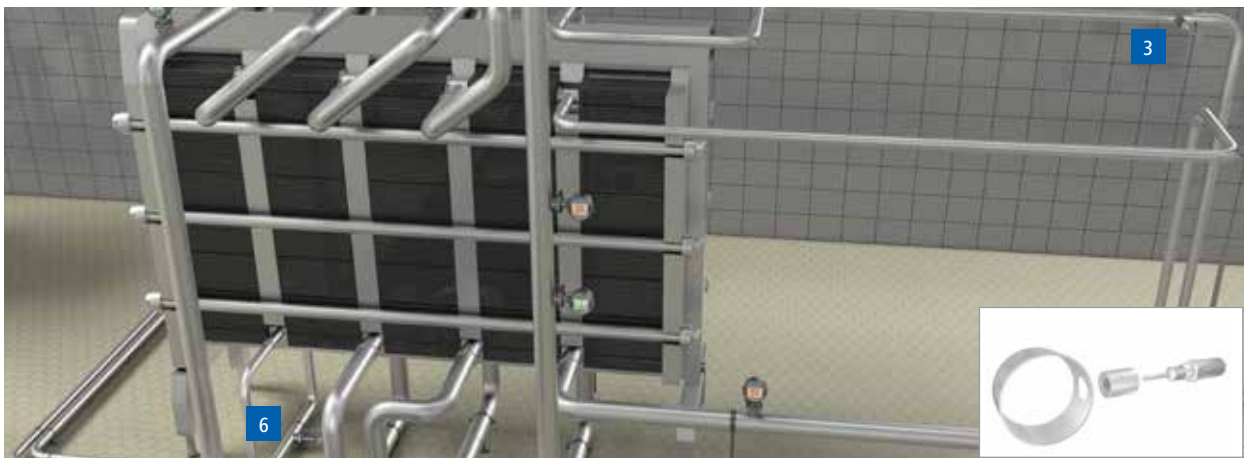
LFFS, *CleverLevel*® LBFS – page 35, 36

During the milk recovery process, prior to the CIP cycle, it is important that the tank is completely empty. This is to ensure all milk has been recovered before cleaning starts. For point level control Baumer offers the smartest and most reliable sensor available on the market today. The LFFS does not react to thick foam or cream sticking to the sensor tip and thereby avoids false triggering. This contributes to a safe, time saving and reliable recovery process.

Tank calculator

Continuous level measurement by hydrostatic pressure utilizes the areal force generated by the height and density of the media and gravity. To accurately measure the filling height in tanks, choosing the fitting sensor parameters like accuracy and measuring range is crucial. This simple calculator is made to help you with the calculations and to assure the sensor parameters match the tank parameters. Additionally this calculator helps you to minimize dregs and to monetize your possible saving with a *CleverLevel*® level switch at the bottom of the tank. To download the tank calculator go to: www.baumer.com/tank-calculator

Pasteurizing system.



Flow and temperature control of the heating and cooling cycle
FlexFlow PF20H – page 39

To maintain the correct temperature in the plate heat exchanger both the flow speed and temperature need to be measured. The heating cycle used for maintaining the pasteurization process can be controlled by one single sensor that measures flow velocity and temperature at the same time. This reduces installation and maintenance efforts; thereby decreasing costs. With a measuring range of flow from 10 ... 400 cm/s and a maximum measuring error of ± 2% (± 8 cm/s) the PF20H flow sensor is the best fit for heating and cooling applications.

On the PF20H the heating and measuring element are both located in one sensor head. This saves time on installation as orientation of the sensor is irrelevant.

The following standard applications are not described here. For more information about possible solutions, please contact us directly at food@baumer.com.

2 Temperature monitoring for filtration inlet – Temperature sensors, page 27–30

4 Pressure drop monitoring – Pressure sensors, page 31–34

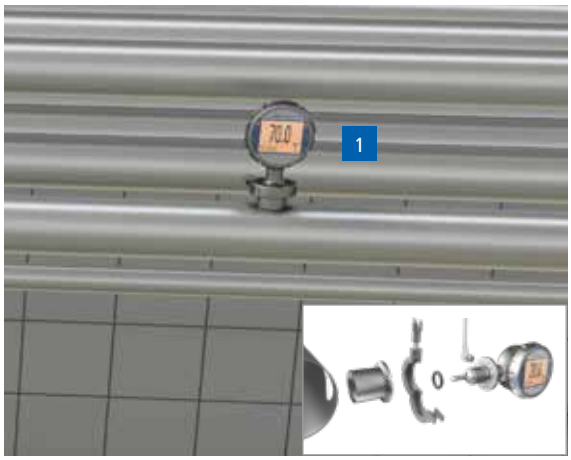
5 Pasteurizing temperature monitoring beginning of holding pipe – Temperature sensors, page 27–30

7 Pressure drop monitoring – Pressure sensors, page 31–34

8 Pressure drop monitoring – Pressure sensors, page 31–34

9 Temperature monitoring for the milk cooling cycle – Temperature sensors, page 27–30

10 Pressure drop monitoring milk cooling cycle – Pressure sensors, page 31–34



Pasteurizing temperature monitoring end of holding pipe

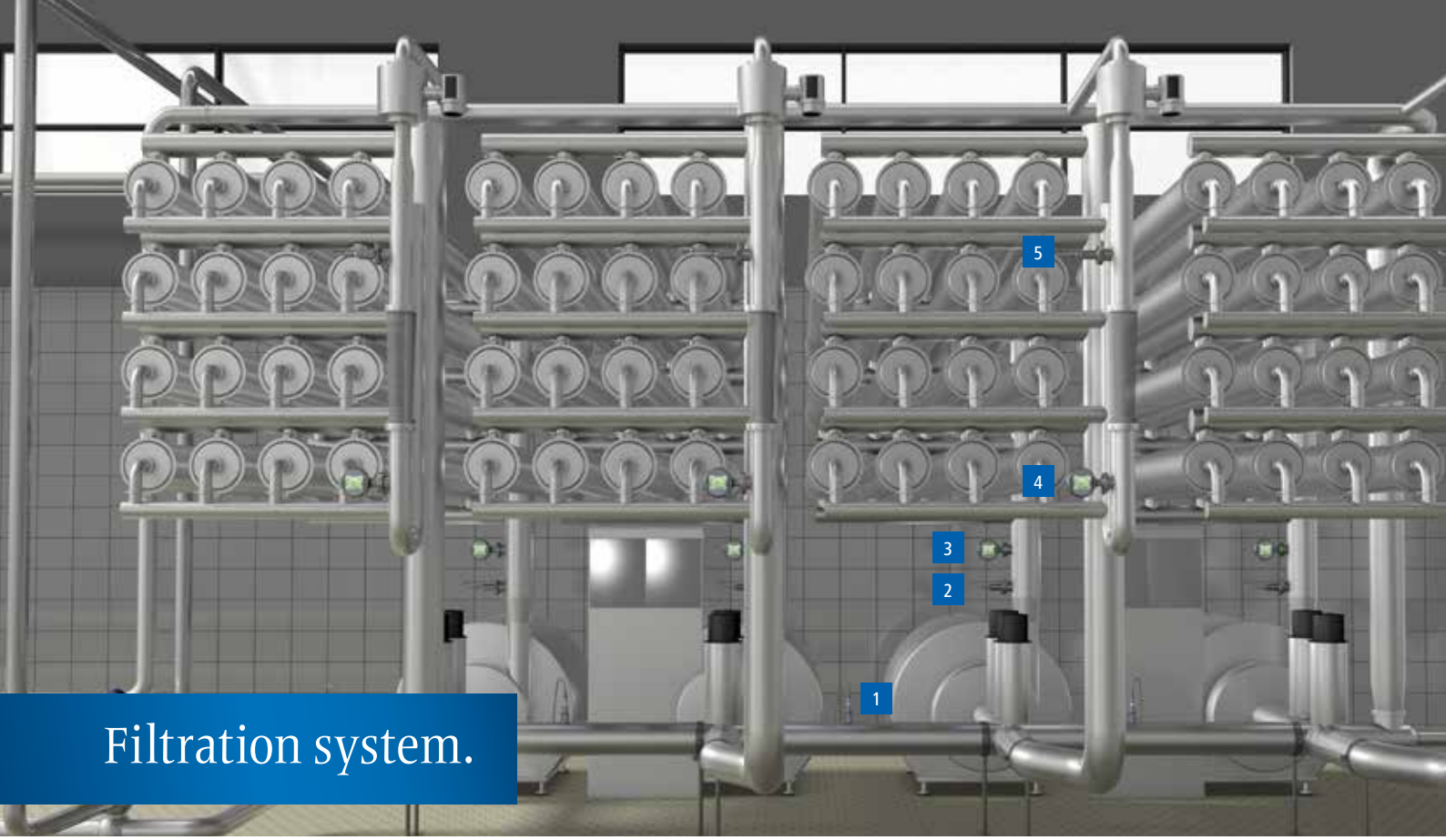
CombiTemp® TFRH, TER8, TE2 – page 27, 28, 29

A temperature sensor has to regulate the process in order to increase or decrease the flow speed of the heating water cycle. The *CombiTemp*® is a temperature sensor with a built in "touch screen" display. The display offers configuration capability which eliminates the requirement for an external programming unit. On board configuration is time saving as it ensures a continues production process during configuration changes. The *CombiTemp*® is designed for fast response applications and comes with ø 4 mm sensor tip to ensure fast and accurate measurements.

Flow & temperature control of the milk cooling cycle

FlexFlow PF20H – page 39

After pasteurization, the milk needs to be cooled in order to avoid the growth of microorganisms. The milk flows trough the cooling section and exits the plate heat exchanger at around 4 °C. The flow speed is important to optimize the effectiveness of the plate heat exchanger. The *FlexFlow* can measure both temperature and flow speed in order to maintain the right temperature of the milk and the performance of the equipment. The Baumer Hygienic Connection (BHC) provides the best hygienic installation, improving the efficiency of CIP cleaning as well as food safety.



Filtration system.

Filter pump dry run protection

CleverLevel® LBFH – page 37

It is important to protect these pumps from running dry and being damaged. The *CleverLevel*® can detect both thin and thick foam in the pipe and send a fast signal to the PLC to stop the pump and prevent it from running dry. This guards against high maintenance costs and increases the life cycle of your equipment.

Feed Flow – flow & pressure measurement

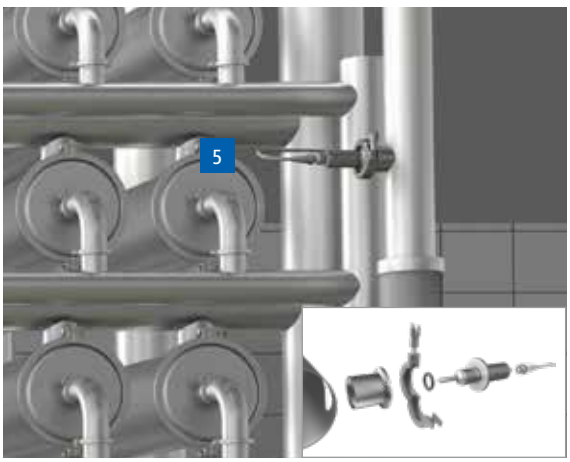
FlexFlow PF20H, *CombiPress*® PFMH or PBMH – page 39, 31, 32

The combination of flow, temperature and pressure measurement is an indicator of the effectiveness of a filtration pump. If the flow velocity is too low, the polarization effect is too high and the filter gets clogged and needs to be cleaned. If the flow velocity is too high, the effectiveness of filtration decreases. If the temperature is incorrect the filtration process becomes ineffective. The *FlexFlow* measures both flow and temperature, handling two applications with one sensor. This reduces installation costs.

Transmembrane pressure control

CombiPress® PFMH, PBMH – page 31, 32

In order to control the transmembrane pressure (TMP), the differential pressure between the feed pressure and the permeate must be measured. If the differential pressure decreases, it means that the filter is dirty and the pump will increase its power to maintain a constant TMP. This results in higher energy costs. The PFMH and PBMH, with an accuracy or 0.1% full scale, can be used to maintain the optimal TMP for the highest efficiency.

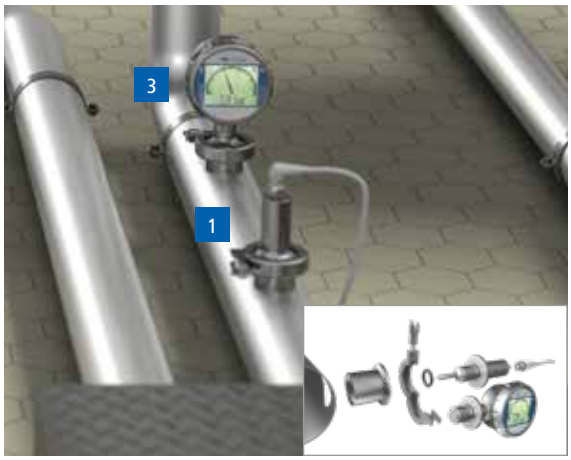


Filter quality control – flow & temperature measurement

FlexFlow PF20H – page 39

Maintaining flow speed in the membrane filter is critical to minimizing process downtime and maximizing system effectiveness. If the flow velocity is too low, the polarization effect can cause the filter to clog, requiring unscheduled maintenance. If the flow velocity is too high the effectiveness of the filtration separation process will be reduced. Measuring flow velocity using the *FlexFlow*, with its high accuracy, can help to ensure an efficient process and reduce downtime. The *FlexFlow*'s BHC connection increases both food safety and CIP cycle performance. The duration of the cleaning cycle is reduced.

Separating system.



Feed Flow – flow, temperature & pressure measurements

FlexFlow PF20H – page 39

The flow velocity and the pressure in the feed flow before the milk enters the separator influence the effectiveness of the separation process as well as the life cycle of the centrifuge. If the flow velocity and the pressure are too low, the centrifuge will suck the milk into the bowl section. This increases vibrations and reduces performance of the centrifuge itself. The *FlexFlow* can maintain the correct flow velocity and at the same time the necessary temperature in order to have the best performance of the separation process.

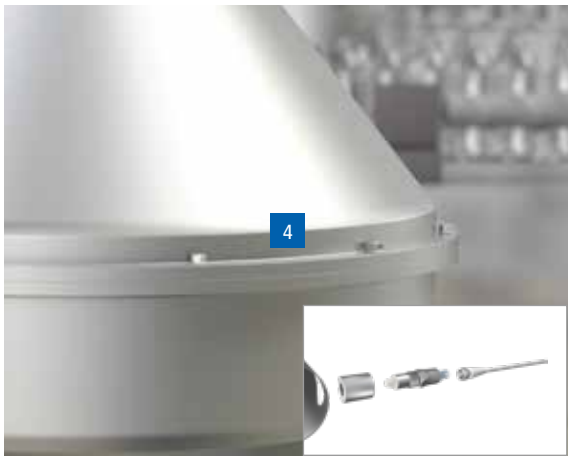
Differential pressure measurement

CombiPress® PFMH, PBMH – page 31, 32

Three pressure sensors can maintain the differential pressure between the feed flow and the two discharge outlets for skim milk and cream. The differential pressure is an indication of the performance of the centrifuge and therefore the effectiveness of the separation process. With the high accuracy of 0.1% FS, the PFMH and the PBMH recognize pressure drops and increases very precisely to regulate the effectiveness of the pumps and motors involved in the feed flow.

The following standard application are not described here. For more information about possible solutions, please contact us directly at food@baumer.com.

2 Pressure control separator supply pipe – Pressure sensors, page 31–34



Sludge detection
CleverLevel® LBFH – page 37

During the separating process sludge is gradually built up at the center edge sediment discharge port of the bowl. In order to reduce product wast, a sludge detection sensor can be used to measure the presence of sludge to give the signal to the PLC to open the centrifuge and extract the sludge. The *Clever-Level*® can detect the difference between milk and sludge in order to give the signal to the PLC to open the middle section of the centrefuge and clean out the sludge. This reduces the ammount of product waste as the effectiveness of the centri-fuge is increased.

Homogenizing.

Feed flow & feed pressure control

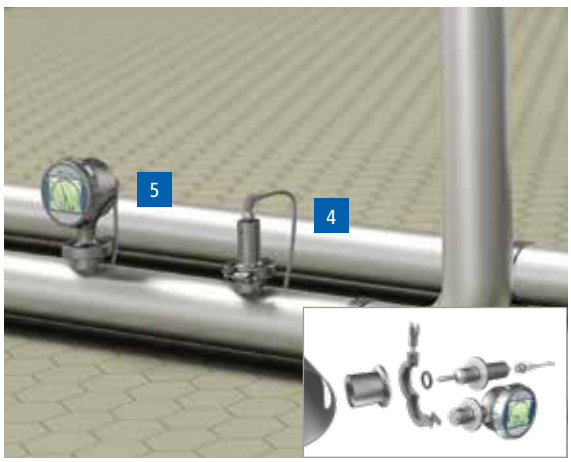
FlexFlow PF20H, *CombiPress*® PFMH – page 39, 31

The flow velocity and the pressure in the feed flow before the milk enters the homogenizer are important to measure in order to know the effectiveness as well as to regulate the vibrations. The pressure sensor PFMH and PBMH in combination with the flow sensor *FlexFlow* can measure the performance of the feed flow and pressure to ensure that they are constant and avoid a vacuum effect on the system which can cause vibrations and decreases the life cycle.

Temperature monitoring supply line

CombiTemp® – page 27

For the proper homogenization of cold milk, since the homogenization of cold milk is ineffective, the feed flow needs to maintain a temperature between 55 ... 80 °C. Increasing the homogenizing temperature decreases the viscosity of the milk and improves the transport of membrane material to the fat globules. The *CombiTemp*® in combination with the BHC connection offers the best hygienic integration of a temperature sensor into the process line. This improves food safety and allows equipment to be cleaned in less time.

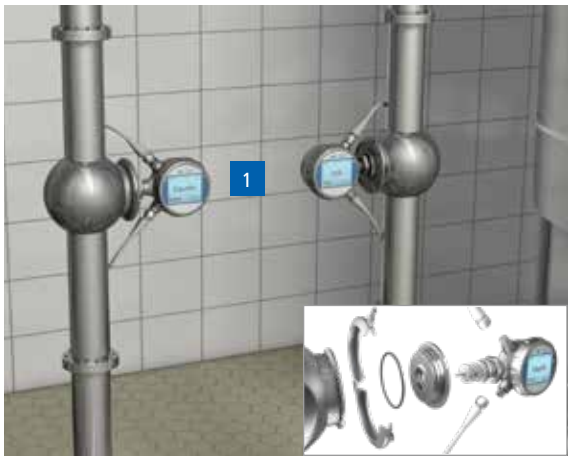


Homogenizing quality control

FlexFlow PF20H, *CombiPress*® PFMH – page 39, 31

In the discharge line of the homogenizer the pressure and the flow can be measured to maintain the right position of the homogenization gap where the milk gets forced through and the fat globules are split. Flow velocity and pressure drop are an indication of the quality of the homogenization. The *CombiPress*® with its accurate measurement of 0.1% FS, measures the milk pressure and gives the homogenizer PLC a very precise value in order to position the gap inside the homogenization tool in a very precise way. The *FlexFlow* supports this adjustment by measuring the flow speed.

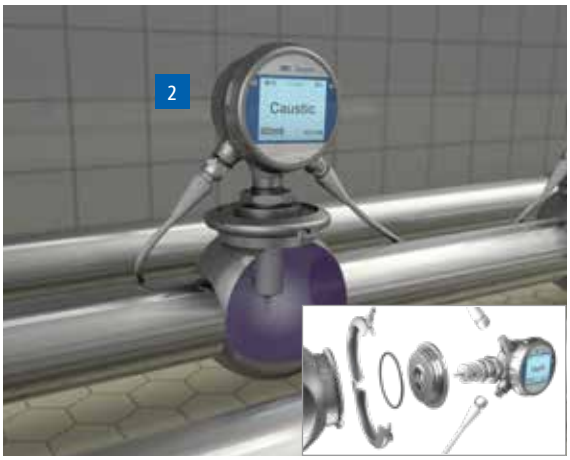
CIP system.



Concentrate dosing of chemicals

CombiLyz® – page 40

In the CIP process it is important to know the concentration between acid and water and caustic and water before cleaning. For the best measuring results, many dairy manufacturers prefer a by-pass installation as shown above. The conductivity meter calculates the concentration with pre programmed linearization curves. This reduces installation efforts. With precise measurement it ensures food safety and savings on cleaning agents.



Phase separation on the return line

CombiLyz® – page 40

To control the CIP process steps the conductivity meter, installed in the return line, measures the different conductivity values of the media. The robust one piece design sensor tip of the *CombiLyz*® increases the life cycle and saves maintenance costs. This one piece design has the fastest temperature compensation response time on the market today and ensures fast and accurate communication to the PLC. This can help to optimize your CIP process; saving water, product and chemicals. Checkout how much media you can save with the CIP calculator on our webpage: www.baumer.com/CIP.

These applications in a CIP helps you to optimize the cleaning process and can reduce your costs.
More applications can be found in the CIP brochure.

3 Tank temperature monitoring – Temperature sensors, page 27–30

4 Point level detection – *CleverLevel*®, page 35–37

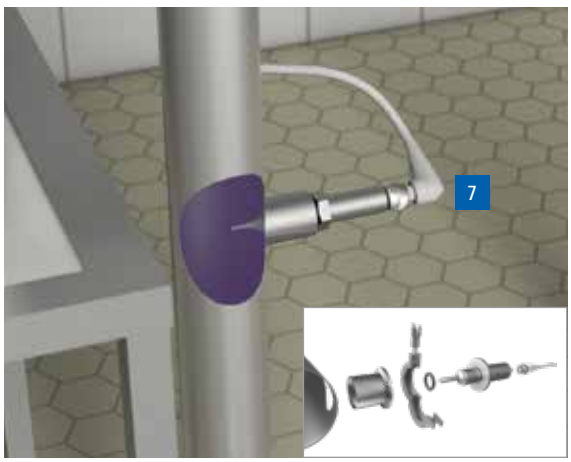
5 Continuous level measurement – LSP, page 38

6 Pump dry run protection – *CleverLevel*®, page 35–37

8 Pump pressure measurement – Pressure sensors, page 31–34

9 Flow measurement in the CIP supply – *FlexFlow* PF20H, page 39

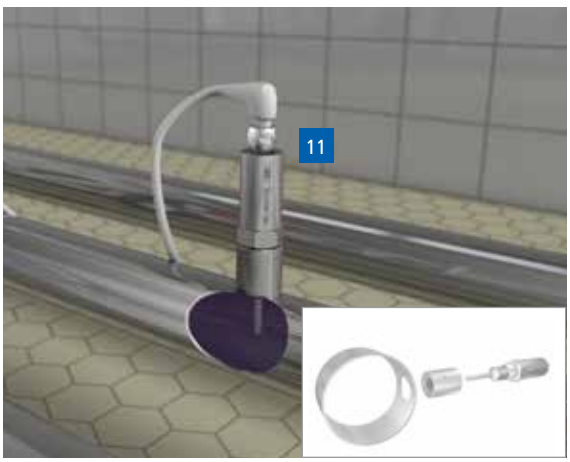
10 Temperature control for the CIP supply – Temperature sensors, page 27–30



Regulation of flow velocity – heating cycle

FlexFlow PF20H – page 39

For precise regulation of temperature in the cleaning cycle, it is important to measure flow velocity and temperature in the hot water cycle. With the Baumer *FlexFlow* you can measure both flow velocity and temperature with one sensor. This reduces the overall installation costs.

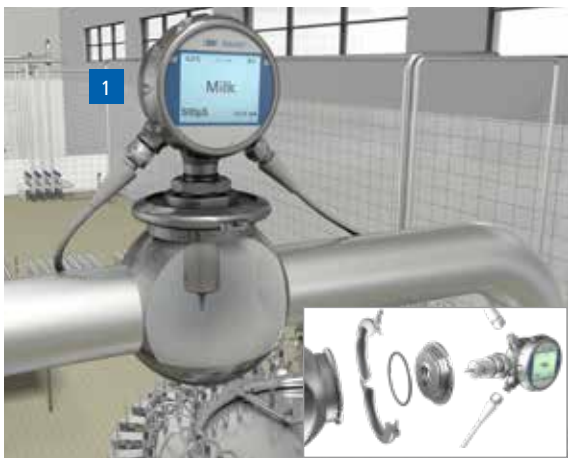


Flow & temperature control of the CIP return pipe

FlexFlow PF20H – page 39

Flow rates that are too low cause less mechanical turbulence needed to clean the dirty spots in the pipe. Flow rates that are too high limit the cleaning time or increase media waste. Cleaning temperatures that are too low increase the safety risk of keeping bacteria and microorganisms in the cycle. The *FlexFlow* measures both temperature and flow velocity; eliminating an additional sensor installation; reducing installation and maintenance costs.

Rinsing, filling.



Final food safty control before packaging

CombiLyz® – page 40

After primary packaging, it is impossible to detect any harmful contamination of the packaged milk. Any residual chemicals from the CIP cycle could migrate to the filling process. A conductivity meter installed in the feed flow of the buffer tank of the filling machine can detect deviations and stop the filling process. The *CombiLyz*® conductivity sensor, with an accuracy of 1%, measures very low conductivity deviations. This ensures the detection of minimal contaminants in the final product and the halting the filling process to ensure food safety.

Head pressure measurement in a tank

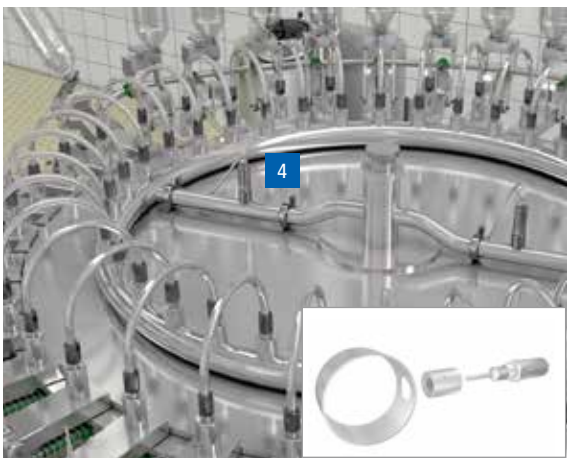
PP20H – page 33

The head pressure in the buffer tank just before the filling valves is used in order to reduce foam. The PP20H with its hygienic flush connection can be used to solve this application and reduce the cleaning time during CIP.

Level measurement in small buffer tanks

LSP – page 38

During the filling process, the level inside of the buffer tank needs to be regulated constantly. In order to avoid production stops, the measurement needs to be very fast and independent of a foamy surface. The LSP has a very fast response time and the potentiometric measuring principle is effective to fade out foam.



Cleaning validation rinsing process

FlexFlow PF20H – page 39

In the food industry, having a clean packaging container prior to filling is critical. Measurement of the delivery speed and temperature of the chemicals in the rinsing process can be used to be certain that the container has been rinsed and sanitized to the point where it is safe for filling. The calorimetric technology used in the *FlexFlow* PF20H can be used to measure both flow velocity and temperature. Use of one device for two measurements reduces installation costs. The robustness of this sensor increases its life cycle, prevents unplanned production stops and helps you to achieve utmost reliability in food safety.

Process sensors – ordering details.

CombiTemp® TFRH

Main features

- Pt100 sensor element, 2- or 4-wire
- Built in graphical display, *CombiView*® DFON optional
- Head mounted 4 ... 20 mA transmitter, FlexTop type 22xx
- HART®, PA
- ATEX
- 3-A, FDA
- Programmable by touch screen
- Easy and full programmable with FlexProgrammer 9701

Applications

- Food & beverage
- Pharmaceutical
- Water treatment
- General process industry

	TFRH	–																						
Model														70										
CombiTempTM	**TFRH**																							
Housing material			**5**											Varilline® N										
ø 80 mm, Stainless steel, AISI 304 Bottom			**6**																					
ø 80 mm, Stainless steel, AISI 304 Rear			**7**																					
Field housing Ø55, stainless steel, AISI 304																								
Electrical connection														66										
M12, 5 pins				**1**										DN51 Clamp ISO 285										
M12, 8 pins				**3**																				
Cable gland, M16				**5**																				
Cable gland, M20				**B**																				
Material el. Connection																								
Plastic					**1**																			
AISI 304					**3**																			
Display														65										
Without display, Ø55 housing						**0**								DN25/DN38 Clamp ISO 2852										
Without display						**1**																		
With display No relays activated						**2**																		
With display With activated relays						**4**																		
Transmitter / socket																								
Flying leads							**0**																	
Ceramic socket Pt100							**1**																	
Transmitter 2202 4-20 mA ±0,25 °C (Accuracy class)							**2**																	
Transmitter 2211 4-20 mA ±0,10 °C (Accuracy class)							**3**																	
Transmitter 2221 4-20 mA / HART® ±0,10 °C (Accuracy class)							**4**																	
Transmitter 2231 Profibus® ±0,10 °C (Accuracy class)							**5**																	
Safety														60										
Standard								**0**																
Ex ia IIC T4/T5 1G (Gas)								**1**																
Ex nA II T4/T5 3G (Gas)								**3**																
Ex ia II 1 G Eex ia IIC, Zone 0, simple apparatus								**9**																
Configuration																								
No configuratio									**0**															
Configuration of Rang									**1**															
Configuration of Rang + Display									**2**															
Configuration of Rang + Display incl. 2 x relays									**3**															
Sensor element (DIN/EN/IEC 60751)																								
None (for cable sensor)										**0**														
1x Pt100 Class 1/1 B										**1**														
2x Pt100 Class 1/1 B										**2**														
1x Pt100 Class 1/3 B										**5**														
2x Pt100 Class 1/3 B										**6**														
1x Pt100 Class 1/6 B										**7**														
2x Pt100 Class 1/6 B										**8**														
1x Pt100 Class 1/1 A										**A**														
2x Pt100 Class 1/1 A										**B**														
Sensor insert type																								
Sensor tube with embedded sensor element 2-wire 1											**1**													
Sensor tube with embedded sensor element 4-wire 2											**2**													
Cable sensor Pt100 Class 1/1 B (1xPt100 only, for ø 8 mm only) A											**A**													
Cable sensor Pt100 Class 1/3 B (1xPt100 only, for ø 8 mm only) B											**B**													
Cable sensor Pt100 Class 1/6 B (1xPt100 only, for ø 8 mm only) C											**C**													
Cable sensor Pt100 Class 1/1 A (1xPt100 only, for ø 8 mm only) D											**D**													
Sensor tube length																								
Length in mm (min. 20 mm) x x x x																							X X X X	

Cooling neck																								
None	**0**																							
Cooling neck	**4**																							
Process connection																								
G½ hygienic	**51**																							
DN38 Hygienic connection																								
Seal																								
Without (to be ordered separat	**0**																							
Sensor diameter																								
ø 6 mm AISI 316	**1**																							
ø 8 mm AISI 316	**2**																							
Sensor tip																								
Normal resp.	**1**																							
Fast response ø 4 mm tip																								
Approvals																								
None	**0**																							
Max sensor length : 300 mi	**2**																							

TER8

Product highlights

- 3-A fulfillment without elastomers
- Front-flush or immersed types
- Accurate reading independent on ambient temperature
- Fast response time
- Hermetically sealed towards process
- Capable of SIP (Sterilization in Place)
- Compact stainless steel housing, protection up to IP 69K
- Optional integrated 4 ... 20 mA transmitter

User benefits

- Safe process with less downtime
- Free choice of mounting position even with agitators and pigging systems
- Ability for mounting in small tubes down to DN 25
- High process effectiveness
- Long life time even in wash-down areas
- Reliable in SIP operation
- High flexibility by programmable output range

	TER8	-	1	x	x	0	.	x	0	x	x	.	0	A	0	3	.	0	x	x	0	.	x	x	x	x
Product line																										
Front-flush and low-invasive resistance thermometers	TER8																									
Electrical connection	**BCID**																									
M12, 4-pin, stainless steel	X04		1	3																						
Output signal																										
Pt100 (4-wire)								0																		
4 … 20 mA (2-wire), Iout at pin 2								2																		
4 … 20 mA (2-wire), Iout at pin 2, 3								A																		
Configuration																										
Without									0																	
Output range									1																	
Pt100 accuracy class (EN 60751)																										
B (± 0.3 °C at 0 °C)										1																
A (± 0.15 °C at 0 °C)										A																
AA (± 0.1 °C at 0 °C)										5																
1/6 B (± 0.05 °C at 0 °C)										7																
Process connection	**BCID**																									
G 1/2 A hygienic	A03													A	0	3										
Immersion length																										
0 mm (front-flush)																			A	1	0	.	0	0	0	0
20 mm																			B	2	0	.	0	0	2	0
50 mm																			B	2	0	.	0	0	5	0

TE2

Main features

- Compact and light weight
- Available with 4 ... 20 mA transmitter or Pt100 output
- Available with hygienic as well as industrial process connections
- Programmable by FlexProgrammer 9701

Applications

- Food & beverage
- Laboratory & medical
- Oil & gas / chemical
- Water & waste water
- Energy
- Transportation & logistics

TE2	_	x	.	x	.	x	x	x	x	.	xxxx	.	x

Model

Compact temperature sensor	TE2

Sensor tip

Not specified	For connection code 6 & 7			0
Standard	Normal response			1
Fast	Fast response	Ø4 mm	Sensor length 35...300 mm	2
Fast	Fast response	Ø3 mm	Sensor length 35...300 mm	3

Process connection

Tube without connection				PN40	1
Nipple, male	G1/2A	ISO 228/1		PN100	3
Nipple, male	G1/2A hygienic	ISO 228/1		PN40	4
Nipple, male	M12 x 1.5 hygienic	ISO 228/1		PN40	5
Nipple, male	M12 x 1.5 hygienic	ISO 228/1	PEEK cone Ø3 x 5 mm tip	PN40	6
G⅛" union nut	Conical sensor		Ø3 x 20 mm or 25 mm sensor tip	PN40	7
Nipple, male	G1/4A	DIN 3852-E		PN100	8
DN25/DN38 clamp, 3-A	(1", 1½")	ISO 2852		PN40	9
Triclamp® ½", ¾"	(DN15/DN20)			PN40	A
3A/DN38, BHC	Hygienic connection			PN40	B
NPT	½-14			PN100	D
NPT	¼-18			PN100	E
Nipple, male	G1/2A	DIN 3852-E		PN100	F

Sensor element

1 x Pt100 Cl. B		1
2 x Pt100 Cl. B	For 6 mm standard tip only	2
1 x Pt100 Cl. 1/3 B		3
2 x Pt100 Cl. 1/3 B	For 6 mm standard tip only	4
1 x Pt100 Cl. 1/6 B		5
1 x Pt100 Cl. A		7
2 x Pt100 Cl. A	For 6 mm standard tip only	8

Cooling neck

None		0
Cooling neck	See table page 1	4

Electrical connection

M12 plug, 4 pole			1
M12 plug, 4 pole, Iout pin 2	with 4...20 mA transmitter	1 x Pt100 only	2
M12 plug, 4 pole, Iout pin 2, 3	with 4...20 mA transmitter	1 x Pt100 only	A
DIN 43650-A			4
DIN 43650-A	with 4...20 mA transmitter	1 x Pt100 only	5

Certificates

Not specified	0
Ex ia Simple apparatus, gas and dust	9

Sensor tube length

5 mm for connection code 6	0005
20 mm for connection code 7	0020
25 mm for connection code 7	0025
Length in mm (e.g. 60 mm = 0060)	xxxx

Configuration

No configuration	0
Configuration of range	C

8155 Hygienic cable sensor

Product highlights

- Hygienic, without gasket
- Compact mounting
- Fast response time
- High accuracy
- Wide temperature range
- Acid-proof, stainless steel

		8155 - x x	.xxxx
Tip length (T)	**5´ digit**		
20 mm		2	
25 mm		3	
As customer specification (Max. 25 mm)		S	
Pt100 element (DIN/EN/IEC 60751)	**6´ digit**		
1/1 DIN B		2	
1/1 DIN A		3	
1/3 DIN B		4	
1/6 DIN B		5	
Cable length (L)	**7...10´ digit**		
Length in cm			xxxx

CombiPress® PFMH

Main benefits

- Flush diaphragm
- Built in graphical display
- *CombiView*® DFON optional
- HART®
- high accuracy 0.1% FS from –20 … 85 °C
- 3-A, FDA
- EHEDG
- Programmable by touch screen
- Easy and full programmable with FlexProgrammer 9701

Applications

- Food & beverage
- Pharmaceutical
- Water treatment
- General process industry

		-																
Model																		
CombiPressTM	**PFMH**																	
Housing																		
Stainless steel 1.4301 / AISI304 Bottom connection		**5**																
Stainless steel 1.4301 / AISI304 Rear connection		**6**																
Accuracy						**C1**												
±0.25%			**4**															
±0.10% (not range 0.345 bar)			**5**															
Pressure range and unit																		
Min. 0.0 / Max 0.345 bar (vacuum and absolute are not available)				**BC1**														
Min. -1.0 / Max 1.0 bar (0...1 bar abs)				**BC2**														
Min. -1.0 / Max 5.0 bar (0...5 bar abs)				**BC3**														
Min. -1.0 / Max 20.0 bar (0...20 bar abs)				**BC4**														
Min. -1.0 / Max 34.0 bar (0...34 bar abs)				**BC5**														
Min. -1.0 / Max 68.0 bar (0...68 bar abs)				**BC6**														
Kind of pressure																		
Relative					**R**													
Absolute					**A**													
Output signal																		
Output Connection																		
M12, 5 pins							**15**											
M12, 8 pins							**18**											
Cable gland, M16							**55**											
Cable gland, M20							**57**											
Material of el. Connection																		
Process connection																		
DN38 BHC 3-A Hygienic Connection 50																		
DN38 ISO 2852 / TriClamp 1 1/2", 3-A																		
DN51 ISO 2852 Clamp. 3-A																		
DN76 BHC 3-A Hygienic Connection (max. range 5 bar)																		
Varivent® type N (Varivent DN32/125)																		
DN38 ISO 2852 / TriClamp 1 1/2", 3-A, with cooling neck																		
DN51 ISO 2852 TriClamp 2", 3-A, with cooling neck																		
Wetted parts material																		
Seal																		
Oil filling																		
Display																		
ATEX																		
Approvals																		
Configuration																		
No configuration (configured according to pressure cell) 0																		**0**
Configuration of Range 1																		**1**
Configuration of Range + Display 2																		**2**

					4...20 mA	4...20 mA + HART®		Plastic (cable gland only)	AISI 304		Stainless steel 1.4404 / AISI 316	Hastelloy C (on request)		Without (to be ordered separately)		Silicon oil -40...200 °C FDA approved white oil -5...200 °C Standard		Without display	With display No relays activated	With display With activated relay		Without	Ex nA II T5 (Gas)	Ex ia IIC T5 Ga or Ex ia IIC T100°C Da (Gas or Dust)		Without	EAC (TR CU 020/2011)
			R	**C1**	**A1**		**1**	**3**		**2**	**H**		**0**		**2**		**1**	**2**	**4**		**0**	**3**	**5**		**0**	**7**

PBMH

Main benefits

- High temperature resistance for SIP and CIP processes
- high accuracy 0.1% FS from –20 … 85 °C
- Fully welded and compact design for washdowns without residuals
- Excellent active temperature compensation for increased process stability
- External programming of zero point and span with FlexProgrammer 9701

Applications

- Food & beverage
- Biotechnology
- Pharmaceutical

	PBMH	_	2	.	x	.	xxx	.	x	.	xx	.	xx	.	xx	.	x	.	x	.	x	.				
Model																										
Pressure transmitter	**PBMH**																									
Housing material																										
Stainless steel 1.4404 AISI 316L			**2**																							
Accuracy																										
0.25% FS					**4**																					
0.10% FS P > 250 mbar					**5**																					
Pressure range and unit in bar															**54**											
-0.1...0.1 Only pressure type relative B2H							**B2H**								Fiel housing											
-0.2...0.2 Only pressure type relative B4G							**B4G**																			
-1...0 Only pressure type relative B59							**B59**																			
-1...0.6 Only pressure type relative B72							**B72**																			
-1...1.5 Only pressure type relative B74							**B74**																			
-1...3 Only pressure type relative B76							**B76**								**53**											
-1...5 Only pressure type relative B77							**B77**																			
-1...9 Only pressure type relative B79							**B79**																			
-1...15 Only pressure type relative B81							**B81**																			
-1...24 Only pressure type relative B82							**B82**																			
-1...39 Only pressure type relative B1L							**B1L**																			
0...0.1 Only pressure type relative B08							**B08**																			
0...0.16 Only pressure type relative B09							**B09**																			
0...0.25 Only pressure type relative B10							**B10**																			
0...0.4 B11							**B11**																			
0...0.6 B12							**B12**		**A**		**A2**				**44**											
0...1 B15							**B15**																			
0...1.6 B16							**B16**																			
0...2 B17							**B17**																			
0...2.5 B18							**B18**																			
0...4 B19							**B19**																			
0...6 B20							**B20**		**R**		**A1**				**14**											
0...10 B22							**B22**																			**S0x**
0...16 B24							**B24**																			
0...20 B25							**B25**																			
0...25 B26							**B26**																			
0...40 B27							**B27**																			
								Type of pressure		Output signal		Output connection														
Process connection																										
DN 38 Hygienic Connection 3-A													**50**													
DN 33.7 - DN 38 ISO2852 / TriClamp 1 1/2" / DN 25 - DN 40 DIN32676													**51**													
DN 3/4" TriClamp / DN 3/4" DIN32676 (without 3-A)													**52**													
DN 25 ISO2852 / DN 26.9 DIN32676													**53**													
DN 21.3 ISO 2852 / DN 20 DIN32676													**57**													
DN 40 - DN51 ISO2852 / DN 42.4 - DN 48.3 DIN32676													**54**													
DN76 Hygienic Connection 3-A													**56**													
DN 25 Aseptic Clamp DIN 11864-3 BKS, Series A, Form A													**58**													
Varivent® type N													**61**													
Varivent® type F													**62**													
DN 33.7 - DN 38 ISO2852 / TriClamp 1 1/2" / DN 25 - DN 40 DIN32676 with cooling neck													**81**													
DN 3/4" TriClamp / DN 3/4" DIN32676 with cooling neck (without 3-A)													**82**													
DN 25 ISO2852 / DN 26.9 DIN32676 with cooling neck													**83**													
DN 40 - DN51 ISO2852 / DN 42.4 - DN 48.3 DIN32676 with cooling neck													**84**													
DN 21.3 ISO 2852 / DN 20 DIN32676 with cooling neck													**87**													
DN 25 Aseptic clamp DIN 11864-3 BKS, Series A, Form A with cooling neck													**88**													
Process connection material																										
Stainless steel 1.4404 AISI 316L														**2**												
Stainless steel 1.4435 AISI 316L In combination with process connection Code 51/52/54/57/81/82/84/87														**5**												
Stainless steel 1.4435 AISI 316L electropolished In combination with process connection Code 51/52/54/57/81/82/84/87														**F**												
Hastelloy-C														**H**												
															Sealing											
															Without	**0**										
															EPDM (FDA / 3-A)	**1**										
															EPDM (EHEDG) In combination with process connection Co	**7**										
															* Size of sealing according bold description at process connect											
																Oil filling										
																Silicon oil	**1**									
																FDA approved white oil T ≥ -10°C	**2**									
																	Display									
																	Without	**0**								
																		ATEX								
																		ATEX according to SEV 11 ATEX 0129 In combination w	**1**							
																		Without	**0**							
																				Approval						
																				None	**0**					
																						S0x				
																						With downscale				
																						Without downscale				
																						Downscale				

PP20H

Main benefits

- All market typical hygienic connections available
- EHEDG & 3-A certified versions available
- Condensate-proof measuring cell
- IO-Link available
- Space-saving installations from DN 25 on

Applications

- Process pressure for a wide variety of applications in
- Food & beverage
- Continuous level monitoring
- CIP cleaning processes (Clean In Place)

	PP20H	-	2	·	x	xxx	x	·	xx	xx	·	xx	2	0	2	0	·	0	0	0
Product line																				
Fully welded pressure sensor for industrial applications	PP20H																			
Max. measuring error																				
± 0.5 % FS (for all except 0 ... 0.4 bar)					3															
± 1.0 % FS (valid for 0 ... 0.4 bar)					1															
Measuring range (bar)																				
-1 ... 0						B59														
-1 ... 1						B73														
-1 ... 3						B76														
-1 ... 5						B77														
-1 ... 9						B79														
0 ... 0.4						B11														
0 ... 1						B15														
0 ... 2.5						B18														
0 ... 4						B19														
0 ... 6						B20														
0 ... 10						B22														
0 ... 25						B26														
0 ... 40						B27														
Pressure type																				
Relative (gauged)							R													
Absolute [2]							A													
Output signal																				
4 … 20 mA (2-wire)									A1											
IO-Link									D1											
Electrical connection																				
M12, 4-pin										14										
M12, 5-pin										15										
Process connection	**BCID**																			
G 1/2 A DIN 3852-E	G51											41								
G1 A hygienic	A04											44								
G 1/2 A hygienic [3]	A03											48								
Tri-Clamp Ø 50.5	C03											53								
Tri-Clamp Ø 64.0	C05											54								
DIN 11851 (dairy pipe connection), DN 40	D03											65								
DIN 11851 (dairy pipe connection), DN 50	D04											66								
DIN 11864-1-A (aseptic screwed union), DN 40	H03											59								
DIN 11864-1-A (aseptic screwed union) DN 50,female	H14											68								
Varivent® DN 25; 1“ (Type F), Ø 50	V01											62								
Varivent® DN 32 … 125; 1 1/2“ … 6“ (Type N), Ø 68	V02											61								

[2] Available for „Measuring range“ B15 (0 ... 1 bar) … B27 (0 ... 40 bar)
[3] Not compatible with following adapters: ZPW2-321, ZPH1-3213, ZPH1-3216, ZPH1-324E, ZPH1-344F

PBMN flush

Main benefits

- Flush membrane
- Fully welded version
- Robust stainless steel housing
- External programming of zero point and span with FlexProgrammer 9701
- High overpressure resistance
- Available with optional ATEX approval
- high accuracy 0.1% FS from –20 … 85 °C

Applications

- Food & beverage
- Water treatment
- Chemical

	PBMN	-	2	.	x	.	xxx	.	xx	.	xx		2						
Model: Pressure transmitter	**PBMN**																		
Housing: Stainless Steel 1.4404 AISI 316L			**2**																
Accuracy: 0.5 % FS					3														
0.25 % FS					4														
0.10 % FS P > 250 mbar					5														
Pressure range and unit in bar:																			
-0.1 ... 0.1 Only pressure type relative							B2H												
-0.2 ... 0.2 Only pressure type relative							B4G												
-1 ... 0 Only pressure type relative							B59					**54**							
-1 ... 0.6 Only pressure type relative							B72												
-1 ... 1.5 Only pressure type relative							B74												
-1 ... 3 Only pressure type relative							B76												
-1 ... 5 Only pressure type relative							B77												
-1 ... 9 Only pressure type relative							B79												
-1 ... 15 Only pressure type relative							B81					**53**							
-1 ... 24 Only pressure type relative							B82												
-1 ... 39 Only pressure type relative							B1L												
0 ... 0.1 Only pressure type relative							B08		**A**										
0 ... 0.16 Only pressure type relative							B09												
0 ... 0.25 Only pressure type relative							B10												
0 ... 0.4							B11												
0 ... 0.6							B12												
0 ... 1							B15			**A2**									
0 ... 1.6							B16		**R**			**44**							
0 ... 2							B17												
0 ... 2.5							B18												
0 ... 4							B19												
0 ... 6							B20												
0 ... 10							B22												
0 ... 16							B24												
0 ... 20							B25			**A1**									
0 ... 25							B26												
0 ... 40							B27					**14**							
0 ... 100							B31												
0 ... 400							B38												
Kind of pressure:									Absolute	0 ... 10 V	4 ... 20 mA	DIN43650, 4 pins							
Output signal:									Relative			M12, 4 pins							
Output connection:													**2**	**3**					
Process connection:													Stainless Steel 1.4404 AISI 316	FKM (Vitron®)					
1/2-14 NPT BCID N02													49						
G 1/2 A hygienic 1), 2) BCID A03													48						S0x
G 1/2 DIN 3852-E BCID G51													41						
G 1/2 A cone BCID G08													42						
G 1/2 A with O-ring at front BCID G09													46	**2**					
G 1 A with O-ring at front1) BCID G12													43	EPDM					
G 1 A hygienic1) BCID A04													44						
G 1/2 DIN 3852-E with cooling neck BCID G51													71		2				
G 1 A with O-ring at front with cooling neck1) BCID G12													73	**1**	FDA approved white oil T >= -10°C				
G 1 A hygienic with cooling neck1) BCID A04													74	NBR	1				
Process connection material:															Silicon oil	0			
Sealing:																Without			
Oil filling:																	1		
Display:																	ATEX according to SEV 11 ATEX 0129		
ATEX:																		0	
Approval:																		None	
Downscale:																		Without downscale	With downscale

Level Switch LFFS

Special Features

- Wetted parts in acid-proof, stainless steel and PEEK
- Compact, food compatible, hygienic design
- Hygienic connections conform to 3-A standards, FDA demands and EHEDG guidelines
- Precise switching point without calibration
- Process temperature –40 ... 200 °C
- Measures media with DC-values >1.5 (DC = Dielectric Constant)
- Not in uenced by foam
- LED switch indicator
- Maintenance free
- Suitable for media separation measurement
- Configurable by FlexProgrammer 9701
- ATEX approval for gas and dust
- WHG approval (leakage and over II)

		–				.
Model						
Level Switch		LFFS				
Safety	5' digit					
Standard			0			
Ex ia IIC T5, ATEX II 1G (Gas) *			1			
Ex tD A20 IP67 T100 °C, ATEX II 1D (Dust)			2			
Ex nA II T5, ATEX II 3G			3			
UL listed, E365692			A			
Electrical Connection	6' digit					
M12, 4 pins, nickel-plated brass				1		
M16 cable gland, nickel-plated brass				2		
M16 cable gland, polyamide				3		
M12, 4 pins, stainless steel				4		
M16 cable gland, stainless steel				5		
Process connection	7' digit					
G1/2 A, PEEK tip (1)					1	
3-A/DN38 Hygienic connection (1)					2	
G1/2, PEEK tip, sliding connection, 100 mm adjustable, incl. compression ring kit ZPX1-006 (2)					3	
G1/2, PEEK tip, sliding connection, 250 mm adjustable, incl. compression ring kit ZPX1-006 (2)					4	
Configuration	8' digit					
No configuration						0
Configuring according to customer specification						C

* For PNP output the barrier module PROFSI3-B25100-ALG-LS is required for funtional purposes.

The compression ring kit for sliding connection, type no. ZPX1-006 can be ordered separately.
Baumer recommended to replace this kit if deformed.

CleverLevel® LBFS

Product highlights

- Safe detection of liquids, bulk solids and powders
- Short immersion length
- Excellent cleanability
- Ability for differentiation between foam and liquid
- Not sensitive to adherent or sticky media
- Status signaling by bright, blue LED
- Compact stainless steel housing, sealed up to IP 69K

User benefits

- One sensor for all applications
- Less disturbance of process
- Safe process with less downtime
- Visual observation of process
- Long life time even in wash-down areas

		LBFS	-	x	x	x	x	x	.	x
Type										
Level switch		LBFS								
Compliance and approvals										
Standard				0						
ATEX II 1 G Ex ia IIC T4/T5 (2)				1						
ATEX II 1 D Ex ta IIIC T100 °C Da				2						
ATEX II 3 G Ex nA II T4/T5				3						
ATEX II 1 G Ex ia IIC T4/T5 and ATEX II 1 D Ex ta IIIC T100 °C Da (2)				4						
cULus Listed, Class 2, E365692				A						
Electrical connection										
Connector M12, 4 pin, polycarbonate (with LED)					1					
Cable outlet 5 m, 4-wire, PVC (3)					2					
Connector M12, 4 pin, stainless steel (without LED)					3					
Process connection	**(BCID)**									
G 1/2 A ISO 228-1	(G07)					1				
G 1/2 A ISO 228-1 with cooling neck	(G07)					G				
G 1/2 A DIN 3852 form E, NBR gasket	(G51)					A				
G 1/2 A DIN 3852 form E, FKM (Viton®) gasket	(G51)					B				
G 1/2 A hygienic	(A03)					4				
G 1/2 A hygienic, length 82 mm	(A03)					K				
G 1/2 A hygienic, sliding connection, length 250 mm	(A03)					L				
G 1/2 A ISO 228-1 for reverse assembly (in-shell thread) (4)	(T10)					5				
G 3/4 A ISO 228-1	(G10)					2				
G 1 A ISO 228-1	(G11)					3				
1/2-14 NPT	(N02)					N				
1/2-14 NPT with cooling neck	(N02)					M				
3/4-14 NPT	(N03)					6				
M18x1	(M11)					7				
Wetted parts material										
AISI 304 (1.4301) (available for „Process connection“ 1, 2, 3, 5, 6, 7)							1			
AISI 316L (1.4404)							2			
Switching polarity										
PNP								1		
NPN								2		
Configuration										
Factory setting										0
Customer-specifi										C

(2) The isolating barrier PROFSI3-B25100-ALG-LS is recommended with PNP switching polarity for Ex ia IIC (please refer to accessories, page 10)

(3) Ambient temperature: -25 ... 70°C (if the cable is unmoved)
-5 ... 70°C (if the cable is moved)
Bending radius min.: r ≥ 10 mm

(4) Including gasket ZPX3-14B0 (glass/aramide fiber with NBR)

CleverLevel® LBFH

Product highlights

- Safe detection of liquids, bulk solids and powders
- Short immersion length
- Excellent cleanability
- Capable of differentiation between foam and liquid
- Insensitive to adherent or sticky media
- Status indication by bright, multi-color LED
- Compact stainless steel housing, protection up to IP 69K
- Teach-in on site or remote by control wire
- Two switching outputs with dedicated switching windows
- IO-Link configuration and interface

User benefits

- One sensor for all applications
- Less disturbance of process
- Safe process with less downtime
- Visual observation of process
- Long life time even in wash-down areas
- High acceptance of process connections
- Easy to operate

		LBFH	-	x	1	·	xxx	·	A030	2	0	·	x	·	x	00	3	·	x
Type																			
Level switches		LBFH																	
Version																			
Standard without IO-Link				1															
Programmable output, IO-Link				2															
Housing																			
Standard					1														
Electrical connection	**(BCID)**																		
Connector M12-A, 4-pin, polycarbonate (with LED)	X04						010												
Connector M12-A, 4-pin, stainless steel (without LED)	X04						020												
Process connection	**(BCID)**																		
G 1/2 A hygienic	A03								A030										
Wetted parts material																			
AISI 316L (1.4404)										2									
Gasket																			
Without											0								
Output type																			
PNP													1						
NPN													2						
Digital (push-pull)													3						
Explosion protection																			
Without															0				
ATEX II 3G Ex nA IIC T4 Gc															3				
ATEX II 1G Ex ia IIC T4 Ga and ATEX II 1D Ex ta IIIC T100 °C Da															4				
Industrial approvals																			
Standard																00			
Special approvals																			
Standard (3-A, EHEDG)																	3		
Configuration																			
Factory settings																			0
Customer-specific																			1

LSP

Product highlights

- Wetted parts in acid-proof, stainless steel and PEEK
- Compact, food compatible, hygienic design
- 3-A approved / FDA and EHEDG compliant
- Process temperature –20 ... 140 °C
- Defined empty registration
- LED level monitor
- Unaffected by strong adhesive media
- Configurable measuring range

			LSP-05x . xxx . x . xxx
Type	**Approval**	**6´ digit**	
Compact version - integrated electronics			**0**
Compact version - integrated electronics	3A		**1**
Split version - separate electronics			**5**
Split version - separate electronics	3A		**6**
Rod Length		**7´...9´ digit**	
Length in cm (Min. 20 cm - max. 300 cm)			xxx
Gland		**10´ digit**	
Cable gland, M16			1
Plug, M12, nickel plated brass			2
Plug, M12, stainless steel			3
Cable Length (version LSP055 and LSP056 only)		**11´...13´ digit**	
Length in cm (Min. 100 cm - max. 500 cm)			xxx

FlexFlow PF20H

Main benefits

- Parallel measurement of flow and temperature
- Flow measurement independent of the mounting position
- Large measuring range up to 400 cm/s
- Measurement at high media temperatures up to 125 °C
- High pressure resistance up to 40 bar
- One-piece, compact measuring probe
- FDA-compliant hygienic design
- Capable of SIP (Sterilization in Place) up to 150 °C (interminable)
- Resistant to all common CIP cleaning agents
- Calibrated linear analog outputs for flow and temperature
- IO-Link interface combined with analogue or switching output (programmable)

Applications

- Reduced installation effort with only one process connection
- Easy mounting without sensor alignment
- One sensor for all applications
- Less disturbance of process
- Support for food safety
- Increased process stability by linear regulation
- High acceptance of process connections

			PF20H	-	1	1	.	010	.	xxxx	2	0	.	x	.	0	xx	0	.	x
Product line	Hygienic flow sensor		**PF20H**																	
Version	Standard													1						
Standard					1															
Housing	Stainless steel, AISI 316L (1.4404)					1														
Electrical connection		**BCID**																		
M12-A, 4-pin, stainless steel		X04						010												
Process connection	**Sensor length**	**BCID**																		
G 1/2 A hygienic	16.4	A03								A031										1
G 1/2 A hygienic	50	A03								A035										
ISO 2852 (Tri-Clamp), DN 21.3, Ø 34.0														0						
DIN 32676-A (Tri-Clamp), DN 21.3, Ø 34.0	32	C02								C023										
ISO 2852 (Tri-Clamp), DN 25; 33.7; 38, Ø50.5																	01			
DIN 32676-A (Tri-Clamp), DN 25; 32; 40, Ø 50.5																				
DIN 32676-B (Tri-Clamp), DN33.7, Ø 50.5	32	C04								C043										
DIN 32676-C (Tri-Clamp), DN 1"; 1 1/2", Ø 50.5																				
ISO 2852 (Tri-Clamp), DN 40; 51, Ø 64.0																	00	0		
DIN 32676-A (Tri-Clamp), DN 50, Ø 64.0	50	C05								C055					0					0
DIN 32676-B (Tri-Clamp), DN 42.4; 48.3, Ø 64.0																				
DIN 32676-C (Tri-Clamp), DN 2", Ø 64.0																				
DIN 11851 (dairy pipe connection), DN 25	32	D01								D013										
DIN 11851 (dairy pipe connection), DN 40	36	D03								D034										
DIN 11851 (dairy pipe connection), DN 50	50	D04								D045		0								
Varivent® DN 32 ... 125; 1 1/2" ... 6" (Type N), Ø 68	32	V02								V023										
Varivent® DN 32 ... 125; 1 1/2" ... 6" (Type N), Ø 68	50	V02								V025										
Varivent® DN 25; 1" (Type F), Ø 50	32	V01								V013										
Varivent® DN 25; 1" (Type F), Ø 50	50	V01								V015										
BHC 3A DN 38	32	B01								B013										
BHC 3A DN 38	50	B01								B015										
Wetted parts material	AISI 316L (1.4404)										2									

Gasket Without
Output signal Multi-parameter, 2x4...20mA(3-wire), Program., IO-Link
Explosion protection Without
Industrial approvals Standard, EAC
Special approvals Standard
Configuration Factory settings, Customer-specific

CombiLyz® AFI4 / AFI5

Main benefits

- Range from 50 µS/cm to 1000 mS/cm
- All hygienic design
- Built in graphical display *CombiView*® DFON
- Very fast temperature compensation
- Easy and full programmable with FlexProgrammer 9701
- AFI5 split version with remote sensor
- Separate 4 ... 20 mA output for conductivity / concentration and 4 ... 20 mA output for temperature
- FDT software
- 3-A approved
- EHEDG
- Touch screen

Applications

- Controlling CIP procedure
- Controlling filling machines
- Detection of specific medias
- Water systems with >50 µS/cm

	AFI		–					.		0			.	0			
Model																	
Conductivity transmitter, CombiLyz AFI	AFI																
Type																	
Compact version			4														
Split version			5														
			–														
Housing																	
Bottom connection				5													
Rear conection				6													
Wall mounted				4													
Pipe mounted, DN38				C													
Pipe mounted, DN51				D													
Pipe mounted, DN64				E													
Electrical connection																	
M12 - 2x4-wire (w.o. relay output) 6					6												
M12 - 1x4-wire / 1x8-wire 7					7												
2 x M16 cable gland 8					8												
M16 (left) and M20 (right) cable gland A					A												
2 x M20 cable gland B					B												
Material of electrical Connection																	
Plastic (not available with M12)						1											
Stainless steel						3											
Cable length																	
								.									
Display																	
Safety																	
Standard										0							
Configuration																	
No configuration											0						
Configuration without display or with display as slave											1						
Configuration with separate configuration of display and relays											3						
Output																	
Version																	
Process connection																	
G1B hygienic, PEEK, 37 mm (A04) 1																	
G1B hygienic, PEEK, 83 mm (A04) 2																	
G1B hygienic, PEEK, 60 mm (A04) 3																	
Approvals																	
Without																	
3-A approved / EHEDG 37 mm version																	
3-A approved 60 and 83 mm version																	
Calibration certificate																	
No 01																	
Calibration certificate, conductivity (5 points)																	
Calibration certificate, temperature (3 points)																	
Calibration certificate, conductivity (5 points) and temperature (3 points)																	

Cable length																	
Cable 10m							3										
Cable 5m							2										
Cable 2.5 m							1										
No cable							0										
Display																	
DFON with 2 relay outputs								4									
Without								1									
Output																	
2 x 4...20 mA, HART												4					
2 x 4...20 mA												2					
Version																	
Standard														0			
Process connection																	
G1B hygienic, PEEK, 37 mm (A04) 1															1		
G1B hygienic, PEEK, 83 mm (A04) 2															2		
G1B hygienic, PEEK, 60 mm (A04) 3															3		
Approvals																	
Without																0	
3-A approved / EHEDG 37 mm version																1	
3-A approved 60 and 83 mm version																2	
Calibration certificate																	
No 01																	0
Calibration certificate, conductivity (5 points)																	1
Calibration certificate, temperature (3 points)																	2
Calibration certificate, conductivity (5 points) and temperature (3 points)																	3

CombiView® DFON

Main benefits

- Graphical display with backlight
- Showing errors and limits by steady or flashing colors
- Fits Baumer *CombiSeries* (ø80 mm FlexHousing)
- Hygienic design
- Option: Two configurable relay outputs
- Programmable by touch screen
- Easy and fully programmable with FlexProgrammer 9701
- ATEX

Applications

- Remote display fits for all 4 ... 20 mA transmitter
- Wall mounting, panel mounting and pipe mounting

	DFON	–					.		
Model									
CombiView	DFON								
Safety									
Standard		1							
EX II 3G, Ex nA II T5		3							
EX II 1 G Ex ia IIC T5 Ga or EX II 1D Ex ia IIIC T100°C Da		5							
Relays									
Not activated			1						
Activated			2						
Configuration									
None				0					
Configured according to customer specification				1					
Front ring									
None					0				
Front ring for Ø80 mm SS housing (FlexBar + CombiTemp 814)					1				
Front ring for SS FlexHousing (CombiSeries)					2				
							.		
Housing									
None								0	
FlexHousing wall mounting								2	
FlexHousing panel mounting								3	
FlexHousing tube mounting	DN38							4	
FlexHousing tube mounting	DN51							5	
FlexHousing tube mounting	DN64							6	
Electrical connection on housing									
None									0
1 x M16 plastic cable gland									3
2 x M16 plastic cable gland									4
1 x M16 stainless steel cable gland									5
2 x M16 stainless steel cable gland									6
1 x M20 plastic cable gland									7
2 x M20 plastic cable gland									8
1 x M20 stainless steel cable gland									9
2 x M20 stainless steel cable gland									A

Accessories, Software for relays

Activation code for relays (for instruments with not activated relays)
UnitCom ribbon cable (for retrofitting of DFON on TFRx and PFMx)

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China
India
Indonesia
Israel
Japan
Kuwait
Malaysia
Oman
Philippines
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Finland
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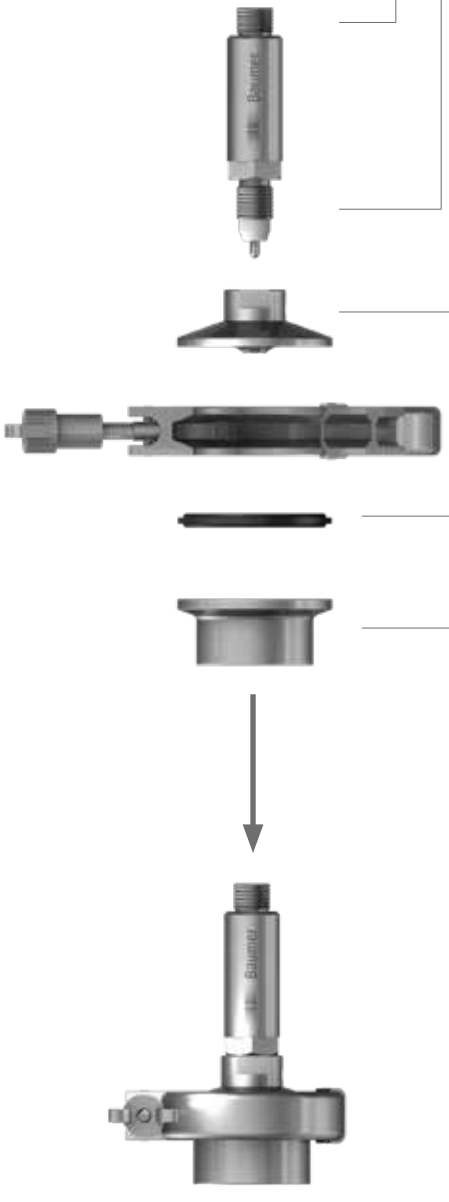
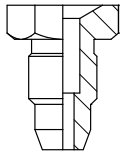
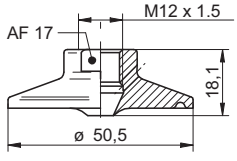
Baumer Hygienic Connection

Selection guide



Sensor		TE2
Instrument connection	Description	M12×1.5 hygienic
	BCID	A02

Instrument connection	BCID	A02
		
Process connection	Description	M12×1.5 hygienic
	BCID	A02

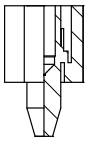
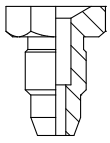
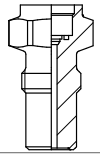
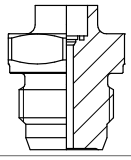
Hygienic adapters	BCID	A02
	Description	M12×1.5 hygienic
Ordering key		ZPH1-2213
		
Process connection	Description	Tri-Clamp Ø 50.5
	BCID	C04

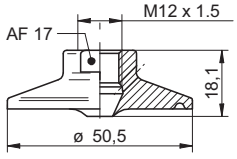
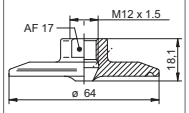
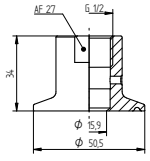
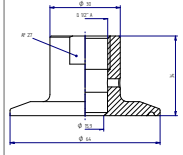
Mounting aids	BCID	C04
	Description	Tri-Clamp Ø 50.5
Ordering key		ZPX4-310
		
	BCID	C04

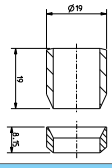
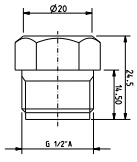
Gaskets and O-rings	BCID	C04
	Description	Tri-Clamp Ø 50.5
Ordering key		ZPX3-7234
		
	BCID	C04

Hygienic weld-in sleeves	BCID	C04
	Description	Tri-Clamp Ø 50.5
Ordering key		ZPX4-320
		
	Description	Universal use
	BCID	W_U_use

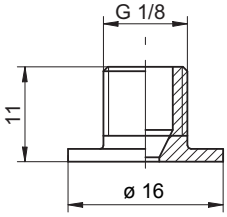
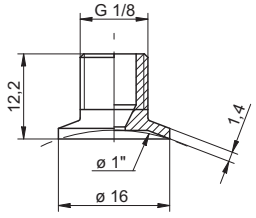
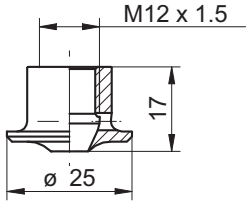
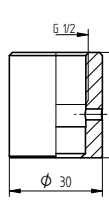
		Conductivity		Level									
Sensor		AFI4	AFI5	LFFS		LBFS	LBFI	LBFH	LSP	PBMN flush			
Instrument connection	Description	G1 A hygienic	G1 A hygienic	G 1/2 A hygienic	BHC 3A DN 38	G 1/2 A hygienic	G 1/2 A hygienic	G 1/2 A hygienic	G1 A hygienic	G 1/2 A hygienic	G1 A hygienic	BHC 3A DN 38	
	BCID	A04	A04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

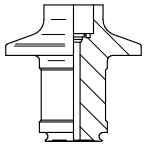
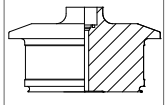
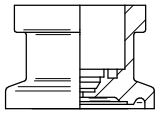
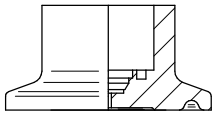
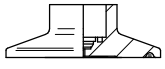
Gaskets and O-rings	BCID	C04	C04
	Description	Tri-Clamp Ø 50.5	Tri-Clamp Ø 50.5
Ordering key		ZPX3-7232	ZPX3-7234
			
	BCID	C04	C04

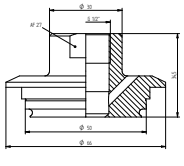
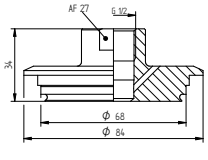
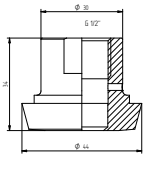
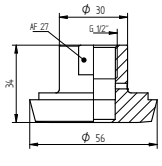
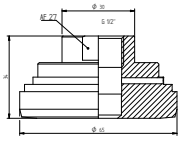
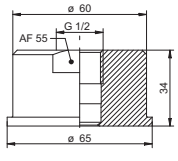
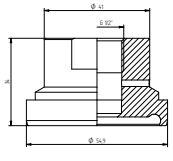
Hygienic weld-in sleeves	BCID	A01	A01	A02	A03
	Description	G 1/8 B male thread hygienic	G 1/8 B male thread hygienic	M12×1.5 hygienic	G 1/2 A hygi
Ordering key		ZPW2-122	ZPW2-125	ZPW2-222	ZPW3-32
					
	Description	Ø 16 × 12.2 (Thin-walled tanks)	DN 25, Ø 16 (Pipes without collar)	Ø 25 × 17 (Thin-walled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

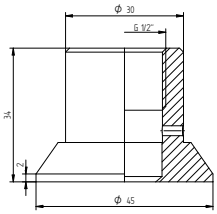
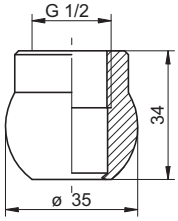
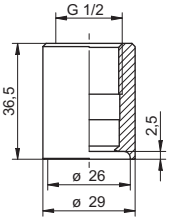
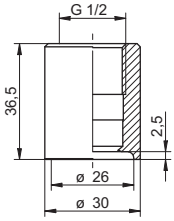
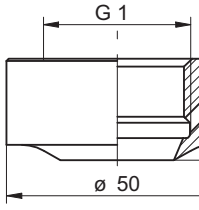
PBMH									PFMH								
BHC 3A DN 76	Tri-Clamp Ø 24.9	Tri-Clamp Ø 34.0	Tri-Clamp Ø 50.5	Tri-Clamp Ø 50.5	Tri-Clamp Ø 64.0	Varivent® (Type F), Ø 50	Varivent® (Type N), Ø 68	DIN 11864-3-A, DN25, Ø 50.5	BHC 3A DN 38	BHC 3A DN 76	Tri-Clamp Ø 50.5	Tri-Clamp Ø 64.0	Varivent® (Type N), Ø 68	G 1/2 A hygienic	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

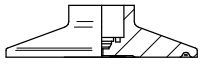
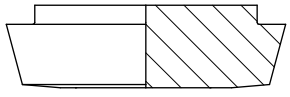
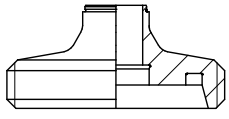
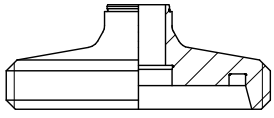
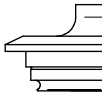
D03	D04	D05
DIN 11851 (dairy pipe connection), DN 40	DIN 11851 (dairy pipe connection), DN 50	DIN 11851 (dairy pipe connection), DN 65
ZPX4-440	ZPX4-540	ZPX4-740
		
D03	D04	D05

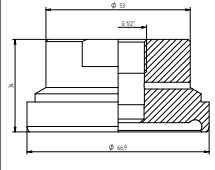
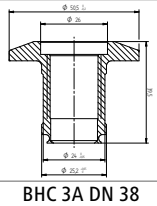
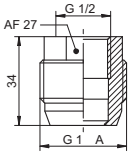
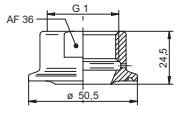
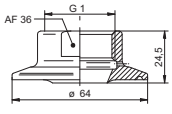
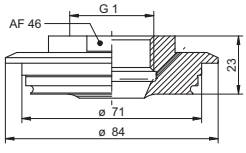
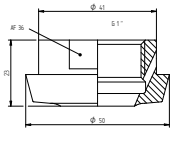
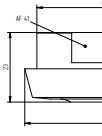
	C05	C04
	Tri-Clamp Ø 64.0	Tri-Clamp Ø 50.5
	ZPX3-7262	ZPX3-7234
		
	C05	C04

	A03	A03	A03	A03	A04
enic	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

Tempe

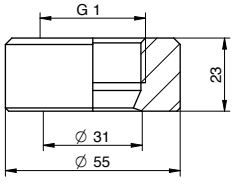
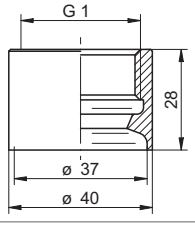
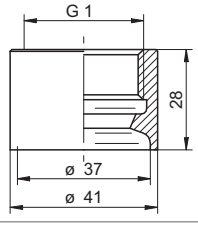
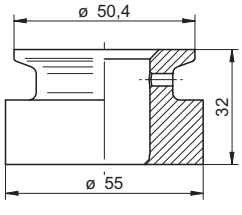
PP20H						(Y)Ted			TFRH						TER8	
DIN 11851, DN 40	DIN 11851, DN 50	Varivent® (Type F), Ø 50	Varivent® (Type N), Ø 68	DIN 11864-1-A, DN 40	DIN 11864-1-A, DN 50, female thread	Tri-Clamp Ø 50.5	Tri-Clamp Ø 50.5	Tri-Clamp Ø 64.0	G 1/2 A hygienic	BHC 3A DN 38	Tri-Clamp Ø 50.5	Tri-Clamp Ø 50.5	Tri-Clamp 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	
					
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	

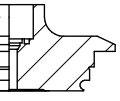
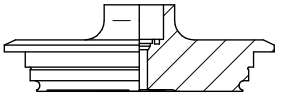
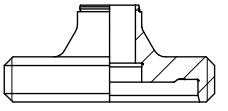
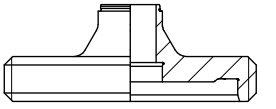
A03	A03	A03	A04	A04	A04	A04	A
G 1/2 A hygienic	G 1/2 A hygienic	G 1/2 A hygienic	G1 A hygienic	G1 A hygienic	G1 A hygienic	G1 A hygienic	G1 A h
ZPH3-3255	ZPH1-32D3	ZPH1-32C0	ZPH1-5213	ZPH1-5216	ZPH1-524E	ZPH3-5222	ZPH3
							
DIN 11864-1-A, DN 50	BHC 3A DN 38	G1 A hygienic	Tri-Clamp Ø 50.5	Tri-Clamp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

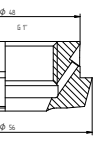
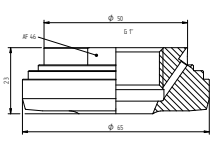
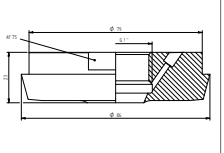
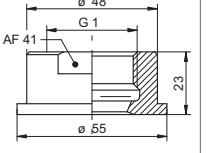
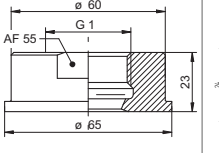
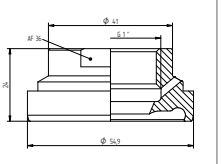
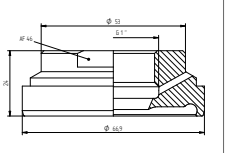
	D01	S01	S02	
	DIN 11851 (dairy pipe connection), DN 25	SMS 1145, DN 38	SMS 1145, DN 51	
	ZPX4-140	ZPX4-330	ZPX4-630	
				
	D01	S01	S02	

	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

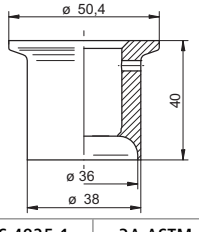
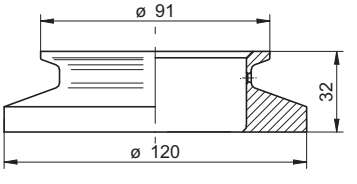
erature							Flow									
TE2						8155 Hygienic cable sensor	*FlexFlow* PF20H									
M12×1.5 hygienic	G 1/2 A hygienic	BHC 3A DN 38	Tri-Clamp Ø 24.9	Tri-Clamp Ø 50.5	Tri-Clamp Ø 50.5	G 1/8 B male thread hygienic	G 1/2 A hygienic	BHC 3A DN 38	Tri-Clamp Ø 34.0	Tri-Clamp Ø 50.5	Tri-Clamp Ø 64.0	DIN 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
ygienic	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
						
51, 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