

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, multicolor LED
- Compact stainless steel housing, protection up to IP69K
- 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

Technical data

Housing

Style	■ Compact design
Overall size	■ Refer to section „Dimensional drawings“
Material	■ Stainless steel

Electrical connection

Connector variants	■ M12-A, 4-pin, polycarbonate ■ M12-A, 4-pin, stainless steel
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Ambient conditions

Operating temperature range	■ -40 ... 85 °C
Storage temperature range	■ -40 ... 85 °C
Humidity	■ < 98 % RH, condensing
Degree of protection (EN 60529)	■ IP67 ■ IP69K (with appropriate cable)
Vibration (sinusoidal) (EN 60068-2-6)	■ 1.6 mm p-p (2 ... 25 Hz), 4 g (25 ... 100 Hz), 1 octave / min.

Process connection

Connection variants	■ Refer to section „Dimensional drawings“
Mounting position	■ Any (top, bottom, side)
Wetted parts material	■ PEEK Natura ■ AISI 316L (1.4404)
Surface roughness wetted parts	■ Ra < 0.8 µm

Process conditions

Process temperature	■ Refer to section „Process conditions“
Process pressure	■ Refer to section „Process conditions“

Power supply

Voltage supply range	■ 8 ... 36 V DC
Current consumption (no load)	■ < 35 mA typ., 50 mA max.

Power supply

Reverse polarity protection	■ Yes
Power-up time	■ < 3 s

Output signal

Output type	■ PNP ■ NPN ■ Digital (push-pull)
Current rating	■ 100 mA max.
Short circuit protection	■ Yes
Voltage drop	■ PNP: (+Vs -0.5 V) ± 0.2 V, Rload ≥ 10 kΩ ■ NPN: (+0.4 V) ± 0.2 V, Rload ≥ 10 kΩ
Off leak current	■ < 100 µA max.
Switching logic	■ Normally open (NO) ■ Normally closed (NC) ■ Active high ■ Active low
Interface	■ IO-Link 1.1

Performance characteristics

Repeatability	■ ± 1 mm
Hysteresis	■ ± 1 mm
Response time	■ 0.04 s typ.
Media characteristics	■ DC > 1.5
Damping	■ 0.0 ... 10.0 s (adjustable)

Factory settings

Switching range (dielectric constant DC)	■ < 75 % (DC > 2)
Range hysteresis	■ 2.4 %
Switching logic	■ SW1: Normally open (NO) ■ SW2: Normally closed (NC)
qTeach	■ activated
Damping	■ 0.1 s

Note:

Information on product characteristics may relate to defined product options.

Technical data
ATEX II 1G Ex ia IIC T4 Ga, ATEX II 1D Ex ta IIIC T100 °C Da

Maximum values (for barrier selection)	<ul style="list-style-type: none"> ■ Ui: 30 V DC max. ■ Ii: 100 mA ■ Pi: 750 mW
Internal capacitance	■ Ci: 63 nF
Internal inductance	■ Li: 617 µH
Temperature class	<ul style="list-style-type: none"> ■ T1 ... T4: -40 < Tamb < 85 °C ■ T100 °C: -40 < Tamb < 85 °C
Degree of protection for cable	■ IP67

Compliance and approvals

EMC Immunity	■ EN 61326
EMC Emission	■ EN 61326 (installed in a metal tank)
Safety	■ cULus listed, E365692
Hygiene	<ul style="list-style-type: none"> ■ FDA (21 CFR 177.2416) ■ 3-A (74-06) ■ EHEDG

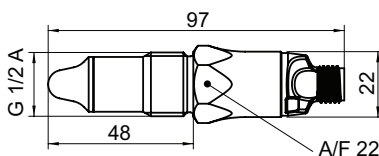
ATEX II 3G Ex nA IIC T4 Gc

Voltage supply range	■ Un: 30 V DC max.
Current rating	■ In: 100 mA
Temperature class	■ T1 ... T4: -40 < Tamb < 85 °C
Degree of protection for cable	■ IP67

Process conditions

Process connection	BCID	Ordering key	Process temperature continuous Tamb < 50 °C °C	Process pressure bar	Process temperature max. temporary t < 1 h Tamb < 50 °C °C	Process pressure @ Process temperature max. temporary bar
G 1/2 A hygienic	A03	A030	-20 ... 115	-1 ... 10	135	-1 ... 5

The requirements of the respective 3-A Sanitary Standard will be only fulfilled in combination with appropriate mounting accessories. Those are marked with the 3-A logo.
The EHEDG certification is only valid in combination with appropriate mounting accessories. Those are marked with the „EHEDG Certified“ logo.

Dimensional drawings
Process connection

G 1/2 A hygienic

A03-A030

Note:

Information on product characteristics may relate to defined product options.
Information in format AXX-X... relates to „Baumer Connection Identifier“ (BCID) and dedicated ordering code.

Field of application

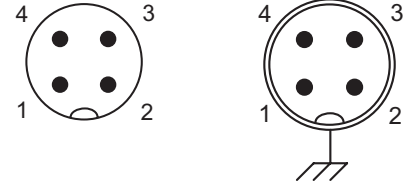
CleverLevel® LBFH is designed for level detection in tanks and dry-run protection of pumps by empty pipe monitoring. It detects liquid, pasty or oily media, but also solid-bulk materials like flour or plastic granulate. The *CleverLevel®* LBFH is capable of media differentiation by distinguishing the specific properties, such as oil, water, foam and liquid. Reliable performance is assured in any mounting position (from top, bottom or side). Depending on the desired process connection, different mounting options are available. Corresponding mounting aids and adaptors for conventional process connections are available as an accessory. Two switching outputs are available with dedicated switching windows.

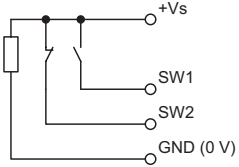
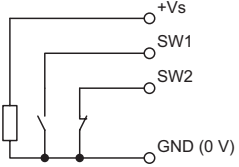
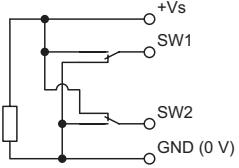
The switching function is programmable as PNP, NPN or digital (push- pull) polarity, as well as the switching logic like Normally Open (NO), Normally Closed (NC) or inverted.

CleverLevel® LBFH in its default configuration covers a major part of potential applications. Where customer-specific configuration is required because of demanding media (e. g. foamy or adhering), qTeach, remote teach or the FlexProgrammer 9701 allows for easy optimization of the switching windows. The measured data can be visualized on a PC for further parameter adjustment, for example time constant of a damping function and inverted switching output logic.

Measuring principle

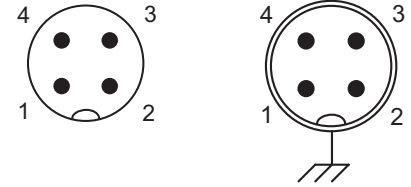
An electrode integrated into the sensor tip forms a capacitor with the environment. The medium determines the capacity value depending on its dielectric constant (DC values). A resonant circuit occurs together with a coil in the sensor electronics. Depending on the resonance frequency measured and the programmable switching window, the switch signal is activated.

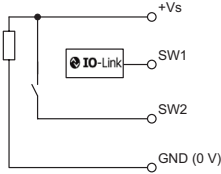
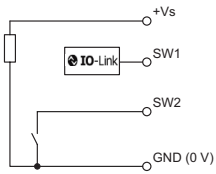
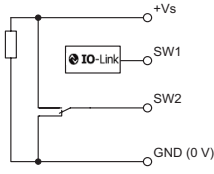
Electrical connection
Pin assignment


Output type	Equivalent circuit	Function	M12-A, 4-Pin, polycarbonat X04-010	M12-A, 4-Pin, stainless steel X04-020
PNP		+Vs	1	1
		SW1	4	4
		SW2	2	2
		GND (0 V)	3	3
		Frame ground	N/A	Plug thread
NPN		+Vs	1	1
		SW1	4	4
		SW2	2	2
		GND (0 V)	3	3
		Frame ground	N/A	Plug thread
Digital (push-pull)		+Vs	1	1
		SW1	4	4
		SW2	2	2
		GND (0 V)	3	3
		Frame ground	N/A	Plug thread

Electrical connection

Pin assignment
















Output type	Equivalent circuit	Function	M12-A, 4-Pin, polycarbonat X04-010	M12-A, 4-Pin, stainless steel X04-020
Programmable output IO-Link PNP		+Vs	1	1
		SW1 (IO-Link)	4	4
		SW2	2	2
		GND (0 V)	3	3
		Frame ground	N/A	Plug thread
Programmable output IO-Link NPN		+Vs	1	1
		SW1 (IO-Link)	4	4
		SW2	2	2
		GND (0 V)	3	3
		Frame ground	N/A	Plug thread
Programmable output IO-Link Digital (push-pull)		+Vs	1	1
		SW1 (IO-Link)	4	4
		SW2	2	2
		GND (0 V)	3	3
		Frame ground	N/A	Plug thread

Ordering information
Ordering key

	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

Accessories

		Hygienic weld-in sleeves for „Process connection“ A030 (G 1/2 A hygienic, BCID: A03)	
		Description	Ordering information
 		Universal use, with leak detection port Ø 30 x 34, AISI 316L (1.4404)	ZPW2-321
		Thin-walled tanks Ø 45 x 34, AISI 316L (1.4404)	ZPW2-322
	Inclined mounting Ø 35 x 34, AISI 316L (1.4404)	ZPW2-324	
	Pipes with collar DN 25 ... 50, Ø 29 x 36.5, AISI 316L (1.4404) DN 65 ... 150, Ø 30 x 36.5, AISI 316L (1.4404)	ZPW2-326 ZPW2-327	
		Hygienic adapters for „Process connection“ A030 (G 1/2 A hygienic, BCID: A03)	
		Beschreibung	Ordering information
 		ISO 2852 (Tri-Clamp) DN 25; 33.7; 38, Ø 50.5, AISI 316L (1.4404) DN 40; 51, Ø 64.0, AISI 316L (1.4404)	ZPH1-3213 ZPH1-3216
		DIN 32676-A (Tri-Clamp) DN 25; 32; 40, Ø 50.5 AISI 316L (1.4404) DN 50; Ø 64.0 AISI 316L (1.4404)	ZPH1-3213 ZPH1-3216
 		DIN 32676-C (Tri-Clamp) DN 1"; 1 1/2", Ø 50.5 AISI 316L (1.4404) DN 2", Ø 64.0 AISI 316L (1.4404)	ZPH1-3213 ZPH1-3216
 		Varivent® DN 25; 1" (Type F), Ø 50, 1.4435 BN2 DN 32 ... 125; 1 1/2" ... 6" (Type N), Ø 68, AISI 316L (1.4404)	ZPH1-344F ZPH1-324E

Accessories
**Hygienic adapters for
„Process connection“
A030 (G 1/2 A hygienic, BCID: A03)**

Description

Ordering information

DIN 11851 (dairy pipe connection)

 DN 25, AISI 316L (1.4404)
 DN 40, AISI 316L (1.4404)
 DN 50, AISI 316L (1.4404)

 ZPH1-3221
 ZPH1-3224
 ZPH1-3225

SMS 1145


DN 51, AISI 316L (1.4404)

ZPH1-3236

**Thread adapters for „Process connection“ A030
(G 1/2 A hygienic, BCID: A03)**

Description

Ordering information

Industry standard

 G 1 A ISO 228-1, AISI 316L (1.4404)
 G 1 1/2 A ISO 228-1, AISI 316L (1.4404)
 G 2 A ISO 228-1, AISI 316L (1.4404)
 1-11 1/2 NPT, AISI 316L (1.4404)

 ZPI1-32B
 ZPI1-32D
 ZPI1-32E
 ZPI1-32G

Vibration fork replacement

 Rd52 (EH FTL EE2), AISI 316L (1.4404)
 G 3/4 A ISO 228-1 (EH FTL GQ2), AISI 316L (1.4404)
 G 3/4 A ISO228-1 (VS Ø 21.3), AISI 316L (1.4404)
 G 1 A ISO 228-1 (EH FTL GW2), AISI 316L (1.4404)
 G 1 A ISO228-1 (VS Ø 21.3), AISI 316L (1.4404)

 ZPH1-32A1
 ZPH1-32BA
 ZPH1-32BC
 ZPH1-32CB
 ZPH1-32CD

Hygienic interfacing


G 1 A hygienic, AISI 316L (1.4404)

ZPH1-32C0

Accessories
Hygienic connectors with stainless steel knurl, protection up to IP69K (M12-A, 4-pin, BCID: X04)

Description

Ordering information


Female connector straight with attached cable

 2 m, TPE
 5 m, TPE
 10 m, TPE
 25 m, TPE

 ESG 34AY0200
 ESG 34AY0500
 ESG 34AY1000
 ESG 34AY2500

Female connector angular with attached cable

 2 m, TPE
 5 m, TPE
 10 m, TPE
 25 m, TPE

 ESW 33AY0200
 ESW 33AY0500
 ESW 33AY1000
 ESW 33AY2500

Industrial connectors, protection up to IP67 (M12-A, 4-pin, BCID: X04)

Description

Ordering information


Female connector straight with attached cable

 2 m, PUR
 5 m, PUR
 10 m, PUR

 ESG 34AH0200
 ESG 34AH0500
 ESG 34AH1000

Female connector angular with attached cable

 2 m, PUR
 5 m, PUR
 10 m, PUR
 15 m, PUR
 20 m, PUR

 ESW 33AH0200
 ESW 33AH0500
 ESW 33AH1000
 ESW 33AH1500
 ESW 33AH2000

Female connector straight with attached cable, shielded

 2 m, PUR
 5 m, PUR
 10 m, PUR

 ESG 34AH0200G
 ESG 34AH0500G
 ESG 34AH1000G

Female connector angular with attached cable, shielded

 2 m, PUR
 5 m, PUR
 10 m, PUR

 ESW 33AH0200G
 ESW 33AH0500G
 ESW 33AH1000G

Accessories
**Industrial connectors, protection up to IP67
(M12-A, 4-pin, BCID: X04)**

Description

Ordering information

Female connector straight with screw terminals

PG7, PBT

ES 18A PG7


Female connector angular with screw terminals

PG7, PBT

ES 14A PG7


Interfaces

Description

Ordering information

FlexProgrammer 9701

Kit for sensor parameterization, including programming interface with USB, connecting cables, carrying strap, CD-ROM with PC software and DTM drivers

9701-0001

