Baumer
Passion for Sensors

Level measurement

CleverLevel® LBFI

Point level detection

Product highlights

- Safe detection of liquids, bulk solids and powders
- Short immersion length
- 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
- Safe process with less downtime
- Visual observation of process
- High acceptance of process connections
- Less disturbance of process

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

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

Compliance and approvals

EMC Immunity	▪ EN 61326
EMC Emission	▪ EN 61326 (installed in a closed metal tank)
Safety	▪ cULus listed, Class 2, E365692
Hygiene	▪ FDA (21 CFR 177.2415)
Explosion protection	▪ IECEx ▪ ATEX

IECEx Ex ia IIC T4 Ga, IECEx Ex ta IIIC T100 °C Da

Maximum values (for barrier selection)	▪ Ui: 30 V DC max. ▪ Ii: 100 mA ▪ Pi: 750 mW
Internal capacitance	▪ Ci: 63 nF
Internal inductance	▪ Li: 617 µH
Temperature class	▪ T1 … T4: -40 < Tamb < 85 °C ▪ T100 °C: -40 < Tamb < 85 °C
Degree of protection for cable	▪ IP67

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

Maximum values (for barrier selection)	▪ Ui: 30 V DC max. ▪ Ii: 100 mA ▪ Pi: 750 mW
Internal capacitance	▪ Ci: 63 nF
Internal inductance	▪ Li: 617 µH
Temperature class	▪ T1 … T4: -40 < Tamb < 85 °C ▪ T100 °C: -40 < Tamb < 85 °C
Degree of protection for cable	▪ IP67

IECEx 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

ATEX II 3G Ex nA IIC T4 Gc

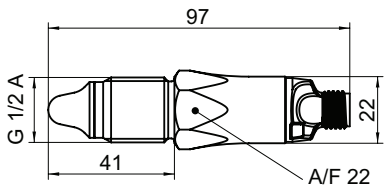
Voltage supply range	▪ Un: 30 V DC max.
Current rating	▪ In: 100 mA
Temperature class	▪ T1 … T4: -40 < Tamb < 85 °C
Degree of protection for cable	▪ IP67

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 ISO 228-1	G07	G070	-40 … 115	-1 … 100	135	-1 … 100
G 1/2 A hygienic	A03	A030	-40 … 115	-1 … 10	135	-1 … 5
1/2-14 NPT	N02	N020	-40 … 115	-1 … 100	135	-1 … 100

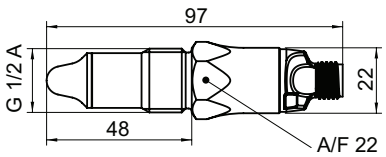
Dimensional drawings

Process connection



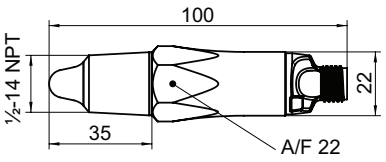
G 1/2 A ISO 228-1

G07-G070



G 1/2 A hygienic

A03-A030



1/2-14 NPT

N02-N020

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.

CleverLevel® LBFI

Point level detection

Field of application

CleverLevel® LBFI 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*® LBFI 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.

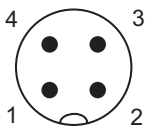
The switching function is programmable as PNP, NPN or digital (push-pull) polarity, as well as the switching logic like Normally Open (NO), Normally Closed (NC) or inverted.
CleverLevel® LBFI in its default configuration covers a major part of potential applications. Where customer-specific configuration is required because of demanding media (e. g. foamy or adhering), qTeach, remote teach, IO-Link or the FlexProgrammer 9701 allows for easy optimation 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.

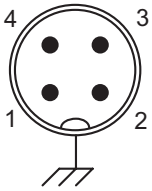
Measuring principle

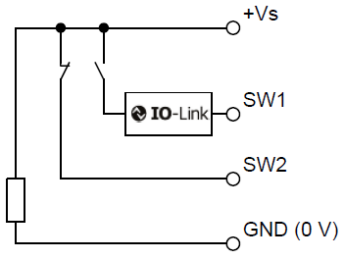
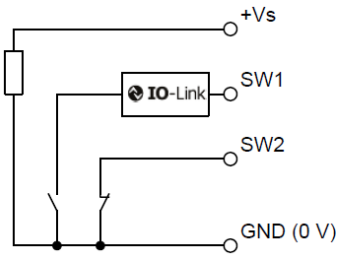
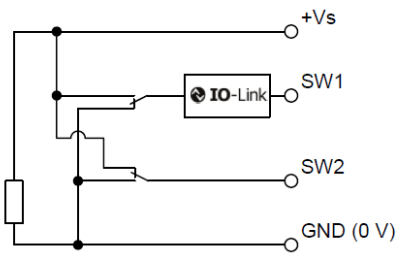
An electrode integrated into the sensor tip forms a capacitor with the environment. The medium determines the capacity value depending on its dielectric c onstant (DC values). A resonant circuit occurs together with a coil in the sensor electronics.
Depending on the resonance frequency measured and the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

Electrical connection

Pin assignment





Output type	Equivalent circuit	Function	M12-A, 4-Pin, polycarbonate 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

		LBFI	-	2	1	.	xxx	.	xxxx	2	0	.	x	.	x	00	0	.	x
Type																			
Level switches		LBFI																	
Version																			
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 ISO 228-1	G07								G070										
G 1/2 A hygienic	A03								A030										
1/2-14 NPT	N02								N020										
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				
IECEx / ATEX nA															3				
IECEx / ATEX ia + ta															4				
Industrial approvals																			
Standard																00			
Special approvals																			
Standard																	0		
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)	ZPW3-321
	**Thin-walled tanks** Ø 45 x 34, AISI 316L (1.4404)	ZPW3-322
	**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)	ZPH3-3213 ZPH3-3216
	**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)	ZPH3-3213 ZPH3-3216
	**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)	ZPH3-3213 ZPH3-3216
	**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)	ZPH3-344F ZPH3-324E

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)	ZPH3-3221
	DN 40, AISI 316L (1.4404)	ZPH3-3224
	DN 50, AISI 316L (1.4404)	ZPH3-3225
	**DIN 11864-1-A**	
	DN 40, AISI 316L (1.4404)	ZPH3-3254
	DN 50, AISI 316L (1.4404)	ZPH3-3255
	**Baumer Hygienic Connection**	
	BHC 3A DN 38, AISI 316L (1.4404)	ZPH1-32D3
	**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)	ZPI1-32B
	G 1 1/2 A ISO 228-1, AISI 316L (1.4404)	ZPI1-32D
	G 2 A ISO 228-1, AISI 316L (1.4404)	ZPI1-32E
	1-11 1/2 NPT, AISI 316L (1.4404)	ZPI1-32G
	**Vibration fork replacement**	
	Rd52 (EH FTL EE2), AISI 316L (1.4404)	ZPH1-32A1
	G 3/4 A ISO 228-1 (EH FTL GQ2), AISI 316L (1.4404)	ZPH1-32BA
	G 3/4 A ISO228-1 (VS Ø 21.3), AISI 316L (1.4404)	ZPH1-32BC
	G 1 A ISO 228-1 (EH FTL GW2), AISI 316L (1.4404)	ZPH1-32CB
	G 1 A ISO228-1 (VS Ø 21.3), AISI 316L (1.4404)	ZPH1-32CD
	**Hygienic interfacing**	
	G 1 A hygienic, AISI 316L (1.4404)	ZPH1-32C0

Industrial weld-in sleeves for „Process connection“ G070 (G 1/2 A ISO 228-1, BCID: G07)

	Description	Ordering information
	**Universal use**	
	Ø 30 x 26, AISI 304 (1.4301)	ZPW1-711
	Ø 30 x 26, AISI 316L (1.4404)	ZPW1-721
	Ø 26.5 x 25, AISI 316L (1.4404)	ZPW1-728

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	ESG 34AY0200
	5 m, TPE	ESG 34AY0500
	10 m, TPE	ESG 34AY1000
	25 m, TPE	ESG 34AY2500
	**Female connector angular with attached cable**	
	2 m, TPE	ESW 33AY0200
	5 m, TPE	ESW 33AY0500
	10 m, TPE	ESW 33AY1000
	25 m, TPE	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	ESG 34AH0200
	5 m, PUR	ESG 34AH0500
	10 m, PUR	ESG 34AH1000
	**Female connector angular with attached cable**	
	2 m, PUR	ESW 33AH0200
	5 m, PUR	ESW 33AH0500
	10 m, PUR	ESW 33AH1000
	15 m, PUR	ESW 33AH1500
	20 m, PUR	ESW 33AH2000
	**Female connector straight with attached cable, shielded**	
	2 m, PUR	ESG 34AH0200G
	5 m, PUR	ESG 34AH0500G
	10 m, PUR	ESG 34AH1000G
	**Female connector angular with attached cable, shielded**	
	2 m, PUR	ESW 33AH0200G
	5 m, PUR	ESW 33AH0500G
	10 m, PUR	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