

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 by remote control wire
- Two switching outputs with dedicated switching windows

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
--------------------	-------------------------------

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)	■ 25 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

Performance characteristics

Repeatability	■ ± 1 mm
Hysteresis	■ ± 1 mm
Response time	■ 0.02 s typ.
Media characteristics	■ DK > 1.5
Damping	■ 0.0 ... 10.0 s (adjustable)

Factory settings

Switching range (dielectric constant DC)	■ < 75 % (DC > 2)
Damping	■ 0.1 s

Compliance and approvals

EMC Immunity	■ EN 61326
EMC Emission	■ EN 61326 (installed in a metal tank)
Hygiene	■ FDA (21 CFR 177.2416)

Note:

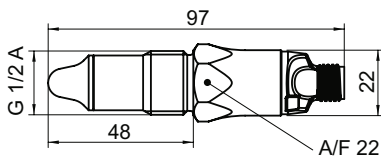
Information on product characteristics may relate to defined product options.

Process conditions

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

Dimensional drawings

Process connection



G 1/2 A hygienic

A03-A030

Note:

Information on product characteristics may relate to defined product options.

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 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

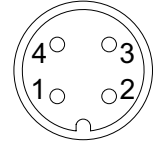
well as the switching logic like Normally Open (NO), Normally Closed (NC) or inverted. *CleverLevel®* LBFH in its default configuration covers a major part of potential applications. Where customer-specific configuration is required because of demanding media (e. g. foamy or adhering), qTeach, remote 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 inside the sensor tip builds a capacitor together with the surroundings. The medium with its dielectric constant (DC value) is defining the capacitance value. A resonance circuit is created in combination with a coil in the sensor head. Switching signal tripping is according to the measured resonance frequency and the programmed trigger thresholds.

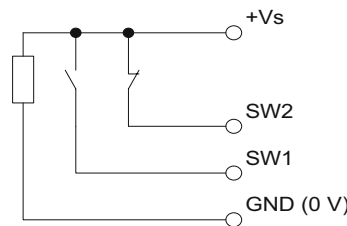
Electrical connection

Pin assignment



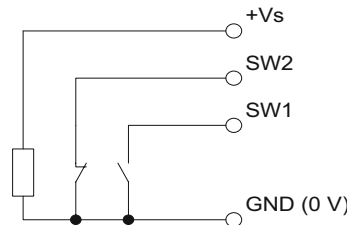
Output type	Equivalent circuit	Function	M12-A, 4-pin, polycarbonate X04-000
-------------	--------------------	----------	-------------------------------------

PNP



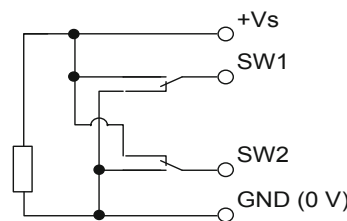
+Vs	+Vs	1
SW2	SW1	4
SW1	SW2	2
GND (0 V)	GND (0 V)	3
	Frame ground	

NPN



+Vs	+Vs	1
SW2	SW1	4
SW1	SW2	2
GND (0 V)	GND (0 V)	3
	Frame ground	

Digital push-pull















+Vs	+Vs	1
SW1	SW1	4
SW2	SW2	2
GND (0 V)	GND (0 V)	3
	Frame ground	

Ordering information

	L	B	F	H	-	x	x	.	xxx	.	xxxx	x	x	.	x	.	x	xx	x	.	x	
Type																						
Level switches	L	B	F	H																		
Version																						
Standard									1													
Housing																						
Standard									1													
Electrical connection																						
Connector M12-A, 4-pin, polycarbonate (with LED)									(BCID)													
									X04													010
Process connection																						
G 1/2 A hygienic									(BCID)													
									A03													A030
Wetted parts material																						
AISI 316L (1.4404)																						2
Gasket																						
Without																						0
Output type																						
PNP																						1
NPN																						2
Explosion protection																						
Without																						0
Industrial approvals																						
Standard																						00
Special approvals																						
3-A (74-06), 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
		Geneigte Montage Ø 35 x 34, AISI 316L (1.4404)	ZPW2-324
		Inclined mounting 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 (G 1/2 A hygienic, BCID: A03)	
		Beschreibung	Ordering information
 		ISO 2852 (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 (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, AISI 316L (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
(G 1/2 A hygienic, BCID: A03)**

Description

Ordering information

DIN 11851 (tapered union)

 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)

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

Vibration fork replacement

 G 3/4 A EH FTL (GW2), AISI 316L (1.4404)
 G 1 A EH FTL (GQ2), AISI 316L (1.4404)
 G 3/4 A VS, AISI 316L (1.4404)
 G 1 A VS, AISI 316L (1.4404)

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

Hygienic interfacing


G 1 A hygienegerecht, AISI 316L (1.4404)

ZPH1-32C0

**Connectors with stainless steel knurl for
demanding applications, 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

Accessories
**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

Female connector straight with screw terminals

Female connector M12, 4-pol., straight

ES 18A PG7


Female connector angular with screw terminals

Female connector M12, 4-pol., angular

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