

LBF1

Explosion-proof point level detection for industrial applications

LBF1-21.###.####20.#.###0.0

Overview

- Optionally with adaptive trigger
- ATEX and IECEx certified for dust and gas
- Compact and robust stainless steel housing
- Problem solver for adhesions
- Two adjustable switching outputs
- 360° visible multicolor LED
- IO-Link interface



Technical data

Performance characteristics

Measuring principle	CleverLevel level switches (Frequency Sweep)
Hysteresis	± 1 mm
Media characteristics	DC > 1.5
Step response time	0.04 s , typ.
Trigger modes	Window trigger Adaptive trigger
Damping	0 ... 10 s , adjustable
Repeatability	± 1 mm

Process conditions

Process temperature	Refer to section "Operating conditions"
Process pressure	Refer to section "Operating conditions"

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

Ambient conditions

Operating temperature range	-40 ... 85 °C
Storage temperature range	-40 ... 85 °C
Degree of protection (EN 60529)	M12-A connector, polycarbonate and stainless steel: IP67 , with appropriate cable IP69K , with appropriate cable KingCrown M12-A connector (proTect+): IP68 , with appropriate cable IP69K , with appropriate cable
Humidity	< 98 % RH , condensing

Ambient conditions

Vibration (sinusoidal) (EN 60068-2-6)	1.6 mm p-p (2 ... 25 Hz), 4 g (25 ... 100 Hz), 1 octave / min.
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Output signal

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

Housing

Style	Compact transmitter
Overall size	Refer to section "Dimensional drawings"
Material	Stainless steel

Electrical connection

Connector	M12-A, 4-pin, polycarbonate M12-A, 4-pin, stainless steel
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Power supply

Voltage supply range	8 ... 36 V DC
Current consumption (no load)	25 mA , typ. 40 mA , max.
Power-up time	< 3 s
Reverse polarity protection	Yes

Factory settings

QTeach	Activated
Switching logic SW1	Normally open (NO)

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Factory settings

Switching logic SW2	Normally closed (NC)
Switching range (dielectric constant DC)	< 75 %, DC > 2
Range hysteresis	2.4 %
Damping	0.1 s

Factory settings – Adaptive trigger

Switching logic	Normally open (NO)
Advanced setup	Disabled
Set point high	100 %
Damping	0 ms
Trigger distance	3.0 %
Startup Level	0.0 %
Steady detection	Active

IECEX / ATEX II 1D Ex - ta IIIC T100 °C Da

Voltage supply range, Un	30 V DC , max.
Current rating, In	100 mA
Degree of protection for cable accessories	IP 67
Temperature class T100 °C	-40 < Tamb < 85 °C

IECEX / ATEX II 1G - Ex ia IIC T4 Ga

Maximum values for barrier selection, Ui	30 V DC , max.
Maximum values for barrier selection, li	100 mA

IECEX / ATEX II 1G - Ex ia IIC T4 Ga

Maximum values for barrier selection, Pi	750 mW
Internal capacitance, Ci	63 nF
Internal inductance, Li	617 µH
Temperature class, T1 ... T4	-40 < Tamb < 85 °C

IECEX / ATEX II 3G - Ex ec IIC T4 Gc

Voltage supply range, Un	30 V DC , max.
Current rating, In	100 mA
Degree of protection for cable accessories	IP 67
Temperature class T1 ... T4	-40 < Tamb < 85 °C

Compliance and approvals

EMC Emission	EN 61326, installed in a closed metal tank
EMC Immunity	EN 61326, installed in a closed metal tank
Hygiene	FDA (21 CFR 177.2415)
Safety	cULus listed, E365692 WHG (overflow, leakage)
Explosion protection	IECEX / ATEX II 1D Ex - ta IIIC T100 °C Da IECEX / ATEX II 1G - Ex ia IIC T4 Ga IECEX / ATEX II 3G - Ex ec IIC T4 Gc
Pharma	USP Class VI (PEEK material)

Operating conditions

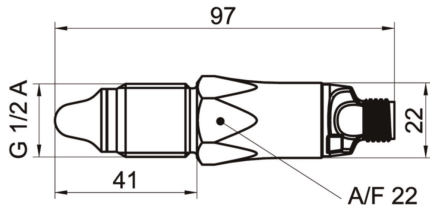
Ordering key	Process connection	BCID	Continuous		Temporary (t < 1 h)	
			Process temperature @ Tamb < 50 °C	Process pressure	Process temperature max. @ Tamb < 50 °C	Process pressure @ Process temperature max.
			(° C)	(bar)	(° C)	(bar)
G070	G 1/2 A ISO 228-1 BSC	G07	-40 ... 115	-1 ... 100	135	-1 ... 100
N020	1/2-14 NPT	N02	-40 ... 115	-1 ... 100	135	-1 ... 100
T110	G 3/4 A ISO 228-1 for reverse assembly (in-shell thread)	T11	-40 ... 85	-1 ... 100	N/A	N/A
A030	G 1/2 A hygienic	A03	-40 ... 115	-1 ... 10	135	-1 ... 5
A031	G 1/2 A hygienic, length 82 mm	A03	-40 ... 115	-1 ... 100	135	-1 ... 100

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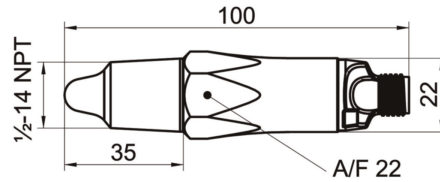
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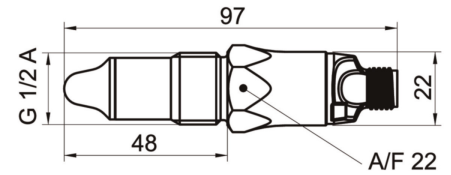
Dimensional drawings (mm)



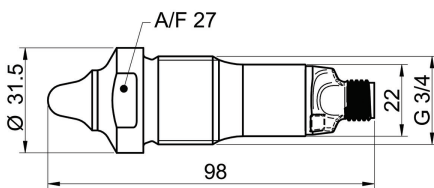
G 1/2 A ISO 228-1 BSC (BCID: G07)



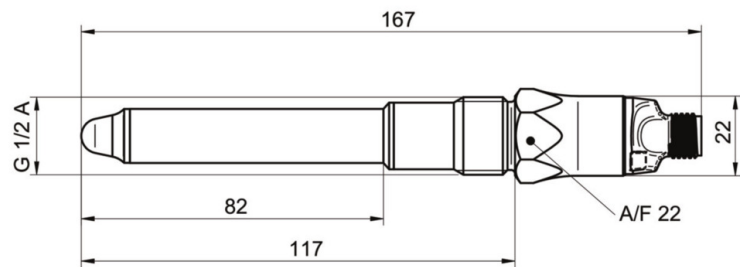
1/2-14 NPT (BCID: N02)



G 1/2 A hygienic (BCID: A03)

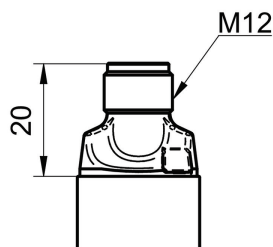


G 3/4 A ISO 228-1 for reverse assembly (in-shell thread) (BCID: T11)

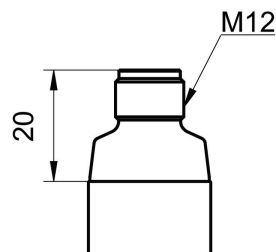


G 1/2 A hygienic, 82 mm length (BCID: A03)

Housing



Connector M12-A, 4-pin, polycarbonate (with LED)



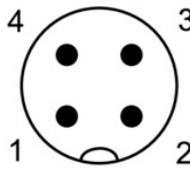
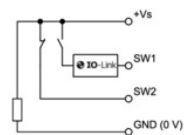
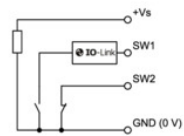
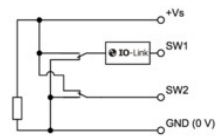
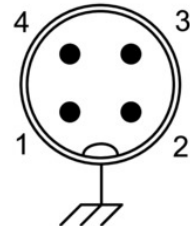
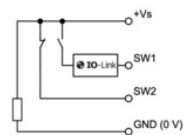
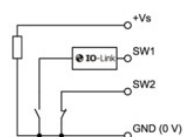
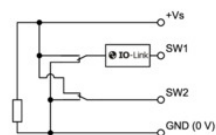
Connector M12-A, 4-pin, stainless steel (without LED)

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Electrical connection

Output type	Electrical connection	Equivalent circuit	Function	Pin assignment									
Programmable output IO-Link PNP			<table><tr><td>+Vs</td><td>1</td></tr><tr><td>SW1 (IO-Link)</td><td>4</td></tr><tr><td>SW2</td><td>2</td></tr><tr><td>GND (0 V)</td><td>3</td></tr></table>	+Vs	1	SW1 (IO-Link)	4	SW2	2	GND (0 V)	3		
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Ordering information

Ordering key - Configuration possibilities see website

	LBF1	-	2	1	.	###	.	####	2	0	.	#	.	#	##	0	.	#
Product	Level switches	LBF1																
Version	Programmable output, IO-Link		2															
Housing	AISI 316L (1.4404)			1														
Electrical connection	M12-A, 4-pin, polycarbonate (with LED)					010												
	M12-A, 4-pin, stainless steel (without LED)					020												
Process connection	G 1/2 A ISO 228-1 (G07)							G070										
	1/2-14 NPT (N02)							N020										
	G 1/2 A hygienic (A03)							A030										
	G 1/2 A hygienic, length 82 mm (A03)							A031										
	G 3/4 A ISO 228-1 for reverse assembly (in-shell thread) (T11) ⁽¹⁾							T110										
Process connection material	AISI 316L (1.4404)							2										
Gasket	Without							0										
Output type	PNP											1						
	NPN											2						
	Digital (push-pull)											3						
Explosion protection	Without														0			
	ATEX ec														3			
	IECEX / ATEX ia + ta														4			
Industrial approvals	Standard															00		
	WHG															11		
Special approvals	Standard																0	
Configuration	Factory settings																	0
	Customer-specific																	1

Remarks orderkey /9271: Upgrade to adaptive trigger