

## LBF1

Explosion-proof point level detection for industrial applications

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

### Overview

- Optionally with adaptive trigger
- ATEX, IECEx and CCC 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.
---------------------------------------	--

#### 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
-----------	--

#### 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)

## LBF1

Explosion-proof point level detection for industrial applications

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

### Technical data

#### 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 / CCC - Ex tD A20 IP67 T100°

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 / CCC - Ex ia IIC T4 Ga

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

#### IECEX / ATEX II 1G / CCC - 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 / CCC - Ex nA 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 (overfill, leakage)
Explosion protection	IECEX / ATEX II 1D Ex - ta IIIC T100 °C Da / CCC - Ex tD A20 IP67 T100°C IECEX / ATEX II 1G / CCC - Ex ia IIC T4 Ga IECEX / ATEX II 3G - Ex ec IIC T4 Gc / CCC - Ex nA IIC T4 Gc
Pharma	USP Class VI (PEEK material)

### Operating conditions

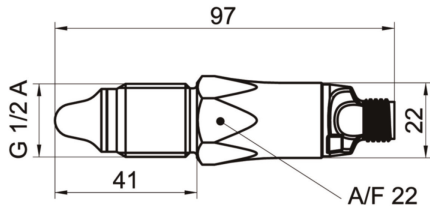
Ordering key	Process connection	BCID	Continuous		Temporary (t < 1 h)	
			Process temperature @ Tamb < 50 °C	Process pressure	Process temperature max. @ Tamb < 50 °C	Process pressure @ Process temperature max.
			(° C)	(bar)	(° C)	(bar)
G070	G 1/2 A ISO 228-1 BSC	G07	-40 ... 115	-1 ... 100	135	-1 ... 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

## LBFi

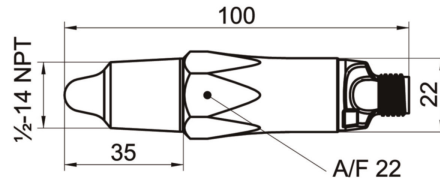
Explosion-proof point level detection for industrial applications

LBFi-21.###.####20.#.###0.0

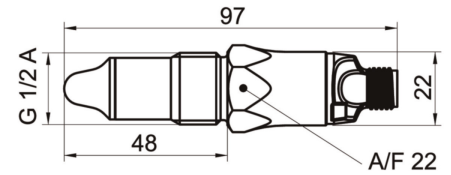
### Dimensional drawings (mm)



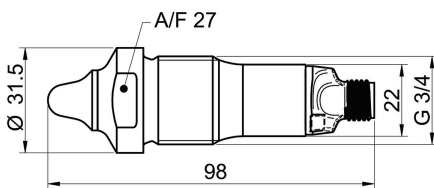
G 1/2 A ISO 228-1 BSC (BCID: G07)



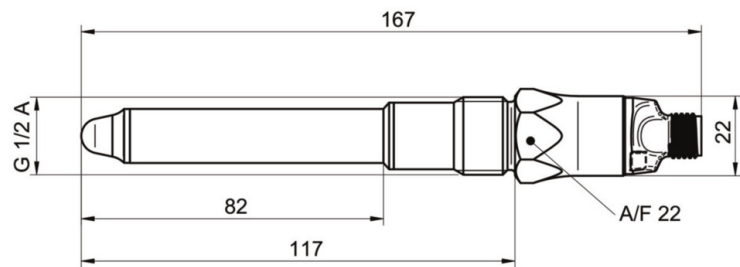
1/2-14 NPT (BCID: N02)



G 1/2 A hygienic (BCID: A03)

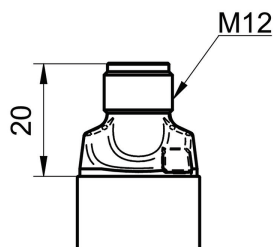


G 3/4 A ISO 228-1 for reverse assembly (in-shell thread) (BCID: T11)

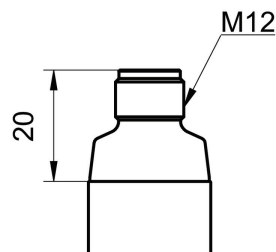


G 1/2 A hygienic, 82 mm length (BCID: A03)

### Housing



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



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

## LBF1

Explosion-proof point level detection for industrial applications

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

### 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		
+Vs		1											
SW1 (IO-Link)		4											
SW2	2												
GND (0 V)	3												
Programmable output IO-Link NPN		<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			
+Vs	1												
SW1 (IO-Link)	4												
SW2	2												
GND (0 V)	3												
Programmable output IO-Link Digital (push-pull)		<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			
+Vs	1												
SW1 (IO-Link)	4												
SW2	2												
GND (0 V)	3												
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><tr><td>Frame Ground</td><td>Plug thread</td></tr></table>	+Vs	1	SW1 (IO-Link)	4	SW2	2	GND (0 V)	3	Frame Ground	Plug thread
+Vs		1											
SW1 (IO-Link)		4											
SW2	2												
GND (0 V)	3												
Frame Ground	Plug thread												
Programmable output IO-Link NPN		<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><tr><td>Frame Ground</td><td>Plug thread</td></tr></table>	+Vs	1	SW1 (IO-Link)	4	SW2	2	GND (0 V)	3	Frame Ground	Plug thread	
+Vs	1												
SW1 (IO-Link)	4												
SW2	2												
GND (0 V)	3												
Frame Ground	Plug thread												
Programmable output IO-Link Digital (push-pull)		<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><tr><td>Frame Ground</td><td>Plug thread</td></tr></table>	+Vs	1	SW1 (IO-Link)	4	SW2	2	GND (0 V)	3	Frame Ground	Plug thread	
+Vs	1												
SW1 (IO-Link)	4												
SW2	2												
GND (0 V)	3												
Frame Ground	Plug thread												

## LBFi

Explosion-proof point level detection for industrial applications

LBFi-21.###.####20.#.###0.0

### Ordering information

Ordering key - Configuration possibilities see website

	LBFi	-	2	1	.	###	.	####	2	0	.	#	.	#	##	0	.	#
<b>Product</b>	Level switches	LBFi																
<b>Version</b>	Programmable output, IO-Link			2														
<b>Housing</b>	AISI 316L (1.4404)			1														
<b>Electrical connection</b>	M12-A, 4-pin, polycarbonate (with LED)					010												
	M12-A, 4-pin, stainless steel (without LED)					020												
<b>Process connection</b>	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) <sup>(1)</sup>							T110										
<b>Process connection material</b>	AISI 316L (1.4404)							2										
<b>Gasket</b>	Without							0										
<b>Output type</b>	PNP											1						
	NPN											2						
	Digital (push-pull)											3						
<b>Explosion protection</b>	Without														0			
	ATEX ec														3			
	IECEX / ATEX ia + ta														4			
<b>Industrial approvals</b>	Standard															00		
	WHG															11		
<b>Special approvals</b>	Standard																0	
<b>Configuration</b>	Factory settings																	0
	Customer-specific																	1

Remarks orderkey      /9271: Upgrade to adaptive trigger  
                                  /9306: CCC ia + tD  
                                  /9309: CCC nA