

## LBFS

Point level detection based on frequency sweep technology

LBFS-#####.0

### Overview

- Reliable in diverse media
- Wide variety of process connections
- For hygienic and industrial applications
- With marine, WHG and cULus approval
- Optionally available with Ex certification
- Process temperatures up to 150 °C



Picture similar



EN 50155



### Technical data

#### Performance characteristics

Measuring principle	CleverLevel level switches (Frequency Sweep)
Hysteresis	± 1 mm
Media characteristics	DC > 1.5
Step response time	0.1 s, typ. 0.2 s, max.
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) AISI 304 (1.4301), optional

Surface roughness wetted parts	Ra ≤ 0.8 µm
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#### Ambient conditions

Operating temperature range	-40 ... 85 °C
	-25 ... 70 °C, with cable outlet
	-5 ... 70 °C, when cable is moved
Storage temperature range	-40 ... 85 °C
	-25 ... 70 °C, with cable outlet
Degree of protection (EN 60529)	IP67, with appropriate cable IP69K, with appropriate cable
Humidity	< 98 % RH, condensing
Cable bending radius	r ≥ 10 mm

#### Ambient conditions

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

Output type	PNP NPN
Switching logic	Normally closed (NC) Normally open (NO)
Voltage drop	PNP: (+Vs -1.5 V) ± 0.5 V, Rload = 10 kΩ NPN: (+1.5 V) ± 0.5 V, Rload = 10 kΩ
Current rating	20 mA, max.
Off leak current	< 100 µA, max.
Status indication	Status indication by bright, blue LED
Short circuit protection	Yes

#### 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
Cable	5 m, 4-wire, PVC

#### Power supply

Voltage supply range	12 ... 30 V DC
Current consumption (no load)	25 mA, typ. 50 mA, max.
Power-up time	< 2 s
Reverse polarity protection	Yes

#### Factory settings

Switching range (dielectric constant DC)	< 75.3 %, DC > 2
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## Technical data

### Factory settings

Range hysteresis	2.4 %
Damping	0.1 s

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

Voltage supply range, Un	30 V DC , max.
Maximum values for barrier selection, Ui	100 mA
Degree of protection for cable accessories	IP 67
Temperature class T100 °C	-40 < Tamb < 85 °C -25 < Tamb < 70 °C , with cable sensor

### IECEX / CCC / ATEX II 1G - Ex ia IIC T5...T4 Ga

Maximum values for barrier selection, Ui	30 V DC
Maximum values for barrier selection, Ii	100 mA
Maximum values for barrier selection, Pi	750 mW
Internal capacitance, Ci	43 nF For versions with cable outlet add 0.17 nF/meter for cable lengths above 5 meters
Internal inductance, Li	10 µH For versions with cable outlet add 0.27 µH/meter for cable lengths above 5 meters
Recommended barrier for output type PNP	PROFSI3-B25100-ALG-LS
Temperature class, T1 ... T4	-40 < Tamb < 85 °C
Temperature class, T1 ... T5	-40 < Tamb < 74 °C -25 < Tamb < 70 °C , with cable sensor

### IECEX / CCC / ATEX II 3D Ex ec IIC T5...T4

Voltage supply range, Un	30 V DC , max.
Current rating, In	100 mA , max.
Degree of protection for cable accessories	IP 67
Temperature class, T1 ... T4	-40 < Tamb < 85 °C
Temperature class, T1 ... T5	-40 < Tamb < 74 °C -25 < Tamb < 70 °C , with cable sensor

### Compliance and approvals

EMC Emission	EN 61326, installed in a closed metal tank
EMC Immunity	EN 61326, installed in a closed metal tank
Hygiene	Refer to section "Compliance and approvals"
Railway applications	EN 50155
Safety	cULus listed, E365692 WHG (overflow, leakage)
Marine	Refer to section "Compliance and approvals"
Explosion protection	IECEX / CCC / ATEX II 1D - Ex ta IIIC T100 °C Da IECEX / CCC / ATEX II 1G - Ex ia IIC T5...T4 Ga IECEX / CCC / ATEX II 3G - Ex ec IIC T5...T4
Pharma	Refer to section "Compliance and approvals"

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## 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)
LBFS-##1###.#	G 1/2 A ISO 228-1 BSC	G07	-40 ... 115	-1 ... 100	135	-1 ... 100
LBFS-##2###.#	G 3/4 A ISO 228-1	G10	-40 ... 115	-1 ... 100	135	-1 ... 100
LBFS-##3###.#	G 1 A ISO 228-1	G11	-40 ... 115	-1 ... 100	135	-1 ... 100
LBFS-##4###.#	G 1/2 A hygienic	A03	-40 ... 115	-1 ... 10	135	-1 ... 5
LBFS-##5###.#	G 1/2 A ISO 228-1 for reverse assembly (in-shell thread)	T10	-40 ... 85	-1 ... 100	N/A	N/A
LBFS-##6###.#	3/4-14 NPT	N03	-40 ... 115	-1 ... 100	135	-1 ... 100
LBFS-##7###.#	M18 × 1 ISO 261 / ISO 965	M11	-40 ... 115	N/A	N/A	N/A
LBFS-##A###.#	G 1/2 A DIN 3852-E, NBR gasket	G51	-40 ... 115	-1 ... 100	135	-1 ... 100
LBFS-##B###.#	G 1/2 A DIN 3852-E, FKM gasket	G51	-40 ... 115	-1 ... 100	135	-1 ... 100
LBFS-##E###.#	G 1/2 A DIN 3852-E, FKM gasket, with cooling neck	G51	-40 ... 150	-1 ... 100	N/A	N/A
LBFS-##G###.#	G 1/2 A ISO 228-1 BSC, with cooling neck, not applicable for mounting with ZPW1-7x1	G07	-40 ... 150	-1 ... 100	N/A	N/A
LBFS-##J###.#	G 1/2 a hygienic gasket, with cooling neck	A03	0 ... 150	-1 ... 10	N/A	N/A
LBFS-##K###.#	G 1/2 A hygienic, length 82 mm	A03	-40 ... 115	-1 ... 100	135	-1 ... 100
LBFS-##L###.#	G 1/2 A hygienic, sliding connection, length 250 mm	A03	-40 ... 150	-1 ... 5	N/A	N/A
LBFS-##M###.#	1/2-14 NPT, with cooling neck	N02	-40 ... 150	-1 ... 100	N/A	N/A
LBFS-##N###.#	1/2-14 NPT	N02	-40 ... 115	-1 ... 100	135	-1 ... 100
LBFS-##S###.#	G 1/2 A hygienic gasket, VMQ70, with cooling neck	A03	-10 ... 150	-1 ... 10	N/A	N/A

For further information on permissible process and ambient temperatures, please refer to the operating instructions.

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## Compliance and approvals

Ordering key	Process connection	BCID	EN 1935/2004 EN 10/2011 EN 2023/2006	FDA	3-A	EHEDG EL-Class I	USP Class VI	DNV GL	Lloyd's Register	CCS	WHG (overfill, leakage)
LBFS-##1###.#	G 1/2 A ISO 228-1 BSC	G07					■	■	■	■	■
LBFS-##2###.#	G 3/4 A ISO 228-1	G10					■	■	■	■	■
LBFS-##3###.#	G 1 A ISO 228-1	G11					■	■	■	■	■
LBFS-##4###.#	G 1/2 A hygienic	A03	■	■	■	■	■	■	■	■	■
LBFS-##5###.#	G 1/2 A ISO 228-1 for reverse assembly (in-shell thread)	T10					■	■	■	■	■
LBFS-##6###.#	3/4-14 NPT	N03					■	■	■	■	■
LBFS-##7###.#	M18 × 1 ISO 261 / ISO 965	M11					■	■	■	■	■
LBFS-##A###.#	G 1/2 A DIN 3852-E, NBR gasket	G51					■	■	■	■	■
LBFS-##B###.#	G 1/2 A DIN 3852-E, FKM gasket	G51					■	■	■	■	■
LBFS-##E###.#	G 1/2 A DIN 3852-E, FKM gasket, with cooling neck	G51					■			■	■
LBFS-##G###.#	G 1/2 A ISO 228-1 BSC, with cooling neck	G07					■			■	■
LBFS-##J###.#	G 1/2 A hygienic gasket, with cooling neck	A03	■	■	■					■	
LBFS-##K###.#	G 1/2 A hygienic, length 82 mm	A03	■	■						■	■
LBFS-##L###.#	G 1/2 A hygienic, sliding connection, length 250 mm	A03	■	■		■				■	■
LBFS-##M###.#	1/2-14 NPT, with cooling neck	N02								■	■
LBFS-##N###.#	1/2-14 NPT	N02						■	■	■	■
LBFS-##S###.#	G 1/2 A hygienic gasket, VMQ70, with cooling neck	A03	■	■	■	■				■	

Information on product characteristics may relate to defined product options.

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.

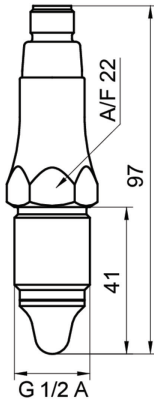
The EHEDG certification is only valid in combination with appropriate mounting accessories. Those are marked with the "EHEDG Certified" logo.

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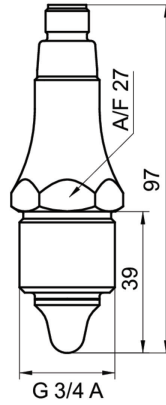
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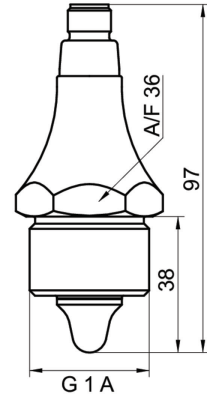
## Dimensional drawings (mm)



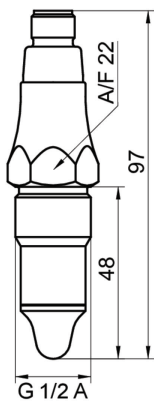
G 1/2 A ISO 228-1 BSC (BCID: G07)



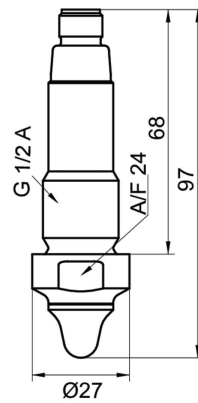
G 3/4 A ISO 228-1 (BCID: G10)



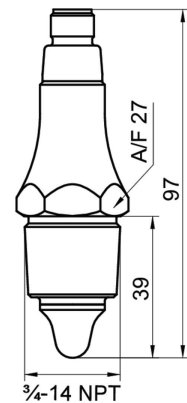
G 1 A ISO 228-1 (BCID: G11)



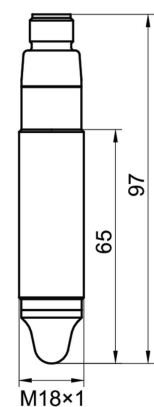
G 1/2 A hygienic (BCID: A03)



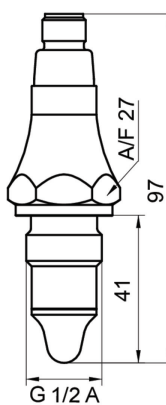
G 1/2 A ISO 228-1 for reverse assembly (in-shell thread) (BCID: T10)



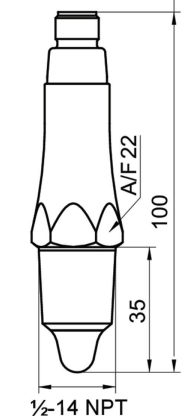
3/4-14 NPT (BCID: N03)



M18 x 1 ISO 261 / ISO 965 (BCID: M11)



G 1/2 A DIN 3852-E (BCID: G51)



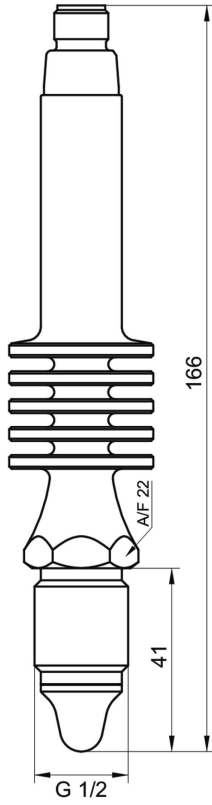
1/2-14 NPT (BCID: N02)

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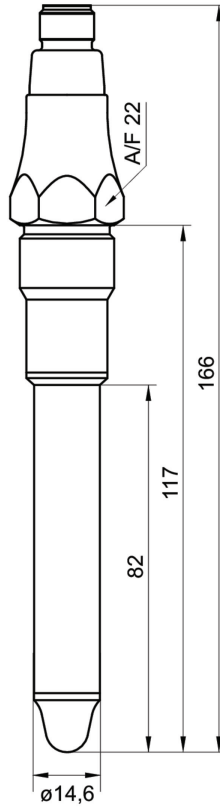
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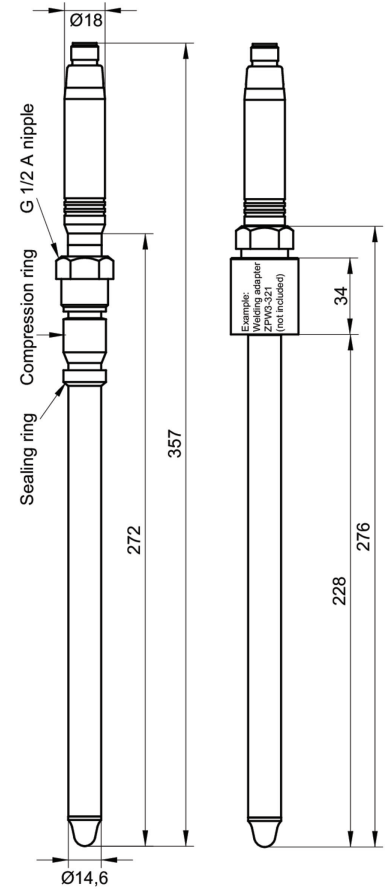
## Dimensional drawings (mm)



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



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



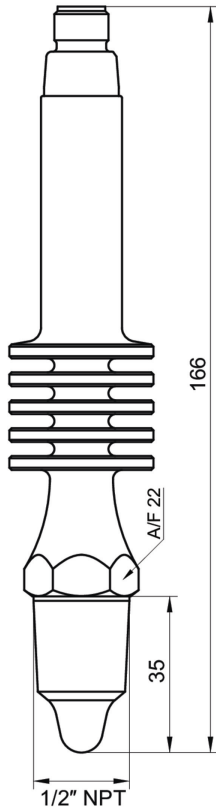
G 1/2 A hygienic, sliding connection, 250 mm length, including compression ring kit ZPX1-006 (BCID: A03)

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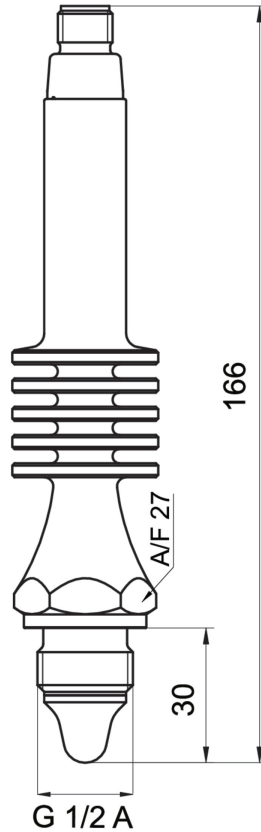
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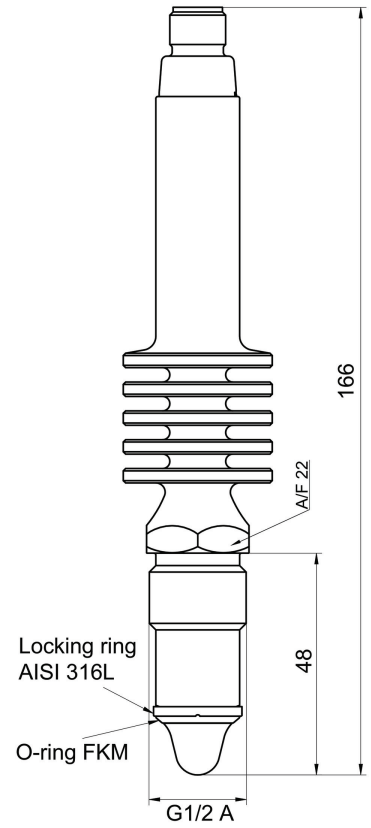
## Dimensional drawings (mm)



1/2-14 NPT with cooling neck (BCID: N02)

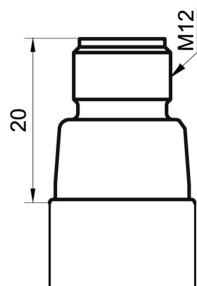


G 1/2 A DIN 3852-E with cooling neck (BCID: G51)

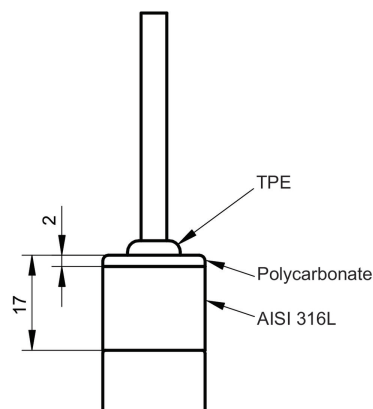


G 1/2 A hygienic, high temperature, with cooling neck (BCID: A03)

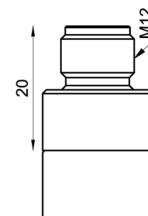
## Housing



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



Cable outlet, 4-wire, 5 m length



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

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## Electrical connection

Output type	Electrical connection	Equivalent circuit	Function	Pin assignment
PNP			+Vs	1
			SW1, Normally open (NO)	4
			SW1, Normally closed (NC)	2
			GND (0 V)	3
			+Vs	BN
			SW1, Normally open (NO)	BK
SW1, Normally closed (NC)	WH			
GND (0 V)	BU			
NPN			+Vs	1
			SW1, Normally open (NO)	4
			SW1, Normally closed (NC)	2
			GND (0 V)	3
			+Vs	BN
			SW1, Normally open (NO)	BK
SW1, Normally closed (NC)	WH			
GND (0 V)	BU			

## Ordering information

Ordering key - Configuration possibilities see website

	LBFS	-	#	#	#	#	#	.	#
<b>Product</b>	LBFS								
Level switches									
<b>Compliance and approvals</b>									
Standard			0						
IECEX / ATEX II 1G - Ex ia IIC T5...T4 Ga			1						
IECEX / ATEX II 1D - Ex ta IIIC T100 °C Da			2						
IECEX / CCC / ATEX II 3G - Ex ec IIC T5...T4			3						
IECEX / CCC / ATEX II 1G - Ex ia IIC T5...T4 Ga & IECEX / CCC / ATEX II 1D - Ex ta IIIC T100 °C Da			4						
cUL listed, E365692			A						
<b>Electrical Connection</b>									
M12-A, 4-pin, polycarbonate (with LED)			1						
Cable outlet 5 m, 4-wire, PVC			2						
M12-A, 4-pin, stainless steel (without LED)			3						



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## Ordering information

**Ordering key - Configuration possibilities see website**

	LBFS	-	#	#	#	#	#	.	#
<b>Process Connection</b>									
G 1/2 A ISO 228-1 (G07)									1
G 3/4 A ISO 228-1 (G10)									2
G 1 A ISO 228-1 (G11)									3
G 1/2 A hygienic (A03)									4
G 1/2 A ISO 228-1 for reverse assembly (in-shell thread) (T10)									5
3/4-14 NPT (N03)									6
M18x1 (M11)									7
G 1/2 A DIN 3852 form E, NBR gasket (G51)									A
G 1/2 A DIN 3852 form E, FKM gasket (G51)									B
G 1/2 A ISO 228-1 with cooling neck (G07)									G
G 1/2 A hygienic gasket, FKM, with cooling neck (A03)									J
G 1/2 A hygienic, length 82 mm (A03)									K
G 1/2 A hygienic, sliding connection, length 250 mm (A03)									L
1/2-14 NPT (N02)									N
1/2-14 NPT with cooling neck (N02)									M
G 1/2 A DIN 3852 form E, FKM gasket, with cooling neck (G51)									E
G 1/2 A hygienic gasket, VMQ70, with cooling neck (A03)									S
<b>Process connection material</b>									
Stainless Steel 1.4301 - AISI 304									1
Stainless Steel 1.4404 - AISI 316L									2
<b>Output Configuration</b>									
PNP output									1
NPN output									2
<b>Configuration</b>									
Factory settings									0
Customer-specific									C

(1) Process connection "5": Including gasket ZPX3-14B0 (glass/aramide fiber with NBR)

(2) Process connection "7": Including the two M18 nut