LBFS

Point level detection based on frequency sweep technology

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Overview

- Reliable in diverse media
- Wide variety of process connections
- For hygienic and industrial applications
- With marine, ATEX, WHG and cULus approval
- Process temperatures up to 200 °C

EN 50155

Technical data

Performance characteristics	
Measuring principle	CleverLevel level switches (Frequency Sweep)
Media characteristics	DC > 1.5
Hysteresis	± 1 mm
Repeatability	± 1 mm
Response time	0.1 s , typ. 0.2 s , max.
Damping	0… 10 s , adjustable
Process conditions	
Process pressure	Refer to section "Operating conditions"
Process temperature	Refer to section "Operating conditions"
Process connection	
Mounting position	Any, top, bottom, side
Connection variants	Refer to section "Dimensional drawings"
Wetted parts material	PEEK Natura AISI 316L (1.4404) AISI 304 (1.4301), optional
Surface roughness wetted parts	Ra ≤ 0.8 µm
Ambient conditions	
Cable bending radius	r ≥ 10 mm
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
Degree of protection (EN 60529)	IP 67 IP 69K , with appropriate cable
Humidity	< 98 % RH , condensing
Operating temperature range	-40 … 85 °C -25 … 85 °C , with cable outlet -5 … 85 °C , when cable is moved
Storage temperature range	-40 … 85 °C -25 … 85 °C , with cable outlet

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	
Overall size	Refer to section "Dimensional drawings"
Style	Compact transmitter
Material	Stainless steel
Electrical connection	
Cable	5 m, 4-wire, PVC
Cable bending radius	r ≥ 10 mm
Connector	M12-A, 4-pin, polycarbonate M12-A, 4-pin, stainless steel
Power supply	
Current consumption (no load)	25 mA , typ. 50 mA , max.
Reverse polarity protection	Yes
Power-up time	< 2 s
Voltage supply range	12 … 30 V DC
Factory settings	
Switching range (dielectric constant DC)	< 75 % °C , DC > 2
Damping	0.1 s
ATEX II 1D Ex ta IIIC T100 °C Da	
Voltage supply range, Un	30 V DC , max.

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ATEX II 1D Ex ta IIIC T100 °C Da	
Current rating, In	20 mA , max.
Degree of protection for cable accessories	IP 67
Temperature class T100 °C	-40 < Tamb < 85 °C -25 < Tamb < 70 °C , with cable outlet
ATEX II 1G Ex ia IIC T4/T5	
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 outlet

ATEX II 3G Ex nA II T4/T5	
Voltage supply range, Un	30 V DC , max.
Current rating, In	20 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 outlet
Compliance and approvals	
EMC Emission	EN 61326, installed in a closed metal tank
EMC Immunity	EN 61326, installed in a closed metal tank
Explosion protection	ATEX II 1D Ex ta IIIC T100 °C Da ATEX II 1G Ex ia IIC T4/T5 ATEX II 3G Ex nA IIC T4/T5
Hygiene	Refer to section "Compliance and approvals"
Marine	Refer to section "Compliance and approvals"
Railway applications	EN 50155
Safety	cULus listed, E365692
WHG (overfill, leakage)	Refer to section "Compliance and approvals"
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	135	-1 … 100
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 (Viton®) gasket	G51	-40 … 115	-1 … 100	135	-1 … 100
LBFS-##E##.#	G 1/2 A DIN 3852-E, FKM (Viton®) 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-##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 … 200	-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

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

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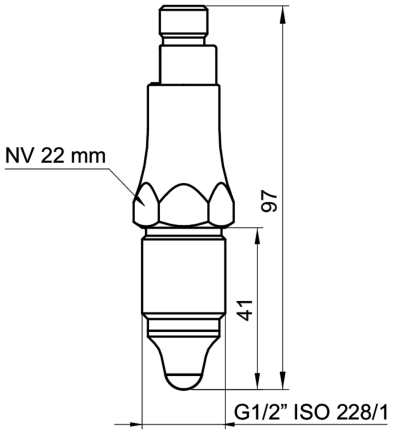
Compliance and approvals

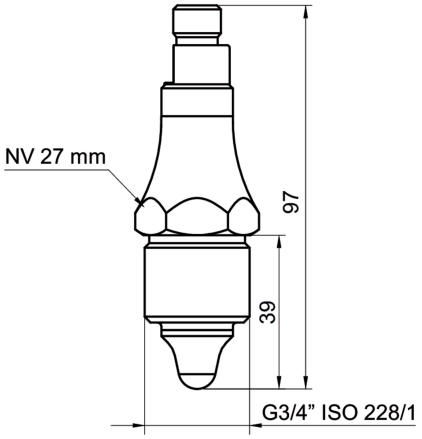
Ordering key	Process connection	BCID	EN 1935/2004 EN 10/2011 EN 2023/2006	FDA	3-A	EHEDG EL-Class I	USP Class VI	DNV GL	Lloyd's Register	CCS	WHG (overfill, leakage)
LBFS-##1##.#	G 1/2 A ISO 228-1 BSC	G07					■	■	■	■	■
LBFS-##2##.#	G 3/4 A ISO 228-1	G10					■	■	■	■	■
LBFS-##3##.#	G 1 A ISO 228-1	G11					■	■	■	■	■
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 (Viton®) gasket	G51					■	■		■	■
LBFS-##E##.#	G 1/2 A DIN 3852-E, FKM (Viton®) gasket, with cooling neck	G51					■			■	■
LBFS-##G##.#	G 1/2 A ISO 228-1 BSC, with cooling neck	G07					■			■	■
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								■	■

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.

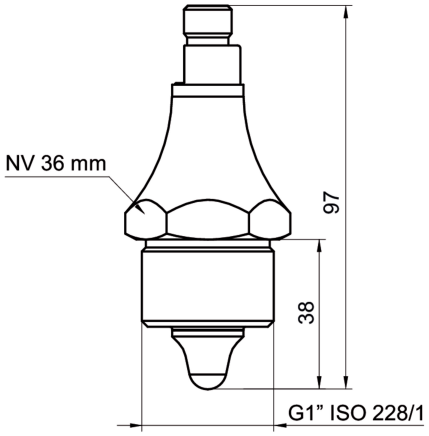
Dimensional drawings



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)

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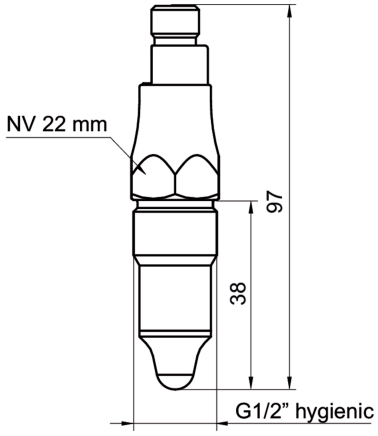
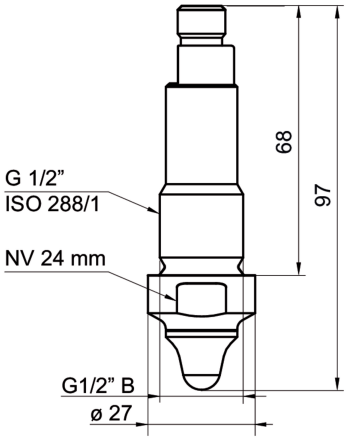
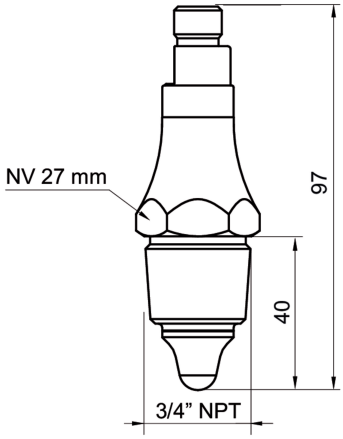
Dimensional drawings



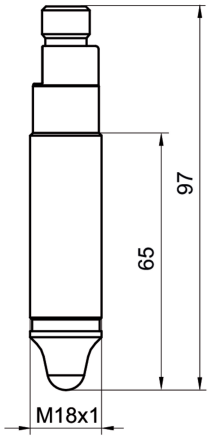
G 1/2 A hygienic (BCID: A03)



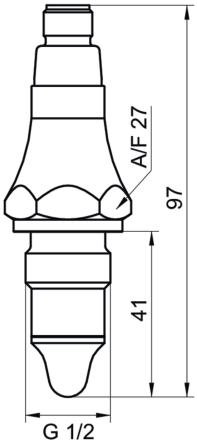
G 1/2 A ISO 228-1 for reverse assembly (in-shell thread) (BCID: T10)



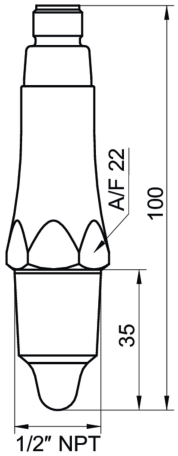
3/4-14 NPT (BCID: N03)



M18 × 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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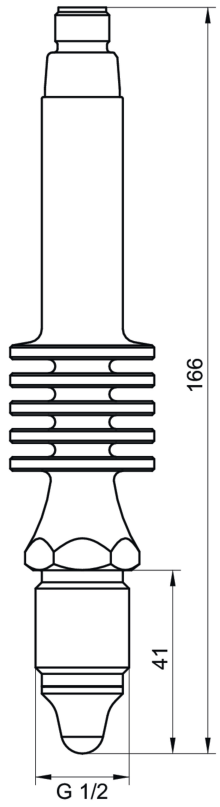
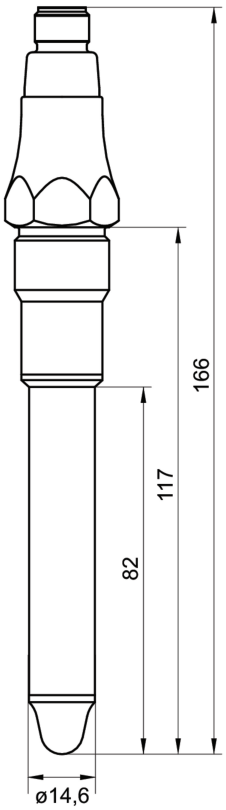
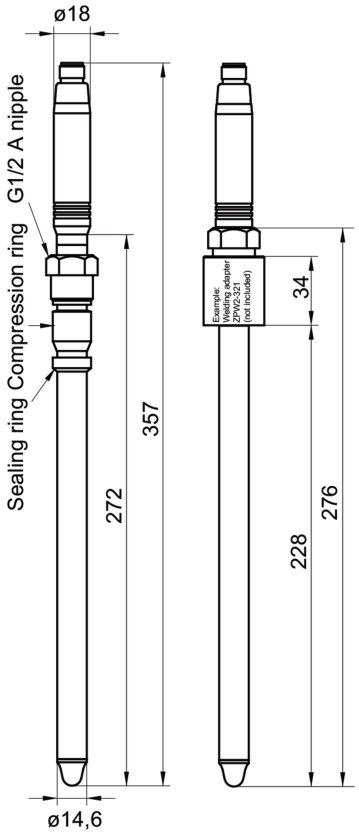
Dimensional drawings



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 (BCID: A03)

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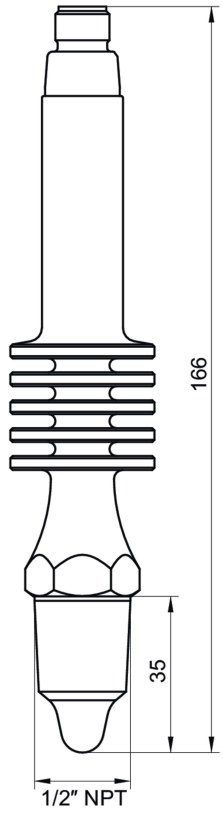
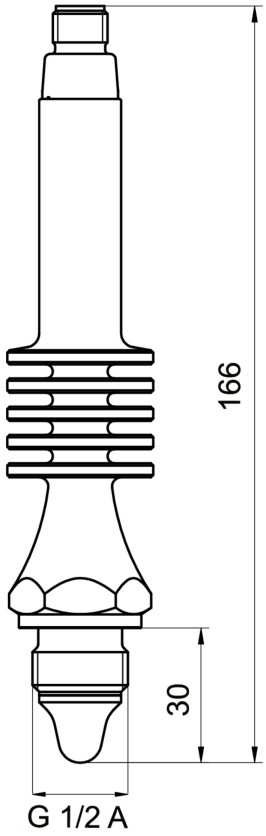
Dimensional drawings

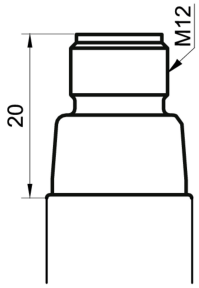


1/2-14 NPT with cooling neck (BCID: N02)

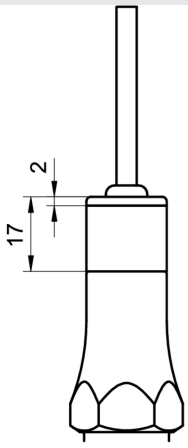


G 1/2 A DIN 3852-E with cooling neck (BCID: G51)

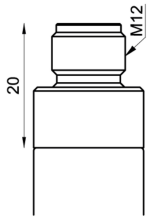
Housing



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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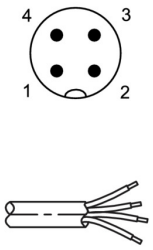
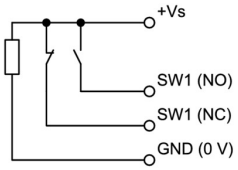
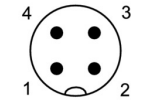
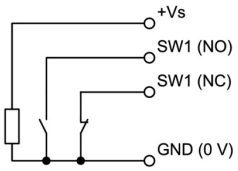
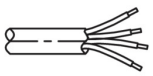
Electrical connection

Process connection

Output type	Electrical connection	Equivalent circuit	Function	Pin assignment
PNP			+Vs	1
			SW1, Normally open (NO)	4
			SW2, Normally closed (NC)	2
			GND (0 V)	3
			+Vs	BN
			SW1, Normally open (NO)	BK
			SW2, Normally closed (NC)	WH
			GND (0 V)	BU
NPN			+Vs	1
			SW1, Normally open (NO)	4
			SW2, Normally closed (NC)	2
			GND (0 V)	3
			+Vs	BN
			SW1, Normally open (NO)	BK
			SW2, Normally closed (NC)	WH
			GND (0 V)	BU

Ordering information

Ordering key - Configuration possibilities see website

	LBFS	-	#	#	#	#	.	#
Product								
Level switches	LBFS							
Compliance and approvals								
Standard		0						
ATEX II 1G Ex ia IIC T5 Ga		1						
ATEX II 1D Ex ta IIIC T100 °C		2						
ATEX II 3G Ex nA II T5		3						
ATEX II 1G Ex ia IIC T5/T4 Ga/ATEX II 1D Ex ta IIIC T100°C Da		4						
cUL listed, E365692		A						
EAC (TR CU 020/2011)		B						
Electrical Connection								
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					
Hanging version with 1.5 m cable			A					
Hanging version with 5 m cable			B					
Hanging version with 10 m cable			C					
Hanging version with 25 m cable			D					
Process Connection								
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				

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Ordering key - Configuration possibilities see website	LBFS	-	#	#	#	#	.	#
G 1/2 A DIN 3852 form E, FKM (Viton®) gasket (G51)				B				
G 1/2 A ISO 228-1 with cooling neck (G07)				G				
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 (Viton®) gasket, with cooling neck (G51)				E				
Process connnection material								
Stainless Steel 1.4301 - AISI 304					1			
Stainless Steel 1.4404 - AISI 316L					2			
Output Configuration								
PNP output						1		
NPN output						2		
Configuration								
Factory settings								0
Customer-specific								C