

# LFFS

Point level detection based on frequency deviation technology for high-temperature hygienic applications

LFFS-###.0

## Overview

- Process temperatures up to 200 °C
- Housing design with 360° status indicator
- For hygienic and industrial applications
- 3-A- and FDA-compliant, EHEDG-certified
- With ATEX, WHG and cULus approval



## 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) EPDM, optional

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

Operating temperature range	-40 ... 85 °C
Storage temperature range	-40 ... 85 °C
Degree of protection (EN 60529)	IP 67 , with appropriate cable
Humidity	< 98 % RH , condensing
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	PNP NPN Digital (push-pull)
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### Output signal

Switching logic	Normally open (NO) Normally closed (NC) Active high Active low
Voltage drop	PNP: (+Vs -2.5 V) ± 0.5 V, Rload = 1 kΩ NPN: (+2.5 V) ± 0.5 V, Rload = 1 kΩ Digital (push-pull): (+Vs -2.5 V) ± 0.5 V, Rload = 1 kΩ Digital (push-pull): (+2.5 V) ± 0.5 V, Rload = 1 kΩ
Current rating	50 mA , max.
Off leak current	< 100 µA , max.
Short circuit protection	Yes

### Housing

Style	Field housing, Ø55 mm
Overall size	Refer to section "Dimensional drawings"
Material	AISI 304 (1.4301)

### Electrical connection

Connector	M12-A, 4-pin, nickel plated brass M12-A, 4-pin, stainless steel
Cable gland	M16x1.5, nickel plated brass M16x1.5, polyamid M16x1.5, stainless steel

### Power supply

Voltage supply range	12.5 ... 36 V DC
Current consumption (no load)	35 mA , max.
Power-up time	< 2 s
Reverse polarity protection	Yes

### Factory settings

Output polarity	AUTO
Switching logic SW1	PNP

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## Technical data

### Factory settings

Switching range (dielectric constant DC)	< 75.3 % , DC > 2
Trigger level	80.4 %
Range hysteresis	2.4 %
Damping	0.1 s

### ATEX II 1D Ex tD A20 IP67 T100 °C

Voltage supply range	12.5 ... 30 V DC
Current rating, I <sub>n</sub>	100 mA
Degree of protection for cable accessories	IP 67
Temperature class T100 °C	-40 < Tamb < 85 °C

### ATEX II 1G Ex ia IIC T5

Voltage supply range	24 ... 30 V DC
Maximum values for barrier selection, U <sub>i</sub>	30 V DC , max.
Maximum values for barrier selection, I <sub>i</sub>	100 mA
Maximum values for barrier selection, P <sub>i</sub>	750 mW
Internal capacitance, C <sub>i</sub>	33 nF
Internal inductance, L <sub>i</sub>	10 µH

### ATEX II 1G Ex ia IIC T5

Temperature class, T1 ... T5	-40 < Tamb < 85 °C
Recommended barrier	PROFSI3-B25100-ALG-LS

### ATEX II 3G Ex nA IIC T5

Voltage supply range	12.5 ... 30 V DC
Current rating, I <sub>n</sub>	100 mA
Degree of protection for cable accessories	IP 67
Temperature class, T1 ... T5	-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	Refer to section "Compliance and approvals"
Safety	cULus listed, E365692 WHG (overflow, leakage)
Explosion protection	ATEX II 1D Ex tD A20 IP67 T100 °C ATEX II 1G Ex ia IIC T5 ATEX II 3G Ex nA IIC T5
Pharma	Refer to section "Compliance and approvals"

## Operating conditions

Ordering key	Process connection	BCID	Continuous		Temporary (t < 1 h)	
			Process temperature @ Tamb < 60 °C	Process pressure	Process temperature max. @ Tamb < 60 °C	Process pressure @ Process temperature max.
			(° C)	(bar)	(° C)	(bar)
LFFS-##1.#	G 1/2 A hygienic	A03	-40 ... 115	-1 ... 10	140	-1 ... 5
LFFS-##2.#	BHC 3A DN 38	B01	-40 ... 115	-1 ... 40	140	-1 ... 40
LFFS-##3.#	G 1/2 A hygienic, sliding connection, length 100 mm	A03	-40 ... 150	-1 ... 16	N/A	N/A
LFFS-##4.#	G 1/2 A hygienic, sliding connection, length 250 mm	A03	-40 ... 200	-1 ... 16	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	WHG (overfill, leakage)
LFFS-##1.#	G 1/2 A hygienic	A03	■	■	■	■	■	■
LFFS-##2.#	BHC 3A DN 38	B01	■	■	■	■		■
LFFS-##3.#	G 1/2 A hygienic, sliding connection, length 100 mm	A03	■	■		■		■
LFFS-##4.#	G 1/2 A hygienic, sliding connection, length 250 mm	A03	■	■		■		■

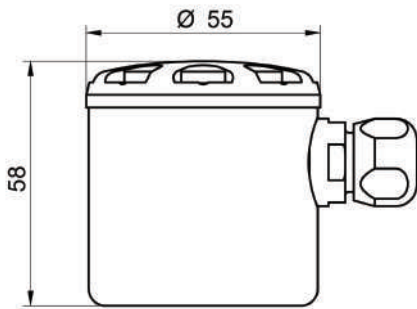
Information on product characteristics may relate to defined product options.

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.

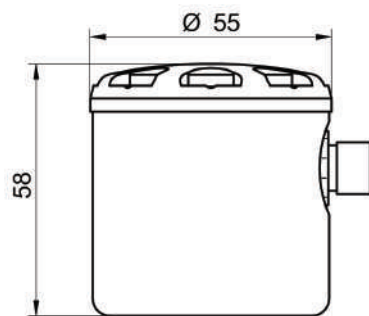
The EHEDG certification is only valid in combination with appropriate mounting accessories. Those are marked with the "EHEDG Certified" logo.

## Dimensional drawings (mm)

### Housing

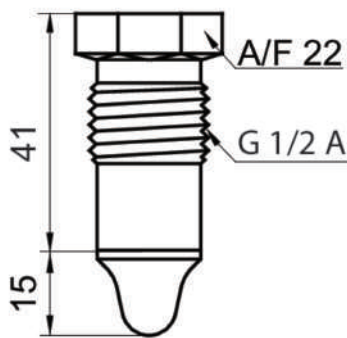


Housing with cable gland M16x1.5

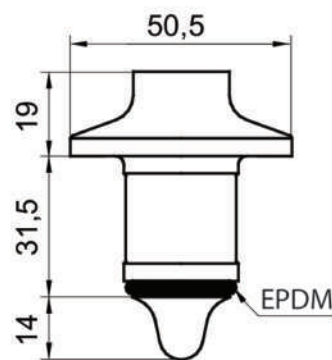


Housing with connector M12-A, 4-pin

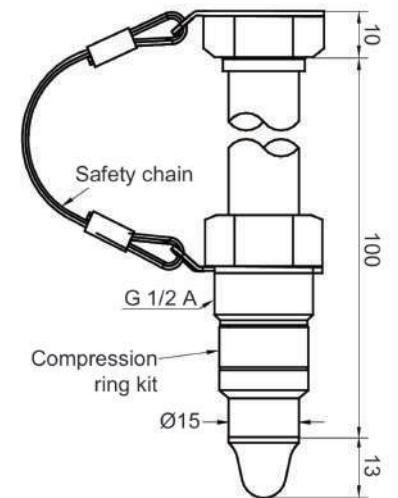
### Process connection



G 1/2 A hygienic (BCID: A03)



BHC 3A DN 38, including O-ring ZPX2-123 (BCID: B01)



G 1/2 A hygienic, sliding connection, 100 mm adjustable, including compression ring kit ZPX1-006 (BCID: A03)

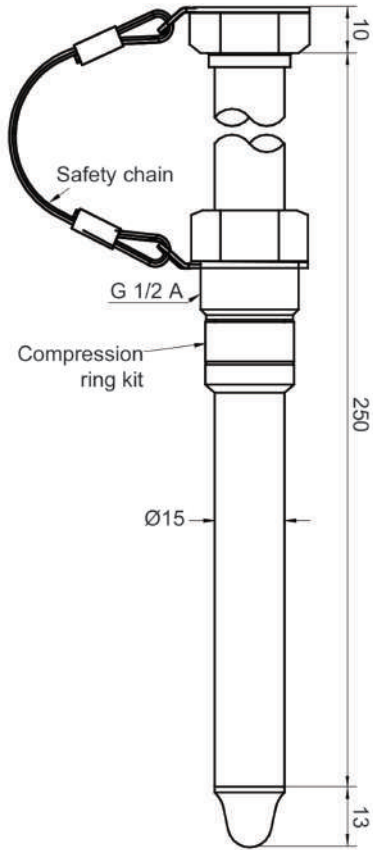
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### Dimensional drawings (mm)

#### Process connection



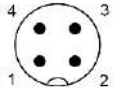
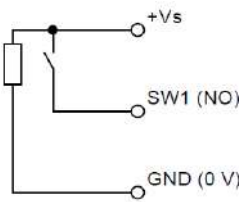
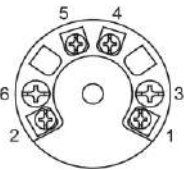
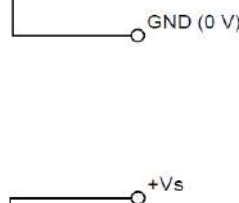

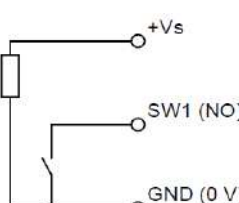
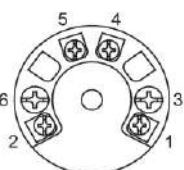
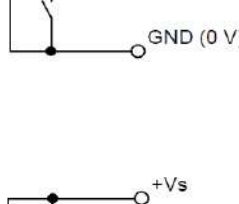

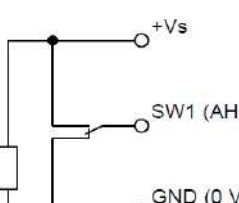
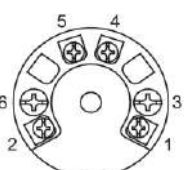
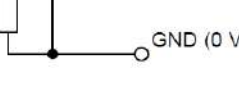
G 1/2 A hygienic, sliding connection, 250 mm adjustable, including compression ring kit  
ZPX1-006 (BCID: A03)

# LFSS

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## Electrical connection

Output type	Electrical connection	Equivalent circuit	Function	Pin assignment
PNP Normally open (NO)			+Vs	1
			SW1	4
			Teach-in	2
			GND (0 V)	3
			+Vs	1
			SW1	5
NPN Normally open (NO)			+Vs	1
			SW1	4
			Teach-in	2
			GND (0 V)	3
			+Vs	1
			SW1	5
Digital (push-pull) Active high			+Vs	3
			SW1	4
			Teach-in	2
			GND (0 V)	1
			+Vs	2
			SW1	5
			Teach-in	4
			GND (0 V)	1

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## Electrical connection

Output type	Electrical connection	Equivalent circuit	Function	Pin assignment
PNP Normally closed (NC)			+Vs	3
			SW1	4
			Teach-in	2
			GND (0 V)	1
			+Vs	2
			SW1	5
Teach-in	4			
GND (0 V)	1			
NPN Normally closed (NC)			+Vs	3
			SW1	4
			Teach-in	2
			GND (0 V)	1
			+Vs	2
			SW1	5
Teach-in	4			
GND (0 V)	1			
Digital (push-pull) Active low			+Vs	1
			SW1	4
			Teach-in	2
			GND (0 V)	3
			+Vs	1
			SW1	5
Teach-in	4			
GND (0 V)	2			

## Ordering information

Ordering key - Configuration possibilities see website

Product	LFFS	-	#	#	#	.	#
Compliance and approvals	LFFS						
Standard							0
ATEX II 1G Ex ia IIC T5 Ga							1
ATEX II 1D Ex tD A20 IP67 T100 °C							2
ATEX II 3G Ex nA IIC T5							3
UL listed, E365692							A
EAC (TR CU 020/2011)							B
Electrical Connection							
M12-A, 4-pin, nickel plated brass							1
Cable gland, M16x1.5, nickel plated brass							2
Cable gland, M16x1.5, polyamid							3
M12-A, 4-pin, stainless steel							4
Cable gland, M16x1.5, stainless steel							5

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## Ordering information

Ordering key - Configuration possibilities see website

	LFFS	-	#	#	#	.	#
<b>Process Connection</b>							
G 1/2 A hygienic, PEEK-tip (A03)							1
BHC 3A DN 38, PEEK-tip (B01) <sup>(1)</sup>							2
G 1/2 A hygienic, PEEK-tip (A03), sliding connection, 100 mm adjustable, incl. Compression ring kit ZPX1-006							3
G 1/2 A hygienic, PEEK-tip (A03), sliding connection, 250 mm adjustable, incl. Compression ring kit ZPX1-006							4
<b>Configuration</b>							
Factory settings							0
Customer-specific							C

(1) Including O-ring ZPX2-123