

## 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.<br>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<br>AISI 316L (1.4404)<br>EPDM, optional |

|                                |             |
|--------------------------------|-------------|
| 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)       | 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<br>NPN<br>Digital (push-pull) |
|-------------|-----------------------------------|

#### Output signal

|                          |  |
|--------------------------|--|
| Switching logic          | Normally open (NO)<br>Normally closed (NC)<br>Active high<br>Active low  |
| Voltage drop             | PNP: (+Vs -2.5 V) ± 0.5 V, Rload = 1 kΩ<br>NPN: (+2.5 V) ± 0.5 V, Rload = 1 kΩ<br>Digital (push-pull): (+Vs -2.5 V) ± 0.5 V, Rload = 1 kΩ<br>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<br>M12-A, 4-pin, stainless steel            |
| Cable gland | M16x1.5, nickel plated brass<br>M16x1.5, polyamid<br>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<br>WHG (overflow, leakage)  |
| Explosion protection | ATEX II 1D Ex tD A20 IP67 T100 °C<br>ATEX II 1G Ex ia IIC T5<br>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<br>EN 10/2011<br>EN 2023/2006 | FDA | 3-A | EHEDG<br>EL-Class I | USP<br>Class VI | WHG<br>(overflow,<br>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  | ■  | ■   |     | ■                   |                 | ■                             |

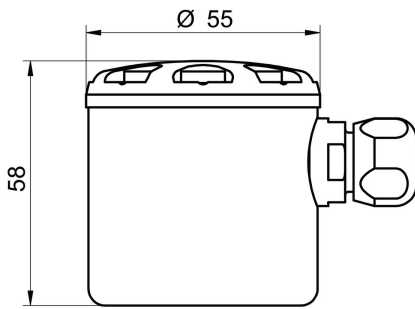
Information on product characteristics may relate to defined product options.

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.

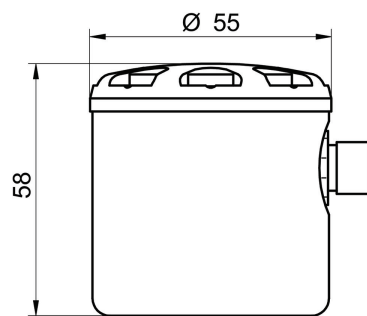
The EHEDG certification is only valid in combination with appropriate mounting accessories. Those are marked with the "EHEDG Certified" logo.

## Dimensional drawings (mm)

### Housing

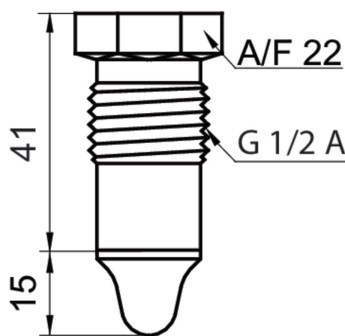


Housing with cable gland M16x1.5

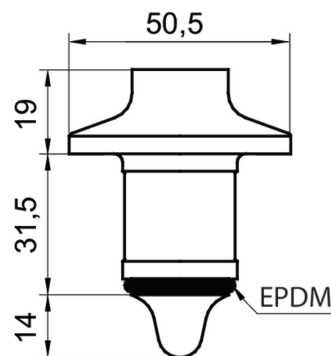


Housing with connector M12-A, 4-pin

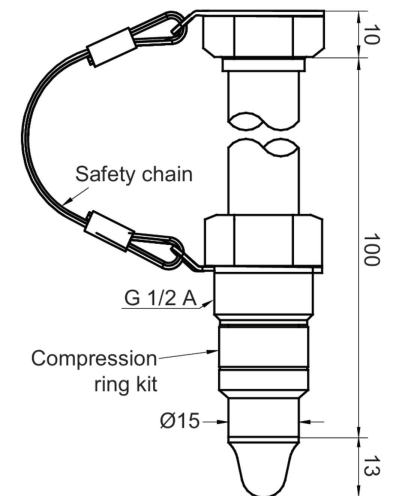
### Process connection



G 1/2 A hygienic (BCID: A03)



BHC 3A DN 38 (BCID: B01)



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

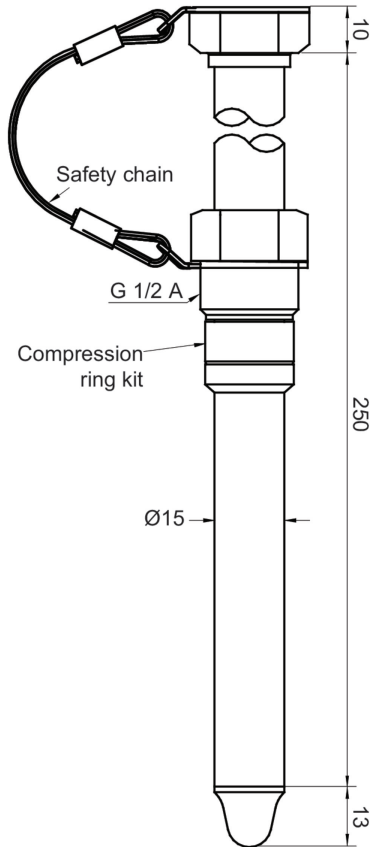
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### Dimensional drawings (mm)

#### Process connection



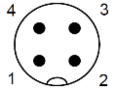
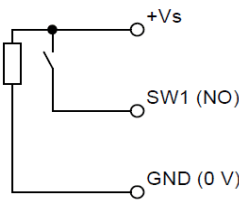
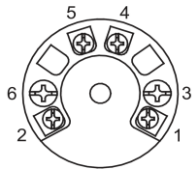
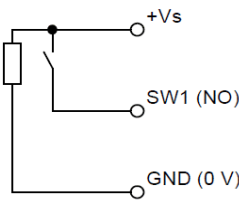

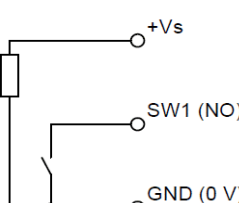
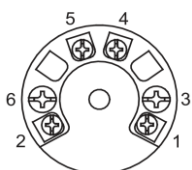
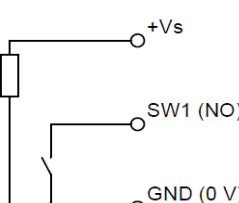

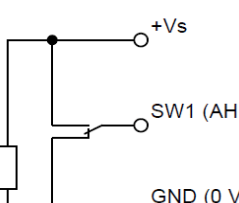
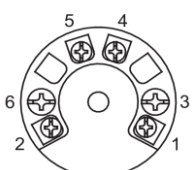
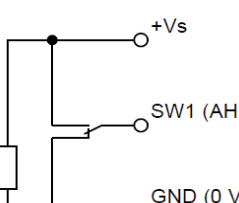
G 1/2 A hygienic, sliding connection, 250 mm adjustable, including compression ring kit  
ZPX1-006 (BCID: A03)

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## Electrical connection

| Output type                        | Electrical connection   | Equivalent circuit  | Function  | Pin assignment |
|------------------------------------|---|---|-----------|----------------|
| PNP<br>Normally open (NO)          |    |    | +Vs       | 1              |
|                                    |   |   | SW1       | 4              |
|                                    |    |    | Teach-in  | 2              |
|                                    |   |   | GND (0 V) | 3              |
|                                    |   |   | +Vs       | 1              |
|                                    |   |   | SW1       | 5              |
| NPN<br>Normally open (NO)          |    |    | +Vs       | 1              |
|                                    |   |   | SW1       | 4              |
|                                    |   |    | Teach-in  | 2              |
|                                    |   |   | GND (0 V) | 3              |
|                                    |   |   | +Vs       | 1              |
|                                    |   |   | SW1       | 5              |
| Digital (push-pull)<br>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<br>Normally closed (NC)       |                       |                    | +Vs       | 3              |
|                                   |                       |                    | SW1 (NC)  | 4              |
|                                   |                       |                    | Teach-in  | 2              |
|                                   |                       |                    | GND (0 V) | 1              |
|                                   |                       |                    | +Vs       | 2              |
|                                   |                       |                    | SW1       | 5              |
| NPN<br>Normally closed (NC)       |                       |                    | +Vs       | 3              |
|                                   |                       |                    | SW1 (NC)  | 4              |
|                                   |                       |                    | Teach-in  | 2              |
|                                   |                       |                    | GND (0 V) | 1              |
|                                   |                       |                    | +Vs       | 2              |
|                                   |                       |                    | SW1       | 5              |
| Digital (push-pull)<br>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 | - | # | # | # | . | # |
|---|------|---|---|---|---|---|---|
|   | LFFS |   |   |   |   |   |   |
| <b>Compliance and approvals</b>           |      |   |   |   |   |   |   |
| 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 |
| <b>Electrical Connection</b>              |      |   |   |   |   |   |   |
| 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 |

The product features and technical data specified do not express or imply any warranty. Technical modifications subject to change.

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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)   |      |   |   |   |   |   | 2 |
| G 1/2 A hygienic, PEEK-tip (A03),<br>sliding connection, 100 mm adjustable,<br>incl. Compression ring kit ZPX1-006 |      |   |   |   |   |   | 3 |
| G 1/2 A hygienic, PEEK-tip (A03),<br>sliding connection, 250 mm adjustable,<br>incl. Compression ring kit ZPX1-006 |      |   |   |   |   |   | 4 |
| <b>Configuration</b>   |      |   |   |   |   |   |   |
| Factory settings   |      |   |   |   |   |   | 0 |
| Customer-specific  |      |   |   |   |   |   | C |