



## Special Features

- Wetted parts in stainless steel and PEEK
- Compact design
- Precise switching point with no requirement for calibration
- Process temperature -40... 115 °C
- Measures media with DK-values >1.5 (DK = Dielectrical Constant)
- LED switch indicator
- Maintenance free
- Suitable for media separation
- Configurable by FlexProgrammer 9701
- ATEX approval for gas and dust
- WHG (pending)



## Technical Data

### Sensor

Radiated signal	100...180 MHz
Process connection	Refer to dimensional drawings
Insulating material	PEEK

### Mechanical data

Housing	Stainless Steel
Amb. temperature	-40...85 °C
Process temperature	-40...115 °C
Protection class	IP67 (IEC 529)
Media pressure	Max. 100 bar
Vibrations	IEC 60068-2-6, GL test2
Installation	Any position

### Electrical connection

Cable	5 meter, 4 wire
Plug M12	Plastic or Stainless steel 304

### Other electrical data

Power supply	12...30 VDC, 35 mA max.
Damping	0...10 sec.
Power-up time	<2 sec.
Hysteresis	± 1 mm
Repeatability	± 1 mm
Reaction time	0.1 sec. (100 mS)

### Disposal of product and packing

According to national laws or by returning to Baumer

### EMC data and packing

Immunity	EN 61326
Emission	EN 61326

### EMC data and packing

Internal inductivity	$L_i \leq 10 \mu\text{H}$
Internal capacity	$C_i \leq 43 \text{ nF}$
Barrier data	$U \leq 30 \text{ VDC}$ ; $I < 0.1 \text{ A}$ ; $P < 0.75 \text{ W}$

### Approval Ex ia IIC T5, ATEX II 1G

Supply range	24...30 VDC
Temperature class	T1...T4: $-40 < T_{\text{amb}} < 85 \text{ °C}$ T1...T5: $-40 < T_{\text{amb}} < 74 \text{ °C}$

### Approval Ex ta IIIC T100 Da, ATEX II 1D

Supply range	12...30 VDC
Temperature class	T100 °C: $-40 < T_{\text{amb}} < 85 \text{ °C}$

### Approval Ex nA II T5, ATEX II 3G

Supply range	12,5...30 VDC
Temperature class	T1...T5: $-40 < T_{\text{amb}} < 85 \text{ °C}$

### Output

Output (active)	Max. 20 mA, short-circuit and high-temperature protected
Output type	PNP or NPN
Output polarity	NO and NC
Active "High"	PNP (VDC -1.5V) ± 0.5V ; Rload 10 kOhm
Active "Low"	NPN (-VDC +1.5V) ± 0.5V ; Rload 10 kOhm
Off leak current	± 100µA Max.

### Factory Settings

Damping	0.1 sec.
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### Approvals/conformities

Approvals/conformities	DNV Marine Approval EN 50155 Railway 3A, EHEDG, FDA, WHG (pending)
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## Description

The Level Switch LBFS is designed to detect levels in tanks, for media separation and provide empty-pipe detection or dry-run protection for pumps.

A high frequency sweep signal is radiated from the sensor tip into the tank. The media will act as a virtual capacitor, which together with a coil in the sensor head, will form a circuit creating the switch point signal. This virtual capacitance will depend of the di-electric value DK (Dielectrical Constant) of the media.

Two output signals are available, Normally Open (NO) and Normally Closed (NC). By means of the FlexProgrammer 9701, a damping of the output signal can be activated in case of a fluctuating media level, e.g. during tank filling. Additionally the output signals NO and NC can be reversed.

The measurement is precise and unaffected by the mounting position in the tank. In the Flex-software a compensation for foam, bubbles and condensate as well as sticky media can be set.

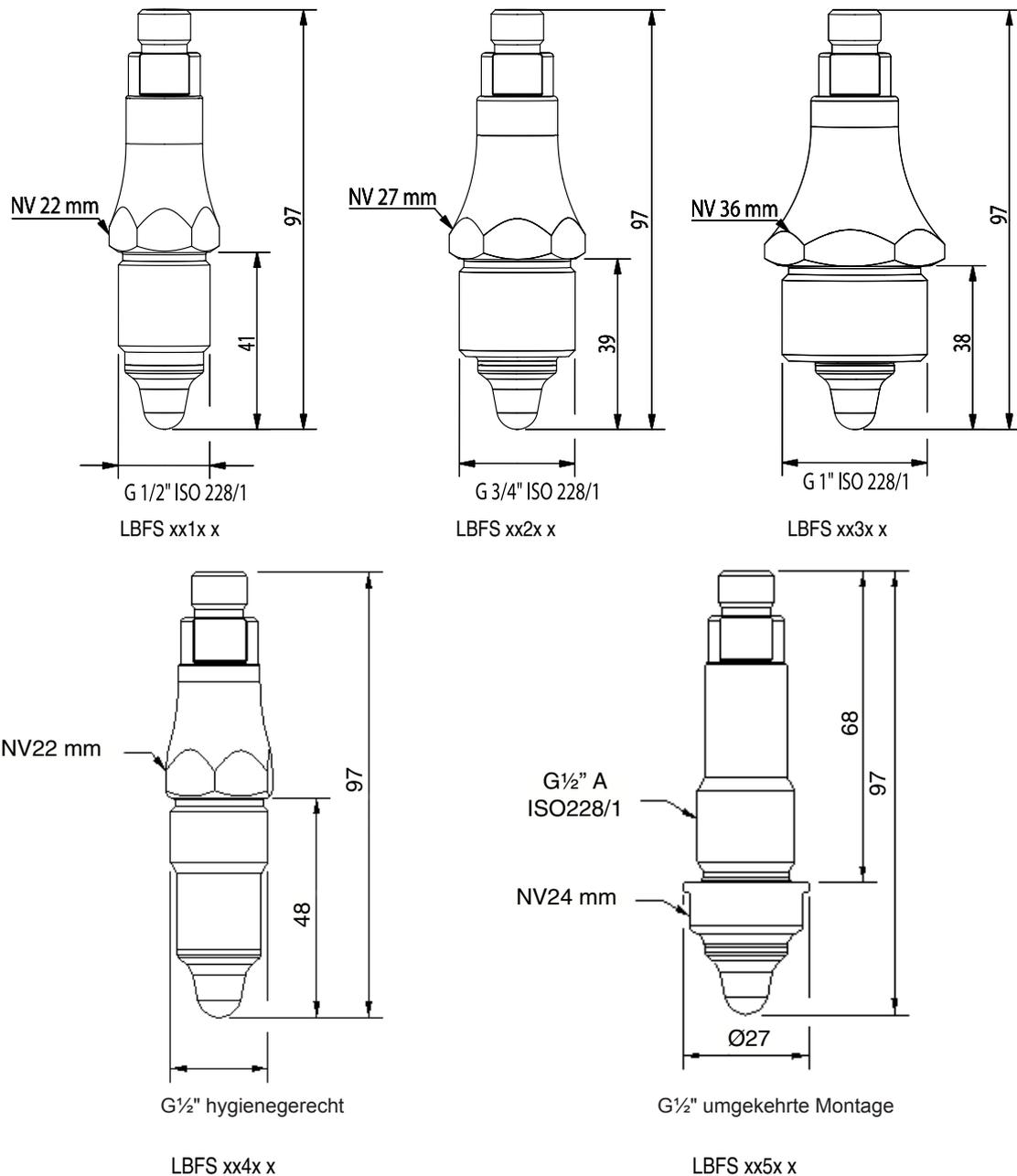
The Flex-software also features an adjustment facility making the user able to adjust the sensor to a specific media.

The Level Switch LBFS measures liquids such as water and oil. Even dry media can be measured, eg. coal dust or plastic granulate.

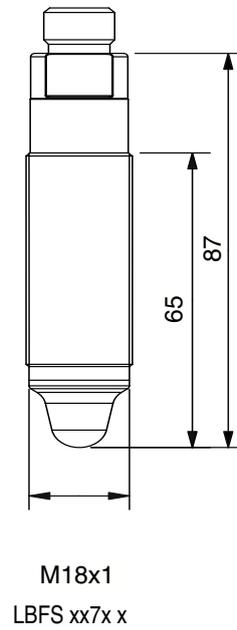
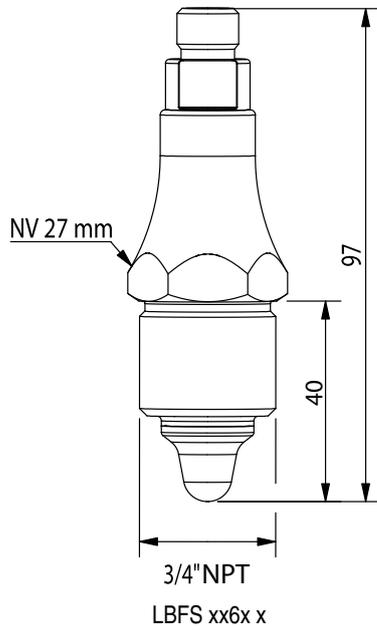
Level Switch LBFS can be delivered with PNP output as well as NPN output.

The process connection can easily be sealed by use of PTFE tape or by use of special welding adapter for the hygienic edition.

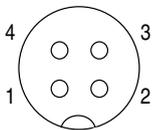
## Dimensional Drawings



## Dimensional Drawings



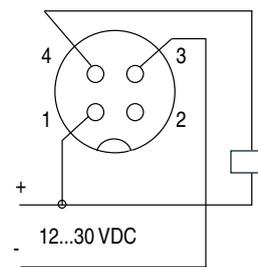
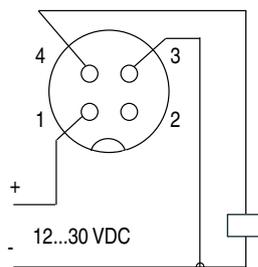
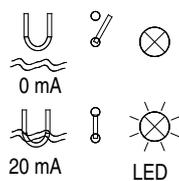
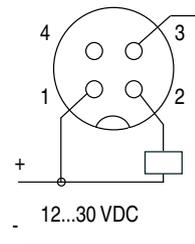
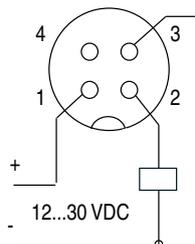
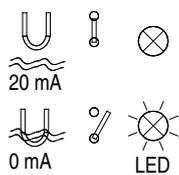
## Electrical Connection



M12 plug	Cable	Function
1	Brown	+ VDC
2	White	Normally Closed
3	Blue	- VDC
4	Black	Normally Open

## Electrical Installation

### Normally Closed

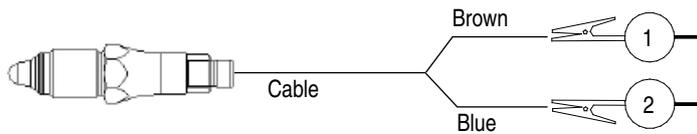


## Configuration

### FlexProgrammer 9701



Note: Ambient temperature range 0...50°C



Disconnect the power supply before connecting the FlexProgrammer 9701 to the Level Switch LBFS

## Accessories

### FlexProgrammer 9701



The FlexProgrammer 9701 is a dedicated tool to configure Baumer configurable products.

**Type No. 9701-0001 comprises:**  
FlexProgrammer  
Cables  
CD with the FlexProgram software

### Accessories examples

**LB020**



G1/2 welding sleeve AISI 304  
(for non hygienic installation)

**CAM023**



ISO 2852 clamp

**VAM023**



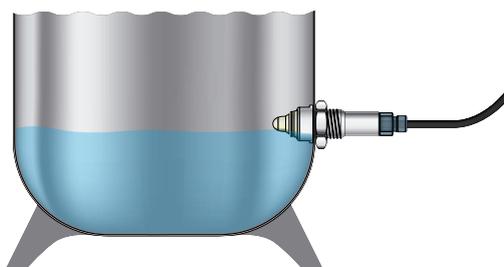
Varivent

**PM023**



G1/2 hygienic welding sleeve in AISI 316

## Application



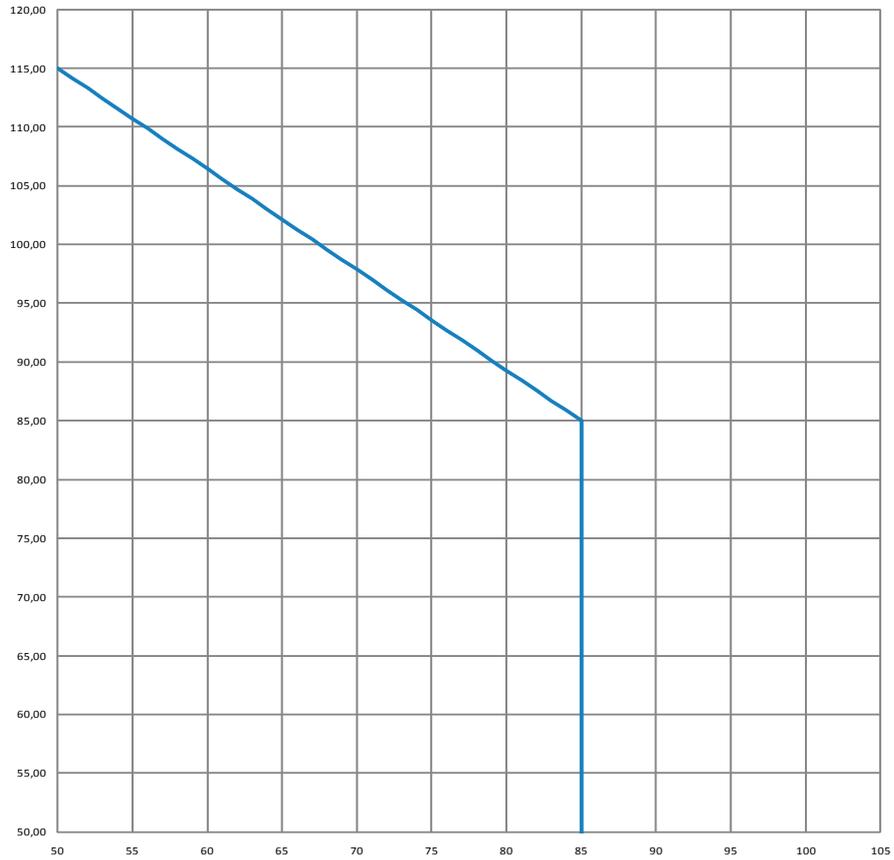
LBFS xx5x x



LBFS xx5x x

## Media Temperature versus Ambient Temperature

**Media Temperature**  
°C



**Ambient Temperature**

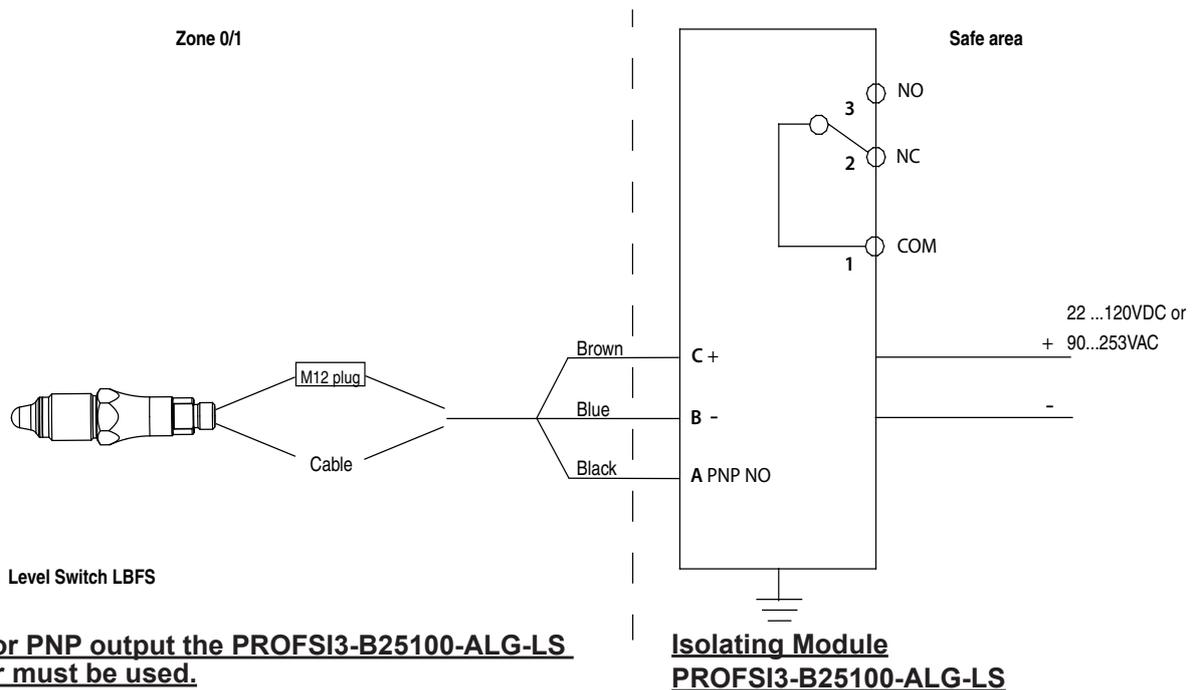
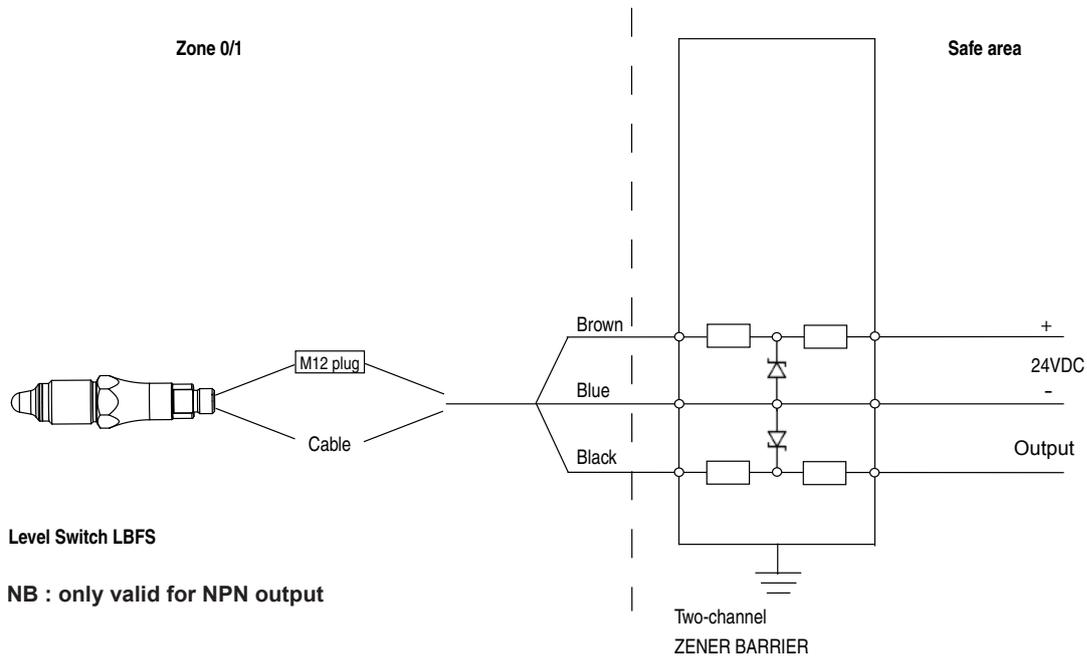
## Ex ia IIC T5, ATEX II 1G - Installation

A Level Switch LBFS 1xxx x is Ex ia IIC T5, ATEX II 1G approved for application in hazardous areas in accordance with the current EU directives. The product must be installed in accordance with prevailing guidelines for zone 0 with a barrier.

A certified Ex ia isolation barrier with the maximum values  $U_{max} = 30\text{VDC}$  ;  $I_{max} = 0.1\text{A}$  ;  $P_{max} = 0.75\text{W}$  must be used. Use the isolating module PROFSI 3-B25100-ALG-LS (for PNP output only) or a ZENER Barrier (for NPN output only) as shown below (see installation manual for special instructions).

### Ex-data

Supply range	24...30 VDC
Temperature class	T1...T4: $-40 < T_{amb} < 85\text{ }^{\circ}\text{C}$ T1...T5: $-40 < T_{amb} < 74\text{ }^{\circ}\text{C}$
Internal inductivity	$L_i < 10\text{ }\mu\text{H}$
Internal capacity	$C_i < 43\text{ nF}$
Barrier data	$U < 30\text{ VDC}$ ; $I < 0.1\text{ A}$ ; $P < 0.75\text{ W}$



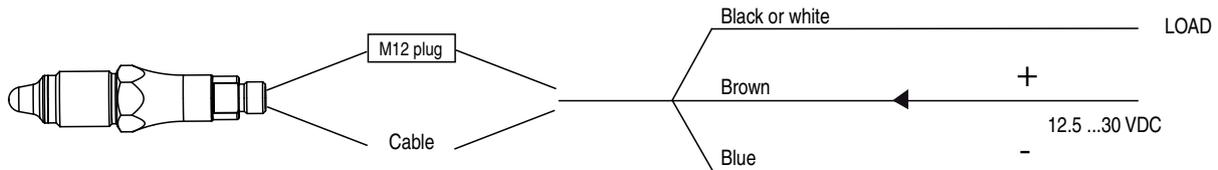
## Ex ta IIIC T100 Da, ATEX II 1D - Installation

A Level Switch LBFS 2xxx x Ex ta IIIC T100 Da, ATEX II 1D approved for application in hazardous areas in accordance with the current EU directives.

The product must be installed in accordance with prevailing guidelines for zone 20 without a barrier.

### Ex-data

Supply range	12.5...30 VDC, max. 100 mA
Temperature class	T100



### Level Switch LBFS

NB : The cable must be fixed to an external strain relief not more than 5 cm from the Level Switch. Only IP 67 compliant cable must be used for installation.  
See below.

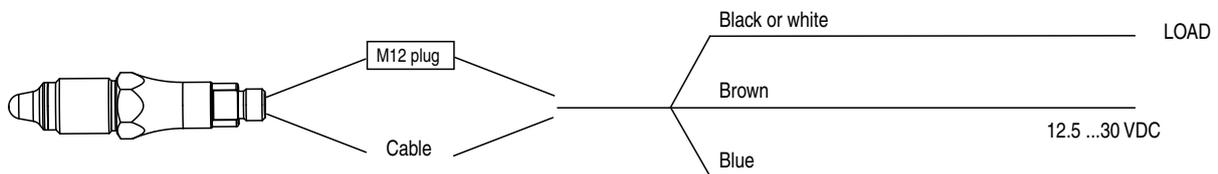
## Ex nA II T5, ATEX II 3G - Installation

A Level Switch LBFS3 xxx x is Ex nA II T5, ATEX II 3G approved for application in hazardous areas in accordance with the current EU directives.

The product must be installed in accordance with prevailing guidelines for zone 2 without a barrier.

### Ex-data

Supply range	12.5...30 VDC, Max. 0.1A
Temperature class	T1...T5



### Level Switch LBFS

## Ordering details

	-					
<b>Model</b>						
Level Switch	LBFS					
<b>Safety</b>	5' digit					
Standard						0
Ex ia IIC T5, ATEX II 1G (Gas) <sup>(7)</sup>						1
Ex ta IIIC T100 Da, ATEX II 1D (Dust) <sup>(2)</sup>						2
Ex nA II T5, ATEX II 3G						3
Ex ia IIC T5 / Ex ta IIC T100 Da (combined gas/dust) <sup>(2)</sup>						4
<b>Electrical Connection</b>	6' digit					
Plug, M12 plastic with LED						1
Cable 5 meter <sup>(3)</sup>						2
Plug, M12, stainless steel, without LED						3
<b>Process Connection</b>	7' digit					
G1/2"						1
G3/4"						2
G1"						3
G1/2" hygienic (for Accessories Universal) 3A / EHEDG <sup>(4) (6)</sup>						4
G1/2" for reverse assembly <sup>(1)</sup>						5
3/4" NPT <sup>(6)</sup>						6
M18x1 <sup>(5)</sup>						7
<b>Process Connection material</b>	8' digit					
Stainless Steel 1.4301 - AISI 304						1
Stainless Steel 1.4404 - AISI 316L						2
<b>Output Configuration</b>	9' digit					
PNP output						1
NPN output						2
<b>Configuration</b>	10' digit					
No configuration						0
Configuring according to customer specification						C

<sup>(1)</sup> Max. 85 °C media temperature

<sup>(2)</sup> Not valid with "cable connection"

<sup>(3)</sup> Max ambient temperature 70 °C

<sup>(4)</sup> Max 130 °C for <1 hour, Tamb 40°C

<sup>(5)</sup> Only available in AISI 304

<sup>(6)</sup> Only available in AISI 316L

<sup>(7)</sup> For PNP output the barrier module PFOFSI3-B25100-ALG-LS is required for functional purposes. For NPN output a standard barrier may be used.