

# Level Switch LBFS

**Wetted parts in stainless steel and PSU**

**Compact design**

**Precise switching point with no requirement for calibration**

**Process temperature -40...115°C**

**Measures media with DK-values >1.5**

**LED switch indicator**

**Maintenance free**

**Suitable for media separation measurement**

**Configurable by FlexProgrammer 9701**

**ATEX approval for gas and dust**



## Description

The Level Switch LBFS designed to detect levels in tanks, 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 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 medias 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 Teflon Tape.



**Baumer**

## Technical Data

### Sensor

Radiated signal	100...180 MHz
Process connection	Refer to page 2 Dimensional drawings
Insulating material	PSU

### Ex data (ia)

Internal inductivity	$L_i \leq 10 \mu\text{H}$
Internal capacity	$C_i \leq 33 \text{ nF}$
Barrier data	$U \leq 30 \text{ VDC}$ ; $I \leq 0.1 \text{ A}$ ; $P \leq 0.75 \text{ W}$

### Mechanical data

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

### Approval Ex ia IIC T5, ATEX II 1G (Pending)

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

### Approval Ex ta IP67 T100°C Da, ATEX II 1D (Pending)

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

### Approval Ex nA IIT5, ATEX II 3G (Pending)

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

### Electrical connection

Cable	5 meter, 4 wire
Plug M12	Plastic

### 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) $\pm$ 0.5V ; Rload 10 kOhm
Active "Low"	NPN (-VDC +1.5V) $\pm$ 0.5V ; Rload 10 kOhm
Off leak current	$\pm 100 \mu\text{A}$ Max.

### Other electrical data

Power supply	12...30 VDC, 35 mA max.
Damping	0...10 sec.
Power-up time	<2 sec.
Hysteresis	$\pm 1 \text{ mm}$
Repeatability	$\pm 1 \text{ mm}$
Reaction time	0.2 sec. typ.

### Factory Settings

Measure	DK value > 2
Damping	0.1 sec.

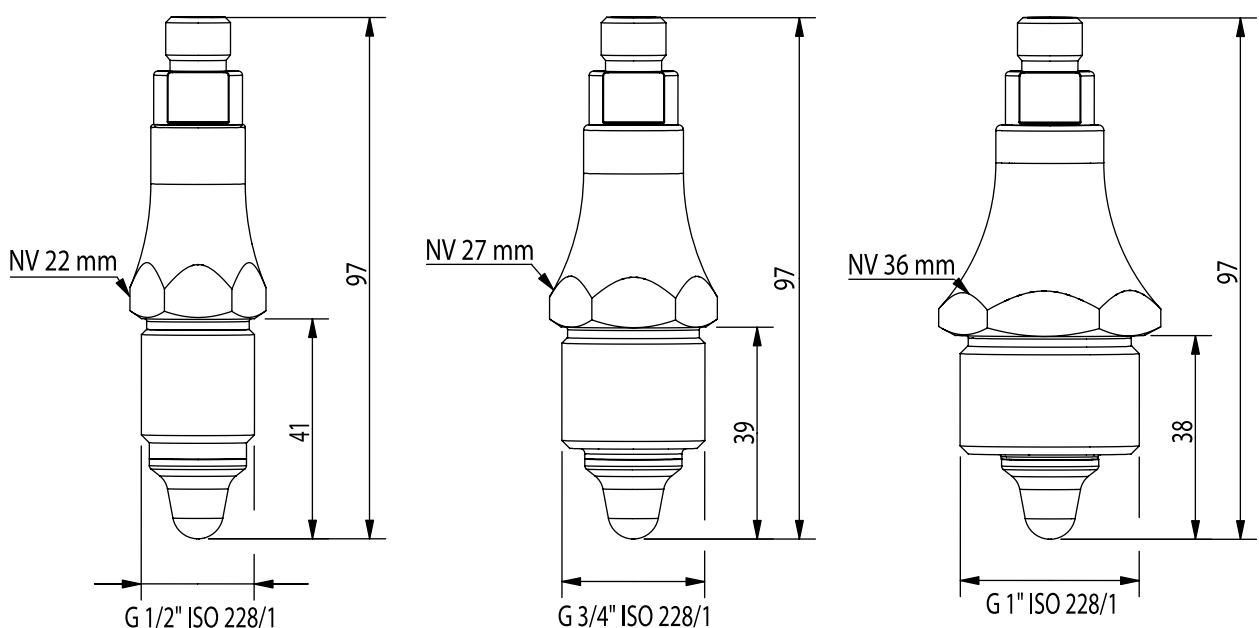
### Disposal of product and packing

According to national laws or by returning to Baumer

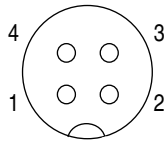
### EMC data

Immunity	EN 61326
Emission	EN 61326

## Dimensional Drawings



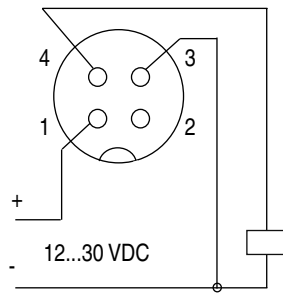
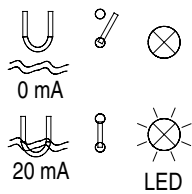
## Electrical Connection



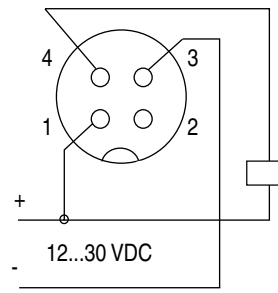
M12 plug	Cable	Funktion
1	Brown	+ VDC
2	White	Normally Closed
3	Blue	- VDC
4	Black	Normally Open

## Electrical Installation

### Normally Open

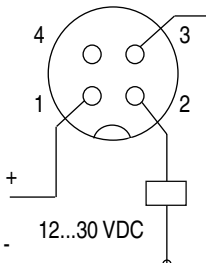
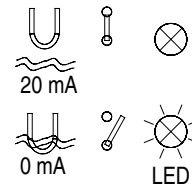


PNP Output  
20 mA max.

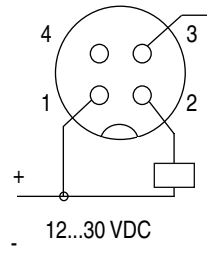


NPN Output  
20 mA max.

### Normally Closed



PNP Output  
20 mA max.



NPN Output  
20 mA max.

## Ordering Details - Level Switch LBFS

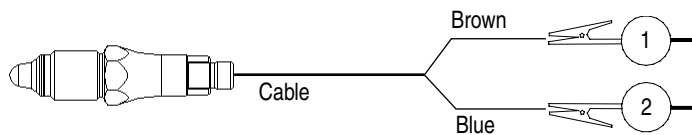
	LBFS xxxx x (x)			
<b>Safety</b>	<b>5<sup>th</sup> digit</b>			
Standard	0			
Ex ia IIC T5, ATEX II 1G (Gas) (pending)	1			
Ex tD A20 IP67 T100°C, ATEX II 1D (Dust) (pending)	2			
Ex nA II T5, ATEX II 3G (pending)	3			
<b>Electrical Connection</b>	<b>6<sup>th</sup> digit</b>			
Plug, M12	1			
Cable 5 meter	2			
<b>Process Connection</b>	<b>7<sup>th</sup> digit</b>			
G1/2	1			
G3/4	2			
G1	3			
<b>Process Connection material</b>	<b>8<sup>th</sup> digit</b>			
Stainless Steel 1,4301 - AISI 304	1			
Stainless Steel 1,4404 - AISI 316L	2			
Stainless Steel 1,4571 - AISI 316Ti	3			
<b>Output Configuration</b>	<b>9<sup>th</sup> digit</b>			
PNP output	1			
NPN output	2			
<b>Configuration</b>	<b>10<sup>th</sup> digit</b>			
Configuring according to customer specification				(C)

## 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 interface unit  
CD with the FlexProgram software and product drivers (DTM)  
USB cable  
Cable with 2 alligator clips

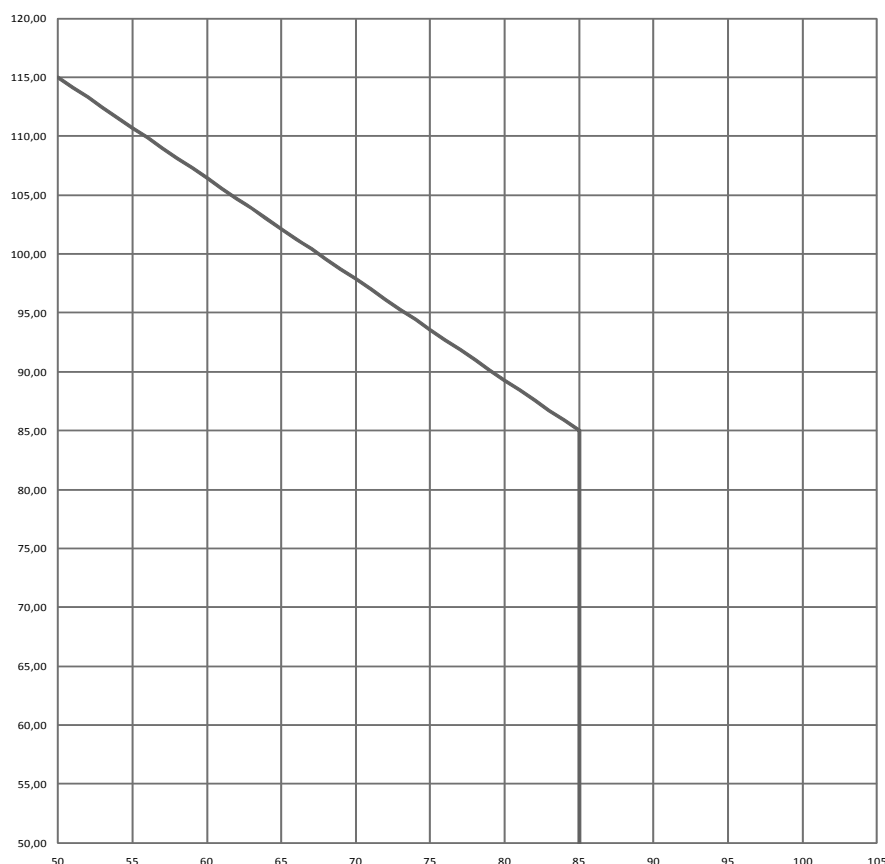
### Other

**Cable type no.:**

132 548 4 pol M12 plug with 5m cable  
127 804 4 pol M12 angle plug with 5m cable  
9000 0019 M12 plug female with screw terminals  
9701 8005 M12 adaptor Cable for FlexProgrammer

## Media Temperature versus Ambient Temperature

Media Temperature  
°C



Ambient Temperature

### Ex ia G - Installation (Pending)

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.

### Ex ta - Installation (Pending)

A Level Switch LBFS 2xxx x is Ex ta IP67 T100°C 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 nA - Installation (Pending)

A Level Switch LBFS 3xxx 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.

### Conditions for Ex-Certification (Pending)

Connection Type	Tamb °C	Media Temp. max. °C
All connections	-40...85	85
	-40...60	95
	-40...40	105