

Level Switch LFFS

Wetted parts in acid-proof, stainless steel and PEEK

Compact, food compatible, hygienic design

Hygienic connections conform to 3-A standards, FDA demands and EHEDG guidelines

Precise switching point without calibration

Process temperature -40...200°C

Measures media with DK-values >1.5

Not influenced by foam

LED switch indicator

Maintenance free

Suitable for media separation measurement

Configurable by FlexProgrammer 9701

ATEX approval for gas and dust



Description

The Level Switch LFFS 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 capacity will depend of the di-electric value of the media.

By means of the FlexProgrammer 9701 the output can be configured to either NPN, PNP or digital output signal. A damping of the output signal can be activated in case of a fluctuating media level, e.g. during tank filling.

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 viscous 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 LFFS measures liquids such as water and beer as well as viscous, sticky fluids, such as honey, yoghurt, toothpaste and ketchup. Even dry medias can be measured, eg. sugar or flour.

The Level Switch LFFS is resistant against CIP and SIP agents.

Hygienic installation is also possible with the comprehensive range of accessories, see the overview at page 6.



Baumer

Technical Data

Sensor

Radiated signal	100...180 MHz
Process connection	Hygienic: G1/2, 3A/DN38 or sliding connection
Adapters	Refer to page 6
Insulating material	PEEK Natura

Mechanical data

Housing	Stainless Steel, W1.4301/AISI 304
Process connection	Stainless Steel, W1.4404/AISI 316 L
Amb. temperature	-40...85°C
Process temperature	
Sliding connection	-40...200°C (See curve 1)
Std. & 3A/DN38	-40...115°C (See curve 1)
< 1 hour, $T_{amb} < 60^{\circ}\text{C}$	-40...140°C
Protection class	IP67 (IEC 529)
Media pressure	Sliding connection: Max. 16 bar Std. & 3A/DN38: Max. 40 bar
Vibrations	IEC 60068-2-6, GL test2
Installation	Any position
Conformity	3-A standards (Std. & 3A/DN38)

Electrical connection

Cable gland M16	Plast or Nickel-plated brass
Plug M12	Nickel-plated brass

Other electrical data

Power supply	12...36 VDC, 35 mA max.
Damping	0...10 sec.
Power-up time	<2 sec.
Hysteresis	± 1 mm
Repeatability	± 1 mm
Reaction time	0.1 sec. max.

Disposal of product and packing

According to national laws or by returning to Baumer

EMC data

Immunity	EN 61326
Emission	EN 61326

Ex data (ia)

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

Approval Ex ia IIC T5, ATEX II 1G (See table 1)

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

Approval Ex tD A20 IP67 T100°C, ATEX II 1D (See table 1)

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

Approval Ex nA II T5, ATEX II 3G (See table 1)

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

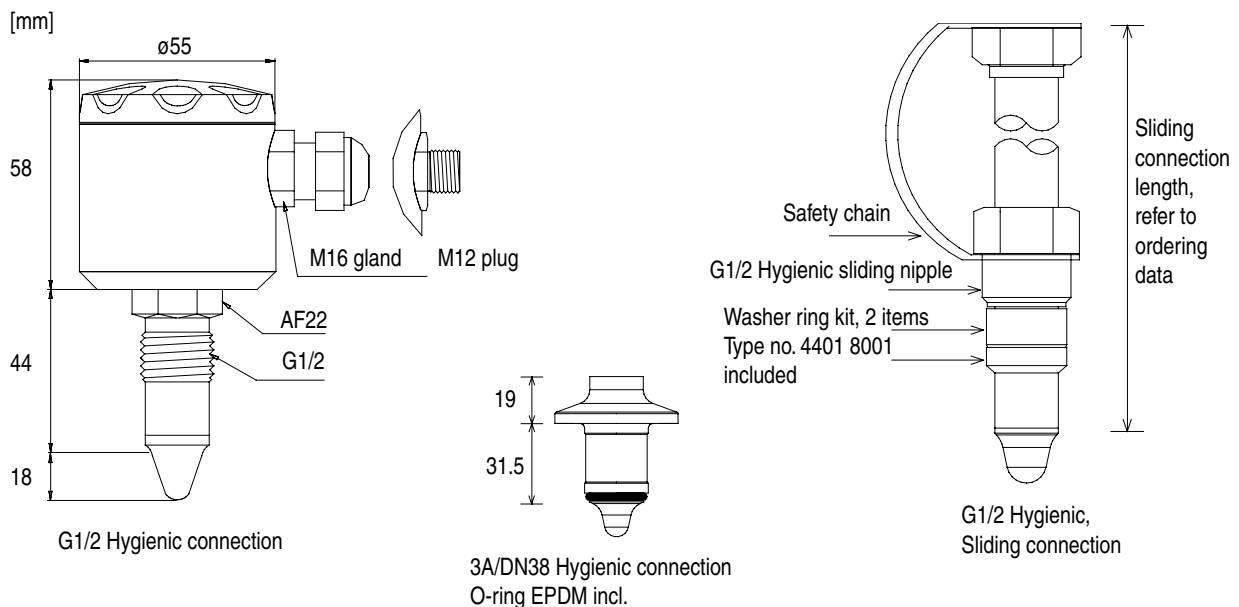
Output

Output (active)	Max. 50 mA, short-circuit and high-temperature protected
Output type	PNP, NPN or Digital output (Push-pull)
Output polarity	See drawing
Active "Low"	NPN and Digital output (-VDC +2.5V) ± 0.5V ; Rload 1 kOhm
Active "High"	PNP and Digital output (VDC -2.5V) ± 0.5V ; Rload 1 kOhm
Three State Output	± 100µA Max.

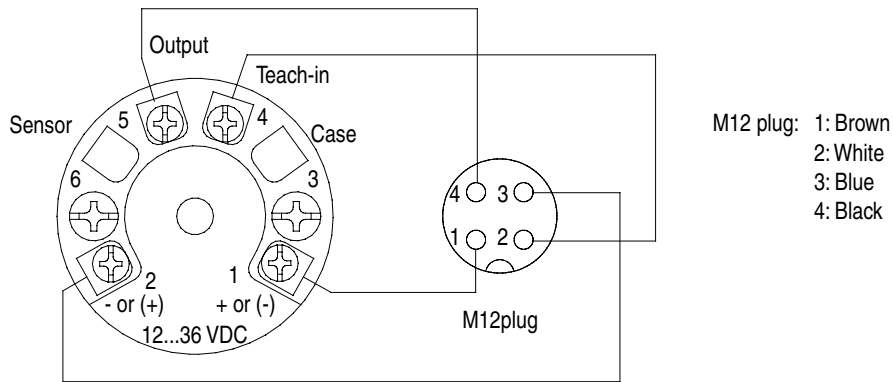
Factory Settings

Output	PNP
Measure	DK value > 2
Damping	0.1 sec.

Dimensional Drawings

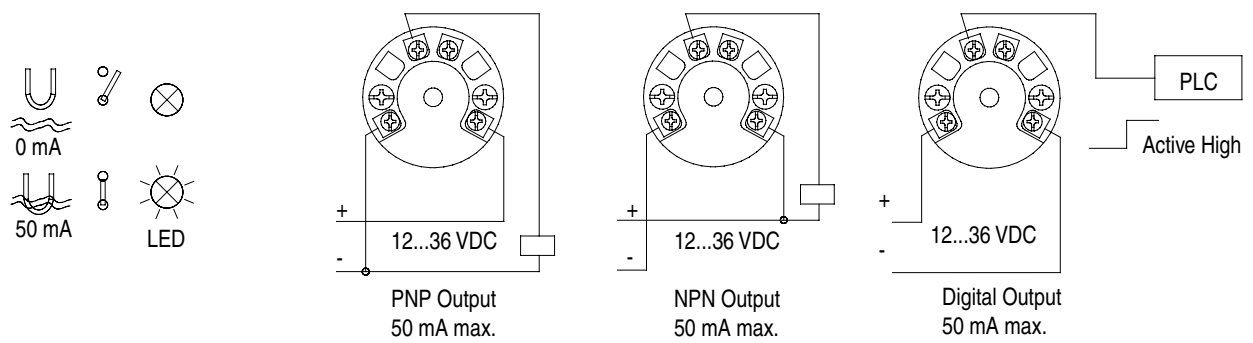


Electrical Connection

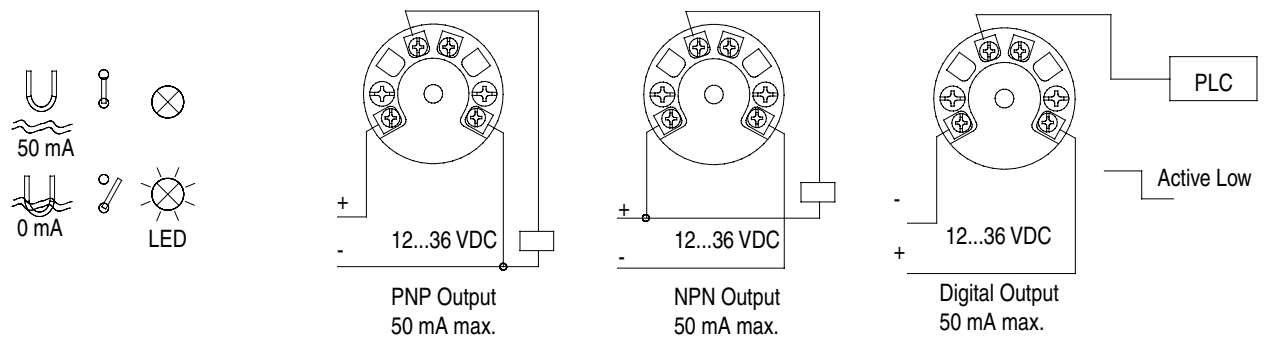


Electrical Installation

Normally Open



Normally Closed



Ordering Details - Level Switch LFFS

	LFFS xxx (c)	
Safety	5' digit	
Standard		0
Ex ia IIC T5, ATEX II 1G (Gas)		1
Ex tD A20 IP67 T100°C, ATEX II 1D (Dust)		2
Ex nA II T5, ATEX II 3G		3
Electrical Connection	6' digit	
Plug, M12		1
Cable gland, M16 brass		2
Cable gland, M16 Polyamid		3
Process Connection	7' digit	
G1/2, PEEK tip, 3-A conform, Note{1}		1
3A/DN38 Hygienic connection, 3-A conform, Note {1}		2
G1/2, PEEK tip, sliding connection, 100 mm adjustable, incl. washer ring kit 4401 8001		3
G1/2, PEEK tip, sliding connection, 250 mm adjustable, incl. washer ring kit 4401 8001		4
Configuration	8' digit	
Configuration according to customer specifications		c

The washer ring kit for sliding connection, type no. 4401 8001
Can be ordered separately.
Baumer recommended to replace this kit if deformed.

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 Adaptor cable M12 for FlexProgrammer 9701

3-A Conformity

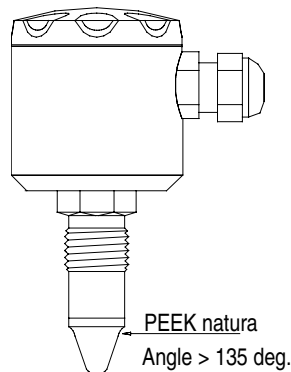
Note {1}: The 3-A mark is valid only when the product is mounted in a 3-A marked counter part and installed according to the installation manual. Use also a 3-A marked O-ring or gasket if relevant. The 3-A marked products conforms to the 3-A Sanitary Standard criteria. Materials and surfaces fulfill the FDA demands and follow the EHEDG guidelines regarding design, materials and finishing.

EPDM O-rings supplied with 3-A marked products are conform to Sanitary Standard Class II (8% milk fat max.)

EPDM gaskets supplied with 3-A marked products are conform to Sanitary Standard Class I (8% milk fat max.)

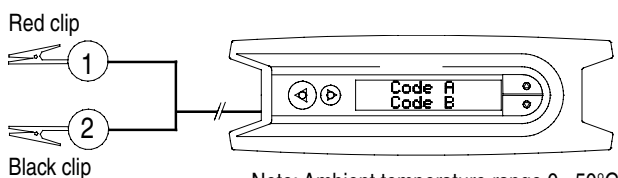
Refer to the 3-A marked counter parts in the data sheet "Accessories Universal".

Level Switch LFFS, example

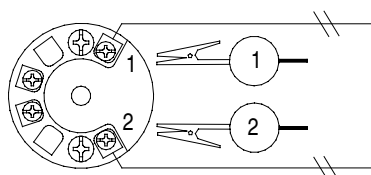


Configuration

FlexProgrammer 9701



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



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

Accessories

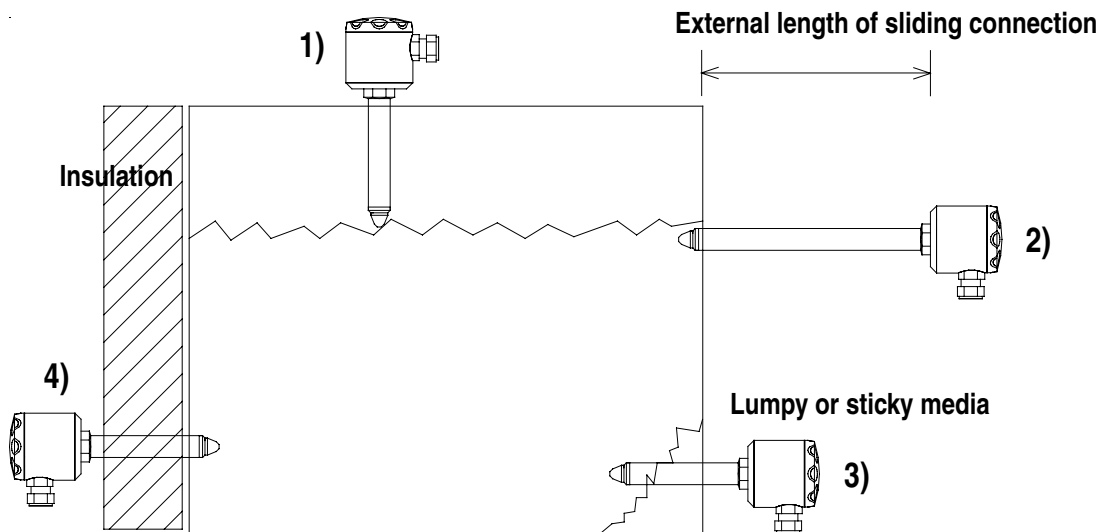


The FlexProgrammer 9701 is a dedicated tool to configure all Baumer configurable Flex-products.

Type No. 9701-0001 comprises:

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

The Sliding Connection (Figure 1)



The drawing shows how the sliding connection can be used for at least 4 applications:

- 1) Mounted at the top of a tank to adjust to a maximum level.
- 2) Serving as a cooling neck in high media temperature applications.
- 3) Adjusted to place the sensor tip deeper inside the tank.
- 4) To reach in through insulation material.

It is essential that the max. ambience temperature for the electronics is never exceeded. For ATEX approved products please refer to table 1.

The working conditions for the sliding connection in different media temperatures and specified ambient temperatures can be found in curve 1.

Example, how to read Curve 1:

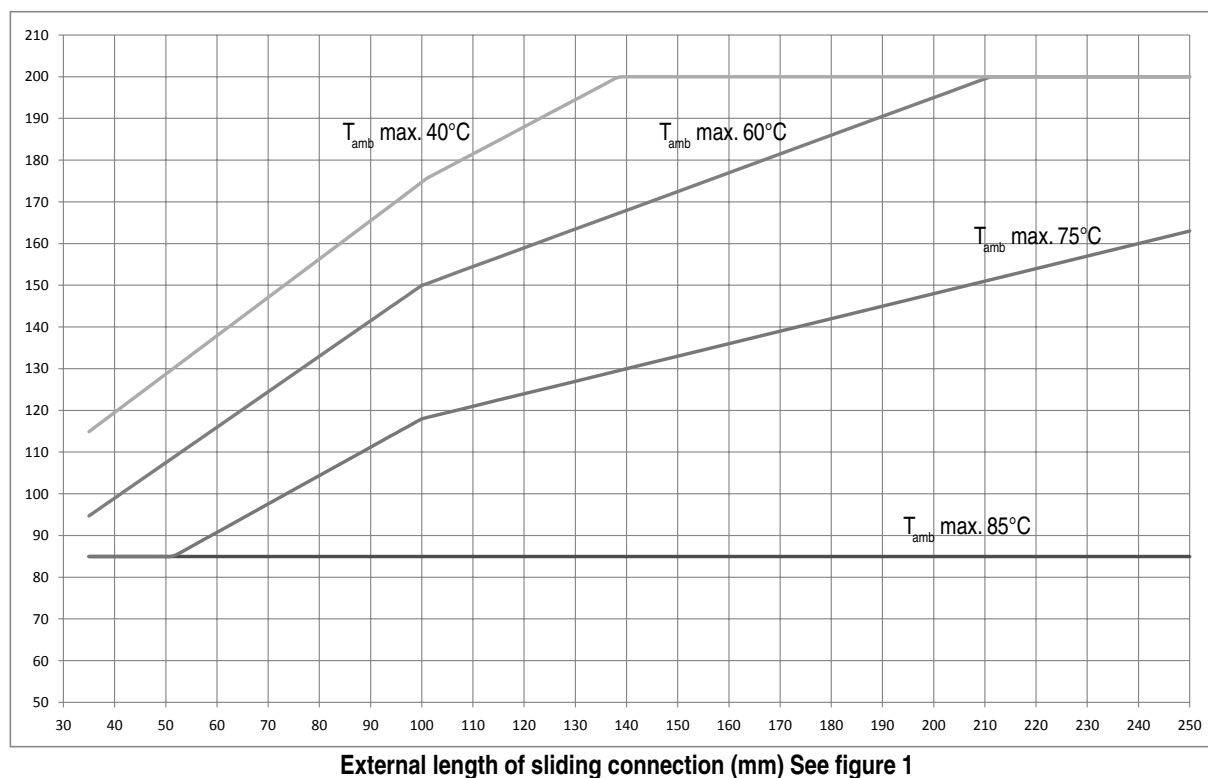
A 250 mm sliding connection is mounted in a tank with a total insert length of 150 mm. Hence the external length of the sliding connection will be $250 - 150 = 100$ mm.

The media temperature will be max. $160\text{ }^{\circ}\text{C}$.

Read the x-axis at 100 mm on the y-axis at $160\text{ }^{\circ}\text{C}$ and find that the ambient temperature must be kept below $40\text{ }^{\circ}\text{C}$. In case the radiated heat from the tank will cause a higher ambient temperature at the housing efficient insulation of the tank must be established.

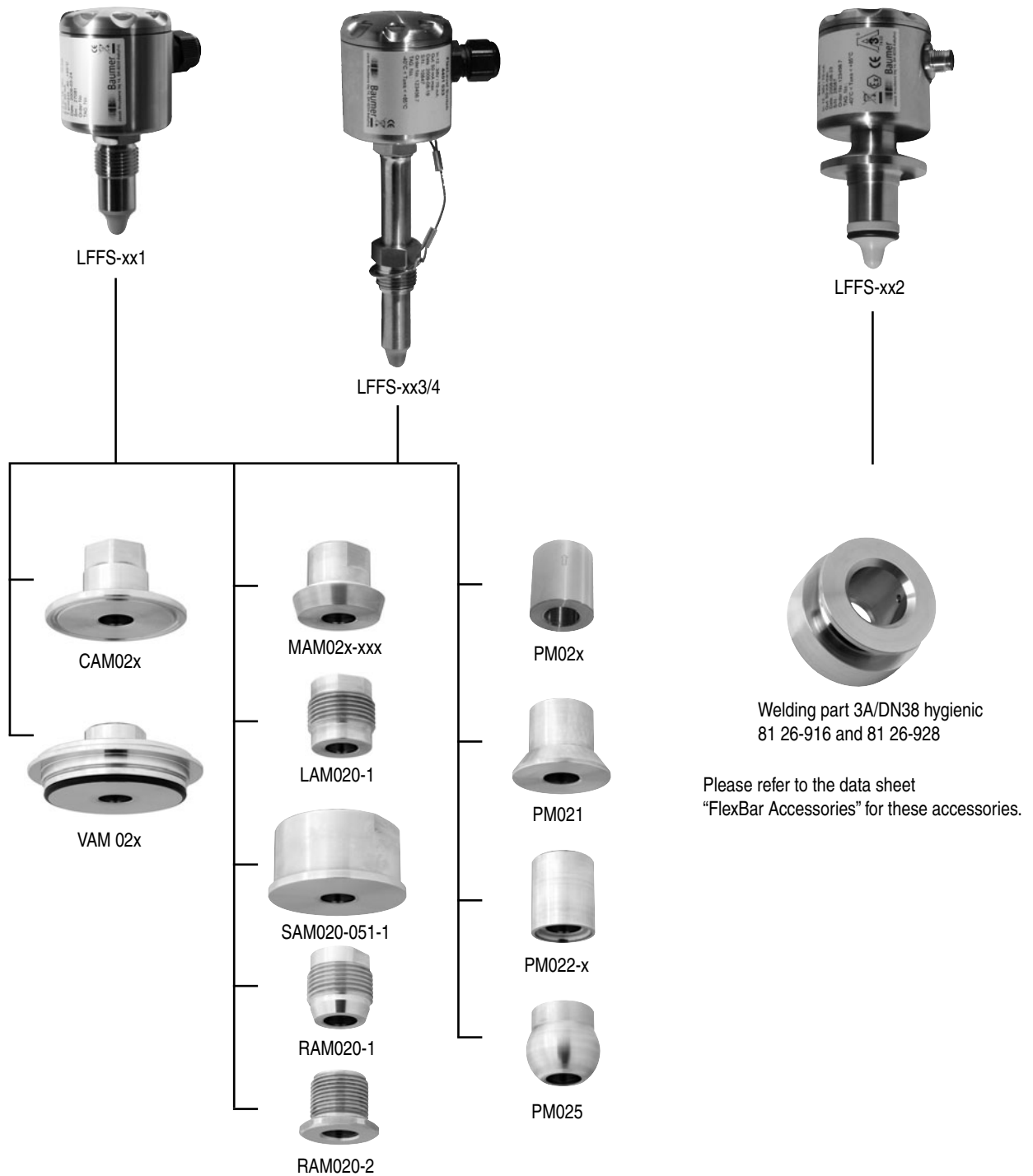
Media Temperature versus External Length of Sliding Connection (Curve 1)

Media Temperature
 $^{\circ}\text{C}$



NB: Std. + 3A/DN38 = 35 mm external length

Accessories - Overview



Please refer to the data sheet
"Accessories Universal" for these
accessories.

Ex ia G - Installation

A Level Switch LFFS-1xx 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 tD - Installation

A Level Switch LFFS-2xx is Ex tD A20 IP67 T100°C, 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

A Level Switch LFFS-3xx 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 (Table 1)

Connection Type	Tamb °C	Media Temp. max. °C	Note
Std. & 3A/DN38	-40...85	85	
	-40...60	95	{2}
	-40...40	115	{2}
Sliding 100 mm	-40...85	85	
	-40...60	150	{2}
	-40...40	175	{2}
Sliding 250 mm	-40...85	85	
	-40...60	195	{2}
	-40...40	200	{2} {3}

Note {2}: Provided that the sensor tip at the instrument is the only part in contact with the media.

Note {3}: Max. allowed media temperature.

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