PRODUCT INFORMATION

TDR Level Sensor LFP

The clean solution

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The clean solution

Hygienic

Product description

The LFP is a hygienic level sensor for liquids using TDR technology – a process for determining the time of flight of electromagnetic waves. The time difference between the sent pulse and the reflected pulse is used to generate a level signal, both as a continuous value (analog output) and a freely positionable switching point (switching output). The use of robust FDA-compliant materials like stainless steel in an EHEDG-certified design means that the LFP guarantees optimal, unrestricted cleaning, even for the highest hygiene requirements. Its modular connection system allows simple and flexible installation in any application. Thanks to high temperature and pressure resistance, unrestricted use is possible under CIP and SIP conditions. The communication capability via IO-Link to the superordinate control units rounds off the profile.

At a glance

- Level monitoring in hygienic applications
- Manually cutable monoprobe up to 2,000 mm long with Ra ≤ 0.8 µm
- Process temperature up to 150 °C, process pressure up to 16 bar
- CIP/SIP resistant
- High enclosure rating IP 67 and IP 69K
- Interchangeable hygienic process connections
- 3-in-1: combined display, analog output and binary output
- Analog output 4 mA ... 20 mA / 0 V ... 10 V, switchable, plus two binary outputs

Your benefits

- Robust design increases service life
- High flexibility due to retractable probe and interchangeable connection concept
- Cost savings thanks to multiple output signals: one system for level detection and continuous level monitoring
- Maintenance-free and quick to commission, saving time and costs
- No calibration or recalibration required for commissioning, thus saving time and costs

Additional information

Detailed technical data

Features

Medium	Fluids
Measurement	Switch, continuous
Probe length	300 mm ... 2,000 mm
Process pressure	–1 bar ... +16 bar
Process temperature	–20 °C ... +150 °C
EHEDG approval	✔
Gost approval	✔
RoHS certificate	✔
WHG certificate	In preparation

Performance

Accuracy [1]	± 5 mm
Reproducibility [1]	< 2 mm
Resolution	< 2 mm
Dielectricity constante	≥ 5
Conductivity	No limitation
Inactive area at process connection [2]	25 mm
Inactive area at probe end [1]	10 mm

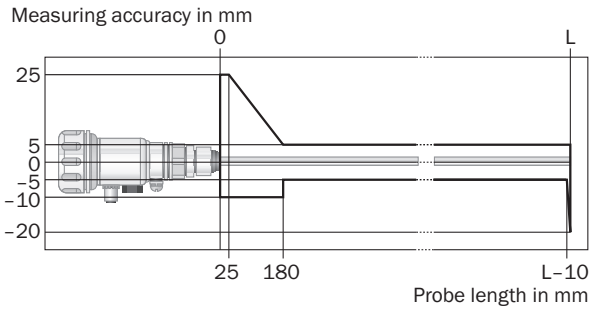
[1] With water under reference conditions.

[2] With parameterized tank with water under reference conditions, otherwise 40 mm.

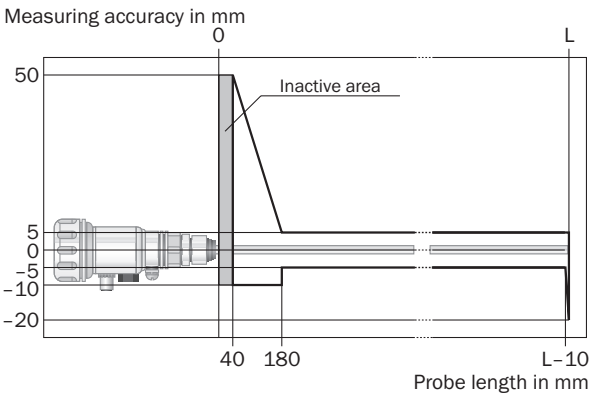
Mechanics

Wetted parts	316L (Ra ≤ 0,8 µm), PEEK
Process connection	G 3/4 (hygienic process connectors with adapter for G 3/4, see accessories), 3/4" NPT
Housing material	303
Max. probe load	6 Nm

Accuracy diagram with parameterized tank



Accuracy diagram without parameterized tank



Electronics

Supply voltage [1]	12 V DC ... 30 V DC
Power consumption	≤ 75 mA at 24 V without output load
Initialisation time	≤ 2 s
Protection class	III
Electrical connection	M12x1, 5-pin
Signal output [1]	Analog output 4 mA ... 20 mA, 0 V ... 10 V automatic switching to a current or voltage output depending on the load. 1 PNP transistor output (Q1) and 1 PNP/NPN transistor output (Q2) switchable.
Hysteresis [2]	Min. 2 mm, free adjustable
Signal voltage HIGH $Q_{1/2}$	V_s - 2 V
Signal voltage LOW $Q_{1/2}$	≤ 2 V
Output current $Q_{1/2}$	< 100 mA
Inductive load $Q_{1/2}$	< 1 H
Capacative load $Q_{1/2}$	< 100 nF
Response time	< 400 ms
Enclosure rating	IP 67: EN 60529, IP 69K: EN 40050
Temperature drift:	< 0.1 mm/K
Output load	4 mA ... 20 mA: < 500 Ohm at U_v > 13,5 V 4 mA ... 20 mA: < 400 Ohm at U_v > 12 V 0 V ... 10 V: > 750 Ohm at U_v ≥ 14 V
Lower signal level Q_A	3.8 mA ... 4 mA / 0 V
Upper signal level Q_A	20 mA ... 20.5 mA / 10.5 V
EMC	EN 61326-1:2006, 2004/108/EG
Interference resistance	EN 61000-6-2:2005
Interference emission	EN 61000-6-4:2007

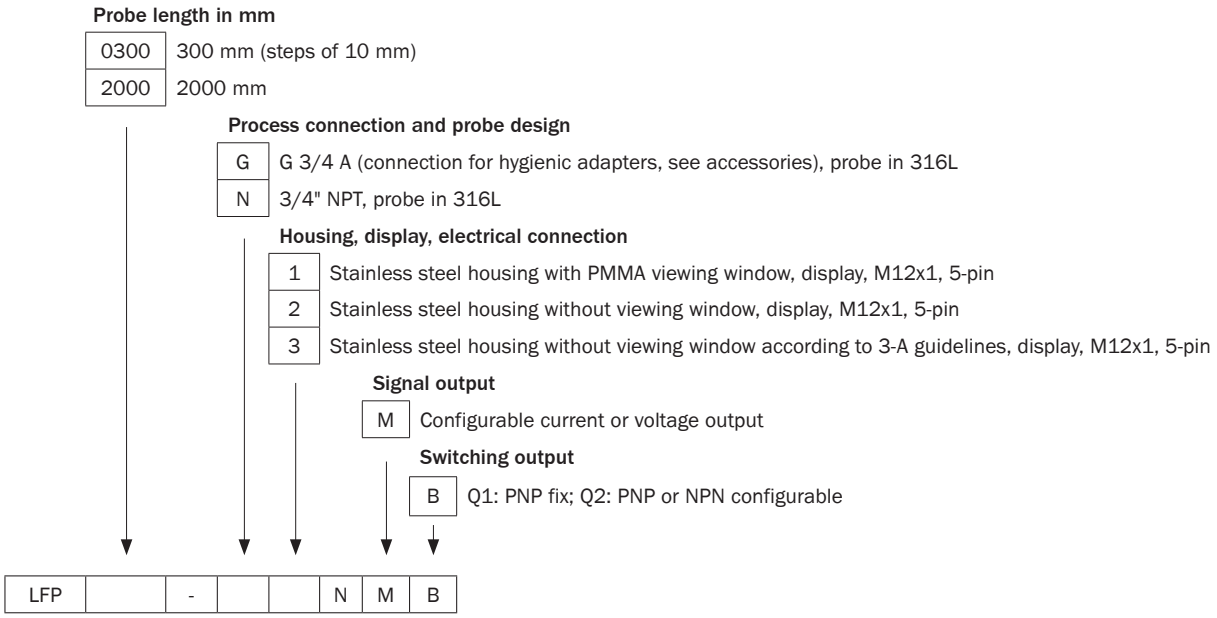
[1] All connections are polarity protected. All outputs are overload and short-circuit protected.

[2] Min. 2 mm, free adjustable.

Ambient data

Ambient temperature, operation	–20 °C ... +60 °C
Ambient temperature, storage	–40 °C ... +80 °C

Type code



Ordering information

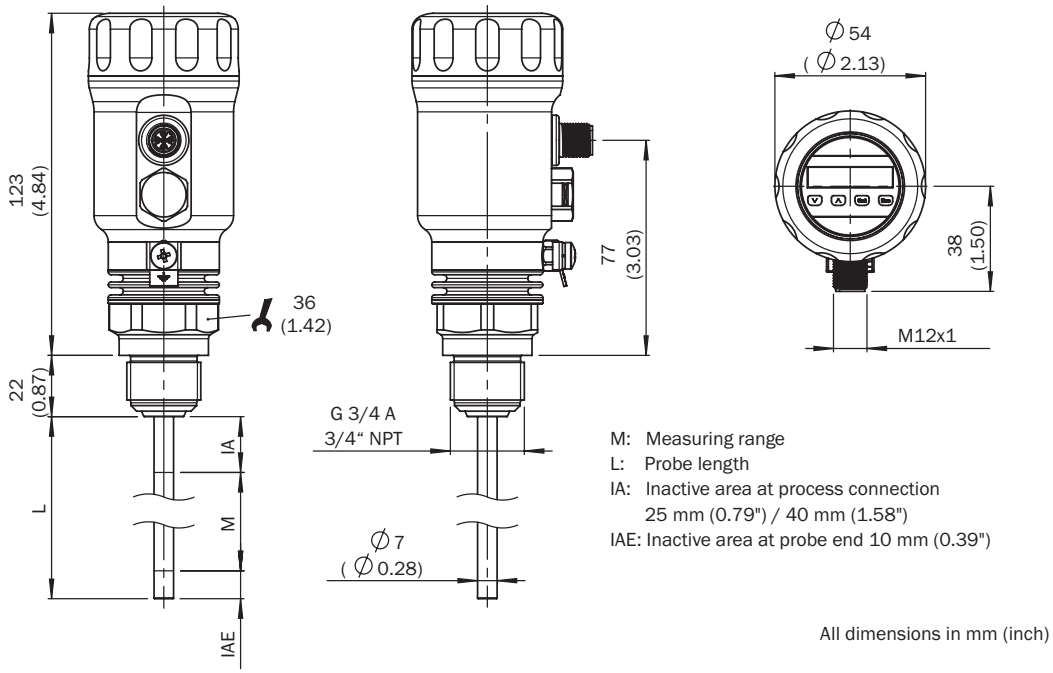
The part numbers below show a selection of our common configurations and represent only an extract of the product portfolio.

LFP

- **Signal output:** 1x PNP+1x PNP/NPN + 4 mA ... 20 mA / 0 V ... 10 V
- **Process connection:** G 3/4 A
- **Process temperature:** –20 °C ... +150 °C
- **Process pressure:** –1 bar ... +16 bar
- **Housing, display, electrical connection:** Stainless steel housing with PMMA viewing window, display, M12x1, 5-pin
- **Enclosure rating:** IP 67, IP 69K

Probe length	Model name	Part No.
300 mm	LFP0300-G1NMB	1053288
400 mm	LFP0400-G1NMB	1052069
500 mm	LFP0500-G1NMB	1052070
600 mm	LFP0600-G1NMB	1052071
700 mm	LFP0700-G1NMB	1052072
800 mm	LFP0800-G1NMB	1052073
900 mm	LFP0900-G1NMB	1052074
1,000 mm	LFP1000-G1NMB	1052075
1,100 mm	LFP1100-G1NMB	1052076
1,200 mm	LFP1200-G1NMB	1052077
1,300 mm	LFP1300-G1NMB	1052078
1,400 mm	LFP1400-G1NMB	1052079
1,500 mm	LFP1500-G1NMB	1052080
1,600 mm	LFP1600-G1NMB	1052081
1,700 mm	LFP1700-G1NMB	1052082
1,800 mm	LFP1800-G1NMB	1052083
1,900 mm	LFP1900-G1NMB	1052084
2,000 mm	LFP2000-G1NMB	1052085

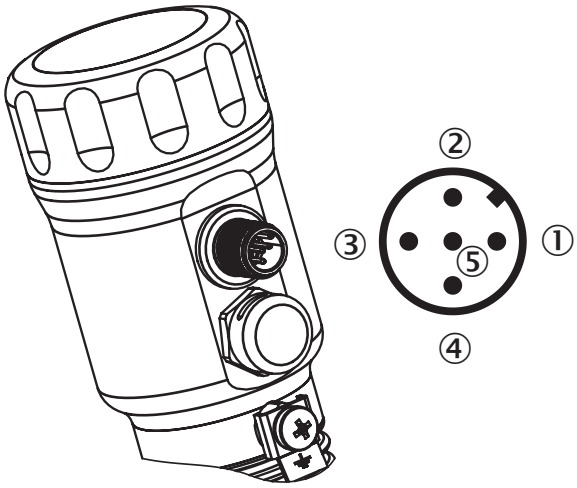
Dimensional drawing



M: Measuring range
L: Probe length
IA: Inactive area at process connection
25 mm (0.79") / 40 mm (1.58")
IAE: Inactive area at probe end 10 mm (0.39")

All dimensions in mm (inch)

Connection type / diagram



① L^+: Supply voltage, brown
② Q_A: Analog current-/voltage output, white
③ M: Ground, OUT- for current-/voltage output, blue
④ C/Q_1: Switching output 1, PNP/IO-Link-communication, black
⑤ Q_2: Switching output 2, PNP/NPN, grey

Recommended accessories

Flanges, flange plates

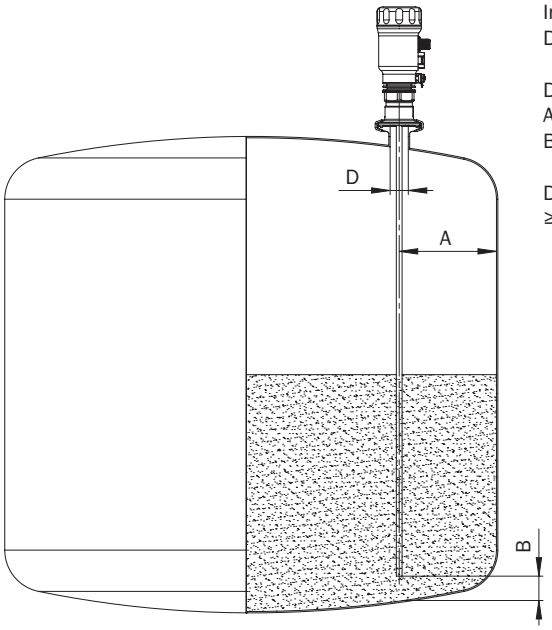
	Brief description	Process connection	Model name	Part No.
	Hygienic process connection adapter for LFP with G 3/4	Coupling (DIN 11864-1) DN 25 form A with union nut	BEF-HA-641D25-LFP1	2058795
		Flange (DIN 11864-2) DN 25 form A	BEF-HA-642D25-LFP1	2058823
		Clamp (DIN 11864-3) DN 25 form A	BEF-HA-643D25-LFP1	2058821
		Conical coupling (DIN 11851) DN 25 with union nut	BEF-HA-851D25-LFP1	2058138
		Conical coupling (DIN 11851) DN 40 with union nut	BEF-HA-851D40-LFP1	2058139
		Conical coupling (DIN 11851) DN 50 with union nut	BEF-HA-851D50-LFP1	2058141
		Tri-Clamp 1" and 1 ½"	BEF-HA-TCLI10-LFP1	2058808
		Tri-Clamp 2"	BEF-HA-TCLI20-LFP1	2058824
Hygienic adapter for LFP with G 3/4“ and 3-A housing		Tri-Clamp 1“ and 1 ½“ with leakage indication port according to 3-A guidelines	BEF-HA-TCLI10-LFP3	2058851

Plug connectors and cables

Brief description	Model name	Part No.
Power supply cable IP 69K, with 5-pin M12 socket (straight) / open end, 2 m, PVC	DOL-1205-G02MN	6028140
Power supply cable IP 69K, with 5-pin M12 socket (straight) / open end, 5 m, PVC	DOL-1205-G05MN	6028141
Power supply cable IP 69K, with 5-pin M12 socket (straight) / open end, 10 m, PVC	DOL-1205-G10MN	6028142

Installation instructions

Installation in a metal tank



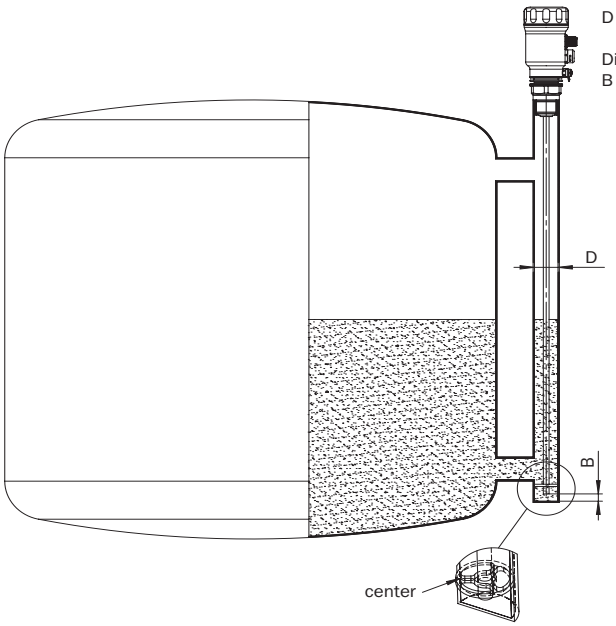
Installation in nozzle:
Diameter D ≥ DN 25

Distance tank wall/tank bottom:
A ≥ 50 mm
B ≥ 15 mm

Distance to other tank fittings
≥ 100 mm

In a 3-A compliant installation, the neck height shouldn‘t be bigger than the neck diameter. Tank, pipe and process connection (tank side) should follow the guidelines and applicable standards for hygienic design such as roughness of wet parts Ra< = 0.8 µm.

Installation in a metal immersion tube or metal bypass



D ≥ DN 40

Distance to bypass/tank bottom
B ≥ 15 mm

Centering: To prevent contact between the probe and the bypass pipe during oscillations, the probe should be centered according to its length and depending on the diameter of the bypass pipe. To do this, it is necessary to insert one or two centering pieces (see accessories). The use of LFP in bypass and immersion tube systems are not hygienic, because these systems are very difficult to clean.

Tank welds can affect the measurement accuracy.

Notes

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