Level sensor
Magnetostrictive, high-resolution measurement principle
Model FLM-H, for sanitary applications

Applications

- Food and beverage industry
- Pharmaceutical industry
- Biotechnology
- Level measurement in fermenters

Special features

- Fully welded and dead-space free
- Operating limits:
  - Operating temperature: T = -40 ... +250 °C
  - Operating pressure: P = Vacuum to 10 bar
- Insensitive to foaming, ideal for interface measurement
- High-precision level measurement: Accuracy < 0.5 mm
- Wide variety of hygienic process connections

Level sensor, model FLM-H

Description

The model FLM-H magnetostrictive sensor has been specifically designed for the requirements of the food and beverage, pharmaceutical and biotechnology industries. The sensor is particularly suitable for the special conditions of CIP/SIP cleaning processes, such as chemical stability towards cleaning liquids and high temperatures.
The guide tube is directly welded to the process connection. This guarantees a crevice-free joint, additional sealings are not required.

The sensor is supplied with a DC voltage of 10 ... 30 V. Available electronic output signals are 4 ... 20 mA or 4 ... 20 mA with HART® signal.

The hygienically designed sensor housing, with an ingress protection of up to IP68, offers a secure protection for external cleaning with splash water and enables its use in high-humidity environments.
The model FLM-H sensor fulfils the high demands of sanitary applications. It is marked with the 3-A symbol and current version number, as it conforms, based on a third party verification, to the 3-A standard.

Data sheets showing similar products:
Level sensor, magnetostrictive; for the process industry; models FFG, FLM-H; see data sheet LM 20.01
Level sensor, with reed measuring chain, for the process industry; model FLR; see data sheet LM 20.02

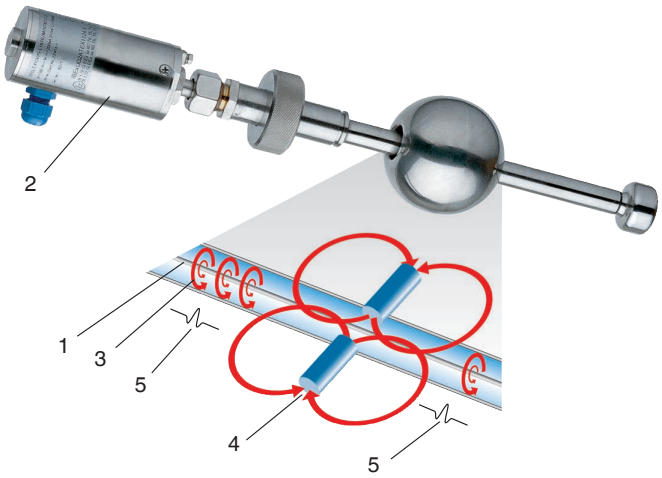
Further special features

- Large range of application due to the simple, proven functional principle
- For harsh operating conditions, long service life
- Continuous measurement of levels, independent of physical and chemical changes of the media such as: Foaming, conductivity, dielectric, pressure, vacuum, temperature, vapours, condensation, bubble formation, boiling effects, density change
- Signal transmission over long distances
- Simple installation and commissioning, onetime calibration only, no recalibration necessary
- Level displayed proportional to volume or height

Options

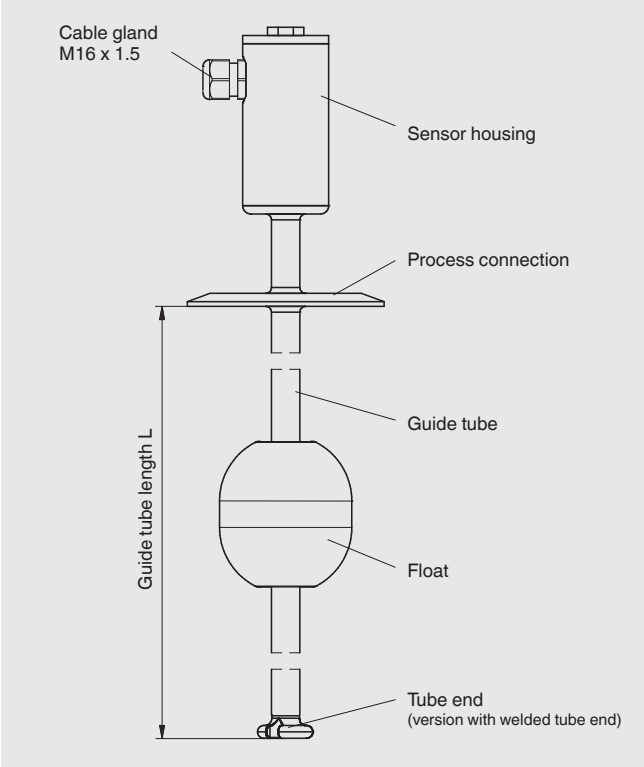
Customer-specific solutions

Illustration of the principle



Legend
1 Wire
2 Sensor housing
3 Magnetic field
4 Permanent magnet
5 Torsional wave

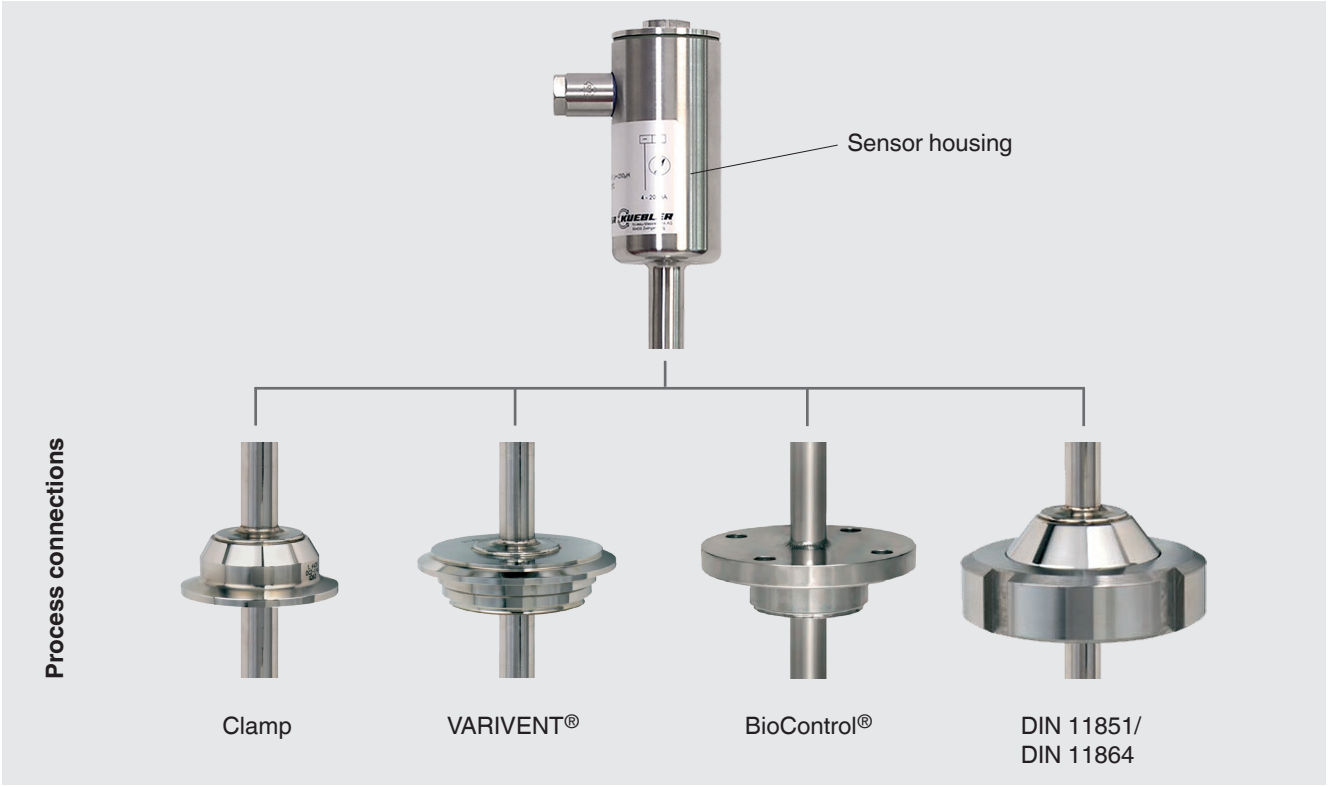
Components of the level sensor



Design and operating principle

- The measuring process is triggered by a current impulse. This current produces a circular magnetic field (3) along a wire (1) made of magnetostrictive material fixed in the guide tube.
- At the point being measured (liquid level) there is a float with permanent magnets (4) acting as a position transducer.
- The superposition of these two magnetic fields triggers a mechanical torsional wave (5) in the wire.
- This is converted into an electrical signal at the end of the wire in the sensor housing by a piezoceramic converter.
- The measured propagation delay enables the origination point of the mechanical wave, and thus the float position, to be determined with high accuracy.

Overview of the process connections



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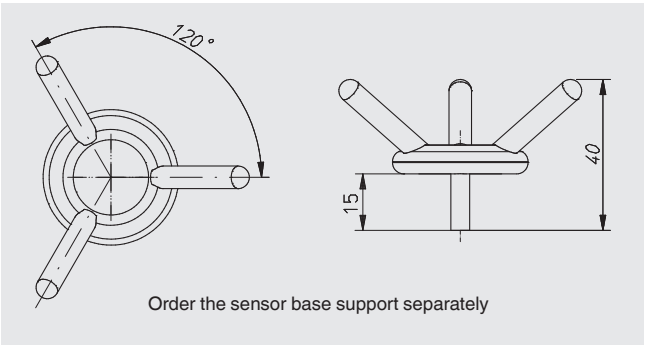
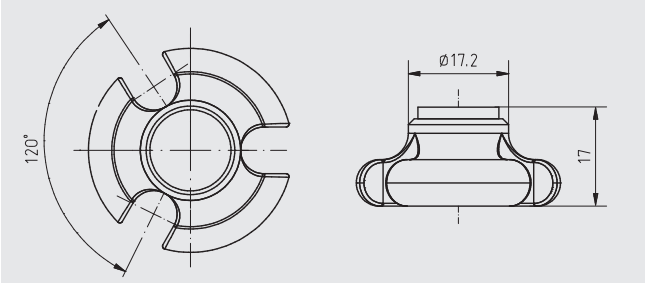
BioControl® is a registered trademark of the company NEUMO.

Tube ends

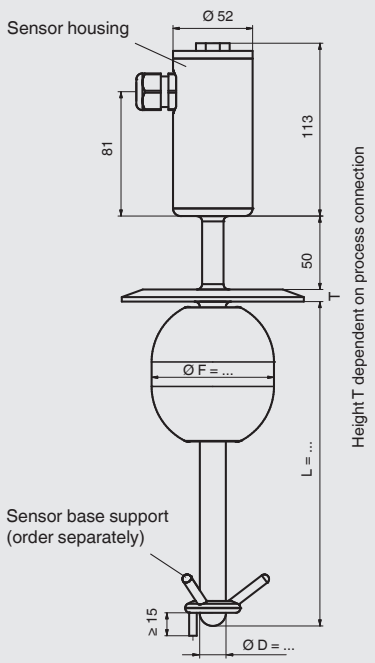
Version with separate sensor base support
This sensor base support is welded “separately” at the bottom of the tank. When mounting the sensor, the guide tube with the float can be fitted into the sensor base support inside the vessel to fix it. Thus the float is held in position and serves as a position transducer for the level. With stirring movement within the container, the sensor is fixed. Additional advantage: If the cover of the process vessel is large enough and the float can be placed onto the sensor, then small process connections can be used.



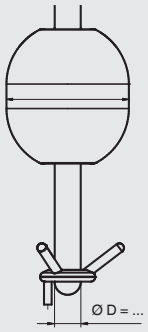
Version with welded tube end
This tube end is fully welded at the end of the guide tube and offers a dead-space free end to the sensor guide tube. The geometry of the end of the guide tube enables CIP/ SIP cleaning. This variant can be selected when the sensor including the float (taking into account the float diameter) can be mounted through the process connection.



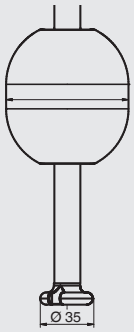
Level sensor, sterile version, model FLM-H



Version with separate sensor base support



Version with welded tube end



	Separate sensor base support	Welded tube end
Electrical connection	Sensor housing: material stainless steel 1.4305, with cable gland M16 x 1.5, polyamide or hygienic design	
Process connection	■ Clamp connection ISO 2852 (DN 32 ... DN 100 or 1.5" ... 4") ■ Clamp connection DIN 32676 (DN 32 ... DN 100 or 1.5" ... 4") ■ Aseptic mounting thread downwards DIN 11864-1 (DN 32 ... DN 100 or 1.5" ... 4") ■ Aseptic liner DIN 11864-1 (DN 32 ... DN 100 or 1.5" ... 4") ■ Aseptic flange connection DIN 11864-2 (DN 32 ... DN 50 or 1.5" ... 2") ■ Aseptic clamp connection DIN 11864-3 (DN 32 ... DN 100 or 1.5" ... 4") ■ VARIVENT® (form F, N and G) ■ BioConnect® threaded connection (DN 32 ... DN 100 or 1.5" ... 2") ■ BioConnect® flange connection (DN 32 ... DN 100 or 1.5" ... 2") ■ BioConnect® clamp connection (DN 32 ... DN 100 or 1.5" ... 2")	
Guide tube	Material: Stainless steel 1.4435 (316L) or 1.4404 (316L) Surface ground and polished, $R_a \leq 0.8$ µm or $R_a \leq 0.4$ µm, alternatively electropolished	
Guide tube diameter	12, 14 or 17.2 mm	
Max. guide tube length L	6,000 mm	
Float	Material: Stainless steel 1.4435 (316L) or 1.4404 (316L) Surface ground and polished, $R_a \leq 0.8$ µm or $R_a \leq 0.4$ µm, alternatively electropolished Float diameter: 50 or 80 mm Float selection depending on guide tube diameter	
Density range Float diameter 50 mm Float diameter 80 mm	 1,000 ... 1,860 kg/m³ 770 ... 1,162 kg/m³	
Max. operating pressure	10 bar	
Temperature range Medium (standard) Ambient temperature at the sensor housing Storage temperature	 -40 ... +250 °C -40 ... +85 °C -20 ... +60 °C	
Output signal	4 ... 20 mA, HART®	
Power supply	DC 10 ... 30 V	
Measurement accuracy	< ±0.5 mm	
Resolution	< 0.1 mm	
Load	max. 900 Ω at 30 V	
Mounting position	Vertical ±30°	
Ingress protection	IP68 per IEC/EN 60529	

Approvals

Logo	Description	Country
	3-A Sanitary Standard This instrument is 3-A marked, based on a third party verification for conformance to the 3-A standard.	USA

Manufacturer‘s information and certificates

Logo	Description
	SIL 2 Functional safety

Certificates (option)

- 2.2 test report
- 3.1 inspection certificate

Approvals and certificates, see website

Ordering information

Model / Version / Cable gland / Process connection / Guide tube diameter / Guide tube length (insertion length) L / 100 % mark L_1 / Measuring range M (span 0 ... 100 %) / Process specifications (operating temperature and pressure, limit density) / Options

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