

TORRIX

Magnetostrictive
level sensor 



Precision



Versatility



Security

FAFNIR – Quality and Satisfaction

Company:

Based in Hamburg, Germany, FAFNIR GmbH has over 45 years of experience in the development and production of filling safety devices, overfill prevention devices, limit signal controllers and continuous level gauging solutions for all types of liquids.

The optimisation of process controls, improvements in cost-efficiency and the protection of people and the environment are at the heart of our business.

Our close and trusting relationship with our customers is a key factor in the practice-orientated implementation of innovative ideas and the functionality of our products.



Quality for your Satisfaction:

To provide all our customers with consistently high quality products, FAFNIR has been operating an internationally recognised, comprehensive quality management system compliant with ISO 9001 (EN 29001) for many years. Our expertise in the development and manufacture of explosion-proof equipment is certified by an independent body. All our products are subject to strict FAFNIR quality requirements. We are committed to meeting international standards and applicable EU directives.



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TORRIX

For precision level gauging

The TORRIX level sensor operates on the high precision magnetostrictive measuring principle. This enables it to achieve an accuracy of up to ± 0.3 mm, placing it among the best in its class. Designed to provide continuous level gauging, TORRIX is integral to the quality assurance and safety of your process.

TORRIX is compatible with all liquid media, but is particularly suited to level gauging applications that require a high degree of precision.

Tried and tested in the following industries:

Chemical, petrochemical, liquid gas, pharmaceutical, laboratory, off-shore, ship building, power plants, energy systems, mechanical engineering, treatment of process water and drinking water.



**Quality assurance
and safety in
your process!**

Benefits of FAFNIR technology

- Easy to install and set up
- Maintenance-free
- Simultaneous measurement of the separation layer and the level via HART®
- Temperature-compensated measuring principle
- 2-wire terminal (4 to 20 mA)
- HART® protocol
- Short measuring intervals (50 measurements per second)
- Durability due to robust construction
- Shock and vibration-proof
- Measuring range freely adjustable along the entire probe length
- Application in Ex-zone 0 (ATEX, IECEx certificate)

TORRIX

Application and measuring principle

Application

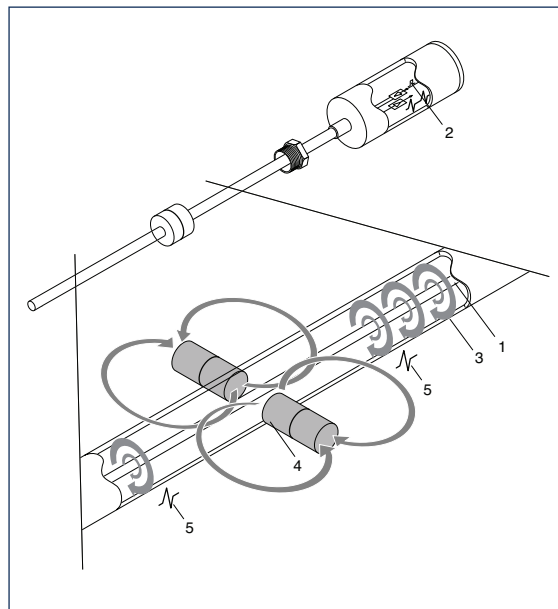


The level sensor's uncomplicated, float-based operating principle makes it compatible with a very wide range of applications. Levels can be gauged regardless of whether the media undergo any physical or chemical change of state. Changes in conductivity or permittivity have no impact on the measurement. Even bubble or foam formation, rising vapours or condensation and changes in process pressure or process temperature have no effect on measuring accuracy. Separation layers and total filling levels are both measurable.

Adjustment of the measuring probe according to liquid or the container type is not necessary, which eliminates the cost of a justification when liquid is changed.

If the accuracy of your reed switch sensor no longer meets your requirements, our TORRIX probe offers an outstanding alternative – we can usually provide a sensor with the same dimensions, float and process connection as your existing sensor.

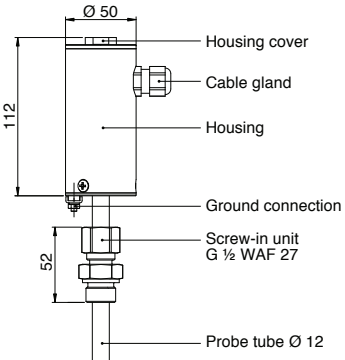
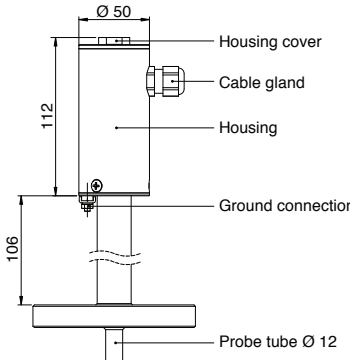
Measuring principle



The TORRIX probe tube contains a tensioned wire (1) made of magnetostrictive material. The sensor electronics transmit current pulses (2) through the wire, which generate a circular magnetic field (3). A magnet (4) contained in the float acts as the level sensor. The superposition of the two magnetic fields produces a torsional wave (5) at the float position, which then propagates along the wire. The time between the current pulse being transmitted and the wave arriving at the sensor head is measured. From these propagation times, it is possible to determine the current position of the float.

TORRIX

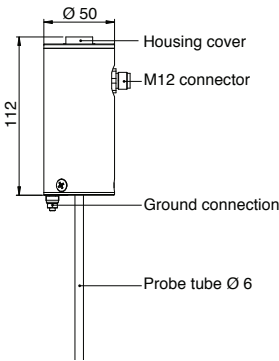
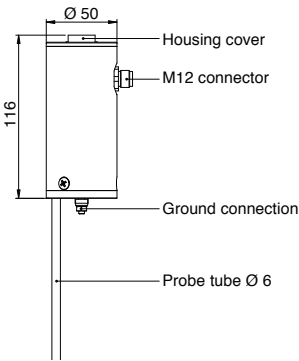
Technical data

Name	TORRIX	TORRIX flange
Technical drawing		
Process connection*	Height adjustable with screw-in unit: all common threads	Welded: all common threads and flanges
Probe head		
Protection class	IP68	
Material	Standard: stainless steel 303; optional: stainless steel 316 L	
Cable connection	M16 x 1.5 cable gland for cable diameter 5 to 10 mm; optional: 1/2" NPT-thread for conduit connection; M12 connector	
Ambient temperature	-40 °C to +85 °C	
Probe tube		
Material	Standard: stainless steel 316 Ti; optional: stainless steel 316 L, Hastelloy, titanium, tantalum, stainless steel 316 Ti coated	
Diameter	12 mm	
Length	200 mm to 6,000 mm Highest-temperature versions up to 3,000 mm	
Options	Vibration-resistant version, e.g. for use on tank trucks	
Accuracy		
Fill level	±0.5 mm or ±0.025 %, optional ±0.3 mm or ±0.01 %	
Resolution	0.1 mm	
Electrical connection		
Connection	2-wire	
Voltage	8 to 30 V _{DC} , Ex-version 10 to 30 V _{DC}	
Binary signal	Current output: 4 to 20 mA; optional: HART®	
HART® functions	Float position in mm, cm, m, inches or feet; positioning of second float; separation layer (difference between floats); sensorstatus-information	
Approvals	Optional: ATEX, IECEx approval	
Process conditions		
Temperature	Normal temperature (NT): -40 °C to +125 °C High temperature (HT): -40 °C to +250 °C Highest temperature (HHT): -40 °C to +450 °C Low temperature (LT): -65 °C to +125 °C	
Pressure**	0 bar to 120 bar (room temperature) 0 bar to 95 bar (250 °C) 0 bar to 82 bar (450 °C)	
Options	Material and calibration certificate	

* See order information page 8. ** Higher pressure range on request.

TORRIX 6

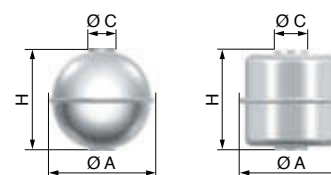
Technical data

Name	TORRIX 6	TORRIX 6 B
Technical drawing		
Process connection*	Height adjustable with screw-in unit: all common threads. Bottle caps for all common laboratory bottles, e.g. GL45	
Probe head		
Protection class	IP68	
Material	Standard: stainless steel 303; optional: stainless steel 316 L	
Cable connection	M16 x 1.5 screwed cable gland for cable diameter 5 to 10 mm; optional: M12 connector (see drawing)	
Ambient temperature	-40 °C to +85 °C	
Probe tube		
Material	Standard: stainless steel 316 Ti; optional: stainless steel 316 L, Hastelloy, titanium, tantalum	
Diameter	6 mm	
Length	200 mm to 1,000 mm	
Accuracy		
Fill level	0.75 mm or ± 0.025 %	
Resolution	0.1 mm	
Electrical connection		
Connection	2-wire	
Voltage	8 to 30 V _{DC} , Ex-version 10 to 30 V _{DC}	
Binary signal	Current output: 4 to 20 mA; optional: HART®	
HART® functions	Float position in mm, cm, m, inches or feet; sensor status information	
Approvals	Optional: ATEX, IECEx approval	
Process conditions		
Temperature	Normal temperature (NT): -40 °C to +125 °C	
Options	Material and calibration certificate	
Float**	External diameter: 27 mm; for media with a density < 0.75 g/mm ³ ; Process pressure max. 19 bar	

* See order information page 8. ** Other floats on request.

Floats and process connections

Floats (excerpt)



For medium density	Float density	Temperature range	Max. operating pressure	Dimensions in mm			Shape	Order number
				A	H	C		
Stainless steel 316 Ti								
≥0.95 g/cm ³	<0.85 g/cm ³	-200 °C to +250 °C	50 bar	43.0	40.0	15.0	Sphere	909115
≥0.85 g/cm ³	<0.75 g/cm ³	-200 °C to +250 °C	20 bar	43.0	40.0	15.5	Sphere	909130
≥0.70 g/cm ³	<0.60 g/cm ³	-200 °C to +250 °C	40 bar	52.0	52.0	15.5	Sphere	900013
≥0.60 g/cm ³	<0.50 g/cm ³	-200 °C to +250 °C	20 bar	52.0	49.0	15.5	Sphere	909109
≥0.45 g/cm ³	<0.36 g/cm ³	-40 °C to +250 °C	25 bar	83.0	82.0	15.0	Sphere	909229
≥0.70 g/cm ³	<0.60 g/cm ³	-200 °C to +250 °C	16 bar	43.0	43.0	15.5	Cylinder	909119
≥0.70 g/cm ³	<0.60 g/cm ³	-200 °C to +250 °C	5 bar	29.5	40.0	12.5	Cylinder	908495
≥0.70 g/cm ³	<0.60 g/cm ³	-200 °C to +250 °C	1 bar	29.5	40.0	12.5	Cylinder	908528
TITANIUM								
≥0.50 g/cm ³	<0.40 g/cm ³	-200 °C to +250 °C	20 bar	50.0	48.0	15.4	Sphere	909113
≥0.40 g/cm ³	<0.30 g/cm ³	-40 °C to +125 °C	25 bar	83.0	81.0	15.0	Sphere	909140
≥0.50 g/cm ³	<0.42 g/cm ³	-40 °C to +125 °C	25 bar	98.0	96.0	23.0	Sphere	909177
≥0.69 g/cm ³	<0.59 g/cm ³	-200 °C to +450 °C	200 bar	60.0	59.0	14.5	Sphere	909205

Other floats on request.

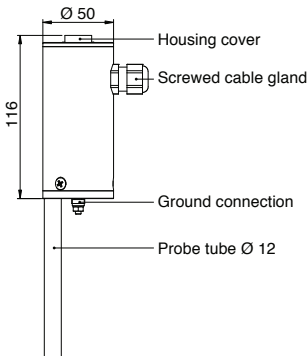

Process connections (excerpt)

Fittings, flanges and threads			
Description	Material	Thread	Order number
Fitting for standard probes Ø 12 mm			
Screw-in unit	Brass	R 1½	909097
Screw-in unit	316 Ti	G ½	909092
Screw-in unit (Swagelok)	316	NPT ½"	909117
Screw-in unit (Swagelok)	316	NPT ¾"	909228
Fitting for 6 mm probes			
Screw-in unit	316 Ti	G ¾	909250
Laboratory bottle caps	PTFE/PP	GL45	905632
Canister caps	PTFE/PP	S60/S61	905633
Flange			
2" ANSI, 150 lbs	316 Ti		909245
3" ANSI, 150 lbs	316 Ti		909237
DN 25, PN 6, DIN 2527, Form B	316 Ti		909238
DN 50, PN 16, DIN 2527, Form C	316 Ti		909243
DN 65, PN 16, DIN 2527, Form C	316 Ti		909247

Other fittings and flanges on request.

TORRIX Bypass

Technical data

Name		TORRIX Bypass	
Technical drawing	 <p>Technical drawing showing dimensions and components: Housing cover (Ø 50), Screwed cable gland, Ground connection, and Probe tube Ø 12. The height of the housing is 116 mm.</p>	 <p>Photograph of the TORRIX Bypass probe head.</p>	
Process connection	None, for installation on a magnetic level indicator		
Probe head			
Protection class	IP68		
Material	Standard: stainless steel 303; optional: stainless steel 316 L		
Cable connection	M16 x 1.5 cable gland for cable diameter 5 to 10 mm; optional: ½" NPT for conduit connection; M12 connector		
Ambient temperature	-40 °C to +85 °C		
Probe tube			
Material	Standard: stainless steel 316 Ti; optional: stainless steel 316 L		
Diameter	12 mm		
Length	200 mm to 6,000 mm Highest-temperature versions up to 3,000 mm		
Accuracy			
Fill level	Depending on bypass float, down to ±0.5 mm		
Resolution	0.1 mm		
Electrical connection			
Connection	2-wire		
Voltage	8 to 30 V _{DC} , Ex-version 10 to 30 V _{DC}		
Binary signal	Current output: 4 to 20 mA; optional: HART®		
HART® functions	Float position in mm, cm, m, inches or feet; sensorstatus-information		
Approvals	Optional: ATEX, IECEx approval		
Process conditions			
Temperature	Normal temperature (NT): -40 °C to +125 °C High temperature (HT): -40 °C to +250 °C Highest temperature (HHT): -40 °C to +450 °C Low temperature (LT): -65 °C to +125 °C		
Options	Material and calibration certificate		

Accessories

HPH Ex d

Pressure resistant connection housing

The HPH Ex d is a flameproof enclosure „d“ with safety barriers for connecting Ex i sensors without an Ex power supply. The output signal can be shown in percentage unit at the optional display.

The display can be adjusted individually to face a number of directions, facilitating its reading.



Benefits of FAFNIR technology

- On-the-spot display of measured values
- Easy installation
- Robust construction
- Corrosion-resistant (stainless steel AISI 303)
- Energy restriction safety barrier
- Display position adjustable
- 10-mm-LED-display field

Technical data

Operating data:

- Ambient temperature: -40 °C to +85 °C
- Protection class: IP68
- Power supply: 14 to 27 V without display
17 to 30 V with display
- Voltage drop: ≤4 V without display; ≤7 V with display
- Accuracy: 0.1 % (4 to 20 mA)

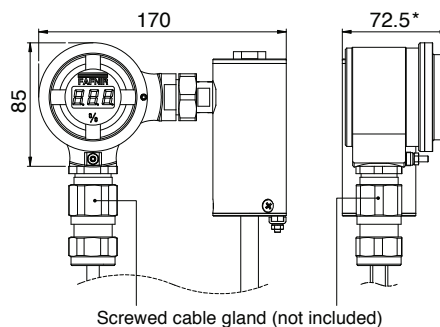
Display field:

- 3-digit display, 10 mm; 0.0 % (4 mA) to 100 % (20 mA)
- Display range: -9.9 % to +199 %

Output:

- Output signal: 4 to 20 mA
- Electrical connection: M 20 x 1.5 other threads on request
- suitable for ex-zone 1 (ATEX, IECEx approval)

Dimensions in mm:



- * with display: 72.5
- without display: 65.5

Accessories

UM-X

Field Display for Continuous Level Sensors

Field of application

The UM-X control unit in splash-proof housing is used wherever a convenient stand alone level gauge display is needed. It features 5 relay outputs, all of which have freely configurable switching thresholds.

The UM-X display in a field casing is used wherever a comfortable stand alone filling level indicator is necessary.

In addition the UM-X control unit has a compact design and can be connected directly to the mains.



Installation

The field displays (also UM-Ex and UM-O Ex) must be installed outside the explosion atmosphere.

Benefits of FAFNIR technology

- Easy menu-driven operation via graphic display
- Applicable for all sensors with 4-20 mA-interface
- Intrinsically safe sensor circuit ATEX approval (Ex ia)
- In combination with TORRIX, approved as overfill prevention (WHG)
- Up to five limit detections with relay output
- Pump control (alternating)
- Continuous display of filling level
- Filling levels can be displayed in mm, inches, % or mA
- Splash-proof housing (IP64)

Technical data

Version designations:

- UM-S: standard
- UM-O: approved as an overfill prevention device
- UM-Ex: intrinsically safe sensor circuit (Ex ia)
- UM-O Ex: approved as an overfill prevention device and with intrinsically safe circuit (Ex ia)

Operating data:

- Auxiliary power: 230 V, 24 V_{AC}; 24 V_{DC}
- Maximum power input: 7 W
- Ambient temperature: 0 °C to +50 °C
- Protection class: IP64

Sensor electrical circuit:

4 to 20 mA; U_{nominal} = 24 V; short-circuit-proof

Output:

Five relays each with floating changeover contact

- Load: AC: ≤250 V, ≤5 A, ≤500 VA,
DC: ≤30 V, ≤5 A, ≤150 W

Dimensions in mm:

H 130 x W 180 x D 50



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