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Process Automation



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**FAFNIR™**

# Process Automation

Level Sensors | Level Detectors | Overfill Prevention

Sensors and Systems: [www.bms-ltd.com](http://www.bms-ltd.com)



Accuracy



Flexible



Reliable

# TORRIX

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## The Accurate Solution for your Application: Magnetostrictive Level Sensor

The most adaptable level sensor in our range, TORRIX can be used across a multitude of sophisticated level measurement applications. Users benefit from quick and easy installation, proven reliability and simple troubleshooting. With its highly precise magnetostrictive measuring principle, TORRIX achieves outstanding accuracy of up to  $\pm 0.3$  mm, among the very best in its class.

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## Why Choose TORRIX?

### Quick and Precise

- + Easy to install; easy to use: TORRIX provides accurate level measurement across most stored liquids, saving your time and enabling to plan ahead for even the most challenging application
- + Simple field calibration and testing: No additional calibration equipment required.

### Solution for the Most Complex Applications

- + The solution for interface measurement: With its two floats, the sensor measures both the filling and the interface accurately, even when an emulsion layer is present at the interface or when there is only a small difference of the dielectric constant value
- + Flexible use: TORRIX can be installed almost anywhere with its small sensor head and tube with a diameter of just 6 mm

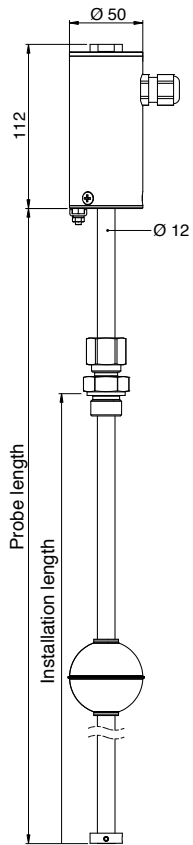
### Main Features and Benefits

- + Easy to install and configure
- + Measuring the interface and fill level via HART®
- + 2-wire terminal (4 ... 20 mA / HART®)
- + Robust long-life design
- + Versions available from 100 mm to 6,000 mm
- + Resistant to shock and vibration (OIML D11)
- + Use in Ex zone 0 (ATEX and IECEx approval)
- + SIL 2 certified

### Applications

- + Storage tanks and containers
  - + Interface measurements with emulsions
  - + Pilot plants and prototype systems
  - + Manufacturing plants
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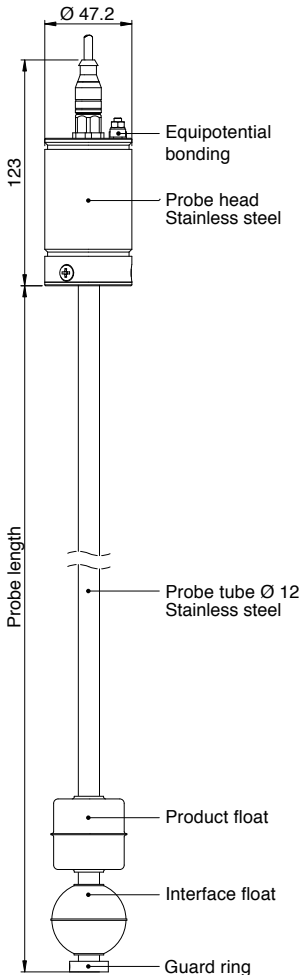
## TORRIX – Technical Data



<b>Probe head</b>	
Protection class	IP68
Material	Stainless steel 1.4305 (303)
Cable terminal	M16 x 1.5 cable gland for cable diameter 5 to 10 mm ½" NPT threads for conduit cabling; M12 connector
Ambient temperature	-40 °C ... +85 °C
<b>Probe tube</b>	
Material	Stainless steel 1.4571 (316Ti); Hastelloy® C4/C22; Titan
<b>Accuracy</b>	
Filling level	Up to $\pm 0.3$ mm or $\pm 0.01$ %
Resolution (HART®)	0.1 mm
<b>Electrical connection</b>	
Connection	2-wire
Voltage	8 ... 30 V <sub>DC</sub> , Ex version 10 ... 30 V <sub>DC</sub>
Signal	Output power: 4 ... 20 mA / HART® Failure mode in accordance with NAMUR NE43
HART® functions	Float position in mm, cm, m, inches or feet; positioning of second float; interface (difference between floats); sensor status information; remote configuration
<b>Process conditions</b>	
Temperature	Up to 450 °C
Pressure	Up to 120 bar
<b>Options</b>	
	Vibration-resistant design (to OIML D11) ATEX and IECEx approval Qualified for SIL 2 (IEC 61508)



## TORRIX RS485 – Technical Data

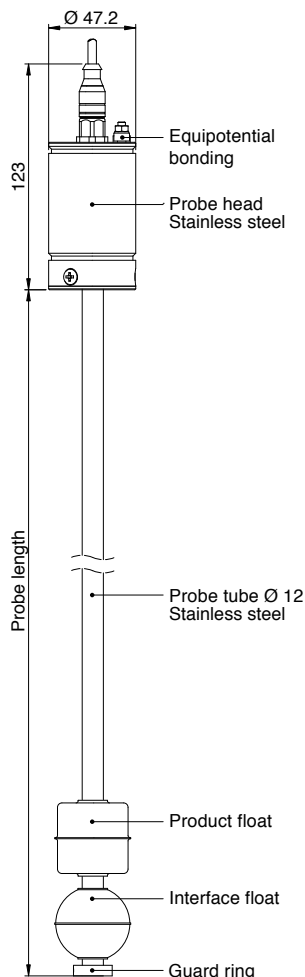


<b>Probe head</b>	
Protection class	IP68
Material	Stainless steel 1.4305 (303)
Cable terminal	M12 connector
Ambient temperature	-40 °C ... +85 °C
<b>Probe tube</b>	
Material	Stainless steel 1.4571 (316Ti)*
<b>Accuracy</b>	
Filling level	Up to $\pm 0.3$ mm or $\pm 0.01$ %
Temperature	Up to $\pm 0.3$ °C
<b>Electrical connection</b>	
Connection	4-wire with RS485 interface
Voltage	24 V <sub>DC</sub>
Protocol	Modbus (ASCII); FAFNIR Universal Device Protocol*
Functions	Positioning of up to two floats Temperature (optional) Sensor status information, configuration
<b>Process conditions</b>	
Temperature	Up to 450 °C For probes with integrated temperature sensors: -40 °C ... +85 °C
Pressure	Up to 120 bar
<b>Options</b>	
As Advanced version with increased measuring accuracy and 5 temperature sensors; (TORRIX RS485 and TORRIX RS485 flange) Vibration-resistant design (to OIML D11) ATEX and IECEx approval	

\* Others on request



## TORRIX SC – Technical Data



### Probe head

Protection class	IP68
Material	Stainless steel 1.4305 (303)
Cable terminal	M12 connector
Ambient temperature	-40 °C ... +85 °C

### Probe tube

Material	Stainless steel 1.4571 (316Ti)*
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### Accuracy

Filling level	Up to $\pm 0.3$ mm or $\pm 0.01$ %
Temperature	Up to $\pm 0.3$ °C

### Electrical connection

Connection	4-wire, serial interface
Voltage	$< 10 V_{DC}$
Protocol	FAFNIR serial protocol (LOGI-X and VISY-X)
Functions	Positioning of up to two floats Temperature (optional) Sensor status information, configuration

### Process conditions

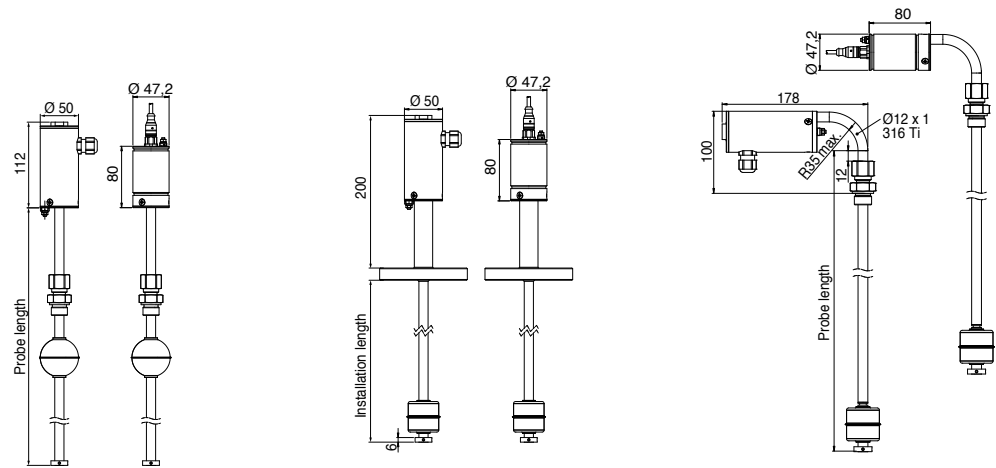
Temperature	Up to 450 °C For probes with integrated temperature sensors: -40 °C ... +85 °C
Pressure	Up to 120 bar

### Options

As Advanced version with increased measuring accuracy and 5 temperature sensors; (TORRIX SC and TORRIX SC flange)  
Vibration-resistant design (to OIML D11)  
ATEX and IECEx approval

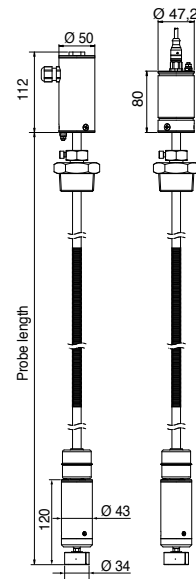
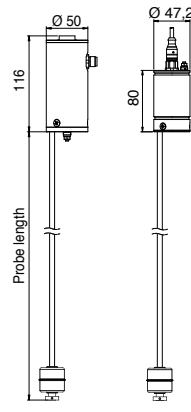
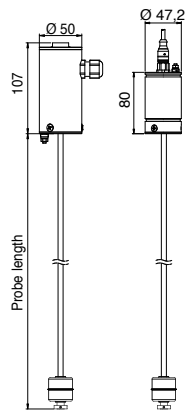
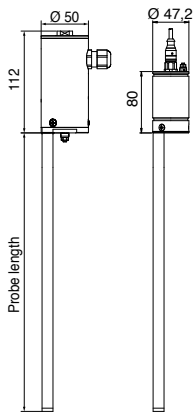
\* Others on request





Name	TORRIX	TORRIX Flange	TORRIX 90
Type	4 ... 20 mA / HART®; SC; RS485	4 ... 20 mA / HART®; SC; RS485	4 ... 20 mA / HART®; SC; RS485
Description	Our standard sensor, with a variable process fitting. The installation length can be adjusted directly on the tank during installation.	The process connection is airtight welded to the sensor. This makes it especially suitable for applications in toxic liquids or at high pressures and temperatures.	The sensor head is bent by 90° which reduces the needed head space significantly. The best solution where head space is limited, i.e. for barrels stored under a table or in a safety cabinet.
<b>Probe tube</b>			
Diameter	12 mm	12 mm	12 mm
Length	100 mm ... 6,000 mm Highest temperature version (HHT) up to 3,000 mm	100 mm ... 6,000 mm Highest temperature version (HHT) up to 3,000 mm	150 mm ... 1,000 mm
Accuracy	Standard: ±0.5 mm or ±0.025 % Precision: ±0.3 mm or ±0.010 % (only NT)	Standard: ±0.5 mm or ±0.025 % Precision: ±0.3 mm or ±0.010 % (only NT)	Standard: ±0.75 mm or ±0.025 %
<b>Process conditions</b>			
Temperature	Normal temperature (NT): -40 °C ... +125 °C High temperature (HT): -40 °C ... +250 °C Highest temperature (HHT): -40 °C ... +450 °C Low temperature (LT): -65 °C ... +125 °C Lowest temperature (LLT)*: -200 °C ... +85 °C	Normal temperature (NT): -40 °C ... +125 °C High temperature (HT): -40 °C ... +250 °C Highest temperature (HHT): -40 °C ... +450 °C Low temperature (LT): -65 °C ... +125 °C Lowest temperature (LLT)*: -200 °C ... +85 °C	Normal temperature (NT): -40 °C ... +85 °C
Pressure (probe tube)	-1 bar ... 120 bar (20 °C) -1 bar ... 95 bar (250 °C) -1 bar ... 82 bar (450 °C)	-1 bar ... 120 bar (20 °C) -1 bar ... 95 bar (250 °C) -1 bar ... 82 bar (450 °C)	-1 bar ... 120 bar (20 °C)
Minimum process connection	G 3/8"	DN 25	G 3/8"

\* Only as TORRIX M12. Pressure range -1 bar ... +3 bar.



**TORRIX Bypass**

**TORRIX 6**

**TORRIX 6B**

**TORRIX Flex T / F**

4 ... 20 mA / HART®;  
SC; RS485

4 ... 20 mA / HART®;  
SC; RS485

4 ... 20 mA / HART®;  
SC; RS485

4 ... 20 mA / HART®; SC;  
RS485; C (4 ... 20 mA)

Our best solution for mounting on the outside of a magnetic level indicator. The TORRIX Bypass picks up the magnetic field of the floater. The ideal solution for retrofitting most brands of magnetic level indicators.

Where space is limited, our compact version of the TORRIX is ideal for applications in small containers, such as in the lab or in pilot plants.

If there is just a little space on the container cap, the TORRIX 6B is the ideal solution, because the sensor head is not installed centrally.

The flexible version of our sensor for tall tanks. The sensor is shipped rolled in a compact package and then unrolled during installation.

12 mm

6 mm

6 mm

12 mm / 13 mm (Version T/F)

200 mm ... 6,000 mm  
Highest-temperature version (HHT) up to 3,000 mm

100 mm ... 1,000 mm

100 mm ... 1,000 mm

Version T:  
3,500 mm ... 10,000 mm /  
... 15,000 mm (SC; RS485; C)  
Version F:  
1,500 mm ... 5,000 mm

Standard: ±0.50 mm or ±0.025 %

Standard: ±0.75 mm or ±0.025 %

Standard: ±0.75 mm or ±0.025 %

Standard: ±2 mm or ±0.025 %

Normal temperature (NT):  
-40 °C ... +125 °C  
High temperature (HT):  
-40 °C ... +250 °C  
Highest temperature (HHT):  
-40 °C ... +450 °C  
Low temperature (LT):  
-65 °C ... +125 °C

Normal temperature (NT):  
-40 °C ... +125 °C

Normal temperature (NT):  
-40 °C ... +125 °C

Normal temperature (NT):  
-40 °C ... +85 °C

n.a.

-1 bar ... 16 bar (125 °C)

-1 bar ... 16 bar (125 °C)

-1 bar ... 2 bar (85 °C)

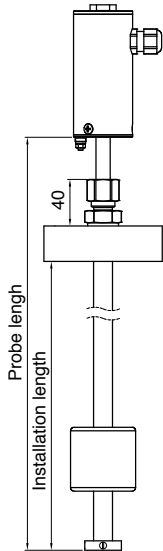
n.a.

G ¼"

G ¼"

G ¾"

## TORRIX Installation Kit



### Function

The installation kit consists of a jacketed pipe with process fitting and float. The installation kit is installed in the tank, and the TORRIX measuring sensor is then inserted into the jacketed pipe. TORRIX picks up the magnetic field of the float on the installation kit and can thereby determine the product filling level. The sensor does not come in contact with the medium.

### Aggressive liquids

The plastic installation kit (PP, PVDF, PVC) is the best solution for use in aggressive liquids, because it separates the TORRIX measuring sensor from the liquid.

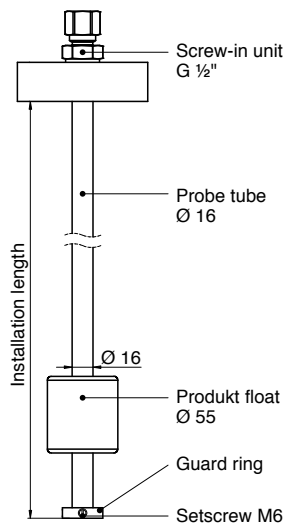
### Mobile containers

Applications in which containers or barrels are delivered to the customer by the supplier can be excellently monitored using an installation kit. TORRIX can be used to monitor the filling level constantly both when the supplier fills the tanks and when the customer draws from the tanks, without the need to open the container.

### Pressure tanks

The measuring sensor is located outside the pressurized area. This allows pressure testing without impeding sensor. The sensor can be installed or replaced later without the need to open the tank.

## Installation Kit Options



### For Applications in Aggressive Liquids

#### Probe tube

Length 150 mm ... 5,000 mm

Material PVDF, PP or PVC

#### Process conditions

Temperature PP: -20 °C ... +85 °C; PVC: -20 °C ... +60 °C; PVC: -20 °C ... +100 °C

Pressure Max. 1 bar

#### Minimum process connection

Thread G 2"; G 3"

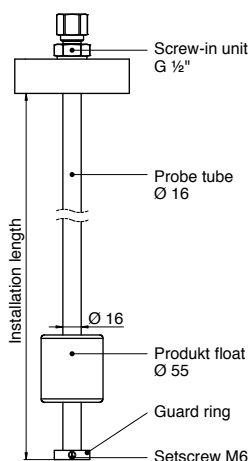
Flange DN65 to DN100

#### Product float

Shape Cylinder 55 x 69 mm

Material PVDF, PP or PVC

Medium density > 0.82 g/cm<sup>3</sup>



### For Applications in LPG Tanks

#### Probe tube

Length 150 mm ... 4,500 mm

Material Stainless steel 1.4571 (303)

#### Process conditions

Temperature -40 °C ... +85 °C

Pressure Max. 16 bar

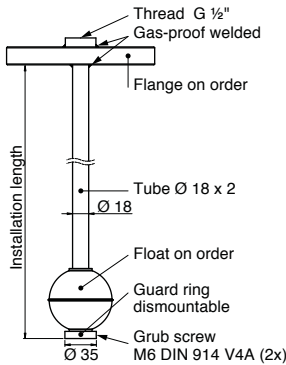
#### Product float

Shape Cylinder 40 x 120 mm

Material Buna

Medium density > 0.45 g/cm<sup>3</sup>

## Installation Kit Options



### Heavy-Duty Installation Kit

#### Probe tube

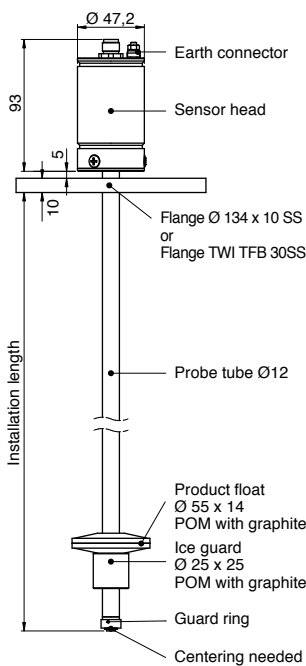
Length	1,000 mm ... 6,000 mm
Material	Stainless steel 1.4571 (303)
Diameter	18 x 2 mm
Minimum process connection	Welded flange or thread

#### Process conditions

Temperature	-40 °C ... +450 °C
Pressure	Max. 60 bar

## TORRIX VT – Technical Data

A vibration-resistant version for use in tank trucks, mobile tanks, tank wagons and other applications in which containers are subject to strong vibration.



#### Probe head

Protection class	IP68
Material	Stainless steel 1.4305 (303)
Cable terminal	M12 connector
Ambient temperature	-40 °C ... +85 °C

#### Probe tube

Material	Stainless steel 1.4571 (303)
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#### Accuracy

Filling level	0.5 mm or $\pm 0.025\%$
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#### Output signal

TORRIX CVT	4 ... 20 mA
TORRIX RS485VT	RS485 interface
TORRIX SCVT	Serial interface

#### Process conditions

Temperature	-40 °C ... +85 °C
Pressure	-1 bar ... +3 bar

#### Minimum process connection

Welded flange; welded thread;  
Tube fitting (cutting ring)

#### Configuration

Programming of TORRIX CVT with FAFNIR USB adapter (available separately)  
TORRIX RS485VT and TORRIX SCVT with programming software



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