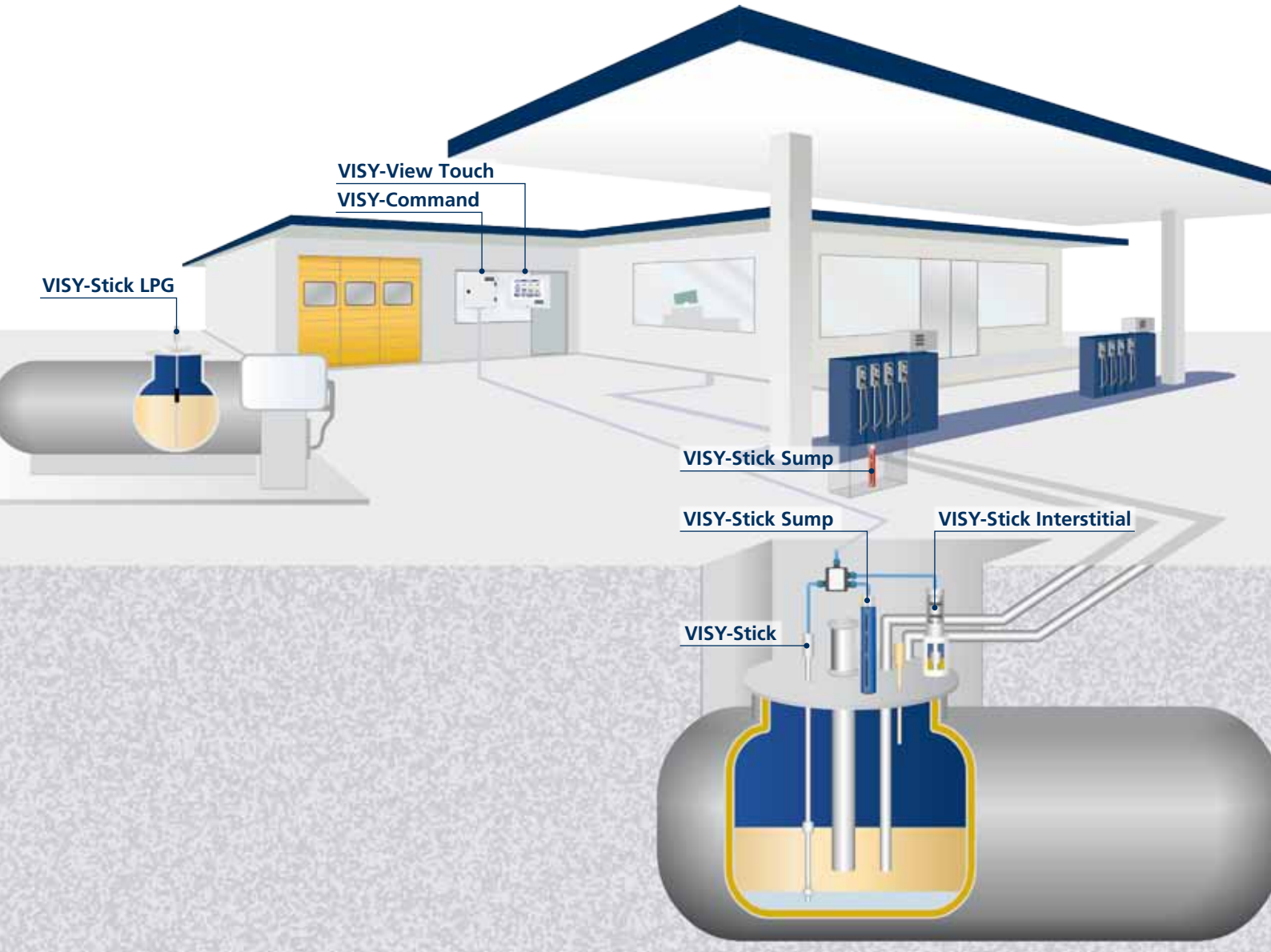
VISY-X

Automatic Tank Gauging System



FAFNIR – Quality and Satisfaction

Company:

FAFNIR GmbH, based in Hamburg, Germany, has over 45 years of experience in the development and production of filling safety devices, overfill prevention solutions, limit signal controllers and continuous level gauging solutions for all types of liquid.
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-oriented implementation of innovative ideas and the functionality of our products.

Quality for your satisfaction:

To provide all customers with products of consistently high quality, FAFNIR has for many years operated an internationally recognised, comprehensive quality management system that meets the requirements of ISO 9001 (EN 29001). 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.

TÜV NORD
TÜV NORD CERT GmbH
Production Quality Assurance
Notification acc. to 94/9/EG

CE Ex

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Content

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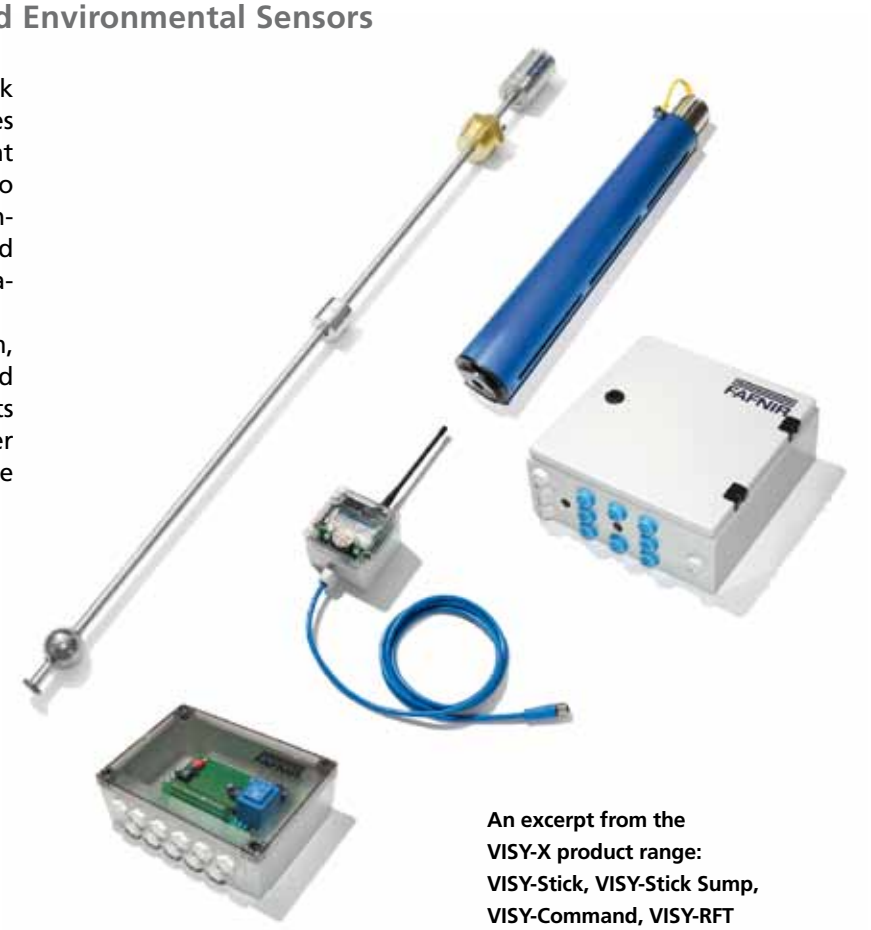
VISY-X

Tank Level Gauging and Environmental Sensors

The VISY-X system supplies tank level information. It improves cost efficiency and logistics at petrol stations and also helps to protect people and the environment. Through the integrated water detection it creates quality assurance.
In conjunction with the system, it offers real-time volume and leakage monitoring, and its support of remote data transfer makes it a high-quality resource management tool.



An excerpt from the VISY-X product range: VISY-Stick, VISY-Stick Sump, VISY-Command, VISY-RFT and VISY-Output

Application

VISY-X, the high-precision tank level gauging, is specially designed for use in fuel petrol stations. Its modular architecture, however, also makes it ideal for use as a tank content management for any area of industry in which mineral oil products are stored. VISY-X is suitable for both underground tanks and above-ground storage tanks.

Features of FAFNIR technology

- High-precision level and environmental sensors based on the magnetostrictive measuring principle
- In conjunction with remote data transfer, it is an efficient resource management tool
- Economical resource management of the petrol station network
- Permanent display of tank contents
- Continuous water level reading
- Delivery volume monitoring
- All parts with media contact are made of high-quality stainless steel
- Easy and cost-effective start-up
- Maintenance-free
- Connection to a wide range of cash systems (PoS) with proprietary interfaces
- Optional: IFSF-LON field bus technology
- Optional: wireless link with long battery life
- Worldwide approval: ATEX, NEPSI, IECEx and UL-Brasil
- Certificates: CPA, EPA

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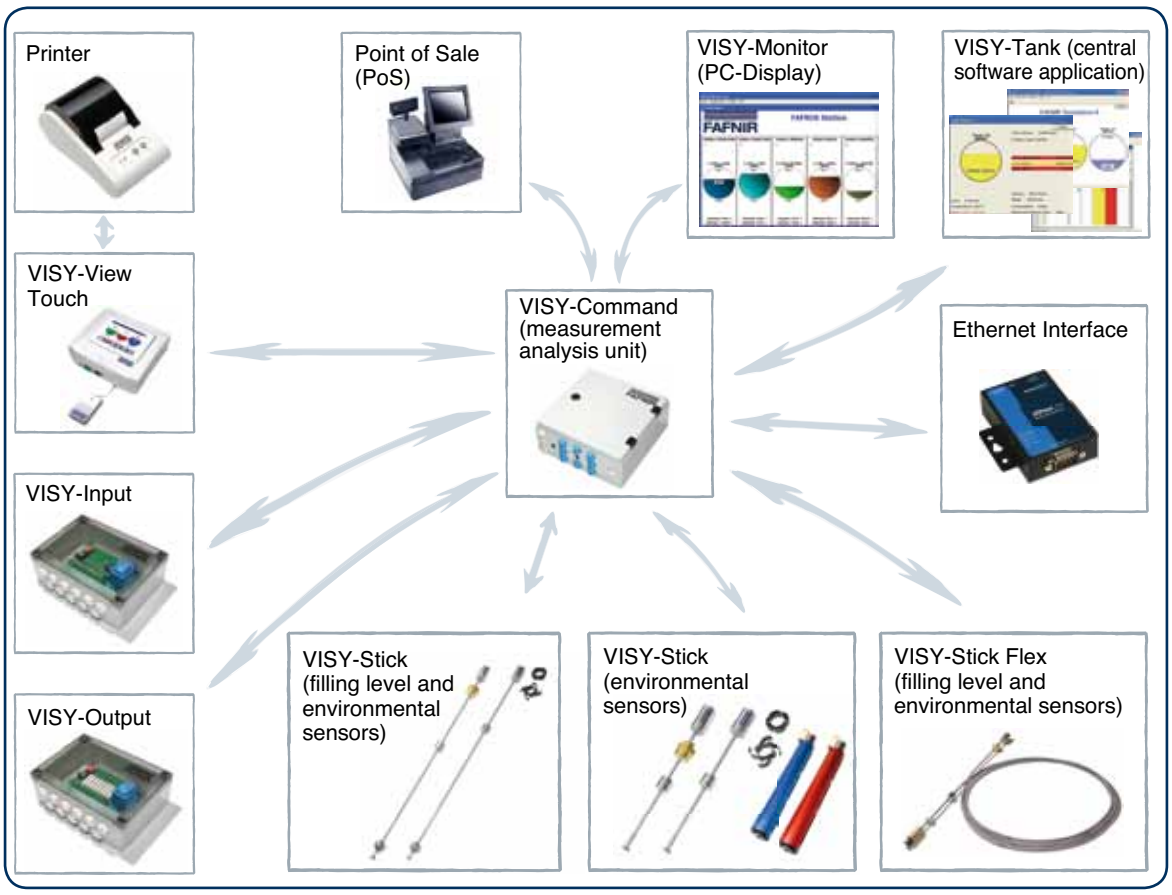
Function Description

A VISY-X system consists of 1 to 16 VISY-Stick sensors and a VISY-Command measurement analysis unit. It can be optionally extended by a wide range of hardware and software components (e.g. environmental sensors, I-/O-interfaces). The VISY-Stick magnetostrictive level sensor provides highly accurate readings of the product filling level, product temperature and water level. The VISY-Command measurement analysis unit contains the power supply for the VISY-Stick sensors with its varity of integrated protocols it is able to interface to a wide range of management systems (PoS / BOS). There is also a comprehensive selection of connection methods for the PC, display, modem, alarm systems, etc. The VISY-X sensors are able to connect to the measurement analysis unit wirelessly (VISY-X RF).

VISY-X System



System Design

Level / environmental sensor	Measurement analysis unit	Display	Software
Magnetostrictive Sensors	VISY-Command 4/8/16	VISY-View Touch	VISY-Tank
Reed Sensors	VISY-Command GUI		VISY-Monitor
	VISY-Command RF		

VISY-Stick

The Level and Environmental Sensor based on the Magnetostrictive Measuring Principle

VISY-Stick is a level and environmental sensor that has been specially designed to offer high-precision volume and leakage monitoring.

VISY-Stick magnetostrictive sensors with screw-in unit (left) and for riser installation (right)

Function

The VISY-Stick sensor operates in accordance with the magnetostrictive measuring principle. The sensor tube contains a wire made of magnetostrictive material. Magnets integrated in the floats magnetise the wire at the float position. The sensor electronics transmit current pulses through the wire, which generate a circular magnetic field. A torsional wave develops at the point where the two magnetic fields overlap and it propagates towards the sensor head. In the sensor head, these waves are converted into an electrical signal. The float positions and the temperature are calculated from the different propagation times.

Design

A VISY-Stick comprises:

» Stainless steel sensor housing
» Stainless steel sensor tube
» Brass screw-in unit
» (height adjustable)*
» Stainless steel product float
» Stainless steel water float

Features of FAFNIR technology

- High-precision sensors based on the magnetostrictive measuring principle
- Detects product filling level, product temperature and water level
- All parts with media contact are made of high-quality stainless steel
- Maintenance-free
- Permanent self-diagnostics
- Also suitable for AdBlue
- Optional: with 1" floats and screw-in unit*
- Wireless link to VISY-Command supported

* for use in AdBlue, the screw-in unit is made of stainless steel

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Technical Data

VISY-Stick

Standard Version:

» Product:
Accuracy: ± 0.5 mm;
Repeatability: ± 0.1 mm;
Resolution: 0.001 mm;
Response threshold: 75 mm*;
Floater: Ø 43 mm, 1½";

» Water:
Accuracy: ± 2 mm
Repeatability: ± 0.5 mm;
Resolution: 0.001 mm;
Response threshold: 23 mm*;
Floater: Ø 43 mm, 1½"

* Product density and the position of the other float may result in variations

» Temperature:
Measuring range:
– 40 °C to + 85 °C;
Accuracy: ± 1 °C (20 °C);
Repeatability: ± 0.5 °C;
Resolution: 0.001 °C

» Process connection:
R1½ screw-in unit continuously variable height adjustment

» Electrical connection:
M12 Plug connector

» Protection class: IP68

» Sensor material:
Stainless steel 304 (Tube),
Stainless steel 303 (Head)

» Approvals:
ATEX, NEPSI, IECEx, UL-Brazil

» Certificate: CPA

VISY-Stick

Options:

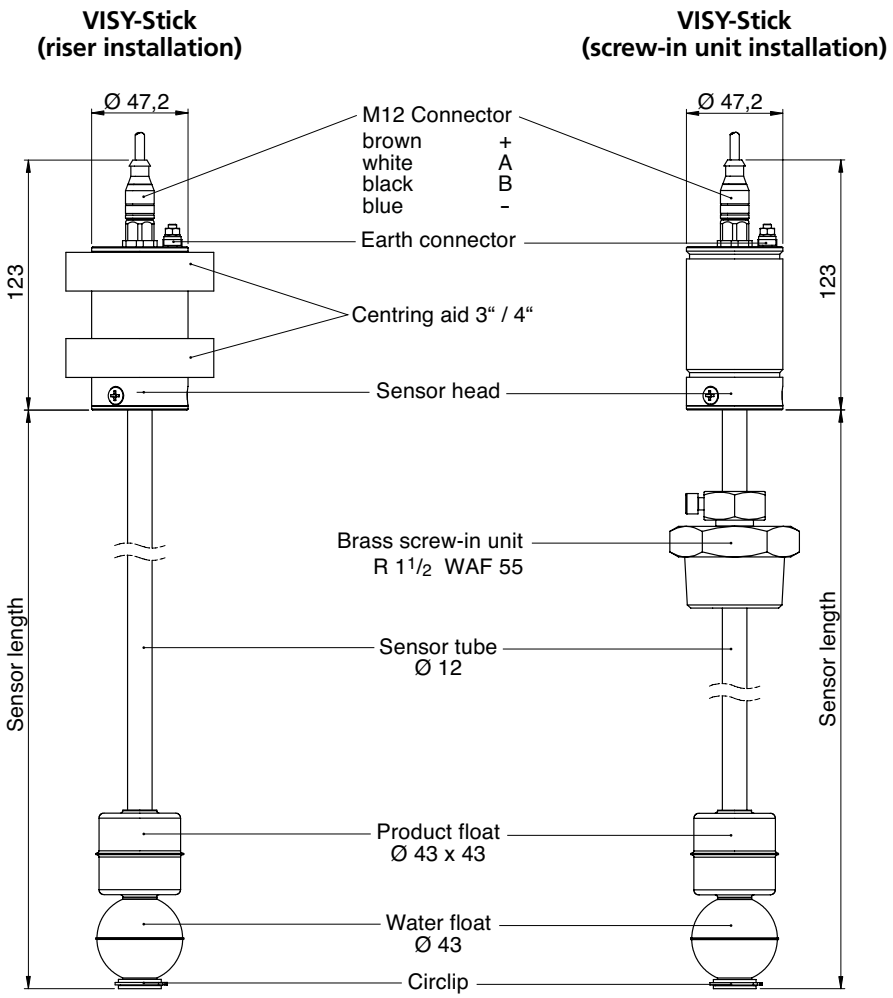
» Riser installation

» Battery-powered sensor with wireless link to the VISY-Command measurement analysis unit

» 1" Installation kit

» Screw-in unit made of stainless steel

VISY-Stick



Dimensions in mm

VISY-Stick Advanced

The High-precision Level and Environmental Sensor based on the Magnetostrictive Measuring Principle

The VISY-Stick Advanced level sensor is ideal for applications that demand maximum precision and it is also suitable for detecting tank leaks.

VISY-Stick Advanced magnetostrictive sensors with screw-in unit (left) and riser installation (right)

Function

The VISY-Stick sensor operates in accordance with the magnetostrictive measuring principle. The sensor tube contains a wire made of magnetostrictive material. Magnets integrated in the floats magnetise the wire at the float position. The sensor electronics transmit current pulses through the wire, which generate a circular magnetic field. A torsional wave develops at the point where the two magnetic fields overlap and it propagates towards the sensor head. In the sensor head, these waves are converted into an electrical signal. The float positions are calculated from the different propagation times. For precision temperature measurements, the sensor tube of the VISY-Stick Advanced contains temperature sensors.

Features of FAFNIR technology

- Detects product filling level, water level, and temperatures at multiple points along the measurement length
- Precise gauging of product temperature by means of temperature sensors
- Detects even the most minimal of level changes
- Wireless link to VISY-Command supported
- Certificate: CPA, EPA

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Technische Daten
VISY-Stick Advanced

Standard Version:

» Product:
Accuracy: ± 0.25 mm;
Repeatability: ± 0.05 mm;
Resolution: 0.001 mm;
Response threshold: 75 mm*;
Floater: Ø 54 mm, 2“

» Water:
Accuracy: ± 2 mm;
Repeatability: ± 0.5 mm;
Resolution: 0.001 mm;
Response threshold: 23 mm*;
Floater: Ø 43 mm, 1½“

* Product density and the position of the other float may result in variations

» Temperature:
Measuring range:
– 40 °C to + 85 °C;
Accuracy: ± 0.3 °C (20 °C);
Repeatability: ± 0.1 °C;
Resolution: 0.001 °C

» Process connection:
R2 screw-in unit continuously variable height adjustment

» Electrical connection:
M12 Plug connector

» Protection class: IP68

» Sensor material:
Stainless steel 304 (Tube),
Stainless steel 303 (Head)

» Approvals:
ATEX, NEPSI, IECEx, UL-Brazil

» Certificates: CPA, EPA

VISY-Stick Advanced

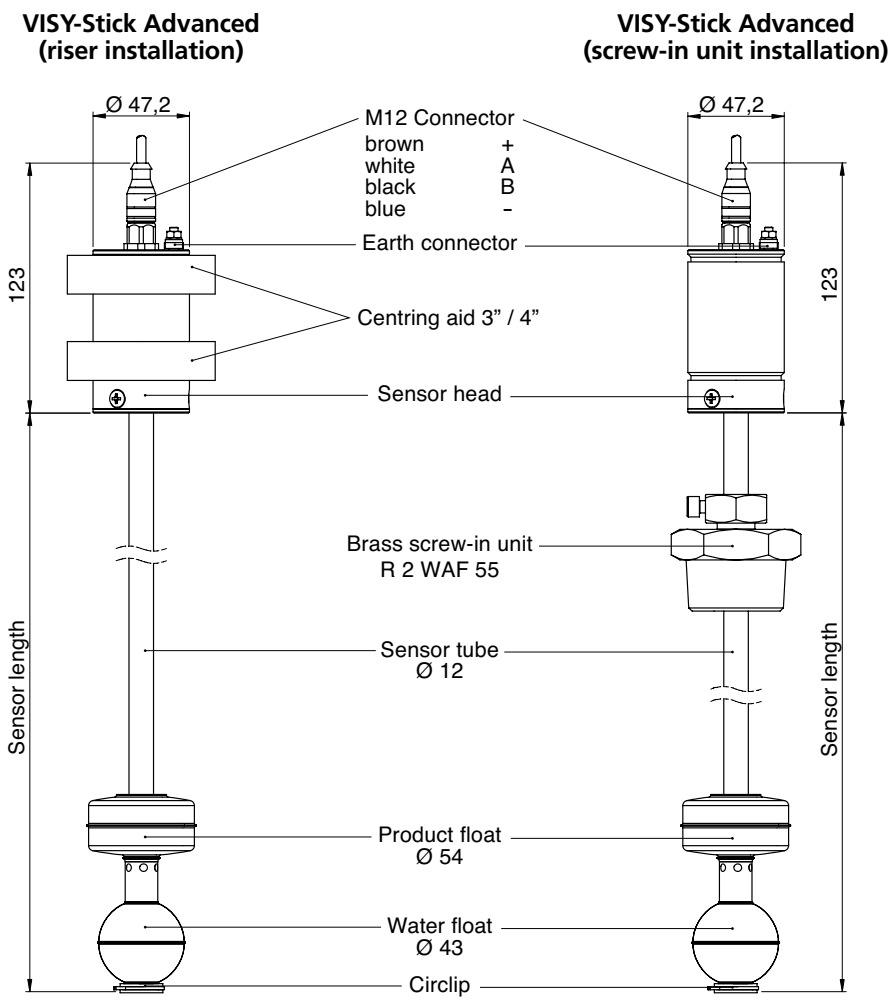
Options:

» Riser installation

» Battery-powered sensor with wireless link to the VISY-Command measurement analysis unit

» Screw-in unit made of stainless steel

VISY-Stick Advanced



Dimensions in mm

VISY-Density Module

The highly accurate density measuring module

The VISY-Density Module measuring module allows the determination of the fuel density. It can be mounted on the VISY-Stick Advanced ATG sensor, eliminating the need to instal an additional sensor.
In combination with the density module the VISY-Stick Advanced can provide accurate information and alarms about fuel level, water level, temperature and the density of the product in the tank.

The magnetostrictive sensors VISY-Density with screw-in unit (left) and for installation in the riser pipe (right)

Function

The VISY-Density Module* is based on the buoyancy principle. It provides precise information as to whether fuel in the tank is in conformity with legal and in-house standards. Any deterioration in product quality is recognised, triggering alarms for action if necessary.

The VISY ATG and VISY-Density combination will enable you to control and manage your valuable wet stocks in every respect.

* Patents pending

Features of FAFNIR technology

- Continuous and hysteresis free density measurement
- Function in conjunction with the level gauge VISY-Stick Advanced
- Compact design
- Quality control of fuels
- Recognition of water containing sump fluids in ethanol blends
- Determination of water content in E85 to E100 fuels

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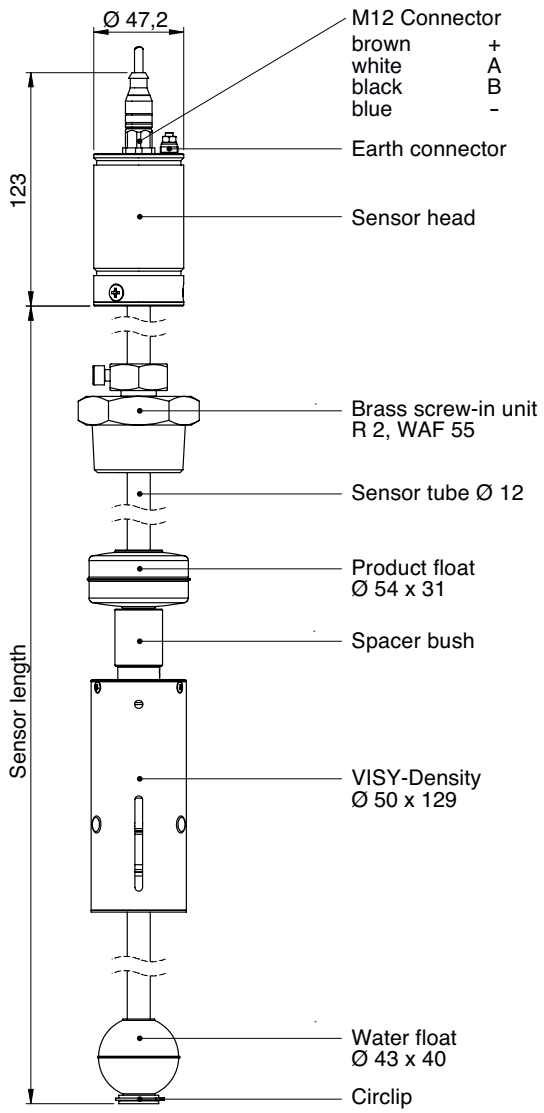
VISY-Density Module



Example

Technical Data
VISY-Density Module

» Accuracy
on a VISY-Stick Advanced:
better than 2 g/l;
Resolution: 0.1 g/l
» Temperature range:
– 40 °C to +85 °C;
Dimensions
Diameter: 50 mm;
Length: 129 mm
» Operating pressure:
up to 16 bar
» Sensor material:
Stainless steel 304, 316 Ti

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VISY-Stick Flex

Level Measurement for Large Storage Tanks

VISY-Stick Flex is a level and environmental sensor which is especially designed for large storage tanks.

Functions

When the installation of the VISY-Stick Flex level sensor has been completed, the corrugated tube is positioned vertically and both the product and the water floater can freely move up and down. The VISY-Stick Flex sensor works according to the magnetostrictive measuring principle. A wire made of magnetostrictive material has been integrated into the flexible tube.

The special design of the sensor allows the sensor body to bend so the VISY-Stick Flex can be packed compactly and shipped at low cost. Another advantage is the easy installation. A weight at the lower end of the sensor stretches it out to its full length, and a magnet placed below the weight secures the sensor to be in place. When the magnet is in contact with the bottom of the tank (after installation) any unintentional movement of the VISY-Stick Flex is avoided.

Features of FAFNIR technology

- High precision sensor based on the magnetostrictive measuring principle
- Detects product level, product temperature and water level
- Sensor length up to 15 meters
- Compact packaging and easy transport thanks to corrugated tube
- Weight at end of sensor guarantees vertical installation
- Lower end of the sensor held in place by a magnet
- Installation in tanks with low ceiling height possible
- Easy installation
- Installation in 1½'' process connection possible
- Wireless connection to a VISY-Command RF possible
- Maintenance-free

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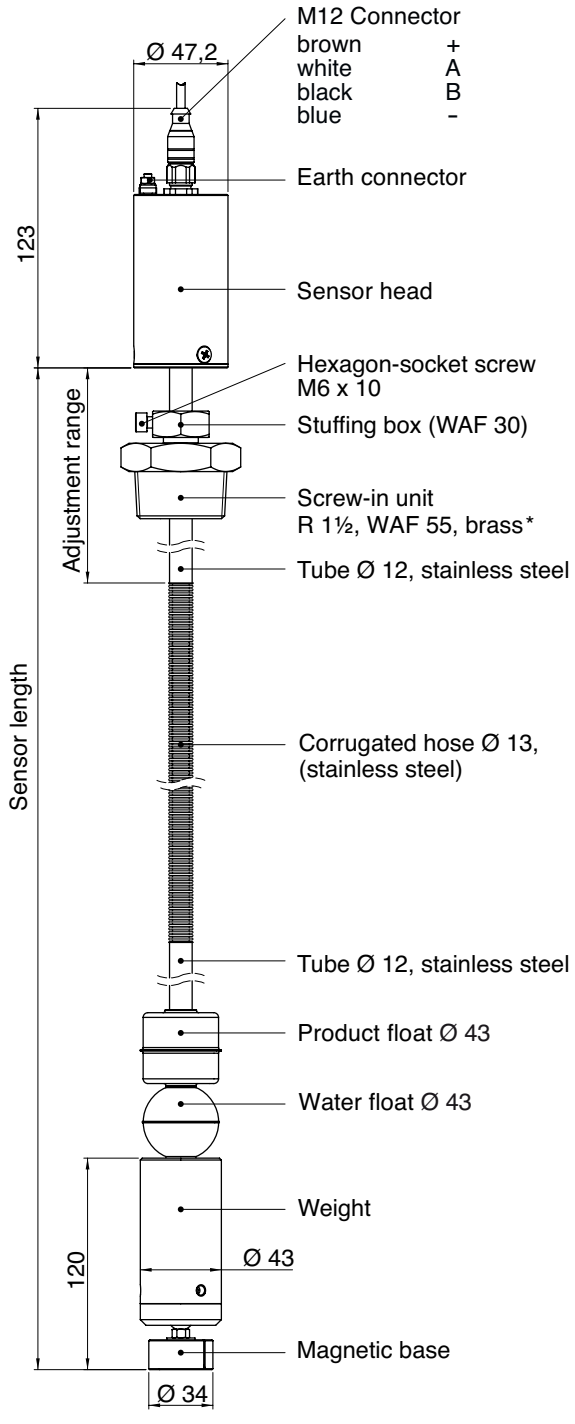
VISY-Stick Flex



Dimensions in mm

Technical Data
VISY-Stick Flex

» Measurement lengths up to 15 m
» Product
Accuracy: ± 2 mm;
Repeatability: ± 0.5 mm;
Response threshold:
185 mm*;
Floater: 43 mm, Ø 1½“
» Water
Accuracy: ± 3 mm;
Repeatability: ± 0.5 mm;
Response threshold:
160 mm*;
Floater: 43 mm, Ø 1½“

* Product density and the position of the other float may result in variations

» Temperature
Measuring range:
– 40 °C to + 85 °C;
Accuracy: ± 1.5 °C;
Repeatability: ± 0.5 °C;
Resolution: 0.001 °C
» Process connection
R 1½“ screw-in unit;
Adjustment range
ca. 500 mm
» Electrical connection:
M12 plug-in connection
» Protection class: IP68
» Sensor materials:
Housing: Stainless steel 303;
Pipe: Stainless steel 304;
Corrugated tube, float:
Stainless steel 316 Ti;
Screw-in unit, weight: Brass;
Encapsulation of the holder magnet: conductive plastic
» Approvals:
ATEX, IECEx

Options

» Battery-operated sensor with radio connection to measurement analysis VISY-Command RF
» Screw-in unit made of stainless steel
» Weight made of stainless steel

VISY-Stick LPG

VISY-X Tank Content Measuring System for Liquefied Petroleum Gas Applications

The VISY-Stick LPG level sensor supplies information about the fuel level in LPG tanks. The magnetostrictive sensor with buna float and pressure-resistant stainless steel screw connection is specially designed for use in liquefied petroleum gas.

VISY-Stick LPG for direct connection inside the tank

Function

The VISY-Stick sensor operates in accordance with the magnetostrictive measuring principle. The sensor tube contains a wire made of magnetostrictive material. A magnet integrated in the float magnetises the wire at the float position. The sensor electronics transmit current pulses through the wire, which generate a circular magnetic field. A torsional wave develops at the point where the two magnetic fields overlap and it propagates towards the sensor head. In the sensor head, these mechanical waves are converted into an electrical signal. The float position and the temperature are calculated from the propagation time.

Features of FAFNIR technology

- Magnetostrictive sensor for use in liquefied petroleum gas (buna float, pressure-resistant stainless steel screw connection)
- Continuous monitoring of product level and product temperature
- Fully integrated into VISY architecture
- Two installation versions consists:
  - directly
  - with installation kit
- Suitable for all tanks sizes and shapes

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Technical Data

VISY-Stick LPG

Standard Version:

» Product:
Accuracy: ± 2 mm;
Repeatability: ± 0.5 mm;
Resolution: 0.001 mm;
Response threshold: 120 mm;
Floater: Ø 43 mm, 1½“

» Temperature:
Measuring range:
– 40 °C to + 85 °C;
Accuracy: ± 1 °C;
Repeatability: ± 0.5 °C;
Resolution: 0.001 °C

» Process connection:
Screw-in unit ½“ NPT
made of stainless steel
continuously variable
height adjustment

» Electrical connection:
M12 Plug connector

» Protection class: IP68

» Sensor material:
Stainless steel 304 (Tube),
Stainless steel 303 (Head)

» Approvals:
ATEX, NEPSI, IECEx, UL-Brazil

» Certificate: CPA

VISY-Stick LPG

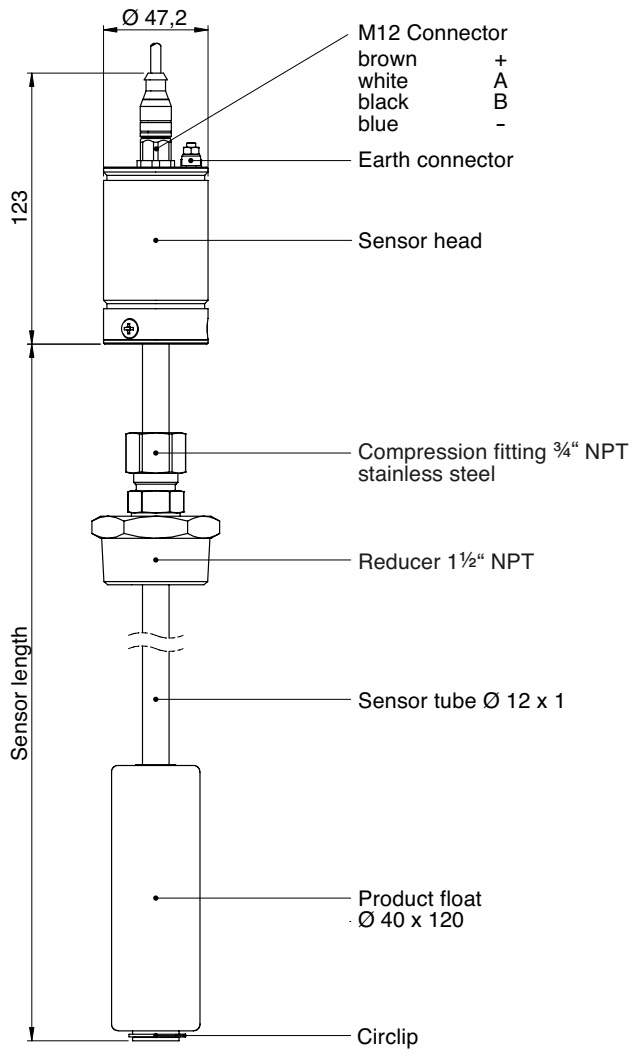
Options:

» Battery-powered sensor
with wireless link to the
VISY-Command measurement
analysis unit

» Installation kit for LPG

» Screw-in unit 1½“ NPT
made of stainless steel

VISY-Stick LPG



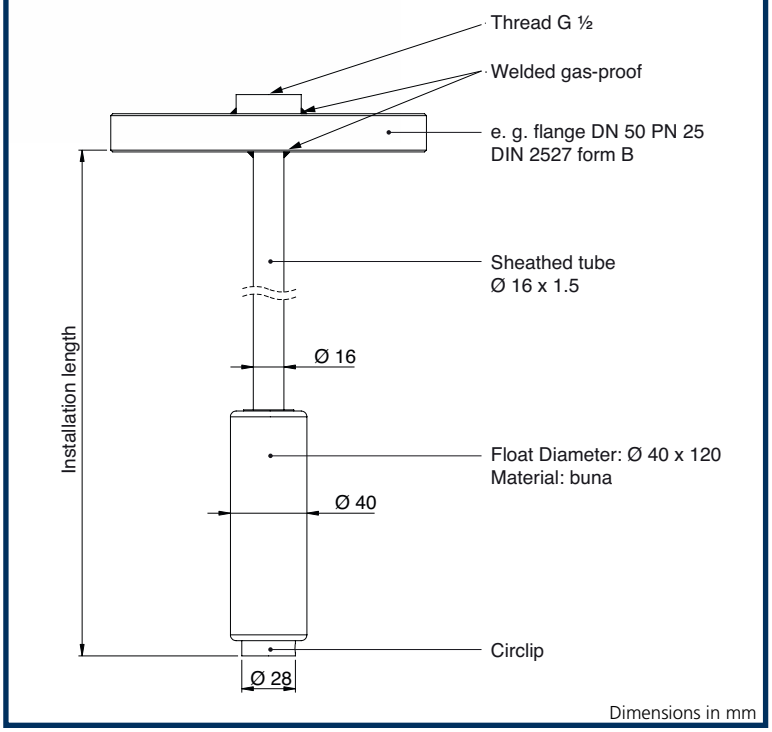
Dimensions in mm

LPG Installation Kit

The optional LPG installation kit comprises a riser with flange and a special LPG float. After the LPG installation kit has been installed in the fuel tank, the VISY-Stick tank content sensor is inserted into the riser without a float and screwed into position. This makes it possible to replace the sensor at any time without opening the tank. The sensor is not in a pressure chamber of the tank.

If the VISY-Stick LPG was installed in the tank with the VISY-Stick LPG installation kit, it is possible to replace the sensor without having to open and drain the tank

LPG Installation Kit



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LPG Adjustable Installation Kit

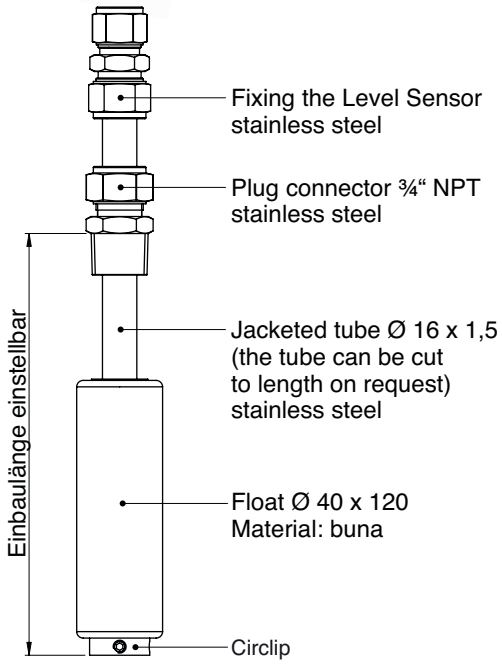
The variable LPG installation kit consists of a jacketed tube with a special LPG float and a ¾" NPT cutting ring screw.

LPG Installation Kit Variable (Shown with flange) for installation of VISY-Stick LPG

Function

The variable LPG installation kit consists of a jacketed tube with a special LPG float and a ¾" NPT cutting ring screw. The installation length of the jacketed tube is variable and can be set with the cutting ring screw, which can in turn be screwed into the process connection of the tank, e.g. flange or thread (reduction). The exact installation dimensions for the installation of the jacketed tube are no longer required when this installation kit is used. The jacketed tube length can be shortened on-site. The level sensor is placed in the jacketed tube and locked. Now, the level sensor is not located in a pressurised chamber and can be replaced at any time without releasing the pressure in the tank.

LPG Adjustable Installation Kit



Dimensions in mm

Features of FAFNIR technology

- Variable settings of installation length
- No prior knowledge of installation length required
- Can be shortened on-site
- One-time emptying of tank during installation
- Reduced labour
- Significant cost savings
- Easy installation
- Maintenance-free

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VISY-Stick Interstitial

The Leakage Sensor for Double-walled Tanks

The VISY-Stick Interstitial is a sensor for installation in the interstitial chamber and is designed to guarantee rapid leak detection. It is used in double-walled fuel tanks whose interstitial chambers are filled with a leak fluid (e.g. brine, glycol, etc.). An alarm is issued if the fluid level in the interstitial chamber leaves the spezified range.

VISY-Stick Interstitial with screw-in unit (left) and for installation in the riser pipe (right)

Function

The VISY-Stick sensor operates in accordance with the magnetostrictive measuring principle. The sensor tube contains a wire made of magnetostrictive material. A magnet integrated in the float magnetises the wire at the float position. The sensor electronics transmit current pulses through the wire, which generate a circular magnetic field. A torsional wave develops at the point where the two magnetic fields overlap and it propagates towards the sensor head. In the sensor head, these waves are converted into an electrical signal. The float position is calculated from the propagation time.

Features of FAFNIR technology

- Continuous monitoring of fluid level and temperature
- Instant alarm in the event of a leak
- Easy and cost-effective to install and commission

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Technical Data

VISY-Stick Interstitial

Product:

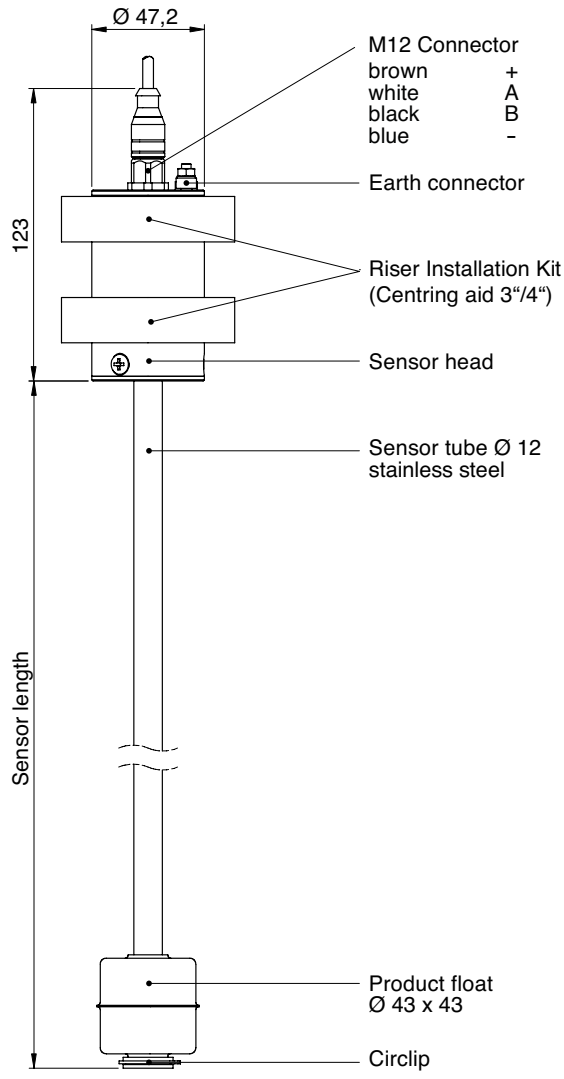
» Accuracy: ± 0.5 mm;
Repeatability: ± 0.1 mm;
Resolution: 0.1 mm;
Response threshold: 40 mm;
Floater: Ø 43 mm, 1½"
» Temperature:
Measuring range:
– 40 °C to + 85 °C;
Accuracy: ± 1 °C;
Repeatability: ± 0.5 °C;
Resolution: 0.1 °C
» Process connection:
R1½ screw-in unit
continuously variable
height adjustment
» Electrical connection:
M12 Plug connector
» Protection class: IP68
» Sensor material:
Stainless steel 304 (Tube),
Stainless steel 303 (Head)
» Approvals:
ATEX, NEPSI, IECEx, UL-Brazil

VISY-Stick Interstitial

Options:

» Riser installation
» 1" Installation kit
» Screw-in unit made of
stainless steel

VISY-Stick Interstitial



Dimensions in mm

VISY-Stick Sump

The Sensors for Monitoring Manhole and Dispenser Sumps

The VISY-Stick Sump sensors are used to monitor the manhole sump and the sump underneath the dispenser for fluids that could potentially accumulate there. They are capable of discriminating between water and fuel rapidly and accurately.

VISY-Stick Sump (blue for manhole sump, red for dispenser sump) and the VISY-Stick Sump installation kit

Function

The VISY-Stick sensor operates in accordance with the magnetostrictive measuring principle. The sensor tube contains a wire made of magnetostrictive material. Magnets integrated in the floats magnetise the wire at the float position. The sensor electronics transmit current pulses through the wire, which generate a circular magnetic field. A torsional wave develops at the point where the two magnetic fields overlap and it propagates towards the sensor head. In the sensor head, these waves are converted into an electrical signal. The float positions are calculated from the different propagation times, and the water level is reported and the fuel alarm or tamper alarm are issued as and when necessary.

Features of FAFNIR technology

- Continuous monitoring of the water level in the manhole and dispenser sump
- Alarm in the event of fuel or water being detected
- No additional cable required due to operation on VISY-Sensor bus parallel to VISY-Stick and VISY-Reed Sump
- Encapsulated design for protection against contamination
- Anti-Tamper device

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Technical Data
VISY-Stick Sump

Standard Version:

» Product:
Accuracy: ± 1 mm;
Repeatability: ± 0.1 mm;
Resolution:
only generating an alarm;
Response threshold:
35 mm over water*;
Floater: Ø 54 mm

» Water:
Accuracy: ± 2 mm;
Repeatability: ± 0.5 mm

» Resolution: 1 mm;
Response threshold: 66 mm*;
Floater: Ø 54 mm

* Product density and the position of the other float may result in variations

» Temperature:
Measuring range:
– 40 °C to + 85 °C;
Accuracy: ± 1 °C;
Repeatability: ± 0.5 °C;
Resolution: 0.1 °C

» Electrical connection:
M12 Plug connector

» Protection class: IP68

» Sensor material:
Stainless steel 304 (Tube),
Alu (Head, Protection tube),
PA 6

» Approvals:
ATEX, NEPSI, IECEx, UL-Brazil

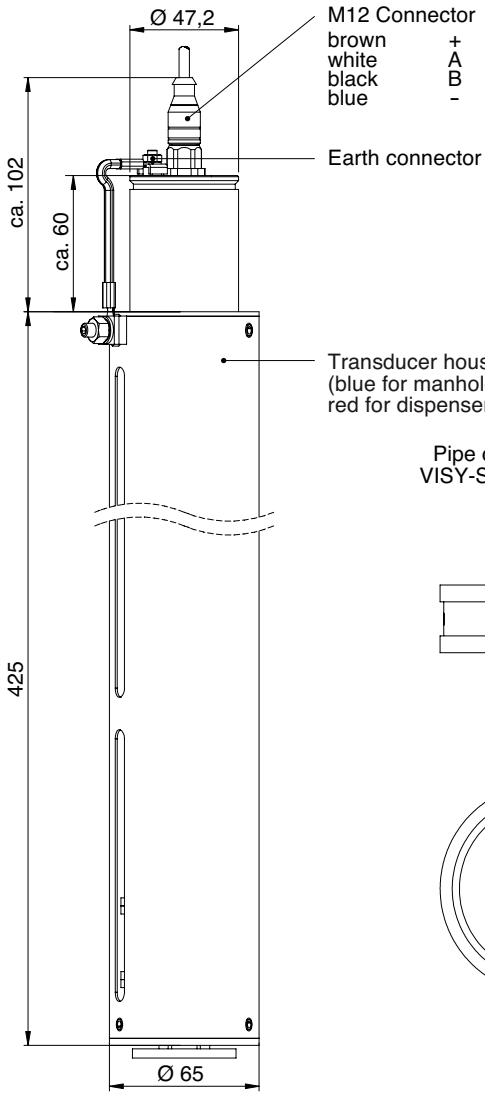
VISY-Stick Sump

Options:

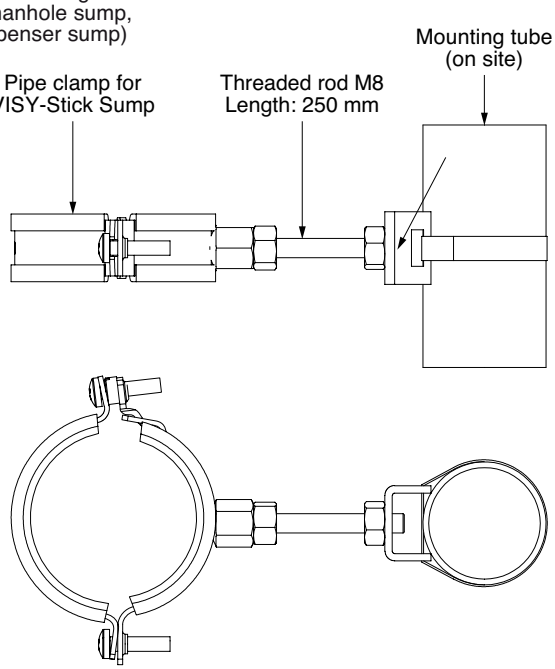
» Installation kit

VISY-Stick Sump

VISY-Stick Sump



VISY-Stick Sump Installation kit

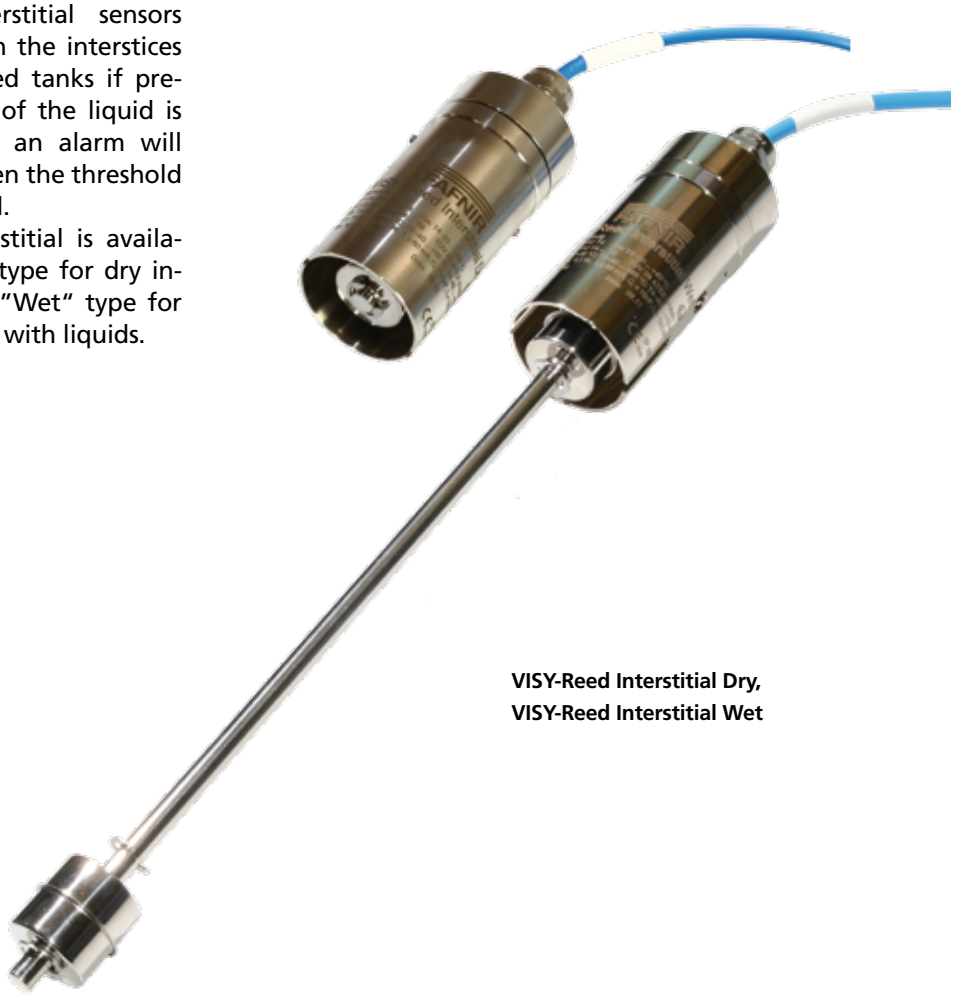


Dimensions in mm

VISY-Reed Interstitial

Leak Detection for Double-walled Tanks

VISY-Reed Interstitial sensors detect liquids in the interstices of double-walled tanks if present. The level of the liquid is monitored and an alarm will be relaesed when the threshold has been passed.
VISY-Reed Interstitial is available as a "Dry" type for dry interstices and a "Wet" type for interstices filled with liquids.



VISY-Reed Interstitial Dry,
VISY-Reed Interstitial Wet

Functions

VISY-Reed Interstitial sensors combine simple floater switches based on reed contacts with the VISY-Sensor interface for connection to VISY-Command. The floater follows the level of the liquid as it rises, and a magnet opens a reed switch inside the sensor pipe. This alarm message is transmitted directly to VISY-Command. Thanks to the low power input, VISY-Reed sensors of different types can be operated on a single channel of VP parallel to a VISY-Stick.

Features of FAFNIR technology

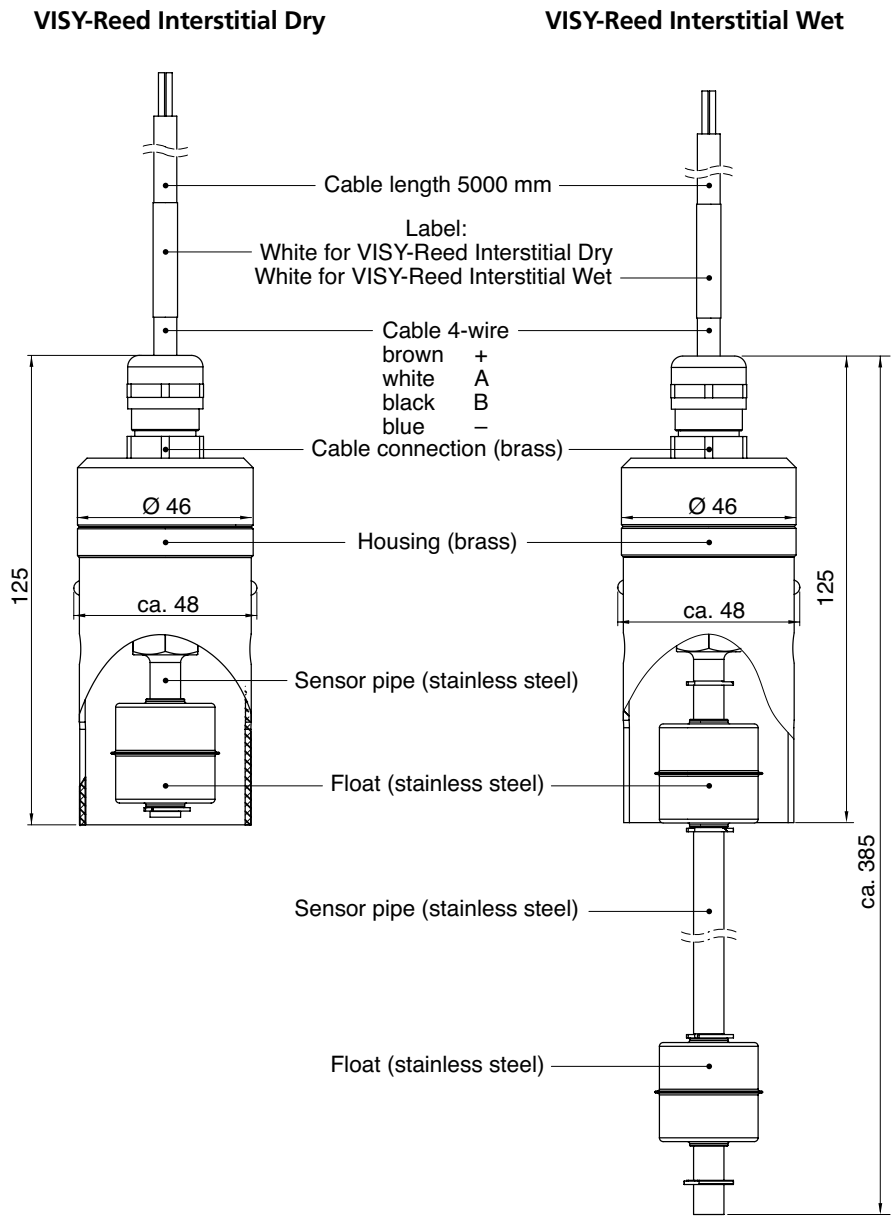
- Solid, stable design
- Housing made of brass, floater made of stainless steel
- No additional cable required due to operation on VISY-Sensor bus parallel to VISY-Stick and VISY-Reed Sump
- Response threshold at ca. 30 mm (VISY-Reed Interstitial Dry)
- Tolerance range of 260 mm (VISY-Reed Interstitial Wet)

date of issue 07.12 Subject to technical change

Technical Data
VISY-Reed Interstitial

» Product:
Response threshold fuel (dry):
ca. 35 mm
Response threshold water (dry):
ca. 30 mm
Tolerance range (wet):
ca. 30 to 290 mm
» Float: Stainless steel Ø 26 mm
» Electrical connection:
4-wire cable
» Protection class: IP68
» Sensor material:
Stainless steel / Brass
» Approvals: ATEX, IECEx

VISY-Reed Interstitial



Dimensions in mm

VISY-Reed Sump

Sensors for Monitoring Manhole and Dispenser Sumps

VISY-Reed Sump sensors detect liquids in the manhole sump and under dispensers if present. The level of the liquid is monitored and an alarm will be relaesed when the threshold has been passed.

VISY-Reed sensors are a low-cost solution for simple and reliable detection of liquids.

VISY-Reed Sump:
blue for manhole sump
red for dispenser sump

Functions

VISY-Reed Sump sensors combine simple floater switches based on reed contacts with the VISY-Sensor interface for connection to VISY-Command. The floater follows the level of the liquid as it rises, and a magnet opens a reed switch inside the sensor pipe. This alarm message is transmitted directly to VISY-Command. Thanks to the low power input, VISY-Reed sensors of different types can be operated on a single channel of VP parallel to a VISY-Stick.

Features of FAFNIR technology

- Solid, stable design
- Housing made of brass, floater made of stainless steel
- No additional cable required due to operation on VISY-Sensor bus parallel to VISY-Stick and VISY-Reed Interstitial
- Response threshold at ca. 30 mm
- Alarm when fuel and water are detected

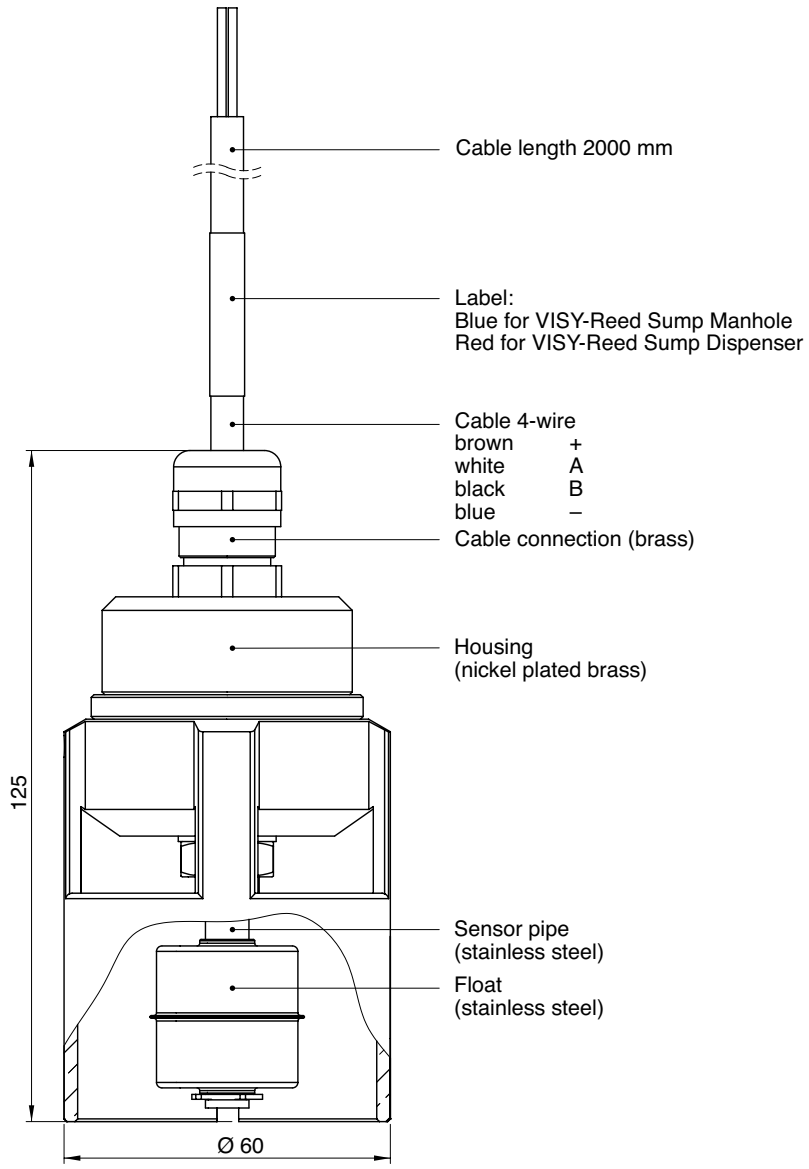
date of issue 07.12 Subject to technical change

Technical Data
VISY-Reed Sump

» Product
Response threshold fuel:
ca. 35 mm
Response threshold water:
ca. 30 mm
Floater:
stainless steel Ø 26 mm

» Electrical connection:
4-wire cable
» Protection class: IP68
» Sensor material:
Stainless steel / Brass
» Approvals: ATEX, IECEx

VISY-Reed Sump



Dimensions in mm

VISY-Command

VISY-Command
measurement analysis unis

VISY-Command contains the intrinsically safe power supply for the VISY-Stick sensors and their measurement analysis unit. Various interfaces ensure that it always has access to the latest data.

Features of FAFNIR technology

- Up to 3 different sensors can be connected to the one connection by a common cable
- Highly flexible due to the modular architecture
- Easy to upgrade and convert
- IFSF-LON-compatible
- Easy to configure thanks to free VISY-Setup software application
- Easy start-up
- Communication via Ethernet possible
- Free firmware updates released throughout the entire product life cycle ensure that the product is kept up-to-date
- Free, user-friendly software for firmware updates
- Wireless communication with the VISY-Command RF version

date of issue 07.12 Subject to technical change

Function

The VISY-Command measurement analysis unit has a modular architecture. VISY-Command is available in the form of basic versions VISY-Command 8 and 16, i.e. with either 4/8 or 16 sensor connections. Up to three different sensors (e.g. VISY-Stick, VISY-Stick Interstitial and VISY-Stick Sump) can be connected to the one connection by a common cable. The measurement analysis unit is also available in the form of VISY-Command RF; this supports the wireless operation of up to 16 VISY-Stick sensors.

VISY-Command provides an intrinsically safe power supply for the VISY-Stick sensors. The measured values supplied are prepared in such a way that all of the latest measurement data can be viewed at any time on a superordinate system (e.g. cash system (PoS), petrol station controller, VISY-Monitor PC software) connected to a serial port. Data transmission is supported by various, common data protocols including Ethernet and IFSF-LON.

The expansion interface of VISY-Command enables multiple external VISY-View Touch displays (e.g. fuel tanker display and local display in the office) to be connected and positioned where they can be seen and operated by personnel at all times. VISY-Command itself can be fitted in a location that achieves the most cost-effective cabling arrangement (e.g. power distribution unit or basement). By contrast with systems having an integrated display, the major advantage of our system is that it is not necessary to have all of the sensor cabling routed though the building to the viewing point (e.g. the office).

The optional VISY-ICI 485 interface makes it possible to connect multiple VISY-Input/-Output units. These enable the inputting (VISY-Input) of additional external alarms (e.g. oil separators) and/or the outputting (VISY-Output) of alarms by way of relay contacts.

VISY-Command is configured using the VISY-Setup software application through the separate serial service port. As a result, practically all maintenance and diagnostics tasks can be carried out while the entire system is still in operation. It is not necessary to switch off individual components: petrol station operations are not affected. VISY-Setup is free of charge and, in addition to offering user-friendly and efficient direct configuration by notebook, it also supports remote servicing via a modem or serial-to-Ethernet converter.

date of issue 07.12 Subject to technical change

Technical Data

	VISY-Command	
Housing	up to 8 measuring value sensorconnections and RF version: h 300 x w 300 x d 175 [mm]	16 measuring value sensor connections: h 300 x w 400 x d 175 [mm]
Protection class	IP20	
Weight	5,7 kg	9,7 kg
Ambient temperature	0 °C to + 40 °C	
Supply	230 V, ± 10 %, about 15 VA or 23 VA (VISY-Command 16)	
Internal display	7-segment status indicator	
Number of measuring value sensor connections	4, 8 or 16	
Host interface (RS232 / RS485) **– IFSF-LON module** **– Ethernet Modul (MoxaNPort5110) for long distance scanning** **– Modem for long distance scanning** **– VISY-View Touch display**	• ° (1) ° (1) ° (1) ° (1)	
Service interface (RS232) **– Modem for remote servicing** **– Ethernet Modul (MoxaNPort5110) for remote servicing**	• ° (1) ° (1)	
Expansion interface (RS485) **– VISY-View Touch display**	• ° (2)	
VISY-ICI 485 module **– VISY-Output (relay outputs)** **– VISY-Input (digital switch inputs)**	° ° (2) ° (2)	
Printer	° (3) (external)*	

* only in connection with VISY-View Touch

Functions

	VISY-Command
Communication with the PoS / BOS system or petrol station controller	•
Automatic filler recognition	•
Automatic tank calibration	° (4)
Loss / leak monitoring	• (5)
Stock, filling and alarm histories	• (5)

• Standard
° Optional

(1) Alternatively, one of the available options can be used at the interface concerned.
(2) Multiple instances of the options available can be used simultaneously at the interface concerned.
(3) In conjunction with VISY-View Touch.
(4) In conjunction with VISY-Monitor and a compatible cash system (PoS) / automated tank system.
(5) In conjunction with VISY-Monitor.

date of issue 07.12 Subject to technical change

VISY-Command GUI

The Measurement Analysis with a Graphic Display

VISY-Command GUI with printer

- **Instant alarm message via e-mail**
- **Daily report via e-mail at your preset time**
- **Static leak detection**

VISY-Command GUI contains the intrinsically safe power supply for the VISY-Stick sensors and their measurement analysis unit. Various interfaces ensure that it always has access to the latest data. The integrated display unit with the 5.7" colour touch screen provides and displays the current measurement values and the reporting functions in a user-friendly form.

The VISY-Command GUI has a display with a clearly structured and easy to operate interface. The most important information, e.g. tank level and alarms are displayed directly and up-to-date on the screen. Using the touch screen, operators can call up detailed information simply by touching the tank graphics or the function keys.

Features of FAFNIR technology

- Up to 3 different sensors can be connected to the one connection by a common cable
- Up-to-date overview of tank contents shown at a graphic display
- Convenient tank content visualisation with useful additional data, e.g. ullage
- Display of actual and temperature compensated tank contents in litres
- Display of product temperature and water level
- Highly flexible due to modular architecture
- Easy to upgrade and retrofit
- Precise configuration using free software VISY-Setup
- Easy start-up
- Communication via Ethernet available
- Free, user-friendly software for firmware updates
- Integrated alarm signal
- Wireless communication of VISY-Command GUI RF with VISY-Stick sensors
- Available with or without printer

date of issue 07.12 Subject to technical change

Functions

The display of the VISY-Command GUI visualises the data provided by the FAFNIR sensors. All of the relevant data related to the tank (tank number and product name), the product (level, water level and product temperature) and various additional data (e.g. ullage) are displayed. The displayed tank information is always up to date and available at any time.
Fuel deliveries and tank alarms are archived additionally in a database.

The VISY-Command GUI is operated by a coloured 5,7" touch screen interface. Special attention was given to ergonomics when determining the size of the function keys.

If required, all of the displayed tank information can be printed out using the integrated printer. Moreover, obligatory print-outs for alarm messages are possible. An audio warning sounds in additional for tank alarms.

Data Management

» Volumetric display of tank contents
» Temperature-compensated volume
» Product temperature
» Ullage
» Tank and product names
» Water level
» Variable number of tanks displayed (maximum 16 tanks)
» Alarm message and recording
» History records (delivery data and alerts)
» Archiving of delivery data and alarms in a database

Technical Data

	VISY-Command GUI	
Housing	up to 8 measuring value sensor connections: h 300 x w 300 x d 175 [mm]	up to 16 measuring value sensor connections: h 300 x w 400 x d 175 [mm]
Protection class	IP20	
Weight	6,7 kg	10,7 kg
Ambient temperature	0 °C to + 40 °C	
Supply	230 V, ± 10 %, about 50 VA	
Internal display	5.7" TFT touch screen	
Number of measuring value sensor connections	4, 8 or 16	
Host interface (RS232 / RS485) **– Ethernet Modul (MoxaNPort5110) for long distance scanning** **– Modem for remote servicing** **– VISY-View Touch display**	standard optional optional optional	
Service interface (RS232) **– Modem for remote servicing**	standard optional	
Ext. interface (RS485) **– VISY-View Touch display / VISY-View Touch Night Switch**	standard optional	
VISY-ICI 485 module **– VISY-Output (relay output)** **– VISY-Input (digital switch inputs)**	optional optional optional	
Printer	optional	

Functions

	VISY-Command GUI
Communication with the PoS / BOS system or petrol station controller	standard
Automatic filler recognition	standard
Static leak detector	standard

date of issue 07.12 Subject to technical change

VISY-RF

The Wireless Solution for VISY-X

VISY-Command RF
VISY-Command GUI RF
External Antenna
VISY-RFT Module

The VISY-RFT module (radio frequency transmitter) transmits the tank data recorded by the VISY-Stick sensors wirelessly to the VISY-Command RF measurement analysis unit, which is equipped with one, optionally two external antenna(s).

Features of FAFNIR technology

- Compatible with all VISY-X components
- Long battery life
- High level of data availability
- Easy to install and configure

date of issue 07.12 Subject to technical change

Application

VISY-RF is used wherever the routing of cables is unfeasible, or would be too cost-intensive. The wireless system proves beneficial in this scenario because no excavation work is required. The wireless system is suitable for all aboveground and underground storage tanks.

Technical Data

	VISY-Command RF / VISY-Command GUI RF
Housing	up to 16 measuring value sensor connections: h 300 x w 300 x d 175 [mm]
Protection class	IP20
Weight	6,7 kg
Ambient temperature	0 °C to + 40 °C
Supply	230 V, ± 10 %, ca. 50 VA
Internal display	5,7" TFT touch screen*
Number of measuring value sensor connections	16
Host interface (RS232 / RS485) **– Ethernet Modul (MoxaNPort5110) for long distance scanning** **– Modem for remote servicing** **– VISY-View Touch display**	standard optional optional optional
Service interface (RS232) **– Modem for remote servicing**	standard optional
Ext. interface (RS485) **– VISY-View Touch display / VISY-View Touch Night Switch**	standard optional
VISY-ICI 485 module **– VISY-Output (relay output)** **– VISY-Input (digital switch inputs)**	optional optional optional
Printer	optional

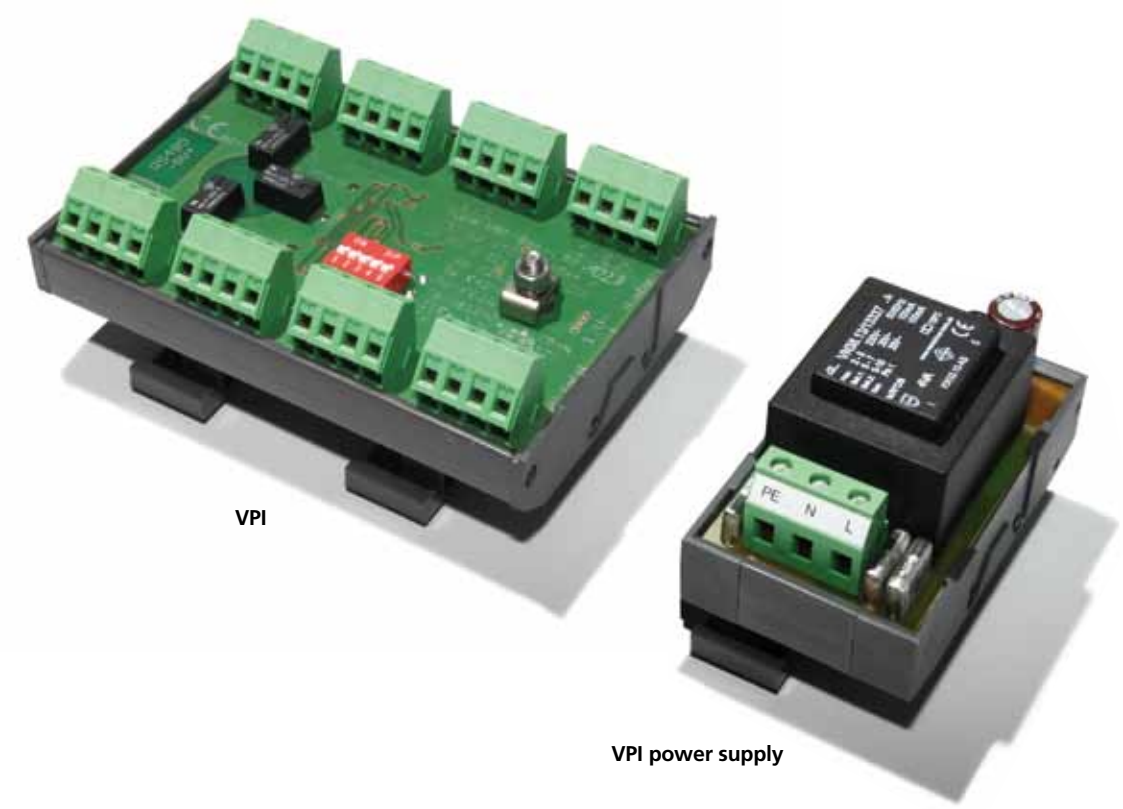
* VISY-Command GUI RF

	VISY-RFT Module
Housing	h 80 x w 80 x d 55 [mm]
Protection class	IP68
Ambient temperature	– 20 °C to + 40 °C
Transmission frequency	433 MHz
Transmission range (line of sight)	max. 250 m
Battery life	8 years at 5-minute transmission intervals; 4 years at 1-minute transmission intervals

Functions

	VISY-Command GUI RF
Communication with the PoS / BOS system or petrol station controller	standard
Automatic filler recognition	standard
Static leak detector	standard

VPI
VISY-Power Interface



VPI

VPI power supply

The VPI (VISY-Power Interface) provides a communications interface between the sensor and a higher-level system (master). For the sending of commands to the sensor, the VPI supports two protocols*. The response is assigned and forwarded to the individual sensor terminals.

Up to 1,024 sensors can be connected to 32 VPIs. The sensors require a connection to the VPI. The installation location for the VPI must be outside the potentially explosive atmosphere. The VPI is designed for DIN carrier rail installation and has eight intrinsically safe sensor terminals.

Up to 32 VPIs can be circuited in parallel, depending on the quantity of sensors to be connected.

* The following protocols are supported:
1. FAFNIR Universal Device Protocol (UDP)
2. H Protocol

Features of FAFNIR technology

- 8 intrinsically safe sensor terminals per VPI
- Connection of max. 32 VPIs in parallel possible = 256 sensor terminals
- One sensor terminal can support the connection of up to four sensors
- Intrinsically safe power supply
- Passive communication via RS485
- Supply to VPI by commercially available power supply unit possible
- Two VPIs can be connected to one FAFNIR VPI-Supply (power supply unit)
- Easy DIN carrier rail installation, no additional enclosure required
- Maintenance-free

VISY-View Touch

Visualization for the Automatic Tank Gauging System VISY-X

VISY-View Touch with
VISY-View Touch Night Switch

Application

VISY-View Touch is a display for use with the VISY-X tank level gauging. It is a viewer and work platform for managing tank contents at the petrol station. In addition, it is particularly useful to the fuel tanker driver, who will be able to read tank levels before refuelling the petrol station.

Features of FAFNIR technology

- Permanent overview of tank contents at the petrol station
- User-friendly tank content viewer with a useful range of additional information
- Tank contents displayed in litres or gallons
- Display of product temperature and water level
- Communication with the VISY-Command measurement analysis unit
- Optional printer connection
- Display of various historical data
- Ability to connect multiple VISY-View Touch displays if necessary
- Also usable as display for fuel tanker*

* In connection with VISY-View Night Switch

date of issue 07.12 Subject to technical change

Product Features

The tank content viewer displays the following:

» Display of tank contents in litres and gallons
» Product temperature
» Temperature-compensated volume
» Ullage
» Product / Sump density
» Tank and product name
» Water level
» Alarms for water and product
» Delivery history for all tanks
» Alarms for environmental sensors
» Additional information with wireless version
» Static leak detector*

* available from 4 quarter 2011

Technical Data

VISY-View Touch

» Dimension: h 205 x w 230 x d 80 [mm]
» Display: Embedded microcomputer with 5.7" colour touchscreen and VISY-SoftView application software
» Plug-in power supply: 12 V_{DC}
» Ambient temperature: 0 °C to + 40 °C
» Inputs: 1 x RS485 communication interface with VISY-Command
» Outputs: 1 x RS232 (printer output)
» Protection class: IP20

Delivery:

» Display
» Plug-in power supply

Accessories:

» Thermal transfer printer

Printer

The printer for VISY-View Touch (available in the colours white and black)

Application

Optionally, it is possible to connect the printer to the VISY-View Touch display to print out the current tank contents, delivery data and alarms.

Technical Data

Printer

- » Dimension: h 90 x w 100 x d 191 [mm]
- » Ambient temperature: 0 °C to + 40 °C
- » Power supply: 100 to 240 V_{AC}, 50 to 60 Hz, via AC adapter
- » Printing method: Thermal line printing
- » Paper changing: Easy paper drop in
- » Paper width: 58 mm ± 0.5 mm
- » Paper roll diameter: max. 60 mm
- » Communication: RS-232 connection to VISY-View Touch

date of issue 07.12 Subject to technical change

VISY-Input

Input module for external alarm

VISY-Input:
the octal input module

Application

VISY-Input is an octal input module installed in a case with an index of protection of IP66. It serves as a link between external alarm outputs and the tank level gauge VISY-X. Alarm signals delivered by external systems can be connected to the inputs of VISY-Input and will then be collected by the tank level gauge VISY-X. This allows the indication of alarms from different systems at one central point. The connection to the tank level gauge VISY-X is done by a communication line.

Features of FAFNIR technology

- Flexible installation location
- Cost-effective connection to VISY-X
- Easy to configure using VISY-Setup
- External alarms displayed centrally by VISY-X
- Clear LED status indicators
- Ability to connect up to eight VISY-Input modules to VISY-X

date of issue 07.12 Subject to technical change

Technical Data
VISY-Input

» Dimensions:
h 60 x w 180 x d 130 [mm]
(excluding cable gland)
» Ambient temperature:
0 °C to + 40 °C
» Protection class: IP66
» Communication:
1 x RS485 (connection over VISY-ICI 485 module to VISY-Command)*,
2 x RS232 (optional)

* The connection to VISY-Command RF and VISY-Command GUI RF not possible at this time.

» Displays:
2 x power LEDs,
1 x status LED,
2 x communication LEDs,
8 x Input LED
» Inputs:
8 inputs, which can be configured either as potential-free voltage inputs or as inputs for relay contacts

» Voltage inputs:
input voltage range 5 V_{DC} (approximately 1 mA) to 24 V_{DC} (approximately 7 mA), potential-free, protected against polarity reversal
» Relay inputs:
internal power supply 12 V_{DC}, relay contact current approximately 10mA
» Power supply:
230 V_{AC} ± 10 %, 50 to 60 Hz, ≤ 4 VA

date of issue 07.12 Subject to technical change

VISY-Output

Quad relay output module

VISY-Output:
the quad output module

Application

VISY-Output is a four relays output module installed in a case with a protection class IP66. It serves as a link between the tank level gauge VISY-X and external safety equipment or alarm indicators. Each of the 4 relays can be mapped to different alarm conditions detected by the tank level gauge VISY-X. The connection to the tank level gauge VISY-X is done by a communication line.

Features of FAFNIR technology

- Flexible installation location
- Cost-effective connection to VISY-X
- Easy to configure using VISY-Setup
- Alarms freely configurate to individual relays
- Clear LED status indicators
- Ability to connect up to four VISY-Output modules to VISY-X*

* eight relays version will be available from 4 quater 2011

Technical Data
VISY-Output

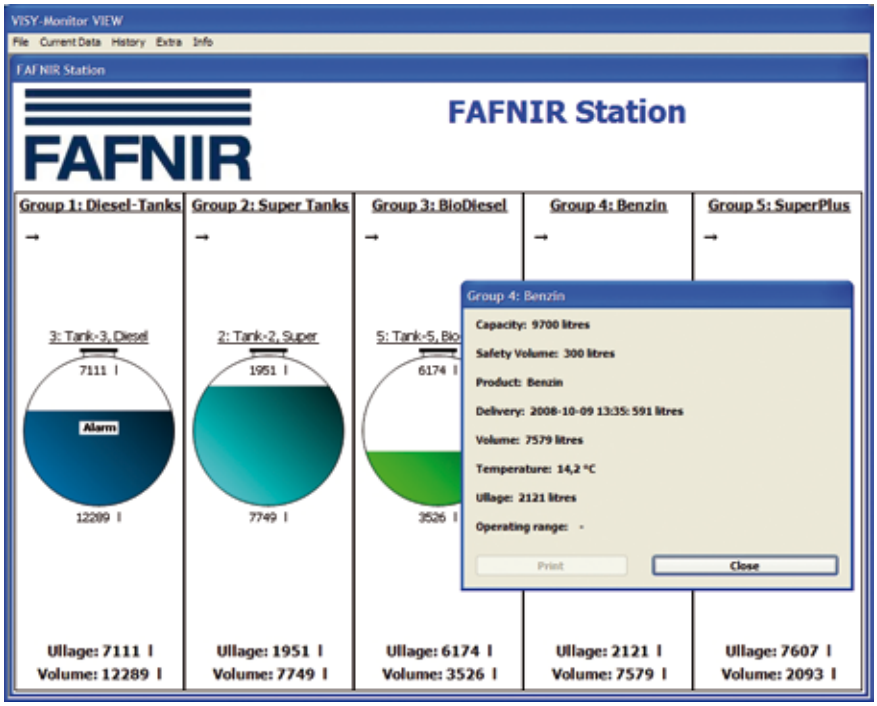
» Dimensions:
h 60 x w 180 x d 130 [mm]
(excluding cable gland)
» Ambient temperature:
0 °C to +40
°CCommunication:
» 1 x RS485 (connection
over VISY-ICI 485 module
to VISY-Command),
2 x RS232 (optional)

» Displays:
1 x power LED,
1 x status LED,
4 x alarm LEDs,
4 x relay LEDs
» Outputs:
4 x relays each with
one potential-free
changeover contact;
load rating of the contacts:
AC voltage: $U_{eff} \leq 250$ V,
$\cos \varphi \geq 0{,}7$, $I_{eff} \leq 5$ A,
$P_{eff} \leq 500$ VA; DC voltage:
$U \leq 30$ V, $I \leq 5$ A, $P \leq 150$ W
» Power supply:
$230V_{AC} \pm 10$ %, 50 to 60 Hz,
≤ 4 VA

date of issue 07.12 Subject to technical change

VISY-Monitor

Software Application



VISY-Monitor software application

VISY-Monitor is a software application for monitoring and recording data from tanks at petrol stations, fuel depots, etc. It displays tank data and provides the work platform for tank data management.

Features of FAFNIR technology

- Graphical presentation of tank contents for permanent overview
- User-friendly tank content viewer with a useful range of additional information, e.g. spare capacity
- Tank contents displayed in litres
- Display of product temperature and water level
- Clearly presented numerical and graphical representation of historical data
- Automatic tank calibration
- Reconcilliation
- Automatic leakage monitoring
- Automatic tank mapping
- Static and dynamic leak detection
- Communication with the VISY-Command measurement analysis unit
- Connection to the VISY-Tank resource management software application via Ethernet
- Three separate channels for connection to different tank level gauging
- Supports the most common tank level gauging
- Runs on Windows NT/2000/XP/Vista/Win7

Function

VISY-Monitor displays a fully comprehensive range of tank data. The level data from the VISY-X system (VISY-Stick and VISY-Command) are forwarded to the PC where they are displayed by the VISY-Monitor software application.
VISY-Monitor supports a range of different types of tank data, including all relevant data about the tank (tank number and content) and the product (filling level, water level and product temperature) as well as additional information (e.g. spare capacity). The tank information displayed is continuously refreshed and viewable at all times. In addition, VISY-Monitor offers a host of other features, such as automatic tank calibration, optimum leakage monitoring and the ability to display historical data. Historical data are displayed in tabular and graphical form and can be printed out. All inventory and event data are stored indefinitely in a database for further processing.

It is also possible to connect an external journal printer for documenting current tank levels and enabling mandatory printouts of all alarm messages. For audible alarms, it is a simple matter of connecting up to a standard audio system.

In addition to FAFNIR proprietary sensors, two further tank level gauging from the most common manufacturers can be connected in parallel, which means that existing sensors can be replaced in stages.

Data Management

» Volumetric representation of tank contents
» Temperature-compensated volume
» Product temperature
» Spare capacity
» Tank and product name
» Water level
» Variable number of tank displays
» Alarm messages and logging
» Automatic tank calibration
» Reconciliation
» Automatic loss monitoring
» History logging
» All data stored in a database

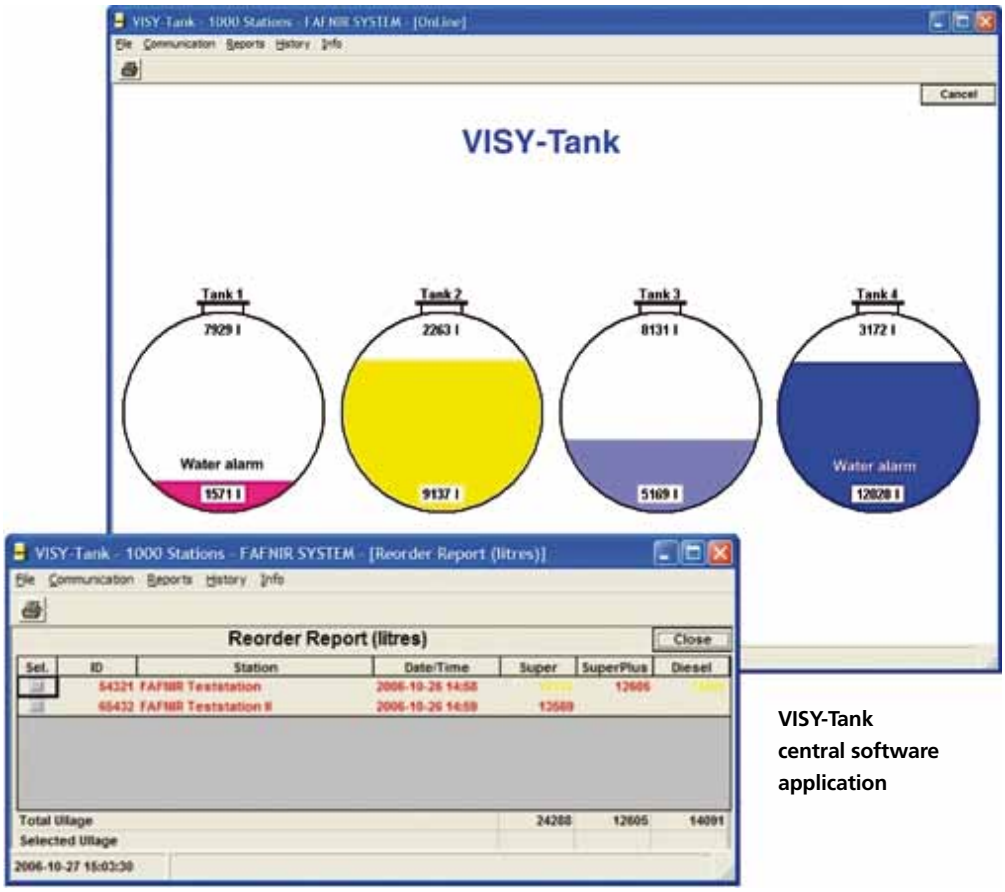
Minimum System Requirements

» CPU 700 MHz
» RAM 512 MB
» Spare hard drive capacity for VISY-Monitor software application: 30 MB
» Windows 2000 Professional with SP4,
Windows XP Professional with SP2 or
Windows Vista with SP1, Win7
» Microsoft.NET 2.0 Framework

date of issue 07.12 Subject to technical change

VISY-Tank

Central Software Application



VISY-Tank central software application

VISY-Tank is a software application for monitoring and recording data from tanks at petrol stations, fuel depots, etc. It is the central program for long distance scanning by petrol stations.

Features of FAFNIR technology

- Online graphical overview of a petrol station's tank contents
- Tank contents displayed in litres
- Display of product temperature and water level
- Delivery demand breakdown by region
- Tabular and graphical display of historical data
- Calculation and display of time to depletion of existing tank content
- Communication with the VISY-Command measurement analysis unit and the VISY-Monitor software application
- Three separate channels for connection by different communication links: GSM, modem or Internet
- Supports the most common tank level gauging
- Fastest viewing speeds (@ VISY-X System via LAN < 3 s)
- Runs on Windows NT / 2000 / XP / VISTA / Win7

Function

VISY-Tank is the optimum software application for fuel tanker resource management. By (W)LAN, GSM or modem link, it compiles all the information from the various petrol stations. With access to three separate communication channels, it is possible to select a different communication type for each channel [GSM, modem and (W) LAN]. This means that a heterogeneous network with different connections can be fully managed by VISY-Tank.

The software application is capable of managing up to 1,000 stations distributed across up to 100 regions. On receipt of data, VISY-Tank automatically prints out a demand report (by station, by region or overall).

Data Management

» Volumetric representation of tank contents
» Product temperature
» Spare capacities
» Tank and product name
» Water level
» Online tank display
» Alarm messages and logging
» History logging

Minimum System Requirements

» CPU 700 MHz
» RAM 512 MB
» Spare hard drive capacity for VISY-Tank software application: 30 MB
» Windows 2000 Professional with SP4,
Windows XP Professional with SP2 or
Windows Vista with SP1, Win7

date of issue 07.12 Subject to technical change

SMS-Box

Alarm Messages by SMS

Application

The SMS-Box can be used universally to send alarm and status messages from all FAFNIR systems as well as devices from other manufacturers as text message (SMS), fax or e-mail. The SMS-Box is the ideal reporting device for a broad range of applications. Typical applications include unmanned filling stations or operations, remote warehouses or containers as well as other technical facilities. Moreover, there is an option for communicating process messages or to schedule the filling of storage containers. Alarm and status messages can be received as text messages, e-mails or faxes.

Features of FAFNIR technology

- Universal application
- Easy installation and configuration
- Compact design
- Alarm routing
- Devices from other manufacturers can also be connected
- Central signalling of alarms
- Maintenance-free

date of issue 07.12 Subject to technical change

Technical Data
SMS-Box

» Dimensions:
h 60 x w 180 x d 130 [mm]
» Ambient temperature:
0 °C to + 40 °C
» Protection class: IP66
» Communication:
1x mini USB connection for configuration
» Connection for:
3 potential-free switches (the device supplies: 3.7V; max. 10 mA) each input can be configured "fail safe"
» GSM module;
Quad GSM Band:
850, 900, 1800, 1900 MHz
» Multi-band aerial integrated into housing
» Power supply:
230 V_{AC} ± 10%, 50 to 60 Hz, 5 VA
» Delivery includes*:
USB cable, Programming software

* Additional requirements:
Activated SIM card (not included in delivery)

Alarm Message

» Alarm and status message:
32 characters
» Alarm and status messages can be sent simultaneously in various forms, as:
– Text message (SMS) to as many as 12 different telephone numbers,
– Fax to 4 different fax numbers,
– E-mail to 4 different e-mail addresses
» Variable settings for repetition of alarm and status message:
– None; 1.5h; 3h; 6h; 12h; 24h and 48h

date of issue 07.12 Subject to technical change

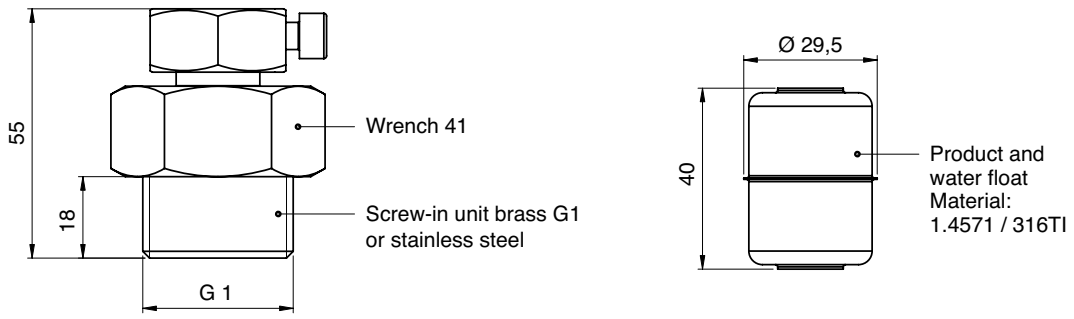
Spare parts / Accessories

1" Installation Kit

The optional installation kit comprises a product float, a water float and a screw-in unit. It makes it possible to install a VISY-Stick using an R1 threaded coupler. The screw-in unit is also available in stainless steel.

1" Installation Kit

1" Installation Kit



Dimensions in mm

date of issue 07.12 Subject to technical change

Spare parts / Accessories

VISY-RFT Installation kit
Installation kit for mounting a VISY-RFT module.

RF-Meter
The RF meter measures radio field strength for a comfortable start-up of VISY-X RF.

RFT-Cable
Connecting cable for VISY-RFT installations, poor damping

RFT-Battery
Battery for the VISY-RFT Module

date of issue 07.12 Subject to technical change

BNC Connector pins
consisting of:
2x BNC-Cable pin crimp
1x Adapter BNC-F

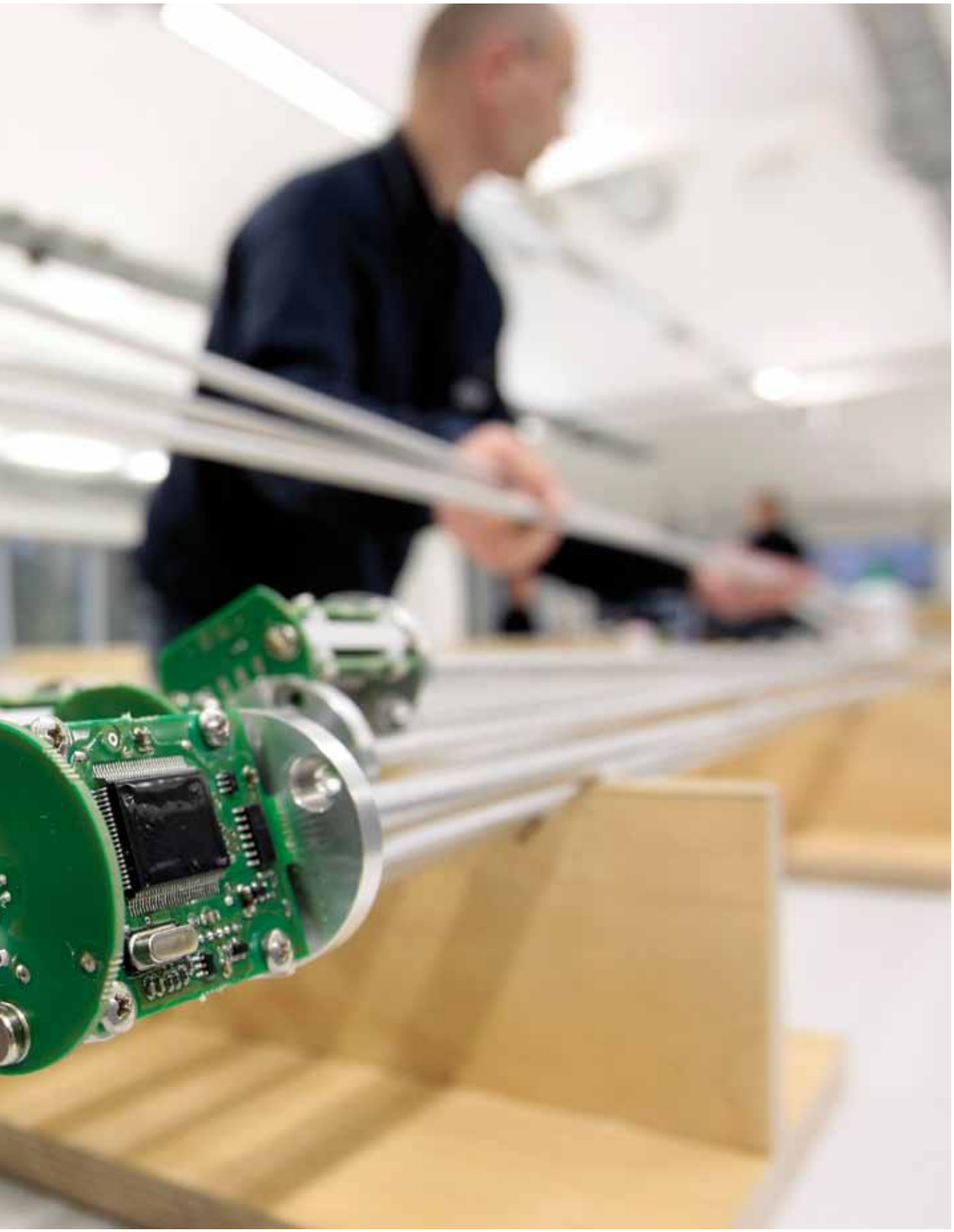
Junction Tube
The 5-pin junction tube makes it quick and easy to establish the connection between the VISY-Stick and the cable to the VISY-Command.

Connection Cable M12
The blue, fuel-resistant installation and connection cables are two metres long 4-wire and available in two versions: straight and 90° elbow.

VISY-Connecting cable
Cable for VISY-X installations
4-wire, blue, fuel resistant

FAFNIR – Sensors and Systems

To protect people and the environment



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