

# VISY

## VISY-Command (VI-4)



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## 1 Introduction

The VISY-X system (**V**olume **I**nformation **S**ystem) provides highly precise and continuous level measurements for all commercially available fuels in up to 16 tanks. Simultaneously the product temperature and the water level at the bottom of the tank are measured.

The system includes:

- **VISY-Command** (central unit)
- **VISY-Setup** (software application) for configuring the VISY-Command
- **VISY-Stick** (filling-level sensors) for tank gauging in the versions:  
VISY-Stick, VISY-Stick Advanced, VISY-Stick Advanced with VISY-Density Module, VISY-Stick Flex, VISY-Stick LPG (liquefied petroleum gas), ...

In addition, following environmental sensors can also be operated with the VISY-X System:

- **VISY-Stick Sump** for monitoring the manhole or the dispenser sump with the distinction between product and water
- **VISY-Reed Sump** for monitoring the manhole or the dispenser sump without a distinction between liquids
- **VISY-Stick Interstitial** (with configurable measuring range) for monitoring the intermediate chamber in double-walled tanks
- **VISY-Reed Interstitial** (with fixed measuring points) for monitoring the intermediate chamber in double-walled tanks
- **VISY-Stick Temp** for temperature measurement with up to 31 integrated temperature sensors depending on the probe length
- **VIMS Sensors** (VIMS-Tank, VIMS-Product Pipe, VIMS-Delivery Pipe) for monitoring the intermediate chamber in double-walled tanks, filling lines and product lines from our system partner SBG GmbH, see chapter 1.1
- **COMS (Continuous Oil separator Monitoring System) with VISY-Stick Oil separator and VISY-Sludge probes** for monitoring the oil and sludge layer in oil separators, see chapter 1.1
- **VPS** for monitoring of pressures

The VISY-Command central unit is installed in the petrol station building outside the potentially explosive area.

The VISY probes are to be connected with the VISY-Command. VISY-Command collects data from the probes and transmits this to a higher-level system (e.g. POS) on request.

In this manual, you will be guided through the installation and commissioning of the VISY-Command.

## 1.1 Related documentation

Before configuring and operating the VISY-Command central unit, the level and environmental sensors must be installed and connected to it. The VISY-Command is then configured with the VISY-Setup software via a PC or notebook. Please also observe the additional instructions in the following technical documentation:



VISY-Setup V4..., art. no. 207158



VISY-Stick VISY-Reed, art. no. 207194

For the installation and commissioning of the VIMS sensors please contact:



SGBGmbH, Hofstraße 10, 57076 Siegen, Germany

Tel.: +49 271 48964-0, Fax: +49 271 48964-6, E-mail: [sgb@sgb.de](mailto:sgb@sgb.de)

The VISY-SoftView software application is used for the display module in the VISY-Command GUI and in the VISY-View Touch. VISY-SoftView provides the capability to view current tank data, delivery data and the various alarms signalled by the VISY-Command central unit. For configuration and operation of the display module with VISY-SoftView see the following technical documentation:



VISY-SoftView User Guide, art. no. 350026



VISY-SoftView Administrator, art. no. 350144

The probes VISY-Stick Oil separator and VISY-Sludge are used for monitoring of oil separators (**COMS Continuous Oil separator Monitoring**). The sensor VISY-Stick Oil separator continuously monitors the height of the light-liquid layer, VISY-Sludge continuously monitors the height of the sludge layer. For installation and operation see the following technical documentation:



COMS Technical data, art. no. 350273



COMS Installation Quick Guide, art. no. 350240



COMS oil layer table, art. no. 350007



VISY-SoftView Oil separator, art. no. 350193

## 1.2 Requirements for service engineers

The complete VISY-X system should only be installed by trained service engineers.

### 1.3 Safety instructions

The VISY-X system is optimised for use in petrol stations and is compatible with all commercially available fuels. It serves to measure and evaluate the filling levels in tanks. The system must be used exclusively for this purpose. Observe and follow all product safety notes and operating instructions. The manufacturer accepts no liability for any form of damage resulting from improper use.

The level and environmental sensors and the VISY-Command central unit have been developed, manufactured and tested in accordance with the latest good engineering practices and generally accepted safety standards. Nevertheless, hazards may arise from their use.

The following safety precautions must be observed in order to reduce the risk of injury, electric shocks, fire or damage to the equipment:

- Opening or removing the housing cover from the VISY-Command could result in a risk of electric shock.
- Do not change or modify the system or add any equipment without the prior consent of the manufacturer.
- Only use original parts. These comply with the technical requirements specified by the manufacturer.
- The installation, operation and servicing of the sensors and the VISY-Command must solely be carried out by expert personnel.
- Operators, installers and service technicians must observe all applicable safety regulations. This also applies to any local safety and accident prevention regulations which are not stated in this manual.
- The VISY-Command central unit is only suitable for wall mounting inside buildings and must not be installed in potentially explosive areas.
- The isolating amplifiers type VP-... respectively VISY-RFR, and the interface type VI-... included in the VISY-Command central unit must always be undamaged and clean.
- During normal operation, the casing cover of the VISY-Command central unit must remain closed.
- The product may be powered only via the permissible auxiliary power supply.

The safety instructions in this manual are marked as follows:



*If these safety instructions are not observed, it may result in the risk of accident or damage to the VISY-X system.*



*Useful tips and information in this manual, you should observe, appear in italics and are identified by this symbol.*

## 2 Versions of the VISY-X system

Two versions of the VISY-X system are available which differ in different data transmission technology:

- (1) The wired version
- (2) The wireless version / radio system

### 2.1 Wired version

In most cases, data is transferred between the sensors and the VISY-Command central unit via cable. This cable is also in charge of the voltage supply of the sensors. The wired version of the VISY-X system is the standard version.

### 2.2 Wireless version / radio system

If no free cable ducts are available at the petrol station, it is possible to instead opt for the wireless tank gauging system. In this case, the benefit of installing the wireless system is that it does not entail any excavation work.

In the wireless system, the sensors are connected to a transmitter and powered by a battery. The radio version of the central unit is equipped with a receiving module.

The radio system consists of the additional components:

- VISY-RFR (radio frequency receiver, receiver installed in VISY-Command ... RF)
- VISY-RFT (radio frequency transmitter, transmitter with battery)

The installation procedure for the wireless system is described in the following technical documentation:



VISY-RF III radio system, art. no. 350272

### 3 VISY-Command

The designation of the VISY-Command depends on the number of sensor terminals or the transmission technology, for example, "VISY-Command 8" with eight sensor terminals or "VISY-Command RF" as wireless version.

#### 3.1 Design and function

##### 3.1.1 VISY-Command – wired version (standard)

The wired (standard) version of VISY-Command has 2, 4, 8, or 16 sensor terminals.

At each sensor terminal, it is possible to connect up to three different types of FAFNIR sensors VISY-Stick/Reed (e.g. one VISY-Stick, one VISY-Stick Interstitial and one VISY-Reed Sump).

These three types of sensors can be connected to each other directly at the installation point. This means that only one cable (4-wire) is required for the connection to the VISY-Command.



*In combination with the VIMS sensors from our system partner for leakage control (SGB GmbH, Siegen), either 2 FAFNIR sensors and 2 SGB sensors or 3 FAFNIR sensors and 1 SGB sensor can be connected to the VISY-Command central unit using one single cable (4-wire).*



*Connecting sensors of the same type (e. g. 3 x VISY-Stick or VISY-Stick Interstitial with VISY-Reed Interstitial) to one sensor terminal is not supported.*



*The terminal box/cable connector used to extend the connection cables for the sensors in the manhole chamber must comply with a degree of protection of IP68 for the housing.*

The VISY-Command central unit comprises a VI-4 interface and one or two VP... isolating amplifiers installed in a housing for wall mounting (IP20). One VP... isolating amplifier is installed in the VISY-Command 2, 4 or 8; two VP-1 isolating amplifiers are installed in the VISY-Command 16.

The sensors are electrically supplied with power via the VISY-Command. The VISY-Command receives the measured values, stores this data temporarily and makes the data available to a higher-level system (e.g. central computer). A serial interface, either an RS-232 or an RS-485, is used for communication. Various logs are available for transmitting the data to the service station computers.

The IFSF-LON interface is also available as an option, see the following technical documentation:



IFSF-LON interface converter, art. no. 207092

### 3.1.2 VISY-Command RF – wireless version (radio system)

With the wireless version (RF), each VISY-Stick/Reed sensor is connected to one VISY-RFT transmitter, which transmits the measured data to VISY-Command RF.

Up to 16 VISY-Stick/Reed sensors can be operated in conjunction with the VISY-Command RF. Each sensor is electrically powered via a battery in the VISY-RFT transmitter.



*The VISY-RFT transmitter must not be operated without an antenna.*



*If the wireless system is used, it should be noted that reception conditions may vary with the number of cars or lorries passing through the petrol station. This can, under certain circumstances, result in long data reception failures in the VISY-Command. Therefore, the tank data may not always be updated at the set transmission intervals and delivery data could potentially be lost.*



*For improved wireless communication, the VISY-Command RF should preferably be equipped with two external receiving antennas.*

The VISY-Command RF comprises an interface VI-4 and a wireless receiver installed in a case to be mounted on the wall (IP20). The data received from the VISY-Command RF is evaluated, stored temporarily and made available to a higher-level system (e.g. central computer). Communication takes place via a serial interface, either the RS-232 or RS-485. Various logs are available for transmitting the data to the service station computers.

The IFSF-LON interface is also available as an option, see the following technical documentation:



IFSF-LON interface converter, art. no. 207092

The installation of the wireless system is a complex installation procedure and is described in detail in the following technical documentation:



VISY-RF III radio system, art. no. 350272

## 4 Installation



*When installing and operating the VISY-Command central unit, the requirements of the Explosion Protection Regulations, the Industrial Health and Safety Regulations and the Equipment Safety Regulations as well as generally accepted rules of engineering and these operating instructions must be observed.*



*Observe also the local safety and accident prevention regulations, which are not stated in these operating instructions.*



*Wiring work may only be performed with the power disconnected.*

### 4.1 Assembly

The VISY-Command central unit must be securely mounted on a wall inside a building.



*The VISY-Command central unit is not suitable for outdoor installation.*



*For mounting the case, the VISY-Command contains the relevant drilling template.*

### 4.2 Sensor connections ...

#### 4.2.1 ... to VISY-Command (standard wired version)

Connect the filling level and environmental sensors to the sensor terminal block on the VP-... board (see Figure 1 and Figure 2). To feed in the cable, please use the blue cable gland for intrinsically safe circuits.



*The maximum permitted external inductance must not exceed 40 mH and the maximum permitted capacitance must not exceed 680 nF including the cable (see data sheet of the used cable).*

The connection cable between the sensors and VISY-Command must have the following characteristics:

- 4-core unshielded, oil-resistant cable
- Cable cross-section (4 x 0.5 mm<sup>2</sup> up to 100 m or 4 x 1.0 mm<sup>2</sup> up to 200 m)
- Colour blue or marked blue (cable for intrinsically safe power circuits)
- Maximum diameter of 10 mm to fit through the cable glands in the VISY-Command.

If cables with shielding are used to connect the VISY Command to the sensors in the potentially explosive area, the shield must be connected in the VISY Command to the equipotential bonding (provided on the base plate) and this grounding point must be included in the equipotential bonding system of the potentially explosive area. In addition, the shield must be sufficiently insulated in the potentially explosive area. Insulation with insulating tape alone is not permitted, but the use of heat shrink tubing would meet the requirements.

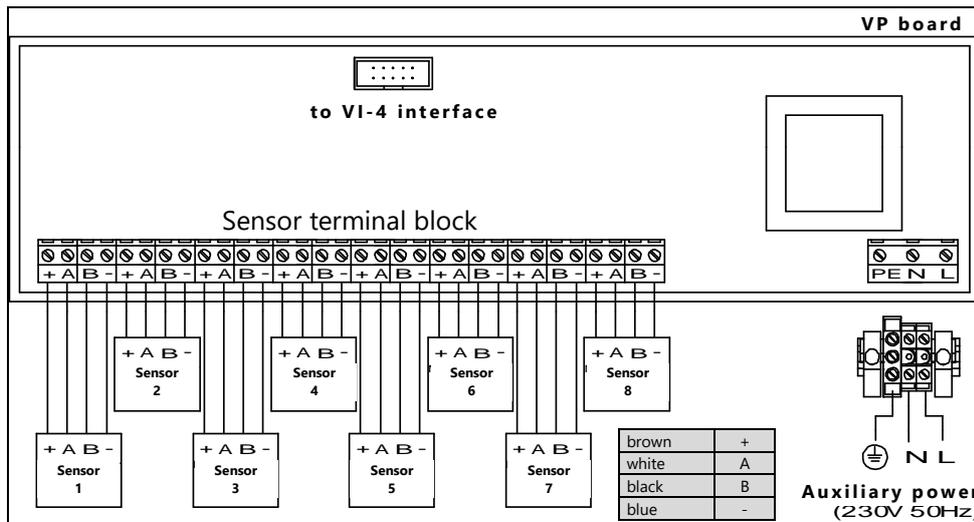


Figure 1: VISY-Command 8 with one VP-1 board for 8 sensors

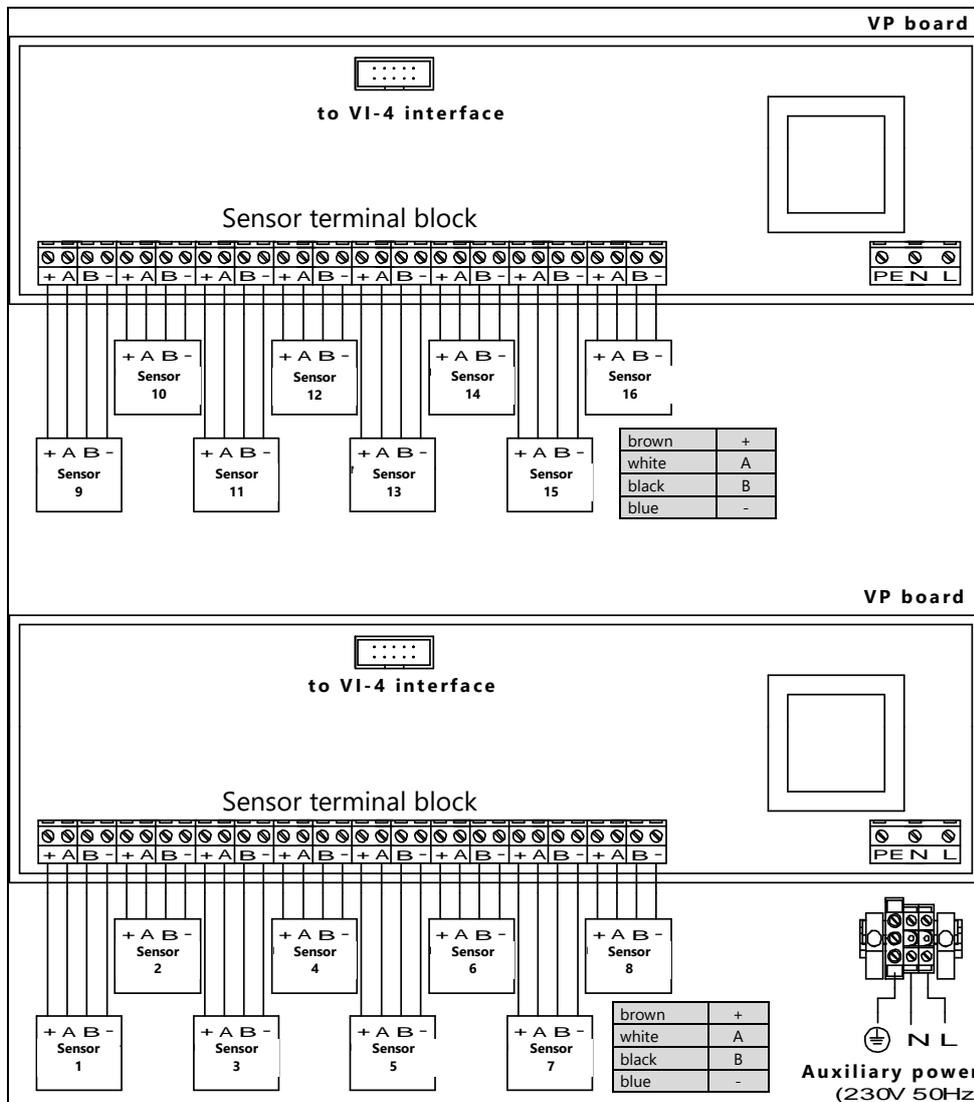


Figure 2: VISY-Command 16 with two VP-1 boards for 16 sensors

#### 4.2.2 ... to VISY-Command RF (wireless version)

The installation of the wireless version is described in detail in the manual of the VISY-RF radio system, see the technical documentation:

VISY-RF III radio system, art. no. 350272

### 4.3 Interface connections

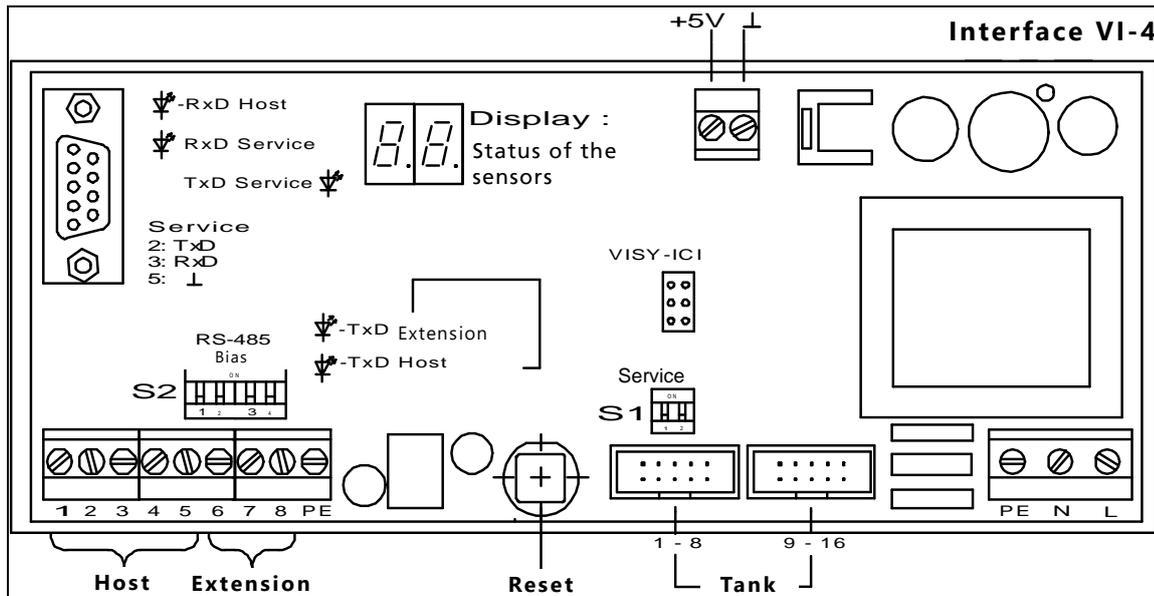


Figure 3: Interface VI-4

#### 4.3.1 Service interface

The RS-232 serial interface (9-pin D-sub socket) can be used for the connection of three different applications. The DIP switch S1 is used for the relevant settings:

##### DIP switch S1: Service

1	2	Function
OFF	OFF	Configuration of VISY-Command using the VISY-Setup software application
OFF	ON	VISY-Quick protocol (FAFNIR protocol)
ON	OFF	Auxiliary measurement system
ON	ON	No function

Table 1: DIP switch S1 settings

The RxD service LED (green) displays incoming data of the service interface.  
The TxD service LED (green) displays outgoing data of the service interface.

For connecting to the service interface, a serial interface cable (standard) must be used.

### 4.3.2 Host interface

The serial host interface (galvanically isolated) for communication with a higher-level system, e.g. POS, is designed to function as an RS-232 interface or an RS-485 interface. Depending on requirements, the host computer can be connected to the RS-232 interface or the RS-485 interface. The data protocol for the interface can be selected using the VISY-Setup software application and is determined by the host code entered. The VI-4 interface automatically recognises the interface to which the host computer is connected.

Connect the host computer to the corresponding terminals of the host interface, as shown below.

1	2	3	4	5	6	7	8	9
RxD	TxD	⊥	A+	B-	⊥	A+	B-	PE
RS-232			RS-485		RS-485			
Host					Extension			

Figure 4: Host interface



*A simultaneous operation of the RS-232 interface and the RS-485 interface is not supported.*

If the RS-485 interface is used, it is advisable (for reasons of interference resistance) to use a 3-wire cable in order to also be able to connect the interface ground of the VISY-Command (terminal ⊥ of the host interface) to the interface ground of the host system (if provided as a connection terminal) in addition to the ports A+ and B-.

If shielded lines are used, the shield must be placed on the PE connection. Please also observe the installation instructions for the device to be connected to the interface. If the shield cannot be fitted on both sides, it is possible to work with a shield fitted to one side of the VISY-Command only.

The RxD Host LED (red) indicates incoming data from the host computer.

The TxD Host LED (red) indicates outgoing data to the host computer.



*Do not connect the line shield to the interface ground (⊥/GND).*



*Please note that the longer the line length, the greater the probability of equipotential currents flowing through a line shield earthed on both sides. Depending on local rules and regulations, it may be necessary to provide an additional equipotential bonding between the connected devices.*

### 4.3.3 Extension interface (RS-485)

The extension interface is a galvanically isolated RS-485 serial port through which data can be transmitted to other system components (e.g. VISY-View Touch if the host interface is busy). This interface is unidirectional. This means that data is only sent from VISY-Command to the system components connected there. The system components receive the data without having to send a request. This means that, in contrast to bidirectional interfaces, it is possible to connect several system components (e.g. several VISY-View Touches) to the extension interface in parallel. Theoretically, up to 31 system components can be connected to this interface. By default, this interface is inactive. It can be activated using the VISY-Setup application. To determine whether other configurations are required, please refer to the technical documentation supplied with the device to be connected.

1	2	3	4	5	6	7	8	9
RxD	TxD	⊥	A+	B-	⊥	A+	B-	PE
RS-232			RS-485		RS-485			
Host					Extension			

Figure 5: Extension interface

If shielded lines are used, the shield must be placed on the PE connection. Please also observe the installation instructions for the device to be connected to the interface. If the shield cannot be fitted on both sides, it is possible to work with a shield fitted to one side of the VISY-Command only.

The yellow TxD LED of the extension interface indicates data being transmitted through the extension interface.



*Do not connect the line shield to the interface ground (⊥/GND).*



*Please note that the longer the line length, the greater the probability of equipotential currents flowing through a line shield earthed on both sides. Depending on local rules and regulations, it may be necessary to provide an additional equipotential bonding between the connected devices.*

#### 4.3.4 DIP switch S2 for bias (RS-485 host/extension)

With the DIP switch S2, the RS-485 host interface (2.1./2.2) and the RS-485 extension interface (2.3/2.4) can be biased when required, in order to achieve a significant improvement of communication security.

##### DIP switch S2: RS-485 bias

1	2	3	4	Function
OFF	OFF	OFF	OFF	Bias off (factory setting)
ON	ON	OFF	OFF	Host bias
OFF	OFF	ON	ON	Extension bias
ON	ON	ON	ON	Host and extension bias

Table 2: DIP switch S2 configuration



*In an RS-485 network, only one bias point is permitted. For this reason, leave the switches in the OFF position if another device is already biasing the network.*

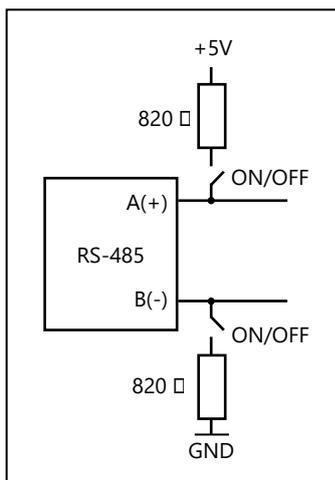


Figure 6: DIP switch S2

#### 4.4 Supply voltage connection

The auxiliary power (electrical connection) must be supplied using fixed wiring (not via a connector), and is ducted through the lower right cable gland. Connect the power supply to the provided terminal blocks (see Figure 1).

## 4.5 Status display

After switching on or resetting the VI... interface, the firmware checksum is initially checked. If an error in the firmware is detected, the display shows permanently SE (Signature Error).

Otherwise, the firmware version of the interface is displayed. This is shown in form of three numbers displayed in sequence, e. g. 4 – 2 – 3 represents version 4.2.3.

If no sensor has been configured yet, the display will show 99 continually. If, however, sensors have been configured, for each and every configured terminal of the VP-... isolating amplifier, first the terminal number and then the type of sensor represented by a symbol will be displayed one after the other (see following table):

	VISY-Stick fitted in the tank
	VISY-Stick/Reed Interstitial (monitoring of the intermediate chamber in double-walled tanks)
	VISY-Stick/Reed Sump (monitoring of the manhole)
	VISY-Stick/Reed Sump (monitoring of the dispenser sump)
	VPS pressure sensor
	VISY-Sludge
	VISY-Stick Temp (temperature measurement with up to 31 temperature sensors)
	VIMS Tank (monitoring of the intermediate chamber in double-walled tanks)
	VIMS Product Pipe (monitoring of intermediate chamber in double-walled product pipes)
	VIMS Delivery Pipe (monitoring intermediate chamber in double-walled filling pipes)
	VISY-Input
	VISY-Output

Table 3: Sensor symbols



*VIMS sensors cannot be operated with the VISY-Command RF.*

Finally, the status of the various sensors is displayed in the form of a number (see below).

### 4.5.1 Status messages

As soon as configuration has been completed with the VISY-Setup, you can monitor the operation of the sensors using the status display on the VI-4 interface. The display consecutively shows the terminal number of a particular sensor, a symbol and the associated status (e. g. „  “ means “VP board terminal no. 5 with VISY-Stick under operation”). In this case, one sensor after another is then scanned in an endless loop.

Code	<u>Message (VISY-Setup)</u> Description	► Possible cause <input checked="" type="checkbox"/> Required action
0	<u>Probe running</u>	<input checked="" type="checkbox"/> No measures required.
1	<u>Probe not running</u> The measured values are no longer being recorded and are set to "0" by the central unit.	► If this status is displayed permanently, it must be assumed that the sensor is defective. <input checked="" type="checkbox"/> The sensor must be replaced.
2	<u>Mounting fault</u> All measured values are processed normally. However, it must be assumed that the measured values supplied by the sensor are not correct.	► The sensor is not installed correctly. <input checked="" type="checkbox"/> Check the mounting position of the sensor and correct if necessary. The sensor must be positioned vertically on a level surface.
5	<u>Probe cannot determine temperature</u> The central unit is no longer capturing the temperature and sets the value to 0.0 °C. The temperature compensation of the filling volume is no longer being carried out. The product and water level continue to be processed.	► If this status is displayed permanently, it must be assumed that the sensor is defective. <input checked="" type="checkbox"/> The sensor must be replaced.
6	<u>Probe cannot determine filling level</u> The product level and water level are set to "0" by the central unit, the temperature will continue to be transmitted.	► If this status is displayed permanently, it must be assumed that the sensor is defective. <input checked="" type="checkbox"/> The sensor must be replaced.
7	<u>Reduced measuring accuracy</u> All measured values are being processed normally. However, it must be assumed that total measurement accuracy is not being achieved.	► Powerful fluid movements prevent a fully accurate measurement. This may be the case during fuel deliveries, for example. <input checked="" type="checkbox"/> No measures required.
8	Relevant to wireless mode only: <u>Checksum error:</u> <u>Probe - RF-transmitter</u> The VISY-RF transmitter is reporting an error communicating with the sensor. The central unit is not receiving data from the sensor.	► Dirty or damaged plug-in connection, loose connection, strong interference radiation, or VISY-RF transmitter defective. <input checked="" type="checkbox"/> Check cable and plug-in connection, replace VISY-RFT transmitter, replace sensor, check surrounding area for powerful sources of radiation (e.g. three-phase supply cables, motors).

Code	<u>Message (VISY-Setup)</u> Description	► Possible cause <input checked="" type="checkbox"/> Required action
9	Relevant to wireless mode only: <u>RF-transmitter has no communication with probe</u>  The VISY-RFT transmitter is reporting that the sensor is no longer responding.	► Dirty or damaged connection, connection cable defective, sensor or VISY-RFT transmitter defective.  <input checked="" type="checkbox"/> Check cable and plug-in connection, replace VISY-RFT transmitter, replace VISY-Stick/Reed.
10	<u>Checksum error:</u> <u>Probe - Control Unit</u>  The central unit displays an error message when communicating with the sensor or the RF receiver.	► In case of wired operation, the cable connection (also connectors and terminals) to the sensor is loose, dirty, or damaged, or there is severe interference.  ► In wireless mode, the cable connection (also connectors and terminals) between RF receiver and VI-4 interface is loose, damaged, or there is severe interference.  <input checked="" type="checkbox"/> Check cables, plug-in connections and terminal connections.  <input checked="" type="checkbox"/> In wired mode, replace sensor, VP-... isolating amplifier, VI-4 interface.  <input checked="" type="checkbox"/> In wireless mode, replace RF receiver, VI-4 interface. Check surrounding area for powerful sources of radiation (e.g. three-phase cables, power switches, etc.).
11	<u>No communication with probe</u>  The central unit is no longer able to establish data communication with the sensor. The measured values are not being captured and are set to "0" by the central unit.	► Sensor not connected / available / defective, wiring fault, incorrect serial number configured for the sensor, central unit (VI-4 interface or VP-... isolating amplifier) defective.  <input checked="" type="checkbox"/> Take the necessary measures as appropriate to the possible causes.
12	<u>Incompatible data</u>  There are no transmission errors in the data communication with the sensor, but the central unit cannot interpret the data. The measured values are not being captured and are set to "0" by the central unit.	► The sensor or the particular version of the sensor is not supported by the central unit.  <input checked="" type="checkbox"/> Ask the manufacturer whether the sensor and the central unit are compatible, and whether any updates are available. When doing so, please have the type and version number of the

Code	<u>Message (VISY-Setup)</u> Description	► Possible cause <input checked="" type="checkbox"/> Required action
		central unit, and the type, serial number and/or version number and possibly the model of the sensor (e.g. number of floats or density measurements installed) to hand.
13	Relevant to wireless mode only: <u>Waiting for first wireless transmission</u> After switching on or resetting, the VISY-Command RF is reporting that no data has been received from the sensors.	► Data from the sensors is only being transmitted periodically. <input checked="" type="checkbox"/> Not required because of normal reset/switch-on behaviour. If data is still not being received following the lapse of the configurable timeout in the VISY-Command (1 – 99 hours), the status automatically changes from 13 to 11.
99	<u>Probe not configured</u> The central unit assumes that the sensor is not connected. No data communication is taking place via the relevant connection point (tank 1 ... 16). All the measured values for this connection are set to "0".	► When the central unit is delivered, all the connected sensors/tanks show this status initially. In order for communication with a sensor to be established through a particular terminal, it is necessary to enter the serial number of the sensor and also the type of product. If this status is displayed, either one or both of these items of data have not been input. <input checked="" type="checkbox"/> The central unit must be configured by using the VISY-Setup.
--	<u>Reset central unit</u> The central unit is not working. During a reset, there is no communication with the sensors, host and VISY-Setup. Here, the VISY-Setup is reporting that the central unit is no longer responding.	► The central unit is reset by its switching-on or pressing the reset button. If this status is displayed permanently, even after you have pressed the reset button, it should be assumed that the central unit (VI-4 interface) is defective. <input checked="" type="checkbox"/> Replace the VI-4 interface inside the central unit.

Table 4: Status messages

## 4.6 Reset button

This button can be used to trigger a reset of the VI-4 interface. All saved settings will be retained.

## 5 Configuration

After installation, the VISY-Command has to be configured using the VISY-Setup software application. Please follow the relevant instructions in the following document:



Technical documentation VISY-Setup V4..., art. no. 207158

## 6 Replacing components

VI-4 interface and VP-... isolating amplifier can be replaced each as complete assembly units. The boards are mounted on a support rail from which they can be easily removed using a screwdriver.

## 7 Maintenance

### 7.1 Return shipment

Before returning any FAFNIR equipment, the Return Material Authorization (RMA) from FAFNIR customer service is required. Please contact your account manager or the customer service to receive the instructions on how to return goods.



*The return of FAFNIR equipment is possible only with authorization by the FAFNIR customer care.*

## 8 Technical Data



*Details of the technical data can be found in the approvals and instructions.*

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**EU-Konformitätserklärung  
EU Declaration of Conformity  
Déclaration UE de Conformité**

**FAFNIR GmbH  
Schnackenburgallee 149 c  
22525 Hamburg / Germany**

erklärt als Hersteller in alleiniger Verantwortung, dass das Produkt  
declares as manufacturer under sole responsibility that the product  
déclare sous sa seule responsabilité en qualité de fabricant que le produit

**Messauswertung  
Evaluation Unit  
Unité d'analyse**

**VISY-Command ...**

den Vorschriften der europäischen Richtlinien  
complies with the regulations of the European directives  
est conforme aux réglementations des directives européennes suivantes

2011/65/EU	<b>Beschränkung der Verwendung bestimmter gefährlicher Stoffe in Elektro- und Elektronikgeräten</b>	RoHS
2011/65/EU	<b>Restriction of the use of certain hazardous substances in electrical and electronic equipment</b>	RoHS
2011/65/EU	<b>Limitation de l'utilisation de certaines substances dangereuses dans les équipements électriques et électroniques</b>	RoHS
2014/30/EU	<b>Elektromagnetische Verträglichkeit</b>	EMV
2014/30/EU	<b>Electromagnetic compatibility</b>	EMC
2014/30/EU	<b>Compatibilité électromagnétique</b>	CEM
2014/34/EU	<b>Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen</b>	ATEX
2014/34/EU	<b>Equipment and protective systems intended for use in potentially explosive atmospheres</b>	ATEX
2014/34/EU	<b>Appareils et systèmes de protection destinés à être utilisés en atmosphères explosibles</b>	ATEX
2014/35/EU	<b>Bereitstellung elektrischer Betriebsmittel zur Verwendung innerhalb bestimmter Spannungsgrenzen auf dem Markt</b>	NSRL
2014/35/EU	<b>Making available on the market of electrical equipment designed for use within certain voltage limits</b>	LVD
2014/35/EU	<b>Mise à disposition sur le marché du matériel électrique destiné à être employé dans certaines limites de tension</b>	DBT
2014/53/EU	<b>Bereitstellung von Funkanlagen auf dem Markt und zur Aufhebung der Richtlinie 1999/5/EG</b>	FAR
2014/53/EU	<b>Making available on the market of radio equipment and repealing Directive 1999/5/EC</b>	RED
2014/53/EU	<b>Mise à disposition sur le marché d'équipements radioélectriques et abrogeant la directive 1999/5/CE</b>	DER

durch die Anwendung folgender harmonisierter Normen entspricht  
by applying the harmonised standards  
par l'application des normes

**RoHS / RoHS / RoHS  
EMV / EMC / CEM**

**EN 50581:2012  
EN 55022:2010  
EN 55024:2010  
EN 61000-3-2:200 + A1:2009 + A2:2009  
EN 61000-3-3:2008  
EN 61000-6-2:2005**

**ATEX / ATEX / ATEX**

**EN 61326-1:2013  
ETSI EN 300 220-1 V2.4.1  
EN 60079-0:2009  
EN 60079-11:2007  
EN 60079-14:2014  
EN 60079-26:2007**

**NSRL / LVD / DBT  
FAR / RED / DER**

**EN 61010-1:2010  
ETSI EN 300 220-2 V2.4.1**



Das Produkt ist bestimmt als Elektro- und Elektronikgerät der RoHS-  
The product is determined as electrical and electronic equipment of RoHS  
Le produit est déterminés comme des équipements électriques et électroniques de RoHS

**Kategorie / Category / Catégorie**

**Überwachungs- und Kontrollinstrumenten in der Industrie /  
Industrial Monitoring and Control Instruments /  
Instruments de contrôle et de surveillance industriels**

Das Produkt entspricht den EMV-Anforderungen  
The product complies with the EMC requirements  
Le produit est conforme aux exigences CEM

**Störaussendung / Emission / Émission  
Störfestigkeit / Immunity / D'immunité**

**Klasse B / Class B / Classe B  
Industrielle elektromagnetische Umgebung /  
Industrial electromagnetic environment /  
Environnement électromagnétique industriel**

**Empfänger / Receiver / Récepteur (VISY-Command RF) Kategorie 2 / Category 2 / Catégorie 2**

Die notifizierte Stelle TÜV NORD CERT GmbH, 0044 hat eine EG-Baumusterprüfung durchgeführt und folgende Bescheinigung ausgestellt  
The notified body TÜV NORD CERT GmbH, 0044 performed a EC-type examination and issued the certificate  
L'organisme notifié TÜV NORD CERT GmbH, 0044 a effectué examen CE de type et a établi l'attestation

**VP-...**

**TÜV 98 ATEX 1380**

Das Produkt entspricht dem NSRL-Konformitätsbewertungsverfahren  
The product complies with the LVD conformity assessment procedure  
Le produit est conforme avec la procédure d'évaluation DBT de la conformité

**VISY-Command ...**

**Modul A / Module A / Module A**

Das Produkt entspricht dem FAR-Konformitätsbewertungsverfahren  
The product complies with the RED conformity assessment procedure  
Le produit est conforme conformes avec la procédure d'évaluation DER de la conformité

**VISY-Command RF ...**

**Modul A / Module A / Module A**

Hamburg, 13.06.2016  
Ort, Datum / Place, Date / Lieu, Date

  
Geschäftsführer / Managing Director / Gérant: René Albrecht



**EU-Konformitätserklärung  
EU Declaration of Conformity  
Déclaration UE de Conformité**

**FAFNIR GmbH  
Schnackenburgallee 149 c  
22525 Hamburg  
Deutschland / Germany / Allemagne**

erklärt als Hersteller in alleiniger Verantwortung, dass das Produkt  
declares as manufacturer under sole responsibility that the product  
déclare sous sa seule responsabilité en qualité de fabricant que le produit

**Trennverstärker / Isolating Amplifier / Amplificateurs d'isolement**

**VP-...**

den Vorschriften der europäischen Richtlinien  
complies with the regulations of the European directives  
est conforme aux réglementations des directives européennes suivantes

2011/65/EU 2011/65/EU 2011/65/UE	<b>Beschränkung der Verwendung bestimmter gefährlicher Stoffe in Elektro- und Elektronikgeräten</b> <b>Restriction of the use of certain hazardous substances in electrical and electronic equipment</b> <b>Limitation de l'utilisation de certaines substances dangereuses dans les équipements électriques et électroniques</b>	<b>RoHS</b> <b>RoHS</b> <b>RoHS</b>
2014/30/EU 2014/30/EU 2014/30/UE	<b>Elektromagnetische Verträglichkeit</b> <b>Electromagnetic compatibility</b> <b>Compatibilité électromagnétique</b>	<b>EMV</b> <b>EMC</b> <b>CEM</b>
2014/34/EU 2014/34/EU 2014/34/UE	<b>Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen</b> <b>Equipment and protective systems intended for use in potentially explosive atmospheres</b> <b>Appareils et systèmes de protection destinés à être utilisés en atmosphères explosibles</b>	<b>ATEX</b> <b>ATEX</b> <b>ATEX</b>

durch die Anwendung folgender harmonisierter Normen entspricht  
by applying the harmonised standards  
par l'application des normes

<b>RoHS / RoHS / RoHS</b>	<b>EN 50581:2012</b>
<b>EMV / EMC / CEM</b>	<b>EN 61326-1:2013</b>
<b>ATEX / ATEX / ATEX</b>	<b>EN 60079-0:2012 + A11:2013</b>
	<b>EN 60079-11:2012</b>

Das Produkt ist bestimmt als Elektro- und Elektronikgerät der RoHS-  
The product is determined as electrical and electronic equipment of RoHS  
Le produit est déterminés comme des équipements électriques et électroniques de RoHS

<b>Kategorie / Category / Catégorie</b>	<b>Überwachungs- und Kontrollinstrumenten in der Industrie / Industrial Monitoring and Control Instruments / Instruments de contrôle et de surveillance industriels</b>
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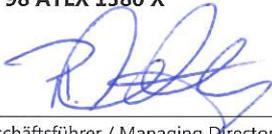
Das Produkt entspricht den EMV-Anforderungen  
The product complies with the EMC requirements  
Le produit est conforme aux exigences CEM

<b>Störaussendung / Emission / Émission</b>	<b>Klasse B / Class B / Classe B</b>
<b>Störfestigkeit / Immunity / D'immunité</b>	<b>Industrielle elektromagnetische Umgebung / Industrial electromagnetic environment / Environnement électromagnétique industriel</b>

Die notifizierte Stelle TÜV NORD CERT GmbH, 0044 hat eine EU-Baumusterprüfung durchgeführt und folgende Bescheinigung ausgestellt  
The notified body TÜV NORD CERT GmbH, 0044 performed a EU-type examination and issued the certificate  
L'organisme notifié TÜV NORD CERT GmbH, 0044 a effectué examen UE de type et a établi l'attestation

<b>VP-...</b>	<b>TÜV 98 ATEX 1380 X</b>
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Hamburg, 15.09.2017  
Ort, Datum / Place, Date / Lieu, Date

  
Geschäftsführer / Managing Director / Gérant: René Albrecht



**EU-Konformitätserklärung  
EU Declaration of Conformity  
Déclaration UE de Conformité**

**FAFNIR GmbH  
Bahrenfelder Straße 19  
22765 Hamburg / Germany**

erklärt als Hersteller in alleiniger Verantwortung, dass das Produkt  
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déclare sous sa seule responsabilité en qualité de fabricant que le produit

**Messauswertung  
Evaluation Unit  
Unité d'analyse**

**VI-4**

den Vorschriften der europäischen Richtlinien  
complies with the regulations of the European directives  
est conforme aux réglementations des directives européennes suivantes

2011/65/EU	<b>Beschränkung der Verwendung bestimmter gefährlicher Stoffe in Elektro- und Elektronikgeräten</b>	RoHS
2011/65/EU	<b>Restriction of the use of certain hazardous substances in electrical and electronic equipment</b>	RoHS
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2014/35/UE	<b>Mise à disposition sur le marché du matériel électrique destiné à être employé dans certaines limites de tension</b>	DBT

durch die Anwendung folgender harmonisierter Normen entspricht  
by applying the harmonised standards  
par l'application des normes

<b>RoHS / RoHS / RoHS</b>	<b>EN 50581:2012</b>
<b>EMV / EMC / CEM</b>	<b>EN 61326-1:2013</b>
<b>NSRL / LVD / DBT</b>	<b>EN 61010-1:2010</b>

Das Produkt ist bestimmt als Elektro- und Elektronikgeräte der RoHS-  
The product is determined as electrical and electronic equipment of RoHS  
Le produit est déterminés comme des équipements électriques et électroniques de RoHS

<b>Kategorie / Category / Catégorie</b>	<b>Überwachungs- und Kontrollinstrumenten in der Industrie / Industrial Monitoring and Control Instruments / Instruments de contrôle et de surveillance industriels</b>
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Das Produkt entspricht den EMV-Anforderungen  
The product complies with the EMC requirements  
Le produit est conforme aux exigences CEM

<b>Störaussendung / Emission / Émission</b>	<b>Klasse B / Class B / Classe B</b>
<b>Störfestigkeit / Immunity / D'immunité</b>	<b>Industrielle elektromagnetische Umgebung / Industrial electromagnetic environment / Environnement électromagnétique industriel</b>

Hamburg, 20.04.2016  
Ort, Datum / Place, Date / Lieu, Date

  
\_\_\_\_\_  
Geschäftsführer / Managing Director / Gérant: René Albrecht

Translation

(1) **EU-Type Examination Certificate**

(2) Equipment and protective systems intended for use in potentially explosive atmospheres, **Directive 2014/34/EU**



(3) **Certificate Number**                      **TÜV 98 ATEX 1380 X**                      **issue:** 00

(4) for the product:                              Isolating amplifier VP-1, VP-2 resp. VP-4

(5) of the manufacturer:                        **FAFNIR GmbH**

(6) Address:                                        Schnackenburgallee 149 c, 22525 Hamburg, Germany

Order number:                                    8000466920

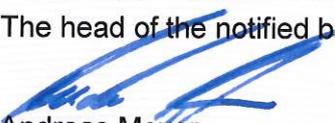
Date of issue:                                      2017-09-05

- (7) The design of this product and any acceptable variation thereto are specified in the schedule to this EU-Type Examination Certificate and the documents therein referred to.
- (8) The TÜV NORD CERT GmbH, Notified Body No. 0044, in accordance with Article 17 of the Directive 2014/34/EU of the European Parliament and the Council of 26 February 2014, certifies that this product has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of products intended for use in potentially explosive atmospheres given in Annex II to the Directive.  
The examination and test results are recorded in the confidential ATEX Assessment Report No. 17 203 191840.
- (9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:  
**EN 60079-0:2012+A11:2013    EN 60079-11:2012**  
except in respect of those requirements listed at item 18 of the schedule.
- (10) If the sign "X" is placed after the certificate number, it indicates that the product is subject to the Specific Conditions for Use specified in the schedule to this certificate.
- (11) This EU-Type Examination Certificate relates only to the design, and construction of the specified product. Further requirements of the Directive apply to the manufacturing process and supply of this equipment. These are not covered by this certificate.
- (12) The marking of the product shall include the following:

 II (1) G    [Ex ia Ga] IIC  
II (1) D    [Ex ia Da] IIIC

TÜV NORD CERT GmbH, Langemarckstraße 20, 45141 Essen, notified by the central office of the countries for safety engineering (ZLS), Ident. Nr. 0044, legal successor of the TÜV NORD CERT GmbH & Co. KG Ident. Nr. 0032

The head of the notified body



Andreas Meyer

Hanover office, Am TÜV 1, 30519 Hannover, Tel. +49 511 998-61455, Fax +49 511 998-61590

(13) **SCHEDULE**

(14) **EU-Type Examination Certificate No. TÜV 98 ATEX 1380 X issue 00**

(15) Description of product

The isolating amplifier type VP-... is an associated apparatus which is used for the transmission of electrical signals from the hazardous explosive area to the non-hazardous explosive area resp. preferably for powering of electronic filling level sensors and forwarding of measuring values to a superordinate evaluation system. It is designed as a module of a tank level measuring system. The types vary in the number of IS sensor circuit.

The isolating amplifier shall be only used outside the hazardous area and must be installed inside an IP20 enclosure according to IEC 60529.

**Type Code**

- VP-1: Eight intrinsically safe sensor circuits
- VP-2: Two intrinsically safe sensor circuits
- VP-4: Four intrinsically safe sensor circuits

**Technical data**

Supply circuit "Power"  
(terminals L, N, PE)

$U_n = 230 \text{ VAC} \pm 10\%$ ; approx. 2 VA,  $U_m = 253 \text{ V}$  resp.  
 $U_n = 115 \text{ VAC} \pm 10\%$ ; approx. 2 VA,  $U_m = 138 \text{ V}$  resp.  
 $U_n = 24 \text{ VAC} \pm 10\%$ ; approx. 2 VA,  $U_m = 36 \text{ V}$

Sensor circuits "1" to "8"  
(terminals +, A, B, -)

in Type of Protection "Intrinsic Safety" Ex ia IIC/IIB/IIIC  
Maximum values per circuit:

$U_o = 14.3 \text{ V}$   
 $I_o = 27.5 \text{ mA}$   
 $P_o = 98.1 \text{ mW}$

Characteristic line: linear

$C_i$  negligibly small  
 $L_i$  negligibly small

The maximum permissible values for the external inductance ( $L_o$ ) and capacitance ( $C_o$ ) shall be taken from the following table:

	Ex ia IIC		Ex ia IIB/IIIC	
$L_o$	5 mH	2 mH	20 mH	10 mH
$C_o$	380 nF	480 nF	1.5 $\mu\text{F}$	1.8 $\mu\text{F}$

The aforementioned maximum values for  $L_o$  and  $C_o$  consider the coincidental appearance of concentrated capacitance and inductance.

Communication circuit  
(plug connector)

$U_n = 5 \text{ V}$   
 $U_m = 134 \text{ V}$

The intrinsically safe sensor circuits are safely galvanically separated from the supply circuit (terminals L, N, PE) up to a peak crest value of the voltage of 375 V and from the communication circuit (plug connector) up to a peak crest value of the voltage of 190 V.

Permissible range of ambient temperature:

-20 °C to +55 °C.

**Schedule to EU-Type Examination Certificate No. TÜV 98 ATEX 1380 X issue 00**

(16) Drawings and documents are listed in the ATEX Assessment Report No. 17 203 191840

(17) Specific Conditions for Use

The isolating amplifier has to be installed in a housing in such a way, that a degree of protection of at least IP20 according to EN 60529 is reached.

(18) Essential Health and Safety Requirements

no additional ones

- End of Certificate -



## Instructions in accordance with Directive 2014/34/EU

TÜV 98 ATEX 1380 X

### Isolating amplifier VP-...

Edition: 08.2017

#### I Range of application

The isolating amplifiers VP-... are primarily used to supply electronic fill level sensors and forward the measured data to a superordinate evaluation system.

#### II Standards

The isolating amplifier is designed in accordance with the following European standards

EN 60079-0:2012 + A11:2013	Equipment - General Requirements
EN 60079-11:2012	Equipment protection by intrinsic safety "i"

#### III Instructions for safe ...

##### III.a ... use

The isolating amplifier serves as associated equipment and is not suitable for use in potentially explosive area. The intrinsically safe sensor circuits may be routed into the Zone 0 or Zone 20 and are applicable for all gas groups (IIA, IIB and IIC) as well as all dust groups (IIIA, IIIB and IIIC).

The approval applies to the device versions

VP-1	Isolating amplifier with eight intrinsically safe sensor circuits
VP-2	Isolating amplifier with two intrinsically safe sensor circuits
VP-4	Isolating amplifier with four intrinsically safe sensor circuits

##### III.b ... assembling and dismantling

The isolating amplifier is manufactured with an open plastic housing for DIN rail mounting. The housing must not be opened!

##### III.c ... installation

The wiring must be carried out only with the power disconnected. Special rules and regulations, including EN 60079-14 and local installation regulations, must be observed.

The isolating amplifier must be installed outside the potentially explosive area in a housing with degree of protection of at least IP20. If the isolating amplifier is mounted outdoors, the housing protection class must be at least IP54.

For the wiring (preferably blue cable) from the sensor to the isolating amplifier, the permissible inductance and capacitance under item V must not be exceeded.

Terminal designation:

Connection	Terminal	Contacts
Power supply	Power	PE, N, L
Sensor circuits	VP1: 1 ... 8 VP-2: 1 ... 2 VP-4: 1 ... 4	+, A, B, -
Communication	(Cradle connector)	1 ... 10

Table III.c: Terminal designation on the isolating amplifier



### III.d ... adjustment

No Ex-relevant equipment is required for operating the isolating amplifier.

### III.e ... putting into service

Before putting into service, all devices must be checked of right installation and connection. The electrical supply, as well as connected devices, must be checked.

### III.f ... maintenance (servicing and emergency repair)

The isolating amplifier is generally maintenance-free. In case of a defect, it must be send back to FAFNIR or one of its representations.

There is consistency with the requirements for the dielectric strength (according to EN 60079-11, clause 6.3.13) between the intrinsically safe sensor circuits and the auxiliary energy as well as the communication connection.

## IV Equipment marking

1	Manufacturer:	FAFNIR GmbH, 22525 Hamburg
2	Type designation:	VP-...
3	Certificate number:	TÜV 98 ATEX 1380 X
4	Ex marking:	 II (1) G [Ex ia Ga] IIC II (1) D [Ex ia Da] IIIC
5	CE marking:	 0044
6	Technical Data:	$U_o \leq 14.3 \text{ V}$ $I_o \leq 28 \text{ mA}$ $P_o \leq 98 \text{ mW}$ $L_o \leq 2 \text{ mH}$ $C_o \leq 480 \text{ nF}$ $T_a \leq +55 \text{ °C}$



## V Technical data

The auxiliary power for the isolating amplifier depends on the model:

$$\begin{aligned}U &= 24 V_{AC}/115 V_{AC}/230 V_{AC} \pm 10 \%, 50 \text{ Hz} \dots 60 \text{ Hz} \\P &\approx 2 \text{ VA} \\U_m &= 36 V@24 V_{AC} / 138 V@115 V_{AC} / 253 V@230 V_{AC}\end{aligned}$$

The sensor circuits are designed in ignition protection type "intrinsic safety" (ia) with a linear output characteristic. Output values per electric circuit are

$$\begin{aligned}\text{Output voltage} &U_o \leq 14.3 \text{ V} \\ \text{Output current} &I_o \leq 27.5 \text{ mA} \\ \text{Output power} &P_o \leq 98.1 \text{ mW} \\ \text{Internal inductance} &L_i \text{ negligibly small} \\ \text{Internal capacitance} &C_i \text{ negligibly small}\end{aligned}$$

The permissible external inductance and capacitance are:

	IIC	IIB / IIIC
$L_o \leq$	5 mH	20 mH
$C_o \leq$	380 nF	1.5 $\mu$ F

**2 mH**                      **10 mH**  
**480 nF**                      **1.8  $\mu$ F**

The maximum values of the parameter pairings may simultaneously be used as concentrated capacitance and concentrated inductance. The values written in bold can be found also in the device marking.

The signal and maximum safety voltage of the communication interface is

$$\begin{aligned}U &= 5 \text{ V} \\U_m &= 134 \text{ V}\end{aligned}$$

The isolating amplifier can be used in the following ambient temperature range:

$$T_a = -20 \text{ }^\circ\text{C} \dots +55 \text{ }^\circ\text{C}$$

The isolating amplifier achieves a housing protection degree of

$$\text{Degree of protection} \quad \text{IP00}$$

## VI Specific conditions for use

The isolating amplifier must be installed in a housing which has a degree of protection according to EN 60529 of at least IP20.



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Web: [www.fafnir.com](http://www.fafnir.com)

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