

VISY-X

VISY-Command (VI-4)



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1 Introduction

The VISY-X system (volume information system) provides continuous and highly precise level gauging of all commercially available fuels in up to 16 tanks. The product temperature and the water level at the tank bottom are gauged simultaneously.

The system includes:

- the level sensors VISY-Stick for the tank gauging in the versions:
 - VISY-Stick Standard
 - VISY-Stick Advanced
 - VISY-Stick Advanced with VISY-Density module
 - VISY-Stick Flex
 - VISY-Stick LPG (liquefied petroleum gas)
 - ...
- VISY-Command control unit
- VISY-Setup software for configuring VISY-Command

A range of other environmental sensors can also be operated with the VISY-X system:

- VISY-Stick Sump for monitoring the manhole or dispenser sump with capability to distinguish between product and water
- VISY-Reed Sump for monitoring the manhole or dispenser sump without liquid distinguishing capability
- VISY-Stick Interstitial (with adjustable 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
- ...

The robust sensors can be installed without difficulty both by means of the screw-in unit with external threads as well as by using a riser installation. The sensors are suitable for use in Ex zone 0.

The sensors have to be connected with the VISY-Command control unit to be mounted in the petrol station building.

Before use, VISY-Command has to be configured from a PC or notebook using the VISY-Setup software application. The parameters for the sensors and tanks are entered using the VISY-Setup software application and then transmitted to VISY-Command.

VISY-Command collects data from the sensors and transmits the data to a higher-level system (e.g. PoS) on request.

1.1 In this manual...

... you are guided through the installation and set-up of the VISY-Command control unit.

These instructions contain a description of all the steps needed to perform the installation. The level and environmental sensors must have been installed and linked to the VISY-Command control unit before VISY-Command can be configured. Please also observe the additional instructions in the following documents:

- Technical Documentation VISY-Stick VISY-Reed (English) – Art. No. 207194
- Technical Documentation VISY-Setup V4... (English) – Art. No. 207158

The VISY-SoftView software 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 control unit.

For instructions on how to operate the display module with VISY-SoftView, see:

- Technical Documentation VISY-SoftView (English) – Art. No. 350026

1.2 Requirements for service engineers

The complete VISY-X system should be installed only 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 provides the capability to gauge and evaluate the filling levels in the 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 loss or damage arising from improper use.

The VISY-Stick sensors and VISY-Command control 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, the risk of 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 maintenance of the VISY-Sticks and VISY-Command must be carried out by expert personnel only.

- Operators, installers and service technicians must comply with all applicable safety regulations. This also applies to local safety regulations and accident prevention regulations, which are not stated in these operating instructions.
- The measuring system VISY-Command is only suitable for wall mounting inside buildings and must not be installed in hazardous areas.
- The type VP... transducer, and the type VI... interface included in the VISY-Command control unit must always be undamaged and clean.
- During normal operation, the housing of the VISY-Command control unit must remain closed.
- The product must be powered by the permissible auxiliary power supply only.

The safety instructions in this manual are labelled as follows:



Failure to observe these safety instructions will result in a risk of accident and a risk of damage to the VISY-X system.



Useful tips and information in these instructions that should be observed are in italics and identified by this symbol.

2 Versions of the VISY-X system

Two versions of the VISY-X System are available, each supporting a different data transmission protocol:

- (1) The wired version
- (2) The wireless (radio frequency) version

2.1 Wired version

In most cases, data are transferred between the sensors and VISY-Command by cable. This cable is also the means by which power is supplied to the sensors. The wired version of the VISY-X system is the standard version.

The wired version may comprise the following components:

- VISY-Command... / GUI
- VISY-Stick/Reed for tank gauging
- VISY-View Touch
- Input / output box
- Other sensors

2.2 Wireless (radio frequency) version

If no free conduits at the petrol station are available, it is possible to opt instead for the wireless (RF) tank gauging system. In such cases, the benefit of installing the wireless system is that it does not entail any excavation work. With the wireless system, power is supplied to the VISY-Sticks and VISY-RFT transmitters by a battery.

The installation procedure for the wireless system is described in the following operating instructions:

- Technical Documentation for VISY-RF wireless system (English) – Art. No. 207116



The wireless system can be used only for VISY-Stick tank gauging. The wireless system does not support the use of environmental sensors or input / output boxes.

The wireless system comprises the following components:

- VISY-Command RF (wireless version of VISY-Command)
- VISY-Stick for tank gauging
- VISY-RFT transmitter with battery

3 VISY-Command

The exact designation assigned to the VISY-Command control unit depends on the number of sensor terminals or the method of data transmission.

3.1 Design and function description

3.1.1 VISY-Command – wired version (standard)

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

At each sensor terminal, it is possible to connect up to three different types of sensors (e.g. one VISY-Stick, one VISY-Stick Interstitial and one VISY-Stick Sump). These three types of probes can be connected to each other directly at the measuring point. This means that only one cable (four-core) is required for connection to VISY-Command.



In the standard version up to three different FAFNIR sensors can be connected to the VISY-Command control unit by a single cable (4 wire). In combination with the VIMS of our system partner for leakage control (SGB GmbH, Siegen), two FAFNIR sensors and two SGB sensors can be connected to the VISY-Command control unit by a single cable (4 wire).



Connecting multiple sensors of the same type (e.g. 3 x VISY-Stick) to one sensor terminal is not permitted.



The terminal block / cable connectors for terminating the lines must offer housing protection type IP 68.

The VISY-Command control unit comprises a VI... interface and one or two VP... transducers installed in a housing for wall mounting (IP20). One VP... transducer is installed in VISY-Command 2, 4, or 8; two VP... transducers are installed in VISY-Command 16.

The VISY-Sticks are supplied with power by VISY-Command. VISY-Command receives the measured values, stores these data temporarily and makes the data available to a higher-level system (e.g. central computer). Communication runs via a serial interface, either the RS-232 or RS-485. For the transmission of data to the petrol station computers, a range of protocols is available.

The IFSF-LON interface is also available as an option, see:

- Technical Documentation IFSF-LON interface converter (English) – Art. No. 207092

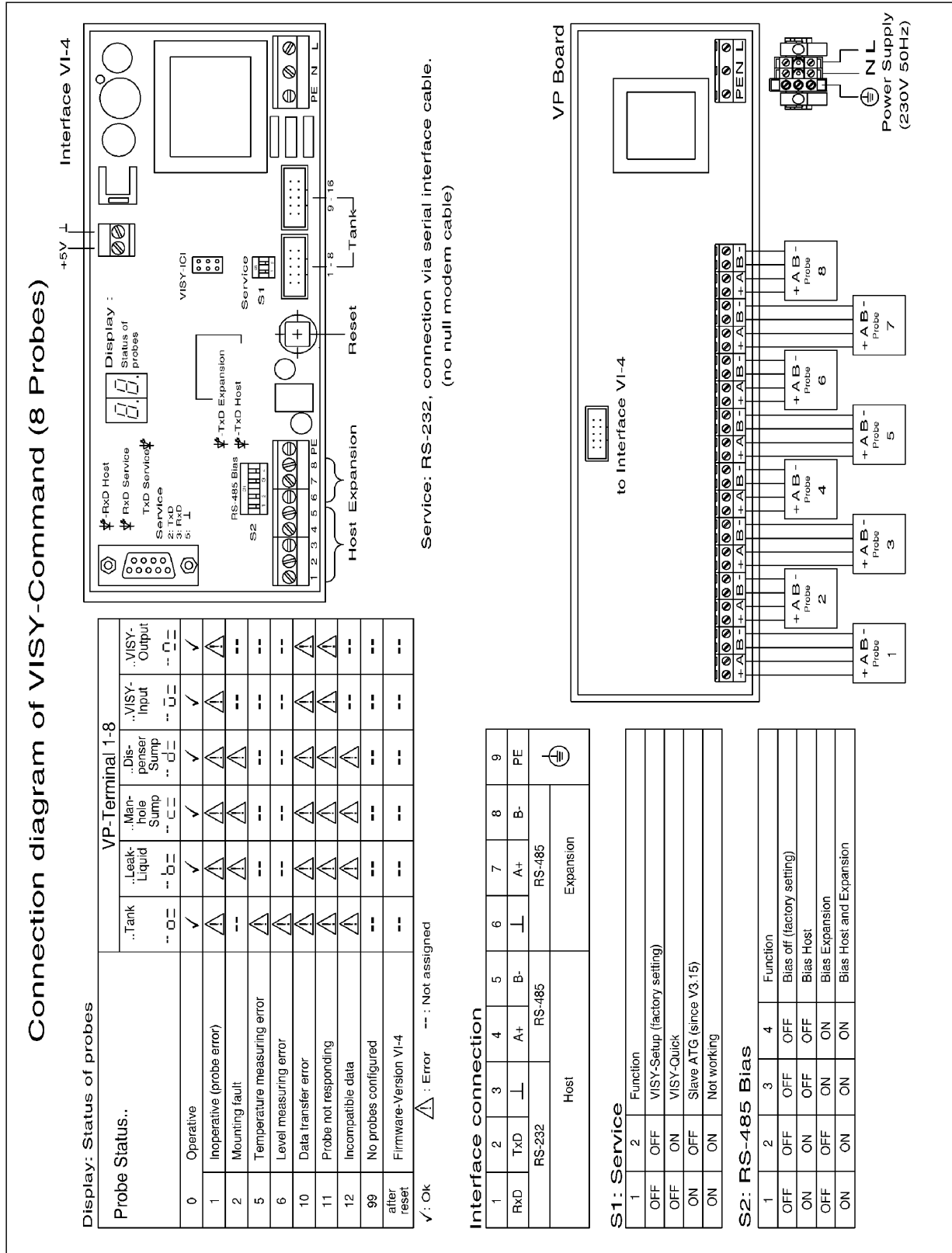


Figure 1: Terminal connection diagram for VISY-Command 8

3.1.2 VISY-Command RF – wireless (radio frequency) version

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

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



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



If the wireless system is used, it should be noted that reception conditions may vary with the amount of car or lorry traffic passing through the petrol station. In some cases, the interference may be such that no data are received by VISY-Command for some time. As a result, the tank data may not always be updated at the set transmission intervals and delivery data could be lost.



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

VISY-Command RF comprises an interface VI... and an RF receiver PCB installed in a housing for wall mounting (IP20). The data received from VISY-Command RF are evaluated, stored temporarily and made available to a higher level system (e.g. central computer). Communication runs via a serial interface, either the RS-232 or RS-485. For the transmission of data to the petrol station computers, a range of protocols is available.

The IFSF-LON interface is also available as an option, see:

- Technical Documentation IFSF-LON interface converter (English) – Art. No. 207092

The installation of the wireless system is a complex installation and is described in detail in the VISY-RF wireless system manual:

- Technical Documentation VISY-RF wireless system (English) – Art. No. 207116

Connection diagram of VISY-Command RF

Display: Status of probes

Probe Status..	..Tank
0	Operative
1	Inoperative (probe error)
2	Mounting fault
5	Temperature measuring error
6	Level measuring error
8	RFT probe data error
9	RFT probe data missing
10	Data transfer error
11	Probe not responding
12	Incompatible data
13	Waiting for first data
99	No probes configured
after reset	Firmware-Version VI-4

√ : Ok ⚠ : Error -- : Not assigned

Interface connection

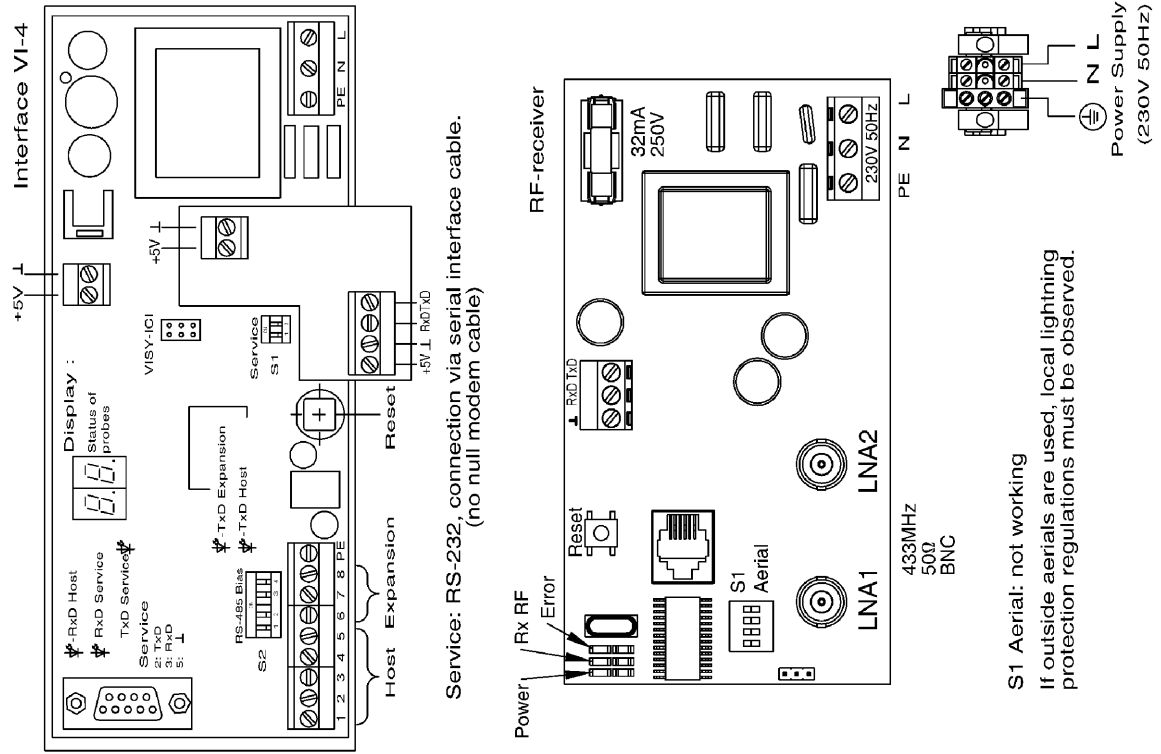
	1	2	3	4	5	6	7	8	9
RxD	TxD	⌋	A+	B-	⌋	A+	B-	PE	PE
RS-232	RS-485								
	Host				Expansion				

S1: Service

1	2	Function
OFF	OFF	VISY-Setup (factory setting)
OFF	ON	VISY-Quiek
ON	OFF	Slave ATG (since V3.15)
ON	ON	Not working

S2: RS-485 Bias

1	2	3	4	Function
OFF	OFF	OFF	OFF	Bias off (factory setting)
ON	ON	OFF	OFF	Bias Host
OFF	OFF	ON	ON	Bias Expansion
ON	ON	ON	ON	Bias Host and Expansion



S1 Aerial: not working
If outside aerials are used, local lightning protection regulations must be observed.

4 Installation



For the installation and operation of the VISY-Command control unit in Germany, the requirements of the Ordinance on Explosion Protection (ExVo), of the Ordinance on Industrial Safety and Health (BetrSichV) and of equipment safety legislation must be observed (in other countries, equivalent local requirements and regulations must be observed). In all countries, recognised and generally accepted good engineering practices as well as these operating instructions must be observed.



All applicable local safety regulations and accident prevention regulations not stated in these operating instructions must also be observed.

4.1 Installation

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



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



For the mounting VISY-Command contains the relevant drilling template.

4.2 Sensor termination

4.2.1 VISY-Command – wired version (standard)

Connect the level sensors and environmental sensors according to the terminal connection diagram at the VISY-Command door (see Figure 1). For it, use the appropriate cable glands for intrinsically safe circuits.



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

Connect the “Host” terminal with the host computer as shown in the terminal diagram.

4.2.2 VISY-Command RF – wireless (radio frequency) version

The installation of the wireless system is a complex installation and is described in detail in the VISY-RF wireless system manual:

- Technical Documentation VISY-RF wireless system (English) – Art. No. 207116

4.3 Power supply termination







The supply of auxiliary power (electrical connection) requires a fixed wiring arrangement (no plugging) fed through the bottom right cable entry. Connect the supply voltage to the terminal blocks provided.

4.4 VI... interface

4.4.1 Status display

After switching on or resetting the VI... Interface, the firmware version of the interface is initially shown. This is represented by three numbers which appear one after the other on the display, e.g. 4 – 0 – 8 corresponds to Version 4.08.

If no sensor has been configured yet, this sequence is followed by a fixed 99. If sensors have been configured, for each and every configured terminal of the VP... transducer first the terminal number and then a letter symbol followed by an equals sign will be displayed one after the other:

-  VISY-Stick fitted in the tank
-  VISY-Stick/Reed Interstitial for monitoring the leak-detection fluid level
-  VISY-Stick/Reed Sump for monitoring the manhole
-  VISY-Stick/Reed Sump for monitoring the dispenser sump
-  VISY-Input
-  VISY-Output



With the VISY-Command RF version, only the status of the VISY-Stick sensor is displayed (column "tank o=").

Finally, the status of the sensor is displayed as a digit (see section 4.6 Fault diagnostics).

4.4.2 Service interface and DIP switch S1

The RS-232 serial interface (9-pin D-sub socket) can be used for the connection of three different service applications:

DIP switch S1: Service

1	2	Function
OFF	OFF	Configuration of VISY-Command using the VISY-Setup software application
OFF	ON	Connection to VISY-Quick (FAFNIR protocol)
ON	OFF	Connection to an auxiliary gauging system
ON	ON	no function

Table 1: DIP switch S1 configuration



The RxD service LED (green) indicates data coming in through the service interface; the TxD service LED (green) indicates data going out through the service interface.

4.4.3 Host computer

The serial host interface (galvanically isolated) for communication with a higher-level system, e.g. petrol station computer or PC, is designed to function as an RS-232 interface or as an RS-485 interface. Depending on requirements, the host computer can be connected to the RS-232 interface or to 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... Interface automatically recognises the interface to which the host computer is connected.



Simultaneous operation of the RS-232 interface and the RS-485 interface is not possible.

If the RS-485 interface is being used, it is advisable for reasons of interference resistance to use a 3-core cable and to connect in addition to the ports A+ and B- also the interface earth (\perp - terminal on host interface) of the VISY-Command to the interface earth on the host system (if provided there as connection terminal).

If shielded lines are used, the shield must be placed on the PE connection. 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.



Do not connect the line shield on reference earth (\perp /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 conductor between the connected devices.

4.4.4 Host interface and DIP switch S2

Using DIP switches 2.1 / 2.2 (host interface) or 2.3 / 2.4 (expansion interface), it is possible to bias the RS-485 interfaces accordingly in order to achieve a significant improvement in reliability of communication.

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	Expansion bias
ON	ON	ON	ON	Host and expansion bias

Table 2: DIP switch S2 configuration



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

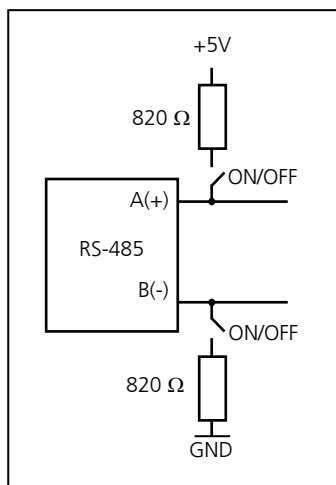


Figure 3: DIP switch S2



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

4.4.5 Expansion interface (RS-485)

The expansion 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 are 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-Views Touch) to the expansion 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.

If shielded lines are used, the shield must be placed on the PE connection. 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.



Do not connect the line shield on reference earth (\perp /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 conductor between the connected devices.

The yellow TxD LED of the expansion interface indicates data going out through the expansion interface.

4.4.6 Reset button

This button can be used to effect a reset of the VI... Interface. All stored settings are retained.







4.5 Configuration

After installation, 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... (English) – Art. No. 207158

4.6 Fault diagnostics

As soon as configuration has been completed with VISY-Setup, you can monitor the operation of the sensors using the status display on the VI... interface. The display shows, one after the other, the number of a particular sensor, an equals sign and the associated status (e.g. "5 o= 0" means "VISY-Stick sensor at terminal 5 in operation"). Accordingly, one sensor after another is scanned in a continuous loop operation.

-  VISY-Stick fitted in the tank
-  VISY-Stick/Reed Interstitial for monitoring the leak-detection fluid level
-  VISY-Stick/Reed Sump for monitoring the manhole
-  VISY-Stick/Reed Sump for monitoring the dispenser sump
-  VISY-Input
-  VISY-Output

Display: Status of probes

Probe Status..		VP-Terminal 1-8					
		..Tank	..Leak-Liquid	..Man-hole Sump	..Dis-penser Sump	..VISY-Input	..VISY-Output
							
0	Operative	✓	✓	✓	✓	✓	✓
1	Inoperative (probe error)	⚠	⚠	⚠	⚠	⚠	⚠
2	Mounting fault	--	⚠	⚠	⚠	--	--
5	Temperature measuring error	⚠	--	--	--	--	--
6	Level measuring error	⚠	--	--	--	--	--
10	Data transfer error	⚠	⚠	⚠	⚠	⚠	⚠
11	Probe not responding	⚠	⚠	⚠	⚠	⚠	⚠
12	Incompatible data	⚠	⚠	⚠	⚠	--	--
99	No probes configured	--	--	--	--	--	--
after reset	Firmware-Version VI-4	--	--	--	--	--	--

✓ : Ok ⚠ : Error -- : Not assigned

Table 3: Status of probes (sensors)



With the VISY-Command RF version, only the status of the VISY-Stick sensor is displayed (column "tank o=").

4.7 Status messages

Code	"Message" ▷ Description	► Possible cause ☑ Required action
0	"Probe running"	☑ No measures required.
1	"Probe not running" ▷ The measured values are no longer being recorded and are set to "0" by the control unit.	► If this status is displayed permanently, it should be assumed that the probe has developed a defect. ☑ It is necessary to replace the probe.
5	"Probe cannot determine temperature" ▷ The temperature is no longer being recorded by the control unit and its value is set to 0.0 °C. The filling volume is no longer compensated for temperature. Product and water level continue to be processed.	► If this status is displayed permanently, it should be assumed that the probe has developed a defect. ☑ It is necessary to replace the probe.
6	"Probe cannot determine filling level" ▷ The product level and water level are set to "0" by the control unit, the temperature continues to be transmitted.	► If this status is displayed permanently, it should be assumed that the probe has developed a defect. ☑ It is necessary to replace the probe.
7	"Reduced measuring accuracy" ▷ All measured values are processed normally. However, it must be assumed that maximum accuracy can no longer be achieved.	► Powerful fluid movements prevent a fully accurate measurement. This may be the case during fuel deliveries, for example. ☑ No measures required.
8	Relevant to wireless mode only: "Checksum error: Probe - RF-transmitter" ▷ The RF transmitter is reporting an error in communication with the probe. The control unit stops receiving data from the probe.	► Dirty or damaged plug-in connection, loose connection, strong interference radiation, or VISY-RF transmitter defective. ☑ Check cable and plug-in connection, replace VISY-RFT transmitter, replace probe, check surrounding area for powerful sources of radiation (e.g. three-phase supply cables, motors).
9	Relevant to wireless mode only: "RF-transmitter has no communication with probe" ▷ The VISY-RFT transmitter is reporting that the probe is no longer responding.	► Dirty or damaged plug-in connection, connection cable defective, probe or VISY-RFT transmitter defective. ☑ Check cable and plug-in connection, replace VISY-RFT transmitter, replace probe.

Code	"Message" ▷ Description	▶ Possible cause ☑ Required action
10	<p>"Checksum error: Probe – control unit"</p> <p>▷ Control unit is reporting an error in communication with the sensor or RF receiver.</p>	<p>▶ In wired operation, loose, dirty or damaged cable connection (including connectors and terminals) to the probe, or strong interference radiation.</p> <p>▶ In wireless operation, loose or damaged cable connection (including connectors and terminals) between RF receiver and VI... interface, or strong interference radiation.</p> <p>☑ Check cables, plug-in connections and terminal connections.</p> <p>☑ In wired mode, replace sensor, VP... transducer, VI... interface.</p> <p>☑ In wireless mode, replace RF receiver, VI... interface. Check surrounding area for powerful sources of radiation (e.g. three-phase cables, power switches, etc.).</p>
11	<p>"No communication with probe"</p> <p>▷ The control unit is no longer able to establish data communication with the probe. The measured values are no longer being recorded and are set to "0" by the control unit.</p>	<p>▶ Probe not connected / available / defective, wiring fault, incorrect serial number configured for the probe, control unit (VI... interface or VP... transducer) defective.</p> <p>☑ Take the necessary measures as appropriate to the possible causes.</p>
12	<p>"Incompatible Data"</p> <p>▷ The data communication with the sensor works without transmission errors, but the data cannot be interpreted by the control unit. The measured values are no longer being recorded and are set to "0" by the control unit.</p>	<p>▶ The sensor or it's special version is not supported by the control unit.</p> <p>☑ Ask the manufacturer if sensors and control unit are compatible and if updates are available. The type, version, and serial number of the control unit and the sensors will be required (e.g. the number of mounted float or density units).</p>
13	<p>Relevant to wireless mode only: "Waiting for first wireless transmission"</p> <p>▷ VISY-Command RF is reporting after the switch-on or a reset that no data have been received from the probes.</p>	<p>▶ Data from the probes are transmitted only periodically.</p> <p>☑ Not required because of normal reset/switch-on behaviour. If data are still not being received following expiry of the configurable timeout in VISY-Command (1 – 99 hours), the status automatically changes from 13 to 11.</p>

Code	"Message" ▷ Description	▶ Possible cause ☑ Required action
99	<p>"Probe not configured"</p> <p>▷ The control unit is assuming that the probe has not been connected. No data communication takes place through the associated terminal (tank 1 to 16). All measured values from this terminal are set to "0".</p>	<p>▶ All connected probes/tanks initially display this status following delivery of the control unit. In order for communication with a measuring 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. Whenever this status is displayed, one or both of these entries must be missing.</p> <p>☑ The control unit must be configured by using the VISY-Setup.</p>
--	<p>"Reset control unit."</p> <p>▷ The control unit is not working. During a reset, no communication is taking place between the probes, host and VISY-Setup. Here, VISY-Setup is reporting that the control unit is no longer responding.</p>	<p>▶ A control unit reset is carried out after switch-on or if you press the Reset button. If this status is displayed permanently, even after you have pressed the Reset button, it should be assumed that the measurement control unit (VI... interface) is defective.</p> <p>☑ Replace the VI... interface inside the control unit.</p>

Table 4: Status messages

4.8 Replacement of components

VI... interface and VP... transducer can be replaced each as complete assembly units. The PCB printed circuit boards are mounted on a support rail from which they can be easily detached with a screwdriver.

5 Technical data

5.1 VP... transducer

Explosion protection	II (1) G [Ex ia Ga] IIC
EC type approval certificate	TÜV 98 ATEX 1380
Permissible ambient temperature:	-20 °C to +60 °C
Power supply (terminals L, N, PE)	Alternating voltage 230 V \pm 10%; approx. 2 VA, $U_m = 253$ V
Sensor circuits (terminals + A B -)	intrinsic safety ignition protection class [Ex ia Ga] IIC (linear output characteristic) Maximum values $U_0 = 14,3$ V $I_0 = 28$ mA $P_0 = 98$ mW Maximum permitted external inductance 40 mH Maximum permitted external capacitance 680 nF
Measurement and control circuits (plug connector S1)	Interface electric circuit $U_N = 5$ V Maximum voltage for safety reasons $U_m = 100$ V

Table 5: Technical data for VP... transducer

The intrinsically safe sensor circuits are safely galvanically isolated from the supply circuit (power supply) up to a peak rated voltage value of 375 V. The measurement and control circuits are safely galvanically isolated up to a peak rated voltage value of 190 V.

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EG – Konformitätserklärung
EC – Declaration of Conformity

FAFNIR GmbH
Bahrenfelder Str. 19
22765 Hamburg

erklärt in eigener Verantwortlichkeit, dass die Produkte
declare under sole responsibility that the products

Messumformer für Füllstandmessgeräte
Measuring Transmitter for Tank Level Measuring Devices

VP-1, VP-2 und VP-4

in Übereinstimmung mit nachfolgenden Richtlinien
in accordance with the following directives

EMV-Richtlinie; EMC Directive 2004/108/EG/EC
Ex-Richtlinie; *Ex Directive 94/9/EG/EC*

und folgenden Vorschriften (Normen) entwickelt und gefertigt wurden
and designed and manufactured to the following specifications

EMV; EMC:
EN 55011:2007 + A2:2007 Emission: Klasse B / *Class B*
EN 61326-1:2006 Immission: *Industrienumgebung / Industrial Environment*

Ex:
EN 50014:1997; EN 50020:1994

Die Produkte entsprechen der EG-Baumusterprüfbescheinigung
The above mentioned products is in conformity with EC-Type Examination Certificate

TÜV 99 ATEX 1380

Die Prüfung erfolgte durch die benannte Stelle Nr.: 0044
The inspection was carried out by the notified body No: 0044

TÜV NORD CERT GmbH & Co. KG
Am TÜV 1
30519 Hannover

Hamburg, 25.02.2010

Ort, Datum / Place, Date



Geschäftsführer / *Managing Director: R. Albrecht*

EG – Konformitätserklärung
EC – Declaration of Conformity

FAFNIR GmbH
Bahrenfelder Str. 19
22765 Hamburg

erklärt in eigener Verantwortlichkeit, dass das Produkt
declare under sole responsibility that the product

Interface für Füllstandmessgeräte

Interface Transmitter for Tank Level Measuring Devices

VI-4

in Übereinstimmung mit nachfolgenden Richtlinien
in accordance with the following directives

EMV-Richtlinie; *EMC Directive 2004/108/EG/EC*

Niederspannungsrichtlinie; *Low Voltage Directive 2006/95/EG/EC*

und folgenden Vorschriften (Normen) entwickelt und gefertigt wurden
and designed and manufactured to the following specifications

EMV; *EMC:*

EN 55011:2007 + A2:2007

Emission: Klasse B / *Class B*

EN 61326-1:2006

Immission: Industrieumgebung / *Industrial Environment*

NSR; *LVD:*

EN 61326-1

Hamburg, 25.02.2010

Ort, Datum / *Place, Date*

A handwritten signature in black ink, appearing to read "R. Albrecht".

Geschäftsführer / *Managing Director: R. Albrecht*



Translation

EC TYPE-EXAMINATION CERTIFICATE

(2) Equipment or Protective System intended for use in potentially explosive atmospheres - **Directive 94/9/EC**



(3) EC-Type Examination Certificate Number

TÜV 98 ATEX 1380

(4) Equipment: Measuring Transmitter for Tank Level Measuring Devices type VP-1

(5) Manufacturer: Fafnir GmbH

(6) Address: Bahrenfelder Strasse 19
D – 22765 Hamburg

(7) This equipment or protective system and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

(8) The TÜV Hannover/Sachsen-Anhalt e.V., TÜV CERT-Certification Body, notified body number N° 0032 in accordance with Article 9 of the Council Directive of the EC of March 23, 1994 (94/9/EC), certifies that this equipment or protective system has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in the confidential report N° 98/PX31280.

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN 50 014: 1997

EN 50 020: 1994

(10) If the sign "X" is placed after the certificate number, it indicates that the equipment or protective system is subject to special conditions for safe use specified in the schedule to this certificate.

(11) This EC-type examination certificate relates only to the design and construction of the specified equipment or protective system according to Directive 94/9/EC. Further requirements of this Directive apply to the manufacture and placing on the market of this equipment or protective system.

(12) The marking of the equipment or protective system must include the following:

II (1) G [EEEx ia] IIC

TÜV Hannover/Sachsen-Anhalt e.V.
TÜV CERT-Zertifizierungsstelle
Am TÜV 1
D-30519 Hannover

Hanover, 15.12.1998

Head of the
Certification Body





SCHEDULE

(13)

(14) **EC-TYPE EXAMINATION CERTIFICATE N° TÜV 98 ATEX 1380**

(15) Description of equipment

The measuring transmitter is an associated apparatus which is used for the transmission of electrical signals of up to eight sensors from the hazardous explosive area to the non hazardous explosive area. It is designed as a module of a tank level measuring system.

Electrical data

Supply circuit
(terminals L, N and SL)

alternating voltage: $230\text{ V} \pm 10\%$; about 2 VA, $U_m = 253\text{ V}$
resp.

alternating voltage: $24\text{ V} \pm 10\%$; about 2 VA, $U_m = 33\text{ V}$

Sensor circuit(s)
(terminals

in type of protection „Intrinsic Safety“ EEx ia IIC

1A, 1B, 1+ and 1- resp.
2A, 2B, 2+ and 2- resp.
3A, 3B, 3+ and 3- resp.
4A, 4B, 4+ and 4- resp.
5A, 5B, 5+ and 5- resp.
6A, 6B, 6+ and 6- resp.
7A, 7B, 7+ and 7- resp.
8A, 8B, 8+ and 8-)

maximum values: $U_o = 14,3\text{ V}$
 $I_o = 28\text{ mA}$
 $P_o = 98\text{ mW}$

characteristic line: linear
The effective internal inductances and capacitances are negligibly small.

maximum effective external inductance 40 mH
maximum effective external capacitance 0,68 μF

Measuring- and control circuits $U \leq 100\text{ V}$, $U_m = 100\text{ V}$

(16) Test documents consisting of description (7 sheets) and drawings (4 sheets) are listed in the test report.

(17) Special conditions for safe use

none

(18) Essential Health and Safety Requirements

no additional ones



Translation

**1. SUPPLEMENT to
EC-Type Examination Certificate No. TÜV 98 ATEX 1380**

of the company: FAFNIR GmbH
Bahrenfelder Strasse 19
D-22765 Hamburg

In the future, the Measuring Transmitter for Tank Level Measuring Devices type VP-* may also be manufactured in the following variations

type VP-1 (maximal 8 sensors)
type VP-2 (maximal 2 sensors)
type VP-4 (maximal 4 sensors)

according to the test documents listed in the test report. The modifications refer to the inner structure of the device. The variations differ in the number of maximal sensors.

Electrical data

The intrinsically safe sensor circuits are safely galvanically separated from the supply circuit (terminals L, N, SL) up to a peak crest value of the voltage of 375 V and from the measuring- and control circuits (connector S1) up to a peak crest value of the voltage of 190 V.

All other data and details apply unchanged.

Test documents are listed in the test report No. 01YEX144312.

TÜV Hannover/Sachsen-Anhalt e.V.
TÜV CERT-Zertifizierungsstelle
Am TÜV 1
D-30519 Hannover

Hannover, 21.12.2001

Head of the
Certification Body



Translation

2. SUPPLEMENT to

EC-Type Examination Certificate No. TÜV 98 ATEX 1380

of the company: FAFNIR GmbH
Bahrenfelder Strasse 19
D-22765 Hamburg

In the future, the Measuring Transmitter for Tank Level Measuring Devices type VP-1, VP-2 resp. VP-4 may also be manufactured according to the test documents listed in the test report. The modifications refer to the supply circuit of the Measuring Transmitter, which can also be supplied with an alternating voltage of 115V / 50-60Hz.

Electrical data

Supply circuit
(terminals L, N and SL)

alternating voltage: 230 V \pm 10 %; about 2 VA, $U_m = 253$ V

resp.

alternating voltage: 115 V \pm 10 %; about 2 VA, $U_m = 126,5$ V

resp.

alternating voltage: 24 V \pm 10 %; about 2 VA, $U_m = 33$ V

The intrinsically safe sensor circuits are safely galvanically separated from the supply circuit (terminals L, N, SL) up to a peak crest value of the voltage of 375 V and from the measuring- and control circuits (connector S1) up to a peak crest value of the voltage of 190 V.

All other data and details apply unchanged.

Test documents are listed in the test report No. 02YEX170887.

TÜV NORD CERT GmbH & Co. KG
TÜV CERT-Zertifizierungsstelle
Am TÜV 1
D-30519 Hannover
Tel.: 0511 986-1470
Fax: 0511 986-2555

Hannover, 30.05.2002

Head of the
Certification Body

Translation

3. SUPPLEMENT

to Certificate No. TÜV 98 ATEX 1380

Equipment: Measuring Transmitter for Tank Level
Measuring Devices type VP-1, VP-2 resp. VP-4

Manufacturer: FAFNIR GmbH

Address: Bahrenfelder Straße 19
22765 Hamburg
Germany

Order number: 8000392110

Date of issue: 2011-02-03

Amendments:

In the future, the Measuring Transmitter for Tank Level Measuring Devices type VP-1, VP-2 resp. VP-4 may also be manufactured according to the test documents listed in the test report.

The permissible ambient temperature range was modified and will be -20 °C to +60 °C in the future.

Furthermore the equipment was evaluated according to the newest standards.

All other data apply unchanged for this supplement.

The device will then be labeled as follows:

 II (1) G [Ex ia Ga] IIC

The equipment incl. of this supplement meets the requirements of these standards:

EN 60079-0:2009

EN 60079-11:2007

EN 60079-26:2007

(16) Test documents are listed in the test report No. 11 203 077325.

(17) Special conditions for safe use

none

3. Supplement to Certificate No. TÜV 98 ATEX 1380

(18) Essential Health and Safety Requirements

no additional ones

TÜV NORD CERT GmbH, Langemarckstraße 20, 45141 Essen, accredited 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 certification body

A handwritten signature in black ink, appearing to read "Schwedt".

Schwedt

Hanover office, Am TÜV 1, 30519 Hannover, Fon +49 (0)511 986 1455, Fax +49 (0)511 986 1590

8.3.1 Operating instructions VP-... transducer

Edition: 02.2011

I Range

The associated apparatus VP-... may only be used outside the potentially explosive atmosphere. The purpose of the VP-... transducer is to supply electronic level sensors with power and to forward measuring data to a higher level analysis system.

II Standards

See EC type examination certificate.

III Instructions for safe ...

III.a ... use

The transducer VP-1 has eight, VP-2 has two and VP-4 has four intrinsically safe sensor connectors. Each level sensor is connected by four terminal clamps. Two clamps are dedicated to the intrinsically safe power supply, the other two are for the transmission of measuring data. At the same time, the transducer serves for safe separation of intrinsically safe and non-intrinsically safe circuits. All sensor connections are galvanically connected together.

The non-intrinsically safe communications interface (S1) is linked to a ten-pin connector. This connector establishes the connection to a higher-level data processing system.

The intrinsically safe sensor circuits of the transducer, the communications interface and power supply circuit are all isolated galvanically from one another.

III.b ... Installation

All wiring operations must be carried out with the power disconnected. The specific EN directives respectively the local installation regulations including EN 60079-14 are to be observed. The wiring from the sensor to the control unit shall be established by a four-wire cable (preferably blue). The terminals +, -, A and B on the measuring sensors must be connected to the same terminals on the transducer.

III.c ... Assembly

The transducer must be installed in a housing having an index of protection of at least IP20. It is important to ensure that non-intrinsically safe wiring connections are located at a clearance of at least 50 mm (tight string length) to the intrinsically safe sensor terminals. This can also be achieved through appropriate separation plates.



III.d ... Commissioning

Before commissioning, all devices must be checked to determine that they are correctly connected and working properly. The power supply, including that of downstream devices, must also be checked.

III.e ... Maintenance, servicing and repair

The device is maintenance free. In case of a defect, resend the transducer to the manufacturer.

IV Labelling

1	Manufacturer:	FAFNIR GmbH
2	Type designation:	VP-...
3	Serial Number:	Ser. N°: ...
4	Certificate Number:	TÜV 98 ATEX 1380
5	Ex marking:	 II (1) G [Ex ia Ga] IIC
6	CE marking:	 0044
7	Electrical Data:	$U_o \leq 14,3 \text{ V}$ $I_o \leq 28 \text{ mA}$ $P_o \leq 98 \text{ mW}$ $C_o \leq 680 \text{ nF}$ $L_o \leq 40 \text{ mH}$

V Electrical Data

The power supply is connected to the terminals PE, N and L. Depending on the design of this module, the power supply is

$$U = 24 \text{ V a.c.}, 115 \text{ V a.c.}, \text{ or } 230 \text{ V a.c.}, \pm 10 \%, 40 \dots 60 \text{ Hz}, \sim 2 \text{ VA.}$$

The safety maximum voltage is

$$U_m = 33 \text{ V at } 24 \text{ V a.c.}, \text{ resp.}$$

$$U_m = 126.5 \text{ V at } 115 \text{ V a.c.}, \text{ resp.}$$

$$U_m = 253 \text{ V at } 230 \text{ V a.c.}$$

The safety maximum voltage on the communication interface (S1) of the control unit, which is separated by optocouplers from the intrinsically safe sensor circuits, is

$$U_m = 100 \text{ V.}$$

The sensor circuits are designed in intrinsic safety [Ex ia Ga] IIC with a linear output characteristic. The terminals are numbered with 1 ... 8 and the additions +, A, B and - . The output values are:

$$U_o \leq 14,3 \text{ V}$$

$$I_o \leq 28 \text{ mA}$$

$$P_o \leq 98 \text{ mW}$$

$$C_o \leq 680 \text{ nF}$$

$$L_o \leq 40 \text{ mH}$$