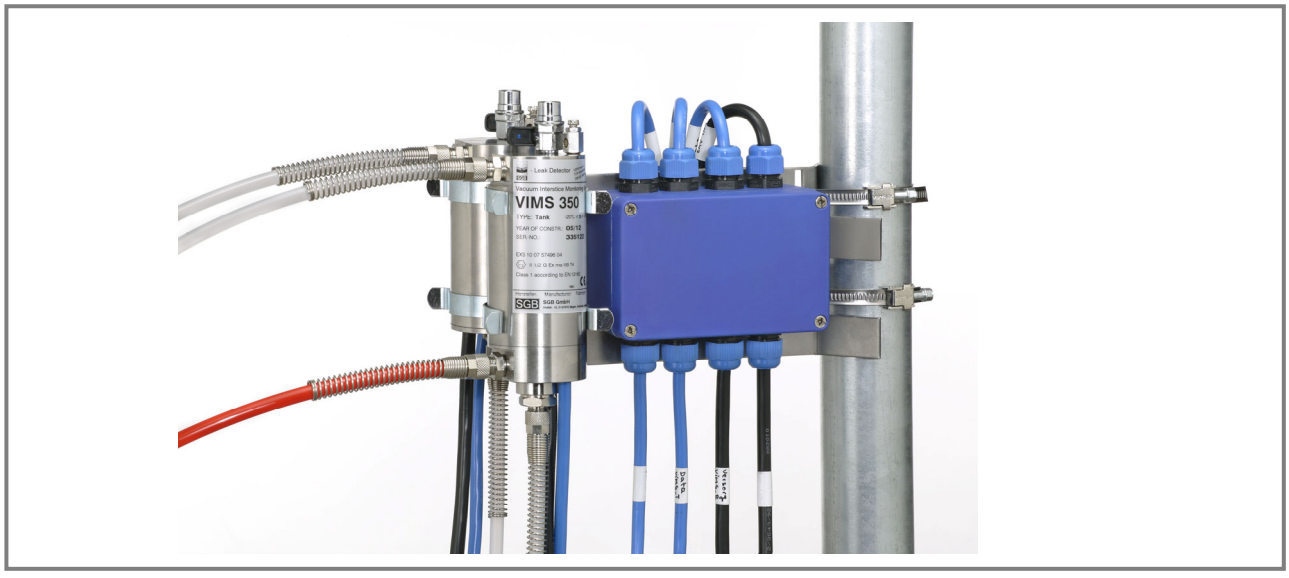
Documentation

Vacuum Interstice Monitoring Sensor
VIMS

TÜV-A 18ATEX0050 X



Before commencing any work, please read the instructions

Last updated: 07/2024

Art. no.: 602102

Contents

1. General

1.1 Information

This manual provides important information for handling the leak detector. The precondition for safe working is compliance with all the specified safety information and action instructions.

In addition, all the applicable local accident protection regulations and general safety instructions must be complied with at the location of the leak indicator (e. g., manhole shaft).

1.2 Explanation of symbols

In this manual, warning information is indicated by a symbol alongside it.

The signal word expresses the level of risk.

DANGER:
An immediately dangerous situation, which will lead to death or serious injuries if not avoided.

WARNING:
A possibly dangerous situation, which could lead to death or serious injuries if not avoided.

CAUTION:
A possibly dangerous situation, which could lead to minor serious injuries if not avoided.

Information:
Highlights useful tips, recommendations and information.

1.3 Liability waiver

All the data and information in this documentation was compiled using the applicable standards and regulations, the state of the art and our long-term experience into account.

SGB will not accept liability for:

- Non-compliance with this manual
- Improper use
- Deployment of unqualified personnel
- Unapproved refitting work
- Connection to systems not approved by SGB

1.4 Copyright

1.5 Warranty

We provide a 24-month warranty on the VIMS leak detector according to our Terms and Conditions, starting from the day of installation.

The warranty period ends 27 months after the date of sale at the latest.

Before a warranty claim can be made, the functional report/test report that details the first commissioning by trained staff must first be submitted. (For test report, see the Appendix of this documentation)
The serial number of the VIMS must be stated.

The warranty obligation is rendered null and void in the case of
- inadequate or incorrect installation
- improper operation
- changes/repairs out without the manufacturer's consent.

Our warranty does not include parts, which may be perished premature due to their consistence or category of usage (e.g. pumps, valves, gaskets, etc.). Furthermore, we are not liable for defects or corrosion damages caused by humid or inappropriate installation environments.

1.6 Customer Service

Our customer service department is available to provide you with information.

A list of contact persons can be found online at sgb.de/en or on the sticker on the display unit.

2. Safety

2.1 Intended use

WARNING!

Danger from misuse

- Only for connection to display units approved by SGB
- Only to be used in the area of released mineral oil products (according to Appendix)
- Only for interstitial spaces of double-wall tanks/pipes with sufficient resistance to vacuum:
  VIMS 34: min. -300 mbar
  VIMS 230, 320, 350 min. -600 mbar
  VMS 500 min. -750 mbar
- Earthing according to applicable regulations (e.g. EN 1127)
- Detonation flame arresters on the side of the interstitial space are usually required
- Tightness of the interstitial space according to this documentation (Chap. 6.1.).
- Installation only in zone 1, zone 2 or outside the Ex-area
- Installation of the pump unit outside closed spaces
- Explosive vapour-air mixtures: II A to II B and T 1 to T4
- Ambient temperature max. 60°C
- Conduits must be closed off so that they are gas-tight
- Power connection cannot be switched off
- Mains earth may be on the same potential as the equipotential bonding of the tank/pipe
- The volume of the space monitored by the leak detector must not exceed 10 m^3 (manufacturer's recommendation: 4 m^3).

Any claims resulting from improper use will not be accepted.

CAUTION! The protective function of the device may be impaired if it is not used as specified by the manufacturer.

2.2 Responsibility of the operator

The VIMS sensor is used in commercial applications. This means that the operator is subject to the statutory workplace safety obligations.

Besides the safety information in this documentation, all the applicable safety, accident prevention and environmental protection regulations must be complied with. In particular:

WARNING!

Risk in case of incomplete documentation

- Compilation of a risk evaluation and implementation of its results in operating instructions
- Regular checking of whether the operating instructions correspond to the current state of regulations
- The content of the operating instructions may also be the reaction to a possible alarm
- Instigation of an annual function test

2.3 Qualification

WARNING!

Danger to people and the environment in the case of insufficient qualification

Staff must be sufficiently qualified so that they are able to recognise and prevent possible hazards independently.

Companies that put leak detectors into operation must be trained by SGB or an authorized representative

National regulations must be observed.

For Germany:

Certified company qualification for assembly/installation, commissioning and maintenance of leak detector systems.

2.4 Personal safety equipment

Personal safety equipment must be worn during work.

- Wear the necessary safety equipment for the appropriate work
- Observe and comply with any signs concerning PSE

Entry in the "Safety Book"

Wear a warning vest

Wear safety shoes

Wear a protective helmet

Wear gloves – where necessary

Wear protective goggles – where necessary

2.41 Personal protective equipment when working on systems which pose an explosion hazard

The parts listed here apply in particular to safety when working on systems which pose an explosion hazard.

If work is carried out in areas with a potentially explosive atmosphere, the following items of equipment are required as an absolute minimum:

- Suitable clothing (risk of a build-up of electrostatic charge)
- Suitable tools (compliant with EN 1127)
- A suitable gas warning device which is calibrated for the existing vapor-air mixture (work should only be performed at a concentration of 50 % below the lower explosion limit)[1]
- Measuring device for determining the oxygen content of the air (Ex/O meter)

2.5 Basic hazards

DANGER

From electric current

When working on the sensors or the leak indication devices, deenergise them unless the documentation states something else.

Comply with the relevant regulations for electrical installations, explosion protection (e.g. EN 60 079-17) and accident protection regulations.

CAUTION

Through moved parts

If work is carried out on the pump unit (usable as an option), this must be deenergised. If this unit is opened as part of a function check, sufficient distance must be kept from the moved parts.

DANGER

Through explosive vapour-air mixtures

There may be explosive steam-air mixtures in the sensors, connection lines and in the pump unit.

Before carrying out work, the presence of gas should be checked.

Explosion protection regulations, such as the German BetrSichV (or the directive 1999/92/EC and the resulting laws in the appropriate member states) and/or others.

DANGER

When working in shafts

The sensors are normally installed in manhole shafts. The shaft should be entered for installation.

Before entry, the appropriate protection measures should be installed and the freedom from gas and sufficient oxygen ensured.

[1] Other percentages may be applicable according to national, regional or plant-specific regulations.

3. Technical data of the sensor

3.1 General data

Dimensions	D = 55 mm; L = 150 mm
Weight	1.6 kg
Storage temperature range	-30°C to +70°C
Use temperature range	-20°C to +60°C
Max. height for safe operation	≤ 2000 m above sea level
Max. relative humidity for safe operation	95 %

3.2 Electrical data

Power supply	24 V DC
Overvoltage Category	II
Degree of Contamination	N.a.
Communication	Ex i IIB T4
Ui	20 V
Ii	n. a.
Pi	n. a.
Ci	0,2 nF
Li	0,002 mH
Switching contact load of the relay contacts (output):	AC, max: 250 V; 3 A; 300 VA DC, max: 24 V; 2 A; 50 VA

3.3 Ex data

Sensor	Ⓔx II 1/2G Ex ma IIB T4 Ga/Gb
Communication	Ⓔx Ex ib IIB T4

3.4 Data for applications that fall under the PED (pressure equipment directive)

Note: The leak detector, installation kits, and manifolds are pressure accessories without a safety function.

Volume of the leak detector	0,05 liter
Max. operating pressure in the event of a fault	3.5 bar

3.5 Switching values

VIMS 34

Alarm ON, at the latest at:	-34 mbar
Pump OFF, not more than:	-120 mbar

VIMS 230

Alarm ON, at the latest at:	-230 mbar
Pump OFF, not more than:	-360 mbar

VIMS 310
Alarm ON, at the latest at: -310 mbar
Pump OFF, not more than: -400 mbar

VIMS 320
Alarm ON, at the latest at: -320 mbar
Pump OFF, not more than: -410 mbar

VIMS 350
Alarm ON, at the latest at: -350 mbar
Pump OFF, not more than: -550 mbar

VIMS 500
Alarm ON, at the latest at: -500 mbar
Pump OFF, not more than: -620 mbar

Other switching values can be implemented on request.

3.6 Field of application

Monitoring of underground double-wall tanks and pipes with a conveying pressure of up to 6 bar for the storage and conveyance of mineral oil products listed in the appendix.

The sensors can be used provided that there is an interstitial space with sufficient resistance to underpressure.

VIMS 34 (green)
On tanks, the suction line must be run to the lowest point of the interstitial space.

VIMS 230 (blue)
On pipes or tanks, the height difference between the lowest point of the interstitial space and the bottom edge of the sensor may not exceed 2.00 m.

VIMS 310 (yellow)
On pipes (syphon pipes), the height difference between the lowest point of the interstitial space and the bottom edge of the sensor may not exceed 2.80 m.

VIMS 320 (red)
On pipes or tanks, the height difference between the lowest point of the interstitial space and the bottom edge of the sensor may not exceed 2.90 m.

VIMS 350 (blue: pipes / red: tanks)
On pipes or tanks, the height difference between the lowest point of the interstitial space and the bottom edge of the sensor may not exceed 3.20 m.

VIMS 500 (yellow)
On pipes or tanks, the height difference between the lowest point of the interstitial space and the bottom edge of the sensor may not exceed 4.70 m.

If double-walled suction lines are monitored, then the height difference is reduced by the level of the vacuum in the inner pipe.

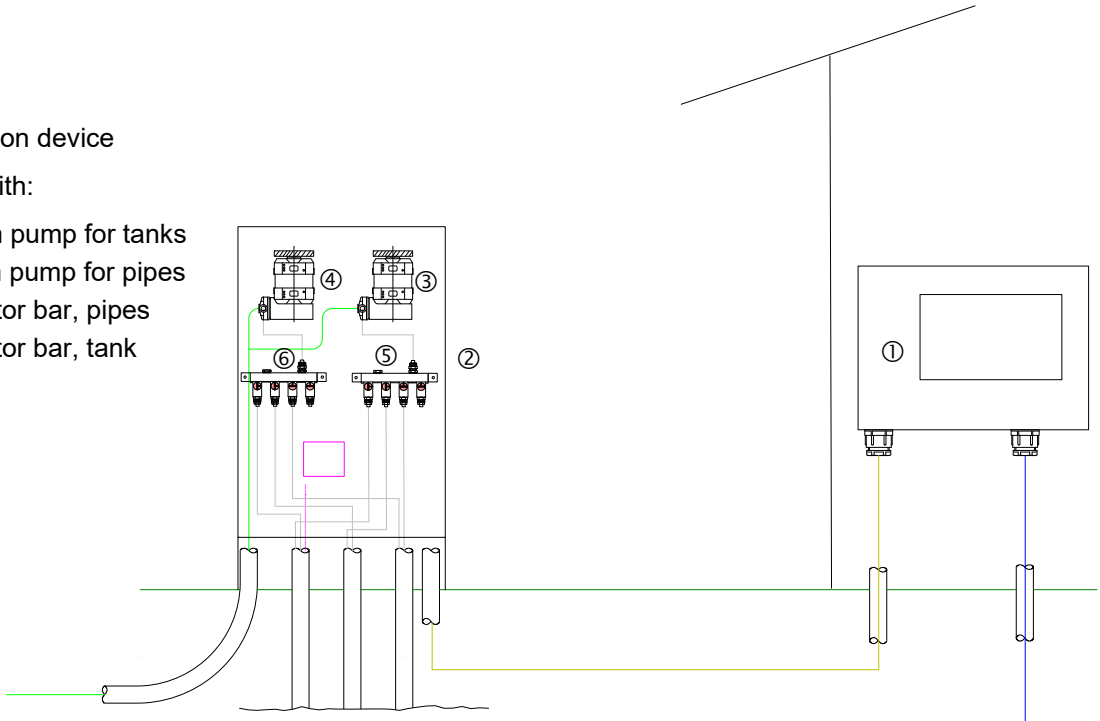
4. Design and function

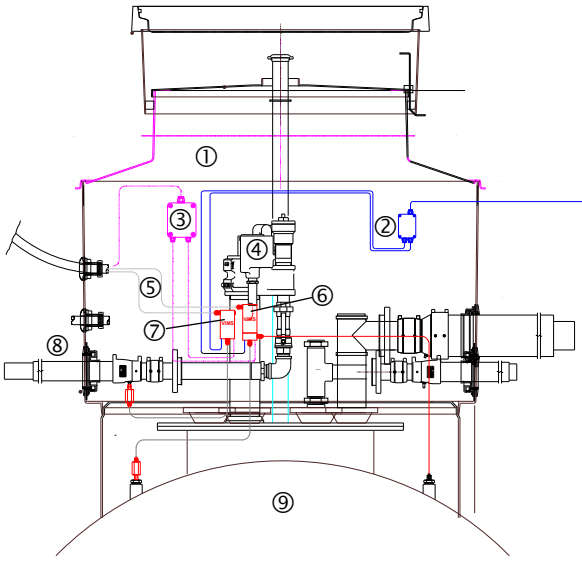
4.1 Design

① Leak indication device

② Pump unit with:

- ③ Vacuum pump for tanks
- ④ Vacuum pump for pipes
- ⑤ Distributor bar, pipes
- ⑥ Distributor bar, tank





① Manhole shaft with:

- ② Power supply terminal box
- ③ Communication terminal box
- ④ Submersible turbine pump
- ⑤ Suction line to pump unit
- ⑥ VIMS tank
- ⑦ VIMS pipe
- ⑧ Pressure pipe line
- ⑨ Double-wall tank

4.2 Normal operation

The VIMS sensor is connected to the interstitial space using the suction and measuring line (for tanks) or via the connection line (for pipes). The generated vacuum is measured via a pressure sensor and regulated.

Due to small leaks in the leak detection system which are unavoidable, the vacuum will slowly start to fall. When the Pump ON switching value is reached, this signal is transmitted to the indicating unit. This switches the vacuum source on. After the pump is switched on, the solenoid valve in the sensor is opened and the interstitial space evacuated until the operating vacuum (Pump OFF) is achieved.

Depending on the level of tightness of the overall system, the vacuum alternates between the Pump OFF switching value and the Pump ON switching value, with short pump running times and longer down times.

4.3 Air leak

If an air leak occurs (in the outer wall [secondary] or inner wall [primary], above the fluid level), the vacuum source switches on, in order to restore the operating vacuum. If the volume of air flowing in through the leak exceeds the limited conveying quantity of the vacuum source, the pump continues to run.

Increasing leakage rates lead to a further increase in pressure (when the pump is running). The sensor determines that no vacuum build up has occurred and outputs the message "No vacuum build up".
Air continues to flow into the system until the Alarm ON switching value is reached. The optical and audible alarm signal is then triggered.

4.4 Liquid leak

a) Product leak
   Liquid is sucked into the interstitial space through a leak in the inner pipe / inner tank until it enters the sensor. The sensor determines that there is product in the sensor and triggers the visual (PRODUCT detected) and audible alarm.

b) Water leak
   Water is sucked into the interstitial space through a leak in the outer pipe / outer tank until it enters the sensor. The sensor determines that there is water in the sensor and triggers the visual (WATER detected) and audible alarm.

In both cases, i.e. when there is liquid in the sensor, the integrated solenoid valve is closed. The conveyor pump and the vacuum generation pump can be switched off by setting the output events.

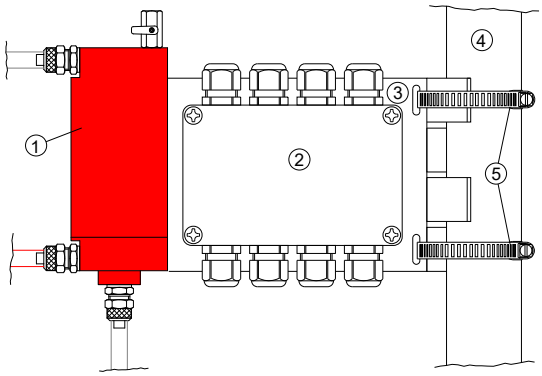
5. Installing the system

5.1 General notes

- Before starting work, the documentation must be read and understood. If anything is unclear, please contact the manufacturer.
- The safety information in this documentation must be observed.
- Close conduits for pneumatic and electrical connection lines, via which the Ex atmosphere can spread, so that they are gas-tight.
- A separate "site prep manual" for the planning of systems can be downloaded from the SGB website. There, amongst other topics, a description is available of how conduits should be laid.

5.2 Sensor (VIMS)

- The sensor is intended for installation in the tank sump using suitable installation material.



① VIMS sensor
② Terminal box
③ Bracket for 1 or 2 VIMS and 1 terminal box
④ Pipe (here, riser pipe)
⑤ Strip clips to fastening the bracket (1" to 4")

- Should the mounting not be possible in the tank sump, the sensor must be installed in a shaded place and the distance to the interstitial space may not exceed 50 m.
  In addition, the following conditions apply:

  VIMS 34: a) Suction line to the lowest point essential
  b) Height between the sensor and the lowest point of the interstitial space: < 4 m

  VIMS 230: Height between the sensor and lowest point of interstitial space: < 4 m

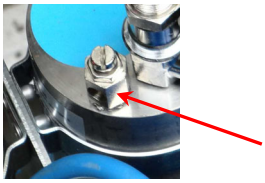
  VIMS 320: a) Height up to the separation of suction and measuring line: < 2.9 m
  b) Height between the sensor and the lowest point of the interstitial space: < 4 m

  VIMS 350: Tank:
  a) Height up to the separation of suction and measuring line: < 3.2 m

b) Height between the sensor and the lowest point of the interstitial space: < 5 m

VIMS 350: Pipe:
Height between the sensor and lowest point of interstitial space: < 5 m

VIMS 500: Height between the sensor and lowest point of interstitial space: < 6 m
(If a suction line is monitored, the height must be reduced by the vacuum level in the inner pipe)



- Installation can be carried out on an existing pipe using the SGB installation accessories (e.g. dip stick pipe, riser pipe).
- Create earthing/inclusion in the equipotential bonding (e.g. via the tank earthing clip). Use the planned and labelled connection point on the sensor.
- The sensor is approved for installation in zone 1.
- The serial numbers of the sensors should be noted for the appropriate manhole shaft.

5.3 Leak indicating device, here VISY Command GUI of company Fafnir

The sensors installed in the various tank sumps are connected to the① leak indicating device. At the same time, tank gauges are connected to this unit. The leak indicating device has a graphic user interface, upon which the alarms of the sensors are displayed, in addition to the levels.

- Installation takes place inside a building, in a dry space.
- The leak indicating device should be installed so that it is accessible and the display and operating elements can be actuated.
- Outside the Ex area
- For further individual details, see the manufacturer's operation and installation instructions (e.g. Fafnir)
  https://www.fafnir.de/sites/fafnir.com/files/pdfs/Dokumente/Technik/VISY-X/VISY-Command-VI-4/TeDo_VISY-Command-GUI_en_2021-03.pdf
- Another part of the leak indicating device is the Output Box②, via whose relay the system is controlled (e.g., the pump).

② 

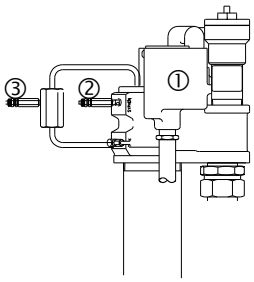
5.4 Pump unit

- Depending on the external pump unit version, it is either installed on a wall (wall mounting) or on a foundation.
- The **dimensions** of the wall or the foundation must be sufficient to accept possible loads.
- The interior of the pump unit can usually be regarded as zone 1.
- The pumps used must be suitable for the application (e.g. Ex protection).

- The exhaust pipe must terminate in a danger-free location, e.g. in the vent line of the tank, fill sump, under dispenser sump or in the feed line to the oil water separator.
- The volumetric flow of the pump may not exceed 100 l/h at the alarm switching point of the VIMS. In addition, the following conveyor heights must be observed:

VIMS 34, VIMS 230, VIMS 320	< - 400 mbar
VIMS 350	< - 550 mbar
VIMS 500	< - 650 mbar

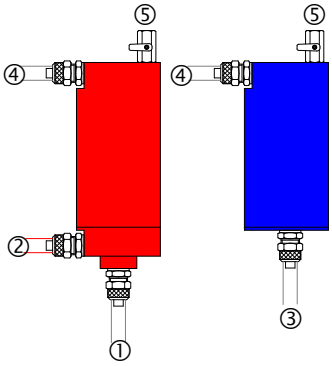
Suitable vacuum pumps can be obtained from SGB GmbH.



Note:
In some applications, it is also possible to use the syphon port of the submersible turbine pump①, which may not convey more than 100 l/h in the alarm switching point of the VIMS.

One syphon port should be used② for tank monitoring and one syphon port③ for pipe monitoring.

5.5 Pneumatic tubing



- At least 6 mm clearance
- Resistance to the stored or conveyed product
- At least PN 10 over the complete temperature range
- The full cross-section must be retained (do not bend).
- Test valve ⑤ for ventilation during the function test, as well as the option of connecting an external vacuum pump

a) Between the sensor and the interstitial space

- A detonation flame arrester must be located at the connection to the interstitial space of the suction① and measuring line② or the connection③ line.

  If the syphon port of a submersible turbine pump is used, there is no need for these detonation flame arresters.

b) Between the sensor and the pump④

- The pump can be connected directly.

5.6 Electric lines

Must be resistant to mineral oil products. The following colour designation is the specification of SGB GmbH. Different wire labelling can be used, although correct allocation must be ensured.

a) Power supply cable - connection in the manhole cover only via an Ex“e" housing
   - Shielded
   - 2 x 0.75²

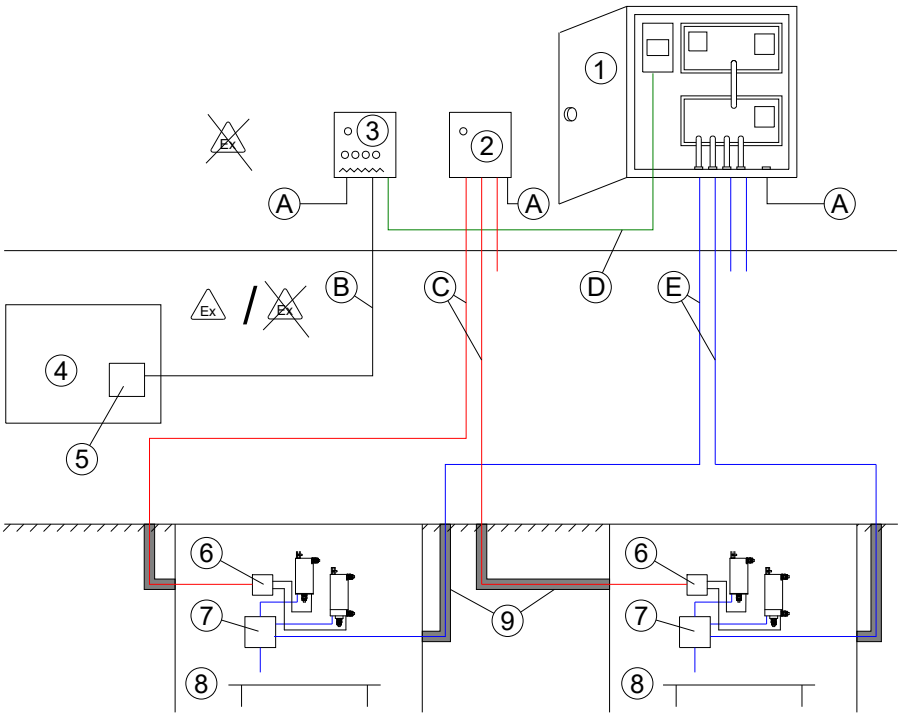
   Connection diagram:
   - White (-)
   - Brown (+)

b) Data cable (intrinsically-safe)
- Blue jacket
- 4 x 0.5^2

Connection diagram:
- Brown (+)
- White (A)
- Black (B)
- Blue (-)

5.7 Electrical connection diagram

Diagram with a standard 24 V power supply unit.



① Leak indicating device GUI
② Power supply unit to supply the VIMS
③ Output Box
④ External vacuum pump unit
⑤ Ex "e" terminal box
⑥ Ex "e" terminal box
⑦ Ex "i" terminal box
⑧ Tank sump
⑨ Conduit
A Cable for power connection
B Cable to control the external vacuum pumps, 4-wire (3+PE)
C Power supply cable for VIMS
D Cable for RS 485, 3-wire (2+PE)
E Data cable, "intrinsically-safe"

6. Commissioning

Pictorial, step-by-step instructions for start-up (and function testing) can be downloaded from the SGB website.

6.1 Tightness test

Before start-up, check the tightness of the interstitial space.

The vacuum should be created with an external vacuum pump.

The test is to be considered as having been passed, if the vacuum does not fall by more than one mbar during a testing period (in minutes) of the monitoring period volume, divided by 10.
e.g.: Interstitial space volume: 800 litres
resulting in: 800/10 = 80
resulting in: 80 minutes of testing for max. 1 mbar vacuum loss.

6.2 Creating pneumatic connections

The pneumatic connections must be created between the sensor and the interstitial space as well as between the sensor and the vacuum source.

(1) Install the installation kit and gland.

(2) Create the appropriate connection (according to the depictions in the following images)

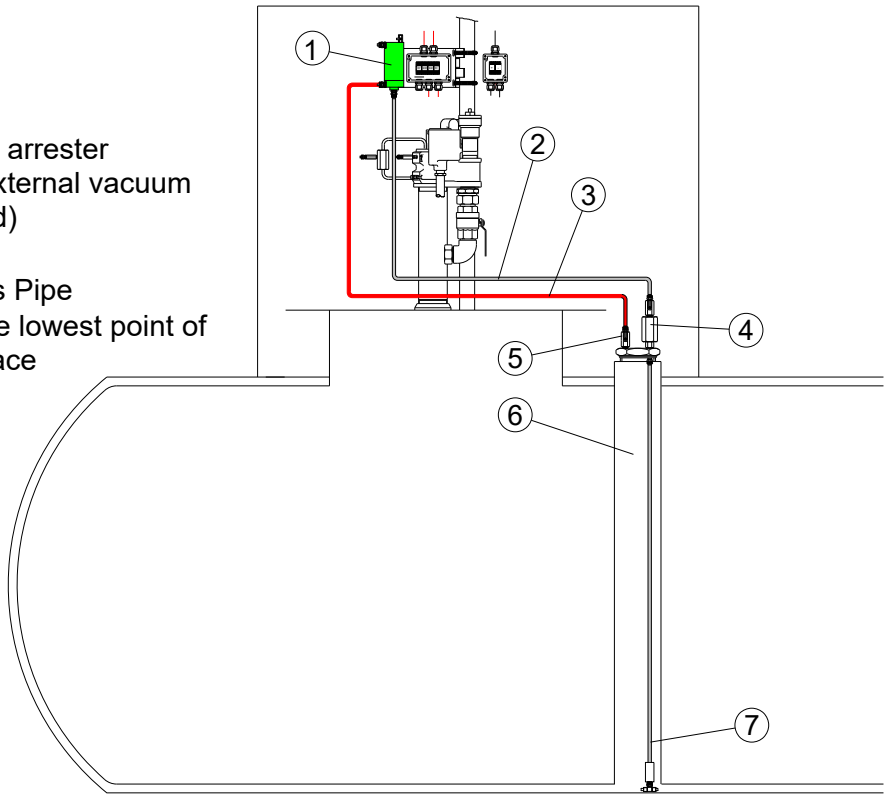
(3) When routing the tube, check again that the tubes are protected against damage when the tank sump is inspected.

(4) Tighten the glands.

6.2.1 Between the sensor and the tank interstitial space

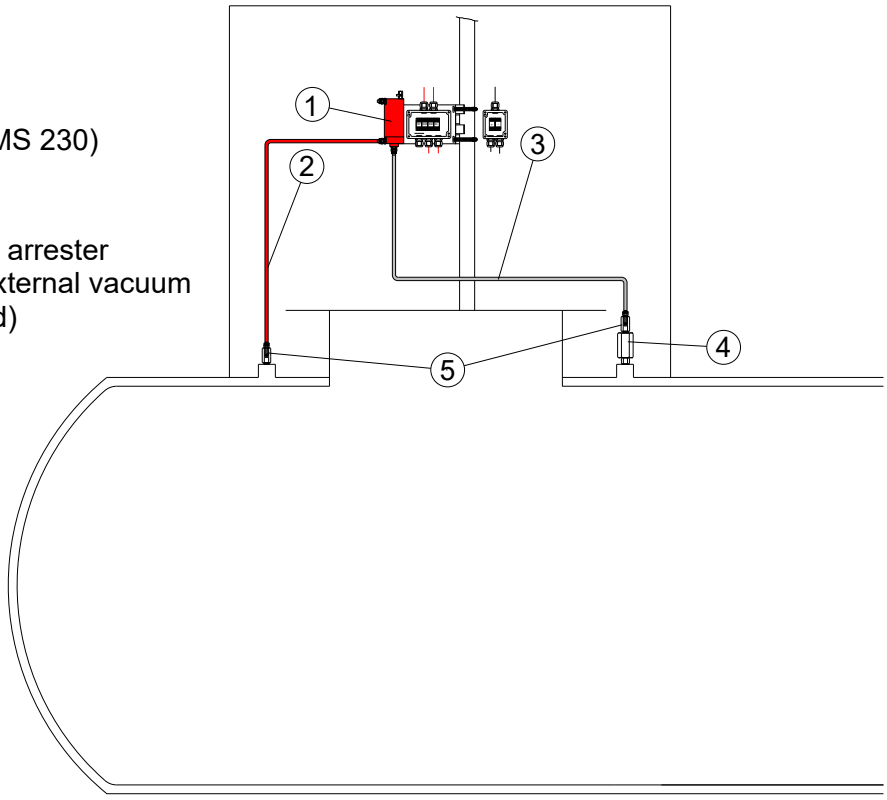
a) With a suction line to the lowest point in the Interstitial Access Pipe

① VIMS (Tank)
② Suction line
③ Measuring line
④ Detonation flame arrester (only when the external vacuum pump unit is used)
⑤ Shut-off valve
⑥ Interstitial Access Pipe
⑦ Suction line to the lowest point of the interstitial space



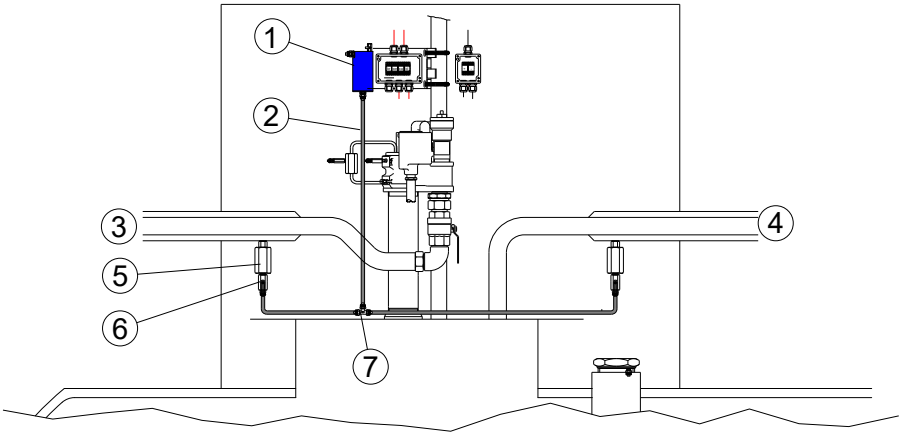
b) Without suction line to the lowest point

① VIMS (Tank) (VIMS 230)
② Measuring line
③ Suction line
④ Detonation flame arrester (only when the external vacuum pump unit is used)
⑤ Shut-off valve



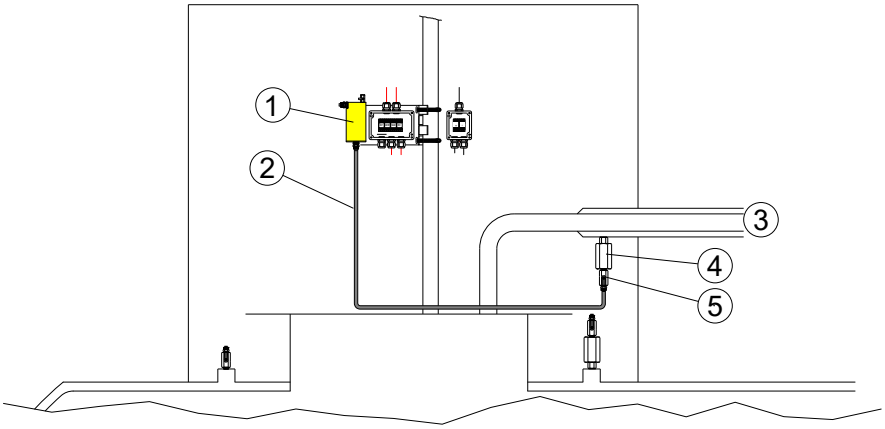
6.2.2 Between the sensor and the pipe interstitial space

a) Monitoring of one pressure line and one filling line with a VIMS



① VIMS (pipe)
② Connecting line
③ Double-walled pressure line
④ Double-walled filling line
⑤ Detonation flame arrester (only required, if the external vacuum pump unit is used)
⑥ Shut-off valve
⑦ T gland to join 2 monitoring areas

b) Monitoring of a suction line

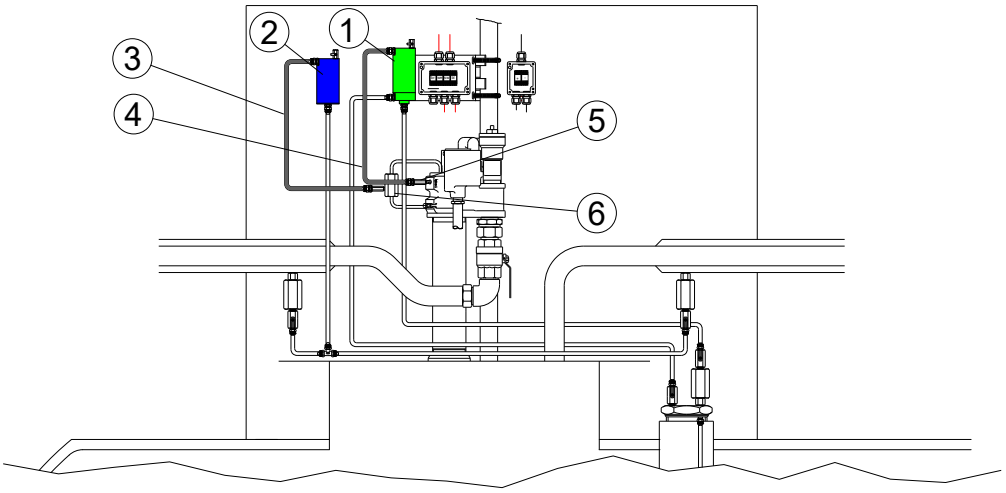


① VIMS (pipe)
② Connecting line
③ Double-walled suction line
④ Detonation flame arrester (only required, if the external vacuum pump unit is used)
⑤ Shut-off valve

6.2.3 Between the sensor and the vacuum source

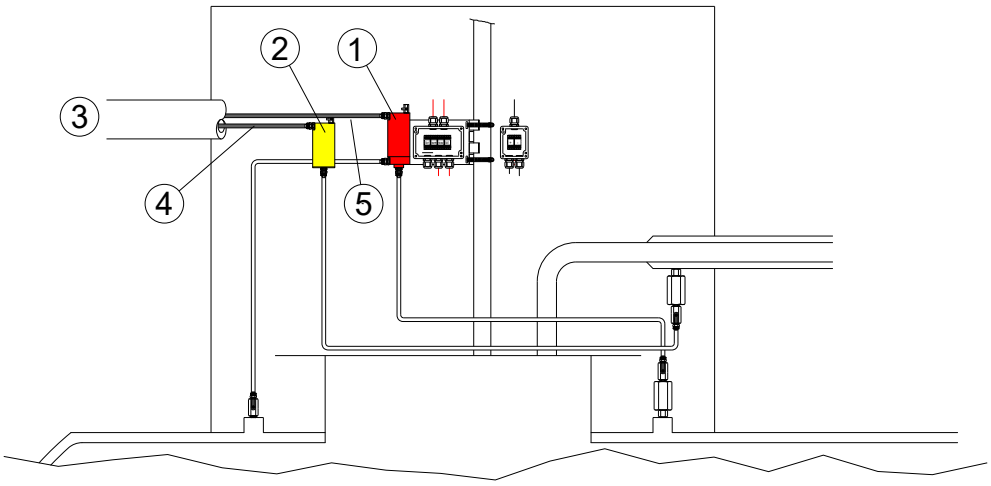
Separate vacuum sources must be used for the interstitial space of the tank, and for the interstitial space of the pipe.

a) Syphon ports of the submersible turbine pump



① VIMS tank
② VIMS pipe
③ Suction line to vacuum connection 2
④ Suction line to vacuum connection 1
⑤ Primary syphon port
⑥ Secondary syphon port or also external syphon port

b) External pump unit



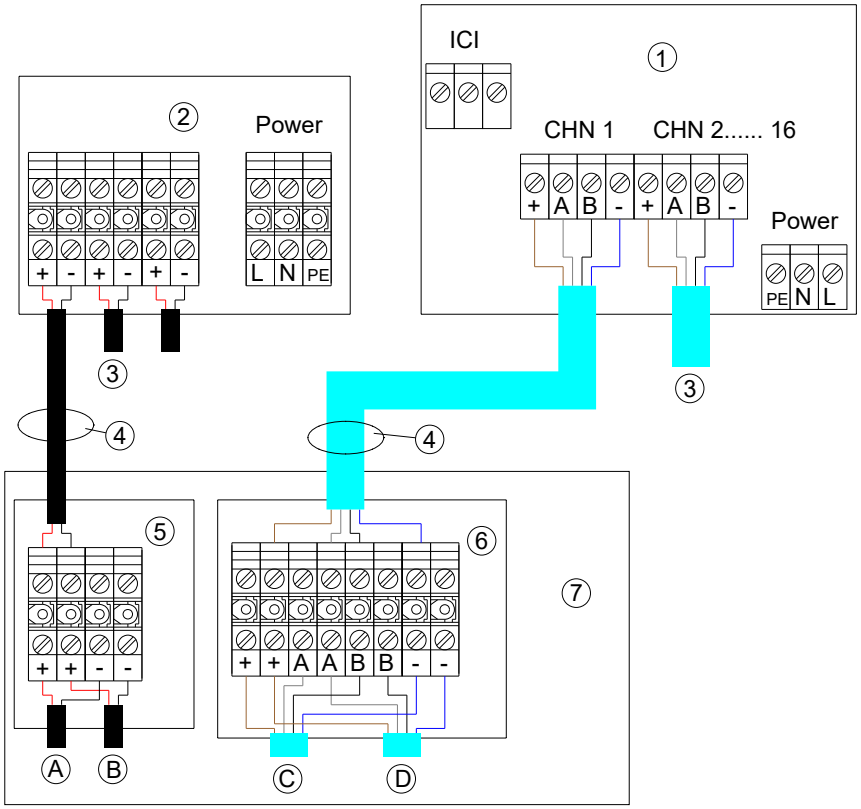
① VIMS tank
② VIMS pipe
③ Protective pipe to the external pump unit
④ Suction line to the "Pipe" vacuum pump
⑤ Suction line to the "Tank" vacuum pump

6.3 Creating electrical connections

The diagram is shown in Chap. 5.7.

6.3.1 Leak indicating device – tank sump

With standard power supply unit

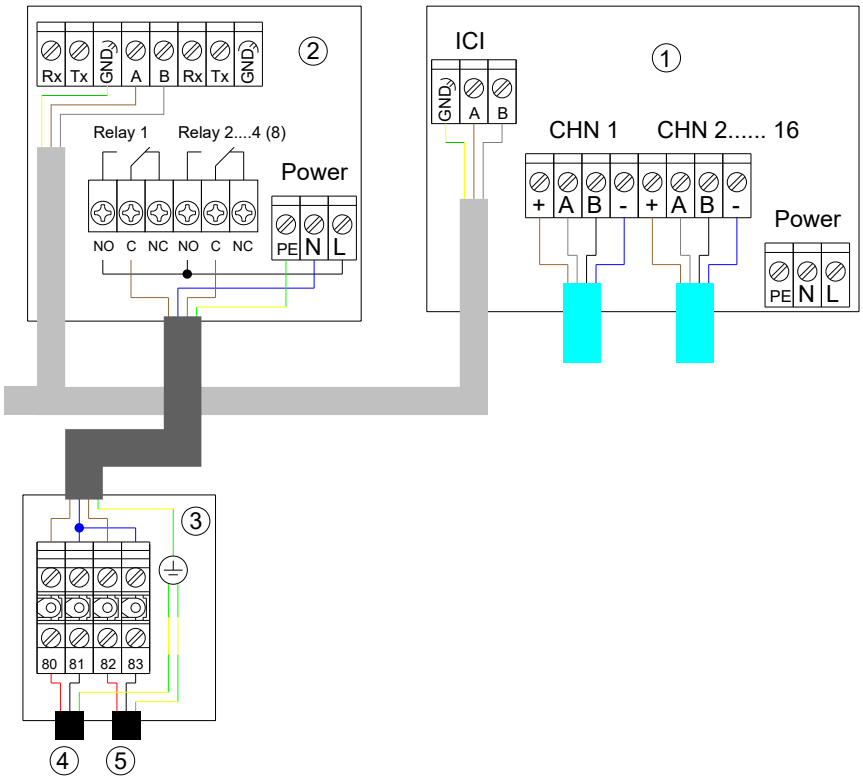


① Leak indicating device
② Standard power supply unit (24 V)
③ Power supply / Communication into the next tank sump
④ One conduit each to the tank sump
⑤ Terminal box Ex "e"
⑥ Terminal box Ex "i"
⑦ Tank sump
A Power supply, VIMS pipe
B Power supply, VIMS tank
C Data cable, VIMS pipe
D Data cable, VIMS tank

6.3.2 Leak indicating device – Output box

a) External pump unit, relay in the output box not setup as "failsafe"

In the circuit shown, it is assumed that one pump takes over the vacuum creation for all tank interstitial spaces and one pump the vacuum creation for all pipe interstitial spaces.

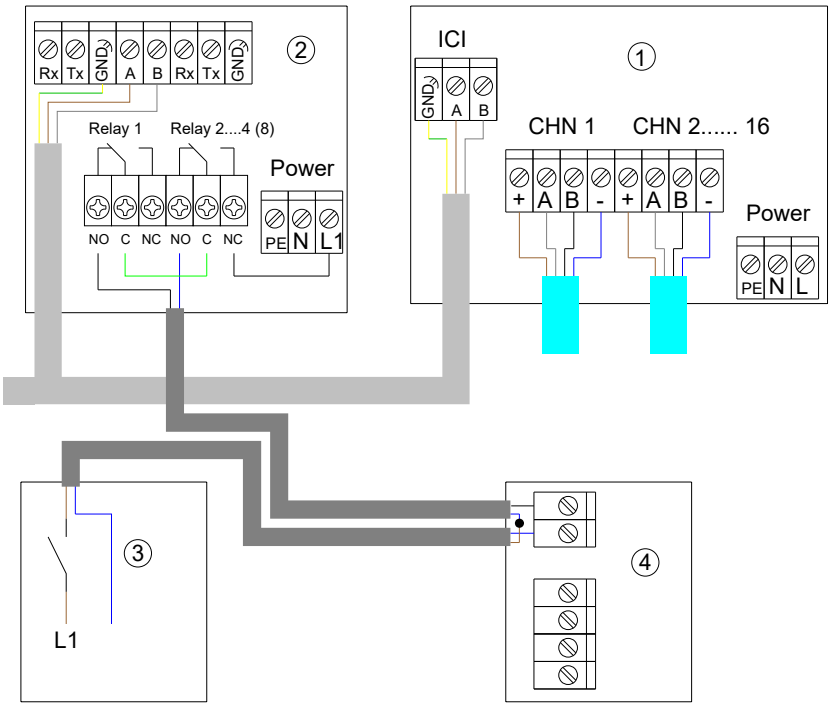


① Leak indicating device
② Output box
③ Ex "e" terminal box in the external pump unit
④ Pump for tank interstitial spaces
⑤ Pump for pipe interstitial spaces

b) Submersible turbine pump as vacuum source, relay in the output box controlled in "failsafe" mode.

As in the wiring diagram shown, the submersible turbine pump is activated (to create vacuum) as well as switched off (in the case of a liquid leak of the inner pipe).

In this circuit type, 2 relays in the output box are used for one submersible turbine pump.



① Leak indicating device
② Output box
③ Dispenser, the contact of the nozzle is shown
④ Controller for the submersible turbine pump, the assigned terminals are the "nozzle" terminals.

6.4 Setup of the sensor

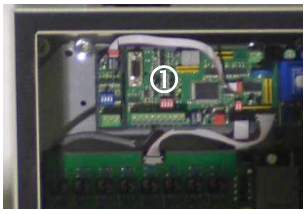
The sensor communicates with the leak indicating device via a bus system. For this reason, the sensor must be set up in the leak indicating device for the communication to function.

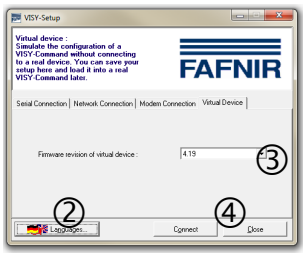
The material required for this is:

- PC, ideally a laptop or comparable
- Adapter cable USB – RS 232. Usually, a driver must be installed for this, which matches the adapter cable.
- Software "VISY-Setup". After registration, the software can be downloaded free of charge from the https://www.fafnir.de/downloads/software page. After downloading, please install the software.

A detailed operating manual can also be downloaded from that page.

6.4.1 Basic settings





(1) Connect the PC with the leak indication device via the adapter cable.

(2) Insert the adapter cable in the leak indication device① and then plug it into the USB port of the laptop.

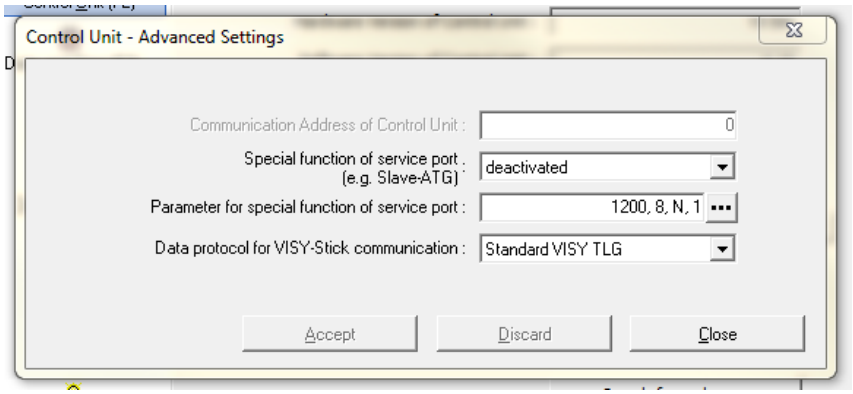
(3) Launch the VISY-Setup software.

(4) If necessary, select the language.②

(5) Press the "Automatic search"③ button, after which Com XX appears in the box above it.

(6) Press the "Connect"④ button. The user desktop of the software opens.

(7) On the left-hand side, select the program item "Measurement Evaluation" (F2). Then select the menu item "Advanced Settings". The following window opens:

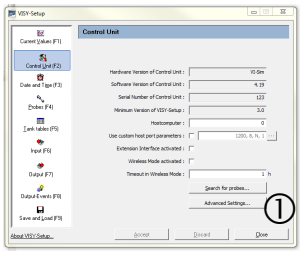


(8) In the lowest box "Multi Measured Value…", then press "Apply".

(9) On the left-hand side, select the next program item "Date and Time" (F3).

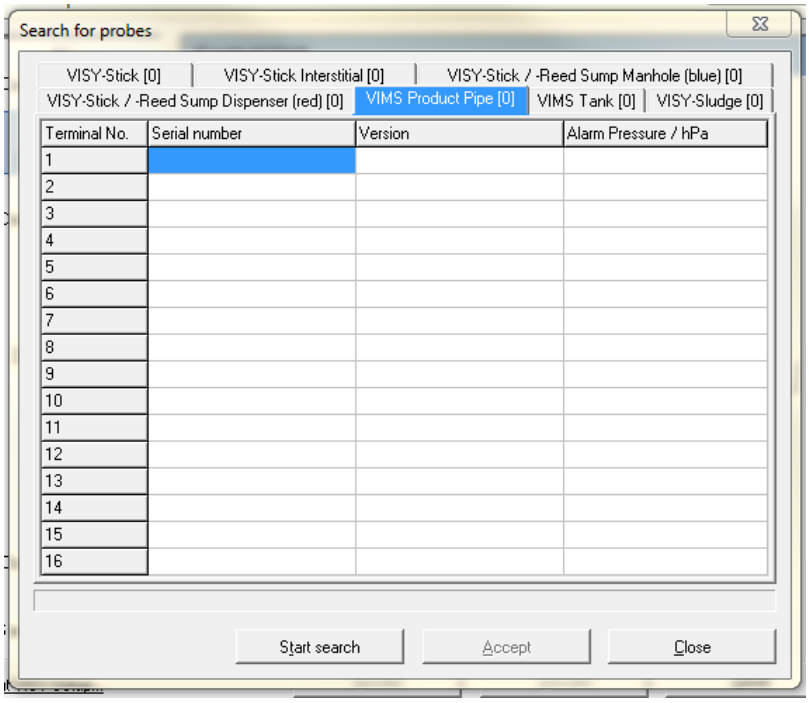
(10) Set the date and time, either through a transfer from the PC or by entering it.

6.4.2 Setting up the VIMS sensors



(1) On the left-hand side, select the program item "Measurement Evaluation" (F2).

(2) Select the menu "Search for Measured Value Encoder…"①. The following window then appears:



(3) In the top pane of the window, select "VIMS Product Pipe", then "Start Search".

The serial numbers of the connected VIMS sensors for the pipe appear. Press the "Apply" button.

(4) In the top pane of the window, select "VIMS Tank", then "Start Search". As above, the serial numbers of the connected VIMS tank sensors appear. Press the "Apply" button.

(5) Close the window.

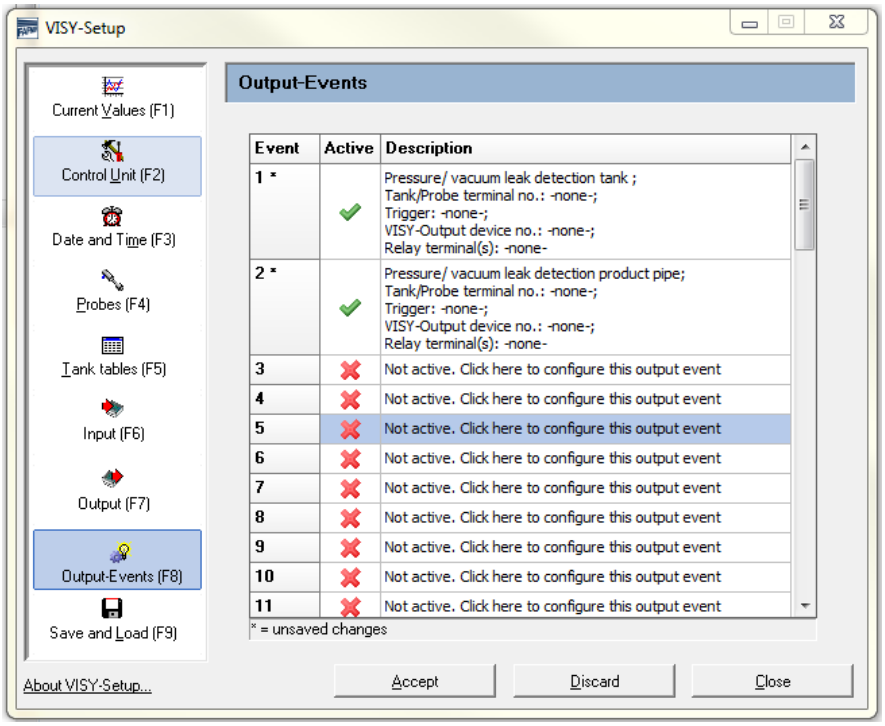
6.4.3 Defining the output events

The "Reactions" to a specific event can be specified using the output events.

Example: If a sensor sends the "Vacuum request" signal to the leak indicating device, then the output event defines which relay is actuated, in accordance with the wiring from the previous chapters.

In the same way, alarm situations to different reactions can be programmed and can be selected freely.

Only examples are shown below.

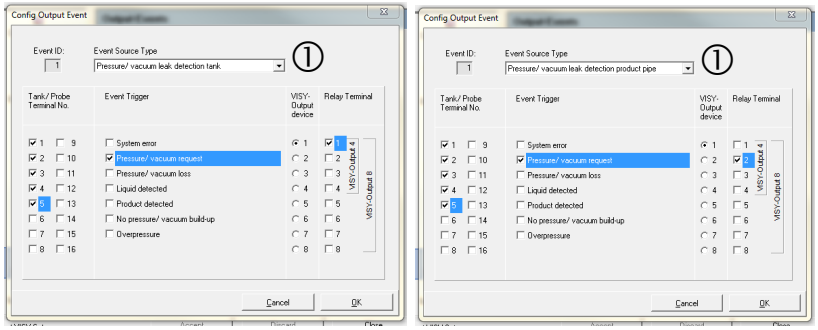


The events with a green checkmark have already occurred. Those with the red cross can still be defined. A total of 64 events can be defined.

After the events have been defined, press the "Apply" button.

a) External pump unit, with one pump each for the tank and pipe monitoring areas.

   5 tanks (one with 2 chambers) and 6 pipes are to be monitored.



   In the box at the top①, select which sensor (tank or pump) is required. Here, the comparison of tank and pipe is selected.

   In the lower pane, the channels (up to 16 are possible) are listed on the left-hand side. The selection in this column must match with the wiring and allocation to the manhole covers.

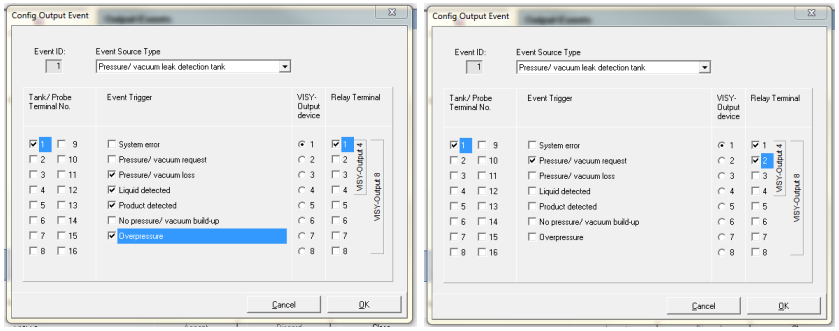
   The middle pane lists the events which can be selected. Here "Pressure / Vacuum demand" is selected.

   This is defined on the left in the table:

If a "Vacuum request" signal comes from one of the sensors for tank monitoring from one or more tank sumps (1 to 5), then Relay 1 is switched in Output Box 1.
***Note:** The appropriate pump is wired to this relay.*

Events can also be defined for the various alarms.

b) Submersible turbine pump as vacuum source



Here, Events 1 and 2 are shown for the control of an submersible turbine pump.

In Event 1 (left), the submersible turbine pump is blocked in the case of an alarm, i.e. no product is conveyed. Comparison with Chap 6.3.2 b) shows that signal of the nozzle is also interrupted.

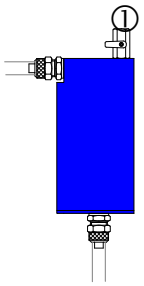
Event 2 (right) shows how the pump is controlled when a vacuum request occurs on the sensor. Relay 2 is controlled, thus generating a contact in parallel to the nozzle signal. The submersible turbine pump starts and generates the necessary vacuum.

6.4.4 Saving the settings

After this work has been carried out, always save the settings.

To do this, open the program item "Save and Load" (F9) and perform the steps listed there.

6.5 Vacuum build-up

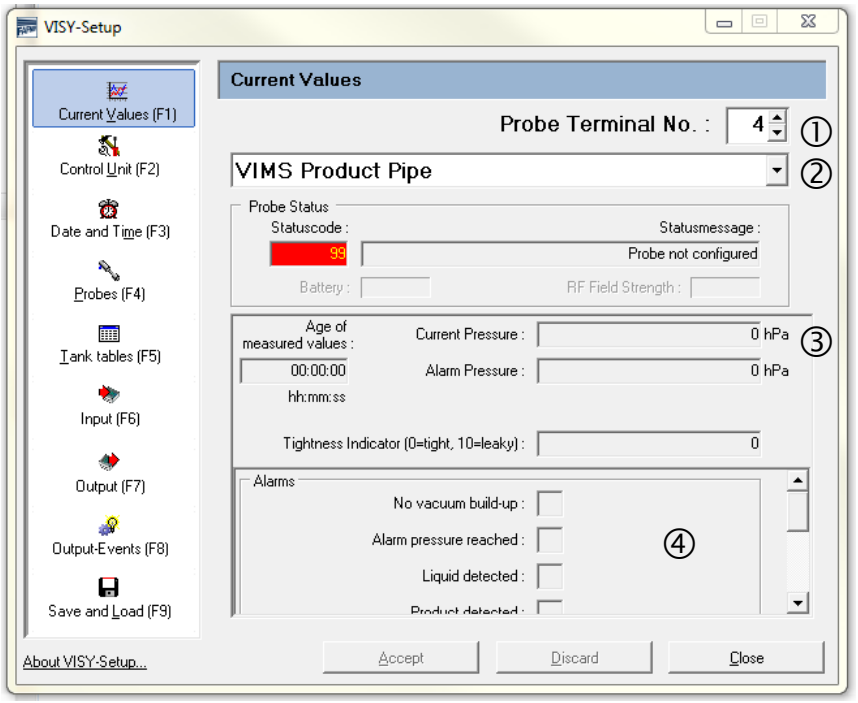


As soon sensor setup has been completed, vacuum build-up begins. The use of an installation pump is recommended for larger interstitial spaces (more than 100 litres).

The installation pump can be connected to the tap① of the VIMS.

If the external vacuum pump unit is used, then there is also the option for connecting an installation pump in the pump unit housing (simpler, as not all sumps need to be entered).

(1) Vacuum build-up must be monitored. To do this, perform the following settings in the VISY-Setup software:



Select the program item "Current Measured Values" (F1).

In the box "Measured value encoder connection no.:"①, the appropriate channel (tank sump) to be monitored can be selected

In the box beneath②, the sensor (pipe or tank) to be monitored can be selected.

In the "Current Pressure" box③, the pressure currently measured on the sensor is displayed.

In the "Operating States" pane④, the appropriate operating states are displayed. A grey box means "inactive". If the colour of the box changes to red, then the appropriate function is active.

(2) Monitor the vacuum build-up on all the connected sensors.

(3) After a successful vacuum build-up, a function check must be performed.

7. Function test and maintenance

7.1 General

Step-by-step instructions for start-up and function testing can be downloaded from the SGB website sgb.de/en.

7.2 Maintenance

- Annually to determine functional safety
- Scope of check according to 7.3

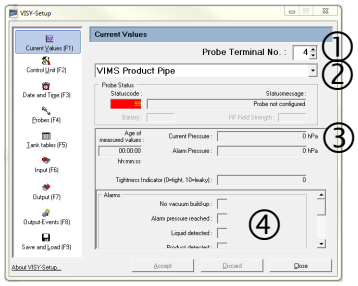
7.3 Function test

Two people are usually required to perform a function check. The function check must contain the following content:

- Agreement of work with the responsible operative officer
- Observe the safety information regarding handling of the materials being stored or conveyed.
- Free passage of the interstitial space (section 7.3.1)
- Testing the switching values (section 7.3.2)
- Testing of the conveying height of the pump (7.3.3)
- Tightness test of the system (section 7.3.4)
- Setting up of the operating mode (section 7.3.5)
- Completion of a test report with the confirmation of functional and operation safety. (Test reports are available for downloading on the SGB website)

7.3.1 Free passage of the interstitial space

This test checks that an interstitial space is connected to the VIMS and that this interstitial space has sufficient continuity for an air leak to cause an alarm.



(1) Connect the laptop with the leak display unit (see 6.4.1, Paras. (1) to (6)).

(2) Select the program item "Current Measured Values" (F1).

(3) Select the interstitial space to be tested, i.e. the "Measured value encoder connection" box ① as well as the type of interstitial space. ②

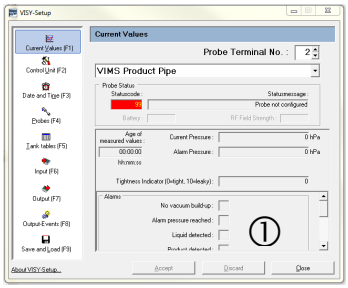
(4) In the "Current Pressure" box③, the pressure currently measured on the sensor is displayed.

(5) The interstitial space must now be ventilated:
For pipes: On the test valve at the end of the pipe
For tanks: On the test valve of the sensor.

(6) The test is considered as passed when a vacuum drop is determined on③ ventilation.

(7) Carry out nos. (3) to (6) for all connected interstitial spaces.

7.3.2 Testing the switching values



(1) Remove the plug on the test tap on the sensor and screw in an appropriate nozzle.

(2) Attach a measurement instrument to the nozzle and then open the tap.

(3) This part test is considered as passed when the pressure displayed on the measurement instrument does not deviate from that shown in the software by more than 10 mbar.

(4) Carry out this test for each interstitial space.

(5) Then ventilate each interstitial space so that the alarm is triggered.

The alarm is displayed both on the display of the leak indicating device and in the software①.

(6) The test is considered as passed when the alarm is triggered when the "Alarm ON" switching value is reached and then a vacuum is created until the vacuum source is switched off.

7.3.3 Testing of the conveying height of the pump

The testing of the pump conveying height is carried out in order to determine whether the vacuum source is able to create the operating vacuum in the interstitial space.

There is a test tap on the external pump unit, to which the measurement instrument can be connected. On the submersible turbine pump, the suction line must be disconnected from the syphon port and the measuring instrument then connected to the now free nozzle.

(1) Connect the measuring instrument as described above.

(2) Ventilate a corresponding interstitial space up to the "Vacuum request" switching point. This switches on the pump and the value can be read off on the measuring instrument.

(3) Carry out this operation for the pumps and syphon ports.

(4) This test is considered as passed when the suction height of the vacuum source is at least 20 mbar higher than the "Pump OFF" switching value, i.e. the operating vacuum.

(5) After the test has been carried out, remove the measuring instrument and reconnect all the previously disconnected connections.

7.3.4 Tightness test of the system

(1) The requirements for system tightness are defined in Chap. 6.1.

(2) Determine the testing time for each connection interstitial space (calculate it or use the prepared SGB GmbH test reports).

(3) Select the first interstitial space to be tested in VISY-Setup.

(4) Read off the start vacuum and time and write them down. Let the test time elapse and determine the vacuum drop.

(5) The test is considered as passed when the vacuum does not fall than more than 1 mbar within the test time.
Of course, a multiple of the test time can be measured, for which the approved vacuum drop is then also a multiple.

7.3.5 Setting up the equipment ready for operation

(1) Check whether all the pneumatic connections are set up correctly.

(2) Check that all tabs on the sensors are closed and secured against soiling with a plug. The same applies for the test valves at the end of the pipes.

(3) Check that all the shut-off valves in the installation kits are open.

(4) Disconnect the connection between the notebook and the leak indicating unit and close the housing of the leak indicating unit.

8. Fault (Alarm)

8.1 Alarm description

"NO VACUUM BUILD-UP"
Warning message that the pump is not able to create the underpressure again.

"ALARM VACUUM REACHED"
So much air is entering the system that the vacuum has fallen below the alarm vacuum.

"OVERPRESSURE IN SYSTEM"
An overpressure of more than 500 mbar has formed in the interstitial space.

"FLUID DETECTED"
Water has been detected in the sensor.

"PRODUCT DETECTED"
Product has been detected in the sensor.

8.2 Behaviour

The different alarms can be used for various automated reactions (e.g. switching off pumps).

Inform the installation company. They must find and eliminate the error.

A function check must be carried out after the repair work.

8.2.1 Condensate in the sensor – Creation of the operating state

If condensate is collected in the sensor, this may lead to a "Fluid detected" alarm. We recommend the following procedure to eliminate this problem:

(1) Make a collection vessel available

(2) Pipe: Open the test valve of the affected line
Tank: Slacken the gland on the side of the measuring line

(3) This depressurises the interstitial space and does not draw the condensate back into the interstitial space.

(4) Disconnect the vacuum pump from the WIMS sensor.

(5) Disconnect the suction line on the pipe / tank from the interstitial space and hold the end in a collection vessel.

(6) Open the tap on the sensor, letting the condensate flow into the collection trough due to gravity. If necessary, blow the sensor and suction line out carefully.

(7) Carry out steps (6) to (2) in reverse order and start the system up.

To avoid this type of false alarm, condensate traps can be placed in the connection lines.

9. Spare parts

Spare parts can be found on our shop site shop.sgb.de, e.g.

Due to the construction of the sensor, only the complete sensor can be replaced

Pipe sensor

020 230-07	VIMS 230, VA, QV 8/6
020 350-07	VIMS 350, VA, QV 8/6
020 500-07	VIMS 500, VA, QV 8/6

Tank sensor

021 034-07	VIMS 34, VA, QV 8/6
021 320-07	VIMS 320, VA, QV 8/6
021 350-07	VIMS 350, VA, QV 8/6

10. Accessories

Accessories can be found on our shop site shop.sgb.de.

11. Disassembly and disposal

11.1 Disassembly

Check that no gas is present before and during the work.

Seal any openings gas-tight which could otherwise allow the spread of a potentially explosive atmosphere.

Do not use tools capable of generating sparks (saw, cutting grinder...) for dismantling. If this remains unavoidable, comply with EN 1127, and the area must not have a potentially explosive atmosphere.

Avoid any build-up of electrostatic charge (e.g. due to friction).

11.2 Disposal

Contaminated components (potential outgassing) should be disposed of appropriately.

Dispose of electronic components appropriately.

12. Appendix

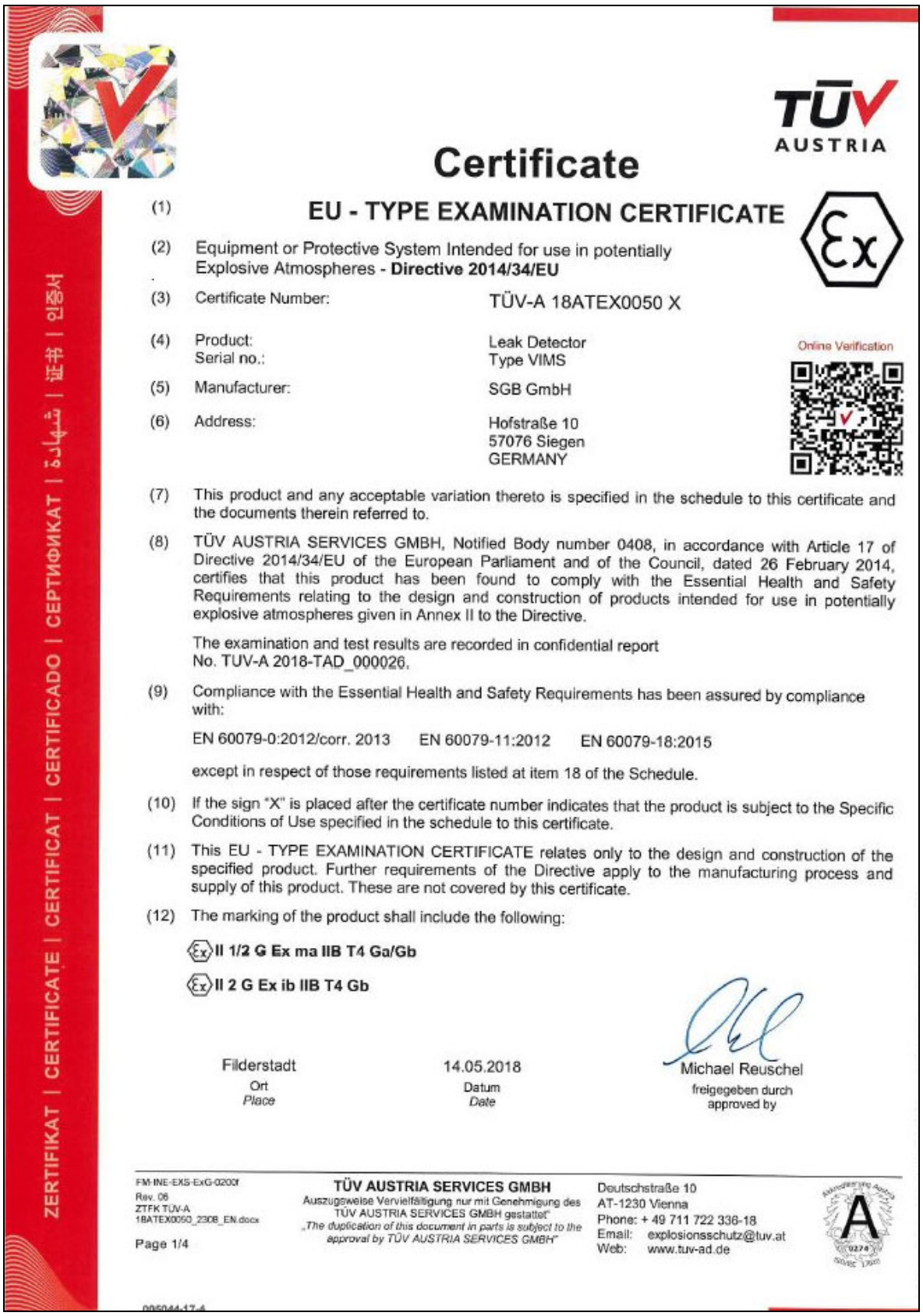
12.1 Monitorable fluids

- Heating oil
- Diesel
- Petrol
- E-85
- The VIMS sensors are also suitable for the above fuels with biogenic components, provided that they were available on the market before 01.01.2012.

The following restriction must be observed:

As a test fluid,
Gasoline Test Fuel, RSG E 10 (Haltermann Products – Hamburg Factory)
was used, i.e. the properties of this test fluid must be appropriate for the fuel. This relates to the chemical and physical properties.

12.2 Ex approvals



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TÜV AUSTRIA

Certificate

EU - TYPE EXAMINATION CERTIFICATE

(1)

(2) Equipment or Protective System Intended for use in potentially Explosive Atmospheres - **Directive 2014/34/EU**

(3) Certificate Number: TÜV-A 18ATEX0050 X

(4) Product: Leak Detector
Serial no.: Type VIMS

(5) Manufacturer: SGB GmbH

(6) Address: Hofstraße 10
57076 Siegen
GERMANY

Online Verification

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

(8) TÜV AUSTRIA SERVICES GMBH, Notified Body number 0408, in accordance with Article 17 of Directive 2014/34/EU of the European Parliament and of the Council, dated 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 confidential report No. TUV-A 2018-TAD_000026.

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

EN 60079-0:2012/corr. 2013 EN 60079-11:2012 EN 60079-18:2015

except in respect of those requirements listed at item 18 of the Schedule.

(10) If the sign "X" is placed after the certificate number indicates that the product is subject to the Specific Conditions of 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 product. These are not covered by this certificate.

(12) The marking of the product shall include the following:

II 1/2 G Ex ma IIB T4 Ga/Gb

II 2 G Ex ib IIB T4 Gb

Filderstadt	14.05.2018	Michael Reuschel
Ort *Place*	Datum *Date*	freigegeben durch approved by

FM-INE-EXS-ExG-0200f
Rev. 06
ZTFK TÜV-A
18ATEX0050_230B_EN.docx

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Web: www.tuv-ad.de

005044-17-4

(13)

(14)

ANNEX

TÜV AUSTRIA

EU - TYPE EXAMINATION TÜV-A 18ATEX0050 X

(15) **Description of Product**

Monitoring of underground double-wall tanks and pipes with a conveying pressure of up to 6 bar for the storage and conveyance of mineral oil products listed in the appendix.
The sensors, listed below, can be used provided that there is an interstitial space with sufficient resistance to underpressure.

Type codes:

- **VIMS 34**
  On tanks, the suction line must be run to the lowest point of the interstitial space.
- **VIMS 230**
  On pipes or tanks, the height difference between the lowest point of the interstitial space and the bottom edge of the sensor may not exceed 2.00 m.
- **VIMS 320**
  On pipes or tanks, the height difference between the lowest point of the interstitial space and the bottom edge of the sensor may not exceed 2.90 m.
- **VIMS 350**
  On pipes or tanks, the height difference between the lowest point of the interstitial space and the bottom edge of the sensor may not exceed 3.20 m.
- **VIMS 500**
  On pipes or tanks, the height difference between the lowest point of the interstitial space and the bottom edge of the sensor may not exceed 4.70 m.
  If double-walled suction lines are monitored, then the height difference is reduced by the level of the vacuum in the inner pipe.

Technical data

Rated value

Rated voltege Un	24 V DC
Rated current In	max. 70 mA
Overvoltage category	II
Switching capacity relais (output)	AC: max. 250 V; 3 A; 300 VA
	DC: max. 24 V; 2A; 50 VA

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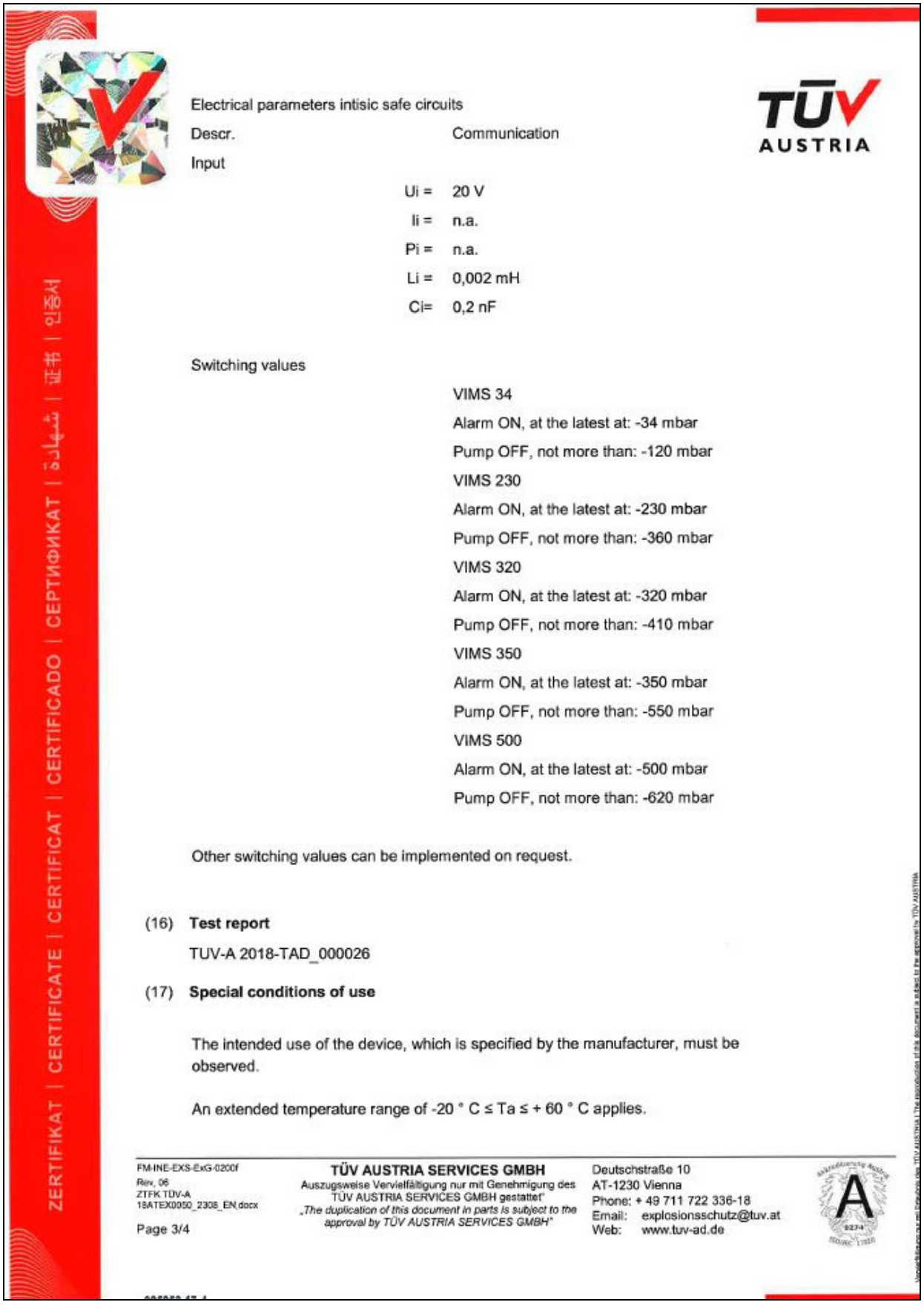

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Electrical parameters intisic safe circuits

Descr.	Communication
Input	
Ui =	20 V
Ii =	n.a.
Pi =	n.a.
Li =	0,002 mH
Ci=	0,2 nF

Switching values

VIMS 34
Alarm ON, at the latest at: -34 mbar
Pump OFF, not more than: -120 mbar
VIMS 230
Alarm ON, at the latest at: -230 mbar
Pump OFF, not more than: -360 mbar
VIMS 320
Alarm ON, at the latest at: -320 mbar
Pump OFF, not more than: -410 mbar
VIMS 350
Alarm ON, at the latest at: -350 mbar
Pump OFF, not more than: -550 mbar
VIMS 500
Alarm ON, at the latest at: -500 mbar
Pump OFF, not more than: -620 mbar

Other switching values can be implemented on request.

(16) **Test report**

TUV-A 2018-TAD_000026

(17) **Special conditions of use**

The intended use of the device, which is specified by the manufacturer, must be observed.

An extended temperature range of -20 ° C ≤ Ta ≤ + 60 ° C applies.

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To prevent a zone carryover from the inside of the product to the outside, a permanent negative pressure must be ensured inside. At atmospheric pressure inside, an immediate shutdown must occur. The responsibility for this lies with the operator.

TÜV AUSTRIA

The electrical installation must be carried out in accordance with the requirements of EN 60079-14

(18) **Essential health and safety requirements**

Met by the standards mentioned above.

Filderstadt	14.05.2018	Michael Reuschel
Ort *Place*	Datum *Date*	freigegeben durch approved by

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Government of India
Ministry of Commerce & Industry
Petroleum & Explosives Safety Organisation (PESO)
5th Floor, A-Block, CGO Complex, Seminary Hills,
Nagpur - 440006

स्पीड पोस्ट
SPEED POST

E-mail : explosives@explosives.gov.in
Phone/Fax No : 0712 -2510248, Fax-2510577

Approval No : A/P/HQ/MH/104/6014 (P428252)

Dated : 17/10/2018

22 OCT 2018

To,

M/s. SGB GmbH,
Hofstrasse 10,Siegen
57076
GERMANY

Sub : Approval of Intrinsically Safe, Encapsulated Type Leak Detector under Petroleum Rules 2002- Regarding.

Sir(s),

Please refer to your letter No. **NIL** dated **02/10/2018** on the subject.

The following Ex electrical equipment(s) manufactured by you according to **EN 60079-0 : 2012/A11 : 2013, EN 60079-11 : 2012, EN 60079-18 : 2015,** standards and covered under **TUV Austria Services GmbH** Test reports mentioned below is/are approved for use in **Zone 1,Zone 2** of Gas **IIB** hazardous areas coming under the the Petroleum Rules, 2002 administered by this Organization.

Sr. No	Description	Safety Protection	Equipment reference Number	Test Agency			Drawing no
				Name	Certificate No.	Certificate Date	
1	Leak Detector Type VIMS	Ex ma IIB T4 Ga/Gb	P428252/1	TUV Austria Services GmbH	TUV-A 18ATEX0050 X	14/05/2018	Z-020 034
2	Leak Detector Type VIMS	Ex ib IIB T4 Gb	P428252/2	TUV Austria Services GmbH	TUV-A 18ATEX0050 X	14/05/2018	Z-020 034

This Approval is granted subject to observance of the following conditions:-

1)The design and construction of the equipment shall be strictly in accordance with description, condition and drawings as mentioned in the TUV Austria Services GmbH Test Reports referred to above.

2)The equipment shall be used only with approved type of accessories and associated apparatus.

3)Each equipment shall be marked either by raised lettering cast integrally or by plate attached permanently to the main structure to indicate conspicuously:-
(a) Name of the manufacturer
(b) Name and number by which the equipment is identified.
(c) Number & date of the test report of the TUV Austria Services GmbH applicable to the equipment.
(d) Equipment reference number of this letter by which use of apparatus is approved.
(e) Protection level.

4) A certificate to the effect that the equipment has been manufactured strictly in accordance with the drawing referred to in the TUV Austria Services GmbH Test report and is identical with the one tested and certified at TUV Austria Services GmbH shall be furnished with each equipment.
5) The customer shall be supplied with a copy of this letter, an extract of the conditions and maintenence schedule, if any, recommended by TUV Austria Services GmbH in their test reports and copy of instructions booklet detailing operation & maintenance of the equipment so as to maintain its Flame Proof characterestics.
6) The After sales service and maintanance of subject equipment shall be looked after by your representative GILBARCO VEEDER-ROOT INDIA PVT. LTD., PHOENIX MARKETCITY, L.B.S. MARG, KURLA (W) -400070

Conditions of the Approval:-
The approval for above equipment is subject to validity of production quality assessment notification No. TUV-A 18ATEX3054Q.

This approval also covers the permissible variations as approved under the TUV Austria Services GmbH test reports referred above. This approval is liable to be cancelled if any of the conditions of the approval is violated or not complied with . The approval may also be amended or withdrawn at any time, if considered necessary in the interest of safety.

The field performance report from actual users/your customers of the subject equipment may please be collected and furnished to this office for verification and record on annual basis.

The Approval is Valid upto **31/12/2022**

Yours faithfully,

(Ninad Dattaram Gawade)
Dy. Controller of Explosives
For Chief Controller of Explosives
Nagpur

Copy to :
1. Jt. Chief Controller of Explosives, West Circle, MUMBAI
2.GILBARCO VEEDER-ROOT INDIA PVT. LTD.,PHOENIX MARKETCITY, L.B.S. MARG, KURLA (W) -400070

for Chief Controller of Explosives
Nagpur

(For more information regarding status,fees and other details please visit our website http://peso.gov.in)

Note:- Please submit the revalidation application one month before the date of Expiry of approval otherwise approval will be treated as cancelled and a fresh application for approval will be considered for the approval.

12.3

12.3 Declaration of conformity

We,

SGB GmbH

Hofstraße 10

57076 Siegen, Germany,

hereby declare in sole responsibility that the leak detector

VIMS (Vacuum Interstice Monitoring Sensor)

comply with the essential requirements of the EU directives listed below.

This declaration shall lose its validity if the device is modified or used for another purpose without consulting us.

Number / short title	**Satisfied regulations**
2014/30/EU EMC directive	EN 61000-6-2:2006 EN 55011:2016 / A1:2017 / A2:2020
2014/34/EU Equipment in Potentially Explosive Atmospheres	EN 1127-1:2019 **TÜV-A 18ATEX0050 X** with: EN 60079-0:2018 EN 60079-11:2012 EN 60079-18:2015 / A1:2017
Notified Body: Notfied Body no.:	TÜV Austria Services GmbH 0408

Compliance is declared by

ppa. Martin Hücking
(Technical Director)

Last updated: 02/2023

12.4 Declaration of Performance (DoP)

Number: **009 EU-BauPVO 2016**

1. Distinct identification code of the product type:
   VIMS: Vacuum Interstice Monitoring Sensor for containers and pipes
2. Purpose of use:
   Class I sensor for monitoring of underground double-wall tanks and pipes
3. Manufacturer:
   SGB GmbH, Hofstraße 10, 57076 Siegen, Germany
   Tel.: +49 271 48964-0, E-Mail: sgb@sgb.de
4. Authorised agent:
   n/a
5. System for the evaluation and inspection of the reliability of performance:
   System 3
6. In the case of the declaration of performance, which applies to a building product, which is covered by a harmonised standard:
   Harmonised norm: EN 13160-1-2: 2003
   Notified body: TÜV Nord Systems GmbH & Co.KG, CC Tankanlagen, Große Bahnstraße 31, 22525 Hamburg, Germany
   ID number of the notified test laboratory: 0045
7. Declared performance:

Essential features	Performance	Harmonised norm
Pressure switch point	Passed	EN 13160-2: 2003
Reliability	10,000 Cycles	
Pressure test	Passed	
Volume flow rate test in the alarm switch point	Passed	
Function and leak tightness of the leak detection system	Passed	
Temperature resistance	-20°C .. +60°C	

8. Signed for the manufacturer and in the name of the manufacturer by:

   Dipl.-Ing. M. Hücking, Director of Operations
   Siegen, 02-2023

12.5 Manufacturer's declaration of compliance

SGB
MVV TB
Anhang C 2.15.15
TÜV-NORD

Compliance with the "Muster-Verwaltungsvorschrift Technische Baubestimmungen" (sample administrative regulation technical building regulations) is hereby declared.

Dipl.-Ing. M. Hücking, Director of Operations
Siegen, 02-2023

12.6 TÜV Nord certificate

Note:
By TÜV not certified translation of the German original version

TÜV NORD Systems GmbH & Co. KG
PÜZ – Office for tanks, pipelines and equipment parts
for systems with substances hazardous to water

Code no.:0045

Große Bahnstrasse 31 • 22525 Hamburg
Tel: 040 8557-0
Fax: 040 8557-2295
hamburg@tuev-nord.de
www.tuev-nord.de

Certificate

Object on test:	**Underpressure leak display VIMS** (Vacuum Interstice Monitoring Sensor)
Client:	SGB GmbH Hofstraße 10 57076 Siegen
Manufacturer:	SGB GmbH
Test type:	Type testing of the sensor with leak display unit and underpressure generator according to DIN EN 13160-1:2003/EN 13160-1:2010 and DIN EN 13160-2:2003 as leak monitoring system Class I
Testing period:	06/2012 to 05/2013
Testing location:	PÜZ Prüflabor TÜV NORD Systems GmbH & Co. KG
Test result:	**When using an underpressure generator according to DIN EN 13160-2:2003, the underpressure leak display VIMS corresponds to the leak monitoring system Class I according to DIN EN 13160-1:2003/EN 13160-1:2010 and fulfils the requirements according to DIN EN 13160-2:2003 and the basic approval principles for leak display devices of DIBt. With regard to the area of use and installation, the regulations of the technical description "Documentation Ex5 10 07 57 496 004" of 01/2013 apply**

Details on the test are contained in the test report PÜZ 8108956003 dated 25.05.2013.

Hamburg, 25.05.2013

Head of Test Laboratory

TÜV NORD

J. Straube

Page 1 of 1

Date 01/2013 ST
STPÜZ-QMM-321-032-02

12.7 Proof of Intrinsically Safety for intrinsically safe circuits with one source

Associated Apparatus (source)

Nr.	Manufacturer/ Production type	Inspection document	U_o [V]	I_o [mA]	P_o [mW]	L_o [mH]	C_o [nF]	Explosion group
1	FAFNIR VISY-Command	TÜV 98 ATEX 1380	14,3	28,0	98,0	40,0	680,0	IIC

Intrinsically Safe Devices

Nr.	Manufacturer/ Production type	Inspection document	U_i [V]	I_i [mA]	P_i [mW]	L_i [mH]	C_i [nF]
2	FAFNIR VISY-Stick	TÜV 99 ATEX 1496	15	60	100	0,1	10
3	FAFNIR VISY-Stick	TÜV 99 ATEX 1496	15	60	100	0,1	10
4	FAFNIR VISY-Reed	TÜV 09 ATEX 374581	15	60	100	0,12	10
5	SGB VIMS	TÜV Süd Ex5 10 07 57496004	20	--	--	0,002	0,2
Capacity and inductivity of cable*			Length:				
					Sum	0,322	30,2

* According to EN 60079-14: 2009, clause 12.2.2.2, c
the values of the cable can be calculated with 1mH/km or 200 nF/km

12.8 Function and test report

1.) Basic data

Tank or pipe owner _____ _____

Location of the system _____ _____ _____

No. of the report _____

VIMS type (tank): VIMS ____ number of monitored tanks: ____

Serial numbers: _____ + _____ + _____ + _____ + _____ + _____

VIMS type (pipe): VIMS ____ number of monitored pipes: ____

Serial numbers: _____ + _____ + _____ + _____ + _____ + _____

2.) Continuity in the interstitial space and the connecting lines (Chap. 7.3.1)

Exists: ___ Yes ___ No ___ Repaired ___ Must be repaired

3.) Testing of the switching values(Chap. 7.3.12)

Difference < 15 mbar ___ Yes for all ___ No for all

Comments: _____

4.) Conveying height of the pump(s) (Chap. 7.3.3)

Tank pump:_____ mbar; for immersion pumps: STP __: _____ mbar; STP __: _____ mbar; STP __: _____ mbar; STP __: _____ mbar; STP __: _____ mbar; STP __: _____ mbar;

Pipe pump:_____ mbar; for immersion pumps: STP __: _____ mbar; STP __: _____ mbar; STP __: _____ mbar; STP __: _____ mbar; STP __: _____ mbar; STP __: _____ mbar

5.) Tightness test of the system (Chap. 7.3.4)

The test is to be considered as having been passed, if the vacuum does not fall by more than one mbar during a testing period (in minutes) of the monitoring period volume, divided by 10.

	Litres, int. space vol.;	Δp	in .. Minutes		Litres, int. space vol.;	Δp	in .. Minutes
Tank 1:	_____;	_____	in _____	Pipe 1:	_____;	_____	in _____
Tank 2:	_____;	_____	in _____	Pipe 2:	_____;	_____	in _____
Tank 3:	_____;	_____	in _____	Pipe 3:	_____;	_____	in _____
Tank 4:	_____;	_____	in _____	Pipe 4:	_____;	_____	in _____
Tank 5:	_____;	_____	in _____	Pipe 5:	_____;	_____	in _____
Tank 6:	_____;	_____	in _____	Pipe 6:	_____;	_____	in _____

6.) Setting up of equipment for operating state (Chap. 7.3.5) performed

7.) The leak display system is:

__ Functionally and operationally-safe

__ Not functionally and operationally-safe and must be repaired

DATE: _____ Signature of owner: _____ Signature of installer: _____

Imprint

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57076 Siegen
Germany

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