Documentation

Vacuum leak detector VLXE-S 350 M

For 1 to 6 double-walled tanks with suction lines for the leak detector at the lowest point of the interstitial space/double-walled pipes/double-walled bottoms of flat-bottomed tanks

Please read instructions prior to commencing any work

As of: 04/2023

Art. No.: 602742

Table of Contents

1. General

1.1 Information

These instructions provide important notes on using the leak detector VLXE-S 350 M.

The leak detector VLXE-S 350 M is only suitable for tanks with suction lines for the leak detector until the lowest point of the interstitial space and pipes with a suitable design.

Workplace safety requires all the safety and handling instructions specified in this manual to be adhered to.

Furthermore, any local regulations for preventing accidents at the site where the leak detector is used and general safety instructions must be complied with.

1.2 Explanation of Symbols

In these instructions, warnings are marked with the adjacent symbol.

The signal word expresses the level of hazard.

DANGER:
Imminently hazardous situation which, if not avoided, will result in death or serious injury.

WARNING:
Potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION:
Potentially hazardous situation which, if not avoided, could result in minor or moderate injury.

Information:
Emphasizes useful tips, recommendations, and information.

1.3 Limitation of Liability

All information and notes in this documentation were compiled with due consideration for the applicable standards and regulations, state-of-the-art technology, as well as our longstanding experience.

SGB does not assume any liability in the case of:

- non-compliance with these instructions,
- improper use
- deployment of unqualified personnel,
- unauthorized modifications,
- connection to systems not approved by SGB,

1.4 Copyright

1.5 Warranty Conditions

We provide warranty for the leak detector VLXE- S 350 M for a period of 24 months from the day of installation on site in accordance with our General Terms & Conditions.

The maximum warranty period is 27 months from our date of sale.

Warranty is subject to submission of the functional/test report on initial commissioning by qualified personnel.
The serial number of the leak detector must be stated.

The warranty obligation shall cease to exist in the case of
- Inadequate or improper installation,
- Improper use,
- Modifications/repairs without consent of the manufacturer.

No liability is accepted for delivery parts that wear or are exhausted prematurely due to their material properties or application (e.g., pumps, valves, seals, etc.). We do not assume responsibility for corrosion damage due to a humid installation site.

1.6 Customer Service

Our customer service is available for any inquiries.

For information on contacts please refer to our website sgb.de or the label of the leak detector.

2. Safety

2.1 Intended Use

WARNING!

Danger from Misuse

- Leak detector VLXE-S 350 M only for use in interstitial spaces that are at least 800 millibar vacuum resistant of:
  - Double-walled tanks with a height (⌀) up to 3 meters,
  - Double bottoms of flat-bottomed tank constructs,
  - Double-walled pipes, h ≤ 3 meters
- Depending on the device design, the leak detector VLXE-S 350 M is suitable for monitoring one to six interstitial spaces.
- Tanks feature a suction line to the lowest point of the interstitial space for evacuating/emptying the interstitial space.
- Pipelines must be evacuated at the lowest point of the interstitial space.
- The leak indicating unit (LIU) is installed outside the explosive area.
- Pressure sensor for the VLXE-S 350 M fulfills category 1, therefore connect to appropriate interstitial spaces (zone 0, 1, 2 or outside)
- Classification possible vapor-air-mixtures of the stored material into the gas group II A to II B and temperature code T1 to T4.
- Grounding/potential equalization in accordance with applicable regulations (e.g., EN 1127)

  Note: The shield of the electrical connecting cable is set up in the sensor.
- Tightness of the interstitial spaces according to this documentation
- The overall volume of each individual interstitial space does not exceed 10 m^3.
- Ambient temperature sensor: -40°C to +60°C
- Leak indicating unit ambient temperature: 0°C to +40°C
- The pressure in the inner tank/inner pipe may not exceed 25 bar.
- Conduits for feeding through the electrical connection lines in dome or inspection chambers must be sealed gas-tight.
- The power supply cannot be disconnected

Any claims arising from misuse are excluded.

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

2.2 Obligation of the Operating Company

The VLXE-S 350 M leak detector is used in a commercial environment. The operating company is therefore subject to statutory occupational safety obligations. In addition to the safety instructions in this documentation, all applicable safety, accident prevention and environmental regulations must be adhered to. In particular:

- Compiling a risk assessment and implementing its results in a directive
- Performing regular checks as to whether the directive is in compliance with the current standards
- The directive includes information on how to react to an alarm that might arise
- Arranging for an annual functional check

2.3 Qualification

WARNING!

Danger to humans and the environment in the case of inadequate qualification

The personnel must be capable of independently recognizing and avoiding potential dangers by virtue of their qualifications.

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

National guidelines must be adhered to.

For Germany: Technical service qualification for mounting, commissioning, and maintenance of leak detection systems.

2.4 Personal Protective Equipment (PPE)

Personal protective equipment must be worn during work.

- Wear the necessary protective equipment for the work in question!
- Note and comply with existing PPE signs!

Entry in the "Safety Book"

Wear a safety helmet

Wear HV vest

Wear gloves – where necessary

Wear safety footwear

Wear safety goggles – where necessary

2.4.1 Personal protective equipment for systems that may present a danger of explosion

The parts listed here refer in particular to safety when working with systems that may be subject to risk of explosion.

If work is performed in areas in which an explosive atmosphere must be expected, the minimum required equipment is as follows:

- Suitable clothing (risk of electrostatic charge)
- Suitable tools (in accordance with EN 1127)

- Suitable combustible gas indicator calibrated to the existing vapor-air mixture (work should be performed only at a concentration of 50% below the lower explosion limit)[1]
- Measuring equipment to determine the oxygen content of the air (Ex/O–Meter)

2.5 Fundamental Hazards

DANGER
From electric current

When working on the electricity of the VLXE-S 350 M it must be disconnected from the mains.

Comply with relevant regulations regarding electric installation, explosion protection (e.g., EN 60079-17), and accident prevention.

DANGER
From explosive vapor-air mixtures

Explosive vapor-air-mixtures may occur in the interstitial space. When opening the connections to the interstitial space, explosive vapors may escape.

Explosive vapor-air-mixtures can be present in the connection lines, when vapors penetrate the interior wall due to permeation or when a leak occurs.

Ensure there is no gas present prior to performing work on the leak detection system.

In case of the possible presence of explosive vapor-air-mixtures use explosion-protected pumps for evacuating the interstitial space.

Comply with explosion regulations, e.g., German Ordinance on Industrial Safety and Health (Betriebssicherheitsverordnung, BetrSichV) (and/or Directive 1999/92/EC and the laws of the respective member states resulting from this) and/or others.

DANGER
From working in chambers

The leak detectors are mounted outside the access chambers. Pneumatic connection is usually performed inside the access chamber. Therefore, the chamber must be entered in order to complete the mounting process.

Before entering, the appropriate protective measures should be taken. Ensure no gas is present and that sufficient oxygen is available.

[1]Other manufacturers' or countries' regulations may indicate different percentages.

3. Technical Data

3.1 General Data

Dimensions and drilling pattern		see section 12.1, 12.2
Storage temperature range		-20°C to +60°C
Sensor operating temperature range		-40°C to +60°C
Precision of the sensor		2% FK ≙ 20 mbar
Operating temperature range leak indicating unit		0°C to +40°C
Leak indicating unit protection class		IP 30
Weight	single-fold version	1.2 kg
	six-fold version	5.6 kg
Max. height for safe operation		≤ 2000 m NN
Max. relative humidity for safe operation		95 %
Buzzer volume		> 70 dB(A) at a distance of 1 m

3.2 Electrical Data

Power supply: optional	100… 240 V AC 24 V DC
Terminals 5, 6, external signal: (Only for devices with 1 display)	24 V DC; 2 A
Terminals 11…13 (voltage-free): Terminals 17…19 (voltage-free):	DC ≤ 25 W or AC ≤ 50 VA DC ≤ 25 W or AC ≤ 50 VA
Terminals 21, 22, Pressure sensor	
Device protection: Sensor protection:	max. 10 A 40 mA; (4000 A)
Overvoltage category	2
Level of soiling	PD2

3.3 Switching values VLXE-S 350 M

Alarm ON, no later than	-350 mbar
Alarm OFF, above	-400 mbar
Refilling required ON, no later than	-400 mbar
Refilling required, OFF, no later than	-700 mbar
Recommended applicable operating pressure:	-700 mbar

3.4 Field of Application

Monitoring of suitable double-walled tanks with suction line extended to the lowest point. Alternatively, to the suction line, an intake port can also be set up at the lowest point of the tank, which is used for evacuating the interstitial space.

Interstitial spaces of double-walled pipes that have the option of applying the operating vacuum at the lowest point of the pipeline.

The interstitial space must be sealed to such a degree that no alarm is triggered within one year.

3.4.1 Tank with the VLXE-S 350 M

- DIN 6618/2 with following limits:

Tank diameter (mm)	Tank height (mm)	Max. density of the stored material (kg/dm³)
1600	2820	≤ 1.90
	3740	≤ 1.90
	5350	≤ 1.50
	6960	≤ 1.12
2000	5400	≤ 1.52
	6960	≤ 1.15
	8540	≤ 0.92
2500	6665	≤ 1.22
	8800	≤ 0.92
2900	8400	≤ 0.97
	9585	(≤ 0.63)
	12750	(≤ 0.61)
	15950	(≤ 0.48)

Values in parentheses are not meaningful, but are included for the sake of completeness.

- Other double-walled tanks (also single-walled with leak-protection casing) that use a suction line to or an accessible port on the lowest point of the interstitial space.
- Tanks with double-layered floor, which have a suction line to the lowest point of the interstitial space (e.g., DIN 4119)

The tank may be operated at an inner space pressure of up to 25 bar.

3.4.2 Pipelines

- Double-walled pipes in metal or plastic with proof of building authority approval.
- The feed pressure in the inner pipe may not exceed 25 bar.
- The interstitial space must resist an operating vacuum of -700 mbar taking into account temperature fluctuations.
- When laying pipelines (above and below ground) observe temperature fluctuations and prevent them as much as possible as they can lead to false alarms!

- Dimension H[2] for pipelines:

Density [kg/dm³]	0.8	1.2	1.4	1.6	1.8	2.0
H[m]	3.8	2.5	2.1	1.9	1.7	1.5

3.4.3 Stored material

- Water-polluting liquids
- Vapor-air mixtures, arising from
  - the stored liquid,
  - the stored liquid combined with air/humidity or condensation,
  - the stored liquid combined with components/ materials with which the liquid comes into contact,

  must be classified in explosion group II A, II B or II C and in temperature class T1 to T4.
- The stainless-steel material must be resistant to the liquids.

[2] H = height from the lowest point of the pipeline to the sensor

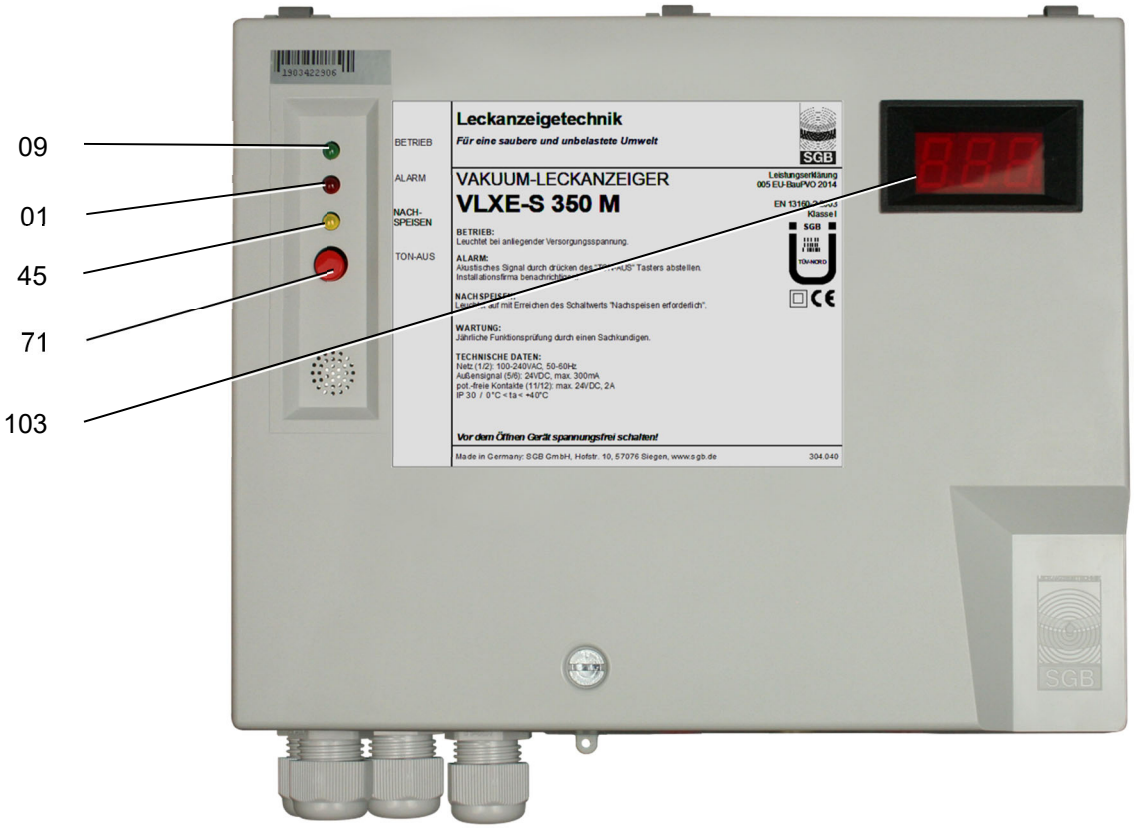
4. Design and Function

4.1 System Design

The leak detector VLXE-S 350 M consists of a leak indicating unit and an installation kit with a pressure sensor to be installed in the interstitial space. The leak indicating unit can contain 1 or 2, up to 6 indication/operating units, depending on the number of interstitial spaces to be monitored.

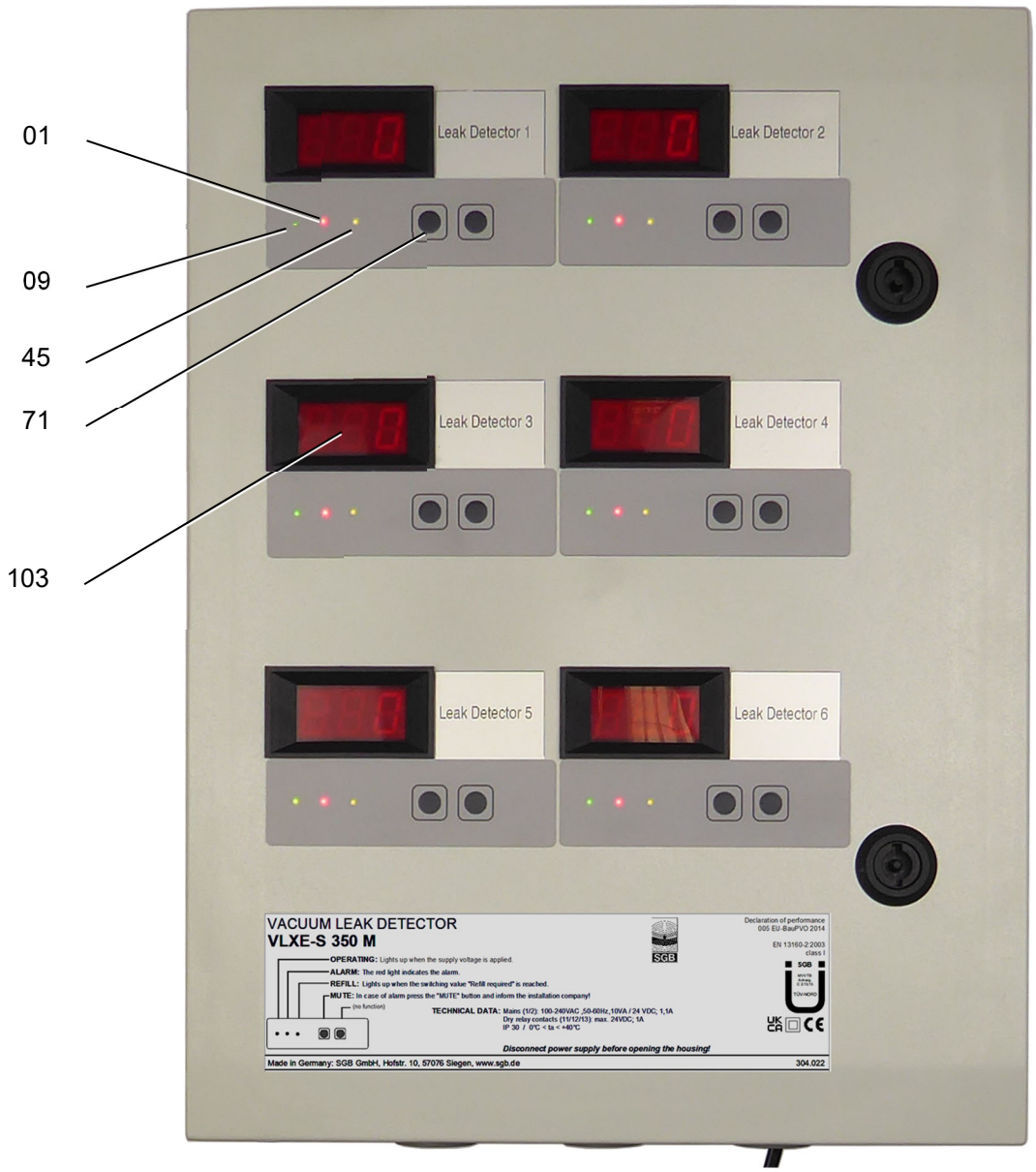
An indication/operating unit for an interstitial space consists of a display for the digital pressure indication, an acknowledgment button of the acoustic alarm, a green operating light and a red alarm light, as well as a yellow warning light that indicates that the vacuum has dropped to a specific value.

The installation kit consists of an explosion-protected pressure sensor and a shut-off valve for the suction connection.



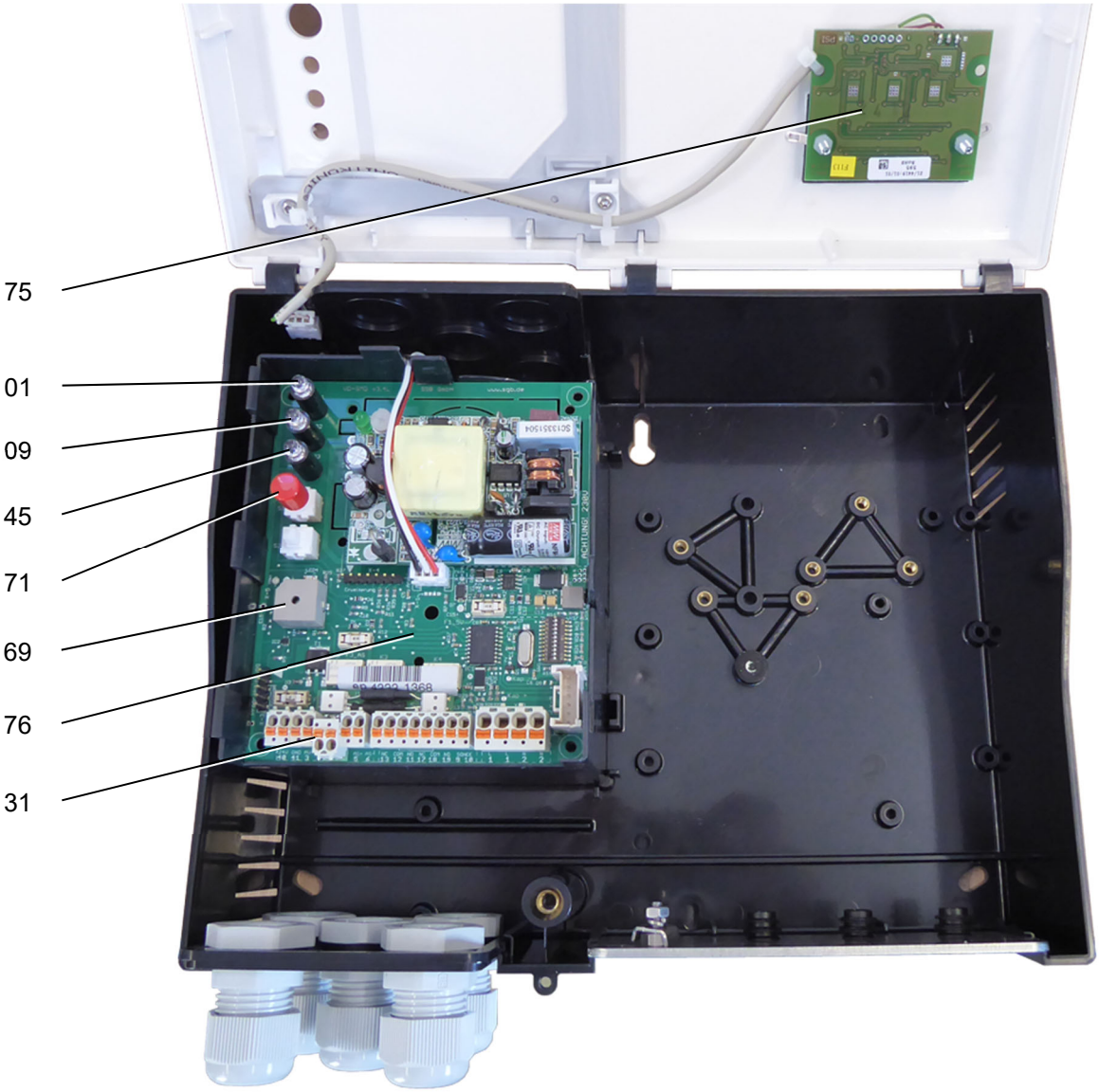
Leak indicating unit with 1 display /operating unit:

01	Signal lamp "alarm", red
09	Signal lamp "operation", green
45	Signal lamp "refill", yellow
71	"Mute" button
103	Display with digital pressure indication



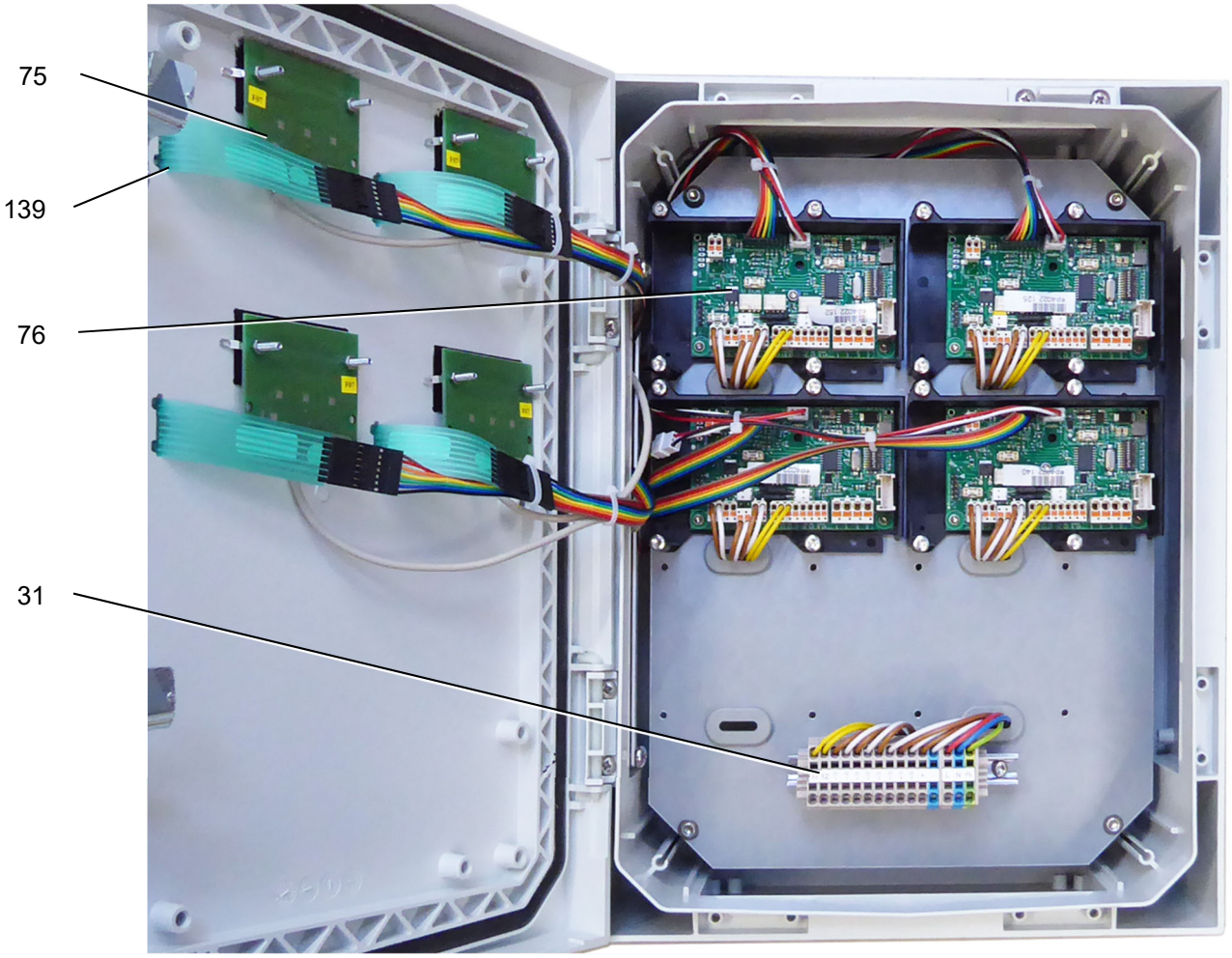
Leak indicating unit with six display /operating units:

01	Signal lamp "alarm", red
09	Signal lamp "operation", green
45	Signal lamp "refill", yellow
71	"Mute" button
103	Display with digital pressure indication



Interior view of a leak indicating unit with one display /operating unit:

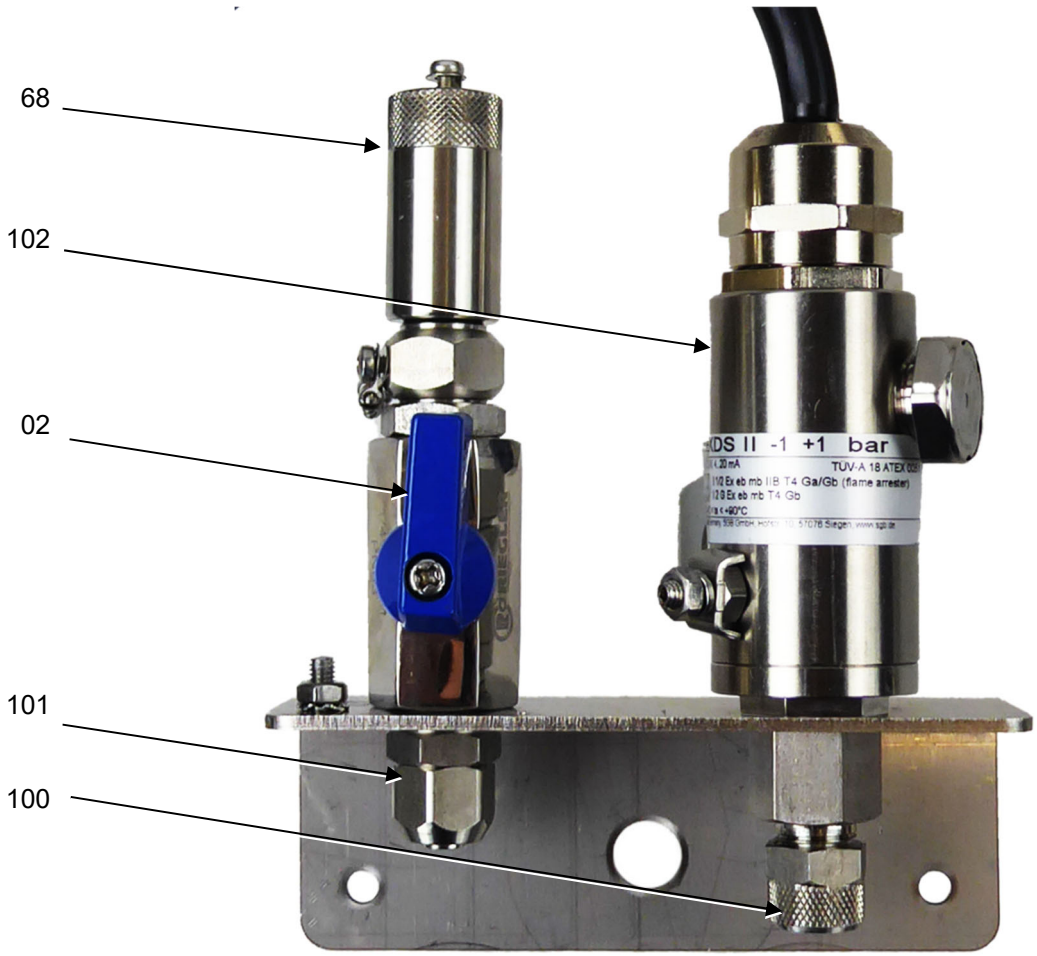
01	Signal lamp "alarm", red
09	Signal lamp "operation", green
45	Signal lamp "refill", yellow
31	Terminal strip
69	Buzzer
71	"Mute" button
75	Display board
76	Main board



Sample interior view of a leak indicating unit from 2 indicating units, shown here with 4 display/operating units:

31	Terminal strip
75	Display board
76	Main board
139	Keypad

Installation kit:



Installation kit with:

02	Shut-off valve
68	Suction connection (with protective cap)
100	Measuring connection to the interstitial space
101	Suction connection to the interstitial space
102	Pressure sensor (explosion protected version)

4.2 Normal Operating Condition

For each interstitial space the normal operating condition is reached at start-up by building up the operating vacuum using an external installation pump.

The vacuum present in the interstitial space is measured by the sensor and shown on the digital display of the leak indicating unit (for devices with several displays, several interstitial spaces can be connected with the vacuum of each shown on the associated display.)

Any leaks will lead to a vacuum drop. When reaching the switching value “Refilling required”, the yellow LED is illuminated and the isolated contacts switch.

Very high requirements are placed on the impermeability of the interstitial room(s) and the connecting line to ensure trouble-free operation. The system should be sufficiently sealed in such a way that within a year (maintenance interval) no vacuum loss up to the alarm vacuum occurs.

In case of power disruptions, the operating lamp goes out and the alarm relay drops off.

4.3 Air leak

If a leak occurs in the outer wall (above the groundwater) or in the inner wall above the liquid level, air will be sucked into the interstitial space due to the vacuum existing there. The vacuum drops. In case of a vacuum drop, the alarm is triggered until the set alarm vacuum is reached.

4.4 Liquid leak

In case of a liquid leak, the liquid enters the interstitial space and collects in the lowest point of the interstitial space.

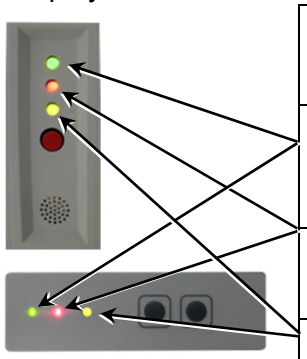
The vacuum decreases due to the incoming liquid. Additional incoming leaking liquid (due to the vacuum in the interstitial space) leads to a further vacuum drop. The alarm is triggered as soon as enough liquid has penetrated into the interstitial space so as to exceed the alarm vacuum.

Note: When the interstitial space is again evacuated after occurrence of a leak there is a possibility that liquid is drawn in.

After recommissioning the leak detector, the drawn in liquid must be completely emptied via the suction line!

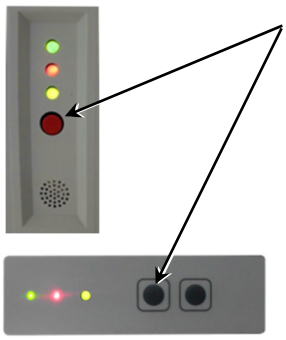
4.5 Displays and controls

4.5.1 Display



Indicator light	Operating condition	Refilling activated or required	Alarm state	Alarm, audible alarm acknowledged	Malfunction
OPERATION: green	ON	ON	ON	ON	ON
ALARM: red	OFF	OFF	ON	FLASHING	ON
MAINTENANCE: yellow	OFF	ON	OFF	OFF	OFF

4.5.2 "Turn off audible alarm signal" function

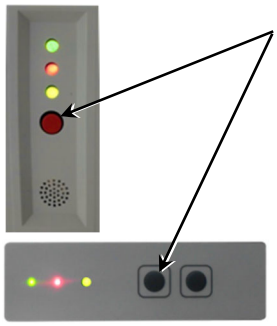


Briefly press “Mute” button once; audible signal turns off, and the red LED flashes.

Pressing the key again will turn the audible signal on.

This function is not available during normal operating conditions and malfunctions.

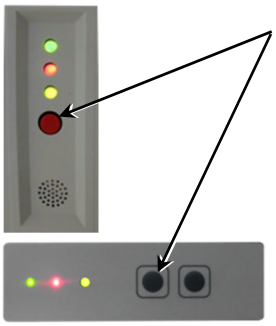
4.5.3 "Testing the visual and audible alarm signal" function



Press and hold the “Mute” button (for about 10 seconds). The alarm will be triggered until the button is released.

This function is not available in case of malfunction.

4.5.4 “Zero point adjustment” function



Press the "Mute" button and keep it pressed until the "Alarm" indicator flashes quickly after approx. 5 seconds, then release the button. Press and release the button again as soon as possible.

This function is used to adjust the pressure sensor and the board to the ambient pressure.

This function is used during commissioning and can also be repeated in later operation. However, this function is only active in a range of ±40 mbar around the ambient pressure.

When the process is started, the -S- indicator appears on the display for a brief moment.

5. Mounting the System

5.1 Basic Instructions

- Prior to commencing work, the documentation must be read and understood. In case of ambiguities, please ask the manufacturer.
- The safety instructions in this documentation must be adhered to.
- Only qualified service companies may carry out the mounting.
- Comply with relevant regulations for prevention of accidents.
- Comply with relevant regulations regarding electric installation and explosion protection.

- Lead-throughs for pneumatic and electric connection lines, through which the EX-atmosphere can carry over, must be sealed gas-tight.
- Before entering inspection chambers, the oxygen content must be tested and the inspection chamber flushed if necessary.
- If metallic connection lines are used, it must be ensured that the power supply grounding is on the same potential as the pipe-line/tank to be monitored.
- Some notes on personal protective equipment are provided in section 2.4 and 2.4.1.

5.2 Indicating unit

(1) Generally mounted on walls with plugs and screws. Dimensions of housings and drilling patterns are illustrated in Appendix 12.1 and 12.2.

(2) **NOT in potentially explosive areas**.

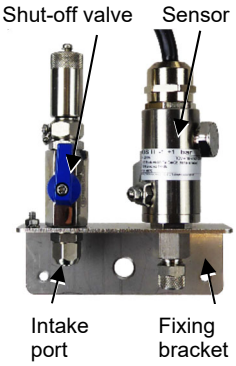
(3) The housing is mounted in an appropriate location in the building or inside a weatherproof protective box outside.

To allow the ventilation slots to work properly, make sure there is a side clearance of at least 2 cm from other objects and walls.

(4) The distance between the monitoring device and the interstitial space must be kept as small as possible. (See also section 5.3)

(5) Conduits must be installed for feeding through the electrical connection line to the tank/pipeline. Conduits must be sealed gas-tight to prevent carrying over explosive atmospheres.

5.3 Sensor



- The sensor is installed in combination with the fixing bracket and the shut-off valve (installation kit) as close as possible to the tank/pipe.
- The sensor cable can be extended using appropriate connection methods.
  On request, the sensor can also be ordered directly with the required cable length.
- The maximum line length (for 2 x 0.75 mm^2 shielded cable) between the explosion sensor and the leak detector VLXE-S 350 M is 500 m.
- The sensor cable is equipped with shielding, which is applied in the sensor. The shielding must be continued for every cable extension.

- Inside an explosive zone, explosive junction boxes must be used, e.g., SGB article no. 220488 “EX “e” distribution box with two cable glands M 20”.

5.4 Pneumatic Connection Lines, Requirements

- Install metal or plastic pipes that are installed underground or overground exposed on the surface in protective pipes.
- Inside clearance min. 6 mm
- Hose/pipe wall thickness at least 1 mm
- Resistant to the stored product
- At least PN 10 across the entire temperature range or according to the pressure inside the tank or pipe
- 10 m between the sensor and the interstitial space should not be considerably exceeded, if it is, then the manufacturer should be consulted. The alarm signal must be guaranteed.
- Color coding measuring line: red
- Avoid build-up of electrostatic charges (e.g., during pulling of lines).

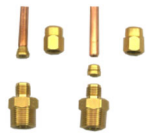
5.5 Completing pneumatic connections (between assembly kit and interstitial space)

- Select and install a suitable PA hose or suitable pipe.
- During installation, ensure that the pipes/hoses are protected against damage when the manhole chamber is entered.
- The full diameter must be maintained, indenting and bending[3] are not allowed.
- Provide grounding/equipotential bonding of metal parts in non-conductive connection lines.

[3] If necessary, install commercially available fittings for plastic pipes (specified bending radii).

- Seal the conduit gas-tight to prevent carrying over explosive atmospheres into buildings via conduits or to prevent the penetration of liquids.
- Make sure that the correct screw connections and matching threads are used.
- Complete the relevant connection (according to the illustrations in the following images).

5.5.1 Clamping ring screw connection for metal and plastic pipes



(1) Insert support sleeve (only plastic pipes) into end of the pipe

(2) Insert pipe (with support sleeve) all the way to the stop

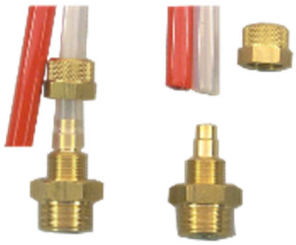
(3) Tighten the screw connection by hand until resistance becomes noticeable, then tighten a further 1¾ turns with a wrench

(4) Loosen nut

(5) Tighten the nut by hand up to a noticeable stop

(6) Final assembly of the screw connection by tightening a ¼ turn

5.5.2 Quick screw connections for PA hose



(1) Cut PA hose to length at a right angle

(2) Unfasten union nut and slide over the end of the pipe

(3) Slide hose onto connector up to the beginning of the thread

(4) Hand-tighten union nut

(5) Wrench-tighten union nut until need for increased force is noticeable (approx. 1 to 2 turns)

5.6 Electrical cables

Power connection:

- 2.5 mm^2 without ferrule
- 1.5 mm^2 with ferrule and plastic collar

Potential-free contacts, external signal and 24 V DC power supply via junctions 40/41:

- 1.5 mm^2 with/without ferrule, without plastic collar
- 0.75 mm^2 with ferrule and plastic collar

5.7 Electrical wiring diagram

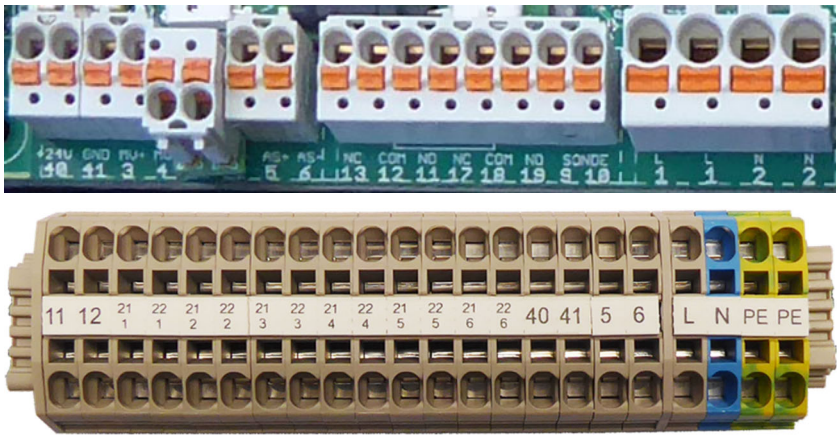
(1) Fixed wiring, i.e., no plug or switch connections

(2) Devices in plastic housing may only be connected with a fixed cable.

(3) Unused cable glands must be closed professionally and correctly.

(4) Regulations of power supply companies must be adhered to[4].

(5) Terminal layout: (see also 5.9 block diagrams)

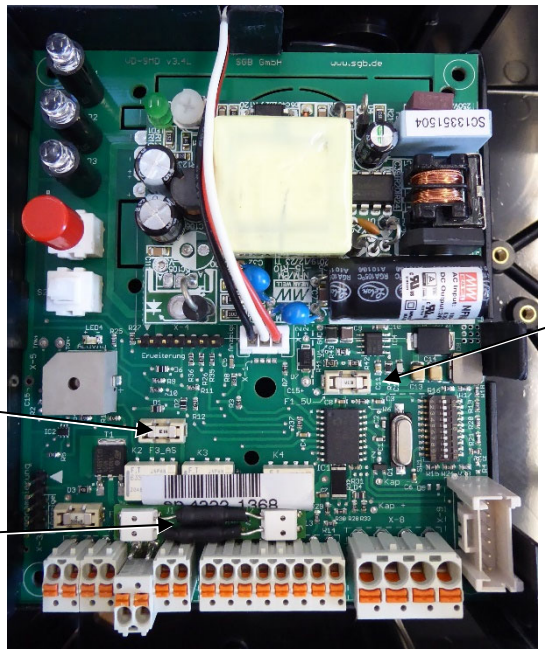


1/2	Power connection (100–240 V AC)
5/6	External signal (24 V DC in case of alarm, switched off by activating the “mute” button, only available with the device variation with a display)
11/12	Potential-free contacts (opened in the event of an alarm or loss of power)
12/13	As above, but contacts closed
17/ 18/19	Potential-free contacts closed in the event of “Refilling required” (Open at approx. ca. 430 to 700 mbar vacuum): 17/18 open, 18/19 closed; Potential-free contacts for “refilling off” or when disconnected: 17/18 closed, 18/19 open.
21/22	Pressure sensor (21 = +/22 = -)
40/41	24 V DC as permanent power supply to power other assemblies or, for a device with a supply voltage of 24 V DC, the power supply is connected here.

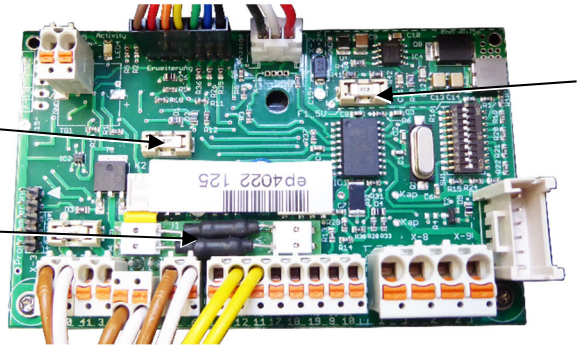
[4]For Germany: also VDE regulations

5.7.1 Location of fuses and their values

5.7.1.1 Single version



5.7.1.2 Multiple version



5.7.2 Pressure sensor fuses

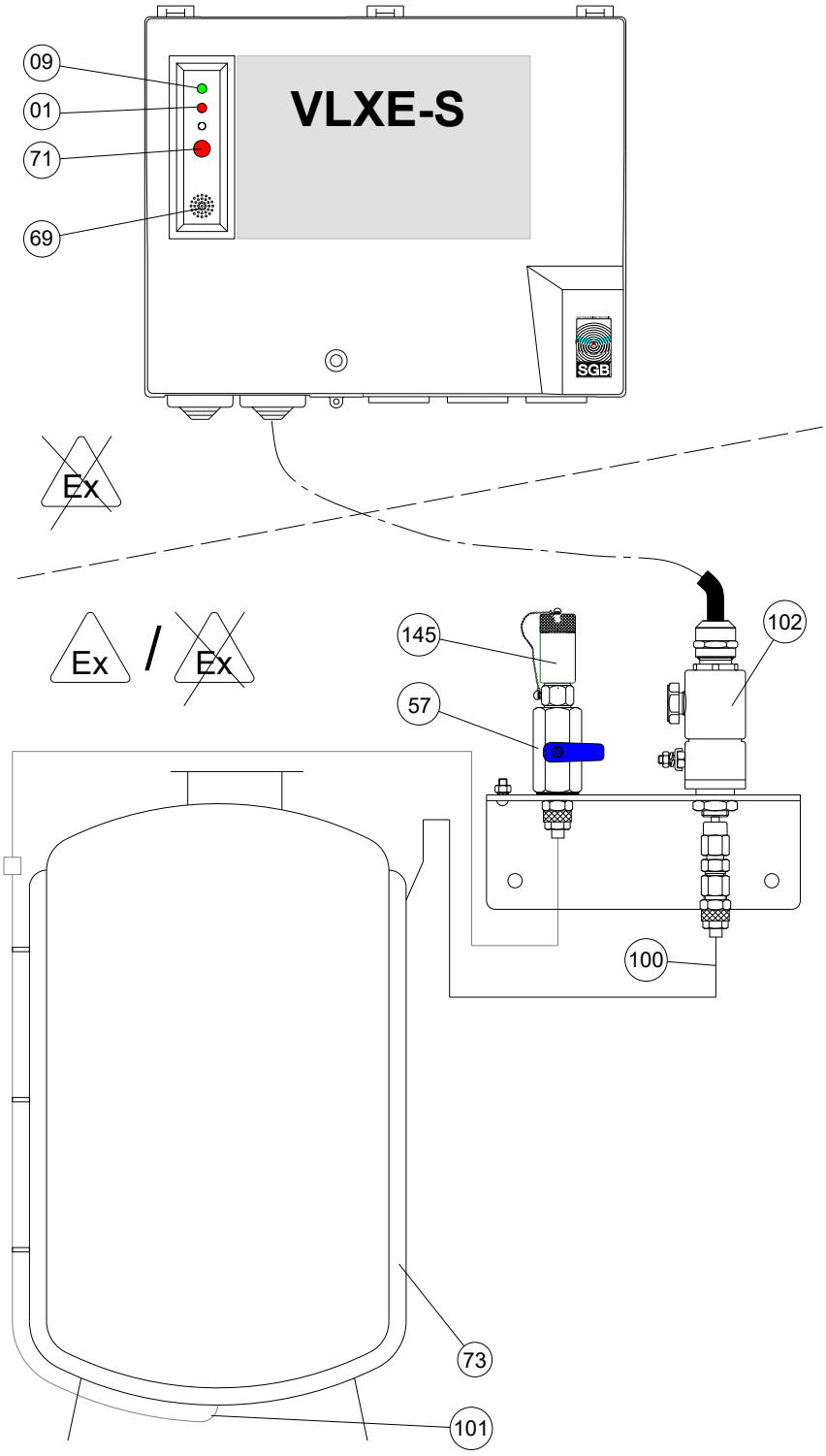
(1) The pressure sensors are additionally secured with fuses (Fx21 and Fx22).

(2) Fuse type: C308F-V-40mA

(3) If a fuse acts, the cause must be found and resolved. For replacement, a special tool is provided with the fuse for releasing the terminals.

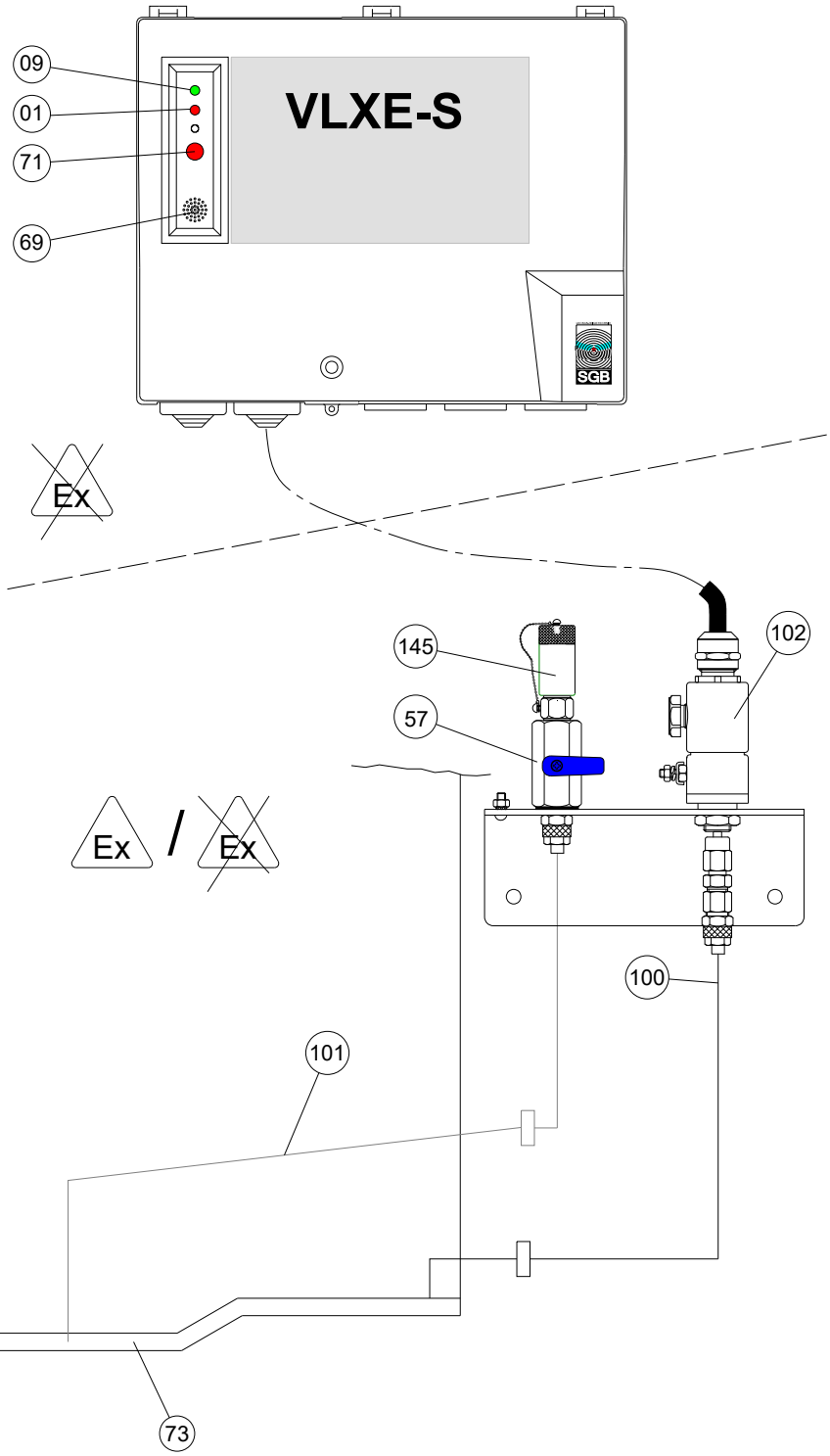
Please **do not** forcefully pull the fuse out.

5.8 Installation examples



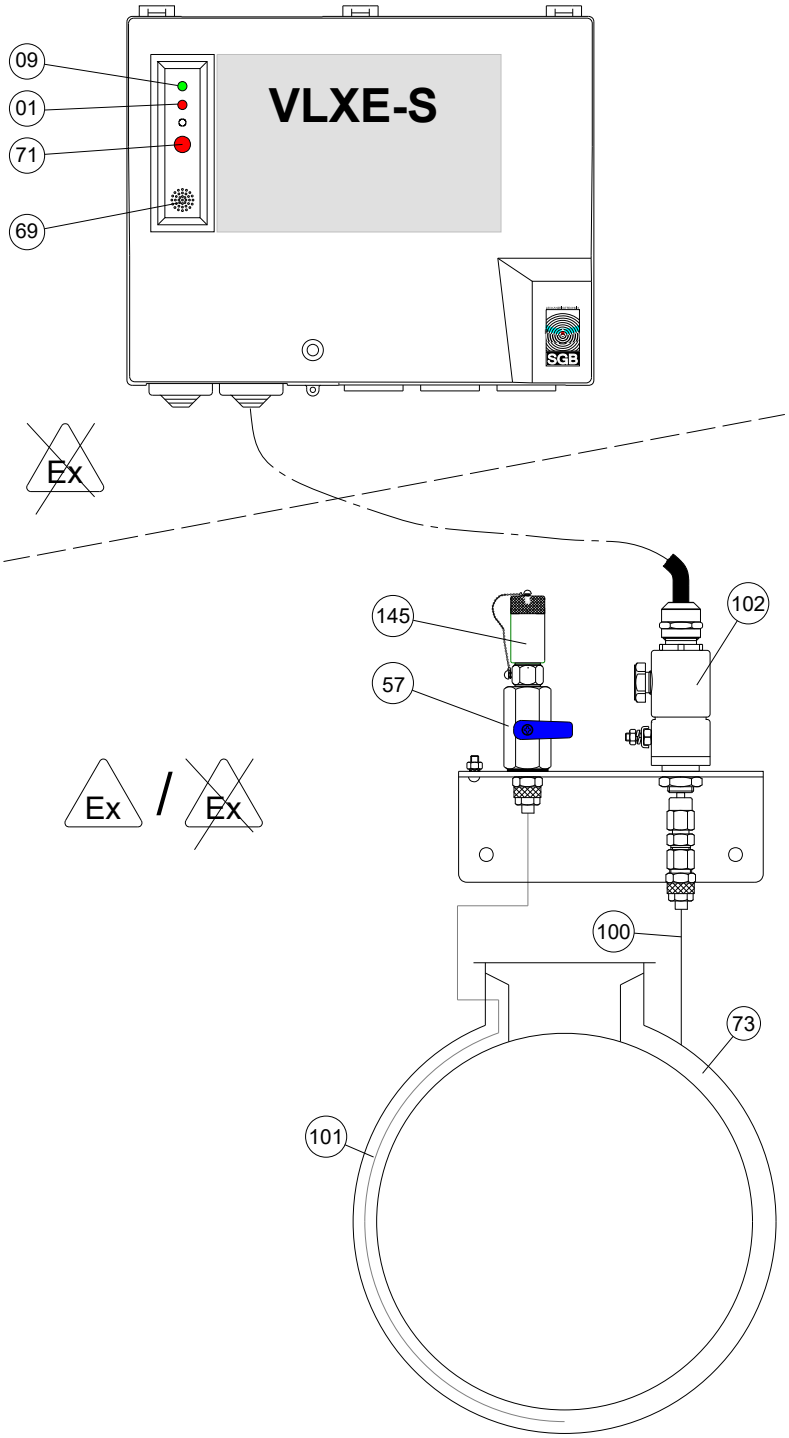
Tank DIN 6618/2 with suction line led to the lowest point:

57	Test valve
73	Interstitial space
100	Measuring connection
101	Suction line to low point
102	Pressure sensor
145	Hose connector with screw-on cap



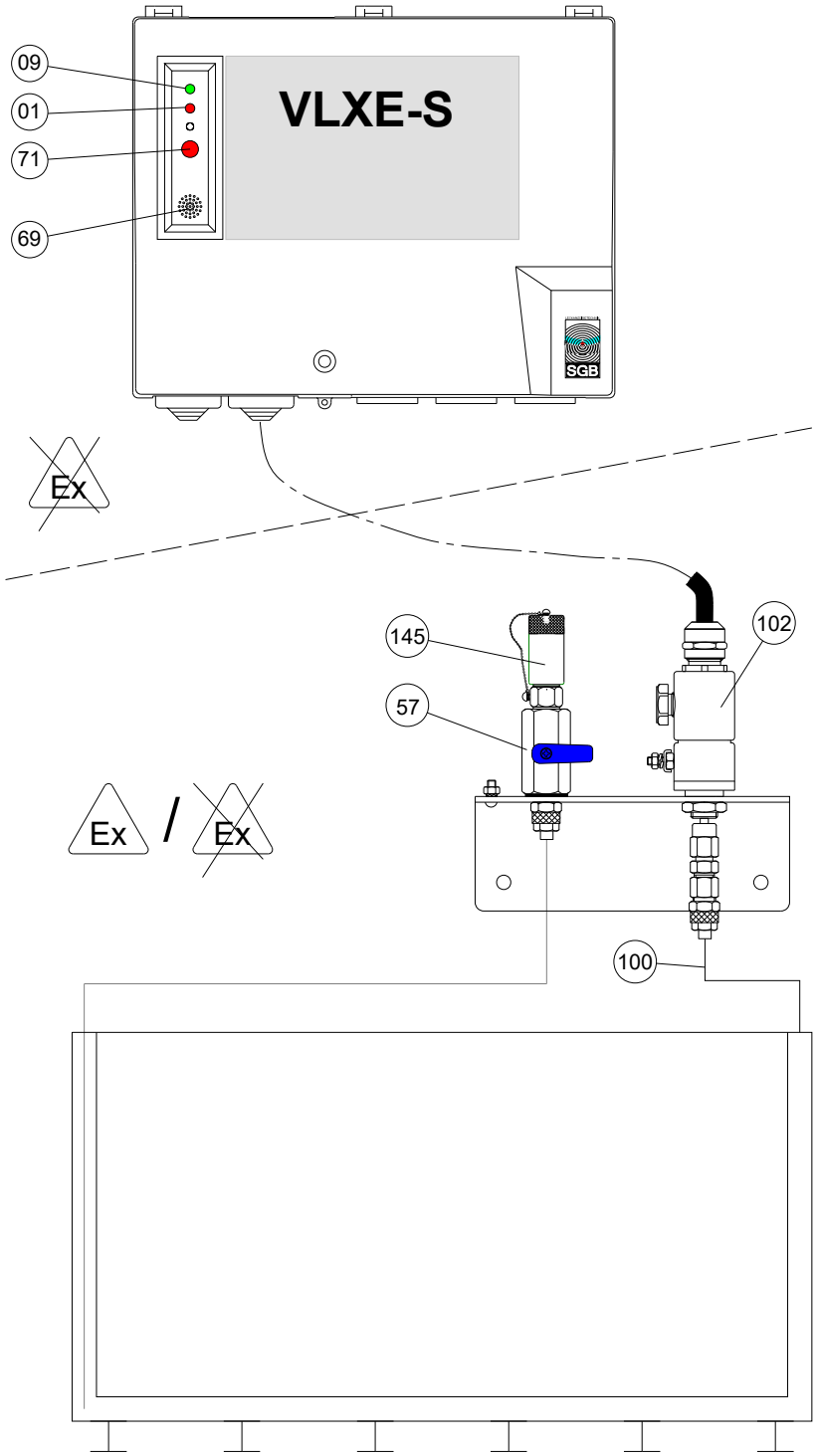
Flat-bottomed tank constructs (e.g., acc. to DIN 4119) with double bottom:

57	Test valve
73	Interstitial space
100	Measuring connection
101	Suction line to low point
102	Pressure sensor
145	Hose connector with screw-on cap



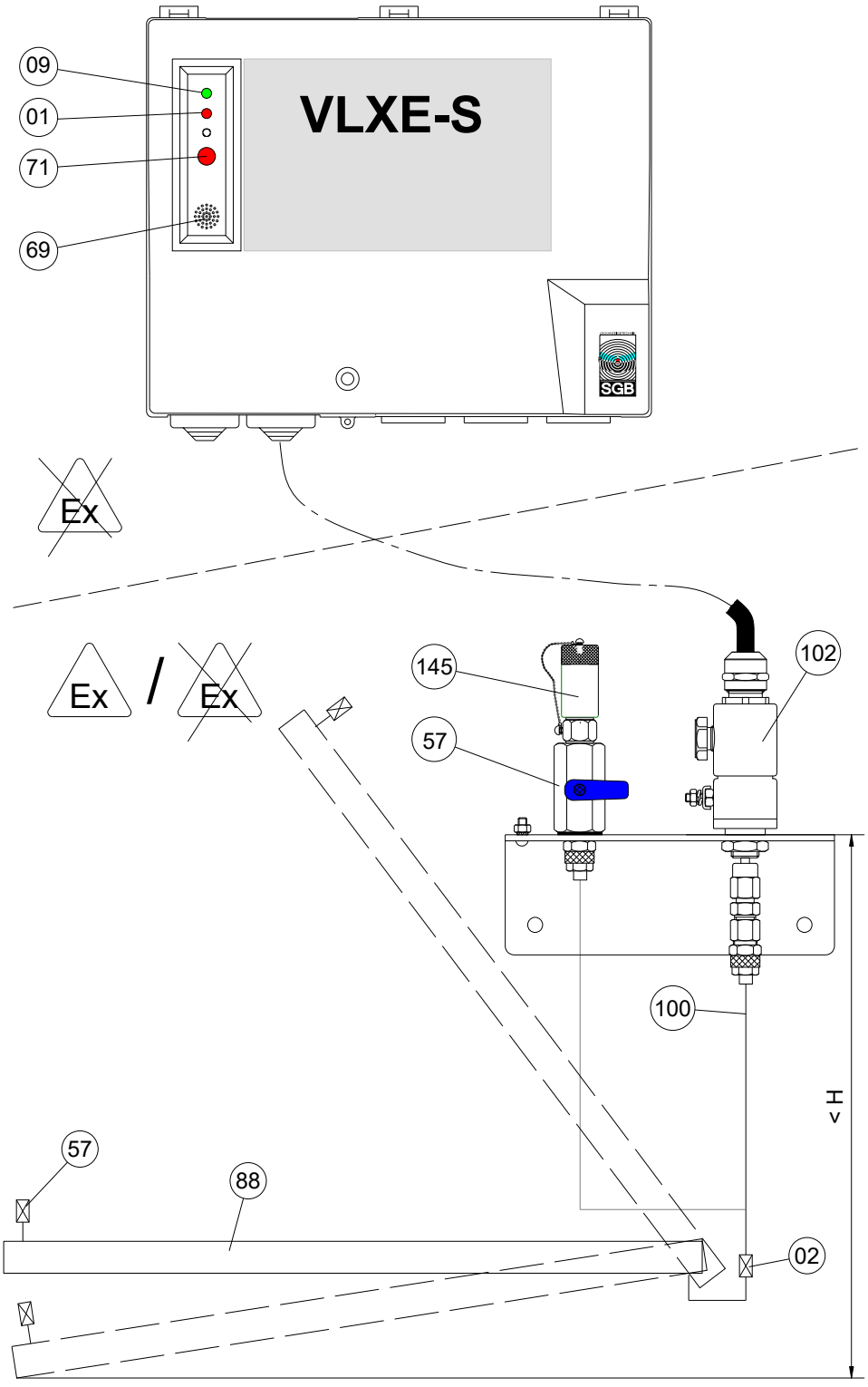
Horizontal cylindric tank (e.g., acc. to 66 ff or EN 12285) with leak protection lining and suction line led to the lowest point:

57	Test valve
73	Interstitial space
100	Measuring connection
101	Suction line to low point
102	Pressure sensor
145	Hose connector with screw-on cap



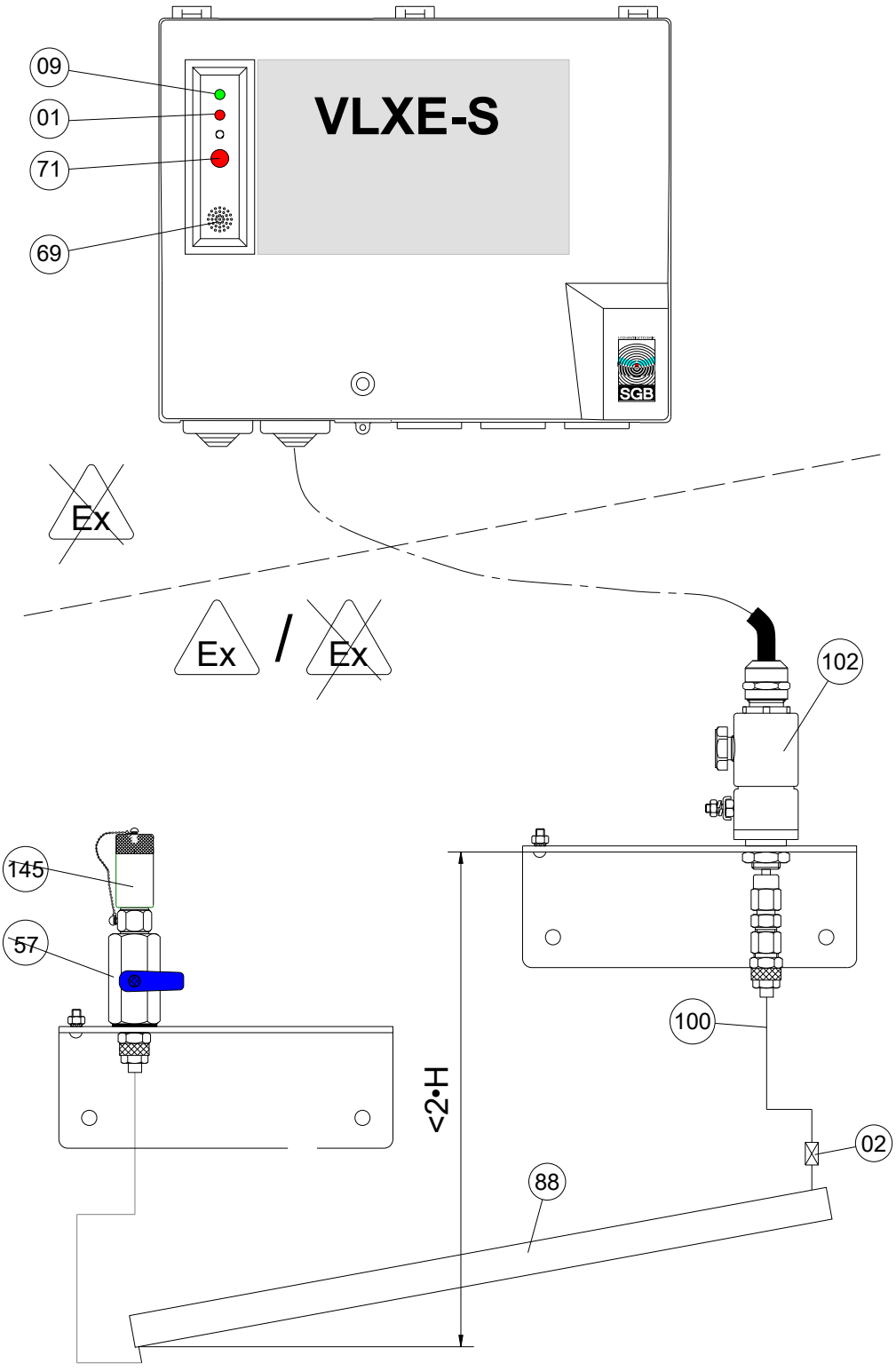
On-site welded cubic tank with leak protection lining and suction line led to the lowest point:

57 Test valve
73 Interstitial space
100 Measuring connection
101 Suction line to low point
102 Pressure sensor
145 Hose connector with screw-on cap



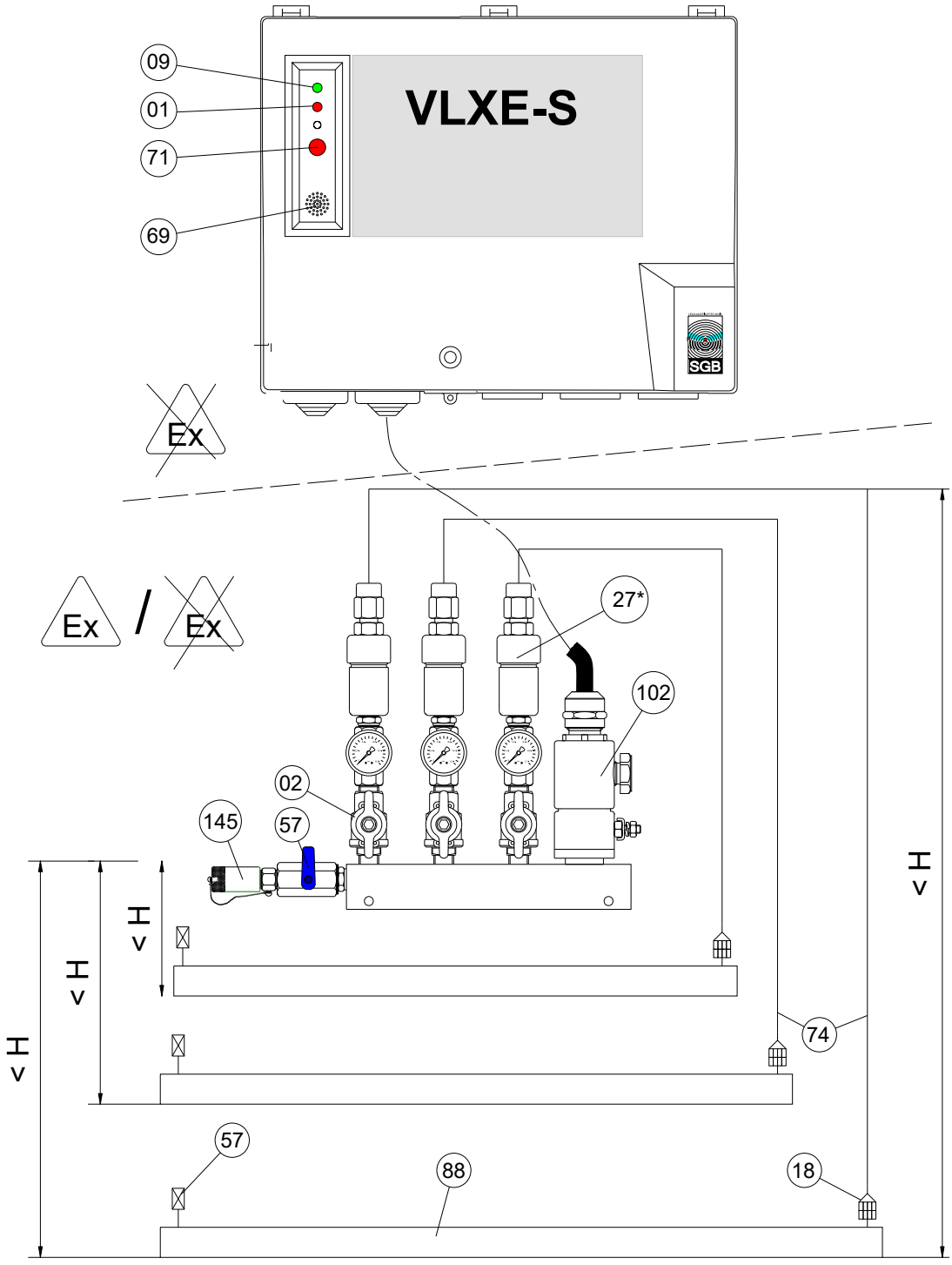
Pipeline with:

01	Signal lamp "alarm", red	71	"Mute" button
02	Shut-off valve	88	Double-walled pipe
09	Signal lamp "Operation", green (white)	100	Measuring connection
57	Test valve	102	Pressure sensor
69	Buzzer	145	Hose connector with screw-on cap



Pipeline with suction connection at the lowest point with:

01	Signal lamp "alarm", red	71	“Mute” button
02	Shut-off valve	88	Double-walled pipe
09	Signal lamp "Operation", green (white)	100	Measuring connection
57	Test valve	102	Pressure sensor
69	Buzzer	145	Hose connector with screw-on cap

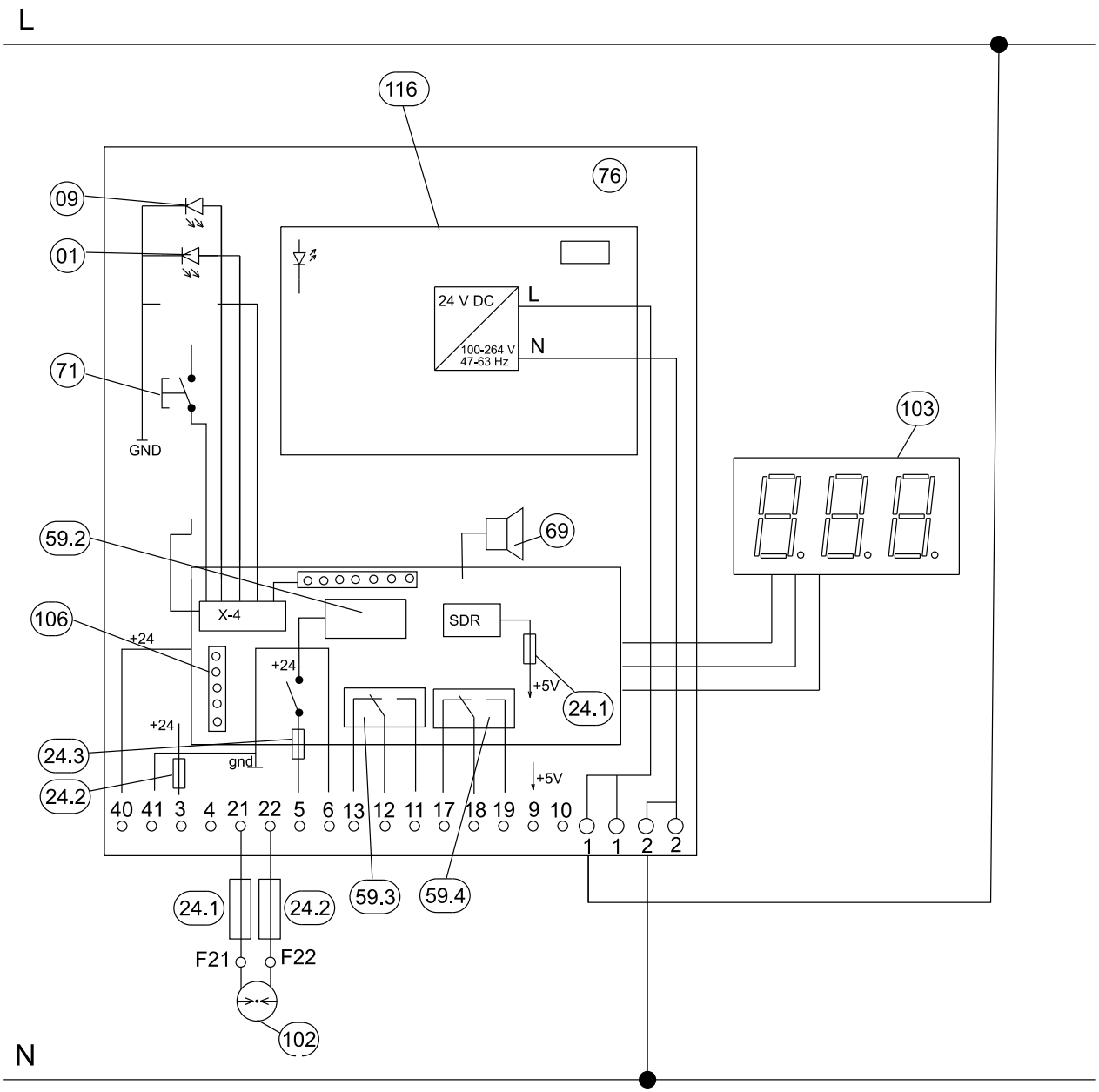


Several pipelines, connected in parallel with:

01	Signal lamp "alarm", red	69	Buzzer
02	Shut-off valve	71	“Mute” button
09	Signal lamp "Operation", green (white)	74	Connection line
18	Detonation flame arrester	88	Double-walled pipe
27	Liquid stop valve, connected against the flow direction	102	Pressure sensor
57	Test valve	145	Hose connector with screw-on cap

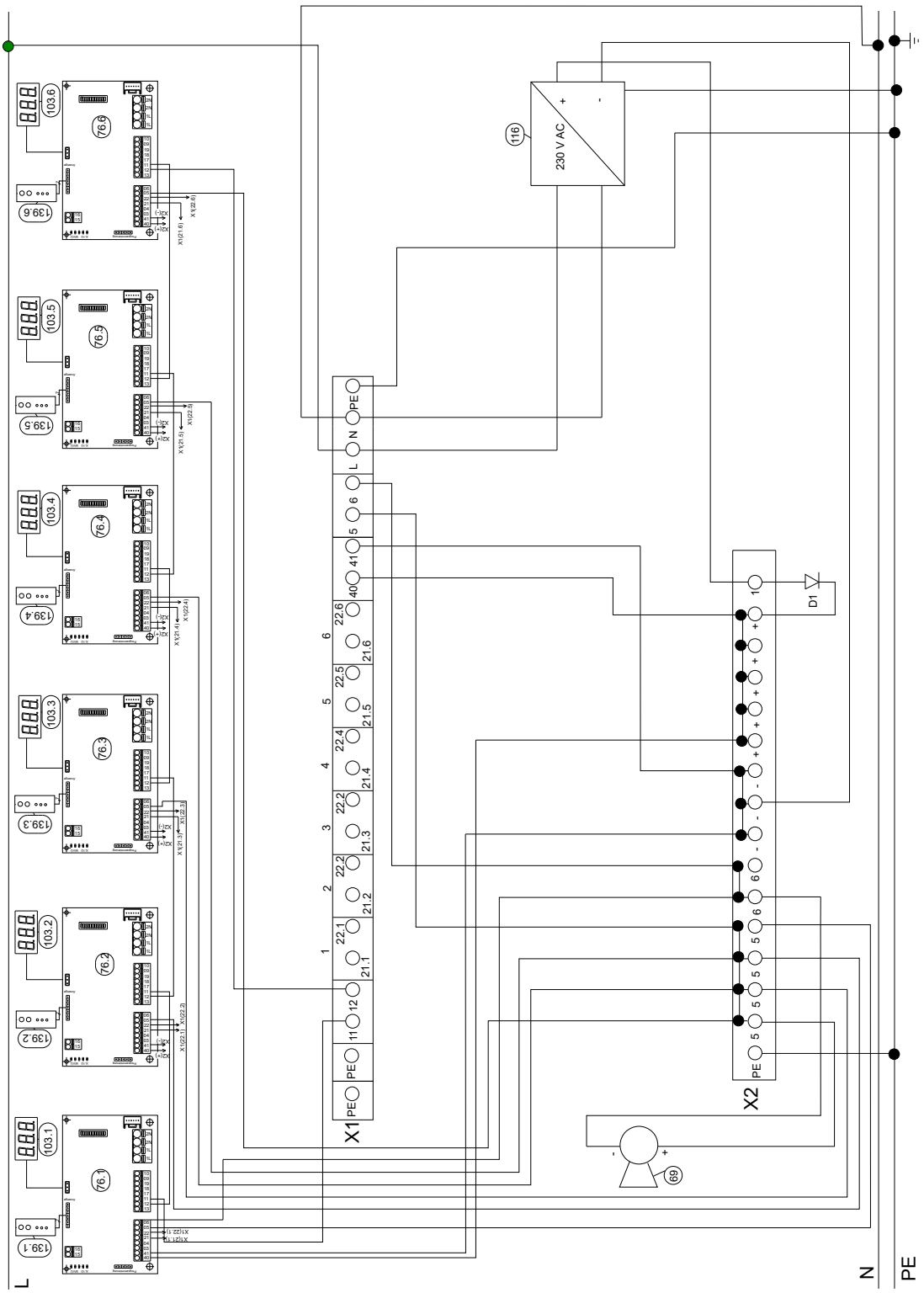
5.9 Block diagram

5.9.1 Block diagram VLXE-S 350 M with one display



01	Signal lamp "alarm", red
09	Signal lamp "operation", green
24	Fuse
59	Relay
69	Buzzer
71	"Mute" button
76	Main board
102	Pressure sensor
103	Display
106	Contacts for serial data transfer
116	Power supply unit (24 V DC)

5.9. 3. Block diagram with VLXE-S 350 M with up to 6 displays



24	Fuse
69	Buzzer
76	Main board
103	Display
116	Power supply unit (24 V DC)
139	Keypad

6. Commissioning

- Only perform commissioning once the steps in chapter 5 “Mounting the system” have been fulfilled.
- If a leak detector is placed into operation on already filled tanks/pipes, special protective measures must be taken (for example, testing for the presence of gas in the leak detector and/or the interstitial space). Additional measures may be necessary, depending on the local conditions, and must be assessed by qualified personnel.

6.1 Tightness test of the interstitial spaces

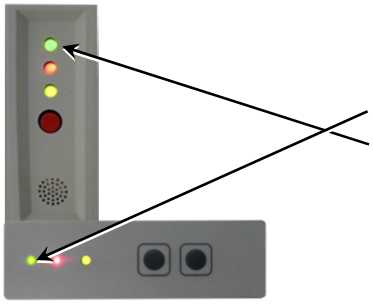
(1) Prior to commissioning the VLXE-S 350 M, the tightness of the connected interstitial spaces must be confirmed.

(2) The vacuum build-up should be carried out with an external pump to 700 mbar vacuum.

(3) **CAUTION: Never exceed the maximum permissible vacuum in the interstitial space during vacuum build-up**!

(4) Sufficient tightness for a one-year fault-free operation is present when the vacuum does not drop by more than 0.8 mbar per day, based on an applied operating pressure of 700 mbar.

6.2 Commissioning the Leak Detector



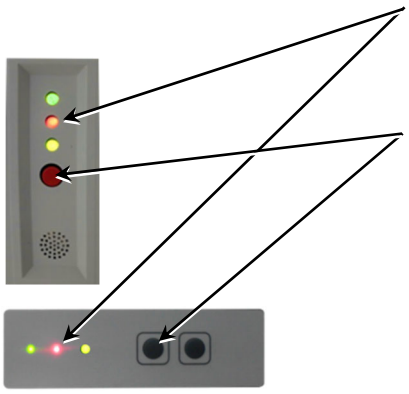
Tightness of the interstitial space prior to commissioning is assumed.

(1) Apply voltage supply.

(2) Check that the "Operation" signal lamp on the board lights up. In devices with several displays, the illumination of each connected “operating” signal lamp must be confirmed.

(3) Carry out zero-point adjustment – before applying vacuum to the sensor (chap. 4.5.4).

(Press the “Mute” button until the LED flashes quickly. Release button and press again immediately.)



(4) If the vacuum in the concerned interstitial space is below the alarm vacuum, the associated “alarm” signal lamp and the acoustic alarm signal are activated.
At the same time, the yellow “refilling required” lamp is on.
The acoustic signal can be turned off by pressing the respective “mute” button.
If several “alarm” signal lamps are active, all corresponding “mute” buttons must be pressed to acknowledge the acoustic signal.

Note:
Already acknowledged signals can be identified by the flashing red LEDs.

(5) An operating vacuum of 700 mbar must be created in each interstitial space via an external vacuum pump. The yellow LED goes off no later than when 700 mbar vacuum is reached. If the maximum permissible vacuum in the respective interstitial space is lower than 700 mbar, the maximum permissible vacuum should be used. Caution: False alarms due to temperature-related pressure changes become more likely, a higher tightness becomes required for 1 year of fault-free operation.

(6) If explosive vapors may be present, it is mandatory to take suitable measures for explosion protection.

(7) Perform a functional check according to section 7.

6.3 Vacuum build-up to operating vacuum

The vacuum build-up (with proven tightness test) is carried out with an external pump. Connect the external pump to the intake port. Open the shut-off valve.

If the concerned tank/pipe is or was filled with stored material, the occurrence of stored material or its vapors must be expected at the outlet of the pump. According safety measures must be observed. A receiving vessel for the discharge of liquids should be installed in front of the pump.

If the vapors are potentially explosive, suitable explosion-proof equipment must be used.

A vacuum of no more than 700 mbar is built up. After that the shut-off valve is closed and the pump separated. Attach the sealing plug/protective cap.

The steps described in this section (section 6.3) must be repeated for all connected interstitial spaces.

7. Functional Check and Maintenance

7.1 General Information

(1) If the leak detection system has been properly installed and is free of leaks, trouble-free operation can be assumed.

(2) In the event of an alarm, determine the cause and fix it quickly.

(3) The leak detector must be disconnected from the power when performing any repairs on it (on the leak indicating unit).

(4) A loss of power is indicated by the "Operation" indicator light going off. Alarm signals are triggered via the potential-free relay contacts (if used for alarm transmission) if contacts 11 and 12 were used.
After the power loss, the green indicator light lights up again and the potential-free contacts no longer generate an alarm (unless the power loss has caused the pressure to drop below the alarm pressure).

(5) The operator must check the function of the operating lights at regular intervals.

(6) Use a dry cloth to clean the leak alarm unit in the plastic housing.

7.2 Maintenance

- Maintenance work and functional checks must be performed by trained personnel only[5].
- Once a year to ensure functional and operational safety.
- Test scope according to section 7.3.
- Compliance with the conditions in sections 5 and 6 must also be tested.

7.3 Functional Check

The functional and operational safety checks must be performed

- after each commissioning,
- according to the time intervals given in section 7.4. 3[6],
- each time a malfunction has been corrected.

7.4 Test scope

(1) Coordinate the work to be performed with those responsible for operation on site

(2) Observe the safety instructions for working with the stored material.

(3) Checking the free passage of air in the interstitial space (section 7.4.1)

(4) Testing the switching values

[5] For Germany: Technical service based on water legislation with expertise in leak detection systems. For Europe: Authorization by the manufacturer
[6] for Germany: additional national laws apply (e.g. AwSV)

(5) Tightness test following commissioning or correction of malfunctions (section 7.4.3)

(6) Tightness test as part of the annual functional check (section 7.3.7)

(7) Achieving the operating conditions (section 7.4.4)

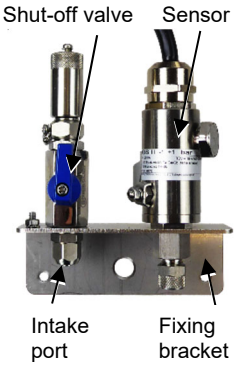
(8) A qualified person must complete a test report, confirming functional and operational safety.

7.4.1 Checking the free passage of air in the interstitial space

The shut-off valve of the concerned interstitial space must be opened briefly. In case of an existing passage through the interstitial space a pressure drop is shown on the associated digital manometer.

If no pressure drop occurs, the fault should be found and corrected.

7.4.2 Testing the switching values



(1) Remove the screw cap of the suction connection.

(2) Connect a suitable measuring instrument to the suction connection and open the shut-off valve

(3) Determine the pressure on the measuring device and compare to the pressure on the digital display. The difference may not exceed ± 20 mbar.

(4) Close the shut-off valve and remove the measuring unit from the intake port.

(5) For testing the alarm activating value, the shut-off valve is ventilated until the alarm occurs. Ascertain the optical and acoustic alarm signal and protocol the alarm pressure of the digital display. Switch the potential-free contacts 11 to 13.

NOTE: If the function "N" is activated, the yellow LED will light up when the value falls below the switching value "refilling required"; this provides the information "refilling required". The potential-free contacts 17 to 19 switch.

(6) To build up the vacuum, connect the external pump (with the receiving vessel) to the intake port and build up a vacuum until the alarm is extinguished and then on to the operating vacuum of -700 mbar.

Note: In case of several interstitial spaces or several leak indicating units with several displays, these steps must be carried out for each interstitial space or each display.

7.4.3 Tightness test

For the tightness test, a measuring instrument is connected to the intake port of the concerned tank/pipe and the associated shut-off valve opened. At the beginning of the tightness test there should be a vacuum of around 700 mbar. If required, the vacuum should be created in advance accordingly.

Wait for pressure compensation prior to starting the measurement.

Sufficient tightness for a one-year fault-free operation is present when the vacuum does not drop by more than 0.8 mbar per day (0.033 mbar per hour), based on an applied operating pressure of 700 mbar.

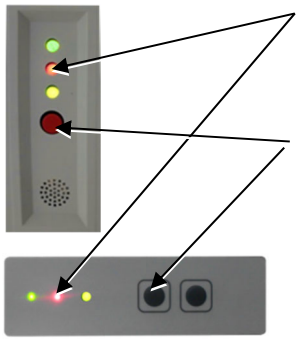
7.4.4 Achieving the operating conditions

(1) Correctly close the shut-off valve on the intake port and attach the sealing plug.

(2) Close the housing and seal it if required.

8. Alarm

8.1 Alarm



An alarm is indicated optically and acoustically by the red alarm lamp and an intermittent sound.

The potential-free relay contacts open.

The acoustic alarm can be switched off by pressing the alarm button.

The alarm message via the relay contact remains in place until the cause for the alarm is removed.

Inform the installation company for troubleshooting and correction.

After repair, a functional check must be conducted.

8.2 How to Behave

(1) Inform the installation company immediately and state the display from the preceding paragraph.

(2) Determine the cause for the alarm, fix it, and then perform a functional check for the leak detection system according to section 7.3.

9. Disassembly and Disposal

9.1 Disassembly

Make sure the unit is free of gas before and during removal!

Seal any openings through which an explosive atmosphere can carry over so they are gas-tight.

Avoid using spark-producing tools (saws, parting grinders, etc.) for disassembly whenever possible. Should this be unavoidable, however, comply with EN 1127 or the area must be free of explosive atmosphere.

Avoid the build-up of electrostatic charges (e.g., through friction).

9.2 Disposal

Properly dispose of components that have been contaminated (possibly through outgassing).

Properly dispose of electronic components.

10. Spare Parts

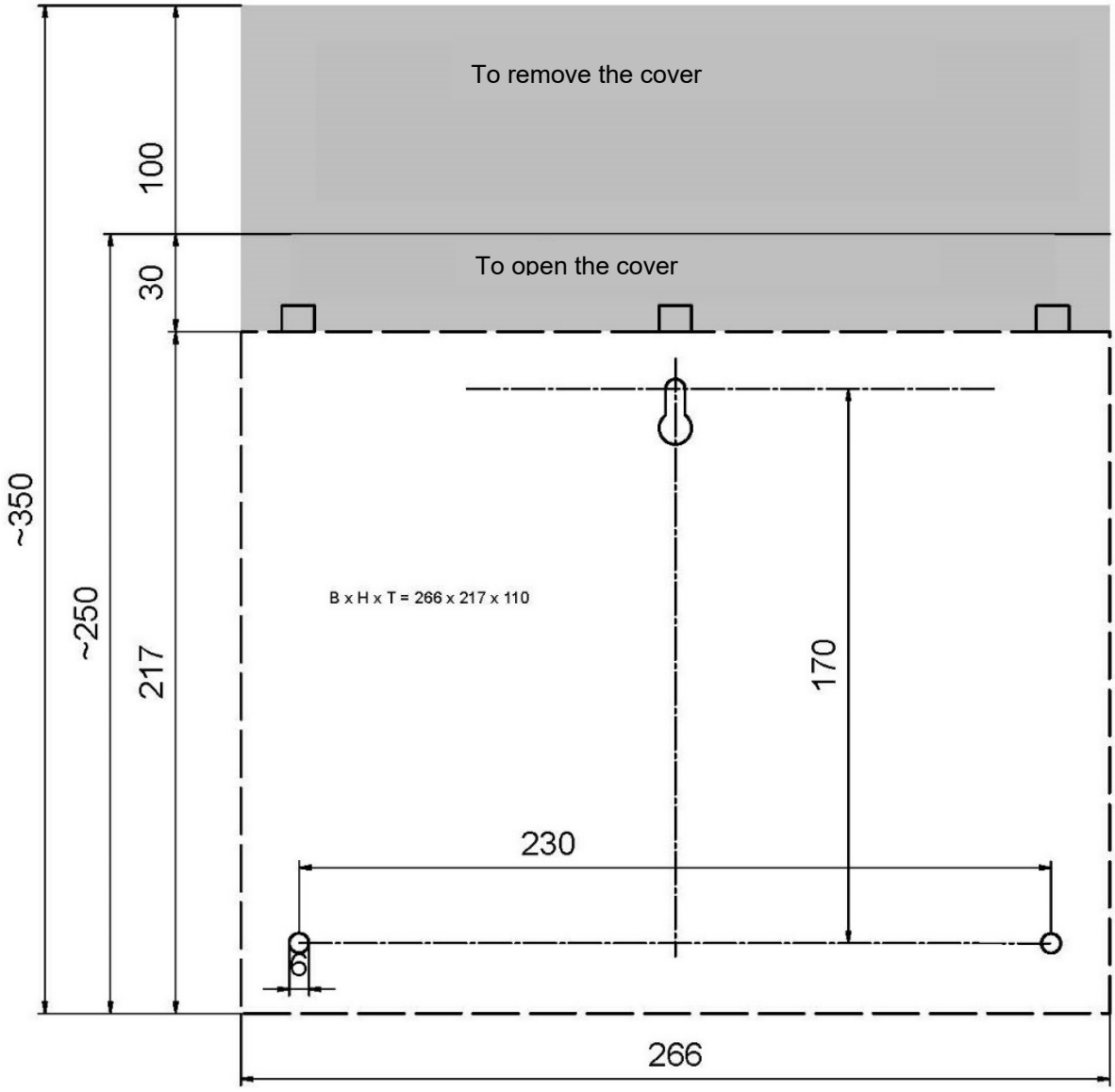
See the SGB online shop at shop.sgb.de

11. Accessories

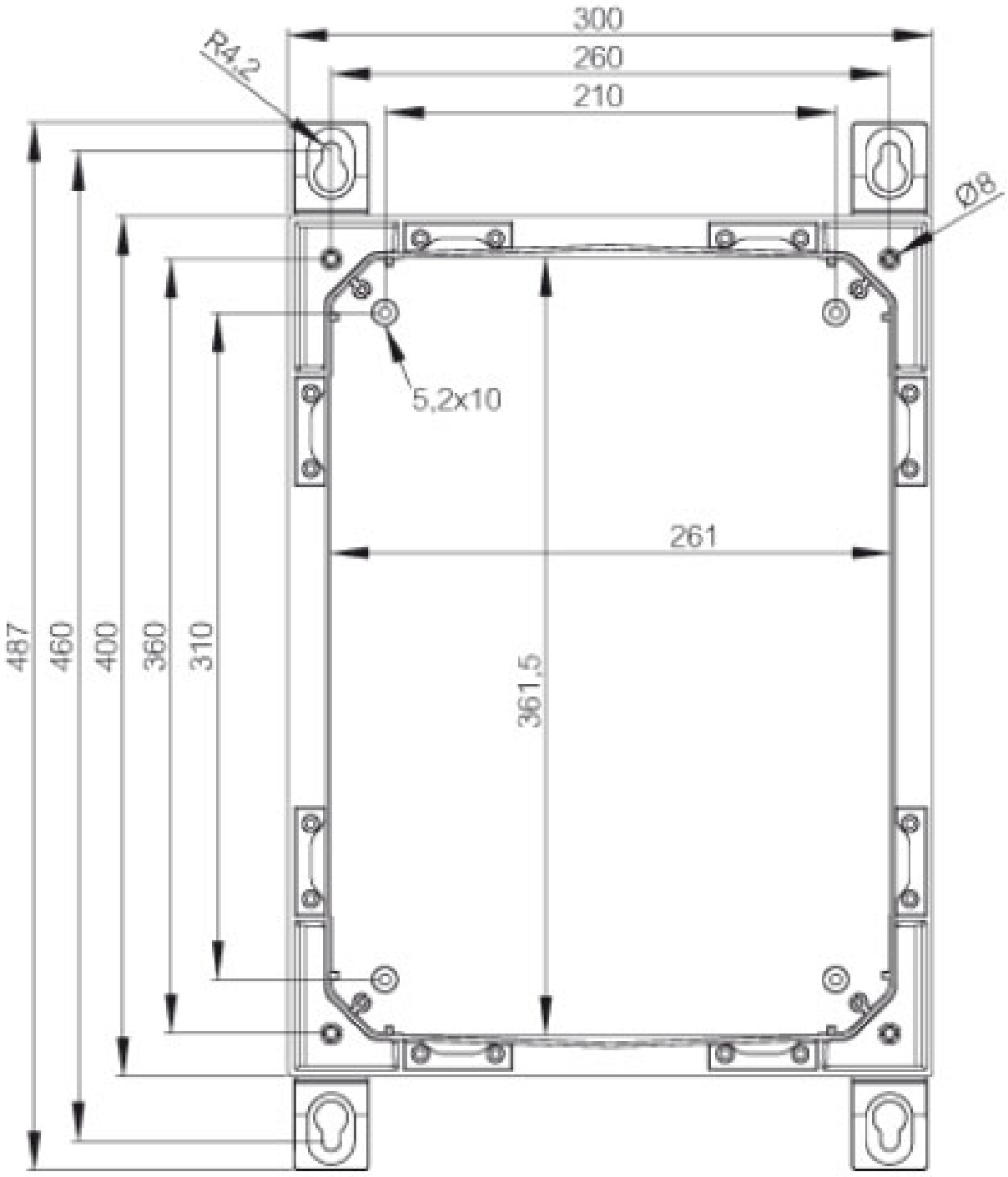
See the SGB online shop at shop.sgb.de

12. Appendix

12.1 Dimensions and drilling pattern (single leak indicating unit)



12.2 Dimension and drilling pattern 2 to 6 display/operating units



Depth= 80 mm

12.3 EU Declaration of Conformity

We,

SGB GmbH
Hofstr. 10
57076 Siegen, Germany,

hereby declare in sole responsibility that the leak detector

VLXE-S 350 M / VLXE-S … MN AZ

is in conformity with the essential requirements of the EU directives / regulations / UK statutory requirements listed below.

If the device is modified in a way that has not been agreed with us, this declaration shall lose its validity.

Number/short title	Satisfied regulations
2014/30/EU EMC Directive SI 2016 No. 1091	EN 61000-6-3: 2007 / A1:2011 EN 61000-6-2: 2006 EN 61000-3-2: 2014 EN 61000-3-3: 2013
2014/35/EU Low-voltage Directive SI 2016 No. 1101	EN 60335-1: 2012 / A11:2014 / A13:2017 / A1:2019 / A2:2019 / A14:2019 / A15:2020 EN 61010-1: 2010 / A1:2019 EN 60730-1: 2011
2014/34/EU Equipment for EX Areas (ATEX) SI 2016 No. 1107	The pneumatic components of the pressure sensor may be connected to spaces (interstitial spaces of tanks/pipes/fittings) that require category 1 devices, and also to spaces that require category 2 devices. The following documents have been consulted: TÜV-A 18 ATEX 0051 x EN 60079 -0: 2012/corr. 2013; EN 60079-18: 2015 The ignition hazard assessment did not result in any additional hazards.

Conformity is declared by

ppa. Martin Hücking
(Technical Director)

as of: February 2023

12.4 Declaration of Performance (DoP)

Number: **005 EU-BauPVO 2014**

1. Unique identification code of the product type:

   Vacuum leak detector type VLXE S 350 M

2. Use:

   Class I vacuum detector for monitoring double-walled, below-ground or above-ground, non-pressurized tanks

3. Manufacturer:

   SGB GmbH, Hofstraße 10, 57076 Siegen, Germany
   Phone: +49 271 48964-0, e-mail: sgb@sgb.de

4. Authorized representative:

   N/A

5. System for assessment and verification of constancy of performance:

   System 3

6. In the event of a declaration of performance for a construction product which is covered by a harmonized standard:

   Harmonized standard: EN 13160-1-2: 2003
   Notified body: TÜV Nord Systems GmbH & Co.KG, CC Tankanlagen, Große Bahnstraße 31, 22525 Hamburg, Germany
   Identification number of the notified testing laboratory: 0045

7. Declared performance:

Essential characteristics	Performance	Harmonized standard
Pressure switch points	Passed	EN 13160-2: 2003
Reliability	10,000 cycles	
Pressure test	Passed	
Volume flow rate test in the alarm switch point	Passed	
Function and tightness of the leak detection system	Passed	
Temperature resistance	-20°C … +60°C	

8. Signed for and on behalf of the manufacturer by:

   Dipl.-Ing. M. Hücking, Technical Director
   Siegen, 12.2022

12.5 Declaration of Compliance of the Manufacturer (ÜHP)

SGB
MVV TB
Anhang C 2.15.15
TÜV-NORD

Compliance of the leak detector with the Specimen Administrative Provision of the Technical Building Regulations is hereby declared.

Dipl.-Ing. M. Hücking, Technical Director
Siegen, 12.2022

12.6 Certification (TÜV Nord)

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

TÜV NORD Systems

TÜV NORD Systems GmbH & Co. KG
PÜZ — Site for containers, pipes and equipment parts
for plants with water-polluting substances

Reference code: HHA02
Reference number: 0045

Große Bahnstraße 31.22525
Hamburg

Tel.: 040 8557-0
Fax: 040 8557-2995

hamburg@tuev.de
www.tuev-nord.de

Certificate

Subject of the examination: **Leak detector and leak measurement indicator according to DIN EN 13160-1:2003/EN 13160-1:2010 and DIN EN 13160-2:2003**
Category I Pressure control system

Manufacturer: SGB GmbH
Hofstr. 10
57076 Siegen

Examination type: **First assessment (System 3)**

Examination time range: 10.08. — 14.11.2012

Place of examination: PÜZ testing laboratory TÜV NORD Systems GmbH & Co. KG

Results of the examination: The first assessment of the pressure leak detector with pressure leak measurement indicator type VLX-S 350 M according to DIN EN 13160-1:2003/EM 13160-1 :2010 and DIN EN 13160-2:2003 gave no cause for complaint. This confirms the compliance of the leak measurement indicator type VLX-S 350 M with the guidelines of DIN EN 13160:1. 2003/EN 13160-1:2010 and DIN EN 13160-2:2003. The requirements of the approval policy for safety equipment for containers and pipes/leak measurement devices (ZG-LAGB/R) have been fulfilled. With regard to the area of application and installation the specification of technical description VLX-S 350 M of 05.11.2012 applies.

Details of the examination are available in the inspection report ETI 8109 340 886 of 03.12.2012.

Hamburg, 03.12.2012

Head of testing laboratory
(Stamp)
(Signature)
J. Straube

Legal notice

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Germany

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