# Documentation

# Explosion-protected vacuum leak detector VLX .. A-Ex

Working device –
operational in combination with leak indicating unit LAE, see documentation 605602

**TÜV-A 19 ATEX 1119 X**


**Please read instructions prior to commencing any work**
Issue: 01/2025
Art. No.: 602642

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# 1. General

## 1.1 Information

These instructions provide important notes on using the leak detector VLX .. A-Ex. The prerequisite for workplace safety is the adherence to all safety and handling instructions specified in this manual.

Furthermore, any local regulations for prevention of accidents applicable at the site of use of the leak detector and general safety instructions must be complied with.

## 1.2 Explanation of Symbols

Warnings in this manual are indicated by a symbol next to them.

The signal word expresses the level of risk.

**DANGER:**
An immediately hazardous situation that results in death or serious injuries if not avoided.

**WARNING:**
A potentially hazardous situation that can result in death or serious injuries if not avoided.

**CAUTION:**
A potentially hazardous situation that can result in minor or slight injuries if not avoided.

**Information:**
Highlights useful tips, recommendations and information.

## 1.3 Limitation of Liability

All the data and information in this documentation have been compiled taking account of applicable standards and regulations, the current state of technology and our many years of experience.

SGB will not accept liability for:

- Non-compliance with this manual
- Unintended use
- Deployment of unqualified personnel
- Unauthorized conversions
- Connection to systems not approved by SGB

## 1.4 Copyright

The contents, texts, drawings, pictures, and any other representations are protected by copyright and are subject to industrial property rights. Any misuse is a criminal offence.

## 1.5 Warranty

We provide 24 months of warranty on the VLX .. A-Ex leak detector from the day of installation on-site in accordance with our General Terms and Conditions of Sale and Delivery.

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

The prerequisite for any warranty is the presentation of the function/test report about initial commissioning by trained personnel.

Specification of the serial number of the leak detector is required.

The warranty obligation is rendered null and void in the case of
- inadequate or incorrect installation,
- improper operation,
- changes/repairs made without the agreement of the manufacturer.

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.

You can find information about contacts on the World Wide Web at sgb.de/en or on the rating plate of the leak detector.

## 2. Safety

### 2.1 Intended Use

**WARNING!**

**Danger from misuse**

- Mounting of the VLX .. A-Ex preferably outdoors
- Conditions from sec. 3.6 “Field of application” must be complied with.
- Only for monitoring spaces of double-wall tanks/pipelines with sufficient resistance to underpressures
- The volume of the space monitored using a leak detector may not exceed 10 $m^3$ (manufacturer recommendation: 4 $m^3$).
- Earthing/equipotential bonding in accordance with applicable regulations
- Detonation flame arresters on the interstitial space side are required
- Tightness of the interstitial spaces according to this documentation (Chap. 6.1.)
- Mounting of the working device only in zone 1, zone 2 or outside the Ex-area, whereby the following must be observed:
  - Explosive mixtures: II A to II B3; T1 to T3, as special version also T4
  - Ambient temperature -20°C … +60°C
  - Feedthroughs in manholes or inspection chambers must be sealed gas-tight.
- Power connection cannot be switched off.
- Mains earth may be on the same potential as the equipotential bonding of the tank/pipeline

Any claims resulting from misuse 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 Operating Company

The leak detector, consisting of the working device VLX .. A-Ex and the leak indicating unit LAE, is used in the industrial sector. The operating company must therefore comply with statutory occupational health and safety requirements.

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

**WARNING!**

**Hazard in case of incomplete documentation**

- Compilation of a hazard analysis and implementation of its results in operating instructions
- Regular checking of whether the operating instructions comply with the current state of regulations
- The content of the operating instructions may also be the reaction to a possible alarm
- Instigation of an annual functional check

## 2.3 Qualification

**WARNING!**

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

The personnel must be sufficiently qualified to recognize and avoid possible dangers on their own.

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

National regulations must be complied with.

For Germany: Specialist company qualification for the installation, commissioning and maintenance of leak detection systems.

## 2.4 Personal Protective Equipment (PPE)

Personal safety equipment must be worn during work.

- Wear the necessary protective equipment for the respective work
- Observe and comply with any signs concerning PPE
- For additional information see 2.4.1

Entry in the “Safety Book“

Wear a protective helmet

Wear a warning vest

Wear gloves – where necessary

Wear safety shoes

Wear protective goggles – where necessary

2.4.1 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 opened leak detector, it must be disconnected from the power supply unless otherwise stated in the documentation.

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 leak detector, switch off the power supply.


**DANGER**
From explosive vapor-air mixtures

There may be explosive steam-air mixtures in the leak detector and in the connection lines.

The absence of gas must be established before carrying out work.

Comply with explosion protection regulations, such as the German BetrSichV (or the Directive 1999/92/EC and the resulting laws in the respective member states) and/or others.

**DANGER**
When working in shafts

The leak detectors are fitted outside the manhole shafts. The pneumatic connection is typically made in the manhole shaft. The shaft should therefore be entered for the installation.

Before entry, the appropriate protection measures must be installed and the absence of gas and sufficient oxygen must be ensured.

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

# 3. Technical Data of the Leak Detector

## 3.1 General Data

| | |
|---|---|
| Dimensions and drilling template: | see sec. 12.2 |
| Weight working device: | 6,3 kg |
| Storage temperature range: | -20°C bis +60°C |
| Use temperature range | T3: -20°C … +60°C<br>T4: -20°C … +45°C |
| Max. height for safe operation: | ≤ 2000 m above sea level |
| Max. relative humidity for safe operation: | 95 % |
| Protection rating of housing: | IP 66 |
| Version: | ≤ 5 bar (Feed pressure) |

## 3.2 Electrical Data (for leak indicating unit LAE see documentation 605602)

| | |
|---|---|
| Power supply: | 230 V AC, 50 Hz |
| Power consumption: | 50 W |
| Fuse protection: | max. 2 A (1500 A) |
| Overvoltage category: | 2 |
| Degree of soiling: | PD2 |

## 3.3 Ex-Data

Working device: II 1/2(2)G Ex eb mb IIB T3(T4) Ga/Gb

With detonation flame arrester:

F 501: II 1/2(2)G Ex eb mb IIB3 T3(T4) Ga/Gb

## 3.4 Switching Values

| **Type** | **Alarm ON,** at the latest at: | **Pump OFF,** not more than: | **Functional capability** of the interstitial space for |
|---|---|---|---|
| **34** | -60±25 mbar | -100±25 mbar | -500 mbar |
| **330** | -370±40 mbar | -500±40 mbar | -700 mbar |

Special switching values can be agreed between the customer and SGB.

* Classed as fulfilled for double-walled steel tanks. Lower values may occur with corresponding safety device, possibly when using a vacuum valve.

## 3.5 Data for applications that fall under the PED in the event of an error (not Ex)

Note: The leak detector, installation kits, and manifolds are pressure-maintaining accessories (in case of leakage of the monitored system) without a safety function.

### 3.5.1 Volume

| | |
|---|---|
| Leak detector: | 0,08 Liter |
| Manifold 2…8: | 0,07 Liter … 0,27 Liter |
| Installation kit: | < 1,67 Liter |

3.5.2 Max. operating pressure in case of error

| | |
|---|---|
| Leak detector: | 5 bar |
| Manifold 2…8: | 25 bar |
| Installation kit: | 25 bar |

## 3.6 Field of Application

3.6.1 Tanks

a) Single-walled horizontal (underground or overground) cylindrical tanks with leak protection lining or leak protecting jacket and suction line leading to the low point

*Usage limits:* none in terms of density and diameter

b) Double-walled horizontal cylindrical (underground or overground) tanks (e.g., DIN 6608-2, 6616 or DIN EN 12 285-1-2)
- as a), but without suction line to the low point
- as c), but without suction line to the low point
- as d), but without suction line to the low point

*Usage limits:*

| Density of stored material [kg/dm³] | $H_{max.}$* **330** [m] | |
|---|---|---|
| 0,8 | 3.8 | Only aboveground tanks / pipes |
| 0,9 | 3.4 | |
| 1,0 | 3.1 | Aboveground and underground tanks / pipes |
| 1,1 | 2.8 | |
| 1,2 | 2.6 | |
| 1,3 | 2.4 | |
| 1,4 | 2.2 | |
| 1,5 | 2.0 | |
| 1,6 | 1.9 | |
| 1,7 | 1.8 | |
| 1,8 | 1.7 | |
| 1,9 | 1.6 | |

* Tank height or height of the low point of the pipeline to the node point[2]

For **underground systems** a minimum of **density 1** is needed.

[2] The junction point is the junction of the suction and measuring lines in a vacuum leak detector for pipelines. This can also be located in the installation kit or a manifold.

c) Double-walled (or single-walled with leak protection lining or leak protecting jacket) vertical cylindrical tanks or troughs with a dished bottom (underground or overground) with a suction line leading to the low point (DIN 6618-2: 1989)

*Usage limits:*

| Diameter [mm] | Height [mm] | Max. density stored material [kg/dm³] | |
|---|---|---|---|
| | | **34** | **330** |
| 1 600 | ≤ 2 820 | ≤ 1,9 | ≤ 1,9 |
| | ≤ 3 740 | ≤ 1,6 | ≤ 1,9 |
| | ≤ 5 350 | ≤ 1,2 | ≤ 1,9 |
| | ≤ 6 960 | ≤ 0,8 | ≤ 1,8 |
| 2 000 | ≤ 5 400 | ≤ 1,0 | ≤ 1,9 |
| | ≤ 6 960 | ≤ 0,9 | ≤ 1,8 |
| | ≤ 8 540 | - | ≤ 1,4 |
| 2 500 | ≤ 6 665 | ≤ 0,9 | ≤ 1,9 |
| | ≤ 8 800 | - | ≤ 1,4 |
| 2 900 | ≤ 8 400 | ≤ 0,8 | ≤ 1,4 |
| | ≤ 9 585 | - | ≤ 1,2 |
| | ≤ 12 750 | - | ≤ 0,9 |
| | ≤ 15 950 | - | - |

d) Rectangular or cylindrical tanks or troughs with a flat bottom (double-walled or with leak detection lining or leak detection jacket) with a suction line to the low point

| Density of stored material [kg/dm³] | $H_{max.}$ [m] | |
|---|---|---|
| | **34** | **330** |
| 0,8 | 4,7 | 13,6 |
| 0,9 | 4,2 | 12,1 |
| 1,0 | 3,8 | 10,9 |
| 1,1 | 3,5 | 9,9 |
| 1,2 | 3,2 | 9,1 |
| 1,3 | 2,9 | 8,4 |
| 1,4 | 2,7 | 7,8 |
| 1,5 | 2,5 | 7,2 |
| 1,6 | 2,4 | 6,8 |
| 1,7 | 2,2 | 6,4 |
| 1,8 | 2,1 | 6,0 |
| 1,9 | 2,0 | 5,7 |

e) Standing cylindrical tanks with double-layered floor made of metal (e.g., acc. to DIN 4119)
- as before, but with leak protection lining (stiff or flexible)
- standing cylindrical tanks made of plastic with double-layered floor

*Usage limits:* none regarding density and diameter

f) Tanks according to a) to d), which are operated with an inner overlay pressure with up to 5 bar

### 3.6.2 Pipelines / hoses

In factory or on-site construction

*Usage limits: according to the table in section* 3.6.1 under b), whereby the height between the low point of the interstitial space and the nodal point is to be used instead of the tank diameter.

- Suction lines: The alarm underpressure must be at least 30 mbar higher than the max. negative pressure in the inner pipe at the highest point of the interstitial space
- Pressure lines with feed pressures up to 5 bar
- In special applications (e.g., single pipeline with gradient to low point), the VLX 34 A-Ex version with connection at the low point and node point at the level[3] of the connection can also be used.
- For Germany: with proof of usability from construction authority

Note: Double-walled fittings can also be monitored separately with this leak detector. The installation examples for the pipelines are to be applied analogously.

### 3.6.3 Monitorable liquids

Liquids hazardous to water with a flash point below 60°C (55°C for Germany as per TRBS/TRGS), such as fuels. The following also applies:

- The materials used must be resistant to the liquids being monitored.
- Water-polluting liquids, the (possible) explosive steam-air mixture (also such ones that can arise through the stored/conveyed liquids in contact with air, humidity, condensation or the materials used) of which classes them in gas groups IIA to IIB3, as well as temperature codes T1 to T3 (T4) such as gasoline, for example.
- If different water-polluting liquids are transported in individual pipelines and monitored with a leak detector these liquids or their mixing must not have any hazardous effects on one another or cause any chemical reactions.

### 3.6.4 Resistance / Materials

For VLX .. A-Ex leak detectors, material MS 58 or 1.4301, 1.4306, 1.4541[4] or 1.4571[5] as well as the material used for the connection lines must be sufficiently[6] resistant to the stored material.

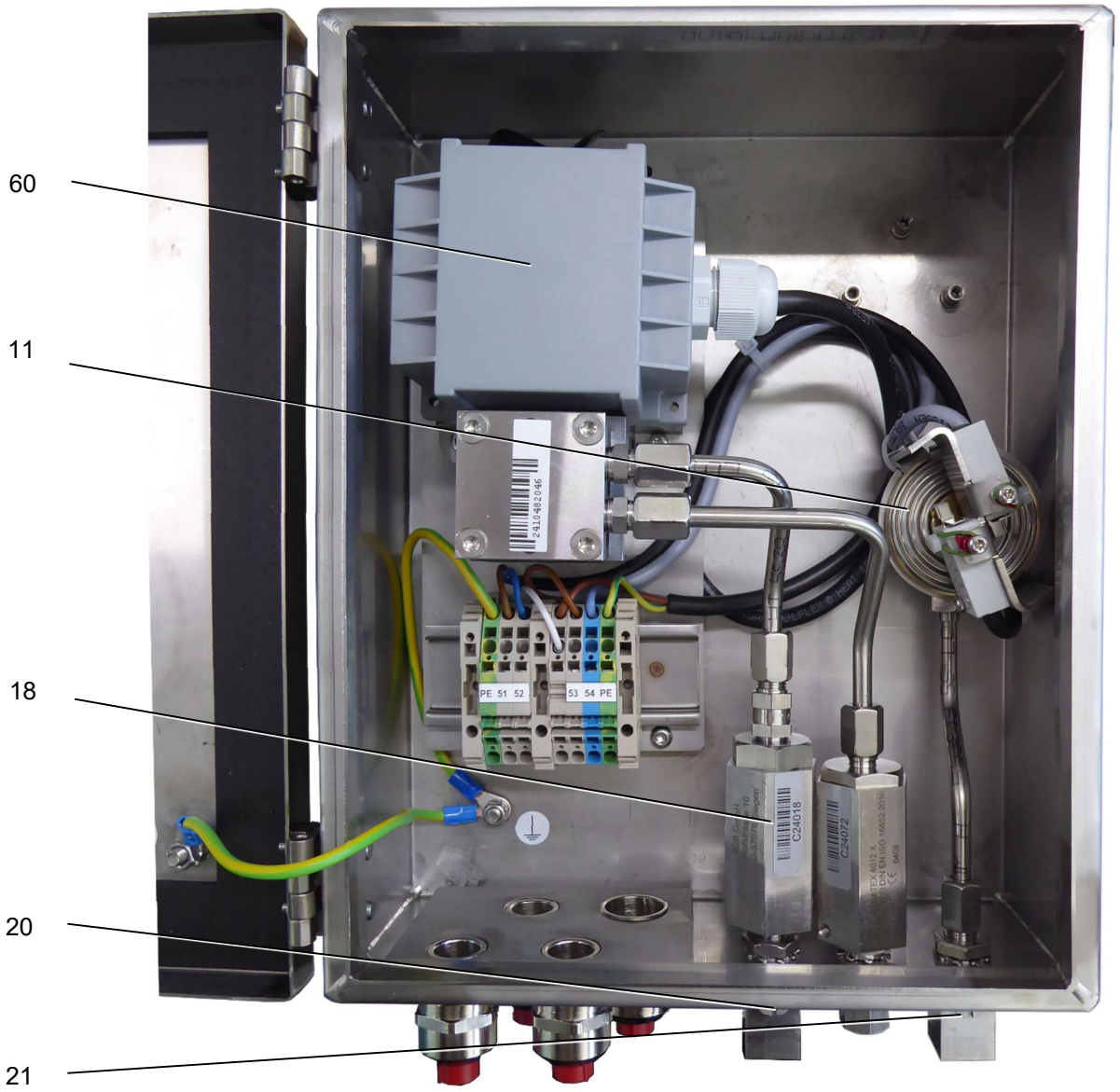
[3] Can also be located lower than the connection, but **NOT** higher!
[4] See DIN 6601, middle column
[5] See DIN 6601, right column
[6] Sufficient means that the physical properties are not adversely affected; discoloration is acceptable.

## 4. Design and FunctionDesign

The leak detector consists of a working device VLX .. A-Ex (shown below) and a leak indicating unit LAE. This associated leak indicating unit has separate documentation.

In terms of the European standard, the working device is the leak detector.

In place of the dots in the type designation “VLX .. A-Ex”, the respective minimum alarm pressure is given, e.g., VLX 34 A-Ex.




Interior view with:

| | |
|---|---|
| 11 | Vacuum switch |
| 18 | Detonation flame arrester |
| 20 | Three-way valve in suction line |
| 21 | Three-way valve in measuring line |
| 60 | Vacuum pump |

## 4.2 Normal Operating Condition

The leak detector (working device) is connected to the interstitial space via suction, measuring and connection line(s). The vacuum generated by the pump is measured and controlled by a pressure switch.

When the operating vacuum is reached (Pump OFF), the pump shuts off. The vacuum slowly drops due to slight, unavoidable leaks in the leak detector system. When the Pump ON switching value is reached, the pump turns on and the interstitial space is evacuated until the operating vacuum is reached (Pump OFF).

Under normal operating conditions, the vacuum swings between the Pump OFF and Pump ON switching values, with short periods when the pump is run and longer standstills, depending on the tightness and temperature fluctuations of the entire unit.

## 4.3 Air Leak

If an air leak occurs (in the outer or inner wall, above the liquid level), the vacuum pump switches on to restore the operating vacuum. If the leak causes the incoming air to exceed the pump's capacity limit, the pump remains on continuously.

Increasing leak rates lead to a further decrease in pressure (with the pump running) until the Alarm ON switching value is reached. This triggers the visual and audible alarms.

## 4.4 Liquid Leak

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

The incoming liquid decreases the vacuum, which causes the pump to turn on and evacuate the interstitial space(s) until the operating vacuum is reached. The process repeats itself until the liquid stop valve in the suction line closes.

Because of the vacuum that still exists on the measuring line side, additional stored or conveyed product or water is sucked into the interstitial space, the measuring line, and, if applicable, into a pressure compensation vessel. This causes the vacuum to drop until the "Alarm ON" pressure is reached. This triggers the visual and audible alarms.

## 4.5 Displays and Controls

Are part of the associated leak indicating unit.

# 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.
- Observe the approvals of the manufacturer for the tank/pipeline and the interstitial space.
- The safety instructions in this documentation must be adhered to.
- Only qualified service companies may be used for assembly and commissioning [7].
- Lead-throughs for pneumatic and electric connection lines, through which the EX-atmosphere can carry over, must be sealed gas-tight.
- Comply with relevant regulations regarding electric installation, explosion protection (e.g., EN 60079-14, -17), and accident prevention.
- Comply with explosion regulations, e.g., BetrSichV (and/or directive 1999/92/EC and the laws of the respective member states resulting therefrom) and/or other regulations.
- Pneumatic connections, connection lines and fittings must be designed to at least PN 10 for the entire temperature range.
- 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
  - Mains earth is at the same potential as the tank/pipe to be monitored,
  - all existing metallic components of the leak detection system are connected via potential equalization conductors as well as
  - the grounding conductor of the electrical connection is connected to the main ground.

## 5.2 Assembly of the Leak Detector

- Wall mounting using the supplied mounting material
- Outside and inside the Ex-area (zone 1 or 2), in the open air, without any more protective boxes.

  If a protective box should nevertheless be necessary for operational reasons, the protective box must be adequately ventilated.
- Install the housing protected from external mechanical loads. (Test with low requirements).
- If it is assembled in an enclosed space, it must be well ventilated. The operator shall apply EN 60079-10/EN 13237 as a basis for evaluation.

[7] For Germany: Specialist service companies as per German water legislation that have documented qualifications to install leak detection systems.

- To avoid excessive heating, the leak detector must not be installed directly next to a heat source.

  The ambient temperature must not exceed 60°C; appropriate measures may need to be taken (e.g., installation of a roof to protect against sunlight, see chapter 10, accessories).
- Do not mount in access or inspection chambers.
- Integrate the housing of the leak detector into the potential compensation.
- For mounting the leak indicating unit, see documentation 605602 “Leak Indicating Unit LAE”.

## 5.3 Pneumatic connection lines

### 5.3.1 Requirements

- Fixed, metallic pipes (e.g., Cu pipe) or sufficiently pressure-resistant plastic pipes in accordance with section 4.1. (across the entire temperature range), the latter only if the interstitial space is **NOT** Zone 0.
  When using plastic pipes, the underground pipes and overground pipes have to be protective pipes whose inlets and outlets must be sealed against gas and liquid.
- At least 6 mm inside clearance
- Resistant to the stored or conveyed product
- At least PN 10 over the total temperature range
- The full cross section must be maintained (not bent)
- Color coding:
  *Measuring line*: RED;
  *Suction line* : WHITE or CLEAR;
  *Exhaust*: GREEN
- The lines between the interstitial space and leak detector must not exceed 50 m in length. If the distance is greater than this, a larger cross section must be used. There are special requirements for the exhaust line, see section 5.3.2.
- Condensate traps must be installed at all low points of the connection lines.
- Assemble liquid stop valve in the suction line (generally included in the assembly kit).
- If liquids are being stored or transported that require compliance with explosion protection, suitable denotation flame arresters must be installed at the entry to the interstitial space.

### 5.3.2 Exhaust

- The length of the exhaust line must not exceed 35 m. If these lengths are not sufficient, consult the manufacturer.
- The exhaust line is generally routed to the tank ventilation, in which case a denotation flame arrester must be installed directly before the connection on the tank vent side.

- Exceptions to the return of the exhaust to the tank ventilation:
  Tanks with interior overlay pressure, tanks according to DIN 4119 with double-layered floor, double-walled pipes or comparable:
  - The exhaust line can lead outside to a safe[8] area, outside of the explosion area: Provide a condensate trap and liquid stop valve at the end of the exhaust line. The area within 1 m diameter of the end of the exhaust is considered as having zone 1 conditions; attach a warning sign if necessary.
  - The exhaust ends in zone 1 (e.g., remote fill chamber or collection space): A denotation flame arrester[9] must be provided at the end of the exhaust line. Condensate traps must be provided at low points; a liquid stop valve is not required if the end of the exhaust is in an area which is made liquid-tight (e.g., with collecting area).

- **Caution:** An exhaust line which ends outdoors must not in any circumstances be used to detect leaks (e.g., by “sniffing”). Attach warning signs, if necessary!

### 5.3.3 Several pipelines’ interstitial spaces connected in parallels

- Lay connection lines at a downward angle to the interstitial space or the manifold. If there are low points in the connection lines and lines are laid out of doors as well install condensate traps at all low points!
- Lay suction and measuring lines at a downward angle to the manifold. If this is not possible, place condensate traps at all low points.
- Connect a liquid stop valve to each connection line to the interstitial space, against the valve direction. This prevents leaking liquids from entering the interstitial spaces of the other pipelines.
- If stop valves are installed in the connection line shut-off valves, then they should be sealable in open position.
- For applications with pressure compensation vessel (s. 5.8.5 and 5.8.6): Length of the measuring line from the pressure compensation vessel (V=0,1 l)[10]: Type 330: $L_{max}$ 8 m

  **CAUTION:** The bottom edge of the pressure compensation vessel must not be lower than the node point; the upper edge of the pressure compensation vessel must not end more than 30 cm above the node point. For each 10 ml of the condensate trap(s) used in the measuring line between the pressure compensation vessel and leak detector, **$L_{max}$ is reduced** by 0.4 m
- OR (alternatively to the pressure compensation vessel) 50% of the overall length of the measuring line must be laid with a 0.5 to 1% gradient to the node point. $L_{min}$ = 0.5 x total length of the measuring line.

[8] Among other things, not accessible to public transport/persons
[9] The denotation flame arrester can be omitted, if the exhaust is laid frost-free and a kink (e.g., shifting of a protective tube) or a block in the exhausted can be precluded.
[10] If this volume is multiplied, $L_{max}$. is multiplied in the same way.

5.3.4 Several pipeline interstitial spaces connected in series

The liquid stop valves installed against the direction of flow (27*) prevent that the other interstitial spaces become filled with liquid in case of a leak in a pipeline. The interstitial space volumes of the connected pipes must meet the following conditions:
$3 \cdot V_{ÜR\ 1} > V_{ÜR\ 1} + V_{ÜR\ 2} + V_{ÜR\ 3} + V_{ÜR\ 4}$ and
$3 \cdot V_{ÜR\ 2} > V_{ÜR\ 2} + V_{ÜR\ 3} + V_{ÜR\ 4}$ etc.
$V_{ÜR\ (number)}$ is the volume of the respective interstitial space. No. 1 is the interstitial space the suction line is connected to (see 5.8.6).

## 5.4 Completing Pneumatic Connections

5.4.1 Assembling the connection to the tank's interstitial space

(1) Generally according to the tank manufacturer's specifications.

(2) SGB offers assembly kits with the various connection possibilities.

5.4.2 Assembling the connection to the pipelines interstitial space or test valves

(1) Generally according to the pipelines/interstitial space manufacturer's specifications.

(2) If Schrader valves are used, please proceed as follows:
- Unscrew protective cap
- Re-tighten lock nut
- Unscrew valve insert and stick next to the connection with adhesive tape. (As evidence of disassembly)
- Screw connection to the interstitial space or test valve and fasten finger-tight.
- If necessary, further tighten with suitable pliers.

5.4.3 Between leak detector and interstitial space

(1) Select and install suitable pipe.

(2) During installation of the pipe, ensure again that they are protected against damage when the manhole chamber is entered.

(3) Complete the relevant connection (according to the illustrations in the following images)

5.4.3.1 Flanged screw connection (for flanged pipes)

(1) Lubricate O-rings

(2) Insert spacer ring loosely into the screw socket

(3) Slide union nut and pressure ring over the pipe

(4) Hand-tighten union nut

(5) Tighten union nut until need for increased force is clearly noticeable

(6) Final assembly: Tighten by another ¼ turn

5.4.3.2 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 1 ¾ 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

5.4.3.3 Quick screw connections for PA pipes

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

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

(3) Slide pipe onto nipple 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)

## 5.5 Installation of Electric Connection Lines (Leak Detector – Leak Indicating Unit)

(1) Requirements for the line:

- Insulated, with screen depending on local conditions
- Resistant to the existing or expected vapors and liquids
- Color of the jacket: gray (also other colors, but no blue)
- Outside diameter: 6 to 13 mm
- Number of leads: 5 (4 + PE) (Leads must be distinguishable)
- Cross section of VLX .. A-Ex: 1,5 $mm^2$ to 200 m lead length

(2) If the cable is laid in a line, then only together with measurement, controller, or regulation technology cables, **not** together with cables carrying load.

(3) Fixed wiring, no plug or switch connections

(4) Outer cable diameter of 6 to 13 mm. If other cable diameters are used, the screw connections must be replaced, as **explosion protection depends on correct cable routing**.

(5) Close unused cable glands properly and professionally.

## 5.6 Electrical Connection

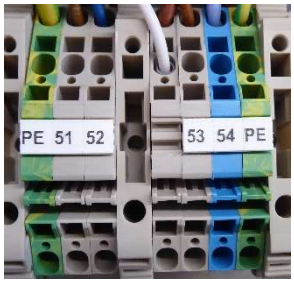
(1) Power supply: 230 V – 50 Hz, usually via the leak indicating unit LAE

(2) Observe GROUNDING and equipotential bonding

(3) Terminal layout for **LAE leak indicating unit**:

See documentation 605602 “Leak Indicating Unit LAE“

51–54 Connection between LAE and VLX .. A-Ex




(4) Representation from the VLX .. A-Ex:

51 Connecting line to LAE (Alarm, potential-free)

52 Connecting line to LAE (Alarm, potential-free)

53 Connecting line to LAE (Pump, phase)

54 Connecting line to LAE (Pump, neutral wire)

(5) Do not apply voltage until all electrical and pneumatic cables are connected and the housing cover is closed.

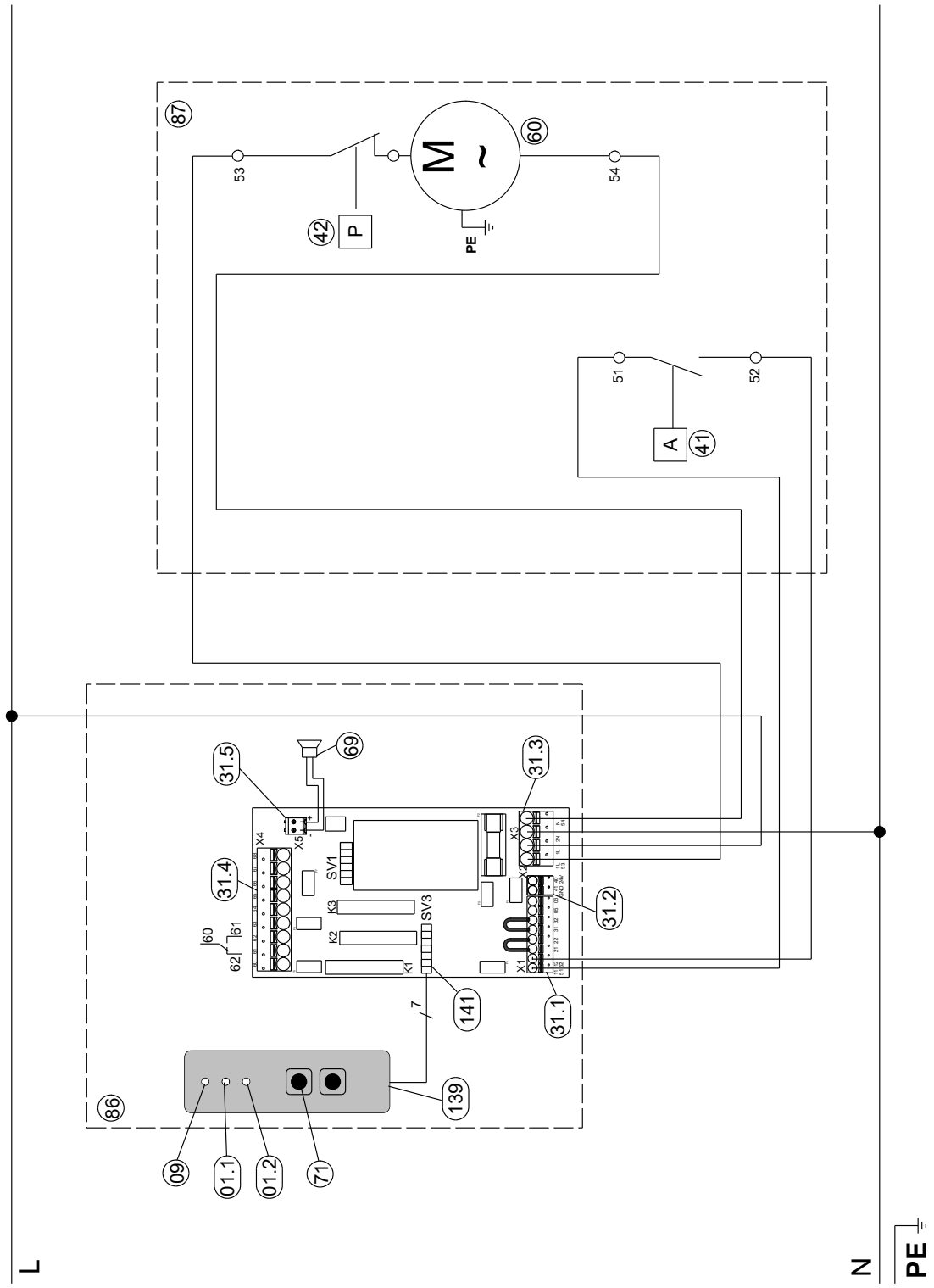
### 5.6.1 Equipotential bonding

- The housing of the leak detector must be connected to the equipotential bonding of the overall system by means of the stud provided for that purpose.
- The fittings in the connection lines must likewise be integrated into the equipotential bonding, especially when plastic pipes (connection lines to tanks) have been used.
- Before replacing a leak detector (working device), disconnection lines or similar work, it must be ensured that the equipotential bonding remains intact (if necessary, pull electrically conducting bridges).

## 5.7 Additional instructions for underground tanks / pipelines

If a KKS system (cathodic corrosion protection) is installed on a tank/pipeline which requires potential isolation, electrical isolating pieces must be installed in the pneumatic lines. These isolating pieces must be provided with overvoltage protection (isolating spark gap) and the isolating pieces must be protected against accidental bridging.

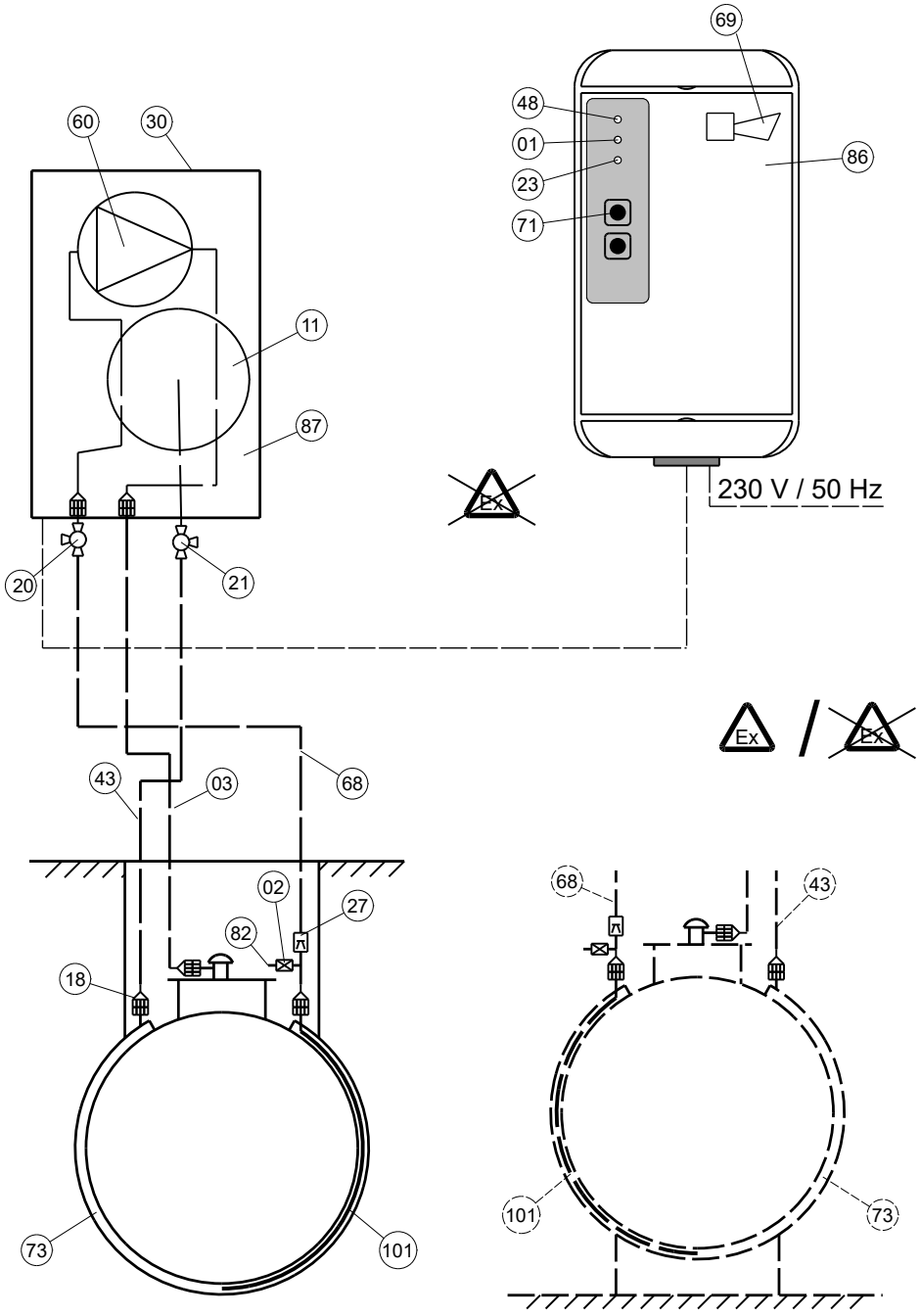
### 5.7.1 Block diagram




| | | | |
|---|---|---|---|
| 41 | Alarm switch | 69 | Buzzer |
| 42 | Pump switch | 86 | Leak indicating unit |
| 60 | Vacuum pump | 87 | Leak detector |

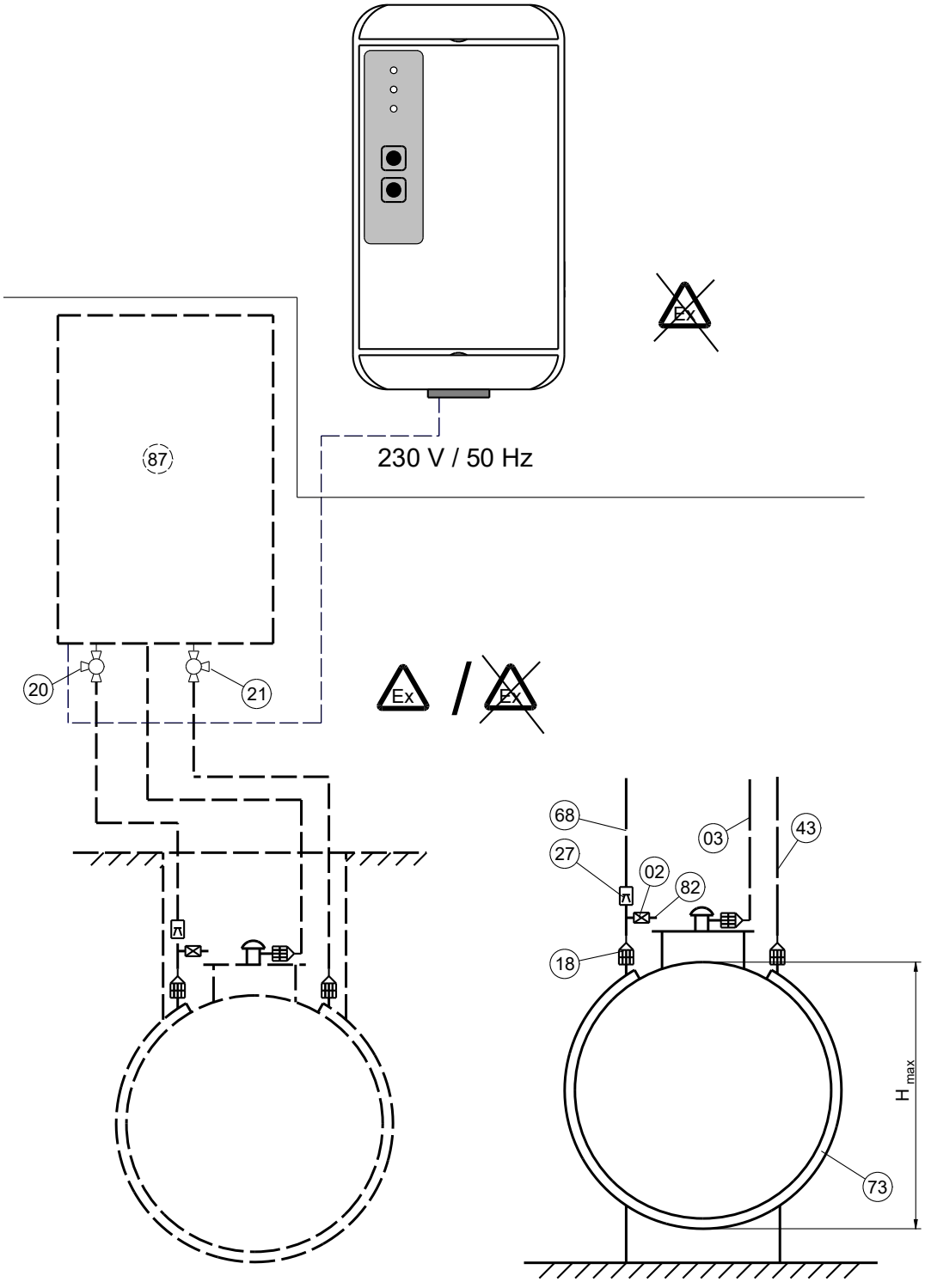
## 5.8 Installation Examples

### 5.8.1 Horizontal cylindrical tank with leak protection lining and suction line to low point



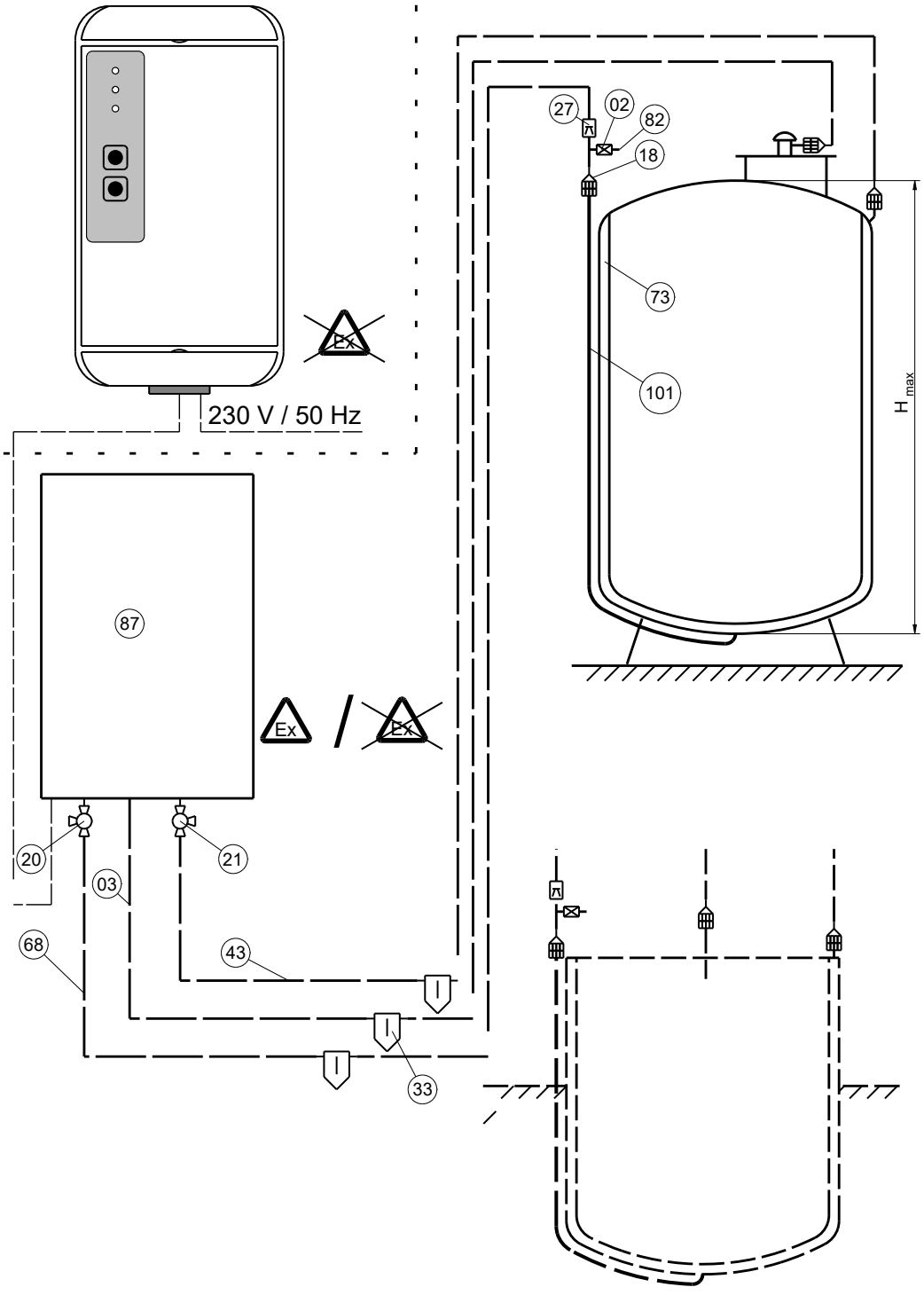

| | | | |
|---|---|---|---|
| 01 | Signal lamp „Alarm“, red | 48 | Signal lamp “Power”, green |
| 02 | Shut-off valve | 60 | Vacuum pump |
| 03 | Exhaust | 68 | Suction line |
| 11 | Vacuum switch | 69 | Buzzer |
| 18 | Detonation flame arrester | 71 | “Mute”-Button |
| 20 | Three-way valve in suction line | 73 | Interstitial space |
| 21 | Three-way valve in measuring line | 82 | Connection assembly pump |
| 23 | Signal lamp “Filling“, yellow | 86 | Leak indicating unit |
| 27 | Liquid stop valve | 87 | Leak detector |
| 30 | Housing | 101 | Suction line to low point |
| 43 | Measuring line | | |

### 5.8.2 Horizontal cylindrical tank, double-walled steel, without suction line to low point



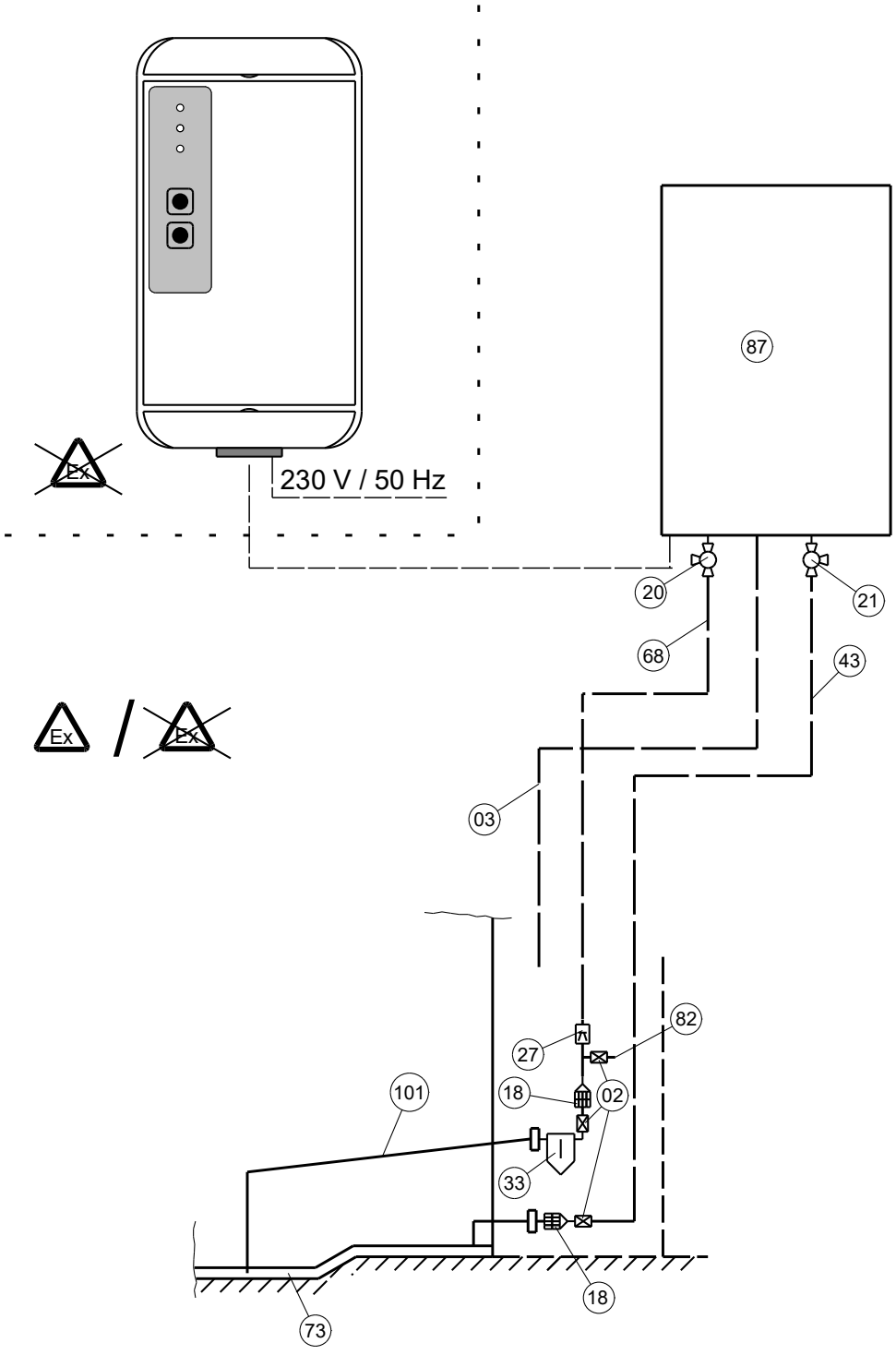

| | | | |
|---|---|---|---|
| 02 | Shut-off valve | 43 | Measuring line |
| 03 | Exhaust | 68 | Suction line |
| 18 | Detonation flame arrester | 73 | Interstitial space |
| 20 | Three-way valve in suction line | 82 | Connection assembly pump |
| 21 | Three-way valve in measuring line | 87 | Leak detector |
| 27 | Liquid stop valve | | |

### 5.8.3 Vertical cylindrical tank acc. to DIN 6618-2 (downwards outside suction line)



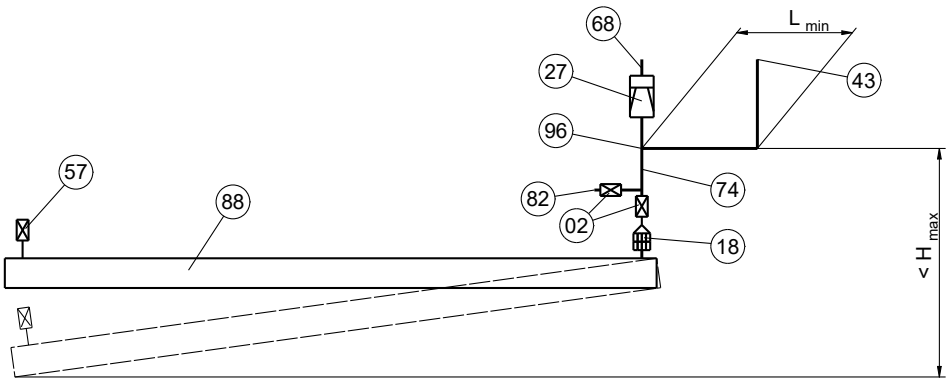

| | | | |
|---|---|---|---|
| 02 | Shut-off valve | 43 | Measuring line |
| 03 | Exhaust | 68 | Suction line |
| 18 | Detonation flame arrester | 73 | Interstitial space |
| 20 | Three-way valve in suction line | 82 | Connection assembly pump |
| 21 | Three-way valve in measuring line | 87 | Leak detector |
| 27 | Liquid stop valve | 101 | Suction line to low point |
| 33 | Condensate trap | | |

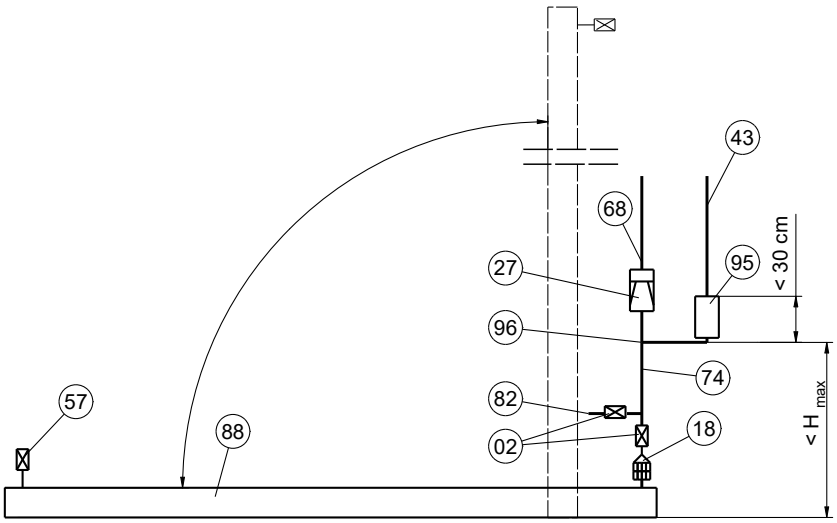
### 5.8.4 Tank with double bottom, exhaust opens in the open air

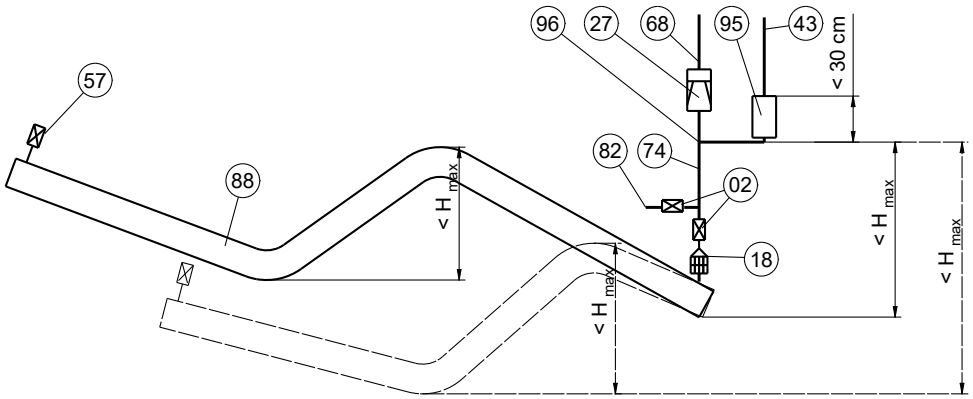



| | | | |
|---|---|---|---|
| 02 | Shut-off valve | 43 | Measuring line |
| 03 | Exhaust | 68 | Suction line |
| 18 | Detonation flame arrester | 73 | Interstitial space |
| 20 | Three-way valve in suction line | 82 | Connection assembly pump |
| 21 | Three-way valve in measuring line | 87 | Leak detector |
| 27 | Liquid stop valve | 101 | Suction line to low point |
| 33 | Condensate trap | | |

### 5.8.5 Double-walled pipe, single, feed pressure up to 5 bar



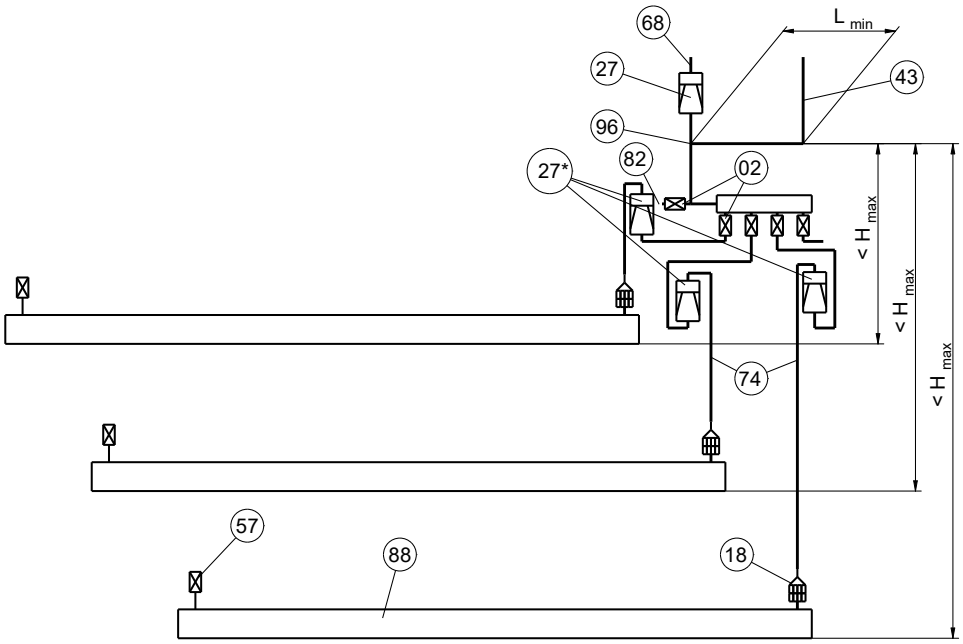



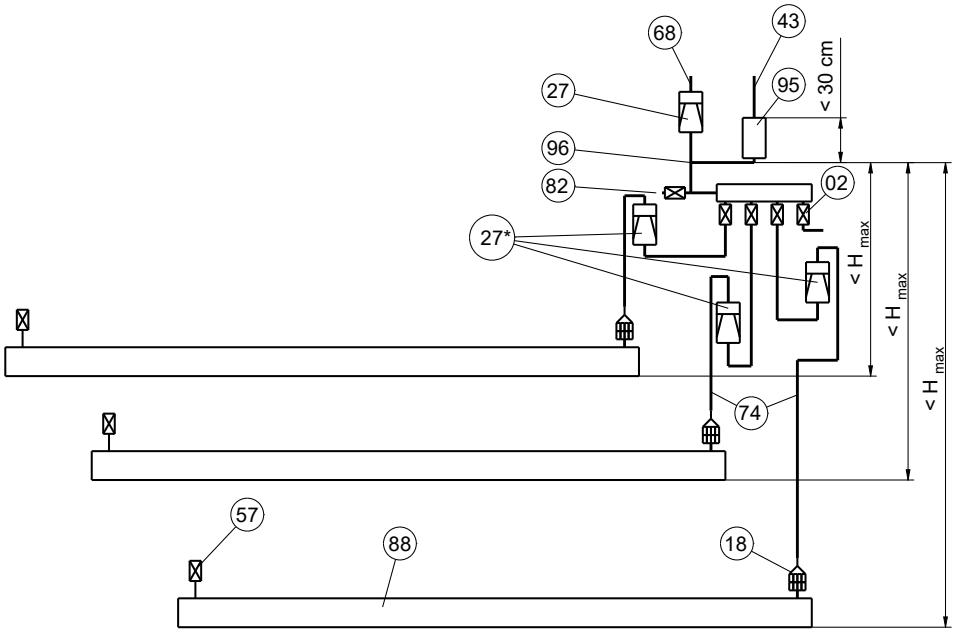




| | | | |
|---|---|---|---|
| 02 | Shut-off valve | 74 | Connection line |
| 18 | Detonation flame arrester | 82 | Connection assembly pump |
| 27 | Liquid stop valve | 88 | Double-walled pipe |
| 43 | Measuring line | 95 | Pressure compensation vessel |
| 57 | Test valve | 96 | Node point |
| 68 | Suction line | | |

### 5.8.6 Double-walled pipe, connected in parallel, feed pressure up to 5 bar

The liquid barriers (27*) connected in the opposite direction to the flow direction prevent the other interstitial spaces from being filled with leakage liquid in the event of a leak in one pipeline.



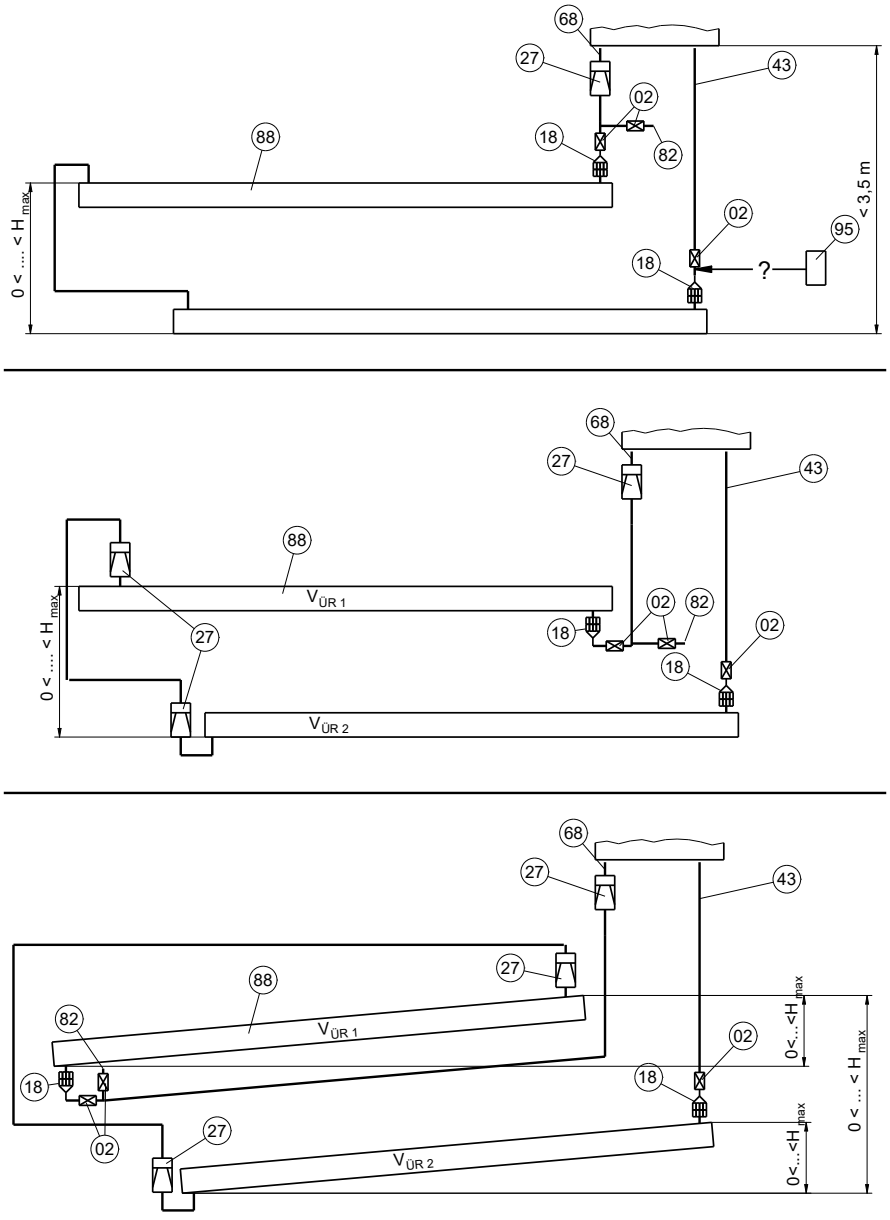




| | | | |
|---|---|---|---|
| 02 | Shut-off valve | 68 | Suction line |
| 18 | Detonation flame arrester | 74 | Connection line |
| 27 | Liquid stop valve | 82 | Connection assembly pump |
| 27* | Liquid stop valve, connected in the opposite Direction to the flow direction | 88 | Double-walled pipe |
| 43 | Measuring line | 95 | Pressure compensation vessel |
| 57 | Test valve | 96 | Node point |

## 5.8.7 Double-walled pipe, connected in series, feed pressure up to 5 bar

Requirement:

The volumes of the connected pipelines must comply with the following condition:
$3 \bullet V_{ÜR\,1} > V_{ÜR\,1} + V_{ÜR\,2} + V_{ÜR\,3} + V_{ÜR\,4}$
and
$3 \bullet V_{ÜR\,2} > V_{ÜR\,2} + V_{ÜR\,3} + V_{ÜR\,4}$ etc.
$V_{ÜR\,(number)}$ is the volume of the respective interstitial space. No. 1 is the interstitial space to which the suction line is connected.




| | | | |
|---|---|---|---|
| 02 | Shut-off valve | 68 | Suction line |
| 18 | Detonation flame arrester | 82 | Connection assembly pump |
| 27 | Liquid stop valve | 88 | Double-walled pipe |
| 43 | Measuring line | 95 | Pressure compensation vessel |

# 6. Commissioning

(1) Only perform commissioning once the steps in Section 5 “Mounting” have been completed

(2) If a leak detector is operated on an interstitial space that is already in operation, special protective measures must be taken (for example, testing for gas freedom 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.

(3) If an external vacuum pump is used to evacuate, this shall be carried out with **explosion protection** (see section 10, accessories). Warning: Be aware of temperature code, EX group, resistances!

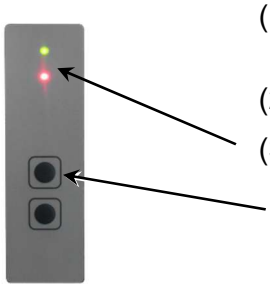
## 6.1 Tightness Test

Prior to commissioning, ensure the leak-tightness of the interstitial space.

The vacuum build-up (generally approx. 500 mbar) should be executed using an external vacuum pump.

The test is generally considered passed if the vacuum does not drop by more than 1 mbar within a test period (in minutes) calculated from the interstitial space volume divided by 10.
E.g.: The test period for an interstitial space volume of 800 liters is: 800/10 = 80 minutes. Within this test period, the vacuum must not fall below 1 mbar.

## 6.2 Commissioning the Leak Detector

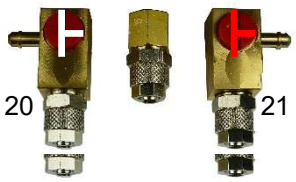


(1) Tightness of the interstitial space prior to commissioning is assumed.

(2) Connect voltage supply.

(3) Information leak indicating unit: Ascertain lighting of "Operation" and "Alarm" indicator lights and sounding of the audible alarm. If necessary, turn off audible alarm signal.

The vacuum pump in the working device starts immediately and builds up the vacuum in the monitored system (if the interstitial space has not already been evacuated).

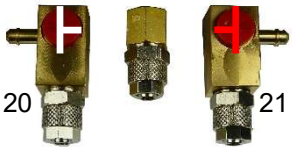



(4) Attach measuring gauge to connection on the three-way valve 21 in order to turn the valve 180°.
CAUTION: Explosive vapor-air mixtures can exist in the interior (of the test valve/connection line). Sufficient safety measures should be met (e.g., insert a diaphragm seal or a relevant, approved pressure measuring instrument, see e.g., section 10, accessories).

(5) The vacuum build-up can be monitored via the connected measuring gauge.


(6) If the vacuum build-up is too slow, an assembly pump can be attached to the connection on three-way valve 20.

Turn valve 180° and switch on the assembly pump.




(7) After the operating vacuum of the leak detector has been reached (pump in leak detector shuts off), turn three-way valve 20 180°, switch off the assembly pump, and remove it.

(8) Turn three-way valve 21 180° and remove the pressure measuring gauge.

(9) Perform a functional check according to Section 7.3.

# 7. Functional Check and Maintenance

## 7.1 General

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

(2) Frequent switching on or continuous running of the pump indicates leaks, which should be corrected within a reasonable time.

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

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

(5) The leak detector must be disconnected from the power when performing any repairs. if necessary. Test EX atmosphere.

(6) A loss of power is indicated by the "Operation" indicator light going off. Alarm signals are triggered via the potential-free relay contacts if contacts 60…67 of the leak indicating unit LAE were used.
After the power loss, the leak detector automatically goes into operation 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).

(7) CAUTION: For single-walled tanks, equipped with a flexible leak detector lining, the interstitial space can never be without pressure (collapse of the leak protection lining).

(8) To clean the leak detector, use a **moist** cloth (electrostatic).

## 7.2 Maintenance

- Maintenance work and functional checks must be performed by trained personnel only[11].
- 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.
- Comply with explosion regulations (if required), e.g., BetrSichV (and/or directive 1999/92/EC and the laws of the respective member states resulting therefrom) and/or others.
- As part of the annual functional check, check the motor of the pump for running noises (damaged bearings).
- The pump must be replaced after 30,000 h (rotation) (working time of the pump).
- If the pump or its exhaust-side piping is replaced or loosened, a leak test of the installed pump with 10 bar pressure must be carried out after the replacement to ensure the tightness of the exhaust in the housing.

[11] For Germany: Technical service according to water legislation with expertise in leak detection systems
For Europe: Authorization by the manufacturer

## 7.3 Functional Check

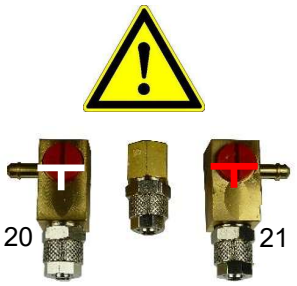
The functional and operational safety tests must be performed:

- after each commissioning
- according to the time intervals given in Chap. 7.2[12]
- each time a malfunction has been corrected

Two persons may be required to perform a functional check, depending on the type of pipeline or tank. The following contents must be observed or met:

- Coordinate the work to be performed with those responsible for operation.
- Observe the safety instructions for working with the product to be stored or conveyed.
- Checking and if necessary, emptying the condensate traps (7.3.1).
- Continuity test of the interstitial space (7.3.2)
- Testing the switching values with the interstitial space (7.3.3) or testing the switching values with testing equipment (7.3.4), see section 10, accessories
- Testing the pump delivery pressure (7.3.5)
- System tightness test (7.3.6)
- A test report must be completed, confirming functional and operational safety. (Test reports are available for download for the SGB website)

### 7.3.1 Checking and emptying the condensate traps, if required




CAUTION: The condensate traps may contain the stored/conveyed product. Take appropriate protective measures.

(1) Close any shut-off valves on the interstitial space side.

(2) Turn three-way valves 90° (20 clockwise, 21 counterclockwise). With that the connections lines are ventilated.

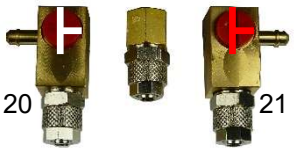
(3) Open and empty the condensate traps.

(4) Close the condensate traps.

(5) Turn three-way valves back to operating position.

(6) Reopen the valves closed I Nor. (1).

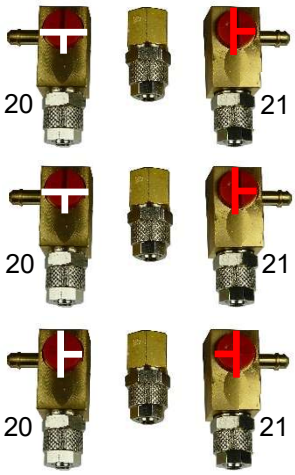
### 7.3.2 Checking free passage in the interstitial space




Checking the free passage of air ensures that an interstitial space is connected to the leak detector and that it has sufficient passage to cause an air leak to trigger an alarm.

(1) Attach the measuring gauge to the connection on three-way valve 21 and turn valve 180°.

[12] For Germany: In addition, national laws apply (e.g., AwSV)



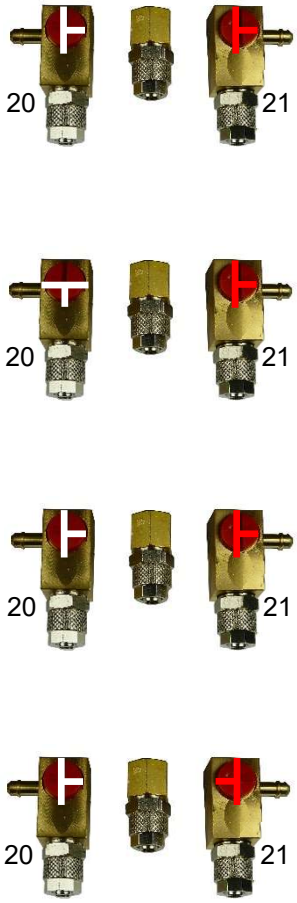

(2) For pipelines:
Open the test valve at the end opposite the leak detector; in case of multiple pipe interstitial spaces, the test valves must be opened sequentially at the end opposite the leak detector.

For tanks:
Turn three-way valve 20 90° (clockwise) so that the suction line and system are ventilated.

(3) Check if the measuring gauge registers a vacuum drop. If no pressure drop occurs, locate and correct the cause.

(4) Return three-way valves to the operating position and remove the measuring gauge.

### 7.3.3 Testing the switching values with the interstitial space




(1) Attach measuring gauge to connection on three-way valve 21 and turn valve 180°.

(2) For pipelines:
Open the test valve on the end away from the leak detector, in case of multiple pipe interstitial spaces, the leak detector-side shut-off valves of the interstitial spaces not included in the test can be closed.

For tanks:
Turn three-way valve 20 90° (clockwise) so that the suction line and system are ventilated.

(3) Check switching values ”Pump ON” and ”Alarm ON” (with visual and audible, if available). Record the values.

(4) Press the “Mute” button if necessary.

(5) Return three-way valve 20 to its original position or close test valve and check the switching values “Alarm OFF” and “Pump OFF”. Record the values.

(6) The unit passes the test if the measured switching values fall within the specified tolerance.

(7) Open any shut-off valves that were closed prior to the test.

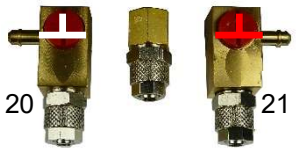
(8) Return three-way valves to the operating position and remove the measuring gauge.

### 7.3.4 Testing the switching values with the testing device – observe explosion protection

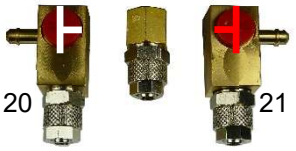
(1) Connect the testing device (see section 10, accessories) to the two hose ends on each of the free connections of three-way valves 20 and 21.

(2) Connect the measuring gauge to the T-piece of the testing device.

(3) Close the needle valve of the testing device.








(4) Turn three-way valve 20 90° (CCW) and three-way valve 21 90° (CW) so that the interstitial space is disconnected.
The interstitial space volume is now simulated by the test tank.

(5) The operational vacuum is now established in the test tank.

(6) Ventilate using the needle valve, check switching values “Pump ON” and “Alarm ON” (visual and acoustic, if necessary). Record the values.

(7) Press the “Mute” button if necessary.

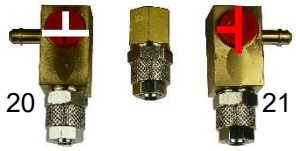
(8) Slowly close the needle valve and check switching values “Alarm OFF” and “Pump OFF”.

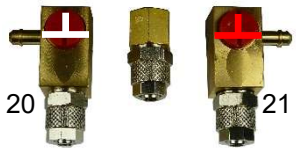
(9) The unit passes the test if the measured switching values fall within the specified tolerance.

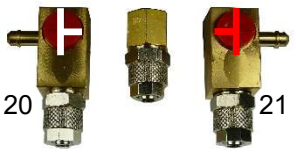
(10) Turn back three-way valves 20 and 21 and remove the testing device.

### 7.3.5 Testing the pump delivery pressure

The test of the delivery pressure of the pump is carried out in order to determine if the vacuum source is capable of establishing the operating vacuum in the interstitial space.




(1) Attach measuring gauge to connection on three-way valve 20 and turn valve 90° (CCW).

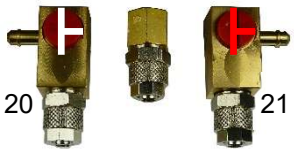
(2) The pump is usually not running at this moment, i.e., the pressure sensor must be vented to start the pump.

(3) Turn three-way valve 21 90° (CW). The pressure sensor is vented, the pump starts (and the alarm is triggered, acknowledge if necessary).

(4) This unit passes the test if the suction height of the vacuum pump is at least 40 mbar higher than the switching value “Pump OFF” (i.e., the operational vacuum).

(5) Once the test is complete, return valves to their original positions and remove the measuring gauge.

### 7.3.6 System Tightness Test

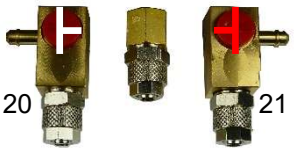



(1) The system tightness requirement is defined in section 6.1.

Determine the test period for each interstitial space connected (and/or the entire monitored system) (calculate or use test reports prepared by SGB GmbH).

(2) Attach the measuring gauge to the connection on three-way valve 21 and turn valve 180°.

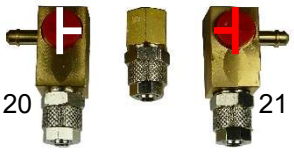
(3) Read off and record starting vacuum and time. Wait for the test period to elapse and determine the vacuum drop.




(4) The test is considered passed if the vacuum does not drop by more than 1 mbar during the test period.
Of course, a multiple of the test period can also be measured; in this case, the permissible vacuum drop is also a multiple.

(5) Once the test is complete, return valves to their original positions and remove the measuring gauge.

### 7.3.7 Achieving the Operating Condition




(1) Test if all pneumatic connections are completed.

(2) Check that the three-way valves are in the correct position.

(3) Seal the housing.

(4) Seal the shut-off valves (between the leak detector and interstitial space) for each connected interstitial space in the open position.

(5) Attach a sign with troubleshooting information.

(6) Fill out a test report and hand over to the operating company.

# 8. Malfunction (Alarm)

## 8.1 Alarm Description

If an alarm goes off, one must assume that there is an explosive vapor-air mixture in the interstitial space. Take appropriate protective measures.

(1) An alarm (vacuum loss) is indicated by the red “Alarm” signal lamp lighting up and the sounding of the audible signal, if available.

(2) Close any shut-off valves in the connection line between the interstitial space and leak detector.

(3) Shut off the audible signal by activating the “Mute“ button, if available.

(4) Inform the installation company.

(5) The installation company must detect the cause and correct it.
CAUTION: Depending on the tank/pipelines, there could be liquid under pressure in the connection lines.
CAUTION: Do not depressurize the interstitial space in the tanks with flexible leak protection lining (risk of collapse of the insert).

(6) Repairs to the leak detector (e.g., replacement of components) may only be made outside the ex-area, or if suitable safety measures have been met.

(7) Perform a functional check as per 7.3.

## 8.2 Malfunction

In case of a malfunction, only the red signal lamp will light up in addition to the green signal lamp (yellow is off), and at the same time, the audible signal cannot be acknowledged.

## 9. Spare parts

Click at our B2B web shop to find out about spare parts:
shop.sgb.de/en

## 10. Accessories

For practical and helpful accessories, please refer to our website shop.sgb.de/en. The suitability for the respective application (resistances, Ex-groups, temperature classes etc.) must be observed!

- Testing Device
Art.no. 115395

- Electrical Separator
Art.no. 340400-06

- Hood for Housing
Art.no. 412261

- Digital Measuring Device DM 115 Ex
Art.no. 115381

- Ex-Vacuum Installation Pump
Art.no. 200860

# 11. Disassembly and Disposal

## 11.1 Disassembly

Prior to and during works, make sure the unit is free of gas and the breathing air contains sufficient oxygen levels!

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).

## 11.2 Disposal

Properly dispose of contaminated components (possibly through outgassing).

Properly dispose of electronic components.

# 12. Appendix

## 12.1 Use of Interstitial Spaces That Are Filled with Leak Detector Fluid

### 12.1.1 Requirements

(1) Only leak detectors with suitable alarm pressures which depend on the tank diameter and the density of the stored material may be used.

(2) The procedure described below is intended for the horizontal cylindrical tanks (e.g., DIN 6608 or EN 12285-1).

(3) If this method is used on other tanks, the permission of the locally responsible authority is required on a case-by-case basis.

### 12.1.2 Preparation

(1) Remove the fluid-based leak detector.

(2) Remove the leak detection fluid from the interstitial space by suction. Follow this procedure:

- Connect the suction line connection of the assembly pump to a tank[13] socket with intermediately connected tanks.
- Suction out until no more liquid is being suctioned.
- Assembly of a (large) shut-off valve (at least ½") on the other connection and close the shut-off valve.
- Pump out liquid until no more liquid comes into the intermediate tanks.
- Suddenly open shut-off valve (with pump running) so that a further “surge” of leak detecting fluid enters the intermediate tanks.
- Continue operating with opening and closing of the test valve until no fluids enter the intermediate tanks either in the open position or in the close position.

### 12.1.3 Installation and Commissioning of the Leak Detector

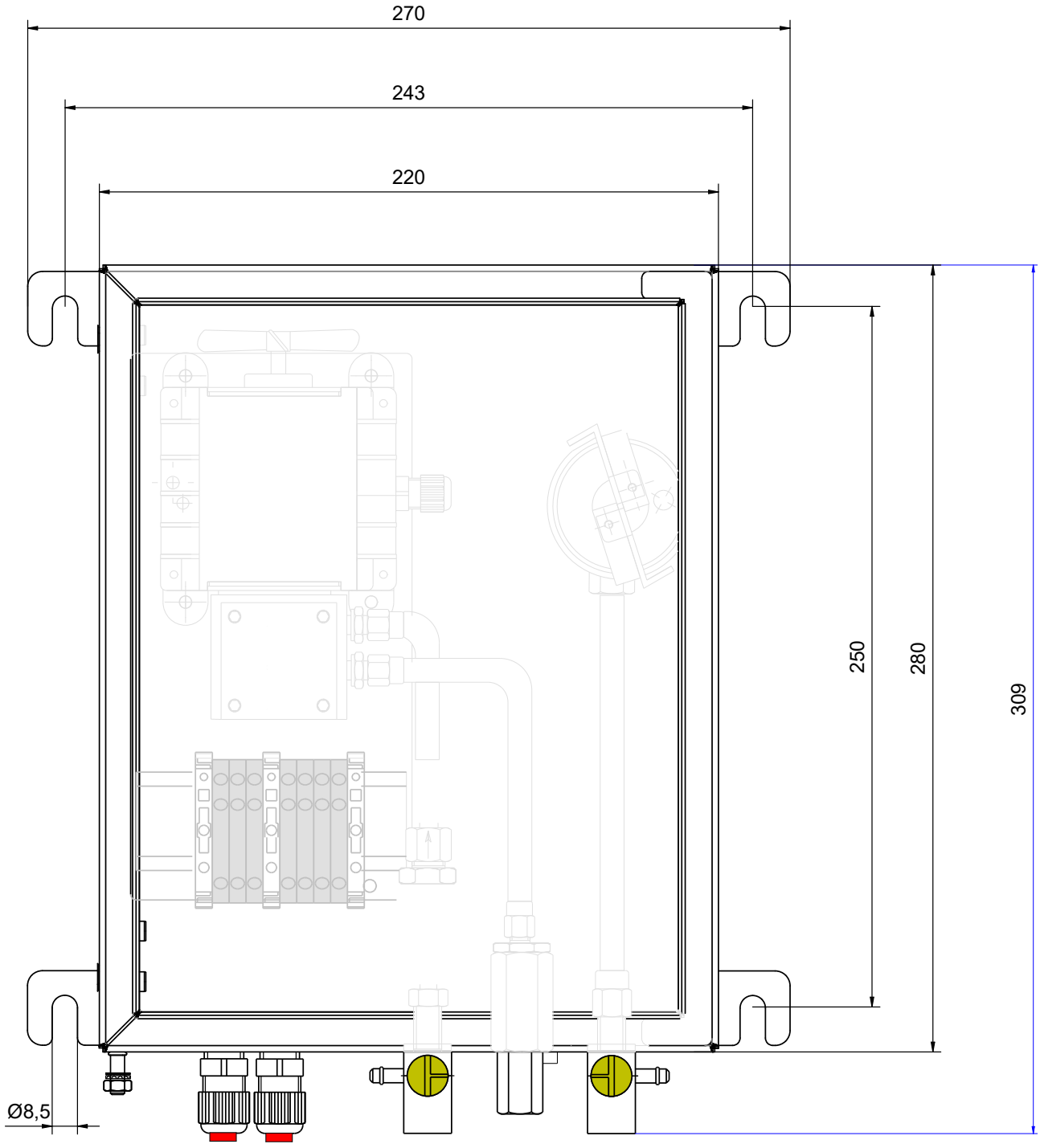
(1) The suctioning of the leak-detection liquid creates an air cushion above the leak detection liquid.

(2) Install the leak detector according to the documentation and start it up.

(3) Perform a functional check on the leak detector.

[13] The liquid to be suctioned out is collected in this tank.

## 12.2 Dimensions and Drilling Pattern




D = 120 mm

## 12.3 Declaration of Conformity

We,

SGB GmbH
Hofstr. 10
57076 Siegen, Germany,

hereby declare in sole responsibility that the leak detector

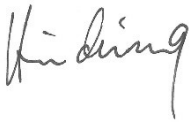
**VLX .. A-Ex**

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

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

| Number / short title | Satisfied regulations |
|---|---|
| 2014/30/EU<br>EMC Directive<br>SI 2016 No. 1091 | EN 55014-1:2017 / A11:2020;<br>EN 55014-2:1997 / A1:2001 / A2:2008<br>EN 61000-3-2:2014; -3-3:2013 |
| 2014/34/EU<br>Equipment for Ex Areas<br>SI 2016 No. 1107 | The pneumatic components of the leak detector may be connected to spaces (interstitial spaces of pipelines/fittings) that require category 1 devices. The following documents have been consulted:<br>TÜV-A 19 ATEX 1119 X with:<br>EN 60079-0:2012/corr. 2013; EN 60079-1:2007 (Micro switch)<br>EN 60079-7:2015/A1:2018 EN 60079-18:2015/A1:2017<br>EN 60079-26:2015<br>The ignition hazard analysis did not result in any additional hazards.<br>Marking of the component:<br>⟨Ex⟩ II 1/2(2)G Ex eb mb IIB T3(T4) Ga/Gb<br>with detonation flame arrester:<br>⟨Ex⟩ II G IIB3 |
| Notified body<br>with the code number | TÜV Austria Services GmbH<br>0408 |
| 2014/68/EU<br>Pressure Equipment Directive<br>SI 2016 No. 1105 | Pressure accessory without safety function acc. to Art. 1 No. (2) letter f) iii) |

Compliance is declared by:



Last updated: 02/2023

ppa. Martin Hücking
(Technical Director)

## 12.4 Declaration of Performance

Number: **003 EU-BauPVO 2014**

1. Distinct identification code of the product type:

   ***Vacuum leak detector type VLX .. A-Ex***

2. Purpose of use:

   ***Class I vacuum leak detector for monitoring double-walled tanks and pipes***

3. Manufacturer:

   ***SGB GmbH, Hofstr. 10, 57076 Siegen, Germany***
   ***Tel.: +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 case 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, Deutschland***
   ***Identification number of the notified testing laboratory: 0045***

7. Declared performance:

| Essential characteristics | Performance | Harmonized standard |
|---|---|---|
| Electrical function | corresponds to documentation | EN 13160-2: 2003 |
| Operating/alarm signal light | Green/red | |
| Tightness test | < 1 Pa l/s | |
| Pressure switching values, depends on type | satisfied | |
| Ensuring the Alarm | System requirement (met, if field of application is observed) | |

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

   Dipl.-Ing. M. Hücking, Technical Director

   Siegen, 02-2023

## 12.5 Declaration of Compliance of the Manufacturer

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.

ppa. Dipl.-Ing. M. Hücking, Technical Director

Siegen, 02-2023

## 12.6 Ex-Approval

ZERTIFIKAT | CERTIFICATE | CERTIFICAT | CERTIFICADO | СЕРТИФИКАТ | شهادة | 证书 | 인증서

TÜV AUSTRIA

# Certificate

(1) 1. SUPPLEMENT to EU - TYPE EXAMINATION

acc. Directive 2014/34/EU Annex III figure 6

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

| | | |
|---|---|---|
| (3) | 1. Supplement to EU - Type Examination Certificate Number: | **TÜV-A 19ATEX0119 X** |
| (4) | Product: | **Vacuum leak detector** |
| | Type: | **VLXE ...Ex** **VLXE ... A-Ex**<br>**VLX ... A-Ex** **Klemmenkasten** |
| (5) | Manufacturer: | **SGB GmbH** |
| (6) | Address: | **Hofstraße 10**<br>**57076 Siegen** |

(7) This 1st supplement certificate extends EU – Type Examination Certificate No. TÜV-A 19ATEX0119 X to apply to products designed and constructed in accordance with the specification set out in the Schedule of the said certificate but having any variations specified in the Schedule attached 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 the product, as modified by this supplement certificate, 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 2020-TAD-000130.

(9) In accordance with Article 41 of Directive 2014/34/EU, EC-Type Examination Certificates referring to 94/9/EC that were in existence prior to the date of application of 2014/34/EU (20 April 2016) may be referenced as if they were issued in accordance with Directive 2014/34/EU. Supplement Certificates to such EC-Type Examination Certificates, and new issues of such certificates, may continue to bear the original certificate number issued prior to 20 April 2016

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

**see (15)**

Online Verification

Vienna — Place
25.11.2020 — Date
Michael Reuschel
***Notified Body 0408***
**TÜV AUSTRIA SERVICES GMBH**







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Akkreditierung Austria A 0274 ISO/IEC 17020

028195-20-1

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(13)

(14)

# Schedule

## 1. SUPPLEMENT to EU - TYPE EXAMINATION
## TÜV-A 19ATEX0119 X

(15) **Description of the variation to the Product:**

The following changes and additions have been made:

**VLX ... A-Ex**
Version in 230 V with leakage indication device (LAE) outside the Ex-area

The following components are used in the housing:

| Equipment | EC-Type Examination |
|---|---|
| Pump | TÜV-A 18 ATEX 0058 X in connection with TÜV-A 18 ATEX 0057 X |
| Pressure switch | EPS 14 ATEX 1 688 U |
| Detonation safety devices | |
| F 501 or F 502 | PTB 02 ATEX 4012 X PTB 09 ATEX 4002 |

The terminals and cable glands comply with the type of protection Ex "eb".

**VLX ... A-Ex**
Version in 230 V with leakage indication device (LAE) outside the Ex-area

| Equipment | EC-Type Examination |
|---|---|
| Pump | TÜV-A 18 ATEX 0058X in connection with TÜV-A 18 ATEX 0056X |
| Pressure sensor | TÜV-A 18 ATEX 0051 |
| Detonation safety devices | |
| F 501 or F 502 | PTB 02 ATEX 4012 X PTB 09 ATEX 4002 |

The terminals and cable glands comply with the type of protection Ex "eb".

**Terminal box**
Connection of max. 16 solenoid valves and max. two pumps.

The terminals used and the cable and power entries comply with the Type of protection Ex "eb".





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1230 Vienna / Austria
Tel.:+ 43 5 0454-6402
E-Mail: wien.et@tuv.at
Web: http://www.tuv.at

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**Electrical data:**

| VLX .. A-Ex | |
|---|---|
| Rated voltage: | 230 VAC |
| Rated frequency: | 50 Hz |
| Rated power: | 50 W |

| VLXE .. A-Ex | |
|---|---|
| Rated current:: | 24 VDC |
| Rated power: | 50 W |

| Klemmenkasten | |
|---|---|
| Max. voltage | 24 VDC |
| Max. current | 4 A |
| Contact resistance terminal block acc. IEC 60947-7-x | 1,33 mOhm |
| Max. terminal block | 32 |
| Max. section | 2,5 mm² |

**Marking:**

| | |
|---|---|
| VLX ... A-Ex | EX 1/2 (2) G Ex eb mb IIB H2 T3<br>without detonation safety devices with motor Type Ex-3038-117<br>EX 1/2 (2) Ex eb mb IIB H2 T4<br>without detonation safety devices with motor Type Typ Ex-3038-65<br>EX 1/2 (2) Ex eb mb IIB3 T3<br>with detonation safety devices with motor Type Ex-3038-117<br>EX 1/2 (2) Ex eb mb IIB3 T4<br>with detonation safety devices with motor Type Ex-3038-65<br>EX 1/2 (2) Ex eb mb IIC T3<br>with detonation safety devices with motor Type Ex-3038117<br>EX 1/2 (2) Ex eb mb IIC T4<br>with detonation safety devices with motor Type Ex-3038-65 |
| VLXE ... A-Ex | EX 1/2 (2) Ex eb mb IIB H2 T4<br>without detonation safety devices<br>with Motor Typ GMEX 24-65-25<br>EX 1/2 (2) Ex eb mb IIB3 T4<br>with detonation safety devices Typ 501<br>with Motor Typ GMEX 24-65-25<br>EX 1/2 (2) Ex eb mb IIC T4<br>with detonation safety devices Type 502<br>with Motor Typ GMEX 24-65-25 |
| Klemmkasten | EX 2 G Ex eb IIC T4 |





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(16) **Test report**

TÜV-A 19ATEX0119 X

TÜV AUSTRIA

(17) **Specific Conditions of Use**

The following additional special conditions for safe installation and safe operation of the device apply to the types VLX ... A-Ex / VLXE ... A-Ex / Klemmenkasten:

a) The housing in the ignition protection type of flameproof enclosure must bear the warning marking:
WARNING - DO NOT OPEN WITHIN A POTENTIALLY EXPLOSIVE AREA

b) The supply must be provided by the corresponding leak detection device.

c) All other special conditions from the EC-Type Examination
No. TÜV-A 19ATEX0119 X are not applicable for the above-mentioned types

d) For Type VLXE ...Ex the special conditions from the EU type examination remain unchanged.

(18) **Essential Health and Safety Requirements**

Covered by the application of following standards:

| | |
|---|---|
| EN 60079-0:2012/corr. 2013 | EN 60079-7:2015 |

(19) **Drawings and documents**

| Document / Drawing no / File name/ Reference | Rev | Pages | Date | Description |
|---|---|---|---|---|
| TÜV-A 19ATEX0119 X | 00 | 3 | 24.07.2020 | EC-Type Examination |
| TUV-A 2020-TAD-000130 | 00 | 8 | 25.11.2020 | test report |
| Z -035330 | 00 | 2 | 16.10.2020 | Drawing VLXE ... Ex |
| Z -096 330-01 | 00 | 2 | 26.02.2018 | Drawing VLX ... Ex |





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## 12.7 Certificates TÜV-Nord

Note: Translation of the German original version not checked by TÜV Nord

**TÜV NORD Systems GmbH & Co. KG**
PÜZ (testing, supervision and certification) — centre for containers, pipelines and pieces of equipment for systems with substances hazardous to water

Große Bahnstraße 31.22525 Hamburg
Tel.: 040 8557-0
Fax: 040 8557-2295
hamburg@tuev-nord.de
www.tuev-nord.de

### Certification

**Contracting body:**
SGB GmbH
Hofstr. 10
D-57076 Siegen

**Manufacturer:**
see above

**Subject of testing:**

**Leak detector with leak detector system type VLX ... in the versions VLX .../Ex, VLX .../A-Ex according to DIN EN 13160-1:2003 and DIN EN 13160-2:2003 class 1 vacuum monitoring system**

**Types of tests:**
Testing of the building product before confirming conformance in line with the ÜHP (manufacturer's declaration of conformity) procedure (initial testing)

**Testing period:** 05/28 - 10/24/2014

**Test results:**
The leak detector type VLX 330 / Ms as a sample for vacuum systems corresponds to the leak monitoring system class 1 according to EN 13160-1:2003 and meets the requirements of EN 13160-1:2003 in conjunction with the EN 13160-2:2003. Regarding the area of application and the installation of the leak detector, the specifications in the
– operating manual "Vacuum Leak Detector VLX ..", document no. 602.200, updated 10/2014
– operating manual "Vacuum Leak Detector VLX ..", document no. 602.205, updated 12/2013
– operating manual "Vacuum Leak Detector VLX ..", document no. 602.408, updated 04/2014 apply

Details on testing can be found in the test report PÜZ PÜZ 8111401078 dated 10/24/2014 for leak detector type VLX....

Hamburg, October 29, 2014

Page 1 of 1

Note: Translation of the German original version not checked by TÜV Nord

**TÜV NORD Systems GmbH & Co. KG**
PÜZ – Center for containers, pipes and equipment for plants with materials hazardous to water

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

**Amendment to the change of the device configuration for the low pressure leak detector type VLX../A-Ex**
**Approval 65.22-340**
**Approval 65.22-341**

**Ordering party / manufacturer**
SGB GmbH
Hofstraße 10 2
D-57076 Siegen

**Reason for the statement**
Change of the device configuration of the leak detector type VLX../A-Ex for ensuring the alarm function for installations with distances of up to 500 m between working equipment and indicating unit (alarm unit)

**Test:**
The TÜV NORD Systems GmbH & Co. KG test center for leak indicating systems was commissioned to test whether the functional safety of the leak indicating system is still ensured after the operational voltage of the alarm circuit has been converted from 230 VAC to 24 VDC using an appropriate control transformer.

**Result:**
From the point of view of the TÜV NORD Systems GmbH & Co. KG test center for leak indicating systems, there are no concerns regarding the changed supply voltage for the alarm circuit of the low pressure leak indicator VLX../A-Ex according to the circuit diagram SL-854 400-25 of 3/4/2016, if the following requirements are met:

1. The secondary side of the retrofit control transformer 230V/24V must be connected with the device ground electrode via the PE wire.

2. After the installation of the leak detector, the alarm function must be tested as part of the commissioning test of the device, and the result must be documented in the specialist company expert's test report.

This certification is valid in association with test certificate 8112692865 of 9/3/2015.

Hamburg, 8/12/2016

Imprint

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