Documentation

Vacuum leak detector VLX .. SA-Ex

Read the instructions prior to commencing any work

As of: 10/2024

Item no.: 602802

Table of Contents

1. General

1.1 Information

These instructions provide important information on using the VLX 350 SA-Ex vacuum leak detector, a partly explosion-proof vacuum leak detector without integrated pressure generator with an alarm vacuum of at least 350 mbar.

Design variations:

a) Additional pre-alarm (warning before the actual alarm is signaled)
b) Completely explosion-proof

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.

Caution: Risk of fatal injury resulting from the loss of explosion protection!

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:

- Noncompliance with these instructions,
- Improper use,
- Use of unqualified personnel,
- Unauthorized modifications,
- Connection to systems not approved by SGB.

1.4 Copyright

The contents, texts, drawings, images, and other representations are copyrighted and subject to industrial property rights. Any misuse is punishable.

1.5 Warranty Conditions

We provide warranty for the VLX 350 SA-Ex leak detector 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/en or the label of the leak detector.

2. Safety

2.1 Intended Use

WARNING!

Danger from Misuse

- Vacuum leak detector for double-walled tanks and pipelines
- 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.
- Classification of possible vapor-air mixtures of the stored/transported material into gas group IIA, IIB or IIC and into temperature codes T1 to T6
- Grounding/potential equalization in accordance with applicable regulations (e.g. EN 1127)
- Tightness of the interstitial spaces according to this documentation
- The volume of the space monitored using a leak detector may not exceed 10 m^3 (manufacturer recommendation: 4 m^3).
- Contact manometer ambient temperature: -20°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.
- For the VLX 350 SA-Ex, stainless steel (1.4571) must be sufficiently resistant to the stored/transported material.
- Conduits for feeding through the electrical connection lines in dome or inspection chambers must be sealed gas-tight.
- Ground/main voltages must be at the same potential as the equipotential bonding of the tank/pipelines.
- The power supply cannot be disconnected
- No unauthorized modifications (both to the contact manometer and to the leak indicating unit)

Any claims arising from misuse are excluded.

Caution: The device may not be adequately protected if it is not used as specified by the manufacturer.

2.2 Obligation of the Operating Company

The VLX.. SA-Ex leak detector is used in the commercial sector. 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 "Safety Book"

Wear 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)

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

2.5 Fundamental Hazards

DANGER
From electric current

Make sure that the VLX 350 SA-Ex is disconnected from the power supply before starting work on its electrical components.

Comply with relevant regulations regarding electrical 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) (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.

3. Technical Data

3.1 General Data

Dimensions and drilling pattern:	see section 12.1
Weight:	approx. 1.5 kg
Storage temperature range:	-20 °C to +70 °C
Operating temperature range:	
Leak indicating unit:	0 °C to +40 °C
Contact manometer:	-20 °C to +60 °C
Degree of protection:	
Leak indicating unit housing:	IP 30
Leak detector (contact manometer):	IP 65
Max. height for safe operation:	≤ 2000 m above sea level
Max. relative humidity for safe operation:	95 %
Buzzer volume:	> 70 dB(A) at 1 m
Indicating range:	0 mbar to -1000 mbar
with colored marking	
red (= alarm):	0 mbar to -350 mbar
green (= normal operating condition):	-350 mbar to -700 mbar
red crosshatched (= excessive vacuum):	-700 mbar to -1000 mbar
Burst pressure:	min. 50 bar
Pneumatic explosion protection for gas group:	II C
Contact design:	SN

3.2 Electrical Data

Power supply:	230 V - 50Hz - 10 W
Switching contact load at terminals 4, 5:	max. 2.5 A
Switching contact load at potential-free contacts:	230 V, 50 Hz, 1 A 24 V DC/1 A resistive load
External fuse for leak detector:	max. 10 A
Overvoltage category:	2
Degree of soiling:	PD2

3.3 EX data of control unit (leak indicating unit)

Marking:	II (1) G [Ex ia, Ga] IIC
Voltage U_o:	9.56 V
Current I_o:	16.8 mA
Power P_o:	41 mW (linear characteristic)

3.4 EX data of contact manometer

Marking with flame arrester F 502:	II 1/2 G Ex ia IIC T6[2]
Voltage U_i:	16 V
Current I_i:	25 mA
Power P_i:	64 mW
Capacitance C_i:	30 nF
Inductance L_i:	100 µH

Note: Evidence of intrinsic safety must be provided!

3.5 Switching values of leak detector

Alarm ON, at the latest:	-375 ± 25 mbar
Recommended operating pressure to be applied (nominal pressure):	> -350 mbar to max. -700 mbar

3.6 Field of Application

3.6.1 Tanks

a) DIN 6618 T2:1989

Usage limits:

Tank diameter [mm]	Tank height [mm]	Max. density of stored material kg/dm³
1600	2 820	≤ 1.90
	3 740	≤ 1.90
	5 350	≤ 1.50
	6 960	≤ 1.12
2000	5 400	≤ 1.52
	6 960	≤ 1.15
	8 540	≤ 0.92
2500	6 665	≤ 1.22
	8 800	≤ 0.92
2900	8 400	≤ 0.97
	9 585	(≤ 0.63)[3]
	12 750	(≤ 0.61)
	15 950	(≤ 0.48)

Evidence of assurance of the alarm signal must be provided!

[2] Maximum permissible ambient temperature in °C when used for temperature code T6: 60 °C, T5–T1: 70 °C
[3] Values in parentheses () are not meaningful, but are included for the sake of completeness

(1) To ensure the alarm signal, the interstitial space volume must be reduced by V = 52% by incoming liquid.

(2) Based on the alarm pressure (alarm ON), the interstitial space (in case of a leak) can be filled up to a height h_1 with respect to the tank low point.

$$h_1 = \frac{p_{AE}}{g \cdot \rho}$$

with:

H1 height in m

p_{AE} alarm pressure: 35000 Pa

ρ Density in kg/m³

G Gravitation constant: 9.81 m/s²

(3) The interstitial volume V_1 at a fill level of h_1 is determined by calculating (or gauging the capacity by liters), while taking into account the tank geometry.

(4) The alarm is considered ensured if the following condition is met:

$$V < \frac{V_1}{V_0} \cdot 100\%$$

with:

V volume to be displaced in %

V_1 interstitial space volume from the lowest point of the interstitial space to height h_1 in m³

V_0 total interstitial space volume in m³

b) Other suitable double-walled tanks (also single-walled with leak protection lining or jacket) to the lowest point of the routed suction line. 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.

c) Tanks with double-layered floor, which have a suction line to the lowest point of the interstitial space (e.g. DIN 4119)

3.6.2 Pipelines

Double-walled pipelines that are approved by a construction authority laid out according to the installation examples.

The feed pressure in the inner pipe may not exceed 25 bar.

The following dimensions depending on density ρ must be complied with[4]:

[4] The different heights (H and h) result from the pipeline laying procedure. The laying procedures are presented as installation examples (see page 25 f)

Density ρ in kg/dm³	Height H in m	Height h in m
1.0	≤ 6.7	≤ 3.2
1.1	≤ 6.1	≤ 2.9
1.2	≤ 5.6	≤ 2.7
1.3	≤ 5.2	≤ 2.5
1.4	≤ 4.8	≤ 2.3
1.5	≤ 4.5	≤ 2.1
1.6	≤ 4.2	≤ 2.0
1.7	≤ 3.9	≤ 1.9
1.8	≤ 3.7	≤ 1.8
1.9	≤ 3.5	≤ 1.7

3.6.3 Monitorable fluids

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 classifiable into gas group IIA; IIB or IIC and temperature codes T1 to T6.
- For the VLX 350 SA-Ex vacuum leak detector, the stainless steel used must be sufficiently[5] resistant to the liquids (stored/transported material).

[5] "Sufficiently" means that the physical properties are not adversely affected. Discoloration is acceptable.

4. Design and Function

4.1 System Design

The VLX 350 SA-Ex vacuum leak detector consists of a leak indicating unit as well as a leak detector (= contact manometer). It is partly explosion-proof and does not have an integrated pressure generator.

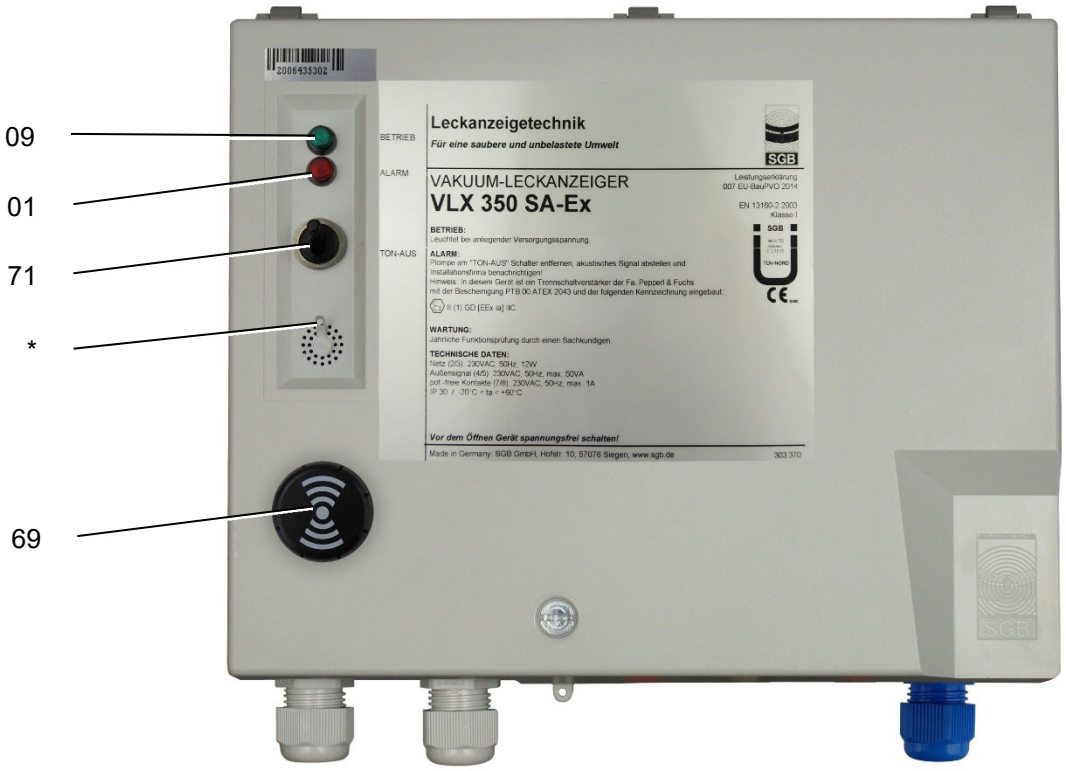
Design variations:

a) additional pre-alarm (warning before the actual alarm is signaled)

b) completely explosion-proof

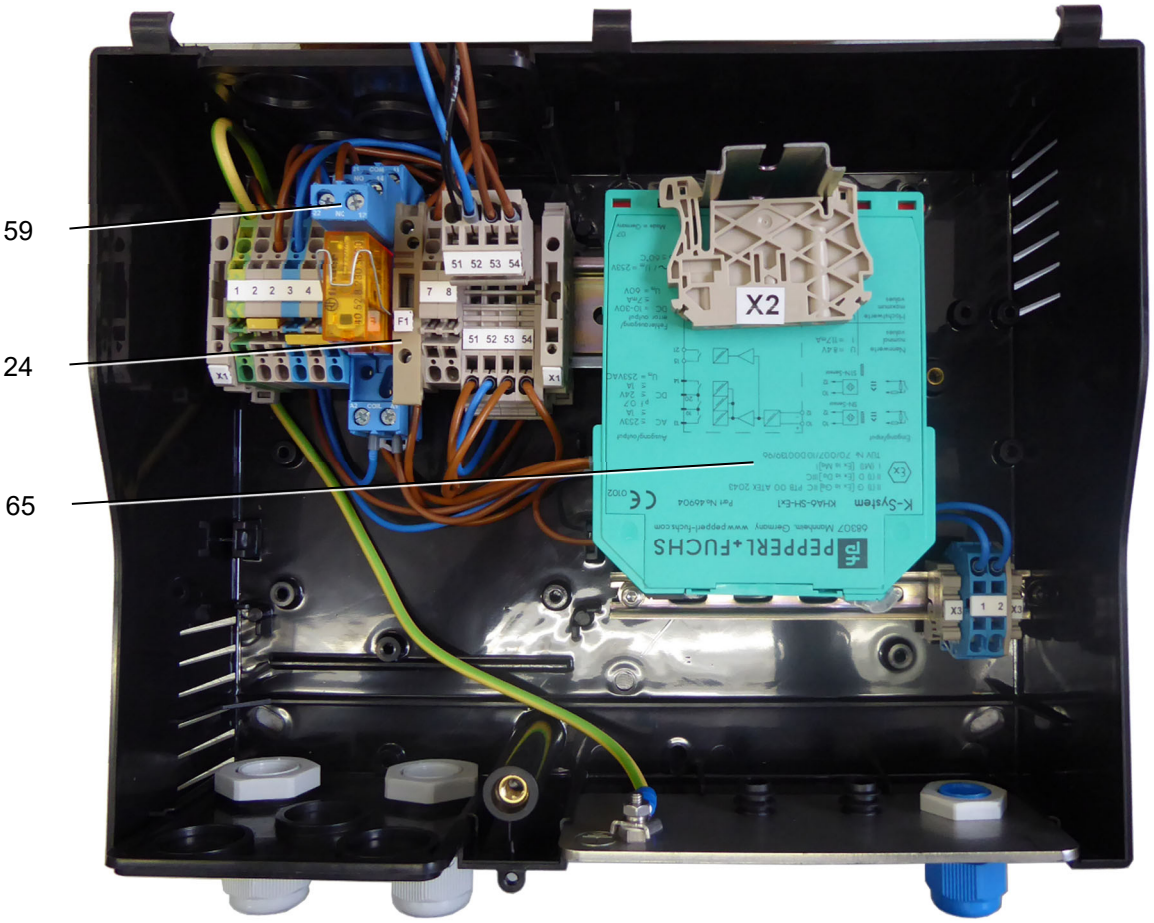
CAUTION: Risk of fatal injury resulting from the loss of explosion protection!

The VLX 350 SA-Ex leak detector monitors both walls of a tank/pipeline for leaks. The vacuum created by an external installation pump is so high that leaks in the inner or outer walls are indicated by a vacuum drop (= pressure increase).



Leak indicating unit with:

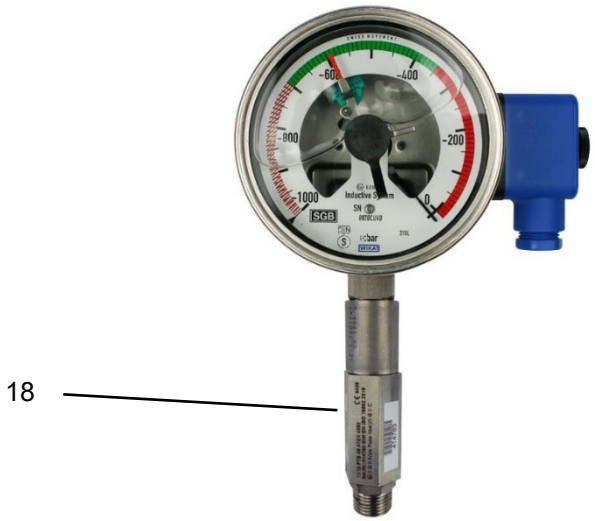
01	Signal lamp "alarm", red
09	Signal lamp "operation", green
69	Buzzer
71	"Mute" button/toggle switch
*	Sealing eyelet



Inside view of leak indicating unit with:

24	AS fuse
59	Relay
65	Control unit

Leak detector/contact manometer:



18	Detonation flame arrester

4.2 Normal Operating Condition

The normal operating condition is reached during commissioning by building up the operating vacuum using an external installation pump.

The vacuum existing in the interstitial space is monitored by the leak detector (contact manometer).

Any leaks will lead to a vacuum drop. Consequently, high demands are placed on the impermeability of the interstitial space and the connection lines in order 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 low 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 the amount of liquid that has penetrated the interstitial space is such that the set alarm vacuum is reached.

If several pipelines are connected to a VLX 350 SA-Ex leak detector at the same time (see Fig. M3 - 100 380, page 26), liquid stop valves should be installed against the direction of flow so that if there is a leak in one of the pipelines, the leaking liquids are prevented from entering the interstitial spaces of the other pipes.

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

Before the leak detector is commissioned again, the drawn-in liquid must be completely extracted via the suction line!

4.5 Displays and controls

4.5.1 Display

Indicator light	Operating condition	Alarm state	Alarm, audible alarm acknowledged
OPERATION: green	ON	ON	ON
ALARM: red	OFF	ON	ON

4.5.2 "Turn off audible alarm signal" function

Activate the "Mute" button/toggle switch; the audible signal turns off and the red LED lights up.

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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.
- The approvals of the manufacturer of the tank or interstitial space must be complied with.
- Only qualified service companies may be used for assembly and commissioning[6].
- Comply with relevant regulations for prevention of accidents.
- Comply with relevant regulations regarding electrical installation[7] (e.g. EN 60079-14) and explosion protection[8] (e.g. EN 60079-17).
- 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
- Before installation, check the device for transport damage. Report any obvious damage immediately!

- Feed-throughs for pneumatic and electric connection lines, through which the EX-atmosphere can carry over, must be sealed gas-tight.
- Pneumatic connections and fittings must be designed to at least PN 10. If the contact manometer is installed at the lowest point, the static pressure (or feed pressure) of the liquid must also be taken into account.
- 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 pipeline/tank to be monitored.
- For pipelines: Observe the height restrictions given in the installation example M2 – 100 380 and M3 – 100 380. In the case of installation according to M3 – 100 380 (top), clarify assurance of alarm signaling in each individual case and consult the manufacturer if necessary.
- Some notes on personal protective equipment are provided in section 2.4 and 2.4.1.

[6] For Germany: Technical services in accordance with water legislation. For Europe: Authorization by the manufacturer.
[7] For Germany: e.g. VDE regulations, regulations of the electricity suppliers
[8] For Germany: e.g. ElexV, GSiG, BetrSichV

5.2 Installation of leak indicating unit

(1) Generally mounted on walls with plugs and screws. For the housing dimensions and hole pattern, see Appendix 12.1.

- In closed, dry areas: not directly next to sources of heat
- Outdoors or in damp environments: in the protective box. If installed in a protective box: additional external signal or alarm forwarding via potential-free contacts to a switchboard or similar device.

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.

(2) **NOT in potentially explosive areas (see also schematic diagram I – 100 380)**.

(3) The distance between the leak indicating unit and the contact manometer must be kept as small as possible (see also section 5.3).

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

5.2.1 Installation of leak indicating unit, top hat rail installation of control modules in control cabinet

(1) Attaching to top hat rail (dimensions/designation) in the control cabinet.

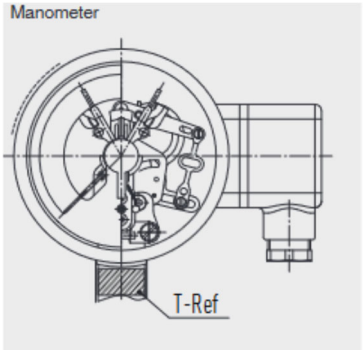
(2) Connect wiring according to section 5.5.2.

(3) **NOT** in potentially explosive areas[9] (see page 21, schematic diagram I-100380).

(4) If installed in a control cabinet: additional external signal[10] or alarm forwarding via potential-free contacts to a switchboard or similar device.

5.3 Installation of leak detector

(1) As close as possible to the tank/pipeline. Usually directly on the tank/pipeline using an installation kit.



(2) Avoid direct sunlight (installation in shaded area). The operator must ensure that the permissible temperature range is observed during operation. The area labeled "T-Ref" in the illustration below can be used for this purpose.

(3) The leak detector can be installed outdoors (IP 65).

(4) Also, in potentially explosive areas (zone 1 and 2); see page 21, schematic diagram I-100380

(5) In combination with the detonation flame arrester F 502 (included in the delivery), the inside of the leak detector is suitable for zone 0.

[9] If a pressure-resistant enclosed housing and explosion-protected signal lights and switches are used, the leak indicating unit can also be installed in areas with potentially explosive atmospheres (zones 1 and 2). Occurring vapor-air mixtures must be classifiable into the respective gas group and temperature code according to the explosion protection of the leak indicating unit.
[10] Provide an external switch for switching off the external signal

(6) If the leak detector is mounted on a heated tank, the temperatures specified in section 3 "Technical data" in the context of point (2), taking the ambient conditions into consideration, may not be exceeded.

(7) Avoid installation locations with mechanical vibration.
Frequency range < 150 Hz
Acceleration < 0.5 g

(8) For safe pressure release in the event of a fault, the rear wall must have a clearance of at least 20 mm from all objects.

(9) The inclination of the manometer may not exceed 5° on all sides.

(10) If the leak detector is installed in a building (e.g. tank inside a building), sufficient ventilation of the room must be provided in accordance with EN 60079-10/EN 13237.

(11) If the leak detector is to be screwed in, only the points intended for this purpose are to be used. The housing of the manometer may not be used.

5.4 Installation of electrical connecting line (intrinsically safe, blue)

(1) Cable with shielding[11], if it is not possible to always ensure a clearance of at least 5 cm from other live lines.

(2) Requirements: Max. cross section: 1.5 mm^2
Cable diameter: 7–13 mm
Resistant to possible vapors that may be present.

(3) Evidence of intrinsic safety must be provided.

(4) Observe polarity.

(5) Switch or plug connections are prohibited.

(6) When laying in conduits, at least the opening at the tank/pipeline end must be sealed gas-tight.

(7) A cable break causes the alarm to be signaled (safety wiring)

(8) EN 60079-14/IEC 60079-14 must be observed.

5.5 Electrical Connection

(1) 230 V – 50 Hz

(2) Fixed wiring, i.e. no plug or switch connections. Devices with plastic housing may only be connected with a fixed cable.

(3) Regulations of power supply companies must be adhered to[12].

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

(5) The leak detector must be integrated into the on-site equipotential bonding.

[11] If a shielded cable is used, the shielding must be connected only in the contact manometer.
[12] For Germany: also, VDE regulations

5.5.1 Terminal layout, housing for wall installation (see SL-854100, page 27 f.)

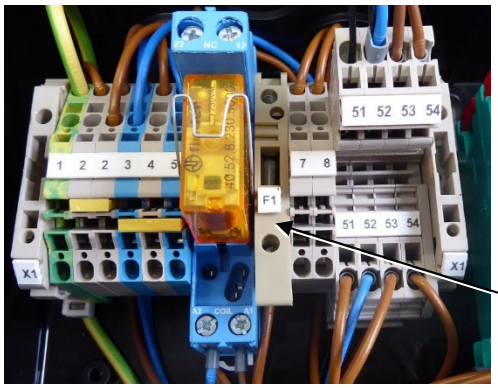
1	Ground
2	Outer conductor (230 V); + (24 V DC)
3	Zero conductor (230 V); - (24 V DC)
4/5	External signal (230 V/24 V DC in the event of an alarm)
7/8	Potential-free contacts (opened in the event of an alarm or loss of power)
- (1)	Blue terminal: leak detector connection (negative)
+ (2)	Blue terminal: leak detector connection (positive)

5.5.2 Terminal layout, control module, top hat rail installation (see SL-854100, page 27 f.)

If a control module is used in an existing control cabinet, then at least the potential-free contacts must be used to forward the alarm signal to a switchboard. If this is not possible, a visual and acoustic alarm must be provided.

23	Outer conductor (phase)
24	Zero conductor
13-14	Potential-free contacts
15-21	Potential-free contacts
12 (- (1))	Blue terminal: leak detector connection (negative)
10 (+ (2))	Blue terminal: leak detector connection (positive)

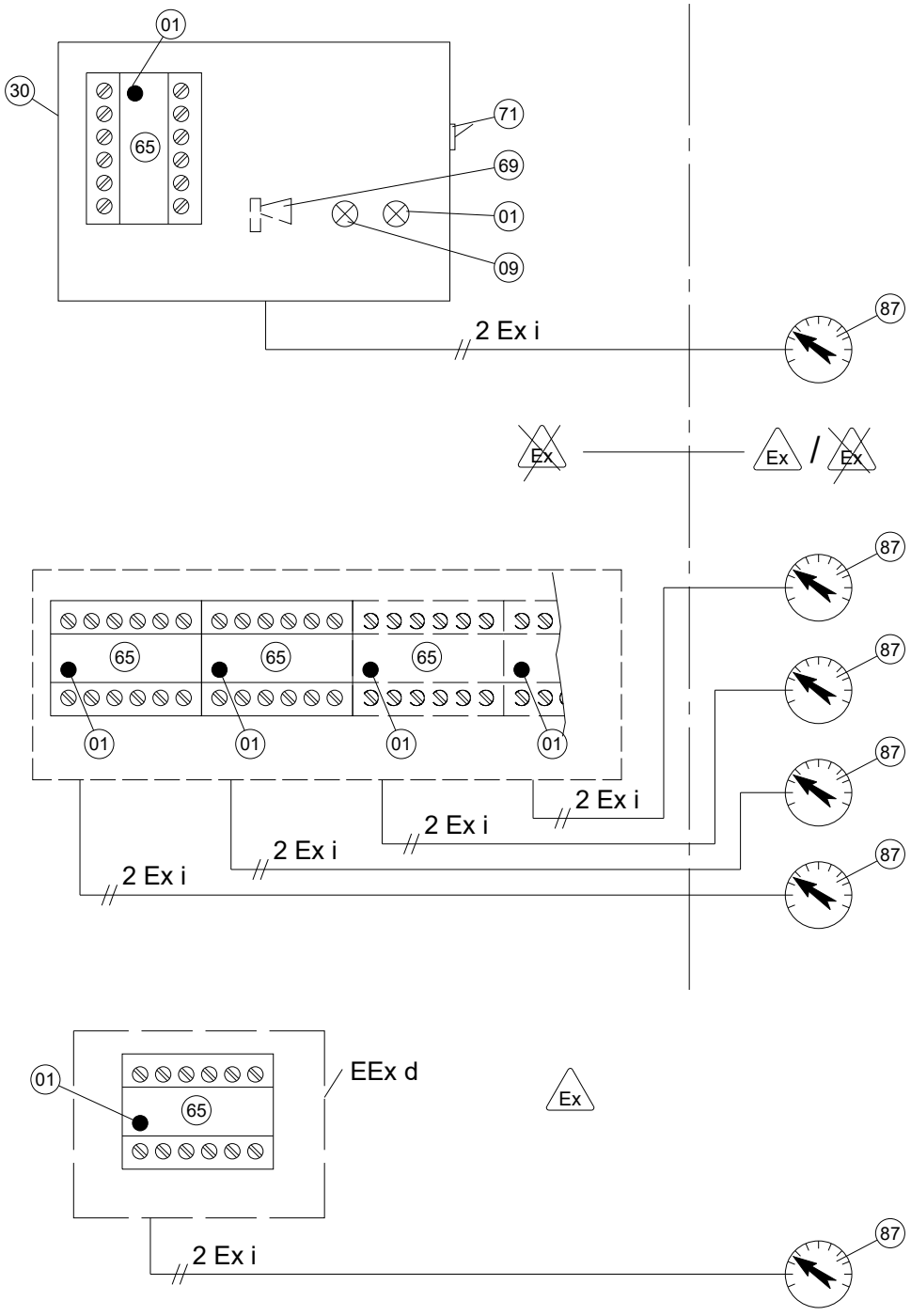
5.6 Location of fuses and their ratings



Fuse 2.5 A MT (H)
for external signal AS

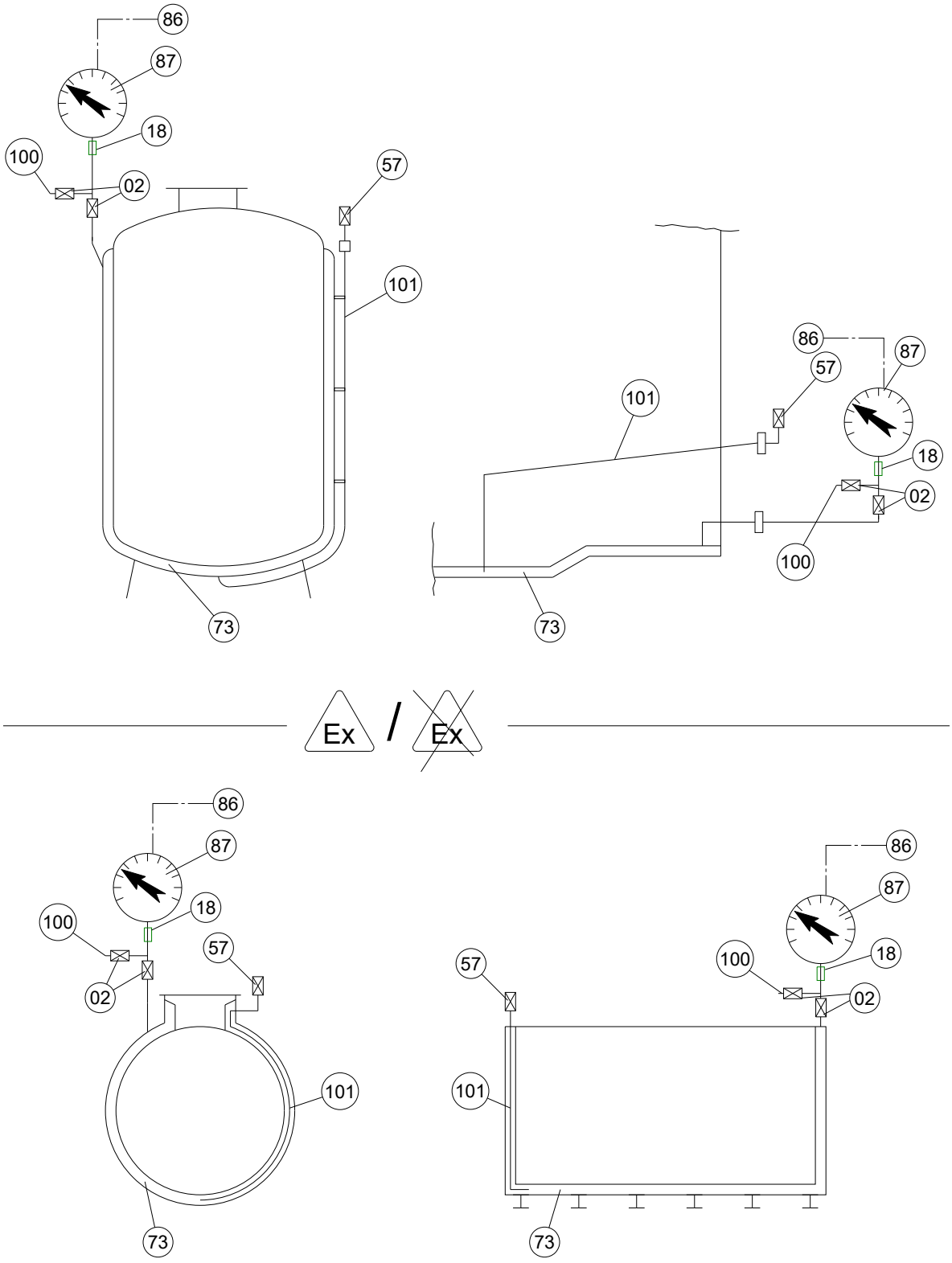
5.7 Installation examples

5.7.1 Schematic diagram (I – 100 380)



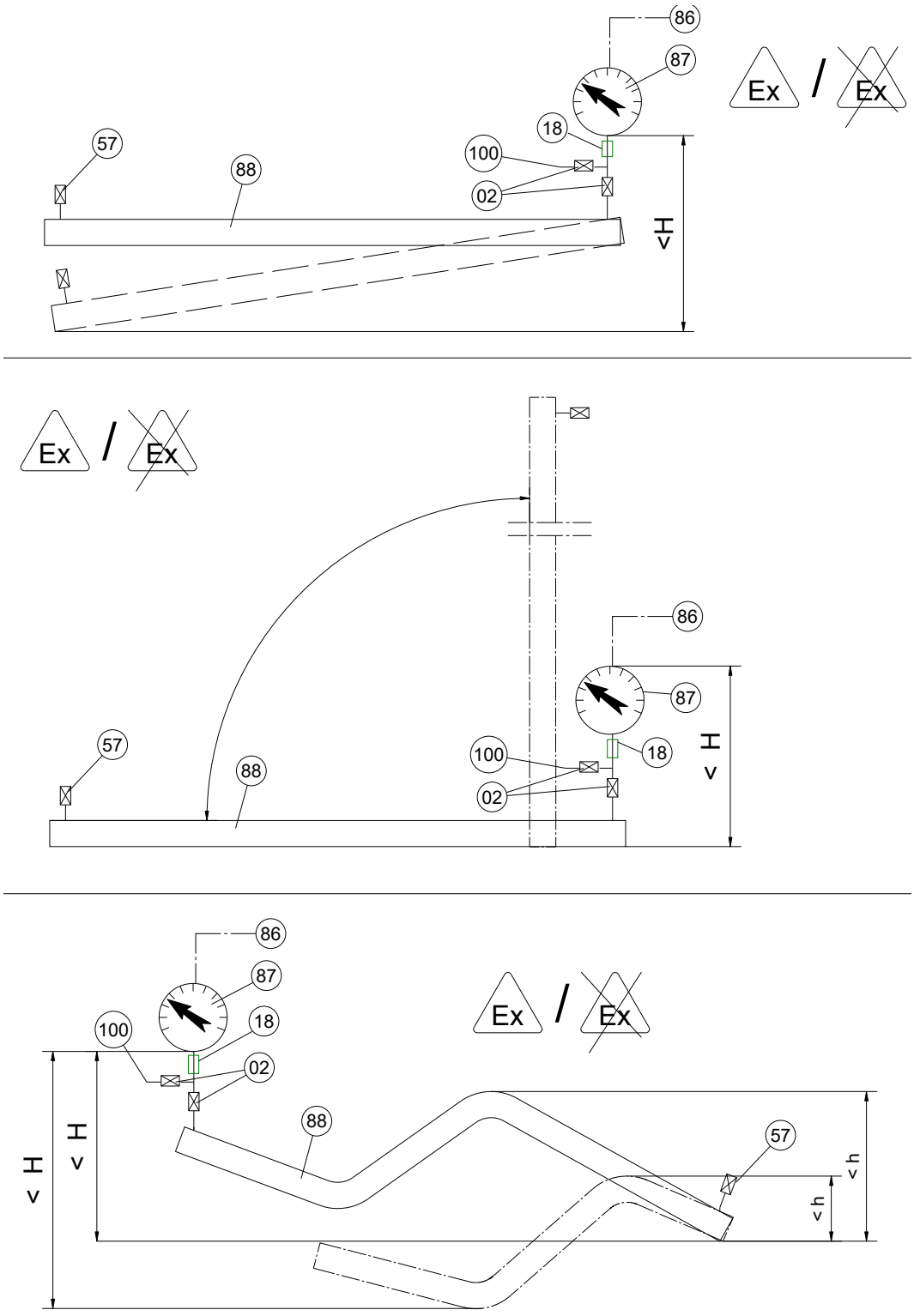
01	Signal lamp "alarm", red	65	Control unit
02	Shut-off valve	69	Buzzer
09	Signal lamp "operation", green	71	"Mute" button/switch
18	Detonation flame arrester	73	Interstitial space
30	Housing	86	Indicating unit
57	Test valve	87	Leak detector

5.7.2 Installation example for tank (M1 – 100 380)



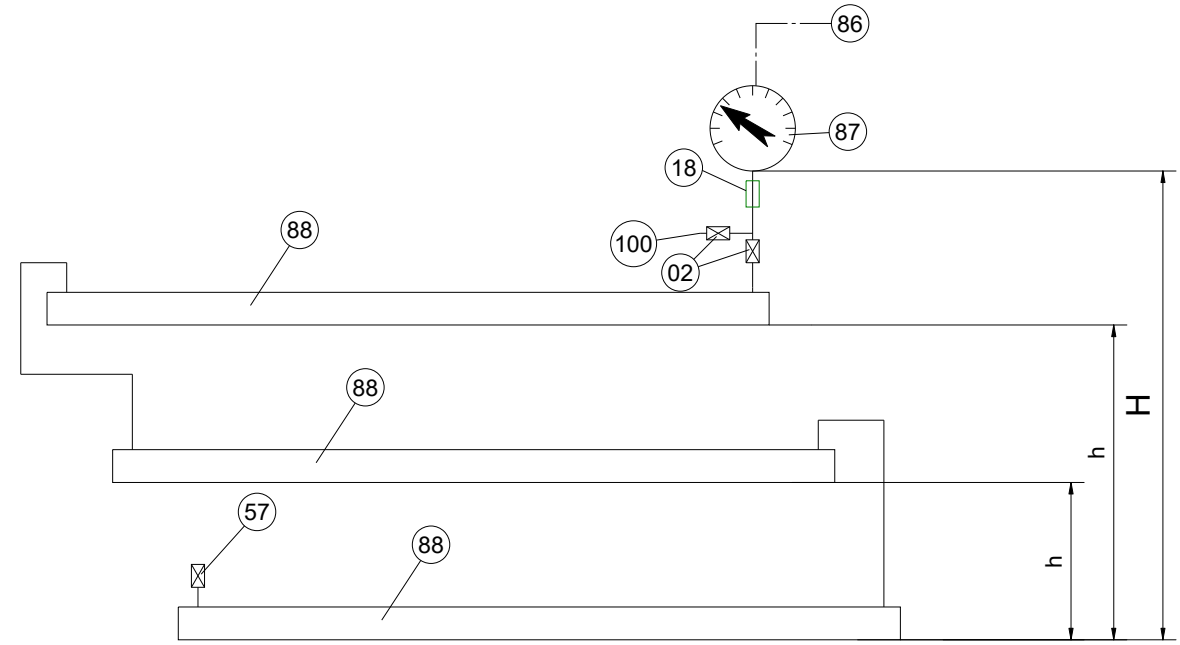
02	Shut-off valve	86	Indicating unit
18	Detonation flame arrester	87	Leak detector
57	Test valve	100	Measuring connection
73	Interstitial space	101	Suction line to low point

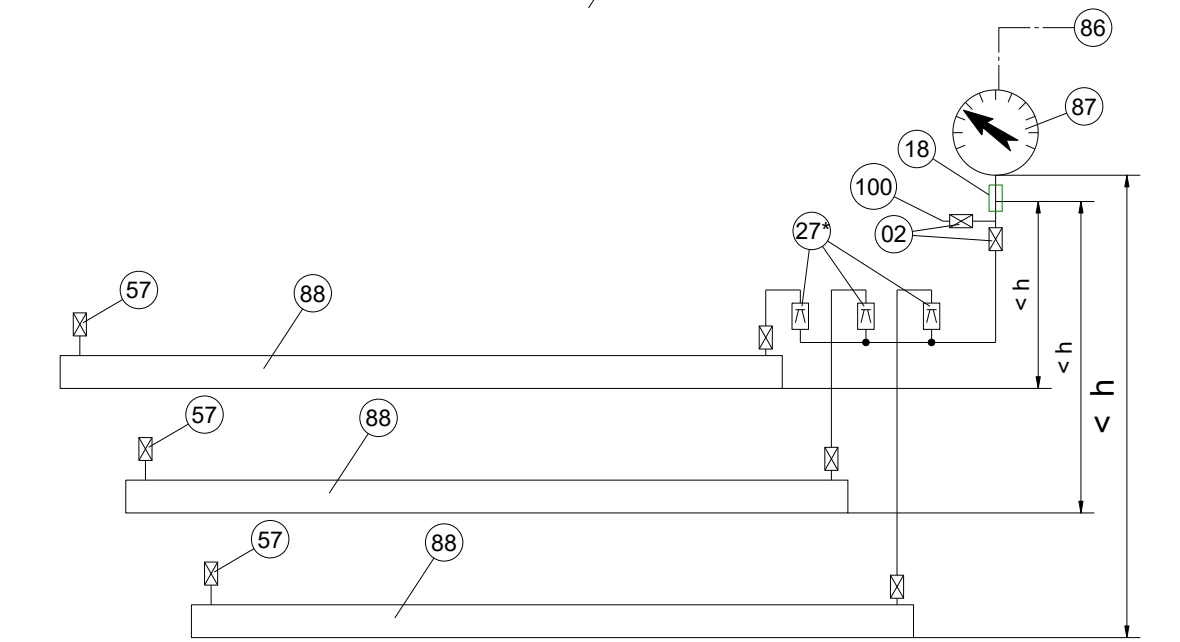
5.7.3 Installation example for pipeline (M2 – 100 380)



02	Shut-off valve	86	Indicating unit
18	Detonation flame arrester	87	Leak detector
57	Test valve	88	Double-walled pipe
73	Interstitial space	100	Measuring connection

5.7.4 Installation example for pipeline with multiple segments (M3 – 100 380)

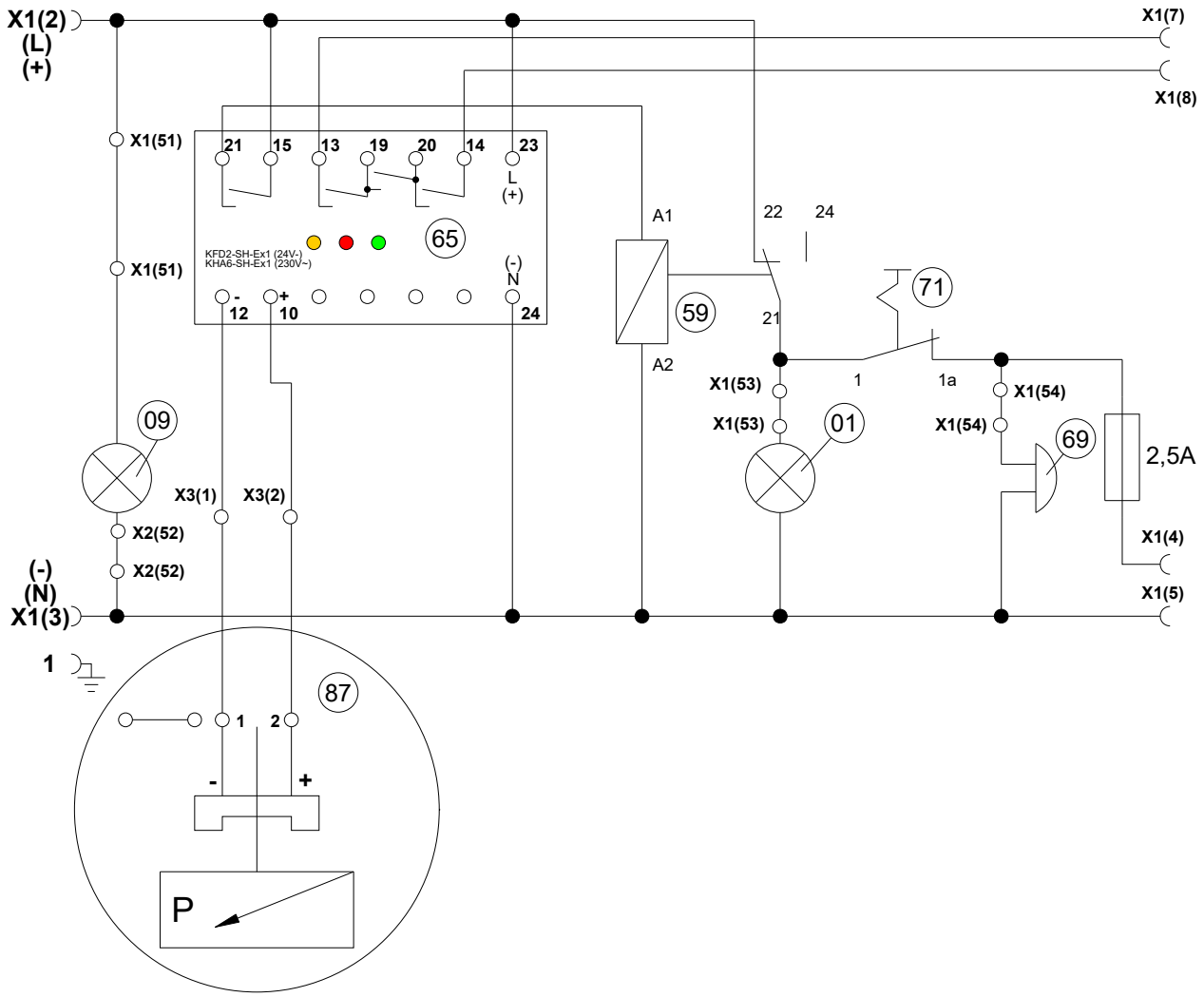




02	Shut-off valve	73	Interstitial space
18	Detonation flame arrester	86	Indicating unit
27*	Liquid stop valve, installed opposite the valve direction	87	Leak detector
57	Test valve	88	Double-walled pipe
		100	Measuring connection

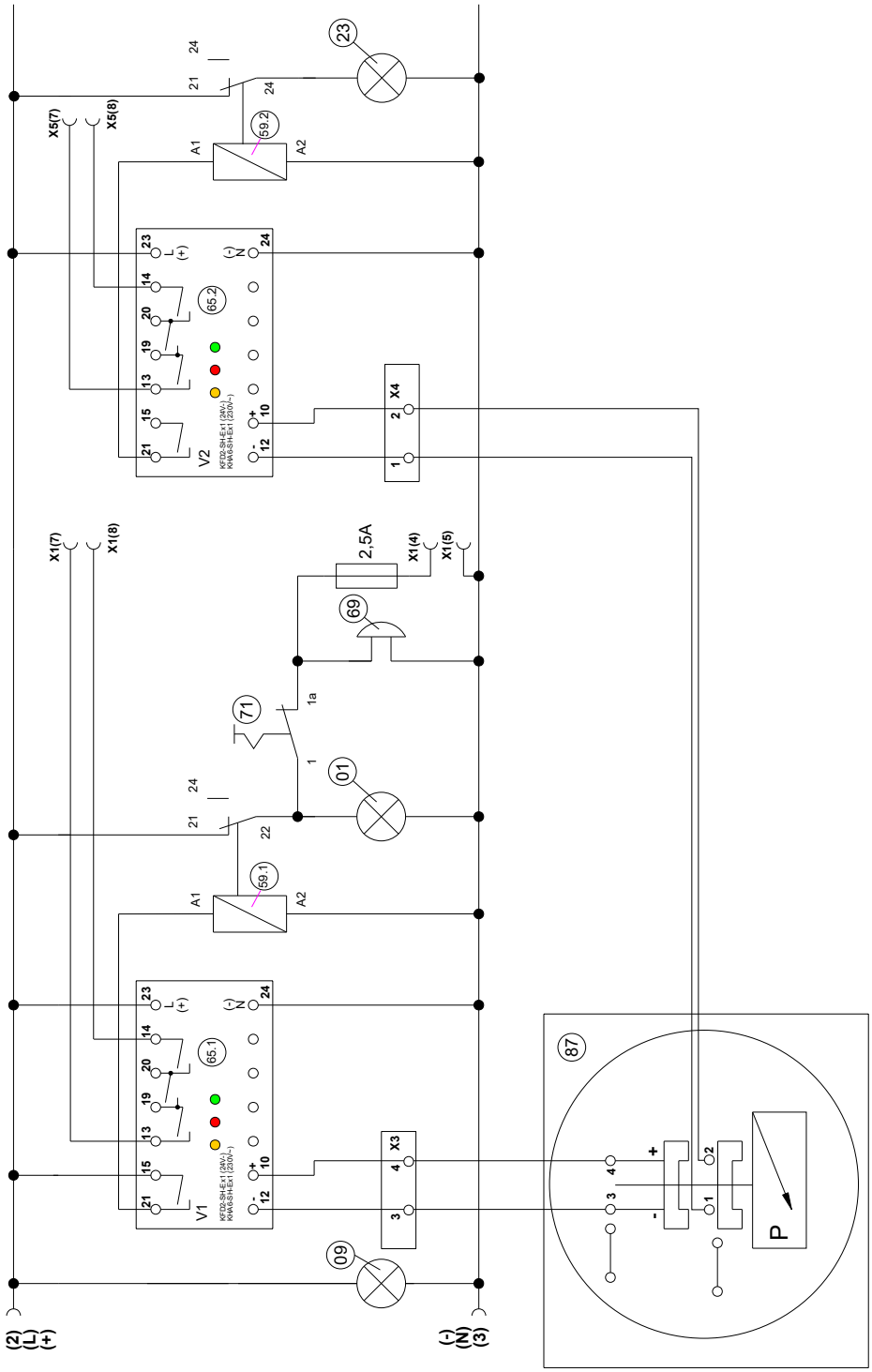
5.8 Block diagrams

5.8.1 Circuit diagram (SL – 854 100)



01	Signal lamp "alarm", red
09	Signal lamp "operation", green
59	Relay
65	Control unit
69	Buzzer
71	"Mute" button/switch
87	Leak detector

5.8.2 Circuit diagram with pre-alarm and main alarm (SL – 854 100)



01	Signal lamp "alarm", red	65	Control unit
09	Signal lamp "Operation", green (white)	69	Buzzer
23	Signal lamp "filling", yellow	71	"Mute" button
59	Relay	87	Leak detector

6. Commissioning

- Only perform commissioning once the steps in section 5 "Mounting" have been completed.
- If a leak detector is put into operation on already filled tanks/pipes, special protective measures must be taken (e.g. checking that no gas is present 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.

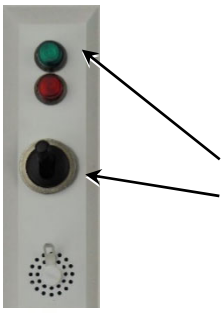
6.1 Tightness Test

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

(2) The vacuum build-up should be performed using an external pump.

CAUTION: During vacuum build up the maximum permissible vacuum in the interstitial space may not be exceeded!

6.2 Commissioning the Leak Detector



Tightness of the interstitial space prior to commissioning is assumed.

(1) After installation of the pneumatic fittings, connect the power supply.

(2) Check that the "Operation" and "Alarm" signal lamps light up and that the acoustic alarm signal is output[13] (if present). Then set the "Mute" button/switch to the "OFF" position.

(3) Connect the installation pump to the test port (suction line to the lowest point).

Caution: The installation pump must be suitable for the relevant vapor-air mixture with respect to explosion protection.

(4) Connect a suitable measuring gauge to the measuring pipe union (parallel to the contact manometer).

(5) Supply the leak detection system with a vacuum up to max. 700 mbar.

(6) Close the shut-off valve in front of installation pump.

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

(8) The leak detector (WIKA, 9694473) may be operated only in combination with the transformer isolated amplifiers P&F KHA6-SH-Ex1 (230 V AC) and KFD2-SH-Ex1 (24 V DC).

(9) Avoid pressure surges to the leak detector; open/close the test valves slowly.

[13] Or the alarm signal is forwarded

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) Frequent sounding of the alarm indicates leaks, which must be corrected within a reasonable time. 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) The operator must check the function of the operating lights at regular intervals.

(5) Use a dry cloth to clean the leak detector.

7.2 Maintenance

- Maintenance work and functional checks must be performed by trained personnel only[14].
- Once a year to ensure functional and operational safety.
- Once a year also check the fluid level in the manometer. It must not drop below 75 % of the diameter.

  WARNING:

  Risk of fatal injury resulting from impermissible filling/topping up of the device with loss of explosion protection

  The filling/topping up of devices by unauthorized persons results in a loss of explosion protection and can cause damage to the device.

  > Have the devices repaired by authorized service centers only!
- Comply with explosion regulations (if required), 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.
- Test scope according to section 7.3.
- Compliance with the conditions in sections 5 and 6 must also be tested.
- Disconnect the power to the leak detector before opening the housing.
- Clean the leak detector (contact manometer) only using a damp cloth (moistened in soapy water).

[14] for Germany: Technical service based on water legislation with expertise in leak detection systems. For Europe: Authorization by the manufacturer

7.3 Functional Check

The functional and operational safety check must be performed

- After each commissioning,
- according to the time intervals given in section 7.4. 3[15],
- Each time a malfunction has been corrected

7.4 Scope of check

(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) 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

Only possible if there is a second connection (test valve) in the interstitial space of the tank.

(1) Connect the measuring instrument to the measuring pipe union.

(2) Open the shut-off valve to the measuring instrument.

(3) Compare the pressure value between the contact manometer and the measuring instrument. The difference should not be greater than the value calculated from the class precision of the measuring instrument.

(4) Ventilate the system via the test pipe union.

(5) Determine the vacuum drop on the measuring gauge and close the test pipe union.

(6) Close the shut-off valve to the measuring instrument and remove the measuring instrument.

7.4.2 Testing the switching values

(1) Ventilate the system via the test pipe union until the "Alarm ON" switching value is reached. Close test pipe union, record the values.

[15] for Germany: additional national laws apply (e.g. AwSV)

(2) Install installation pump on the test pipe union, switch pump on and open shut-off valve.

(3) Build up the vacuum. During this operation, determine the "Alarm OFF" switching value.

(4) Further vacuum build-up to 700 mbar.
Note: If there is no vacuum build-up, first check the delivery head of the pump[16]. If this test is satisfactory, the existing leak must be determined and corrected.

(5) Close shut-off valve, turn off and remove pump.

7.4.3 Tightness test on leak detection system

(1) Wait for the pressure to be equalized after the vacuum build-up.

(2) Connect the measuring instrument to the measuring pipe union and open the shut-off valve.

(3) Provided that operation is trouble-free, the test is considered positive if the pressure drop is less than 1 mbar per 24 hours.

(4) Close the shut-off valve and remove the measuring instrument.

7.4.4 Achieving the operating conditions

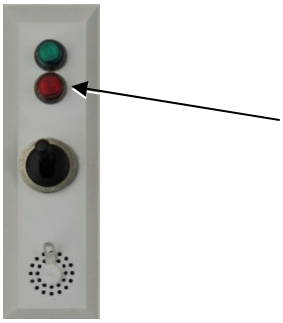
(1) Seal the device housing and the "Mute" button/switch in the "ON" position.

[16] To do so, close the shut-off valve, remove the pump from the test pipe union and connect the measuring gauge to the air intake of the pump. The vacuum reading should now be at least 750 mbar.

8. Alarm

When pressure lines are monitored, the potential-free contacts of the leak detector must be used to switch off the feed pumps.

8.1 Alarm



(1) An alarm is indicated by illumination of the (respective) light-emitting diode in the control module (top hat rail installation).

(2) Only housings for wall installation: An alarm is indicated by the “Alarm” signal lighting up and the sounding of the acoustic signal. Shut off the acoustic signal by activating the "Mute" button/switch.

(3) Notify technical service.

(4) Technical service must detect the cause and correct it.

Caution: The contact manometer can be damaged when pressure in the interstitial space is > 1 bar and must then be replaced.

Caution: A cable break also triggers the alarm.

Caution: There may be medium in the contact manometer or the associated installation kit – wear the necessary protective equipment!

(5) Further possible malfunctions:

Malfunction	Cause	Measure
Contact no longer switches in accordance with specification.	Electrical connection is interrupted.	Perform continuity test on electrical connection lines.
	Electrical load unsuitable for switching contact type.	Observe permissible electrical load of switching contact type.
	Contact soiled.	
Residual current device of electric circuit triggers.	Insulation fault	Replace device
Contact bounce (multiple, momentary opening and closing).	Vibrations	Mechanically isolate device.
Indicator does not move despite change in pressure.	Measuring element jammed.	Replace device.

(6) If the alarm can be traced back to a defect in the contact manometer or control module (e.g. a mechanical problem, a component failure, etc.), repair work may be carried out at the manufacturer's factory only.

(7) Perform a function test per 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).

Caution: Measuring material residue can cause injury, damage and harm to the environment!

- Wear the necessary protective equipment!
- Observe the specifications in the safety data sheet for the respective measuring material!
- Flush out or clean the removed device in order to protect persons and the environment from harm caused by adhering measuring material residue!

9.2 Disposal

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

Properly dispose of electronic components.

10. Spare Parts

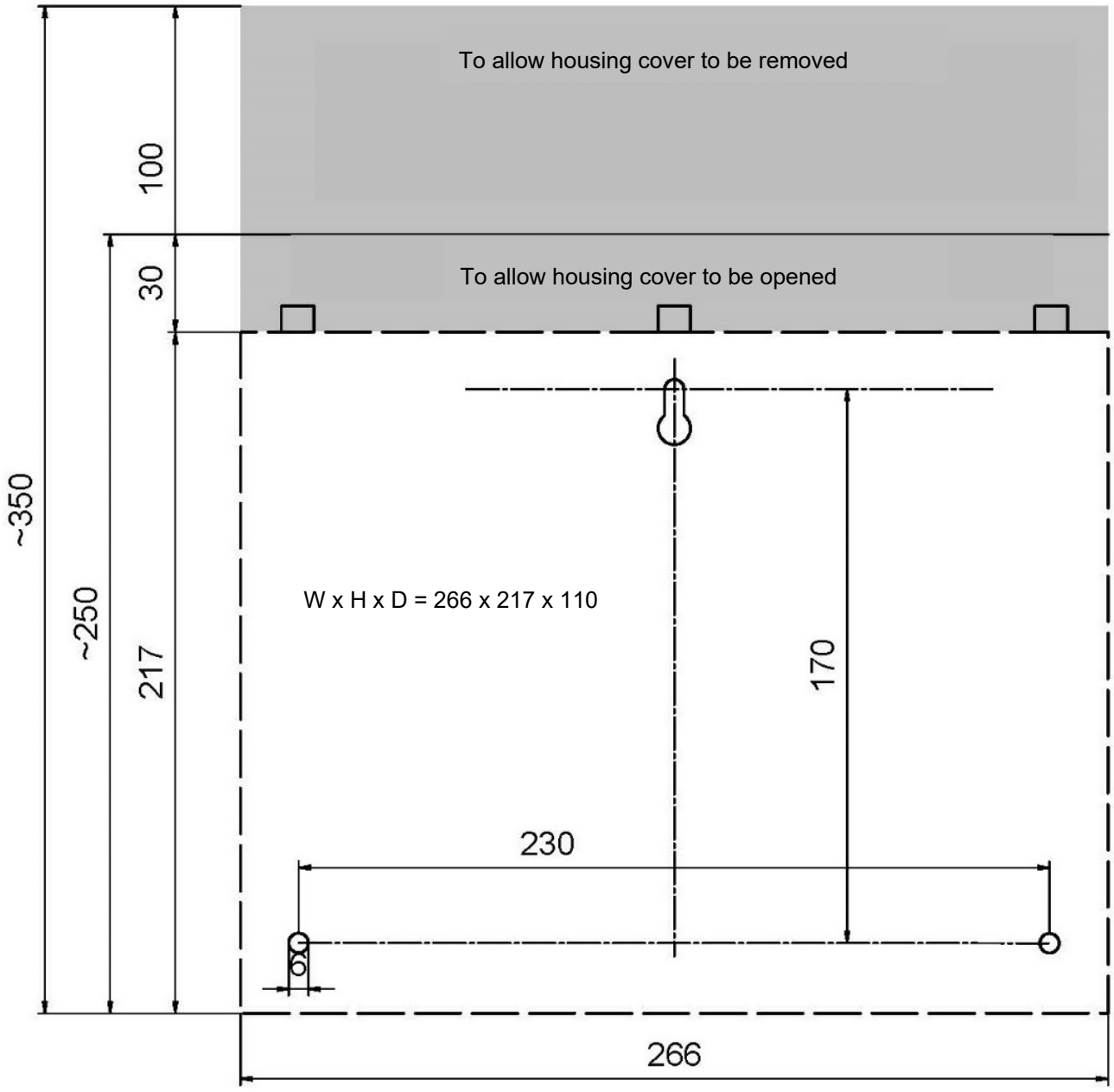
See the SGB online shop at shop.sgb.de

11. Accessories

See the SGB online shop at shop.sgb.de

12. Appendix

12.1 Dimensions and drilling pattern



12.2 EU Declaration of Conformity

We,

SGB GmbH
Hofstrasse 10
57076 Siegen,

hereby declare in sole responsibility that the leak detector

VLX 350 SA-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 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 1989 No. 728	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	EN 1127-1: 2019 PTB 02 ATEX 4012 X (F 501) PTB 09 ATEX 4002 X (F 502) PTB 00 ATEX 2043 X (transformer isolated amplifier) CML 18 ATEX 2109 X (contact manometer) Under consideration of the EC type examination certificates for the used components, the ignition hazard assessment did not reveal any further hazards.

Conformity is declared by

ppa. Martin Hücking
(Technical Director)

As of: February 2023

12.3 Declaration of Performance (DoP)

Number: **005 EU-BauPVO 2014**

1. Unique identification code of the product type:

   Vacuum leak detector type VLX .. SA-Ex

2. Use:

   Vacuum leak detector of class I for monitoring double-walled tanks and pipes

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, 02-2023

12.4 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, 02-2023

12.5 Certification (TÜV Nord)

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

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

Identification number: 0045

Große Bahnstraße 31, 22525 Hamburg
Tel: +49(0)40 8557-0
Fax: +49(0)40 8557-2295
hamburg@tuev-nord.de
www.tuev-nord.de

Certification

Subject of test:	**Under pressure leak detector type VLX../SA-Ex**
Client:	SGB GmbH Hofstraße 10 57076 Siegen
Manufacturer:	SGB GmbH
Type of test:	Initial examination of an under pressure leak detector type VLX../SA-Ex with leak indicator equipment and leak detector according to DIN EN 13160-1:2003/EN 13160-1:2010 and DIN EN 13160-2:2003 and BRL A, part 1, appendix 15.23 as a class I leak monitoring system
Testing period:	03/2015 to 09/2015
Testing location:	PÜZ testing lab TÜV NORD Systems GmbH & Co. KG
Test results:	**The under pressure leak detector VLX../SA-Ex corresponds with class I for leak monitoring systems according to DIN EN 131601:2003/EN 13160-1:2010 and fulfills the requirements of DIN EN 13160-2:2003 and BRL A, part 1, no. 15.43 with appendix 15.23. Regarding the area of application and installation, the specifications of the technical description "Document 602 800" as of 01/2009 apply**

Details on the test can be found in the test report PÜZ 8112692865 dated 03.09.2015.

Hamburg, 04.09.2015

Test laboratory supervisor

J.Straube

Page 1 of 1

Dated 01/2013
STPÜZ-QMM-321-032-

Legal notice

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