Documentation

VLX-S 350 M leak indicator

For tanks with a suction line for the leak indicator to the lowest point of the monitoring chamber

Issue 06/2015
Art. No. 602 702

Read the instructions before starting all work

Table of content

General

1.1 Information

These instructions provide important information on how to handle the VLX-S 350 M negative pressure leak indicator.

The VLX-S 350 M leak indicator is only suitable for tanks with a suction line for the leak indicator to the lowest point of the monitoring chamber.

A prerequisite for safety during work is the adherence to all stipulated safety instructions and instructions for actions.

Moreover, all the regulations for the prevention of accidents and general safety instructions which apply at the location of use of the leak indicator must be adhered to.

1.2 Explanation of symbols

Warnings in these instructions are indicated with the symbol opposite.

The signal word expresses the extent of the hazard.

DANGER:
An immediate hazardous situation which will lead to serious or even fatal injuries if not avoided.

WARNING:
A possible hazardous situation which may lead to serious or even fatal injuries if not avoided.

CAUTION:
A possible hazardous situation which may lead to minor or light injuries if not avoided.

Information:
Highlights tips, recommendations and information.

1.3 Limitation of warranty

All information and instructions in this documentation have been compiled taking into account the valid standards and regulations, state-of-the-art technology and our many years of experience.

SGB assumes no liability in case of:

- Failure to adhere to these instructions
- Improper use and the employment of unqualified staff
- Arbitrary modifications
- Connection to systems which are not approved by SGB

1.4 Copyright

The contents, texts, drawings, images and other illustrations are protected by copyright and subject to commercial property law. Misuse will be prosecuted.

1.5 Warranty conditions

We provide a 24 month warranty for the VLX-S 350 M leak indicator, starting from the day of installation.

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

In order to make warranty claims, the function/test report from initial initialisation by trained staff must be submitted.
The serial number of the leak indicator must also be specified.

The warranty cover is rendered null and void in case of
- faulty or improper installation
- improper operation
- changes or repairs made without the consent of the manufacturer.

1.6. Customer service

Contact our customer service department for information.

Contacts are listed on the internet at www.sgb.de
or on the sticker on the indicator unit.

2. Safety

2.1 Proper use

WARNING!

Hazard due to improper use

- Only use the VLX-S 350 M leak indicator for monitoring chambers which are resistant to negative pressure to at least 800 millibars, of double-walled tanks with a maximum constructed height of 3 metres or double floors of flat bottom tank constructions.
- A VLX-S 350 M leak indicator for monitoring a tank monitoring chamber only.
- Tank has a suction line to the lowest point of the monitoring chamber for evacuation / emptying the monitoring chamber.
- Signalling device is installed outside a Ex Zone
- Signalling device is installed in the building
- Signalling device is installed in a weather-proof protective cabinet outdoors with additional external acoustic signal or alarm transmission using the floating relay contact.
- Sensor for VLX-S 350 meets the requirements of category 1, thus connection to suitable monitoring chambers (Zone 0, I, II or no Ex Zone)
- Possible vapours from stored goods are classified in explosion group II A to II B and temperature class T 1 to T4.
- Grounding as per valid regulations (e.g. EN 1127)
- Leak tightness of the monitoring chambers as per this documentation
- The total volume of the monitoring chamber does not exceed 8000 litres.
- Sensor ambient temperature: - 20°C - max. 60°C
- VLX-S 350 M signalling unit ambient temperature: -0°C - + 40°C
- Empty pipe for electrical connection cables in dome shafts and control shafts must be sealed and gas-tight
- Power connection cannot be shut off

Claims of any kind made as a result of improper use cannot be asserted.

2.2 Obligations of the user

The VLX-S 350 M leak indicator is used commercially. The user is thus subject to the legal obligations of occupational safety.

As well as the safety instructions in this documentation, all the applicable regulations for safety, accident prevention and environmental protection must be adhered to. In particular:

- Compilation of a risk assessment report and implementation of its results in operating instructions
- Regular checks to make sure that the operating instructions are in line with the current regulations
- Content of the operating instructions includes reaction to possible alarms
- Organisation of an annual functional test

2.3 Qualification

WARNING!

Risk to personnel and the environment due to insufficient qualifications

Staff must be qualified to be able to recognise and prevent possible hazards independently.

Companies putting the leak indicator into operation should have attended the appropriate training course provided by SGB.

For Germany:

Certified company qualification for assembly/installation, initialisation and maintenance of leak indicator systems

2.4 Personal safety clothing and equipment

Personal safety clothing and equipment must be worn during work.

- Wear the safety clothing and equipment required for the respective work
- Adhere to and follow the existing signs on the personal safety clothing and equipment

Entry in the "Safety Book"

Wear a high-visibility vest

Wear safety shoes

Wear a safety helmet

Wear safety gloves - when necessary

Wear safety goggles - when necessary

2.5 Basic hazards

DANGER

From electrical current

When working on the electrics of the VLX-S 350 M, it has to be isolated from the current.

Adhere to the valid regulations relating to electrical installation, explosion protection (e.g. EN 60 079-17) and the regulations for the prevention of accidents.

DANGER

From potentially explosive vapour and air mixtures.

Potentially explosive vapour and air mixtures may be generated in tank monitoring chambers. In certain circumstances, potentially explosive vapours may escape when the connections to the monitoring chamber are opened.

There may be potentially explosive vapour and air mixtures in the connection lines if vapours penetrate into the inner walls due to permeation or in case of a leak.

You must make sure that the leak indicator system is free of gas before carrying out work on it.

If there is a possibility of potentially explosive vapour and air mixtures, use pumps with explosion protection for evacuating the monitoring chamber.

Adhere to the explosion protection regulations, e.g. BetrSichV (Directive 1999/92/EC and the derived laws in the respective member states) and/or others.

DANGER

From working in shafts

The connections to the monitoring chambers are usually installed in dome shafts or other shafts.

Before entering, the respective safety measures must be set up and you must make sure they are free of gas and have sufficient oxygen.

3. Technical data of the VLX-S 350 M leak indicator

3.1 General data

Dimensions:	
Width / height / depth (in mm)	160 / 250 / 70 mm
Storage temperature	-30°C to +60°C
Temperature for use of signalling unit	-5°C to +50°C
Temperature for use of sensor	-20°C to +60°C
Leak indicating device protection class	IP 40
Accuracy of sensor	2% FK ≙ 20 mbar

3.2 Electrical data

Voltage supply:	230 V AC, 50 Hz
Fuse protection:	max. 10 A
Switch contact load, terminals AS:	230 V; 50 Hz, 1 A
Switch contact load, floating contacts	
max.:	230 V; 50 Hz; 2 A
min.:	10 V; 10 mA

3.3 Switching values

For VLX-S 350 M	
(relative negative pressure)	
Alarm ON	> 375 mbar
Alarm OFF	< 400 mbar
Recommended negative operating pressure to be generated:	700 mbar

3.4 Area of application

Monitoring of suitable double-walled tanks for storage of mineral oil products which are usually used at service stations.

(tanks suitable for leak monitoring are sufficiently leak-tight, have a suction line for the leak indicator to the lowest point of the monitoring chamber and are sufficiently resistant to negative pressure)

4. Construction and function

4.1 Construction of the system

The VLX-S 350 M leak indicator comprises a signalling unit with a green operating lamp, red alarm lamp, an acknowledging button for the acoustic alarm and an installation kit for the tank. The installation kit comprises a pressure sensor with explosion protection and a shut-off valve for the suction connection.

Signalling unit:

Digital pressure display

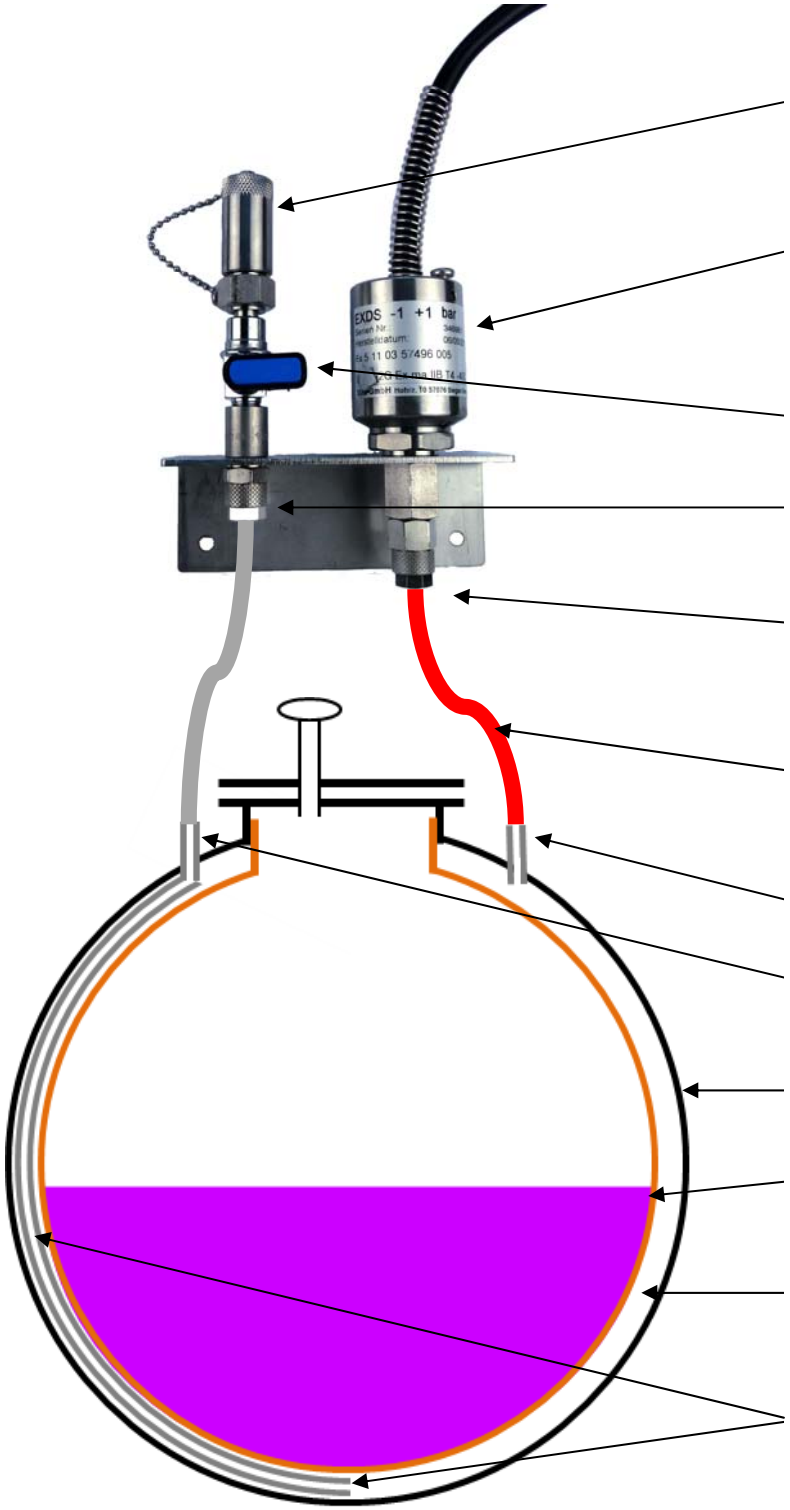
Operating lamp

Alarm lamp

Acknowledgement button for acoustic signal

Aerial for DTM data transfer module (optional)

Installation kit:



Suction connection (with protective cap)

Pressure sensor with explosion protection

Shut-off valve

Suction connection for the monitoring chamber for PA hose 8/6 x 1 mm

Measuring connection for the monitoring chamber for PA hose 8/6 x 1 mm

Connection line (PA hose 8/6 x 1mm)

Measuring connection on tank

Test (suction) connection on tank

External tank

Coating

Monitoring chamber gap

Suction line to the lowest point of the monitoring chamber

4.2 Normal mode

Normal mode status is achieved during initialisation by building up negative operating pressure using an external installation pump.

The negative pressure in the monitoring chamber is measured by the sensor and displayed on the digital display screen of the signalling unit.

Any leaks cause a drop in negative pressure.

Very high demands are made of the leak tightness of the monitoring chamber and the connecting line in order to ensure fault-free operation.

The operating lamp extinguishes to indicate any breaks in the current supply. The floating relay contact opens.

4.3 Leak

4.3.1 Air leak

If there is a leak in the outer wall (above the ground water) or in the inner wall above the liquid level, air is sucked into the monitoring room due to the negative pressure. The negative pressure drops. In case of a drop in negative pressure to the set alarm negative pressure level, an alarm is triggered.

4.3.2 Liquid leak

In case of a liquid leak, liquid enters into the monitoring chamber and collects at the lowest point of the monitoring chamber.

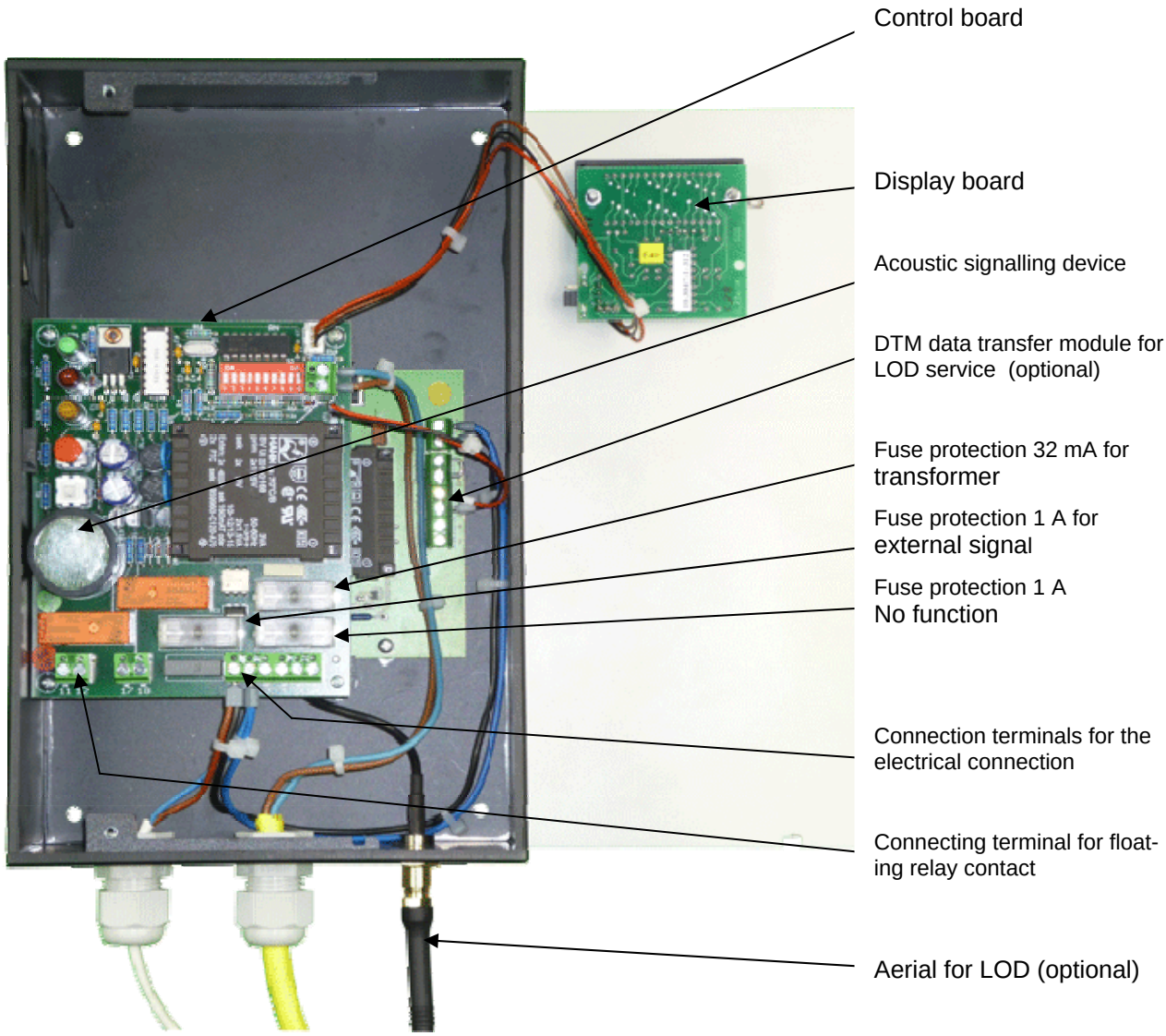
The penetration of liquid causes the negative pressure to drop. If leak liquid continues to enter (due to the negative pressure on the monitoring chamber), there is a further drop in negative pressure. As soon as enough liquid has penetrated into the monitoring chamber in order to make the negative pressure drop below the lower limit, an alarm is triggered.

Note:
after a leak has occurred, there is a risk that liquid will be suctioned when evacuating the monitoring chamber again.

Before re-initialisation of the leak indicator, the liquid has to be fully suctioned off via the suction line.

4.4 Description of the indicator and operating controls

Electrical controller:
In the signalling unit of the VLX-S 350 M there is a controller board and a display board.
If the leak indicator online diagnosis service (LOD service) is included in the scope of delivery, the data transfer module (DTM) is situated underneath the control board.



To shut off the acoustic alarm:
Press the "Acoustic alarm" button once. The acoustic signal shuts off and the red LED flashes.
Press the button again to switch on the acoustic signal.
This function is not available in normal mode or in case of malfunctions.

To test the optical and acoustic alarms
Press and hold (approx. 10 seconds) the "acoustic alarm" button. The alarm is triggered until you release the button.
This check is only possible when the pressure in the system has exceeded the "Alarm OFF" level.

5. Assembly of the system

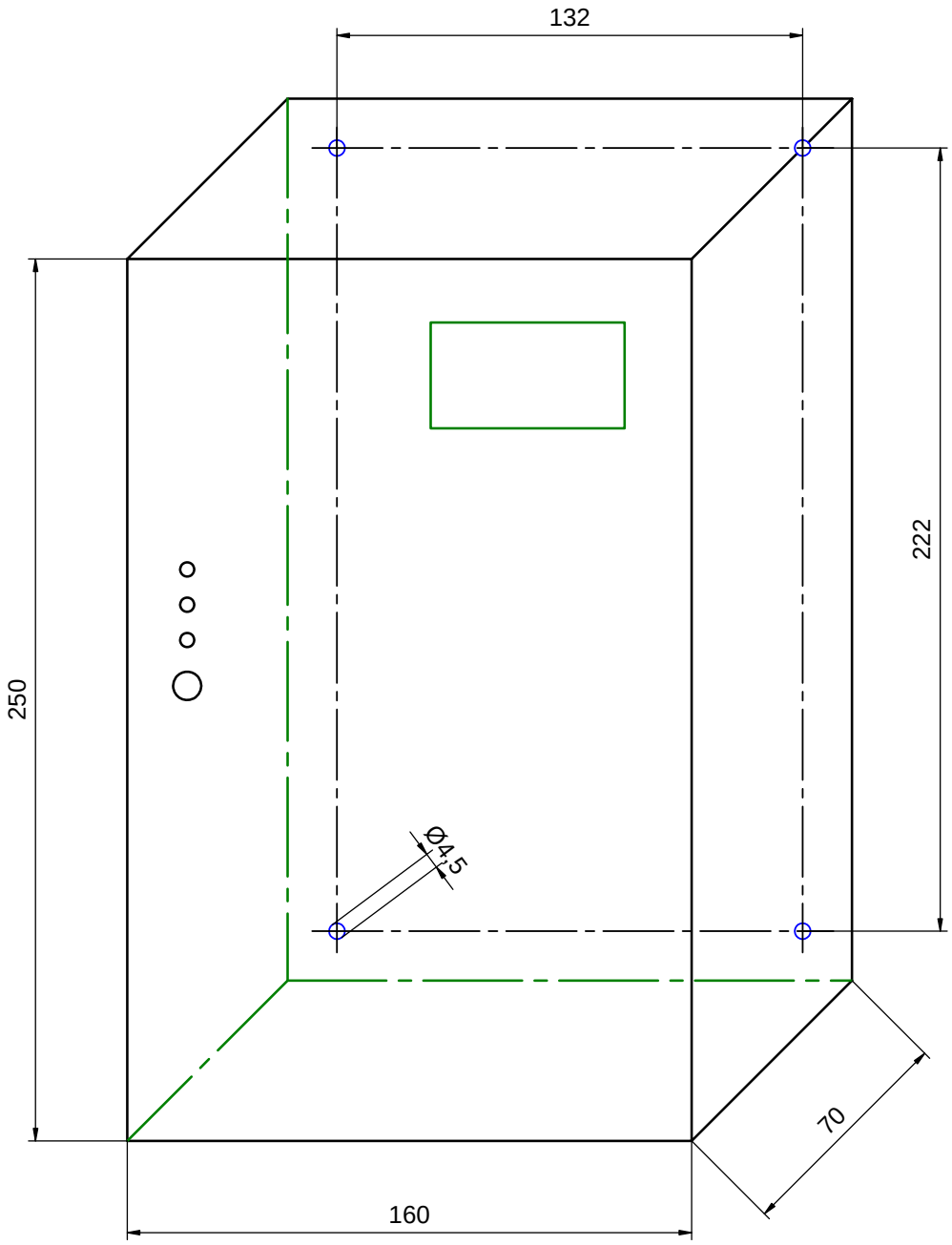
5.1 Basic instructions

- Before starting work, you must read and understood the documentation. In case of any doubts, contact the manufacturer.
- The safety instructions in this documentation must be adhered to.
- Adhere to the valid regulations relating to electrical installation and explosion protection.
- Feedthroughs for pneumatic and electrical connection lines which may spread the potentially explosive atmosphere must be sealed gas-tight.
- When using metallic connection lines, you must make sure that the mains earth is connected to the same potential as the tank being monitored.

5.2 Signalling unit

- **DO NOT install in potentially explosive areas**
- The housing is installed in a suitable position in the building or in a weather-proof protective cabinet outdoors, as close to the tank as possible. The housing is designed for wall mounting.
- Empty pipes must be laid for feeding through the electrical connection line to the tank.
  Empty pipes must be sealed gas-tight on the tank side in order to prevent the spreading of the potentially explosive atmosphere.

Dimensional drawing of the housing and drilling pattern:

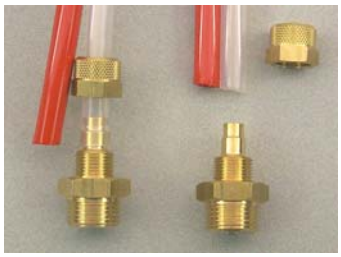


5.3 Sensor

The sensor is installed as close as possible to the tank in combination with the supporting bracket and shut-off valve (installation kit).

5.4 Pneumatic connection lines

- Polyamide or nylon 8/6 x 1 mm
- Resistant to the stored product
- At least PN 10 over the entire temperature range.
- The full cross section must remain intact (do not kink).
- 50 m between the monitoring chamber and the sensor should not be exceeded significantly.
- Lay in a protective pipe as necessary. Do not lay in the soil without protection.
- Seal the protective pipes so that they are gas-tight in order to prevent the spreading of potentially explosive atmospheres through the pipes within the building.

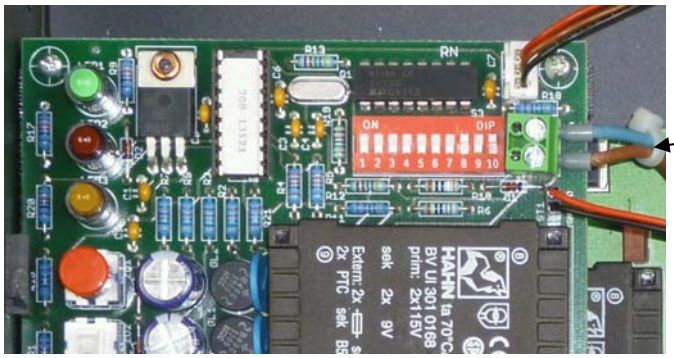


<u>Quick-release screw connector for polyamide pipe:</u>

1. Cut the pipe to length at a right angle
2. Unscrew the union nut and push it over the pipe
3. Push the pipe onto the nipple up to the start of the thread
4. Tighten the union nut by hand
5. Tighten the union nut with a screw wrench until there is a noticeable increase in force (approximately 1 to 2 turns).

5.5 Connecting the sensor to the signalling unit electrically

The sensor is connected to the control board to terminals 21 / 22.



Sensor connection:

Brown sensor cable to +

Blue sensor cable to -

5.5.1 Sensor cable extension

- The sensor cable can be extended using suitable connection techniques.
- The maximum line length (for 2 x 0.75 mm screened cable) between the explosion sensor and the VLX-S 350 M leak indicator is 500 m.
- The sensor cable has screening. The screening is not connected in the pressure sensor. In general screening is not necessary. In case it is required, extend the screening in every cable extension and continue it from the signalling unit to an external connection point.
- Terminal boxes for potentially explosive atmospheres must be used within the Ex Zone. ***E.g. SGB article number:*** 220480 "EX "e" junction box with three screw-type cable ducts (M 20)"

5.6 Electrical connection of the leak indicator equipment

- Supply line: at least 1.0 mm^2
- Terminal assignment without acoustic signalling device:

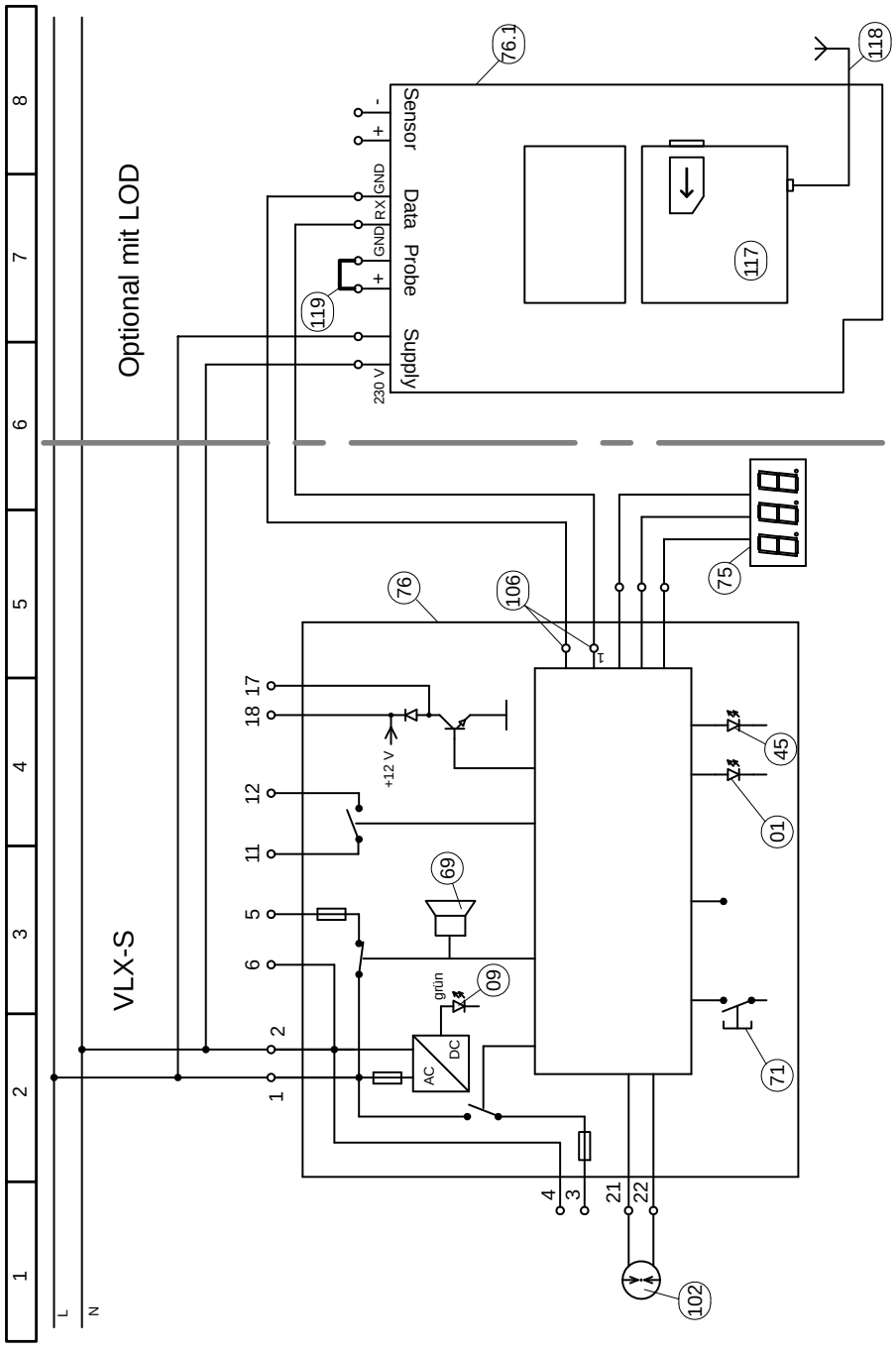
  1/2 mains connections

  5/6 external acoustic signal

  11/12 floating contact
  (open in case of alarm and power failure)

  17/18 no function

5.7 VLX-S 350 M circuit diagram



01	Alarm signal lamp	102	Pressure sensor
09	Operation signal lamp	106	Contacts for data transfer
45	Signal lamp for subsequent evacuation requirement	116	24V DC power unit
59	Relay	117	GSM module
69	Buzzer	118	Aerial
71	"acoustic alarm" button	119	Wire jumper
75	Digital pressure display		
76	Control board		
76.1	DTM data transfer board		

6. Initialisation

By qualified staff only. (Staff trained by SGB or by our authorised distributors, specialist company recognised in Germany).

If a leak indicator is to be put into operation on an already filled tank, special safety measures have to be taken. (e. g. checking that the leak indicator and / or monitoring chamber are free of gas). Further measures depend on the local conditions and must be assessed by the staff on the basis of a risk assessment

6.1 Monitoring chambers leak test

Before initialisation of the VLX-S 350 M you must make sure that the monitoring chamber is leak-tight.

The negative pressure should be built up to 700 mbar using an external pump.

¡ **CAUTION: when building up the pressure, do not under any circumstances exceed the permitted pressure in the monitoring chamber**.

There is sufficient leak-tightness for one year of fault-free operation if the pressure does not fall any more than 0.8 mbar per day, starting with negative operating pressure of 700 mbar.

6.2 Connection

First establish the pneumatic connections and then the voltage supply to the VLX-S 350 M leak indicator.

Make sure that the "operation" signal lamp on the circuit board lights up.

If the pressure in the monitoring chamber is below the alarm pressure level, the "alarm" signal lamp and the acoustic alarm are activated.

Press the "acoustic alarm" button to deactivate the acoustic signal.

Generate negative operating pressure of 700 mbar in the monitoring chamber using an external vacuum pump. If the maximum permitted negative pressure in the monitoring chamber is less than 700 mbar, generate the maximum permitted negative pressure. (Caution: False alarms due to temperature related pressure changes become more likely. A higher level of leak-tightness is required for 1 year of fault-free operation)

If potentially explosive vapours are possible, it is imperative to take suitable measures for explosion protection.

Adhere to the explosion protection regulations, e.g. BetrSichV (Directive 1999/92/EC and the derived laws in the respective member states) and/or others.

6.3. Build-up of negative pressure up to operating pressure

The build up of negative pressure (with certified leak test) is performed using an external pump. Connect the external pump to the suction port. Open the shut-off valve.

If the tank is filled with stored goods, you must expect the stored goods to be expelled at the pump outlet. Suitable precautionary measures must be made. A buffer vessel for separating off liquid should be installed upstream of the pump.

If the vapours are potentially explosive, the appropriate explosion protection equipment must be used.

A maximum negative pressure of 700 mbar is generated. The shut-off valve is then closed and the pump is disconnected. Fit the sealing plug/protective cap.

6.4. Optional DTM data transfer module

If a DTM data transfer module is included in the scope of delivery and you have contracted a leak indicator online diagnosis service (LOD service), contact our LOD service hotline (+49 271 48964-0) after initialisation of the leak indicator in order to set up the LOD service.

6.5. Functional test

Carry out the functional check as per chapter 7.

7. Functional check and maintenance

7.1. General

The test of functional and operational stability must be performed

- after each initialisation
- at the time intervals specified in chap. 6.2
- after fault clearance

CAUTION:
Maintenance work and functional checks by qualified personnel only.

7.2. Maintenance

- Once a year to check functional stability
- Scope of testing as per 7.3

7.3. Functional test

The functional check must fulfil the following content:

- Coordination of the work with the party responsible operation
- Adherence to the safety instructions on handling the stored goods
- Monitoring chamber continuity test
- Testing the switching values
- Leak test
- Establishing operating status
- Completion of a test report with confirmation of the functional and operational stability (Test reports are available for download at the SGB website)

7.3.1. Monitoring chamber continuity test

The shut-off valve must be opened briefly. If there is a passage through the monitoring chamber, a pressure drop registers on the digital pressure display. If there is no drop in pressure, you must localise and clear the fault.

7.3.2. Testing the switching values

Connect a suitable measuring instrument to the suction port and open the shut-off valve. Read the pressure from the measuring instrument and compare it with the pressure reading in the digital display. Factor in the pressure difference from the displays in your subsequent procedure. Close the shut-off valve and disconnect the measuring instrument from the suction port.

To test the alarm threshold value, the shut-off valve is vented until the alarm is triggered. Make sure that the optical and acoustic alarms are triggered and record the alarm pressure shown in the digital display.

Compare with the external measuring device again in order to determine whether the VLX-S 350 M has triggered an alarm at higher negative pressure than 350 mbar.

To generate the negative pressure, connect an external pump (with buffer vessel) to the suction port and generate negative pressure until the alarm is deactivated and continue until negative operating pressure of 700 mbar has been generated.

7.3.3. Leak test

For the leak test, a measuring instrument is connected to the suction port and the shut-off valve is opened. At the start of the leak test, the negative pressure should be approximately 700 mbar. If necessary, the negative pressure has to be generated beforehand.

Before starting the measurement, wait for the pressure to equalise.

There is sufficient leak-tightness for one year of fault-free operation if the pressure does not fall any more than 0.8 mbar per day (0.033 mbar per hour), starting with negative pressure of 700 mbar.

7.3.4. Establishing operating status

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

(2) Close the housing

8. Fault (alarm)

8.1. Alarm description

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

The floating relay contact opens.

The acoustic alarm can be deactivated by pressing the red alarm button.

The alarm signal via the relay contact remains in place until the cause for the alarm has been cleared.

Inform the installation company in order to localise and clear the fault.

A functional check has to be carried out after repairs are made.

9. Spare parts

See spare parts sheets on the internet (www.sgb.de)

10. Identification marking

- Electrical data
- Serial number
- Type designation
- Date of manufacture (month/year)
- Manufacturer's mark
- Legally required mark
- Class 1 leak indicator as per EN 13160

11. Disassembly and disposal

11.1. Disassembly

Check to make sure free of gas before and after work

Seal (leak tight) any openings which may spread a potentially explosive atmosphere.

As far as possible, disassembly should be performed with tools (saws, grinders etc.) which do not generate sparks. However, if it is unavoidable, you must adhere to EN 1127 and the area must be free of a potentially explosive atmosphere.

Prevent electrostatic charges (e.g. from friction).

11.2. Disposal

Dispose of contaminated components (possible outgassing) appropriately.

Dispose of electronic components in the appropriate manner.

12. Appendix

12.1. Liquids suitable for monitoring

All usual fuels at the service station and Ad Blue

12.2 Declaration of Conformity

We hereby declare,

SGB GmbH
Hofstraße 10
57076 Siegen, Germany

under sole responsibility, that the leak indicator

VLX-S 350 M / VLX-S … M AZ

complies with the basic requirements of the EC directives listed below.

This declaration will become null and void in case of any change to the device not approved by us.

Number / short title	Applied regulations
2004/108/EC EMC Directive	EN 61 000-6-3: 2007 + A1: 2011 EN 61 000-6-2: 2005 EN 61 000-3-2: 2014 EN 61 000-3-3: 2013
2006/95/EC Low-voltage Directive	EN 60 335-1: 2012 EN 61 010-1: 2010 EN 60 730-1: 2011
94/9 EEC Devices in Potentially Explosive Atmospheres	The pressure sensor can be connected by its pneumatic parts to chambers (monitoring chambers of tanks / fittings) for which devices of category 1 are required. The following documents were consulted: EN 1127-1: 2011 EN 13 160-1-2: 2003 EN 13 463-1: 2009 EX5 11 03 57496 005 with EN 60 079-0:2013; EN 60 079-18:2009 The assessment of ignition hazards revealed no further hazards

Compliance is declared by

ppa. Martin Hücking
(Technical Director)

Issue: February 2015

12.3 Declaration of Performance (DoP)

Number: **005 EU-BauPVO 06-2014**

1. Distinct identification code of the product type:

   Class I
   Vacuum leak detector

2. Type, batch or serial number or other label for the identification of the building product according to article 11 para. 4:

   VLX-S 350 M: Vacuum leak detector for containers

3. Purpose of use or purposes of use of the building product intended by the manufacturer according to the applicable harmonised technical specification:

   Vacuum leak detector, which is intended for application in double-walled, underground or above-ground, unpressurised tanks for liquids/fluids hazardous to water

4. Name, registered trade name or registered brand and contact address of the manufacturer according to article 11 para. 5:

   SGB GmbH
   Hofstraße 10
   57076 Siegen
   Germany
   Tel.: +49 271 48964-0
   Fax: +49 271 48964-6
   E-mail: sgb@sgb.de

5. If applicable, name and contact address of the agent authorised with the tasks according to article 12 para. 2:

   n/a

6. System or systems for the evaluation and inspection of the reliability of performance of the building product according to appendix V of the Building Products Regulation:

   System 3

7. In the case of the declaration of performance, which applies to a building product, which is covered by a harmonised standard:

   TÜV Nord Systems GmbH & Co.KG, CC Tankanlagen, Große Bahnstraße 31, 22525 Hamburg, Germany
   ID number of the notified test laboratory: 0045

   conducted a type approval text according to system 3 and issued the following test report:

   Test report no.: PÜZ 8109 340 886

8. Declared performance:

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

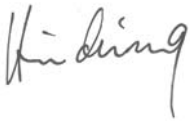
9. The performance of the product according to numbers 1 and 2 corresponds to the declared performance according to number 8:

Solely the manufacturer is responsible for the compilation of this declaration of performance according to number 4

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

Dipl.-Ing. M. Hücking, Director of Operations

Siegen, 30-06-2014



12.4 Certification TÜV Nord

TÜV NORD Systems

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

Reference code: HHA02
Reference number: 0045

Große Bahnstraße 31.22525
Hamburg

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

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

Certificate

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

Manufacturer: SGB GmbH
Hofstr. 10
57076 Siegen

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

Examination time range: 10.08. — 14.11.2012

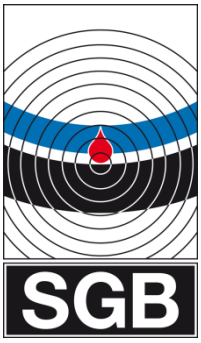
Place of examination: PÜZ testing laboratory TÜV NORD Systems GmbH & Co. KG

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

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

Hamburg, 03.12.2012

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



Imprint

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