Documentation

Pressure Leak Detector DLR-GS

Please read instructions prior to commencing any work

As of: 02/2024

Item no.: 604302

Overview of the design variants

DLR pressure leak detectors are available in different versions that are described more precisely by the suffix characters. The levels of availability and the possible combinations depend on the device. Please contact our sales team. Phone +49 271 48964-0, email sgb@sgb.de

DLR- … .. P M N Si

„**S**ervice **i**ndication": integrated service indicator (LED) with an adjustable service period

„**N**/Feed required": The leak detector indicates by means of a diode that the pressure in the interstitial space has decreased and that the pressure must be built up again

„**M**anometer/Digital Pressure Display": The leak detector is equipped with a digital pressure display in the housing cover

„**P**rotected": Construction of the leak detector in a weatherproof housing

„**..**" = „Numerical value" for the alarm-vacuum of the leak detector.

„**G** = **G**as (bottle)": A pressure gas bottle is used for pressure generation, usually nitrogen

„**P** = **P**ump": A pump integrated in the leak detector is used for pressure generation

„**GS** = **G**as (bottle) **static**": A static pressure generator must be brought to the site since the leak detector does not have a pump or automatic feed mechanism

„**DLR/ Pressure Leak Detector Pipe**": The leak detector operates with overpressures towards the atmosphere and is designed for application on double-walled pipes

Table of Contents

1. General

1.1 Information

These instructions provide important notes on using the leak detector DLR-GS. Complying with all safety instructions and guidelines is a prerequisite for safe working.

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

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:

Highlights useful tips, recommendations and information

1.3 Limitation of Liability

All information and instructions in this documentation have been compiled considering the applicable norms and regulations, the state of the art and our longstanding experience.

SGB does not assume any liability in case of:

- Noncompliance with these instructions
- Unintended 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 leak detector DLR-GS for a period of 24 months from the day of installation on site in accordance with the 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.
Stating the serial number of the leak detector is required.

The obligation of warranty shall cease to exist in case of
- inadequate or improper installation
- unintended use
- modifications/repairs without the manufacturer's consent.

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

1.6 Customer Service

Our customer service 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

- For double-walled pipes/fittings installed underground or indoors only.
- The leak detector alarm pressure must be at least 1 bar higher than the maximum feed pressure in the product-transporting pipe.
- Grounding in accordance with valid regulations[1].
- Tightness of the leak detection system according to section 7.3.4.
- Leak detector installed outside of the explosive area.
- Lead-throughs for connection lines into and out of the manhole chamber must be sealed gas-tight.
- Leak detector (electric) cannot be turned off.
- Use of the leak detection medium compressed air only with conveyed media with flash point > 60°C (> 55°C for Germany according to TRGS 509 and 751).
- Use of the leak detection medium nitrogen with conveyed media with flash point > 60°C and ≤ 60°C if the interstitial space is zone 2 (> 55°C and ≤ 55°C for Germany according to TRGS 509 and 751).
- The pressure build-up must be carried out with a suitable pressure reducer if nitrogen is used.
- Section 3.4.5 must be complied with.

Any claims arising from misuse are excluded.

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

2.2 Obligation of the Operating Company

WARNING!

Danger in case of incomplete documentation

The leak detector DLR-GS is used in a commercial environment. The operating company is therefore subject to statutory occupational safety obligations.

In addition to the safety instructions in this documentation, all applicable safety, accident prevention and environmental regulations must be adhered to. In particular:

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

[1] For Germany: e.g. EN 1127

2.3 Qualification

WARNING!

Danger to humans and the environment in case of inadequate qualification

The personnel must be capable of independently recognizing and avoiding potential risks based on their qualifications.

Companies commissioning leak detectors must be trained by SGB or an authorized representative.

National guidelines must be adhered to.

For Germany:

Technical service qualification for installation, commissioning and maintenance of leak detection systems

2.4 Personal Protective Equipment (PPE)

Personal protective equipment must be worn during work.

- Wear necessary protective equipment for the relevant work
- Note and comply with existing PPE signs

Entry in the "Safety Book"

Wear HV vest

Wear safety footwear

Wear hard hat

Wear gloves – where necessary

Wear safety goggles – where necessary

Use an oxygen warning device with the leak detection medium nitrogen

2.4.1 Personal Protective Equipment working with systems that may be subject to risk 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)[2]
- Measuring equipment to determine the oxygen content in the air (Ex/O-meter)

2.5 Fundamental Hazards

DANGER

From electric current

When working on the leak detector, it must be disconnected from the power supply unless stated otherwise in the documentation.

Comply with relevant regulations regarding electric installation, explosion protection (e.g. EN 60 079-17), if necessary, and accident prevention.

DANGER

From explosive vapor-air mixtures

Ensure there is no gas present prior to performing work

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 others.

DANGER

From working in shafts

The leak detectors are mounted outside the manhole chambers. Pneumatic connection is usually performed inside the manhole chamber. Therefore, the chamber must be entered for mounting.

Before entering, the corresponding protective measures must be taken and it must be ensured that no gas and sufficient oxygen are present.

[2] Other manufacturers' or countries' regulations may provide different percentages.

3. Technical Data of the Leak Detector

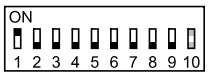
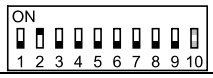
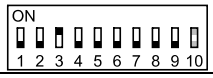
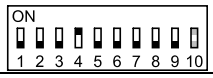
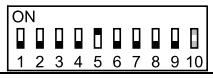
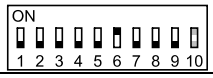
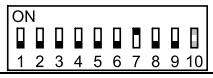
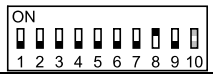
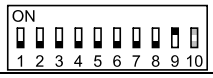
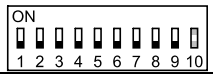
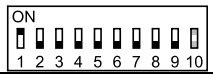
3.1 General Data

Dimensions and drilling pattern:	see sections 12.1 and 12.2
Weight:	2.1 kg (plastic housing) 6.3 kg (stainless steel housing)
Storage temperature range:	-40°C to +70°C
Operating temperature range:	0°C to +40°C (plastic housing) -40°C to +60°C (stainless steel housing incl. heating)
Housing protection class:	IP 30 (plastic housing) IP 66 (stainless steel housing)
Volume leak detector:	0,02 liter
Volume manifold 2 … 8:	0,02 liter … 0,08 liter
Max. operating pressure:	see chap. 3.3, column p_{SETPT}

3.2 Electrical Data

Power supply optional:	100 … 240 V AC 24 V DC
Power input:	10 W (without heating) 28 W (incl. heating at 20°C)
Terminals 5, 6 (external signal):	max. 24 V DC; max. 300 mA
Terminals 11…13 (voltage-free):	DC ≤ 25 W or AC ≤ 50 VA
Terminals 17…19 (voltage-free):	DC ≤ 25 W or AC ≤ 50 VA
Fuse protection:	max. 10 A
Overvoltage category:	2

3.3 Switching Values

Type DLR-GS	p_O [bar]	p_{AON} [bar]	p_{SETPT} [bar]	Switch position of dip switch	p_{TEST} [bar]	p_{PR} [bar]
1	pressureless	> 1	5	 [3]	> 6,5	5
2	< 1	> 2	6		> 8	6
3	< 2	> 3	7		> 9	7
4	< 3	> 4	8		> 10	8
6	< 5	> 6	10		> 13	10
8	< 7	> 8	12		> 16	12
10	< 9	> 10	14		> 18	14
13	< 12	> 13	17		> 22	17
16	< 15	> 16	20		> 26	20
–	Special values agreed between SGB and customer					
With pressure sensor 40 bar						
18	< 17	> 18	23		> 30	23

The following abbreviations are used in the table:

p_O Maximum operating pressure in the inner pipe (feed pressure + dynamic pressure + pressure due to geodetic height differences)

p_{AON} Switching value "Alarm ON"; the alarm will be triggered at this pressure level at the latest

p_{SETPT} Pressure setpoint which should be built up according to the manufacturer's recommendation. Note: there is no display indication when this pressure is reached. This setting can be varied, in which case the following must be noted:
- Upwards: the test pressure must be at least 1.3 times higher
- Downwards: the alarm pressure is reached considerably more quickly

p_{TEST} Minimum test pressure of the interstitial space

p_{PR} Set pressure on the pressure reducer (must be adjusted in some cases, according to the pressure setpoint)

With the function "Feed required" display, this pressure value is about 1 bar higher than the alarm pressure.

Further switching values:

p_{AOFF} Switching value "Alarm OFF"; the alarm will be deactivated if the value p_{AON} is exceeded by 25 … 500 mbar

[3] Switches 1 to 9 for determining the pressure level

3.4 Field of Application

3.4.1 Interstitial space requirements

- Proof of pressure resistance of the interstitial space (see section 3.3, column "p_{TEST}" minimum test pressure of the interstitial space)
- Proof of suitability of the interstitial space (for Germany: proof of usability from construction authority).
- Sufficient passage in the interstitial space for the leak detection medium (air/nitrogen)
- Tightness of the interstitial space according to this documentation.
- The number of interstitial spaces to be monitored depends on the total interstitial space volume. According to EN 13160, 10 m^3 may not be exceeded. To be able to test the tightness of the interstitial space, it is recommended not to exceed 4 m^3.
  The pipeline length (per duct) to be monitored should not exceed 2500 m and must correspond with the specifications for the pipe permit.

3.4.2 Pipes

- Double-walled pipes made of metal or plastic, in factory or on-site construction.
  For Germany: Additional requirements may result from the respective permits.
- ONLY for applications without temperature variations of more than ± 10°C (e.g. double-walled pipes installed underground or indoors – no hot media).

3.4.3 Fittings

- Double-walled fittings made of metal or plastic in factory or on-site construction.
  For Germany: with proof of usability from construction authority, unless it is part of the pipe permit.
- ONLY for applications without temperature variations of more than ± 10°C (e.g. double-walled pipes installed underground or indoors – no hot media).

3.4.4 Conveyed product

- Liquids hazardous to water, even with a flash point of ≤ 60°C (for Germany ≤ 55°C according to TRGS 509 and TRGS 751). Chapter 3.4.5 is to be observed.
- The conveyed product may not react with the leak detection medium.

3.4.5 Interaction between interstitial space, leak detection medium and operating mode

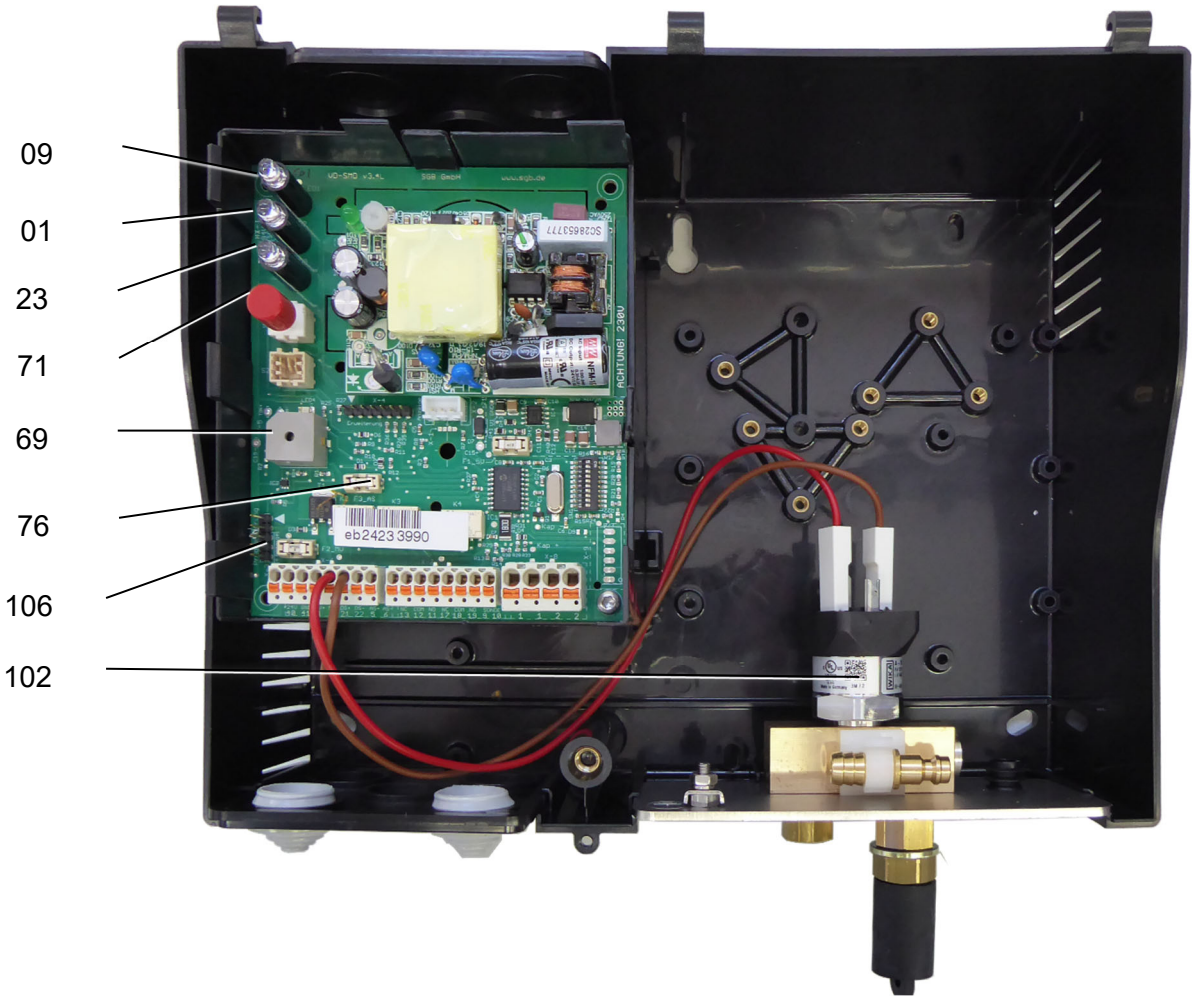
Regardless whether there is permeation in the interstitial space or not, the leak detection medium nitrogen is to be used for all applications if the goods to be conveyed have a flash point ≤ 60°C (≤ 55°C for Germany according to TRGS 509 and TRGS 751).

This specification is based on a risk evaluation according to the directive 2014/34/EU (explosion directive). The risk evaluation was performed based on the table in section 3.3 (informative) for EN 13160.

If the evaluation of the device categories has different results due to operational regulations or for any other reasons, the use of the leak detector must be checked separately.

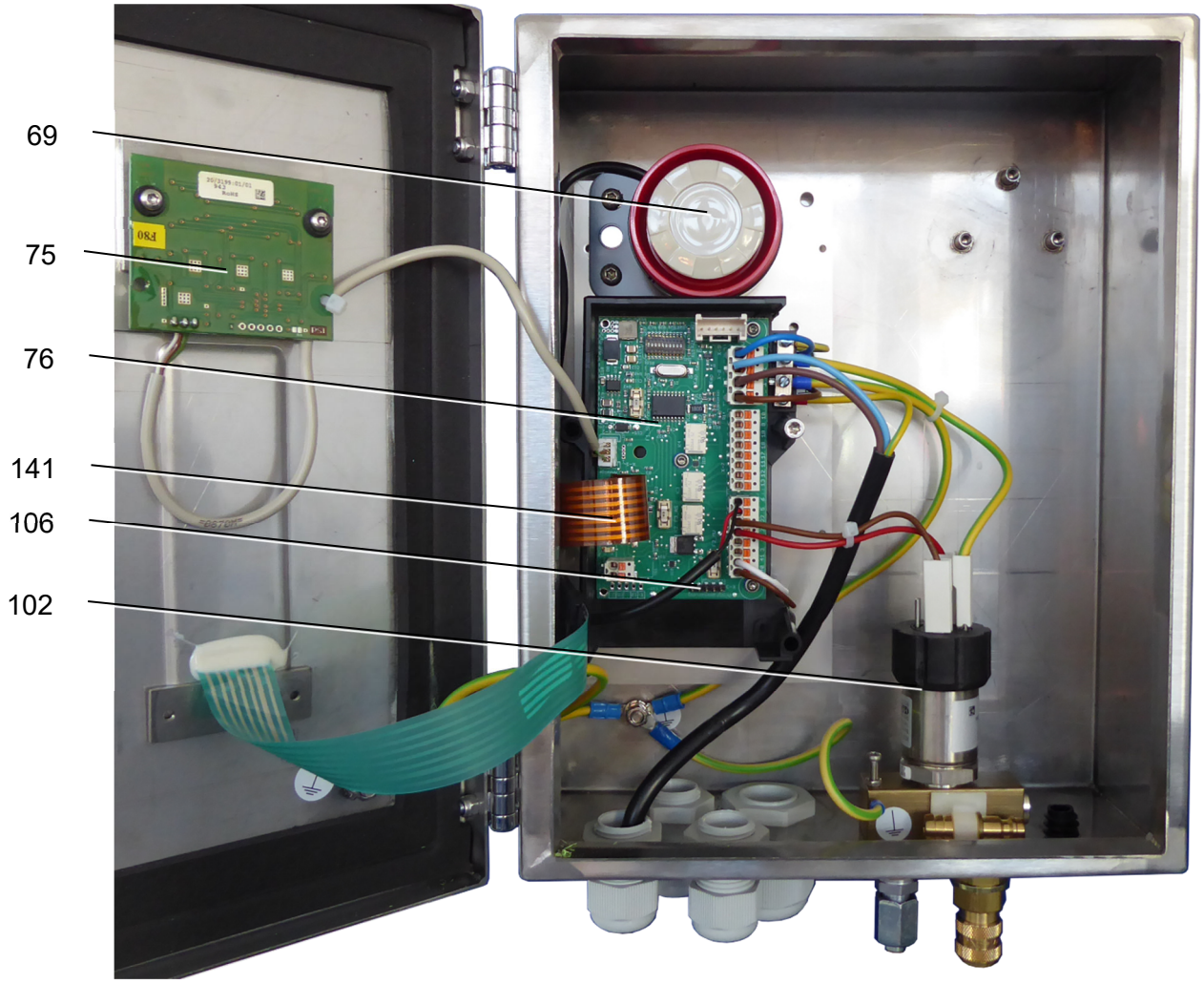
4. Design and Function

4.1 Design



Interior view of plastic housing with:

01	Signal lamp "Alarm", red
09	Signal lamp "Operation", green
23	Signal lamp "Refilling required", yellow
29	Button "Commissioning" (filling)
69	Buzzer
71	“Mute” Button
76	Main board
102	Pressure sensor
106	Contact for serial data transfer



Interior view of stainless-steel housing, weather-protected, with:

44	Solenoid valve
69	Buzzer
75	Display board
76	Main board
102	Pressure sensor
106	Contact for serial data transfer
141	Keypad terminal strip

The pressure leak detector DLR-GS monitors both walls of the double-walled system for leaks. The monitoring pressure during operation is higher than any pressure on the inner or outer wall, so that leaks will be indicated by a pressure drop.

Inert gas, air from a pressure gas bottle or from a pressure gas system can be used as leak detection media. If air is used, it must be dried to a relative humidity of less than 10 %.

The current pressure is shown on the display in mbar/bar or PSI[4]:

- Values of less than 150 mbar or less than 2.18 PSI will not be displayed.
- Values of up to 990 mbar will be displayed in mbar and without decimal.
- Values from 1 bar are displayed in bar with two decimals and from 10 bar with one decimal.
- Values in PSI are displayed with one or two decimals.

4.2 Normal Operating Condition

The normal operating condition is achieved during the initial operation through pressure buildup to the operating pressure, generally with a mobile pressure tank.

The existing pressure in the interstitial space is monitored with a pressure sensor in the leak detector. Any minor leaks will lead to a fall in pressure. The result of this is that the requirements for the impermeability of the interstitial space(s) and the connection(s) must be set very high to assure trouble free operation for one year.

4.3 Function in Case of Leaks

If there is a leak in the inner or outer wall, gas will leak from the interstitial space. The pressure drops.

An optical and audible alarm will be triggered when the alarm pressure is reached, which will open the voltage-free contacts.

Optionally, an additional relay can be used to establish voltage-free contacts when the specified “Refilling required” pressure is not reached. The pressure value for “Refilling required” is approx. 1 bar above the "Alarm ON” switching value.

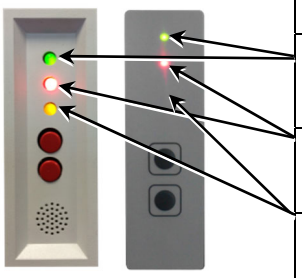
4.4 Overpressure Valve

An overpressure valve is not provided in the leak detector, but it can be installed if the application requires it. (Please consult with the manufacturer).

[4] The change of the bar and PSI settings is performed at the factory. This change can also be performed on site following coordination with the manufacturer.

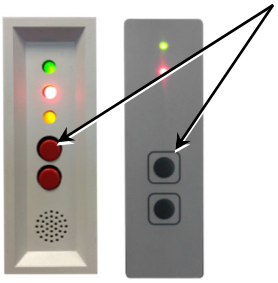
4.5 Displays and Controls

4.5.1 Display



Signal lamps	Operating Condition	Refilling activated or required	Alarm condition	Alarm, audible alarm acknowledged	Device malfunction
OPERATION: green	ON	ON	ON	ON	ON
ALARM: red	OFF	OFF	ON	BLINKING	ON
REFILLING: yellow	OFF	ON	ON	ON	OFF

4.5.2 Function "Turn off audible alarm signal"



Shortly press the "Mute" button once, audible signal turns off, the red LED blinks.

Pressing the button again will turn the audible signal on.

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

4.5.3 Function "Testing the optical and audible alarm signal"

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

This inquiry is only possible if the pressure in the system has exceeded the "Alarm OFF" pressure.

5. Mounting the System

5.1 Basic Instructions

- Prior to commencing work, the documentation must be read and understood. In case of ambiguities, please refer to the manufacturer.
- The safety instructions in this documentation must be adhered to.
- Bur and clean it prior to the connection of cut pipes.
- Only qualified service companies may be used for installation.
- Comply with relevant regulations for prevention of accidents.
- Lead-throughs for pneumatic and electric connection lines, through which the explosion atmosphere can carry over, must be sealed gas-tight.
- 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.
- Compliance with the relevant traffic regulations is required when transporting pressure gas bottles to and from the construction site.
- The pressure gas bottle must be protected from falling over at the construction site.
- If nitrogen is used, sufficient ventilation must be provided if commissioning/operation is performed in enclosed spaces. Attach information sign.
- Provide a test valve at the end facing away from the leak detector at the end of the pipe(s)/fitting(s).
- Before entering inspection chambers, the oxygen content must be tested and the inspection chamber flushed if necessary.
- If metallic connection lines are used, it must be ensured that the power supply grounding is on the same potential as the pipe to be monitored.
- Notes on personal protective equipment are provided in chapter 2.4 and 2.4.1.

5.2 Leak Detector

(1) Generally mounted on walls with plugs and screws.
With plastic box: 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.

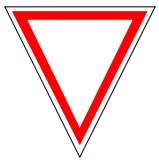
(2) In a dry room, or outdoors in a suitable housing.

(3) If mounted in a protective box: additional external signal or alarm forwarding via voltage-free contacts to a switchboard or similar device.

(4) NOT in potentially explosive areas.

(5) Dimensions of housings and drilling patterns are illustrated in Appendix 12.1 and 12.2, respectively.

5.3 Selecting the Pressure Gas Bottle and the Pressure Reducer



(1) The pressure reducer must have an integrated overpressure valve.

(2) The range of settings for the pressure reducer to be used must be selected in correspondence with the application or the pressure to be set. (see section 3.3).

(3) The maximum pressure setting on the pressure reducer should not exceed the test pressure for the interstitial space (SGB recommendation).

(4) The system pressure range of the pressure reducer must match the bottle. In this case, 200 bar maximum.

5.4 Setting up the Pressure Gas Bottle and Mounting the Pressure Reducer

(1) Set up and secure pressure gas bottle, e.g. using a bracket and safety chain intended for this purpose.

(2) Close safety chain.

(3) Remove protective cover and mount pressure reducer to bottle.

(4) Close shut-off valve on the pressure reducer.

5.5 Pneumatic Connection Lines, Requirements

- Pressure resistance of the metal (generally Cu) or plastic pipes must at least correspond with the test pressure in the interstitial space. Also applies to fittings and screwed connections. Note temperature range, especially when using plastic.
- Inside clearance
  at least 4 mm with inert gas as leak detection medium
  at least 6 mm with air as leak detection medium
- 50 m should not be significantly exceeded, but if this happens: Install pipe with greater inside clearance using transition pieces.
- The full cross section must be maintained. Do not push in or bend[5].
- Install metal or plastic pipes underground or plastic pipes aboveground outdoors in protective pipes.
- Seal the protective pipe gas-tight and protect from moisture.
- Avoid build-up of electrostatic charges (e.g., during pulling of lines).
- Make sure that the correct screw connections and matching threads are used.

[5] If necessary, install commercial fittings for plastic pipes (specified bending radii).

5.6 Completing Pneumatic Connections

5.6.1 Between pressure reducer and leak detector

(1) Select suitable test equipment to connect the pressure reducer to the leak detector. Recommendation: Use the test equipment SGB item no.: 115520

(2) Mount the test equipment with pressure reducer at the pressure gas bottle.

(3) Connect the test equipment to the leak detector.

5.6.2 Between leak detector and interstitial space, test valves

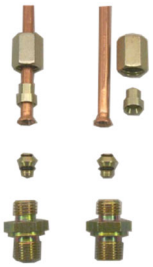
(1) Select and install suitable pipe.

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

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

(4) According to the specifications of the manufacturer of the pipe/interstitial space

5.6.2.1 Flanged screw connections (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

5.6.2.2 Clamping ring screw connection for metal and plastic pipes

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

(2) Insert the pipe (with support sleeve) as far as it will go

(3) Tighten nut of screw connection by hand to the resistance; then turn further 1¾ turns with the wrench

(4) Release nut

(5) Tighten nut by hand until stronger resistance

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

5.6.2.3 Quick screw connections for PA tubing

(1) Cut PA tube 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)

5.7 Electrical Cables

Supply line: at least 1.0 mm², e. g., NYM 3 x 0.75 mm², and max. 2.5 mm²

Power connection:
- 2.5 mm² without ferrule
- 1.5 mm² with ferrule and plastic collar

Voltage-free contacts and external signal:
- 1.5 mm² without ferrule
- 0.75 mm² with ferrule and plastic collar

5.8 Electrical Wiring Diagram

(1) Power supply: according to label imprint

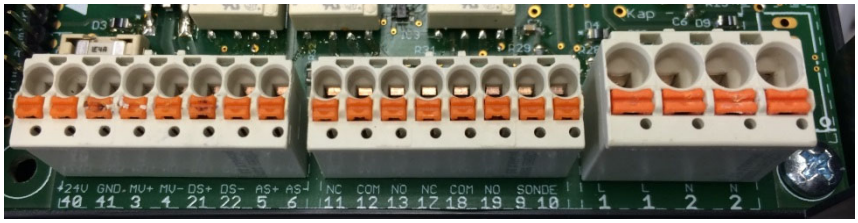
(2) Fixed wiring, i.e., no plug or switch connections

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

(4) Regulations of power supply companies must be adhered to[6].

(5) Close unused cable glands properly and professionally.

(6) Terminal layout: (see also section 5.9.3)



1 / 2	Power connection (100…240 V AC) **CAUTION:** both terminals exist in duplicate!
3 / 4	not used, internal assignment
5 / 6	External signal (24 V in case of alarm, can be turned off by activating the "Audible alarm signal" button)
11 / 12	Voltage-free contacts (opened in case of alarm or loss of power)
12 / 13	As above, but contacts closed
17 / 18 /19	Voltage-free contacts at “Refilling on”: 17/18 opened; 18/19 closed; Voltage-free contacts at “Refilling off” or in currentless condition: 17/18 closed; 18/19 opened
21 / 22	Occupied (with internal sensor)
40 / 41	24 V DC as permanent power supply to power other assemblies or, for a device with a supply voltage of 24 V DC, the power supply is connected here

[6] For Germany: also, VDE regulations

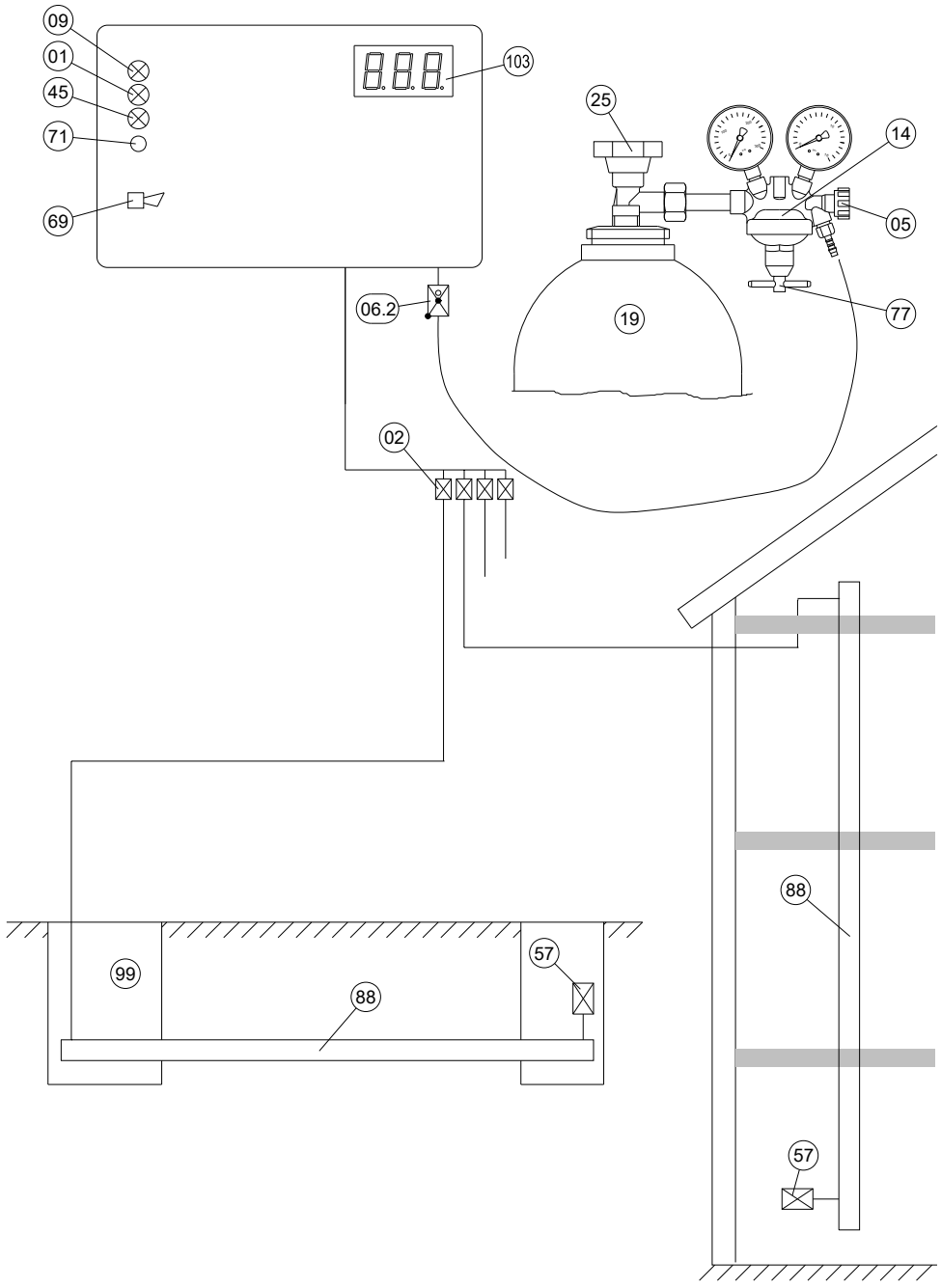
5.8.1 Location of fuses and their values

5.8.1.1 Plastic housing

5.8.1.2 Stainless steel housing

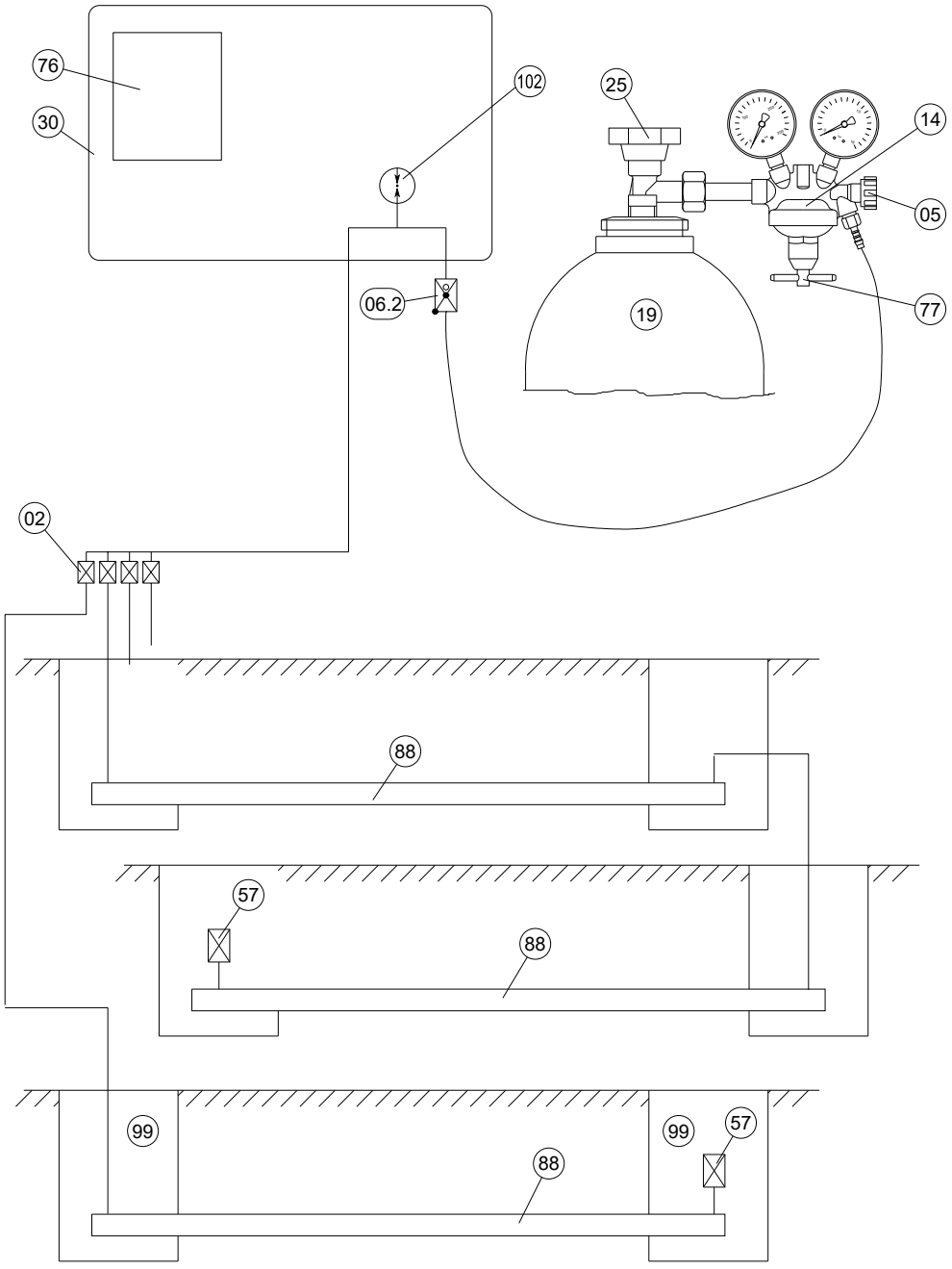
5.9 Installation Examples

5.9.1 Leak detector DLR-GS .. (single, underground pipeline and/or above-ground riser in the building



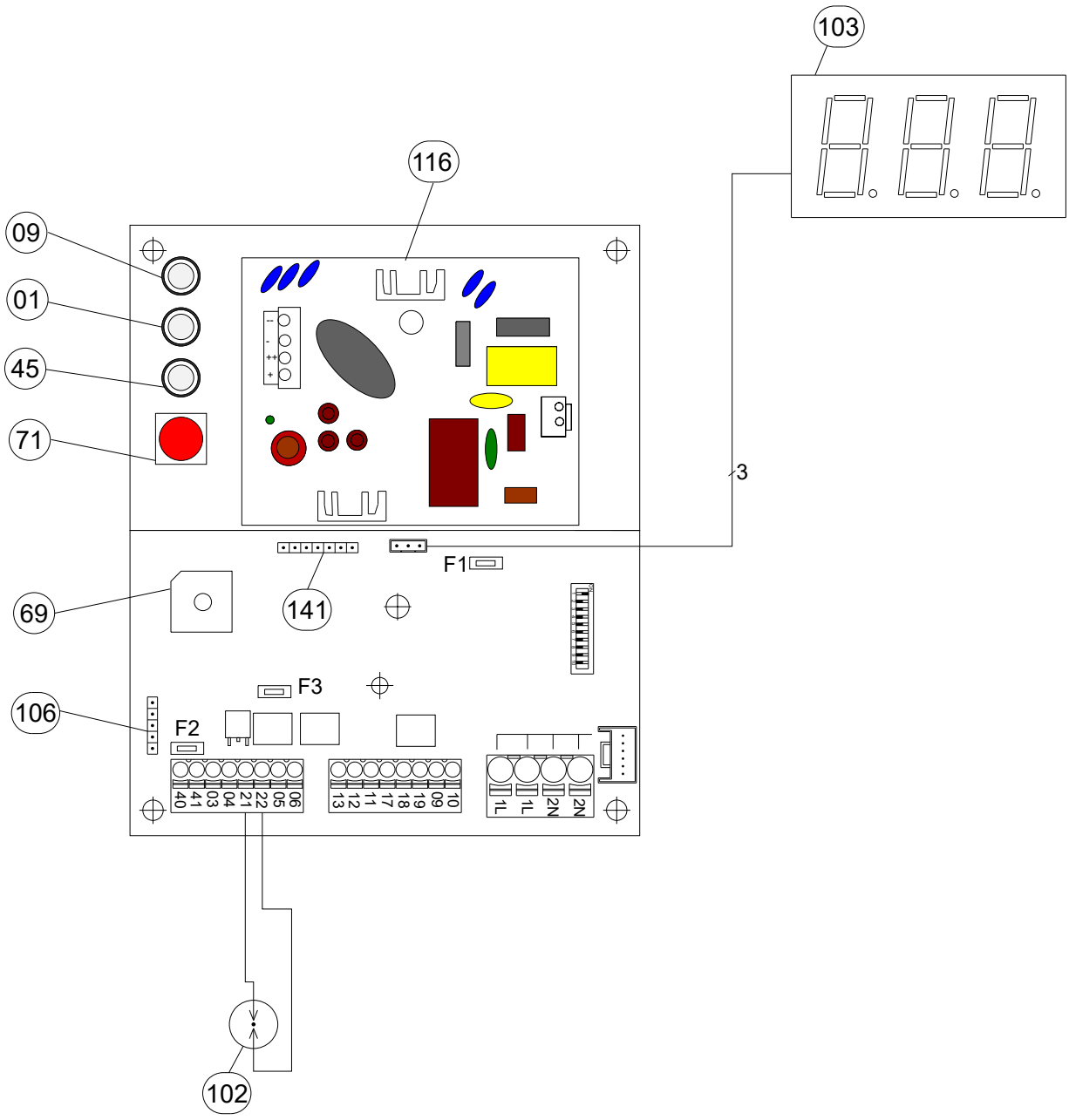
01	Signal lamp "Alarm", red	51	Test coupling
02	Shut-off valve	57	Test valve
05	Shut-off valve (on pressure reducer)	69	Buzzer
06.2	Coupling, on the leak detector side	71	“Mute” Button
09	Signal lamp "Operation", green	77	Pressure regulating valve
14	Pressure reducer	88	Double-walled pipe
19	Pressure accumulator	99	Control shaft
25	Canister shut-off valve	103	Display
29	Button "Filling"	104	On-site compressed air system (e.g. air/nitrogen)
45	Signal lamp "Refilling", yellow		

5.9.2 Leak detector DLR-GS .. (underground pipeline, series connection)



01	Signal lamp "Alarm", red	51	Test coupling
02	Shut-off valve	57	Test valve
05	Shut-off valve	69	Buzzer
06.2	Coupling, on the leak detector side	71	“Mute” Button
09	Signal lamp "Operation", green	76	Main circuit board
14	Pressure reducer	77	Pressure regulator
19	Pressure cylinder	88	Double-walled pipe
25	Cylinder shut-off valve	99	Inspection chamber
29	Button "Filling"	102	Pressure sensor
30	Housing	103	Display
45	Signal lamp "Refilling", yellow		

5.9.3 Block diagram



01	Signal lamp "Alarm", red
09	Signal lamp "Operation", green
29	Button "Filling"
45	Signal lamp "Refilling", yellow
59.2	Relay "External signal"
59.3	Relay "Alarm"
59.4	Relay "Refilling
"	

69	Buzzer
71	“Mute” Button
76	Main board
102	Pressure sensor
103	Display
105	Control unit
106	Contact for serial data transfer
116	Power supply unit 24 V DC
141	Keypad terminal strip

6. Commissioning

(1) Only perform commissioning once the steps in section 5 "Mounting" have been fulfilled.

(2) Flush the interstitial space with inert gas if walls of storage medium are not impermeable.[7]

(3) If a leak detector is commissioned on a pipe (fitting) that is already in operation, special protective measures must be taken (e.g. testing that the leak detector and/or the interstitial space is free of gas). Additional measures may be necessary depending on the local conditions and must be assessed by qualified personnel.

6.1 Commissioning the Pressure Gas Bottle

(1) Turn pressure regulator all the way back.

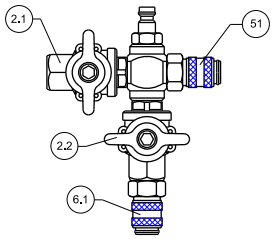
(2) Insert a suitable manometer (indicating range) into the coupling 51 of the test equipment and insert the test equipment into the coupling (6.2) of the leak detector.

(3) Open cylinder shut-off valve (if necessary, test tightness between pressure reducer and bottle)

(4) Set pressure on the pressure reducer using the pressure regulator on the pressure reducer according to section 3.3 (adjust during pressure build-up, if necessary).

(5) After completion of the functional check:
- Close shut-off valve on the pressure reducer.
- Close cylinder shut-off valve.
- Remove pressure reducer from the bottle (Caution: Gas will escape until the pressure reducer has no pressure).
- Install protective cover on bottle.

6.2 Commissioning the Leak Detector



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

(2) Switch on line voltage

(3) Ascertain lighting of "Operation" and "Alarm" signal lamps and sounding of the audible alarm. If necessary, turn off audible alarm signal.

(4) Pressure build-up the interstitial space:
Open the shut-off valve 2.2 at the test equipment to build up the pressure in the leak detector and the interstitial space.
With very large interstitial spaces it may be necessary to switch bottles (see section 5.3 in conjunction with sections 5.4 and 6.1)

Note: If no pressure build-up is achieved with the pressure gas bottle connected, the leak must be located and corrected (check the settings for the pressure reducer as well, if necessary).

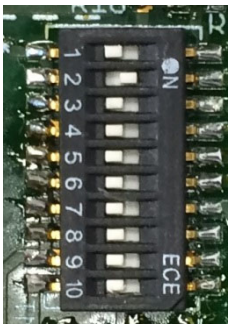
[7] For Germany: Additional DIBT requirements must be considered for such double-walled pipes.

CAUTION: Display on the leak detector (display) begins with a pressure from 150 mbar.

(5) Check all connections for leaks with a foaming agent.

(6) Perform a functional check according to section 7.3.

6.3 Changing the Pressure Level



(1) Switch positions 1-9 are designed to select the pressure level.

(2) The assignment of the switch position to the relevant pressure level is shown in chapter 3.3.

(3) If the switch positions 1-9 are changed at the construction site, it must be assured that the operating pressure to be built up does not exceed the test pressure of the interstitial space.

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) Even very minor leaks will trigger an alarm.

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

(4) The leak detector must be disconnected from power for any repairs to be performed on the leak detector.

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

(6) Use a dry cloth to clean the leak detector with a plastic box.

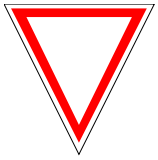
7.2 Maintenance

- Maintenance work and functional checks must be performed by trained personnel only[8].
- Once a year to ensure functional and operational safety.
- Test scope according to section 7.3.
- Compliance with the conditions according to 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.

7.3 Functional Check

The functional and operational safety tests must be performed:

- after each commissioning
- in accordance with the time intervals listed in section 7.2[9]
- each time a malfunction has been corrected



CAUTION: During the functional check nitrogen is usually released. If this must be done in a chamber or similar, it is mandatory to permanently check the oxygen content.

[8] For Germany: Technical service according to water law with expertise in leak detection systems. For Europe: Authorization by the manufacturer
[9] For Germany: In addition, national laws apply (e.g. AwSV)

7.3.1 Test scope

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

(2) Observe the safety instructions for working with the product to be conveyed.

(3) Check the test valve at the end of the interstitial space pointing away from the leak detector for tightness and contamination, and clean it, if necessary

(4) Checking the free passage of air in the interstitial space (section 7.3.2)

(5) Testing the switching values (section 7.3.3)

(6) Tightness test following commissioning or correction of malfunctions (section 7.3.4)

(7) Creating the operating condition (section 7.3.5)

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

7.3.2 Checking the free passage of air in the interstitial space

If several interstitial spaces are connected in parallel, each one of them must be checked for passage.

(1) Insert measuring gauge into the test coupling 6.2. The current pressure in the interstitial space will be displayed.

(2) Open the test valve for the first connected interstitial space.

(3) Check whether the measuring gauge registers a pressure drop.

(4) Close the test valve.

(5) Repeat process from paragraph (2) to (4) for each additional test valve of the interstitial space(s) connected to this leak detector.

(6) The pressure drop generated by the test can be compensated as follows:

a) Remove the measuring gauge from the coupling and insert it into the test coupling 51 of the test equipment.

b) Insert the test equipment into coupling 6.2.

c) Connect the pressure cylinder to the test equipment acc. To chapter 5.3 (5.4 and 6.1)

d) Open the shut-off valve 2.2.

e) Pressure build-up until pressure setpoint; during filling, monitor the pressure on the pressure reducer (test pressure must not be exceeded) and re-adjust if necessary

f) Once the filling process has been completed, close the shut-off valve on the pressure reducer, and disconnect the measuring gauge and pressure cylinder.

7.3.3 Testing the switching values

(1) If several interstitial spaces are connected through a distribution system, close all shut-off valves on the distributor.

(2) Insert the test equipment into the coupling 6.2

(3) Insert the manometer into the test coupling 51 of the test equipment.

(4) Connect the pressure cylinder to the test equipment acc. To chapter 5.3 (5.4 and 6.1).

(5) Bleed the shut-off valve 2.1 to determine the switching values “Refilling required” (the yellow signal lamp, if available, lights up) and for “Alarm ON”. Record the values.

(6) Close the shut-off valve.

(7) (Slowly) open the shut-off valve 2.2. During the pressure build-up, check the switching values for “Alarm OFF” and “Refilling (here: Filling) OFF” (if available). Record the values.

(8) Close the shut-off valves. Remove the pressure cylinder properly and decouple the test equipment.

(9) The test is considered passed if the values specified in section 3.3 have been satisfied.

(10) Open all shut-off valves in the connection line(s).

7.3.4 Tightness test following commissioning or correction of malfunctions[10]

(1) Insert measuring gauge into the coupling 6.2. The measuring gauge will display the current pressure.

(2) The tightness test is approved for one year of trouble-free operation if the following conditions have been met:
Determine the difference between the measured values for “Refilling (Filling) OFF” and “Alarm ON” and convert into mbar (x 1000). Divide the calculated value by 8760. This results in a maximum tolerated pressure drop (per hour) to prevent triggering an alarm before one year has passed. If the determined value cannot be measured, multiplication of the pressure drop will result in the same multiplication of the test time.

Example: Difference between the above-named switching values:
1.75 bar (value measured on site)
1.75 x 1000 = 1750
1750 / 8760 = 0.2 mbar/h (admissible pressure drop)

The measuring gauge available on site “only” shows a value of 5 mbar. This means the readability is 25 times (5 / 0.2). This extends the test time to 25 hours.

(3) Disconnect the measuring gauge after the tightness test has been completed.

[10] This section assumes that the operating pressure has been built up in the interstitial space and the pressure has been compensated.

7.3.5 Creating the operating condition

(1) Seal the housing and the test valve(s) at the end of the interstitial space pointing away from the leak detector.

(2) If shut-off cocks have been installed in the connection lines, they must be sealed in an opened position (if connected to an interstitial space).

8. Alarm (Malfunction)

8.1 Alarm

(1) The red signal lamp lights up (yellow also lights up if existing), the audible signal sounds.

(2) Turn the audible signal off.

8.2 Malfunction

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

8.3 How to Behave

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

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

9. Spare Parts

See also online shop shop.sgb.de

Switchboards (for plastic housing):

331670 Switchboard VD SMD L with LED and transformer 630 mA (please indicate pressure level)

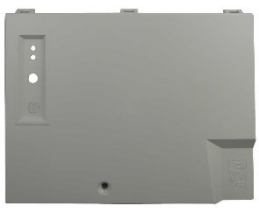
331725 Display board for electronic leak indicator, VL, VLR, DL, DLG, DLR-G, DLR-P

Manifolds:

412690 Manifold DLR-GS with sensor 20 bar and flange plate including test coupling (please indicate screw connection)

Pressure sensors:

344520 Sensor 20 bar for DLR-GS



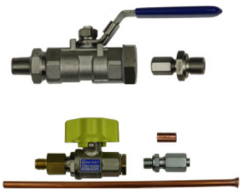
Housings:

220220 Housing lower part, "ABS" RAL 7033 (dark gray)

220210 Upper housing part, "ABS", RAL 7171 (light gray)

Accessories

For accessories, please refer to our online shop shop.sgb.de, e.g.



- Installation kits

- Electrical isolators

- Manifolds

- Pressure reducers

- P version, stainless-steel housing

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 gas-tight through which an explosion atmosphere can carry over.

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).

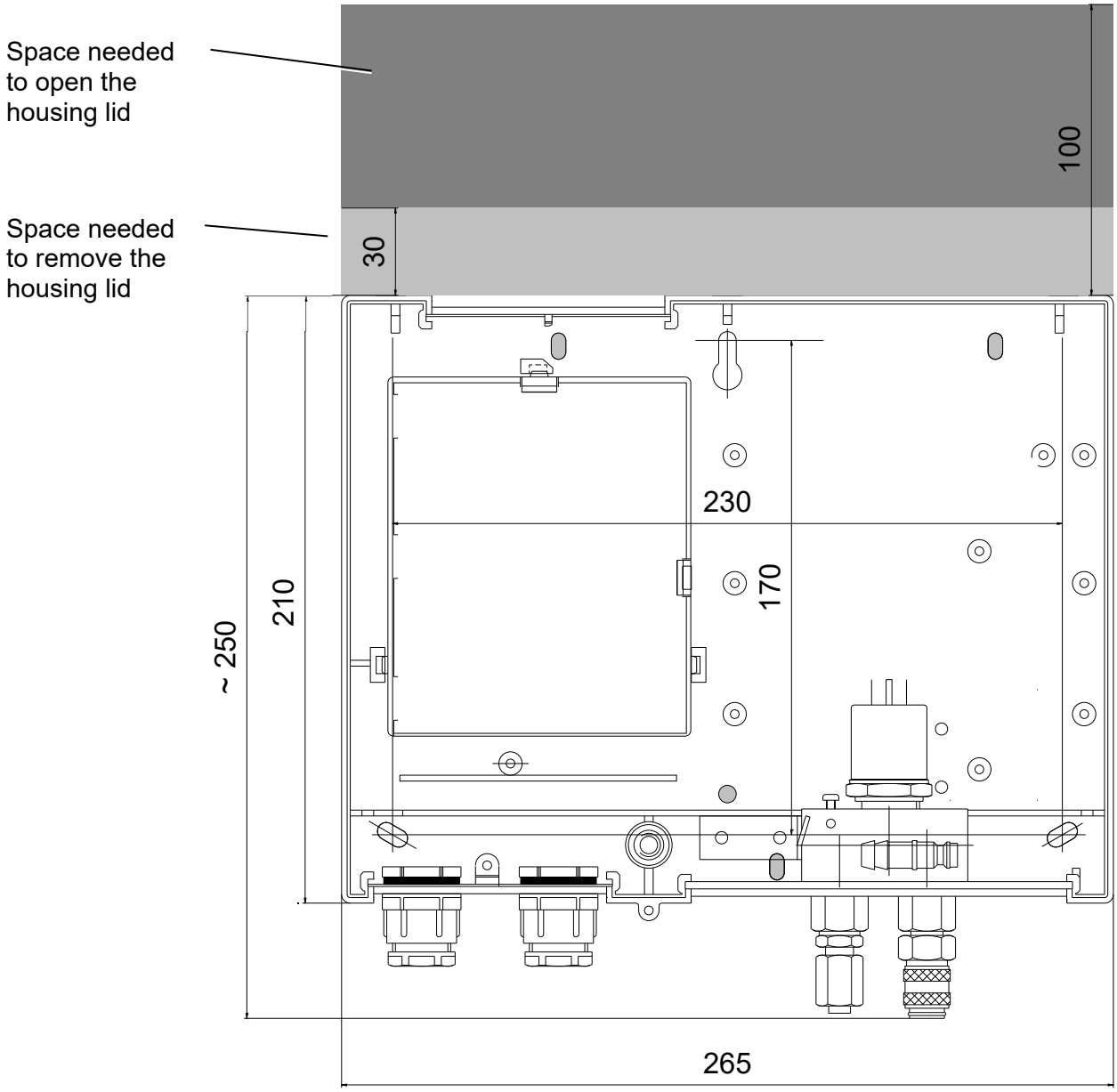
11.2 Disposal

Properly dispose of contaminated components (possibly through outgassing).

Properly dispose of electronic components.

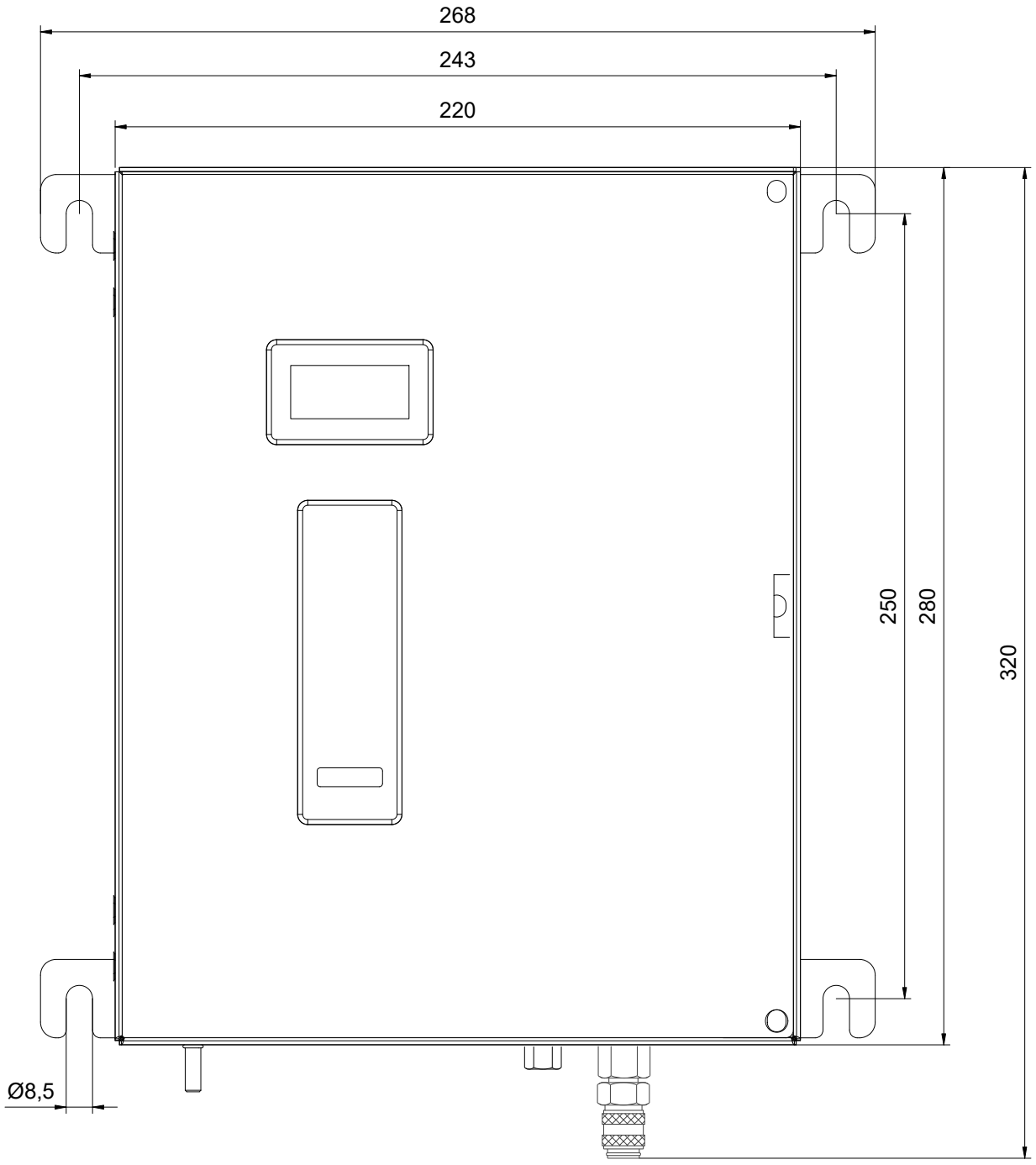
12. Appendix

12.1 Dimensions and Drilling Pattern, Plastic Housing



D = 110

12.2 Dimensions and Drilling Pattern, Stainless Steel Housing for Installation Outdoors



D = 120

12.3 Declaration of Conformity

We,

SGB GmbH

Hofstraße 10

57076 Siegen, Germany,

hereby declare in sole responsibility that the leak detectors

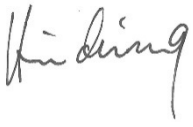
DLR-GS

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

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

Number/short title	Satisfied regulations
2014/30/EU EMC Directive SI 2016 No. 1091	EN 61000-6-3:2017; 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 Explosive Atmospheres SI 2016 No. 1107	The pneumatic components of the leak detector may be connected to spaces (interstitial spaces of containers/pipes/fittings) that require category 3 devices. The following documents have been consulted: EN 1127-1:2019 The ignition hazard assessment did not result in any additional hazards.

Conformity is declared by:



ppa. Martin Hücking
(Technical Director)

As of: 02/2023

12.4 Declaration of Performance

Number: **008 EU-BauPVO 2015**

1. Unique identification code of the product type:

   Pressure leak detector type DLR-GS

2. Usage purpose:

   Class I pressure leak detector for monitoring double-walled pipes

3. Manufacturer:

   SGB GmbH, Hofstr. 10, 57076 Siegen, Germany
   Phone: +49 271 48964-0, E-Mail: sgb@sgb.de

4. Authorized representative:

   n/a

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

   System 3

6. In the case of the declaration of performance concerning a construction product that is covered by a harmonized standard:

   Harmonized norm: 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 norm
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 depending on housing type	0°C .. +40°C -40°C .. +60°C	

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

   Dipl.-Ing. M. Hücking, Technical Director

   Siegen, 02/2023

12.5 Manufacturer's declaration of compliance

SGB
MVV TB
Anhang C 2.15.15
TÜV-NORD

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

Dipl.-Ing. M. Hücking, Technical Director

Siegen, 02/2023

12.6 Certification TÜV Nord

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

TÜV NORD Systems

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

Identification no.: 0045

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

Certification

Subject of the test:	**Pressure Leak Detector Type DLR-G xx/yy; DLR-GS xx/yy**
Client:	SGB GmbH Hofstraße 10 D-57076 Siegen
Manufacturer:	SGB GmbH
Test type:	Initial testing of a pressure leak detector type DLR-G xx/yy and DLR-GS xx/yy with indicating unit according to DIN EN 13160-1:2003/EN 13160-1:2010 and DIN EN 13160-2:2003 and BRL (Construction Products List) A, Part 1, Annex 15.23 as a class I leak monitoring system
Test period:	02/2015 until 09/2015
Test location:	PÜZ Prüflabor TÜV NORD Systems GmbH & Co. KG
Test results:	**The pressure leak detectors type DLR-G xx/yy and DLR-GS xx/yy comply with the class I leak monitoring system according to DIN EN 13160-1:2003/EN 13160-1:2010 and fulfill the requirements according to DIN EN 13160-2:2003 and/or BRL A, Part 1, Annex 15.43 and Annex 15.23 when a mobile or stationary pressure cylinder (air or nitrogen) is used. In relation to the field of application and installation, the specifications according to the technical description "Documentation 604 100" as of 02/2015 for DLR-G xx/yy and the technical description "Documentation 604 300" as of 11/2015 for DLR-GS xx/yy apply**

For details on testing, please refer to test report PÜZ 8112235824 dated 3 September 2015.

Hamburg, 11 March 2016 — Head of the Testing Laboratory

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As of 01/2013
STPÜZ-QMM-321-032-02

Legal notice

SGB GmbH
Hofstr. 10
57076 Siegen
Germany

T +49 271 48964-0
E sgb@sgb.de
W sgb.de | shop.sgb.de