

Pressure leak detector

DL .. ELC

with leak indicating unit LAE

Documentation DL .. ELC

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Overview of the various designs

The different designs of pressure leak detectors in the DL series are described more precisely by means of the attached letters.

DL .. ELC P FC M LE/LG

Equipped with a data transfer module (DTM) for using remote monitoring service LOD. Data transmission either via Ethernet (LE) or via GSM cellular mobile technology.

The leak detector's 'manometer' design is equipped with a digital pressure reading in the housing's lid.

The leak detector's 'filter control' design is equipped with a monitoring device for the dry filter, which emits a separate status signal when the dry material has been consumed.

It is only available for alarm pressures of up to 450 mbars.

The leak detector's 'protected' design is located in a weatherproof housing.

Leak detectors for alarm pressures of 590 mbars and higher are only available in this design.

The leak detector's 'economic leak control' design functions as both a leak detector and a leak reading device: whereby the leak detector is equipped with an integrated distribution for connecting up to 6 tanks.

This design is always weatherproof and the 'P' is therefore inapplicable.

'Numerical values' for the leak detector's alarm pressure.

The alarm pressures range from 50 mbars to 3,000 mbars.

The leak detector's 'pressure leak detector' design works at overpressure in relation to the atmospheric pressure.





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1 Object

Pressure leak detector, consisting of a leak indicating unit (documentation LAE 605 602) and a leak detector. Up to 6 above-ground, double-wall tanks can be connected to the leak detector through the integrated distributor.

Type: DL .. ELC (FC) The placeholders stand for the alarm pressure.

2 Field of Application

2.1 Requirements for the Interstitial Spaces

- Proof of pressure resistance of the interstitial space (see Appendix B, Column “ t_{EST} ” minimum test pressure of the interstitial space)
- Proof of suitability of the interstitial space (for Germany: proof of usability from construction authority).
- Impermeability of the interstitial space (see section 6.4.6)
- The number of interstitial spaces of **underground containers** to be monitored depends on the total interstitial space volume. According to EN 13160, 8 m³ may not be exceeded. To be able to test the tightness of the interstitial space, it is recommended not to exceed 4 m³.

2.2 Container/interstitial spaces (observe section 2.4)

- Underground double-wall steel or plastic containers, without leakage display liquid in the interstitial space, in factory or on-site production design, whose interstitial space is suitable for connection of a DL .. ELC in accordance with Appendix B.
- Underground single-wall steel or plastic containers with pressure-resistant leak protection lining or leak protecting jacket, whose interstitial space is suitable for connection of a DL .. ELC in accordance with Appendix B.
- Underground double-walled collecting tubs or surface sealings, whose interstitial space is suitable for connection of a DL .. ELC in accordance with Appendix B.

2.3 Stored material

Water-hazardous liquids, with consideration given to the following points:

- The leak indicator medium air must not react with the stored material.
- 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 in gas group II A and II B as well as in temperature code T1 to T3.



2.4 Exclusions

If a permeation into the interstitial space that can lead to formation of an explosive atmosphere in the interstitial space occurs due to the stored material and the material composition of the inside container walls (e.g. tanks with plastic walls on the storage medium side), the DL .. ELC leak detector must NOT be used.

3 Function description

The DL .. ELC pressure leak detector monitors both walls of a container for leaks. The monitoring pressure is so high that leaks are displayed below or above the liquid level (stored material and groundwater) due to pressure drops.

With the DL .. ELC leak detector, an integrated pump takes in external air through a dry filter to build pressure and forwards it to the interstitial spaces.

The dry filter will dry the external air to a relative humidity of approximately 10%. Drying is necessary to prevent moisture or condensation accumulation in the interstitial space. **Used dry filter fillings must be regenerated or exchanged.**

3.1 Switch and pressure values

A list of switching values is shown in Appendix B.

3.2 Normal Operating Condition

The pressure leak detector is connected to the interstitial spaces via pressure and measuring lines. The excess pressure generated by the pump is measured and controlled by a pressure sensor.

When the operating pressure is reached (Refilling OFF), the pump shuts off. The pressure drops off slowly due to unavoidable leaks in the leak detector system. When the "Refilling ON" switching value is reached, the pump will be turned on and the operating pressure will be built up again.

During normal operation, the leak detector will move between these two pressure values, with short run times and longer idle times, depending on the degree of impermeability and temperature variations of the total system.

3.3 Air or liquid leak

If a leak occurs below or above the liquid level or groundwater, leak detection medium seeps out of the interstitial space. The pressure will fall until the pump is turned on to reestablish the operating pressure. If the volume flow exiting the leak is larger than the refilling output, the pressure in the system will fall even though the pump is working.

An enlargement of the leak will lead to a further pressure fall until the alarm pressure is reached. This triggers the visual and acoustic alarms.

3.4 Air drying/dry filter

The supplied air in the interstitial space will be fed through a dry filter in the vacuum line. The dry filter dries the air to about 10% relative humidity to avoid corrosion and condensation accumulation¹ in the interstitial space.

The dry filter is designed for one year as long as it is used as intended and no additional temperature variances occur.

A used dry filter, which is orange in the beginning, will become colorless. Exchange or regenerate used drying material.

The DL .. ELC FC version is also equipped with monitoring that ensures that only dry air enters the interstitial space.

If the permitted residual moisture is exceeded, an optical, acoustic and potential-free message is output by the leak detector. (For further information, see Appendix FC)

3.5 Overpressure Valve

The overpressure valve installed in the pressure line protects the interstitial space against impermissibly high overpressures (exceeding of the test pressure).

Impermissibly high overpressures can occur due to:

- Temperature increase resulting from environmental influences (e.g. sunlight)
- Temperature increase resulting from hot filling (contact the manufacturer, if necessary)

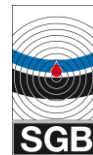
3.6 Description of indicator and operating elements

3.6.1 Status of the display elements on the leak detector (the housing cover of the leak detector must be opened to see/operate the displays and controls)

Indicator Lights	Operation	Alarm / message	Alarm, acoustic alarm acknowledged	Alarm + TF message	Malfunction
OPERATION: green	ON	ON	ON	ON	ON
ALARM: red	OFF	ON	BLINKING	ON	ON
Message Dry filter: red	OFF	Alternating blinking of the two red LEDs	BLINKING	OFF (back ON when container alarm is canceled)	ON
Acoustic signal	OFF	ON	OFF	ON	ON (not acknowledgeable)

For display of the operating statuses on the leak indicating unit, see its documentation.

¹ Condensation accumulations in the interstitial space can result in an impermissible rise in pressure.



3.6.3 Operating functions via the buttons in the leak detector (WITHOUT influence on the leak indicating unit)

Turning off the acoustic alarm:

Briefly press "Sound off" key once; acoustic signal turns off, and 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).

Testing the optical and acoustic alarm: Press the "Sound off" key and hold it down (about 10 seconds). The alarm will be triggered until the key is released.

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

Acknowledgment of the message "Dry filter used up"

With this message, the dry material should be replaced.

If no replacement material is available, there are 2 options to acknowledge or switch off the acoustic signal:

- a) Pressing the button briefly switches off the acoustic signal, but the alternating blinking of the LEDs remains as does the alarm on the leak indicating unit.
- b) Pressing the button longer (about 5 seconds) until the LED "Dry filter message" blinks deletes the message completely. When the pump runs again, the visual and acoustic message is triggered again if the air humidity is too high.

Zero point adjustment:

Three-way valve 21 in position II (The alarm is triggered; the pump runs)

Press and hold down the "Acoustic alarm" button until the "Alarm" indicator light blinks (about 5 seconds), then release the button and press and release it again.

The zero-point adjustment is confirmed with a 3-time visual and acoustic signal.

Three-way valve 21 in position I

A repetition of the zero-point adjustment is not possible until the operating pressure has been built up.

Inquiry about leak-tightness of the monitored system

Press and hold down the "acoustic alarm" button until the "Alarm" indicator light blinks quickly, then release it. A value for leak-tightness is displayed through illumination of the "Alarm" indicator light. (See section 6.4.5)

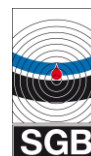
The leak detector must have performed at least 1 automatic refilling interval in the normal operating condition (i.e. without filling by an installation pump) for this inquiry to be valid.

4 Installation instructions

4.1 Basic Instructions

- (1) Only qualified service companies may be used for installation².
- (2) Comply with relevant regulations for prevention of accidents.
- (3) Comply with explosion regulations (if required), e.g. BetrSichV (or Directive 1999/92/EC and the derived laws of the respective member states) and/or others.
- (4) Before entering inspection chambers, the oxygen content must be tested and the inspection chamber flushed, if necessary.
- (5) If metallic connection lines are used, it must be ensured that the power supply grounding is at the same potential as the tank to be monitored.

² For Germany: Specialist companies in accordance with § 19I WHG, that also have basic knowledge in the area of fire and explosion protection.



4.2 Personal equipment

The parts listed here refer exclusively 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 limit³)
- Measuring equipment to determine the oxygen content in the air (Ex/O meter)

4.3 Installation of the leak detector (see also “Leak indicating unit” documentation)

- (1) For both the leak indicating unit and leak detector, wall installation is normally with screws and anchors.
- (2) The leak indicating unit must be installed in a dry room or outdoors in a suitable protective box.
The leak detector can be installed outdoors without further protective measures.
- (3) If the indicating unit is 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 (neither the indicating unit nor the leak detector).**
- (5) The distance between the leak detector and the interstitial space must be kept as small as possible.

4.4 Connection lines (between leak detector and container)

- (1) Metal (generally Cu) or plastic pipes with a minimum pressure resistance corresponding to the test pressure in the interstitial space. Also applies to fittings and screwed connections. (Note temperature range, especially with use of plastic).
- (2) Inside clearance min. 6 mm.
- (3) A distance of 50 m should not be significantly exceeded, but if this happens: install pipe/tube with greater inside clearance using appropriate transition pieces.
- (4) Color coding:
Measuring line: red
Pressure line: white (or clear)
- (5) The full cross section must be maintained. Do not push in or bend⁴.
- (6) Install metal or plastic pipes underground or plastic pipes aboveground outdoors in protective pipes.
- (7) Seal the protective pipe gas-tight and protect from moisture.
- (8) Avoid the buildup of electrostatic charges (e.g., while inserting and pulling lines).
- (9) For details regarding connection systems, see worksheet AB-820 500

³ Other countries' or companies' regulations may provide different percentages.

⁴ If necessary, install commercial fittings for plastic pipes (specified bending radii).



4.5 Installation of the dry filter

- (1) Near the leak detector, if possible.
- (2) Fastening with the provided installation material: Vertical with suction opening pointing up, beneath the leak detector if possible.

4.6 Electrical connection

- (1) Power supply: according to label imprint
- (2) Fixed wiring, i.e. no plug or switch connections.
- (3) The regulations of power supply companies must be adhered to⁵.
- (4) Requirements for the cable between the tool and the monitoring device:
 - Number of wires: 8⁶ + PE
 - Cross section of the wires: 1 mm²
 - Maximum line length: 100 m
 - Outside diameter of the line: 5–10 mm
- (5) Terminal layout:

Leak detector (see also SL-853 100 ELC):

1 (L)	Line (outside conductor)
2 (N)	Neutral conductor
PE	Ground
11/12	Connection to the leak indicating unit, pressure alarm
21/22	Connection to the leak indicating unit, pressure alarm, pipe leak detector, if connected
31/32	Connection to the leak indicating unit, pressure alarm, pipe leak detector, if connected

For connection of an (external) pipe leak detector

21/22 Potential-free contact of the pipe leak detector

Note:

The leak detector can provide power to the tool, or the tool can provide power to the leak detector, or both can be provided power separately through the network.

4.7 Installation example

An installation example is shown in the appendix.

⁵ For Germany: also VDE regulations

⁶ 8-wire cable, number of wires can be reduced, depending on the situation on site:

2 wires: Power supply (if both are not supplied separately)

2 wires: Container pressure alarm; 2 wires: Pipe pressure alarm; 2 wires: Dry filter message

5 Commissioning/repair

- (1) Observe remarks from section 4 here as well.
- (2) If a leak detector is placed into operation on already filled containers, special protective measures must be taken (for example, testing for the presence of gas in the leak detector and/or the interstitial space). Additional measures may be necessary, depending on the local conditions, and must be assessed by qualified personnel.
- (3) After completion of the pneumatic connection, connect the power.
- (4) Ascertain lighting of "Operation" and "Alarm" signal lamps and sounding of the audible alarm,
Leak indicating unit: Press "Sound off" key on the keypad
Leak detector: Press "Sound off" key
- (5) Valve 21 in position "II", connect measuring gauge. (see also P-063 000)
- (6) The leak detection system must be supplied with the operating pressure according to the table on page 3. (Insert installation pump with sufficiently sized dry filter! Or nitrogen pressure cylinder, ensure correct setting of the pressure reducer!).
Note: If the feed pressure of the installation pump (or the pressure at the pressure reducer) exceeds the opening pressure of the overpressure valve, the overpressure valve will be blown off.
All valves (with connected interstitial space) in open position.
- (7) Pressure can be built up with the installation pump through valve 20 (position II).
Note: If pressure buildup is not achieved with the installation pump connected, the leak must be located and fixed (also check the performance of the installation pump and the pressure reducer for correct settings, if necessary).
- (8) When the operating pressure of the leak detector has been reached (pump in the leak detector will turn off), reconnect the pressure line and/or put both valves in position "I", and remove the pressure measuring instrument.
- (9) Perform a functional check according to section 6.4.

6 Operating Instructions

6.1 General Notes

- (1) If the leak detection system is installed properly and tightly, it can be assumed that the leak detector works within the control range.
- (2) Frequent switching on or continuous running of the pump indicates leaks, which should be corrected within a reasonable time.
- (3) If the alarm goes off, this always indicates a more significant leak or a defect. Determine the cause and correct it quickly.
- (4) The operator must check the function of the "Operation" indicator light at regular intervals.
- (5) The leak detector must be disconnected from power for any repairs to be performed on the leak detector.
- (6) A loss of power is indicated by extinguishing of the "Operation" indicator light. Open the potential-free relay contacts.
- (7) If the filter filling color changes from orange to colorless (or green, depending on the dry material), it must be replaced or regenerated.



6.2 Maintenance

6.2.1 By the operator:

The operator must check the dry filter at regular intervals⁷. When the color changes from orange to colorless (or green), the filter filling must be replaced or regenerated.

6.2.2 Maintenance work and functional checks must be performed by qualified persons⁸.

- (1) Once a year for functional and operational safety.
- (2) Test scope according to section 6.4.
- (3) Compliance with the conditions from sections 4, 5 and 6.2 must also be checked.
- (4) Comply with explosion regulations (if required), e.g. BetrSichV (and/or Directive 1999/92/EC and the derived laws of the respective member states) and/or others.

6.3 Intended use

- Connection of multiple interstitial spaces to a pressure leak detector **only for underground** interstitial spaces.
- Components of the stored material that can generate explosive vapors must be contained within double-walled containers, tubs or surface sealings whose medium-side walls are permeation-tight.
- The alarm pressure must be at least 30 mbar higher than any pressure against the interstitial space (from inside and/or outside).
- Grounding (if applicable) in accordance with applicable regulations⁹
- The leak detection system is leak-proof according to the table in section 6.4.6 of this documentation
- Leak detector installed outside of the explosive area.
- Lead-throughs for the pneumatic hoses are sealed gas-tight.
- Leak detector (electric) cannot be turned off.

6.4 Functional check

The functional and operational safety checks must be performed

- after each commissioning
- in accordance with the time intervals listed in section 6.2¹⁰
- each time a malfunction has been corrected

6.4.1 Scope of test

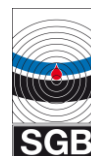
- (1) Coordinate the work to be performed with those responsible for operation on site, if necessary
- (2) Observe the safety instructions for working with the stored material.
- (3) Regenerating or replacing the filter filling.
- (4) Checking the free passage of air in the interstitial space (section 6.4.2)

⁷ Intervals of a max. 2 months are recommended

⁸ For Germany: Technical knowledge for installation service leak detection systems or under the supervision of a responsible expert in accordance with currently valid regulations.

⁹ For example, in accordance with EN 1127

¹⁰ For Germany: In addition, national regulations apply (e.g. AwSV)



- (5) Testing the switching values with the testing device (section 6.4.3), alternatively: Testing the switching values without a testing device (section 6.4.4)
- (6) Checking the overpressure valve (section 6.4.5)
- (7) Tightness test (section 6.4.6)
- (8) Achieving the operating conditions (section 6.4.7)
- (9) A qualified person must complete a test report, confirming functional and operational safety.

6.4.2 Checking free passage in the interstitial space

- (1) If several interstitial spaces are connected, each interstitial space must be checked for free passage:
- (2) Connect test-measurement instrument to valve 21, position "III" (all shut-off valves (to the interstitial spaces) closed). (see P - 063 000)
- (3) Valve 20 in position "III".
- (4) Open shut-off valves of the first (following) container (measurement and pressure line in pairs).
- (5) Check whether the measuring gauge registers a pressure drop. If no pressure drop occurs, locate and correct the cause.
- (6) Close the shut-off valves opened in par. (4).
- (7) Perform procedure in (5) to (7) with each additional container.
- (8) Set valve 20 and 21 to position "I"; pull off test-measurement instrument.
- (9) Open all shut-off valves with connected container.

6.4.3 Testing the switching values with test equipment

- (1) Unlock all valves for the interstitial spaces. Connect test equipment to valves 20 and 21. Both test valves in position "III".
- (2) Connect test-measurement instrument to test equipment.
- (3) Close needle valve (test equipment); pressure is built up to operating pressure.
- (4) Vent using the needle valve; determine "Pump ON" and "Alarm ON" switching values (visual and acoustic); record values.
- (5) Close needle valve and determine "Alarm OFF" and "Pump OFF" switching values; record values. (Open needle valve somewhat, if necessary, so that the pressure rises slowly)
- (6) Set valves 20 and 21 to position "I". (Open connection to the interstitial spaces). Remove the testing device.

6.4.4 Testing the switching values without test equipment

- (1) Close all shut-off valves to the interstitial spaces, except for the valves with the smallest interstitial space volume.
- (2) Connect test-measurement instrument to valve 21, position "II".
- (3) Vent through valve 20 (position "II"); determine "Pump ON" and "Alarm ON" switching values (with visual and acoustic alarm); record values.
- (4) Set valve 20 to position "I" and determine "Alarm OFF" and "Pump OFF" switching values; record values.
- (5) Set valve 21 to position "I"; pull off test-measurement instrument.



- (6) Open all valves with connected containers.

6.4.5 Checking the overpressure valve

For this check, operating pressure of the leak detector must be built up (pump is switched off).

- (1) Connect measurement instrument to valve 20, position "III".
- (2) Close all valves to the interstitial spaces.
- (3) Set Valve 21 to position "III"; the pressure sensor is vented, the pump switches on, and the alarm is triggered.
- (4) Determine the opening pressure of the overpressure valve (no further pressure increase), and record the value. If the opening pressure of the overpressure valve exceeds the test pressure of the container, it must be replaced or readjusted.
- (5) Set valve 21 to position "I" and open the valves with connected interstitial space. The pump switches off; determine the closing pressure of the overpressure valve (no additional pressure drop¹¹); record the value.
- (6) Set valve 20 to position "I"; pull off test-measurement instrument.

6.4.6 Tightness test

- (1) Check that all shut-off valves with connected containers are opened.
- (2) Connect test-measurement instrument to valve 21, position "II".
- (3) After pressure equalization, the tightness test is started. The test is positive if the values of the following table are met.

Interstitial space volume in liters	Max. 1 mbar (0.015 psi) pressure drop in
250	22 minutes
500	45 minutes
1000	1.50 hours
1500	2.25 hours
2000	3.00 hours
2500	3.75 hours
3000	4.50 hours
3500	5.25 hours
4000	6.00 hours

- (4) Set valve 21 to position "I"; pull off test-measurement instrument.

6.4.7 Achieving the operating condition

- (1) Seal the housing.
- (2) The shut-off valves for each connected container must be in the "open" position.

6.5 Alarms

- (1) The red indicator light lights up, the audible signal sounds.

¹¹ If the pump switches on before the closing pressure is reached, determine the cause and repair it.



- (2) Turn the audible signal off.
- (3) Inform the installation company immediately.
- (4) Determine the cause for the alarm, fix it, and then perform a functional check for the leak detection system according to section 6.4.

7 **Disassembly**

For disassembly of systems which can cause an explosion risk, the following points must be observed in particular:

- Make sure the unit is free of gas before and during removal.
- Seal any openings gas-tight through which an explosive atmosphere can carry over.
- Avoid using spark-producing tools (saws, parting grinders, etc.) for disassembly whenever possible. If this is unavoidable, be certain to observe EN 1127.
- Avoid electrostatic charges (e.g. from rubbing of plastic parts or wearing of unsuitable work clothing).
- Properly dispose of contaminated components (danger of gas release).

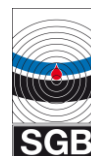
8 **Marking**

- Electrical data
- Serial number
- Type ID
- Date of manufacture (month/year)
- Manufacturer ID
- Legally specified symbols
- Pressure and measuring line in connection with the leak detection medium air can be connected to Zone 2 interstitial spaces; there are not restrictions with the leak detection medium nitrogen.

9 **Abbreviations**

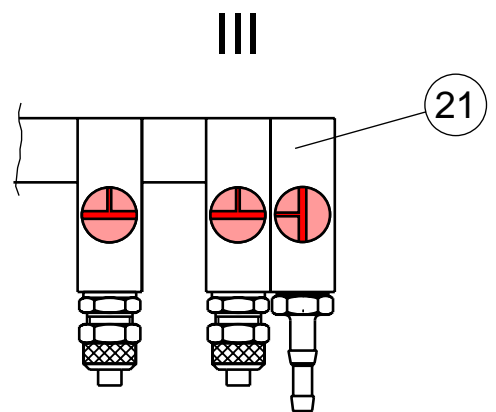
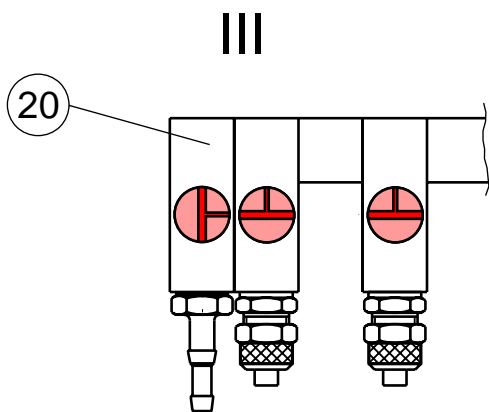
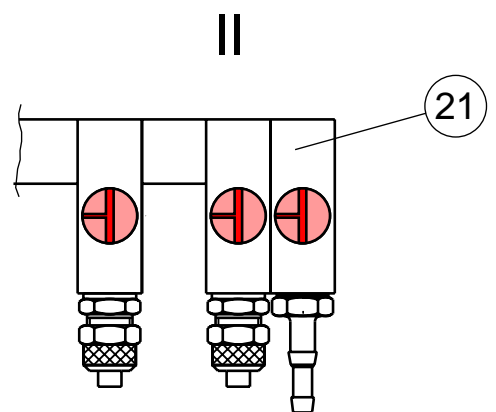
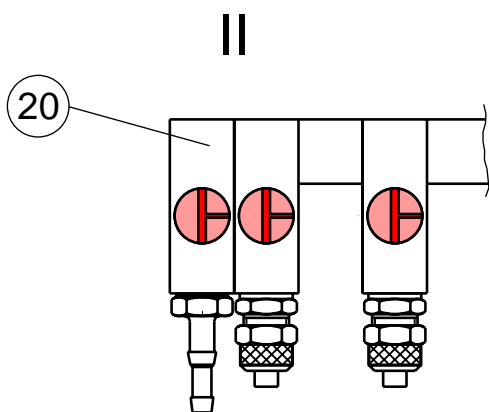
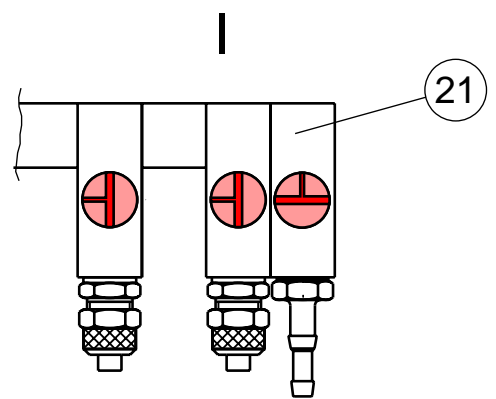
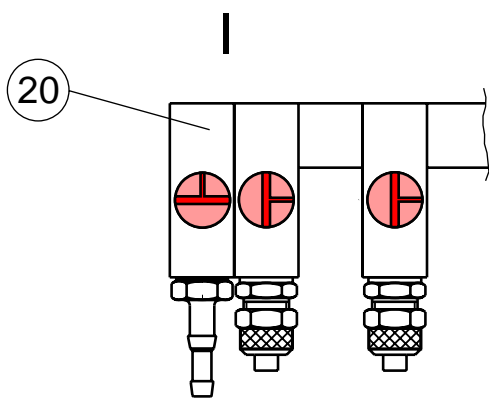
- | | |
|------|---|
| 01.1 | Indicator light "(Container) Alarm", red |
| 01.2 | Indicator light "Dry filter message", red |
| 01.3 | Indicator light "(Pipeline) Alarm", red |
| 02 | Shut-off valve |
| 09 | Indicator light "Operation", green |
| 13 | Pressure line |
| 17 | Overpressure pump |
| 20 | Three-way valve in the pressure line |
| 21 | Three-way valve in the measuring line |
| 24 | Fuse in [A] |

	24.1	24.2	24.3
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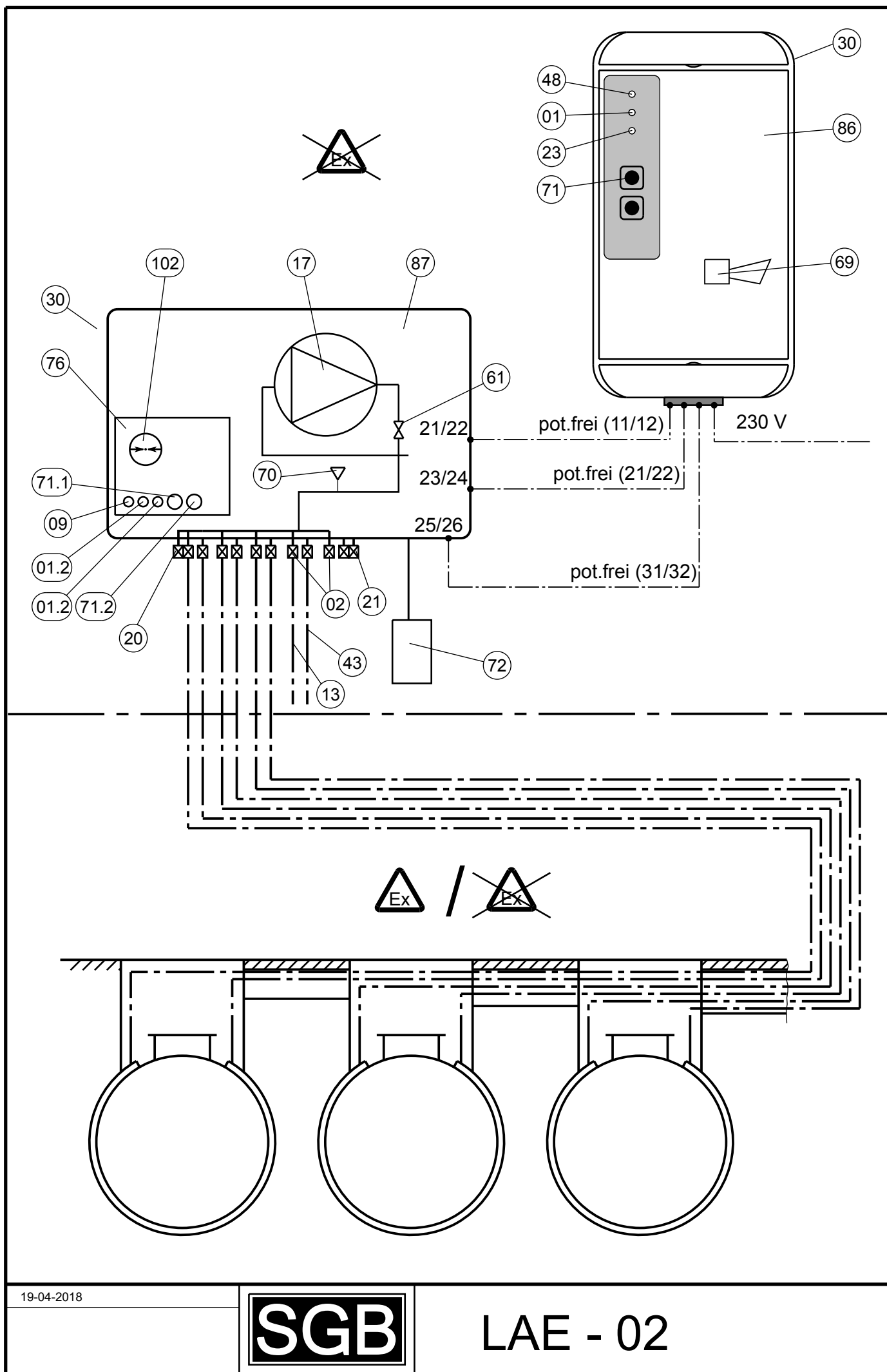
DL .. ELC (230 V)	T1	T0.25	T1
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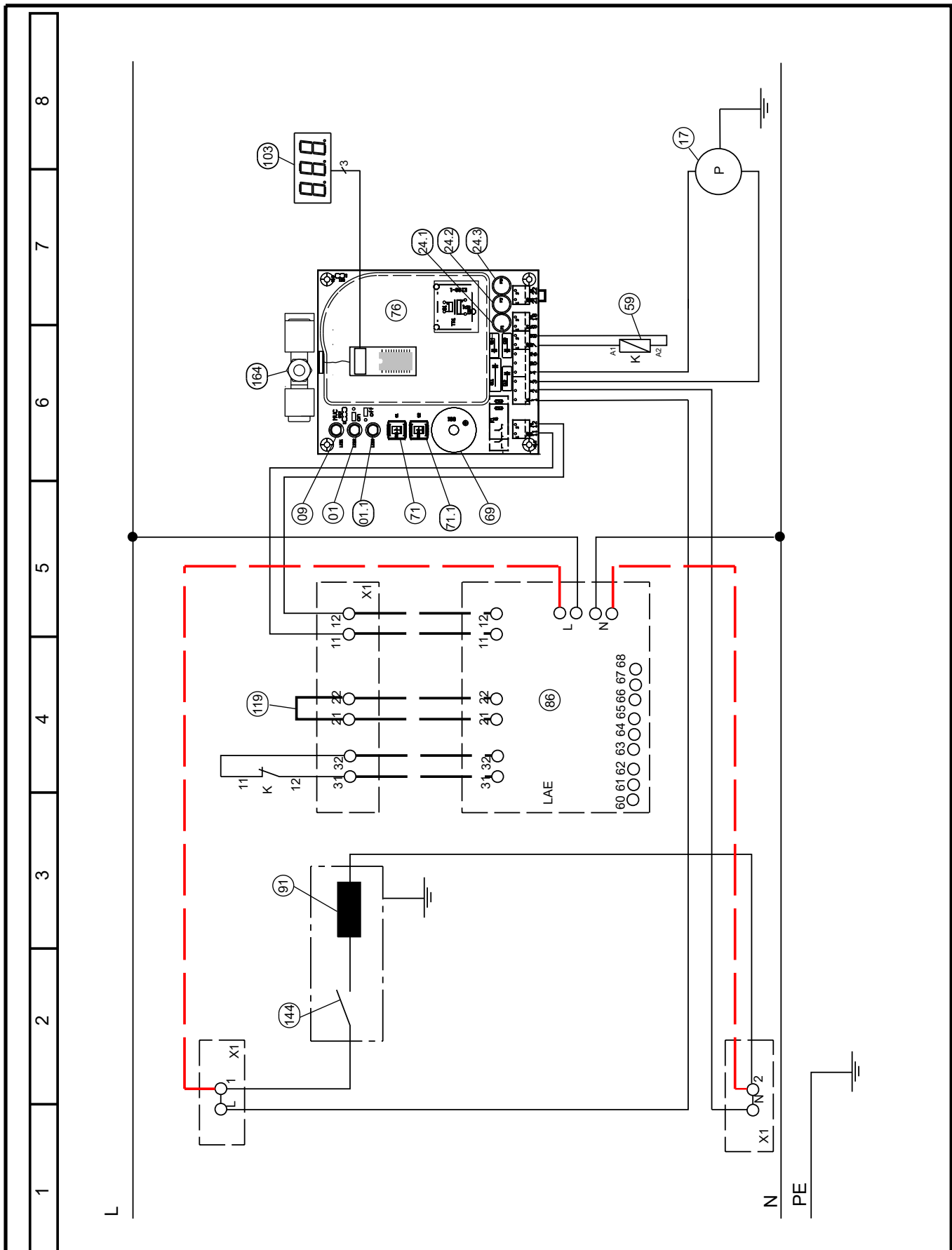
- 30 Housing
- 43 Measuring line
- 59.1 Relay
- 59.2 Relay
- 59.3 Relay
- 61 Check valve with filter
- 69 Buzzer
- 70 Overpressure valve
- 71 "Mute" button
- 71.1 Key "Mute"
- 71.2 Key "Dry filter message"
- 72 Dry filter
- 73 Interstitial space
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Pressure line
(front bar)

Measuring line
(rear bar)





				Toleranzen nach DIN 7168-m			Werkstoff k.A.		Maßstab k.A.	
				Bearb. 14.09.2018		Stich		Bezeichnung		
				Gepr.				Stromlaufplan		
								ELC-R + LAE		
								Zeichnungsnummer		Blatt
								SL-853 100 ELC		
										Bl.
Nr.	Änderung	Datum	Name							



B Switching and pressure values

Type DL	p_{TS} [mbar]	p_{AE} [mbar]	p_{PA} [mbar]	$P_{ÜDV1}^1$ [mbar]	$p_{PRÜF}$ [mbar]
50	20	> 50	< 100	170 ± 20	≥ 200
100	70	> 100	< 150	220 ± 20	≥ 250
230*	200	> 230	< 310	360 ± 10	≥ 400
280**	250	> 280	< 330	360 ± 10	≥ 400
290	260	> 290	< 350	420 ± 20	≥ 450
325**	300	> 325	< 360	385 ± 10	≥ 400
330	300	> 330	< 410	465 ± 20	≥ 500
400	370	> 400	< 500	565 ± 20	≥ 600
450	420	> 450	< 510	565 ± 20	≥ 600
—	Special switching values agreed between SGB and customer				

The following abbreviations are used in the table:

- p_{TS} maximum pressure at the low point of the tank, including overlay pressure
 p_{AE} switch value "Alarm ON", the alarm is triggered at the latest at this pressure
 p_{PA} Switch value "Pump OFF" (=nominal pressure)
 $p_{ÜDV1}$ Opening pressure overpressure valve 1 (interstitial space side)
 $p_{PRÜF}$ Minimum test pressure of the interstitial space

Further switching values:

- p_{AA} switch value "Alarm OFF", the alarm goes off on passing this value.
The switching value "Alarm OFF" is approx. 15 mbar higher than the switch value "Alarm ON" ($p_{AA} = p_{AE} + \sim 15 \text{ mbar}$)
 p_{PE} Switch value "Pump ON"
The switch value "Pump ON" is approx. 15 mbar lower than the switch value "Pump OFF" ($p_{PE} = p_{PA} - \sim 15 \text{ mbar}$)

* was added to the table later

** only for underground tanks; values were added to the table later

¹ The table states the opening pressure for the overpressure valve at which the volume flow of the pump is blown off. The triggering pressure (first opening) is lower.



Technical data

1. Electrical data (LAE, see documentation „leak indicating unit“)

Power supply (DL .. ELC + LAE) 230~ V - 50 Hz - 50 W

2. Electrical data

External fuse of the leak detector max. 10 A

Overvoltage category 2

3. Pneumatic data (requirements for the test measuring gauge)

Nominal size mind. 100

Class accuracy mind. 1.6

Scale end value suitable



Dry filter monitoring (FC)

1 Function

A sensor is integrated in the suction line of the pump between pump and dry filter to measure the moisture of the air intake.

The sensor registers the increase in relative humidity when the desiccant is spent. The optical and audible message is triggered together with the potential-free message when the drying capacity is insufficient.

The visual indication consists of alternate flashing of the two red alarm LEDs. The potential-free indication is present at terminals 25 to 26:

25/26 Contact opens on receiving a message; at device version DL .. ELC FC this contact is forwarded to the leak indicating unit (see documentation leak indicating unit LAE)

2 Changing the drying material

When getting the indication "dry filter spent", the drying material should be replaced after an appropriate period of time.

The audible signal can be acknowledged by pressing briefly once. The visual and potential-free indication remains.

The entire indication can be acknowledged by pressing and holding the button "Acknowledge dry filter message" (until the lower LED flashes). Next time the pump starts up (or if this function is carried out while the pump is running, after approx. 30 s), the indication is triggered again if the residual moisture is too high.

After replacing the drying material, quit the indication by pressing and holding the button as described above.

3 Limits of use

The following limits of use must be observed for the dry filter monitoring function:

1. The pump must run min. 30 sec to obtain a meaningful statement.
During or after start up of the leak detector, the time between pump ON and OFF should be measured to check whether this minimum operating time is achieved.
2. No meaningful measuring results are obtained at low temperatures (below 5°C) so that the measurement is deactivated below 5°C.



Evaluating the display for the function "Tightness test"

Chapter 3.6.3 described "Checking the tightness of the monitored system". This function can be used to obtain an indication of the tightness of the monitored system.

This is only possible if the switching value "Alarm OFF" has been exceeded. It can be repeated several times in succession.

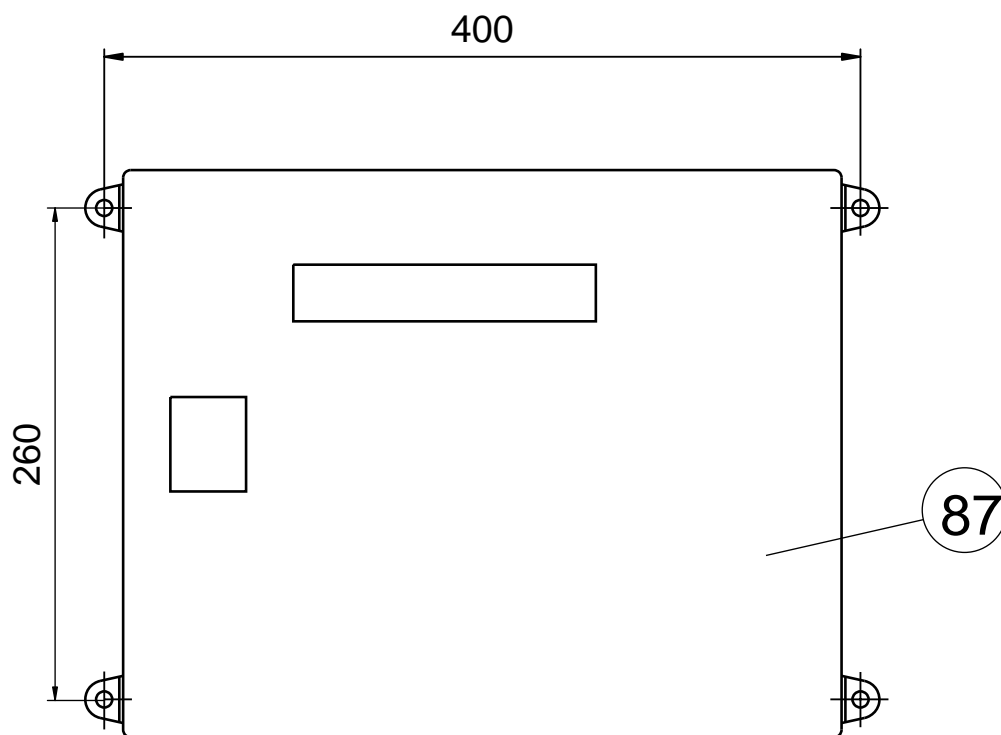
This check is advisable **before** carrying out a recurrent function test on a leak detector, to see directly whether there is any need to look for leaks.

After pressing the button, this is confirmed by a brief acoustic signal which can be heard once, followed by a flashing signal, i.e. the Alarm LED flashes briefly to indicate the tightness as follows:

No flashing: the system is very tight

10 flashes: the system has major leaks

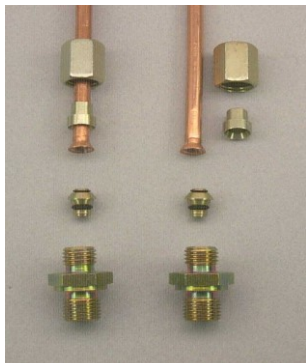
The smaller the above value, the more tight is the system. The meaningfulness of this value naturally also depends on temperature fluctuations and should therefore be considered to be an indicative value.



LAE: 605 600

Installation of screw connections

1 Flanged screw connection for flanged pipes

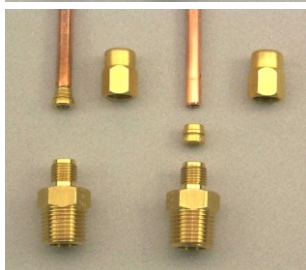


1. Oil o-rings
2. Place the intermediate ring loosely in the screw connection sleeve
3. Push the union nut and pressure ring over the pipe
4. Tighten the union nut by hand
5. Tighten the union nut until there is a noticeable increase in force
6. Final installation: Turn $\frac{1}{4}$ turn further

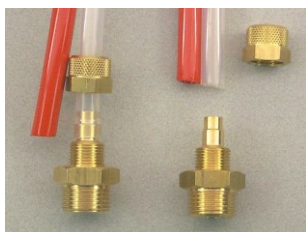
2 Clamping ring screw connection for plastic and metal pipes



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 $1\frac{3}{4}$ turns with the wrench
4. Release nut
5. Tighten nut by hand until stronger resistance
6. Final assembly of the screw connection by tightening $\frac{1}{4}$ turn



3 Quick-release screw connection for PA and PUR hose



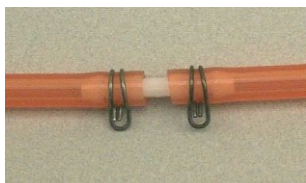
1. Cut the PA pipe to length at a right angle
2. Unfasten the union nut and push it over the end of the pipe
3. Push the pipe onto the nipple up to the start of the thread
4. Tighten the union nut by hand
5. Re-tighten the union nut with a screwdriver until there is a noticeable increase in force (approximately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

NOT suitable for PE hose

Installation of screw connections



4 Hose connections (4 and 6 mm nozzle for OVERPRESSURE)



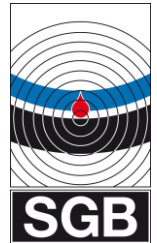
1. Push the wire or screw clip over the hose
2. Push the hose onto the Cu pipe or hose nozzle (heat or moisten PVC hose as necessary). The hose must fit tightly all round
3. Wire clip: press together with pliers and push onto the connection point
Screw clip: push onto the connection point and tighten with screw-driver
Make sure that the clip is an even tight fit.

4 Hose connections (4 and 6 mm nozzle for NEGATIVE PRESSURE)

For negative pressure applications with which there is no overpressure on the connection lines even in case of a leak, as point 5 but without clips.

For negative pressure applications with which there may be overpressure, as point 5.

EU DECLARATION OF CONFORMITY



We,

SGB GmbH

Hofstr. 10

57076 Siegen, Germany

hereby declare in sole responsibility that the leak detector

DL(G) ../.

comply with the essential requirements of the EU directives listed below.

This declaration shall lose its validity if the device is modified without consulting us.

Number / short title	Satisfied regulations
2014/30/EU EMC Directive	EN 61 000-6-3: 2012 EN 61 000-6-2: 2006 EN 61 000-3-2: 2015 EN 61 000-3-3: 2014
2014/35/EU Low Voltage Directive	EN 60 335-1: 2012 EN 61 010-1: 2011 EN 60 730-1: 2017
2014/34/EU Equipment in Potentially Explosive Atmospheres	The leak detector with its pneumatic parts may be connected to spaces (interstitial spaces of tanks) which are required for category 3 devices (DL and DLG) and also, under specific conditions, to spaces which are required for category 1 devices (only DLG). The following documents were used: EN 1127-1: 2011 The ignition hazard analysis did not result in any additional hazards.

Compliance is declared by

ppa. Martin Hücking
(Technical Director)



Declaration of Performance (DoP)

Number: **006 EU-BauPVO 2014**

1. Distinct identification code of the product type:

Pressure leak detector DL ../DLG ..

2. Purpose of use:

Class I pressure leak detector for monitoring double-walled, underground or above-ground, pressurised or unpressurised tanks

3. Manufacturer:

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

4. Appointed agent:

n/a

5. System for the evaluation and inspection of performance:

System 3

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

Harmonised standard: EN 13160-1-2: 2003

Notified body: TÜV Nord Systems GmbH & Co.KG, CC Tankanlagen, Große Bahnstraße 31, 22525 Hamburg, Germany

ID number of the notified test laboratory: 0045

7. 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	0°C ... +40°C	

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

Dipl.-Ing. M. Hücking, Director of Operations
Siegen, 10-06-2015

TÜV NORD Systems GmbH & Co.

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 8557-2295hamburg@tuev-nord.de
www.tuev-nord.de**Certification**

Subject of test:	Overpressure leak detector type DL../DLG..
Client:	SGB GmbH Hofstraße 10 57076 Siegen
Manufacturer:	SGB GmbH
Type of test:	Initial examination of an overpressure leak detector type DL../DLG.. 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 overpressure leak detector DL../DLG.. corresponds with class I for leak monitoring systems according to DIN EN 13160-1:2003/EN 13160-1:2010 and fulfils 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 603 000" as of 06/2014 apply

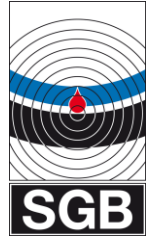
Details of the test can be found in the test report PÜZ 8112235330 dated 03.09.2015.

Hamburg, 04.09.2015

Test laboratory supervisor

J. Straube

Warranty



Dear customer,

You have purchased a high-quality leak detector from our company.

All of our leak detectors undergo a 100% quality control examination. The type plate with the serial number is only affixed after all test criteria have been complied with.

The **warranty period** for our leak detectors is **24 months**, beginning on the date of installation on site. The maximum warranty period is 27 months from our date of sale.

Our warranty will be effective only if the customer submits to us the functional report or test report on initial putting into service, prepared by a recognised company specialised in water and water protection systems, including the serial number of the leak detector.

The warranty shall not apply in the event of faulty or improper installation or improper operation, or if modifications or repairs are carried out without the manufacturer's consent.

The warranty is also subject to our General Terms and Conditions of business (see these online at: www.sgb.de/en/contact/imprint.html).

In case of malfunction, please contact your local specialist company:



Stamp of the specialist company

Yours sincerely

SGB GmbH

Hofstr. 10
57076 Siegen
Germany

Phone: +49 271 48964-0

E-mail: sgb@sgb.de

Web: www.sgb.de
