

Overpressure leak detector

DL and DLG

Documentation DL

Art. No.: 603 002
Issue: 12/2015

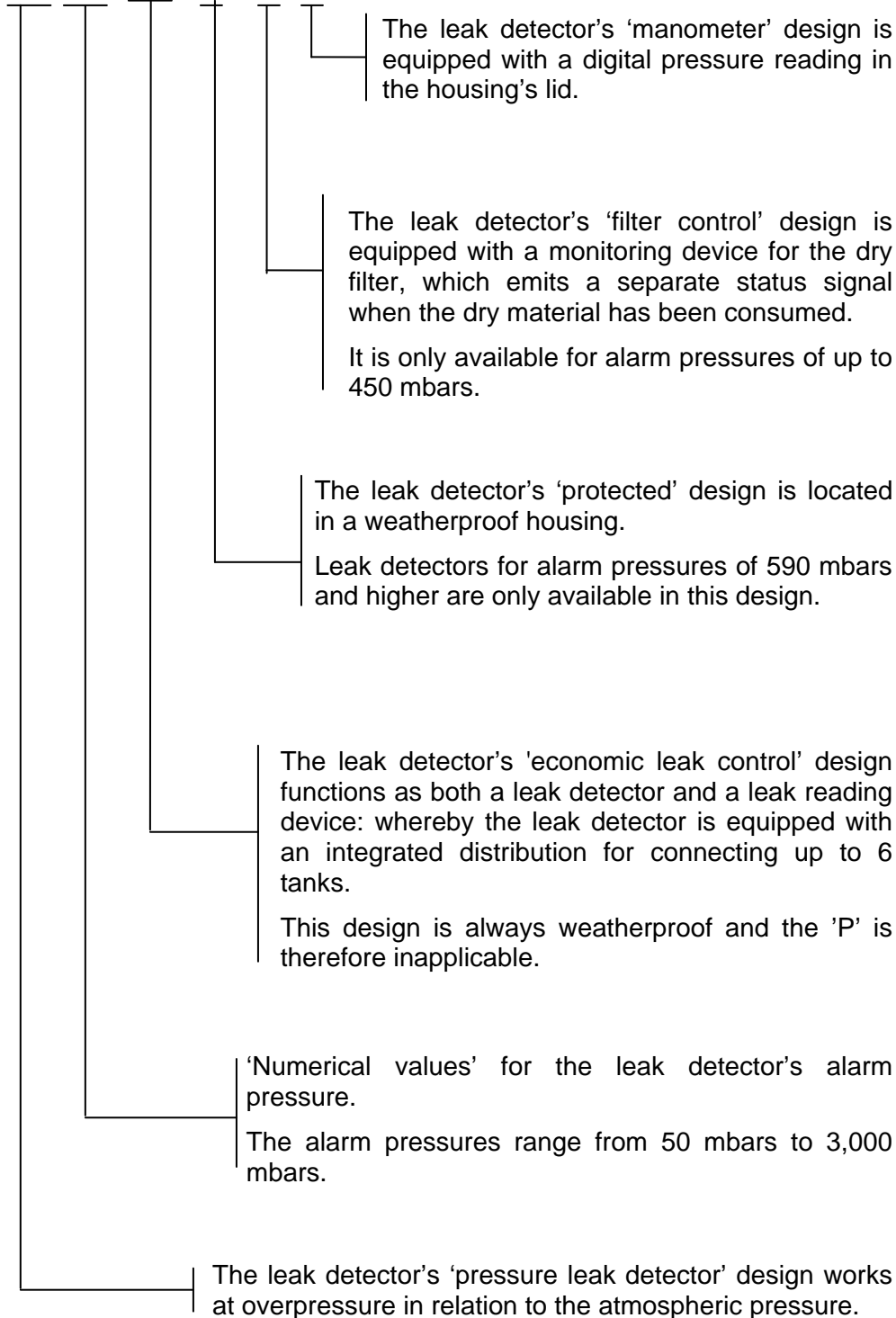
SGB GmbH
Hofstr. 10
57076 Siegen
GERMANY



Overview of the various designs

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

DL ELC (P) FC M





Content

1	Overview of the various designs	1 page
2	Technical description for the overpressure leak detector DL	15 pages
3	Drawings to the technical description	8 pages
4	Appendix to the technical description	6 pages
4.1	Appendix B: Switch and pressure values	2 pages
4.2	Appendix TD: Technical Data	1 page
4.3	Appendix FC: Dry Filter monitoring	1 page
4.4	Appendix TF: Dry filter – Size of dry filters	1 page
4.5	Appendix DP: Evaluating the display for the function "Tightness test"	1 page
5	Dimension and Drilling, Plastic-housing	1 page
6	Dimension and Drilling, Steel-housing, weather protected	1 page
7	Working sheet AB-820 500 pneumatic connections	2 pages
8	Declaration of conformity	1 page
9	Declaration of performance (DoP)	2 pages
10	Certificate TÜV Nord	1 page
11	Warranty	1 page



Contents	Page
1 Subject	2
2 Field of application	2
2.1 Requirements for interstitial space	2
2.2 Tanks / interstitial space	2
2.3 Stored products	2
2.4 Exclusion	3
3 Description of functions	3
3.1 Switching and pressure values	3
3.2 Normal operation	3
3.3 Air or liquid leak	4
3.4 Air drying / Dry filter (DL.. ONLY)	4
3.5 Overpressure valve	4
3.6 Description of the display and control elements	4
4 Installation instructions	6
4.1 General	6
4.2 Personal protective equipment	7
4.3 Installation of the leak detector	7
4.4 Installation of the connection lines	7
4.5 Installation of the dry filter (DL.. ONLY)	8
4.6 Choice of pressure reducer (DLG.. ONLY)	8
4.7 Pressure cylinder and pressure reducer (DLG.. ONLY)	8
4.8 Electrical connection	9
4.9 Installation examples	9
5 Start up/servicing	9
6 Operating instructions	10
6.1 General	10
6.2 Maintenance	11
6.3 Intended use	11
6.4 Function test	11
6.5 Alarms	14
7 Removal	14
8 Marking	15
9 Abbreviations	15

DRAWINGS

Setting three-way valves	P – 060 000
Installation example DL ..	M1 + M2 – 060 000
Installation example DLG ..	M3 + M4 – 065 000
Wiring diagram DL ..	SL - 853 600
Wiring diagram DLG ..	SL – 853 700
Test device	P - 115 392

ANNEX

B Switching and pressure values	B – 1
TD Technical data	TD –1
FC Dryfilter monitoring (FC)	FC –1
TF Dryfilter	TF – 1
DP Evaluating the display for the function "Tightness test"	DP– 1



1 **Subject**

Overpressure leak detector for double-walled tanks with pressure provided either by a pump or by a compressed gas supply.

DL .. Overpressure leak detector with integrated pump. Dots stand for alarm pressure.

DLG .. Overpressure leak detector with compressed gas supply. Dots stand for alarm pressure

2 **Field of application**

2.1 **Requirements for interstitial space**

- Evidence of the pressure resistance of the interstitial space (see Annex B, column "p_{TEST}" minimum test pressure of the interstitial space)
- Evidence of the suitability of the interstitial space (for Germany: Building Inspectorate Suitability Serification)
- Tightness of the interstitial space (see chap. 6.4.4)
- The number of interstitial spaces for monitoring in **underground tanks** depends on the total interstitial space volume. According to EN 13160, 8 m³ must not be exceeded. It is recommended not to exceed 4 m³ with regard to the feasibility of monitoring the tightness of the interstitial space.

2.2 **Tanks/interstitial space (see chapter 2.4)**

- Under- and above ground double-walled steel or plastic tanks, without leak detection liquid in the interstitial space, manufactured in the factory or on site, whose interstitial space is suitable for the connection of a DL .. as per Annex B.
- Under- and above ground single-walled steel or plastic tanks with pressure-resistant leak detection lining or leak detection jacketing, whose interstitial space is suitable for the connection of a DL .. as per Annex B.
- Double-walled sumps or containments with interstitial space suitable for the connection of a DL .. as per Annex B.

2.3 **Stored products**

Liquids hazardous to water with regard to the following points:

- The leak detection medium must not react with the stored products.
- Vapour/air mixtures resulting from the
 - stored liquid
 - stored liquid in combination with air / humidity or condensation
 - stored liquid in combination with parts (materials) in contact with the liquidmust be classified in gas group IIA and II B and in temperature code T1 to T3.



2.4 Exclusion

If permeation occurs in the interstitial space as a result of the stored product and the material structure of the inner tank wall (e.g. in double-walled GRP tanks) which can result in an explosive atmosphere in the interstitial space under normal operating condition, ONLY leak detector DLG .. must be used in combination with an inert leak detection medium (pressure cylinder or operational network).

3 Description of functions

The overpressure leak detector DL .. resp. DLG .. monitors both walls of a tank for leaks. The monitoring pressure is high so that any leaks above or below the liquid level (stored product and ground water) are detected as a fall in pressure.

Pressure is built in up in:

DL .. by sucking in the outside air through the integrated pump via a dry filter and forwarding it to the interstitial space.

The dry filter dries the air to approx. 10% humidity. Drying is necessary to prevent moisture/condensation from collecting in the interstitial space. **Spent dry filter fillings must be regenerated or replaced.**

DLG .. by conveying compressed gas (dried air or inert gas) to the interstitial space. The leak detector has a display in the housing lid which shows the operating pressure in the interstitial space.

- Values under 50 mbar or under 0.73 PSI are not shown.
- Values between 50 and 999 mbar are shown in mbar without decimals.
- Values from 1 bar are shown in bar with 2 decimal places and from 10 bar with 1 decimal place.
- Values in PSI are shown with 1 or 2 decimal places.

3.1 Switching and pressure values

Annex B contains a list of the switching values.

3.2 Normal operation

The overpressure leak detector is connected by pressure and measuring line with the interstitial space(s). The overpressure created by the pressure generator (pump or pressure cylinder) is measured and controlled by a pressure sensor.

On reaching the operating pressure (refill OFF), the pressure generator (pump or solenoid valve) is switched off. The pressure slowly falls again due to unavoidable leaks in the leak detection system. On reaching the switching value for "refill ON", the pressure generator is switched on again and operating pressure restored.

In normal operation, the leak detector swings between these two pressure values with short operational times and longer standstill periods, depending on the level of tightness and temperature fluctuations in the system.



3.3 Air or liquid leak

If a leak occurs below or above the liquid level or ground water, leak detection medium escapes from the interstitial space. Pressure falls until the pressure generator is switched on to restore the operating pressure. If the volume flow escaping out of the leak is greater than the refill intake from the pressure generator, then the pressure in the system falls although the pressure generator is activated.

Enlargement of the leak causes a further loss in pressure until the alarm pressure is reached. The visual and audible alarm is triggered.

3.4 Air drying / dry filter (DL .. ONLY)

The air fed to the interstitial space passes through a dry filter in the suction line. The dry filter dries the air to approx. 10% humidity to prevent corrosion and accumulation of condensation¹ in the interstitial space.

The dry filter is rated for twelve months as long as the system is used for its intended use and there are no additional fluctuations in temperature.

A used dry filter turns green or colourless from its original orange colour. Used dry material must be immediately replaced or regenerated.

3.5 Overpressure valve

The overpressure valve integrated in the pressure line protects the interstitial space from intolerably high overpressure (exceeding the test pressure).

Intolerably high overpressure can be caused among others by:

- increase in ambient temperature (e.g. direct sunshine)
- increase in temperature from hot filling (possibly consult manufacturer)

3.6 Description of the display and control elements

3.6.1 Status of the display elements (LEDs) for type DL ..

LEDs	Operating status	Alarm status	Alarm, audible alarm switched off	Unit out of order
OPERATION: green	ON	ON	ON	ON
ALARM: red	OFF	ON	FLASHES	ON

¹ Accumulation of condensation in the interstitial space can cause an intolerable pressure increase.



3.6.2 Status of the display elements (LEDs) for type DLG ..

LEDs	Operating status	Refilling activated	Filling activated	Alarm status	Alarm, audible alarm switched off	Unit out of order
OPERATION: green	ON	ON	ON	ON	ON	ON
ALARM: red	OFF	OFF	OFF FLASHES ON ²	ON	FLASHES	ON
PRESSURE FEED: yellow	OFF	ON	FLASHES	ON	ON	OFF

3.6.3 Operating functions through keys

For DL .. and DLG ..

Switch audible alarm off:

Press the button "Audible alarm" once briefly, audible signal switches off, red LED flashes. Press again to switch the audible signal on. This function is not available in normal operation and during malfunctions.

Testing the visual and audible alarm

Press and hold the button "Audible alarm" (approx. 10 sec.), the alarm is triggered until the button is released. This is only possible if pressure in the system has exceeded the "Alarm OFF" pressure.

² on or off depending on pressure and/or audible alarm

**DL ..**Zero point adjustment³:

Three-way valve 21 in setting II (alarm triggered, pump running)

Press and hold the button "Audible alarm" until the "Alarm" LED flashes quickly (approx. 5 sec.), release button, then press again and release.

Zero point adjustment is confirmed by 3 visual and audible signals.

Three-way valve 21 in setting I

The zero point adjustment can only be repeated after operating pressure has been built up.

Checking the tightness of the monitored system

Press and hold the button "Audible alarm" until the "Alarm" LED flashes quickly, then release. A value for tightness is shown when the "Alarm" LED lights up (see chapter 6.4.5)

For this check, the leak detector must have completed at least 1 automatic refilling interval in normal operation (i.e. without filling with an installation pump) for a meaningful statement.

DLG ..Filling the interstitial space with leak detection medium

Press and hold the "Filling" button for approx. 5 sec. until the yellow LED flashes. Filling is activated.

On reaching the operating pressure, the yellow LED goes off and filling stops.

When pressure falls because of pressure compensation processes, filling can be activated again to ensure that the interstitial space is filled completely.

If you hold the button for longer than 10 sec., this triggers the alarm. It goes off again just after you release the button.

Checking the tightness of the monitored system.

Press and hold the button "Audible alarm" until the "Alarm" LED flashes quickly, then release. A value for tightness is shown when the "Alarm" LED lights up and is also shown in the display (see chapter 6.4.5)

10 sec. after the value is displayed, the leak detector goes back to normal operation.

For this check, the leak detector must have completed at least 1 automatic refilling interval in normal operation (i.e. without activating the filling function) for a meaningful statement.

4 Installation instructions**4.1 General**

- (1) Installation only by qualified companies⁴.
- (2) Comply with pertinent accident prevention regulations.
- (3) Follow explosion protection regulations (if applicable) e.g. laws on the basis of the European Directive 1999/92/EG and/or other applicable codes.
- (4) Before inspecting control shafts, check the oxygen level and scavenge the control shaft if necessary.
- (5) When using metallic connection lines, you must make sure that the mains earth is connected to the same potential as the tank being monitored.

³ Only applicable for DL 50 to DL 450.

⁴ For Germany: qualified companies as per § 19I WHG [Water Resources Act] with skills and know-how when it comes to fire and explosion protection.



DLG ONLY

- (6) When transporting the pressure cylinder to and from the site, always comply with the corresponding traffic regulations.
- (7) Secure the pressure cylinder on site to prevent it from falling over.
- (8) If start up/operation takes place in enclosed rooms, ensure that there is adequate ventilation. Affix a warning sign.

4.2 Personal Protective Equipment

The items listed here refer in particular to safety when working on systems which may be subject to risk of explosion.

When working in potentially explosive areas, at least the following items of equipment are required:

- Suitable clothing (risk of electrostatic charge)
- Suitable tools (as per EN 1127)
- Suitable gas detectors for the prevailing vapour/air mixtures (work should only be carried out at concentrations 50% below the lower flammable limit⁵)
- Instruments for measuring the oxygen level in the air (Ex / O-meter)

4.3 Installing the leak detector

- (1) Mounted to the wall usually with plugs and screws.
- (2) In a dry room, or in the open air in a suitable protective box.
- (3) Installation in protective box: additional external signal or alarm forwarding via dry relais contacts to central control desk or similar device.
- (4) **NOT in potentially explosive areas.**
- (5) The distance between leak detector and interstitial space should be kept as short as possible.

4.4 Installation of connection lines (between leak detector and tank)

- (1) Metal (usually copper) or plastic tubes with pressure resistance at least equal to the test pressure of the interstitial space, the same applies to fittings and screwed unions. (Note temperature range, particularly when using plastic).
- (2) Inside clearance min. 4 mm for inert gas as leak detection medium
 min. 6 mm for air as leak detection medium
- (3) Should not be much longer than 50 m. If longer than 50 m, use tube/hose with larger inside clearance using corresponding adapters.
- (4) Colour coding: Measuring line: red
 Pressure line: white (or clear)

⁵ Other percentages are possible based on national or company regulations.



- (5) The full cross section must be maintained. No squeezing or bending⁶.
- (6) Metal or plastic tubes underground or plastic tubes installed outside above ground must be routed in conduits.
- (7) Seal conduits to be gas-tight with protection from penetration of liquids.
- (8) Avoid build-up of static electricity (e.g. when inserting and routing tubes).
- (9) Details for connecting systems, see worksheet AB-820 500

4.5 Installation of the dry filter (DL .. ONLY)

- (1) As close as possible to the leak detector. If the leak detector is mounted in a protective box, the dry filter can be installed in the protective box or in the open air.
- (2) Vertical with intake opening at the bottom, using enclosed installation material.
- (3) Connect the dry filter to the leak detector intake port with a PVC hose (or similar).

4.6 Choice of pressure reducer (DLG ..ONLY)

- (1) The pressure reducer must have an integrated overpressure valve.
- (2) The range for the pressure reducer must be selected according to the specific application respectively adjusted pressure (see Annex B).

4.7 Pressure cylinder and pressure reducer (star up/function test) (DLG .. ONLY)

- (1) After the pressure cylinder has been set up securely, remove the protective cover.
- (2) Fit the pressure reducer to the cylinder.
- (3) Close the shut-off cock on the pressure reducer.
- (4) Install the connecting tube between leak detector and pressure reducer.
- (5) Turn pressure control valve all the way back.
- (6) Open bottle shut-off cock (poss. leak test between pressure reducer and bottle)
- (7) Adjust pressure at pressure reducer as per Annex B using pressure control valve on pressure reducer (poss. readjust during pressure build-up).
- (8) To change the pressure cylinder:
 - Close the shut-off cock on the pressure reducer.
 - Close the bottle shut-off cock.
 - Remove the pressure reducer from the cylinder (caution: gas escapes until pressure is relieved in the pressure reducer)
 - Put protection cover on the cylinder.
 - Erect and secure new cylinder, remove protection cover.
 - Fit the pressure reducer (poss. leak test between pressure reducer and cylinder)
 - Open bottle shut-off cock.
 - Open shut-off cock on pressure reducer, poss. readjust pressure using the pressure control valve.

⁶ If necessary, use commercially available moulded pieces (with stipulated bending radii) for plastic tubes.



4.8 Electric connection

- (1) Power supply: according to label
- (2) Permanent installation, i.e. no plugged or switched connections.
- (3) Comply with the regulations issued by the utility company.⁷

DL ..

Terminal configuration: (see also SL-853 600)

- | | |
|---------|---|
| 1 / 2 | Mains connection |
| 3 / 4 | Occupied (internal pump) |
| 5 / 6 | External signal (in an alarm, a line voltage present here, stopped by pressing button "Audible alarm"). |
| 11 / 12 | Dry relay contacts (opened on alarm and power failure). |

DLG ..

Terminal configuration: (see also SL-853 700)

- | | |
|---------|---|
| 1 / 2 | Mains connection |
| 3 / 4 | Occupied (internal solenoid) |
| 5 / 6 | External signal (in an alarm, a line voltage present here, stopped by pressing button "Audible alarm"). |
| 11 / 12 | Dry relay contacts (open on alarm and power failure) |
| 17/18 | When the pressure „refeed ON“ is not achieved, 12V are applied to this terminal. Suitable for connection of a relay (12 V) in order to pass-on this message potential-free. |
| 21 / 22 | Occupied (internal sensor) |

4.9 Installation examples

Installation examples are shown in the Annex

5 Start up/servicing

- (1) Observe also the instructions in chapter 4.
- (2) Special safety measures are required when commissioning a leak detector in an already filled tank (e.g. check that there is no gas in leak detector and/or interstitial space). Other measures can depend on local conditions at the discretion of the staff.
- (3) After completing the pneumatic connection, proceed with the electrical connection.
- (4) Check that the LEDs "Operation" and "Alarm" light up and that the audible alarm works. Press the button "Audible alarm".
- (5) Three-way valve 21 in position "III", connect test instrument.

⁷ For Germany: also VDE regulations

**DL ..**

- (6) Apply operating pressure to leak detection system as per table on page 3 (use installation pump with adequately dimensioned dry filter or nitrogen pressure cylinder).
- (7) Pressure can be built up with the installation pump directly using the pressure line or via the three-way valve 20 (position IV).

Note: If pressure cannot be built up with the connected installation pump, find and eliminate the leak (poss. check capacity of installation pump, check correct setting of pressure reducer).

DLG ..

- (6) Press and hold "Fill" button for approx. 5 secs. until yellow LED flashes. The solenoid valve opens to fill the interstitial space quickly. On reaching the operating pressure, filling stops and the yellow LED goes off.
For very large interstitial spaces, it may be necessary to change the cylinder (see chapter 4.6).

Note: If pressure cannot be built up in spite of the connected pressure cylinder, find and eliminate the leak (poss. check correct setting of pressure reducer). CAUTION: Leak detector display begins at 150 mbar pressure.

- (7) Filling can (should) be activated again to ensure that the interstitial space is filled completely.

- (8) On reaching the leak detector operating pressure (pressure generator in leak detector switches off), install pressure tube again or set both valves to setting "I". Remove pressure instrument.
- (9) Check functions as per chapter 6.4

6 Operating instructions

6.1 General

- (1) Following impervious, correct connection of the leak detection system, the leak detector can be presumed to work in the normal range.
- (2) If the pressure generator switches on frequently or runs continuously, this indicates leaks which must be eliminated in an appropriate period of time.
- (3) An alarm always indicates a major leak or defect. Find and eliminate the cause quickly.
- (4) The operator must regularly check that the "Operation" LED is working properly.
- (5) Disconnect the leak detector from the power supply before performing and repair work.
- (6) The operating lamp goes off when there is a circuit failure: the dry relay contacts open.
- (7) (DL .. ONLY). When the filter filling changes colour from orange to colourless, it must be replaced or regenerated.



6.2 Maintenance

6.2.1 By the operator:

- (1) Check the dry filter regularly⁸. When it changes colour from orange to colourless, replace or regenerate the filter filling.
- (2) Check the filling in the pressure cylinder regularly. If the pressure is only just above the pressure setting on the pressure reducer, refill or replace the cylinder.

6.2.2 Maintenance work and function check by qualified experts⁹.

- (1) Once a year to ensure functional and operational safety.
- (2) Scope of inspection as per chapter 6.4
- (3) Also check compliance with the conditions in chapter 4.5 and 6.2.
- (4) Explosion protection requirements must be satisfied (where necessary), such as laws on the basis of the European Directive 1999/92/EG and/or other applicable codes.

6.3 Intended use

- Groups of interstitial space **only for underground** interstitial spaces.
- Double-walled tanks, sumps or containments whose walls on the stored product side are resistant to permeation from particles which can generate potentially explosive vapours.
EXCEPTION:
Inner walls not resistant to permeation when using an inert leak detection medium.
- The alarm pressure must be min. 30 mbar higher than any pressure occurring in the interstitial space (from inside and/or outside).
- Grounding (where applicable) according to valid regulations¹⁰.
- Leak detection system is impermeable, according to chapter 6.4.6 of this documentation.
- Mount the leak detector outside potentially explosive area.
- Lead-throughs for the pneumatic hoses are sealed gas tight.
- Leak detector (electric) is connected so that it cannot be switched off.

6.4. Function test

Check functional and operational safety

- every time after start up
- on the basis of chapter 6.2 in the intervals stated there¹¹
- every time after troubleshooting

⁸ Recommended: min.at 2 month intervals

⁹ For Germany: experts for installation/service of leak detectors or in the responsibility of an expert, according to the currently valid regulations.

¹⁰ e.g. EN 1127

¹¹ For Germany; otherwise comply with the national regulations (e.g. VAWS)



6.4.1 Test scope

- (1) Poss. check the scope of work with the person responsible on site.
- (2) Comply with the safety regulations for handling the specific stored product.
- (3) (DL .. ONLY) Regeneration/replacement of the filter filling.
- (4) Check the free passage of air (gas) in the interstitial space (chapter 6.4.2).
- (5) Check the switching values with the test unit (chapter 6.4.3), alternatively: check the switching values without test unit (chapter 6.4.4)
- (6) Check the overpressure valve (chapter 6.4.5).
- (7) Tightness test (chapter 6.4.6).
- (8) Restore operating condition (chapter 6.4.7).
- (9) Test report confirming functional and operational safety to be compiled by the qualified person.

6.4.2 Check the free passage of air (gas) in the interstitial space

- (1) If several interstitial spaces are manifolded together, check the free passage of each interstitial space on its own:
- (2) If several interstitial spaces are connected to a manifold with shut-off cocks in the pressure and measuring lines, close all shut-off devices at the distribution units.
- (3) Connect measuring gauge at three-way valve 21, setting "III".
- (4) Three-way valve 20 in setting "IV". The (corresponding) interstitial space is vented.
CAUTION: maintenance work and function checks only by qualified persons. If inert gas is used as leak detection medium, ensure there is adequate ventilation!
- (5) Open shut-off cocks of the first (following) tank (measuring and pressure lines in pairs).
- (6) Ascertain the pressure loss on the measuring gauge. If there is no pressure loss, find and remedy the cause.
- (7) Close the shut-off cocks opened under paragraph (4).
- (8) Proceed with steps (5) to (7) with every other tank.
- (9) Three-way valve 20 and 21 in setting "I", remove measuring gauge.
- (10) Open all shut-off cocks on the manifold with connected tanks.

6.4.3 Checking the switching values with test unit.

- (1) Connect the test unit to the test port of three-way valve 20 and 21. Both valves in setting "II".
- (2) Connect measuring gauge to the test unit.
- (3) Close needle valve (test unit), pressure is built up to operating pressure.
- (4) Vent using the needle valve, ascertain switching values for "Pump ON" and "Alarm ON" (visual and audible), note values.
- (5) Close needle valve and ascertain switching values for "Alarm OFF" and "Pump OFF". Note values (possibly open needle valve slightly for slow increase in pressure)
- (6) Three-way valve 20 and 21 in setting "I", remove measuring gauge.



6.4.4 Checking the switching values without test unit

- (1) If several tanks are connected by a manifold, close all the shut-off cocks on the manifold apart from the valves for the tank with the smallest interstitial space.
- (2) Connect measuring gauge to three-way valve 21, setting "III".
- (3) Vent via three-way valve 20 (setting "III"), ascertain switching values for "Pump ON" and "Alarm ON" (with visual and audible alarm), note values.
- (4) Three-way valve 20 in setting "I", ascertain switching values for "Alarm OFF" and "Pump OFF", note values
- (5) Three-way valve 21 in setting "I", remove measuring gauge.
- (6) Open all shut-off cocks on the manifold with connected tanks.

6.4.5 Checking the overpressure valve

Operating pressure must have been built up in the leak detector for this test.

- (1) Three-way valve 21 in setting "II" (pressure sensor is vented). The pump switches on and the alarm is triggered.
- (2) Connect measuring gauge to three-way valve 20, setting "II".
- (3) Ascertain opening pressure of the overpressure valve (no further increase in pressure) and note value. If the opening pressure of the overpressure valve exceeds the test pressure of the tank, replace or adjust the valve.
- (4) Three-way valve 21 in setting "I". The pump switches off, ascertain the closing pressure of the overpressure valve (no further fall in pressure¹²), note the values.
- (5) Three-way valve in setting "I", remove measuring gauge.

6.4.6 Tightness test

- (1) Check that all shut-off cocks with connected tank are open.
- (2) Connect measuring gauge to three-way valve 21, setting "III".
- (3) Begin with the leak test after pressure has compensated. The tightness test is passed when the values in the following table are achieved.

¹² If the pump switches on before the closing pressure is reached, find out why and eliminate the cause.



Interstitial space volume in litres	Max. 1 mbar (0.015 psi) pressure loss 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) Three-way valve 21 in setting "I", remove measuring gauge.

6.4.7. Restore the operating condition

- (1) Seal the housing
- (2) The shut-off cocks for every connected tank must be in the "open" setting.

6.5 Alarms

DL ..

- (1) Red LED lights up, the audible signal can be heard.
- (2) Stop the audible signal.
- (3) Inform the installation company immediately.
- (4) Find and eliminate the cause of the alarm, then check the functions of the leak detection system according to section 6.4.

DLG ..

- (1) Red and yellow LEDs light up, the audible signal can be heard.
- (2) Stop the audible signal.
- (3) Inform the installation company immediately.
- (4) Find and eliminate the cause of the alarm, then check the functions of the leak detection system according to section 6.4.
- (5) In the event of a malfunction, only the red LED lights up (yellow is off). Inform the manufacturer.

7 Removal

For the removal of units, which can cause a risk of explosion, always comply with the following points:

- Check that no gas is present before and during work.
- Any openings which could allow for entrainment of a potentially explosive atmosphere must be sealed gas-tight.
- Do not use spark-producing electrical tools (saws, abrasive cutters). If this is unavoidable, comply with EN 1127.



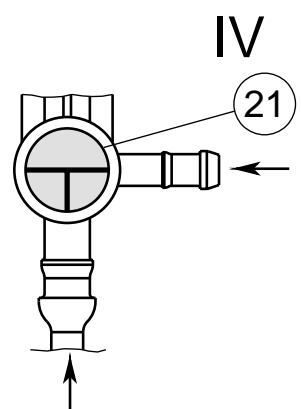
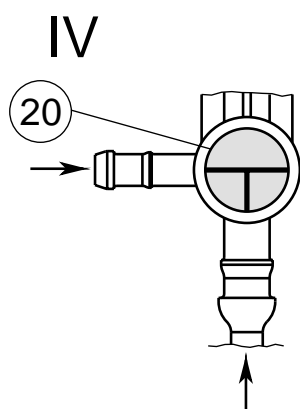
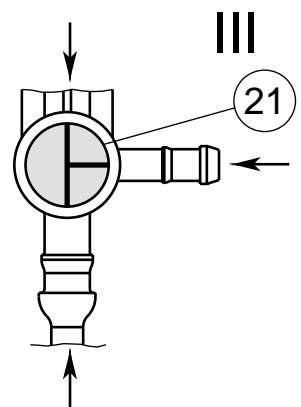
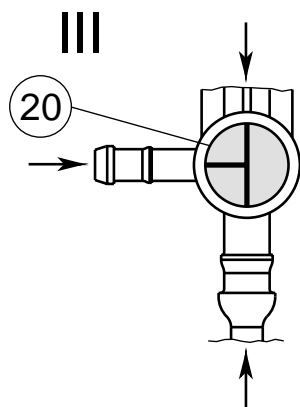
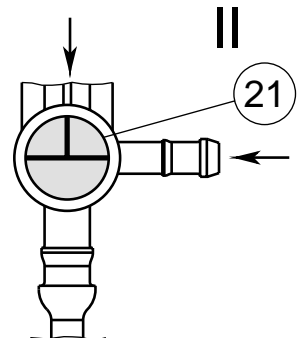
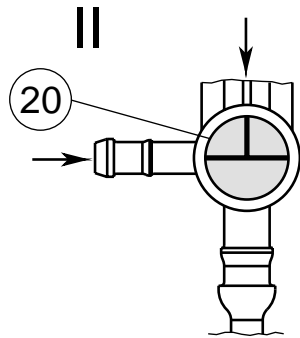
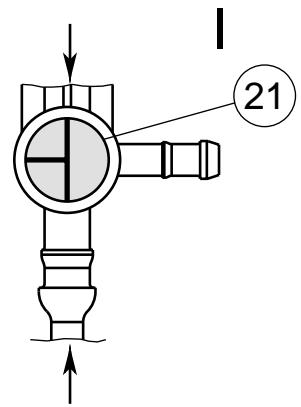
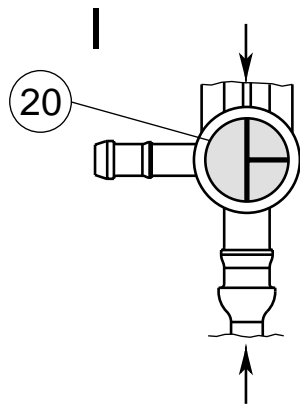
- Avoid the build-up of electrostatic charges (e.g. through friction or wearing unsuitable clothing).
- Dispose of contaminated parts appropriately (risk of outgassing).

8 Marking

- Electrical data
- Serial number
- Type designation
- Manufacturing date (month / year)
- Manufacturer's symbol
- Statutory symbols
- Pressure and shut-off cock line for leak detection medium air can be connected to zone 2 interstitial space; there are no restrictions for nitrogen as leak detection medium.

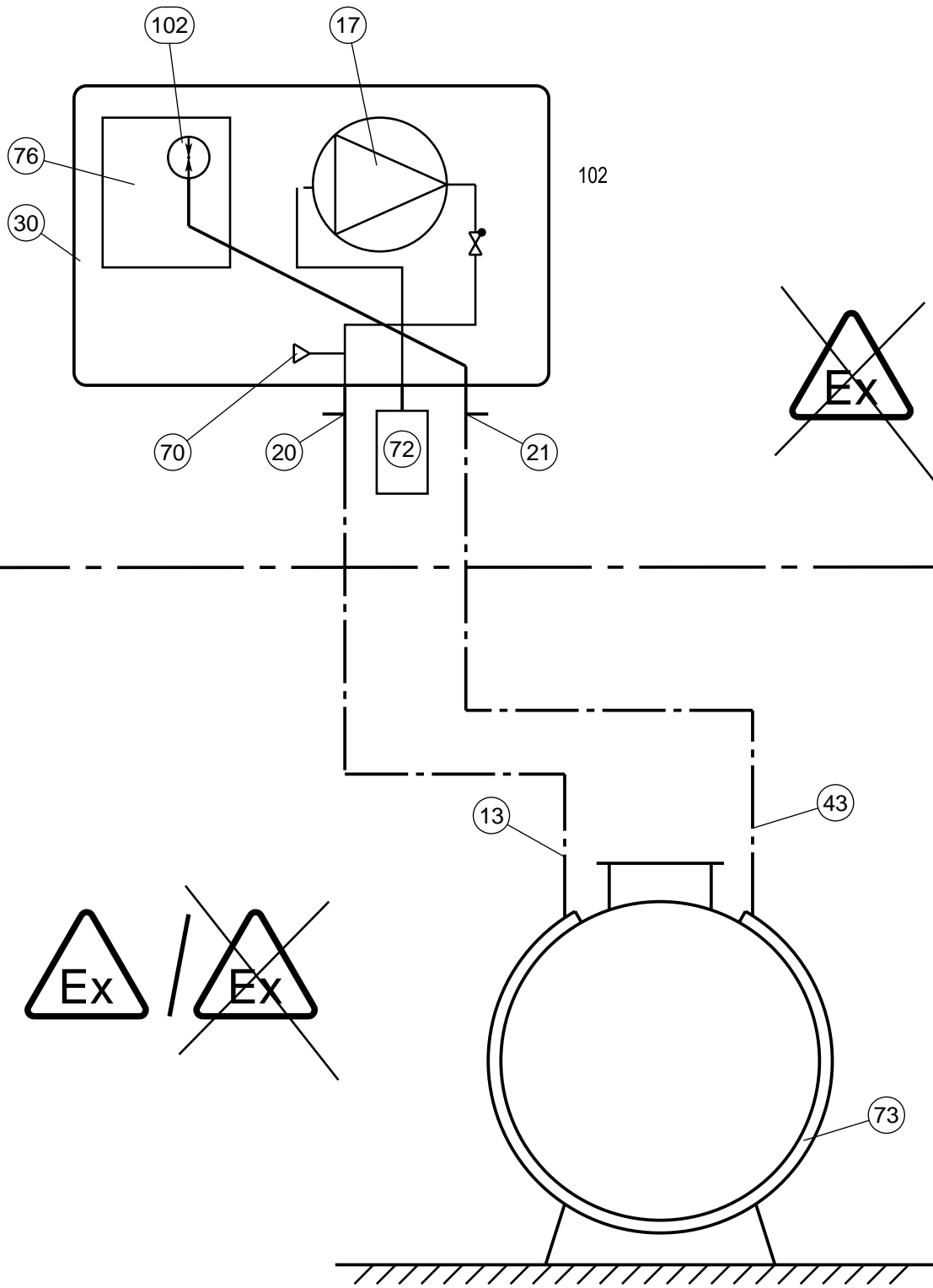
9 Abbreviations

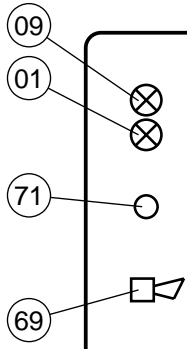
01	LED "Alarm", red	44	Solenoid valve
02	Shut-off cock	45	LED "Refill", yellow"
05	Shut-off cock (pressure regulator)	59	Relay
09	LED "Operation", green	61	Check valve with filter
13	Pressure line	69	Buzzer
14	Pressure reducer	70	Overpressure valve
17	Overpressure pump	71	Key "Audible alarm"
19	Pressure cylinder	72	Dry filter
20	Three-way valve in pressure line	73	Interstitial space
21	Three-way valve in measuring line	76	Main PCB
24.1	Fine-wire fuse	77	Pressure control valve
24.2	Fine-wire fuse	102	Pressure sensor
24.3	Fine-wire fuse	103	Display
25	Pressure cylinder shut-off cock	104	Operational pressure network (air / nitrogen)
29	Key "Fill"	105	Control unit
30	Housing	106	Contacts for serial data transfer
43	Measuring line		



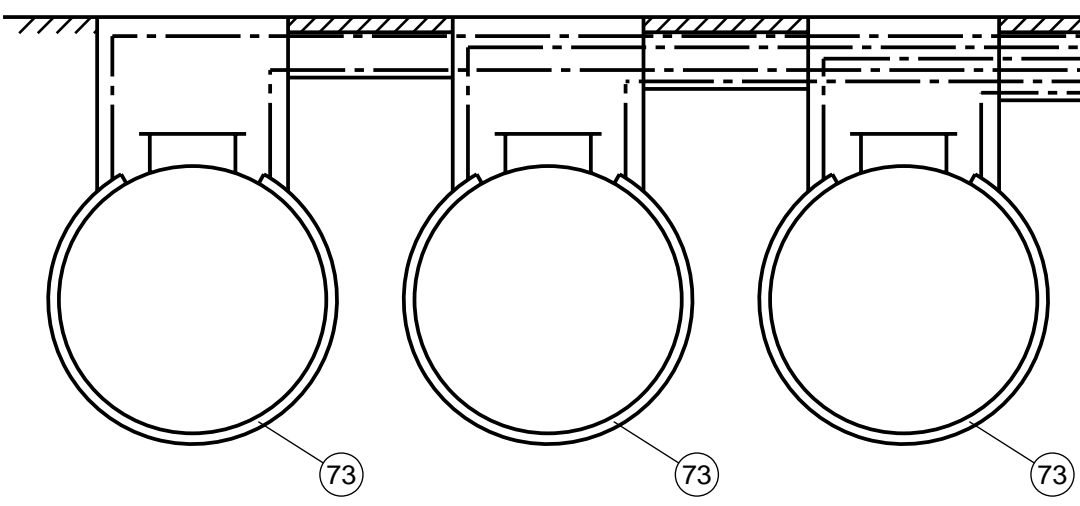
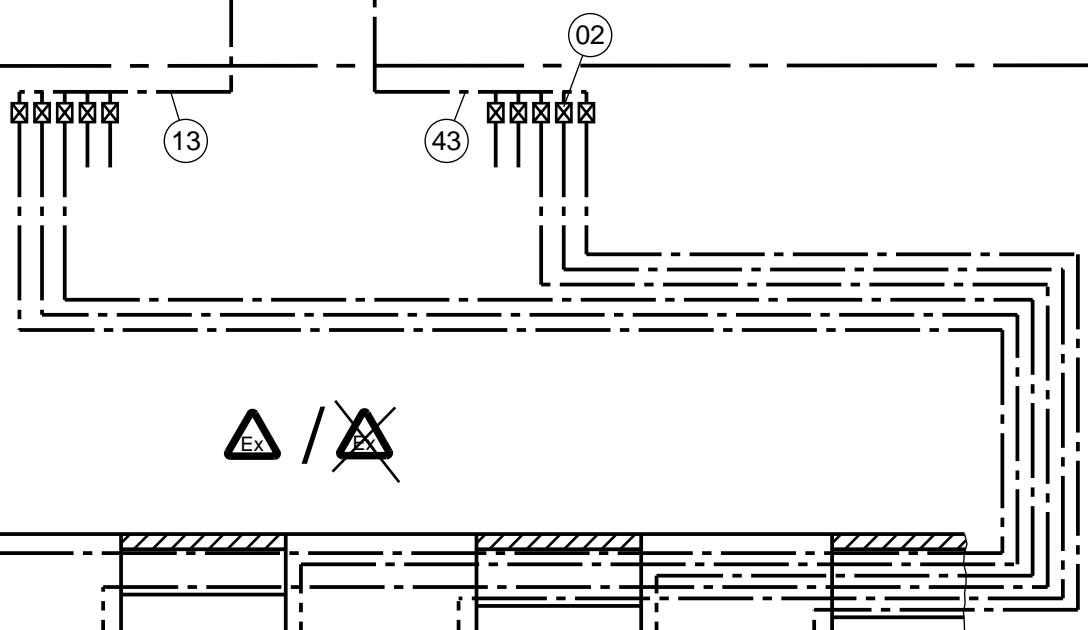
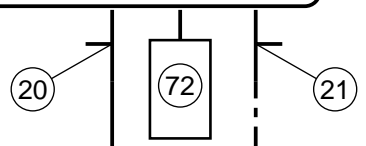
pressure line

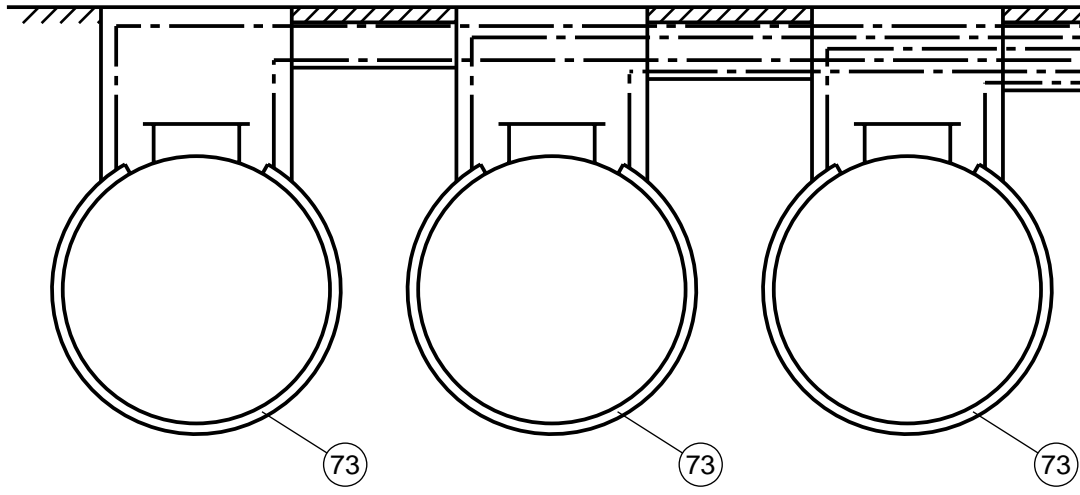
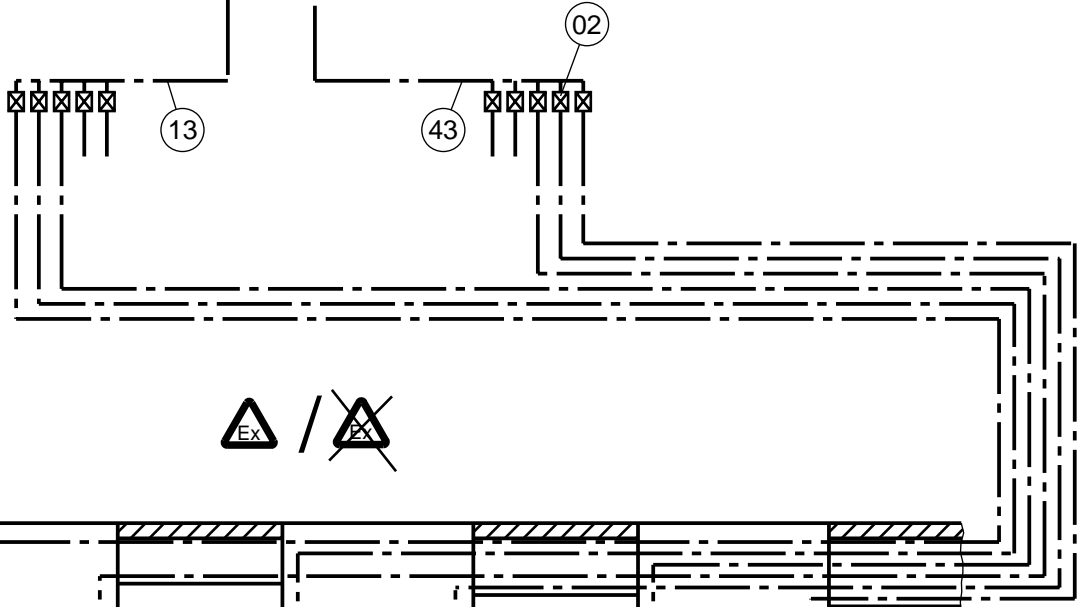
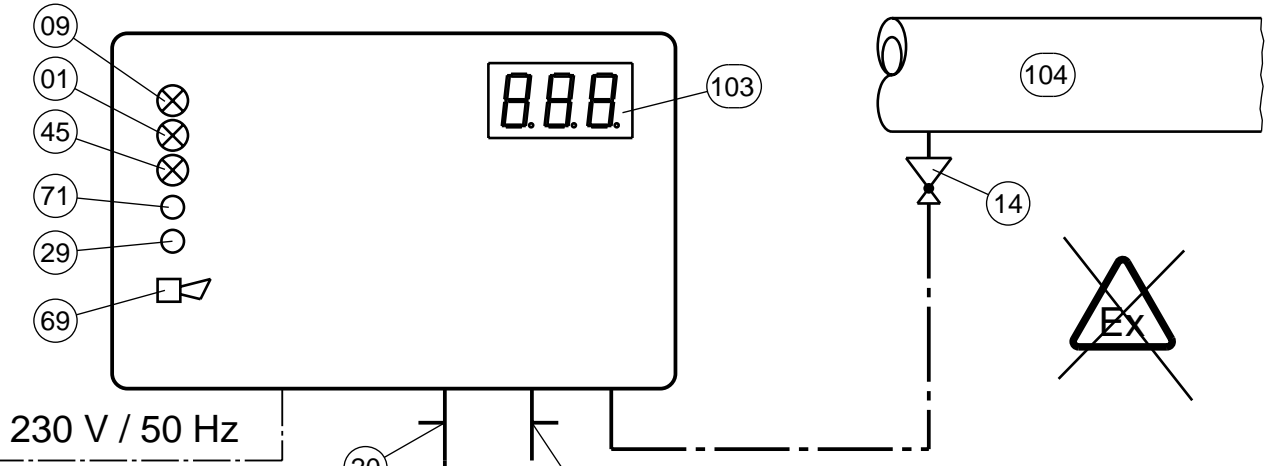
measuring line

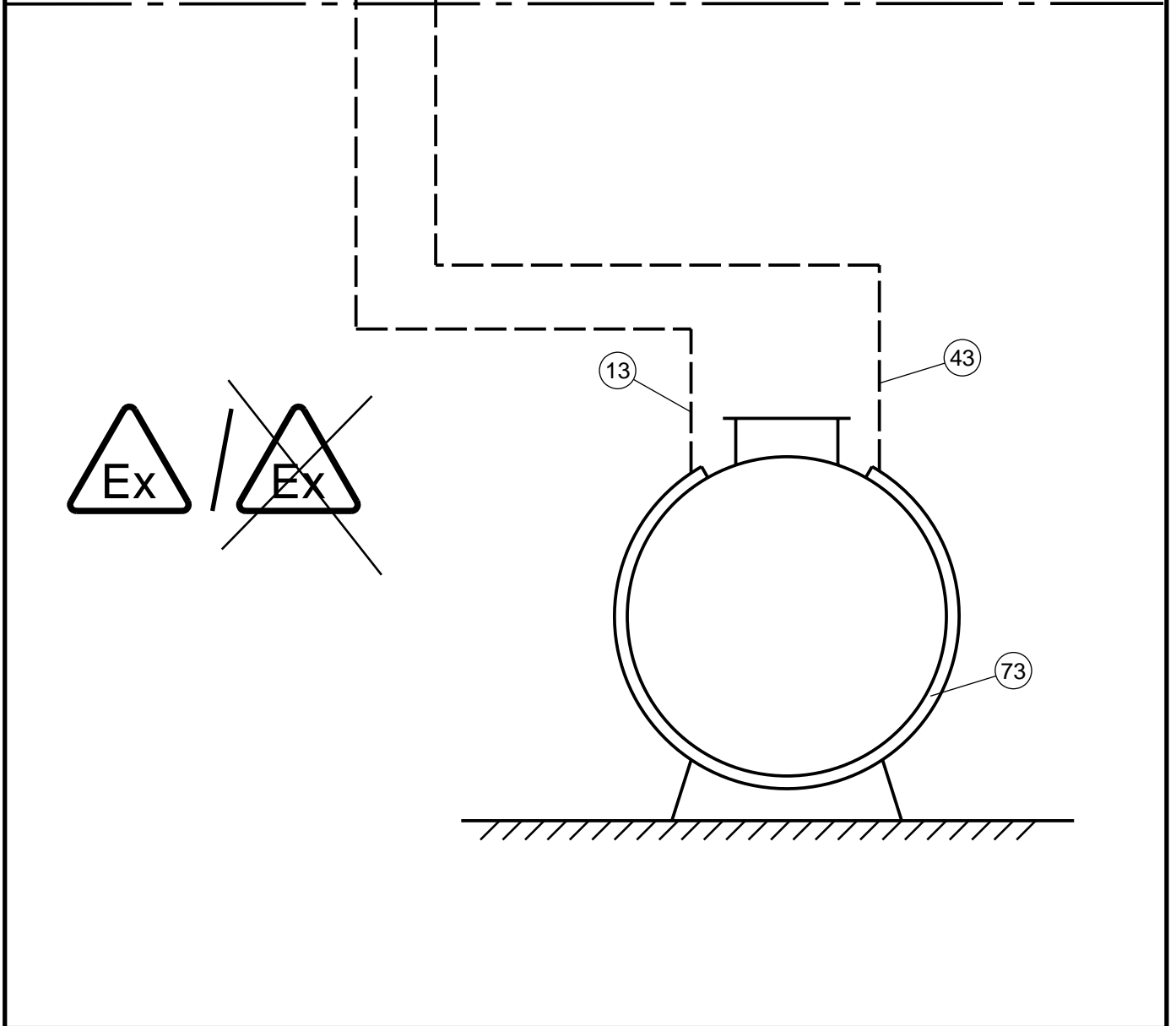
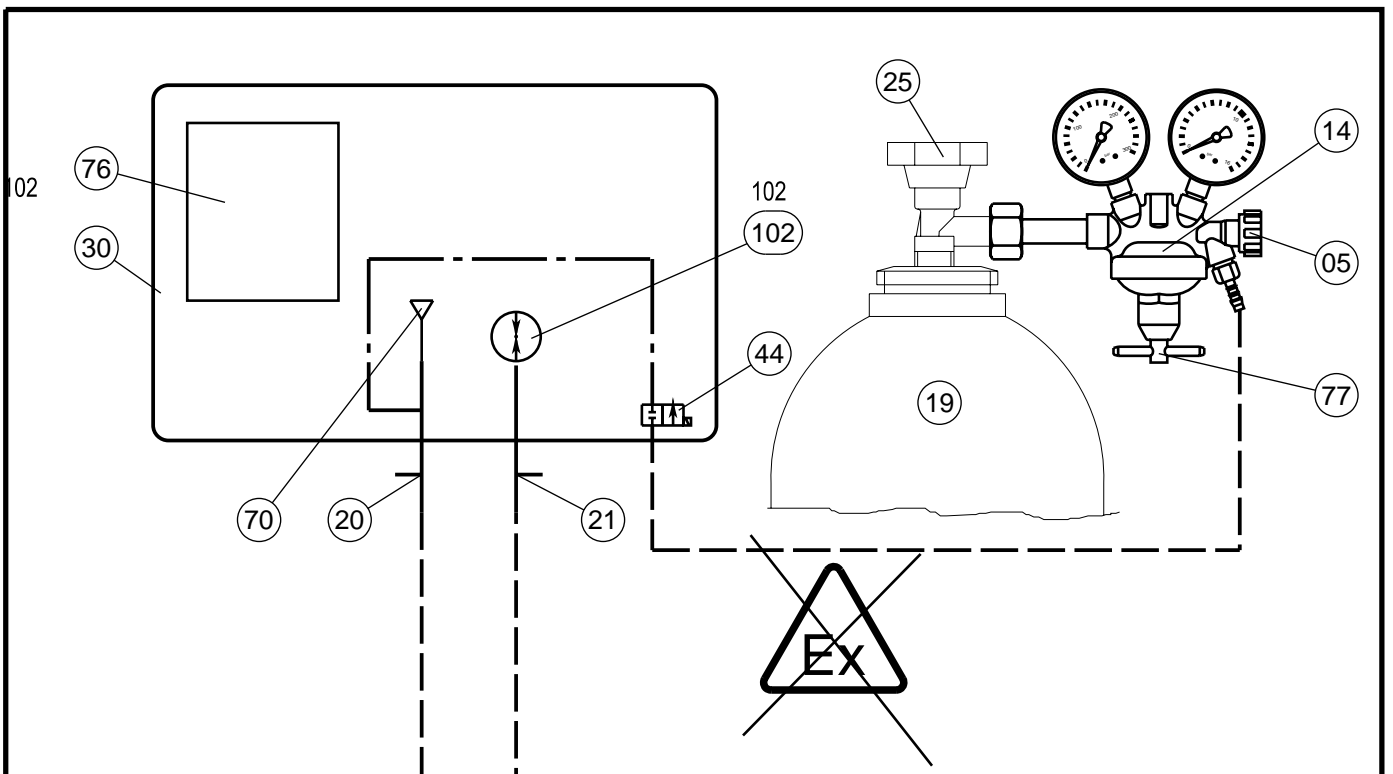


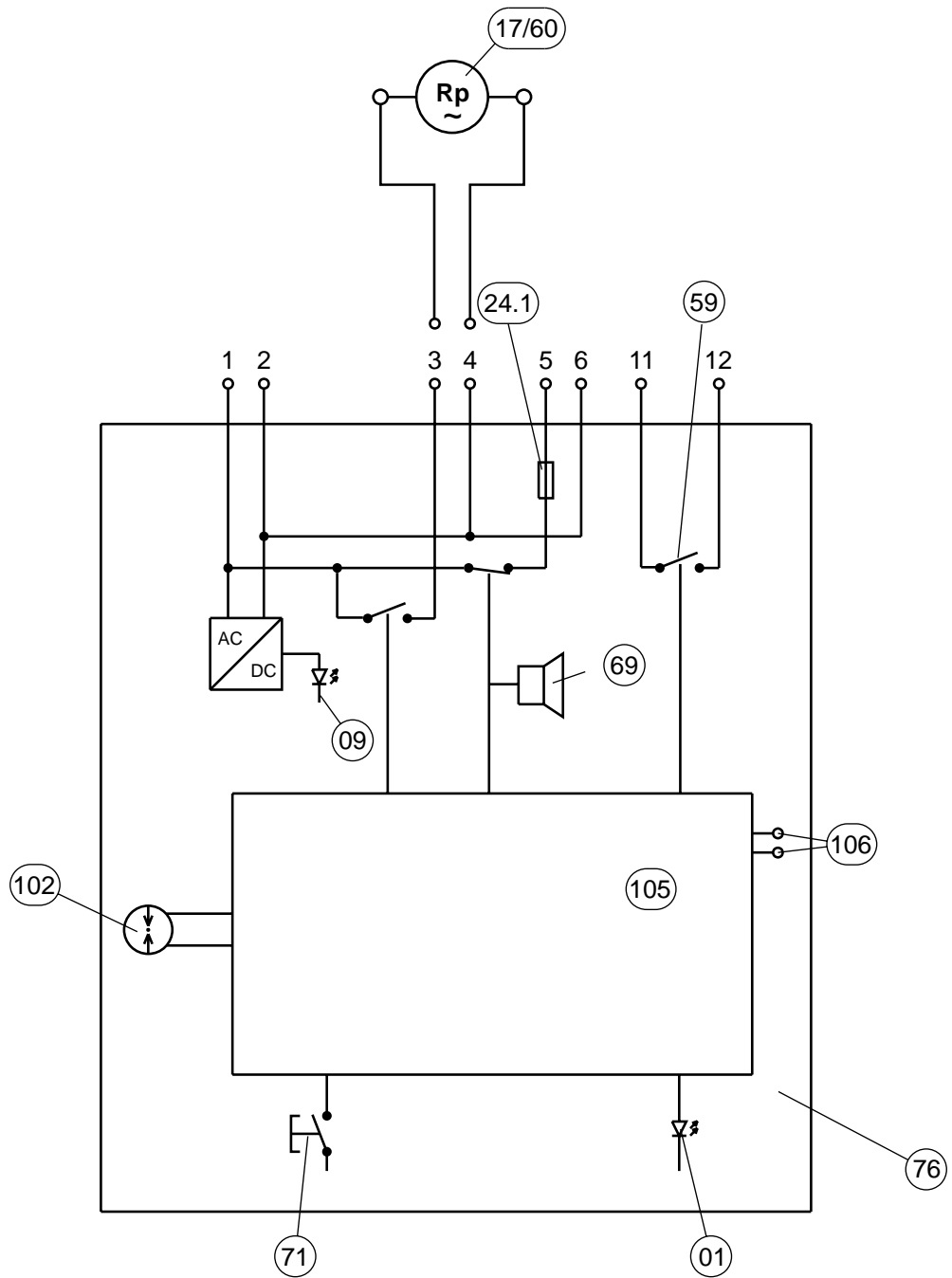


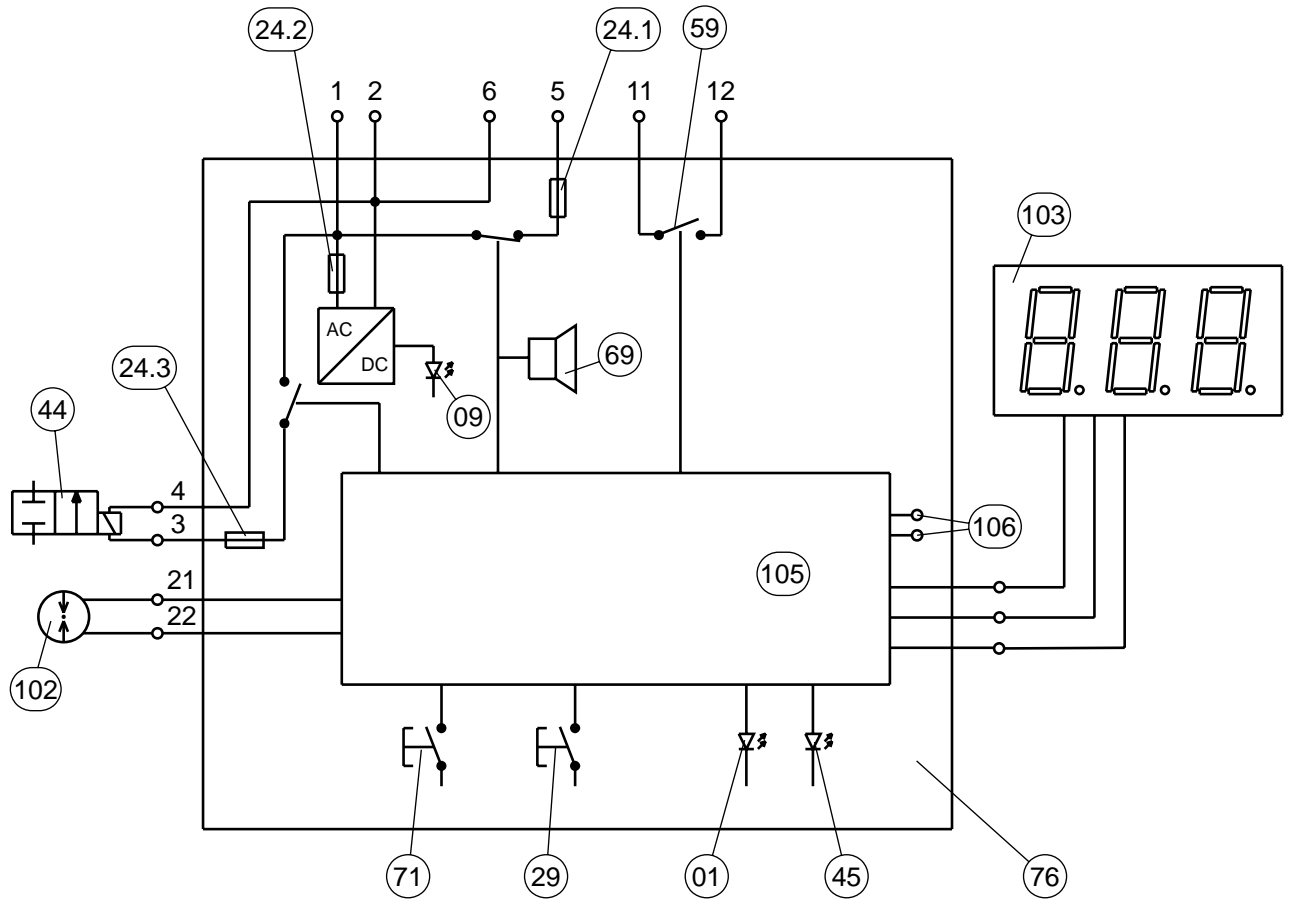
230 V / 50 Hz

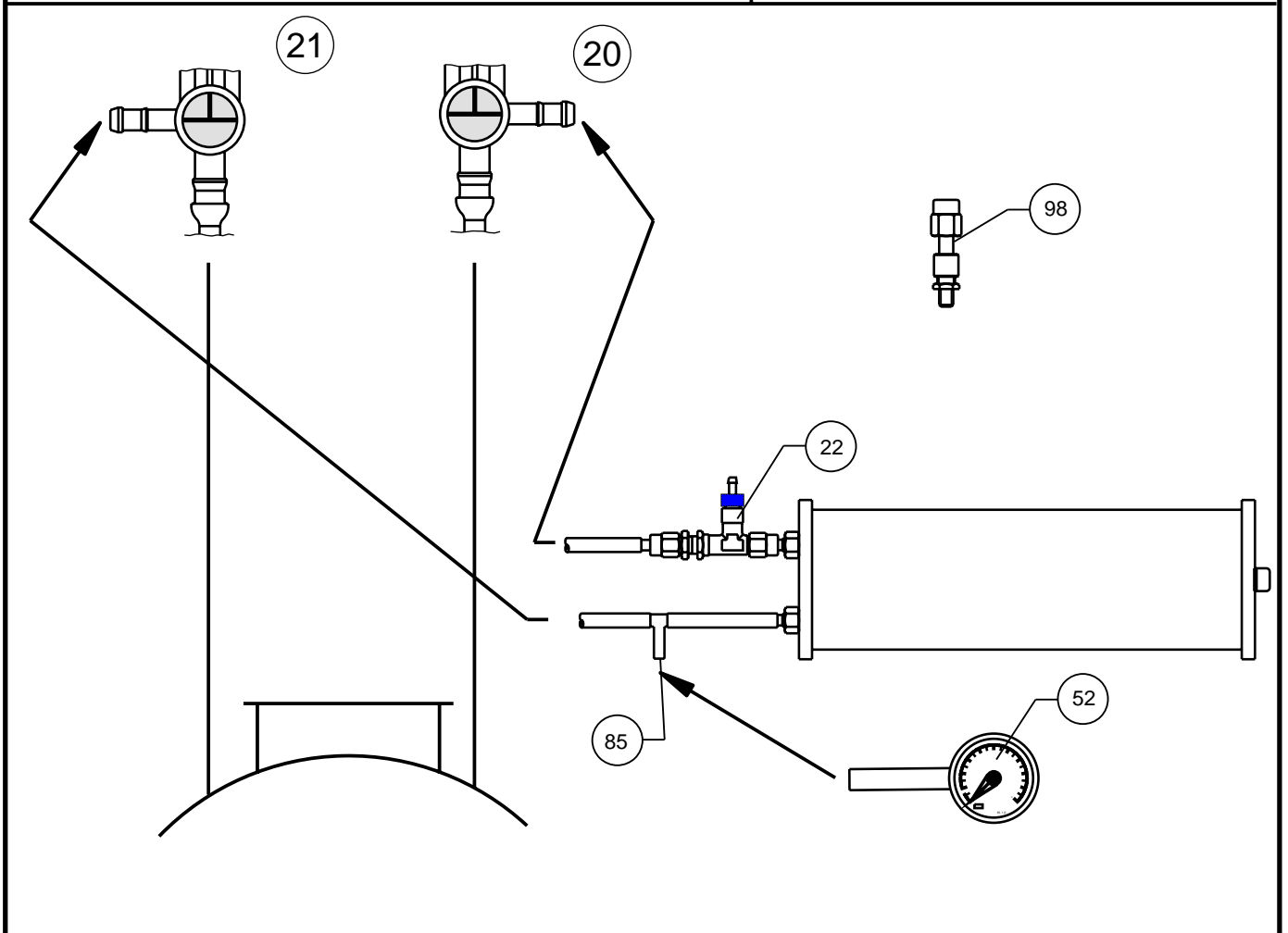
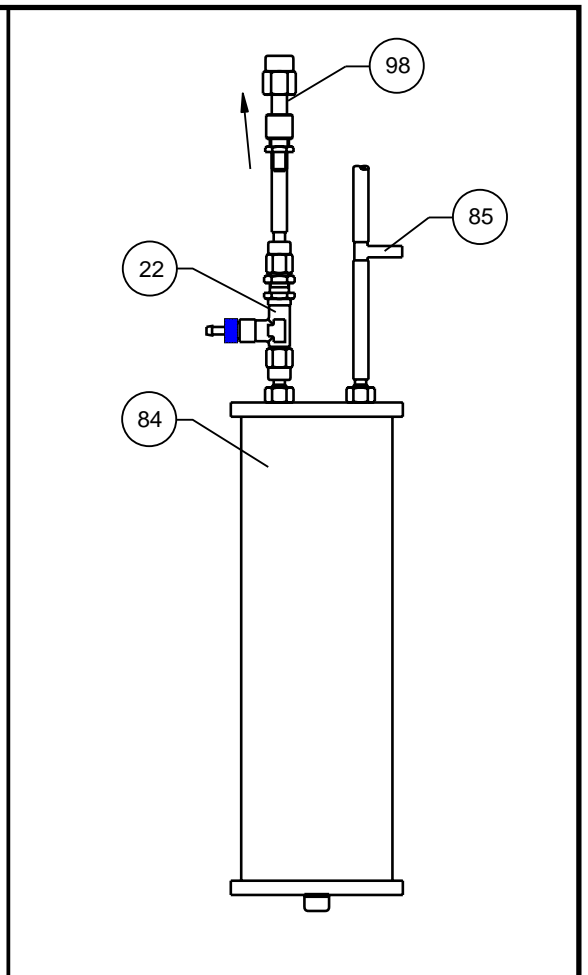
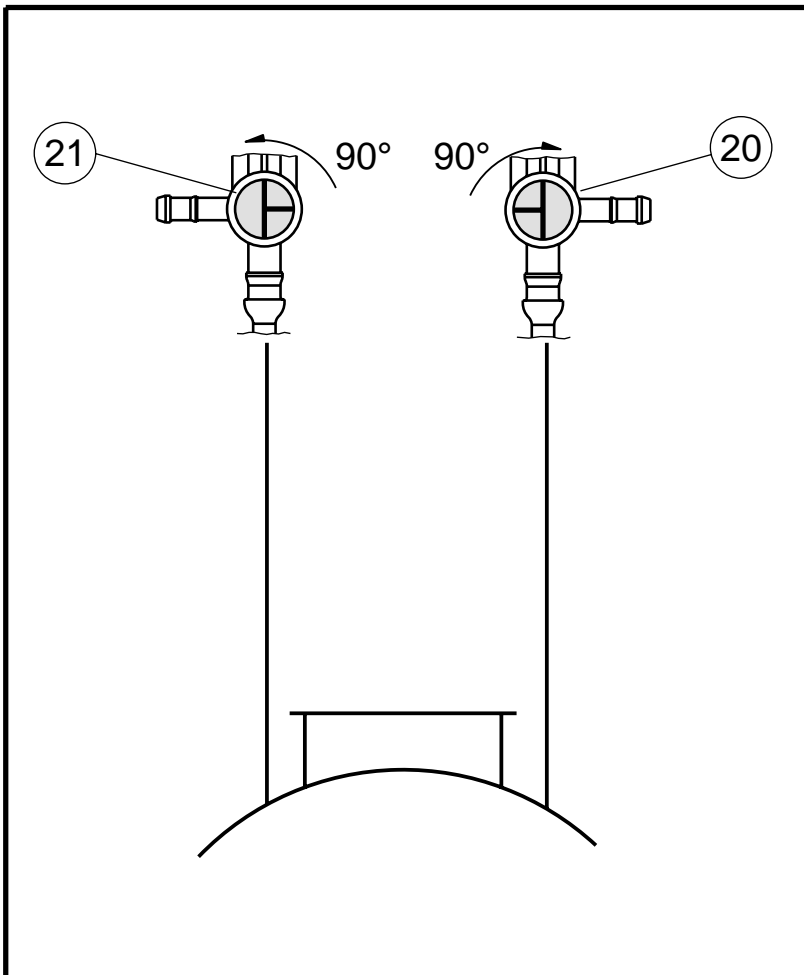












17-12-2002

SGB

P - 115 392

ANNEX B
OVERPRESSURE LEAK DETECTOR DL ..



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
590	560	> 590	< 700	770 ± 30	≥ 850
750	720	> 750	< 850	940 ± 30	≥ 1000
1000	970	> 1000	< 1400	1590 ± 50	≥ 1750
1100	1070	> 1100	< 1450	1650 ± 70	≥ 1820
1500	1450	> 1500	< 1900	2100 ± 50	≥ 2350
2000	1950	> 2000	< 2400	2650 ± 50	≥ 3000
2300	2250	> 2300	< 2770	3100 ± 100	≥ 3500
2500	2450	> 2500	< 2900	3200 ± 50	≥ 3550
3000	2950	> 3000	< 3400	3750 ± 50	≥ 4150
—	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_{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" for pressure stages < 1000 and approx. 100 mbar higher for pressure stages > 1000 ($p_{AA} = p_{AE} + \sim 15$ mbar (pressure stages < 1000) ~ 100 mbar (pressure stages > 1000))
- p_{PA} Switch value "Pump OFF" (=operating pressure)
- p_{PE} Switch value "Pump ON"
The switch value "Refill ON" is approx. 15 mbar lower than the switch value "Refill OFF" for pressure stages < 1000 and approx. 100 mbar lower for pressure stages > 1000 ($p_{PE} = p_{PA} - \sim 15$ mbar (pressure stages < 1000) ~ 100 mbar (pressure stages > 1000))
- $P_{ÜDV1}$ Opening pressure overpressure valve 1 (interstitial space side)
- $p_{PRÜF}$ Minimum test pressure of the interstitial space
- * 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.

ANNEX B
OVERPRESSURE LEAK DETECTOR DL ..



Type DLG	p_{TS} [mbar]	p_{AE} [mbar]	p_{PA} [mbar]	$P_{ÜDV1}^2$ [mbar]	$p_{ÜDV2}^3$ [mbar]	$p_{PRÜF}$ [mbar]	P_{DM} [mbar]
50	20	> 50	< 100	170 ± 20	600 ± 50	≥ 200	200
100	70	> 100	< 150	220 ± 20	650 ± 50	≥ 250	250
290	260	> 290	< 350	420 ± 20	850 ± 50	≥ 450	450
330	300	> 330	< 410	465 ± 20	900 ± 50	≥ 500	500
400	370	> 400	< 500	565 ± 20	1000 ± 50	≥ 600	600
450	420	> 450	< 510	565 ± 20	1000 ± 50	≥ 600	600
590	560	> 590	< 700	770 ± 30	1250 ± 100	≥ 850	850
750	720	> 750	< 850	940 ± 30	1500 ± 100	≥ 1000	1000
1000	970	> 1000	< 1400	1590 ± 50	2700 ± 100	≥ 1750	1800
1100	1070	> 1100	< 1450	1650 ± 70	2750 ± 100	≥ 1820	1850
1500	1450	> 1500	< 1900	2100 ± 50	3400 ± 100	≥ 2350	2400
2000	1950	> 2000	< 2400	2650 ± 50	4200 ± 100	≥ 2950	3000
2300	2250	> 2300	< 2770	3100 ± 100	4800 ± 200	≥ 3500	3500
2500	2450	> 2500	< 2900	3200 ± 50	5000 ± 100	≥ 3550	3600
3000	2950	> 3000	< 3400	3750 ± 50	6000 ± 100	≥ 4150	4200
-	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_{AA} switch value "Alarm OFF", the alarm goes off on passing this value.
The switch value "Alarm OFF" is approx. 15 mbar higher than the switch value "Alarm ON" for pressure stages < 1000 and approx. 100 mbar higher for pressure stages > 1000
($p_{AA} = p_{AE} + \sim 15$ mbar (pressure stages < 1000) ~ 100 mbar (pressure stages > 1000))
- p_{PA} Switch value "Pump OFF" (=operating pressure)
- p_{PE} Switch value "Pump ON"
The switch value "Refill ON" is approx. 15 mbar lower than the switch value "Refill OFF" for pressure stages < 1000 and approx. 100 mbar lower for pressure stages > 1000
($p_{PE} = p_{PA} - \sim 15$ mbar (pressure stages < 1000) ~ 100 mbar (pressure stages > 1000))
- $P_{ÜDV1}$ Opening pressure overpressure valve 1 (interstitial space side)
- $P_{ÜDV2}$ Opening pressure overpressure valve 2 (supply side)
- $p_{PRÜF}$ Minimum test pressure of the interstitial space
- P_{DM} Set pressure at the pressure reducer

² 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.

³ Overpressure valve 2 ÜDV2 can be omitted if the test pressure in the interstitial space is higher than the triggering pressure of the overpressure valve integrated in the pressure reducer.



Technical data

1. Electrical data

Power supply (without external signal)	230~ V - 50 Hz - 50 W
Switch contact load, terminals AS (5 and 6)	max. 230~ V - 50 Hz - 200 VA min. 20 mA
Switch contact load, potential-free contacts, (Terminals 11 and 12)	max: 230~ V - 50 Hz - 3 A min: 6 V / 10 mA
External fuse of the leak detector	max. 10 A
Overvoltage category	2

2. 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 alarm 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 31 to 34:

- 31/32 Contact opens on receiving a message
- 31/34 Contact closes on receiving a message

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.



Dry filter

1 Size of dry filter for underground tanks:

TF 180 (the larger dry filters can also be used)

2 Size of dry filters for above ground tanks:

Type	Max. volume of the interstitial space with				
	TF 180	TF 200	TF 400	TF 600	TF 1200
DL 50	350	750	1400	2100	4800
DL 100					
DL 230					
DL 290	300	600	1100	1600	3700
DL 330					
DL 400	250	520	1000	1500	3500
DL 450					
DL 590	240	500	900	1350	3000
DL 750					
DL 1000	210	400	750	1150	2600
DL 1100					
DL 1500	150	300	550	800	1850
DL 2000					
DL 2300	130	250	400	700	1600
DL 2500					
DL 3000	110	230	350	600	1400



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.

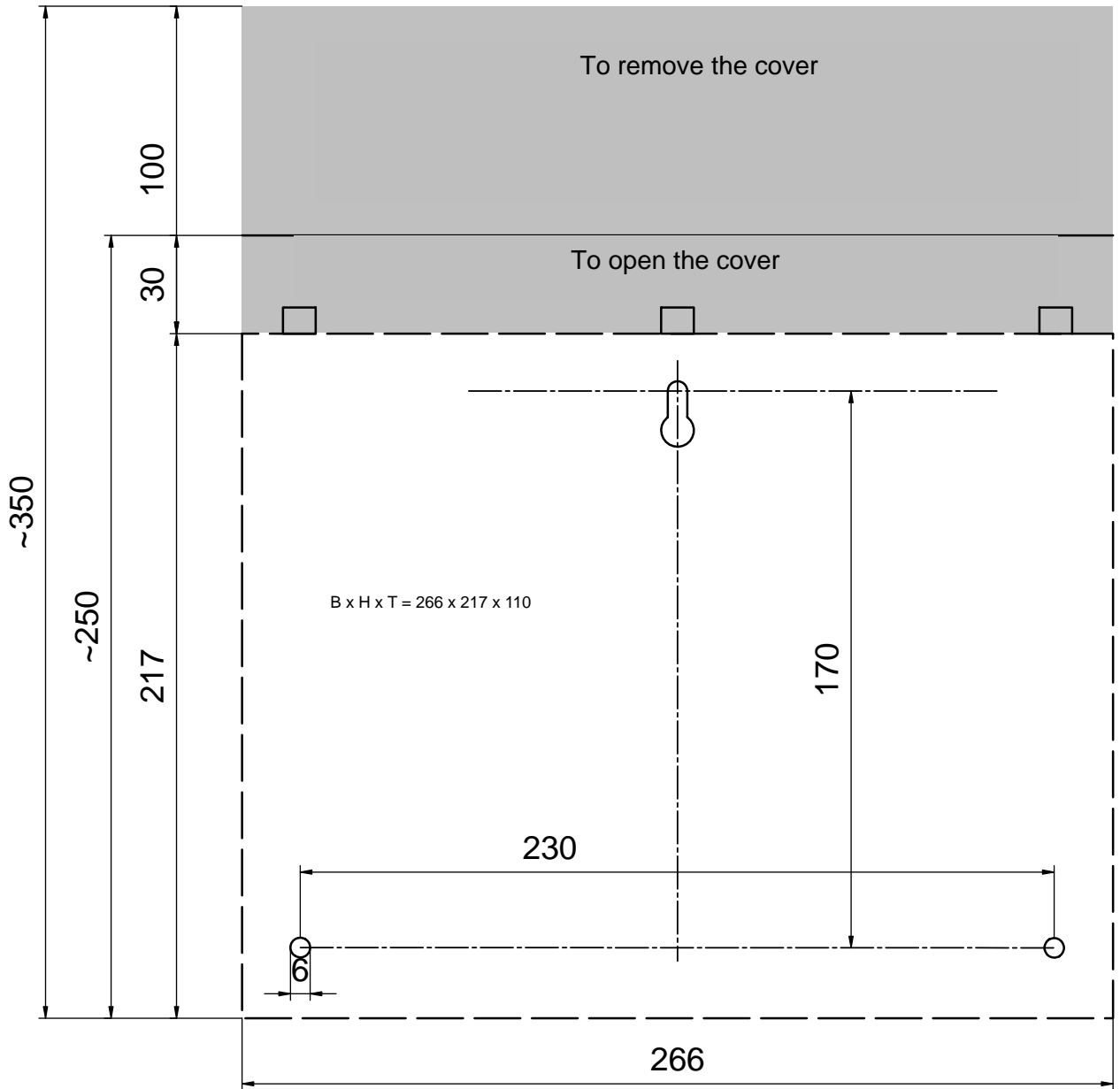
This is only possible if the switching value "Alarm OFF" has been exceeded. It can be repeated several times in succession.

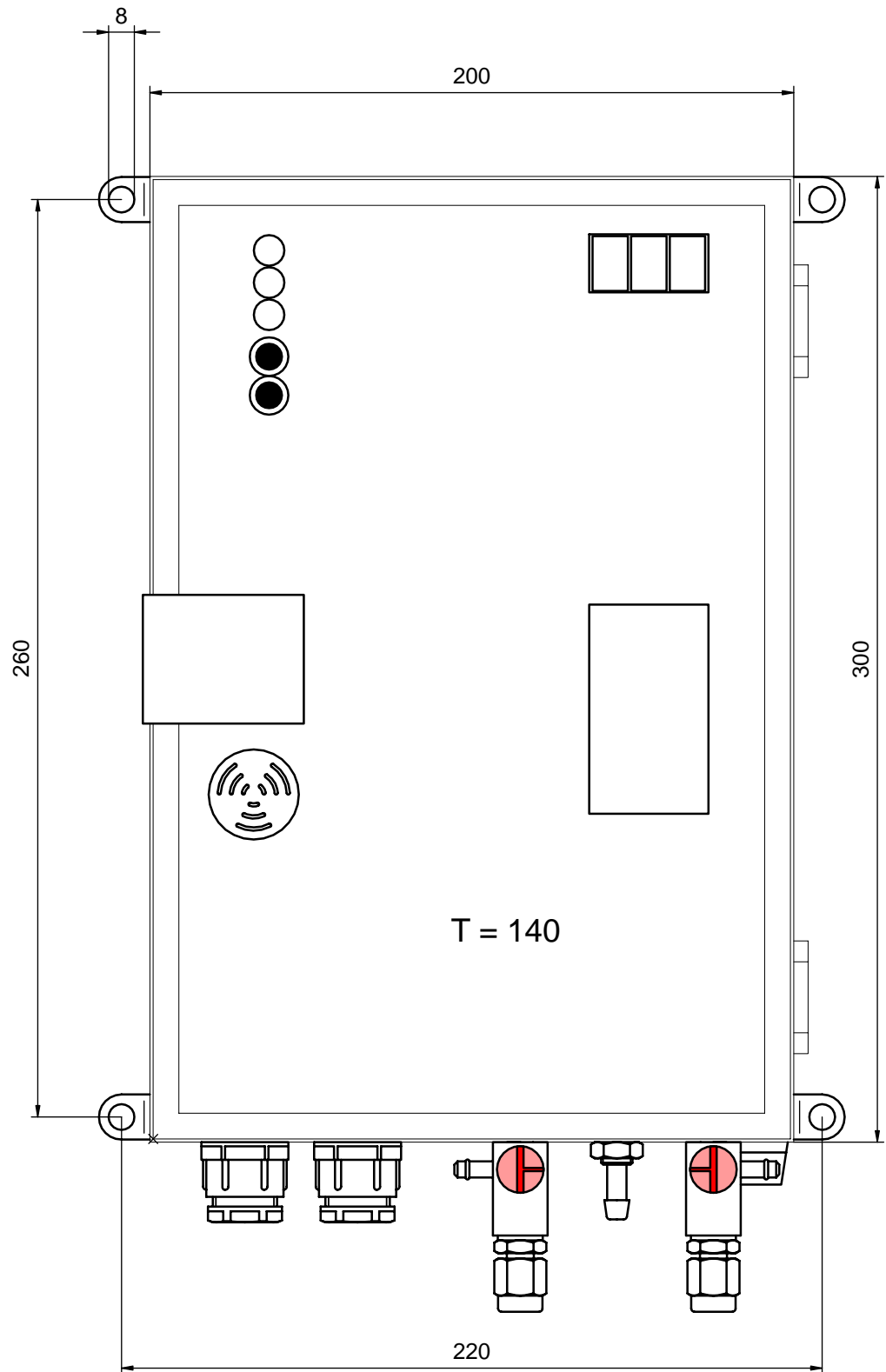
This check is advisable **before** carrying out a recurrent function test on a leak detector, to see directly whether there is any need to look for leaks.

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

Number of flashes	Evaluation of the tightness
0	Very tight
1 to 3	Tight
4 to 6	Sufficient tight
7 to 8	Maintenance recommended
9 to 10	Maintenance highly recommended

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.





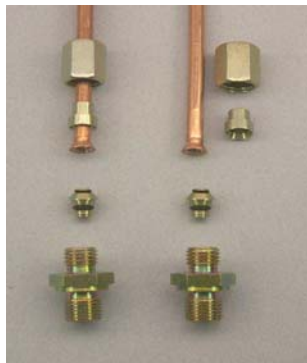
28-06-2005

SGB

Dimension/Drilling

Installation of screw connections

1 Flanged screw connection for flanged pipes

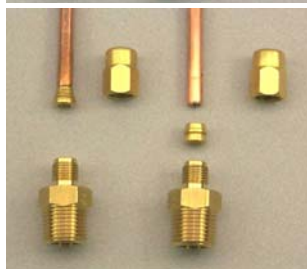


1. Oil o-rings
2. Place the intermediate ring loosely in the screw connection sleeve
3. Push the union nut and pressure ring over the pipe
4. Tighten the union nut by hand
5. Tighten the union nut until there is a noticeable increase in force
6. Final installation: Turn $\frac{1}{4}$ turn further

2 Clamping ring screw connection for plastic and metal pipes



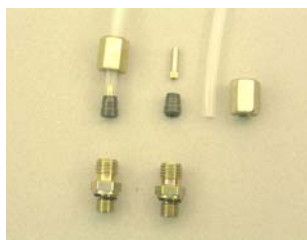
1. Insert support sleeve into the pipe end
2. Insert the pipe with support sleeve as far as it will go
3. Tighten nut of screw connection until stronger resistance can be felt
4. Tighten with $1\frac{3}{4}$ turns



3 Cutting ring screw connection for plastic and metal pipes



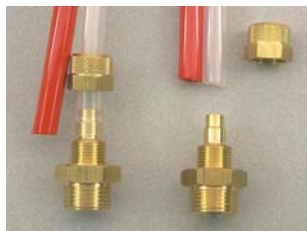
1. Insert the reinforcement sleeve into the end of the pipe
2. Drive in the reinforcement sleeve
3. Push the union nut and cutting ring over the end of the pipe
4. Screw the union nut on by hand until it noticeably rests in place
5. Press the pipe against its limit stop with internal cone
6. Tighten the union nut by approximately 1.5 turns (pipe must not turn)
7. Unfasten the union nut: check whether the pipe can be seen to protrude from the cutting ring. (not of significance if the clamping ring can be turned)
8. Tighten the union nut without applying increased force.





Installation of screw connections

4 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

5 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 screwdriver
Make sure that the clip is an even tight fit.

6 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.

EC DECLARATION OF CONFORMITY



We,

SGB GmbH
Hofstraße 10
57076 Siegen, Germany

hereby declare in sole responsibility that the leakage probes

DL(G) ../.

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

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

Number / short title	Satisfied regulations
2004/108/EC EMC Directive	EN 61 000-6-3: 2007 + A1: 2011 EN 61 000-6-2: 2005 EN 61 000-3-2: 2014 EN 61 000-3-3: 2013
2006/95/EC Low Voltage Directive	EN 60 335-1: 2012 EN 61 010-1: 2010 EN 60 730-1: 2011
94/9 EEC 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 EN 13 160-1-2: 2003 EN 13 463-1: 2009 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 06-2014

1. Distinct identification code of the product type:

Class I
Overpressure leak detector

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

DL xx / yy: Overpressure leak detector for containers,
with xx overpressure for alarm setting
with yy for alternative designs

DLG xx / yy: Overpressure leak detector with nitrogen as leak
detection medium for containers,
with xx overpressure for alarm setting
with yy for alternative designs

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

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

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

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

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

n/a

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

System 3

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

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

conducted a type approval test according to system 3 and is-
ssued the following test report:

Test report no.: PÜZ 8112235330



Declaration of Performance

8. Declared performance:

Essential features	Performance	Harmonised technical specification
Pressure switch point	Passed	EN 13160-2: 2003
Reliability	10,000 Cycles	
Pressure test	Passed	
Volume flow rate test in the alarm switch point	Passed	
Function and leak tightness of the leak detection system	Passed	
Temperature resistance	0°C .. +40°C	

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

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

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

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

Siegen, 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
fax: +49 271 48964-6
e-mail: sgb@sgb.de
web: www.sgb.de
