Over-Pressure Leakage Indicator
TYPE DLR - 8

Documentation DLR - 8

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SICHERUNGS**G**ERÄTE**B**AU GMBH
Hofstraße 10
57076 Siegen, Germany

Technical Control Board Department of tank and **TÜV®**
North Germany heating installations **North Germany**

Hamburg, 06.07.1995
2102-Möl/Me
File: 113 BL SGB
Order No. 113 BM 34710

Test certificate

for the construction type of a leakage indicator forming part of a leakage indicating device

1 Client

SGB Sicherungsgerätebau GmbH, Hofstrasse 10, 57076 Siegen

Order of 21.08.1991 from Mr. Berg

2 Subject

Leakage indicator for over-pressure as part of a leakage indicating appliance for double-walled pipelines for pumping non-inflammable liquids.

3 Details of the leakage indicator

3.1 Manufacturer

SGB Sicherungsgerätebau GmbH, Hofstrasse 10, 57076 Siegen

3.2 Type

"DLR-8/../.."

3.3 Area of application

- Pumping media

  Non-inflammable liquids which pose a water hazard and are approved for pumping in pipes manufactured by the company Georg Fischer + GF +.

- Monitoring areas of the following pipeline types
  - Double-walled pipelines made by the company Georg Fischer + GF +
    - ⇒ made of the materials PVC, PP, PE and PVDF
    - ⇒ with inner pipes with a nominal pressure rating of PN 10 and PN 16 and internal diameters from 20 to 110 mm

- for pumping pressures/operating pressures in the inner pipe of
  ⇒ a maximum of 3.0 bar with an outer pipe of nominal pressure rating PN 10
  ⇒ a maximum of 7.0 bar with an outer pipe of nominal pressure rating PN 16

3.4 Construction type

The leakage indicator for over-pressure is an appliance with pressure sensors for working pressure and alarm pressure, with display, operating and reporting features, solenoid valves for manual and automatic refilling of the working pressure and one connection each for the monitoring area, the inert gas refill system and a test coupling.

The leakage indicator feeds inert gas into the monitoring area from a pressure tank. The working pressure is at least 2.2 bar higher than the permissible pipe over-pressure.

The program of the leakage indicator permits two different operating modes:

1. Operating mode S (leakage indicators DLR-8/S/...)

   The working over-pressure is built up by pressure-controlled refilling from a permanently connected nitrogen pressure tank. If the working pressure in the monitoring area falls by 1.0 bar, a visual and acoustic alarm is automatically given.

2. Operating mode M (leakage indicators DLR-8/M/...)

   The working over-pressure is built up by pressing the filling button on a pressure tank which is only connected for the purpose of refilling the monitoring area.

   If the working over-pressure in the monitoring area falls by more than 1.0 bar within a year, a visual and acoustic alarm is automatically given.

   The respective operating mode S or M is adjusted manually by changing the cable assignment on the terminal rail of the pressure switch PUE-N in the leakage indicator.

   The current monitoring area pressure is displayed by a manometer on the front of the leakage indicator.

   Details of the construction type of the leakage indicator "DLR-8/../.." can be seen in the technical description issued by the company Sicherungsgerätebau GmbH.

4 Basis of test

Construction and test principles for leakage indicating devices for double-walled pipelines (BPG-LAGR)

5 Test documents

5.1 Technical description of the leakage indicator of type "DLR-8/../.." of 01.06.1992 issued by the company Sicherungsgerätebau GmbH with the accompanying bills of materials and drawings.

5.2 Specimen of the leakage indicator type "DLR-8/S/3"

6 Tests

Inspection of the technical description and the specimen of the leakage indicator of type "DLR-8/S/3" for conformity to BPG-LAGR.

As the leakage indicator can optionally be mounted outdoors in a weather protection cabinet with a clear lid conforming to DIN 40050 IP 55, the functional test of the leakage indicator according to BPG-LAGR was carried out at temperatures between -25°C and +70°C. For the test, operating mode S (permanently connected pressure tank with automatic refilling) with a working over-pressure of 5.2 bar was selected.

7 Test results

The technical description of the leakage indicator fulfils the construction requirements stipulated in BPG-LAGR. The components of the leakage indicator conform with the technical description and the drawings. The functional test of the leakage indicator provided positive results.

8 Evaluation

On the basis of the tests, there are no objections to issuing a test certificate. The functionality of the leakage indicator of type "DLR-8/../.." as part of a leakage indicating appliance for double-walled pipelines of the construction type stipulated under section 3.2 can be regarded as assured under the following conditions:

1. The leakage indicator must only be used for the double-walled pipelines produced by the company Georg Fischer +GF +.
2. - The leakage indicator of type "DLR-8/../3" must only be used on pipelines with a pumping and operating pressure of 3.0 bar
   - The leakage indicator of type "DLR-8/../7" must only be used on pipelines with a pumping and operating pressure of 7.0 bar

- The leakage indicator of type "DLR-8/M/.." (with a mobile over-pressure generator) must only be used if it is assured that no false alarms must be anticipated during a year.

3. The components of the leakage indicator must be identical with those specified in the test documents.
4. The correct manufacture of the leakage indicators must be supervised by the Sicherungsgerätebau GmbH company by self-monitoring in accordance with the construction and testing principles for leakage indication devices for double-walled pipelines.
5. Each leakage indicator must be permanently labelled
   with
   Manufacturer's name or signet
   Year of manufacture
   Production number
   Type designation
   Test certification mark
   Rated operating data
6. The leakage indicator must be mounted, adjusted and operated in accordance with the technical description.

(Signature)
Möller
Expert in the service of the
Technical Control Board (TÜV) North Ger-

Test documents
for the
leakage indicator type DLR-8/.../...

1. Technical description of the leakage indicator of 01.06.1992 Page 1 to 24

Appendix:

Drawings that go with the description Pages 1.1091 to 11.1091

1.1091	Rating plate
2.1091	Exterior view
3.1091	Interior view
4.1091	Single line system: operating mode S
5.1091	Ring pipe: operating mode S
6.1091	Multiple pipe system: operating mode S
7.1091	Single line system: operating mode M
8.1091	Ring pipe: operating mode M
9.1091	Multiple pipe system: operating mode M
10.1091	Circuit diagram
11.1091	Couplings of the connecting pipes

- Key to the abbreviations used Pages A.I and A.II

- Bill of materials Page A.III

2. Specimen of the leakage indicator DLR-8/.../...

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Leakage indicator DLR-8

List of contents of the technical description

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Technical description

of the leakage indicator type DLR-8/.../...

as part of a leakage indicating appliance

1 Subject

Leakage indicator for over-pressure systems as part of a leakage indicating appliance for double-walled pipelines for pumping non-inflammable liquids which are a water hazard.

2 Type

Leakage indicator type DLR-8/.../... (The exact type designation of the applicable leakage indicators dependent on the operating mode and pumping pressure can be determined by reference to point 4.1 (2) of this description)

3 Area of application

3.1 Pipelines

Double-walled pipes made by the company Georg Fischer +GF+ of types:

- Georg Fischer + GF + PVC/PE
- Georg Fischer + GF + PP/PE
- Georg Fischer + GF + PE/PE
- Georg Fischer + GF + PVDF/PE

for pumping pressures / operating pressures in the inner pipe of

- a maximum of 3.0 bar with an outer pipe with a nominal pressure of PN 6
- a maximum of 7.0 bar with an outer pipe with a nominal pressure of PN 10.

3.2 Liquid for pumping

Non-inflammable liquids which pose a water hazard and are approved for pumping in pipelines manufactured by the company Georg Fischer +GF+.

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4 Functional description

4.1 General functioning

(1) In double-walled pipelines equipped with the leakage indicator DLR-8/.../..., leakages in the pipeline walls under all operating conditions are indicated visually and acoustically by means of the fall in pressure.

The alarm signal from the leakage indicator is given, at the latest, at a pressure that is at least 1 bar higher than the pumping pressure of the working pipeline.

(2) The **necessary working over-pressure = rated pressure** in the monitoring area is created

- by **pressure-controlled refilling** from a nitrogen pressure tank which is **stationary** and connected to the monitoring area (**operating mode S**, leakage indicator DLR-8/S/...)

or

- by **mobile** pressure tanks which are **only connected during start-up and functional testing** (**operating mode M**, leakage indicator DLR-8/S/...)

Depending on the pumping pressure of the operating pipes, the pressures shown in tables 1 and 2 result:

Table 1: Rated and alarm pressures in bar, leakage indicator type

Leakage indicator type		DLR - 8 / S / 3 or DLR - 8 / M / 3	DLR - 8 / S / 7 or DLR - 8 / M / 7
Pumping pressure in the operating pipeline		≤ 3.0	≤ 7.0
Over-pressure in monitoring area	ALARM "ON"	$4.2\ ^{+0.1}/_{-0.2}$	$8.2\ ^{+0.1}/_{-0.2}$
	RATED pressure	$5.2\ ^{+0.1}/_{-0.1}$	$9.2\ ^{+0.1}/_{-0.1}$
Supply pressure at pressure reducing device		$5.7\ ^{+0.2}/_{-0.2}$	$9.7\ ^{+0.1}/_{-0.2}$
Nominal pressure rating, outer pipe		PN 6	PN 10

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The operating modes S or M must be determined or changed by means of the cable assignment on the terminal rail of the pressure switch PUE-N (cf. drawings No. 3.1091 and 10.1091).

Table 2: Rated and alarm pressures in bar, leakage indicator type

Leakage indicator type		DLR - 8 / S / 3 or DLR - 8 / M / 3	DLR - 8 / S / 7 or DLR - 8 / M / 7
SV 1	Trigger pressure	6.0 $^{+0.2}/_{-0.2}$	10.2 $^{+0.2}/_{-0.2}$
	Closing pressure at the latest	5,4	9,4
SV 2	Trigger pressure	10.2 $^{+0.2}/_{-0.2}$	14.2 $^{+0.2}/_{-0.2}$
	Closing pressure at the latest	9,5	13,5

(3) The over-pressure built up in the monitoring area of the double-walled pipeline is measured by means of the pressure sensors PUE-A and PUE-N which are linked with the monitoring area by connecting pipe VL. The current actual pressure in the monitoring area is displayed as a guidance value on the manometer which is integrated into the lid of the leakage indicator housing. For a precise measurement, a suitable separate measuring device must be connected to the test coupling PK.

(4) If the pressure in the monitoring system falls to the pre-set fixed alarm "ON" value because of a leakage, an alarm is triggered. This alarm is given visually by the red indicator lamp A and acoustically by the buzzer SU. The acoustic signal can be switched off by a switch T (sound off), which is sealed with an official seal during normal operation.

In the event of an alarm, there is a zero potential contact is made at the same time to enable the alarm signal to be used externally.

(5) To prevent the pumping medium from entering the monitoring area, all pumps must be switched off in the event of an alarm. This can also be carried out by zero potential contacts via the relay integrated in the leakage indicator if the appropriate connection terminals on terminal rail RA are wired.

(6) The safety valves SV1 (monitoring side) and SV2 (pressure reduction side) prevent excessive over-pressure from occurring in the system by means of the pre-set trigger pressures (cf. table 2).

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(7) The leakage indicator is designed for a mains voltage of 220 V 50 Hz alternating current. The green indicator lamp B (operation) lights up as soon as the electrical contact has been made.

(8) A brief failure of the supply voltage has no adverse consequences. After the end of the power failure, the leakage indicator automatically begins to operate again.

4.2 Function in operating mode S

In this operating mode, the over-pressure in the monitoring area is controlled by pressure-controlled refilling from a nitrogen pressure tank DS which is permanently connected to the monitoring area and has a subsequent pressure reducing device DM (cf. drawings No. 4.1091 to 6.1091).

The refilling of gas to build up the over-pressure is controlled by the pressure switch PUE-N.

If the over-pressure in the monitoring area falls by about 0.5 bar below the rated pressure, the solenoid valve NSM is opened via the pressure switch PUE-N, and the over-pressure is brought back to the rated pressure by refilling with a maximum of 100 litres/hr. via the regulating valve DR.

During the refilling process, the indicator light N ("automatic refilling") lights up, and it only goes off again when the solenoid valve NSM (refilling) has been closed.

By this means, a fall in pressure can be compensated as long as the alarm pressure has not yet been reached.

If the supply pressure of the compressed gas tank is not sufficient to restore the operating over-pressure (e.g. if the pressure tank is empty), the solenoid valve NSM remains open. A further fall in pressure triggers an alarm.

A leakage with a leakage rate of more than 100 litres/hr. leads to a fall in pressure which will trigger an alarm.

4.3 Function in operating mode M

Here, the monitoring area is subjected to over-pressure by a pressure tank which is not permanently connected and which has a subsequent pressure reducing device to the pressure defined in table 1 under "RATED pressure" (cf. drawings 7.1091 to 9.1091). The pressure reducing device must be set to the supply pressure prescribed in table 1.

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After the RATED pressure has been reached, the leakage indicator takes over the monitoring of the connected system as described under 4.1.

In the case of an alarm, the area must be refilled with inert gas from the pressure tank which is then connected, until the "RATED pressure" value prescribed in the leakage indicator (table 1) is reached.

High requirements must be placed on the leakproofing of the double-walled pipes monitored in order to ensure fault-free operation for a full year. If it is not possible to fulfil these requirements, a leakage indicator working in operating mode S must be used.

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5 Design of the leakage indicator

5.1 General structure

The leakage indicator consists of the housing which contains the following parts:

- Pressure sensor PUE-A to control the alarm signal
- Pressure sensor PUE-N to control automatic refilling
- Solenoid valve NSM for refilling via the regulating valve DR
- Solenoid valve FM for faster filling of the monitoring area, which can be addressed with the button FT "Fill" on the lid of the housing
- Regulating valve DR to limit the maximum refilling volume flow
- Manometer to show the current pressure (guidance value) in the monitoring area
- Non-return valves to preserve the pressure in the monitoring area even when the supply pressure is insufficient (e.g. empty compressed gas flask, change of flask)
- Connection fittings
- Terminal rail K for electrical connection
- Terminal rail RA (zero potential relay contacts)
- Electrical switching equipment
- Safety valves SV1 and SV2

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6 Installation instructions

6.1 Basic information

(1) The installation of the leakage indicating device with the leakage indicator DLR-8 must be carried out by a specialist company in accordance with § 191 of the WHG.

(2) **Leakage indicators with operating mode M must only be operated on double-walled pipelines installed underground. Operating mode S is permissible for operation with double-walled pipelines installed above ground and underground.**

(3) The relevant accident prevention regulations must be adhered to during installation.

6.2 Installation of the leakage indicator

(1) The installation of the indicator device should, as far as possible, take place in a closed and dry room not accessible to third parties. **The device must not be installed in explosion hazard zones**.

(2) If the indicator device is installed outdoors or in rooms which must be regarded as moist rooms in the sense of the VDE regulations, the indicator device must be fitted in a weather-proof protection cabinet with a transparent lid (DIN 40050 IP 55). In this case, an additional outdoor signal (signal horn) must be mounted in a suitable place.

(3) The indicator device is designed for wall mounting. The distance between the indicator device and the monitoring area must be kept as small as possible.

6.3 Electrical connections

(1) The indicator device is designed for an electrical connection of 230 V - 50 Hz alternating current. The connection is made to the designated terminal on terminal rail K. Plug-in or switching connections are not permissible.

(2) The local regulations of the electricity supply company and the VDE must be adhered to.

(3) An additional outdoor signal for fault indication is connected to the terminals on terminal rail K which are marked in the leakage indicator. The power consumption of the outdoor signal must not exceed 50 VA.

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(4) To control or switch off pumps in the event of an alarm, the zero potential relay contracts can be wired with the connection terminals of terminal rail RA. The maximum permissible switching contact load of 220 V / 16 A must be observed.

6.4 Connection of the connecting pipes

(1) The connecting pipe VL between the leakage indicator and the monitoring area of the double-walled pipeline and the refilling pipe NSL (only in operating mode S) must be made of seamless drawn copper piping in accordance with DIN 17671 page 1, of metal precision pipes or plastic pipes, all designed for the pressure rating PN 25.

The pipes must have a clear internal diameter of at least 4 mm and a wall thickness of at least 1 mm.

For pipes mounted less than 30 cm below the ground and for pipes mounted above ground outdoors, the dimensions of the connecting pipe must be increased to 8 x 1 mm.

(2) Care must be taken to ensure that the full pipe diameter is preserved throughout the length of the pipe. Dents and folds in the pipe are not permissible.

(3) The couplings of the connecting pipes VL and the refill pipe NSL to the leakage indicator and to the monitoring area must be carried out as in drawing No. 11.1091.

(4) The assembly regulations of the manufacture of the double-walled pipelines remain unaffected.

(5) The test valve PV and other fittings in the connecting pipes must be designed for pressure rating PN 25.

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7 Commissioning of the leakage indicator and the leakage indicating device

7.1 General

(1) The leakage indicator has been subjected to a leakproofing test in the manufacturer's factory with the over-pressure defined in table 1 as the "RATED pressure". The leakproofing test on the building site can therefore be dispensed with.

(2) By means of the connecting pipe VL, the leakage indicator must be connected with a pressure-tight connection to the monitoring area of the double-walled pipeline, and it must also be connected with a pressure-tight connection by means of the refill pipe NSL to the pressure tank used to refill the monitoring area - depending on the operating mode.

(3) Then the electrical connection is established. The green indicator light "Operation" (B) and the right indicator light "Alarm" (A) light up, the acoustic alarm sounds. The acoustic signal can be switched off with the T ("Sound off") switch. In operating mode S, the yellow indicator light "automatic refilling" also lights up.

(4) The pressure reducing device used should have an adjustment range of 10 bar.

7.2 Commissioning in operating mode S (leakage indicator DLR-8/S/.)

(1) **In the factory** the leakage indicator DLR-8/S/. is set to operating mode S.

(2) After opening the flask shut-off valve FAV on the compressed gas flask, N_2 inert gas flows via the permanently connected refilling pipe NSL to the solenoid valves NS and F in the leakage indicator.

(3) In the pressure reduction device DM in the pressure tank, the reducing valve must be set to the supply pressure values stipulated in table 1.

The setting of the pressure reducing device must be checked shortly before completing the filling procedure (reaching the RATED pressure).

A rise in pressure in the pressure reducing device which occurs after the completion of the filling procedure has not negative effects on the monitoring system. When a solenoid valve is opened again (for automatic refilling), the pressure in the pressure reducing device falls again to the pre-set value.

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The safety valve SV2 in the leakage indicator is set to a trigger pressure according to table 2 in order to avoid prohibited over-pressure coming from the pressure tank.

(4) The solenoid valve NSM is opened by the pressure switch PUE-N, the indicator light N lights up.

(5) To open the solenoid valve FM, the filling button FT "ON" must now be pressed. Then the filling process via the two solenoid valves NSM and FM begins. When the switching point for alarm "OFF" is reached, the visual and acoustic alarm signals are deleted. When the rated pressure is reached, the solenoid valves NSM and FM are closed and the indicator lights N and F go off. The leakage indicator now goes into normal monitoring mode, refilling only occurs by pressure control via the solenoid valve NSM with the subsequent regulating valve. Further filling with the filling button FT is no longer possible.

(6) If the switching point for alarm "OFF" (to delete the acoustic and visual alarm signals) and the RATED pressure (to switch off indicator lights F and N) are not reached, the cause of the fault must be identified and remedied (empty pressure tank, leakages in the system). Then the filling process must be resumed.

(7) After the rated pressure has been reached, a leakproofing test for the entire system must be carried out. All joints and connections on the leakage indicator, the pressure tank and the monitoring area must be checked for the tightness of the seal with a gas detecting agent.

The over-pressure built up in the system, which can be read on the connected test manometer, must not visibly fall within 120 minutes. Any identified leakages must be remedied and the leak-proofing test must be repeated after the over-pressure has been built up again.

(8) After the leakproofing test has been carried out, a functional test in accordance with section 8.3 must be carried out.

7.3 Commissioning in operating mode M (leakage indicator DLR-8/M/.)

(1) **In the factory** the leakage indicator DLR-8/M/. is set to operating mode M.

(2) A mobile pressure tank with a pressure reducing device and an integrated safety valve is connected to the connection coupling AVK of the leakage indicator with a high pressure hose. The reducing valve of the pressure reducing device must be set according to table 1 to prevent forbidden over-pressure in conjunction with safety valve SV2 in the monitoring system.

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(3) After opening the flask shut-off valve FAV on the compressed gas flask, inert gas flows via the pressure hose to the solenoid valves FM and NSM in the leakage indicator.

(4) The solenoid valves NSM and the indicator light N are not activated in this operating mode.

(5) To open the solenoid valve FM, the filling button FT must be pressed.

(6) As in operating mode S, the visual alarm signal only goes off after the pressure value for alarm "OFF" has been reached. The solenoid valve FM closes after the rated pressure is reached and the indicator light F goes off.

(7) To carry out the leakproofing test for the entire system, the pressure tank DS must now be disconnected from the connecting coupling AVK.. All joints and connections on the leakage indicator and the monitoring area must be checked for the tightness of the seal with a gas detecting agent.

The over-pressure built up in the system, which can be read on the connected test manometer, must not visibly fall within 120 minutes. Any identified leakages must be remedied and the leakproofing test must be repeated after the over-pressure has been built up again.

(8) After the leakproofing test has been carried out, a functional test in accordance with section 8.3 must be carried out.

(9) In order to **switch the function of the leakage indicator from operating mode M to operating mode S**, the cable of terminal N on the terminal rail on pressure switch PUE-N must be clamped to terminal 4 (cf. drawings 3.1091 and 10.1091).

Before this is done, the leakage indicator must be disconnected from the power supply!

After the operating mode has been changed, it must be ensured that the rating plate corresponds to the respective operating mode.

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8 Operating instructions

8.1 General information

(1) After leak-proof and correct installation of the leakage indicator device (monitoring area, connection pipes and leakage indicator), it can be assumed that the leakage indicator will normally work without defects for at least one year.

(2) Even minor leakages in the monitoring system in systems operated in operating mode M lead to an alarm signal if the system is not refilled with inert gas.

(3) In systems operating in operating mode S, a fall in pressure due to leakages only leads to an alarm if the fall in pressure cannot be compensated by the pressure-controlled refill procedure.

(4) In the event of an alarm, the cause must be quickly determined and remedied.

8.2 Maintenance

(1) The leakage indicator DLR-8/./. must be checked for functionality **once per year** by a competent employee of a specialist company or the operating company.

(2) The scope of the annual functional check is based on 8.3.

(3) It must also be checked whether the conditions in section 6 are still met.

(4) In every case,

- the test valves at the end of the double-walled pipeline must be checked for the tightness of the seal and for freedom from dirt, and
- it must be checked whether the pressure tank is still sufficiently full of inert gas.

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8.3 Functional test of the leakage indicating device

Tests of the functional and operating reliability must be carried out

- after every start-up
- in accordance with section 8.2 at the intervals specified there and
- every time a fault is remedied.

The fall in pressure for functional testing must **always** be achieved by means of the test valve(s) PV situated at the end of the double-walled pipeline. The fall in pressure must be monitored on the manometer of the leakage indicator and also via a separate test measuring instrument which is connected to the test coupling PK of the leakage indicator. In this way, every functional test also includes a test of the free passage between the end of the monitoring area(s) and the pressure switches of the leakage indicator

The functional test must be carried out **at least to the following extent**:

(1) Via the test valve(s) PV situated at the end of the double-walled pipeline(s), the monitored system must be **slowly** vented so that the fall in pressure enables the switching value of the pressure switch for the solenoid valve "OPEN" and a further fall in pressure enables the switching point for alarm "ON" to be read on the manometer of the leakage indicator. To check the reading, a measuring instrument with a class accuracy of at least 1.6 and a scale of up to 16.0 bar must be connected to the test coupling of the leakage indicator.

(2) The visual and acoustic alarm signal of the leakage indicator is observed, and the acoustic alarm is switched off by pressing the switch T ("Sound off").

The alarm signal must be triggered at the pressure values stipulated in table 1.

(3) After the alarm has been observed, the test valve must be closed again and the over-pressure must be built up again in accordance with section 7.2 paragraphs (4) to (5) for operating mode S and section 7.3 paragraphs (2) to (6) for operating mode M until the required "RATED pressure" is reached.

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(4) The leakage indicator returns to normal operation and takes over its monitoring function.

(5) The fittings and system parts that are necessary for operation must be checked for functional reliability and operational safety. The housing of the leakage indicator must be sealed with an official seal.

(6) A report must be drawn up on the test.

8.4 Pressure test of the double-walled pipeline

The pressure test of the monitoring area of the double-walled pipeline is necessary **on the building site**. The scope of this pressure test is based on the specifications in the approval for the pipeline construction used. The specialist company responsible for laying the double-walled pipeline must issue the specialist company fitting the leakage indicator written confirmation of the successfully completed pressure test for the monitoring area of the double-walled pipeline in the form of a test report before work begins on installing the leakage indicator.

8.5 Alarm

(1) In the event of an alarm, the red indicator light A lights up and the acoustic signal sounds both in operating mode S and operating mode M.

(2) Remove the lead seal on the "sound off" switch T, switch off the acoustic signal and immediately notify the installation company.

(3) Any pumping medium pumps which are not controlled by the leakage indicator must be switched off manually.

(4) The specialist employed by the specialist company or the operating company must determine and remedy the cause of the alarm, then restart the leakage indicating device according to section 7.2 for operating mode S or 7.3 for operating mode, and then subject it to a functional test in accordance with section 8.3.

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Hamburg, 08.7.92 (Signature)
Technical Control Board (TÜV) North Germany
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SGB Sicherungsgerätebau GmbH
57076 Siegen

OVER-PRESSURE LEAKAGE INDICATOR TYPE PA - VI....

DLR - 8

Year of manufacture

Manufacturing No.

Rated performance details: 230 V - 50 Hz - 30 W (without outdoor signal)

CE

Operation: The green operating indicator lamp must always be on.

Alarm: If the red alarm lamp lights up, remove the lead seal on the alarm switch, switch off the acoustic signal and notify the installation company.

Maintenance: The leakage indicator must be checked for functionality and reliability of operation once per year by a competent person from a specialist company or the operating company.

OPERATION	Manual filling	**ALARM**	Automatic REFILLING

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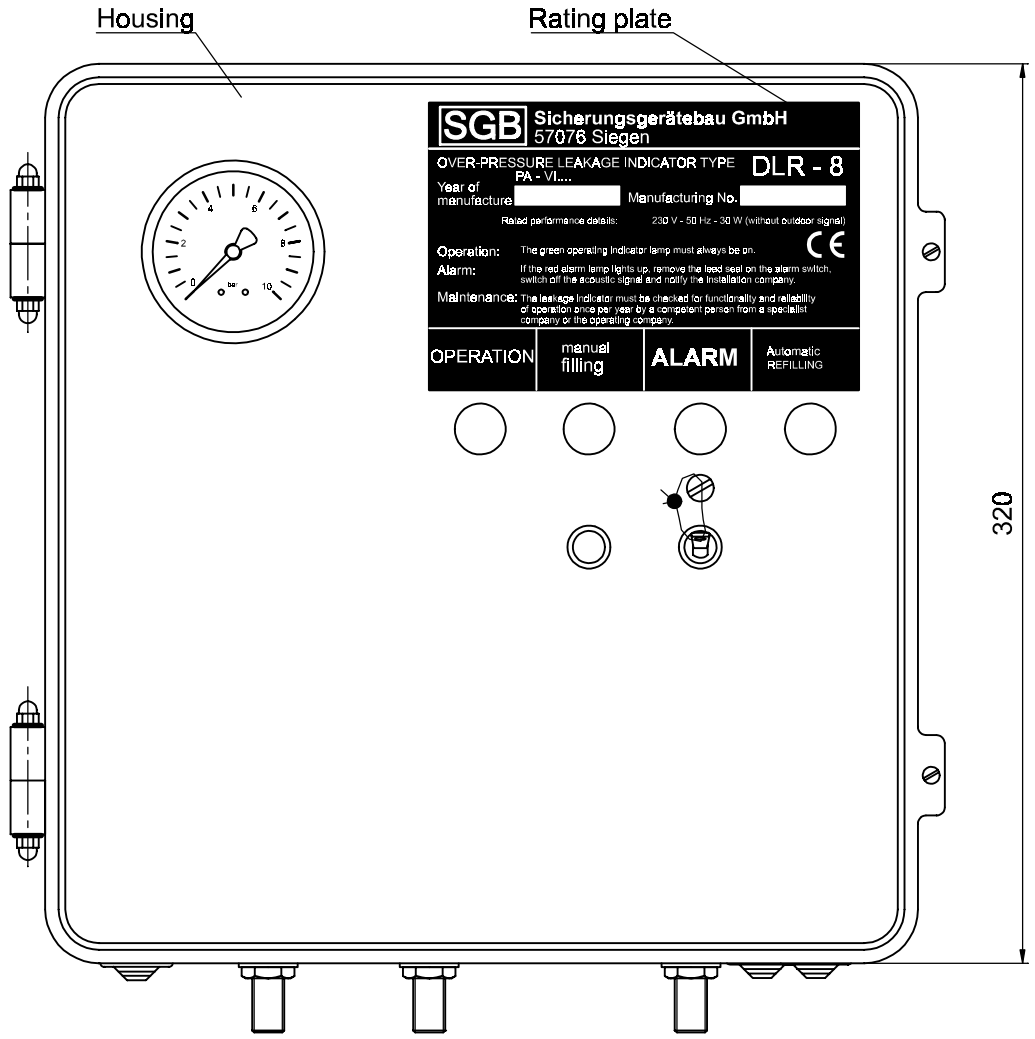
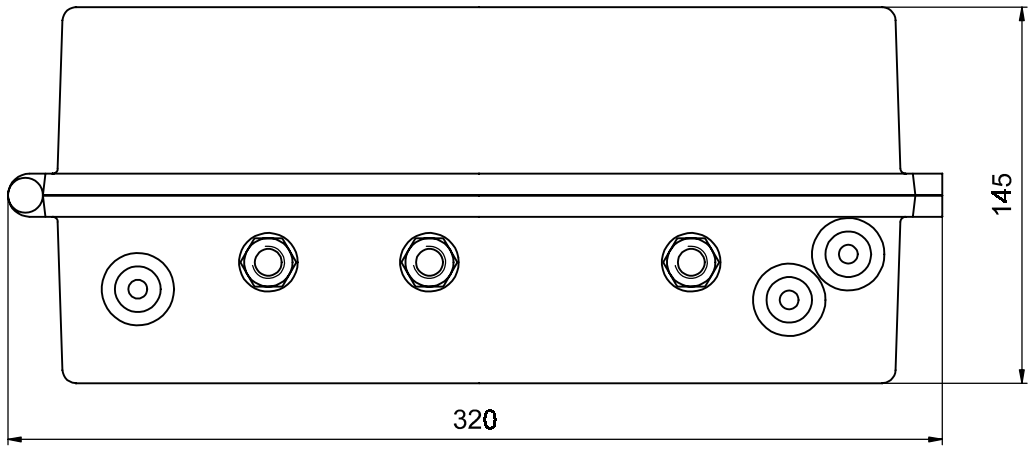
M.:	**Overpressure Leakage Indicator DLR - 8**	SGB Sicherungsgeräte-bau GmbH 57076 Siegen
Date: 5. Dezember 2002		
Page: 1.0593	**Rating plate**	





Dimensions in mm

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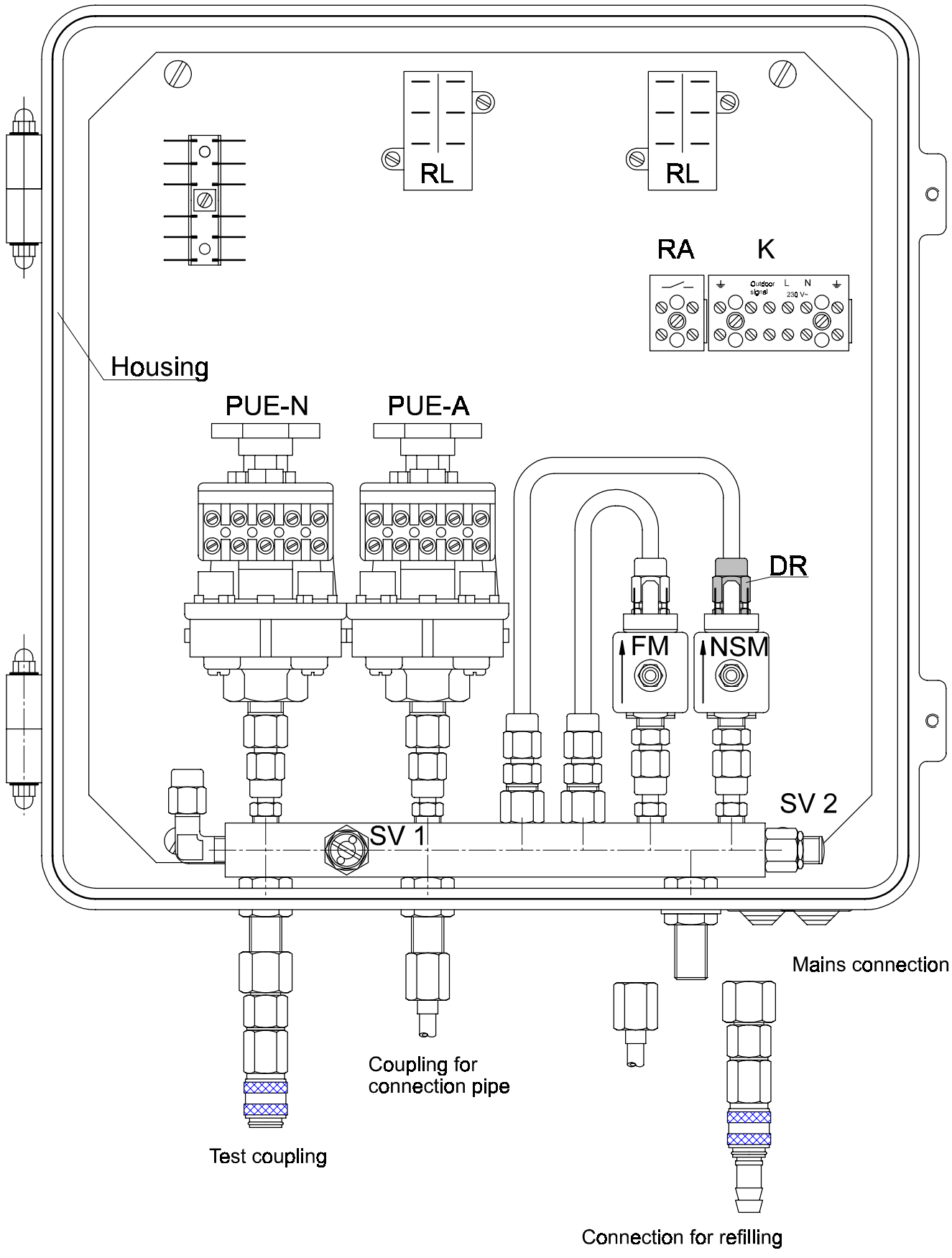
M.:	**Overpressure Leakage Indicator DLR - 8**	SGB Sicherungsgeräte-bau GmbH 57076 Siegen
Date: 5. Dezember 2002		
Page: 2.0593	**Exterior view**	



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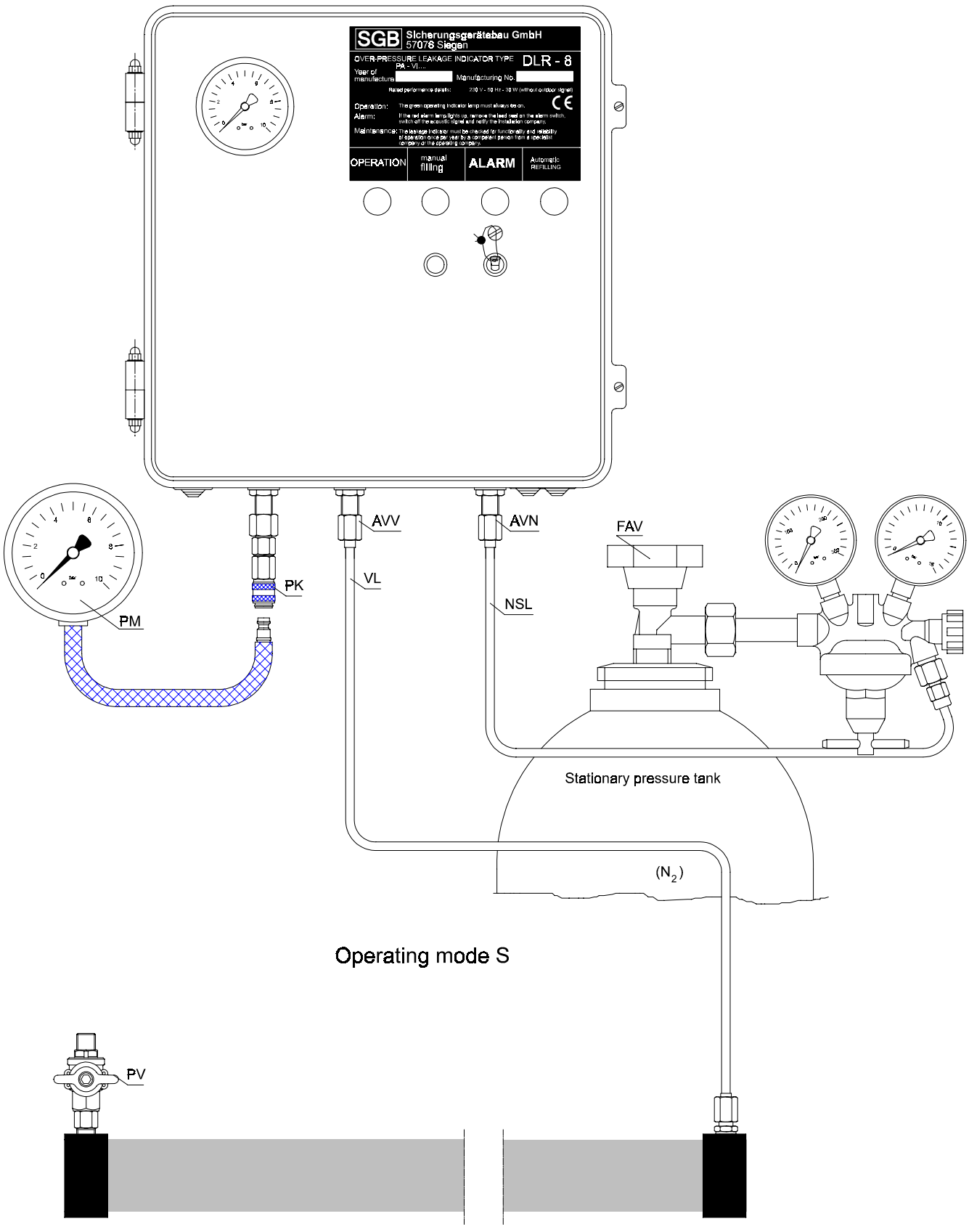
M.:	**Overpressure Leakage Indicator DLR - 8**	SGB Sicherungsgeräte-bau GmbH 57076 Siegen
Date: 5. Dezember 2002		
Page: 3.0593	**Interior view**	



Operating mode S

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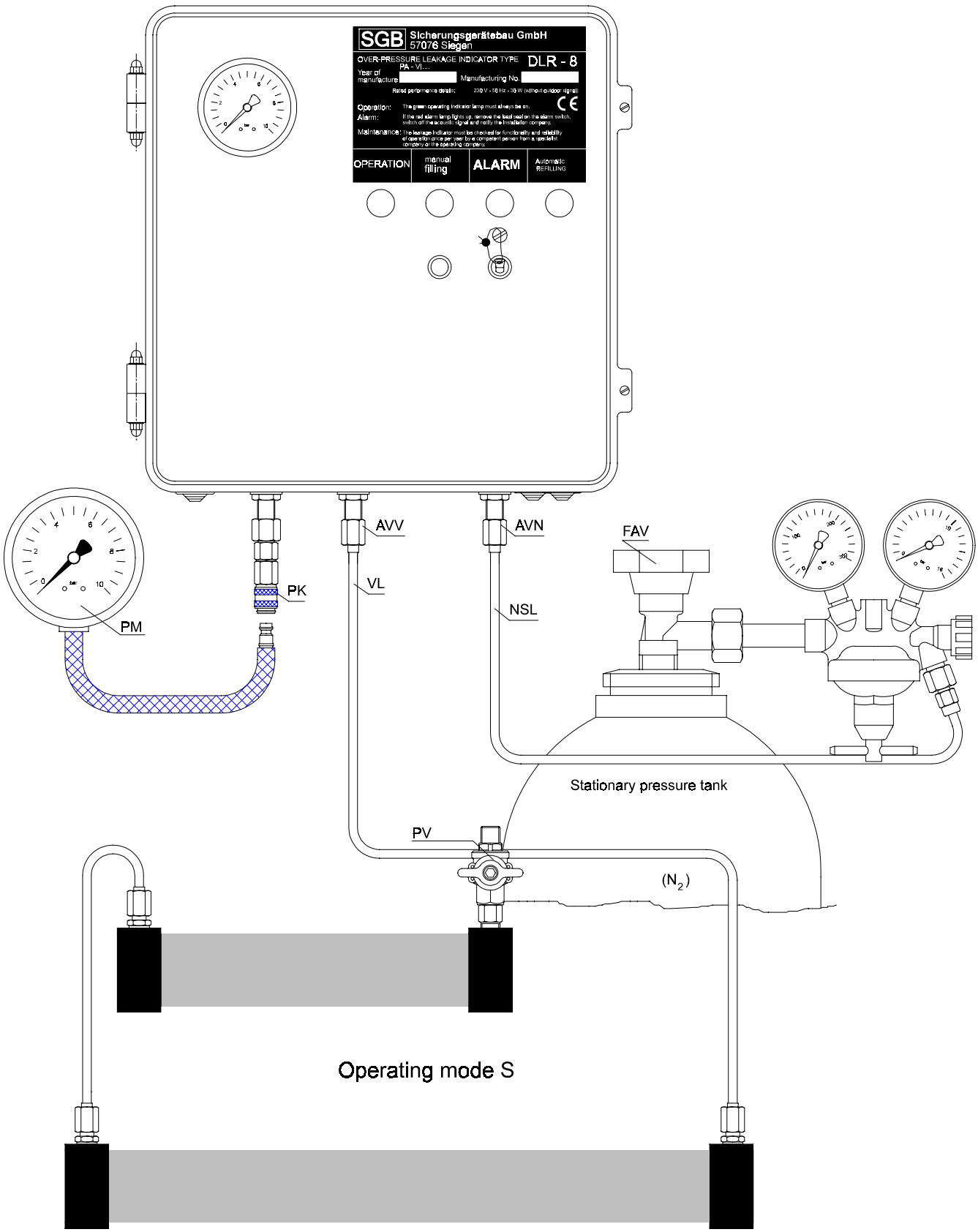
M.:	**Overpressure Leakage Indicator DLR - 8**	SGB Sicherungsgeräte-bau GmbH 57076 Siegen
Date: 5. Dezember 2002		
Page: 4.0593	**Single line system, operating mode S**	



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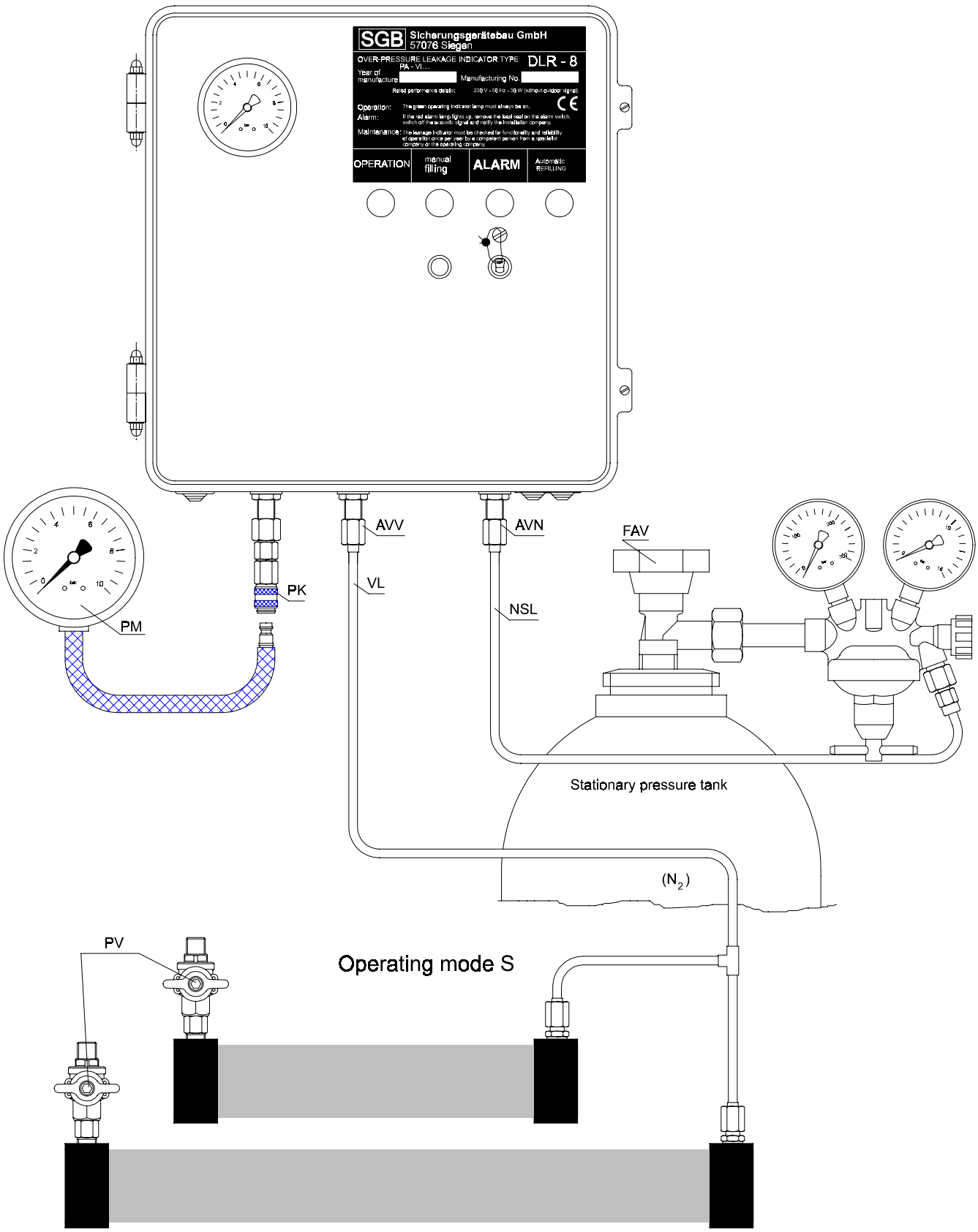
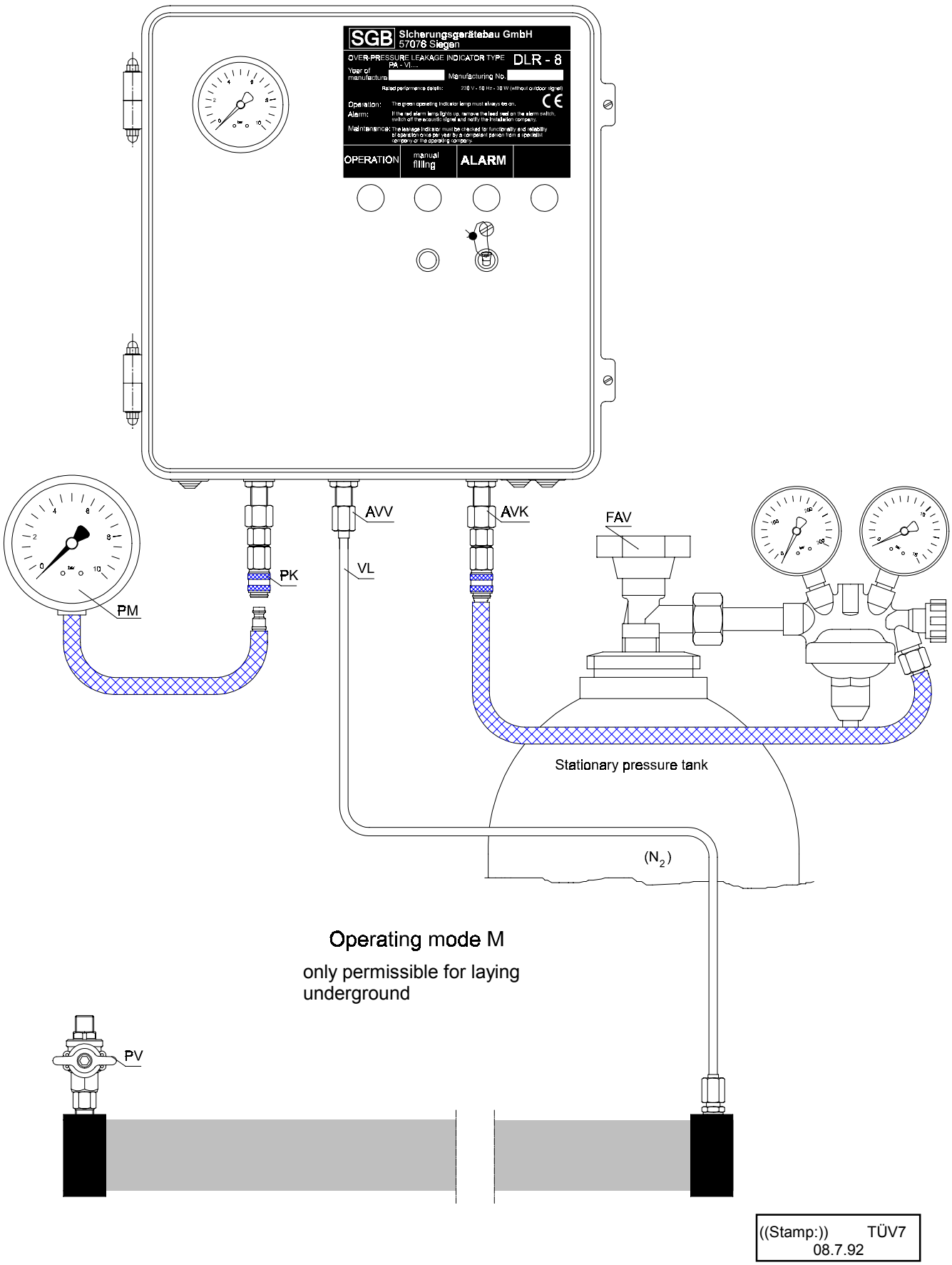
M.:	**Overpressure Leakage Indicator DLR - 8**	SGB Sicherungsgeräte-bau GmbH 57076 Siegen
Date: 5. Dezember 2002		
Page: 5.0593	**Ring pipe, operating mode S**	



((Stamp:)) TÜV7
08.7.92

M.:	**Overpressure Leakage Indicator DLR - 8**	SGB Sicherungsgeräte-bau GmbH 57076 Siegen
Date: 5. Dezember 2002		
Page: 6.0593	**Multiple pipe system, operating mode S**	



Operating mode M

only permissible for laying underground

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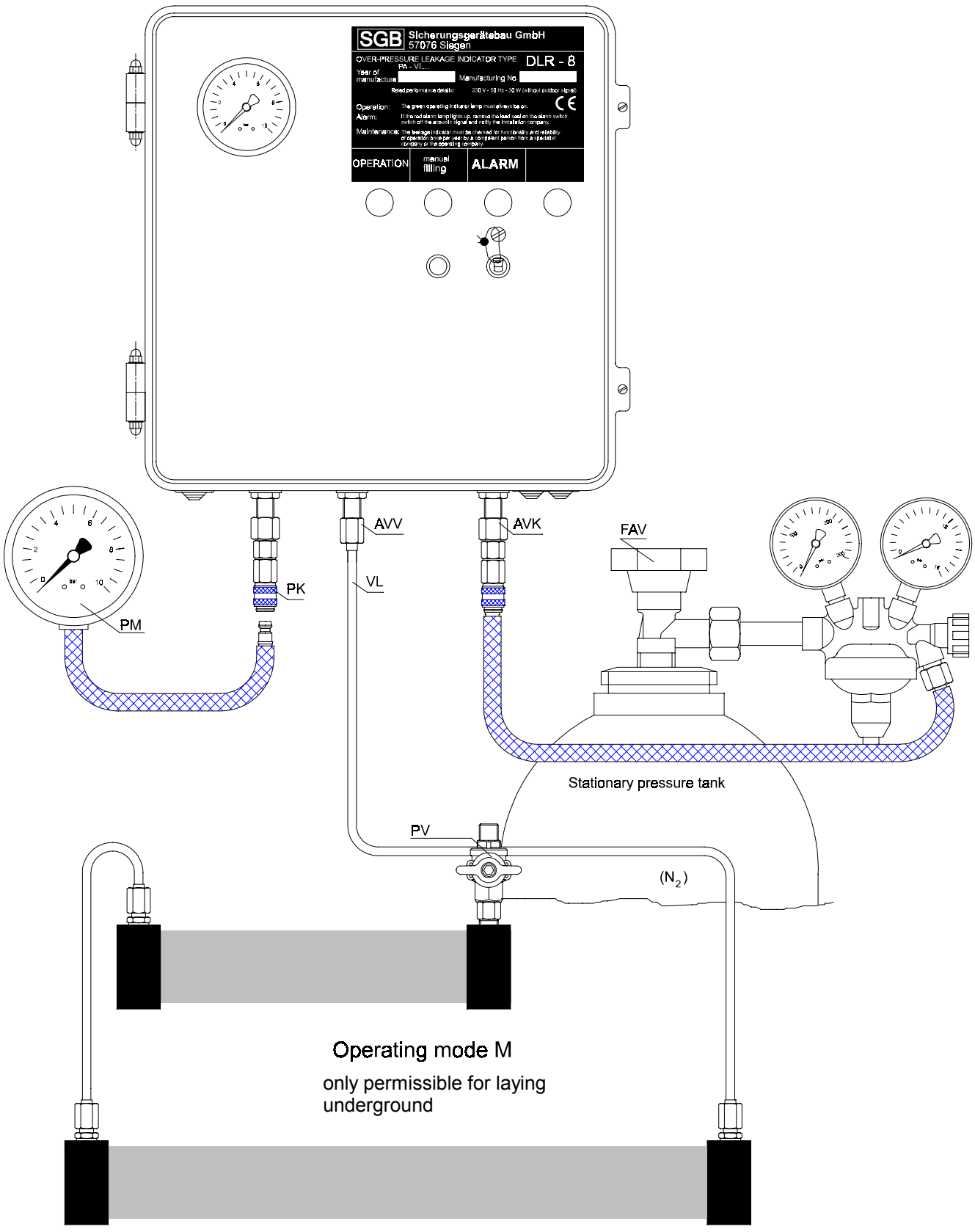
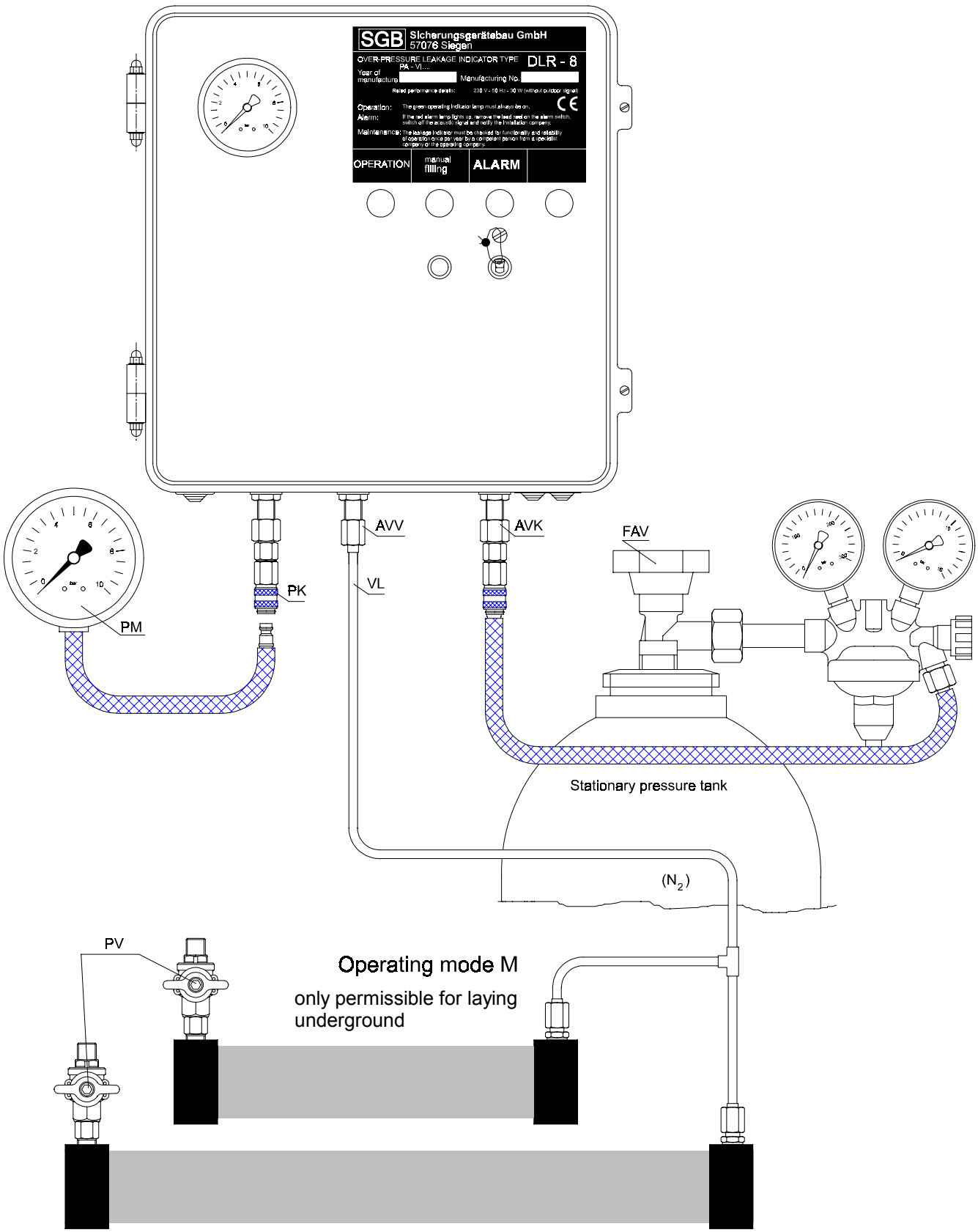
M.:	**Overpressure Leakage Indicator DLR - 8**	SGB Sicherungsgeräte-bau GmbH 57076 Siegen
Date: 5. Dezember 2002		
Page: 7.0593	**Single line system, operating mode M**	



M.:	**Overpressure Leakage Indicator DLR - 8**	SGB Sicherungsgeräte-bau GmbH 57076 Siegen
Date: 5. Dezember 2002		
Page: 8.0593	**Ring pipe, operating mode M**	



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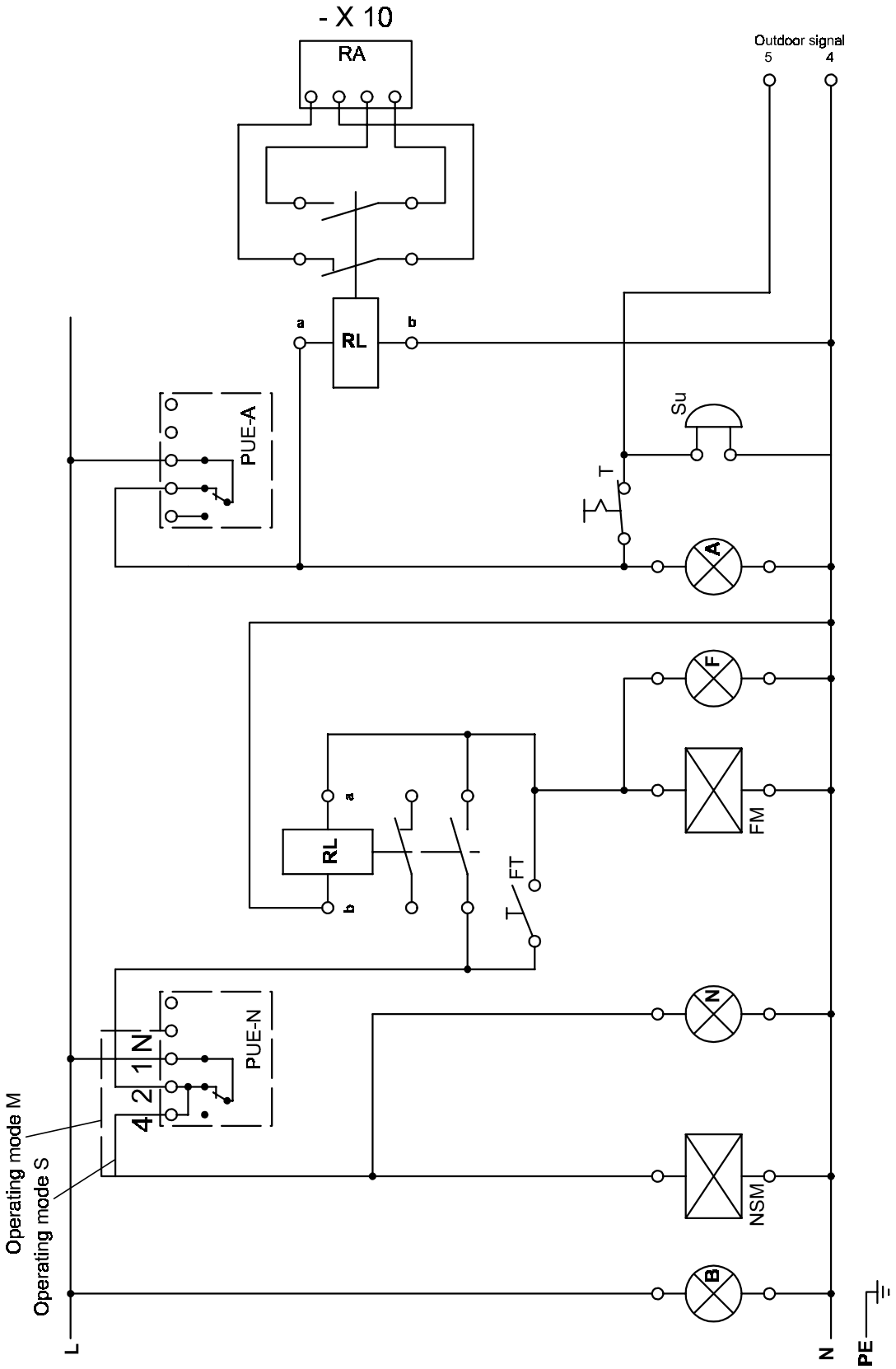
M.:	**Overpressure Leakage Indicator DLR - 8**	SGB Sicherungsgeräte-bau GmbH 57076 Siegen
Date: 5. Dezember 2002		
Page: 9.0593	**Multiple pipe system, operating mode M**	



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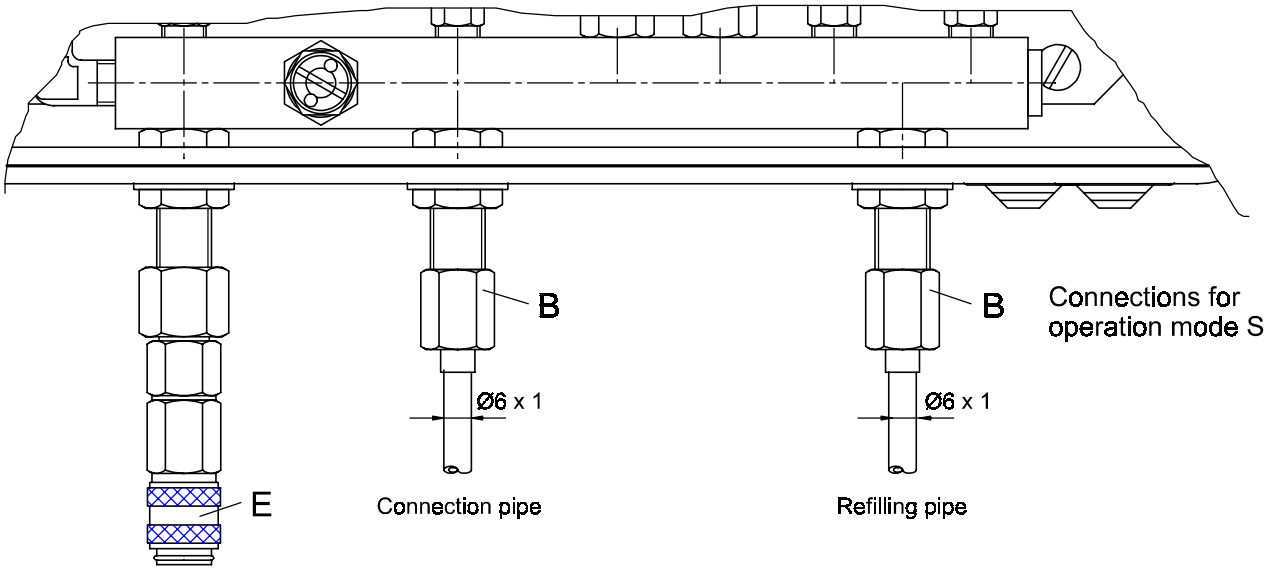
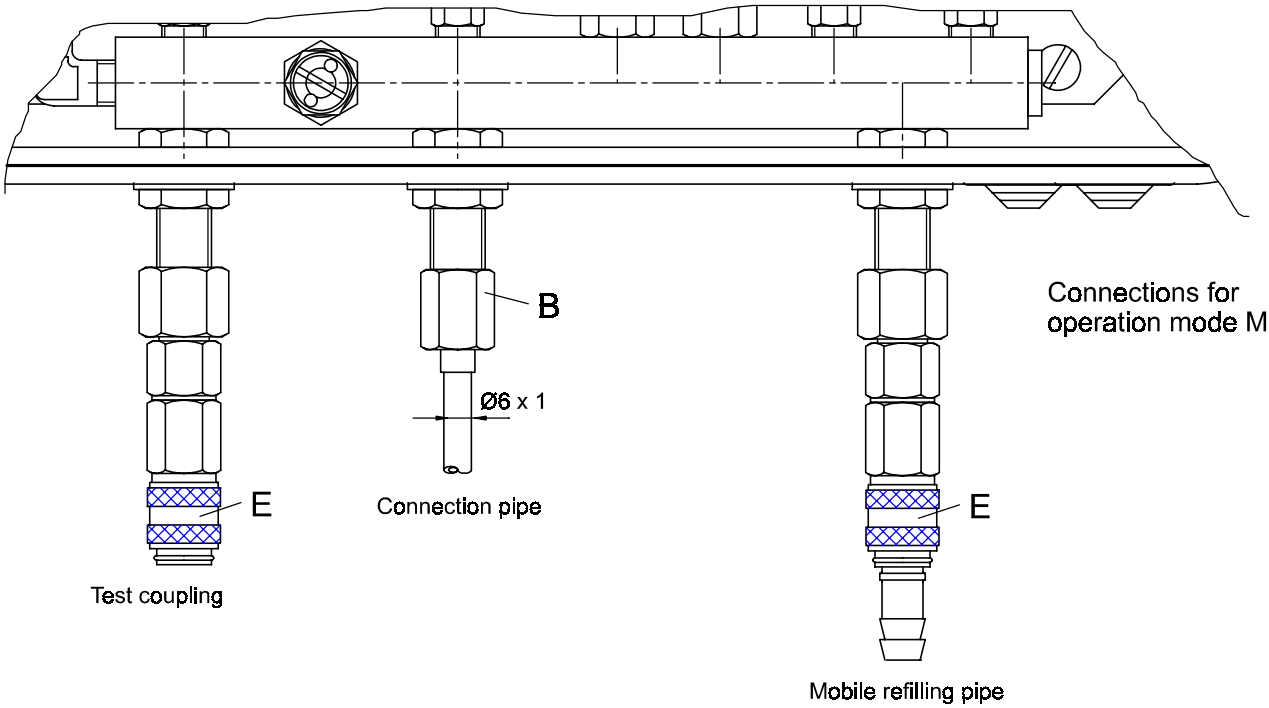
M.:	**Overpressure Leakage Indicator DLR - 8**	SGB Sicherungsgeräte-bau GmbH 57076 Siegen
Date: 5. Dezember 2002		
Page: 10.0593	**Circuit diagram**	



Connections for operation mode S

B = Flanged scew joint
E = Hose insertion coupling

For double walled pipelines laid less than 30 cm below ground or above ground level and outdoors, the dimensions of the connection pipes must be increased to 8x1 mm



Connections for operation mode M

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M.:	**Overpressure Leakage Indicator DLR - 8**	SGB Sicherungsgeräte-bau GmbH 57076 Siegen
Date: 5. Dezember 2002		
Page: 11.0593	**Couplings of the connecting pipes**	

A.1 Key to the abbreviations used

A	"Alarm" indicator light, red
AVK	Connection coupling, refilling pipe
AVN	Connection, refilling pipe
AVV	Coupling, connection pipe
B	"Operation" indicator light, green
DM	Pressure reducing device
DR	Regulating valve
DS	Pressure tank
F	"Fill" indicator light, yellow
FAV	Flask shut-off valve
FM	Solenoid valve for faster filling of the pipeline
FT	Filling button
G	Housing
K	Terminal rail
N	"Automatic refill" indicator light, yellow
NSM	Solenoid valve for refilling
NSL	Refilling pipe from pressure tank to leakage indicator
PK	Test coupling
PM	Test measurement instrument
PUE-A	Pressure switch to control the alarm signal
PUE-N	Pressure switch to control refilling
PV	Test valve
RA	RA terminal strip, zero potential relay contacts
RL	Relay
RSP	Non-return valve
SV1	Safety valve 1
SV2	Safety valve 2
T	"Sound off" switch
SU	Buzzer
VL	Connecting pipe between leakage indicator and pipeline

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A.2 Bill of materials for leakage indicator DLR-8

Index	Component	Designation / material	Manufacturer
A	Indicator light	Glow lamp 220 V, red	Hurst+Schröder, any suitable
B	Indicator light	Glow lamp 220 V, green	Hurst+Schröder, any suitable
Dr	Regulator valve	Type 3, for DLR-8/./3 Type 7, for DLR-8/./7	SGB
F	Indicator light	Glow lamp 220 V, yellow	Hurst+Schröder, any suitable
FM	Solenoid valve	MA 222-001 P-27	Staiger, any suitable
G	Device housing	320 x 320 x 145 mm, GfK, IP 43 acc. to DIN 40050	SGB
K	Terminal rail	Polyamide 6.6, 6 pins	Standard
M	Manometer	111.10/0 - 10 bar 111.10/0 - 16 bar	Wika, any suitable
N	Indicator light	Glow lamp 220 V, yellow	Hurst+Schröder, any suitable
NSM	Solenoid valve	MA 222-001 P-27	Staiger, any suitable
RA	Relay	E 3252	Eichhoff, any suitable
RSP	Non-return valve	SO. 41121	Jacob, any suitable
T	Alarm switch	Toggle switch 1620-0401	Marquardt, any suitable
PUE-A	Pressure switch	MSC11/MSC22	Klöckner, Möller, any suitable
PUE-N	Pressure switch	MSC11/MSC22	Klöckner, Möller, any suitable
SU	Buzzer	E 2772, BV01	Eichhoff, any suitable
SV1/SV2	Safety valve	3-7 bar / 6-12 bar	Riegler, any suitable

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