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Operating Manual

Leak Detector

Model: LAD-10

Art. No.: 43678, 43778, 43779

Type approval certificate: 01/PTB/III B/S 2104
General building regulation approval: Z-65.23-3

- ☞ Read before use!
- ☞ Observe all safety instructions!
- ☞ Retain for future use!

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1 Safety

1.1 Danger in using the unit

The LAD 10 leakage indicator is a state-of-the-art instrument which meets recognised safety regulations.
Each leakage indicator is checked thoroughly before delivery to ensure correct performance and a high level of safety. The leakage indicator will function reliably in operation if used correctly.
The leakage indicator may only be operated if it is in perfect condition and if the requirements of this Operating Manual have been complied with.
Incorrect operation or misuse can result in

- ➢ personal injury or loss of life,
- ➢ damage to the unit or other property,
- ➢ the incorrect functioning of the unit.

Everyone involved in the installation, commissioning, operation, maintenance and repair of the unit must:

- ➢ be appropriately qualified,
- ➢ comply precisely with this Operating Manual and
- ➢ comply with recognised regulations governing occupational safety.

It is your safety which is at stake!

1.2 Safety information and tips

This Operating Manual uses the following symbols:

DANGER!
Highlights an immediate danger.
Death or severe personal injury can result if the relevant steps are not taken.

WARNING!
Highlights a situation which could be dangerous.
Death or severe personal injury can result if the relevant steps are not taken.

CAUTION!
Highlights a situation which could be dangerous.
Minor injuries or damage to property can occur if the relevant steps are not taken.

IMPORTANT!
Provides tips and other useful information.

1.3 Correct use

The LAD 10 leakage indicator for pressurised systems with an alarm overpressure of 465 mbar must only be used for indicating leaks in the following **tanks** which are used under atmospheric conditions, i.e. depressurised, for above-ground and underground storage of the following liquids:

- ➢ Double-walled tanks complying with DIN 6608, 6616 Form A, 6619,6623, 6624 without leakage indication liquid in the monitoring chamber, groundwater levels of up to 1450 mm above the crown of the tanks being permissible.
- ➢ Double-walled tanks for storing non-combustible, water-endangering liquids.
- ➢ Double-walled tanks for storing combustible liquids in accordance with §12 of the VbF.

The LAD 10 leakage indicator is only suitable for the above tanks and for storing the following **liquids**:

- ➢ Combustible liquids (mineral oil products) of danger classes AI, AII, AIII and B.
- ➢ Non-combustible, water-endangering liquids which are stored in compliance with DIN 6601 in tanks as per 3.1 and which do not exceed the following densities for the following tank diameters / heights:

Tank diameter / height:	Permissible density of stored liquids:
≤ 2.00 m	≤ 1900 kg/m3
≤ 2.50 m	≤ 1740 kg/m3
≤ 2.60 m	≤ 1670 kg/m3
≤ 2.76 m	≤ 1580 kg/m3
≤ 2.84 m	≤ 1530 kg/m3
≤ 2.90 m	≤ 1500 kg/m3

IMPORTANT!
The tank monitoring chamber must be sufficiently resistant to the stored liquid.

The leakage indicator must not be used for any other purposes!

Any "DIY" conversions or changes to the product can result in substantial safety risks and are therefore prohibited for safety reasons!

Afriso-Euro-Index shall not be liable for any injury or damage resulting therefrom or for injury or damage resulting from improper use.

WARNING!
The leakage indicator is connected to mains voltage (230 V, 50 Hz).
This can cause serious burns and can even kill.
Do not bring the leakage indicator into contact with water.
Always disconnect the power supply before opening the leakage indicator.
Do not perform any adjustments to the leakage indicator.

Important!
The operating, maintenance and repair requirements set out in this Operating Manual must be strictly observed.

1.4 Dangers resulting from accessories

Add-on units for forwarding the output signal must only be installed by an appropriately trained electrical expert.

1.5 Emissions

The A-weighted sound level of the audible alarm is at least 70 dB(A) at a distance of one metre.

1.6 Sources of danger

The leakage indicator is connected to mains voltage (230 V, 50 Hz).
These voltages can cause very severe burns. Persons coming into contact with this voltage can be killed.
Before opening the leakage indicator and / or performing maintenance or cleaning work, always disconnect the power supply (disconnect the fuse)!
Do not use the leakage indicator in explosion-hazard areas. Any sparks occurring in such areas can result in fire or explosions.

The leakage indicator must only be used:
➢ for the purpose intended,
➢ in a safe state.
Malfunctions which put safety at risk must be eliminated immediately!

1.7 Qualified operators

The leakage indicator may only be installed and operated by properly trained personnel.
Work on electrical parts may only be performed by electricians with appropriate qualifications.
Apprentices and trainees must be supervised by experienced personnel. The installer must ensure that the operator has access to the Operating Manual.
The installer and operator must have read and understood the Operating Manual before they start their work.
The operator must be at least 16 years old.

1.8 Safety measures at the installation site

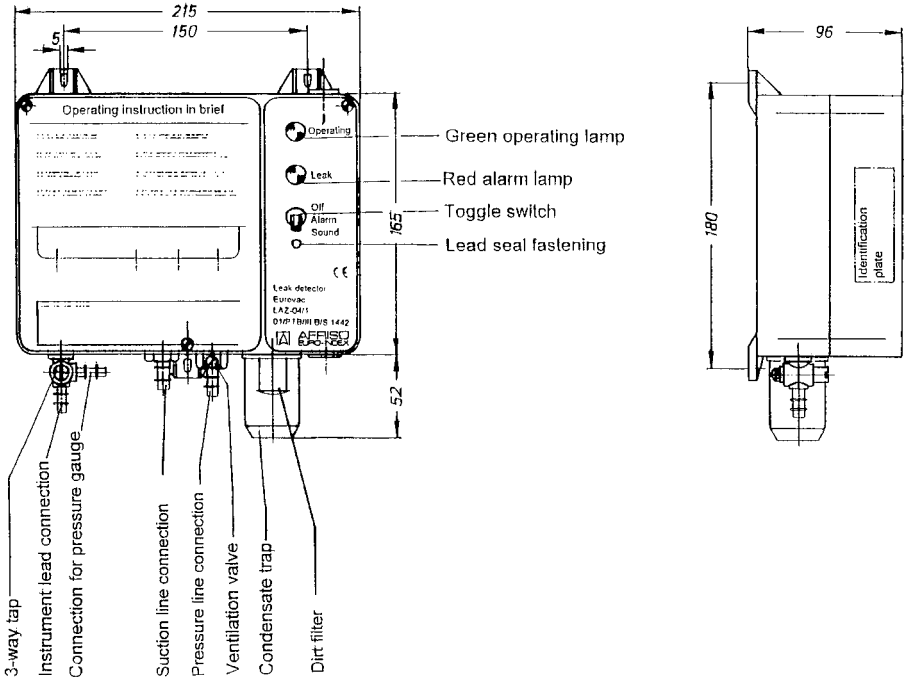
The leakage indicator must be installed at eye height on a flat, firm and dry wall.
It must not be possible for the leakage indicator to come into contact with water (including splash water)!
The leakage indicator must not be fitted in explosion-hazard areas!

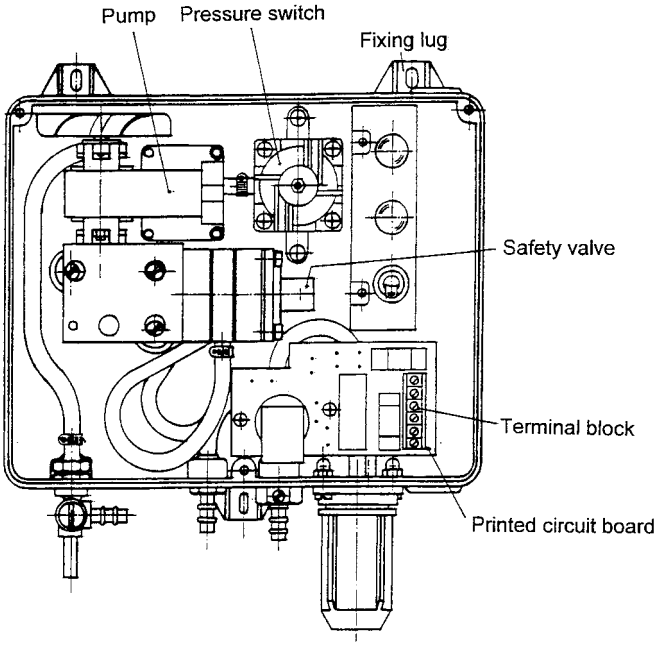
2 Product description

2.1 Design

The LAD 10 leakage indicator consists of an impact-resistant plastic housing which accommodates the indicators and controls, a pressure pump, a pressure switch, a safety valve, a printed circuit board containing the electronic components for processing the output signal, a filter and three hose connections for making the pneumatic connection with the tank's monitoring chamber.
The green pilot lamp lights up if mains power is applied (230 V, 50 Hz).
The leakage indicator generates a constant overpressure in the tank's monitoring chamber and triggers an alarm if the pressure falls. The alarm is indicated both visually and audibly and can be picked off by means of a floating relay contact (1 changeover switch).
In drying filters (not included in the scope of delivery), the air which is compressed to produce the operating pressure is dried to a residual moisture level of approx. 10% and is then passed through a filter to clean it of dust particles. The dried and filtered air is pumped into the tank's monitoring chamber. Pressure fluctuations in the monitoring chamber are compensated by the pump / safety valve.

2.2 Components, controls and indicators





2.3 Function

When power has been connected and the unit is ready for operation, the green pilot lamp lights up. The pump integrated into the leakage indicator draws in air via the drying filter and pumps it via the pressure line to the tank's monitoring chamber until a constant overpressure of around 530 mbar has been built up. The pressure switch measures the overpressure in the monitoring chamber via the measuring line and keeps it at a constant level (in conjunction with the pump). The safety valve fitted to the pump opens at a pressure of 570 mbar in order to prevent the monitoring chamber test pressure (0.6 bar) from being reached. If a leakage occurs in the tank's inner or outer shell either above or below the level of the stored liquid or the groundwater, and if this leakage is greater than the pump's pumping capacity, the overpressure will decrease. If the pressure falls below the minimum pressure of 465 to 485 mbar, the leakage indicator will trigger an alarm, i.e. the red alarm lamp and audible alarm will be activated and the output relay will pick up. The audible alarm can be deactivated using the "Alarm tone" toggle switch after detaching the seal. The switching point for "Alarm on" is at least 30 mbar higher than the static pressure of the stored liquid or the groundwater.
No alarm is signalled if the mains voltage fails. The unit is ready for operation again immediately after the power returns. Any leakage which occurs in the meantime will be indicated.

2.4 Operating modes

The LAD 10 leakage indicator is equipped with an output relay for forwarding the alarm signal to add-on devices. The relay drops out during trouble-free operation and picks up if an alarm is signalled. The LAD 10 leakage indicator can be operated both with and without add-on units. The add-on units can take the form of optical and audible alarm generators, telecommunications equipment, building services management equipment, etc.

2.5 Technical specifications

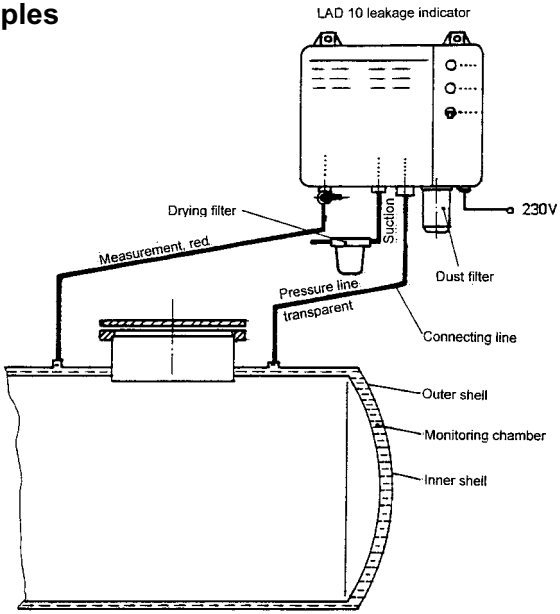
Dimensions (L x W x H):	215 x 165 x 100 mm
Space requirement (L x W x H):	250 x 300 x 999 mm
Weight:	1.8 kg
Supply voltage:	230 V AC +/-10%, 50/60 Hz
Nominal power:	100 VA
Mains fuse:	T2A
Output relay:	1 changeover switch

Switching cap. of output relay	Max. 250 V, 2 A, ohmic load
Relay contact fuse:	T2A
Switching point, alarm on:	**465 to 485 mbar**
Switching point, alarm off:	510 mbar (guide value)
Switching point, pump on:	500 mbar (guide value)
Switching point, pump off:	**540 to 555 mbar**
Safety valve opens at:	570 mbar
Hose connection:	Dia. 5 mm
Connecting hose:	PVC hose 6 x 2 mm
Mechanical connection:	See section 3.3
Electrical connection:	See section 3.4
Permissible ambient temp.:	-5°C to +50°C
Safety class:	II to EN 60730
Degree of protection:	IP 30 to EN 60529
Radio interference suppression:	To EN 50081-1
Immunity to interference:	To EN 50082-2
Electrical safety:	To EN 60730 Part 1

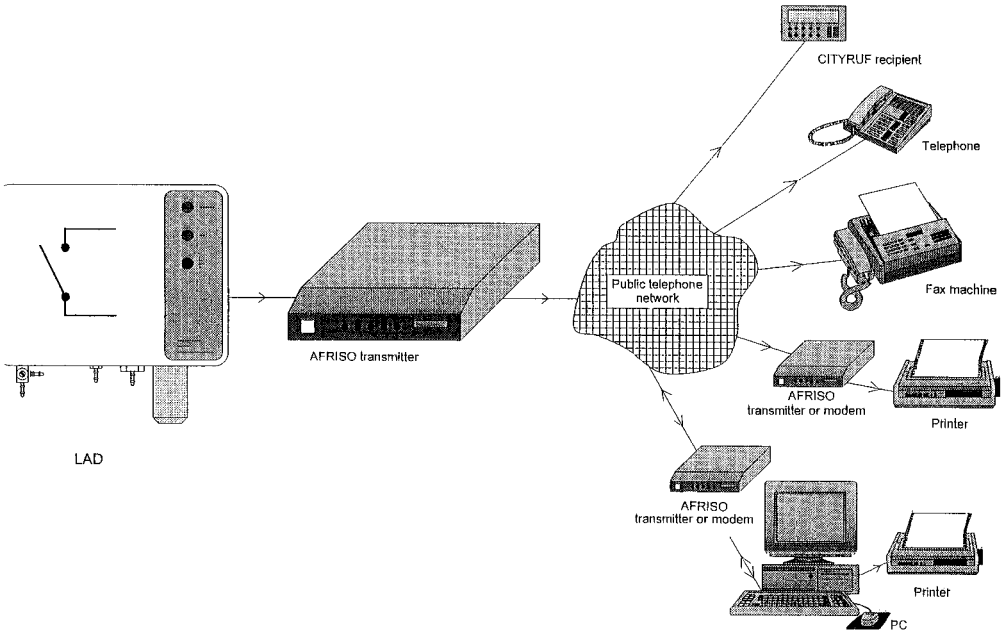
2.6 Approvals, tests, conformities

The LAD 10 leakage indicator has been granted a type approval certificate: 01/PTB No. III B/S 2104, the general building regulation approval with test mark Z-65.23-3 and complies with the EMC guideline (89/336/EWG and 92/31/EWG) and the low voltage guideline (73/23/EWG and 93/68/EWG).

2.7 Application examples



Leakage indicator with Afriso event signalling system for remote indication of leaks:



3 Transport, installation

3.1 Transport

The LAD 10 leakage indicator is supplied along with this Operating Manual and accessories bag in a cardboard box. The box has external dimensions 270 x 260 x 170 mm and, complete with the leakage indicator, weighs 2.4 kg. The accessories bag contains 3 dowels, 3 screws, 3 hose clamps and the seal for the "Alarm tone on / off" switch.
Do not throw or drop the box. The leakage indicator may be damaged or scratched as a result. Protect against wetness, moisture, dirt and dust.

3.2 Storage

The LAD 10 leakage indicator can be stored in dry rooms - packaged in this box - at temperatures of between -10°C and +60°C. Protect against wetness, moisture, dirt and dust.

3.3 Installation

Important!

- ➢ Installation of the leakage indication equipment and LAD 10 leakage indicator may only be performed by specialist personnel who are qualified in accordance with §19.1 WHG and who satisfy the conditions of TRbF 180/280 No. 1.7.
- ➢ In the case of underground tanks, the possible groundwater level must not exceed the crown of the tank by more than 1.45 m.
- ➢ The hydrostatic pressure of the stored liquid must not exceed 435 mbar.
- ➢ The leakage indicator must not be installed in explosion-hazard areas or in the fuel pipes of underground tanks.
- ➢ The leakage indicator must be installed at eye height on a flat, firm and dry wall. It must be possible to access and inspect the leakage indicator at all times. Choose an installation location which is as close as possible to the tank being monitored and ensure that the ambient temperature does not fall outside the range -5°C - +50°C. When installing the unit outdoors, the leakage indicator must be protected from the direct influence of the weather (use IP 55 protective housing!). It must not be possible for water (including splash water) to come into contact with the indicator. It must not be installed in damp locations.

Leakage indicator:

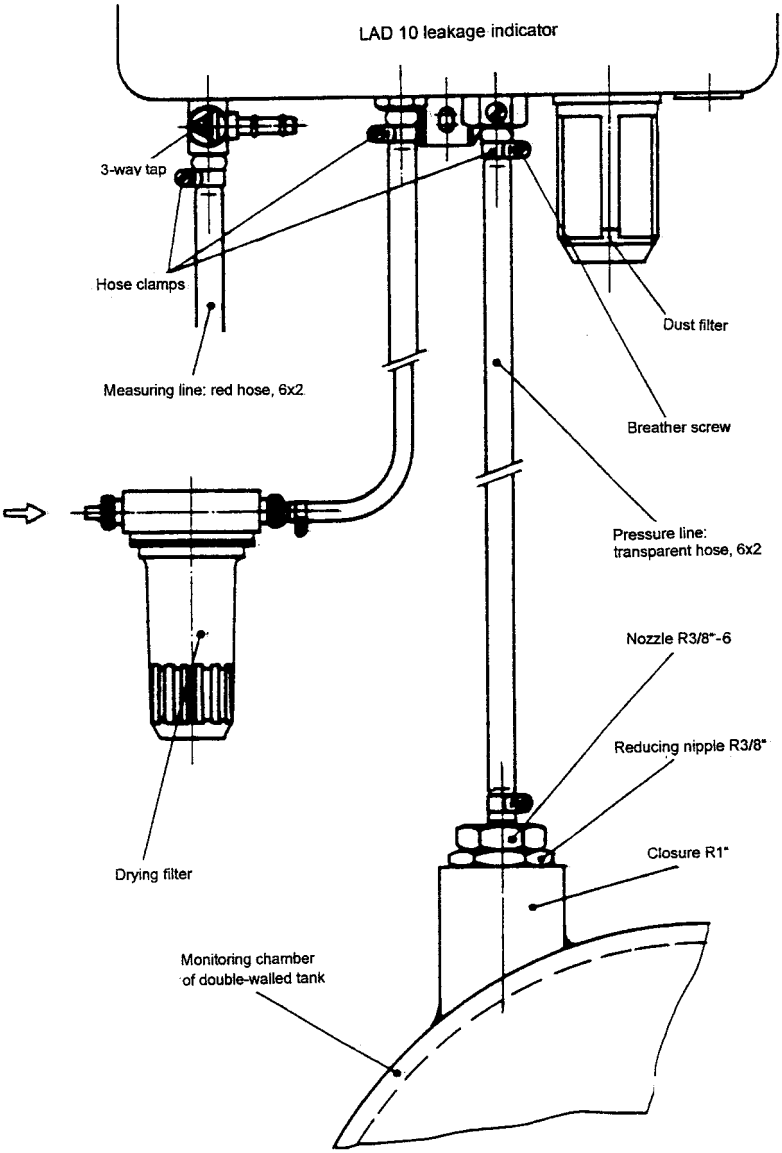
To install the leakage indicator, loosen the three housing screws from the front of the unit and remove the top part of the housing. Secure the bottom part of the housing to the wall using the enclosed dowels and screws (3 x DIN 96-4x30).
Make the electrical connection as set out in section 3.4.
Fit the upper part of the housing and secure it with the three housing screws.
When installing the indicator outdoors, it must be installed in a protective housing with a transparent cover. An additional audible alarm generator (IP 55) must be screw-connected to the protective housing from the outside. A thermostat-controlled heater must be installed in the protective housing.

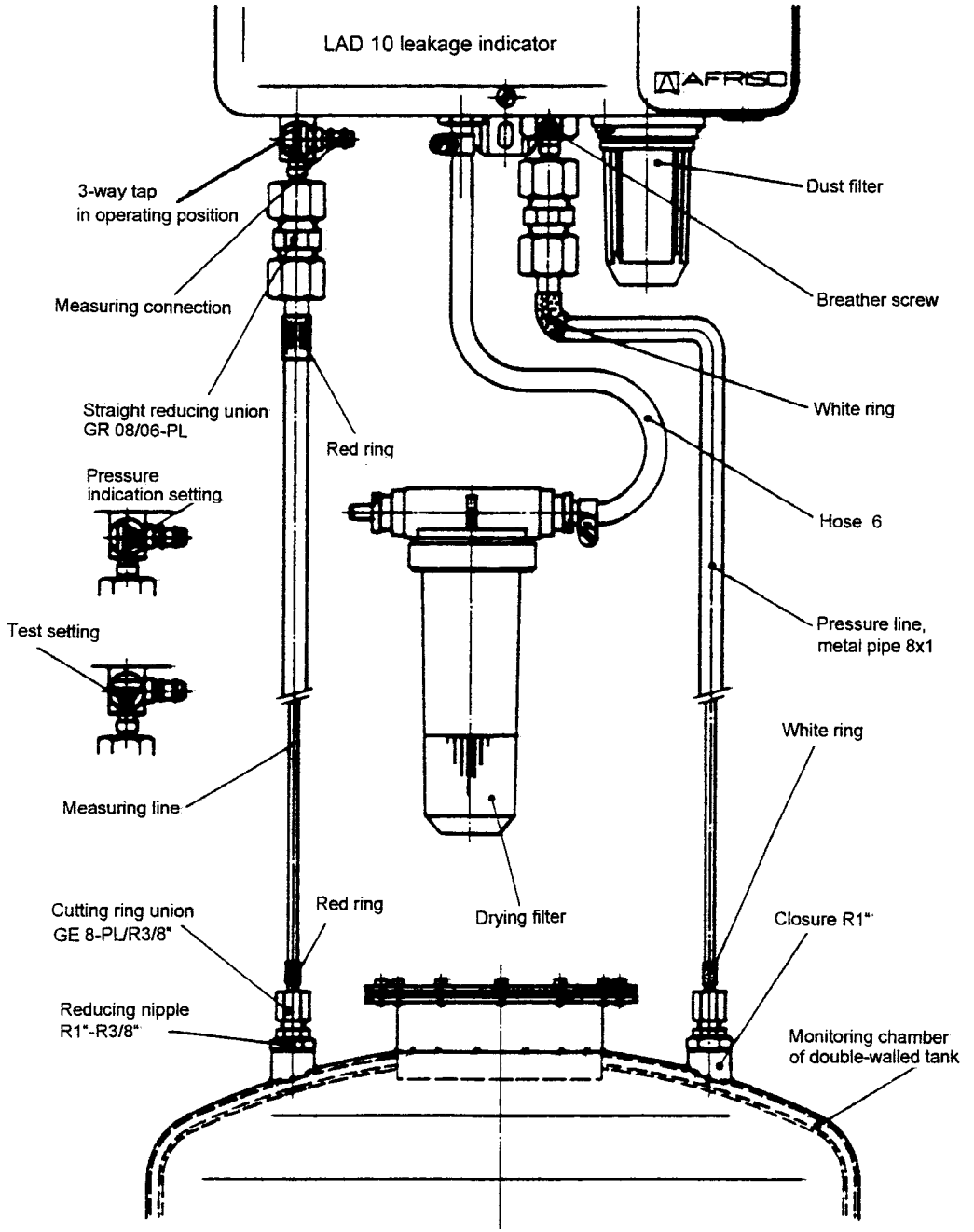
Connecting line:

The connecting lines from the leakage indicator to the tank being monitored must be made in accordance with the illustrations shown on pages 12 and 13.
Make connecting lines from metal pipe with the dimensions 8 x 1 mm. Connecting lines from coloured plastic hoses of dimension 6 x 2 mm can be used for tanks installed above-ground and outdoors which are used for storing water-endange-

ring liquids. Hoses with 6 mm inner diameter must be connected to hose connecting nozzles of nominal diameter 4 mm by means of suitable reduction adapters (6 mm to 4 mm) at the shortest possible distance from the leakage indicator, e.g. using the 4 x 1 mm hose sections supplied.

Hose connecting line




LAD 10 leakage indicator
AFRISO
3-way tap
in operating position
Measuring connection
Straight reducing union
GR 08/06-PL
Red ring
Pressure
indication setting
Test setting
Measuring line
Cutting ring union
GE 8-PL/R3/8"
Red ring
Reducing nipple
R1"-R3/8"
Drying filter
Dust filter
Breather screw
White ring
Hose 6
Pressure line,
metal pipe 8x1
White ring
Closure R1"
Monitoring chamber
of double-walled tank

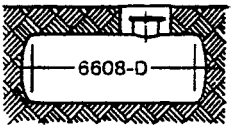
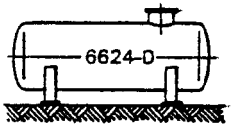
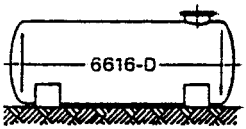
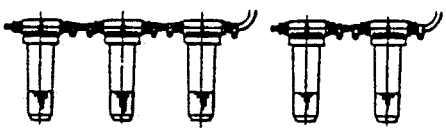
When installed underground, weather-resistant protective pipes must be used. For above-ground connecting lines, use only 8 x 1 mm metal pipe without protective pipe. The connecting lines must be compression-proof, resistant to oil, water and weathering, and must also be resistant to the stored liquid and its vapours. The connecting lines must have permanent colour coding:

Measuring line from hose: red
Measuring line from pipe: red rings at the pipe ends
Pressure line from hose: white or transparent
Pressure line from pipe: white rings at the pipe ends.

The connecting lines must have no kinks or indentations along their entire lengths. Do not fit any shut-off devices.
Hose connections must be secured by means of hose clamps which fit over the entire circumference.

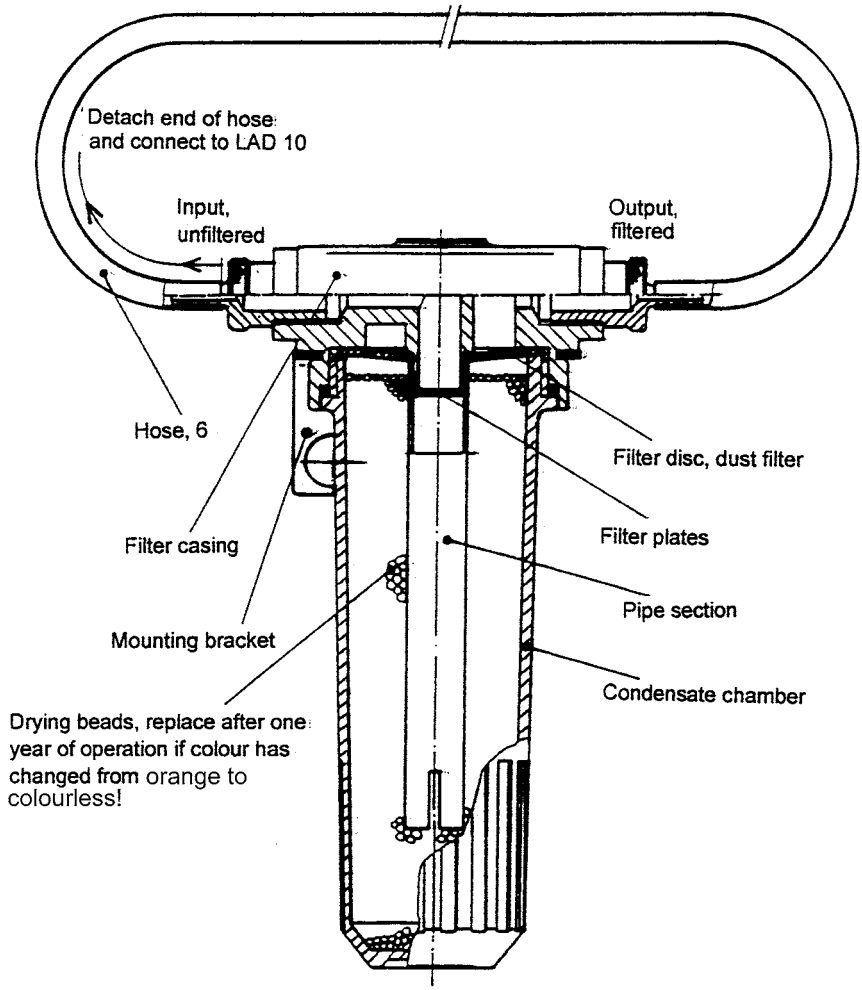
Drying filters:

Drying filters (not included in the scope of delivery) must be installed into the suction line in order to dry the incoming air (see section 5.1). The quantity of drying beads which can be poured into a drying filter is intended for monitoring chambers on DIN tanks with a capacity of up to 16 m³. For larger tanks, additional drying filters must be connected in series. The number of drying filters required is set out in the following table:

Tank	Tank capacity	Number of filters	Tank	Tank capacity	Number of filters
	5- 16 m³ 20- 60 m³ 80-100 m³	1 2 3		1- 5 m³	1
	5-15,5 m³	1		1- 16 m³ 20- 60 m³ 80-100 m³	1 2 3
	0,4-1 m³	1			

Use the above table to calculate the number of drying filters required and secure the filters near the leakage indicator using the mounting brackets. Make the hose connection between the drying filters and the leakage indicator and secure it using hose clamps fitted around the full circumference. Fill the drying filter with orange drying beads. The beads change from orange to colourless as they absorb moisture. The beads must then be replaced no later than this point since they are then unable to absorb any further moisture. Drying beads which change to colourless after start-up must be replaced. During normal operation, the beads will last for at least one year.
The beads must be replaced after one year or after they begin to take on a colourless appearance.

Drying filters

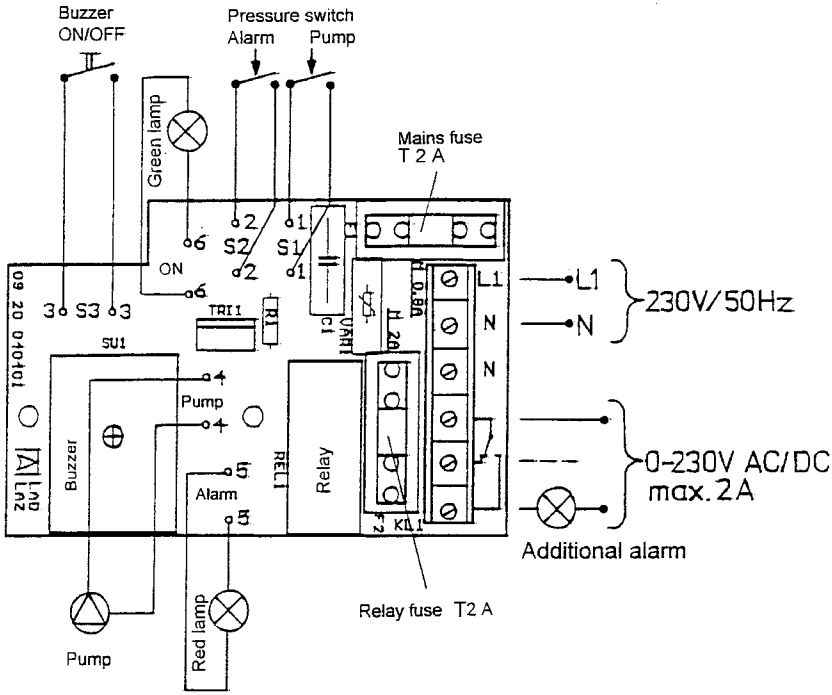


3.4 Electrical connection

WARNING!
Mains voltage (230 V, 50 Hz).
Can cause serious burns and can even kill.
Electrical work should only be performed by specially trained electrical technicians. Switch off the unit during installation work!

Important!
Comply with national electrical regulations, accident prevention regulations and the Operating Manuals for the leakage indicator and tank!
Connect the leakage indicator directly to the 230 V power supply network without using a switch or plug device!

Power supply: Connect the leakage indicator to the power supply by means of a fixed wire, e.g. NYM-J 3x1.5mm^2. The power cable is routed through the rubber bushing at the bottom right into the leakage indicator. Run the phase to terminal L1 and the neutral conductor to terminal N. It must not be possible to switch off the feeder to the leakage indicator. The feeder should be fused separately (max. 16 A). Do not run the feeder into the circuits of other electrical devices.



Output: The output signal from the LAD 10 leakage indicator can be picked off via a floating relay contact (1 changeover switch). Run the relay cable (also fixed in position) through the rubber bushing at the top right into the leakage indicator and connect it to the terminals marked with the relay contact. The relay drops out during trouble-free operation and picks up in the event of an alarm. The relay contact is protected by a 2 A fuse (medium time lag).

Important!
When inductive consumers are shut down, voltage peaks occur which can significantly impair the correct functioning of electrical installations and can even destroy the switch contact.
Inductive consumers must therefore be wired with standard RC combinations, e.g. 0.1µF/100 Ω.

4 Operation

4.1 Start-up

Before starting up the leakage indicator, ensure that the unit has been installed in accordance with this Operating Manual and agrees with the data on the tank's nameplate (DIN number, test pressure 0.6 bar, number of drying filters) and that the monitoring chamber contains no leakage indication liquid.

Leakage test: Before fitting the connecting lines to the monitoring chamber, check that they have been fitted without leaks. To do this, carry out a leakage test at 600 mbar. The connecting lines can be considered tight if the pressure drop is less than 20 mbar within a period of 30 minutes. Once the connecting lines have passed the leakage test, connect to the tank's monitoring chamber.
Caution: If the test pressure exceeds 600 mbar when the LAD 10 is connected, the measuring instrument may be damaged or destroyed.

Basic charge: The leakage indicator pump must not exceed a specific pumping rate (100 l/h). The monitoring chamber should therefore be precharged to an overpressure of approximately 500 mbar before the leakage indicator is connected. To do this, fit an installation pump with a higher volume capacity. The air which is drawn in must be dried with a sufficiently large drying filter.
Once the overpressure of 500 mbar has been reached, disconnect the installation pump and connect the leakage indicator.
Caution: If the overpressure exceeds 600 mbar when the LAD 10 is connected, the measuring instrument may be damaged or

destroyed.

Checklist: Now use the following checklist to check that all requirements for trouble-free operation are satisfied:

Requirements	Satisfied	Not satisfied
✓Operating Manual read?	❑	❑
✓Tank nameplate checked?	❑	❑
✓Number of drying filters determined?	❑	❑
✓Leakage indicator fitted in accordance with 3.3?	❑	❑
✓Leakage test performed?	❑	❑
✓Electrical connection made as per 3.4?	❑	❑
✓Monitoring chamber pre-charged?	❑	❑
✓Overpressure in monitoring chamber <600 mbar?	❑	❑
✓Leakage indicator connected to monit. chamber?	❑	❑
✓Leakage indicator housing screwed back?	❑	❑

If all the requirements have been satisfied, the unit can be powered up a mains fuse system.
The green pilot lamp lights up. The pump control maintains the operating pressure. If the operating pressure falls below the switching point for "Alarm on", the red alarm lamp lights up, the audible alarm sounds and the relay picks up. The audible alarm can be deactivated by means of the toggle switch. Once the required pressure has been reached, the leakage indicator pump switches off. Now move the toggle switch to "Alarm tone on" and seal in position. The system is now ready for operation. Have a specialist company certify that the installation, commissioning and testing of the leakage indicator have been performed correctly. Use the form shown in section 5.4.

4.2 Operating

The leakage indicator monitors double-walled tanks.
If a leakage occurs, the overpressure in the monitoring chamber drops and the leakage indicator triggers an alarm.
Operation of the leakage indicator by the operator is thus restricted to regular monitoring work:

✓Is the green pilot lamp lit? ❑ OK
✓Is the red alarm lamp off? ❑ OK
✓Is the audible alarm off? ❑ OK

When checking the leakage indicator (see section 4.3), the red alarm lamp must be lit and the audible alarm must sound.

In the event of an alarm:

In the event of an alarm, the audible alarm can be switched off by means of the toggle switch after detaching the seal. The red alarm lamp remains lit. Inform the installation company immedia-

tely. The installation firm must locate the cause of the alarm. Once the cause has been eliminated, perform a complete functional test as per 4.3.

4.3 Test

Correction functioning of the leakage indicator must be tested:
- after every start-up
- at least once yearly by an expert
- after every alarm and every troubleshooting operation

- By simulation:

To ensure the leakage indicator functions correctly, a functional check must be performed at least once every year by simulating a real alarm scenario.
For this purpose, a breather valve has been fitted to the pressure line nozzle. When the breather valve opens, the tank's monitoring chamber is ventilated. The overpressure in the monitoring chamber is reduced and the leakage indicator triggers an alarm. Close the breather valve. The overpressure in the monitoring chamber starts to build up again. The alarm signals must switch off automatically.

- By measurement:

A 3-way cock is connected to the nozzle on the measuring line. The free connection at the side is provided for connecting a pressure gauge for checking the system.

☞ Connect pressure gauge (0 to 1000 mbar).
☞ Move the screw-type valve of the 3-way cock to the 'Pressure indication' position (see illustration on page 13).
☞ The pressure gauge indicates the overpressure in the monitoring chamber.
☞ Slowly open the breather valve at the nozzle of the pressure line. The overpressure drops slowly.
☞ Observe the pressure gauge and note the pressure values at which the pump and alarm signals are activated.
☞ Close the breather valve. Observe the pressure gauge and note the pressure values at which the alarm signals and pump switch off.
☞ Compare the noted pressure values with the required values shown in the technical specifications on page 9.
☞ Move the screw-type valve of the 3-way cock back to the operating position and disconnect the pressure gauge.
☞ Move the toggle switch to the "Alarm tone on" setting and seal in position.

- Check the pressure relief valve:

☞ Connect a pressure gauge (0 to 1000 mbar) to the connection on the side of the measuring line nozzle.

☞ Slowly open the breather valve on the pressure line nozzle until the pump switches on.
☞ Move the screw-type valve on the 3-way cock to the "Test" setting (see illustration on page 13). This deactivates the pressure switch and the pump remains on.
☞ Close the breather valve. The pressure in the monitoring chamber increases but must not exceed 570 mbar!
☞ Turn the screw-type valve on the 3-way cock to the starting position. The pump must switch off immediately.

- Check drying filter:
☞ Replace the drying beads immediately if they change from orange to colourless.
☞ Replace the beads at least once every year.
☞ Carefully close the drying filter after exchanging the beads in order to prevent any moisture from entering.

- Documentation: A test report must be drawn up and kept with the other documentation for the leakage indicator. The pressure switch integrated into the leakage indicator and the pressure relief valve may only be adjusted / calibrated by the manufacturer or specially trained personnel.

4.4 Troubleshooting

Malfunction	Remedy
Green pilot lamp does not light up:	☞ Check mains voltage! ☞ Check mains fuse!
Red alarm lamp lights up:	☞ Is there a leakage? ☞ Check hoses! ☞ Are breather valves closed? ☞ Screw filter chamber shut! ☞ Notify installation company
Red alarm lamp lights up, alarm does not sound:	☞ Is seal missing? ☞ Move toggle switch to "On" and seal in position!
Drying beads are colourless:	☞ Replace drying beads!
Filter dirty:	☞ Exchange dirty filter!

4.5 Maintenance

The LAD 10 leakage indicator must be checked yearly by an expert. The expert must check whether the conditions stipulated in this Operating Manual are still being complied with.
The drying beads must be replaced at least once every year or must be exchanged immediately if their colour changes from orange to colourless. Beads which have turned colourless can

be activated again by drying them in an oven at a temperature of 125°C for a period of 24 hours. The beads can be reactivated in this way a maximum of three times. Use tight-sealing containers for storing the beads.

Use appropriate checks to ensure that the leakage indicator and its environment are always kept clean and accessible and can be inspected at all times. The leakage indicator requires no maintenance. It is advisable, however, to conclude a maintenance agreement with a specialist company as per TRbF 180 or 280.

4.6 Servicing

WARNING!
Leakage indicators are safety instruments and may only be repaired by the manufacturer.
Changes and adjustments to the product involve considerable safety risks!

WARNING!
Mains voltage (230 V, 50 Hz).
Can cause severe burns and can even kill.
Electrical work should only be performed by trained electrical experts. Disconnect the unit when performing installation work!

Repairs carried out on site must only be performed by trained electrical experts with the unit switched off. The power supply must be safely disconnected during repair work.

Exchanging mains fuse F1:

- ☞ Switch off the mains voltage
- ☞ Remove the upper section of the housing
- ☞ Remove the transparent cover from the fuse
- ☞ Replace mains fuse F1: T2A
- ☞ Snap the transparent cover onto the fuse
- ☞ Fit the upper section of the housing and screw in position
- ☞ Switch on the mains voltage.

Exchanging relay fuse F2:

- ☞ Switch off the mains voltage
- ☞ Remove the upper section of the housing
- ☞ Remove the transparent cover from the fuse
- ☞ Replace relay fuse F2: T2A
- ☞ Snap the transparent cover onto the fuse
- ☞ Fit the upper section of the housing and screw in position
- ☞ Switch on the mains voltage.

4.7 Shutting down, disposal

The leakage indicator is shut down by switching off the mains voltage.
To dispose of the leakage indicator, dismantle the unit and sort out the various parts according to the material and bearing in mind the availability of local disposal facilities (e.g. recycling centres).

Discoloured beads can be disposed of in normal domestic waste.

5 Annex

5.1 Spares, accessories

1 drying filter with mounting bracket	Art. No.: 43688
1 can of drying beads (850 g)	Art. No.: 69926
LAD 10 in prot. housing w. aud. alarm	Art. No.: 43679
Audible alarm, weatherproof	Art. No.: 61012
Alarm lamp, weatherproof	Art. No.: 61015
PVC hose 6x2 mm, 100 m, red	Art. No.: 43662
PVC hose 6x2 mm, 100 m, green	Art. No.: 43663
PVC hose 6x2 mm, 100 m, transparent	Art. No.: 43664
PVC hose 4x1 mm transparent	Id. No.: 820 010 4014
Pump for LAD 10 with safety valve	Art. No.: 43685
Pressure switch for LAD 10	Art. No.: 43686
Pilot lamp, green	Art. No.: 43659
Alarm lamp, red	Art. No.: 43658
Event signalling unit AM1	Art. No.: 90001
Event signalling unit AM2	Art. No.: 90002
Phone alarm	Art. No.: 90003
Hose clamp 7-11 mm	Id. No.: 810 000 0004
RC combination 0.1 µF/100 Ω	Id. No.: 618 001 5100
Mains fuse T2A	Id. No.: 960127 2000
Relay fuse T2A	Id. No.: 960127 2000
Lead seal	Id. No.: 06 15 000015
Sealing wire	Id. No.:9013670303B2

5.2 Warranty

As manufacturers of the leakage indicator, we provide a 12 month warranty for the unit from the date of purchase.
Within this warranty period, we will eliminate free of charge all deficiencies relating to material flaws or production faults, either by repairing or exchanging the unit (our choice). The following are not covered by the warranty: Damage resulting from improper use, normal wear and tear, and deficiencies which have only an insignificant effect on the value or performance of the unit.
The warranty shall be rendered invalid if the unit has been adjusted or manipulated by persons that have not been approved by us, or if spares other than original Afriso spares have been used.
This warranty is valid for all countries in which this unit is sold by Afriso-Euro-Index or its authorised dealers.

5.3 Copyright

The copyright to this Operating Manual is the property of Afriso-Euro-Index GmbH. Reprints, translations and reproductions, including extracts thereof, are not permitted without prior written approval. We reserve the right to make technical modifications to the specifications and illustrations set out in this Operating Manual.

5.4 Expert certification

I hereby confirm that installation, commissioning and functional testing of the leakage indicator has been performed in accordance with this Operating Manual.:

Pump OFF: _____mbar, Pump ON: _____mbar

Alarm ON: _____mbar, Alarm OFF: _____mbar

Pressure drop (compl. system): _____mbar in _____minutes

Tank to DIN _____, Year: _____, Litres: _____

Serial No..:_____, m above-ground, m underground

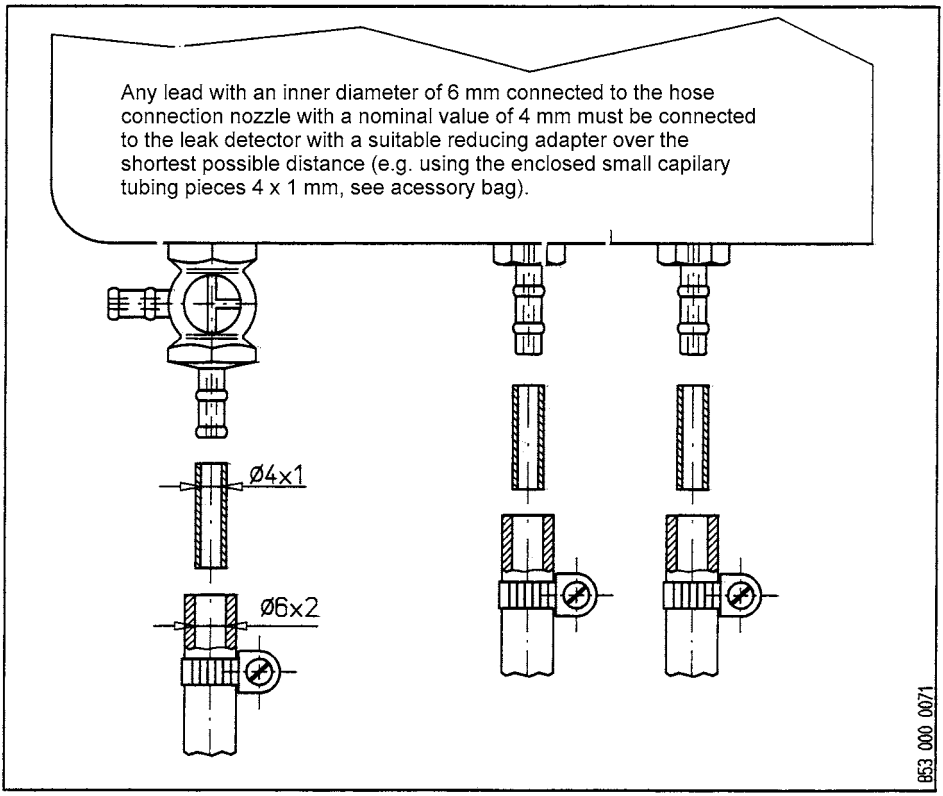
Tank manufacturer:_____

Specialist firm: _____

Operator: _____

Installation site:_____

Date:_____, Signature:_____



5.5 Addresses

The addresses of the worldwide representations and offices can be found on the Internet at www.afriso.de.