Technik für Umweltschutz

Messen. Regeln. Überwachen.

Operating instructions

Pneumatic level indicator

Unitel

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1 About these operating instructions

These operating instructions describe the pneumatic level indicator "Unitel" (also referred to as "product" in these operating instructions). These operating instructions are part of the product.

- You may only use the product if you have fully read and understood these operating instructions.
- Verify that these operating instructions are always accessible for any type of work performed on or with the product.
- Pass these operating instructions as well as all other product-related documents on to all owners of the product.
- If you feel that these operating instructions contain errors, inconsistencies, ambiguities or other issues, contact the manufacturer prior to using the product.

The manufacturer shall not be liable in any form whatsoever for direct or consequential damage resulting from failure to observe these operating instructions or from failure to comply with directives, regulations and standards and any other statutory requirements applicable at the installation site of the product.

2 Information on safety

2.1 Safety messages and hazard categories

These operating instructions contain safety messages to alert you to potential hazards and risks. In addition to the instructions provided in these operating instructions, you must comply with all directives, standards and safety regulations applicable at the installation site of the product. Verify that you are familiar with all directives, standards and safety regulations and ensure compliance with them prior to using the product.

Safety messages in these operating instructions are highlighted with warning symbols and warning words. Depending on the severity of a hazard, the safety messages are classified according to different hazard categories.

NOTICE

NOTICE indicates a hazardous situation, which, if not avoided, can result in equipment damage.

2.2 Intended use

This product may only be used for measuring the level of the following media:

- Grey water as per EN 12056-1
- Fuel oil EL as per DIN 51603-1
- Diesel fuel as per EN 590
- Fatty acid methyl ester (FAME) as fuel oil as per EN 14213
- Fatty acid methyl ester (FAME) as biodiesel as per EN 14214
- Paraffinic fuels (HVO/GTL) proportionally with 0 - 100 %
- Flammable liquids of danger class A III and non-flammable liquids with the following prerequisites:
  - The vapours of the liquids do not attack plastic materials (PA, PS, PE), Cu, Zn and Sn alloys and elastomers.
  - The liquid does not belong to danger classes AI, AII or B.
  - Cinematic viscosity < 300 mm^2/s.

Any use other than the application explicitly permitted in these operating instructions is not permitted and causes hazards.

Verify that the product is suitable for the application planned by you prior to using the product. In doing so, take into account at least the following:

- All directives, standards and safety regulations applicable at the installation site of the product
- All conditions and data specified for the product
- The conditions of the planned application

In addition, perform a risk assessment in view of the planned application, according to an approved risk assessment method, and implement the appropriate safety measures, based on the results of the risk assessment. Take into account the consequences of installing or integrating the product into a system or a plant.

When using the product, perform all work and all other activities in conjunction with the product in compliance with the conditions specified in the operating instructions and on the nameplate, as well as with all directives, standards and safety regulations applicable at the installation site of the product.

2.3 Predictable incorrect application

The product must never be used in the following cases and for the following purposes:

- Hazardous area (EX)
  - If the product is operated in hazardous areas, sparks may cause deflagrations, fires or explosions.
- Level measurement of liquids other than those listed above.
- Use of the measurement result for billing purposes.

2.4 Qualification of personnel

Only appropriately trained persons who are familiar with and understand the contents of these operating instructions and all other pertinent product documentation are authorized to work on and with this product.

These persons must have sufficient technical training, knowledge and experience and be able to foresee and detect potential hazards that may be caused by using the product.

All persons working on and with the product must be fully familiar with all directives, standards and safety regulations that must be observed for performing such work.

2.5 Personal protective equipment

Always wear the required personal protective equipment. When performing work on and with the product, take into account that hazards may be present at the installation site which do not directly result from the product itself.

2.6 Modifications to the product

Only perform work on and with the product which is explicitly described in these operating instructions. Do not make any modifications to the product which are not described in these operating instructions.

3 Transport and storage

The product may be damaged as a result of improper transport or storage.

NOTICE

INCORRECT HANDLING

- Verify compliance with the specified ambient conditions during transport or storage of the product.
- Use the original packaging when transporting the product.
- Store the product in a clean and dry environment.
- Verify that the product is protected against shocks and impact during transport and storage.

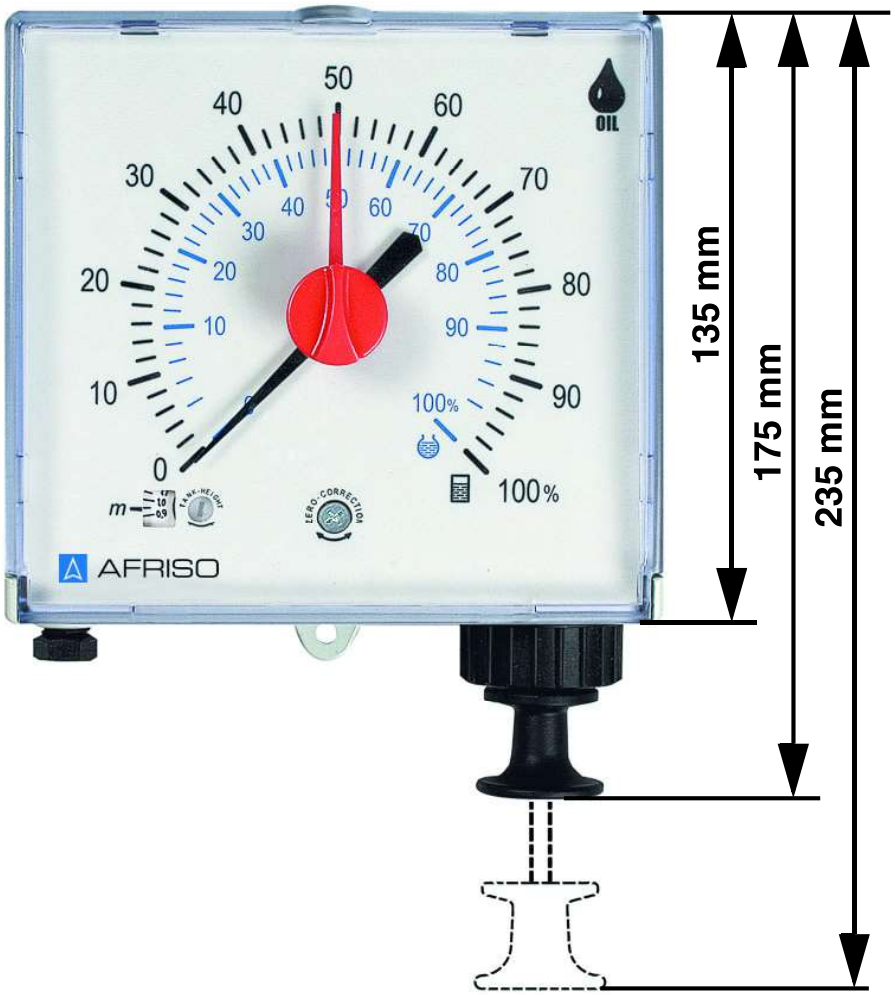
Failure to follow these instructions can result in equipment damage.

4 Product description

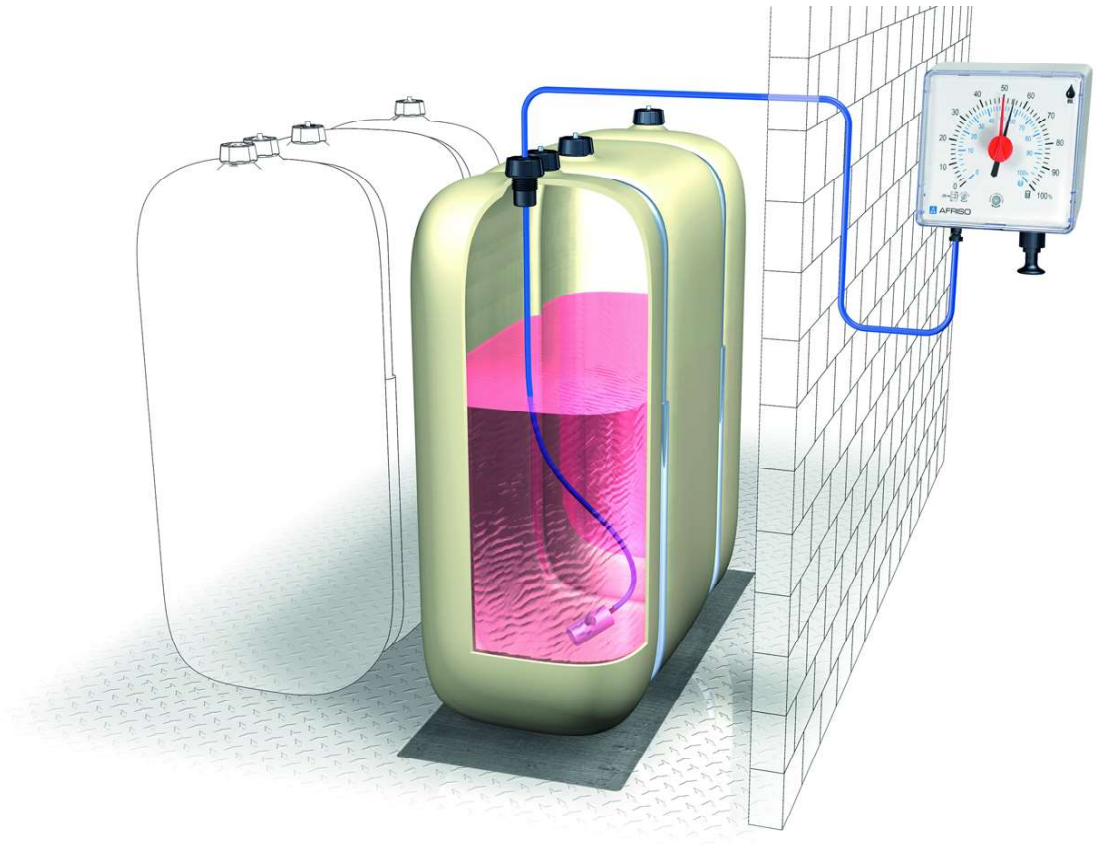
4.1 Overview

A. Reference pointer
B. Connection for measuring line
C. Adjustment scale for measuring range
D. Adjustment screw for measuring range
E. Adjustment screw for zero correction
F. Pump plunger

4.2 Dimensions



4.3 Application example(s)



4.4 Function

The product measures the hydrostatic pressure at the tank bottom to determine the level. The hydrostatic pressure depends on the level and the density of the stored liquid. The pressure is measured approximately 20 mm above the tank bottom and indicated on the dial.

Pneumatic pressure is generated in the pressure line by pulling out the pump plunger. The pressure line consists of the measuring line (from the measuring instrument to the tank) and the vertical line (inside the tank). The pneumatic pressure displaces the liquid from the vertical line. When the pneumatic pressure is equal to the hydrostatic pressure acting at the tank bottom, the liquid is fully displaced from the vertical line. Bubbles start to escape at the lower end of the vertical line. In this condition, the pointer has reached the maximum deflection and remains at the indicated value.

The product enables consumption monitoring and timely re-fuelling. The tank lorry driver can use the product to verify prior to filling whether the ordered volume fits into the tank.

4.5 Technical specifications

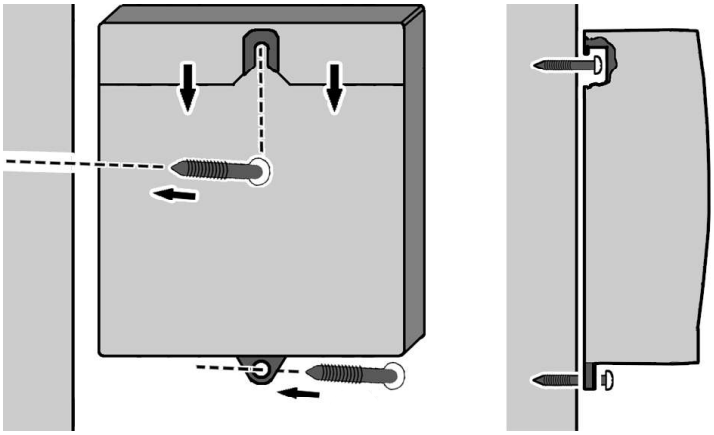
Parameter	Value
General specifications	
Dimensions (W x H x D)	145 x 135 x 65 mm
Weight	400 g
Material product	Shock-resistant, impact-resistant plastic
Remote measurement	Up to 50 m
Measuring range (tank height)	0/3000 mm "Unitel" 0/2500 mm "Unitel for water"
Movement	Linear capsule element with over-pressure device
Measuring accuracy	±3 % of full scale value
Indicator	Standard: 0-100 % liquid level for rectangular and cylindrical horizontal tanks
Operating temperature range	
Ambient	-5 ... 55 °C
Storage	-5 ... 55 °C
Vertical line (wetted)	
Material	The vertical line must consist of a material that is neutral with regard to the medium. For example, for fuel oil EL, diesel fuel and FAME: Pneumofix line (PVC), copper pipe or oil-resistant Perbunan hose with weight as spacer

Parameter	Value
Inside diameter	4 mm for fuel oil EL, L, M, diesel fuel, FAME, liquids with a kinematic viscosity of up to 90 mm^2/s 6 mm for liquids with a kinematic viscosity of up to 190 mm^2/s 8 mm for liquids with a kinematic viscosity of up to 300 mm^2/s
Measuring line	
Length	Max. 50 m
Version	Pneumofix measuring line (PE), copper pipe 6 mm (outside Ø) x 1 mm PE hose 4 mm (inside Ø) x 1 mm
Media/height adjustment	
Fuel oil/diesel; black scale = rectangular tanks blue scale = cylindrical tanks	Density 0.84 g/cm^3 Adjustment = tank height Adjustment for other media as per table on Page 23
Part numbers 72511, 72516: scale only for water	Density 1.0 g/cm^3 Adjustment = tank height

5 Mounting

5.1 Mounting the product

- ⇨ Verify that the product is accessible and easy to oversee at all times.
- ⇨ Verify that the product is protected against water and splash water.
- ⇨ Verify that the product is not mounted in a humid room.
- ⇨ Verify that the permissible ambient temperature is not exceeded at the product.
- ⇨ Verify that the product is protected from direct sunlight.

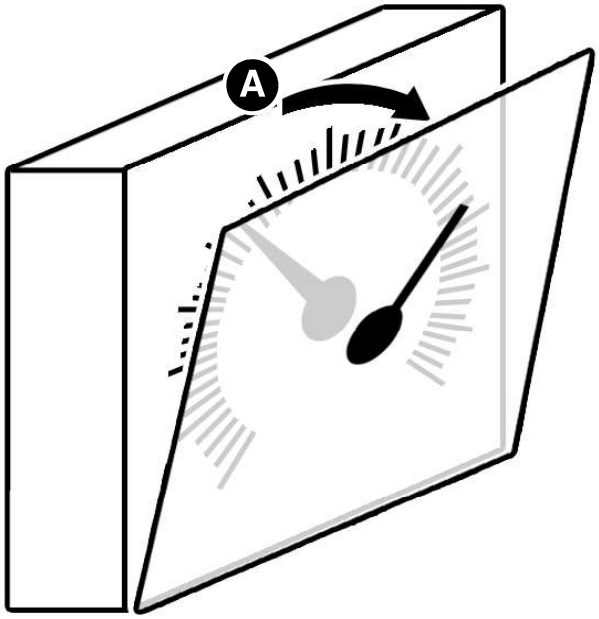


1. Drill a hole into the wall.
2. Fit the enclosed dowel into the hole.
3. Screw in the screw up to approx. 1.5 cm.
4. Fit the product onto the screw and slightly pull it down.
   - The lug is flush with the wall.
5. Create a mark at the wall through the hole of the lower lug.
6. Remove the product.
7. Drill a hole at the mark.
8. Fit the enclosed dowel into the hole.
9. Fit the product onto the screw again and slightly pull it down.
   - The lug is flush with the wall.
10. Fasten the product to the wall by means of the second screw.

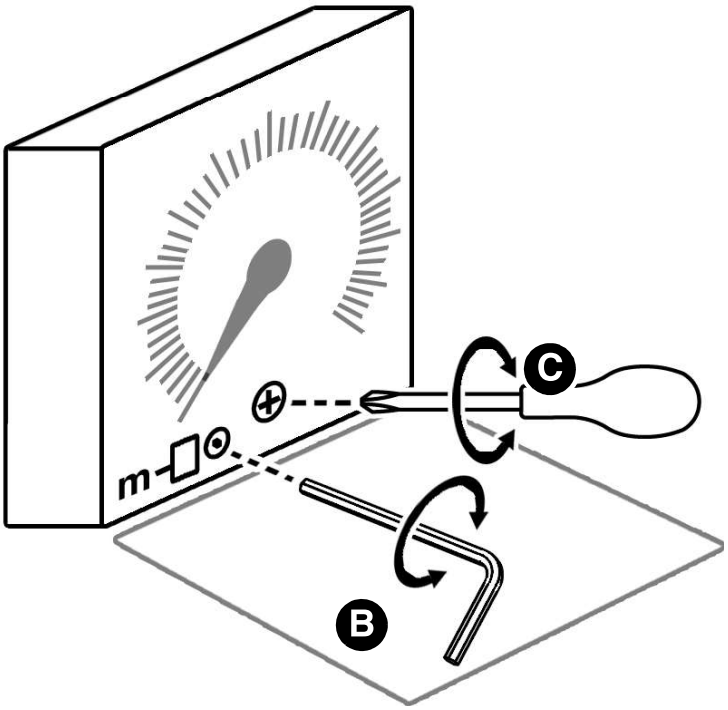
5.2 Adjusting the measuring range and calibrating the zero point

The measuring range and the zero point must be accurately adjusted for the product to operate with maximum measuring accuracy.

⇨ Verify that the system is unpressurised when you set the zero point.

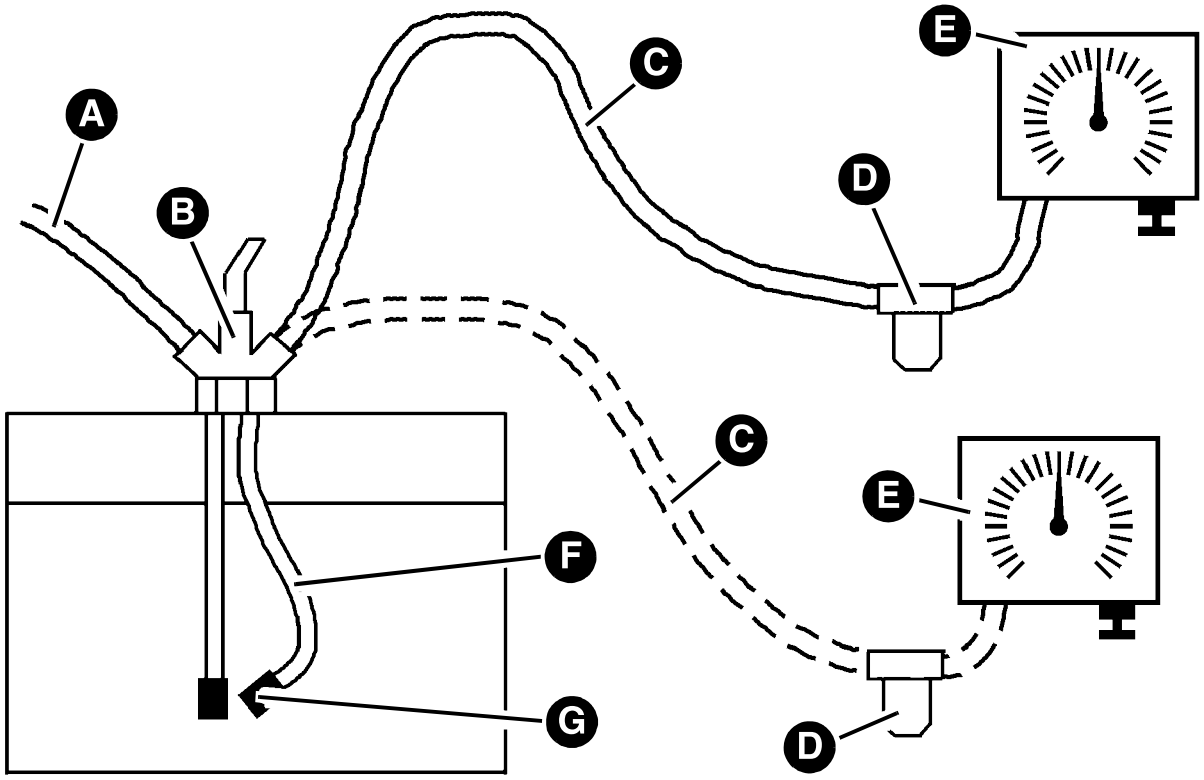


1. Determine the measuring range.
   - Fuel oil EL and diesel fuel: Measuring range = tank height
   - Other liquids: See chapter "Adjusting the measuring range and calibrating the zero point"
2. Open the window (A).



3. Accurately adjust the measuring range (B).
4. Slightly tap at the side of the product.
5. Correct the zero point (C) by setting the pointer to "0" with no more than one turn to the right or the left.

5.3 Mounting the pressure line

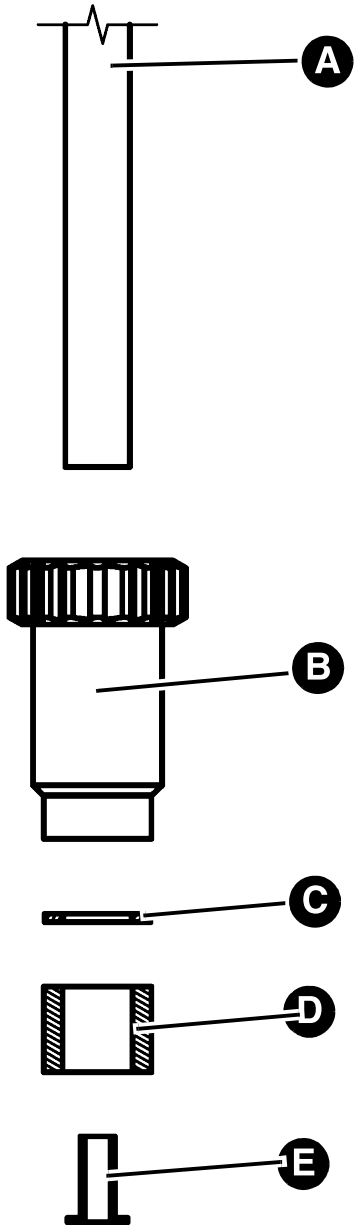


A. Sampling line
B. Euroflex 3
C. Measuring line
D. Condensate trap
E. Unitel
F. Standpipe
G. Bottom part

If no connection thread is available on the tank, several lines can be connected via the combination fitting "Euroflex 3" to a single G1 connection thread.

1. Mount the vertical line in the tank in such a way that the lower end of the vertical line is approximately 20 mm above the lowest point of the tank bottom.
2. Install the measuring line with a steady gradient towards the tank, avoid bends.
3. Push the screw connection onto the measuring line.

If the measuring line does not have a steady gradient to the tank or if condensate can collect in the measuring line, use a condensate trap.



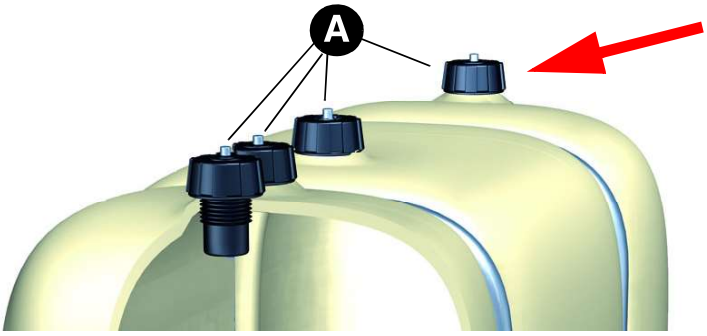
A. Measuring line (pipe/hose
B. Compression screw
C. Washer
D. Sealing ring
E. Stiffener (only if a hose is used)

1. Push the stiffener (E) into the hose.
2. Push the compression screw (B), the washer (C) and the sealing ring (D) onto the measuring line.
3. Push the pipe/hose into the connection piece all the way to the stop.
4. Tighten the compression screw (B).

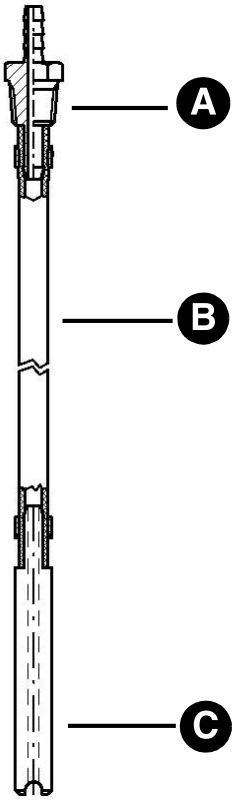
5.4 Mounting the mounting kit for battery tanks "Pneum." (optional)

Depending on the manufacturer, battery tanks have one or more plastic flanges (A). The plastic flanges are provided for filling, venting or withdrawal.

The mounting kit is installed in one of the plastic flanges (A).



A. Plastic flange



A. Connection piece with conical thread
B. Hose
C. Weight Ø 9 mm

1. Check whether the plastic flange of the battery tank has a hole Ø 10 mm to Ø 10.5 mm which is closed by means of a blind plug.
2. Remove the blind plug.
3. Push the weight (C) and the hose (C) through the hole.

4. Screw the connection piece (A) into the hole.

If the plastic flange does not have a hole, proceed as follows:

1. Dismount the plastic flange.
2. Drill a vertical hole Ø 10 mm through the plastic flange.
3. Remount the plastic flange.
4. Push the weight (C) and the hose (B) through the hole.
5. Screw the connection piece (A) into the hole.

6 Operation

⇨ Precise measurements are not possible during filling of the tank. The pointer does not provide a stable reading during filling.

The product provides semi-permanent indication. The pump closes off the measuring line when it reaches the upper dead end. The pointer stays temporarily at its last reading and then drops back very slowly. As a result of this, the gauge mechanism is protected by an air cushion.

1. Pull out the pump plunger all the way to the stop.
2. Then release the pump plunger.
3. Repeat the pumping procedure until the indicated value no longer changes.
4. Read the level on the scale.
   - If the measuring line has been installed airtight, the pointer of the gauge will continue to show the last reading for a long period of time. In order to obtain an accurate reading, operate the pump before a reading is taken.

The red reference pointer can be adjusted manually, for example to the level after the last filling. The red reference pointer lets you compare the current level to a previous level for consumption monitoring.

6.1 Use in flood hazard areas

The product is suitable for use in flood hazard areas; it is watertight up to 10 m water column (1 bar pressure).

The product does not have to be replaced after a flood.

7 Maintenance

7.1 Maintenance intervals

When	Activity
Water in condensate trap	Drain the condensate trap
During tank maintenance or tank cleaning	Verify correct operation of the product If necessary, readjust the measuring range and correct the zero point

8 Troubleshooting

Any malfunctions that cannot be removed by means of the measures described in this chapter may only be repaired by the manufacturer.

Problem	Possible reason	Repair
Pointer does not move when pump is operated or drops back very quickly	Connections or lines have a leak	Seal leaking connections and lines
	Tank is being filling	Measure the level after filling
Pointer goes beyond 100 % or pump plunger does not fully return	Measuring line clogged or bent	Make sure there are no bends in the measuring line Install a condensate trap
	Condensate trap full	Drain the condensate trap
	Measuring range not correctly adjusted	Verify the tank height (see chapter "Adjusting the measuring range and calibrating the zero point")
Incorrect indication	Measuring range not correctly adjusted	Verify the measuring range (see chapter "Adjusting the measuring range and calibrating the zero point")
	Zero point not correctly adjusted	
Other malfunctions	-	Contact the AFRISO service hotline

9 Decommissioning, disposal

Dispose of the product in compliance with all applicable directives, standards and safety regulations.

1. Dismount the product (see chapter "Mounting", reverse sequence of steps).
2. Dispose of the product.

10 Returning the device

Get in touch with us before returning your product.

11 Warranty

See our terms and conditions at www.afriso.com or your purchase contract for information on warranty.

12 Spare parts and accessories

NOTICE

UNSUITABLE PARTS

- Only use genuine spare parts and accessories provided by the manufacturer.

Failure to follow these instructions can result in equipment damage.

Product

Product designation	Part no.	Figure
Pneumatic level indicator "Unitel"	72500 72530	

Spare parts and accessories

Product designation	Part no.	Figure
Universal mounting kit Pneumofix type 2	20142	-
Combination fitting Euroflex 3 with hose 2.15 m	20160	-
Condensate trap KG 2	20320	-
Hose connector	43945	-
Mounting kit battery tanks "Pneum."	52154	-

13 Appendix

13.1 Determining the height adjustment*

Tank height [mm]	Density of the liquid to be measured [kg/m³]															
	700	720	740	760	780	800	820	840	860	880	900	920	940	960	980	1000
800													0.90	0.91	0.93	0.95
850											0.91	0.93	0.95	0.97	0.99	1.01
900								0.90	0.92	0.94	0.96	0.99	1.01	1.03	1.05	1.07
950						0.91	0.93	0.95	0.97	1.00	1.02	1.04	1.06	1.08	1.11	1.13
1000				0.90	0.93	0.95	0.98	1.00	1.02	1.05	1.07	1.10	1.12	1.14	1.17	1.19
1100	0.92	0.94	0.97	1.00	1.02	1.05	1.07	1.10	1.13	1.15	1.18	1.20	1.23	1.26	1.28	1.31
1200	1.00	1.03	1.06	1.08	1.11	1.14	1.17	1.20	1.23	1.26	1.29	1.31	1.34	1.37	1.40	1.43
1250	1.04	1.07	1.10	1.13	1.16	1.19	1.22	1.25	1.28	1.31	1.34	1.37	1.40	1.43	1.46	1.50
1300	1.08	1.11	1.14	1.18	1.21	1.24	1.27	1.30	1.33	136	1.39	1.42	1.45	1.48	1.52	1.55
1400	1.17	1.20	1.23	1.27	1.30	1.33	1.37	1.40	1.43	1.47	1.50	1.53	1.57	1.60	1.63	1.65
1500	1.25	1.28	1.32	1.36	1.39	1.43	1.46	1.50	1.54	1.57	1.60	1.64	1.68	1.71	1.75	1.79
1600	1.33	1.37	1.41	1.45	1.48	1.52	1.56	1.60	1.64	1.67	1.70	1.75	1.80	1.83	1.85	1.90
1700	1.42	1.46	1.50	1.54	1.58	1.62	1.65	1.70	1.75	1.78	1.82	1.85	1.90	1.95	1.98	2.00
1800	1.50	1.54	1.59	1.63	1.67	1.70	1.75	1.80	1.85	1.89	1.93	1.95	2.00	2.05	2.10	2.15
1900	1.58	1.63	1.67	1.72	1.75	1.80	1.85	1.90	1.95	2.00	2.08	2.12	2.10	2.15	2.20	2.25
2000	1.67	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20	2.25	2.30	2.35	2.40
2100	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50
2200	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60
2300	1.95	2.00	2.05	2.10	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70
2400	2.00	2.05	2.10	2.15	2.20	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.70	2.75	2.80	2.85
2500	2.10	2.15	2.20	2.25	2.30	2.40	2.45	2.50	2.55	2.60	2.70	2.75	2.80	2.85	2.90	3.00
2600	2.20	2.25	2.30	2.35	2.40	2.50	2.55	2.60	2.65	2.70	2.80	2.85	2.90	2.95	3.00	
2700	2.25	2.30	2.40	2.45	2.50	2.55	2.65	2.70	2.75	2.85	2.90	2.95	3.00			
2800	2.35	2.40	2.45	2.55	2.60	2.65	2.75	2.80	2.85	2.95	3.00					
2900	2.45	2.50	2.55	2.60	2.70	2.75	2.85	2.90	2.95							
3000	2.50	2.55	2.65	2.70	2.80	2.85	2.95	3.00								
3100	2.60	2.65	2.75	2.80	2.90	2.95										
3200	2.65	2.75	2.80	2.90	2.95											

Appendix

Tank height [mm]	Density of the liquid to be measured [kg/m³]															
	700	720	740	760	780	800	820	840	860	880	900	920	940	960	980	1000
3300	2.75	2.85	2.90	3.00												
3400	2.85	2.90	3.00													
3500	2.90	3.00														
3600	3.00															

*This table does not apply to Unitel for water (part numbers 72511, 72516).