Technik für Umweltschutz

Messen. Regeln. Überwachen.

Operating instructions

Digital tank contents indicator

DIT 10

Lindenstraße 20
74363 Güglingen
Telephone +49 7135 102-0
Service +49 7135 102-211
Telefax +49 7135 102-147
info@afriso.com
www.afriso.com

Version: 02.2022.0
ID: 900.000.0740

1 About these operating instructions

These operating instructions describe the digital tank contents indicator "DIT 10" (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 and as per DIN SPEC 51603-6 with 5 - 100 % fatty acid methyl ester (FAME) as per EN 14214
- Diesel fuel as per EN 590 with up to 7 % fatty acid methyl ester (FAME) as per EN 14214
- Biodiesel with up to 100 % fatty acid methyl ester (FAME) as per EN 14214
- Paraffinic fuels (such as HVO/GTL) proportionately with 0 - 100 %

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

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

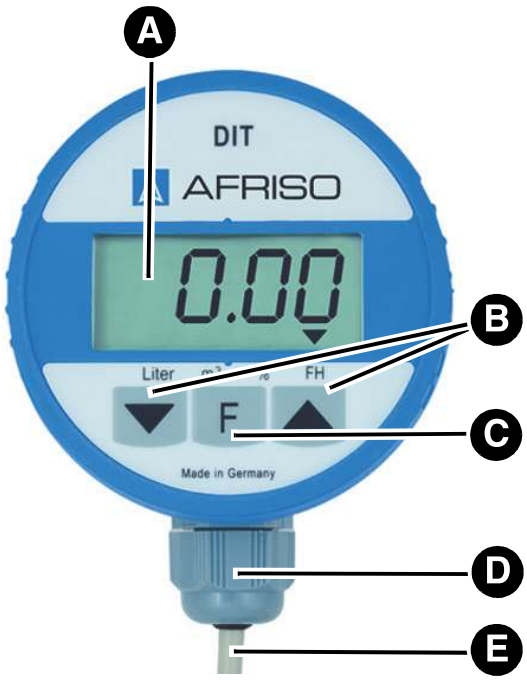
- Verify compliance with the specified ambient conditions during transport or storage of the product.
- Use the original packaging when transporting the product.
- Store the product in a clean and dry environment.
- Verify that the product is protected against shocks and impact during transport and storage.

Failure to follow these instructions can result in equipment damage.

4 Product description

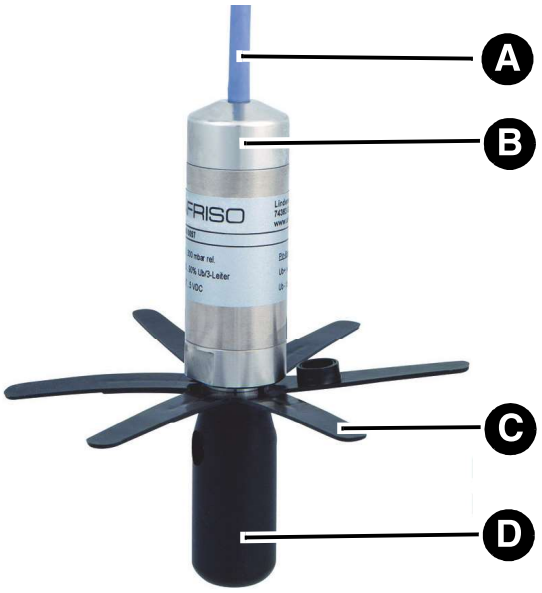
The product consists of a control unit with a digital display and a submersible probe with a pressure sensor.

4.1 Overview



A. Display
B. Programming keys
C. Function key
D. Cable gland
E. Cable

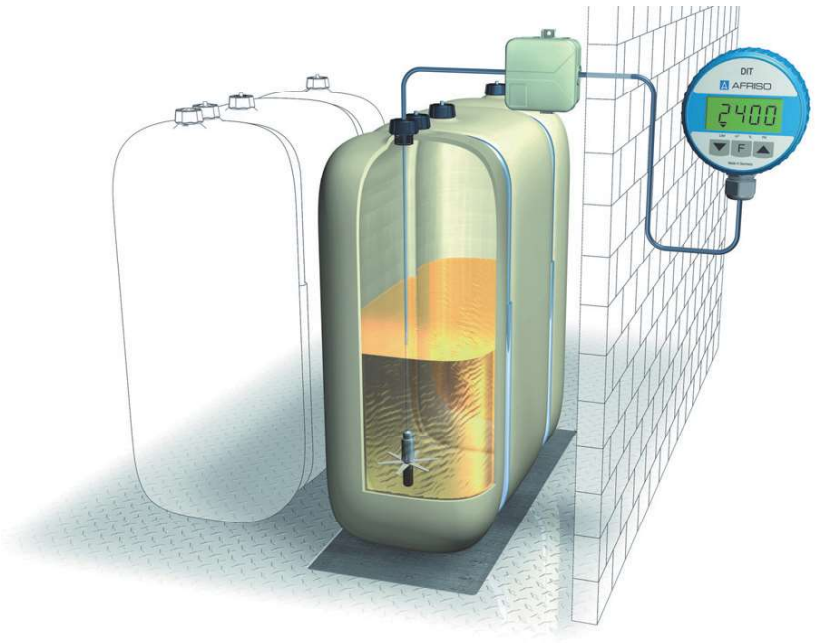
Fig. 1: Control unit



A. Cable with vent hose
B. Pressure sensor
C. Star
D. Spacer

Fig. 2: Submersible probe

4.2 Application example



4.3 Function

The submersible probe measures the hydrostatic pressure at the tank bottom and converts it into a voltage signal. The voltage signal is transmitted to the control unit.

The control unit calculates the content of the tank on the basis of the voltage signal and displays the content (in litres, cubic metres, percentage, liquid level).

4.4 Approvals, conformities, certifications

The product complies with:

- EMC Directive (2014/30/EU)
- RoHS Directive (2011/65/EU)

4.5 Technical data

4.5.1 Control unit

Parameter	Value
General specifications	
Dimensions (Ø x L)	75 x 50 mm
Cable length	5 m
Housing material	PA6 15 % glass-loaded
Display	Graphic, 4 digits
Measuring accuracy*	± 1.5 %
Function	Level measurement
Ambient conditions	
Ambient temperature operation	0 ... 45 °C
Temperature of the medium	-5 ... 70 °C
Ambient temperature storage	-5 ... 80 °C
Electrical data	
Degree of protection (EN 60529)	IP 51
Supply voltage	
Nominal voltage	3.6 V
Supply voltage via battery	Lithium battery 3.6 V Type LS 14500, Li-metal

*Accuracy of the complete system with reference to the indication of the liquid level in mm: ±1.5 % FSO, IEC 60770.

4.5.2 Submersible probe

Parameter	Value
General specifications	
Dimensions (Ø x L)	24 x 64.5 mm
Weight	350 g
Cable length	6 m
Pressure range	0 - 400 mbar
Measuring accuracy*	< ± 0.5 %
Temperature error	< ± 0.3 % FSO, 10 K in compensated range 0 ... 70 °C
Ambient conditions	
Temperature of the medium	-5 ... 70 °C
Ambient temperature storage	-5 ... 70 °C
Electrical safety	
Degree of protection (EN 60529)	IP 68

*Accuracy of the complete system with reference to the indication of the liquid level in mm: ±1.5 % FSO, IEC 60770.

5 Mounting

- ⇨ Verify that the control unit is accessible and easy to oversee at all times.
- ⇨ Verify that the control unit is protected against water and splash water.
- ⇨ Verify compliance with the permissible ambient conditions.
- ⇨ Verify that the control unit is protected from direct sunlight.

5.1 Determining the tank data

5.1.1 Tank shape

Tank shape code	Tank shape	Description
1	Linear tank	Rectangular tanks, upright cylinders, steel tanks welded in the basement and all other linear measuring applications
2	Cylindrical tank	Vertically mounted cylinders
3	Spherical tank	Spherical tanks
4	Plastic battery tank	Plastic battery type tanks with straps or bulges
5	Oval tank	Oval basement tanks (for example, glass-fibre reinforced plastic tanks or sheet metal tanks)
6	Plastic tank with recess	Plastic tanks with larger recesses in the tank centre (manufacturers: for example, Roth, Werit)

Tank shape code:_____

5.1.2 Tank volume

1. Determine the total volume of the tank system in litres (see the technical data of the tank).

Tank volume:_____litres

5.1.3 Tank height (maximum liquid level)

1. Determine the tank height in mm (see the technical data of the tank).

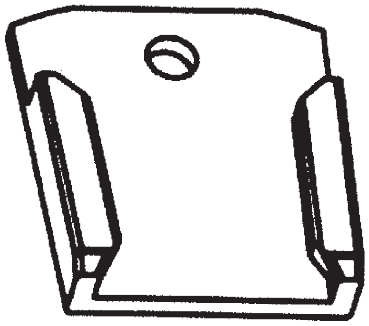
Tank height:_____ mm

5.1.4 Current liquid level

1. Determine the liquid level in mm (for example, use a dipstick to determine the liquid level).

Liquid level:_____ mm

5.2 Mounting the wall bracket



1. Mount the wall bracket at a suitable location using the enclosed screws (4 x 30 mm).

5.3 Mounting the moisture-proof junction box

⇨ Verify that the moisture-proof junction box is not used for outdoors.

⇨ Verify that the cable length is sufficient so that the control unit can be removed from the wall bracket if you need to replace the battery.

1. Mount the moisture-proof junction box using the enclosed screws.
2. Fit the control unit into the wall bracket.
3. Route the cable (pressure sensor cable and cable of the control unit) into the moisture-proof junction box.
4. Push the cable gland at the tank onto the cable of the pressure sensor.

5.4 Electrical connection

NOTICE

INOPERABLE PRODUCT

- Verify that the transparent hose of the pressure sensor is not closed or bent.

Failure to follow these instructions can result in equipment damage.

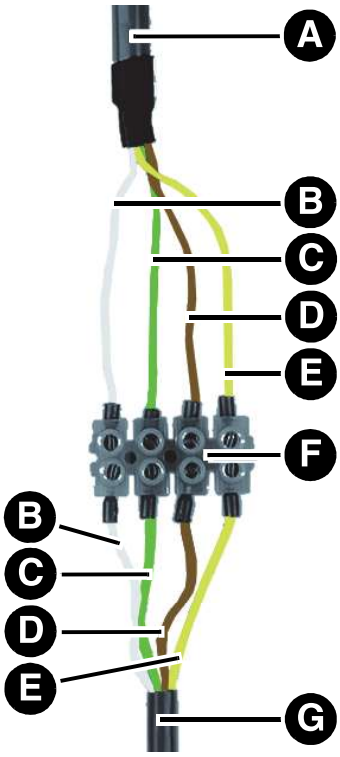
⇨ Verify that the the moisture-proof junction box is closed in such a way that it is water-tight.

⇨ Verify that the moisture-proof junction box is closed in such a way that it is **not** air-tight.

5.4.1 Connection diagram

⇨ Verify that the cables of the pressure sensor and of the control unit have been routed into the moisture-proof junction box.

1. Connect the cables using the terminal strip.
2. Close the moisture-proof junction box.



A. Cable from control unit
B. White (U+)
C. Green (signal)
D. Brown (U-)
E. Yellow/black (shield)
F. Terminal strip
G. Cable from pressure sensor

5.4.2 Connecting the lithium battery

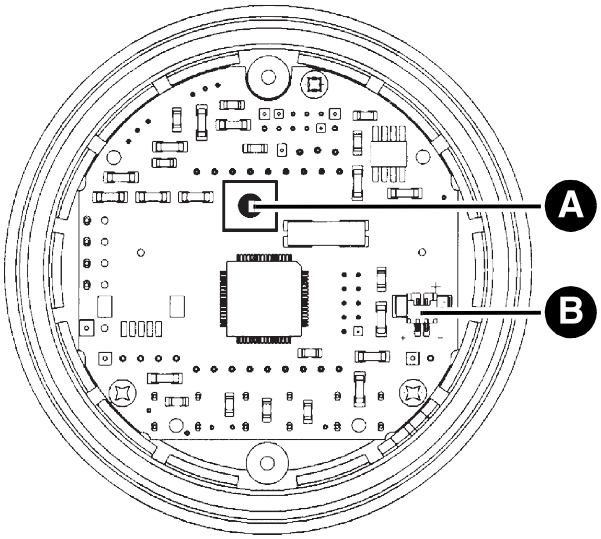
If you insert a new lithium battery, the tank data already stored are not cleared.

NOTICE

INOPERABLE PRODUCT

- Verify correct polarity when plugging the battery connector into the socket on the PCB.

Failure to follow these instructions can result in equipment damage.



1. Turn the upper part of the control unit clockwise all the way to the stop.
2. Remove the upper part of the housing.
   - There are wires between the upper part of the housing and the bottom part of the housing.
3. Press the reset pushbutton (A) and hold it down.
4. Plug the two-pin battery connector into the two-pin socket (B) on the PCB.
   - Verify correct polarity.
5. Release the reset pushbutton (A).

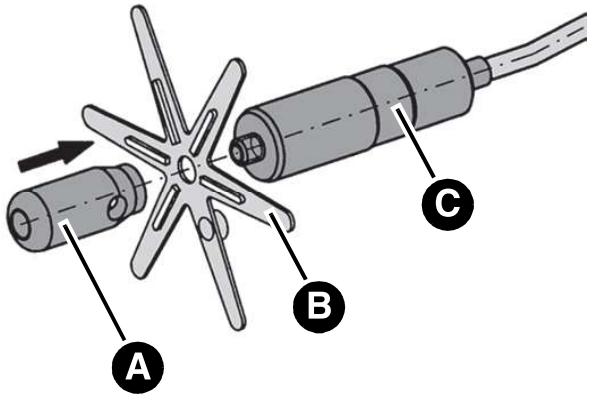
5.5 Zero calibration

⇨ Verify that the pressure sensor is not in the tank.

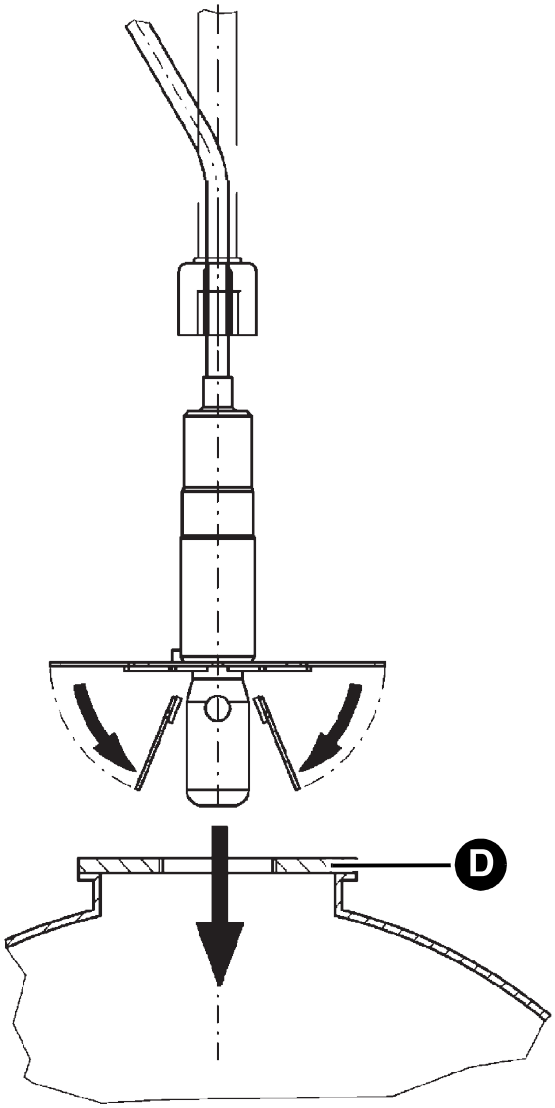
1. Close the control unit.
   - The control unit is on.
   - The display toggles between "Zero" and the current offset of the pressure sensor (indication in hPa = mbar).
   - The arrows on the display indicate that the control unit in calibration mode.
2. Press the two programming keys simultaneously.
   - The value is set to 0.00.
   - In this state, zero calibration can be performed any number of times.
3. Press the function key to terminate zero calibration.
   - An arrow pointing to the unit "Litres" is displayed at the bottom of the display.

5.6 Mounting the pressure sensor

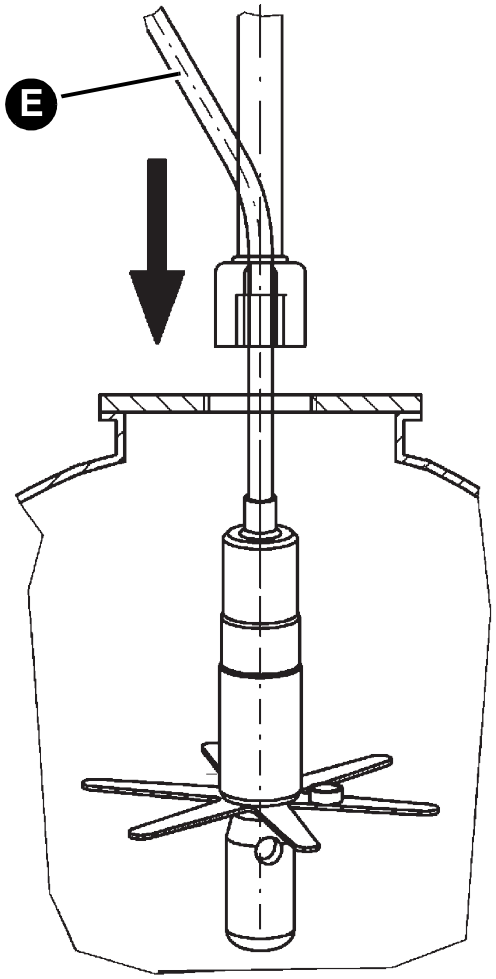
⇨ Verify that zero calibration has been performed.



1. Plug the star (B) onto the pressure sensor (C). Note the position of the ribs at the star.
2. Use the spacer (A) to screw the star (B) to the pressure sensor (C).



3. Bend the arms of the star over the spacer.
4. Push the pressure sensor from the top though the tank connection thread (D).



5. At the cable gland, adjust the cable length of the sensor cable in such a way that the tip of the pressure sensor reaches the tank bottom.

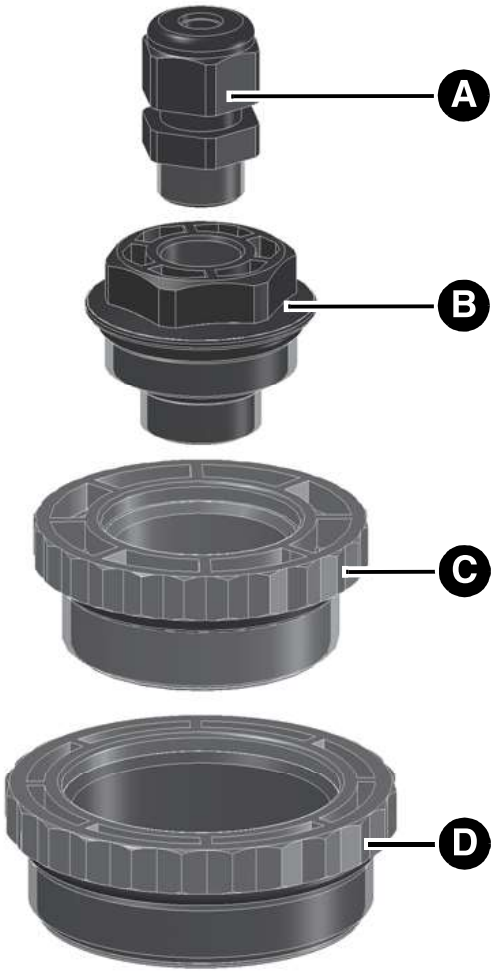
⇨ Verify that the pressure sensor is not submerged in sludge.

6. Only fit the withdrawal hose (E) after the pressure sensor is in the tank.
7. Tighten the cable gland so that the cable can no longer be moved and that the connection is odour-tight.

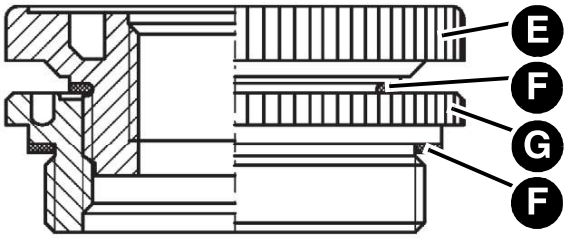
5.7 Mounting with cable gland kit

Use threaded socket in the tank for mounting.

1. Route the cable of the pressure sensor trough the cable gland.
   - For mounting to the tank, use the appropriate parts of the cable gland kit required for your specific tank.
2. Determine the cable length as described above.
3. Tighten the cable gland so that the cable can no longer be moved and that the connection is odour-tight.

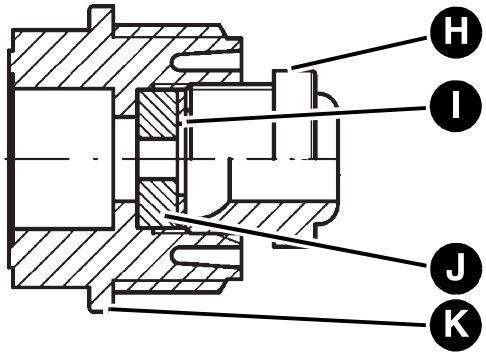


A. Cable gland (PG 9) for holding the cable
B. Screw fitting G1 / G$^{1}/_{2}$ cable gland (PG 9)
C. Reducer G1$^{1}/_{2}$ - G1
D. Reducer G2 - G1$^{1}/_{2}$



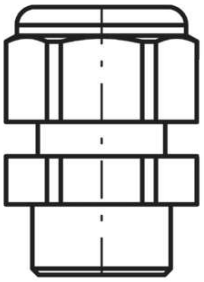
Cable gland kit
G2 x G1$^{1}/_{2}$ x G1

E. Reducer G1$^{1}/_{2}$ - Rp1
F. Flat gasket NBR
G. Reducer G2 - G1$^{1}/_{2}$



Cable gland kit G1

H. Sealing gland
I. Washer Ø 17
J. Gland
K. Screw fitting



Cable gland (PG 9)

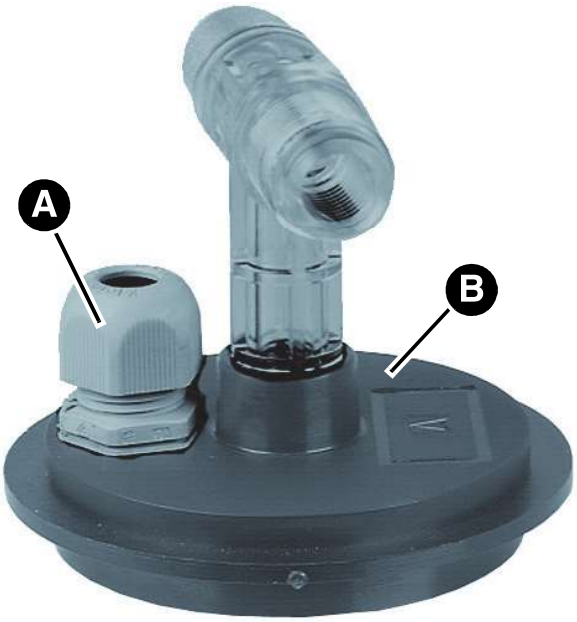
5.8 Mounting with cable gland (PG 9)

NOTICE

DAMAGE TO THE SYSTEM

- Only use existing tank connections to install the product.
- Verify that you only drill into existing screw fittings, caps or blind connections.
- Verify that no foreign matter (such as drilling chips) can get into the tank during mounting.

Failure to follow these instructions can result in equipment damage.



1. Remove the screw fitting (B), the cap/blind connection from the tank and drill a Ø 15 mm hole.
2. Insert the enclosed cable gland (PG 9) (A) and fasten it with the enclosed nut.
3. Route the cable of the pressure sensor trough the cable gland (PG 9) (A) and tighten the cable gland so that the cable can no longer be moved and that the connection is odour-tight.

6 Commissioning

⇨ Verify that all components have been properly mounted and electrically connected.

6.1 Entering the tank data

⇨ Verify that zero calibration has been performed.

6.1.1 Adjusting the tank shape

⇨Verify that the arrow at the bottom of the display points to the unit *Litres*.

The display shows the code of the selected tank shape.
- When the unit is commissioned for the first time, the displayed code is *0*. Code *0* means that no tank shape has yet been selected.

1. Use the two programming keys to set the code of the tank shape determined (see chapter "Tank shape").
2. Press the function key to confirm the setting.

6.1.2 Tank volume

⇨Verify that the arrow at the bottom of the display points to the unit *m³*.

The display shows the tank volume set.
- The value *0000* means that no tank volume has yet been entered.

1. Use the programming keys to enter the total volume of the tank facility determined.
2. Press the programming key (arrow up) to select the digit to be changed.
3. Then press the programming key (arrow down) to change the value of the selected digit.
   - Up to a value of 9999 litres, the value is entered in litres without a decimal place.
   - In the case of volumes > 9999 litres, the value is entered in cubic metres (1000 litres = 1 cubic metre) with a decimal place.
4. Use the programming key (arrow up) to move the decimal place.
5. Press the function key to confirm the setting.

6.1.3 Tank height

⇨Verify that the arrow at the bottom of the display points to the unit %.

The display shows the tank height adjusted.
- The value *0000* means that no tank height has yet been entered.

1. Use the two programming keys to enter the determined tank height in *mm*.
2. Press the programming key (arrow up) to select the digit to be changed.
3. Press the programming key (arrow down) to change the value of the selected digit.
4. Press the function key to confirm the setting.

6.1.4 Current liquid level

⇨Verify that the arrow at the bottom of the display points to the unit Level (*FH*).
- The display shows level measured by the submersible probe in *mm*.

The value shown on the display is based on the tank data you have already entered and on the measurement.

Check whether the displayed value corresponds to the value you have determined in chapter "Determining the tank data". The fuller the tank, the higher the measuring accuracy.
- If the actual liquid level is less than 50 %, it is not meaningful to correct the displayed value.

1. Use the two programming keys to enter the determined liquid level in *mm*.
2. Press the programming key (arrow up) to select the digit to be changed.
3. Press the programming key (arrow down) to change the value of the selected digit.
4. Press the function key to confirm the setting.

You have now entered all the tank data and the control unit switches to measurement mode.
- The symbol (both arrows) is no longer displayed in the top left corner of the display.

7 Operation

7.1 Switching the product on and off

1. Press the function key to switch on the display of the control unit.
   - The control unit automatically switches off approximately 2 $^1/_2$ minutes after the last time a key was pressed. The display shows *OFF*.

7.2 Display formats

Keep pressing the function key to select one of the four available units for the level:

- Indication of volume in litres
  - The arrow at the bottom of the display points to *Litres*
- Indication of volume in m³
  - The arrow at the bottom of the display points to *m³*
- Indication of volume in percent of total contents
  - The arrow at the bottom of the display points to *%*
- Indication of liquid level in mm
  - The arrow at the bottom of the display points to *FH*

7.3 Correcting the adjusted tank data

If the measured value exceeds the set tank data (for example, because the tank data is incorrect), the display starts to flash. The display toggles between the displayed value and "----".

- Only the current liquid level in mm is displayed permanently.

1. Simultaneously press and hold down the two programming keys for a period of three seconds to activate the "Enter Tank Data" mode.
   - The upper left corner of the display shows the arrows.
2. Correct the tank data (see chapter "Determining the tank data").
   - If you do not want to change any of the tank data, press the function key four times to return to the measuring mode.
   - The arrows are no longer displayed in the top left corner of the display.

7.4 Zero calibration at a later point in time

⇨ Verify that the submersible probe is not submerged in the medium.

1. Turn the upper part of the control unit clockwise all the way to the stop.
2. Remove the upper part of the housing.
   - There are wires between the upper part of the housing and the bottom part of the housing.
3. Remove the battery connector from the PCB.
4. Connect the lithium battery (see chapter "Connecting the lithium battery").
5. Perform zero calibration (see chapter "Zero calibration").
6. Enter the tank data (see chapter "Entering the tank data").

8 Maintenance

8.1 Maintenance intervals

When	Activity
If required	Replace the battery

8.2 Maintenance activities

1. Proceed as described in chapter "Connecting the lithium battery".
   - The tank data already stored are not cleared when the battery is replaced.

8.3 Use in flood hazard areas

The product is suitable for use in flood hazard areas; it is watertight up to 10 mH_2O (1 bar pressure).

After a flood, the product does not have to be replaced.

9 Troubleshooting

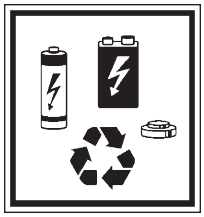
Any malfunctions that cannot be removed by means of the measures described in this chapter may only be repaired by the manufacturer.

Problem	Possible reason	Repair
The display shows *OFF*	Automatic switch off after 2 $^1/_2$ minutes	Press the function key to read the liquid level
The display shows the battery symbol	The battery voltage is below critical value	Replace the lithium battery (see chapter "Connecting the lithium battery")
Display remains blank	The battery is not connected	Connect the lithium battery (see chapter "Connecting the lithium battery")
	The battery connector is not connected to the PCB	Check the battery connector (see chapter "Connecting the lithium battery")
Display toggles between value and "----"	Incorrect tank data entered	Correct the tank data (see chapter "Entering the tank data")
The displayed level is incorrect	Incorrect tank data entered	Correct the tank data (see chapter "Entering the tank data")
Display toggles between *9999* and "----"	Line interruption or submersible probe not connected	Check the cable and the submersible probe
Display shows *0* even though the level is higher	Short circuit in the connection cable between the pressure sensor and the control unit	Check the cable
Other malfunctions	-	Contact the AFRISO service hotline

10 Decommissioning, disposal

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

Electronic components and batteries must not be disposed of together with the normal household waste.



1. Dismount the product (see chapter "Mounting", reverse sequence of steps).
2. Remove the battery (see chapter "Connecting the lithium battery", reverse sequence of steps).
3. Dispose of the product and of the battery separately.

11 Returning the device

Get in touch with us before returning your product (service@afriso.de).

12 Warranty

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

13 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
Digital tank contents indicator "DIT 10"	52150	

Spare parts and accessories

Product designation	Part no.	Figure
Spare battery	68309	-
Spare submersible probe (0/400 mbar)	52153	-
Outdoor junction box	31824	-
Cable gland kit + cable gland G1	52125	-