Operating Instructions

Mechanical Tank Contents Gauge with Electronic Remote Indication
Type: Unimes E

Part no.: 52130

☞ Read instructions before using device!

☞ Observe all safety information!

☞ Keep instructions for future use!

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Contents

1 This instruction manual

This instruction manual is part of the product.

▶ Read this manual before using the instrument.

▶ Keep this manual during the entire service life of the product and always have it readily available for reference.

▶ Always hand this manual over to future owners or users of the product.

1.1 Precautions

WARNING TERM Type and source of the danger are shown here.

▶ Precautions to take in order to avoid the danger are shown here.

There are three different levels of warnings:

Warning term	Meaning
DANGER	Immediately imminent danger! Failure to observe the information will result in death or severe injuries.
WARNING	Possibly imminent danger! Failure to observe the information may result in death or severe injuries.
CAUTION	Dangerous situation! Failure to observe the information may result in minor or severe injuries as well as damage to property.

1.2 Explanation of symbols and typeface

Symbol	Meaning
☑	Prerequisite for an activity
▶	Activity consisting of a single step
1.	Activity consisting of a several steps
↳	Result of an activity
•	Bulleted list
Text	Indication on display
Highlighting	Highlighting

2 Safety

2.1 Intended use

Unimes E is only suitable for continuous level measurement in tanks containing fuel oil EL, diesel and other low-viscosity media which do not attack the materials used (refer to chapter 4, page 9). For tank heights from 900 to 2000 mm.

Any use other than the application explicitly permitted in this instruction manual is not permitted.

2.2 Predictable incorrect application

Unimes E must never be used in the following cases:

- Hazardous areas (ex)
- Applications involving persons and animals

2.3 Safe handling

Unimes E represents state-of-the-art technology and is made according to the pertinent safety regulations. Each device is subjected to a function and safety test prior to shipping.

▶ Operate Unimes E only when it is in perfect condition. Always observe the operating instructions, all pertinent local and national directives and guidelines as well as the applicable safety regulations and directives concerning the prevention of accidents.

▶ Unimes E is not safety equipment. It does not replace the function of a level sensor at the fuel oil tank.

▶ Unimes E may only be installed in unpressurised tanks. An approved tank vent and a fully functional level sensor must be installed.

▶ The measured values displayed, in particular the values of the litre indication, must not be used for billing purposes. The accuracy of the measured values displayed depends on the accuracy of the tank data determined and entered. Therefore, the accuracy required for billing purposes cannot be guaranteed by the manufacturer.

Extreme environmental conditions have negative effects on the function of the product.

▶ Protect the product from shocks.
▶ Only use the product in rooms.
▶ Protect the product from humidity.

2.4 Staff qualification

The product may only be mounted, commissioned, operated, maintained, shut down and disposed of by qualified, specially trained staff.

Electrical work may only be performed by trained electricians qualified in accordance with the local and national directives such as VDE.

2.5 Modifications to the product

Changes or modifications made to the product by unauthorised persons may lead to malfunctions and are prohibited for safety reasons.

2.6 Usage of spare parts and accessories

Usage of unsuitable spare parts and accessories may cause damage to the product.

▶ Use only genuine AFRISO-EURO-INDEX GmbH spare parts and accessories (refer to chapter 11, page 19).

2.7 Liability information

AFRISO-EURO-INDEX GmbH shall not be liable in any form whatsoever for damages and consequential damages resulting from failure to observe the technical instructions, guidelines and recommendations.

The manufacturer or the sales company shall not be liable for costs or damages incurred by the user or by third parties in the usage or application of this device, in particular in case of improper use of the device, misuse or malfunction of the connection, malfunction of the device or of connected devices. The manufacturer or the sales company shall not be liable for any damage whatsoever resulting from any use other than the use explicitly permitted in this instruction manual.

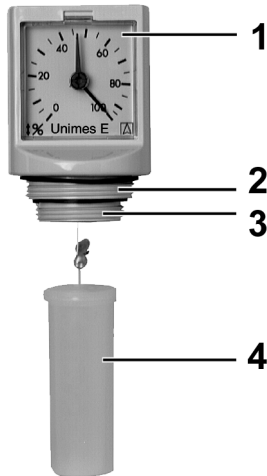AFRISO-EURO-INDEX GmbH shall not be liable for misprints.

3 Product description

3.1 Scope of delivery

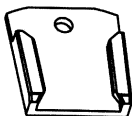- Direct indication gauge with float

1 Direct indication gauge

2 G2 thread

3 G1½ thread

4 Float

- Remote indicator with battery and connection cable

1 Display

2 Programming keys

3 PG cable gland

4 Connection cable

5 Function key

- Wall bracket for remote indicator

3.2 Function

The direct indication gauge is a universal mechanical tank contents gauge. It features a fully adjustable brass and nickel silver gear train mechanism. The pointer movement is always 270° when the tank is full. The level is indicated in percentage of height. An electronic sensor is located at the movement. It supplies the remote indicator with a signal that is proportional to the level.

The remote indicator is connected to the mechanical gauge by means of a 3-core screened cable and plug. The remote indicator is operated by means of a long-lasting battery. It is only switched on to read the level (push-to-read function). Diverse tank shapes are stored in a microprocessor so that the level is indicated either in liquid level or volume, as desired.

This combination of devices allows you to check the supply directly next to the tank and from an easily accessible, different location.

The measurement signal is transmitted to the remote indicator via the cable. Using this signal, the electronic system of the remote indicator calculates the tank contents which can be displayed in litres, cubic metres, percentage or liquid level. The display mode is selected by means of function key F. The two programming keys ▼ and ▲ are used to enter the tank data.

3.3 Application example
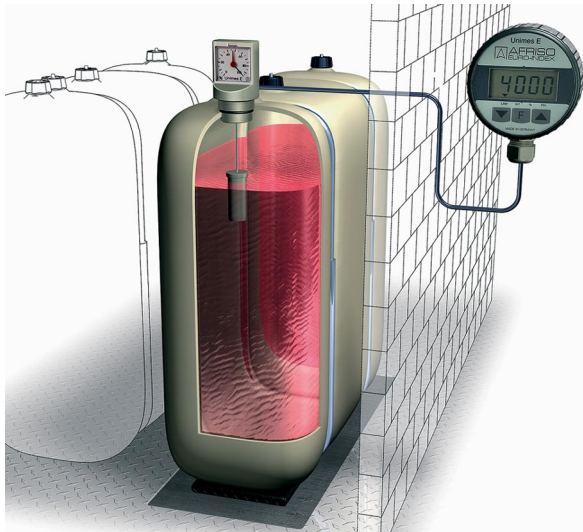
Fig. 1: Application example

4 Technical specifications

Table 1: Direct indication gauge

Parameter	Value
General specifications	
Housing dimensions (ø x H)	80 x 100 mm
Weight	180 g
Housing material	Impact-resistant ABS
Display	Percentage (%)
Mounting	Double thread G2-G1½
Operating temperature range	
Medium	0 °C to +60 °C
Storage	-5 °C to +80 °C
Electrical safety	
Protection	IP 30 EN 60529

Table 2: Float

Parameter	Value
Housing dimensions (ø x H)	42 x 100 mm
Weight	95 g
Housing material	PE-HD

Table 3: Remote indicator

Parameter	Value
General specifications	
Dimensions (ø x D)	75 x 50 mm
Weight	380 g
Cable length	10 m
Housing material	PA6 15 % glass loaded
Supply	3.6 V lithium battery
Service life of battery	Max. 8 years (if F key is pressed once per month)
Display	4-digit LC display
Resolution	14 bits

Parameter	Value
Measurement input	0 to 3.6 V
Accuracy*	< ± 1.0 % FSO, IEC 60770
Operating temperature range	
Ambient	0 °C to +45 °C
Storage	-5 °C to +80 °C
Electrical safety	
Protection	IP 51 EN 60529
Electromagnetic compatibility (EMC)	
Interference	According to EN 50081-1
Noise immunity	According to EN 50082-1

Accuracy of the complete system*: < ± 5 % FSO, IEC 60770

* relating to indication of the liquid level in mm.

4.1 Approvals, tests, conformities

Unimes E complies with the EMC directive (89/336/EEC und 92/31/EEC).

5 Transport and storage

CAUTION	**Damage to the device due to improper transport.**
⚠️	▶ Do not throw or drop the device.

CAUTION	**Damage to the device due to improper storage.**
⚠️	▶ Protect the device from shock when storing it.
	▶ Store the device in a clean and dry environment.
	▶ Only store the device within the permissible temperature range.

6 Mounting and commissioning

6.1 Determining the tank data

Before Unimes E can be installed, you must determine the tank data. For safety reasons and to facilitate subsequent checks, you should document the tank data on this page.

Tank shape

▶ Determine the tank shape code using the table below.
Example for linear indication: tank shape code 1.

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	Ball-shaped tank	Tanks with the shape of a ball
4	Plastic battery type tank	Plastic battery type tanks with straps or bulges
5	Oval tank	Oval basement tanks, e.g. glass-fibre re-enforced tanks or sheet metal tanks
6	Plastic tank with recess	Plastic tanks with larger recesses in the tank centre (manufacturers: e.g. Roth, Werit)

Determined tank shape code:

Tank volume

▶ Determine the total volume of the tank facility.

Determined tank volume: litres

Tank height (max. liquid level)

▶ Determine tank height.

Determined tank height: mm

Current liquid level

▶ Determine the current liquid level as accurately as possible.

Determined liquid level: mm

6.2 Mounting the wall bracket for the remote indicator

▶ Mount the wall bracket to the wall where you want to position the remote indicator using the enclosed screw (4 x 30 mm) and a dowel, if required (6 mm).

6.3 Adjusting the float

☑ A free connection G1½ or G2 is available at the tank.

The float wire has three lead seals. Lead seal 1 is located at the end, lead seal 2 is located 15 cm higher. The moving lead seal 3 is located between these two lead seals.

1 Lead seal 1: fixated

2 Lead seal 2: fixated

3 Lead seal 3: moving
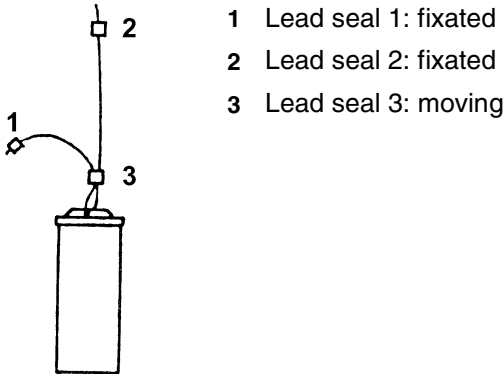
Fig. 2: Float wire

Tank without manhole or flange connection piece

▶ Push the float up to lead seal 2 and press lead seal 3 together to fixate the float.

Tank with manhole or flange connection piece

1. Deduct the excess length of the manhole or the flange connection piece with reference top the wire length from probe 2 towards probe 1.
2. Mark the point, push the float up to the mark and press lead seal 3 together to fixate the float

6.4 Adjusting the tank height at the direct indication gauge

The direct indication gauge is factory-adjusted to the maximum height which corresponds to a tank height or diameter or 200 cm.

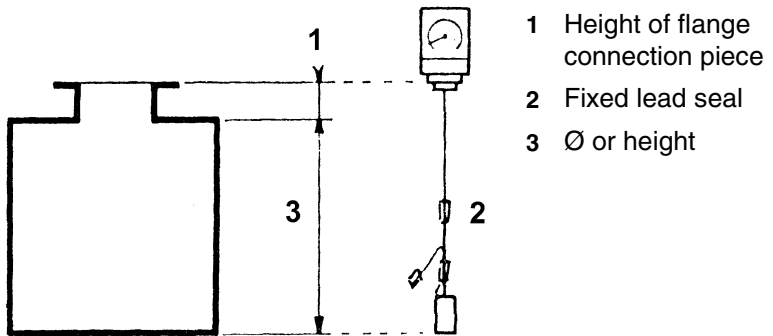1. Adjust the length of the float wire to the tank height according to the illustration below:

1 Height of flange connection piece

2 Fixed lead seal

3 Ø or height

2. Hold the float wire in this position.
3. Turn the adjustment screw to set the pointer to zero.
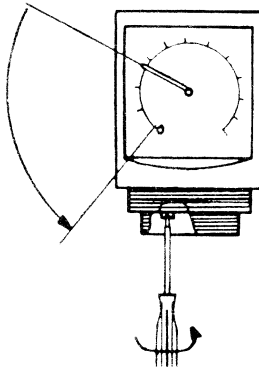
↳ The direct indication gauge is now adjusted to the tank.

6.5 Connecting the direct indication gauge and the remote indicator

▶ Plug the connector of the connection cable into the rear side of the direct indication gauge.

6.6 Connecting the battery of the remote indicator

1. When the direct indication gauge and the remote indicator are electrically connected, open the housing of the remote indicator by turning the upper part all the way to the stop and pulling it open.

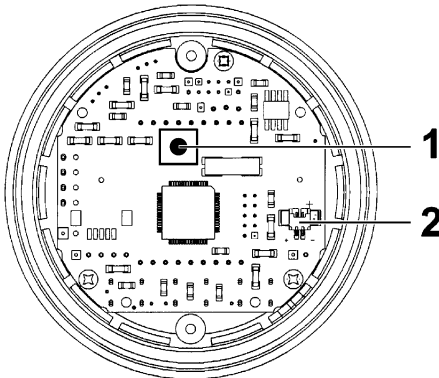2. Press mini button (1) and hold it down. Plug the two-pole battery plug into the two-pole socket (2) on the PCB.

1 Mini button

2 Socket

Fig. 3: PCB

WARNING	**Danger of explosion due to short circuit of lithium battery**
⚠️	▶ Do not short-circuit the lithium battery.

3. Release the mini button.

6.7 Zero point adjustment at the remote indicator

☑ The pointer of the direct indication gauge points to zero.

1. Close the housing of the remote indicator by pushing the housing parts together.

The remote indicator was switched on when the battery was connected. The display toggles between "Zero" and the current offset of the complete system. The upper left corner of the display shows the two arrows ▼▲ to indicate that the instrument is in calibration mode.

2. Press the two keys ▼ and ▲ simultaneously in order to correct the offset to the value 0.00.
In this state, zero calibration can be performed any number of times.

3. Press the F key in order to terminate zero calibration.

↳ An arrow pointing to the unit "Litres" is displayed at the bottom of the display.

6.8   Entering the tank data at the remote indicator

☑ Zero calibration has been performed.

☑ The pointer of the direct indication gauge points to 100 %.

Tank shape

☑ 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 keys ▼ and ▲ to set the code of the tank shape determined. Refer to chapter 6.1, page 11.

2.   Press the F key to accept the setting and continue with the tank volume.

Tank volume

☑ The arrow at the bottom of the display points to the unit m³.

☑ The display shows the currently selected tank volume. 0000 means that no tank volume has yet been entered.

1.   Use the ▼ and ▲ keys to enter the total volume of the tank facility. By pressing the ▲ key, you can select the digit to be changed. The ▼ key allows you to change the selected digit within a range from 0 to 9.

2.   Up to a volume of 9999 litres, the volume is entered in litres without decimal places. In the case of volumes of > 9999 litres, the value is entered in cubic metres with a decimal place (1000 litres = 1 cubic metre). The decimal place is moved with the ▲ key.

3.   Press the F key to accept the setting and continue with the tank height.

Tank height

☑ The arrow at the bottom of the display points to the unit "Percent". The display shows the currently selected tank height. 0000 means that no tank height has yet been entered.

1.   Set the tank height in mm with the ▼▲ keys: By pressing the ▲ key, you can select the digit to be changed. The ▼ key allows you to change the selected digit within a range from 0 to 9.

2.   Press the F key to accept the setting and continue with the current level.

Maximum liquid level

☑ The pointer of the direct indication gauge points to 100 %.

☑ The arrow at the bottom of the display points to the unit "Level" (FH). The display shows the maximum liquid level in mm measured by the direct indication gauge.

1. Overwrite the displayed value to correct the displayed maximum liquid level: Set the liquid level in mm with the ▼ and ▲ keys. By pressing the ▲ key, you can select the digit to be changed. The ▼ key allows you to change the selected digit within a range from 0 to 9.

2. Press the F key to accept the setting.

↳ You have now entered all the tank data and the remote indicator switches to normal measurement mode.

↳ The symbol ▼▲ in the upper left corner of the display is no longer shown.

6.9   Mounting the direct indication gauge

1. Slowly lower the float into the tank.
2. Screw the direct indication gauge into the tank.

7   Operation

7.1   Switching Unimes E on and off

Direct indication gauge

The direct indication gauge is always on.

Remote indicator

▶ Press the F key to switch on the display of the remote indicator. The remote indicator automatically switches off approx. 2 ½ minutes after the last time a key was pressed.

↳ The display shows OFF.

In this mode, the battery is not discharged. By pressing the F key, you switch on the remote indicator for another 2 ½ minutes, i.e. the level is indicated.

7.2 Display formats of the remote indicator

Direct indication gauge

The liquid level is displayed in %.

Remote indicator

▶ Keep pressing the F 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 % 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 tank data of the remote indicator

If the measured value exceeds the set tank data (e.g. due to incorrect tank data), the display starts to flash. The display toggles between the displayed value and "----". Only the current liquid level in mm is displayed permanently.

1. Hold down the keys ▼▲ simultaneously for 3 seconds to activate the "Enter Tank Data" mode.

✍ The upper left corner of the display shows the symbol ▼▲.

2. The individual tank data can be checked and/or overwritten as described in chapter 6.1, page 11.
   If you do not want to change tank data, press the F key four times to return to the normal measurement mode.

✍ The upper left corner of the display no longer shows the symbol ▼▲.

7.4 Subsequent zero point adjustment at the remote indicator

☑ The pointer of the direct indication gauge points to zero.

1. Unplug the battery connector from the PCB.
2. Proceed as described in chapter 6.6, page 13, to chapter 6.8, page 15.

✍ If you press the mini button when connecting the battery connector, all tank data is cleared.

8 Maintenance

8.1 Maintenance times

When	Activity
⊟⊞ is shown on the display of the remote indicator.	▶ Replace the battery as described in chapter 8.2, page 18.

## 8.2 Replacing the battery of the remote indicator

1. Remove the old battery and connect the new battery (refer to chapter 6.6, page 13).
2. To protect the environment, used batteries **must not** be disposed of together with the normal household waste. Return empty batteries to the point of purchase or to special collecting points.

Saved tank data is not lost when the battery is replaced.

9 Troubleshooting

Repairs may only be performed by specially trained, qualified staff.

Table 4: Troubleshooting

Problem	Possible reason	Repair
"**OFF**" is shown on the display of the remote indicator.	Automatic shutdown after 2 ½ minutes.	▶ Press F key to read the liquid level.
⊟⊞ is shown on the display of the remote indicator.	Battery voltage below critical value.	▶ Replace battery (refer to chapter 8.2, page 18).
Display of the remote indicator is blank.	The battery is not connected.	▶ Connect the battery (refer to chapter 6.6, page 13).
	The battery connector is not connected to the printed.	▶ Check the battery connector.
The display toggles between the displayed value and "----".	Incorrect tank data entered.	▶ Correct the tank data (refer to chapter 7.3, page 17).

Problem	Possible reason	Repair
Incorrect indication of level at remote indicator.	Incorrect tank data entered.	▶ Correct the tank data (refer to chapter7.3, page 17).
The display toggles between the "**9999**" and "----".	Cable break or remote indicator not connected to direct indication gauge.	▶ Check cable and connection.
Display of the remote indicator shows "**0**" in spite of contents > 0.	Short circuit in the connection cable between direct indication gauge and remote connector.	▶ Check cable.
Other malfunctions	–	▶ Send the device to AFRSIO.

10 Shutting down, disposal

1. Dismount the device (see chapter 6, page 11, reverse sequence of steps).
2. To protect the environment, this device **must not** be disposed of together with the normal household waste. Dispose of the device according to the local conditions and directives.

This device consists of materials that can be reused by recycling firms. The electronic inserts can be easily separated and the device consists of recyclable materials.

If you do not have the opportunity to dispose of the used device in accordance with environmental regulations, please contact us for possibilities to return it.

11 Spare parts and accessories

Part	Part no.
Direct indication gauge with float	06 15 07
Remote indicator	06 15 000010
3.6 V lithium battery	68309
Bracket for wall mounting	00 24 000111

12 Warranty

The warranty of AFRISO-EURO-INDEX GmbH for this product is 24 months after the date of purchase. This warranty shall be good in all countries in which this device is sold by AFRISO-EURO-INDEX GmbH or its authorised dealers.

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14 Customer satisfaction

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15 Addresses

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