# Operating instructions



# Level switches

# Minimelder-R
# Maximelder-R

### with relay

Version: 07.2021.0
ID: 900.000.0206

# 1 About these operating instructions

These operating instructions describe the level switches Minimelder-R and Maximelder-R (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.

These operating instructions are protected by copyright and may only be used as provided for by the corresponding copyright legislation. We reserve the right to modifications.

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.

⚠️⚡ **DANGER**

DANGER indicates a hazardous situation, which, if not avoided, will result in death or serious injury.

**NOTICE**

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

In addition, the following symbols are used in these operating instructions:

⚠️ This is the general safety alert symbol. It alerts to injury hazards or equipment damage. Comply with all safety instructions in conjunction with this symbol to help avoid possible death, injury or equipment damage.

⚡ This symbol alerts to hazardous electrical voltage. If this symbol is used in a safety message, there is a hazard of electric shock.

## 2.2   Intended use

This product may be used to signal minimum levels and maximum levels in tanks containing the following liquids:

- Water

- Fuel oil EL, L or M

- Oil/water mixtures

- Comparable liquids with identical viscosity

The product is suitable for liquids to which the following wetted parts are resistant:

- Plastic: polypropylene

- Cable: Ölflex 100

- O ring: NBR (SH 70)

- Weight/screw connection: Brass

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.

- In corrosive liquids

- Use as overfill prevention system

## 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 mount, commission, maintain and decommission 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.**

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# 4 Product description

## 4.1 Overview

The product consists of a control unit and a floating probe. The type designation at the front of the control unit indicates whether the product monitors the minimum level or the maximum level.

- The product Minimelder-R monitors the minimum level in tanks.
- The product Minimelder-R monitors the maximum level in tanks.

If the corresponding level is reached, the product triggers visual and audible alarms. The alarm signal can be transmitted to additional equipment via the output relay.

**Floating probe**

The floating probe determines the minimum level or the maximum level in a tank.



A. Two-wire probe cable

B. Screw fitting with thread G1

C. Brass weight

D. Float switch Minimelder-R
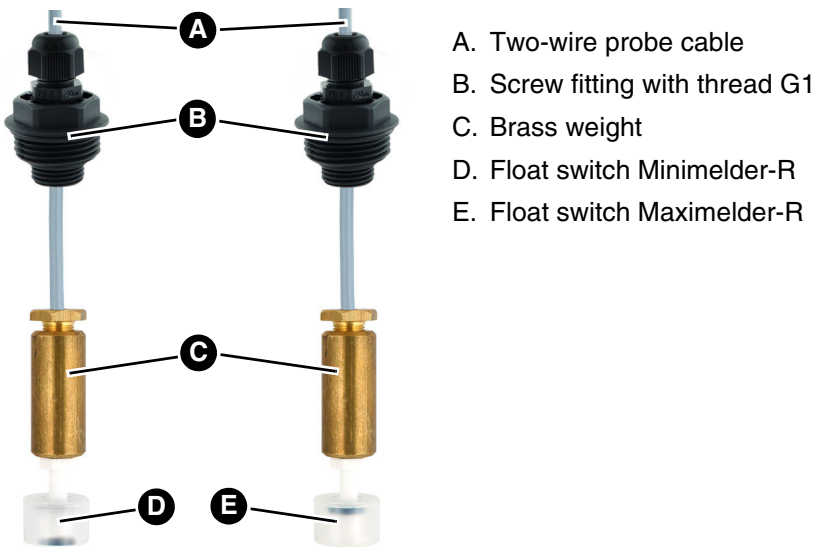
E. Float switch Maximelder-R

*Fig 1: Floating probe*

A magnet in the float of the probe switches a contact. Switching is triggered when the level of the liquid rises or falls and the float switch moves accordingly.

# Product description

The float switch is mounted in such a way that it is suspended at the height/level of the required switching point. The floating probe is connected to the control unit by means of a two-wire probe cable.

## Control unit

The control unit contains the following elements in an impact-resistant plastic housing: display elements and controls as well as all electronic components for signal processing and conversion of the probe signal into a digital output signal. The output signal is available via a voltage-free relay contact (change-over contact).



A. Designation of product

B. Green LED

C. Test key

D. Red LED

E. Acknowledge button

F. Without function

G. LRN pushbutton

H. Icon from AFRISOhome app

I. Type designation of the product

*Fig 2: Control unit*

**Pictograms**

| Symbol | Meaning/function |
|---|---|
| | **Indicator**<br><br>When power is supplied to the product, the green LED next to the symbol indicates that the product is ready for operation. |
| | **Key**<br><br>The Test key allows you to perform the function test of the product. |
| | **Indicator**<br><br>The red LED to the right of the symbol indicates an alarm or an error. |
| | **Key**<br><br>This key allows you to acknowledge and mute the audible alarm. |

# Product description

## 4.2    Dimensions

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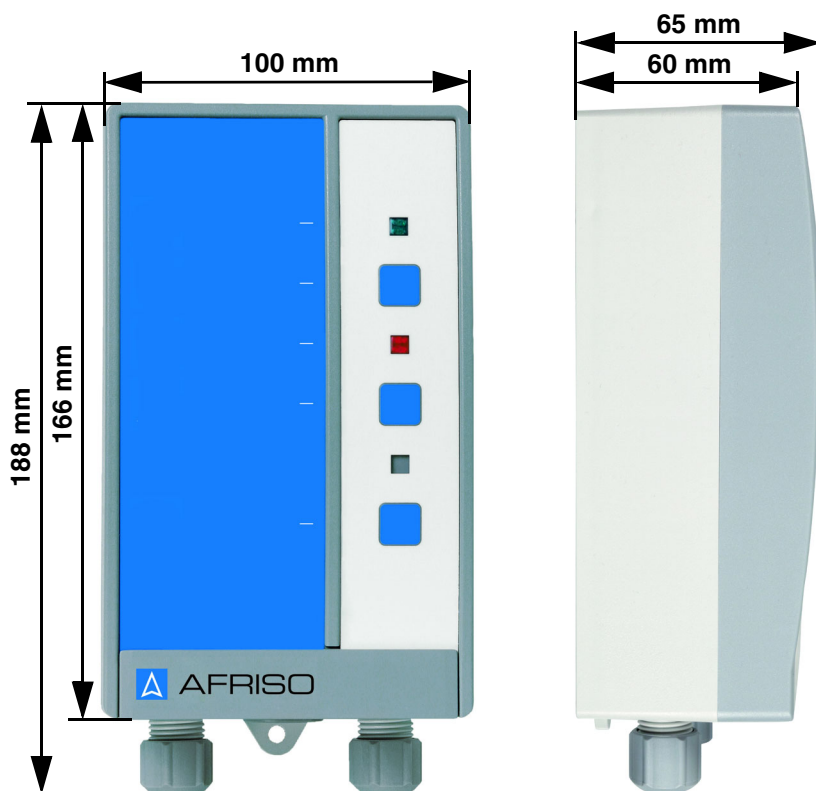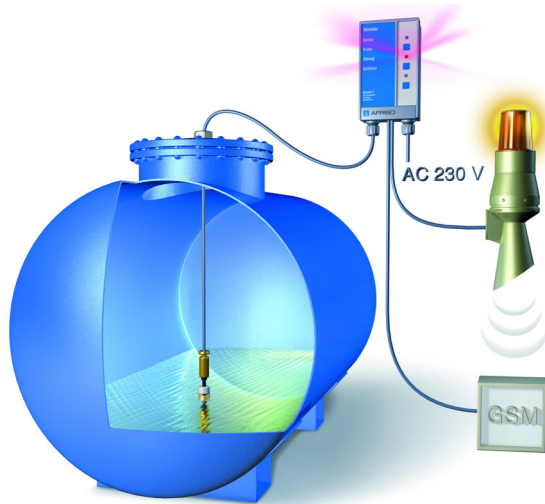
## 4.3    Application example(s)



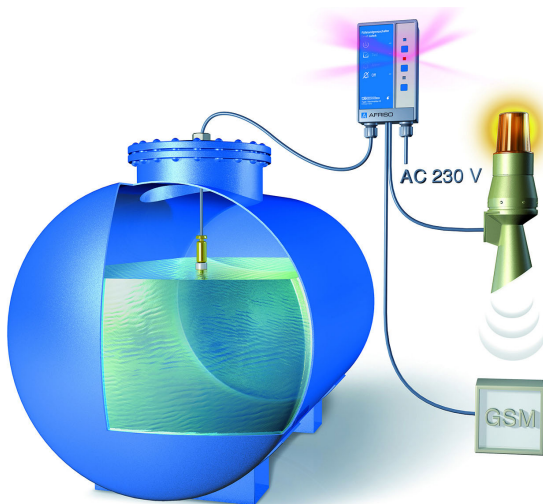*Fig 3: Standard application Minimelder-R*



*Fig 4: Standard application Maximelder-R*

## 4.4    Function

### 4.4.1    Minimelder-R

Minimelder-R monitors a falling level of the liquid. When the alarm switching point is reached, the red LED lights solid and the audible alarm sounds.

### 4.4.2    Maximelder-R

Maximelder-R monitors a rising level of the liquid. When the alarm switching point is reached, the red LED lights solid and the audible alarm sounds.

### 4.4.3    Products with EnOcean® wireless module

The AFRISOhome gateway allows for automatic transmission of messages when the alarm switching point is reached.

## 4.5    Output relay

The control unit is equipped with an output relay to transmit the alarm signal to additional equipment.

The product can be operated with or without additional equipment, for example:

• Visual and audible alarm units

• Remote alarm equipment

• Building control systems

• Other

**Operating mode Eco**

The product is factory-set to the operating mode "Eco". If no alarm is present, the relay is de-energised. In case of an alarm, the relay is energised.

**Operating mode Failsafe**

You can also operate the product in the operating mode "FailSafe" (see "Setting the operating mode" on page 20). If no alarm is present, the relay is energised. In case of an alarm, the relay is de-energised.

## 4.6 Approvals, conformities, certifications

The product complies with:

- EMC Directive (2014/30/EU)
- Low Voltage Directive (2014/35/EU)

The product with EnOcean® wireless also complies with:

- Radio Equipment Directive, RED (2014/53/EU)

## 4.7 Technical data

### 4.7.1 Control unit

| Parameter | Value |
|---|---|
| **General specifications** | |
| Dimensions housing (W x H x D) | 100 x 188 x 65 mm |
| Weight | 0.5 kg |
| Response delay | < 1 second |
| Emissions alarm sound | Min. 70 dB(A) |
| | A-weighted sound level of the audible alarm at a distance of one metre |
| Additional connections | 1 output relay (changeover contact) |
| Breaking capacity output relay | Max. 250 V, 2 A, resistive load |
| Relay fuse | T 2 A |
| **Ambient conditions** | |
| Ambient temperature operation | -5 ... 50 °C |
| Ambient temperature storage | -10 ...  60 °C |
| **Electrical data** | |
| Supply voltage | AC 230 V ±10 %, 50/60 Hz |
| Nominal power | 5 VA |
| Mains fuse | T 100 mA H (1.5 kA) |
| Protection class (EN 60730) | II |
| Degree of protection (EN 60529) | IP 30 |

| Parameter | Value |
|---|---|
| **EnOcean® wireless** | |
| Frequency | 868.3 MHz |
| Transmission power | Max. 10 mW |
| Range | See chapter "Information on EnOcean® wireless" |
| EnOcean® Equipment Profile (EEP) | A5-30-04 |
| **Radio Equipment Directive (RED) (2014/53/EU)** | |
| **Electromagnetic compatibility (EMC) (2014/30/EU)** | |
| **Low Voltage Directive (2014/35/EU)** | |

### 4.7.2   Floating probe

| Parameter | Value |
|---|---|
| **General specifications** | |
| Dimensions (Ø x L) | 24 x 85 mm |
| Weight | 0.35 kg |
| Material probe body | Polypropylene |
| Probe weight | Brass |
| Resistance | Water, oil |
| **Ambient conditions** | |
| Ambient temperature operation | -5 ... 50 °C |
| Ambient temperature storage | -5 ... 55 °C |
| **Electrical data** | |
| Connection cable: | Ölflex 2 x 0.5 mm² |
| Standard length | 5 m |
| Maximum length | 50 m (shielded) |

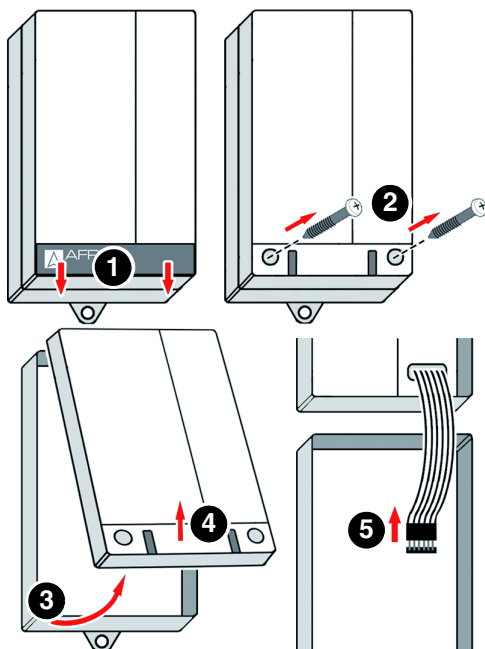## 5 Mounting

### 5.1 Mounting the floating probe

The floating probe is mounted in such a way that it is suspended in the tank. The height at which the float switch of the floating probe is mounted corresponds to the alarm switching point.

⇨ Verify that the correct floating probe for Minimelder-R or Maximelder-R is mounted (fee figure "Floating probe" on page 7).

1. Suspend the floating probe into the tank at the cable.

2. Fasten the floating probe cable with the enclosed G1 screw fitting at the height/level of the required alarm switching point.

3. Alternative: Fasten the floating probe with a cable clamp or a cable gland.

### 5.2 Mounting the control unit

Select a mounting position where the audible alarm signal can always be heard, even in the case of ambient noise. If audibility cannot be ensured, you must install an additional alarm unit at a suitable location.

⇨ Verify that the control unit is mounted to an even, rigid and dry wall at eye level.

⇨ Verify that the permissible ambient temperature is respected at the control unit.

⇨ Verify that the control unit is accessible and easy to oversee at all times.

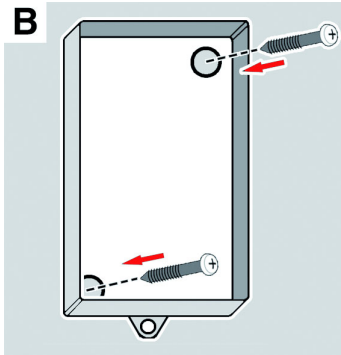⇨ Verify that the control unit is protected against water and splash water.

1. Open the control unit.
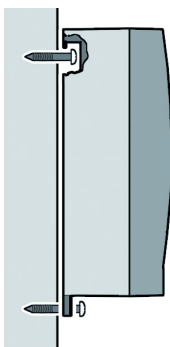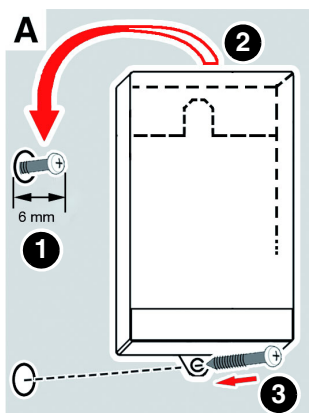
2. Mount the housing to the wall using mounting type A or B. Use the housing as a drilling template.
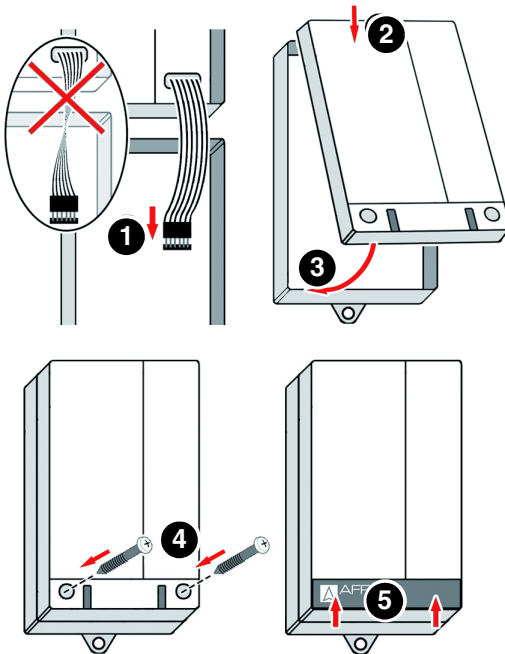
**Mounting type A**

1. Mount the screw to the wall.

2. Fit the control unit.

3. Fasten the control unit by screwing the bottom lug to the wall.

**B**

**Mounting type B**

1. Drill two fixing holes with a Ø 5 mm into the base.

2. Mount the control unit to the wall with the enclosed screws.

3. Connect the control unit as described in chapter "Electrical connection".

4. Close the control unit.

## 5.3 Electrical connection

<table>
<tr><td>⚡ ⚠ **DANGER**</td></tr>
</table>

**ELECTRIC SHOCK**
- Verify that the degree of protection against electric shock (protection class, double insulation) is not reduced by the type of electrical installation.
- Verify that the product is connected by means of a permanently installed cable connection.

**Failure to follow these instructions will result in death or serious injury.**

<table>
<tr><td>⚡ ⚠ **DANGER**</td></tr>
</table>

**ELECTRIC SHOCK CAUSED BY LIVE PARTS**
- Disconnect the mains voltage supply before performing the work and ensure that it cannot be switched on.
- Verify that no hazards can be caused by electrically conductive objects or media.

**Failure to follow these instructions will result in death or serious injury.**

<table>
<tr><td>**NOTICE**</td></tr>
</table>

**ELECTROSTATIC DISCHARGE**
- Always earth yourself before touching electronic components.

**Failure to follow these instructions can result in equipment damage.**

<table>
<tr><td>**NOTICE**</td></tr>
</table>

**UNAVAILABLE MONITORING FUNCTION**
- Do not install mains plugs or switches in the supply line to the product.
- Only power on/power off the product via the on-site mains fuse.

**Failure to follow these instructions can result in equipment damage.**

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## 5.3.1 Power supply control unit

⇨Verify that the product is connected to mains by means of a suitable, permanently installed cable (for example NYM-J 3 x 1.5 mm²).

⇨Verify that the power supply to the control unit is separately fused (16 A maximum).

1. Route the mains cable through the left cable gland into the control unit.

2. Connect the phase to terminal L1 and the neutral conductor to terminal N.
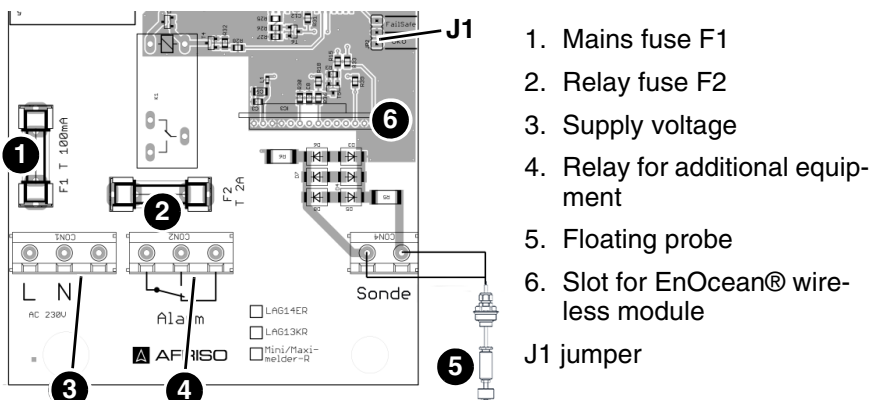   - The protective ground conductor (PE) does not have to be connected.



1. Mains fuse F1
2. Relay fuse F2
3. Supply voltage
4. Relay for additional equipment
5. Floating probe
6. Slot for EnOcean® wireless module

J1 jumper

*Fig 5: Electrical connection*

## 5.3.2 Connecting the floating probe

1. Install the probe cable.

2. Route the probe cable through the cable gland at the right to the terminals designated "Sonde".

3. Connect the two wires. Any polarity is permissible.

### 5.3.3 Setting the operating mode

The product is factory-set to the operating mode "Eco". If you want to operate the product in the operating mode "FailSafe", you must change the position of the jumper on the PCB.

⇨ Verify that the mains voltage is interrupted and cannot be switched on.

1. Open the control unit.

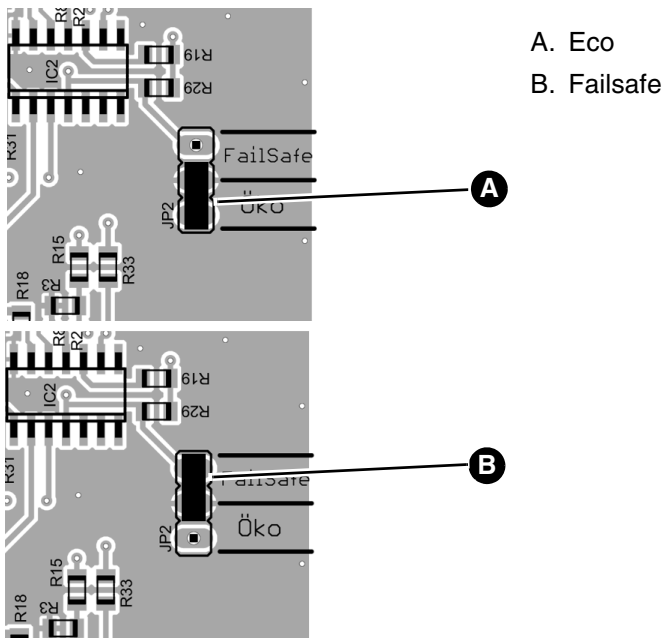2. Plug the jumper onto the contacts for the operating mode to be set.



A. Eco

B. Failsafe

*Fig 6: Setting the operating mode*

3. Close the control unit.

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### 5.3.4 Relay output

The output signal of the control unit is made available via a voltage-free relay contact (changeover contact). The alarm signal can be transmitted to additional equipment.

1. Connect the additional equipment to the terminals "Alarm".

# NOTICE

**VOLTAGE PEAKS WHEN INDUCTIVE CONSUMERS ARE SWITCHED OFF**

When inductive consumers are switched off, this can cause voltage peaks and can lead to adverse effects on electrical systems and may destroy the switching contact.

• Use commercially available standard RC combinations such as 0.1 μF/100 Ohm for inductive consumers.

**Failure to follow these instructions can result in equipment damage.**

### 5.3.5    Retrofitting an EnOcean® wireless module (optional)

## NOTICE

**ELECTROSTATIC DISCHARGE**
• Always earth yourself before touching electronic components.
• Do not touch the EnOcean® wireless module to plug it in; use the anti-elec-
  trostatic film to plug it into the slot.

**Failure to follow these instructions can result in equipment damage.**

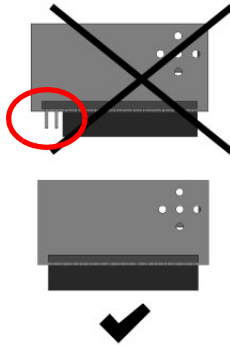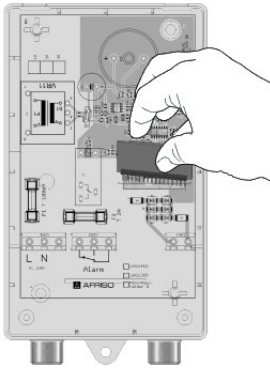⇨ Verify that the mains voltage is interrupted and cannot be switched on.

1. Open the control unit.
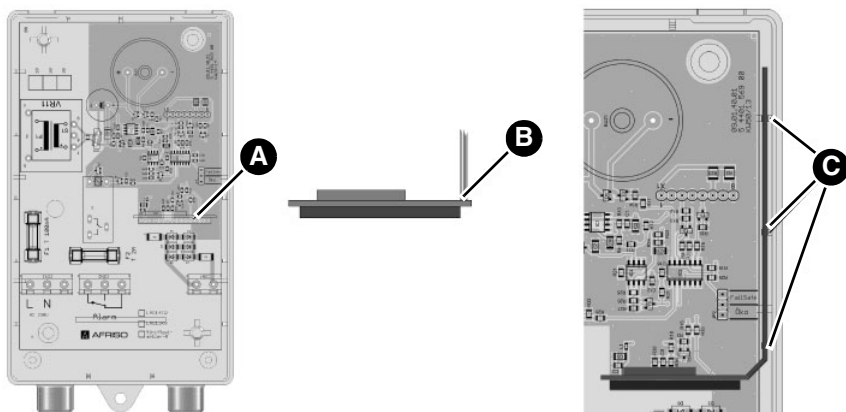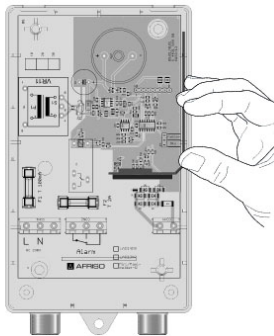


A. Slot for EnOcean® wireless          C. Housing opening (for fastening
   module                                 the antenna)
B. Position antenna

2. Plug the EnOcean® wireless module into the slot.

   When plugging in the wireless module, ensure the following:
   - The position of the antenna must be at the right side (close to the housing wall).
   - All pins must be inserted into the female connector.
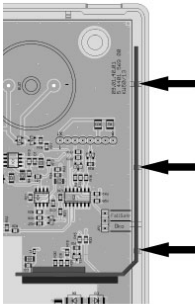
3. Push the antenna of the EnOcean® wireless module into the three housing openings of the control unit.

4. Close the cover of the control unit.

# 6    Commissioning

## 6.1    Commissioning the product

⇨ Verify that the product has been properly mounted and electrically connected.

1. Apply voltage via the on-site mains fuse.
   - The green LED is on.

## 6.2    Establishing a wireless connection (EnOcean® products only)

See the operating instructions of the AFRISOhome gateway or the app for detailed information on establishing a wireless connection.

⇨ Verify that the product is in the vicinity of the AFRISOhome gateway.

⇨ Verify that the AFRISOhome gateway is in "Learn" mode.



1. Briefly press the lower key (A) once.
   - The product sends a Learn telegram (LRN-TEL).
   - The product is now connected to the AFRISOhome gateway.

## 6.3 **Performing the function test**

1. Minimelder-R: Push the float switch of the floating probe down (minimum alarm).
   - The red LED lights up and the audible alarm sounds.

2. Maximelder-R: Push the float switch of the floating probe up (maximum alarm).
   - The red LED lights up and the audible alarm sounds.

3. Press the Test button at the control unit.
   - The red LED lights up and the audible alarm sounds.

# 7 Operation

The product monitors for a minimum or maximum level.

If the floating probe is used for minimum level detection, the control unit triggers an alarm as soon as the liquid level falls below the switching level.

If the floating probe is used for maximum level detection, the control unit triggers an alarm as soon as the liquid level exceeds the switching level.

Operating the product is limited to its regular monitoring:

- The green LED is on.
- The red LED is off.
- The audible alarm is off.

## 7.1 Alarm

In the case of a level alarm, the red LED lights and the audible alarm is activated.

## 7.2 Acknowledging an alarm

You can mute the audible alarm by pressing the "Acknowledge" key. Press the key again to switch on the audible alarm again. The alarm remains active until the level is below the maximum level (Maximelder-R) or above the minimum level (Minimelder-R).

**Power outage**

No alarm is triggered in case of a power outage. When mains voltage is restored, the product immediately resumes operation.

If, during the power outage, the minimum level or the maximum level have been reached, the product triggers an alarm once power is available again.

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## 8 Maintenance

Maintenance on the product may only be performed by a specialised company.

### 8.1 Maintenance intervals

| When | Activity |
|------|----------|
| Once per year | Perform a function test. See "Performing the function test" on page 25. |

### 8.2 Maintenance activities

⚡ ⚠ **DANGER**

**ELECTRIC SHOCK CAUSED BY LIVE PARTS**

- Disconnect the mains voltage supply before performing the work and ensure that it cannot be switched on.

**Failure to follow these instructions will result in death or serious injury.**

**Replacing the mains fuse F1**

⇨ Verify that the mains voltage is interrupted and cannot be switched on.

1. Open the control unit, see Page 16.

2. Remove the transparent cover from the mains fuse F1. See "Electrical connection" on page 19.

3. Insert a new mains fuse F1.

4. Refit the transparent cover.

5. Connect the flat cable to the connector.

6. Close the control unit, see 1 above.

7. Apply mains voltage.

**Replacing the relay fuse F2**

⇨ Verify that the mains voltage is interrupted and cannot be switched on.

1. Open the control unit, see Page 16.

2. Remove the transparent cover from the fuse F2. See "Electrical connection" on page 19.

3. Fit a new relay fuse F2.

4. Refit the transparent cover.

5. Connect the flat cable to the connector.

6. Close the control unit, see 1 above.

7. Apply mains voltage.

## 8.3    Use in flood hazard areas

The floating probe is suitable for use in flood hazard areas; it is watertight up to 10 mH$_2$O (1 bar pressure).

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## 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 |
|---------|-----------------|--------|
| Green LED is not on | No supply voltage | Apply supply voltage |
|  | Mains fuse defective | Replace the mains fuse |
|  | Flat cable not connected to printed circuit board | Connect the flat cable to the printed circuit board |
| Red LED is on | Alarm: Minimum level or maximum level reached | Remove the cause of the alarm |
|  | Floating probe not connected | Connect the floating probe |
|  | Line interruption in the probe cable | Check the probe cable |
| Red LED does not light up, even though the floating probe should respond | Float of the floating probe cannot move | Find a different position for the floating probe |
|  | Floating probe defective | Replace the floating probe |
| Red LED is always on, even though no alarm is present. | Short circuit in the floating probe | Check the floating probe |
|  | Line interruption in the probe cable | Check the probe cable |
| Pressing the Test button has no effect | Control unit defective | Replace the control unit |
| 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 must not be disposed of together with the normal household waste.

1. Disconnect the product from mains.
2. Dismount the product (see chapter "Mounting the control unit", reverse sequence of steps).
3. Dispose of the product.

## 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.

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## 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 |
|---|---|---|
| Minimelder-R (with relay) with floating probe | 16701 |  |
| Maximelder-R (with relay) with floating probe | 16702 | |

**Spare parts and accessories**

| Product designation | Part no. | Figure |
|---|---|---|
| Floating probe for Minimelder-R | 16703 | |
| Floating probe for Maximelder-R | 16704 | |
| EnOcean® wireless module | 78082 | |
| Cable extension fitting KVA | 40041 | |
| Mounting frame for control unit | 43521 | |
| IP 54 kit with cable gland M20 | 43416 | |
| Additional alarm unit ZAG 01 | 40633 | |
| Warning light with rotating reflector | 61015 | |
| Horn KH 1 | 61011 | |
| Combined alarm light and horn | 61020 | |
| Horn HPW 2 | 61012 | |

## 14 Information on EnOcean® wireless

### 14.1 Range of EnOcean® wireless

Visit www.enocean.com for further information on range planning with EnOcean®.

### 14.2 Additional information on EnOcean® wireless systems

Additional information on planning, installation and operation of EnOcean® wireless systems can be found at www.enocean.com.

- Wireless standard
- Wireless technology
- AN001
- AN102
- AN103
- AN201

### 14.3 Features of the EnOcean® technology

Visit www.afrisohome.de for documents on EnOcean® technologies.

A variety of videos on AFRISO products can also be found on the AFRISO YouTube channel.

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