

b.safe

Installation Manual **b.safe Isolated Amplifier**



b.safe Isolated Amplifier

Cat.No.:
R 660-01 / R 660-04



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Compatibility

The b.safe Isolated Amplifier is compatible with all b.safe devices for fill-level control (except for b.safe Disc Sensor, cat. no. R 640-05). The compatibility of devices for fill-level control of other manufacturers has to be checked individually.

Safety Information

Sensors used in explosion hazardous areas (EX zone) generally have to be secured with an isolated amplifier.

All components that are connected upstream of the sensors, e. g. b.safe Display, b.safe Splitter as well as b.safe Isolated Amplifier, have to be installed outside of the explosion hazardous area.

Make sure to use only sensors that are explicitly approved for use in potentially explosive areas.

The installation of electronic components, especially in explosion hazardous areas, must always be carried out by trained specialist staff.

Installation

Please have the sensor cables and the cables leading to the b.safe Mini-Display installed by a trained specialist in accordance with the illustrations on the following pages.

The b.safe Isolated Amplifier must be installed in a dry, largely clean location that is protected from damage and splash water.

When used in together with a safety cabinet, we recommend mounting on the back of the cabinet.

Functionality

The b.safe Isolated Amplifier ensures a galvanic isolation of the sensor from the output device. This effectively limits the given voltage as well as the highest possible current flow.

This ensures that no ignitable sparks can be triggered by our alarm electronics in the explosive atmosphere on the sensor side. Together with the b.safe Mini-Display, the b.safe Isolated Amplifier enables the automatic detection of unconnected or damaged sensors as well as cable breaks.

b.safe Isolated Amplifier 1-channel
Cat.No.: R 660-04



b.safe Isolated Amplifier 2-channels
Cat.No.: R 660-01



Information

Mains connection

Using the interchangeable plug attachments,
connection to the following sockets is possible:

EU, UK, AU, US/JP

Input/

Input voltage:

- AC 100 to 240 V

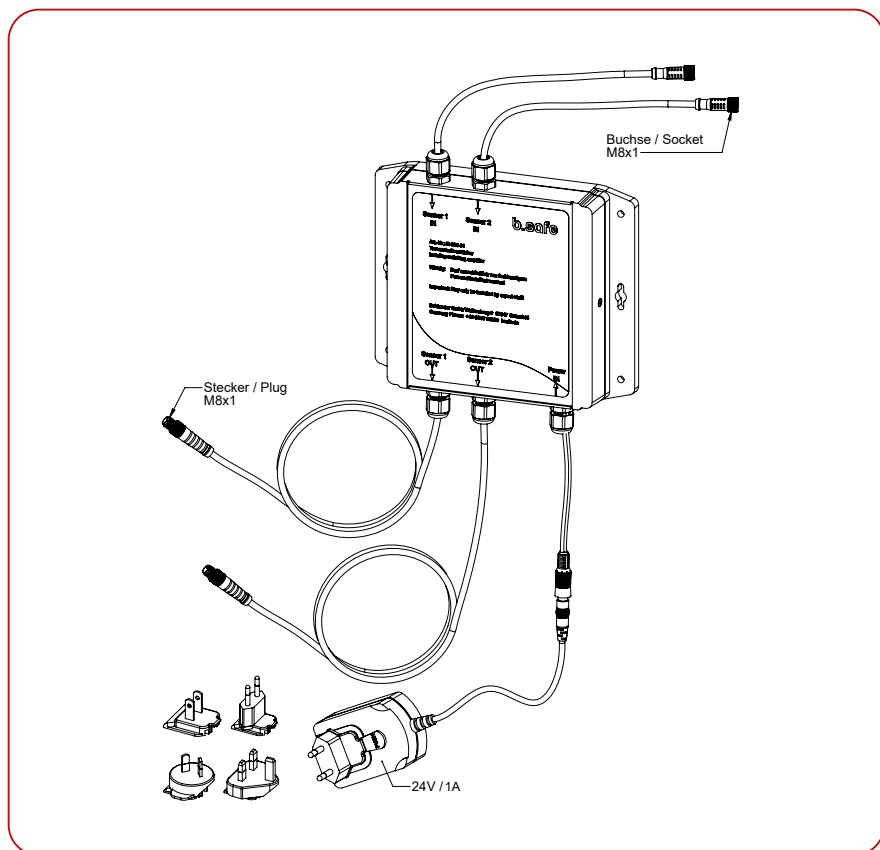
- 50-60 Hz

Output /

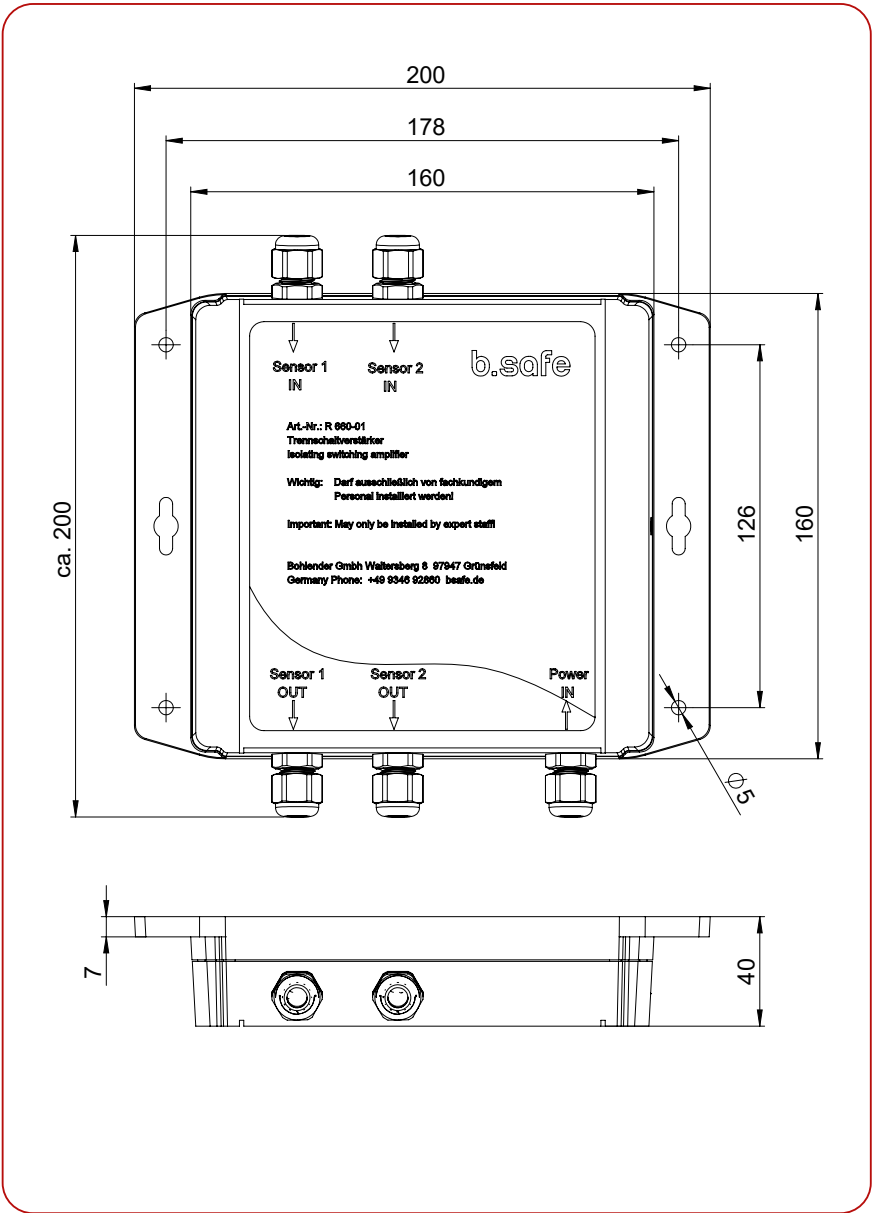
Output voltage:

- DC 24 V

- 1A



Installation dimensions (housing identical for R 660-01 and R 660-04)



Scope of Delivery

The b.safe Isolated Amplifier is delivered ready for installation in a plastic housing that protects against accidental contact of live contacts. A power supply with interchangeable adapter plugs for EU, Australia, UK and USA/Japan is included. With the labelling on the front side of the housing, each through-screw connection is clearly assigned to the respective channels/ functions.

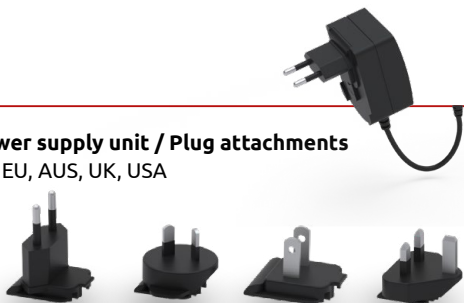
Cat.No.: R 660-04
1-channel



Cat.No.: R 660-01
2-channels



Power supply unit / Plug attachments
for EU, AUS, UK, USA



Setting of operation modes

The **b.safe Isolated Amplifier** has automatic sensor and line break detection. Once a compatible sensor is plugged in, a green control lamp lights up on the output device (b.safe Mini-Display). This control lamp also serves as line break monitoring: It goes out as soon as the connected sensor cable is interrupted at any point.

To ensure this function, the operation mode of the **b.safe Isolated Amplifier** has to be set prior to its installation. All versions of the **b.safe Isolated Amplifier** are factory set for the use with **b.safe System Waste Caps LC**.

If used with e.g. a capacitive sensor, the setting of the dip switches has to be adapted (see illustration on page 53).

Please make sure that the plug-in power supply is disconnected from the grid and thus there is no voltage. Loose the screws and remove the housing lid.

Now you have access to the Isolated Amplifier. Now set the dip switches on the front side to the requested operation modes (if necessary, use a small screw driver).

You can refer to the illustrations on page 53 for the respective correct setting.

Please close the housing of the Isolated Amplifier after having made the required setting

Opening of the signal output device

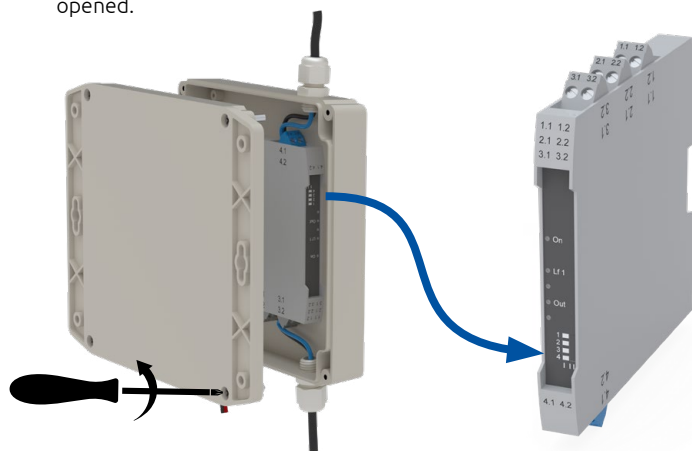
1. Opening the signal output device

To carry out the switch setting, the signal output device must be opened.

2.

Correct switch positions

The corresponding switch settings can be made using the toggle switches.



Isolated Amplifier 1-channel (Cat.No.: R 660-04) For use with Mini-Display 1 channel

Sensor IN

Connection of:

- b.safe Waste Cap LC
- b.safe Waste Cap Capacitive



Sensor OUT

Connection of:

- b.safe Mini-Display Sensor

Switch settings

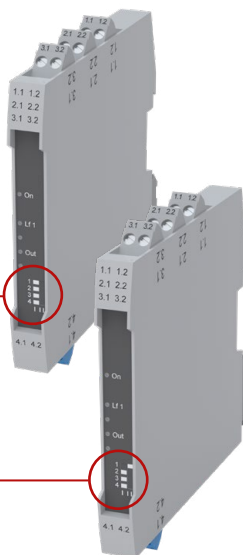
Connection of b.safe Mini-Display 1 channel
Switch position must only be changed for b.safe System Waste Caps Capacitive



Factory-set/Setting
 for **System Waste Caps LC**
1, 2, 3, 4 to I



Setting for
System Waste Caps Capacitive
1 to II 2, 3, 4 to I



Suitable items for Isolated Amplifier 1 channel



b.safe System Waste Caps LC
 S60 » [Cat.No.: R 1306-01](#)



b.safe System Waste Caps LC
 S55 » [Cat.No.: R 1305-01](#)



b.safe System Waste Caps LC
 S90 » [Cat.No.: 1309-01](#)



b.safe System Waste Caps Capacitive
 S60 » [Cat.No.: R 1325-60](#)



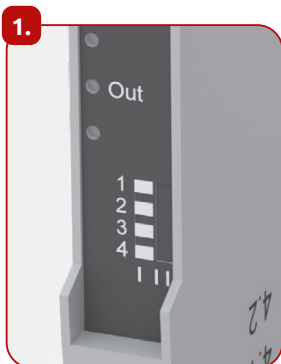
b.safe Mini-Display Wall,
 1-channel » [Cat.No.: R 658-01](#)



b.safe Mini-Display Table,
 1-channel » [Cat.No.: R 659-01](#)

Installation Isolated Amplifier 1-channel

Fill level control with **b.safe System Waste Caps LC** and **b.safe Mini-Display 1 channel**

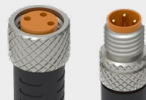


Switch position at Isolated Amplifier does not have to be changed



b.safe Isolated Amplifier to be mounted at the requested position

CAUTION: Carefully insert the plug and insert the **pins** into the holes provided! Then screw together.



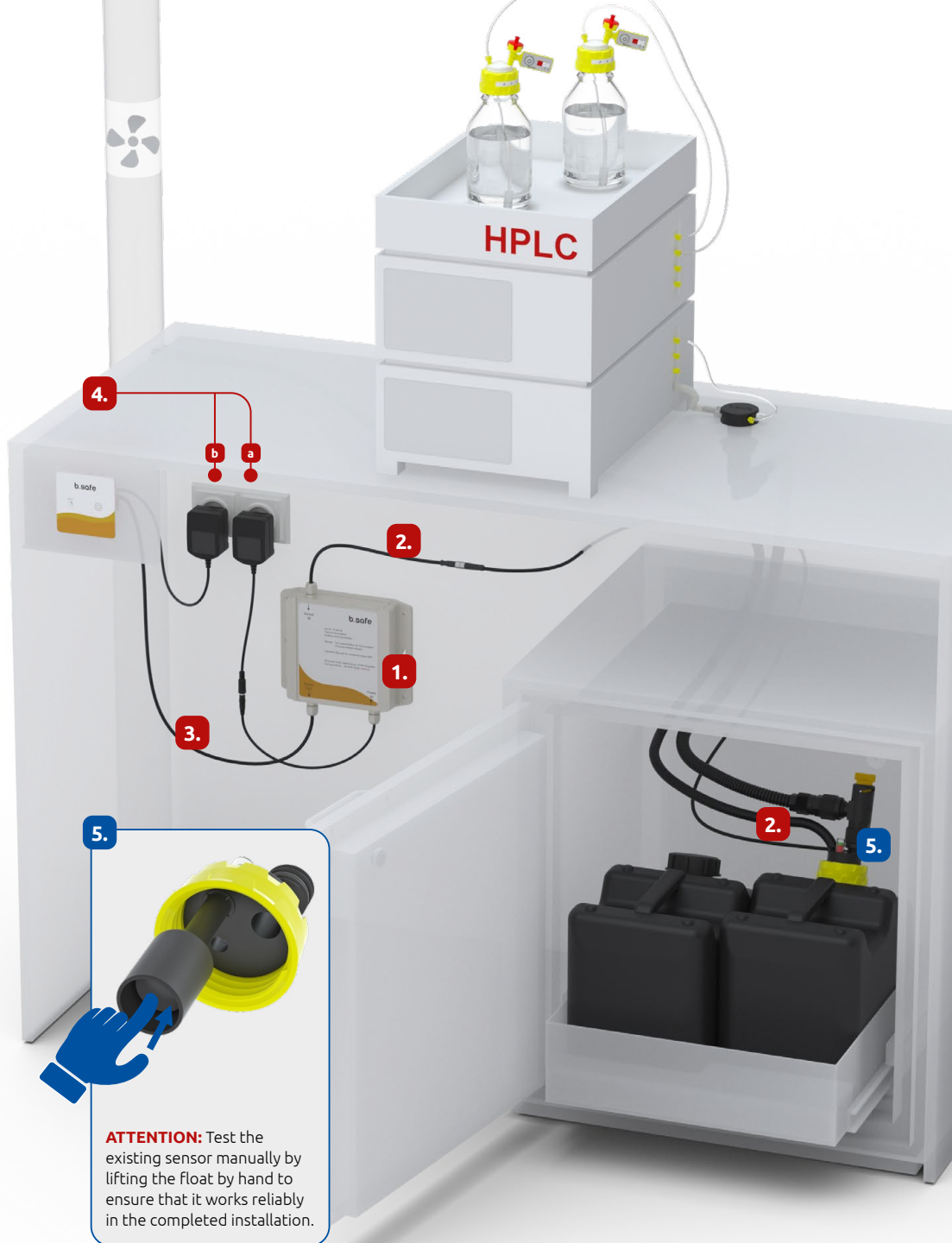
Connect signal cable of the **b.safe System Waste Cap LC** with the signal cable of the **b.safe Isolated Amplifier Waste Cap** with **Sensor IN**



Connect signal cable of the **b.safe Isolated Amplifier** with the **b.safe Mini-Display:**
Sensor OUT with **Sensor**



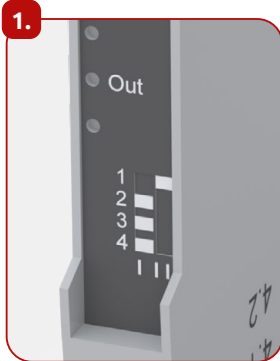
Then plug in the power plug and connect the power supply unit to the mains:
a. Isolated Amplifier
b. Mini-Display



ATTENTION: Test the existing sensor manually by lifting the float by hand to ensure that it works reliably in the completed installation.

Installation Isolated Amplifier 1-channel

Fill level control with **b.safe System Waste Caps Capacitive** and **b.safe Mini-Display 1 channel**

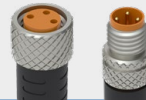


Switch position on Isolated Amplifier must be changed as shown (see page 53)



b.safe Isolated Amplifier to be fastened at the requested position with suitable mounting material

CAUTION: Carefully insert the plug and insert the pins into the holes provided! Then screw together.



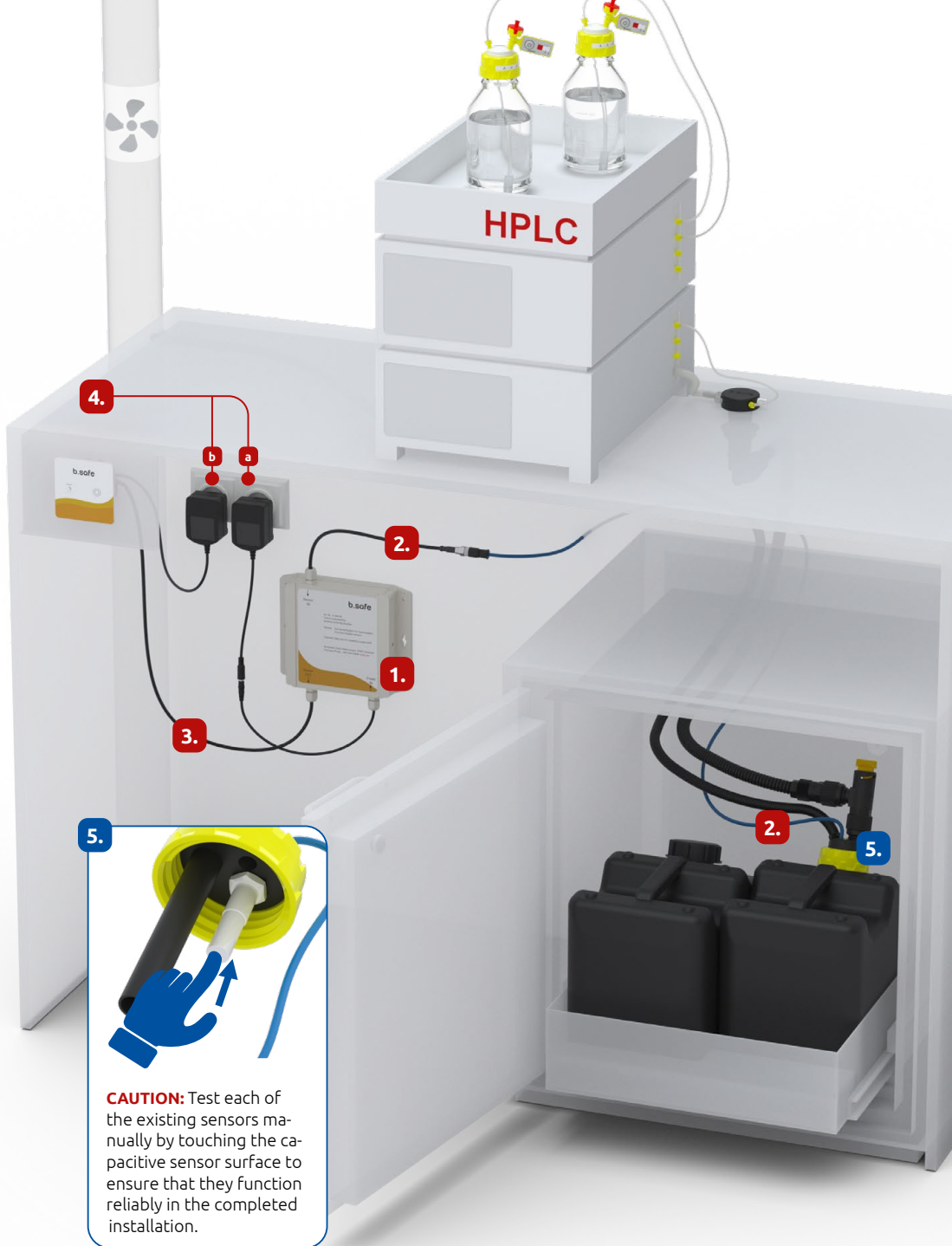
Connect signal cable of the **b.safe System Waste Cap Capacitive** with the signal cable of the **b.safe Isolated Amplifier:**
Waste Cap with **Sensor IN**



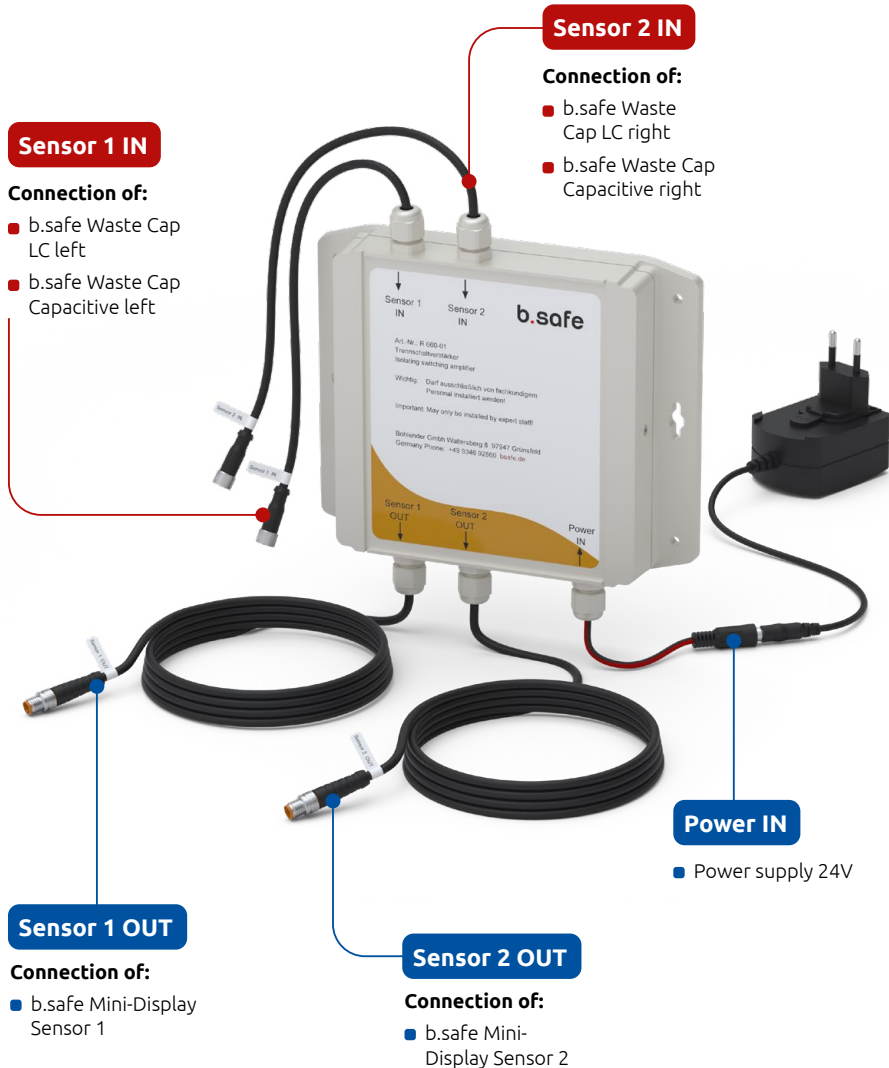
Connect signal cable of the **b.safe Isolated Amplifier** with the **b.safe Mini-Display:**
Sensor OUT with **Sensor**



Then plug in the power plug and connect the power supply unit to the mains:
a. Isolated Amplifier
b. Mini-Display



Isolated Amplifier 2-channels (Cat.No.: R 660-01) for use with Mini-Display 2 channels



Switch settings

Connection of b.safe Mini-Display 2 channels

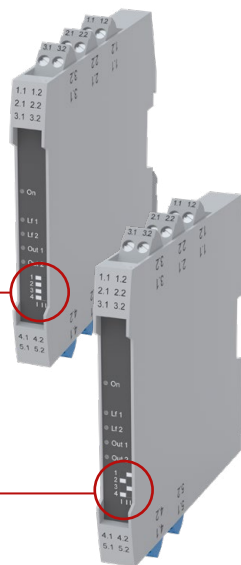
Switch position must only be changed for b.safe System Waste Caps Capacitive:



Factory-set/Setting for
System Waste Caps LC
1, 2, 3, 4 to I



Settings for
System Waste Caps Kapazitiv
1, 3 to II 2, 4 to I



Suitable items for Isolated Amplifier 2 channels



b.safe System Waste Caps LC S60
» Cat.No.: R 1306-01



b.safe System Waste Caps LC S55
» Cat.No.: R 1305-01



b.safe System Waste Caps LC S90
» Cat.No.: 1309-01



b.safe System Waste Caps Capacitive S60
» Cat.No.: 1325-60



b.safe Mini-Display Wall, 2-channels
» Cat.No.: R 658-02



b.safe Mini-Display Table, 2-channels
» Cat.No.: R 659-02

Installation Isolated Amplifier 2-channels

Fill level control with **b.safe System Waste Caps LC** and **b.safe Mini-Display 2 channels**

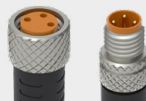


Switch position on Isolated Amplifier does not have to be changed.



b.safe Isolated Amplifier to be fastened at the requested position with suitable mounting material

CAUTION: **Carefully** insert the plug and insert the **pins** into the holes provided! Then screw together.



Connect signal cable of **b.safe System Waste Caps LC** with the **b.safe Isolated Amplifier**.

Waste Cap left with **Sensor IN 1**

Waste Cap right with **Sensor IN 2**



Connect signal cable of **b.safe Isolated Amplifier** with the **b.safe Mini-Display**

Isolated Amplifier Sensor 1 OUT with **Sensor 1**

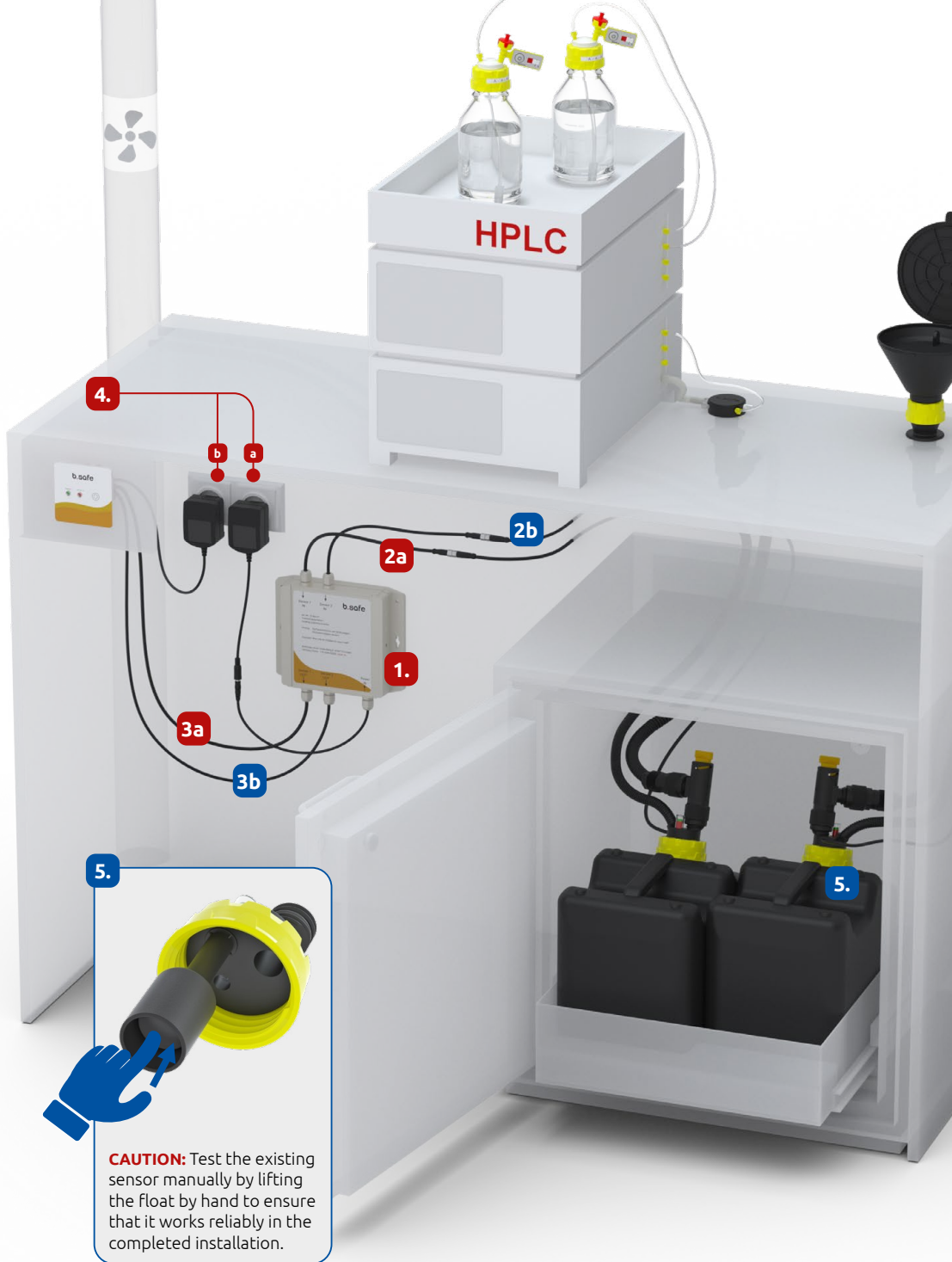
Isolated Amplifier Sensor 2 OUT with **Sensor 2**



Then plug in the power plug and connect the power supply unit to the mains:

a. Isolated Amplifier

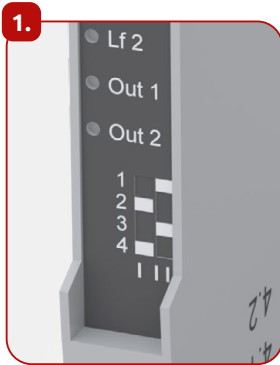
b. Mini-Display



CAUTION: Test the existing sensor manually by lifting the float by hand to ensure that it works reliably in the completed installation.

Installation Isolated Amplifier 2-channels

Fill level control with **b.safe System Waste Caps Capacitive** and **b.safe Mini-Display 2 channels**

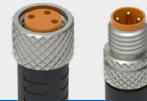


Switch position on Isolated Amplifier must be changed as shown (see page 53)



b.safe Isolated Amplifier to be fastened at the requested position with suitable mounting material

CAUTION: Carefully insert the plug and insert the pins into the holes provided! Then screw together.



Connect signal cable of the **b.safe System Waste Caps Capacitive** with the **b.safe Isolated Amplifier**.

Waste Cap left (2a) with **Sensor IN 1**

Waste Cap right (2b) with **Sensor IN 2**



Connect signal cable of the **b.safe Isolated Amplifier** with the **b.safe Mini-Display**

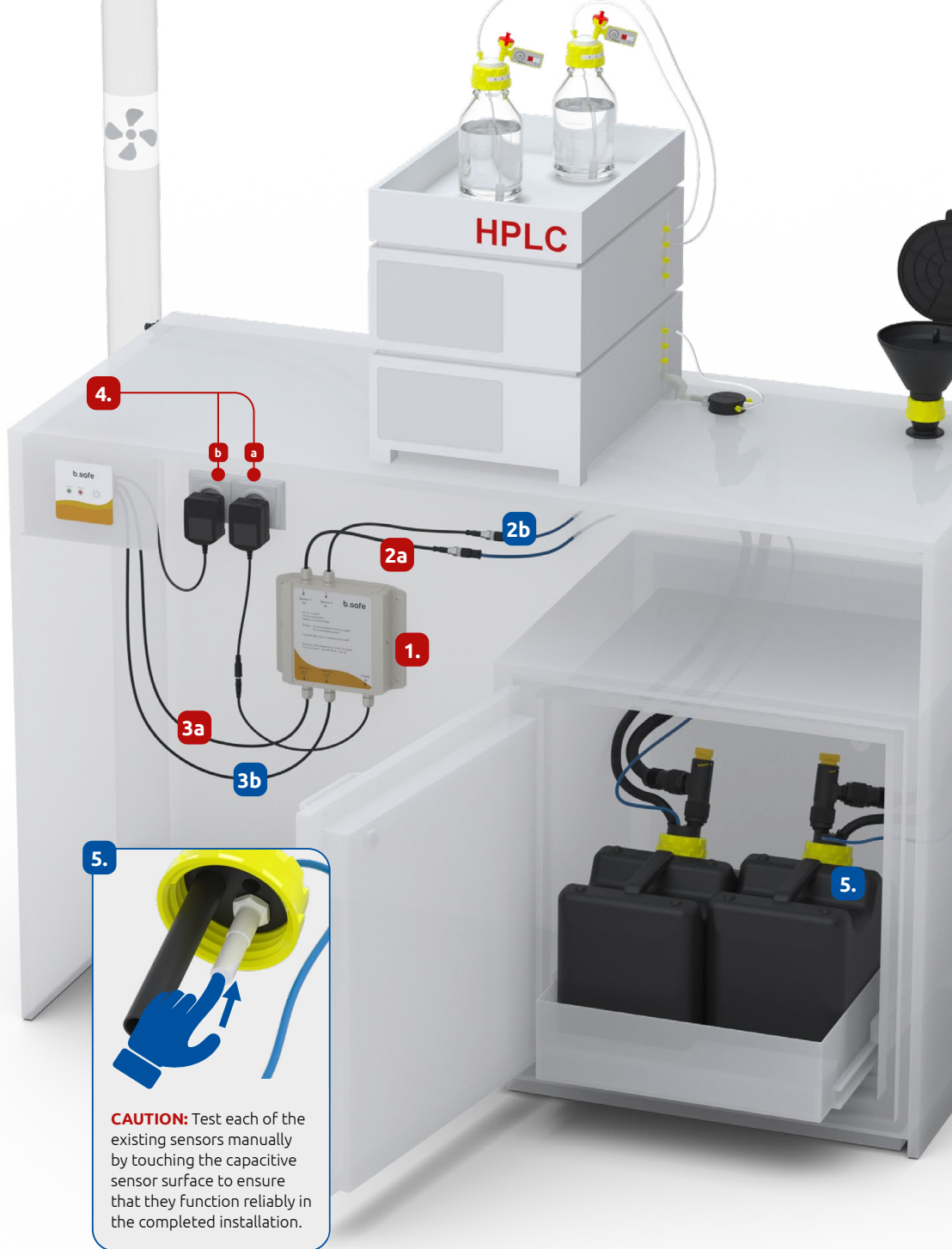
Isolated Amplifier Sensor 1 OUT with **Sensor 1 (3a)**

Isolated Amplifier Sensor 2 OUT with **Sensor 2 (3b)**



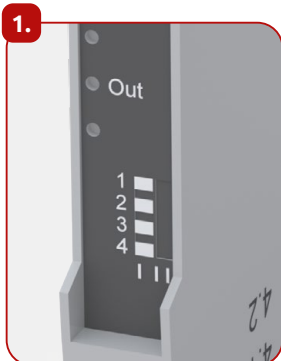
Then plug in the power plug and connect the power supply unit to the mains:

a. Isolated Amplifier
b. Mini-Display



Installation Isolated Amplifier 2-channels

Fill level control with **b.safe System Waste Caps LC** and **b.safe Mini-Display Splitter** as well as **b.safe Splitter** for automatic switchover when the canister is full



Switch position on Isolated Amplifier does not have to be changed.

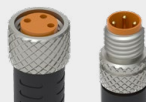


b.safe Isolated Amplifier to be fastened at the requested position with suitable mounting material



Install **b.safe Splitter** according to the appropriate instructions

CAUTION: Carefully insert the plug and insert the **pins** into the holes provided! Then screw together.



Connect signal cable of the **b.safe System Waste Caps LC** with the **b.safe Isolated Amplifier**:

Waste Cap left with **Sensor IN 1**

Waste Cap right with **Sensor IN 2**



Connect signal cable of the **b.safe Splitter** with the **b.safe Mini-Display**:

Splitter left with **Mini-Display Splitter left**

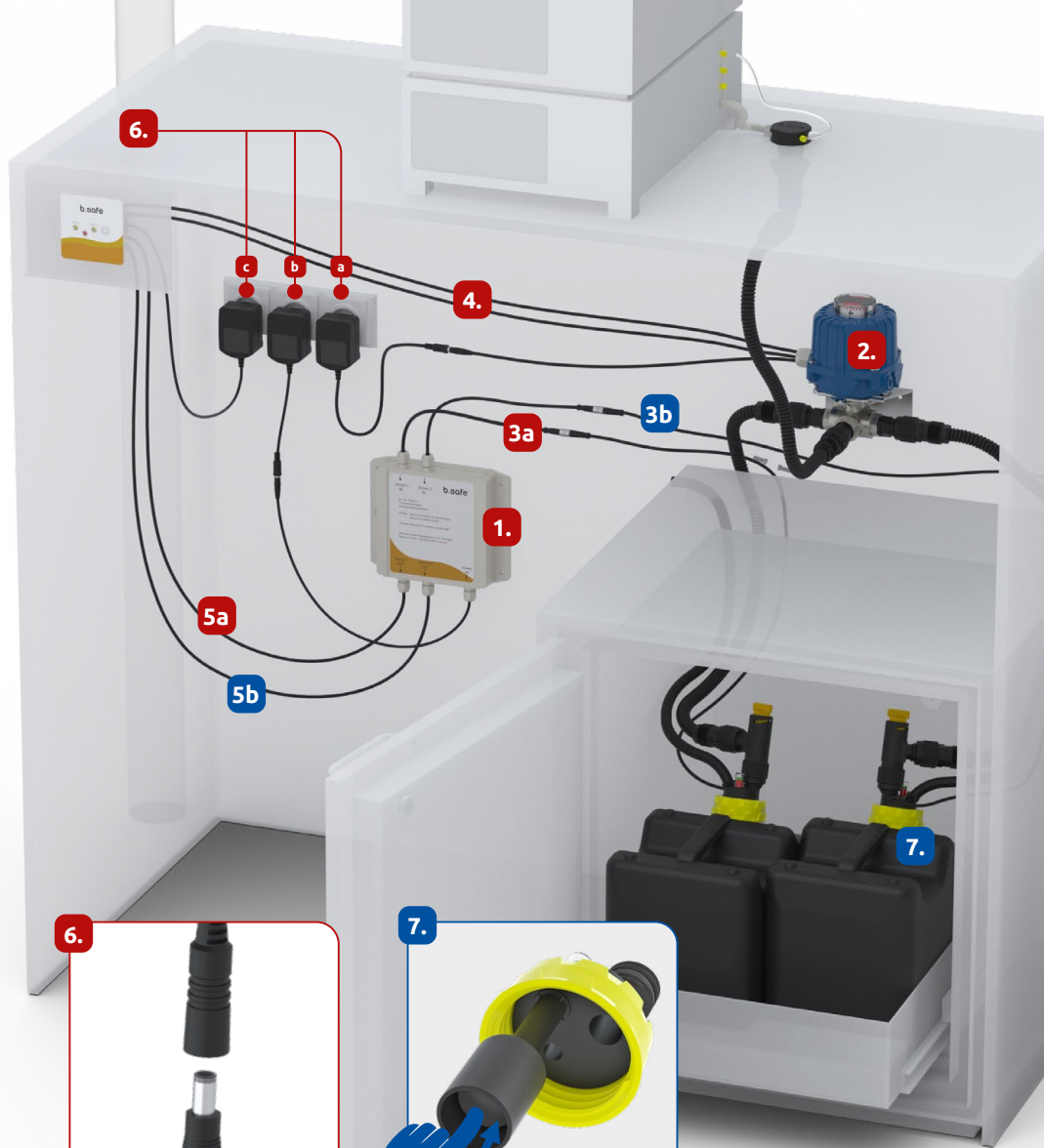
Splitter right with **Mini-Display Splitter right**



Connect signal cable of the **b.safe Isolated Amplifier** with the **b.safe Mini-Display**:

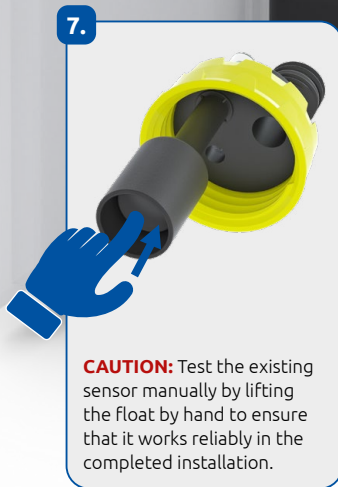
Isolated Amplifier Sensor 1 OUT with **Sensor 1 (5a)**

Isolated Amplifier Sensor 2 OUT with **Sensor 2 (5b)**



Then plug in the power plug and connect the power supply unit to the mains:

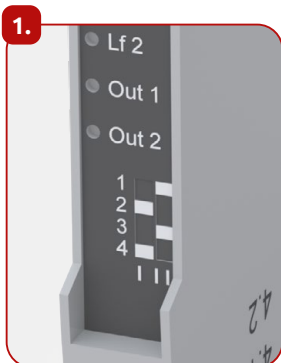
- a. Splitter
- b. Isolated Amplifier
- c. Mini-Display



CAUTION: Test the existing sensor manually by lifting the float by hand to ensure that it works reliably in the completed installation.

Installation Isolated Amplifier 2-channels

Fill level control with **b.safe System Waste Caps Capacitive** and **b.safe Mini-Display Splitter** as well as **Splitter** for automatic switchover when the canister is full



Switch position on Isolated Amplifier must be changed as shown (see page 53)

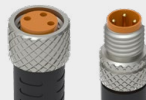


b.safe Isolated Amplifier to be fastened at the requested position with suitable mounting material



Install **b.safe Splitter** according to the appropriate instructions.

CAUTION: Carefully insert the plug and insert the **pins** into the holes provided! Then screw together.



Connect signal cable of the **b.safe System Waste Caps Capacitive** with the **b.safe Isolated Amplifier**:
Waste Cap left with **Sensor 1 IN**
Waste Cap right with **Sensor 2 IN**

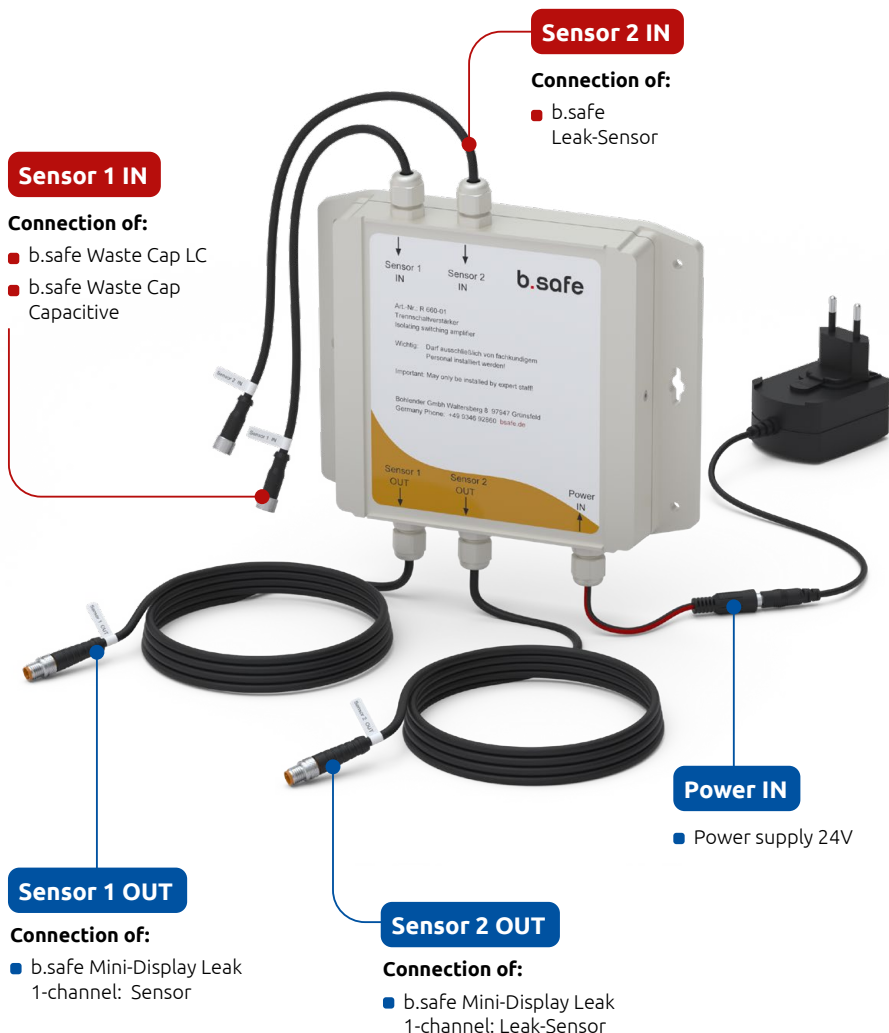


Connect signal cable of the **b.safe Splitter** with the **b.safe Mini-Display**:
Splitter left with **Mini-Display Splitter left**
Splitter right with **Mini-Display Splitter right**



Connect signal cable of the **b-safe Isolated Amplifier** with the **b-safe Mini-Display**:
Isolated Amplifier Sensor 1 OUT with **Sensor 1 (5a)**
Isolated Amplifier Sensor 2 OUT with **Sensor 2 (5b)**

Isolated Amplifier 2-channels (Cat.No.: R 660-01) for use with Mini-Display Leak 1 channel and Leak-Sensor



Switch settings

Connection of b.safe Mini-Display Leak 1 channel and Leak-Sensor
Switch position must be changed:



Settings for **System Waste Caps LC** for use with **Mini-Display Leak 1 channel and Leak-Sensor**
1, 2, 4 to I, 3 to II



Suitable items for Isolated Amplifier 2 channels



b.safe System Waste Caps LC S60
» Cat.No.: R 1306-01



b.safe System Waste Caps LC S55
» Cat.No.: R 1305-01



b.safe System Waste Caps LC S90
» Cat.No.: R 1309-01



b.safe System Waste Caps Capacitive S60
» Cat.No.: R 1325-60



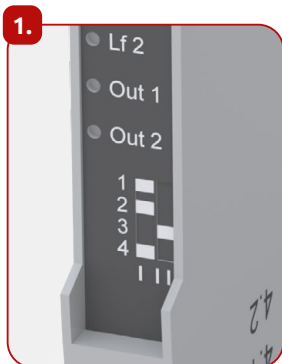
b.safe Mini-Display Leak, 1-channel
» Cat.No.: R 658-21



b.safe Leak-Sensor
» Cat.No.: R 637-01

Installation Isolated Amplifier 2-channels with Leak-Sensor

Fill level control with **b.safe System Waste Caps LC**,
b.safe Mini-Display Leak 1 channel and **b.safe Leak-Sensor**

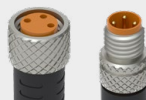


Switch position on Isolated Amplifier must be changed as shown (see page 63)



b.safe Isolated Amplifier to be fastened at the requested position with suitable mounting material

CAUTION: Carefully insert the plug and insert the pins into the holes provided! Then screw together.



Connect signal cable of the **b.safe System Waste Cap LC** with the signal cable of the **b.safe Isolated Amplifier**.
Waste Cap with **Sensor 1 IN**



Connect signal cable of the **b.safe Isolated Amplifier** with the **b.safe Leak-Sensor**
Leak-Sensor with **Sensor 2 IN**



Connect signal cable of the **b.safe Isolated Amplifier** with the **b.safe Mini-Display**
Isolated Amplifier
Sensor 1 OUT with **Sensor 1 (4a)**
Isolated Amplifier
Sensor 2 OUT with **Leak-Sensor (4b)**

5.

b

a

2.

3.

1.

4a

4b

2.

6.

3.

7.

5.

6.

7.

Then plug in the power plug and connect the power supply unit to the mains:
 a. Isolated Amplifier
 b. Mini-Display

CAUTION: Test the existing sensor manually by lifting the float by hand to ensure that it works reliably in the completed installation.

CAUTION: Test the Leak-Sensor manually by touching the capacitive sensor surface to ensure that it functions reliably in the completed installation.

Isolated Amplifier 1-channel (Cat.No.: R 660-04) and Isolated Amplifier 2-channels (Cat.No.: R 660-01) for use with Mini-Display Leak 2 channel and Leak-Sensor

Sensor IN

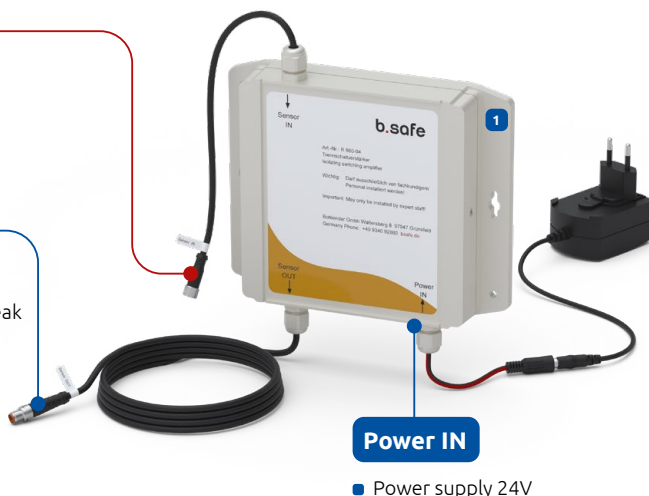
Connection of:

- b.safe Leak-Sensor

Sensor OUT

Connection of:

- b.safe Mini-Display Leak



Sensor 2 IN

Connection of:

- b.safe Waste Cap LC

Sensor 1 IN

Connection of:

- b.safe Waste Cap LC

Sensor 1 OUT

Connection of:

- b.safe Mini-Display Leak 2-channels: Sensor 1

Sensor 2 OUT

Connection of:

- b.safe Mini-Display Leak 2-channels: Sensor 2



Switch settings

Connection of b.safe Mini-Display Leak 2 channel with Leak-Sensor
Switch position must be changed:

Isolated Amplifier 1

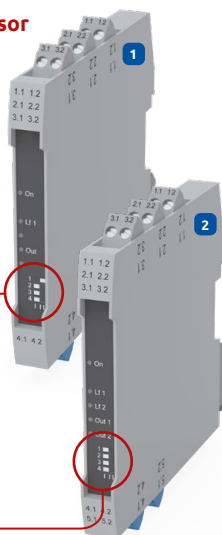


Settings for use of
b.safe Leak-Sensor
1 to II, 2, 3, 4 to I

Isolated Amplifier 2



Factory-set switch for use of
Mini-Display Leak 2 channels
1, 2, 4 to I, 3 to II



Suitable items for Isolated Amplifier 2 channels



b.safe System Waste Caps LC S60
» Cat.No.: R 1306-01



b.safe System Waste Caps LC S55
» Cat.No.: R 1305-01



b.safe System Waste Caps LC S90
» Cat.No.: R 1309-01



b.safe System Waste Caps Capacitive S60
» Cat.No.: R 1325-60



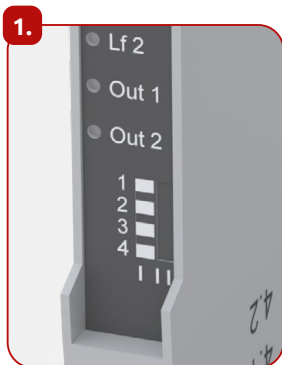
b.safe Mini-Display Leak, 2-channels
» Cat.No.: R 658-22



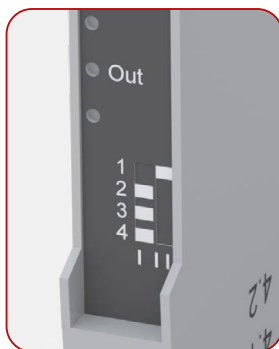
b.safe Leak-Sensor
» Cat.No.: R 637-01

Isolated Amplifier 2-channels with Leak-Sensor

Fill level control with **b.safe System Waste Cap LC**,
b.safe Mini-Display Leak 2 channels and **b.safe Leak-Sensor**



Switch position on **Isolated Amplifier 2** does not have to be changed.

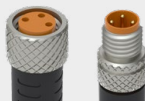


Switch position on **Isolated Amplifier 1** must be changed as shown (see page 29)



b.safe Isolated Amplifier to be fastened at the requested position with suitable mounting material

CAUTION: Carefully insert the plug and insert the pins into the holes provided! Then screw together.



2. Connect signal cable of the **b.safe System Waste Cap LC** with the signal cable of the **b.safe Isolated Amplifier 2**

Waste Cap left with **Sensor 1 IN**

Waste Cap right with **Sensor 2 IN**



3. Connect signal cable of the **b.safe Isolated Amplifier 2** with the **b.safe Mini-Display Leak**.

Sensor 1 OUT with **Sensor 1 (3a)**

Sensor 2 OUT with **Sensor 2 (3b)**

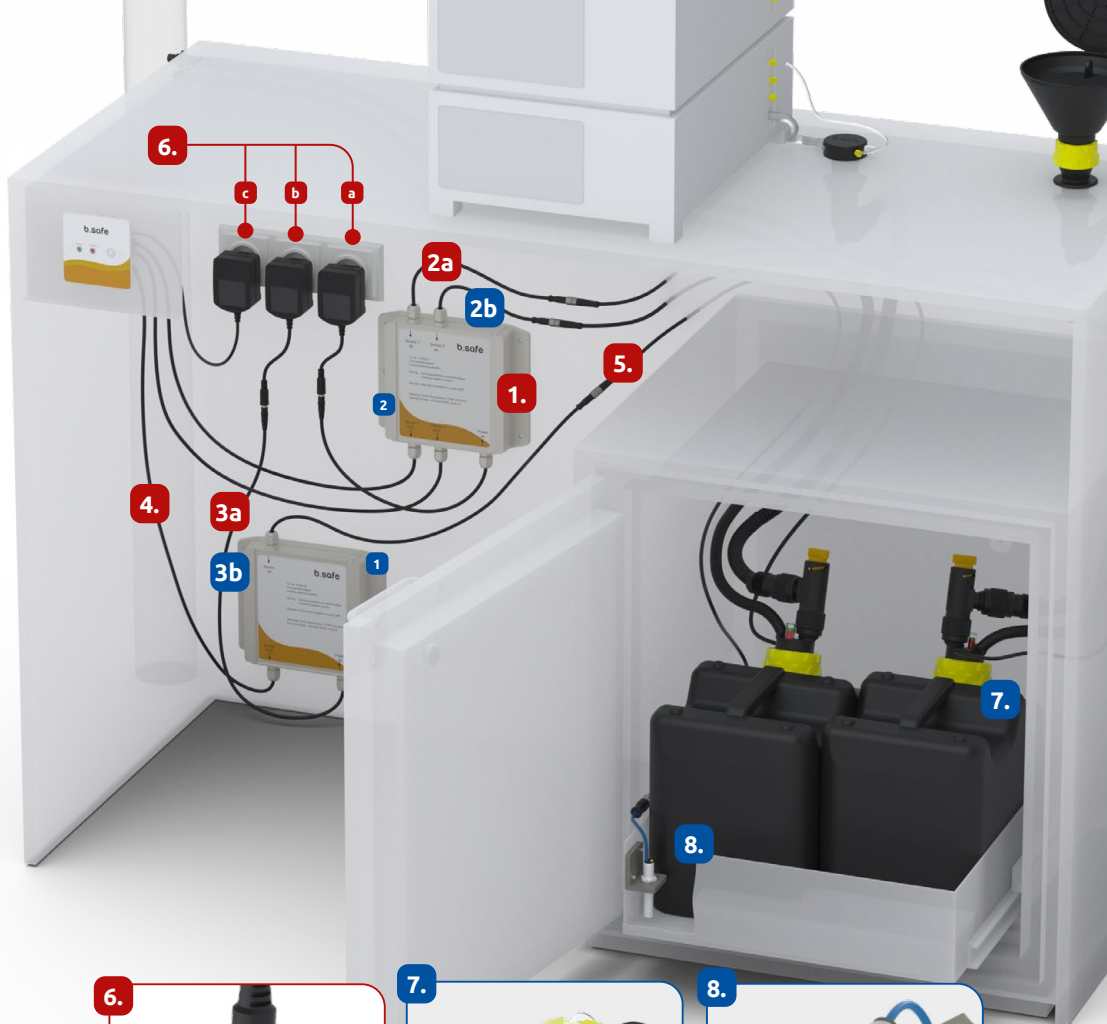


4. Connect signal cable of the **b.safe Isolated Amplifier 1** with the **b.safe Mini-Display Leak**.

Sensor OUT with **Leak-Sensor**

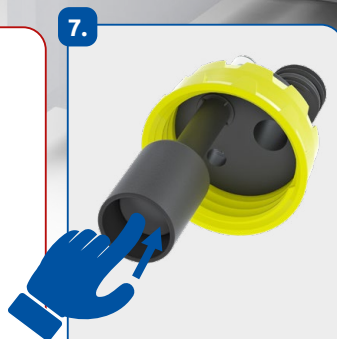
5. Connect signal cable of the **b.safe Isolated Amplifier 1** with the **b.safe Leak-Sensor**.

Sensor IN with **Leak-Sensor**



6. Then plug in the power plug and connect the power supply unit to the mains:

- a. Isolated Amplifier 1
- b. Isolated Amplifier 2
- c. Mini-Display Leak



CAUTION: Test the existing sensor manually by lifting the float by hand to ensure that it works reliably in the completed installation.



CAUTION: Test the Leak-Sensor manually by touching the capacitive sensor surface to ensure that it functions reliably in the completed installation.

Isolated Amplifier 1-channel (Cat.No.: R 660-04) and Isolated Amplifier 2-channels (Cat.No.: R 660-01) for use with Mini-Display Leak 2 channels, Leak-Sensor and Splitter

Sensor IN

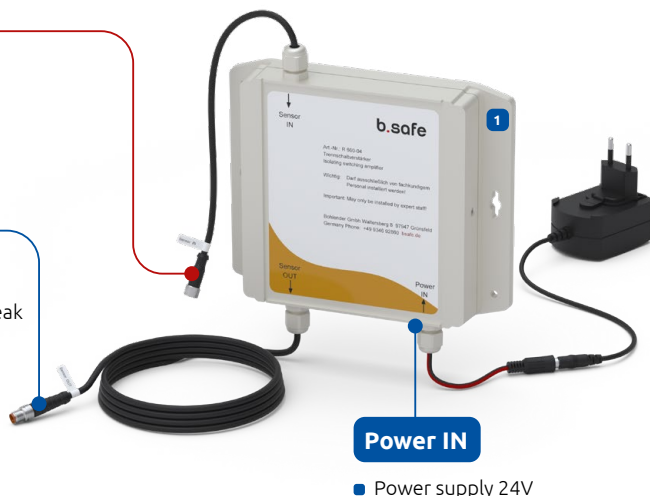
Connection of:

- b.safe Leak-Sensor

Sensor OUT

Connection of:

- b.safe Mini-Display Leak



Sensor 2 IN

Connection of:

- b.safe Waste Cap LC

Sensor 1 IN

Connection of:

- b.safe Waste Cap LC

Sensor 1 OUT

Connection of:

- b.safe Mini-Display Leak 2-channels: Sensor 1

Sensor 2 OUT

Connection of:

- b.safe Mini-Display Leak 2-channels: Sensor 2



Switch settings

Connection of b.safe Mini-Display Leak 2 channels with Splitter and Leak-Sensor
Switch position must be changed:

Isolated Amplifier 1

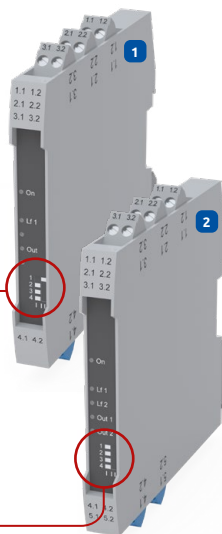


Settings for **use**
of b.safe Leak-Sensor
1 to II, 2, 3, 4 to I

Isolated Amplifier 2



Factory-set switch for **use**
of Mini-Display Leak 2 channels
1, 2, 4 to I, 3 to II



Suitable items for Isolated Amplifier 2 channels



b.safe System Waste
Caps LC S60
» Cat.No.: R 1306-01



b.safe System Waste
Caps LC S55
» Cat.No.: R 1305-01



b.safe System Waste
Caps LC S90
» Cat.No.: R 1309-01



b.safe System Waste
Caps Capacitive S60
» Cat.No.: R 1325-60



b.safe Mini-Display
Leak, 2-channels
» Cat.No.: R 658-22



b.safe Mini-Display
Leak Splitter
» Cat.No.: R 658-24



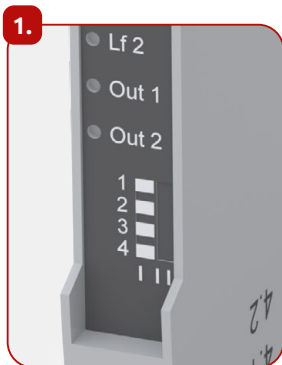
b.safe
Leak-Sensor
» Cat.No.: R 637-01



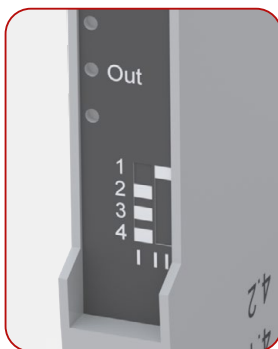
b.safe Splitter
» Cat.No.: R 680-01

Isolated Amplifier 2-channels with Leak-Sensor and Splitter

Fill level control with **b.safe System Waste Caps LC** and **b.safe Mini-Display Leak Splitter** and **b.safe Leak-Sensor** as well as **Splitter** for automatic switchover when the canister is full



Switch position on Isolated Amplifier 2 does not have to be changed.

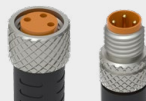


Switch position on Isolated Amplifier 1 must be changed as shown (see page 33)



b.safe Isolated Amplifier to be fastened at the requested position with suitable mounting material

CAUTION: Carefully insert the plug and insert the pins into the holes provided! Then screw together.



2. Connect signal cable of the **b.safe System Waste Cap LC** with signal cable of the **b.safe Isolated Amplifier 2**

Waste Cap left with **Sensor 1 IN**

Waste Cap right with **Sensor 2 IN**



3. Connect signal cable of the **b.safe Isolated Amplifier 2** with the **b.safe Mini-Display Leak**.

Sensor 1 OUT with **Sensor 1 (3a)**

Sensor 2 OUT with **Sensor 2 (3b)**



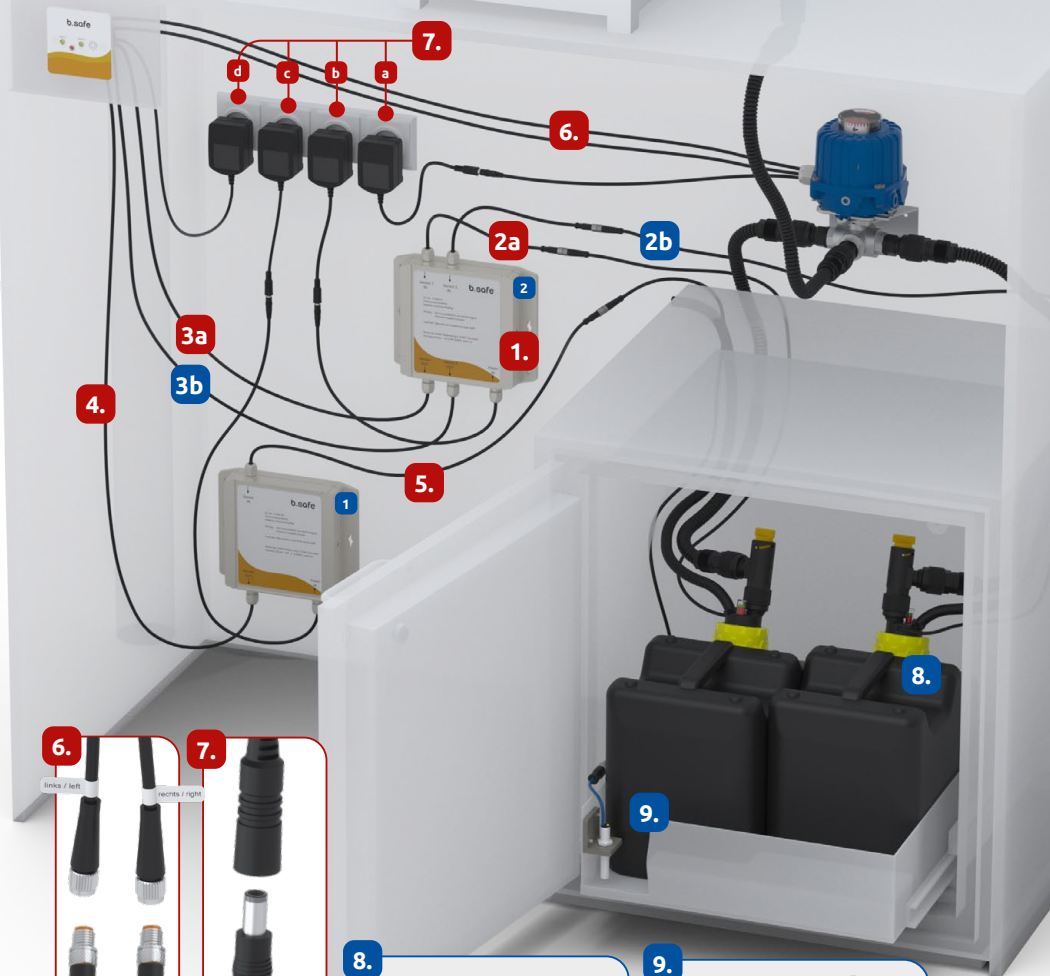
4. Connect signal cable of the **b.safe Isolated Amplifier 1** with the **b.safe Mini-Display Leak**.

Sensor OUT with **Leak-Sensor**



5. Connect signal cable of the **b.safe Isolated Amplifier 1** with the **b.safe Leak-Sensor**.

Sensor IN with **Leak-Sensor**

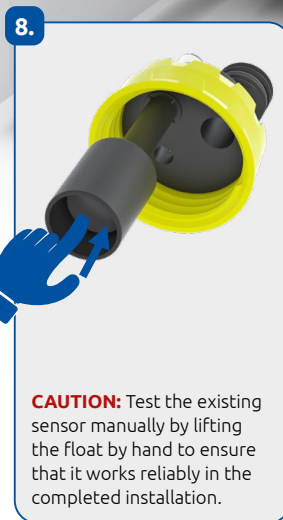


6. Connect signal cable of the **b.safe Splitter** with the **b.safe Mini-Display Leak**.

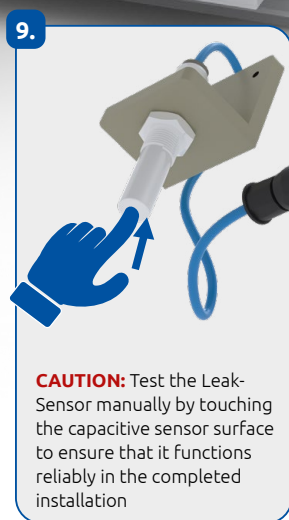
Splitter left with **Mini-Display Splitter left**
Splitter right with **Mini-Display Splitter right**

7. Then plug in the power plug and connect the power supply unit to the mains:

- Isolated Amplifier 1
- Isolated Amplifier 2
- Mini-Display



CAUTION: Test the existing sensor manually by lifting the float by hand to ensure that it works reliably in the completed installation.



CAUTION: Test the Leak-Sensor manually by touching the capacitive sensor surface to ensure that it functions reliably in the completed installation

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