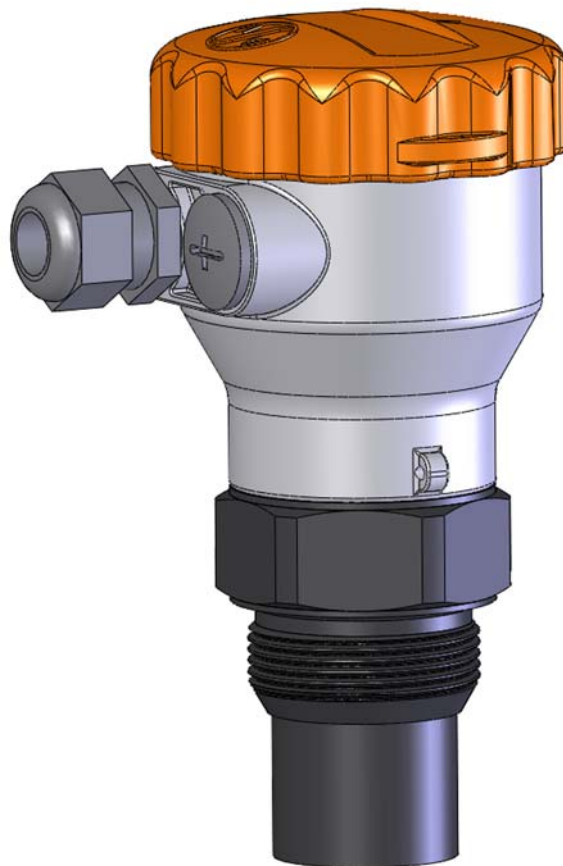


## Operating Manual

# Operating and Maintenance Manual

## Ultrasonic Filling Level Sensor Type UFM



### CAUTION



This operating manual contains important information and safety precautions. Please read this manual thoroughly prior to installation, electrical connection and commissioning of the device.






# Table of Contents

<b>1. Target groups</b> . . . . .	3	<b>8.1 Disposal</b> . . . . .	12
<b>2. Warning signs and symbols</b> . . . . .	3	<b>9. Appendix</b> . . . . .	12
<b>3. General information</b> . . . . .	3	9.1 General technical data . . . . .	12
3.1 General safety information . . . . .	3	9.2 Materials / weights . . . . .	12
3.2 Intended use . . . . .	4	9.2.1 Materials coming into contact with the medium 12	
3.3 Warning against misuse . . . . .	4	9.2.2 Materials not coming into contact with the medium . . . . .	12
3.4 General safety information . . . . .	4	9.2.3 Weight . . . . .	12
3.5 CE sign . . . . .	4	9.3 Output signal . . . . .	12
3.6 Personnel qualification and training . . . . .	4	9.4 Measuring value . . . . .	12
3.7 Hazards resulting from non-observance of the safety information . . . . .	4	9.5 Ambient/process conditions . . . . .	12
3.8 Safety-conscious work practices . . . . .	4	9.6 Display and control module . . . . .	12
3.9 Safety information for the user . . . . .	4	9.7 Error messages . . . . .	13
3.10 Safety information for maintenance, inspection and assembly work . . . . .	4	9.7.1 Relay version + 4-wire current version with display and control module . . . . .	13
3.11 Unauthorised conversion/spare part procurement . . . . .	4	9.7.2 2-wire current version . . . . .	13
3.12 Inadmissible operation . . . . .	4	<b>10. Dimensions</b> . . . . .	13
<b>4. Product description</b> . . . . .	5	<b>11. Ident No.</b> . . . . .	13
4.1 Components . . . . .	5	<b>12. Operating module menu</b> . . . . .	14
4.2 Application . . . . .	5	12.1 Display, relay version . . . . .	14
4.3 Function description . . . . .	5	12.2 Display, current version . . . . .	14
4.4 Operation . . . . .	5	12.3 Button function . . . . .	15
4.4.1 Relay version . . . . .	5	12.4 Basic settings . . . . .	16
4.4.2 4-wire current version . . . . .	5	12.5 Relay version . . . . .	17
4.4.3 2-wire current version . . . . .	5	12.6 4-wire current version / display . . . . .	18
4.4.4 Display . . . . .	5	12.7 Diagnosis . . . . .	19
4.5 Storage and transport . . . . .	5	12.8 Service . . . . .	20
<b>5. Assembly</b> . . . . .	6	12.9 Hysteresis operating mode . . . . .	21
5.1 General information . . . . .	6	12.10 Operating mode window . . . . .	22
5.2 Measuring range . . . . .	6	<b>13. Settings</b> . . . . .	23
5.3 Pressure influence . . . . .	6		
5.4 Container installations . . . . .	6		
5.5 Agitators . . . . .	6		
5.6 Flowing in medium . . . . .	6		
5.7 Foaming media . . . . .	6		
5.8 Mechanical installation . . . . .	7		
5.9 Power/voltage supply . . . . .	8		
5.10 Wiring diagram, relay version . . . . .	8		
5.11 Wiring diagram, 4-wire current version . . . . .	9		
5.12 Wiring diagram, 2-wire current version . . . . .	9		
<b>6. Commissioning/start-up</b> . . . . .	9		
6.1 Switch-on phase . . . . .	9		
6.2 Commissioning of the relay and 4-wire current version with the display and control module . . . . .	9		
6.3 Commissioning/start-up of the 4-wire current version (without display and control module) . . . . .	10		
6.4 Commissioning/start-up of the 2-wire current version (only without display and control module) . . . . .	10		
<b>7. Service/maintenance</b> . . . . .	11		
7.1 Maintenance . . . . .	11		
7.2 Troubleshooting . . . . .	11		
<b>8. Removal</b> . . . . .	12		

## 1. Target groups

Target group	Task
User/owner	Ensure that this manual is accessible at the place of use of the plant/system for future reference.
	Ensure that all staff read and observe this manual and the included documentation, in particular, the safety and warning signs/instructions.
	Inform all staff about the potential dangers emanating from the fluid and/or plant/system components.
	Train and instruct all specialist personnel and fitters with regard to the contents of this manual.
	Ensure that the contents of the operating manual are fully understood and adhered to by the specialist personnel and fitters.
Specialist personnel, fitters	Read and observe this manual and the included documentation, in particular, the safety and warning signs/instructions.

## 2. Warning signs and symbols

Warning sign	Hazard rating	Consequences of non-observance
	Imminent danger	Death or serious injuries due to explosion
	Imminent danger	Death or serious injuries due to live components
	Imminent danger	Death or serious injuries as a result of ignoring the warning
	Possibly dangerous situation	Minor injuries or damage to assets
	indicates important information	Nonobservance could impair the function of the valve!

Symbols	Meaning
•	Bullets

## 3. General information

Prerequisites for the perfect function of the ultrasonic filling level sensor

- Observance of the warning signs and symbols.
- Chemical and mechanical resistance of all components coming into contact with the medium.
- Observance of the installation and mounting direction.
- Proper transport and storage.
- Installation and commissioning by instructed specialist personnel.
- Operation in accordance with this operating manual.

- Correct servicing.

### NOTE

The description and instructions refer to the standard version.

### 3.1 General safety information

The safety information in this operating manual only refers to the device described herein.

In combination with other components of the plant/system, hazard potentials may result that must be evaluated by means of a hazard analysis.

The user/owner of the system is responsible for this hazard analysis, the adherence to resulting

protection measures as well as to regional safety regulations.

**The following is not taken into account by the safety information:**

Unexpected situations and events that could be encountered during installation, operation and maintenance.

The location specific safety instructions, for the adherence of which the user/owner is responsible - together with the installation personnel involved.

### 3.2 Intended use

This product (type ASV UFM) is a sensor for continuous non-contact level measurement.

Please refer to the chapter "Product description" for detailed information on the application of the sensor.



not suitable for use in potentially explosive areas!

### 3.3 Warning against misuse

In the event of improper/incorrect use or non-intended use, hazards may emanate from this device such as container overflow or damage to system/plant components due to incorrect assembly or setting.

### 3.4 General safety information

This product is designed according to state-of-the-art technology taking the standard regulations and directives into consideration. As the user/owner, adhere to the safety information contained in this operating manual, the country-specific installation standards (e.g. in Germany the VDE regulations), as well as the applicable safety regulations for containers and pipes, and the accident prevention regulations.

### 3.5 CE sign

This product complies with the following directives: EN 55041/B; EN61326-1.

### 3.6 Personnel qualification and training

Ensure that the personnel employed for the operation, maintenance, inspection and installation of the device are suitably qualified for this type of work.

### 3.7 Hazards resulting from non-observance of the safety information

Non-observance of the safety information can lead to hazards to persons, to the environment and to the device/system/plant.

Non-observance of the safety information will lead to the loss of any right to claim for damages.

In particular, non-observance could lead to the following hazardous situations, for example:

- Danger to persons due to electrical, mechanical or chemical effects.

- Environmental hazards as a result of the leakage of hazardous substances.
- Malfunction of important functions of the device/system/plant.
- Disruption of prescribed maintenance and repair methods.

### 3.8 Safety-conscious work practices

Observe the safety information contained in this operating manual, the pertinent national accident prevention regulations, as well as all in-house work, operating and safety instructions of the owner/user.

### 3.9 Safety information for the user

- Inform personnel, instructed with the installation, inspection and/or maintenance work, of any potential dangers emanating from the medium/plant and ensure that they work in accordance with safety procedures and in a suitable way for thermoplastic materials.
- Exclude the risk of electric shock (apply the country-specific and/or the local public utility company regulations).

### 3.10 Safety information for maintenance, inspection and assembly work

- Ensure that the device/system/plant is disconnected from the power supply and secured against unauthorised reactivation.
- Always decontaminate device components exposed to media that are hazardous to health.
- Refit and/or reactivate and check all safety and protective devices/guards immediately after completion of the work.

### 3.11 Unauthorised conversion/spare part procurement

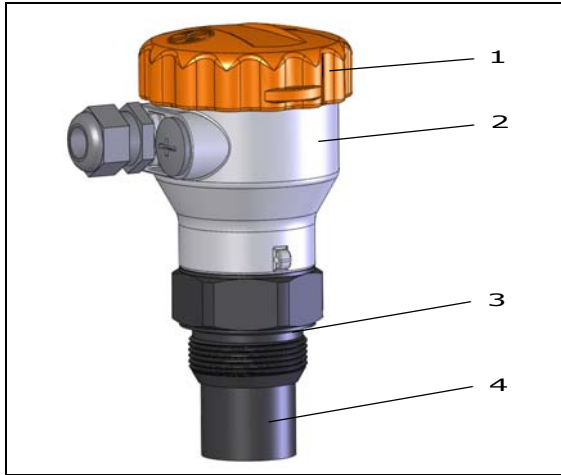
The device may not be converted or changed without the prior approval of the manufacturer. Original spare parts and accessories authorised by the manufacturer ensure the safety of the device. The use of other components shall invalidate the guarantee with respect to any resulting damage!

### 3.12 Inadmissible operation

The operational safety of the supplied device is only guaranteed if it is used according to its intended use and in compliance with the following sections of the operating manual. Ensure that the device parameters specified by the manufacturer are not exceeded.

## 4. Product description

### 4.1 Components



1. Housing cover
2. Connection head
3. Device connection to container
4. Sensor

### 4.2 Application

The ASV type UFM is an ultrasonic sensor for continuous non-contact level measurement of fluids and bulk materials.

Comprehensive operating and display possibilities via relay or with 0/4 ... 20 mA signal output (as 2 or 4-wire version). This product may be exposed to the temperatures and pressures specified in the "Technical data".

### 4.3 Function description

The sensor consists of an ultrasonic transducer which continuously transmits short ultrasonic pulses to the surface of the medium to be measured. The pulses are received by the sensor as echoes.

The time between the transmission and receipt of the pulses is measured. This time is proportional to the distance and therefore to the filling height of the medium. The values such as distance, filling height and volume are converted in the connection head. The output values can be indicated by LCD and/or transmitted via the respective outputs. Versions with 4 freely programmable relay outputs, 4-wire current version or a 2-wire current version are available. In the two-wire variant, the same wire is used for the measured value output and voltage supply.

### 4.4 Operation

The filling level sensor (type ASV UFM) offers different operation and setting possibilities according to the respective version.

#### 4.4.1 Relay version

The **display and control module** is always

needed for commissioning/start-up but is not required for permanent operation.

#### 4.4.2 4-wire current version

The **display and control module** is not necessary for commissioning/start-up. Instead the settings can be performed using the **potentiometers**.

#### 4.4.3 2-wire current version

Two buttons in the connection head are used for setting.

#### 4.4.4 Display and control module

This optionally available module makes it possible to set several sensors; the entered parameters are always saved in the respective sensor. A function for copying all parameters allows them to be loaded and stored in the display and control module.

### 4.5 Storage and transport

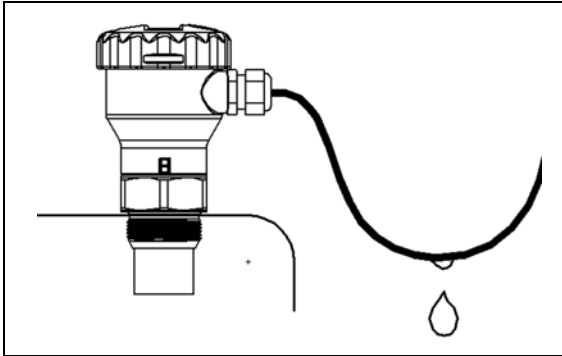
During delivery to the place of use your device is protected by packaging from the normal wear and tear of transport. For standard devices the packaging is made of cardboard, which is recyclable and environmentally compatible. Dispose of the packaging material via a specialised recycling company.

## 5. Installation

### 5.1 General information

Ensure that the device components coming into contact with the medium are suitable for the respective process conditions such as pressure, temperature etc., as well as for the chemical properties of the media.

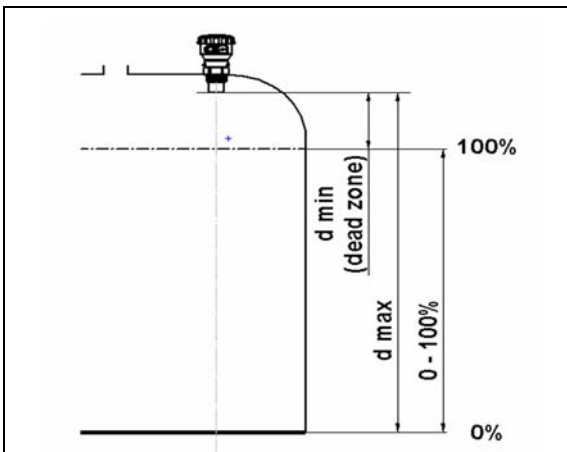
Take the appropriate measures to prevent the ingress of moisture:



### 5.2 Measuring range

The plane of reference for the measuring area is the bottom face of the ultrasonic transducer.

Adhere to the minimum distance beneath this reference plane. No measurement is possible within this "dead zone" (blanking zone). Please refer to the chapter "Technical data" for specification of the precise area.



### 5.3 Influence of pressure

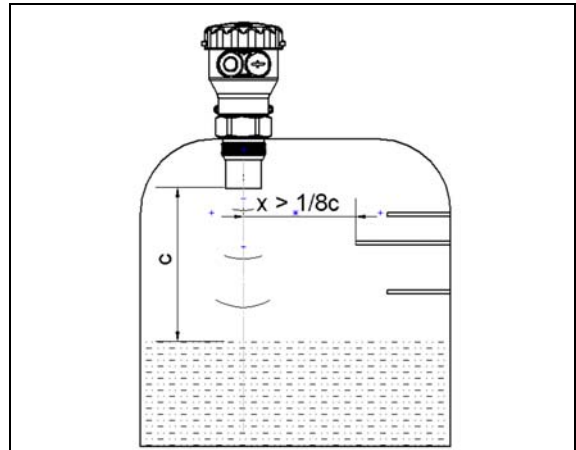
Ultrasonic measuring devices are not affected by pressure above atmospheric pressure. However, a pressure below atmospheric pressure attenuates the ultrasonic pulses, influencing the measuring result, particularly if the filling level is low.

### 5.4 Container installations

When choosing the location for the ultrasonic sensor, ensure that there are no installations inside the tank that could obstruct the ultrasonic signals.

Installations such as ladders, limit switches, container struts etc. can cause false echoes.

Observe the following minimum distances:



If container installations such as struts and supports cause false echoes, these can be attenuated by additional measures. Small sheet metal or plastic baffle plates fitted at an angle over the installations scatter the ultrasonic signals and prevent direct reflection of false echoes.

### 5.5 Agitators

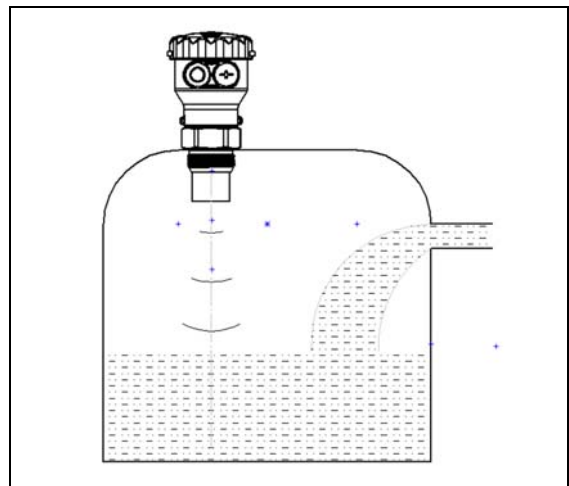
In the case of agitators that cause strong turbulence, the ultrasonic signal may be dampened or dispersed, causing incorrect distance measurements.

A very strong stirring action may cause a vortex in the surface of the medium, leading to excessive deflection of the ultrasonic signal.

Do not fit the filling level sensor directly above an agitator.

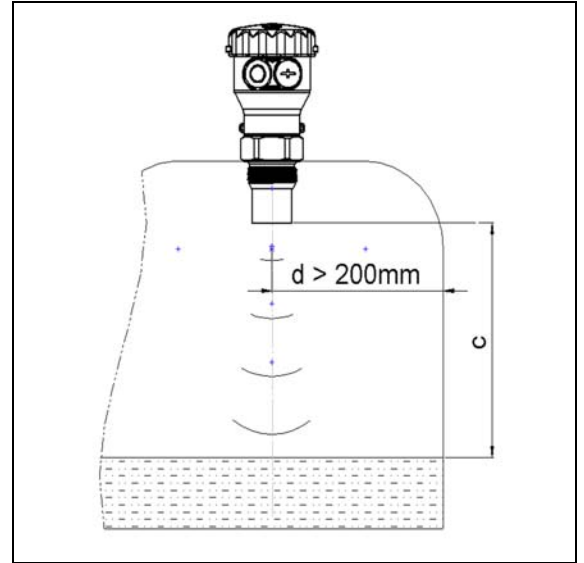
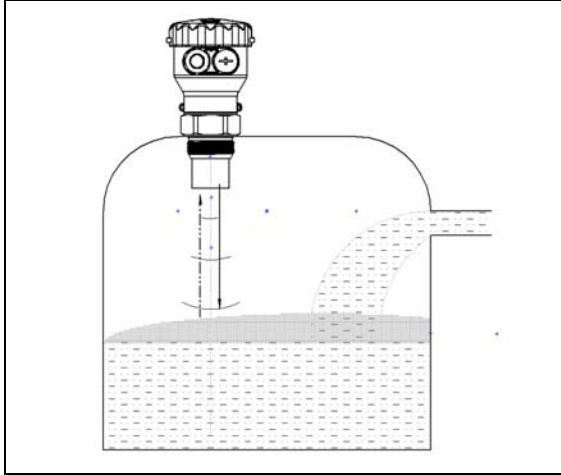
### 5.6 Flowing in medium

Do not fit the filling level sensor directly above or in the flow of medium from the filling inlet. Ensure that the surface of the medium is measured and not the medium flowing into the container.



### 5.7 Foaming media

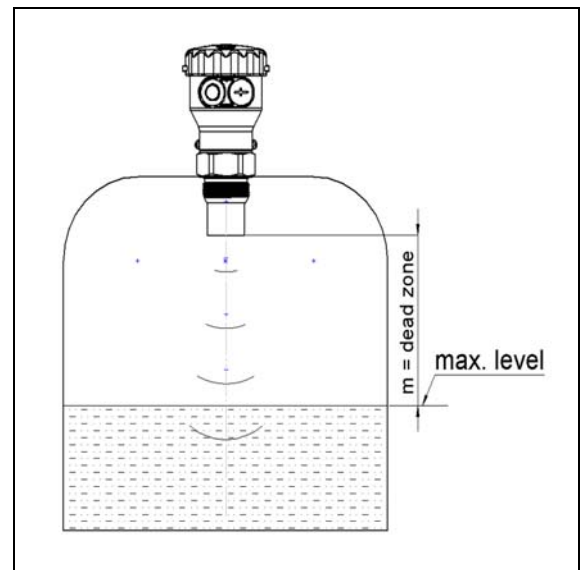
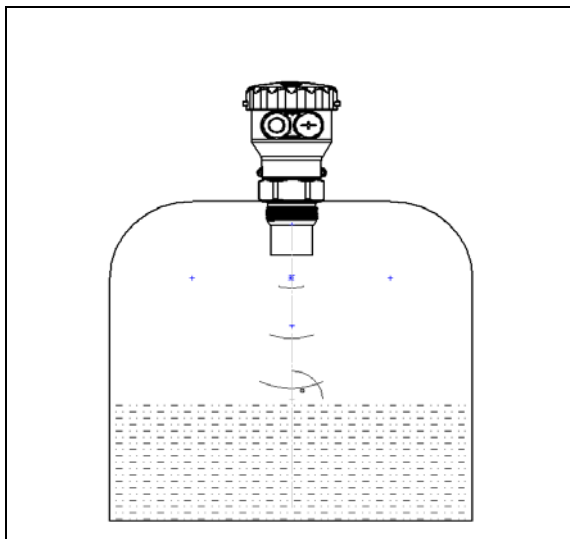
Filling, agitator action or other processes in the container may cause very consistent foam on the surface of the liquid, which will attenuate the transmitted signal to a great extent. If foam causes measurement errors, you should consider mounting the sensor in a standpipe.



### 5.8 Mechanical installation

Use a suitably sized open jaw spanner to screw the filling level sensor vertically into the top of the container at the hexagon of the threaded socket. Ensure that it is vertically aligned in relation to the surface of the medium to be measured.

- For installation over open channels (canals, ditches etc.), the sensor is fitted to a bracket that should be installed as closely as possible to the maximum expected level.
- Due to the general function of an ultrasonic measuring device, the area directly below the ultrasonic transducer is a dead zone (blanking zone) that cannot be used for measurement. Thus the dead zone corresponds to the minimum distance between the filling level sensor and the maximum expected level.



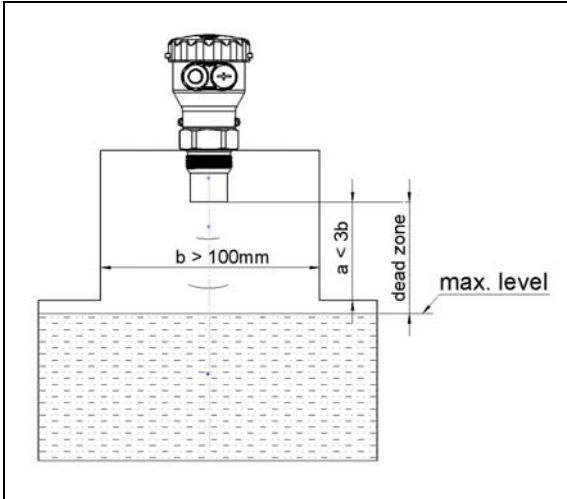
#### CAUTION



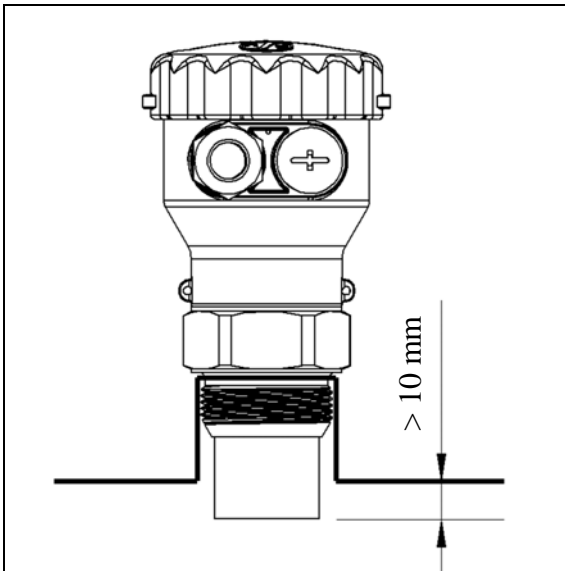
Do not use the top part of the housing to screw in the device as this could cause mechanical damage leading to leaks.

- Minimum distances for installation in / on a container

- If it is possible for the maximum filling level to reach the dead zone, the sensor should be fitted in a spigot. Ensure that the inner surface of the spigot is smooth and the edge of the spigot outlet is rounded. The diameter of the spigot should be as large as possible and the length as short as necessary.



Otherwise, the bottom of the ultrasonic transducer should protrude at least 10 mm from the spigot.



## 5.9 Voltage supply

**DANGER**



Please adhere to the safety information!

Only connect in an isolated state!

Connect the supply voltage in accordance with the following connection diagrams.

### Connection cable

The device is connected with a commercially available cable. We recommend using a shielded cable if electro-magnetic interference above the EN 61326 test values for industrial areas is to be expected or if the cable length exceeds 30 m.

The max. cable cross section must not exceed 1.5 mm<sup>2</sup>. A cable outer diameter of 7 ... 13 mm guarantees the sealing effect of the cable screw connection.

If you use cables with other diameters, change

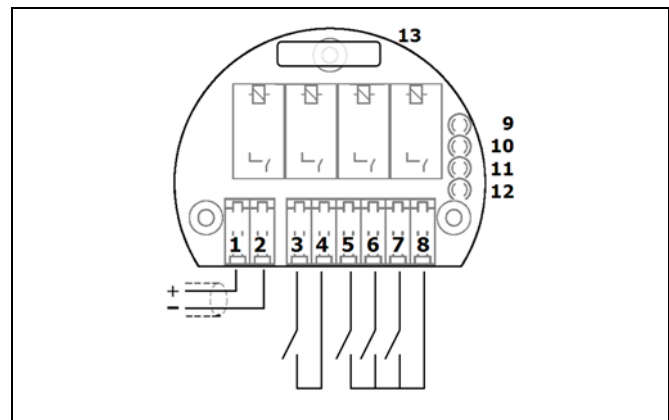
the seal or use a suitable cable screw connection.

### Electrical connection

Proceed as follows:

1. Unscrew the housing cover.
  2. Undo the union nut of the cable screw connection.
  3. Strip approx. 10 cm of the connection cable, remove approx. 1 cm of the insulation from the lead ends and fit ferrules.
  4. Insert the cable through the cable screw connection into the connection head.
  5. Insert the ends of the leads into the terminal according to the wiring diagram.
  6. Push down the clamp levers.
  7. Check that the leads are correctly seated in the terminals.
  8. Firmly tighten the union nut of the cable screw. Ensure that the sealing ring completely encloses the cable.
  9. Screw on the housing cover.
- The electrical connection is completed.

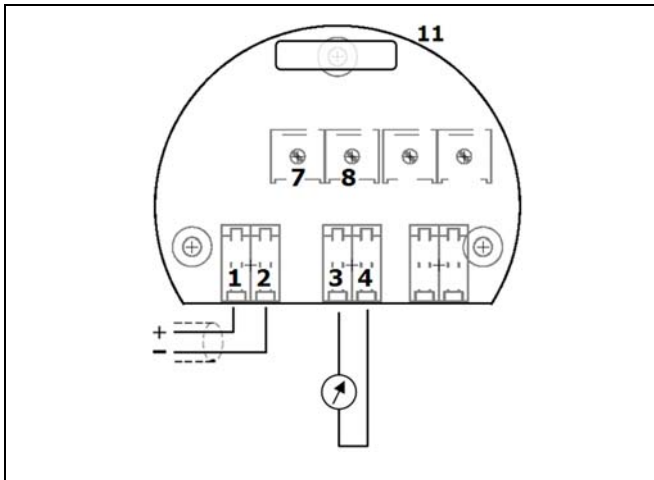
## 5.10 Wiring diagram, relay version



1. Voltage supply (18..30VDC)
2. Voltage supply (0V)
3. Relay 1 (NO)
4. Relay 1 (COM)
5. Relay 2 (NO)
6. Relay 3 (NO)
7. Relay 4 (NO)
8. Relay 2-4 (COM)
9. LED relay 1
10. LED relay 2
11. LED relay 3
12. LED relay 4
13. Display and control module plug connector

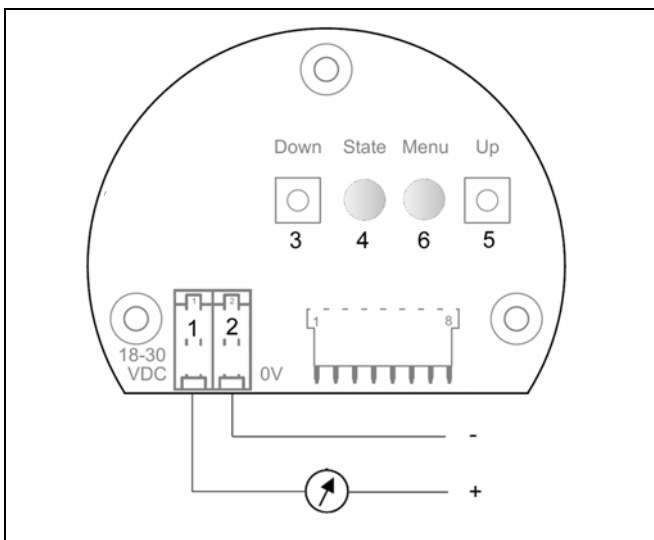


### 5.11 Wiring diagram, 4-wire current version



1. Voltage supply (18..30VDC)
2. Voltage supply (0V)
3. 0/4 ... 20mA distance
4. (-) distance
5. Min. adjustment distance
6. Max. adjustment distance

### 5.12 Wiring diagram, 2-wire current version



1. Voltage supply (18..30VDC)
2. Voltage supply (0V)
3. "Down" button
4. "State" LED
5. "Up" button
6. "Menu" LED

## 6. Commissioning/start-up

### 6.1 Switch-on phase

After connection of the filling level sensor (type UFM) to the voltage supply and/or voltage return, the device first performs a self-test for approx. 10 seconds.

Then the relays are set to the respective states and the respective current is output (the value corresponds to the current distance).

When the display and control module is connected, the device type and current status are also indicated.

### 6.2 Commissioning/start-up of the relay and 4-wire current version with the display and control module

The display and control module is used for indicating the measured values, setting, operation/control and diagnosis.

The display and control module can be inserted into the housing and removed whenever required. It is not necessary to interrupt the voltage supply for this. Proceed as follows:

1. Unscrew the housing cover.
2. Place the display and control module onto the electronics and press down gently

**CAUTION**  Pay attention to the position!

3. The module is now ready for operation. Proceed in the reverse order to remove the module.



The display and control module is supplied with power by the sensor, an additional connection is not necessary.

### Operation

The filling level sensor is operated using the four buttons on the display and control module. The individual menu items are indicated on the LCD (also see appendix: menu structure).

It is always necessary to perform an adjustment and/or enter limit values.

These steps are not necessary for modules that

have already been programmed at the factory according to customer specifications.

Using the display and control module, it is possible to perform an adjustment without filling the container. This allows the necessary settings to be performed and saved without installation of the module on site.

The module automatically returns to the measured value display approx. 2 minutes after the last key press. Any values that have not yet been confirmed with [OK] are lost.

**NOTE**

The relay version cannot be set without the display and control module.

**6.3 Commissioning/start-up of the 4-wire current version (without display and control module)**

In order to perform the adjustment without the display and control module, it is necessary to determine two filling heights.

The desired output current can be adjusted between 4mA and 20mA using trimmer potentiometers once the respective filling height (min. / max.) has been reached. For this it is necessary to determine the current at the respective filling heights using an external ammeter and adjust it using trimmer potentiometers.

Any intermediate height can be used for this instead of the maximum filling level. Set the output current according to the filling height.

**NOTE**

As soon as a display and control module is used, the trimmer potentiometers can be switched off and the software settings taken over. The settings remain stored even after removal of the display and control module. Thus it is also possible to lock the trimmer potentiometers. Trimmer operation can then only be enabled again using the display and control module.

**6.4 Commissioning/start-up of the 2-wire current version (only without display and control module)**

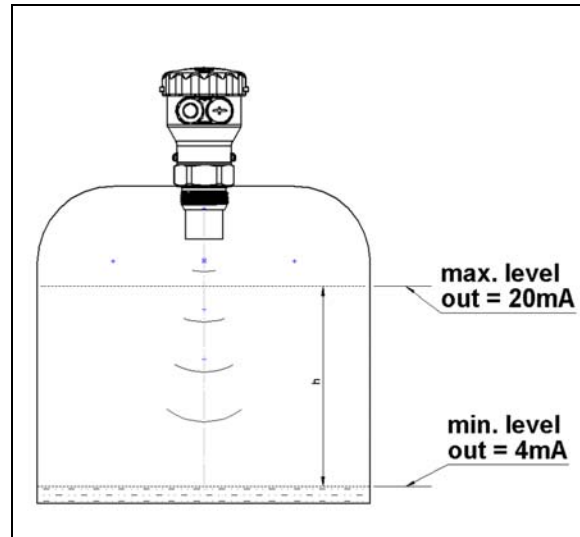
After installation and electrical connection, the output signal can be adjusted to a limited extent using the two buttons. The LEDs on the PCB indicate the status.

LED	Colour	Function
State	green	<b>Slowly flashing light (~ 1.5 s)</b> indicates reception of the reflected signal (echo) from the medium surface -> correct function

LED	Colour	Function
		<b>Rapidly flashing light</b> indicates that the measured value is within the dead zone or the ultrasonic transducer is soiled.
		<b>Off</b> indicates that the measured value is within the dead zone or installation is incorrect or there is a malfunction.
Menu	yellow	<b>Slowly flashing light</b> during adjustment of the 4mA point
		<b>Rapidly flashing light</b> during adjustment of the 20mA point

The basic mode is used to measure the filling level height and the inverse mode to determine the distance.

**BASIC MODE:**



**Setting the lower level (4mA)**

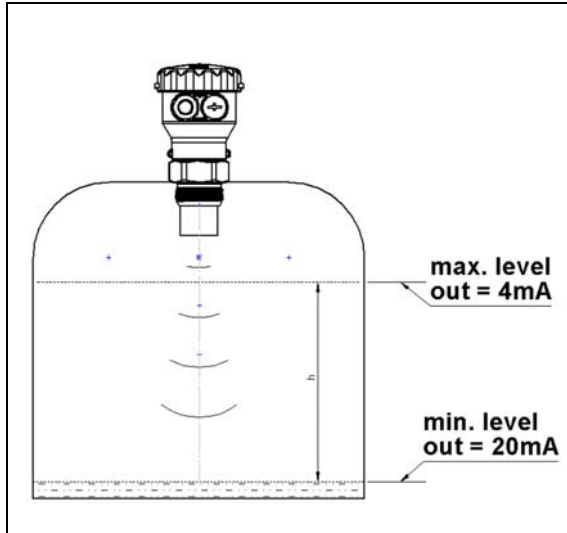
1. Fill the container up to the desired level.
2. Press the "Down" button for at least 2 seconds to activate the set-up mode (the menu LED flashes slowly). If the button is pressed for a further 3 seconds, the output value is directly set to 4mA (in this case, proceed with step 4).
3. Press the "Down" or "Up" button to incrementally decrease or increase the output value.
4. Confirm the output value by pressing both buttons simultaneously for ~ 1 second.
5. It is not possible to perform further settings until at least 2 seconds after release of the buttons.

**Setting the upper level (20mA)**

1. Fill the container up to the desired level.
2. Press the "Up" button for at least 2 seconds to activate the set-up mode (the menu LED flashes rapidly). If the button is pressed for a further 3 seconds, the output value is directly set to 20mA (in this case, proceed with step 4).

3. Press the "Down" or "Up" button to incrementally decrease or increase the output value.
4. Confirm the output value by pressing both buttons simultaneously for ~ 1 second.
5. It is not possible to perform further settings until at least 2 seconds after release of the buttons.

**INVERSE MODE:**



**Setting the lower level (20mA)**

1. Fill the container up to the desired level.
2. Press the "Up" button for at least 2 seconds to activate the set-up mode (the menu LED flashes rapidly). If the button is pressed for a further 3 seconds, the output value is directly set to 20mA (in this case, proceed with step 4).
3. Press the "Down" or "Up" button to incrementally decrease or increase the output value.
4. Confirm the output value by pressing both buttons simultaneously for ~ 1 second.
5. It is not possible to perform further settings until at least 2 seconds after release of the buttons.

**Setting the upper level (4mA)**

1. Fill the container up to the desired level.
2. Press the "Down" button for at least 2 seconds to activate the set-up mode (the menu LED flashes slowly). If the button is pressed for a further 3 seconds, the output value is directly set to 4mA (in this case, proceed with step 4).
3. Press the "Down" or "Up" button to incrementally decrease or increase the output value.
4. Confirm the output value by pressing both buttons simultaneously for ~ 1 second.
5. It is not possible to perform further settings until at least 2 seconds after release of the buttons.

**NOTE**

If the level is within the dead zone, the set-up mode will be locked.  
If no button is pressed for 20 seconds, the sensor will automatically exit the set-up mode. The values are not stored.

**7. Service/maintenance**

**7.1 Maintenance**

This product is maintenance-free when used in accordance with its intended use.

In some applications residue may adhere to the sensor and impair the measuring result. Depending on the sensor and application it is therefore necessary to take measures to remove any excessive residue and prevent such residue from hardening. Clean the transducer if necessary. Ensure that the cleaning measures are suitable for the respective materials.

Prior to commissioning, check that all devices are correctly connected and functioning. Check the electricity supply - including that of the downstream devices.

Observe the general operating instructions for the devices used.

Check the function of the devices at suitable intervals.

It is the responsibility of the user/owner to define the type of inspection and the time intervals within the specified time frame.

We recommend that devices used outside are checked/tested at least every six months.

**7.2 Troubleshooting**

Despite the high functional reliability of this product, malfunctions can still occur during operation. This can have the following causes:

- Sensor
- Process
- Supply
- Signal evaluation

The first measures should include checking the output/input signal and evaluating the status messages via the display and control module.

## 8. Removal

### Removal procedure



Prior to removal, take necessary precautions with regard to hazardous process conditions such as pressure in the container, high temperatures, aggressive or toxic filling media etc.

### 8.1 Disposal

The device consists of materials that can be recycled by specialised recycling companies.

We have designed the electronics to allow easy separation and have used recyclable materials.

This device is not subject to the WEEE Directive 2002/96/EC and the respective national laws (in Germany e.g. ElektroG). Give the device directly to a specialised recycling company. The device may not be disposed of via a municipal collection point that is only intended for products used by private households in accordance with the WEEE Directive.

Professional disposal avoids a negative impact on persons and the environment and allows the recycling of valuable raw materials.

## 9. Appendix

### 9.1 General technical data

#### Measuring value

- Filling level

#### Measuring principle

- Ultrasonic

#### Type of protection

- Connection head: IP67
- Sensor: IP68

#### Voltage supply

- $U_{in} = 18 \dots 30V DC$

#### Connection cable

- Cable outer diameter of 7 ... 13 mm
- Nominal cross-section 1.5 mm<sup>2</sup>

### 9.2 Materials / weights

#### 9.2.1 Materials coming into contact with the medium

- Sensor housing: PVDF
- Sensor seals: FPM

#### 9.2.2 Materials not coming into contact with the medium

- Housing: PP-GF
- Housing cover: PP-GF / PA transparent
- Cover seal: NBR

### 9.2.3 Weight

- Basic weight: 0.45 kg

### 9.3 Output signal

- between power up and first measurement: 3 seconds

#### Relay version

- 4 NO relays
- 8A / 230VAC
- 3 x common COM connection
- Programmable NC/NO switching function

#### 4-wire current version

- 1 x 0/4..20mA
- Can be calibrated/set
- Integration time 0..60 seconds

#### 2-wire current version

- 1 x 4..20mA (limit values 3.9..20.5mA)
- Can be calibrated/set
- Inverse mode
- Max. load resistance (at 24VDC) 600  $\Omega$

### 9.4 Measuring value

Distance between the bottom face of the ultrasonic transducer and the medium surface

- Dead zone 0.25m
- Measuring range up to 6m
- Temperature faults max. 0.04%/K
- Measuring resolution  $\leq 1mm$
- Precision  $\pm 0.2\%FS$
- Ultrasonic frequency 75 kHz
- Beam angle (-3dB) 14°
- Measuring interval 1.4 seconds

### 9.5 Ambient/process conditions

- Ambient/storage and transport temperature -20 ... 70°C
- Short-term temperature load +90°C/1h
- Process temperature -20 ... 70°C
- Ambient/container pressure 0.8 ... 1.1 bar
- Relative humidity 20..85%

### 9.6 Display and control module

- Voltage supply: no separate voltage supply necessary
- Display: Illuminated LCD
- Operation: 4 buttons
- Housing material: ABS
- Front film: Polyester

## 9.7 Error messages

### 9.7.1 Relay version + 4-wire current version with display and control module

- E002 - no sensor connected
- E004 - reflected signal within the dead zone
- E005 - no reflected signal (no echo)
- E006 - reflected signal in the lower limit range, still OK
- E007 - reflected signal in the upper limit range, still OK

### 9.7.2 2-wire current version

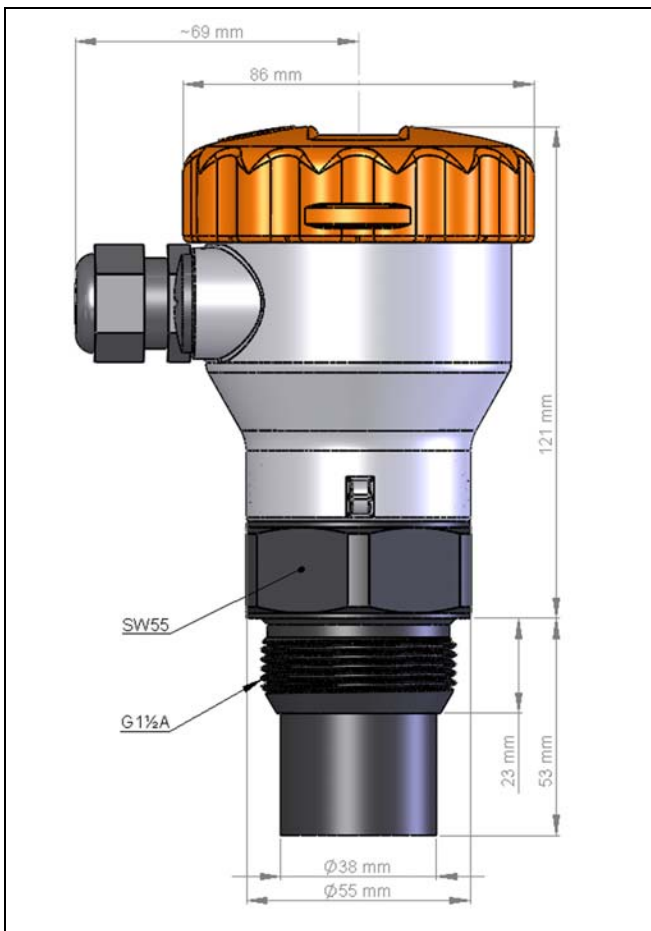
- no reflected signal (basic mode) 3.75mA
- no reflected signal (inverse mode) 2mA
- within the dead zone (basic mode) 22mA
- within the dead zone (inverse mode) 3.75mA

## 11. Ident No.

ID No.	Designation
141033	ASV UFM R Relay version* Ultrasonic filling level sensor Measuring range: 0.3 - 6m 4 freely programmable relays 230V / 8A
140870	ASV UFM C2 2-wire current version Ultrasonic filling level sensor 2-wire current output 4 ... 20mA
141148	ASV UFM C4 4-wire current version Ultrasonic filling level sensor 4-wire current output 4 ... 20mA
141032	ASV UFM D Display with transparent cover

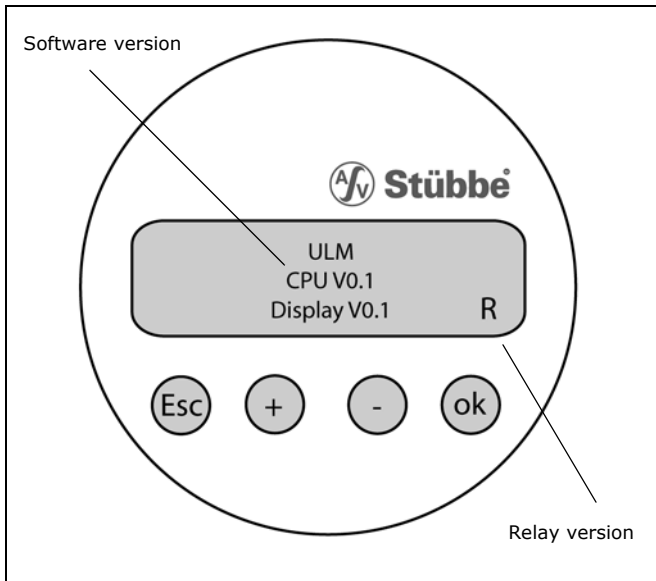
\* A display (Ident No. 141032) is necessary for setting the relay version!

## 10. Dimensions

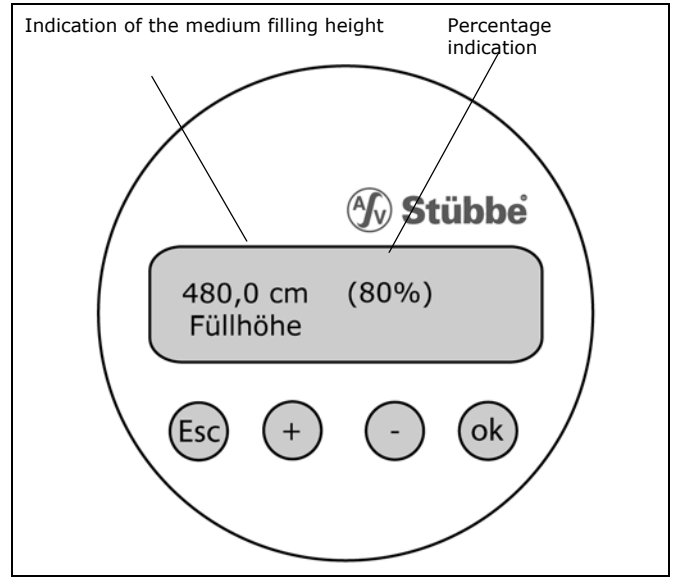
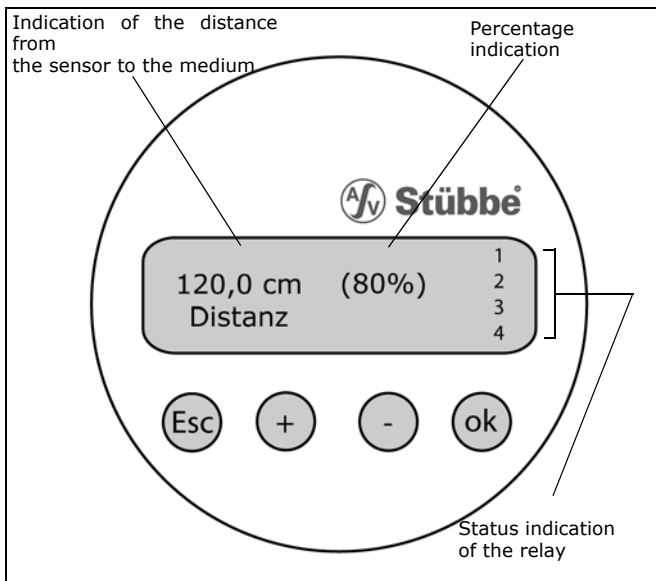
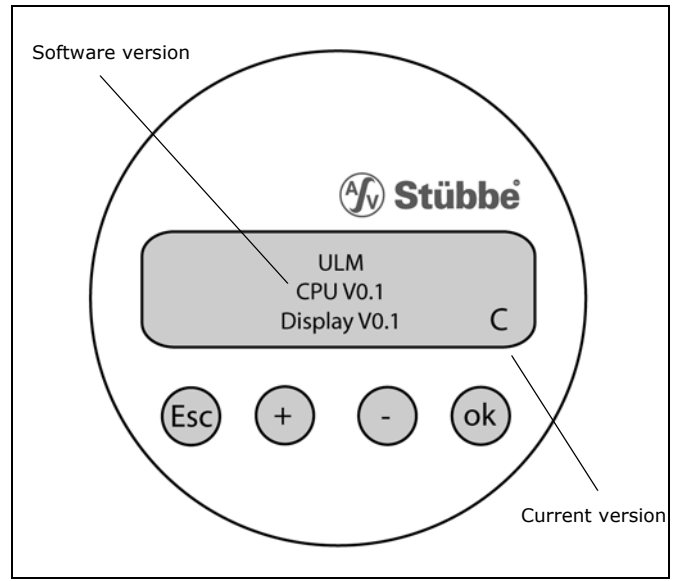


## 12. Control module menu

### 12.1 Display, relay version



### 12.2 Display, current version



## 12.3 Button function

### [OK] button

- changes to the menu overview
- confirms the selected menu
- confirms parameters and saves the values

### [ + ] button

- selection arrow up
- increases the parameter value

### [ - ] button

- selection arrow down
- decreases the parameter value

### [ + ] and [ - ]

- increases the number before the decimal point

### [ - ] and [ + ]

- decreases the number before the decimal point

### [ESC] button

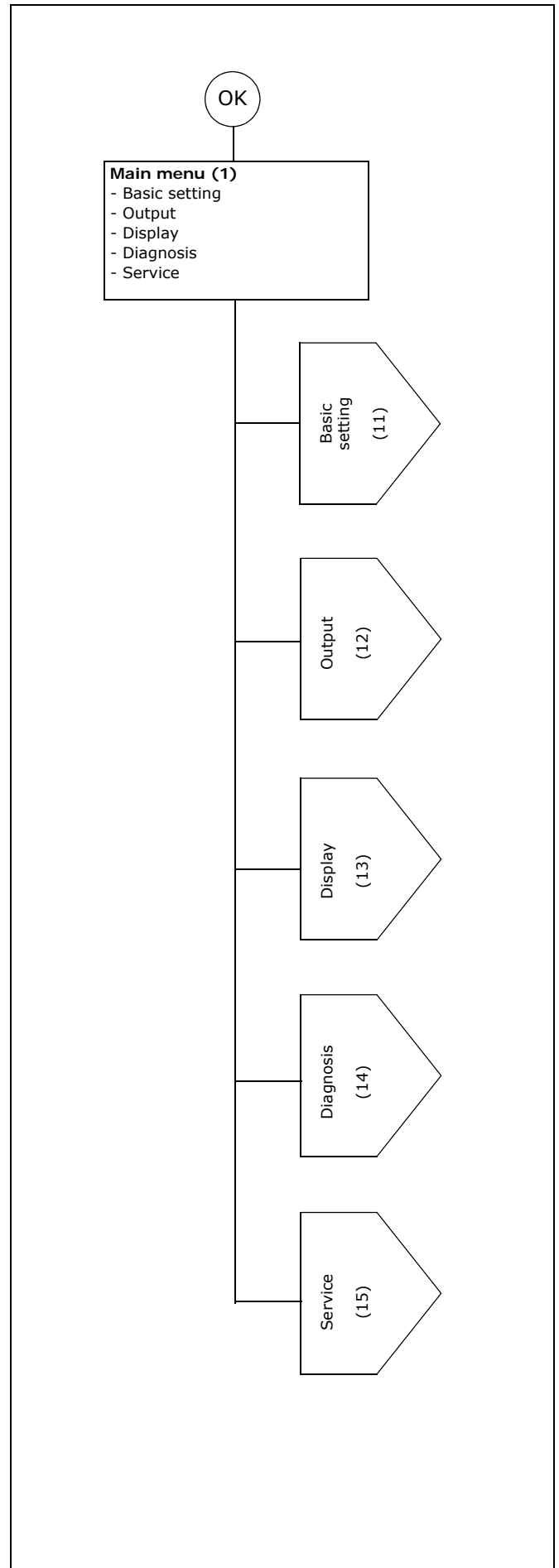
- aborts the entry and changes to the higher menu item
- the values are not stored

### 2.5 minutes after the last key press

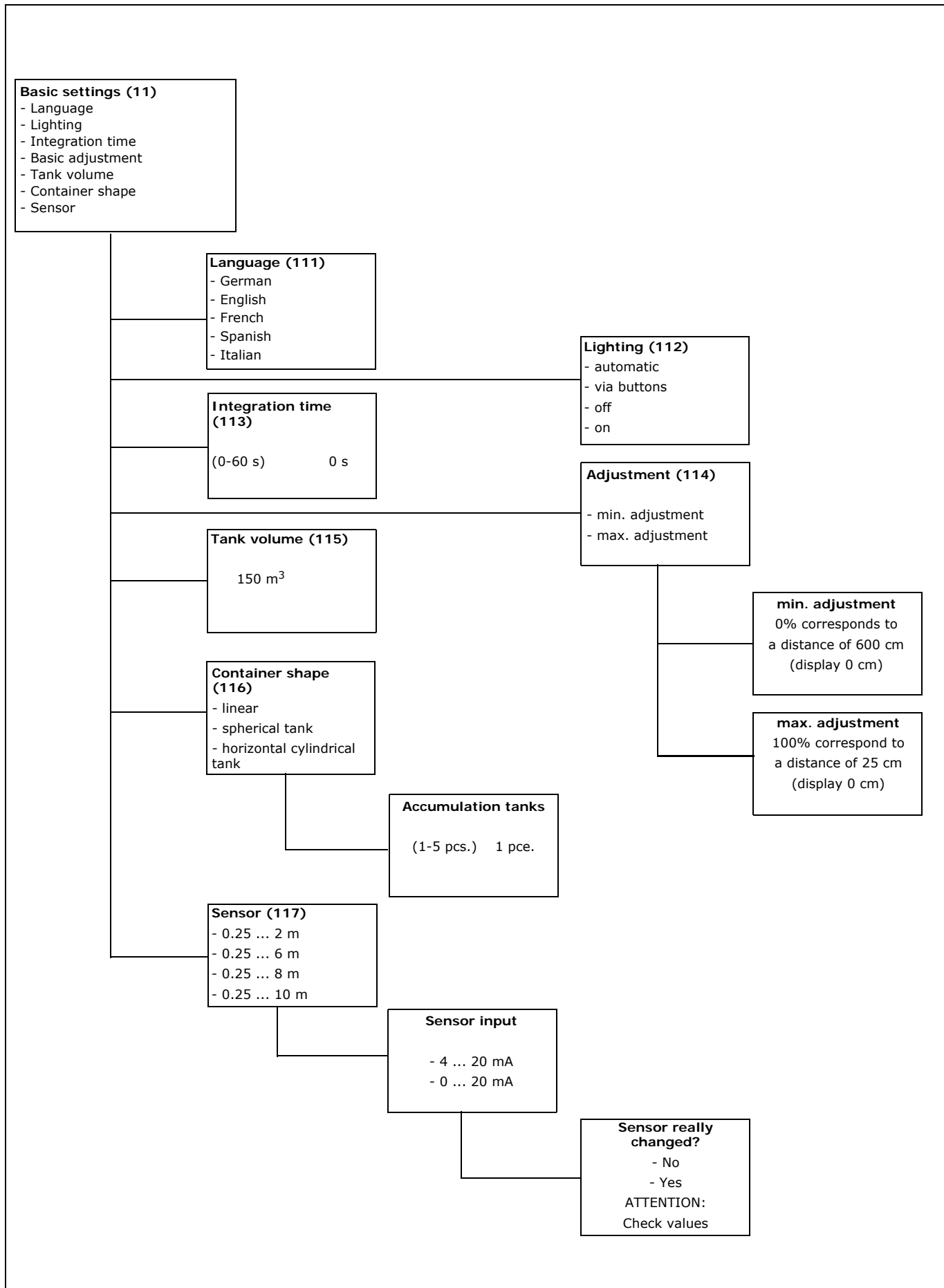
- lighting off

### 2 minutes after the last key press

- returns without saving to the main display

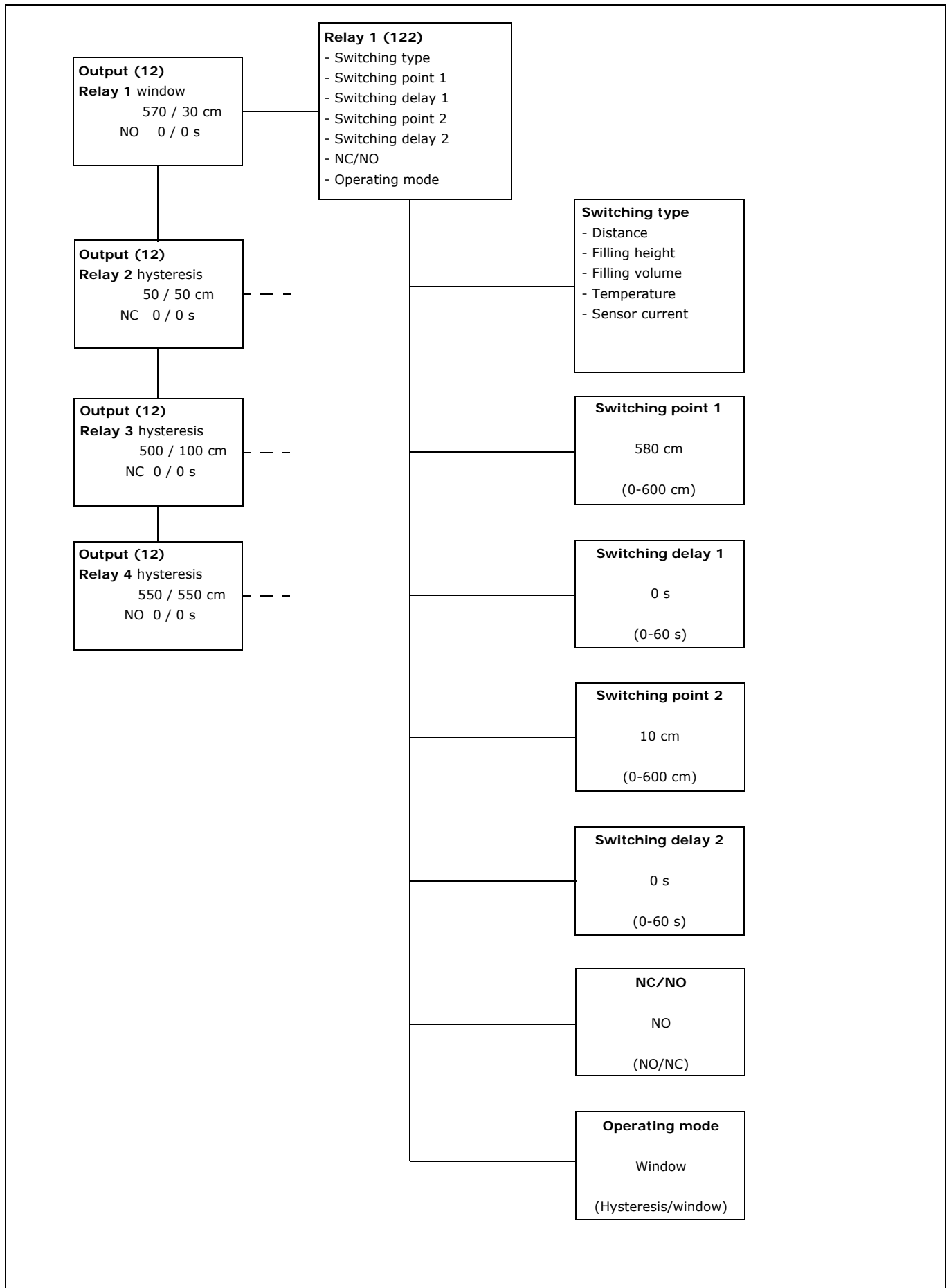


## 12.4 Basic settings

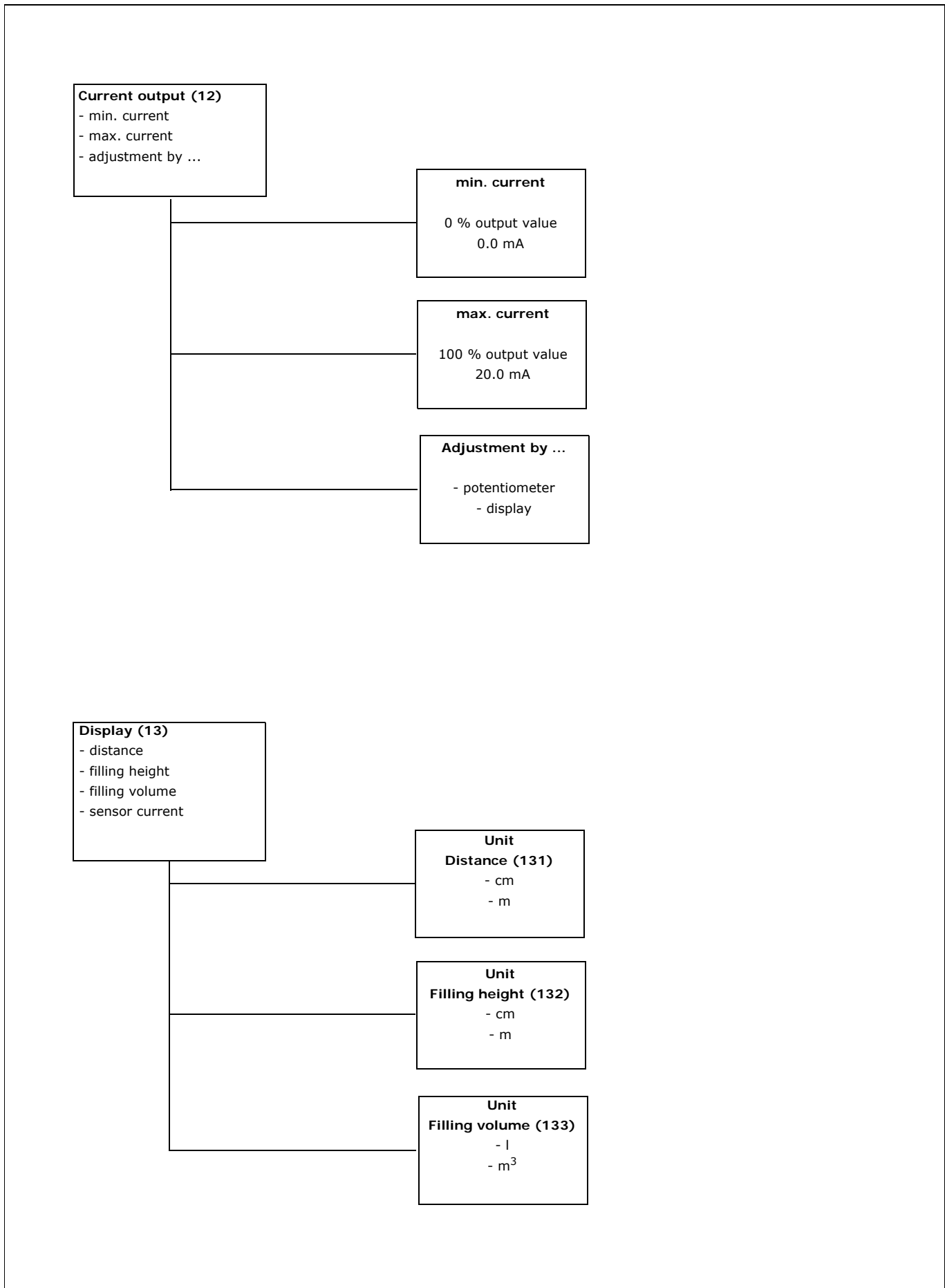




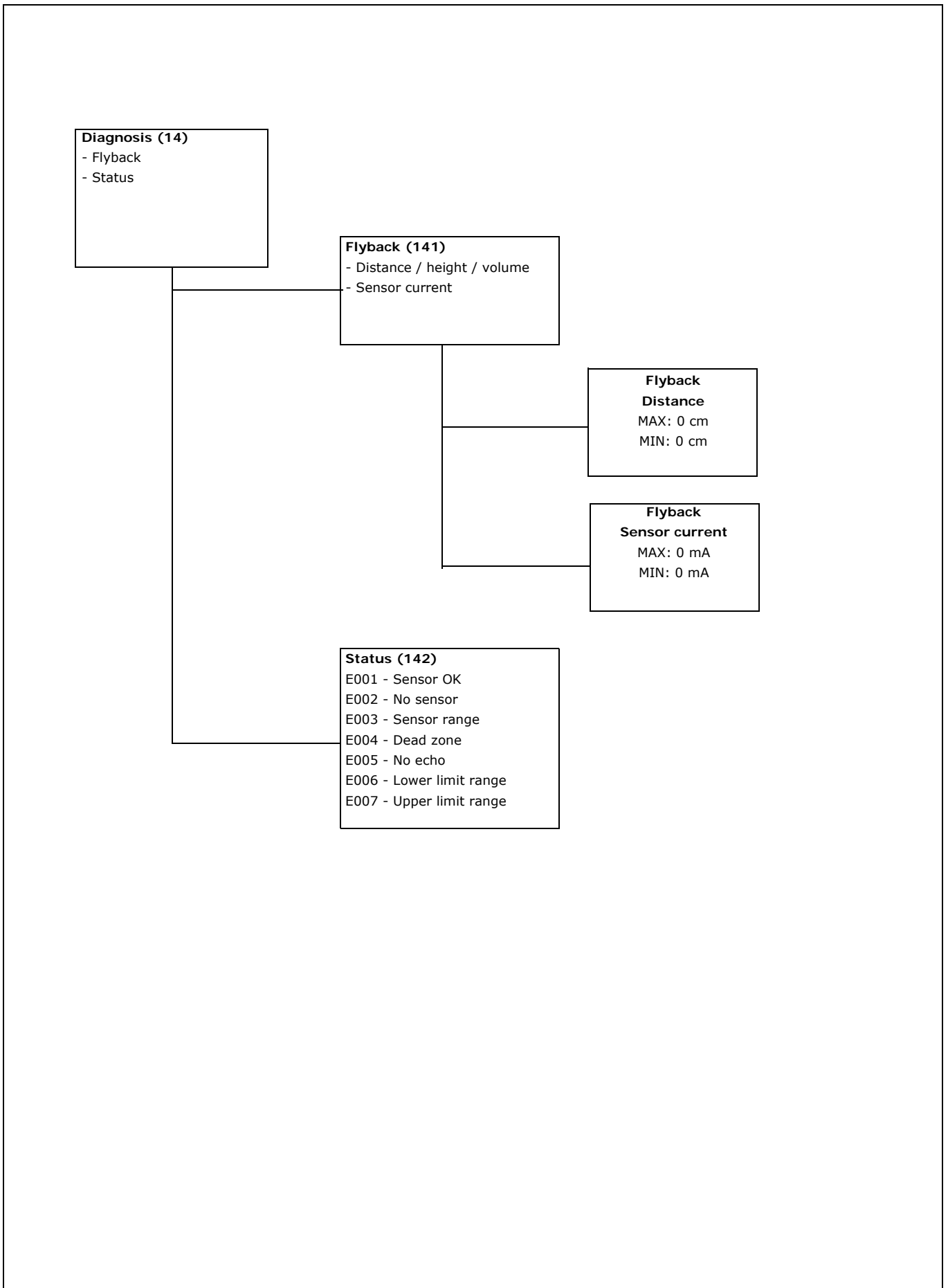
## 12.5 Relay version



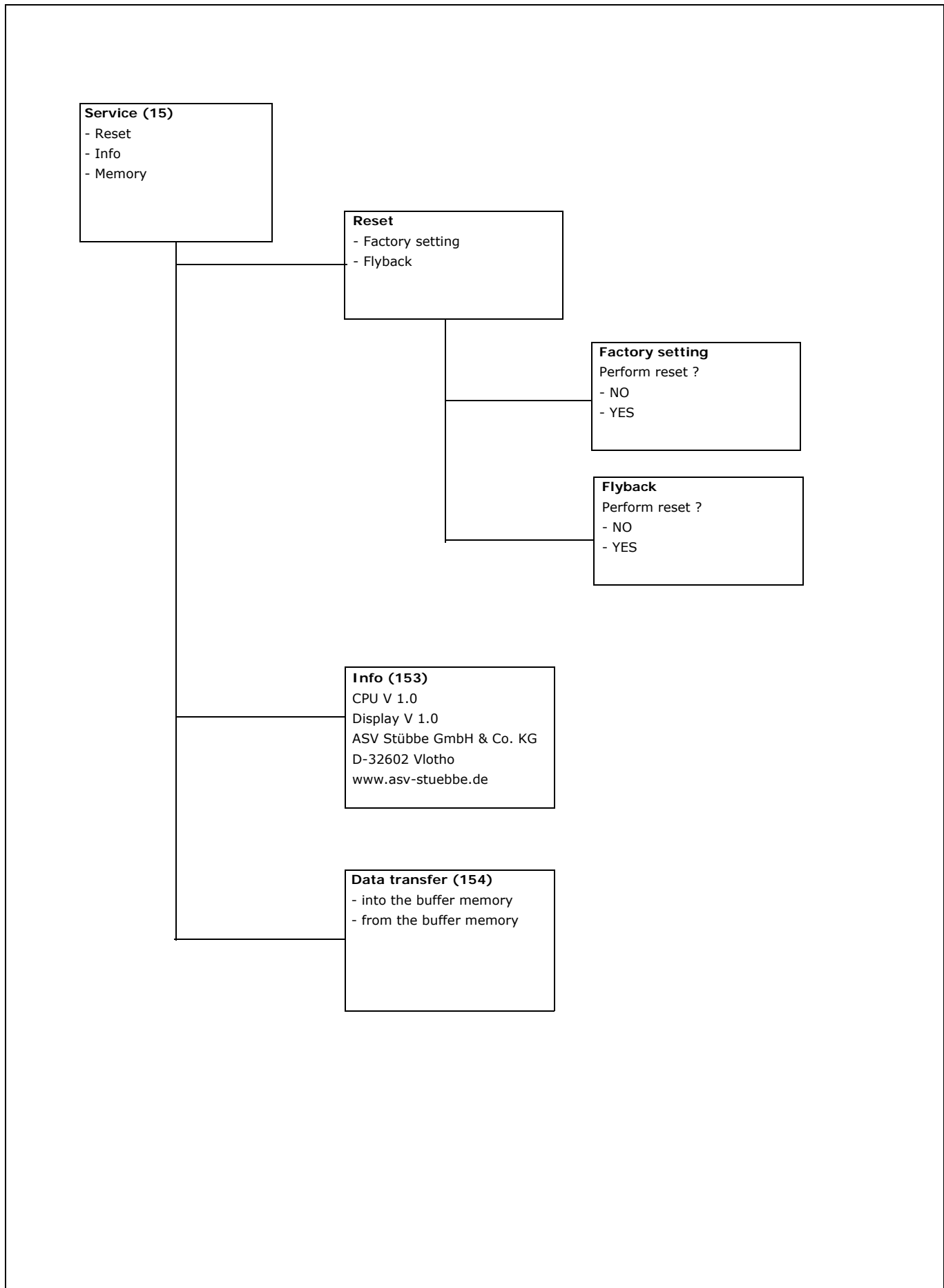
## 12.6 4-wire current version / display



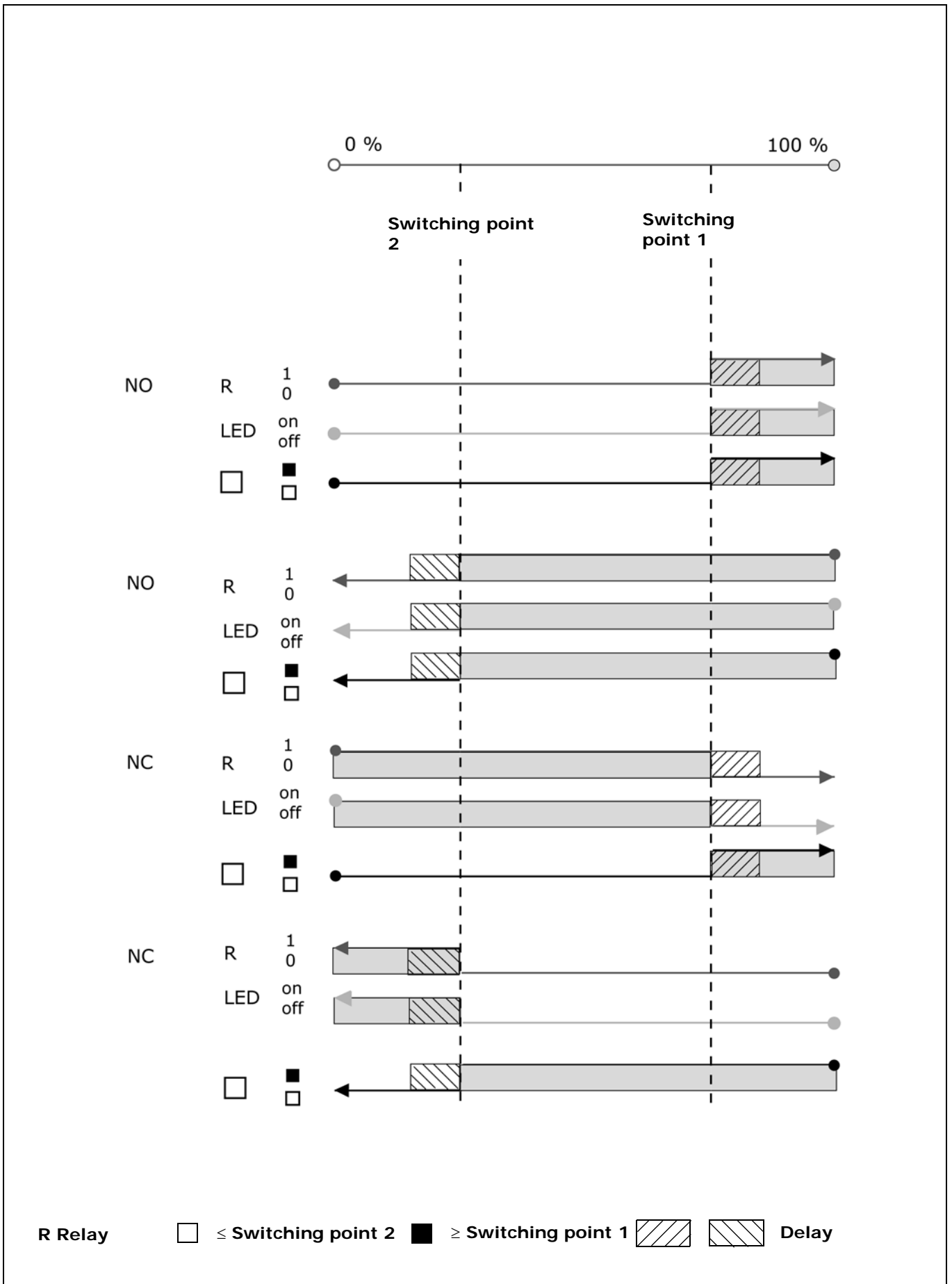
## 12.7 Diagnosis



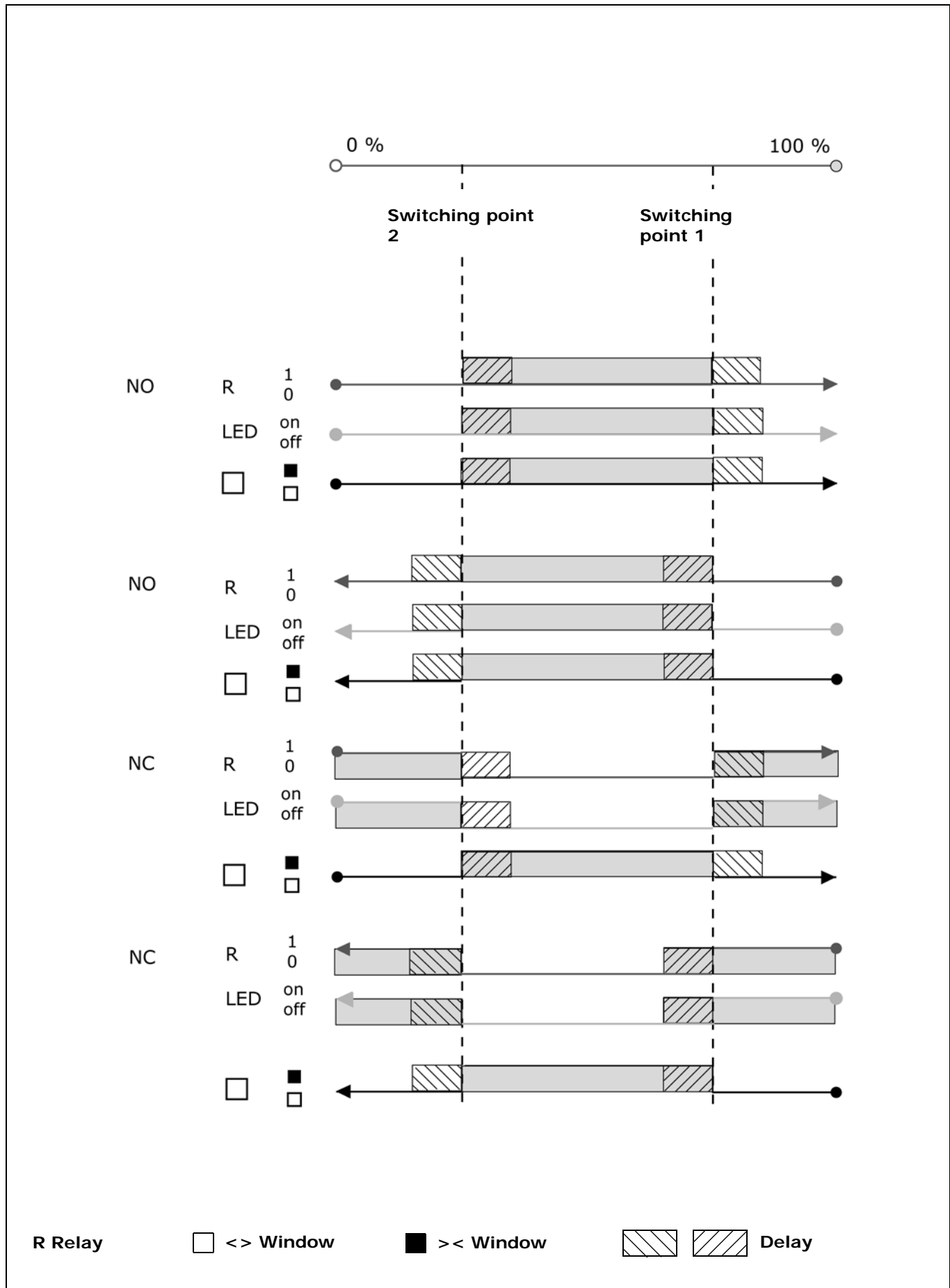
## 12.8 Service



### 12.9 Hysteresis operating mode



## 12.10 Operating mode window



### 13. Settings

Menu point		Factory setting	User setting
<b>111</b>	<b>Language</b>		
		German	X
		English	
		French	
		Spanish	
		Italian	
<b>112</b>	<b>Lighting</b>		
		Automatic	X
		Via buttons	
		Off	
		On	
<b>113</b>	<b>Integration time</b>		
		0 - 60 s	0 s
<b>114</b>	<b>Adjustment</b>		
		min. filling height 0%	Distance of 600 cm
		max. filling height 100%	Distance of 0 cm
<b>115</b>	<b>Volume</b>		150 m <sup>3</sup>
<b>116</b>	<b>Container shape</b>		
		Linear	X
		Spherical tank	
		Horizontal cylindrical tank	
	Accumulation tanks	1-5 pcs.	1 pce.
<b>117</b>	<b>Sensor</b>		
		0.25.. 2 m	
		0.25.. 6 m	X
		0.25.. 8 m	
		0.25..10 m	
	Sensor input	4..20mA	X
		0..20mA	
<b>13</b>	<b>Display</b>		
		Distance	
		Filling height	X
		Filling volume	
		Sensor current	
<b>131</b>	<b>Distance unit</b>		
		cm	X
		m	
<b>132</b>	<b>Filling height unit</b>		
		cm	X
		m	
<b>133</b>	<b>Filling volume unit</b>		
		l	
		m <sup>3</sup>	X
<b>12</b>	<b>Current output</b>		
		min. current 0%	0 mA
		max. current 100%	20 mA
	Adjustment by...	Potentiometer	X
		Display	

Menu point		Factory setting	User setting
<b>12</b>	<b>Relay output</b>		
<b>121</b>	<b>Relay 1</b>		
	Switching type	Distance	
		Filling height	X
		Filling volume	
		Sensor current	
	Switching point 1	0 - 600 cm	580 cm
	Switching delay 1	0 - 60 s	0 s
	Switching point 2	0 - 600 cm	30 cm
	Switching delay 2	0 - 60 s	0 s
	NC/NO	NO / NC	NO
	Operating mode	Hysteresis / window	Window
<b>122</b>	<b>Relay 2</b>		
	Switching type	Distance	
		Filling height	X
		Filling volume	
		Sensor current	
	Switching point 1	0 - 600 cm	50 cm
	Switching delay 1	0 - 60 s	0 s
	Switching point 2	0 - 600 cm	50 cm
	Switching delay 2	0 - 60 s	0 s
	NC/NO	NO / NC	NC
	Operating mode	Hysteresis / window	Hysteresis
<b>123</b>	<b>Relay 3</b>		
	Switching type	Distance	
		Filling height	X
		Filling volume	
		Sensor current	
	Switching point 1	0 - 600 cm	500 cm
	Switching delay 1	0 - 60 s	0 s
	Switching point 2	0 - 600 cm	100 cm
	Switching delay 2	0 - 60 s	0 s
	NC/NO	NO / NC	NC
	Operating mode	Hysteresis / window	Hysteresis
<b>124</b>	<b>Relay 4</b>		
	Switching type	Distance	
		Filling height	X
		Filling volume	
		Sensor current	
	Switching point 1	0 - 600 cm	550 cm
	Switching delay 1	0 - 60 s	0 s
	Switching point 2	0 - 600 cm	550 cm
	Switching delay 2	0 - 60 s	0 s
	NC/NO	NO / NC	NO
	<b>Operating mode</b>	Hysteresis / window	Hysteresis