BA01069F/09/EN/09.25-00
71714892
2025-08-25



# Operating Instructions
# **Soliswitch FTE20**

Rotary paddle level switch

Endress+Hauser
People for Process Automation

# Table of contents

# 1 About this document

## 1.1 Document function

These Operating Instructions contain all the information required in the various life cycle phases of the device: from product identification, incoming acceptance and storage, to installation, connection, operation and commissioning, through to troubleshooting, maintenance and disposal.

## 1.2 Symbols

### 1.2.1 Safety symbols

**⚠ DANGER**
This symbol alerts you to a dangerous situation. Failure to avoid this situation will result in serious or fatal injury.

**⚠ WARNING**
This symbol alerts you to a potentially dangerous situation. Failure to avoid this situation can result in serious or fatal injury.

**⚠ CAUTION**
This symbol alerts you to a potentially dangerous situation. Failure to avoid this situation can result in minor or medium injury.

**NOTICE**
This symbol alerts you to a potentially harmful situation. Failure to avoid this situation can result in damage to the product or something in its vicinity.

### 1.2.2 Electrical symbols

| Symbol | Meaning |
|---|---|
|  | Direct current |
|  | Alternating current |
|  | Direct current and alternating current |
|  | **Ground connection**<br>A grounded terminal which, as far as the operator is concerned, is grounded via a grounding system. |
|  | **Protective earth (PE)**<br>Ground terminals that must be connected to ground prior to establishing any other connections.<br>The ground terminals are located on the interior and exterior of the device:<br>▪ Interior ground terminal: protective earth is connected to the mains supply.<br>▪ Exterior ground terminal: device is connected to the plant grounding system. |

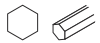
### 1.2.3 Symbols for certain types of information

| Symbol | Meaning |
|---|---|
|  | **Permitted**<br>Procedures, processes or actions that are permitted. |
|  | **Preferred**<br>Procedures, processes or actions that are preferred. |
|  | **Forbidden**<br>Procedures, processes or actions that are forbidden. |
|  | **Tip**<br>Indicates additional information. |
|  | Reference to documentation |
|  | Reference to page |
|  | Reference to graphic |
|  | Notice or individual step to be observed |
| 1., 2., 3... | Series of steps |
|  | Result of a step |
|  | Help in the event of a problem |
|  | Visual inspection |

### 1.2.4 Symbols in graphics

| Symbol | Meaning |
|---|---|
| 1, 2, 3 ... | Item numbers |
| 1., 2., 3... | Series of steps |
| A, B, C, ... | Views |
| A-A, B-B, C-C, ... | Sections |
|  | **Hazardous area**<br>Indicates the hazardous area. |
|  | **Safe area (non-hazardous area)**<br>Indicates the non-hazardous area. |

### 1.2.5 Tool symbols

| Symbol | Meaning |
|---|---|
|  A0011220 | Flat-blade screwdriver |
|  A0011221 | Allen key |
|  A0011222 | Open-ended wrench |
|  A0013442 | Torx screwdriver |

# 2 Basic safety instructions

## 2.1 Requirements for the personnel

The personnel for installation, commissioning, diagnostics and maintenance must fulfill the following requirements:

- Trained, qualified specialists must have a relevant qualification for this specific function and task.
- Are authorized by the plant owner/operator.
- Are familiar with federal/national regulations.
- Before starting work, read and understand the instructions in the manual and supplementary documentation as well as the certificates (depending on the application).
- Follow instructions and comply with basic conditions.

The operating personnel must fulfill the following requirements:

- Are instructed and authorized according to the requirements of the task by the facility's owner-operator.
- Follow the instructions in this manual.

## 2.2 Intended use

The device must only be used as a level switch for specific bulk solids (see Technical Data → 26).

- Only operate the device when it is installed.
- The manufacturer accepts no liability for damages resulting from improper or non-intended use. Do not make any modifications or changes to the device.

## 2.3 Workplace safety

For work on and with the device:
- ▶ Wear the required personal protective equipment according to federal/national regulations.

## 2.4 Operational safety

Damage to the device!
- ▶ Operate the device in proper technical condition and fail-safe condition only.
- ▶ The operator is responsible for the interference-free operation of the device.

### Modifications to the device

Unauthorized modifications to the device are not permitted and can lead to unforeseeable dangers!
- ▶ If modifications are nevertheless required, consult with the manufacturer.

### Repair

To ensure continued operational safety and reliability:
- ▶ Carry out repairs on the device only if they are expressly permitted.
- ▶ Observe federal/national regulations pertaining to the repair of an electrical device.
- ▶ Use only original spare parts and accessories.

## 2.5 Product safety

This state-of-the-art device is designed and tested in accordance with good engineering practice to meet operational safety standards. It left the factory in a condition in which it is safe to operate.

It meets general safety standards and legal requirements. It also complies with the EU directives listed in the device-specific EU declaration of conformity. The manufacturer confirms this by affixing the CE mark.

# 3 Incoming acceptance and product identification

## 3.1 Incoming acceptance

On receipt of the delivery:

1. Check the packaging for damage.
   ↳ Report all damage immediately to the manufacturer.
   Do not install damaged components.
2. Check the scope of delivery using the delivery note.
3. Compare the data on the nameplate with the order specifications on the delivery note.

4. Check the technical documentation and all other necessary documents, e.g. certificates, to ensure they are complete.

If one of the conditions is not satisfied, contact the manufacturer.

## 3.2 Product identification

### 3.2.1 Nameplate

**Do you have the correct device?**

The nameplate provides you with the following information on the device:
- Manufacturer identification, device designation
- Order code
- Extended order code
- Serial number
- Tag name (TAG) (optional)
- Technical values, e.g. supply voltage, current consumption, ambient temperature, communication-specific data (optional)
- Degree of protection
- Approvals with symbols
- Reference to Safety Instructions (XA) (optional)

▶ Compare the information on the nameplate with the order.

### 3.2.2 Name and address of manufacturer

| | |
|---|---|
| **Name of manufacturer:** | Endress+Hauser Wetzer GmbH + Co. KG |
| **Address of manufacturer:** | Obere Wank 1, D-87484 Nesselwang or www.endress.com |

## 3.3 Storage and transport

Note the following:
- Pack the device so that is protected against impact for storage and transport. The original packaging offers optimum protection.
- The permitted storage temperature is −20 to 60 °C (−4 to 140 °F).

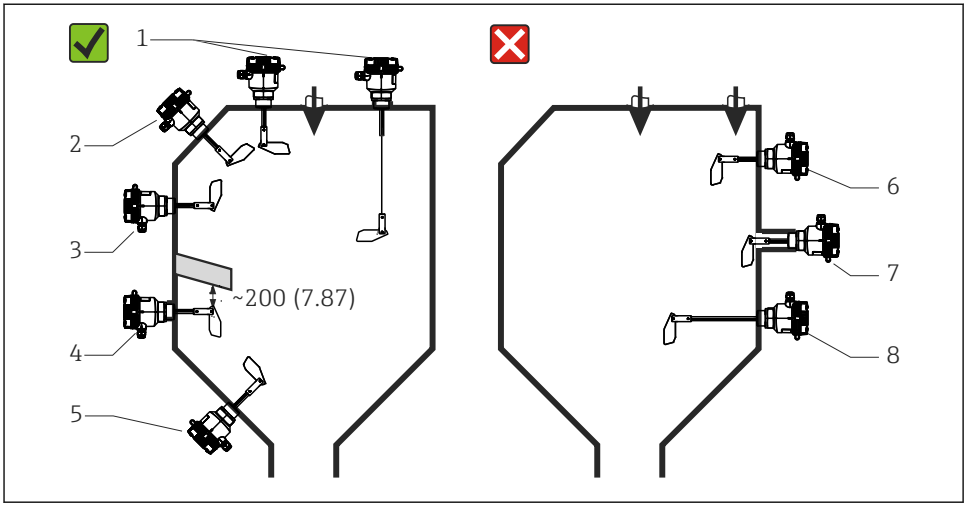
# 4 Installation

## 4.1 Installation requirements

Correct and incorrect orientations are indicated in → 1, 8.

Protect the device from direct sunlight. A weather protection cover is available as an accessory, see the "Accessories" section → 31.

The dimensions of the device are provided in the "Technical data" section → 17, 27.




*1 Orientations of the level switch, dimensions in mm (in)*

| Permitted orientations | | Forbidden orientations | |
|---|---|---|---|
| 1: | Vertical from the top | 6: | In direction of solids flow |
| 2: | Angled from the top | 7: | Installation coupling too long |
| 3: | From the side | 8: | Horizontal with shaft length > 300 mm (11.8 in) (In version with reinforced shaft: horizontal with shaft length > 600 mm (23.6 in)) |
| 4: | From the side with protective cover against falling solids | | |
| 5: | From the bottom (device must be protected against shock-type loads) | | |

**Ambient temperature range**
–20 to 60 °C (–4 to 140 °F)

**Medium temperature range**
–20 to 80 °C (–4 to 176 °F)

**Mechanical load of the optional signal lamp**
The optional signal lamp must be protected against mechanical stress (impact energy > 1 J).

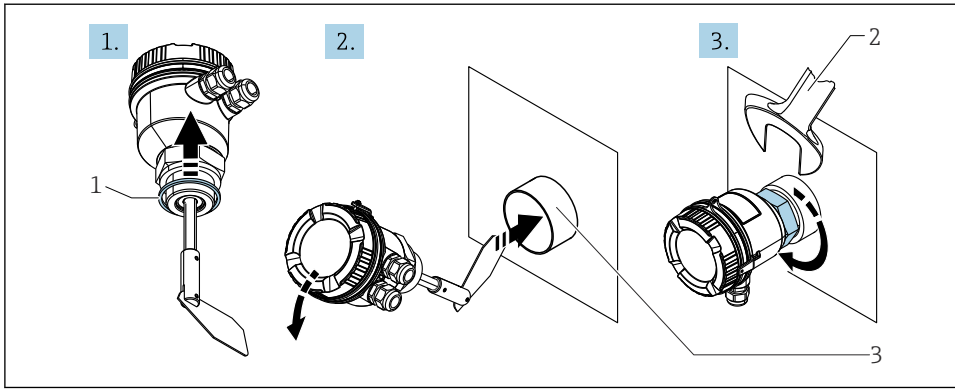
More information is provided in the "Technical data" section → 📄 25.

## 4.2 Installing the device

NOTICE

**The device can be damaged if handled incorrectly during installation**

- Do not turn the housing to tighten the process connection. Once the process connection has been tightened, the housing can be aligned so that the cable entries point downwards.



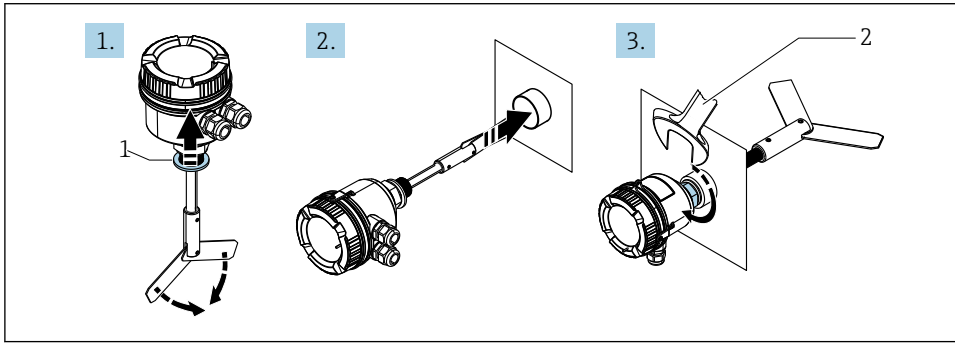

2 *Installation of the standard version*

1 *Attach sealing ring (1) 60x48x3 mm (2.36x1.89x0.12 in).*
2 *Insert the rotary paddle into the connecting flange (3). Note: Pay attention to the maximum flange depth of the connection. With the standard rotary paddle, installation in flange connections is permitted up to a sleeve length ≤ 40 mm (1.57 in). For sleeve lengths > 40 mm (1.57 in) only the version with hinged rotary paddle can be used. It must be possible to insert the rotary paddle without force.*
3 *Tighten nut with open-ended wrench AF 60 (2).*

**NOTICE**

**The device with hinged rotary paddle does not function correctly when the transport lock is secured.**

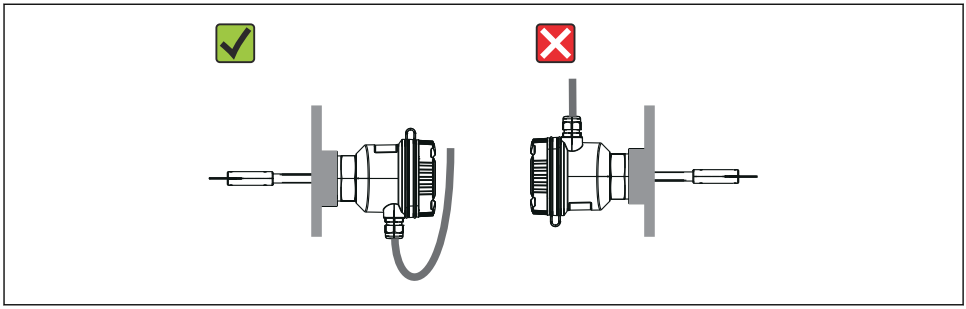
► Remove the transport lock (plastic net around the rotary paddle) prior to installation.




3 *Installation of the version with hinged rotary paddle*

1 *Attach sealing ring (1) 60x48x3 mm (2.36x1.89x0.12 in).*
2 *Insert the rotary paddle into the connecting flange (3).*
3 *Tighten nut with open-ended wrench AF 60 (2).*

### 4.2.1 Turning the housing to the right position

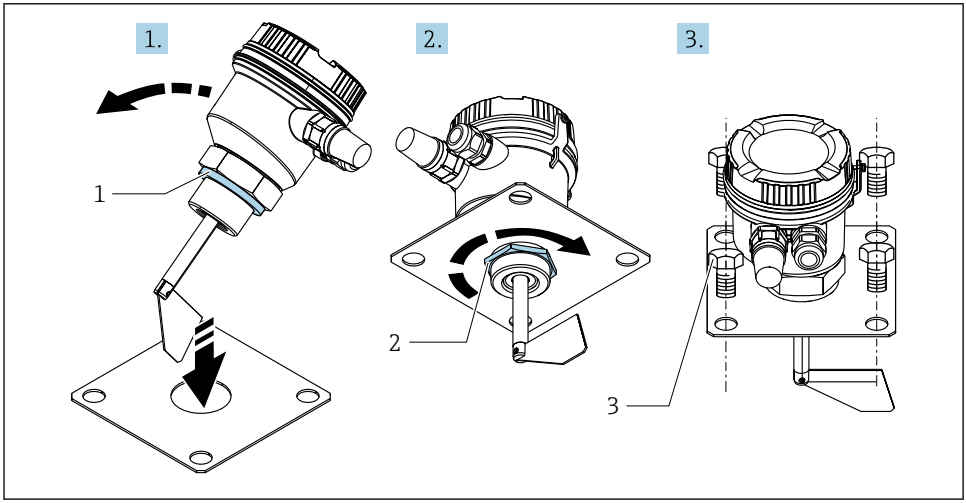


A0017364

*4 Correct housing position*

### 4.2.2 Installation of the flange version

The flange version is available as an accessory. The dimensions are provided in the "Technical data" section.



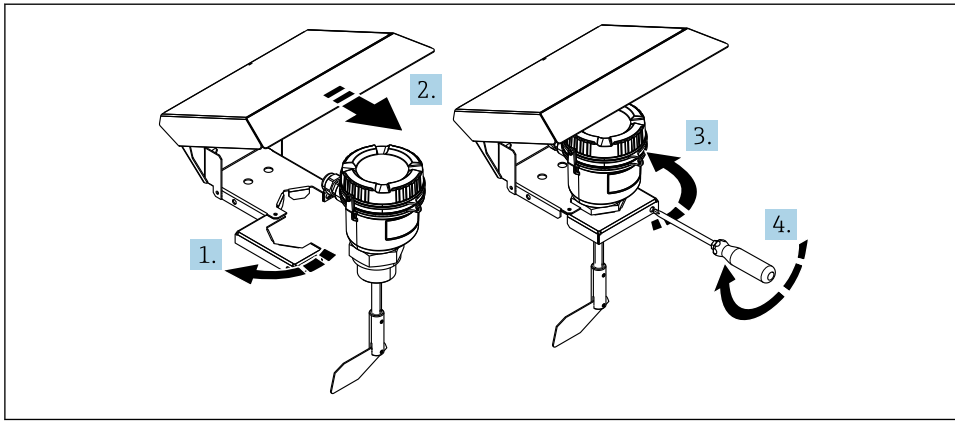

A0018473

*5 Installation of the flange version*

1 *Attach sealing ring (1) 60x48x3 mm (2.36x1.89x0.12 in) and insert rotary paddle into connecting flange.*
2 *Tighten nut (2) with open-ended wrench AF 60.*
3 *Secure the device using 4 screws (not included in the scope of delivery).*

### 4.2.3 Mounting the weather protection cover

The weather protection cover is available as an accessory and can be installed without disassembling the level switch. The dimensions are provided in the "Technical data" section.




A0017698

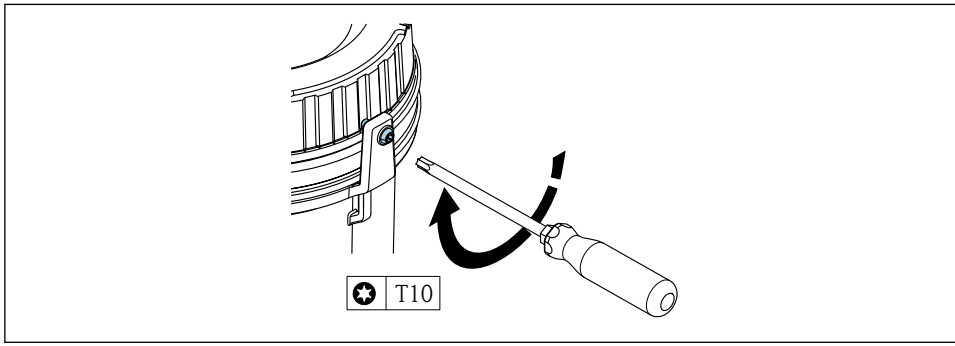
6 *Mounting the weather protection cover*

To protect the device from sunlight, arrange the weather protection cover in such a way that provides optimum shade for the device.

### 4.2.4 Installation in hazardous areas

When installing the level switch in a hazardous area, the securing screw must be tightened to prevent the cover from opening.

Additional installation instructions for the hazardous area are provided in the separate Ex documentation for the device (optional).




A0017368

7 *Tightening the cover securing screw. This is a combined screw; a flat-blade screwdriver can be used as an alternative to a T10 Torx screwdriver.*

## 4.3 Post-installation check

- Are the seals undamaged?
- Is the process connection securely tightened?
- Do the cable entries point downwards and are they tightened?
- Is the cover securely closed and the securing screw securely tightened?

# 5 Electrical connection

## 5.1 Connecting requirements

**⚠ WARNING**

**Danger! Electric voltage!**

▶ The entire connection of the device must take place while the device is de-energized.

**⚠ CAUTION**

**Pay attention to additional information provided**

▶ The protective ground conductor must be connected before any other connection is established.
▶ Before commissioning the device, make sure that the supply voltage matches the voltage specifications on the nameplate.
▶ Provide a suitable switch or circuit breaker in building installation. Install the switch near the device (easily accessible) and mark it as a disconnector.
▶ An overcurrent protection element (rated current ≤ 10 A) is required for the power cable.

**NOTICE**

**High temperatures can damage the cables and the device**

▶ Use cables that are suitable for temperatures 10 °C (18 °F) above the ambient temperature.

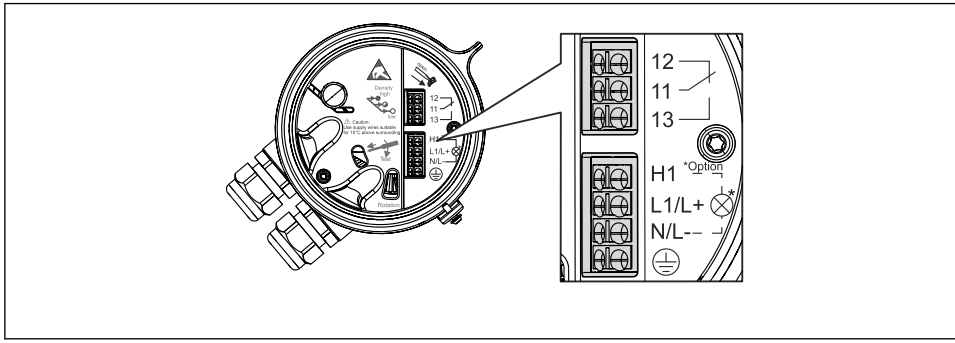
**NOTICE**

**IP66 protection is not provided if the protective caps supplied are used for the cable entries**

▶ The protective caps supplied are designed to protect against contamination during transport and storage. Use a suitable dummy plug to seal any cable entry that is not used during operation.

If replacing an older Soliswitch FTE3x with a new FTE20-type device, note that the free ends of the cable to the terminal are longer than in the older version (approx. 5 to 6 cm (1.97 to 2.36 in)).

## 5.2 Connecting the device

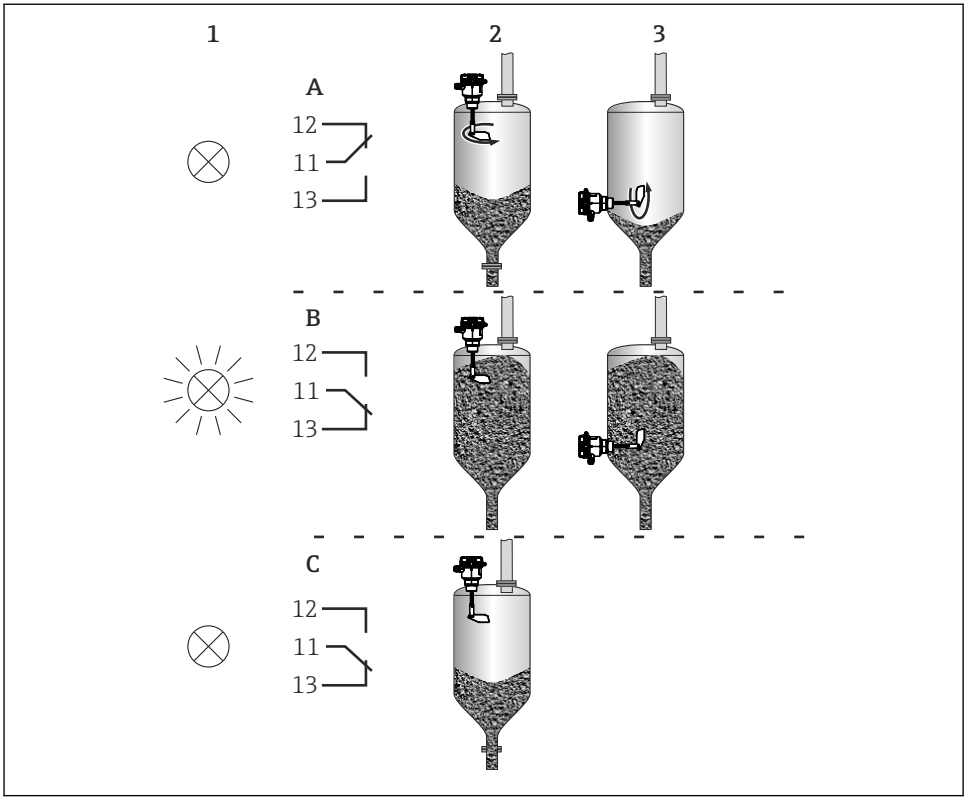



A0017295

*8 Terminal assignment of the level switch*

| Symbol | Description | Symbol | Description |
|---|---|---|---|
| ⏚ | Protective ground | H1 | Connection for signaling empty/full status detection (optional) |
| N (AC), L- (DC) | Power supply | N/L- | |
| | | 11 | Change-over contact |
| L1 (AC), L+ (DC) | Power supply | 12 | Normally closed contact |
| | | 13 | Normally open contact |

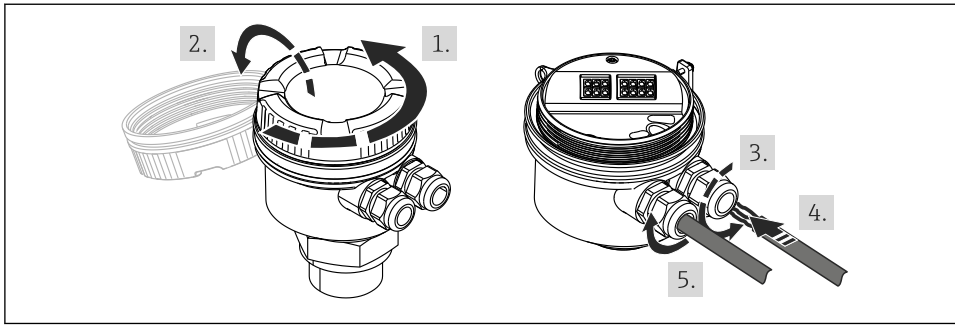
### 5.2.1 Switching states



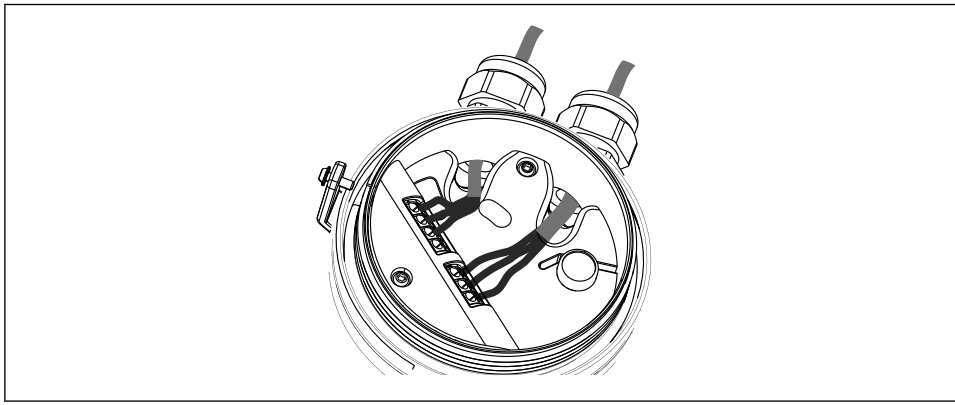

A0017628

| | 1 = Indicator light (optional, non-Ex only) | 2 = Full signaling | 3 = Refill signaling | Shaft rotation | Internal light |
|---|---|---|---|---|---|
| A | OFF | OFF | ON | YES | ON |
| B | ON | ON | OFF | NO | ON |
| C (only with optional rotation monitoring) | OFF | ON | OFF | NO | Flashes |

### 5.2.2 Inserting the cables




*9 Removing the housing cover and inserting the cables*




*10 Connecting the cables to the terminals*

## 5.3 Post-connection check

| **Device condition and specifications** | **Notes** |
|---|---|
| Are cables or the device damaged? | Visual inspection |
| **Electrical connection** | **Notes** |
| Does the supply voltage match the information on the nameplate? | → 7 |
| Are the mounted cables connected correctly and strain-relieved? | - |
| Are the cable glands securely tightened? | - |

# 6 Operation options

**WARNING**

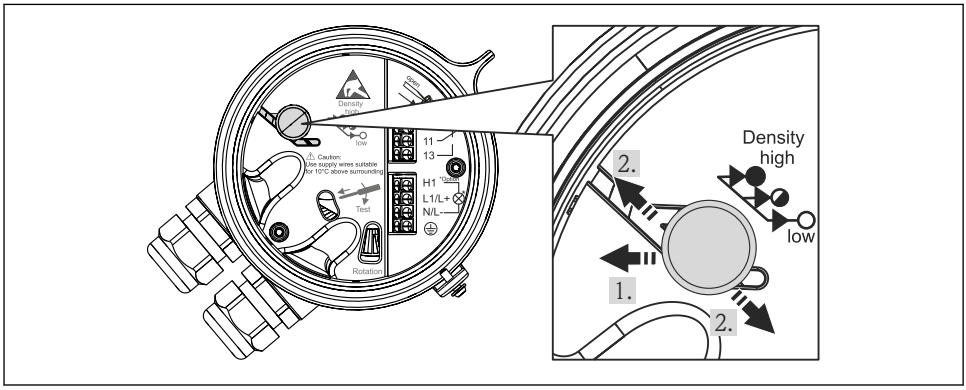
**The device is not explosion-protected if the housing is open.**

- The device may only be opened in the hazardous area if no supply voltage is applied. Therefore, the device may only be operated in a de-energized state or outside the hazardous area.

## 6.1 Setting the switching threshold (sensitivity)

The switching threshold can be set in 3 stages via an operating element that is accessible from above. The threshold can also be set during operation (in the non-hazardous area):

- Minimum: 80 g/l (4.99 lb/ft³)
- Adjustable in 3 stages depending on the density of the bulk solids: low, medium (factory default), high




A0017352

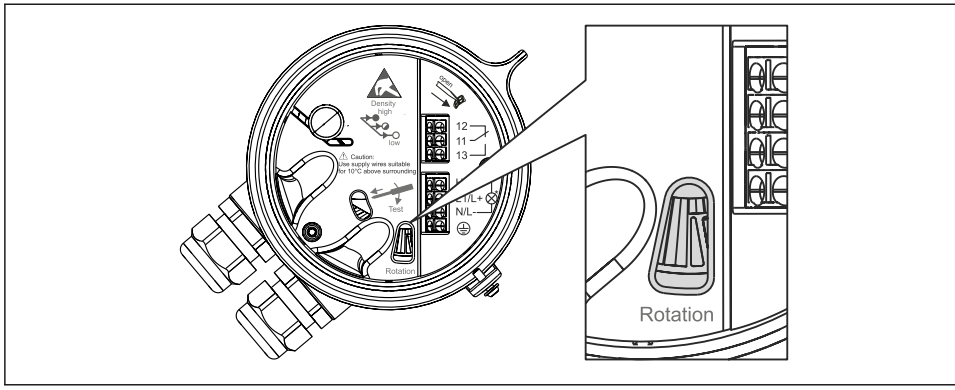
*11 Setting the switching threshold*

### Setting the switching pressure

1. Move the operating element counterclockwise as illustrated in the graphic.
2. Move the operating element to the desired position and let it click into place.

## 6.2 Rotational movement display

The shaft's rotational movement is displayed by a ratchet disk fitted on the drive axle of the rotary paddle. The viewing area is lit up by an LED to make it easier to see. The rotational movement of the disk, and therefore also the shaft, can be checked through an inspection opening in the cover of the internal compartment when the cover is closed.




A0017353

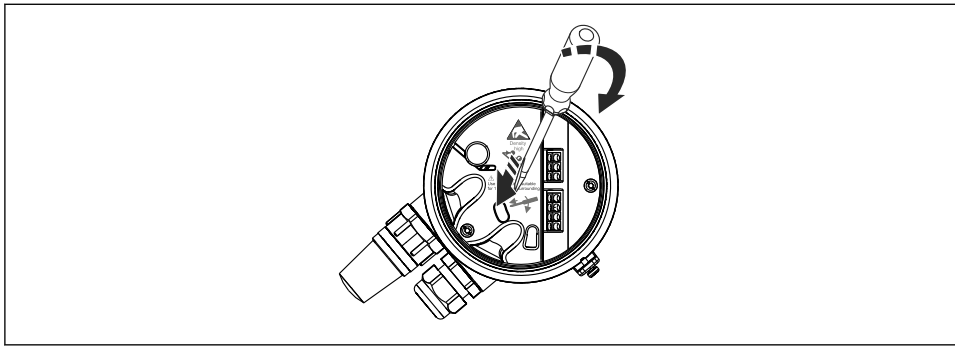
*12 Inspection glass to observe rotational movement*

## 6.3 Signal lamp (optional)

The level switch is optionally fitted with a signal lamp that lights up when the rotary paddle stops.

## 6.4 Testing the internal switch

When the housing cover is open, the function of the internal switch to switch off the motor can be checked by inserting a screwdriver into the opening provided in the electronics cover and by moving the handle in the direction of the arrow.



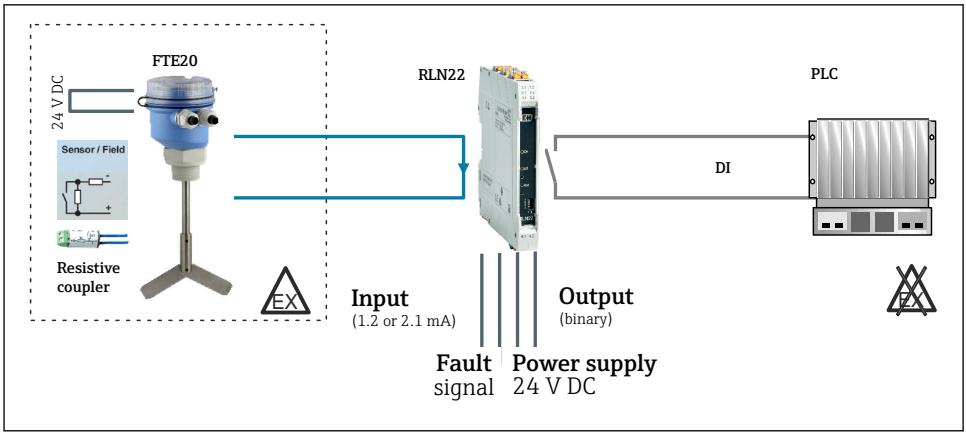
A0017369

*13 Testing the internal switch*

## 6.5 Line monitoring for line breaks or short-circuit

Line monitoring for line breaks and short-circuit can be implemented using the RLN22 NAMUR isolating switch repeater—available as an accessory—as well as the resistive coupling element. This monitoring function is described in greater detail in the NE21

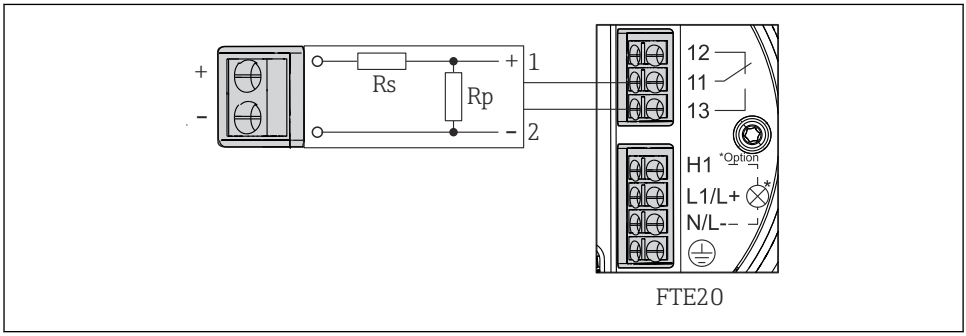
Recommendations (User Association of Automation Technology in Process Industries (NAMUR)).




14 *NAMUR limit detection with FTE20 rotary paddle level switch with line monitoring in the hazardous area*

**Operating principle:**

In fault-free operation, the FTE20 sends a binary signal to the control unit via its switching contact. The behavior of a NAMUR sensor is simulated via the resistive coupling element used in the terminal compartment of the FTE20.




15 *Resistance circuit for line monitoring (short-circuit and line break)*

*Rs: 1 kΩ*
*Rp: 10 kΩ*

NAMUR sensors are operated with an impressed current and have four states so that sensor faults can also be detected by an analog evaluation unit (RLN22). This is sometimes referred to as the "closed circuit current principle". NAMUR sensors can adopt four states at the output:
- Current 0 mA: fault state line break
- Current <1.2 mA: FTE20 ready, switching contact open
- Current >2.1 mA: FTE20 ready, switching contact closed
- Current maximum value >6 mA: fault state short-circuit

Fault states are indicated by LEDs on the RLN22, and - if the DIN rail bus connector is used - are reported as a collective error message to the RNF22 power supply and error message module. In the event of an error message, the output relay in the RNF22 switches to the currentless state.

# 7 Commissioning

## 7.1 Post-installation and post-connection check

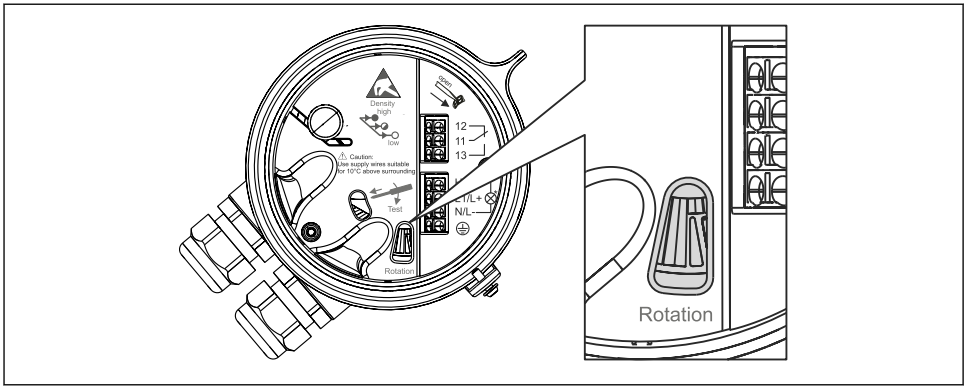
Checklists:
- Post-installation check → 🖹 12
- Post-connection check → 🖹 15

## 7.2 Setting the switching pressure (sensitivity)

The switching threshold can be adapted to the weight of the bulk solids in 3 stages via an operating element that is accessible from above (also possible during operation):
- Minimum: 80 g/l (4.99 lb/ft$^3$)
- Adjustable in 3 stages depending on the density of the bulk solids: low, medium (factory default), high

## 7.3 Switching on the device

The shaft starts to turn as soon as the supply voltage is switched on. The rotational movement can be observed from the outside.




A0017353

*16 Window to observe rotational movement*

# 8 Diagnostics and troubleshooting

Functional testing of the level switch by testing the internal switch → 13, 17

## 8.1 Level switch with rotation monitoring

The table below shows the output signal of the level switch with rotation monitoring for overfill protection.

*Rotation monitoring of the level switch (optional)*

| | Power supply | Motor | Output signal of "full" sensor | Internal light |
|---|---|---|---|---|
| Normal operation | On | Shaft turns | - | On |
| | On | Shaft does not turn, rotary paddle is covered | Full | On |
| Fault | On | Shaft does not turn, rotary paddle is not covered | Full | Flashes |
| | Off | | Full | Off |

If the rotation monitoring system detects a fault, a "full" alarm is signaled and the light in the electronics housing flashes.

**Function testing of the level switch**

Operate the internal switch

1. Insert a screwdriver or another suitable tool in the opening provided in the electronics cover and move it in the direction indicated, see the section on testing the internal switch → 13, 17.
   ↳ The switch is operated and the empty/full alarm is reset.
2. Wait for the error detection time to elapse (approx. 25 s).
   ↳ If no rotational movement is detected during the error detection time, the device signals the full or empty alarm again and the light in the electronics housing flashes.

# 9 Maintenance

No special maintenance work is required for the device.

## 9.1 Cleaning

A clean, dry cloth can be used to clean the device.

# 10 Repair

## 10.1 General notes

Due to its design, the device cannot be repaired.

## 10.2 Spare parts

Product spare parts that are currently available can be found online at: www.endress.com/onlinetools

## 10.3 Return

The requirements for safe device return can vary depending on the device type and national legislation.

1. Refer to the web page for information: https://www.endress.com
2. If returning the device, pack the device in such a way that it is reliably protected against impact and external influences. The original packaging provides the best protection.

## 10.4 Disposal

If required by the Directive 2012/19/EU on waste electrical and electronic equipment (WEEE), the product is marked with the depicted symbol in order to minimize the disposal of WEEE as unsorted municipal waste. Do not dispose of products bearing this marking as unsorted municipal waste. Instead, return them to the manufacturer for disposal under the applicable conditions.

# 11 Technical data

## 11.1 Input

### 11.1.1 Measured variable

Level (in line with the orientation and length)

### 11.1.2 Measuring range

The measuring range depends on the installation location of the device and the selected length of the shaft 75 to 600 mm (2.95 to 23.62 in) or the rope extension up to max. 2 000 mm (6.56 ft).

## 11.2 Output

### 11.2.1 Output signal

Binary

### 11.2.2 Switch output

**Function**

Switch a floating change-over contact.

**Switching behavior**

On/off

**Switching time**

From rotary paddle standstill until output of the switch signal: 20°, corresponds to 3.5 s

**Switching capacity**

- According to EN 61058: 250 V AC 5E4, 6(2) A
- According to UL 1054: 125 to 250 V AC, 5 A
- 24 V DC, 3 A
- Min. switching load 300 mW (5 V/5 mA)

After a current >100 mA is actuated, it is no longer possible to guarantee the switching function with a switching current I < 100 mA.

## 11.3 Power supply

### 11.3.1 Terminal assignment

| Symbol | Description | Symbol | Description |
|---|---|---|---|
| ⏚ | Protective ground | H1 | Connection for signaling empty/full status detection (optional) |
| N (AC), L- (DC) | Power supply | N/L- | |
| L1 (AC), L+ (DC) | Power supply | 11 | Change-over contact |
| | | 12 | Normally closed contact |
| | | 13 | Normally open contact |

### 11.3.2 Supply voltage

- 24 V DC ±15%
- 24 V AC ±10%, 50/60 Hz
- 115 V AC ±10%, 50/60 Hz
- 230 V AC ±10%, 50/60 Hz

An overload protection element (rated current ≤ 10 A) is required for the power cable.

### 11.3.3 Power consumption

Max. 3.5 VA

### 11.3.4 Terminals

Terminals with spring terminal design

*Permitted cable cross-sections*

| | |
|---|---|
| Rigid | 0.2 to 2.5 mm² (24 to 14 AWG) |
| Flexible | 0.2 to 2.5 mm² (24 to 14 AWG) |
| Flexible with wire end ferrule without plastic ferrule | 0.5 to 2.5 mm² (22 to 14 AWG) |
| Flexible with wire end ferrule with plastic ferrule | 0.5 to 1.5 mm² (22 to 16 AWG) |
| AWG as per UL/CUL/kcmil | |

Use wires that are suitable for temperatures 10 °C (18 °F) above the ambient temperature.

## 11.4 Performance characteristics

### 11.4.1 Shaft speed

1 $min^{-1}$

### 11.4.2 Sensitivity

Can be adjusted using an operating element accessible from the top → 29.

- Minimum: 80 g/l (4.99 lb/ft³)
- Depending on the density of the bulk solids adjustable in three stages: low, medium (default), high

### 11.4.3 Mechanical operating life

500 000 switching operations

## 11.5 Installation

### 11.5.1 Installation location

*Orientation* → 🖼 *1*, 🖹 *8*

| Permitted | Not permitted | Comment |
|---|---|---|
| Vertical from the top | | |
| Angled from the top | | Cable entry must point downwards |
| From the side | | Cable entry must point downwards; with protective cover against falling solids depending on the installation position |
| From the bottom (device must be protected against shock-type loads) | | Cable entry must point downwards |
| | In direction of solids flow | |
| | Installation socket too long | |
| | Horizontal with shaft length > 300 mm (11.8 in) (In version with reinforced shaft: horizontal with shaft length > 600 mm (23.6 in)) | |

### 11.5.2 Special installation instructions

**Side load on the shaft**
- Max. 60 N
- Max. 1 500 N for version with reinforced shaft

**Load on the rope**
Max. 1 500 N

**Operating pressure (abs.)**
0.5 to 2.5 bar (7.25 to 36.3 psi)

**Housing can be rotated 360 °**
To adjust to the direction of the cable entries (pointing downwards)

**Cable entries**
The dust protection caps which are delivered with the device are only for protection during transport and storage. Close an unused cable entry with a blind plug (IP65) when commissioning the device.

**Mechanical load of the optional signal lamp**
The optional signal lamp must be protected against mechanical stress (impact energy > 1 J).

**Maximum flange depth of the connection**
With the standard rotary paddle, installation in flange connections is permitted up to a sleeve length ≤ 40 mm (1.57 in). For sleeve lengths > 40 mm (1.57 in) only the version with hinged rotary paddle can be used. The insertion of the rotary paddle must be performed without the use of force and must be possible.

## 11.6 Environment

The device must be protected against direct sunshine.

A weather protection cover is available as an accessory, see the "Accessories" section → 31.

All values not indicated as per DIN EN 6054-1.

### 11.6.1 Ambient temperature range

−20 to 60 °C (−4 to 140 °F)

### 11.6.2 Storage temperature

−20 to 60 °C (−4 to 140 °F)

### 11.6.3 Climate class

EN60654-1, Class C2

### 11.6.4 Degree of protection

IP66

### 11.6.5 Shock resistance

As per EN 60068-2-27: 30g

### 11.6.6 Vibration resistance

As per EN 60068-2-64: 0.01g²/Hz

### 11.6.7 Electromagnetic compatibility

Electromagnetic compatibility in accordance with all the relevant requirements of the EN 61326 series. For details refer to the Declaration of Conformity.

- Interference immunity: as per IEC 61326-1, industrial environment
- Interference emission: as per IEC 61326-1, Class B

### 11.6.8 Electrical safety

Class I equipment, overvoltage category II, pollution degree 2

### 11.6.9 Altitude

< 2 000 m (6 560 ft) over MSL

## 11.7 Process

### 11.7.1 Medium temperature range

−20 to 80 °C (−4 to 176 °F)

### 11.7.2 Process pressure range

≤ 1.5 bar (21.8 psi) overpressure (e.g. when silo is filled)

### 11.7.3 Solids weight

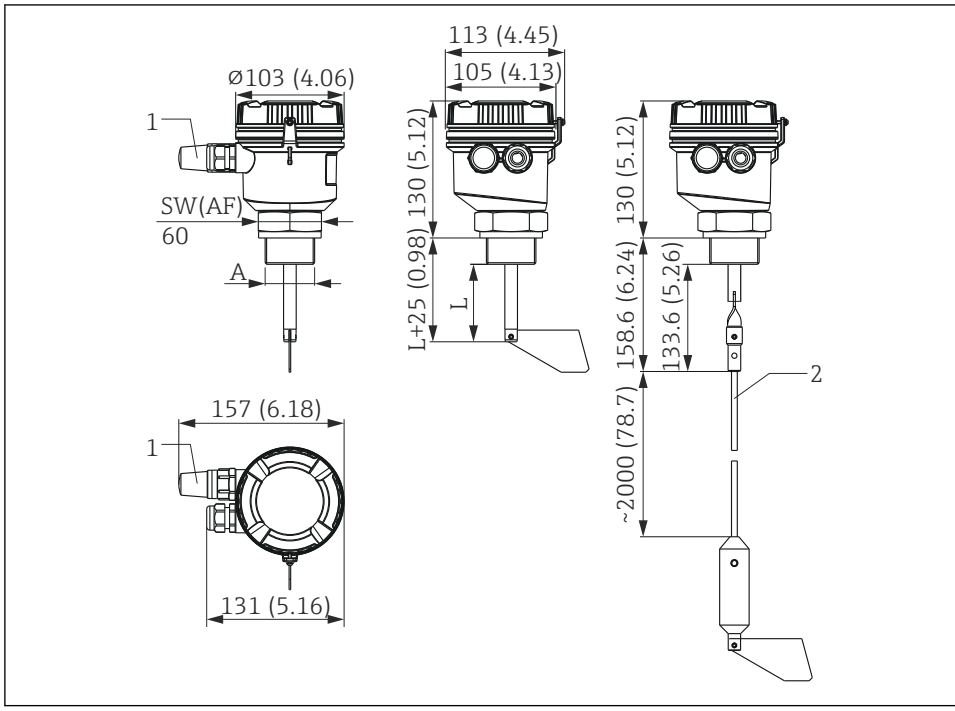
≥ 80 g/l (4.99 lb/ft$^3$)

### 11.7.4 Grain size

≤ 50 mm (1.97 in)

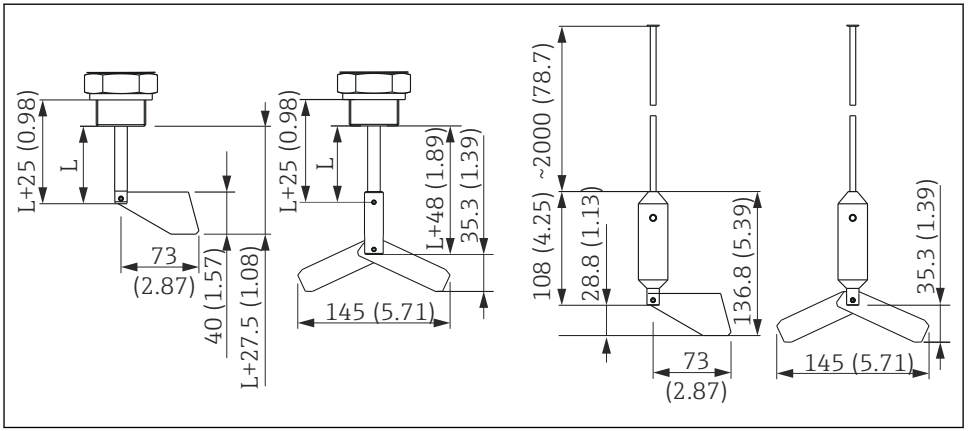
## 11.8 Mechanical construction

### 11.8.1 Design, dimensions




*17 Dimensions of the level switch, dimensions in mm (in)*

*1 Signal lamp (optional)*
*2 Version with rope extension, can be shortened*




*18 Dimensions of the rotary paddle - standard and hinged, for shaft and rope extension, dimensions in mm (in)*

| Dimensions depending on the version | | |
|---|---|---|
| A | Process connection | NPT 1¼", NPT 1½", G 1½" |
| L | Length of shaft | 75 to 600 mm (2.95 to 23.62 in)<br>300 to 600 mm (11.81 to 23.62 in) for version with reinforced shaft |

## 11.8.2 Weight

| Version / part | Weight (approx.) |
|---|---|
| With 100 mm (3.94 in) axis, plastic process connection | 800 g (1.76 lb) |
| With 100 mm (3.94 in) axis, metal process connection | 1 600 g (3.53 lb) |
| Reinforced shaft, with 300 mm (11.81 in) axis, metal process connection | 4 100 g (9.04 lb) |
| Hinged rotary paddle | 110 g (0.24 lb) |
| Rope extension | 755 g (1.66 lb) |

## 11.8.3 Materials

| Designation | Material |
|---|---|
| Housing | Polycarbonate |
| Captive screw cap | Polyamide |
| Cover seal | Silicone |
| Housing/process connection seal | Viton |

| Designation | Material |
|---|---|
| Process seal | Synthetic/organic fiber elastomer seal (asbestos-free)<br>NPT versions do not have a process seal and the thread must be sealed by the customer onsite, e.g. using a Teflon tape. |
| Shaft | 1.4305 / 303 |
| Rope extension | 1.4401 / 316 |
| Rotary paddle (standard / hinged) | 1.4301 / 304 |
| Shaft seal | NBR |
| Process connections | In stainless steel 1.4305 / 303 or PBT |

### 11.8.4 Cable entries

2 x cable gland, M20 x1.5

(optionally 1 x cable gland M20 x 1.5 and indicator lamp)

Permitted cable diameter
5 to 9 mm (0.2 to 0.35 in)

## 11.9 Operability

### 11.9.1 Local operation

**Rotational movement display**

The shaft's rotational movement is indicated by a reflector disk fitted on drive shaft of the rotary paddle and can be monitored through a sight opening in the drive/terminal cover. The disk's viewing area is lit up by an LED to make it easier to see.

If rotation monitoring (optional) detects a fault, the LED flashes.

**Setting the switching threshold (sensitivity)**

The switching threshold can be adapted to the weight of the bulk solids in 3 stages via an operating element that is accessible from above (also possible during operation):
- Minimum: 80 g/l (4.99 lb/ft$^3$)
- Adjustable in 3 stages depending on the density of the bulk solids: low, medium (factory default), high

## 11.10 Certificates and approvals

Current certificates and approvals for the product are available at www.endress.com on the relevant product page:

1. Select the product using the filters and search field.
2. Open the product page.
3. Select **Downloads**.

## 11.11 Ordering information

Detailed ordering information is available from your nearest sales organization www.addresses.endress.com or in the Product Configurator at www.endress.com:

1. Select the product using the filters and search field.
2. Open the product page.
3. Select **Configuration**.

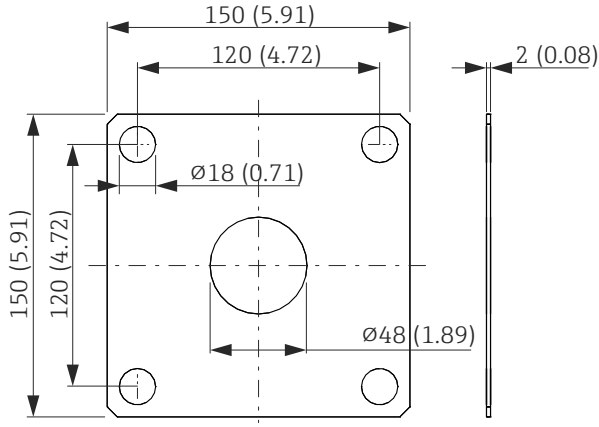
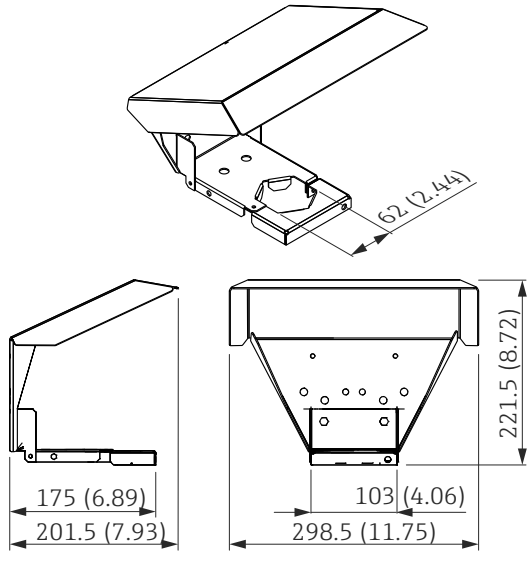
**Product Configurator - the tool for individual product configuration**
- Up-to-the-minute configuration data
- Depending on the device: direct input of information specific to the measuring point, such as the measuring range or operating language
- Automatic verification of exclusion criteria
- Automatic creation of the order code and its breakdown in PDF or Excel output format
- Ability to order directly in the Endress+Hauser Online Shop

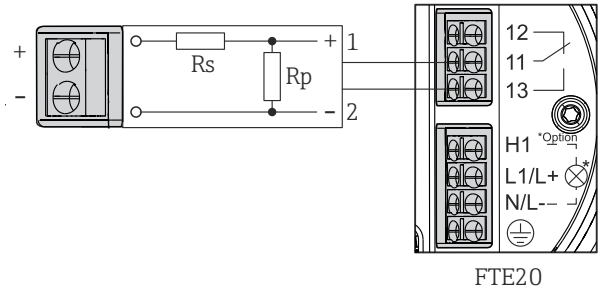
## 11.12 Accessories

The accessories currently available for the product can be selected at www.endress.com:

1. Select the product using the filters and search field.
2. Open the product page.
3. Select **Spare parts & Accessories**.

### 11.12.1 Device-specific accessories

| Accessory | Description |
|---|---|
| Flanged version, incl. seal and nut for the process connection |  <br>19 Dimensions of the flange connection, dimensions in mm (in)<br><br>Order as an accessory in the product structure |
| Weather protection cover | Used to protect the measuring instrument from the adverse effect of the weather and sunlight when fitted in the roof of a silo.<br>  <br>20 Dimensions of the protective cover, dimensions in mm (in) |

| Accessory | Description |
|---|---|
| Resistive coupling element for line monitoring<br>Order No. 71505353 | Resistive coupling element 1K/10K Ohm (1 pc) for line monitoring; for installation in the terminal compartment of the FTE20;<br>  <br>A0045584<br>*Rs: 1 kΩ*<br>*Rp: 10 kΩ* |
| RLN22 NAMUR isolating switch repeater for line monitoring | Single-channel 24 V DC NAMUR isolating switch repeater with relay contact as signal output for switch cabinet installation on the DIN rail. Input for proximity sensors, floating contacts or contacts with resistance circuit. Monitors line faults such as line breaks or short-circuits of mechanical switching contacts. The device is suitable for use in explosive atmospheres and safeguards up to SIL 2 according to IEC 61508.<br>For details, see Technical Information RLN22: TI01560K |

## 11.13 Documentation

For an overview of the scope of the associated Technical Documentation, refer to the following:

- *Device Viewer* (www.endress.com/deviceviewer): Enter the serial number from the nameplate
- *Endress+Hauser Operations app*: Enter serial number from nameplate or scan matrix code on nameplate.

The following document types are available in the Downloads area of the Endress+Hauser website (www.endress.com/downloads), depending on the device version:

| Document type | Purpose and content of the document |
|---|---|
| Technical Information (TI) | **Planning aid for your device**<br>The document contains all the technical data on the device and provides an overview of the accessories and other products that can be ordered for the device. |
| Brief Operating Instructions (KA) | **Guide that takes you quickly to the 1st measured value**<br>The Brief Operating Instructions contain all the essential information from incoming acceptance to initial commissioning. |

| Document type | Purpose and content of the document |
|---|---|
| Operating Instructions (BA) | **Your reference document**<br>The Operating Instructions contain all the information that is required in various phases of the life cycle of the device: from product identification, incoming acceptance and storage, to mounting, connection, operation and commissioning through to troubleshooting, maintenance and disposal. |
| Description of Device Parameters (GP) | **Reference for your parameters**<br>The document provides a detailed explanation of each individual parameter. The description is aimed at those who work with the device over the entire life cycle and perform specific configurations. |
| Safety instructions (XA) | Depending on the approval, safety instructions for electrical equipment in hazardous areas are also supplied with the device. These are an integral part of the Operating Instructions.<br>The nameplate indicates which Safety Instructions (XA) apply to the device. |
| Supplementary device-dependent documentation (SD/FY) | Always comply strictly with the instructions in the relevant supplementary documentation. The supplementary documentation is a constituent part of the device documentation. |


www.addresses.endress.com

Endress+Hauser

People for Process Automation