



Level



Pressure



Flow



Temperature

Liquid
Analysis

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Solutions

Technical Information

Soliswitch FTE20

Point level switch for granular solids



Applications

The Soliswitch FTE20 is a paddle switch for granular solids. Its robust and compact design makes the point level switch an ideal sensor for detecting the full, empty or refill status in applications with bulk solids, such as in silos containing solids.

- Full sensor
- Empty sensor
- Point level sensor

Your benefits

- Easy installation thanks to
 - Screw-cover housing
 - Preformed cable entries
 - Push-in double-level terminals
- Robust plastic housing with cover with sight glass
- Captive screw cap
- Weight of solids can be adjusted without the need for tools
- Fault detection without uninstalling the device by means of
 - Visualization of shaft rotation, visible when device is installed
 - Ability to test the switching function
- Automatic rotation monitoring (optional)
- Ex approvals
 - ATEX II 1/3D
 - CSA DIP/ II, III/1/E-G
 - FM DIP/ II, III/1/E-G
- Housing can be rotated through 360 ° to enable optimal alignment following installation.
- Sensitivity can be adjusted even during operation

Function and system design

Measuring principle

The paddle switch is primarily used to detect the full or refill status in silos containing solids. When used as a refill switch, it is typically mounted from below or at an angled position from below in the silo cone. When used as a full switch, it is fitted in the roof of the silo.

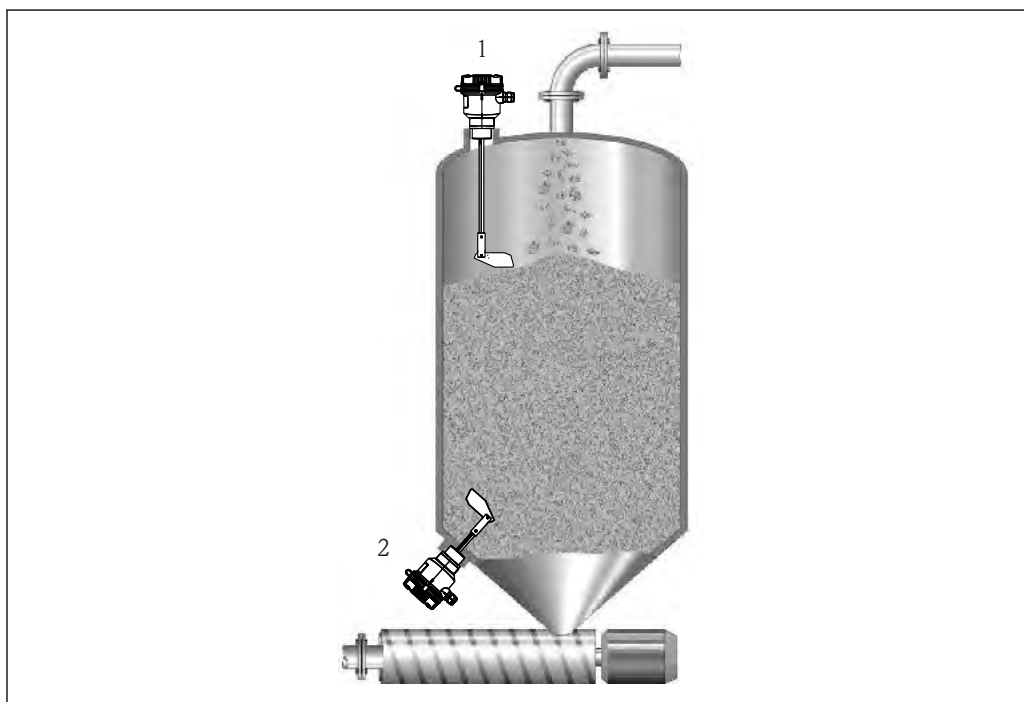
The shaft and paddle are driven using a reduction gear and synchronous motor. If the paddle is stopped by material covering it, the hinged motor in the housing moves from the rest to the switch position. This movement operates two switch contacts; the first is for external level indication and the second switches off the power to the motor.

The paddle starts to rotate once the medium level falls below the paddle, the hinged motor returns to its rest position and the two contacts switch to normal operation. Intermittent loads that operate against or even in the same direction of rotation are evened out by a slip clutch.

The rotational movement of the shaft can be observed from the outside when the cover is closed. Optional automatic rotation monitoring detects a blockage or the failure of the drive unit.

Measuring system

Complete point level switch consisting of a shaft (optionally available with rope extension) with synchronous motor and slip clutch, and single pole changeover contact. Typical application areas are point level detection in bulk solids, e.g. cereals, sugar, cacao, animal feeds, washing powders, chalk, dry plaster, cement, granulates and wood chips.



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 1 Measuring system with Soliswitch FTE20

1 Functioning as full sensor

2 Functioning as demand sensor

Input

Measured variable

Level (in line with the orientation and length)

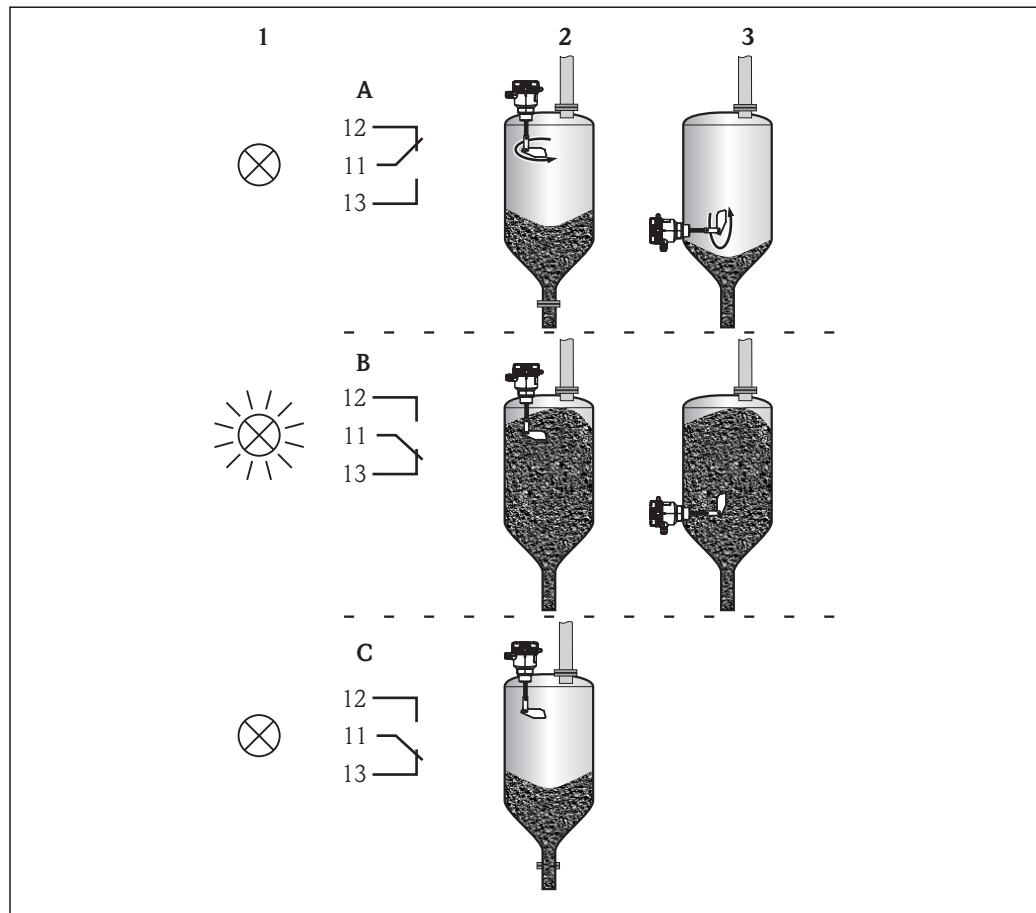
Measuring range

The measuring range depends on the installation location of the Soliswitch FTE20 and the selected length of the shaft 75 to 300 mm (2.95 to 11.81 in) or the rope extension up to max. 2 000 mm (6.56 ft).

Output

Output signal	Binary
Switching output	<div><div>Function</div><div>Switch a floating changeover contact.</div><div>Switching behavior</div><div>On/off</div><div>Switching capacity</div><div><div><div>■</div>EN 61058: 6(2) A 250 V AC 5E4</div><div><div>■</div>UL 1054: 5 A 125 to 250 V AC</div><div><div>■</div>50 V DC, 1 A</div><div><div>■</div>Min. switching load 300 mW (5 V/5 mA)</div></div><div><div><div><div>i</div></div></div>After actuating with current >100 mA the switch must not be used with a signal current <100 mA.</div></div>

Switching states

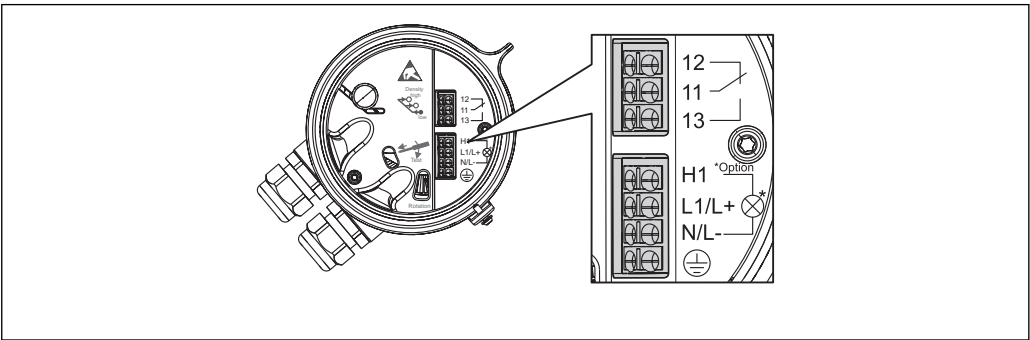


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	1 = signal lamp (optional)	2 = full sensor	3 = demand sensor
A = output signal FTE20 and FTE20 with rotation monitoring	Lamp not lit	Shaft turns \Rightarrow No "Full" signal	Shaft turns \Rightarrow "Refill" signal
B = output signal FTE20 and FTE20 with rotation monitoring	Lamp lit	Shaft does not turn \Rightarrow "Full" signal	Shaft does not turn \Rightarrow No refill signal
C = output signal FTE20 with rotation monitoring	Lamp not lit	Shaft does not turn \Rightarrow Error or "power failure" $\hat{=}$ "Full" signal	

Power supply

Terminal assignment



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2 Terminal assignment of the point level switch

	Protective ground
N (AC), L- (DC)	Power connection
L1 (AC), L+ (DC)	Power connection
H1	Connection for signaling empty/full status detection (optional)
N/L-	
11	Changeover contact
12	Normally closed contact
13	Normally open contact

Supply voltage

- 20 to 28 V DC
- 24 V AC 50/60 Hz
- 115 V AC 50/60 Hz
- 230 V AC 50/60 Hz



An overcurrent protection unit (nominal current = 10 A) is required for the power cable.

Power consumption

Max. 3.5 VA

Terminals

Terminals with spring terminal design

Permitted cable cross-sections

Rigid	0.2 to 2.5 mm ² (24 to 14 AWG)
Flexible	0.2 to 2.5 mm ² (24 to 14 AWG)
Flexible with wire end ferrule without plastic ferrule	0.5 to 2.5 mm ² (22 to 14 AWG)
Flexible with wire end ferrule with plastic ferrule	0.5 to 1.5 mm ² (22 to 16 AWG)
AWG as per UL/CUL/kcmil	

Performance characteristics

Shaft speed

1 min⁻¹

Switching pressure

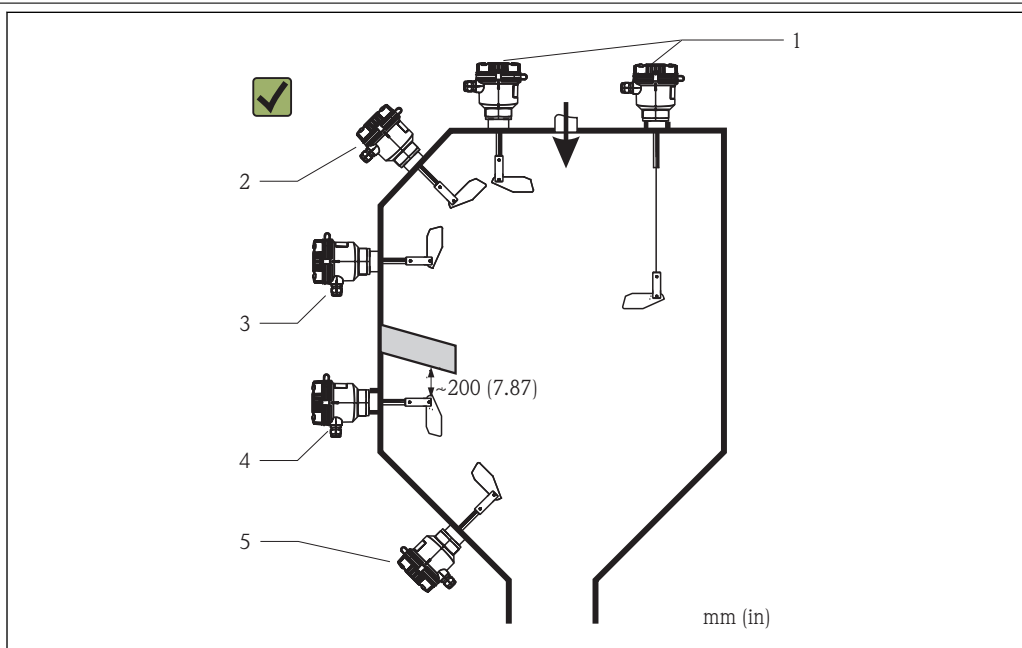
Can be adjusted using an operating element accessible from the top (→ 11).

Levels:

- Low ≥ 80 g/l (4.99 lb/ft³)
- Medium ≥ 100 g/l (6.24 lb/ft³)
- High ≥ 120 g/l (7.49 lb/ft³)

Installation

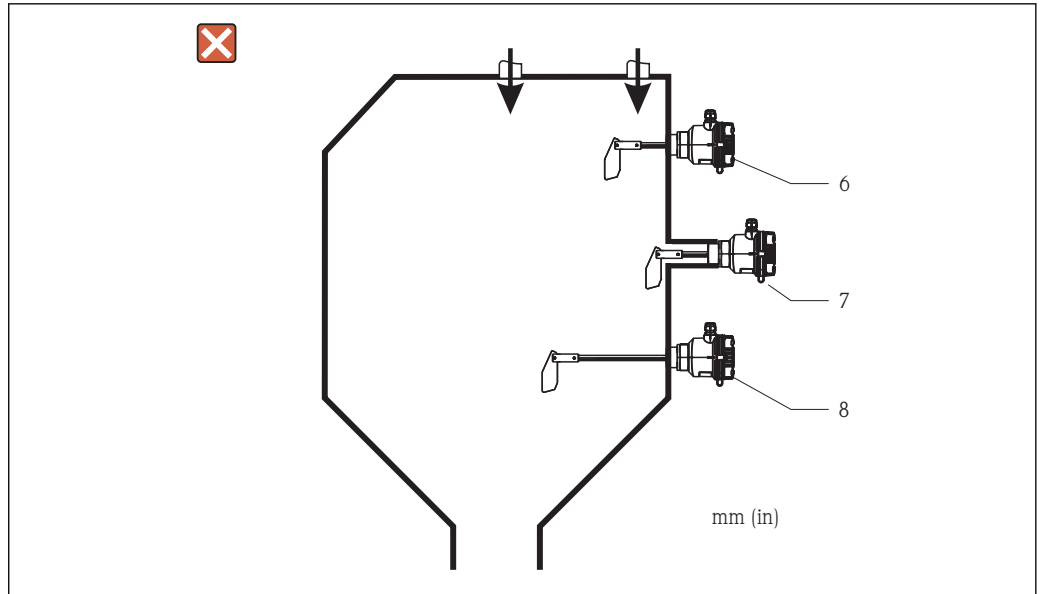
Mounting location



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 3 Correct installation positions of the device

- 1: Vertical from the top
- 2: Angled from the top
- 3: From the side
- 4: From the side with protective cover against falling solids
- 5: From below



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 4 *Incorrect installation positions of the device*

- 6: In direction of solids flow
- 7: Installation coupling too long
- 8: Horizontal with shaft length >300 mm (11.8 in)

Special mounting instructions

Side load on the shaft

max.60 N

Load on the rope

max.1 500 N

Operating pressure (abs.)

0.5 to 1.8 bar (7.25 to 26.1 psi)

360 °Housing can be rotated

To adjust to the direction of the cable entries (pointing downwards)

Environment

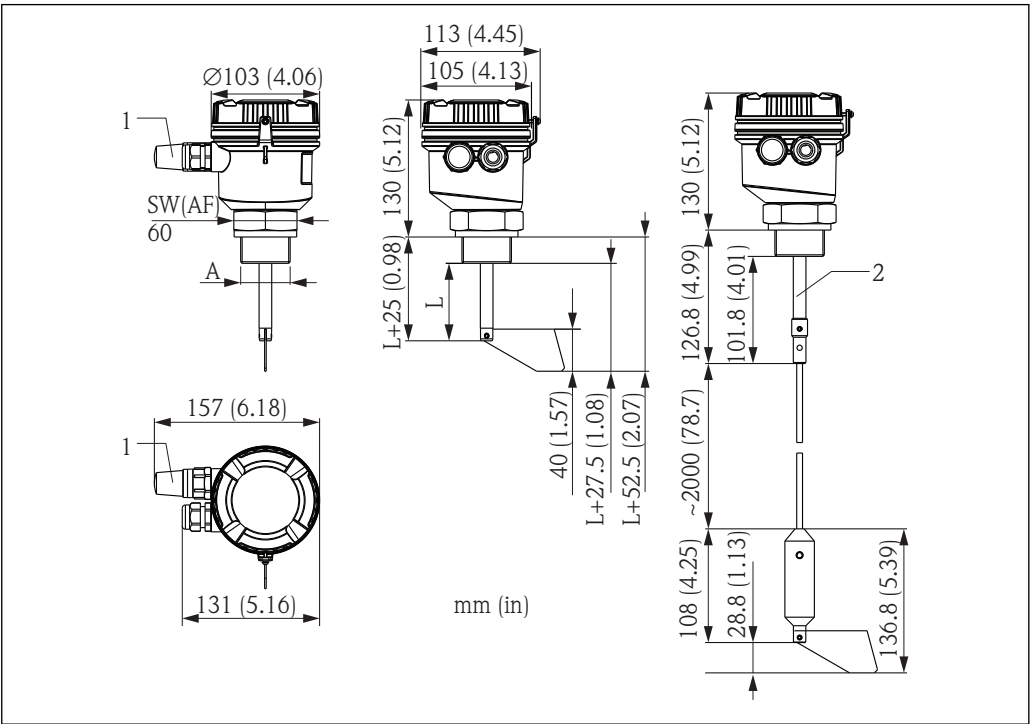
Ambient temperature range	–20 to 60 °C (–4 to 140 °F)
Storage temperature	–20 to 60 °C (–4 to 140 °F)
Degree of protection	IP66
Electromagnetic compatibility	<p>Electromagnetic compatibility accoprding to all relevant requirements of the EN 61326 series. Details can be found in the declaration of conformity.</p> <ul style="list-style-type: none">■ Interference immunity: As per IEC 61326-1 industrial environments■ Interference emissions: As per IEC 61326-1 Class B
Electrical safety	<p>According to IEC 61010-1</p> <p>Protection class I, overvoltage category II, pollution level 2</p>
Operating height	< 2 000 m (6 560 ft) above MSL

Process

Medium temperature range	–20 to 80 °C (–4 to 176 °F)
Process pressure range	0.8 bar (11.6 psi)overpressure when silo is filled
Solids weight	≥ 80 g/l (4.99 lb/ft ³)
Grain size	≤ 50 mm (1.97 in)

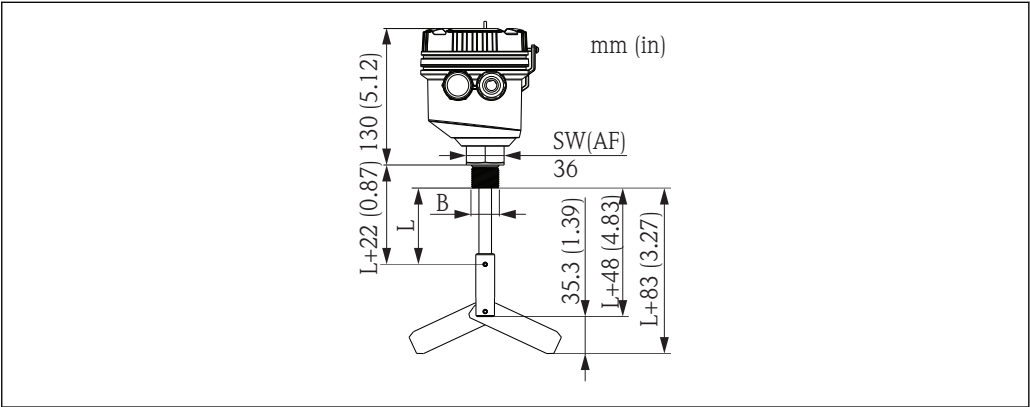
Mechanical construction

Design, dimensions



5 Dimensions of point level switch

- 1 Indicator light (optional)
- 2 Version with rope extension



6 Dimensions with hinged rotating paddle

Dimensions depending on the version		
A	Process connection	NPT 1 ¼", NPT 1 ½", G 1 ½"
B	Process connection	G ¾" (only available with hinged rotating paddle)
L	Length of shaft	75 to 300 mm (2.95 to 11.81 in)

Weight

Version / part	Weight (approx.)
FTE20 with shaft 100 mm (3.94 in), plastic process connection	800 g (1.76 lb)
FTE20 with shaft 100 mm (3.94 in), metal process connection	1 600 g (3.53 lb)
FTE20 with shaft 100 mm (3.94 in), G ¾"	1 095 g (2.41 lb)

Version / part	Weight (approx.)
Hinged paddle	110 g (0.24 lb)
Rope extension	755 g (1.66 lb)

Materials

- Housing:
Polycarbonate
- Captive screw cap:
Polyamide
- Cover seal:
EPDM
- Process seal:
Synthetic/organic fiber-elastomer sealing (nonasbestos)
NPT versions have no process seal and need to be sealed at the thread by the customer by using e.g. a Teflon tape.
- Shaft seal:
NBR
- Process connections:
G3/4": Stainless steel 303
Other versions: Stainless steel 303 version or PBT version

Cable entries

- 2 x cable gland, M20 x1.5
(optionally 1 x cable gland M20 x 1.5 and indicator lamp)
- Permitted cable diameter
- non-Ex: 5 to 12 mm (0.2 to 0.47 in)
 - Ex d: 5 to 9 mm (0.2 to 0.35 in)

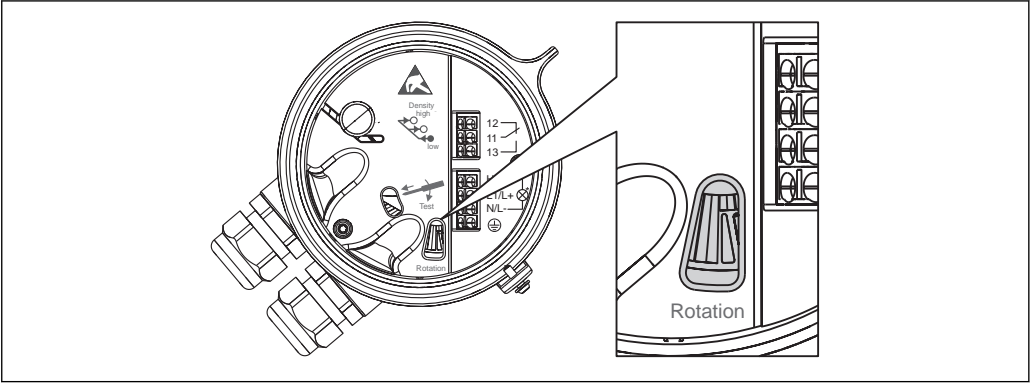
Operability

Local operation


Rotational movement display

The shaft's rotational movement is displayed by a reflector disk fitted on drive shaft of the 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 an error, the LED flashes.



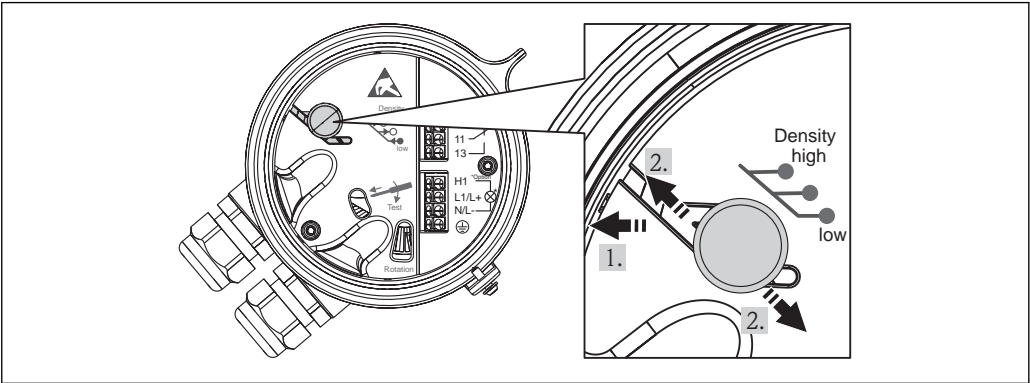
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 7 Inspection glass to observe rotational movement


Adjusting the switching pressure

The switching pressure can be adapted to the weight of the bulk solids in 3 levels using an operating element accessible from the top:

- Slight $\geq 80 \text{ g/l}$ (4.99 lb/ft^3)
- Medium $\geq 100 \text{ g/l}$ (6.24 lb/ft^3)
- High $\geq 120 \text{ g/l}$ (7.49 lb/ft^3)



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 8 Adjustment of switching pressure

Certificates and approvals

CE mark	The device meets the legal requirements of the EU directives. Endress+Hauser confirms that the device has been tested successfully by affixing the CE mark.
Ex approval	Information about currently available Ex versions (ATEX, FM, CSA, etc.) can be supplied by your E+H Sales Center on request. All explosion protection data are given in a separate documentation which is available upon request.
Other standards and guidelines	<ul style="list-style-type: none"> ■ IEC 60529: Degrees of protection by housing (IP code) ■ IEC 61010-1: Safety requirements for electrical equipment for measurement, control and laboratory use ■ IEC 61326 series: Electromagnetic compatibility (EMC requirements)

Ordering information

Detailed ordering information is available from the following sources:

- In the Product Configurator on the Endress+Hauser website: www.endress.com → Select country → Instruments → Select device → Product page function: Configure this product
- From your Endress+Hauser Sales Center: www.endress.com/worldwide



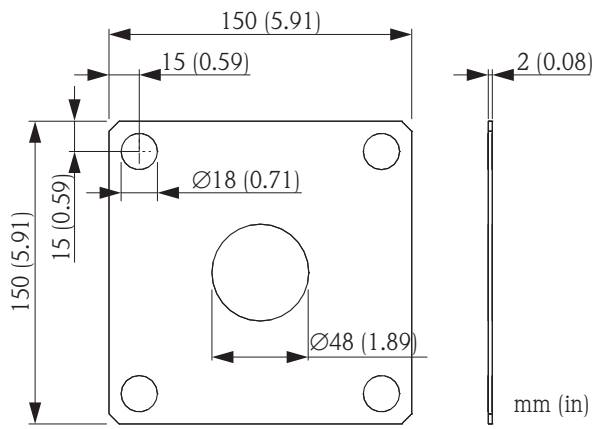

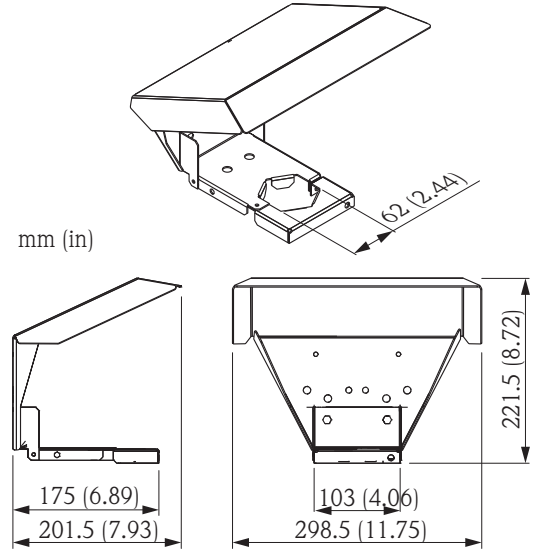

Product Configurator - the tool for individual product configuration

- Up-to-the-minute configuration data
 - Depending on the device: Direct input of measuring point-specific information such as 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

Accessories

Various accessories, which can be ordered with the device or subsequently from Endress+Hauser, are available for the device. Detailed information on the order code in question is available from your local Endress+Hauser sales center or on the product page of the Endress+Hauser website: www.endress.com.

Device-specific accessories

Accessories	Description
Flange version	<div><p>mm (in)</p><p>A0018472</p></div> <div> 9</div> <div>Dimensions of the flange connection</div> <div>Order as an accessory in the product structure</div>
Protective cover	<div><p>Used to protect the measuring device from the adverse effect of the weather when fitted in the roof of a silo.</p><p>mm (in)</p><p>A0017694</p></div> <div> 10</div> <div>Dimensions of the protective cover</div> <div>Order as an accessory in the product structure</div>

Instruments International

Endress+Hauser
Instruments International AG
Kaegenstrasse 2
4153 Reinach
Switzerland

Tel.+41 61 715 81 00
Fax+41 61 715 25 00
www.endress.com
info@ii.endress.com

Endress+Hauser 
People for Process Automation