Level | Pressure | Flow | Temperature | Liquid Analysis | Registration | Systems Components | Services | Solutions

Technical Information

Soliswitch FTE30

Level limit switch
Economical paddle limit switch with type-examination certificate to ATEX dust Ex-approval zone 20



Application

The universal paddle level limit switch FTE 30 is used as a full, empty and demand alarm on silos containing solids.
Its construction and materials make the unit suitable for use in the food industry. Certification to dust Zone 20 provides more application possibilities.

Your benefits

- Simple operation
- Proven principle
- Slip clutch
- Ingress protection to IP 65
- Dust Ex to ATEX Zone 20

TI052R/09/en/06.08
50080138

Endress+Hauser
People for Process Automation

Function and system design

Measuring principle

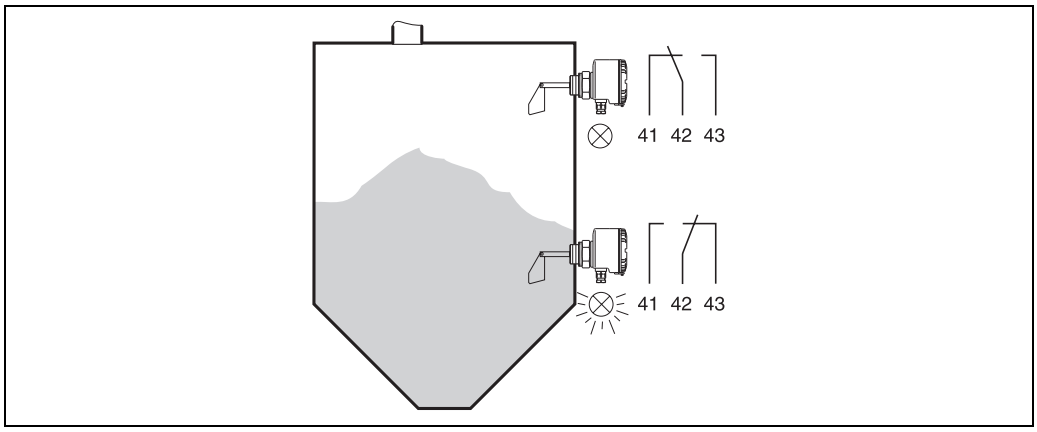


Fig. 1: Level measurement changeover contact

The shaft and paddle are driven via a reduction gear by a synchronous motor. If the paddle is stopped by material covering it, the hinged motor in the housing moves from the rest to the switched position. This movement operates two switch contacts. The first is for external level indication and the second switches power off the motor.
The paddle starts to rotate once the level falls below the paddle level. The hinged motor returns to its rest position and the two contacts switch to the normal operation condition. Intermittent loads that operate against or even in the direction of rotation are evened out by using a slip clutch.

Measuring system

Complete level limit switch consisting of a shaft with synchronous motor and slip clutch, single pole changeover contact. Typical application areas for level detection are:
Cereals, Sugar, Cacao, Animal feeds, Washing powders, Chalk, Dry plaster, Cement, Granulates, Wood chips

Input

Measured variable

Filling height of solids

Measuring range

Variable dependent on the model used by:

- Installation position
- Length of the rotating shaft/rope

Output

Output signal

A contact changes once the solids reach the level limit.

Switching output

Potential free change over contact.

Connectable Load

- Relay: ≤ 250 VAC, nominal current 100 mA...10 A, on motor load ≤ 3 A
- PLC-relay: ≤ 48 VDC, nominal current10 mA...100 mA

Switch time delay

approx. 2 seconds

Mechanical life time

min. 500 000 switch cycles

Power supply

Electrical connection

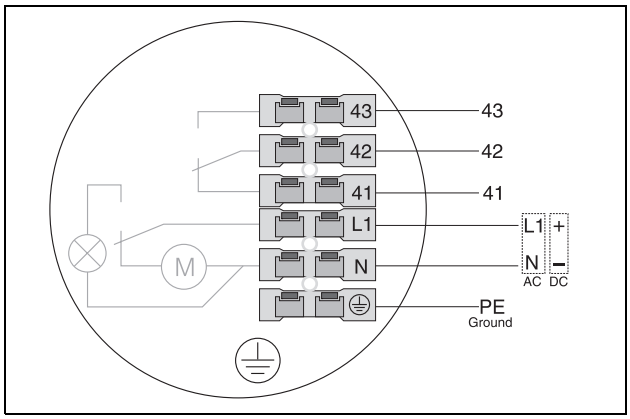


Fig. 2: Terminal layout

- PE: Earth (Ground)connection
- N (AC), - (DC): Power connection
- L (AC), + (DC): Power connection
- 41: Normally closed contact
- 42: Common
- 43: Normally open contact

Supply voltage

- 230 VAC 50/60 Hz, ± 10% max. 4.5 VA
- 115 VAC 50/60 Hz, ± 10% max. 4.5 VA
- 48 VAC 50/60 Hz, ± 10% max. 4.5 VA
- 24 VAC 50/60 Hz, ± 10% max. 4.5 VA
- 20 to 28 VDC, I_{max} = 66 mA

Cable entry

Cable entries PG 13.5

Installation condition

Installation instructions

Orientation

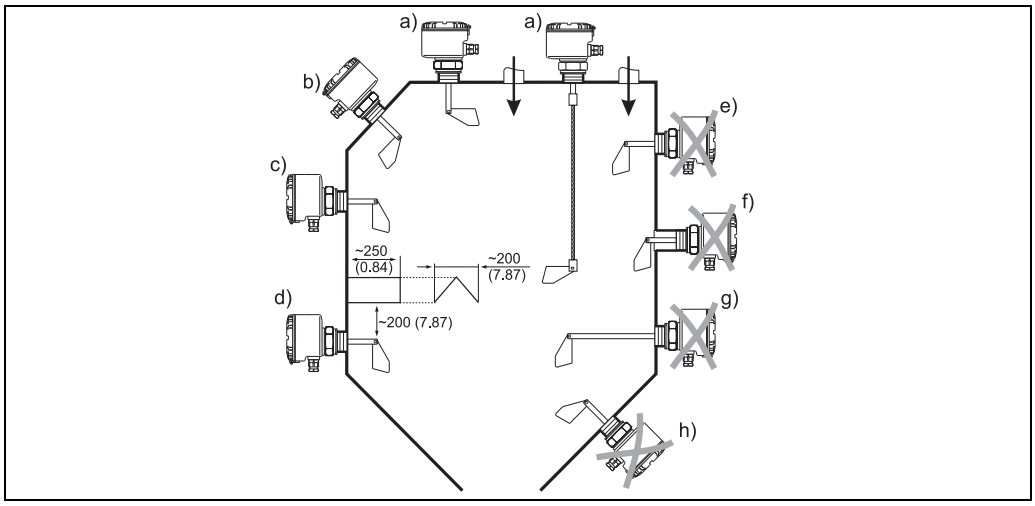


Fig. 3: Installation orientations of the device, dimensions in mm (inch)

Correct installation:	Incorrect installation:
Vertically from top of silo (Pos. a)	In direction of solids flow (Pos. e)
Angled from the top (Pos. b)	Installation coupling too long (Pos. f)
From the side (Pos. c)	Horizontally with shaft length > 300 mm (11.81"); not valid for version with strengthened shaft (Pos. g)
With protective cover against falling solids (Pos. d)	Angled from below (Pos. h)

Mechanical load on the shaft	■ max. 60 N ■ max. 1500 N on strengthened shaft
Load on the rope	max. 1500 N
Operating pressure (abs.)	0.5 to 1.8 bar (7.25 to 26.1 PSI)

Environmental conditions

Ambient temperature range	– 20 °C to + 60 °C (-4 to 140 °F)
Storage temperature	– 20 °C to + 60 °C (-4 to 140 °F)
Degree of protection	■ IP 65 with closed lid ■ IP 20 with open lid
Vibration resistance	IEC 654-3, dimension V.S.1 (v<3 mm/s, 1<f<150 Hz)
Protection class	I
Measurement category	II
Pollution degree	2
Altitude	Up to 2000 m (6560 ft) above sea level.

Process conditions

Medium temperature range	-20 °C to +80 °C (-4 to 176 °F)
Solids weight	100 g/l
Material grain size	Up to 50 mm (1.97")

Mechanical construction

Design, dimensions

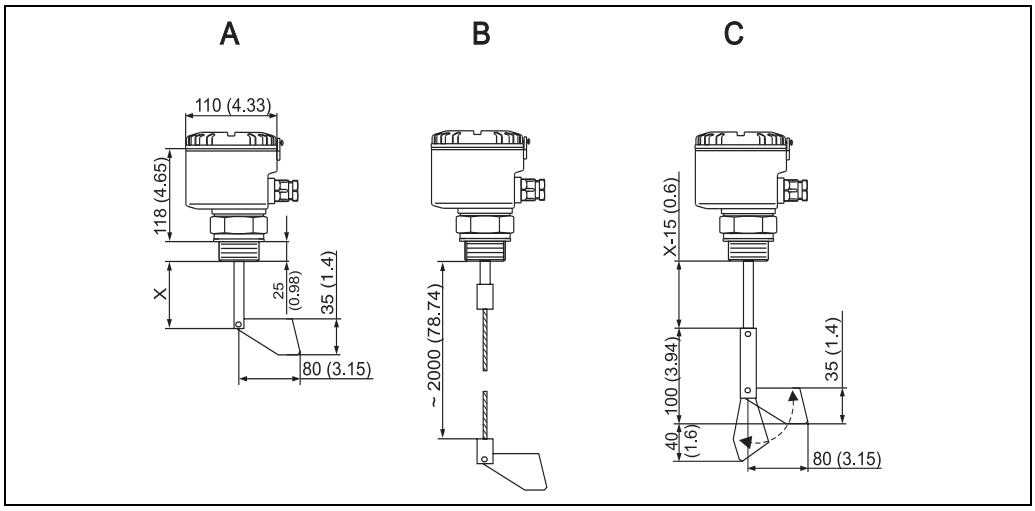


Fig. 4: Dimensions FTE30 in mm (inch)

Pos. A: Solid shaft
Pos. B: Rope extension
Pos. C: FTE30 with hinged paddle as additional equipment or as retrofit kit

Compact version	Extended version	Strengthened version	Rope extension
Shaft length X	Shaft length X	Shaft length X	Rope length of approx. 2000 mm (78.74"), can be shortened
75 mm (2.95")	100 mm (3.94")	300 mm (11.81")	
	200 mm (7.87")	500 mm (19.7")	
	300 mm (11.81")	800 mm (23.6")	
	400 mm (15.75")		
	500 mm (19.7")		
	600 mm (23.6")		

Hinged paddle (optional)

The paddle is hinged so that it can be easily mounted through a threaded mounting coupling. The paddle returns to its normal operating position by means of a built-in spring.Removal of the unit is always possible.The hinged paddle can be mounted to both the solid shaft as well as the rope extended versions.

Protective cover (optional)

When installing the device, the protective cover can simply be mounted at the same time. It protects the device in outdoor use against extreme climatic conditions, e.g. hailstorm when used on the roof of a silo.

Weight

Compact version approx. 1 kg (2.2 lb)

Material

- Housing, lid and process connection: plastic with 30% fibre glass.
- Shaft: Stainless steel 1.4305
- Paddle: Stainless steel 1.4301
- O-ring seal: NBR
- Shaft seal: NBR Perbunan
- Cable entries PG 13.5: for cable diameter 7.0 to 11 mm (0.28 to 0.43") poliamid with neoprene-CR seal
- As option:
  - Process connection: Stainless steel 1.4305
  - Rope extension: Stainless steel 1.4401 with stainless steel 1.4305 weight
  - Hinged paddle: Stainless steel 1.4435
  - Protection tube: Stainless steel 1.4301
  - Protective cover: Stainless steel 1.4301

Shaft bearing

High power friction bearing - maintenance free

Shaft rotation

approx. 1 rotation per minute

Process connection

Threaded boss - thread G1 ½"

Terminals

Plug in screw terminals 2.5 mm^2 (14 AWG) solid core, 1.5 mm^2 (16 AWG) core with ferrule

Human interface

Display elements

signal lamp (optional)

Yellow signal lamp illuminates in alarm condition (shaft stopped).
The signal lamp is fitted in the PG cable gland. It indicates the switch condition of the unit:

- Signal lamp on: Contact 42-43 closed
- Signal lamp off: Contact 41-42 closed

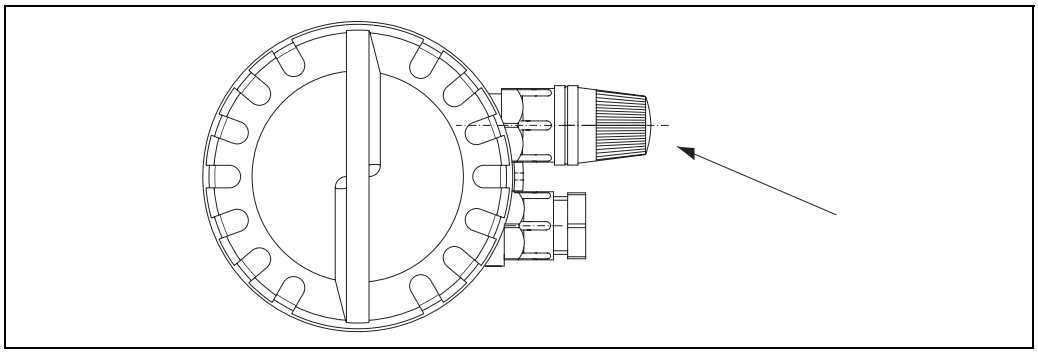


Fig. 5: Signal lamp as option

Certificates and approvals

CE approval

The measurement system fulfils the requirements demanded by the EU regulations. Endress+Hauser acknowledges successful unit testing by adding the CE mark.

Ex approval

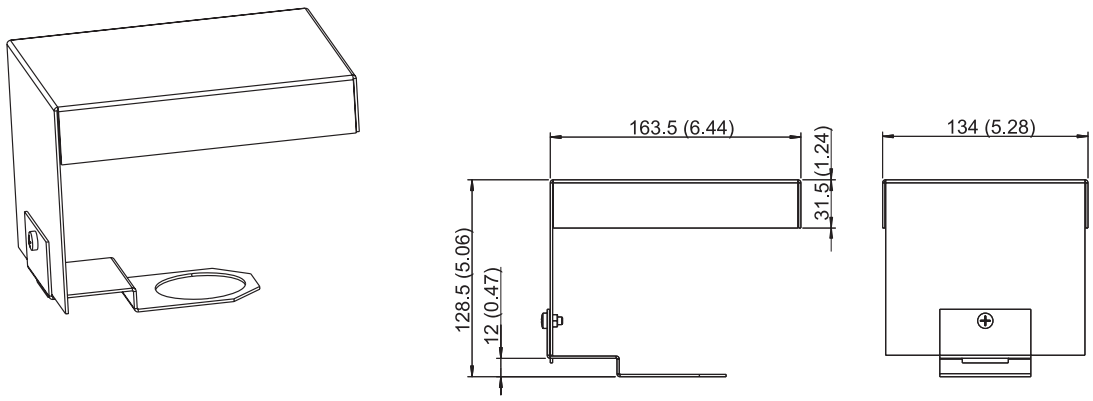
Dust Ex Zone 20
Construction certification II 1/3 D Zone 20/22

Ordering information

Soliswitch FTE30						
	Power supply; Output:					
	A	230 V AC, relay 250 V AC, 100 mA...10 A				
	B	115 V AC, relay 250 V AC, 100 mA...10 A				
	C	48 V AC, relay 250 V AC, 100 mA...10 A				
	D	24 V AC, relay 250 V AC, 100 mA...10 A				
	E	20 to 28 V DC, relay 250 V AC, 100 mA...10 A				
	F	230 V AC, PLC-Relay 48 V DC, 10 mA...100 mA				
	G	115 V AC, PLC-Relay 48 V DC, 10 mA...100 mA				
	H	48 V AC, PLC-Relay 48 V DC, 10 mA...100 mA				
	I	24 V AC, PLC-Relay 48 V DC, 10 mA...100 mA				
	J	20 to 28 V DC, PLC-Relay 48 V DC, 10 mA...100 mA				
	K	230 V AC, paddle revolution 6 U/min; 100 mA...10 A				
	L	20 to 28 V DC, paddle revolution 6 U/min; 100 mA...10 A				
	M	230 V AC, paddle revolution 6 U/min; 10 mA...100 mA relay 250 V AC				
	N	20 to 28 V DC, paddle revolution 6 U/min; 10 mA...100 mA relay 250 V AC				
	Y	Special version				
		Process connection:				
		A	Thread G 1½, PBT			
		B	Thread G 1½, 303			
		C	Thread G 1½, 303, armoured			
		Y	Special version			
			Version:			
			A	Shaft 100 mm		
			B	Shaft 200 mm		
			C	Shaft 300 mm		
			D	Shaft 400 mm		
			E	Shaft 500 mm		
			F	Shaft 600 mm		
			G	Shaft 120 mm		
			1	Shaft 75 mm; compact		
			2	Rope 2 m, 316, shortable		
			3	Shaft 300 mm; armoured		
			4	Shaft 500 mm; armoured		
			5	Shaft 800 mm; armoured		
			9	Special version		
				Paddle; Additional option:		
				1	303; w/o signal lamp	
				2	303; signal lamp	
				3	316L; fold-away	
				4	316L; fold-away; signal lamp	
				9	Special version	
FTE30-					⇐ **Ordercode**	

This ordering information can give an overview about the available order options. The Endress +Hauser sales organization can provide detailed ordering information and information on the order code.

Accessories

Accessory	Order No.
Hinged paddle retro-fit kit	50089768
Protective cover, dimensions in mm (inch) 	51005551
Rope extension 2 m (78.74")	50080209

Documentation

❑ Short operating instructions Level Limit Switch FTE30 (KA059R/09/a6)

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

TI052R/09/en/06.08
50080138
FM+SGML 6.0