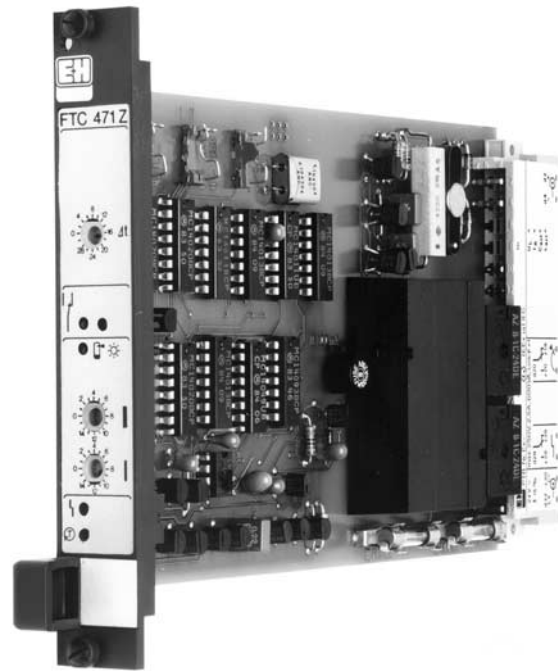




Capacitance Limit Detection *nivotester FTC 470 Z, 471 Z*

Capacitance limit switch for liquids and bulk solids



Application

The Nivotester FTC 470 Z, 471 Z is a level limit switch in compact Racksyst format for limit detection in liquids tanks and bulk solids silos.

The intrinsically safe probe current circuit [EEx ia] IIC T6 allows the use of the probes also in explosion-hazardous areas.

FTC 470 Z: without switching delay

FTC 471 Z: with adjustable switching delay

Features and Benefits

- Approved for overspill protection – for water-polluting liquids conforming to German water regulations (WHG)
- User-friendly calibration
- Signal transmission over two-core cable
- With function monitoring of electronics and connection cables
- Each with one potential-free output for level signal and flow alarm, consequently safety precaution against fault response
- Wide supply voltage tolerance allows low-cost power supply from simple power pack

Endress + Hauser

The Power of Know How



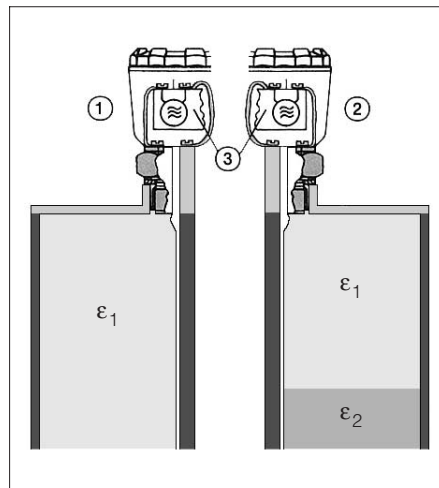
Measuring System

The complete measuring system comprises:

- a Nivotester FTC 470 Z or FTC 471 Z
- a suitable electronic insert (see Technical Data)
- a probe matching the application.

Measuring Principle

The capacitance measurement principle is based on the physical properties of a capacitor formed by the sensor and the vessel wall. The capacitance is affected by the dielectric value of the product. When the sensor is not covered ①, the dielectric constant is ϵ_1 (usually ϵ_1 of air with $\epsilon_r = 1$). When the sensor is covered with material ② (dielectric constant ϵ_2), an increase in capacitance occurs. The electronic insert EC... is either mounted in the probe head (③) or, at operating temperatures above 100 °C, in the separate protection housing HTC. It converts the level-dependent capacitance signal into a frequency, which is then transmitted over two-core cable to the Nivotester FTC... as a series of current pulses superimposed on the DC power supply: pulse-frequency-modulation (PFM).

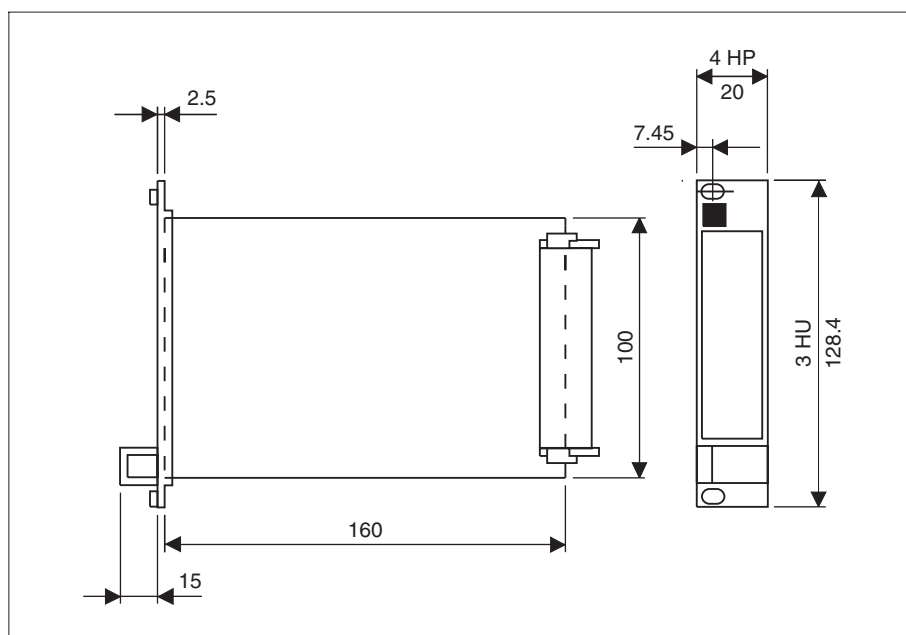


The principle of capacitance limit detection

Dimensions

Dimensions in mm
of the Nivotester
FTC 470 Z / FTC 471 Z

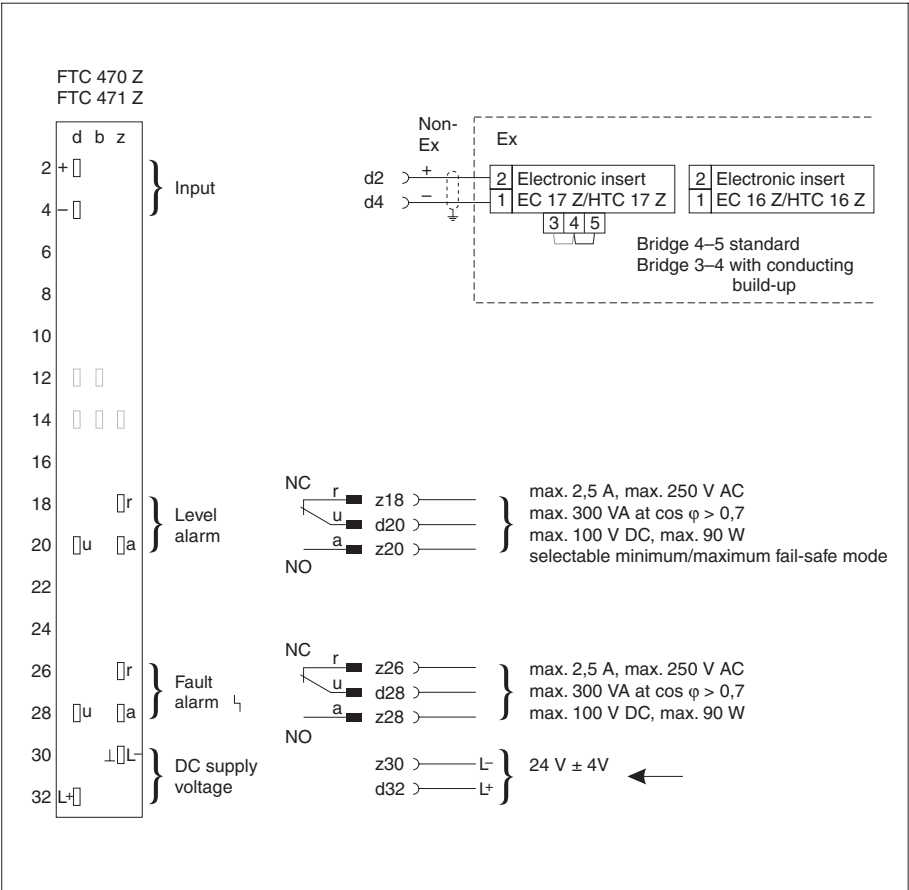
100 mm = 3.94 in



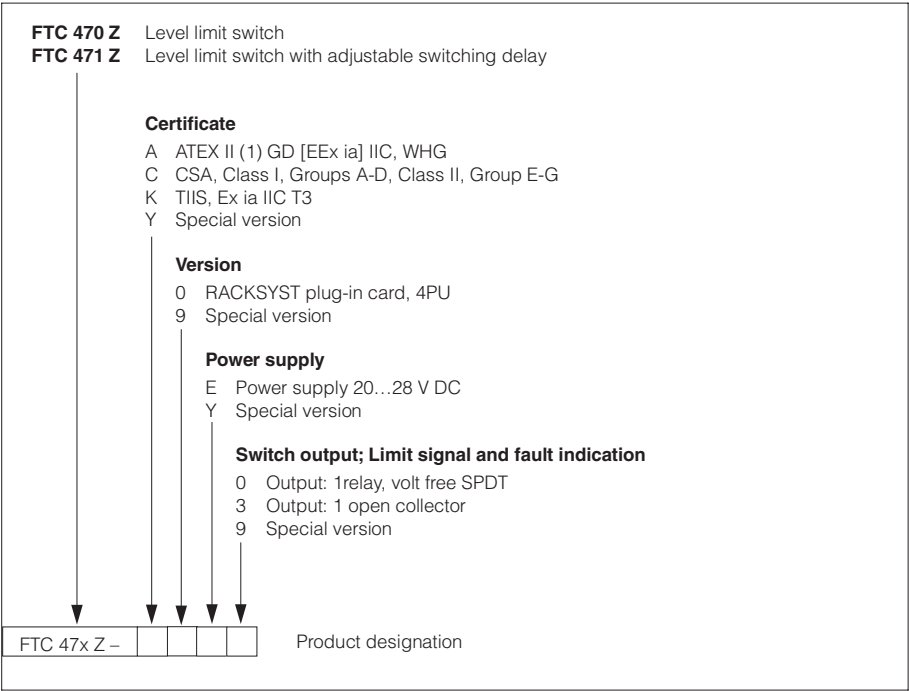
Electrical Connection

Electrical connection of the Nivotester FTC 470 Z / FTC 471 Z in the assembly rack.

View on the contact blades on the unit's male multipoint or on the connection side of the female connector in the rack.



Product Structure



Technical Data

Mechanical construction	Racksyst plug-in board to DIN 41494, Part 2 and Part 4; t = 160, h = 100 (Europa format)
Connection	strip to DIN 41612, Part 3, Format F
Coding pins in strip	for FTC 470 Z / 471 Z with relay output at Points 1 and 6
Width	4 HP (20 mm)
Protection type to DIN 40050	front panel IP 20, plug-in board IP 00
Permissible ambient temperature	0 °C...+70 °C (30 °F...160 °F)
Storage temperature	-20 °C...+85 °C (0 °F...185 °F)
DC supply voltage	24 V ± 4 V
Current consumption	70 mA
Input	galvanically isolated from other circuits
Suitable electronic insert	
• in probe head	EC 16 Z / EC 17 Z
• in separate housing	HTC 16 Z / HTC 17 Z
Explosion protection type	[EEx ia] IIC T6 (Zone 0)
Electromagnetic compatibility	Interference Emission to EN 61326, Electrical Equipment Class A Interference Immunity to EN 61326
Connection cable	2 -core, screened
Cable resistance	max. 25 Ω per core
Short circuit current	max. 50 mA (continuous short circuit proof)
Initial capacitance range C_A	approx. 20 pF...1000 pF
Outputs	each with 1 relay with potential-free change-over contact
Max. contact load	U~: 250 V, U-: 100 V, I~: 2.5 A, P~: 300 VA, cos φ > 0.7, P-: 90 W
Electrical connection	See diagram on page 3
Safety mode for level alarm	selectable min./max. safety mode
Switching delay	FTC 470 Z: 0.5 s, FTC 471 Z: 0...30 s
Switching hysteresis	0.5 pF (at C_A = 30 pF)
Compensation for build-up	The switchpoint can be adjusted further from point C_A with the switch if build-up is expected on the probe.

Supplementary Documentation

- ❑ Electronic Insert EC 16 Z
Technical Information TI 170F/00/en
- ❑ Electronic Insert EC 17 Z
Technical Information TI 268F/00/en
- ❑ Electronic insert in separate housing
HTC 16 Z
Technical Information TI 171F/00/en
- ❑ Separate housing for electronic insert
Technical Information TI 228F/00/en
- ❑ EMC Test Procedures
Technical Information TI 241F/00/en

Endress+Hauser
GmbH+Co. KG
Instruments International
P.O. Box 2222
D-79574 Weil am Rhein
Germany
Tel. (076 21) 975-02
Fax (076 21) 975-345
<http://www.endress.com>
info@ii.endress.com

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