Floating Switch
FTS 20

Füllstandgrenzschalter
Level Limit Switch
Détecteur de niveau

Endress + Hauser
The Power of Knowledge
Safety instructions

The FTS 20 floating switch may only be used as a level limit switch in suitable liquids. Improper use may cause dangerous situations.
The instrument may only be installed, connected and commissioned by qualified and authorised personnel, paying particular attention to:

- this compact manual
- the appropriate standards
- the statutory regulations and
- certificates (depending on version and application)

Safety symbols

⚠️ Warning!
“Warning” indicates an action or procedure which, if not performed correctly, can result in injury or a safety hazard. Read the instructions thoroughly and proceed carefully.

ℵ Note!
“Note” indicates processes which – if improperly executed – could affect operation or trigger unexpected instrument actions.
## Instrument variants

<table>
<thead>
<tr>
<th>Order Code</th>
<th>Type of switch</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Initiator with switching ball for use in explosion-hazardous areas</td>
</tr>
<tr>
<td></td>
<td>2-wire to EN 60947-5-6 (NAMUR)</td>
</tr>
<tr>
<td></td>
<td>Use with isolating amplifier; hazardous explosion areas to Zone1</td>
</tr>
<tr>
<td></td>
<td>Cable length 5 m</td>
</tr>
<tr>
<td>52010119</td>
<td>With PVC cable material (for water, wastewater)</td>
</tr>
<tr>
<td>52010120</td>
<td>With PUR cable material (for fuels and oils)</td>
</tr>
<tr>
<td>52010121</td>
<td>With CSM cable material (for acids and alkalis)</td>
</tr>
<tr>
<td>52010122</td>
<td>Microswitch with switching ball for standard application, 3-wire, change-over contact for max. 250 V AC / 150 V DC</td>
</tr>
<tr>
<td>52010123</td>
<td>Cable length 5 m</td>
</tr>
<tr>
<td>52010124</td>
<td>With PVC cable material (for water, wastewater)</td>
</tr>
<tr>
<td>52010125</td>
<td>With PUR cable material (for fuels and oils)</td>
</tr>
<tr>
<td>52010126</td>
<td>With CSM cable material (for acids and alkalis)</td>
</tr>
</tbody>
</table>

### Accessories

<table>
<thead>
<tr>
<th>Order Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>52010125</td>
<td>Nivotester FTL 325N, Isolating amplifier</td>
</tr>
<tr>
<td>52010126</td>
<td>Compression gland G1A, PVC</td>
</tr>
<tr>
<td>52010127</td>
<td>Counter nut G1A, PVC</td>
</tr>
<tr>
<td>52010128</td>
<td>Weight (coated with polyamide)</td>
</tr>
</tbody>
</table>
**Function**

An element built into the floating switch switches when a deviation in the horizontal is detected. The switching process is triggered by the movement of a steel ball and, depending on the version, is carried out by an inductive initiator or a microswitch. The inductive initiator acts as a switching output and provides a switching signal to EN 60947-5-6 (NAMUR). The microswitch version is a two-way switch.

**Features**

- Reliable level limit detection in liquids
- Electrical connections to NAMUR for hazardous areas (to Zone 1) or change-over contact (AC/DC) for universal standard application
- Different cable materials for different media
- Small diameter for simple installation using tapped hole G1A
Applications

Controlling pumps and valves with one switch or signal level height or limit
Installation

The floating switch can be installed as follows:

• The floating switch can be inserted into the tank – through a tapped hole G1A – and screwed to the compression gland (G1A).

• If it is installed from above, use the weight.

Note!

• The fulcrum of the cable should always be horizontal.

• The cable length between the fixture and the floating body is dependent on the cable type (see "Technical data").

• When using the weight, place an extra strain relief (e.g., a knot in the cable) behind the compression gland – on the outside of the tank.
## Electrical connection

**Warning!**  
Note the switch type.

### Inductive proximity switch with switching ball (NAMUR)  
Order codes:  
52010119  
52010120  
52010121  

<table>
<thead>
<tr>
<th>1/ Brown</th>
<th>L+</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2/ Blue</th>
<th>L-</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blue</td>
<td></td>
</tr>
</tbody>
</table>

**Connection indication**  
L+ = black or brown  
L- = blue  
(closing when floating)

### Change-over contact (AC/DC)  
Order codes:  
52010122  
52010123  
52010124  

<table>
<thead>
<tr>
<th>Blue</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Black</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Brown</th>
</tr>
</thead>
</table>

**Cable colours:**  
black + brown = contact open  
black + blue = contact closed  
(contact position when floating)
Technical data FTS 20 (NAMUR) types: 52010119, 52010120, 52010121

Measuring system: Comprising an FTS 20 floating switch and an isolating amplifier, e.g. Endress+Hauser Nivotester FTL 325N.

Switching element: Inductive proximity switch with switching ball, closed when floating.

Power supply: 8.2 V ± 2 V

Operating current: < 1.2 mA unswitched; > 2.1 mA switched

Reverse polarity protection: yes

Switching angle: Switching points top/bottom ± 12°, measured to the horizontal.

Ambient temperature: dependent on cable material; PVC, PUR and CSM: -20 … +70 °C

Ambient pressure: ≤ 3 bar

Density of floating switch: ≥ 0.8 g/cm³

Floating body material: Polypropylene (PP)

Cable material:
- PVC, CSM: standard length 5 m, cross section 2 x 0.75 mm²
- PUR: standard length 5 m, cross section 2 x 0.50 mm²

Areas of application and minimum cable length between fixing and floating body:
- PVC: ≥ 50 mm, suitable for water, dirty water, slightly aggressive media
- PUR: ≥ 100 mm, suitable for fuels, heating oils, liquids containing oil
- CSM: ≥ 100 mm, suitable for acids and alkalis

Ex approval: TÜV 01 ATEX 1709

Ex ingress protection: © II 2G Ex ia II T5

Ex data:
- T5 (Tₐ = 70 °C)
  - Voltage Ci: 16 V
  - Current Li: 52 mA
  - Power Pi: 180 mW
  - Inductance Li: 1 mH
  - Capacitance Ci: 153 nF
- T4 (Tₐ = 70 °C)
  - Voltage Ci: 16 V
  - Current Li: 72 mA
  - Power Pi: 242 mW
  - Inductance Li: 1 mH
  - Capacitance Ci: 153 nF

**Technical data FTS 20 (AC/DC) types: 52010122, 52010123, 52010124**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
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<tr>
<td>Measuring system</td>
<td>Comprising an FTS 20 floating switch</td>
</tr>
<tr>
<td>Switching element</td>
<td>Microswitch with switching ball</td>
</tr>
<tr>
<td>Switching function</td>
<td>Change-over contact</td>
</tr>
<tr>
<td>Switching voltage</td>
<td>AC: max. 250 V, DC: max. 150 V</td>
</tr>
<tr>
<td>Switching current</td>
<td>Max. 3 A (AC), max. 1 A (DC)</td>
</tr>
<tr>
<td>Switching angle</td>
<td>Upper switching point: +25° ± 6°</td>
</tr>
<tr>
<td></td>
<td>Lower switching point: +14° ± 3°, measured to the horizontal</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>Dependent on cable material; PVC: +5 … +70 °C, PUR and CSM: -20 … +85 °C</td>
</tr>
<tr>
<td>Ambient pressure</td>
<td>≤ 3 bar</td>
</tr>
<tr>
<td>Density of floating switch</td>
<td>≥ 0.8 g/cm³</td>
</tr>
<tr>
<td>Floating body material</td>
<td>Polypropylene (PP)</td>
</tr>
<tr>
<td>Cable material</td>
<td>PVC: standard length 5 m, cross section 2 x 0.75 mm²</td>
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</table>
Dimensions

FTS 20 floating switch

Compression gland weight

Weight

(Dimensions in mm)
Translation

EC-TYPE EXAMINATION CERTIFICATE

TÜV 01 ATEX 1709

(4) Equipment or Protective System: Liquid level switch type FTS 20 (NAMUR)***

(5) Manufacturer: Endress+Hauser GmbH & Co.

Hauptstrasse 1
D-76869 Maulburg

(7) This equipment or protective system and any acceptable variation thereof is specified in the schedule to this certificate and the documents therein referred to.

(8) The TÜV Hannover/Schleswig-Arnett e.V., TÜV CERT-Certification Body, notified body number NF 0032 in accordance with Annex II of the Council Directive of the EC of March 23, 1994 (94/9/EC), certifies that this equipment or protective system has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in confidential report No. 91 P.X. 11310.

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN 50 020:1994

(10) If the sign “Ex” is placed after the certificate number, it indicates that the equipment or protective system is subject to special conditions for safe use specified in the schedule to this certificate.

(11) This EC-type examination certificate relates only to the design and construction of the specified equipment or protective system according to Directive 94/9/EC. Further requirements of this Directive apply to the manufacturer and placing on the market of this equipment or protective system.

(12) The marking of the equipment or protective system must include the following:

TÜV NORD
Hannover, 2001-09-18

Head of the Certification Body

Endress+Hauser GmbH & Co.
Hauptstrasse 1
D-76869 Maulburg

This certificate may only be reproduced without any change, signature included.

They are available for download.
EC-TYPE EXAMINATION CERTIFICATE N° TÜV 01 ATEX 1709

Description of equipment
The liquid level switch type FTS.20 (NAMUR)™ is intended for the registration of liquid levels. It may be used within the explosion-hazardous area. The form of the message signal is binary.

The maximum permissible ambient temperature is 70°C.

Electrical data
Signaling and supply circuit in type of protection “Intrinsic Safety” EEx ia IIB (connection cable)
only for the connection to certified intrinsically safe circuits.

The maximum values for voltage, current and power in dependence of the temperature class have to be taken from the following table:

<table>
<thead>
<tr>
<th>Temperature class</th>
<th>T4</th>
<th>T5</th>
</tr>
</thead>
<tbody>
<tr>
<td>EEx ia IIB</td>
<td>24 V, 72 mA</td>
<td>242 mW</td>
</tr>
<tr>
<td>EEx ia IIB</td>
<td>18 V, 62 mA</td>
<td>180 mW</td>
</tr>
</tbody>
</table>

Effective internal inductance: \( L_i = 1 \text{ nH} \)
Effective internal capacitance: \( C_i = 153 \text{ nF} \)

Test documents are listed in the test report N° 01 PX 11310.

Special condition for safe use
none

Essential Health and Safety Requirements
no additional ones