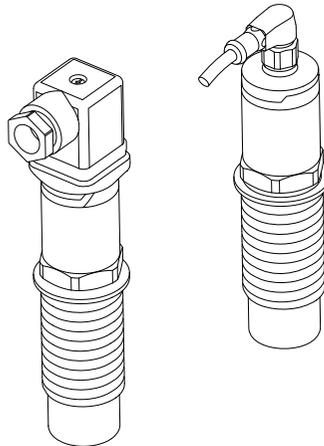


# Brief Operating Instructions

## Nivector FTI26

Capacitance

Point level switch for powdered and fine-grained solids

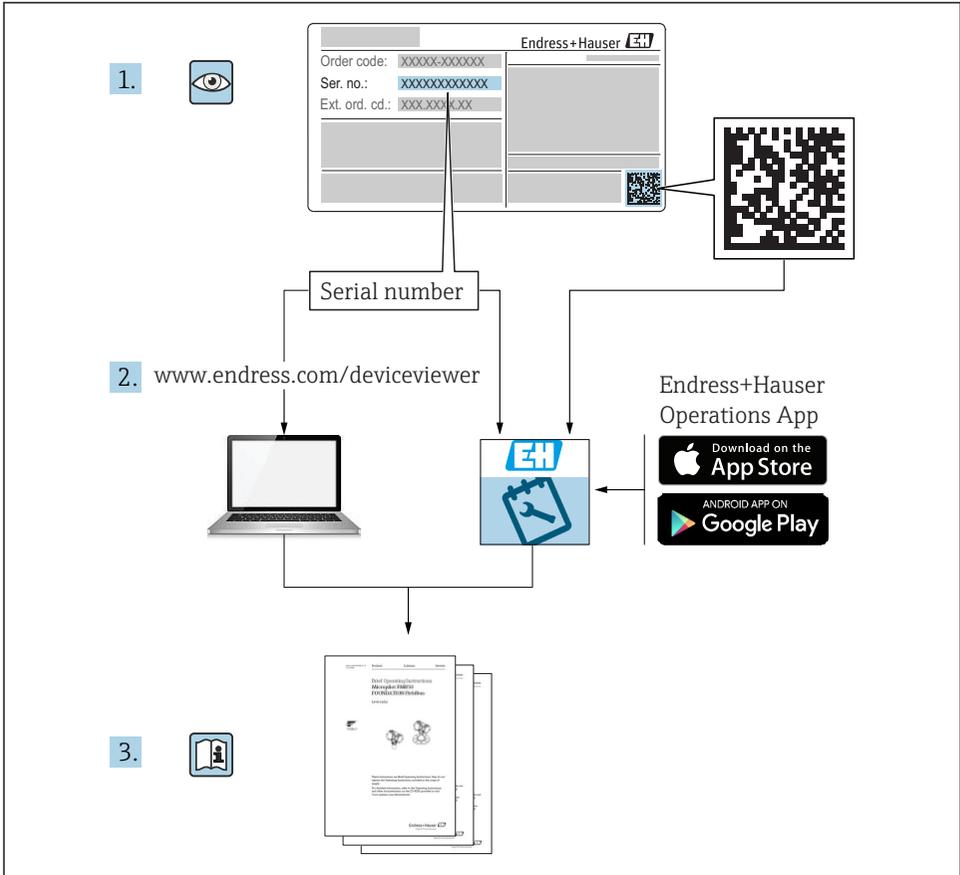


These Instructions are Brief Operating Instructions; they are not a substitute for the Operating Instructions pertaining to the device.

Detailed information about the device can be found in the Operating Instructions and the other documentation:

Available for all device versions via:

- Internet: [www.endress.com/deviceviewer](http://www.endress.com/deviceviewer)
- Smart phone/tablet: *Endress+Hauser Operations App*



A0023555

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# 1 About this document

## 1.1 Symbols used

### 1.1.1 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 dangerous situation. Failure to avoid this situation can result in serious or fatal injury.

#### CAUTION

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

#### NOTICE

This symbol contains information on procedures and other facts which do not result in personal injury.

## 1.2 Electrical symbols

Symbol	Meaning
	<b>Ground connection</b> A grounded terminal which, as far as the operator is concerned, is grounded via a grounding system.
	<b>Protective ground connection</b> A terminal which must be connected to ground prior to establishing any other connections.

## 1.3 Symbols for certain types of information

Symbol	Meaning
	<b>Preferred</b> Procedures, processes or actions that are preferred.
	<b>Permitted</b> Procedures, processes or actions that are permitted.
	<b>Forbidden</b> Procedures, processes or actions that are forbidden.
	<b>Tip</b> Indicates additional information.
	Reference to page
	Series of steps

Symbol	Meaning
	Result of a step
	Visual inspection

## 1.4 Symbols for graphics

Symbol	Meaning
1, 2, 3 ...	Item numbers
A, B, C, ...	Views

## 1.5 Documentation



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

- *W@M Device Viewer* ([www.endress.com/deviceviewer](http://www.endress.com/deviceviewer)): Enter the serial number from nameplate
- *Endress+Hauser Operations App*: Enter the serial number from the nameplate or scan the 2D matrix code (QR code) on the nameplate

## 1.6 Standard documentation

- TI01384F → Nivector FTI26, IO-Link
- BA01830F → Nivector FTI26 without IO-Link
- BA01832F → Nivector FTI26, IO-Link
- KA01408F → Nivector FTI26

## 1.7 Supplementary documentation

- TI00426F/00 → Weld-in adapter, process adapter and flanges (overview)
- SD01622P/00 → Weld-in adapter (installation instructions)
- SD00356F/00 → Valve plug (installation instructions)
- SD02242F/00 → Protector (installation instructions)

## 1.8 Certificates

Depending on the option selected in the "Approval" order code, Safety Instructions are supplied with the device, e. g. XA. This documentation is an integral part of the Operating Instructions. The nameplate indicates the Safety Instructions (XA) that are relevant to the device.

### Safety instructions

- XA01734F/00 → ATEX; IECEX
- XA01821F/00 → CSA Ex
- XA01943F/00 → EAC Ex

## 1.9 Registered trademarks

### IO-Link

is a registered trademark of the IO-Link company group.

## 2 Basic safety instructions

### 2.1 Requirements for the personnel

The personnel must fulfill the following requirements for its tasks:

- ▶ 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.

### 2.2 Designated use

The measuring device described in these instructions may be used only as a point level switch for powdery and fine-grained bulk solids. Incorrect use may pose a hazard. To ensure that the measuring device remains in perfect condition during the operating time:

- Measuring devices must be used only for media to which the process-wetted materials have an adequate level of resistance.
- The relevant limit values must not be violated, see TI01384F/00/EN.

#### 2.2.1 Incorrect use

The manufacturer is not liable for damage caused by improper or non-designated use.

### Residual risks

Due to heat transfer from the process, the temperature of the electronics housing and the assemblies contained therein may rise to 80 °C (176 °F) during operation.

#### CAUTION

#### Hot surfaces

Danger of burns from contact with surfaces!

- ▶ In the event of elevated fluid temperatures, ensure protection against contact to prevent burns.

### 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

### CAUTION

#### Risk of injury!

- ▶ The operator is responsible for the trouble-free operation of the device.
- ▶ Operate the device only if it is in proper technical condition, free from errors and faults.
- ▶ The device must be operated with a 500 mA fine-wire fuse (slow-blow) which is suitable for DC current in accordance with IEC 60127-2.

## 2.5 Product safety

This measuring device is designed in accordance with good engineering practice to meet state-of-the-art safety requirements, has been tested, and 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 EC directives listed in the device-specific EC Declaration of Conformity. Endress+Hauser confirms this by affixing the CE mark to the device.

## 2.6 IT security

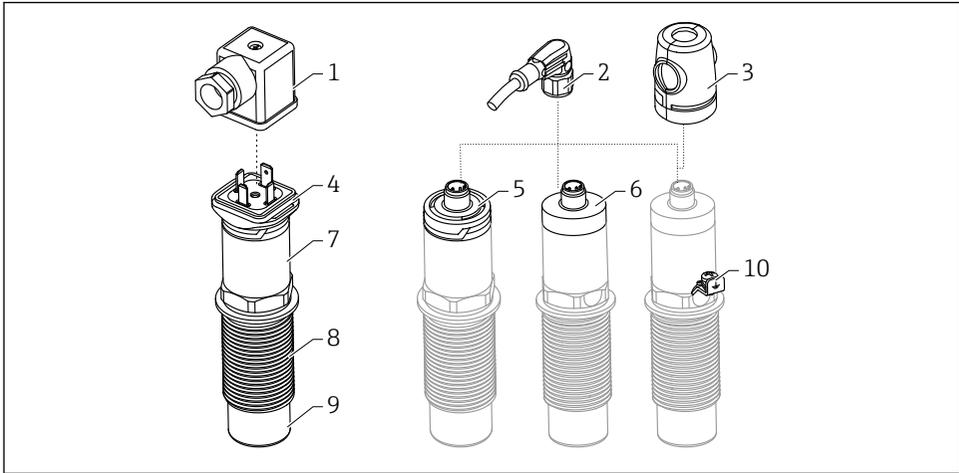
Our warranty is valid only if the device is installed and used as described in the Operating Instructions. The device is equipped with security mechanisms to protect it against any inadvertent changes to the settings.

IT security measures, which provide additional protection for the device and associated data transfer, must be implemented by the operators themselves in line with their security standards.

# 3 Product description

Capacitance point level switch for powdery and fine-grained bulk solids; use preferably in bulk solids vessels, e.g. silos

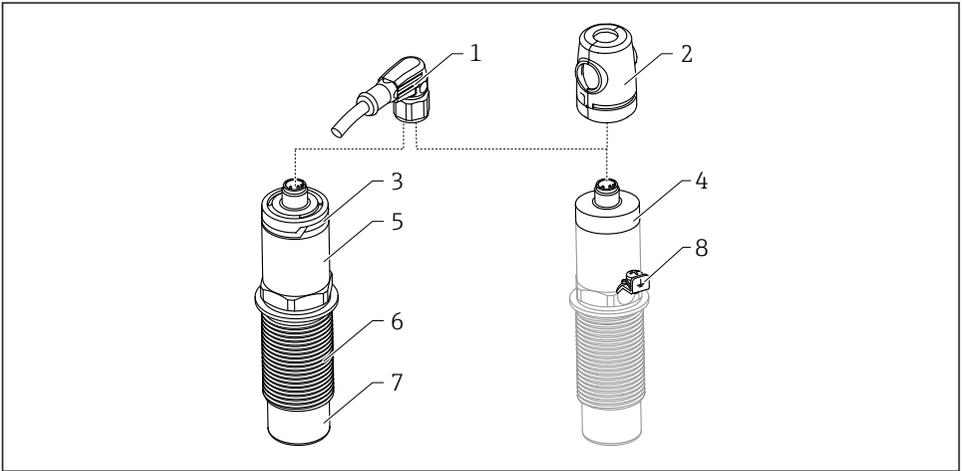
### 3.1 Product structure



A0035860

1 Product structure of Nivector FTI26, connection and housing covers optional

- 1 Valve plug
- 2 M12 plug
- 3 Protection cover (for hazardous areas)
- 4 Plastic housing cover with LED for valve plug, IP65
- 5 Plastic housing cover with LED, IP65/67
- 6 Metal housing cover, IP66/68/69
- 7 Housing
- 8 Process connection G 1"
- 9 Sensor
- 10 Ground terminal (hazardous areas)



A0035936

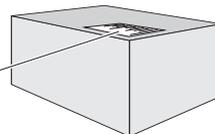
2 Product structure of Nivector FTI26 IO-Link, connection and housing covers optional

- 1 M12 plug
- 2 Protection cover (for hazardous areas)
- 3 Plastic housing cover with LED, IP65/67
- 4 Metal housing cover, IP66/68/69
- 5 Housing
- 6 Process connection G 1"
- 7 Sensor
- 8 Ground terminal (hazardous areas)

Additional and optional accessories available to order .

## 4 Incoming acceptance and product identification

### 4.1 Incoming acceptance

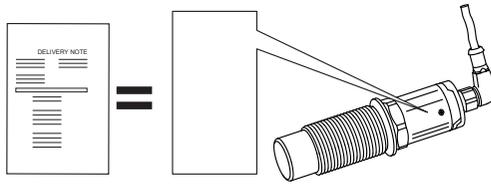


1 = 2

A0016051

Is the order code on the delivery note (1) identical to the order code on the product sticker (2)?

Are the goods undamaged?



A0035872

Do the data on the nameplates correspond to the order specifications on the delivery note?



If one of these conditions is not satisfied, contact your Sales Center.

## 4.2 Product identification

The measuring device can be identified in the following ways:

- Nameplate data
- Order code with breakdown of the device features on the delivery note
- Enter serial number from nameplates in *W@M Device Viewer* ([www.endress.com/deviceviewer](http://www.endress.com/deviceviewer)): All information on the measuring device is displayed

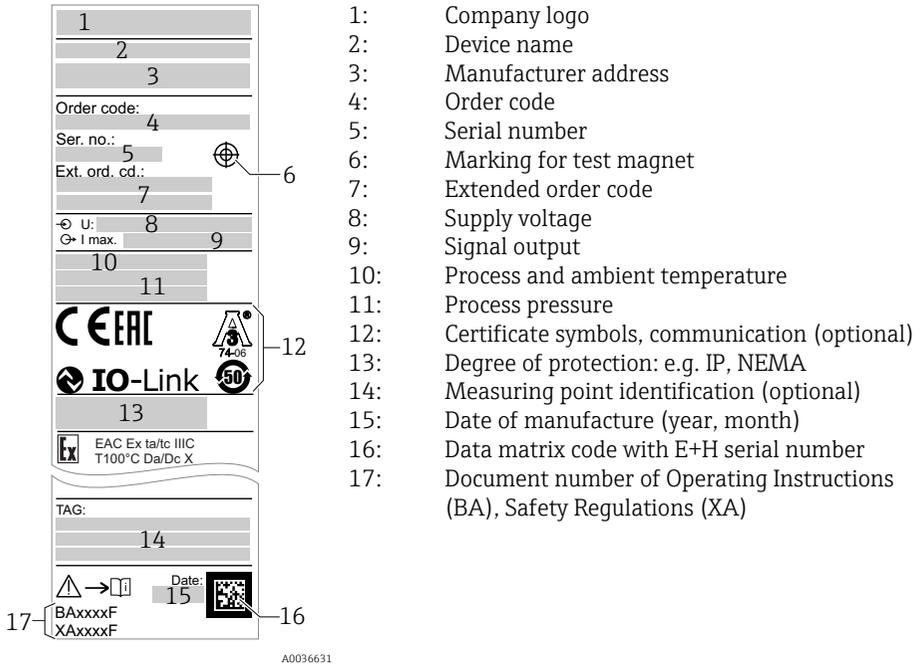
The serial number on the nameplate can also be used to obtain an overview of the technical documentation supplied with the device in *W@MDevice Viewer* ([www.endress.com/deviceviewer](http://www.endress.com/deviceviewer))

### 4.2.1 Manufacturer address

Endress+Hauser SE+Co. KG  
Hauptstraße 1  
79689 Maulburg, Germany

Address of the manufacturing plant: See nameplate.

## 4.2.2 Nameplate



The test magnet is included in the scope of delivery. It is also possible to cancel it .

## 4.3 Storage and transport

### 4.3.1 Storage conditions

- Permitted storage temperature: -25 to +85 °C (-13 to +185 °F)
- Use original packaging.

### 4.3.2 Transport

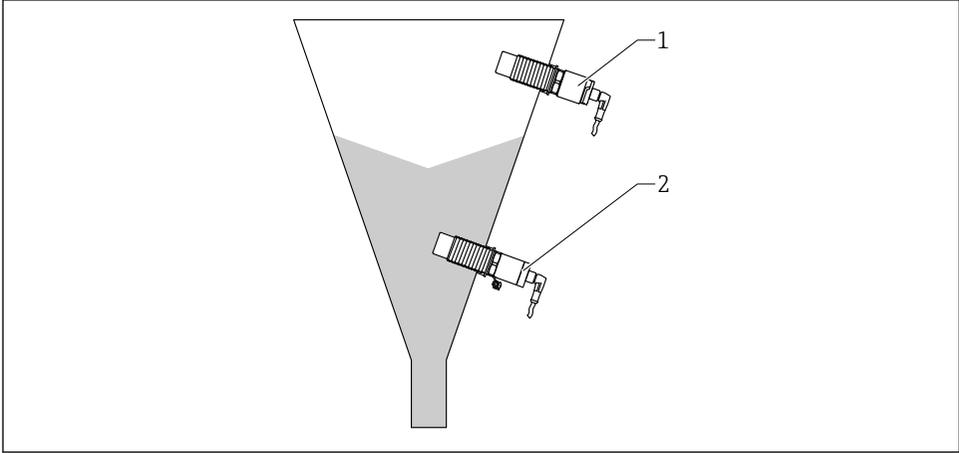
Transport the device to the measuring point in the original packaging.

## 5 Installation

### 5.1 Installation conditions

Lateral mounting in bulk solids vessel, e.g. silo

A miniature contactor, a solenoid valve or a programmable logic controller (PLC) can be connected directly to the point level switch.



A0035880

### 3 Application examples

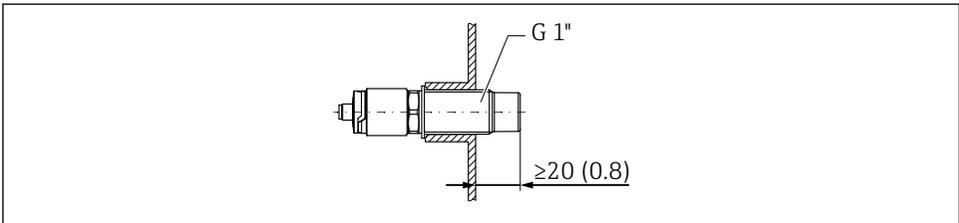
- 1 Overfill prevention or upper level detection (MAX)
- 2 Dry-running protection or lower level detection (MIN)

## 5.2 Mounting the measuring device

### 5.2.1 Required tools

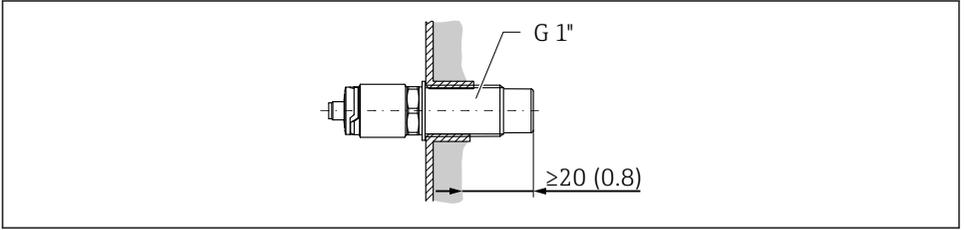
- Open-ended wrench AF32
  - When screwing in, turn by the hex bolt only.
  - Torque: 5 to 12 Nm (3.7 to 8.9 lbf ft)
- Sensor surface  $\geq 20$  mm (0.79 in) projecting into silo (when installing with weld-in adapter 20 mm (0.79 in))
- Silo wall thickness  $< 35$  mm (1.38 in) or welding socket G 1"  $< 50$  mm (1.97 in)

### 5.2.2 Installation examples



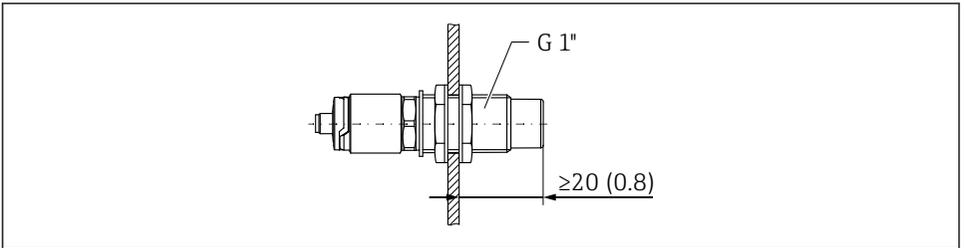
A0035881

### 4 Standard installation with external G 1" threaded adapter



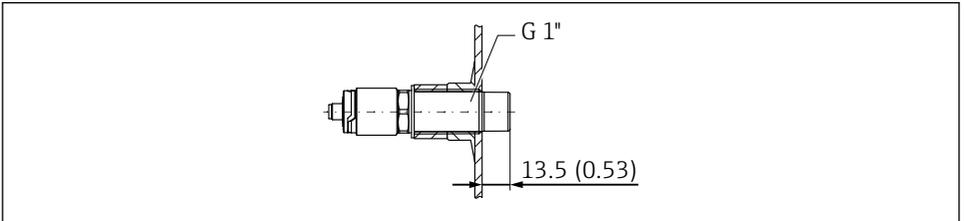
A0036360

- 5 Where buildup occurs on the silo wall with internal G 1" threaded adapter



A0036359

- 6 Bore hole in silo wall with lock nuts, can be ordered as an accessory



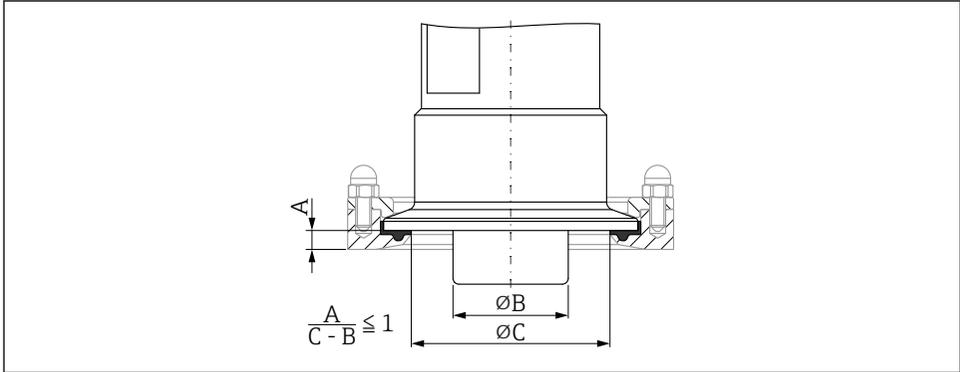
A0036362

- 7 Installation with weld-in adapter, can be ordered as an accessory

### NOTICE

**Installation in a conventional T-section or in a metallic tank nozzle reduces the measuring performance of the sensor.**

- ▶ Install Tri-Clamp version, e. g. NA Connect adapter for hygiene-compliant connection. This minimizes dead legs and increases cleanability.

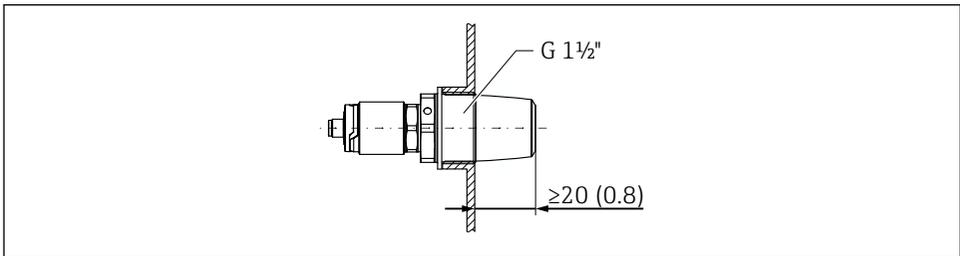


- 8 Installation with Tri-Clamp, which can be ordered as an accessory, and with NA Connect adapter provided by customer

- A Distance between Tri-Clamp and NA Connect adapter  
 B Diameter of Nivector  
 C Diameter of NA Connect adapter

#### Installation with protector

- Protection of point level switch against damage by particularly abrasive or coarse product
- Outflow protection in silo for functional testing when silo is full



- 9 Installation with protector, can be ordered as an accessory

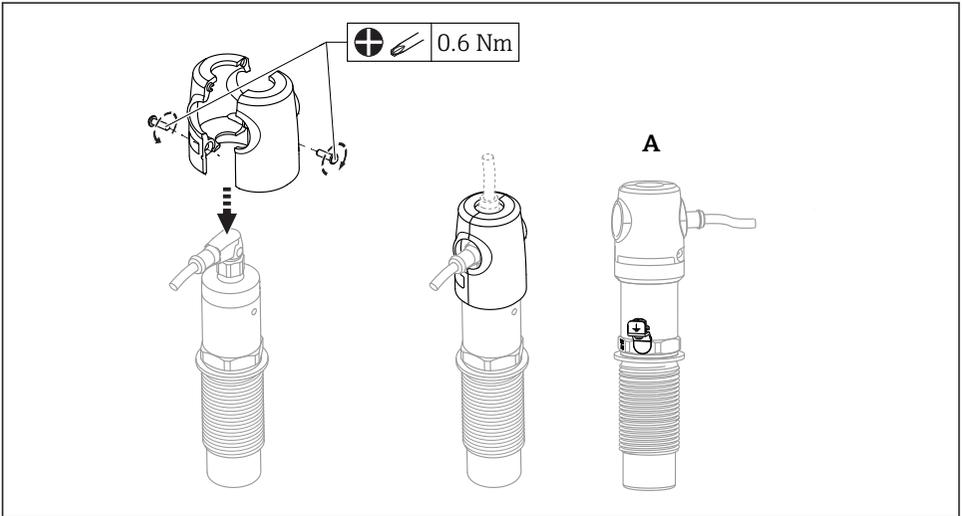
**i** Take account of metallic or non-metallic vessels in accordance with EMC guidelines, see Technical Information TI01384F.

### 5.2.3 Protection cover for hazardous areas

#### **⚠ WARNING**

#### Damage to the device from impact.

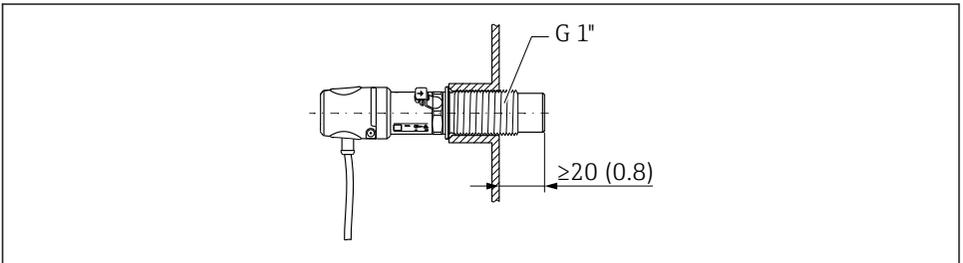
- The protection cover must be fitted before the device is put into operation.



A0035999

A View with ground terminal

Can also be ordered as an accessory



A0036433

- ☑ 10 Installation with protection cover, included in scope of delivery for hazardous areas or can be ordered as an accessory

### 5.3 Post-installation check

<input type="checkbox"/>	Is the device undamaged (visual inspection)?
<input type="checkbox"/>	Is the device adequately protected from wet conditions and direct sunlight?
<input type="checkbox"/>	Is the device properly secured?
<input type="checkbox"/>	Use in hazardous areas: Is the protection cover installed?

## 6 Electrical connection

### 6.1 Connection conditions

The measuring device has two modes of operation:

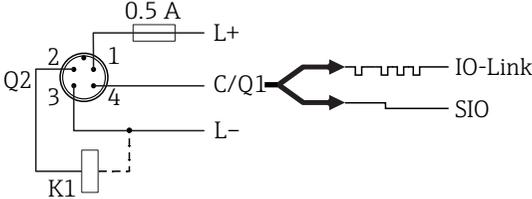
- **Maximum point level detection (MAX):** e.g. for overflow prevention  
The device keeps the electrical switch closed as long as the sensor is not yet covered by medium.  
The device keeps the electrical switch closed as long as the sensor is not yet covered by medium or the measured value is within the process window.
- **Minimum point level detection (MIN):** e.g. Dry running protection  
The device keeps the electrical switch closed as long as the sensor is covered by medium.  
The device keeps the electrical switch closed as long as the sensor is covered by medium or the measured value is outside the process window.

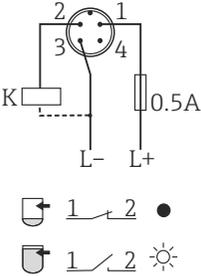
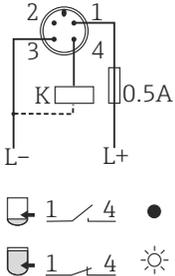
Choosing the MAX or MIN mode of operation ensures that the device switches in a safety-oriented manner even in an alarm condition, e.g. if the power supply line is disconnected. The electronic switch opens if the point level is reached, if a fault occurs or if the power fails (quiescent current principle).

### 6.2 Connecting the measuring device

- Supply voltage 12 to 30 V DC
- In accordance with IEC/EN61010 a suitable circuit breaker must be provided for the measuring device.
- Voltage source: Non-hazardous contact voltage or Class 2 circuit (North America).
- The device must be operated with a 500 mA fine-wire fuse (slow-blow) which is suitable for DC current in accordance with IEC 60127-2.
- Depending on the analysis of the switch outputs, the measuring device works in the MAX or MIN modes.

#### 6.2.1 Operation with IO-Link

Electrical connection	IO-Link with a switch output
<p>M12 plug</p> 	 <p style="text-align: right;">A0034411</p> <ol style="list-style-type: none"> <li>1 Supply voltage +</li> <li>2 DC-PNP (Q2)</li> <li>3 Supply voltage -</li> <li>4 C/Q1 (IO-Link communication or SIO mode)</li> </ol>

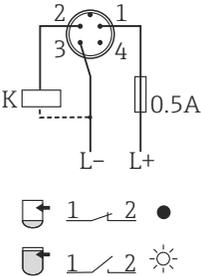
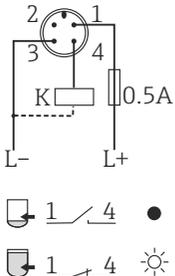
Electrical connection	Operating mode (SIO mode with factory setting)									
	<b>MAX</b>	<b>MIN</b>								
										
<table border="0"> <thead> <tr> <th style="text-align: left;">Symbols</th> <th style="text-align: left;">Description</th> </tr> </thead> <tbody> <tr> <td>☼</td> <td>Yellow LED (ye) lit</td> </tr> <tr> <td>●</td> <td>Yellow LED (ye) not lit</td> </tr> <tr> <td>K</td> <td>External load</td> </tr> </tbody> </table>			Symbols	Description	☼	Yellow LED (ye) lit	●	Yellow LED (ye) not lit	K	External load
Symbols	Description									
☼	Yellow LED (ye) lit									
●	Yellow LED (ye) not lit									
K	External load									

### Function monitoring

With two-channel evaluation, functional monitoring of the sensor is also possible in addition to level monitoring provided that no other monitoring option has been configured via IO-Link.

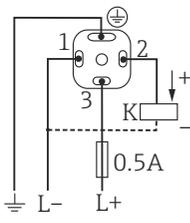
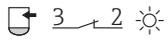
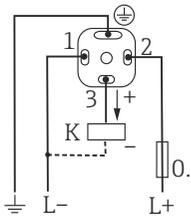
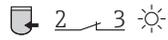
#### 6.2.2 Operation without IO-Link

Depending on the assignment of the connector or the wiring of the cable, the device works in either the MAX or MIN operating mode.

Electrical connection	Mode of operation									
	<b>MAX</b>	<b>MIN</b>								
										
<table border="0"> <thead> <tr> <th style="text-align: left;">Symbols</th> <th style="text-align: left;">Description</th> </tr> </thead> <tbody> <tr> <td>☼</td> <td>Yellow LED (ye) lit</td> </tr> <tr> <td>●</td> <td>Yellow LED (ye) not lit</td> </tr> <tr> <td>K</td> <td>External load</td> </tr> </tbody> </table>			Symbols	Description	☼	Yellow LED (ye) lit	●	Yellow LED (ye) not lit	K	External load
Symbols	Description									
☼	Yellow LED (ye) lit									
●	Yellow LED (ye) not lit									
K	External load									

### 6.3 Valve plug

Depending on the assignment of the connector or the wiring of the cable, the device works in either the MAX or MIN operating mode.

Electrical connection	Mode of operation	
 <p>A0022900</p>	<p style="text-align: center;">MAX</p>  <p>     </p>	<p style="text-align: center;">MIN</p>  <p>     </p>
<p><b>Symbols</b></p> <p> Yellow LED (ye) not lit</p> <p> Yellow LED (ye) lit</p> <p>K External load</p>		

### 6.4 Post-connection check

<input type="checkbox"/>	Is the device or cable undamaged (visual check)?
<input type="checkbox"/>	Do the cables comply with the requirements?
<input type="checkbox"/>	Do the mounted cables have adequate strain relief?
<input type="checkbox"/>	Are the cable glands mounted and firmly tightened?
<input type="checkbox"/>	Does the supply voltage match the specifications on the nameplate?
<input type="checkbox"/>	If supply voltage is present, is the green LED lit? With IO-Link communication: is the green LED flashing?

## 7 Operation options

### 7.1 Structure and function of the operating menu

#### 7.1.1 IO-Link

##### IO-Link information

IO-Link is a point-to-point connection for communication between the device and an IO-Link master. The device features an IO-Link communication interface type 2 with a second IO function on pin 4. This requires an IO-Link-compatible assembly (IO-Link master) for operation. The IO-Link communication interface enables direct access to the process and diagnostic data. It also provides the option of configuring the device while in operation.

Physical layer, the device supports the following features:

- IO-Link specification: version 1.1
- IO-Link Smart Sensor Profile 2nd Edition
- SIO mode: yes
- Speed: COM2; 38.4 kBaud
- Minimum cycle time: 6 msec.
- Process data width: 16 bit
- IO-Link data storage: yes
- Block configuration: no

##### IO-Link download

<http://www.endress.com/download>

- Select "Software" as the media type.
- Select "Device Driver" as the software type.  
Select IO-Link (IODD).
- In the "Text Search" field enter the device name.

<https://ioddfinder.io-link.com/>

Search by

- Manufacturer
- Article number
- Product type

#### 7.1.2 Structure of the operating menu

The menu structure has been implemented according to VDMA 24574-1 and complemented by Endress+Hauser-specific menu items.

## 8 Commissioning

If an existing configuration is changed, measuring operation continues! The new or modified entries are only accepted once the setting has been made.

## ⚠ WARNING

**Risk of injury and damage to property due to uncontrolled activation of processes!**

- ▶ Make sure that downstream processes are not started unintentionally.

## 8.1 Function check

Before commissioning your measuring point, ensure that the post-installation and post-connection checks have been performed:

- "Post-installation check" checklist → 📄 15
- "Post-connection check" checklist → 📄 18

## 8.2 Commissioning with an operating menu

For a detailed description of the IO-Link operating menu, see operating instructions.

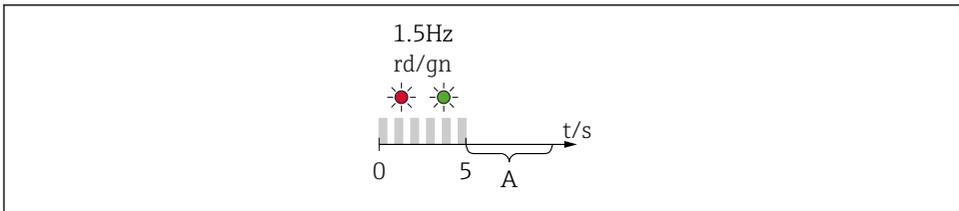
## 8.3 Operation with test magnet

### 8.3.1 Full adjustment

**Prerequisite: Sensor is covered by the medium**

1. Hold the test magnet against the marking on the housing.
2. Apply operating voltage to the device.
3. The green and red LEDs flash at a frequency of 1.5Hz.
4. The LEDs stop flashing after 5s.
5. Remove test magnet.
  - ↳ The full adjustment is performed and the switching thresholds are set accordingly.

**i** The test magnet must be removed in the timeframe between 5 seconds and 10 seconds. A full adjustment is not performed if the magnet is removed outside this timeframe.



A0036912

A Remove the magnet now for full adjustment.

### 8.3.2 Empty adjustment

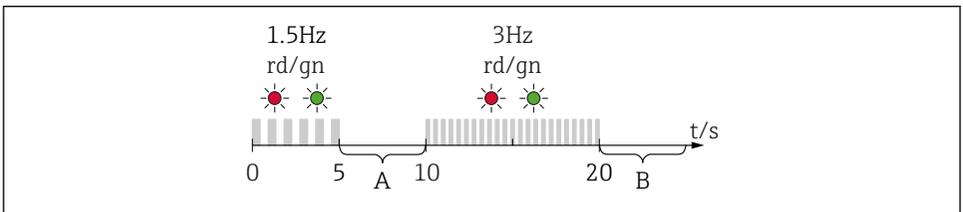
**Prerequisite: Sensor is free**

1. Hold the test magnet against the marking on the housing

2. Apply operating voltage to the device
3. The green and red LEDs flash at a frequency of 1.5Hz
4. The LEDs stop flashing after 5s
5. After 10s the green and red LEDs flash at a frequency of 3Hz
6. The LEDs stop flashing after 20s
7. Remove test magnet.
  - ↳ The empty adjustment is performed and the switching thresholds are set accordingly.



The test magnet must be removed in the timeframe between 20 seconds and 25 seconds. An empty adjustment is not performed if the magnet is removed outside this timeframe.



A0036913

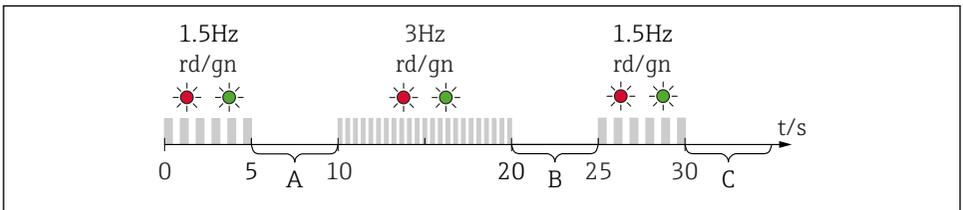
- A Remove the magnet now for full adjustment.  
 B Remove the magnet now for empty adjustment.

### 8.3.3 Resetting to factory settings

If the test magnet is held against the marking for  $\geq 30$  seconds, the switching thresholds are reset to the factory setting. Observe time or flashing frequencies!



If a medium-specific switching threshold is active, this is signaled by a flashing green LED indicator during the first 5 seconds of the operating voltage being applied.



A0036914

- A Remove the magnet now for full adjustment.  
 B Remove the magnet now for empty adjustment.  
 C Remove the magnet now to reset to factory settings.

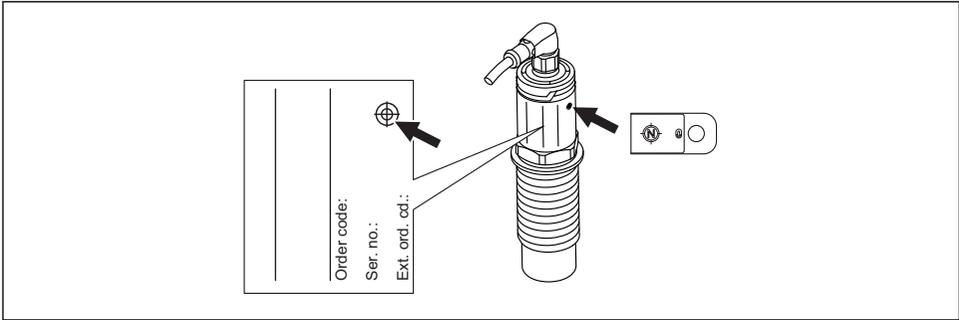
### 8.3.4 Function test

Carry out a function test while the device is in operation.

- ▶ Hold the test magnet against the marking on the housing for at least 2 seconds.
  - ↳ This inverts the current switch status, and the yellow LED changes state. When the magnet is removed, the switching status valid at that time is adopted.

If the test magnet is held against the marking for  $\geq 30$  seconds, the red LED will flash: The device returns automatically to the current switch status.

 The test magnet is included in the scope of delivery. It is also possible to cancel it .



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 11 Position for test magnet on housing nameplate





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