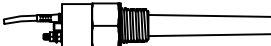


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Subject to technical change.  
 All dimensions in mm (inch).

We assume no liability for typing errors.  
 Different variations than specified are possible.  
 Please contact our technical consultants.

## Safety notes / Technical support

### Notes

- Installation, maintenance and commissioning may be accomplished only by qualified technical personnel.
- The product must be used only in the manner outlined in this instruction manual.
- This product is intended for use in industrial areas. Operation of this equipment in a residential area may cause interference to several frequency based communications.

Special attention must be paid to warnings and notes as follows:

#### WARNING



Relates to a caution symbol on the product: A failure to observe the necessary precautions can result in death, serious injury and/or considerable material damage.

#### WARNING



Relates to a caution symbol on the product: Risk of electric shock

#### WARNING



A failure to observe the necessary precautions can result in death, serious injury and/or considerable material damage.

This symbol is used, when there is no corresponding caution symbol on the product.

#### CAUTION

A failure to observe the necessary precautions can result in considerable material damage.

### Safety symbols

| In manual and on product                                                            | Description                                                    |
|-------------------------------------------------------------------------------------|----------------------------------------------------------------|
|  | CAUTION: refer to accompanying documents (manual) for details. |
|  | Earth (ground) Terminal                                        |
|  | Protective Conductor Terminal                                  |

### Technical support

Please contact your local supplier (for address see [www.uwt.de](http://www.uwt.de)). Otherwise you can contact:

UWT GmbH  
 Westendstr. 5  
 D-87488 Betzigau

Tel.: 0049 (0)831 57123-0  
 Fax: 0049 (0)831 76879  
[info@uwt.de](mailto:info@uwt.de)  
[www.uwt.de](http://www.uwt.de)

## Introduction

---

### Applications

CN 7000 is a compact 2-wire capacitance switch for level detection in constricted spaces, applicable in:

- Interfaces, solids, liquids, slurries, and foam
- Foods and pharmaceuticals
- Chemical and petrochemical
- Hazardous areas

### Versions

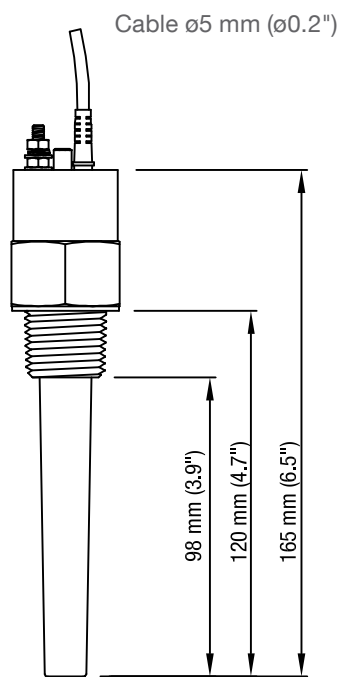
- Integral cable version with stainless steel process connection and probe options of PPS or PVDF
- Enclosure version (thermoplastic polyester enclosure) with stainless steel process connection in combination with a PPS or PVDF probe.
- Enclosure version (thermoplastic polyester enclosure) with fully synthetic process connection combined with a PPS probe.

### Features

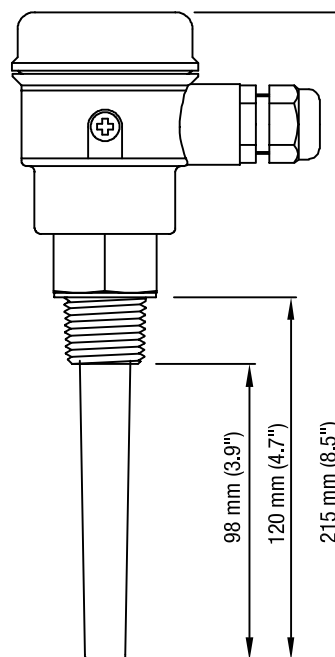
- NPT, R (BSPT), G (BSPP) process connections.
- Corrosion resistant construction, PPS, and 316L stainless steel (optional PVDF wetted parts).
- Non-polarized, solid-state switch or relay output (enclosure version with fully synthetic process connection only).

## Technical data - Dimensions

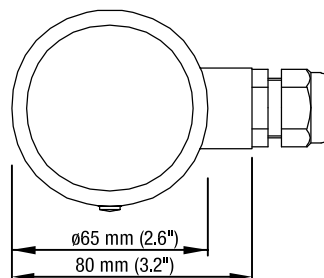
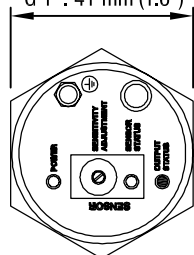
**CN 7100**  
 Integral Cable version



**CN 7100**  
 Enclosure version



¾" NPT: 36 mm (1.4")  
 R 1": 36 mm (1.4")  
 G 1": 41 mm (1.6")



## Technical data - Electrical data

### Electrical

|                                            | <b>Integral cable version or<br/>Enclosure version</b><br>with stainless steel process connection                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>Enclosure version</b><br>with PPS process connection                |
|--------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|
| <b>Power supply</b>                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                        |
| Standard                                   | 12 - 33 V DC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 12 - 33 V DC                                                           |
| Intrinsically safe                         | 10 - 30 V DC<br>Intrinsically safe barrier required<br><br>For ATEX: $U_i=30\text{ V}$ $I_i=120\text{ mA}$ $P_i=0.8\text{ W}$<br>$C_i=2.1\text{ nF}^*$ $L_i=1.3\text{ mH}$<br><br>For INMETRO: $U_i=30\text{ V}$ $I_i=200\text{ mA}$ $P_i=1.5\text{ W}$<br>$C_i=2\text{ nF}^*$ $L_i=1\text{ mH}$<br><br>* For an integral cable with a length of more than<br>1.5m a capacitance of 0.3 nF/ m shall be added<br><br>For FM/ CSA: see page 12                                                                                   | -                                                                      |
| <b>Alarm Outputs</b>                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                        |
| mA                                         | 4/ 20 mA or 20/ 4 mA 2-wire<br>current loop detection                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 4/ 20 mA or 20/ 4 mA 2-wire<br>current loop detection                  |
| Solid-state switch<br>(Standard)           | 30 V DC/ 30 V AC 82 mA max.<br>Limited to<br>30 V DC/ 16 V AC 82 mA max.<br>in wet locations                                                                                                                                                                                                                                                                                                                                                                                                                                   | -                                                                      |
| Solid-state switch<br>(Intrinsically safe) | 30 V DC max.<br>Intrinsically safe barrier required.<br>The power supply circuit is infallibly galvanically<br>isolated from the solid-state switch circuit.<br><br>For ATEX: $U_i=30\text{ V}$ $I_i=200\text{ mA}$ $P_i=350\text{ mW}$<br>$C_i=0^*$ $L_i=0$<br><br>For INMETRO: $U_i=30\text{ V}$ $I_i=200\text{ mA}$ $P_i=1.5\text{ W}$<br>$C_i=2\text{ nF}^*$ $L_i=1\text{ mH}$<br><br>* For an integral cable with a length of more than<br>1.5m a capacitance of 0.3 nF/ m shall be added<br><br>For FM/ CSA: see page 12 | -                                                                      |
| Relay output                               | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                        |
| - max. switching voltage                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 60 V DC or 30 V AC;<br>limited to 30 V DC/ 16 V AC<br>in wet locations |
| - max. switching current                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 1 A                                                                    |
| - max. switching power                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 60 W                                                                   |
| Repeatability                              | 2 mm (0.08")                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 2 mm (0.08")                                                           |

## Technical data - Mechanical data / Operating conditions

### Mechanical

|                            |                                                                                                    |
|----------------------------|----------------------------------------------------------------------------------------------------|
| Common probe/ wetted parts | PPS process connection and PPS sensor<br>or 316L process connection and PPS or PVDF sensor         |
|                            | Metal process connection seal:<br>Standard is FKM (e.g. Viton).<br>FFKM (e.g. Kalrez) is optional. |

#### Integral cable version

|                       |                                                                 |
|-----------------------|-----------------------------------------------------------------|
| - Integral cable body | 316L stainless steel                                            |
| - Process connection  | 316L stainless steel, ¾" NPT or R 1" (BSPT), or G 1" (BSPP)     |
| - Connecting cable    | 1 m (3.3 ft) of 4 conductor, 22 AWG, shielded, polyester jacket |

#### Enclosure version

|                      |                                                                                                                 |
|----------------------|-----------------------------------------------------------------------------------------------------------------|
| - Housing            | VALOX® (thermoplastic polyester)                                                                                |
| - Lid                | Transparent thermoplastic polycarbonate (PC)                                                                    |
| - Process connection | 316L stainless steel, ¾" NPT or R 1" (BSPT), or G 1" (BSPP) or<br>PPS process connection, ¾" NPT or R 1" (BSPT) |
| - Wiring             | Internal 5-point terminal block<br>½" NPT wiring entrance (optional M20 x 1.5" cable entry)                     |

### Environmental

|                     |                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ambient temperature | Integral cable version and<br>Enclosure version with stainless steel process connection:<br>-30 to +85°C (-22 to +185°F)<br>-20 to +85°C (-4 to +185°F) with option FFKM seal O-ring<br><br>Enclosure version with PPS process connection:<br>-10 to +85°C (+14 to +185°F)<br><br>With ATEX approval:<br>Depending on Surface Temperature and Temperature Class,<br>details see page 22. |
|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

#### Ingress protection:

|                          |              |
|--------------------------|--------------|
| - Enclosure version      | Type 4/ IP68 |
| - Integral cable version | Type 4/ IP65 |

|                       |   |
|-----------------------|---|
| Installation category | I |
|-----------------------|---|

|                  |   |
|------------------|---|
| Pollution degree | 4 |
|------------------|---|

### Process Conditions

|                              |                                                                                                                                                                                                                                                                                                                                                                                             |
|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Relative dielectric constant | 1.5 minimum                                                                                                                                                                                                                                                                                                                                                                                 |
| Process Temperature          | Integral cable version and<br>Enclosure version with stainless steel process connection:<br>-30 to +100°C (-22 to +212°F)<br>-20 to +100°C (-4 to +212°F) with option FFKM seal O-ring<br><br>Enclosure version with PPS process connection:<br>-10 to +100°C (+14 to +212°F)<br><br>With ATEX approval:<br>Depending on Surface Temperature and Temperature Class,<br>details see page 22. |
| Pressure (vessel)            | -1 to 10 bar (146 psi) gauge, nominal                                                                                                                                                                                                                                                                                                                                                       |

## Approvals / Mounting

### Approvals

|                                                           | PPS process connection,<br>enclosure version | Stainless steel process connection,<br>enclosure version and internal cable<br>version   |
|-----------------------------------------------------------|----------------------------------------------|------------------------------------------------------------------------------------------|
| General Purpose                                           | CE, FM, CSA                                  | CE, FM/ CSA, TR-CU                                                                       |
| Intrinsically Safe<br>(intrinsic safety barrier required) | -                                            | ATEX II 1G 1/2G 1D 1/2D<br>FM/ CSA Class I, II, III, Div. 1, Gr. A-G<br>INMETRO<br>TR-CU |
| Marine                                                    | -                                            | Lloyds Register of Shipping, Categories<br>ENV1, ENV2 and ENV5                           |
| Overfill protection                                       | WHG                                          | WHG                                                                                      |

#### Note:

EMC testing was conducted on the CN 7000 metal version while mounted in a metallic vessel and wired using shielded cable. The sensitivity was set by turning sensitivity potentiometer 2 turns counter-clockwise from the set point.

## Mounting



### General Safety Instructions

Installation shall only be performed by qualified personnel and in accordance with local governing regulations.

This product is susceptible to electrostatic shock. Follow proper grounding procedures.

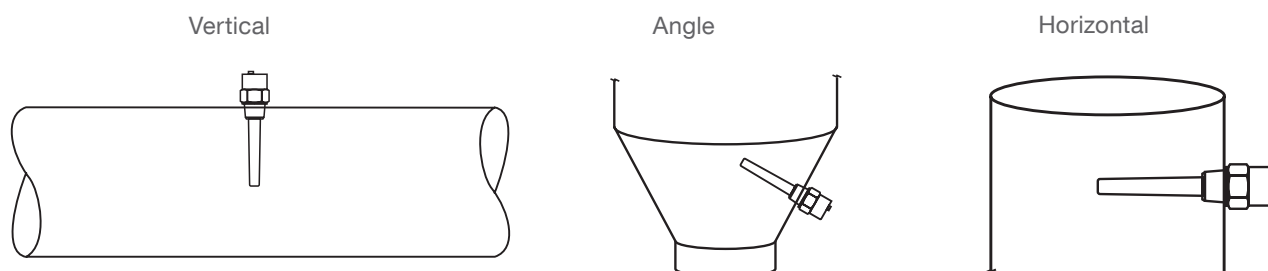


### Additional Safety Instructions for Hazardous Locations

see page 20ff

## Location

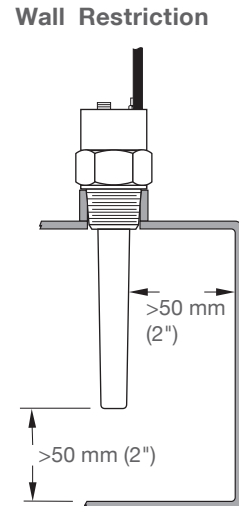
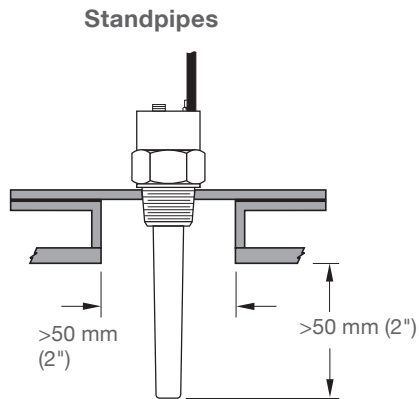
The CN 7000 is normally mounted into the vessel top (high detection alarm) or through the tank wall at the detection level (high or low detection alarm).



## Mounting

### Installation Features and Restrictions

**Note:** Mounting diagrams apply to intergal cable version and enclosure version.

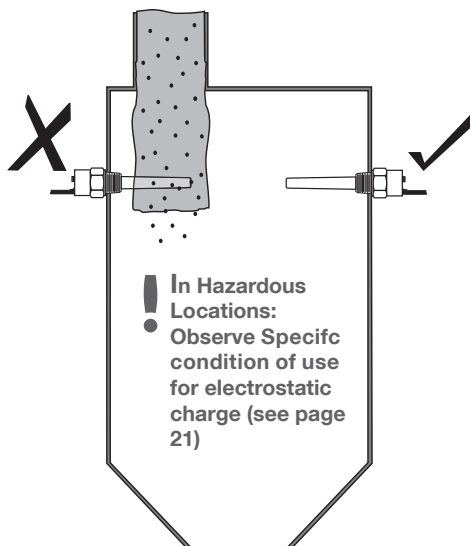


### Multiple Units

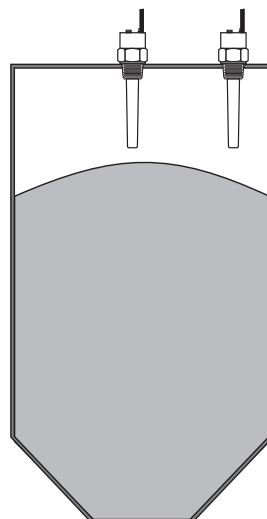
When using multiple units, sensors must be 100 mm apart. Mount diagonally if vertical space is restricted.

### Process cautions for solids

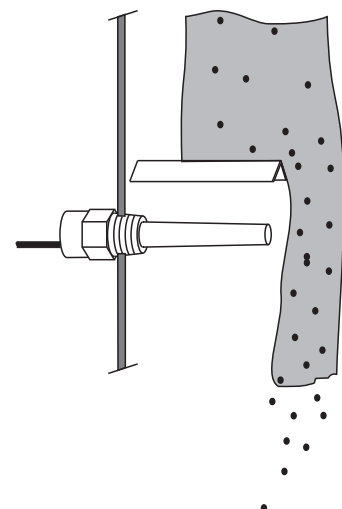
Keep out of path  
of falling material



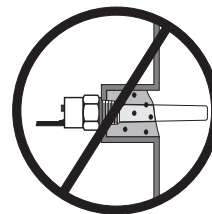
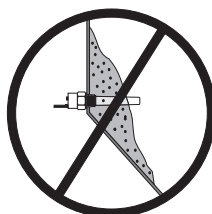
Consider material  
surface configuration  
when installing unit



Protect probe from  
falling material



Avoid areas where  
material build up occurs.





## Electrical installation

---



### General Safety Instructions

The DC input terminal shall be supplied from a source providing electrical isolation between the input and output, in order to meet the applicable safety requirements of IEC 61010-1.

A wet location is a location where water or other conductive liquid may be present and is likely to increase the risk of electric shock.

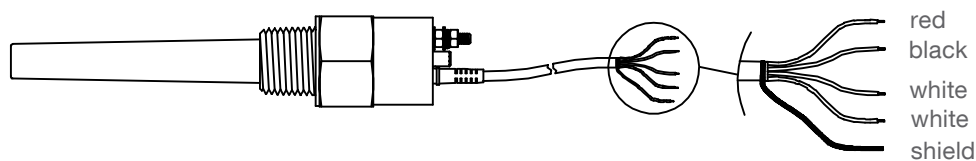


### Additional Safety Instructions for Hazardous Locations

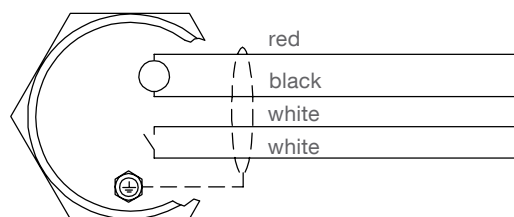
see page 20 and following pages

## Electrical installation

### Integral Cable Version



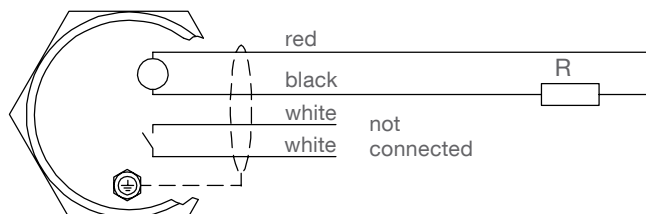
### Operation with solid state switch/ relay



Shield is internal connected to ground.  
It is recommended to use a shielded cable for stable measurement.

| red/ black                                                                                                                                                         | white/ white                                                                                                                                                               |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Supply:</b><br>12 - 33V DC<br>10 - 30V DC intrinsic safe*<br><br>Polarity determines output logic, see table below                                              | <b>Output:</b><br><br><b>Solid state switch*</b><br>Observe protection (see below).<br>Max. 30 V DC/ 30 V AC, 82 mA<br>Limited to 30 V DC/ 16 V AC, 82 mA in wet locations |
| * For intrinsic safe operation an intrinsic safety barrier is required<br>Ratings $U_i$ $I_i$ $P_i$ $C_i$ $L_i$ of power supply and solid state switch: see page 5 |                                                                                                                                                                            |

### Operation with 4/ 20 mA loop



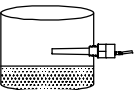
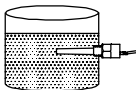
Shield is internal connected to ground.  
It is recommended to use a shielded cable for stable measurement.

|                                                                                                                                           |
|-------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Supply:</b><br>12 - 33V DC<br>10 - 30V DC intrinsic safe*<br>Polarity determines output logic, see table below                         |
| * For intrinsic safe operation an intrinsic safety barrier is required. Ratings $U_i$ $I_i$ $P_i$ $C_i$ $L_i$ of power supply: see page 5 |

$$R_{max} = (V_{supply} - 12 \text{ V}) / 20 \text{ mA}$$

Example: 24 V supply allows  $R_{max}$  of 600 Ohms

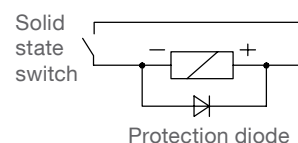
### Output logic

|                                |  |  |                                                                                     |                                                                                     |
|--------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Yellow LED                     | ○                                                                                   | ☀                                                                                   |                                                                                     |                                                                                     |
| Status                         | FSL                                                                                 | FSH                                                                                 | FSL                                                                                 | FSH                                                                                 |
| Supply polarity (cable colour) | red +<br>black -                                                                    | red -<br>black +                                                                    | red +<br>black -                                                                    | red -<br>black +                                                                    |
| Red LED                        | ○                                                                                   | ☀                                                                                   | ☀                                                                                   | ○                                                                                   |
| Solid state switch             |  |  |  |  |
| 4/ 20 mA loop                  | 4 mA                                                                                | 20 mA                                                                               | 20 mA                                                                               | 4 mA                                                                                |

FSL = Fail safe low FSH = Fail safe high

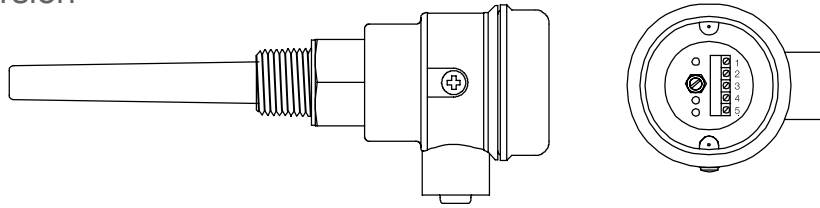
### Protection of Solid State Switch

Observe a Protection diode in case of connecting an external relay to the Solid state switch

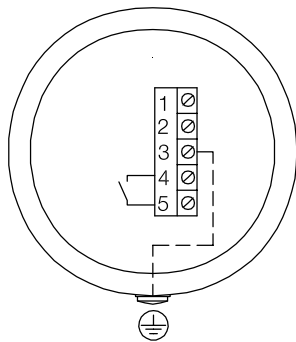


## Electrical installation

### Enclosure Version



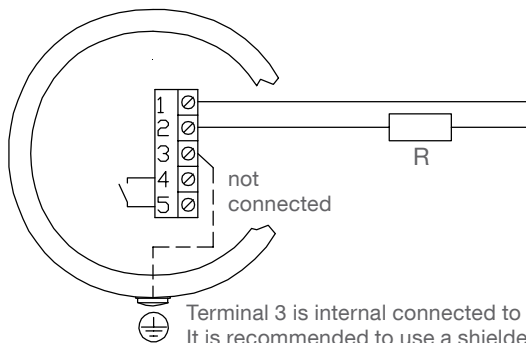
### Operation with solid state switch/ relay



Terminal 3 is internal connected to ground. It is recommended to use a shielded cable for stable measurement.

| Terminal 1, 2                                                                                                                                                      | Terminal 3                                       | Terminal 4, 5                                                                                                                                                                                                                                                                                                                                                                                                             |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Supply:</b><br>12 - 33 V DC<br>10 - 30 V DC intrinsic safe*<br><br>Polarity determines output logic, see table below                                            | cable shield connection<br><br>connect to ground | <b>Output:</b><br><br><b>Solid state switch *</b><br>Present with stainless steel process connection. Observe protection (see below).<br>Max. 30 V DC/ 30 V AC, 82 mA, limited to 30 V DC/ 16 V AC, 82 mA in wet locations<br><br><b>Relay</b><br>Present with PPS process connection. Intrinsic Safety operation not available.<br>Max. 60 V DC or 30 V AC; limited to 30 V DC/ 16 V AC in wet locations, Max. 1 A, 60 W |
| * For intrinsic safe operation an intrinsic safety barrier is required<br>Ratings $U_i$ $I_i$ $P_i$ $C_i$ $L_i$ of power supply and solid state switch: see page 5 |                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                           |

### Operation with 4/ 20 mA loop



Terminal 3 is internal connected to ground. It is recommended to use a shielded cable for stable measurement.

$R_{max} = (V_{supply} - 12 V) / 20 mA$   
 Example: 24 V supply allows  $R_{max}$  of 600 Ohms

|                                                                                                                                                                                                                                                                    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Supply:</b><br>12 - 33V DC<br>10 - 30V DC intrinsic safe*<br>Polarity determines output logic, see table below<br><br>* For intrinsic safe operation an intrinsic safety barrier is required. Ratings $U_i$ $I_i$ $P_i$ $C_i$ $L_i$ of power supply: see page 5 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

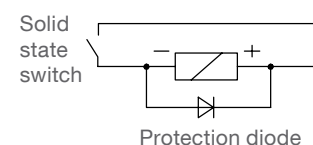
### Output logic

| Yellow LED                 |            |            |            |            |
|----------------------------|------------|------------|------------|------------|
| Status                     | FSL        | FSH        | FSL        | FSH        |
| Supply polarity (Terminal) | 1 +<br>2 - | 1 -<br>2 + | 1 +<br>2 - | 1 -<br>2 + |
| Red LED                    |            |            |            |            |
| Solid state switch         |            |            |            |            |
| 4/ 20 mA loop              | 4 mA       | 20 mA      | 20 mA      | 4 mA       |

FSL = Fail safe low FSH = Fail safe high

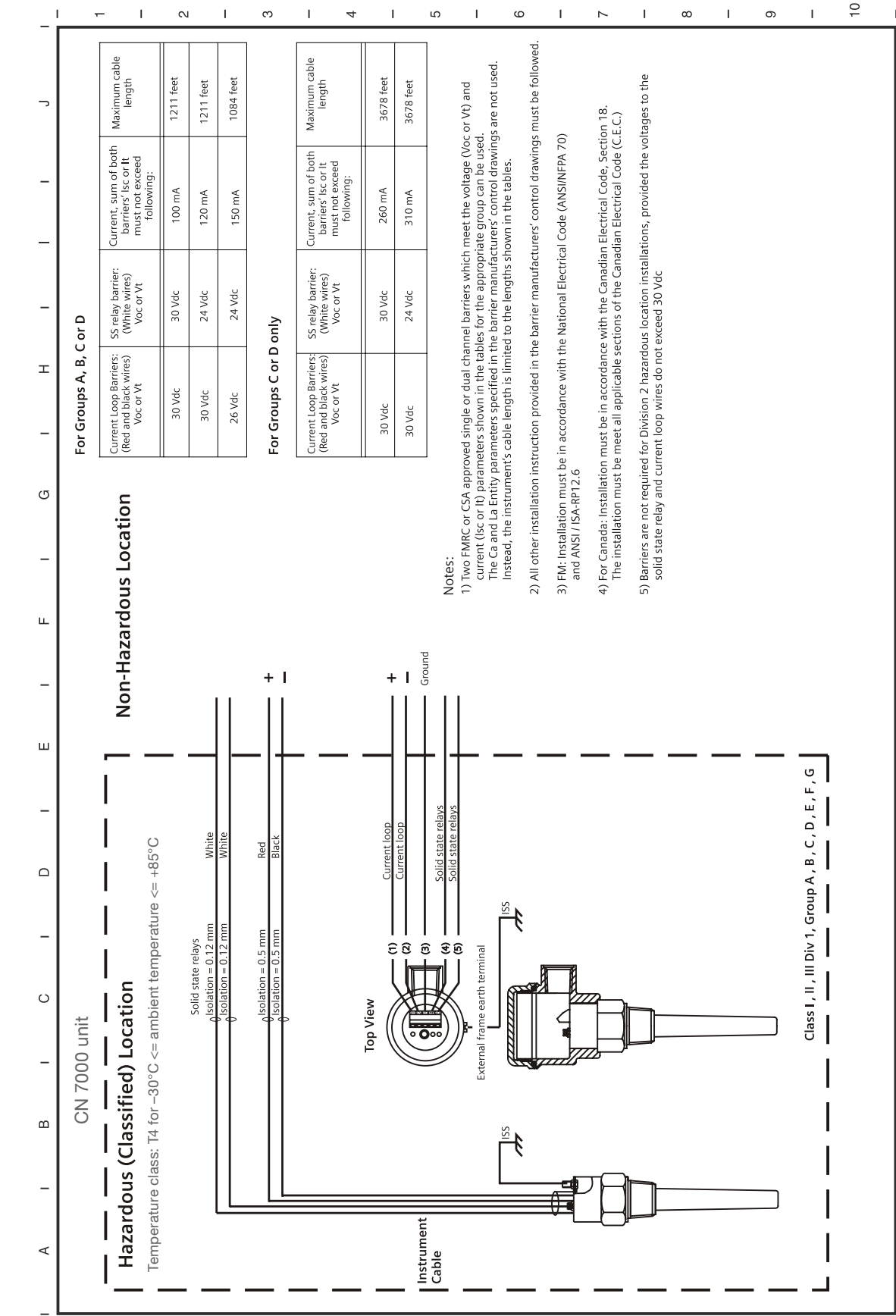
### Protection of Solid State Switch

Observe a Protection diode in case of connecting an external relay to the Solid state switch



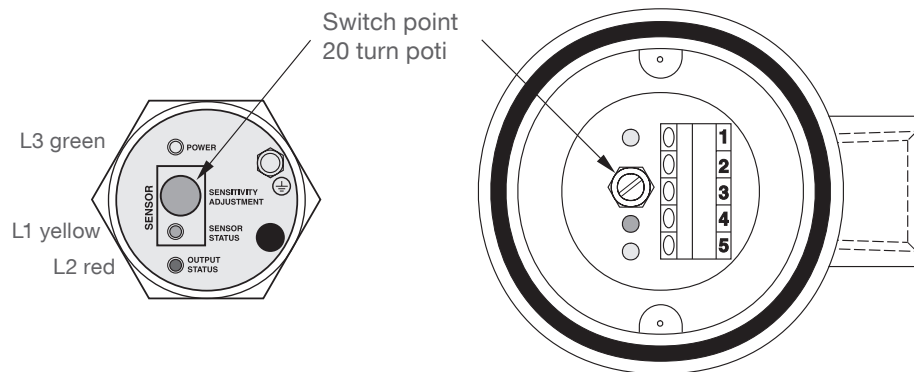
Electrical installation

FM/ CSA Approval Connection drawing



## Operation

### Settings



| LEDs              |                                                                                                |
|-------------------|------------------------------------------------------------------------------------------------|
| L1: Sensor status | ON if sensor is detected as covered (capacitance on sensor is greater than setted switchpoint) |
| L2: Signal output | ON if current loop has 20 mA/ Solid state switch is closed.                                    |
| L3: Power supply  | ON if power is present                                                                         |

### Output logic (Failsafe High/ Failsafe Low)

See table on page 10 and 11.

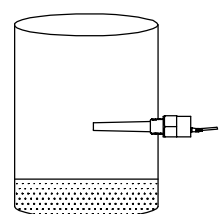
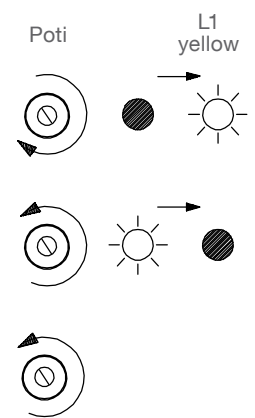
## Operation

### Switchpoint Adjustment

Select the switchpoint adjustment according to the application as follows:

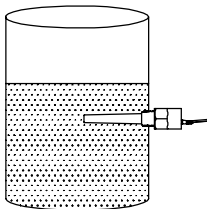
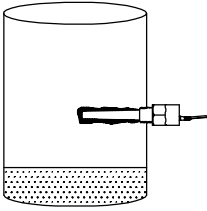
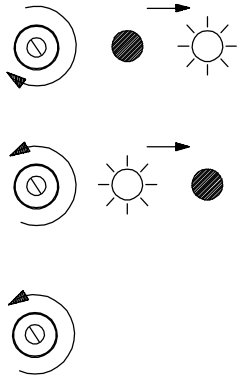
| Application         | Material                                                                                                                             | Adjustment conditions                                                        |
|---------------------|--------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|
| General             | <ul style="list-style-type: none"> <li>• Dry solids</li> <li>• Low viscosity liquids</li> </ul>                                      | Sensor uncovered                                                             |
| Demanding           | <ul style="list-style-type: none"> <li>• Hygroscopic/ wet solids</li> <li>• High viscosity and high conductivity liquids</li> </ul>  | Sensor immersed and then uncovered, retaining max. possible material buildup |
| Interface detection | <ul style="list-style-type: none"> <li>• Ignoring liquid A/ detecting liquid B</li> <li>• Ignoring foam/ detecting liquid</li> </ul> | Immerse sensor in liquid A or foam                                           |

### General applications

| <b>1. Ensure material level is well below the probe</b> | <p>The unit will calibrate to an uncovered probe.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                 |                 |    |     |         |     |    |   |
|---------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|-----------------|----|-----|---------|-----|----|---|
| <b>2. Adjust switchpoint with poti</b>                  | <p>If LED L1 (yellow) is OFF, turn poti clockwise until L1 is ON.</p> <p>Turn poti counter clockwise until L1 just stops glowing.</p> <p>Turn poti further counter clockwise:</p> <table border="1" data-bbox="507 1467 893 1653"> <thead> <tr> <th>Dielectric constant of material</th><th>Number of turns</th></tr> </thead> <tbody> <tr> <td>&lt;2</td><td>1/4</td></tr> <tr> <td>2 ... 4</td><td>1/2</td></tr> <tr> <td>&gt;4</td><td>1</td></tr> </tbody> </table> <p>Depending on the application and the required switchpoint the number of turns can be varied.</p>  | Dielectric constant of material | Number of turns | <2 | 1/4 | 2 ... 4 | 1/2 | >4 | 1 |
| Dielectric constant of material                         | Number of turns                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                 |                 |    |     |         |     |    |   |
| <2                                                      | 1/4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                 |                 |    |     |         |     |    |   |
| 2 ... 4                                                 | 1/2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                 |                 |    |     |         |     |    |   |
| >4                                                      | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                 |                 |    |     |         |     |    |   |
| <b>Switchpoint adjustment is finished</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                 |                 |    |     |         |     |    |   |

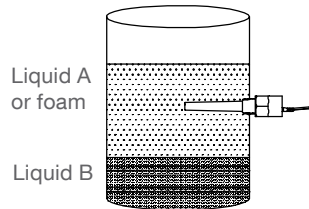
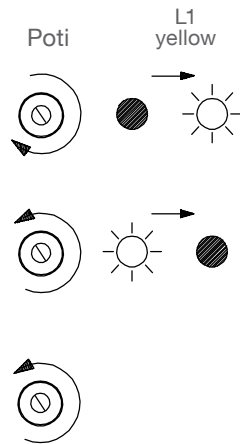
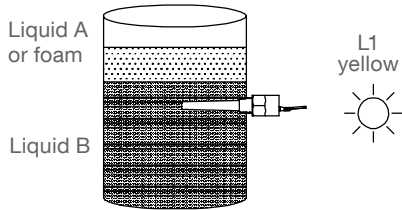
## Operation

### Demanding applications

| <b>1. Ensure material level is well above the probe</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                 |                 |    |     |         |     |    |   |
|---------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|-----------------|----|-----|---------|-----|----|---|
| <b>2. Ensure material level is well below the probe</b> | <p>It is important that as much material buildup as possible is retaining on the sensor.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                 |                 |    |     |         |     |    |   |
| <b>3. Adjust switchpoint with poti</b>                  | <p>If LED L1 (yellow) is OFF, turn poti clockwise until L1 is ON.</p> <p>Turn poti counter clockwise until L1 just stops glowing.</p> <p>Turn poti further counter clockwise:</p> <table border="1" data-bbox="603 1317 995 1503"> <thead> <tr> <th>Dielectric constant of material</th><th>Number of turns</th></tr> </thead> <tbody> <tr> <td>&lt;2</td><td>1/4</td></tr> <tr> <td>2 ... 4</td><td>1/2</td></tr> <tr> <td>&gt;4</td><td>1</td></tr> </tbody> </table> <p>Depending on the application and the required switchpoint the number of turns can be varied.</p> <div data-bbox="1209 949 1449 1391"> <p>Poti      L1 yellow</p>  </div> | Dielectric constant of material | Number of turns | <2 | 1/4 | 2 ... 4 | 1/2 | >4 | 1 |
| Dielectric constant of material                         | Number of turns                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                 |                 |    |     |         |     |    |   |
| <2                                                      | 1/4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                 |                 |    |     |         |     |    |   |
| 2 ... 4                                                 | 1/2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                 |                 |    |     |         |     |    |   |
| >4                                                      | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                 |                 |    |     |         |     |    |   |
| <b>Switchpoint adjustment is finished</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                 |                 |    |     |         |     |    |   |

## Operation

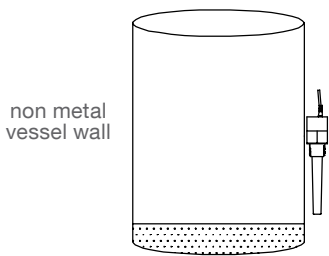
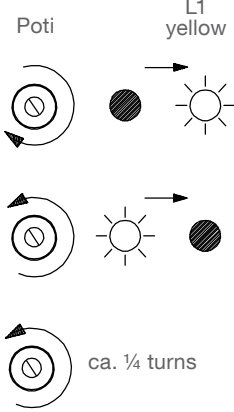
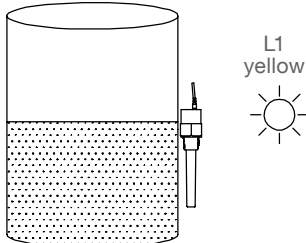
### Interface detection

| <b>1. Immerse probe in liquid A or in foam which should NOT be detected</b> | <p>Ensure that liquid A or foam (which should NOT be detected) is covering the probe.</p> <p>Liquid A or foam must have a <b>lower dielectric constant</b> than liquid B, which should be detected.</p> <div data-bbox="1050 376 1359 584">  </div>                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                 |                 |    |   |         |   |    |   |
|-----------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|-----------------|----|---|---------|---|----|---|
| <b>2. Adjust switchpoint with poti</b>                                      | <p>If LED L1 (yellow) is OFF, turn poti clockwise until L1 is ON.</p> <p>Turn poti counter clockwise until L1 just stops glowing.</p> <p>Turn poti further counter clockwise:</p> <table border="1" data-bbox="507 1048 900 1227"> <thead> <tr> <th>Dielectric constant of material</th><th>Number of turns</th></tr> </thead> <tbody> <tr> <td>&lt;2</td><td>¼</td></tr> <tr> <td>2 ... 4</td><td>½</td></tr> <tr> <td>&gt;4</td><td>1</td></tr> </tbody> </table> <p>Depending on the application and the required switchpoint the number of turns can be varied.</p> <p>Note: The sensitivity is now settled thus that liquid A or foam is NOT detected.</p> <div data-bbox="1107 651 1347 1093">  </div> | Dielectric constant of material | Number of turns | <2 | ¼ | 2 ... 4 | ½ | >4 | 1 |
| Dielectric constant of material                                             | Number of turns                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                 |                 |    |   |         |   |    |   |
| <2                                                                          | ¼                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                 |                 |    |   |         |   |    |   |
| 2 ... 4                                                                     | ½                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                 |                 |    |   |         |   |    |   |
| >4                                                                          | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                 |                 |    |   |         |   |    |   |
| <b>3. Immerse probe in liquid B which should be detected</b>                | <p>Ensure that liquid B (which should be detected) is covering the probe.</p> <p>L1 should glow.</p> <div data-bbox="975 1458 1378 1666">  </div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                 |                 |    |   |         |   |    |   |
| <b>Switchpoint adjustment is finished</b>                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                 |                 |    |   |         |   |    |   |



## Operation

### Measurement through non metal vessel wall

|                                                         |                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>1. Ensure material level is well below the probe</b> | <p>The unit will calibrate to an uncovered probe.</p>                                                                                                                                                                                                                                        |
| <b>2. Adjust switchpoint with poti</b>                  | <p>If LED L1 (yellow) is OFF, turn poti clockwise until L1 is ON.</p> <p>Turn poti counter clockwise until L1 just stops glowing.</p> <p>Turn poti counter clockwise another ca. ¼ turns. Depending on the application and the required switchpoint the number of turns can be varied.</p>  |
| <b>3. Ensure material level is well above the probe</b> | <p>L1 should glow.</p>                                                                                                                                                                                                                                                                     |
| <b>Switchpoint adjustment is finished</b>               |                                                                                                                                                                                                                                                                                                                                                                                 |

## Troubleshooting

| Symptom                                                                           | Cause                                                                                                                        | Action                                                                                                                         |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| Green LED off                                                                     | Proper power not applied to device<br><br>Power range must equal 12 to 33 V DC at all times (10 to 30 V DC for IS versions)  | Check power source<br><br>Minimum 12 V DC on the terminals when the signal current is 20 mA (minimum 10 V DC for IS versions)  |
| Green LED off, with proper supply                                                 | Defective component in device.<br><br>Connector came loose.                                                                  | Contact distributor<br><br>Refasten connector                                                                                  |
| Green LED on and Yellow LED on while not responding to product and/ or adjustment | Proper power not applied to device.<br><br>Power range must equal 12 to 33 V DC at all times (10 to 30 V DC for IS versions) | Check power source<br><br>Minimum 12 V DC on the terminals when the signal current is 20 mA (minimum 10 V DC for IS versions)  |
| Hysteresis region too great                                                       | Proper power not applied to device.<br><br>Power range must equal 12 to 33 V DC at all times (10 to 30 V DC for IS versions) | Check power source<br><br>Minimum 12 V DC on the terminals when the signal current is 20 mA (minimum 10 V DC for IS versions). |
| Unequal current in red and black wire                                             | Loop circuitry is DC biased w.r.t. ground<br><br>Black wire exceeds +36 V DC against ground                                  | Correct loop circuitry.<br><br>Remove cause of voltage on the red wire and/or bias                                             |
| Yellow LED won't come on or off                                                   | Defective component in device                                                                                                | Contact distributor                                                                                                            |
| Too much current in loop                                                          | Supply voltage too high                                                                                                      | Ensure power range equals 12 to 33 V DC at all times (10 to 30 V DC for IS versions).                                          |
| Red LED lights opposite to the Yellow LED when this is not meant to happen        | Incorrect polarity on red and black loop terminals                                                                           | Reverse polarity on loop terminals                                                                                             |
| Red and Yellow LEDs are blinking fast                                             | Proper power not applied to device.<br><br>Power range must equal 12 to 33 V DC at all times (10 to 30 V DC for IS versions) | Check power source<br><br>Minimum 12 V DC on the terminals when the signal current is 20 mA (minimum 10 V DC for IS versions)  |
| Red and Yellow LEDs are blinking while switching                                  | Proper power not applied to device.<br><br>Power range must equal 12 to 33 V DC at all times (10 to 30 V DC for IS versions) | Check power source<br><br>Minimum 12 V DC on the terminals when the signal current is 20 mA (minimum 10 V DC for IS versions)  |
| Solid state contact does not follow status Red LED                                | Defective component in device. Probable cause: wrong wiring in this circuit.                                                 | Contact distributor                                                                                                            |

## Troubleshooting / Maintenance

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|                                                    |                                                   |                                                                                      |
|----------------------------------------------------|---------------------------------------------------|--------------------------------------------------------------------------------------|
| Relay state contact does not follow status Red LED | Proper power not applied to device                | Check power source                                                                   |
|                                                    | Power range must equal 12 to 33 V DC at all times | Minimum 12 V DC on the terminals when the signal current is 20 mA                    |
|                                                    | Defective component in device.                    | Contact distributor                                                                  |
| Yellow LED is lit while probe is not covered       | May indicate significant product buildup.         | Rotate sensitivity potentiometer further CCW (counter clockwise)<br>Check sensor tip |

## Maintenance

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The CN 7000 requires no maintenance or cleaning.

## Notes for use in Hazardous Locations

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### Use of this Manual

For use and assembly, refer to the instructions in this Manual. It does contain all instruction as required by ATEX Directive 2014\_34\_EU, Annex II, 1/0/6 and Ordinance INMETRO n° 179/2010

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### General notes

Refer to appropriate certificate for application in specific hazardous environment.

The equipment has not been assessed as a safety related device (as referred to by Directive 2014\_34\_EU Annex II, clause 1.5).

The certificate numbers have an 'X' suffix, which indicates that specific condition of use apply. Those installing or inspecting this equipment must have access to the certificates.

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### Qualification of personnel / Servicing / Repair

Installation and inspection of this equipment shall be carried out by suitably trained personnel in accordance with the applicable code of practice (ABNT NBR IEC/EN 60079-14 and ABNT/NBR IEC/EN 60079-17 in Europe).

Repair of this equipment shall be carried out by suitably trained personnel in accordance with the applicable code of practice (e.g. ABNT NBR IEC/EN 60079-19 within Europe).

Components to be incorporated into or used as replacements in the equipment shall be fitted by suitably trained personnel in accordance with the manufacturer's documentation.

Turn off power before servicing any device (the transmitter is in operation when the power supply is switched on). In case of removing the unit from vessel, take care of process pressure and material passing the opening.

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### ATEX: Certificates / List of Standards

See [www.uwt.de](http://www.uwt.de) for the latest certificates

See EU - Declaration of conformity for the list of standards valid for ATEX certificates

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### ATEX: Year of manufacturing

Marking on the name plate is done according to IEC 60062 as follows:

| Year of manufacturing | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 |
|-----------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Marking code          | K    | L    | M    | N    | P    | R    | S    | T    | U    | V    | W    | X    |

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### ATEX: Ex-Marking

Devices with ATEX approval are marked on the name plate as follows:

II 1 G Ex ia IIC TX Ga  
II 1/2 G Ex ia IIC TX Ga/Gb  
II 1 D Ex ia IIIC TX Da  
II 1/2 D Ex ia IIIC TX Da/Db

## Notes for use in Hazardous Locations

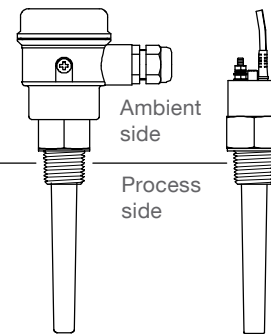
### ! ATEX: Permitted zones for installation

Devices can be installed as follows:

|          | Dust applications |               | Gas applications |               |
|----------|-------------------|---------------|------------------|---------------|
|          | marking<br>Da/Db  | marking<br>Da | marking<br>Ga/Gb | marking<br>Ga |
| EPL      | Db                | Da            | Gb               | Ga            |
| Category | 2D                | 1D            | 2G               | 1G            |
| Zone     | 21                | 20            | 1                | 0             |

|          | Da | Da | Ga | Ga |
|----------|----|----|----|----|
|          | 1D | 1D | 1G | 1G |
| EPL      |    |    |    |    |
| Category |    |    |    |    |
| Zone     | 20 | 20 | 0  | 0  |



### ! Specific condition of use

|                                        |                                                                                                                                                                                                           |
|----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Electrostatic charge</b>            | The user shall ensure that the equipment is not installed in a location where it may be subjected to external conditions which might cause a build-up of electrostatic charge on non-conducting surfaces. |
| <b>Process and ambient temperature</b> | The relation between ambient and process temperature ranges and the surface temperature or temperature class is shown in the thermal data tables page 22.                                                 |

### ! Warnings for installation

|                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Intrinsically safe supply</b>              | For intrinsically safe models, power must be supplied from an Intrinsically Safe power source, otherwise protection is no longer guaranteed.                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Process pressure</b>                       | The device construction allows process over-pressure up to 10 bar (146 psi). This pressure is allowed for test purposes. The definition of the Ex approvals are only valid for a container-over-pressure between -0.2 .. +0.1 bar (-2.9 .. +1.45 psi). For higher or lower pressures the approvals are not valid.                                                                                                                                                                                               |
| <b>Chemical resistance against the medium</b> | If the equipment is likely to come into contact with aggressive substances, then it is the responsibility of the user to take suitable precautions that prevent it from being adversely affected, thus ensuring that the type of protection is not compromised. Aggressive substances: e.g. acidic liquids or gases that may attack metals, or solvents that may affect polymeric materials. Suitable precautions: e.g. establishing from the material's data sheet that it is resistant to specific chemicals. |

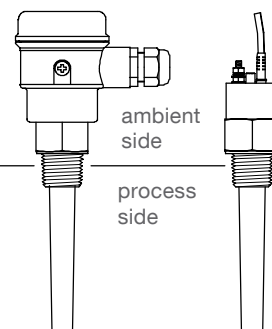
## Notes for use in Hazardous Locations

- ! Ambient and process temperature range,
- max. Surface Temperature and Temperature Class

### ATEX:

| Ambient temperature range        | Process temperature range        | Max. Surface temperature (EPL Da or Db) | Temperature class (EPL Ga or Gb) |
|----------------------------------|----------------------------------|-----------------------------------------|----------------------------------|
| -30 to +45°C (-22 to +113°F) (1) | -30 to +45°C (-22 to +113°F) (1) | T <sub>200</sub> 95°C                   | T6                               |
| -30 to +85°C (-22 to +185°F) (1) | -30 to +85°C (-22 to +185°F) (1) | T <sub>200</sub> 135°C                  | T4                               |

(1) With option FFKM O-ring seal: Lower ambient and process temperature limited to -20°C (-4°F)



### INMETRO:

| Ambient temperature range    | Process temperature range     | Max. Surface temperature | Temperature class |
|------------------------------|-------------------------------|--------------------------|-------------------|
| -40 to +40°C (-40 to +104°F) | -40 to +40°C (-40 to +104°F)  | 62 °C                    | T6                |
| -40 to +85°C (-40 to +185°F) | -40 to +100°C (-40 to +212°F) | 107 °C                   | T4                |

### FM:

| Ambient temperature range    | Process temperature range     | Temperature class |
|------------------------------|-------------------------------|-------------------|
| -30 to +85°C (-22 to +185°F) | -30 to +100°C (-22 to +212°F) | T4                |

### CSA:

| Ambient temperature range    | Process temperature range     | Temperature class |
|------------------------------|-------------------------------|-------------------|
| -40 to +85°C (-40 to +185°F) | -40 to +100°C (-40 to +212°F) | T4                |