

## Input

|                   |  |
|-------------------|--|
| Measured variable | Density  |
| Measuring range   | > 0.7 g/cm <sup>3</sup> (optionally available: > 0.5 g/cm <sup>3</sup> ) |

## Output

|                 |  |
|-----------------|--|
| Switch output   | <p>Switching behavior: On/Off</p> <p><b>Function</b><br/>           3-wire DC-PNP:<br/>           Positive voltage signal at the switch output of the electronics (PNP), switching capacity 200 mA<br/>           2-wire AC/DC:<br/>           Load switching in the power supply line, switching capacity 250 mA</p>  |
| Operating modes | <p>The device has two operating modes: maximum safety (MAX) and minimum safety (MIN).</p> <p>By choosing the corresponding operating mode, the user ensures that the device also switches in a safety-oriented manner even in an alarm condition, e.g. if the power supply line is disconnected.</p> <ul style="list-style-type: none"> <li>▪ <b>Maximum safety (MAX)</b><br/>             The device keeps the electronic switch closed as long as the liquid level is below the fork. Sample application: overflow prevention</li> <li>▪ <b>Minimum safety (MIN)</b><br/>             The device keeps the electronic switch closed as long as the fork is immersed in liquid. Sample application: Dry running protection for pumps</li> </ul> <p>The electronic switch opens if the limit is reached, if a fault occurs or the power fails (quiescent current principle).</p> |

## Power supply

|                     |   |
|---------------------|---|
| Supply voltage      | DC-PNP: 10 to 30 V DC, 3-wire<br>AC/DC: 20 to 253 V AC/DC, 2-wire |
| Power consumption   | DC-PNP: < 975 mW<br>AC/DC: < 850 mW                               |
| Current consumption | DC-PNP: < 15 mA<br>AC/DC: < 3.8 mA                                |
| Residual ripple     | DC-PNP: 5 Vss 0 to 400 Hz<br>AC/DC: —                             |

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| Electrical connection | <p>Two electronic versions and three different connections are available for the device.</p> <ul style="list-style-type: none"> <li>▪ Electronic version 3-wire DC-PNP with connection; M12 plug, valve plug or cable</li> <li>▪ Electronic version 2-wire AC/DC with connection; valve plug or cable</li> </ul> <p>A fine-wire fuse is necessary for operation: 500 mA slow-blow.</p> |
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### Electronic version 3-wire DC-PNP

3-wire DC-PNP is preferably used in conjunction with programmable logic controllers (PLC), DI modules as per EN 61131-2. Positive signal at the switch output of the electronics (PNP).

Voltage source: non-hazardous contact voltage or Class 2 circuit (North America).

## Performance characteristics

|   |   |   |
|---|---|---|
| <b>Reference operating conditions</b>   | Ambient temperature:  | +25 °C (+77 °F)   |
|   | Process pressure:   | 1 bar (14.5 psi)  |
|   | Fluid:  | Water (density: approx. 1 g/cm <sup>3</sup> , viscosity 1 mm <sup>2</sup> /s) |
|   | Medium temperature:   | 25 °C (77 °F)   |
|   | Density setting:  | > 0.7 g/cm <sup>3</sup>   |
|   | Switching time delay:   | Standard (0.5 s, 1 s)   |
| <b>Switch point</b>                     | 13 mm (0.51 in)±1 mm  |   |
| <b>Hysteresis</b>                       | max. 3 mm (0.12 in)   |   |
| <b>Non-repeatability</b>                | ±1 mm (0.04 in) in accordance with DIN 61298-2  |   |
| <b>Influence of ambient temperature</b> | Negligible  |   |
| <b>Influence of medium temperature</b>  | -25 µm (984 µin)/°C   |   |
| <b>Influence of medium pressure</b>     | -20 µm (787 µin)/bar  |   |
| <b>Switching delay</b>                  | <ul style="list-style-type: none"> <li>■ 0.5 s when tuning fork is covered</li> <li>■ 1.0 s when tuning fork is uncovered</li> <li>■ Optionally available: 0.2 s; 1.5 s or 5 s (when the tuning fork is covered and uncovered)</li> </ul> |   |
| <b>Switch-on delay</b>                  | max. 3 s  |   |
| <b>Measuring frequency</b>              | approx. 1 100 Hz in air   |   |
| <b>Measured error</b>                   | In event of device change: ±2 mm (0.08 in) as per DIN 61298-2   |   |

|                                      |  |
|--------------------------------------|--|
| <b>Degree of protection</b>          | <ul style="list-style-type: none"> <li>▪ IP65/67 NEMA Type 4X Enclosure (M12 connector)</li> <li>▪ IP65 NEMA Type 4X Enclosure (valve plug)</li> <li>▪ IP66/68 NEMA Type 4X/6P Enclosure (cable)</li> </ul>  |
| <b>Shock resistance</b>              | a = 300 m/s <sup>2</sup> = 30 g, 3 planes x 2 directions x 3 shocks x 18 ms,<br>as per test Ea, prEN 60068-2-27:2007   |
| <b>Vibration resistance</b>          | a(RMS) = 50 m/s <sup>2</sup> , ASD = 1.25 (m/s <sup>2</sup> ) <sup>2</sup> /Hz, f = 5 to 2000 Hz, t = 3 x 2 h,<br>as per test Fh, EN 60068-2-64:2008   |
| <b>Electromagnetic compatibility</b> | Electromagnetic compatibility in accordance with all relevant requirements of the EN 61326 series and NAMUR recommendation EMC (NE21). For details, refer to the EC Declaration of Conformity. The EC Declaration of Conformity is available in the Download Area of the Endress+Hauser website: <a href="http://www.endress.com">www.endress.com</a> → Downloads.   |
| <b>Reverse polarity protection</b>   | <p><b>2-wire AC/DC</b></p> <ul style="list-style-type: none"> <li>▪ AC mode: the device has reverse polarity protection.</li> <li>▪ DC mode: in the event of reverse polarity the maximum safety mode is always detected. Check the wiring and perform a function check before commissioning. The device is not damaged in the event of reverse polarity.</li> </ul> <p><b>3-wire DC-PNP</b></p> <p>Integrated. In the event of reverse polarity, the device is deactivated automatically.</p>   |
| <b>Short-circuit protection</b>      | <p><b>2-wire AC/DC</b></p> <p>During switching the sensor checks whether a load, e.g. relay or contactor, is present (load check). If an error occurs, the sensor is not damaged.<br/>Smart monitoring: normal operation is resumed once the error is fixed.</p> <p><b>3-wire DC-PNP</b></p> <p>Overload protection/short-circuit protection at I &gt; 250 mA; the sensor is not destroyed.<br/>Intelligent monitoring: Testing for overload at intervals of approx. 1.5 s; normal operation resumes once the overload/short-circuit has been rectified.</p> |



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