

Features

- Limit switch for liquids and bulk solids
- Device with rod probe
- Complete unit consisting of the probe and electronic insert
- Integrated active build-up compensation: exact switch point, even with strong build-up
- Mechanically rugged: no wearing parts, long operating life, maintenance-free

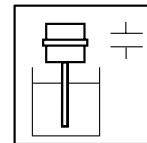
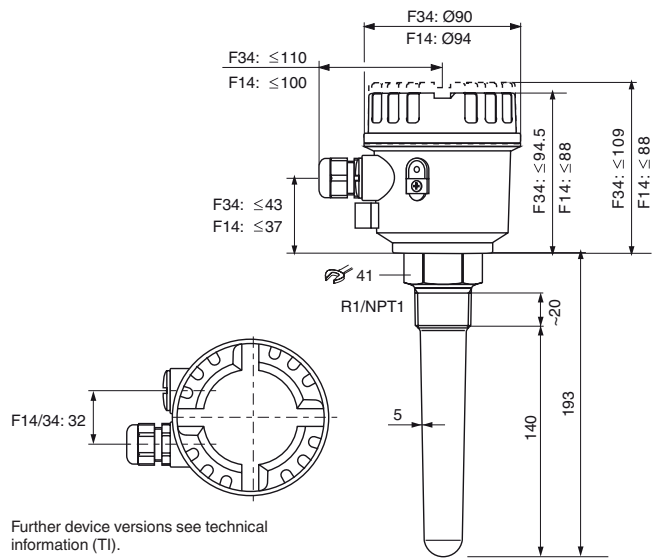
Function

The capacitive limit switch is designed for limit detection of light bulk solids, e. g. grain products, flour, milk powder, animal feed, cement, chalk or plaster.

Versions:

- Device with 140 mm (5.5 inch) rod probe, for bulk solids and liquids
- Relay output (potential-free change-over contact) with AC or DC connection
- PNP output with 3-wire DC connection

Assembly



Connection

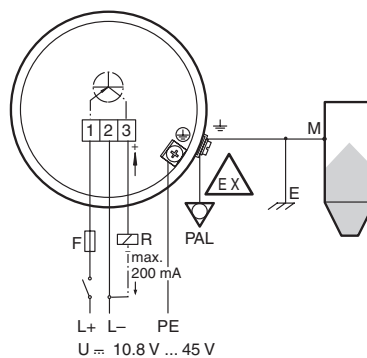
Connection type E5, 3-wire DC connection (example)

3-wire DC connection

- F: Fine-wire fuse, 500 mA
- R: connected load, e. g. PLC, DCS, relay
- M: Connection to ground, silo or metal parts silo
- E: Grounding

The LCL is protected against reverse polarity. In case of mixing up the connections, the green LED does not illuminate "ready to operate".

PE-connection and PAL-connection for LCL1 are unnecessary.



Other connection types see section electrical connection.

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Refer to "General Notes Relating to Pepperl+Fuchs Product Information".

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| General specifications | |
| Measuring method | A metal plate at the end of the probe, within the insulation, and the surroundings (e. g. the silo walls) combine to form the two electrodes of a capacitor. If the probe is covered or free of material, then the capacitance changes and the LCL switches. |
| Equipment architecture | The measuring system consists of: - the device - a supply point - the connected control systems, switching units, signalling systems (e. g. lamps, horns, PCS, PLC, etc.) |
| Construction type | device with rod probe |
| Operating mode | MAX = maximum safety: The device switches if the probe is covered or if the supply voltage is disconnected in a safety-oriented manner (signal on alarm). example application: overspill protection MIN = minimum safety: The device switches if the probe is uncovered or if the supply voltage is disconnected in a safety-oriented manner (signal on alarm). example application: dry-running protection |
| Supply | |
| Rated voltage U_r | electrical connection E5: 10.8 ... 45 V DC, short-term pulse on 55 V DC electrical connection WA: 20 ... 235 V AC, 50/60 Hz or 20 ... 55 V DC |
| Current consumption | electrical connection E5: max. 30 mA, reverse-polarity-proof electrical connection WA: max. 130 mA |
| Electrical specifications | |
| Surge protection | overvoltage category III |
| Input | |
| Measured variable | limit level (limit value) |
| Measurement range | dielectric constant ≥ 1.6 |
| Output | |
| Switch-on delay t_{on} | correct switching after max. 1.5 s |
| Output signal | connection E5: switching PNP, $I_{max} = 200$ mA - overload and short circuit protection - residual voltage at transistor at $I_{max} < 2.9$ V connection WA: contact change-over, potential-free - $U_{max} = 253$ V - $I_{max} = 4$ A (AC) - $P_{max} = 1000$ VA, $\cos \phi = 1$, $P_{max} = 500$ VA, $\cos \phi > 0.7$ |
| Signal on alarm | connection E5: < 100 μ A connection WA: relay de-energized |
| Directive conformity | |
| Electromagnetic compatibility | |
| Directive 2014/30/EU | EN 61326-1:2006 , EN 61326-2-3:2006 |
| Low voltage | |
| Directive 2014/35/EU | EN 61010-1:2010 |
| Conformity | |
| Electromagnetic compatibility | NE 21 |
| Degree of protection | IEC 60529:2001 |
| Vibration resistance | EN 60068-2-64 |
| Climate class | EN 60068, part 2-38 (test Z/AD) |
| Measurement accuracy | |
| Reference operating conditions | vessel type: plastic vessel, ambient temperature: 73 °F (23 °C, 296 K), medium temperature: 73 °F (23 °C, 296 K) medium pressure p_e : 0 bar, medium: dielectric constant = 2.6, conductivity: < 1 μ S sensitivity setting: C |
| Hysteresis | horizontal 4 mm (0.16 inch), vertical 7 mm (0.28 inch) |
| Long-term drift | horizontal 3 mm (0.12 inch), vertical 6 mm (0.24 inch) |
| Influence of medium temperature | depending on the filling material |
| Switching time | approx. 0.5 s when covering and uncovering the sensor |
| Operating conditions | |
| Installation conditions | |
| Installation position | any position |
| Mounting location | The capacitive limit switch can be installed in silos made of different materials (e. g. metal, plastic, concrete). |
| Process conditions | |
| Process temperature | -40 ... 130 °C (-40 ... 266 °F) -40 ... 80 °C (-40 ... 176 °F) (Dust-Ex version) |
| Medium pressure limits | -1 ... 25 bar |
| State of aggregation | fluids and solids |
| Solid contents | $\leq \varnothing 30$ mm |

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| Bulk density | ≤ 200 g/l |
| Ambient conditions | |
| Ambient temperature | -40 ... 80 °C (-40 ... 176 °F) -40 ... 60 °C (-40 ... 140 °F) (Dust-Ex version) |
| Storage temperature | -40 ... 80 °C (-40 ... 176 °F) |
| Shock resistance | device with F34 housing: 7 J |
| Vibration resistance | a(RMS) = 50 m/s ² , ASD = 1.25 (m/s ²)/Hz, f = 5 to 2000 Hz, t = 3 x 2 h |
| Mechanical specifications | |
| Degree of protection | IP66, NEMA 4 |
| Connection | gland M20 thread G1/2, NPT1/2 |
| Material | F14 housing: polyester PBT-FR F34 housing F34: aluminum Probe: PPS GF40 |
| Dimensions | max. Ø94 mm (3.7 inch), length 391 mm (15.4 inch) |
| Process connection | thread R1 acc. to EN 10226, BSPT, adapter for R1-1/2 and G1-1/2 see accessories thread NPT1 to ANSI B 1.20.1, adapter for NPT1-1/4 see accessories |
| Data for application in connection with hazardous areas | |
| EU-Type Examination Certificate | see instruction manuals (SI) |
| Directive conformity | |
| Directive 2014/34/EU | EN 60079-0:2012+A11:2013 , EN 60079-11:2012 , EN 60079-31:2009 |
| General information | |
| Supplementary documentation | technical information (TI) manuals, brief instructions (BA, KA) instruction manuals (SI) |
| Supplementary information | EC-Type Examination Certificate, Statement of Conformity, Declaration of Conformity, Attestation of Conformity and instructions have to be observed where applicable. For information see www.pepperl-fuchs.com . |
| Accessories | |
| Optional accessories | LCL-Z10 cover with sight glass for F14 housing LCL-Z11 adapter for R1-1/2, EN 10226 LCL-Z12 adapter for G1-1/2, DIN ISO 228 LCL-Z13 adapter for NPT1-1/4, steel LCL-Z15 adapter for NPT1-1/4, 1.4571 |

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Electrical connection

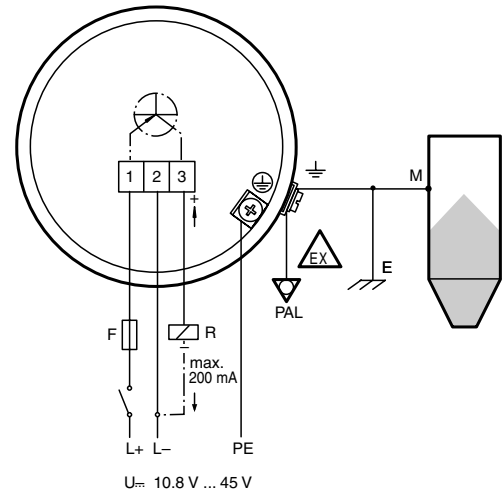
Electronic insert E5

3-wire DC connection

- F: fine-wire fuse, 500 mA
- R: connected load, e. g. PLC, DCS, relay
- M: connection to ground, silo or metal parts silo
- E: grounding
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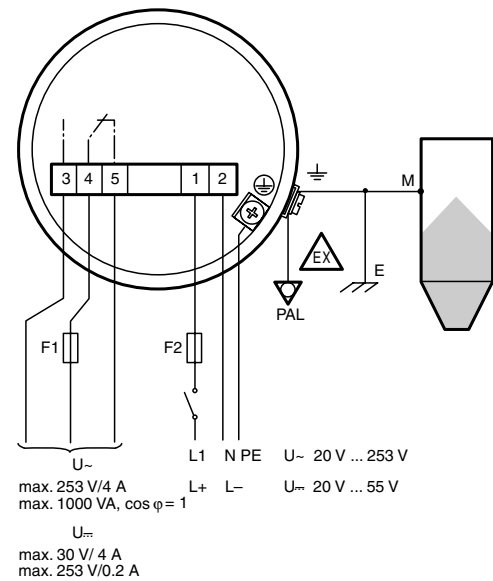


Electronic insert WA

AC/DC connection with relay output

- F1: fine-wire fuse for the protection of the relay contact, dependent on the connected load
- F2: fine-wire fuse, 500 mA
- M: connection to ground, silo or metal parts silo
- E: grounding

PE-connection and PAL-connection for LCL1 are unnecessary.



Type Code



*This overview does not mark options which are mutually exclusive.
Option with * = on request/in preparation.*

| | |
|--------------------------------|--|
| Device | |
| LCL | Capacitive limit switch |
| Design | |
| 1 | Compact device |
| Process connection | |
| N3 | Thread ANSI NPT1, PPS |
| R3 | Thread EN 10226 R1, PPS |
| Probe length | |
| K | 140 mm |
| Housing, cable entrance | |
| C | Polyester housing F14, IP66, NEMA 4, thread NPT1/2 |
| H | Aluminium housing F34, IP66, NEMA 4X, thread NPT1/2 |
| I | Aluminium housing F34, IP66, NEMA 4X, thread G1/2 |
| J | Aluminium housing F34, IP66, NEMA 4X, cable gland M20 |
| P | Polyester housing F14, IP66, NEMA 4, cable gland M20 |
| Q | Polyester housing F14, IP66, NEMA 4, thread G1/2A |
| Electrical output | |
| E5 | 3-wire, PNP, 10.8 V DC ... 45 V DC |
| WA | Relay, potential-free change-over contact, 20 V AC ... 253 V AC, 20 V DC ... 55 V DC |
| Additional equipment | |
| N | Without additional equipment |
| D | Cover with sight glass |
| Approval | |
| NA | Version for non-hazardous area |
| CS | CSA, DIP Cl.II, Gr.E-G, Cl.III |
| CG | CSA General Purpose |
| EX | ATEX II 1/3 D Ex ta/tc IIIC T105°C Da/Dc |
| FS | FM, DIP Cl.II,III, Gr.E-G, T5 |
| WH | Overspill protection WHG |

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