



## Vibration Limit Switch

### LVL-A7-AG1A-E5V1-CG-EMS

- Limit switch for liquids
- Process connection G1/2
- Suitable for process temperatures up to 100 °C (212 °F)
- Rugged stainless steel housing
- Onsite function check possible thanks to LED indication
- External function test with test magnet



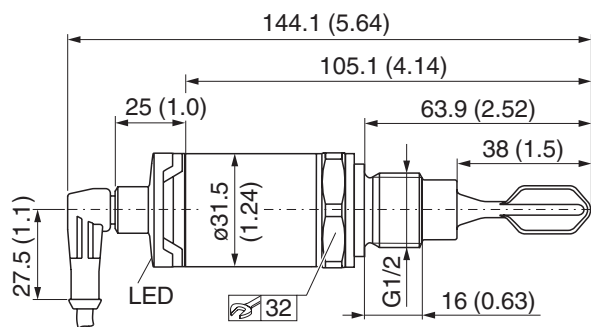
### Function

The Vibracon LVL-A7 is a limit switch for liquids and is used in tanks, vessels and pipes. The device is used for overfill prevention or pump protection in cleaning and filter systems as well as in cooling and lubrication vessels, for instance. The device is suitable for applications in which float switches or conductive, capacitance and optical sensors have been used up to now. The device also works in areas where these measuring principles are not suitable due to conductivity, buildup, turbulence, flow conditions or air bubbles. The device can be used for process temperatures up to 100 °C (212 °F). The device is not suitable for use in hazardous areas. For hygienic areas we recommend the use of Vibracon LVL A7H.

### Connection



### Dimensions



## Technical Data

### General specifications

|                   |                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Measuring method  | The tuning fork is brought to its resonance frequency by means of a piezoelectric drive. If the tuning fork is covered by liquid, this frequency changes. The electronics monitor the resonance frequency and indicate whether the tuning fork is freely vibrating or is covered by liquid. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Construction type |                                                                                                                                                                                                                                                                                             | compact device                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Operating mode    |                                                                                                                                                                                                                                                                                             | <p>MAX = maximum safety:<br/>The device keeps the electronic switch closed as long as the liquid level is below the fork.<br/>example application: overspill protection</p> <p>MIN = minimum safety:<br/>The device keeps the electronic switch closed as long as the fork is immersed in liquid.<br/>example application: dry running protection of pumps<br/>The electronic switch opens if the limit is reached, if a fault occurs or in the event of a power fails (quiescent current principle)</p> |
| Series            |                                                                                                                                                                                                                                                                                             | LVL-A*                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

### Supply

|                     |       |                                                                                                                                                  |
|---------------------|-------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| Connection          |       | This device may be used with any sequential circuit, as long as the circuit can support the electrical circuit values of the switching elements. |
| Rated voltage       | $U_r$ | 10 ... 35 V DC                                                                                                                                   |
| Fusing              |       | external 500 mA slow                                                                                                                             |
| Current consumption |       | < 15 mA                                                                                                                                          |
| Power consumption   |       | 975 mW                                                                                                                                           |
| Residual ripple     |       | 5 V <sub>ss</sub> at 0 ... 400 Hz                                                                                                                |

### Input

|                   |                            |
|-------------------|----------------------------|
| Measured variable | density                    |
| Measurement range | min. 0.7 g/cm <sup>3</sup> |

### Output

|                   |                  |
|-------------------|------------------|
| Output type       | switching output |
| Switching current | max. 250 mA      |

### Directive conformity

|                               |                                     |
|-------------------------------|-------------------------------------|
| Electromagnetic compatibility |                                     |
| Directive 2014/30/EU          | EN 61326-1:2006 , EN 61326-2-3:2006 |
| Directive 2004/108/EC         | EN 61326-1:2006 , EN 61326-2-3:2006 |

### Conformity

|                               |                               |
|-------------------------------|-------------------------------|
| Electromagnetic compatibility | NE 21                         |
| Degree of protection          | IEC 60529                     |
| Shock resistance              | EN 60068-2-27                 |
| Vibration resistance          | EN 60068-2-64                 |
| Climate class                 | DIN EN 60068-2-38/IEC 68-2-38 |

### Measurement accuracy

|                                  |                                                                                                                                                                                                                                                                                                                                                                                               |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Reference operating conditions   | <ul style="list-style-type: none"> <li>- ambient temperature: 25 °C (+77 °F)</li> <li>- process pressure: 1 bar (14.5 psi)</li> <li>- fluid: water (density: approx. 1 g/cm<sup>3</sup>, viscosity: 1 mm<sup>2</sup>/s)</li> <li>- medium temperature: 25 °C (+77 °F)</li> <li>- density setting: &gt; 0.7 g/cm<sup>3</sup></li> <li>- switching time delay: standard (0,5 s, 1 s)</li> </ul> |
| Measured value resolution        | < 0.5 mm                                                                                                                                                                                                                                                                                                                                                                                      |
| Measuring frequency              | approx. 1100 Hz in air                                                                                                                                                                                                                                                                                                                                                                        |
| Switching point                  | 13 mm ± 1 mm                                                                                                                                                                                                                                                                                                                                                                                  |
| Non-repeatability                | ± 1 mm acc. to DIN 61298-2                                                                                                                                                                                                                                                                                                                                                                    |
| Hysteresis                       | max. 3 mm                                                                                                                                                                                                                                                                                                                                                                                     |
| Influence of ambient temperature | negligible                                                                                                                                                                                                                                                                                                                                                                                    |
| Influence of medium temperature  | -25 µm/°C                                                                                                                                                                                                                                                                                                                                                                                     |
| Influence of medium pressure     | -20 µm/bar                                                                                                                                                                                                                                                                                                                                                                                    |
| Switching time                   | <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> </ul>                                                                                                                                                                                                                                                          |
| Switch-on delay                  | max. 3 s                                                                                                                                                                                                                                                                                                                                                                                      |

### Operating conditions

|                         |
|-------------------------|
| Installation conditions |
|-------------------------|

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## Technical Data

|                                    |                                                                                                                                                                                                                             |
|------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Installation position              | see technical information (TI)                                                                                                                                                                                              |
| <b>Ambient conditions</b>          |                                                                                                                                                                                                                             |
| Ambient temperature                | -40 ... 70 °C (-40 ... 158 °F)                                                                                                                                                                                              |
| Storage temperature                | -40 ... 85 °C (-40 ... 185 °F)                                                                                                                                                                                              |
| Shock resistance                   | a = 300 m/s <sup>2</sup> = 30 g, 3 planes x 2 directions x 3 shocks x 18 ms, as per test Ea                                                                                                                                 |
| Vibration resistance               | 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                                                                                                               |
| <b>Process conditions</b>          |                                                                                                                                                                                                                             |
| Medium temperature                 | -40 ... 100 °C (-40 ... 212 °F)                                                                                                                                                                                             |
| Process pressure (static pressure) | -1 ... +40 bar (-14.5 ... +580 psi)                                                                                                                                                                                         |
| State of aggregation               | liquid                                                                                                                                                                                                                      |
| Density                            | min. 0.7 g/cm <sup>3</sup>                                                                                                                                                                                                  |
| Viscosity                          | 1 ... 10000 mPa/s, dynamic viscosity                                                                                                                                                                                        |
| Solid contents                     | < Ø5 mm                                                                                                                                                                                                                     |
| <b>Mechanical specifications</b>   |                                                                                                                                                                                                                             |
| Degree of protection               | IP65/IP67, NEMA 4X                                                                                                                                                                                                          |
| Connection                         | M12 connector, 4-pin                                                                                                                                                                                                        |
| Material                           | process connection and short tube: stainless steel 316L (1.4401/1.4435)<br>tuning fork: stainless steel 316L<br>housing cover and connector: PPSU                                                                           |
| Surface quality                    | R <sub>a</sub> < 3.2 µm                                                                                                                                                                                                     |
| Mass                               | approx. 140 g                                                                                                                                                                                                               |
| Process connection                 | thread G1/2 to ISO 228                                                                                                                                                                                                      |
| <b>Indication and operation</b>    |                                                                                                                                                                                                                             |
| Display elements                   | The LED display is on the connection side.<br>- green LED: indication of ready to operate<br>- red LED: fault indication<br>- yellow LED: operating mode indication                                                         |
| Function test                      | function test with test magnet (optional accessory)                                                                                                                                                                         |
| <b>Certificates and approvals</b>  |                                                                                                                                                                                                                             |
| CSA approval                       | cCSAus Listed, General Purpose                                                                                                                                                                                              |
| Overspill protection               | see approval (ZE)                                                                                                                                                                                                           |
| <b>General information</b>         |                                                                                                                                                                                                                             |
| Supplementary documentation        | technical information (TI)<br>manual (BA)<br>approval (ZE)                                                                                                                                                                  |
| Supplementary information          | Statement of Conformity, Declaration of Conformity, Attestation of Conformity and instructions have to be observed where applicable. For information see <a href="http://www.pepperl-fuchs.com">www.pepperl-fuchs.com</a> . |
| <b>Accessories</b>                 |                                                                                                                                                                                                                             |
| Designation                        | see technical information (TI)                                                                                                                                                                                              |