Model Number

LVL-A1-G1S-E5V1-CG-EMS

Vibration Limit Switch

Features

- **Level limit switch for liquids**
- **Process connection G½**
- **Rugged stainless steel housing**
- **External test option using test magnet**
- **Highly visible status LEDs**

Description

The LVL-A* is a level limit switch for all kinds of fluids. It is used in tanks, containers and pipelines. It is used in cleaning and filtering systems and coolant and lubricant tanks as an overspill protection or as a pump protector.

The LVL-A* is ideal for applications which previously used float switches and conductive, capacitive and optical sensors. It also works in applications which are unsuitable for these measuring methods due to conductivity, build-ups, turbulence, flows or air bubbles.

Technical Data

Application	
Function principle	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.
Input characteristics	
Measured variable	density
Measurement range	min. 0.7 g/cm^3, other density (e. g. 0.5 g/cm^3) settings on request
Output characteristics	
Fail-safe mode	minimum/maximum closed circuit safety The level limit switch can be connected in two operating modes, depending on the operating mode selected (MAX or MIN safety). The level limit switch will switch off safely in the event of a fault (e. g. if the power supply line is interrupted). MAX = maximum fail-safe mode: The level limit switch keeps the electronic switch closed as long as the fluid level is below the fork. example application: overspill protection MIN = minimum fail-safe mode: The level limit switch keeps the electronic switch closed as long as the fork is immersed in fluid. example application: dry running protection of pumps The electronic switch opens if the limit is reached, if a fault occurs or in the event of a power failure.
Auxiliary energy	
Electrical 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. M12 x 1 connector
Supply voltage	10 ... 35 V DC
Power consumption	< 825 mW
Current consumption	< 15 mA
Residual ripple	5 V $_{ss}$ at 0 ... 400 Hz
Measurement accuracy	
Reference operating conditions	ambient temperature: 23 °C (296 K), process pressure: 1 bar, medium: water, medium density: 1, medium temperature: 23 °C (296 K), installation from above/vertical, density setting: > 0.7 g/cm^3
Measured value resolution	< 0.5 mm
Measuring frequency	approx. 1100 Hz in air
Maximum measured error	13 mm ± 1 mm
Non-repeatability	± 0.5 mm
Hysteresis	3 mm ± 0.5 mm
Influence of ambient temperature	negligible
Influence of medium temperature	-29.6 x 10^{-3} mm/K
Influence of medium pressure	-55.2 x 10^{-3} mm/bar
Switching time	when covering the sensor approx. 0.5 s, when uncovering the sensor approx. 1.0 s other switching times on request
Settling time	< 2 s
Operating conditions	
Installation conditions	
Installation position	see section mounting position
Ambient conditions	
Ambient temperature	-40 ... 70 °C (-40 ... 158 °F)
Ambient temperature limits	derating from 80 °C (353 K) process temperature: reduction to max. 50 °C (323 K) ambient derating from 80 °C (353 K) process temperature: reduction to max. 150 mA relay switching capacity
Storage temperature	-40 ... 85 °C (-40 ... 185 °F)
Overvoltage protected	overvoltage category III
Process conditions	
Medium temperature	-40 ... 100 °C (-40 ... 212 °F) , see ambient temperature limits
Process pressure (static pressure)	-1 ... 40 bar (-14.5 ... 580.2 psi)
State of aggregation	liquid
Density	min. 0.7 g/cm^3 , other density setting on request
Viscosity	max. 10000 mm^2/s (10000 cSt)
Gas content	stagnant mineral water
Mechanical specifications	
Degree of protection	IP66 / IP67
Mechanical construction	
Mass	210 g
Material	vibration fork, process connection and housing: stainless steel 1.4435/316L connection: PSU
Surface quality	R_a < 3.2 µm/80 grit
Process connection	cylindrical thread G½A to DIN ISO 228/1 Stainless steel 1.4435 / AISI 316L
Electrical connection	4-pin, M12 x 1 connector
Indication and operation	
Display elements	The LED display is on the connection side. green LED: indication of ready to operate red LED: fault indication, mode indication
Function test	function test with test magnet: Put the testing magnet to the mark of nameplate. On testing, the current state of the electronic switch is reversed
Certificates and approvals	

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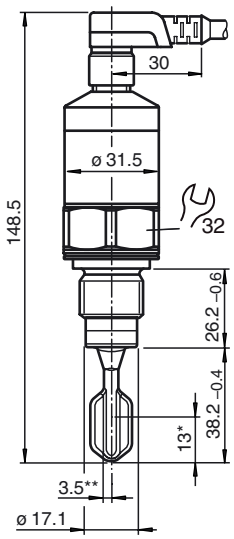
Application	The general authorization by the board of suveyors must be obtained for the site of installation. It is accessible together with the technical description and the certificate from Pepperl+Fuchs.
CSA approval	cULus Listed, General Purpose
General information	
Directive conformity	
Directive 89/336/EEC (EMC)	emitted interference to EN 61326, class B equipment noise immunity to EN 61326, annex A (industrial sector)
Conformity	
Electromagnetic compatibility	NE 21
Degree of protection	EN 60529
Vibration resistance	EN 60068-2-64
Shock and impact resistance	EN 60068-2-27 , 30 g
Supplementary documentation	see www.pepperl-fuchs.com
Supplementary information	Statement of Conformity, Declaration of Conformity, Attestation of Conformity and instructions have to be observed where applicable. For information see www.pepperl-fuchs.com.

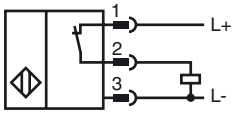
Dimensions



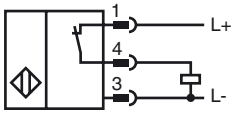
* Switch point for vertical installation
** Switch point for horizontal installation
Switch points at densitiy 0.7 g/cm^3 , 23 °C (296 K), 0 bar

Electrical Connection

MAX



MIN



Mounting position

The level limit switch can be installed in any position in a container or pipe. The formation of foam does not impair its function.

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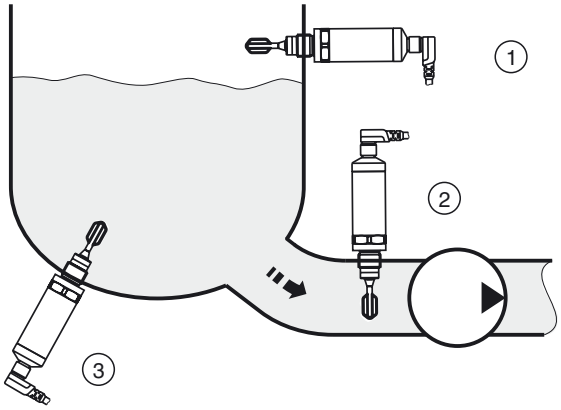

Example 1: overfill protection or top level detection
Example 2: dry running protection for pump
Example 3: lower level detection

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