

Vibration Limit Switch Compact Version

Vibracon

LVL-M3-A

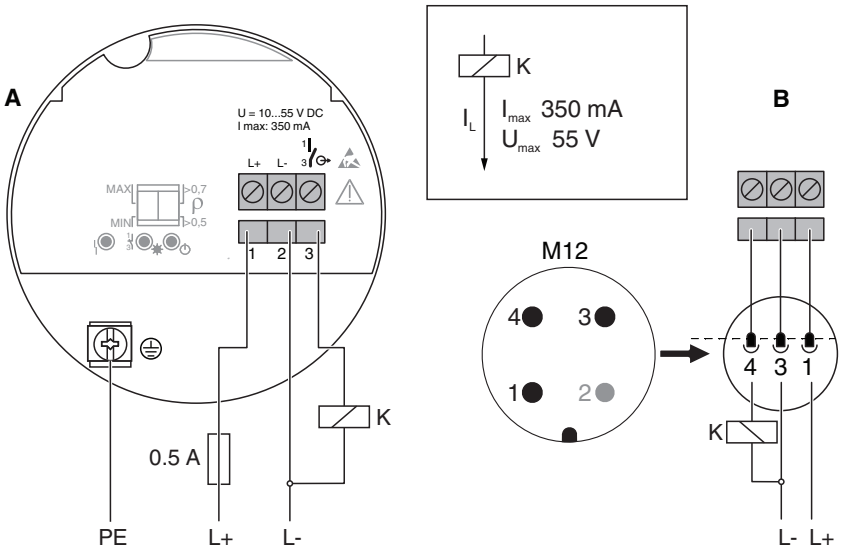
- Vibration limit switch for liquids
- Compact device
- Wide variety of electronic modules (e. g., relay, thyristor signal output): the right connection for every process control system
- No calibration: quick and low-cost start up
- No mechanically moving parts: maintenance-free, no wear, long operating life
- Operation via push buttons and DIP switches on the electronic insert

Function

The device is a vibration limit switch for use in all liquids.
- for temperatures from -40 °C to +150 °C
- for pressures up to 40 bar
- for viscosities up to 10000 mm²/s
- for densities up to 0.5 g/cm³ or 0.4 g/cm³ (other settings available on request)

The function is not affected by flow, turbulence, bubbles, foam, vibration, bulk solids content or build-up, the device is thus the ideal substitute for float switches.
The device is available with extension tube up to 2 m.
Specific versions are suitable for use in explosion-hazardous areas.
The device is operated via push buttons and DIP switches on the electronic insert.

Connection



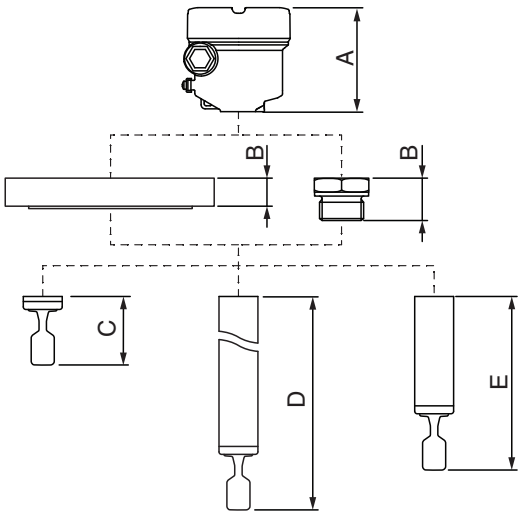
3-wire DC-PNP, electronic insert FEL42 (example)

A Terminal assignment at electronic insert
B Terminal assignment on M12 plug

For further connection versions see technical information (TI).

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Assembly



The device is assembled from the following components:

A Housing including cover
B Process connection, flange or thread
C Compact probe with tuning fork
D Tube extension probe with tuning fork
E Short tube probe with tuning fork

For further information see technical information (TI).

Technical Data

General specifications		
Function principle		point level detection, maximum or minimum detection for liquids
Measuring method		The change in vibration frequency causes the device to switch.
Construction type		compact device
Series		Vibracon LVL-M3
Housing		single compartment, aluminum, coated single compartment, plastic
Supply		
Rated voltage	U_r	electronic insert FEL42: 10 V DC ... 55 V DC electronic insert FEL44: 19 V AC ... 253 V AC/19 V DC ... 55 V DC electronic insert FEL48: switch amplifier acc. to IEC 60947-5-6 (NAMUR)
Current consumption		electronic insert FEL42: ≤ 10 mA, without load
Power consumption		electronic insert FEL42: ≤ 0,5 W electronic insert FEL44: ≤ 25 VA/< 1.3 W electronic insert FEL48: acc. to IEC 60947-5-6 (NAMUR)
Input		
Switching point		see section switch point
Measured variable		limit level (limit value)
Measuring range		depends on installation location and the tube extension maxmum sensor length : 2 m
Output		
Output type		electronic insert FEL42: 3-wire PNP electronic insert FEL44: relay DPDT electronic insert FEL48: 2-wire NAMUR
Switch behaviour		switch-over for minimum/maximum residual current safety on electronic insert MAX = maximum safety: The output switches to the power fail response when the fork is covered. for use with overspill protection for example MIN = minimum safety: The output switches to the power fail response when the fork is exposed. for use with dry running protection for example
Directive conformity		
Electromagnetic compatibility		
Directive 2014/30/EU		EN 61326
Low voltage		
Directive 2014/35/EU		EN 61010-1
Conformity		
Electromagnetic compatibility		NE 21
Degree of protection		IEC 60529 , NEMA 250

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Shock resistance	IEC 60068-2-27
Vibration resistance	EN 60068-2-64
Climate class	IEC 60068-2-38 test Z/AD
Corrosion resistance	acc. to ISA-71.04, severity level G3
Input characteristics	
Medium density	adjustment on the electronic insert > 0,5 g/cm³ or > 0,7 g/cm³ (other on request)
Measurement accuracy	
Reference operating conditions	ambient temperature: 23 °C (73 °F) process temperature: 23 °C (73 °F) density: 1 g/cm³ (water) medium viscosity: 1 mPa·s process pressure: ambietn pressure/unpressurized sensor installation: verticaly from above density selection switch: > 0.7 g/cm³ switch direction of sensor: uncovered to covered
Maximum measured error	max. ± 1 mm
Hysteresis	typ. 2.5 mm
Influence of medium density	see technical information (TI)
Influence of medium temperature	max. +1.4 ... -2.8 mm (-40 ... 150 °C (-40 ... 302 °F))
Influence of medium pressure	max. 0 ... 2.6 mm (-1 ... 40 bar)
Operating conditions	
Installation conditions	
Installation position	any position
Process conditions	
Medium temperature	-40 ... 150 °C (-40 ... 302 °F)
Medium pressure	p_e = -1 ... 40 bar (-14.5 ... 580.2 psi) over the entire temperature range , exceptions see process connections
Test pressure	PN = 40 bar (580 psi): test pressure = 1.5 x PN max. 60 bar (870 psi) dependent on the process connection selected
Thermal shock resistance	≤ 120 K/s
State of aggregation	liquid
Density	min. 0.5 g/cm³ , optional 0.4 g/cm³
Viscosity	max. 10000 mm²/s (max. 10000 cSt)
Ambient conditions	
Ambient temperature	-40 ... 70 °C (-40 ... 158 °F) For further information see technical information (TI).
Storage temperature	-40 ... 80 °C (-40 ... 176 °F)
Altitude	≤ 2000 m above MSL
Mechanical specifications	
Degree of protection	plug M12 : IP66/67, NEMA type 4X Others : IP66/68, NEMA type 4X/6P
Connection	gland M20 thread M20 , G1/2 , NPT1/2 , NPT3/4 plug M12
Material	see technical information (TI)
Surface quality	R_a < 3.2 µm/126 µinch
Mass	basic weight: 0.65 kg the basic weight comprises: - sensor (compact) - electronic insert - housing: single compartment, plastic with cover - process connection: thread, G3/4 in addition to the basic weight: - housing: single compartment, aluminum, coated: 0.8 kg - pipe extension: 1000 mm: 0.9 kg, 100 inch: 2.3 kg - plastic protective cover: 0.2 kg For further information see technical information (TI).
Dimensions	housing: diameter max. 101 mm, heigth max. 118 mm compact version: length depends on process connection short tube version: length 99 ... 118 mm, depends on process connection tube extension: length 117 ... 2000 mm tuning fork: width 17.2 mm, fork width 10 mm, length 40 mm For further information see technical information (TI).

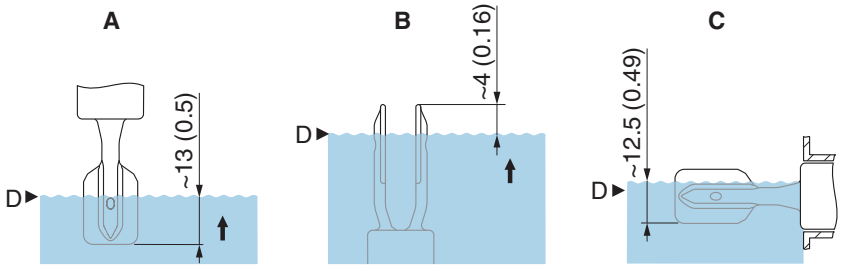
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Process connection		cylindrical threads G3/4, G1 acc. to DIN ISO 228 G for installing in weld-in adapter cylindrical threads G3/4, G1 acc. to DIN ISO 228 G with flat seal conical threads NPT3/4, NPT1 acc. to ANSI B 1.20.3 conical threads R3/4, R1 acc. to EN 10226 flanges RF, RJF, FF from 1 inch acc. to ASME B16.5 flanges form A, B1, C, D, E from DN25 acc. to EN 1092-1 flanges RF from 10K 25A acc. to JIS B2220 Tri-Clamp from DN25 acc. to ISO 2852 For further information see technical information (TI).
Data for application in connection with hazardous areas		
EU-type examination certificate		see instruction manuals
International approvals		
CSA approval		see instruction manuals
IECEx approval		see instruction manuals
Indication and operation		
Display elements		without display
Control elements		switches on the electronic insert
Function test		via switches on the electronic insert
Certificates and approvals		
Overspill protection		see approval (ZE)
General information		
Supplementary documentation		technical information (TI) manuals, brief instructions (BA, KA) instruction manuals Special documentation (SD)
Supplementary information		Observe the certificates, declarations of conformity, instruction manuals, and manuals where applicable. For information see www.pepperl-fuchs.com.
Accessories		
Designation		see technical information (TI)

Mounting

Typical switch points, depending on the orientation of the device (water +23 °C (+73 °F))



A Mounting from above
B Mounting from below
C Mounting from the side
D Switch point

Type Code

This overview does not mark options which are mutually exclusive.

L	V	L	–	M	3	–	(1)	(2)	(3)	(4)	–	(5)	(6)	(7)	(8)	(9)	(10)	–	(11)	(12)	.	L

LVL-M3	Device
LVL-M3	Limit switch for liquids

(1)	Type of probe
A	Compact version
B	Short tube version
C	Tube extension
X	Special version

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Type Code

(2)	Process connection, sealing surface
A	Flange ASME B16.5, RF (Raised Face)
D	Thread ASME B1.20.3, NPT
E	Flange EN 1092-1, Form A
F	Flange EN 1092-1, Form B1
J	Thread EN 10226, R
K	Flange HG/T20592, RF (Raised Face)
L	Flange HG/T20615, RF (Raised Face)
N	Thread ISO 228, G
P	Flange JIS B2220, RF (Raised Face)
T	Tri-Clamp ISO 2852
X	Special version

(3)	Process connecetion
ASME B16.5 flanges	
A31	NPS 1 inch, Cl.150, 316/316L
A41	NPS 1-1/4 inch, Cl.150, 316/316L
A42	NPS 1-1/4 inch, Cl.300, 316/316L
A51	NPS 1-1/2 inch, Cl.150, 316/316L
A61	NPS 2 inch, Cl.150, 316/316L
A62	NPS 2 inch, Cl.300, 316/316L
A81	NPS 3 inch, Cl.150, 316/316L
A82	NPS 3 inch, Cl.300, 316/316L
A91	NPS 4 inch, Cl.150, 316/316L
A92	NPS 4 inch, Cl.300, 316/316L
E35	1-1/2 inch, Cl.150, 316L
E45	2 inch, Cl.150, 316L
E55	3 inch, Cl.150, 316L
E65	1-1/2 inch, Cl.300, 316L
E75	2 inch, Cl.300, 316L
E85	3 inch, Cl.300, 316L
EN 1092-1 flanges	
D75	DN50 PN40, 316L
D95	DN80 PN40, 316L
F45	DN25 PN25/40, 316L
F51	DN32 PN6, 316L
F55	DN32 PN25/40, 316L
F61	DN40 PN6, 316L
F62	DN40 PN40, 316L
F65	DN40 PN25/40, 316L
F71	DN50 PN6, 316L
F75	DN50 PN25/40, 316L
F85	DN65 PN25/40, 316L
F93	DN80 PN10/16, 316L
F95	DN80 PN25/40, 316L
FA3	DN100 PN10/16, 316L
FA5	DN100 PN25/40, 316L
JIS B2220 flanges	
J13	10K 25A, 316L
J16	10K 40A, 316L
J17	10K 50A, 316L
ISO 228 threads, EN 10226 threads, ASME B1.20.3 threads	
G21	G3/4 inch, 316L, installation > accessory weld-in adapter
G31	1 inch, 316L
G3E	1 inch, 316L, installation > accessory weld-in adapter
G41	G3/4 inch, 316L
Tri-Clamp ISO 2852	
T51	DN25-38 (1 to 1-1/2 inch), 316L, DIN 32676 DN25/40
T61	DN40-51 (2 inch), 316L, DIN 32676 DN50
XXX	Special version

(4)	Sensor length, material
B	Compact version, 316L
D	Short tube version, 316L
F	Tube extension, length L in mm, 316L, Ra < 3.2 µm/126 µinch
H	Tube extension, length L in inch, 316L, Ra < 3.2 µm/126 µinch

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Type Code

(4)	Sensor length, material
X	Special version

(5)	Housing, material
A	Single compartment, aluminum, coated
P	Single compartment, plastic
X	Special version

(6)	Electrical connection
A	Gland M20, plastic, IP66/68, NEMA type 4X/6P
B	Gland M20, brass nickel plated, IP66/68, NEMA type 4X/6P
F	Thread M20, IP66/68, NEMA type 4X/6P
G	Thread G1/2, IP66/68, NEMA type 4X/6P
H	Thread NPT1/2, IP66/68, NEMA type 4X/6P
I	Thread NPT3/4, IP66/68, NEMA type 4X/6P
M	Plug M12, IP66/67, NEMA type 4X
X	Special version

(7)	Application, temperature
A	Process: max. 150 °C/302 °F, max. 40 bar
X	Special version

(8)	Surface refinement
A	Standard Ra < 3.2 µm/126 µinch
X	Special version

(9)	Electrical output
E	FEL42, 3-wire PNP, 10 V DC to 55 V DC
N	FEL48, 2-wire NAMUR
W	FEL44, relay DPDT, 19 V AC to 253 V AC/19 V DC to 55 V DC, contact 253 V/6 A
X	Special version

(10)	Display, operation
A	Without display, switch
X	Special version

(11)	Approval
NA	Version for non-hazardous area
CC	CSA C/US Cl. I Div. 2 Gr.A-D
CG	CSA C/US General Purpose
CH	CSA C/US IS Cl. I Div. 1 Gr. A-D, Cl. I Zone 0, AEx/Ex ia IIC T6
CX	CSA C/US XP Cl. I Div. 1 Gr. A-D, Cl. I Zone 1, AEx/Ex d IIC T6
E2	ATEX/IEC II 1/2G, 2G Ex ia IIC T6 Ga/Gb
E3	ATEX/IEC II 1/2G, 2G Ex db IIC T6 Ga/Gb
UB	UK Ex ia IIC T6 Ga/Gb
UC	UK Ex db II C T6 Ga/Gb
UR	Non-hazardous area and UK marking

Additional Options

(12)	Service
D1	Presetting density > 0.4 g/cm^3
D2	Presetting density > 0.5 g/cm^3
P1	Product documentation on paper
S1	Cleaned from oil and grease (wetted parts)
S3	Adjustment switching delay according to specification
S7	PWIS free (paint-wetting impairment substances)
S8	Adjustment MIN safety circuit
XX	Special version

(12)	Test, certificate, declaration
DD	Pressure test, internal procedure, test report
S5	Inspection certificate 3.1, EN 10204 (material certificate wetted parts)
XX	Special version

(12)	Additional approval
WH	WHG overfill protection, leakage

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Type Code

(12)	Accessory mounted
XX	Special version

(12)	Accessory enclosed
WP	Weather protection cover, plastic
XX	Special version

(12)	Marking
S9	Tagging (TAG), see additional specification
XA	Tag plate, stainless steel
XB	Adhesive label
XC	Supplied label/plate

L	Sensor length, tube extension
Length	Option F, 316L, length L in mm, 117 mm to 2000 mm
Length	Option H, 316L, length L in inch, 4.61 inch to 78.47 inch

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