LBV301

VIBRATING SWITCHES

LEVEL CONTROLS

RIELS® INSTRUMENTS

CE

Technical data overview

Measurement principle	Vibrating level switch
Detection principle	Contact
Medium	Bulk solids
Measurement	Switch
Process temperature	–50 °C ... +250 °C, Temperature range with temperature adapter, detection of solids in water, Temperature adapter (depending on type)
Process pressure	–1 bar ... 16 bar (depending on type)
Output signal	Non-contact switch Double relay (DPDT) 1 x PNP/NPN NAMUR signal (depending on type)
Accuracy of sensor element	± 10 mm

Product description

The vibrating level switches in the LBV301 product family can be relied upon to signal full, empty, or demand states in bulk materials. The monoprobe design prevents bulk materials from jamming. The rugged stainless steel sensor design is piezo-electrically energized. When the probe is covered with bulk materials, the change in vibration amplitude is reliably detected and converted into a switching signal. As the monoprobe is easy to clean, the sensors are even suitable for use in the food industry. While the LBV311 compact device is used for horizontal mounting, the LBV321 cable-extended switch and the LBV331 tube-extended switch are used for vertical mounting in silos and bridge sensing ranges of up to 80 m and 6 m respectively. With a variety of process connections for hygienic applications and several electronic variants, the LBV301 can be used for nearly all applications, even in explosive atmospheres.

At a glance

- Compact sensor from 1" thread
- Monoprobe design prevents bulk materials from sticking or jamming
- Polished monoprobe for food applications
- Commissioning without filling and medium calibration
- Process temperature up to 250 °C
- ATEX certifications (1D/2D/1G/2G) available
- Tube extension variant (LBV331) up to 6 m and cable extension model (LBV321) up to 80 m available for vertical mounting

Your benefits

- Easy commissioning, no upstream calibration necessary
- Maintenance-free system
- Sensors can be tested while installed
- Flexible, reliable system suitable for many types of applications
- Vertical mounting, even in difficult installation and ambient conditions

Fields of application

- Level measurement of pellets or wood chips in the wood industry
- Detection of basic substances in the food industry, such as milk powder
- Min./max. or demand signal in silos
- Explosive dust mixtures

LBV311 type code

Certification

XX	without
CX	ATEX II 1G, ½ G, 2G Ex ia IIC T6
CK	ATEX II 1G, ½ G, 2G Ex ia IIC T6 + 1D, 1/2D, 2D Ex tD IP66 T
LX	ATEX II ½ G, 2G Ex d IIC T6
LK	ATEX II ½ G, 2G Ex d IIC T6 + 1D, ½ D, 2D Ex tD IP66 T
GX	ATEX II 1D, ½ D, 2D Ex tD IP66 T

Execution / Process temperature

A	Standard / –50 °C ... +150 °C
B	With spacer / –50 °C ... +250 °C
C	Detection of solids in water / –50 °C ... +150 °C

Process connection / Material (see below)

Electronics

C	Contact-free switch 20 ... 253 V AC (DC)
R	Relay (DPDT) 20 ... 72 V DC / 20 ... 253 V AC (3A)
T	Transistor (NPN/PNP) 10 ... 55 V DC
N	NAMUR signal

Housing / Enclosure rating

K	Plastic / IP 66, IP 67
A	Aluminum / IP 66, IP 67
V	Stainless steel (investment casting) 316L / IP 66, IP 67
8	Stainless steel (electropolished) 316L / IP 66, IP 67

Cable entry / Male connector connection

M	M20 x 1.5 / Without
N	½" NPT / Without

LBV311 -							X

Not all variants of the type code can be combined! Not all available variants are shown.

Process connection / Material

GC	Thread G 1, DIN 3852-A, PN 16 / 316L
GR	Thread G 1, DIN 3852-A, PN 16 / 316L, Ra < 0.8 µm
GG	Thread G 1 ½, DIN 3852-A, PN 16 / 316L
GP	Thread G 1 ½, DIN 3852-A, PN 16 / 316L, Ra < 0.8 µm
NC	Thread 1" NPT, ASME B1.20.1, PN 16 / 316L
NR	Thread 1" NPT, ASME B1.20.1, PN 16 / 316L, Ra < 0.8 µm
NH	Thread 1 ¼" NPT, ASME B1.20.1, PN 16 / 316L
NI	Thread 1 ¼" NPT, ASME B1.20.1, PN 16 / 316L, Ra < 0.8 µm
NG	Thread 1 ½" NPT, ASME B1.20.1, PN 16 / 316L
NP	Thread 1 ½" NPT, ASME B1.20.1, PN 16 / 316L, Ra < 0.8 µm
CT	Tri-Clamp 1 ½" / 316L, Ra < 0.8 µm
CV	Tri-Clamp 2" / 316L, Ra < 0.8 µm
CQ	Tri-Clamp 2 ½" / 316L, Ra < 0.8 µm
CM	Tri-Clamp 3 ½" / 316L, Ra < 0.8 µm
RP	Pipe connection DN 40, PN 40, DIN 11851 / 316L, Ra < 0.8 µm
RF	Pipe connection DN 40, PN 40, DIN 11864-1, form A / 316L, Ra < 0.8 µm
RH	Pipe connection DN 65, PN 25, DIN 11851 / 316L, Ra < 0.8 µm
TV	Tuchenhagen Varivent DN 32.1 ½", PN 25 / 316L, Ra < 0.8 µm
C2	Bundle clamp DN 40, PN 40, DIN 11864-3, form A / 316L, Ra < 0.8 µm
BF	Flange DN 32, PN 40, form C, DIN 2501 / 316L
DF	Flange DN 40, PN 40, form C, DIN 2501 / 316L
AU	Flange DN50 10K RF, JIS / 316L
HU	Flange DN65 10K RF, JIS / 316L

EF	Flange DN 50, PN 40, form C, DIN 2501 / 316L
4F	Flange DN 65, PN 16, form C, DIN 2501 / 316L
No error	Flange DN 80, PN 40, form C, DIN 2501 / 316L
ZF	Flange DN 100, PN 6, form C, DIN 2501 / 316L
MF	Flange DN 100, PN 16, form C, DIN 2501 / 316L
OF	Flange DN 100, PN 40, form C, DIN 2501 / 316L
3F	Flange DN 125, PN 6, form C, DIN 2501 / 316L
QF	Flange DN 150, PN 16, form C, DIN 2501 / 316L
2F	Flange DN 200, PN 10, form C, DIN 2501 / 316L
EB	Flange DN 50, PN 40, EN 1092-1, form B1 / 316L
DA	Flange 1 ½" 150 lb RF, ANSI B16.5 / 316L
EA	Flange 1 ½" 300 lb RF, ANSI B16.5 / 316L
HA	Flange 2" 150 lb RF, ANSI B16.5 / 316L
IA	Flange 2" 300 lb RF, ANSI B16.5 / 316L
OA	Flange 3" 150 lb RF, ANSI B16.5 / 316L
OE	Flange 3" 150 lb FF, ANSI B16.5 / 316L
PA	Flange 3" 300 lb RF, ANSI B16.5 / 316L
PE	Flange 3" 300 lb FF, ANSI B16.5 / 316L
JA	Flange 3 ½" 150 lb RF, ANSI B16.5 / 316L
SA	Flange 4" 150 lb RF, ANSI B16.5 / 316L
UA	Flange 4" 300 lb RF, ANSI B16.5 / 316L
BU	Flange DN80 10K RF, JIS / 316L
CU	Flange DN100 10K RF, JIS / 316L

LBV321 type code

Certification

XX	without
CX	ATEX II 1G, 1/2 G, 2G Ex ia IIC T6
CK	ATEX II 1G, 1/2 G, 2G Ex ia IIC T6 +
GX	ATEX II 1D, 1/2 D, 2D Ex tD IP66 T

Execution / Process temperature

C	Cable PUR, detection of solids in water / –20 °C ... +80 °C
H	Cable FEP / –40 °C ... +150 °C
T	Cable PUR / –20 °C ... +80 °C

Process connection / Material (see below)

Electronics

C	Contact-free switch 20 ... 253 V AC (DC)
R	Relay (DPDT) 20 ... 72 V DC / 20 ... 253 V AC (3A)
T	Transistor (NPN/PNP) 10 ... 55 V DC
N	NAMUR signal

Housing / Enclosure rating

K	Plastic / IP 66, IP 67
A	Aluminum / IP 66, IP 67
V	Stainless steel (investment casting) 316L / IP 66, IP 67
8	Stainless steel (electropolished) 316L / IP 66, IP 67

Cable entry / Male connector connection

M	M20 x 1.5 / Without
N	½" NPT / Without

Length 480 ... 80,000 mm

Additional equipment

X	without
Z	Locking screw with strain relief IP20/1.4305
M	Locking screw with cable gland + strain relief IP65/316

LBV321 -									

Not all variants of the type code can be combined!

Process connection / Material

XP	Without / 316L, Ra < 0.8 µm
GC	Thread G 1, DIN 3852-A, PN 6 / 316L
GR	Thread G 1, DIN 3852-A, PN 6 / 316L, Ra < 0.8 µm
GD	Thread G 1 ½, DIN 3852-A, PN 16 / 316L
GT	Thread G 1 ½, DIN 3852-A, PN 16 / 316L, Ra < 0.8 µm
NC	Thread 1" NPT, ASME B1.20.1, PN 6 / 316L
NR	Thread 1" NPT, ASME B1.20.1, PN 6 / 316L, Ra < 0.8 µm
NH	Thread 1 ¼" NPT, ASME B1.20.1, PN 6 / 316L
NI	Thread 1 ¼" NPT, ASME B1.20.1, PN 6 / 316L, Ra < 0.8 µm
ND	Thread 1 ½" NPT, ASME B1.20.1, PN 16 / 316L
NT	Thread 1 ½" NPT, ASME B1.20.1, PN 16 / 316L, Ra < 0.8 µm
BF	Flange DN 32, PN 40, form C, DIN 2501 / 316L
DF	Flange DN 40, PN 40, form C, DIN 2501 / 316L
EF	Flange DN 50, PN 40, form C, DIN 2501 / 316L
4F	Flange DN 65, PN 16, form C, DIN 2501 / 316L
No error	Flange DN 80, PN 40, form C, DIN 2501 / 316L
ZF	Flange DN 100, PN 6, form C, DIN 2501 / 316L
MF	Flange DN 100, PN 16, form C, DIN 2501 / 316L
OF	Flange DN 100, PN 40, form C, DIN 2501 / 316L

3F	Flange DN 125, PN 6, form C, DIN 2501 / 316L
QF	Flange DN 150, PN 16, form C, DIN 2501 / 316L
2F	Flange DN 200, PN 10, form C, DIN 2501 / 316L
EB	Flange DN 50, PN 40, EN 1092-1, form B1 / 316L
DA	Flange 1 ½", 150 lb RF, ANSI B16.5 / 316L
EA	Flange 1 ½", 300 lb RF, ANSI B16.5 / 316L
HA	Flange 2", 150 lb RF, ANSI B16.5 / 316L
IA	Flange 2", 300 lb RF, ANSI B16.5 / 316L
OA	Flange 3", 150 lb RF, ANSI B16.5 / 316L
OE	Flange 3", 150 lb FF, ANSI B16.5 / 316L
PA	Flange 3", 300 lb RF, ANSI B16.5 / 316L
PE	Flange 3", 300 lb FF, ANSI B16.5 / 316L
JA	Flange 3 ½", 150 lb RF, ANSI B16.5 / 316L
SA	Flange 4", 150 lb RF, ANSI B16.5 / 316L
UA	Flange 4", 300 lb RF, ANSI B16.5 / 316L
AU	Flange DN 50, 10K RF, JIS / 316L
HU	Flange DN 65, 10K RF, JIS / 316L
BU	Flange DN 80, 10K RF, JIS / 316L
CU	Flange DN 100, 10K RF, JIS / 316L

LBV331 type code

Certification

XX	without
CX	ATEX II 1G, ½ G, 2G Ex ia IIC T6
CK	ATEX II 1G, ½ G, 2G Ex ia IIC T6 + 1D, 1/2D, 2D Ex tD IP66 T
LX	ATEX II ½ G, 2G Ex d IIC T6
LK	ATEX II ½ G, 2G Ex d IIC T6 + 1D, 1/2 D, 2D Ex tD IP66 T
GX	ATEX II 1D, ½ D, 2D Ex tD IP66 T

Execution / Process temperature

A	Standard / –50 °C ... +150 °C
B	With spacer / –50 °C ... +250 °C
C	Detection of solids in water / –50 °C ... +150 °C

Process connection / Material (see below)

Electronics

C	Contact-free switch 20...253VAC(DC)
R	Relay (DPDT) 20...72VDC / 20...253VAC(3A)
T	Transistor (NPN/PNP) 10...55VDC
N	NAMUR signal

Housing / Enclosure rating

K	Plastic / IP66, IP67
A	Aluminum / IP66, IP67
V	Stainless steel (investment casting) 316L / IP66, IP67
8	Stainless steel (electropolished) 316L / IP66, IP67

Cable entry / Male connector connection

M	M20 x 1.5 / Without
N	½" NPT / Without

Length 180 ... 6,000 mm

LBV 331 -							X	

Not all variants of the type code can be combined!

Process connection / Material

GC	Thread G 1 (DIN 3852-A) PN 16 / 316L
GR	Thread G 1 (DIN 3852-A) PN 16 / 316L,Ra< 0.8µm
GD	Thread G 1 ½ (DIN 3852-A) PN 16 / 316L
GT	Thread G 1 ½ (DIN 3852-A) PN 16 / 316L,Ra< 0.8µm
ND	Thread 1 ½" NPT (ASME B1.20.1) PN 16 / 316L
NT	Thread 1 ½" NPT (ASME B1.20.1) PN 16 / 316L,Ra< 0.8µm
CT	Tri-Clamp 1 ½" / 316L Ra< 0.8µm
CV	Tri-Clamp 2" / 316L Ra< 0.8µm
CQ	Tri-Clamp 2 ½" / 316L Ra< 0.8µm
CM	Tri-Clamp 3 ½" / 316L Ra< 0.8µm
RP	Pipe connection, DN 40, PN 40, DIN 11851 / 316L Ra< 0.8µm
RF	Pipe connection, DN 40, PN 40, DIN 11864-1 form A / 316L Ra< 0.8µm
RH	Pipe connection, DN 65, PN 25, DIN 11851 / 316L Ra< 0,8µm
TV	Tuchenhagen Varivent,DN 32..,1 ½".. PN 25 / 316L Ra< 0.8µm
C2	Bundle clamp, DN 40, PN 40, DIN,11864-3 form A / 316L Ra< 0.8µm
BF	Flange, DN 32, PN 40, form C, DIN 2501 / 316L
DF	Flange, DN 40, PN 40, form C, DIN 2501 / 316L
EF	Flange, DN 50, PN 40, form C, DIN 2501 / 316L
4F	Flange, DN 65, PN 16, form C, DIN 2501 / 316L
No error	Flange, DN 80, PN 40, form C, DIN 2501 / 316L
ZF	Flange, DN 100, PN 6, form C, DIN 2501 / 316L

MF	Flange DN 100, PN 16, form C, DIN2501 / 316L
OF	Flange DN 100, PN 40, form C, DIN2501 / 316L
3F	Flange DN 125, PN 6, form C, DIN2501 / 316L
QF	Flange DN 150, PN 16, form C, DIN2501 / 316L
2F	Flange DN 200, PN 10, form C, DIN2501 / 316L
EB	Flange DN 50, PN 40 EN1092-1 form B1 / 316L
DA	Flange 1 ½" 150 lb RF, ANSI B16.5 / 316L
EA	Flange 1 ½" 300 lb RF, ANSI B16.5 / 316L
HA	Flange 2" 150 lb RF, ANSI B16.5 / 316L
IA	Flange 2" 300 lb RF, ANSI B16.5 / 316L
OA	Flange 3" 150 lb RF, ANSI B16.5 / 316L
OE	Flange 3" 150 lb FF, ANSI B16.5 / 316L
PA	Flange 3" 300 lb RF, ANSI B16.5 / 316L
PE	Flange 3" 300 lb FF, ANSI B16.5 / 316L
JA	Flange 3 ½" 150 lb RF, ANSI B16.5 / 316L
SA	Flange 4" 150 lb RF, ANSI B16.5 / 316L
UA	Flange 4" 300 lb RF, ANSI B16.5 / 316L
AU	Flange DN 50, 10K RF, JIS / 316L
HU	Flange DN 65, 10K RF, JIS / 316L
BU	Flange DN 80, 10K RF, JIS / 316L
CU	Flange DN 100, 10K RF, JIS / 316L