

SITRANS L Level instruments

Point level measurement - Electro-mechanical switches

SITRANS LVS200

Overview



SITRANS LVS200 is a vibrating point level switch for high or low levels of bulk solids

Benefits

- High resistance to mechanical forces
- Strong vibration resistance to high bulk material loads
- Rotatable enclosure
- Suitable for low density material: standard version, 20 g/l (1.3 lb/ft³); liquid/solid interface version, 50 g/l (3 lb/ft³), and low density option min. 5 g/l (0.3 lb/ft³)
- Customer desired extensions up to 20000 mm (787")
- Optional detection of solids within liquid
- Durable short fork option with 165 mm (6.5 ft) insertion length

Application

The standard LVS200 detects high, low or demand levels of dry bulk solids in bins, silos or hoppers. The liquid/solid interface version can also detect settled solids within liquids or solids within confined spaces such as feed pipes. It is designed to ignore liquids in order to detect the interface between a solid and a liquid.

A pipe extension version is available with either the standard or liquid/solid interface electronics and fork, separated by a customer supplied 1" pipe.

SITRANS LVS200 has an optional 4 to 20 mA output for monitoring buildup on the fork to determine when preventative maintenance should be performed in sticky applications.

The LVS200 has a compact design and can be top, side or angle mounted. The vibrating fork design ensures the tines are kept clean. The unique design of the fork and crystal assembly eliminates false high level readings even if tines become damaged.

A signal from the electronic circuit excites a crystal in the probe causing the fork to vibrate. If the fork is covered by material, the change in vibration is detected by the electronic circuitry which causes the relay to change state after a one second delay. When the fork is free from material pressure, full vibration resumes and the relay reverts to its normal condition.

- Key Applications: dry bulk solids in bins, silos, hoppers or settled solids within liquids (interface version)

Technical specifications

Mode of operation

Measuring principle Vibrating point level switch

Input

Measured variable High, low and demand

Measuring frequency

- Standard 125 Hz
- Liquid/solid interface version 350 Hz

Output

- PNP Open collector:
Permanent load max. 0.4 A, short-circuit and overload protected
Turn-on voltage: max. 50 V (reverse protection)

- 2-wire without contact

Load current:

- min. 10 mA
- max. 500 mA permanent
- max. 2 A < 200 ms
- max. 5 A < 50 ms

Voltage drop on the electronic module: max. 7 V with closed electric circuit

Cutoff current with open electric circuit: max. 5 mA

- Relays

- Version with 1 relay
- Version with 2 relays

SPDT relay

DPDT relay

- Relay delay

- From loss of vibration: approximately 1 second
- From resumption of vibration: approximately 1 to 2 seconds

- Signal delay

- Probe uncovered to covered: approximately 1 second
- Probe covered to uncovered: approximately 1 to 2 seconds

- Relay fail-safe

High or low, switch selectable

- Alarm output

- Relay 8 A at 250 V AC, non-inductive
- Relay 5 A at 30 V DC, non-inductive

- mA output

8/16 mA or 4 to 20 mA

- Resolution

4 to 20 mA $\pm$ 0.1 mA

Sensitivity

High or low, switch selectable

Rated operating conditions

Installation conditions

- Location Indoor/outdoor

Ambient conditions

- Ambient temperature -40 to +60 °C (-40 to +140 °F)
- Installation category III
- Pollution degree 2

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Medium conditions

• Process temperature	• All except CSA Class II, Group G: -40 to +150 °C (-40 to +302 °F) • CSA Class II, Group G: -40 to +140 °C (-40 to +284 °F), CSA temperature code T3B
• Max. threaded bushing temperature	+80 °C (+176 °F)
• Max. enclosure surface temperature (Category 2D)	+90 °C (+194 °F)
• Max. extension surface temperature (Category 1D)	+150 °C (+302 °F)
• Pressure (vessel)	max. 10 bar (145 psi) European Pressure Directive 97/23/EC: Category 1
• Minimum material density	• standard version: approx. 20 g/l (1.2 lb/ft³) • liquid/solid interface version: approx. 50 g/l (3 lb/ft³) • optional low density version: approx. 5 g/l (0.3 lb/ft³)

Design

• Material	
- Enclosure	Epoxy coated aluminum
• Process connection	• Thread 1½" NPT [(Taper), ANSI/ASME B1.20.1], R 1½" [(BSPT), EN 10226] and flange options • Optional sliding bushing with 2" NPT [(Taper), ANSI/ASME B1.20.1] or BSP thread • Thread material: stainless steel 303 (1.4301)
• Tine material	Stainless steel 316Ti (1.4571), PTFE-coated tines are available upon special request
• Degree of protection	IP65/Type 4/NEMA 4
• Conduit entry	2 x M20x1.5 or 2 x ½" NPT
• Weight	• Standard version, no extensions: approx. 2.0 kg (4.4 lbs) • Solids/liquids version, no extensions: approx. 1.9 kg (4.2 lbs)

Power supply

- 19 to 230 V AC, +10%, 50 to 60 Hz, 8 VA
- 19 to 55 V DC, +10%, 1.5 W

Certificates and approvals

- CSA/FM General Purpose
- CE
- CSA/FM Dust Ignition Proof
- ATEX II 1/2 D
- CSA/FM IS Class I, II, III Div. 1, Groups A, B, C, D, E, F, G, FM Class 1, Aex ia IIC, CSA Class 1, Ex ia IIC, available only with power supply option 5
- ATEX II 1G and 1/2 G Eex ia IIC; ATEX II 1D and 1/2 D, available only with power supply option 5

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Selection and Ordering data

Order No.

SITRANS LVS200, standard

Vibrating point level switch for high or low levels of bulk solids

Power supply

19 to 230 V AC, 19 to 55 V DC, one relay output (SPDT)

19 to 230 V AC, 19 to 55 V DC, two relay outputs (DPDT)

18 to 50 V DC PNP

19 to 230 V AC/DC without contact, 2-wire loop powered¹⁾

7 to 9 V DC (requires NAMUR switch amplifier)

NAMUR IEC 60947-5-6, 2-wire²⁾

8/16 mA or 4 to 20 mA; 12.5 to 35 V DC, 2-wire³⁾

19 to 230 V AC, 19 to 55 V DC, one relay output (SPDT) basic version⁴⁾ and ⁵⁾

Process temperature

Without temperature isolator

With temperature isolator

Separated enclosure - cable length 1.5 m (4.92 ft)
[max. temperature process +180 °C (+356 °F)/max. temperature electronics +80 °C (+176 °F)]

Separated enclosure - cable length 4.0 m (13.12 ft)
[max. temperature process +180 °C (+356 °F)/max. temperature electronics +80 °C (+176 °F)]

Process connection

Threaded

R 1½" [(BSPT), EN 10226]

1½" NPT [(Taper), ANSI/ASME B1.20.1]

G 2" [(BSPP), EN ISO 228-1], sliding sleeve [min. length 500 mm (19.69")]⁶⁾

2" NPT [(Taper), ANSI/ASME B1.20.1], sliding sleeve [min. length 500 mm (19.69")]⁶⁾

Flanged

DN100 PN 6, EN1092-1 (1.4541/321)

DN100 PN 16, EN1092-1 (1.4541/321)

2" ASME 150 lbs B16.5 (1.4541/321)

3" ASME 150 lbs B16.5 (1.4541/321)

4" ASME 150 lbs B16.5 (1.4541/321)

Extension length

Stainless steel 304 (1.4301)

Standard length, 230 mm (9.06")⁷⁾

Add order code Y01 and plain text: "Insertion length ... mm"

• 300 to 500 mm (11.81 to 19.69")⁷⁾

• 501 to 750 mm (19.72 to 29.53")⁷⁾

• 751 to 1000 mm (29.57 to 39.37")⁷⁾

• 1001 to 1250 mm (39.41 to 49.21")⁷⁾

• 1251 to 1500 mm (49.25 to 59.06")⁷⁾

• 1501 to 1750 mm (59.09 to 68.90")⁷⁾

• 1751 to 2000 mm (68.94 to 78.74")⁷⁾

• 2001 to 2250 mm (78.78 to 88.58")⁷⁾

• 2251 to 2500 mm (88.62 to 98.43")⁷⁾

• 2501 to 2750 mm (98.46 to 108.27")⁷⁾

• 2751 to 3000 mm (108.31 to 118.11")⁷⁾

• 3001 to 3250 mm (118.15 to 127.95")⁷⁾

• 3251 to 3500 mm (127.99 to 137.80")⁷⁾

• 3501 to 3750 mm (137.83 to 147.64")⁷⁾

• 3751 to 4000 mm (147.68 to 157.48")⁷⁾

• 4001 to 4250 mm (157.52 to 167.32")⁷⁾

• 4251 to 4500 mm (167.36 to 177.16")⁷⁾

• 4501 to 4750 mm (177.20 to 187.00")⁷⁾

• 4751 to 5000 mm (187.04 to 196.85")⁷⁾

• 5001 to 5250 mm (197.01 to 206.81")⁷⁾

• 5251 to 5500 mm (206.94 to 216.75")⁷⁾

• 5501 to 5750 mm (216.98 to 226.78")⁷⁾

• 5751 to 6000 mm (227.02 to 236.82")⁷⁾

• 6001 to 6250 mm (237.06 to 246.87")⁷⁾

• 6251 to 6500 mm (247.10 to 256.90")⁷⁾

• 6501 to 6750 mm (257.14 to 266.94")⁷⁾

• 6751 to 7000 mm (267.18 to 276.98")⁷⁾

• 7001 to 7250 mm (277.22 to 287.02")⁷⁾

• 7251 to 7500 mm (287.26 to 297.06")⁷⁾

• 7501 to 7750 mm (297.30 to 307.10")⁷⁾

• 7751 to 8000 mm (307.34 to 317.14")⁷⁾

• 8001 to 8250 mm (317.38 to 327.18")⁷⁾

• 8251 to 8500 mm (327.42 to 337.22")⁷⁾

• 8501 to 8750 mm (337.46 to 347.26")⁷⁾

• 8751 to 9000 mm (347.50 to 357.30")⁷⁾

• 9001 to 9250 mm (357.54 to 367.34")⁷⁾

• 9251 to 9500 mm (367.58 to 377.38")⁷⁾

• 9501 to 9750 mm (377.62 to 387.42")⁷⁾

• 9751 to 10000 mm (387.66 to 397.46")⁷⁾

• 10001 to 10250 mm (397.70 to 407.50")⁷⁾

• 10251 to 10500 mm (407.74 to 417.54")⁷⁾

• 10501 to 10750 mm (417.78 to 427.58")⁷⁾

• 10751 to 11000 mm (427.82 to 437.62")⁷⁾

• 11001 to 11250 mm (437.86 to 447.66")⁷⁾

• 11251 to 11500 mm (447.90 to 457.70")⁷⁾

• 11501 to 11750 mm (457.94 to 467.74")⁷⁾

• 11751 to 12000 mm (467.98 to 477.78")⁷⁾

• 12001 to 12250 mm (478.02 to 487.82")⁷⁾

• 12251 to 12500 mm (488.06 to 497.86")⁷⁾

• 12501 to 12750 mm (498.10 to 507.90")⁷⁾

• 12751 to 13000 mm (508.14 to 517.94")⁷⁾

• 13001 to 13250 mm (518.18 to 527.98")⁷⁾

• 13251 to 13500 mm (528.22 to 538.02")⁷⁾

• 13501 to 13750 mm (538.26 to 548.06")⁷⁾

• 13751 to 14000 mm (548.30 to 558.10")⁷⁾

• 14001 to 14250 mm (558.34 to 568.14")⁷⁾

• 14251 to 14500 mm (568.38 to 578.18")⁷⁾

• 14501 to 14750 mm (578.42 to 588.22")⁷⁾

• 14751 to 15000 mm (588.46 to 598.26")⁷⁾

• 15001 to 15250 mm (598.50 to 608.30")⁷⁾

• 15251 to 15500 mm (608.54 to 618.34")⁷⁾

• 15501 to 15750 mm (618.58 to 628.38")⁷⁾

• 15751 to 16000 mm (628.62 to 638.42")⁷⁾

• 16001 to 16250 mm (638.66 to 648.46")⁷⁾

• 16251 to 16500 mm (648.70 to 658.50")⁷⁾

• 16501 to 16750 mm (658.74 to 668.54")⁷⁾

• 16751 to 17000 mm (668.78 to 678.58")⁷⁾

• 17001 to 17250 mm (678.82 to 688.62")⁷⁾

• 17251 to 17500 mm (688.86 to 698.66")⁷⁾

• 17501 to 17750 mm (698.90 to 708.70")⁷⁾

• 17751 to 18000 mm (708.94 to 718.74")⁷⁾

• 18001 to 18250 mm (718.98 to 728.78")⁷⁾

• 18251 to 18500 mm (729.02 to 738.82")⁷⁾

• 18501 to 18750 mm (739.06 to 748.86")⁷⁾

• 18751 to 19000 mm (749.10 to 758.90")⁷⁾

• 19001 to 19250 mm (759.14 to 768.94")⁷⁾

• 19251 to 19500 mm (769.18 to 778.98")⁷⁾

• 19501 to 19750 mm (779.22 to 789.02")⁷⁾

• 19751 to 20000 mm (789.26 to 799.06")⁷⁾

• 20001 to 20250 mm (799.30 to 809.10")⁷⁾

• 20251 to 20500 mm (809.34 to 819.14")⁷⁾

• 20501 to 20750 mm (819.38 to 829.18")⁷⁾

• 20751 to 21000 mm (829.42 to 839.22")⁷⁾

• 21001 to 21250 mm (839.46 to 849.26")⁷⁾

• 21251 to 21500 mm (849.50 to 859.30")⁷⁾

• 21501 to 21750 mm (859.54 to 869.34")⁷⁾

• 21751 to 22000 mm (869.58 to 879.38")⁷⁾

• 22001 to 22250 mm (879.62 to 889.42")⁷⁾

• 22251 to 22500 mm (889.66 to 899.46")⁷⁾

• 22501 to 22750 mm (899.70 to 909.50")⁷⁾

• 22751 to 23000 mm (909.74 to 919.54")⁷⁾

• 23001 to 23250 mm (919.78 to 929.58")⁷⁾

• 23251 to 23500 mm (929.82 to 939.62")⁷⁾

• 23501 to 23750 mm (939.86 to 949.66")⁷⁾

• 23751 to 24000 mm (949.90 to 959.70")⁷⁾

• 24001 to 24250 mm (959.94 to 969.74")⁷⁾

• 24251 to 24500 mm (969.98 to 979.78")⁷⁾

• 24501 to 24750 mm (980.02 to 989.82")⁷⁾

• 24751 to 25000 mm (990.06 to 999.86")⁷⁾

• 25001 to 25250 mm (1000.10 to 1009.90")⁷⁾

• 25251 to 25500 mm (1010.14 to 1019.94")⁷⁾

• 25501 to 25750 mm (1020.18 to 1029.98")⁷⁾

• 25751 to 26000 mm (1030.22 to 1040.02")⁷⁾

• 26001 to 26250 mm (1040.26 to 1050.06")⁷⁾

• 26251 to 26500 mm (1050.30 to 1060.10")⁷⁾

• 26501 to 26750 mm (1060.34 to 1070.14")⁷⁾

• 26751 to 27000 mm (1070.38 to 1080.18")⁷⁾

• 27001 to 27250 mm (1080.42 to 1090.22")⁷⁾

• 27251 to 27500 mm (1090.46 to 1100.26")⁷⁾

• 27501 to 27750 mm (1100.50 to 1110.30")⁷⁾

• 27751 to 28000 mm (1110.54 to 1120.34")⁷⁾

• 28001 to 28250 mm (1120.58 to 1130.38")⁷⁾

• 28251 to 28500 mm (1130.62 to 1140.42")⁷⁾

• 28501 to 28750 mm (1140.66 to 1150.46")⁷⁾

• 28751 to 29000 mm (1150.70 to 1160.50")⁷⁾

• 29001 to 29250 mm (1160.74 to 1170.54")⁷⁾

• 29251 to 29500 mm (1170.78 to 1180.58")⁷⁾

• 29501 to 29750 mm (1180.82 to 1190.62")⁷⁾

• 29751 to 30000 mm (1190.86 to 1200.66")⁷⁾

• 30001 to 30250 mm (1200.90 to 1210.70")⁷⁾

• 30251 to 30500 mm (1210.94 to 1220.74")⁷⁾

• 30501 to 30750 mm (1220.98 to 1230.78")⁷⁾

• 30751 to 31000 mm (1231.02 to 1240.82")⁷⁾

• 31001 to 31250 mm (1241.06 to 1250.86")⁷⁾

• 31251 to 31500 mm (1251.10 to 1260.90")⁷⁾

• 31501 to 31750 mm (1261.14 to 1270.94")⁷⁾

• 31751 to 32000 mm (1271.18 to 1280.98")⁷⁾

• 32001 to 32250 mm (1281.22 to 1291.02")⁷⁾

• 32251 to 32500 mm (1291.26 to 1301.06")⁷⁾

• 32501 to 32750 mm (1301.30 to 1311.10")⁷⁾

• 32751 to 33000 mm (1311.34 to 1321.14")⁷⁾

• 33001 to 33250 mm (1321.38 to 1331.18")⁷⁾

• 33251 to 33500 mm (1331.42 to 1341.22")⁷⁾

• 33501 to 33750 mm (1341.46 to 1351.26")⁷⁾

• 33751 to 34000 mm (1351.50 to 1361.30")⁷⁾

• 34001 to 34250 mm (1361.54 to 1371.34")⁷⁾

• 34251 to 34500 mm (1371.58 to 1381.38")⁷⁾

• 34501 to 34750 mm (1381.62 to 1391.42")⁷⁾

• 34751 to 35000 mm (1391.66 to 1401.46")⁷⁾

• 35001 to 35250 mm (1401.70 to 1411.50")⁷⁾

• 35251 to 35500 mm (1

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SITRANS LVS200

Selection and Ordering data	Order No.
SITRANS LVS200, liquids/solids interface Vibrating point level switch for interface applications, and high load applications with short insertion requirements	7 ML 5 7 3 2 - A 0
Power supply 19 to 230 V AC, 19 to 55 V DC, one relay output (SPDT) 19 to 230 V AC, 19 to 55 V DC, two relay outputs (DPDT) 18 to 50 V DC PNP 19 to 230 V AC/DC without contact, 2-wire loop powered ¹⁾ 8/16 mA or 4 to 20 mA; 12.5 to 35 V DC, 2-wire ²⁾	1 2 3 4 5
Process temperature Without temperature isolator With temperature isolator Separated enclosure - cable length 1.5 m (4.92 ft) [max. temperature process +180 °C (+356 °F)/max. temperature electronics +80 °C (+176 °F)] Separated enclosure - cable length 4.0 m (13.12 ft) [max. temperature process +180 °C (+356 °F)/max. temperature electronics +80 °C (+176 °F)]	A B C D
Process connection <u>Threaded</u> R 1½" [(BSPT), EN 10226] 1½" NPT [(Taper), ANSI/ASME B1.20.1] G 2" [(BSPP), EN ISO 228-1], sliding sleeve [min. length 500 mm (19.69")] 2" NPT [(Taper), ANSI/ASME B1.20.1], sliding sleeve [min. length 500 mm (19.69")] <u>Flanged</u> DN100 PN 6, EN1092-1 (1.4541/321) DN100 PN 16, EN1092-1 (1.4541/321) 2" ASME 150 lbs B16.5 (1.4541/321) 3" ASME 150 lbs B16.5 (1.4541/321) 4" ASME 150 lbs B16.5 (1.4541/321)	A B C D E F G H J
Extension length <u>Stainless steel 304 (1.4301)³⁾</u> Standard length, 165 mm (6.50") <u>Add order code Y01 and plain text: "Insertion length ... mm"</u> 200 to 500 mm (7.87 to 19.69") ³⁾ 501 to 750 mm (19.72 to 29.53") ³⁾ 751 to 1000 mm (29.57 to 39.37") ³⁾ 1001 to 1250 mm (39.41 to 49.21") ³⁾ 1251 to 1500 mm (49.25 to 59.06") ³⁾ 1501 to 1750 mm (59.09 to 68.90") ³⁾ 1751 to 2000 mm (68.94 to 78.74") ³⁾ 2001 to 2250 mm (78.78 to 88.58") ³⁾ 2251 to 2500 mm (88.62 to 98.43") ³⁾ 2501 to 2750 mm (98.46 to 108.27") ³⁾ 2751 to 3000 mm (108.31 to 118.11") ³⁾ 3001 to 3250 mm (118.15 to 127.95") ³⁾ 3251 to 3500 mm (127.99 to 137.80") ³⁾ 3501 to 3750 mm (137.83 to 147.64") ³⁾ 3751 to 4000 mm (147.68 to 157.48") ³⁾ <u>Stainless Steel 316TI (1.4571)</u> Standard length, 165 mm (6.50") ⁴⁾ <u>Add order code Y01 and plain text: "Insertion length ... mm"</u> 200 to 500 mm (7.87 to 19.69") ⁴⁾ 501 to 750 mm (19.72 to 29.53") ⁴⁾ 751 to 1000 mm (29.57 to 39.37") ⁴⁾ 1001 to 1250 mm (39.41 to 49.21") ⁴⁾	11 12 13 14 15 16 17 18 21 22 23 24 25 26 27 28 31 32 33 34 35

Selection and Ordering data	Order No.
SITRANS LVS200, liquids/solids interface Vibrating point level switch for interface applications, and high load applications with short insertion requirements	7 ML 5 7 3 2 - A 0
1251 to 1500 mm (49.25 to 59.06") ⁴⁾ 1501 to 1750 mm (59.09 to 68.90") ⁴⁾ 1751 to 2000 mm (68.94 to 78.74") ⁴⁾ 2001 to 2250 mm (78.78 to 88.58") ⁴⁾ 2251 to 2500 mm (88.62 to 98.43") ⁴⁾ 2501 to 2750 mm (98.46 to 108.27") ⁴⁾ 2751 to 3000 mm (108.31 to 118.11") ⁴⁾ 3001 to 3250 mm (118.15 to 127.95") ⁴⁾ 3251 to 3500 mm (127.99 to 137.80") ⁴⁾ 3501 to 3750 mm (137.83 to 147.64") ⁴⁾ 3751 to 4000 mm (147.68 to 157.48") ⁴⁾	36 37 38 41 42 43 44 45 46 47 48
Material process connection/extension Stainless steel 304 (1.4301) Stainless steel 316 TI (1.4571)	1 2
Approvals CSA/FM Dust Ignition Proof ATEX II 1/2 D CSA/FM General Purpose CE	A B C D
Further designs Please add "-Z" to Order No. and specify Order code(s). Total insertion length: Enter the total insertion length in plain text description, max. 4000 mm (157.48") Signal bulb inserted in M20 cable gland ⁵⁾	Order code Y01 A20
Instruction manual Multi-language This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and instruction manual library.	Order No. 7ML1998-5FT62
Spare parts Replacement Electronics Module (350 Hz) [19 to 230 V AC, 19 to 55 V DC, one relay output (SPDT)] Sliding sleeve, 2" [(BSPP), EN ISO 228-1] Sliding sleeve, 2" NPT [(Taper), ANSI/ASME B1.20.1]	7ML1830-1KM 7ML1830-1JM 7ML1830-1JN

¹⁾ Available with approval options B, C, D only

²⁾ Available only with approval option D only

³⁾ Available with material process connection/extension option 1 only

⁴⁾ Available with material process connection/extension option 2 only

⁵⁾ Available with approval options C, D only

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SITRANS LVS200

Selection and Ordering data	Order No.
SITRANS LVS200, pipe extension Vibrating point level switch for high or low levels of bulk solids Extended using 1" pipe extension (customer supplied)	7 M L 5 7 3 3 -
Power supply 19 to 230 V AC, 19 to 55 V DC, one relay output (SPDT) 19 to 230 V AC, 19 to 55 V DC, two relay outputs (DPDT) 18 to 50 V DC PNP 19 to 230 V AC/DC without contact, 2-wire loop powered ¹⁾ 7 to 9 V DC (requires NAMUR switch amplifier) NAMUR IEC 60947-5-6, 2-wire ²⁾ 8/16 mA or 4 to 20 mA; 12.5 to 35 V DC, 2-wire ³⁾	1 2 3 4 5 6
Process temperature Up to +150 °C (+302 °F)	A
Process connection <u>Threaded</u> R 1½" [(BSPT), EN 10226] 1½" NPT [(Taper), ANSI/ASME B1.20.1] <u>Flanged</u> DN100 PN 6, EN1092-1 (1.4541/321) DN100 PN 16, EN1092-1 (1.4541/321) 2" ASME 150 lbs B16.5 (1.4541/321) 3" ASME 150 lbs B16.5 (1.4541/321) 4" ASME 150 lbs B16.5 (1.4541/321)	A B C D E F G
Process connection material Stainless steel 304 (1.4301) Stainless steel 316 Ti (1.4571)	1 2
Extension length Customer supplied 1" pipe extension Length: 300 to 3800 mm (11.81 to 149.61")	1
Application type Dry bulk solids (125 Hz) Liquids/solids interface (350 Hz)	1 2
Approvals CSA/FM Dust Ignition Proof ATEX II 1/2 D CSA/FM General Purpose CE CSA/FM IS Class I, II, III Div. 1, Groups A, B, C, D, E, F, G, FM Class 1, Aex ia IIC, CSA Class 1, Ex ia IIC ⁴⁾ ATEX II 1G and 1/2G Eex ia IIC; ATEX II 1D and 1/2D ⁴⁾	A B C D E F
Further designs Please add "-Z" to Order No. and specify Order code(s). Enter the total insertion length in plain text description, min. 300 mm (11.81") max. 3800 mm (149.61") Enhanced sensitivity > 5 g/l via electronics and increased fork length to 195 mm (7.68 ") Signal bulb inserted in M20 cable gland ⁵⁾ NAMUR 8 to 16 mA switch amplifiers	Order code Y01 K05 A20 A15

Selection and Ordering data		Order No.
SITRANS LVS200, pipe extension Vibrating point level switch for high or low levels of bulk solids Extended using 1" pipe extension (customer supplied)		
Instruction manual Multi-language Note: One instruction manual is shipped with this product. This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Ordering manual library.		7ML1998-5FT62
Spare parts Replacement Electronics Module (125 Hz) [19 to 230 V AC, 19 to 55 V DC, one relay output (SPDT)] Replacement Electronics Module (350 Hz) [19 to 230 V AC, 19 to 55 V DC, one relay output (SPDT)]		7ML1830-1KL 7ML1830-1KM

1) Available with approval options A, B, C, D, E only

2) Available with approval options E and F only

3) Available with approval option D only

4) Available with power supply option 5 only

5) Available with approval options C, D only

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SITRANS LVS200

Selection and Ordering data	Order No.
SITRANS LVS200, cable extended Vibrating point level switch for high or low levels of bulk solids	7 ML 5 7 3 4 - A 0
Power supply 19 to 230 V AC, 19 to 55 V DC, one relay output (SPDT) 19 to 230 V AC, 19 to 55 V DC, two relay outputs (DPDT) 18 to 50 V DC PNP 19 to 230 V AC/DC without contact, 2-wire loop powered ¹⁾ 7 to 9 V DC (requires NAMUR switch amplifier) NAMUR IEC 60947-5-6, 2-wire ²⁾ and ³⁾ 8/16 mA or 4 to 20 mA; 12.5 to 35 V DC, 2-wire ⁴⁾	1 2 3 4 5 6
Process temperature Up to +80 °C (+176 °F)	A
Process connection <u>Threaded</u> R 1½" [(BSPT), EN 10226] 1½" NPT [(Taper), ANSI/ASME B1.20.1] <u>Flanged</u> DN100 PN 6, EN1092-1 (1.4541/321) DN100 PN 16, EN1092-1 (1.4541/321) 2" ASME 150 lbs B16.5 (1.4541/321) 3" ASME 150 lbs B16.5 (1.4541/321) 4" ASME 150 lbs B16.5 (1.4541/321)	A B C D E F G
Extension length 500 to 1000 mm (19.7 to 39.4") [max. length 20000 mm (787.4"), not with Power supply option 5 (max. 10000 mm, 393.7")] <u>Add order code Y01 and plain text: "Insertion length ... mm"</u> 1001 to 2000 mm (39.41 to 78.74") 2001 to 3000 mm (78.78 to 118.11") 3001 to 4000 mm (118.15 to 157.48") 4001 to 5000 mm (157.52 to 196.85") 5001 to 6000 mm (196.89 to 236.22") 6001 to 7000 mm (236.26 to 275.59") 7001 to 8000 mm (275.63 to 314.96") 8001 to 9000 mm (315 to 354.33") 9001 to 10000 mm (354.37 to 393.70") 10001 to 11000 mm (393.74 to 433.07") 11001 to 12000 mm (433.11 to 472.44") 12001 to 13000 mm (472.48 to 511.81") 13001 to 14000 mm (511.85 to 551.18") 14001 to 15000 mm (551.22 to 590.55") 15001 to 16000 mm (590.59 to 629.92") 16001 to 17000 mm (629.96 to 669.29") 17001 to 18000 mm (669.33 to 708.66") 18001 to 19000 mm (708.70 to 748.03") 19001 to 20000 mm (748.07 to 787.40")	10 11 12 13 14 15 16 17 18 20 21 22 23 24 25 26 27 28 30 31
Application type Dry bulk solids (125 Hz) Liquid/solids interface (350 Hz) ⁵⁾	1 2

Selection and Ordering data	Order No.
SITRANS LVS200, cable extended Vibrating point level switch for high or low levels of bulk solids	7 ML 5 7 3 4 - A 0
Approvals CSA/FM Dust Ignition Proof ATEX II 1/2 D CSA/FM General Purpose CE CSA/FM IS Class I, II, III Div. 1, Groups A, B, C, D, E, F, G, FM Class 1, Aex ia IIC, CSA Class 1, Ex ia IIC ⁶⁾ and ⁷⁾ ATEX II 1G and 1/2G Eex ia IIC; ATEX II 1D and 1/2D ^{and 5)}	A B C D E F
Further designs Please add "-Z" to Order No. and specify Order code(s). Enter the total insertion length in plain text description, max. 20000 mm (787.40") Enhanced sensitivity > 5 g/l via electronics and increased fork length to 195 mm (7.68") Signal bulb inserted in M20 cable gland ⁴⁾ NAMUR 8 to 16 mA switch amplifiers	Order code Y01 K05 A20 A15
Instruction manual Multi-language This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and instruction manual library.	Order No. 7ML1998-5FT62
Spare parts Replacement Electronics Module (125 Hz) [19 to 230 V AC, 19 to 55 V DC, one relay output (SPDT)] Replacement Electronics Module (350 Hz) [19 to 230 V AC, 19 to 55 V DC, one relay output (SPDT)]	7ML1830-1KL 7ML1830-1KM

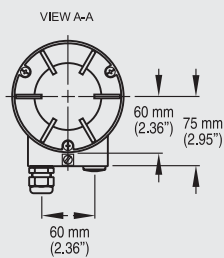
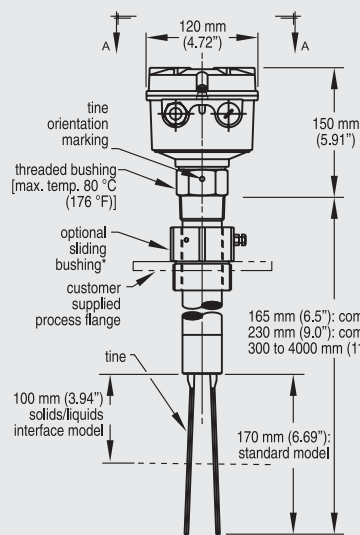
- ¹⁾ Available with approval options A, B, C, D, E only
- ²⁾ Available with approval options E and F only
- ³⁾ Cable length is limited to 10000 mm (393.70")
- ⁴⁾ Available with approval options C, D only
- ⁵⁾ Cable length is limited to 7000 mm (275.59")
- ⁶⁾ Available with power supply option 5 only
- ⁷⁾ Available with application type 1 only

SITRANS L Level instruments

Point level measurement - Electro-mechanical switches

SITRANS LVS200

Dimensional drawings

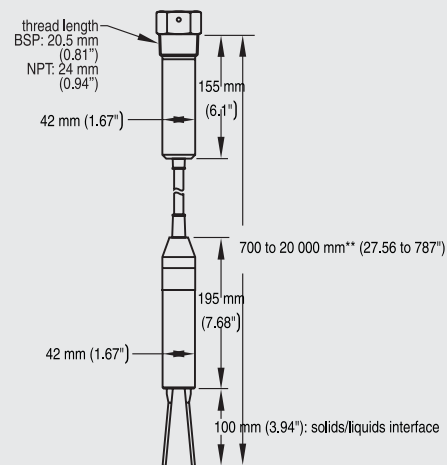


Notes:

*The clamping screws of the sliding bushing must be tightened to 10 Nm.

** Cable version with Liquids/solids interface model option length to 7000 mm (275.59")
Cable version with NAMUR electronics length to 10 000 mm (393.7")

See drawing 23650563 for pipe extended version details. (Pipe is customer supplied.)



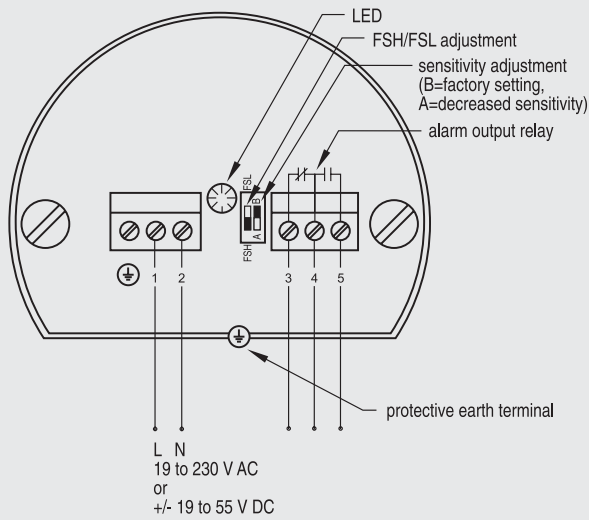
SITRANS LVS200 dimensions

SITRANS L Level instruments

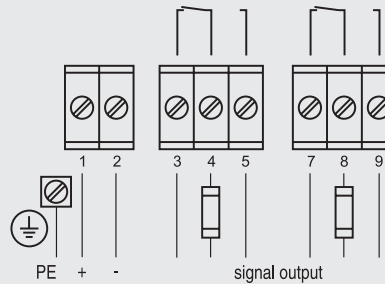
Point level measurement - Electro-mechanical switches

SITRANS LVS200

Schematics

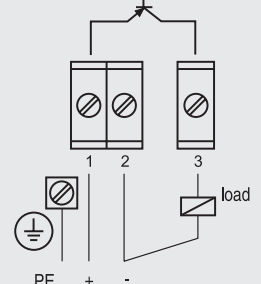


Universal voltage (DPDT relay)



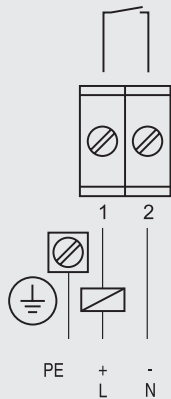
AC
terminal 1: L, terminal 2: N
19 to 230 V AC, + 10 % 50 to 60 Hz, 18 VA
DC
terminal 1: +, terminal 2: -
19 to 55 V DC, + 10 %, 2 W

3-wire PNP



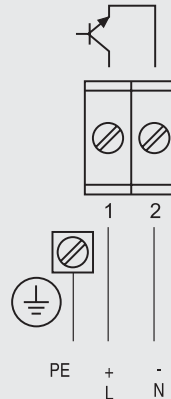
DC
terminal 1: +, terminal 2: -
18 to 50 V DC, + 10 %, 1.5 W

2-wire

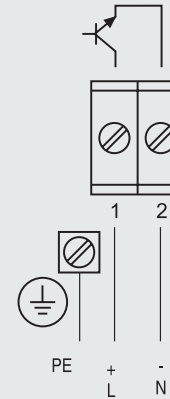


AC
terminal 1: L, terminal 2: N
19 to 230 V AC, + 10 %, 50 to 60 Hz, 1.5 VA
DC
terminal 1: +, terminal 2: -
19 to 230 V DC, + 10 %, 1 W

NAMUR IEC 60947-5-6 8/16 mA or 4 to 20 mA



ca. 7 to 9 V DC,
intrinsically safe
(IEC 60947-5-6)



DC
terminal 1: +, terminal 2: -
12.5 to 36 V DC, + 0 %

SITRANS LVS200 connections

SITRANS L Level instruments

Point level measurement - Ultrasonic switch

Ultrasonic

Overview

Introduction

Ultrasonic measurement is based on the speed of sound. Sound can be used as a measurement tool because there is a measurable time lapse between sound generation and the "hearing" of the sound. This time lapse is then converted into usable information. Ultrasonic sensing equipment generates a sound above 20000 Hz and then interprets the time lapse of the returned echo. The transducer creates the sound and senses the echo and then a transceiver interprets the sound and converts it into information.

Siemens Milltronics ultrasonic units include Sonic Intelligence, a patented signal processing technology. Using unique algorithms, Sonic Intelligence differentiates between true echoes from the material and false echoes from obstructions or electrical noise, providing intelligent processing of echo profiles.

Typical System

Ultrasonic level measurement requires two components: one to generate the sound and catch the echo (transducer) and one to interpret the data and derive a measurement (transceiver). Even though some ultrasonic instruments combine the components in one unit, the individual functionality remains distinct. The measurement output is communicated to the unit, PLCs or PCs for process control.

Principle of Operation

A piezoelectric crystal inside the transducer converts an electrical signal into sound energy, firing a burst into the air which travels to the target and then is reflected back to the transducer. The transducer then acts as a receiving device and converts the sonic energy back into an electrical signal contained in the transceiver. An electronic signal processor analyzes the return echo and calculates the distance between the transducer and the target. The time lapse between firing the sound burst and receiving the return echo is directly proportional to the distance between the transducer and the material in the vessel. This basic principle lies at the heart of the ultrasonic measurement technology and is illustrated in the equation: $\text{Distance} = (\text{Velocity of Sound} \times \text{Time})/2$.

Mode of operation

Common Terms

Attenuation

Denotes a decrease in signal magnitude in transmission from one point to another. Attenuation may be expressed as a scalar ratio of the input magnitude to the output magnitude or in decibels.

Beam angle

The diameter of a conical boundary centered around the axis of transmission when the power (radiating perpendicular to the transducer face on the axis of transmission) is reduced by half (-3 dB).

Blanking distance

Specified zone extending downward from the transducer face in which received echoes are ignored by the transceiver. Blanking distance ignores echoes from ringing.

Echo confidence

The recognition of the validity of the echo as material level. A measure of echo reliability.

Ringing

The inherent nature of the transducer to continue vibrating after the transmit pulse has ceased; the decay of the transmit pulse.

Transducer/Transceiver

A transducer provides the initial ultrasonic pulse and receives its echo. An ultrasonic transducer amplifies the sound wave created by the piezoelectric crystal and transmits that sound wave to the face of the transducer while at the same time dampening the sound wave from the other sides of the crystal.

Transceivers analyze the echo from the transducer to determine the required measurement.

SITRANS L Level instruments

Point level measurement - Ultrasonic switch

Ultrasonic

SIEMENS

Ultrasonic Level Application Questionnaire

Customer information

Contact: _____ Prepared By: _____
Company: _____ Date: _____
Address: _____ Notes on the Application: _____
City: _____ Country: _____
Zip/Postal Code: _____ Phone: () _____
E-mail: _____ Fax: () _____

Tanks/Vessel information

(Supply sketch where possible) Sketch attached ☐

Type: ☐ Storage ☐ Process ☐ Pump station ☐ Open channel
Dimensions: Height: _____ m/ft
Width/Diameter: _____ m/ft

Critical Information

Nozzle Length: _____ cm/in
Nozzle Diameter: _____ cm/in

Tank top: ☐ Open ☐ Flat ☐ Conical ☐ Parabolic
Tank bottom: ☐ Sloped ☐ Flat ☐ Conical ☐ Parabolic
Internal equipment and/or obstructions: ☐ No ☐ Yes Please list _____

Measurement type: ☐ Point Level ☐ Continuous Level ☐ Volume ☐ Flow

Area safety classification: _____

Material

Material being measured: _____ ☐ Liquid ☐ Solid

Material temperature: Norm: _____ C/F Max: _____ C/F

Atmosphere: ☐ Air ☐ Other _____ Homogenous: ☐ Yes ☐ No

Dust: ☐ None ☐ Light ☐ Heavy

Installation

(indicate all that apply)

Power available: _____

Inputs required:

☐ 4-20 mA

☐ Pump Interlocks (#): _____

Outputs required:

☐ 4-20 mA

☐ Relays (#): _____

Communications:

☐ HART ®

☐ PROFIBUS DP

☐ Modbus RTU/ASCII

☐ AB Remote I/O

☐ DeviceNet

☐ None

Products recommended: _____