Level Measurement
Continuous level measurement - Ultrasonic transmitters

SITRANS Probe LU

Overview

SITRANS Probe LU is a 2-wire loop powered ultrasonic transmitter for level, volume and flow monitoring of liquids in open channels, storage vessels and simple process vessels.

Benefits

- Continuous level measurement up to 12 m (40 ft) range
- Easy installation and simple start-up
- Programming using infrared Intrinsically Safe handheld programmer, SIMATIC PDM or HART® Communicator
- Communication using HART or PROFIBUS PA
- ETFE or PVDF transducers for chemical compatibility
- Patented Sonic Intelligence signal processing
- Extremely high signal-to-noise ratio
- Auto False-Echo Suppression for fixed obstruction avoidance
- Level to volume or level to flow conversion

Application

The SITRANS Probe LU is ideal for level monitoring in the water and wastewater industry and chemical storage vessels.

The range of SITRANS Probe LU is 6 or 12 m (20 or 40 ft). Using Auto False-Echo Suppression for fixed obstruction avoidance, as well as an improved signal-to-noise ratio and improved accuracy of 0.15 % of range or 6 mm (0.25"), the Probe LU provides unmatched reliability.
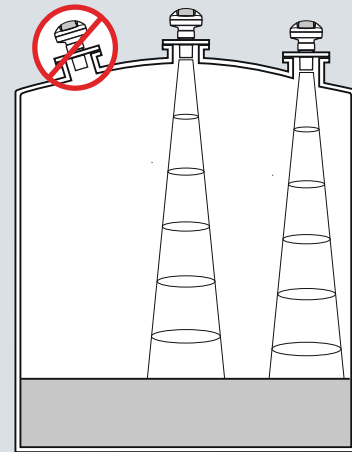
SITRANS Probe LU includes Sonic Intelligence® signal processing from the field-proven Probe and incorporates new echo processing features and the latest micro-processor and communications technology. The Probe LU offers two communications options: HART or PROFIBUS PA (Profile version 3.0, Class B).

The transducer on the Probe LU is available as ETFE or PVDF to suit the chemical conditions of your application. As well, for applications with varying material and process temperatures, the Probe LU incorporates an internal temperature sensor to compensate for temperature changes.
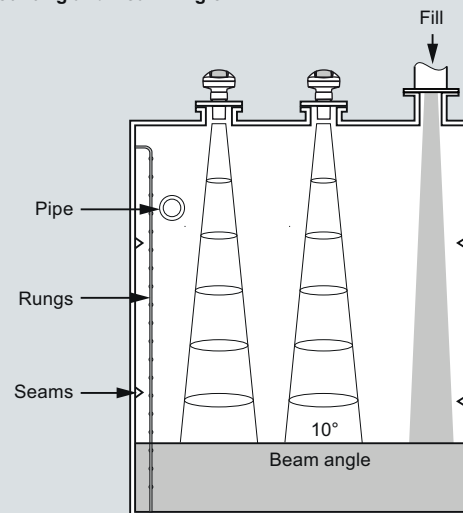
- Key Applications: chemical storage vessels, filter beds, liquid storage vessels

Configuration

Parabolic Mounting

Flat Mounting and Beam Angle

SITRANS Probe LU mounting

■ **Technical specifications**

Mode of operation	
Measuring principle	Ultrasonic level measurement
Typical application	Level measurement in storage vessels and simple process vessels

Inputs	
Measuring range	
• 6 m (20 ft) model	0.25 ... 6 m (10" ... 20 ft)
• 12 m (40 ft) model	0.25 ... 12 m (10" ... 40 ft)
Frequency	54 kHz

Outputs	
mA/HART®	
• Range	4 ... 20 mA
• Accuracy	± 0.02 mA
PROFIBUS PA	Profile 3, Class B

Performance	
Resolution	≤ 3 mm (0.12")
Accuracy	± the greater of 0.15 % of range or 6 mm (0.24")
Repeatability	≤ 3 mm (0.12")
Blanking distance	0.25 m (10")
Update time	≤ 5 seconds
• 4/20 mA/HART version	≤ 5 seconds at 4 mA
• PROFIBUS version	≤ 4 seconds at 15 mA current loop
Temperature compensation	Built-in to compensate over temperature range
Beam angle	10°

Rated operating conditions	
Ambient conditions	
• Location	Indoor/outdoor
• Ambient temperature	-40 ... +80 °C (-40 ... +176 °F)
• Relative humidity/ingress protection	Suitable for outdoor
• Installation category	I
• Pollution degree	4
Medium conditions	
• Temperature at flange or threads	-40 ... +85 °C (-40 ... +185 °F)
• Pressure (vessel)	0.5 bar g (7.25 psi g)

Design	
Material (enclosure)	PBT (Polybutylene Terephthalate)
Degree of protection	Type 4X/NEMA 4X, Type 6/NEMA 6/IP67/IP68 enclosure
Weight	2.1 kg (4.6 lbs)
Cable inlet	2 x M20x1.5 cable gland or 2 x ½" NPT thread
Material (transducer)	ETFE (Ethylene Tetrafluoroethylene) or PVDF (Polyvinylidene Fluoride)

Process connection	
Threaded connection	2" NPT [(Taper), ANSI/ASME B1.20.1]
	R 2" [(BSPT), EN 10226] or G 2" [(BSPP), EN ISO 228-1]
Flange connection	3" (80 mm) universal flange
Other connection	FMS 200 mounting bracket (see page 5/190) or customer supplied mount

Display and Controls	
Interface	Local: LCD display with bar graph
	Remote: Available via HART or PROFIBUS PA
Configuration	Using Siemens SIMATIC PDM (PC) or HART handheld communicator or Siemens infrared handheld programmer
Memory	Non-volatile EEPROM

Power supply	
4 ... 20 mA/HART	Nominal 24 V DC with 550 Ω maximum; maximum 30 V DC 4 ... 20 mA
PROFIBUS PA	12, 13, 15, or 20 mA depending on programming (General Purpose or Intrinsically Safe version)
	per IEC 61158-2

Certificates and Approvals	
General	CSA$_{US/C}$, FM, CE, C-TICK
Marine (only applies to HART communication option)	• Lloyd's Register of Shipping
	• ABS Type Approval
Hazardous	
• Intrinsically Safe (Europe)	ATEX II 1G EEx ia IIC T4
• Intrinsically Safe (USA/Canada)	CSA/FM (barrier required) T4, Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III
• Intrinsically Safe (Australia/New Zealand)	ANZEx Ex ia IIC T4, Tamb = -40 ... +80 °C (-40 ... +176 °F) IP67, IP68
• Intrinsically Safe (International)	IECEx TSA 04.0020X Ex ia IIC T4
• Intrinsically Safe (Brazil)	INMETRO Br-Ex ia IIC T4
• Non-incendive (USA)	FM (no barrier required) T5: Class I, Div. 2, Groups A,B,C, D

Handheld Programmer	
Intrinsically Safe Siemens handheld programmer	Infrared receiver
• Approvals for handheld programmer	IS model with ATEX EEx ia IIC T4 CSA/FM Class I, Div. 1, Groups A, B, C, D
Ambient temperature	-20 ... +40 °C (-5 ... +104 °F)
Interface	Proprietary infrared pulse signal
Power	3 V lithium battery (non-replaceable)

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Level Measurement
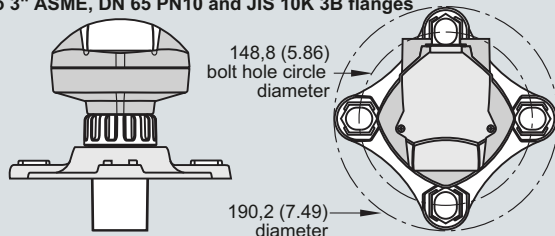## Continuous level measurement - Ultrasonic transmitters

SITRANS Probe LU

Selection and Ordering data	Order No.
SITRANS Probe LU **2-wire, loop powered ultrasonic transmitter for level, volume and flow monitoring of liquids in open channels, storage vessels and simple process vessels.**	C) **7ML5221 -** ■ ■ ■ ■
Enclosure/Cable Inlet	
Plastic (PBT), 2 x M20x1.5 (check Approvals for cable gland details)	1
Plastic (PBT), 2 x ½" NPT (no cable glands supplied)	2
Range/Transducer material	
6 meter (20 ft), ETFE	A
6 meter (20 ft), PVDF Copolymer	B
12 meter (40 ft), ETFE	C
12 meter (40 ft), PVDF Copolymer	D
Process connection	
2" NPT [(Taper), ANSI/ASME B1.20.1]	A
R 2" [(BSPT], EN 10226]	B
G 2" [(BSPP), EN ISO 228-1]	C
Communication/Output	
4 ... 20 mA, HART®	1
PROFIBUS PA	2
Approvals	
General Purpose, FM, CSA, CE, C-TICK	1
FM, Class I, Div. 2[1]	4
Intrinsically Safe, CSA/FM Class I, Div. 1, Groups A, B, C, D (barrier required); Class II, Div. 1, Groups E, F, G; Class III[2]	5
Intrinsically Safe, ATEX II 1G EEx ia IIC T4[2]	6
Intrinsically safe, ATEX II 1 G EEx ia IIC T4, ANZEx, IECEx, INMETRO, CE, C-TICK [3]	7
Intrinsically safe, CSA/FM Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1 Group E, F, G; Class III T4[3]	8

[1] Available with Enclosure/Cable Inlet option 2 only.
[2] Available with communication option 2 only.
[3] Available with communication option 1 only.
C) Subject to export regulations AL: N, ECCN: EAR99

Selection and Ordering data	Order code
Further designs	
Please add "**-Z**" to Order No. and specify Order code(s).	
Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text	**Y15**
Operating Instructions for HART/mA device	Order No.
English	C) **7ML1998-5HT02**
French	C) **7ML1998-5HT12**
German Note: The Operating Instructions should be ordered as a separate item on the order.	C) **7ML1998-5HT32**
Additional Multi-language Quick Start manual This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	C) **7ML1998-5QR81**
Operating Instructions for PROFIBUS PA device	
English	C) **7ML1998-5JB02**
German Note: The Operating Instructions should be ordered as a separate item on the order.	C) **7ML1998-5JB32**
Additional Multi-language Quick Start manual This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	C) **7ML1998-5QV81**
Optional equipment	
Handheld programmer, Intrinsically Safe, EEx ia	**7ML5830-2AH**
Handheld programmer, General Purpose approvals	**7ML1830-2AN**
Handheld programmer, Infrared, Intrinsically Safe, PROFIBUS PA	**7ML5830-2AJ**
HART modem/RS-232 (for use with PC and SIMATIC PDM)	D) **7MF4997-1DA**
HART modem/USB (for use with a PC and SIMATIC PDM)	D) **7MF4997-1DB**
2" NPT locknut, plastic	**7ML1830-1DT**
2" BSPT locknut, plastic	**7ML1830-1DQ**
3" ASME, DN 65 PN 10, JIS 10K 3B ETFE Flange adapter for 2" NPT	**7ML1830-1BT**
3" ASME, DN 65 PN 10, JIS 10K 3B ETFE Flange adapter for 2" BSPT	**7ML1830-1BU**
One General Purpose polymeric cable gland M20x1.5, rated for -20 ... +80 °C (-4 ... +176 °F)	**7ML1930-1AM**
One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F) for General Purpose or ATEX EEx e installations (available for HART only)	**7ML1930-1AP**
One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F) with integrated shield connection (available for PROFIBUS PA)	**7ML1930-1AQ**
SITRANS RD100 Remote display - see Chapter 8	
SITRANS RD200 Remote display - see Chapter 8	
SITRANS RD500 Remote display - see Chapter 8	
Spare Parts	
Plastic lid	**7ML1830-1KB**

C) Subject to export regulations AL: N, ECCN: EAR99
D) Subject to export regulations AL: N, ECCN: EAR99H

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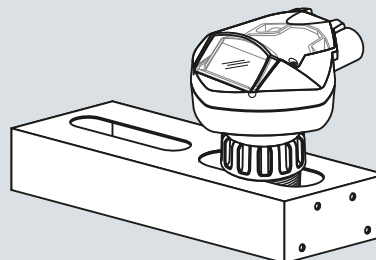
■ Options

Flange adapter for mating 2" NPT or 2" BSP process connections to 3" ASME, DN 65 PN10 and JIS 10K 3B flanges

148,8 (5.86) bolt hole circle diameter

190,2 (7.49) diameter

SITRANS Probe LU optional flange adapter, dimensions in mm (inch)

SITRANS Probe LU with FMS 200 Mounting Bracket

SITRANS Probe LU with optional mounting bracket
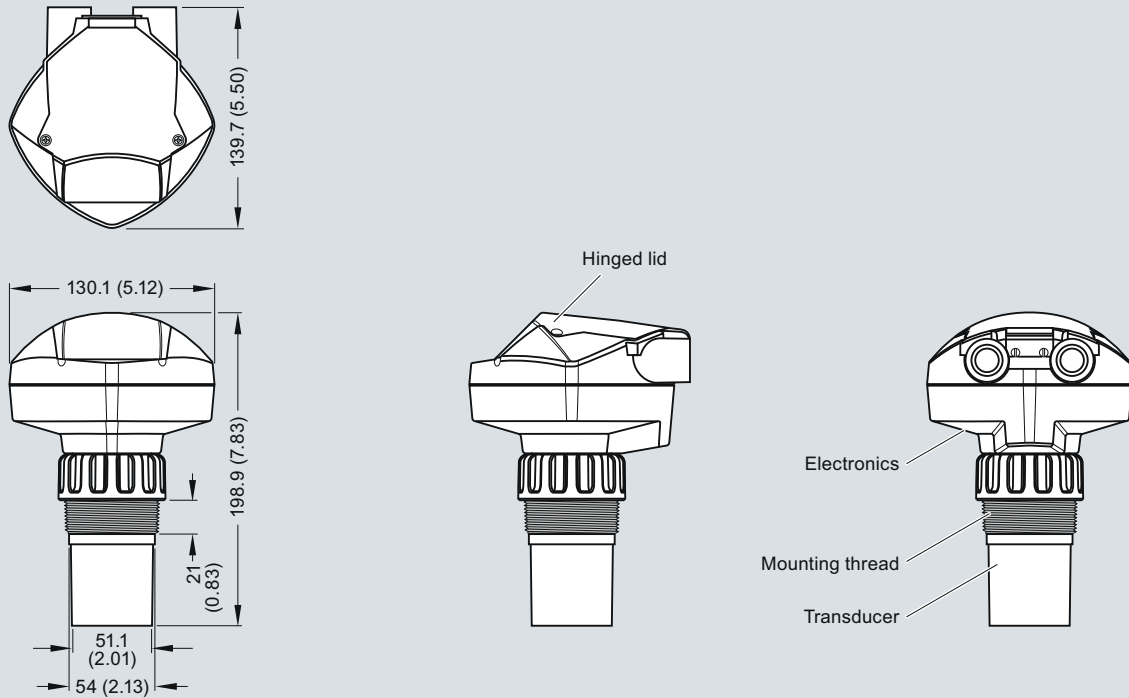
■ Dimensional drawings

139.7 (5.50)

130.1 (5.12)

198.9 (7.83)

21 (0.83)

51.1 (2.01)

54 (2.13)

Hinged lid

Electronics

Mounting thread

Transducer
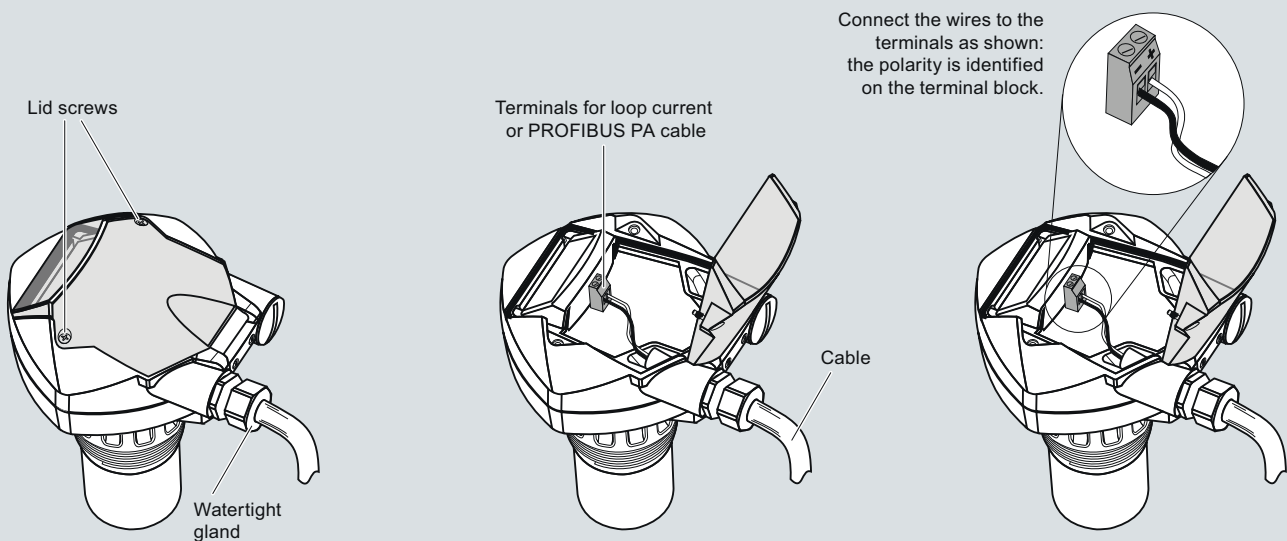
Note: Above model is shown without M20 cable glands or 1/2" NPT conduit connectors.

SITRANS Probe LU, dimensions in mm (inch)

■ Schematics

Connect the wires to the terminals as shown: the polarity is identified on the terminal block.

Lid screws

Terminals for loop current or PROFIBUS PA cable

Cable

Watertight gland

Note:
- HART model above is shown with M20 cable glands. 1/2" NPT threaded connection is also available.
- DC terminal shall be supplied from an SELV source in accordance with IEC-1010-1 Annex H.
- All field wiring must have insulation suitable for rated input voltages.
- Separate cables and conduit may be required to conform to standard instrumentation wiring practices or electrical codes.

SITRANS Probe LU connections

5

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