

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.

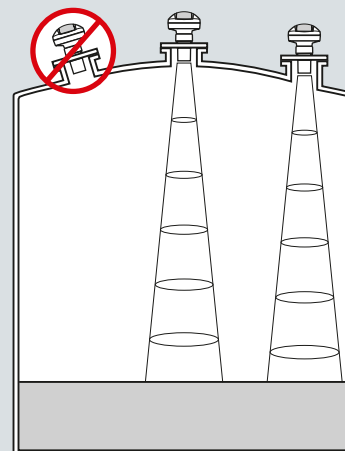
SITRANS Probe LU includes Sonic Intelligence signal processing from the field-proven Probe and incorporates new echo processing features and the latest micro-processor and communications technology. The Probe LU offers two communications options: HART or PROFIBUS PA (Profile version 3.0, Class B).

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.

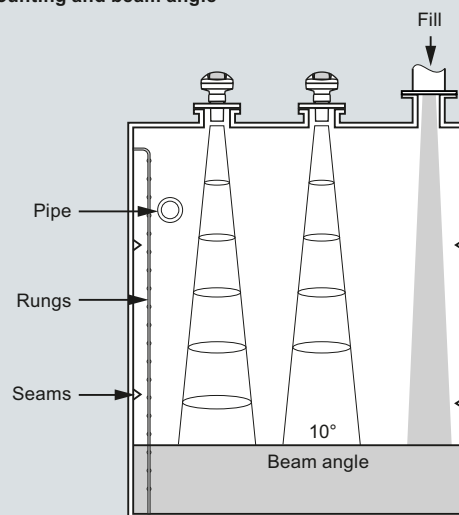
- Key Applications: chemical storage vessels, filter beds, liquid storage vessels

Configuration

Parabolic mounting



Flat mounting and beam angle



SITRANS Probe LU mounting

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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 s
• 4/20 mA/HART version	≤ 5 s at 4 mA
• PROFIBUS version	≤ 4 s 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 or 1 x M20 x 1.5 and 1 x ½" NPT
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] 3" (80 mm) universal flange
• Flange connection	
• Other connection	FMS 200 mounting bracket (see page 5/198) 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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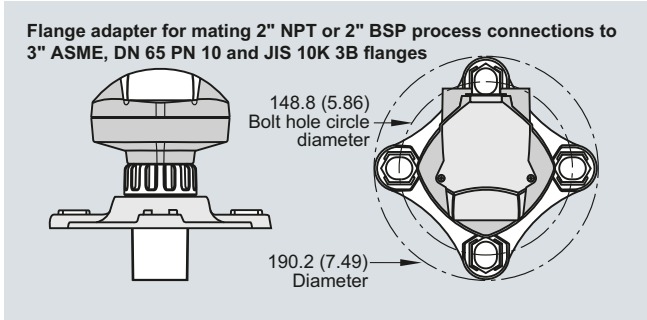
Selection and Ordering data	Order No.	Selection and Ordering data	Order code
SITRANS Probe LU 2-wire, loop powered ultrasonic transmitter for level, volume and flow monitoring of liquids in open channels, storage vessels, and simple process vessels.	C) 7ML5221-	Further designs Please add "-Z" to Order No. and specify Order code(s).	
Enclosure/Cable Inlet Plastic (PBT), 1 x M20x1.5 and 1 x 1/2" NPT (no cable glands supplied) Plastic (PBT), 2 x M20x1.5 (includes 1 general purpose cable gland: 7ML1930-1AM) Plastic (PBT), 2 x 1/2" NPT (no cable glands supplied)	0 1 2	Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text	Y15
Range/Transducer material 6 meter (20 ft), ETFE 6 meter (20 ft), PVDF Copolymer 12 meter (40 ft), ETFE 12 meter (40 ft), PVDF Copolymer	A B C D	Operating Instructions for HART/mA device	Order No.
Process connection 2" NPT [(Taper), ANSI/ASME B1.20.1] R 2" [(BSPT), EN 10226] G 2" [(BSPP), EN ISO 228-1]	A B C	English French German Note: The Operating Instructions should be ordered as a separate item on the order. 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) 7ML1998-5HT02 C) 7ML1998-5HT12 C) 7ML1998-5HT32 C) 7ML1998-5QR81
Communication/Output 4 ... 20 mA, HART PROFIBUS PA	1 2	Operating Instructions for PROFIBUS PA device	
Approvals General Purpose, FM, CSA, CE, C-TICK FM, Class I, Div. 2 ¹⁾ 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⁾ Intrinsically Safe, ATEX II 1G EEx ia IIC T4 ²⁾ Intrinsically safe, ATEX II 1 G EEx ia IIC T4, ANZEx, IECEX, INMETRO, CE, C-TICK ³⁾ 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⁾	1 4 5 6 7 8	English German Note: The Operating Instructions should be ordered as a separate item on the order. 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) 7ML1998-5JB02 C) 7ML1998-5JB32 C) 7ML1998-5QV81
1) Available with Enclosure/Cable Inlet option 2 only. 2) Available with communication option 2 only. 3) Available with communication option 1 only.		Optional equipment	
C) Subject to export regulations AL: N, ECCN: EAR99.		Handheld programmer, Intrinsically Safe, EEx ia Handheld programmer, General Purpose approvals Handheld programmer, Infrared, Intrinsically Safe, PROFIBUS PA HART modem/RS-232 (for use with PC and SIMATIC PDM) HART modem/USB (for use with a PC and SIMATIC PDM) 2" NPT locknut, plastic 2" BSPT locknut, plastic 3" ASME, DN 65 PN 10, JIS 10K 3B ETFE Flange adapter for 2" NPT 3" ASME, DN 65 PN 10, JIS 10K 3B ETFE Flange adapter for 2" BSPT One General Purpose polymeric cable gland M20x1.5, rated for -20 ... +80 °C (-4 ... +176 °F) 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) One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F) with integrated shield connection (available for PROFIBUS PA) Probe LU, rock guard/sunshield kit, 304 SS SITRANS RD100 Remote display - see Chapter 8 SITRANS RD200 Remote display - see Chapter 8 SITRANS RD500 web, datalogging, alarming, ethernet, and modem support for instrumentation - see Chapter 8	7ML5830-2AH 7ML1830-2AN 7ML5830-2AJ D) 7MF4997-1DA D) 7MF4997-1DB 7ML1830-1DT 7ML1830-1DQ 7ML1830-1BT 7ML1830-1BU 7ML1930-1AM 7ML1930-1AP 7ML1930-1AQ C) 7ML1930-1GH K) 7ML5750-1AA00-0
		Spare Parts	
		Plastic lid	7ML1830-1KB
		C) Subject to export regulations AL: N, ECCN: EAR99. D) Subject to export regulations AL: N, ECCN: EAR99H. K) Subject to export regulations AL: N, ECCN: 5A991X.	

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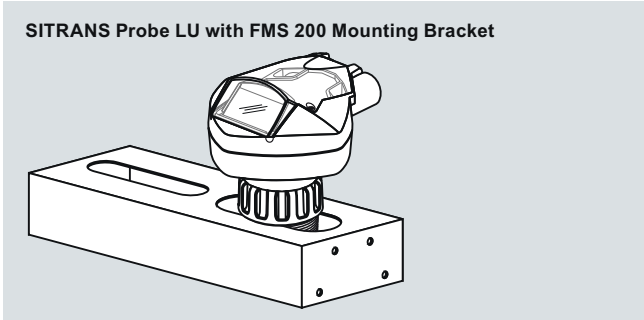
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Options

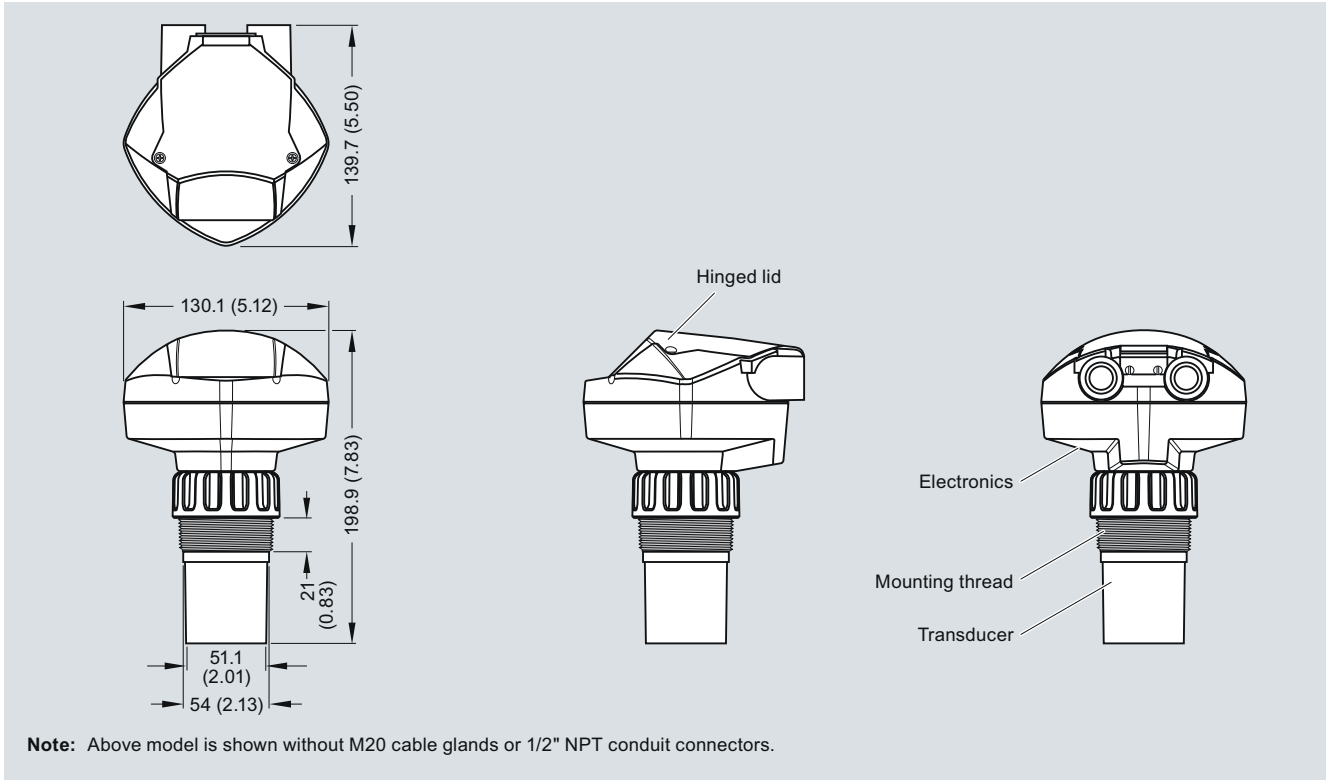


SITRANS Probe LU optional flange adapter, dimensions in mm (inch)



SITRANS Probe LU with optional mounting bracket

Dimensional drawings



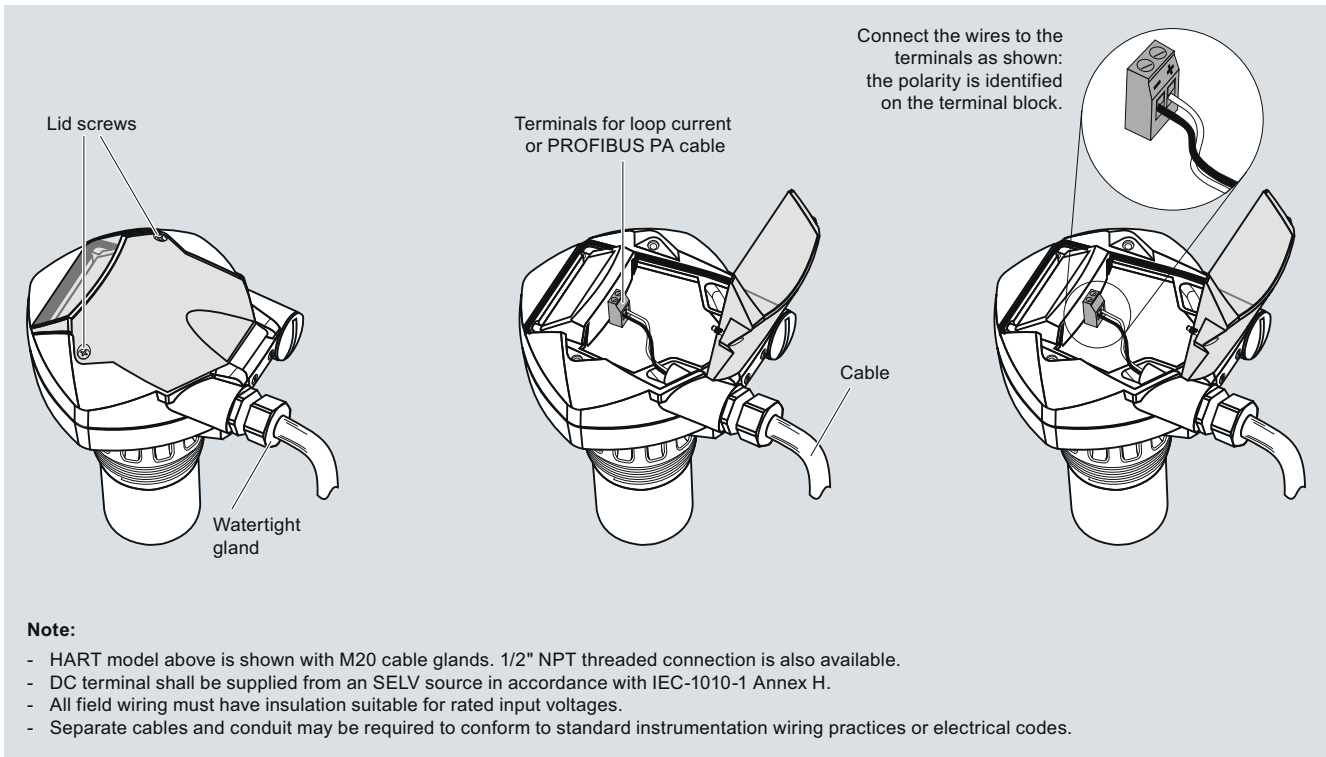
SITRANS Probe LU, dimensions in mm (inch)

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Schematics



SITRANS Probe LU connections