

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
- 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, chemical storage vessels, and small bulk hoppers.

The range of SITRANS Probe LU is 6 or 12 m (20 or 40 ft). Using Sonic Intelligence, Auto False Echo Suppression for fixed obstruction avoidance, and accuracy of 0.15 % of range or 6 mm (0.25 inch), the Probe LU provides unmatched reliability.

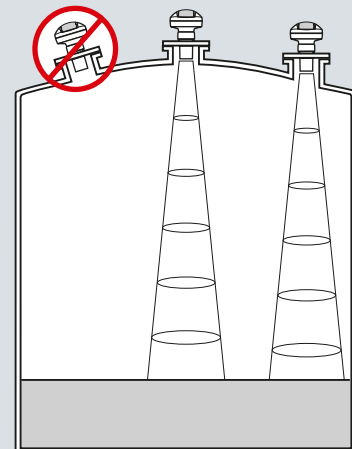
The Probe LU offers two communications options: HART or PROFIBUS PA (Profile version 3.0, Class B).

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.

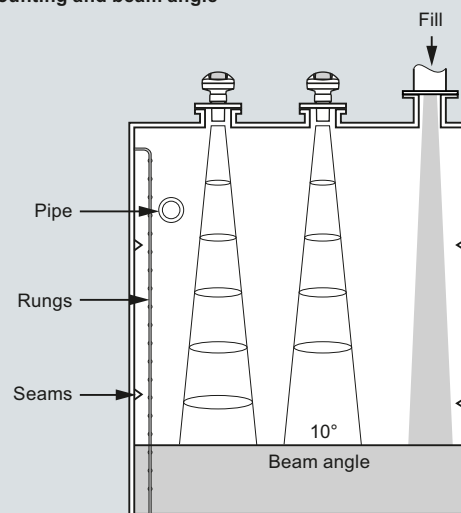
- Key Applications: chemical storage vessels, filter beds, liquid storage vessels

Configuration

Parabolic mounting



Flat mounting and beam angle



SITRANS Probe LU mounting

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Technical specifications

Mode of operation		Process connection	
Measuring principle	Ultrasonic level measurement	• Threaded connection	2" NPT [(Taper), ANSI/ASME B1.20.1] R 2" [(BSPT), EN 10226] or G 2" [(BSPP), EN ISO 228-1]
Typical application	Level measurement in storage vessels and simple process vessels	• Flange connection	3 inch (80 mm) universal flange
Inputs		• Other connection	FMS 200 mounting bracket (see page 4/204) or customer supplied mount
Measuring range		Display and Controls	
• 6 m (20 ft) model	0.25 ... 6 m (10 inch ... 20 ft)	Interface	Local: LCD display with bar graph Remote: Available via HART or PROFIBUS PA
• 12 m (40 ft) model	0.25 ... 12 m (10 inch ... 40 ft)	Configuration	Using Siemens SIMATIC PDM (PC) or HART handheld communicator or Siemens infrared handheld programmer
Frequency	54 kHz	Memory	Non-volatile EEPROM
Outputs		Power supply	
mA/HART		4 ... 20 mA/HART	Nominal 24 V DC with 550 Ω maximum; maximum 30 V DC 4 ... 20 mA
• Range	4 ... 20 mA	PROFIBUS PA	12, 13, 15, or 20 mA depending on programming (General Purpose or Intrinsically Safe version) per IEC 61158-2
• Accuracy	± 0.02 mA	Certificates and Approvals	
PROFIBUS PA	Profile 3, Class B	General	CSA _{US/C} , FM, CE, C-TICK
Performance		Marine (only applies to HART communication option)	• Lloyd's Register of Shipping • ABS Type Approval
Resolution	≤ 3 mm (0.12 inch)	Hazardous	
Accuracy	± the greater of 0.15 % of range or 6 mm (0.24 inch)	• Intrinsically Safe (Europe)	ATEX II 1G EEx ia IIC T4
Repeatability	≤ 3 mm (0.12 inch)	• Intrinsically Safe (USA/Canada)	CSA/FM T4, Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III
Blanking distance	0.25 m (10 inch)	• Intrinsically Safe (Australia/New Zealand)	ANZEx Ex ia IIC T4, Tamb = -40 ... +80 °C (-40 ... +176 °F) IP67, IP68
Update time	≤ 5 seconds	• Intrinsically Safe (International)	IECEx TSA 04.0020X Ex ia IIC T4
• 4/20 mA/HART version	≤ 5 seconds at 4 mA	• Intrinsically Safe (Brazil)	INMETRO Br-Ex ia IIC T4
• PROFIBUS version	≤ 4 seconds at 15 mA current loop	• Non-incendive (USA)	FM T5: Class I, Div. 2, Groups A,B,C, D
Temperature compensation	Built-in to compensate over temperature range	Handheld Programmer	
Beam angle	10°	Intrinsically Safe Siemens handheld programmer	Infrared receiver
Rated operating conditions		• Approvals for handheld programmer	IS model with ATEX EEx ia IIC T4 CSA/FM Class I, Div. 1, Groups A, B, C, D
Ambient conditions		Ambient temperature	-20 ... +40 °C (-5 ... +104 °F)
• Location	Indoor/outdoor	Interface	Proprietary infrared pulse signal
• Ambient temperature	-40 ... +80 °C (-40 ... +176 °F)	Power	3 V lithium battery (non-replaceable)
• 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 lb)		
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)		

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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.	7ML5221- ■ ■ ■ ■ ■	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 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Enclosure/Cable Inlet Plastic (PBT), 1 x M20x1.5 and 1 x ½" NPT (no cable glands supplied) Plastic (PBT), 2 x M20x1.5 (includes 1 general purpose cable gland: 7ML1930-1AM) Plastic (PBT), 2 x ½" NPT (no cable glands supplied)	0 1 2	Operating Instructions for HART/mA device 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.	Order No. 7ML1998-5HT02 7ML1998-5HT11 7ML1998-5HT32
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 PROFIBUS PA device 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.	7ML1998-5QR81
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	Accessories 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 7 SITRANS RD200 Remote display - see Chapter 7 SITRANS RD500 web, datalogging, alarming, ethernet, and modem support for instrumentation - see Chapter 7	7ML1998-5JB02 7ML1998-5JB32 7ML1998-5QV81
Communication/Output 4 ... 20 mA, HART PROFIBUS PA	1 2		7ML5830-2AH 7ML1830-2AN 7ML5830-2AJ 7MF4997-1DA 7MF4997-1DB 7ML1830-1DT 7ML1830-1DQ 7ML1830-1BT 7ML1830-1BU 7ML1930-1AM 7ML1930-1AP 7ML1930-1AQ 7ML1930-1GH
Approvals General Purpose, FM, CSA, CE, C-TICK, KCC FM, Class I, Div. 2 ¹⁾ Intrinsically Safe, CSA/FM Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III ²⁾ Intrinsically Safe, ATEX II 1G EEx ia IIC T4, INMETRO, CE, C-TICK, KCC ²⁾ Intrinsically safe, ATEX II 1 G EEx ia IIC T4, ANZEx, IECEX, INMETRO, CE, C-TICK, KCC 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	Spare Parts Plastic lid	7ML5750-1AA00-0 7ML1830-1KB

- 1) Available with Enclosure/Cable Inlet option 2 only.
2) Available with communication option 2 only.
3) Available with communication option 1 only.

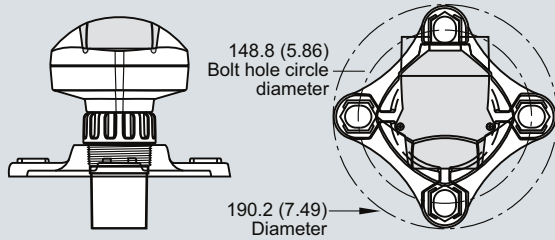
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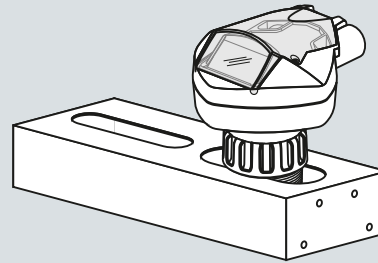
Options

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



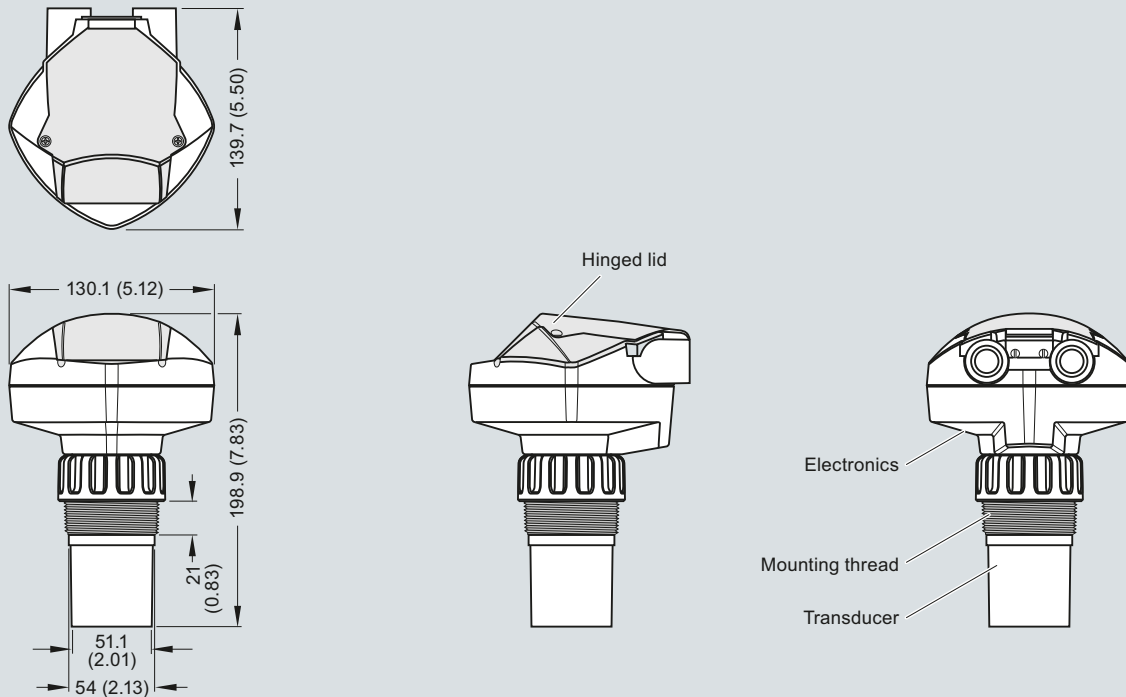
SITRANS Probe LU optional flange adapter, dimensions in mm (inch)

SITRANS Probe LU with FMS 200 mounting bracket



SITRANS Probe LU with optional mounting bracket

Dimensional drawings



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

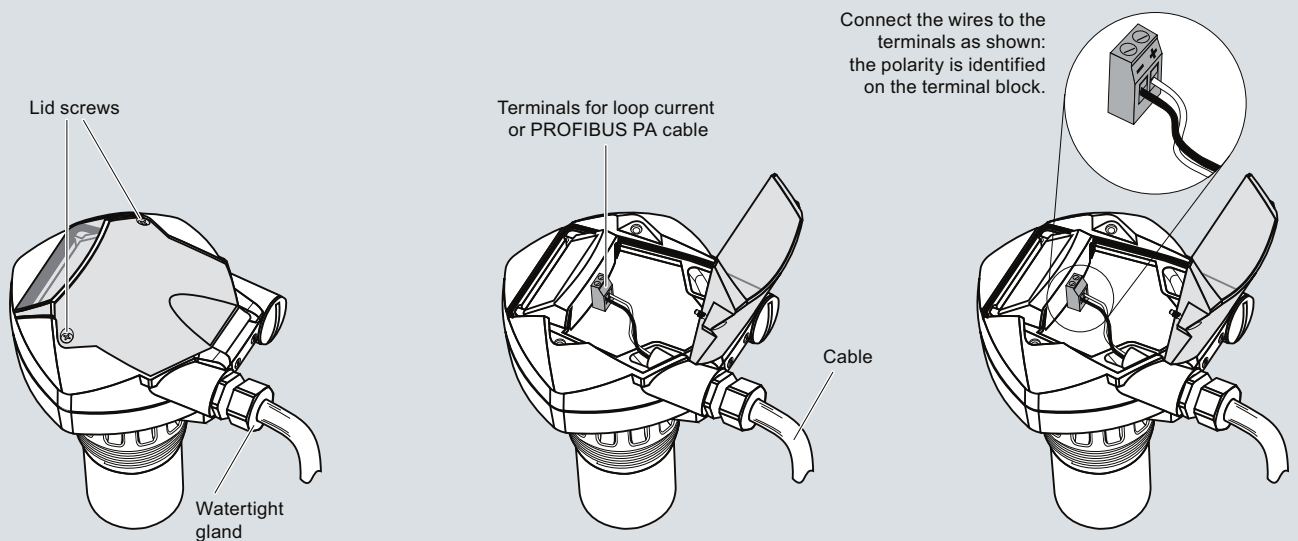
SITRANS Probe LU, dimensions in mm (inch)

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Schematics



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