

Level instruments

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.

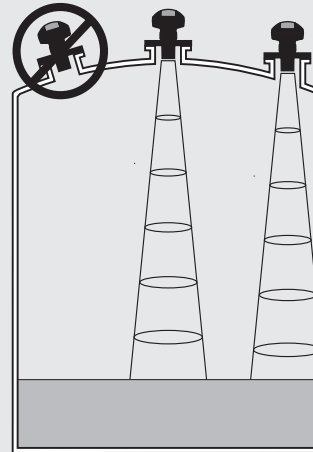
SITRANS Probe LU includes Sonic Intelligence® signal processing from the field-proven Probe and incorporates new echo processing features and the latest micro-processor and communications technology. The Probe LU offers two communications options: HART or PROFIBUS PA (Profile version 3.0, Class B).

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.

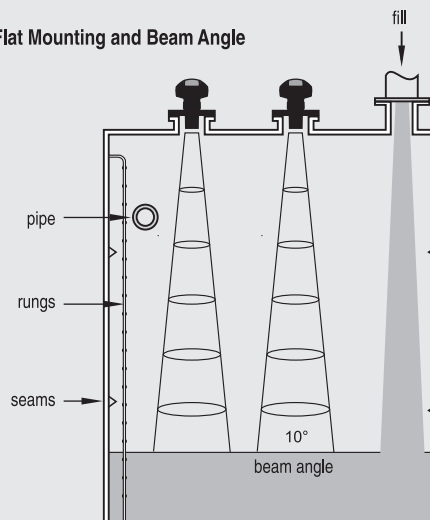
- Key Applications: chemical storage vessels, filter beds, liquid storage vessels

Configuration

Parabolic Mounting



Flat Mounting and Beam Angle



SITRANS Probe LU mounting

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Technical specifications

Mode of operation		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" (80 mm) universal flange
Inputs		• Other connection	FMS 200 mounting bracket (see page 5/189) or customer supplied mount
Measuring range		Display and Controls	
• 6 m (20 ft) model	0.25 to 6 m (10" to 20 ft)	Interface	Local: LCD display with bar graph Remote: Available via HART or PROFIBUS PA
• 12 m (40 ft) model	0.25 to 12 m (10" to 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 to 20 mA/HART	Nominal 24 V DC with 550 Ω maximum; maximum 30 V DC 4 to 20 mA
• Range	4 to 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	
Performance		CSA _{US/C} , FM, CE, C-TICK	
Resolution	≤ 3 mm (0.12")	Marine (only applies to HART communication option)	
Accuracy	± the greater of 0.15 % of range or 6 mm (0.24")	• Lloyd's Register of Shipping	
Repeatability	≤ 3 mm (0.12")	• ABS Type Approval	
Blanking distance	0.25 m (10")	Hazardous	
Update time	≤ 5 seconds	• Intrinsically Safe (Europe)	
• 4/20 mA/HART version	≤ 5 seconds at 4 mA	ATEX II 1G EEx ia IIC T4	
• PROFIBUS version	≤ 4 seconds at 15 mA current loop	• Intrinsically Safe (USA/Canada)	
Temperature compensation	Built-in to compensate over temperature range	CSA/FM (barrier required) T4, Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III	
Beam angle	10°	• Intrinsically Safe (Australia/New Zealand)	
Rated operating conditions		ANZEx Ex ia IIC T4, Tamb = -40 to +80 °C (-40 to +176 °F) IP67, IP68	
• Ambient conditions		• Intrinsically Safe (International)	
- Location	Indoor/outdoor	IECEx TSA 04.0020X Ex ia IIC T4	
- Ambient temperature	-40 to +80 °C (-40 to +176 °F)	• Intrinsically Safe (Brazil)	
- Relative humidity/ingress protection	Suitable for outdoor	INMETRO Br-Ex ia IIC T4	
- Installation category	I	• Non-incendive (USA)	
- Pollution degree	4	FM (no barrier required) T5: Class I, Div. 2, Groups A,B,C, D	
• Medium conditions		Handheld Programmer	
- Temperature at flange or threads	-40 to +85 °C (-40 to +185 °F)	• Intrinsically Safe Siemens handheld programmer	
- Pressure (vessel)	0.5 bar g (7.25 psi g)	- Approvals for handheld programmer	
Design		IS model with ATEX EEx ia IIC T4 CSA/FM Class I, Div. 1, Groups A, B, C, D	
Material (enclosure)	PBT (Polybutylene Terephthalate)	• Ambient temperature	
Degree of protection	Type 4X/NEMA 4X, Type 6/NEMA 6/IP67/IP68 enclosure	-20 to +40 °C (-5 to +104 °F)	
Weight	2.1 kg (4.6 lbs)	• Interface	
Cable inlet	2 x M20x1.5 cable gland or 2 x ½" NPT thread	Proprietary infrared pulse signal	
Material (transducer)	ETFE (Ethylene Tetrafluoroethylene) or PVDF (Polyvinylidene Fluoride)	• Power	
		3 V lithium battery (non-replaceable)	

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Selection and Ordering data

Selection and Ordering data	Order No.
SITRANS Probe LU	C) 7ML5221-
2-wire, loop powered ultrasonic transmitter for level, volume and flow monitoring of liquids in open channels, storage vessels and simple process vessels.	
Enclosure/Cable Inlet	
Plastic (PBT), 2 x M20x1.5 (check Approvals for cable gland details)	1
Plastic (PBT), 2 x 1/2" 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 to 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 1G 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
Further designs	Order code
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) 7ML1998-5HT11
German	C) 7ML1998-5HT32
Note: The Operating Instructions should be ordered as a separate item on the order.	
Additional Multi-language Quick Start manual	C) 7ML1998-5QR81
This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	
Operating Instructions for PROFIBUS PA device	Order No.
English	C) 7ML1998-5JB02
German	C) 7ML1998-5JB32
Note: The Operating Instructions should be ordered as a separate item on the order.	
Additional Multi-language Quick Start manual	C) 7ML1998-5QV81
This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	

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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 to +80 °C (-4 to +176 °F)	7ML1930-1AM
One metallic cable gland M20x1.5, rated -40 to +80 °C (-40 to +176 °F) for General Purpose or ATEX EEx e installations (available for HART only)	7ML1930-1AP
One metallic cable gland M20x1.5, rated -40 to +80 °C (-40 to +176 °F) with integrated shield connection (available for PROFIBUS PA)	7ML1930-1AQ
SITRANS RD100 Remote display - see RD100 on page 5/312	
SITRANS RD200 Remote display - see RD200 on page 5/314	
SITRANS RD500 Remote display - see RD500 on page 5/318	
Spare Parts	
Plastic lid	7ML1830-1KB

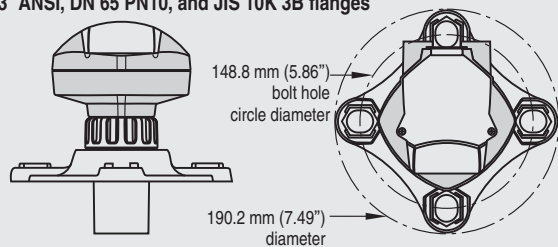
- 1) Available with Enclosure/Cable Inlet option 2 only.
 2) Available with communication option 2 only.
 3) Available with communication option 1 only.

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

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

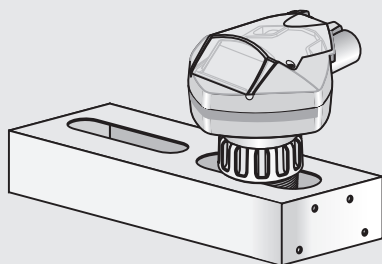
Options

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



SITRANS Probe LU optional flange adapter

SITRANS Probe LU with FMS 200 Mounting Bracket



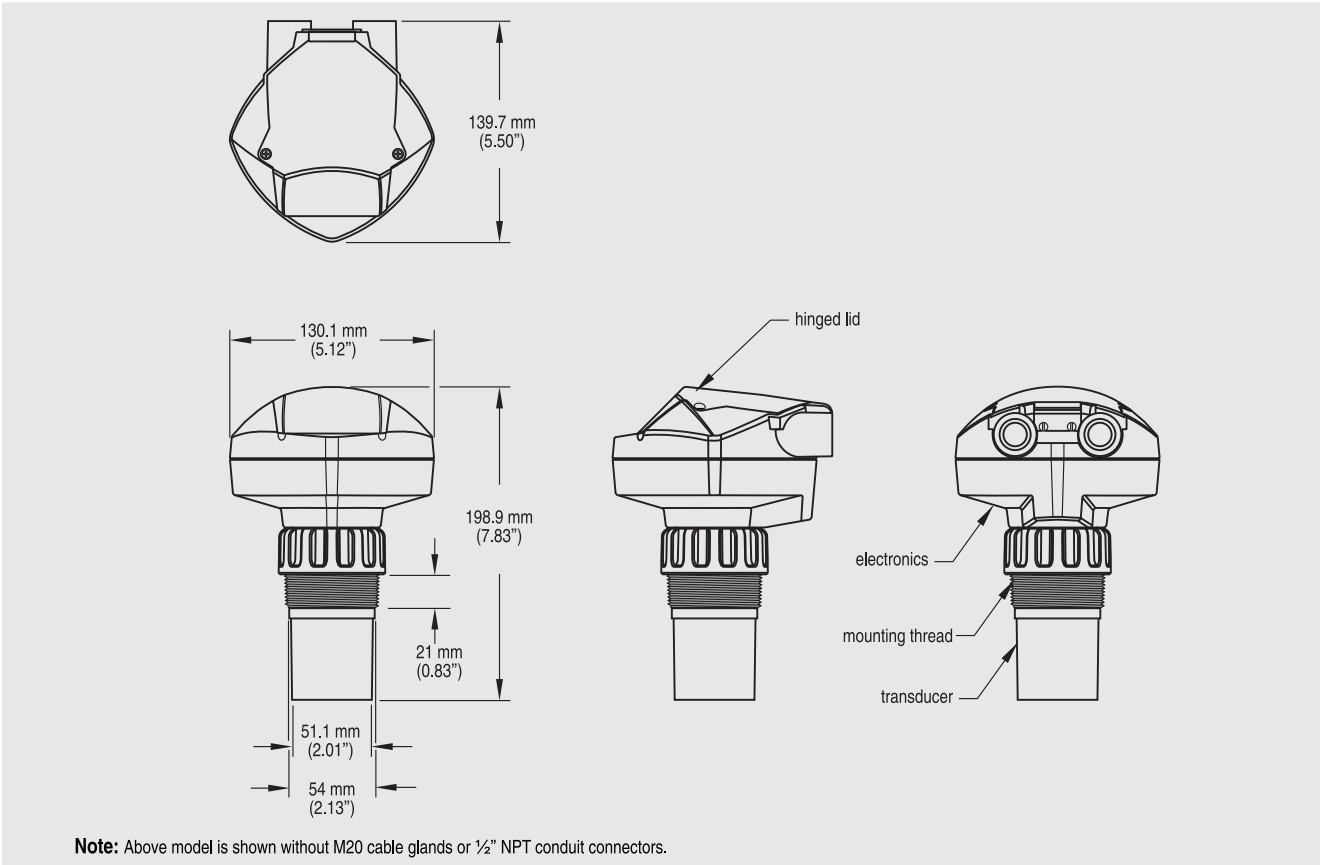
SITRANS Probe LU with optional mounting bracket

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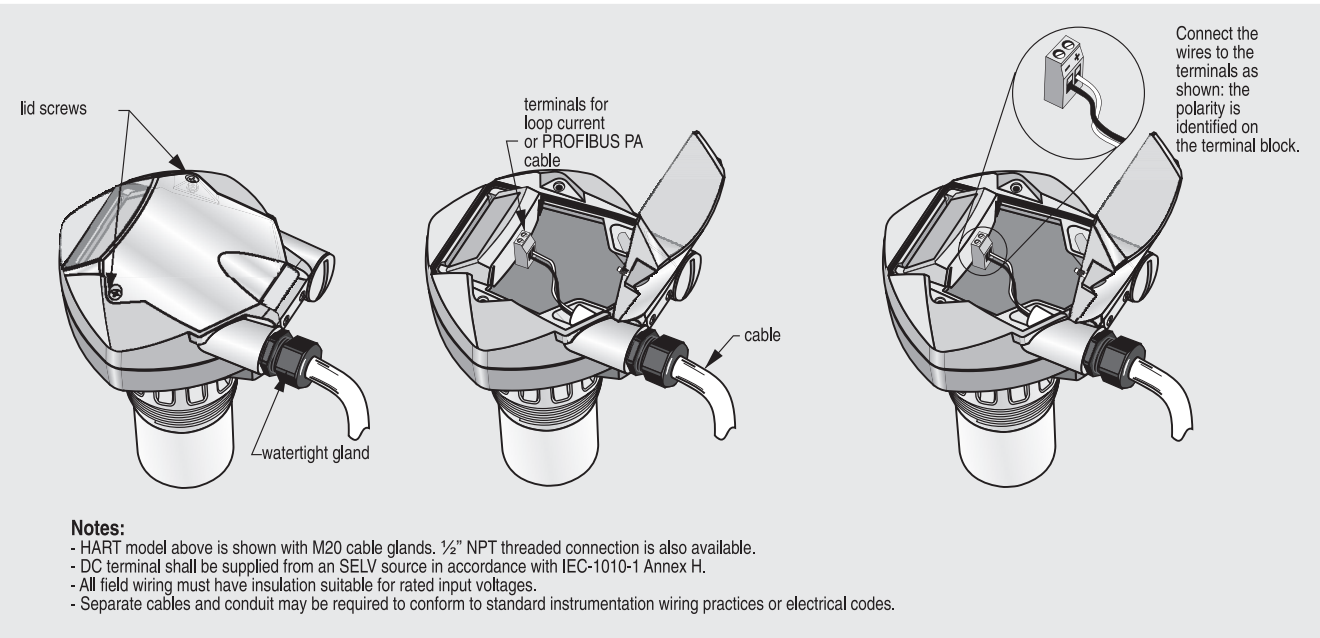
SITRANS Probe LU

Dimensional drawings



SITRANS Probe LU dimensions

Schematics



SITRANS Probe LU connections