

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.

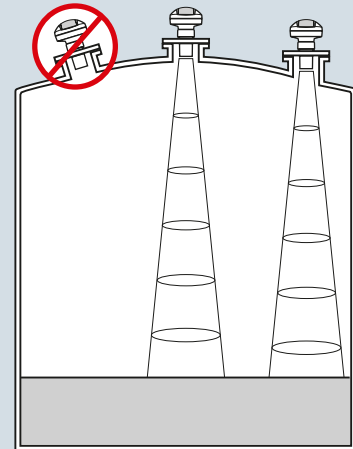
The Probe LU offers two communications options: HART or PROFIBUS PA (Profile version 3.0, Class B).

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.

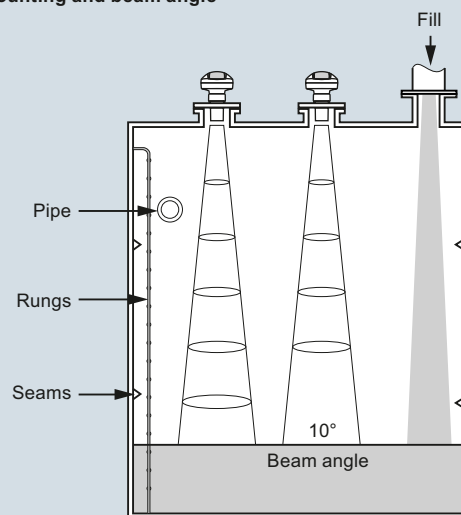
- Key Applications: chemical storage vessels, filter beds, liquid storage vessels

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] 3 inch (80 mm) universal flange
Typical application	Level measurement in storage vessels and simple process vessels	• Flange connection	FMS 200 mounting bracket (see page 4/188) or customer supplied mount
• Other connection			
Inputs		Display and Controls	
Measuring range		Interface	Local: LCD display with bar graph Remote: Available via HART or PROFIBUS PA
• 6 m (20 ft) model	0.25 ... 6 m (10 inch ... 20 ft)	Configuration	Using Siemens SIMATIC PDM (PC) or HART handheld communicator or Siemens infrared handheld programmer
• 12 m (40 ft) model	0.25 ... 12 m (10 inch ... 40 ft)	Memory	Non-volatile EEPROM
Frequency	54 kHz		
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		
PROFIBUS PA	Profile 3, Class B		
Performance		Certificates and Approvals	
Resolution	≤ 3 mm (0.12 inch)	General	CSA _{US/C} , FM, CE, C-TICK
Accuracy	$\pm$ the greater of 0.15 % of range or 6 mm (0.24 inch)	Marine (only applies to HART communication option)	• Lloyd's Register of Shipping • ABS Type Approval
Repeatability	≤ 3 mm (0.12 inch)	Hazardous	ATEX II 1G EEx ia IIC T4
Blanking distance	0.25 m (10 inch)	• Intrinsically Safe (Europe)	CSA/FM T4, Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III
Update time	≤ 5 s	• Intrinsically Safe (USA/Canada)	ANZEx Ex ia IIC T4, Tamb = -40 ... +80 °C (-40 ... +176 °F) IP67, IP68
• 4/20 mA/HART version	≤ 5 s at 4 mA	• Intrinsically Safe (Australia/New Zealand)	IECEx TSA 04.0020X Ex ia IIC T4
• PROFIBUS version	≤ 4 s at 15 mA current loop	• Intrinsically Safe (International)	INMETRO Ex ia IIC T4 Ga
Temperature compensation	Built-in to compensate over temperature range	• Intrinsically Safe (Brazil)	FM T5: Class I, Div. 2, Groups A, B, C, D
Beam angle	10°	• Non-incendive (USA)	
Rated operating conditions		Handheld Programmer	
Ambient conditions		Intrinsically Safe Siemens handheld programmer	Infrared receiver
• Location	Indoor/outdoor	• Approvals for handheld programmer	IS model with ATEX EEx ia IIC T4
• Ambient temperature	-40 ... +80 °C (-40 ... +176 °F)		CSA/FM Class I, Div. 1, Groups A, B, C, D
• Relative humidity/ingress protection	Suitable for outdoor	Ambient temperature	-20 ... +40 °C (-5 ... +104 °F)
• Installation category	I	Interface	Proprietary infrared pulse signal
• Pollution degree	4	Power	3 V lithium battery (non-replaceable)
• 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 1/2" NPT thread or 1 x M20 x 1.5 and 1 x 1/2" NPT		
Material (transducer)	ETFE (Ethylene Tetrafluoroethylene) or PVDF (Polyvinylidene Fluoride)		

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Selection and Ordering data	Article 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.	7ML5221-
Enclosure/Cable Inlet	
Plastic (PBT), 1 x M20x1.5 and 1 x 1/2" NPT (no cable glands supplied)	0
Plastic (PBT), 2 x M20x1.5 (includes 1 general purpose cable gland: 7ML1930-1AM)	1
Plastic (PBT), 2 x 1/2" NPT (no cable glands supplied)	2
Range/Transducer material	
6 m (20 ft), ETFE	A
6 m (20 ft), PVDF Copolymer	B
12 m (40 ft), ETFE	C
12 m (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, KCC	1
FM, Class I, Div. 2 ¹⁾	4
Intrinsically Safe, CSA/FM Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III ²⁾	5
Intrinsically Safe, ATEX II 1G EEx ia IIC T4, INMETRO, CE, C-TICK, KCC ²⁾	6
Intrinsically safe, ATEX II 1 G EEx ia IIC T4, ANZEx, IECEx, INMETRO, CE, C-TICK, KCC ³⁾	7
Intrinsically safe, CSA/FM Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1 Groups 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.

◆ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ◆. For details see page 9/5 in the appendix.

Selection and Ordering data	Order code
Further designs Please add "-Z" to Article 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
Operating Instructions for HART/mA device	Article No.
English	7ML1998-5HT02
French	7ML1998-5HT11
German	7ML1998-5HT32
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 DVD containing the ATEX Quick Start and Operating Instructions library.	A5E32052143
Operating Instructions for PROFIBUS PA device	
English	7ML1998-5JB02
German	7ML1998-5JB32
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 DVD containing the ATEX Quick Start and Operating Instructions library.	A5E32081626
Accessories	
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)	7MF4997-1DA
HART modem/USB (for use with a PC and SIMATIC PDM)	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
Probe LU, rock guard/sunshield kit, 304 stainless steel	7ML1930-1GH
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	7ML5750-1AA00-0
Spare Parts	
Plastic lid	7ML1830-1KB

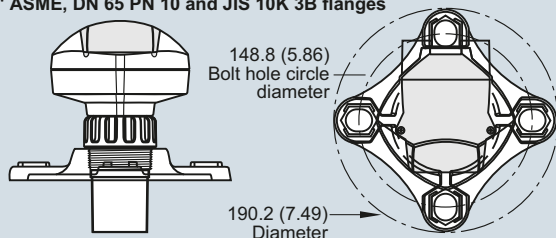
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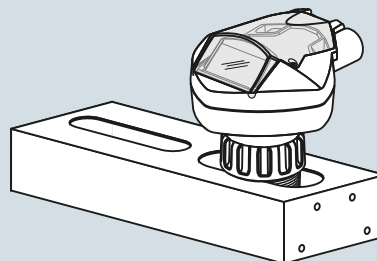
Options

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



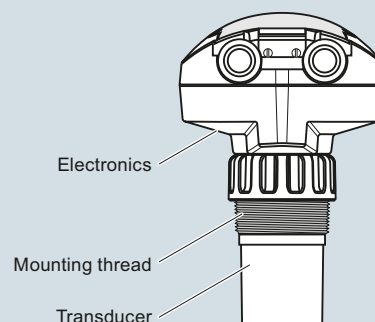
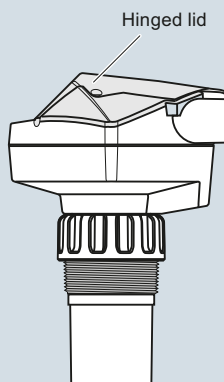
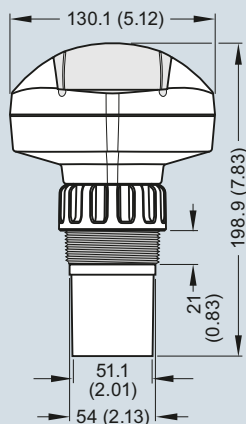
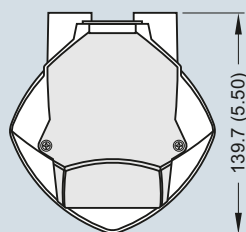
SITRANS Probe LU optional flange adapter, dimensions in mm (inch)

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" NPT conduit connectors.

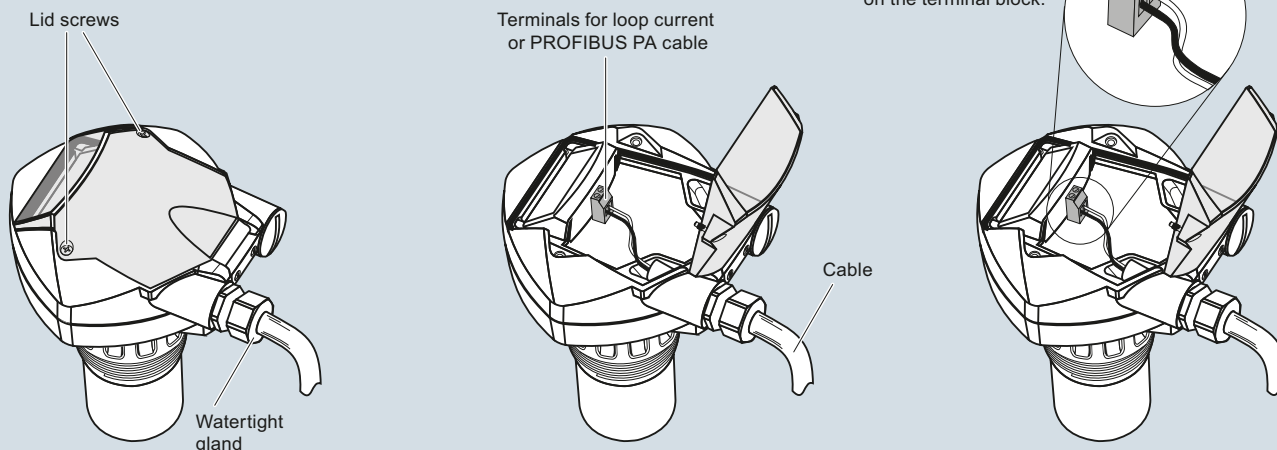
SITRANS Probe LU, dimensions in mm (inch)

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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