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.

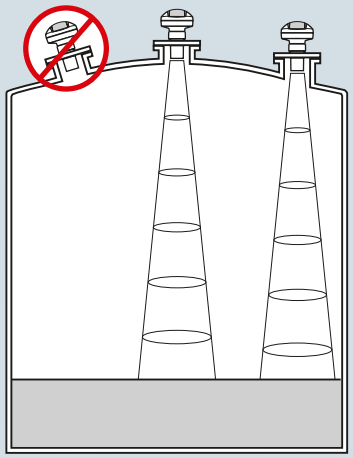
The Probe LU offers two communications options: HART or PROFIBUS PA (Profile version 3.0, Class B).

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.

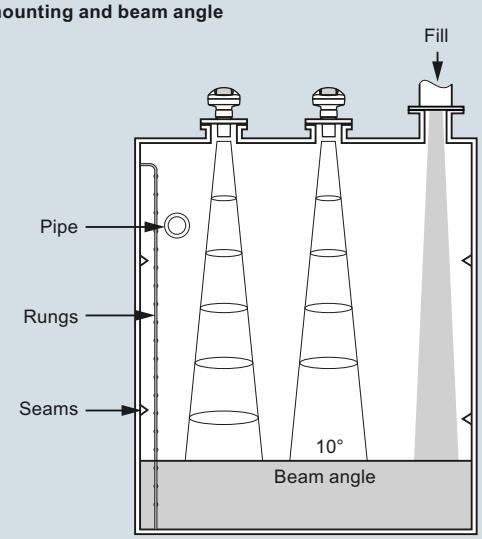
- Key Applications: chemical storage vessels, filter beds, liquid storage vessels

Configuration

Parabolic mounting



Flat mounting and beam angle



SITRANS Probe LU mounting

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 inch ... 20 ft)
• 12 m (40 ft) model	0.25 ... 12 m (10 inch ... 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 inch)
Accuracy	± the greater of 0.15 % of range or 6 mm (0.24 inch)
Repeatability	≤ 3 mm (0.12 inch)
Blanking distance	0.25 m (10 inch)
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 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)

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 inch (80 mm) universal flange
• Other connection	FMS 200 mounting bracket (see page 4/188) 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 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 Ex ia IIC T4 Ga
• Non-incendive (USA)	FM 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)

SITRANS Probe LU

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 ½" 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 ½" 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.

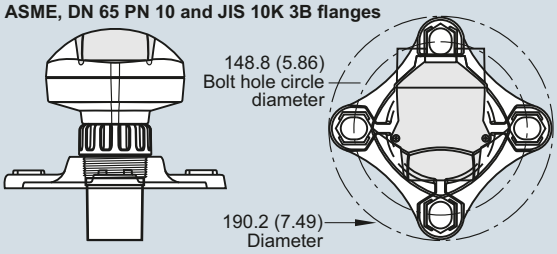
3) Available with communication option 1 only.

⬟ 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		**A5E32337695**
French		**7ML1998-5HT11**
German Note: The Operating Instructions should be ordered as a separate item on the order.		**7ML1998-5HT32**
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.		**A5E32168031**
Operating Instructions for PROFIBUS PA device		
English		**A5E32337708**
German Note: The Operating Instructions should be ordered as a separate item on the order.		**7ML1998-5JB32**
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**

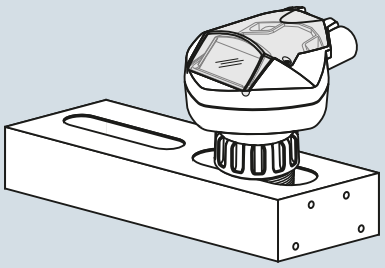
Options

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



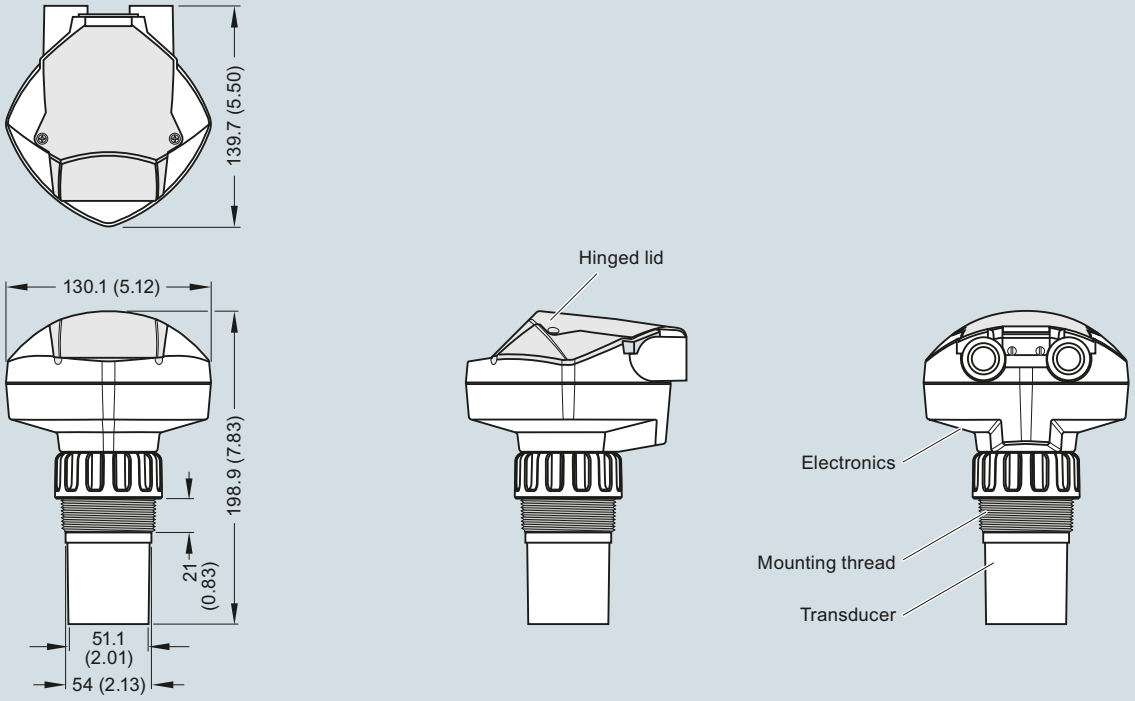
SITRANS Probe LU optional flange adapter, dimensions in mm (inch)

SITRANS Probe LU with FMS 200 mounting bracket



SITRANS Probe LU with optional mounting bracket

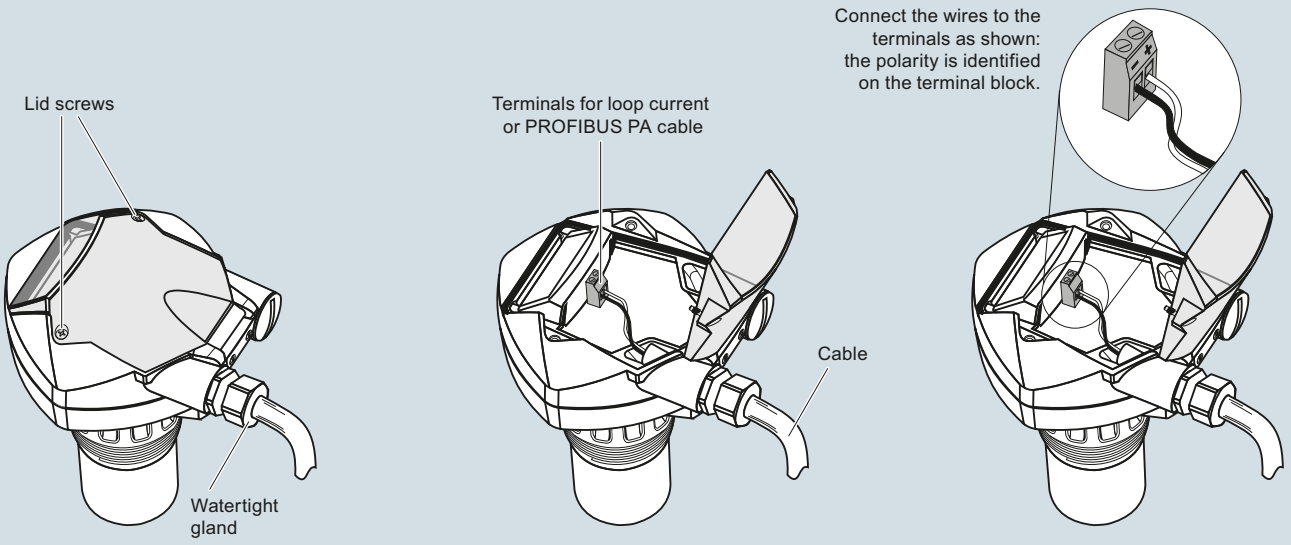
Dimensional drawings



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

SITRANS Probe LU, dimensions in mm (inch)

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