

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.

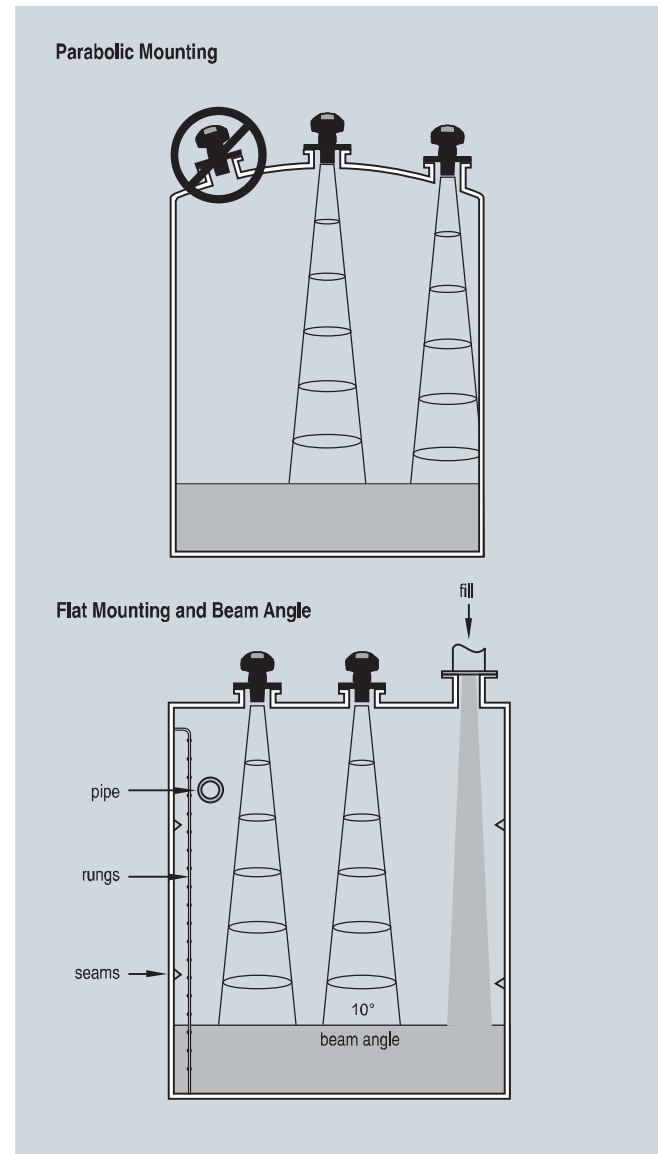
The range of SITRANS Probe LU is 6 or 12 m (20 or 40 ft). Using Auto False-Echo Suppression for fixed obstruction avoidance, as well as an improved signal-to-noise ratio and improved accuracy of 0.15% of range or 6 mm (0.25"), the Probe LU provides unmatched reliability.

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



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

Input

Measuring range	
• 6 m (20 ft) model	0.25 to 6 m (10" to 20 ft)
• 12 m (40 ft) model	0.25 to 12 m (10" to 40 ft)
Frequency	54 kHz

Output

mA/HART®	
• Range	4 to 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 seconds
• 4/20 mA/HART version	≤ 5 seconds at 4 mA
• PROFIBUS version	≤ 4 seconds 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 to +80 °C (-40 to +176 °F)
- Relative humidity/ingress protection	Suitable for outdoor
- Installation category	I
- Pollution degree	4
• Medium conditions	
- Temperature at flange or threads	-40 to +85 °C (-40 to +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 1/2" NPT thread
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" (80 mm) universal flange
• Other connection	FMS 200 mounting bracket (see page 5/146) or customer supplied mount

Displays 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 to 20 mA/HART	Nominal 24 V DC with 550 Ω maximum; maximum 30 V DC 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

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 to +80 °C (-40 to +176 °F) IP67, IP68
• Intrinsically Safe (International)	IECEX TSA 04.0020X 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 to +40 °C (-5 to +104 °F)
• Interface	Proprietary infrared pulse signal
• Power	3 V lithium battery (non-replaceable)

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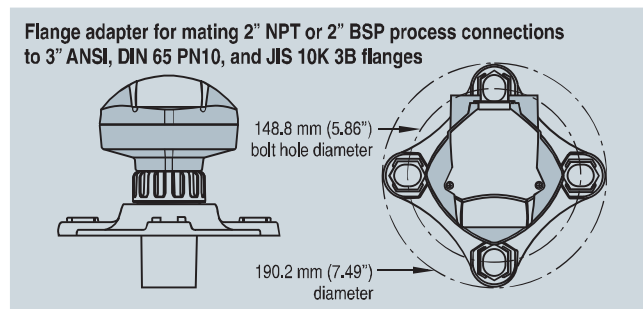
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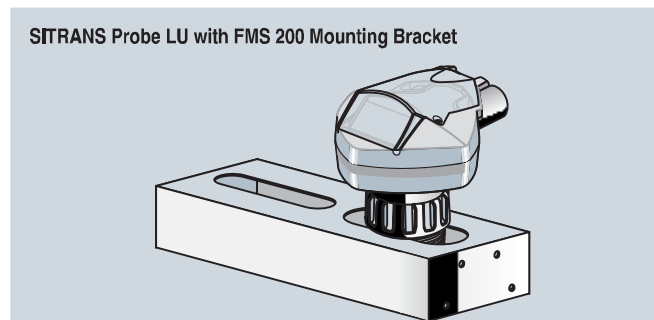
Selection and Ordering data	Order No.
SITRANS Probe LU	C) 7ML5221-
2-wire, loop powered ultrasonic transmitter for level, volume and flow monitoring of liquids in open channels, storage vessels and simple process vessels.	■ ■ ■ ■
Enclosure/Cable Inlet	
Plastic (PBT), 2 x M20x1.5 (check Approvals for 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
Intrinsically Safe, FM Class I, Div. 1, Groups A, B, C, D (barrier required); Class II, Div. 1, Groups E, F, G; Class III; ATEX II 1G EEx ia IIC T4, ANZEx, IECEx (HART model only)	2
Intrinsically Safe, CSA Class I, Div. 1, Groups A, B, C, D (barrier required); Class II, Div. 1, Group G; Class III (HART model only)	3
FM, Class I, Div. 2 (Enclosure option 2 only)	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 (PROFIBUS PA model only)	5
Intrinsically Safe, ATEX II 1G EEx ia IIC T4 (PROFIBUS PA model only)	6
Further designs	Order code
Please add "-Z" to Order No. and specify Order code(s).	
Stainless steel tag [69 mm x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text	Y15
Instruction manual for HART/mA device	
English	C) 7ML1998-5HT02
French	C) 7ML1998-5HT11
German	C) 7ML1998-5HT32
Note: The instruction manual 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 instruction manual library.	

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.	■ ■ ■ ■
Instruction manual for PROFIBUS PA device	
English	C) 7ML1998-5JB02
German	C) 7ML1998-5JB32
Note: The instruction manual 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 instruction manual library.	
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, DIN 65 PN 10, JIS 10K 3B ETFE Flange adapter for 2" NPT	7ML1830-1BT
3" ASME, DIN 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 5/263	
SITRANS RD200 Remote display - see RD200 on page 5/265	
Spare Parts	
Plastic lid	C) 7ML1830-1KB
C) Subject to export regulations AL: N, ECCN: EAR99	
D) Subject to export regulations AL: N, ECCN: EAR99H	

Options



SITRANS Probe LU optional flange adapter



SITRANS Probe LU with optional mounting bracket

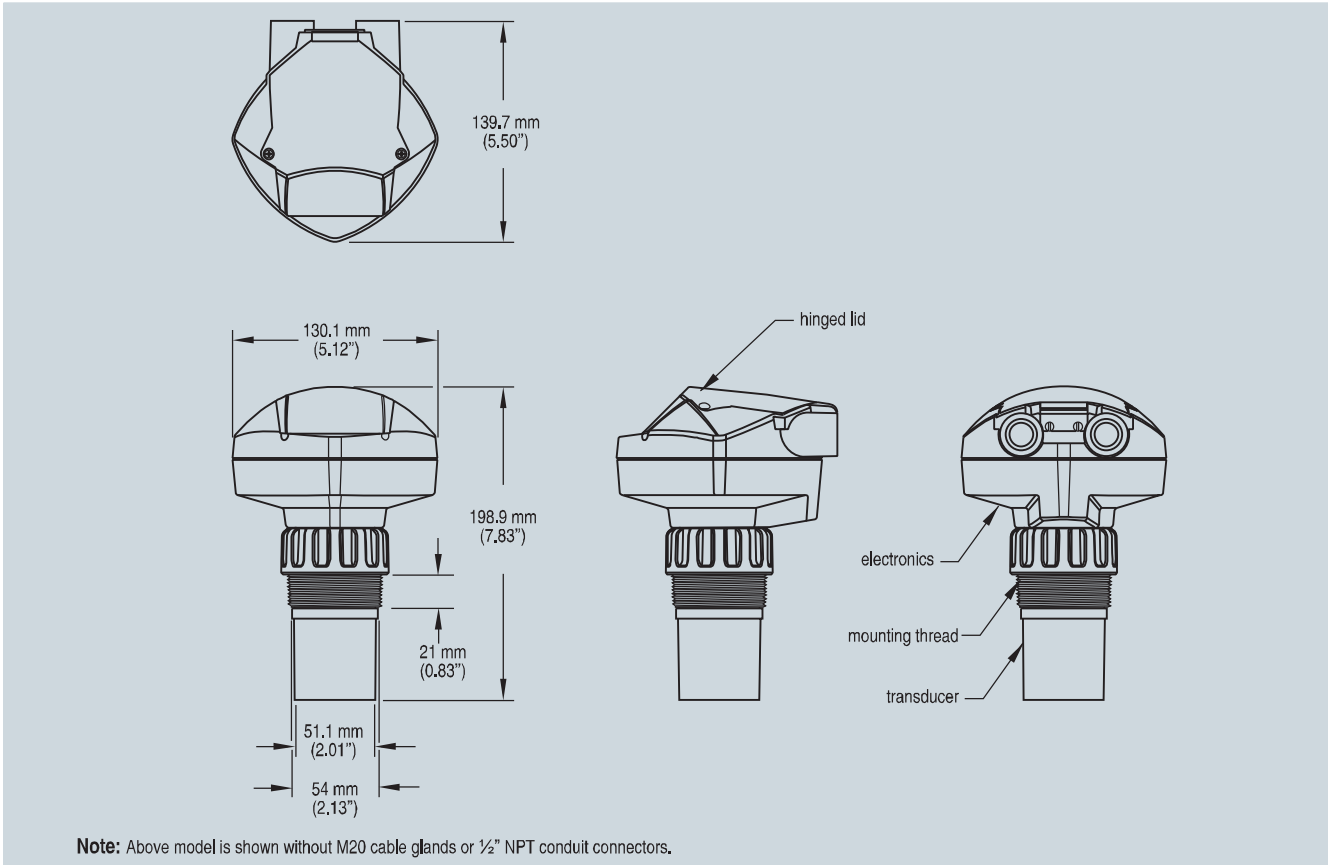
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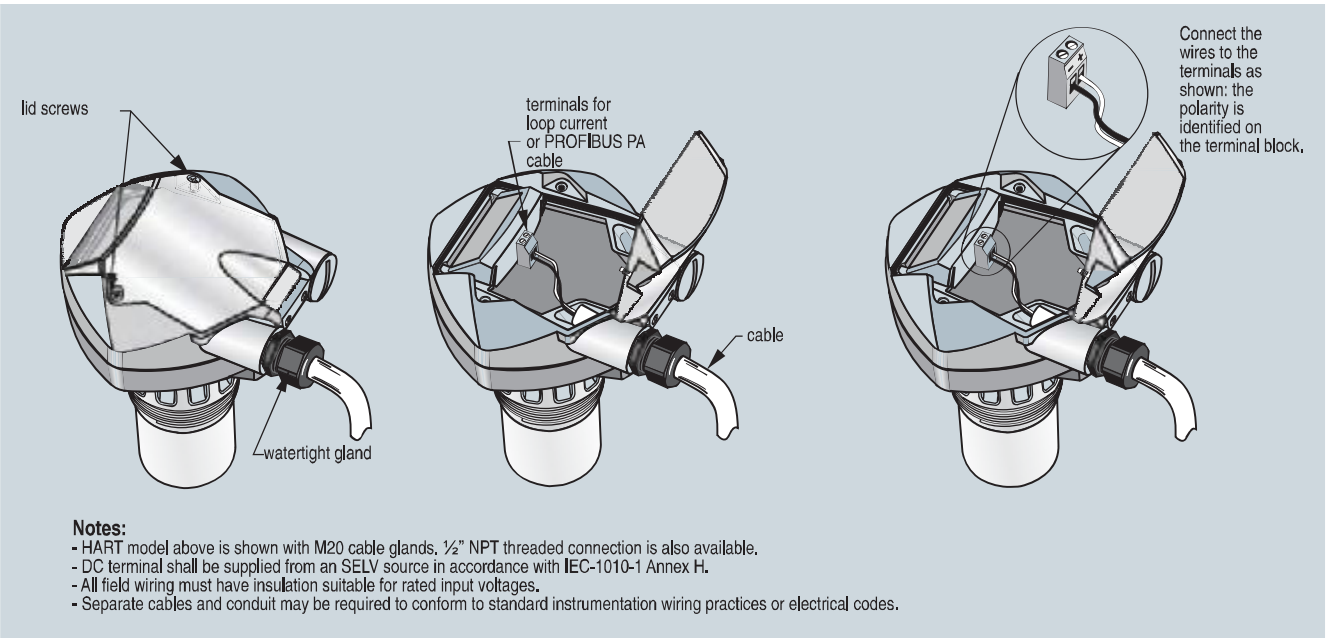
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Dimensional drawings



SITRANS Probe LU dimensions

Schematics



- Notes:**
- 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