

Level measurement

Continuous level measurement – Radar transmitters

SITRANS Probe LR

4

Overview



SITRANS Probe LR is a 2-wire, 6 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage vessels with nominal pressure and temperature, to a range of 20 m (66 ft).

Benefits

- Uni-Construction polypropylene rod antenna standard
- Easy installation and simple startup
- Programming using infrared Intrinsically Safe handheld programmer, SIMATIC PDM or HART handheld communicator
- Communication using HART
- Patented Process Intelligence signal processing
- Extremely high signal-to-noise ratio
- Auto False-Echo Suppression of false echoes

Application

The Probe LR is ideal for applications with chemical vapors, temperature gradients, vacuum or pressure, such as tank farms, chemical storage, digesters and long-range applications. SITRANS Probe LR has a range of 0.3 to 20 m (1 to 65 ft).

Probe LR is designed for safe and simple programming using the Intrinsically Safe handheld programmer without having to open the instrument's lid. It has a standard Uni-Construction polypropylene rod antenna that offers excellent chemical resistance and is hermetically sealed. The Uni-Construction antenna includes an internal, integrated shield that eliminates vessel nozzle interference.

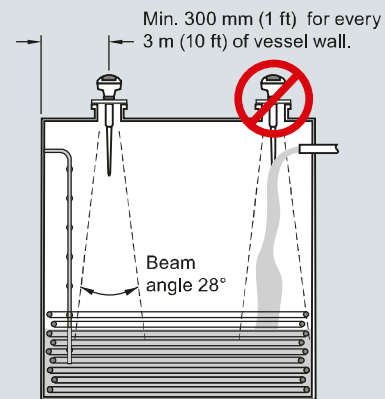
SITRANS Probe LR incorporates Process Intelligence signal processing. The Probe LR also has a high signal-to-noise ratio leading to improved reliability.

Start-up is easy with as few as two parameters for basic operation. Programming is simple using SIMATIC PDM, HART handheld communicator or the Intrinsically Safe handheld programmer.

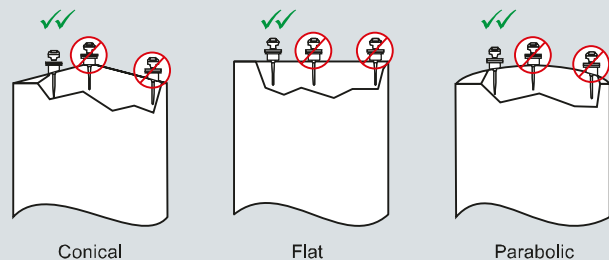
- Key Applications: tank farms, chemical storage, wastewater wet well

Configuration

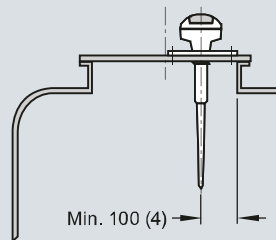
Installation



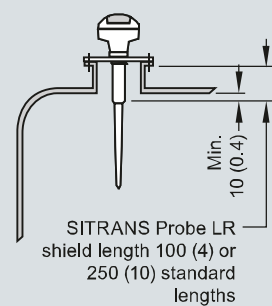
Mounting unit on vessel



Mounting on a manhole cover



Mounting on a nozzle



SITRANS Probe LR installation, dimensions in mm (inch)

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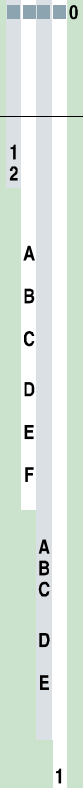
Technical specifications

| | | | |
|--|--|--|--|
| Mode of operation | | Power supply | |
| Measuring principle | Pulse radar level measurement | Certificates and approvals | <ul style="list-style-type: none"> Nominal 24 V DC with max. 550 Ω, maximum 30 V DC 4 ... 20 mA |
| Frequency | 5.8 GHz (North America 6.3 GHz) | | |
| Measuring range | 0.3 ... 20 m (1.0 ... 65 ft) | General | CSA _{US/CA} , CE, FM, C-TICK |
| Output | | Marine | <ul style="list-style-type: none"> Lloyd's Register of Shipping ABS Type Approval |
| Analog output | 4 ... 20 mA | Radio | FCC, Industry Canada and European (R&TTE), C-TICK |
| Accuracy | ± 0.02 mA | Hazardous | INMETRO Ex ia IIC T4 Ga CSA Class I, Div.1, Groups A,B,C,D; Class II, Div. 1, Group G; Class III ATEX II 1G EEx ia IIC T4 IECEx Ex ia IIC T4 GOST-R Ex ia FM Class I, Div.1, Groups A,B,C,D; Class II, Div. 1, Groups E,F, G; Class III |
| Span | Proportional or inversely proportional | <ul style="list-style-type: none"> Intrinsically Safe (Brazil) Intrinsically Safe (Canada) | |
| Communications | HART | <ul style="list-style-type: none"> Intrinsically Safe (Europe) Intrinsically Safe (International) Intrinsically Safe (Russia) Intrinsically Safe (USA) | |
| Performance (reference conditions) | | Programming | |
| Accuracy | \pm the greater of 0.1 % of range or 10 mm (0.4 inch) | Handheld programmer | HART communicator 375 |
| Influence of ambient temperature | 0.003 %/K | PC | SIMATIC PDM |
| Repeatability | ± 5 mm (2 inch) | Intrinsically safe Siemens handheld programmer (optional) | Infrared receiver |
| Fail-safe | mA signal programmable as high, low or hold (LOE) | <ul style="list-style-type: none"> Approvals (handheld programmer) | ATEX II 1G EEx ia IIC T4 CSA and FM Class I, Div.1, Groups A,B,C,D, T6 at max. ambient |
| Rated operating conditions | | Display (local) | Multi-segment alphanumeric liquid crystal with bar graph (representing level) available in four languages |
| Installation conditions | Indoor/outdoor | | |
| <ul style="list-style-type: none"> Location | | | |
| Ambient conditions (enclosure) | | | |
| <ul style="list-style-type: none"> Ambient temperature Installation category Pollution degree | -40 ... +80 °C (-40 ... +176 °F) I 4 | | |
| Medium conditions | | | |
| Dielectric constant ϵ_r | $\epsilon_r > 1.6$ (for $\epsilon_r < 3$, use stillpipe) | | |
| Vessel temperature | -40 ... +80 °C (-40 ... +176 °F) | | |
| Vessel pressure | 3 bar g (43.5 psi g) | | |
| Design | | | |
| Enclosure | | | |
| <ul style="list-style-type: none"> Body construction Lid construction Cable inlet | PBT (Polybutylene Terephthalate) PEI (Polyether Imide) 2 x M20x1.5 or 2 x 1/2" NPT with adapter | | |
| Degree of protection | Type 4X/NEMA 4X, Type 6/NEMA 6, IP67, IP68 | | |
| Weight | 1.97 kg (4.35 lb) | | |
| Antenna | | | |
| <ul style="list-style-type: none"> Material Dimensions | Polypropylene rod, hermetically sealed construction Standard 100 mm (4 inch) shield for maximum 100 mm (4 inch) nozzle or optional 250 mm (10 inch) long shield | | |
| Process connections | 1 1/2" NPT [(Taper), ANSI/ASME B1.20.1] R 1 1/2" [(BSPT), EN 10226] G 1 1/2" [(BSPP), EN ISO 228-1] | | |

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| Selection and Ordering data | Order No. |
|--|---|
| SITRANS Probe LR 2-wire, 6 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage vessels with nominal pressure and temperature, to a range of 20 m (66 ft). Max. 3 bar g (43.5 psi g) pressure and 80 °C (176 °F) | 7ML5430-  |
| Enclosure/Cable inlet Plastic, (PBT), 2 x 1/2" NPT Plastic, (PBT), 2 x M20x1.5 | 1 2 |
| Antenna type/Material - (max. 3 bar and 80 °C) Polypropylene Antenna 1 1/2" NPT [(Taper), ANSI/ASME B1.20.1], c/w integral 100 mm shield R 1 1/2" [(BSPT), EN 10226], c/w integral 100 mm shield G 1 1/2" [(BSPP), EN ISO 228-1], c/w integral 100 mm shield 1 1/2" NPT [(Taper), ANSI/ASME B1.20.1], c/w integral 250 mm shield R 1 1/2" [(BSPT), EN 10226], c/w integral 250 mm shield G 1 1/2" [(BSPP), EN ISO 228-1], c/w integral 250 mm shield | A B C D E F |
| Approvals General Purpose, CE, R&TTE, C-TICK General Purpose, CSAus/c, FM, FCC CSA Class I, Div 1, Groups A, B, C, D, Class II, Div. 1 Group G, Class III, FCC, Intrinsically Safe FM, Class I, II and III, Div 1, Groups A, B, C, D, E, F, G, FCC, Intrinsically Safe IECEx Ex ia IIC T4; ATEX II 1G EEx ia IIC T4, R&TTE, C-TICK, Intrinsically Safe; INMETRO Ex ia IIC T4 Ga; GOST-R | A B C D E |
| Communication/Output 4 ... 20 mA, HART | 1 |

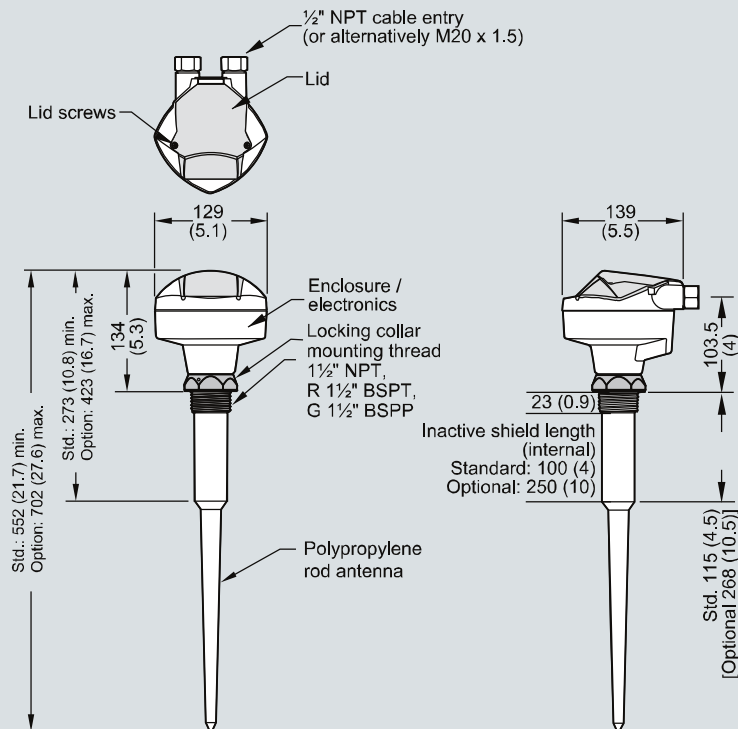
| Selection and Ordering data | Order code |
|--|--|
| Further designs Please add "-Z" to Order No. and specify Order code(s). Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000 | Y15 C11 |
| Operating Instructions English French Spanish German Note: The Operating Instructions should be ordered as a separate item on the order. This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library. | Order No. 7ML1998-5HR02 7ML1998-5HR11 7ML1998-5HR21 7ML1998-5HR32 |
| Additional Operating Instructions Multi-language Quick Start manual | 7ML1998-5QP81 |
| Accessories Handheld programmer, Intrinsically Safe, ATEX II 1G, Ex ia HART modem/RS 232 (for use with a PC and SIMATIC PDM) HART modem/USB (for use with a PC and SIMATIC PDM) One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F) 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 | 7ML5830-2AH 7MF4997-1DA 7MF4997-1DB 7ML1930-1AP 7ML5750-1AA00-0 |
| Spare parts Plastic lid | 7ML1830-1KB |

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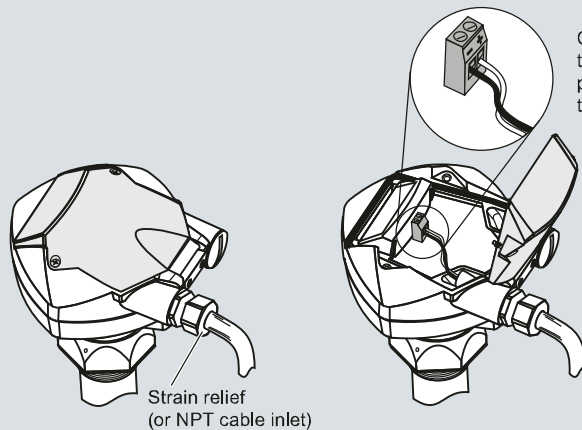
SITRANS Probe LR

Dimensional drawings



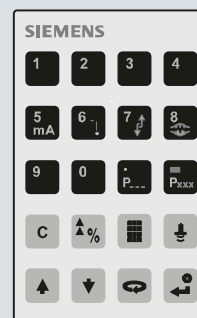
SITRANS Probe LR, dimensions in mm (inch)

Schematics



Connect the wires to the terminals as shown: the polarity is identified on the terminal block.

Hand Programmer



SITRANS Probe LR

Part number: 7ML5830-2AH

Notes:

- 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.
- Use shielded twisted pair cable (14-22 AWG)
- Separate cables and conduit may be required to conform to standard instrumentation wiring practices or electrical codes.

SITRANS Probe LR connections