

## Level Measurement

Continuous level measurement  
Radar transmitters

### SITRANS Probe LR

#### 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
- Process Intelligence signal processing
- 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 simple chemical storage or water treatment vessels. 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.

Startup 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.

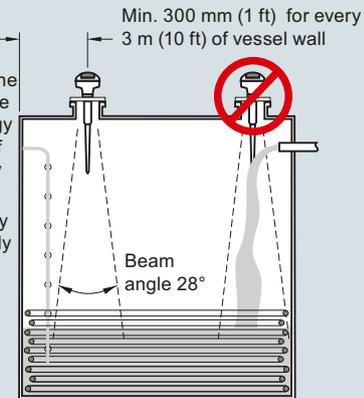
- Key Applications: chemical storage, wastewater wet well, and drilling mud

#### Configuration

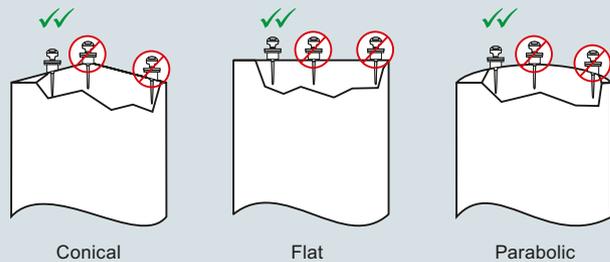
##### Installation

##### Note:

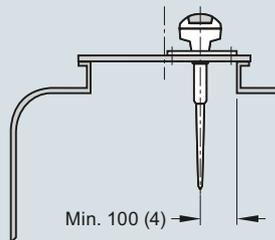
- Beam angle is the width of the cone where the energy density is half of the peak energy density.
- The peak energy density is directly in front of and in line with the rod antenna.



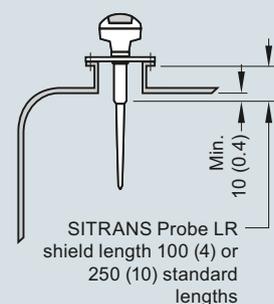
##### Mounting unit on vessel



##### Mounting on a manhole cover



##### Mounting on a nozzle



SITRANS Probe LR installation, dimensions in mm (inch)

#### Technical specifications

|   |  |
|---|--|
| <b>Mode of operation</b>  |  |
| Measuring principle   | Pulse radar level measurement  |
| Frequency   | C-band, approx. 6 GHz  |
| Measuring range   | 0.3 ... 20 m (1.0 ... 65 ft)   |
| <b>Output</b>   |  |
| Analog output   | 4 ... 20 mA  |
| Accuracy  | ± 0.02 mA  |
| Span  | Proportional or inversely proportional   |
| Communications  | HART   |
| <b>Performance (reference conditions)</b>   |  |
| Accuracy  | ± the greater of 0.1 % of range or 10 mm (0.4 inch)  |
| <ul style="list-style-type: none"> <li>From end of antenna to 600 mm (23.62 inch)</li> <li>Remainder of range 10 mm (0.4 inch) or 0.1 % of span (whichever is greater)</li> </ul> | 40 mm (1.57 inch)<br>10 mm (0.4 inch) or 0.1 % of span (whichever is greater)  |
| Influence of ambient temperature  | 0.003 %/K  |
| Repeatability   | ± 5 mm (2 inch)  |
| Fail-safe   | mA signal programmable as high, low or hold (LOE)  |
| <b>Rated operating conditions</b>   |  |
| Installation conditions   |  |
| <ul style="list-style-type: none"> <li>Location</li> </ul>  | Indoor/outdoor   |
| Ambient conditions (enclosure)  |  |
| <ul style="list-style-type: none"> <li>Ambient temperature</li> <li>Installation category</li> <li>Pollution degree</li> </ul>  | -40 ... +80 °C (-40 ... +176 °F)<br>I<br>4   |
| <b>Medium conditions</b>  |  |
| Dielectric constant $\epsilon_r$  | > 3.0  |
| Vessel temperature  | -40 ... +80 °C (-40 ... +176 °F)   |
| Vessel pressure   | 3 bar g (43.5 psi g)   |
| <b>Design</b>   |  |
| Enclosure   |  |
| <ul style="list-style-type: none"> <li>Body construction</li> <li>Lid construction</li> <li>Cable inlet</li> </ul>  | PBT (Polybutylene Terephthalate)<br>PEI (Polyether Imide)<br>2 x M20 x 1.5 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"> <li>Material</li> <li>Dimensions</li> </ul>  | Polypropylene rod, hermetically sealed construction<br>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]<br>R 1 1/2" [(BSPT), EN 10226]<br>G 1 1/2" [(BSPP), EN ISO 228-1]  |

|   |   |
|---|---|
| <b>Power supply</b>   |   |
|   | <ul style="list-style-type: none"> <li>Nominal 24 V DC with max. 550 <math>\Omega</math>, maximum 30 V DC</li> <li>4 ... 20 mA</li> </ul>   |
| <b>Certificates and approvals</b>   |   |
| General   | CSA <sub>US/C</sub> , CE, FM, RCM   |
| Marine  | <ul style="list-style-type: none"> <li>Lloyd's Register of Shipping</li> <li>ABS Type Approval</li> </ul>   |
| Radio   | FCC, Industry Canada, RED, RCM  |
| Hazardous   |   |
| <ul style="list-style-type: none"> <li>Intrinsically Safe (Brazil)</li> <li>Intrinsically Safe (Canada)</li> <li>Intrinsically Safe (Europe)</li> <li>Intrinsically Safe (International)</li> <li>Intrinsically Safe (Russia/Kazakhstan)</li> <li>Intrinsically Safe (USA)</li> </ul> | INMETRO Ex ia IIC T4 Ga<br>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<br>IECEx Ex ia IIC T4<br>EAC Ex ia<br>FM Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III |
| <b>Programming</b>  |   |
| Handheld programmer   | HART communicator 375   |
| PC  | SIMATIC PDM   |
| Intrinsically safe Siemens handheld programmer (optional)   | Infrared receiver   |
| <ul style="list-style-type: none"> <li>Approvals (handheld programmer)</li> </ul>   | ATEX II 1G EEx ia IIC T4<br>CSA and FM Class I, Div. 1, Groups A, B, C, D, T6 at max. ambient   |
| Display (local)   | Multi-segment alphanumeric liquid crystal with bar graph (representing level) available in four languages   |

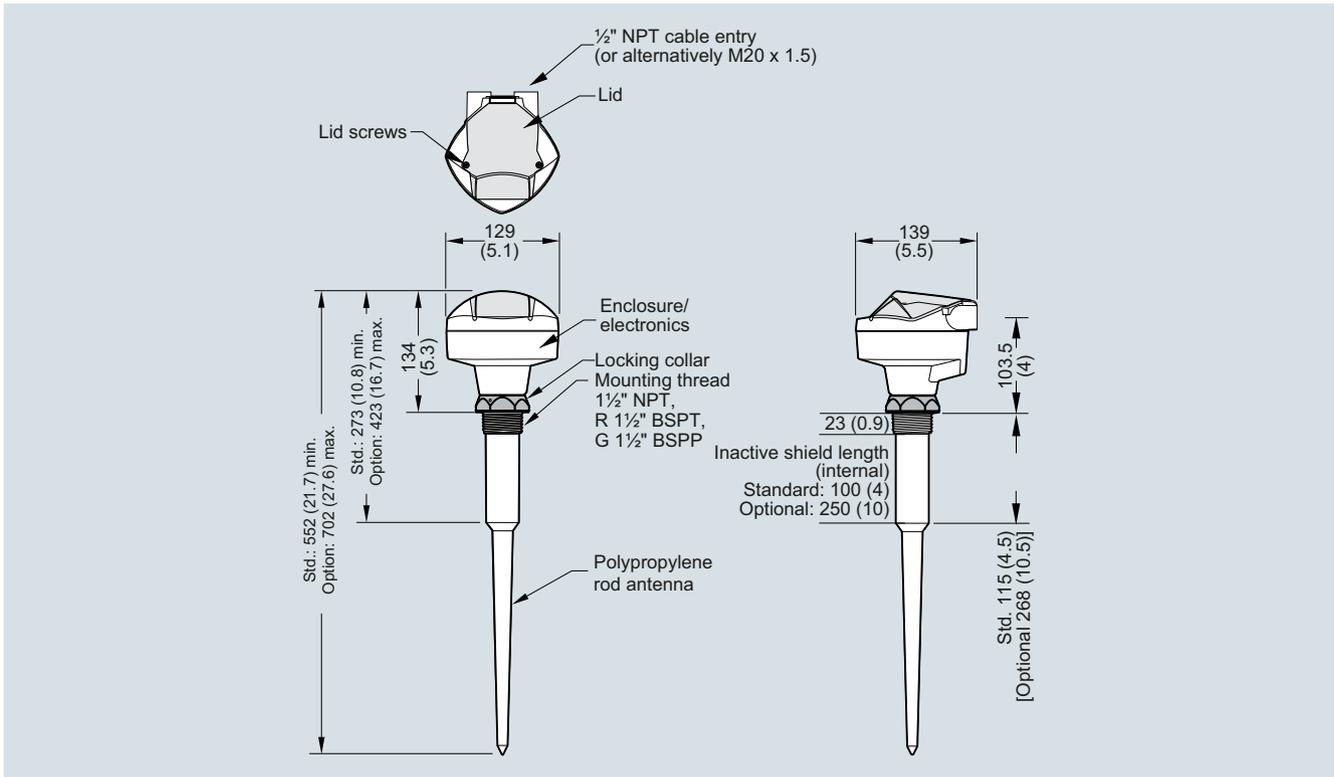
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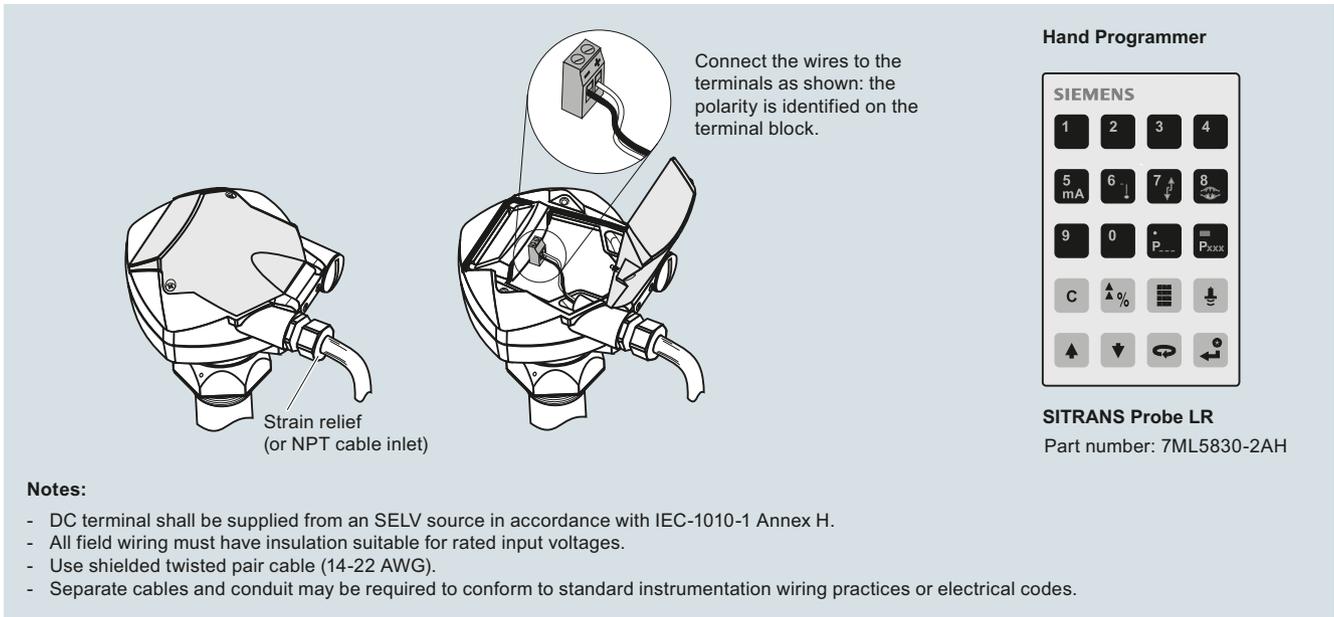
| Selection and Ordering data  | Article No.                | Selection and Ordering data   | Order code  |
|--|----------------------------|---|---|
| <b>SITRANS Probe LR</b><br>2-wire, 6 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage vessels with nominal pressure and temperature, to a range of 20 m (66 ft).<br>Max. 3 bar g (43.5 psi g) pressure and 80 °C (176 °F)<br><a href="#">Click on the Article No. for the online configuration in the PIA Life Cycle Portal.</a>   | <b>7ML5430-</b><br>        | <b>Further designs</b><br>Please add <b>"-Z"</b> to Article No. and specify Order code(s).<br>Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]:<br>Measuring-point number/identification (max. 27 characters) specify in plain text<br>Manufacturer's test certificate:<br>M to DIN 55350, Part 18 and to ISO 9000   | <br><b>Y15</b><br><br><b>C11</b>  |
| <b>Enclosure/Cable inlet</b><br>Plastic, (PBT), 2 x 1/2" NPT<br>Plastic, (PBT), 2 x M20 x 1.5  | 1<br>2                     | <b>Operating Instructions</b><br>All literature is available to download for free, in a range of languages, at <a href="http://www.siemens.com/processinstrumentation/documentation">http://www.siemens.com/processinstrumentation/documentation</a>  |   |
| <b>Antenna type/Material - (max. 3 bar and 80 °C)</b><br>Polypropylene Antenna<br>1/2" NPT [(Taper), ANSI/ASME B1.20.1], comes with integral 100 mm shield<br>R 1/2" [(BSPT), EN 10226], comes with integral 100 mm shield<br>G 1/2" [(BSPP), EN ISO 228-1], comes with integral 100 mm shield<br>1/2" NPT [(Taper), ANSI/ASME B1.20.1], comes with integral 250 mm shield<br>R 1/2" [(BSPT), EN 10226], comes with integral 250 mm shield<br>G 1/2" [(BSPP), EN ISO 228-1], comes with integral 250 mm shield | A<br>B<br>C<br>D<br>E<br>F | <b>Accessories</b><br>Handheld programmer, Intrinsically Safe, ATEX II 1G, Ex ia<br>HART modem/USB (for use with a PC and SIMATIC PDM)<br>One metallic cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F)<br>SITRANS RD100, loop powered display - see Chapter 7<br>SITRANS RD200, universal input display with Modbus conversion - see Chapter 7<br>SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7<br>SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7<br>For applicable back up point level switch - see point level measurement section | Article No.<br><b>7ML5830-2AH</b><br><b>7MF4997-1DB</b><br><b>7ML1930-1AP</b><br><b>7ML5741-...</b><br><b>7ML5740-...</b><br><b>7ML5744-...</b><br><b>7ML5750-...</b> |
| <b>Approvals</b><br>General Purpose, CE, RED, RCM<br>General Purpose, CSA <sub>US/C</sub> , FM, FCC<br>CSA Class I, Div. 1, Groups A, B, C, D, Class II, Div. 1, Group G, Class III, FCC, Intrinsically Safe<br>FM, Class I, II and III, Div. 1, Groups A, B, C, D, E, F, G, FCC, Intrinsically Safe<br>IECEx Ex ia IIC T4; ATEX II 1G EEx ia IIC T4, RED, RCM, Intrinsically Safe;<br>INMETRO Ex ia IIC T4 Ga; EAC  | A<br>B<br>C<br>D<br>E      | <b>Spare parts</b><br>Plastic lid<br>For applicable back up point level switch - see point level measurement section  | <b>7ML1830-1KB</b>  |
| <b>Communication/Output</b><br>4 ... 20 mA, HART   | 1                          |   |   |

**Dimensional drawings**



SITRANS Probe LR, dimensions in mm (inch)

**Circuit diagrams**



SITRANS Probe LR connections