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
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 to 6 m (10" to 20 ft)
- 12 m (40 ft) model: 0.25 to 12 m (10" to 40 ft)
Frequency: 54 kHz

Outputs
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:
- 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 ½" 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
- Other connection: FMS 200 mounting bracket (see page 5/189) 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 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
- Marine (only applies to HART communication option)
- CSAUS/C: FM, CE, C-TICK
Hazardous
- Intrinsically Safe (Europe)
- Intrinsically Safe (USA/Canada)
- Intrinsically Safe (Australia/New Zealand)
- Intrinsically Safe (International)
- Intrinsically Safe (Brazil)
- Non-incendive (USA)
- Lloyd’s Register of Shipping
- ABS Type Approval
- CSA/FM (barrier required) T4, Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III
- ANZEx Ex ia IIC T4, Tamb = -40 to +80 °C (-40 to +176 °F) IP67, IP68
- Intrinsically Safe (Brazil)
- Non-incendive (USA)
- IECEx TSA 04.0020X Ex ia IIC T4
- FM (no barrier required) TS: Class I, Div. 2, Groups A,B,C, D
- Intrinsically Safe Siemens handheld programmer
- Approvals for handheld programmer
- Ambient temperature
- Interface
- Power
Infrared receiver
- IS model with ATEX EEx ia IIC T4
- CSA/FM Class I, Div. 1, Groups A, B, C, D
- -20 to +40 °C (-5 to +104 °F)
- Proprietary infrared pulse signal
- 3 V lithium battery (non-replaceable)
# Level instruments
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### SITRANS Probe LU

#### Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C) 7ML5221-1</td>
<td>2-wire, loop powered ultrasonic transmitter for level, volume and flow monitoring of liquids in open channels, storage vessels and simple process vessels.</td>
</tr>
</tbody>
</table>

#### Enclosure/Cable Inlet

<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Plastic (PBT), 2 x M20x1.5 (check Approvals for cable gland details)</td>
</tr>
<tr>
<td>2</td>
<td>Plastic (PBT), 2 x ½&quot; NPT (no cable glands supplied)</td>
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</tbody>
</table>

#### Range/Transducer material

<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>6 meter (20 ft), ETFE</td>
</tr>
<tr>
<td>B</td>
<td>6 meter (20 ft), PVDF Copolymer</td>
</tr>
<tr>
<td>C</td>
<td>12 meter (40 ft), ETFE</td>
</tr>
<tr>
<td>D</td>
<td>12 meter (40 ft), PVDF Copolymer</td>
</tr>
</tbody>
</table>

#### Process connection

<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>2&quot; NPT [(Taper), ANSI/ASME B1.20.1]</td>
</tr>
<tr>
<td>B</td>
<td>R 2&quot; [(BSPT), EN 10226]</td>
</tr>
<tr>
<td>C</td>
<td>G 2&quot; [(BSPP), EN ISO 228-1]</td>
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</table>

#### Communication/Output

<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
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<tbody>
<tr>
<td>A</td>
<td>4 to 20 mA, HART®</td>
</tr>
<tr>
<td>B</td>
<td>PROFIBUS PA</td>
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#### Approvals

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
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</thead>
<tbody>
<tr>
<td>General Purpose, FM, CSA, CE, C-TICK</td>
<td>C) 7ML1998-5HT02</td>
</tr>
<tr>
<td>Intrinsic Safe, CSA/FM Class I, Div. 1, Groups A, B, C, D (barrier required), Class II, Div. 1, Groups E, F, G; Class III</td>
<td>C) 7ML1998-5HT11</td>
</tr>
<tr>
<td>Intrinsic Safe, ATEX II 1G Ex ia IIC T4</td>
<td>C) 7ML1998-5HT32</td>
</tr>
<tr>
<td>Intrinsic safe, ATEX II 1 G Ex ia IIC T4, ANZEEx, IECEx, INMETRO, CE, C-TICK</td>
<td>7ML1998-5QR81</td>
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<tr>
<td>Intrinsic safe, CSA/FM Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1 Group E, F, G; Class III T4</td>
<td>7ML1998-5QR81</td>
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#### Further designs

<table>
<thead>
<tr>
<th>Order code</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>Y15</td>
<td>Stainless steel tag [69 x 50 mm (2.71 x 1.97&quot;)]: Measuring-point number/identification (max. 16 characters) specify in plain text</td>
</tr>
</tbody>
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#### Operating Instructions for HART/ma device

<table>
<thead>
<tr>
<th>Language</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>C) 7ML1998-5HT02</td>
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<tr>
<td>French</td>
<td>C) 7ML1998-5HT11</td>
</tr>
<tr>
<td>German</td>
<td>C) 7ML1998-5HT32</td>
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</table>

#### Additional Multi-language Quick Start manual

<table>
<thead>
<tr>
<th>Order code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>7ML1998-5QR81</td>
<td>This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.</td>
</tr>
</tbody>
</table>

### Optional equipment

<table>
<thead>
<tr>
<th>Description</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Handheld programmer, Intrinsically Safe, EEx ia</td>
<td>7ML5830-2AH</td>
</tr>
<tr>
<td>Handheld programmer, General Purpose approvals</td>
<td>7ML1830-2AN</td>
</tr>
<tr>
<td>Handheld programmer, Infrared, Intrinsically Safe, PROFIBUS PA</td>
<td>7ML5830-2AJ</td>
</tr>
<tr>
<td>HART modem/RS-232</td>
<td>D) 7MF4997-1DA</td>
</tr>
<tr>
<td>HART modem/USB</td>
<td>D) 7MF4997-1DB</td>
</tr>
</tbody>
</table>

### Additional Multi-language Quick Start manual

<table>
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<tr>
<th>Order code</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>7ML1830-1KB</td>
<td>Plastic lid</td>
</tr>
</tbody>
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1) Available with Enclosure/Cable Inlet option 2 only.
2) Available with communication option 1 only.
3) Available with communication option 1 only.

C) Subject to export regulations AL: N, ECCN: EAR99
D) Subject to export regulations AL: N, ECCN: EAR99H
Options

Flange adapter for mating 2" NPT or 2" BSP process connections to 3" ANSI, DN 65 PN10, and JIS 10K 3B flanges

- 148.8 mm (5.86") bolt hole circle diameter
- 190.2 mm (7.49") diameter

SITRANS Probe LU optional flange adapter

SITRANS Probe LU with optional mounting bracket
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SITRANS Probe LU

Dimensional drawings

Note: Above model is shown without M20 cable glands or ½” NPT conduit connectors.

SITRANS Probe LU dimensions

Schematics

Notes:
- HART model above is shown with M20 cable glands. ½” 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