# Level Measurement

## Continuous level measurement

### Ultrasonic transducers

#### ST-H

**Overview**

ST-H transducers use ultrasonic technology to measure level in chemical storage and liquid tanks.

#### Benefits

- Can be mounted on a narrow standpipe
- Immune to corrosive and harsh environments
- Integral temperature sensor

#### Application

The narrow design of the ST-H allows the transducer to be mounted on a narrow standpipe. When mounted correctly, it is completely protected from the process and can even be used in harsh, corrosive environments.

During operation, the ultrasonic transducer emits acoustic pulses in a narrow beam perpendicular to the transducer face. The level transceiver measures the propagation time between pulse emission and reception of the echo to calculate the distance from the transducer to the material. Variations in sound velocity due to changes in temperature within the permissible range are automatically compensated by the integral temperature sensor.

- **Key Applications:** chemical storage, liquid tanks

#### Technical specifications

<table>
<thead>
<tr>
<th>Mode of operation</th>
<th>Measuring principle</th>
<th>Ultrasonic transducer</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Input</strong></td>
<td>Measuring range</td>
<td>0.3 ... 10 m (1 ... 33 ft)</td>
</tr>
<tr>
<td><strong>Output</strong></td>
<td>Frequency</td>
<td>44 kHz</td>
</tr>
<tr>
<td></td>
<td>Beam angle</td>
<td>12°</td>
</tr>
<tr>
<td><strong>Accuracy</strong></td>
<td>Temperature compensation</td>
<td>Compensated by integral temperature sensor</td>
</tr>
</tbody>
</table>

#### Rated operating conditions

<table>
<thead>
<tr>
<th>Ambient conditions</th>
<th>Pressure</th>
<th>Normal atmospheric pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature</td>
<td>-20 ... +60 °C (-5 ... +140 °F) (ATEX approved model)</td>
<td>-40 ... +73 °C (-40 ... +163 °F) (CSA/FM approved model)</td>
</tr>
</tbody>
</table>

#### Design

<table>
<thead>
<tr>
<th>Weight¹</th>
<th>1.4 kg (3 lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material (enclosure)</td>
<td>Base and lid made of ETFE or PVDF (epoxy fitted joint)²</td>
</tr>
<tr>
<td>Process connection</td>
<td>2&quot; NPT [(Taper), ANSI/ASME B1.20.1], R 2&quot; [(BSPT), EN 10226] or G 2&quot; [(BSPP), EN ISO 228-1]</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP68</td>
</tr>
<tr>
<td>Cable connection</td>
<td>2-core shielded/twisted, 0.519 mm² (20 AWG), PVC sheath</td>
</tr>
<tr>
<td>Cable (max. length)</td>
<td>365 m (1 200 ft) with RG 62 A/U coaxial cable</td>
</tr>
</tbody>
</table>

#### Options

| Flange adapter | 3" Universal (fits DN 65, PN 10 and 3" ASME) |

#### Certificates and approvals

| CE, CSA Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G T3 (ETFE only), FM Class I, II, Div. 1, Groups C, D, E, F, G T4A, ATEX II 2G / INMETRO Ex mb IIC T5 Gb, RCM, KCC |

¹ Approximate shipping weight of transducer with standard cable length
² When measuring chemicals, check compatibility of ETFE or PVDF and epoxy, or mount joint external to process.
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Selection and Ordering data

<table>
<thead>
<tr>
<th>Article No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>7ML1100-0A0</td>
<td>EchoMax ST-H ultrasonic transducer</td>
</tr>
</tbody>
</table>

- Level measurement in chemical storage and liquid tanks.
- The narrow design of the ST-H allows the transducer to be mounted on a 2 inch standpipe.
- Measuring range: min. 0.3 m (1 ft), max. 10 m (33 ft).
- Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Process connection

- ETFE, 2" NPT [(Taper), ANSI/ASME B1.20.1]
- ETFE, R 2" [(BSPT), EN 10226]
- ETFE, G 2" [(BSPP), EN ISO 228-1]
- PVDF copolymer, 2" NPT [(Taper), ANSI/ASME B1.20.1]
- PVDF copolymer, R 2" [(BSPT), EN 10226]
- PVDF copolymer, G 2" [(BSPP), EN ISO 228-1]

Cable length

- 5 m (16.40 ft)
- 10 m (32.81 ft)
- 30 m (98.43 ft)
- 50 m (164.04 ft)
- 100 m (328.08 ft)

Approvals

- CE, FM Class I, II, Div. 1, Groups C,D,E,F,G T4
- ATEX 2G / INMETRO Ex mb IIC T5 Gb, RCM, KCC
- CSA Class I, II, III, Div. 1, Groups A,B,C,D,E,F,G T3
- CE, ATEX 2G / INMETRO Ex mb IIC T5 Gb, RCM, KCC

Operating Instructions

- Multi-language

- Note: The Operating Instructions should be ordered as a separate line item on the order.

All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation

Further designs

- Please add "-Z" to Article No. and specify Order code(s).

- Acrylic coated, stainless steel tag [13 x 45 mm (0.5 x 1.75 inch)]; Measuring-point number/identification (max. 16 characters) specify in plain text

Accessories

- Universal box bracket, mounting kit
- 3" ASME, DN 65 PN 10, JIS 10K 3B ETFE flange adapter for 2" NPT
- 3" ASME, DN 65 PN 10, JIS 10K 3B ETFE flange adapter for 2" BSPT
- Easy Aimer 2, aluminum, NPT with ¾" x 1" PVC coupling
- Easy Aimer 2, aluminum with M20 adapter and 1" and 1½" BSPT aluminum couplings
- Easy Aimer 304, NPT with 1" stainless steel coupling
- Easy Aimer 304, with M20 adapter and 1" and 1½" BSPT 304 stainless steel couplings
- Plastic adapter 1" NPT
- Plastic adapter 1" NPT/M20

Selection and Ordering data

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<th>Order code</th>
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<tr>
<td>A</td>
<td>5 m (16.40 ft)</td>
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<tr>
<td>E</td>
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1) Available with Process connection options 0...2 only
2) Available with Process connection options 3...5 only
3) Not suitable for Ketone, Hexane, Ester or Ethyl Acetate atmospheres
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Dimensional drawings

ST-H ultrasonic transducer, dimensions in mm (inch)

Circuit diagrams

Direct connection

Coaxial extension

3 Terminal direct*

3 Terminal extension*

* For SITRANS LUT400, MultiRanger 100/200, HydroRanger 200

ST-H ultrasonic transducer connections