HydroRanger Plus is an ultrasonic level controller for control of wet wells and reservoir pump operations, differential control, and open channel flow monitoring, using energy-saving algorithms.

**Benefits**
- Outputs for alarms, chart recorders, controllers and integration of existing systems
- Monitors wet wells, weirs and flumes
- Energy-saving function with built-in real-time clock
- Special control mode to reduce grease rings and other deposits
- Integral temperature compensation
- Pump performance monitoring
- System monitoring and network analysis

**Application**

The system is effective in wet wells, weirs, and flumes where foam and turbulence are typical operating conditions. It can be customized to meet your specific application needs – from measuring flow rate in a narrow flume to volume in a ferric chloride storage bank.

The system consists of the electronics housed in a wall-mounted enclosure and a hermetically sealed, corrosion-resistant EchoMax transducer. These components can be separated by up to 365 m (1200 ft).

Optional submergence shields ensure consistent operation in wet wells where the transducer may be submerged during flooding from rainfall or a power outage. Siemens patented detection software can differentiate between a submerged condition and a high level.

- Key Applications: wet wells, weirs, flumes
Level Measurement
Continuous level measurement – Ultrasonic controllers

HydroRanger Plus

Technical specifications

Mode of operation
Measuring principle: Ultrasonic level measurement
Measuring range: 0.3 ... 15 m (1 ... 50 ft)
Measuring points: 1 or 2

Output
Ultrasonic transducer: 44 kHz
Relays: 5 alarm/control relays, 1 SPDT Form C per relay, rated 5 A at 250 V AC, resistive load
mA output: 0/4 ... 20 mA, optically isolated
• Max. load: 1 kΩ
• Resolution: 0.1 % of 20 mA

Accuracy
Error in measurement: 0.25% of range or 6 mm (0.24\textdegree), whichever is greater
Resolution: 0.1% of measuring range or 2 mm (0.08\textdegree), whichever is greater
Temperature compensation: -50 ... +150 °C (-58 ... +302 \textdegree F)
• Integral temperature sensor
• External TS-3 temperature sensor (optional)
• Programmable fixed temperature

Rated operating conditions
Ambient conditions
• Ambient temperature for enclosure: -20 ... +50 °C (-4 ... +122 °F)

Design
Rack mount: DIN 3 HU/14 pitch, 4 rail plug-in unit suitable for standard 84 pitch (19\textdegree) rack
Panel mount: Suitable for standard panel cutout DIN 43700, 72 x 144 mm, 100 mm center height
Degree of protection (wall mount): IP65/NEMA 4X/Type 4X
Weight (rack and panel mount): 0.87 kg (1.9 lbs)
Weight (wall mount): 1.5 kg (3.3 lbs)
Material (enclosure): Polyester/polycarbonate alloy

Electrical connection
Ultrasonic transducer cable extension: RG 62-A/U coaxial cable with low capacitance
mA output signal: 2-core copper conductor, twisted, shielded, 0.5 ... 0.75 mm² (22 ... 18 AWG), Belden 8760 or equivalent is acceptable

Power supply
100/115/200/230 V AC, ±15\%, 50/60 Hz, 15 VA and/or 9 ... 30 V DC, 8 W

Ultrasonic transducer
Compatible transducers: ST-H and Echomax series XPS-10/10F, XPS 15/15F, XCT-6, XCT-12 and XRS-5

Displays and controls
Rack and panel mount: 75 x 20 mm (3 x 0.8\textdegree) LCD (selectable backlighting)
Wall mount: 100 x 40 mm (4 x 1.5\textdegree) multifield LCD, backlit

Programming
Removable programmer or optional Dolphin Plus

Memory
EEPROM (non-volatile), no backup battery required

Certificates and approvals
CE\textsuperscript{2)}, FM, CSAUS/C, C-TICK

1) The measuring range corresponds to the distance from the zero point to the sensor face, plus any range extension.
2) EMC certificate available on request
## HydroRanger Plus

### Selection and Ordering data

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>7ML1025-01</td>
<td>HydroRanger Plus, rack and panel mount</td>
</tr>
<tr>
<td>7ML1028-01</td>
<td>HydroRanger Plus, wall mount</td>
</tr>
</tbody>
</table>

#### Mounting/device version
- Version for 19" rack (requires terminal block; see accessories)
- Version for panel

#### Approvals
- CE (EN 61326), CSA, US/C, FM, C-TICK

#### Input voltage
- 100 V AC, 9 ... 30 V DC
- 115 V AC, 9 ... 30 V DC
- 200 V AC, 9 ... 30 V DC
- 230 V AC, 9 ... 30 V DC

### Selection and Ordering data

<table>
<thead>
<tr>
<th>Order code</th>
<th>Further designs</th>
</tr>
</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>
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</table>

### Operating Instructions

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Language</th>
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<tbody>
<tr>
<td>7ML1998-1AC02</td>
<td>English</td>
</tr>
<tr>
<td>7ML1998-1AC12</td>
<td>French</td>
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<tr>
<td>7ML1998-1AC32</td>
<td>German</td>
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</tbody>
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### HydroRanger Plus Wall Mount

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>7ML1028-01</td>
<td>Non-contacting ultrasonic echo ranging technology monitor that comes standard with a backlit display</td>
</tr>
</tbody>
</table>

#### Input voltage
- 100 V AC, 9 ... 30 V DC
- 115 V AC, 9 ... 30 V DC
- 200 V AC, 9 ... 30 V DC
- 230 V AC, 9 ... 30 V DC

#### Approvals
- CE; FM General Purpose; CSA Class I, Div. 2, C-TICK

#### Mounting/enclosure version
- Standard enclosure (NEMA 4X)
- Standard enclosure prepared for five M20 cable glands

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### Accessories

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Description</th>
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</thead>
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<tr>
<td>7ML1830-2AC</td>
<td>Handheld programmer</td>
</tr>
<tr>
<td>7ML1830-1AC</td>
<td>Tag, stainless steel, 12 x 45 mm (0.47 x 1.77&quot;), one text line, suitable for enclosure</td>
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<tr>
<td>7ML1830-1AC</td>
<td>M20 cable gland kit (6 M20 cable glands, 6 M20 nuts, 3 stop plugs)</td>
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<tr>
<td>7ML1830-1AC</td>
<td>M20 cable gland kit (4 M20 cable glands, 4 M20 nuts, 4 washers)</td>
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<tr>
<td>7ML1830-1AC</td>
<td>Sunshield kit, 304 SS</td>
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<tr>
<td>7ML1830-1AC</td>
<td>SITRANS RD100 Remote display - see Chapter 8</td>
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<tr>
<td>7ML1830-1AC</td>
<td>SITRANS RD200 Remote display - see Chapter 8</td>
</tr>
<tr>
<td>7ML1830-1AC</td>
<td>SITRANS RD500 web, datalogging, alarming, ethernet, and modem support for instrumentation - see Chapter 8</td>
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<tr>
<td>7ML1830-1AC</td>
<td>Card, mother main</td>
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<tr>
<td>7ML1830-1AC</td>
<td>Card, daughter</td>
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<tr>
<td>7ML1830-1AC</td>
<td>Card, display</td>
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</tbody>
</table>

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Subject to export regulations AL: N, ECCN: EAR99, K: Subject to export regulations AL: N, ECCN: 5A991X.
Level Measurement
Continuous level measurement – Ultrasonic controllers

HydroRanger Plus

Dimensional drawings

Rack Mount
DIN 3U/14HP, 4 rail plug-in unit suitable for standard 84 HP (19") subrack. (Terminal is customer supplied or available as optional accessory.)

Panel Mount

Wall Mount

Suitable location for conduit entrances. Use watertight conduit hubs to maintain enclosure rating.

HydroRanger Plus, dimensions in mm (inch)

Schematics

Notes
1. Required only if mounted adjacent to other Siemens Milltronics equipment. Interconnect all ‘SYNC’ terminals with a single 18 AWG (0.5 mm²) wire.

2. Use RG-62 A/U coaxial (or equivalent) for extensions up to 365 m (1200 ft). Run in grounded metal conduit, separate from other wiring.

3. Each relay has 1 set of Form 'C' (SPDT) contacts relay rated at 5 A 250 V AC, non-inductive, when equal or lower rated limiting fuses are installed. Relay de-energized when in alarm conditions and energized for pump control.

4. Before applying AC power (mains), ensure the correct voltage is selected. Never operate the HydroRanger Plus with the ground (earth) wire disconnected.

Voltage Selection

HydroRanger Plus connections, rack and panel mount
### Level Measurement

**Continuous level measurement — Ultrasonic controllers**

#### HydroRanger Plus connections, wall mount

<table>
<thead>
<tr>
<th>Terminal</th>
<th>Description</th>
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<tbody>
<tr>
<td>1-10</td>
<td>mA Out I</td>
</tr>
<tr>
<td>11-15</td>
<td>shield</td>
</tr>
<tr>
<td>16</td>
<td>+</td>
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<tr>
<td>17</td>
<td>mA In I</td>
</tr>
<tr>
<td>18</td>
<td>sync</td>
</tr>
<tr>
<td>19</td>
<td>black</td>
</tr>
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</tr>
<tr>
<td>31</td>
<td>GND</td>
</tr>
<tr>
<td>32</td>
<td>L1</td>
</tr>
<tr>
<td>33</td>
<td>L2/N</td>
</tr>
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