Overview

HydroRanger 200 HMI is an ultrasonic level controller for up to six pumps and provides control, differential control, and open channel flow monitoring.

Benefits

- Easy to use HMI display with local four-button programming, menu-driven parameters, and Wizard support for key applications
- English, German, French, Spanish, Chinese, Italian, Portuguese, and Russian texts on the HMI
- Removable terminal blocks for ease of wiring
- Monitors wet wells, weirs, and flumes
- Communication using built-in Modbus RTU via RS 485 and SIMATIC PDM configuration software
- Compatible with SmartLinx system: PROFIBUS DP, PROFINET (cyclic access of process values only), DeviceNet, Modbus TCP/IP, and EtherNet/IP
- Single or dual point level monitoring
- 6 relays
- Auto False-Echo Suppression for fixed obstruction avoidance
- Anti-grease ring/tide mark buildup
- Differential amplifier transceiver for common mode noise rejection and improved signal-to-noise ratio
- Wall and panel mounting options

Application

For water authorities, municipal water, and wastewater plants, HydroRanger 200 HMI is an economical, low-maintenance solution delivering control efficiency and productivity needed to meet today’s exacting standards. It offers single point monitoring with all models, and optional dual-point monitoring with 6 relay model. As well, it has digital communications with built-in Modbus RTU via RS 485.

The standard 6 relay HydroRanger 200 HMI will monitor open channel flow and features advanced relay alarming and pump control functions as well as volume conversion. It is compatible with SIMATIC PDM, allowing for PC configuration and set-up. Sonic Intelligence advanced echo-processing software provides increased reading reliability.

HydroRanger 200 HMI uses proven continuous ultrasonic echo ranging technology to monitor water and wastewater of any consistency up to 15 m (50 ft) in depth. Achievable resolution is 0.1 % with accuracy to 0.25 % of range. Unlike contacting devices, HydroRanger 200 HMI is immune to problems caused by suspended solids, harsh corrosives, grease or silt in the effluent, reducing downtime.

- Key Applications: wet wells, flumes/weirs, bar screen control

Technical specifications

Mode of Operation

<table>
<thead>
<tr>
<th>Measuring principle</th>
<th>Ultrasonic level measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring range</td>
<td>0.3 ... 15 m (1 ... 50 ft), transducer dependent</td>
</tr>
<tr>
<td>Measuring points</td>
<td>1 or 2</td>
</tr>
</tbody>
</table>

Input

<table>
<thead>
<tr>
<th>Analog</th>
<th>0 ... 20 mA or 4 ... 20 mA, from alternate device, scalable (6 relay model)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discrete</td>
<td>10 ... 50 V DC switching level Logical 0 ≤ 0.5 V DC Logical 1 = 10 ... 50 V DC max. 3 mA</td>
</tr>
</tbody>
</table>

Output

<table>
<thead>
<tr>
<th>EchoMax transducer</th>
<th>44 kHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ultrasonic transducer</td>
<td>Compatible transducers: ST-H and EchoMax series XPS-10, XPS-15/15F, and XRS-5</td>
</tr>
</tbody>
</table>

Relays

- Model with 6 relays
- Rating 5 A at 250 V AC, non-inductive
- 4 SPST Form A/2 SPDT Form

mA output

- 0 ... 20 mA or 4 ... 20 mA
- Max. load 750 Ω, isolated
- Resolution 0.1 % of range

Accuracy

<table>
<thead>
<tr>
<th>Error in measurement</th>
<th>0.25 % of range or 6 mm (0.24 inch), whichever is greater</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resolution</td>
<td>0.1 % of measuring range or 2 mm (0.08 inch), whichever is greater</td>
</tr>
<tr>
<td>Temperature compensation</td>
<td>-50 ... +150 °C (-58 ... +302 °F)</td>
</tr>
</tbody>
</table>

Rated operating conditions

<table>
<thead>
<tr>
<th>Installation conditions</th>
<th>Indoor / outdoor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installation category</td>
<td>II</td>
</tr>
<tr>
<td>Pollution degree</td>
<td>4</td>
</tr>
</tbody>
</table>

Ambient conditions

| Ambient temperature (enclosure) | -20 ... +50 °C (-4 ... +122 °F) |

Design

<table>
<thead>
<tr>
<th>Weight</th>
<th>1.22 kg (2.68 lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panel mount</td>
<td>1.35 kg (2.97 lb)</td>
</tr>
<tr>
<td>Material (enclosure)</td>
<td>Polycarbonate</td>
</tr>
</tbody>
</table>

Degree of protection (enclosure)

- Wall mount
- Panel mount
- IP65/Type 4X/NEMA 4X
- IP54/Type 3/NEMA 3

Cable

- Transducer and mA output signal
- 2-core copper conductor, twisted, shielded, 300 Vrms, 0.82 mm² (18 AWG), Belden 8760 or equivalent is acceptable
- Max. separation between transducer and transceiver 365 m (1 200 ft)

Displays and controls

- 60 x 40 mm (2.36 x 1.57 inch) LCD 240 x 160 pixels resolution

Power supply

AC version

- 100 ... 230 V AC ± 15 %, 50/60 Hz, 36 VA (17 W)

DC version

- 12 ... 30 V DC (20 W)
Level Measurement
Continuous level measurement
Ultrasonic controllers

HydroRanger 200 HMI

Certificates and approvals
- CE, RCM, EAC, KCC
- FM, CSA, UL listed
- CSA Type I, Div. 2, Groups A, B, C and D, Class II, Div. 2, Groups E, F and G, Class III (wall mount only)
- MCERTS Class 2 approved for Open Channel Flow

Communication
- RS 232 with Modbus RTU or ASCII via RJ-11 connector
- RS 485 with Modbus RTU or ASCII via terminal blocks
- Optional: SmartLinx cards for:
  - PROFIBUS DP-V1, PROFINET (cyclic access of process values only)
  - DeviceNet, Modbus TCP/IP, EtherNet/IP
- EMC performance available upon request

Selection and Ordering data

<table>
<thead>
<tr>
<th>Selection and Ordering data</th>
<th>Article No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Siemens HydroRanger 200 HMI</td>
<td>7ML5034-</td>
</tr>
</tbody>
</table>

Further designs
Please add "-Z" to Article 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

Test Certificate: Manufacturer’s test certificate M to DIN 55350, Part 18 and to ISO 9000

Operating Instructions

<table>
<thead>
<tr>
<th>Language</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>A5E36281317</td>
</tr>
<tr>
<td>German</td>
<td>A5E36281391</td>
</tr>
</tbody>
</table>

Accessories

<table>
<thead>
<tr>
<th>Accessories</th>
<th>Article No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sunshield kit, 304 stainless steel</td>
<td>7ML1930-1GA</td>
</tr>
<tr>
<td>RS 232 to RJ11 COMMS adapter</td>
<td>7ML1930-6AK</td>
</tr>
<tr>
<td>SITRANS RD100, loop powered display</td>
<td>7ML5741-...</td>
</tr>
<tr>
<td>SITRANS RD200, universal input display with Modbus conversion</td>
<td>7ML5740-...</td>
</tr>
<tr>
<td>SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion</td>
<td>7ML5744-...</td>
</tr>
<tr>
<td>SITRANS RD500 web, universal remote monitoring solution for instrumentation</td>
<td>7ML5750-...</td>
</tr>
</tbody>
</table>

Spare parts

<table>
<thead>
<tr>
<th>Spare parts</th>
<th>Article No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power Supply Board (100 ... 230 V AC)</td>
<td>7ML1830-1MD</td>
</tr>
<tr>
<td>Power Supply Board (12 ... 30 V DC)</td>
<td>7ML1830-1ME</td>
</tr>
<tr>
<td>Removable terminal blocks</td>
<td>A5E38824197</td>
</tr>
<tr>
<td>Spare lid with HMI, MultiRanger 200 HMI/HydroRanger 200 HMI, wall</td>
<td>A5E35778738</td>
</tr>
<tr>
<td>Spare lid with HMI, MultiRanger 200 HMI/HydroRanger 200 HMI, panel</td>
<td>A5E35778740</td>
</tr>
<tr>
<td>SmartLinx DeviceNet module</td>
<td>7ML1830-1HT</td>
</tr>
<tr>
<td>SmartLinx PROFIBUS DP-V1 module</td>
<td>A5E35778741</td>
</tr>
<tr>
<td>SmartLinx PROFINET IO module</td>
<td>7ML1830-1PM</td>
</tr>
<tr>
<td>SmartLinx Modbus TCP/IP, EtherNet/IP module</td>
<td>7ML1830-1PN</td>
</tr>
</tbody>
</table>

Approvals
- General Purpose CE, FM, CSA, UL listed, RCM, EAC, KCC

1) All relays certified for use with equipment that fails in a state at or under the rated maximums of the relays.
2) Program range is defined as the empty distance to the face of the transducer plus any range extension.
3) Maximum power consumption is listed
4) EMC performance available upon request
5) Selection and Ordering data

Mounting, enclosure design
- 4 button HMI, Wall mount, standard enclosure
- 4 button HMI, Wall mount, 4 entries, 4 M20 cable glands included
- 4 button HMI, Panel Mount

Input voltage
- 100 ... 230 V AC
- 12 ... 30 V DC

Number of measurement points
- Single point model, 6 relays
- Dual point model, 6 relays

Communication (SmartLinx)
- Without module
- SmartLinx PROFIBUS DP-V0 module
- SmartLinx DeviceNet module
- SmartLinx PROFIBUS DP-V1 module
- SmartLinx PROFINET module
- SmartLinx EtherNet/IP module
- SmartLinx Modbus TCP/IP module
- See SmartLinx product page 4/348 for more information

Accessories
- Tag, stainless steel, 12 x 45 mm (0.47 x 1.77 inch), one text line, suitable for enclosure
- Sunshield kit, 304 stainless steel
- USB to RS 232 adapter
- RS 232 to RJ11 COMMS adapter
- SITRANS RD100, loop powered display - see Chapter 7
- SITRANS RD200, universal input display with Modbus conversion - see Chapter 7
- SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7
- SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7

Spare parts
- Power Supply Board (100 ... 230 V AC)
- Power Supply Board (12 ... 30 V DC)
- Removable terminal blocks
- Spare lid with HMI, MultiRanger 200 HMI/HydroRanger 200 HMI, wall
- Spare lid with HMI, MultiRanger 200 HMI/HydroRanger 200 HMI, panel
- SmartLinx DeviceNet module
- SmartLinx PROFIBUS DP-V1 module
- SmartLinx PROFINET IO module
- SmartLinx Modbus TCP/IP, EtherNet/IP module
### Dimensional drawings

**Panel mount dimensions**

- **Dimensions:** 198 (7.8) mm x 278 (10.9) mm
- **Enclosure lid**
- **Cable entry location**
- **Cable entry**
- **Enclosure base**
- **Lid screws** (6)

**Wall mount dimensions**

- **Dimensions:** 161 (6.3) mm x 240 (9.4) mm
- **Enclosure lid**
- **Cable entry**
- **Enclosure base**
- **Cable entry location**
- **Lid screws** (6)

**Dimensions in mm (inch):**

- **Panel mount:**
  - Length: 198 (7.8) mm
  - Height: 278 (10.9) mm
  - Lid screws: 6

- **Wall mount:**
  - Length: 161 (6.3) mm
  - Height: 240 (9.4) mm
  - Lid screws: 6
  - Cable entry location
  - Enclosure base

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Circuit diagrams

Relays shown in released state

Note:
1. Use 2-core copper wire, twisted, with shield, for expansion up to 365 m (1 200 ft). Route cable in grounded metal conduit, separate from other cables.
2. Verify that all system components are installed in accordance with instructions.
3. Connect all cable shields to the HydroRanger shield connections. Avoid differential ground potentials by not connecting cable shields to ground (earth) anywhere else.
4. Keep exposed conductors on shielded cables as short as possible to reduce noise on the line caused by stray transmissions and noise pickup.

HydroRanger 200 HMI connections