

Level Measurement

Continuous level measurement - Ultrasonic controllers

HydroRanger 200 HMI

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
- Digital communications with built-in Modbus RTU via RS 485
- Compatible with SmartLinx system and SIMATIC PDM configuration software
- Single or dual point level monitoring
- 6 relays
- Auto False-Echo Suppression for fixed obstruction avoidance
- Anti-grease ring/tide mark build-up
- 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	
Measuring principle	Ultrasonic level measurement
Measuring range	0.3 ... 15 m (1 ... 50 ft), transducer dependent
Measuring points	1 or 2
Input	
Analog	0 ... 20 mA or 4 ... 20 mA, from alternate device, scalable (6 relay model)
Discrete	10 ... 50 V DC switching level Logical 0 ≤ 0.5 V DC Logical 1 = 10 ... 50 V DC Max. 3 mA
Output	
EchoMax transducer	44 kHz
Ultrasonic transducer	Compatible transducers: ST-H and EchoMax series XPS-10, XPS-15/15F, and XRS-5
Relays ¹⁾	Rating 5 A at 250 V AC, non-inductive 4 SPST Form A/2 SPDT Form C
• Model with 6 relays	
mA output	0 ... 20 mA or 4 ... 20 mA
• Max. load	750 Ω, isolated
• Resolution	0.1 % of range
Accuracy	
Error in measurement	0.25 % of range or 6 mm (0.24 inch), whichever is greater
Resolution	0.1 % of measuring range or 2 mm (0.08 inch), whichever is greater ²⁾
Temperature compensation	<ul style="list-style-type: none"> -50 ... +150 °C (-58 ... +302 °F) Integral temperature sensor in transducer External TS-3 temperature sensor (optional) Programmable fixed temperature values
Rated operating conditions	
Installation conditions	
• Location	Indoor / outdoor
• Installation category	II
• Pollution degree	4
Ambient conditions	
• Ambient temperature (enclosure)	-20 ... +50 °C (-4 ... +122 °F)

Design	
Weight	
• Wall mount	1.37 kg (3.02 lb)
• Panel mount	1.50 kg (3.31 lb)
Material (enclosure)	Polycarbonate
Degree of protection (enclosure)	
• Wall mount	IP65/Type 4X/NEMA 4X
• Panel mount	IP54/Type 3/NEMA 3
Cable	
• Transducer and mA output signal	2-core copper conductor, twisted, shielded, 300 Vrms, 0.82 mm ² (18 AWG), Belden 8 760 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 ³⁾	
AC version	100 ... 230 V AC ± 15 %, 50/60 Hz, 36 VA (17 W)
DC version	12 ... 30 V DC (20 W)
Certificates and approvals	
	<ul style="list-style-type: none"> CE, RCM⁴⁾ FM, CSA_{US/C}, UL listed CSA_{US/C} Class I, Div. 2, Groups A, B, C and D, Class II, Div. 2, Groups F and G, Class III (wall mount only) MCERTS Class 2 approved for Open Channel Flow
Communication	
	<ul style="list-style-type: none"> 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 <ul style="list-style-type: none"> - PROFIBUS DPV1 - DeviceNet

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.

Level Measurement

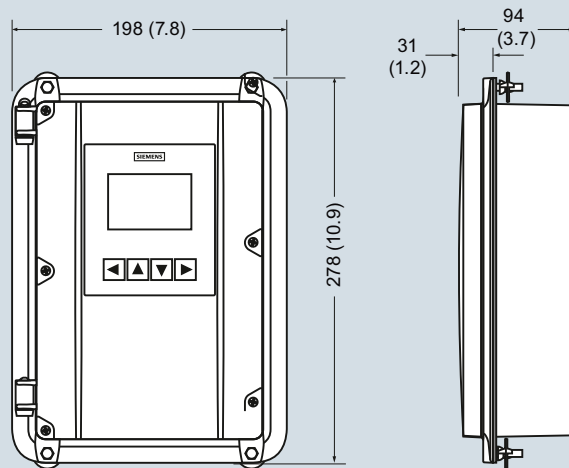
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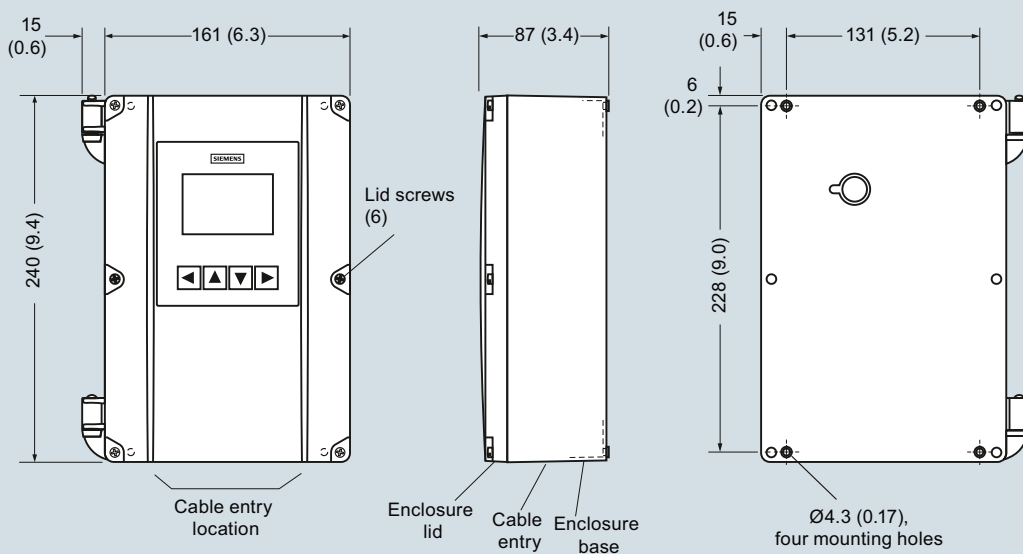
Selection and Ordering data	Article No.	Selection and Ordering data	Order code
Siemens HydroRanger 200 HMI Ultrasonic level controller for up to six pumps that provides control, differential control and open channel flow monitoring. The HydroRanger 200 HMI is also available as a level measurement controller only. Select option from number of measurement points options below. ↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	7ML5034- 	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	 Y15 C11
Mounting 4 button HMI, Wall mount, standard enclosure 4 button HMI, Wall mount, 4 entries, 4 M20 cable glands included 4 button HMI, Panel Mount	4 5 6	Operating Instructions English German Note: The Operating Instructions should be ordered as a separate item on the order. This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	Article No. A5E36281317 A5E36281391
Input voltage 100 ... 230 V AC 12 ... 30 V DC	A B	Other Operating Instructions SmartLinx PROFIBUS DPV1, English SmartLinx PROFIBUS DPV1, German SmartLinx PROFIBUS DP, English SmartLinx PROFIBUS DP, German SmartLinx PROFIBUS DP, French SmartLinx DeviceNet, English Note: The appropriate SmartLinx Operating Instructions should be ordered as a separate line on the order.	A5E36197302 A5E36197305 7ML1998-1AQ03 7ML1998-1AQ33 7ML1998-1AQ13 7ML1998-1BH02
Number of measurement points Single point model, 6 relays Dual point model, 6 relays	A B	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 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	7ML1930-1AC 7ML1930-1GA 7ML5741-... 7ML5740-... 7ML5744-... 7ML5750-...
Communication (SmartLinx) Without module SmartLinx PROFIBUS DP V0 module SmartLinx DeviceNet module SmartLinx PROFIBUS DP V1 module See SmartLinx product page for more information	0 2 3 4	Spare parts Power Supply Board (100 ... 230 V AC) Power Supply Board (12 ... 30 V DC) Replacement lid with 4 button HMI SmartLinx PROFIBUS DP V1 module	7ML1830-1MD 7ML1830-1ME A5E35778738 A5E35778741
Approvals General Purpose CE, FM, CSA _{US/C} , UL listed, RCM CSA Class I, Div. 2, Groups A, B, C, and D; Class II, Div. 2, Groups F and G; Class III	1 2		

Dimensional drawings

Panel mount dimensions



Wall mount dimensions



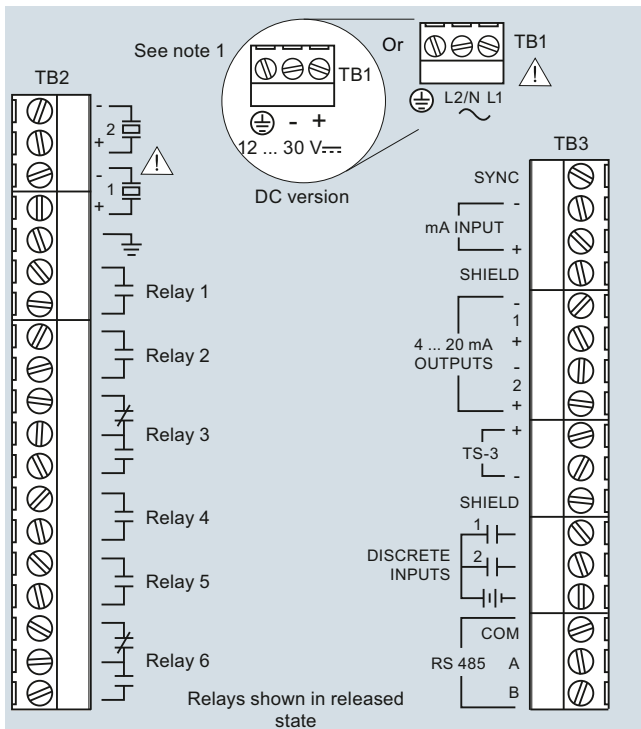
HydroRanger 200 HMI, dimensions in mm (inch)

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Schematics



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 MultiRanger 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