Level measurement
Continuous level measurement
Controllers

HydroRanger 200 HMI

4

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	
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
• Model with 6 relays	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	
Error in measurement	• 0.25 % of range or 6 mm (0.24 inch), whichever is greater • ± 4 mm (0.16 inch) in combination with an XRS-5 transducer on ranges 4 m (13 ft) or less.
Resolution	0.1 % of measuring range or 2 mm (0.08 inch), whichever is greater[2)]
Temperature compensation	• -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)
• Storage temperature	-20 ... +50 °C (-4 ... +122 °F)
Design	
Weight	
• Wall mount	1.22 kg (2.68 lb)
• Panel mount	1.35 kg (2.97 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 mm² (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)

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Technical specifications (continued)

Certificates and approvals	• CE, RCM, EAC, KCC[4)] • 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	• 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 DPV1, PROFINET (cyclic access of process values only) - DeviceNet, Modbus TCP/IP, EtherNet/IP

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

Selection and ordering data — Article No.

HydroRanger 100/200 Ultrasonic level controller ↗	**7ML5034-**									
Continuous, non-contact, 15 m (50 ft) range. Monitors level, volume, and open channel flow in liquids, slurries, and solids.										
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.										
Mounting, enclosure design										
4 button HMI, Wall mount, standard enclosure	**4**									
4 button HMI, Wall mount, 4 entries, 4 M20 cable glands included	**5**									
4 button HMI, Panel Mount	**6**									
Input voltage										
100 ... 230 V AC		**A**								
12 ... 30 V DC		**B**								
Number of measurement points										
Single point model, 6 relays			**A**							
Dual point model, 6 relays			**B**							
Communication (SmartLinx)										
Without module				**0**						
SmartLinx PROFIBUS DP-V0 module				**2**						
SmartLinx DeviceNet module				**3**						
SmartLinx PROFIBUS DP-V1 module				**4**						
SmartLinx PROFINET module[2)]				**5**						
SmartLinx EtherNet/IP module				**6**						
SmartLinx Modbus TCP/IP module See SmartLinx product page 4/348 for more information				**7**						
Approvals										
General Purpose CE, FM, $CSA_{US/C}$, UL listed, RCM, EAC, KCC					**1**					
CSA Class I, Div. 2, Groups A, B, C, and D; Class II, Div. 2, Groups F and G; Class III[1)]					**2**					

1) Available with Mounting/Enclosure design options 4 or 5.

2) SmartLinx PROFINET module is certified per standard V2.2.4.

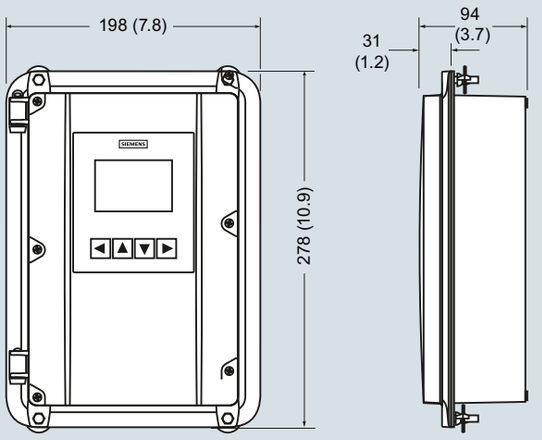
Selection and ordering data — Order code

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	**Y15**
Test Certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and to ISO 9000	**C11**
Operating Instructions	
All literature is available to download for free, in a range of languages, at	
http://www.siemens.com/processinstrumentation/documentation.	

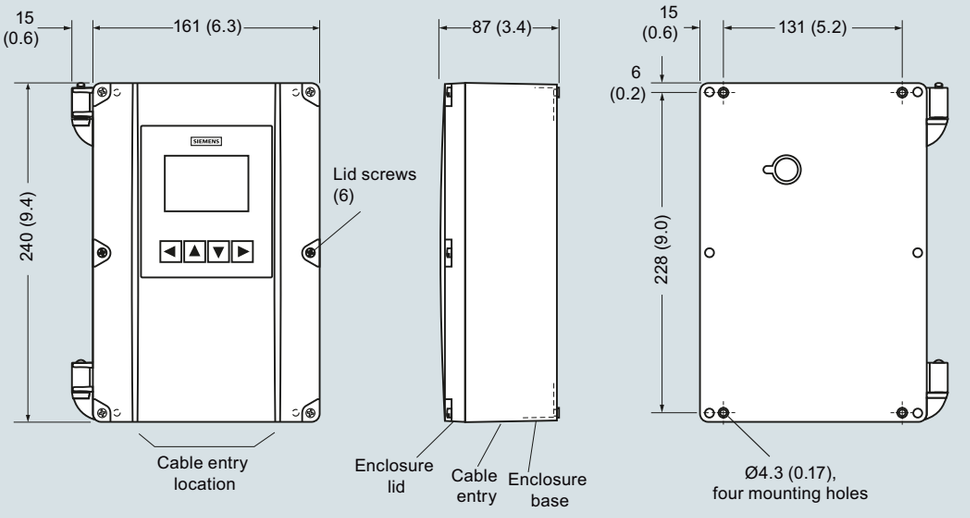
Accessories	Article No.
Tag, stainless steel, 12 x 45 mm (0.47 x 1.77 inch), one text line, suitable for enclosure	**7ML1930-1AC**
Sunshield kit, 304 stainless steel	**7ML1930-1GA**
USB to RS 232 adapter	**7ML1930-6AK**
RS 232 to RJ11 COMMS adapter	**7ML1830-1MC**
SITRANS RD100, loop powered display - see Chapter 7	**7ML5741-...**
SITRANS RD150, remote digital display for 4 ... 20 mA and HART devices - see Chapter 7	**7ML5742-.....-....**
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	**7ML5740-...**
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	**7ML5744-...**
SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7	**7ML5750-...**
Spare parts	
Power Supply Board (100 ... 230 V AC)	**7ML1830-1MD**
Power Supply Board (12 ... 30 V DC)	**7ML1830-1ME**
Removable terminal blocks	**A5E38824197**
Spare lid with HMI, MultiRanger 200 HMI/HydroRanger 200 HMI, wall	**A5E35778738**
Spare lid with HMI, MultiRanger 200 HMI/HydroRanger 200 HMI, panel	**A5E35778740**
SmartLinx DeviceNet module	**7ML1830-1HT**
SmartLinx PROFIBUS DP-V1 module	**A5E35778741**
Smartlinx PROFINET IO module	**7ML1830-1PM**
SmartLinx Modbus TCP/IP, EtherNet/IP module	**7ML1830-1PN**

Dimensional drawings

Panel mount dimensions

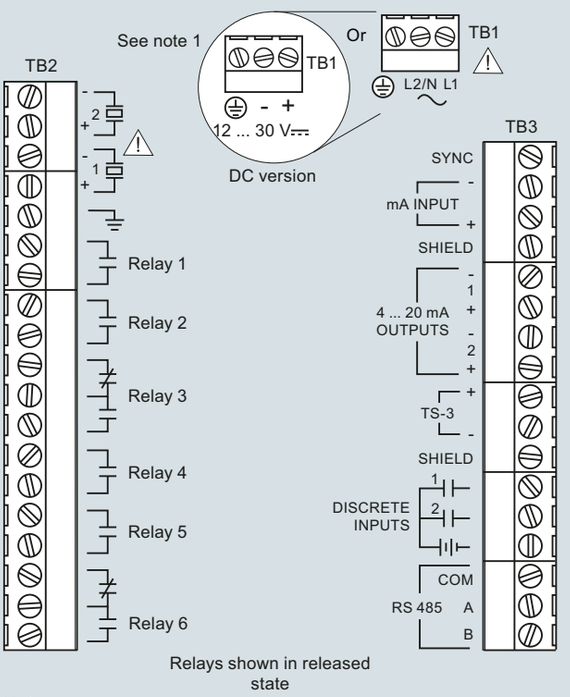


Wall mount dimensions



HydroRanger 200 HMI, dimensions in mm (inch)

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