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HydroRanger 200

Overview

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

Benefits

- 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 relay (standard), 1 or 3 relay (optional)
- 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 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 will monitor open channel flow and features more advanced relay alarming and pump control functions as well as volume conversion. It is compatible with SIMATIC PDM, allowing for PC configuration and setup. Sonic Intelligence® advanced echo-processing software provides increased reading reliability. The optional 1 or 3 relay models provide accurate level measurement functions only; these two models do not provide open channel flow, differential level measurement or volume conversion functions.

HydroRanger 200 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 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, scaleable (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-10/10F, XPS 15/15F, XCT-8, XCT-12 and XRS-5
Relays[1)]	Rating 5 A at 250 V AC, non-inductive
• Model with 1 relay[2)]	1 SPST Form A
• Model with 3 relays[2)]	2 SPST Form A/1 SPDT Form C
• Model with 6 relays	4 SPST Form A/2 SPDT Form C
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"), whichever is greater
Resolution	0.1 % of measuring range or 2 mm (0.08"), whichever is greater[3)]
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)
Design	
Weight	
• Wall mount	1.37 kg (3.02 lbs)
• Panel mount	1.50 kg (3.31 lbs)
Material (enclosure)	Polycarbonate
Degree of protection (enclosure)	
• Wall mount	IP65/Type 4X/NEMA 4X
• Panel mount	IP54/Type 3/NEMA 3

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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 (1200 ft)
Displays and controls	100 x 40 mm (4 x 1.5") multi-block LCD with backlighting
Programming	Programming using handheld programmer or via PC with SIMATIC PDM software
Power supply[4]	
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	• CE, C-TICK[5] • Lloyd's Register of Shipping • ABS Type Approval • 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 1 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 - DeviceNet™ - Allen-Bradley® Remote I/O

1) All relays certified for use with equipment that fails in a state at or under the rated maximums of the relays
2) This model is level control only; no open channel flow, differential level or volume conversion functions
3) Program range is defined as the empty distance to the face of the transducer plus any range extension
4) Maximum power consumption is listed
5) EMC performance available upon request

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HydroRanger 200

Selection and Ordering data		Order No.
Siemens HydroRanger 200	L)	**7ML5034-**
Ultrasonic level controller for up to six pumps that provides control, differential control and open channel flow monitoring. The HydroRanger 200 is also available as a level measurement controller only. Select option from model code below.		
Mounting		
Wall mount, standard enclosure		**1**
Wall mount, 4 entries, 4 M20 cable glands included		**2**
Panel mount[1]		**3**
Power supply		
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**
Single point model, level only, 1 relay[2]		**C**
Single point model, level only, 3 relays[2]		**D**
Communication (SmartLinx)		
Without module		**0**
SmartLinx® Allen-Bradley® Remote I/O module		**1**
SmartLinx PROFIBUS DP module		**2**
SmartLinx DeviceNet™ module See SmartLinx product page 5/310 for more information.		**3**
Approvals		
General Purpose CE, FM, $CSA_{US/C}$, UL listed, C-TICK		**1**
CSA Class I, Div. 2, Groups A, B, C and D; Class II, Div 2, Groups F and G; Class III (for wall mount applications only)		**2**

1) Available with approval option 1 only
2) This model is level control only; no open channel flow, differential level, or volume conversion functions

L) Subject to export regulations AL: N, ECCN: 3A991X

®Modbus is a registered trademark of Schneider Electric.

®Belden is a registered trademark of Belden Wire and Cable Company.

®Allen-Bradley is a registered trademark of Rockwell Automation.

™DeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA)

Selection and Ordering data		Order code
Further designs		
Please add "**-Z**" to Order No. and specify Order code(s).		
Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text		**Y15**
Operating Instructions		Order No.
English	C)	**7ML1998-5FC03**
French	C)	**7ML1998-5FC11**
German	C)	**7ML1998-5FC32**
Note: The Operating Instructions should be ordered as a separate item on the order. This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.		
Other Operating Instructions		
SmartLinx Allen-Bradley Remote I/O, English	C)	**7ML1998-1AP03**
SmartLinx PROFIBUS DP, English	C)	**7ML1998-1AQ03**
SmartLinx PROFIBUS DP, German	C)	**7ML1998-1AQ33**
SmartLinx PROFIBUS DP, French	C)	**7ML1998-1AQ12**
SmartLinx DeviceNet, English Note: The appropriate SmartLinx Operating Instructions should be ordered as a separate line on the order.	C)	**7ML1998-1BH02**
Accessories		
Handheld programmer		**7ML1830-2AK**
Tag, stainless steel, 12 x 45 mm (0.47 x 1.77"), one text line, suitable for enclosure		**7ML1930-1AC**
SITRANS RD100 Remote display - see Chapter 8		
SITRANS RD200 Remote display - see Chapter 8		
SITRANS RD500 Remote display - see Chapter 8		
Spare parts		
Power Supply Board (100 ... 230 V AC)	C)	**7ML1830-1MD**
Power Supply Board (12 ... 30 V DC)	C)	**7ML1830-1ME**
Display Board	C)	**7ML1830-1MF**

C) Subject to export regulations AL: N, ECCN: EAR99

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Selection and Ordering data		Order No.
Milltronics HydroRanger 200 Ultrasonic level controller for up to six pumps that provides control, differential control and open channel flow monitoring. The HydroRanger 200 is also available as a level measurement controller only. Select option from model code below.	L)	**7ML1034 -**
Mounting		
Wall mount, standard enclosure		**1**
Wall mount, 4 entries, 4 M20 cable glands included		**2**
Panel mount[1]		**3**
Power supply		
100 ... 230 V AC		**A**
12 ... 30 V DC		**B**
Communication (SmartLinx)		
Without module		**A**
SmartLinx® Allen-Bradley® Remote I/O module		**B**
SmartLinx PROFIBUS DP module		**C**
SmartLinx DeviceNet™ module See SmartLinx product page 5/310 for more information.		**D**
Approvals		
General Purpose CE, FM, CSA$_{US/C}$, UL listed, C-TICK		**1**
CSA Class I, Div. 2, Groups A, B, C and D; Class II, Div 2, Groups F and G; Class III (for wall mount applications only)		**2**
Number of measurement points		
Single point model, 6 relays		**1**
Dual point model, 6 relays		**2**
Single point model, level only, 1 relay[2]		**3**
Single point model, level only, 3 relays[2]		**4**

[1] Available with approval option 1 only
[2] This model is level control only; no open channel flow, differential level, or volume conversion functions

L) Subject to export regulations AL: N, ECCN: 3A991X

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Selection and Ordering data		Order code
Further designs		
Please add "**-Z**" to Order No. and specify Order code(s).		
Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text		**Y15**
Operating Instructions		Order No.
English	C)	**7ML1998-1FC05**
French	C)	**7ML1998-1FC14**
German Note: The Operating Instructions should be ordered as a separate item on the order. This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	C)	**7ML1998-1FC34**
Other Operating Instructions		
SmartLinx Allen-Bradley Remote I/O, English	C)	**7ML1998-1AP03**
SmartLinx PROFIBUS DP, English	C)	**7ML1998-1AQ03**
SmartLinx PROFIBUS DP, German	C)	**7ML1998-1AQ33**
SmartLinx PROFIBUS DP, French	C)	**7ML1998-1AQ12**
SmartLinx DeviceNet, English Note: The appropriate SmartLinx Operating Instructions should be ordered as a separate line on the order.	C)	**7ML1998-1BH02**
Accessories		
Handheld programmer		**7ML1830-2AM**
Tag, stainless steel, 12 x 45 mm (0.47 x 1.77"), one text line, suitable for enclosure		**7ML1930-1AC**
SITRANS RD100 Remote display - see Chapter 8		
SITRANS RD200 Remote display - see Chapter 8		
SITRANS RD500 Remote display - see Chapter 8		
Spare parts		
Power Supply Board (100 ... 230 V AC)	C)	**7ML1830-1MD**
Power Supply Board (12 ... 30 V DC)	C)	**7ML1830-1ME**
Display Board	C)	**7ML1830-1MF**

C) Subject to export regulations AL: N, ECCN: EAR99

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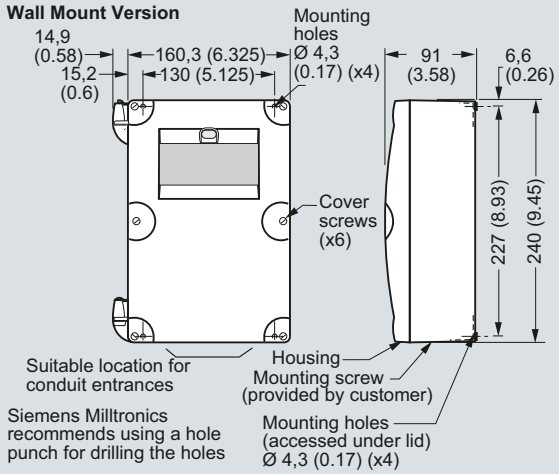
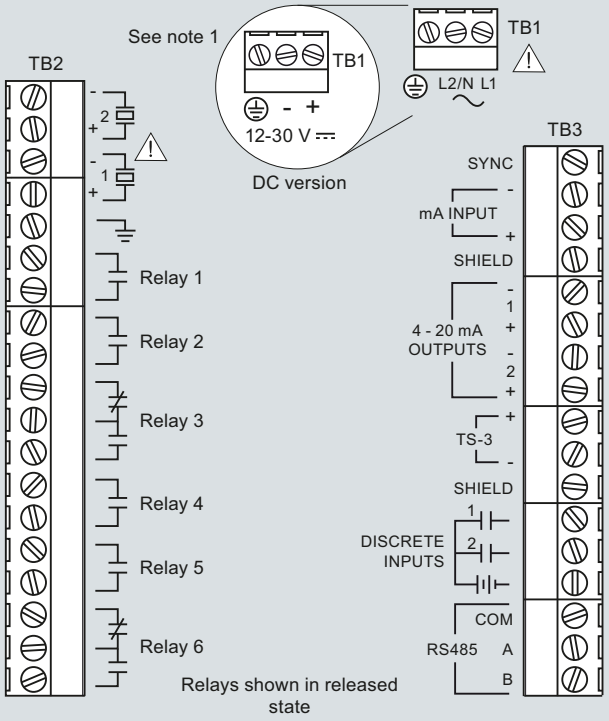
HydroRanger 200

Dimensional drawings



HydroRanger 200, dimensions in mm (inch)

Schematics



Note:

1. Use 2-core copper wire, twisted, with shield, for expansion up to 365 m (1200 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 200 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 connections

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