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MultiRanger 100/200

Overview

MultiRanger is a versatile short to medium-range ultrasonic single and multi-vessel level monitor/controller for virtually any application in a wide range of industries.

Benefits

- Digital input for back-up level overide from point level device
- Communication using built-in Modbus RTU via RS-485
- Compatible with SmartLinx system and SIMATIC PDM configuration software
- Single or dual point level monitoring
- Auto False-Echo Suppression for fixed obstruction avoidance
- Differential amplifier transceiver for common mode noise reduction and improved signal-to-noise ratio
- MultiRanger 100: level measurements, simple pump control and level alarm functions
- MultiRanger 200: level, volume and flow measurements in open channels, differential control, extended pump control and alarm functions
- Wall and panel mounting options

Application

MultiRanger can be used on different materials, including fuel oil, municipal waste, acids, woodchips or on materials with high angles of repose. MultiRanger offers true dual point monitoring, digital communications with built-in Modbus® RTU via RS-485, as well as compatibility with SIMATIC PDM, allowing PC configuration and setup. MultiRanger features Sonic Intelligence® advanced echo-processing software for increased reading reliability.

MultiRanger 100 offers cost-effective level alarming, as well as on/off and alternating pump control. MultiRanger 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 chemical-resistant Echomax® transducers that can be used in hostile environments at temperatures as high as +145 °C (+293 °F).

- Key Applications: wet wells, flumes/weirs, bar screen control, hoppers, chemical storage, liquid storage, crusher bins, dry solids storage

Design

The MultiRanger is available in wall or panel mounting options.

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Technical specifications

Mode of Operation	
Measuring principle	Ultrasonic level measurement
Measuring range	0.3 to 15 m (1 to 50 ft)
Measuring points	1 or 2
Input	
• Analog (MultiRanger 200 only)	0 to 20 mA or 4 to 20 mA, from alternate device, scaleable
• Discrete	10 to 50 V DC switching level Logical 0 =< 0.5 V DC Logical 1 = 10 to 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	Rating 5 A at 250 V AC, non-inductive
- Version with 1 relay (MultiRanger 100 only)	1 SPST Form A
- Version with 3 relays	2 SPST Form A/1 SPDT Form C
- Version with 6 relays	4 SPST Form A/2 SPDT Form C
• mA output	0 to 20 mA or 4 to 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[1)] or 2 mm (0.08"), whichever is greater
• Temperature compensation	• -50 to +150 °C (-58 to +302 °F) • Integral temperature sensor • 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 (housing)	-20 to +50 °C (-4 to +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
Electrical connection	
• Transducer and mA output signal	2-core copper conductor, twisted, shielded, 0.5 to 0.75 mm² (22 to 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 hand-held programmer, SIMATIC PDM or via PC with Dolphin Plus software
Power supply	
• AC version	100 to 230 V AC ± 15 %, 50/60 Hz, 36 VA (17 W)
• DC version	12 to 30 V DC (20 W)
Certificates and approvals	• CE, C-TICK[2)] • Lloyd's Register of Shipping • ABS Type Approval • FM, $CSA_{US/C}$, UL listed • CSA Class I, Div. 2, Groups A, B, C and D, Class II, Div.2, Groups F and G, Class III (wall mount only), ATEX II 3D
Communication	• RS-232 with Modbus RTU or ASCII via RJ-11 connector • RS-485 with Modbus RTU or ASCII via terminal strips • Optional: SmartLinx® cards for - PROFIBUS DP - DeviceNet™ - Allen-Bradley® Remote I/O

1) Program range is defined as the empty distance to the face of the transducer plus any range extension
2) EMC performance available on request

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MultiRanger 100/200

Selection and Ordering data		Order No.
MultiRanger 100/200 Versatile short to medium-range ultrasonic single and multi-vessel level monitor/controller for virtually any application in a wide range of industries	L)	**7ML5033-**
Versions		
MultiRanger 100, level measurement only		**1**
MultiRanger 200, level, volume, flow and differential measurements		**2**
Mounting, enclosure design		
Wall mount, standard enclosure		**A**
Wall mount, 4 entries, 4 M20 cable glands included		**B**
Panel mount (CE, $CSA_{US/C}$, FM, UL)		**C**
Power supply		
100 to 230 V AC		**A**
12 to 30 V DC		**B**
Number of measurement points		
Single point version		**0**
Dual point version		**1**
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 5/301 for more information.		**3**
Output relays		
3 relays (2 Form A, 1 Form C), 250 V AC		**1**
6 relays (4 Form A, 2 Form C), 250 V AC		**2**
1 relay (1 Form A), 250 V AC (available on MultiRanger 100 model only)		**3**
Approvals		
General Purpose CE, FM, $CSA_{US/C}$, UL listed, C-TICK		**A**
CSA Class I, Div. 2, Groups A, B, C and D; Class II, Div 2, Groups F and G; Class III[1]		**B**
ATEX II 3D[2]		**C**
Further designs		Order code
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**

Selection and Ordering data		Order No.
MultiRanger 100/200 Versatile short to medium-range ultrasonic single and multi-vessel level monitor/controller for virtually any application in a wide range of industries	L)	**7ML5033-**
Instruction manual		
English	C)	**7ML1998-5FB06**
French	C)	**7ML1998-5FB13**
Spanish	C)	**7ML1998-5FB23**
German	C)	**7ML1998-5FB34**
Quick Start guide, multi-language Note: The instruction manual should be ordered as a separate line on the order.	C)	**7ML1998-5QD83**
This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and instruction manual library.		
Other instruction manuals		
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 instruction manual 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**
TS-3 Temperature Sensor - see TS-3 on page 5/186		
SITRANS RD100 Remote display - see RD100 on page 5/304		
SITRANS RD200 Remote display - see RD200 on page 5/306		
Spare parts		
Power Supply Board (100 to 230 V AC)	C)	**7ML1830-1MD**
Power Supply Board (12 to 30 V DC)	C)	**7ML1830-1ME**
Display Board	C)	**7ML1830-1MF**
See SmartLinx product page 5/301 for more information.		

1) For wall mount applications only
2) For standard enclosure wall mount, option A only

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

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

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

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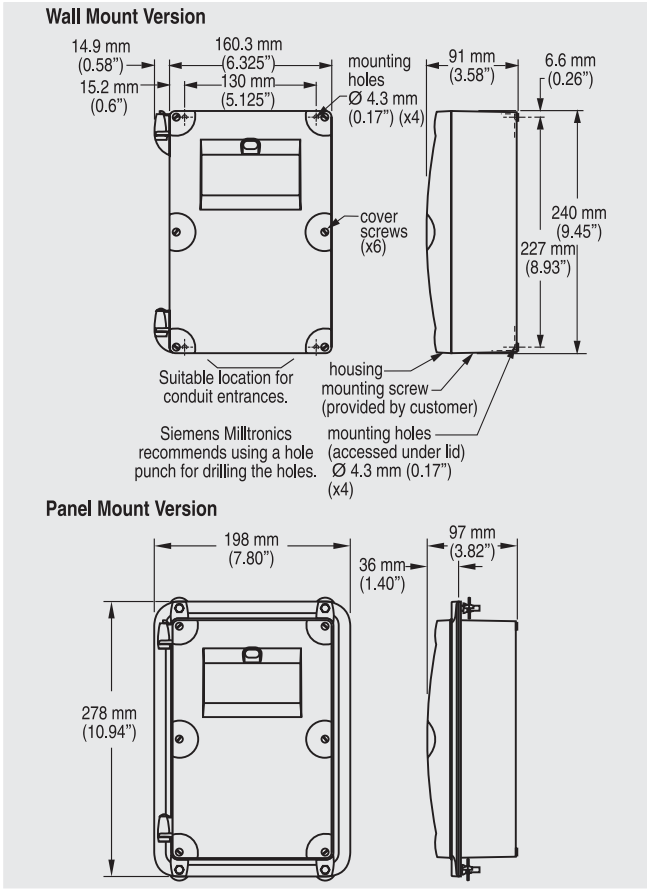
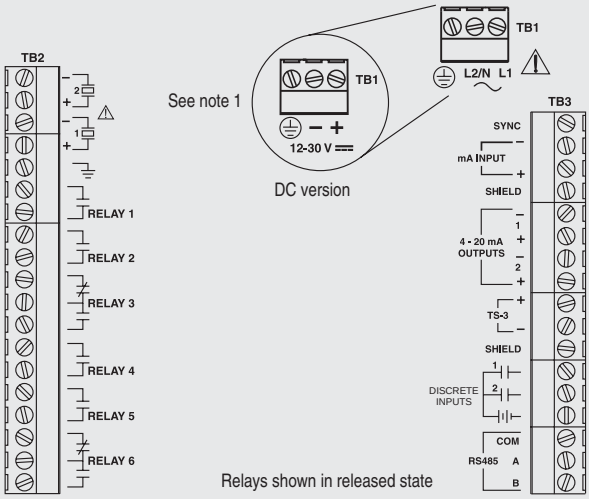
Dimensional drawings



MultiRanger dimensions

Schematics



Notes

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 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.

MultiRanger connections

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