

Level Measurement

Continuous level measurement - Ultrasonic controllers

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 override from point level device
- Communication using built-in Modbus RTU via RS 485
- Compatible with SmartLinx communication options or SIMATIC PDM via RS 485
- 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.

Technical specifications

Mode of Operation

Measuring principle	Ultrasonic level measurement
Measuring range	0.3 ... 15 m (1 ... 50 ft)
Measuring points	1 or 2

Input

Analog (MultiRanger 200 only)	0 ... 20 mA or 4 ... 20 mA, from alternate device, scalable
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	Rating 5 A at 250 V AC, non-inductive
<ul style="list-style-type: none"> • Version with 1 relay (MultiRanger 100 only) • Version with 3 relays • Version with 6 relays 	1 SPST Form A 2 SPST Form A/1 SPDT Form C 4 SPST Form A/2 SPDT Form C
mA output	0 ... 20 mA or 4 ... 20 mA
<ul style="list-style-type: none"> • Max. load • Resolution 	750 Ω, isolated 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 ¹⁾ or 2 mm (0.08 inch), whichever is greater
Temperature compensation	<ul style="list-style-type: none"> • -50 ... +150 °C (-58 ... +302 °F) • Integral temperature sensor • External TS-3 temperature sensor (optional) • Programmable fixed temperature values

Rated operating conditions

Installation conditions	
<ul style="list-style-type: none"> • Location • Installation category • Pollution degree 	Indoor/outdoor II 4
Ambient conditions	
<ul style="list-style-type: none"> • Ambient temperature (housing) 	-20 ... +50 °C (-4 ... +122 °F)

Design

Weight	
<ul style="list-style-type: none"> • Wall mount • Panel mount 	1.37 kg (3.02 lb) 1.50 kg (3.31 lb)
Material (enclosure)	Polycarbonate
Degree of protection (enclosure)	
<ul style="list-style-type: none"> • Wall mount • Panel mount 	IP65/Type 4X/NEMA 4X IP54/Type 3/NEMA 3
Electrical connection	
<ul style="list-style-type: none"> • Transducer and mA output signal 	2-core copper conductor, twisted, shielded, 0.5 ... 0.75 mm ² (22 ... 18 AWG), Belden 8760 or equivalent is acceptable
<ul style="list-style-type: none"> • Max. separation between transducer and transceiver 	365 m (1 200 ft)

Displays and controls

	100 x 40 mm (4 x 1.5 inch) 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 ... 230 V AC ± 15 %, 50/60 Hz, 36 VA (17 W)
DC version	12 ... 30 V DC (20 W)

Certificates and approvals

- CE, RCM²⁾
- 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

- 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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Selection and Ordering data	Article No.	Selection and Ordering data	Order code
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 ↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	7ML5033- 	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)]: ● Y15 Measuring-point number/identification (max. 27 characters) specify in plain text	
Versions MultiRanger 100, level measurement only ● 1 MultiRanger 200, level, volume, flow, and differential measurements ● 2		Operating Instructions English German Note: The Operating Instructions should be ordered as a separate item on the order. All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	Article No. 7ML1998-5FB06 7ML1998-5FB36
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		Accessories Handheld programmer Tag, stainless steel, 12 x 45 mm (0.47 x 1.77 inch), one text line, suitable for enclosure M20 cable gland kit (4 M20 cable glands, 4 M20 nuts, 4 washers) Sunshield kit, 304 stainless steel USB to RS 232 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	A5E36563512 7ML1930-1AC 7ML1930-1FV 7ML1930-1GA 7ML1930-6AK 7ML5741-... 7ML5740-... 7ML5744-... 7ML5750-...
Power supply 100 ... 230 V AC ● A 12 ... 30 V DC ● B		Spare parts Power Supply Board (100 ... 230 V AC) Power Supply Board (12 ... 30 V DC) MultiRanger 100/200/ HydroRanger 200 display, non-HMI Removable terminal blocks	7ML1830-1MD 7ML1830-1ME 7ML1830-1MF A5E38824197
Number of measurement points Single point version ● 0 Dual point version ● 1			
Communication (SmartLinx) Without module ● 0 SmartLinx PROFIBUS DP module ● 2 SmartLinx DeviceNet module ● 3 See SmartLinx product on page 4/337 for more information.			
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, RCM CSA Class I, Div. 2, Groups A, B, C, and D; Class II, Div. 2, Groups F and G; Class III ¹⁾ ATEX II 3D ²⁾	A B C		
¹⁾ For wall mount applications only ²⁾ For standard enclosure wall mount, option A only ● We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ●. For details see page 10/11 in the appendix.		● We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ●. For details see page 10/11 in the appendix.	

