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.

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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 • Version with 1 relay (MultiRanger 100 only)	Rating 5 A at 250 V AC, non-inductive 1 SPST Form A			
Version with 3 relaysVersion with 6 relays	2 SPST Form A/1 SPDT Form C 4 SPST Form A/2 SPDT Form C			
mA output • Max. load • Resolution	0 20 mA or 4 20 mA 750 Ω_i 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	-50 +150 °C (-58 +302 °F) Integral temperature sensor External TS-3 temperature sensor (optional) Programmable fixed temperature values			
Rated operating conditions				
Installation conditions Location Installation category Pollution degree	Indoor/outdoor II 4			
Ambient conditions • Ambient temperature (housing)	-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 • Panel mount	IP65/Type 4X/NEMA 4X IP54/Type 3/NEMA 3			
Electrical connection Transducer and mA output signal Max. separation between transducer	2-core copper conductor, twisted, shielded, 0.5 0.75 mm ² (22 18 AWG), Belden 8760 or equivalent is acceptable 365 m (1 200 ft)			
and transceiver	305 III (1 200 II)			
Displays and controls	100 x 40 mm (4 x 1.5 inch) multi- block LCD with backlighting			
Programming	Programming using hand-held pro- grammer, 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, RCM 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 ASC via RJ-11 connector RS 485 with Modbus RTU or ASC via terminal strips Optional: SmartLinx cards for PROFIBUS DP DeviceNet			

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

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Selection and Ordering data			Article No. 7ML5033-				
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				033-		i	
Versions MultiRanger 100, level measurement only MultiRanger 200, level, volume, flow, and differential measurements	1 2						
Mounting, enclosure design Wall mount, standard enclosure Wall mount, 4 entries, 4 M20 cable glands included Panel mount (CE, CSA _{USIC} , FM, UL)		A B C					
Power supply 100 230 V AC 12 30 V DC			A B				
Number of measurement points Single point version Dual point version			1				
Communication (SmartLinx) Without module SmartLinx PROFIBUS DP module SmartLinx DeviceNet module				0 2 3			
See SmartLinx product on page 4/337 for more information.							
Output relays 3 relays (2 Form A, 1 Form C), 250 V AC 6 relays (4 Form A, 2 Form C), 250 V AC 1 relay (1 Form A), 250 V AC (available on MultiRanger 100 model only)					1 2 3		
Approvals General Purpose CE, FM, CSA _{USIC} ,	,					A	
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⁾						В	
ATEX II 3D ²⁾						С	

¹⁾For wall mount applications only

We can offer shorter delivery times for configurations designated with the Quick Ship Symbol
 For details see page 10/11 in the appendix.

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			
Operating Instructions	Article No.			
English	7ML1998-5FB06			
German	7ML1998-5FB36			
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				
Accessories				
Handheld programmer	A5E36563512			
Tag, stainless steel, 12×45 mm (0.47 \times 1.77 inch), one text line, suitable for enclosure	7ML1930-1AC			
M20 cable gland kit (4 M20 cable glands, 4 M20 nuts, 4 washers)	7ML1930-1FV			
Sunshield kit, 304 stainless steel	7ML1930-1GA			
USB to RS 232 adapter	7ML1930-6AK			
SITRANS RD100, loop powered display - see Chapter 7	7ML5741			
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			
MultiRanger 100/200/ HydroRanger 200 display, non-HMI	7ML1830-1MF			
Removable terminal blocks	A5E38824197			

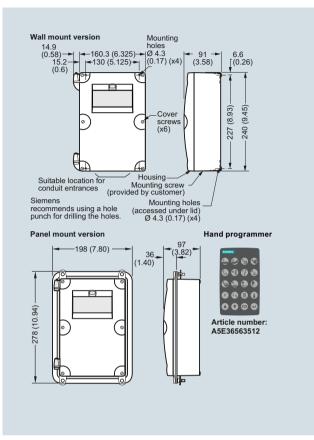
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²⁾For standard enclosure wall mount, option A only

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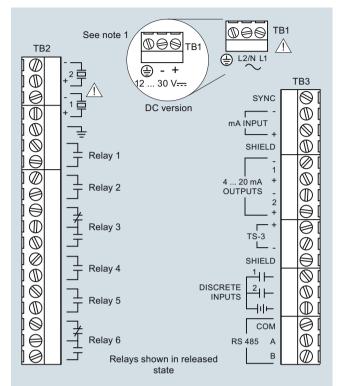
MultiRanger 100/200

Dimensional drawings



MultiRanger 100/200, dimensions in mm (inch)

Schematics



Note:

- 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.
- Connect all cable shields to the MultiRanger shield connections. Avoid differential ground potentials by not connecting cable shields to ground (earth) anywhere else.
- Keep exposed conductors on shielded cables as short as possible to reduce noise on the line caused by stray transmissions and noise pickup.

MultiRanger 100/200 connections