Continuous level measurement Ultrasonic controllers

MultiRanger 100/200

Overview



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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 $^{\circ}$ C (293 $^{\circ}$ 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 sp	ecifications
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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 alter- nate device, scalable	
Discrete	10 50 V DC switching level Logical 0 \leq 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	
RelaysVersion 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, 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 	2-core copper conductor, twisted, shielded, 0.5 0.75 mm ² (22 18 AWG), Belden 8760 or equivalent is acceptable	
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 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, EAC, KCC²⁾ 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, EAC Ex 	
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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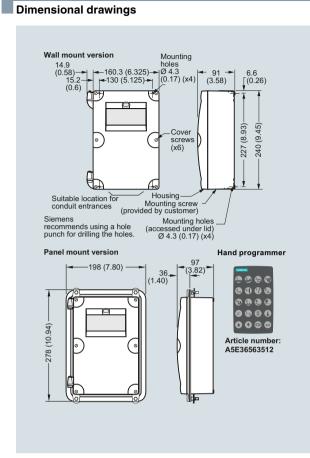
MultiRanger 100/200

Selection and Ordering data	Article No.	Selection and Ordering data	Order code
	7ML5033-	Further designs	
Versatile short to medium-range ultrasonic single and multi-vessel level monitor/controller for virtually any application in a wide range of industries	*****	Please add "-Z" to Article No. and spe code(s).	,
Click on the Article No. for the online configura- tion in the PIA Life Cycle Portal.		Stainless steel tag [69 x 50 mm (2.71 Measuring-point number/identificatio (max. 27 characters) specify in plain	n
Versions		Operating Instructions	Article No.
MultiRanger 100, level measurement only MultiRanger 200, level, volume, flow, and differen-	1	English	7ML19985FB06
tial measurements		German	7ML19985FB36
Mounting, enclosure design Wall mount, standard enclosure	A	Note: The Operating Instructions sho ordered as a separate item on the or	
Wall mount, 4 entries, 4 M20 cable glands included Panel mount (CE, CSA _{USIC} , FM, UL)	B C	All literature is available to download range of languages, at http://www.sie	emens.com/
Power supply 100 230 V AC		processinstrumentation/documentation	on
12 30 V DC	AB	Accessories	
Number of measurement points		Handheld programmer	A5E36563512
Single point version Dual point version	0	Tag, stainless steel, 12 x 45 mm (0.4) one text line, suitable for enclosure	7 x 1.77 inch), 7ML1930-1AC
Communication (SmartLinx) Without module	0	M20 cable gland kit (4 M20 cable gla 4 M20 nuts, 4 washers)	ands, 7ML1930-1FV
SmartLinx PROFIBUS DP module	2	Sunshield kit, 304 stainless steel	7ML1930-1GA
SmartLinx DeviceNet module	3	USB to RS 232 adapter	7ML1930-6AK
See SmartLinx product on page 4/355 for more information.		SITRANS RD100, loop powered disp see Chapter 7	lay - 7ML5741
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	SITRANS RD200, universal input disp Modbus conversion - see Chapter 7	blay with 7ML5740
1 relay (1 Form A), 250 V AC (available on MultiRanger 100 model only)	3	SITRANS RD300, dual line display wi and linearization curve and Modbus see Chapter 7	ith totalizer 7ML5744 conversion -
Approvals General Purpose CE, FM, CSA _{usic} , UL listed, RCM, EAC, KCC	A	SITRANS RD500 web, universal remo solution for instrumentation - see Cha	
CSA Class I. Div. 2. Groups A. B. C. and D. Class II.	В	Spare parts	
Div. 2, Groups F and G; Class III ¹⁾ ATEX II 3D, EAC Ex ²⁾	с	Power Supply Board (100 230 V A	C) 7ML1830-1MD
,	Ū	Power Supply Board (12 30 V DC)	7ML1830-1ME
 For wall mount applications only For standard enclosure wall mount, option A only 		MultiRanger 100/200/ HydroRanger 2 non-HMI	
		Removable terminal blocks	A5E38824197

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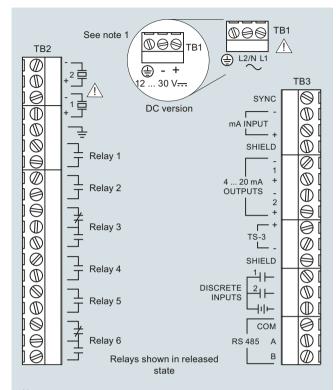
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MultiRanger 100/200, dimensions in mm (inch)

Circuit diagrams



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.
- 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