

Level measurement

Continuous level measurement
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 1 SPST Form A
<ul style="list-style-type: none"> • Version with 1 relay (MultiRanger 100 only) • Version with 3 relays • Version with 6 relays 	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	Indoor/outdoor
<ul style="list-style-type: none"> • Location • Installation category • Pollution degree 	II 4
Ambient conditions	
<ul style="list-style-type: none"> • Ambient temperature (housing) • Storage temperature 	-20 ... +50 °C (-4 ... +122 °F) -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 • Max. separation between transducer and transceiver 	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)
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	
	<ul style="list-style-type: none"> • 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	
	<ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> - 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.

Order code

MultiRanger 200 Ultrasonic level controller

↗ 7ML5033-

Continuous, non-contact, 15 m (50 ft) range.
Monitors level, volume, and open channel flow in liquids, slurries, and solids.

↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Versions

MultiRanger 100, level measurement only
MultiRanger 200, level, volume, flow, and differential measurements

Mounting, enclosure design

Wall mount, standard enclosure
Wall mount, 4 entries, 4 M20 cable glands included
Panel mount (CE, CSA_{US/C}, FM, UL)

Power supply

100 ... 230 V AC
12 ... 30 V DC

Number of measurement points

Single point version
Dual point version

Communication (SmartLinX)

Without module
SmartLinX PROFIBUS DP module
SmartLinX DeviceNet module
See SmartLinX product on page 4/348 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)

Approvals

General Purpose CE, FM, CSA_{US/C}, UL listed, RCM, EAC, KCC
CSA Class I, Div. 2, Groups A, B, C, and D; Class II, Div. 2, Groups F and G; Class III¹⁾
ATEX II 3D, EAC Ex²⁾

¹⁾ For wall mount applications only.

²⁾ For standard enclosure wall mount, option A only.

Article No.	Order code
7ML5033-	
1	
2	
A	
B	
C	
A	
B	
0	
1	
0	
2	
3	
1	
2	
3	
A	
B	
C	

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

All literature is available to download for free, in a range of languages, at

<http://www.siemens.com/processinstrumentation/documentation>

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 RD150, remote digital display for 4 ... 20 mA and HART devices - 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

Article No.

A5E36563512

7ML1930-1AC

7ML1930-1FV

7ML1930-1GA

7ML1930-6AK

7ML5741-...

7ML5742-.....-....

7ML5740-...

7ML5744-...

7ML5750-...

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

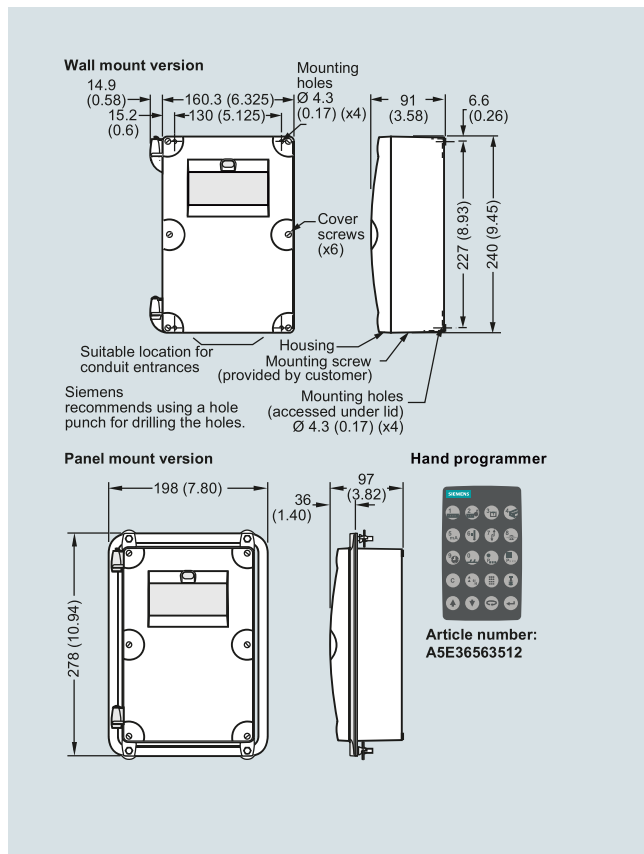
7ML1830-1MD

7ML1830-1ME

7ML1830-1MF

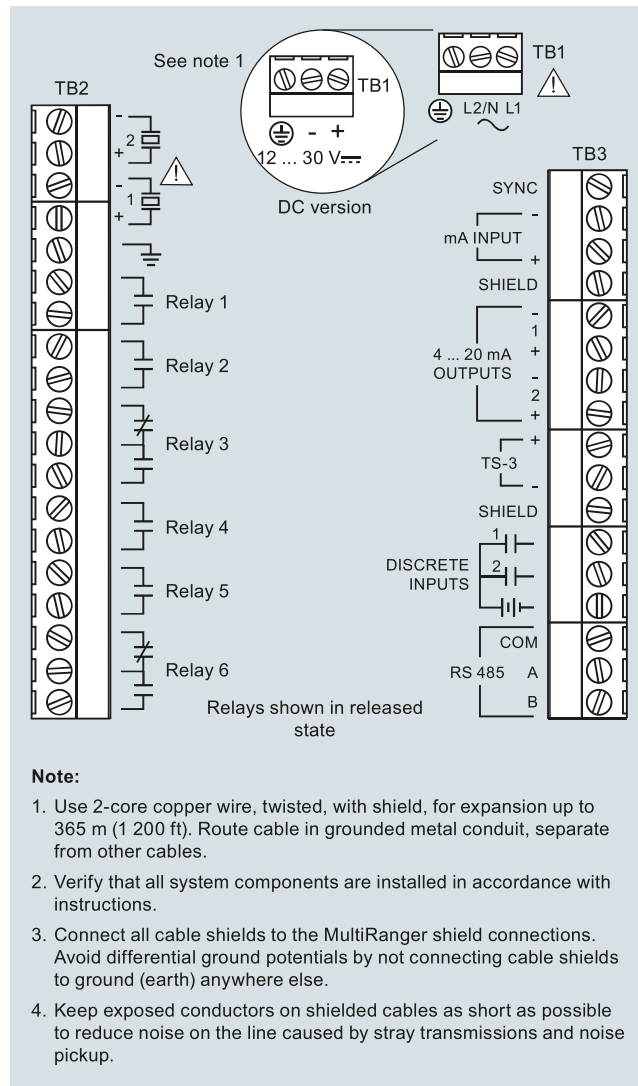
A5E38824197

Dimensional drawings



MultiRanger 100/200, dimensions in mm (inch)

Circuit diagrams



MultiRanger 100/200 connections