## 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<br>Logical 0 ≤ 0.5 V DC<br>Logical 1 = 10 ... 50 V DC<br>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 |
| • 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 ... 20 mA or 4 ... 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 inch), whichever is greater |
| Resolution | 0.1 % of measuring range[1]<br>or 2 mm (0.08 inch), whichever is greater |
| Temperature compensation | • -50 ... +150 °C (-58 ... +302 °F)<br>• Integral temperature sensor<br>• External TS-3 temperature sensor (optional)<br>• Programmable fixed temperature values |
| **Rated operating conditions** | |
| Installation conditions | |
| • Location | Indoor/outdoor |
| • Installation category | II |
| • Pollution degree | 4 |
| Ambient conditions | |
| • Ambient temperature (housing) | -20 ... +50 °C (-4 ... +122 °F) |
| • Storage temperature | -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 | 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 ... 0.75 mm² (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 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, RCM, EAC, KCC[2]<br>• Lloyd's Register of Shipping<br>• ABS Type Approval<br>• FM, $CSA_{US/C}$, UL listed<br>• 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<br>• RS 485 with Modbus RTU or ASCII via terminal strips<br>• Optional: SmartLinx cards for<br>- PROFIBUS DP<br>- 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

## Selection and ordering data

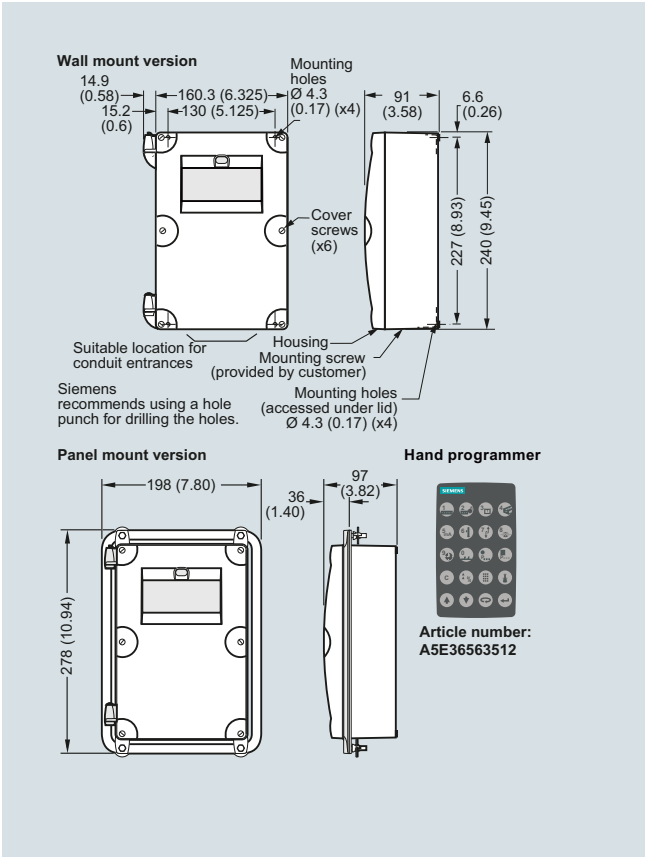
| | Article No. |
|---|---|
| **MultiRanger 200 Ultrasonic level controller** ↗<br>Continuous, non-contact, 15 m (50 ft) range. Monitors level, volume, and open channel flow in liquids, slurries, and solids.<br>↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | **7ML5033-** ■■■■■ - ■■ |
| **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 ... 230 V AC | **A** |
| 12 ... 30 V DC | **B** |
| **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<br>See SmartLinx product on page 4/348 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, RCM, EAC, KCC | **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, EAC Ex [2] | **C** |

[1] For wall mount applications only.

[2] For standard enclosure wall mount, option A only.

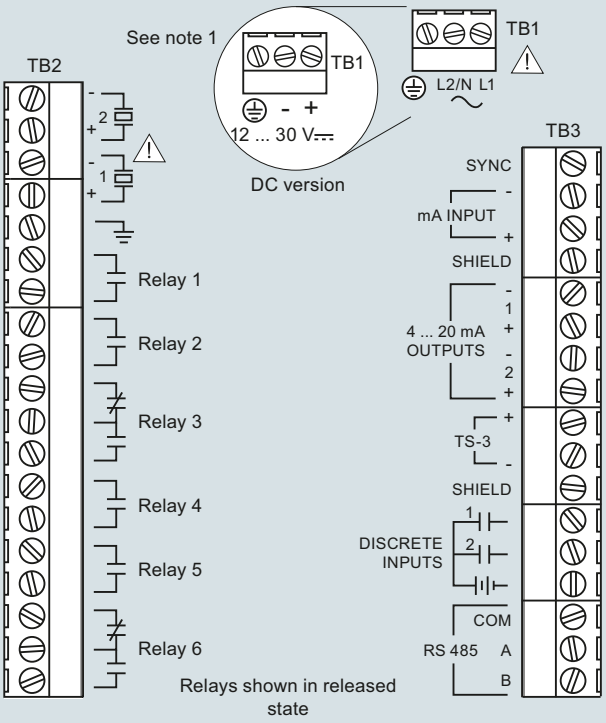
| | Order code |
|---|---|
| ***Further designs*** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text | **Y15** |
| ***Operating Instructions*** | |
| All literature is available to download for free, in a range of languages, at | |
| http://www.siemens.com/processinstrumentation/documentation | |
| ***Accessories*** | Article No. |
| Handheld programmer | **A5E36563512** |
| Tag, stainless steel, 12 x 45 mm (0.47 x 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 RD150, remote digital display for 4 ... 20 mA and HART devices - see Chapter 7 | **7ML5742-.....-....** |
| 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** |

## Dimensional drawings




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.
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 100/200 connections