

# Level Measurement



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# Level Measurement

## Product overview







### Overview

	Application	Device description	Page	Programming Software
<b>Point level measurement - Capacitance switches</b>				
	Powerful range of level switches suitable for a variety of industries	<b>Pointek CLS100/CLS200/CLS300/CLS500</b> <ul style="list-style-type: none"> <li>CLS100: compact 2-wire inverse frequency shift capacitance level switch for level detection in constricted spaces, interfaces, solids, liquids, slurries, and foam</li> <li>CLS200: a versatile inverse frequency shift capacitance level switch with optional rod/cable choices and configurable output, ideal for detection of liquids, solids, slurries, foam, and interfaces; digital version (with PROFIBUS PA) includes a display and provides additional diagnostic features</li> <li>CLS300: inverse frequency shift capacitance level switch with optional rod/cable choices and configurable output. It is ideal for detecting liquids, solids, slurries, foam and interfaces in demanding conditions where high pressure and temperatures are present; digital version (with PROFIBUS PA) includes a display and provides additional diagnostic features</li> <li>CLS500: inverse frequency shift capacitance level switch for detecting interfaces, solids, liquids, toxic and aggressive chemicals in critical conditions of high temperature and pressure; HART® communication for remote commissioning</li> </ul>	5/10	-
		5/15	SIMATIC PDM	
		5/41	SIMATIC PDM	
		5/61	SIMATIC PDM	
<b>Point level measurement - Vibrating switches</b>				
	Reliable vibrating point level switches for liquid and slurry applications across all industries	<b>SITRANS LVL100/LVL200</b> <ul style="list-style-type: none"> <li>LVL100: compact vibrating level switch for use in liquid and slurry applications such as overflow, high, low and demand level applications. Also ideal for dry run protection</li> <li>LVL200: advanced vibrating level switch for use in liquid and slurry applications. Suited for most hazardous area applications such as: overflow, high, low, demand, and dry run protection; can also be used for SIL-2 Safety Functions in terms of IEC 61511-1 First Edition 2003-01</li> </ul>	5/79	-
		5/85	-	
	Reliable vibrating point level switches for bulk solids in a wide variety of applications at a competitive price	<b>SITRANS LVS100/LVS200</b> <ul style="list-style-type: none"> <li>Vibrating point level switch designed to be impervious to external vibrations and to provide reliable performance in demanding bulk solids applications</li> </ul>	5/101, 5/104	-
		<b>Point level measurement - Rotating paddle switch</b>		
	Reliable rotating point level switches for bulk solids in a wide variety of applications at a competitive price	<b>SITRANS LPS200</b> <ul style="list-style-type: none"> <li>Rotating paddle switch for detection of high, low, and demand levels for a wide variety of bulk solids industries. Unique engineering provides long-lasting reliable performance</li> </ul>	5/112	-
		<b>Point level measurement - Heading</b>		
	Electro-mechanical tilt switch for point level detection, and feed loss detection on conveyor belts	<b>Milltronics Tilt switch</b> <ul style="list-style-type: none"> <li>Rugged, stainless steel encapsulated probe</li> <li>Provides a signal when material tilts it through an angle of more than 17° in any direction</li> </ul>	5/122	-






	Application	Device description	Page	Programming Software
<b>Point level measurement - Ultrasonic switch</b>				
	Ultrasonic non-contacting switch with two switch points for level detection of bulk solids, liquids and slurries in a wide variety of industries	<b>Pointek ULS200</b> <ul style="list-style-type: none"> <li>Rugged design, no moving parts and virtually maintenance-free</li> <li>Transducer available in ETFE or PVDF copolymer and therefore inert to most chemicals</li> </ul>	5/127	-
<b>Continuous level measurement - Ultrasonic transmitters</b>				
	Compact level transmitter with integrated transducer for accurate level measurement for liquid applications	<b>The Probe</b> <ul style="list-style-type: none"> <li>Simple, compact and competitively priced ultrasonic level transmitter in several versions for maximum versatility: <ul style="list-style-type: none"> <li>Three-wire system with 5 m model 24 V DC</li> <li>Two-wire system with current loop</li> </ul> </li> </ul>	5/131	-
	2-wire loop powered ultrasonic transmitter for level, volume and flow monitoring of liquids in open channels, storage vessels and simple process vessels	<b>SITRANS Probe LU</b> <ul style="list-style-type: none"> <li>Continuous level measurement up to 12 m (40 ft) range</li> <li>Patented Sonic Intelligence signal processing</li> <li>Extremely high signal-to-noise ratio</li> <li>Auto False-Echo Suppression of false echoes</li> </ul>	5/134	SIMATIC PDM
<b>Continuous level measurement - Ultrasonic controllers</b>				
	Ultrasonic level controller for up to six pumps - control, differential control and open channel flow monitoring	<b>HydroRanger 200</b> <ul style="list-style-type: none"> <li>An economical, low-maintenance solution delivering control efficiency and productivity needed to meet today's exacting standards</li> <li>Auto False-Echo Suppression of false echoes</li> </ul>	5/138	SIMATIC PDM
	Versatile short- to medium-range ultrasonic single- and dual-vessel level controller for virtually any application in a wide range of industries	<b>MultiRanger 100/200</b> <ul style="list-style-type: none"> <li>Using non-contacting ultrasonic technology, the controller measures the level in short- to medium-range applications up to 15 m (50 ft) of solids, liquids or slurries</li> <li>Auto False-Echo Suppression of false echoes</li> </ul>	5/143	SIMATIC PDM
	Non-contacting, cost-effective solution for reliable control of level and flow measurements in water and wastewater applications	<b>HydroRanger Plus</b> <ul style="list-style-type: none"> <li>Available as 19" rack, for panel mounting or in wall enclosure</li> <li>Compatible with Echomax® ultrasonic transducers</li> </ul>	5/147	Dolphin Plus
	Complete ultrasonic level controller for monitoring and control of water distribution and wastewater collection systems, with energy-saving algorithms	<b>SITRANS LUC500</b> <ul style="list-style-type: none"> <li>Monitoring and control in one device</li> <li>Integral telemetry interface (Modbus® RTU/ASCII)</li> <li>Expandable platform to handle any liquid application from tank level measurement to pump control</li> </ul>	5/151	Dolphin Plus
	Ultrasonic long-range level monitoring system for liquids and solids	<b>SITRANS LU01/LU02/LU10</b> <ul style="list-style-type: none"> <li>Automatic conversion of level into volume for standard or custom tank shapes</li> <li>Easy to install and program</li> <li>Optional fieldbus card, e.g. PROFIBUS DP</li> </ul>	5/156, 5/161	Dolphin Plus

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## Product overview



	Application	Device description	Page	Programming Software
	Output modules for SITRANS LU10	<b>SITRANS LU SAM/SITRANS LU AO</b> <ul style="list-style-type: none"> <li>SITRANS LU SAM satellite alarm module provides up to 20 relay contacts for the measurement points connected to a SITRANS LU10</li> <li>SITRANS LU AO analog output module provides remote analog outputs for the measurement points of the SITRANS LU10 transceiver</li> </ul>	5/164 5/166	- -
<b>Continuous level measurement - Ultrasonic transducers</b>				
	ST-H: ETFE or PVDF transducer for chemicals	<b>ST-H/Echomax XRS-5</b> <ul style="list-style-type: none"> <li>The narrow design of the ST-H allows the sensor to be mounted using a 2" connection</li> </ul>	5/169	-
	XRS-5: Standard transducer for applications to 8 m (26 ft)	<ul style="list-style-type: none"> <li>XRS-5: narrow beam angle of only 10°, measuring range maximum 8 m (26 ft) for measurement of liquids, solids and slurries</li> </ul>	5/172	-
	Transducers for liquids and bulk solids	<b>Echomax XPS and XCT/XLT</b> <ul style="list-style-type: none"> <li>XPS series offers versions for various distances up to 40 m (130 ft) and up to a max. temperature of +95 °C (+203 °F)</li> <li>XCT series for applications at high temperatures, for measurement of levels at distances up to 12 m (40 ft) and up to a max. temperature of +145 °C (+293 °F)</li> <li>XLT: measuring ranges from 0.9 ... 60 m (1.8 ... 200 ft) and temperatures up to +150 °C (+302 °F). Beam angle of just 5° provides accurate readings in solids storage bunkers</li> </ul>	5/175 5/175 5/185	- - -
	XPS and XCT series: Hermetically sealed PVDF enclosure for chemical immunity			
	XLT: Designed for high temperature and long range applications			
<b>Continuous level measurement - Radar transmitters</b>				
	2-wire, 6 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage vessels with nominal pressure and temperature, to a range of 20 m (66 ft)	<b>SITRANS Probe LR</b> <ul style="list-style-type: none"> <li>Uni-Construction polypropylene rod antenna standard</li> <li>Patented Sonic Intelligence signal processing</li> <li>Auto False-Echo Suppression of false echoes</li> </ul>	5/196	SIMATIC PDM AMS
	2-wire, 6 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including high temperature and pressure, to a range of 20 m (66 ft)	<b>SITRANS LR200</b> <ul style="list-style-type: none"> <li>Program without opening the lid, even in hazardous areas, using patented infrared IS handheld programmer</li> <li>Special Uni-Construction hermetically sealed polypropylene rod antenna has integrated threaded connection</li> <li>Built-in alphanumeric display with support in four languages</li> </ul>	5/200	SIMATIC PDM AMS
	2-wire, 25 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including high temperature and pressure, to a range of 20 m (66 ft); ideal for small vessels and low dielectric media	<b>SITRANS LR250</b> <ul style="list-style-type: none"> <li>Simple operation using the graphical local user interface (LUI)</li> <li>Plug-and-play setup using the intuitive Quick Start Wizard</li> <li>25 GHz high frequency allows for small horn antennas and easy mounting in nozzels</li> <li>Process Intelligence signal processing for improved measurement reliability and Auto False-Echo Suppression of fixed obstructions</li> <li>Communication using HART® or PROFIBUS PA</li> </ul>	5/215	SIMATIC PDM AMS



	Application	Device description	Page	Programming Software
	2-wire, 25 GHz pulse radar level transmitter for continuous monitoring of solids up to 20 m (66 ft); ideal for measurement in extreme dust	<b>SITRANS LR260</b> <ul style="list-style-type: none"> <li>• Simple operation using the graphical local user interface (LUI)</li> <li>• Plug-and-play setup using the intuitive Quick Start Wizard</li> <li>• 25 GHz high frequency allows for small horn antennas and easy mounting in nozzels</li> <li>• Process Intelligence signal processing for improved measurement reliability and Auto False-Echo Suppression of fixed obstructions</li> <li>• Communication using HART® or PROFIBUS PA</li> </ul>	5/224	SIMATIC PDM
	4-wire, 24 GHz FMCW radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including high temperature and high pressure, to a range of 50 m (164 ft); ideal for low dielectric media	<b>SITRANS LR400</b> <ul style="list-style-type: none"> <li>• Minimum maintenance requirements and wear as result of non-contacting measuring principle</li> <li>• High long-term stability resulting from self-calibration with highly stable internal reference</li> <li>• High measuring accuracy and repeatability as result of 24 GHz; narrow beam angle for tall, narrow vessels</li> </ul>	5/229	SIMATIC PDM
	4-wire, 24 GHz FMCW radar level transmitter with extremely high signal-to-noise ratio and advanced signal processing for continuous monitoring of solids up to 100 m (328 ft); ideal for measurement in extreme dust	<b>SITRANS LR460</b> <ul style="list-style-type: none"> <li>• Process Intelligence for advanced signal processing and quick and easy adjustment</li> <li>• Self-guided Quick Start Wizard for plug and play start-up</li> <li>• 100 m (328 ft) range for long-range and difficult applications</li> </ul>	5/237	SIMATIC PDM
<b>Continuous level measurement - Guided wave radar transmitter</b>				
	Guided wave radar transmitter for short- and medium-range level, level/interface and volume measurement of liquids and solids. It is unaffected by changes in process conditions, high temperatures and pressures, and steam	<b>SITRANS LG200</b> <ul style="list-style-type: none"> <li>• Measures accurately on materials with dielectric (dK) as low as 1.4</li> <li>• Guided wave radar measurement for up to 2.5 mm (0.12") accuracy</li> <li>• Measures level and interface on challenging applications including foam</li> <li>• 3 button programming for quick setup</li> <li>• Reliable level measurement on harsh applications with pressure up to 430 bar g (6250 psi g) and temperatures as high as +427 °C (+800 °F)</li> </ul>	5/246	SIMATIC PDM
<b>Continuous level measurement - Capacitance transmitters</b>				
	For liquids and solids applications, ideal for standard industrial applications in chemical, hydrocarbon processing, food and beverage and mining, aggregate and cement industries	<b>SITRANS LC300</b> <ul style="list-style-type: none"> <li>• Sophisticated, but easy-to-adjust microprocessor combined with field-proven probes</li> <li>• Patented active shield technology ensures measurements are unaffected by vapors, product deposits, dust and condensation</li> </ul>	5/271	-
	Level and interface transmitter for extreme and critical process conditions, such as oil and liquid natural gas (LNG), toxic and aggressive chemicals and vapours	<b>SITRANS LC500</b> <ul style="list-style-type: none"> <li>• Equipped with the HART® Smart protocol for remote setup and calibration</li> <li>• Patented active shield technology ensures measurements are unaffected by vapors, product deposits, dust and condensation</li> </ul>	5/282	SIMATIC PDM

# Level Measurement

## Product overview

Application	Device description	Page	Programming Software
<b>Continuous measurement - Open channel flow - Ultrasonic controller</b>			
	High accuracy ultrasonic flow monitor for open channels  <b>OCM III</b> <ul style="list-style-type: none"> <li>• Compatible with most standard open channel weirs and flumes</li> <li>• AC and DC operation</li> <li>• Automatically switches to battery operation for uninterrupted power</li> <li>• MCERTS approved device</li> </ul>	5/307	-
<b>Communications and Displays</b>			
	<b>SmartLinX module, Dolphin Plus Software</b> <ul style="list-style-type: none"> <li>• Optional communication modules, SmartLinX, provide direct digital connection to popular industrial fieldbus systems</li> <li>• Dolphin Plus for quick and easy configuring, monitoring, tuning and diagnostics of Siemens devices</li> </ul>	5/310 5/312	- -

# Level Measurement

## Point level measurement - Capacitance switches

### Capacitance

#### Overview

##### Introduction

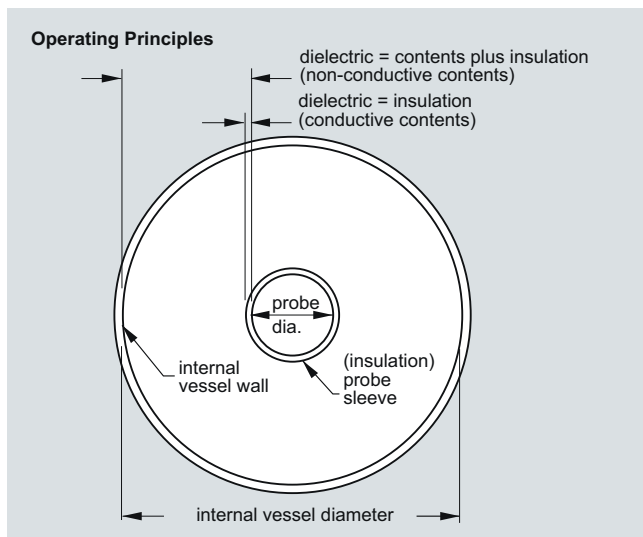
Inverse frequency shift capacitance point level switches and continuous level transmitters are designed to withstand the harsh environments of high pressure and high temperature applications.

##### Inverse Frequency Technology

Inverse frequency shift capacitance devices incorporate a unique frequency-based approach to level measurement. The capacitance units monitor the effect of capacitance based on frequency change. The relationship between capacitance and frequency is inverse. Because small level changes result in a large frequency change, the result is excellent resolution and accuracy.

##### Principle of Operation

Inverse frequency shift capacitance devices require two components: a reference electrode of a variable capacitor and the measurement electrode. In capacitive level measurement, the environment (typically the vessel wall) acts as the reference electrode, while the probe supplies the measurement electrode. The dielectric is composed of the vessel contents and, if the measurement electrode is insulated, the insulating layer.



Inverse frequency shift capacitance operation

Capacitance is affected by the surface area of the electrodes, the separation distance between the electrodes and the dielectric constant of the vessel contents. The dielectric constant is the measure of a material's ability to store energy. The relative dielectric constant of air (vacuum) is 1; all other materials have a higher value.

#### Mode of operation

##### Common Terms

##### Active shield

The portion of the probe isolated from the active measurement section. The sensor signal is connected to the active shield portion of the probe, eliminating the electrical potential difference between the shield and the measurement section. So, the shield portion of the probe near the process connection is not affected by changes in vapour concentration, material buildup, dust or condensation.

##### Dielectric constant

The ability of a dielectric to store electrical potential energy under the influence of an electric field. This is measured by a ratio which compares the capacitance of a condenser with the material as dielectric to its capacitance with a vacuum/dry air as dielectric: the dielectric constant of air is 1.

##### Capacitance

The property of a system of conductors and dielectrics that permits the storage of electricity when a potential difference exists between the conductors. Its value is expressed as the ratio of a quantity of electricity to a potential difference and the unit is a Farad.

##### Capacitor

A device in a circuit that has the potential to store an electric charge. Typically a capacitor has two conductors or electrodes separated by a layer of a non-conducting material called a dielectric. With the conductors on opposite sites of the dielectric layer oppositely charged by a source of voltage, the electrical energy of the charged system is stored in the polarized dielectric.

# Level Measurement

## Point level measurement - Capacitance switches

### Capacitance

#### Technical specifications

Criteria	Point level measurement				Continuous level/ Interface measurement	
	Pointek CLS100	Pointek CLS200	Pointek CLS300	Pointek CLS500	SITRANS LC300	SITRANS LC500
Typical applications	Liquids, slurries, powders, granules, applications in constricted spaces	Liquids, slurries, powders, granules, foam, food and pharmaceuticals, petrochemicals	Liquids, slurries, powders, granules, relatively high pressure and temperature, hazardous areas	Water in oil level, foam or liquid/ foam level, glycol regenerators, high-pressure coalescers	Conductive or non-conductive liquids, Water in oil, foam or liquid/foam level	Water in oil, foam or liquid/foam level, high-pressure coalescers, LNG (Liquified Natural Gas)
Max. length including sensor	100 mm (4")	Rod: 5.5 m (18 ft) Cable: up to 30 m (98 ft)	Rod: 1 m (40") Cable: 25 m (82 ft)	Rod: 1 m (40")	Rod: 5 m (18 ft) Cable: 25 m (82 ft)	Rod: 5.5 m (18 ft) Cable: 35 m (115 ft)
Process temperature (Temperature ratings are pressure dependent. See Pressure/Temperature curves for respective product.)	<ul style="list-style-type: none"> <li>Stainless steel process connection: -30 ... +100 °C (-22 ... +212 °F)</li> <li>Fully Synthetic (PPS process connection): -10 ... +100 °C (+14 ... +212 °F)</li> </ul>	<ul style="list-style-type: none"> <li>-40 ... +85 °C (-40 ... +185 °F)</li> <li>With thermal isolator: -40 ... +125 °C (-40 ... +257 °F)</li> </ul>	<ul style="list-style-type: none"> <li>-40 ... +200 °C (-40 ... +392 °F)</li> <li>HT version: -40 ... +400 °C (-40 ... +752 °F)</li> </ul>	<ul style="list-style-type: none"> <li>-50 ... +200 °C (-58 ... +392 °F)</li> <li>HT version: -60 ... +400 °C (-76 ... +752 °F)</li> </ul>	-40 ... +200 °C (-40 ... +392 °F)	<ul style="list-style-type: none"> <li>-50 ... +200 °C (-58 ... +392 °F)</li> <li>Option: -60 ... +400 °C (-76 ... +752 °F)</li> </ul>
Process pressure (Pressure ratings are temperature dependent. See Pressure/Temperature curves for respective product.)	Up to 10 bar g (146 psi g)	<ul style="list-style-type: none"> <li>Rod versions: Up to 25 bar g (365 psi g)</li> <li>Cable version: Up to 10 bar g (146 psi g)</li> </ul>	Up to 35 bar g (511 psi g)	<ul style="list-style-type: none"> <li>Up to 150 bar g (2175 psi g)</li> <li>HP version: Up to 345 bar g (5004 psi g)</li> </ul>	Up to 35 bar g (511 psi g)	<ul style="list-style-type: none"> <li>Up to 150 bar g (2175 psi g)</li> <li>Option: Up to 345 bar g (5004 psi g)</li> </ul>
Output	Stainless steel cable or enclosure version: <ul style="list-style-type: none"> <li>4 ... 20/20 ... 4 mA 2-wire current loop</li> <li>Solid-state output</li> </ul> Fully-synthetic version (PPS) <ul style="list-style-type: none"> <li>Relay output</li> </ul>	CLS200 Standard: <ul style="list-style-type: none"> <li>1 SPDT Form C relay, solid-state switch</li> </ul> CLS200 Digital: <ul style="list-style-type: none"> <li>solid-state switch included</li> </ul>	CLS300 Standard: <ul style="list-style-type: none"> <li>1 SPDT Form relay, solid-state switch</li> </ul> CLS300 Digital: <ul style="list-style-type: none"> <li>solid-state switch included</li> </ul>	<ul style="list-style-type: none"> <li>4 ... 20/20 ... 4 mA 2-wire current loop</li> <li>Solid-state switch</li> </ul>	4 ... 20/20 ... 4 mA 2-wire current loop	<ul style="list-style-type: none"> <li>4 ... 20/20 ... 4 mA 2-wire current loop</li> <li>Solid-state switch</li> </ul>
Communications		CLS200 Standard: <ul style="list-style-type: none"> <li>3 LED indicators</li> </ul> CLS200 Digital: <ul style="list-style-type: none"> <li>PROFIBUS PA; SIMATIC PDM compatible</li> </ul>	CLS300 Standard: <ul style="list-style-type: none"> <li>3 LED indicators</li> </ul> CLS300 Digital: <ul style="list-style-type: none"> <li>PROFIBUS PA; SIMATIC PDM compatible</li> </ul>	HART, SIMATIC PDM compatible		HART, SIMATIC PDM compatible
Power Specifications	<ul style="list-style-type: none"> <li>Standard: 12 ... 33 V DC</li> <li>Intrinsically Safe (Stainless steel version only): 10 ... 30 V DC</li> </ul>	CLS200 Standard: <ul style="list-style-type: none"> <li>12 ... 250 V AC/DC, 0-60 Hz, 2 W max.</li> </ul> CLS200 Digital: <ul style="list-style-type: none"> <li>bus voltage: 12 ... 30 V DC, IS version</li> <li>12 ... 24 V DC</li> <li>current consumption: 12.5 mA</li> </ul>	CLS300 Standard: <ul style="list-style-type: none"> <li>12 ... 250 V AC/DC, 0-60 Hz, 2 W max.</li> </ul> CLS300 Digital: <ul style="list-style-type: none"> <li>bus voltage: 12 ... 30 V DC, IS version</li> <li>12 ... 24 V DC</li> <li>current consumption: 12.5 mA</li> </ul>	<ul style="list-style-type: none"> <li>12 ... 33 V DC</li> <li>3.6 ... 22 mA/ 22 ... 3.6 mA (2-wire current loop)</li> </ul>	12 ... 32 V DC any polarity, 2-wire current loop circuit	<ul style="list-style-type: none"> <li>12 ... 33 V DC</li> <li>3.6 ... 22 mA/ 22 ... 3.6 mA (2-wire current loop)</li> </ul>
Approvals	Stainless steel cable or enclosure version: CE, CSA, FM, ATEX, C-TICK, Lloyds Register, WHG  Fully-synthetic version (PPS): CSA, FM	CE, CSA, FM, ATEX, C-TICK, Lloyds Register, WHG, Vlare II	CE, CSA, FM, ATEX, C-TICK, Lloyds Register, WHG, Vlare II	CE, CSA, FM, ATEX, C-TICK, Lloyds Register, Bureau Veritas, Current Signalling according to NAMUR NE 43	CE, CSA, FM, ATEX, C-TICK, Bureau Veritas, ABS, Current Signalling according to NAMUR NE 43	CE, CSA, FM, ATEX, C-TICK, Lloyds Register, Bureau Veritas, Current Signalling according to NAMUR NE 43

SIEMENS

## Capacitance Application Questionnaire

## Customer information

Contact: \_\_\_\_\_ Prepared By: \_\_\_\_\_  
 Company: \_\_\_\_\_ Date: \_\_\_\_\_  
 Address: \_\_\_\_\_ Notes on the Application: \_\_\_\_\_  
 City: \_\_\_\_\_ Country: \_\_\_\_\_  
 Zip/Postal Code: \_\_\_\_\_ Phone: ( ) \_\_\_\_\_  
 E-mail: \_\_\_\_\_ Fax: ( ) \_\_\_\_\_

## Tank/Vessel Information

(Supply sketch where possible) Sketch attached Type:  Storage Process Separator FPSO  
(Floating Processing  
Storage and Offloading)Tank top:  Open Flat Conical ParabolicTank bottom:  Sloped Flat Conical Parabolic

## Tank construction:

 Metallic  Non-metallic Agitated top, bottom or side

## Pressure:

Normal: \_\_\_\_\_

Maximum (relief): \_\_\_\_\_

Mounting:  Top Mount Side Mount Pipe Mount

## Dimensions:

Height: \_\_\_\_\_ m/ft

Width/Diameter: \_\_\_\_\_ m/ft

## Critical Information

Nozzle Length: \_\_\_\_\_ cm/in

Nozzle Diameter: \_\_\_\_\_ cm/in

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## Process Data

Material being measured: \_\_\_\_\_  Liquid  Solid  Slurry

Material temperature: Norm: \_\_\_\_\_ °C/°F Max: \_\_\_\_\_ °C/°F

Measurement type:  Point level Continuous level Interface levelConstant dielectric:  No  Yes DK Value \_\_\_\_\_

Upper material: \_\_\_\_\_ DK Value \_\_\_\_\_

Lower material: \_\_\_\_\_ DK Value \_\_\_\_\_

Process pressure: \_\_\_\_\_ Min. \_\_\_\_\_ Max. Atmosphere steam:  No  YesCoating build-up:  No  Yes Conductive material:  No  Yes pH Value \_\_\_\_\_

## Installation

(indicate all that apply)

Power available: \_\_\_\_\_

## Outputs required:

 4 to 20 mA  Relay  Solid state

## Communications

 HART ® / 4 to 20 mA  PROFIBUS PA

## Products recommended:

# Level Measurement

## Point level measurement - Capacitance switches

### Pointek CLS100

#### Overview



Pointek CLS100 is a compact 2-wire inverse frequency shift capacitance switch for level detection in constricted spaces, interfaces, solids, liquids, slurries and foam.

#### Benefits

- Easy installation with verification by built-in LED
- Low maintenance with no moving parts
- Sensitivity adjustment
- Integrated cable or PBT enclosure versions available
- Intrinsically Safe, Dust Ignition Proof and General Purpose options available

#### Application

Pointek CLS100's short insertion length of 100 mm (4") and versatility in various applications and in vessels or pipes makes it a good replacement for traditional capacitance sensors.

Its advanced tip-sensing technology provides accurate, repeatable switchpoint performance. The PPS (Polyphenylene sulfide) probe [optional PVDF (Polyvinylidene Fluoride)] is chemically resistant with an effective process operating temperature range from -30 to +100 °C (-22 to +212 °F) (7ML5501), and -10 to +100 °C (+14 to +212 °F) (7ML5610). The fully potted design ensures reliability in a vibrating environment such as agitated tanks up to 4 g. When used with a SensGuard protection cover, the CLS100 is protected from shearing, impact and abrasion in tough primary processes.

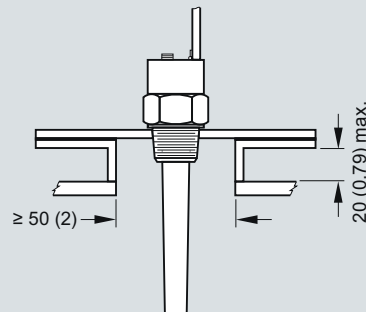
The Pointek CLS100 is available in three versions. The integral cable version has a stainless steel process connection and probe options of PPS or PVDF. The fully synthetic version has a thermoplastic polyester enclosure with a PPS process connection combined with a PPS probe. The standard enclosure version has a thermoplastic polyester enclosure with a stainless steel process connection in combination with a PPS or PVDF probe.

- Key Applications: liquids, slurries, powders, granules, food and pharmaceuticals, chemicals, hazardous areas

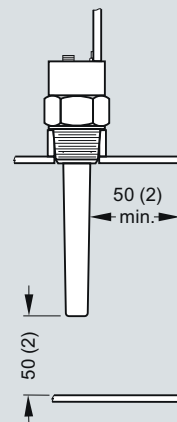
#### Configuration

##### Installation

##### Standpipes



##### Wall Restriction



Pointek CLS100 installation, dimensions in mm (inch)



# Level Measurement

## Point level measurement - Capacitance switches

Pointek CLS100

### Technical specifications

	Stainless steel process connection (integral cable or enclosure version) (7ML5501)	Fully synthetic process connection (enclosure version only) (7ML5610)
<b>Mode of operation</b>		
Measuring principle	Inverse frequency shift capacitive level detection	Inverse frequency shift capacitive level detection
<b>Input</b>		
Measured variable	Change in picoFarad (pF)	Change in picoFarad (pF)
<b>Output</b>		
Output signal		
• Alarm output	4 or 20/20 or 4 mA 2-wire loop	4 or 20/20 or 4 mA 2-wire loop
• Switch output <sup>1)</sup>	Solid-state: 30 V DC/ 30 V AC, max. 82 mA	Max. switching voltage: 60 V DC/30 V AC Max. switching current: 1 A
• Fail-safe mode	Min. or max.	Min. or max.
<b>Accuracy</b>		
Repeatability	2 mm (0.08")	2 mm (0.08")
<b>Rated operating conditions<sup>2)</sup></b>		
Installation conditions		
• Location	Indoor/outdoor	Indoor/outdoor
Ambient conditions		
• Ambient temperature	-30 ... +85 °C (-22 ... +185 °F)	-10 ... +85 °C (+14 ... +185 °F)
• Installation category	I	I
• Pollution degree	4	4
Medium conditions		
• Relative dielectric constant $\epsilon_r$	Min. 1.5	Min. 1.5
• Process temperature	-30 ... +100 °C (-22 ... +212 °F)	-10 ... +100 °C (+14 ... +212 °F)
• Pressure (vessel)	-1 ... +10 bar g (-14.6 +146 psi g), nominal <sup>2)</sup>	-1 ... +10 bar g (-14.6 +146 psi g), nominal
• Degree of protection		
- Enclosure version	IP68/Type 4/NEMA 4	IP68/Type 4/NEMA 4
- Integral cable version	IP65/Type 4/NEMA 4	Not applicable
• Cable inlet	½" NPT (M20x1.5 optional)	½" NPT (M20x1.5 optional)
<b>Design</b>		
	<u>Enclosure/Integral cable version</u>	<u>Fully synthetic version</u>
Material		
• Body (Enclosure version)	Thermoplastic polyester	Thermoplastic polyester
• Lid (Enclosure version)	Transparent thermoplastic polycarbonate (PC)	Transparent thermoplastic polycarbonate (PC)
• Integrated cable body (Integral cable version)	316L stainless steel	Not applicable
Sensor length (nominal)	100 mm (4")	100 mm (4")

	Stainless steel process connection (integral cable or enclosure version) (7ML5501)	Fully synthetic process connection (enclosure version only) (7ML5610)
Process connection material of probe/wetted parts <sup>3)</sup>	Connection: 316L stainless steel; Process seal: FKM (optional FFKM); Sensor: PPS (optional PVDF) <sup>4)</sup>	PPS process connection and PPS sensor (Uni-Construction)
Connection (Enclosure version)	Internal 5-point terminal block, ½" NPT wiring entrance, M20x1.5 optional	Removable internal 5-point all one word, ½" NPT wiring entrance, M20 x 1.5 optional
Connection (Integral cable version)	4 conductors, 1 m (3.3 ft), 0.5 mm <sup>2</sup> (22 AWG), shielded, polyester jacket	Not applicable
Process connection	¾" NPT [(Taper), ANSI/ASME B1.20.1] R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	¾" NPT [(Taper), ANSI/ASME B1.20.1] R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]
<b>Power supply</b>		
Standard	12 ... 33 V DC	12 ... 33 V DC
Intrinsically Safe	10 ... 30 V DC (Intrinsically Safe barrier required)	Not applicable
<b>Certificates and approvals</b>		
	General: CE, CSA, FM, C-TICK Marine: Lloyds Register of Shipping, categories ENV1, ENV2, and ENV5 Dust Ignition Proof (barrier required): CSA/FM Class II and III, Div. 1, Groups E, F, G T4 Intrinsically Safe (barrier required): CSA/FM Class I, II and III, Div. 1, Groups A, B, C, D, E, F, G T4 ATEX II 1 GD 1/2GD EEx ia IIC T4 to T6 T107 °C Overfill protection: WHG (Germany)	General: CSA, FM

- When synthetic process connection version (7ML5610) is used in wet locations, switching voltage of the relay is limited to 35 V DC/16 V AC.
- When operation is in areas classified as hazardous, observe restrictions according to relevant certificate. See also Pressure/Temperature curves on page 5/13.
- For Caustic Materials please contact [nacc.smpi@siemens.com](mailto:nacc.smpi@siemens.com) for alternative O Rings.
- When FFKM O-ring (Option A22) is selected, process temperature is restricted to -20 °C (-4 °F).

# Level Measurement

## Point level measurement - Capacitance switches

### Pointek CLS100

#### Selection and Ordering data

##### Pointek CLS100, stainless steel process connection

Compact 2-wire inverse frequency shift capacitance switch for level detection in constricted spaces, interfaces, solids, liquids, slurries and foam

#### Process connection

¾" NPT [(Taper), ANSI/ASME B1.20.1]  
R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]  
G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]

#### Approvals

General Purpose: CE, CSA, FM, C-TICK  
CSA/FM Class I, II and III, Div. 1, Groups A, B, C, D, E, F, G T4; ATEX II 1 GD 1/2GD EEx ia IIC T4 to T6 T107 °C<sup>1)</sup>  
CSA/FM Class II and III, Div. 1, Groups E, F, G<sup>1)</sup>

#### Device version

Integral cable version (PPS probe) 1  
Enclosure version (PPS probe), ½" NPT cable inlet 3  
Integral cable version with PVDF probe body 5  
Enclosure version with PVDF probe body (½" NPT cable inlet) 6  
Enclosure version (PPS probe), M20x1.5 cable inlet 7  
Enclosure version with PVDF probe body, M20x1.5 cable inlet 8

#### WHG approval, German overfill protection

Not required 0  
Required 1

<sup>1)</sup> Barrier or Intrinsically safe power supply required for Intrinsically Safe protection

C) Subject to export regulations AL: N, ECCN: EAR99

Order No.

C) 7ML5501-

0

A

E

J

A

C

G

1

3

5

6

7

8

0

1

#### Selection and Ordering data

##### Further designs

Please add "-Z" to Order No. and specify Order code(s).

Acrylic coated, stainless steel tag [13 x 45 mm (0.5 x 1.75")]: Measuring-point number/identification (max. 20 characters) specify in plain text

FFKM seal O-ring<sup>1)</sup>

Inspection Certificate Type 3.1 per EN 10204

##### Operating Instructions

Quick start manual, multi-language

Note: due to ATEX regulations one Quick start manual is included with every product.

This device is shipped with the Siemens Milltronics manual CD containing ATEX Quick Starts and Operating Instructions.

##### Optional equipment

Sensguard, ¾" NPT (PPS)  
Only available for CLS100 with ¾" NPT thread

Sensguard, R 1" (BSPT) (PPS)  
Only available for CLS100 with ¾" NPT thread

Siemens Intrinsically Safe Barrier (DC powered), ATEX II 1 G EEx ia

½" NPT cable gland, nickel plated brass, fits cable diameter 6 ... 12 mm (0.24 ... 0.47") -40 ... +100 °C (-40 ... +212 °F), IP68 (General Purpose)

M20x1.5 cable gland, PA polyamide, ATEX II 2G EEx e II, fits cable diameter 7 ... 12 mm (0.28 ... 0.47"), -20 ... +70 °C (-4 ... +158 °F), IP68 (General Purpose)

Order code

Y17

A22

C12

Order No.

7ML1998-5QJ82

7ML1830-1DL

7ML1830-1DM

7NG4122-1AA10

7ML1830-1JA

7ML1830-1JC

<sup>1)</sup> See Temperature restriction on page 5/13

#### Selection and Ordering data

##### Pointek CLS100, PPS process connection

Compact 2-wire inverse frequency shift capacitance switch for level detection in constricted spaces, interfaces, solids, liquids, slurries and foam

#### Process connection (PPS)

¾" NPT [(Taper), ANSI/ASME B1.20.1] (PPS probe body)  
R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] (PPS probe body)

#### Approvals

General Purpose: CSA, FM

#### Versions/Options

Enclosure version, PPS process connection, ½" NPT cable inlet 1  
Enclosure version, PPS process connection, M20x1.5 2

Order No.

C) 7ML5610-

0

A

B

D

1

2

#### Selection and Ordering data

Order code

##### Further designs

Please add "-Z" to Order No. and specify Order code(s).

Acrylic coated, stainless steel tag [13 x 45 mm (0.5 x 1.75")]: Measuring-point number/identification (max. 20 characters) specify in plain text

FFKM seal O-ring<sup>1)</sup>

Inspection Certificate Type 3.1 per EN 10204

##### Operating Instructions

Quick start manual, multi-language

Note: due to ATEX regulations one Quick start manual is included with every product.

This device is shipped with the Siemens Milltronics manual CD containing ATEX Quick Starts and Operating Instructions.

##### Optional equipment

Sensguard, ¾" NPT (PPS)  
Only available for CLS100 with ¾" NPT thread

Sensguard, R 1" (BSPT) (PPS)  
Only available for CLS100 with ¾" NPT thread

<sup>1)</sup> See Temperature restriction on page 5/13

Y17

A22

C12

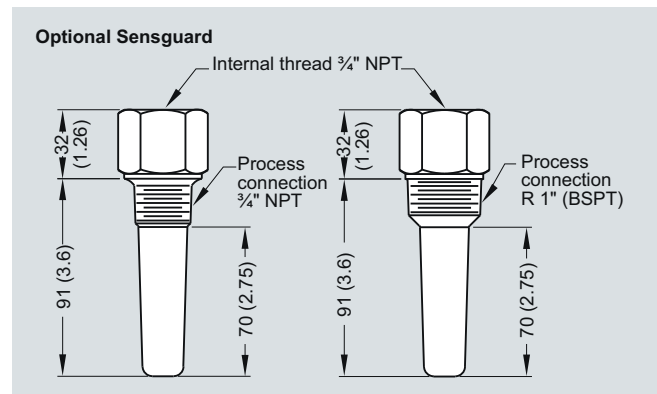
Order No.

7ML1998-5QJ82

7ML1830-1DL

7ML1830-1DM

#### Options



Optional Sensguard, dimensions in mm (inch)

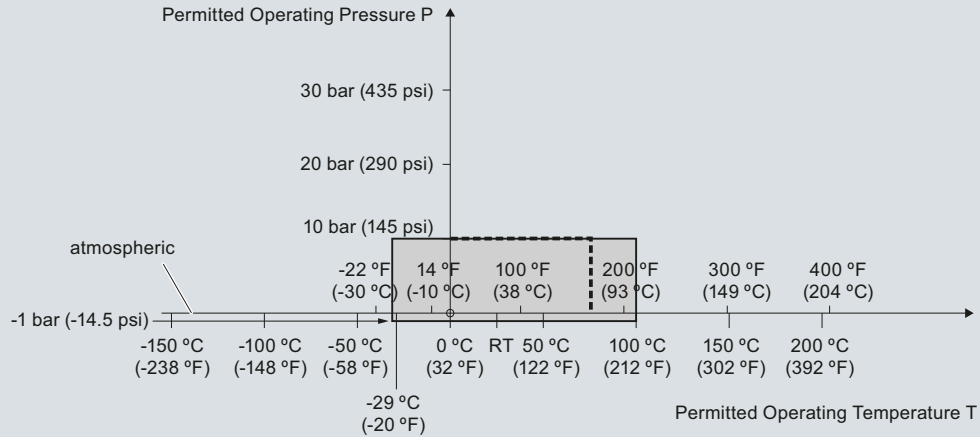
# Level Measurement

## Point level measurement - Capacitance switches

Pointek CLS100

### Characteristic curves

Pressure/Temperature Curve  
CLS100  
Threaded Process Connections  
(7ML5501)

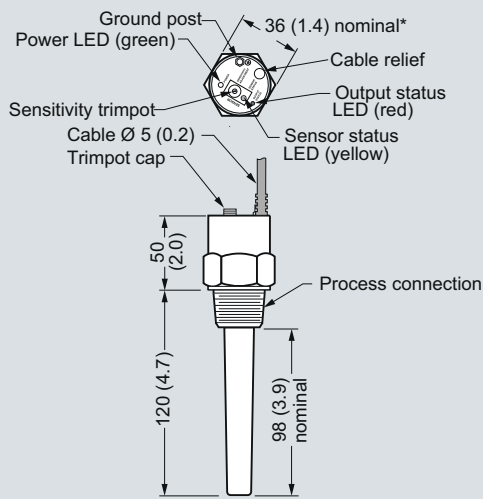


----- Example:  
Permitted operating pressure = 10 bar (145 psi) at 75 °C

Pointek CLS100 Process Pressure/Temperature derating curves

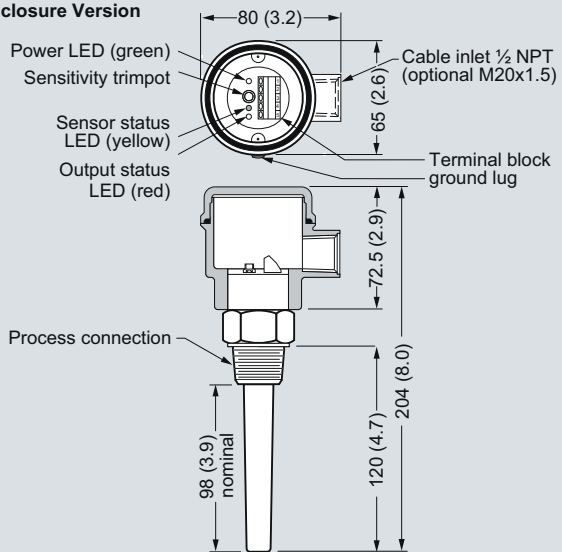
### Dimensional drawings

#### Integral Cable Version



\*Some G thread configurations deviate from this size.

#### Enclosure Version



Pointek CLS100, dimensions in mm (inch)

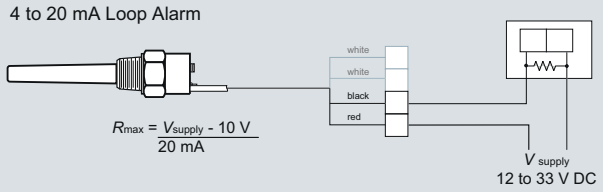
# Level Measurement

## Point level measurement - Capacitance switches

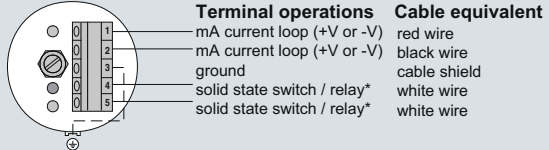
### Pointek CLS100

#### Schematics

##### Integral Cable Version - Non Intrinsically Safe only



##### Enclosure and Fully Synthetic Version



\* switch/relay normally open in unpowered state  
 \* relay not available on Pointek CLS100 IS version (7ML5501)

**Note:**  
 When driving an inductive load (for example, an external relay), a protection diode must be connected in the correct polarity to prevent possible switch damage due to inductive spikes generated by switching the inductor (please refer to instruction manual). Intrinsically Safe Models - please follow local regulations and area classifications; refer to instruction manual for more details.

5

Pointek CLS100 connections

# Level Measurement

## Point level measurement - Capacitance switches

Pointek CLS200 - Standard

### Overview



Pointek CLS200 (standard version) is a versatile inverse frequency shift capacitance level switch with optional rod/cable choices and configurable output, ideal for detection of liquids, solids, slurries, foam and interfaces.

### Benefits

- Potted construction protects signal circuit from shock, vibration, humidity and/or condensation
- High chemical resistance
- Level detection independent of tank or pipe earth reference
- Insensitive to product buildup due to high frequency oscillation
- 3 LED indicators for sensor status, output status, and power

### Application

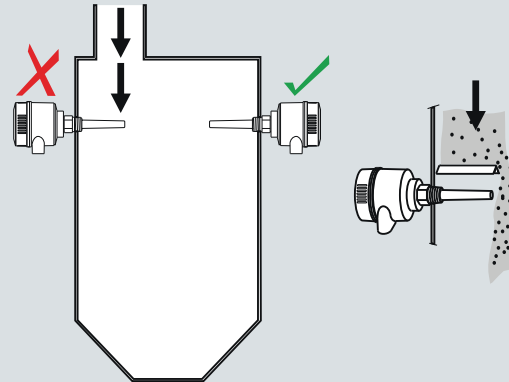
Pointek CLS200 standard version has 3 LED indicators with basic relay and solid-state switch alarms.

The power supply is galvanically isolated and accepts a wide range of voltages (12 to 250 V AC/DC). When used with thermal isolator, the stainless steel and PPS (PVDF optional) materials used in the probe construction provide a temperature rating up to +125 °C (+257 °F) on the process wetted portion of the probe. The switch responds to any material with a dielectric constant of 1.5 or more by detecting a change in oscillating frequency, and it can be set to detect before contact or on contact with the probe. The CLS200 operates independently of the tank wall or pipe so it does not require an external reference electrode for level detection in a non-conductive vessel such as concrete or plastic (EMC regulations applicable in some regions).

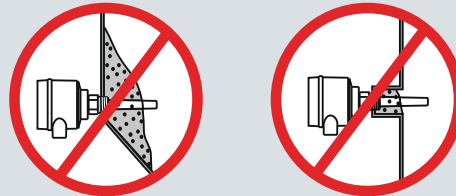
- Key Applications: liquids, slurries, powders, granules, pressurized applications, hazardous areas

### Configuration

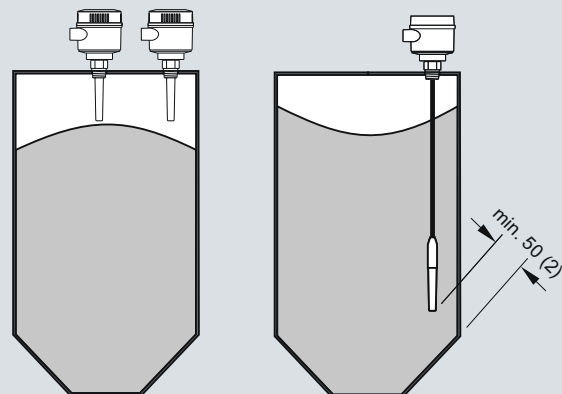
#### Installation



Keep unit out of path of falling material, or protect probe from falling material.



Avoid areas where material build up occurs.



Install probe at least 50 (2") mm from tank wall.

Pointek CLS200 installation, dimensions in mm (inch)

# Level Measurement

## Point level measurement - Capacitance switches

### Pointek CLS200 - Standard

#### Technical specifications

Mode of operation	
Measuring principle	Inverse frequency shift capacitive level detection
Input	
Measured variable	Change in picoFarad (pF)
Output	
Output signal	
• Relay output	1 SPDT Form C relay
- Max. contact voltage	<ul style="list-style-type: none"> <li>• 30 V DC</li> <li>• 250 V AC</li> </ul>
- Max. contact current	<ul style="list-style-type: none"> <li>• 5 A (DC)</li> <li>• 8 A (AC)</li> </ul>
- Max. switching capacity	150 W (DC) 2000 VA (AC)
- Time delay (ON and/or OFF)	1 ... 60 s
• Solid-state output	
- Output	Galvanically isolated
- Protection	Against reversed polarity (bipolar)
- Max. switching voltage	<ul style="list-style-type: none"> <li>• 30 V (DC)</li> <li>• 30 V peak (AC)</li> </ul>
- Max. load current	82 mA
- Voltage drop	< 1 V, typical at 50 mA
- Time delay (pre or post switching)	1 ... 60 s
Rated operating conditions <sup>1)</sup>	
Installation conditions	
• Location	Indoor/outdoor
Ambient conditions	
• Ambient temperature	-40 ... +85 °C (-40 ... +185 °F) <sup>2)</sup>
• Installation category	II
• Pollution degree	4
Medium conditions	Liquids, bulk solids, slurries and interfaces
• Relative dielectric constant $\epsilon_r$	Min. 1.5
• Process temperature	
- Without thermal isolator	-40 ... +85 °C (-40 ... +185 °F) <sup>2)</sup>
- With thermal isolator	-40 ... +125 °C (-40 ... +257 °F)
• Process pressure (rod version)	-1 ... +25 bar g (-14.6 ... +365 psi g) (nominal)
• Process pressure (cable version) <sup>3)</sup>	-1 ... +10 bar g (-14.6 ... +150 psi g) (nominal)
• Process pressure (sliding coupling version)	-1 ... +10 bar g (-14.6 ... +150 psi g) (nominal)
Electromagnetic Compatibility	To comply with CE EMC regulations (where applicable); the CLS200 should only be used under these conditions: <ul style="list-style-type: none"> <li>- Installed in a metallic vessel</li> <li>- Wired with shielded cable</li> <li>- Cable shields are terminated in suitable EMC rated cable glands at the device cable entry point.</li> </ul>

Design	
Material	
• Enclosure	Epoxy-coated aluminum with gasket
• Optional thermal isolator	316L stainless steel
Connection	Removable terminal block, max. 2.5 mm <sup>2</sup>
Degree of protection	IP65/Type 4/NEMA 4 (optional IP68)
Cable inlet	2 x M20x1.5 thread (option: 2 x 1/2" NPT conduit entry including 1 plugged entry)
Power supply	
	12 ... 250 V AC/DC, 0 ... 60 Hz max. 2 W
Certificates and approvals	
General Purpose	CSA, FM, CE, C-TICK
Dust Ignition Proof	ATEX II 1/2 D T100°C
Flameproof Enclosure With IS Probe	ATEX II 1 G EEx d[ia] IIC T6...T4 ATEX II 1/2 D T100°C
Dust Ignition Proof with IS Probe	CSA/FM Class II, Div. 1, Gr. E, F, G CSA/FM Class III T4
Explosion Proof Enclosure With IS Probe	CSA/FM Class I, Div. 1, Gr. A, B, C, D CSA/FM Class II, Div. 1, Gr. E, F, G CSA/FM Class III T4
Marine	Lloyds Register of Shipping, Categories ENV1, ENV2 and ENV5
Overfill Protection	WHG (Germany) VLAREM II
Others	Pattern Approval (China)

- 1) When operation is in areas classified as hazardous, observe restrictions according to relevant certificate. See also Pressure/Temperature curves on page 5/34.
- 2) Thermal isolator is used if process connection temperature exceeds +85 °C (+185 °F)
- 3) Pressure rating of process seal is temperature dependent. See Pressure/Temperature curves on page 5/34.



# Level Measurement

## Point level measurement - Capacitance switches

Pointek CLS200 - Standard

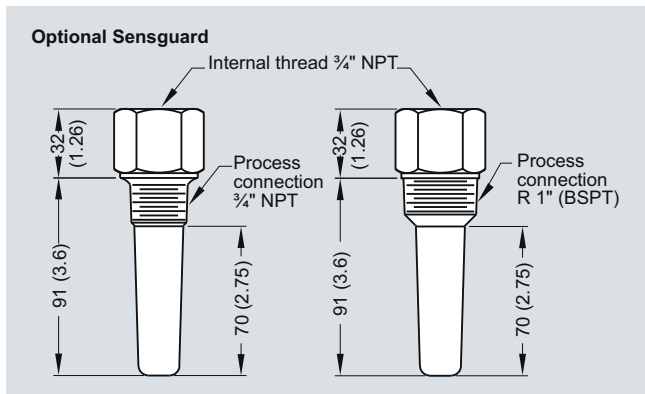
Design: Probe	Rod version	Sanitary version	Cable version	Sliding Coupling version
Max. length	5500 mm (216.53")	5500 mm (216.53")	30000 mm (1181.1") liquids and slurries 5000 mm (196.85") solids (under loads)	5500 mm (216.53")
Process connection	R ¾", 1", 1¼", 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] ¾", 1", 1¼", 1½" NPT [(Taper), ANSI/ASME B1.20.1] G ¾", 1", 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] 316L stainless steel ASME/EN flange	1½", 2" sanitary fitting clamp 316L stainless steel	R ¾", 1", 1¼", 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] ¾", 1", 1¼", 1½" NPT [(Taper), ANSI/ASME B1.20.1] G ¾", 1", 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] 316L stainless steel ASME/EN flange	R ¾", 1", 1¼", 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] ¾", 1", 1¼", 1½" NPT [(Taper), ANSI/ASME B1.20.1] G ¾", 1", 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]
Extension material	316L stainless steel optional PFA coated <sup>1)</sup>	316L stainless steel	Fluoroethylene propylene (FEP) cable with stainless steel core	316L stainless steel
Sensor wetted parts	PPS (optional PVDF)	PPS (optional PVDF)	PPS (optional PVDF)	PPS (optional PVDF)
O-ring seal material	FKM (optional FFKM) <sup>2)</sup>	FKM (optional FFKM) <sup>2)</sup>	FKM (optional FFKM) <sup>2)</sup>	FKM (optional FFKM) <sup>2)</sup>
Thermal isolator <sup>3)</sup>	Optional	Optional	Optional	Optional
Extension	User selected length	User selected length	Cable extension	User selected length

1) PFA coating (7ML5634 and 7ML5644) has 120 micron thickness.

2) For caustic materials please contact [nacc.smpi@siemens.com](mailto:nacc.smpi@siemens.com) for alternative O-rings.

3) Thermal isolator is used if process connection temperature exceeds +85 °C (+185 °F).

### Options



Optional Sensguard, dimensions in mm (inch)

# Level Measurement

## Point level measurement - Capacitance switches

### Pointek CLS200 - Standard

#### Selection and Ordering data

Order No.

#### Pointek CLS200 - Standard - Rod Version with Threaded or Flanged process connection

C) 7 ML 5 6 3 0 - 0

Versatile inverse frequency shift capacitance level switch with optional rod/cable choices and configurable output, ideal for detection of liquids, solids, slurries, foam and interfaces

#### Process Connection

Threaded, 316L stainless steel

¾" NPT [(Taper), ANSI/ASME B1.20.1] **0 A**  
 1" NPT [(Taper), ANSI/ASME B1.20.1] **0 B**  
 1¼" NPT [(Taper), ANSI/ASME B1.20.1] **0 C**  
 1½" NPT [(Taper), ANSI/ASME B1.20.1] **0 D**  
 R ¾" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] **1 A**  
 R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] **1 B**  
 R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] **1 D**  
 G ¾" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] **3 A**  
 G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] **3 B**  
 G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] **3 D**

Welded flange, 316L stainless steel, raised face

1" ASME, 150 lb **5 A**  
 1" ASME, 300 lb **5 B**  
 1" ASME, 600 lb **5 C**  
 1½" ASME, 150 lb **5 D**  
 1½" ASME, 300 lb **5 E**  
 1½" ASME, 600 lb **5 F**  
 2" ASME, 150 lb **5 G**  
 2" ASME, 300 lb **5 H**  
 2" ASME, 600 lb **5 J**  
 3" ASME, 150 lb **5 K**  
 3" ASME, 300 lb **5 L**  
 3" ASME, 600 lb **5 M**  
 4" ASME, 150 lb **5 N**  
 4" ASME, 300 lb **5 P**  
 4" ASME, 600 lb **5 Q**

Welded flange, 316L stainless steel, Type A flat faced

DN 25, PN 16 **6 A**  
 DN 25, PN 40 **6 B**  
 DN 40, PN 16 **6 C**  
 DN 40, PN 40 **6 D**  
 DN 50, PN 16 **6 E**  
 DN 50, PN 40 **6 F**  
 DN 80, PN 16 **6 G**  
 DN 80, PN 40 **6 H**  
 DN 100, PN 16 **6 J**  
 DN 100, PN 40 **6 K**

(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)

**Probe length (length from flange face)**  
 (threaded lengths include process thread)

Note: No Y01 needed in order code for standard lengths

Compact [threaded 120 mm (4.72"), Flanged 98 mm (3.86")] **A**  
 Extended rod, 250 mm (9.84") **B**  
 Extended rod, 350 mm (13.78") **C**  
 Extended rod, 500 mm (19.69") **D**  
 Extended rod, 750 mm (29.53") **E**  
 Extended rod, 1000 mm (39.37") **F**  
 Extended rod, 1250 mm (49.21") **G**  
 Extended rod, 1350 mm (53.15") **H**  
 Extended rod, 1500 mm (59.06") **J**  
 Extended rod, 1750 mm (68.90") **K**  
 Extended rod, 2000 mm (78.74") **L**

#### Selection and Ordering data

Order No.

#### Pointek CLS200 - Standard - Rod Version with Threaded or Flanged process connection

C) 7 ML 5 6 3 0 - 0

Versatile inverse frequency shift capacitance level switch with optional rod/cable choices and configurable output, ideal for detection of liquids, solids, slurries, foam and interfaces

Add order code Y01 and plain text:  
"Insertion length ... mm"

Extended rod, 200 ... 1000 mm (7.87 ... 39.37") **M**  
 Extended rod, 1001 ... 2000 mm (39.41 ... 78.74") **N**  
 Extended rod, 2001 ... 3000 mm (78.78 ... 118.11") **P**  
 Extended rod, 3001 ... 4000 mm (118.15 ... 157.48") **Q**  
 Extended rod, 4001 ... 5000 mm (157.52 ... 196.85") **R**  
 Extended rod, 5001 ... 5500 mm (196.89 ... 216.53") **S**

#### Thermal Isolator

Without thermal isolator **0**  
 With thermal isolator [for process connection temperatures over +85 °C (+185 °F)] **1**

#### Remote mount electronics and mounting bracket

With 2 m (79") of cable **2**  
 With 5 m (197") of cable **3**

#### Wetted Seals

FKM **0**  
 FFKM [for process temperatures above -20 °C (-4 °F)] **1**

#### Probe Material

316L Stainless Steel with PPS probe body **0**  
 316L Stainless Steel with PVDF probe body **1**

#### Approvals

Dust Ignition Proof:  
 CE, C-TICK, ATEX II 1/2 D T100 °C **C**  
 Flameproof Enclosure with IS Probe:  
 CE, C-TICK, ATEX II 1 G EEx d[ia] IIC T6...T4, ATEX II 1/2 D T100 °C **D**  
 Flameproof Enclosure with IS Probe, with WHG approval:  
 CE, C-TICK, ATEX II 1/2 G EEx d[ia] IIC T6...T4, ATEX II 1/2 D T100 °C **E**  
 Dust Ignition Proof with IS Probe:  
 CSA/FM Class II, Div. 1, Gr. E, F, G **F**  
 CSA/FM Class III T4 **F**  
 Explosion Proof Enclosure with IS Probe:  
 CSA/FM Class I, Div. 1, Gr. A, B, C, D **G**  
 CSA/FM Class II, Div. 1, Gr. E, F, G **G**  
 CSA/FM Class III T4 **G**

General Purpose (CSA, FM) **H**

General Purpose (CE, C-TICK) **J**

General Purpose (CSA, FM, CE, C-TICK) with WHG approval **K**

#### Enclosure and Lid

Aluminum epoxy coated **A**  
 2 x ½" NPT via adapter - cable inlet, IP65 **B**  
 2 x M20 x 1.5 cable inlet IP65 **B**  
 2 x ½" NPT via adapter - cable inlet, IP68 **C**  
 2 x M20 x 1.5 cable inlet IP68 **D**

C) Subject to export regulations AL: N, ECCN: EAR99

# Level Measurement

## Point level measurement - Capacitance switches

Pointek CLS200 - Standard

Selection and Ordering data	Order code
<b>Further designs</b>	
Please add <b>"-Z"</b> to Order No. and specify Order code(s).	
Total insertion length: enter the total insertion length in plain text description	<b>Y01</b>
Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text	<b>Y15</b>
Acceptance test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and ISO 9000	<b>C11</b>
Inspection Certificate Type 3.1 per EN 10204	<b>C12</b>
<b>Operating Instructions</b>	
Note: The Operating Instructions should be ordered as a separate line on the order. This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and manual library.	<b>See page 5/33</b>
<b>Accessories</b>	
	<b>See page 5/33</b>

# Level Measurement

## Point level measurement - Capacitance switches

### Pointek CLS200 - Standard

Selection and Ordering data	Order No.
<b>Pointek CLS200 - Standard - Cable Version with C) Threaded or Flanged process connection</b>	<b>7ML5631 -</b>
Versatile inverse frequency shift capacitance level switch with optional process connection choices and configurable output, ideal for detection of liquids, solids, slurries, foam and interfaces	0
<b>Process Connection</b>	
<u>Threaded, 316L stainless steel</u>	
¾" NPT [(Taper), ANSI/ASME B1.20.1]	0 A
1" NPT [(Taper), ANSI/ASME B1.20.1]	0 B
1¼" NPT [(Taper), ANSI/ASME B1.20.1]	0 C
1½" NPT [(Taper), ANSI/ASME B1.20.1]	0 D
R ¾" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1 A
R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1 B
R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1 D
G ¾" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3 A
G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3 B
G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3 D
<u>Welded flange, 316L stainless steel, raised face</u>	
1" ASME, 150 lb	5 A
1" ASME, 300 lb	5 B
1" ASME, 600 lb	5 C
1½" ASME, 150 lb	5 D
1½" ASME, 300 lb	5 E
1½" ASME, 600 lb	5 F
2" ASME, 150 lb	5 G
2" ASME, 300 lb	5 H
2" ASME, 600 lb	5 J
3" ASME, 150 lb	5 K
3" ASME, 300 lb	5 L
3" ASME, 600 lb	5 M
4" ASME, 150 lb	5 N
4" ASME, 300 lb	5 P
4" ASME, 600 lb	5 Q
<u>Welded flange, 316L stainless steel, Type A flat faced</u>	
DN 25, PN 16	6 A
DN 25, PN 40	6 B
DN 40, PN 16	6 C
DN 40, PN 40	6 D
DN 50, PN 16	6 E
DN 50, PN 40	6 F
DN 80, PN 16	6 G
DN 80, PN 40	6 H
DN 100, PN 16	6 J
DN 100, PN 40	6 K
(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)	
<b>Probe length</b> (length from flange face) (threaded lengths include process thread)	
Note: No Y01 needed in order code for standard lengths	
<u>Extended cable, 3000 mm (118.11"), length can be determined by customer on assembly</u>	A
<u>Extended cable, 6000 mm (236.22"), length can be determined by customer on assembly</u>	B
<u>Add order code Y01 and plain text: "Insertion length ... mm"</u>	
<u>Extended cable, 500 ... 5000 mm (19.69 ... 196.85")</u>	C
<u>Extended cable, 5001 ... 10000 mm (196.89 ... 393.70")</u>	D
<u>Extended cable, 10001 ... 15000 mm (393.74 ... 590.55")</u>	E
<u>Extended cable, 15001 ... 20000 mm (590.59 ... 787.4")</u>	F
<u>Extended cable, 20001 ... 25000 mm (787.44 ... 984.25")</u>	G
<u>Extended cable, 25001 ... 30000 mm (984.29 ... 1181.1")</u>	H

Selection and Ordering data	Order No.
<b>Pointek CLS200 - Standard - Cable Version with C) Threaded or Flanged process connection</b>	<b>7ML5631 -</b>
Versatile inverse frequency shift capacitance level switch with optional process connection choices and configurable output, ideal for detection of liquids, solids, slurries, foam and interfaces	0
<b>Thermal Isolator</b>	
Without thermal isolator	0
With thermal isolator [for process connection temperatures over +85 °C (+185 °F)]	1
<b>Remote mount electronics and mounting bracket</b>	
With 2 m (79") of cable	2
With 5 m (197") of cable	3
<b>Wetted Seals</b>	
FKM and PTFE	0
FFKM and PTFE [for process temperatures above -20 °C (-4 °F)]	1
<b>Probe Material</b>	
FEP jacketed cable with PPS probe body	0
FEP jacketed cable with PVDF probe body	1
<b>Approvals</b>	
Dust Ignition Proof: CE, C-TICK, ATEX II 1/2 D T100 °C	C
Flameproof Enclosure with IS Probe: CE, C-TICK, ATEX II 1 G EEx d[ia] IIC T6...T4, ATEX II 1/2 D T100 °C	D
Flameproof Enclosure with IS Probe, with WHG approval: CE, C-TICK, ATEX II 1/2 G EEx d[ia] IIC T6...T4, ATEX II 1/2 D T100 °C	E
Dust Ignition Proof with IS Probe: CSA/FM Class II, Div. 1, Gr. E, F, G CSA/FM Class III T4	F
Explosion Proof Enclosure with IS Probe: CSA/FM Class I, Div. 1, Gr. A, B, C, D CSA/FM Class II, Div. 1, Gr. E, F, G CSA/FM Class III T4	G
General Purpose (CSA, FM)	H
General Purpose (CE, C-TICK)	J
General Purpose (CSA, FM, CE, C-TICK) with WHG approval	K
<b>Enclosure and Lid</b>	
Aluminum epoxy coated	
2 x ½" NPT via adapter - cable inlet, IP65	A
2 x M20x1.5 cable inlet, IP65	B
2 x ½" NPT via adapter - cable inlet, IP68	C
2 x M20x1.5 cable inlet, IP68	D

Selection and Ordering data	Order code
<b>Further designs</b>	
Please add <b>"-Z"</b> to Order No. and specify Order code(s).	
Total insertion length: enter the total insertion length in plain text description	<b>Y01</b>
Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text	<b>Y15</b>
Acceptance test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and ISO 9000	<b>C11</b>
Inspection Certificate Type 3.1 per EN 10204	<b>C12</b>
<b>Operating Instructions</b>	
Note: The Operating Instructions should be ordered as a separate line on the order. This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and manual library.	<b>See page 5/33</b>
<b>Accessories</b>	
C)Subject to export regulations AL: N, ECCN: EAR99	<b>See page 5/33</b>

# Level Measurement

## Point level measurement - Capacitance switches

### Pointek CLS200 - Standard

Selection and Ordering data	Order No.	Selection and Ordering data	Order No.
<b>Pointek CLS200 - Standard - Rod with Sanitary process connection</b> Versatile inverse frequency shift capacitance level switch with optional process connection choices and configurable output, ideal for detection of liquids, solids, slurries, foam and interfaces	C) 7 M L 5 6 3 2 - 0	<b>Pointek CLS200 - Standard - Rod with Sanitary process connection</b> Versatile inverse frequency shift capacitance level switch with optional process connection choices and configurable output, ideal for detection of liquids, solids, slurries, foam and interfaces	C) 7 M L 5 6 3 2 - 0
<b>Process Connection</b> <u>Sanitary 316L stainless steel</u> 1" sanitary fitting clamp 1½" sanitary fitting clamp 2" sanitary fitting clamp 2½" sanitary fitting clamp 3" sanitary fitting clamp (Note: Sanitary connection dimensionally corresponds to the applicable ISO 2852 standard)	8 A 8 B 8 C 8 D 8 E	<b>Approvals</b> Dust Ignition Proof: CE, C-TICK, ATEX II 1/2 D T100 °C Flameproof Enclosure with IS Probe: CE, C-TICK, ATEX II 1 G EEx d[ia] IIC T6...T4, ATEX II 1/2 D T100 °C Flameproof Enclosure with IS Probe, with WHG approval: CE, C-TICK, ATEX II 1/2 G EEx d[ia] IIC T6...T4, ATEX II 1/2 D T100 °C Dust Ignition Proof with IS Probe: CSA/FM Class II, Div. 1, Gr. E, F, G CSA/FM Class III T4 Explosion Proof Enclosure with IS Probe: CSA/FM Class I, Div. 1, Gr. A, B, C, D CSA/FM Class II, Div. 1, Gr. E, F, G CSA/FM Class III T4 General Purpose (CSA, FM) General Purpose (CE, C-TICK) General Purpose (CSA, FM, CE, C-TICK) with WHG approval	C D E F G H J K
<b>Probe length</b> (length from process connection face) <u>Note: No Y01 needed in order code for standard lengths</u> Compact 98 mm (3.86") Extended rod, 250 mm (9.84") Extended rod, 350 mm (13.78") Extended rod, 500 mm (19.69") Extended rod, 750 mm (29.53") Extended rod, 1000 mm (39.37") Extended rod, 1250 mm (49.21") Extended rod, 1350 mm (53.15") Extended rod, 1500 mm (59.06") Extended rod, 1750 mm (68.90") Extended rod, 2000 mm (78.74") Add order code Y01 and plain text: <u>"Insertion length ... mm"</u> Extended rod, 110 ... 350 mm (4.3 ... 13.78") Extended rod, 351 ... 1000 mm (13.82 ... 39.33") Extended rod, 1001 ... 2000 mm (39.41 ... 78.74") Extended rod, 2001 ... 3000 mm (78.78 ... 118.11") Extended rod, 3001 ... 4000 mm (118.15 ... 157.48") Extended rod, 4001 ... 5000 mm (157.52 ... 196.85") Extended rod, 5001 ... 5500 mm (196.89 ... 216.53")	A B C D E F G H J K L M N P Q R S T	<b>Enclosure and Lid</b> <u>Aluminum epoxy coated</u> 2 x ½" NPT via adapter - cable inlet, IP65 2 x M20x1.5 cable inlet, IP65 2 x ½" NPT via adapter - cable inlet, IP68 2 x M20x1.5 cable inlet, IP68 C) Subject to export regulations AL: N, ECCN: EAR99	A B C D
<b>Thermal Isolator</b> Without thermal isolator With thermal isolator [for process connection temperatures over +85 °C (+185 °F)]	0 1	<b>Further designs</b> Please add <b>"-Z"</b> to Order No. and specify Order code(s). Total insertion length: enter the total insertion length in plain text description Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text Acceptance test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and ISO 9000 Inspection Certificate Type 3.1 per EN 10204	Y01 Y15 C11 C12
<b>Remote mount electronics and mounting bracket</b> Remote mount electronics with 2 m (79") of cable Remote mount electronics with 5 m (197") of cable	2 3	<b>Operating Instructions</b> Note: The Operating Instructions should be ordered as a separate line on the order. This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and manual library.	See page 5/33
<b>Wetted Seals</b> FKM FFKM [for process temperatures above -20 °C (-4 °F)]	0 1	<b>Accessories</b>	See page 5/33
<b>Probe Material</b> 316L Stainless Steel with PPS probe body 316L Stainless Steel with PVDF probe body	0 1		

# Level Measurement

## Point level measurement - Capacitance switches

### Pointek CLS200 - Standard

#### Selection and Ordering data

Order No.

#### Pointek CLS200 - Standard - Sliding Coupling with Threaded process connection

C) 7 ML 5 6 3 3 - 0

Versatile inverse frequency shift capacitance level switch with optional process connection choices and configurable output, ideal for detection of liquids, solids, slurries, foam and interfaces

#### Process Connection

Threaded, 316L stainless steel

¾" NPT [(Taper), ANSI/ASME B1.20.1] 0 A  
 1" NPT [(Taper), ANSI/ASME B1.20.1] 0 B  
 1¼" NPT [(Taper), ANSI/ASME B1.20.1] 0 C  
 1½" NPT [(Taper), ANSI/ASME B1.20.1] 0 D  
 R ¾" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] 1 A  
 R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] 1 B  
 R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] 1 D  
 G ¾" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] 3 A  
 G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] 3 B  
 G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] 3 D

#### Probe length (length from flange face)

(threaded lengths include process thread)

Note: No Y01 needed in order code for standard lengths

Extended rod, 350 mm (13.78") C  
 Extended rod, 500 mm (19.69") D  
 Extended rod, 750 mm (29.53") E

Extended rod, 1000 mm (39.37") F  
 Extended rod, 1250 mm (49.21") G  
 Extended rod, 1350 mm (53.15") H

Extended rod, 1500 mm (59.06") J  
 Extended rod, 1750 mm (68.90") K  
 Extended rod, 2000 mm (78.74") L

Add order code Y01 and plain text:

"Insertion length ... mm"

Extended rod, 350 ... 1000 mm (13.82 ... 39.33") M  
 Extended rod, 1001 ... 2000 mm (39.41 ... 78.74") N  
 Extended rod, 2001 ... 3000 mm (78.78 ... 118.11") P

Extended rod, 3001 ... 4000 mm (118.15 ... 157.48") Q  
 Extended rod, 4001 ... 5000 mm (157.52 ... 196.85") R  
 Extended rod, 5001 ... 5500 mm (196.89 ... 216.53") S

#### Thermal Isolator

Without thermal isolator 0

With thermal isolator [for process connection temperatures over +85 °C (+185 °F)] 1

#### Remote mount electronics and mounting bracket

With 2 m (79") of cable 2

With 5 m (197") of cable 3

#### Wetted Seals

FKM and PTFE 0

FFKM and PTFE [for process temperatures above -20 °C (-4 °F)] 1

#### Probe Material

316L Stainless Steel with PPS probe body 0

316L Stainless Steel with PVDF probe body 1

#### Selection and Ordering data

Order No.

#### Pointek CLS200 - Standard - Sliding Coupling with Threaded process connection

C) 7 ML 5 6 3 3 - 0

Versatile inverse frequency shift capacitance level switch with optional process connection choices and configurable output, ideal for detection of liquids, solids, slurries, foam and interfaces

#### Approvals

Dust Ignition Proof:

CE, C-TICK, ATEX II 1/2 D T100 °C C

Flameproof Enclosure with IS Probe:

CE, C-TICK, ATEX II 1 G EEx d[ia] IIC T6...T4, ATEX II 1/2 D T100 °C D

Flameproof Enclosure with IS Probe, with WHG approval:

CE, C-TICK, ATEX II 1/2 G EEx d[ia] IIC T6...T4, ATEX II 1/2 D T100 °C E

Dust Ignition Proof with IS Probe:

CSA/FM Class II, Div. 1, Gr. E, F, G F  
 CSA/FM Class III T4

Explosion Proof Enclosure with IS Probe:

CSA/FM Class I, Div. 1, Gr. A, B, C, D G  
 CSA/FM Class II, Div. 1, Gr. E, F, G  
 CSA/FM Class III T4

General Purpose (CSA, FM) H

General Purpose (CE, C-TICK) J

General Purpose (CSA, FM, CE, C-TICK) with WHG approval K

#### Enclosure and Lid

Aluminum epoxy coated

2 x ½" NPT via adapter - cable inlet, IP65 A

2 x M20x1.5 cable inlet, IP65 B

2 x ½" NPT via adapter - cable inlet, IP68 C

2 x M20x1.5 cable inlet, IP68 D

C) Subject to export regulations AL: N, ECCN: EAR99

#### Selection and Ordering data

Order code

#### Further designs

Please add "-Z" to Order No. and specify Order code(s).

Total insertion length: enter the total insertion length in plain text description Y01

Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text Y15

Acceptance test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and ISO 9000 C11  
 Inspection Certificate Type 3.1 per EN 10204 C12

#### Operating Instructions

Note: The Operating Instructions should be ordered as a separate line on the order. This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and manual library. See page 5/33

#### Accessories

See page 5/33



# Level Measurement

## Point level measurement - Capacitance switches

### Pointek CLS200 - Standard

Selection and Ordering data	Order No.
<b>Pointek CLS200 - Standard - PFA Coated Rod with PFA Coated Flanged process connection</b> <p>Versatile inverse frequency shift capacitance level switch with optional rod/cable choices and configurable output, ideal for detection of liquids, solids, slurries, foam and interfaces</p> <p><b>Process Connection</b>  <u>Welded flange, 316L stainless steel, raised face</u>                      1" ASME, 150 lb                      1" ASME, 300 lb                      1" ASME, 600 lb                      1½" ASME, 150 lb                      1½" ASME, 300 lb                      1½" ASME, 600 lb                      2" ASME, 150 lb                      2" ASME, 300 lb                      2" ASME, 600 lb                      3" ASME, 150 lb                      3" ASME, 300 lb                      3" ASME, 600 lb                      4" ASME, 150 lb                      4" ASME, 300 lb                      4" ASME, 600 lb  <u>Welded flange, 316L stainless steel, Type A flat faced</u>                      DN 25, PN 16                      DN 25, PN 40                      DN 40, PN 16                      DN 40, PN 40                      DN 50, PN 16                      DN 50, PN 40                      DN 80, PN 16                      DN 80, PN 40                      DN 100, PN 16                      DN 100, PN 40                      (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)  <b>Probe length</b> (length from flange face) (threaded lengths include process thread)  <u>Note: No Y01 needed in order code for standard lengths</u>                      Compact (Threaded 98 mm (3.86")                      Extended rod, 250 mm (9.84")                      Extended rod, 350 mm (13.78")                      Extended rod, 500 mm (19.69")                      Extended rod, 750 mm (29.53")                      Extended rod, 1000 mm (39.37")                      Extended rod, 1250 mm (49.21")                      Extended rod, 1350 mm (53.15")                      Extended rod, 1500 mm (59.06")                      Extended rod, 1750 mm (68.90")                      Extended rod, 2000 mm (78.74")  <u>Add order code Y01 and plain text: "Insertion length ... mm"</u>                      Extended rod, 200 ... 1000 mm (7.87 ... 39.33")                      Extended rod, 1001 ... 2000 mm (39.41 ... 78.74")                      Extended rod, 2001 ... 3000 mm (78.78 ... 118.11")                      Extended rod, 3001 ... 4000 mm (118.15 ... 157.48")                      Extended rod, 4001 ... 5000 mm (157.52 ... 196.85")                      Extended rod, 5001 ... 5500 mm (196.89 ... 216.53")</p>	C) <b>7 M L 5 6 3 4 -</b> ■■■■■ - ■■■■ 0 5 A 5 B 5 C 5 D 5 E 5 F 5 G 5 H 5 J 5 K 5 L 5 M 5 N 5 P 5 Q 6 A 6 B 6 C 6 D 6 E 6 F 6 G 6 H 6 J 6 K A B C D E F G H A B C D M N P Q R S

Selection and Ordering data	Order No.
<b>Pointek CLS200 - Standard - PFA Coated Rod with PFA Coated Flanged process connection</b> <p>Versatile inverse frequency shift capacitance level switch with optional rod/cable choices and configurable output, ideal for detection of liquids, solids, slurries, foam and interfaces</p> <p><b>Thermal Isolator</b>                      Without thermal isolator                      With thermal isolator [for process connection temperatures over +85 °C (+185 °F)]  <b>Remote mount electronics and mounting bracket</b>                      With 2 m (79") of cable                      With 5 m (197") of cable  <b>Wetted Seals</b>                      FKM                      FFKM [for process temperatures above -20°C (-4°F)]  <b>Probe Material</b>                      PFA Coated 316L Stainless Steel with PPS probe body                      PFA Coated 316L Stainless Steel with PVDF probe body  <b>Approvals</b>                      Dust Ignition Proof with IS Probe:                      CSA/FM Class II, Div. 1, Gr. E, F, G                      CSA/FM Class III T4                      Explosion Proof Enclosure with IS Probe:                      CSA/FM Class I, Div. 1, Gr. A, B, C, D                      CSA/FM Class II, Div. 1, Gr. E, F, G                      CSA/FM Class III T4                      General Purpose (CSA, FM)  <b>Enclosure and Lid</b>                      Aluminum epoxy coated                      2 x ½" NPT via adapter - cable inlet, IP65                      2 x M20x1.5 cable inlet, IP65                      2 x ½" NPT via adapter - cable inlet, IP68                      2 x M20x1.5 cable inlet, IP68                      C) Subject to export regulations AL: N, ECCN: EAR99</p>	C) <b>7 M L 5 6 3 4 -</b> ■■■■■ - ■■■■ 0 0 1 2 3 0 1 0 1 0 1 F G H A B C D
Selection and Ordering data	Order code
<b>Further designs</b> Please add <b>"-Z"</b> to Order No. and specify Order code(s). Total insertion length: enter the total insertion length in plain text description Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text Acceptance test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and ISO 9000 Inspection Certificate Type 3.1 per EN 10204 <b>Operating Instructions</b> Note: The Operating Instructions should be ordered as a separate line on the order. This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and manual library. <b>Accessories</b>	Y01 Y15 C11 C12 See page 5/33 See page 5/33



# Level Measurement

## Point level measurement - Capacitance switches

### Pointek CLS200 - Digital

#### Overview



Pointek CLS200 (digital version) is a versatile inverse frequency shift capacitance level switch with optional rod/cable choices and configurable output, ideal for detection of liquids, solids, slurries, foam and interfaces. The digital version includes PROFIBUS PA, an LCD display, and advanced diagnostic features.

#### Benefits

- Potted construction protects signal circuit from shock, vibration, humidity and/or condensation
- High chemical resistance
- Level detection independent of tank or pipe earth reference
- Insensitive to product buildup due to high frequency oscillation
- High sensitivity allows installation in a wide range of liquids, solids or slurry applications
- Integral LCD display allows for easy menu-driven setup
- PROFIBUS PA communication (SIMATIC PDM compatible)

#### Application

Pointek CLS200 digital version provides an integral LCD display for stand-alone use, and also provides PROFIBUS PA communication (Profile version 3.0, Class B) for connection to a network.

The power supply is galvanically isolated and accepts a wide range of voltages (12 to 30 V DC). When used with thermal isolator, the stainless steel and PPS (PVDF optional) materials used in the probe construction provide a temperature rating up to +125 °C (+257 °F) on the process wetted portion of the probe. The switch responds to any material with a dielectric constant of 1.5 or more by detecting a change in oscillating frequency, and it can be set to detect before contact or on contact with the probe. The menu-driven setup allows precise control of the switch point signal damping and alarm functions.

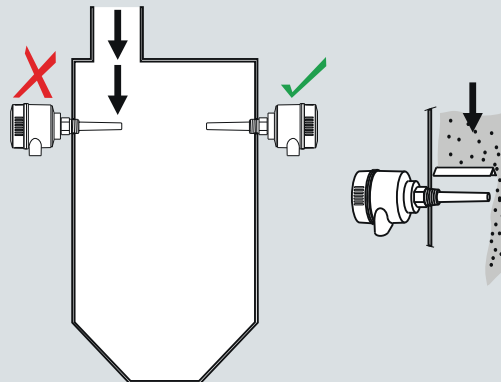
When connected to the PROFIBUS network, advanced diagnostics and set up using SIMATIC PDM are possible.

The CLS200 operates independently of the tank wall or pipe so it does not require an external reference electrode for level detection in a non-conductive vessel such as concrete or plastic (EMC regulations applicable in some regions).

- Key Applications: liquids, slurries, powders, granules, pressurized applications, hazardous areas

#### Configuration

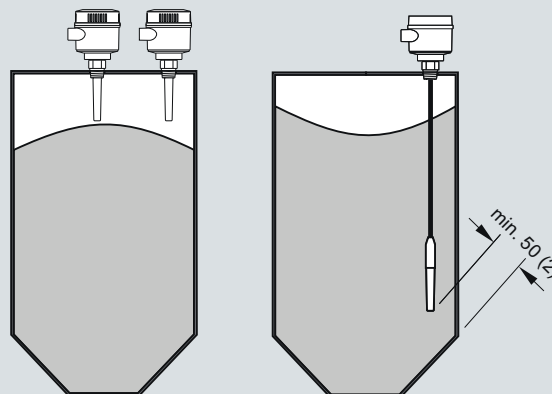
##### Installation



Keep unit out of path of falling material, or protect probe from falling material.



Avoid areas where material build up occurs.



Install probe at least 50 (2") mm from tank wall.

Pointek CLS200 installation, dimensions in mm (inch)

# Level Measurement

## Point level measurement - Capacitance switches

Pointek CLS200 - Digital

### Technical specifications

<b>Mode of operation</b>	
Measuring principle	Inverse frequency shift capacitive level detection
<b>Input</b>	
Measured variable	Change in picoFarad (pF)
<b>Output</b>	
Output signal	
• Solid-state output	
- Output	Galvanically isolated
- Protection	Against reversed polarity (bipolar)
- Max. switching voltage	• 30 V (DC) • 30 V peak (AC)
- Max. load current	82 mA
- Voltage drop	< 1 V, typical at 50 mA
- Time delay (ON and/or OFF)	Programmable by user (0 ... 100 s)
• Fail-safe mode	Min. or max
• Connection	Removable terminal block
<b>Rated operating conditions</b> <sup>1)</sup>	
Installation conditions	
• Location	Indoor/outdoor
Ambient conditions	
• Ambient temperature	-40 ... +85 °C (-40 ... +185 °F) <sup>2)</sup>
• Installation category	II
• Pollution degree	4
Medium conditions	Liquids, bulk solids, slurries and interfaces
• Relative dielectric constant $\epsilon_r$	Min. 1.5
• Process temperature	
- Without thermal isolator	-40 ... +85 °C (-40 ... +185 °F) <sup>2)</sup>
- With thermal isolator	-40 ... +125 °C (-40 ... +257 °F)
• Process pressure (rod version)	-1 ... +25 bar g (-14.6 ... +365 psi g) (nominal)
• Process pressure (cable version) <sup>3)</sup>	-1 ... +10 bar g (-14.6 ... +150 psi g) (nominal)
• Process pressure (sliding coupling version)	-1 ... +10 bar g (-14.6 ... +150 psi g) (nominal)
<b>Design</b>	
Material	
• Enclosure	Epoxy-coated aluminum with gasket
• Optional thermal isolator	316L stainless steel
Connection	Removable terminal block, max. 2.5 mm <sup>2</sup>
Degree of protection	IP65/Type 4/NEMA 4 (optional IP68)
Cable inlet	2 x M20x1.5 thread (option: 2 x 1/2" NPT conduit entry including 1 plugged entry)
Electromagnetic Compatibility	To comply with CE EMC regulations (where applicable); the CLS200 should only be used under these conditions: <ul style="list-style-type: none"> <li>- Installed in a metallic vessel</li> <li>- Wired with shielded cable</li> <li>- Cable shields are terminated in suitable EMC rated cable glands at the device cable entry point.</li> </ul>

<b>Power supply</b>	
Bus voltage	Standard: 12 ... 30 V DC Intrinsically Safe: 12 ... 24 V DC
Current consumption	12.5 mA
<b>Certificates and approvals</b>	
General Purpose	CSA, FM, CE, C-TICK
Dust Ignition Proof	ATEX II 1/2 D T100 °C
Dust Ignition Proof with IS Probe	CSA/FM Class II, Div. 1, Gr. E, F, G CSA/FM Class III T4
Flameproof Enclosure with IS Probe	ATEX II 1/2 G EEx d[ia] IIC T6...T4 ATEX II 1/2 D T100 °C
Explosion Proof with IS Probe	CSA/FM Class I, Div. 1, Gr. A, B, C, D CSA/FM Class II, Div. 1, Gr. E, F, G CSA/FM Class III T4
Intrinsically Safe <sup>4)</sup>	ATEX II 1 G EEx ia IIC T6 ... T4 ATEX II 1/2 D IP6X T100 °C CSA/FM Class I, Div. 1, Gr. A, B, C, D CSA/FM Class II, Div. 1, Gr. E, F, G CSA/FM Class III T4
Non-incendive	CSA/FM Class I, Div. 2, Gr. A, B, C, D CSA/FM Class II, Div. 2, Gr. F, G CSA/FM Class III T4 or T6
Non-Sparking	ATEX II 3 G Ex nA II T6...T4 ATEX II 2 D IP6X T100 °C
Marine	Lloyds Register of Shipping, Categories ENV1, ENV2 and ENV5
Others	Pattern Approval (China)
<b>Communication</b>	
PROFIBUS PA (IEC 61158 CPF3 CP3/2) Bus physical layer: IEC 61158-2 MBP (IS) Device profile: PROFIBUS PA profile for Process Control Devices Version 3.0, Class B FISCO field device	

<sup>1)</sup> When operation is in areas classified as hazardous, observe restrictions according to relevant certificate.  
See also Pressure/Temperature curves on page 5/34.

<sup>2)</sup> Thermal isolator is used if process connection temperature exceeds +85 °C (+185 °F)

<sup>3)</sup> Pressure rating of process seal is temperature dependent.  
See Pressure/Temperature curves on page 5/34.

<sup>4)</sup> Barrier or Intrinsically safe power supply required for Intrinsically Safe protection

# Level Measurement

## Point level measurement - Capacitance switches

### Pointek CLS200 - Digital

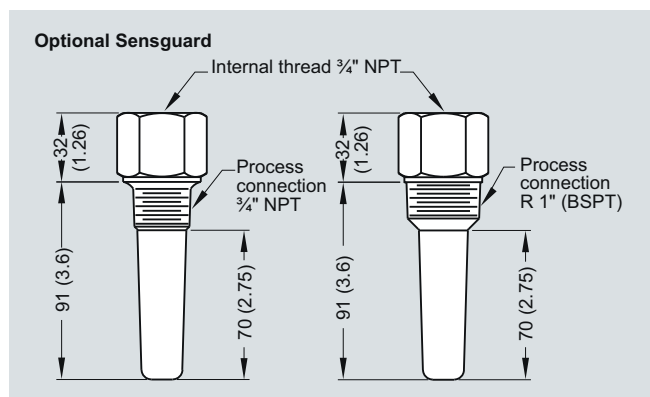
Design: Probe	Rod version	Sanitary version	Cable version	Sliding Coupling version
Max. length	5500 mm (216.53")	5500 mm (216.53")	30000 mm (1181.1") liquids and slurries 5000 mm (196.85") solids (under loads)	5500 mm (216.53")
Process connection	R ¾", 1", 1¼", 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] ¾", 1", 1¼", 1½" NPT [(Taper), ANSI/ASME B1.20.1] G ¾", 1", 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] 316L stainless steel ASME/EN flange	1½", 2" sanitary fitting clamp 316L stainless steel	R ¾", 1", 1¼", 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] ¾", 1", 1¼", 1½" NPT [(Taper), ANSI/ASME B1.20.1] G ¾", 1", 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] 316L stainless steel ASME/EN flange	R ¾", 1", 1¼", 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] ¾", 1", 1¼", 1½" NPT [(Taper), ANSI/ASME B1.20.1] G ¾", 1", 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]
Extension material	316L stainless steel optional PFA coated <sup>1)</sup>	316L stainless steel	Fluoroethylene propylene (FEP) cable with stainless steel core	316L stainless steel
Sensor wetted parts	PPS (optional PVDF)	PPS (optional PVDF)	PPS (optional PVDF)	PPS (optional PVDF)
O-ring seal material	FKM (optional FFKM) <sup>2)</sup>	FKM (optional FFKM) <sup>2)</sup>	FKM (optional FFKM) <sup>2)</sup>	FKM (optional FFKM) <sup>2)</sup>
Thermal isolator <sup>3)</sup>	Optional	Optional	Optional	Optional
Extension	User selected length	User selected length	Cable extension	User selected length

<sup>1)</sup> PFA coating (7ML5634 and 7ML5644) has 120 micron thickness

<sup>2)</sup> For Caustic Materials please contact [nacc.smpi@siemens.com](mailto:nacc.smpi@siemens.com) for alternative O-rings

<sup>3)</sup> Thermal isolator is used if process connection temperature exceeds +85 °C (+185 °F).

### Options



Optional Sensguard, dimensions in mm (inch)

# Level Measurement

## Point level measurement - Capacitance switches

Pointek CLS200 - Digital

Selection and Ordering data	Order No.	Selection and Ordering data	Order No.
<b>Pointek CLS200 - Digital - Rod with Threaded or Flanged process connection</b>	<b>7 ML 5 6 4 0 -</b>	<b>Pointek CLS200 - Digital - Rod with Threaded or Flanged process connection</b>	<b>7 ML 5 6 4 0 -</b>
Versatile inverse frequency shift capacitance level switch with optional process connection choices and configurable output, ideal for detection of liquids, solids, slurries, foam and interfaces	■ ■ ■ ■ ■ - ■ ■ ■ ■ ■ 0	Versatile inverse frequency shift capacitance level switch with optional process connection choices and configurable output, ideal for detection of liquids, solids, slurries, foam and interfaces	■ ■ ■ ■ ■ - ■ ■ ■ ■ ■ 0
<b>Process Connection</b> <u>Threaded, 316L stainless steel</u>		<b>Process Connection</b> <u>Threaded, 316L stainless steel</u>	
¾" NPT [(Taper), ANSI/ASME B1.20.1]	0 A	Extended rod, 200 ... 1000 mm (7.87 ... 39.37")	M
1" NPT [(Taper), ANSI/ASME B1.20.1]	0 B	Extended rod, 1001 ... 2000 mm (39.41 ... 78.74")	N
1¼" NPT [(Taper), ANSI/ASME B1.20.1]	0 C	Extended rod, 2001 ... 3000 mm (78.78 ... 118.11")	P
1½" NPT [(Taper), ANSI/ASME B1.20.1]	0 D	Extended rod, 3001 ... 4000 mm (118.15 ... 157.48")	Q
R ¾" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1 A	Extended rod, 4001 ... 5000 mm (157.52 ... 196.85")	R
R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1 B	Extended rod, 5001 ... 5500 mm (196.89 ... 216.53")	S
R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1 D		
G ¾" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3 A	<b>Thermal Isolator</b>	
G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3 B	Without thermal isolator	0
G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3 D	With thermal isolator [for process connection temperatures over +85 °C (+185 °F)]	1
<u>Welded flange, 316L stainless steel, raised face</u>		<b>Remote mount electronics and mounting bracket</b>	
1" ASME, 150 lb	5 A	With 2 m (79") of cable	2
1" ASME, 300 lb	5 B	With 5 m (197") of cable	3
1" ASME, 600 lb	5 C		
1½" ASME, 150 lb	5 D	<b>Wetted Seals</b>	
1½" ASME, 300 lb	5 E	FKM	0
1½" ASME, 600 lb	5 F	FFKM [for process temperatures above -20 °C (-4 °F)]	1
2" ASME, 150 lb	5 G		
2" ASME, 300 lb	5 H	<b>Probe Material</b>	
2" ASME, 600 lb	5 J	316L Stainless Steel with PPS probe body	0
3" ASME, 150 lb	5 K	316L Stainless Steel with PVDF probe body	1
3" ASME, 300 lb	5 L		
3" ASME, 600 lb	5 M	<b>Approvals</b>	
4" ASME, 150 lb	5 N	Non-Sparking:	B
4" ASME, 300 lb	5 P	CE, C-TICK, ATEX II 3 G Ex nA II T6...T4, ATEX II 2 D IP6X T100 °C	C
4" ASME, 600 lb	5 Q	Dust Ignition Proof:	D
<u>Welded flange, 316L stainless steel, Type A flat faced</u>		CE, C-TICK, ATEX II 1/2 D T100 °C	E
DN 25, PN 16	6 A	Intrinsically Safe: <sup>1)</sup>	F
DN 25, PN 40	6 B	CE, C-TICK, ATEX II 1 G EEx ia IIC T6...T4, ATEX II 1/2 D IP6X T100 °C	G
DN 40, PN 16	6 C	Flameproof Enclosure with IS Probe:	H
DN 40, PN 40	6 D	CE, C-TICK, ATEX II 1/2 G EEx d[ia] IIC T6...T4, ATEX II 1/2 D T100 °C	J
DN 50, PN 16	6 E	Non-incendive:	K
DN 50, PN 40	6 F	CSA/FM Class I, Div. 2, Gr. A, B, C, D	L
DN 80, PN 16	6 G	CSA/FM Class II, Div. 2, Gr. F, G	
DN 80, PN 40	6 H	CSA/FM Class III T4 or T6	
DN 100, PN 16	6 J	Dust Ignition Proof with IS Probe:	
DN 100, PN 40	6 K	CSA/FM Class II, Div. 1, Gr. E, F, G	
		CSA/FM Class III T4	
(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)		Intrinsically Safe: <sup>1)</sup>	
<b>Probe length (length from flange face) (threaded lengths include process thread)</b>		CSA/FM Class I, Div. 1, Gr. A, B, C, D	
<u>Note: No Y01 needed in order code for standard lengths</u>		CSA/FM Class II, Div. 1, Gr. E, F, G	
CSA/FM Class III T4		Explosion Proof with IS Probe:	
Compact [threaded 120 mm (4.72"), Flanged 98 mm (3.86")]	A	CSA/FM Class I, Div. 1, Gr. A, B, C, D	
Extended rod, 250 mm (9.84")	B	CSA/FM Class II, Div. 1, Gr. E, F, G	
Extended rod, 350 mm (13.78")	C	CSA/FM Class III T4	
Extended rod, 500 mm (19.69")	D	General Purpose (CSA, FM)	K
Extended rod, 750 mm (29.53")	E	General Purpose (CE, C-TICK)	L
Extended rod, 1000 mm (39.37")	F		
Extended rod, 1250 mm (49.21")	G	<b>Enclosure and Lid</b>	
Extended rod, 1350 mm (53.15")	H	<u>Aluminum epoxy coated</u>	
Extended rod, 1500 mm (59.06")	J	2 x ½" NPT via adapter - cable inlet, IP65	A
Extended rod, 1750 mm (68.90")	K	2 x M20x1.5 cable inlet, IP65	B
Extended rod, 2000 mm (78.74")	L	2 x ½" NPT via adapter - cable inlet, IP68	C
		2 x M20x1.5 cable inlet, IP68	D

<sup>1)</sup> Barrier or Intrinsically safe power supply required for Intrinsically Safe protection

C) Subject to export regulations AL: N, ECCN: EAR99

# Level Measurement

## Point level measurement - Capacitance switches

### Pointek CLS200 - Digital

Selection and Ordering data	Order code	Selection and Ordering data	Order No.
<b>Further designs</b>		<b>Pointek CLS200 - Digital - Cable with Threaded or Flanged process connection</b> C)	<b>7 M L 5 6 4 1 -</b>
Please add <b>"-Z"</b> to Order No. and specify Order code(s).		Versatile inverse frequency shift capacitance level switch with optional process connection choices and configurable output, ideal for detection of liquids, solids, slurries, foam and interfaces	<b>0</b>
Total insertion length: enter the total insertion length in plain text description	<b>Y01</b>	<b>Process Connection</b>	
Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text	<b>Y15</b>	<u>Threaded, 316L stainless steel</u>	
Acceptance test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and ISO 9000	<b>C11</b>	¾" NPT [(Taper), ANSI/ASME B1.20.1]	<b>0 A</b>
Inspection Certificate Type 3.1 per EN 10204	<b>C12</b>	1" NPT [(Taper), ANSI/ASME B1.20.1]	<b>0 B</b>
<b>Operating Instructions</b>		1¼" NPT [(Taper), ANSI/ASME B1.20.1]	<b>0 C</b>
Note: The Operating Instructions should be ordered as a separate line on the order.	<b>See page 5/33</b>	1½" NPT [(Taper), ANSI/ASME B1.20.1]	<b>0 D</b>
This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and manual library.		R ¾" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	<b>1 A</b>
<b>Accessories</b>	<b>See page 5/33</b>	R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	<b>1 B</b>
		R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	<b>1 D</b>
		G ¾" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	<b>3 A</b>
		G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	<b>3 B</b>
		G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	<b>3 D</b>
		<u>Welded flange, 316L stainless steel, raised face</u>	
		1" ASME, 150 lb	<b>5 A</b>
		1" ASME, 300 lb	<b>5 B</b>
		1" ASME, 600 lb	<b>5 C</b>
		1½" ASME, 150 lb	<b>5 D</b>
		1½" ASME, 300 lb	<b>5 E</b>
		1½" ASME, 600 lb	<b>5 F</b>
		2" ASME, 150 lb	<b>5 G</b>
		2" ASME, 300 lb	<b>5 H</b>
		2" ASME, 600 lb	<b>5 J</b>
		3" ASME, 150 lb	<b>5 K</b>
		3" ASME, 300 lb	<b>5 L</b>
		3" ASME, 600 lb	<b>5 M</b>
		4" ASME, 150 lb	<b>5 N</b>
		4" ASME, 300 lb	<b>5 P</b>
		4" ASME, 600 lb	<b>5 Q</b>
		<u>Welded flange, 316L stainless steel, Type A flat faced</u>	
		DN 25, PN 16	<b>6 A</b>
		DN 25, PN 40	<b>6 B</b>
		DN 40, PN 16	<b>6 C</b>
		DN 40, PN 40	<b>6 D</b>
		DN 50, PN 16	<b>6 E</b>
		DN 50, PN 40	<b>6 F</b>
		DN 80, PN 16	<b>6 G</b>
		DN 80, PN 40	<b>6 H</b>
		DN 100, PN 16	<b>6 J</b>
		DN 100, PN 40	<b>6 K</b>
		(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)	
		<b>Probe length</b> (length from flange face) (threaded lengths include process thread)	
		<u>Note: No Y01 needed in order code for standard lengths</u>	
		Extended cable, 3000 mm (118.11"), length can be determined by customer on assembly	<b>A</b>
		Extended cable, 6000 mm (236.22"), length can be determined by customer on assembly	<b>B</b>
		<u>Add order code Y01 and plain text:</u> "Insertion length ... mm"	
		Extended cable, 500 ... 5000 mm (19.69 ... 196.85")	<b>C</b>
		Extended cable, 5001 ... 10000 mm (196.89 ... 393.70")	<b>D</b>
		Extended cable, 10001 ... 15000 mm (393.74 ... 590.55")	<b>E</b>
		Extended cable, 15001 ... 20000 mm (590.59 ... 787.4")	<b>F</b>
		Extended cable, 20001 ... 25000 mm (787.44 ... 984.25")	<b>G</b>
		Extended cable, 25001 ... 30000 mm (984.29 ... 1181.1")	<b>H</b>



# Level Measurement

## Point level measurement - Capacitance switches

Pointek CLS200 - Digital

Selection and Ordering data	Order No.	Selection and Ordering data	Order code
<b>Pointek CLS200 - Digital - Cable with Threaded or Flanged process connection</b> Versatile inverse frequency shift capacitance level switch with optional process connection choices and configurable output, ideal for detection of liquids, solids, slurries, foam and interfaces	<b>7ML5641-</b> 	<b>Further designs</b> Please add <b>"-Z"</b> to Order No. and specify Order code(s).  Total insertion length: enter the total insertion length in plain text description  Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text  Acceptance test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and ISO 9000  Inspection Certificate Type 3.1 per EN 10204	
<b>Thermal Isolator</b> Without thermal isolator With thermal isolator [for process connection temperatures over +85 °C (+185 °F)]	0 1	<b>Operating Instructions</b> Note: The Operating Instructions should be ordered as a separate line on the order. This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and manual library.	Y01  Y15  C11  C12
<b>Remote mount electronics and mounting bracket</b> With 2 m (79") of cable With 5 m (197") of cable	2 3		
<b>Wetted Seals</b> FKM and PTFE FFKM and PTFE [for process temperatures above -20°C (-4°F)]	0 1		See page 5/33
<b>Probe Material</b> FEP jacketed cable with PPS probe body FEP jacketed cable with PVDF probe body	0 1		See page 5/33
<b>Approvals</b> Non-Sparking: CE, C-TICK, ATEX II 3 G Ex nA II T6...T4, ATEX II 2 D IP6X T100 °C  Dust Ignition Proof: CE, C-TICK, ATEX II 1/2 D T100 °C  Intrinsically Safe: <sup>1)</sup> CE, C-TICK, ATEX II 1 G EEx ia IIC T6...T4, ATEX II 1/2 D IP6X T100 °C  Flameproof Enclosure with IS Probe: CE, C-TICK, ATEX II 1/2 G EEx d[ia] IIC T6...T4, ATEX II 1/2 D T100 °C  Non-incendive: CSA/FM Class I, Div. 2, Gr. A, B, C, D CSA/FM Class II, Div. 2, Gr. F, G CSA/FM Class III T4 or T6  Dust Ignition Proof with IS Probe: CSA/FM Class II, Div. 1, Gr. E, F, G CSA/FM Class III T4  Intrinsically Safe: <sup>1)</sup> CSA/FM Class I, Div. 1, Gr. A, B, C, D CSA/FM Class II, Div. 1, Gr. E, F, G CSA/FM Class III T4  Explosion Proof with IS Probe: CSA/FM Class I, Div. 1, Gr. A, B, C, D CSA/FM Class II, Div. 1, Gr. E, F, G CSA/FM Class III T4  General Purpose (CSA, FM) General Purpose (CE, C-TICK)	B  C  D  E  F  G  H  J  K  L		
<b>Enclosure and Lid</b> <u>Aluminum epoxy coated</u> 2 x 1/2" NPT via adapter - cable inlet, IP65 2 x M20x1.5 cable inlet, IP65 2 x 1/2" NPT via adapter - cable inlet, IP68 2 x M20x1.5 cable inlet, IP68	A B C D		

<sup>1)</sup> Barrier or Intrinsically safe power supply required for Intrinsically Safe protection

C) Subject to export regulations AL: N, ECCN: EAR99

# Level Measurement

## Point level measurement - Capacitance switches

### Pointek CLS200 - Digital

Selection and Ordering data	Order No.
<b>Pointek CLS200 - Digital - Rod with Sanitary process connection</b> Versatile inverse frequency shift capacitance level switch with optional process connection choices and configurable output, ideal for detection of liquids, solids, slurries, foam and interfaces	C) 7 M L 5 6 4 2 - 0
<b>Process Connection</b> <u>Sanitary 316L stainless steel</u>	
1" sanitary fitting clamp	8 A
1½" sanitary fitting clamp	8 B
2" sanitary fitting clamp	8 C
2½" sanitary fitting clamp	8 D
3" sanitary fitting clamp (Note: Sanitary connection dimensionally corresponds to the applicable ISO 2852 standard)	8 E
<b>Probe length (length from process connection face)</b> <u>Note: No Y01 needed in order code for standard lengths</u>	
Compact 98 mm (3.86")	A
Extended rod, 250 mm (9.84")	B
Extended rod, 350 mm (13.78")	C
Extended rod, 500 mm (19.69")	D
Extended rod, 750 mm (29.53")	E
Extended rod, 1000 mm (39.37")	F
Extended rod, 1250 mm (49.21")	G
Extended rod, 1350 mm (53.15")	H
Extended rod, 1500 mm (59.06")	J
Extended rod, 1750 mm (68.90")	K
Extended rod, 2000 mm (78.74")	L
<u>Add order code Y01 and plain text: "Insertion length ... mm"</u>	
Extended rod, 110 ... 350 mm (4.3 ... 13.78")	M
Extended rod, 351 ... 1000 mm (13.82 ... 39.33")	N
Extended rod, 1001 ... 2000 mm (39.41 ... 78.74")	P
Extended rod, 2001 ... 3000 mm (78.78 ... 118.11")	Q
Extended rod, 3001 ... 4000 mm (118.15 ... 157.48")	R
Extended rod, 4001 ... 5000 mm (157.52 ... 196.85")	S
Extended rod, 5001 ... 5500 mm (196.89 ... 216.53")	T
<b>Thermal Isolator</b>	
Without thermal isolator	0
With thermal isolator [for process connection temperatures over +85 °C (+185 °F)]	1
<b>Remote mount electronics and mounting bracket</b>	
With 2 m (79") of cable	2
With 5 m (197") of cable	3
<b>Wetted Seals</b>	
FKM	0
FFKM [for process temperatures above -20°C (-4°F)]	1
<b>Probe Material</b>	
316L Stainless Steel with PPS probe body	0
316L Stainless Steel with PVDF probe body	1
<b>Approvals</b>	
Non-Sparking: CE, C-TICK, ATEX II 3 G Ex nA II T6...T4, ATEX II 2 D IP6X T100 °C	B
Dust Ignition Proof: CE, C-TICK, ATEX II 1/2 D T100 °C	C
Intrinsically Safe: <sup>1)</sup> CE, C-TICK, ATEX II 1 G EEx ia IIC T6...T4, ATEX II 1/2 D IP6X T100 °C	D
Flameproof Enclosure with IS Probe: CE, C-TICK, ATEX II 1/2 G EEx d[ia] IIC T6...T4, ATEX II 1/2 D T100 °C	E
Non-incendive: CSA/FM Class I, Div. 2, Gr. A, B, C, D CSA/FM Class II, Div. 2, Gr. F, G CSA/FM Class III T4 or T6	F
Dust Ignition Proof with IS Probe: CSA/FM Class II, Div. 1, Gr. E, F, G CSA/FM Class III T4	G

Selection and Ordering data	Order No.
<b>Pointek CLS200 - Digital - Rod with Sanitary process connection</b> Versatile inverse frequency shift capacitance level switch with optional process connection choices and configurable output, ideal for detection of liquids, solids, slurries, foam and interfaces	C) 7 M L 5 6 4 2 - 0
Intrinsically Safe: <sup>1)</sup> CSA/FM Class I, Div. 1, Gr. A, B, C, D CSA/FM Class II, Div. 1, Gr. E, F, G CSA/FM Class III T4	H
Explosion Proof with IS Probe: CSA/FM Class I, Div. 1, Gr. A, B, C, D CSA/FM Class II, Div. 1, Gr. E, F, G CSA/FM Class III T4	J
General Purpose (CSA, FM)	K
General Purpose (CE, C-TICK)	L
<b>Enclosure and Lid</b> <u>Aluminum epoxy coated</u>	
2 x ½" NPT via adapter - cable inlet, IP65	A
2 x M20x1.5 cable inlet, IP65	B
2 x ½" NPT via adapter - cable inlet, IP68	C
2 x M20x1.5 cable inlet, IP68	D
<sup>1)</sup> Barrier or Intrinsically safe power supply required for Intrinsically Safe protection	
C) Subject to export regulations AL: N, ECCN: EAR99	

Selection and Ordering data	Order code
<b>Further designs</b>	
Please add <b>"-Z"</b> to Order No. and specify Order code(s).	
Total insertion length: enter the total insertion length in plain text description	<b>Y01</b>
Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text	<b>Y15</b>
Acceptance test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and ISO 9000	<b>C11</b>
Inspection Certificate Type 3.1 per EN 10204	<b>C12</b>
<b>Operating Instructions</b>	
Note: The Operating Instructions should be ordered as a separate line on the order. This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and manual library.	<b>See page 5/33</b>
<b>Accessories</b>	<b>See page 5/33</b>

# Level Measurement

## Point level measurement - Capacitance switches

Pointek CLS200 - Digital

Selection and Ordering data	Order No.
<b>Pointek CLS200 - Digital - Rod with Sliding coupling with Threaded process connection</b>	C) 7 ML 5 6 4 3 - 0
Versatile inverse frequency shift capacitance level switch with optional process connection choices and configurable output, ideal for detection of liquids, solids, slurries, foam and interfaces	
<b>Process Connection</b> <u>Threaded, 316L stainless steel</u>	
3/4" NPT [(Taper), ANSI/ASME B1.20.1]	0 A
1" NPT [(Taper), ANSI/ASME B1.20.1]	0 B
1 1/4" NPT [(Taper), ANSI/ASME B1.20.1]	0 C
1 1/2" NPT [(Taper), ANSI/ASME B1.20.1]	0 D
R 3/4" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1 A
R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1 B
R 1 1/2" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1 D
G 3/4" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3 A
G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3 B
G 1 1/2" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3 D
<b>Probe length</b> (length from flange face) (threaded lengths include process thread)	
<u>Note: No Y01 needed in order code for standard lengths</u>	
Extended rod, 350 mm (13.78")	C
Extended rod, 500 mm (19.69")	D
Extended rod, 750 mm (29.53")	E
Extended rod, 1000 mm (39.37")	F
Extended rod, 1250 mm (49.21")	G
Extended rod, 1350 mm (53.15")	H
Extended rod, 1500 mm (59.06")	J
Extended rod, 1750 mm (68.90")	K
Extended rod, 2000 mm (78.74")	L
Add order code Y01 and plain text: <u>"Insertion length ... mm"</u>	
Extended rod, 350 ... 1000 mm (13.82 ... 39.33")	M
Extended rod, 1001 ... 2000 mm (39.41 ... 78.74")	N
Extended rod, 2001 ... 3000 mm (78.78 ... 118.11")	P
Extended rod, 3001 ... 4000 mm (118.15 ... 157.48")	Q
Extended rod, 4001 ... 5000 mm (157.52 ... 196.85")	R
Extended rod, 5001 ... 5500 mm (196.89 ... 216.53")	S
<b>Thermal Isolator</b>	
Without thermal isolator	0
With thermal isolator [for process connection temperatures over +85 °C (+185 °F)]	1
<b>Remote mount electronics and mounting bracket</b>	
With 2 m (79") of cable	2
With 5 m (197") of cable	3
<b>Wetted Seals</b>	
FKM and PTFE	0
FFKM and PTFE [for process temperatures above -20°C (-4°F)]	1
<b>Probe Material</b>	
316L Stainless Steel with PPS probe body	0
316L Stainless Steel with PVDF probe body	1
<b>Approvals</b>	
Non-Sparking:	
CE, C-TICK, ATEX II 3 G Ex nA II T6...T4, ATEX II 2 D IP6X T100 °C	B
Dust Ignition Proof:	
CE, C-TICK, ATEX II 1/2 D T100 °C	C
Intrinsically Safe: <sup>1)</sup>	
CE, C-TICK, ATEX II 1 G EEx ia IIC T6...T4, ATEX II 1/2 D IP6X T100 °C	D
Flameproof Enclosure with IS Probe:	
CE, C-TICK, ATEX II 1/2 G EEx d[ia] IIC T6...T4, ATEX II 1/2 D T100 °C	E
Non-incendive:	
CSA/FM Class I, Div. 2, Gr. A, B, C, D	F
CSA/FM Class II, Div. 2, Gr. F, G	
CSA/FM Class III T4 or T6	

Selection and Ordering data	Order No.
<b>Pointek CLS200 - Digital - Rod with Sliding coupling with Threaded process connection</b>	C) 7 ML 5 6 4 3 - 0
Versatile inverse frequency shift capacitance level switch with optional process connection choices and configurable output, ideal for detection of liquids, solids, slurries, foam and interfaces	
Dust Ignition Proof with IS Probe: CSA/FM Class II, Div. 1, Gr. E, F, G CSA/FM Class III T4	G
Intrinsically Safe: <sup>1)</sup> CSA/FM Class I, Div. 1, Gr. A, B, C, D CSA/FM Class II, Div. 1, Gr. E, F, G CSA/FM Class III T4	H
Explosion Proof with IS Probe: CSA/FM Class I, Div. 1, Gr. A, B, C, D CSA/FM Class II, Div. 1, Gr. E, F, G CSA/FM Class III T4	J
General Purpose (CSA, FM)	K
General Purpose (CE, C-TICK)	L
<b>Enclosure and Lid</b> <u>Aluminum epoxy coated</u>	
2 x 1/2" NPT via adapter - cable inlet, IP65	A
2 x M20x1.5 cable inlet, IP65	B
2 x 1/2" NPT via adapter - cable inlet, IP68	C
2 x M20x1.5 cable inlet, IP68	D

<sup>1)</sup> Barrier or Intrinsically safe power supply required for Intrinsically Safe protection  
C) Subject to export regulations AL: N, ECCN: EAR99

Selection and Ordering data	Order code
<b>Further designs</b>	
Please add "-Z" to Order No. and specify Order code(s).	
Total insertion length: enter the total insertion length in plain text description	Y01
Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text	Y15
Acceptance test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and ISO 9000	C11
Inspection Certificate Type 3.1 per EN 10204	C12
<b>Operating Instructions</b>	
Note: The Operating Instructions should be ordered as a separate line on the order. This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and manual library.	See page 5/33
<b>Accessories</b>	See page 5/33

# Level Measurement

## Point level measurement - Capacitance switches

### Pointek CLS200 - Digital

Selection and Ordering data	Order No.
<b>Pointek CLS200 - Digital - PFA Rod with PFA Flanged process connection</b>	C) 7 ML 5 6 4 4 - 0
Versatile inverse frequency shift capacitance level switch with optional process connection choices and configurable output, ideal for detection of liquids, solids, slurries, foam and interfaces	
<b>Process Connection</b>	
<u>Welded flange, PFA coated, 316L stainless steel, raised face</u>	
1" ASME, 150 lb	5 A
1" ASME, 300 lb	5 B
1" ASME, 600 lb	5 C
1½" ASME, 150 lb	5 D
1½" ASME, 300 lb	5 E
1½" ASME, 600 lb	5 F
2" ASME, 150 lb	5 G
2" ASME, 300 lb	5 H
2" ASME, 600 lb	5 J
3" ASME, 150 lb	5 K
3" ASME, 300 lb	5 L
3" ASME, 600 lb	5 M
4" ASME, 150 lb	5 N
4" ASME, 300 lb	5 P
4" ASME, 600 lb	5 Q
<u>Welded flange, PFA coated, 316L stainless steel, Type A flat faced</u>	
DN 25, PN 16	6 A
DN 25, PN 40	6 B
DN 40, PN 16	6 C
DN 40, PN 40	6 D
DN 50, PN 16	6 E
DN 50, PN 40	6 F
DN 80, PN 16	6 G
DN 80, PN 40	6 H
DN 100, PN 16	6 J
DN 100, PN 40	6 K
(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)	
<b>Probe length (length from process connection face)</b>	
<u>Note: No Y01 needed in order code for standard lengths</u>	
Compact (Threaded 98 mm (3.86"))	A
Extended rod, 250 mm (9.84")	B
Extended rod, 350 mm (13.78")	C
Extended rod, 500 mm (19.69")	D
Extended rod, 750 mm (29.53")	E
Extended rod, 1000 mm (39.37")	F
Extended rod, 1250 mm (49.21")	G
Extended rod, 1350 mm (53.15")	H
Extended rod, 1500 mm (59.06")	J
Extended rod, 1750 mm (68.90")	K
Extended rod, 2000 mm (78.74")	L
<u>Add order code Y01 and plain text: "Insertion length ... mm"</u>	
Extended rod, 200 ... 1000 mm (7.87 ... 39.33")	M
Extended rod, 1001 ... 2000 mm (39.41 ... 78.74")	N
Extended rod, 2001 ... 3000 mm (78.78 ... 118.11")	P
Extended rod, 3001 ... 4000 mm (118.15 ... 157.48")	Q
Extended rod, 4001 ... 5000 mm (157.52 ... 196.85")	R
Extended rod, 5001 ... 5500 mm (196.89 ... 216.53")	S
<b>Thermal Isolator</b>	
Without thermal isolator	0
With thermal isolator [for process connection temperatures over +85 °C (+185 °F)]	1
<b>Remote mount electronics and mounting bracket</b>	
With 2 m (79") of cable	2
With 5 m (197") of cable	3

Selection and Ordering data	Order No.
<b>Pointek CLS200 - Digital - PFA Rod with PFA Flanged process connection</b>	C) 7 ML 5 6 4 4 - 0
Versatile inverse frequency shift capacitance level switch with optional process connection choices and configurable output, ideal for detection of liquids, solids, slurries, foam and interfaces	
<b>Wetted Seals</b>	
FKM	0
FFKM [for process temperatures above -20°C (-4°F)]	1
<b>Probe Material</b>	
PFA Coated 316L Stainless Steel with PPS probe body	0
PFA Coated 316L Stainless Steel with PVDF probe body	1
<b>Approvals</b>	
Non-incendive:	
CSA/FM Class I, Div. 2, Gr. A, B, C, D	F
CSA/FM Class II, Div. 2, Gr. F, G	
CSA/FM Class III T4 or T6	
Dust Ignition Proof with IS Probe:	
CSA/FM Class II, Div. 1, Gr. E, F, G	G
CSA/FM Class III T4	
Intrinsically Safe: <sup>1)</sup>	
CSA/FM Class I, Div. 1, Gr. A, B, C, D	H
CSA/FM Class II, Div. 1, Gr. E, F, G	
CSA/FM Class III T4	
Explosion Proof with IS Probe:	
CSA/FM Class I, Div. 1, Gr. A, B, C, D	J
CSA/FM Class II, Div. 1, Gr. E, F, G	
CSA/FM Class III T4	
General Purpose (CSA, FM)	K
<b>Enclosure and Lid</b>	
<u>Aluminum epoxy coated</u>	
2 x ½" NPT via adapter - cable inlet, IP65	A
2 x M20x1.5 cable inlet, IP65	B
2 x ½" NPT via adapter - cable inlet, IP68	C
2 x M20x1.5 cable inlet, IP68	D
1) Barrier or Intrinsically safe power supply required for Intrinsically Safe protection	
C) Subject to export regulations AL: N, ECCN: EAR99	

Selection and Ordering data	Order code
<b>Further designs</b>	
Please add "-Z" to Order No. and specify Order code(s).	
Total insertion length: enter the total insertion length in plain text description	Y01
Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text	Y15
Acceptance test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and ISO 9000	C11
Inspection Certificate Type 3.1 per EN 10204	C12
<b>Operating Instructions</b>	
Note: The Operating Instructions should be ordered as a separate line on the order. This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and manual library.	See page 5/33
<b>Accessories</b>	See page 5/33

# Level Measurement

## Point level measurement - Capacitance switches

Pointek CLS200 - Standard and Digital

Selection and Ordering data	Order code
<b>Operating Instructions - Standard</b>	
English	C) <b>7ML1998-5JH02</b>
German	C) <b>7ML1998-5JH32</b>
Note: The Operating Instructions should be ordered as a separate line on the order.	
Quick Start manual, multi-language	C) <b>7ML1998-5QY82</b>
This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	
<b>Operating Instructions - Digital</b>	
English	C) <b>7ML1998-5JJ02</b>
German	C) <b>7ML1998-5JJ32</b>
Note: The Operating Instructions should be ordered as a separate line on the order.	
Quick Start manual, multi-language	C) <b>7ML1998-5XA82</b>
This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	
<b>Accessories</b>	
Sensguard, ¾" NPT (PPS) Only available for CLS200 with ¾" NPT thread	<b>7ML1830-1DL</b>
Sensguard, R 1" (BSPT) (PPS) Only available for CLS200 with ¾" NPT thread	<b>7ML1830-1DM</b>
One metallic cable gland M20x1.5, -40 ... +80 °C (-40 ... +176 °F) with integrated shield connection (available for PROFIBUS PA)	<b>7ML1930-1AQ</b>
<b>General Purpose</b>	
1/2" NPT General Purpose Cable Entry IP68/IP69K NEMA6, -40 ... -100 °C (-40 ... -212 °F), cable size 6 ... 12 mm (0.236 ... 0.472")	C) <b>A5E03252530</b>
M20x1.5 General Purpose Cable Entry IP68/IP69K NEMA6, -40 ... -100 °C (-40 ... -212 °F), cable size 7 ... 12 mm (0.275 ... 0.472")	C) <b>A5E03252531</b>
<b>Hazardous Locations</b>	
1/2" NPT EMC rated Cable Gland: Dust Ignition Proof, Flameproof Exd, and Increased Safety ATEX II 2 GD ExtD A21 (Zone 1, Zone 2, Zone 21, Zone 22, and in Gas Groups IIA, IIB and IIC) -60 ... +80 °C IP66, IP67, IP68, NEMA4X, cable sizes 5.5 ... 12 mm (0.216 ... 0.472")	<b>A5E03252527</b>
M20 EMC rated Cable Gland: Dust Ignition Proof, Flameproof Exd, and Increased Safety ATEX II 2 GD ExtD A21 (Zone 1, Zone 2, Zone 21, Zone 22 and in Gas Groups IIA, IIB and IIC) -60 ... +80 °C IP66, IP67, IP68, NEMA4X, cable sizes 5.5 ... 12 mm (0.216 ... 0.472")	<b>A5E03252528</b>
<b>Blind threaded flanges are available. Please contact <a href="mailto:nacc.smpi@siemens.com">nacc.smpi@siemens.com</a> with a completed application data sheet on page 5/9</b>	
<b>Pointek Specials</b>	<b>See page 5/77</b>
C) Subject to export regulations AL: N, ECCN: EAR99	

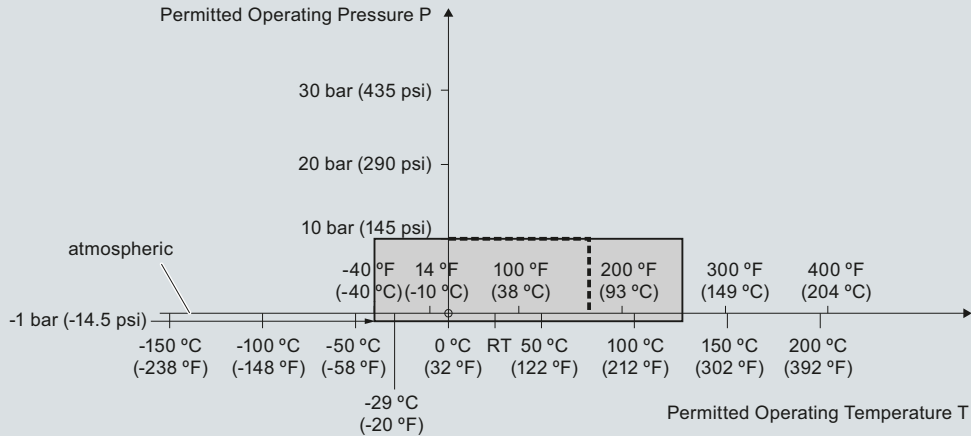
# Level Measurement

## Point level measurement - Capacitance switches

### Pointek CLS200 - Standard and Digital

#### Characteristic curves

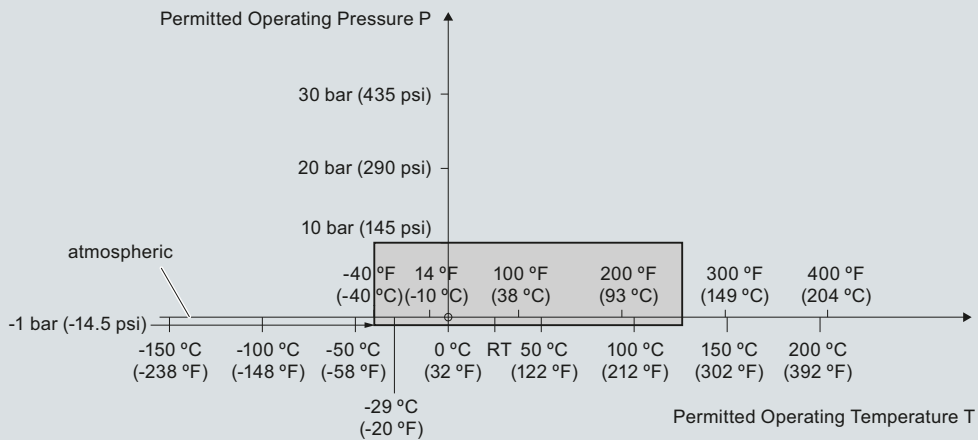
**Pressure/Temperature Curve**  
**CLS200 Sliding Coupling**  
**Threaded Process Connections**  
**(7ML5633 and 7ML5643)**



--- Example:  
 Permitted operating pressure = 10 bar (145 psi) at 75 °C

Pointek CLS200 Process Pressure/Temperature derating curves (7ML5633 and 7ML5643)

**Pressure/Temperature Curve**  
**CLS200 Cable**  
**Threaded Process Connections**  
**(7ML5631 and 7ML5641)**



Pointek CLS200 Process Pressure/Temperature derating curves (7ML5631 and 7ML5641)

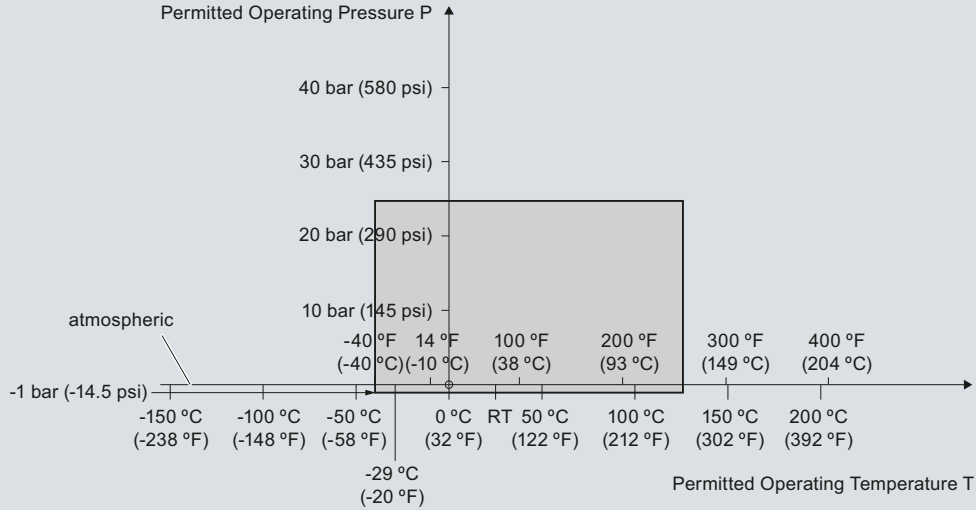
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# Level Measurement

## Point level measurement - Capacitance switches

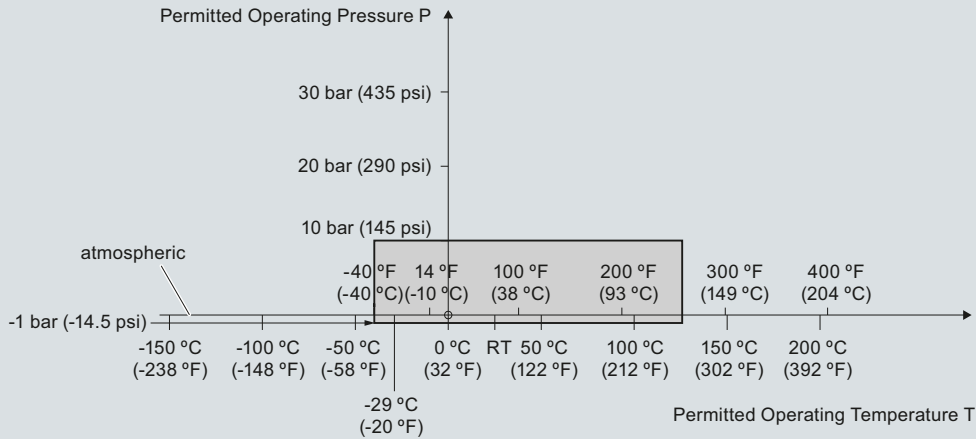
Pointek CLS200 - Standard and Digital

**Pressure/Temperature Curve**  
**CLS200 Compact and Extended Rod**  
**Threaded Process Connections**  
**(7ML5630 and 7ML5640)**



Pointek CLS200 Process Pressure/Temperature derating curves (7ML5630 or 7ML5640)

**Pressure/Temperature Curve**  
**CLS200 Compact and Extended Sanitary Type**  
**Sanitary Process Connections**  
**(7ML5632 and 7ML5642)**



Pointek CLS200 Process Pressure/Temperature derating curves (7ML5632 and 7ML5642)

5

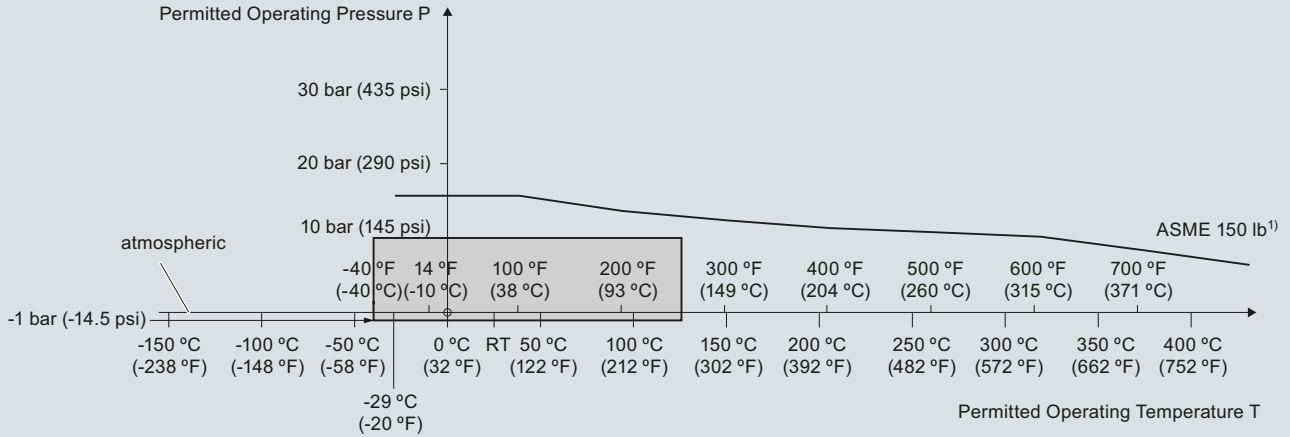


# Level Measurement

## Point level measurement - Capacitance switches

### Pointek CLS200 - Standard and Digital

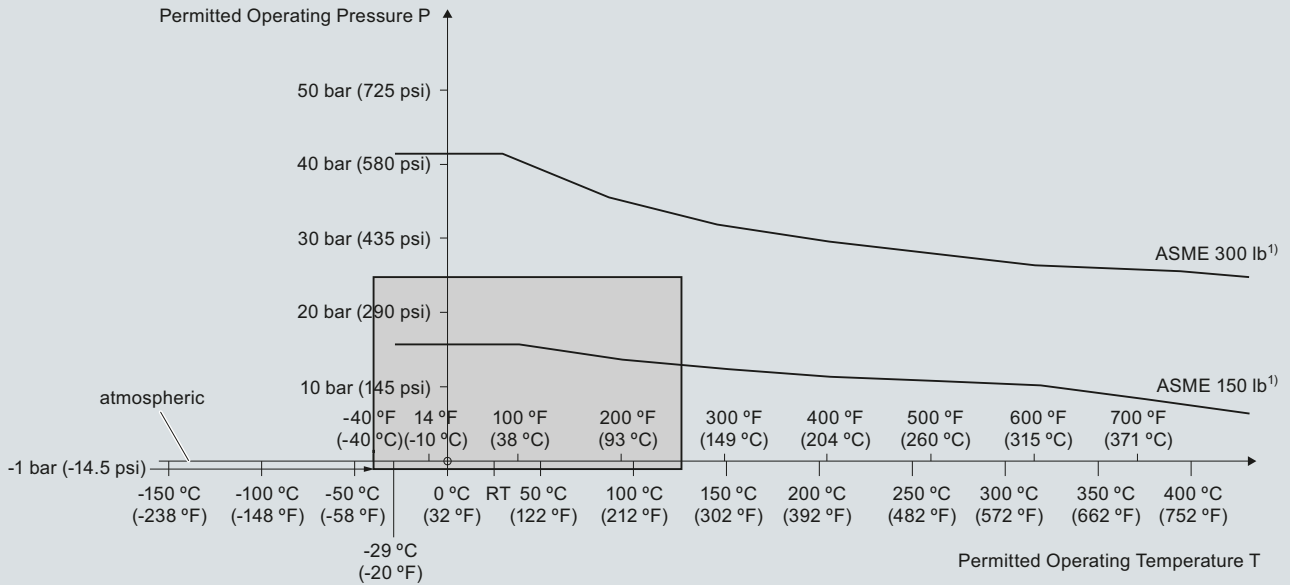
**Pressure/Temperature Curve**  
**CLS200 Cable**  
**ASME Flanged Process Connections**  
**(7ML5631 and 7ML5641)**



1) The curve denotes the minimum allowable flange class for the shaded area below.

Pointek CLS200 Process Pressure/Temperature derating curves (7ML5631 and 7ML5641)

**Pressure/Temperature Curve**  
**CLS200 Compact and Extended Rod**  
**ASME Flanged Process Connections**  
**(7ML5630 and 7ML5640)**



1) The curve denotes the minimum allowable flange class for the shaded area below.

Pointek CLS200 Process Pressure/Temperature derating curves (7ML5630 and 7ML5640)

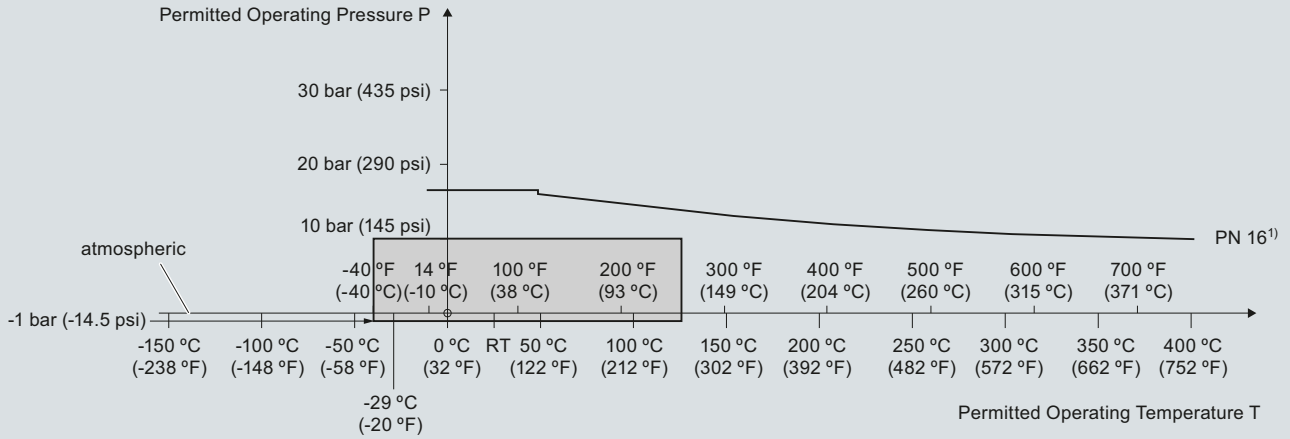
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# Level Measurement

## Point level measurement - Capacitance switches

Pointek CLS200 - Standard and Digital

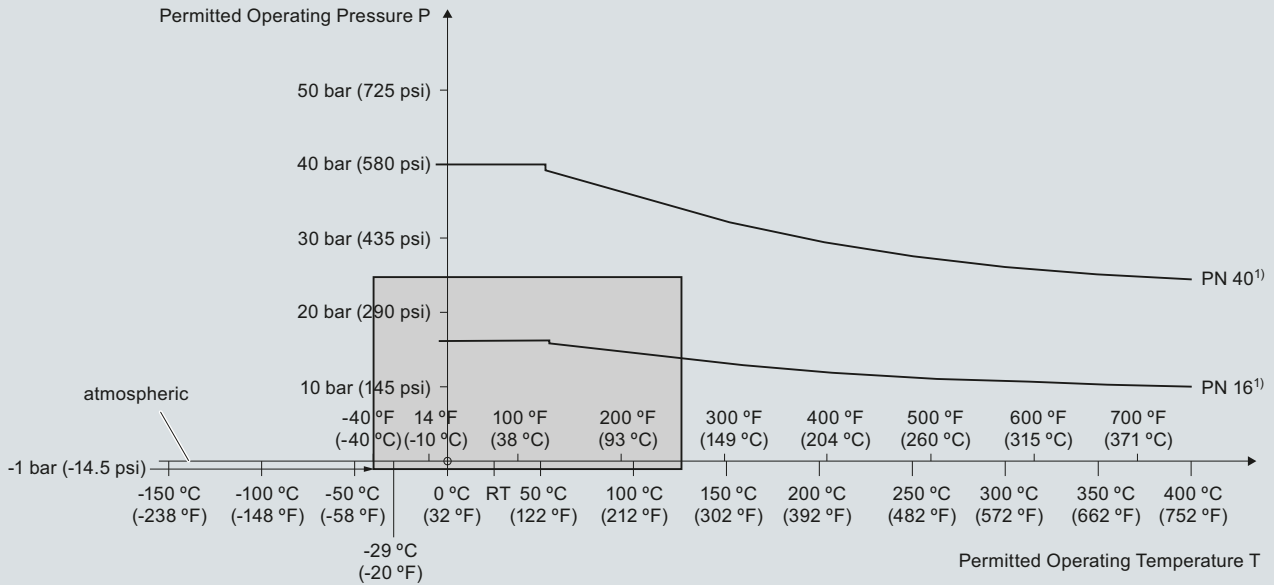
**Pressure/Temperature Curve**  
**CLS200 Cable**  
**EN Flanged Process Connections**  
**(7ML5631 and 7ML5641)**



1) The curve denotes the minimum allowable flange class for the shaded area below.

Pointek CLS200 Process Pressure/Temperature derating curves (7ML5631 and 7ML5641)

**Pressure/Temperature Curve**  
**CLS200 Compact and Extended Rod**  
**EN Flanged Process Connections**  
**(7ML5630 and 7ML5640)**



1) The curve denotes the minimum allowable flange class for the shaded area below.

Pointek CLS200 Process Pressure/Temperature derating curves (7ML5630 and 7ML5640)

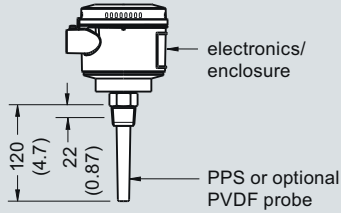
# Level Measurement

## Point level measurement - Capacitance switches

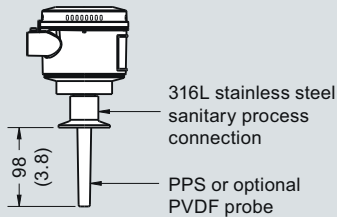
### Pointek CLS200 - Standard and Digital

#### Dimensional drawings

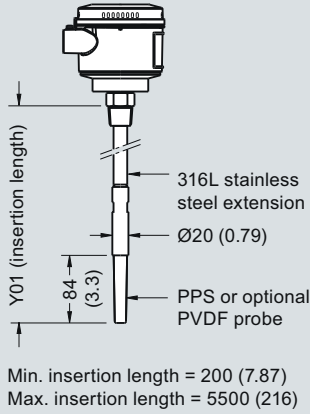
**Compact version  
Threaded  
(7ML5630 and 7ML5640)**



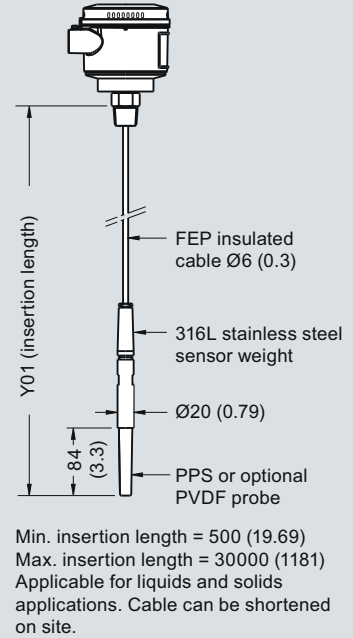
**Sanitary compact version  
Sanitary fitting  
(7ML5632 and 7ML5642)**



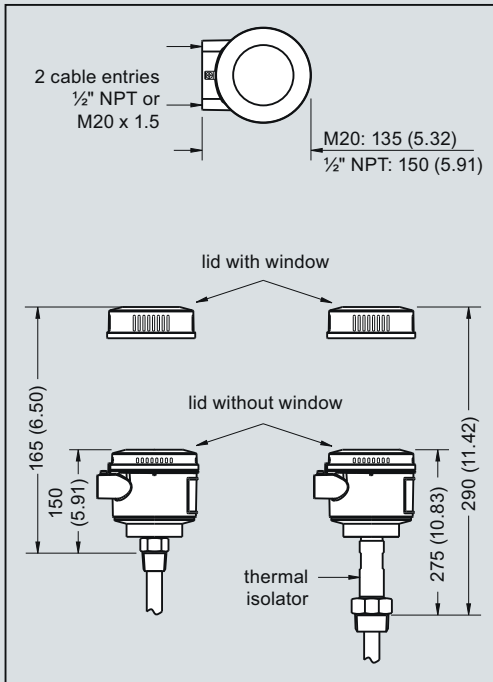
**Extended rod version  
Threaded  
(7ML5630 and 7ML5640)**



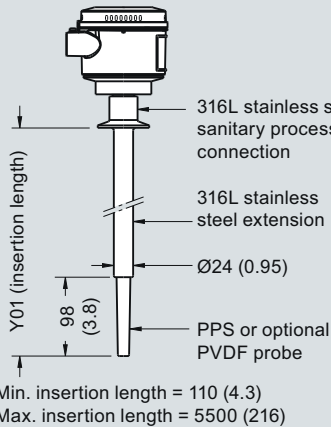
**Extended cable version  
Threaded  
(7ML5631 and 7ML5641)**



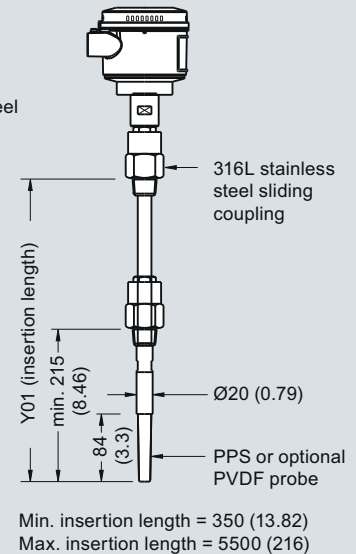
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**Sanitary extended version  
Sanitary fitting  
(7ML5632 and 7ML5642)**



**Sliding coupling version  
Threaded  
(7ML5633 and 7ML5643)**



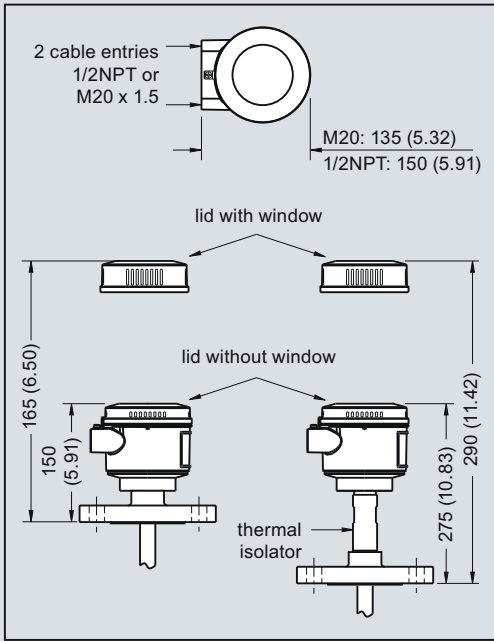
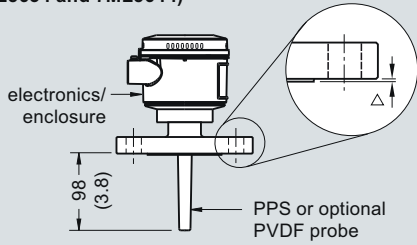
Pointek CLS200 - Threaded/Sanitary Process Connections, dimensions in mm (inch)

# Level Measurement

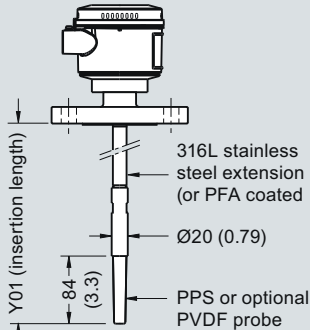
## Point level measurement - Capacitance switches

### Pointek CLS200 - Standard and Digital

**Compact version**  
**Welded Flange (7ML5630 and 7ML5640)**  
**Welded Flange, PFA coated**  
**(7ML5634 and 7ML5644)**

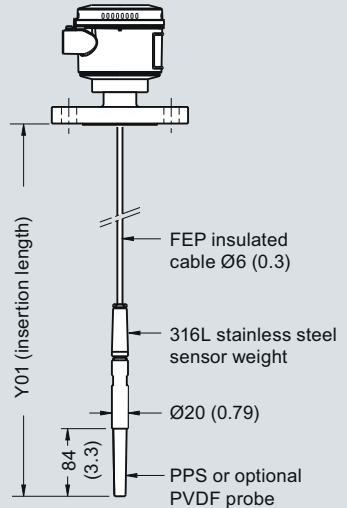


**Extended rod version**  
**Welded Flange (7ML5630 and 7ML5640)**  
**Welded Flange, PFA coated**  
**(7ML5634 and 7ML5644)**



Min. insertion length = 200 (7.87)  
 Max. insertion length = 5500 (216)

**Extended cable version**  
**Welded Flange**  
**(7ML5631 and 7ML5641)**



Min. insertion length = 500 (19.69)  
 Max. insertion length = 30000 (1181)  
 Applicable for liquids and solids applications. Cable can be shortened on site.

Flange Facing (raised face)	
Flange Class	Facing thickness
△ ASME 150/300	2 (0.08)
△ ASME 600/900	7 (0.28)
△ PN16/40	2 (0.08)

Insertion length does not include any raised face/gasket face dimension (see Flange Facing Table above)

Pointek CLS200 - Flanged Process Connections, dimensions in mm (inch)

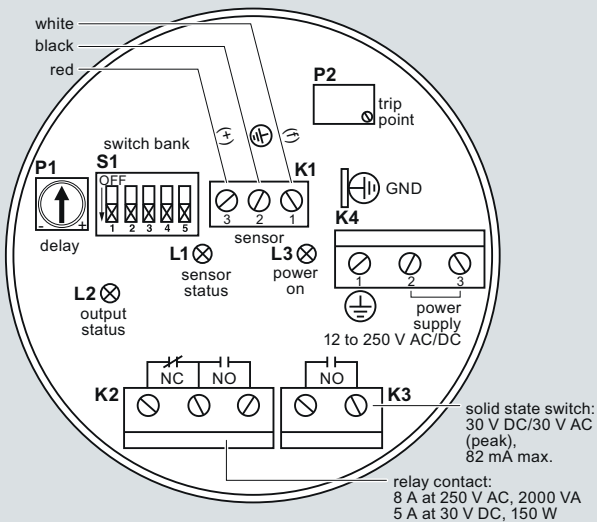
# Level Measurement

## Point level measurement - Capacitance switches

### Pointek CLS200 - Standard and Digital

#### Schematics

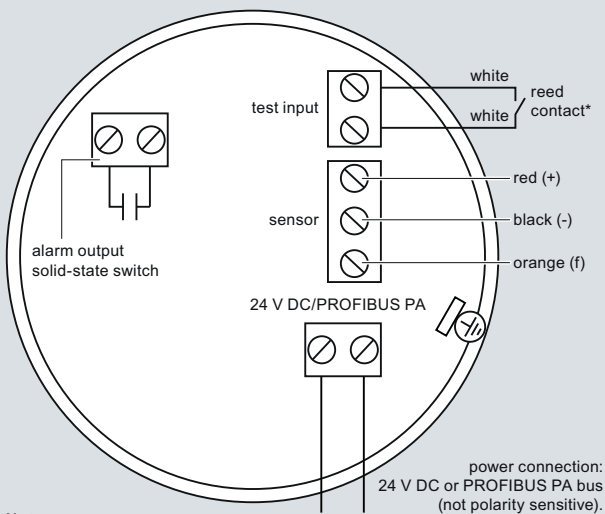
##### Wiring: Pointek CLS200 Standard



##### Notes:

- Identification label is on underside of lid. Switch and Potentiometer settings are for illustration purposes only (Refer to Operation/Setup in manual).
- All field wiring must have insulation suitable for at least 250 V.
- Relay contact terminals are for use with equipment having no accessible live parts and wiring having insulation suitable for at least 250 V.
- Maximum working voltage between adjacent relay contacts shall be 250 V.
- Refer to the Instruction Manual or contact Siemens representative for detailed wiring information.

##### Wiring: Pointek CLS200 Digital



##### Notes:

Refer to the Instruction Manual or contact a Siemens representative for detailed wiring information.

##### \*Magnet Activated Sensor Test

A magnet can be used to test the sensor without opening the lid of the Pointek CLS200 Digital version. Bring the magnet close to the test area indicated on the enclosure. The sensor test starts and finishes automatically after 10 seconds.



5

Pointek CLS200 connections

# Level Measurement

## Point level measurement - Capacitance switches

Pointek CLS300 - Standard

### Overview



Pointek CLS300 (standard version) is an inverse frequency shift capacitance level switch with optional rod/cable choices and configurable output. It is ideal for detecting liquids, solids, slurries, foam and interfaces in demanding conditions where high pressure and temperatures are present.

### Benefits

- Patented Active-Shield technology so measurement is unaffected by material buildup or nozzle interference in active shield section
- Performs in extremely abrasive conditions because of solid rod construction
- Three LED indicators for adjustment control, output status and power
- High-temperature version up to +400 °C (+185 °F)

### Application

Pointek CLS300 standard version has three LED indicators with basic relay and solid-state switch alarms.

The robust design of CLS300 makes it specifically applicable for heavy solids applications where abrasive materials occur as in the mining industry.

The fully potted electronics are unaffected by condensation, dust or vibration.

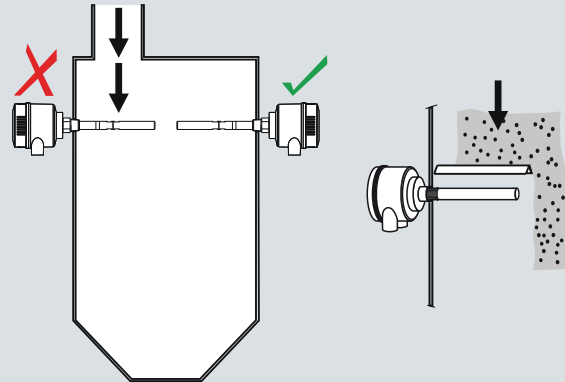
Wetted parts are made of stainless steel with a PFA shield for high chemical resistance, and of ceramic and stainless steel for high temperature version. Materials with low or high dielectric constants can be accurately detected. The unique Active Shield suppresses interference from material buildup or long installation nozzles.

The unique modular design of the Pointek CLS300 provides a wide range of configurations, process connections, extensions and approvals to meet the temperature and pressure requirements of specific applications. The modular design makes ordering easier and reduces stocking requirements. A wide range of probe configurations are available, including rod and cable versions.

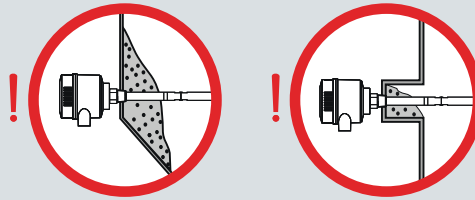
- Key Applications: liquids, slurries, bulk solids, relatively high pressure and temperature, hazardous areas, milling and mining applications

### Configuration

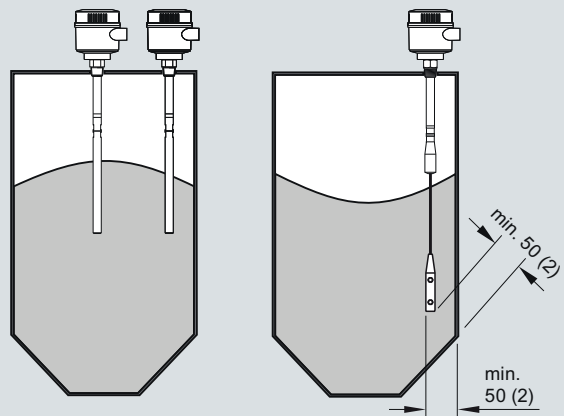
#### Installation



Keep unit out of path of falling material, or protect probe from falling material.



Build up of material in active shield area does not affect switch operation.



Install probe at least 50 mm (2") from tank wall.  
Note angle of repose and adjust accordingly.

Pointek CLS300 installation, dimensions in mm (inch)

# Level Measurement

## Point level measurement - Capacitance switches

### Pointek CLS300 - Standard

#### Technical specifications

Mode of operation		Design	
Measuring principle	Inverse frequency shift capacitive level detection	Material (enclosure)	Powder-coated aluminum with gasket
<b>Input</b>		Degree of Protection	Standard: Type 4/NEMA 4/IP65 Optional: Type 4/NEMA 4/IP68
Measured variable	Change in picoFarad (pF)	Cable inlet	2 x M20x1.5 thread (option: 2 x 1/2" NPT conduit entry including 1 plugged entry)
<b>Output</b>		<b>Controls and displays</b>	
Output signal		Displays	3 LEDs, for probe status, output status and power supply
• Relay output	1 SPDT Form C relay	Potentiometers	2 potentiometers for time delay and sensitivity
- Max. contact voltage	• 30 V DC • 250 V AC	Switches	5 DIP switches for delay on/off, fail-safe high/low, time delay test/adjust, high/low sensitivity, test delay settings
- Max. contact current	• 5 A (DC) • 8 A (AC)	<b>Power supply</b>	
- Max. switching capacity	• 150 W (DC) • 2000 VA (AC)	Supply	12 ... 250 V AC/DC, 0 ... 60 Hz, galvanically isolated, 2 W
- Time delay (ON and/or OFF)	1 ... 60 s	<b>Certificates and approvals</b>	
• Solid-state output		General Purpose	CSA, FM, CE, C-TICK
- Output	Galvanically isolated	Flameproof Enclosure with IS Probe	ATEX II 1/2 G EEx d[ia] IIC T6...T1 ATEX II 1/2 D T100 °C
- Protection	Against reversed polarity (bipolar)	Dust Ignition Proof with IS Probe	ATEX II 1/2 D T100 °C CSA/FM Class II, Div. 1, Gr. E, F, G CSA/FM Class III T4
- Max. switching voltage	• 30 V (DC) • 30 V peak (AC)	Explosion Proof Enclosure with IS Probe	CSA/FM Class I, Div. 1, Gr. A, B, C, D CSA/FM Class II, Div. 1, Gr. E, F, G CSA/FM Class III T4
- Max. load current	82 mA	Marine	Lloyds Register of Shipping, Categories ENV1, ENV2 and ENV5
- Voltage drop	< 1 V, typical at 50 mA	Overfill Protection	WHG (Germany) VLAREM II (Belgium)
- Time delay (pre or post switching)	1 ... 60 s	Others	Pattern Approval (China)
<b>Accuracy</b>		<ol style="list-style-type: none"> <li>When operation is in areas classified as hazardous, observe restrictions according to relevant certificate. See also Pressure/Temperature curves starting on page 5/55.</li> <li>Thermal isolator is used if process connection temperature exceeds +85 °C (+185 °F).</li> <li>Pressure rating of process seal is temperature dependent. See Pressure/Temperature curves starting on page 5/55.</li> </ol>	
Resolution			
• Min. sensitivity (pF)	1 % change in actual capacitance		
• Max. temperature error	0.2 % of actual capacitance value		
<b>Rated operating conditions<sup>1)</sup></b>			
Installation conditions			
• Location	Indoor/outdoor		
Ambient conditions			
• Ambient temperature	-40 ... +85 °C (-40 ... +185 °F) <sup>2)</sup>		
Medium conditions	Liquids, bulk solids, slurries and interfaces, and applications with viscous materials		
• Relative dielectric constant $\epsilon_r$	Min. 1.5		
• Process temperature			
- Rod/Cable version	-40 ... +200 °C (-40 ... +392 °F) <sup>2)</sup>		
- High-temperature version	-40 ... +400 °C (-40 ... +752 °F)		
• Process pressure <sup>3)</sup>	-1 ... +35 bar g (-14.6 ... +511 psi g)		

Design: Probe	Rod version	High Temperature version	Cable version
Length	Min. 250 mm (9.8"), max. 1000 mm (40")	Min. 250 mm (9.8"), max. 1000 mm (40")	Min. 1000 mm (40"), max. 25000 mm (984")
Sensor wetted parts	PFA (no insulation on active probe), 316L stainless steel, PEEK isolators	Ceramic (ZrO <sub>2</sub> ) <sup>1)</sup> isolators (no insulation on active probe), 316L stainless steel	316 stainless steel, optional PFA, PEEK isolators
O-ring seal material	FKM (optional FFKM) <sup>2)</sup>	Graphite <sup>2)</sup>	FKM (optional FFKM) <sup>2)</sup>
Thermal isolator	Optional	Standard	Optional
Extension	User selectable length	User selectable length	User selectable cable length

<sup>1)</sup> Zirconium Oxide



<sup>2)</sup> For Caustic Materials please contact [nacc.smpi@siemens.com](mailto:nacc.smpi@siemens.com) for alternative O-rings



# Level Measurement

## Point level measurement - Capacitance switches

Pointek CLS300 - Standard

Selection and Ordering data	Order No.	Selection and Ordering data	Order No.
<b>Pointek CLS300 - Standard - Rod Version with Threaded or Flanged process connection</b> C)	<b>7 M L 5 6 5 0 -</b> 	<b>Pointek CLS300 - Standard - Rod Version with Threaded or Flanged process connection</b> C)	<b>7 M L 5 6 5 0 -</b> 
Inverse frequency shift capacitance level switch with optional rod/cable choices and configurable output. It is ideal for detecting liquids, solids, slurries, foam and interfaces in demanding conditions where high pressure and temperatures are present.		Inverse frequency shift capacitance level switch with optional rod/cable choices and configurable output. It is ideal for detecting liquids, solids, slurries, foam and interfaces in demanding conditions where high pressure and temperatures are present.	
<b>Process Connection</b> <u>Threaded, 316L stainless steel</u>		Add order code Y01 and plain text: <u>"Insertion length ... mm"</u>	
¾" NPT [(Taper), ANSI/ASME B1.20.1]	0 A	Extended rod, factory adjusted length 250 ... 499 mm (9.8 ... 19.65")	E
1" NPT [(Taper), ANSI/ASME B1.20.1]	0 B	Extended rod, factory adjusted length 500 ... 749 mm (19.69 ... 29.49")	F
1¼" NPT [(Taper), ANSI/ASME B1.20.1]	0 C	Extended rod, factory adjusted length 750 ... 999 mm (29.53 ... 39.3")	G
1½" NPT [(Taper), ANSI/ASME B1.20.1]	0 D	<b>Thermal Isolator</b>	
R ¾" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1 A	Without thermal isolator	0
R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1 B	With thermal isolator [for process connection temperatures over +85 °C (+185 °F)]	1
R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1 D	<b>Wetted Seals</b>	
G ¾" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3 A	FKM	0
G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3 B	FFKM [for process temperatures above -20°C (-4°F)]	1
G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3 D	<b>Probe Material</b>	
<u>Welded flange, 316L stainless steel, raised face</u>		316L stainless steel with PFA lining and PEEK isolators	0
1" ASME, 150 lb	5 A	<b>Approvals</b>	
1" ASME, 300 lb	5 B	Dust Ignition Proof with IS Probe: CE, C-TICK, ATEX II 1/2 D T100 °C	C
1" ASME, 600 lb	5 C	Flameproof Enclosure with IS Probe: CE, C-TICK, ATEX II 1/2 G EEx d[ia] IIC T6...T1, ATEX II 1/2 D T100 °C	D
1½" ASME, 150 lb	5 D	Flameproof Enclosure with IS Probe, with WHG approval: CE, C-TICK, ATEX II 1/2 G EEx d[ia] IIC T6...T1, ATEX II 1/2 D T100 °C	E
1½" ASME, 300 lb	5 E	Dust Ignition Proof with IS Probe: CSA/FM Class II, Div. 1, Gr. E, F, G CSA/FM Class III T4	F
1½" ASME, 600 lb	5 F	Explosion Proof Enclosure with IS Probe: CSA/FM Class I, Div. 1, Gr. A, B, C, D CSA/FM Class II, Div. 1, Gr. E, F, G CSA/FM Class III T4	G
2" ASME, 150 lb	5 G	General Purpose (CSA, FM)	H
2" ASME, 300 lb	5 H	General Purpose (CE, C-TICK)	J
2" ASME, 600 lb	5 J	General Purpose with WHG approval (CSA, FM, CE, C-TICK)	K
3" ASME, 150 lb	5 K	<b>Enclosure and Lid</b>	
3" ASME, 300 lb	5 L	<u>Aluminum epoxy coated</u>	
3" ASME, 600 lb	5 M	2 x ½" NPT via adapter - cable inlet, IP65	A
4" ASME, 150 lb	5 N	2 x M20x1.5 cable inlet, IP65	B
4" ASME, 300 lb	5 P	2 x ½" NPT via adapter - cable inlet, IP68	C
4" ASME, 600 lb	5 Q	2 x M20x1.5 cable inlet, IP68	D
<u>Welded flange, 316L stainless steel, Type A flat faced</u>		<b>Active Shield Length</b>	
DN 25, PN 16	6 A	Standard length - (125 mm threaded, 105 mm flanged)	0
DN 25, PN 40	6 B	Extended shield - (250 mm threaded, 230 mm flanged) <sup>1)</sup>	1
DN 40, PN 16	6 C	Extended shield - (400 mm threaded, 380 mm flanged) <sup>2)</sup>	2
DN 40, PN 40	6 D		
DN 50, PN 16	6 E		
DN 50, PN 40	6 F		
DN 80, PN 16	6 G		
DN 80, PN 40	6 H		
DN 100, PN 16	6 J		
DN 100, PN 40	6 K		
DN 100, PN 40 (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)	6 K		
<b>Probe length</b> (length from flange face) (threaded lengths include process thread)			
<u>Note: No Y01 needed in order code for standard lengths</u>			
Standard version, rod 350 mm (13.78")	A		
Extended rod, length 500 mm (19.69")	B		
Extended rod, length 750 mm (29.53")	C		
Extended rod, length 1000 mm (39.37")	D		

1) Available with Probe version options B to D, F, G only [≥ 500 mm (19.69")]  
 2) Available with Probe version options C, D, and, G only [≥ 750 mm (29.53")]

C) Subject to export regulations AL: N, ECCN: EAR99

# Level Measurement

## Point level measurement - Capacitance switches

### Pointek CLS300 - Standard

Selection and Ordering data	Order code	Selection and Ordering data	Order No.
<b>Further designs</b>		<b>Pointek CLS300 - Standard - Cable Version with Threaded or Flanged process connection</b>	<b>7 M L 5 6 5 1 -</b>
Please add <b>"-Z"</b> to Order No. and specify Order code(s).		Inverse frequency shift capacitance level switch with optional rod/cable choices and configurable output. It is ideal for detecting liquids, solids, slurries, foam and interfaces in demanding conditions where high pressure and temperatures are present.	
Total insertion length: enter the total insertion length in plain text description	<b>Y01</b>	<b>Process Connection</b>	
Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text	<b>Y15</b>	<u>Threaded, 316L stainless steel</u>	
Acceptance test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and ISO 9000	<b>C11</b>	1¼" NPT [(Taper), ANSI/ASME B1.20.1]	<b>0 C</b>
Inspection Certificate Type 3.1 per EN 10204	<b>C12</b>	1½" NPT [(Taper), ANSI/ASME B1.20.1]	<b>0 D</b>
<b>Operating Instructions</b>		R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	<b>1 D</b>
Note: The Operating Instructions should be ordered as a separate line on the order. This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and manual library.	<b>See page 5/54</b>	G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	<b>3 D</b>
<b>Accessories</b>	<b>See page 5/54</b>	<u>Welded flange, 316L stainless steel, raised face</u>	
		1½" ASME, 150 lb	<b>5 D</b>
		1½" ASME, 300 lb	<b>5 E</b>
		1½" ASME, 600 lb	<b>5 F</b>
		2" ASME, 150 lb	<b>5 G</b>
		2" ASME, 300 lb	<b>5 H</b>
		2" ASME, 600 lb	<b>5 J</b>
		3" ASME, 150 lb	<b>5 K</b>
		3" ASME, 300 lb	<b>5 L</b>
		3" ASME, 600 lb	<b>5 M</b>
		4" ASME, 150 lb	<b>5 N</b>
		4" ASME, 300 lb	<b>5 P</b>
		4" ASME, 600 lb	<b>5 Q</b>
		<u>Welded flange, 316L stainless steel, Type A flat faced</u>	
		DN 40, PN 16	<b>6 C</b>
		DN 40, PN 40	<b>6 D</b>
		DN 50, PN 16	<b>6 E</b>
		DN 50, PN 40	<b>6 F</b>
		DN 80, PN 16	<b>6 G</b>
		DN 80, PN 40	<b>6 H</b>
		DN 100, PN 16	<b>6 J</b>
		DN 100, PN 40	<b>6 K</b>
		(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)	
		<b>Probe length</b> (length from flange face) (threaded lengths include process thread)	
		<u>Note: No Y01 needed in order code for standard lengths</u>	
		Extended cable, 3000 mm (118.11"), length can be shortened by customer	<b>A</b>
		Extended cable, 6000 mm (236.22"), length can be shortened by customer	<b>B</b>
		<u>Add order code Y01 and plain text:</u> <u>"Insertion length ... mm"</u>	
		Extended cable, 500 ... 1000 mm (19.69 ... 39.37")	<b>E</b>
		Extended cable, 1001 ... 5000 mm (39.41 ... 196.85")	<b>F</b>
		Extended cable, 5001 ... 10000 mm (196.89 ... 393.70")	<b>G</b>
		Extended cable, 10001 ... 15000 mm (393.74 ... 590.55")	<b>H</b>
		Extended cable, 15001 ... 20000 mm (590.59 ... 787.40")	<b>J</b>
		Extended cable, 20001 ... 25000 mm (787.44 ... 984.25")	<b>K</b>
		<b>Thermal Isolator</b>	
		Without thermal isolator	<b>0</b>
		With thermal isolator [for process connection temperatures over +85 °C (+185 °F)]	<b>1</b>

# Level Measurement

## Point level measurement - Capacitance switches

Pointek CLS300 - Standard

Selection and Ordering data	Order No.	Selection and Ordering data	Order code
<b>Pointek CLS300 - Standard - Cable Version with Threaded or Flanged process connection</b> Inverse frequency shift capacitance level switch with optional rod/cable choices and configurable output. It is ideal for detecting liquids, solids, slurries, foam and interfaces in demanding conditions where high pressure and temperatures are present.	7 M L 5 6 5 1 -	<b>Further designs</b> Please add <b>"-Z"</b> to Order No. and specify Order code(s).  Total insertion length: enter the total insertion length in plain text description  Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text  Acceptance test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and ISO 9000  Inspection Certificate Type 3.1 per EN 10204	
<b>Wetted Seals</b> FKM FFKM [for process temperatures above -20°C (-4°F)]	0 1	<b>Operating Instructions</b> Note: The Operating Instructions should be ordered as a separate line on the order. This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and manual library.	Y01 Y15 C11 C12
<b>Probe Material</b> Bare 316L stainless steel cable, PEEK isolators and 316L stainless steel cable weight PFA coated cable, PEEK isolators and 316L stainless steel cable weight	0 1	<b>Accessories</b>	See page 5/54
<b>Approvals</b> Dust Ignition Proof with IS Probe: CE, C-TICK, ATEX II 1/2 D T100 °C  Flameproof Enclosure with IS Probe: CE, C-TICK, ATEX II 1/2 G EEx d[ia] IIC T6...T1, ATEX II 1/2 D T100 °C Flameproof Enclosure with IS Probe, with WHG approval: CE, C-TICK, ATEX II 1/2 G EEx d[ia] IIC T6...T1, ATEX II 1/2 D T100 °C  Dust Ignition Proof with IS Probe: CSA/FM Class II, Div. 1, Gr. E, F, G CSA/FM Class III T4  Explosion Proof Enclosure with IS Probe: CSA/FM Class I, Div. 1, Gr. A, B, C, D CSA/FM Class II, Div. 1, Gr. E, F, G CSA/FM Class III T4  General Purpose (CSA, FM) General Purpose (CE, C-TICK) General Purpose with WHG approval (CSA, FM, CE, C-TICK)	C D E F G H J K		
<b>Enclosure and Lid</b> <u>Aluminum epoxy coated</u> 2 x ½" NPT via adapter - cable inlet, IP65 2 x M20x1.5 cable inlet, IP65 2 x ½" NPT via adapter - cable inlet, IP68 2 x M20x1.5 cable inlet, IP68	A B C D		
<b>Active Shield Length</b> Standard length - (125 mm threaded, 105 mm flanged) Extended shield - (250 mm threaded, 230 mm flanged) <sup>1)</sup> Extended shield - (400 mm threaded, 380 mm flanged) <sup>1)</sup>	0 1 2		

<sup>1)</sup> Available with Probe version options A, B, F to K, only [≥ 1000 mm (39.7")]

C) Subject to export regulations AL: N, ECCN: EAR99

# Level Measurement

## Point level measurement - Capacitance switches

### Pointek CLS300 - Standard

Selection and Ordering data	Order No.
<b>Pointek CLS300 - Standard - High Temperature Rod Version with Threaded or Flanged process connection</b>	<b>7 ML 5 6 5 2 -</b> 0 0 - 0
Inverse frequency shift capacitance level switch with optional rod/cable choices and configurable output. It is ideal for detecting liquids, solids, slurries, foam and interfaces in demanding conditions where high pressure and temperatures are present.	
<b>Process Connection</b> <u>Threaded, 316L stainless steel</u>	
¾" NPT [(Taper), ANSI/ASME B1.20.1]	0 A
1" NPT [(Taper), ANSI/ASME B1.20.1]	0 B
1¼" NPT [(Taper), ANSI/ASME B1.20.1]	0 C
1½" NPT [(Taper), ANSI/ASME B1.20.1]	0 D
R ¾" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1 A
R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1 B
R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1 D
G ¾" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3 A
G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3 B
G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3 D
<u>Welded flange, 316L stainless steel, raised face</u>	
1" ASME, 150 lb	5 A
1" ASME, 300 lb	5 B
1" ASME, 600 lb	5 C
1½" ASME, 150 lb	5 D
1½" ASME, 300 lb	5 E
1½" ASME, 600 lb	5 F
2" ASME, 150 lb	5 G
2" ASME, 300 lb	5 H
2" ASME, 600 lb	5 J
3" ASME, 150 lb	5 K
3" ASME, 300 lb	5 L
3" ASME, 600 lb	5 M
4" ASME, 150 lb	5 N
4" ASME, 300 lb	5 P
4" ASME, 600 lb	5 Q
<u>Welded flange, 316L stainless steel, Type A flat faced</u>	
DN 25, PN 16	6 A
DN 25, PN 40	6 B
DN 40, PN 16	6 C
DN 40, PN 40	6 D
DN 50, PN 16	6 E
DN 50, PN 40	6 F
DN 80, PN 16	6 G
DN 80, PN 40	6 H
DN 100, PN 16	6 J
DN 100, PN 40	6 K
(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)	
<b>Probe length</b> (length from flange face) (threaded lengths include process thread)	
<u>Note: No Y01 needed in order code for standard lengths</u>	
Rod 350 mm (13.78")	A
Extended rod, length 500 mm (19.69")	B
Extended rod, length 750 mm (29.53")	C
Extended rod, length 1000 mm (39.37")	D

Selection and Ordering data	Order No.
<b>Pointek CLS300 - Standard - High Temperature Rod Version with Threaded or Flanged process connection</b>	<b>7 ML 5 6 5 2 -</b> 0 0 - 0
Inverse frequency shift capacitance level switch with optional rod/cable choices and configurable output. It is ideal for detecting liquids, solids, slurries, foam and interfaces in demanding conditions where high pressure and temperatures are present.	
<u>Add order code Y01 and plain text:</u> <u>"Insertion length ... mm"</u>	
Extended rod, factory adjusted length 250 ... 499 mm (9.8 ... 19.65")	E
Extended rod, factory adjusted length 500 ... 749 mm (19.69 ... 29.49")	F
Extended rod, factory adjusted length 750 ... 999 mm (29.53 ... 39.3")	G
<b>Wetted Seals</b>	
Graphite	0
<b>Probe Material</b>	
316L stainless steel with ceramic (ZrO <sub>2</sub> ) isolators	0
<b>Approvals</b>	
Dust Ignition Proof with IS Probe: CE, C-TICK, ATEX II 1/2 D T100 °C	C
Flameproof Enclosure with IS Probe: CE, C-TICK, ATEX II 1/2 G EEx d[ia] IIC T6...T1, ATEX II 1/2 D T100 °C	D
Flameproof Enclosure with IS Probe, with WHG approval: CE, C-TICK, ATEX II 1/2 G EEx d[ia] IIC T6...T1, ATEX II 1/2 D T100 °C	E
Dust Ignition Proof with IS Probe: CSA/FM Class II, Div. 1, Gr. E, F, G CSA/FM Class III T4	F
Explosion Proof Enclosure with IS Probe: CSA/FM Class I, Div. 1, Gr. A, B, C, D CSA/FM Class II, Div. 1, Gr. E, F, G CSA/FM Class III T4	G
General Purpose (CSA, FM)	H
General Purpose (CE, C-TICK)	J
General Purpose with WHG approval (CSA, FM, CE, C-TICK)	K
<b>Enclosure and Lid</b> <u>Aluminum epoxy coated</u>	
2 x ½" NPT via adapter - cable inlet, IP65	A
2 x M20x1.5 cable inlet, IP65	B
2 x ½" NPT via adapter - cable inlet, IP68	C
2 x M20x1.5 cable inlet, IP68	D
<b>Active Shield Length</b>	
Standard length - (125 mm threaded, 105 mm flanged)	0
Extended shield - (250 mm threaded, 230 mm flanged) <sup>1)</sup>	1
Extended shield - (400 mm threaded, 380 mm flanged) <sup>2)</sup>	2
<sup>1)</sup> Available with Probe version options B to D, F, G only [≥ 500 mm (19.69")]	
<sup>2)</sup> Available with Probe version options C, D, and, G only [≥ 750 mm (29.53")]	
C) Subject to export regulations AL: N, ECCN: EAR99H	

# Level Measurement

## Point level measurement - Capacitance switches

Pointek CLS300 - Standard

Selection and Ordering data	Order code
<b>Further designs</b>	
Please add <b>"-Z"</b> to Order No. and specify Order code(s).	
Total insertion length: enter the total insertion length in plain text description	<b>Y01</b>
Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text	<b>Y15</b>
Acceptance test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and ISO 9000	<b>C11</b>
Inspection Certificate Type 3.1 per EN 10204	<b>C12</b>
<b>Operating Instructions</b>	
Note: The Operating Instructions should be ordered as a separate line on the order. This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and manual library.	<b>See page 5/54</b>
<b>Accessories</b>	
	<b>See page 5/54</b>

# Level Measurement

## Point level measurement - Capacitance switches

### Pointek CLS300 - Digital

#### Overview



Pointek CLS300 (digital version) is an inverse frequency shift capacitance level switch with optional rod/cable choices and configurable output. It is ideal for detecting liquids, solids, slurries, foam and interfaces in demanding conditions where high pressure and temperatures are present. The digital version includes PROFIBUS PA, an LCD display, and advanced diagnostic features.

#### Benefits

- Patented Active-Shield technology so measurement is unaffected by material buildup or nozzle interference in active shield section
- Performs in extremely abrasive conditions because of solid rod construction
- Push-button calibration, full-function diagnostics
- High sensitivity allows installation in a wide range of liquids, solids or slurry applications
- Integral LCD display allows for easy menu-driven setup
- PROFIBUS PA communication (SIMATIC PDM compatible)

#### Application

Pointek CLS300 digital version provides an integral LCD display for stand-alone use, with PROFIBUS PA communication (Profile version 3.0, Class B) when required. Solid-state switch alarm is standard.

The robust design of CLS300 makes it specifically applicable for heavy solids applications where abrasive materials occur as in the mining industry.

The fully potted electronics are unaffected by condensation, dust or vibration.

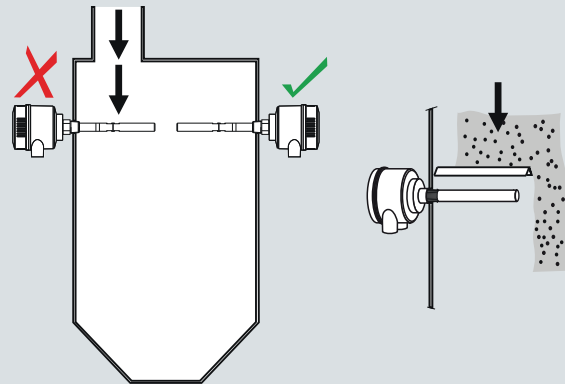
Wetted parts are made of stainless steel with a PFA shield for high chemical resistance, and of ceramic and stainless steel for high temperature version. Materials with low or high dielectric constants can be accurately detected. The unique Active Shield suppresses interference from material buildup or long installation nozzles.

The unique modular design of the Pointek CLS300 provides a wide range of configurations, process connections, extensions and approvals to meet the temperature and pressure requirements of specific applications. The modular design makes ordering easier and reduces stocking requirements. A wide range of probe configurations are available, including rod and cable versions.

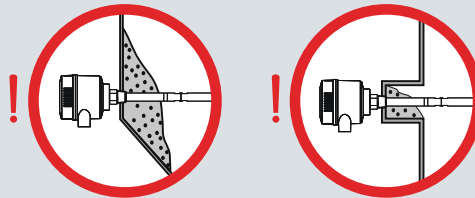
- Key Applications: liquids, slurries, bulk solids, relatively high pressure and temperature, hazardous areas, milling and mining applications

#### Configuration

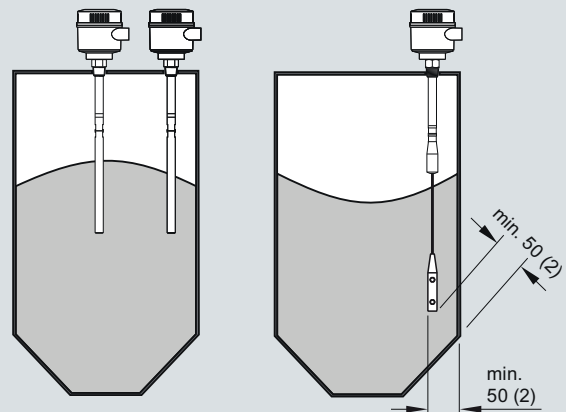
##### Installation



Keep unit out of path of falling material, or protect probe from falling material.



Build up of material in active shield area does not affect switch operation.



Install probe at least 50 mm (2") from tank wall. Note angle of repose and adjust accordingly.

Pointek CLS300 installation, dimensions in mm (inch)

# Level Measurement

## Point level measurement - Capacitance switches

Pointek CLS300 - Digital

### Technical specifications

<b>Mode of operation</b>	
Measuring principle	Inverse frequency shift capacitive level detection
<b>Input</b>	
Measured variable	Change in picoFarad (pF)
<b>Output</b>	
Solid-state output	
• Output	Galvanically isolated
• Protection	Against reversed polarity (bipolar)
• Max. switching voltage	<ul style="list-style-type: none"> <li>• 30 V (DC)</li> <li>• 30 V peak (AC)</li> </ul>
• Max. load current	82 mA
• Voltage drop	< 1 V, typical at 50 mA
• Time delay (pre or post switching)	Programmable by user (0 ... 100 s)
Fail-safe mode	Min. or max.
Connection	Removable terminal block
<b>Accuracy</b>	
Resolution	
• Min. sensitivity (pF)	1 % change in actual capacitance
• Max. temperature error	0.2 % of actual capacitance value
<b>Rated operating conditions</b> <sup>1)</sup>	
Installation conditions	
Location	Indoor/outdoor
Ambient conditions	
• Ambient temperature	-40 ... +85 °C (-40 ... +185 °F) <sup>2)</sup>
Medium conditions	Liquids, bulk solids, slurries and interfaces, and applications with viscous materials
• Relative dielectric constant $\epsilon_r$	Min. 1.5
• Process temperature	
- Rod/Cable version	-40 ... +200 °C (-40 ... +392 °F) <sup>2)</sup>
- High Temperature version	-40 ... +400 °C (-40 ... +752 °F)
• Process pressure <sup>3)</sup>	-1 ... +35 bar g (-14.6 ... +511 psi g)
<b>Design</b>	
Material (enclosure)	Powder-coated aluminum with gasket
Degree of protection	Standard: Type 4/NEMA 4/IP65 Optional: Type 4/NEMA 4/IP68
Cable inlet	2 x M20x1.5 thread (option: 2 x 1/2" NPT conduit entry including 1 plugged entry)

<b>Controls and displays</b>	
Local display	LCD
Configuration	<ul style="list-style-type: none"> <li>• Locally, using 3 button keypad (for standalone operation)</li> <li>• Remotely, using SIMATIC PDM (for installation on a network)</li> </ul>
<b>Power supply</b>	
Bus voltage (at process connection)	<ul style="list-style-type: none"> <li>• Standard: 12 ... 30 V DC</li> <li>• Intrinsically Safe: 12 ... 24 V DC</li> </ul>
Current consumption	12.5 mA
<b>Certificates and approvals</b>	
General Purpose	CSA, FM, CE, C-TICK
Dust Ignition Proof	ATEX II 1/2 D, 2 D IP6X T100 °C
Flameproof Enclosure with IS Probe	ATEX II 1/2 G EEx d[ia] IIC T6...T4 ATEX II 1/2 D T100 °C
Dust Ignition Proof with IS Probe	CSA/FM Class II, Div. 1, Gr. E, F, G CSA/FM Class III T4
Intrinsically Safe <sup>4)</sup>	ATEX II 1 G EEx ia IIC T6...T4 ATEX II 1/2 D, 2 D IP6X T100 °C CSA/FM Class I, Div. 1, Gr. A, B, C, D CSA/FM Class II, Div. 1, Gr. E, F, G CSA/FM Class III T4
Non-incendive	CSA/FM Class I, Div. 2, Gr. A, B, C, D CSA/FM Class II, Div. 2, Gr. F, G CSA/FM Class III T4 or T6
Explosion Proof with IS Probe	CSA/FM Class I, Div. 1, Gr. A, B, C, D CSA/FM Class II, Div. 1, Gr. E, F, G CSA/FM Class III T4
Marine	Lloyds Register of Shipping, Categories ENV1, ENV2 and ENV5
Others	Pattern Approval (China)
<b>Communication</b>	
	PROFIBUS PA (IEC 61158 CPF3 CP3/2)
	Bus physical layer: IEC 61158-2 MBP-(IS)
	Device profile: PROFIBUS PA profile for Process Control Devices Version 3.0, Class B
	FISCO field device

- 1) When operation is in areas classified as hazardous, observe restrictions according to relevant certificate. See also Pressure/Temperature curves starting on page 5/55.
- 2) Thermal isolator is used if process connection temperature exceeds +85 °C (+185 °F)
- 3) Pressure rating of process seal is temperature dependent. See Pressure/Temperature curves starting on page 5/55.
- 4) Barrier or Intrinsically safe power supply required for Intrinsically Safe protection

Design: Probe	Rod version	High Temperature version	Cable version
Length	Min. 250 mm (9.8"), max. 1000 mm (40")	Min. 250 mm (9.8"), max. 1000 mm (40")	Min. 1000 mm (40"), max. 25000 mm (984")
Sensor wetted parts	PFA (no insulation on active probe), 316L stainless steel, PEEK isolators	Ceramic (ZrO <sub>2</sub> ) <sup>1)</sup> isolators (no insulation on active probe), 316L stainless steel	316 stainless steel, optional PFA, PEEK isolators
O-ring seal material	FKM (optional FFKM) <sup>2)</sup>	Graphite <sup>2)</sup>	FKM (optional FFKM) <sup>2)</sup>
Thermal isolator	Optional	Standard	Optional
Extension	User selectable length	User selectable length	User selectable cable length

<sup>1)</sup> Zirconium Oxide

<sup>2)</sup> For Caustic Materials please contact [nacc.smpi@siemens.com](mailto:nacc.smpi@siemens.com) for alternative O-rings



# Level Measurement

## Point level measurement - Capacitance switches

### Pointek CLS300 - Digital

#### Selection and Ordering data

Order No.

#### Pointek CLS300 - Digital - Rod with Threaded or C) Flanged process connection

7 M L 5 6 6 0 -

- 0

Inverse frequency shift capacitance level switch with optional rod/cable choices and configurable output. It is ideal for detecting liquids, solids, slurries, foam and interfaces in demanding conditions where high pressure and temperatures are present.

#### Process Connection

Threaded, 316L stainless steel

¾" NPT [(Taper), ANSI/ASME B1.20.1] **0 A**  
 1" NPT [(Taper), ANSI/ASME B1.20.1] **0 B**  
 1¼" NPT [(Taper), ANSI/ASME B1.20.1] **0 C**  
 1½" NPT [(Taper), ANSI/ASME B1.20.1] **0 D**  
 R ¾" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] **1 A**  
 R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] **1 B**  
 R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] **1 D**  
 G ¾" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] **3 A**  
 G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] **3 B**  
 G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] **3 D**

Welded flange, 316L stainless steel, raised face

1" ASME, 150 lb **5 A**  
 1" ASME, 300 lb **5 B**  
 1" ASME, 600 lb **5 C**  
 1½" ASME, 150 lb **5 D**  
 1½" ASME, 300 lb **5 E**  
 1½" ASME, 600 lb **5 F**  
 2" ASME, 150 lb **5 G**  
 2" ASME, 300 lb **5 H**  
 2" ASME, 600 lb **5 J**  
 3" ASME, 150 lb **5 K**  
 3" ASME, 300 lb **5 L**  
 3" ASME, 600 lb **5 M**  
 4" ASME, 150 lb **5 N**  
 4" ASME, 300 lb **5 P**  
 4" ASME, 600 lb **5 Q**

Welded flange, 316L stainless steel, Type A flat faced

DN 25, PN 16 **6 A**  
 DN 25, PN 40 **6 B**  
 DN 40, PN 16 **6 C**  
 DN 40, PN 40 **6 D**  
 DN 50, PN 16 **6 E**  
 DN 50, PN 40 **6 F**  
 DN 80, PN 16 **6 G**  
 DN 80, PN 40 **6 H**  
 DN 100, PN 16 **6 J**  
 DN 100, PN 40 **6 K**

(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)

**Probe length** (length from flange face)  
 (threaded lengths include process thread)

Note: No Y01 needed in order code for standard lengths

Standard version, rod 350 mm (13.78") **A**  
 Extended rod, length 500 mm (19.69") **B**  
 Extended rod, length 750 mm (29.53") **C**  
 Extended rod, length 1000 mm (39.37") **D**

#### Selection and Ordering data

Order No.

#### Pointek CLS300 - Digital - Rod with Threaded or C) Flanged process connection

7 M L 5 6 6 0 -

- 0

Inverse frequency shift capacitance level switch with optional rod/cable choices and configurable output. It is ideal for detecting liquids, solids, slurries, foam and interfaces in demanding conditions where high pressure and temperatures are present.

Add order code Y01 and plain text:

"Insertion length ... mm"

Extended rod, factory adjusted length 250 ... 499 mm (9.8 ... 19.65") **E**  
 Extended rod, factory adjusted length 500 ... 749 mm (19.69 ... 29.49") **F**  
 Extended rod, factory adjusted length 750 ... 999 mm (29.53 ... 39.3") **G**

#### Thermal Isolator

Without thermal isolator **0**

With thermal isolator [for process connection temperatures over +85 °C (+185 °F)] **1**

#### Wetted Seals

FKM **0**

FFKM [for process temperatures above -20°C (-4°F)] **1**

#### Probe Material

316L stainless steel with PFA lining and PEEK isolators **0**

#### Approvals

Dust Ignition Proof:  
 CE, C-TICK, ATEX II 1/2 D, 2 D IP6X T100 °C **B**

Intrinsically Safe<sup>1)</sup>  
 CE, C-TICK, ATEX II 1 G EEx ia IIC T6...T4, ATEX II 1/2 D, 2 D IP6X T100 °C **C**

Flameproof Enclosure with IS Probe:  
 CE, C-TICK, ATEX II 1/2 G EEx d[ia] IIC T6...T4, ATEX II 1/2 D T100 °C **D**

Dust Ignition Proof with IS Probe:  
 CSA/FM Class II, Div. 1, Gr. E, F, G  
 CSA/FM Class III T4 **E**

Intrinsically Safe<sup>1)</sup>  
 CSA/FM Class I, Div. 1, Gr. A, B, C, D  
 CSA/FM Class II, Div. 1, Gr. E, F, G  
 CSA/FM Class III T4 **F**

Explosion Proof Enclosure with IS Probe:  
 CSA/FM Class I, Div. 1, Gr. A, B, C, D  
 CSA/FM Class II, Div. 1, Gr. E, F, G  
 CSA/FM Class III T4 **G**

General Purpose (CSA, FM) **H**

General Purpose (CSA, FM, CE, C-TICK) **J**

#### Enclosure and Lid

Aluminum epoxy coated

2 x ½" NPT via adapter - cable inlet, IP65 **A**  
 2 x M20x1.5 cable inlet, IP65 **B**  
 2 x ½" NPT via adapter - cable inlet, IP68 **C**  
 2 x M20x1.5 cable inlet, IP68 **D**

#### Active Shield Length

Standard length - **0**  
 (125 mm threaded, 105 mm flanged)  
 Extended shield - **1**  
 (250 mm threaded, 230 mm flanged)<sup>2)</sup>  
 Extended shield - **2**  
 (400 mm threaded, 380 mm flanged)<sup>3)</sup>

<sup>1)</sup> Barrier or Intrinsically safe power supply required for Intrinsically Safe protection

<sup>2)</sup> Available with Probe version options B to D, F, G only [≥ 500 mm (19.69")]

<sup>3)</sup> Available with Probe version options C, D, and, G only [≥ 750 mm (29.53")]

C) Subject to export regulations AL: N, ECCN: EAR99

# Level Measurement

## Point level measurement - Capacitance switches

Pointek CLS300 - Digital

Selection and Ordering data	Order code	Selection and Ordering data	Order No.
<b>Further designs</b>		<b>Pointek CLS300 - Digital - Cable with Threaded or Flanged process connection</b>	<b>7 M L 5 6 6 1 -</b>
Please add <b>"-Z"</b> to Order No. and specify Order code(s).		Versatile inverse frequency shift capacitance level switch with optional process connection choices and configurable output, ideal for detection of liquids, solids, slurries, foam and interfaces	
Total insertion length: enter the total insertion length in plain text description	<b>Y01</b>	<b>Process Connection</b>	
Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text	<b>Y15</b>	<u>Threaded, 316L stainless steel</u>	
Acceptance test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and ISO 9000	<b>C11</b>	1¼" NPT [(Taper), ANSI/ASME B1.20.1]	<b>0 C</b>
Inspection Certificate Type 3.1 per EN 10204	<b>C12</b>	1½" NPT [(Taper), ANSI/ASME B1.20.1]	<b>0 D</b>
		R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	<b>1 D</b>
		G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	<b>3 D</b>
		<u>Welded flange, 316L stainless steel, raised face</u>	
		1½" ASME, 150 lb	<b>5 D</b>
		1½" ASME, 300 lb	<b>5 E</b>
		1½" ASME, 600 lb	<b>5 F</b>
		2" ASME, 150 lb	<b>5 G</b>
		2" ASME, 300 lb	<b>5 H</b>
		2" ASME, 600 lb	<b>5 J</b>
		3" ASME, 150 lb	<b>5 K</b>
		3" ASME, 300 lb	<b>5 L</b>
		3" ASME, 600 lb	<b>5 M</b>
		4" ASME, 150 lb	<b>5 N</b>
		4" ASME, 300 lb	<b>5 P</b>
		4" ASME, 600 lb	<b>5 Q</b>
		<u>Welded flange, 316L stainless steel, Type A flat faced</u>	
		DN 40, PN 16	<b>6 C</b>
		DN 40, PN 40	<b>6 D</b>
		DN 50, PN 16	<b>6 E</b>
		DN 50, PN 40	<b>6 F</b>
		DN 80, PN 16	<b>6 G</b>
		DN 80, PN 40	<b>6 H</b>
		DN 100, PN 16	<b>6 J</b>
		DN 100, PN 40	<b>6 K</b>
		(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)	
		<b>Probe length</b> (length from flange face) (threaded lengths include process thread)	
		<u>Note: No Y01 needed in order code for standard lengths</u>	
		Extended cable, 3000 mm (118.11"), length can be shortened by customer	<b>A</b>
		Extended cable, 6000 mm (236.22"), length can be shortened by customer	<b>B</b>
		<u>Add order code Y01 and plain text:</u>	
		<u>"Insertion length ... mm"</u>	
		Extended cable, 500 ... 1000 mm (19.69 ... 39.37")	<b>E</b>
		Extended cable, 1001 ... 5000 mm (39.41 ... 196.85")	<b>F</b>
		Extended cable, 5001 ... 10000 mm (196.89 ... 393.70")	<b>G</b>
		Extended cable, 10001 ... 15000 mm (393.74 ... 590.55")	<b>H</b>
		Extended cable, 15001 ... 20000 mm (590.59 ... 787.40")	<b>J</b>
		Extended cable, 20001 ... 25000 mm (787.44 ... 984.25")	<b>K</b>
<b>Operating Instructions</b>	<b>See page 5/54</b>		
Note: The Operating Instructions should be ordered as a separate line on the order. This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and manual library.			
<b>Accessories</b>	<b>See page 5/54</b>		



# Level Measurement

## Point level measurement - Capacitance switches

Pointek CLS300 - Digital

Selection and Ordering data	Order No.	Selection and Ordering data	Order No.
<b>Pointek CLS300 - Digital - High Temperature Rod version with Threaded or Flanged process connection</b> Inverse frequency shift capacitance level switch with optional rod/cable choices and configurable output. It is ideal for detecting liquids, solids, slurries, foam and interfaces in demanding conditions where high pressure and temperatures are present.	<b>7 ML 5 6 6 2 - 0 0 - 0</b>	<b>Pointek CLS300 - Digital - High Temperature Rod version with Threaded or Flanged process connection</b> Inverse frequency shift capacitance level switch with optional rod/cable choices and configurable output. It is ideal for detecting liquids, solids, slurries, foam and interfaces in demanding conditions where high pressure and temperatures are present.	<b>7 ML 5 6 6 2 - 0 0 - 0</b>
<b>Process Connection</b> <u>Threaded, 316L stainless steel</u> ¾" NPT [(Taper), ANSI/ASME B1.20.1] 1" NPT [(Taper), ANSI/ASME B1.20.1] 1¼" NPT [(Taper), ANSI/ASME B1.20.1] 1½" NPT [(Taper), ANSI/ASME B1.20.1] R ¾" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] G ¾" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	<b>0 A</b> <b>0 B</b> <b>0 C</b> <b>0 D</b> <b>1 A</b> <b>1 B</b> <b>1 D</b> <b>3 A</b> <b>3 B</b> <b>3 D</b>	<b>Probe Material</b> 316L stainless steel with ceramic (ZrO <sub>2</sub> ) isolators	<b>0</b>
<b>Welded flange, 316L stainless steel, raised face</b> 1" ASME, 150 lb 1" ASME, 300 lb 1" ASME, 600 lb 1½" ASME, 150 lb 1½" ASME, 300 lb 1½" ASME, 600 lb 2" ASME, 150 lb 2" ASME, 300 lb 2" ASME, 600 lb 3" ASME, 150 lb 3" ASME, 300 lb 3" ASME, 600 lb 4" ASME, 150 lb 4" ASME, 300 lb 4" ASME, 600 lb	<b>5 A</b> <b>5 B</b> <b>5 C</b> <b>5 D</b> <b>5 E</b> <b>5 F</b> <b>5 G</b> <b>5 H</b> <b>5 J</b> <b>5 K</b> <b>5 L</b> <b>5 M</b> <b>5 N</b> <b>5 P</b> <b>5 Q</b>	<b>Approvals</b> Dust Ignition Proof: CE, C-TICK, ATEX II 1/2 D, 2 D IP6X T100 °C Intrinsically Safe <sup>1)</sup> CE, C-TICK, ATEX II 1 G EEx ia IIC T6...T4, ATEX II 1/2 D, 2 D IP6X T100 °C Flameproof Enclosure with IS Probe: CE, C-TICK, ATEX II 1/2 G EEx d[ia] IIC T6...T4, ATEX II 1/2 D T100 °C Dust Ignition Proof with IS Probe: CSA/FM Class II, Div. 1, Gr. E, F, G CSA/FM Class III T4 Intrinsically Safe <sup>1)</sup> CSA/FM Class I, Div. 1, Gr. A, B, C, D CSA/FM Class II, Div. 1, Gr. E, F, G CSA/FM Class III T4 Explosion Proof Enclosure with IS Probe: CSA/FM Class I, Div. 1, Gr. A, B, C, D CSA/FM Class II, Div. 1, Gr. E, F, G CSA/FM Class III T4 General Purpose (CSA, FM) General Purpose (CSA, FM, CE, C-TICK)	<b>B</b> <b>C</b> <b>D</b> <b>E</b> <b>F</b> <b>G</b> <b>H</b> <b>J</b>
<b>Welded flange, 316L stainless steel, Type A flat faced</b> DN 25, PN 16 DN 25, PN 40 DN 40, PN 16 DN 40, PN 40 DN 50, PN 16 DN 50, PN 40 DN 80, PN 16 DN 80, PN 40 DN 100, PN 16 DN 100, PN 40	<b>6 A</b> <b>6 B</b> <b>6 C</b> <b>6 D</b> <b>6 E</b> <b>6 F</b> <b>6 G</b> <b>6 H</b> <b>6 J</b> <b>6 K</b>	<b>Enclosure and Lid</b> <u>Aluminum epoxy coated</u> 2 x ½" NPT via adapter - cable inlet, IP65 2 x M20x1.5 cable inlet, IP65 2 x ½" NPT via adapter - cable inlet, IP68 2 x M20x1.5 cable inlet, IP68	<b>A</b> <b>B</b> <b>C</b> <b>D</b>
<b>Probe length</b> (length from flange face) (threaded lengths include process thread) <u>Note: No Y01 needed in order code for standard lengths</u> Standard version, rod 350 mm (13.78") Extended rod, length 500 mm (19.69") Extended rod, length 750 mm (29.53") Extended rod, length 1000 mm (39.37")	<b>0</b> <b>1</b> <b>2</b>	<b>Active Shield Length</b> Standard length - (125 mm threaded, 105 mm flanged) Extended shield - (250 mm threaded, 230 mm flanged) <sup>2)</sup> Extended shield - (400 mm threaded, 380 mm flanged) <sup>3)</sup>	<b>0</b> <b>1</b> <b>2</b>
Add order code Y01 and plain text: "Insertion length ... mm" Extended rod, factory adjusted length 250 ... 499 mm (9.8 ... 19.65") Extended rod, factory adjusted length 500 ... 749 mm (19.69 ... 29.49") Extended rod, factory adjusted length 750 ... 999 mm (29.53 ... 39.3")	<b>A</b> <b>B</b> <b>C</b> <b>D</b> <b>E</b> <b>F</b> <b>G</b>	1) Barrier or Intrinsically safe power supply required for Intrinsically Safe protection 2) Available with Probe version options B to D, F, G only [≥ 500 mm (19.69")] 3) Available with Probe version options C, D, and, G only [≥ 750 mm (29.53")] C) Subject to export regulations AL: N, ECCN: EAR99	
<b>Wetted Seals</b> Graphite	<b>0</b>	<b>Enclosure and Lid</b> <u>Aluminum epoxy coated</u> 2 x ½" NPT via adapter - cable inlet, IP65 2 x M20x1.5 cable inlet, IP65 2 x ½" NPT via adapter - cable inlet, IP68 2 x M20x1.5 cable inlet, IP68	<b>A</b> <b>B</b> <b>C</b> <b>D</b>
		<b>Active Shield Length</b> Standard length - (125 mm threaded, 105 mm flanged) Extended shield - (250 mm threaded, 230 mm flanged) <sup>2)</sup> Extended shield - (400 mm threaded, 380 mm flanged) <sup>3)</sup>	<b>0</b> <b>1</b> <b>2</b>
		1) Barrier or Intrinsically safe power supply required for Intrinsically Safe protection 2) Available with Probe version options B to D, F, G only [≥ 500 mm (19.69")] 3) Available with Probe version options C, D, and, G only [≥ 750 mm (29.53")] C) Subject to export regulations AL: N, ECCN: EAR99	
		<b>Selection and Ordering data</b>	<b>Order code</b>
		<b>Further designs</b> Please add "-Z" to Order No. and specify Order code(s). Total insertion length: enter the total insertion length in plain text description Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text Acceptance test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and ISO 9000 Inspection Certificate Type 3.1 per EN 10204	<b>Y01</b> <b>Y15</b> <b>C11</b> <b>C12</b>
		<b>Operating Instructions</b> Note: The Operating Instructions should be ordered as a separate line on the order. This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and manual library.	<b>See page 5/54</b>
		<b>Accessories</b>	<b>See page 5/54</b>

# Level Measurement

## Point level measurement - Capacitance switches

### Pointek CLS300 - Standard and Digital

Selection and Ordering data	Order No.
<b>Operating Instructions - Standard</b>	
English	C) <b>7ML1998-5JH02</b>
German	C) <b>7ML1998-5JH32</b>
Note: The Operating Instructions should be ordered as a separate line on the order.	
Quick Start manual, multi-language	C) <b>7ML1998-5QY82</b>
This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	
<b>Operating Instructions - Digital</b>	
English	C) <b>7ML1998-5JJ02</b>
German	C) <b>7ML1998-5JJ32</b>
Note: The Operating Instructions should be ordered as a separate line on the order.	
Quick Start manual, multi-language	C) <b>7ML1998-5XA82</b>
This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	
<b>Accessories</b>	
One metallic cable gland M20x1.5, -40 ... +80 °C (-40 ... +176 °F) with integrated shield connection (available for PROFIBUS PA)	<b>7ML1930-1AQ</b>
<u>General Purpose</u>	
1/2" NPT General Purpose Cable Entry IP68/IP69K NEMA6, -40 ... -100 °C (-40 ... -212 °F), cable size 6 ... 12 mm (0.236 ... 0.472")	C) <b>A5E03252530</b>
M20x1.5 General Purpose Cable Entry IP68/IP69K NEMA6,-40 ... -100 °C (-40 ... -212 °F), cable size 7 ... 12 mm (0.275 ... 0.472")	C) <b>A5E03252531</b>
<u>Hazardous Locations</u>	
1/2" NPT EMC rated Cable Gland: Dust Ignition Proof, Flameproof Exd, and Increased Safety ATEX II 2 GD ExtD A21 (Zone 1,Zone 2, Zone 21, Zone 22, and in Gas Groups IIA,IIB and IIC) -60 ... +80 °C IP66,IP67,IP68, NEMA4X, cable sizes 5.5 ... 12 mm (0.216 ... 0.472")	<b>A5E03252527</b>
M20 EMC rated Cable Gland: Dust Ignition Proof, Flameproof Exd, and Increased Safety ATEX II 2 GD ExtD A21 (Zone 1,Zone 2, Zone 21, Zone 22 and in Gas Groups IIA,IIB and IIC) -60 ... +80 °C IP66,IP67,IP68, NEMA4X, cable sizes 5.5 ... 12 mm (0.216 ... 0.472")	<b>A5E03252528</b>
<b>Blind threaded flanges are available. Please contact <a href="mailto:nacc.smpi@siemens.com">nacc.smpi@siemens.com</a> with a completed application data sheet on page 5/9</b>	
<b>Pointek Specials</b>	<b>See page 5/77</b>
C) Subject to export regulations AL: N, ECCN: EAR99	

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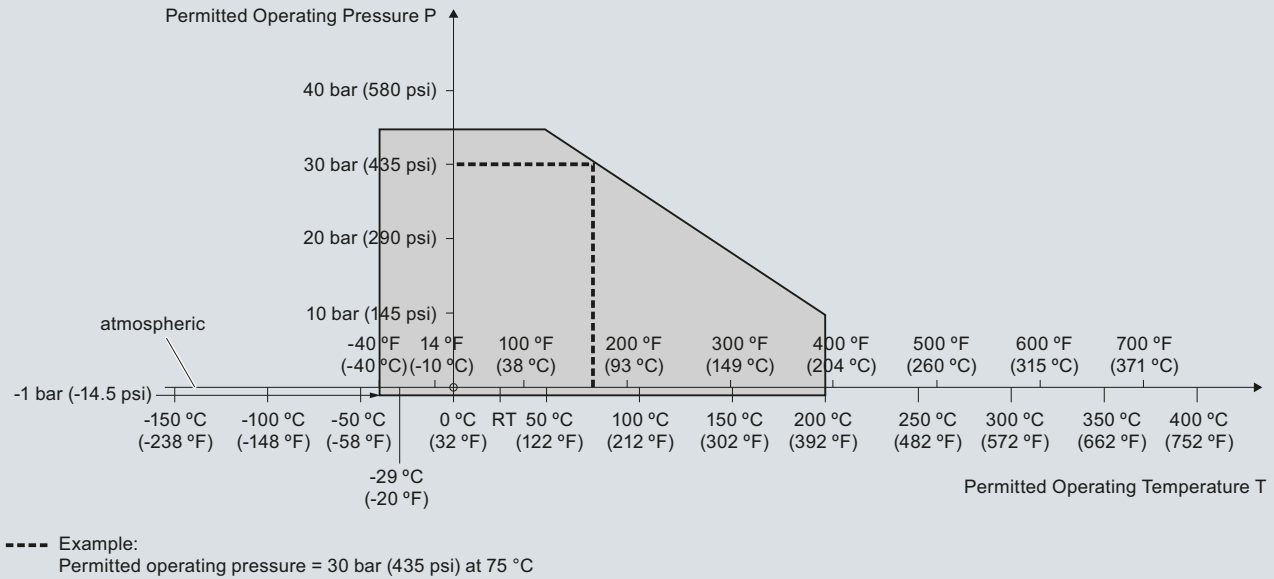
# Level Measurement

## Point level measurement - Capacitance switches

Pointek CLS300 - Standard and Digital

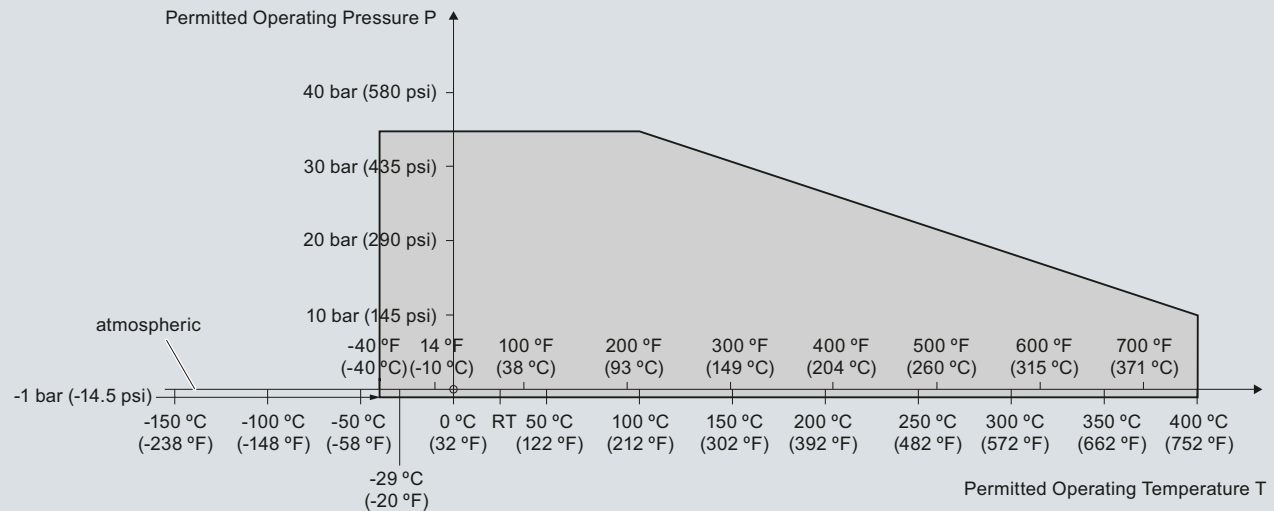
### Characteristic curves

**Pressure/Temperature Curve**  
**CLS300 Extended Rod and Cable Probes**  
**Threaded Process Connections**  
**(7ML5650, 7ML5651, 7ML5660 and 7ML5661)**



Pointek CLS300 Process Pressure/Temperature derating curves (7ML5650, 7ML5651, 7ML5660 and 7ML5661)

**Pressure/Temperature Curve**  
**CLS300 High Temperature Rod Probes**  
**Threaded Process Connections**  
**(7ML5652 and 7ML5662)**



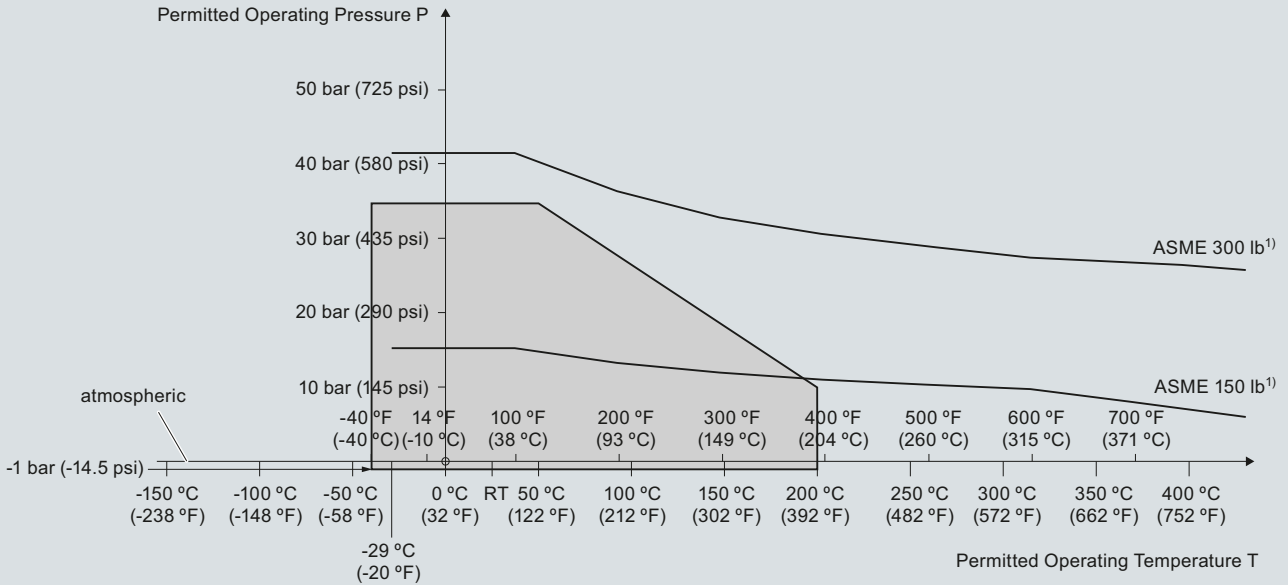
Pointek CLS300 Process Pressure/Temperature derating curves (7ML5652 and 7ML5662)

# Level Measurement

## Point level measurement - Capacitance switches

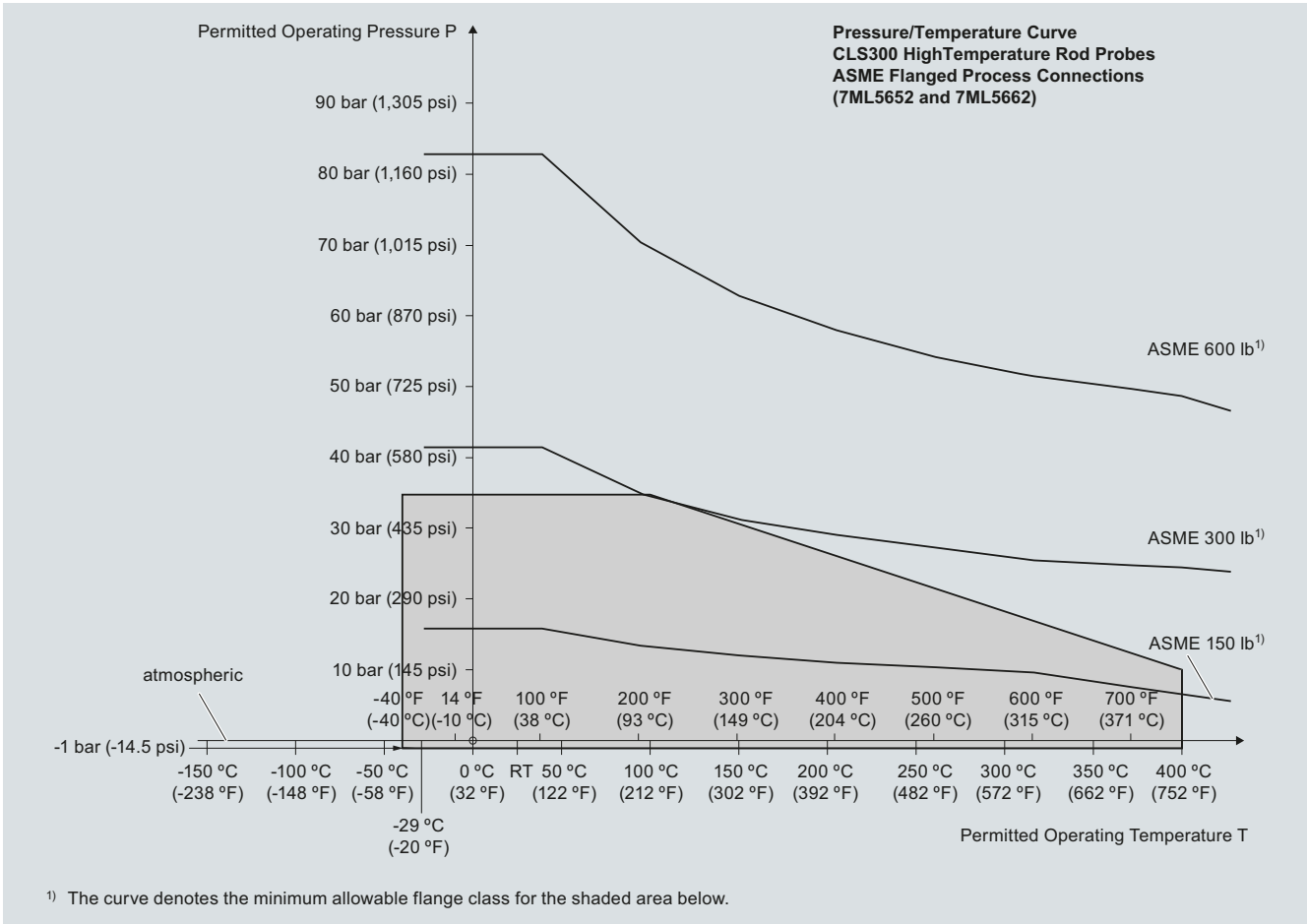
### Pointek CLS300 - Standard and Digital

**Pressure/Temperature Curve**  
**CLS300 Extended Rod and Cable Probes**  
**ASME Flanged Process Connections**  
**(7ML5650, 7ML5651, 7ML5660 and 7ML5661)**



<sup>1)</sup> The curve denotes the minimum allowable flange class for the shaded area below.

Pointek CLS300 Process Pressure/Temperature derating curves (7ML5650, 7ML5651, 7ML5660, and 7ML5661)



<sup>1)</sup> The curve denotes the minimum allowable flange class for the shaded area below.

Pointek CLS300 Process Pressure/Temperature derating curves (7ML5652 and 7ML5662)

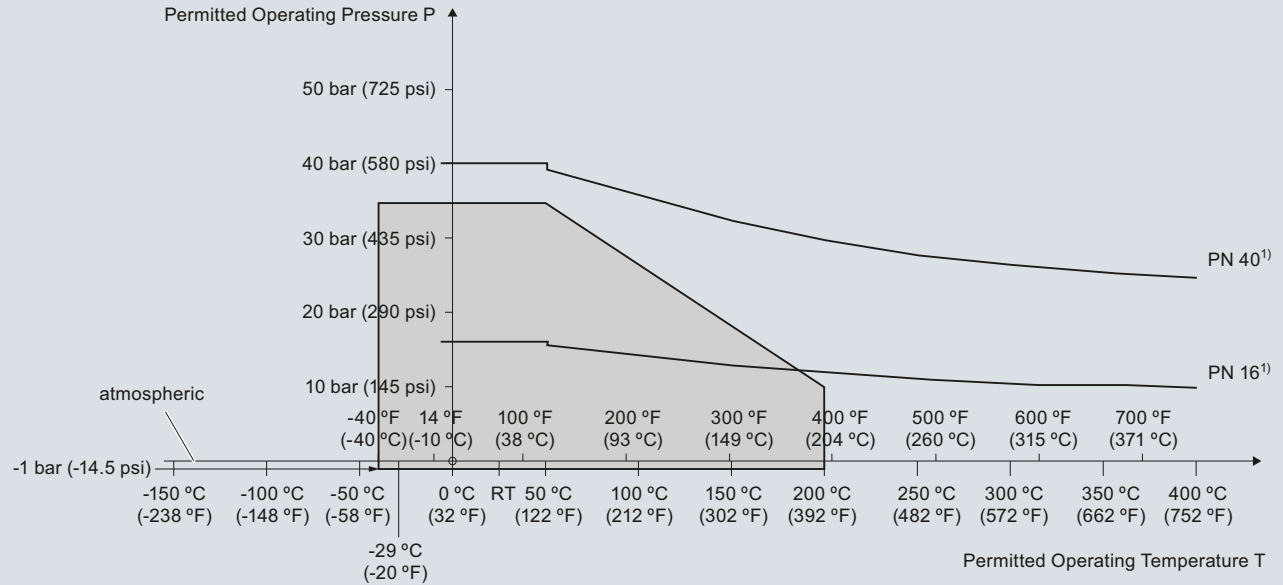


# Level Measurement

## Point level measurement - Capacitance switches

Pointek CLS300 - Standard and Digital

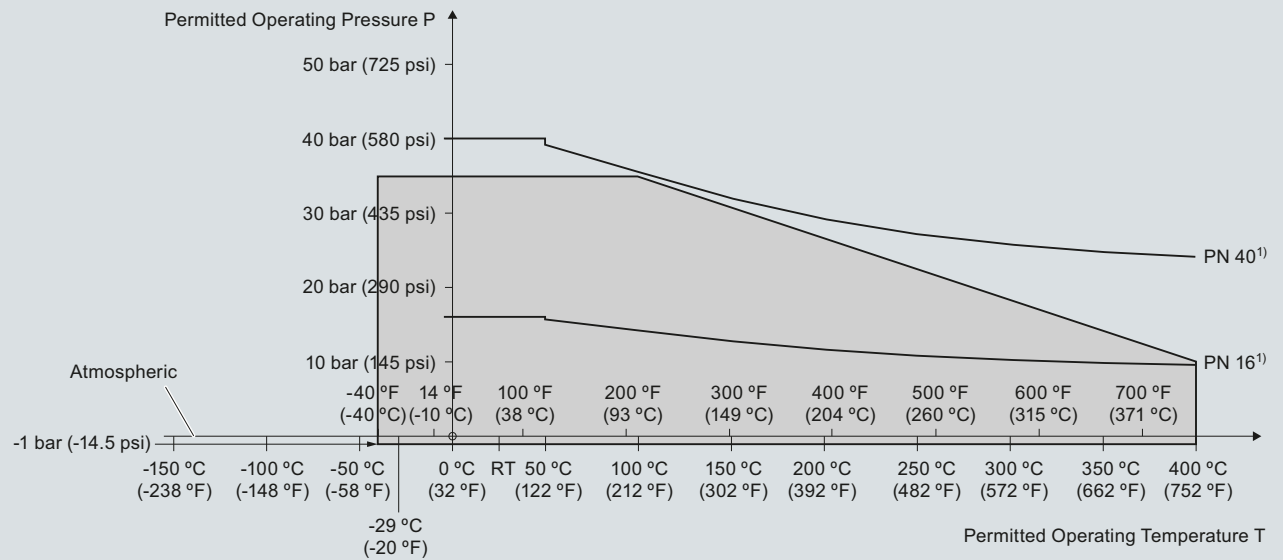
**Pressure/Temperature Curve**  
**CLS300 Extended Rod and Cable Probes**  
**EN Flanged Process Connections**  
**(7ML5650, 7ML5651, 7ML5660 and 7ML5661)**



1) The curve denotes the minimum allowable flange class for the shaded area below.

Pointek CLS300 Process Pressure/Temperature derating curves (7ML5650, 7ML5651, 7ML5660 and 7ML5661)

**Pressure/Temperature Curve**  
**CLS300 High Temperature Rod Probes**  
**EN Flanged Process Connections (7ML56552 and 7ML5662)**



1) The curve denotes the minimum allowable flange class for the shaded area below.

Pointek CLS300 Process Pressure/Temperature derating curves (7ML5652 and 7ML5662)

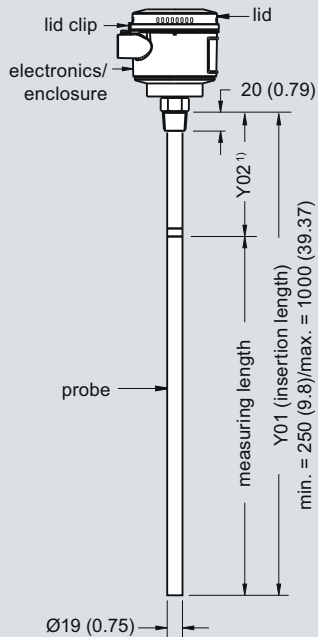
# Level Measurement

## Point level measurement - Capacitance switches

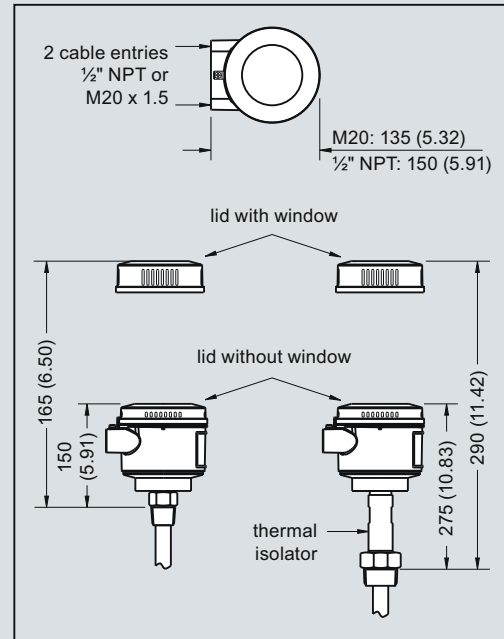
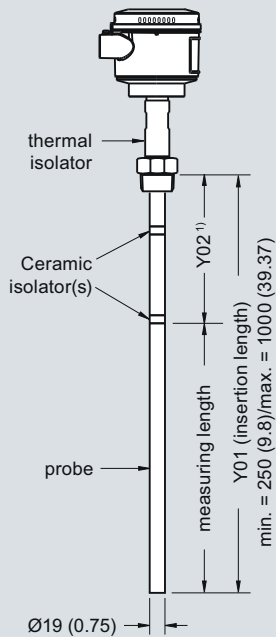
### Pointek CLS300 - Standard and Digital

#### Dimensional drawings

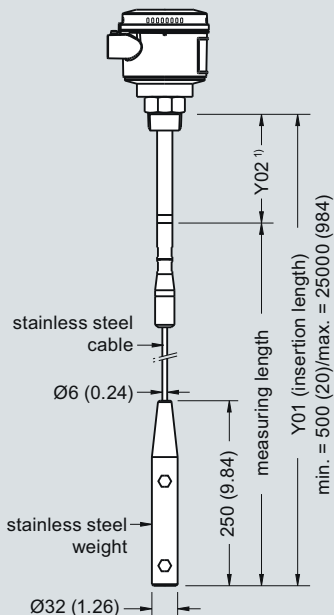
**Rod version**  
Threaded (7ML5650 and 7ML5660)



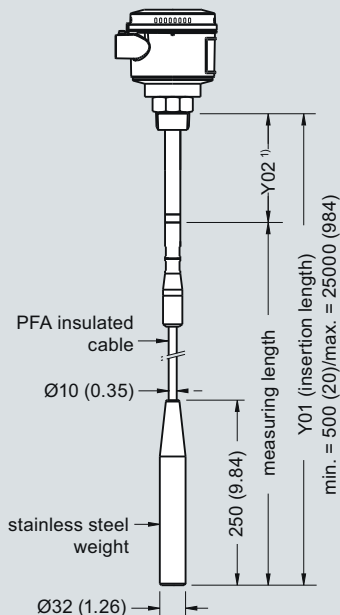
**High temperature rod version**  
Threaded (7ML5652 and 7ML5662)



**Cable version, non-insulated**  
Threaded (7ML5651 and 7ML5661)



**Cable version, insulated**  
Threaded (7ML5651 and 7ML5661)



**Note:**

<sup>1)</sup> Extended Active Shield (Y02): standard length 125 mm (4.92"). Optional active shield lengths: 250 mm (9.84") or 400 mm (15.75").

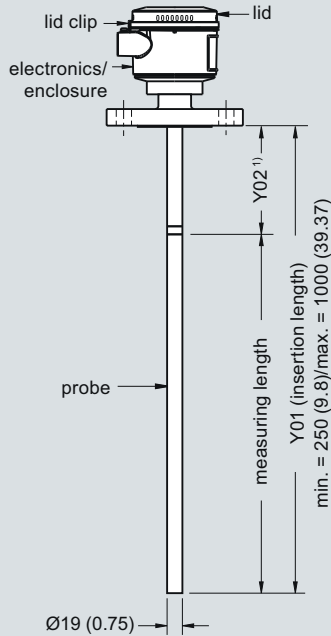
Pointek CLS300 - Threaded Process Connections, dimensions in mm (inch)

# Level Measurement

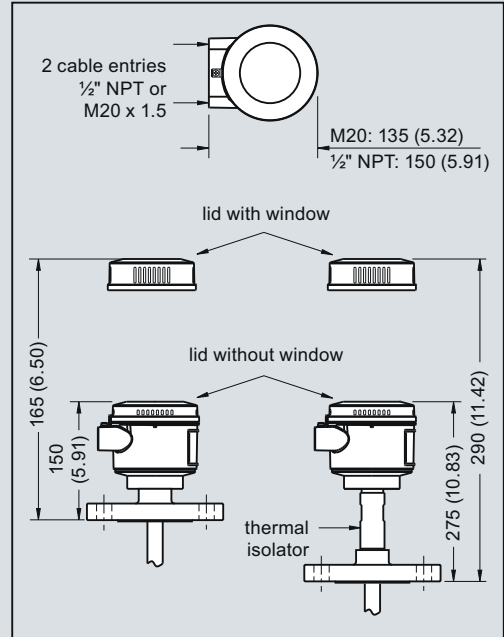
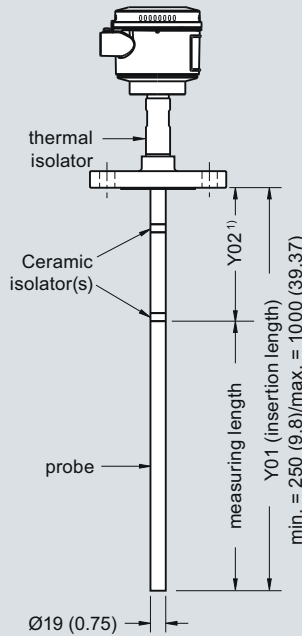
## Point level measurement - Capacitance switches

### Pointek CLS300 - Standard and Digital

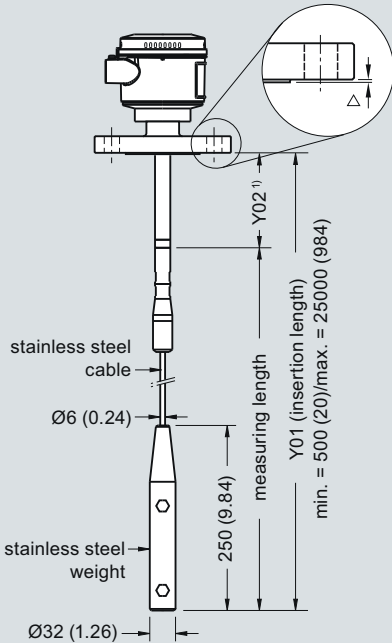
**Rod version**  
Welded flange (7ML5650 and 7ML5660)



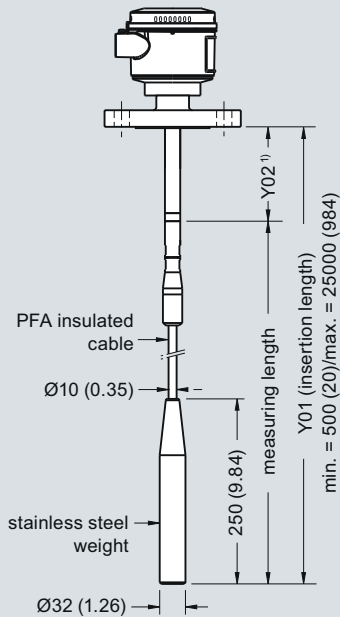
**High temperature rod version**  
Welded flange (7ML5652 and 7ML5662)



**Cable version, non-insulated**  
Welded flange (7ML5651 and 7ML5661)



**Cable version, insulated**  
Welded flange (7ML5651 and 7ML5661)



Flange Facing (raised face)	
Flange Class	Facing thickness
△ ASME 150/300	2 (0.08)
△ ASME 600/900	7 (0.28)
△ PN16/40	2 (0.08)

**Note:**

<sup>1)</sup> Extended Active Shield (Y02): standard length 105 mm (4.13"). Optional active shield lengths: 230 mm (9.06") or 380 mm (14.96"). Insertion length does not include any raised face/gasket face dimension (see Flange Facing Table above)

Pointek CLS300 - Flanged Process Connections, dimensions in mm (inch)

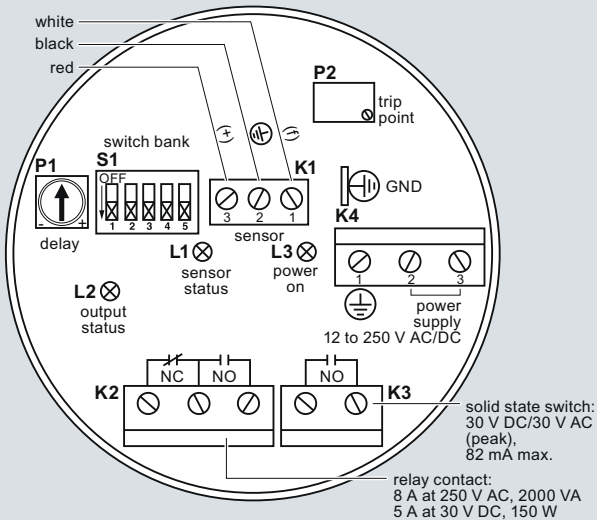
# Level Measurement

## Point level measurement - Capacitance switches

### Pointek CLS300 - Standard and Digital

#### Schematics

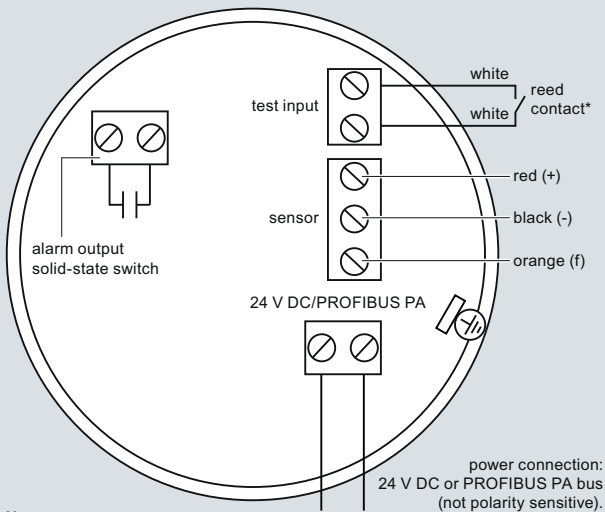
##### Wiring: Pointek CLS300 Standard



**Notes:**

- Identification label is on underside of lid. Switch and Potentiometer settings are for illustration purposes only (Refer to Operation/Setup in manual).
- All field wiring must have insulation suitable for at least 250 V.
- Relay contact terminals are for use with equipment having no accessible live parts and wiring having insulation suitable for at least 250 V.
- Maximum working voltage between adjacent relay contacts shall be 250 V.
- Refer to the Instruction Manual or contact Siemens representative for detailed wiring information.

##### Wiring: Pointek CLS300 Digital



**Notes:**

Refer to the Instruction Manual or contact a Siemens representative for detailed wiring information.

**\*Magnet Activated Sensor Test**

A magnet can be used to test the sensor without opening the lid of the Pointek CLS300 Digital version. Bring the magnet close to the test area indicated on the enclosure. The sensor test starts and finishes automatically after 10 seconds.



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Pointek CLS300 connection

# Level Measurement

## Point level measurement - Capacitance switches

Pointek CLS500

### Overview



Pointek CLS500 is an inverse frequency shift capacitance level switch for detecting interfaces, solids, liquids, toxic and aggressive chemicals in critical conditions of high temperature and pressure

### Benefits

- Patented Active-Shield technology so measurement is unaffected by material buildup in active shield section
- 2-wire loop powered with solid-state switch or 4 to 20/20 to 4 mA output
- Simple push-button calibration and integrated local display
- Full function diagnostics
- HART communications for remote commissioning and inspection

### Application

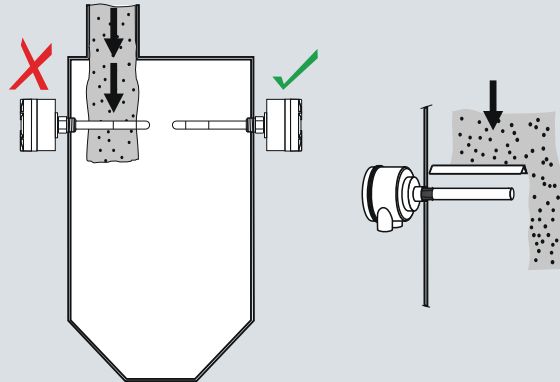
Patented Active-Shield technology ensures that measurement is unaffected by vapours, product deposits, dust and condensation. The unique mechanical probe design coupled with a high performance transmitter gives superior performance in a wide range of level detection applications.

Pointek CLS500's microprocessor-based electronics provide one-point calibration, making setup possible without shutting down your production process.

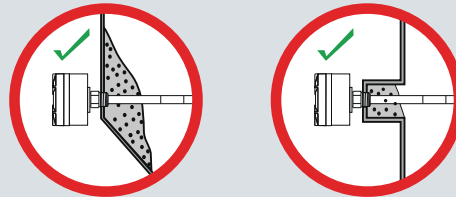
- Key Applications: foam or liquid/foam level, glycol regenerators, high-pressure coalescers, LNG applications

### Configuration

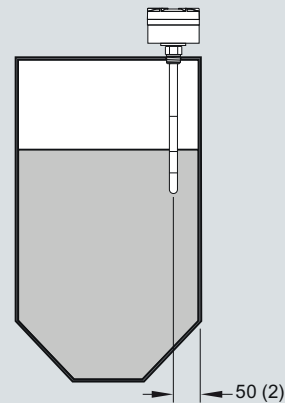
#### Installation



Keep unit out of path of falling material, or protect probe from falling material.



Build up of material in active shield area does not affect switch operation.



Install probe at least 50 mm (2") from tank wall.

Pointek CLS500 installation, dimensions in mm (inch)

# Level Measurement

## Point level measurement - Capacitance switches

### Pointek CLS500

#### Technical specifications

Input		Design	
Measuring range	0 ... 330 pF	Material	
Span	Min. 1 pF	<ul style="list-style-type: none"> <li>Wetted parts material - Standard rod</li> </ul>	316L stainless steel
<b>Output</b>		<ul style="list-style-type: none"> <li>Probe isolation (rod)</li> </ul>	PFA, enamel
Solid-state switch		Probe diameter	
<ul style="list-style-type: none"> <li>Output</li> <li>Protection</li> <li>Max. switching voltage</li> </ul>	Galvanically isolated Against reversed polarity (bipolar) 30 V (DC) 30 V peak (AC)	<ul style="list-style-type: none"> <li>Standard rod version (PFA)</li> <li>High temperature rod version (Enamel)</li> </ul>	16 mm (0.63") Contact <a href="mailto:nacc.smpi@siemens.com">nacc.smpi@siemens.com</a> for details.
<ul style="list-style-type: none"> <li>Max. load current</li> <li>Voltage drop</li> <li>Time delay (pre or post switching)</li> </ul>	82 mA < 1 V, typical at 50 mA 1 ... 60 s	<ul style="list-style-type: none"> <li>High temperature rod version (Stainless steel)</li> </ul>	19 mm (0.75")
Current loop	4 ... 20 mA/20 ... 4 mA	Probe length	
<b>Accuracy (transmitter)</b>		<ul style="list-style-type: none"> <li>Standard rod version (PFA)</li> </ul>	Max. 1000 mm (39.4") with 16 mm (0.63") diameter probe
Temperature stability	0.15 pF (0 pF) or < 0.25 % (typical < 0.1 %) of actual measurement value, whichever is greater over the full temperature range	<ul style="list-style-type: none"> <li>High temperature rod version (Enamel)</li> <li>High temperature rod version (Stainless steel)</li> </ul>	Contact <a href="mailto:nacc.smpi@siemens.com">nacc.smpi@siemens.com</a> for details.
Non-linearity and repeatability	0.1 % of full scale and actual measurement respectively	Process connection of probe	Max. measuring length 1000 mm (39.4") with 19 mm (0.75") diameter probe
Accuracy	Deviation < 0.1 % of measured value	<ul style="list-style-type: none"> <li>Threaded mounting</li> </ul>	NPT [(Taper), ANSI/ASME B1.20.1] R [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] G [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]
<b>Rated operating conditions<sup>1)</sup></b>		<ul style="list-style-type: none"> <li>Flange mounting</li> </ul>	ASME, EN 1092-1
Installation conditions		Enclosure	
<ul style="list-style-type: none"> <li>Location</li> </ul>	Indoor/outdoor	<ul style="list-style-type: none"> <li>Material</li> </ul>	Aluminium, epoxy-coated (Stainless steel option available). Contact <a href="mailto:nacc.smpi@siemens.com">nacc.smpi@siemens.com</a>
Ambient conditions		<ul style="list-style-type: none"> <li>Cable inlet</li> <li>Degree of protection</li> </ul>	2 x 1/2" NPT Type 4X/NEMA4X/IP65, IP68
<ul style="list-style-type: none"> <li>Ambient temperature (transmitter)</li> <li>Installation category</li> <li>Pollution degree</li> </ul>	-40 ... +85 °C (-40 ... +185°F) <sup>2)</sup> I 4	<b>Power supply</b>	Max. 33 V DC
Medium conditions		<b>Features</b>	
<ul style="list-style-type: none"> <li>Relative dielectric constant <math>\epsilon_r</math></li> <li>Process temperature</li> </ul>	Min. 1.5 Temperature ratings are pressure dependent. See Pressure/Temperature curves on page 5/67.	Measurement current signalling	NAMUR NE 43
<ul style="list-style-type: none"> <li>Standard (PFA)</li> <li>High temperature stainless steel version with enamel insulation and thermal isolator</li> <li>High temperature stainless steel version with thermal isolator</li> <li>Cryogenic version</li> </ul>	-50 ... +200 °C (-58 ... +392 °F) Contact <a href="mailto:nacc.smpi@siemens.com">nacc.smpi@siemens.com</a>	Safety	Inputs/outputs fully galvanically isolated Polarity-insensitive current loop Fully potted Integrated safety barrier
	-60 ... +400 °C (-76 ... +752 °F) -200 ... +200 °C (-328 ... +392 °F) Contact <a href="mailto:nacc.smpi@siemens.com">nacc.smpi@siemens.com</a> for details.	<ul style="list-style-type: none"> <li>Diagnostics with fault alarm when:</li> </ul>	Primary variable (PV) out of limits, system failure in measurement circuit, deviation between A/D and D/A converter, check sum, watch dog and self-checking facility
Process pressure	Pressure rating of process seal is temperature dependent. See Pressure/Temperature curves on page 5/67.	<ul style="list-style-type: none"> <li>Function rotary switch</li> <li>SMART communication</li> </ul>	Positions 0 ... 9, A ... F Conforming to HART Communication Foundation (HCF)
<ul style="list-style-type: none"> <li>Standard (PFA)</li> <li>High temperature version (Enamel)<sup>3)</sup></li> <li>High temperature version (Stainless steel)</li> </ul>	-1 ... +150 bar g (-14.6 ... +2175 psi g) Contact <a href="mailto:nacc.smpi@siemens.com">nacc.smpi@siemens.com</a>		
	-1 ... +35 bar g (-14.6 ... +507.6 psi g)		

# Level Measurement

## Point level measurement - Capacitance switches

Pointek CLS500

### Certificates and approvals

General Purpose	CE, CSA/FM, C-TICK
Non incendive/Non sparking	CSA/FM Class I, Div. 2, Groups A, B, C, D T4 ATEX II 3G GD EEx n A [ib] IIC T6 to T4 T100 °C
Dust Ignition Proof	CSA/FM Class II and III, Div. 1, Groups E, F, G T4 ATEX II 1/2 GD EEx d [ia] T6 to T1 T100 °C
Explosion Proof	FM Class 1, Div. 1, Groups A, B, C, D T4 ATEX II 1/2 GD EEx d [ia] IIC T6 to T1 T100 °C
Marine	Lloyds Register of Shipping, Categories ENV1, ENV2, ENV3, ENV5, Bureau Veritas

- 1) When operation is in areas classified as hazardous, observe restrictions according to relevant certificate. See also Pressure/Temperature curves on page 5/67.
- 2) Thermal isolator is used if process connection temperature exceeds +85 °C (+185 °F)
- 3) Enamel insulation is available as a special order item, subject to application review. Please complete the Application Questionnaire on page 5/9 and contact [nacc.smpi@siemens.com](mailto:nacc.smpi@siemens.com)

Pointek CLS500 probe version	Standard	HT Series
Process connection types	Standard (PFA) (7ML5601, 7ML5602, 7ML5603)	High Temperature (Enamel or Stainless steel) (7ML5604)
Threaded	Available as standard	–
Flange	Available as standard	Available as standard
<b>Process connection materials</b>		
316L stainless steel	Available as standard	Available as standard
<b>Probe insulation</b>		
None	–	HT Stainless: available as standard
PFA	Available as standard	–
Enamel		HT Enamel: available as special order <sup>1)</sup>
<b>Length parameters</b>		
Max. rod length	1000 mm (40")	1000 mm (40")
<b>Process conditions<sup>2)</sup></b>		
Max. process pressure	150 bar g (2175 psi g)	Stainless steel: <sup>3)</sup> 35 bar g (507 psi g) Enamel: <sup>3)</sup> 345 bar g (5004 psi g)
Max. process temperature	+200 °C (+392 °F)	+400 °C (+752 °F)

- 1) Enamel insulation is available as a special order item, subject to application review. Please complete the Application Questionnaire on page 5/9 and contact [nacc.smpi@siemens.com](mailto:nacc.smpi@siemens.com)
  - 2) When operation is in areas classified as hazardous, observe restrictions according to relevant certificate. See also Pressure/Temperature curves on page 5/67. Pressure rating of process seal is temperature dependent. See Pressure/Temperature curves on page 5/67.
  - 3) Pressure rating of process seal is temperature dependent. See Pressure/Temperature curves on page 5/67.
- Not available as standard



# Level Measurement

## Point level measurement - Capacitance switches

### Pointek CLS500

Selection and Ordering data	Order No.
<b>Pointek CLS500, threaded</b> Inverse frequency shift capacitance level switch for detecting interfaces, solids, liquids, toxic and aggressive chemicals in critical conditions of extreme temperature and pressure.	C) 7 ML 5 6 0 1 - A 0
<b>Electronic transmitter</b> No transmitter supplied MSP 2002-1 (330 pF)	0 1
<b>Process connection</b> ¾" 1" 1¼" 1½" 2"	A B C D E
<b>Threaded connection and rating</b> NPT [(Taper), ANSI/ASME B1.20.1] R [(BSPT), EN 10226/PT (JIS-T) JIS B 0203] G [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	A B D
<b>Probe insulation/material of process connection</b> PFA insulation/316L stainless steel	1
<b>Approvals</b> General Purpose: CE, CSA/FM, C-TICK CSA/FM Class I, Div. 2, Groups A, B, C, D T4; ATEX II 3GD 2D EEx nA [ib] IIC T6 to T4 T100 °C; CSA/FM Class II and III Div. 1, Groups E, F, G T4 ATEX II 1/2 GD EEx d [ja] IIC T6 to T1 T100 °C FM Class I, Div. 1, Groups A, B, C, D T4	1 2 4 6
<b>Probe/electrode diameter</b> 16 mm (0.63") rigid rod, minimum insertion length 200 mm (7.9"), maximum insertion length 1000 mm (39.4") <sup>1)</sup>	1
<b>Thermal isolator/remote version</b> Rigid thermal isolator [for process connection temperature over +85 °C (+185 °F)] No thermal isolator	A B

<sup>1)</sup> Add order code Y01 and Y02 in plain text:  
 "Insertion/active shield length to mm"

C) Subject to export regulations AL: N, ECCN: EAR99

Selection and Ordering data	Order code
<b>Further designs</b> Please add "-Z" to Order No. and specify Order code(s).	
Total insertion length: enter the total insertion length in plain text description	Y01
Active Shield length - minimum length is 50 mm Y02: to mm <sup>1)</sup>	Y02
Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text	Y15
Acceptance test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and ISO 9000	C11
Inspection Certificate Type 3.1 per EN 10204	C12
<b>Operating Instructions</b> Note: The Operating Instructions should be ordered as a separate line on the order. This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and manual library.	See page 5/66
<b>Pointek Specials</b>	See page 5/77

<sup>1)</sup> See dimension drawings on page 5/74 for further explanation of Y02

Selection and Ordering data	Order No.
<b>Pointek CLS500, welded flange</b> Inverse frequency shift capacitance level switch for detecting interfaces, solids, liquids, toxic and aggressive chemicals in critical conditions of extreme temperature and pressure.	C) 7 ML 5 6 0 2 - A 0
<b>Electronic transmitter</b> MSP 2002-1 (330 pF)	1
<b>Process connection and pressure rating</b> <u>Welded flange, 316L stainless steel, raised face</u> 2" ASME, 150 lb 2" ASME, 300 lb 3" ASME, 150 lb 3" ASME, 300 lb <sup>1)</sup> 4" ASME, 150 lb <sup>1)</sup> 4" ASME, 300 lb <sup>1)</sup> 6" ASME, 150 lb <sup>1)</sup> 6" ASME, 300 lb <sup>1)</sup> <u>Welded flange, 316L stainless steel, Type A flat faced</u> DN 50 PN 16 DN 50 PN 25 DN 80 PN 16 DN 80 PN 25 DN 100 PN 16 <sup>1)</sup> DN 125 PN 16 <sup>1)</sup> (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)	AA AB BA BB CA CB DA DB
<b>Probe insulation/material of process connection</b> PFA insulation/316L stainless steel	EC ED FC FD GC HC
<b>Approvals</b> General Purpose CSA/FM Class I, Div. 2, Groups A, B, C, D T4; ATEX II 3G 2D EEx nA [ib] IIC T6 to T4 T100 °C; CSA/FM Class II and III Div. 1, Groups E, F, G T4 ATEX II 1/2 GD EEx d [ja] IIC T6 to T1 T100 °C FM Class I, Div. 1, Groups A, B, C, D T4	1 2 4 6
<b>Probe/electrode diameter</b> 16 mm (0.63") rigid rod, min. length 200 mm (7.9"), max. length 1000 mm (39.4")	1
<b>Thermal isolator</b> Rigid thermal isolator [for process temperature over +85 °C (+185 °F)] No thermal isolator	A B

<sup>1)</sup> Custom shipping methods required. Contact factory for more details.

Selection and Ordering data	Order code
<b>Further designs</b> Please add "-Z" to Order No. and specify Order code(s).	
Total insertion length: enter the total insertion length in plain text description	Y01
Active Shield length - minimum length is 50 mm.Y02: to mm <sup>1)</sup>	Y02
Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text	Y15
Acceptance test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and ISO 9000	C11
Inspection Certificate Type 3.1 per EN 10204	C12
<b>Operating Instructions</b> Note: The Operating Instructions should be ordered as a separate line on the order. This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and manual library.	See page 5/66
<b>Pointek Specials</b>	See page 5/77

<sup>1)</sup> See dimensional drawings on page 5/74 for further explanation of Y02

# Level Measurement

## Point level measurement - Capacitance switches

Pointek CLS500

Selection and Ordering data	Order No.	Selection and Ordering data	Order code
<b>Pointek CLS500, single piece flange</b> Inverse frequency shift capacitance level switch for detecting interfaces, solids, liquids, toxic and aggressive chemicals in critical conditions of extreme temperature and pressure.	C) 7 ML 5 6 0 3 - A 0	<b>Further designs</b> Please add "-Z" to Order No. and specify Order code(s).  Total insertion length: enter the total insertion length in plain text description  Active Shield length - minimum length is 50 mm.Y02: to mm <sup>1)</sup>  Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text  Acceptance test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and ISO 9000  Inspection Certificate Type 3.1 per EN 10204	Y01  Y02  Y15  C11  C12
<b>Electronic transmitter</b> MSP 2002-1 (330 pF)	1	<b>Operating Instructions</b> Note: The Operating Instructions should be ordered as a separate line on the order. This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and manual library.	See page 5/66
<b>Process connection and pressure rating</b> <u>Single piece flange, 316L stainless steel, raised face</u> 2" ASME, 150 lb 2" ASME, 300 lb 3" ASME, 150 lb 3" ASME, 300 lb <sup>1)</sup> 4" ASME, 150 lb <sup>1)</sup> 4" ASME, 300 lb <sup>1)</sup> 6" ASME, 150 lb <sup>1)</sup> 6" ASME, 300 lb <sup>1)</sup> <u>Single piece flange, 316L stainless steel, Type B1 raised faced</u> DN 50 PN 16 DN 50 PN 25 DN 80 PN 16 DN 80 PN 25 DN 100 PN 16 <sup>1)</sup> DN 100 PN 25 <sup>1)</sup> DN 125 PN 16 <sup>1)</sup>	AA AB BA BB CA CB DA DB  EC ED FC FD GC GD HC	<b>Accessories</b> 1) See dimensional drawings on page 5/74 for further explanation of Y02	See page 5/77
<b>Probe insulation/material of process connection</b> PFA insulation/316L stainless steel	1		
<b>Approvals</b> General Purpose: CE, CSA/FM, C-TICK CSA/FM Class I, Div. 2, Groups A, B, C, D T4; ATEX II 3G 2D EEx nA [ib] IIC T6 to T4 T100 °C; CSA/FM Class II and III Div. 1, Groups E, F, G T4 ATEX II 1/2 GD EEx d [ja] IIC T6 to T1 T100 °C FM Class I, Div. 1, Groups A, B, C, D T4	1 2 4 6		
<b>Probe/electrode diameter</b> 16 mm (0.63") rigid rod, maximum length 1000 mm (39.4") (Y01)	1		
<b>Thermal isolator</b> Rigid thermal isolator [for process connection temperature over +85 °C (+185 °F)] No thermal isolator	A B		

<sup>1)</sup> Custom shipping methods required. Contact factory for more details

C) Subject to export regulations AL: N, ECCN: EAR99

# Level Measurement

## Point level measurement - Capacitance switches

### Pointek CLS500

Selection and Ordering data	Order No.
<b>Pointek CLS500 High temperature</b>	C) 7ML5604-
Inverse frequency shift capacitance level switch for detecting interfaces, solids, liquids, toxic and aggressive chemicals in critical conditions of extreme temperature and pressure.	A
<b>Electronic transmitter</b>	
MSP 2002-1 (330 pF)	1
<b>Process connection and pressure rating</b>	
<u>316L stainless steel, raised face<sup>1)</sup></u>	
2" ASME, 150 lb	A 1
2" ASME, 300 lb	A 2
2" ASME, 600 lb	A 3
2" ASME, 900 lb	A 4
3" ASME, 150 lb	B 1
3" ASME, 300 lb <sup>2)</sup>	B 2
3" ASME, 600 lb <sup>2)</sup>	B 3
3" ASME, 900 lb <sup>2)</sup>	B 4
4" ASME, 150 lb <sup>2)</sup>	C 1
4" ASME, 300 lb <sup>2)</sup>	C 2
4" ASME, 600 lb <sup>2)</sup>	C 3
4" ASME, 900 lb <sup>2)</sup>	C 4
6" ASME, 150 lb <sup>2)</sup>	D 1
6" ASME, 300 lb <sup>2)</sup>	D 2
6" ASME, 600 lb <sup>2)</sup>	D 3
6" ASME, 900 lb <sup>2)</sup>	D 4
<u>316L stainless steel, Type B1 raised face<sup>3)</sup></u>	
DN 50 PN 16	E 1
DN 50 PN 25	E 2
DN 50 PN 40	E 3
DN 50 PN 63	E 4
DN 80 PN 16	F 1
DN 80 PN 25	F 2
DN 80 PN 40 <sup>2)</sup>	F 3
DN 80 PN 63 <sup>2)</sup>	F 4
DN 100 PN 16 <sup>2)</sup>	G 1
DN 100 PN 25 <sup>2)</sup>	G 2
DN 100 PN 40 <sup>2)</sup>	G 3
DN 100 PN 63 <sup>2)</sup>	G 4
DN 125 PN 16 <sup>2)</sup>	H 1
DN 125 PN 25 <sup>2)</sup>	H 2
DN 125 PN 40 <sup>2)</sup>	H 3
DN 125 PN 63 <sup>2)</sup>	H 4
(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)	

Selection and Ordering data	Order No.
<b>Pointek CLS500 High temperature</b>	C) 7ML5604-
Inverse frequency shift capacitance level switch for detecting interfaces, solids, liquids, toxic and aggressive chemicals in critical conditions of extreme temperature and pressure.	A
<b>Probe insulation/material of process connection</b>	
<b>NOTE:</b>	
<b>Enamel insulation is available as a special order item, subject to application review. Please complete the Application Questionnaire on page 5/9 and contact <a href="mailto:nacc.smpi@siemens.com">nacc.smpi@siemens.com</a></b>	
No insulation/316L stainless steel <sup>4) 5)</sup>	1
<b>Stilling well</b>	
No stilling well	0
<b>Approvals</b>	
General Purpose	A
CSA/FM Class I, Div. 2, Groups A, B, C, D T4;	B
ATEX II 3G 2D EEx nA [ib] IIC T6 to T4 T100 °C;	
CSA/FM Class II and III Div. 1, Groups E, F, G T4	
ATEX II 1/2 GD EEx d [ia] IIC T6 to T1 T100 °C	D
FM Class I, Div. 1, Groups A, B, C, D T4	F
<b>Probe/electrode diameter</b>	
Maximum length 1000 mm (39.37") <sup>5)</sup>	A
<b>Thermal isolator</b>	
Rigid thermal isolator	1
1) Welded flange for no insulation option only	
2) Custom shipping methods required	
3) Contact factory for more details. Flat faced flange for no insulation option only	
4) Non-conductive material only, stainless steel non-insulated probe diameter 19 mm (0.75")	
5) Add order code Y01 and Y02 in plain text: "Insertion/active shield length to mm" Minimum insertion length depends on probe version selected. See dimensional drawings on page 5/74 for more details.	
C) Subject to export regulations AL: N, ECCN: EAR99	

Selection and Ordering data	Order code
<b>Further designs</b>	
Please add "-Z" to Order No. and specify Order code(s).	
Total insertion length: enter the total insertion length in plain text description	<b>Y01</b>
Active Shield length - minimum length is 50 mm. Y02: to mm <sup>1)</sup>	<b>Y02</b>
Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text	<b>Y15</b>
Acceptance test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and ISO 9000	<b>C11</b>
Inspection Certificate Type 3.1 per EN 10204	<b>C12</b>
<b>Operating Instructions</b>	
English	<b>7ML1998-5GG02</b>
German	<b>7ML1998-5GG31</b>
French	<b>7ML1998-5GG11</b>
Dutch	<b>7ML1998-5GG41</b>
Note: The Operating Instructions should be ordered as a separate line on the order. This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	
<b>Pointek Specials</b>	<b>See page 5/77</b>

1) See dimensional drawings on page 5/74 for further explanation of Y02

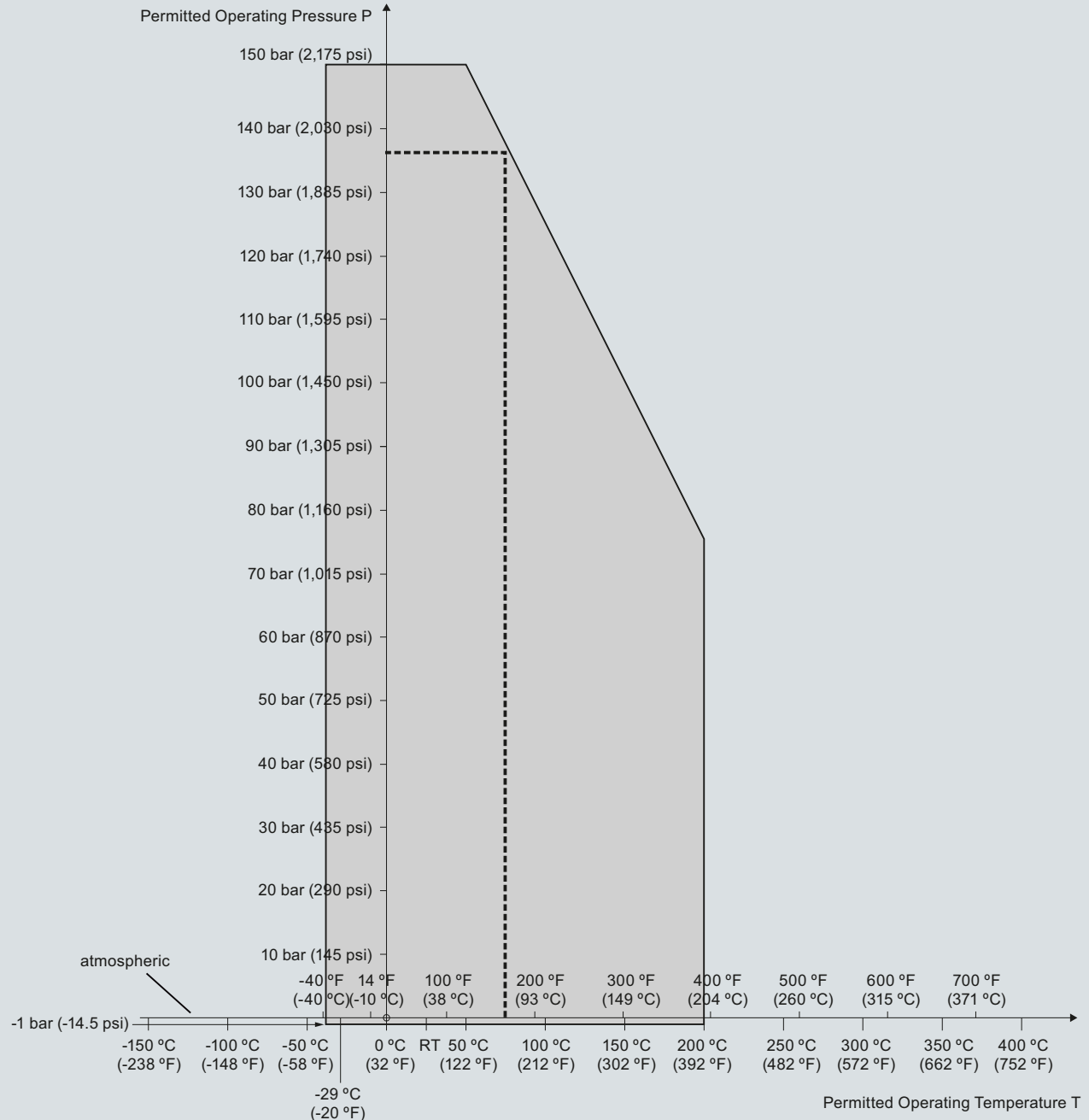
# Level Measurement

## Point level measurement - Capacitance switches

Pointek CLS500

### Characteristic curves

Pressure/Temperature Curve  
CLS500 Rod Probes  
Threaded Process Connections  
(7ML5601)



--- Example:  
Permitted operating pressure = 137 bar (1,988 psi) at 75 °C (167 °F)

Pointek CLS500 Process Pressure/Temperature derating curves (7ML5601)

5

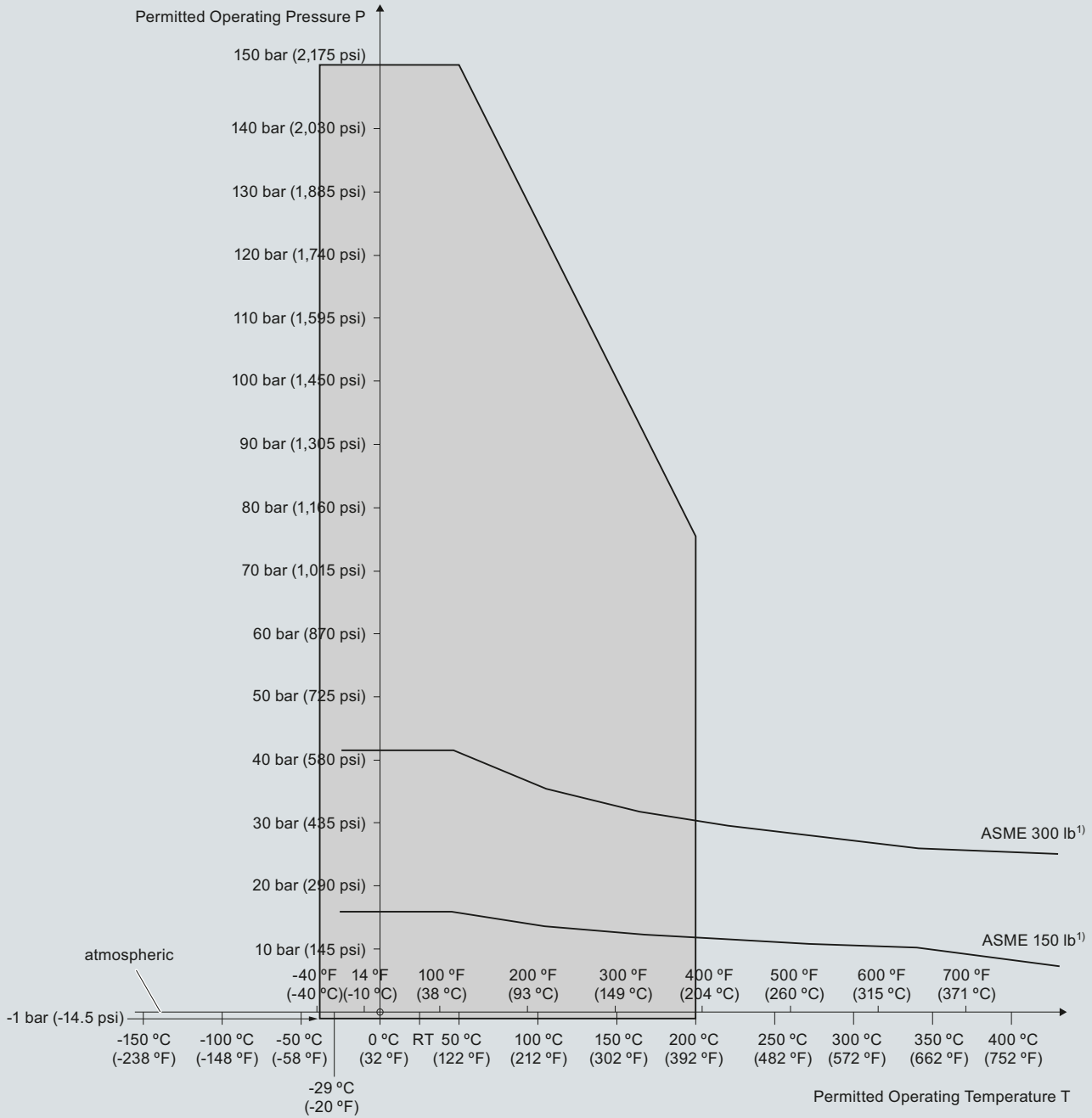
# Level Measurement

## Point level measurement - Capacitance switches

### Pointek CLS500

**Pressure/Temperature Curve**  
**CLS500 Rod Probes**  
**ASME Flanged Process Connections**  
**(7ML5602 and 7ML5603)**

5



<sup>1)</sup> The curve denotes the minimum allowable flange class for the shaded area below.

Pointek CLS500 Process Pressure/Temperature derating curves (7ML5602 and 7ML5603)

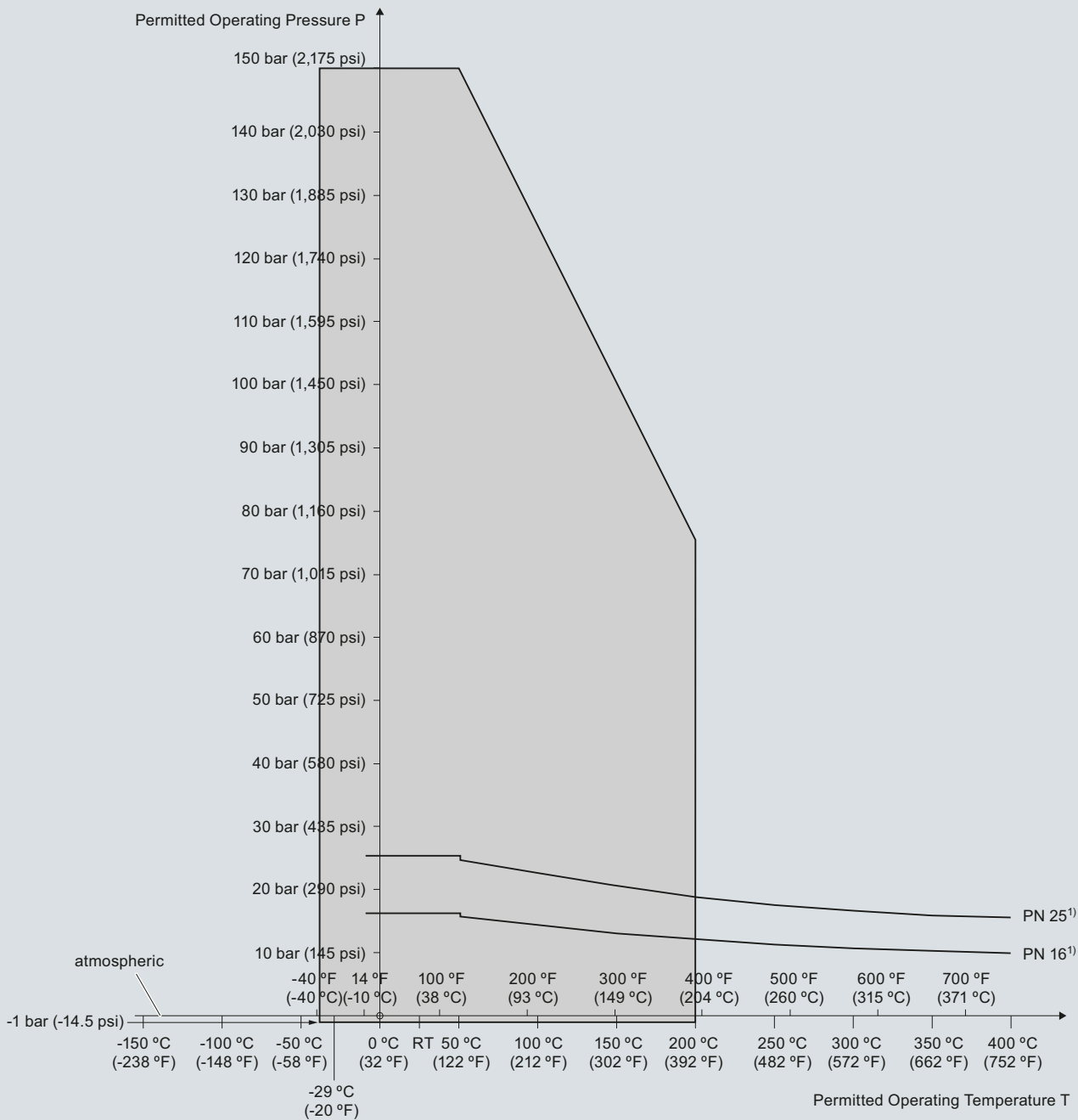
# Level Measurement

## Point level measurement - Capacitance switches

Pointek CLS500

5

**Pressure/Temperature curve**  
**CLS500 Rod Probes**  
**EN Flanged process connections**  
**(7ML5602 and 7ML5603)**



<sup>1)</sup> The curve denotes the minimum allowable flange class for the shaded area below.

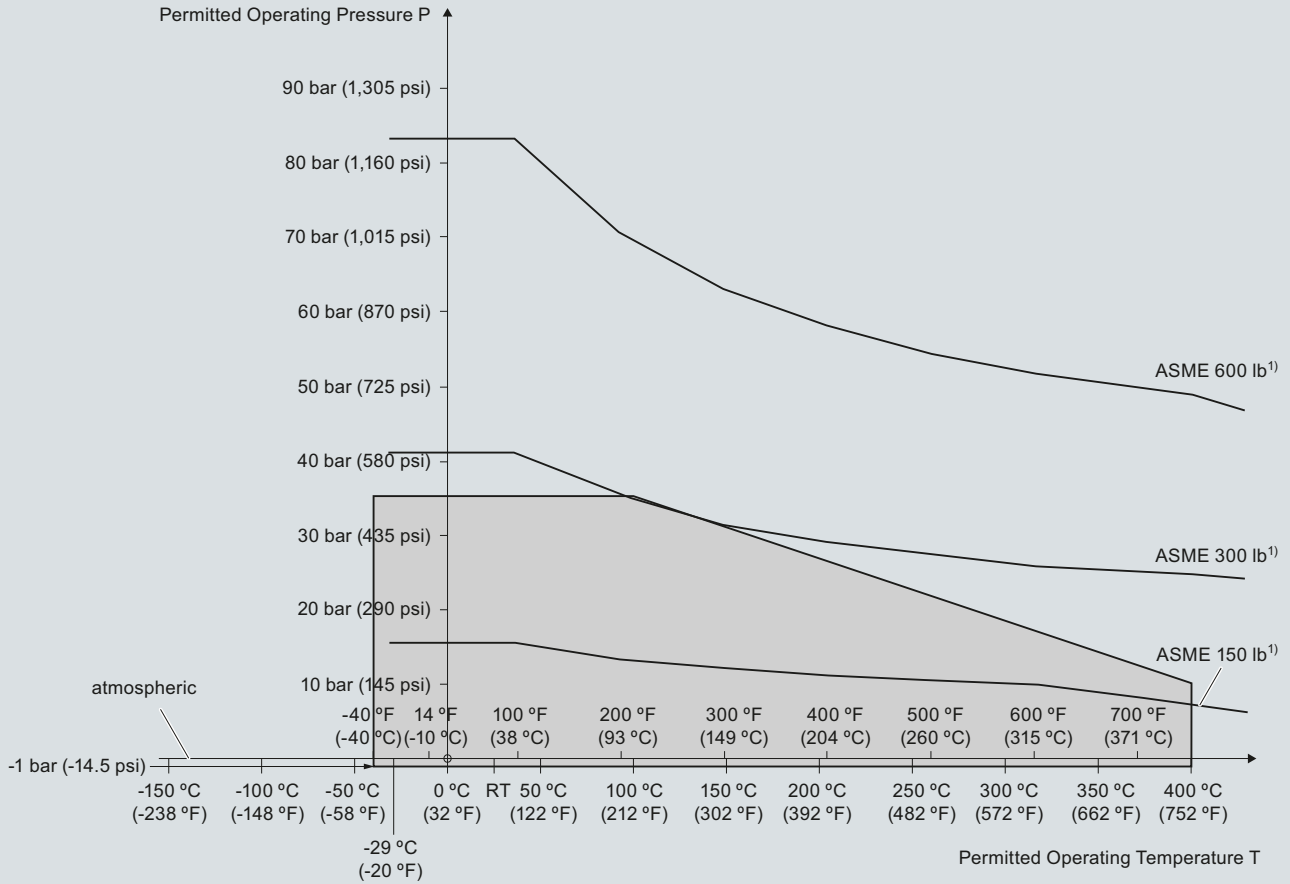
Pointek CLS500 Process Pressure/Temperature derating curves (7ML5602 and 7ML5603)

# Level Measurement

## Point level measurement - Capacitance switches

### Pointek CLS500

**Pressure/Temperature Curve**  
**CLS500 HighTemperature (no insulation)**  
**ASME Flanged Process Connections**  
**(7ML5604)**



<sup>1)</sup> The curve denotes the minimum allowable flange class for the shaded area below.

Pointek CLS500 Process Pressure/Temperature derating curves (7ML5604)

5

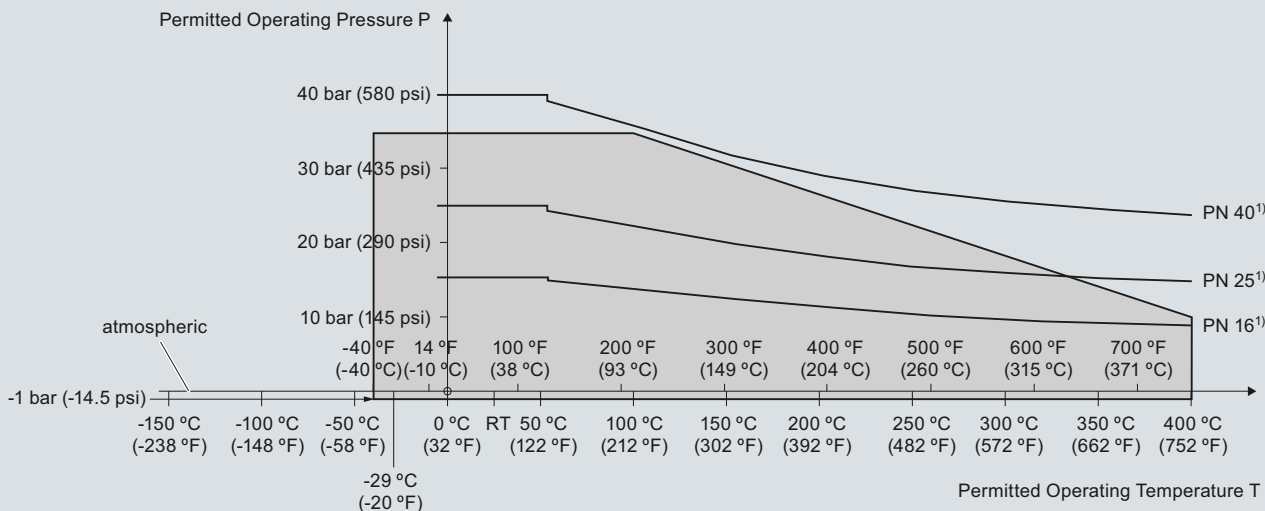


# Level Measurement

## Point level measurement - Capacitance switches

Pointek CLS500

**Pressure/Temperature Curve**  
**CLS500 HighTemperature (no insulation)**  
**EN Flanged Process Connections**  
**(7ML5604)**



1) The curve denotes the minimum allowable flange class for the shaded area below.

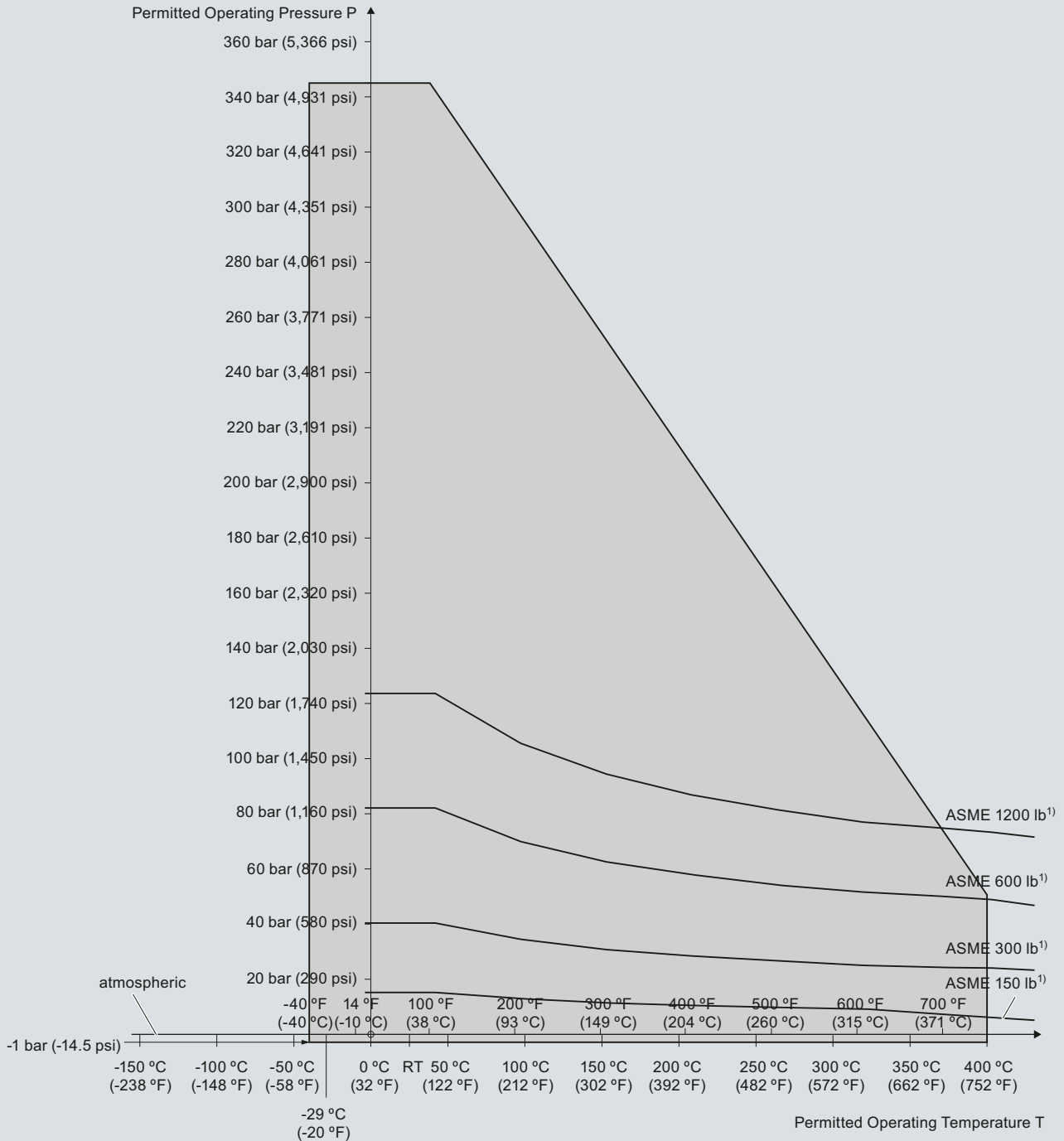
Pointek CLS500 Process Pressure/Temperature derating curves (7ML5604)

# Level Measurement

## Point level measurement - Capacitance switches

### Pointek CLS500

**Pressure/Temperature Curve**  
**CLS500 HighTemperature Enamel Rod Probes**  
**ASME Flanged Process Connections (7ML5604)**



<sup>1)</sup> The curve denotes the minimum allowable flange class for the shaded area below.

Pointek CLS500 Process Pressure/Temperature derating curves (7ML5604)

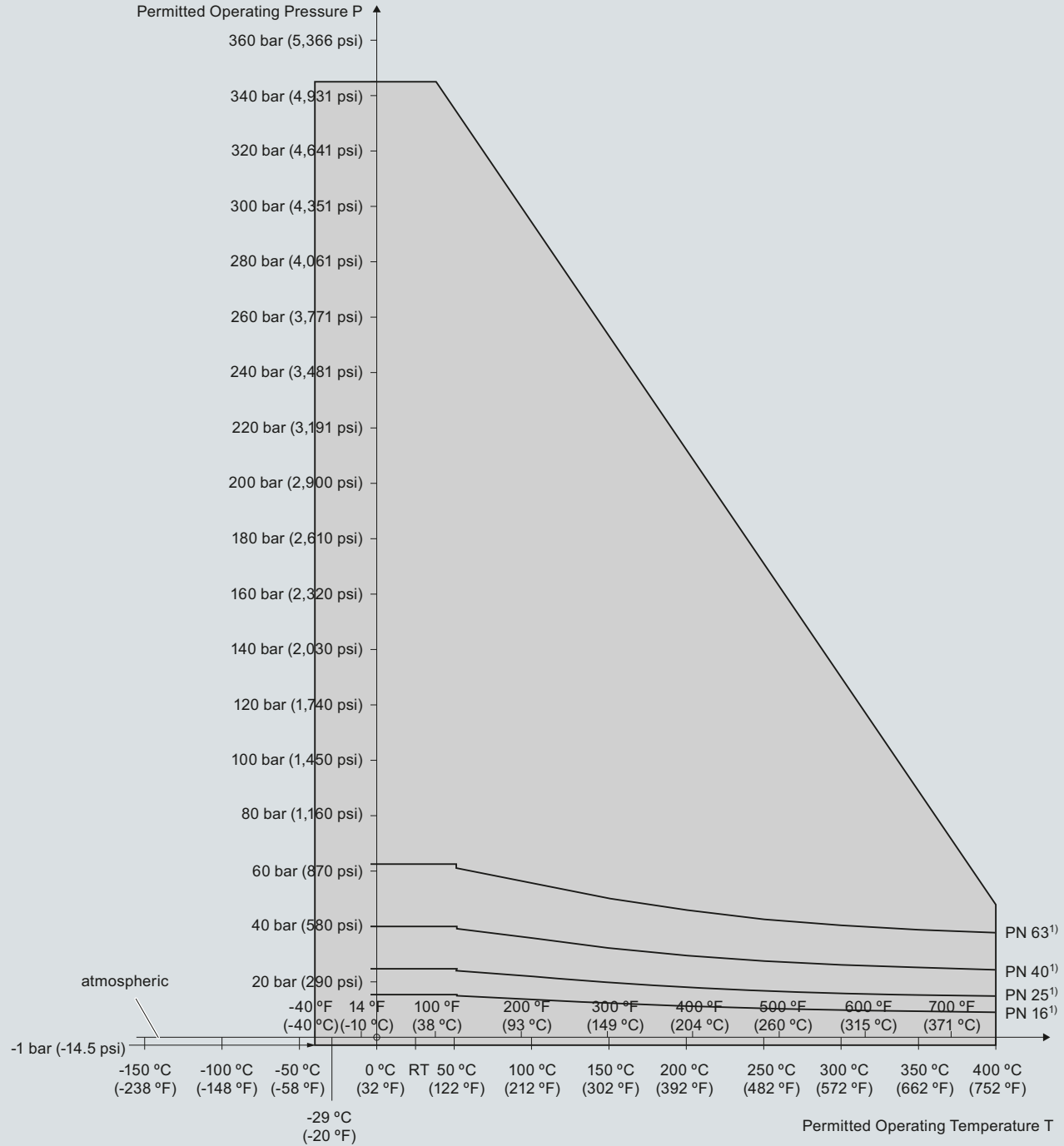
5

# Level Measurement

## Point level measurement - Capacitance switches

Pointek CLS500

**Pressure/Temperature Curve**  
**CLS500 High Temperature Enamel Rod Probes**  
**EN Flanged Process Connections (7ML5604)**



<sup>1)</sup> The curve denotes the minimum allowable flange class for the shaded area below.

Pointek CLS500 Process Pressure/Temperature derating curves (7ML5604)

5

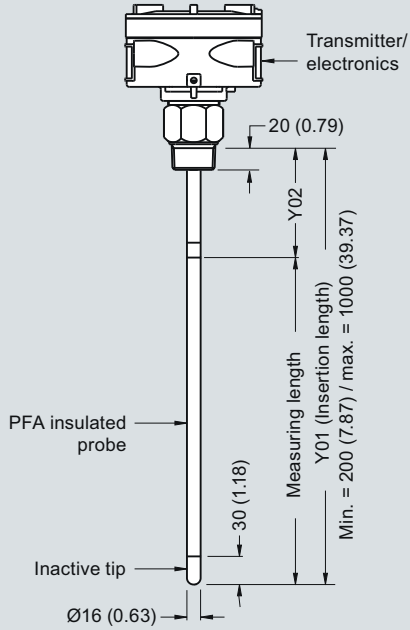
# Level Measurement

## Point level measurement - Capacitance switches

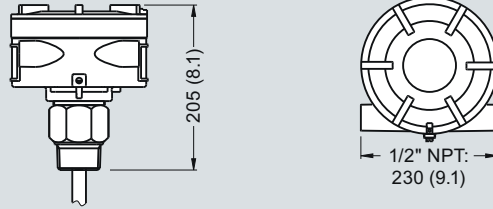
### Pointek CLS500

#### Dimensional drawings

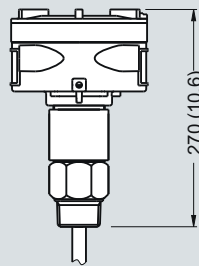
**Standard Rod version  
Threaded (7ML5601)**



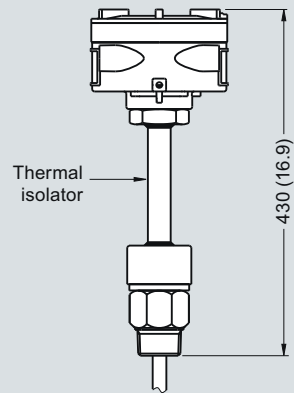
**Standard configuration  
(7ML5601)**



**With explosion-proof seal option  
(all versions)**



**With thermal isolator option  
(all versions)**



Pointek CLS500 - Threaded Process Connections, dimensions in mm (inch)

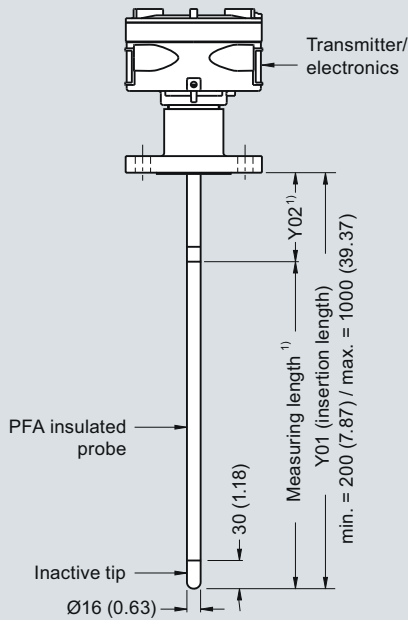
5

# Level Measurement

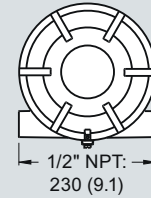
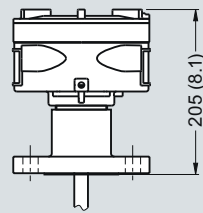
## Point level measurement - Capacitance switches

Pointek CLS500

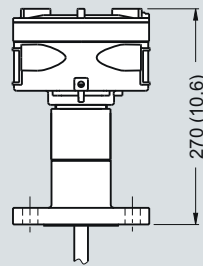
**Standard Rod version**  
**Welded Flange (7ML5602)**  
**Single Piece Flange (7ML5603)**



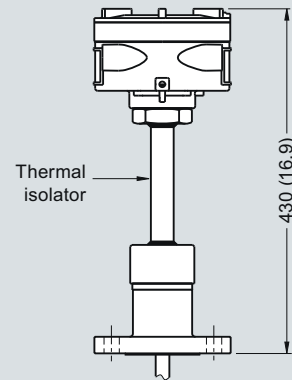
**Standard configuration**  
**(7ML5602, 7ML5603)**



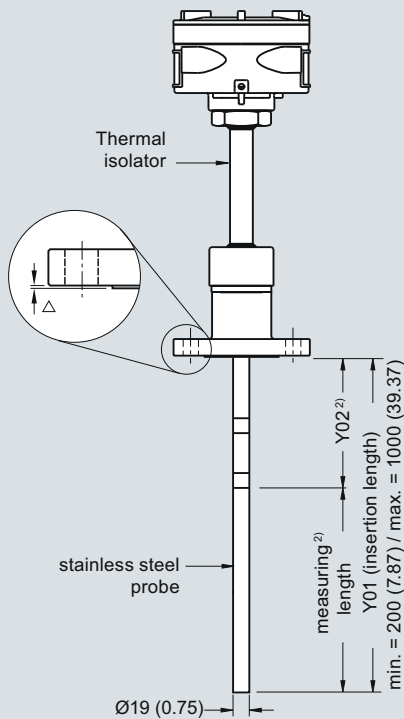
**With explosion-proof seal option**  
**(all versions)**



**With thermal isolator option**  
**(all versions)**



**High temperature rod version**  
**Welded Flange (7ML5604), Stainless steel rod<sup>3)</sup>**



Flange Facing (raised face)	
Flange Class	Facing thickness
△ ASME 150/300	2 (0.08)
△ ASME 600/900	7 (0.28)
△ PN16/25/40/64	2 (0.08)

**Notes:**

- 1) Min. Y02 (active shield length) = 50 (1.96)
- 2) Min. Y02 (active shield length) = 105 (4.13)
- 3) Non conductive materials only

Insertion length does not include any raised face/gasket face dimension (see Flange Facing Table above)

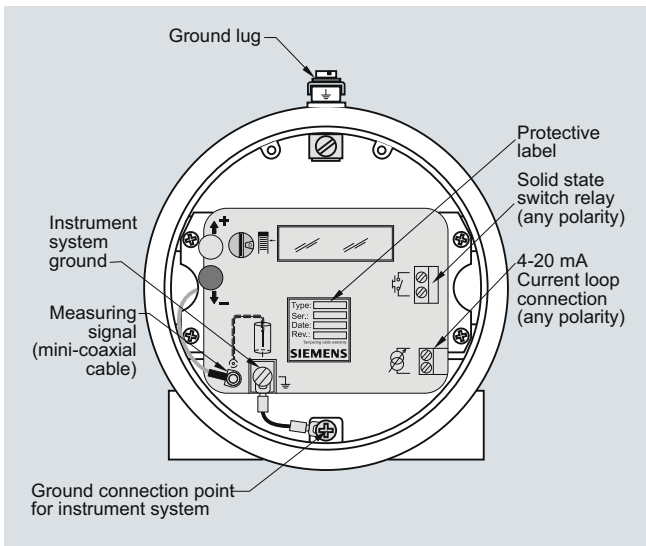
Pointek CLS500 - Flanged Process Connections, dimensions in mm (inch)

# Level Measurement

## Point level measurement - Capacitance switches

### Pointek CLS500

#### Schematics



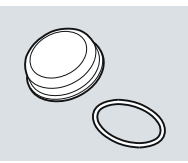
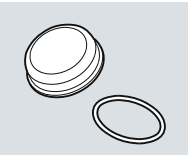
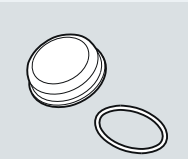
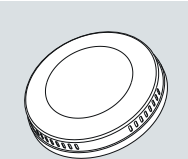
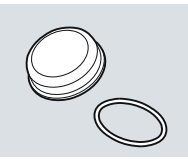

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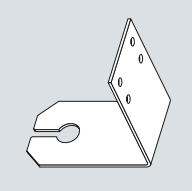
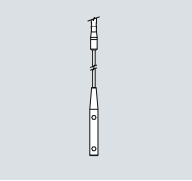
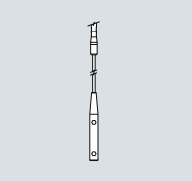
Pointek CLS500 connections

# Level Measurement

## Point level measurement - Capacitance switches

### Pointek CLS Specials

Pointek Specials <sup>1)</sup>		Order No.
<b>CLS100 Polycarbonate Lid and Gasket, FKM</b>		
Kit, Lid and gasket, CLS100 enclosure version	F)	<b>A5E01163671</b>
<b>CLS100 Miscellaneous Parts</b>		
Custom length of cable is available only for 7ML5501-xxx1x and 7ML5501-xxx5x	2)	
<b>CLS200 Gasket (IP65), Synprene</b>		
Spare gasket, enclosure version (IP65 versions only)	F)	<b>A5E01163672</b>
		
<b>CLS200 Gasket (IP68), Silicone</b>		
Spare gasket, enclosure version (IP68 versions)	F)	<b>A5E01163673</b>
<b>CLS200 Blind Lid</b>		
Spare aluminum blind lid (for standard versions only)		<b>A5E01163674</b>
<b>CLS200 Lid with window</b>		
Spare aluminum lid with window		<b>A5E01163676</b>
<b>CLS200 Sensor Kit for cable units</b>		
Kit, Sensor for cable units, PPS, Standard, FKM	C)	<b>A5E01163677</b>
Kit, Sensor for cable units, PPS, Digital, FKM	C)	<b>A5E01163678</b>
Kit, Sensor for cable units, PPS, Standard, FFKM	C)	<b>A5E01163679</b>
Kit, Sensor for cable units, PPS, Digital, FFKM	C)	<b>A5E01163680</b>
Kit, Sensor for cable units, PVDF, Standard, FKM	C)	<b>A5E01163681</b>
Kit, Sensor for cable units, PVDF, Digital, FKM	C)	<b>A5E01163682</b>

Pointek Specials <sup>1)</sup>		Order No.
Kit, Sensor for cable units, PVDF, Standard, FFKM	C)	<b>A5E01163683</b>
Kit, Sensor for cable units, PVDF, Digital, FFKM	C)	<b>A5E01163684</b>
<b>CLS200 Mounting Bracket, 316L stainless steel</b>		
Spare mounting bracket		<b>A5E01163685</b>
<b>CLS200 PROFIBUS Connector (IP65)</b>		
Spare, PROFIBUS connector (IP65 versions only)		<b>A5E01163686</b>
<b>CLS200 Miscellaneous Parts</b>		
CLS200 with FFKM O-rings (any version)	2)	
<b>CLS200 Electronics</b>		
Test magnet, digital version		<b>7ML1830-1JE</b>
Amplifier/power supply kit, standard version	C)	<b>A5E03251681</b>
Amplifier/power supply, digital version	L)	<b>7ML1830-1JF</b>
LCD display, digital version		<b>7ML1830-1JK</b>
<b>CLS300 Cable Extensions, 316L stainless steel</b>		
Kit, Stainless steel cable extension, 1 m, adjustable by customer		<b>A5E01163688</b>
Kit, Stainless steel cable extension, 3 m, adjustable by customer		<b>A5E01163689</b>
Kit, Stainless steel cable extension, 5 m, adjustable by customer		<b>A5E01163690</b>
Kit, Stainless steel cable extension, 10 m, adjustable by customer		<b>A5E01163691</b>
Kit, Stainless steel cable extension, 15 m, adjustable by customer		<b>A5E01163693</b>
Kit, Stainless steel cable extension, 20 m, adjustable by customer		<b>A5E01163695</b>
<b>CLS300 Cable Extensions, 316 stainless steel with PFA coating</b>		
Kit, PFA cable extension, 1 m, adjustable by customer		<b>A5E01163697</b>
Kit, PFA cable extension, 3 m, adjustable by customer		<b>A5E01163698</b>
Kit, PFA cable extension, 5 m, adjustable by customer		<b>A5E01163699</b>
Kit, PFA cable extension, 10 m, adjustable by customer		<b>A5E01163700</b>
Kit, PFA cable extension, 15 m, adjustable by customer		<b>A5E01163701</b>
Kit, PFA cable extension, 20 m, adj.by customer		<b>A5E01163702</b>

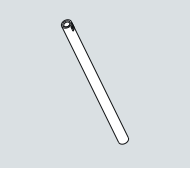

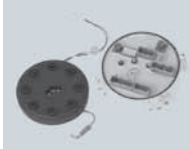


# Level Measurement


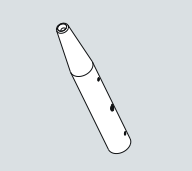
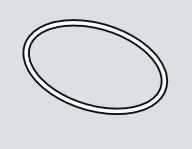
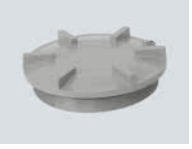
## Point level measurement - Capacitance switches

### Pointek CLS Specials

#### Pointek Specials. <sup>1)</sup>

	Order No.
<b>CLS300 Rod Kits, 316L stainless steel</b>	
	
Kit, Stainless steel rod 180 mm (7.09") to be used with CLS300 units only (with standard active shield). Insertion length after installation is 350 mm (13.78").	<b>A5E01163719</b>
Kit, Stainless steel rod 330 mm (12.99") to be used with CLS300 units only (with standard active shield). Insertion length after installation is 500 mm (19.69").	<b>A5E01163720</b>
Kit, Stainless steel rod 580 mm (22.83") to be used with CLS300 units only (with standard active shield). Insertion length after installation is 750 mm (29.53").	<b>A5E01163721</b>
Kit, Stainless steel rod 830 mm (32.68") to be used with CLS300 units only (with standard active shield). Insertion length after installation is 1000 mm (39.37").	<b>A5E01163722</b>
Kit, Stainless steel rod 1330 mm (52.36") to be used with CLS300 units only (with standard active shield). Insertion length after installation is 1500 mm (59.06").	2)
Kit, Stainless steel rod 1830 mm (72.05") to be used with CLS300 units only (with standard active shield). Insertion length after installation is 2000 mm (78.74").	2)
Kit, Stainless steel rod customized length up to 1 m	2)
Kit, Stainless steel rod customized length up to 2 m	2)
<b>CLS300 Electronics Kits with drivers (for rod or cable versions)</b>	
	
Kit, Electronics with driver, standard CLS300. To be used in rod or cable versions with length less than 5 m. <sup>3) 4)</sup>	C) <b>A5E01163723</b>
Kit, Electronics with driver, digital CLS300. To be used in rod or cable versions with length less than 5 m. <sup>3) 4)</sup>	C) <b>A5E01163725</b>
<b>CLS300 Electronics Kits with drivers (for cable versions)</b>	
	
Kit, Electronics with driver, standard CLS300. To be used in cable versions with length greater than 5 m. <sup>3) 4)</sup>	C) <b>A5E01163724</b>
Kit, Electronics with driver, digital CLS300. To be used in cable versions with length greater than 5 m. <sup>3) 4)</sup>	C) <b>A5E01163726</b>

#### Pointek Specials. <sup>1)</sup>

	Order No.
<b>CLS300 Electronics</b>	
	
Test magnet, digital version	<b>7ML1830-1JE</b>
Amplifier/power supply kit, standard version	C) <b>A5E03251683</b>
Amplifier/power supply, digital version	L) <b>7ML1830-1JF</b>
LCD display, digital version	<b>7ML1830-1JK</b>
<b>CLS300 Weight Kit, 316L stainless steel</b>	
	
Kit, Spare stainless steel weight. To be used in any cable version of CLS300	<b>A5E01163727</b>
<b>CLS500 Gasket (IP65), Silicone</b>	
	
Spare gasket, CLS500 enclosure version, IP65	J) <b>A5E01163728</b>
<b>CLS500 Blind Lid</b>	
	
Spare CLS500 aluminum blind lid	<b>A5E01163729</b>
<b>CLS500 Electronics Kit</b>	
Transmitter, MSP 2002-1, 330 PF	C) <b>7ML1830-1JP</b>

- Special flange sizes and facings are available. Please contact [nacc.smpi@siemens.com](mailto:nacc.smpi@siemens.com) for part number and pricing. Submit Application Questionnaire found on page 5/9.
- Please contact [nacc.smpi@siemens.com](mailto:nacc.smpi@siemens.com) for part number and pricing.
- For General Purpose approvals only.
- To maintain approvals, qualified trained Siemens personnel required for part replacement.

Please contact [nacc.smpi@siemens.com](mailto:nacc.smpi@siemens.com) for special requests.

C) Subject to export regulations AL: N, ECCN: EAR99.

F) Subject to export regulations AL: 91999, ECCN: N.

L) Subject to export regulations AL: N, ECCN: 3A991X.

J) Subject to export regulations AL: 91999, ECCN: EAR99H.

# Level Measurement

## Point level measurement - Vibrating switches

SITRANS LVL100

### Overview



SITRANS LVL100 is a compact vibrating level switch for use in liquid and slurry applications such as overflow, high, low and demand applications, as well as pump protection. It is ideal for use in confined spaces.

### Benefits

- Proven vibrating level switch technology for liquids
- Compact insertion length of 40 mm (1.57") for confined space applications
- Fault monitoring for corrosion, loss of vibration, or line break to the piezo drive
- Integrated test function to confirm correct operation

### Application

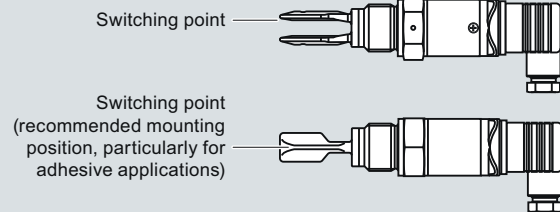
SITRANS LVL100 is a compact level switch designed for industrial use in all areas of process technology and can be used with liquids and slurries. With an insertion length of only 40 mm (1.57"), SITRANS LVL100 can be mounted in small pipes and confined space applications. It is virtually unaffected by the chemical and physical properties of the liquid. The LVL100 can be used in difficult conditions including turbulence, air bubbles, foam generation, buildup, or strong external vibration.

The tuning fork is piezoelectrically energized and vibrates at a mechanical resonance frequency of approximately 1200 Hz. The vibration frequency changes when the tuning fork is covered by the medium. This change is detected by the integrated oscillator and converted into a switching command. The integrated electronics evaluate the level signal and output a switching signal to connected devices.

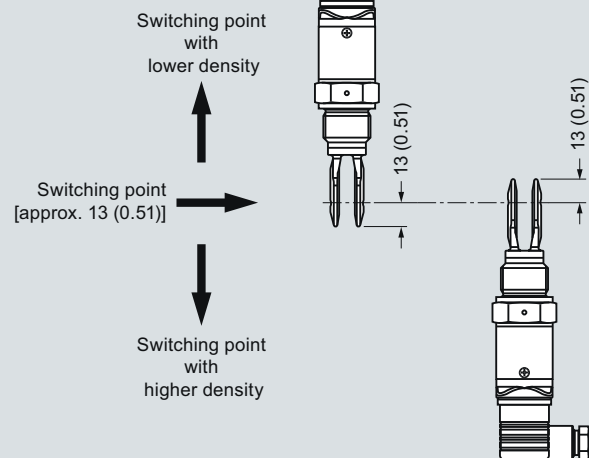
- Key Applications: For use in liquids and slurries, for level measurement, overflow, and dry run protection

### Configuration

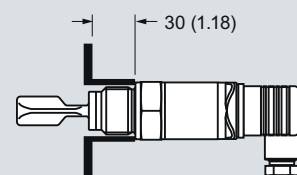
#### Horizontal mounting



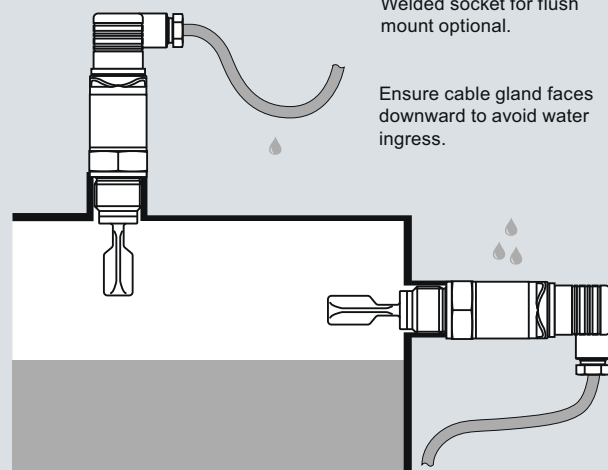
#### Vertical mounting



#### Horizontal mounting in viscous or adhesive applications



#### Moisture protection



SITRANS LVL100 Installation, dimensions in mm (inch)

# Level Measurement

## Point level measurement - Vibrating switches

### SITRANS LVL100

#### Technical specifications

##### Mode of operation

Measuring principle Vibrating point level switch

##### Input

Measured variable High and low and demand

##### Output

Output options Contactless electronic switch  
Transistor output PNP

##### Measuring Accuracy

Hysteresis approx. 2 mm (0.08") with vertical installation

Switching delay approx. 500 ms (on/off)

Frequency approx. 1200 Hz

##### Rated operating conditions

Installation conditions

• Location Indoor/outdoor

Ambient conditions

• Ambient temperature -40 ... +70 °C (-40 ... +158 °F)

• Installation category III

• Pollution degree 2

Medium conditions

• Temperature

- Standard -40 ... +100 °C (-40 ... +212 °F)

- High temperature option -40 ... +150 °C (-40 ... +302 °F)

• Pressure (vessel) -1 ... 64 bar g (-14.5 ... 928 psi g)

• Density 0.7 ... 2.5 g/cm<sup>3</sup>  
(0.025 ... 0.09 lbs/in<sup>3</sup>)

##### Design

Material

• Enclosure 316L and Plastic PEI

• Tuning fork 316L (1.4404 or 1.4435)

• Process connection (threaded) 316L (1.4404 or 1.4435)

• Process seal Klingersil C-4400

Process connection

• Pipe thread, cylindrical (ISO 228 T1) G ¾" A or G 1" A

• Pipe thread, tapered ¾" NPT or 1" NPT

• Hygienic fittings Bolting DN40 PN40

Tri-clamp 1", 1½", 2" PN 10

Degree of protection IP65/Type 4/NEMA 4 (with DIN 43650 valve plug), IP66/67 or IP68 (with M12 connector)

Conduit entry 1 x M12 [IP66/IP67 or IP68 (0.2 bar)]

Weight (housing) 250 g (9 oz)

##### Power supply

Supply voltage 20 ... 253 V AC, 50/60 Hz  
20 ... 253 V DC

Power consumption 1 ... 8 VA (AC), approx. 1.3 W (DC)

##### Certificates and approvals

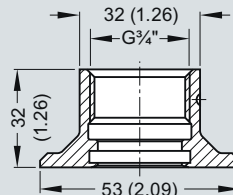
Overfill protection (WHG)

Shipping approvals

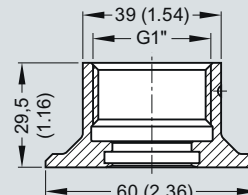
#### Options

##### LVL100 Threaded Welded Socket

###### G¾" A/316L



###### G1" A/316L



SITRANS LVL100 welded socket, dimensions in mm

# Level Measurement

## Point level measurement - Vibrating switches

SITRANS LVL100

Selection and Ordering data	Order No.	Selection and Ordering data	Order code
<b>SITRANS LVL100</b> Compact vibrating level switch for use in liquid and slurry applications such as overflow, high, low and demand applications, as well as pump protection. Ideal for use in confined spaces.	7 ML 5 7 4 5 -	<b>Further designs</b> Please add <b>"-Z"</b> to Order No. and specify Order code(s).	
<b>Approvals</b> Without approvals Shipping approvals <sup>1)</sup> Overfill protection (WHG) <sup>2)</sup>	A 0 1 2 3	Cleaning including Certificate (oil, grease and sili-cone free) Identification Label, foil laser marking Acceptance test certificate 3.1 for instrument Acceptance test certificate 2.2 for instrument	W01 Y16 C12 C14
<b>Process temperature</b> Standard -40 ... +100 °C (-40 ... +212 °F) <sup>3)</sup> Extended -40 ... +150 °C (-40 ... +302 °F) <sup>3)</sup> Hygienic applications -40 ... +150 °C (-40 ... +302 °F) <sup>4)</sup>	A B C	<b>Additional Operating Instructions</b> <a href="#">LVL 100 (Contactless electronic switch)</a>	Order No.
<b>Process connection</b> Thread G $\frac{3}{4}$ " A PN64/316L Thread G $\frac{3}{4}$ " A PN64/316L Ra < 0.8 $\mu\text{m}^5$ Thread $\frac{3}{4}$ " NPT PN64/316L Thread $\frac{3}{4}$ " NPT PN64/316L Ra < 0.8 $\mu\text{m}^5$ Thread G1" A PN64/316L Thread G1" A PN64/316L Ra < 0.8 $\mu\text{m}^5$ Thread G1" A PN64/316L Ra < 0.8 $\mu\text{m}^5$ Thread 1" NPT PN64/316L Thread 1" NPT PN64/316L Ra < 0.8 $\mu\text{m}^5$ Tri-Clamp 1" PN16 DIN 32676/316L Ra < 0.8 $\mu\text{m}^5$ Tri-Clamp 1 $\frac{1}{2}$ " PN16 DIN 32676/316L Ra < 0.8 $\mu\text{m}^5$ Tri-Clamp 2" PN16 DIN 32676/316L Ra < 0.8 $\mu\text{m}^5$ Bolting DN25 PN40 DIN 11851/316L Ra < 0.8 $\mu\text{m}^5$ Bolting DN40 PN40 DIN 11851/316L Ra < 0.8 $\mu\text{m}^5$ Bolting DN50 PN25 DIN 11851/316L Ra < 0.8 $\mu\text{m}^5$ SMS DN38 PN6 SMS1145/316L Ra < 0.8 $\mu\text{m}^5$ Hygienic fitting with compression nut F40 <sup>5)</sup> PN25/316L Ra < 0.8 $\mu\text{m}$	A 0 A 1 A 2 A 3 A 4 A 5 A 6 A 7 A 8 B 0 B 1 B 2 B 3 B 4 B 5 B 6	English French Spanish German <a href="#">LVL 100 (Transistor PNP)</a> English French Spanish German This device is shipped with the Siemens Milltronics manual CD containing the complete Operating Instructions library.	7ML1998-5KN01 7ML1998-5KN11 7ML1998-5KN21 7ML1998-5KN31 7ML1998-5KP01 7ML1998-5KP11 7ML1998-5KP21 7ML1998-5KP31
<b>Electronics</b> Contactless electronic switch 20 ... 250 V AC/DC <sup>6)</sup> Transistor output PNP 10 ... 55 V DC	1 2	<b>Spare Parts</b> <a href="#">LVL 100 Threaded Welded Socket</a> G $\frac{3}{4}$ " A/316L with FKM Seal G 1 A/316L with FKM Seal M27x1.5/316L with FKM Seal G $\frac{3}{4}$ " A/316L with EPDM Seal G 1 A/316L with EPDM Seal M27x1.5/316L with EPDM Seal	7ML1930-1EE 7ML1930-1EF 7ML1930-1EG 7ML1930-1EH 7ML1930-1EJ 7ML1930-1EK
<b>Housing</b> 316L	1		
<b>Electrical connection/Protection</b> M12x1/IP67 According to DIN 43650 including plug/IP65 Acc. to DIN 43650 incl. plug with QuickOn connection/IP65 M12x1 incl. 5 m cable/IP68 (0.2 bar)	A B C D		

- 1) Available with Process Temperature option A only
- 2) Available with Electronics option 2 only
- 3) Available with process connection A0, A2, A4, and A6 only
- 4) Available with process connection A1, A3, A5, and A7 to B6 only
- 5) Available with Process Temperature option C only
- 6) Available with Electrical connection/Protection option B and C only

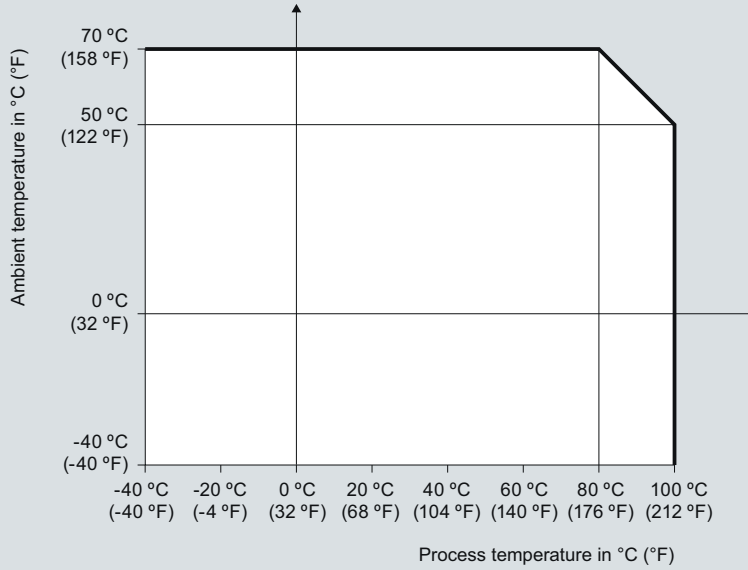
# Level Measurement

## Point level measurement - Vibrating switches

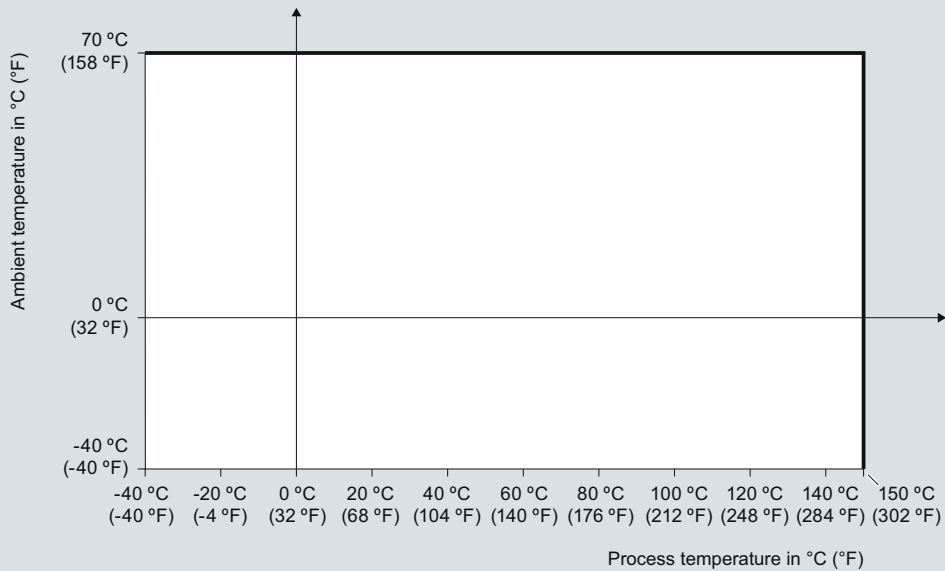
### SITRANS LVL100

#### Characteristic curves

Ambient Temperature to Process Temperature dependency  
(Standard version)



Ambient Temperature to Process Temperature dependency  
(High temperature version)



SITRANS LVL100 Ambient Temperature/Process Temperature derating curves

5

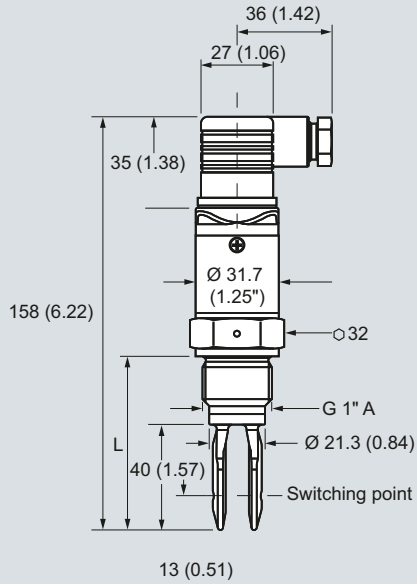
# Level Measurement

## Point level measurement - Vibrating switches

SITRANS LVL100

### Dimensional drawings

SITRANS LVL100 (standard)

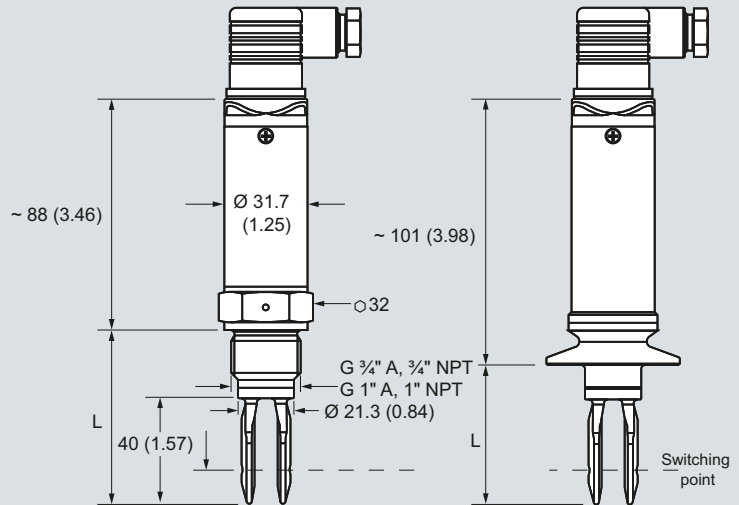


L =  
 Length with G 3/4" A, 3/4" NPT: 66 (2.6)  
 Length with G 1" A, 1" NPT: 69 (2.7)

SITRANS LVL100 (extended)

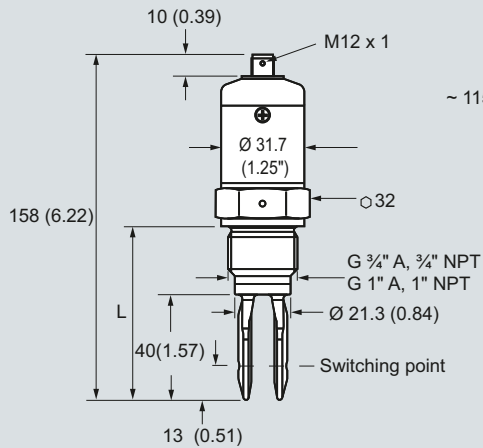
Thread G 3/4" A, G 1" A (DIN ISO 228/1),  
 3/4" NPT or 1" NPT (valve plug DIN 43650)

Tri-clamp (valve plug DIN 43650)



L =  
 Length with G 3/4" A, 3/4" NPT: 66 (2.6)  
 Length with G 1" A, 1" NPT: 69 (2.7)  
 Length with Tri-clamp: 53 (2.1)

SITRANS LVL100 (standard with M12 connector)

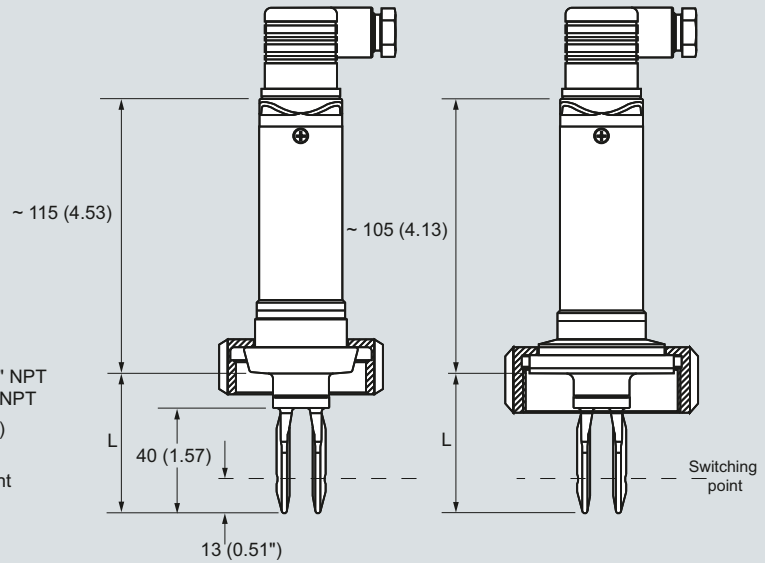


L =  
 Length with G 3/4" A, 3/4" NPT: 66 (2.6)  
 Length with G 1" A, 1" NPT: 69 (2.7)

SITRANS LVL100 (extended, high temperature)

Bolting DIN 11851 (valve plug DIN 43650)

SMS 1145 (valve plug DIN 43650)



L =  
 Length with bolting: 53 (2.1)  
 Length with SMS 1145: 53 (2)

SITRANS LVL100, dimensions in mm (inch)

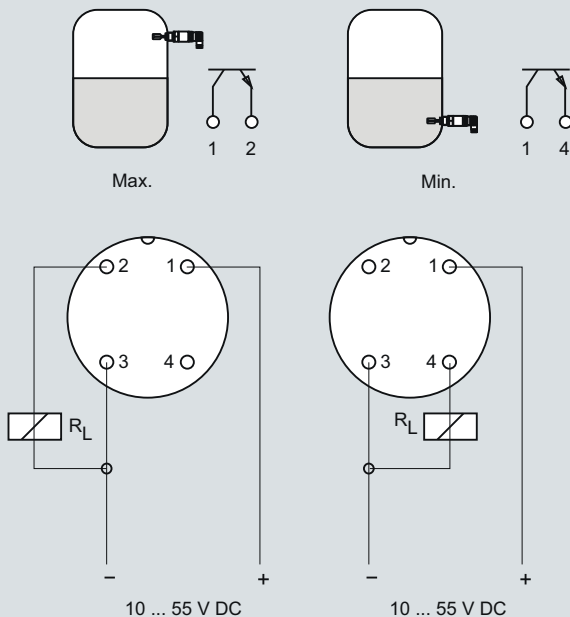
# Level Measurement

## Point level measurement - Vibrating switches

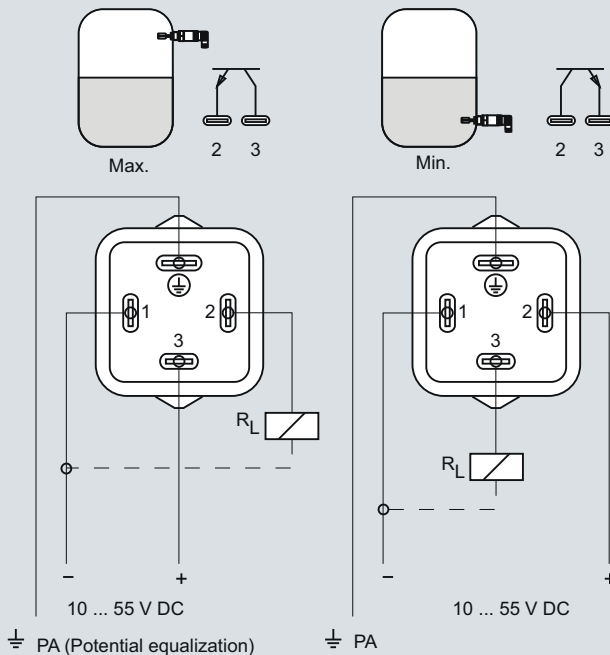
### SITRANS LVL100

#### Schematics

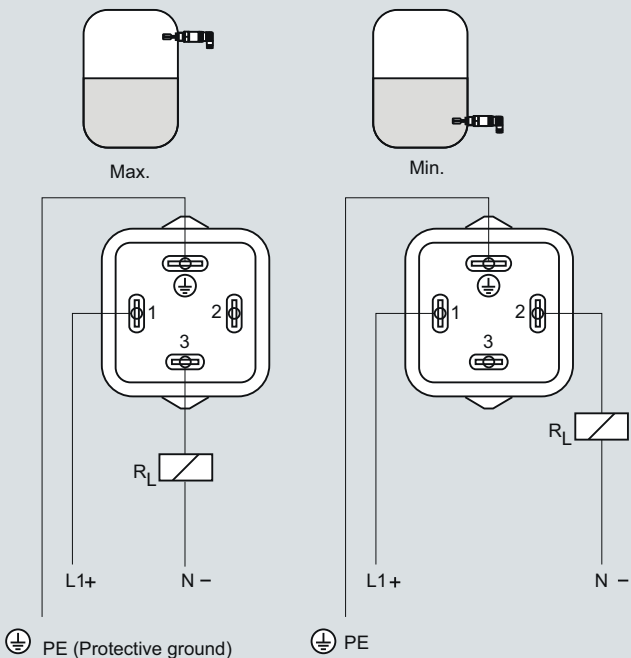
Transistor PNP (M12 x 1 Plug connection)



Transistor PNP (with valve plug DIN 43650)



Contactless electronic switch (Valve plug DIN 43650)



SITRANS LVL100 connections

5

# Level Measurement

## Point level measurement - Vibrating switches

SITRANS LVL200

### Overview



SITRANS LVL200 is a standard vibrating level switch for use in liquid and slurry applications such as overflow, high, low, and demand applications, as well as pump protection. For use in SIL-2 applications.

### Benefits

- Proven vibrating level switch technology for liquids
- Compact insertion length of 40 mm (1.57") for confined space applications
- Fault monitoring for corrosion, loss of vibration or line break to the piezo drive
- SIL-2 qualified for high level and dry run applications
- Hygienic process connections

### Application

SITRANS LVL200 is a level switch designed for industrial use in all areas of process technology and can be used with liquids and slurries. With a tuning fork insertion length of only 40 mm (1.57"), SITRANS LVL200 can be mounted in small pipes and applications with confined space. The LVL200 can be used to measure products with a minimum density of  $> 0.5 \text{ g/cm}^3$  (0.018 lbs/in<sup>3</sup>). The LVL200 can be used in difficult conditions including turbulence, air bubbles, foam generation, buildup, or strong external vibration.

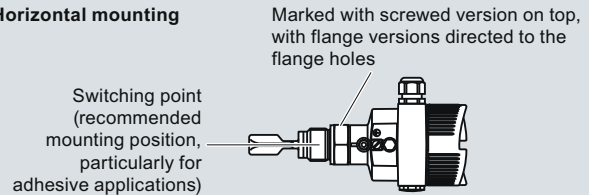
SITRANS LVL200 continuously monitors faults via frequency evaluation, providing early detection of strong corrosion or damage on the tuning fork, loss of vibration, or a line break to the piezo drive.

The tuning fork is piezoelectrically energized and vibrates at its mechanical resonance frequency of approx. 1200 Hz. The vibration frequency changes when the tuning fork is covered by the medium. This change is detected by the integrated oscillator and converted into a switching command. The integrated electronics evaluate the level signal and output a switching signal, directly operating connected devices.

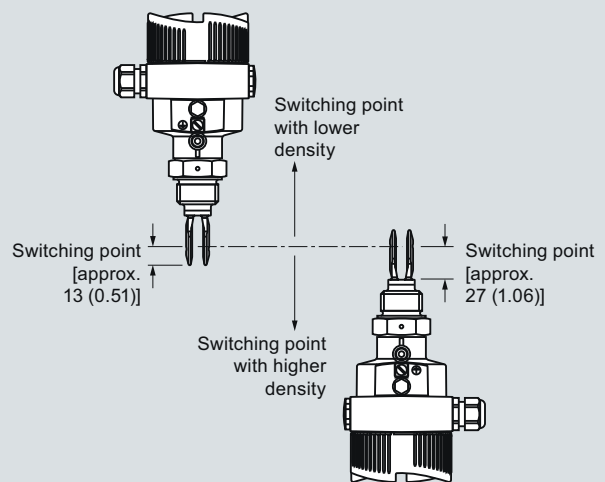
- Key Applications: For use in liquids and slurries, for level measurement, overflow, and dry run protection

### Configuration

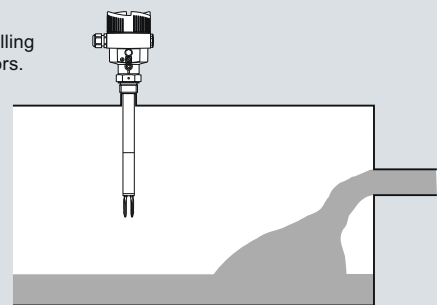
#### Horizontal mounting



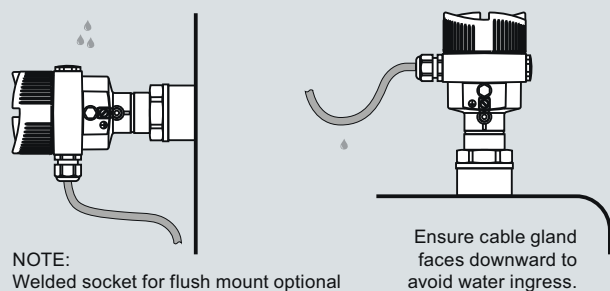
#### Vertical mounting



Mount away from filling openings or agitators.



#### Moisture protection



SITRANS LVL200 installation, dimensions in mm (inch)



# Level Measurement

## Point level measurement - Vibrating switches

### SITRANS LVL200

#### Technical specifications

##### Mode of operation

Measuring principle Vibrating point level switch

##### Input

Measured variable High and low and demand (via mode switch)

##### Output

Output options

- Relay output (DPDT), 2 floating SPDTs
- Contactless electronic switch

##### Measuring Accuracy

Repeatability 0.1 mm (0.004")  
 Hysteresis approx. 2 mm (0.08") with vertical installation  
 Switching delay approx. 500 ms (on/off)  
 Frequency approx. 1200 Hz

##### Rated operating conditions

Installation conditions

- Location Indoor/outdoor

Ambient conditions

- Ambient temperature -40 ... +70 °C (-40 ... +158 °F)
- Installation category III
- Pollution degree 2

Medium conditions

- Temperature
  - LVL200S Standard -50 ... +150 °C (-58 ... +302 °F)
  - LVL200S High temperature option -50 ... +250 °C (-58 ... +482 °F)
  - LVL200E Standard: with 316L/Hastelloy -50 ... +150 °C (-58 ... +302 °F)
  - LVL200E High temperature option: with 316L/Hastelloy -50 ... +250 °C (-58 ... +482 °F)
- Pressure (vessel) -1 ... 64 bar g (-14.5 ... 928 psi g)
- Density 0.7 ... 2.5 g/cm<sup>3</sup> (0.025 ... 0.09 lbs/in<sup>3</sup>); 0.5 ... 2.5 g/cm<sup>3</sup> (0.018 ... 0.09 bs/in<sup>3</sup>) by switching over

##### Design

Material

- Enclosure Aluminum die-cast AlSi10Mg, powder-coated, basis: Polyester
- Tuning fork 316L (1.4404 or 1.4435), Hastelloy
- Extension tube [ø 21.3 mm (0.839")]
- Process connection: threaded 316L (1.4404 or 1.4435), Hastelloy
- Process connection: flange 316L (1.4404 or 1.4435), 316L with Hastelloy, ECTFE, or PFA coating
- Process seal Klingersil C-4400

##### Process connection

- Pipe thread, cylindrical (ISO 228 T1) G ¾" A, G 1" A
- Pipe thread, tapered ¾" NPT, 1" NPT, 1½" NPT
- Flanges DIN from DN25, ANSI from 1"
- Hygienic fittings Bolting DN40 PN40, 1, 1½, 2, 2½" Tri-Clamp PN 10, conus DN25 PN 40, Tuchenhagen Varivent DN50 PN10, SMS

##### Degree of protection

Conduit entry Type 4X/NEMA 4X/IP66/IP67

- 1 x M20x1.5 (cable: ø5 ... 9 mm), 1 x blind stopper M20x1.5; attached 1 x M20x1.5 cable entry
- 1 x ½" NPT cable entry, 1 x blind stopper ½"NPT, 1 x ½" NPT cable entry
- 1 x M12x1; 1 x blind stopper M20x1.5

##### Weight

- Device weight (dependent on process fitting) approx. 0.8 ... 4 kg (0.18 ... 8.82 lbs)
- Tube extension (extended version) approx 920 g/m (10 oz/ft)

##### Power supply

Supply voltage

- Relay DPDT 20 ... 253 V AC, 50/60 Hz, 20 ... 72 V DC [at U>60 V DC, the ambient temperature can be max. +50 °C (+122 °F)]
- Contactless - 20 ... 253 V AC, 50/60 Hz, 20 ... 253 V DC

Power consumption

- Relay DPDT 1 ... 8 VA (AC), approx. 1.3 W (DC)
- Contactless 1 ... 8 VA (AC), approx. 1.3 W (DC)

Domestic current requirement approx. 3 mA (via load circuit)

Load current

- Min. 10 mA
- Max. 400 mA [with I > 300 mA the ambient temperature can be max. +60 °C (+140 °F)]
- Max. 4 A up ... 40 ms (not WHG specified)

##### Certificates and approvals

- CE, CSA
- Overfill protection (WHG)
- FM (Non-Incendive) Class I, Div. 2, Groups A, B, C, D
- FM (Explosion-Proof) Class I, Div. 1, Groups A, B, C, D; (Dust Ignition-Proof) Class II, III, Div. 1, Groups E, F, G1)
- IECEx d IIC T6...T2 Ga/Gb EHEDG
- ATEX II 1/2G, 2G EEx d IIC T6
- Shipping approvals: ABS, DNV, LR, RINA, GL, CCS
- SIL/IEC61508 Declaration of Conformity [SIL-2 (overfill)]

# Level Measurement

## Point level measurement - Vibrating switches

SITRANS LVL200

Selection and Ordering data	Order No.	Selection and Ordering data	Order No.
<b>SITRANS LVL200, Standard</b> Compact vibrating level switch for use in liquid and slurry applications such as overflow, high, low and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.	7 ML 5 7 4 6 - A 0	<b>SITRANS LVL200, Standard</b> Compact vibrating level switch for use in liquid and slurry applications such as overflow, high, low and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.	7 ML 5 7 4 6 - A 0
<b>Electronics</b> Contactless electronic switch 20...250 V AC/DC Double relay (DPDT) 20 ... 72 V DC/20 ... 250 V AC	1 2	Tri-Clamp 2", PN16/316L Ra < 0.8 µm Tri-Clamp 2½", PN10/316L Ra < 0.3 µm Tri-Clamp 2½", PN10/316L Ra < 0.8 µm Tri-Clamp 3", PN10/316L Ra < 0.3 µm Tri-Clamp 3", PN10/316L Ra < 0.8 µm Bolting DN32, PN40 DIN11851/316L Ra < 0.3 µm Bolting DN32, PN40 DIN11851/316L Ra < 0.8 µm Bolting DN25, PN40 DIN11851/316L Ra < 0.3 µm Bolting DN25, PN40 DIN11851/316L Ra < 0.8 µm Bolting DN40, PN40 DIN11851/316L Ra < 0.3 µm Bolting DN40, PN40 DIN11851/316L Ra < 0.8 µm Bolting DN 40, PN40 DIN11864-1 A/316L Ra < 0.8 µm ZB3052 Bolting DN50, PN25 DIN11851/316L Ra < 0.3 µm Bolting DN50, PN25 DIN11851/316L Ra < 0.8 µm Bolting DN50, PN25 DIN11864-1 A/316L Ra < 0.8 µm ZB3052 Hygienic w. compr. nut F40, PN25/316L Hygienic w. compr. nut F40, PN25/316L Ra < 0.3 µm Hygienic w. compr. nut F40, PN25/316L Ra < 0.8 µm Varivent N50-40/316L Ra < 0.3 µm Varivent N50-40/316L Ra < 0.8 µm Varivent N125/100/316L Ra < 0.8 µm DRD flange, PN40/316L ZB3007 SMS DN38/316L Ra < 0.8 µm <sup>1)</sup> SMS DN51, PN6/316L Ra < 0.8 µm <sup>1)</sup> Swagelok VCR screwing ZG2579, PN64/316L Neumo biocontrol Gr. 25, PN16/316L Ra < 0.8 µm Neumo biocontrol Gr. 50, PN16/316L Ra < 0.8 µm <sup>1)</sup> Neumo biocontrol Gr. 65, PN16/316L Ra < 0.8 µm Neumo biocontrol Gr. 80, PN16/316L Ra < 0.8 µm SÜDMO DN50, PN10/316L/316L Ra<0,8µm Small flange DN25, PN1.5 DIN 28403/316L pol.Ra < 0.8 µm Small flange DN40, PN1.5 DIN 28403/316L pol.Ra < 0.8 µm Ingold connection, PN16/316L Ra < 0.8 µm Ingold connection, PN16/Hastelloy Terminal DN 33,7 PN40 DIN11864-3-A-/316L BN2 Ra < 0.8 µm <sup>1)</sup> Hygienic fl. DN50 PN16 DIN11864-2-A-/316L Ra < 0.8 µm Flange DN25, PN6 Form C, DIN 2501/316L Flange DN25, PN6 Form C, DIN 2501/PFA <sup>1)</sup> Flange DN25, PN40 Form C, DIN 2501/316L Flange DN25, PN40 Form C, DIN 2501/Hastelloy Flange DN25, PN40 Form C, DIN 2501/ECTFE <sup>1)</sup> Flange DN25, PN40 Form C, DIN 2501/PFA <sup>1)</sup> Flange DN25, PN40 Form C, DIN 2501/Enamelled Flange DN25, PN40 Form D, DIN 2501/316L Flange DN25, PN40 Form F, DIN 2501/316L Flange DN25, PN40 Form N, DIN 2501/316L Flange DN25, PN40 Form N, DIN 2501/Hastelloy Flange DN25, PN40 Form N, DIN 2501/Monel solid Flange DN25, PN40 V13, DIN 2501/316L Flange DN32, PN40 Form C, DIN 2501/316L Flange DN32, PN40 Form C, DIN 2501/ECTFE <sup>1)</sup> Flange DN40, PN6 Form C, DIN 2501/316L Flange DN40, PN6 Form C, DIN 2501/ECTFE <sup>1)</sup> Flange DN40, PN40 Form C, DIN 2501/316L	A 46 A 47 A 48 A 50 A 51 A 52 A 53 A 54 A 55 A 56 A 57 A 58 A 60 A 61 A 62 A 63 A 64 A 65 A 66 A 67 A 68 A 70 A 71 A 72 A 73 A 74 A 75 A 76 A 77 A 78 A 80 A 81 A 82 A 83 A 84 A 85 A 86 A 87 A 88 B 00 B 01 B 02 B 03 B 04 B 05 B 06 B 07 B 08 B 10 B 11 B 12 B 13 B 14 B 15
<b>Approvals</b> Without approvals Overfill protection (WHG) ATEX II 1/2G, 2G EEx d IIC T6 + WHG ATEX II 1/2G, 2G EEx d IIC T6 + shipping approvals Shipping approvals FM (XP) Class I, Div. 1, Groups A, B, C, D; (DIP) Class II, III, Div. 1, Groups E, F, G <sup>1)</sup> FM (NI) Class I, Div. 2, Groups A, B, C, D <sup>1)</sup> IECEx d IIC T6...T2 Ga/Gb CSA(XP)CL I,II,III DIV 1,GP A B C D E F G CSA(NI)CL I,II,III, DIV 2,GP A B C D E F G	A B D F K P Q R S T		
<b>Process connection</b> Thread G¾" A, PN64/316L Thread G¾" A, PN64/316L Ra < 0.8 µm Thread ¾" NPT, PN64/316L Thread ¾" NPT, PN64/316L Ra < 0.8 µm Thread ¾" NPT, PN64/Monel Thread G¾" A, PN64/Hastelloy Thread ¾" NPT, PN64/Hastelloy Thread G1" A, PN64/316L Thread G1" A, PN64/316L ECTFE coated MB1982 <sup>2)</sup> Thread G1" A, PN64/316L PFA coated <sup>1)</sup> Thread G1" A, PN64/Monel Thread G1" A, PN64/316L Ra < 0.8 µm Thread 1" NPT, PN64/316L Thread 1" NPT, PN64/316L ECTFE coated MB1982 <sup>1)</sup> Thread 1" NPT, PN64/316L PFA-coated <sup>1)</sup> Thread 1" NPT, PN64/Monel Thread 1" NPT, PN64/316L Ra < 0.8 µm Thread G1" A, PN64/Hastelloy Thread G1" A, PN64/Hastelloy Thread G1½" A, PN64/316L Thread G1½" A, PN64/316L Ra<0,8µm Thread G1½" A, PN64/Hastelloy Thread 1" NPT, PN64/Hastelloy Thread 1½" NPT, PN64/316L Thread 1½" NPT, PN64/316L Ra<0,8µm Thread 1½" NPT, PN64/Hastelloy Thread G2" A, PN64/316L Thread M27x1.5, PN64/316L Conus DN25, PN40/316L Ra < 0.3 µm Conus DN25, PN40/316L Ra < 0.8 µm Conus DN25, PN40/ECTFE (ZB3033) <sup>1)</sup> Conus M52, PN40/316L Conus M52, PN40/316L Ra < 0.3 µm Conus M52, PN40/316L Ra < 0.8 µm Tri-Clamp 1", PN16/316L Ra < 0.3 µm Tri-Clamp 1", PN16/Hastelloy Tri-Clamp 1", PN16 DIN 32676/316L Ra < 0.8 µm Tri-Clamp 1½", PN16/316L Ra < 0.3 µm Tri-Clamp 1½", PN16/Hastelloy Tri-Clamp 1½", PN16/316L Ra < 0.8 µm Tri-Clamp 2", PN16/316L Ra < 0.3 µm Tri-Clamp 2", PN16/Hastelloy	A 00 A 01 A 02 A 03 A 04 A 05 A 06 A 07 A 08 A 10 A 11 A 12 A 13 A 14 A 15 A 16 A 17 A 18 A 20 A 21 A 22 A 23 A 24 A 25 A 26 A 27 A 28 A 30 A 31 A 32 A 33 A 34 A 35 A 36 A 37 A 38 A 40 A 41 A 42 A 43 A 44 A 45		

# Level Measurement

## Point level measurement - Vibrating switches

### SITRANS LVL200

#### Selection and Ordering data

Order No.

#### SITRANS LVL200, Standard

Compact vibrating level switch for use in liquid and slurry applications such as overflow, high, low and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.

7 M L 5 7 4 6 -

- A 0

Flange DN40, PN40 Form C, DIN 2501/Hastelloy	<b>B 1 6</b>
Flange DN40, PN40 Form C, DIN 2501/ECTFE <sup>1)</sup>	<b>B 1 7</b>
Flange DN40, PN40 Form C, DIN 2501/PFA <sup>1)</sup>	<b>B 1 8</b>
Flange DN40, PN40 Form C, DIN 2501/Enamelled <sup>3)</sup>	<b>B 2 0</b>
Flange DN40, PN40 Form F, DIN 2501/316L	<b>B 2 1</b>
Flange DN40, PN40 Form N, DIN 2501/316L	<b>B 2 2</b>
Flange DN40, PN40 Form E, DIN 2501/316L	<b>B 2 3</b>
Flange DN40, PN40 V13, DIN 2501/316L	<b>B 2 4</b>
Flange DN50, PN40 Form C, DIN 2501/316L	<b>B 2 5</b>
Flange DN50, PN40 Form C, DIN 2501/Hastelloy	<b>B 2 6</b>
Flange DN50, PN40 Form C, DIN 2501/ECTFE <sup>1)</sup>	<b>B 2 7</b>
Flange DN50, PN40 Form C, DIN 2501/ECTFE (ZB3108) <sup>1)</sup>	<b>B 2 8</b>
Flange DN50, PN40 Form C, DIN 2501/PFA <sup>1)</sup>	<b>B 3 0</b>
Flange DN50, PN40 Form D, DIN 2501/316L	<b>B 3 1</b>
Flange DN50, PN40 Form D, DIN 2501/Hastelloy	<b>B 3 2</b>
Flange DN50, PN40 Form F, DIN 2501/316L	<b>B 3 3</b>
Flange DN50, PN40 Form N, DIN 2501/316L	<b>B 3 4</b>
Flange DN50, PN40 Form N, DIN 2501/Hastelloy	<b>B 3 5</b>
Flange DN50, PN40 Form E, DIN 2501/316L	<b>B 3 6</b>
Flange DN50, PN40 V13, DIN 2501/316L	<b>B 3 7</b>
Flange DN50, PN40 R13, DIN 2501/316L	<b>B 3 8</b>
Flange DN50, PN64 Form F, DIN 2501/316L	<b>B 4 0</b>
Flange DN50, PN64 Form N, DIN 2501/Hastelloy	<b>B 4 1</b>
Flange DN50, PN64 Form C, DIN 2501/316L	<b>B 4 2</b>
Flange DN50, PN64 Form L, DIN 2501/316L	<b>B 4 3</b>
Flange DN50, PN100 Form E, DIN 2501/316L	<b>B 4 4</b>
Flange DN50, PN100 Form L, DIN 2501/316L	<b>B 4 5</b>
Flange DN65, PN40 Form C, DIN 2501/316L	<b>B 4 6</b>
Flange DN65, PN40 Form C, DIN 2501/Hastelloy	<b>B 4 7</b>
Flange DN65, PN40 Form C, DIN 2501/ECTFE <sup>1)</sup>	<b>B 4 8</b>
Flange DN65, PN40 Form C, DIN 2501/PFA <sup>1)</sup>	<b>B 5 0</b>
Flange DN65, PN40 Form F, DIN 2501/316L	<b>B 5 1</b>
Flange DN65, PN64 Form E, DIN 2501/316L	<b>B 5 2</b>
Flange DN80, PN40 Form C, DIN 2501/316L	<b>B 5 3</b>
Flange DN80, PN40 Form C, DIN 2501/Hastelloy	<b>B 5 4</b>
Flange DN80, PN40 Form C, DIN 2501/ECTFE <sup>1)</sup>	<b>B 5 5</b>
Flange DN80, PN40 Form C, DIN 2501/PFA <sup>1)</sup>	<b>B 5 6</b>
Flange DN80, PN40 Form C, DIN 2501/Enamelled <sup>2)</sup>	<b>B 5 7</b>
Flange DN80, PN40 Form F, DIN 2501/316L	<b>B 5 8</b>
Flange DN80, PN40 Form N, DIN 2501/316L	<b>B 6 0</b>
Flange DN80, PN40 Form N, DIN 2501/Hastelloy	<b>B 6 1</b>
Flange DN100, PN16 Form C, DIN 2501/316L	<b>B 6 2</b>
Flange DN100, PN16 Form C, DIN 2501/Hastelloy	<b>B 6 3</b>
Flange DN100, PN16 Form C, DIN 2501/ECTFE <sup>1)</sup>	<b>B 6 4</b>
Flange DN100, PN16 Form C, DIN 2501/PFA <sup>1)</sup>	<b>B 6 5</b>
Flange DN100, PN16 Form C, DIN 2501/Enamelled <sup>2)</sup>	<b>B 6 6</b>
Flange DN100, PN16 Form D, DIN 2501/316L	<b>B 6 7</b>
Flange DN100, PN16 Form F, DIN 2501/316L	<b>B 6 8</b>
Flange DN100, PN16 Form N, DIN 2501/316L	<b>B 7 0</b>
Flange DN100, PN40 Form C, DIN 2501/316L	<b>B 7 1</b>
Flange DN100, PN40 Form C, DIN 2501/ECTFE <sup>1)</sup>	<b>B 7 2</b>
Flange DN100, PN40 Form C, DIN 2501/PFA <sup>1)</sup>	<b>B 7 3</b>
Flange DN100, PN40 Form C, DIN 2501/Enamelled <sup>2)</sup>	<b>B 7 4</b>
Flange DN100, PN40 Form F, DIN 2501/316L	<b>B 7 5</b>
Flange DN100, PN40 Form N, DIN 2501/316L	<b>B 7 6</b>
Flange DN100, PN40 V13, DIN 2501/316L	<b>B 7 7</b>

#### Selection and Ordering data

Order No.

#### SITRANS LVL200, Standard

Compact vibrating level switch for use in liquid and slurry applications such as overflow, high, low and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.

7 M L 5 7 4 6 -

- A 0

Flange DN100, PN64 Form E, DIN 2501/316L	<b>B 7 8</b>
Flange DN100, PN100 Form E, DIN 2501/316L	<b>B 8 0</b>
Flange DN100, PN100 Form L, DIN 2501/316L	<b>B 8 1</b>
Flange DN125, PN16 Form F, DIN 2501/316L	<b>B 8 2</b>
Flange DN125, PN40 Form C, DIN 2501/316L	<b>B 8 3</b>
Flange DN125, PN40 Form N, DIN 2512/316L	<b>B 8 4</b>
Flange DN150, PN16 Form C, DIN 2501/316L	<b>B 8 5</b>
Flange DN150, PN16 Form C, DIN 2501/Hastelloy	<b>B 8 6</b>
Flange DN150, PN16 Form C, DIN 2501/ECTFE <sup>1)</sup>	<b>B 8 7</b>
Flange DN150, PN16 Form C, DIN 2501/PFA <sup>1)</sup>	<b>B 8 8</b>
Flange DN150, PN16 Form D, DIN 2501/316L	<b>C 0 0</b>
Flange DN150, PN40 Form C, DIN 2501/316L	<b>C 0 1</b>
Flange DN150, PN40 Form C, DIN 2501/Hastelloy	<b>C 0 2</b>
Flange DN150, PN40 Form F, DIN 2501/316L	<b>C 0 3</b>
Flange DN150, PN40 Form N, DIN 2512/316L	<b>C 0 4</b>
Flange DN200, PN10 Form C, DIN 2501/ECTFE <sup>1)</sup>	<b>C 0 5</b>
Flange DN200, PN16 Form C, DIN 2501/316L	<b>C 0 6</b>
Flange DN25, PN40 Form B1, EN 1092-1/316L	<b>C 0 7</b>
Flange DN25, PN40 Form B1, EN 1092-1/Hastelloy	<b>C 0 8</b>
Flange DN25, PN40 Form B1, EN/316L/PFA <sup>1)</sup>	<b>C 1 0</b>
Flange DN25, PN40 Form B1, EN 1092-1/Enamelled <sup>2)</sup>	<b>C 1 1</b>
Flange DN25, PN40 Form B2, EN 1092-1/316L	<b>C 1 2</b>
Flange DN25, PN40 Form F, EN 1092-1/316L	<b>C 1 3</b>
Flange DN25, PN63 Form B1, EN 1092-1/316L	<b>C 1 4</b>
Flange DN25, PN100 Form B2, EN 1092-1/316L	<b>C 1 5</b>
Flange DN40, PN40 Form B1, EN/316L	<b>C 1 6</b>
Flange DN40, PN40 Form B1, EN 1092-1/PFA <sup>1)</sup>	<b>C 1 7</b>
Flange DN40, PN40 Form B2, EN/316L	<b>C 1 8</b>
Flange DN50, PN40 Form B1, EN/316L	<b>C 2 0</b>
Flange DN50, PN40 Form B1, EN 1092-1/Hastelloy	<b>C 2 1</b>
Flange DN50, PN40 Form B1, EN 1092-1/Monel ZB2977	<b>C 2 2</b>
Flange DN50, PN40 Form B1, EN 1092-1/ECTFE <sup>1)</sup>	<b>C 2 3</b>
Flange DN50, PN40 Form B1, EN/316L/PFA <sup>1)</sup>	<b>C 2 4</b>
Flange DN50, PN40 Form B1, EN 1092-1/Enamelled <sup>2)</sup>	<b>C 2 5</b>
Flange DN50, PN40 Form C, EN 1092-1/316L	<b>C 2 6</b>
Flange DN50, PN40 Form D, EN/316L	<b>C 2 7</b>
Flange DN50, PN40 Form D, EN 1092-1/Hastelloy	<b>C 2 8</b>
Flange DN50, PN40 Form B2, EN 1092-1/316L	<b>C 3 0</b>
Flange DN50, PN40 Form E, EN 1092-1/316L	<b>C 3 1</b>
Flange DN80, PN40 Form B1, EN 1092-1/316L	<b>C 3 2</b>
Flange DN80, PN40 Form B1, EN 1092-1/Hastelloy	<b>C 3 3</b>
Flange DN80, PN40 Form B1, EN 1092-1/ECTFE <sup>1)</sup>	<b>C 3 4</b>
Flange DN80, PN40 Form B1, EN 1092-1/Enamelled <sup>2)</sup>	<b>C 3 5</b>
Flange DN80, PN40 Form B2, EN 1092-1/316L	<b>C 3 6</b>
Flange DN100, PN16 Form B1, EN 1092-1/316L	<b>C 3 7</b>
Flange DN100, PN16 Form B1, EN 1092-1/Hastelloy	<b>C 3 8</b>
Flange DN100, PN16 Form B1, EN 1092-1/Enamelled <sup>2)</sup>	<b>C 4 0</b>
Flange DN100, PN40 Form B1, EN 1092-1/316L	<b>C 4 1</b>
Flange DN100, PN40 Form B1, EN 1092-1/Enamelled <sup>2)</sup>	<b>C 4 2</b>
Flange DN100, PN40 Form C, EN 1092-1/316L	<b>C 4 3</b>
Flange DN100, PN63 Form B2, EN 1092-1/316L	<b>C 4 4</b>
Flange DN150, PN16 Form B1, EN 1092-1/316L	<b>C 4 5</b>
Flange DN150, PN16 Form B1, EN 1092-1/PFA <sup>1)</sup>	<b>C 4 6</b>
Flange DN150, PN40 Form B1, EN 1092-1/316L	<b>C 4 7</b>

# Level Measurement

## Point level measurement - Vibrating switches

SITRANS LVL200

Selection and Ordering data	Order No.	Selection and Ordering data	Order No.
<b>SITRANS LVL200, Standard</b> Compact vibrating level switch for use in liquid and slurry applications such as overflow, high, low and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.	7 ML 5 7 4 6 - A 0	<b>SITRANS LVL200, Standard</b> Compact vibrating level switch for use in liquid and slurry applications such as overflow, high, low and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.	7 ML 5 7 4 6 - A 0
Flange DN150, PN40 Form B1, EN 1092-1/ECTFE <sup>1)</sup>	C 4 8	Flange 3" 300lb RF, ANSI B16.5/Hastelloy	D 2 2
Flange DN150, PN40 Form B2, EN 1092-1/316L	C 5 0	Flange 3" 300lb RF, ANSI B16.5/ECTFE <sup>1)</sup>	D 2 3
Flange 1" 150lb ANSI B16.5/316L	C 5 1	Flange 3" 300lb RF, ANSI B16.5/PFA <sup>1)</sup>	D 2 4
Flange 1" 150lb RF, ANSI B16.5/Hastelloy	C 5 2	Flange 3" 300lb RF, ANSI B16.5/Enamelled <sup>2)</sup>	D 2 5
Flange 1" 150lb RF, ANSI B16.5/Monel ZB2977	C 5 3	Flange 3" 600lb RF, ANSI B16.5/316L	D 2 6
Flange 1" 150lb RF, ANSI B16.5/ECTFE <sup>1)</sup>	C 5 4	Flange 3½" 150lb RF, ANSI B16.5/316L	D 2 7
Flange 1" 150lb RF, ANSI B16.5/PFA <sup>1)</sup>	C 5 5	Flange 3½" 150lb RF, ANSI B16.5/ECTFE <sup>1)</sup>	D 2 8
Flange 1" 150lb RF, ANSI B16.5/Enamelled <sup>2)</sup>	C 5 6	Flange 4" 150lb RF, ANSI B16.5/316L	D 3 0
Flange 1" 300lb RF, ANSI B16.5/316L	C 5 7	Flange 4" 150lb RF, ANSI B16.5/Hastelloy	D 3 1
Flange 1" 300lb RF, ANSI B16.5/ECTFE <sup>1)</sup>	C 5 8	Flange 4" 150lb RF, ANSI B16.5/ECTFE <sup>1)</sup>	D 3 2
Flange 1" 600lb RF, ANSI B16.5/316L	C 6 0	Flange 4" 150lb RF, ANSI B16.5/PFA <sup>1)</sup>	D 3 3
Flange 1½" 150lb RF, ANSI B16.5/316L	C 6 1	Flange 4" 150lb RF, ANSI B16.5/Enamelled <sup>2)</sup>	D 3 4
Flange 1½" 150lb RF, ANSI B16.5/Hastelloy	C 6 2	Flange 4" 150lb LT, ANSI B16.5/316L	D 3 5
Flange 1½" 150lb RF, ANSI B16.5/ECTFE <sup>1)</sup>	C 6 3	Flange 4" 300lb RF, ANSI B16.5/316L	D 3 6
Flange 1½" 150lb RF, ANSI B16.5/PFA <sup>1)</sup>	C 6 4	Flange 4" 300lb RF, ANSI B16.5/Hastelloy	D 3 7
Flange 1½" 150lb RF, ANSI B16.5 Enamelled <sup>2)</sup>	C 6 5	Flange 4" 300lb RF, ANSI B16.5/ECTFE <sup>1)</sup>	D 3 8
Flange 1½" 150lb FF, ANSI B16.5/ECTFE <sup>1)</sup>	C 6 6	Flange 4" 300lb RJF, ANSI B16.5/316L	D 4 0
Flange 1½" 300lb RF, ANSI B16.5/316L	C 6 7	Flange 4" 300lb LG, ANSI B16.5/316L	D 4 1
Flange 1½" 300lb RF, ANSI B16.5/Monel ZB2977	C 6 8	Flange 4" 300lb LT, ANSI B16.5/316L	D 4 2
Flange 1½" 300lb RF, ANSI B16.5/ECTFE <sup>2)</sup>	C 7 0	Flange 4" 600lb RF, ANSI B16.5/316L	D 4 3
Flange 1½" 600lb RF, ANSI B16.5/316L	C 7 1	Flange 4" 600lb RJF, ANSI B16.5/316L	D 4 4
Flange 2" 150lb RF, ANSI B16.5/316L	C 7 2	Flange 6" 150lb RF, ANSI B16.5/316L	D 4 5
Flange 2" 150lb RF, ANSI B16.5/Hastelloy	C 7 3	Flange 6" 150lb RF, ANSI B16.5/Hastelloy	D 4 6
Flange 2" 150lb RF, ANSI B16.5/Monel ZB2977	C 7 4	Flange 6" 150lb RF, ANSI B16.5/ECTFE <sup>1)</sup>	D 4 7
Flange 2" 150lb RF, ANSI B16.5/ECTFE <sup>1)</sup>	C 7 5	Flange 6" 150lb RF, ANSI B16.5/PFA <sup>1)</sup>	D 4 8
Flange 2" 150lb RF, ANSI B16.5/PFA <sup>1)</sup>	C 7 6	Flange 6" 150lb RJF, ANSI B16.5/316L	D 5 0
Flange 2" 150lb RF, ANSI B16.5/Enamelled <sup>2)</sup>	C 7 7	Flange 6" 300lb RF, ANSI B16.5/316L	D 5 1
Flange 2" 150lb FF, ANSI B16.5/316L	C 7 8	Flange 8" 150lb RF, ANSI B16.5/316L	D 5 2
Flange 2" 150lb FF, ANSI B16.5/ECTFE <sup>1)</sup>	C 8 0	Flange 8" 150lb RF, ANSI B16.5/ECTFE <sup>1)</sup>	D 5 3
Flange 2" 150lb SG (small groove), ANSI B16.5/316L	C 8 1	Flange 1" BS.10 Table E/316L	D 5 4
Flange 2" 300lb RF, ANSI B16.5/316L	C 8 2	Flange 1" BS.10 Table E/PFA <sup>1)</sup>	D 5 5
Flange 2" 300lb RF, ANSI B16.5/Hastelloy	C 8 3	Flange 1½" BS.10 Table E/316L	D 5 6
Flange 2" 300lb RF, ANSI B16.5/Hastelloy	C 8 4	Flange 3½" BS.10 Table E/316L	D 5 7
Flange 2" 300lb RF, ANSI B16.5/ECTFE <sup>1)</sup>	C 8 5	Flange 4" BS.10 Table E/ECTFE <sup>1)</sup>	D 5 8
Flange 2" 300lb RF, ANSI B16.5/PFA <sup>1)</sup>	C 8 6	Flange DN40 10K, JIS/316L	D 6 0
Flange 2" 300lb RF, ANSI B16.5 Enamelled <sup>2)</sup>	C 8 7	Flange DN50 10K, JIS/316L	D 6 1
Flange 2" 300lb RJF, ANSI B16.5/316L	C 8 8	Flange DN80 10K, JIS/316L	D 6 2
Flange 2" 300lb ST, ANSI B16.5/316L	D 0 0	Flange DN100 10K, JIS/316L	D 6 3
Flange 2" 300lb LG (large groove), ANSI B16.5/316L	D 0 1		
Flange 2" 300lb LT, ANSI B16.5/316L	D 0 2	<b>Adapter/Process temperature</b>	
Flange 2" 600lb RF, ANSI B16.5/316L	D 0 3	Without adapter/-50 ... +150 °C (-58 ... +302 °F)	1
Flange 2" 600lb RF, ANSI B16.5/Monel ZB2977	D 0 4	With adapter/-50 ... +200 °C (-58 ... +392 °F) <sup>4)</sup>	2
Flange 2" 600lb RF, ANSI B16.5/ECTFE <sup>1)</sup>	D 0 5	With adapter/-50 ... +250 °C (-58 ... +482 °F)	3
Flange 2" 600lb RJF, ANSI B16.5/316L	D 0 6	With gas-tight leadthrough/-50 ... +150 °C (-58 ... +302 °F)	4
Flange 2" 600lb LG, ANSI B16.5/316L	D 0 7	With gas-tight leadthrough/-50 ... +250 °C (-58 ... +482 °F)	5
Flange 2" 900lb RJF, ANSI B16.5/316L	D 0 8		
Flange 2½" 150lb RF, ANSI B16.5/316L	D 1 0	<b>Housing/ Cable entry</b>	
Flange 2½" 300lb RF, ANSI B16.5/316L	D 1 1	Aluminium IP66/IP67/M20x1.5	A
Flange 3" 150lb RF, ANSI B16.5/316L	D 1 2	Aluminium IP66/IP67/½" NPT	B
Flange 3" 150lb RF, ANSI B16.5/Hastelloy	D 1 3		
Flange 3" 150lb RF, ANSI B16.5/ECTFE <sup>1)</sup>	D 1 4		
Flange 3" 150lb RF, ANSI B16.5/PFA <sup>1)</sup>	D 1 5		
Flange 3" 150lb RF, ANSI B16.5/Enamelled <sup>2)</sup>	D 1 6		
Flange 3" 150lb FF, ANSI B16.5/316L	D 1 7		
Flange 3" 150lb FF, ANSI B16.5/ECTFE <sup>1)</sup>	D 1 8		
Flange 3" 150lb FF, ANSI B16.5/PFA <sup>1)</sup>	D 2 0		
Flange 3" 300lb RF, ANSI B16.5/316L	D 2 1		

- 1) Available with Housing/Cable entry option B only
- 2) Available with Adapter/Process temperature options 1 and 4 only
- 3) Available with Adapter/Process temperature options 1, 2, and 4 only
- 4) Available with enamelled Process connection options only

# Level Measurement

## Point level measurement - Vibrating switches

### SITRANS LVL200

Selection and Ordering data	Order code
<b>Further designs</b>	
Please add "-Z" to Order No. and specify Order code(s).	
Cleaning including Certificate (oil, grease and silicone free)	<b>W01</b>
Identification Label (measurement loop) SS: max. 16 characters add in plain text	<b>Y17</b>
Identification Label (measurement loop) Foil: max. 16 characters add in plain text	<b>Y18</b>
Acceptance test certificate 3.1 NACE MR 0775 for material EN10204	<b>D07</b>
Acceptance test certificate 3.1 for instrument	<b>C12</b>
Acceptance test certificate 2.2 for instrument	<b>C14</b>
Acceptance test Certificate 2.2 for material EN10204	<b>C15</b>
SIL/IEC61508 Certificate of conformity (SIL-2/3 min. and max. detection)	<b>C20</b>
<b>Additional Operating Instructions</b>	
<u>LVL 200 (DPDT Relay)</u>	Order No.
• English	<b>7ML1998-5KR01</b>
• French	<b>7ML1998-5KR11</b>
• Spanish	<b>7ML1998-5KR21</b>
• German	<b>7ML1998-5KR31</b>
<u>LVL 200 (Contactless electronic switch)</u>	
• English	<b>7ML1998-5KQ01</b>
• French	<b>7ML1998-5KQ11</b>
• Spanish	<b>7ML1998-5KQ21</b>
• German	<b>7ML1998-5KQ31</b>
<u>Electronics module LVL200 Relay</u>	
• English	<b>7ML1998-5LS01</b>
• French	<b>7ML1998-5LS11</b>
• Spanish	<b>7ML1998-5LS21</b>
• German	<b>7ML1998-5LS31</b>
This device is shipped with the Siemens Milltronics manual CD containing the complete Operating Instructions library.	
<b>Spare Parts</b>	
Electronics module SITRANS LVL200 Relay	<b>7ML1830-1NC</b>
<u>LVL100 Threaded Welded Socket</u>	
• G ¾" A / 316L with FKM Seal	<b>7ML1930-1EE</b>
• G 1 A / 316L with FKM Seal	<b>7ML1930-1EF</b>
• M27x1.5 / 316L with FKM Seal	<b>7ML1930-1EG</b>
• G ¾" A / 316L with EPDM Seal	<b>7ML1930-1EH</b>
• G 1 A / 316L with EPDM Seal	<b>7ML1930-1EJ</b>
• M27x1.5 / 316L with EPDM Seal	<b>7ML1930-1EK</b>



# Level Measurement

## Point level measurement - Vibrating switches

SITRANS LVL200

Selection and Ordering data	Order No.	Selection and Ordering data	Order No.
<b>SITRANS LVL200, Rigid extension</b> Compact vibrating level switch for use in liquid applications such as overflow, high, low and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.	7 ML 5 7 4 7 -	<b>SITRANS LVL200, Rigid extension</b> Compact vibrating level switch for use in liquid applications such as overflow, high, low and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.	7 ML 5 7 4 7 -
<b>Electronics</b>			
Contactless electronic switch 20...250 V AC/DC	1	Tri-Clamp 1½" PN16/316L Ra < 0.3 µm	A 4 2
Double relay (DPDT) 20 ... 72 V DC/20 ... 250 V AC	2	Tri-Clamp 1½" PN16/Hastelloy	A 4 3
		Tri-Clamp 1½" PN16/316L Ra < 0.8 µm	A 4 4
<b>Approvals</b>		Tri-Clamp 2" PN16/316L Ra < 0.3 µm	A 4 5
Without approvals	A	Tri-Clamp 2" PN16/Hastelloy	A 4 6
Overfill protection (WHG)	B	Tri-Clamp 2" PN16/316L Ra < 0.8 µm	A 4 7
ATEX II 1/2G, 2G EEx d IIC T6 + WHG	D	Tri-Clamp 2½" PN10/316L Ra < 0.3 µm	A 4 8
ATEX II 1/2G, 2G EEx d IIC T6 + shipping approvals	F	Tri-Clamp 2½" PN10/316L Ra < 0.8 µm	A 5 0
Shipping approvals	K	Tri-Clamp 3" PN10/316L Ra < 0.3 µm	A 5 1
FM (XP) Class I, Div. 1, Groups A, B, C, D; (DIP) Class II, III, Div. 1, Groups E, F, G <sup>1)</sup>	P	Tri-Clamp 3" PN10/316L Ra < 0.8 µm	A 5 2
FM (NI) Class I, Div. 2, Groups A, B, C, D <sup>1)</sup>	Q	Bolting DN32 PN40 DIN11851/316L Ra < 0.3 µm	A 5 3
IECEX d IIC T6...T2 Ga/Gb	R	Bolting DN32 PN40 DIN11851/316L Ra < 0.8 µm	A 5 4
CSA(XP)CL I,II,III DIV 1,GP A B C D E F G...T2 Ga/Gb	S	Bolting DN25 PN40 DIN11851/316L Ra < 0.3 µm	A 5 5
CSA(NI)CL I,II,III, DIV 2,GP A B C D E F G	T	Bolting DN25 PN40 DIN11851/316L Ra < 0.8 µm	A 5 6
		Bolting DN40 PN40 DIN11851/316L Ra < 0.3 µm	A 5 7
<b>Process connection</b>		Bolting DN40 PN40 DIN11851/316L Ra < 0.8 µm	A 5 8
Thread G¾" A, PN64/316L	A 0 0	Bolting DN40 PN40 DIN11864-1 A/316L Ra < 0.8 µm ZB3052	A 6 0
Thread G¾" A, PN64/316L Ra < 0.8 µm	A 0 1	Bolting DN50 PN25 DIN11851/316L Ra < 0.3 µm	A 6 1
Thread ¾" NPT, PN64/316L	A 0 2	Bolting DN50 PN25 DIN11851/316L Ra < 0.8 µm	A 6 2
Thread ¾" NPT, PN64/316L Ra < 0.8 µm	A 0 3	Bolting DN50 PN25 DIN11864-1 A/316L Ra < 0.8 µm ZB3052	A 6 3
Thread ¾" NPT, PN64/Monel	A 0 4	Hygienic w.compr.nut F40 PN25/316L	A 6 4
Thread G¾" A, PN64/Hastelloy	A 0 5	Hygienic w.compr.nut F40 PN25/316L Ra < 0.3 µm	A 6 5
Thread ¾" NPT, PN64/Hastelloy	A 0 6	Hygienic w.compr.nut F40 PN25/316L Ra < 0.8 µm	A 6 6
Thread G1" A, PN64/316L	A 0 7	Varivent N50-40/316L Ra < 0.3 µm	A 6 7
Thread G1" A, PN64/316L ECTFE coated MB1982 <sup>2)</sup>	A 0 8	Varivent N50-40/316L Ra < 0.8 µm	A 6 8
Thread G1" A, PN64/316L PFA coated <sup>1)</sup>	A 1 0	Varivent N125/100/316L Ra < 0.8 µm	A 7 0
Thread G1" A, PN64/Monel	A 1 1	DRD flange PN40/316L ZB3007	A 7 1
Thread G1" A, PN64/316L Ra < 0.8 µm	A 1 3	SMS DN38/316L Ra < 0.8 µm <sup>1)</sup>	A 7 2
Thread 1" NPT, PN64/316L	A 1 4	SMS DN51 PN6/316L Ra < 0.8 µm <sup>1)</sup>	A 7 3
Thread 1" NPT, PN64/316L ECTFE coated MB1982 <sup>1)</sup>	A 1 5	Swagelok VCR screwing ZG2579 PN64/316L	A 7 4
Thread 1" NPT, PN64/316L PFA coated <sup>1)</sup>	A 1 6	Neumo biocontrol Gr.25 PN16/316L Ra < 0.8 µm	A 7 5
Thread 1" NPT, PN64/Monel	A 1 7	Neumo biocontrol Gr.50 PN16/316L Ra < 0.8 µm	A 7 6
Thread 1" NPT, PN64/316L Ra < 0.8 µm	A 1 8	Neumo biocontrol Gr.65 PN16/316L Ra < 0.8 µm	A 7 7
Thread G1" A, PN64/Hastelloy	A 2 0	Neumo biocontrol Gr.80 PN16/316L Ra < 0.8 µm	A 7 8
Thread G1½" A, PN64/316L	A 2 1	SÜDMO DN50 PN10/316L/316L Ra < 0.8 µm	A 8 0
Thread G1½" A, PN64/316L Ra < 0.8 µm	A 2 2	Small flange DN25 PN1.5 DIN 28403/316L pol.Ra < 0.8 µm	A 8 1
Thread G1½" A, PN64/Hastelloy	A 2 3	Small flange DN40 PN1.5 DIN 28403/316L pol.Ra < 0.8 µm	A 8 2
Thread 1" NPT, PN64/Hastelloy	A 2 4	Ingold connection PN16/316L Ra < 0.8 µm	A 8 3
Thread 1½" NPT, PN64/316L	A 2 5	Terminal DN33.7 PN40 DIN 11864-3-A-/316L BN2 Ra < 0.8 µm	A 8 4
Thread 1½" NPT, PN64/316L Ra < 0.8 µm	A 2 6	Hygienic fl. DN50 PN16 DIN 11864-2-A-/316L Ra < 0.8 µm	A 8 5
Thread 1½" NPT, PN64/Hastelloy	A 2 7	Flange DN25 PN6 Form C, DIN 2501/316L	A 8 6
Thread G2" A, PN64/316L	A 2 8	Flange DN25 PN6 Form C, DIN 2501/PFA <sup>1)</sup>	A 8 7
Thread M27x1.5 PN64/316L	A 3 0	Flange DN25 PN40 Form C, DIN 2501/316L	A 8 8
Cyl. socket/316Ti/1.4581 ECTFE coated ZB2984 <sup>1)</sup>	A 3 1	Flange DN25 PN40 Form C, DIN 2501/Hastelloy	B 0 0
Conus DN25 PN40/316L Ra < 0.3 µm	A 3 2	Flange DN25 PN40 Form C, DIN 2501/ECTFE <sup>1)</sup>	B 0 1
Conus DN25 PN40/316L Ra < 0.8 µm.	A 3 3	Flange DN25 PN40 Form C, DIN 2501/PFA <sup>1)</sup>	B 0 2
Conus DN25 PN40/ECTFE (ZB3033) <sup>1)</sup>	A 3 4	Flange DN25 PN40 Form D, DIN 2501/316L	B 0 3
Conus M52 PN40/316L	A 3 5		
Conus M52 PN40/316L Ra < 0.3 µm	A 3 6		
Conus M52 PN40/316L Ra < 0.8 µm	A 3 7		
Tri-Clamp 1" PN16 DIN 32676/316L Ra < 0.3 µm	A 3 8		
Tri-Clamp 1" PN16/Hastelloy	A 4 0		
Tri-Clamp 1" PN16/316L Ra < 0.8 µm	A 4 1		

# Level Measurement

## Point level measurement - Vibrating switches

### SITRANS LVL200

#### Selection and Ordering data

Order No.

#### SITRANS LVL200, Rigid extension

Compact vibrating level switch for use in liquid applications such as overflow, high, low and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.

7 M L 5 7 4 7 -

Flange DN25 PN40 Form F, DIN 2501/316L	<b>B 0 4</b>
Flange DN25 PN40 Form N, DIN 2501/316L	<b>B 0 5</b>
Flange DN25 PN40 Form N, DIN 2501/Hastelloy	<b>B 0 6</b>
Flange DN25 PN40 Form N, DIN 2501/Monel solid	<b>B 0 7</b>
Flange DN25 PN40 V13, DIN 2501/316L	<b>B 0 8</b>
Flange DN32 PN40 Form C, DIN 2501/316L	<b>B 1 0</b>
Flange DN32 PN40 Form C, DIN 2501/ECTFE <sup>1)</sup>	<b>B 1 1</b>
Flange DN40 PN6 Form C, DIN 2501/316L	<b>B 1 2</b>
Flange DN40 PN6 Form C, DIN 2501/ECTFE <sup>1)</sup>	<b>B 1 3</b>
Flange DN40 PN40 Form C, DIN 2501/316L	<b>B 1 4</b>
Flange DN40 PN40 Form C, DIN 2501/Hastelloy	<b>B 1 5</b>
Flange DN40 PN40 Form C, DIN 2501/ECTFE <sup>1)</sup>	<b>B 1 6</b>
Flange DN40 PN40 Form C, DIN 2501/PFA <sup>1)</sup>	<b>B 1 7</b>
Flange DN40 PN40 Form C, DIN 2501/Enamelled <sup>3)</sup>	<b>B 1 8</b>
Flange DN40 PN40 Form F, DIN 2501/316L	<b>B 2 0</b>
Flange DN40 PN40 Form N, DIN 2501/316L	<b>B 2 1</b>
Flange DN40 PN40 Form E, DIN 2501/316L	<b>B 2 2</b>
Flange DN40 PN40 V13, DIN 2501/316L	<b>B 2 3</b>
Flange DN50 PN40 Form C, DIN 2501/316L	<b>B 2 4</b>
Flange DN50 PN40 Form C, DIN 2501/Hastelloy	<b>B 2 5</b>
Flange DN50 PN40 Form C, DIN 2501/ECTFE <sup>1)</sup>	<b>B 2 6</b>
Flange DN50 PN40 Form C, DIN 2501/ECTFE <sup>1)</sup> (ZB3108)	<b>B 2 7</b>
Flange DN50 PN40 Form C, DIN 2501/PFA <sup>1)</sup>	<b>B 2 8</b>
Flange DN50 PN40 Form D, DIN 2501/316L	<b>B 3 0</b>
Flange DN50 PN40 Form D, DIN 2501/Hastelloy	<b>B 3 1</b>
Flange DN50 PN40 Form F, DIN 2501/316L	<b>B 3 2</b>
Flange DN50 PN40 Form N, DIN 2501/316L	<b>B 3 3</b>
Flange DN50 PN40 Form N, DIN 2501/Hastelloy	<b>B 3 4</b>
Flange DN50 PN40 Form E, DIN 2501/316L	<b>B 3 5</b>
Flange DN50 PN40 V13, DIN 2501/316L	<b>B 3 6</b>
Flange DN50 PN40 R13, DIN 2501/316L	<b>B 3 7</b>
Flange DN50 PN64 Form F, DIN 2501/316L	<b>B 3 8</b>
Flange DN50 PN64 Form N, DIN 2501/Hastelloy	<b>B 4 0</b>
Flange DN50 PN64 Form C, DIN 2501/316L	<b>B 4 1</b>
Flange DN50 PN64 Form L, DIN 2501/316L	<b>B 4 2</b>
Flange DN50 PN100 Form E, DIN 2501/316L	<b>B 4 3</b>
Flange DN50 PN100 Form L, DIN 2501/316L	<b>B 4 4</b>
Flange DN65 PN40 Form C, DIN 2501/316L	<b>B 4 5</b>
Flange DN65 PN40 Form C, DIN 2501/Hastelloy	<b>B 4 6</b>
Flange DN65 PN40 Form C, DIN 2501/ECTFE <sup>1)</sup>	<b>B 4 7</b>
Flange DN65 PN40 Form C, DIN 2501/PFA <sup>1)</sup>	<b>B 4 8</b>
Flange DN65 PN40 Form F, DIN 2501/316L	<b>B 5 0</b>
Flange DN65 PN64 Form E, DIN 2501/316L	<b>B 5 1</b>
Flange DN80 PN40 Form C, DIN 2501/316L	<b>B 5 2</b>
Flange DN80 PN40 Form C, DIN 2501/Hastelloy	<b>B 5 3</b>
Flange DN80 PN40 Form C, DIN 2501/ECTFE <sup>1)</sup>	<b>B 5 4</b>
Flange DN80 PN40 Form C, DIN 2501/PFA <sup>1)</sup>	<b>B 5 5</b>
Flange DN80 PN40 Form F, DIN 2501/316L	<b>B 5 6</b>
Flange DN80 PN40 Form N, DIN 2501/316L	<b>B 5 7</b>
Flange DN80 PN40 Form N, DIN 2501/Hastelloy	<b>B 5 8</b>
Flange DN100 PN16 Form C, DIN 2501/316L	<b>B 6 0</b>
Flange DN100 PN16 Form C, DIN 2501/Hastelloy	<b>B 6 1</b>
Flange DN100 PN16 Form C, DIN 2501/ECTFE <sup>1)</sup>	<b>B 6 2</b>
Flange DN100 PN16 Form C, DIN 2501/PFA <sup>1)</sup>	<b>B 6 3</b>
Flange DN100 PN16 Form D, DIN 2501/316L	<b>B 6 4</b>
Flange DN100 PN16 Form F, DIN 2501/316L	<b>B 6 5</b>
Flange DN100 PN16 Form N, DIN 2501/316L	<b>B 6 6</b>

#### Selection and Ordering data

Order No.

#### SITRANS LVL200, Rigid extension

Compact vibrating level switch for use in liquid applications such as overflow, high, low and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.

7 M L 5 7 4 7 -

Flange DN100 PN40 Form C, DIN 2501/316L	<b>B 6 7</b>
Flange DN100 PN40 Form C, DIN 2501/ECTFE <sup>1)</sup>	<b>B 6 8</b>
Flange DN100 PN40 Form C, DIN 2501/PFA <sup>1)</sup>	<b>B 7 0</b>
Flange DN100 PN40 Form C, DIN 2501/ Enamelled <sup>2)</sup>	<b>B 7 1</b>
Flange DN100 PN40 Form F, DIN 2501/316L	<b>B 7 2</b>
Flange DN100 PN40 Form N, DIN 2501/316L	<b>B 7 3</b>
Flange DN100 PN40 V13, DIN 2501/316L	<b>B 7 4</b>
Flange DN100 PN64 Form E, DIN 2501/316L	<b>B 7 5</b>
Flange DN100 PN100 Form E, DIN 2501/316L	<b>B 7 6</b>
Flange DN100 PN100 Form L, DIN 2501/316L	<b>B 7 7</b>
Flange DN125 PN16 Form F, DIN 2501/316L	<b>B 7 8</b>
Flange DN125 PN40 Form C, DIN 2501/316L	<b>B 8 0</b>
Flange DN125 PN40 Form N, DIN 2512/316L	<b>B 8 1</b>
Flange DN150 PN16 Form C, DIN 2501/316L	<b>B 8 2</b>
Flange DN150 PN16 Form C, DIN 2501/Hastelloy	<b>B 8 3</b>
Flange DN150 PN16 Form C, DIN 2501/ECTFE <sup>1)</sup>	<b>B 8 4</b>
Flange DN150 PN16 Form C, DIN 2501/PFA <sup>1)</sup>	<b>B 8 5</b>
Flange DN150 PN16 Form D, DIN 2501/316L	<b>B 8 6</b>
Flange DN150 PN40 Form C, DIN 2501/316L	<b>B 8 7</b>
Flange DN150 PN40 Form C, DIN 2501/Hastelloy	<b>B 8 8</b>
Flange DN150 PN40 Form F, DIN 2501/316L	<b>C 0 0</b>
Flange DN150 PN40 Form N, DIN 2512/316L	<b>C 0 1</b>
Flange DN200 PN10 Form C, DIN 2501/ECTFE <sup>1)</sup>	<b>C 0 2</b>
Flange DN200 PN16 Form C, DIN 2501/316L	<b>C 0 3</b>
Flange DN25 PN40 Form B1, EN 1092-1/316L	<b>C 0 4</b>
Flange DN25 PN40 Form B1, EN 1092-1/Hastelloy	<b>C 0 5</b>
Flange DN25 PN40 Form B1, EN/316L/PFA <sup>1)</sup>	<b>C 0 6</b>
Flange DN25 PN40 Form B1, EN 1092-1/ Enamelled <sup>2)</sup>	<b>C 0 7</b>
Flange DN25 PN40 Form B2, EN 1092-1/316L	<b>C 0 8</b>
Flange DN25 PN40 Form F, EN 1092-1/316L	<b>C 1 0</b>
Flange DN25 PN63 Form B1, EN 1092-1/316L	<b>C 1 1</b>
Flange DN25 PN100 Form B2, EN 1092-1/316L	<b>C 1 2</b>
Flange DN40 PN40 Form B1, EN/316L	<b>C 1 3</b>
Flange DN40 PN40 Form B1, EN 1092-1/PFA <sup>1)</sup>	<b>C 1 4</b>
Flange DN40 PN40 Form B2, EN/316L	<b>C 1 5</b>
Flange DN50 PN40 Form B1, EN/316L	<b>C 1 6</b>
Flange DN50 PN40 Form B1, EN 1092-1/Hastelloy	<b>C 1 7</b>
Flange DN50 PN40 Form B1, EN 1092-1/ Monel ZB2977	<b>C 1 8</b>
Flange DN50 PN40 Form B1, EN 1092-1/ECTFE <sup>1)</sup>	<b>C 2 0</b>
Flange DN50 PN40 Form B1, EN/316L/PFA <sup>1)</sup>	<b>C 2 1</b>
Flange DN50 PN40 Form B1, EN 1092-1/ Enamelled <sup>2)</sup>	<b>C 2 2</b>
Flange DN50 PN40 Form C, EN 1092-1/316L	<b>C 2 3</b>
Flange DN50 PN40 Form D, EN/316L	<b>C 2 4</b>
Flange DN50 PN40 Form D, EN 1092-1/ Hastelloy	<b>C 2 5</b>
Flange DN50 PN40 Form B2, EN 1092-1/316L	<b>C 2 6</b>
Flange DN50 PN40 Form E, EN 1092-1/316L	<b>C 2 7</b>
Flange DN80 PN40 Form B1, EN 1092-1/316L	<b>C 2 8</b>
Flange DN80 PN40 Form B1, EN 1092-1/Hastelloy	<b>C 3 0</b>
Flange DN80 PN40 Form B1, EN 1092-1/ECTFE <sup>1)</sup>	<b>C 3 1</b>
Flange DN80 PN40 Form B1, EN 1092-1/ Enamelled <sup>2)</sup>	<b>C 3 2</b>
Flange DN80 PN40 Form B2, EN 1092-1/316L	<b>C 3 3</b>
Flange DN100 PN16 Form B1, EN 1092-1/316L	<b>C 3 4</b>
Flange DN100 PN16 Form B1, EN 1092-1/Hastelloy	<b>C 3 5</b>
Flange DN100 PN16 Form B1, EN 1092-1/ Enamelled <sup>2)</sup>	<b>C 3 6</b>

# Level Measurement

## Point level measurement - Vibrating switches

SITRANS LVL200

Selection and Ordering data	Order No.	Selection and Ordering data	Order No.
<b>SITRANS LVL200, Rigid extension</b> Compact vibrating level switch for use in liquid applications such as overflow, high, low and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.	<b>7 ML 5 7 4 7 -</b>	<b>SITRANS LVL200, Rigid extension</b> Compact vibrating level switch for use in liquid applications such as overflow, high, low and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.	<b>7 ML 5 7 4 7 -</b>
Flange DN100 PN40 Form B1, EN 1092-1/316L	<b>C 3 7</b>	Flange 3" 150lb RF, ANSI B16.5/Monel ZB2977	<b>D 1 1</b>
Flange DN100 PN40 Form B1, EN 1092-1/Enamelled <sup>2)</sup>	<b>C 3 8</b>	Flange 3" 150lb RF, ANSI B16.5/ECTFE <sup>1)</sup>	<b>D 1 2</b>
Flange DN100 PN40 Form C, EN 1092-1/316L	<b>C 4 0</b>	Flange 3" 150lb RF, ANSI B16.5/PFA <sup>1)</sup>	<b>D 1 3</b>
Flange DN100 PN63 Form B2, EN 1092-1/316L	<b>C 4 1</b>	Flange 3" 150lb RF, ANSI B16.5/Enamelled <sup>2)</sup>	<b>D 1 4</b>
Flange DN150 PN16 Form B1, EN 1092-1/316L	<b>C 4 2</b>	Flange 3" 150lb FF, ANSI B16.5/316L	<b>D 1 5</b>
Flange DN150 PN16 Form B1, EN 1092-1/PFA <sup>1)</sup>	<b>C 4 3</b>	Flange 3" 150lb FF, ANSI B16.5/ECTFE <sup>1)</sup>	<b>D 1 6</b>
Flange DN150 PN40 Form B1, EN 1092-1/316L	<b>C 4 4</b>	Flange 3" 150lb FF, ANSI B16.5/PFA <sup>1)</sup>	<b>D 1 7</b>
Flange DN150 PN40 Form B1, EN 1092-1/ECTFE <sup>1)</sup>	<b>C 4 5</b>	Flange 3" 300lb RF, ANSI B16.5/316L	<b>D 1 8</b>
Flange DN150 PN40 Form B2, EN 1092-1/316L	<b>C 4 6</b>	Flange 3" 300lb RF, ANSI B16.5/Hastelloy	<b>D 2 0</b>
Flange 1" 150lb ANSI B16.5/316L	<b>C 4 7</b>	Flange 3" 300lb RF, ANSI B16.5/ECTFE <sup>1)</sup>	<b>D 2 1</b>
Flange 1" 150lb RF, ANSI B16.5/Hastelloy	<b>C 4 8</b>	Flange 3" 300lb RF, ANSI B16.5/PFA <sup>1)</sup>	<b>D 2 2</b>
Flange 1" 150lb RF, ANSI B16.5/Monel ZB2977	<b>C 5 0</b>	Flange 3" 300lb RF, ANSI B16.5/Enamelled <sup>2)</sup>	<b>D 2 3</b>
Flange 1" 150lb RF, ANSI B16.5/ECTFE <sup>1)</sup>	<b>C 5 1</b>	Flange 3" 600lb RF, ANSI B16.5/316L	<b>D 2 4</b>
Flange 1" 150lb RF, ANSI B16.5/PFA <sup>1)</sup>	<b>C 5 2</b>	Flange 3½" 150lb RF, ANSI B16.5/316L	<b>D 2 5</b>
Flange 1" 150lb RF, ANSI B16.5/Enamelled <sup>2)</sup>	<b>C 5 3</b>	Flange 3½" 150lb RF, ANSI B16.5/ECTFE <sup>1)</sup>	<b>D 2 6</b>
Flange 1" 300lb RF, ANSI B16.5/316L	<b>C 5 4</b>	Flange 4" 150lb RF, ANSI B16.5/316L	<b>D 2 7</b>
Flange 1" 300lb RF, ANSI B16.5/ECTFE <sup>1)</sup>	<b>C 5 5</b>	Flange 4" 150lb RF, ANSI B16.5/Hastelloy	<b>D 2 8</b>
Flange 1" 600lb RF, ANSI B16.5/316L	<b>C 5 6</b>	Flange 4" 150lb RF, ANSI B16.5/ECTFE <sup>1)</sup>	<b>D 3 0</b>
Flange 1½" 150lb RF, ANSI B16.5/316L	<b>C 5 7</b>	Flange 4" 150lb RF, ANSI B16.5/PFA <sup>1)</sup>	<b>D 3 1</b>
Flange 1½" 150lb RF, ANSI B16.5/Hastelloy	<b>C 5 8</b>	Flange 4" 150lb RF, ANSI B16.5/Enamelled <sup>2)</sup>	<b>D 3 2</b>
Flange 1½" 150lb RF, ANSI B16.5/ECTFE <sup>1)</sup>	<b>C 6 0</b>	Flange 4" 150lb LT, ANSI B16.5/316L	<b>D 3 3</b>
Flange 1½" 150lb RF, ANSI B16.5/PFA <sup>1)</sup>	<b>C 6 1</b>	Flange 4" 300lb RF, ANSI B16.5/316L	<b>D 3 4</b>
Flange 1½" 150lb RF, ANSI B16.5 Enamelled <sup>2)</sup>	<b>C 6 2</b>	Flange 4" 300lb RF, ANSI B16.5/Hastelloy	<b>D 3 5</b>
Flange 1½" 150lb FF, ANSI B16.5/ECTFE <sup>1)</sup>	<b>C 6 3</b>	Flange 4" 300lb RF, ANSI B16.5/ECTFE <sup>1)</sup>	<b>D 3 6</b>
Flange 1½" 300lb RF, ANSI B16.5/316L	<b>C 6 4</b>	Flange 4" 300lb RJF, ANSI B16.5/316L	<b>D 3 7</b>
Flange 1½" 300lb RF, ANSI B16.5/Monel ZB2977	<b>C 6 5</b>	Flange 4" 300lb LG, ANSI B16.5/316L	<b>D 3 8</b>
Flange 1½" 300lb RF, ANSI B16.5/ECTFE <sup>1)</sup>	<b>C 6 6</b>	Flange 4" 300lb LT, ANSI B16.5/316L	<b>D 4 0</b>
Flange 1½" 600lb RF, ANSI B16.5/316L	<b>C 6 7</b>	Flange 4" 600lb RF, ANSI B16.5/316L	<b>D 4 1</b>
Flange 2" 150lb RF, ANSI B16.5/316L	<b>C 6 8</b>	Flange 4" 600lb RJF, ANSI B16.5/316L	<b>D 4 2</b>
Flange 2" 150lb RF, ANSI B16.5/Hastelloy	<b>C 7 0</b>	Flange 5" 150lb RF, ANSI B16.5/316L	<b>D 4 3</b>
Flange 2" 150lb RF, ANSI B16.5/Monel ZB2977	<b>C 7 1</b>	Flange 6" 150lb RF, ANSI B16.5/316L	<b>D 4 4</b>
Flange 2" 150lb RF, ANSI B16.5/ECTFE <sup>1)</sup>	<b>C 7 2</b>	Flange 6" 150lb RF, ANSI B16.5/Hastelloy	<b>D 4 5</b>
Flange 2" 150lb RF, ANSI B16.5/PFA <sup>1)</sup>	<b>C 7 3</b>	Flange 6" 150lb RF, ANSI B16.5/ECTFE <sup>1)</sup>	<b>D 4 6</b>
Flange 2" 150lb RF, ANSI B16.5/Enamelled <sup>2)</sup>	<b>C 7 4</b>	Flange 6" 150lb RF, ANSI B16.5/PFA <sup>1)</sup>	<b>D 4 7</b>
Flange 2" 150lb FF, ANSI B16.5/316L	<b>C 7 5</b>	Flange 6" 150lb RJF, ANSI B16.5/316L	<b>D 4 8</b>
Flange 2" 150lb FF, ANSI B16.5/ECTFE <sup>1)</sup>	<b>C 7 6</b>	Flange 6" 300lb RF, ANSI B16.5/316L	<b>D 5 0</b>
Flange 2" 150lb SG (small groove), ANSI B16.5/316L	<b>C 7 7</b>	Flange 8" 150lb RF, ANSI B16.5/316L	<b>D 5 1</b>
Flange 2" 300lb RF, ANSI B16.5/316L	<b>C 7 8</b>	Flange 8" 150lb RF, ANSI B16.5/ECTFE <sup>1)</sup>	<b>D 5 2</b>
Flange 2" 300lb RF, ANSI B16.5/Hastelloy	<b>C 8 0</b>	Flange 1" BS.10 Table E/316L	<b>D 5 3</b>
Flange 2" 300lb RF, ANSI B16.5/Hastelloy	<b>C 8 1</b>	Flange 1" BS.10 Table E/PFA <sup>1)</sup>	<b>D 5 4</b>
Flange 2" 300lb RF, ANSI B16.5/ECTFE <sup>1)</sup>	<b>C 8 2</b>	Flange 1½" BS.10 Table E/316L	<b>D 5 5</b>
Flange 2" 300lb RF, ANSI B16.5/PFA <sup>1)</sup>	<b>C 8 3</b>	Flange 3½" BS.10 Table E/316L	<b>D 5 6</b>
Flange 2" 300lb RF, ANSI B16.5 Enamelled <sup>2)</sup>	<b>C 8 4</b>	Flange 4" BS.10 Table E/ECTFE <sup>1)</sup>	<b>D 5 7</b>
Flange 2" 300lb RJF, ANSI B16.5/316L	<b>C 8 5</b>	Flange DN40 10K, JIS/316L	<b>D 5 8</b>
Flange 2" 300lb ST, ANSI B16.5/316L	<b>C 8 6</b>	Flange DN50 10K, JIS/316L	<b>D 6 0</b>
Flange 2" 300lb LG (large groove), ANSI B16.5/316L	<b>C 8 7</b>	Flange DN80 10K, JIS/316L	<b>D 6 1</b>
Flange 2" 300lb LT, ANSI B16.5/316L	<b>C 8 8</b>	Flange DN100 10K, JIS/316L	<b>D 6 2</b>
Flange 2" 600lb RF, ANSI B16.5/316L	<b>D 0 0</b>		
Flange 2" 600lb RF, ANSI B16.5/Monel ZB2977	<b>D 0 1</b>		
Flange 2" 600lb RF, ANSI B16.5/ECTFE <sup>1)</sup>	<b>D 0 2</b>		
Flange 2" 600lb RJF, ANSI B16.5/316L	<b>D 0 3</b>		
Flange 2" 600lb LG, ANSI B16.5/316L	<b>D 0 4</b>		
Flange 2" 900lb RJF, ANSI B16.5/316L	<b>D 0 5</b>		
Flange 2½" 150lb RF, ANSI B16.5/316L	<b>D 0 6</b>		
Flange 2½" 300lb RF, ANSI B16.5/316L	<b>D 0 7</b>		
Flange 3" 150lb RF, ANSI B16.5/316L	<b>D 0 8</b>		
Flange 3" 150lb RF, ANSI B16.5/Hastelloy	<b>D 1 0</b>		



# Level Measurement

## Point level measurement - Vibrating switches

### SITRANS LVL200

#### Selection and Ordering data

Order No.

#### SITRANS LVL200, Rigid extension

Compact vibrating level switch for use in liquid applications such as overflow, high, low and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.

7 M L 5 7 4 7 -

#### Adapter/Process temperature

Without adapter/-50 ... 150 °C

1

With adapter/-50 ... 200 °C<sup>4)</sup>

2

With adapter/-50... 250 °C

3

With gas-tight leadthrough/-50 ... +150 °C

4

With gas-tight leadthrough/-50 ... +250 °C

5

#### Housing/ Cable entry

Aluminium IP66/IP67/M20x1.5

A

Aluminium IP66/IP67/½" NPT

B

#### NOTE:

**When selecting a Rigid Extension option, extension coating must match the process connection coating and the material and surface roughness type.**

#### Rigid Extension 316L

80 ... 500 mm

A 0

501 ... 1000 mm

A 1

1001 ... 1500 mm

A 2

1501 ... 2000 mm

A 3

2001 ... 2500 mm

A 4

2501 ... 3000 mm

A 5

3001 ... 3500 mm

A 6

3501 ... 4000 mm

A 7

#### Rigid Extension ECTFE coated<sup>1)</sup>

80 ... 500 mm

B 0

501 ... 1000 mm

B 1

1001 ... 1500 mm

B 2

1501 ... 2000 mm

B 3

2001 ... 2500 mm

B 4

2501 ... 3000 mm

B 5

3001 ... 3500 mm

B 6

3501 ... 4000 mm

B 7

#### Rigid Extension PFA coated<sup>1)</sup>

80 ... 500 mm

C 0

501 ... 1000 mm

C 1

1001 ... 1500 mm

C 2

1501 ... 2000 mm

C 3

2001 ... 2500 mm

C 4

2501 ... 3000 mm

C 5

#### Rigid Extension 316L Ra ≤ 0.8 µm

80 ... 500 mm

D 0

501 ... 1000 mm

D 1

1001 ... 1500 mm

D 2

1501 ... 2000 mm

D 3

2001 ... 2500 mm

D 4

2501 ... 3000 mm

D 5

3001 ... 3500 mm

D 6

3501 ... 4000 mm

D 7

#### Rigid Extension 316L Ra ≤ 0.3 µm

80 ... 500 mm

E 0

501 ... 1000 mm

E 1

1001 ... 1500 mm

E 2

1501 ... 2000 mm

E 3

2001 ... 2500 mm

E 4

2501 ... 3000 mm

E 5

3001 ... 3500 mm

E 6

3501 ... 4000 mm

E 7

#### Selection and Ordering data

Order No.

#### SITRANS LVL200, Rigid extension

Compact vibrating level switch for use in liquid applications such as overflow, high, low and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.

7 M L 5 7 4 7 -

#### Rigid Extension Enamelled version<sup>2)</sup>

80 ... 250 mm

F 0

251 ... 500 mm

F 1

501 ... 750 mm

F 2

751 ... 1000 mm

F 3

1001 ... 1250 mm

F 4

1251 ... 1500 mm

F 5

#### Rigid Extension Hastelloy

80 ... 500 mm

G 0

501 ... 1000 mm

G 1

1001 ... 1500 mm

G 2

1501 ... 2000 mm

G 3

2001 ... 2500 mm

G 4

2501 ... 3000 mm

G 5

3001 ... 3500 mm

G 6

3501 ... 4000 mm

G 7

#### Rigid Extension Monel

80 ... 500 mm

H 0

501 ... 1000 mm

H 1

1001 ... 1500 mm

H 2

1501 ... 2000 mm

H 3

2001 ... 2500 mm

H 4

2501 ... 3000 mm

H 5

1) Available with Housing/Cable entry option B only

2) Available with Adapter/Process temperature options 1 and 4 only

3) Available with Adapter/Process temperature options 1, 2, and 4 only

4) Available with enamelled Process connection and Extension options only

# Level Measurement

## Point level measurement - Vibrating switches

SITRANS LVL200

Selection and Ordering data	Order code
<b>Further designs</b>	
Please add "-Z" to Order No. and specify Order code(s).	
Cleaning including Certificate (oil, grease and silicone free)	<b>W01</b>
Enter the total insertion length in plain text description, max. 4000 mm (157.48")	<b>Y01</b>
Identification Label (measurement loop) SS: max. 16 characters add in plain text	<b>Y17</b>
Identification Label (measurement loop) Foil: max. 16 characters add in plain text	<b>Y18</b>
Acceptance test certificate 3.1 NACE MR 0775 for material EN10204	<b>D07</b>
Acceptance test certificate 3.1 for instrument	<b>C12</b>
Acceptance test certificate 2.2 for instrument	<b>C14</b>
Acceptance test Certificate 2.2 for material EN10204	<b>C15</b>
SIL/IEC61508 Certificate of conformity (SIL-2/3 min. and max. detection)	<b>C20</b>
<b>Additional Operating Instructions</b>	
<u>LVL 200 Extended (DPDT Relay)</u>	Order No.
• English	<b>7ML1998-5KW01</b>
• French	<b>7ML1998-5KW11</b>
• Spanish	<b>7ML1998-5KW21</b>
• German	<b>7ML1998-5KW31</b>
<u>LVL200 (Contactless electronic switch)</u>	
• English	<b>7ML1998-5KV01</b>
• French	<b>7ML1998-5KV11</b>
• Spanish	<b>7ML1998-5KV21</b>
• German	<b>7ML1998-5KV31</b>
<u>Electronics module LVL 200 Relay</u>	
• English	<b>7ML1998-5LS01</b>
• French	<b>7ML1998-5LS11</b>
• Spanish	<b>7ML1998-5LS21</b>
• German	<b>7ML1998-5LS31</b>
This device is shipped with the Siemens Milltronics manual CD containing the complete Operating Instructions library.	
<b>Spare Parts</b>	
Electronics module SITRANS LVL200 Relay	<b>7ML1830-1NC</b>
Lock fitting, unpressurized, G1A/316L	<b>7ML1930-1DQ</b>
Lock fitting, unpressurized, 1NPT/316L	<b>7ML1930-1DR</b>
Lock fitting, unpressurized, 1-1/2NPT/316L	<b>7ML1930-1DS</b>
Lock fitting, unpressurized, G1-1/2A/316L	<b>7ML1930-1DT</b>
Lock fitting, unpressurized, 1-1/2NPT/316L	<b>7ML1930-1DU</b>
Lock fitting, -1... 16 bar, G1A/316L	<b>7ML1930-1DV</b>
Lock fitting, -1... 16 bar, 1NPT/316L	<b>7ML1930-1DW</b>
Lock fitting, -1... 16 bar, G1-1/2A/316L	<b>7ML1930-1DX</b>
Lock fitting, -1... 16 bar, 1-1/2NPT/316L	<b>7ML1930-1EA</b>
Lock fitting, -1... 64 bar, G1A/316L	<b>7ML1930-1EB</b>
Lock fitting, -1... 64 bar, 1NPT/316L	<b>7ML1930-1EC</b>
Lock fitting, -1... 64 bar, G1-1/2A/316L	<b>7ML1930-1ED</b>

# Level Measurement

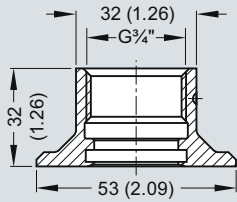
## Point level measurement - Vibrating switches

### SITRANS LVL200

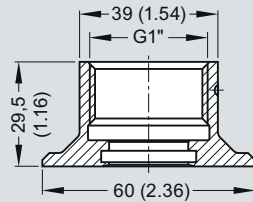
#### Options

##### LVL200 Threaded Welded Socket

G $\frac{3}{4}$ " A/316L

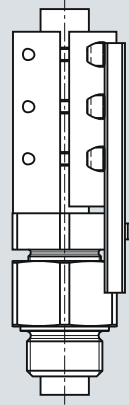


G1" A/316L

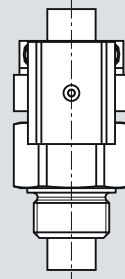


##### Lock fitting

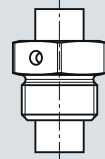
LVL200 Extended  
64 bar



LVL200 Extended  
16 bar



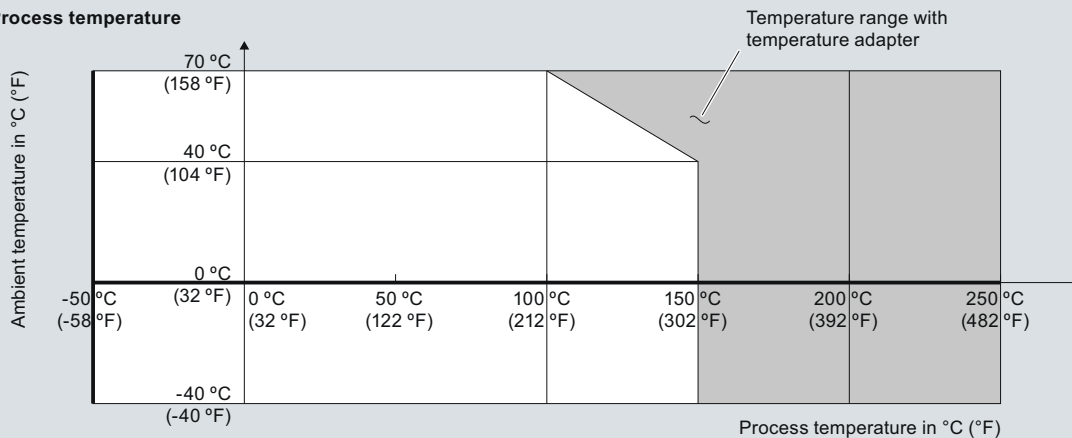
LVL200 Extended  
Unpressurized



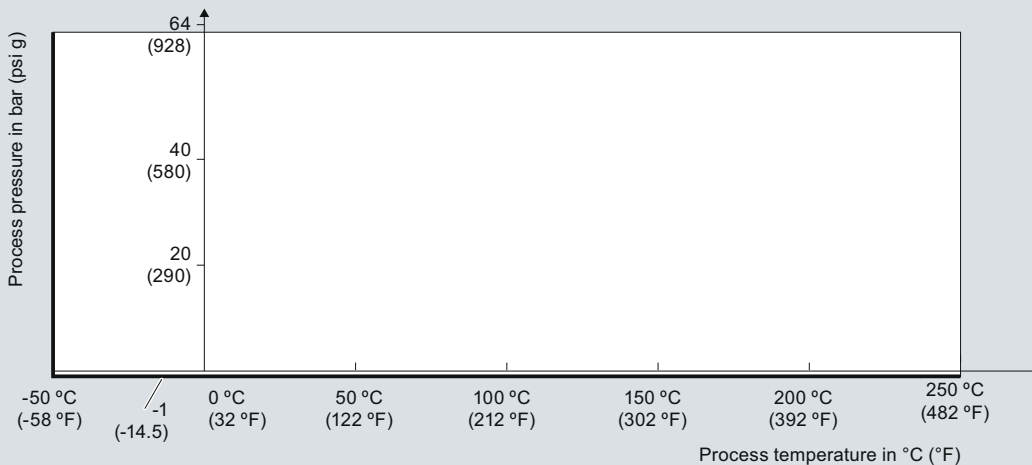
SITRANS LVL200 welded socket and lock fitting, dimensions in mm (inch)

### Characteristic curves

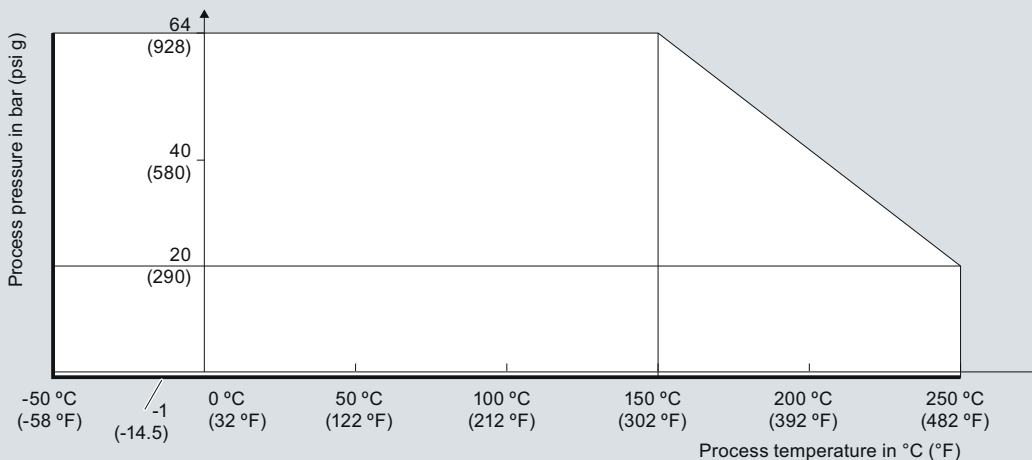
Ambient/Process temperature



Process pressure with switch position 0.7 g/cm<sup>3</sup> (mode switch)



Process pressure with switch position 0.5 g/cm<sup>3</sup> (mode switch)



SITRANS LVL200 Process Pressure/Process Temperature/Ambient Temperature derating curves

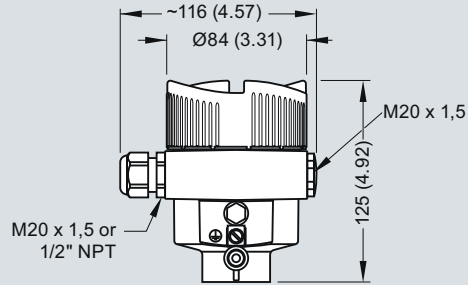
# Level Measurement

## Point level measurement - Vibrating switches

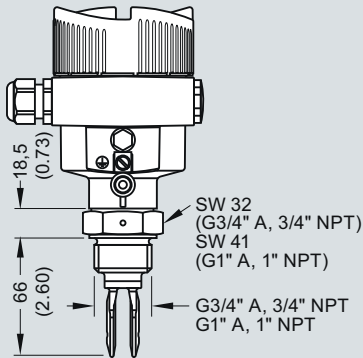
### SITRANS LVL200

#### Dimensional drawings

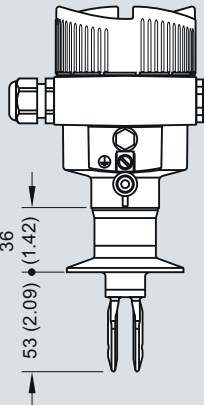
SITRANS LVL200 (Standard)



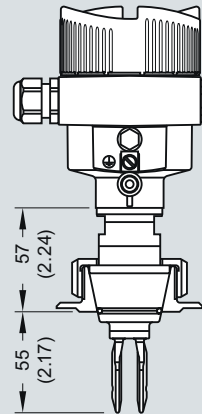
Threaded



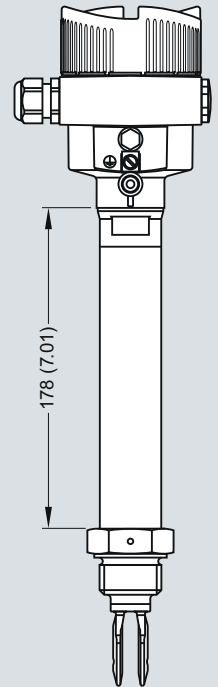
Tri-Clamp



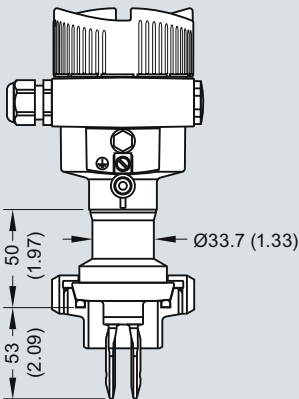
Cone DN25



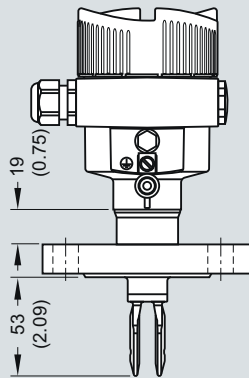
Temperature adapter



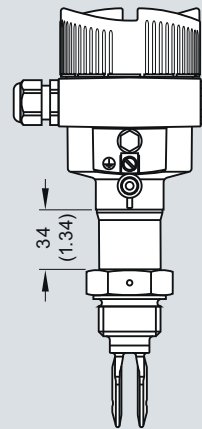
Bolting DN 40



Flange



Gas-tight leadthrough



SITRANS LVL200 (Standard), dimensions in mm (inch)

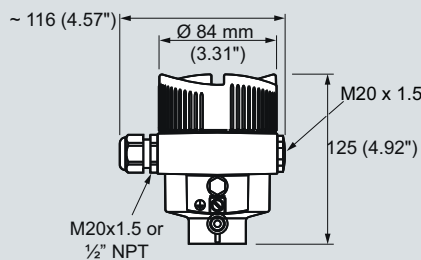
5

# Level Measurement

## Point level measurement - Vibrating switches

SITRANS LVL200

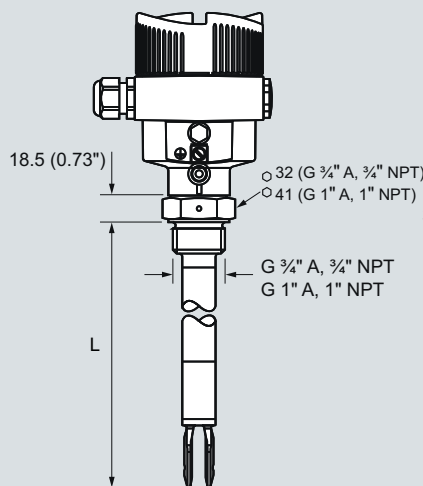
SITRANS LVL200 (Extended)



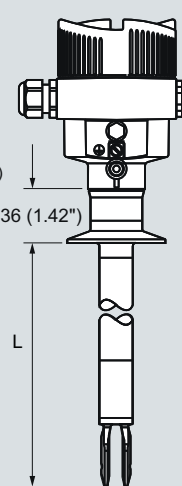
Sensor length (L)

316L, Hastelloy C4 (2.4610)	80 ... 6000 (3.15 ... 236.2")
Hastelloy C4 (2.4610) enamelled	80 ... 1500 (3.15 ... 59.06")
316L, ECTFE coated	80 ... 3000 (3.15 ... 118.1")
316L, PFA coated	80 ... 3000 (3.15 ... 118.1")

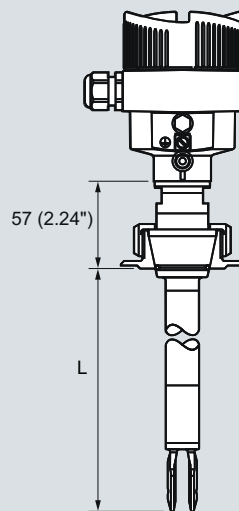
Threaded



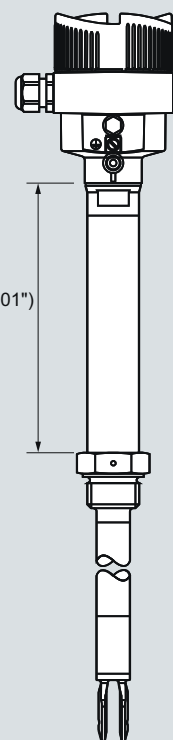
Tri-clamp



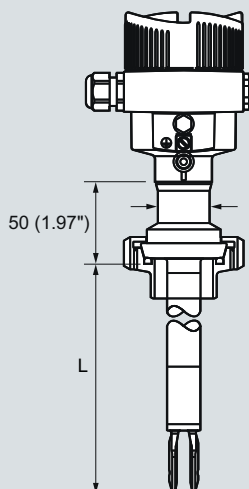
Cone DN25



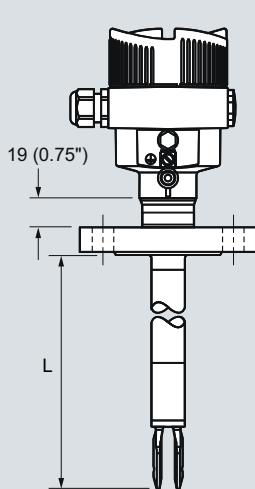
Temperature adapter



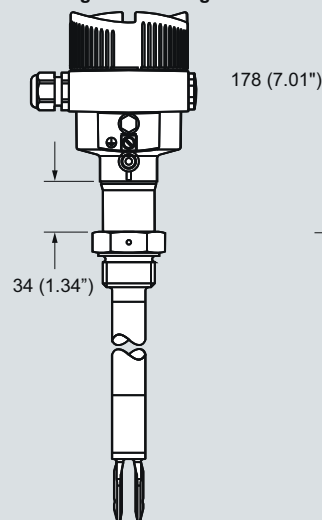
Bolting DN40



Flanged



Gas-tight leadthrough



SITRANS LVL200 (Extended), dimensions in mm (inch)

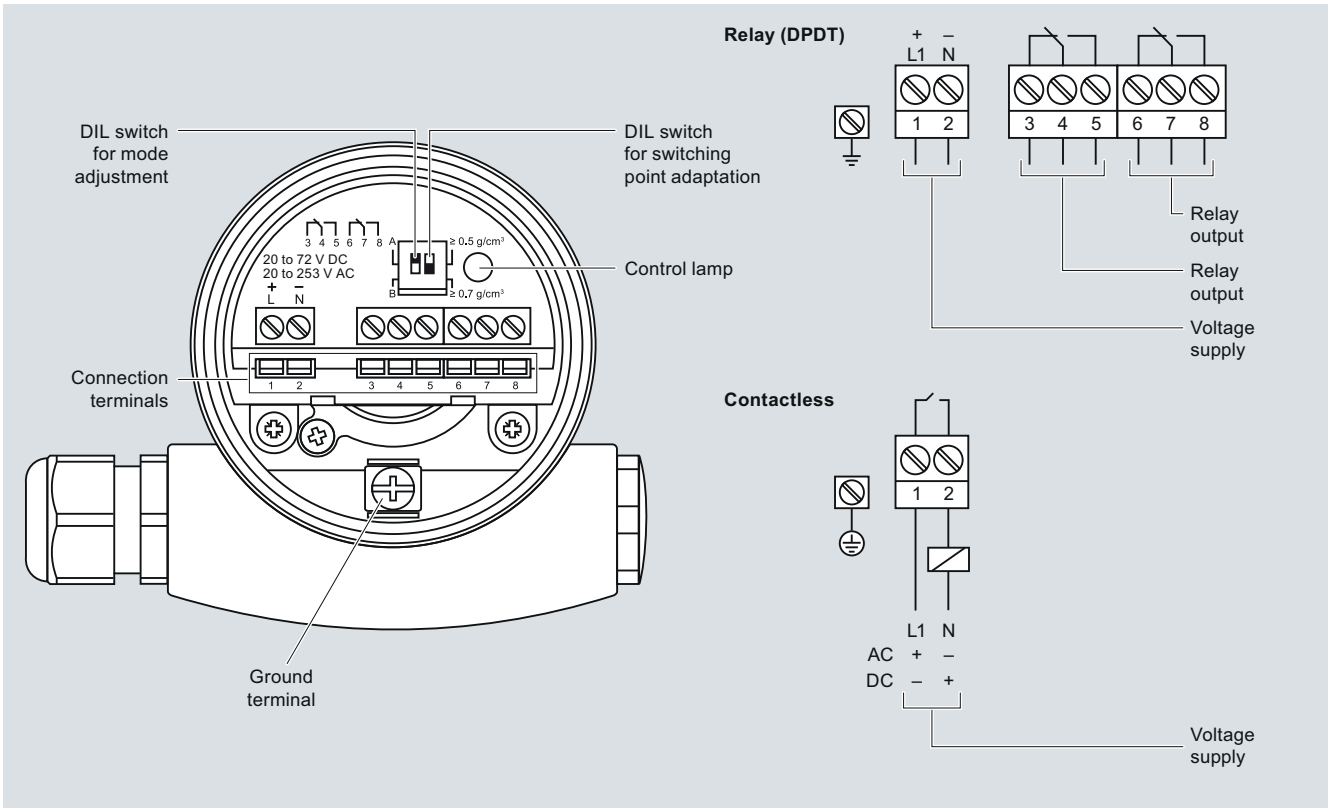
# Level Measurement

## Point level measurement - Vibrating switches

### SITRANS LVL200

#### Schematics

5



SITRANS LVL200 connections

# Level Measurement

## Point level measurement - Vibrating switches

SITRANS LVS100

### Overview



SITRANS LVS100 is a vibrating point level switch for bulk solids.

### Benefits

- High resistance to mechanical forces
- Strong resistance to external vibrations
- Rotatable enclosure for ease of installation and wiring
- Suitable for point level detection of materials starting at a bulk density of 60 g/l (3.8 lb/ft<sup>3</sup>)
- Customer desired extensions up to 2000 mm (78.74")

### Application

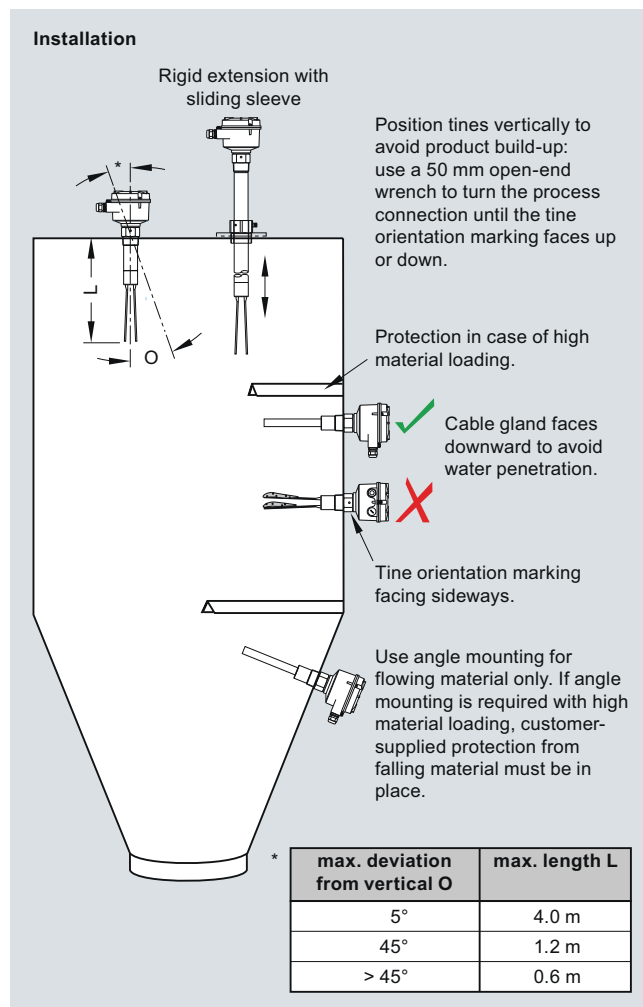
SITRANS LVS100 detects high, low or demand levels of dry bulk solids in bins, silos or hoppers.

SITRANS LVS100 has a compact design and can be top, side, or angle mounted. The vibrating fork design ensures the tines are kept clean. The unique design of the fork and crystal assembly eliminates false high level readings even if tines become damaged.

A signal from the electronic circuit excites a crystal in the probe causing the fork to vibrate. If the fork is covered by material, the change in vibration is detected by the electronic circuitry which causes the relay to change state after a one second delay. When the fork is free from material pressure, full vibration resumes and the relay reverts to its normal condition.

- Key Applications: dry bulk solids in bins, silos, hoppers

### Configuration



SITRANS LVS100 installation



# Level Measurement

## Point level measurement - Vibrating switches

### SITRANS LVS100

#### Technical specifications

<b>Mode of Operation</b>	
Measuring principle	Vibrating point level switch
<b>Input</b>	
Measured variable	High, low and demand
Measuring frequency	200 Hz
<b>Output</b>	
Relays	DPDT relay
Relay delay	From loss of vibration: approximately 1 second From resumption of vibration: approximately 1 ... 2 seconds
Signal delay	Probe uncovered to covered: approximately 1 second Probe covered to uncovered: approximately 1 ... 2 seconds
Relay fail-safe	High or low, switch selectable
Alarm output	Relay 8 A at 250 V AC, non-inductive Relay 5 A at 30 V DC, non-inductive
<b>Sensitivity</b>	
	High or low, switch selectable
<b>Rated operating conditions</b>	
Installation conditions	
• Location	Indoor/outdoor
Ambient conditions	
• Ambient temperature	-40 ... +60 °C (-40 ... +140 °F)
• Installation category	III
• Pollution degree	2
Medium conditions	
• Process temperature	-40 ... +150 °C (-40 ... +302 °F)
• Max. threaded bushing temperature	+80 °C (+176 °F)
• Max. enclosure surface temperature (Category 2D)	+90 °C (+194 °F)
• Max. extension surface temperature (Category 1D)	+150 °C (+302 °F)
• Pressure (vessel)	Max. 10 bar g (145 psi g) European Pressure Directive 97/23/EC: Category 1
Minimum material density	approx. 60 g/l (3.8 lb/ft <sup>3</sup> )
<b>Design</b>	
Material	
• Enclosure	Epoxy coated aluminum
Process connection	<ul style="list-style-type: none"> <li>• Thread 1¼" NPT [(Taper), ANSI/ASME B1.20.1], R 1½" [(BSPT), EN 10226]</li> <li>• Thread R 1½" [(BSPT), EN 10226], ½" NPT [(Taper), ANSI/ASME B1.20.1], sliding sleeve [min. length 500 mm (19.69")]</li> <li>• Thread material: stainless steel 304 (1.4301) or 316TI (1.4571) depending on configuration</li> </ul>
Tine material	Stainless steel 316TI (1.4571)
Degree of protection	IP66/Type 4/NEMA 4
Conduit entry	2 x M20x1.5 or 2 x ½" NPT
Weight	Standard version, no extensions: approx 1.7 kg (3.7 lbs)

<b>Power supply</b>	<ul style="list-style-type: none"> <li>• 19 ... 230 V AC, +10 %, 50 ... 60 Hz, 8 VA</li> <li>• 19 ... 50 V DC, +10 %, 1.5 W</li> </ul>
<b>Certificates and approvals</b>	<ul style="list-style-type: none"> <li>• CSA/FM General Purpose</li> <li>• CE</li> <li>• CSA/FM Dust Ignition Proof</li> <li>• C-TICK</li> <li>• ATEX II 1/2 D</li> </ul>

# Level Measurement

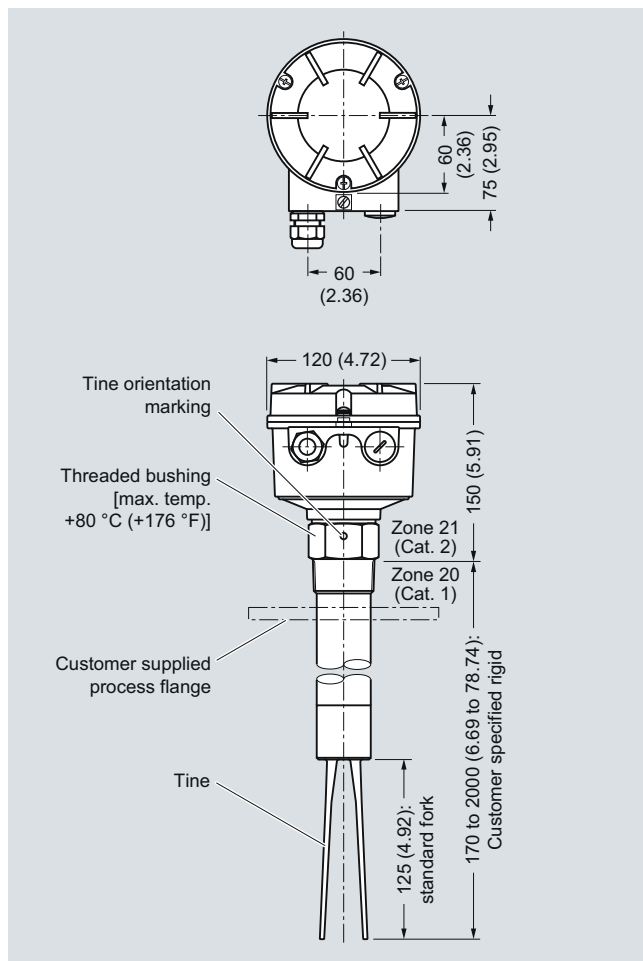
## Point level measurement - Vibrating switches

SITRANS LVS100

Selection and Ordering data	Order No.
<b>SITRANS LVS100, standard</b> Vibrating point level switch for high or low level detection of bulk solids Sensitivity > 60 g/l.	<b>7ML5735-</b> - 0 A 0
<b>Input Voltage</b> DPDT Relay - 19 ... 230 V AC, 19 ... 50 V DC	1
<b>Process temperature</b> up to +150 °C (+302 °F)	A
<b>Process connection</b> Threaded R 1½" [(BSPT), EN 10226] 1¼" NPT [(Taper), ANSI/ASME B1.20.1] R 1½" [(BSPT), EN 10226] DIN 2999 thread, sliding sleeve - min. length 500 mm (19.69") 1½" NPT [(Taper), ANSI/ASME B1.20.1], sliding sleeve [min. length 500 mm (19.69")]	A B C D
<b>Extension length</b> <u>Stainless steel 316TI (1.4571)</u> Standard length, 170 mm (6.69") <u>Add order code Y01 and plain text:</u> "Insertion length ... mm" <u>Stainless steel 304 (1.4301)</u> • 300 ... 500 mm (11.81 ... 19.69") • 501 ... 1000 mm (19.72 ... 39.37") • 1001 ... 1500 mm (39.41 ... 59.06") • 1501 ... 2000 mm (59.09 ... 78.74")	1 1 1 2 1 3 1 4 1 5
<b>Approvals</b> CSA/FM General Purpose, CE, C-TICK CSA/FM Class II, Div. 1, Group E,F, G, Class III, ATEX II 1/2 D, C-TICK	A B

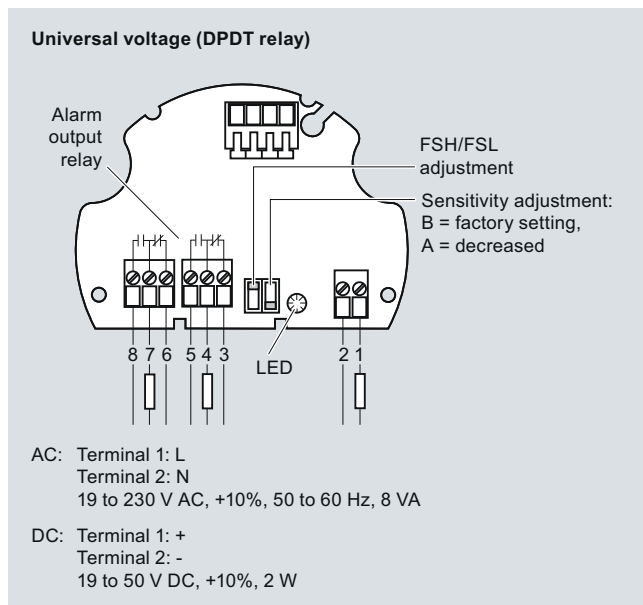
Selection and Ordering data	Order code
<b>Further Designs</b> Please add <b>"-Z"</b> to Order No. and specify Order code(s).	
Total insertion length: Enter the total insertion length in plain text description, max. 2000 mm (78.74")	<b>Y01</b>
Signal bulb inserted in M20 cable gland	<b>A20</b>
<b>Operating Instructions</b> Multi-language This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	Order No. <b>7ML1998-5FT63</b>
<b>Spare Parts</b> Replacement Electronics Module LVS100 DPDT Relay (19 to 253 V AC, 19 to 55 V DC) R 1½" [(BSPT), EN 10226] DIN 2999 thread, sliding sleeve 1½" NPT [(Taper), ANSI/ASME B1.20.1], sliding sleeve [min. length 500 mm (19.69")]	<b>7ML1830-1NS</b> <b>7ML1830-1NT</b> <b>7ML1830-1NU</b>

### Dimensional drawings



SITRANS LVS100, dimensions in mm (inch)

### Schematics



SITRANS LVS100 connections

# Level Measurement

## Point level measurement - Vibrating switches

### SITRANS LVS200

#### Overview



SITRANS LVS200 is a vibrating point level switch for high, low or demand level detection of bulk solids.

#### Benefits

- High resistance to mechanical forces
- Strong vibration resistance to high bulk material loads
- Rotatable enclosure
- Suitable for low density material: standard version, 20 g/l (1.3 lb/ft<sup>3</sup>); liquid/solid interface version, 50 g/l (3 lb/ft<sup>3</sup>), and low density option min. 5 g/l (0.3 lb/ft<sup>3</sup>)
- Customer desired extensions up to 20000 mm (787")
- Optional detection of solids within liquid
- Durable short fork option with 165 mm (6.5") insertion length

#### Application

The standard LVS200 detects high, low, or demand levels of dry bulk solids in bins, silos or hoppers. The liquid/solid interface version can also detect settled solids within liquids or solids within confined spaces such as feed pipes. It is designed to ignore liquids in order to detect the interface between a solid and a liquid.

A pipe extension version is available with either the standard or liquid/solid interface electronics and fork, separated by a customer supplied 1" pipe.

SITRANS LVS200 has an optional 4 to 20 mA output for monitoring buildup on the fork to determine when preventative maintenance should be performed in sticky applications.

The LVS200 has a compact design and can be top, side or angle mounted. The vibrating fork design ensures the tines are kept clean. The unique design of the fork and crystal assembly eliminates false high level readings even if tines become damaged.

A signal from the electronic circuit excites a crystal in the probe causing the fork to vibrate. If the fork is covered by material, the change in vibration is detected by the electronic circuitry which causes the relay to change state after a one second delay. When the fork is free from material pressure, full vibration resumes and the relay reverts to its normal condition.

- Key Applications: dry bulk solids in bins, silos, hoppers or settled solids within liquids (interface version)

#### Technical specifications

<b>Mode of operation</b>	
Measuring principle	Vibrating point level switch
<b>Input</b>	
Measured variable	High, low and demand
Measuring frequency	<ul style="list-style-type: none"> <li>• Standard 125 Hz</li> <li>• Liquid/solid interface and short fork version 350 Hz</li> </ul>
<b>Output</b>	
PNP	Open collector: Permanent load max. 0.4 A, short-circuit and overload protected Turn-on voltage: max. 50 V (reverse protection)
2-wire without contact	Load current: <ul style="list-style-type: none"> <li>• min. 10 mA</li> <li>• max. 500 mA permanent</li> <li>• max. 2A &lt; 200 ms</li> <li>• max. 5A &lt; 50 ms</li> </ul> Voltage drop on the electronic module: max. 7 V with closed electric circuit Cutoff current with open electric circuit: max. 5 mA
Relays	<ul style="list-style-type: none"> <li>• Version with 1 relay SPDT relay</li> <li>• Version with 2 relays DPDT relay</li> </ul>
Relay delay	<ul style="list-style-type: none"> <li>• From loss of vibration: approximately 1 second</li> <li>• From resumption of vibration: approximately 1 ... 2 seconds</li> </ul>
Signal delay	<ul style="list-style-type: none"> <li>• Probe uncovered to covered: approximately 1 second</li> <li>• Probe covered to uncovered: approximately 1 to 2 seconds</li> </ul>
Relay fail-safe	High or low, switch selectable
Alarm output	<ul style="list-style-type: none"> <li>• Relay 8 A at 250 V AC, non-inductive</li> <li>• Relay 5 A at 30 V DC, non-inductive</li> </ul>
mA output	8/16 mA or 4 ... 20 mA
• Resolution	4 ... 20 mA ± 0.1 mA
<b>Sensitivity</b>	
High or low, switch selectable	
<b>Rated operating conditions</b>	
Installation conditions	
• Location	Indoor/outdoor
Ambient conditions	
• Ambient temperature	-40 ... +60 °C (-40 ... +140 °F)
• Installation category	III
• Pollution degree	2



# Level Measurement

## Point level measurement - Vibrating switches

### SITRANS LVS200

#### Selection and Ordering data

##### SITRANS LVS200, standard

SITRANS LVS200 is a vibrating point level switch for high, low or demand level detection of bulk solids.

##### Stainless Steel 316TI (1.4571)

Standard length, 235 mm (9.25")<sup>7)</sup>

Add order code Y01 and plain text:

"Insertion length ... mm"

300 ... 500 mm (11.81 ... 19.69")<sup>7)</sup>

501 ... 750 mm (19.72 ... 29.53")<sup>7)</sup>

751 ... 1000 mm (29.57 ... 39.37")<sup>7)</sup>

1001 ... 1250 mm (39.41 ... 49.21")<sup>7)</sup>

1251 ... 1500 mm (49.25 ... 59.06")<sup>7)</sup>

1501 ... 1750 mm (59.09 ... 68.90")<sup>7)</sup>

1751 ... 2000 mm (68.94 ... 78.74")<sup>7)</sup>

2001 ... 2250 mm (78.78 ... 88.58")<sup>7)</sup>

2251 ... 2500 mm (88.62 ... 98.43")<sup>7)</sup>

2501 ... 2750 mm (98.46 ... 108.27")<sup>7)</sup>

2751 ... 3000 mm (108.31 ... 118.11")<sup>7)</sup>

3001 ... 3250 mm (118.15 ... 127.95")<sup>7)</sup>

3251 ... 3500 mm (127.99 ... 137.80")<sup>7)</sup>

3501 ... 3750 mm (137.83 ... 147.64")<sup>7)</sup>

3751 ... 4000 mm (147.68 ... 157.48")<sup>7)</sup>

#### Material process connection/extension

Stainless steel 304 (1.4301) ▶

Stainless steel 316 TI (1.4571) ▶

#### Approvals

CSA/FM Dust Ignition Proof, C-TICK ▶

ATEX II 1/2 D, C-TICK ▶

CSA/FM General Purpose, C-TICK

CE, C-TICK

CSA/FM IS Class I, II, III Div. 1, Groups A, B, C, D, E, F, G, FM Class 1, Aex ia IIC, CSA Class 1, Ex ia IIC, C-TICK<sup>8)</sup>

ATEX II 1G and 1/2G Eex ia IIC; ATEX II 1D and 1/2D, C-TICK

1) Available with approval options A to D only

2) Available with approval options E, F only

3) Available only with process temperature option A (process connection A with approval option B, or process connection B with approval option A), extension length 11 and material process connection 1

4) Basic version is cost effective and offers fast delivery

5) Not available with extension length options 11 and 12

6) Available with Material process connection/extension option 1 only

7) Available with Material process connection/extension option 2 only

8) Available with power supply option 5 and 6 only

▶ Available ex stock.

#### Order No.

7ML5731 -

3 1 3 2 3 3 3 4 3 5 3 6 3 7 3 8 4 1 4 2 4 3 4 4 4 5 4 6 4 7 4 8 A 0

#### Selection and Ordering data

##### Further Designs

Please add "-Z" to Order No. and specify Order code(s).

Total insertion length: Enter the total insertion length in plain text description, max. 2000 mm (78.74")

Enhanced sensitivity > 5 g/l via electronics and increased fork length to 195 mm (7.68")

Enhanced sensitivity < 5 g/l via electronics, increased fork length to 195 mm (7.68"), and increased aluminum fork width (available only with universal voltage, SPDT, CE/FM and CSA General Purpose approvals)

Signal bulb inserted in M20 cable gland<sup>1)</sup>

NAMUR 8/16 mA switch amplifiers

##### Operating Instructions

Multi-language

This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.

##### Spare Parts

Replacement Electronics Module (125 Hz) [19 ... 230 V AC, 19 ... 55 V DC, one relay output (SPDT)]

Sliding sleeve, 2" BSP (ISO 228)

Sliding sleeve, 2" NPT [(Taper), ANSI/ASME B1.20.1]

##### Available ex stock

SITRANS LVS200, standard, power supply 7, process temperature A, process connection A, extension length 11, material process connection/extension 1, and approval B

SITRANS LVS200, standard, power supply 7, process temperature A, process connection B, extension length 11, material process connection/extension 1, and approval A

1) Available with approval options C, D only

#### Order code

Y01

K05

G01

A20

A15

Order No.

7ML1998-5FT62

7ML1830-1KL

7ML1830-1JM

7ML1830-1JN

7ML5731-7AA11-1BA0

7ML5731-7AB11-1AA0

# Level Measurement

## Point level measurement - Vibrating switches

SITRANS LVS200

Selection and Ordering data	Order No.
<b>SITRANS LVS200, short fork for liquids/solids interface</b> Vibrating point level switch for solids or solids within liquid interface applications, and high load applications with short insertion requirements	<b>7 ML 5 7 3 2 -</b> A 0
<b>Power supply</b> 19 ... 230 V AC, 19 ... 55 V DC, one relay output (SPDT)	<b>1</b>
19 ... 230 V AC, 19 ... 55 V DC, two relay outputs (DPDT)	<b>2</b>
18 ... 50 V DC PNP	<b>3</b>
19 ... 230 V AC/DC without contact, 2-wire loop powered <sup>1)</sup>	<b>4</b>
8/16 mA or 4 ... 20 mA; 12.5 ... 35 V DC, 2-wire <sup>2)</sup>	<b>5</b>
<b>Process temperature</b> Without temperature isolator	<b>A</b>
With temperature isolator	<b>B</b>
Separated enclosure - cable length 1.5 m (4.92 ft) [max. temperature process +180 °C (+356 °F)/max. temperature electronics +80 °C (+176 °F)]	<b>C</b>
Separated enclosure - cable length 4.0 m (13.12 ft) [max. temperature process +180 °C (+356 °F)/max. temperature electronics +80 °C (+176 °F)]	<b>D</b>
<b>Process connection</b> <u>Threaded</u> R 1½" [(BSPT), EN 10226]	<b>A</b>
1½" NPT [(Taper), ANSI/ASME B1.20.1]	<b>B</b>
G 2" [(BSPP), EN ISO 228-1], sliding sleeve [min. length 500 mm (19.69")]	<b>C</b>
2" NPT [(Taper), ANSI/ASME B1.20.1], sliding sleeve [min. length 500 mm (19.69")]	<b>D</b>
<u>Flanged</u> DN 100 PN 6, EN1092-1 (1.4541/321)	<b>E</b>
DN 100 PN 16, EN1092-1 (1.4541/321)	<b>F</b>
2" ASME 150 lbs B16.5 (1.4541/321)	<b>G</b>
3" ASME 150 lbs B16.5 (1.4541/321)	<b>H</b>
4" ASME 150 lbs B16.5 (1.4541/321)	<b>J</b>
<b>Extension length</b> <u>Stainless steel 304 (1.4301)<sup>3)</sup></u> Standard length, 165 mm (6.50") <sup>3)</sup>	<b>1 1</b>
<u>Add order code Y01 and plain text: "Insertion length ... mm"</u> 200 ... 500 mm (7.87 ... 19.69") <sup>3)</sup>	<b>1 2</b>
501 ... 750 mm (19.72 ... 29.53") <sup>3)</sup>	<b>1 3</b>
751 ... 1000 mm (29.57 ... 39.37") <sup>3)</sup>	<b>1 4</b>
1001 ... 1250 mm (39.41 ... 49.21") <sup>3)</sup>	<b>1 5</b>
1251 ... 1500 mm (49.25 ... 59.06") <sup>3)</sup>	<b>1 6</b>
1501 ... 1750 mm (59.09 ... 68.90") <sup>3)</sup>	<b>1 7</b>
1751 ... 2000 mm (68.94 ... 78.74") <sup>3)</sup>	<b>1 8</b>
2001 ... 2250 mm (78.78 ... 88.58") <sup>3)</sup>	<b>2 1</b>
2251 ... 2500 mm (88.62 ... 98.43") <sup>3)</sup>	<b>2 2</b>
2501 ... 2750 mm (98.46 ... 108.27") <sup>3)</sup>	<b>2 3</b>
2751 ... 3000 mm (108.31 ... 118.11") <sup>3)</sup>	<b>2 4</b>
3001 ... 3250 mm (118.15 ... 127.95") <sup>3)</sup>	<b>2 5</b>
3251 ... 3500 mm (127.99 ... 137.80") <sup>3)</sup>	<b>2 6</b>
3501 ... 3750 mm (137.83 ... 147.64") <sup>3)</sup>	<b>2 7</b>
3751 ... 4000 mm (147.68 ... 157.48") <sup>3)</sup>	<b>2 8</b>
<u>Stainless Steel 316TI (1.4571)</u> Standard length, 165 mm (6.50") <sup>4)</sup>	<b>3 1</b>
<u>Add order code Y01 and plain text: "Insertion length ... mm"</u> 200 ... 500 mm (7.87 ... 19.69") <sup>4)</sup>	<b>3 2</b>
501 ... 750 mm (19.72 ... 29.53") <sup>4)</sup>	<b>3 3</b>
751 ... 1000 mm (29.57 ... 39.37") <sup>4)</sup>	<b>3 4</b>

Selection and Ordering data	Order No.
<b>SITRANS LVS200, short fork for liquids/solids interface</b> Vibrating point level switch for solids or solids within liquid interface applications, and high load applications with short insertion requirements	<b>7 ML 5 7 3 2 -</b> A 0
1001 ... 1250 mm (39.41 ... 49.21") <sup>4)</sup>	<b>3 5</b>
1251 ... 1500 mm (49.25 ... 59.06") <sup>4)</sup>	<b>3 6</b>
1501 ... 1750 mm (59.09 ... 68.90") <sup>4)</sup>	<b>3 7</b>
1751 ... 2000 mm (68.94 ... 78.74") <sup>4)</sup>	<b>3 8</b>
2001 ... 2250 mm (78.78 ... 88.58") <sup>4)</sup>	<b>4 1</b>
2251 ... 2500 mm (88.62 ... 98.43") <sup>4)</sup>	<b>4 2</b>
2501 ... 2750 mm (98.46 ... 108.27") <sup>4)</sup>	<b>4 3</b>
2751 ... 3000 mm (108.31 ... 118.11") <sup>4)</sup>	<b>4 4</b>
3001 ... 3250 mm (118.15 ... 127.95") <sup>4)</sup>	<b>4 5</b>
3251 ... 3500 mm (127.99 ... 137.80") <sup>4)</sup>	<b>4 6</b>
3501 ... 3750 mm (137.83 ... 147.64") <sup>4)</sup>	<b>4 7</b>
3751 ... 4000 mm (147.68 ... 157.48") <sup>4)</sup>	<b>4 8</b>
<b>Material process connection/extension</b> Stainless steel 304 (1.4301)	<b>1</b>
Stainless steel 316 TI (1.4571)	<b>2</b>
<b>Approvals</b> CSA/FM Dust Ignition Proof, C-TICK	<b>A</b>
ATEX II 1/2 D, C-TICK	<b>B</b>
CSA/FM General Purpose, C-TICK	<b>C</b>
CE, C-TICK	<b>D</b>
1) Available with approval options B, C, D only	
2) Available with approval option D only	
3) Available with material process connection/extension option 1 only	
4) Available with material process connection/extension option 2 only	

Selection and Ordering data	Order code
<b>Further Designs</b> Please add "-Z" to Order No. and specify Order code(s).	
Total insertion length: Enter the total insertion length in plain text description, max. 4000 mm (157.48")	<b>Y01</b>
Signal bulb inserted in M20 cable gland <sup>1)</sup>	<b>A20</b>
<b>Operating Instructions</b> Multi-language This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	Order No. <b>7ML1998-5FT62</b>
<b>Spare Parts</b> Replacement Electronics Module (350 Hz) [19 ... 230 V AC, 19 ... 55 V DC, one relay output (SPDT)]	<b>7ML1830-1KM</b>
Sliding sleeve, 2" BSP (ISO 228)	<b>7ML1830-1JM</b>
Sliding sleeve, 2" NPT [(Taper), ANSI/ASME B1.20.1]	<b>7ML1830-1JN</b>
1) Available with approval options C, D only	

5



# Level Measurement

## Point level measurement - Vibrating switches

### SITRANS LVS200

#### Selection and Ordering data

##### SITRANS LVS200, pipe extension

Vibrating point level switch for high or low levels of bulk solids  
Extended using 1" pipe extension (customer supplied)

##### Power supply

19 ... 230 V AC, 19 ... 55 V DC, one relay output (SPDT)

19 ... 230 V AC, 19 ... 55 V DC, two relay outputs (DPDT)

18 ... 50 V DC PNP

19 ... 230 V AC/DC without contact, 2-wire loop powered<sup>1)</sup>

7 ... 9 V DC (requires NAMUR switch amplifier)

NAMUR IEC 60947-5-6, 2-wire<sup>2) 3)</sup>

8/16 mA or 4 ... 20 mA; 12.5 ... 35 V DC, 2-wire<sup>4)</sup>

##### Process temperature

Up to +150 °C (+302 °F)

##### Process connection

###### Threaded

R 1½" [(BSPT), EN 10226]

1½" NPT [(Taper), ANSI/ASME B1.20.1]

###### Flanged

DN 100 PN 6, EN1092-1 (1.4541/321)

DN 100 PN 16, EN1092-1 (1.4541/321)

2" ASME 150 lbs B16.5 (1.4541/321)

3" ASME 150 lbs B16.5 (1.4541/321)

4" ASME 150 lbs B16.5 (1.4541/321)

##### Process connection material

Stainless steel 304 (1.4301)

Stainless steel 316 T1 (1.4571)

##### Extension length

Customer supplied 1" pipe extension

Length: 300 ... 3800 mm (11.81 ... 149.61")

##### Application type

Dry bulk solids (125 Hz)

Liquids/solids interface (350 Hz)

##### Approvals

CSA/FM Dust Ignition Proof, C-TICK

ATEX II 1/2 D, C-TICK

CSA/FM General Purpose, C-TICK

CE, C-TICK

CSA/FM IS Class I, II, III Div. 1, Groups A, B, C, D,

E, F, G, FM Class 1, Aex ia IIC, CSA Class 1,

Ex ia IIC, C-TICK<sup>5)</sup>

ATEX II 1G and 1/2G Eex ia IIC; ATEX II 1D and 1/2D, C-TICK<sup>5)</sup>

<sup>1)</sup> Available with approval options A to E only

<sup>2)</sup> Available with application type 1 only

<sup>3)</sup> Available with approval option C to F only

<sup>4)</sup> Available with approval option D only

<sup>5)</sup> Available with power supply option 5 only

#### Order No.

7ML5733 -

■■■■■ - ■■■■ A 0

■■■■■ - ■■■■ A 0

■■■■■ - ■■■■ A 0

■■■■■ - ■■■■ A 0

■■■■■ - ■■■■ A 0

■■■■■ - ■■■■ A 0

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#### Selection and Ordering data

##### Further Designs

Please add **"-Z"** to Order No. and specify Order code(s).

Total insertion length: Enter the total insertion length in plain text description, max. 4000 mm (157.48")

Enhanced sensitivity > 5 g/l via electronics and increased fork length ... 195 mm (7.68")

Signal bulb inserted in M20 cable gland<sup>1)</sup>

NAMUR 8/16 mA switch amplifiers

##### Operating Instructions

Multi-language

This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.

##### Spare Parts

Replacement Electronics Module (125 Hz)  
[19 ... 230 V AC, 19 ... 55 V DC, one relay output (SPDT)]

Replacement Electronics Module (350 Hz)  
[19 ... 230 V AC, 19 ... 55 V DC, one relay output (SPDT)]

<sup>1)</sup> Available with approval options C, D only

#### Order code

**Y01**

**K05**

**A20**

**A15**

Order No.

**7ML1998-5FT62**

**7ML1830-1KL**

**7ML1830-1KM**

# Level Measurement

## Point level measurement - Vibrating switches

SITRANS LVS200

Selection and Ordering data	Order No.
<b>SITRANS LVS200, cable extended</b> Vibrating point level switch for high or low level detection of bulk solids materials	<b>7 ML 5 7 3 4 -</b> - - - - - <b>A 0</b>
<b>Power supply</b>	
19 ... 230 V AC, 19 ... 55 V DC, one relay output (SPDT)	<b>1</b>
19 ... 230 V AC, 19 ... 55 V DC, two relay outputs (DPDT)	<b>2</b>
18 ... 50 V DC PNP	<b>3</b>
19 ... 230 V AC/DC without contact, 2-wire loop powered <sup>1)</sup>	<b>4</b>
7 ... 9 V DC (requires NAMUR switch amplifier)	<b>5</b>
NAMUR IEC 60947-5-6, 2-wire <sup>2) 3)</sup>	
8/16 mA or 4 ... 20 mA; 12.5 ... 35 V DC, 2-wire <sup>4)</sup>	<b>6</b>
<b>Process temperature</b>	
Up to +80 °C (+176 °F)	<b>A</b>
<b>Process connection</b>	
<u>Threaded</u>	
R 1½" [(BSPT), EN 10226]	<b>A</b>
1½" NPT [(Taper), ANSI/ASME B1.20.1]	<b>B</b>
<u>Flanged</u>	
DN 100 PN 6, EN1092-1 (1.4541/321)	<b>C</b>
DN 100 PN 16, EN1092-1 (1.4541/321)	<b>D</b>
2" ASME 150 lbs B16.5 (1.4541/321)	<b>E</b>
3" ASME 150 lbs B16.5 (1.4541/321)	<b>F</b>
4" ASME 150 lbs B16.5 (1.4541/321)	<b>G</b>
<b>Extension length</b>	
700 ... 1000 mm (19.7 ... 39.4") [max. length 20000 mm (787.4"), not with Power supply option 5 (max. 10000 mm, 393.7")]	<b>1 0</b>
<u>Add order code Y01 and plain text: "Insertion length ... mm"</u>	
1001 ... 2000 mm (39.41 ... 78.74")	<b>1 1</b>
2001 ... 3000 mm (78.78 ... 118.11")	<b>1 2</b>
3001 ... 4000 mm (118.15 ... 157.48")	<b>1 3</b>
4001 ... 5000 mm (157.52 ... 196.85")	<b>1 4</b>
5001 ... 6000 mm (196.89 ... 236.22")	<b>1 5</b>
6001 ... 7000 mm (236.26 ... 275.59")	<b>1 6</b>
7001 ... 8000 mm (275.63 ... 314.96")	<b>1 7</b>
8001 ... 9000 mm (315 ... 354.33")	<b>1 8</b>
9001 ... 10000 mm (354.37 ... 393.70")	<b>2 0</b>
10001 ... 11000 mm (393.74 ... 433.07")	<b>2 1</b>
11001 ... 12000 mm (433.11 ... 472.44")	<b>2 2</b>
12001 ... 13000 mm (472.48 ... 511.81")	<b>2 3</b>
13001 ... 14000 mm (511.85 ... 551.18")	<b>2 4</b>
14001 ... 15000 mm (551.22 ... 590.55")	<b>2 5</b>
15001 ... 16000 mm (590.59 ... 629.92")	<b>2 6</b>
16001 ... 17000 mm (629.96 ... 669.29")	<b>2 7</b>
17001 ... 18000 mm (669.33 ... 708.66")	<b>2 8</b>
18001 ... 19000 mm (708.70 ... 748.03")	<b>3 0</b>
19001 ... 20000 mm (748.07 ... 787.40")	<b>3 1</b>
<b>Application type</b>	
Dry bulk solids (125 Hz)	<b>1</b>
Liquid/solids interface (350 Hz) <sup>5)</sup>	<b>2</b>

Selection and Ordering data	Order No.
<b>SITRANS LVS200, cable extended</b> Vibrating point level switch for high or low level detection of bulk solids materials	<b>7 ML 5 7 3 4 -</b> - - - - - <b>A 0</b>
<b>Approvals</b>	
CSA/FM Dust Ignition Proof, C-TICK	<b>A</b>
ATEX II 1/2 D, C-TICK	<b>B</b>
CSA/FM General Purpose, C-TICK	<b>C</b>
CE, C-TICK	<b>D</b>
CSA/FM IS Class I, II, III Div. 1, Groups A, B, C, D, E, F, G, FM Class 1, Aex ia IIC, CSA Class 1, Ex ia IIC, C-TICK <sup>6)</sup>	<b>E</b>
ATEX II 1G and 1/2G Exe ia IIC; ATEX II 1D and 1/2D, C-TICK <sup>6)</sup>	<b>F</b>
1) Available with approval options A to D only	
2) Available with approval options C to F only	
3) Cable length is limited to 10000 mm (393.70")	
4) Available with approval options C, D only	
5) Cable length is limited to 7000 mm (275.59")	
6) Available with power supply option 5 and application type 1 only	

Selection and Ordering data	Order code
<b>Further Designs</b>	
Please add <b>"-Z"</b> to Order No. and specify Order code(s).	
Total insertion length: Enter the total insertion length in plain text description, max. 4000 mm (157.48")	<b>Y01</b>
Enhanced sensitivity > 5 g/l via electronics and increased fork length to 195 mm (7.68")	<b>K05</b>
Signal bulb inserted in M20 cable gland <sup>1)</sup>	<b>A20</b>
NAMUR 8/16 mA switch amplifiers	<b>A15</b>
<b>Operating Instructions</b>	Order No. <b>7ML1998-5FT62</b>
Multi-language This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	
<b>Spare Parts</b>	
Replacement Electronics Module (125 Hz) [19 ... 230 V AC, 19 ... 55 V DC, one relay output (SPDT)]	<b>7ML1830-1KL</b>
Replacement Electronics Module (350 Hz) [19 ... 230 V AC, 19 ... 55 V DC, one relay output (SPDT)]	<b>7ML1830-1KM</b>
1) Available with approval options C, D only	

5

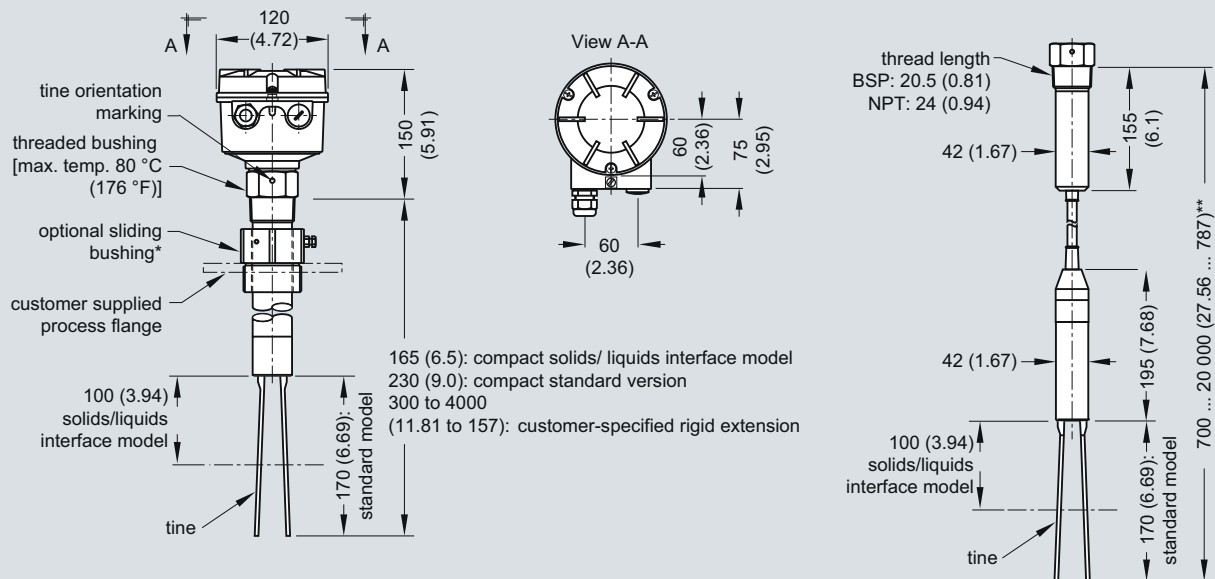


# Level Measurement

## Point level measurement - Vibrating switches

### SITRANS LVS200

#### Dimensional drawings



#### Notes:

- \* The clamping screws of the sliding bushing must be tightened to 10 Nm.
- \*\* Cable version with Liquids/solids interface model option length to 7000 mm (275.59")  
Cable version with NAMUR electronics length to 10 000 mm (393.7") tightened to 10 Nm.  
See drawing 23650563 for pipe extended version details. (Pipe is customer supplied.)

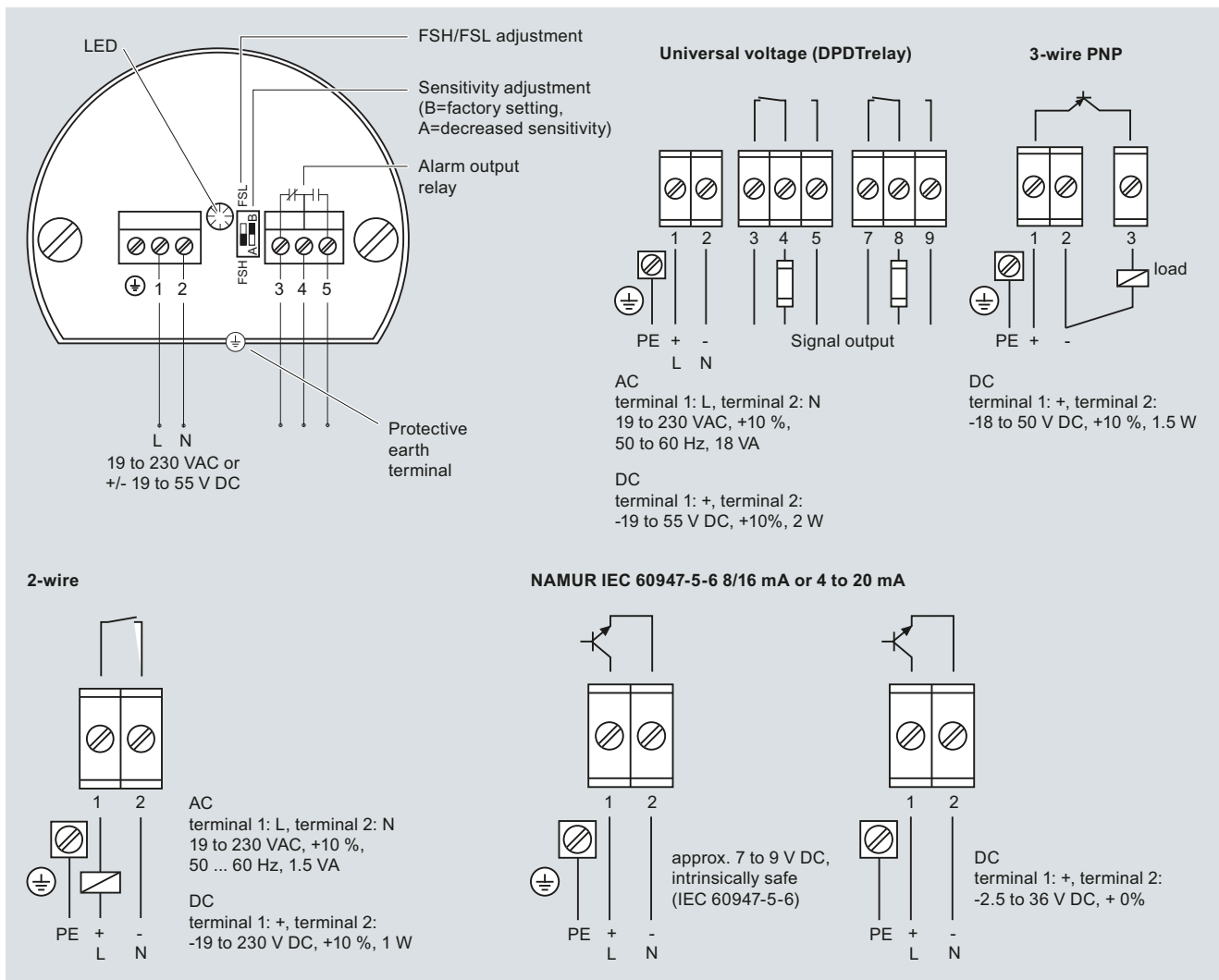
SITRANS LVS200, dimensions in mm (inch)

# Level Measurement

## Point level measurement - Vibrating switches

SITRANS LVS200

### Schematics



SITRANS LVS200 connections

# Level Measurement

## Point level measurement - Rotating paddle switch

### SITRANS LPS200

#### Overview



SITRANS LPS200 is a rotary paddle switch for point level detection in bulk solids.

#### Benefits

- Proven paddle switch technology for bulk solids
- High integrity mechanical seal
- Optional switch selectable power supply
- Unique friction clutch mechanism
- Rotatable enclosure
- Optional paddle for use with low density materials
- Simple installation through existing process connection
- High temperature model and optional extension kit available
- Optional fail-safe configuration

#### Application

The paddle switch technology detects full, empty or demand conditions on materials such as grain, feed, cement, plastic granulate and wood chips. The paddle switch can handle bulk densities as low as 15 g/l (2,19 lb/ft<sup>3</sup>) with the optional rectangular vane or 100 g/l (6.25 lb/ft<sup>3</sup>) with the standard measuring vane.

A low revolution geared motor with slip clutch drives a rotating measuring vane which senses the presence of material at the mounted level of the LPS200. As material comes into contact with the rotating paddle, rotation stops, which changes the microswitch state. When the paddle is no longer covered by material, rotation resumes and the relay reverts to its normal condition.

The LPS200 has a rugged design for use in harsh conditions in the solids industry. The sensitivity of the paddle can be adjusted for varying material properties like buildup on the vane.

The LPS200 comes in a variety of configurations including compact, extended and cable extension. It is equipped with a standard vane which is effective in most applications, but can be configured with a hinged or rectangular vane for increased sensitivity for light materials.

- Key Applications: bulk solids such as grain, feed, cement, plastic granulate, wood chips

#### Technical specifications

<b>Mode of operation</b>	
Measuring principle	Rotating point level switch
<b>Input</b>	
Measured variable	High and low and demand
<b>Output</b>	
Output signal	
• Alarm output	<ul style="list-style-type: none"> <li>• Microswitch 5 A at 250 V AC, non inductive</li> <li>• Microswitch SPDT contact 4 A at 30 V DC, non-inductive</li> </ul>
• Pickup delay	<ul style="list-style-type: none"> <li>• Standard (1 rpm model): approx. 1.3 seconds</li> <li>• Optional process applications (5 rpm model): approx. 0.26 seconds</li> </ul>
<b>Sensitivity</b>	
	Adjustable via reset force of spring or geometry of measuring vane
<b>Rated operating conditions</b>	
Installation conditions	
• Location	Indoor/outdoor
Ambient conditions	
• Ambient temperature	-25 ... +60 °C (-13 ... +140 °F)
• Installation category	III
• Pollution degree	2
Medium conditions	
Bulk solids	
• Temperature	
- Standard	-25 ... +80 °C (-13 ... +176 °F)
- Optional	-25 ... +350 °C (-13 ... +662 °F)
• Pressure (vessel)	
- Standard	Max. 0.5 bar g (7.25 psi g)
- Optional	Max. 10 bar g (145 psi g)
• Minimum material density	
- Standard measuring vane	• Can detect down to 100 g/l (6.25 lb/ft <sup>3</sup> )
- Optional measuring vane	• Can detect down to 15 g/l (2.19 lb/ft <sup>3</sup> )
<b>Design</b>	
Material	
• Enclosure	Epoxy coated aluminum
• Process connection, measuring shaft and vane	Stainless steel or aluminum
Process connection	
	Thread NPT, BSP, and flange options
Degree of protection	
	IP65/Type 4/NEMA 4
Conduit entry	
	2 x M20x1.5 or 2 x ½" NPT
<b>Power supply</b>	
Jumper selectable	
	<ul style="list-style-type: none"> <li>• 115 V AC, ±15 %, 50 ... 60 Hz, 4 VA or 230 V AC, ±15 %, 50 Hz, 6 VA, or 48 V AC, or 24 V AC or 24 V DC, ±15 %, 2.5 W</li> </ul>
<b>Certificates and approvals</b>	
	<ul style="list-style-type: none"> <li>• CSA/FM General Purpose</li> <li>• CE</li> <li>• CSA/FM Dust Ignition Proof</li> <li>• ATEX II 1/2 D</li> <li>• C-TICK</li> </ul>

# Level Measurement

## Point level measurement - Rotating paddle switch

SITRANS LPS200

Selection and Ordering data	Order No.	Selection and Ordering data	Order No.
<b>SITRANS LPS200, compact</b> Rotary paddle switch for level detection in bulk solids. Compact design for side or top mounted applications.	7 ML 5 7 2 5 - 0	<b>SITRANS LPS200, compact</b> Rotary paddle switch for level detection in bulk solids. Compact design for side or top mounted applications.	7 ML 5 7 2 5 - 0
<b>Process temperature</b> Up to +80 °C (+176 °F) Up to +150 °C (+302 °F) Up to +250 °C (+482 °F) Up to +350 °C (+662 °F) <sup>1)</sup> Up to +80 °C (+176 °F) basic version aluminum <sup>2) 3)</sup> Up to +80 °C (+176 °F) basic version stainless steel <sup>2) 4)</sup>	1 2 3 4 5 6	<b>Measuring vane</b> Boot shaped, 35 x 106 mm (1.38 x 4.17") <sup>7)</sup> Hinged vane, 65 x 210 mm (2.56 x 8.27") <sup>7) 8)</sup> Boot shaped, 28 x 98 mm (1.10 x 3.86") Rectangular 50 x 150 mm (1.97 x 5.91") <sup>9)</sup> Rectangular 50 x 250 mm (1.97 x 9.84") <sup>9)</sup> Rectangular 98 x 150 mm (3.86 x 5.91") <sup>9)</sup> Rectangular 98 x 250 mm (3.86 x 9.84") <sup>9)</sup>	A B C D E F G
<b>Power supply</b> 230 V AC, 1 rev/min. 230 V AC, 1 rev/min., fail-safe 230 V AC, 5 rev/min. 230 V AC, 5 rev/min., fail-safe 115 V AC, 1 rev/min. 115 V AC, 1 rev/min., fail-safe 115 V AC, 5 rev/min. 115 V AC, 5 rev/min., fail-safe 48 V AC, 1 rev/min. 24 V AC, 1 rev/min. 24 V DC, 1 rev/min. 24 V DC, 1 rev/min., fail-safe 24 V DC, 5 rev/min. 24 V DC, 5 rev/min., fail-safe Switch selectable 230 V AC/115 V AC/24 V DC multivoltage, 1 rev/min. Switch selectable 230 V AC/115 V AC/24 V DC multivoltage, 5 rev/min.	A B C D E F G H J K L M N P Q R	<b>Approvals</b> CSA/FM Dust Ignition Proof, C-TICK ATEX II 1/2 D, C-TICK CSA/FM General Purpose, C-TICK CE, C-TICK	A B C D
<b>Process connection</b> <u>Threaded</u> G 1¼" [(BSPP), EN ISO 228-1] G 1" [(BSPP), EN ISO 228-1] G ½" [(BSPP), EN ISO 228-1] 1" NPT [(Taper), ANSI/ASME B1.20.1] 1¼" NPT [(Taper), ANSI/ASME B1.20.1] 1½" NPT [(Taper), ANSI/ASME B1.20.1] <u>Flanged</u> DN 32 PN 6, EN1092-1 (1.4541/321) DN 100 PN 6, EN1092-1 (1.4541/321) DN 100 PN 16, EN1092-1 (1.4541/321) 2" ASME 150 lbs B16.5 (1.4541/321) 3" ASME 150 lbs B16.5 (1.4541/321) 4" ASME 150 lbs B16.5 (1.4541/321)	A B C D E F G H J K L M	1) Available with approval option C and D only, up to max. 0.8 bar 2) Basic version is cost effective and offers fast delivery 3) Available only with power supply option A and with process connection C, and approval D, or power supply E with process connection E, and approval C, and then process pressure 1, process connection material 1, extension length 2, measuring vane A 4) Available only with power supply option Q, process connection C with approval B, or process connection E with approval A, and then process pressure 1, process connection material 2, extension length 2 and measuring vane A 5) Available with process connections A to F, process pressure option 1, and process temperature option 1 only 6) Available with measuring vane options A, C to G, only 7) Add 16 mm (0.63") to extension length 8) Available with extension length options 2 to 5 only 9) Available with process connections G, H, J to M, only Available ex stock.	
<b>Process pressure</b> Up to 0.5 bar (7.25 psi) Up to 5 bar (72.5 psi) Up to 10 bar (145 psi)	1 2 3	<b>Selection and Ordering data</b>	Order code
<b>Process connection material</b> Aluminum <sup>5)</sup> Stainless steel 303 (1.4305)	1 2	<b>Further Designs</b> Please add "-Z" to Order No. and specify Order code(s). Heating of enclosure <sup>1) 2)</sup> Signal bulb inserted in M20 cable gland <sup>1)</sup> SITRANS LPS200 designed for food applications with shaft seal conforming to FDA standards	A35 A20 K01
<b>Extension length</b> 100 mm (3.94") <sup>6)</sup> 150 mm (5.91") 200 mm (7.87") 250 mm (9.84") 300 mm (11.81")	1 2 3 4 5	<b>Additional Operating Instructions</b> Multi-language This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	Order No. <b>7ML1998-5FS62</b>
		<b>Spare Parts</b> Motor gear /PLC, multi-voltage Replacement vane, boot shape, 35 x 106 mm (1.38 x 4.17") Hinged vane, 65 x 210 mm (2.56 x 8.27")	<b>7ML1830-1KG</b> <b>7ML1830-1KH</b> <b>7ML1830-1KJ</b>
		<b>Rigid extension kit</b> (includes spring coupling, rigid tube extension and required pins) Extension: 500, 400, 300 mm (19.7, 15.8, 11.8") Extension: 1000, 900, 800, 700, 600 (39.4, 35.4, 31.5, 27.6, 23.6") Extension: 1500, 1400, 1300, 1200, 1100 mm (59.1, 55.1, 51.2, 47.2, 43.3")	<b>7ML5711-0AA</b> <b>7ML5711-1AA</b> <b>7ML5711-2AA</b>

# Level Measurement

## Point level measurement - Rotating paddle switch

### SITRANS LPS200

#### Available ex stock

SITRANS LPS200, compact for up to +80 °C (+176 °F), aluminum, with power supply A, process connection C, process pressure 1, process connection material 1, extension length 2, measuring vane A, and approval D

**7ML1830-1KG**

SITRANS LPS200, compact for up to +80 °C (+176 °F), aluminum, with power supply E, process connection E, process pressure 1, process connection material 1, extension length 2, measuring vane A, and approval C

**7ML5725-  
5EE11-2AC0**

SITRANS LPS200, compact for up to +80 °C (+176 °F), stainless steel, with power supply Q, process connection C, process pressure 1, process connection material 2, extension length 2, measuring vane A, and approval B

**7ML5725-  
6QC12-2AB0**

SITRANS LPS200, compact for up to +80 °C (+176 °F), stainless steel, with power supply Q, process connection E, process pressure 1, process connection material 2, extension length 2, measuring vane A, and approval A

**7ML5725-  
6QE12-2AA0**

- 1) Available with approval option D only
- 2) Available with power supply options A to H, J to N, P only

# Level Measurement

## Point level measurement - Rotating paddle switch

SITRANS LPS200

Selection and Ordering data	Order No.	Selection and Ordering data	Order No.
<b>SITRANS LPS200, Extended</b> Rotary paddle switch for level detection in bulk solids; ideal for heavy, sticky, or high impact applications. Designed with added protection tube for enhanced shaft protection	7 M L 5 7 2 6 -	<b>SITRANS LPS200, Extended</b> Rotary paddle switch for level detection in bulk solids; ideal for heavy, sticky, or high impact applications. Designed with added protection tube for enhanced shaft protection	7 M L 5 7 2 6 -
<b>Process temperature</b> Up to +80 °C (+176 °F) Up to +150 °C (+302 °F) Up to +250 °C (+482 °F) Up to +350 °C (+662 °F) <sup>1)</sup> Up to +80 °C (+176 °F) basic version <sup>2)</sup>	1 2 3 4 ▶ 5	<b>Measuring vane</b> Boot shaped 35 x 106 mm (1.38 x 4.17") <sup>6)</sup> Hinged vane 65 x 210 mm (2.56 x 8.27") <sup>6)</sup> Rectangular 50 x 150 mm (1.97 x 5.91") <sup>7)</sup> Rectangular 50 x 250 mm (1.97 x 9.84") <sup>7)</sup> Rectangular 98 x 150 mm (3.86 x 5.91") <sup>7)</sup> Rectangular 98 x 250 mm (3.86 x 9.84") <sup>7)</sup>	▶ A ▶ B ▶ D ▶ E ▶ F ▶ G
<b>Power supply</b> 230 V AC, 1 rev/min. 230 V AC, 1 rev/min., fail-safe 230 V AC, 5 rev/min. 230 V AC, 5 rev/min., fail-safe 115 V AC, 1 rev/min. 115 V AC, 1 rev/min., fail-safe 115 V AC, 5 rev/min. 115 V AC, 5 rev/min., fail-safe 48 V AC, 1 rev/min. 24 V AC, 1 rev/min. 24 V DC, 1 rev/min. 24 V DC, 1 rev/min., fail-safe 24 V DC, 5 rev/min. 24 V DC, 5 rev/min., fail-safe Switch selectable 230 V AC/115 V AC/24 V DC multivoltage, 1 rev/min. Switch selectable 230 V AC/115 V AC/24 V DC multivoltage, 5 rev/min.	A B C D E F G H J K L M N P ▶ Q R	<b>Approvals</b> CSA/FM Dust Ignition Proof, C-TICK ATEX II 1/2 D, C-TICK CSA/FM General Purpose, C-TICK CE, C-TICK	▶ 1 ▶ 2 ▶ 3 ▶ 4
<b>Process connection</b> <b>Threaded</b> G 1¼" [(BSPP), EN ISO 228-1] G 1½" [(BSPP), EN ISO 228-1] 1¼" NPT [(Taper), ANSI/ASME B1.20.1] 1½" NPT [(Taper), ANSI/ASME B1.20.1] <b>Flanged</b> DN 32 PN 6, EN1092-1 (1.4541/321) DN 100 PN 6, EN1092-1 (1.4541/321) DN 100 PN 16, EN1092-1 (1.4541/321) 2" ASME 150 lbs B16.5 (1.4541/321) 3" ASME 150 lbs B16.5 (1.4541/321) 4" ASME 150 lbs B16.5 (1.4541/321)	▶ A ▶ B ▶ C ▶ D E F G H J K	1) Available with approval option 3 and 4 only, up to max. 0.8 bar 2) Available with power supply option Q (process connection B with approval 2 or process connection C with approval 1), process pressure 1, process connection material 2, extension length 2, protection tube B and measuring vane A only 3) Available with process connections A to D, and process temperature option 1 only 4) Available with process pressure option 1 only 5) Not available with measuring vane option B 6) Add 16 mm (0.63") to extension length 7) Available with process connections E to H, J, K, only ▶ Available ex stock.	
<b>Process pressure</b> Up to 0.5 bar (7.25 psi) Up to 5 bar (72.5 psi) Up to 10 bar (145 psi)	▶ 1 2 3	<b>Selection and Ordering data</b>	Order code
<b>Process connection material</b> Aluminum <sup>3) 4)</sup> Stainless steel 303 (1.4305)	▶ 1 ▶ 2	<b>Further Designs</b> Please add "-Z" to Order No. and specify Order code(s). Heating of enclosure <sup>1) 2)</sup> Signal bulb inserted in M20 cable gland <sup>1)</sup>	A35 A20 K01
<b>Extension length</b> 150 mm (5.91") <sup>5)</sup> 200 mm (7.87") 250 mm (9.84") 300 mm (11.81")	▶ 1 ▶ 2 3 4	SITRANS LPS200 designed for food applications with shaft seal conforming to FDA standards <b>Additional Operating Instructions</b> Multi-language This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	Order No. 7ML1998-5FS62
<b>Extension material (protection tube)</b> Aluminum <sup>3)</sup> Stainless steel 303 (1.4305)	▶ A ▶ B	<b>Spare Parts</b> Motor gear /PLC, multi-voltage Replacement vane, boot shape, 35 x 106 mm (1.38 x 4.17") Hinged vane, 65 x 210 mm (2.56 x 8.27")	7ML1830-1KG 7ML1830-1KH 7ML1830-1KJ
		<b>Available ex stock</b> SITRANS LPS200, extended for up to +80 °C (+176 °F), power supply Q, process connection B, process pressure 1, process connection material 2, extension length 2, extension material B, measuring vane A, and approval 2 SITRANS LPS200, extended for up to +80 °C (+176 °F), power supply Q, process connection C, process pressure 1, process connection material 2, extension length 2, extension material B, measuring vane A, and approval 1	7ML5726-5QB12-2BA2 7ML5726-5QC12-2BA1
		1) Available with approval options 4 only 2) Available with power supply options A to H, J to N, P only	

# Level Measurement

## Point level measurement - Rotating paddle switch

### SITRANS LPS200

Selection and Ordering data	Order No.
<b>SITRANS LPS200, cable extension</b> Rotary paddle switch for level detection in bulk solids Cable extension for increased length in top-mounted applications	7 ML 5 7 2 7 - 0
<b>Process temperature</b> Up to +80 °C (+176 °F) Up to +150 °C (+302 °F) Up to +250 °C (+482 °F) Up to +350 °C (+662 °F) <sup>1)</sup> Up to +80 °C (+176 °F) basic version <sup>2) 5)</sup>	1 2 3 4 5
<b>Power supply</b> 230 V AC, 1 rev/min. 230 V AC, 1 rev/min., fail-safe 230 V AC, 5 rev/min. 230 V AC, 5 rev/min., fail-safe 115 V AC, 1 rev/min. 115 V AC, 1 rev/min., fail-safe 115 V AC, 5 rev/min. 115 V AC, 5 rev/min., fail-safe 48 V AC, 1 rev/min. 24 V AC, 1 rev/min. 24 V DC, 1 rev/min. 24 V DC, 1 rev/min., fail-safe 24 V DC, 5 rev/min. 24 V DC, 5 rev/min., fail-safe Switch selectable 230 V AC/115 V AC/24 V DC multivoltage, 1 rev/min. Switch selectable 230 V AC/115 V AC/24 V DC multivoltage, 5 rev/min.	A B C D E F G H J K L M N P Q R
<b>Process connection</b> <b>Threaded</b> G 1¼" [(BSPP), EN ISO 228-1] G 1½" [(BSPP), EN ISO 228-1] 1¼" NPT [(Taper), ANSI/ASME B1.20.1] 1½" NPT [(Taper), ANSI/ASME B1.20.1] <b>Flanged</b> DN 32 PN 6, EN1092-1 (1.4541/321) DN 100 PN 6, EN1092-1 (1.4541/321) DN 100 PN 16, EN1092-1 (1.4541/321) 2" ASME 150 lbs B16.5 (1.4541/321) 3" ASME 150 lbs B16.5 (1.4541/321) 4" ASME 150 lbs B16.5 (1.4541/321)	A B C D E F G H J K
<b>Process pressure</b> Up to 0.5 bar (7.25 psi) Up to 5 bar (72.5 psi) Up to 10 bar (145 psi)	1 2 3
<b>Process connection material</b> Aluminum <sup>3)</sup> Stainless steel 303 (1.4305)	1 2
<b>Cable extension length</b> Standard cable length, 2000 mm (78.74") <b>Add order code Y01 and plain text:</b> <b>"Insertion length ... mm"</b> 500 ... 1000 mm (19.69 ... 39.37") Cable length 1001 ... 2000 mm (39.41 ... 78.74") Cable length 2001 ... 3000 mm (78.78 ... 118.11") Cable length 3001 ... 4000 mm (118.15 ... 157.48") Cable length 4001 ... 5000 mm (157.52 ... 196.85") Cable length 5001 ... 6000 mm (196.89 ... 236.22") Cable length 6001 ... 7000 mm (236.26 ... 275.59") Cable length 7001 ... 10000 mm (275.63 ... 393.70")	0 1 2 3 4 5 6 7 8

Selection and Ordering data	Order No.
<b>SITRANS LPS200, cable extension</b> Rotary paddle switch for level detection in bulk solids Cable extension for increased length in top-mounted applications	7 ML 5 7 2 7 - 0
<b>Measuring vane</b> Boot shaped, 35 x 106 mm (1.38 x 4.17") <sup>4)</sup> Hinged vane, 65 x 210 mm (2.56 x 8.27") <sup>4)</sup> Boot shaped, 28 x 98 mm (1.10 x 3.86") Rectangular 50 x 150 mm (1.97 x 5.91") <sup>5)</sup> Rectangular 50 x 250 mm (1.97 x 9.84") <sup>5)</sup> Rectangular 98 x 150 mm (3.86 x 5.91") <sup>5)</sup>	A B C D E F
<b>Approvals</b> CSA/FM Dust Ignition Proof, C-TICK ATEX II 1/2 D, C-TICK CSA/FM General Purpose, C-TICK CE, C-TICK	A B C D
<ol style="list-style-type: none"> <li>1) Available with approval option C and D only, up to max. 0.8 bar</li> <li>2) Available only with Power supply Q, (Process connection B with Approvals B or Process connection C with Approvals A), Process pressure 1, Process connection material 2, Cable Extension length 0 and Measuring Vane A</li> <li>3) Available with process connections A to D, process pressure option 1, and process temperature option 1 only</li> <li>4) Add 16 mm (0.63") to extension length</li> <li>5) Available with process connections E to H, J, K, only</li> </ol>	

Selection and Ordering data	Order code
<b>Further Designs</b> Please add <b>"-Z"</b> to Order No. and specify Order code(s).	
Total insertion length: Enter the total insertion length in plain text description, max. 10000 mm (393.70") Reinforced cable (max. 28 kN pulling force) Heating of enclosure <sup>1) 2)</sup> Signal bulb inserted in M20 cable gland <sup>1)</sup>	Y01 P01 A35 A20
<b>Additional Operating Instructions</b> Multi-language This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	Order No. 7ML1998-5FS62
<b>Spare Parts</b> Motor gear /PLC, multi-voltage Replacement vane, boot shape, 35 x 106 mm (1.38 x 4.17") Hinged vane, 65 x 210 mm (2.56 x 8.27") Rope extension kit, 2 m (6.56 ft)	7ML1830-1KG 7ML1830-1KH 7ML1830-1KJ 7ML1830-1KK
<b>Available ex stock</b> SITRANS LPS200, cable extension for up to +80 °C (+176 °F), power supply Q, process connection B, process pressure 1, process connection material 2, extension length 0, measuring vane A, and approval B SITRANS LPS200, cable extension for up to +80 °C (+176 °F), power supply Q, process connection C, process pressure 1, process connection material 2, extension length 0, measuring vane A, and approval A	7ML5727-5QB12-0AB0 7ML5727-5QC12-0AA0
<ol style="list-style-type: none"> <li>1) Available with approval options D only</li> <li>2) Available with power supply options A to H, J to N, and P, only</li> </ol>	



# Level Measurement

## Point level measurement - Rotating paddle switch

SITRANS LPS200

Selection and Ordering data	Order No.	Selection and Ordering data	Order code
<b>SITRANS LPS200, angled extension</b> Rotary paddle switch with robust design for level detection in bulk solids; ideal for heavy or sticky applications. Angled extension designed to avoid falling material in side mount applications	<b>7ML5728-</b> 	<b>Further Designs</b> Please add "-Z" to Order No. and specify Order code(s).	
<b>Process temperature</b> Up to +80 °C (+176 °F) Up to +150 °C (+302 °F) Up to +250 °C (+482 °F)	<b>1</b> <b>2</b> <b>3</b>	<b>Heating of enclosure</b> <sup>1) 2)</sup> Signal bulb inserted in M20 cable gland <sup>1)</sup>	<b>A35</b> <b>A20</b>
<b>Power supply</b> 230 V AC, 1 rev/min. 230 V AC, 1 rev/min., fail-safe 230 V AC, 5 rev/min. 230 V AC, 5 rev/min., fail-safe 115 V AC, 1 rev/min. 115 V AC, 1 rev/min., fail-safe 115 V AC, 5 rev/min. 115 V AC, 5 rev/min., fail-safe 48 V AC, 1 rev/min. 24 V AC, 1 rev/min. 24 V DC, 1 rev/min. 24 V DC, 1 rev/min., fail-safe 24 V DC, 5 rev/min. 24 V DC, 5 rev/min., fail-safe Switch selectable 230 V AC/115 V AC/24 V DC multivoltage, 1 rev/min. Switch selectable 230 V AC/115 V AC/24 V DC multivoltage, 5 rev/min.	<b>A</b> <b>B</b> <b>C</b> <b>D</b> <b>E</b> <b>F</b> <b>G</b> <b>H</b> <b>J</b> <b>K</b> <b>L</b> <b>M</b> <b>N</b> <b>P</b> <b>Q</b> <b>R</b>	<b>Additional Operating Instructions</b> Multi-language This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	Order No. <b>7ML1998-5FS62</b>
<b>Process connection</b> <u>Flanged</u> DN 100 PN 6, EN1092-1 (1.4541/321) DN 100 PN 16, EN1092-1 (1.4541/321) 4" ASME 150 lbs B16.5 (1.4541/321)	<b>A</b> <b>B</b> <b>C</b>	<b>Spare Parts</b> Motor gear /PLC, multi-voltage Replacement vane, boot shape, 35 x 106 mm (1.38 x 4.17") Hinged vane, 65 x 210 mm (2.56 x 8.27")	<b>7ML1830-1KG</b> <b>7ML1830-1KH</b> <b>7ML1830-1KJ</b>
<b>Process pressure</b> Up to 0.5 bar (7.25 psi) Up to 5 bar (72.5 psi) Up to 10 bar (145 psi)	<b>1</b> <b>2</b> <b>3</b>	<sup>1)</sup> Available with approval options D only <sup>2)</sup> Available with power supply options A to H, J to N, P only	
<b>Process connection material</b> Stainless steel 303 (1.4305)	<b>1</b>		
<b>Extension length</b> 125 mm (4.92") 150 mm (5.91") 200 mm (7.87") 250 mm (9.84") 300 mm (11.81")	<b>1</b> <b>2</b> <b>3</b> <b>4</b> <b>5</b>		
<b>Measuring vane</b> Rectangular vane, 50 x 98 mm (1.97 x 3.86") Rectangular vane, 50 x 150 mm (1.97 x 5.91") Rectangular vane, 50 x 250 mm (1.97 x 9.84") Rectangular vane 98 x 150 mm (3.86 x 5.91") Rectangular vane 98 x 250 mm (3.86 x 9.84") Hinged vane, 65 x 210 mm (2.56 x 8.27")	<b>A</b> <b>B</b> <b>C</b> <b>D</b> <b>E</b> <b>F</b>		
<b>Approvals</b> CSA/FM Dust Ignition Proof, C-TICK ATEX II 1/2 D, C-TICK CSA/FM General Purpose, C-TICK CE, C-TICK	<b>A</b> <b>B</b> <b>C</b> <b>D</b>		



# Level Measurement

## Point level measurement - Rotating paddle switch

### SITRANS LPS200

#### Selection and Ordering data

Order No.

#### SITRANS LPS200, rigid extension

Rotary paddle switch for top mount point level detection in bulk solids

7 ML 5 7 3 0 -

#### Process temperature

Up to +80 °C (+176 °F)

Up to +150 °C (+302 °F)

Up to +250 °C (+482 °F)

Up to +350 °C (+662 °F)<sup>1)</sup>1  
2  
3  
4

#### Power supply

230 V AC, 1 rev/min.

230 V AC, 1 rev/min., fail-safe

230 V AC, 5 rev/min.

A  
B  
C

230 V AC, 5 rev/min., fail-safe

115 V AC, 1 rev/min.

115 V AC, 1 rev/min., fail-safe

115 V AC, 5 rev/min.

115 V AC, 5 rev/min., fail-safe

48 V AC, 1 rev/min.

24 V AC, 1 rev/min.

D  
E  
F  
G  
H

24 V DC, 1 rev/min.

24 V DC, 1 rev/min., fail-safe

24 V DC, 5 rev/min.

24 V DC, 5 rev/min., fail-safe

J  
K  
L  
M  
N

Switch selectable 230 V AC/115 V AC/24 V DC multivoltage, 1 rev/min.

Switch selectable 230 V AC/115 V AC/24 V DC multivoltage, 5 rev/min.

P  
Q  
R

#### Process connection

##### Threaded

G 1¼" [(BSPP), EN ISO 228-1]

G 1½" [(BSPP), EN ISO 228-1]

1¼" NPT [(Taper), ANSI/ASME B1.20.1]

1½" NPT [(Taper), ANSI/ASME B1.20.1]

A  
B  
C  
D

##### Flanged

DN 32 PN 6, EN1092-1 (1.4541/321)

DN 100 PN 6, EN1092-1 (1.4541/321)

DN 100 PN 16, EN1092-1 (1.4541/321)

2" ASME 150 lbs B16.5 (1.4541/321)

3" ASME 150 lbs B16.5 (1.4541/321)

4" ASME 150 lbs B16.5 (1.4541/321)

E  
F  
G  
H  
J  
K

#### Process pressure

Up to 0.5 bar (7.25 psi)

Up to 5 bar (72.5 psi)

Up to 10 bar (145 psi)

1  
2  
3

#### Process connection material

Aluminum<sup>2) 3) 4)</sup>Stainless steel 303 (1.4305)<sup>5)</sup>1  
2

#### Extension material (protection tube)

Aluminum<sup>2) 4) 6) 7)</sup>Stainless steel 303 (1.4305)<sup>5)</sup>0  
1

#### Extension length

Aluminum

250 ... 500 mm (9.84 ... 19.69")

501 ... 750 mm (19.72 ... 29.53")

751 ... 1000 mm (29.57 ... 39.37")

1001 ... 1250 mm (39.41 ... 42.21")

1251 ... 1500 mm (49.25 ... 59.06")

1501 ... 1750 mm (59.09 ... 68.90")

1751 ... 2000 mm (68.94 ... 78.74")

2001 ... 2250 mm (78.78 ... 88.58")

2251 ... 2500 mm (88.62 ... 98.43")

2501 ... 2750 mm (98.46 ... 108.27")

2751 ... 3000 mm (108.31 ... 118.11")

3001 ... 3250 mm (118.15 ... 127.95")

3251 ... 3500 mm (127.99 ... 137.80")

3501 ... 3750 mm (137.83 ... 147.64")

3751 ... 4000 mm (147.67 ... 157.48")

A  
B  
C  
D  
E  
F  
G  
H  
J  
K  
L  
M  
N  
P  
Q

#### Selection and Ordering data

Order No.

#### SITRANS LPS200, rigid extension

Rotary paddle switch for top mount point level detection in bulk solids

7 ML 5 7 3 0 -

Stainless steel 303 (1.4305)

250 ... 500 mm (9.84 ... 19.69")

501 ... 750 mm (19.72 ... 29.53")

751 ... 1000 mm (29.57 ... 39.37")

1001 ... 1500 mm (39.41 ... 59.06")

1501 ... 2000 mm (59.09 ... 78.74")

2001 ... 2500 mm (78.78 ... 98.42")

2501 ... 3000 mm (98.46 ... 118.11")

3001 ... 4000 mm (118.14.78 ... 157.48")

R  
S  
T  
U  
V  
W  
X  
Y

#### Measuring vane

Boot shaped, 35 x 106 mm (1.34 x 4.17")<sup>8)</sup>

Hinged vane, 60 x 200 mm (2.36 x 7.87")

Rectangular 50 x 150 mm (1.97 x 5.91")<sup>9)</sup>Rectangular 50 x 250 mm (1.97 x 9.84")<sup>9)</sup>Rectangular 98 x 150 mm (3.86 x 5.91")<sup>9)</sup>Rectangular 98 x 250 mm (3.86 x 9.84")<sup>9)</sup>A  
B  
C  
D  
E  
F

#### Approvals

CSA/FM Dust Ignition Proof, C-TICK

ATEX II 1/2 D, C-TICK

CSA/FM General Purpose, C-TICK

CE, C-TICK

1  
2  
3  
4

1) Available with approval option 3 and 4 only, up to max. 0.8 bar

2) Available with process connections A to D only

3) Available with process pressure option 1 only

4) Available with extension length options A to Q only

5) Available with extension length options R to Y only

6) Available with process connection material option 1 only

7) Available with process temperature option 1 only

8) Add 16 mm (0.63") to extension length

9) Available with process connections E to H, J, K, only

# Level Measurement

## Point level measurement - Rotating paddle switch

SITRANS LPS200

Selection and Ordering data	Order code
<b>Further Designs</b>	
Please add <b>"-Z"</b> to Order No. and specify Order code(s).	
Total insertion length: Enter the total insertion length in plain text description, max. 4000 mm (157.48")	<b>Y01</b>
Heating of enclosure <sup>1) 2)</sup>	<b>A35</b>
Signal bulb inserted in M20 cable gland <sup>1)</sup>	<b>A20</b>
SITRANS LPS200 designed for food applications with shaft seal conforming to FDA standards <sup>3)</sup>	<b>K01</b>
<u>Seal at tube end for ingress protection and shaft stability</u>	
Max. temperature +80 °C (+176 °F)	<b>P06</b>
Max. temperature +150 °C (+302 °F)	<b>P07</b>
Max. temperature +250 °C (+482 °F)	<b>P08</b>
Max. temperature +350 °C (+662 °F)	<b>P09</b>
Sliding sleeve (standard, max. pressure 0.8 bar)	<b>P12</b>
Sliding sleeve (pressure tight, for over-pressure application starting from 1 bar max., dependent on pressure option ordered)	<b>P13</b>
<b>Additional Operating Instructions</b>	
Multi-language This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	Order No. <b>7ML1998-5FS62</b>
<b>Spare Parts</b>	
Motor gear/PLC, multi-voltage	<b>7ML1830-1KG</b>
Replacement vane, boot shape, 35 x 106 mm (1.38 x 4.17")	<b>7ML1830-1KH</b>
Hinged vane, 65 x 210 mm (2.56 x 8.27")	<b>7ML1830-1KJ</b>

1) Available with approval options 4 only

2) Available with power supply options A to H, J to N, P, only

3) Available when ordered with ingress protection seal P06 to P09 only

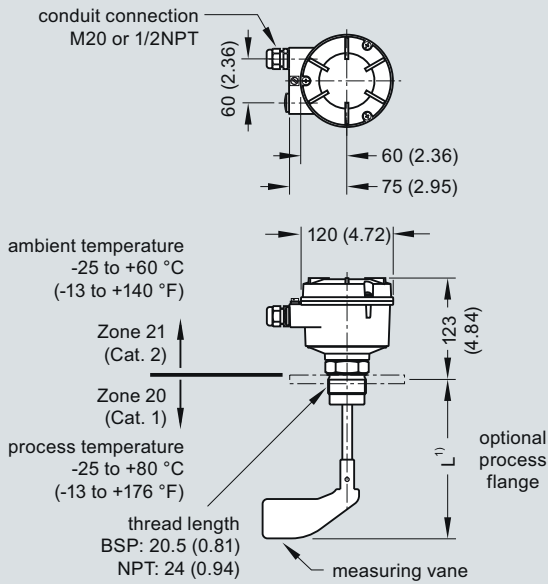
# Level Measurement

## Point level measurement - Rotating paddle switch

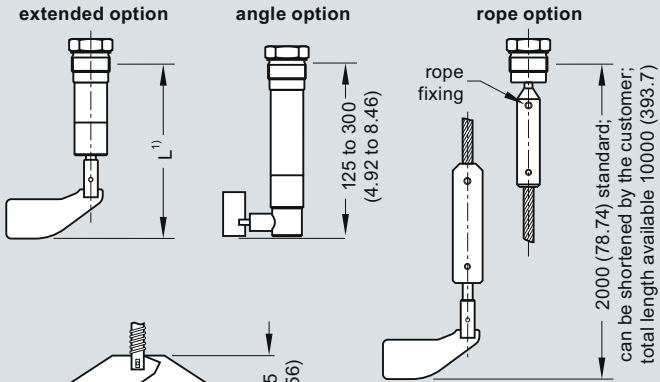
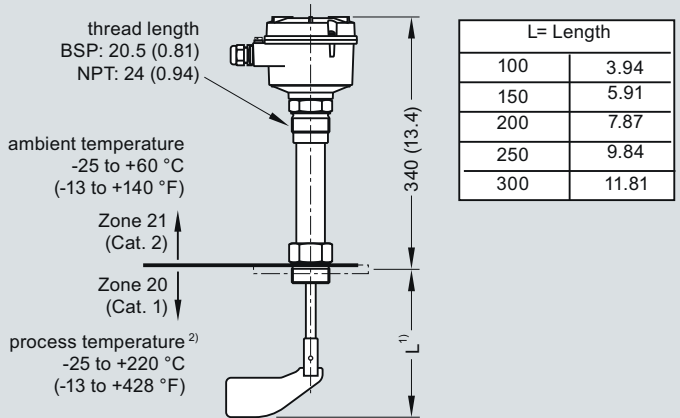
### SITRANS LPS200

#### Dimensional drawings

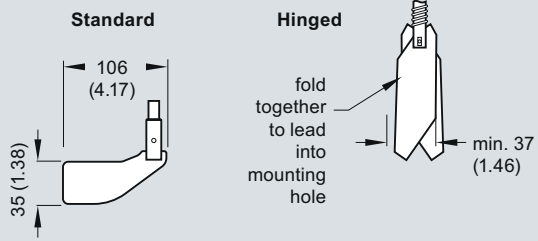
##### Standard model: compact version



##### High Temperature Model: compact version



##### Measuring Vanes



Rectangular

Rectangular vane options

A	B
50 (1.97)	98 (3.86)
50 (1.97)	150 (5.90)
50 (1.97)	250 (9.84)
98 (3.86)	150 (5.90)
98 (3.86)	250 (9.84)

- For 35 x 106 mm boot shaped and 65 x 210 mm hinged measuring vanes, add 16 mm to extension length.
- For use with all approval options except CSA Class II. See manual for more details.

**Notes**  
For heavy material, only top mounting of paddle switch is recommended.  
Compact LPS200 is recommended for side mounting on bins for low or intermediate material levels.

Vane	completely covered with material		covered up to 10 cm (3.93") with material	
	spring adjustment		spring adjustment	
	light	central (factory setting)	light	central (factory setting)
boot shaped 35 x 106 mm	200 g/l (12.5 lb/ft <sup>3</sup> )	300 g/l (18.7 lb/ft <sup>3</sup> )	100 g/l (6.2 lb/ft <sup>3</sup> )	150 g/l (9.4 lb/ft <sup>3</sup> )
boot shaped 28 x 98 mm	300 g/l (18.7 lb/ft <sup>3</sup> )	500 g/l (31.2 lb/ft <sup>3</sup> )	150 g/l (9.4 lb/ft <sup>3</sup> )	150 g/l (9.4 lb/ft <sup>3</sup> )
rectangular 50 x 98 mm	300 g/l (18.7 lb/ft <sup>3</sup> )	500 g/l (31.2 lb/ft <sup>3</sup> )	150 g/l (9.4 lb/ft <sup>3</sup> )	250 g/l (15.6 lb/ft <sup>3</sup> )
rectangular 50 x 150 mm	80 g/l (5.0 lb/ft <sup>3</sup> )	120 g/l (7.5 lb/ft <sup>3</sup> )	40 g/l (2.5 lb/ft <sup>3</sup> )	60 g/l (3.7 lb/ft <sup>3</sup> )
rectangular 50 x 250 mm	30 g/l (1.9 lb/ft <sup>3</sup> )	50 g/l (3.1 lb/ft <sup>3</sup> )	15 g/l (0.9 lb/ft <sup>3</sup> )	25 g/l (1.6 lb/ft <sup>3</sup> )
rectangular 98 x 150 mm	30 g/l (1.9 lb/ft <sup>3</sup> )	50 g/l (3.1 lb/ft <sup>3</sup> )	15 g/l (0.9 lb/ft <sup>3</sup> )	25 g/l (1.6 lb/ft <sup>3</sup> )
rectangular 98 x 250 mm	20 g/l (1.2 lb/ft <sup>3</sup> )	30 g/l (1.9 lb/ft <sup>3</sup> )	15 g/l (0.9 lb/ft <sup>3</sup> )	15 g/l (0.9 lb/ft <sup>3</sup> )
hinged 65 x 210 mm	70 g/l (4.4 lb/ft <sup>3</sup> )	100 g/l (6.2 lb/ft <sup>3</sup> )	35 g/l (2.2 lb/ft <sup>3</sup> )	50 g/l (3.1 lb/ft <sup>3</sup> )
hinged 60 x 200 mm	70 g/l (4.4 lb/ft <sup>3</sup> )	100 g/l (6.2 lb/ft <sup>3</sup> )	35 g/l (2.2 lb/ft <sup>3</sup> )	50 g/l (3.1 lb/ft <sup>3</sup> )

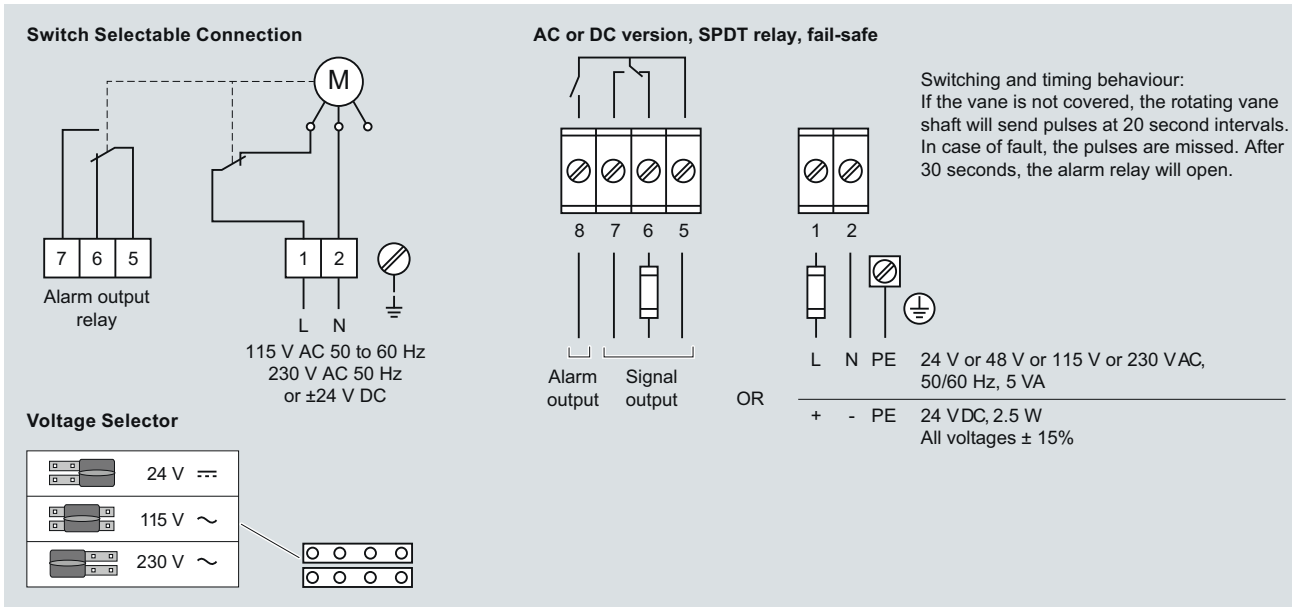
SITRANS LPS200, dimensions in mm (inch)

# Level Measurement

## Point level measurement - Rotating paddle switch

SITRANS LPS200

### Schematics



SITRANS LPS200 connections

# Level Measurement

## Point level measurement - Tilt switch

### Milltronics Tilt switch

#### Overview



The Milltronics Tilt switch probe is an electro-mechanical tilt switch for point level detection, plugged chute detection, and feed loss detection on conveyor belts.

#### Benefits

- High or low alarm
- Easy installation and operation
- Low cost
- Customized options

#### Application

Tilt switches provide point level detection. They offer a cost-effective solution for point level detection, plug chute detection, belt tracking, and feed loss detection on conveyor belts. They also provide simple high and low alarms for both dry bulk solids and liquids.

The Tilt switch consists of a rugged, stainless steel encapsulated probe. The probe is suspended vertically over a bin or belt, and the potted switch inside the probe provides a signal when material tilts it through an angle of more than 17° in any direction. Additional assembly options are available including replaceable wear extensions (for coarse and abrasive materials), flat or cross paddles (for medium bulk density materials), and floats (for liquids or light density bulk materials). The probes are also available for high or low temperature applications.

- Key Applications: point level detection, belt mis-alignment, conveyor feed starvation detection

#### Technical specifications

<b>Mode of operation</b>	
Measuring principle	Tilting of encapsulated mercury switch
Typical application	<ul style="list-style-type: none"> <li>• High or low level alarm on bulk solids</li> <li>• High or low level alarm for liquids (when used with float option)</li> </ul>
<b>Features</b>	
Number of points	Single point destination
Output	• 2A at 24 V DC
Transducers	Tilt angle sensitive mercury contacts
<b>Characteristics</b>	
Probe (Tilt switch)	• Resolution: nominal 17° from vertical
<b>Design</b>	
Housing	• Schedule 80 stainless steel pipe with ½" NPT mounting for extensions
Material type	<ul style="list-style-type: none"> <li>• Stainless steel:               <ul style="list-style-type: none"> <li>- Low temperature: -40 ... +90 °C (-40 ... +194 °F)</li> <li>- High temperature: -40 ... +150 °C (-40 ... +302 °F)</li> </ul> </li> </ul>
Weight	• 2 kg (4.4 lbs)
<b>Approvals</b>	CE, C-TICK
<b>Options</b>	Extensions: stainless steel Wear, Cross Paddle, Flat Paddle, or Float

# Level Measurement

## Point level measurement - Tilt switch

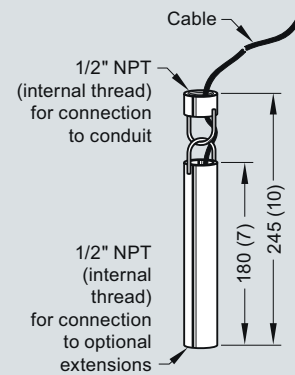
Milltronics Tilt switch

Selection and Ordering data	Order No.
<b>Tilt Switch Probe</b> Offers a cost-effective solution for point level detection, plug chute detection, belt tracking and feed loss detection on conveyor belts.	C) <b>7MH7143-0</b>
<b>Model</b> Standard, CE approved	<b>3</b>
<b>Sensor Construction</b> Stainless steel	<b>A</b>
<b>Temperature Rating</b> Low temperature with 6 m (20 ft.) of cable High temperature with 1.5 m (5 ft.) of cable	<b>A</b> <b>B</b>
<b>Probe Extension</b> None Wear extension, stainless steel Cross paddle extension, stainless steel Flat paddle extension, stainless steel Float, stainless steel	<b>1</b> <b>3</b> <b>5</b> <b>7</b> <b>8</b>

Selection and Ordering data	Order No.
<b>Further Designs</b> Please add <b>"-Z"</b> to Order No. and specify Order code(s).	
<b>Instruction manual</b> TSP Probe, English Note: The instruction manual should be ordered as a separate item on the order.  This device is shipped with the Siemens Milltronics manual CD containing ATEX Quick Starts and instruction manuals.	C) <b>7ML1998-1FL01</b>
<b>Spare parts</b> Float, stainless steel Wear extension, stainless steel Cross paddle, stainless steel Flat paddle, stainless steel	C) <b>7MH7723-1DH</b> C) <b>7MH7723-1DJ</b> C) <b>7MH7723-1DK</b> C) <b>7MH7723-1DL</b>
C) Subject to export regulations AL:N, ECCN: EAR99	

### Dimensional drawings

#### Tilt Switch Probe



#### Material

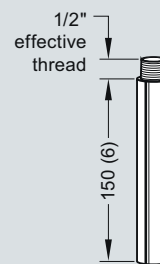
304 stainless steel (1.4301)

#### Cable

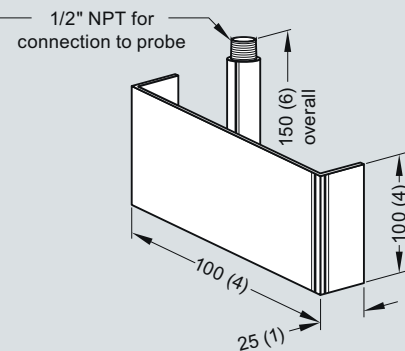
- Low temperature 6 m (20 ft): Type SJO 18-2
- High temperature 1.5 m (5 ft): Shielded PTFE

#### Optional Extensions (material: 304 Stainless Steel)

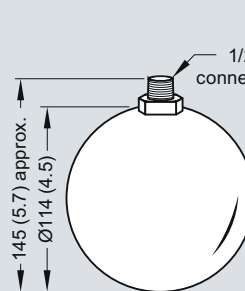
##### Wear



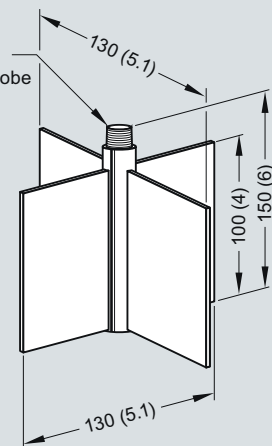
##### Flat Paddle



##### Float



##### Cross Paddle



Tilt switch, dimensions in mm (inch)

# Level Measurement

## Point level measurement - Ultrasonic switch

### Ultrasonic

#### Overview

##### Introduction

Ultrasonic measurement is based on the speed of sound. Sound can be used as a measurement tool because there is a measurable time lapse between sound generation and the "hearing" of the sound. This time lapse is then converted into usable information. Ultrasonic sensing equipment generates a sound above 20000 Hz and then interprets the time lapse of the returned echo. The transducer creates the sound and senses the echo and then a transceiver interprets the sound and converts it into information.

Siemens ultrasonic units include Sonic Intelligence, a patented signal processing technology. Using unique algorithms, Sonic Intelligence differentiates between true echoes from the material and false echoes from obstructions or electrical noise, providing intelligent processing of echo profiles.

##### Typical System

Ultrasonic level measurement requires two components: one to generate the sound and catch the echo (transducer) and one to interpret the data and derive a measurement (transceiver). Even though some ultrasonic instruments combine the components in one unit, the individual functionality remains distinct. The measurement output is communicated to the unit, PLCs or PCs for process control.

##### Principle of Operation

A piezoelectric crystal inside the transducer converts an electrical signal into sound energy, firing a burst into the air which travels to the target and then is reflected back to the transducer. The transducer then acts as a receiving device and converts the sonic energy back into an electrical signal contained in the transceiver. An electronic signal processor analyzes the return echo and calculates the distance between the transducer and the target. The time lapse between firing the sound burst and receiving the return echo is directly proportional to the distance between the transducer and the material in the vessel. This basic principle lies at the heart of the ultrasonic measurement technology and is illustrated in the equation:  
Distance = (Velocity of Sound x Time)/2.

#### Mode of operation

##### Common Terms

##### Attenuation

Denotes a decrease in signal magnitude in transmission from one point to another. Attenuation may be expressed as a scalar ratio of the input magnitude to the output magnitude or in decibels.

##### Beam angle

The diameter of a conical boundary centered around the axis of transmission when the power (radiating perpendicular to the transducer face on the axis of transmission) is reduced by half (-3 dB).

##### Blanking distance

Specified zone extending downward from the transducer face in which received echoes are ignored by the transceiver. Blanking distance ignores echoes from ringing.

##### Echo confidence

The recognition of the validity of the echo as material level. A measure of echo reliability.

##### Ringing

The inherent nature of the transducer to continue vibrating after the transmit pulse has ceased; the decay of the transmit pulse.

##### Transducer/Transceiver

A transducer provides the initial ultrasonic pulse and receives its echo. An ultrasonic transducer amplifies the sound wave created by the piezoelectric crystal and transmits that sound wave to the face of the transducer while at the same time dampening the sound wave from the other sides of the crystal.

Transceivers analyze the echo from the transducer to determine the required measurement.

# Level Measurement

## Point level measurement - Ultrasonic switch


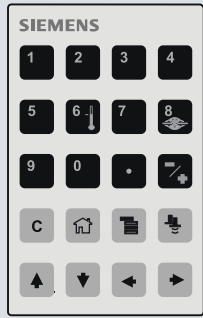
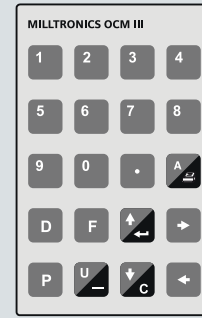

Ultrasonic

### Technical specifications

#### Ultrasonics Transmitter/Controller Selection Guide

Criteria	SITRANS Probe LU	HydroRanger 200	MultiRanger 100/200	SITRANS LUC500	SITRANS LU	OCM III
Range	6 m (20 ft) or 12 m (40 ft)	15 m (50 ft) transducer and application dependent	15 m (50 ft) transducer and application dependent	15 m (50 ft) transducer and application dependent	60 m (200 ft) transducer and application dependent	3 m (10 ft)
Typical applications	Chemical storage vessels, filter beds, liquid storage vessels	Wet wells, flumes/weirs, bar screen control	Wet wells, flumes/weirs, bar screen control, hoppers, chemical storage, liquid storage, crusher bins, dry solids storage	Wet well/lift station control, flumes/weirs, open channels	Chemical storage, liquid storage, bulk solids storage (sugar, flour bins, grains, cereals), plastic pellets	Open channel measurement
Output	HART model: 4 ... 20 mA/HART PROFIBUS PA model: PROFIBUS	6 relays standard, two 4 ... 20 mA outputs (isolated)	1 relay (option on MultiRanger 100) 3 relays standard 6 relays (option) Two 4 ... 20 mA outputs (isolated)	5 relays, 4 ... 20 mA (option)	4 relays (LU01, LU02) Up to 40 relays (LU10) 4 ... 20 mA isolated	3 relays, 4 ... 20 mA
Communications	HART or PROFIBUS PA Options: • SIMATIC PDM for remote configuration and diagnostics	Built-in Modbus RTU/ASCII via RS-485 Options: • SIMATIC PDM • SmartLinX (PROFIBUS DP, Allen-Bradley Remote I/O, DeviceNet)	Built-in Modbus RTU or ASCII via RS-485 Options: • SIMATIC PDM • Smartlinx (PROFIBUS DP, Allen-Bradley Remote I/O, DeviceNet)	Telemetry capability with Modbus RTU/ASCII via RS-232/RS-485 Options: • SIMATIC PDM • SmartLinX (PROFIBUS DP, Allen-Bradley Remote I/O, DeviceNet) • ECT EnviroRanger Tool software	Dolphin, RS-232/RS-485 (LU01, LU02) Dolphin via infrared (LU10) Options: • SmartLinX (PROFIBUS DP, Allen-Bradley Remote I/O, DeviceNet)	Via RS-232 Options: • Flow Reporter software
Power specifications	HART: 4 ... 20 mA, 24 V DC nominal, max. 550 W, 30 V DC max. PROFIBUS PA: 12, 13, 15, or 20 mA, dependent on programming	AC version: 100 ... 230 V AC ±15 %, 50/60 Hz, 36 VA/17 W DC version: 12 ... 30 V DC, 20 W	AC version: 100 ... 230 V AC ±15 %, 50/60 Hz, 36 VA/17 W DC version: 12 ... 30 V DC, 20 W	AC version: 100 ... 230 V AC ±15 %, 50/60 Hz, 30 VA/17 W DC version: 12 ... 30 V DC, 20 W	LU01, LU02: AC version: 100/115/200/230 V AC, ±15 %, 50/60 Hz, 15 VA and/or 9 ... 30 V DC, 8 W LU10: 100/115/200/230 V AC	100/115/200/230 V AC, ±15 %, 50/60 Hz, 15 VA and/or 9 ... 30 V DC, 8 W
Approvals	CE, CSA <sub>US/C</sub> , FM, C-TICK, ATEX, ANZEx, IECEx	CE, CSA <sub>US/C</sub> , UL Listed, FM, C-TICK	CE, CSA <sub>US/C</sub> , UL Listed, FM, C-TICK	CE, CSA <sub>US/C</sub> , UL Listed	CE, CSA <sub>US/C</sub> , FM, Lloyd's Register	CE, CSA <sub>US/C</sub> , FM

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<p><b>7ML1830-2AN</b></p>  <p><b>SITRANS Probe LU HART*</b> <b>SITRANS LU</b></p>	<p><b>7ML5830-2AJ</b></p>  <p><b>SITRANS Probe LU PROFIBUS</b></p>	<p><b>7ML1830-2AA</b></p>  <p><b>OCM III</b></p>	<p><b>7ML1830-2AK</b></p>  <p><b>MultiRanger 100/200</b> <b>HydroRanger 200</b> <b>HydroRanger Plus</b> <b>SITRANS LUC500</b></p>
<p>* <b>Note:</b> To order the IS version of this hand programmer, order 7ML5830-2AH.</p>			



# Level Measurement

## Point level measurement - Ultrasonic switch

Ultrasonic

**SIEMENS****Ultrasonic Level Application Questionnaire****Customer information**

Contact: \_\_\_\_\_ Prepared By: \_\_\_\_\_  
 Company: \_\_\_\_\_ Date: \_\_\_\_\_  
 Address: \_\_\_\_\_ Notes on the Application: \_\_\_\_\_  
 City: \_\_\_\_\_ Country: \_\_\_\_\_  
 Zip/Postal Code: \_\_\_\_\_ Phone: ( ) \_\_\_\_\_  
 E-mail: \_\_\_\_\_ Fax: ( ) \_\_\_\_\_

**Tanks/Vessel information**(Supply sketch where possible) Sketch attached 

**Type:**  Storage  
 Process  
 Pump station  
 Open channel

**Dimensions:**

Height: \_\_\_\_\_ m/ft

Width/Diameter: \_\_\_\_\_ m/ft

**Critical Information****Nozzle Length:** \_\_\_\_\_ cm/in**Nozzle Diameter:** \_\_\_\_\_ cm/in

**Tank top:**  Open **Tank bottom:**  Sloped **Internal equipment and/or obstructions:**  No  
 Flat  Flat  Yes Please list \_\_\_\_\_  
 Conical  Conical \_\_\_\_\_  
 Parabolic  Parabolic \_\_\_\_\_  
(E.g. Agitator, Heating coils, Supports, Other)

**Measurement type:**  Point Level  Continuous Level  Volume  Flow

**Area safety classification:** (specify code required) \_\_\_\_\_

**Material**

**Material being measured:** \_\_\_\_\_  Slurry  Liquid  Solid

**Material temperature:** Norm: \_\_\_\_\_ °C/°F Max: \_\_\_\_\_ °C/°F

**Atmosphere:**  Air  Other \_\_\_\_\_ **Homogenous:**  Yes  No

**Dust:**  None  Light  Heavy

**Installation**

(indicate all that apply)

**Power available:** \_\_\_\_\_

**Communications:****Inputs required:****Outputs required:** 4 to 20 mA 4 to 20 mA HART ® /4 to 20 mA  AB Remote I/O PROFIBUS DP  AB DeviceNet Pump Interlocks (#): \_\_\_\_\_ Relays (#): \_\_\_\_\_ PROFIBUS PA  None Modbus RTU/ASCII**Products recommended:**

# Level Measurement

## Point level measurement - Ultrasonic switch

Pointek ULS200

### Overview



The Pointek ULS200 is an ultrasonic non-contacting switch with two switch points for level detection of bulk solids, liquids and slurries in a wide variety of industries; ideal for sticky materials.

### Benefits

- 2 switch outputs for high-high, high, low and low-low level alarms or pump up/pump down control
- Integral temperature compensation
- AC or DC power supply
- Electronics provided with fail-safe function
- Threaded and sanitary fitting clamp process connections
- Polycarbonate or aluminum enclosures, Type 6/NEMA 6/IP67
- Easy, two-button programming

### Application

The measuring range for bulk solids is max. 3 m (9.8 ft) and 5 m (16.4 ft) for liquids and slurries. Unlike invasive contacting devices, there is no material buildup on the sensor.

The level switch has a rugged design, combining the transducer and electronics in one durable device. It has no moving parts and is virtually maintenance-free.

The transducer, available in ETFE or PVDF copolymer, is inert to most chemicals. This means the device can be used in the chemical, petrochemical, water, and wastewater industries. A sanitary version of the ULS200, with an industry standard flange option, is easy to remove from the application for cleaning. It thus satisfies the prerequisites for use in the food, beverage and pharmaceutical industries. The Pointek ULS200 delivers superior performance while reducing maintenance, downtime and equipment replacement costs.

- Key Applications: liquids, slurries, fluid materials, plugged chute detection, chemical industry

### Design

#### Installation

The Pointek ULS200 should be mounted in an area that is within the temperature range specified and that is suitable to the enclosure rating and materials of construction. The cover should be accessible to allow programming, wiring and display viewing.

It is advisable to keep the Pointek ULS200 away from high voltage or current runs, contactors and SCR control drives

Locate the Pointek ULS200 so that it has a clear sound path perpendicular to the material surface. The sound path should not intersect the fill path, rough walls, seams, rungs etc.

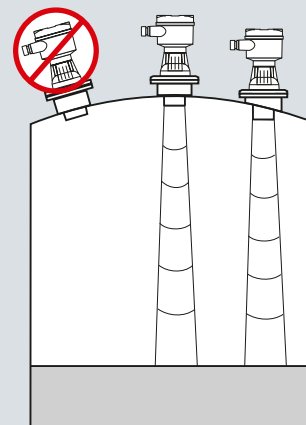
#### Mounting and Interconnection

The Pointek ULS200 is available in three thread types: 2" NPT, R 2" (BSPT), EN 10226 or PF2 and can be fitted with the optional 75 mm (3") flange adapter for mating to 3" ASME, DN 65, PN 10 and JIS 10K 3B sized flanges.

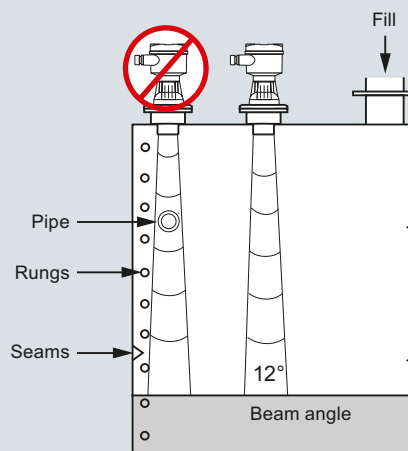
Separate cables and conduit may be required to conform to standard instrumentation wiring or electrical codes.

### Configuration

#### Parabolic Mounting



#### Flat Mounting and Beam Angle



Pointek ULS200 Mounting

# Level Measurement

## Point level measurement - Ultrasonic switch

### Pointek ULS200

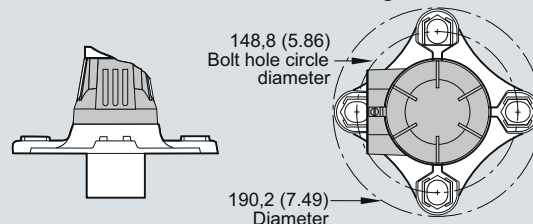
#### Technical specifications

Mode of operation	
Measuring principle	Ultrasonic level switch
Measuring range	
Measuring range in liquids	0.25 ... 5 m (0.8 ... 16.4 ft)
Measuring range in bulk solids	0.25 ... 3 m (0.8 ... 9.8 ft)
Output	
AC Version (relay)	2 SPDT Form C contacts rated 5 A at 250 V AC, resistive load
DC Version (relay)	2 SPDT Form C contacts rated 5 A at 48 V DC
DC Version (transistor)	2 switches, rated max. 100 mA, 48 V DC
Accuracy	
AC/DC version	
• Resolution	3 mm (0.1")
• Repeatability	0.25 % of measuring range
Rated operation conditions	
Installation conditions	
• Location	Indoors/outdoors
• Beam angle	12°
Ambient conditions	
• Ambient temperature	-40 ... +60 °C (-40 ... +140 °F)
• If mounted in metal threads	-20 ... +60 °C (-5 ... +140 °F)
Medium conditions	
• Process pressure	0.5 bar (7.25 psi) max.
Design	
Material	Polycarbonate or epoxy-coated aluminum with gasket
Weight	Approx. 1.5 kg (3.3 lbs)
Transducer material	PVDF copolymer
Threaded mounting	2" NPT [(Taper), ANSI/ASME B1.20.1] R 2" [(BSP), EN 10226] or G 2" [(BSPP), EN ISO 228-1]
• Optional flange adapter	For 3" ASME, DN 65, PN 10 and JIS 10 K3B
Sanitary mounting	4" sanitary fitting clamp
Power supply	
AC version	100 ... 230 V AC, ±15 %, 50/60 Hz, max. 12 VA, 5 W
DC version	18 ... 30 V DC, 3 W
Displays and controls	
Display	LCD, three digits, 9 mm (0.35") high, for display of distance between sensor face and material, multisegment graphic for operating state
Memory	EEPROM, non-volatile
Programming	2 keys

<b>Electronics/enclosure</b>	Connection: terminal block, max. 2.5 mm <sup>2</sup> (14 AWG) solid/1.5 mm <sup>2</sup> (16 AWG) stranded
Degree of protection	IP67/Type 6/NEMA 6
Cable inlet	2 x 1/2" NPT or 2 x PG 13.5
<b>Certificates and approvals</b>	<ul style="list-style-type: none"> <li>• CE (EMC certificate available on request), CSA<sub>US/C</sub>, FM</li> <li>• CSA/FM Class I, II, III, Div. 1, Gr A, B, C, D, E, F, G T4</li> <li>• ATEX II 2G EEx md IIC T5</li> <li>• C-TICK</li> <li>• INMETRO: Br-EEx md IIC T5</li> </ul>

#### Options

##### Flange adapter for mating 2" NPT or 2" BSP process connections to 3" ASME, DN 65 PN10 and JIS 10K 3B flanges



Pointek ULS200 Optional Flange Adapter, dimensions in mm (inch)

# Level Measurement

## Point level measurement - Ultrasonic switch

Pointek ULS200

Selection and Ordering data	Order No.	Selection and Ordering data	Order code
<b>Pointek ULS200</b> Ultrasonic non-contacting switch with two switch points for level detection of bulk solids, liquids and slurries in a wide variety of industries; ideal for sticky materials	C) <b>7ML1510-</b>	<b>Further designs</b> Please add "-Z" to Order No. and specify Order code(s)	
<b>Power supply</b> 24 V DC, relay output 24 V DC, transistor output 100 ... 230 V AC, relay output	<b>1</b> <b>2</b> <b>3</b>	<b>Operating Instructions</b> Additional Multi-language Quick Start manual	C) <b>7ML1998-1XB63</b>
<b>Approvals</b> CE, C-TICK, INMETRO, ATEX II 2G EEx md IIC T5 <sup>1)</sup> CE, C-TICK, CSA Class I, II, III, Div. 1 <sup>2)</sup> CE, C-TICK, FM Class I, II, III, Div. 1 <sup>2)</sup> CE, C-TICK, CSA Class I, II, Div. 2 <sup>3)</sup> CE, C-TICK, CSAus/c, FM	<b>C</b> <b>F</b> <b>G</b> <b>J</b> <b>K</b>	<b>Accessories</b> Tag, stainless steel, 12 x 45 mm (0.47 x 1.77"), one text line, suitable for enclosures Universal Box Bracket Mounting Kit 3" ASME, DN 65, PN 10, JIS 10K 3B ETFE Flange adapter for 2" BSPT 3" ASME, DN 65, PN 10, JIS 10K 3B ETFE Flange adapter for 2" BSPT 2" BSPT Locknut, plastic 2" NPT Locknut 4" sanitary mounting clamp	<b>7ML1930-1AC</b> <b>7ML1830-1BK</b> <b>7ML1830-1BT</b> <b>7ML1830-1BU</b> <b>7ML1830-1DQ</b> <b>7ML1830-1DT</b> <b>7ML1830-1BR</b>
<b>Transducer/Process connection</b> ETFE, 2" NPT [(Taper), ANSI/ASME B1.20.1] EFTE, R 2" [(BSPT), EN 10226] EFTE, G 2" [(BSPP), EN ISO 228-1] PVDF copolymer, 2" NPT [(Taper), ANSI/ASME B1.20.1] PVDF copolymer, R 2" [(BSPT), EN 10226] PVDF copolymer, G [(BSPP), EN ISO 228-1] PVDF copolymer, 4" sanitary mounting <sup>4)</sup>	<b>A</b> <b>B</b> <b>C</b> <b>E</b> <b>F</b> <b>G</b> <b>J</b>	<b>Spare Parts</b> Polycarbonate Lid Aluminum Lid	<b>7ML1830-1LG</b> <b>7ML1830-1LH</b>
<b>Enclosure/cable inlet</b> <u>Polycarbonate</u> • Cable inlet PG 13.5 • Cable inlet ½" NPT <u>Aluminum</u> • Cable inlet PG 13.5 • Cable inlet ½" NPT	<b>1</b> <b>2</b> <b>3</b> <b>4</b>	C) Subject to export regulations AL: N, ECCN: EAR99	

1) Available with enclosure/cable inlet option 4 only

2) Available with enclosure/cable inlet option 4 only and process connection options A and E only

3) Available with enclosure/cable inlet options 2 and 4 only

4) Available with approval option K only

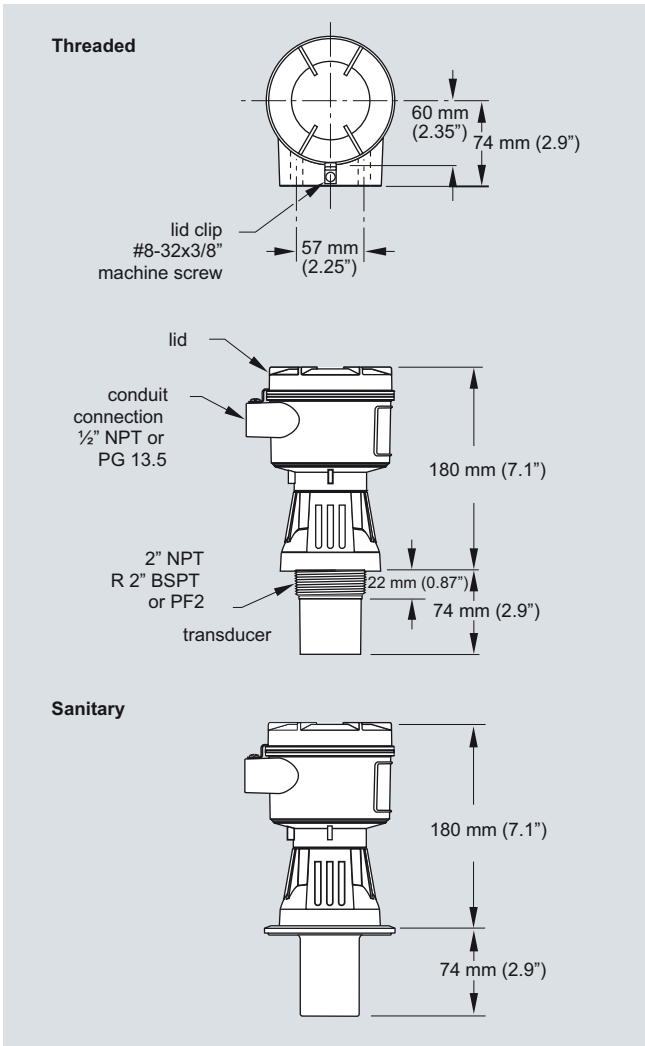
C) Subject to export regulations AL: N, ECCN: EAR99

# Level Measurement

## Point level measurement - Ultrasonic switch

### Pointek ULS200

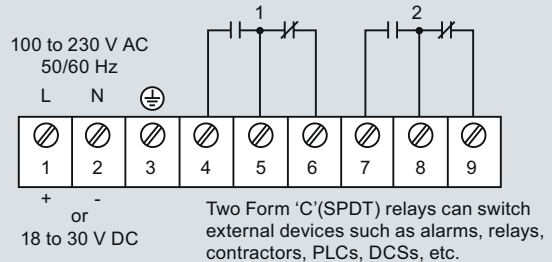
#### Dimensional drawings



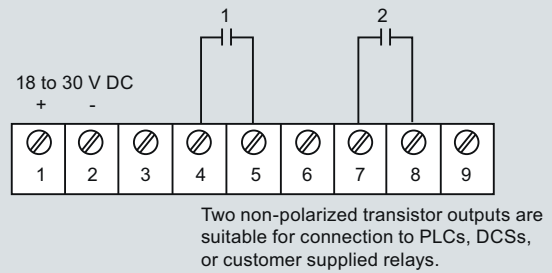
Pointek ULS200, dimensions in mm (inch)

#### Schematics

##### Relay Output



##### Transistor Output: DC version only



Pointek ULS200 connections

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# Level Measurement

## Continuous level measurement - Ultrasonic transmitters

The Probe

### Overview



The Probe is a short-range integrated ultrasonic level transmitter, ideal for liquids and slurries in open or closed vessels.

### Benefits

- Easy to install, program and maintain
- Accurate and reliable
- Sanitary models available
- Patented Sonic Intelligence® echo processing
- Integral temperature compensation

### Application

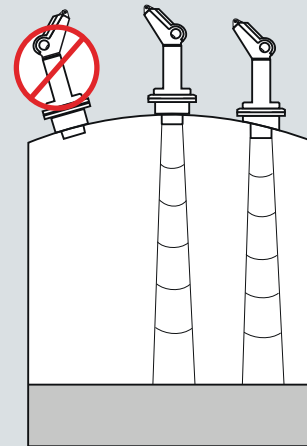
The transducer is available in PVDF copolymer, making the device suitable for use in a wide variety of applications. The Probe is easy to install and maintain, and can be quickly removed for cleaning as required by the food, beverage and pharmaceutical industries.

The reliability of the level data is based on the Sonic Intelligence echo processing algorithms. A filter discriminates between the true echo and false echoes from acoustic or electrical noises and agitator blades in motion. The ultrasonic pulse propagation time to the material and back is temperature-compensated and converted into distance for display, analog output and relay actuation.

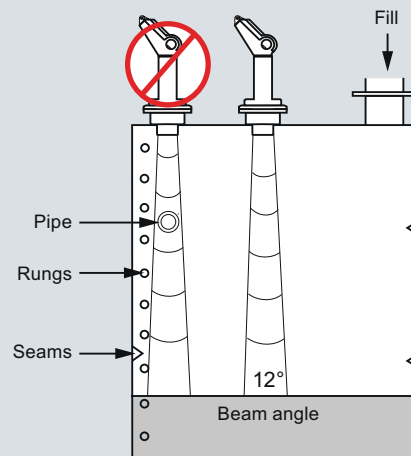
- Key Applications: chemical storage vessels, filter beds, mud pits, liquid storage vessels, food applications

### Configuration

#### Parabolic Mounting



#### Flat Mounting and Beam Angle



The Probe mounting

# Level Measurement

## Continuous level measurement - Ultrasonic transmitters

### The Probe

#### Technical specifications

	Two-wire version (standard)	Three-wire version
<b>Mode of operation</b>		
Measuring principle	Ultrasonic level measurement	Ultrasonic level measurement
<b>Input</b>		
Measuring range	0.25 ... 5 m (0.8 ... 16.4 ft)	0.25 ... 5 m (0.8 ... 16.4 ft)
<b>Output</b>		
mA	4 ... 20 mA	4 ... 20 mA
• Span	Proportional/ inversely proportional	Proportional/ inversely proportional
• Max. load	600 Ω in the loop at 24 V DC	750 Ω at 24 V DC
Relay	No	For level alarm or fault
<b>Power supply</b>		
Supply voltage	12 ... 28 V DC, 0.1 A surge	18 ... 30 V DC, max. 0.2 A
Max. power consumption	0.75 W (25 mA at 24 V DC)	5 W (200 mA at 24 V DC)
<b>Certificates and approvals</b>	CE, C-TICK, CSA <sub>US/C</sub>	CE, C-TICK, CSA <sub>US/C</sub> , FM
<b>Accuracy</b>		
Error in measurement	0.25 % of measuring range (in air)	
Resolution	3 mm (0.125")	
Temperature compensation	Built in	
Echo processing	Sonic Intelligence	
<b>Rated operation conditions</b>		
Beam angle	12°	
Ambient temperature		
• Standard	-40 ... +60 °C (-40 ... +140 °F)	
• Metallic mounting	-20 ... +60 °C (-4 ... +140 °F)	
Max. static operating pressure	Normal atmospheric pressure	
Degree of protection	IP65	
<b>Design</b>		
Weight		
• Without flange adapter	1.5 kg (3.3 lbs)	
• With flange adapter	1.7 kg (3.7 lbs)	
Material		
• Electronics enclosure	PVC	
• Transducer	PVDF copolymer	
Degree of protection	IP65	
Process connection	2" NPT [(Taper), ANSI/ASME B1.20.1] R 2" [(BSPT), EN 10226] or G 2" [(BSPP), EN ISO 228-1]	
Flange adapter	3" Universal, (fits DN 65, PN 10 and 3" ASME) 4" sanitary	
Cable inlet	2 inlets for PG 13.5 or ½" NPT cable glands	

#### Selection and Ordering data

	Order No.
<b>The Probe</b>	C) <b>7ML1201-000</b>
Short-range integrated ultrasonic level transmitter, ideal for liquids and slurries in open or closed vessels	
<b>Measuring range</b>	1
5 m (16.40 ft)	
<b>Transducer/Process connection</b>	E F G J
PVDF copolymer, 2" NPT [(Taper), ANSI/ASME B1.20.1] PVDF copolymer, R 2" [(BSPT), EN 10226] PVDF copolymer, G 2" [(BSPP), EN ISO 228-1] PVDF copolymer, 4" Sanitary mounting	
<b>Model/Approval</b>	E F
3 Wire, 24 V DC, CE, C-TICK, CSA, FM 2 Wire, 24 V DC, CE, C-TICK, CSA	

#### Selection and Ordering data

	Order code
<b>Further designs</b>	
Please add "-Z" to Order No. and specify Order code(s).	
Acrylic coated, stainless steel tag [13 x 45 mm (0.5 x 1.75")]: Measuring-point number/identification (max. 20 characters) specify in plain text	<b>Y17</b>
<b>Additional Operating Instructions</b>	Order No.
3 Wire, 24 V model, Multi-language manual	C) <b>7ML1998-5GD62</b>
2 Wire model, Multi-language manual	C) <b>7ML1998-5GC63</b>
<b>Accessories</b>	
Universal Box Bracket Mounting kit	<b>7ML1830-1BK</b>
Sanitary 4" mounting clamp	<b>7ML1830-1BR</b>
Power Supply, 24 V DC, 200 mA for 2 probes (105 ... 125 V AC input)	C) <b>7ML1930-1AA</b>
Power Supply, 24 V DC, 100 mA for 1 probe (105 ... 125 V AC input)	C) <b>7ML1930-1AB</b>
3" ASME, DN 65 PN 10, JIS 10K 3B ETFE Flange adapter for 2" NPT	<b>7ML1830-1BT</b>
3" ASME, DN 65 PN 10, JIS 10K 3B ETFE Flange adapter for 2" BSPT	<b>7ML1830-1BU</b>
2" NPT locknut, plastic	<b>7ML1830-1DT</b>
2" BSPT locknut, plastic	<b>7ML1830-1DQ</b>
Plastic M20 cable gland with metal locknut	<b>7ML1930-1DB</b>
SITRANS RD100 Remote display - see Chapter 8	
SITRANS RD200 Remote display - see Chapter 8	
SITRANS RD500 Remote display - see Chapter 8	
C) Subject to export regulations AL: N, ECCN: EAR99	

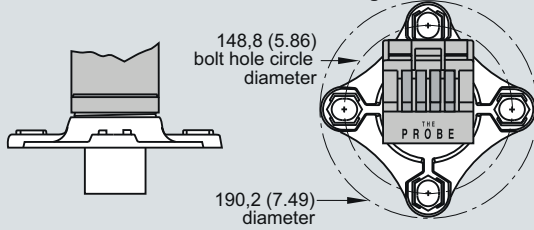
# Level Measurement

## Continuous level measurement - Ultrasonic transmitters

### The Probe

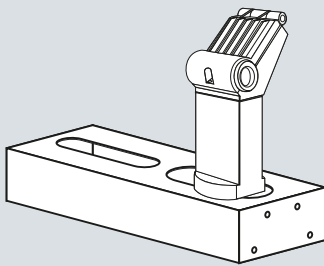
#### Options

Flange adapter for mating 2" NPT or 2" BSP process connections to 3" ASME, DN 65 PN10 and JIS 10K 3B flanges



The Probe Optional Flange Adapter, dimensions in mm (inch)

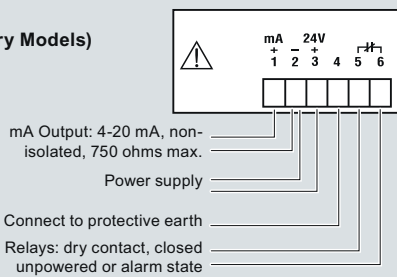
The Probe with FMS 200 Mounting Bracket



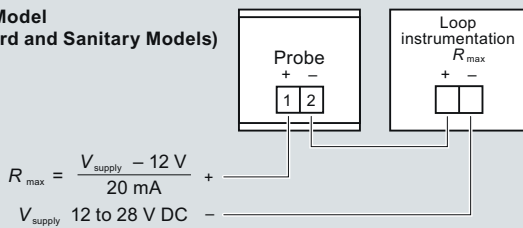
The Probe with Optional Mounting Bracket

#### Schematics

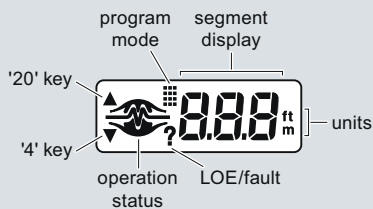
3 Wire Model  
(Standard and Sanitary Models)



2 Wire Model  
(Standard and Sanitary Models)



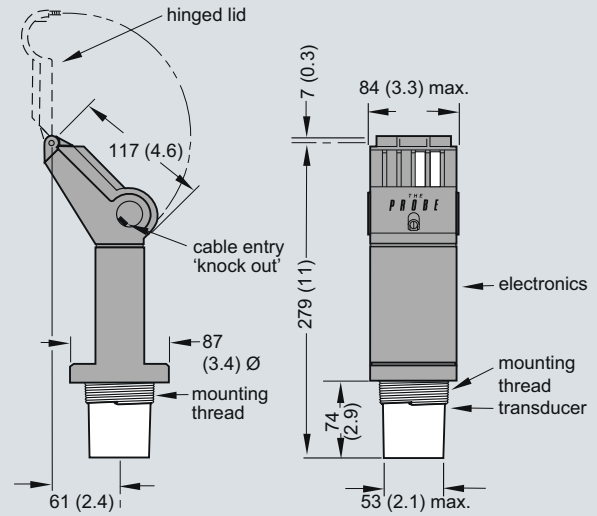
Display



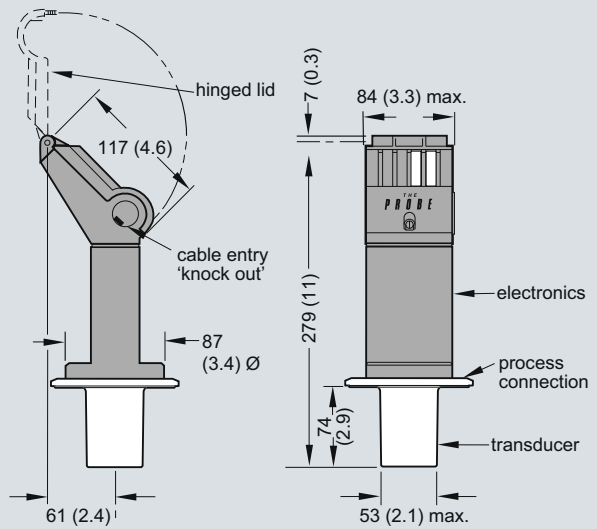
The Probe connections

#### Dimensional drawings

Standard Model



Sanitary Model



The Probe, dimensions in mm (inch)



# Level Measurement

## Continuous level measurement - Ultrasonic transmitters

### SITRANS Probe LU

#### Overview



SITRANS Probe LU is a 2-wire loop powered ultrasonic transmitter for level, volume and flow monitoring of liquids in open channels, storage vessels and simple process vessels.

#### Benefits

- Continuous level measurement up to 12 m (40 ft) range
- Easy installation and simple start-up
- Programming using infrared Intrinsically Safe handheld programmer, SIMATIC PDM or HART® Communicator
- Communication using HART or PROFIBUS PA
- ETFE or PVDF transducers for chemical compatibility
- Patented Sonic Intelligence signal processing
- Extremely high signal-to-noise ratio
- Auto False-Echo Suppression for fixed obstruction avoidance
- Level to volume or level to flow conversion

#### Application

The SITRANS Probe LU is ideal for level monitoring in the water and wastewater industry and chemical storage vessels.

The range of SITRANS Probe LU is 6 or 12 m (20 or 40 ft). Using Auto False-Echo Suppression for fixed obstruction avoidance, as well as an improved signal-to-noise ratio and improved accuracy of 0.15 % of range or 6 mm (0.25"), the Probe LU provides unmatched reliability.

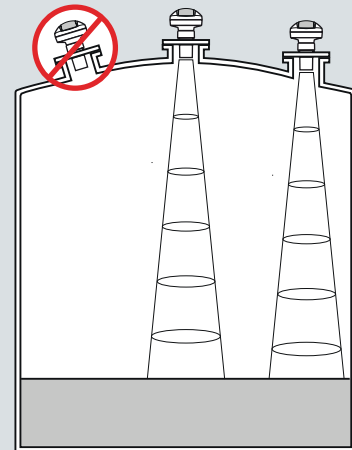
SITRANS Probe LU includes Sonic Intelligence® signal processing from the field-proven Probe and incorporates new echo processing features and the latest micro-processor and communications technology. The Probe LU offers two communications options: HART or PROFIBUS PA (Profile version 3.0, Class B).

The transducer on the Probe LU is available as ETFE or PVDF to suit the chemical conditions of your application. As well, for applications with varying material and process temperatures, the Probe LU incorporates an internal temperature sensor to compensate for temperature changes.

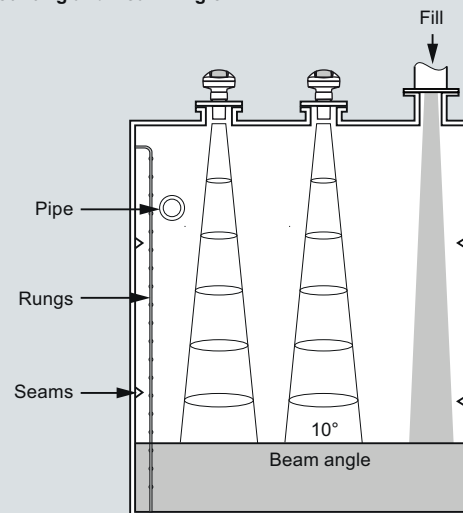
- Key Applications: chemical storage vessels, filter beds, liquid storage vessels

#### Configuration

##### Parabolic Mounting



##### Flat Mounting and Beam Angle



SITRANS Probe LU mounting

# Level Measurement

## Continuous level measurement - Ultrasonic transmitters

SITRANS Probe LU

### Technical specifications

<b>Mode of operation</b>		<b>Process connection</b>	
Measuring principle	Ultrasonic level measurement	Threaded connection	2" NPT [(Taper), ANSI/ASME B1.20.1] R 2" [(BSPT), EN 10226] or G 2" [(BSPP), EN ISO 228-1]
Typical application	Level measurement in storage vessels and simple process vessels	Flange connection	3" (80 mm) universal flange
<b>Inputs</b>		Other connection	FMS 200 mounting bracket (see page 5/190) or customer supplied mount
Measuring range		<b>Display and Controls</b>	
• 6 m (20 ft) model	0.25 ... 6 m (10" ... 20 ft)	Interface	Local: LCD display with bar graph Remote: Available via HART or PROFIBUS PA
• 12 m (40 ft) model	0.25 ... 12 m (10" ... 40 ft)	Configuration	Using Siemens SIMATIC PDM (PC) or HART handheld communicator or Siemens infrared handheld programmer
Frequency	54 kHz	Memory	Non-volatile EEPROM
<b>Outputs</b>		<b>Power supply</b>	
mA/HART®		4 ... 20 mA/HART	Nominal 24 V DC with 550 Ω maximum; maximum 30 V DC 4 ... 20 mA
• Range	4 ... 20 mA	PROFIBUS PA	12, 13, 15, or 20 mA depending on programming (General Purpose or Intrinsically Safe version) per IEC 61158-2
• Accuracy	± 0.02 mA	<b>Certificates and Approvals</b>	
PROFIBUS PA	Profile 3, Class B	General	
<b>Performance</b>		Marine (only applies to HART communication option)	
Resolution	≤ 3 mm (0.12")	Hazardous	
Accuracy	± the greater of 0.15 % of range or 6 mm (0.24")	• Intrinsically Safe (Europe)	
Repeatability	≤ 3 mm (0.12")	• Intrinsically Safe (USA/Canada)	
Blanking distance	0.25 m (10")	• Intrinsically Safe (Australia/New Zealand)	
Update time	≤ 5 seconds	• Intrinsically Safe (International)	
• 4/20 mA/HART version	≤ 5 seconds at 4 mA	• Intrinsically Safe (Brazil)	
• PROFIBUS version	≤ 4 seconds at 15 mA current loop	• Non-incendive (USA)	
Temperature compensation	Built-in to compensate over temperature range	• CSA <sub>US/C</sub> : FM, CE, C-TICK	
Beam angle	10°	• Lloyd's Register of Shipping	
<b>Rated operating conditions</b>		• ABS Type Approval	
Ambient conditions		ATEX II 1G EEx ia IIC T4	
• Location	Indoor/outdoor	CSA/FM (barrier required) T4, Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III	
• Ambient temperature	-40 ... +80 °C (-40 ... +176 °F)	ANZEx Ex ia IIC T4, Tamb = -40 ... +80 °C (-40 ... +176 °F) IP67, IP68	
• Relative humidity/ingress protection	Suitable for outdoor	IECEX TSA 04.0020X Ex ia IIC T4	
• Installation category	I	INMETRO Br-Ex ia IIC T4	
• Pollution degree	4	FM (no barrier required) T5: Class I, Div. 2, Groups A,B,C, D	
Medium conditions		<b>Handheld Programmer</b>	
• Temperature at flange or threads	-40 ... +85 °C (-40 ... +185 °F)	Intrinsically Safe Siemens handheld programmer	
• Pressure (vessel)	0.5 bar g (7.25 psi g)	• Approvals for handheld programmer	
<b>Design</b>		IS model with ATEX EEx ia IIC T4 CSA/FM Class I, Div. 1, Groups A, B, C, D	
Material (enclosure)	PBT (Polybutylene Terephthalate)	Ambient temperature	
Degree of protection	Type 4X/NEMA 4X, Type 6/NEMA 6/IP67/IP68 enclosure	-20 ... +40 °C (-5 ... +104 °F)	
Weight	2.1 kg (4.6 lbs)	Interface	
Cable inlet	2 x M20x1.5 cable gland or 2 x ½" NPT thread	Proprietary infrared pulse signal	
Material (transducer)	ETFE (Ethylene Tetrafluoroethylene) or PVDF (Polyvinylidene Fluoride)	Power	
		3 V lithium battery (non-replaceable)	

# Level Measurement

## Continuous level measurement - Ultrasonic transmitters

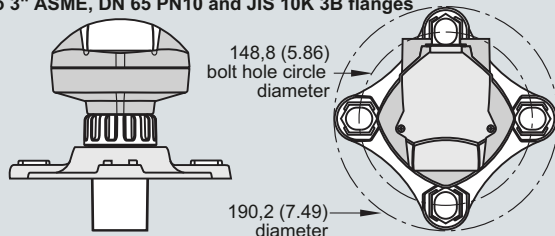
### SITRANS Probe LU

Selection and Ordering data	Order No.
<b>SITRANS Probe LU</b> <b>2-wire, loop powered ultrasonic transmitter for level, volume and flow monitoring of liquids in open channels, storage vessels and simple process vessels.</b>	C) <b>7ML5221-</b>
<b>Enclosure/Cable Inlet</b> Plastic (PBT), 2 x M20x1.5 (check Approvals for cable gland details) Plastic (PBT), 2 x 1/2" NPT (no cable glands supplied)	1 2
<b>Range/Transducer material</b> 6 meter (20 ft), ETFE 6 meter (20 ft), PVDF Copolymer 12 meter (40 ft), ETFE 12 meter (40 ft), PVDF Copolymer	A B C D
<b>Process connection</b> 2" NPT [(Taper), ANSI/ASME B1.20.1] R 2" [(BSPT), EN 10226] G 2" [(BSPP), EN ISO 228-1]	A B C
<b>Communication/Output</b> 4 ... 20 mA, HART® PROFIBUS PA	1 2
<b>Approvals</b> General Purpose, FM, CSA, CE, C-TICK FM, Class I, Div. 2 <sup>1)</sup> Intrinsically Safe, CSA/FM Class I, Div. 1, Groups A, B, C, D (barrier required); Class II, Div. 1, Groups E, F, G; Class III <sup>2)</sup> Intrinsically Safe, ATEX II 1G EEx ia IIC T4 <sup>2)</sup> Intrinsically safe, ATEX II 1G EEx ia IIC T4, ANZEx, IECEX, INMETRO, CE, C-TICK <sup>3)</sup> Intrinsically safe, CSA/FM Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1 Group E, F, G; Class III T4 <sup>3)</sup>	1 4 5 6 7 8
1) Available with Enclosure/Cable Inlet option 2 only. 2) Available with communication option 2 only. 3) Available with communication option 1 only. C) Subject to export regulations AL: N, ECCN: EAR99	

Selection and Ordering data	Order code
<b>Further designs</b> Please add "-Z" to Order No. and specify Order code(s). Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text	<b>Y15</b>
<b>Operating Instructions for HART/mA device</b> English French German Note: The Operating Instructions should be ordered as a separate item on the order. Additional Multi-language Quick Start manual This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	Order No. C) <b>7ML1998-5HT02</b> C) <b>7ML1998-5HT12</b> C) <b>7ML1998-5HT32</b> C) <b>7ML1998-5QR81</b>
<b>Operating Instructions for PROFIBUS PA device</b> English German Note: The Operating Instructions should be ordered as a separate item on the order. Additional Multi-language Quick Start manual This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	C) <b>7ML1998-5JB02</b> C) <b>7ML1998-5JB32</b> C) <b>7ML1998-5QV81</b>
<b>Optional equipment</b> Handheld programmer, Intrinsically Safe, EEx ia Handheld programmer, General Purpose approvals Handheld programmer, Infrared, Intrinsically Safe, PROFIBUS PA HART modem/RS-232 (for use with PC and SIMATIC PDM) HART modem/USB (for use with a PC and SIMATIC PDM) 2" NPT locknut, plastic 2" BSPT locknut, plastic 3" ASME, DN 65 PN 10, JIS 10K 3B ETFE Flange adapter for 2" NPT 3" ASME, DN 65 PN 10, JIS 10K 3B ETFE Flange adapter for 2" BSPT One General Purpose polymeric cable gland M20x1.5, rated for -20 ... +80 °C (-4 ... +176 °F) One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F) for General Purpose or ATEX EEx e installations (available for HART only) One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F) with integrated shield connection (available for PROFIBUS PA) SITRANS RD100 Remote display - see Chapter 8 SITRANS RD200 Remote display - see Chapter 8 SITRANS RD500 Remote display - see Chapter 8	D) <b>7MF4997-1DA</b> D) <b>7MF4997-1DB</b> <b>7ML1830-2AH</b> <b>7ML1830-2AN</b> <b>7ML1830-2AJ</b> <b>7ML1830-1DT</b> <b>7ML1830-1DQ</b> <b>7ML1830-1BT</b> <b>7ML1830-1BU</b> <b>7ML1930-1AM</b> <b>7ML1930-1AP</b> <b>7ML1930-1AQ</b>
<b>Spare Parts</b> Plastic lid C) Subject to export regulations AL: N, ECCN: EAR99 D) Subject to export regulations AL: N, ECCN: EAR99H	<b>7ML1830-1KB</b>

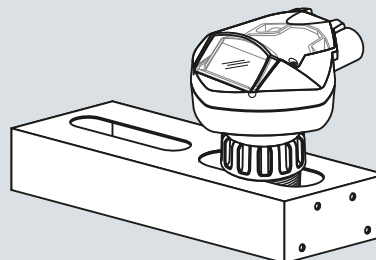
### Options

Flange adapter for mating 2" NPT or 2" BSP process connections to 3" ASME, DN 65 PN10 and JIS 10K 3B flanges



SITRANS Probe LU optional flange adapter, dimensions in mm (inch)

SITRANS Probe LU with FMS 200 Mounting Bracket



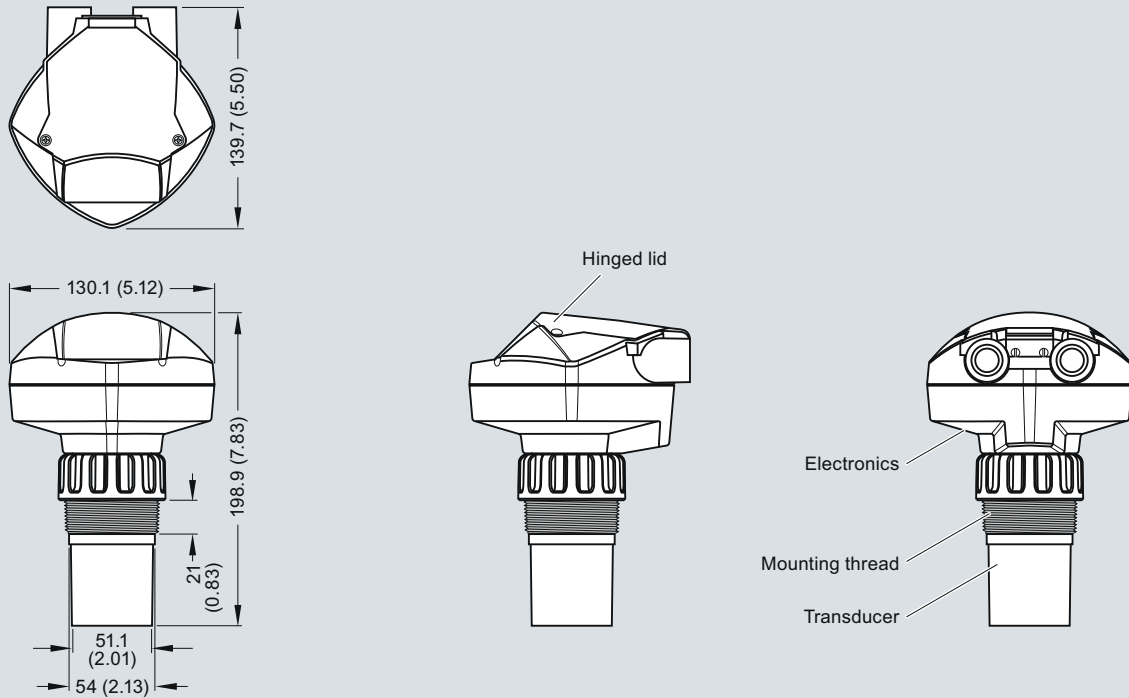
SITRANS Probe LU with optional mounting bracket

# Level Measurement

## Continuous level measurement - Ultrasonic transmitters

SITRANS Probe LU

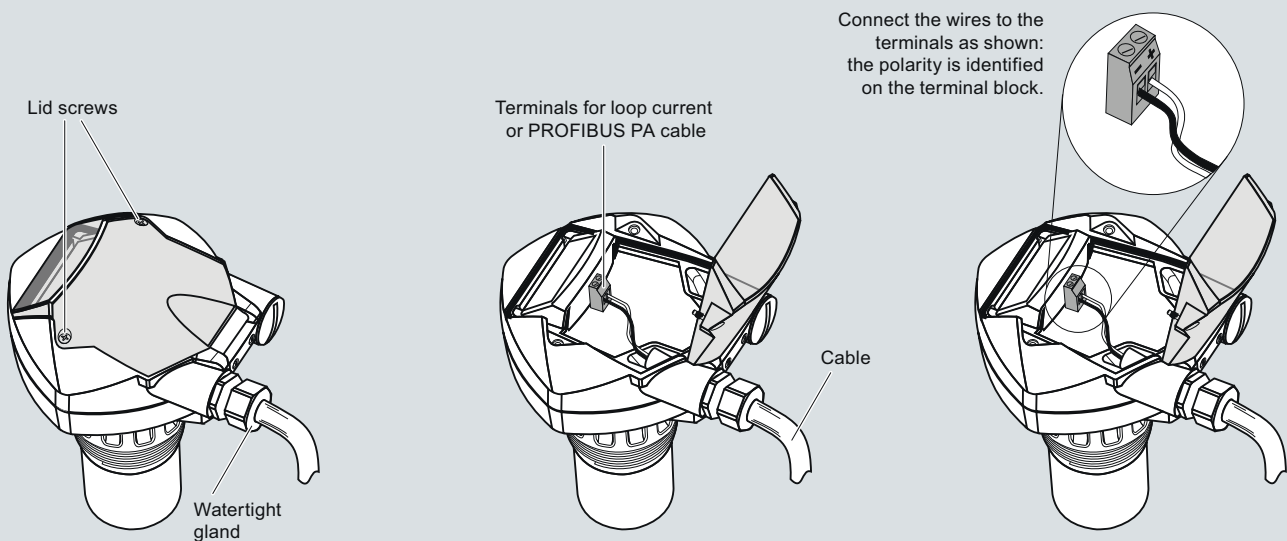
### Dimensional drawings



**Note:** Above model is shown without M20 cable glands or 1/2" NPT conduit connectors.

SITRANS Probe LU, dimensions in mm (inch)

### Schematics



**Note:**

- HART model above is shown with M20 cable glands. 1/2" NPT threaded connection is also available.
- DC terminal shall be supplied from an SELV source in accordance with IEC-1010-1 Annex H.
- All field wiring must have insulation suitable for rated input voltages.
- Separate cables and conduit may be required to conform to standard instrumentation wiring practices or electrical codes.

SITRANS Probe LU connections

# Level Measurement

## Continuous measurement - Ultrasonic controllers

### HydroRanger 200

#### Overview



HydroRanger 200 is an ultrasonic level controller for up to six pumps and provides control, differential control and open channel flow monitoring.

#### Benefits

- Monitors wet wells, weirs and flumes
- Digital communications with built-in Modbus RTU via RS-485
- Compatible with SmartLinx system and SIMATIC PDM configuration software
- Single or dual point level monitoring
- 6 relay (standard), 1 or 3 relay (optional)
- Auto False-Echo Suppression for fixed obstruction avoidance
- Anti-grease ring/tide mark buildup
- Differential amplifier transceiver for common mode noise rejection and improved signal-to-noise ratio
- Wall and panel mounting options

#### Application

For water authorities, municipal water, and wastewater plants, HydroRanger 200 is an economical, low-maintenance solution delivering control efficiency and productivity needed to meet today's exacting standards. It offers single point monitoring with all models, and optional dual-point monitoring with 6 relay model. As well, it has digital communications with built-in Modbus RTU via RS-485.

The standard 6 relay HydroRanger 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 SIMATIC PDM, allowing for PC configuration and setup. Sonic Intelligence<sup>®</sup> advanced echo-processing software provides increased reading reliability. The optional 1 or 3 relay models provide accurate level measurement functions only; these two models do not provide open channel flow, differential level measurement or volume conversion functions.

HydroRanger 200 uses proven continuous ultrasonic echo ranging technology to monitor water and wastewater of any consistency up to 15 m (50 ft) in depth. Achievable resolution is 0.1 % with accuracy to 0.25 % of range. Unlike contacting devices, HydroRanger 200 is immune to problems caused by suspended solids, harsh corrosives, grease or silt in the effluent, reducing downtime.

- Key Applications: wet wells, flumes/weirs, bar screen control

#### Technical specifications

##### Mode of Operation

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

##### Input

Analog	0 ... 20 mA or 4 ... 20 mA, from alternate device, scaleable (6 relay model)
Discrete	10 ... 50 V DC switching level Logical 0 = < 0.5 V DC Logical 1 = 10 ... 50 V DC Max. 3 mA

##### Output

Echomax <sup>®</sup> Transducer	44 kHz
Ultrasonic transducer	Compatible transducers: ST-H and Echomax series XPS-10/10F, XPS 15/15F, XCT-8, XCT-12 and XRS-5
Relays <sup>1)</sup>	Rating 5 A at 250 V AC, non-inductive
• Model with 1 relay <sup>2)</sup>	1 SPST Form A
• Model with 3 relays <sup>2)</sup>	2 SPST Form A/1 SPDT Form C
• Model 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"), whichever is greater
Resolution	0.1 % of measuring range or 2 mm (0.08"), whichever is greater <sup>3)</sup>
Temperature compensation	<ul style="list-style-type: none"> <li>• -50 ... +150 °C (-58 ... +302 °F)</li> <li>• Integral temperature sensor in transducer</li> <li>• External TS-3 temperature sensor (optional)</li> <li>• Programmable fixed temperature values</li> </ul>

##### Rated operating conditions

Installation conditions	
• Location	Indoor / outdoor
• Installation category	II
• Pollution degree	4
Ambient conditions	
• Ambient temperature (enclosure)	-20 ... +50 °C (-4 ... +122 °F)

##### Design

Weight	
• Wall mount	1.37 kg (3.02 lbs)
• Panel mount	1.50 kg (3.31 lbs)
Material (enclosure)	Polycarbonate
Degree of protection (enclosure)	
• Wall mount	IP65/Type 4X/NEMA 4X
• Panel mount	IP54/Type 3/NEMA 3

# Level Measurement

## Continuous measurement - Ultrasonic controllers

**HydroRanger 200**

<b>Cable</b>	
• Transducer and mA output signal	2-core copper conductor, twisted, shielded, 300 Vrms, 0.82 mm <sup>2</sup> (18 AWG), Belden® 8760 or equivalent is acceptable
• Max. separation between transducer and transceiver	365 m (1200 ft)
<b>Displays and controls</b>	
Programming	100 x 40 mm (4 x 1.5") multi-block LCD with backlighting Programming using handheld programmer or via PC with SIMATIC PDM software
<b>Power supply<sup>4)</sup></b>	
AC version	100 ... 230 V AC ±15 %, 50/60 Hz, 36 VA (17 W)
DC version	12 ... 30 V DC (20 W)
<b>Certificates and approvals</b>	
	<ul style="list-style-type: none"> <li>• CE, C-TICK<sup>5)</sup></li> <li>• Lloyd's Register of Shipping</li> <li>• ABS Type Approval</li> <li>• FM, CSA<sub>US/C</sub>, UL listed</li> <li>• CSA<sub>US/C</sub> Class I, Div. 2, Groups A, B, C and D, Class II, Div. 2, Groups F and G, Class III (wall mount only)</li> <li>• MCERTS Class 1 approved for Open Channel Flow</li> </ul>
<b>Communication</b>	
	<ul style="list-style-type: none"> <li>• RS-232 with Modbus RTU or ASCII via RJ-11 connector</li> <li>• RS-485 with Modbus RTU or ASCII via terminal blocks</li> <li>• Optional: SmartLinX® cards for <ul style="list-style-type: none"> <li>- PROFIBUS DP</li> <li>- DeviceNet™</li> <li>- Allen-Bradley® Remote I/O</li> </ul> </li> </ul>

1) All relays certified for use with equipment that fails in a state at or under the rated maximums of the relays

2) This model is level control only; no open channel flow, differential level or volume conversion functions

3) Program range is defined as the empty distance to the face of the transducer plus any range extension

4) Maximum power consumption is listed

5) EMC performance available upon request

# Level Measurement

## Continuous level measurement - Ultrasonic controllers

### HydroRanger 200

Selection and Ordering data	Order No.
<b>Siemens HydroRanger 200</b> Ultrasonic level controller for up to six pumps that provides control, differential control and open channel flow monitoring. The HydroRanger 200 is also available as a level measurement controller only. Select option from model code below.	L) <b>7ML5034-</b>
<b>Mounting</b> Wall mount, standard enclosure Wall mount, 4 entries, 4 M20 cable glands included Panel mount <sup>1)</sup>	1 2 3
<b>Power supply</b> 100 ... 230 V AC 12 ... 30 V DC	A B
<b>Number of measurement points</b> Single point model, 6 relays Dual point model, 6 relays Single point model, level only, 1 relay <sup>2)</sup> Single point model, level only, 3 relays <sup>2)</sup>	A B C D
<b>Communication (SmartLinx)</b> Without module SmartLinx <sup>®</sup> Allen-Bradley <sup>®</sup> Remote I/O module SmartLinx PROFIBUS DP module SmartLinx DeviceNet <sup>™</sup> module See SmartLinx product page 5/310 for more information.	0 1 2 3
<b>Approvals</b> General Purpose CE, FM, CSA <sub>USC</sub> , UL listed, C-TICK CSA Class I, Div. 2, Groups A, B, C and D; Class II, Div 2, Groups F and G; Class III (for wall mount applications only)	1 2

<sup>1)</sup> Available with approval option 1 only

<sup>2)</sup> This model is level control only; no open channel flow, differential level, or volume conversion functions

L) Subject to export regulations AL: N, ECCN: 3A991X

<sup>®</sup>Modbus is a registered trademark of Schneider Electric.

<sup>®</sup>Belden is a registered trademark of Belden Wire and Cable Company.

<sup>®</sup>Allen-Bradley is a registered trademark of Rockwell Automation.

<sup>™</sup>DeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA)

Selection and Ordering data	Order code
<b>Further designs</b> Please add "-Z" to Order No. and specify Order code(s). Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text	<b>Y15</b>
<b>Operating Instructions</b> English French German Note: The Operating Instructions should be ordered as a separate item on the order. This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	Order No. C) <b>7ML1998-5FC03</b> C) <b>7ML1998-5FC11</b> C) <b>7ML1998-5FC32</b>
<b>Other Operating Instructions</b> SmartLinx Allen-Bradley Remote I/O, English SmartLinx PROFIBUS DP, English SmartLinx PROFIBUS DP, German SmartLinx PROFIBUS DP, French SmartLinx DeviceNet, English Note: The appropriate SmartLinx Operating Instructions should be ordered as a separate line on the order.	C) <b>7ML1998-1AP03</b> C) <b>7ML1998-1AQ03</b> C) <b>7ML1998-1AQ33</b> C) <b>7ML1998-1AQ12</b> C) <b>7ML1998-1BH02</b>
<b>Accessories</b> Handheld programmer Tag, stainless steel, 12 x 45 mm (0.47 x 1.77"), one text line, suitable for enclosure SITRANS RD100 Remote display - see Chapter 8 SITRANS RD200 Remote display - see Chapter 8 SITRANS RD500 Remote display - see Chapter 8	<b>7ML1830-2AK</b> <b>7ML1930-1AC</b>
<b>Spare parts</b> Power Supply Board (100 ... 230 V AC) Power Supply Board (12 ... 30 V DC) Display Board	C) <b>7ML1830-1MD</b> C) <b>7ML1830-1ME</b> C) <b>7ML1830-1MF</b>
C) Subject to export regulations AL: N, ECCN: EAR99	



# Level Measurement

## Continuous level measurement - Ultrasonic controllers

HydroRanger 200

Selection and Ordering data	Order No.	Selection and Ordering data	Order code
<b>Milltronics HydroRanger 200</b> Ultrasonic level controller for up to six pumps that provides control, differential control and open channel flow monitoring. The HydroRanger 200 is also available as a level measurement controller only. Select option from model code below.	L) <b>7ML1034-</b>	<b>Further designs</b> Please add <b>"-Z"</b> to Order No. and specify Order code(s). Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text	
<b>Mounting</b> Wall mount, standard enclosure Wall mount, 4 entries, 4 M20 cable glands included Panel mount <sup>1)</sup>	1 2 3	<b>Operating Instructions</b> English French German Note: The Operating Instructions should be ordered as a separate item on the order. This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	Order No. C) <b>7ML1998-1FC05</b> C) <b>7ML1998-1FC14</b> C) <b>7ML1998-1FC34</b>
<b>Power supply</b> 100 ... 230 V AC 12 ... 30 V DC	A B	<b>Other Operating Instructions</b> SmartLinX Allen-Bradley Remote I/O, English SmartLinX PROFIBUS DP, English SmartLinX PROFIBUS DP, German SmartLinX PROFIBUS DP, French SmartLinX DeviceNet, English Note: The appropriate SmartLinX Operating Instructions should be ordered as a separate line on the order.	C) <b>7ML1998-1AP03</b> C) <b>7ML1998-1AQ03</b> C) <b>7ML1998-1AQ33</b> C) <b>7ML1998-1AQ12</b> C) <b>7ML1998-1BH02</b>
<b>Communication (SmartLinX)</b> Without module SmartLinX® Allen-Bradley® Remote I/O module SmartLinX PROFIBUS DP module SmartLinX DeviceNet™ module See SmartLinX product page 5/310 for more information.	A B C D	<b>Accessories</b> Handheld programmer Tag, stainless steel, 12 x 45 mm (0.47 x 1.77"), one text line, suitable for enclosure SITRANS RD100 Remote display - see Chapter 8 SITRANS RD200 Remote display - see Chapter 8 SITRANS RD500 Remote display - see Chapter 8	<b>7ML1830-2AM</b> <b>7ML1930-1AC</b>
<b>Approvals</b> General Purpose CE, FM, CSA <sub>US/IC</sub> , UL listed, C-TICK CSA Class I, Div. 2, Groups A, B, C and D; Class II, Div 2, Groups F and G; Class III (for wall mount applications only)	1 2	<b>Spare parts</b> Power Supply Board (100 ... 230 V AC) Power Supply Board (12 ... 30 V DC) Display Board	C) <b>7ML1830-1MD</b> C) <b>7ML1830-1ME</b> C) <b>7ML1830-1MF</b>
<b>Number of measurement points</b> Single point model, 6 relays Dual point model, 6 relays Single point model, level only, 1 relay <sup>2)</sup> Single point model, level only, 3 relays <sup>2)</sup>	1 2 3 4	C) Subject to export regulations AL: N, ECCN: EAR99	

<sup>1)</sup> Available with approval option 1 only

<sup>2)</sup> This model is level control only; no open channel flow, differential level, or volume conversion functions

L) Subject to export regulations AL: N, ECCN: 3A991X

®Modbus is a registered trademark of Schneider Electric.

®Belden is a registered trademark of Belden Wire and Cable Company.

®Allen-Bradley is a registered trademark of Rockwell Automation.

™DeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA)

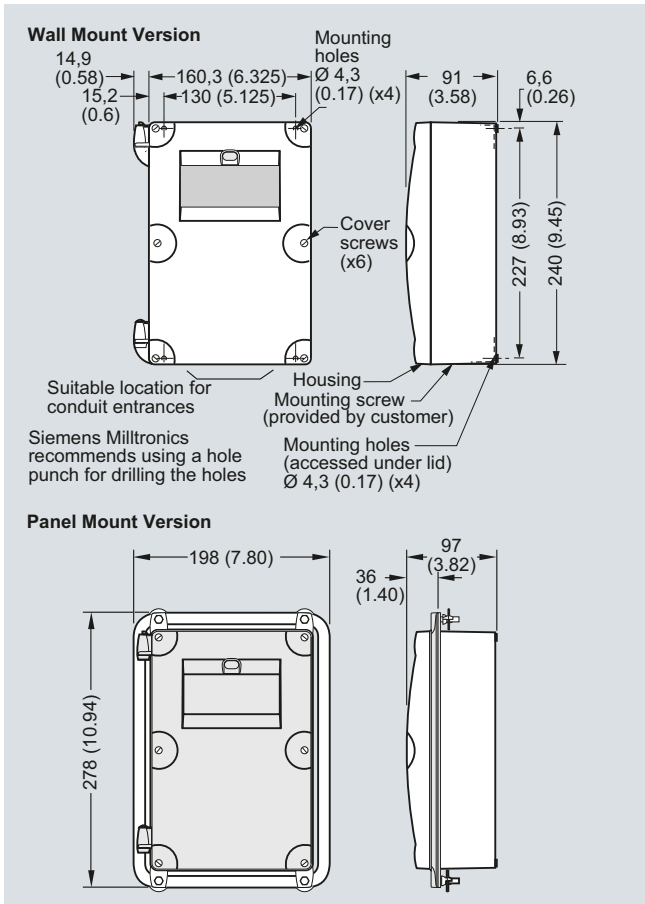


# Level Measurement

## Continuous level measurement - Ultrasonic controllers

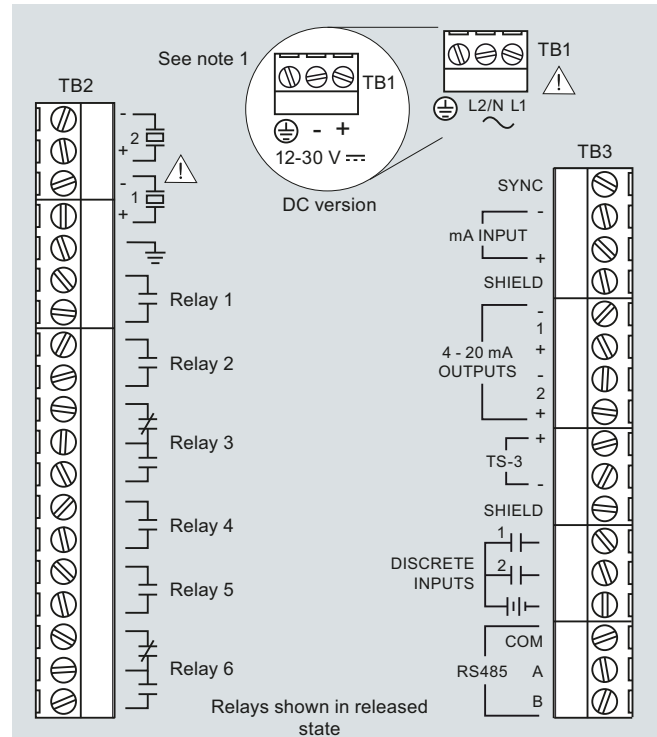
### HydroRanger 200

#### Dimensional drawings



HydroRanger 200, dimensions in mm (inch)

#### Schematics



#### Note:

1. Use 2-core copper wire, twisted, with shield, for expansion up to 365 m (1200 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 HydroRanger 200 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.

HydroRanger 200 connections

# 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 system and SIMATIC PDM configuration software
- 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.

# Level Measurement

## Continuous level measurement - Ultrasonic controllers

### MultiRanger 100/200

#### Technical specifications

<b>Mode of Operation</b>	
Measuring principle	Ultrasonic level measurement
Measuring range	0.3 ... 15 m (1 ... 50 ft)
Measuring points	1 or 2
<b>Input</b>	
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
<b>Output</b>	
Echomax® transducer	44 kHz
Ultrasonic transducer	Compatible transducers: ST-H and Echomax series XPS-10/10F, XPS 15/15F, XCT-8, XCT-12 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
<b>Accuracy</b>	
Error in measurement	0.25 % of range or 6 mm (0.24"), whichever is greater
Resolution	0.1 % of measuring range <sup>1)</sup> or 2 mm (0.08"), whichever is greater
Temperature compensation	<ul style="list-style-type: none"> <li>• -50 ... +150 °C (-58 ... +302 °F)</li> <li>• Integral temperature sensor</li> <li>• External TS-3 temperature sensor (optional)</li> <li>• Programmable fixed temperature values</li> </ul>
<b>Rated operating conditions</b>	
Installation conditions	
• Location	Indoor/outdoor
• Installation category	II
• Pollution degree	4
Ambient conditions	
• Ambient temperature (housing)	-20 ... +50 °C (-4 ... +122 °F)

<b>Design</b>	
Weight	
• Wall mount	1.37 kg (3.02 lbs)
• Panel mount	1.50 kg (3.31 lbs)
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 mm <sup>2</sup> (22 ... 18 AWG), Belden® 8760 or equivalent is acceptable
• Max. separation between transducer and transceiver	365 m (1200 ft)
<b>Displays and controls</b>	
	100 x 40 mm (4 x 1.5") multi-block LCD with backlighting
Programming	Programming using hand-held programmer, SIMATIC PDM or via PC with Dolphin Plus software
<b>Power supply</b>	
AC version	100 ... 230 V AC ±15 %, 50/60 Hz, 36 VA (17 W)
DC version	12 ... 30 V DC (20 W)
<b>Certificates and approvals</b>	
	<ul style="list-style-type: none"> <li>• CE, C-TICK<sup>2)</sup></li> <li>• Lloyd's Register of Shipping</li> <li>• ABS Type Approval</li> <li>• FM, CSA<sub>US/C</sub>, UL listed</li> <li>• 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</li> </ul>
<b>Communication</b>	
	<ul style="list-style-type: none"> <li>• RS-232 with Modbus RTU or ASCII via RJ-11 connector</li> <li>• RS-485 with Modbus RTU or ASCII via terminal strips</li> <li>• Optional: SmartLinX® cards for <ul style="list-style-type: none"> <li>- PROFIBUS DP</li> <li>- DeviceNet™</li> <li>- Allen-Bradley® Remote I/O</li> </ul> </li> </ul>

<sup>1)</sup> Program range is defined as the empty distance to the face of the transducer plus any range extension

<sup>2)</sup> EMC performance available on request

# Level Measurement

## Continuous level measurement - Ultrasonic controllers

MultiRanger 100/200

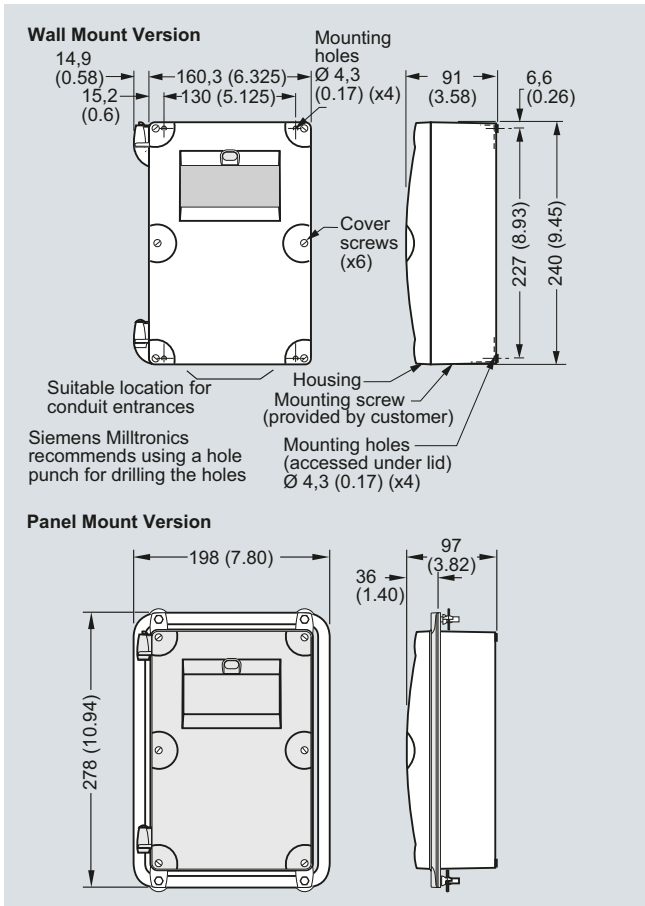
Selection and Ordering data	Order No.	Selection and Ordering data	Order code
<b>MultiRanger 100/200</b> Versatile short to medium-range ultrasonic single and multi-vessel level monitor/controller for virtually any application in a wide range of industries	L) <b>7ML5033-</b>	<b>Further designs</b>	
<b>Versions</b> MultiRanger 100, level measurement only MultiRanger 200, level, volume, flow and differential measurements	1 2	Please add <b>"-Z"</b> to Order No. and specify Order code(s).  Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text	<b>Y15</b>
<b>Mounting, enclosure design</b> Wall mount, standard enclosure Wall mount, 4 entries, 4 M20 cable glands included Panel mount (CE, CSA <sub>USIC</sub> , FM, UL)	A B C	<b>Operating Instructions</b> English French Spanish German Quick Start guide, multi-language Note: The Operating Instructions should be ordered as a separate item on the order. This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	Order No. C) <b>7ML1998-5FB06</b> C) <b>7ML1998-5FB13</b> C) <b>7ML1998-5FB23</b> C) <b>7ML1998-5FB36</b> C) <b>7ML1998-5QD83</b>
<b>Power supply</b> 100 ... 230 V AC 12 ... 30 V DC	A B	<b>Other Operating Instructions</b> SmartLinx Allen-Bradley Remote I/O, English SmartLinx PROFIBUS DP, English  SmartLinx PROFIBUS DP, German SmartLinx PROFIBUS DP, French  SmartLinx DeviceNet, English Note: The appropriate SmartLinx Operating Instructions should be ordered as a separate line on the order.	C) <b>7ML1998-1AP03</b> C) <b>7ML1998-1AQ03</b>  C) <b>7ML1998-1AQ33</b> C) <b>7ML1998-1AQ12</b>  C) <b>7ML1998-1BH02</b>
<b>Number of measurement points</b> Single point version Dual point version	0 1	<b>Accessories</b> Handheld programmer Tag, stainless steel, 12 x 45 mm (0.47 x 1.77"), one text line, suitable for enclosure SITRANS RD100 Remote display - see Chapter 8 SITRANS RD200 Remote display - see Chapter 8 SITRANS RD500 Remote display - see Chapter 8	C) <b>7ML1830-2AK</b> <b>7ML1930-1AC</b>
<b>Communication (SmartLinx)</b> Without module SmartLinx <sup>®</sup> Allen-Bradley <sup>®</sup> Remote I/O module SmartLinx PROFIBUS DP module  SmartLinx DeviceNet <sup>™</sup> module See SmartLinx product page 5/310 for more information.	0 1 2 3	<b>Spare parts</b> Power Supply Board (100 ... 230 V AC) Power Supply Board (12 ... 30 V DC) Display Board	C) <b>7ML1830-1MD</b> C) <b>7ML1830-1ME</b> C) <b>7ML1830-1MF</b>
<b>Output relays</b> 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	C) Subject to export regulations AL: N, ECCN: EAR99	
<b>Approvals</b> General Purpose CE, FM, CSA <sub>USIC</sub> , UL listed, C-TICK CSA Class I, Div. 2, Groups A, B, C and D; Class II, Div 2, Groups F and G; Class III <sup>1)</sup> ATEX II 3D <sup>2)</sup>	A B C		
<sup>1)</sup> For wall mount applications only <sup>2)</sup> For standard enclosure wall mount, option A only  L) Subject to export regulations AL: N, ECCN: 3A991X <sup>®</sup> Modbus is a registered trademark of Schneider Electric. <sup>®</sup> Belden is a registered trademark of Belden Wire and Cable Company. <sup>®</sup> Allen-Bradley is a registered trademark of Rockwell Automation. <sup>™</sup> DeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA)			

# Level Measurement

## Continuous level measurement - Ultrasonic controllers

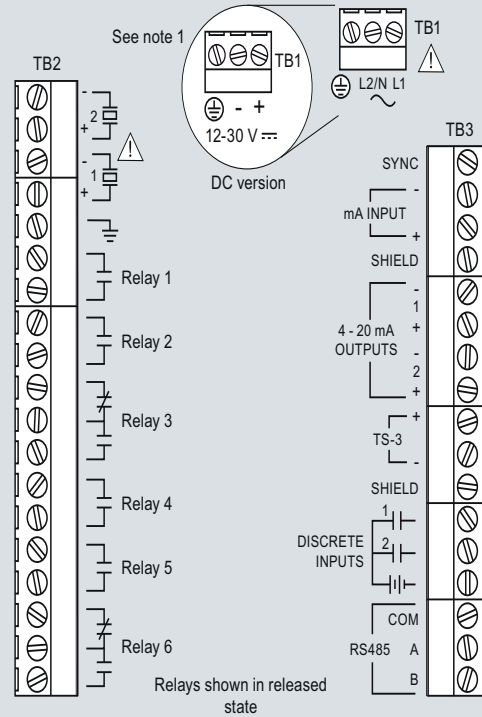
### MultiRanger 100/200

#### Dimensional drawings



MultiRanger, dimensions in mm (inch)

#### Schematics



#### Note:

1. Use 2-core copper wire, twisted, with shield, for expansion up to 365 m (1200 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.

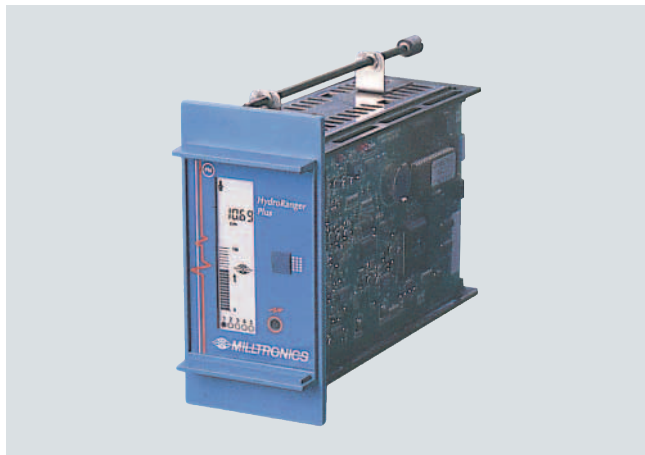
MultiRanger connections

# Level Measurement

## Continuous level measurement - Ultrasonic controllers

### HydroRanger Plus

#### Overview



HydroRanger Plus is an ultrasonic level controller for control of wet wells and reservoir pump operations, differential control and open channel flow monitoring, using energy-saving algorithms.

#### Benefits

- Outputs for alarms, chart recorders, controllers and integration of existing systems
- Monitors wet wells, weirs and flumes
- Energy-saving function with built-in real-time clock
- Special control mode to reduce grease rings and other deposits
- Integral temperature compensation
- Pump performance monitoring
- System monitoring and network analysis

#### Application

The system is effective in wet wells, weirs, and flumes where foam and turbulence are typical operating conditions. It can be customized to meet your specific application needs – from measuring flow rate in a narrow flume to volume in a ferric chloride storage bank.

The system consists of the electronics housed in a wall-mounted enclosure and a hermetically sealed, corrosion-resistant Echomax<sup>®</sup> transducer. These components can be separated by up to 365 m (1200 ft).

Optional submergence shields ensure consistent operation in wet wells where the transducer may be submerged during flooding from rainfall or a power outage. Siemens patented detection software can differentiate between a submerged condition and a high level.

- Key Applications: wet wells, weirs, flumes

#### Technical specifications

<b>Mode of operation</b>	
Measuring principle	Ultrasonic level measurement
Measuring range	0.3 ... 15 m (1 ... 50 ft)
Measuring points	1 or 2
<b>Output</b>	
Ultrasonic transducer	44 kHz
Relays	5 alarm/control relays, 1 SPDT Form C per relay, rated 5 A at 250 V AC, resistive load
mA output	0/4 ... 20 mA, optically isolated
• Max. load	1 kΩ
• Resolution	0.1 % of 20 mA
<b>Accuracy</b>	
Error in measurement	0.25 % of range or 6 mm (0.24"), whichever is greater
Resolution	0.1 % of measuring range or 2 mm (0.08"), whichever is greater <sup>1)</sup>
Temperature compensation	-50 ... +150 °C (-58 ... +302 °F) <ul style="list-style-type: none"> <li>• Integral temperature sensor</li> <li>• External TS-3 temperature sensor (optional)</li> <li>• Programmable fixed temperature</li> </ul>
<b>Rated operating conditions</b>	
Ambient conditions	
• Ambient temperature for enclosure	-20 ... +50 °C (-4 ... +122 °F)
<b>Design</b>	
Rack mount	DIN 3 HU/14 pitch, 4 rail plug-in unit suitable for standard 84 pitch (19") rack
Panel mount	Suitable for standard panel cutout DIN 43700, 72 x 144 mm, 100 mm center height
Degree of protection (wall mount)	IP65/NEMA 4X/Type 4X
Weight (rack and panel mount)	0.87 kg (1.9 lbs)
Weight (wall mount)	1.5 kg (3.3 lbs)
Material (enclosure)	Polyester/polycarbonate alloy
<b>Electrical connection</b>	
Ultrasonic transducer cable extension	Commercially available copper conductor according to local requirements, rated 250 V/5 A RG 62-A/U coaxial cable with low capacitance
mA output signal	2-core copper conductor, twisted, shielded, 0.5 ... 0.75 mm <sup>2</sup> (22 ... 18 AWG), Belden <sup>®</sup> 8760 or equivalent is acceptable
<b>Power supply</b>	
Ultrasonic transducer	100/115/200/230 V AC, ± 15 %, 50/60 Hz, 15 VA and/or 9 ... 30 V DC, 8 W
	Compatible transducers: ST-H and Echomax series XPS-10/10F, XPS 15/15F, XCT-8, XCT-12 and XRS-5
<b>Displays and controls</b>	
Rack and panel mount	75 x 20 mm (3 x 0.8") LCD (selectable backlighting)
Wall mount	100 x 40 mm (4 x 1.5") multifield LCD, backlit
<b>Programming</b>	Removable programmer or optional Dolphin Plus
<b>Memory</b>	EEPROM (non-volatile), no backup battery required
<b>Certificates and approvals</b>	CE <sup>2)</sup> , FM, CSA <sub>US/C</sub> , C-TICK

<sup>1)</sup> The measuring range corresponds to the distance from the zero point to the sensor face, plus any range extension.

<sup>2)</sup> EMC certificate available on request

<sup>®</sup> Belden is a registered trademark of Belden Wire and Cable Company

# Level Measurement

## Continuous level measurement - Ultrasonic controllers

### HydroRanger Plus

Selection and Ordering data	Order No.
<b>HydroRanger Plus, rack and panel mount</b> L) <p>Non-contacting ultrasonic echo ranging technology monitor that comes standard with a backlit display Measuring range: 0.3 m to 15 m (1 ... 50 ft)</p>	<b>7ML1025-01</b>
<b>Mounting/device version</b> Version for 19" rack (requires terminal block; see accessories) Version for panel	1 2
<b>Approvals</b> CE (EN 61326), CSA <sub>US/C</sub> , FM, C-TICK	C
<b>Input voltage</b> 100 V AC, 9 ... 30 V DC 115 V AC, 9 ... 30 V DC 200 V AC, 9 ... 30 V DC 230 V AC, 9 ... 30 V DC	A B C D

Selection and Ordering data	Order code
<b>Further designs</b> Please add <b>"-Z"</b> to Order No. and specify Order code(s).	

Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text	<b>Y15</b>
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Operating Instructions	Order No.
English	C) <b>7ML1998-1AC02</b>
French	C) <b>7ML1998-1AC12</b>
German	C) <b>7ML1998-1AC32</b>
Note: The Operating Instructions should be ordered as a separate item on the order. This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	

Other Operating Instructions	Order No.
SmartLinx Allen-Bradley Remote I/O, English	C) <b>7ML1998-1AP03</b>
SmartLinx PROFIBUS DP, English	C) <b>7ML1998-1AQ03</b>
SmartLinx PROFIBUS DP, German	C) <b>7ML1998-1AQ33</b>
SmartLinx PROFIBUS DP, French	C) <b>7ML1998-1AQ12</b>
SmartLinx DeviceNet, English	C) <b>7ML1998-1BH02</b>
Note: The appropriate SmartLinx Operating Instructions should be ordered as a separate line on the order.	

Accessories	Order No.
Handheld programmer	<b>7ML1830-2AC</b>
Tag, stainless steel, 12 x 45 mm (0.47 x 1.77"), one text line, suitable for enclosure	<b>7ML1930-1AC</b>
Terminal block for rack mount	<b>7ML1830-1JL</b>
SITRANS RD100 Remote display - see Chapter 8	
SITRANS RD200 Remote display - see Chapter 8	
SITRANS RD500 Remote display - see Chapter 8	

Spare parts	Order No.
Card, Analog HydroRanger Plus Rack/Panel	C) <b>7ML1830-1LR</b>
Card, daughter	C) <b>7ML1830-1LS</b>
Card, display, backlit	C) <b>7ML1830-1LX</b>

Selection and Ordering data	Order No.
<b>HydroRanger Plus, wall mount</b> L) <p>Non-contacting ultrasonic echo ranging technology monitor that comes standard with a backlit display Measuring range: 0.3 m to 15 m (1 ... 50 ft)</p>	<b>7ML1028-A70</b>
<b>Input voltage</b> 100 V AC, 9 ... 30 V DC 115 V AC, 9 ... 30 V DC 200 V AC, 9 ... 30 V DC 230 V AC, 9 ... 30 V DC	1 2 3 4
<b>Approvals</b> CE; FM General Purpose; CSA Class I, Div. 2, C-TICK	C
<b>Mounting/enclosure version</b> Standard enclosure (NEMA 4X) Standard enclosure prepared for five M20 cable glands	1 3

C) Subject to export regulations AL: N, ECCN: EAR99

L) Subject to export regulations AL: N, ECCN: 3A991X

Selection and Ordering data	Order code
<b>Further designs</b> Please add <b>"-Z"</b> to Order No. and specify Order code(s).	

Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text	<b>Y15</b>
--	------------

Operating Instructions	Order No.
English	C) <b>7ML1998-1AC02</b>
French	C) <b>7ML1998-1AC12</b>
German	C) <b>7ML1998-1AC32</b>
Note: The Operating Instructions should be ordered as a separate item on the order. This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	

Accessories	Order No.
Handheld programmer	<b>7ML1830-2AC</b>
Tag, stainless steel, 12 x 45 mm (0.47 x 1.77"), one text line, suitable for enclosure	<b>7ML1930-1AC</b>
M20 cable gland kit (6 M20 cable glands, 6 M20 nuts, 3 stop plugs)	<b>7ML1830-1GM</b>
SITRANS RD100 Remote display - see Chapter 8	
SITRANS RD200 Remote display - see Chapter 8	
SITRANS RD500 Remote display - see Chapter 8	

Spare parts	Order No.
Card, mother main	C) <b>7ML1830-1LV</b>
Card, daughter	C) <b>7ML1830-1LW</b>
Card, display	C) <b>7ML1830-1LU</b>

C) Subject to export regulations AL: N, ECCN: EAR99



# Level Measurement

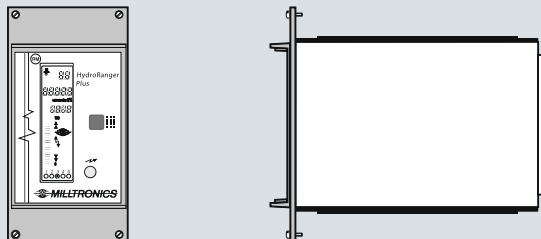
## Continuous level measurement - Ultrasonic controllers

HydroRanger Plus

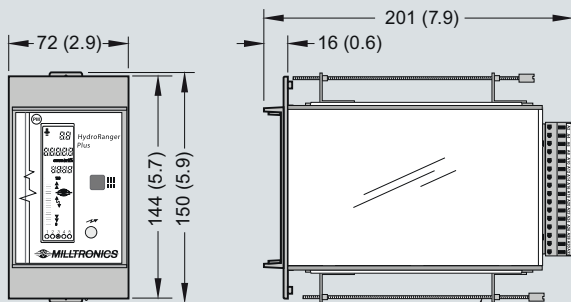
### Dimensional drawings

#### Rack Mount

DIN 3U/14HP, 4 rail plug-in unit suitable for standard 84 HP (19") subrack. (Terminal is customer supplied or available as optional accessory.)

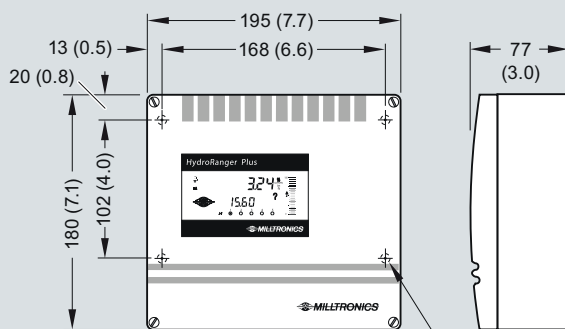


#### Panel Mount



Slip on mounting bracket top and bottom screws to be tightened to no more than 5.9 Nm (1 inch/lb.) torque.

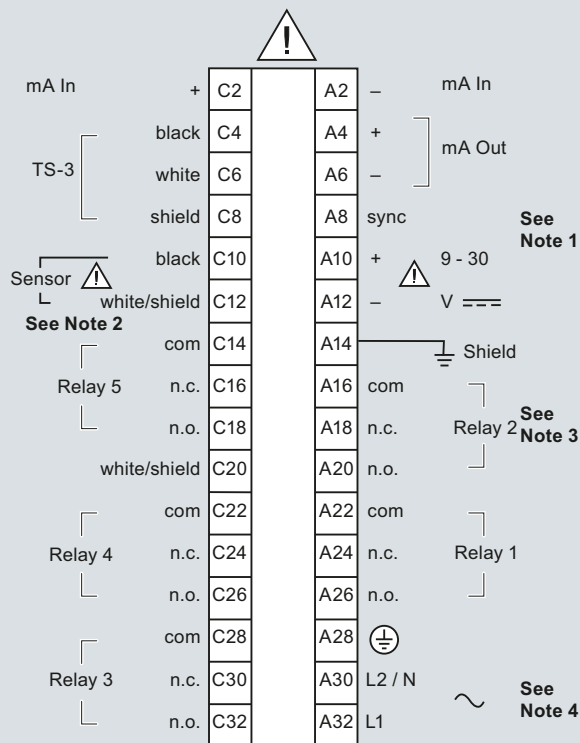
#### Wall Mount



Suitable location for conduit entrances. Use watertight conduit hubs to maintain enclosure rating. mounting holes, Ø4.5 (0.18), 4 places

HydroRanger Plus, dimensions in mm (inch)

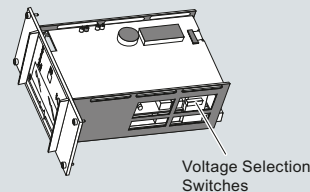
### Schematics



#### Note:

1. Required only if mounted adjacent to other Siemens Milltronics equipment. Interconnect all 'SYNC' terminals with a single 18 AWG (0.5 mm<sup>2</sup>) wire.
2. Use RG-62 A/U coaxial (or equivalent) for extensions up to 365 m (1200 ft). Run in grounded metal conduit, separate from other wiring.
3. Each relay has 1 set of Form 'C' (SPDT) contacts relay rated at 5 A 250 V AC, non-inductive, when equal or lower rated limiting fuses are installed. Relay de-energized when in alarm conditions and energized for pump control.
4. Before applying AC power (mains), ensure the correct voltage is selected. Never operate the HydroRanger Plus with the ground (earth) wire disconnected.

#### Voltage Selection



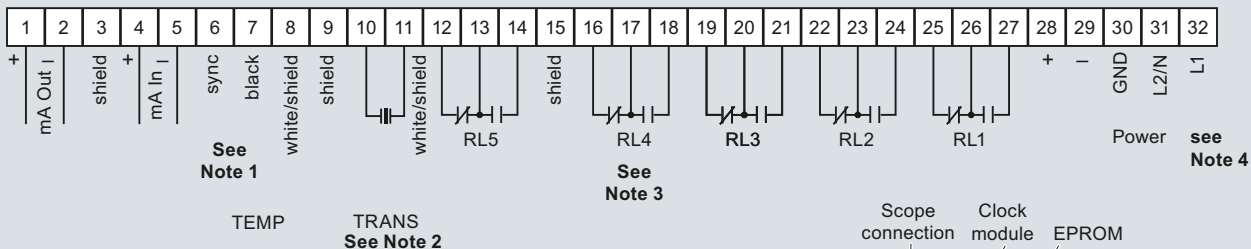
HydroRanger Plus connections, rack and panel mount



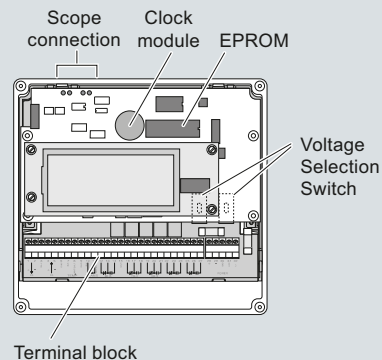
# Level Measurement

## Continuous level measurement - Ultrasonic controllers

### HydroRanger Plus



- Note:**
1. Required only if mounted adjacent to other Siemens Milltronics equipment. Interconnect all 'SYNC' terminals with a single 18 AWG (0.5 mm<sup>2</sup>) wire.
  2. Use RG-62 A/U coaxial (or equivalent) for extensions up to 365 m (1200 ft). Run in grounded metal conduit, separate from other wiring.
  3. Each relay has 1 set of Form 'C' (SPDT) contacts relay rated at 5 A 250 V AC, non-inductive, when equal or lower rated limiting fuses are installed. Relay de-energized when in alarm conditions and energized for pump control.
  4. Before applying AC power (mains), ensure the correct voltage is selected. Never operate the HydroRanger Plus with the ground (earth) wire disconnected.



### 5 HydroRanger Plus connections, wall mount

# Level Measurement

## Continuous level measurement - Ultrasonic controllers

SITRANS LUC500

### Overview



SITRANS LUC500 is a complete ultrasonic level controller for monitoring and control of water distribution and wastewater collection systems, with energy-saving algorithms.

### Benefits

- Monitoring and control in one device
- Integral telemetry interface (Modbus RTU/ASCII)
- Patented algorithm for calculation of pumped volume within 5 % accuracy
- Logging of pump runtime and number of pump starts
- Expandable with I/Os, RAM for data logging, dual point, SmartLinX communications and RS-485 interface
- Simple system configuration and diagnostics with Siemens Dolphin Plus Windows®-based software
- AC or DC power supply
- SITRANS LUC500 is available for rack mount, panel mount or wall mount

### Application

It combines non-contacting ultrasonic technology, patented echo-processing techniques and proven application software to provide accurate level monitoring in liquids up to 15 m (50 ft).

It also effectively monitors flow in flumes, weirs and open channels. Five relays control any combination of pumps, gate valves and alarms. Further advantages include fault signalling and data logging for trend analysis. It can log the time, date and volume of up to 20 occurrences of combined sewer overflows (CSO).

The basic device has 8 digital inputs, 5 digital outputs, 1 analog input, 1 ultrasonic level point, differential/average capability and one RS-232 interface with Modbus® RTU/ASCII protocol.

The device can be expanded by additional I/Os, more RAM, two channels, RS-485 or SmartLinX communications models as your needs grow.

It integrates seamlessly with SCADA or DCS systems or a PLC system to provide remote access to all system parameters (pumped volume, pump runtime, pump status). The integral telemetry interface (Modbus RTU/ASCII) allows remote control in real time.

- Key Applications: wet well/lift station control, weirs/flumes, open channels

### Application of accessories

SITRANS LUC500 can be expanded to meet the requirements of a variety of applications.

Auxiliary I/O cards, RAM and data logging, dual-channel function and SmartLinX communications.

- Input/output cards  
A single auxiliary I/O card can be installed in the SITRANS LUC500. The following I/O cards are available:
  - 2 analog inputs/2 analog outputs
  - 4 analog inputs
  - 4 analog outputs
  - 8 digital inputs
  - 8 digital inputs/2 analog inputs/2 analog outputs (wall mount only)
- Expanded memory card  
The available RAM can be increased using this card. The data logging function is then available.
- Two-channel function  
A second measuring point is provided on the SITRANS LUC500 to permit dual-channel measurements. This function is made available by ordering a software access code. Please contact your Siemens representative for details.
- Communications  
The SITRANS LUC500 is offered with MODBUS RTU/ASCII as a standard feature. Further industrial communications protocols are available with the addition of an optional SmartLinX card. The following protocols are currently available:
  - PROFIBUS DP
  - Allen Bradley® Remote I/O
  - DeviceNet™

®Modbus is a registered trademark of Schneider Electric.

®Allen-Bradley is a registered trademark of Rockwell Automation.

™DeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA) Windows® is a registered trademark of Microsoft Corp.

# Level Measurement

## Continuous level measurement - Ultrasonic controllers

### SITRANS LUC500

#### Technical specifications

<b>Mode of operation</b>	
Measuring principle	Ultrasonic level measurement
Measuring range	0.3 ... 15 m (1 ... 50 ft)
Measuring points	1 or 2
<b>Output</b>	
Ultrasonic transducer	44 kHz
Relays	5 relays, rated 5 A at 250 V AC, non-inductive <ul style="list-style-type: none"> <li>• Wall Mount version: 4 SPST Form A relays, 1 SPDT Form C relay</li> <li>• Rack and Panel Mount version: 4 SPST Form A relays, 1 SPST Form B relay</li> </ul>
<b>Accuracy</b>	
Error in measurement	0.25 % of range or 6 mm (0.24"), whichever is greater
Resolution	0.1 % of measuring range or 2 mm (0.08"), whichever is greater <sup>1)</sup>
Temperature compensation	-50 ... +150 °C (-58 ... +302 °F) <ul style="list-style-type: none"> <li>• Integral temperature sensor</li> <li>• External TS-3 temperature sensor (optional)</li> <li>• Programmable fixed temperature</li> </ul>
<b>Rated operating conditions</b>	
Ambient conditions	
• Ambient temperature for enclosure	-20 ... +50 °C (-4 ... +122 °F)
<b>Design</b>	
Rack mount	DIN 3 HU/21 pitch, 4-rail plug-in unit suitable for standard 3 HU/84 pitch (19") rack
Panel mount	Suitable for standard panel cutout DIN 43700 72 x 144 mm, 110 mm (4.33") center height
Weight (rack and panel mount)	1.5 kg (3.3 lbs)
Weight (wall mount)	2.5 kg (5.5 lbs)
<b>Communications</b>	
RS-232	Siemens Dolphin protocol, Modbus RTU and ASCII
Option	SmartLinx compatible, RS-485
<b>Power supply</b>	
	100 ... 230 V AC ±15 %, 50/60 Hz, 36 VA (17 W) or 12 ... 30 V DC, 20 W
Ultrasonic transducer	Compatible transducers: ST-H and Echomax <sup>®</sup> series XPS-10/10F, XPS 15/15F, XCT-8, XCT-12 and XRS-5
mA output signal	2-core copper conductor, twisted, shielded, 0.5 ... 0.75 mm <sup>2</sup> (22 ... 18 AWG), Belden <sup>®</sup> 8760 or equivalent is acceptable
<b>Displays and controls</b>	
Rack and panel mount	75 x 20 mm (3 x 0.8") LCD (selectable backlighting)
Wall mount	100 x 40 mm (4 x 1.5") multfield LCD, backlit
<b>Programming</b>	
	Using removable handheld programmer (ordered separately) or Dolphin Plus software (option)
<b>Memory</b>	
	1 Mbyte RAM (static) with battery, 1 Mbyte flash EPROM
<b>Certificates and approvals</b>	
	CE, FM, CSA

<sup>1)</sup> The measuring range corresponds to the distance from the zero point to the sensor face, plus any range extension (P801)

# Level Measurement

## Continuous level measurement - Ultrasonic controllers

SITRANS LUC500

Selection and Ordering data	Order No.
<b>SITRANS LUC500</b> A complete ultrasonic level controller for monitoring and control of water distribution and wastewater collection systems, with energy-saving algorithms.	L) <b>7ML5001-</b>
<b>Mounting</b> Panel mount version Rack mount version for 19" rack Wall mount, standard enclosure Wall, 4 entry, M20 (valid with approval option 3 only)	1 2 3 5
<b>Input voltage</b> 100 ... 230 V AC 12 ... 30 V DC	A B
<b>Number of measurement points</b> Single point version Dual point version	A B
<b>Data communications</b> SmartLinx ready, no module SmartLinx PROFIBUS DP module SmartLinx Allen-Bradley Remote I/O module SmartLinx DeviceNet module	0 1 2 3
<b>Protocol</b> Modbus RTU/ASCII	1
<b>Auxilliary memory</b> None 1 Mbyte static RAM, including data logging module	0 1
<b>Auxilliary I/O</b> None 2 analog inputs and 2 analog outputs 4 analog inputs 4 analog outputs 8 digital inputs 8 digital inputs, 2 analog inputs and 2 analog outputs (only for wall mount)	A B C D E F
<b>Approvals</b> CSA, CE, UL (not available with mounting option 5) CE L) Subject to export regulations AL: N, ECCN: 3A991X	2 3
Selection and Ordering data	Order code
<b>Further designs</b> Please add <b>"-Z"</b> to Order No. and specify Order code(s).	
Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text	<b>Y15</b>
<b>Operating Instructions</b> English German Note: The Operating Instructions should be ordered as a separate item on the order. This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	Order No. <b>7ML1998-5GL01</b> <b>7ML1998-5GL31</b>
<b>Other Operating Instructions</b> SmartLinx Allen-Bradley Remote I/O, English SmartLinx PROFIBUS DP, English SmartLinx PROFIBUS DP, German SmartLinx PROFIBUS DP, French SmartLinx DeviceNet, English Note: The appropriate SmartLinx Operating Instructions should be ordered as a separate line on the order.	C) <b>7ML1998-1AP03</b> C) <b>7ML1998-1AQ03</b> C) <b>7ML1998-1AQ33</b> C) <b>7ML1998-1AQ12</b> C) <b>7ML1998-1BH02</b>

Optional Equipment	Order No.
Handheld programmer	<b>7ML1830-2AG</b>
ERS500 Configuration Tool software, CD, cable kit, B) and License	<b>7ML1930-1AE</b>
ERS500 Configuration Tool software, License only	B) <b>7ML1930-1AF</b>
ERS500 Configuration Tool software, demo CD only <u>See SmartLinx product page 5/310 for more information.</u>	B) <b>7ML1930-1AG</b>
Tag, stainless steel, 12 x 45 mm (0.47 x 1.77"), one text line, suitable for enclosures	<b>7ML1930-1AC</b>
SITRANS RD100 Remote display - see Chapter 8	
SITRANS RD200 Remote display - see Chapter 8	
SITRANS RD500 Remote display - see Chapter 8	
<b>Auxiliary Cards. Access code required<sup>1)</sup></b>	
1 MB static RAM extended memory	L) <b>PBD-51034040</b>
2 analog input / 2 analog output for rack and panel mount version	C) <b>PBD-51034039</b>
2 analog input / 2 analog output for wall mount version	C) <b>PBD-51034044</b>
8 digital input for rack and panel mount version	C) <b>PBD-51034042</b>
8 digital input for wall mount version	C) <b>PBD-51034043</b>
4 analog input for rack and panel mount version	C) <b>PBD-51034045</b>
4 analog input for wall mount version	C) <b>PBD-51034046</b>
4 analog output for rack and panel mount version	C) <b>PBD-51034047</b>
4 analog output for wall mount version	C) <b>PBD-51034048</b>
8 digital inputs, 2 analog inputs, 2 analog outputs, wall mount	C) <b>PBD-51034272</b>
Access code, dual point capability	C) <b>7ML1830-1KA</b>
<b>Auxiliary Cards<sup>2)</sup></b>	
1 MB static RAM extended memory	L) <b>7ML1830-1KR</b>
2 analog input / 2 analog output for rack and panel mount version	C) <b>7ML1830-1KS</b>
2 analog input / 2 analog output for wall mount version	C) <b>7ML1830-1KT</b>
8 digital input for rack and panel mount version	C) <b>7ML1830-1KU</b>
8 digital input for wall mount version	C) <b>7ML1830-1LA</b>
4 analog input for rack and panel mount version	C) <b>7ML1830-1LB</b>
4 analog input for wall mount version	C) <b>7ML1830-1LC</b>
4 analog output for rack and panel mount version	C) <b>7ML1830-1LD</b>
4 analog output for wall mount version	C) <b>7ML1830-1LE</b>
8 digital inputs, 2 analog inputs, 2 analog outputs, wall mount	C) <b>7ML1830-1LF</b>

- 1) Values of parameters P345 and P346 must be obtained from the customer in order to generate the order for the access code.  
2) For replacement of auxiliary card or spare auxiliary card. Access code not required. Must be used only as replacement cards.
- B) Subject to export regulations AL: N, ECCN: EAR99S  
C) Subject to export regulations AL: N, ECCN: EAR99  
L) Subject to export regulations AL: N, ECCN: 3A991X

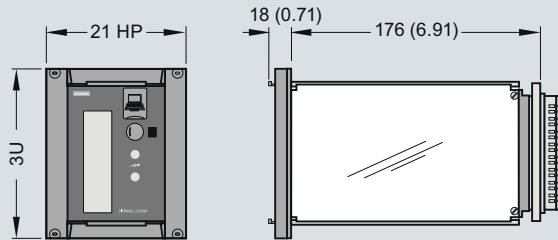
# Level Measurement

## Continuous level measurement - Ultrasonic controllers

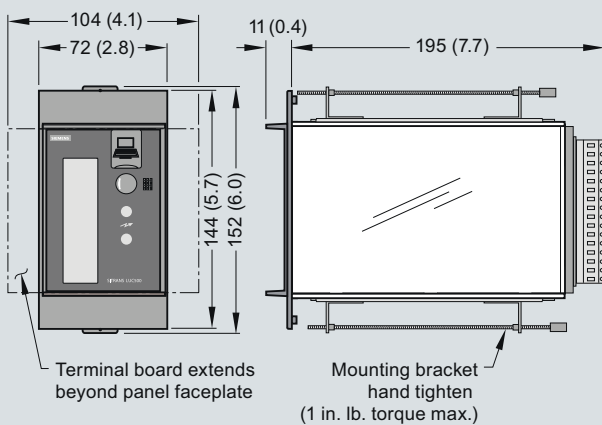
### SITRANS LUC500

#### Dimensional drawings

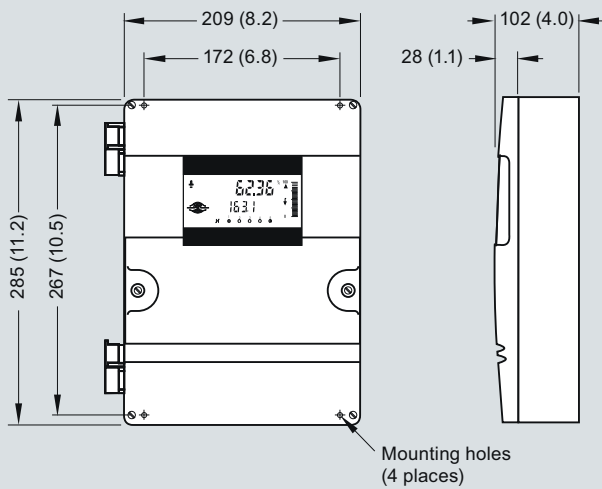
##### Rack Mount Unit



##### Panel Mount Unit



##### Wall Mount Unit



SITRANS LUC500, dimensions in mm (inch)

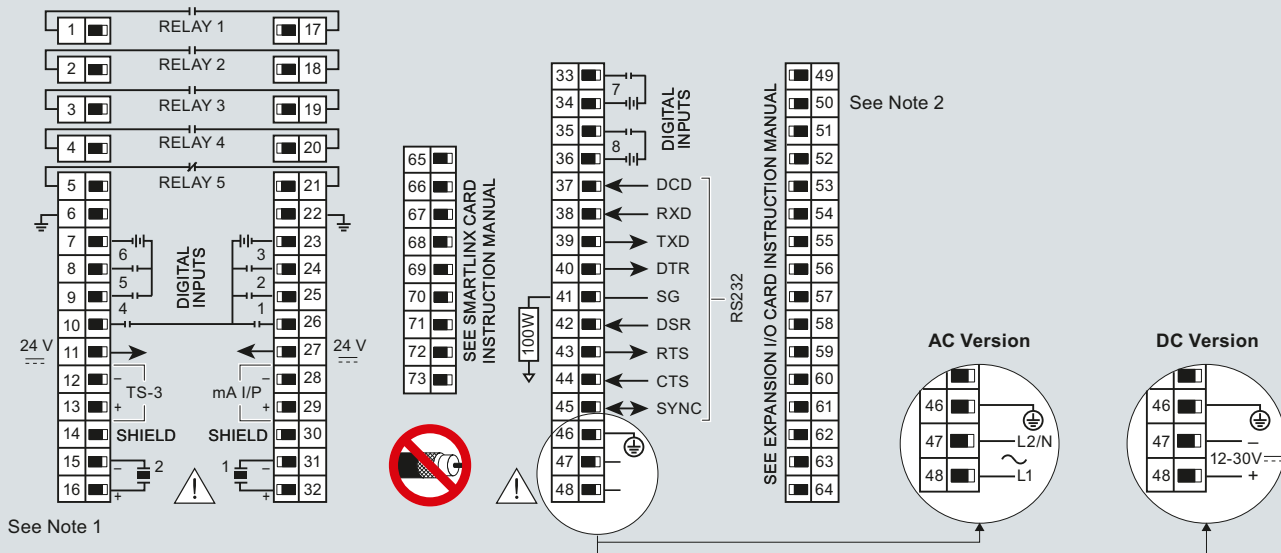
# Level Measurement

## Continuous level measurement - Ultrasonic controllers

SITRANS LUC500

### Schematics

#### Rack and Panel Mount

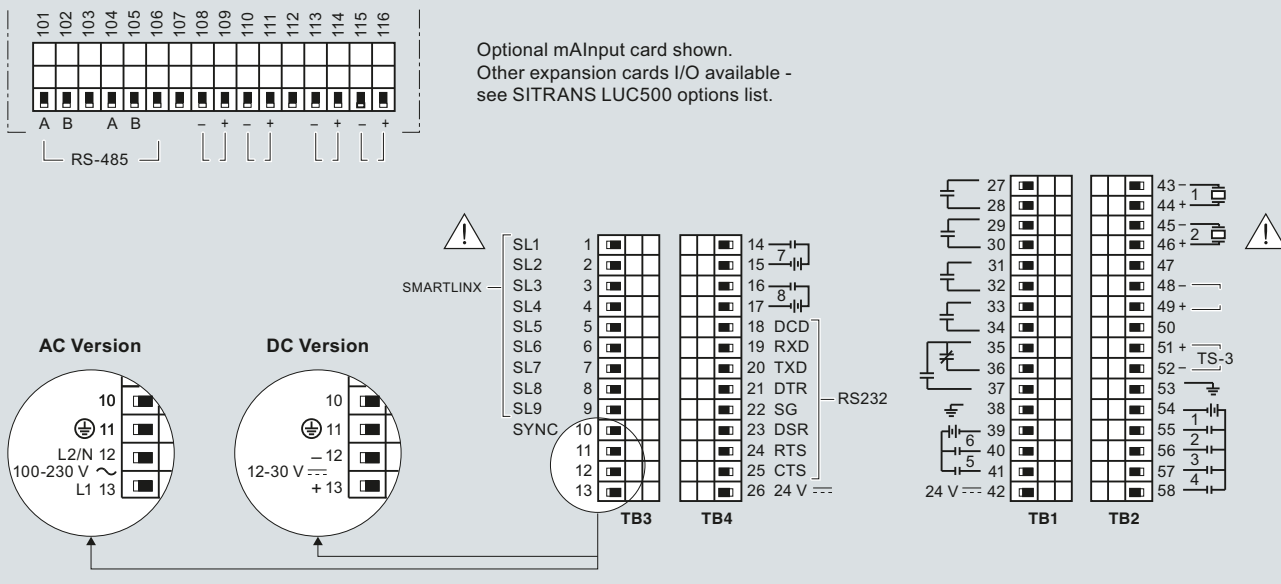


See Note 1

**Note:**

1. Transducer uses 2 wire twisted pair with shield only.
2. Terminals 49-64 are for use with optional expansion I/O cards.

#### Wall Mount



SITRANS LUC500 connections

# Level Measurement

## Continuous level measurement - Ultrasonic controllers

### SITRANS LU01 and LU02

#### Overview



The SITRANS LU01 is an ultrasonic long-range level controller for liquids and solids in a single vessel up to 60 m (200 ft).

Handheld programmer shown is an accessory and must be ordered separately.

#### Overview



The SITRANS LU02 is a dual point ultrasonic long-range level controller for liquids and solids in one or two vessels up to 60 m (200 ft).

Handheld programmer shown is an accessory and must be ordered separately.

#### Benefits

- Single point, long-range level monitoring
- Easy to install; easy to program using removable infrared keypad (optional)
- Compatible with all Echomax<sup>®</sup> transducers
- Backlit LCD display with reading in standard engineering units
- Automatic level-to-volume conversion for standard or custom tank shapes
- Dolphin Plus and SmartLinx compatible
- High/low alarms

#### Application

The system consists of a SITRANS LU01 monitor linked to a non-contacting ultrasonic transducer that can be mounted up to 365 m (1200 ft) away. The SITRANS LU01 will measure distance, level or volume, and it features patented Sonic Intelligence<sup>®</sup> echo processing software for superior reliability.

Readings are displayed in user-selectable linear engineering units on the backlit LCD.

An on-board communications port automatically configures for RS-232, RS-485 or bi-polar current loop. The SITRANS LU01 will connect to a DCS or PLC using Siemens SmartLinx<sup>®</sup> interface modules, giving you remote 2-way communication and full parameter access.

Modules for popular industrial buses can be factory installed or added later to meet changing needs. No external gateway is required, reducing hardware and cabling costs.

- Key Applications: chemical storage, liquid storage, bulk solids storage (gravel, flour bins, grains, cereals), plastic pellets

#### Benefits

- Dual point, long-range level monitoring
- Easy to install; easy to program using removable infrared keypad (optional)
- Compatible with all Echomax<sup>®</sup> transducers
- Backlit LCD display with reading in standard engineering units
- Automatic level-to-volume conversion for standard or custom tank shapes
- Dolphin Plus and SmartLinx compatible
- High/low alarms

#### Application

SITRANS LU02 will measure liquids, solids or a combination of both in one or two vessels of different sizes, shapes and configurations up to 60 m (200 ft).

The system uses ultrasonic technology to measure level, space, distance, volume or average/differential. It features patented Sonic Intelligence<sup>®</sup> echo processing software for superior reliability. Transducers can be mounted up to 365 m (1200 ft) from the monitor.

Readings are displayed in user-selectable linear engineering units on the backlit LCD.

It features an onboard communications port that automatically configures for RS-232, RS-485 or bi-polar current loop. It will connect to a DCS or PLC using Siemens SmartLinx<sup>®</sup> interface modules, giving you remote 2-way communication and full parameter access. Modules for popular industrial buses can be factory installed or added later to meet changing needs. No external gateway is required, reducing hardware and cabling costs.

- Key Applications: chemical storage, liquid storage, bulk solids storage (gravel, flour bins, grains, cereals), plastic pellets, tripper car

# Level Measurement

## Continuous level measurement - Ultrasonic controllers

### SITRANS LU01 and LU02

#### Technical specifications

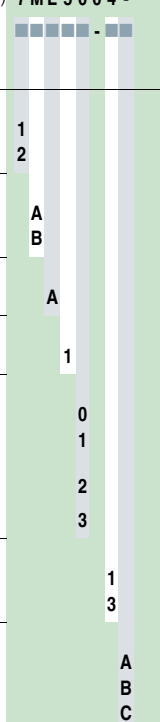
<b>Mode of operation</b>		<b>Power supply</b>	
Measuring principle	Ultrasonic level measurement	AC model	100/115/200/230 V AC ± 15 %, 50/60 Hz, 31 VA
Measuring range	0.3 ... 60 m (1 ... 200 ft)	DC model	18 ... 30 V DC, 25 W
Measuring points	SITRANS LU01: Max. one point; SITRANS LU02: Max. two points	<b>Displays and controls</b>	51 x 127 mm (2 x 5") graphics LCD with backlighting
<b>Output signal</b>		Memory	EEPROM (non-volatile), no backup battery required
Ultrasonic transducer	Echomax series, ST-H transducers	Programming	Using removable programmer (ordered separately) or Dolphin Plus (option)
Relays	4 SPDT Form C relays, rated at 5 A at 250 V AC, resistive load	<b>Certificates and approvals</b>	<ul style="list-style-type: none"> <li>• CE, CSA<sub>US/CA</sub>, FM, ATEX II 3D</li> <li>• Lloyd's register of Shipping (Categories ENV1, ENV2, ENV3 and ENV5)</li> </ul>
mA output	0/4 ... 20 mA, optically isolated	<b>Options</b>	External temperature sensor
• Max. load	750 Ω, isolated, 30 V	Communications	<ul style="list-style-type: none"> <li>• SmartLinX: protocol-specific modules as interface for popular industrial fieldbus systems</li> <li>• Dolphin Plus: Siemens Windows<sup>®</sup>-compatible interface and ComVerter link (infrared)</li> </ul>
• Resolution	0.1 % of range		
• Outputs	SITRANS LU01: Max. 1 mA output SITRANS LU02: Max. 2 mA outputs		
<b>Accuracy</b>			
Error in measurement	0.25 % of range or 6 mm (0.24"), whichever is greater		
Resolution	0.1 % of measuring range or 2 mm (0.08"), whichever is greater		
Temperature compensation	-50 ... +150 °C (-58 ... +302 °F) <ul style="list-style-type: none"> <li>• Integral temperature sensor</li> <li>• External TS-3 temperature sensor (optional)</li> <li>• Programmable fixed temperature</li> </ul>		
<b>Rated operating conditions</b>			
Ambient conditions			
• Ambient temperature for enclosure	-20 ... +50 °C (-4 ... +122 °F)		
<b>Design</b>			
Weight	2.7 kg (6 lbs)		
Material (enclosure)	Polycarbonate		
Degree of protection (wall mount)	IP65		
<b>Electrical connection</b>			
Ultrasonic transducer cable extension	RG62-A/U coaxial cable with low capacitance		
mA output signal	2-core copper conductor, twisted, shielded, 0.5 ... 0.75 mm <sup>2</sup> (22 ... 18 AWG), Belden <sup>®</sup> 8760 or equivalent is acceptable		
Electrical connection and relay connection	Copper conductor according to local requirements, rated 250 V 5 A		
Synchronization	Up to 16 LU01/LU02 units can be synchronized together		



# Level Measurement

## Continuous level measurement - Ultrasonic controllers

### SITRANS LU01 and LU02

Selection and Ordering data	Order No.
<b>SITRANS LU01/LU02</b> Single or dual point ultrasonic long-range level monitoring system for liquids and solids, and ranges up to 60 m (200 ft).	C) <b>7ML5004-</b> 
<b>Number of measuring points</b> LU01 version, 1 point LU02 version, 2 points	1 2
<b>Input voltage</b> 100/115/200/230 V AC, voltage selector switch 18 ... 30 V DC	A B
<b>Feature software</b> Standard	A
<b>Application software</b> Standard	1
<b>Data communications</b> No module (SmartLinX ready) SmartLinX Allen-Bradley® Remote I/O module SmartLinX PROFIBUS DP module SmartLinX Modbus® RTU module	0 1 2 3
<b>Enclosure</b> Wall mount Wall mount, drilled, 6 x M20	1 3
<b>Approvals</b> CE, CSA <sub>US/C</sub> , FM <sup>1)</sup> CE <sup>2)</sup> ATEX II 3D <sup>1)</sup>	A B C

1) Available with enclosure option 1 only

2) Available with enclosure option 3 only

C) Subject to export regulations AL: N, ECCN: EAR99

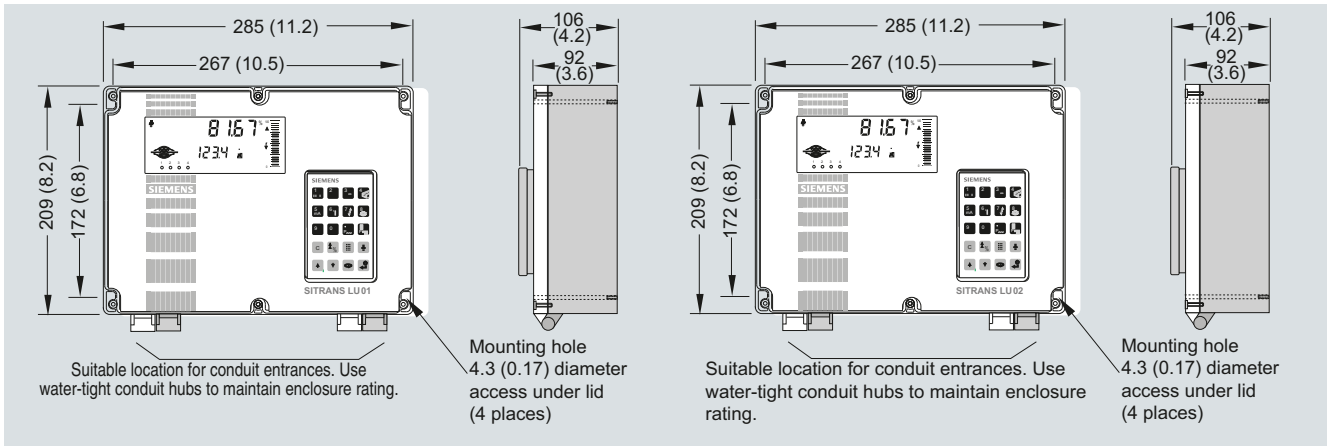
Selection and Ordering data	Order code
<b>Further designs</b> Please add "-Z" to Order No. and specify Order code(s). Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text	<b>Y15</b>
<b>Operating Instructions</b> <b>SITRANS LU01</b> English French German	Order No. C) <b>7ML1998-5BE02</b> C) <b>7ML1998-5BE12</b> C) <b>7ML1998-5BE32</b>
<b>SITRANS LU02</b> English French German	C) <b>7ML1998-5BD02</b> C) <b>7ML1998-5BD12</b> C) <b>7ML1998-5BD32</b>
Note: The Operating Instructions should be ordered as a separate line item. This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	
<b>Other Operating Instructions</b> SmartLinX Allen-Bradley Remote I/O, English SmartLinX PROFIBUS DP, English SmartLinX PROFIBUS DP, German SmartLinX PROFIBUS DP, French SmartLinX Modbus, English SmartLinX Modbus, German SmartLinX Modem, English	C) <b>7ML1998-1AP03</b> C) <b>7ML1998-1AQ03</b> C) <b>7ML1998-1AQ33</b> C) <b>7ML1998-1AQ12</b> C) <b>7ML1998-1BF01</b> C) <b>7ML1998-1BF31</b> C) <b>7ML1998-1BG01</b>
Note: The appropriate SmartLinX Operating Instructions should be ordered as a separate line on the order.	
<b>Accessories</b> Handheld programmer Tag, stainless steel, 12 x 45 mm (0.47 x 1.77"), one text line, suitable for enclosures M20 cable gland kit (6 M20 cable glands, 6 M20 nuts, 3 stop plugs) TS-3 Temperature Sensor - see TS-3 on page 5/191	<b>7ML1830-2AN</b> <b>7ML1930-1AC</b> <b>7ML1830-1GM</b> <b>7ML1830-2AN</b>
<b>Spare parts</b> Card, LU01 mother main, AC, comm ready Card, LU02 mother main, AC, comm ready Card, LU02 daughter, comm ready Card, LU01 daughter, comm ready Card, display See SmartLinX product page 5/310 for more information.	C) <b>7ML1830-1KX</b> C) <b>7ML1830-1MA</b> C) <b>7ML1830-1LP</b> C) <b>7ML1830-1LN</b> C) <b>7ML1830-1LQ</b>
C) Subject to export regulations AL: N, ECCN: EAR99 ®Modbus is a registered trademark of Schneider Electric. ®Allen-Bradley is a registered trademark of Rockwell Automation. ™DeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA).	

# Level Measurement

## Continuous level measurement - Ultrasonic controllers

SITRANS LU01 and LU02

### Dimensional drawings



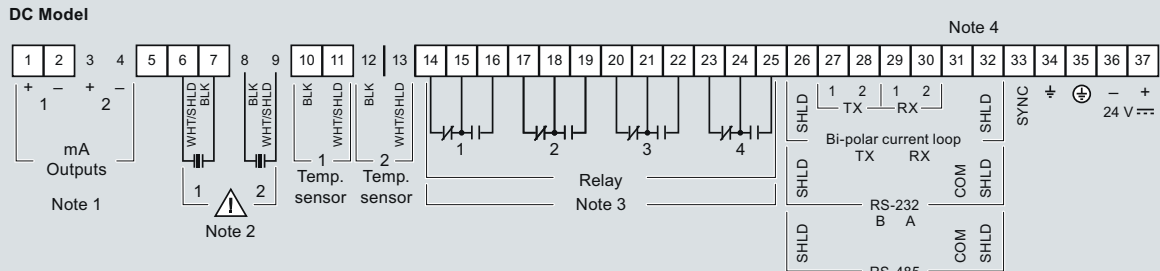
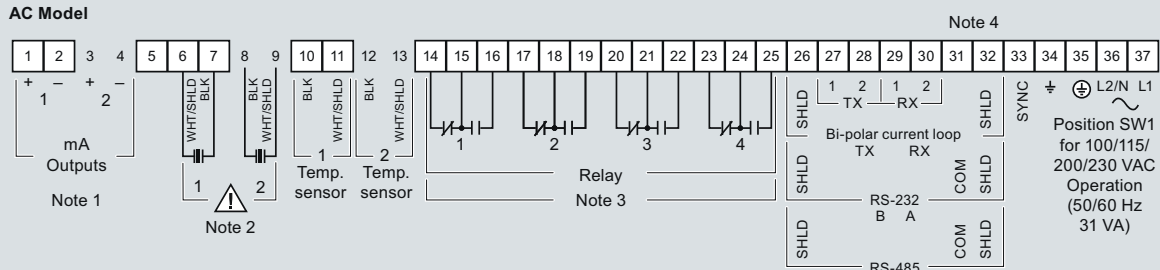
Dimensional drawings for SITRANS LU01 (left) and SITRANS LU02 (right), dimensions in mm (inch)

# Level Measurement

## Continuous level measurement - Ultrasonic controllers

### SITRANS LU01 and LU02

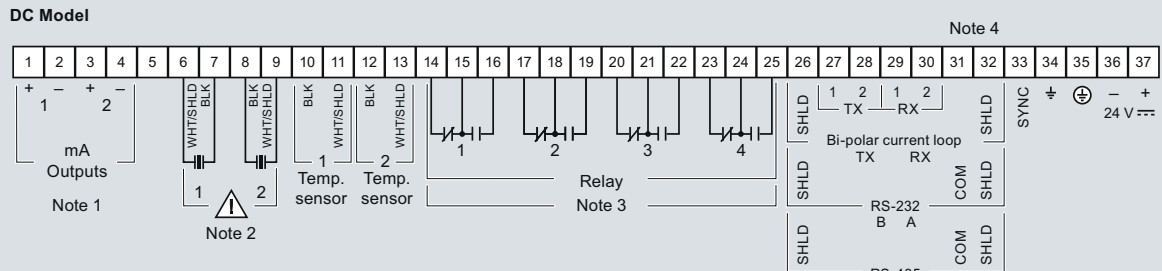
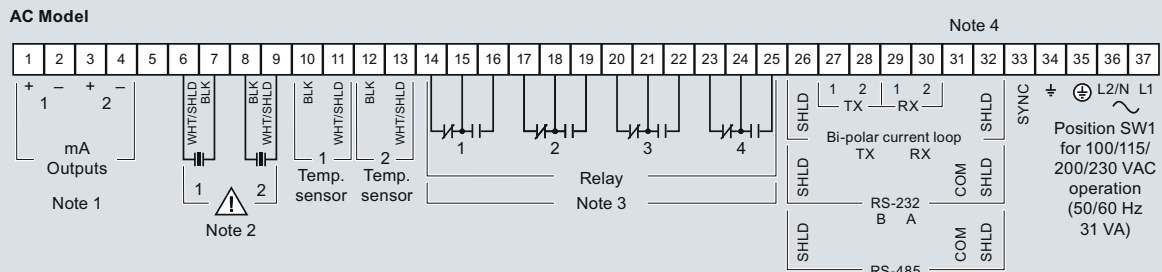
#### Schematics



**Notes:**

1. Optically isolated, 750 Ω max. load
2. Use RG62-A/U coaxial (or equivalent) for extensions up to 365 m (1200 ft). Run in grounded metal conduit, separate from other wiring.
3. Each relay has 1 set of Form 'C' (SPDT) contacts, relay rated at 5 A 250 V AC, non-inductive, when equal or lower rated limiting fuses are installed.
4. Required if mounted adjacent to other SITRANS LU01 units or other specified Siemens Milltronics devices. Interconnect all 'SYNC' terminals with a single 18 AWG (0.5mm<sup>2</sup>) wire.

SITRANS LU01 connections



**Note:**

1. Optically isolated, 750 Ω max. load
2. Use RG62-A/U coaxial (or equivalent) for extensions up to 365 m (1200 ft). Run in grounded metal conduit, separate from other wiring.
3. Each relay has 1 set of Form 'C' (SPDT) contacts, relay rated at 5 A 250 V AC, non-inductive, when equal or lower rated limiting fuses are installed.
4. Required if mounted adjacent to other SITRANS LU01 units or other specified Siemens Milltronics devices. Interconnect all 'SYNC' terminals with a single 18 AWG (0.5mm<sup>2</sup>) wire.

SITRANS LU02 connections

# Level Measurement

## Continuous level measurement - Ultrasonic controllers

SITRANS LU10

### Overview



SITRANS LU10 is an ultrasonic long-range level monitor for liquids and solids, offering 10-point monitoring in a single unit.

Handheld programmer shown is an accessory and must be ordered separately.

### Benefits

- Ten point, long-range level monitoring
- Automatic level-to-volume conversion for standard or custom tank shapes
- Dolphin Plus and SmartLinX<sup>®</sup> compatible
- Backlit LCD display with reading in standard engineering units
- Easy to install, easy to program using removable infrared keypad (optional)

### Application

It can be used in a wide range of applications to scan liquids, solids or a combination of both contained in vessels of differing size, shape and configuration up to 60 m (200 ft).

SITRANS LU10 uses ultrasonic technology to measure level, space, distance, volume or average/differential. Transducers can be mounted up to 365 m (1200 ft) from the monitor. The SITRANS LU10 features patented Sonic Intelligence<sup>®</sup> echo processing software for superior reliability. Readings are displayed in user-selectable linear engineering units on the LCD.

SITRANS LU10 will connect to a DCS or PLC using Siemens SmartLinX<sup>®</sup> interface modules, giving you remote 2-way communication and full parameter access. Modules for popular industrial buses can be factory installed or added later to meet changing needs. No external gateway is required, reducing hardware and cabling costs.

- Key Applications: chemical storage, liquid storage, bulk solids storage (sugar, flour bins, grains, cereals), plastic pellets, tank farms

### Technical specifications

<b>Mode of operation</b>	
Measuring principle	Ultrasonic level measurement
Measuring range	Max. 0.3 ... 60 m (1 ... 200 ft)
Measuring points	Max. 10
<b>Output</b>	
Ultrasonic transducer	Echomax <sup>®</sup> series, ST-H transducers
Relays	<ul style="list-style-type: none"> <li>• SITRANS LU SAM module (option): 20 alarm/control relays</li> <li>• SPDT Form C relays, rated 5 A at 250 V AC, resistive load</li> </ul>
mA output	SITRANS LU A0 module (option): 0/4 ... 20 mA, optically isolated
<ul style="list-style-type: none"> <li>• Max. load</li> <li>• Resolution</li> </ul>	750 $\Omega$ , isolated 0.1 % of range
<b>Accuracy</b>	
Error in measurement	0.25 % of range or 6 mm (0.24"), whichever is greater
Resolution	0.1 % of measuring range or 2 mm (0.08"), whichever is greater
Temperature compensation	-50 ... +150 °C (-58 ... +302 °F) <ul style="list-style-type: none"> <li>• Integral temperature sensor</li> <li>• External TS-3 temperature sensor (expandable to 10 inputs with optional TIB-9 card)</li> <li>• Programmable fixed temperature</li> </ul>
<b>Rated operating conditions</b>	
Ambient conditions	<ul style="list-style-type: none"> <li>• Ambient temperature for enclosure</li> </ul> -20 ... +50 °C (-4 ... +122 °F)
<b>Design</b>	
Weight	2.7 kg (6 lbs)
Material (enclosure)	Polycarbonate
Degree of protection (wall mount)	IP65/Type 4X/NEMA 4X
<b>Electrical connection</b>	
Ultrasonic transducer	RG62-A/U coaxial cable with low capacitance
Signal transmission	2-core copper conductor, twisted, shielded, 0.5 ... 0.75 mm <sup>2</sup> (22 ... 18 AWG), Belden <sup>®</sup> 8760 or equivalent is acceptable
Electrical connection and relay connection	Copper conductor according to local requirements, rated 250 V 5 A
Synchronization	Up to 16 LU10 units can be synchronized together
<b>Power supply</b>	100/115/200/230 V AC $\pm$ 15 %, 50/60 Hz, 31 VA
<b>Displays and controls</b>	
Memory	EEPROM (non-volatile), no backup battery required
Programming	Using removable programmer (ordered separately) or Dolphin Plus (option)
<b>Certificates and approvals</b>	
<ul style="list-style-type: none"> <li>• CE, C-TICK, FM, CSA<sub>US/C</sub>, ATEX II 3D</li> <li>• Lloyd's register of Shipping (Categories ENV1, ENV2, ENV3 and ENV5)</li> </ul>	

# Level Measurement

## Continuous level measurement - Ultrasonic controllers

### SITRANS LU10

#### Options

Expansion card	TIB-9, increases the number of TS-3 inputs from 1 ... 10
External temperature sensor	TS-3
Communications	<ul style="list-style-type: none"> <li>SmartLinx: protocol-specific modules as interface for popular industrial fieldbus systems</li> <li>Dolphin Plus: Siemens Windows<sup>®</sup> compatible interface and ComVerter link (infrared)</li> </ul>
I/O devices	<ul style="list-style-type: none"> <li>Max. 3 I/O devices per SITRANS LU10</li> <li>SITRANS LU AO analog output module (max. 1)</li> <li>SITRANS LU SAM, satellite alarm module (max. 2)</li> </ul>

<sup>®</sup>Windows is a registered trademark of Microsoft Corporation.

#### Selection and Ordering data

Selection and Ordering data	Order No.
<b>SITRANS LU10</b> Ten point ultrasonic long-range level monitoring system for liquids and solids applications, and ranges up to 60 m (200 ft).	C) <b>7ML5007-</b>
<b>Input voltage</b> 100/115, 200/230 V AC, selectable	1
<b>Feature software</b> Standard	A
<b>Application software</b> Standard	A
<b>Data communications</b> No module (SmartLinx ready) SmartLinx Allen-Bradley <sup>®</sup> Remote I/O module SmartLinx PROFIBUS DP module SmartLinx Modbus <sup>®</sup> RTU module	0 1 2 3
<b>TIB-9 temperature card</b> None With TIB-9 card	0 1
<b>Enclosure</b> Wall mount Wall mount, drilled, 12 x M20	1 2
<b>Approvals</b> CE, CSA <sub>US</sub> C, FM <sup>1)</sup> ATEX II 3D <sup>1)</sup> CE, C-TICK <sup>2)</sup>	A B D

1) Available with Enclosure option 1 only

2) Available with Enclosure option 2 only

C) Subject to export regulations AL: N, ECCN: EAR99

#### Selection and Ordering data

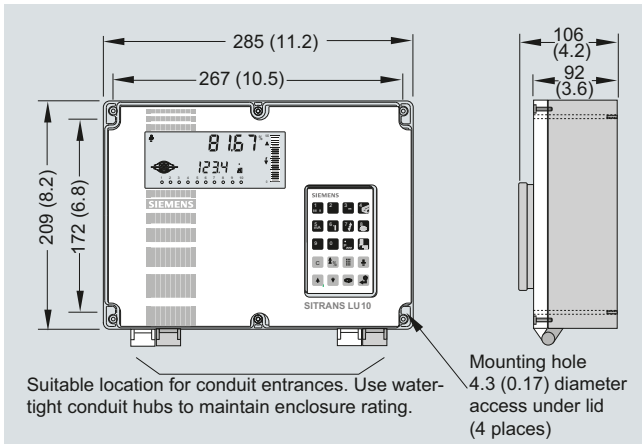
Selection and Ordering data	Order code
<b>Further designs</b> Please add <b>"-Z"</b> to Order No. and specify Order code(s). Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text	<b>Y15</b>
<b>Operating Instructions</b> English French German	Order No. C) <b>7ML1998-5AN02</b> C) <b>7ML1998-5AN12</b> C) <b>7ML1998-5AN32</b>
<b>Other Operating Instructions</b> SmartLinx Allen-Bradley Remote I/O, English SmartLinx PROFIBUS DP, English  SmartLinx PROFIBUS DP, German SmartLinx PROFIBUS DP, French  SmartLinx Modbus, English SmartLinx Modbus, German SmartLinx Modem, English Note: The appropriate SmartLinx Operating Instructions should be ordered as a separate line on the order.	C) <b>7ML1998-1AP03</b> C) <b>7ML1998-1AQ03</b>  C) <b>7ML1998-1AQ33</b> C) <b>7ML1998-1AQ12</b>  C) <b>7ML1998-1BF01</b> C) <b>7ML1998-1BF31</b> C) <b>7ML1998-1BG01</b>
<b>Accessories</b> Handheld programmer Tag, stainless steel, 12 x 45 mm (0.47 x 1.77"), one text line, suitable for enclosures M20 cable gland kit (6 M20 cable glands, 6 M20 nuts, 3 stop plugs)	<b>7ML1830-2AN</b> <b>7ML1930-1AC</b> <b>7ML1830-1GM</b>
<b>Spare parts</b> Card, mother main, AC, comm ready Card, daughter, comm ready  Card, display See SmartLinx product page 5/310 for more information. C) Subject to export regulations AL: N, ECCN: EAR99 <sup>®</sup> Modbus is a registered trademark of Schneider Electric. <sup>®</sup> Allen-Bradley is a registered trademark of Rockwell Automation. <sup>™</sup> DeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA).	C) <b>7ML1830-1ML</b> C) <b>7ML1830-1LY</b>  <b>7ML1830-1LQ</b>

# Level Measurement

## Continuous level measurement - Ultrasonic controllers

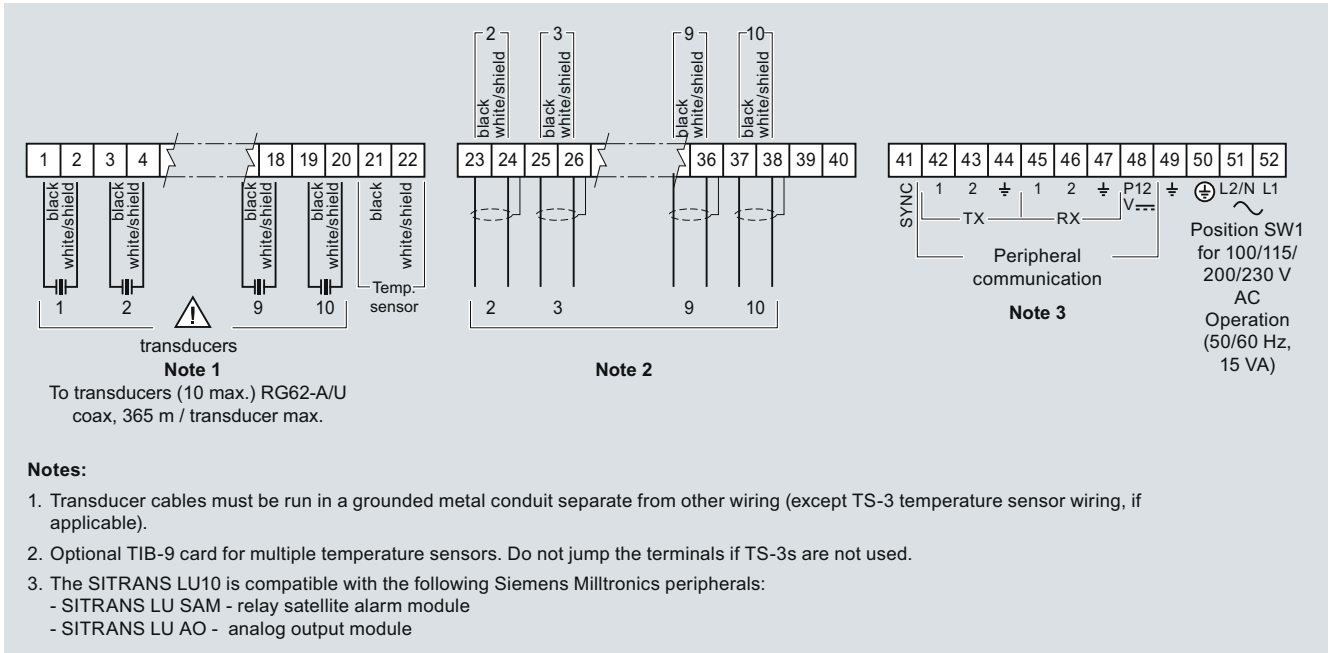
SITRANS LU10

### Dimensional drawings



SITRANS LU10, dimensions in mm (inch)

### Schematics



SITRANS LU10 connections

#### Notes:

1. Transducer cables must be run in a grounded metal conduit separate from other wiring (except TS-3 temperature sensor wiring, if applicable).
2. Optional TIB-9 card for multiple temperature sensors. Do not jump the terminals if TS-3s are not used.
3. The SITRANS LU10 is compatible with the following Siemens Milltronics peripherals:
  - SITRANS LU SAM - relay satellite alarm module
  - SITRANS LU AO - analog output module

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# Level Measurement

## Continuous level measurement - Ultrasonic controllers

### SITRANS LU SAM

#### Overview



SITRANS LU SAM Satellite Alarm Module provides up to 20 relay outputs for the measurement points of the SITRANS LU10 level monitor.

#### Benefits

- The SITRANS LU SAM can be located up to 1500 m (5000 ft) from the SITRANS LU10
- Relay outputs can be assigned to any point on the SITRANS LU10

#### Application

The operation of the SITRANS LU SAM is programmed via the SITRANS LU10. The only on-board settings are for bank selection and output testing.

Using a SITRANS LU SAM, you can have two relay outputs for all ten measurement points, all 20 for a single measurement point or any combination between the two.

All relays are Form C to allow NO or NC wiring.

#### Technical specifications

Mode of operation	Satellite alarm module
<b>Input</b>	
Communications	Data from SITRANS LU10
• Transmission rate	4800 bits/s
• Voltage	± 20 mA bipolar current loop
<b>Output</b>	
Relays	20 multi-purpose relays, programmable from SITRANS LU10 SPDT Form C relays, rated 5 A at 250 V AC, resistive load
± 20 mA bipolar current loop	Input and transmission
• Max. load	1 receiving unit
<b>Rated operation conditions</b>	
Ambient conditions	
• Ambient temperature	-20 ... +50 °C (-5 ... +122 °F)
• Location	Indoor/outdoor
• Installation category	II
• Pollution degree	4
<b>Design</b>	
Weight	3 kg (6.6 lbs)
Material (enclosure)	Polycarbonate
Degree of protection	Type 4X/NEMA 4X/IP65
Cable connection	2 copper conductors, twisted, with foil shield/drain wire, 300 V 0.5 ... 0.75 mm <sup>2</sup> (22 ... 18 AWG)
Electrical connection and relay connection	Copper conductor according to local requirements, rated 250 V 5 A
<b>Power supply</b>	100/115/200/230 V AC ± 15 %, 50/60 Hz, 20 VA
<b>Displays and controls</b>	1 LED for display of voltage/communications state, 20 LEDs for display of relay states
<b>Certificates and approvals</b>	CE, FM, CSA <sub>US/C</sub> , C-TICK

#### Selection and Ordering data

Selection and Ordering data	Order No.
<b>SITRANS LU SAM</b>	C) <b>7ML5811-1A</b>
Satellite alarm module provides up to 20 relay outputs for the measurement points of the SITRANS LU10 level monitor.	
Approvals: CSA <sub>US/C</sub> , FM, CE, C-TICK	
<b>Operating Instructions</b>	
English	C) <b>7ML1998-5CF02</b>
German	C) <b>7ML1998-5CF32</b>
Note: Instruction manuals should be ordered as a separate line item on the order.	
This device is shipped with the Siemens Milltronics manual CD containing the complete Quick Start and instruction manual library.	

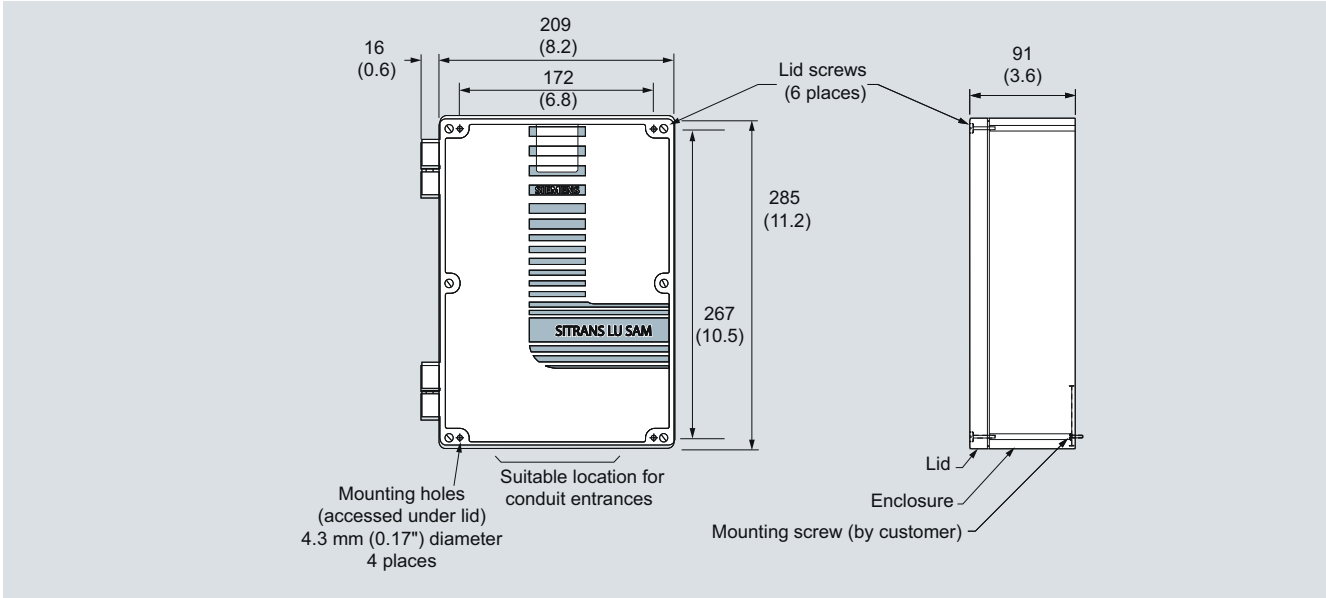
C) Subject to export regulations AL: N, ECCN: EAR99

# Level Measurement

## Continuous level measurement - Ultrasonic controllers

### SITRANS LU SAM

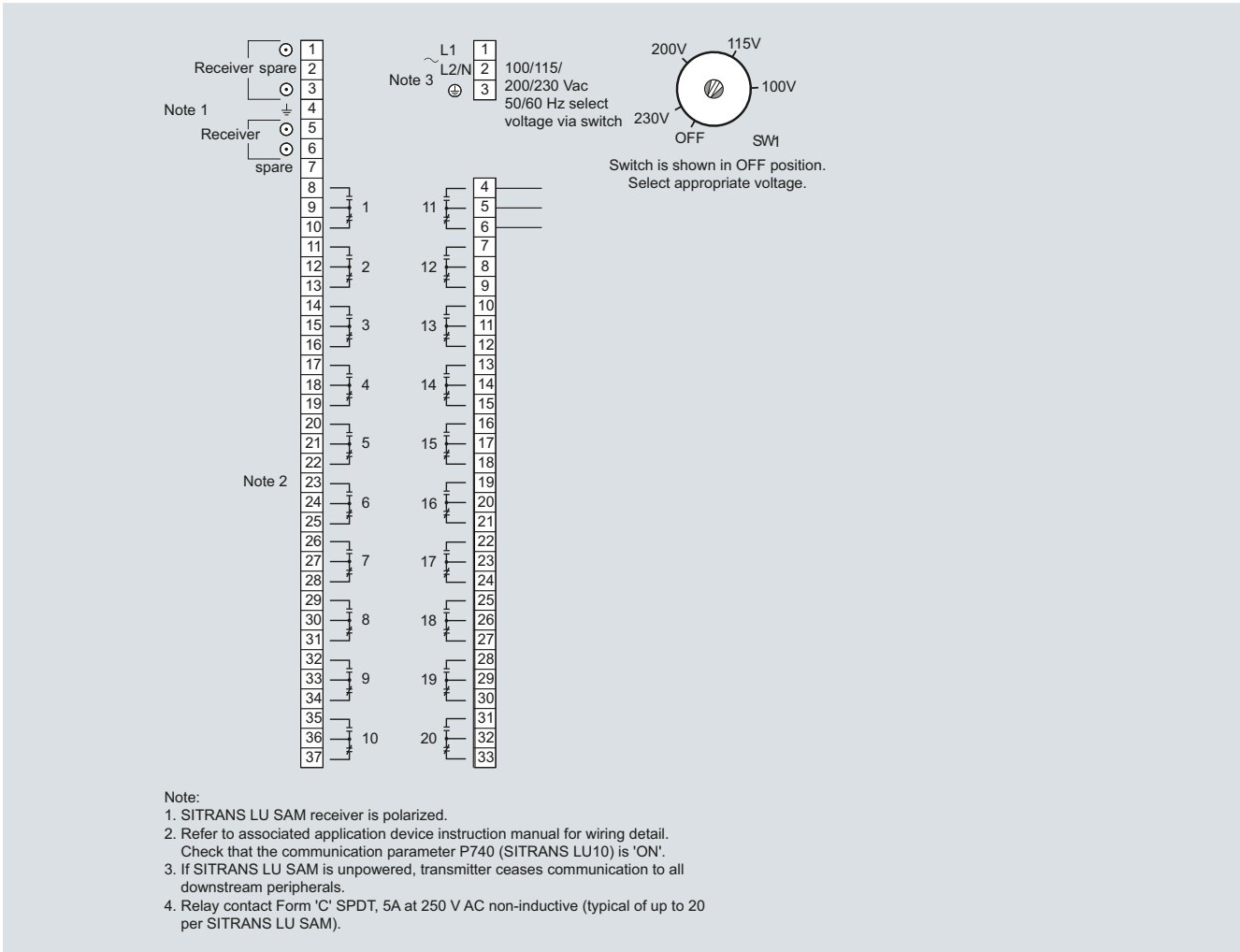
#### Dimensional drawings



SITRANS LU SAM, dimensions

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#### Schematics



SITRANS LU SAM connections



# Level Measurement

## Continuous level measurement - Ultrasonic controllers

### SITRANS LU AO

#### Overview



The SITRANS LU AO Analog Output Module provides remote analog output for the measurement points of the SITRANS LU10 level monitor.

#### Benefits

- Analog outputs can be up to 1500 m (5000 ft) from the SITRANS LU10
- Analog outputs can be per transducer and/or average of 2 or more

#### Application

The operation of the SITRANS LU AO is programmed via the SITRANS LU10. The only on-board settings are for bank selection and output testing.

The SITRANS LU AO can provide up to 10 analog outputs (each sharing a common negative bus which is electrically isolated from ground).

#### Technical specifications

Mode of operation	Output module
<b>Input</b>	
Communications	Data from SITRANS LU10
• Transmission rate	4800 bits/s
• Voltage	± 20 mA bipolar current loop
• Polarization	Non-polarized
• Max. load	1 receiving unit
<b>Output</b>	
Analog outputs	10 analog outputs, programmable from SITRANS LU10
	0 or 4 ... 20 mA, isolated
± 20 mA bipolar current loop	Input and transmission
• Max. load	750 Ω
• Resolution	0.1 %
<b>Rated operating conditions</b>	
Ambient conditions	
• Ambient temperature for enclosure	-20 ... +50 °C (-5 ... +122 °F)
• Location	Indoor/outdoor
• Installation category	II
• Pollution degree	4
<b>Design</b>	
Weight	2 kg (4.4 lbs)
Material (enclosure)	Polycarbonate
Degree of protection	Type 4X/NEMA 4X/IP65
• Cable connection	2 copper conductors, twisted, with foil shield/drain wire, 300 V 0.5 ... 0.75 mm <sup>2</sup> (22 ... 18 AWG)
• Electrical connection and relay connection	Copper conductor according to local requirements, rated 250 V 5 A
<b>Power supply</b>	100/115/200/230 V AC ± 15 %, 50/60 Hz, 15 VA
<b>Displays and controls</b>	1 LED for display of voltage/communications state
<b>Certificates and approvals</b>	CE, FM, CSA <sub>US/C</sub> , C-TICK

#### Selection and Ordering data

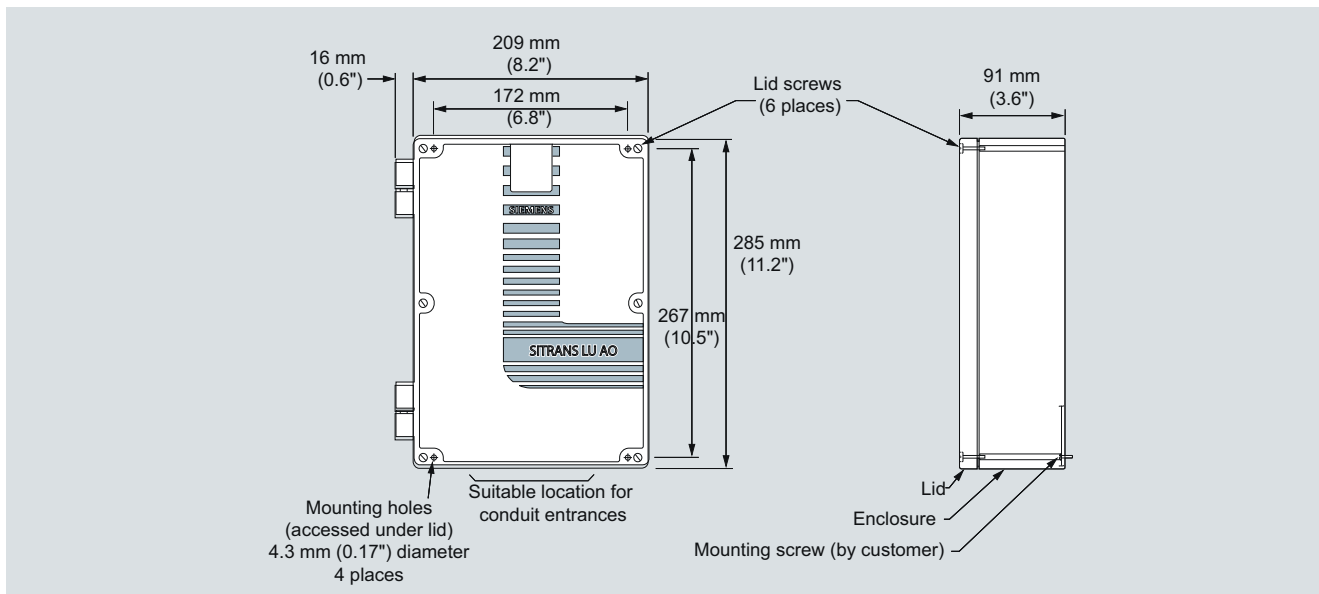
	Order No.
<b>SITRANS LU AO</b> Provides remote analog output for the measurement points of the SITRANS LU10 level monitor. Approvals: CSA <sub>US/C</sub> , FM, CE, C-TICK	C) <b>7ML5810-1A</b>
<b>Operating Instructions</b>	
English	C) <b>7ML1998-5CE01</b>
German	C) <b>7ML1998-5CE31</b>
Note: Instruction manuals should be ordered as a separate line item on the order.	
This device is shipped with the Siemens Milltronics manual CD containing the complete Quick Start and instruction manual library.	
C) Subject to export regulations AL: N, ECCN: EAR99	

# Level Measurement

## Continuous level measurement - Ultrasonic controllers

SITRANS LU AO

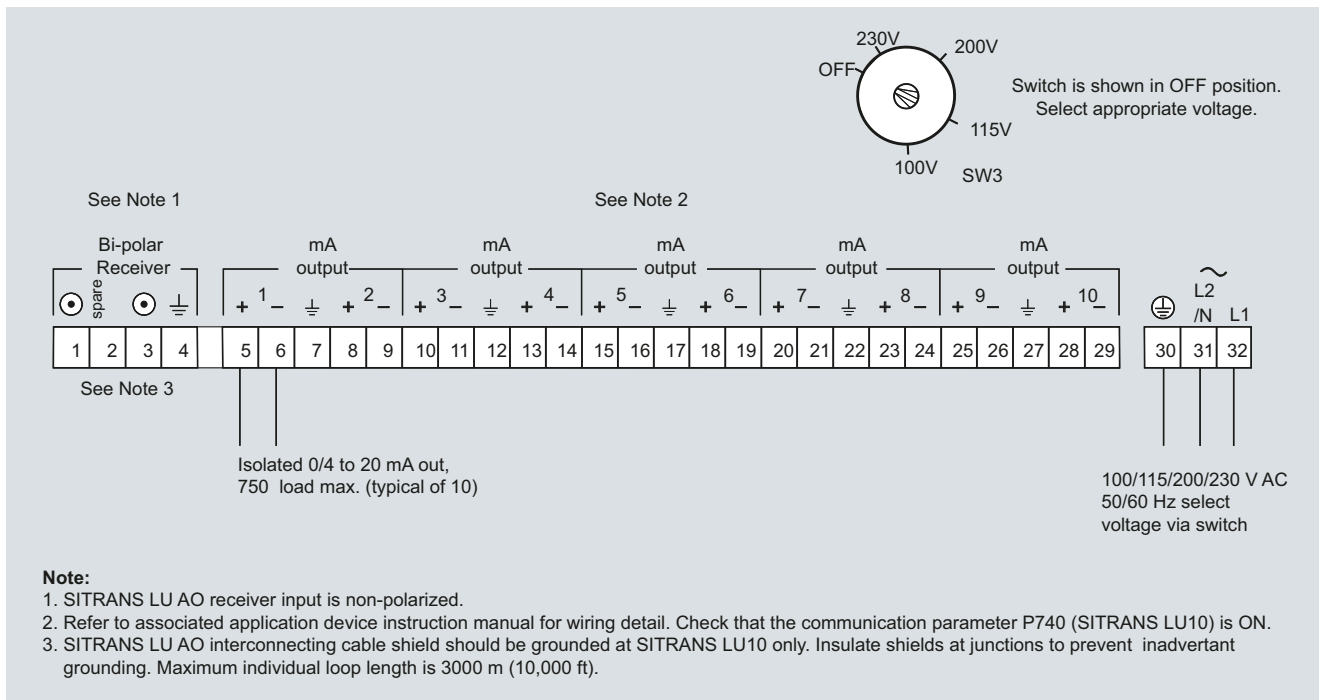
### Dimensional drawings



SITRANS LU AO, dimensions in mm (inch)

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### Schematics



SITRANS LU AO connections

# Level Measurement

## Continuous level measurement - Ultrasonic transducers

### Ultrasonic transducers

#### Overview

##### Ultrasonic Transducers

Ultrasonic measuring systems are the cost-effective choice for monitoring and control in short- to long-range applications for liquids, slurries, and solids in a wide range of industries. Transducers are impervious to dust, moisture, corrosion, vibration, flooding and extreme temperature. They are easy to install and virtually maintenance-free. Choose from a wide selection of models designed for short or long range applications on liquids or solids.

#### Technical specifications

	Echomax Transducers									
	Liquids		Liquids and Solids Standard				High Temperature		Solids High Temperature	
	XRS-5	ST-H	XPS-10	XPS-15	XPS-30	XPS-40	XCT-8	XCT-12	XLT-30	XLT-60
<b>Max. range<sup>1)</sup></b>	8 m (26 ft)	10 m (33 ft)	10 m (33 ft)	15 m (50 ft)	30 m (100 ft)	40 m (130 ft)	8 m (26 ft)	12 m (40 ft)	30 m (100 ft)	60 m (200 ft)
<b>Min. range</b>	0.3 m (1 ft)	0.3 m (1 ft)	0.3 m (1 ft)	0.3 m (1 ft)	0.6 m (2 ft)	0.9 m (3 ft)	0.6 m (2 ft)	0.6 m (2 ft)	0.9 m (3 ft)	1.8 m (6 ft)
<b>Max. temperature</b>	+65 °C (+149 °F)	+73 °C (+164 °F)	+95 °C (+203 °F)	+95 °C (+203 °F)	+95 °C (+203 °F)	+95 °C (+203 °F)	+145 °C (+293 °F)	+145 °C (+293 °F)	+150 °C (+300 °F)	+150 °C (+300 °F)
<b>Min. temperature</b>	-20 °C (-4 °F)	-40 °C (-40 °F)	-40 °C (-40 °F)	-40 °C (-40 °F)	-40 °C (-40 °F)	-40 °C (-40 °F)	-40 °C (-40 °F)	-40 °C (-40 °F)	-40 °C (-40 °F)	-40 °C (-40 °F)
<b>Typical Applications</b>	Wet wells and open channels	Chemical storage and liquid tanks	Dusty solids and slurries	Deep wet wells and solids	Powders, pellets and solids	Powders, pellets and solids	Hot acids and slurries, food	Hot acids and slurries	Clinker and coal bunkers	Clinker and coal bunkers
<b>Frequency</b>	44 kHz	44 kHz	44 kHz	44 kHz	30 kHz	22 kHz	44 kHz	44 kHz	22 kHz	13 kHz
<b>Beam angle (-3dB)</b>	10°	12°	12°	6°	6°	6°	12°	6°	5°	5°
<b>Thread size</b>	R 1" [(BSPT), EN 10226] 1" NPT	1" and 2" NPT R 2" [(BSPT), EN 10226], 2" [(BSPP), EN ISO 228-1]	R 1" [(BSPT), EN 10226] 1" NPT	R 1" [(BSPT), EN 10226] 1" NPT	R 1.5" [(BSPT), EN 10226] Universal thread 1.5" NPT	R 1.5" [(BSPT), EN 10226] Universal thread 1.5" NPT	R 1" [(BSPT), EN 10226] 1" NPT	R 1" [(BSPT), EN 10226] 1" NPT	1" NPT	1" NPT
<b>Enclosure</b>	<ul style="list-style-type: none"> <li>PVDF Copolymer</li> <li>CSM</li> <li>Option: Flange with PTFE facing</li> </ul>	<ul style="list-style-type: none"> <li>ETFE</li> <li>Option: PVDF</li> </ul>	<ul style="list-style-type: none"> <li>PVDF</li> <li>Option: Foam facing</li> <li>Flange with PTFE facing</li> </ul>	<ul style="list-style-type: none"> <li>PVDF</li> <li>Option: Foam facing</li> <li>Flange with PTFE facing</li> </ul>	<ul style="list-style-type: none"> <li>PVDF</li> <li>Option: Foam facing</li> <li>Flange with PTFE facing</li> </ul>	<ul style="list-style-type: none"> <li>PVDF</li> <li>Option: Foam facing</li> </ul>	<ul style="list-style-type: none"> <li>PVDF</li> <li>Option: Flange with PTFE facing</li> <li>Sanitary version</li> </ul>	<ul style="list-style-type: none"> <li>PVDF</li> <li>Option: Flange with PTFE facing</li> </ul>	<ul style="list-style-type: none"> <li>Aluminum</li> <li>304 Stainless steel</li> <li>Polyester</li> <li>Silicone</li> </ul>	<ul style="list-style-type: none"> <li>Aluminum</li> <li>304 Stainless steel</li> <li>Polyester</li> <li>Silicone</li> </ul>
<b>Compatible with:</b>										
<b>SITRANS LU</b>	•	•	•	•	•	•	•	•	•	•
<b>SITRANS LUC500</b>	•	•	•	•			•	•		
<b>Hydro Ranger 200</b>	•	•	•	•			•	•		
<b>Multi-Ranger 100/200</b>	•	•	•	•			•	•		
<b>OCM III</b>	•									

<sup>1)</sup> Application conditions such as extreme dust or angle of repose may reduce the usable maximum range. Consult your local Siemens representative for further information.

# Level Measurement

## Continuous level measurement - Ultrasonic transducers

ST-H

### Overview



ST-H transducers use ultrasonic technology to measure level in chemical storage and liquid tanks.

### Benefits

- Can be mounted on a 2" (50.8 mm) standpipe
- Immune to corrosive and harsh environments
- Integral temperature sensor

### Application

The narrow design of the ST-H allows the transducer to be mounted on a 2" (50.8 mm) standpipe. When mounted correctly, it is completely protected from the process and can even be used in harsh, corrosive environments.

During operation, the ultrasonic transducer emits acoustic pulses in a narrow beam perpendicular to the transducer face. The level transceiver measures the propagation time between pulse emission and reception of the echo to calculate the distance from the transducer to the material. Variations in sound velocity due to changes in temperature within the permissible range are automatically compensated by the integral temperature sensor.

- Key Applications: chemical storage, liquid tanks

### Technical specifications

Mode of operation	
Measuring principle	Ultrasonic transducer
Input	
Measuring range	0.3 ... 10 m (1 ... 33 ft)
Output	
Frequency	44 kHz
Beam angle	12°
Accuracy	
Temperature compensation	Compensated by integral temperature sensor
Rated operating conditions	
Pressure	Normal atmospheric pressure
Ambient conditions	
• Ambient temperature	-20 ... +60 °C (-5 ... +140 °F) (ATEX approved model) -40 ... +73 °C (-40 ... +163 °F) (CSA/FM approved model)
Design	
Weight <sup>1)</sup>	1.4 kg (3 lbs)
Material (enclosure)	Base and lid made of ETFE or PVDF (epoxy fitted joint) <sup>2)</sup>
Process connection	2" NPT [(Taper), ANSI/ASME B1.20.1], R 2" [(BSPT), EN 10226] or G 2" [(BSPP), EN ISO 228-1]
Degree of protection	IP68
Cable connection	2-core shielded/twisted, 0.519 mm <sup>2</sup> (20 AWG), PVC sheath
Cable (max. length)	365 m (1200 ft) with RG 62 A/U coaxial cable
Options	
Flange adapter	3" Universal (fits DN 65, PN 10 and 3" ASME)
Submergence coupling	For maintaining high level readings while the transducer is submerged
Certificates and approvals	
	CE <sup>3)</sup> , CSA Class I, II, III, Div. 1, Gr. A, B, C, D, E, F, G T3 (ETFE only), FM Class I, II, Div. 1, Gr. C, D, E, F, G T4A, ATEX II 2G EEx m IIC T5, C-TICK, INMETRO: Br-Ex m II T5

- <sup>1)</sup> Approximate shipping weight of transducer with standard cable length
- <sup>2)</sup> When measuring chemicals, check compatibility of ETFE or PVDF and epoxy, or mount joint external to process.
- <sup>3)</sup> EMC certificate available on request

# Level Measurement

## Continuous level measurement - Ultrasonic transducers

ST-H

**Selection and Ordering data****Echomax® ST-H ultrasonic transducer**

Level measurement in chemical storage and liquid tanks. The narrow design of the ST-H allows the transducer to be mounted on a 2" standpipe. Measuring range: min. 0.3 m (1 ft), max. 10 m (33 ft).

**Process connection**

ETFE, 2" NPT [(Taper), ANSI/ASME B1.20.1]

ETFE, R 2" [(BSPT), EN 10226]

ETFE, G 2" [(BSPP), EN ISO 228-1]

PVDF copolymer, 2" NPT [(Taper), ANSI/ASME B1.20.1]

PVDF copolymer, R 2" [(BSPT), EN 10226]

PVDF copolymer, G 2" [(BSPP), EN ISO 228-1]

**Cable length**

5 m (16.40 ft)

10 m (32.81 ft)

30 m (98.43 ft)

50 m (164.04 ft)

100 m (328.08 ft)

**Approvals**

FM Class I, II, Div. 1, C-TICK

ATEX II 2G, CSA, C-TICK, INMETRO <sup>1)</sup>

ATEX II 2G, C-TICK, INMETRO <sup>2)</sup>

**Operating Instructions**

Quick Start Manual, multi-language

Applications Guidelines, multi-language

Note: The Applications Guidelines should be ordered as a separate line item on the order.

This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.

<sup>1)</sup> Available with Process connection options 0 to 2 only

<sup>2)</sup> Available with Process connection options 3 to 5 only

C) Subject to export regulations AL: N, ECCN: EAR99

Order No.

7ML1100-

A 0

0

1

2

3

4

5

A

B

C

D

E

2

3

4

C) 7ML1998-5QK82

C) 7ML1998-5HV61

**Selection and Ordering data****Further designs**

Please add "-Z" to Order No. and specify Order code(s).

Acrylic coated, stainless steel tag [13 x 45 mm (0.5 x 1.75")]: Measuring-point number/identification (max. 16 characters) specify in plain text

**Accessories**

Universal box bracket, mounting kit

3" ASME, DN 65 PN 10, JIS 10K 3B ETFE flange adapter for 2" NPT

3" ASME, DN 65 PN 10, JIS 10K 3B ETFE flange adapter for 2" BSPT

Easy Aimer 2, NPT with ¾" x 1" PVC coupling

Easy Aimer 2, aluminum with M20 adapter and 1" and 1½" BSPT aluminum couplings

Easy Aimer 304, with stainless steel coupling

Easy Aimer 304, with M20 adapter and 1" and 1½" BSPT 304 SS couplings

Order code

Y17

Order No.

7ML1830-1BK

7ML1830-1BT

7ML1830-1BU

7ML1830-1AQ

7ML1830-1AX

7ML1830-1AU

7ML1830-1GN

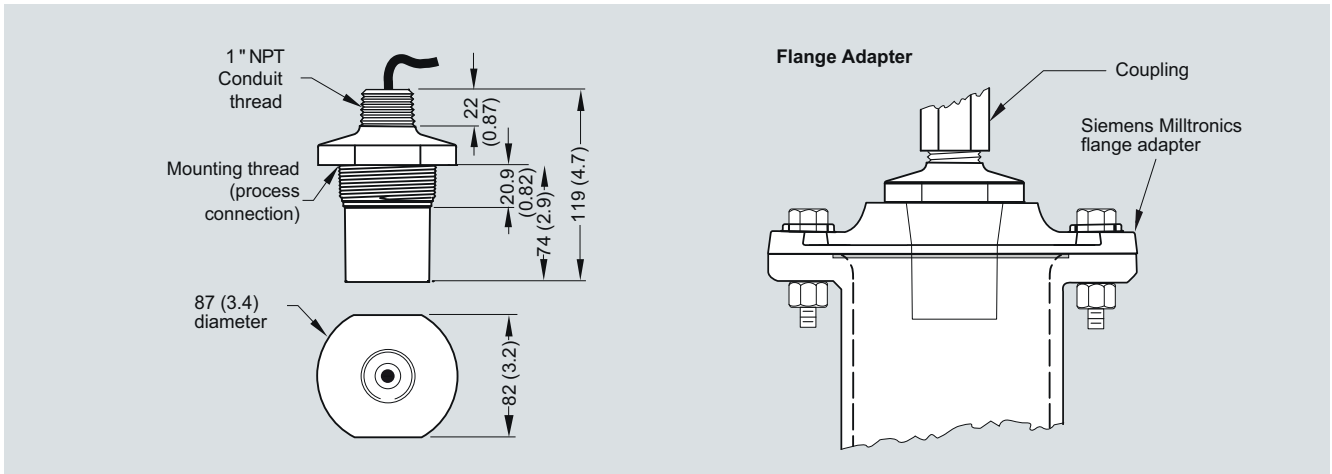
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# Level Measurement

## Continuous level measurement - Ultrasonic transducers

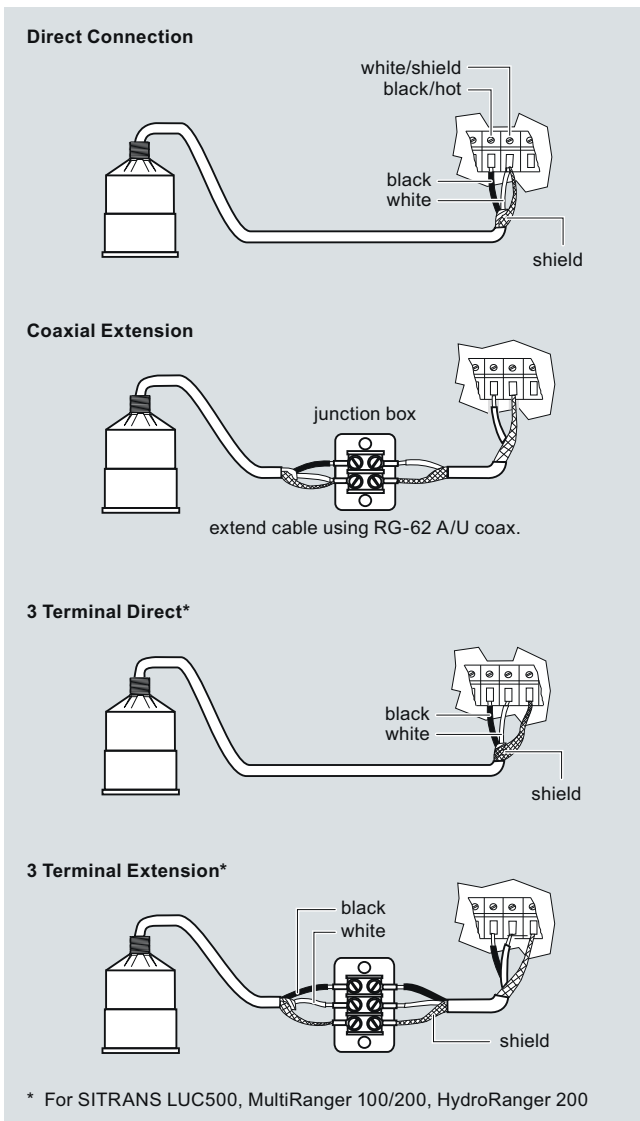
ST-H

### Dimensional drawings



ST-H ultrasonic transducer, dimensions in mm (inch)

### Schematics



ST-H ultrasonic transducer connections

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# Level Measurement

## Continuous level measurement - Ultrasonic transducers

### Echomax XRS-5

#### Overview



Echomax® XRS-5 ultrasonic transducer provides reliable, continuous level monitoring of liquids and slurries in narrow lift stations/wet wells, flumes, weirs and filter beds using a beam angle of just 10° and a CSM rubber face.

#### Benefits

- Narrow beam angle of only 10°
- Chemically resistant PVDF copolymer enclosure and CSM rubber face
- Measuring range: 8 m (26 ft) for measurement of liquids and slurries
- Fully submersible: IP68 degree of protection
- Easy installation with 1" NPT or R 1" BSPT connection

#### Application

The XRS-5 is non-contacting with a measuring range from 0.3 to 8 m (1 to 26 ft). Advanced echo processing ensures reliable data even in conditions with obstructions, turbulence and foam.

The hermetically sealed CSM rubber face and the PVDF copolymer enclosure are designed for maximum resistance to methane, salt water, caustics and harsh chemicals common to wastewater installations. With an IP68 degree of protection, this rugged sensor is fully submersible in the event of flood conditions. Use a submergence shield if full submergence is possible in the application. A submergence shield will maintain a high level reading output during submerged conditions.

The low-cost XRS-5 transducer is compatible with a full range of Siemens controllers, from a basic system for high/low alarm or simple pump control, up to advanced control systems with communications, telemetry and SCADA integration capabilities.

- Key Applications: wet wells, flumes, weirs, filter beds

#### Technical specifications

<b>Mode of operation</b>	
Measuring principle	Ultrasonic transducer
<b>Input</b>	
Measuring range	0.3 ... 8 m (1 ... 26 ft), dependent on application
<b>Output</b>	
Frequency	44 kHz
Beam angle	10°
<b>Accuracy</b>	
Temperature error	Compensated by integral temperature sensor
<b>Rated operating conditions</b>	
Vessel pressure	Normal atmospheric pressure
Ambient conditions	
• Ambient temperature	-20 ... +65 °C (-4 ... +149 °F)
<b>Design</b>	
Weight (approximate shipping weight of sensor with standard cable length)	1.2 kg (2.6 lbs)
Material (enclosure)	PVDF copolymer enclosure and CSM face
Process connection	1" NPT [(Taper), ANSI/ASME B1.20.1] or R 1" [(BSPT), EN 10226]
Degree of protection	IP65/IP68
Cable connection	2-core shielded/twisted, 0.5 mm <sup>2</sup> (20 AWG), PVC sheath
Cable (max. length)	<ul style="list-style-type: none"> <li>• 365 m (1200 ft) with RG 62 A/U coaxial cable</li> <li>• 365 m (1200 ft) with 2-core twisted pair, foil shield, 0.5 mm<sup>2</sup> (20 AWG), PVC sheath, only for SITRANS LUC500, MultiRanger 100/200</li> </ul>
<b>Options</b>	
Flange version	Factory flange with PTFE face for ASME, EN or JIS configuration
Submergence shield	For applications with flooding possible
<b>Certificates and approvals</b>	
CE (EMC certificate available on request), CSA Class I Div. 2, FM Class I, ATEX II 2G, SAA Ex s Class I	

# Level Measurement

## Continuous level measurement - Ultrasonic transducers

Echomax XRS-5

Selection and Ordering data	Order No.	Selection and Ordering data	Order code
<b>Echomax® XRS-5 transducer</b> With a beam angle of 10°, the XRS-5 provides reliable, continuous level monitoring of liquids and slurries in narrow lift stations/wet wells, flumes, weirs and filter beds. Measuring range: min. 0.3 m (1 ft), max. 8 m (26 ft)	C) <b>7ML1106-0-0</b>	<b>Further designs</b> Please add "-Z" to Order No. and specify Order code(s). Acrylic coated, stainless steel tag [13 x 45 mm (0.5 x 1.75")]: Measuring-point number/identification (max. 16 characters) specify in plain text	<b>Y17</b>
<b>Process connection</b> 1" NPT [(Taper), ANSI/ASME B1.20.1] R 1" [(BSPT), EN 10226]	1 2	<b>Accessories</b> Submergence shield kit	Order No. <b>7ML1830-1BH</b>
<b>Cable length</b> 5 m (16.40 ft) 10 m (32.81 ft) 30 m (98.43 ft)	A B C	Easy Aimer 2, NPT with ¾" x 1" PVC coupling	<b>7ML1830-1AQ</b>
<b>Facing</b> Standard (CSM rubber) PTFE (flange versions)	A B	Easy Aimer 2, aluminum with M20 adapter and 1" and 1½" BSPT aluminum couplings	<b>7ML1830-1AX</b>
<b>Approvals</b> CE, FM Class I, ATEX II 2G, CSA Class I Div. 2, SAA Class I	2	Easy Aimer 304, with stainless steel coupling	<b>7ML1830-1AU</b>
<b>Mounting flange (flush mount)</b> None 3" ASME, 150 lbs, flat faced 4" ASME, 150 lbs, flat faced 6" ASME, 150 lbs, flat faced DN 80, PN 10/16, Type A, flat faced DN 100, PN 10/16, Type A, flat faced DN 150, PN 10/16, Type A, flat faced JIS10K 3B style JIS10K 4B style JIS10K 6B style Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1, or JIS B 2220 standard.	A B C D J K L Q R S	Easy Aimer 304, with M20 adapter and 1" and 1½" BSPT 304 SS couplings	<b>7ML1830-1GN</b>
<b>Operating Instructions</b> Quick Start Manual, multi-language Applications Guidelines, multi-language Note: The Applications Guidelines should be ordered as a separate line item on the order. This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	C) <b>7ML1998-5QT81</b> C) <b>7ML1998-5HV61</b>	FMS-200 universal box bracket, mounting kit FMS-210 channel bracket, wall mount FMS-220 extended channel bracket, wall mount FMS-310 channel bracket, floor mount FMS-320 extended channel bracket, floor mount FMS-350 bridge channel bracket, floor mount (see Mounting Brackets on page 5/190 for more information)	<b>7ML1830-1BK</b> <b>7ML1830-1BL</b> <b>7ML1830-1BM</b> <b>7ML1830-1BN</b> <b>7ML1830-1BP</b> <b>7ML1830-1BQ</b>
		1" NPT locknut, plastic 1" BSPT locknut, plastic	<b>7ML1830-1DS</b> <b>7ML1830-1DR</b>

C) Subject to export regulations AL: N, ECCN: EAR99

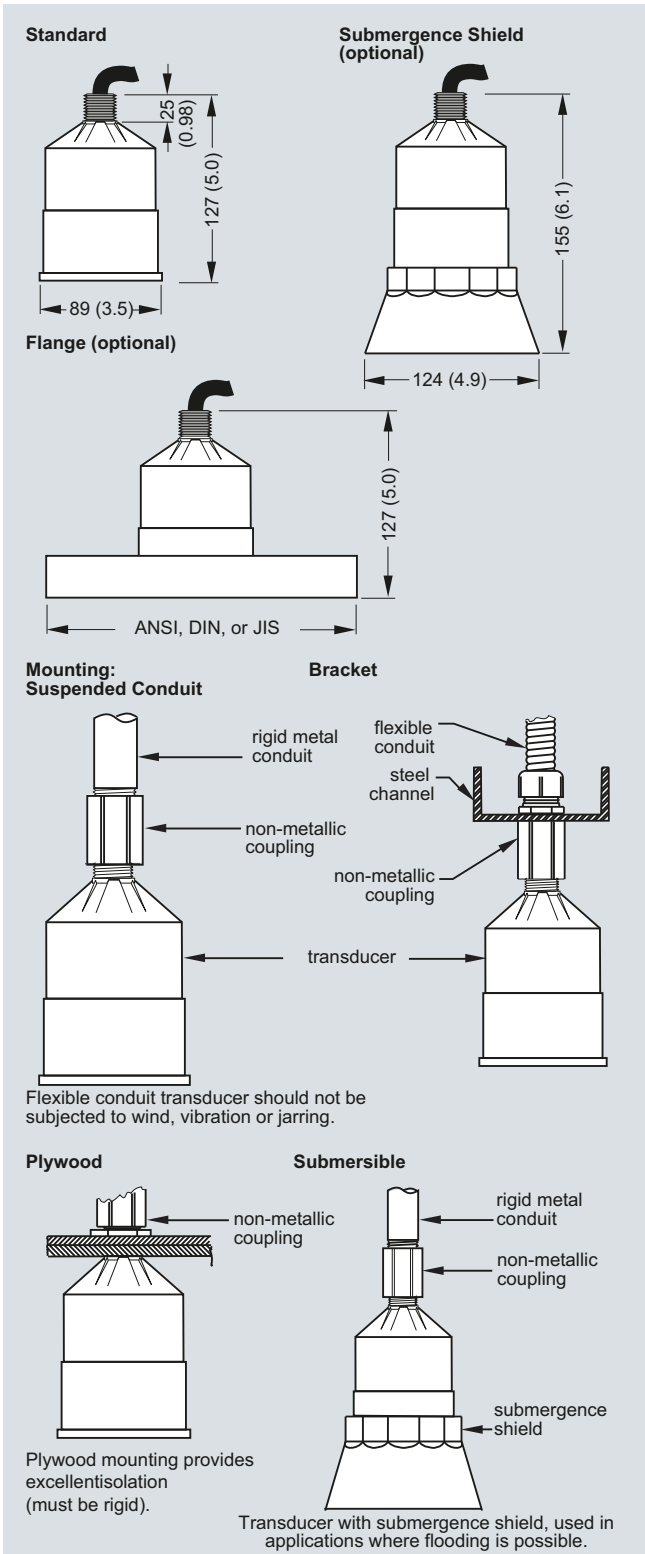


# Level Measurement

## Continuous level measurement - Ultrasonic transducers

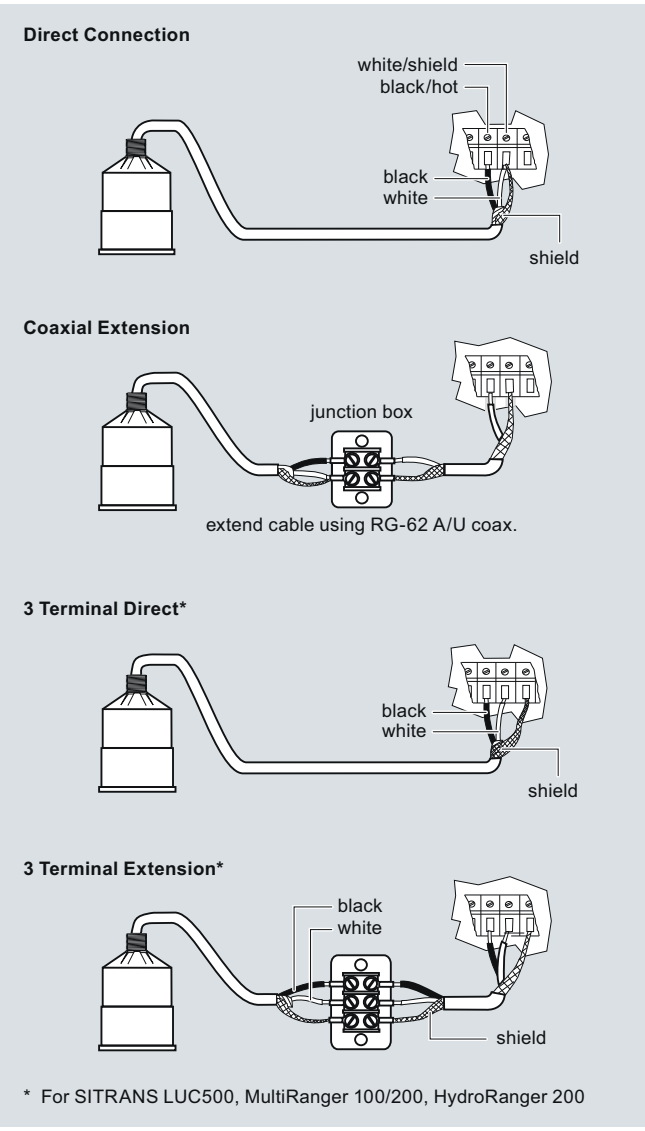
### Echomax XRS-5

#### Dimensional drawings



XRS-5 ultrasonic transducer, dimensions in mm (inch)

#### Schematics



XRS-5 ultrasonic transducer connections

5

# Level Measurement

## Continuous level measurement - Ultrasonic transducers

Echomax XPS and XCT

### Overview



Echomax® XPS/XCT transducers use ultrasonic technology to measure level in a wide range of liquids and solids.

### Benefits

- Integral temperature compensation
- Low ringing effect reduces blanking distance
- Optional foam facing for dusty applications
- Self-cleaning and low-maintenance
- Chemically resistant
- Hermetically sealed

### Application

The transducers can be fully immersed, are resistant to steam and corrosive chemicals, and can be installed without flanges.

The XPS series offers versions for various measuring ranges up to 40 m (130 ft) and up to a max. temperature of +95 °C (+203 °F).

The XCT series can be used in applications at higher temperatures to measure level up to a distance of 12 m (40 ft) and at a max. temperature of +145 °C (+293 °F).

During operation, the Echomax transducers emit acoustic pulses in a narrow beam. The level monitor measures the propagation time between pulse emission and its reflection (echo) to calculate the distance.

# Level Measurement

## Continuous level measurement - Ultrasonic transducers

### Echomax XPS and XCT

#### Technical specifications

Input	XPS-10 (standard and F models)	XPS-15 (standard and F models)	XPS-30	XPS-40	XCT-8 (standard and sanitary models)	XCT-12
Measuring range	0.3 ... 10 m (1 ... 33 ft)	Standard: 0.3 ... 15 m (1 ... 50 ft)  Flanged: 0.45 ... 15 m (1.5 ... 50 ft)	0.6 ... 30 m (2 ... 100 ft)	0.9 ... 40 m (3 ... 130 ft)	0.6 ... 8 m (2 ... 26 ft)	0.6 ... 12 m (2 ... 40 ft)
<b>Output</b>						
Frequency	44 kHz	44 kHz	30 kHz	22 kHz	44 kHz	44 kHz
Beam angle	12°	6°	6°	6°	12°	6°
<b>Environmental</b>						
Location	Indoors/outdoors					
Ambient temperature	-40 ... +95 °C (-40 ... +203 °F)				Standard: -40 ... +145 °C (-40 ... +293 °F)  Sanitary: -40 ... +125 °C (-40 ... +260 °F)	-40 ... +145 °C (-40 ... +293 °F)
Pollution degree	4					
Pressure	8 bar g (120 psi g)  Flanged: 0.5 bar g (7.25 psi g)	8 bar g (120 psi g)  Flanged: 0.5 bar g (7.25 psi g)	0.5 bar g (7.25 psi g)  Flanged: 0.5 bar g (7.25 psi g)	0.5 bar g (7.25 psi g)	Standard: 4 bar g (60 psi g): -40 ... +138 °C (-40 ... +280 °F)  Standard: 8 bar g (120 psi g): -40 ... +95 °C (-40 ... +203 °F)  Flanged: 0.5 bar g (7.25 psi g)  Sanitary: XCT-8: 0.5 bar g (7.25 psi g)	
<b>Design</b>						
Weight	0.8 kg (1.8 lbs)	1.3 kg (2.8 lbs)  Flanged: 2 kg (4.4 lbs)	4.3 kg (9.5 lbs)	8 kg (18 lbs)	0.8 kg (1.7 lbs)	1.3 kg (2.8 lbs)
Power supply	Operation of transducer only with approved Siemens Milltronics controllers					
Material	Standard: PVDF  Flanged: PVDF with CPVC flange  Option: PTFE face with CPVC flange	Standard: PVDF  Flanged: PVDF with CPVC flange  Option: PTFE face with CPVC flange	Standard: PVDF  Flanged: PVDF with CPVC flange  Option: PTFE face with CPVC flange	PVDF	Standard: PVDF  Options: DERAKANE® flange; PTFE face with universal PVDF flange	
Color	Standard: blue  F: gray	Standard: blue  F: gray	blue	blue	white	
Process connection	Standard: 1" NPT or 1" BSPT  F: 1" NPT	Standard: 1" NPT or 1" BSPT  F: 1" NPT	1.5" universal thread (NPT or BSPT)		1" NPT or R 1" (BSPT), EN 10226	
Degree of protection	IP66/68	IP66/68	IP66/68	IP66/68	IP66/68	IP66/68
Cable	2 wire twisted pair/braided and foil shielded 0.5 mm <sup>2</sup> (20 AWG) PVC jacket				2 wire twisted pair/braided and foil shielded 0.5 mm <sup>2</sup> (20 AWG) silicone jacket	
Separation	Max. 365 m (1200 ft)					
<b>Certificates and approvals</b>	Standard: CE <sup>1)</sup> , CSA, FM, ATEX II 2GD  F: FM Class I, Div 1, Groups A, B, C and D, Class II Div 1, Groups E, F and G, Class III	Standard: CE <sup>1)</sup> , CSA, FM, ATEX II 2GD  F: FM Class I, Div 1, Groups A, B, C and D, Class II Div 1, Groups E, F and G, Class III	CE <sup>1)</sup> , CSA, FM, ATEX II 2G 1D	CE <sup>1)</sup> , CSA, FM, ATEX II 2G 1D	Standard: CE <sup>1)</sup> , CSA, FM, ATEX II 2G  Sanitary: CE, C-TICK, CSA <sub>US/C</sub>	CE <sup>1)</sup> , CSA, FM, ATEX II 2G

<sup>1)</sup> EMC certificate available on request.

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# Level Measurement

## Continuous level measurement - Ultrasonic transducers

Echomax XPS and XCT

Selection and Ordering data	Order No.	Selection and Ordering data	Order code
<b>Echomax® XPS-10 ultrasonic transducer</b> High-frequency ultrasonic transducer designed for a wide variety of liquid and solid applications, for use with approved controllers. Includes integral temperature sensor. Measuring range: min. 0.3 m, max. 10 m	C) 7ML1115-0	<b>Further designs</b> Please add <b>"-Z"</b> to Order No. and specify Order code(s).  Acrylic coated, stainless steel tag [13 x 45 mm Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text	Y15
<b>Mounting thread and facing</b> 1" NPT [(Taper), ANSI/ASME B1.20.1] 1" NPT [(Taper), ANSI/ASME B1.20.1] with foam facing <sup>1)</sup> 1" NPT [(Taper), ANSI/ASME B1.20.1] with PTFE facing <sup>2)</sup>  R 1" [(BSPT), EN 10226] R 1" [(BSPT), EN 10226] with foam facing <sup>1)</sup> R 1" [(BSPT), EN 10226] with PTFE facing <sup>2)</sup>	0 1 2 3 4 5	<b>Operating Instructions</b> Quick Start guide, multi-language Applications Guidelines, multi-language Note: The Applications Guidelines should be ordered as a separate line item on the order.  This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	Order No. C) 7ML1998-5QM82 C) 7ML1998-5HV61
<b>Cable length</b> 5 m (16.40 ft) 10 m (32.81 ft) 30 m (98.43 ft)  50 m (164.04 ft) 100 m (328.08 ft)	B C E F K	<b>Accessories</b> Tag, stainless steel with hole, 12 x 45 mm (0.47 x 1.77"), one text line for fastening on sensors Submergence shield kit Easy Aimer 2, with ¾" x 1" NPT PVC coupling  Easy Aimer 2, aluminum with M20 adapter and 1" and 1½" BSPT aluminum couplings Easy Aimer 304, with stainless steel coupling Easy Aimer 304, with M20 adapter and 1" and 1½" BSPT 304 SS couplings  Universal box bracket, mounting kit Channel bracket, wall mount Extended channel bracket, wall mount  Channel bracket, floor mount Extended channel bracket, floor mount Bridge channel bracket, floor mount (see Mounting Brackets on page 5/190 for more information)  1" NPT locknut, plastic 1" BSPT locknut, plastic	7ML1930-1BJ  7ML1830-1BH 7ML1830-1AQ 7ML1830-1AX 7ML1830-1AU 7ML1830-1GN  7ML1830-1BK 7ML1830-1BL 7ML1830-1BM  7ML1830-1BN 7ML1830-1BP 7ML1830-1BQ  7ML1830-1DS 7ML1830-1DR
<b>Mounting flange</b> None 3" ASME, 150 lb, flat faced 4" ASME, 150 lb, flat faced 6" ASME, 150 lb, flat faced 8" ASME, 150 lb, flat faced  DN 80, PN 10/16, Type A, flat faced DN 100, PN 10/16, Type A, flat faced DN 150, PN 10/16, Type A, flat faced  JIS10K3B Style JIS10K4B Style JIS10K6B Style (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1, or JIS B 2220 standard.)	A C D E F G J L M P R	1" NPT locknut, plastic 1" BSPT locknut, plastic  C) Subject to export regulations AL: N, ECCN: EAR99	
<b>Approvals</b> ATEX II 2 GD, FM Class I Div. 2, SAA Class I CSA Class I Div. 1 <sup>3)</sup>	3 4		

1) Not available with flanged versions

2) Available with flanged versions only

3) Valid with mounting thread and facing options 0 to 2 only

C) Subject to export regulations AL: N, ECCN: EAR99

# Level Measurement

## Continuous level measurement - Ultrasonic transducers

### Echomax XPS and XCT

#### Selection and Ordering data

##### Echomax® XPS-10F ultrasonic transducer

High-frequency ultrasonic transducer designed for a wide variety of liquid and solid applications, for use with approved controllers. Includes integral temperature sensor.

Measuring range: min. 0.3 m, max. 10 m

##### Mounting thread and facing

1" NPT [(Taper), ANSI/ASME B1.20.1]

##### Cable length

5 m (16.40 ft)  
10 m (32.81 ft)  
30 m (98.43 ft)  
50 m (164.04 ft)  
100 m (328.08 ft)

##### Mounting flange, flush mount

None

3" ASME, 150 lb, flat faced

4" ASME, 150 lb, flat faced

6" ASME, 150 lb, flat faced

8" ASME, 150 lb, flat faced

(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5, or EN 1092-1, or JIS B 2220 standard.)

##### Approvals

FM Class I Div. 1

C) Subject to export regulations AL: N, ECCN: EAR99

Order No.

C) 7ML1170-

0

1

B

C

D

E

F

A

B

C

D

E

F

1

#### Selection and Ordering data

##### Further designs

Please add "-Z" to Order No. and specify Order code(s).

Acrylic coated, stainless steel tag [13 x 45 mm

Stainless steel tag [69 x 50 mm (2.71 x 1.97")]:

Measuring-point number/identification

(max. 16 characters) specify in plain text

##### Operating Instructions

Quick Start guide, multi-language

Applications Guidelines, multi-language

Note: The Applications Guidelines should be ordered as a separate line item on the order.

This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.

##### Accessories

Tag, stainless steel with hole, 12 x 45 mm

(0.47 x 1.77"), one text line for fastening on sensors

Submergence shield kit

Easy Aimer 2, with 3/4" x 1" NPT PVC coupling

Easy Aimer 304, with stainless steel coupling

Universal box bracket, mounting kit

Channel bracket, wall mount

Extended channel bracket, wall mount

Channel bracket, floor mount

Extended channel bracket, floor mount

Bridge channel bracket, floor mount  
(see Mounting Brackets on page 5/190 for more information)

1" NPT locknut, plastic

C) Subject to export regulations AL: N, ECCN: EAR99

Order code

Y15

Order No.

C) 7ML1998-1DU01

C) 7ML1998-5HV61

7ML1930-1BJ

7ML1830-1BH

7ML1830-1AQ

7ML1830-1AU

7ML1830-1BK

7ML1830-1BL

7ML1830-1BM

7ML1830-1BN

7ML1830-1BP

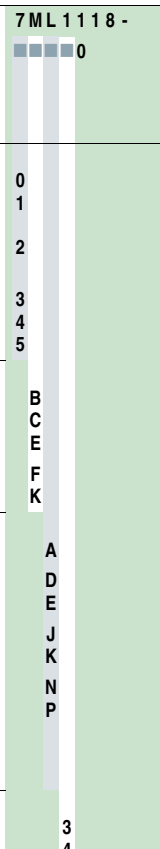
7ML1830-1BQ

7ML1830-1DS

# Level Measurement

## Continuous level measurement - Ultrasonic transducers

Echomax XPS and XCT

Selection and Ordering data	Order No.	Selection and Ordering data	Order code
<b>Echomax® XPS-15 ultrasonic transducer</b> C) High-frequency ultrasonic transducer designed for a wide variety of liquid and solid applications, for use with approved controllers. Includes integral temperature sensor. Measuring range: min. 0.3 m, max. 15 m	<b>7ML1118-0</b> 	<b>Further designs</b> Please add "-Z" to Order No. and specify Order code(s). Acrylic coated, stainless steel tag [13 x 45 mm Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text	<b>Y15</b>
<b>Mounting thread and facing</b> 1" NPT [(Taper), ANSI/ASME B1.20.1] 1" NPT [(Taper), ANSI/ASME B1.20.1] with foam facing <sup>1)</sup> 1" NPT [(Taper), ANSI/ASME B1.20.1] with PTFE facing <sup>2)</sup> R 1" [(BSPT), EN 10226] R 1" [(BSPT), EN 10226] with foam facing <sup>1)</sup> R 1" [(BSPT), EN 10226] with PTFE facing <sup>2)</sup>	0 1 2 3 4 5	<b>Operating Instructions</b> Quick Start guide, multi-language C) Applications Guidelines, multi-language C) Note: The Applications Guidelines should be ordered as a separate line item on the order. This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	Order No. C) <b>7ML1998-5QM82</b> C) <b>7ML1998-5HV61</b>
<b>Cable length</b> 5 m (16.40 ft) 10 m (32.81 ft) 30 m (98.43 ft) 50 m (164.04 ft) 100 m (328.08 ft)	B C E F K	<b>Accessories</b> Tag, stainless steel with hole, 12 x 45 mm (0.47 x 1.77"), one text line for fastening on sensors Submergence shield kit Universal box bracket, mounting kit Channel bracket, wall mount Extended channel bracket, wall mount Channel bracket, floor mount Extended channel bracket, floor mount Bridge channel bracket, floor mount (see Mounting Brackets on page 5/190 for more information) 1" NPT locknut, plastic 1" BSPT locknut, plastic Easy Aimer 2, with ¾" x 1" NPT PVC coupling Easy Aimer 2, aluminum with M20 adapter and 1" and 1½" BSPT aluminum couplings Easy Aimer 304 with stainless steel coupling Easy Aimer 304, with M20 adapter and 1" and 1½" BSPT 304 SS couplings	<b>7ML1930-1BJ</b> <b>7ML1830-1BJ</b> <b>7ML1830-1BK</b> <b>7ML1830-1BL</b> <b>7ML1830-1BM</b> <b>7ML1830-1BN</b> <b>7ML1830-1BP</b> <b>7ML1830-1BQ</b> <b>7ML1830-1DS</b> <b>7ML1830-1DR</b> <b>7ML1830-1AQ</b> <b>7ML1830-1AX</b> <b>7ML1830-1AU</b> <b>7ML1830-1GN</b>
<b>Mounting flange</b> None 6" ASME, 150 lb, flat faced 8" ASME, 150 lb, flat faced DN 150, PN 10/16, Type A, flat faced DN 200, PN 10/16, Type A, flat faced JIS10K 6B JIS10K 8B (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1, or JIS B 2220 standard.)	A D E J K N P	C) Subject to export regulations AL: N, ECCN: EAR99	
<b>Approvals</b> ATEX II 2GD, FM Class I Div. 2, SAA Class I CSA Class I Div. 1 <sup>3)</sup>	3 4		
1) Not available with flanged versions 2) Available with flanged versions only 3) Available with mounting options 0 to 2 only C) Subject to export regulations AL: N, ECCN: EAR99			

# Level Measurement

## Continuous level measurement - Ultrasonic transducers

### Echomax XPS and XCT

Selection and Ordering data	Order No.
<b>Echomax® XPS-15F ultrasonic transducer</b> C) High-frequency ultrasonic transducer designed for a wide variety of liquid and solid applications, for use with approved controllers. Includes integral temperature sensor. Measuring range: min. 0.3 m, max. 15 m	<b>7ML1171-0</b>
<b>Mounting thread and facing</b> 1" NPT [(Taper), ANSI/ASME B1.20.1]	<b>1</b>
<b>Cable length</b> 5 m (16.40 ft) 10 m (32.81 ft) 30 m (98.43 ft) 50 m (164.04 ft) 100 m (328.08 ft)	<b>B</b> <b>C</b> <b>D</b> <b>E</b> <b>F</b>
<b>Mounting flange, flush mount</b> None 6" ASME, 150 lb, flat faced 8" ASME, 150 lb, flat faced (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5, or EN 1092-1, or JIS B 2220 standard.)	<b>A</b> <b>B</b> <b>C</b>
<b>Approvals</b> FM Class I Div. 1	<b>1</b>
C) Subject to export regulations AL: N, ECCN: EAR99	

Selection and Ordering data	Order code
<b>Further designs</b> Please add <b>"-Z"</b> to Order No. and specify Order code(s). Acrylic coated, stainless steel tag [13 x 45 mm Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text	<b>Y15</b>
<b>Operating Instructions</b> Quick Start guide, multi-language Applications Guidelines, multi-language Note: The Applications Guidelines should be ordered as a separate line item on the order. This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	<b>7ML1998-1DU01</b> <b>7ML1998-5HV61</b>
<b>Accessories</b> Tag, stainless steel with hole, 12 x 45 mm (0.47 x 1.77"), one text line for fastening on sensors Submergence shield kit Universal box bracket, mounting kit Channel bracket, wall mount Extended channel bracket, wall mount Channel bracket, floor mount Extended channel bracket, floor mount Bridge channel bracket, floor mount (see Mounting Brackets on page 5/190 for more information) 1" NPT locknut, plastic Easy Aimer 2, with ¾" x 1" NPT PVC coupling Easy Aimer 304 with stainless steel coupling	<b>7ML1930-1BJ</b> <b>7ML1830-1BJ</b> <b>7ML1830-1BK</b> <b>7ML1830-1BL</b> <b>7ML1830-1BM</b> <b>7ML1830-1BN</b> <b>7ML1830-1BP</b> <b>7ML1830-1BQ</b> <b>7ML1830-1DS</b> <b>7ML1830-1AQ</b> <b>7ML1830-1AU</b>
C) Subject to export regulations AL: N, ECCN: EAR99	

Selection and Ordering data	Order No.
<b>Echomax® XPS-30 ultrasonic transducer</b> C) High-frequency ultrasonic transducer designed for a wide variety of liquid and solid applications, for use with approved controllers. Includes integral temperature sensor. 1½" universal thread compatible with 1½" NPT and R 1½" [(BSPT), EN 10226] Measuring range: min. 0.6 m (1.97 ft), max. 30 m (98.43 ft)	<b>7ML1123-0</b>
<b>Mounting thread and facing</b> 1½" universal thread 1½" universal thread, foam facing <sup>1)</sup> 1½" universal thread, PTFE facing <sup>2)</sup>	<b>0</b> <b>1</b> <b>2</b>
<b>Cable length</b> 5 m (16.40 ft) 10 m (32.81 ft) 30 m (98.43 ft) 50 m (164.04 ft) 100 m (328.08 ft)	<b>B</b> <b>C</b> <b>E</b> <b>F</b> <b>K</b>
<b>Mounting flange</b> None 6" ASME, 150 lb, flat faced 8" ASME, 150 lb, flat faced DN 150, PN 10/16, Type A, flat faced DN 200, PN 10/16, Type A, flat faced JIS10K 6B JIS10K 8B (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1, or JIS B 2220 standard.)	<b>A</b> <b>D</b> <b>E</b> <b>J</b> <b>K</b> <b>N</b> <b>P</b>
<b>Approvals</b> ATEX II 2G 1D, FM Class I Div 2, SAA	<b>5</b>
<sup>1)</sup> Not available with flanged versions <sup>2)</sup> Available with flanged versions only C) Subject to export regulations AL: N, ECCN: EAR99	

Selection and Ordering data	Order code
<b>Further designs</b> Please add <b>"-Z"</b> to Order No. and specify Order code(s). Acrylic coated, stainless steel tag [13 x 45 mm Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text	<b>Y15</b>
<b>Operating Instructions</b> Quick Start guide, multi-language Applications Guidelines, multi-language Note: The Applications Guidelines should be ordered as a separate line item on the order. This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	<b>7ML1998-5QM82</b> <b>7ML1998-5HV61</b>
<b>Accessories</b> Tag, stainless steel with hole, 12 x 45 mm (0.47 x 1.77"), one text line for fastening on sensors 1½" BSPT locknut, plastic Easy Aimer 2, 1½" NPT galvanized coupling Easy Aimer 2, 1½" NPT with stainless steel coupling Easy Aimer 2, aluminum with M20 adapter and 1" and 1½" BSPT aluminum couplings Easy Aimer 304, with M20 adapter and 1" and 1½" BSPT 304 SS couplings	<b>7ML1930-1BJ</b> <b>7ML1830-1DP</b> <b>7ML1830-1AN</b> <b>7ML1830-1AT</b> <b>7ML1830-1AX</b> <b>7ML1830-1GN</b>
C) Subject to export regulations AL: N, ECCN: EAR99	

# Level Measurement

## Continuous level measurement - Ultrasonic transducers

Echomax XPS and XCT

Selection and Ordering data	Order No.	Selection and Ordering data	Order code
<b>Echomax® XPS-40 ultrasonic transducer</b> High-frequency ultrasonic transducer designed for a wide variety of liquid and solid applications, for use with approved controllers. Includes integral temperature sensor. 1½" universal thread compatible with 1½" NPT and R 1½" [(BSPT), EN 10226] Measuring range: min. 0.9 m (2.95 ft), max. 40 m (131.23 ft)	C) <b>7ML1127-0</b> 	<b>Further designs</b> Please add "-Z" to Order No. and specify Order code(s). Acrylic coated, stainless steel tag [13 x 45 mm Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text	<b>Y15</b>
<b>Mounting thread and facing</b> 1½" universal thread 1½" universal thread, foam facing	0 1	<b>Operating Instructions</b> Quick Start guide, multi-language Applications Guidelines, multi-language Note: The Applications Guidelines should be ordered as a separate line item on the order. This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	Order No. C) <b>7ML1998-5QM82</b> C) <b>7ML1998-5HV61</b>
<b>Cable length</b> 5 m (16.40 ft) 10 m (32.81 ft) 30 m (98.43 ft) 50 m (164.04 ft) 100 m (328.08 ft)	B C E F K	<b>Accessories</b> Tag, stainless steel with hole, 12 x 45 mm (0.47 x 1.77"), one text line for fastening on sensors 1½" BSPT locknut, plastic Easy Aimer 2, 1½" NPT galvanized coupling Easy Aimer 2, 1½" NPT with stainless steel coupling Easy Aimer 2, aluminum with M20 adapter and 1" and 1½" BSPT aluminum couplings Easy Aimer 304, with M20 adapter and 1" and 1½" BSPT 304 SS couplings	<b>7ML1930-1BJ</b> <b>7ML1830-1DP</b> <b>7ML1830-1AN</b> <b>7ML1830-1AT</b> <b>7ML1830-1AX</b> <b>7ML1830-1GN</b>
<b>Mounting flange</b> None	A		
<b>Approvals</b> ATEX II 2G 1D, FM Class I Div 2, SAA C) Subject to export regulations AL: N, ECCN: EAR99	5		
		C) Subject to export regulations AL: N, ECCN: EAR99	



# Level Measurement

## Continuous level measurement - Ultrasonic transducers

### Echomax XPS and XCT

#### Selection and Ordering data

**Echomax® XCT-8 ultrasonic transducer**  
High-frequency ultrasonic transducer designed for a wide variety of liquid and solid applications, for use with approved controllers. Includes integral temperature sensor.  
Ambient temperatures up to +145 °C (+293 °F)  
Measuring range: min. 0.6 m (2 ft), max. 8 m (26 ft)

#### Mounting thread and facing

1" NPT [(Taper), ANSI/ASME B1.20.1]  
1" NPT [(Taper), ANSI/ASME B1.20.1], PTFE facing<sup>1)</sup>  
R 1" [(BSPT), EN 10226]  
R 1" [(BSPT), EN 10226], PTFE facing<sup>1)</sup>

#### Cable length

1 m (3.28 ft)  
5 m (16.40 ft)  
10 m (32.81 ft)  
30 m (98.43 ft)  
50 m (164.04 ft)  
100 m (328.08 ft)

#### Mounting flange

None  
3" ASME, 150 lb, flat faced  
4" ASME, 150 lb, flat faced  
6" ASME, 150 lb, flat faced  
DN 80, PN 10/16, Type A, flat faced  
DN 100, PN 10/16, Type A, flat faced  
DN 150, PN 10/16, Type A, flat faced  
JIS10K 3B  
JIS10K 4B  
JIS10K 6B  
(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 or JIS B 2220 standard.)  
3" universal<sup>2)</sup>  
4" universal<sup>3)</sup>  
6" universal<sup>4)</sup>  
4" sanitary flange<sup>5)</sup>

#### Approvals

ATEX II 2G, FM Class I, Div. 2, SAA  
CSA Class I Div. 1, available with mounting thread and facing option 0  
CE, C-TICK, CSA<sub>US/C</sub>

- 1) Available with flange versions S to V only  
2) Universal fits 3" ASME, DN 80, JIS 10K3B style  
3) Universal fits 4" ASME, DN 100, JIS 10K4B style  
4) Universal fits 6" ASME, DN 150, JIS 10K6B style  
5) Available with Mounting thread and facing options 1 and 3, and approval option 7 only

C) Subject to export regulations AL: N, ECCN: EAR99

#### Order No.

C) 7ML1132 -

0

1

2

3

A

B

C

E

F

K

A

C

D

E

G

J

L

M

P

R

S

T

U

V

4

5

7

#### Selection and Ordering data

#### Further designs

Please add "-Z" to Order No. and specify Order code(s).

Acrylic coated, stainless steel tag [13 x 45 mm  
Stainless steel tag [69 x 50 mm (2.71 x 1.97")]:  
Measuring-point number/identification (max. 16 characters) specify in plain text

Y15

#### Operating Instructions

Quick start manual, multi-language

Order No.

C) 7ML1998-5QM82

XCT-8 with Sanitary Flange, multi-language

C) 7ML1998-5HX62

Note: This manual should be ordered as a separate line item with Mounting Option V.

Applications Guidelines, multi-language

C) 7ML1998-5HV61

Note: The Applications Guidelines should be ordered as a separate line item on the order.

This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.

#### Accessories

Tag, stainless steel with hole, 12 x 45 mm (0.47 x 1.77"), one text line for fastening on sensors

7ML1930-1BJ

Submersible hood

7ML1830-1BH

Universal box bracket, mounting kit

7ML1830-1BK

Channel bracket, wall mount

7ML1830-1BL

Extended channel bracket, wall mount

7ML1830-1BM

Channel bracket, floor mount

7ML1830-1BN

Extended channel bracket, floor mount

7ML1830-1BP

Bridge channel bracket, floor mount  
(see Mounting Brackets on page 5/190 for more information)

7ML1830-1BQ

1" NPT locknut, plastic

7ML1830-1DS

1" BSPT locknut, plastic

7ML1830-1DR

Easy Aimer 304 with stainless steel coupling

7ML1830-1AU

Easy Aimer, aluminum, with M20 adapter and ¾ to 1" and 1½" BSPT couplings

7ML1830-1AX

Easy Aimer 304, with M20 adapter and 1" and 1½" BSPT 304 SS couplings

7ML1830-1GN

Sanitary, 4" mounting clamp

7ML1830-1BR

Sanitary, isolating gasket

J) 7ML1830-1KC

C) Subject to export regulations AL: N, ECCN: EAR99

J) Subject to export regulations AL: 91999, ECCN: EAR99

# Level Measurement

## Continuous level measurement - Ultrasonic transducers

Echomax XPS and XCT

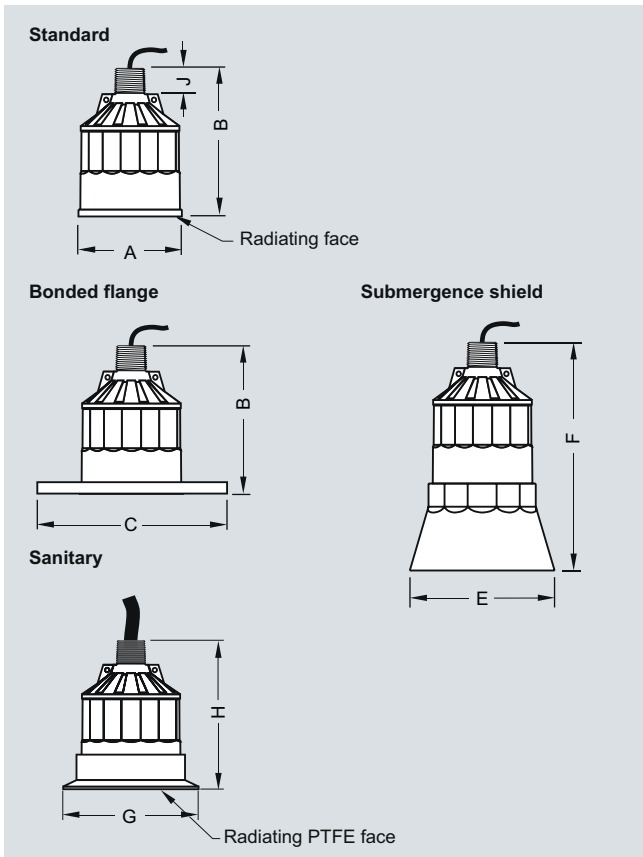
Selection and Ordering data	Order No.	Selection and Ordering data	Order code
<b>Echomax® XCT-12 ultrasonic transducer</b> High-frequency ultrasonic transducer designed for a wide variety of liquid and solid applications, for use with approved controllers. Includes integral temperature sensor. Ambient temperatures up to +145 °C (+293 °F) Measuring range: min. 0.6 m (2 ft), max. 12 m (40 ft)	C) 7ML1136-0	<b>Further designs</b> Please add "-Z" to Order No. and specify Order code(s). Acrylic coated, stainless steel tag [13 x 45 mm Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text	Y15
<b>Mounting thread and facing</b> 1" NPT [(Taper), ANSI/ASME B1.20.1] 1" NPT [(Taper), ANSI/ASME B1.20.1], PTFE facing, available for flange options U only <sup>1)</sup> R 1" [(BSPT), EN 10226] R 1" [(BSPT), EN 10226], PTFE facing, available for flange options U only <sup>1)</sup>	0 1 2 3	<b>Operating Instructions</b> Quick start manual, multi-language Applications Guidelines, multi-language Note: The Applications Guidelines should be ordered as a separate line item on the order. This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	Order No. C) 7ML1998-5QM82 C) 7ML1998-5HV61
<b>Cable length</b> 1 m (3.28 ft) 5 m (16.40 ft) 10 m (32.81 ft) 30 m (98.43 ft) 50 m (164.04 ft) 100 m (328.08 ft)	A B C E F K	<b>Accessories</b> Tag, stainless steel with hole, 12 x 45 mm (0.47 x 1.77"), one text line for fastening on sensors Submergence shield kit Universal box bracket, mounting kit Channel bracket, wall mount Extended channel bracket, wall mount Channel bracket, floor mount Extended channel bracket, floor mount Bridge channel bracket, floor mount (see Mounting Brackets on page 5/190 for more information) 1" NPT locknut, plastic 1" BSPT locknut, plastic Easy Aimer 304 with stainless steel coupling Easy Aimer 2, aluminum with M20 adapter and 1" and 1½" BSPT aluminum couplings Easy Aimer 304, with M20 adapter and 1" and 1½" BSPT 304 SS couplings	7ML1930-1BJ 7ML1830-1BJ 7ML1830-1BK 7ML1830-1BL 7ML1830-1BM 7ML1830-1BN 7ML1830-1BP 7ML1830-1BQ 7ML1830-1DS 7ML1830-1DR 7ML1830-1AU 7ML1830-1AX 7ML1830-1GN
<b>Mounting flange</b> None 6" ASME, 150 lb, flat faced 8" ASME, 150 lb, flat faced DN 150, PN 10/16, Type A, flat faced DN 200, PN 10/16, Type A, flat faced JIS10K 6B JIS10K 8B (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 or JIS B 2220 standard.) 6" universal for 6" ASME, DN 150 or JIS 10K6B style	A D E J K N P U		
<b>Approvals</b> ATEX II 2G, FM Class I, Div. 2, SAA CSA Class I, Div. 1, available with mounting thread and facing option 0 only	3 4		
<sup>1)</sup> Available with universal flanges only C) Subject to export regulations AL: N, ECCN: EAR99			

# Level Measurement

## Continuous level measurement - Ultrasonic transducers

### Echomax XPS and XCT

#### Dimensional drawings



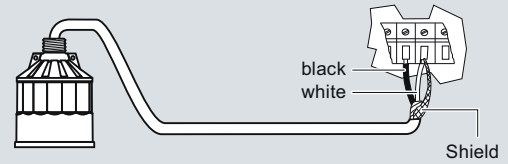
XPS and XCT ultrasonic transducer

Version	XPS-10	XPS-15	XPS-30	XPS-40
<b>Dimension</b>				
<b>A</b>	88 mm (3.464")	121 mm (4.764")	175 mm (6.890")	206 mm (8.110")
<b>B</b>	122 mm (4.803")	132 mm (5.197")	198 mm (7.795")	229 mm (9.016")
<b>C</b>	According to ASME, DIN and JIS			n/a
<b>E</b>	124 mm (4.882")	158 mm (6.220")	n/a	n/a
<b>F</b>	152 mm (5.984")	198 mm (7.795")	n/a	n/a
<b>J</b>	28 mm (1.1")	28 mm (1.1")	28 mm (1.1")	28 mm (1.1")

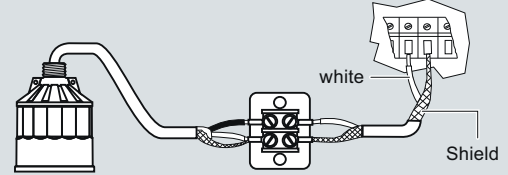
Version	XCT-8	XCT-12
<b>Dimension</b>		
<b>A</b>	88 mm (3.464")	121 mm (4.764")
<b>B</b>	122 mm (4.803")	132 mm (5.197")
<b>C</b>	According to ASME, DIN and JIS	
<b>E</b>	n/a	n/a
<b>F</b>	n/a	n/a
<b>G</b>	Sanitary version: 119 mm (4.68")	n/a
<b>H</b>	Sanitary version: 122 mm (4.8")	n/a
<b>J</b>	28 mm (1.1")	28 mm (1.1")

#### Schematics

##### Direct Connection



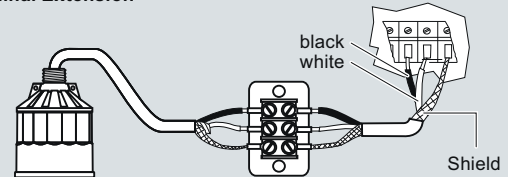
##### Coaxial Connection



##### 3 Terminal Direct\*



##### 3 Terminal Extension\*



\* For SITRANS LUC500, MultiRanger 100/200, HydroRanger 200

##### Mounting

Make particularly sure that the radiating face of the transducer is protected from damage. Mount the transducer so that it is above the maximum material level by at least the blanking value. On liquid applications, the transducer must be mounted so that the axis of transmission is perpendicular to the liquid surface. On solids applications, a Milltronics Easy Aimer should be used to facilitate aiming the transducer. Consider the optional temperature sensor when mounting the transducer.

##### Interconnection

Do not route cable openly or near high voltage or current runs, contactors and SCR control drives. For optimum isolation against electrical noise, run cable separately in a grounded metal conduit. Seal all thread connections to prevent ingress of moisture.

XPS and XCT ultrasonic transducer connections

# Level Measurement

## Continuous level measurement - Ultrasonic transducers

Echomax XLT

### Overview



Echomax® XLT transducers use ultrasonic technology to measure level in a wide range of bulk solids.

### Benefits

- Sealed aluminum face
- Integral temperature sensor
- Self-cleaning and low maintenance
- Connect using only two wires
- Easy to install

### Application

XLT transducers operate with Siemens SITRANS LU transceivers in measuring ranges from 0.9 to 60 m (1.8 to 200 ft) and temperatures up to +150 °C (+300 °F). A beam angle of just 5° provides accurate readings in deep, narrow tanks.

With increased signal sensitivity, the XLT transducers from Siemens can operate in difficult applications such as limestone, cement clinker and hot stone. All models have a sealed aluminum face to withstand very harsh environments.

During operation, Echomax transducers emit acoustic pulses in a narrow beam. The level transceiver measures the propagation time between pulse emission and reception of the echo to calculate the distance from the transducer to the material. Temperature variations are automatically compensated by the integral temperature sensor.

- Key Applications: bulk solids including limestone, cement clinker, hot stone and coal bunkers

### Technical specifications

<b>Mode of operation</b>	
Measuring principle	Ultrasonic transducer
<b>Input</b>	
Measuring range	
• XLT-30	0.9 ... 30 m (3.0 ... 100 ft)
• XLT-60	1.8 ... 60 m (6.0 ... 200 ft)
<b>Output</b>	
Frequency	
• XLT-30	22 kHz
• XLT-60	13 kHz
Beam angle <sup>1)</sup>	5°
<b>Accuracy</b>	
Temperature error	Compensated by transducers internal temperature sensor
<b>Rated operating conditions</b>	
Ambient conditions	
• Ambient temperature	
- XLT-30 and XLT-60	-40 ... +150 °C (-40 ... +300 °F)
<b>Design</b>	
Weight	
• XLT-30	4.3 kg (9.5 lbs)
• XLT-60	6.6 kg (14.5 lbs)
Material (enclosure)	
	Aluminium, 304 stainless steel, polyester and silicone
Degree of protection	
	IP68
Color	
• XLT-30 and XLT-60	Red
<b>Mounting</b>	
	1" NPT [(Taper), ANSI/ASME B1.20.1]
Cable connection	
	2-core shielded/twisted, 0.5 mm <sup>2</sup> (20 AWG), silicone sheath
Cable (max. length)	
	365 m (1200 ft) with RG 62 AU coaxial cable
Certificates and approvals	
	CE (EMC certificate available on request), CSA <sub>USC</sub> , FM, ATEX II 2G 1D T5

<sup>1)</sup> Definition of beam width: twice the angle at which the off-axis transmission is 3 dB less than the acoustic pressure level of the transmission axis (as measured equidistant from the sensor face).

# Level Measurement

## Continuous level measurement - Ultrasonic transducers

### Echomax XLT

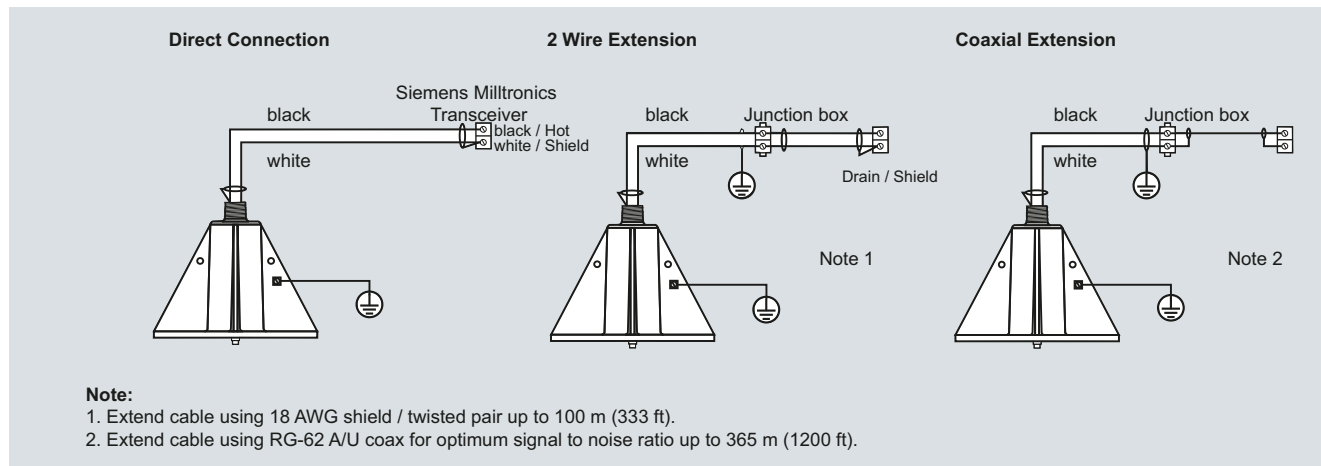
Selection and Ordering data	Order No.
<b>Echomax® XLT-30, XLT-60, ultrasonic transducer</b> High-frequency ultrasonic transducer designed for a wide variety of liquid and solid applications, for use with approved controllers. Includes integral temperature sensor. Measuring range: min. 0.9 m, max. 30 m Process connection: 1" NPT [(Taper), ANSI/ASME B1.20.1]	
<b>XLT-30</b>	C) <b>7 ML 1 1 4 1 -</b>
<b>XLT-60</b>	C) <b>7 ML 1 1 4 5 -</b>
	<b>E 0</b>
<b>Facing</b>	
XLT-30	<b>0</b>
XLT-60	<b>1</b>
XLT-30, nylon	<b>2</b>
XLT-60, nylon	<b>3</b>
<b>Cable length</b>	
1 m (3.28 ft)	<b>A</b>
5 m (16.40 ft)	<b>B</b>
10 m (32.81 ft)	<b>C</b>
20 m (65.62 ft)	<b>D</b>
30 m (98.43 ft)	<b>E</b>
50 m (164.04 ft)	<b>F</b>
70 m (229.66 ft)	<b>G</b>
80 m (262.47 ft)	<b>H</b>
90 m (295.28 ft)	<b>J</b>
100 m (328.08 ft)	<b>K</b>
<b>Approvals</b>	<b>3</b>
ATEX II 2G 1D, CSA Class I Div. 1, FM Class I Div. 2, CE	

C) Subject to export regulations AL: N, ECCN: EAR99

Selection and Ordering data	Order code
<b>Further designs</b> Please add "-Z" to Order No. and specify Order code(s). Acrylic coated, stainless steel tag [13 x 45 mm Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text	<b>Y15</b>
<b>Operating Instructions</b> Quick start manual, multi-language Applications Guidelines, multi-language Note: The Applications Guidelines should be ordered as a separate line item on the order. This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	Order No. C) <b>7ML1998-5QS81</b> C) <b>7ML1998-5HV61</b>
<b>Accessories</b> Tag, stainless steel with hole, 12 x 45 mm (0.47 x 1.77"), one text line for fastening on sensors Easy Aimer 2, 1" NPT galvanized Easy Aimer 304 with stainless steel coupling Easy Aimer 2, aluminum with M20 adapter and 1" and 1½" BSPT aluminum couplings Easy Aimer 304, with M20 adapter and 1" and 1½" BSPT 304 SS couplings C) Subject to export regulations AL: N, ECCN: EAR99	<b>7ML1930-1BJ</b> <b>7ML1830-1AP</b> <b>7ML1830-1AU</b> <b>7ML1830-1AX</b> <b>7ML1830-1GN</b>

5

### Schematics



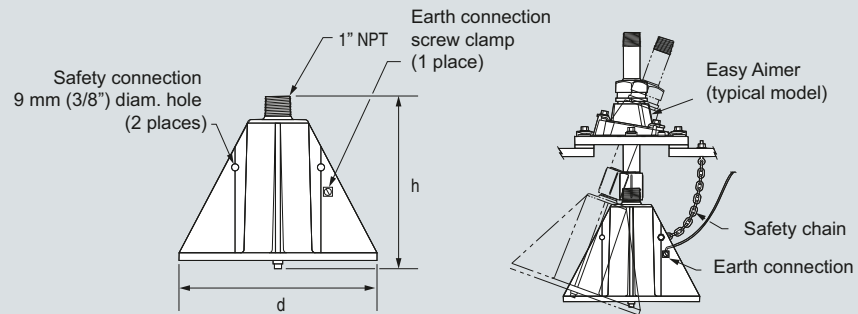
XLT ultrasonic transducer connections

# Level Measurement

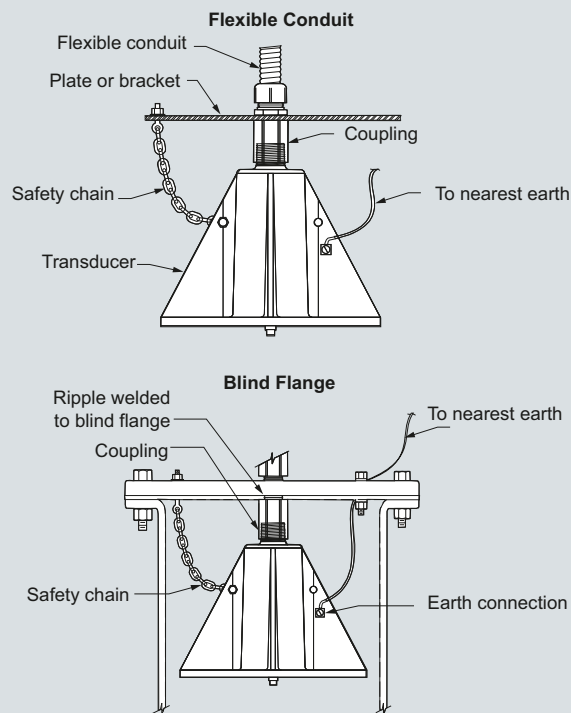
## Continuous level measurement - Ultrasonic transducers

Echomax XLT

### Dimensional drawings



### Mounting - Liquid Applications



XLT ultrasonic transducer, dimensions in mm (inch)

	<b>XLT-30</b>	<b>XLT-60</b>
d	264 mm (10.4")	335 mm (13.2")
h	249 mm (9.8")	324 mm (12.75")

# Level Measurement

## Continuous level measurement - Accessories for ultrasonic

### EA aiming devices

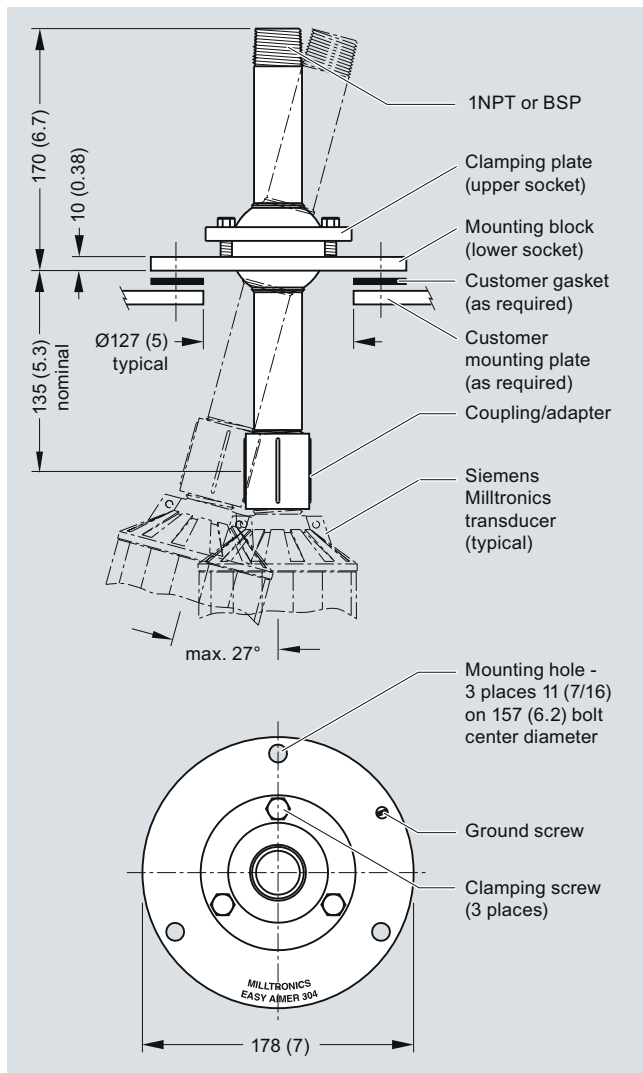
#### Application

##### EA 304 aiming device

The Easy Aimer 304 flange is a stainless steel aiming device for alignment of Siemens ultrasonic transducers used for level measurement of bulk solids.

The sensor must be mounted aimed towards the low level draw point in the silo. The sensor can be rotated through 360° and angled at 0 to 27° off vertical. It must be mounted using an access plate with welded studs or a flange in order to isolate the mounting holes from the pressurized environment. When installed properly, the EA 304 aiming device is capable of withstanding pressures up to 0.5 bar (Europe) or 15 psi (North America). It can even be used in corrosive and aggressive environments.

#### Dimensional drawings



EA 304 aiming device, dimensions in mm (inch)

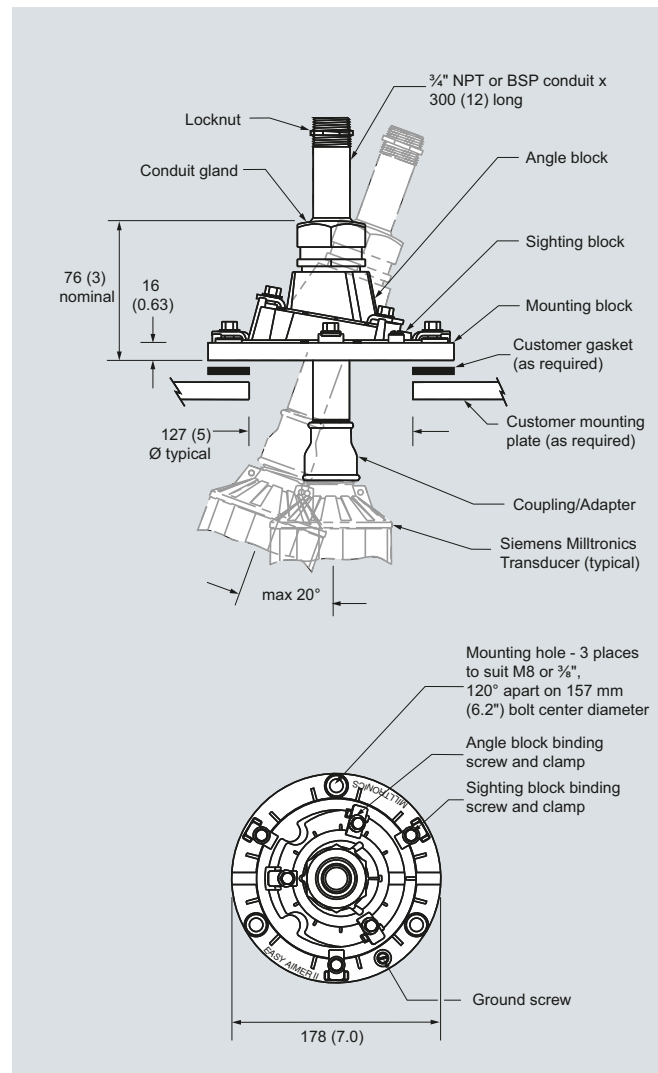
#### Application

##### EA 2 aiming device

The Easy Aimer 2 flange is a cast aluminum aiming device for alignment of Siemens ultrasonic transducers.

The flange has graduated adjustments and an adjustable insertion length. When used for applications with bulk solids, the sensor is mounted so that it is aimed towards the lower level draw point in the silo. The sensor can be rotated through 360° and angled at 0 to 20° off vertical. It must be mounted using an access plate with welded studs or a flange in order to isolate the mounting holes from the pressurized environment. When installed properly, the EA 2 aiming device is capable of withstanding pressures up to 0.5 bar (Europe) or 15 psi (North America). It can even be used in corrosive and aggressive environments.

#### Dimensional drawings



EA 2 aiming device, dimensions in mm (inch)

# Level Measurement

## Continuous level measurement - Accessories for ultrasonic

EA aiming devices

Selection and Ordering data	Order No.
<b>Easy aimer</b> Used on solids applications to aim transducers for optimal performance. Available in a 304 stainless steel model, or a cast aluminum model.	
Easy Aimer 2, aluminum with M20 adapter and 1" and 1½" BSPT aluminum couplings	<b>7ML1830-1AX</b>
Easy Aimer 304, with M20 adapter and 1" and 1½" BSPT 304 SS couplings	<b>7ML1830-1GN</b>
Easy Aimer 2, aluminum, BSPT conduit	<b>7ML1830-1AL</b>
Easy Aimer 2, aluminum, NPT with 1½" galvanized coupling <sup>1)</sup>	<b>7ML1830-1AN</b>
Easy Aimer 2, aluminum, NPT with 1" galvanized coupling	<b>7ML1830-1AP</b>
Easy Aimer 2, aluminum, NPT with ¾" x 1" PVC coupling	<b>7ML1830-1AQ</b>
Easy Aimer 304, BSPT conduit	<b>7ML1830-1AS</b>
Easy Aimer 304, NPT with 1½" coupling <sup>1)</sup>	<b>7ML1830-1AT</b>
Easy Aimer 304, NPT with 1" coupling	<b>7ML1830-1AU</b>
<b>Operating Instructions</b> Easy Aimer 2 and 304 Operating Instructions, Multi-language Note: The Operating Instructions should be ordered as a separate line item on the order.  This device is shipped with the Siemens Milltronics manual CD containing the complete Quick Start and Operating Instructions library.	<b>7ML1998-5HG62</b>

<sup>1)</sup> For use with XPS-30 or XPS-40 transducers only



# Level Measurement

## Continuous level measurement - Accessories for ultrasonic

### FMS mounting brackets

#### Application

Siemens mounting brackets permit simple, fast installation of ultrasonic transducers. These rugged, high quality mounting brackets are constructed of 304 (1.4301) stainless steel and are suitable for use indoors and outdoors. They adjust to fit almost any application, saving you the time and expense of building custom brackets. Each kit includes all mounting parts.

#### FMS-200 universal box bracket system

Mounting of units with 1" or 2" threaded connection.

Distance from sensor to wall or beam: 20 to 31 cm (8 to 12").

The unique box design also acts as a sun shield for transducers with 1" threaded connections.

#### FMS-210 wall mounting set

Mounting of transducers with 1" threaded connection.

Distance from transducer to wall or beam: 12 to 48 cm (5 to 19").

#### FMS-220 extended wall mounting set

Mounting of transducers with 1" threaded connection.

Distance from transducer to wall or beam: 32 to 98 cm (13 to 39").

#### FMS-310 floor mounting set

Mounting of transducers with 1" threaded connection.

Distance from transducer to floor: 20 to 48 cm (8 to 19").

Distance from mounting support: 5 to 57 cm (2 to 22").

#### FMS-320 extended floor mounting set

Mounting of transducers with 1" threaded connection.

Distance from transducer to floor: 20 to 48 cm (8 to 19").

Distance from mounting support: 41 to 108 cm (16 to 43").

#### FMS-350 floor mounting set, bridge

Mounting of transducers with 1" threaded connection.

Distance from transducer to floor: 20 to 48 cm (8 to 19"), anywhere along the complete width of the bridge [166 cm (65")].

This kit is particularly suitable for measurements on open channels (OCM) by providing a very stable mount for the transducer above a flume or weir.

#### Selection and Ordering data

Order No.

#### Mounting brackets for XPS-10/XCT-8 sensors

FMS-200 universal box bracket set

7ML1830-1BK

FMS-210 wall mounting set

7ML1830-1BL

FMS-220 extended wall mounting set

7ML1830-1BM

FMS-310 floor mounting set

7ML1830-1BN

FMS-320 extended floor mounting set

7ML1830-1BP

FMS-350 floor mounting set, bridge

7ML1830-1BQ

#### Additional Operating Instructions

FMS-200

C) 7ML1998-5BK61

FMS-210

C) 7ML1998-5BL61

FMS-220

C) 7ML1998-5BM61

FMS-310

C) 7ML1998-5BN61

FMS-320

C) 7ML1998-5BP61

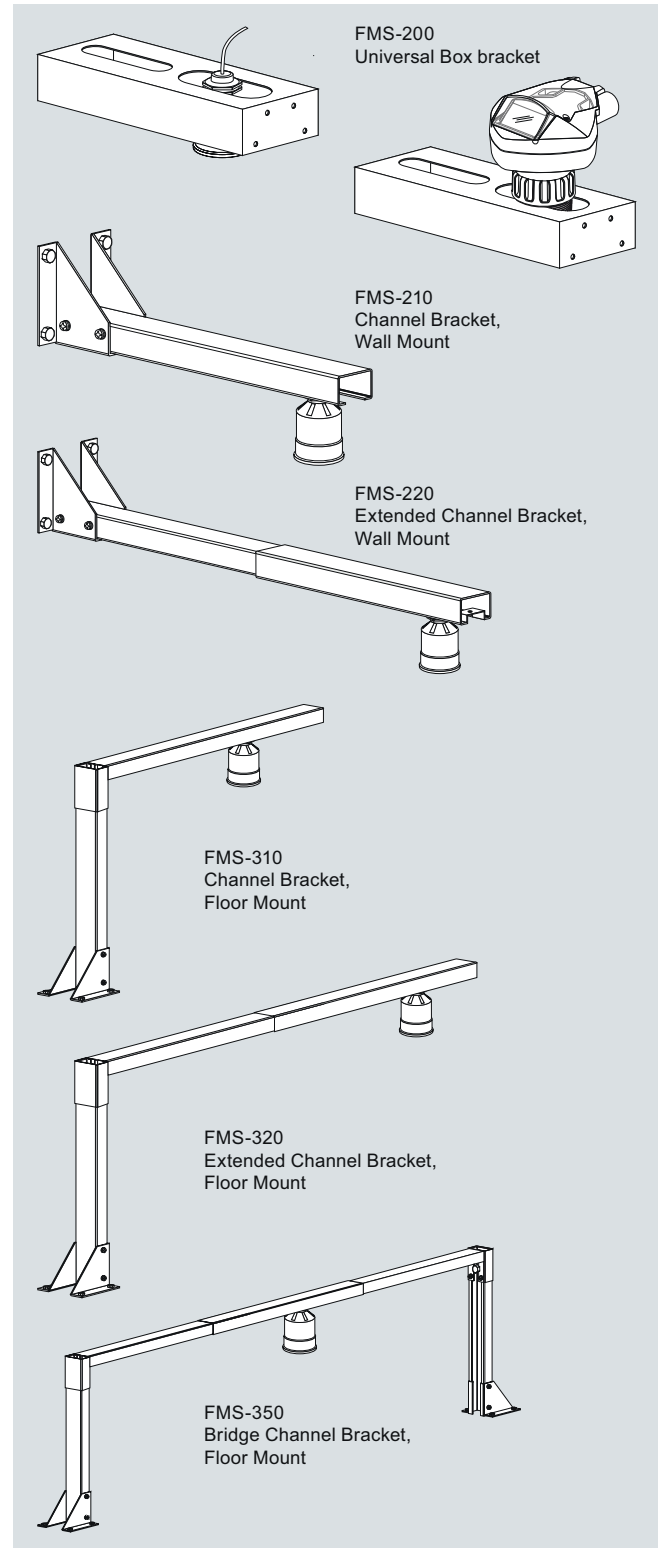
FMS-350

C) 7ML1998-5BQ61

Note: The Operating Instructions should be ordered as a separate line item on the order.

C) Subject to export regulations AL: N, ECCN: EAR99

#### Integration



FMS mounting brackets

# Level Measurement

## Continuous level measurement - Accessories for ultrasonic

### TS-3 temperature sensor

#### Overview



The TS-3 temperature sensor provides an input signal for temperature compensation of specific Siemens ultrasonic level controllers.

#### Benefits

- Chemically resistant ETFE enclosure
- Fast response time
- Approved for use in potentially explosive atmospheres

#### Application

Temperature compensation is essential in applications where temperature variations of the sound medium are expected.

By installing the temperature sensor close to the sound path of the associated ultrasonic transducer, a signal representative of the sound medium's ambient temperature is obtained. The temperature sensor should not be mounted in direct sunlight.

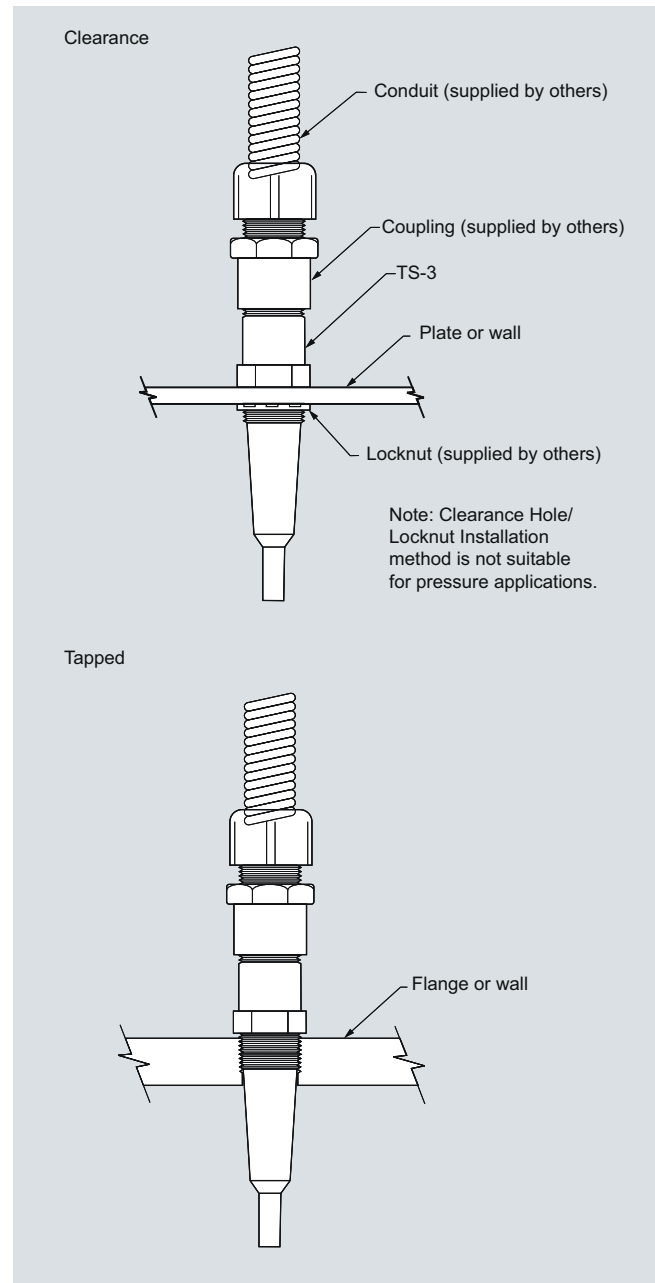
The TS-3 is used in conjunction with ultrasonic transducers that do not have an integral temperature sensor. It is also recommended in cases where the integral temperature sensor of the transducer cannot be used.

The following conditions are typical for use of the TS-3 sensor: where a fast reaction to temperature variations is required, where a flanged ultrasonic transducer is used, or where high temperatures are encountered.

The TS-3 is not compatible with devices using the TS-2 or LTS-1 temperature sensors. Refer to the associated controller manual for more details.

- Key Applications: For use in applications where temperature sensor measurement from transducer does not accurately represent vessel temperature. Used for applications requiring quick temperature response (open channel monitoring).

#### Design



TS-3 temperature sensor

# Level Measurement

## Continuous level measurement - Accessories for ultrasonic

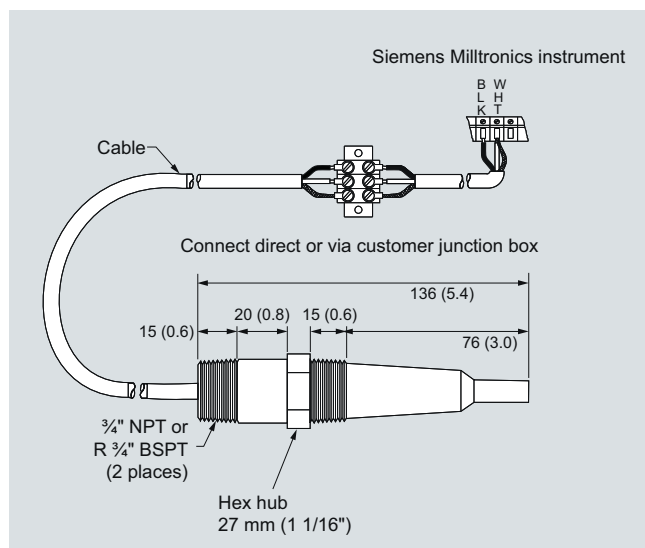
### TS-3 temperature sensor

#### Technical specifications

Mode of operation	
Measuring principle	Temperature sensor
Input	
Measuring range	-40 ... +150 °C (-40 ... + 302 °F)
Output	
Response time	
• Forced circulation (temperature variation: 63 %)	55 seconds
• Flange, forced circulation	90 seconds
• Natural convection	150 seconds
Rated operating conditions	
Installation instructions	Mounted indoors/outdoors, but not exposed to direct sunlight
Pressure	Max. 4 bar (60 psi/400 kPa)
Design	
Material (enclosure)	ETFE <sup>1)</sup>
Cable connection	2-core, 0.5 mm <sup>2</sup> (20 AWG), shielded, silicone sheath
Process connection	¾" NPT [(Taper), ANSI/ASME B1.20.1] R ¾" [(BSPT), EN 10226], totally encapsulated
Certificates and approvals	
	SAA, FM, CSA, ATEX

<sup>1)</sup> ETFE is a fluoropolymer inert to most chemicals. For exposure to specific environments, check the chemical compatibility charts before installing the TS-3 in your application.

#### Dimensional drawings



TS-3 temperature sensor, dimensions in mm (inch)

#### Selection and Ordering data

Selection and Ordering data		Order No.
<b>TS-3 temperature sensor</b>		C) <b>7ML1813-</b>
TS-3 provides an input signal for temperature compensation of specific Siemens ultrasonic level controllers.		
Compensation is essential in applications where variation in temperature of the sound medium is expected.		
Cable length		
1 m (3.28 ft)		1
5 m (16.40 ft)		2
10 m (32.81 ft)		3
30 m (98.43 ft)		4
50 m (164.04 ft)		5
70 m (229.66 ft)		6
90 m (295.28 ft)		7
Process connection		
¾" NPT [(Taper), ANSI/ASME B1.20.1]		A
R ¾" [(BSPT), EN 10226]		B
Approvals		
CSA, FM		3
ATEX, SAA		4
Operating Instructions		
English		C) <b>7ML1998-5EM01</b>
German		C) <b>7ML1998-1EM31</b>
Note: The Operating Instructions should be ordered as a separate line item on the order.		
This device is shipped with the Siemens Milltronics manual CD containing ATEX Quick Starts and Operating Instructions.		
Optional equipment		
¾" NPT locknut, aluminum		C) <b>7ML1930-1BE</b>
Tag, stainless steel with hole, 12 x 45 mm (0.47 x 1.77") for fastening on sensors		<b>7ML1930-1BJ</b>

C) Subject to export regulations AL: N, ECCN: EAR99

# Level Measurement

## Continuous level measurement - Radar transmitters

### Radar transmitters

#### Overview

Radar measurement technology is non-contacting and low maintenance. Because microwaves require no carrier medium, they are virtually unaffected by the process atmosphere (vapour, pressure, dust, or temperature extremes). Siemens offers a variety of models to meet the specific needs of your application.

SITRANS Probe LR is a 2-wire, 6 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage vessels with nominal pressure and temperature, to a range of 20 m (66 ft).

SITRANS LR200 is a 2-wire, 6 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including high temperature and pressure, to a range of 20 m (66 ft).

SITRANS LR250 is a 2-wire, 25 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including high temperature and pressure, to a range of 20 m (66 ft). Ideal for small vessels and low dielectric media.

SITRANS LR260 is a 2-wire, 25 GHz pulse radar level transmitter for continuous monitoring of solids in silos to a range of 30 m (98.4 ft). Ideal for applications with extreme dust and high temperatures to +200 °C (+392 °F).

SITRANS LR400 is a 4-wire, 24 GHz FMCW radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including high temperature and high pressure, to a range of 50 m (164 ft). It is ideal for low dielectric media.

SITRANS LR460 is a 4-wire, 24 GHz FMCW radar level transmitter with extremely high signal to noise ratio and advanced signal processing for continuous monitoring of solids up to 100 m (328 ft). It is ideal for measurement in extreme dust.

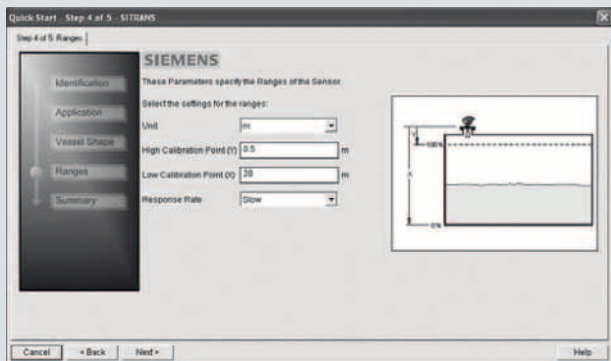
#### Auto False-Echo Suppression

SITRANS LR instruments offer the unique advantage of patented Process Intelligence signal processing technology. This in-depth knowledge and experience is built into the software's advanced algorithms to provide intelligent processing of echo profiles. The result is repeatable, fast and reliable measurement.

A special feature of SITRANS radar devices is Auto False-Echo Suppression, an echo processing technique that automatically detects and suppresses false echoes from vessel obstructions. You can implement this feature using two parameters on the local interface or SIMATIC PDM communicating over HART® or PROFIBUS PA.



Local display interface – graphically displays echo profiles and diagnostic information (available with LR200, LR250, LR260)  
Quick to configure – Quick Start Wizard via SIMATIC PDM guides you during setup (available with LR200, LR250, LR260, LR460)



#### Mode of operation

##### Principle of Operation

Radar measurement technology measures the time of flight from the transmitted signal to the return signal. From this time, distance measurement and level are determined.

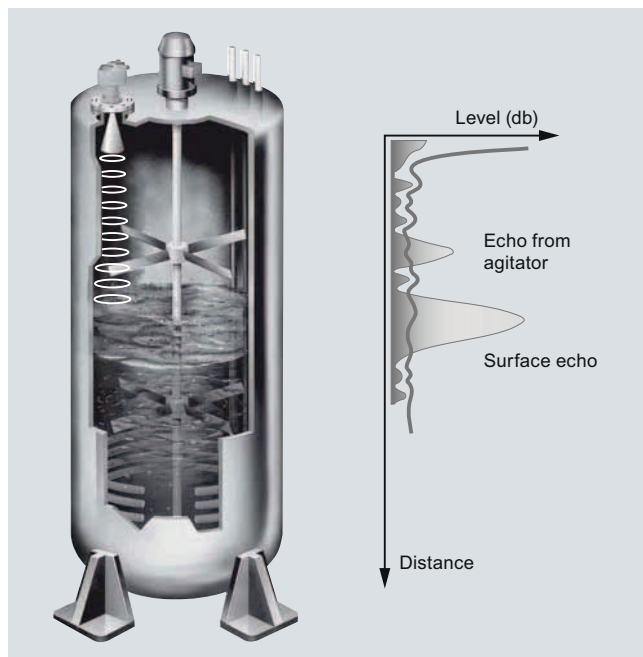
Unlike ultrasonic measurement, radar technology does not require a carrier medium and travels at the speed of light (300 000 000 m/s). Most industrial radar devices operate from 6 to 26 GHz.

Siemens offers pulse radar transmitters (SITRANS Probe LR, SITRANS LR200, SITRANS LR250, SITRANS LR260) and FMCW (Frequency Modulated Continuous Wave) radar transmitters (SITRANS LR400, SITRANS LR460).

Pulse radar emits a microwave pulse from the antenna at a fixed repetition rate that reflects off the interface between the two materials with different dielectric constants (the atmosphere and the material being monitored). The echo is detected by a receiver and the transmit time is used to calculate level.

Reflected echoes are digitally converted to an echo profile. The profile is analyzed to determine the distance from the material surface to the reference point on the instrument.

FMCW (Frequency Modulated Continuous Wave) radar devices send microwaves to the surface of the material. The wave frequency is modulated continuously. At the same time, the receiver is also receiving continuously and the difference in frequency between the transmitter and the receiver is directly proportional to the distance to the material.



Radar operation in a reactor vessel

# Level Measurement

## Continuous level measurement - Radar transmitters

### Radar transmitters

#### Technical specifications

##### Radar Selection Guide

Criteria	SITRANS Probe LR	SITRANS LR200	SITRANS LR250	SITRANS LR260	SITRANS LR400	SITRANS LR460
Typical industries	Chemicals	Chemicals, petrochemicals	Chemicals, petrochemicals	Cement, power generation, food processing, mineral processing, mining	Chemicals, petrochemicals	Cement, power generation, food processing, mineral processing, mining
Typical applications	Liquids, storage vessels	Liquids, storage and process vessels	Liquids, storage and process vessels with agitators, vaporous liquids, high temperatures, low dielectric media	Cement, plastics, grain, flour, coal	Liquids storage vessels, liquid petroleum gas (LPG)	Cement, flyash, grain, coal, flour, plastics
Range	0.3 ... 20 m (1 ... 65 ft)	0.3 ... 20 m (1 ... 65 ft)	50 mm (2") from end of horn ... 20 m (65 ft), horn dependent	30 m (98.4 ft)	0.35 ... 50 m (1.14 ... 164 ft)	100 m (328 ft)
Frequency	5.8 GHz (North America 6.3 GHz)	5.8 GHz (North America 6.3 GHz)	K-band (25.0 GHz)	K-band (25.0 GHz)	24 ... 25 GHz FMCW	24 ... 25 GHz FMCW
Performance accuracy	0.1 % of range or 10 mm (0.4")	0.1 % of range or 10 mm (0.4")	5 mm (0.02")	25 mm (1") from minimum detectable distance to 300 mm (11.8") Remainder of range = 10 mm (0.39") or 0.1 % of span (whichever is greater)	≤ 5 mm (0.2") from 2 ... 10 m (6.6 ... 32.8 ft) ≤ 15 mm (0.6") from 10 ... 50 m (32.8 ... 164 ft)	0.25 %
Temperature	Ambient: -40 ... +80 °C (-40 ... +176 °F) Process: -40 ... +80 °C (-40 ... +176 °F)	Ambient: -40 ... +80 °C (-40 ... +176 °F) Process: -40 ... +200 °C (-40 ... +392 °F), dependent on antenna type	Ambient: -40 ... +80 °C (-40 ... +176 °F) Process: -40 ... +200 °C (-40 ... +392 °F), dependent on antenna type	Ambient: -40 ... +80 °C (-40 ... +176 °F) Process: -40 ... +200 °C (-40 ... +392 °F), dependent on antenna type	Ambient: -40 ... +65 °C (-40 ... +149 °F) Process: -40 ... +250 °C (-40 ... +482 °F), dependent on antenna type	Ambient: max. +65 °C (+149 °F) Process: max. +200 °C (+392 °F)
Output/Communications	<ul style="list-style-type: none"> <li>4 ... 20 mA/HART®</li> <li>SIMATIC PDM for remote configuration and diagnostics</li> </ul>	<ul style="list-style-type: none"> <li>4 ... 20 mA/HART</li> <li>PROFIBUS PA</li> <li>SIMATIC PDM for remote configuration and diagnostics</li> <li>AMS</li> </ul>	<ul style="list-style-type: none"> <li>4 ... 20 mA/HART</li> <li>PROFIBUS PA</li> <li>Foundation Fieldbus</li> <li>SIMATIC PDM for remote configuration and diagnostics</li> <li>AMS</li> <li>SITRANS DTM/FDT for Pactware, Fieldcare, etc.</li> </ul>	<ul style="list-style-type: none"> <li>4 ... 20 mA/HART</li> <li>PROFIBUS PA</li> <li>SIMATIC PDM for remote configuration and diagnostics</li> </ul>	<ul style="list-style-type: none"> <li>4 ... 20 mA/HART</li> <li>PROFIBUS PA</li> <li>SIMATIC PDM for remote configuration and diagnostics</li> </ul>	<ul style="list-style-type: none"> <li>4 ... 20 mA/HART</li> <li>PROFIBUS PA</li> <li>SIMATIC PDM for remote configuration and diagnostics</li> </ul>
Power	<ul style="list-style-type: none"> <li>4 ... 20 mA, 24 V DC nominal, 30 V DC max.</li> <li>Minimum voltage depends on total loop resistance</li> </ul>	<ul style="list-style-type: none"> <li>4 ... 20 mA loop, 24 V DC nominal, 30 V DC max.</li> <li>Minimum voltage depends on total loop resistance</li> </ul>	<ul style="list-style-type: none"> <li>4 ... 20 mA loop, 24 V DC nominal, 30 V DC max.</li> <li>Minimum voltage depends on total loop resistance</li> </ul>	<ul style="list-style-type: none"> <li>4 ... 20 mA (±0.02 mA accuracy)</li> <li>24 V DC nominal, 30 V DC max.</li> <li>Minimum voltage depends on total loop resistance</li> </ul>	<ul style="list-style-type: none"> <li>120 ... 230 V AC, ±15 %, 50/60 Hz</li> <li>24 V DC, +25/-20 %, 6 W (optional)</li> </ul>	<ul style="list-style-type: none"> <li>100 ... 230 V AC, ±15 %, 50/60 Hz, 6 W</li> <li>24 V DC, +25/-20 %, 6 W</li> </ul>
Approvals	CE, CSA <sub>US/C</sub> , FM, Lloyds Register of Shipping, ABS, FCC, Industry Canada, R&TTE, ATEX, PED, C-TICK, INMETRO	CE, CSA <sub>US/C</sub> , FM, Lloyds Register of Shipping, ABS, FCC, Industry Canada, R&TTE, ATEX, PED, C-TICK, INMETRO	CSA <sub>US/C</sub> , CE, FM, FCC, Industry Canada, R&TTE, ATEX, PED, C-TICK, INMETRO	CSA <sub>US/C</sub> , CE, FM, R&TTE, Industry Canada, FCC, ATEX, C-TICK	CE, CSA <sub>US/C</sub> , FM, Lloyds Register of Shipping, ABS, FCC, Industry Canada, R&TTE, ATEX, PED, C-TICK	CSA <sub>US/C</sub> , CE, FM, R&TTE, Industry Canada, FCC, ATEX, C-TICK, INMETRO



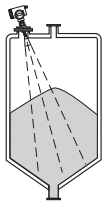
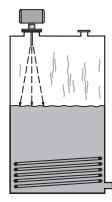
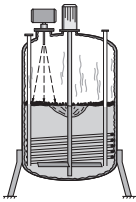
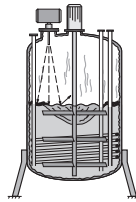
### Radar Application Questionnaire

**Customer information**

Contact: \_\_\_\_\_ Prepared By: \_\_\_\_\_  
 Company: \_\_\_\_\_ Date: \_\_\_\_\_  
 Address: \_\_\_\_\_ Notes on the Application: \_\_\_\_\_  
 City: \_\_\_\_\_ Country: \_\_\_\_\_  
 Zip/Postal Code: \_\_\_\_\_ Phone: ( ) \_\_\_\_\_  
 E-mail: \_\_\_\_\_ Fax: ( ) \_\_\_\_\_

**Vessel Information** *(supply sketch where possible)*

Sketch attached

<input type="checkbox"/> Storage Solids 	<input type="checkbox"/> Storage Liquids 	<input type="checkbox"/> Process 	<input type="checkbox"/> Reactor 
--	---	--	---

**Area safety classification:** *(specify code required)* \_\_\_\_\_

**Height:** \_\_\_\_\_ m/ft **Diameter:** \_\_\_\_\_ m/ft **Filling method:** \_\_\_\_\_

<b>Top:</b>	<b>Atmosphere:</b> <i>(indicate all that apply)</i>	<b>Pressure:</b>
<input type="checkbox"/> Flat	<input type="checkbox"/> Foam <input type="checkbox"/> Steam	Normal: _____
<input type="checkbox"/> Parabolic	<input type="checkbox"/> Dust <input type="checkbox"/> Deposit (build-up)	Maximum (relief): _____
<input type="checkbox"/> Conical	<input type="checkbox"/> Vapor	

**Mounting connection** *(specify type)* \_\_\_\_\_

**Distance to sidewall:** \_\_\_\_\_ cm/in

**Mounting connection maximum temperature:** \_\_\_\_\_ °C/°F

**Max. temperature at electronics:** \_\_\_\_\_ °C/°F

**Critical Information**

**Nozzle Length:** \_\_\_\_\_ cm/in

**Nozzle Diameter:** \_\_\_\_\_ cm/in

**Stilling well or Still Pipe mounting:**  Yes  No **Stilling well diameter:** \_\_\_\_\_ cm/in

**Material**

**Material being measured:** \_\_\_\_\_  Liquid  Solid  Liquefied gas

**Material temperature:** Norm: \_\_\_\_\_ °C/°F Max: \_\_\_\_\_ °C/°F

**Material surface:**  Flat  Turbulent  Agitated  Vortex **Dielectric constant:**   $\epsilon_r < 3$    $\epsilon_r > 3$

**Installation**

**Power available:** \_\_\_\_\_

**Communications:**

- HART® /4 to 20 mA
- PROFIBUS PA
- None

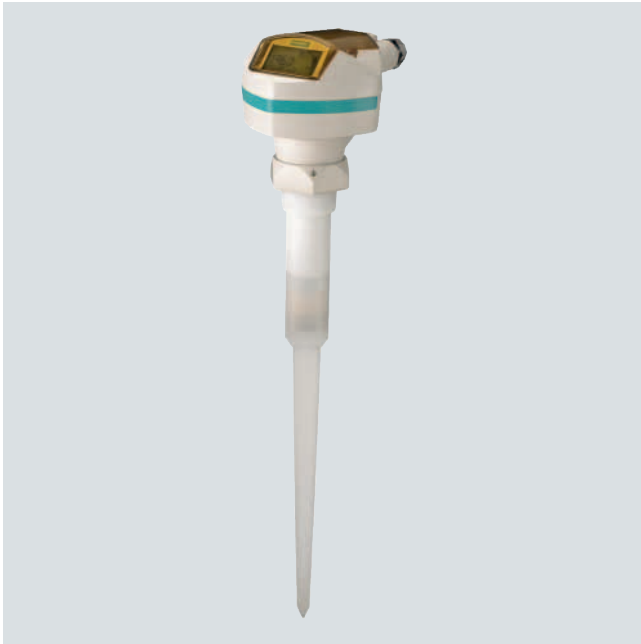
**Products recommended:** \_\_\_\_\_

# Level Measurement

## Continuous level measurement - Radar transmitters

### SITRANS Probe LR

#### Overview



SITRANS Probe LR is a 2-wire, 6 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage vessels with nominal pressure and temperature, to a range of 20 m (66 ft).

#### Benefits

- Uni-Construction polypropylene rod antenna standard
- Easy installation and simple startup
- Programming using infrared Intrinsically Safe handheld programmer, SIMATIC PDM or HART<sup>®</sup> handheld communicator
- Communication using HART<sup>®</sup>
- Patented Process Intelligence<sup>®</sup> signal processing
- Extremely high signal-to-noise ratio
- Auto False-Echo Suppression of false echoes

#### Application

The Probe LR is ideal for applications with chemical vapours, temperature gradients, vacuum or pressure, such as tank farms, chemical storage, digesters and long-range applications. SITRANS Probe LR has a range of 0.3 to 20 m (1 to 65 ft).

Probe LR is designed for safe and simple programming using the Intrinsically Safe handheld programmer without having to open the instrument's lid. It has a standard Uni-Construction polypropylene rod antenna that offers excellent chemical resistance and is hermetically sealed. The Uni-Construction antenna includes an internal, integrated shield that eliminates vessel nozzle interference.

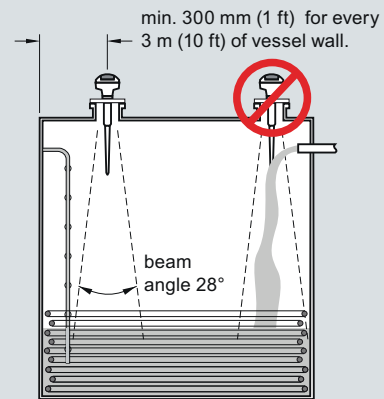
SITRANS Probe LR incorporates Process Intelligence<sup>®</sup> signal processing. The Probe LR also has a high signal-to-noise ratio leading to improved reliability.

Start-up is easy with as few as two parameters for basic operation. Programming is simple using SIMATIC PDM, HART<sup>®</sup> handheld communicator or the Intrinsically Safe handheld programmer.

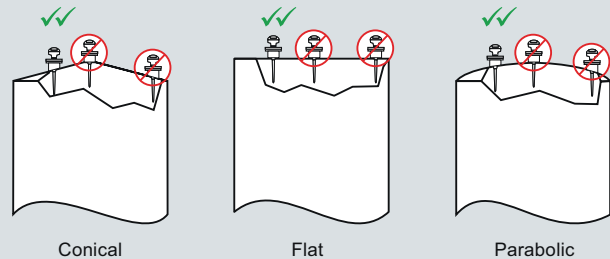
- Key Applications: tank farms, chemical storage, wastewater wet well

#### Configuration

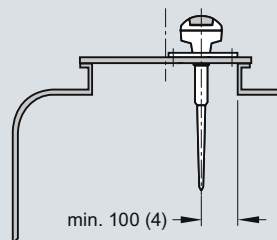
##### Installation



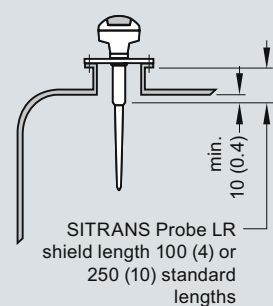
##### Mounting unit on vessel



##### Mounting on a manhole cover



##### Mounting on a nozzle



SITRANS Probe LR installation, dimensions in mm (inch)



# Level Measurement

## Continuous level measurement - Radar transmitters

SITRANS Probe LR

### Technical specifications

<b>Mode of operation</b>	
Measuring principle	Pulse radar level measurement
Frequency	5.8 GHz (North America 6.3 GHz)
Measuring range	0.3 ... 20 m (1.0 ... 65 ft)

<b>Output</b>	
Analog output	4 ... 20 mA
Accuracy	± 0.02 mA
Span	Proportional or inversely proportional
Communications	HART®

<b>Performance (reference conditions)</b>	
Accuracy	± the greater of 0.1 % of range or 10 mm (0.4")
Influence of ambient temperature	0.003 %/K
Repeatability	± 5 mm (2")
Fail-safe	mA signal programmable as high, low or hold (LOE)

<b>Rated operating conditions</b>	
Installation conditions	
• Location	Indoor/outdoor
Ambient conditions (enclosure)	
• Ambient temperature	-40 ... +80 °C (-40 ... +176 °F)
• Installation category	I
• Pollution degree	4

<b>Medium conditions</b>	
Dielectric constant $\epsilon_r$	$\epsilon_r > 1.6$ (for $\epsilon_r < 3$ , use stillpipe)
Vessel temperature	-40 ... +80 °C (-40 ... +176 °F)
Vessel pressure	3 bar g (43.5 psi g)

<b>Design</b>	
Enclosure	
• Body construction	PBT (Polybutylene Terephthalate)
• Lid construction	PEI (Polyether Imide)
• Cable inlet	2 x M20x1.5 or 2 x 1/2" NPT with adapter
Degree of protection	Type 4X/NEMA 4X, Type 6/NEMA 6, IP67, IP68
Weight	1.97 kg (4.35 lb)
Antenna	
• Material	Polypropylene rod, hermetically sealed construction
• Dimensions	Standard 100 mm (4") shield for maximum 100 mm (4") nozzle or optional 250 mm (10") long shield
Process connections	1 1/2" NPT [(Taper), ANSI/ASME B1.20.1] R 1 1/2" [(BSPT), EN 10226] G 1 1/2" [(BSPP), EN ISO 228-1]

<b>Power supply</b>	<ul style="list-style-type: none"> <li>Nominal 24 V DC with max. 550 <math>\Omega</math>, maximum 30 V DC</li> <li>4 ... 20 mA</li> </ul>
---------------------	---

<b>Certificates and approvals</b>	
General	CSA <sub>US/C</sub> , CE, FM, C-TICK
Marine	<ul style="list-style-type: none"> <li>Lloyd's Register of Shipping</li> <li>ABS Type Approval</li> </ul>
Radio	FCC, Industry Canada and European (R&TTE), C-TICK

Hazardous	
• Europe	ATEX II 1G EEx ia IIC T4
• USA	Intrinsically Safe barrier required FM Class I, Div. 1, Groups A,B,C,D; Class II, Div. 1, Groups E,F, G; Class III
• Canada	Intrinsically Safe barrier required CSA Class I, Div. 1, Groups A,B,C,D; Class II, Div. 1, Group G; Class III
• Brazil - INMETRO	BR-Ex ia IIC T4

<b>Programming</b>	
Handheld programmer	HART communicator 375
PC	SIMATIC PDM
Intrinsically safe Siemens handheld programmer (optional)	Infrared receiver
• Approvals (handheld programmer)	ATEX II 1G EEx ia IIC T4 CSA and FM Class I, Div. 1, Groups A,B,C,D, T6 at max. ambient
Display (local)	Multi-segment alphanumeric liquid crystal with bar graph (representing level) available in four languages

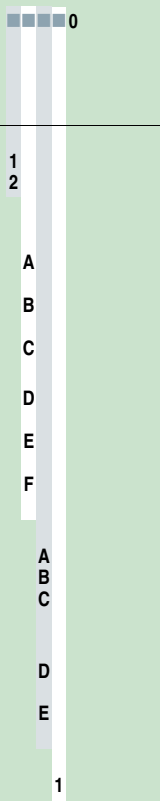
HART® is a registered trademark of the Hart Communications Foundation.



# Level Measurement

## Continuous level measurement - Radar transmitters

### SITRANS Probe LR

Selection and Ordering data	Order No.
<b>SITRANS Probe LR</b>	C) <b>7ML5430-</b>
2-wire, 6 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage vessels with nominal pressure and temperature, to a range of 20 m (66 ft). Max. 3 bar g (43.5 psi g) pressure and +80 °C (+176 °F)	
<b>Enclosure</b> Plastic, (PBT), 2 x 1/2" NPT Plastic, (PBT), 2 x M20x1.5	<b>1</b> <b>2</b>
<b>Antenna type/Material - (max. 3 bar and +80 °C)</b> Polypropylene Antenna 1/2" NPT [(Taper), ANSI/ASME B1.20.1], c/w integral 100 mm shield R 1/2" [(BSPT), EN 10226], c/w integral 100 mm shield G 1/2" [(BSPP), EN ISO 228-1], c/w integral 100 mm shield 1/2" NPT [(Taper), ANSI/ASME B1.20.1], c/w integral 250 mm shield R 1/2" [(BSPT), EN 10226], c/w integral 250 mm shield G 1/2" [(BSPP), EN ISO 228-1], c/w integral 250 mm shield	<b>A</b> <b>B</b> <b>C</b> <b>D</b> <b>E</b> <b>F</b>
<b>Approvals</b> General Purpose, CE <sup>1)</sup> General Purpose, FM, CSA <sub>US/IC</sub> <sup>2)</sup> CSA Class I, Div 1, Groups A, B, C, D, Class II, Div. 1 Group G, Class III, Intrinsically Safe with suitable barrier <sup>2)</sup> FM, Class I, II and III, Div 1, Groups A, B, C, D, E, F, G, Intrinsically Safe with suitable barrier <sup>2)</sup> ATEX II 1G EEx ia IIC T4, Intrinsically Safe with suitable barrier <sup>1)</sup>	<b>A</b> <b>B</b> <b>C</b> <b>D</b> <b>E</b>
<b>Communication/Output</b> 4 to 20 mA, HART <sup>®</sup>	<b>1</b>
<sup>1)</sup> Includes European Radio approvals (R&TTE), 5.8 GHz, C-TICK <sup>2)</sup> Includes FCC Radio approvals, 6.3 GHz for North America only C) Subject to export regulations AL: N, ECCN: EAR99	

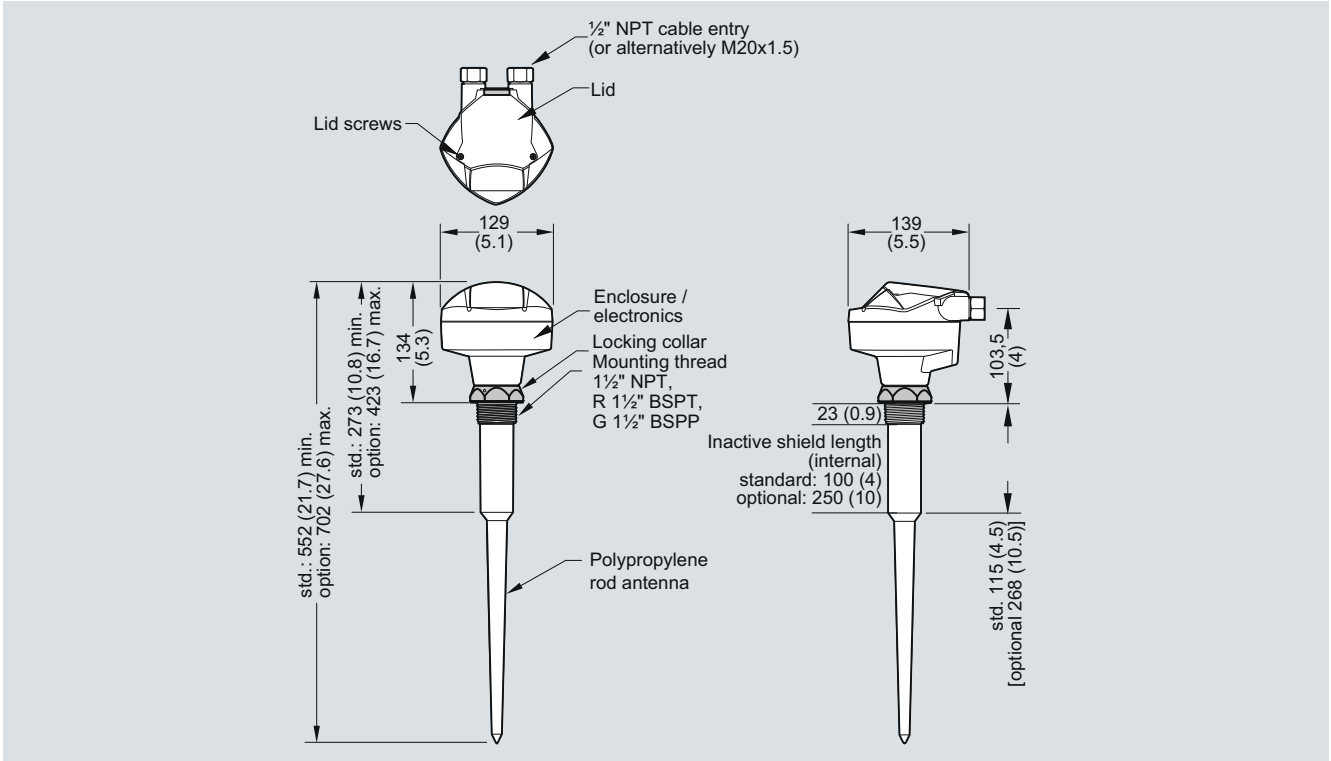
Selection and Ordering data	Order code
<b>Further designs</b> Please add <b>"-Z"</b> to Order No. and specify Order code(s). Acrylic coated, stainless steel tag [13 x 45 mm Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text Test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and to ISO 9000	<b>Y15</b> <b>C11</b>
<b>Operating Instructions</b> English French Spanish German Note: The Operating Instructions should be ordered as a separate item on the order. This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	Order No. C) <b>7ML1998-5HR02</b> C) <b>7ML1998-5HR11</b> C) <b>7ML1998-5HR21</b> C) <b>7ML1998-5HR32</b>
<b>Additional Operating Instructions</b> Multi-language Quick Start manual	C) <b>7ML1998-5QP81</b>
<b>Optional equipment</b> Handheld programmer, Intrinsically Safe, ATEX II 1G, EEx ia HART <sup>®</sup> modem/RS-232 (for use with a PC and SIMATIC PDM) HART modem/USB (for use with a PC and SIMATIC PDM) One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F) <sup>1)</sup> SITRANS RD100 Remote display - see Chapter 8 SITRANS RD200 Remote display - see Chapter 8 SITRANS RD500 Remote display - see Chapter 8	<b>7ML5830-2AH</b> D) <b>7MF4997-1DA</b> D) <b>7MF4997-1DB</b> <b>7ML1930-1AP</b>
<b>Spare parts</b> Plastic lid	<b>7ML1830-1KB</b>
<sup>1)</sup> Product shipped with plastic cable gland, rated to -20 °C. If -40 °C rating required, then metallic cable gland is recommended. C) Subject to export regulations AL: N, ECCN: EAR99 D) Subject to export regulations AL: N, ECCN: EAR99H	

# Level Measurement

## Continuous level measurement - Radar transmitters

SITRANS Probe LR

### Dimensional drawings



SITRANS Probe LR, dimensions in mm (inch)

5

### Schematics

Connect the wires to the terminals as shown: the polarity is identified on the terminal block.

Strain relief (or NPT cable inlet)

**Hand Programmer**

SIEMENS			
1	2	3	4
5 mA	6 ↓	7 ↑	8 ↻
9	0	P...	Pxxx
C	▲%	■	⏏
▲	▼	↺	↻

**SITRANS Probe LR**  
Part number: 7ML5830-2AH

**Note:**

- DC terminal shall be supplied from an SELV source in accordance with IEC-1010-1 Annex H.
- All field wiring must have insulation suitable for rated input voltages.
- Use shielded twisted pair cable (14-22 AWG)
- Separate cables and conduit may be required to conform to standard instrumentation wiring practices or electrical codes.

SITRANS Probe LR connections

# Level Measurement

## Continuous level measurement - Radar transmitters

### SITRANS LR200

#### Overview



SITRANS LR200 is a 2-wire, 6 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including high temperature and pressure, to a range of 20 m (66 ft).

#### Benefits

- Graphical local user interface (LUI) makes operation simple with plug-and-play setup using the intuitive Quick Start Wizard
- LUI displays echo profiles for diagnostic support
- Communication using HART® or PROFIBUS PA
- Process Intelligence signal processing for improved measurement reliability and Auto False-Echo Suppression of fixed obstructions
- Programming using infrared Intrinsically Safe handheld programmer or SIMATIC PDM

#### Application

SITRANS LR200's unique design allows safe and simple programming using the Intrinsically Safe handheld programmer without having to open the instrument's lid. It also features a built-in alphanumeric display in four languages.

The SITRANS LR200 has a standard Uni-Construction polypropylene rod antenna that offers excellent chemical resistance and is hermetically sealed. The Uni-Construction antenna features an internal, integrated shield that eliminates vessel nozzle interference.

Start-up is easy with as few as two parameters for basic operation. Installation is simplified as the electronics are mounted on a rotating head that swivels, allowing the instrument to line up with conduit or wiring connections or simply to adjust the position for easy viewing. SITRANS LR200 features patented Process Intelligence signal-processing technology for superior reliability.

- Key Applications: liquid bulk storage tanks, process vessels with agitators, vaporous liquids, high temperatures, asphalt, digesters

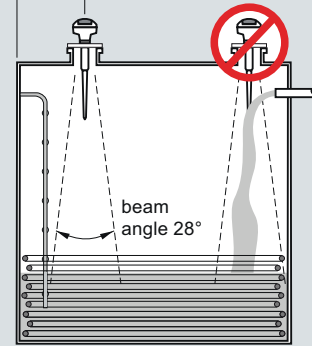
#### Configuration

##### Installation

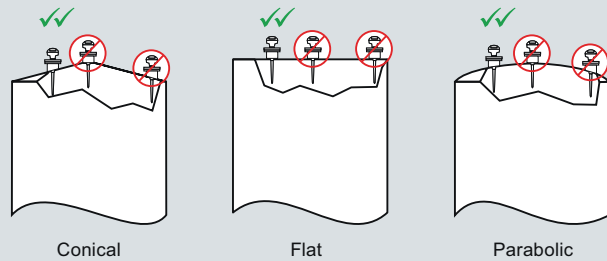
min. 300 mm (1 ft) for every 3 m (10 ft) of vessel wall.

##### Note:

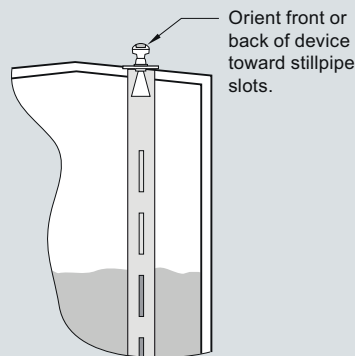
- Beam angle is the width of the cone where the energy density is half of the peak energy density.
- The peak energy density is directly in front of and in line with the rod antenna.
- There is a signal transmitted outside of the beam angle; therefore false targets may be detected.



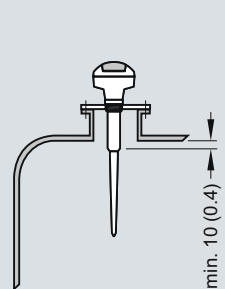
##### Mounting unit on vessel



##### Mounting unit on stilling well



##### Mounting on a nozzle



SITRANS LR200 installation, dimensions in mm (inch)

# Level Measurement

## Continuous level measurement - Radar transmitters

SITRANS LR200

### Technical specifications

<b>Mode of operation</b>		Process connections	
Measuring principle	Radar level measurement	• Process connection	1½" NPT [(Taper), ANSI/ASME B1.20.1] R 1½" [(BSPT), EN 10226], or G 1½" [(BSPP), EN ISO 228-1] (polypropylene rod antenna)
Frequency	5.8 GHz (North America 6.3 GHz)	• Flange connection	Refer to SITRANS LR200 Antennas for more connections
Measuring range	0.3 ... 20 m (1.0 ... 65 ft)	<b>Power supply</b>	
<b>Output</b>		4 ... 20 mA/HART	
Analog output	4 ... 20 mA	• General Purpose, Non-incendive, Intrinsically Safe	Nominal 24 V DC (max. 30 V DC) with max. 550 Ω
Accuracy	± 0.02 mA	• Flame proof, Increased safety, Explosion proof	Nominal 24 V DC (max. 30 V DC) with max. 250 Ω
Span	Proportional or inversely proportional	PROFIBUS PA	10.5 mA per IEC 61158-2
Communications	HART® Optional: PROFIBUS PA (Profile 3.0, Class B)	<b>Certificates and approvals</b>	
Fail-safe	Programmable as high, low or hold (Loss of Echo)	General	CSA <sub>US/C</sub> , CE, FM, C-TICK
<b>Performance (according to reference conditions IEC60770-1)</b>		Marine	Lloyd's Register of Shipping ABS Type Approval
From end of antenna to 600 mm:	40 mm (1.57")	Radio	FCC, Industry Canada and European (R&TTE), C-TICK
Remainder of range:	10 mm (0.4") or 0.1 % of span (whichever is greater)	Hazardous	
<b>Rated operating conditions</b>		• Flame proof (Europe)	ATEX II 1/2 G EEx dmia IIC T4
Installation conditions		• Increased safety (Europe)	ATEX II 1/2 G EEx emia IIC T4
• Location	Indoor/outdoor	• Explosion proof (USA/Canada)	CSA/FM (barrier not required) T4, Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III
Ambient conditions (enclosure)		• Non-incendive (USA)	FM (barrier not required) T5, Class I, Div. 2, Groups A, B, C, D
• Ambient temperature	-40 ... +80 °C (-40 to +176 °F)	• Intrinsically Safe (Europe)	ATEX II 1G EEx ia IIC T4
• Installation category	I	• Intrinsically Safe (USA/Canada)	CSA/FM (barrier required) T4, Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III
• Pollution degree	4	• Intrinsically Safe (Australia)	ANZEX Ex ia IIC T4 [T <sub>a</sub> = -40 ... +80 °C (-40 ... +176 °F)] IP67
<b>Medium conditions</b>		• Intrinsically Safe (International)	IECEx TSA 04.0020X T4
Dielectric constant ε <sub>r</sub>	ε <sub>r</sub> > 1.6 (for ε <sub>r</sub> < 3, use waveguide antenna or stillpipe)	Brazil - INMETRO	BR-Ex ia IIC T4
Vessel temperature and pressure	Varies with connection type; see Pressure/Temperature curves for more information	<b>Programming</b>	
<b>Design</b>		Intrinsically Safe Siemens handheld programmer	Infrared receiver
Enclosure		• Approvals for handheld programmer	IS model: ATEX II 1GD Ex ia IIC T4 Ga Ex iaD 20 T135°C T <sub>a</sub> = -20 ... +50 °C CSA/FM Class I, II, and III, Div. 1, Groups A, B, C, D, E, F, G, T6 T <sub>a</sub> = +50 °C
• Material	Aluminium, polyester powder coated	Handheld communicator	HART communicator 375
• Cable inlet	2 x M20x1.5 or 2 x ½" NPT with adapter	PC	SIMATIC PDM AMS
Degree of protection	Type 4X/NEMA 4X, Type 6/ NEMA 6, IP67, IP68	Display (local)	Multi-segment alphanumeric liquid crystal with bar graph (representing level) available in four languages
Weight	< 2 kg (4.4 lbs) (polypropylene rod antenna)	HART® is a registered trademark of the Hart Communications Foundation.	
Display (local)	Multi-segment alphanumeric liquid crystal with bar graph (representing level) available in four languages		
Antenna			
• Material	Polypropylene rod, hermetically sealed construction, optional PTFE		
• Dimensions	Standard 100 mm (4") shield for maximum 100 mm (4") nozzle, or optional 250 mm (10") long shield		
• Optional rods, horn and waveguides	Refer to SITRANS LR200 Antennas for optional rods, horns and waveguides		

# Level Measurement

## Continuous level measurement - Radar transmitters

### SITRANS LR200

#### Selection and Ordering data

##### SITRANS LR200, Uni-Construction polypropylene rod antenna version

2-wire, 6 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including high temperature and pressure, to a range of 20 m (66 ft).

Max. 3 bar g (43.5 psi g) pressure and +80 °C (+176 °F)

##### Enclosure/Cable inlet

Aluminum, Epoxy painted  
2 x 1/2" NPT, Siemens LUI interface  
2 x M20x1.5, Siemens LUI interface

##### Polypropylene antenna type - (Max. 3 Bar pressure and +80 °C)

1 1/2" NPT [(Taper), ANSI/ASME B1.20.1],  
c/w integral 100 mm shield  
R 1 1/2" [(BSPT), EN 10226],  
c/w integral 100 mm shield  
G 1 1/2" [(BSPP), EN ISO 228-1],  
c/w integral 100 mm shield

1 1/2" NPT [(Taper), ANSI/ASME B1.20.1],  
c/w integral 250 mm shield  
R 1 1/2" [(BSPT), EN 10226],  
c/w integral 250 mm shield  
G 1 1/2" [(BSPP), EN ISO 228-1],  
c/w integral 250 mm shield

##### Approvals

General Purpose, CE<sup>1)</sup>  
General Purpose, CSA<sub>USC</sub>, FM, for North America only<sup>2)</sup>  
CSA Class I and II, Div. I, Groups A, B, C, D, G, 6.3 GHz, for North America only, Intrinsically Safe with suitable barrier<sup>2)</sup>  
FM, Class I and II, Div. I, Groups A, B, C, D, E, F, G, for North America only, Intrinsically Safe with suitable barrier<sup>2)</sup>  
ATEX II 1G EEx ja IIC T4, Intrinsically Safe with suitable barrier<sup>1)</sup>  
FM, Class I, Div. 2, Groups A, B, C, D, for North America only (no barrier required)<sup>2) 3)</sup>  
ATEX II 1/2 G EEx emia IIC T4 (no barrier required)<sup>1) 4) 5)</sup>  
ATEX II 1/2 G EEx dmia IIC T4 (no barrier required)<sup>1) 5)</sup>  
CSA/FM Class I, II and III, Div. 1, Groups A, B, C, D, E, F, G (no barrier required)<sup>2) 3) 5)</sup>

##### Communication/Output

PROFIBUS PA  
4 ... 20 mA, HART<sup>®</sup>, startup at <3.6 mA

<sup>1)</sup> Includes European Radio approval (R&TTE), 5.8 GHz, C-TICK

<sup>2)</sup> Includes Radio approval FCC, 6.3 GHz

<sup>3)</sup> Available with enclosure option 2 only

<sup>4)</sup> Available with enclosure option 3 only

<sup>5)</sup> Available with communication option 1 and 3 only

C) Subject to export regulations AL: N, ECCN: EAR99

#### Order No.

C) 7ML5422-

0

2

3

A

B

C

D

E

F

A

B

C

D

E

F

A

B

C

D

E

F

A

B

C

D

E

F

G

H

J

2

3

#### Selection and Ordering data

##### Further designs

Please add "-Z" to Order No. and specify Order code(s).

Stainless steel tag [69 x 50 mm (2.71 x 1.97")]:  
Measuring-point number/identification (max. 16 characters); specify in plain text

Test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and to ISO 9000

Namur NE43 compliant, device preset to failsafe <3.6 mA<sup>5)</sup>

##### Operating Instructions for HART/mA device

English

German

Note: The Operating Instructions should be ordered as a separate line item on the order.

Multi-language Quick Start manual  
This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.

##### Operating Instructions for PROFIBUS PA device

English

German

Note: The Operating Instructions should be ordered as a separate line item on the order.

Multi-language Quick Start manual  
This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.

##### Accessories

Handheld programmer, Intrinsically safe, EEx ia

HART modem/RS-232 (for use with a PC and SIMATIC PDM)

HART modem/USB (for use with a PC and SIMATIC PDM)

One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F), HART<sup>1)</sup>

One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F), PROFIBUS PA<sup>6)</sup>

SITRANS RD100 Remote display - see Chapter 8

SITRANS RD200 Remote display - see Chapter 8

SITRANS RD500 Remote display - see Chapter 8

<sup>1)</sup> Product shipped with plastic cable gland, rated to -20 °C. If -40 °C rating required, then metallic cable gland is recommended.

C) Subject to export regulations AL: N, ECCN: EAR99

D) Subject to export regulations AL: N, ECCN: EAR99H

# Level Measurement

## Continuous level measurement - Radar transmitters

SITRANS LR200

Selection and Ordering data	Order No.	Selection and Ordering data	Order code
<b>SITRANS LR200, Flange Adapter, Sanitary Version</b> 2-wire, 6 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including high temperature and pressure, to a range of 20 m (66 ft).	C) <b>7ML5424-</b>	<b>Further designs</b>	
<b>Antenna material (uses antenna adapter)</b> PTFE, one piece rod antenna UHMW-PE, one piece rod antenna	0 1	Please add "-Z" to Order No. and specify Order code(s).	
<b>Process connection</b> Sanitary fitting clamp	A	Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters); specify in plain text	<b>Y15</b>
<b>Configuration/Connection size</b> 2" connection, rod antenna only 3" connection, rod antenna only 4" connection, rod antenna only	A B C	Test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and to ISO 9000	<b>C11</b>
<b>Antenna extension</b> No extension	0	Inspection Certificate Type 3.1 per EN 10204	<b>C12</b>
<b>Mounting Clamp</b> No mounting clamp Mounting clamp included, not available with Pressure rating option 0	0 1	Namur NE43 compliant, device preset to failsafe <3.6 mA <sup>5)</sup>	<b>N07</b>
<b>Enclosure/Cable inlet</b> Aluminum, Epoxy painted 2 x 1/2" NPT, Siemens LUI interface C) 2 x M20x1.5, Siemens LUI interface C)	2 3	<b>Operating Instructions for HART/mA device</b>	Order No.
<b>Communication/Output</b> PROFIBUS PA 4 ... 20 mA, HART®, startup at <3.6 mA	B C	English C) <b>7ML1998-5JP02</b> German C) <b>7ML1998-5JP32</b>	
<b>Approvals</b> General Purpose, CE <sup>1)</sup> General Purpose, CSA <sub>USC</sub> , FM, for North America only <sup>2)</sup> C) CSA Class I and II, Div. I, Groups A, B, C, D, G, for C) North America only, Intrinsically Safe with suitable barrier <sup>2)</sup> FM, Class I and II, Div. I, Groups A, B, C, D, E, F, G, C) for North America only, Intrinsically Safe with suitable barrier <sup>2)</sup> ATEX II 1G EEx ia IIC T4, Intrinsically Safe with suitable barrier <sup>1)</sup> FM, Class I, Div. 2, Groups A, B, C, D, FCC C) 6.3 GHz, for North America only (no barrier required) <sup>3)</sup> ATEX II 1/2 G EEx emia IIC T4 (no barrier required) <sup>1) 4) 5)</sup> ATEX II 1/2 G EEx dmia IIC T4 (no barrier required) <sup>1) 5)</sup> CSA/FM Class I, II and III, Div. 1, Groups A, B, C, C) D, E, F, G (no barrier required) <sup>2) 3) 5)</sup>	A B C D E F G H J	Note: The Operating Instructions should be ordered as a separate line item on the order.	
<b>Pressure rating</b> Rating per Pressure/Temperature curves in Manual 0.5 bar g (7.25 psi g) maximum	0 1	Multi-language Quick Start manual This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	C) <b>7ML1998-5XC81</b>
		<b>Operating Instructions for PROFIBUS PA device</b>	Order No.
		English C) <b>7ML1998-5JR02</b> German C) <b>7ML1998-5JR32</b>	
		Note: The Operating Instructions should be ordered as a separate line item on the order.	
		Multi-language Quick Start manual This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	C) <b>7ML1998-5XD81</b>
		<b>Accessories</b>	
		Handheld programmer, Intrinsically safe, EEx ia C) <b>7ML1930-1BK</b>	
		HART modem/RS-232 (for use with a PC and SIMATIC PDM) D) <b>7MF4997-1DA</b>	
		HART modem/USB (for use with a PC and SIMATIC PDM) D) <b>7MF4997-1DB</b>	
		One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F), HART <sup>1)</sup>	<b>7ML1930-1AP</b>
		One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F), PROFIBUS PA <sup>6)</sup>	<b>7ML1930-1AQ</b>
		SITRANS RD100 Remote display - see Chapter 8	
		SITRANS RD200 Remote display - see Chapter 8	
		SITRANS RD500 Remote display - see Chapter 8	
		<b>Sanitary fitting clamps</b>	
		2", 304 stainless steel	<b>7ML1830-1HD</b>
		3", 304 stainless steel	<b>7ML1830-1HE</b>
		4", 304 stainless steel	<b>7ML1830-1HF</b>
1) Includes European Radio approval (R&TTE), 5.8 GHz, C-TICK 2) Includes Radio approval FCC, 6.3 GHz 3) Available with enclosure option 2 only 4) Available with enclosure option 3 only 5) Available with communication option A and C only C) Subject to export regulations AL: N, ECCN: EAR99		1) Product shipped with plastic cable gland, rated to -20 °C. If -40 °C rating required, then metallic cable gland is recommended. C) Subject to export regulations AL: N, ECCN: EAR99 D) Subject to export regulations AL: N, ECCN: EAR99H	



# Level Measurement

## Continuous level measurement - Radar transmitters

### SITRANS LR200

Selection and Ordering data	Order No.
<b>SITRANS LR200, Flange Adapter/PTFE Rod Antenna Version</b>	C) 7 ML 5 4 2 3 -
2-wire, 6 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including high temperature and pressure, to a range of 20 m (66 ft).	
<b>Antenna material (uses antenna adapter)</b> PTFE, uses antenna adapter and additional process connection below	1
<b>Process connection (refer to Pressure/Temperature curves in Operating Instructions)</b> Flanges (316L stainless steel) DN 50 PN 16, Type A, flat faced DN 80 PN 16, Type A, flat faced DN 100 PN 16, Type A, flat faced DN 150 PN 16, Type A, flat faced  2" ASME 150 lb, flat faced 3" ASME 150 lb, flat faced 4" ASME 150 lb, flat faced 6" ASME 150 lb, flat faced  DN 50 PN 40, flat faced DN 80 PN 40, flat faced DN 100 PN 40, flat faced DN 150 PN 40, flat faced  2" ASME 300 lb, flat faced, available with Pressure rating option 1 only 3" ASME 300 lb, flat faced 4" ASME 300 lb, flat faced 6" ASME 300 lb, flat faced  JIS DN 50 10K JIS DN 80 10K JIS DN 100 10K JIS DN 150 10K (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5, or EN 1092-1, or JIS B 2220 standard.)  Threaded connection (316L stainless steel) 1½" NPT [(Taper), ANSI/ASME B1.20.1] 2" NPT [(Taper), ANSI/ASME B1.20.1] R 1½" [(BSPT), EN 10226]  R 2" [(BSPT), EN 10226] G 1½" [(BSPP), EN ISO 228-1] G 2" [(BSPP), EN ISO 228-1]	AA BA CA DA  FB GB HB JB  AC BC CC DC FD  GD HD JD  AE BE CE DE  LA MA LC  MC LE ME
<b>Antenna extensions or Inactive shield length</b> No antenna extension 50 mm (2") extension, PTFE 100 mm (4") extension, PTFE  100 mm (4") extension, 316L stainless steel shield <sup>1)</sup> 150 mm (6") extension, 316L stainless steel shield <sup>1)</sup> 200 mm (8") extension, 316L stainless steel shield <sup>1)</sup>  250 mm (10") extension, 316L stainless steel shield <sup>1)</sup> Custom inactive shield length 101 mm ... 1000 mm (in 1 mm increments) <u>Add order code Y01 and plain text: "Inactive shield length .... mm"<sup>1)</sup></u>	0 1 2 3 4 5 6 7
<b>Process seal/gasket</b> Integral Gasket, for flat faced flange process connections only, not for Antenna extension options 3 to 6  FKM O-ring, not available for combination of flat faced flanges with Antenna extension options 0, 1 or 2	0 1
<b>Enclosure/Cable inlet</b> Aluminum, Epoxy painted 2 x ½" NPT, Siemens LUI interface 2 x M20x1.5, Siemens LUI interface	C) 2 C) 3
<b>Communication/Output</b> PROFIBUS PA 4 ... 20 mA, HART®, startup at <3.6 mA	B C

Selection and Ordering data	Order No.
<b>SITRANS LR200, Flange Adapter/PTFE Rod Antenna Version</b>	C) 7 ML 5 4 2 3 -
2-wire, 6 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including high temperature and pressure, to a range of 20 m (66 ft).	
<b>Approvals</b> General Purpose, CE <sup>2)</sup> General Purpose, CSA <sub>USC</sub> FM, for North America only <sup>3)</sup> CSA Class I and II, Div. I, Groups A, B, C, D, G, for North America only, Intrinsically Safe with suitable barrier <sup>3)</sup> FM, Class I and II, Div. I, Groups A, B, C, D, E, F, G, for North America only, Intrinsically Safe with suitable barrier <sup>3)</sup> ATEX II 1G EEx ia IIC T4, Intrinsically Safe with suitable barrier <sup>2)</sup> FM, Class I, Div. 2, Groups A, B, C, D, FCC 6.3 GHz, for North America only (no barrier required) <sup>3) 4)</sup> ATEX II 1/2 G EEx emia IIC T4 (no barrier required) <sup>2) 5) 6)</sup> ATEX II 1/2 G EEx dmia IIC T4 (no barrier required) <sup>2) 6)</sup> CSA/FM Class I, II and III, Div. 1, Groups A, B, C, D, E, F, G (no barrier required) <sup>2) 4) 6)</sup>	A B C D E F G H J
<b>Pressure rating</b> Rating per Pressure/Temperature curves in Manual 0.5 bar g (7.25 psi g) maximum	0 1

- 1) Available with process connection options BA, CA, DA, GB, HB, JB, BC, CC, DC, GD, HD, JD, BE, CE, DE, MA, MC, ME only  
2) Includes European Radio approval (R&TTE), 5.8 GHz, C-TICK  
3) Includes Radio approval FCC, 6.3 GHz  
4) Available with enclosure option 2 only  
5) Available with enclosure option 3 only  
6) Available with communication option A and C only  
C) Subject to export regulations AL: N, ECCN: EAR99

Selection and Ordering data	Order code
<b>Further designs</b> Please add "-Z" to Order No. and specify Order code(s).	
Inactive custom shield lengths: Enter the total length of the inactive shield in plain text description (in 1 mm increments).	Y01
Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters); specify in plain text	Y15
Test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and to ISO 9000	C11
Inspection Certificate Type 3.1 per EN 10204	C12
Namur NE43 compliant, device preset to failsafe <3.6 mA <sup>5)</sup>	N07
<b>Operating Instructions for HART/mA device</b>	Order No.
English	C) 7ML1998-5JP02
German	C) 7ML1998-5JP32
Note: The Operating Instructions should be ordered as a separate line item on the order.	
Multi-language Quick Start manual This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	C) 7ML1998-5XC81

# Level Measurement

## Continuous level measurement - Radar transmitters

SITRANS LR200

### Operating Instructions for PROFIBUS PA device

English C) **7ML1998-5JR02**  
 German C) **7ML1998-5JR32**

Note: The Operating Instructions should be ordered as a separate line item on the order.

Multi-language Quick Start manual C) **7ML1998-5XD81**  
 This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.

### Accessories

Handheld programmer, Intrinsically safe, EEx ia C) **7ML1930-1BK**  
 HART modem/RS-232 (for use with a PC and SIMATIC PDM) D) **7MF4997-1DA**  
 HART modem/USB (for use with a PC and SIMATIC PDM) D) **7MF4997-1DB**  
 One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F), HART<sup>1)</sup> **7ML1930-1AP**  
 One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F), PROFIBUS PA<sup>6)</sup> **7ML1930-1AQ**  
 Antenna, rod, PTFE **7ML1830-1HC**  
 Antenna extension, 50 mm (2") PTFE **7ML1830-1CG**  
 Antenna extension, 100 mm (4") PTFE **7ML1830-1CH**  
 SITRANS RD100 Remote display - see Chapter 8  
 SITRANS RD200 Remote display - see Chapter 8  
 SITRANS RD500 Remote display - see Chapter 8

<sup>1)</sup> Product shipped with plastic cable gland, rated to -20 °C. If -40 °C rating required, then metallic cable gland is recommended.

C) Subject to export regulations AL: N, ECCN: EAR99

D) Subject to export regulations AL: N, ECCN: EAR99H

### Selection and Ordering data

Order No.

Selection and Ordering data	Order No.
<b>SITRANS LR200, Flange Adapter/Horn Antenna Version</b>	<b>7ML 5 4 2 5 -</b>
2-wire, 6 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including high temperature and pressure, to a range of 20 m (66 ft).	
<b>Antenna Material (uses antenna adapter)</b>	
316L stainless steel with PTFE cone emitter	0
316L stainless steel with PTFE cone emitter and purge connection with 1/8" NPT inlet <sup>1)</sup>	1
Sliding waveguide system with 1000 mm (40") waveguide <sup>1) 2)</sup>	2
<b>Process connection (refer to Pressure/Temperature curves on specification sheets)</b>	
Flanges (316L stainless steel)	
DN 50 PN 16, Type A, flat faced <sup>1)</sup>	AA
DN 80 PN 16, Type A, flat faced	BA
DN 100 PN 16, Type A, flat faced	CA
DN 150 PN 16, Type A, flat faced	DA
DN 200 PN 16, Type A, flat faced	EA
DN 80 PN 10/16 DIN EN1092-1 form B1	BF
DN 100 PN 10/16 DIN EN1092-1 form B1	CF
DN 150 PN 10/16 DIN EN1092-1 form B1	DF
DN 200 PN 16 DIN EN1092-1 form B1	EF
2" ASME 150 lb, flat faced <sup>1)</sup>	FB
3" ASME 150 lb, flat faced	GB
4" ASME 150 lb, flat faced	HB
6" ASME 150 lb, flat faced	JB
8" ASME 150 lb, flat faced	KB
DN 50 PN 40, flat faced <sup>1)</sup>	AC
DN 80 PN 40, flat faced	BC
DN 100 PN 40, flat faced	CC
DN 80 PN 25/40 DIN EN1092-1 form B1	CG
DN 100 PN 25/40 DIN EN1092-1 form B1	DG
DN 150 PN 25/40 DIN EN1092-1 form B1	EG
2" ASME 300 lb, flat faced <sup>1)</sup>	FD
3" ASME 300 lb, flat faced	GD
4" ASME 300 lb, flat faced	HD
JIS DN 50 10K <sup>1)</sup>	AE
JIS DN 80 10K	BE
JIS DN 100 10K	CE
JIS DN 150 10K	DE
JIS DN 200 10K	EE
(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5, or EN 1092-1, or JIS B 2220 standard.)	
<b>Communication/Output</b>	
PROFIBUS PA	1
4 ... 20 mA, HART <sup>®</sup> , startup at <3.6 mA	2
<b>Process seal/gasket</b>	
FKM (-40 ... +200 °C)	0
Nitrile (-40 ... +60 °C), sliding waveguide systems only	1
FFKM (-35 ... +200 °C)	2
<b>Enclosure/Cable inlet</b>	
Aluminum, Epoxy painted	
2 x 1/2" NPT, Siemens LUI interface	2
2 x M20x1.5, Siemens LUI interface	3
<b>Horn size/Waveguide options</b>	
80 mm (3") horn <sup>3)</sup>	B
100 mm (4") horn <sup>3)</sup>	C
150 (6") mm horn	D
200 (8") mm horn	E
100 mm (4") horn with 100 mm (4") waveguide extension <sup>3)</sup>	F
100 mm (4") horn with 150 mm (6") waveguide extension <sup>3)</sup>	G
100 mm (4") horn with 200 mm (8") waveguide extension <sup>3)</sup>	H
100 mm (4") horn with 250 mm (10") waveguide extension <sup>3)</sup>	J

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# Level Measurement

## Continuous level measurement - Radar transmitters

### SITRANS LR200

#### Selection and Ordering data

Order No.

#### SITRANS LR200, Flange Adapter/Horn Antenna C) Version

7 ML 5 4 2 5 -

2-wire, 6 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including high temperature and pressure, to a range of 20 m (66 ft).

150 mm (6") horn with 100 mm (4") waveguide extension  
150 mm (6") horn with 150 mm (6") waveguide extension  
150 mm (6") horn with 200 mm (8") waveguide extension

150 mm (6") horn with 250 mm (10") waveguide extension  
200 mm (8") horn with 100 mm (4") waveguide extension  
200 mm (8") horn with 150 mm (6") waveguide extension

200 mm (8") horn with 200 mm (8") waveguide extension  
200 mm (8") horn with 250 mm (10") waveguide extension

Waveguide only - Waveguide length 500 mm ... 3000 mm (in 1 mm increments)  
(Add order code Y01 and plain text: "waveguide length ... mm")

#### Approvals

General Purpose, CE<sup>4)</sup>

General Purpose, CSA<sub>USC</sub>, FM, for North America only<sup>5)</sup>

CSA Class I and II, Div. I, Groups A, B, C, D, G, for North America only, Intrinsically Safe with suitable barrier<sup>5)</sup>

FM, Class I and II, Div. I, Groups A, B, C, D, E, F, G, for North America only, Intrinsically Safe with suitable barrier<sup>5)</sup>

ATEX II 1G EEx ia IIC T4, Intrinsically Safe with suitable barrier<sup>4)</sup>

FM, Class I, Div. 2, Groups A, B, C, D, for North America only (no barrier required)<sup>5) 6)</sup>

ATEX II 1/2 G EEx emia IIC T4 (no barrier required)<sup>4) 7) 8)</sup>

ATEX II 1/2 G EEx dmia IIC T4 (no barrier required)<sup>4) 8)</sup>

CSA/FM Class I, II and III, Div. 1, Groups A, B, C, D, E, F, G (no barrier required)<sup>5) 6) b)</sup>

#### Pressure rating

Rating per Pressure/Temperature curves in Manual 0.5 bar g (7.25 psi g) maximum

1) Available with pressure rating option 1 only

2) Maximum Process Temperature +60 °C (+140 °F)

3) For stillpipe applications only

4) Includes European Radio approval (R&TTE), 5.8 GHz, C-TICK

5) Includes Radio approval FCC, 6.3 GHz

6) Available with enclosure option 2 only

7) Available with enclosure option 3 only

8) Available with communication option 0 and 2 only

C) Subject to export regulations AL: N, ECCN: EAR99

D) Subject to export regulations AL: N, ECCN: EAR99H

#### Selection and Ordering data

Order code

#### Further designs

Please add **"-Z"** to Order No. and specify Order code(s).

Inactive custom shield lengths: Enter the total length of the inactive shield in plain text description (in 1 mm increments).

Y01

Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters); specify in plain text

Y15

Test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and to ISO 9000

C11

Inspection Certificate Type 3.1 per EN 10204

C12

Namur NE43 compliant, device preset to failsafe <3.6 mA<sup>1)</sup>

N07

#### Operating Instructions for HART/mA device

Order No.

English

C) 7ML1998-5JP02

German

C) 7ML1998-5JP32

Note: The Operating Instructions should be ordered as a separate line item on the order.

Multi-language Quick Start manual

This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.

C) 7ML1998-5XC81

#### Operating Instructions for PROFIBUS PA device

English

C) 7ML1998-5JR02

German

C) 7ML1998-5JR32

Note: The Operating Instructions should be ordered as a separate line item on the order.

Multi-language Quick Start manual

This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.

C) 7ML1998-5XD81

#### Accessories

Handheld programmer, Intrinsically safe, EEx ia

C) 7ML1930-1BK

HART modem/RS-232 (for use with a PC and SIMATIC PDM)

D) 7MF4997-1DA

HART modem/USB (for use with a PC and SIMATIC PDM)

D) 7MF4997-1DB

One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F), HART<sup>2)</sup>

7ML1930-1AP

One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F), PROFIBUS PA<sup>3)</sup>

7ML1930-1AQ

SITRANS RD100 Remote display - see Chapter 8

SITRANS RD200 Remote display - see Chapter 8

SITRANS RD500 Remote display - see Chapter 8

1) Includes Radio approval FCC, 6.3 GHz

2) Product shipped with plastic cable gland, rated to -20 °C. If -40 °C rating required, then metallic cable gland is recommended.

3) Available with enclosure option 2 only

C) Subject to export regulations AL: N, ECCN: EAR99

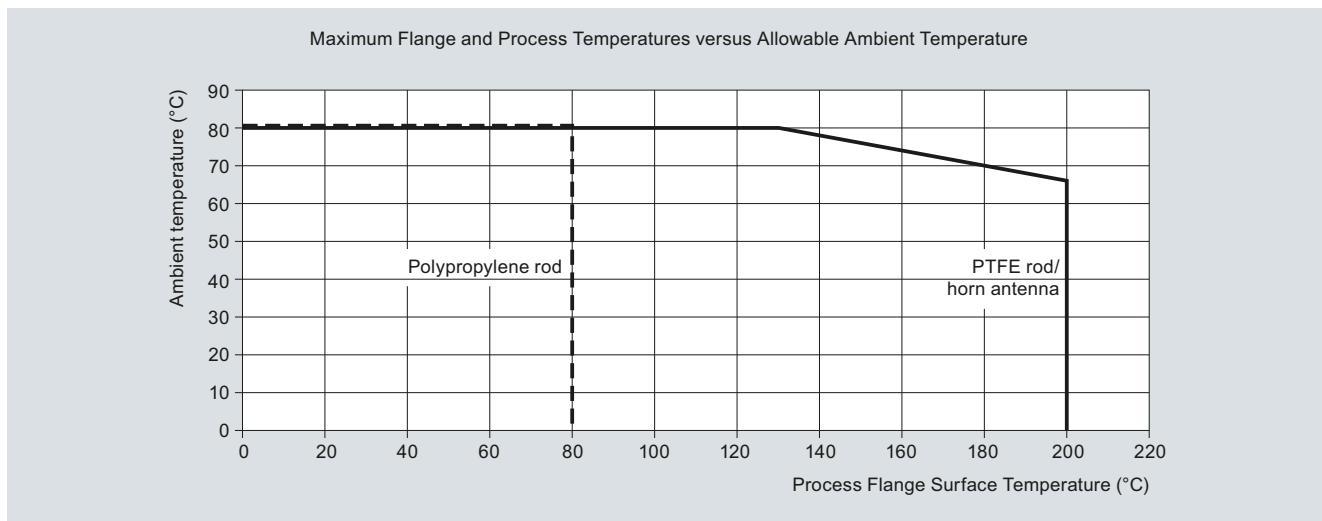
D) Subject to export regulations AL: N, ECCN: EAR99H

# Level Measurement

## Continuous level measurement - Radar transmitters

SITRANS LR200

### Characteristic curves



SITRANS LR200 Ambient/Process Flange Surface Temperature Curve

# Level Measurement

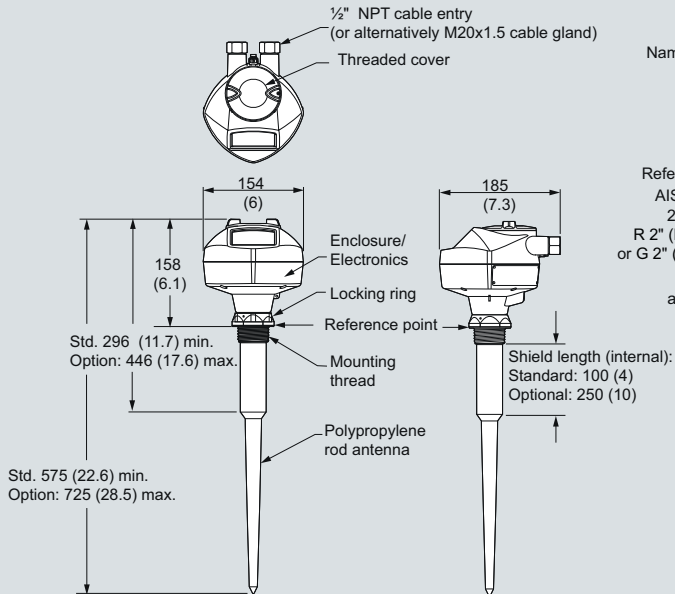
## Continuous level measurement - Radar transmitters

### SITRANS LR200

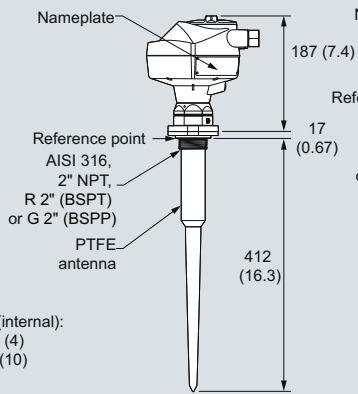
#### Dimensional drawings

5

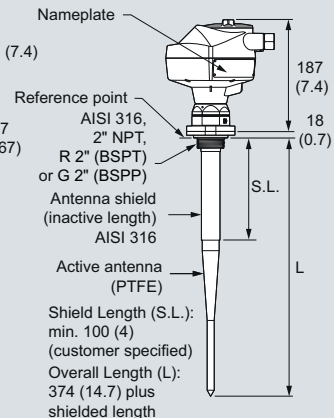
**SITRANS LR200 with Polypropylene Shielded Rod Antenna**



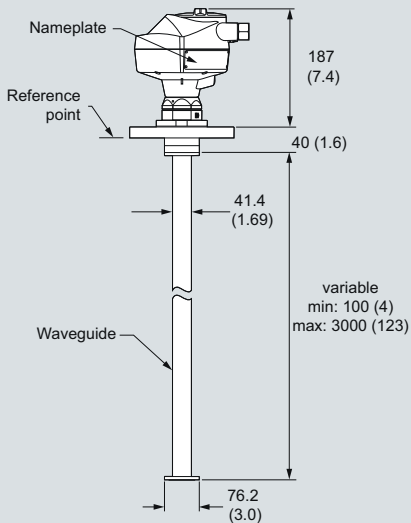
**PTFE Rod Antenna, Threaded**



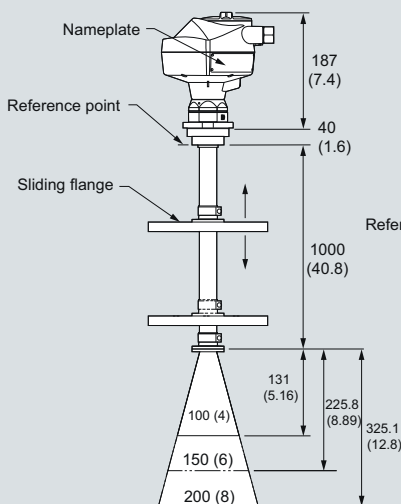
**Threaded Connection PTFE Rod, external shield**



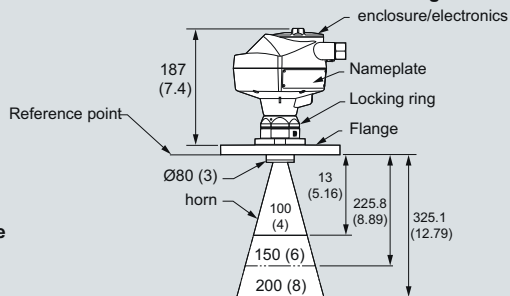
**Waveguide Antenna with Flat Faced Flange**



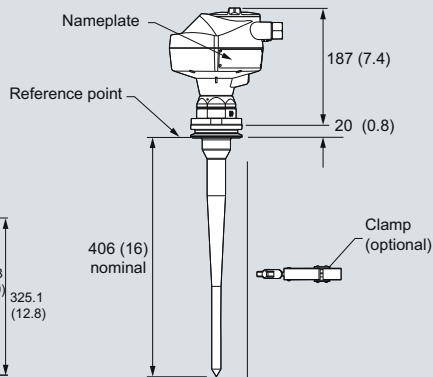
**Sliding Waveguide**



**Horn Antenna with Flat Faced Flange**



**Sanitary Rod Antenna**



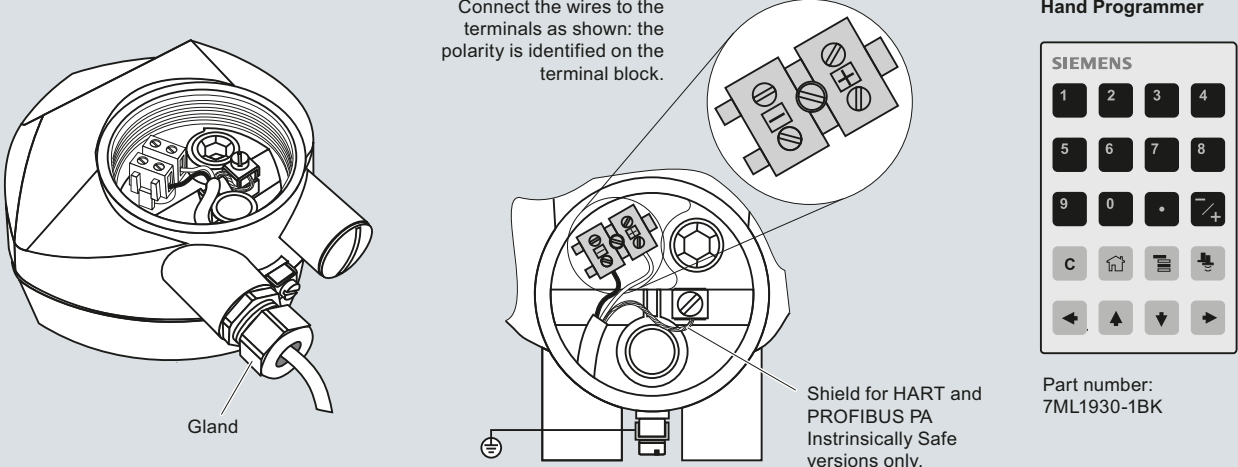
SITRANS LR200, dimensions in mm (inch)

# Level Measurement

## Continuous level measurement - Radar transmitters

SITRANS LR200

### Schematics



Connect the wires to the terminals as shown: the polarity is identified on the terminal block.

Shield for HART and PROFIBUS PA Intrinsically Safe versions only.

**Hand Programmer**

SIEMENS			
1	2	3	4
5	6	7	8
9	0	.	/+
C	⏪	⏩	⏴
⏴	⏵	⏶	⏷

Part number:  
7ML1930-1BK

**Note:**

1. DC terminal shall be supplied from an SELV source in accordance with IEC 1010-1 Annex H.
2. All field wiring must have insulation suitable for rated input voltages.
3. Use shielded twisted pair cable (14 to 22 AWG) for HART version.
4. Separate cables and conduit may be required to conform to standard instrumentation wiring practices or electrical codes.

SITRANS LR200 connections

# Level Measurement

## Continuous level measurement - Radar transmitters

### SITRANS LR200 Antennas

#### Integration



Antenna configurations for SITRANS LR200

#### Technical specifications

Antenna Types	Flat Faced Flange with Rod	Shielded Rod	Sanitary Rod (1 piece construction)	Horn (4", 6", 8" sizes available)	Waveguide
<b>Connection type</b>	Flat faced flange nominal pipe sizes 50, 80, 100, 150 mm (2, 3, 4, 6")	Threaded 2" NPT, R 2" (BSPT), G 2" (BSPP) or flat faced flange nominal pipe sizes 80, 100 mm (3, 4")	Sanitary fitting clamp 50, 80, 100 mm (2, 3, 4") sizes	Flat faced flange nominal pipe sizes 50, 80, 100, 150 mm (2, 3, 4, 6")	Flat faced flange nominal pipe sizes 50, 80, 100, 150 mm (2, 3, 4, 6")
<b>Wetted parts</b>	PTFE	PTFE, 316L stainless steel, FKM o-ring	UHME-PE or PTFE	316L stainless steel PTFE, FKM o-ring	316L stainless steel PTFE, FKM o-ring
<b>Extensions</b>	50 or 100 mm (2 or 4") PTFE or UHMW-PE	100, 150, 200 or 250 mm (4, 6, 8 or 10") standard shield length	N/A	use waveguide for extensions to 6 m (20 ft) long	two sections (max.) can be connected together Max. overall length: 3 m (9.8 ft)
<b>Dielectric constant</b>	> 3	> 3	> 3	> 3	> 1.6
<b>Insertion length (max.)</b>	41 cm (16.3")	variable	41 cm (16.3")	variable with extension	variable
<b>Purging option (liquid or gas)</b>	No	No	No	Yes	Yes
<b>Sliding waveguide option for digesters<sup>1)</sup></b>	Yes	No	No	Yes	N/A
<b>Weight<sup>2)</sup></b>	6.5 kg (14.3 lbs)	5.0 kg (11 lbs)	5.0 kg (11 lbs)	7.5 kg (16.5 lbs)	8.0 kg (17.6 lbs) 1 m (39") length

<sup>1)</sup> Maximum pressure 0.5 bar g at +60 °C (7.25 psi g at +140 °F)


<sup>2)</sup> Not including extensions, includes SITRANS LR200 and smallest process connection

# Level Measurement

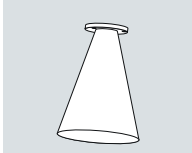

## Continuous level measurement - Radar transmitters

### SITRANS LR200 Specials

#### SITRANS LR200 Specials

	Order No.
<b>SITRANS LR200 Aluminum Enclosure Kit with Electronics and Covers (7ML5422, 7ML5423, 7ML5424, 7ML5425), calibrated for use with standard rod antenna</b>	
SITRANS LR200 aluminum enclosure with board stack, LUI display, 5.8 GHz, M20 cable inlet, approval option A, with HART <sup>®</sup> communication, no process connection. <sup>7)</sup>	C) <b>A5E01483323</b>
SITRANS LR200 aluminum enclosure with board stack, LUI display, 5.8 GHz, M20 cable inlet, approval option E, with HART <sup>®</sup> communication, no process connection. <sup>7)</sup>	C) <b>A5E01483368</b>
SITRANS LR200 aluminum enclosure with board stack, LUI display, 6.3 GHz, M20 cable inlet, approval option C, with HART <sup>®</sup> communication, no process connection. <sup>7)</sup>	C) <b>A5E01483389</b>
SITRANS LR200 aluminum enclosure with board stack, LUI display, 5.8 GHz, M20 cable inlet, approval option E, with PROFIBUS PA communication, no process connection. <sup>7)</sup>	C) <b>A5E01483420</b>
SITRANS LR200 aluminum enclosure with board stack, LUI display, 5.8 GHz, M20 cable inlet, approval option A, with PROFIBUS PA communication, no process connection. <sup>7)</sup>	C) <b>A5E01483440</b>
SITRANS LR200 aluminum enclosure with board stack, LUI display, 6.3 GHz, M20 cable inlet, approval option C, with PROFIBUS PA communication, no process connection. <sup>7)</sup>	C) <b>A5E01483456</b>
SITRANS LR200 aluminum enclosure with board stack, LUI display, 5.8 GHz, NPT cable inlet, approval option A, with HART <sup>®</sup> communication, no process connection. <sup>7)</sup>	C) <b>A5E01483468</b>
SITRANS LR200 aluminum enclosure with board stack, LUI display, 6.3 GHz, NPT cable inlet, approval option C, with HART <sup>®</sup> communication, no process connection. <sup>7)</sup>	C) <b>A5E01483480</b>
SITRANS LR200 aluminum enclosure with board stack, LUI display, 5.8 GHz, NPT cable inlet, approval option E, with HART <sup>®</sup> communication, no process connection. <sup>7)</sup>	C) <b>A5E01483493</b>
SITRANS LR200 aluminum enclosure with board stack, LUI display, 5.8 GHz, NPT cable inlet, approval option E, with HART <sup>®</sup> communication, no process connection. <sup>7)</sup>	C) <b>A5E01483536</b>
SITRANS LR200 aluminum enclosure with board stack, LUI display, 6.3 GHz, NPT cable inlet, approval option C, with PROFIBUS PA communication, no process connection. <sup>7)</sup>	C) <b>A5E01483547</b>
SITRANS LR200 aluminum enclosure with board stack, LUI display, 5.8 GHz, NPT cable inlet, approval option E, with PROFIBUS PA communication, no process connection. <sup>7)</sup>	C) <b>A5E01483559</b>


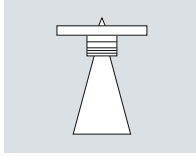
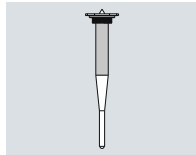
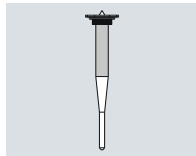


#### SITRANS LR200 Specials

	Order No.
SITRANS LR200 aluminum enclosure with board stack, LUI display, 5.8 GHz, M20 cable inlet, approval option A, with HART <sup>®</sup> communication start-up at <3.6mA, no process connection. <sup>7)</sup>	C) <b>A5E02956419</b>
SITRANS LR200 aluminum enclosure with board stack, LUI display, 5.8 GHz, M20 cable inlet, approval option E, with HART <sup>®</sup> communication start-up at <3.6mA, no process connection. <sup>7)</sup>	C) <b>A5E02956420</b>
SITRANS LR200 aluminum enclosure with board stack, LUI display, 5.8 GHz, M20 cable inlet, approval option G, with HART <sup>®</sup> communication start-up at <3.6mA, no process connection. <sup>7)</sup>	C) <b>A5E02956421</b>
SITRANS LR200 aluminum enclosure with board stack, LUI display, 5.8 GHz, M20 cable inlet, approval option H, with HART <sup>®</sup> communication start-up at <3.6mA, no process connection. <sup>7)</sup>	C) <b>A5E02956422</b>
<b>SITRANS LR200 Horn Antenna Kits with mounting screws (no emitter supplied)</b>	
80 mm (3") horn antenna kit	<b>PBD-25500K02A</b>
100 mm (4") horn antenna kit	<b>PBD-25500K03A</b>
150 mm (6") horn antenna kit	<b>PBD-25500K05A</b>
200 mm (8") horn antenna kit	<b>PBD-25500K07A</b>
<b>SITRANS LR200 Extension Kits for Horn Antenna with mounting screws</b>	
100 mm (4") extension kit for horn antenna	<b>PBD-25501K0100A</b>
150 mm (6") extension kit for horn antenna	<b>PBD-25501K0150A</b>
200 mm (8") extension kit for horn antenna	<b>PBD-25501K0200A</b>
250 mm (10") extension kit for horn antenna	<b>PBD-25501K0250A</b>
500 mm (20") extension kit for horn antenna	<b>PBD-25501K0500A</b>
1000 mm (40") extension kit for horn antenna	<b>PBD-25501K1000A</b>
<b>SITRANS LR200 Flanged Rod Antenna Kit with 316L SS flat faced flanges</b>	
Flanged PTFE rod antenna kit, 2" ASME, 150 lb. See drawing 51003 on <a href="http://www.siemens.com/radar">http://www.siemens.com/radar</a> <sup>1) 6)</sup>	<b>PBD-51003K020AAAA</b>
Flanged PTFE rod antenna kit, DN 50 PN16. See drawing 51003 on <a href="http://www.siemens.com/radar">http://www.siemens.com/radar</a> <sup>1) 6)</sup>	<b>PBD-51003K050AJAA</b>
Flanged PTFE rod antenna kit, JIS 10K DN 50. See drawing 51003 on <a href="http://www.siemens.com/radar">http://www.siemens.com/radar</a> <sup>1) 6)</sup>	<b>PBD-51003K050AOAA</b>

# Level Measurement

## Continuous level measurement - Radar transmitters

### SITRANS LR200 Specials

	Order No.		Order No.
<b>SITRANS LR200 PTFE Rod Antenna Kit with 316L SS 1½" pipe thread process connection</b>		<b>SITRANS LR200 Horn Antenna Kit with 316L SS flat faced flange, with PTFE emitter (without waveguide)</b>	
PTFE rod antenna kit, 1½" NPT 316L SS Process Connection, FKM O-ring; See drawing 51004 on <a href="http://www.siemens.com/radar">http://www.siemens.com/radar</a> <sup>6)</sup>	<b>PBD-51004K1AAA</b>	Horn antenna kit, 2" ASME 316L SS flange 3" horn, PTFE emitter <sup>2) 6)</sup>	<b>PBD-51006K020AAAA</b>
PTFE rod antenna kit, R 1½" (BSPT), EN 10226 316L SS Process Connection, FKM O-ring; See drawing 51004 on <a href="http://www.siemens.com/radar">http://www.siemens.com/radar</a> <sup>6)</sup>	<b>PBD-51004K2AAA</b>	Horn antenna kit, 2" ASME 316L SS flange 4" horn, PTFE emitter <sup>2) 6)</sup>	<b>PBD-51006K020AABA</b>
PTFE rod antenna kit, 1½" G 316L SS Process Connection, FKM O-ring; See drawing 51004 on <a href="http://www.siemens.com/radar">http://www.siemens.com/radar</a> <sup>6)</sup>	<b>PBD-51004K3AAA</b>	Horn antenna kit, 2" ASME 316L SS flange 6" horn, PTFE emitter <sup>2) 6)</sup>	<b>PBD-51006K020AACA</b>
<b>SITRANS LR200 PTFE Rod Antenna Kit with 316L SS 2" pipe thread process connection</b>		Horn antenna kit, 2" ASME 316L SS flange 8" horn, PTFE emitter <sup>2) 6)</sup>	<b>PBD-51006K020AADA</b>
PTFE rod antenna kit, 2" NPT 316L SS Process Connection, FKM O-ring; See drawing 51005 on <a href="http://www.siemens.com/radar">http://www.siemens.com/radar</a> <sup>6)</sup>	<b>PBD-51005K1AAA</b>	Horn antenna kit, DN 50 PN 16 316L SS flange 80 mm horn, PTFE emitter <sup>2) 6)</sup>	<b>PBD-51006K050AJAA</b>
PTFE rod antenna kit, R 2" (BSPT), EN 10226 316L SS Process Connection, FKM O-ring; See drawing 51005 on <a href="http://www.siemens.com/radar">http://www.siemens.com/radar</a> <sup>6)</sup>	<b>PBD-51005K2AAA</b>	Horn antenna kit, DN 50 PN 16 316L SS flange 100 mm horn, PTFE emitter <sup>2) 6)</sup>	<b>PBD-51006K050AJBA</b>
PTFE rod antenna kit, 2" G 316L SS Process Connection, FKM O-ring; See drawing 51005 on <a href="http://www.siemens.com/radar">http://www.siemens.com/radar</a> <sup>6)</sup>	<b>PBD-51005K3AAA</b>	Horn antenna kit, DN 50 PN 16 316L SS flange 150 mm horn, PTFE emitter <sup>2) 6)</sup>	<b>PBD-51006K050AJCA</b>
<b>SITRANS LR200 PTFE Rod Antenna Kit (100 mm shield) with 316L SS 2" pipe thread process connection</b>		Horn antenna kit, DN 50 PN 16 316L SS flange 200 mm horn, PTFE emitter <sup>2) 6)</sup>	<b>PBD-51006K050AJDA</b>
PTFE rod antenna kit, 2" NPT 316L SS Process Connection, FKM O-ring; See drawing 51002 on <a href="http://www.siemens.com/radar">http://www.siemens.com/radar</a> <sup>3) 6)</sup>	<b>PBD-51002K0100AAA</b>	<b>SITRANS LR200 Sanitary Rod Antenna with Sanitary Fitting Clamp Flange mounting and bushing. See drawing 51010 on <a href="http://www.siemens.com/radar">http://www.siemens.com/radar</a> (Sanitary Fitting Clamps not included)</b>	
PTFE rod antenna shielded kit, R 2" (BSPT), EN 10226 316L SS Process Connection, FKM O-ring, 100 mm 316L SS shield. See drawing 51002 on <a href="http://www.siemens.com/radar">http://www.siemens.com/radar</a> <sup>3) 6)</sup>	<b>PBD-51002K0100BAA</b>	PTFE sanitary rod antenna kit, 2" mounting connection. <sup>6)</sup>	<b>PBD-51010K1AA</b>
PTFE rod antenna shielded kit, 2" G 316L SS Process Connection, FKM O-ring, 100 mm 316L SS shield. See drawing 51002 on <a href="http://www.siemens.com/radar">http://www.siemens.com/radar</a> <sup>3) 6)</sup>	<b>PBD-51002K0100CAA</b>	PTFE sanitary rod antenna kit, 3" mounting connection. <sup>6)</sup>	<b>PBD-51010K2AA</b>
<b>SITRANS LR200 PTFE Flanged Rod Antenna Kit with 316L SS shield and 316L SS flat faced flange</b>		PTFE sanitary rod antenna kit, 4" mounting connection. <sup>6)</sup>	<b>PBD-51010K3AA</b>
PTFE shielded rod antenna kit, flanged, 3" ASME 150 lb 316L SS flange, 100 mm 316L SS shield. <sup>1) 6)</sup>	<b>PBD-51014K0100AAA</b>	UHMW-PE sanitary rod antenna kit, 2" mounting connection. <sup>6)</sup>	<b>PBD-51010K1AB</b>
PTFE shielded rod antenna kit, flanged, DN 80 PN 16 316L SS flange, 100 mm 316L SS shield. <sup>1) 6)</sup>	<b>PBD-51014K0100EJA</b>	UHMW-PE sanitary rod antenna kit, 3" mounting connection. <sup>6)</sup>	<b>PBD-51010K2AB</b>
PTFE shielded rod antenna kit, flanged, 3" ASME 150 lb 316L SS flange, 150 mm 316L SS shield. <sup>1) 6)</sup>	<b>PBD-51014K0150AAA</b>	UHMW-PE sanitary rod antenna kit, 4" mounting connection. <sup>6)</sup>	<b>PBD-51010K3AB</b>

# Level Measurement

## Continuous level measurement - Radar transmitters

SITRANS LR200 Specials

	Order No.
PTFE shielded rod antenna kit, flanged, DN 80 PN 16 316L SS flange, 150 mm 316L SS shield. <sup>1) 6)</sup>	<b>PBD-51014K0150EJA</b>
PTFE shielded rod antenna kit, flanged, 3" ASME 150 lb 316L SS flange, 200 mm 316L SS shield. <sup>1) 6)</sup>	<b>PBD-51014K0200AAA</b>
PTFE shielded rod antenna kit, flanged, DN 80 PN 16 316L SS flange, 200 mm 316L SS shield. <sup>1) 6)</sup>	<b>PBD-51014K0200EJA</b>
PTFE shielded rod antenna kit, flanged, 3" ASME 150 lb 316L SS flange, 250 mm 316L SS shield. <sup>1) 6)</sup>	<b>PBD-51014K0250AAA</b>
PTFE shielded rod antenna kit, flanged, DN 80 PN 16 316L SS flange, 250 mm 316L SS shield. <sup>1) 6)</sup>	<b>PBD-51014K0250EJA</b>
<b>PTFE paste</b>	
Kit, PTFE paste, Tube, 250 mL. <sup>7)</sup>	C) <b>PBD-51036065</b>
<b>Cable gland</b>	
One polymeric cable gland M20x1.5, rated -20 ... +80 °C (-4 ... +176 °F) for General Purpose and ATEX EEx e	<b>7ML1930-1AN</b>
One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F), HART®	<b>7ML1930-1AP</b>
One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F), PROFIBUS PA	<b>7ML1930-1AQ</b>

C) Subject to export regulations AL: N, ECCN: EAR99

Please contact [nacc.smpi@siemens.com](mailto:nacc.smpi@siemens.com) for special requests.

- 1) Available in flange sizes including ASME, DIN and JIS: please contact [nacc.smpi@siemens.com](mailto:nacc.smpi@siemens.com).
- 2) Available with no pressure rating
- 3) Available in other shield lengths: please contact [nacc.smpi@siemens.com](mailto:nacc.smpi@siemens.com).
- 4) Available with no pressure rating and with General Purpose Approvals only
- 5) Please contact [nacc.smpi@siemens.com](mailto:nacc.smpi@siemens.com) for pricing and part number. Submit completed Application Questionnaire found on page 5/195
- 6) Available with Pressure rating; serial number of original unit required with completed Application Questionnaire found on page 5/195
- 7) Subject to export regulations AL: N, ECCN: EAR99

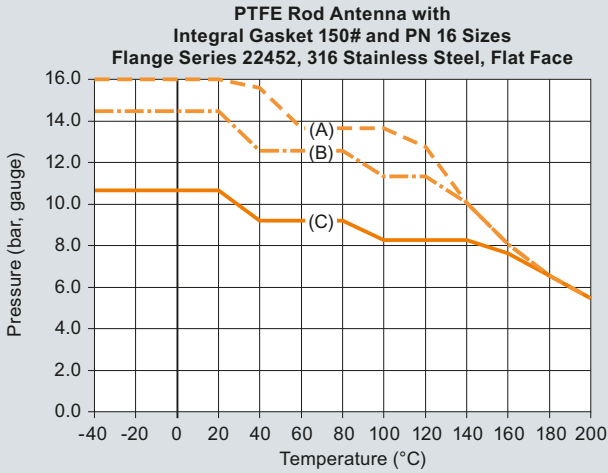


# Level Measurement

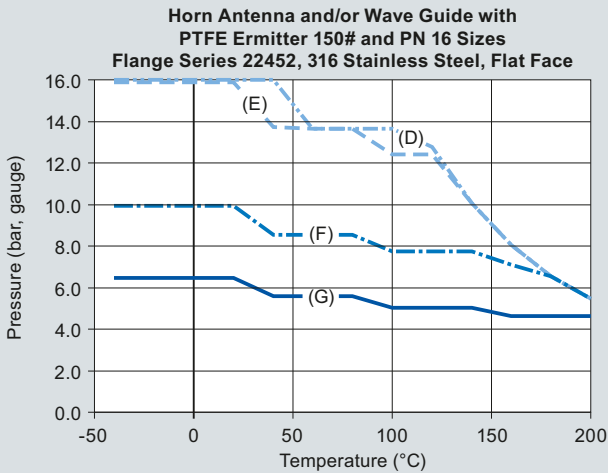
## Continuous level measurement - Radar transmitters

### SITRANS LR200

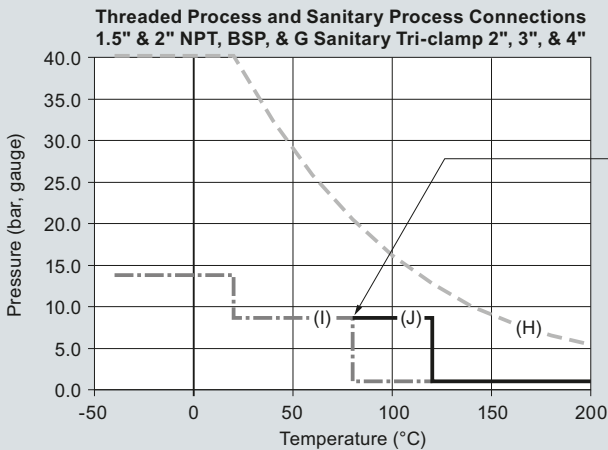
#### Characteristic curves



- (A) 22452 50 mm/2" nom.
- .- (B) 22452 80 mm/3" nom.
- (C) 22452 100 mm/4" nom.



- .- (D) 22452 80 mm/3" nom.
- (E) 22452 100 mm/4" nom.
- .- (F) 22452 150 mm/6" nom.
- (G) 22452 200 mm/8" nom.



UHMW-PE is limited to 80 °C, it can be used to 120 °C for short (3 hrs) durations at ambient pressure, no stress applied to the antenna.

- (H) 1.5" and 2", Thread connection
- .- (I) UHMW-PE, Sanitary antenna
- (J) PTFE, Sanitary antenna

SITRANS LR200 Process Pressure/Temperature derating curves

5

# Level Measurement

## Continuous level measurement - Radar transmitters

SITRANS LR250

### Overview



SITRANS LR250 is a 2-wire, 25 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including high temperature and pressure, to a range of 20 m (66 ft).

### Benefits

- Graphical local user interface (LUI) makes operation simple with plug-and-play setup using the intuitive Quick Start Wizard
- LUI displays echo profiles for diagnostic support
- 25 GHz high frequency allows for small horn antennas for easy mounting in nozzles
- Insensitive to mounting location and obstructions, and less sensitive to nozzle interference
- Short blanking distance for improved minimum measuring range to 50 mm (2") from the end of the horn
- Communication using HART or PROFIBUS PA, or FOUNDATION Fieldbus
- Process Intelligence signal processing for improved measurement reliability and Auto False-Echo Suppression of fixed obstructions
- Programming using infrared Intrinsically Safe handheld programmer or over a network using SIMATIC PDM, Emerson AMS, or Field Device Tools, such as PACTware or Fieldcare via SITRANS DTM

### Application

SITRANS LR250 includes a graphical local user interface (LUI) that improves setup and operation by including an intuitive Quick Start Wizard, and echo profile displays for diagnostic support. Startup is easy using the Quick Start wizard with a few parameters required for basic operation.

The 25 GHz frequency creates a narrow, focused beam allowing for smaller horn options and decreasing sensitivity to obstructions.

SITRANS LR250's unique design allows safe and simple programming using the Intrinsically Safe handheld programmer without having to open the instrument's lid.

SITRANS LR250 measures superbly on low dielectric media, and in small vessels, as well as tall and narrow vessels.

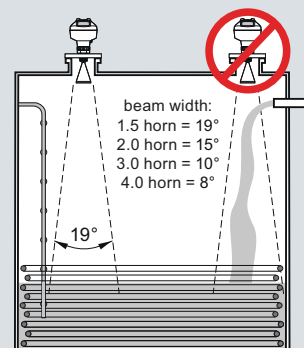
- Key Applications: liquid bulk storage tanks, process vessels with agitators, vaporous liquids, high temperatures, low dielectric media

### Configuration

#### Installation

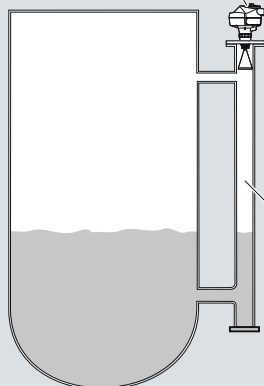
##### Note:

- Beam angle is the width of the cone where the energy density is half of the peak energy density.
- The peak energy density is directly in front of and in line with the horn antenna.
- There is a signal transmitted outside of the beam angle; therefore false targets may be detected.



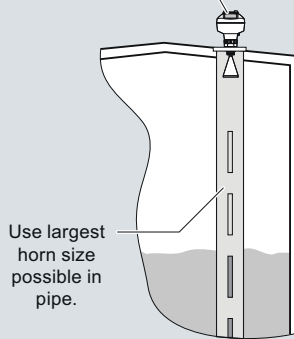
#### Mounting unit on bypass

Orient front or back of device toward vent.

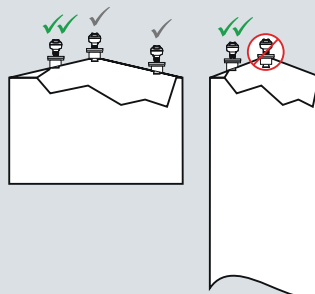


#### Mounting unit on stilling well

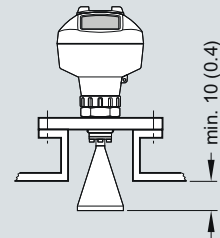
Orient front or back of device toward stillpipe slots.



#### Mounting unit on vessel



#### Mounting on a nozzle



SITRANS LR250 installation, dimensions in mm (inch)

# Level Measurement

## Continuous level measurement - Radar transmitters

### SITRANS LR250

#### Technical specifications

<b>Mode of operation</b>		<ul style="list-style-type: none"> <li>• Dimensions (nominal horn sizes) Standard 1.5" (40 mm), 2" (48 mm), 3" (75 mm), 4" (95 mm) horn and optional 100 mm (4") horn extension</li> </ul>
Measuring principle	Radar level measurement	
Frequency	K-band (25.0 GHz)	<ul style="list-style-type: none"> <li>• Process connections</li> </ul>
Minimum measuring range	50 mm (2") from end of horn	
Maximum measuring range	20 m (65 ft), horn dependent	<ul style="list-style-type: none"> <li>• Process connection 1 1/2" or 2" NPT [(Taper), ANSI/ASME B1.20.1] R 1 1/2" or 2" [(BSPT), EN 10226] G 1 1/2" or 2" [(BSPP), EN ISO 228-1]</li> </ul>
<b>Output</b>		
HART®:	Version 5.1	<ul style="list-style-type: none"> <li>• Flange connection 2", 3", 4" (ANSI 150, 300 lbs), 50, 80, 100 mm (PN 16, 40, JIS 10K)</li> </ul>
<ul style="list-style-type: none"> <li>• Analog output</li> <li>• Accuracy</li> <li>• Fail-safe</li> </ul>	4 ... 20 mA ±0.02 mA <ul style="list-style-type: none"> <li>• Programmable as high low or hold (loss of echo)</li> <li>• NE 43 programmable Profile 3.1</li> </ul>	
PROFIBUS PA:	2 Analog Input (AI)	<b>Power supply</b> 4 ... 20 mA/HART Nominal 24 V DC (max. 30 V DC) with max. 550 Ω PROFIBUS PA <ul style="list-style-type: none"> <li>• 15 mA</li> <li>• per IEC 61158-2</li> </ul> FOUNDATION Fieldbus <ul style="list-style-type: none"> <li>• 20.0 mA</li> <li>• per IEC 61158-2</li> </ul>
<ul style="list-style-type: none"> <li>• Function blocks</li> </ul>	2 Analog Input (AI)	
FOUNDATION Fieldbus™	H1	<b>Certificates and approvals</b> General Radio CSA <sub>US/C</sub> , CE, FM, NE 21, C-TICK FCC, Industry Canada and Europe ETSI EN 302-372, C-TICK Hazardous <ul style="list-style-type: none"> <li>• Intrinsically Safe (Europe) ATEX II 1G Ex ia IIC T4 ATEX II 1D Ex tD A20 IP67 T90°C ATEX II 3G Ex nA/nL IIC T4 Gc</li> <li>• Non-sparking/Energy Limited (Europe)</li> <li>• Intrinsically Safe (Canada/USA) CSA/FM Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III T4</li> <li>• Non-incendive (Canada/USA) CSA/FM Class I, Div. 2, Groups A, B, C, D T5</li> <li>• Intrinsically Safe (International) IECEx Ex ia IIC T4, Ex tD A20 IP67 T90°C</li> <li>• Flame Proof (International/Europe) IECEx/ATEX II 1/2 GD, 1D, 2D, Ex dmbia IIC T4 Ga/Gb, Ex tD A20 IP67 T90°C</li> <li>• Increased Safety (International/Europe) IECEx/ATEX II 1/2 GD, 1D, 2D, Ex embia IIC T4 Ga/Gb, Ex tD A20 IP67 T90°C</li> <li>• Explosion Proof (Canada/USA) CSA/FM Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III T4</li> </ul> Marine <ul style="list-style-type: none"> <li>• Lloyd's Register of Shipping</li> <li>• ABS Type Approval</li> <li>• Bureau Veritas</li> </ul>
<ul style="list-style-type: none"> <li>• Functionality</li> <li>• Version</li> <li>• Function blocks</li> </ul>	Basic or LAS ITK 5.2.0 2 Analog Input (AI)	
<b>Performance (according to reference conditions IEC60770-1)</b>		<b>Programming</b> Intrinsically Safe Siemens handheld programmer <ul style="list-style-type: none"> <li>• Approvals for handheld programmer</li> </ul> Infrared receiver IS model: ATEX II 1 GD Ex ia IIC T4 Ga Ex ia D 20 T135°C Ta = -20 ... +50 °C CSA/FM Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G, T6 Ta = +50 °C IECEx SIR 09.0073 HART communicator 375/475 <ul style="list-style-type: none"> <li>• SIMATIC PDM</li> <li>• Emerson AMS</li> <li>• SITRANS DTM (for connection into FDT, such as PACTware or Fieldcare)</li> </ul> Handheld communicator PC <ul style="list-style-type: none"> <li>• SIMATIC PDM</li> <li>• Emerson AMS</li> <li>• SITRANS DTM (for connection into FDT, such as PACTware or Fieldcare)</li> </ul> Display (local) Graphic local user interface including quick start wizard and echo profile displays
Maximum measured error	5 mm (0.2")	
Influence of ambient temperature	<0.003 %/K	
<b>Rated operating conditions</b>		• Hastelloy and ©C-22 are registered trademarks of Haynes International Inc.
Installation conditions	Indoor/outdoor	
<ul style="list-style-type: none"> <li>• Location</li> </ul>	Indoor/outdoor	
Ambient conditions (enclosure)		
<ul style="list-style-type: none"> <li>• Ambient temperature</li> <li>• Installation category</li> <li>• Pollution degree</li> </ul>	-40 ... +80 °C (-40 ... +176 °F) I 4	
<b>Medium conditions</b>		
Dielectric constant $\epsilon_r$	$\epsilon_r > 1.6$ , horn and application dependent	
Process temperature	-40 ... +200 °C (-40 ... +392 °F) (at process connection with FKM o-ring) -20 ... +200 °C (-4 ... +392 °F) (at process connection with FFKM o-ring)	
Process pressure	Up to 40 bar g (580 psi g), process connection and temperature dependent. See Pressure/Temperature curves for more information	
<b>Design</b>		
Enclosure		
<ul style="list-style-type: none"> <li>• Material</li> <li>• Cable inlet</li> </ul>	Aluminium, polyester powder-coated 2 x M20x1.5 or 2 x 1/2" NPT	
Degree of protection	Type 4X/NEMA 4X, Type 6/NEMA 6, IP67, IP68	
Weight	< 3 kg (6.6 lbs) 3.75 mm (1/2") threaded connection with 1/2" horn antenna	
Display (local)	Graphic local user interface including quick start wizard and echo profile display	
Antenna		
<ul style="list-style-type: none"> <li>• Material</li> </ul>	316L stainless steel [optional alloy N06022/2.4602 (Hastelloy® C-22® or equivalent)]	

# Level Measurement

## Continuous level measurement - Radar transmitters

SITRANS LR250

Selection and Ordering data	Order No.
<b>SITRANS LR250</b>	C) 7ML5431-
2-wire, 25 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including high temperature and pressure, to a range of 20 m (66 ft). Ideal for small vessels and low dielectric media.	0 -
<b>Process Connection and Antenna Material</b>	
316L (1.4435 or 1.4404) stainless steel, PTFE emitter, FKM seal	0
316L (1.4435 or 1.4404) stainless steel, PTFE emitter, FFKM seal	1
Hastelloy C-22/2.4602, PTFE emitter, FKM seal <sup>1)</sup>	2
Hastelloy C-22/2.4602, PTFE emitter, FFKM seal <sup>1)</sup>	3
<b>Process Connection Type</b>	
1½" NPT [(Taper), ANSI/ASME B1.20.1] <sup>2)</sup>	AA
R 1½" [(BSPT), EN 10226] <sup>2)</sup>	AB
G 1½" [(BSPP), EN ISO 228-1] (parallel thread) <sup>2)</sup>	AC
2" NPT [(Taper), ANSI/ASME B1.20.1]	AD
R 2" [(BSPT), EN 10226]	AE
G 2" [(BSPP), EN ISO 228-1] (parallel thread)	AF
2" ASME, 150 lb, FF, ASME B16.5 <sup>3)</sup>	BA
3" ASME, 150 lb, FF, ASME B16.5 <sup>3)</sup>	BB
4" ASME, 150 lb, FF, ASME B16.5 <sup>3)</sup>	BC
2" ASME, 300 lb, FF, ASME B16.5 <sup>3)</sup>	CA
3" ASME, 300 lb, FF, ASME B16.5 <sup>3)</sup>	CB
4" ASME, 300 lb, FF, ASME B16.5 <sup>3)</sup>	CC
DN 50 PN 16, Type A, EN 1092-1 <sup>3)</sup>	DA
DN 80 PN 16, Type A, EN 1092-1 <sup>3)</sup>	DB
DN 100 PN 16, Type A, EN 1092-1 <sup>3)</sup>	DC
DN 50 PN 40, Type A, EN 1092-1 <sup>3)</sup>	EA
DN 80 PN 40, Type A, EN 1092-1 <sup>3)</sup>	EB
DN 100 PN 40, Type A, EN 1092-1 <sup>3)</sup>	EC
JIS 50A 10K, FF, JIS B2220 <sup>3)</sup>	FA
JIS 80A 10K, FF, JIS B2220 <sup>3)</sup>	FB
JIS 100A 10K, FF, JIS B2220 <sup>3)</sup>	FC
DN 50 PN 10/16 DIN EN1092-1 form B1	GA
DN 80 PN 10/16 DIN EN1092-1 form B1	GB
DN 100 PN 10/16 DIN EN1092-1 form B1	GC
DN 150 PN 10/16 DIN EN1092-1 form B1	GD
DN 50 PN 25/40 DIN EN1092-1 form B1	HA
DN 80 PN 25/40 DIN EN1092-1 form B1	HB
DN 100 PN 25/40 DIN EN1092-1 form B1	HC
DN 150 PN 25/40 DIN EN1092-1 form B1	HD
<b>Communication/Output</b>	
PROFIBUS PA	1
4 ... 20 mA, HART®, startup at < 3.6 mA	2
FOUNDATION Fieldbus™	3
<b>Enclosure/Cable inlet</b>	
Aluminum, Epoxy painted	0
2 x ½" NPT	1
2 x M20x1.5	
<b>Antenna</b>	
1½" horn <sup>4)</sup>	A
2" horn (fits 2" ASME or DN 50 nozzles)	B
3" horn (fits 3" ASME or DN 80 nozzles)	C
4" horn (fits 4" ASME or DN 100 nozzles)	D
1½" horn with 100 mm extension <sup>4)</sup>	E
2" horn with 100 mm extension	F
3" horn with 100 mm extension	G
4" horn with 100 mm extension	H
(Note: Please use largest horn size possible.)	

Selection and Ordering data	Order No.
<b>SITRANS LR250</b>	C) 7ML5431-
2-wire, 25 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including high temperature and pressure, to a range of 20 m (66 ft). Ideal for small vessels and low dielectric media.	0 -
<b>Approvals</b>	
General Purpose, CE, CSA, FM, FCC, R&TTE, C-TICK	A
Intrinsically Safe, CSA/FM Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G, FCC	B
Intrinsically Safe, IECEx/ATEX II 1 GD Ex ia IIC T4, Ex tD A20 IP67 T90°C, R&TTE, C-TICK, INMETRO	C
Non-incendive, CSA/FM Class I, Div. 2, Groups A, B, C, D, FCC	D
Non-sparking, Energy Limited, ATEX II 3G Ex nA/nL IIC T4, CE, R&TTE, C-TICK	E
Increased Safety, IECEx/ATEX II 1/2 GD Ex embia IIC T4, Ex tD A20 IP67 T90°C, CE, R&TTE, C-TICK <sup>5)</sup>	F
Flame Proof, IECEx/ATEX II 1/2 GD Ex dmbia IIC T4, Ex tD A20 IP67 T90°C, CE, R&TTE, C-TICK <sup>5)</sup>	G
Explosion Proof CSA/FM Class I, II, III, Div. 1, Gr. A, B, C, D, E, F, G, FCC <sup>5)</sup>	H
<b>Pressure rating</b>	
Rating per Pressure/Temperature curves in manual	0
0.5 bar g (7.25 psi g) maximum	1
1) Not available with process connection options AA to AF	
2) For 1½" horn antennas only, max. range 10 m (32.8 ft), dk > 3	
3) Siemens Milltronics type flange, see instruction manual for details	
4) For 1½" threaded connection only, max. range 10 m (32.8 ft), dk > 3	
5) Applicable to Communication option 0 or 2 only	
C) Subject to export regulations AL: N, ECCN: EAR99	

Selection and Ordering data	Order code
<b>Further designs</b>	
Please add "-Z" to Order No. and specify Order code(s).	
Plug M12 with mating Connector <sup>1) 2) 3)</sup>	<b>A50</b>
Plug 7/8" with mating Connector <sup>7)8)4)</sup>	<b>A55</b>
Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters); specify in plain text	<b>Y15</b>
Test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and to ISO 9000	<b>C11</b>
Inspection Certificate Type 3.1 per EN 10204	<b>C12</b>
Namur NE43 compliant, device preset to failsafe <3.6 mA <sup>5)</sup>	<b>N07</b>
<b>Operating Instructions for HART/ mA device</b>	Order No.
English	C) <b>7ML1998-5JE03</b>
German	C) <b>7ML1998-5JE33</b>
Note: The Operating Instructions should be ordered as a separate line item on the order.	
Multi-language Quick Start manual This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	C) <b>7ML1998-5QX82</b>

5

# Level Measurement

## Continuous level measurement - Radar transmitters

### SITRANS LR250

#### Operating Instructions for PROFIBUS PA device

English C) **7ML1998-5JF03**

German C) **7ML1998-5JF33**

Note: The Operating Instructions should be ordered as a separate line item on the order.

Multi-language Quick Start manual C) **7ML1998-5XE82**

This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.

#### Operating Instructions for FOUNDATION Fieldbus device

English C) **7ML1998-5KL01**

German C) **7ML1998-5KL31**

Note: The Operating Instructions should be ordered as a separate line item on the order.

Multi-language Quick Start manual C) **7ML1998-5XN81**

This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.

#### Accessories

Handheld programmer, Intrinsically safe, EEx ia C) **7ML1930-1BK**

HART modem/RS-232 (for use with a PC and SIMATIC PDM) D) **7MF4997-1DA**

HART modem/USB (for use with a PC and SIMATIC PDM) D) **7MF4997-1DB**

One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F), HART<sup>5)</sup> **7ML1930-1AP**

One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F), PROFIBUS PA<sup>6)</sup> **7ML1930-1AQ**

SITRANS RD100 Remote display - see Chapter 8

SITRANS RD200 Remote display - see Chapter 8

SITRANS RD500 Remote display - see Chapter 8

<sup>1)</sup> Available with Enclosure option 1 only

<sup>2)</sup> To be used with Communication options 1 and 3 only. Connector has IP67 rating.

<sup>3)</sup> Available with Approvals option A, B, or C only

<sup>4)</sup> Available with Enclosure option 0 only

<sup>5)</sup> Product shipped with plastic cable gland, rated to -20 °C. If -40 °C rating required, then metallic cable gland is recommended.

C) Subject to export regulations AL: N, ECCN: EAR99


D) Subject to export regulations AL: N, ECCN: EAR99H

# Level Measurement

## Continuous level measurement - Radar transmitters

### SITRANS LR250 Specials

#### SITRANS LR250 Specials

	Order No.
<b>SITRANS LR250 Enclosures</b>	
	
LR250 enclosure with board stack, NPT cable inlet, approval option A, with HART communication, no process connection	C) <b>A5E01156819</b>
LR250 enclosure with board stack, M20 cable inlet, approval option A, with HART communication, no process connection	C) <b>A5E01156820</b>
LR250 enclosure with board stack, NPT cable inlet, approval option B, with HART communication, no process connection	C) <b>A5E01156823</b>
LR250 enclosure with board stack, M20 cable inlet, approval option B, with HART communication, no process connection	C) <b>A5E01156824</b>
LR250 enclosure with board stack, NPT cable inlet, approval option C, with HART communication, no process connection	C) <b>A5E01156827</b>
LR250 enclosure with board stack, M20 cable inlet, approval option C, with HART communication, no process connection	C) <b>A5E01156832</b>
LR250 enclosure with board stack, NPT cable inlet, approval option D, with HART communication, no process connection	C) <b>A5E01156834</b>
LR250 enclosure with board stack, NPT cable inlet, approval option D, with HART communication, no process connection	C) <b>A5E01156835</b>
LR250 enclosure with board stack, M20 cable inlet, approval option A, with PROFIBUS PA communication, no process connection	C) <b>A5E01156836</b>
LR250 enclosure with board stack, M20 cable inlet, approval option A, with PROFIBUS PA communication, no process connection	C) <b>A5E01156838</b>
LR250 enclosure with board stack, NPT cable inlet, approval option B, with PROFIBUS PA communication, no process connection	C) <b>A5E01156839</b>
LR250 enclosure with board stack, M20 cable inlet, approval option B, with PROFIBUS PA communication, no process connection	C) <b>A5E01156841</b>
LR250 enclosure with board stack, NPT cable inlet, approval option C, with PROFIBUS PA communication, no process connection	C) <b>A5E01156843</b>
LR250 enclosure with board stack, M20 cable inlet, approval option C, with PROFIBUS PA communication, no process connection	C) <b>A5E01156844</b>
LR250 enclosure with board stack, M20 cable inlet, approval option C, with PROFIBUS PA communication, no process connection	C) <b>A5E01156846</b>
LR250 enclosure with board stack, M20 cable inlet, approval option D, with PROFIBUS PA communication, no process connection	C) <b>A5E01156848</b>
LR250 enclosure with board stack, M20 cable inlet, approval option F, with HART® communication, no process connection	C) <b>A5E02448270</b>

#### SITRANS LR250 Specials

	Order No.
LR250 enclosure with board stack, M20 cable inlet, approval option G, with HART® communication, no process connection	C) <b>A5E02448274</b>
LR250 enclosure with board stack, NPT cable inlet, approval option H, with HART® communication, no process connection	C) <b>A5E02448278</b>
LR250 enclosure with board stack, NPT cable inlet, approval option A, with FOUNDATION Fieldbus communication, no process connection	C) <b>A5E02653792</b>
LR250 enclosure with board stack, M20 cable inlet, approval option A, with FOUNDATION Fieldbus communication, no process connection	C) <b>A5E02653793</b>
LR250 enclosure with board stack, NPT cable inlet, approval option C, with FOUNDATION Fieldbus communication, no process connection	C) <b>A5E02654606</b>
LR250 enclosure with board stack, M20 cable inlet, approval option C, with FOUNDATION Fieldbus communication, no process connection	C) <b>A5E02654608</b>
LR250 enclosure with board stack, M20 cable inlet, approval option A, with HART® communication start-up at <3.6mA, no process connection	C) <b>A5E02956317</b>
LR250 enclosure with board stack, M20 cable inlet, approval option C, with HART® communication start-up at <3.6mA, no process connection	C) <b>A5E02956319</b>
LR250 enclosure with board stack, M20 cable inlet, approval option E, with HART® communication start-up at <3.6mA, no process connection	C) <b>A5E02956320</b>
LR250 enclosure with board stack, M20 cable inlet, approval option F, with HART® communication start-up at <3.6mA, no process connection	C) <b>A5E02956322</b>
LR250 enclosure with board stack, M20 cable inlet, approval option G, with HART® communication start-up at <3.6mA, no process connection	C) <b>A5E02956323</b>
LR250 enclosure with board stack, NPT cable inlet, approval option A, with FOUNDATION Fieldbus™ communication, no process connection	C) <b>A5E02653792</b>
LR250 enclosure with board stack, M20 cable inlet, approval option A, with FOUNDATION Fieldbus™ communication, no process connection	C) <b>A5E02653793</b>
LR250 enclosure with board stack, NPT cable inlet, approval option C, with FOUNDATION Fieldbus™ communication, no process connection	C) <b>A5E02654606</b>
LR250 enclosure with board stack, M20 cable inlet, approval option C, with FOUNDATION Fieldbus™ communication, no process connection	C) <b>A5E02654608</b>

# Level Measurement

## Continuous level measurement - Radar transmitters

### SITRANS LR250 Specials

Order No.

#### SITRANS LR250 horn antenna and extension kits



38 mm (1.5") horn antenna kit, 1.5" Process Connections only	C)	<b>A5E01151539</b>
100 mm (4") horn antenna extension kit, 1.5" Process Connections only		<b>A5E01151553</b>
50 mm (2") stainless steel 316L horn antenna kit	C)	<b>A5E01151569</b>
75 mm (3") stainless steel 316L horn antenna kit	C)	<b>A5E01151571</b>
100 mm (4") stainless steel 316L horn antenna kit	C)	<b>A5E01151573</b>
100 mm (4") horn antenna extension kit, 50 mm (2"), 75 mm (3") and 100 mm (4") process connection	C)	<b>A5E01151577</b>
50 mm (2") horn antenna kit, Hastelloy C-22	J)	<b>A5E01151584</b>
75 mm (3") horn antenna kit, Hastelloy C-22	J)	<b>A5E01151585</b>
100 mm (4") horn antenna kit, Hastelloy C-22	J)	<b>A5E01151587</b>
5 Dupont 1Gr Polyback, PTFE grease kit	C)	<b>A5E01151626</b>
LR250 lid with O-ring		<b>A5E02465410</b>

C) Subject to export regulations AL: N, ECCN: EAR99

J) Subject to export regulations AL: 91999, ECCN: EAR99

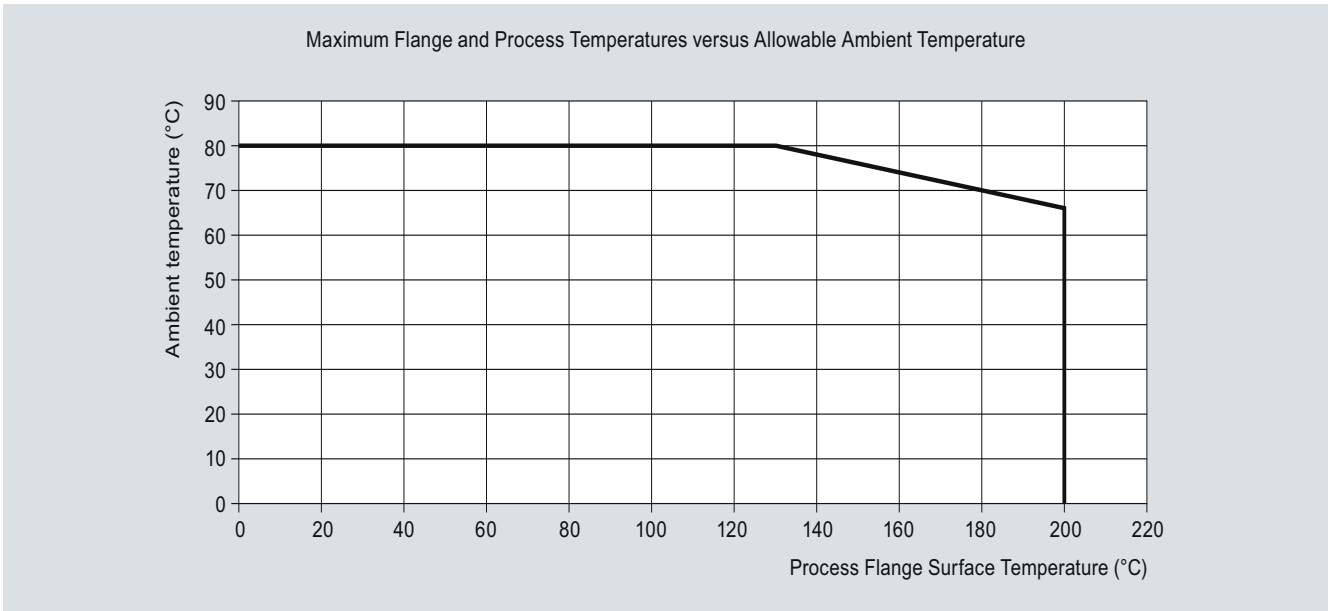
Please contact [nacc.smpi@siemens.com](mailto:nacc.smpi@siemens.com) for special requests

# Level Measurement

## Continuous level measurement - Radar transmitters

SITRANS LR250 Specials

### Characteristic curves



SITRANS LR250 Ambient/Process Flange Surface Temperature Curve



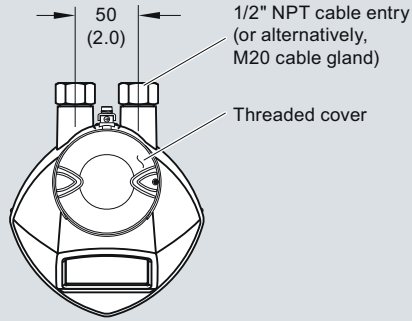
# Level Measurement

## Continuous level measurement - Radar transmitters

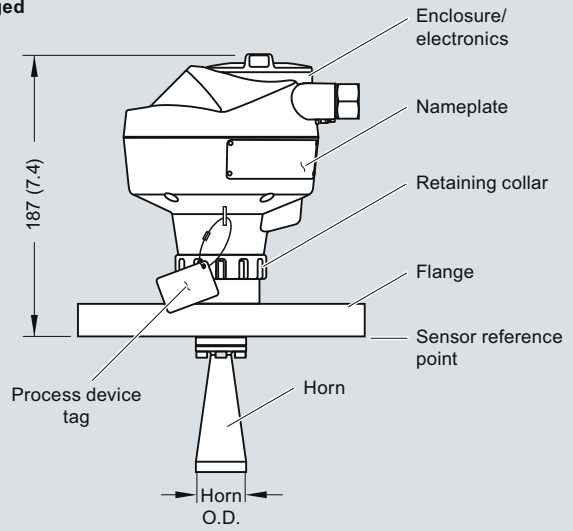
### SITRANS LR250 Specials

#### Dimensional drawings

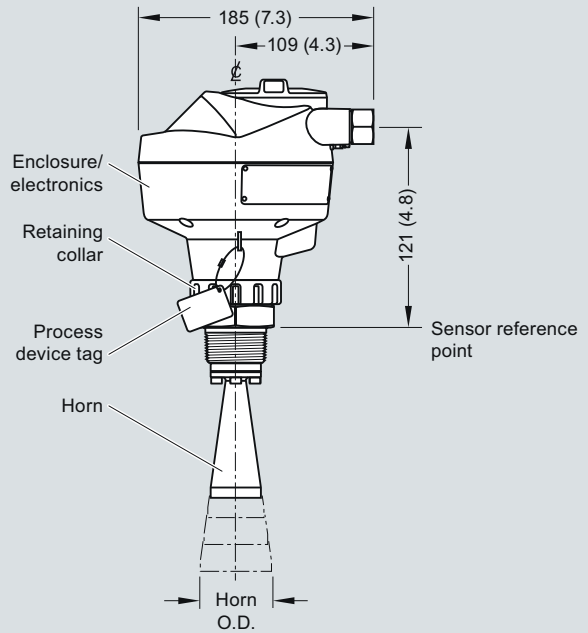
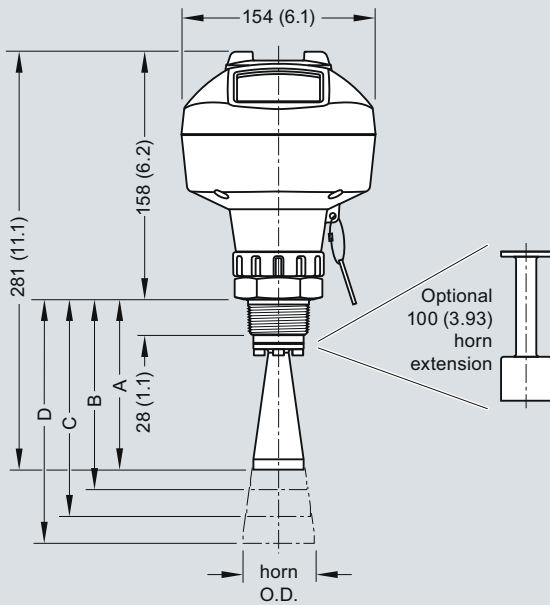
SITRANS LR250



Flanged



Threaded



Nominal Horn Size	Horn O.D.	Horn Height	Beam Angle	Measurement Range
40 (1.5)	39.8 (1.57)	A	135 (5.3)	19 degrees 10 m (32.8 ft)
50 (2)	47.8 (1.88)	B	166 (6.55)	15 degrees 20 m (65.6 ft)
80 (3)	74.8 (2.94)	C	199 (7.85)	10 degrees 20 m (65.6 ft)
100 (4)	94.8 (3.73)	D	254 (10)	8 degrees 20 m (65.6 ft)

SITRANS LR250, dimensions in mm (inch)

5

# Level Measurement

## Continuous level measurement - Radar transmitters

SITRANS LR250 Specials

### Schematics

Connect the wires to the terminals as shown: the polarity is identified on the terminal block.

Shield for HART and PROFIBUS PA  
Intrinsically Safe versions only.

**Hand Programmer**

SIEMENS			
1	2	3	4
5	6	7	8
9	0	.	↗
C	🏠	📄	🔌
←	↑	↓	→

**SITRANS LR250 HART**  
Part number:  
7ML1930-1BK

**Note:**

1. DC terminal shall be supplied from a source providing electrical isolation between the input and output, to meet the applicable safety requirements of IEC 61010-1.
2. All field wiring must have insulation suitable for rated input voltages.
3. Use shielded twisted pair cable (14 to 22 AWG) for HART version.
4. Separate cables and conduit may be required to conform to standard instrumentation wiring practices or electrical codes.

SITRANS LR250 connections

# Level Measurement

## Continuous level measurement - Radar transmitters

### SITRANS LR260

#### Overview



SITRANS LR260 is a 2-wire 25 GHz pulse radar level transmitter for continuous monitoring of solids in storage vessels including extreme levels of dust and high temperatures, to a range of 30 m (98.4 ft).

#### Benefits

- Graphical local user interface (LUI) makes operation simple with plug-and-play setup using the intuitive Quick Start Wizard
- LUI displays echo profiles for diagnostic support
- 25 GHz high frequency allows for small horn antennas mounted easily in nozzles
- Communication using HART® or PROFIBUS PA
- Process Intelligence signal processing for improved measurement reliability and Auto False-Echo Suppression of fixed obstructions
- Programming using infrared Intrinsically Safe handheld programmer or SIMATIC PDM

#### Application

SITRANS LR260 includes a graphical local user interface (LUI) that improves setup and operation using an intuitive Quick Start Wizard, and echo profile displays for diagnostic support. Startup is easy using the Quick Start wizard with a few parameters required for basic operation.

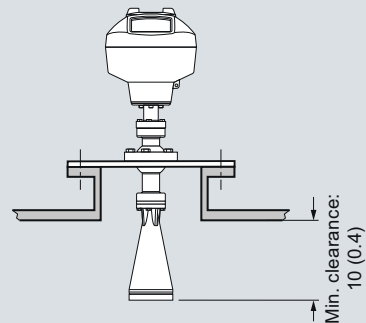
SITRANS LR260's unique design allows safe and simple programming using the Intrinsically Safe handheld programmer without having to open the instrument's lid.

SITRANS LR260 measures virtually any solids material to a range of 30 m (98.4 ft).

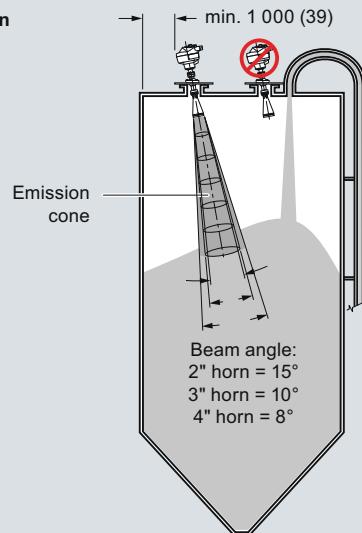
- Key Applications: cement powder, plastic powder/pellets, grain, flour, coal, solids bulk storage vessels, and other applications.

#### Configuration

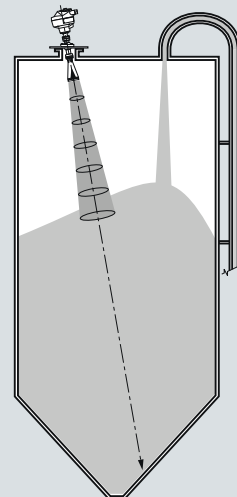
##### Mounting on a nozzle



##### Installation



##### Positioning with Easy Aimer



SITRANS LR260 installation, dimensions in mm (inch)

# Level Measurement

## Continuous level measurement - Radar transmitters

SITRANS LR260

### Technical specifications

<b>Mode of operation</b>	
Measuring principle	Pulse radar level measurement
Frequency	K-band (25.0 GHz)
Minimum detectable distance	50 mm (2") from end of horn
Maximum measuring range <sup>1)</sup>	<ul style="list-style-type: none"> <li>• 2" horn: 10 m (32.8 ft)</li> <li>• 3" horn: 20 m (65.6 ft)</li> <li>• 4" horn: 30 m (98.4 ft)</li> </ul>
<b>Output-HART</b>	
Power	<ul style="list-style-type: none"> <li>• 4 ... 20 mA (<math>\pm 0.02</math> mA accuracy)</li> <li>• Nominal 24 V DC (max. 30 V DC)</li> </ul>
Fail signal	3.6 mA ... 23 mA; or last value
Load	230 ... 600 W, 230 ... 500 W when connecting a coupling module
Max. line length	Multi-wire: $\leq 1500$ m (4921 ft) Protocol HART, Version 5.1
<b>Output - PROFIBUS PA</b>	
	<ul style="list-style-type: none"> <li>• Per IEC 61158-2</li> <li>• 15.0 mA</li> <li>• Profile version 3.01, Class B</li> </ul>
<b>Performance (according to reference conditions IEC60770-1)</b>	
Maximum measured error (including hysteresis and non-repeatability)	<ul style="list-style-type: none"> <li>• 25 mm (1") from minimum detectable distance to 300 mm (11.8")</li> <li>• Remainder of range = 10 mm (0.39") or 0.1 % of span (whichever is greater)</li> </ul>
<b>Rated operating conditions</b>	
Installation conditions	
• Location	Indoor/outdoor
Ambient conditions (enclosure)	
• Ambient temperature	-40 ... +80 °C (-40 ... +176 °F)
• Installation category	I
• Pollution degree	4
<b>Medium conditions</b>	
Dielectric constant $\epsilon_r$	$\epsilon_r > 1.6$ , antenna and application dependent
Process temperature	-40 ... +200 °C (-40 ... +392 °F)
Process pressure	<ul style="list-style-type: none"> <li>• 0.5 bar g (7.25 psi g) maximum</li> <li>• 3 bar g (43.5 psi g) optional with +80 °C (+176 °F) temperature max.</li> </ul>

<b>Design</b>	
Enclosure	
• Construction	Aluminium, polyester powder-coated
• Conduit entry	2 x M20x1.5 or 2 x 1/2" NPT
Degree of protection	Type 4X/NEMA 4X, Type 6/NEMA 6, IP67, IP68
Weight	< 8.14 kg (17.9 lb) including 4" flange and standard Easy Aimer with 4" horn antenna
Display (local)	Graphic LCD, with bar graph representing level
Flange and horn	
• Material	304 stainless steel
• Dimensions (nominal horn sizes)	2" horn: 1.93" (49.0 mm) diameter 3" horn: 2.93" (74.5 mm) diameter 4" horn: 3.84" (97.5 mm) diameter
Process connections	
• Universal flanges <sup>2)</sup>	2"/50 mm, 3"/80 mm, 4"/100 mm, 6"/150 mm
<b>Certificates and approvals</b>	
General	CSA <sub>US/C</sub> , CE, FM
Radio	Europe (R&TTE), FCC, Industry Canada, C-TICK
Hazardous	CSA/FM Class II, Div. 1, Groups E, F, G, Class III ATEX II 1D, 1/2D, 2D Ex tD A20 IP67, IP68 T100 °C
<b>Programming</b>	
Intrinsically Safe Siemens handheld programmer	Infrared receiver
• Approvals for handheld programmer	IS model: ATEX II 1GD Ex ia IIC T4 Ga Ex iaD 20 T135°C Ta = -20 ... +50 °C CSA/FM Class I, II, and III, Div. 1., Gr. A-G, T6 Ta=50C
Handheld communicator	HART communicator 375
PC	SIMATIC PDM
Display (local)	Graphic local user interface including quick start wizard and echo profile displays

<sup>1)</sup> From sensor reference point

<sup>2)</sup> Universal flange mates with EN 1092-1 (PN 16)/ASME B16.5 (150 lb)/JIS 2220 (10K) bolt hole pattern

®HART is a registered trademark of the Hart Communications Foundation.

# Level Measurement

## Continuous level measurement - Radar transmitters

### SITRANS LR260

Selection and Ordering data	Order No.
<b>SITRANS LR260</b> 2-wire, 25 GHz pulse radar level transmitter for continuous monitoring of solids to a range of 30 m (98.4 ft).	C) <b>7ML5427-0</b>
<b>Order handheld programmer separately!</b>	
<b>Process connection</b> Universal flat faced flange fits ANSI/DIN/JIS flanges, Easy Aimer with integral (Easy Aimer ball)	
2"/50 mm	A
3"/80 mm	B
4"/100 mm	C
6"/150 mm	D
<b>Antenna</b>	
2" Horn antenna, fits 50 mm or 2" nozzles <sup>1)</sup>	A
2" Horn antenna with 100 mm extension <sup>1)</sup>	B
2" Horn antenna with 200 mm extension <sup>1)</sup>	C
2" Horn antenna with 500 mm extension <sup>1) 2) 3)</sup>	D
2" Horn antenna with 1000 mm extension <sup>1) 2) 3)</sup>	E
3" Horn antenna, fits 80 mm or 3" nozzles <sup>4)</sup>	F
3" Horn antenna with 100 mm extension <sup>4)</sup>	G
3" Horn antenna with 200 mm extension <sup>4)</sup>	H
3" Horn antenna with 500 mm extension <sup>2) 3) 4)</sup>	J
3" Horn antenna with 1000 mm extension <sup>2) 3) 4)</sup>	K
4" Horn antenna, fits 100 mm or 4" nozzles	L
4" Horn antenna with 100 mm extension	M
4" Horn antenna with 200 mm extension	N
4" Horn antenna with 500 mm extension <sup>2) 3)</sup>	P
4" Horn antenna with 1000 mm extension <sup>2) 3)</sup>	Q
<b>Purge (Self Cleaning) Connection</b>	
No purge connection	0
Purge connection	1
<b>Output / Communication</b>	
4 ... 20 mA, HART <sup>®</sup>	0
PROFIBUS PA	1
<b>Cable inlet</b>	
2 x M20x1.5	A
2 x 1/2" NPT	B
Note: Polymeric cable glands will be provided with M20 devices.	
<b>Approvals</b>	
General purpose, CSA <sub>US/C</sub> , FM, Industry Canada, FCC, CE, R&TTE, C-TICK	A
CSA/FM Class II, Div. I, Groups E, F, G, Class III, Industry Canada, FCC, C-TICK	B
ATEX II 1D, 1/2D, 2D T100 °C, CE, R&TTE, C-TICK	C
<b>Pressure rating</b>	
3 bar g (43.5 psi g) pressure maximum and +80 °C (+176 °F)	0
0.5 bar g (7.25 psi g) maximum	1

- 1) Maximum measurement range 10 m (32.8 ft)  
 2) Available with Purge connection option 0 only  
 3) Available with pressure option 1 only  
 4) Maximum measurement range 20 m (65.6 ft)  
 C) Subject to export regulations AL: N, ECCN: EAR99

Selection and Ordering data	Order code
<b>Further designs</b> Please add "-Z" to Order No. and specify Order code(s).	
Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters); specify in plain text	<b>Y15</b>
Test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and to ISO 9000	<b>C11</b>
Inspection Certificate Type 3.1 per EN 10204	<b>C12</b>
<b>Operating Instructions for HART/mA device</b>	Order No.
English	C) <b>7ML1998-5KE01</b>
German Note: The Operating Instructions should be ordered as a separate line item on the order.	C) <b>7ML1998-5KE11</b>
Multi-language Quick Start manual This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	C) <b>7ML1998-5KE31</b>
<b>Operating Instructions for PROFIBUS PA device</b>	
English	C) <b>7ML1998-5KF01</b>
German Note: The Operating Instructions should be ordered as a separate line item on the order.	C) <b>7ML1998-5KF31</b>
Multi-language Quick Start manual This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	C) <b>7ML1998-5XJ81</b>
<b>Accessories</b>	
One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F), HART <sup>1)</sup>	<b>7ML1930-1AP</b>
One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F), PROFIBUS PA <sup>1)</sup>	<b>7ML1930-1AQ</b>
Handheld programmer, Infrared, Intrinsically Safe	C) <b>7ML1930-1BK</b>
Dust cap, PTFE, for 2"/50 mm horn	<b>7ML1930-1DE</b>
Dust cap, PTFE, for 3"/75 mm horn	<b>7ML1930-1BL</b>
Dust cap, PTFE, for 4"/100 mm horn	<b>7ML1930-1BM</b>
HART modem/RS-232 (for use with a PC and SIMATIC PDM)	D) <b>7MF4997-1DA</b>
HART modem/USB (for use with a PC and SIMATIC PDM)	D) <b>7MF4997-1DB</b>
SITRANS RD100 Remote display - see Chapter 8	
SITRANS RD200 Remote display - see Chapter 8	
SITRANS RD500 Remote display - see Chapter 8	

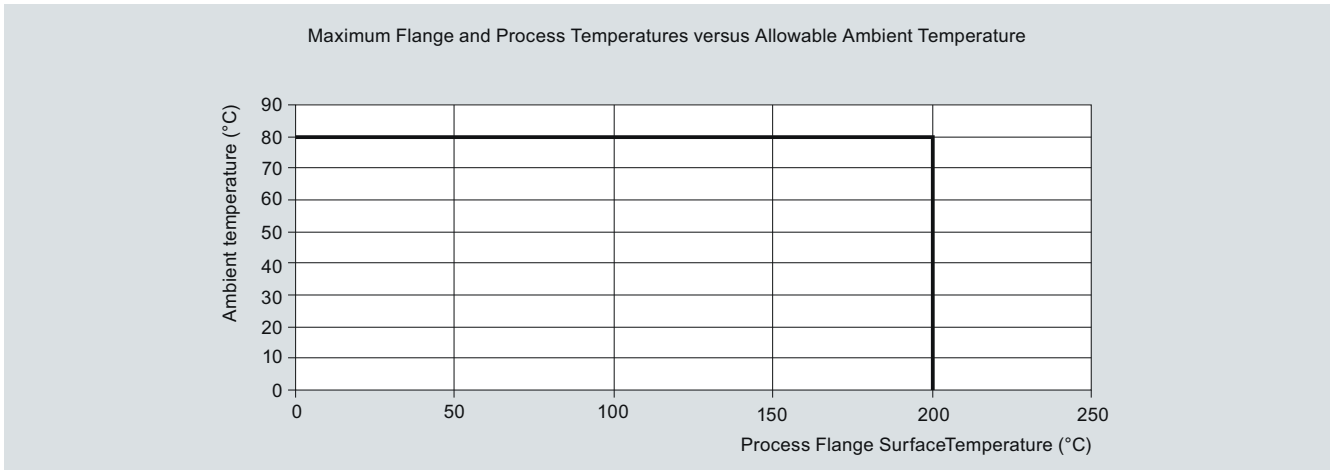
1) Product shipped with plastic cable gland, rated to -20 °C. If -40 °C rating required, then metallic cable gland is recommended.

® HART is a registered trademark of HART Communication Foundation

C) Subject to export regulations AL: N, ECCN: EAR99

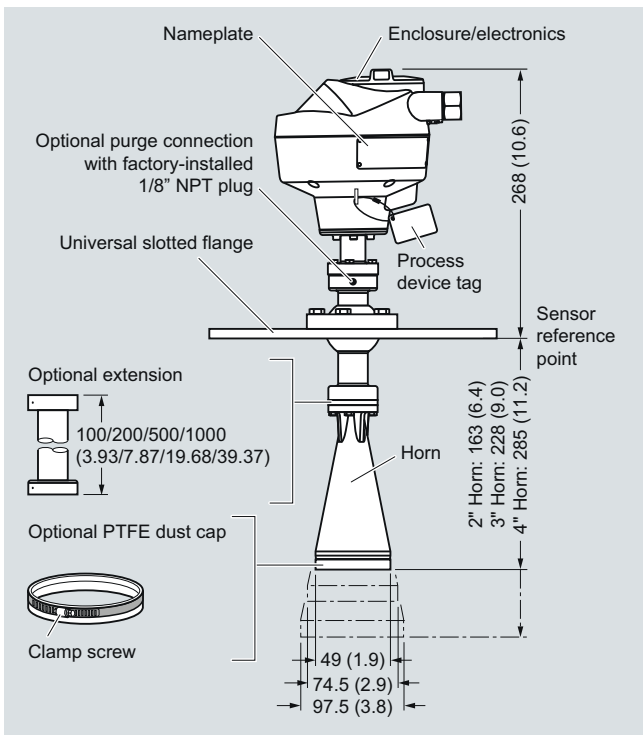
D) Subject to export regulations AL: N, ECCN: EAR99H

### Characteristic curves



SITRANS LR260 Ambient/Process Flange Surface Temperature Curve

### Dimensional drawings



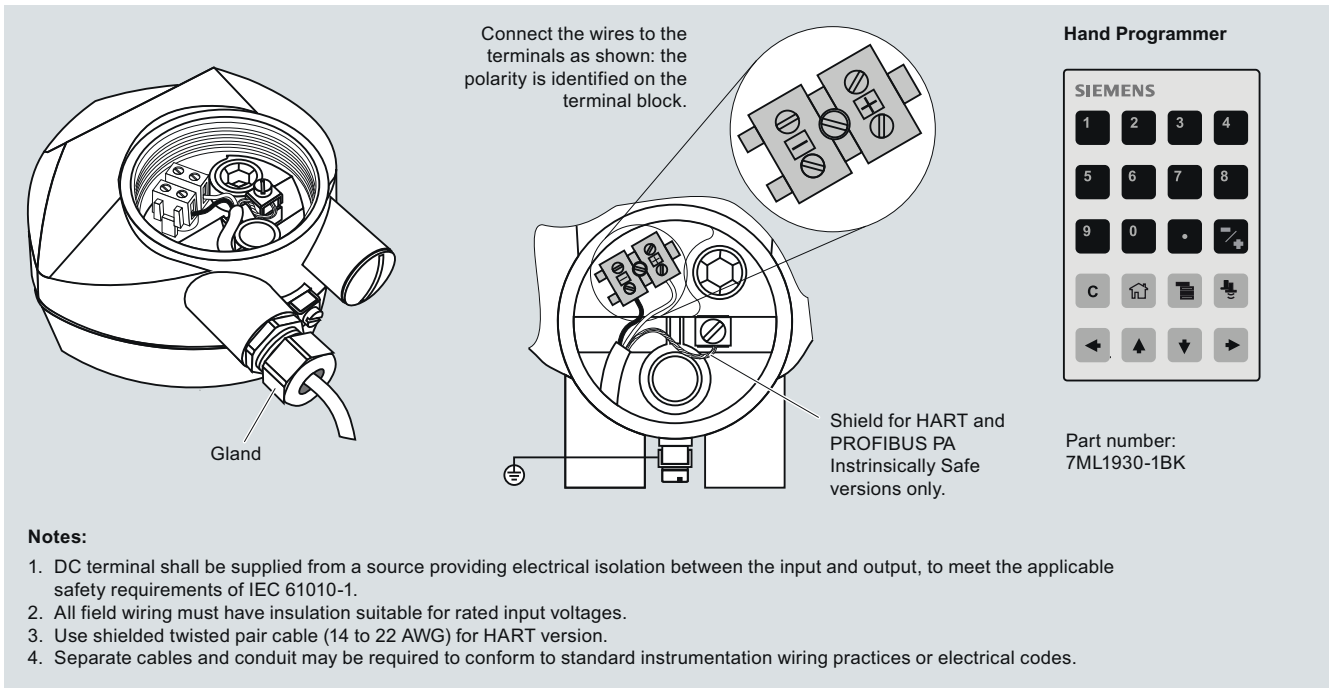
SITRANS LR260, dimensions in mm (inch)

# Level Measurement

## Continuous level measurement - Radar transmitters

### SITRANS LR260

#### Schematics



Connect the wires to the terminals as shown: the polarity is identified on the terminal block.

Shield for HART and PROFIBUS PA Intrinsically Safe versions only.

**Hand Programmer**

SIEMENS			
1	2	3	4
5	6	7	8
9	0	.	↗
C	⏪	⏩	⏴
←	↑	↓	→

Part number:  
7ML1930-1BK

**Notes:**

1. DC terminal shall be supplied from a source providing electrical isolation between the input and output, to meet the applicable safety requirements of IEC 61010-1.
2. All field wiring must have insulation suitable for rated input voltages.
3. Use shielded twisted pair cable (14 to 22 AWG) for HART version.
4. Separate cables and conduit may be required to conform to standard instrumentation wiring practices or electrical codes.

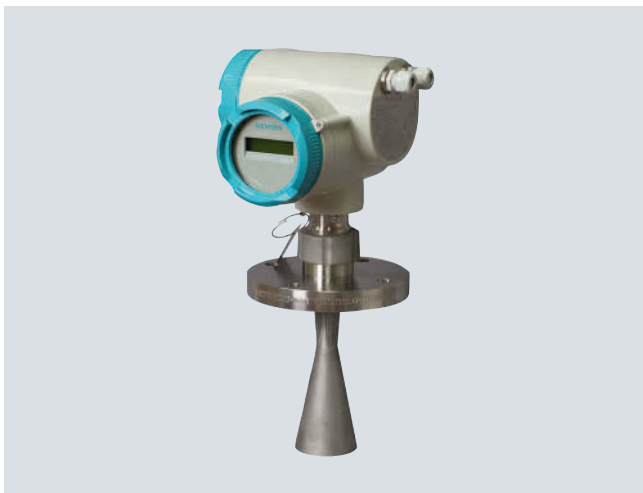
SITRANS LR260 connections

# Level Measurement

## Continuous level measurement - Radar transmitters

SITRANS LR400

### Overview



The SITRANS LR400 is a 4-wire, 24 GHz FMCW radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including high temperature and high pressure, to a range of 50 m (164 ft); ideal for low dielectric media.

### Benefits

- Easy installation and commissioning, low maintenance
- Self-calibration with internal reference
- Built-in diagnostics
- Auto False-Echo Suppression and advanced echo processing
- 24 GHz and high signal-to-noise ratio
- Communication using HART® or PROFIBUS PA
- Programming using infrared Intrinsically Safe handheld programmer or with SIMATIC PDM or HART handheld device

### Application

It provides excellent results on low dielectric media.

SITRANS LR400 is available for standard applications and for applications that require explosion proof protection.

SITRANS LR400 features robust enclosure, flange and horn components. It is virtually unaffected by atmospheric or temperature conditions within the vessel.

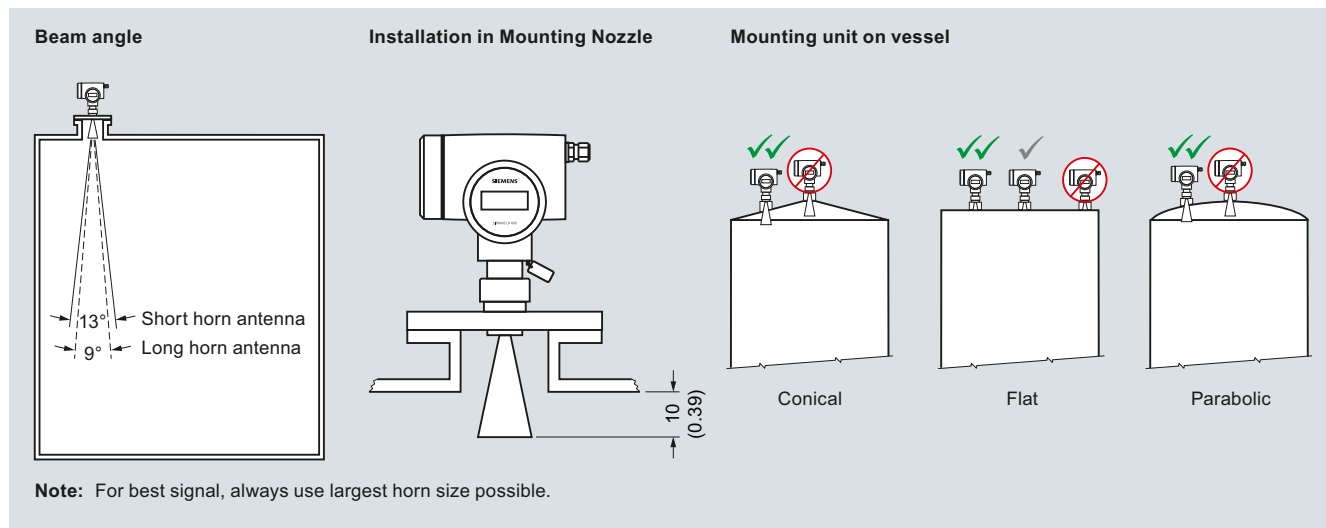
Safe on-site local programming is simple using the Intrinsically Safe handheld programmer. SIMATIC PDM can be used for easy remote programming.

The characteristics of 24 GHz and high signal-to-noise ratio contribute to exceptional signal reflection, regardless of the dielectric value of the medium.

Key applications: long-range liquid or slurry applications, high temperature or high pressure, low dielectric media, such as LPG (liquid, petroleum, gas)

5

### Configuration



SITRANS LR400 installation, dimensions in mm (inch)



# Level Measurement

## Continuous level measurement - Radar transmitters

### SITRANS LR400

#### Technical specifications

<b>Mode of operation</b>		<b>Programming</b>	
Measuring principle	FMCW radar level measurement	Intrinsically Safe Siemens handheld programmer (ordered separately)	Infrared receiver
Frequency	24 ... 25 GHz FMCW	<ul style="list-style-type: none"> <li>Approvals for handheld programmer</li> </ul>	IS model with ATEX EEx ia IIC T4, CSA/FM Class I, Div. 1, Groups A, B, C, D T6 at max. ambient temperature of +40 °C (+104 °F)
Measuring range	0.35 ... 50 m (1.15 ... 164 ft)		
<b>Output</b>		<b>Power supply</b>	
Analog output (HART®)		Handheld communicator	HART communicator 375
<ul style="list-style-type: none"> <li>Signal range</li> <li>Load</li> </ul>	Optically isolated 4 ... 20 mA Max. 600 Ω (330 Ω for [ia] versions, Area classification options G, L, P, S)	PC	SIMATIC PDM
<ul style="list-style-type: none"> <li>Relay</li> </ul>	NC or NO function, max. DC 50 V, max. 200 mA, rating 5 W	Display (local)	Alphanumeric LCD for readout and entry
Communication	HART, optional PROFIBUS PA	<b>Certificates and approvals</b>	
PROFIBUS PA protocol	Layer 1 and 2, Class A, Profile 3.0	Safety	CSA <sub>US/C</sub> , CE, FM, C-TICK
<b>Performance (Reference conditions)</b>		Shipping	<ul style="list-style-type: none"> <li>Lloyd's Register of Shipping</li> <li>ABS</li> </ul>
Dead band	0 ... 350 mm from bottom edge of flange	Radio	Europe (R&TTE, CETECOM), Industry Canada, FCC, C-TICK
Error in measurement at +25 °C (+77 °F)	≤ 5 mm from 2 ... 10 m ≤ 15 mm from 10 ... 50 m	Hazardous areas	ATEX II 1/2 G EEx dem [ia] IIC T6 ATEX II 1/2 G EEx dem IIC T6 CSA/FM Class I, Div. 1, Groups B, C, D; Class II, Div. 1, Groups E, F, G; Class III T6, INMETRO
<ul style="list-style-type: none"> <li>Repeatability</li> <li>Fail-safe</li> </ul>	≤ 1 mm mA signal programmable as high, low or hold (LOE)	<b>Optional equipment</b>	
<b>Rated operating conditions</b>		Purging (self-cleaning) system PTFE dust cover	
Amb. temperature for enclosure	-40 ... +65 °C (-40 ... +149 °F)		
Location	Indoor/outdoor		
Installation category	II		
Pollution degree	4		
<b>Medium conditions</b>			
Dielectric constant	$\epsilon_r > 1.4$		
Process temperature range			
<ul style="list-style-type: none"> <li>Standard</li> </ul>	-40 ... +200 °C (-40 ... +392 °F) -20 ... +200 °C (-4 ... +392 °F) for SITRANS LR400 with ATEX rating		
<ul style="list-style-type: none"> <li>With optional temperature extension</li> </ul>	-40 ... +250 °C (-40 ... +482 °F)		
Vessel Pressure	Up to 40 bar g (process connection dependent)		
<b>Design</b>			
Weight	Approx. 12.2 kg (26.8 lbs) with 3" 150 psi flange		
Materials			
<ul style="list-style-type: none"> <li>Enclosure</li> <li>Degree of protection</li> </ul>	Die-cast aluminum, painted IP67/Type 4X/NEMA 4X, Type 6/NEMA 6		
<ul style="list-style-type: none"> <li>Cable inlet</li> </ul>	2x M20x1.5 or ½" NPT		
Process connections			
<ul style="list-style-type: none"> <li>Flat faced flanges</li> </ul>	316L stainless steel, 80, 100, 150 mm, bolt holes matching EN 1092-1 and JIS B 2220		
<ul style="list-style-type: none"> <li>Raised face flanges</li> </ul>	316L stainless steel, 3", 4", 6", bolt holes matching ASME B 16.5		

# Level Measurement

## Continuous level measurement - Radar transmitters

SITRANS LR400

Selection and Ordering data	Order No.
<b>SITRANS LR400</b>	L) <b>7ML5421-</b>
4-wire, 24 GHz FMCW radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including high temperature and high pressure, to a range of 50 m (164 ft); ideal for low dielectric media.	
<b>Order handheld programmer separately!</b>	
<b>Process temperature range</b>	
-40 °C ... +200 °C (-40 ... +392 °F), standard	<b>0</b>
-40 °C ... +250 °C (-40 ... +482 °F), high temperature extension	<b>1</b>
<b>Process connection</b>	
Universal flange 3"/80 mm <sup>1)</sup>	<b>A</b>
Universal flange 4"/100 mm <sup>1)</sup>	<b>B</b>
Universal flange 6"/150 mm <sup>1)</sup>	<b>D</b>
DN 80, PN 16, Type A, flat faced	<b>S</b>
DN 80, PN 40, Type B1, raised face	<b>C</b>
DN 100, PN 16, Type A, flat faced	<b>T</b>
DN 100, PN 40, Type B1, raised face	<b>G</b>
DN 150, PN 16, Type A, flat faced	<b>U</b>
3" ASME, 150 lb, raised face	<b>E</b>
3" ASME, 300 lb, raised face	<b>F</b>
4" ASME, 150 lb, raised face	<b>J</b>
4" ASME, 300 lb, raised face	<b>K</b>
6" ASME, 150 lb, raised face	<b>N</b>
JIS, DN 80 10K	<b>Q</b>
JIS, DN 100 10K	<b>R</b>
JIS, DN 150 10K	<b>V</b>
(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5, or EN 1092-1, or JIS B 2220 standard.)	
<b>Antenna</b>	
Horn antenna, long 93 mm (3.66") diam. for 100 mm (4") nozzles	<b>D</b>
Horn antenna, short 74 mm (2.91") diam. for 80 mm (3") nozzles	<b>K</b>
<b>Antenna purging system</b>	
None	<b>0</b>
Purging system	<b>1</b>
Note: Available with process connections A, B or D, only, and available for Area Classifications A or B only	
<b>Process seal/gasket</b>	
PTFE for -40 ... +250 °C (-40 ... +482 °F) flange temperatures	<b>1</b>
FKM for -20 ... +200 °C (-4 ... +392 °F) flange temperatures <sup>2)</sup>	<b>3</b>
<b>Output/communication</b>	
4 ... 20 mA, HART <sup>®</sup>	<b>0</b>
PROFIBUS PA	<b>1</b>
<b>Power supply/cable inlet</b>	
100 ... 230 V AC	
• 2 x M20x1.5	<b>B</b>
• 2 x 1/2" NPT	<b>C</b>
24 V DC	
• 2 x M20x1.5	<b>E</b>
• 2 x 1/2" NPT	<b>F</b>
<b>Area classification</b>	
General Purpose, CE, CETECOM <sup>3)</sup>	<b>A</b>
General Purpose, CSA <sub>US/IC</sub> , Industry Canada, FCC, CE and R&TTE	<b>B</b>
ATEX II 2G EEx d IIC T6; CE, R&TTE	<b>E</b>
ATEX II 2G EEx dem IIC T6; CE, R&TTE	<b>F</b>
ATEX II 2G EEx dem [ia] IIC T6; CE, R&TTE <sup>4)</sup>	<b>G</b>
ATEX II 1/2 GD EEx d IIC T6; CE, R&TTE <sup>2)</sup>	<b>J</b>
ATEX II 1/2 GD EEx dem IIC T6; CE, R&TTE <sup>2)</sup>	<b>K</b>

Selection and Ordering data	Order No.
<b>SITRANS LR400</b>	L) <b>7ML5421-</b>
4-wire, 24 GHz FMCW radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including high temperature and high pressure, to a range of 50 m (164 ft); ideal for low dielectric media.	
<b>Order handheld programmer separately!</b>	
ATEX II 1/2 GD EEx dem [ia] IIC T6; CE, R&TTE <sup>2) 4)</sup>	<b>L</b>
ATEX II 2G EEx d IIC T6; CE, CETECOM <sup>3)</sup>	<b>M</b>
ATEX II 2G EEx dem IIC T6; CE, CETECOM <sup>3)</sup>	<b>N</b>
ATEX II 2G EEx dem [ia] IIC T6; CE, CETECOM <sup>2) 4)</sup>	<b>P</b>
ATEX II 1/2 GD EEx d IIC T6; CE, CETECOM <sup>2) 3)</sup>	<b>Q</b>
ATEX II 1/2 GD EEx dem IIC T6; CE, CETECOM <sup>2) 3)</sup>	<b>R</b>
ATEX II 1/2 GD EEx dem [ia] IIC T6; CE, CETECOM <sup>2) 3) 4)</sup>	<b>S</b>
FM Class I, Div. 1, Groups B, C, D; Class II/III, Div. 1, Groups E, F, G; FCC <sup>2)</sup>	<b>T</b>
CSA Class I, Div. 1, Groups B, C, D; Class II/III, Div. 1, Groups E, F, G; FCC <sup>2)</sup>	<b>U</b>
<b>Local operation</b>	
Local Display Only. Handheld programmer not included ( <b>Order programmer separately.</b> )	<b>2</b>
1) Available with antenna purging system option 1 only, universal, 0.5 bar g (7.25 psi g) maximum	
2) Available with process temperature range option 0 only	
3) Germany and Belgium end customers only	
4) Available only with power supply option E or F	
D) Subject to export regulations AL: N, ECCN: EAR99H	
L) Subject to export regulations AL: N, ECCN: 3A991X	

Selection and Ordering data	Order code
<b>Further designs</b>	
Please add <b>"-Z"</b> to Order No. and specify Order code(s).	
Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters); specify in plain text	<b>Y15</b>
Test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and to ISO 9000	<b>C11</b>
Inspection Certificate Type 3.1 per EN 10204	<b>C12</b>
<b>Operating Instructions</b>	Order No.
English	C) <b>7ML1998-5FH06</b>
German	C) <b>7ML1998-5FH36</b>
French	C) <b>7ML1998-5FH16</b>
Spanish	C) <b>7ML1998-5FH22</b>
Note: The Operating Instructions should be ordered as a separate line item on the order.	
Multi-language Quick Start manual This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	C) <b>7ML1998-5QN83</b>

# Level Measurement

## Continuous level measurement - Radar transmitters

### SITRANS LR400

#### Accessories

	Order No.
Handheld programmer Intrinsically Safe, EEx ia	<b>7ML5830-2AJ</b>
Long horn dust cover, PTFE	<b>7ML1930-1AH</b>
Short horn dust cover, PTFE	<b>7ML1930-1AJ</b>
HART® modem/RS-232 (for use with a PC and SIMATIC PDM)	D) <b>7MF4997-1DA</b>
HART® modem/USB (for use with a PC and SIMATIC PDM)	D) <b>7MF4997-1DB</b>
One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F), HART® <sup>1)</sup>	<b>7ML1930-1AP</b>
One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F), PROFIBUS PA <sup>1)</sup>	<b>7ML1930-1AQ</b>
SITRANS RD100 Remote display - see Chapter 8	
SITRANS RD200 Remote display - see Chapter 8	
SITRANS RD500 Remote display - see Chapter 8	

<sup>1)</sup> Product shipped with plastic cable gland, rated to -20 °C. If -40 °C rating required, then metallic cable gland is recommended.

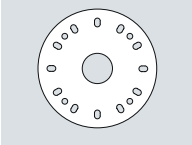
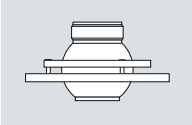

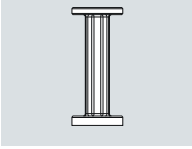
C) Subject to export regulations AL: N, ECCN: EAR99

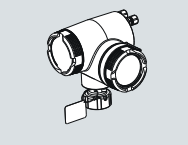
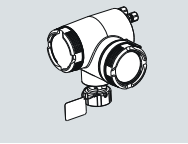
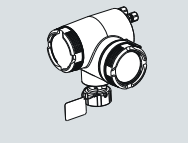
D) Subject to export regulations AL: N, ECCN: EAR99H

# Level Measurement

## Continuous level measurement - Radar transmitters

### SITRANS LR400 Specials

SITRANS LR400 Specials		Order No.
3"/80 mm Universal Flange, without horn or hub. <sup>1)</sup>	<b>PBD-51035813</b>	
4"/100 mm Universal Flange, without horn or hub. <sup>1)</sup>	<b>PBD-51035814</b>	
6"/150 mm Universal Flange, without horn or hub. <sup>1)</sup>	<b>PBD-51035815</b>	
8"/200 mm Universal Flange, without horn or hub. <sup>1)</sup>	<b>PBD-51035816</b>	
Purging kit with Easy Aimer ball, no flange, no horn. <sup>1)</sup>	<b>PBD-51036110</b>	
Purging kit with Easy Aimer ball with 4"/100 mm flange, no horn. <sup>1)</sup>	<b>PBD-51035810</b>	
Purging kit with Easy Aimer ball with 6"/150 mm flange, no horn. <sup>1)</sup>	<b>PBD-51035811</b>	
Purging Kit with Easy Aimer ball with 8"/200 mm flange, no horn. <sup>1)</sup>	<b>PBD-51035812</b>	
Short horn antenna, no emitter supplied	<b>PBD-22475K1A</b>	
Long horn antenna, no emitter supplied	<b>PBD-22475K2A</b>	
Short horn antenna, purged, no emitter supplied	<b>PBD-22475K3A</b>	
Long horn antenna, purged, no emitter supplied	<b>PBD-22475K4A</b>	
Replacement display module, SITRANS LR400 Liquids and Solids versions	<b>PBD-51035410</b>	
4" extension kit for horn antenna with General Purpose approvals	<b>PBD-51035474</b>	
8" extension kit for horn antenna with General Purpose approvals	<b>PBD-51035473</b>	
8" extension kit for horn antenna for hazardous units	<b>PBD-51036180</b>	

SITRANS LR400 Specials		Order No.
SITRANS LR400 Aluminum enclosure with AC power, M20 cable inlet, HART <sup>®</sup> communication, and GP, CE, and CETECOM approvals.	C) <b>PBD-51036479</b>	
SITRANS LR400 Aluminum enclosure with AC power, M20 cable inlet, PROFIBUS PA communication and GP, CE, and CETECOM approvals.	<b>PBD-51036480</b>	
SITRANS LR400 Aluminum enclosure with AC power, M20 cable inlet, HART <sup>®</sup> communication and GP, CE, CSA, Industry Canada, FCC and R&TTE.	C) <b>PBD-51035867</b>	
SITRANS LR400 Aluminum enclosure with AC power, M20 cable inlet, PROFIBUS PA communication and GP, CE, CSA, Industry Canada, FCC and R&TTE.	C) <b>PBD-51035871</b>	
SITRANS LR400 Aluminum enclosure with AC power, M20 cable inlet, PROFIBUS PA communication and ATEX II 1/2 GD EEx d IIC T6, CE and R&TTE approvals.	C) <b>PBD-51035873</b>	
SITRANS LR400 Aluminum enclosure with DC power, M20 cable inlet, HART <sup>®</sup> communication and and GP, CE and CETECOM approvals.	C) <b>PBD-51036481</b>	
SITRANS LR400 Aluminum enclosure with DC power, M20 cable inlet, PROFIBUS PA communication and GP, CE and CETECOM approvals.	<b>PBD-51036482</b>	
SITRANS LR400 Aluminum enclosure with DC power, M20 cable inlet, HART <sup>®</sup> communication and GP, CE, CSA, Industry Canada, FCC and R&TTE.	C) <b>PBD-51036483</b>	
SITRANS LR400 Aluminum enclosure with DC power, M20 cable inlet, PROFIBUS PA communication and GP, CE, CSA, Industry Canada, FCC and R&TTE.	C) <b>PBD-51036484</b>	
SITRANS LR400 Aluminum enclosure with DC power, M20 cable inlet, HART <sup>®</sup> communication and ATEX II 1/2 GD EEx d IIC T6, CE and R&TTE approvals.	C) <b>PBD-51036485</b>	
SITRANS LR400 Aluminum enclosure with DC power, M20 cable inlet, PROFIBUS PA communication and ATEX II 1/2 GD EEx d IIC T6, CE and R&TTE approvals.	C) <b>PBD-51036486</b>	

<sup>1)</sup> Available with no pressure rating and with General Purpose approvals only

Please contact [nacc.smpi@siemens.com](mailto:nacc.smpi@siemens.com) for special requests.

C) Subject to export regulations AL: N, ECCN: 3A991X

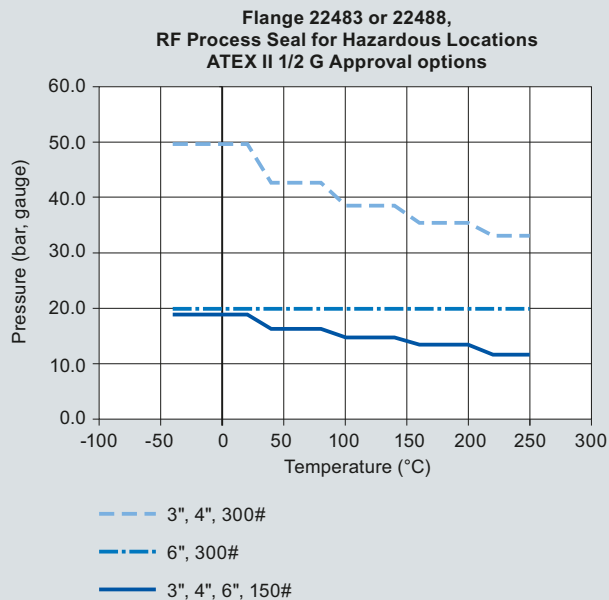
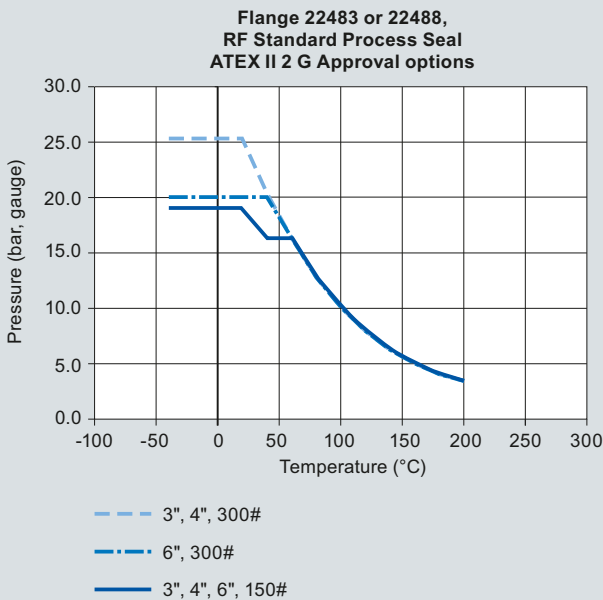
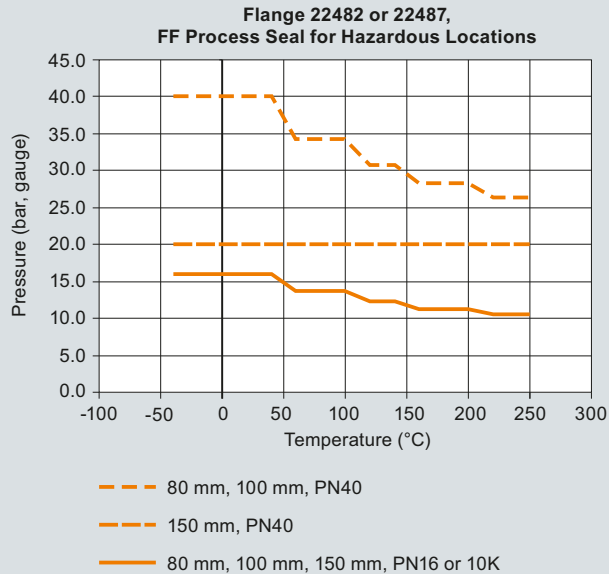
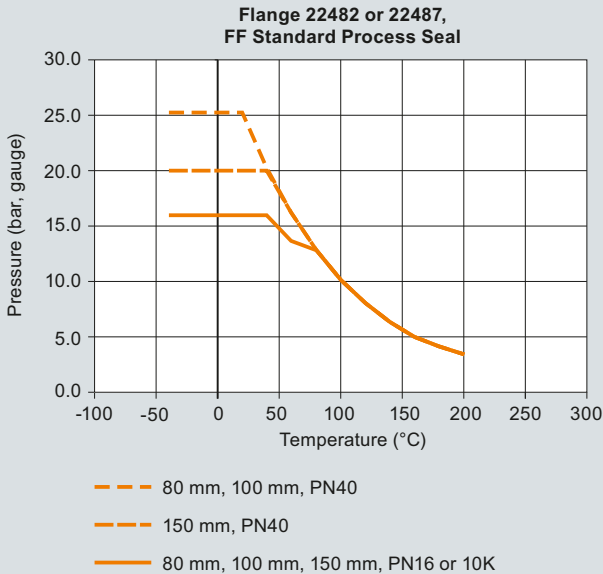
# Level Measurement

## Continuous level measurement - Radar transmitters

### SITRANS LR400

#### Characteristic curves

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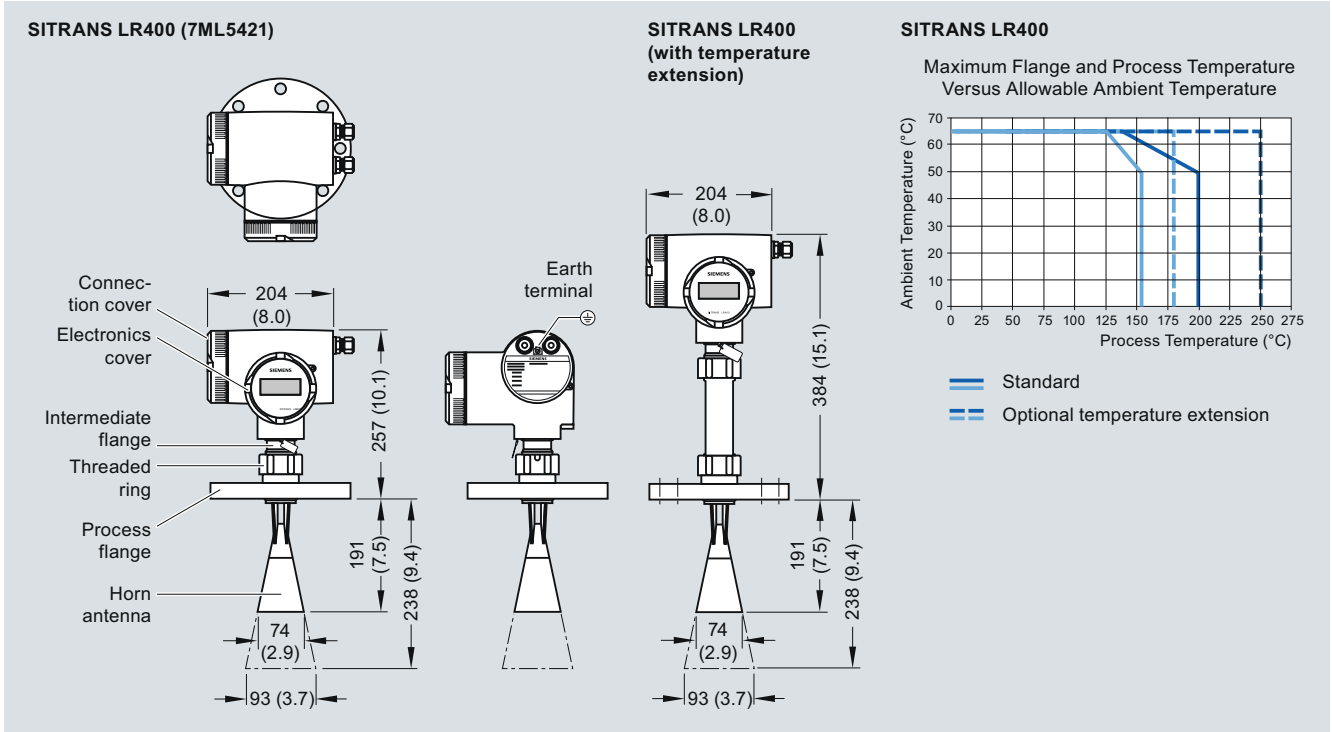
SITRANS LR400 Process Pressure/Temperature derating curves

# Level Measurement

## Continuous level measurement - Radar transmitters

SITRANS LR400

### Dimensional drawings



SITRANS LR400, dimensions in mm (inch)

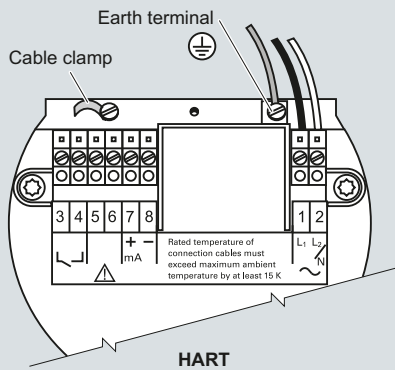
# Level Measurement

## Continuous level measurement - Radar transmitters

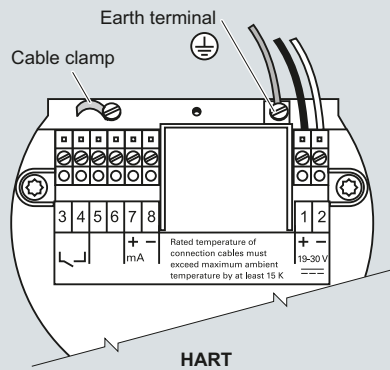
### SITRANS LR400

#### Schematics

##### AC version



##### DC version

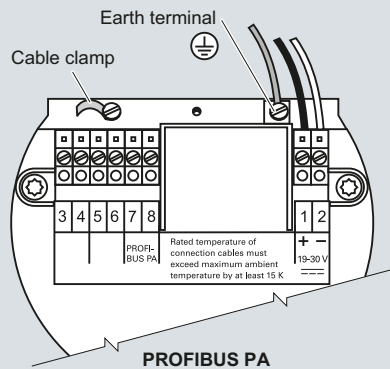
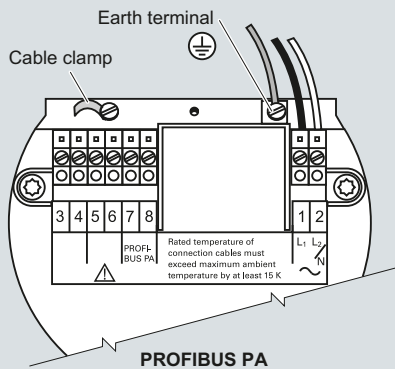


##### Hand Programmer



##### SITRANS LR400

Part number:  
7ML5830-2AJ



#### Note:

- Recommended torque on terminal clamping screws, 0.5 to 0.6 Nm
- 4-20 mA, Profibus PA, DC input circuits, 14-20 AWG, shielded copper wire
- AC input circuit, min. 14 AWG copper wire
- All field wiring must have insulation suitable for at least 250 V
- The equipment must be protected by a 15 A fuse or circuit breaker in the building installation

SITRANS LR400 connections

# Level Measurement

## Continuous level measurement - Radar transmitters

SITRANS LR460

### Overview

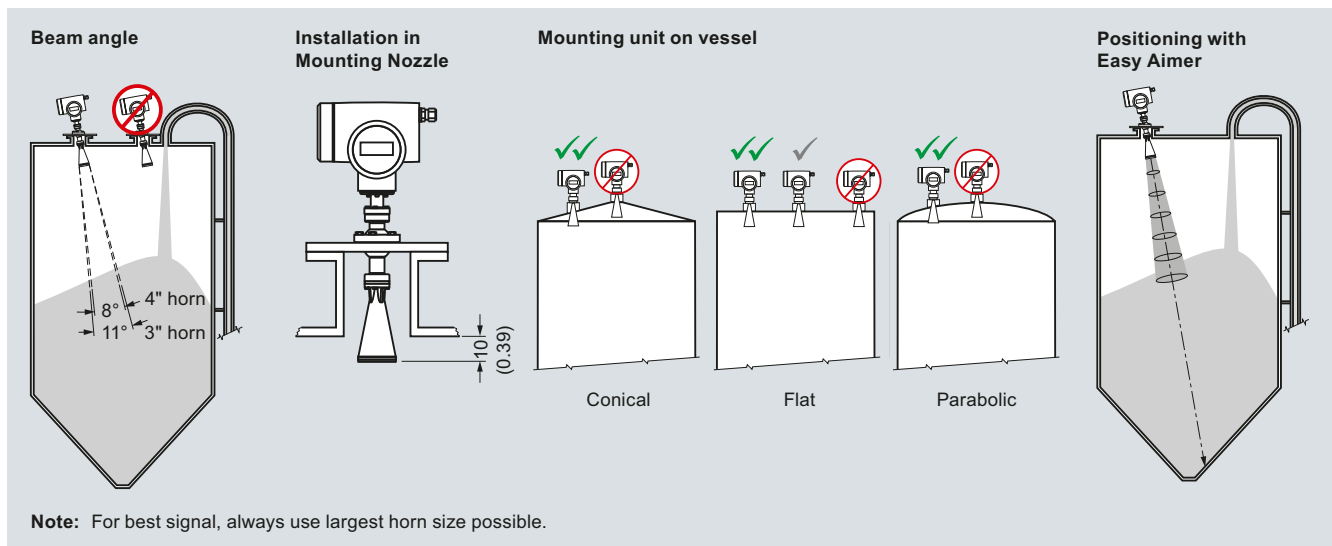


The SITRANS LR460 is a 4-wire, 24 GHz FMCW radar level transmitter with extremely high signal-to-noise ratio and advanced signal processing for continuous monitoring of solids up to 100 m (328 ft). It is ideal for measurement in extreme dust.

### Benefits

- Process Intelligence for advanced signal processing and quick and easy adjustment
- Self-guided quick start wizard for plug and play start-up
- 24 GHz provides superior reflective properties on solids surfaces
- 100 m (328 ft) range for long-range and difficult applications
- Easy Aimer optimizes signal quality on sloped surfaces
- Programming using infrared Intrinsicly Safe handheld programmer or with SIMATIC PDM or HART handheld device

### Configuration



SITRANS LR460 installation, dimensions in mm (inch)

### Application

SITRANS LR460 provides excellent results even during conditions of extreme dust. The integral Easy Aimer included on the SITRANS LR460 allows for easy positioning for optimum measurement on solids.

Process Intelligence onboard SITRANS LR460 means advanced signal processing is harnessed for reliable operation on both simple and difficult solids application.

SITRANS LR460 features a robust enclosure, flange and horn components. It is virtually unaffected by atmospheric or temperature conditions within the vessel.

An optional dust cap is available for sticky solids. Optional air purging is also available for extremely sticky applications. Safe on-site local programming is simple using the Intrinsicly Safe handheld programmer. SIMATIC PDM can be used for easy remote programming using HART or PROFIBUS PA.

The characteristics of 24 GHz and high signal-to-noise ratio contribute to exceptional signal reflection, regardless of the dielectric value of the medium.

Key applications: long-range dusty applications, cement powder, fly-ash, coal, flour, grain, plastics



# Level Measurement

## Continuous level measurement - Radar transmitters

### SITRANS LR460

#### Technical specifications

<b>Mode of operation</b>		<b>Programming</b>	
Measuring principle	FMCW radar level measurement	Intrinsically Safe Siemens handheld programmer (ordered separately)	Infrared receiver
Frequency	24.2 ... 25.2 GHz FMCW	<ul style="list-style-type: none"> <li>Approvals for handheld programmer</li> </ul>	IS model with ATEX II 1G EEx ia IIC T4, CSA/FM Class I, Div. 1, Groups A, B, C, D T6 at max. ambient temperature of +40 °C (+104 °F)
Measuring range	0.35 ... 100 m (1.15 ... 328.08 ft)		
<b>Output</b>		Handheld communicator	HART Communicator 375
Analog output (HART)		PC	SIMATIC PDM
<ul style="list-style-type: none"> <li>Signal range</li> <li>Load</li> <li>Fail-safe</li> </ul>	Optically isolated Max. 600 Ω mA signal programmable as high, low or hold (LOE)	Display (local)	Alphanumeric LCD for readout and entry
Communication	HART, optional PROFIBUS PA	<b>Power supply</b>	
Digital output	Relay, NC or NO function, max. 50 V DC, max. 200 mA, rating 5 W	100 ... 230 V AC ±15 % (50/60 Hz), 6 W (12 VA) or 24 V DC +25/-20 %, 6 W (optional)	
PROFIBUS PA protocol	Layer 1 and 2, Class A, Profile 3.01	<b>Certificates and approvals</b>	
<b>Performance (Reference conditions according to IEC 60770-1)</b>		General	CSA <sub>US/C</sub> , CE, FM, C-TICK
Non-linearity	Greater of 25 mm (1") or 0.25 % of span (including hysteresis and non-repeatability), over the full ambient temperature range	Radio	European Radio (R&TTE), Industry Canada, FCC, C-TICK
Non-repeatability	≤ 10 mm (0.4")	Hazardous Areas	CSA/FM Class II, Div. 1, Groups E, F and G, Class III ATEX II 1D, 1/2 D, 2D T85 °C
<b>Rated operating conditions</b>		<b>Optional equipment</b>	
Amb. temperature for enclosure	-40 ... +65 °C (-40 ... +149 °F)	Dust cap	PTFE
Location	Indoor/outdoor	Air purge connection	1/8" NPT
Installation category	II		
Pollution degree	4		
<b>Medium conditions</b>			
Dielectric constant	$\epsilon_r > 1.4$		
Process temperature range	-40 ... +200 °C (-40 ... +392 °F)		
Vessel pressure	0.5 bar g (7.25 psi g) maximum		
<b>Design</b>			
Weight	Approx. 6.1 kg (13.4 lbs) with 3" universal flange		
Materials			
<ul style="list-style-type: none"> <li>Enclosure</li> <li>Degree of protection</li> <li>Cable inlet</li> </ul>	Die-cast aluminum, painted IP67/Type 4X/NEMA 4X/Type 6/NEMA 6 2x M20x1.5 or 1/2" NPT		
Process connections			
<ul style="list-style-type: none"> <li>Universal flanges, 316L stainless steel, flat faced, with integral Easy Aimer</li> </ul>	3"/80 mm, 4"/100 mm, 6"/150 mm (mates with flange EN 1092-1, ASME B16.5, or JIS B2238 bolt pattern), 0.5 bar g (7.25 psi g) max. pressure		

# Level Measurement

## Continuous level measurement - Radar transmitters

SITRANS LR460

Selection and Ordering data	Order No.	Selection and Ordering data	Order code
<b>SITRANS LR460</b> 4-wire, 24 GHz FMCW radar level transmitter with extremely high signal-to-noise ratio and advanced signal processing for continuous monitoring of solids up to 100 m (328 ft). It is ideal for measurement in extreme dust. <b>Order handheld programmer separately!</b>	L) 7 ML 5 4 2 6 - 0 - 0 - 0	<b>Further designs</b> Please add "-Z" to Order No. and specify Order code(s). Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters); specify in plain text Test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and to ISO 9000	Y15 C11
<b>Process connection</b> Universal, flat faced, 0.5 bar g (7.25 psi g) maximum with integral Easy Aimer ball 3" (80 mm) 4" (100 mm) 6" (150 mm)	A B C	<b>Operating Instructions</b> English French German Multi-language Quick Start manual This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	Order No. C) 7ML1998-5JM02 C) 7ML1998-5JM11 C) 7ML1998-5JM32 C) 7ML1998-5QW82
<b>Antenna</b> 3" horn antenna, fits 80 mm (3") nozzles 3" horn antenna, fits 80 mm (3") nozzles with 100 mm extension 3" horn antenna, fits 80 mm (3") nozzles with 200 mm extension 3" horn antenna, fits 80 mm (3") nozzles with 500 mm extension <sup>1)</sup> 3" horn antenna, fits 80 mm (3") nozzles with 1000 mm extension <sup>1)</sup> 4" horn antenna, fits 100 mm (4") nozzles 4" horn antenna, fits 100 mm (4") nozzles with 100 mm extension 4" horn antenna, fits 100 mm (4") nozzles with 200 mm extension 4" horn antenna, fits 100 mm (4") nozzles with 500 mm extension <sup>1)</sup> 4" horn antenna, fits 100 mm (4") nozzles with 1000 mm extension <sup>1)</sup>	A B C D E F G H J K	<b>Accessories</b> Handheld programmer, Infra-red, Intrinsically Safe, EEx ia Dust cap, PTFE, for 3"/80 mm horn Dust cap, PTFE, for 4"/100 mm horn HART <sup>®</sup> modem/RS-232 (for use with a PC and SIMATIC PDM) HART <sup>®</sup> modem/USB (for use with a PC and SIMATIC PDM) One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F), HART <sup>®</sup> <sup>1)</sup> One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F), PROFIBUS PA <sup>1)</sup> SITRANS RD100 Remote display - see Chapter 8 SITRANS RD200 Remote display - see Chapter 8 SITRANS RD500 Remote display - see Chapter 8	7ML5830-2AJ 7ML1930-1BL 7ML1930-1BM D) 7MF4997-1DA D) 7MF4997-1DB 7ML1930-1AP 7ML1930-1AQ
<b>Purge (self-cleaning) connection</b> No purge connection Purge connection	0 1		
<b>Output/Communication</b> 4 ... 20 mA, HART <sup>®</sup> PROFIBUS PA	0 1		
<b>Power supply/cable inlet</b> 100 ... 230 V AC • 2 x M20x1.5 • 2 x 1/2" NPT 24 V DC • 2 x M20x1.5 • 2 x 1/2" NPT	A B C D		
<b>Approvals</b> General Purpose, CSAUS/c, Industry Canada, FM, FCC, CE and R&TTE, C-TICK CSA/FM Class II, Div. 1, Groups E, F, and G, Class III ATEX II 1/2 D T6, CE, R&TTE	A B C		

<sup>1)</sup> Available with Purge option 0 only

L) Subject to export regulations AL: N, ECCN: 3A991X

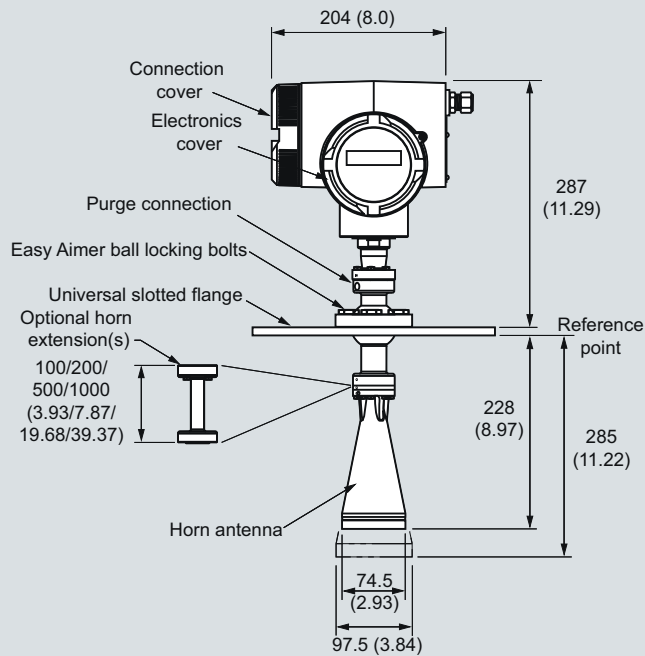
# Level Measurement

## Continuous level measurement - Radar transmitters

### SITRANS LR460

#### Dimensional drawings

SITRANS LR460 (7ML5426)



SITRANS LR460, dimensions in mm (inch)

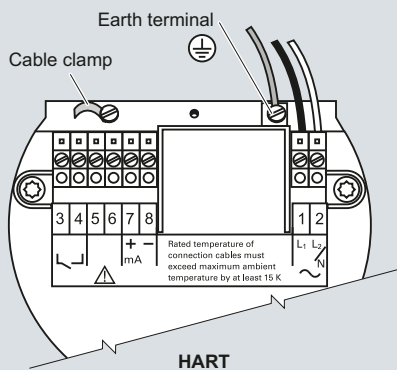
# Level Measurement

## Continuous level measurement - Radar transmitters

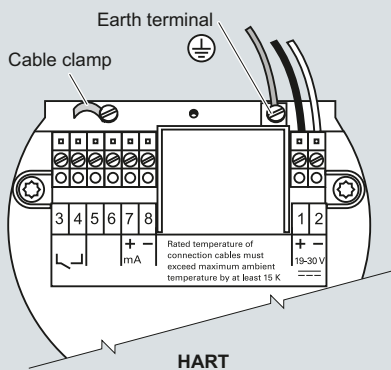
SITRANS LR460

### Schematics

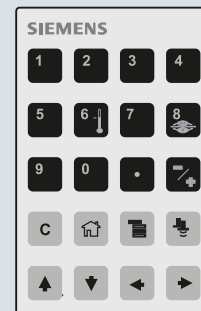
AC version



DC version

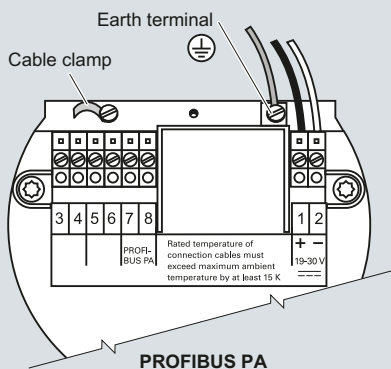
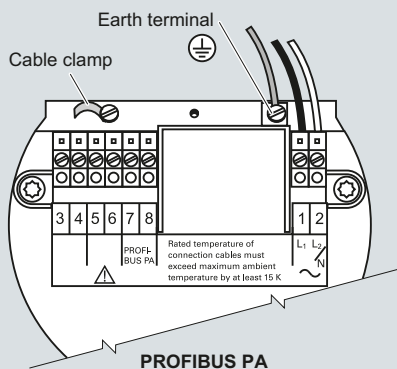


Hand Programmer



SITRANS LR460

Part number:  
7ML5830-2AJ



**Note:**

- Recommended torque on terminal clamping screws, 0.5 to 0.6 Nm
- 4-20 mA, Profibus PA, DC input circuits, 14-20 AWG, shielded copper wire
- AC input circuit, min. 14 AWG copper wire
- All field wiring must have insulation suitable for at least 250 V
- The equipment must be protected by a 15 A fuse or circuit breaker in the building installation


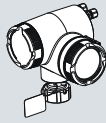
SITRANS LR460 connections

# Level Measurement

## Continuous level measurement - Radar transmitters

### SITRANS LR260/LR460 Specials

SITRANS LR260/LR460 Specials	
	Order No.
<b>Process connection part kits - non-pressure-rated</b>	
LR260/LR460, 100 mm extension for horn antenna, no purge <sup>1)</sup>	<b>A5E01087872</b>
LR260/LR460, 200 mm extension for horn antenna, no purge <sup>1)</sup>	<b>A5E01091262</b>
LR260/LR460, 100 mm extension for horn antenna with purge <sup>1)</sup>	<b>A5E01261979</b>
LR260/LR460, 200 mm extension for horn antenna with purge <sup>1)</sup>	<b>A5E01261981</b>
LR260/LR460, horn 2", no purge, no emitter <sup>1)</sup>	<b>A5E02083905</b>
LR260/LR460, horn 3", no purge, no emitter <sup>1)</sup>	<b>A5E01623511</b>
LR260/LR460, horn 4", no purge, no emitter <sup>1)</sup>	<b>A5E01623512</b>
LR260/LR460, horn 2", with purge, no emitter <sup>1)</sup>	<b>A5E02083906</b>
LR260/LR460, horn 3", with purge, no emitter <sup>1)</sup>	<b>A5E01623513</b>
LR260/LR460, horn 4", with purge, no emitter <sup>1)</sup>	<b>A5E01623514</b>
LR260/LR460, 3" universal flat faced flange <sup>1)</sup>	<b>A5E02303897</b>
LR260/LR460, 4" universal flat faced flange <sup>1)</sup>	<b>A5E01259467</b>
LR260/LR460, 6" universal flat faced flange <sup>1)</sup>	<b>A5E01261834</b>
LR260/LR460 O-rings for Easy Aimer <sup>1)</sup>	F) <b>A5E01261836</b>
Kit, Emitter for LR260/LR460 <sup>1)</sup>	<b>A5E02360694</b>
LR260 lid with O-ring	<b>A5E02465410</b>
<b>Purge conversion kit - non-pressure-rated (no flange or extension included)</b>	
LR260/LR460 purge conversion, 2" horn <sup>1)</sup>	<b>A5E02083914</b>
LR260/LR460 purge conversion, 3" horn <sup>1)</sup>	<b>A5E02083915</b>
LR260/LR460 purge conversion, 4" horn <sup>1)</sup>	<b>A5E02083916</b>

SITRANS LR260/LR460 Specials	
	Order No.
<b>Enclosure with electronics</b>	
	
LR260 enclosure with board stack, HART communication, M20 cable inlet, approval option A, no process connection	C) <b>A5E02203605</b>
LR260 enclosure with board stack, PROFIBUS PA communication, M20 cable inlet, approval option A, no process connection	C) <b>A5E02213423</b>
LR260 enclosure with board stack, HART communication, NPT cable inlet, approval option A, no process connection	C) <b>A5E02165924</b>
LR260 enclosure with board stack, PROFIBUS PA communication, NPT cable inlet, approval option A, no process connection	C) <b>A5E02213428</b>
<b>Enclosure with electronics (LR460)</b>	
	
LR460 enclosure with board stack, HART communication, AC power, M20 cable inlet, approval option A, no process connection	L) <b>A5E02182085</b>
LR460 enclosure with board stack, PROFIBUS PA communication, AC power, M20 cable inlet, approval option A, no process connection	C) <b>A5E02212422</b>
LR460 enclosure with board stack, HART communication, AC power, NPT cable inlet, approval option A, no process connection	L) <b>A5E02212423</b>
LR460 enclosure with board stack, PROFIBUS PA communication, AC power, NPT cable inlet, approval option A, no process connection	L) <b>A5E02212424</b>
LR460 enclosure with board stack, HART communication, DC power, M20 cable inlet, approval option A, no process connection	L) <b>A5E02212425</b>
LR460 enclosure with board stack, PROFIBUS PA communication, DC power, M20 cable inlet, approval option A, no process connection	L) <b>A5E02212426</b>
LR460 enclosure with board stack, HART communication, DC power, NPT cable inlet, approval option A, no process connection	L) <b>A5E02212428</b>
LR460 enclosure with board stack, PROFIBUS PA communication, DC power, NPT cable inlet, approval option A, no process connection	L) <b>A5E02212429</b>

<sup>1)</sup> Available with no pressure rating, 0.5 bar g maximum.

Please contact [nacc.smpi@siemens.com](mailto:nacc.smpi@siemens.com) for special requests.

C) Subject to export regulations AL: N, ECCN: EAR99

F) Subject to export regulations AL: 91999, ECCN: N

L) Subject to export regulations AL: N, ECCN: 3A991X

# Level Measurement

## Continuous level measurement - Guided wave radar transmitter

### Overview

#### Introduction

Guided Wave Radar transmitters combine TDR (time domain reflectometry), ETS (equivalent time sampling) and modern low power circuitry.

#### Time Domain Reflectometry (TDR)

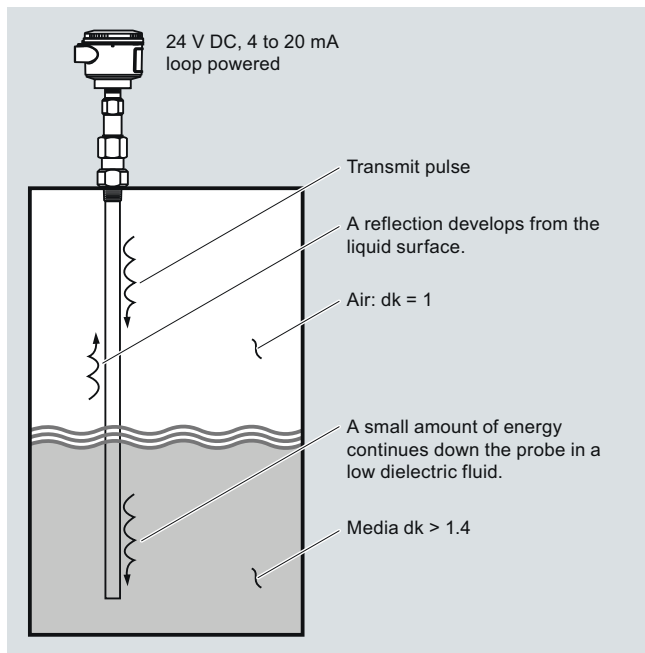
TDR uses pulses of electromagnetic (EM) energy to measure distances or levels. When a pulse reaches a dielectric discontinuity (created by media surface), part of the energy is reflected. The greater the dielectric difference, the greater the amplitude (strength) of the reflection.

In the SITRANS LG200 transmitter, a waveguide with a characteristic impedance in air is used as a probe. When part of the probe is immersed in a material other than air, there is lower impedance due to the increase in the dielectric. When an EM pulse is sent down the probe and meets the dielectric discontinuity, a reflection is generated.

#### Equivalent Time Sampling (ETS)

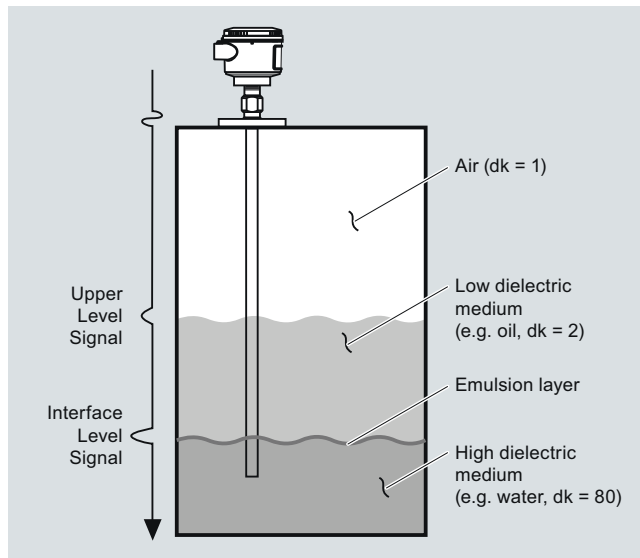
ETS (Equivalent Time Sampling) is used to measure the high speed, low power EM energy. ETS is critical in the application of TDR to vessel level measurement technology. The high speed EM energy (1000 ft/ $\mu$ s) is difficult to measure over short distances and at the resolution required in the process industry. ETS captures the EM signals in real time (nanoseconds) and re-constructs them in equivalent time (milliseconds), which is much easier to measure with today's technology.

ETS is accomplished by scanning the waveguide to collect thousands of samples. Approximately 8 scans are taken per second; each scan gathers more than 30,000 samples.



#### Interface Detection

The SITRANS LG200, when used with the Model 7ML1301-6 coaxial probe, is a transmitter capable of measuring both an upper level and an interface level. The upper liquid must have a dielectric constant between 1.4 and 5 and the two liquids have a difference in dielectric constants greater than 10. A typical application would be oil over water, with the upper layer of oil being non-conductive with a dielectric constant of approximately 2 and the lower layer of water being very conductive with a dielectric constant of approximately 80. This interface measurement can only be accomplished when the dielectric constant of the upper medium is lower than the dielectric constant of the lower medium.



# Level Measurement

## Continuous level measurement - Guided wave radar transmitter

# SIEMENS

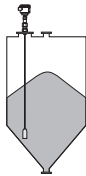
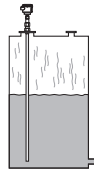
### Guided Wave Radar (Level) Application Questionnaire

#### Customer information

Contact: \_\_\_\_\_ Prepared By: \_\_\_\_\_  
 Company: \_\_\_\_\_ Date: \_\_\_\_\_  
 Address: \_\_\_\_\_ Notes on the Application: \_\_\_\_\_  
 City: \_\_\_\_\_ Country: \_\_\_\_\_  
 Zip/Postal Code: \_\_\_\_\_ Phone: ( ) \_\_\_\_\_  
 E-mail: \_\_\_\_\_ Fax: ( ) \_\_\_\_\_

#### Tank/Vessel Information (supply sketch where possible)

 Sketch attached

 Solids

 Liquids


#### Tank top:

- Open  
 Flat  
 Conical  
 Parabolic

#### Tank bottom:

- Sloped  
 Flat  
 Conical  
 Parabolic

#### Mounting location:

- Top mount  
 Thread mount  
 Flange mount  
 Bypass/Sidepipe mount  
 Pipe mount  
 Displacer replacement  
(please supply drawings)

#### Tank dimensions:

Height: \_\_\_\_\_ m/ft  
 Diameter: \_\_\_\_\_ m/ft  
 Nozzle Length: \_\_\_\_\_ cm/in  
 Nozzle Diameter: \_\_\_\_\_ cm/in  
 Process connection type: \_\_\_\_\_  
 Process connection size: \_\_\_\_\_  
 Distance to sidewall: \_\_\_\_\_ cm/in

#### Pressure:

Normal: \_\_\_\_\_  
 Maximum (relief): \_\_\_\_\_

#### Material

Material being measured: \_\_\_\_\_

Material temperature: Norm: \_\_\_\_\_ °C/°F Max: \_\_\_\_\_ °C/°F

Measurement type:  Continuous level  Interface level

Dielectric constant value: \_\_\_\_\_

Coating buildup:  Yes  No Turbulence:  Yes  No

Maximum viscosity: \_\_\_\_\_ Density: \_\_\_\_\_ kg/m<sup>3</sup>  
Kinematic Viscosity (cSt) = Dynamic Viscosity (cP) / Density (kg/m<sup>3</sup>)

- 1 to 5 cSt (like water)  50 to 100 cSt (like honey)  
 5 to 20 cSt (like machine oil)  100 to 500 cSt (like syrup/molasses)  
 20 to 50 cSt (like cooking oil)  >500 cSt (like tar)

Liquid  Solid  Slurry

#### Particle size:

- Fine dust/powder, <0.5 cm (0.2")  
 Grains (rice, corn), <2 cm (0.8")  
 Small stones/gravel, <2 cm (0.8")  
 Small rocks/chunks, >2 cm (0.8")  
 Large particles, <9 cm (3.5")

#### Foam type:

- None  Wet  
 Dry  Wet/dense

#### Installation (indicate all that apply)

Power available: \_\_\_\_\_ Communications: \_\_\_\_\_ Outputs required:  4 to 20 mA  
 HART® /4 to 20 mA  Other (please specify) \_\_\_\_\_

#### Products recommended:

# Level Measurement

## Continuous level measurement - Guided wave radar transmitter

# SIEMENS

### Guided Wave Radar (Interface) Application Questionnaire

#### Customer information

Contact: \_\_\_\_\_ Prepared By: \_\_\_\_\_  
 Company: \_\_\_\_\_ Date: \_\_\_\_\_  
 Address: \_\_\_\_\_ Notes on the Application: \_\_\_\_\_  
 City: \_\_\_\_\_ Country: \_\_\_\_\_  
 Zip/Postal Code: \_\_\_\_\_ Phone: ( ) \_\_\_\_\_  
 E-mail: \_\_\_\_\_ Fax: ( ) \_\_\_\_\_

#### Tank/Vessel Information

(supply sketch where possible)

Sketch attached

#### Tank dimensions:

Height: \_\_\_\_\_ m/ft  
 Diameter: \_\_\_\_\_ m/ft  
 Nozzle Length: \_\_\_\_\_ cm/in  
 Nozzle Diameter: \_\_\_\_\_ cm/in  
 Process connection type: \_\_\_\_\_  
 Process connection size: \_\_\_\_\_  
 Distance to sidewall: \_\_\_\_\_ cm/in

#### Tank top:

- Open  
 Flat  
 Conical  
 Parabolic

#### Tank bottom:

- Sloped  
 Flat  
 Conical  
 Parabolic

#### Mounting location:

- Top mount  
 Thread mount  
 Flange mount  
 Bypass/Sidepipe Mount  
 Pipe mount  
 Displacer replacement  
(please supply drawings)

#### Pressure:

Normal: \_\_\_\_\_  
 Maximum (relief): \_\_\_\_\_

#### Interface Data

Upper material: \_\_\_\_\_ Lower material: \_\_\_\_\_ Emulsion layer:  Yes  
 Upper material thickness: \_\_\_\_\_ cm/in Lower material thickness: \_\_\_\_\_ cm/in  No (preferred)  
 Upper material dielectric: \_\_\_\_\_ Lower material dielectric: \_\_\_\_\_ Emulsion thickness: \_\_\_\_\_ cm/in

#### Material

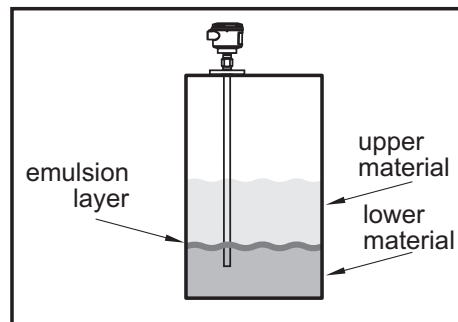
Material being measured: \_\_\_\_\_  Liquid  Slurry

Material temperature: Norm: \_\_\_\_\_ °C/°F Max: \_\_\_\_\_ °C/°F

Coating buildup:  Yes  No Turbulence:  Yes  No

Maximum Viscosity: \_\_\_\_\_ Density: \_\_\_\_\_ kg/m<sup>3</sup>  
 Kinematic Viscosity (cSt) = Dynamic Viscosity (cP) / Density (kg/m<sup>3</sup>)

- 1 to 5 cSt (like water)  50 to 100 cSt (like honey)  
 5 to 20 cSt (like machine oil)  100 to 500 cSt (like syrup/molasses)  
 20 to 50 cSt (like cooking oil)  >500 cSt (like tar)



#### Installation

Power available: \_\_\_\_\_

Outputs required:  4 to 20 mA

Communications:  HART®/4 to 20 mA

Other (please specify) \_\_\_\_\_

#### Products recommended:



# Level Measurement

## Continuous level measurement - Guided wave radar transmitter

### SITRANS LG200

#### Overview



SITRANS LG200 is a guided wave radar transmitter for short and medium range level, level/interface, and volume measurement of liquids and solids. It is unaffected by changes in process conditions, high temperatures and pressures, and steam.

#### Benefits

- Coaxial, rigid, and flexible single or twin rods for many applications
- Measures accurately on materials with dielectric (dK) as low as 1.4 [including LNG at -196 °C (-320.8 °F)]
- Guided wave radar measurement for up to 2.5 mm (0.12") accuracy
- Measures level and interface on challenging applications including foam
- 3 button programming for quick setup
- Reliable level measurement on harsh applications with pressure up to 430 bar g (6250 psi g) and temperatures as high as +427 °C (+800 °F).
- Suitable for use in SIL-1 and SIL-2 Loops (Full FMEDA report available)

#### Application

SITRANS LG200 provides accurate measurement in level, volume, and interface applications. For short and extended applications, LG200 offers coaxial, single or twin rod probes, and single or twin cable probes up to 22.5 m (75 ft).

SITRANS LG200 measures accurately in liquid or slurry applications of corrosive vapors, foam, saturated steam, high viscosity, quick fill/empty rates, low levels and varying dielectrics and product densities.

Ideal for retrofitting torque tube applications, SITRANS LG200 chamber replacement probe can be mounted in existing chambers or cages for optimal measurement.

- Key applications: hydrocarbon processing, interface/level measurement, low dielectric liquids, high temperature/pressure applications, powdered solids with high angle of repose.

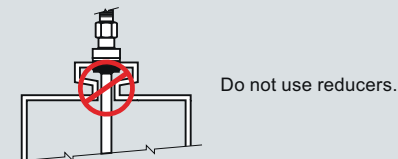
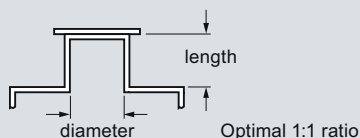
# Level Measurement

## Continuous level measurement - Guided wave radar transmitter

SITRANS LG200

### Configuration

#### Mounting on a nozzle

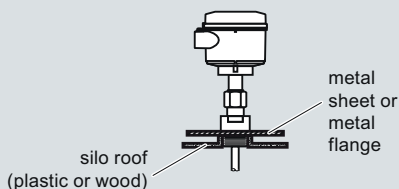


#### Installation in non-metallic silos<sup>1)</sup>

For installation in vessels of a non-metallic construction or possibly open vessels, a suitable launch plate is required to optimize the impedance of the transmitted signal as it travels along the probe. Optimal performance cannot be guaranteed if a suitable transition is not available at the process connection.

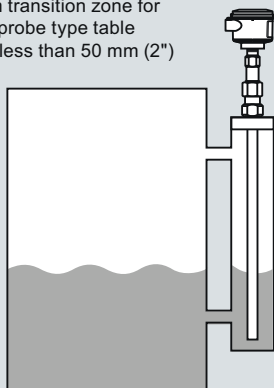
When using single rod versions (flexible or solid) and a threaded process connection, a metal sheet or flange will greatly improve conditions as this provides a suitable launch plate.

A flanged process connection is generally accepted to be provision of this launch plate.



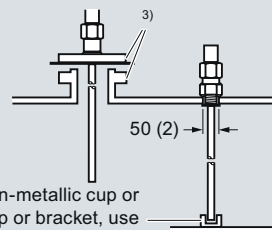
#### Bypass pipe

1. Minimum pipe diameter 50 mm (2")
2. Minimum 25 mm (1") from bottom of the bypass pipe
3. Take note of bottom transition zone for chosen probe, see probe type table
4. For pipe diameters less than 50 mm (2") consult factory



#### Single Rod mounting

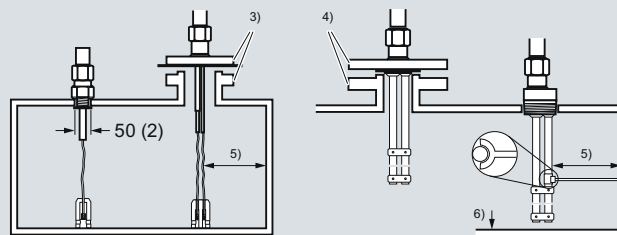
1. Do not mount in nozzles <50 mm (2") in diameter.
2. Mount in applications where ratio of diameter to length is 1:1 or greater. Any ratio less than 1:1 (i.e. 2" x 6" nozzle = 1:3) may require a blanking distance and/or dielectric adjustment.
3. Do not use pipe reducers.
4. Keep conductive objects away from probe to ensure proper performance.



Probe can be stabilized at the bottom with a non-metallic cup or bracket. When mounting into a metallic cup or bracket, use optional TFE bottom spacer (7ML1930-1DJ).

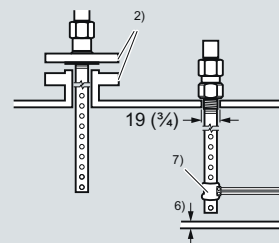
#### Twin Rod mounting 7ML1302-x

1. Active rod must be mounted at least 25 mm (1") away from any obstructions.
2. Minimum stillwell or nozzle diameter for probe is 76 mm (3"), inactive part needs to be flush with inside tank wall.



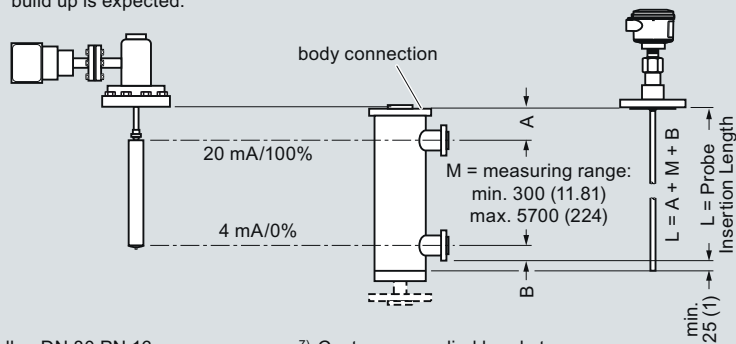
#### Coaxial 7ML1301-x/Coaxial-Interface 7ML1301-6

1. Minimum 25 mm (1") from tank bottom
2. Minimum 2" process connection for enlarged coaxial probe
3. Distance to obstructions not important due to enclosed design



#### Displacer/Torque Tube Replacement

1. With Coaxial Probe 7ML1301-4 there is no top transition zone allowing measurement to the process connection.
2. Minimum pipe size: coaxial probes 2"/DN50, twin rod 3"/DN80, single rod 2"/DN50
3. 22 mm (0.875") Coaxial probes should be used where limited build up is expected.



1) See Electromagnetic compatibility  
2) min. 1" - 150 lbs, DN 25 PN 16  
3) min. 2" - 150 lbs, DN 25 PN 16

4) min. 3" - 150 lbs, DN 80 PN 16  
5) min. 25 mm (1") from any metal object  
6) min. 25 mm (1") from tank bottom

7) Customer supplied brackets  
Recommended:  
1 bracket per 3 m length

SITRANS LG200 installation, dimensions in mm (inch)

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# Level Measurement

## Continuous level measurement - Guided wave radar transmitter

### SITRANS LG200

#### Technical specifications

##### Mode of operation

Measuring principle	Guided wave radar measurement
Measuring range	0.15 ... 22.5 m (0.5 ... 75 ft)

##### Output

mA analog output with HART digital signal	Optically isolated 4 ... 20 mA, 620 Ω max.
Output range	
• Analog	3.8 ... 20.5 mA usable
• Start-up current	4.0 mA
Diagnostic alarm	Adjustable 3.6 mA, 22 mA, HOLD
Digital communication	HART Version 5.x and multidrop compatible

##### Performance

	Reference Conditions 1.82 m (72") Coaxial Probe with water at +20 °C (70 °F) and CFD Threshold
Non-linearity	
• Coaxial/twin rod probes	< 0.1 % of probe length or 2.5 mm (0.1"), whichever is greater [(top 60 cm (24") of twin rod probes 30 mm (1.2"))]
• Single rod probes	< 0.3 % or 0.3" (8 mm), whichever is greater
• Interface models	Upper layer: ± 25.4 mm (1") Interface layer: ± 25.4 mm (1") (distinct interface surface required)
Resolution and repeatability	≤ 2.5 mm (0.1")
Accuracy	
• Coaxial/twin rod probes	< 0.1 % of probe length or 0.1" (2.5 mm), whichever is greater [Top 60 cm (24") of twin rod probes 30 mm (1.2")]
• Single rod probes	± 0.5 % of probe length or 0.5" (13 mm), whichever is greater
• Interface models	± 1" (25 mm) (distinct Interface required)
Electromagnetic compatibility	Meets CE requirements (EN 61326-1/2006) (Single and Twin Rod probes must be used in metallic vessel or stilling well to maintain CE compliance.)
• Response time	< 1 second
• Warm up time	< 5 seconds
• Temperature effects	+ 0.02 % of actual probe length/°C for probes ≥ 2.5 m (8 ft)

##### Rated operating conditions<sup>1)</sup>

Ambient temperature for enclosure	-40 ... +80 °C (-40 ... +176 °F)
LCD readable temperature range	-20 ... +70 °C (-5 ... +160 °F)
Location	Indoor/outdoor
Installation category	II
Pollution degree	2
Humidity	0-99 % (non condensing)

##### Medium conditions<sup>1)</sup>

Dielectric constant	dK ≥ 1.4
Process temperature range <sup>2)</sup>	-196 ... +427 °C (-321 ... +800 °F)
Vessel pressure <sup>3)</sup>	Full vacuum to 431 bar g (6250 psi g), probe dependent

##### Design

Weight of transmitter with solid lid	1.28 kg (2.83 lbs)
Weight of transmitter with glass window lid	1.60 kg (3.52 lbs)
Materials	
• Enclosure	Aluminum, epoxy-coated
• Degree of protection	Type 4/NEMA 4, IP65
• Cable inlet	2x M20x1.5 or 2 x ½" NPT
Process connections	
• Threaded	G ¾" [(BSPP), EN ISO 228-1], 1", 1½", 2" NPT [(Taper), ANSI/ASME B1.20.1] and G 2" [(BSPP), EN ISO 228-1]
• Flanged	3/4" ... 4", ASME, DIN flanges
• Hygienic	3/4" ... 4", Triclover

##### Programming

Local	Three button, menu-driven data entry with security passwords
Remote	SIMATIC PDM via HART
Power	11 ... 36 V DC

##### Certificates and approvals

General Purpose	CSA/FM, CE, C-TICK
Intrinsically Safe	FM Class I, Div. 1, Groups A, B, C, D, Class II, Div. 1, Groups E, F, G T4, Class III, Type 4, IP65 CSA Class I, Div. 1, Groups A, B, C, D, Class II, Div. 1, Groups E, F, G T4, Class III, Type 4, IP65 ATEX II 1G EEx ia IIC T4
Explosion Proof/Flame Proof	FM Class I, Div. 1, Groups B, C, D, Class II, Div. 1, Groups E, F, G T4, Class III, Type 4, IP65 CSA Class I, Div. 1, Groups B, C, D, Class II, Div. 1, Groups E, F, G T4, Class III, Type 4, IP65 ATEX II 1/2 G EEx d [ia] IIC T6 ATEX II 1/2 D IP65 T85 °C
Non-Incendive	FM Class I, Div. 2, Groups A, B, C, D, Class II, Div. 2, Groups F, G T4, Class III, Type 4, IP65 CSA Class I, Div. 2, Groups A, B, C, D, Class II, Div. 2, Groups E, F, G T4, Class III, Type 4, IP65
Non-Sparking	ATEX II 3G EEx nA (nL) IIC T4 to T6 ATEX II 3G EEx nA II T4 to T6
Others	<ul style="list-style-type: none"> <li>• Functional Safety to SIL-1 in accordance with IEC 61508 Safe Failure Fraction (SFF) of 85.5 % (Third party FMEDA Analysis - hardware only)</li> <li>• Functional Safety to SIL-2 in accordance with IEC 61508 Safe Failure Fraction (SFF) of 91 % (Third party FMEDA Analysis - hardware only)</li> <li>• Lloyds Steam Vessel Approval conforming to EN12952-11 &amp; EN12953-9</li> <li>• GOST R</li> </ul>

<sup>1)</sup> If installation is in areas classified as hazardous, please observe relevant certificates

<sup>2)</sup> Temperature rating is pressure dependent

<sup>3)</sup> Pressure rating is temperature dependent

# Level Measurement

## Continuous level measurement - Guided wave radar transmitter

SITRANS LG200

	Coaxial Probe (7ML1301-1)	Coaxial HT/HP Probe (7ML1301-2)	Coaxial HP Probe (7ML1301-3)	Coaxial Overfill/Flooded Cage Probe (7ML1301-4)
Model reference number	7xA-x	7xD-x	7xP-x	7xR-x
<b>Recommended applications</b>	General purpose: clean, low viscosity liquids < +150 °C (+300 °F)	Clean, high temperature/high pressure liquids > +200 °C (+400 °F); ammonia, chlorine, LNG <sup>1)</sup> , LPG <sup>1)</sup>	Clean, high pressure liquids < +200 °C (+400 °F), ammonia, chlorine, LNG, LPG	General applications, overfill, temperatures to +200 °C (+400 °F), clean, low viscosity liquids, displacer/torque-tube replacement
<b>Not recommended for:</b>	Coating and buildup, foam	Coating and buildup, foam, steam	Coating and buildup, foam, steam	Coating and buildup, foam
Materials/wetted parts	316 L SS, TFE spacers, O-ring <sup>2)</sup>	316L SS, Alumina spacers <sup>3)</sup> , (option PEEK <sup>4)</sup> or TFE <sup>5)</sup> , Borosilicate	316L SS, TFE spacers, Borosilicate	316L SS, TFE spacers, O-ring <sup>2)</sup>
Process seal	O-ring <sup>2)</sup>	Borosilicate (no O-ring)	Borosilicate (no O-ring)	O-ring <sup>2)</sup>
<b>Rod/tube diameter</b>				
Standard	ø 8 mm (0.3125") rod ø 22 mm (0.875") tube	ø 8 mm (0.3125") rod ø 22 mm (0.875") tube	ø 8 mm (0.3125") rod ø 22 mm (0.875") tube	ø 8 mm (0.3125") rod ø 22 mm (0.875") tube
Enlarged	ø 15 mm (0.63") rod ø 45 mm (1.75") tube	ø 15 mm (0.63") rod ø 45 mm (1.75") tube	ø 15 mm (0.63") rod ø 45 mm (1.75") tube	ø 15 mm (0.63") rod ø 45 mm (1.75") tube
Process connection thread				
Standard	¾" NPT [(Taper), ANSI/ASME B1.20.1], G 1" [(BSPP), EN ISO 228-1]	¾" NPT [(Taper), ANSI/ASME B1.20.1], G 1" [(BSPP), EN ISO 228-1]	¾" NPT [(Taper), ANSI/ASME B1.20.1], G 1" [(BSPP), EN ISO 228-1]	¾" NPT [(Taper), ANSI/ASME B1.20.1], G 1" [(BSPP), EN ISO 228-1]
Enlarged	2" NPT [(Taper), ANSI/ASME B1.20.1]	2" NPT [(Taper), ANSI/ASME B1.20.1]	2" NPT [(Taper), ANSI/ASME B1.20.1]	2" NPT [(Taper), ANSI/ASME B1.20.1]
<b>Flange ASME (EN/DIN)</b>				
Standard	1 ... 4" (DN 25 ... 100)	1 ... 4" (DN 25 ... 100)	1 ... 4" (DN 25 ... 100)	1 ... 4" (DN 25 ... 100)
Enlarged	2 ... 4" (DN 50 ... 100)	2 ... 4" (DN 50 ... 100)	2 ... 4" (DN 50 ... 100)	2 ... 4" (DN 50 ... 100)
Length	60 ... 610 cm (24 ... 240")	60 ... 610 cm (24 ... 240")	60 ... 610 cm (24 ... 240")	60 ... 610 cm (24 ... 240")
<b>Transition Zone<sup>6)</sup></b>				
Top	25 mm (1") at dk = 1.4 150 mm (6") at dk = 80	none	25 mm (1") at dk = 1.4 150 mm (6") at dk = 80	none
Bottom	150 mm (6") at dk = 1.4 25 mm (1") at dk = 80	150 mm (6") at dk = 1.4 25 mm (1") at dk = 80	150 mm (6") at dk = 1.4 25 mm (1") at dk = 80	150 mm (6") at dk = 1.4 25 mm (1") at dk = 80
Process temperature maximum	+150 °C at 27 bar g (+300 °F at 400 psi g)	+427 °C at 133 bar g (+800 °F at 2000 psi g) <sup>7)</sup>	+200 °C at 379 bar g (+400 °F at 5500 psi g)	+200 °C at 18 bar g (+400 °F at 270 psi g)
Process temperature minimum	-40 °C at 70 bar g (-40 °F at 1000 psi g)	-196 °C at 430 bar g (-321 °F at 6250 psi g)	-196 °C at 430 bar g (-321 °F at 6250 psi g)	-40 °C at 70 bar g (-40 °F at 1000 psi g)
Process pressure				
• Process pressure maximum	70 bar g at +20 °C (1000 psi g at +70 °F)	431 bar g at +20 °C (6250 psi g at +70 °F)	431 bar g at +20 °C (6250 psi g at +70 °F)	70 bar g at +20 °C (1000 psi g at +70 °F)
• Process pressure minimum/vacuum service	Yes, not hermetic <sup>8)</sup>	Yes, hermetic (<10 <sup>-8</sup> cc/sec at 1 atmosphere)	Yes, hermetic (<10 <sup>-8</sup> cc/sec at 1 atmosphere)	Yes, not hermetic
Dielectric range (dk)	1.4 ... 100	1.4 ... 100 <sup>1)</sup>	1.4 ... 100	1.4 ... 100
<b>Maximum viscosity (cP)</b>				
Standard	500	500	500	500
Enlarged	1500	1500	1500	1500
Coating/buildup	No	No	No	No
Foam	No	No	No	No
Corrosives	Yes	Yes	Yes	Yes
Sanitary	No	No	No	No
Overfill	No	Yes	No	Yes

1) Dependent on spacer option

2) See O-ring Selection Guide for guidance

3) For dk ≥ 2, maximum temperature +427 °C (+800 °F)

4) For dk ≥ 1.4, maximum temperature +343 °C (+650 °F), PEEK spacers standard on enlarged coaxial design

5) For dk 1.4, maximum temperature +288 °C (+550 °F)

6) Transition zone is dielectric dependent: dk = dielectric permittivity. Unit will function but accuracy will decrease in Transition Zone

7) +345 °C (+650 °F) with PEEK spacers

8) Not hermetic: sealing by means of O-ring. Hermetic: sealing by means of borosilicate glass window

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# Level Measurement

## Continuous level measurement - Guided wave radar transmitter

### SITRANS LG200

	<b>Coaxial Steam Probe (7ML1301-5)</b>	<b>Coaxial Interface Probe (7ML1301-6)</b>	<b>Single Rigid Rod Probe (7ML1303-1)</b>	<b>Single Rigid Rod HT/HP Probe (7ML1303-2)</b>	<b>Single Rigid Rod Probe, PFA rod insulation (7ML1303-1J)</b>
<b>Model reference number</b>	<b>7xS-x</b>	<b>7xT-x</b>	<b>7xF-x</b>	<b>7xJ-x</b>	<b>7xF-4</b>
<b>Recommended applications</b>	Hot water (steam) >+200 °C (+400 °F) (external chamber is required for use in boilers)	Liquid/liquid-interface, temperatures to +200 °C (+400 °F); clean, low-viscosity liquids	Coating and buildup, foam	Coating and buildup, foam	Excessive coating and buildup, foam
Not recommended for	General purpose, coating and buildup, foam	Coating and buildup, foam	Low dielectric media (dK < 10) <sup>1)</sup>	Low dielectric media (dK < 10) <sup>1)</sup>	Low dielectric media (dK < 10) <sup>1)</sup>
Materials/wetted parts	316L SS, PEEK spacers, Aegis PF128 O-ring <sup>2)</sup>	316L SS, TFE spacers, O-ring <sup>2)</sup>	316L SS, TFE, O-ring <sup>2)</sup>	316L SS, TFE, O-ring <sup>2)</sup>	316L SS, PFA, TFE, O-ring <sup>2)</sup>
Process seal	Aegis PF128 O-ring <sup>2)</sup> , PEEK only	O-ring <sup>2)</sup>	O-ring <sup>2)</sup>	Aegis PF128 O-ring only <sup>2)</sup>	O-ring <sup>2)</sup>
<b>Rod/Tube diameter</b>					
Standard	ø 8 mm (0.3125") rod ø 22 mm (0.875") tube	ø 8 mm (0.3125") rod ø 22 mm (0.875") tube	ø 12 mm (0.5") rod	ø 12 mm (0.5") rod	ø 12 mm (0.5") rod ø 16 mm (0.625") insulation
Enlarged	N/A	ø 15 mm (0.63") rod ø 45 mm (1.75") tube	N/A	N/A	N/A
Process connection thread					
Standard	¾" NPT [(Taper), ANSI/ASME B1.20.1], G 1" [(BSPP), EN ISO 228-1]	¾" NPT [(Taper), ANSI/ASME B1.20.1], G 1" [(BSPP), EN ISO 228-1]	¾" NPT [(Taper), ANSI/ASME B1.20.1], G 1" [(BSPP), EN ISO 228-1]	¾" NPT [(Taper), ANSI/ASME B1.20.1], G 1" [(BSPP), EN ISO 228-1]	2" NPT [(Taper), ANSI/ASME B1.20.1], G 2" [(BSPP), EN ISO 228-1]
Enlarged	N/A	2" NPT [(Taper), ANSI/ASME B1.20.1]	N/A	N/A	N/A
<b>Flange ASME (EN/DIN)</b>					
Standard	1 ... 4" (DN 25 ... 100)	1 ... 4" (DN 25 ... 100)	2 ... 4" (DN 50 ... 100)	2 ... 4" (DN 50 ... 100)	2 ... 4" (DN 50 ... 100)
Enlarged	N/A	2 ... 4" (DN 50 ... 100)	N/A	N/A	N/A
Length	60 ... 455 cm (24 ... 180")	60 ... 610 cm (24 ... 240")	60 ... 610 cm (24 ... 240")	60 ... 610 cm (24 ... 240")	60 ... 610 cm (24 ... 240")
<b>Transition Zone<sup>3)</sup></b>					
Top	25 mm (1") at dk ≥ 10	none	Application, installation, and dielectric dependent	Application, installation, and dielectric dependent	Application, installation, and dielectric dependent
Bottom	25 mm (1") at dk ≥ 10	150 mm (6") at dk = 1.4 25 mm (1") at dk = 80	25 mm (1") at dk >10	25 mm (1") at dk >10	25 mm (1") at dk >10
Process temperature maximum	+343 °C at 165 bar g (+650 °F at 2400 psi g) (saturated steam)	+200 °C at 18 bar g (+400 °F at 270 psi g)	+150 °C at 27 bar g (+300 °F at 400 psi g)	+316 °C at 165 bar g (+605 °F at 2400 psi g)	+150 °C at 27 bar g (+300 °F at 400 psi g)
Process temperature minimum	-40 °C at 207 bar g (-40 °F at 3000 psi g)	-40 °C at 70 bar g (-40 °F at 1000 psi g)	-40 °C at 70 bar g (-40 °F at 1000 psi g)	-40 °C at 70 bar g (-40 °F at 1000 psi g)	-40 °C at 50 bar g (-40 °F at 750 psi g)
Process pressure maximum	165 bar g at +343 °C (2400 psi g at +650 °F)	70 bar g at +20 °C (1000 psi g at +70 °F)	70 bar g at +20 °C (1000 psi g at +70 °F)	207 bar g at +20 °C (3000 psi g at +70 °F)	70 bar g at +20 °C (1000 psi g at +70 °F)
Process pressure min. vacuum service	Yes, not hermetic	Yes, not hermetic	Not suitable	Not suitable	Not suitable
Dielectric range	10 ... 100	Upper liquid layer 1.4 ... 5, Interface liquid layer 15 ... 100	1.9 ... 100 <sup>1)</sup>	1.9 ... 100 <sup>1)</sup>	1.9 ... 100 <sup>1)</sup>
<b>Maximum viscosity</b>					
Standard	500 cP	500 cP	10000 cP (consult factory if severe agitation/turbulence)		
Enlarged	N/A	1500 cP			
Coating/buildup	No	No	Yes, maximum error 10 % of coated length; % error related to dielectric of media, thickness of coating and coated probe length above media		
Foam	No	No	Yes	Yes	Yes
Corrosives	Yes	Yes	Yes	Yes	Yes
Sanitary	No	No	No	No	No
Overfill	Yes	Yes	No	No	No

<sup>1)</sup> With dK of 1.9 to 10, the device must be mounted between 50 and 150 mm (2 and 6") of metal tank wall or in chamber/bridle

<sup>2)</sup> See O-ring Selection Guide for guidance

<sup>3)</sup> Transition zone is dielectric dependent: dK = dielectric permittivity. Unit will function but accuracy will decrease in Transition Zone

# Level Measurement

## Continuous level measurement - Guided wave radar transmitter

SITRANS LG200

Model reference number	Single Rigid Rod Probe, Sanitary (7ML1303-1D) 7xF-E	Single Rigid Rod Probe, PFA faced flange(7ML1303-1E) 7xF-F	Single Flexible Rod Probe (7ML1304-1) 7x1-x	Single Flexible Rod Probe for Bulk Solids (7ML1304-2) 7x2-x
<b>Recommended applications</b>	Applications demanding sanitary specifications	Extreme corrosives, coating/buildup, foam	Coating and buildup, foam; lengths > 6 m (20 ft) head-room	Granular bulk solids applications (powders, grain, dust) 3000 lb pull down force
<b>Not recommended for</b>	Low dielectric media (dK < 10) <sup>1)</sup>	Low dielectric media (dK < 10) <sup>1)</sup>	Low dielectric media (dK < 4)	Solids with dK < 4
Materials/wetted parts	316L SS, TFE, 15 µ-inch (<0.4 µm) R <sub>a</sub>	All PFA - wetted surfaces	316L SS, TFE, O-ring <sup>2)</sup>	316L SS, TFE, O-ring <sup>2)</sup>
Optional	AL6XN SS	N/A	N/A	N/A
Process seal	316L SS, TFE, O-ring <sup>2)</sup>	PFA, no O-ring	O-ring <sup>2)</sup>	Sealant
<b>Rod/Tube diameter</b>	ø 12 mm (0.5") rod	ø 12 mm (0.5") rod ø 16 mm (0.625") insulation	ø 5 mm (0.188") cable	ø 6 mm (0.25") cable
Process connection thread	N/A	N/A	2" NPT [(Taper), ANSI/ASME B1.20.1], G 2" [(BSPP), EN ISO 228-1]	2" NPT [(Taper), ANSI/ASME B1.20.1], G 2" [(BSPP), EN ISO 228-1]
Flange ASME (DIN)	19 ... 100 mm (¾ ... 4") Triclover-style 16 amp fitting	2 ... 4" (DN 50 ... 100)	2 ... 4" (DN 50 ... 100)	2 ... 4" (DN 50 ... 100)
Length	60 ... 610 cm (24 ... 240")	60 ... 610 cm (24 ... 240")	1 ... 22.5 meters (3 ... 75 ft)	1 ... 22.5 meters (3 ... 75 ft)
<b>Transition Zone<sup>3)</sup></b>				
Top	Application, installation, and dielectric dependent	Application, installation, and dielectric dependent	Application, installation, and dielectric dependent	Application, installation, and dielectric dependent
Bottom	25 mm (1") at dk >10	25 mm (1") at dk >10	305 mm (12")	305 mm (12")
Process temperature maximum	+150 °C at 5.1 bar g (+300 °F at 75 psi g)	+150 °C at 27 bar g (+300 °F at 400 psi g)	+150 °C at 27 bar g (+300 °F at 400 psi g)	+66 °C at 3.4 bar g (+150 °F at 50 psi g)
Process temperature minimum	0 °C at 5.1 bar g (+32 °F at 75 psi g)	-40 °C at 13.7 bar g (-40 °F at 200 psi g)	-40 °C at 70 bar g (-40 °F at 1000 psi g)	-40 °C at 3.4 bar g (-40 °F at 50 psi g)
Process pressure:				
• Process pressure maximum	5.1 bar g at +150 °C (75 psi g at +300 °F)	70 bar g at +20 °C (1000 psi g at +70 °F)	70 bar g at +20 °C (1000 psi g at +70 °F)	3.4 bar g +66 °C (50 psi g at +150 °F)
• Process pressure minimum/vacuum service		Not suitable for vacuum applications		
Dielectric range	1.9 ... 100 <sup>1)</sup>	1.9 ... 100 <sup>1)</sup>	4 ... 100 <sup>1)</sup>	4 ... 100
Maximum viscosity (cP)	10000 (consult factory if severe agitation/turbulence)			N/A
Coating/buildup	Yes, maximum error 10 % of coated length; % error related to dielectric of media, thickness of coating and coated probe length above media			
Foam	Yes	Yes	Yes	Yes
Corrosives	No	Yes	No	No
Sanitary	Yes	No	No	No
Overfill	No	No	No	No

<sup>1)</sup> With dK of 1.9 to 10, the device must be mounted between 50 and 150 mm (2 and 6") of metal tank wall or in chamber/bridle

<sup>2)</sup> See O-ring Selection Guide for guidance

<sup>3)</sup> Transition zone is dielectric dependent: dK = dielectric permittivity. Unit will function but accuracy will decrease in Transition Zone

# Level Measurement

## Continuous level measurement - Guided wave radar transmitter

### SITRANS LG200

	<b>Twin Rod Probe (7ML1302-1)</b>	<b>Flexible Twin Rod Probe (7ML1302-3)</b>	<b>Flexible Twin Rod Bulk Solids Probe (7ML1302-2)</b>
<b>Model reference number</b>	<b>7xB-x</b>	<b>7x7-x</b>	<b>7x5-x</b>
<b>Recommended applications</b>	General purpose, foam, minor film coating	Low dielectric media (1.9 ... 10) with lengths > 6 m (20 ft)	Granular light bulk solids applications (powders, grains, dust), 3000 lbs pull-down force
<b>Not recommended for</b>	Media bridging between rods or building up on spacers	Dielectric > 10: media bridging on flexible elements	Media bridging on flexible elements
Materials/wetted parts	316L SS, TFE spacers, O-ring <sup>1)</sup>	316L SS, FEP webbing, O-ring <sup>1)</sup>	316L SS, FEP webbing, O-ring <sup>1)</sup>
Process seal	O-ring <sup>1)</sup>	O-ring <sup>1)</sup>	Sealant
<b>Rod/Tube diameter</b>	Two, ø 12 mm (0.5") rod; 22 mm (0.875") C <sub>L</sub> to C <sub>L</sub>	Two, ø 6 mm (0.25") cables; 22 mm (0.875") C <sub>L</sub> to C <sub>L</sub>	Two, ø 6 mm (0.25") cables; 22 mm (0.875") C <sub>L</sub> to C <sub>L</sub>
Process connection thread	2" NPT [(Taper), ANSI/ASME B1.20.1], G 2" [(BSPP), EN ISO 228-1]	2" NPT [(Taper), ANSI/ASME B1.20.1], G 2" [(BSPP), EN ISO 228-1]	2" NPT [(Taper), ANSI/ASME B1.20.1], G 2" [(BSPP), EN ISO 228-1]
Flange ASME (EN/DIN)	2 ... 4" (DN 50 ... 100)	2 ... 4" (DN 50 ... 100)	2 ... 4" (DN 50 ... 100)
Length	60 ... 610 cm (24 ... 240")	1 ... 22.5 m (3 ... 75 ft)	1 ... 22.5 m (3 ... 75 ft)
<b>Transition Zone<sup>2)</sup></b>			
Top	150 mm (6") at dK > 1.9 Blocking distance: none	150 mm (6") at dK > 1.9 Blocking distance: 12 ... 50 cm (4.8 ... 20")	150 mm (6") at dK > 1.9 Blocking distance: 12 ... 50 cm (4.8 ... 20")
Bottom	150 mm (6") at dK = 1.9 25 mm (1") at dK = 80	305 mm (12")	305 mm (12")
Process temperature max. <sup>3)</sup>	+200 °C at 19 bar g (+400 °F at 275 psi g)		+66 °C at 3.4 bar g (+ 150 °F at 50 psi g)
Process temperature min.	-40 °C at 70 bar g (-40 °F at 1000 psi g)		-40 °C at 3.4 bar g (-40 °F at 50 psi g)
Process pressure max.	70 bar g at +20 °C (1000 psi g at +70 °F)		3.4 bar g at +66 °C (50 psi g at + 150 °F)
Process pressure min./vacuum service	Yes, not hermetic		Not suitable
Dielectric range	1.9 ... 100	1.9 ... 100	1.9 ... 100
Maximum viscosity (cP)	1500	1500	Not suitable
Coating/buildup	Yes, maximum error 3 % of coated length with conductive media Bridging not recommended. <sup>4)</sup>		
Foam	Yes	Yes	Yes
Corrosives	Yes	No	Yes
Sanitary	No	No	No
Overfill	No	No	No

<sup>1)</sup> See O-ring Selection Guide for guidance

<sup>2)</sup> Transition zone is dielectric dependent: dK = dielectric permittivity. Unit will function but accuracy will decrease in Transition Zone

<sup>3)</sup> Refer to Ambient Temperature vs Process Temperature graphs or instruction manual

<sup>4)</sup> Bridging is defined as continuous accumulation of material between the probe elements

#### O-ring and Seal Selection Guide

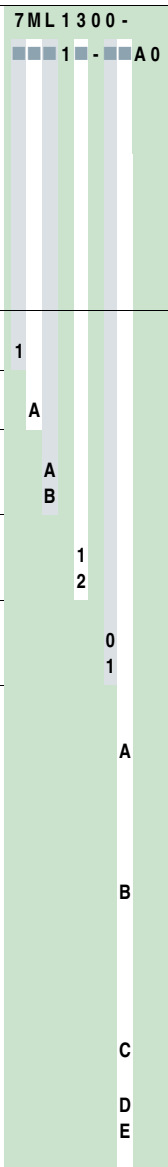
Material	Recommended for Use in:	Not Recommended for Use In:
<b>Viton GFLT</b>	General purpose, steam, ethylene	Ketones (MEK, acetone), skydrol fluids, amines, anhydrous ammonia, low molecular weight esters and ethers, hot hydrofluoric or chlorosulfuric acids, sour HCs
<b>EPDM</b>	Acetone, MEK, skydrol fluids	Petroleum oils, di-ester base lubricants, propane, steam, anhydrous ammonia
<b>Kalrez (4079)</b>	Inorganic and organic acids (including HF and nitric) aldehydes, ethylene, glycols, organic oils, silicone oils, vinegar, sour HCs	Black liquor, hot water/steam, hot aliphatic amines, ethylene oxide, propylene oxide, molten sodium, molten potassium, anhydrous ammonia
<b>Aegis PF128</b>	Inorganic and organic acids (including HF and nitric) aldehydes, ethylene, glycols, organic oils, silicone oils, vinegar, sour HCs, steam, amines, ethylene oxide, propylene oxide	Black liquor, Freon 43, Freon 75, Galden, KEL-F liquid, molten sodium, molten potassium, anhydrous ammonia
<b>Borosilicate (HT/HP probes only)</b>	General high temperature/high pressure applications, hydrocarbons, full vacuum (hermetic), anhydrous ammonia	Steam, hot alkaline solutions, HF acid, media with pH>12, condensate



# Level Measurement

## Continuous level measurement - Guided wave radar transmitters

SITRANS LG200

Selection and Ordering data	Order No.	Selection and Ordering data	Order code
<b>SITRANS LG200 Transmitter</b> A guided wave radar transmitter for short and medium range level, level/interface, and volume measurement of liquids and solids, including high temperature and pressure applications, and steam.  <b>Note:</b> <b>In addition to the transmitter, please select a probe configuration to complete the SITRANS LG200 (ordered separately).</b> <b>For orders of 10 or more, please consult factory.</b>	C) <b>7ML1300-</b> 	<b>Further designs</b> Please add <b>"-Z"</b> to Order No. and specify Order code(s).  Acceptance test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and ISO 9000 [Available only when ordered in conjunction with a probe (7ML130x-x). Testing requires transmitter with probe.]	<b>C11</b>
<b>Power</b> 24 V DC, 2-wire	1	<b>Operating Instructions</b> English French German  Multi-language Quick Start manual This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	Order No. C) <b>7ML1998-5KA01</b> C) <b>7ML1998-5KA11</b> C) <b>7ML1998-5KA31</b> C) <b>7ML1998-5XG81</b>
<b>Signal Output</b> 4 ... 20 mA HART	A	<b>Accessories</b> SITRANS RD100 Remote display - see Chapter 8 SITRANS RD200 Remote display - see Chapter 8 SITRANS RD500 Remote display - see Chapter 8  C) Subject to export regulations AL: N, ECCN: EAR99	
<b>Options</b> SIL-1 Approved (FMEDA analysis) SFF = 85.5 % SIL-2 Approved (FMEDA analysis) SFF = 91 %	A B		
<b>Enclosure/lid</b> Aluminum Aluminum with glass window	1 2		
<b>Cable inlet</b> 2 x ½" NPT, IP65 2 x M20x1.5, IP65	0 1		
<b>Approvals (Please select for your region)</b> <b>North America</b> General Purpose and Intrinsically Safe (CSA/FM Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G T4, Class III); Non-incendive (CSA Class I, Div. 2, Groups A, B, C, D, Class II, Div. 2, Groups E, F, G; FM Class I, Div. 2, Groups A, B, C, D, Class II, Div. 2, Groups F, G)  Explosion Proof (CSA/FM Class I, Div. 1, Groups B, C, and D; Class II, Div. 1, Groups E, F, G, T4; Class III); Non-incendive (CSA Class I, Div. 2, Groups A, B, C, D, Class II, Div. 2, Groups E, F, G; FM Class I, Div. 2, Groups A, B, C, D, Class II, Div. 2, Groups F, G)	A B		
<b>Europe</b> General Purpose and Intrinsically Safe (ATEX II 1G EEx ia IIC T4)  Explosion Proof (ATEX II 1/2 GD EEx d [ia] IIC T6) Non-sparking [ATEX II 3G EEx nA II/EEx nA (nL) IIC T4 to T6]	C D E		
C) Subject to export regulations AL: N, ECCN: EAR99			



# Level Measurement

## Continuous level measurement - Guided wave radar transmitters

### SITRANS LG200

Selection and Ordering data	Order No.
<b>SITRANS LG200 Coaxial Probes</b>	R) <b>7ML1301-</b>
SITRANS LG200 coaxial probes are used in most standard applications. Coaxial probes yield robust signal strength even in extremely low dielectric applications (dK 1.4 ... 100).	
<b>Note:</b>	
<b>In addition to the probe, please select a transmitter configuration to complete the SITRANS LG200 (ordered separately).</b>	
<b>For orders of 10 or more, please consult factory.</b>	
<b>Model</b>	
Coaxial <sup>1) 2)</sup>	1
Coaxial, High Temperature/High Pressure <sup>2) 3)</sup>	2
Coaxial, High Pressure <sup>2) 3)</sup>	3
Coaxial, Overfill/Flooded Cage <sup>1) 2)</sup>	4
Coaxial Steam <sup>4) 5)</sup>	5
Coaxial, Interface <sup>1) 2)</sup>	6
<b>Material of Construction</b>	
316/316L (1.4401/1.4404) stainless steel probe and process connection	A
316/316L (1.4401/1.4404) SS probe ASME B31.1 specifications <sup>6)</sup>	D
Enlarged Coaxial, 316/316L (1.4401/1.4404) stainless steel probe and process connection with PEEK Spacers <sup>7)</sup>	E
316/316L (1.4401/1.4404) stainless steel probe and process connection with PEEK HT spacers dk ≥ 1.4 <sup>8)</sup>	H
316/316L (1.4401/1.4404) stainless steel probe and process connection with Teflon <sup>®</sup> spacers dk ≥ 2 <sup>8) 9)</sup>	J
<b>Probe Insertion Length</b>	
<u>Add order code Y01 and plain text:</u> "Insertion length ... mm"	
Model option 1, 4 and Material of Construction option A, E: 60 ... 100 cm (23.6 ... 39.4")	A 1
Model option 1, 4 and Material of Construction option A, E: 101 ... 200 cm (39.8 ... 78.7")	A 2
Model option 1, 4 and Material of Construction option A, E: 201 ... 300 cm (79.1 ... 118.1")	A 3
Model option 1, 4 and Material of Construction option A, E: 301 ... 400 cm (118.5 ... 157.5")	A 4
Model option 1, 4 and Material of Construction option A, E: 401 ... 500 cm (157.9 ... 196.9")	A 5
Model option 1, 4 and Material of Construction option A,E: 501 ... 610 cm (197.2 ... 240.2")	A 6
<u>Add order code Y01 and plain text:</u> "Insertion length ... cm"	
Model options 3, 6 with Material of Construction option A: 60 ... 100 cm (23.6 ... 39.4")	B 1
Model options 3, 6 with Material of Construction option A: 101 ... 200 cm (39.8 ... 78.7")	B 2
Model options 3, 6 with Material of Construction option A: 201 ... 300 cm (79.1 ... 118.1")	B 3
Model options 3, 6 with Material of Construction option A: 301 ... 400 cm (118.5 ... 157.5")	B 4
Model options 3, 6 with Material of Construction option A: 401 ... 500 cm (157.9 ... 196.9")	B 5
Model options 3, 6 with Material of Construction option A: 501 ... 610 cm (197.2 ... 240.2")	B 6
<u>Add order code Y01 and plain text:</u> "Insertion length ... cm"	
Model options 3, 6 with Material of Construction option E: 60 ... 100 cm (23.6 ... 39.4")	C 1
Model options 3, 6 with Material of Construction option E: 101 ... 200 cm (39.8 ... 78.7")	C 2
Model options 3, 6 with Material of Construction option E: 201 ... 300 cm (79.1 ... 118.1")	C 3
Model options 3, 6 with Material of Construction option E: 301 ... 400 cm (118.5 ... 157.5")	C 4

Selection and Ordering data	Order No.
<b>SITRANS LG200 Coaxial Probes</b>	R) <b>7ML1301-</b>
SITRANS LG200 coaxial probes are used in most standard applications. Coaxial probes yield robust signal strength even in extremely low dielectric applications (dK 1.4 ... 100).	
Model options 3, 6 with Material of Construction option E: 401 ... 500 cm (157.9 ... 196.9")	C 5
Model options 3, 6 with Material of Construction option E: 501 ... 610 cm (197.2 ... 240.2")	C 6
<u>Add order code Y01 and plain text:</u> "Insertion length ... cm"	
Model option 2 with Material of Construction options A, E, H, J: 60 ... 100 cm (23.6 ... 39.4")	E 1
Model option 2 with Material of Construction options A, E, H, J: 101 ... 200 cm (39.8 ... 78.7")	E 2
Model option 2 with Material of Construction options A, E, H, J: 201 ... 300 cm (79.1 ... 118.1")	E 3
Model option 2 with Material of Construction options A, E, H, J: 301 ... 400 cm (118.5 ... 157.5")	E 4
Model option 2 with Material of Construction options A, E, H, J: 401 ... 500 cm (157.9 ... 196.9")	E 5
Model option 2 with Material of Construction options A, E, H, J: 501 ... 610 cm (197.2 ... 240.2")	E 6
<u>Add order code Y01 and plain text:</u> "Insertion length ... cm"	
Model option 5 with Material of Construction options A, D: 60 ... 100 cm (23.6 ... 39.4")	F 1
Model option 5 with Material of Construction options A, D: 101 ... 200 cm (39.8 ... 78.7")	F 2
Model option 5 with Material of Construction options A, D: 201 ... 300 cm (79.1 ... 118.1")	F 3
Model option 5 with Material of Construction options A, D: 301 ... 400 cm (118.5 ... 157.5")	F 4
Model option 5 with Material of Construction options A, D: 401 ... 455 cm (157.9 ... 180")	F 5
<b>O-rings</b>	
Viton	1 1
EPDM (Ethylene Propylene Rubber)	1 2
Kalrez 4079	1 3
HSN (Nitrile)	1 4
Buna-N	1 5
Neoprene	1 6
Chemraz	1 7
Polyurethane	1 8
Aegis PF128	2 1
Kalrez 2035	2 2
None (Borosilicate glass seal, not for steam applications) <sup>10)</sup>	2 3
<b>Process Connection (Size/Type)</b>	
<u>Threaded</u>	
¾" NPT [(Taper), ANSI/ASME B1.20.1]	AA
G 1" [(BSPP), EN ISO 228-1]	AB
G 2" [(BSPP), EN ISO 228-1] <sup>11)</sup>	AC
2" NPT [(Taper), ANSI/ASME B1.20.1] <sup>11)</sup>	AD
<u>ASME flanges</u>	
1" 150 lb ASME raised face flange	BA
1" 300 lb ASME raised face flange	BB
1" 600 lb ASME raised face flange	BC
1" 900/1500 lb ASME raised face flange <sup>10)</sup>	BD
1" 2500 lb ASME raised face flange <sup>10)</sup>	BE
1" 900/1500 lb ASME ring joint flange <sup>10)</sup>	BF
1" 2500 lb ASME ring joint flange <sup>10)</sup>	BG
1½" 150 lb ASME raised face flange	CA
1½" 300 lb ASME raised face flange	CB
1½" 600 lb ASME raised face flange	CC
1½" 900/1500 lb ASME raised face flange <sup>10)</sup>	CD
1½" 2500 lb ASME raised face flange <sup>10)</sup>	CE

Selection and Ordering data	Order No.	Selection and Ordering data	Order No.
<b>SITRANS LG200 Coaxial Probes</b>	R) <b>7ML1301-</b>	<b>SITRANS LG200 Coaxial Probes</b>	R) <b>7ML1301-</b>
SITRANS LG200 coaxial probes are used in most standard applications. Coaxial probes yield robust signal strength even in extremely low dielectric applications (dK 1.4 ... 100).		SITRANS LG200 coaxial probes are used in most standard applications. Coaxial probes yield robust signal strength even in extremely low dielectric applications (dK 1.4 ... 100).	
1½" 600 lb ASME ring joint flange	<b>CF</b>	DN 50 PN 64 EN 1092-1	<b>JC</b>
1½" 900/1500 lb ASME ring joint flange <sup>10)</sup>	<b>CG</b>	Type B1 raised faced flange	
1½" 2500 lb ASME ring joint flange <sup>10)</sup>	<b>CH</b>	DN 50 PN 100 EN 1092-1	<b>JD</b>
2" 150 lb ASME raised face flange	<b>DA</b>	Type B1 raised faced flange	
2" 300 lb ASME raised face flange	<b>DB</b>	DN 50 PN 160 EN 1092-1	<b>JE</b>
2" 600 lb ASME raised face flange	<b>DC</b>	Type B1 raised faced flange <sup>10)</sup>	
2" 900/1500 lb ASME raised face flange <sup>10)</sup>	<b>DD</b>	DN 50 PN 250 EN 1092-1	<b>JF</b>
2" 2500 lb ASME raised face flange <sup>10)</sup>	<b>DE</b>	Type B1 raised faced flange <sup>10)</sup>	
2" 600 lb ASME ring joint flange	<b>DF</b>	DN 50 PN 320 EN 1092-1	<b>JG</b>
2" 900/1500 lb ASME ring joint flange <sup>10)</sup>	<b>DG</b>	Type B1 raised faced flange <sup>10)</sup>	
2" 2500 lb ASME ring joint flange <sup>10)</sup>	<b>DH</b>	DN 50 PN 400 EN 1092-1	<b>JH</b>
3" 150 lb ASME raised face flange	<b>EA</b>	Type B1 raised faced flange <sup>10)</sup>	
3" 300 lb ASME raised face flange	<b>EB</b>	DN 80 PN 16 EN 1092-1 Type A flat faced flange	<b>KA</b>
3" 600 lb ASME raised face flange	<b>EC</b>	DN 80 PN 25/40 EN 1092-1	<b>KB</b>
3" 900 lb ASME raised face flange <sup>10)</sup>	<b>ED</b>	Type A flat faced flange	
3" 1500 lb ASME raised face flange <sup>10)</sup>	<b>EE</b>	DN 80 PN 64 EN 1092-1	<b>KC</b>
3" 2500 lb ASME raised face flange <sup>10)</sup>	<b>EF</b>	Type B1 raised faced flange	
3" 600 lb ASME ring joint flange	<b>EG</b>	DN 80 PN 100 EN 1092-1	<b>KD</b>
3" 900 lb ASME ring joint flange <sup>10)</sup>	<b>EH</b>	Type B1 raised faced flange	
3" 1500 lb ASME ring joint flange <sup>10)</sup>	<b>EJ</b>	DN 80 PN 160 EN 1092-1	<b>KE</b>
3" 2500 lb ASME ring joint flange <sup>10)</sup>	<b>EK</b>	Type B1 raised faced flange <sup>10)</sup>	
4" 150 lb ASME raised face flange	<b>FA</b>	DN 80 PN 250 EN 1092-1	<b>KF</b>
4" 300 lb ASME raised face flange	<b>FB</b>	Type B1 raised faced flange <sup>10)</sup>	
4" 600 lb ASME raised face flange	<b>FC</b>	DN 80 PN 320 EN 1092-1	<b>KG</b>
4" 900 lb ASME raised face flange <sup>10)</sup>	<b>FD</b>	Type B1 raised faced flange <sup>10)</sup>	
4" 1500 lb ASME raised face flange <sup>10)</sup>	<b>FE</b>	DN 80 PN 400 EN 1092-1	<b>KH</b>
4" 2500 lb ASME raised face flange <sup>10)</sup>	<b>FF</b>	Type B1 raised faced flange <sup>10)</sup>	
4" 600 lb ASME ring type joint flange	<b>FG</b>	DN 80 PN 16 EN 1092-1 Type A flat faced flange	<b>LA</b>
4" 900 lb ASME ring type joint flange <sup>10)</sup>	<b>FH</b>	DN 100 PN 25/40 EN 1092-1	<b>LB</b>
4" 1500 lb ASME ring type joint flange <sup>10)</sup>	<b>FJ</b>	Type A flat faced flange	
4" 2500 lb ASME ring type joint flange <sup>10)</sup>	<b>FK</b>	DN 100 PN 64 EN 1092-1	<b>LC</b>
<b>EN flanges</b>		Type B1 raised faced flange	
DN 25 PN 16 EN 1092-1 Type A flat faced flange	<b>GA</b>	DN 100 PN 100 EN 1092-1	<b>LD</b>
DN 25 PN 25/40 EN 1092-1	<b>GB</b>	Type B1 raised faced flange	
Type A flat faced flange		DN 100 PN 160 EN 1092-1	<b>LE</b>
DN 25 PN 64/100 EN 1092-1	<b>GC</b>	Type B1 raised faced flange <sup>10)</sup>	
Type B1 raised faced flange		DN 100 PN 250 EN 1092-1	<b>LF</b>
DN 25 PN 160 EN 1092-1	<b>GD</b>	Type B1 raised faced flange <sup>10)</sup>	
Type B1 raised faced flange <sup>10)</sup>		DN 100 PN 320 EN 1092-1	<b>LG</b>
DN 25 PN 250 EN 1092-1	<b>GE</b>	Type B1 raised faced flange <sup>10)</sup>	
Type B1 raised faced flange <sup>10)</sup>		DN 100 PN 400 EN 1092-1	<b>LH</b>
DN 25 PN 320 EN 1092-1	<b>GF</b>	Type B1 raised faced flange <sup>10)</sup>	
Type B1 raised faced flange <sup>10)</sup>		Fisher torque tube flange, carbon steel (249B)	<b>MA</b>
DN 25 PN 400 EN 1092-1	<b>GG</b>	Fisher torque tube flange, 316 stainless steel (249C)	<b>MB</b>
Type B1 raised faced flange <sup>10)</sup>		Masoniilan torque tube flange, carbon steel	<b>MC</b>
DN 40 PN 16 EN 1092-1 Type A flat faced flange	<b>HA</b>	Masoniilan torque tube flange, 316 stainless steel	<b>MD</b>
DN 40 PN 25/40 EN 1092-1	<b>HB</b>		
Type A flat faced flange			
DN 40 PN 64/100 EN 1092-1	<b>HC</b>		
Type B1 raised faced flange			
DN 40 PN 160 EN 1092-1	<b>HD</b>		
Type B1 raised faced flange <sup>10)</sup>			
DN 40 PN 250 EN 1092-1	<b>HE</b>		
Type B1 raised faced flange <sup>10)</sup>			
DN 40 PN 320 EN 1092-1 Type B1 raised faced flange <sup>10)</sup>	<b>HF</b>		
DN 40 PN 400 EN 1092-1	<b>HG</b>		
Type B1 raised faced flange <sup>10)</sup>			
DN 50 PN 16 EN 1092-1 Type A flat faced flange	<b>JA</b>		
DN 50 PN 25/40 EN 1092-1	<b>JB</b>		
Type A flat faced flange			

- 1) Not available with O-ring option 21 (type Aegis PF128)
- 2) Consult factory for these options in Hastelloy C or Monel
- 3) Available with O-ring option 23 only (none)
- 4) Coaxial steam probe must be used with O-ring option 21 only ( type Aegis PF128)
- 5) Available with Material of Construction option A and D only [316/316L (1.4401/1.4404) stainless steel]
- 6) Available with Model option 5 only (coaxial steam probe)
- 7) 2" or DN 50 minimum Process Connection and available with PEEK Spacers for temperature maximum +345 °C (+650 °F)
- 8) Used with Model option 2 only (coaxial High Temperature/High Pressure probe)
- 9) Process temperature maximum +345 °C (+650 °F)
- 10) Available with model options 2, 3, and 5 only (High Temperature/High Pressure, High Pressure, and Steam probes only)
- 11) Available with Material of Construction option E only (enlarged coaxial probe)

R) Subject to export regulations AL: N, ECCN: EAR99I

# Level Measurement

## Continuous level measurement - Guided wave radar transmitters

### SITRANS LG200

Selection and Ordering data	Order code
<b>Further designs</b>	
Please add <b>"-Z"</b> to Order No. and specify Order code(s).	
Enter the total insertion length in plain text description, max. 610 cm (240.2")	<b>Y01</b>
Stainless steel tag. Measuring-point number/identification (max. 16 characters); specify in plain text	<b>Y15</b>
Inspection Certificate Type 3.1 per EN 10204	<b>C12</b>
Manufacturer's test report (Hydrostatic Test)	<b>C18</b>
NACE MR-0175 materials traceability	<b>D07</b>
<b>Operating Instructions</b>	
English	C) <b>7ML1998-5KA01</b>
French	C) <b>7ML1998-5KA11</b>
German	C) <b>7ML1998-5KA31</b>
Multi-language Quick Start manual This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	C) <b>7ML1998-5XG81</b>
<b>Accessories</b>	
Coaxial probe shortening kit with TFE end spacer [for process temperatures < +200 °C (+400 °F)]	C) <b>A5E02455728</b>
Coaxial probe TFE end spacer [for process temperatures < +200 °C (+400 °F)]	C) <b>A5E02479158</b>
SITRANS RD100 Remote display - see Chapter 8	
SITRANS RD200 Remote display - see Chapter 8	
SITRANS RD500 Remote display - see Chapter 8	
C) Subject to export regulations AL: N, ECCN: EAR99	

## Continuous level measurement - Guided wave radar transmitters

SITRANS LG200

Selection and Ordering data	Order No.	Selection and Ordering data	Order No.
<b>SITRANS LG200 Twin Rod Probes</b>	R) 7ML1302-	<b>SITRANS LG200 Twin Rod Probes</b>	R) 7ML1302-
SITRANS LG200 twin rod probes are used in applications where coating and buildup are possible. Used in application with dielectric constant $\geq 1.9$ .		SITRANS LG200 twin rod probes are used in applications where coating and buildup are possible. Used in application with dielectric constant $\geq 1.9$ .	
<b>Note:</b> <b>In addition to the probe, please select a transmitter configuration to complete the SITRANS LG200 (ordered separately).</b> <b>For orders of 10 or more, please consult factory.</b>		Model option 1 and Material of Construction option A: 301 ... 400 cm (118.5 ... 157.5")	AD
<b>Model</b>		Model option 1 and Material of Construction option A: 401 ... 500 cm (157.9 ... 196.9")	AE
Twin rod	1	Model option 1 and Material of Construction option A: 501 ... 610 cm (197.2 ... 240.2")	AF
Flexible twin rod bulk solids probe <sup>1)</sup>	2	<u>Standard lengths<sup>2)</sup></u>	EA
Flexible twin rod probe	3	Model option 2,3 and Material of Construction option A: 1 m (39.4") <sup>2)</sup>	EB
<b>Material of Construction</b>		Model option 2,3 and Material of Construction option A: 2 m (78.7") <sup>2)</sup>	EC
316/316L (1.4401/1.4404) stainless steel probe and process connection	A	Model option 2,3 and Material of Construction option A: 3 m (118.1") <sup>2)</sup>	ED
<b>Process Connection (size/type)</b>		Model option 2,3 and Material of Construction option A: 4 m (157.5") <sup>2)</sup>	EE
2" NPT [(Taper), ANSI/ASME B1.20.1]	A 1	Model option 2,3 and Material of Construction option A: 5 m (196.9") <sup>2)</sup>	EF
G 2" [(BSPP), EN ISO 228-1]	A 2	Model option 2,3 and Material of Construction option A: 6 m (236.2") <sup>2)</sup>	EG
2" 150 lb ASME raised face flange	A 3	Model option 2,3 and Material of Construction option A: 7 m (275.6") <sup>2)</sup>	EH
2" 300 lb ASME raised face flange	B 1	Model option 2,3 and Material of Construction option A: 8 m (315.0") <sup>2)</sup>	EJ
3" 150 lb ASME raised face flange	B 2	Model option 2,3 and Material of Construction option A: 9 m (354.3") <sup>2)</sup>	EK
2" 600 lb ASME raised face flange	B 3	Model option 2,3 and Material of Construction option A: 10 m (393.7") <sup>2)</sup>	EL
3" 300 lb ASME raised face flange	C 1	Model option 2,3 and Material of Construction option A: 11 m (433.1") <sup>2)</sup>	EM
4" 150 lb ASME raised face flange	C 2	Model option 2,3 and Material of Construction option A: 12 m (472.4") <sup>2)</sup>	EN
3" 600 lb ASME raised face flange	C 3	Model option 2,3 and Material of Construction option A: 13 m (511.8") <sup>2)</sup>	EP
4" 300 lb ASME raised face flange	D 1	Model option 2,3 and Material of Construction option A: 14 m (551.2") <sup>2)</sup>	EQ
DN 50 PN 16 EN 1092-1 Type A flat faced flange	D 2	Model option 2,3 and Material of Construction option A: 15 m (590.6") <sup>2)</sup>	ER
4" 600 lb ASME raised face flange	D 3	Model option 2,3 and Material of Construction option A: 16 m (629.9") <sup>2)</sup>	ES
DN 50 PN 25/40 EN 1092-1 Type A flat faced flange	E 1	Model option 2,3 and Material of Construction option A: 17 m (669.3") <sup>2)</sup>	ET
DN 80 PN 16 EN 1092-1 Type A flat faced flange	E 2	Model option 2,3 and Material of Construction option A: 18 m (708.7") <sup>2)</sup>	EU
DN 80 PN 25/40 EN 1092-1 Type A flat faced flange	E 3	Model option 2,3 and Material of Construction option A: 19 m (748.0") <sup>2)</sup>	EV
DN 100 PN 16 EN 1092-1 Type A flat faced flange	E 4	Model option 2,3 and Material of Construction option A: 20 m (787.4") <sup>2)</sup>	EW
DN 100 PN 25/40 EN 1092-1 Type A flat faced flange	E 5	Model option 2,3 and Material of Construction option A: 21 m (826.8") <sup>2)</sup>	EX
Fisher Torque Tube flange, 316SS (249C)	F 1	Model option 2,3 and Material of Construction option A: 22.5 m (885.8") <sup>2)</sup>	
Masoneilan Torque Tube flange, 316SS	G 1		
<u>Carbon Steel</u>			
Fisher Torque Tube flange, Carbon Steel (249B)	K 1		
Masoneilan Torque Tube flange, Carbon Steel	L 1		
<b>O-ring</b>			
Viton	1 1		
EPDM (Ethylene Propylene Rubber)	1 2		
Kalrez 4079	1 3		
HSN (Nitrile)	1 4		
Buna-N	1 5		
Neoprene	1 6		
Chemraz	1 7		
Polyurethane	1 8		
Aegis PF128	2 1		
Kalrez 2035	2 2		
<b>Probe Insertion Length</b>			
<u>Add order code Y01 and plain text: "Insertion length ... cm"</u>			
Model option 1 and Material of Construction option A: 60 ... 100 cm (23.6 ... 39.4")	AA		
Model option 1 and Material of Construction option A: 101 ... 200 cm (39.8 ... 78.7")	AB		
Model option 1 and Material of Construction option A: 201 ... 300 cm (79.1 ... 118.1")	AC		

1) Available with O-ring option 11 only

2) No Y01 needed in order code

R) Subject to export regulations AL: N, ECCN: EAR99I

# Level Measurement



## Continuous level measurement - Guided wave radar transmitters

### SITRANS LG200

Selection and Ordering data	Order code
<b>Further designs</b>	
Please add <b>"-Z"</b> to Order No. and specify Order code(s).	
Enter the total insertion length in plain text description, max. 610 cm (240.2')	<b>Y01</b>
Stainless steel tag. Measuring-point number/identification (max. 16 characters); specify in plain text	<b>Y15</b>
Inspection Certificate Type 3.1 per EN 10204	<b>C12</b>
Manufacturer's test report (Hydrostatic Test)	<b>C18</b>
NACE MR-0175 materials traceability	<b>D07</b>
<b>Operating Instructions</b>	
English	C) <b>7ML1998-5KA01</b>
French	C) <b>7ML1998-5KA11</b>
German	C) <b>7ML1998-5KA31</b>
Multi-language Quick Start manual This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	C) <b>7ML1998-5XG81</b>
<b>Accessories</b>	
SITRANS RD100 Remote display - see Chapter 8	
SITRANS RD200 Remote display - see Chapter 8	
SITRANS RD500 Remote display - see Chapter 8	
C) Subject to export regulations AL: N, ECCN: EAR99	

## Continuous level measurement - Guided wave radar transmitters

SITRANS LG200

Selection and Ordering data	Order No.	Selection and Ordering data	Order No.
<b>SITRANS LG200 Single Rod Rigid Probes</b> R)	<b>7ML1303-</b>	<b>SITRANS LG200 Single Rod Rigid Probes</b> R)	<b>7ML1303-</b>
SITRANS LG200 single rod rigid probes are used in applications where coating and buildup are likely. Used in applications with dielectric constant $\geq 10$ , or $dk > 1.9$ when installed within 2 ... 6" of a metal tank wall or in cage or bridle.		SITRANS LG200 single rod rigid probes are used in applications where coating and buildup are likely. Used in applications with dielectric constant $\geq 10$ , or $dk > 1.9$ when installed within 2 ... 6" of a metal tank wall or in cage or bridle.	
<b>Note:</b> <b>In addition to the probe, please select a transmitter configuration to complete the SITRANS LG200 (ordered separately).</b> <b>For orders of 10 or more, please consult factory.</b>			
<b>Model</b>			
Single rod rigid probe <sup>1)</sup>	1	DN 50, PN 25/40, EN 1092-1 Type A flat faced flange <sup>11)</sup>	L 2
High Temperature/High Pressure Single rod <sup>2) 3)</sup>	2	DN 80, PN 16, EN 1092-1 Type A flat faced flange <sup>11)</sup>	L 3
<b>Material of Construction</b>		DN 80, PN 25/40, EN 1092-1 Type A flat faced flange <sup>11)</sup>	L 4
316/316L (1.4401/1.4404) stainless steel probe and process connection	A	DN 100, PN 16, EN 1092-1 Type A flat faced flange <sup>11)</sup>	L 5
316/316L (1.4401/1.4404) stainless steel sanitary probe and process connection <sup>1) 4)</sup>	D	DN 100, PN 25/40, EN 1092-1 Type A flat faced flange <sup>11)</sup>	L 6
PFA faced-flange and rod insulation, all PFA wetted parts (316 SS rod) <sup>1) 5)</sup>	E	<b>Higher Pressure rated flanges</b>	
316 AL6XN stainless steel sanitary probe and process connection <sup>1) 6)</sup>	F	<u>ANSI/ASME</u>	
PFA rod insulation (316 SS rod and process connection)	J	2" 600 lb ASME raised face flange <sup>8)</sup>	M 0
<b>Process Connection (size/type)</b>		2" 900/1500 lb ASME raised face flange <sup>12)</sup>	M 1
1 or 1½" Tri-Clover 16 amp sanitary fitting <sup>7)</sup>	A 1	2" 2500 lb ASME raised face flange <sup>12)</sup>	M 2
2" NPT [(Taper), ANSI/ASME B1.20.1] <sup>8)</sup>	A 2	3" 600 lb ASME raised face flange <sup>8)</sup>	N 0
G 2" [(BSPP), EN ISO 228-1] <sup>8)</sup>	A 3	3" 900 lb ASME raised face flange <sup>12)</sup>	N 3
2" 150 lb ASME raised face flange <sup>8)</sup>	A 4	3" 1500 lb ASME raised face flange <sup>12)</sup>	N 4
2" 300 lb ASME raised face flange <sup>8)</sup>	A 5	3" 2500 lb ASME raised face flange <sup>12)</sup>	N 5
2" Tri-Clover 16 amp sanitary fitting <sup>7)</sup>	A 6	4" 600 lb ASME raised face flange <sup>8)</sup>	P 0
¾" Tri-Clover 16 amp sanitary fitting <sup>7) 9)</sup>	A 7	4" 900 lb ASME raised face flange <sup>12)</sup>	P 3
2½" Tri-Clover 16 amp sanitary fitting <sup>7)</sup>	B 0	4" 1500 lb ASME raised face flange <sup>12)</sup>	P 4
3" 150 lb ASME raised face flange <sup>8)</sup>	B 1	4" 2500 lb ASME raised face flange <sup>12)</sup>	P 5
3" 300 lb ASME raised face flange <sup>8)</sup>	B 2	2" 600 lb ASME ring type joint flange <sup>8)</sup>	Q 0
3" Tri-Clover 16 amp sanitary fitting <sup>7)</sup>	B 3	2" 900/1500 lb ASME ring type joint flange <sup>12)</sup>	Q 1
4" 150 lb ASME raised face flange <sup>8)</sup>	C 1	2" 2500 lb ASME ring type joint flange <sup>12)</sup>	Q 2
4" 300 lb ASME raised face flange <sup>8)</sup>	C 2	3" 600 lb ASME ring type joint flange <sup>8)</sup>	R 0
4" Tri-Clover 16 amp sanitary fitting <sup>7)</sup>	C 3	3" 900 lb ASME ring type joint flange <sup>12)</sup>	R 3
DN 50, PN 16, EN 1092-1 Type A flat faced flange <sup>8)</sup>	D 1	3" 1500 lb ASME ring type joint flange <sup>12)</sup>	R 4
DN 50, PN 25/40, EN 1092-1 Type A flat faced flange <sup>8)</sup>	D 2	3" 2500 lb ASME ring type joint flange <sup>12)</sup>	R 5
DN 80, PN 16, EN 1092-1 Type A flat faced flange <sup>8)</sup>	D 3	4" 600 lb ASME ring type joint flange <sup>8)</sup>	S 0
DN 80, PN 25/40, EN 1092-1 Type A flat faced flange <sup>8)</sup>	D 4	4" 900 lb ASME ring type joint flange <sup>12)</sup>	S 3
DN 100, PN 16, EN 1092-1 Type A flat faced flange <sup>8)</sup>	D 5	4" 1500 lb ASME ring type joint flange <sup>12)</sup>	S 4
DN 100, PN 25/40, EN 1092-1 Type A flat faced flange <sup>8)</sup>	D 6	4" 2500 lb ASME ring type joint flange <sup>12)</sup>	S 5
<u>AL6XN<sup>10)</sup></u>		<u>EN flanges</u>	
¾" Tri-Clover 16 amp sanitary fitting <sup>9) 10)</sup>	E 0	DN 50, PN 64, EN 1092-1 Type A flat faced flange <sup>8)</sup>	T 0
1½" Tri-Clover 16 amp sanitary fitting <sup>10)</sup>	E 1	DN 50, PN 100, EN 1092-1 Type A flat faced flange <sup>8)</sup>	T 1
2" Tri-Clover 16 amp sanitary fitting <sup>10)</sup>	E 2	DN 50, PN 160, EN 1092-1 Type A flat faced flange <sup>12)</sup>	T 2
2½" Tri-Clover 16 amp sanitary fitting <sup>10)</sup>	E 3	DN 50, PN 250, EN 1092-1 Type A flat faced flange <sup>12)</sup>	T 3
3" Tri-Clover 16 amp sanitary fitting <sup>10)</sup>	F 1	DN 80, PN 64, EN 1092-1 Type A flat faced flange <sup>8)</sup>	U 0
4" Tri-Clover 16 amp sanitary fitting <sup>10)</sup>	G 1	DN 80, PN 100, EN 1092-1 Type A flat faced flange <sup>8)</sup>	U 1
PFA Coated 316 stainless steel flange <sup>11)</sup>		DN 80, PN 160, EN 1092-1 Type A flat faced flange <sup>12)</sup>	U 2
2" 150 lb ASME raised face flange <sup>11)</sup>	H 1	DN 80, PN 250, EN 1092-1 Type A flat faced flange <sup>12)</sup>	U 3
2" 300 lb ASME raised face flange <sup>11)</sup>	H 2	DN 100, PN 64, EN 1092-1 Type A flat faced flange <sup>8)</sup>	V 0
3" 150 lb ASME raised face flange <sup>11)</sup>	J 1	DN 100, PN 100, EN 1092-1 Type A flat faced flange <sup>8)</sup>	V 1
3" 300 lb ASME raised face flange <sup>11)</sup>	J 2	DN 100, PN 160, EN 1092-1 Type A flat faced flange <sup>12)</sup>	V 2
4" 150 lb ASME raised face flange <sup>11)</sup>	K 1	DN 100, PN 250, EN 1092-1 Type A flat faced flange <sup>12)</sup>	V 3
4" 300 lb ASME raised face flange <sup>11)</sup>	K 2		
DN 50, PN 16, EN 1092-1 Type A flat faced flange <sup>11)</sup>	L 1		



# Level Measurement

## Continuous level measurement - Guided wave radar transmitters

### SITRANS LG200

#### Selection and Ordering data

Order No.

#### SITRANS LG200 Single Rod Rigid Probes

R) 7ML1303-

SITRANS LG200 single rod rigid probes are used in applications where coating and buildup are likely. Used in applications with dielectric constant  $\geq 10$ , or  $dk > 1.9$  when installed within 2 ... 6" of a metal tank wall or in cage or bridle.

#### O-ring

Viton	1	1
EPDM (Ethylene Propylene Rubber)	1	2
Kalrez 4079	1	3
HSN (Nitrile)	1	4
Buna-N	1	5
Neoprene	1	6
Chemraz	1	7
Polyurethane	1	8
Aegis PF128	2	1
Kalrez 2035	2	2
None	2	3

#### Probe Insertion Length

Add order code Y01 and plain text:  
"Insertion length ... cm"

Model option 1, 2 and Material of Construction option A: 60 ... 100 cm (23.6 ... 39.4")

Model option 1, 2 and Material of Construction option A: 101 ... 200 cm (39.8 ... 78.7")

Model option 1, 2 and Material of Construction option A: 201 ... 300 cm (79.1 ... 118.1")

Model option 1, 2 and Material of Construction option A: 301 ... 400 cm (118.5 ... 157.5")

Model option 1, 2 and Material of Construction option A: 401 ... 500 cm (157.9 ... 196.9")

Model option 1, 2 and Material of Construction option A: 501 ... 610 cm (197.2 ... 240.2")

Add order code Y01 and plain text:  
"Insertion length ... cm"

Model option 1 and Material of Construction option D: 60 ... 100 cm (23.6 ... 39.4")

Model option 1 and Material of Construction option D: 101 ... 200 cm (39.8 ... 78.7")

Model option 1 and Material of Construction option D: 201 ... 300 cm (79.1 ... 118.1")

Model option 1 and Material of Construction option D: 301 ... 400 cm (118.5 ... 157.5")

Model option 1 and Material of Construction option D: 401 ... 500 cm (157.9 ... 196.9")

Model option 1 and Material of Construction option D: 501 ... 610 cm (197.2 ... 240.2")

Add order code Y01 and plain text:  
"Insertion length ... cm"

Model option 1 and Material of Construction option F: 60 ... 100 cm (23.6 ... 39.4")

Model option 1 and Material of Construction option F: 101 ... 200 cm (39.8 ... 78.7")

Model option 1 and Material of Construction option F: 201 ... 300 cm (79.1 ... 118.1")

Model option 1 and Material of Construction option F: 301 ... 400 cm (118.5 ... 157.5")

Model option 1 and Material of Construction option F: 401 ... 500 cm (157.9 ... 196.9")

Model option 1 and Material of Construction option F: 501 ... 610 cm (197.2 ... 240.2")

Add order code Y01 and plain text:  
"Insertion length ... cm"

Model option 1 and Material of Construction option E: 60 ... 100 cm (23.6 ... 39.4")

Model option 1 and Material of Construction option E: 101 ... 200 cm (39.8 ... 78.7")

Model option 1 and Material of Construction option E: 201 ... 300 cm (79.1 ... 118.1")

#### Selection and Ordering data

Order No.

#### SITRANS LG200 Single Rod Rigid Probes

R) 7ML1303-

SITRANS LG200 single rod rigid probes are used in applications where coating and buildup are likely. Used in applications with dielectric constant  $\geq 10$ , or  $dk > 1.9$  when installed within 2 ... 6" of a metal tank wall or in cage or bridle.

Model option 1 and Material of Construction option E: 301 ... 400 cm (118.5 ... 157.5")

Model option 1 and Material of Construction option E: 401 ... 500 cm (157.9 ... 196.9")

Model option 1 and Material of Construction option E: 501 ... 610 cm (197.2 ... 240.2")

Add order code Y01 and plain text:  
"Insertion length ... cm"

Model option 1 and Material of Construction option J: 60 ... 100 cm (23.6 ... 39.4")

Model option 1 and Material of Construction option J: 101 ... 200 cm (39.8 ... 78.7")

Model option 1 and Material of Construction option J: 201 ... 300 cm (79.1 ... 118.1")

Model option 1 and Material of Construction option J: 301 ... 400 cm (118.5 ... 157.5")

Model option 1 and Material of Construction option J: 401 ... 500 cm (157.9 ... 196.9")

Model option 1 and Material of Construction option J: 501 ... 610 cm (197.2 ... 240.2")

Add order code Y01 and plain text:  
"Insertion length ... cm"

(¾" Process Connection only)

Model option 1 and Material of Construction option D and F: 60 ... 100 cm (23.6 ... 39.4")<sup>13)</sup>

Model option 1 and Material of Construction option D and F: 101 ... 180 cm (39.8 ... 72")<sup>13)</sup>

- 1) Model option 1 with Material of Construction options D, E, F, available with O-ring option 23 only
- 2) Available with O-ring option 21 only
- 3) Available with Material of Construction option A only
- 4) Available with Process Connection options A1, A6, A7, B0, B3, C3 only
- 5) Available with Process Connection options H1, H2, J1, J2, K1, K2, L1, L2, L3, L4, L5, L6 only.
- 6) Available with Process Connection options E0, E1, E2, E3, F1, G1 only
- 7) Available with Material of Construction option D only
- 8) Available with Material of Construction options A and J only
- 9) Available with Probe Insertion Length options FA and FB only
- 10) Available with Material of Construction option F only
- 11) Available with Material of Construction option E only
- 12) Available with Model option 2 only
- 13) Available with Process Connection options A7 and E0 only (¾")

R) Subject to export regulations AL: N, ECCN: EAR99I

# Level Measurement

## Continuous level measurement - Guided wave radar transmitters

SITRANS LG200

Selection and Ordering data	Order code
<b>Further designs</b>	
Please add <b>"-Z"</b> to Order No. and specify Order code(s).	
Enter the total insertion length in plain text description, max. 610 cm (240.2')	<b>Y01</b>
Stainless steel tag. Measuring-point number/identification (max. 16 characters); specify in plain text	<b>Y15</b>
Inspection Certificate Type 3.1 per EN 10204	<b>C12</b>
Manufacturer's test report (Hydrostatic Test)	<b>C18</b>
NACE MR-0175 materials traceability	<b>D07</b>
<b>Operating Instructions</b>	
English	C) <b>7ML1998-5KA01</b>
French	C) <b>7ML1998-5KA11</b>
German	C) <b>7ML1998-5KA31</b>
Multi-language Quick Start manual This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	C) <b>7ML1998-5XG81</b>
<b>Accessories</b>	
TFE bottom spacer/endplate	R) <b>7ML1930-1DJ</b>
SITRANS RD100 Remote display - see Chapter 8	
SITRANS RD200 Remote display - see Chapter 8	
SITRANS RD500 Remote display - see Chapter 8	
C) Subject to export regulations AL: N, ECCN: EAR99	
R) Subject to export regulations AL: N, ECCN: EAR99I	



# Level Measurement

## Continuous level measurement - Guided wave radar transmitters

### SITRANS LG200

#### Selection and Ordering data

	Order No.
<b>SITRANS LG200 Single Rod Flexible Probes</b> R)	<b>7ML1304-</b>
SITRANS LG200 single rod flexible probes are used in applications where coating and buildup are possible. Used in applications with dielectric constant $\geq 10$ or $dk > 1.9$ when installed within 2 ... 6" of a metal tank wall or in cage or bridle. For solids version only, $dk > 4$ .	
<b>Note:</b>	
<b>In addition to the probe, please select a transmitter configuration to complete the SITRANS LG200 (ordered separately).</b>	
<b>For orders of 10 or more, please consult factory.</b>	
<b>Model</b>	
Single rod flexible probe	1
Single rod bulk solids flexible probe <sup>1)</sup>	2
<b>Material of Construction</b>	
316/316L (1.4401/1.4404) stainless steel probe and process connection	A
<b>Process Connection (size/type)</b>	
<u>316/316L (1.4401/1.4404)</u>	
2" NPT [(Taper), ANSI/ASME B1.20.1]	A 0
G 2" [(BSPP), EN ISO 228-1]	A 1
2" 150 lb ASME raised face flange	A 2
2" 300 lb ASME raised face flange	A 3
3" 150 lb ASME raised face flange	B 1
3" 300 lb ASME raised face flange	B 2
4" 150 lb ASME raised face flange	C 1
4" 300 lb ASME raised face flange	C 2
DN 50 PN 16 EN 1092-1 Type A flat faced flange	D 1
DN 50 PN 25/40 EN 1092-1 Type A flat faced flange	D 2
DN 80 PN 16 EN 1092-1 Type A flat faced flange	E 1
DN 80 PN 25/40 EN 1092-1 Type A flat faced flange	E 2
DN 100 PN 16 EN 1092-1 Type A flat faced flange	F 1
DN 100 PN 25/40 EN 1092-1 Type A flat faced flange	F 2
<b>O-ring</b>	
Viton	1 1
EPDM (Ethylene Propylene Rubber)	1 2
Kalrez 4079	1 3
HSN (Nitrile)	1 4
Buna-N	1 5
Neoprene	1 6
Chemraz	1 7
Polyurethane	1 8
Aegis PF128	2 1
Kalrez 2035	2 2

#### Selection and Ordering data

	Order No.
<b>SITRANS LG200 Single Rod Flexible Probes</b> R)	<b>7ML1304-</b>
SITRANS LG200 single rod flexible probes are used in applications where coating and buildup are possible. Used in applications with dielectric constant $\geq 10$ or $dk > 1.9$ when installed within 2 ... 6" of a metal tank wall or in cage or bridle. For solids version only, $dk > 4$ .	
<b>Flexible Rod Length (To be shortened by customer as required)</b>	
1 meter (39.4")	AA
2 meters (78.7")	AB
3 meters (118.1")	AC
4 meters (157.5")	AD
5 meters (196.9")	AE
6 meters (236.2")	AF
7 meters (275.6")	AG
8 meters (315.0")	AH
9 meters (354.3")	AJ
10 meters (393.7")	AK
11 meters (433.1")	AL
12 meters (472.4")	AM
13 meters (511.8")	AN
14 meters (551.2")	AP
15 meters (590.6")	AQ
16 meters (629.9")	AR
17 meters (669.3")	AS
18 meters (708.7")	AT
19 meters (748.0")	AU
20 meters (787.4")	AV
21 meters (826.8")	AW
22.5 meters (885.8")	AX

<sup>1)</sup> Available with O-ring option 1 1 only (others on request)

R) Subject to export regulations AL: N, ECCN: EAR99


#### Selection and Ordering data

	Order code
<b>Further designs</b>	
Please add <b>"-Z"</b> to Order No. and specify Order code(s).	
Stainless steel tag. Measuring-point number/identification (max. 16 characters); specify in plain text	<b>Y15</b>
<b>Operating Instructions</b>	Order No.
English	C) <b>7ML1998-5KA01</b>
French	C) <b>7ML1998-5KA11</b>
German	C) <b>7ML1998-5KA31</b>
Multi-language Quick Start manual This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	C) <b>7ML1998-5XG81</b>
<b>Accessories</b>	
SITRANS RD100 Remote display - see Chapter 8	
SITRANS RD200 Remote display - see Chapter 8	
SITRANS RD500 Remote display - see Chapter 8	
C) Subject to export regulations AL: N, ECCN: EAR99	

# Level Measurement

## Continuous level measurement - Guided wave radar transmitters

SITRANS LG200

Selection and Ordering data	Order No.	Selection and Ordering data	Order code
<b>SITRANS LG200 Chamber Replacement Probe</b> R)	7ML1305-	<b>Further designs</b>	
Replaces existing aging torque tube transmitters. Proprietary flanges can be used with existing chambers and cages.		Please add "-Z" to Order No. and specify Order code(s).	
<b>Note:</b> <b>In addition to the probe, please select a transmitter configuration to complete the SITRANS LG200 (ordered separately).</b> <b>For this option, please consult factory</b>		Stainless steel tag. Measuring-point number/identification (max. 16 characters); specify in plain text	<b>Y15</b>
<b>Model</b>		Inspection Certificate Type 3.1 per EN 10204	<b>C12</b>
Chamber Replacement Probe <sup>1)</sup>	1	NACE MR-0175 materials traceability	<b>D07</b>
<b>Chamber/Process Connection Material of Construction</b>		<b>Operating Instructions</b>	Order No.
316/316L stainless steel (B31.1 construction)	A	English	C) <b>7ML1998-5KA01</b>
Carbon Steel (106 Grade B) <sup>2)</sup>	B	French	C) <b>7ML1998-5KA11</b>
Carbon Steel (B31.1 construction)	C	German	C) <b>7ML1998-5KA31</b>
<b>Process Connection (size/type)</b>		Multi-language Quick Start manual This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	C) <b>7ML1998-5XG81</b>
1½" NPT [(Taper), ANSI/ASME B1.20.1] thread	A 0	<b>Accessories</b>	
1½", 150 lb ASME raised face flange	A 1	SITRANS RD100 Remote display - see Chapter 8	
1½", 300 lb ASME raised face flange	A 2	SITRANS RD200 Remote display - see Chapter 8	
1½", 600 lb ASME raised face flange	A 3	SITRANS RD500 Remote display - see Chapter 8	
1½" Socket weld	B 1	C) Subject to export regulations AL: N, ECCN: EAR99	
2" NPT [(Taper), ANSI/ASME B1.20.1] thread	B 2		
2", 150 lb ASME raised face flange	C 1		
2", 300 lb ASME raised face flange	C 2		
2", 600 lb ASME raised face flange	D 1		
2" Socket weld	D 2		
Other flange sizes available. Please consult factory.			
<b>Level Range</b>			
14" (0.356 meters)	1		
Other level ranges available. Please consult factory.			
<b>Process Connection Configuration</b>			
Top In, Bottom Out	1		
Top In, Bottom Out, with Sight Glass Connections	2		
Other configurations available. Please consult factory.			
<b>Temperature Range</b>			
+316 °C (+600 °F) (Dielectric constant ≥ 10)	A		
+260 °C (+500 °F) (Dielectric constant ≥ 1.4)	B		
<b>Chamber Type</b>			
Fisher 249B	A		
Fisher 259B	B		
Fisher 249	C		

<sup>1)</sup> Probe is always 316/316L (1.4401/1.4404) Stainless Steel construction regardless of chamber and process connection materials.

<sup>2)</sup> Available Process Connection Configuration option 1 only

R) Subject to export regulations AL: N, ECCN: EAR99I

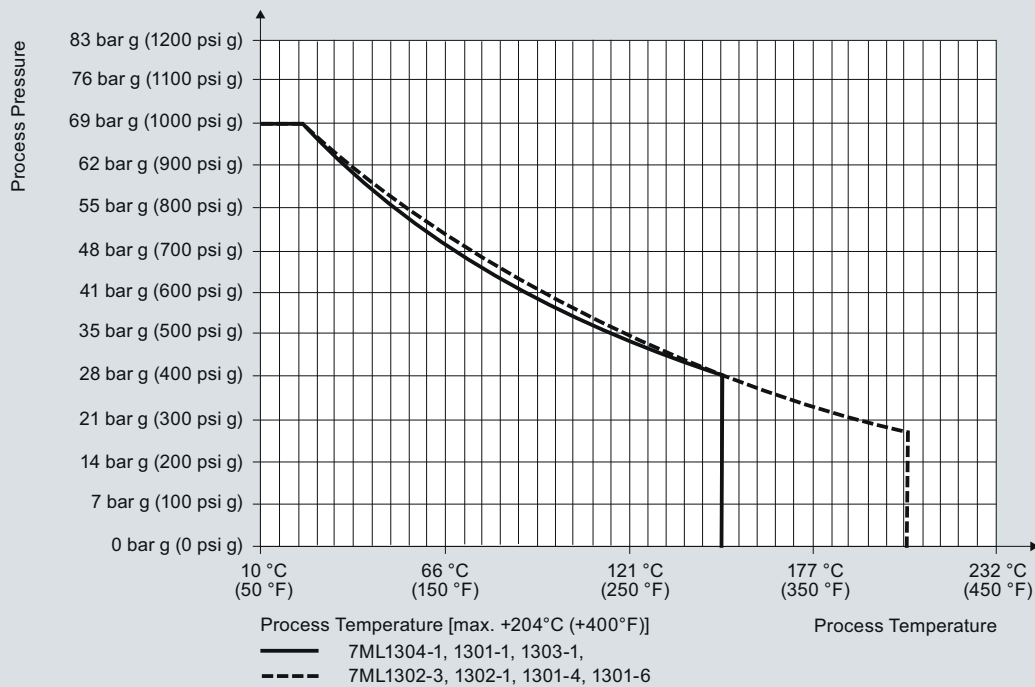
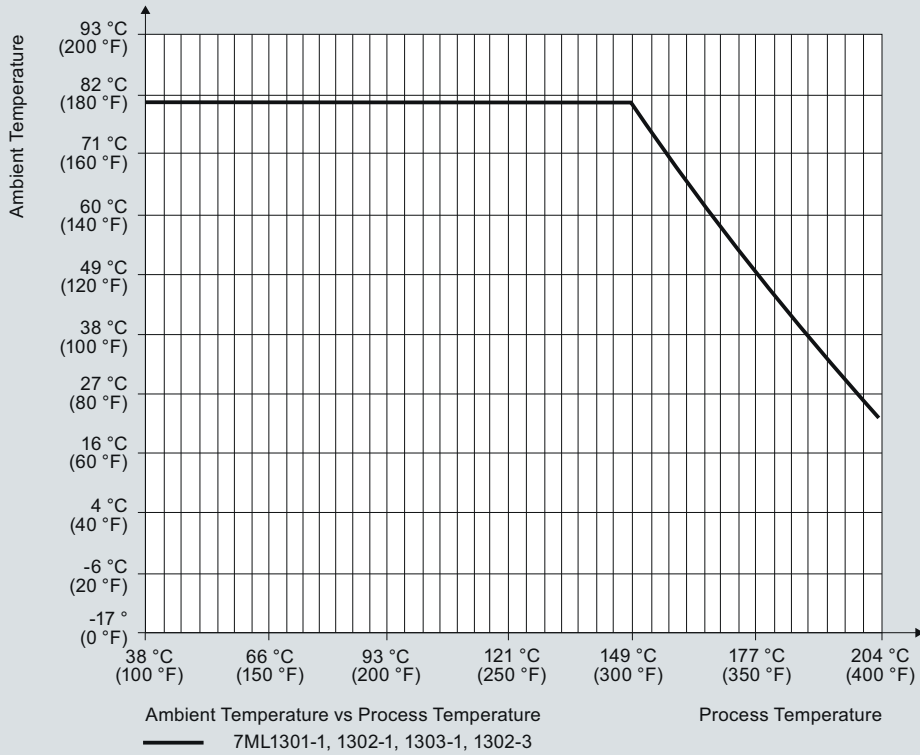
# Level Measurement

## Continuous level measurement - Guided wave radar transmitters

### SITRANS LG200

#### Characteristic curves

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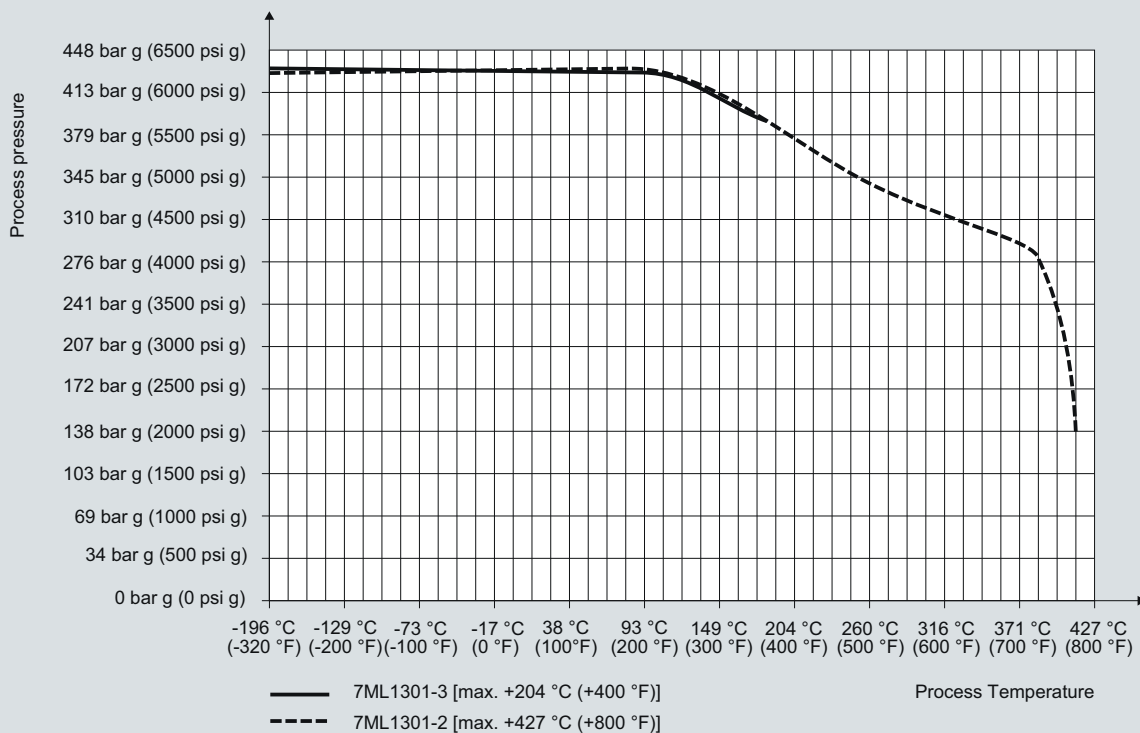
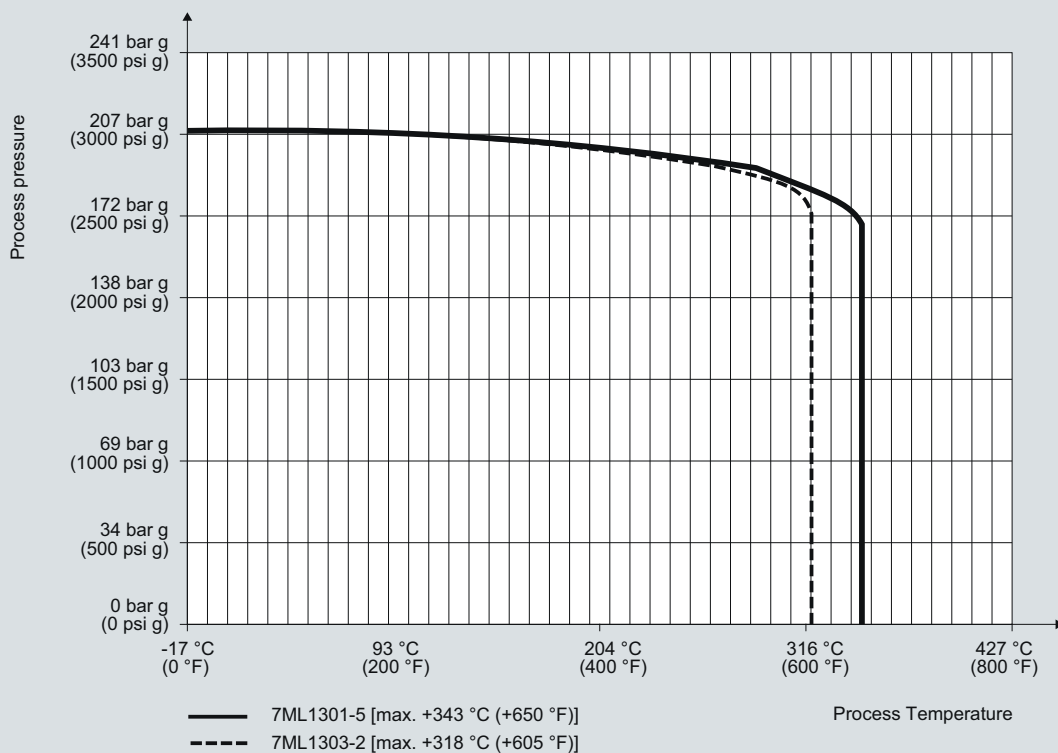
SITRANS LG200 Process Pressure/Temperature derating curves

# Level Measurement

## Continuous level measurement - Guided wave radar transmitters

SITRANS LG200

5



SITRANS LG200 Process Pressure/Temperature derating curves

# Level Measurement

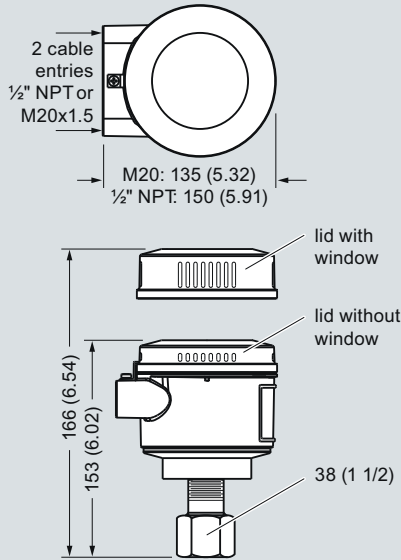
## Continuous level measurement - Guided wave radar transmitters

### SITRANS LG200

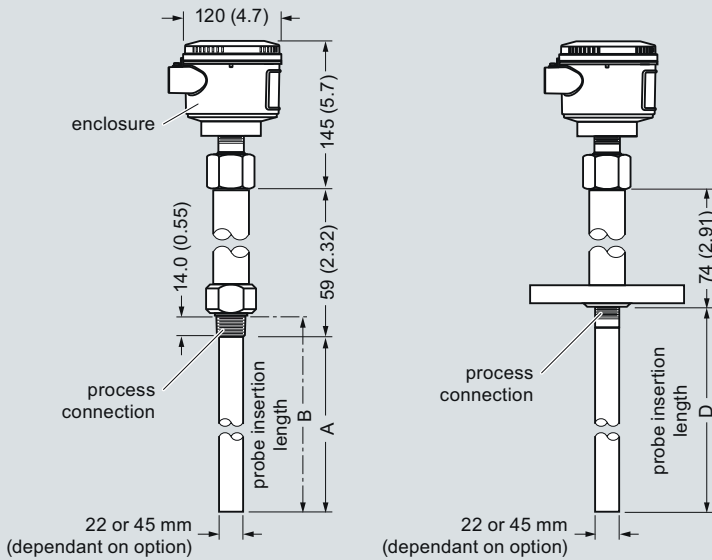
#### Dimensional drawings

5

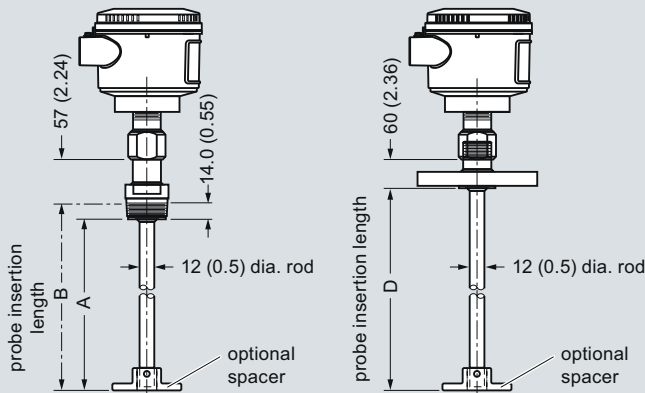
SITRANS LG200 Enclosure 7ML1300



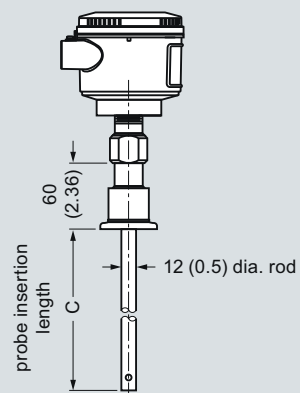
7ML1301-1 (7xA-x) Probe, Threaded and Flanged Connection



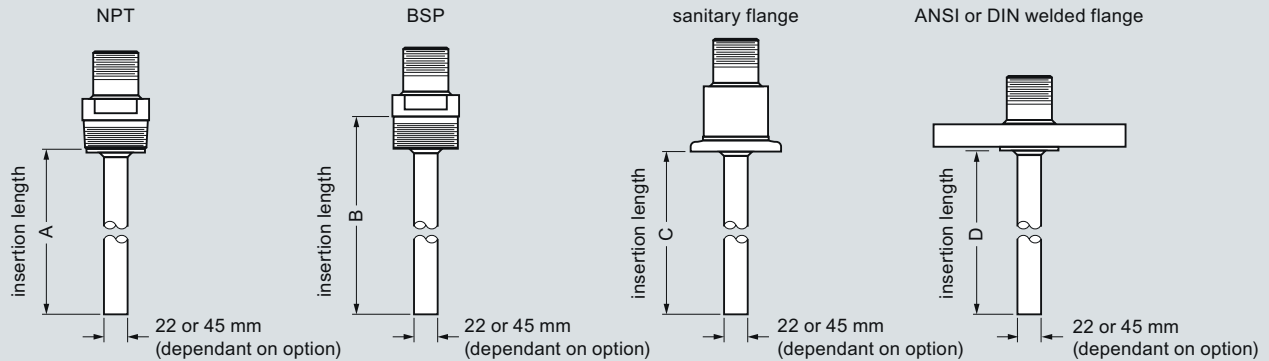
7ML1303-1 (7xF-x) Probe, Threaded and Flanged Connection



7ML1303-1D (7xF-E) Probe, Sanitary Connection



Probe Connections and Insertion Lengths (Note BSP connections differ from NPT)



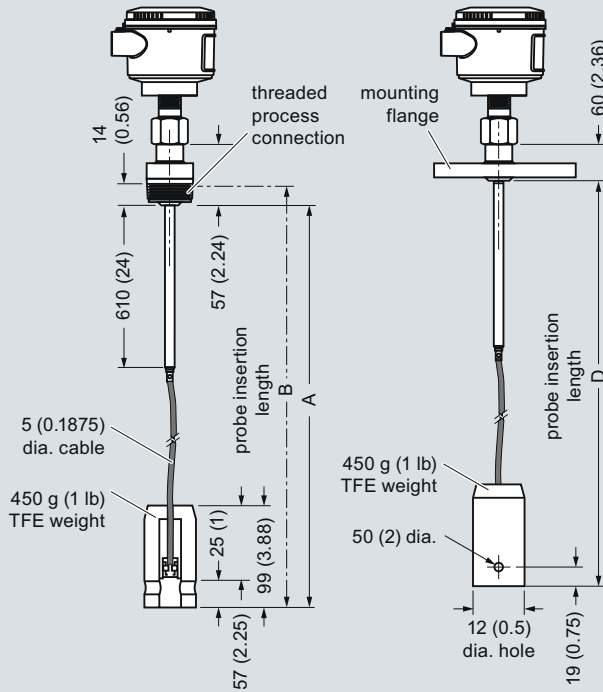
SITRANS LG200 (threaded process connection dimensions shown are NPT connections unless stated otherwise), dimensions in mm (inch)

# Level Measurement

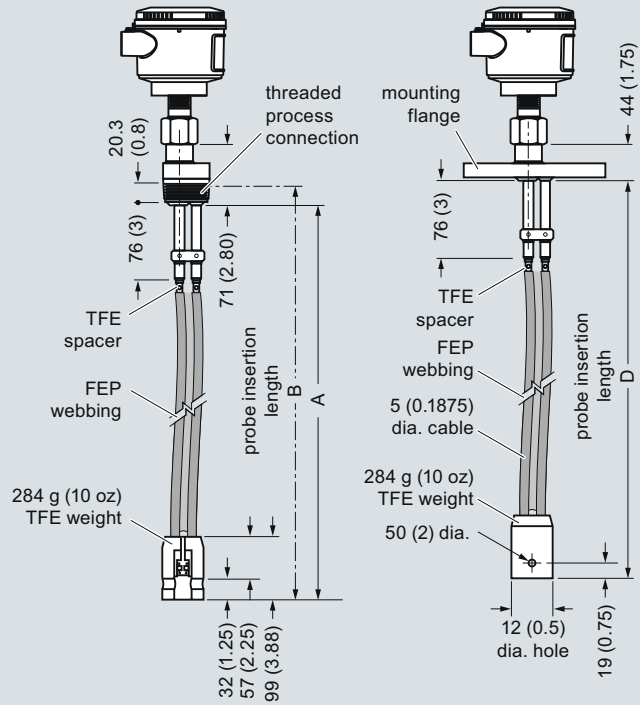
## Continuous level measurement - Guided wave radar transmitters

SITRANS LG200

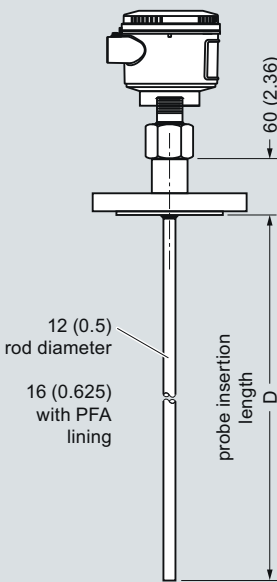
**SITRANS LG200**  
**7ML1304-1 (7x1-x) Flexible Probe,**  
**Threaded or Flanged Connection**



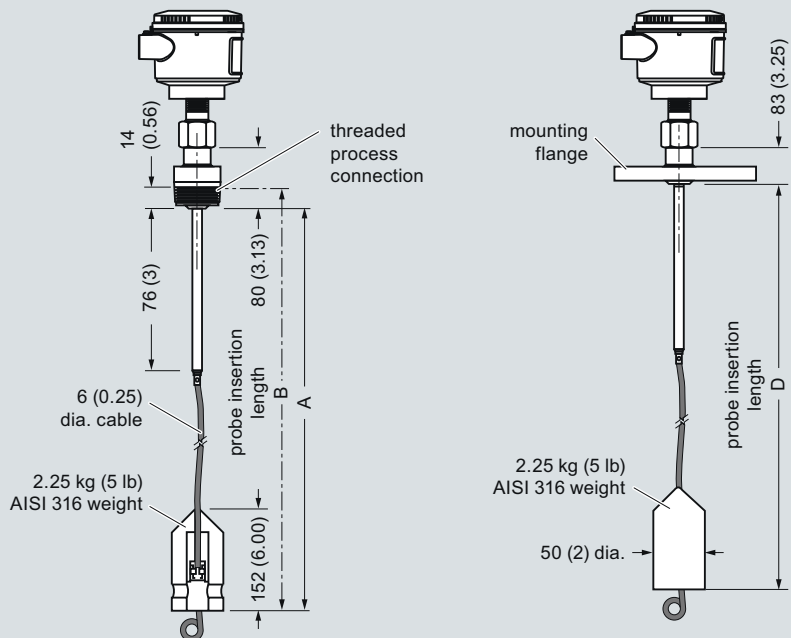
**7ML1302-3 (7x7-x) Twin Rod Flexible Probe,**  
**Threaded or Flanged Connection**



**7ML1303-1E (7xF - F) Probe,**  
**Flat-Faced Flanged Connection**



**7ML1304-2 (7x2-x) Bulk Solids Flexible Probe,**  
**Threaded or Flanged Connection**



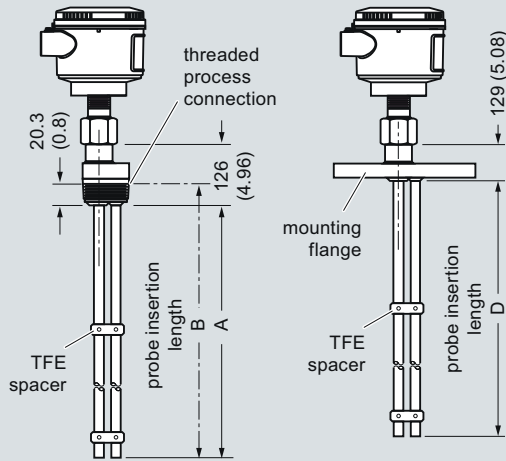
SITRANS LG200 (threaded process connection dimensions shown are NPT connections unless stated otherwise), dimensions in mm (inch)

# Level Measurement

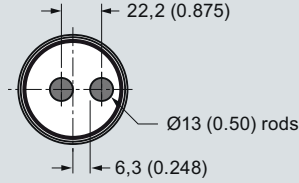
## Continuous level measurement - Guided wave radar transmitters

### SITRANS LG200

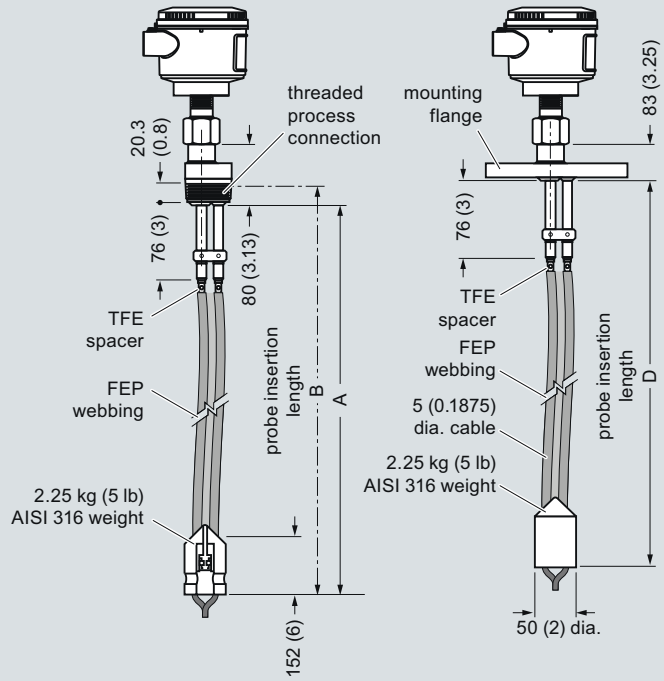
**SITRANS LG200**  
7ML1302-1 (7xB-x) Twin Rod Probe,  
Threaded and Flanged Connection



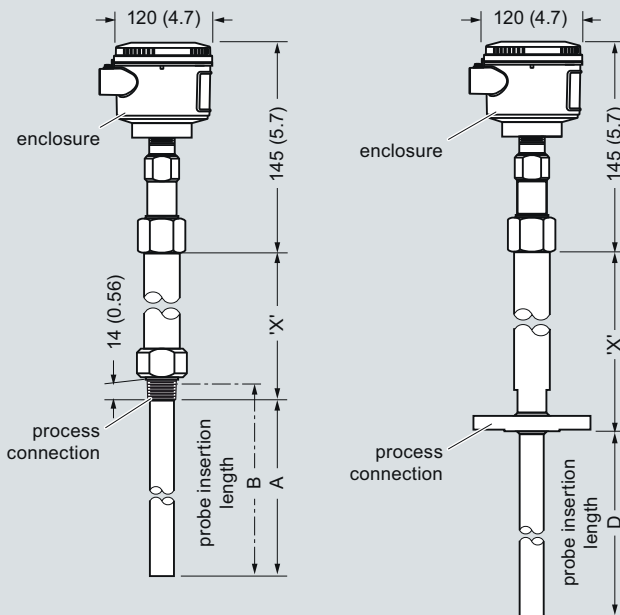
Twin rod end view



**7ML1302-2 (7x5-x) Twin Rod Bulk Solids Flexible Probe**  
Threaded or Flanged Connection



**7ML1301-2 (7xD-x), 7ML1301-3 (7xP-x), 7ML1301-4 (7xR-x), 7ML1301-6 (7xT-x), Threaded or Flanged Connection**



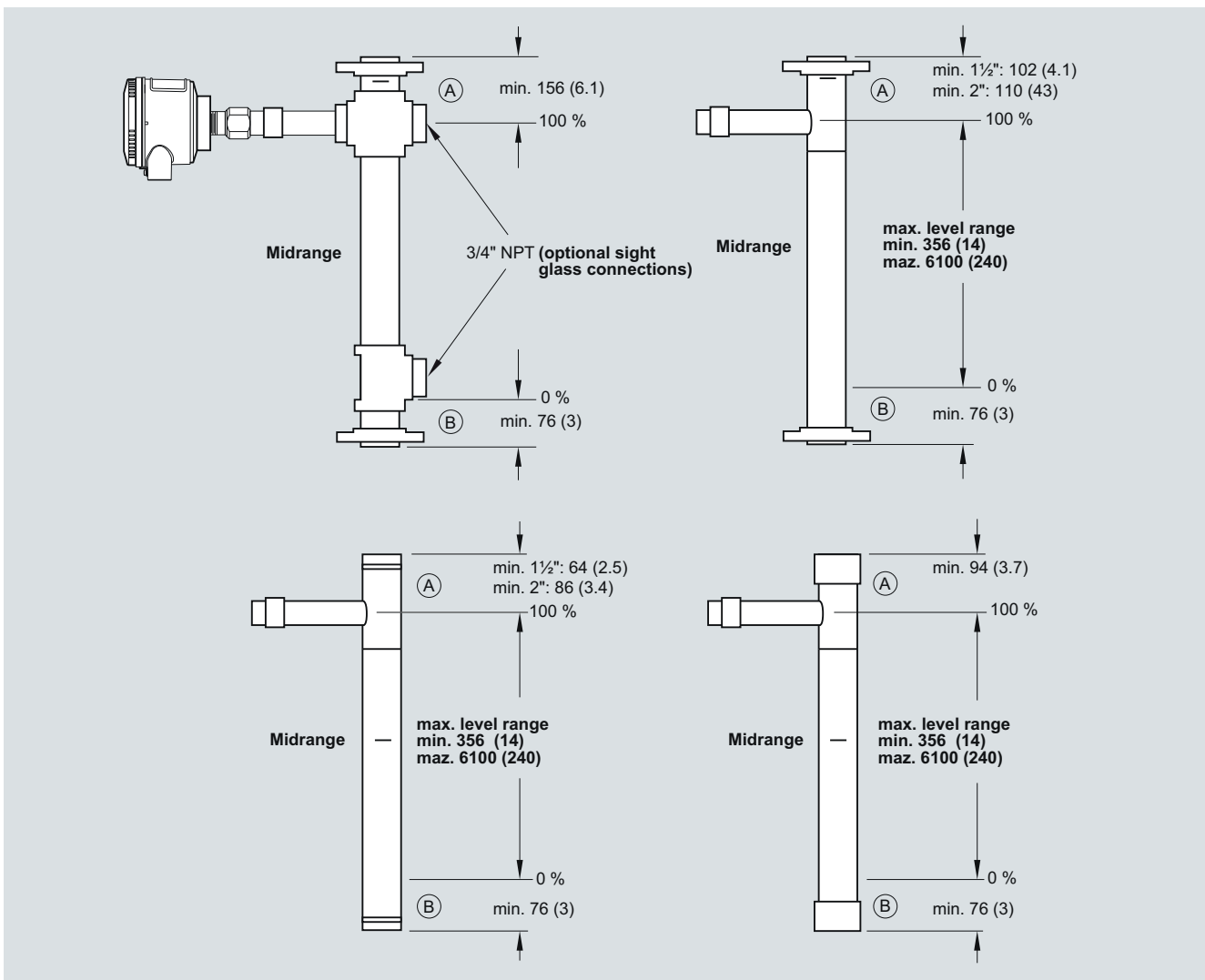
Probes	'X' Dimension (NPT)	'X' Dimension (Flanged)
7ML1301-2 (Coaxial HT/HP Probe)	217 (8.55)	277 (10.91)
7ML1301-3 (Coaxial HP Probe)	106 (4.18)	166 (6.54)
7ML1301-4 (Coaxial Overfill/Flooded Cage Probe), 7ML1301-6 (Coaxial Interface Probe)	150 (5.89)	167 (6.57)
7ML1301-5 (Coaxial HT/HP Steam Probe)	180 (7.10)	242 (9.52)

SITRANS LG200 (threaded process connection dimensions shown are NPT connections unless stated otherwise), dimensions in mm (inch)

# Level Measurement

## Continuous level measurement - Guided wave radar transmitters

SITRANS LG200



SITRANS LG200 - Model 7ML1305-1 Chamber Replacement Probe, dimensions in mm (inch)

5



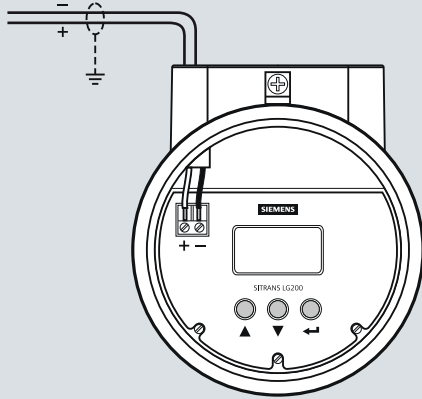
# Level Measurement

## Continuous level measurement - Guided wave radar transmitters

### SITRANS LG200

#### Schematics

##### SITRANS LG200 General Purpose Wiring



##### Intrinsically Safe wiring

When connecting SITRANS LG200 in Intrinsically Safe applications, install an approved IS barrier in the non-hazardous (safe) area.

##### Explosion Proof wiring

When connecting SITRANS LG200 in hazardous areas with explosion hazard, the wiring for the transmitter must be contained in Explosion Proof conduit extending into the safe area. An Explosion Proof conduit fitting is not required within 457 mm (18") of the transmitter. An Explosion Proof conduit fitting is required between the hazardous and safe areas.

SITRANS LG200 connections

# Level Measurement

## Continuous level measurement - Capacitance transmitters

SITRANS LC300

### Overview



SITRANS LC300 is an inverse frequency shift capacitance continuous level transmitter for liquids and solids applications. It is ideal for standard industrial applications in chemical, hydrocarbon processing, food and beverage, water, wastewater, and mining, aggregate, and cement industries.

### Benefits

- Patented Active-Shield technology so measurement is unaffected by material buildup in active shield section
- Highly accurate and reliable PFA-lined probes
- Integrated local LCD display
- 2-wire (4 to 20 mA) current loop design
- Current signalling according to NAMUR NE 43
- Push-button calibration and programming
- Stilling well (ground tube) version for low dielectric media and non-metallic vessels

### Application

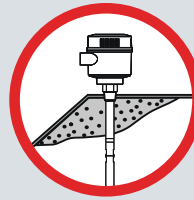
SITRANS LC300 is a 2-wire level measurement instrument combining a sophisticated, yet easy-to-adjust microprocessor with field-proven probes. It is available in four versions: rod, rod with stilling well, cable with PFA insulation, and cable without PFA insulation.

Materials with low or high dielectric properties are accurately measured and patented Active-Shield technology helps in ignoring the effects of buildup or condensation near vessel nozzle.

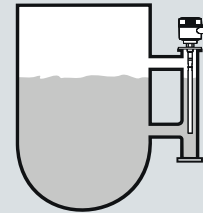
- Key Applications: Conductive and non-conductive media including: liquids and solids in standard industrial processes, bulk solids applications involving dust, and chemical processes involving vapour

### Configuration

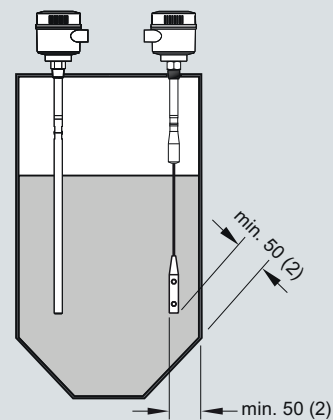
#### Installation



Build up of material in active shield area does not affect switch operation.



Mounting on a bypass area does not affect switch operation.



Install probe at least 50 mm (2") from tank wall.  
Note angle of repose and adjust accordingly.

SITRANS LC300 installation, dimensions in mm (inch)

# Level Measurement

## Continuous level measurement - Capacitance transmitters

### SITRANS LC300

#### Technical specifications

<b>Input</b>	
Measuring range	1.66 ... 3300 pF
Span	Min. 3.3 pF
<b>Output</b>	
Loop current	Continuous signal 4 ... 20 mA/20 ... 4 mA according to NAMUR 43
<b>Accuracy (transmitter)</b>	
Temperature stability	0.25 % of actual capacitance value
Non-linearity and repeatability	< 0.4 % of full scale and actual measurement value
Accuracy	Deviation < 0.5 % of actual measurement value
<b>Rated operating conditions<sup>1)</sup></b>	
Ambient conditions	
• Ambient temperature	-40 ... +85 °C (-40 ... +185 °F) <sup>2)</sup>
• Installation category	I
• Pollution degree	4
• Ingress protection	Type 4/NEMA 4/IP65 (optional IP68)
Installation conditions	
• Location	Indoor/outdoor
Process pressure	-1 to +35 bar g (-14.6 ... +511 psi g)
Process temperature	-40 ... +200 °C (-40 ... +392 °F) <sup>3)</sup>
Min. dielectric constant $\epsilon_r$	1.5
<b>Design</b>	
Material	
• Enclosure	Aluminum, epoxy-coated
Probe diameter	
• Rod version	19 mm (0.75") with PFA jacket
• Cable version	9 mm (0.35") with PFA jacket, 6 mm (0.24") without PFA jacket
Active shield length	
• Rod version	threaded: 120 mm (4.72") flanged: 100 mm (3.94")
• Cable version	threaded: 125 mm (4.92") flanged: 105 mm (4.13")
Process connection of probe	
• Threaded rod mounting	$\frac{3}{4}$ ", 1", 1 $\frac{1}{4}$ ", 1 $\frac{1}{2}$ " NPT [(Taper), ANSI/ASME B1.20.1] R $\frac{3}{4}$ ", 1", 1 $\frac{1}{2}$ " [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] G $\frac{3}{4}$ ", 1", 1 $\frac{1}{2}$ " [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]
• Threaded cable mounting	1 $\frac{1}{2}$ " NPT [(Taper), ANSI/ASME B1.20.1] R 1 $\frac{1}{2}$ " [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] G 1 $\frac{1}{2}$ " [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]
• Flange mounting	1 ... 4" ASME, DN 25 ... 100
Enclosure cable inlet	2 x $\frac{1}{2}$ " NPT or 2 x M20x1.5
<b>Power supply</b>	
	12 ... 30 V DC any polarity, 2-wire current loop circuit
<b>User Interface</b>	
Display	Local LCD, 4 digit, each 0 ... 9 and limited alpha characters

<b>Safety</b>	
Measurement current signalling	According to NAMUR NE 43, signal 3.8 ... 20.5 mA, fault $\leq$ 3.6 or $\geq$ 21 mA (22 mA)
<b>Certificates and approvals</b>	
General	CE, CSA <sub>US/C</sub> , FM, C-TICK
Dust Ignition Proof (Intrinsically Safe probe circuit)	(Europe) ATEX II 1/2 D T100 °C (US/Canada) FM/CSA: Class II, Div. 1, Groups E,F,G Class III T4
Flame Proof (Intrinsically Safe probe circuit)	(Europe) ATEX II 1/2 G EEx d [ia] IIC T6...T1 ATEX II 1/2 D T100 °C
Explosion Proof (Intrinsically Safe probe circuit)	(US/Canada) Class I, Div. 1, Groups A,B,C,D Class II, Div. 1, Groups E,F,G Class III T4
Marine	Bureau Veritas Type Approval ABS Type Approval
Overfill Protection	AIB-Vincotte
Other	Pattern Approval (China)

- 1) When operation is in areas classified as hazardous, observe restrictions according to relevant certificate. See also Pressure/Temperature curves on page 5/277.
- 2) Thermal isolator is used if process connection temperature exceeds +85 °C (+185 °F)
- 3) Not suitable for steam environments

	Design: Probe	Rod version	Stilling well version	Cable version
Length		Min. 300 mm (12"), max. 5000 mm (197")	Min. 300 mm (12"), max. 5000 mm (197")	Min. 1000 mm (40"), max. 25000 mm (984")
Sensor wetted parts		PFA, 316L stainless steel	PFA, 316L stainless steel	316L stainless steel or 316L stainless steel with PFA insulation
O-ring seal material		FKM or FFKM	FKM or FFKM	FKM or FFKM
Thermal isolator		Optional	Optional	Optional
Options		N/A	N/A	Mounting eye for PFA insulated cable version

# Level Measurement

## Continuous level measurement - Capacitance transmitters

SITRANS LC300

Selection and Ordering data	Order No.
<b>SITRANS LC300, rod version</b>	C) 7ML5670 -
An inverse frequency shift capacitance continuous level transmitter for liquids and solids applications.	0
<b>Process Connection</b>	
Threaded, 316L stainless steel	
¾" NPT [(Taper), ANSI/ASME B1.20.1]	0 A
1" NPT [(Taper), ANSI/ASME B1.20.1]	0 B
1¼" NPT [(Taper), ANSI/ASME B1.20.1]	0 C
1½" NPT [(Taper), ANSI/ASME B1.20.1]	0 D
R ¾" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1 A
R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1 B
R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1 D
G ¾" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3 A
G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3 B
G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3 D
<u>Welded flange, 316L stainless steel, raised face<sup>1)</sup></u>	
1" ASME, 150 lb	5 A
1" ASME, 300 lb	5 B
1" ASME, 600 lb	5 C
1½" ASME, 150 lb	5 D
1½" ASME, 300 lb	5 E
1½" ASME, 600 lb	5 F
2" ASME, 150 lb	5 G
2" ASME, 300 lb	5 H
2" ASME, 600 lb	5 J
3" ASME, 150 lb	5 K
3" ASME, 300 lb	5 L
3" ASME, 600 lb	5 M
4" ASME, 150 lb	5 N
4" ASME, 300 lb	5 P
4" ASME, 600 lb	5 Q
<u>Welded flange, 316L stainless steel, Type A flat faced<sup>1)</sup></u>	
DN 25, PN 16	6 A
DN 25, PN 40	6 B
DN 40, PN 16	6 C
DN 40, PN 40	6 D
DN 50, PN 16	6 E
DN 50, PN 40	6 F
DN 80, PN 16	6 G
DN 80, PN 40	6 H
DN 100, PN 16	6 J
DN 100, PN 40	6 K
<b>Probe Length (from flange face or including process thread)</b>	
<u>Add order code Y01 and plain text: "Insertion length ... mm"</u>	
300 ... 1000 mm (11.81 ... 39.37")	A
1001 ... 2000 mm (39.41 ... 78.74")	B
2001 ... 3000 mm (78.78 ... 118.11")	C
3001 ... 4000 mm (118.15 ... 157.48")	D
4001 ... 5000 mm (157.52 ... 196.85")	E
<b>Thermal Isolator</b>	
Without thermal isolator	0
With thermal isolator [for process connection temperatures over +85 °C (+185 °F)]	1
<b>Wetted Seals</b>	
FKM	0
FFKM [for process temperatures above -20 °C (-4 °F)]	1
<b>Probe Material</b>	
19 mm (0.75") diameter 316L stainless steel, PFA lined rod	0

Selection and Ordering data	Order No.
<b>SITRANS LC300, rod version</b>	C) 7ML5670 -
An inverse frequency shift capacitance continuous level transmitter for liquids and solids applications.	0
<b>Approvals</b>	
General Safety (CSA, FM, CE, C-TICK)	A
Dust Ignition Proof With IS Probe CE, C-TICK, ATEX II 1/2 D T100 °C	B
Flame Proof Enclosure With IS Probe CE, C-TICK, ATEX II 1/2 G EEx d [ia] IIC T6...T1, ATEX II 1/2 D T100 °C	C
Dust Ignition Proof With IS Probe CSA/FM Class II, Div. 1, Gr. E, F, G CSA/FM Class III T4	D
Explosion Proof Enclosure With IS Probe CSA/FM Class I, Div. 1, Gr. A, B, C, D CSA/FM Class II, Div. 1, Gr. E, F, G CSA/FM Class III T4	E
<b>Enclosure</b>	
Aluminum epoxy coated 2 x ½" NPT via adapter - cable inlet, IP65	A
Aluminum epoxy coated 2 x M20 x 1.5 cable inlet, IP65	B
Aluminum epoxy coated 2 x ½" NPT via adapter - cable inlet, IP68	C
Aluminum epoxy coated 2 x M20 x 1.5 cable inlet, IP68	D
1) Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.	


Selection and Ordering data	Order code
<b>Further designs</b>	
Please add "-Z" to Order No. and specify Order code(s).	
Insertion length, specify in plain text: Y01: ... mm	Y01
Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text	Y15
Acceptance test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and ISO 9000	C11
Inspection Certificate Type 3.1 per EN 10204	C12
<b>Operating Instructions</b>	Order No.
English	C) 7ML1998-5HE02
French	7ML1998-5HE11
German	C) 7ML1998-5HE32
Spanish	7ML1998-5HE21
Note: The Operating Instructions should be ordered as a separate line item on the order.	
This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	
<b>Accessories</b>	
Electronic transmitter kit (includes transmitter and driver)	C) 7ML1830-1KN
SITRANS RD100 Remote display - see Chapter 8	
SITRANS RD200 Remote display - see Chapter 8	
SITRANS RD500 Remote display - see Chapter 8	
C) Subject to export regulations AL: N, ECCN: EAR99	


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# Level Measurement

## Continuous level measurement - Capacitance transmitters

### SITRANS LC300

Selection and Ordering data	Order No.
<b>SITRANS LC300, stilling well version</b>	<b>7ML5671-</b>
An inverse frequency shift capacitance continuous level transmitter for liquid applications.	
<b>Process Connection</b>	
Threaded, 316L stainless steel	
1½" NPT [(Taper), ANSI/ASME B1.20.1]	<b>0 D</b>
R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	<b>1 D</b>
G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	<b>3 D</b>
<u>Welded flange, 316L stainless steel, raised face<sup>1)</sup></u>	
1½" ASME, 150 lb	<b>5 D</b>
1½" ASME, 300 lb	<b>5 E</b>
1½" ASME, 600 lb	<b>5 F</b>
2" ASME, 150 lb	<b>5 G</b>
2" ASME, 300 lb	<b>5 H</b>
2" ASME, 600 lb	<b>5 J</b>
3" ASME, 150 lb	<b>5 K</b>
3" ASME, 300 lb	<b>5 L</b>
3" ASME, 600 lb	<b>5 M</b>
4" ASME, 150 lb	<b>5 N</b>
4" ASME, 300 lb	<b>5 P</b>
4" ASME, 600 lb	<b>5 Q</b>
<u>Welded flange, 316L stainless steel, Type A flat faced<sup>1)</sup></u>	
DN 40, PN 16	<b>6 C</b>
DN 40, PN 40	<b>6 D</b>
DN 50, PN 16	<b>6 E</b>
DN 50, PN 40	<b>6 F</b>
DN 80, PN 16	<b>6 G</b>
DN 80, PN 40	<b>6 H</b>
DN 100, PN 16	<b>6 J</b>
DN 100, PN 40	<b>6 K</b>
<b>Probe Length (from flange face or including process thread)</b>	
<u>Add order code Y01 and plain text:</u> <u>"Insertion length ... mm"</u>	
300 ... 1000 mm (11.81 ... 39.37")	<b>A</b>
1001 ... 2000 mm (39.41 ... 78.74")	<b>B</b>
2001 ... 3000 mm (78.78 ... 118.11")	<b>C</b>
3001 ... 4000 mm (118.15 ... 157.48")	<b>D</b>
4001 ... 5000 mm (157.52 ... 196.85")	<b>E</b>
<b>Thermal Isolator</b>	
Without thermal isolator	<b>0</b>
With thermal isolator [for process connection temperatures over +85 °C (+185 °F)]	<b>1</b>
<b>Wetted Seals</b>	
FKM	<b>0</b>
FFKM [for process temperatures above -20 °C (-4 °F)]	<b>1</b>
<b>Probe Material</b>	
35 mm (1.38") diameter stilling well, with 19 mm (0.75") diameter 316L stainless steel, PFA lined rod with PTFE spacers	<b>1</b>
<b>Approvals</b>	
General Safety (CSA, FM, CE, C-TICK)	<b>A</b>
Dust Ignition Proof With IS Probe CE, C-TICK, ATEX II 1/2 D T100 °C	<b>B</b>
Flame Proof Enclosure With IS Probe CE, C-TICK, ATEX II 1/2 G EEx d [ia] IIC T6...T1, ATEX II 1/2 D T100 °C	<b>C</b>
Dust Ignition Proof With IS Probe CSA/FM Class II, Div. 1, Gr. E, F, G CSA/FM Class III T4	<b>D</b>
Explosion Proof Enclosure With IS Probe CSA/FM Class I, Div. 1, Gr. A, B, C, D CSA/FM Class II, Div. 1, Gr. E, F, G CSA/FM Class III T4	<b>E</b>

Selection and Ordering data	Order No.
<b>SITRANS LC300, stilling well version</b>	<b>7ML5671-</b>
An inverse frequency shift capacitance continuous level transmitter for liquid applications.	
<b>Enclosure</b>	
Aluminum epoxy coated 2 x ½" NPT via adapter - cable inlet, IP65	<b>A</b>
Aluminum epoxy coated 2 x M20 x 1.5 cable inlet, IP65	<b>B</b>
Aluminum epoxy coated 2 x ½" NPT via adapter - cable inlet, IP68	<b>C</b>
Aluminum epoxy coated 2 x M20 x 1.5 cable inlet, IP68	<b>D</b>

<sup>1)</sup> Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.

Selection and Ordering data	Order code
<b>Further designs</b>	
Please add <b>"-Z"</b> to Order No. and specify Order code(s).	
Insertion length, specify in plain text: Y01: ... mm	<b>Y01</b>
Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text	<b>Y15</b>
Acceptance test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and ISO 9000	<b>C11</b>
Inspection Certificate Type 3.1 per EN 10204	<b>C12</b>
<b>Operating Instructions</b>	Order No.
English	C) <b>7ML1998-5HE02</b>
French	<b>7ML1998-5HE11</b>
German	C) <b>7ML1998-5HE32</b>
Spanish	<b>7ML1998-5HE21</b>
Note: The Operating Instructions should be ordered as a separate line item on the order.	
This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	
<b>Accessories</b>	
Electronic transmitter kit (includes transmitter and driver)	C) <b>7ML1830-1KN</b>
SITRANS RD100 Remote display - see Chapter 8	
SITRANS RD200 Remote display - see Chapter 8	
SITRANS RD500 Remote display - see Chapter 8	
C) Subject to export regulations AL: N, ECCN: EAR99	

# Level Measurement

## Continuous level measurement - Capacitance transmitters

SITRANS LC300

Selection and Ordering data	Order No.	Selection and Ordering data	Order No.
<b>SITRANS LC300, cable version</b>	C) 7ML5672 -	<b>SITRANS LC300, cable version</b>	C) 7ML5672 -
An inverse frequency shift capacitance continuous level transmitter for non-conductive liquids and solids applications.		An inverse frequency shift capacitance continuous level transmitter for non-conductive liquids and solids applications.	
<b>Process Connection</b>		<b>Approvals</b>	
Threaded, 316L stainless steel		General Safety (CSA, FM, CE, C-TICK)	A
1½" NPT [(Taper), ANSI/ASME B1.20.1]	0 D	Dust Ignition Proof With IS Probe	B
R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1 D	CE, C-TICK, ATEX II 1/2 D T100 °C	
G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3 D	Flame Proof Enclosure With IS Probe	C
<u>Welded flange, 316L stainless steel, raised face<sup>1)</sup></u>		CE, C-TICK, ATEX II 1/2 G EEx d [ia] IIC T6...T1, ATEX II 1/2 D T100 °C	
1½" ASME, 150 lb	5 D	Dust Ignition Proof With IS Probe	D
1½" ASME, 300 lb	5 E	CSA/FM Class II, Div. 1, Gr. E, F, G	
1½" ASME, 600 lb	5 F	CSA/FM Class III T4	
2" ASME, 150 lb	5 G	Explosion Proof Enclosure With IS Probe	E
2" ASME, 300 lb	5 H	CSA/FM Class I, Div. 1, Gr. A, B, C, D	
2" ASME, 600 lb	5 J	CSA/FM Class II, Div. 1, Gr. E, F, G	
3" ASME, 150 lb	5 K	CSA/FM Class III T4	
3" ASME, 300 lb	5 L	<b>Enclosure</b>	
3" ASME, 600 lb	5 M	Aluminum epoxy coated 2 x ½" NPT via adapter - cable inlet, IP65	A
4" ASME, 150 lb	5 N	Aluminum epoxy coated 2 x M20 x 1.5 cable inlet, IP65	B
4" ASME, 300 lb	5 P	Aluminum epoxy coated 2 x ½" NPT via adapter - cable inlet, IP68	C
4" ASME, 600 lb	5 Q	Aluminum epoxy coated 2 x M20 x 1.5 cable inlet, IP68	D
<u>Welded flange, 316L stainless steel, Type A flat faced<sup>1)</sup></u>			
DN 40, PN 16	6 C	1) Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.	
DN 40, PN 40	6 D	2) Cable lengths from 15000 (590.55") to 25000 mm (984.25") can be used in non-conductive media. Contact Factory for assistance.	
DN 50, PN 16	6 E		
DN 50, PN 40	6 F		
DN 80, PN 16	6 G		
DN 80, PN 40	6 H		
DN 100, PN 16	6 J		
DN 100, PN 40	6 K		
<b>Probe Length (from flange face or including process thread)</b>		<b>Selection and Ordering data</b>	Order code
<u>Add order code Y01 and plain text: "Insertion length ... mm"</u>		<b>Further designs</b>	
1000 ... 2000 mm (39.37 ... 78.74")	A	Please add "-Z" to Order No. and specify Order code(s).	
2001 ... 4000 mm (78.78 ... 157.48")	B	Insertion length, specify in plain text: Y01: ... mm	Y01
4001 ... 6000 mm (157.52 ... 236.22")	C	Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text	Y15
6001 ... 8000 mm (236.26 ... 314.96")	D	Acceptance test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and ISO 9000	C11
8001 ... 10000 mm (315.00 ... 393.70")	E	Inspection Certificate Type 3.1 per EN 10204	C12
10001 ... 12000 mm (393.74 ... 472.44")	F	<b>Operating Instructions</b>	Order No.
12001 ... 14000 mm (472.48 ... 551.18")	G	English	C) 7ML1998-5HE02
14001 ... 16000 mm (551.22 ... 629.92") <sup>2)</sup>	H	French	7ML1998-5HE11
16001 ... 18000 mm (629.96 ... 708.66") <sup>2)</sup>	J	German	C) 7ML1998-5HE32
18001 ... 20000 mm (708.70 ... 787.40") <sup>2)</sup>	K	Spanish	7ML1998-5HE21
20001 ... 22000 mm (787.44 ... 866.14") <sup>2)</sup>	L	Note: The Operating Instructions should be ordered as a separate line item on the order.	
22001 ... 24000 mm (866.18 ... 944.88") <sup>2)</sup>	M	This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	
24001 ... 25000 mm (944.92 ... 984.25") <sup>2)</sup>	N	<b>Accessories</b>	
<b>Thermal Isolator</b>		Electronic transmitter kit (includes transmitter and driver)	C) 7ML1830-1KN
Without thermal isolator	0	SITRANS RD100 Remote display - see Chapter 8	
With thermal isolator [for process connection temperatures over +85 °C (+185 °F)]	1	SITRANS RD200 Remote display - see Chapter 8	
<b>Wetted Seals</b>		SITRANS RD500 Remote display - see Chapter 8	
FKM	0		
FFKM [for process temperatures above -20 °C (-4 °F)]	1		
<b>Probe Material</b>			
Bare 316L stainless steel cable and 316L stainless steel cable weight, tinned copper crimp, PTFE backing ring, PEEK isolator and PFA lined active shield	0		

# Level Measurement

## Continuous level measurement - Capacitance transmitters

### SITRANS LC300

Selection and Ordering data	Order No.
<b>SITRANS LC300, PFA coated cable version</b> C)	<b>7ML5673-</b>
An inverse frequency shift capacitance continuous level transmitter for liquids and solids applications.	
<b>Process Connection</b>	
Threaded, 316L stainless steel	
1½" NPT [(Taper), ANSI/ASME B1.20.1]	<b>0 D</b>
R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	<b>1 D</b>
G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	<b>3 D</b>
<u>Welded flange, 316L stainless steel, raised face<sup>1)</sup></u>	
1½" ASME, 150 lb	<b>5 D</b>
1½" ASME, 300 lb	<b>5 E</b>
1½" ASME, 600 lb	<b>5 F</b>
2" ASME, 150 lb	<b>5 G</b>
2" ASME, 300 lb	<b>5 H</b>
2" ASME, 600 lb	<b>5 J</b>
3" ASME, 150 lb	<b>5 K</b>
3" ASME, 300 lb	<b>5 L</b>
3" ASME, 600 lb	<b>5 M</b>
4" ASME, 150 lb	<b>5 N</b>
4" ASME, 300 lb	<b>5 P</b>
4" ASME, 600 lb	<b>5 Q</b>
<u>Welded flange, 316L stainless steel, Type A flat faced<sup>1)</sup></u>	
DN 40, PN 16	<b>6 C</b>
DN 40, PN 40	<b>6 D</b>
DN 50, PN 16	<b>6 E</b>
DN 50, PN 40	<b>6 F</b>
DN 80, PN 16	<b>6 G</b>
DN 80, PN 40	<b>6 H</b>
DN 100, PN 16	<b>6 J</b>
DN 100, PN 40	<b>6 K</b>
<b>Probe Length (from flange face or including process thread)</b>	
<u>Add order code Y01 and plain text: "Insertion length ... mm"</u>	
1000 ... 2000 mm (39.37 ... 78.74")	<b>A</b>
2001 ... 4000 mm (78.78 ... 157.48")	<b>B</b>
4001 ... 6000 mm (157.52 ... 236.22")	<b>C</b>
6001 ... 8000 mm (236.26 ... 314.96")	<b>D</b>
8001 ... 10000 mm (315.00 ... 393.70")	<b>E</b>
10001 ... 12000 mm (393.74 ... 472.44")	<b>F</b>
12001 ... 14000 mm (472.48 ... 551.18")	<b>G</b>
14001 ... 16000 mm (551.22 ... 629.92") <sup>2)</sup>	<b>H</b>
16001 ... 18000 mm (629.96 ... 708.66") <sup>2)</sup>	<b>J</b>
18001 ... 20000 mm (708.70 ... 787.40") <sup>2)</sup>	<b>K</b>
20001 ... 22000 mm (787.44 ... 866.14") <sup>2)</sup>	<b>L</b>
22001 ... 24000 mm (866.18 ... 944.88") <sup>2)</sup>	<b>M</b>
24001 ... 25000 mm (944.92 ... 984.25") <sup>2)</sup>	<b>N</b>
<b>Thermal Isolator</b>	
Without thermal isolator	<b>0</b>
With thermal isolator [for process connection temperatures over +85 °C (+185 °F)]	<b>1</b>
<b>Wetted Seals</b>	
FKM	<b>0</b>
FFKM [for process temperatures above -20 °C (-4 °F)]	<b>1</b>
<b>Probe Material</b>	
PFA coated cable and 316L stainless steel cable weight, PEEK isolator and PFA lined active shield	<b>1</b>
<b>Approvals</b>	
General Safety (CSA, FM, CE, C-TICK)	<b>A</b>
Dust Ignition Proof With IS Probe CE, C-TICK, ATEX II 1/2 D T100 °C	<b>B</b>

Selection and Ordering data	Order No.
<b>SITRANS LC300, PFA coated cable version</b> C)	<b>7ML5673-</b>
An inverse frequency shift capacitance continuous level transmitter for liquids and solids applications.	
<b>Flame Proof Enclosure With IS Probe</b>	<b>C</b>
CE, C-TICK, ATEX II 1/2 G EEx d [ia] IIC T6...T1, ATEX II 1/2 D T100 °C	
<b>Dust Ignition Proof With IS Probe</b>	<b>D</b>
CSA/FM Class II, Div. 1, Gr. E, F, G CSA/FM Class III T4	
<b>Explosion Proof Enclosure With IS Probe</b>	<b>E</b>
CSA/FM Class I, Div. 1, Gr. A, B, C, D CSA/FM Class II, Div. 1, Gr. E, F, G CSA/FM Class III T4	
<b>Enclosure</b>	
Aluminum epoxy coated 2 x ½" NPT via adapter - cable inlet, IP65	<b>A</b>
Aluminum epoxy coated 2 x M20 x 1.5 cable inlet, IP65	<b>B</b>
Aluminum epoxy coated 2 x ½" NPT via adapter - cable inlet, IP68	<b>C</b>
Aluminum epoxy coated 2 x M20 x 1.5 cable inlet, IP68	<b>D</b>
<b>Mounting eye</b>	
Without Mounting eye	<b>0</b>
With mounting eye	<b>1</b>

- 1) Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.  
2) Cable lengths from 15000 (590.55") to 25000 mm (984.25") can be used in non-conductive media. Contact Factory for assistance.

Selection and Ordering data	Order code
<b>Further designs</b>	
Please add <b>"-Z"</b> to Order No. and specify Order code(s).	
Insertion length, specify in plain text: Y01: ... mm	<b>Y01</b>
Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text	<b>Y15</b>
Acceptance test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and ISO 9000	<b>C11</b>
Inspection Certificate Type 3.1 per EN 10204	<b>C12</b>
<b>Operating Instructions</b>	Order No.
English	C) <b>7ML1998-5HE02</b>
French	<b>7ML1998-5HE11</b>
German	C) <b>7ML1998-5HE32</b>
Spanish	<b>7ML1998-5HE21</b>
Note: The Operating Instructions should be ordered as a separate line item on the order. This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	
<b>Accessories</b>	
Electronic transmitter kit (includes transmitter and driver)	C) <b>7ML1830-1KN</b>
SITRANS RD100 Remote display - see Chapter 8	
SITRANS RD200 Remote display - see Chapter 8	
SITRANS RD500 Remote display - see Chapter 8	
C) Subject to export regulations AL: N, ECCN: EAR99	



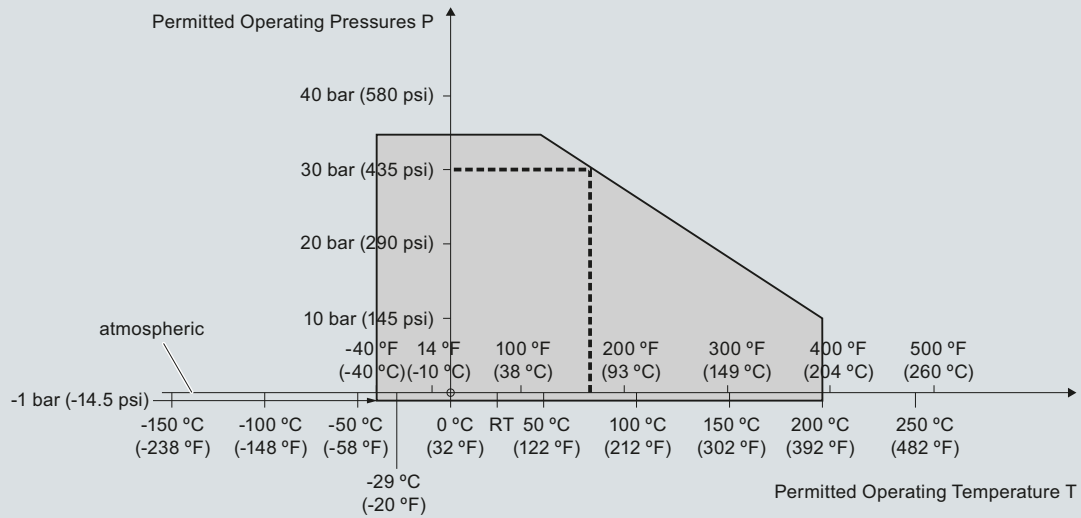
# Level Measurement

## Continuous level measurement - Capacitance transmitters

SITRANS LC300

### Characteristic curves

**Pressure/Temperature Curve**  
**LC300 Standard, Extended Rod and Cable Probes**  
**Threaded Process Connections**  
**(7ML5670, 7ML5671, 7ML5672 and 7ML5673)**



----- Example:  
 Permitted operating pressure = 30 bar (435 psi) at 75 °C

SITRANS LC300 Process Pressure/Temperature derating curves (7ML5670, 7ML5671, 7ML5672 and 7ML5673)



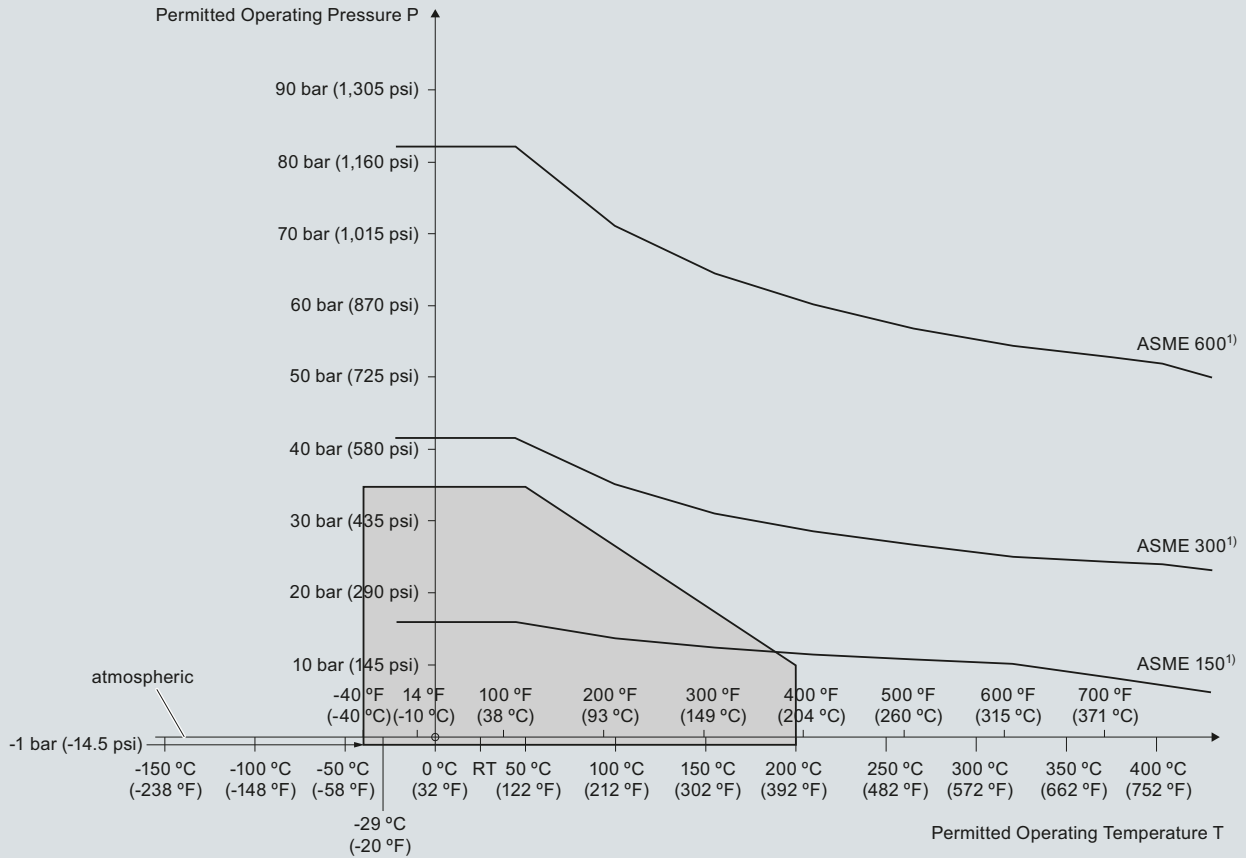
# Level Measurement

## Continuous level measurement - Capacitance transmitters

### SITRANS LC300

5

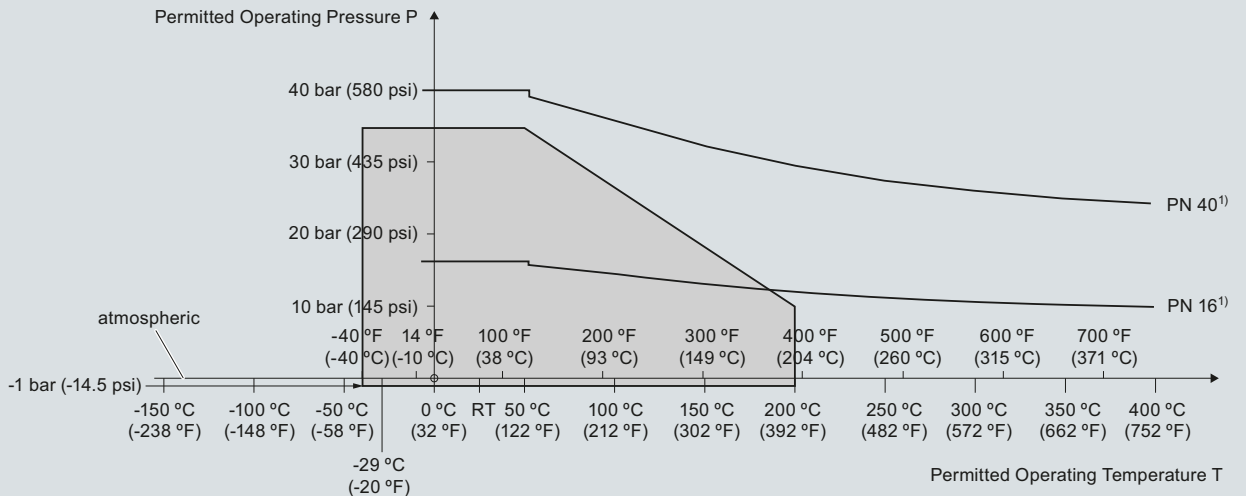
**Pressure/Temperature Curve**  
 LC300 Standard, Extended Rod and Cable Probes  
 ASME Flanged Process Connections  
 (7ML5670, 7ML5671, 7ML5620 and 7ML5673)



<sup>1)</sup> The curve denotes the minimum allowable flange class for the shaded area below.

SITRANS LC300 Process Pressure/Temperature derating curves (7ML5670, 7ML5671, 7ML5672 and 7ML5673)

**Pressure/Temperature Curve**  
 LC300 Standard, Extended Rod and Cable Probes  
 EN Flanged Process Connections  
 (7ML5670, 7ML5610, 7ML5620 and 7ML5670)



<sup>1)</sup> The curve denotes the minimum allowable flange class for the shaded area below.

SITRANS LC300 Process Pressure/Temperature derating curves (7ML5670, 7ML5671, 7ML5672 and 7ML5673)

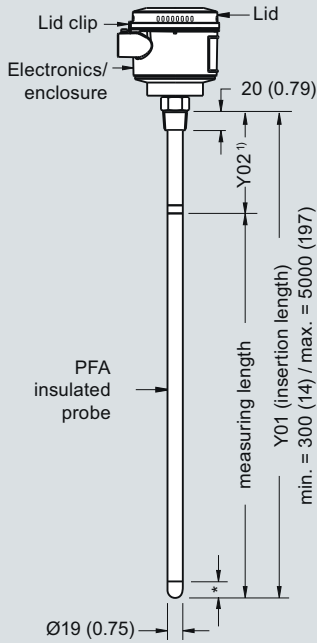
# Level Measurement

## Continuous level measurement - Capacitance transmitters

SITRANS LC300

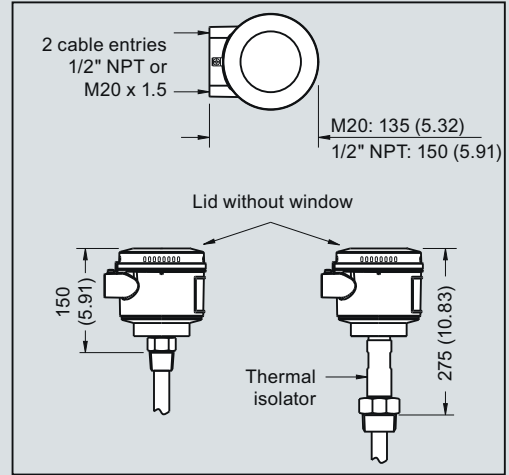
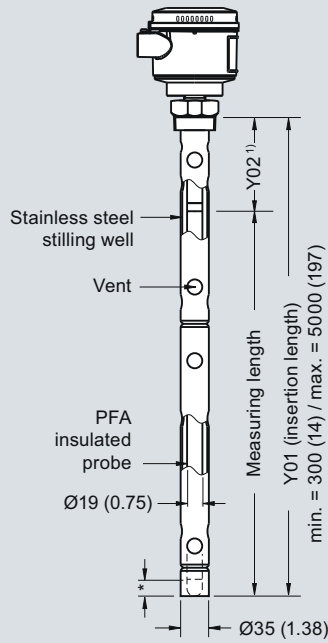
### Dimensional drawings

Threaded (7ML5670)



\* = 30 (1.18) Inactive tip

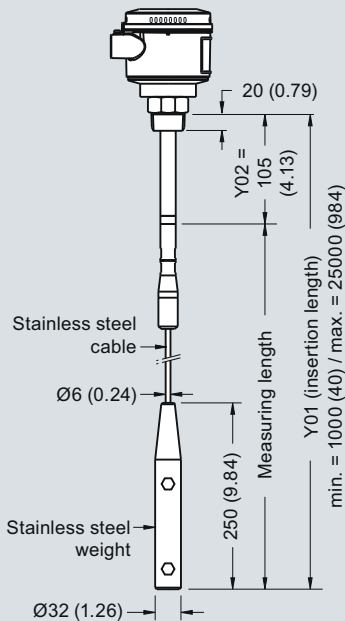
Threaded (7ML5671)



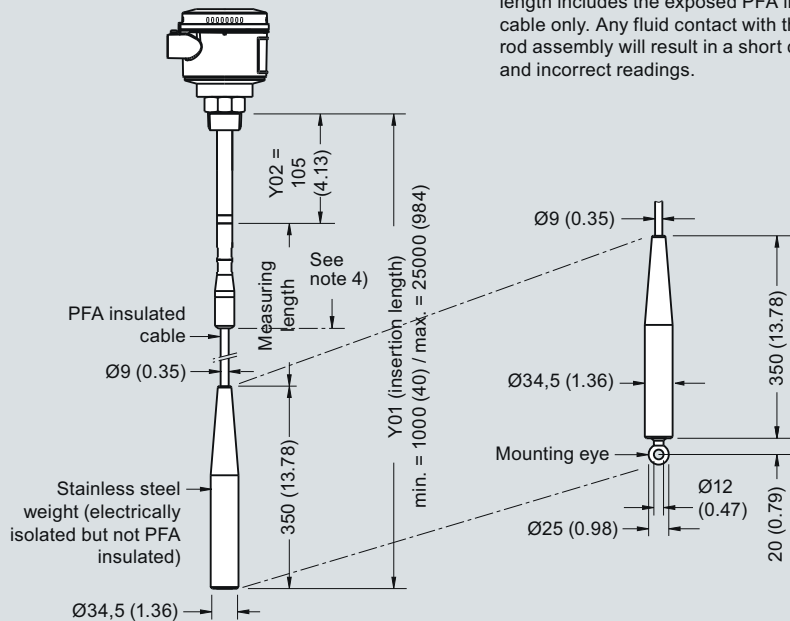
**Note:**

- 1) Rod version Y02: Shield length = 100 mm (3.9") for threaded including process connection thread length, 100 mm (3.9") for welded flange
- 2) For non-conductive applications only. Non-insulated cable can be shortened on site. Weight is included in measuring length.
- 3) For liquids and solids applications. Insulated cable cannot be shortened. Weight is **not** included in measuring length.
- 4) For conductive materials, the measuring length includes the exposed PFA insulated cable only. Any fluid contact with the upper rod assembly will result in a short circuit and incorrect readings.

Cable version, non-insulated <sup>2)</sup>  
Threaded (7ML5672)



Cable version, insulated <sup>3)</sup>  
Threaded (7ML5673)



SITRANS LC300 - Threaded Process Connections, dimensions in mm (inch)

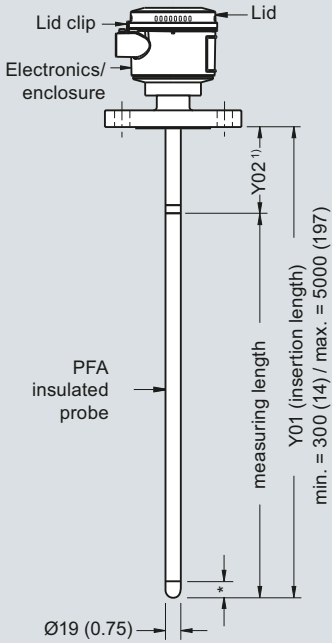
# Level Measurement

## Continuous level measurement - Capacitance transmitters

### SITRANS LC300

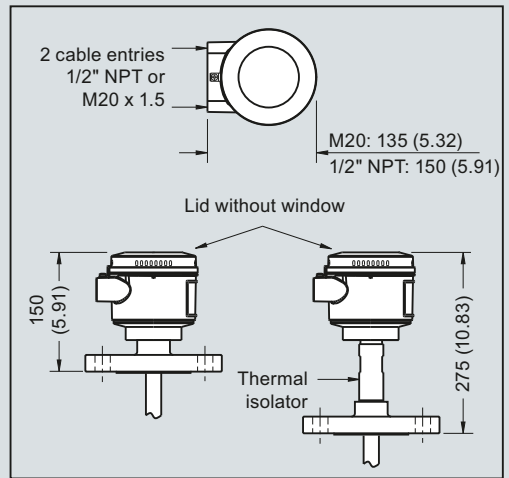
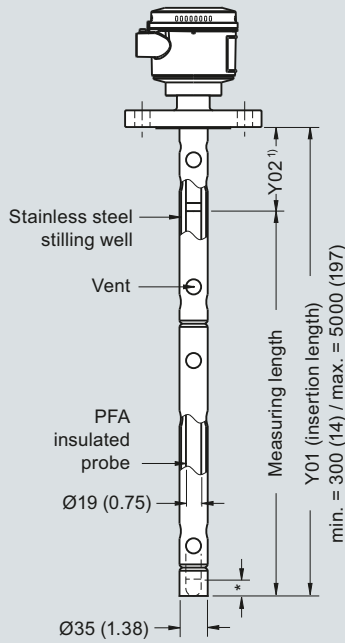
5

#### Welded Flange (7ML5670)



\* = 30 (1.18) inactive tip

#### Welded Flange (7ML5671)

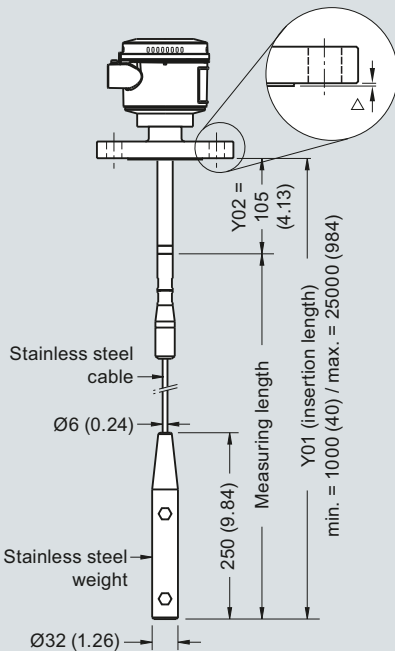


Flange Facing (raised face)	
Flange Class	Facing thickness
△ ASME 150/300	2 (0.08)
△ ASME 600/900	7 (0.28)
△ PN16/40	2 (0.08)

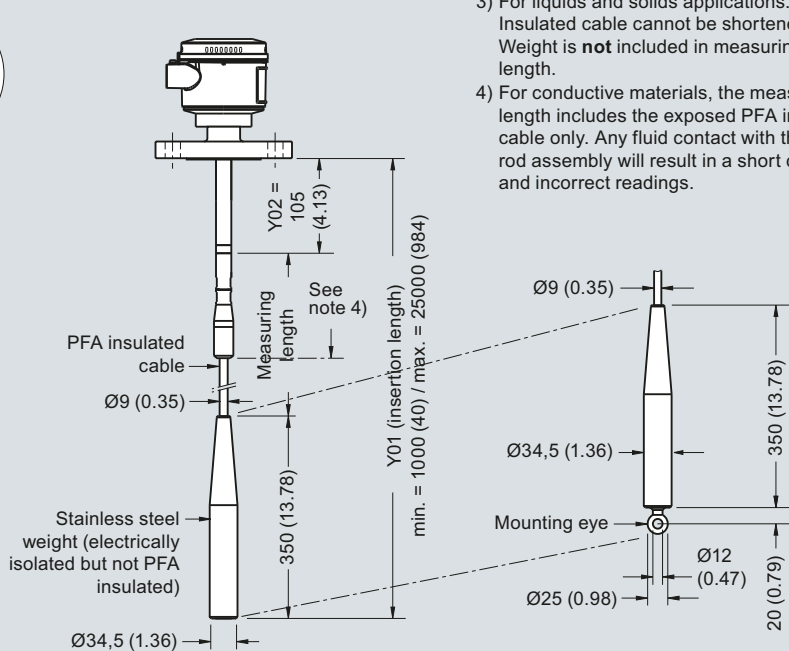
**Note:**

- 1) Rod version Y02: Shield length = 100 mm (3.9") for threaded including process connection thread length, 100 mm (3.9") for welded flange.
- 2) For non-conductive applications only. Non-insulated cable can be shortened on site. Weight is included in measuring length.
- 3) For liquids and solids applications. Insulated cable cannot be shortened. Weight is **not** included in measuring length.
- 4) For conductive materials, the measuring length includes the exposed PFA insulated cable only. Any fluid contact with the upper rod assembly will result in a short circuit and incorrect readings.

#### Cable version, non-insulated<sup>2)</sup> Welded Flange (7ML5672)



#### Cable version, insulated<sup>3)</sup> Welded Flange (7ML5673)



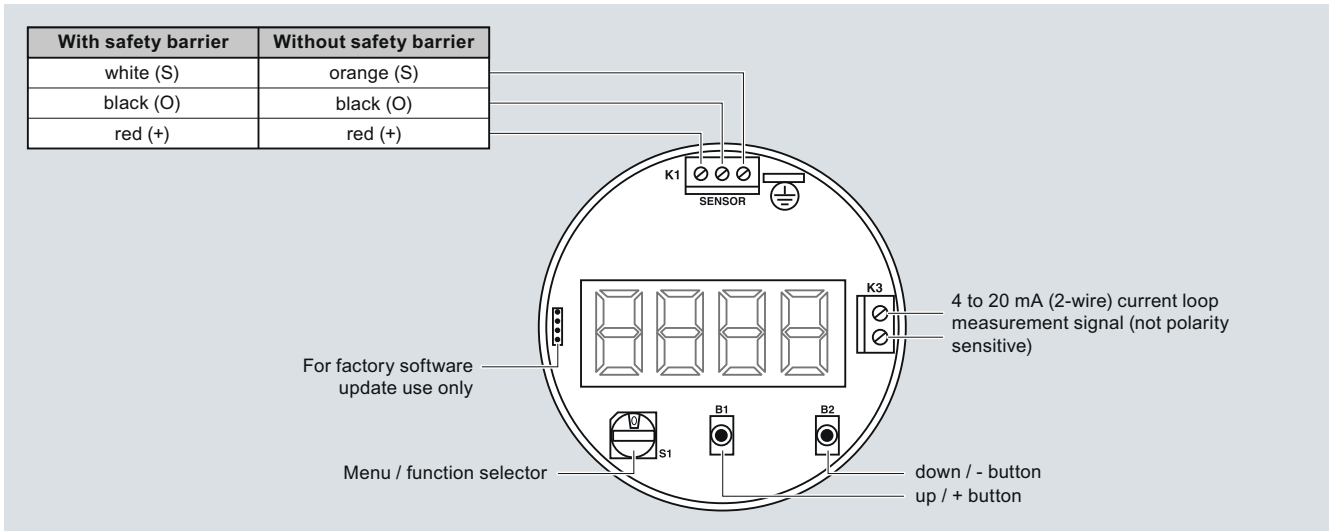
SITRANS LC300 - Flanged Process Connections, dimensions in mm (inch)

# Level Measurement

## Continuous level measurement - Capacitance transmitters

SITRANS LC300

### Schematics



SITRANS LC300 connections

# Level Measurement

## Continuous level measurement - Capacitance transmitters

### SITRANS LC500

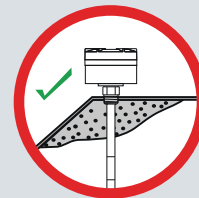
#### Overview



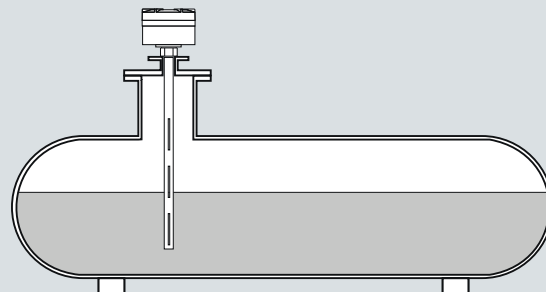
SITRANS LC500 is an inverse frequency shift capacitance level or interface transmitter for extreme and critical process conditions, such as oil and liquified natural gas (LNG) as well as toxic and aggressive chemicals and vapours.

#### Configuration

##### Installation



Build up of material or condensation in active shield area does not affect switch operation.



Mounting on non-linear vessels in non-conductive fluids using stilling well.

SITRANS LC500 installation

#### Benefits

- Patented Active-Shield technology so measurement is unaffected by material buildup in active shield section
- Simple push-button calibration and integrated local display
- Inverse frequency approach provides high resolution
- 2-wire loop powered 4 to 20/20 to 4 mA measurement signal
- Pre-detection alarm and full function diagnostics
- High temperature and pressure resistant (optional)
- Full-function diagnostics comply with NAMUR NE 43
- Easy calibration locally or via HART (using SIMATIC PDM software)

#### Application

SITRANS LC500's advanced electronics provide one-step, push-button calibration and local display for easy on-site installation and setup.

The unique mechanical probe design coupled with a high performance transmitter gives superior performance in toxic and aggressive chemicals, acids, caustics, adhesives and in viscous conductive and non-conductive materials.

The SMART 2-wire transmitter has HART® communications for remote commissioning and inspection.

- Key Applications: Oil/water or foam/liquid interface measurement in separators or coalescers, cryogenic applications including CO<sub>2</sub> and liquified natural gas (LNG), distillation/regeneration tanks with high temperatures

#### Technical specifications

Input	
Measuring range	1 ... 3300 pF
Span	Min. 3.3 pF
Output	
Solid-state switch	
• Output	Galvanically isolated
• Protection	Bipolar
• Max. switching voltage	<ul style="list-style-type: none"> <li>• 30 V (DC)</li> <li>• 30 V peak (AC)</li> </ul>
• Max. load current	82 mA
• Voltage drop	< 1 V, typical at 50 mA
• Time delay (pre or post switching)	1 ... 60 s
Loop current	3.6 ... 22 mA/22 ... 3.6 mA (2-wire current loop)
Accuracy (transmitter)	
Temperature stability	0.15 pF (0 pF) or < 0.25 % (typically < 0.1 %) of actual measured value, whichever is greater over the full temperature range
Non-linearity and repeatability	< 0.1 % of range and actual measured value respectively
Accuracy	Deviation < 0.1 % of measured value

# Level Measurement

## Continuous level measurement - Capacitance transmitters

SITRANS LC500

<b>Rated operating conditions<sup>1)</sup></b>	
Installation conditions	
• Location	Indoor/outdoor
Ambient conditions	
• Ambient temperature (transmitter)	-40 ... +85 °C (-40 ... +185 °F) <sup>2)</sup>
• Installation category	II
• Pollution degree	4
Medium conditions	
• Relative dielectric constant $\epsilon_r$	Min. 1.5
• Process temperature	Temperature rating of process seal is pressure dependent. See Pressure/Temperature curves on page 5/291.
- Standard (PFA) <sup>3)</sup>	-50 ... +200 °C (-58 ... +392 °F)
- High temperature version with thermal isolator and enamel insulation	-60 ... +400 °C (-76 ... +752 °F)
- Cryogenic version	-200 ... +200 °C (-328 ... +392 °F)
• Process pressure	Contact <a href="mailto:nacc.smpi@siemens.com">nacc.smpi@siemens.com</a> for details.
• Standard (PFA)	Pressure rating of process seal is temperature dependent. See Pressure/Temperature curves on page 5/291.
• High temperature version (Enamel) <sup>4)</sup>	-1 ... 150 bar g (2175 psi g) Contact <a href="mailto:nacc.smpi@siemens.com">nacc.smpi@siemens.com</a> for details.
<b>Design</b>	
Material	
• Wetted parts material	316L stainless steel
- Standard rod	
• Probe insulation (rod)	PFA, enamel, contact <a href="mailto:nacc.smpi@siemens.com">nacc.smpi@siemens.com</a> for details.
• Cable	316 stainless steel/ 316 stainless steel PFA
Probe diameter	
• Rod version	16 mm (0.63") or 24 mm (0.95")
• Cable version	9 mm (0.35") with PFA jacket, 6 mm (0.24") without PFA jacket
Active shield length	
• Minimum (rod version)	50 mm (1.97"), customer selectable (order number Y02)
Probe length	
• Rod version	Max. 3.5 m (138") with 16 mm rod, PFA Max. 1.5 m (59") with 16 mm rod, enamel Max. 5.5 m (216") with 24 mm rod, PFA
• Cable version	Max. 35 m (1378")
Process connection of probe	
• Threaded mounting	NPT [(Taper), ANSI/ASME B1.20.1] R [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] G [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]
• Flange mounting	ASME, EN 1092-1
Enclosure	
• Material	Aluminium, epoxy-coated
• Cable inlet	2 x 1/2" NPT (2 x M20x1.5, IP68 adapter, optional)
• Degree of protection	Type 4X/NEMA4X/IP65, IP68

<b>Power supply</b>	12 ... 33 V DC
<b>User Interface</b>	
Display	Local LCD, 4 digit, each 0 ... 9 and limited alpha characters
Rotary function switch	For selecting programmable menu items
Push buttons	Red +, blue -, used in conjunction with rotary switch for programming
<b>Features</b>	
Measurement current signalling	According to NAMUR NE 43, signal 3.8 ... 20.5 mA, fault $\leq 3.6$ or $\geq 21$ mA (22 mA)
Safety	<ul style="list-style-type: none"> <li>• Inputs/outputs fully galvanically isolated</li> <li>• Polarity-insensitive current loop</li> <li>• Fully potted</li> <li>• Integrated safety barrier</li> </ul>
Diagnostics with fault alarm when:	Primary variable (PV) out of limits, system failure in measurement circuit, deviation between A/D and D/A converter, check sum, watch dog and self-checking facility
Function rotary switch	Positions 0 ... 9, A ... F
SMART communication	Conforming to HART Communication Foundation (HCF)
<b>Certificates and approvals</b>	
General Purpose	CE, CSA, FM, C-TICK
Non-incendive/Non-sparking	<ul style="list-style-type: none"> <li>• CSA/FM Class 1, Div. 2, Groups A, B, C, D T4 ATEX II 3G 2D EEx nA [ib] IIC</li> <li>• T6 to T4 T100 °C</li> </ul>
Dust Ignition Proof (Intrinsically Safe Probe Circuit)	<ul style="list-style-type: none"> <li>• CSA/FM Class II and III, Div. 1, Groups E, F, G</li> <li>• ATEX II 1/2 GD EEx d [ia] T6 to T1 T100 °C</li> </ul>
Explosion Proof (Intrinsically Safe Probe Circuit)	<ul style="list-style-type: none"> <li>• FM Class 1, Div. 1, Groups A, B, C, D T4</li> <li>• ATEX II 1/2 GD EEx d [ia] IIC T6 to T1</li> </ul>
Marine	Lloyds Register of Shipping, Categories ENV1, ENV2, ENV3 and ENV5, Bureau Veritas

<sup>1)</sup> When operation is in areas classified as hazardous, observe restrictions according to relevant certificate. See also Pressure/Temperature curves on page 5/291.

<sup>2)</sup> Thermal isolator is used if process connection temperature exceeds +85 °C (+185 °F).

<sup>3)</sup> Not recommended for steam environments

<sup>4)</sup> Enamel insulation is available as a special order item, subject to application review. Please complete the Application Questionnaire on page 5/9 and contact [nacc.smpi@siemens.com](mailto:nacc.smpi@siemens.com)

# Level Measurement

## Continuous level measurement - Capacitance transmitters

### SITRANS LC500

SITRANS LC500 probe version	Standard		Extended Cable version with Rod Sensor
<b>Process connection types</b>	Threaded or welded flange	Single piece flanged	Threaded or welded flange
Threaded	Available as standard	–	Available as standard
Flange	Available as standard	Available as standard	Available as standard
<b>Process connection materials</b>			
Stainless steel 316L	Available as standard	Available as standard	Available as standard
<b>Probe insulation</b>			
PFA	Available as standard	Available as standard	Available as standard
Enamel <sup>1)</sup>	contact <a href="mailto:nacc.smpi@siemens.com">nacc.smpi@siemens.com</a> for details.	contact <a href="mailto:nacc.smpi@siemens.com">nacc.smpi@siemens.com</a> for details.	–
<b>Length and Process parameters<sup>2)</sup></b>			
Rod length for PFA 16 mm version	Min. 200 mm (7.87") Max. 3500 mm (137.80")	Min. 200 mm (7.87") Max. 3500 mm (137.80")	Min. 200 mm (7.87") Max. 3500 mm (137.80")
Rod length for PFA 24 mm version	Min. 200 mm (7.87") Max. 5500 mm (216.54")	Min. 200 mm (7.87") Max. 5500 mm (216.54")	Min. 200 mm (7.87") Max. 5500 mm (216.54")
Rod length for enamel 16 mm version <sup>3)</sup>	contact <a href="mailto:nacc.smpi@siemens.com">nacc.smpi@siemens.com</a> for details.	contact <a href="mailto:nacc.smpi@siemens.com">nacc.smpi@siemens.com</a> for details.	–
Cable length	Min. 1000 mm (39.37") Max. 35000 mm (1377.95")	Min. 1000 mm (39.37") Max. 35000 mm (1377.95")	Min. 5000 mm (196.85") <sup>3)</sup> Max. 35000 mm (1377.95") <sup>3)</sup>
Maximum process pressure	See Pressure/Temperature curves for specific probe type		5 bar g (73 psi g)
Maximum process temperature	See Pressure/Temperature curves for specific probe type		+100 °C (+212 °F)

<sup>1)</sup> Thermal isolator is used if process connection temperature exceeds +85 °C (+185 °F).

<sup>2)</sup> See Pressure/Temperature curves for specific probe type

<sup>3)</sup> Refers to total insertion length. See dimensional drawing on page 5/301 for further explanation

- Not available as standard

# Level Measurement

## Continuous level measurement - Capacitance transmitters

SITRANS LC500

Selection and Ordering data	Order No.
<b>SITRANS LC500, Threaded or Welded Flange with Cable Sensor</b>	C) 7 ML 5 5 1 3 -
Inverse frequency shift capacitance level and interface transmitter for extreme and critical process conditions, such as oil and liquid gas, toxic and aggressive chemicals and vapours.	
<b>Version<sup>1)</sup></b>	
Cable, 9 mm (0.35") diameter, 316 stainless steel with PFA insulation, weighted	
<u>Add order code Y01 and plain text:</u>	
<u>"Insertion length ... mm"</u>	
1000 ... 2000 mm (39.37 ... 78.74")	0 E
2001 ... 4000 mm (78.78 ... 157.48")	1 E
4001 ... 6000 mm (157.52 ... 236.22")	2 E
6001 ... 8000 mm (236.26 ... 314.96")	3 E
8001 ... 10000 mm (315 ... 393.70")	4 E
Longer lengths possible to a max. of 35000 mm (114.83 ft). Contact <a href="mailto:nacc.smpi@siemens.com">nacc.smpi@siemens.com</a> for details.	
Cable, 6 mm (0.24") diameter, 316L stainless steel, non-insulated, weighted (non-conductive media only)	
<u>Add order code Y01 and plain text:</u>	
<u>"Insertion length ... mm"</u>	
1000 ... 2000 mm (39.37 ... 78.74") <sup>2)</sup>	0 F
2001 ... 4000 mm (78.78 ... 157.48") <sup>2) 3)</sup>	1 F
4001 ... 6000 mm (157.52 ... 236.22") <sup>2) 3)</sup>	2 F
6001 ... 8000 mm (236.26 ... 314.96") <sup>2) 3)</sup>	3 F
8001 ... 10000 mm (315 ... 393.70") <sup>2) 3)</sup>	4 F
Cable lengths up to 25000 mm (984.25") are possible for non-conductive media. Cable lengths up to 15000 mm (590.55") are possible for conductive media. Contact <a href="mailto:nacc.smpi@siemens.com">nacc.smpi@siemens.com</a> for details.	
<b>Process connection (316L Stainless steel)</b>	
<u>Threaded connection</u>	
1½" NPT [(Taper), ANSI/ASME B1.20.1]	C 0
R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	F 0
1¼" NPT [(Taper), ANSI/ASME B1.20.1]	K 0
G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	L 0
<u>Welded flange, raised face</u>	
1½", ASME, 150 lb	B 1
1½", ASME, 300 lb	B 2
1½", ASME, 600 lb	B 3
2", ASME, 150 lb	C 1
2", ASME, 300 lb	C 2
2", ASME, 600 lb	C 3
3", ASME, 150 lb <sup>3)</sup>	D 1
3", ASME, 300 lb <sup>3)</sup>	D 2
3", ASME, 600 lb <sup>3)</sup>	D 3
4", ASME, 150 lb <sup>3)</sup>	E 1
4", ASME, 300 lb <sup>3)</sup>	E 2
4", ASME, 600 lb <sup>3)</sup>	E 3
6", ASME, 150 lb <sup>3)</sup>	F 1
6", ASME, 300 lb <sup>3)</sup>	F 2
6", ASME, 600 lb <sup>3)</sup>	F 3
<u>Welded flange, Type A flat faced</u>	
DN 40, PN 16	K 4
DN 40, PN 40	K 5
DN 50, PN 16	L 4
DN 50, PN 40	L 5
DN 80, PN 16	M 4
DN 80, PN 40 <sup>3)</sup>	M 5
DN 100, PN 16 <sup>3)</sup>	N 4
DN 100, PN 40 <sup>3)</sup>	N 5
DN 125, PN 16 <sup>3)</sup>	P 4
DN 125, PN 40 <sup>3)</sup>	P 5
(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5, or EN 1092-1 standard.)	

Selection and Ordering data	Order No.
<b>SITRANS LC500, Threaded or Welded Flange with Cable Sensor</b>	C) 7 ML 5 5 1 3 -
Inverse frequency shift capacitance level and interface transmitter for extreme and critical process conditions, such as oil and liquid gas, toxic and aggressive chemicals and vapours.	
<b>Approvals</b>	
General Purpose: CE, CSA, FM, C-TICK	1
CSA/FM Class 1, Div. 2, Groups A, B, C, D T4;	2
ATEX II 3G 2D EExn A [ib] IIC T6 to T4 T100 °C;	
CSA/FM Class II and III, Div. 1, Groups E, F, G	4
ATEX II 1/2 GD EEx d [ia] IIC T6 to T1	6
FM Class I, Div.1, Groups A, B, C, D, T4	
<b>Enclosure/Cable inlet</b>	
<u>Aluminum epoxy coated</u>	
2 x ½" NPT, IP68	1
2 x M20x1.5 (IP68, adapter)	2
<b>Options</b>	
No additional options	
With mounting eye <sup>4)</sup>	A
	B
<b>Thermal isolator</b>	
Without thermal isolator	
Isolator, only for use when temperature range is outside of -40 ... +85 °C (-40 ... +185 °F), explosion proof approval -40 ... +70 °C (-40 ... +158 °F)	A
	B
<b>Electronic output</b>	
2-wire loop current 4 ... 20 mA	
(transmitter MSP 2002-2 _3300 pF)	1
1) A minimum span of 3 pF must be maintained	
2) Available with non-conductive media only	
3) Custom shipping methods required. Contact factory for more details.	
4) Available in PFA insulated version only	
C) Subject to export regulations AL: N, ECCN: EAR99	

Selection and Ordering data	Order code
<b>Further designs</b>	
Please add <b>"-Z"</b> to Order No. and specify Order code(s).	
Insertion length, specify in plain text: Y01: ... mm	<b>Y01</b>
Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text	<b>Y15</b>
Acceptance test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and ISO 9000	<b>C11</b>
Inspection Certificate Type 3.1 per EN 10204	<b>C12</b>
<b>Operating Instructions</b>	<b>See page 5/290</b>
<b>Accessories</b>	<b>See page 5/290</b>

5



# Level Measurement

## Continuous level measurement - Capacitance transmitters

### SITRANS LC500

#### Selection and Ordering data

Order No.

#### SITRANS LC500, Threaded or Welded Flange, with Rod Sensor

7 ML 5 5 1 5 -

Inverse frequency shift capacitance level and interface transmitter for extreme and critical process conditions, such as oil and liquid gas, toxic and aggressive chemicals and vapours.

#### Version

#### NOTE:

Enamel insulation is available as a special order item, subject to application review. Please complete the Application Questionnaire on page 5/9 and contact [nacc.smpi@siemens.com](mailto:nacc.smpi@siemens.com)

Rod, 16 mm (0.63"), PFA insulated

Add order code Y01 and Y02 and plain text:

"Insertion length ... mm and active shield length ... mm"

200 ... 1000 mm (7.87 ... 39.37")<sup>1)</sup>

0 A

1001 ... 2000 mm (39.41 ... 78.74")

1 A

2001 ... 3000 mm (78.78 ... 118.11")<sup>2)</sup>

2 A

3001 ... 3500 mm (118.15 ... 137.80")<sup>2)</sup>

3 A

Rod, 16 mm (0.63"), PFA insulated with 35 mm

(1.38") stilling well in 316L stainless steel

Add order code Y01 and Y02 and plain text:

"Insertion length ... mm and active shield length ... mm"

200 ... 1000 mm (7.87 ... 39.37")<sup>1) 3)</sup>

0 B

1001 ... 2000 mm (39.41 ... 78.74")<sup>3)</sup>

1 B

2001 ... 3000 mm (78.78 ... 118.11")<sup>2) 3)</sup>

2 B

3001 ... 3500 mm (118.15 ... 137.80")<sup>2) 3)</sup>

3 B

Rod, 24 mm (0.94"), PFA insulated

Add order code Y01 and Y02 and plain text:

"Insertion length ... mm and active shield length ... mm"

200 ... 1000 mm (7.87 ... 39.37")<sup>4)</sup>

0 C

1001 ... 2000 mm (39.41 ... 78.74")<sup>4)</sup>

1 C

2001 ... 3000 mm (78.78 ... 118.11")<sup>2) 4)</sup>

2 C

3001 ... 4000 mm (118.15 ... 157.48")<sup>2) 4)</sup>

3 C

4001 ... 5000 mm (173.26 ... 196.88")<sup>2) 4)</sup>

4 C

5001 ... 5500 mm (196.89 ... 216.54")<sup>2) 4)</sup>

5 C

Rod, 24 mm (0.94"), PFA insulated with 48 mm

(1.89") stilling well in 316L stainless steel

Add order code Y01 and Y02 and plain text:

"Insertion length ... mm and active shield length ... mm"

200 ... 1000 mm (7.87 ... 39.37")<sup>5)</sup>

0 D

1001 ... 2000 mm (39.41 ... 78.74")<sup>5)</sup>

1 D

2001 ... 3000 mm (78.78 ... 118.11")<sup>2) 5)</sup>

2 D

3001 ... 4000 mm (118.15 ... 157.48")<sup>2) 5)</sup>

3 D

4001 ... 5000 mm (173.26 ... 196.88")<sup>2) 5)</sup>

4 D

5001 ... 5500 mm (196.89 ... 216.54")<sup>2) 5)</sup>

5 D

#### Process connection (316L Stainless steel)

##### Threaded connection

¾" NPT [(Taper), ANSI/ASME B1.20.1]

A 0

1" NPT [(Taper), ANSI/ASME B1.20.1]

B 0

1½" NPT [(Taper), ANSI/ASME B1.20.1]

C 0

2" NPT [(Taper), ANSI/ASME B1.20.1]

D 0

R ¾" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]

E 0

R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]

F 0

R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]

J 0

R 2" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]

K 0

1¼" NPT [(Taper), ANSI/ASME B1.20.1]

N 0

G ¾" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]

P 0

G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]

R 0

G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P),

S 0

JIS B 0202]

G 2" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]

T 0

#### Selection and Ordering data

Order No.

#### SITRANS LC500, Threaded or Welded Flange, with Rod Sensor

7 ML 5 5 1 5 -

Inverse frequency shift capacitance level and interface transmitter for extreme and critical process conditions, such as oil and liquid gas, toxic and aggressive chemicals and vapours.

#### Welded flange, raised face

1½", ASME, 150 lb

B 1

1½", ASME, 300 lb

B 2

1½", ASME, 600 lb

B 3

2", ASME, 150 lb

C 1

2", ASME, 300 lb

C 2

2", ASME, 600 lb

C 3

3", ASME, 150 lb<sup>2)</sup>

D 1

3", ASME, 300 lb<sup>2)</sup>

D 2

3", ASME, 600 lb<sup>2)</sup>

D 3

4", ASME, 150 lb<sup>2)</sup>

E 1

4", ASME, 300 lb<sup>2)</sup>

E 2

4", ASME, 600 lb<sup>2)</sup>

E 3

6", ASME, 150 lb<sup>2)</sup>

F 1

6", ASME, 300 lb<sup>2)</sup>

F 2

6", ASME, 600 lb<sup>2)</sup>

F 3

#### Welded flange, Type A flat faced

DN 40, PN 16

K 4

DN 40, PN 40

K 5

DN 50, PN 16

L 4

DN 50, PN 40

L 5

DN 80, PN 16

M 4

DN 80, PN 40<sup>2)</sup>

M 5

DN 100, PN 16<sup>2)</sup>

N 4

DN 100, PN 40<sup>2)</sup>

N 5

DN 125, PN 16<sup>2)</sup>

P 4

DN 125, PN 40<sup>2)</sup>

P 5

(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5, or EN 1092-1 standard.)

#### Approvals

General Purpose: CE, CSA, FM, C-TICK  
 CSA/FM Class 1, Div. 2, Groups A, B, C, D T4;  
 ATEX II 3G 2D EExn A [ib] IIC T6 to T4 T100 °C;  
 CSA/FM Class II and III, Div. 1, Groups E, F, G  
 ATEX II 1/2 GD EEx d [ia] IIC T6 to T1  
 FM Class I, Div.1, Groups A, B, C, D, T4

1

2

4

6

#### Enclosure/Cable inlet

Aluminum epoxy coated

2 x ½" NPT, IP68

1

2 x M20x1.5 (IP68, adapter)

2

#### Options

No additional options

Slotted holes instead of standard vent holes in stilling well (refer to Operating Instructions for dimensions.)<sup>6)</sup>

A

B

#### Thermal isolator/remote version

Without thermal isolator or remote electronics  
 Thermal isolator, only for use when temperature range is outside of -40 ... +85 °C (-40 ... +185 °F), explosion proof approval -40 ... +70 °C (-40 ... +158 °F)

A

B

Remote electronics with mounting bracket and cable<sup>7)</sup>

• Length: 2 m (79")

C

• Length: 3 m (118")

D

• Length: 4 m (158")

E

• Length: 5 m (197")

F

#### Electronic output

2-wire loop current 4 ... 20 mA  
 (transmitter MSP 2002-2\_3300 pF)

1

1) A minimum span of 3 pF must be maintained

2) Custom shipping methods required. Contact factory for more details.

3) Available with process connection 1½" or larger

4) Available with process connection 1" or larger

5) Available with process connection 2" or larger

6) Available with version 0B to 3B, 0D to 5D and 0F only

7) Available with approval option 1 only

C) Subject to export regulations AL: N, ECCN: EAR99

# Level Measurement

## Continuous level measurement - Capacitance transmitters

SITRANS LC500

Selection and Ordering data	Order code
<b>Further designs</b>	
Please add <b>"-Z"</b> to Order No. and specify Order code(s).	
Insertion length, specify in plain text: Y01: ... mm	<b>Y01</b>
Active shield length, specify in plain text [min. length is 50 mm (2")]: Y02: ... mm	<b>Y02</b>
Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text	<b>Y15</b>
Acceptance test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and ISO 9000	<b>C11</b>
Inspection Certificate Type 3.1 per EN 10204	<b>C12</b>
Manufacturing Test Report (Electrode Test)	<b>C18</b>
<b>Operating Instructions</b>	<b>See page 5/290</b>
<b>Accessories</b>	<b>See page 5/290</b>

# Level Measurement

## Continuous level measurement - Capacitance transmitters

### SITRANS LC500

#### Selection and Ordering data

Order No.

#### SITRANS LC500, Single Piece Flanged with Rod C)

7 ML 5 5 1 7 -

#### Sensor

Inverse frequency shift capacitance level and interface transmitter for extreme and critical process conditions, such as oil and liquid gas, toxic and aggressive chemicals and vapours.

#### Version

#### NOTE:

**Enamel insulation is available as a special order item, subject to application review. Please complete the Application Questionnaire on page 5/9 and contact [nacc.smpi@siemens.com](mailto:nacc.smpi@siemens.com)**

Rod, 16 mm (0.63"), PFA insulated

Add order code Y01 and Y02 and plain text:

"Insertion length ... mm and active shield length ... mm"

250 ... 1000 mm (9.84 ... 39.37")<sup>1)</sup>

0 A

1001 ... 2000 mm (39.41 ... 78.74")

1 A

2001 ... 3000 mm (78.78 ... 118.11")<sup>2)</sup>

2 A

3001 ... 3500 mm (118.15 ... 137.80")<sup>2)</sup>

3 A

Rod, 16 mm (0.63"), PFA insulated with 35 mm

(1.34") stilling well in 316L stainless steel

Add order code Y01 and Y02 and plain text:

"Insertion length ... mm and active shield length ... mm"

250 ... 1000 mm (9.84 ... 39.37")

0 B

1001 ... 2000 mm (39.41 ... 78.74")

1 B

2001 ... 3000 mm (78.78 ... 118.11")<sup>2)</sup>

2 B

3001 ... 3500 mm (118.15 ... 137.80")<sup>2)</sup>

3 B

Rod, 24 mm (0.94"), PFA insulated

Add order code Y01 and Y02 and plain text:

"Insertion length ... mm and active shield length ... mm"

250 ... 1000 mm (9.84 ... 39.37")

0 C

1001 ... 2000 mm (39.41 ... 78.74")

1 C

2001 ... 3000 mm (78.78 ... 118.11")<sup>2)</sup>

2 C

3001 ... 4000 mm (118.15 ... 157.48")<sup>2)</sup>

3 C

4001 ... 5000 mm (173.26 ... 196.88")<sup>2)</sup>

4 C

5001 ... 5500 mm (196.89 ... 216.54")<sup>2)</sup>

5 C

Rod, 24 mm (0.94"), PFA insulated with 48 mm

(1.89") stilling well in 316L stainless steel

Add order code Y01 and Y02 and plain text:

"Insertion length ... mm and active shield length ... mm"

250 ... 1000 mm (9.84 ... 39.37")

0 D

1001 ... 2000 mm (39.41 ... 78.74")<sup>2) 3)</sup>

1 D

2001 ... 3000 mm (78.78 ... 118.11")<sup>2) 3)</sup>

2 D

3001 ... 4000 mm (118.15 ... 157.48")<sup>2) 3)</sup>

3 D

4001 ... 5000 mm (173.26 ... 196.88")<sup>2) 3)</sup>

4 D

5001 ... 5500 mm (196.89 ... 216.54")<sup>2) 3)</sup>

5 D

#### Process connection (316L Stainless steel)

##### Single piece flange, raised face

1½", ASME, 150 lb

B 1

1½", ASME, 300 lb

B 2

1½", ASME, 600 lb

B 3

2", ASME, 150 lb

C 1

2", ASME, 300 lb

C 2

2", ASME, 600 lb

C 3

3", ASME, 150 lb<sup>2)</sup>

D 1

3", ASME, 300 lb<sup>2)</sup>

D 2

3", ASME, 600 lb<sup>2)</sup>

D 3

4", ASME, 150 lb<sup>2)</sup>

E 1

4", ASME, 300 lb<sup>2)</sup>

E 2

4", ASME, 600 lb<sup>2)</sup>

E 3

6", ASME, 150 lb<sup>2)</sup>

F 1

6", ASME, 300 lb<sup>2)</sup>

F 2

6", ASME, 600 lb<sup>2)</sup>

F 3

#### Selection and Ordering data

Order No.

#### SITRANS LC500, Single Piece Flanged with Rod C)

7 ML 5 5 1 7 -

#### Sensor

Inverse frequency shift capacitance level and interface transmitter for extreme and critical process conditions, such as oil and liquid gas, toxic and aggressive chemicals and vapours.

#### Single piece flange, Type B1 raised face

DN 40, PN 16

K 4

DN 40, PN 40

K 5

DN 50, PN 16

L 4

DN 50, PN 40

L 5

DN 80, PN 16

M 4

DN 80, PN 40<sup>2)</sup>

M 5

DN 100, PN 16<sup>2)</sup>

N 4

DN 100, PN 40<sup>2)</sup>

N 5

DN 125, PN 16<sup>2)</sup>

P 4

DN 125, PN 40<sup>2)</sup>

P 5

#### Single piece flange with PTFE flange facing (applicable with versions 0A ... 3A and 0C ... 5C)<sup>4)</sup>

1½", ASME, 150 lb

B 4

1½", ASME, 300 lb

B 5

1½", ASME, 600 lb

B 6

2", ASME, 150 lb

C 4

2", ASME, 300 lb

C 5

2", ASME, 600 lb

C 6

3", ASME, 150 lb<sup>2)</sup>

D 4

3", ASME, 300 lb<sup>2)</sup>

D 5

3", ASME, 600 lb<sup>2)</sup>

D 6

4", ASME, 150 lb<sup>2)</sup>

E 4

4", ASME, 300 lb<sup>2)</sup>

E 5

4", ASME, 600 lb<sup>2)</sup>

E 6

6", ASME, 150 lb<sup>2)</sup>

F 4

6", ASME, 300 lb<sup>2)</sup>

F 5

6", ASME, 600 lb<sup>2)</sup>

F 6

#### Single piece flange with PTFE flange facing (applicable with versions 0A ... 3A, 0C ... 5C)<sup>4)</sup>

DN 40, PN 16

K 6

DN 40, PN 40

K 7

DN 50, PN 16

L 6

DN 50, PN 40

L 7

DN 80, PN 16

M 6

DN 80, PN 40<sup>2)</sup>

M 7

DN 100, PN 16<sup>2)</sup>

N 6

DN 100, PN 40<sup>2)</sup>

N 7

DN 125, PN 16<sup>2)</sup>

P 6

DN 125, PN 40<sup>2)</sup>

P 7

(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5, or EN 1092-1 standard.)

#### Approvals

General Purpose: CE, CSA, FM, C-TICK

1

CSA/FM Class 1, Div. 2, Groups A, B, C, D T4;

2

ATEX II 3G 2D EExn A [ib] IIC T6 to T4 T100 °C;

CSA/FM Class II and III, Div. 1, Groups E, F, G

4

ATEX II 1/2 GD EEx d [ia] IIC T6 to T1

6

FM Class I, Div.1, Groups A, B, C, D, T4

#### Enclosure/Cable inlet

Aluminum epoxy coated

2 x ½" NPT, IP68

1

2 x M20x1.5 (IP68, adapter)

2

#### Options

None

A


Slotted holes instead of standard vent holes in stilling well (Refer to manual for dimensions)<sup>5)</sup>

B

# Level Measurement

## Continuous level measurement - Capacitance transmitters

SITRANS LC500

Selection and Ordering data	Order No.	Selection and Ordering data	Order code
<b>SITRANS LC500, Single Piece Flanged with Rod C)</b> <b>Sensor</b> Inverse frequency shift capacitance level and interface transmitter for extreme and critical process conditions, such as oil and liquid gas, toxic and aggressive chemicals and vapours.	<b>7 ML 5 5 1 7 -</b> 	<b>Further designs</b> Please add <b>"-Z"</b> to Order No. and specify Order code(s). Insertion length, specify in plain text: Y01: ... mm Active shield length, specify in plain text [min. length is 50 mm (2")]: Y02: ... mm Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text Acceptance test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and ISO 9000 Inspection Certificate Type 3.1 per EN 10204 Manufacturing Test Report (Electrode Test)	
<b>Thermal isolator/remote version</b> Without thermal isolator Isolator, only for use when temperature range is outside of -40 ... +85 °C (-40 ... +185 °F), explosion proof approval -40 ... +70 °C (-40 ... +158 °F) Remote electronics with mounting bracket and cable <sup>6)</sup>	A B C D E F	<b>Operating Instructions</b> <b>Accessories</b>	<b>Y01</b> <b>Y02</b> <b>Y15</b> <b>C11</b> <b>C12</b> <b>C18</b>
<ul style="list-style-type: none"> <li>• Length: 2 m (79")</li> <li>• Length: 3 m (118")</li> <li>• Length: 4 m (158")</li> <li>• Length: 5 m (197")</li> </ul>			<b>See page 5/290</b> <b>See page 5/290</b>
<b>Electronic output</b> 2-wire loop current 4 ... 20 mA (transmitter MSP 2002-2 _3300 pF)	1		

- 1) A minimum span of 3 pF must be maintained
  - 2) Custom shipping methods required. Contact factory for more details.
  - 3) Available with process connection 2" or larger, and only available with process connection options C1 to F3, L4 to P5
  - 4) Not available with versions 0E and 0F
  - 5) Available with version 0B to 3B, 0D to 5D and 0F only
  - 6) Available with approval option 1 only
- C) Subject to export regulations AL: N, ECCN: EAR99

# Level Measurement

## Continuous level measurement - Capacitance transmitters

### SITRANS LC500

#### Selection and Ordering data

**SITRANS LC500, Extended Cable version with Rod Sensor, threaded connection or welded flange<sup>1)</sup>** C) **7 ML 5 5 2 3 -**

Inverse frequency shift capacitance level and interface transmitter for short range continuous measurement in large storage vessels.

#### Version<sup>2)</sup>

Rod, 16 mm (0.63"), PFA insulated and 316L stainless steel flexible extension tube

Total insertion length:

Add order code Y01 and plain text: "Total insertion length ... mm and Y02 and plain text:

Active shield length ... mm"<sup>3) 4)</sup>

- 5000 ... 10000 mm (196.85 ... 393.70")<sup>1)</sup>
- 10001 ... 15000 mm (393.74 ... 590.55")<sup>1)</sup>
- 15001 ... 20000 mm (590.59 ... 787.40")<sup>1)</sup>
- 20001 ... 25000 mm (787.44 ... 984.25")<sup>1)</sup>
- 25001 ... 30000 mm (984.29 ... 1181.10")<sup>1)</sup>
- 30001 ... 35000 mm (1181.14 ... 1377.95")<sup>1)</sup>

Rod, 24 mm (0.94"), PFA insulated and 316L stainless steel flexible extension tube

Total insertion length:

Add order code Y01 and plain text: "Total insertion length ... mm and Y02 and plain text:

Active shield length ... mm"<sup>3) 4)</sup>

- 5000 ... 10000 mm (196.85 ... 393.70")<sup>1)</sup>
- 10001 ... 15000 mm (393.74 ... 590.55")<sup>1)</sup>
- 15001 ... 20000 mm (590.59 ... 787.40")<sup>1)</sup>
- 20001 ... 25000 mm (787.44 ... 984.25")<sup>1)</sup>
- 25001 ... 30000 mm (984.29 ... 1181.10")<sup>1)</sup>
- 30001 ... 35000 mm (1181.14 ... 1377.95")<sup>1)</sup>

#### Process connection (316L stainless steel)

##### Threaded connection

2" NPT [(Taper), ANSI/ASME B1.20.1]

R 2" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]

G 2" [(BSPP), EN ISO 228-1/PF (JIS-P) JIS B 0202]

##### Welded flange, raised face

2", ASME, 150 lb

2", ASME, 300 lb

3", ASME, 150 lb<sup>1)</sup>

3", ASME, 300 lb<sup>1)</sup>

4", ASME, 150 lb<sup>1)</sup>

4", ASME, 300 lb<sup>1)</sup>

6", ASME, 150 lb<sup>1)</sup>

6", ASME, 300 lb<sup>1)</sup>

##### Welded flange, Type A flat faced

DN 50, PN 16

DN 50, PN 40

DN 80, PN 16

DN 80, PN 40<sup>1)</sup>

DN 100, PN 16<sup>1)</sup>

DN 100, PN 40<sup>1)</sup>

DN 125, PN 16<sup>1)</sup>

DN 125, PN 40<sup>1)</sup>

(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5, or EN 1092-1 standard.)

#### Approvals

General Purpose: CE, CSA, FM, C-TICK

CSA/FM Class 1, Div. 2, Groups A, B, C, D T4;

ATEX II 3G 2D EExn A [ib] IIC T6 to T4 T100 °C;

CSA/FM Class II and III, Div. 1, Groups E, F, G

ATEX II 1/2 GD EEx d [ia] IIC T6 to T1

FM Class I, Div.1, Groups A, B, C, D, T4

#### Enclosure/Cable inlet

Aluminum epoxy coated

2 x ½" NPT, IP68

2 x M20x1.5 (IP68, adapter)

#### Options

No additional options

With mounting eye

Order No.

7 ML 5 5 2 3 -

0 A

1 A

2 A

3 A

4 A

5 A

0 B

1 B

2 B

3 B

4 B

5 B

A 0

B 0

D 0

C 1

C 2

D 1

D 2

E 1

E 2

F 1

F 2

L 4

L 5

M 4

M 5

N 4

N 5

P 4

P 5

1

4

6

1

2

A

B

#### Selection and Ordering data

**SITRANS LC500, Extended Cable version with Rod Sensor, threaded connection or welded flange<sup>1)</sup>** C) **7 ML 5 5 2 3 -**

Inverse frequency shift capacitance level and interface transmitter for short range continuous measurement in large storage vessels.

#### Thermal isolator

Without thermal isolator

Isolator, only for use when temperature range is outside of -40 ... +85 °C (-40 ... +185 °F), explosion proof approval -40 ... +70 °C (-40 ... +158 °F)

#### Electronic output

2-wire loop current 4 ... 20 mA

(transmitter MSP 2002-2\_3300 pF)

<sup>1)</sup> Custom shipping methods required. Contact factory for more details.

<sup>2)</sup> A minimum span of 3 pF must be maintained.

<sup>3)</sup> See dimension drawings on page 5/301 for further explanation of Y01.

<sup>4)</sup> Inactive length is equal to the flexible extension plus transition.

See dimension drawings on page 5/301 for further explanation of Y02.

#### Selection and Ordering data

##### Further designs

Please add "-Z" to Order No. and specify Order code(s).

Insertion length, specify in plain text: Y01: to mm

Active shield length, specify in plain text [min. length is 50 mm (2")]: Y02: to mm

Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text

Acceptance test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and ISO 9000

Inspection Certificate Type 3.1 per EN 10204

##### Operating Instructions

English

French

Spanish

German

Note: The Operating Instructions should be ordered as a separate line item on the order.

This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.

##### Accessories

Transmitter, MSP 2002-1, 330 PF<sup>1)</sup>

Transmitter, MSP 2002-2, 3300 PF<sup>1)</sup>

Transmitter, MSP 2002-3, 6600 PF (used with conductive fluids and probe lengths > 10000 mm)<sup>1)</sup>

SITRANS RD100 Remote display - see Chapter 8

SITRANS RD200 Remote display - see Chapter 8

SITRANS RD500 Remote display - see Chapter 8

<sup>1)</sup> Transmitters not suitable for Intrinsically Safe application

(ATEX II 1G EEx ia IIC T4 or CSA/FM Class 1 Div 1 Grp A,B,C and D)

C) Subject to export regulations AL: N, ECCN: EAR99

D) Subject to export regulations AL: N, ECCN: EAR99H

Please contact [nacc.smpi@siemens.com](mailto:nacc.smpi@siemens.com) for special requests.

Order No.

7 ML 5 5 2 3 -

A

B

1

Order code

Y01

Y02

Y15

C11

C12

Order No.

C) **7ML1998-5GE01**

**7ML1998-5GE11**

**7ML1998-5GE21**

**7ML1998-5GE31**

C) **7ML1830-1JP**

C) **7ML1830-1JQ**

D) **7ML1830-1JR**

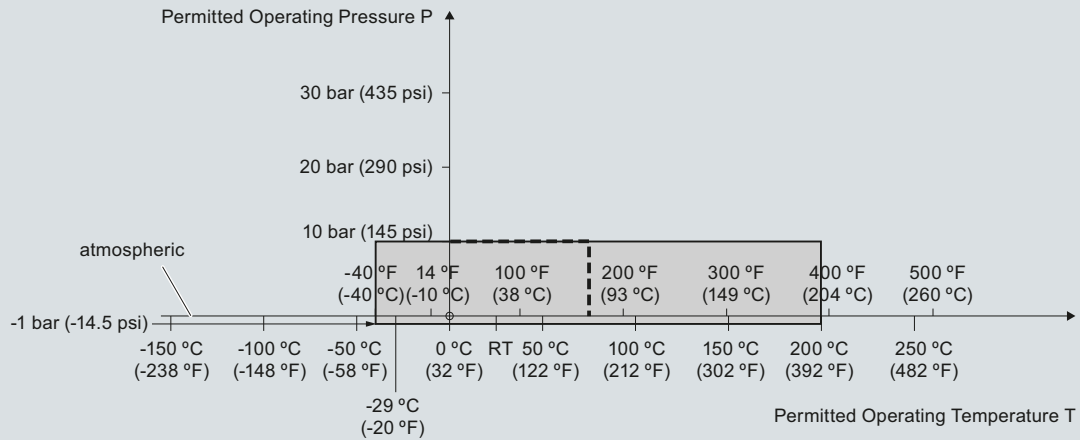
# Level Measurement

## Continuous level measurement - Capacitance transmitters

SITRANS LC500

### Characteristic curves

Pressure/Temperature Curve  
LC500 Cable Probes  
Threaded Process Connections  
(7ML5513)



----- Example:  
Permitted operating pressure = 10 bar (145 psi) at 75 °C

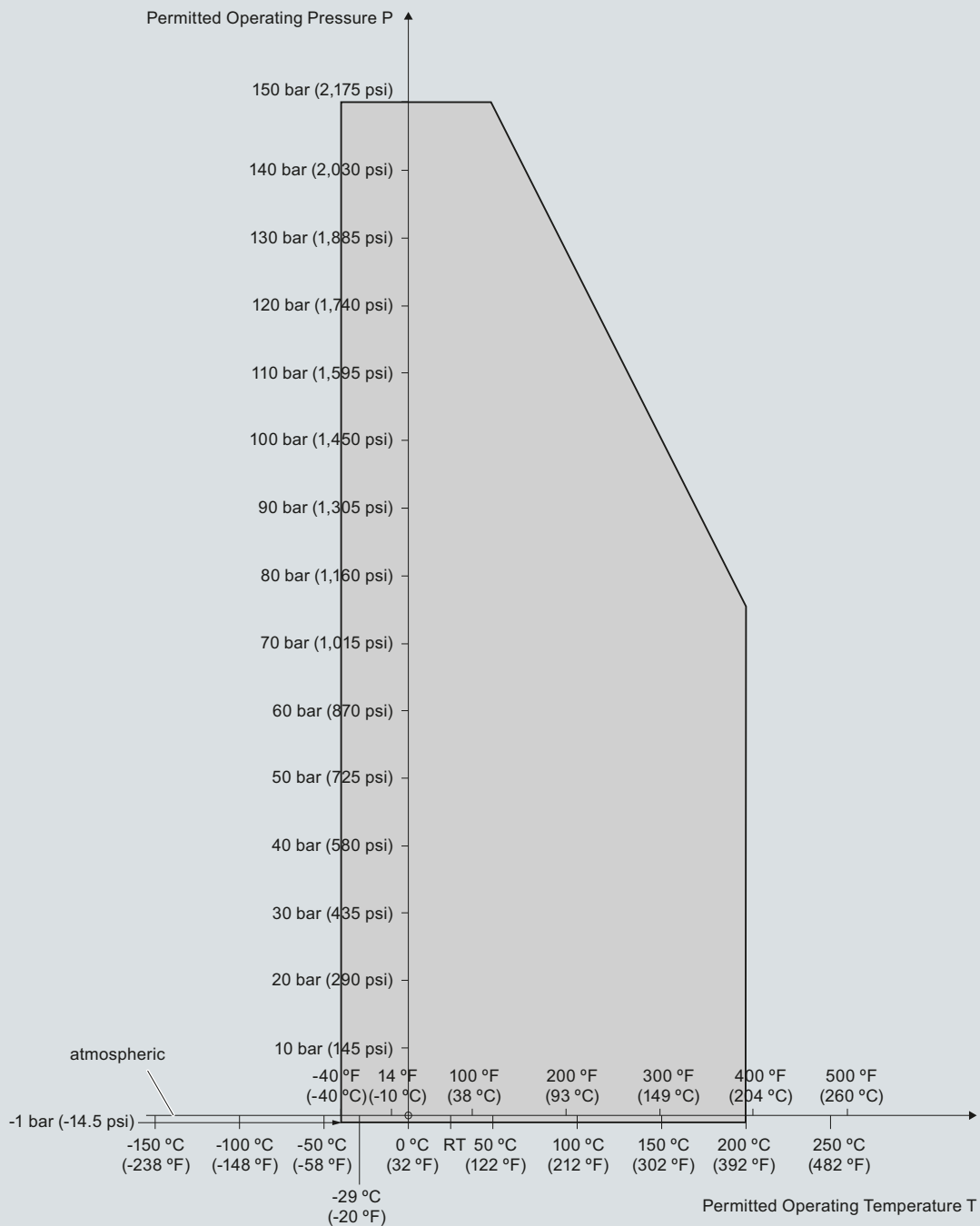
SITRANS LC500 Process Pressure/Temperature derating curves (7ML5513)

# Level Measurement

## Continuous level measurement - Capacitance transmitters

### SITRANS LC500

Pressure/Temperature Curve  
LC500 PFA Rod Probes  
Threaded Process Connections  
(7ML5515)



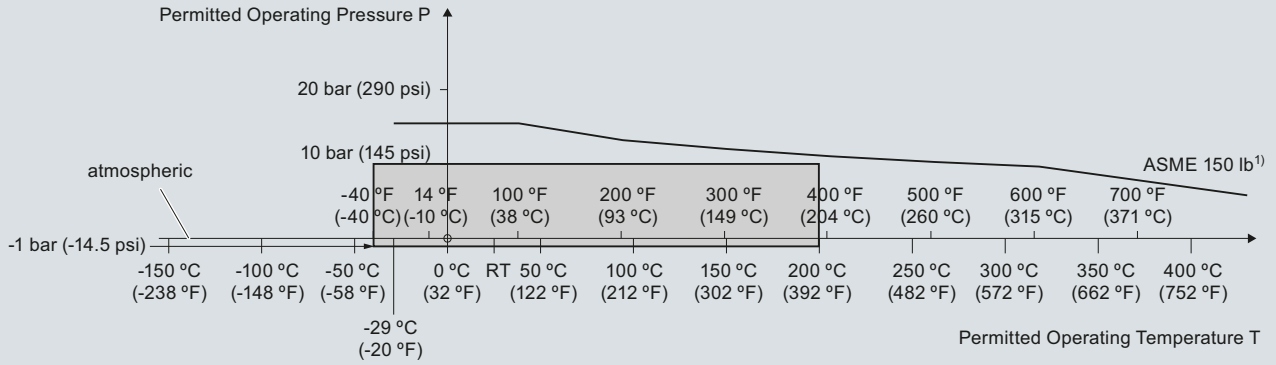
SITRANS LC500 Process Pressure/Temperature derating curves (7ML5515)

# Level Measurement

## Continuous level measurement - Capacitance transmitters

SITRANS LC500

**Pressure/Temperature Curve**  
**LC500 Cable Probes**  
**ASME Flanged Process Connections**  
**(7ML5513)**



<sup>1)</sup> The curve denotes the minimum allowable flange class for the shaded area below.

SITRANS LC500 Process Pressure/Temperature derating curves (7ML5513)



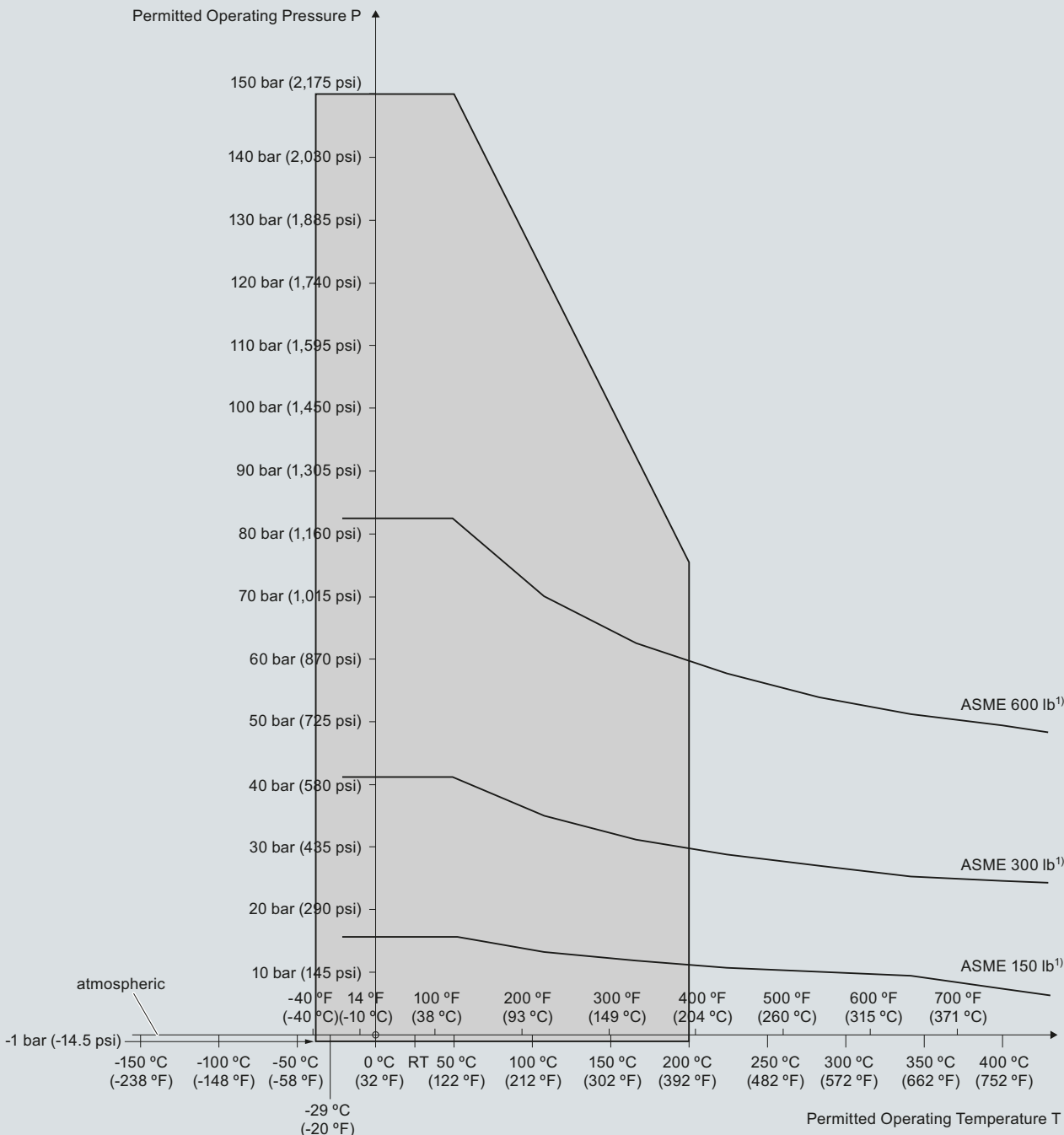
# Level Measurement

## Continuous level measurement - Capacitance transmitters

### SITRANS LC500

**Pressure/Temperature Curve**  
**LC500 PFA Rod Probes**  
**ASME Flanged Process Connections**  
**(7ML5515 and 7ML5517)**

5



<sup>1)</sup> The curve denotes the minimum allowable flange class for the shaded area below.

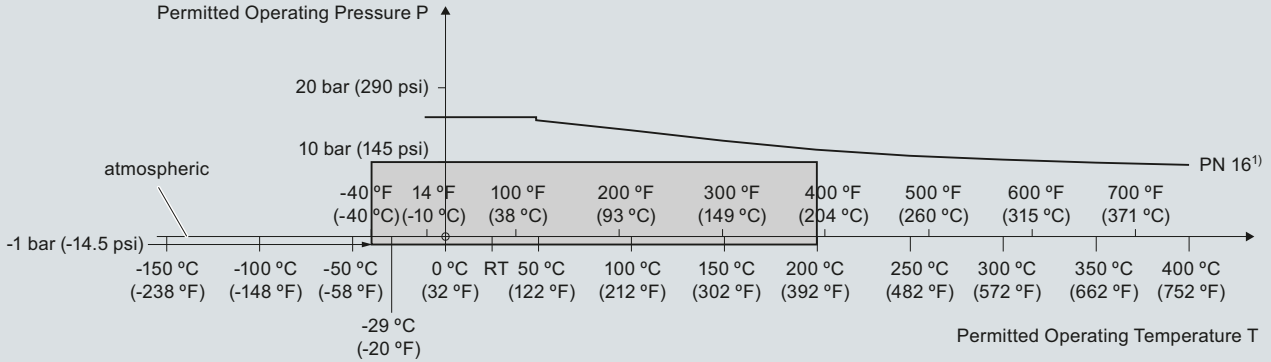
SITRANS LC500 Process Pressure/Temperature derating curves (7ML5515 and 7ML5517)

# Level Measurement

## Continuous level measurement - Capacitance transmitters

SITRANS LC500

**Pressure/Temperature Curve**  
**LC500 Cable Probes**  
**EN Flanged Process Connections**  
**(7ML5513)**



<sup>1)</sup> The curve denotes the minimum allowable flange class for the shaded area below.

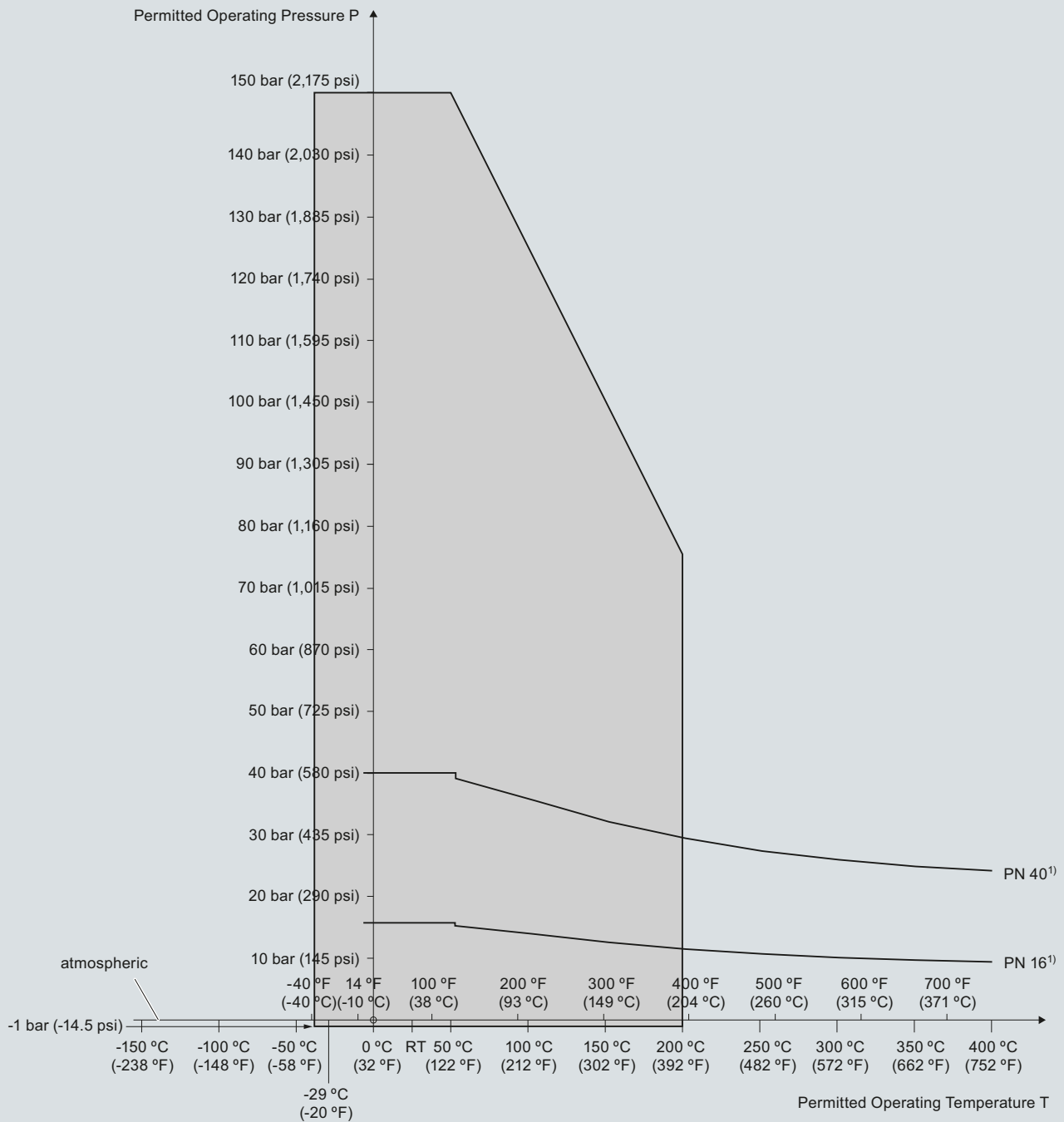
SITRANS LC500 Process Pressure/Temperature derating curves (7ML5513)

# Level Measurement

## Continuous level measurement - Capacitance transmitters

### SITRANS LC500

Pressure/Temperature Curve  
LC500 PFA Rod Probes  
EN Flanged Process Connections  
(7ML5515 and 7ML5517)



SITRANS LC500 Process Pressure/Temperature derating curves (7ML5515 and 7ML5517)

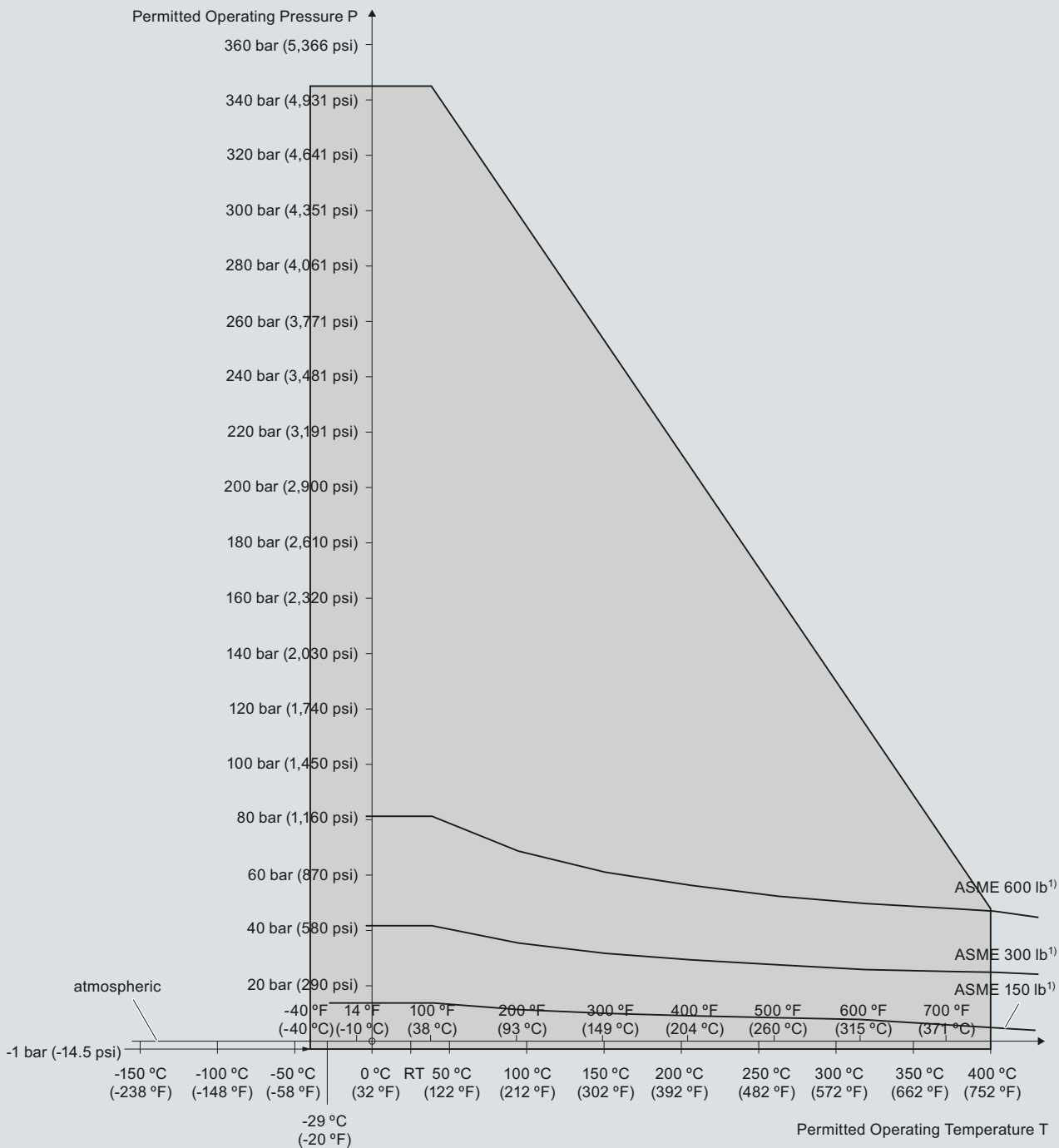
# Level Measurement

## Continuous level measurement - Capacitance transmitters

SITRANS LC500

5

**Pressure/Temperature Curve**  
**LC500 Enamel Rod Probes**  
**ASME Flanged Process Connections (7ML5515 and 7ML5517)**



<sup>1)</sup> The curve denotes the minimum allowable flange class for the shaded area below.

SITRANS LC500 Process Pressure/Temperature derating curves (7ML5515 and 7ML5517)

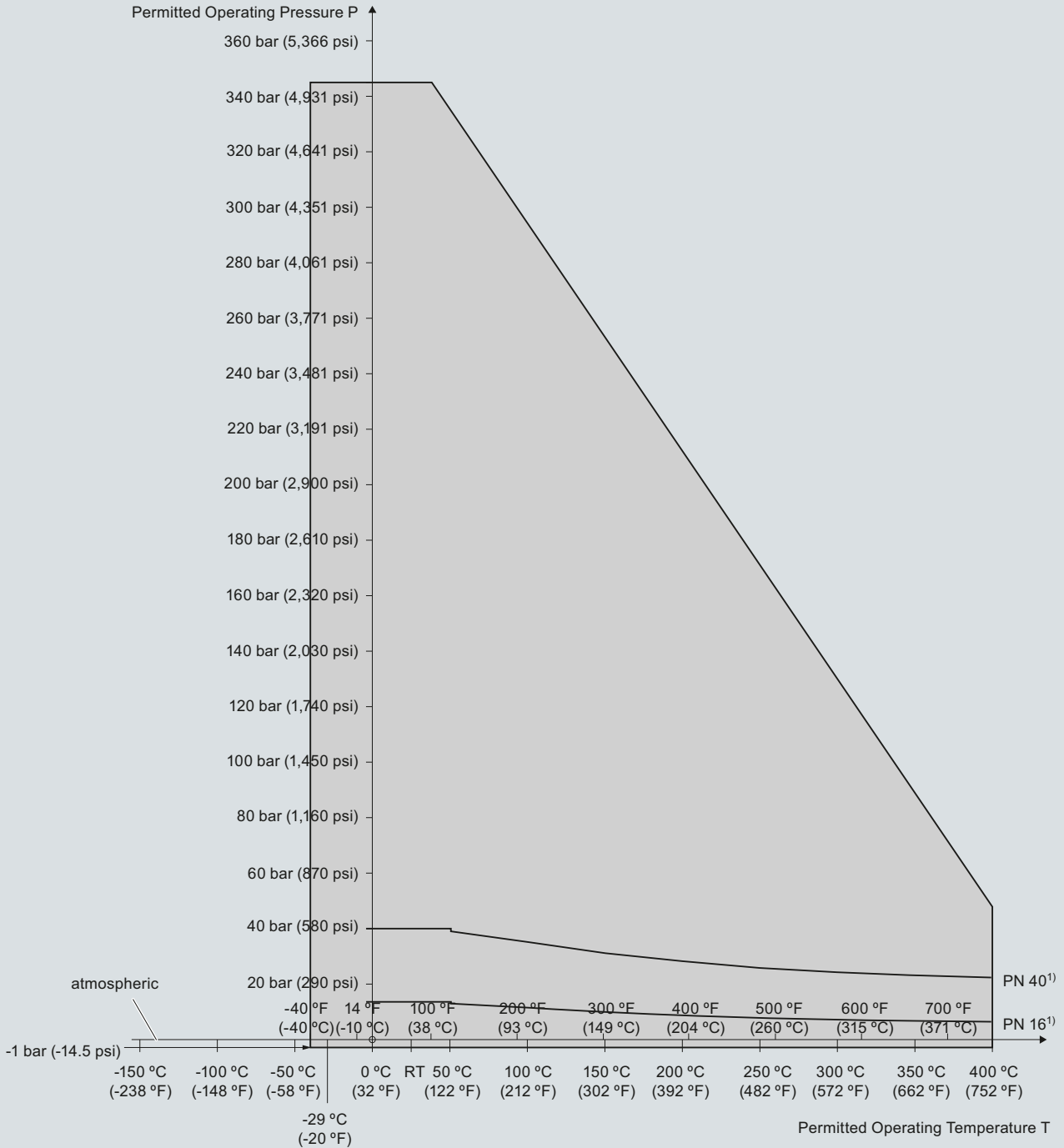
# Level Measurement

## Continuous level measurement - Capacitance transmitters

### SITRANS LC500

Pressure/Temperature Curve  
 LC500 Enamel Rod Probes  
 EN Flanged Process Connections (7ML5515 and 7ML5517)

5



¹) The curve denotes the minimum allowable flange class for the shaded area below.

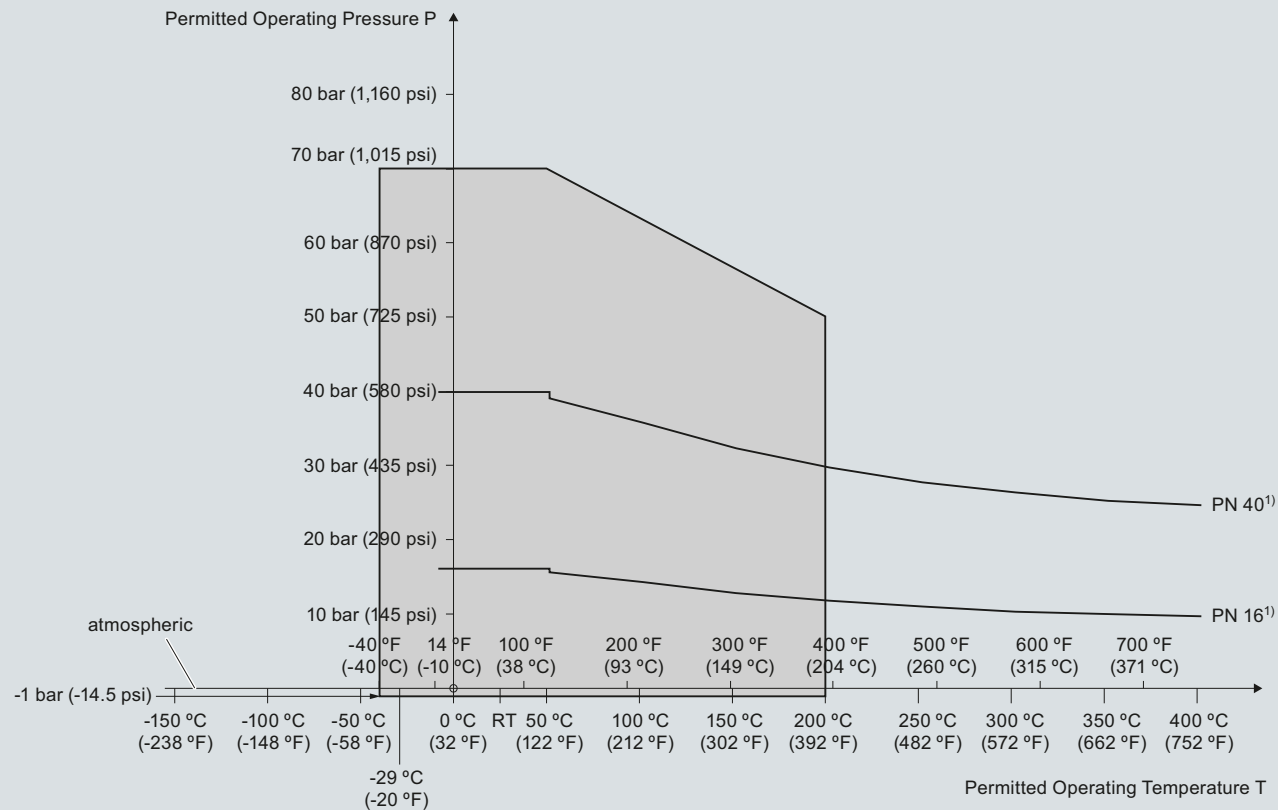
SITRANS LC500 Process Pressure/Temperature derating curves (7ML5515 and 7ML5517)

# Level Measurement

## Continuous level measurement - Capacitance transmitters

SITRANS LC500

**Pressure/Temperature Curve**  
**LC500 Single Piece Flanged Rod Probes with PTFE facing**  
**EN Flanged Process Connections**  
**(7ML5517)**



<sup>1)</sup> The curve denotes the minimum allowable flange class for the shaded area below.

SITRANS LC500 Process Pressure/Temperature derating curves (7ML5517)

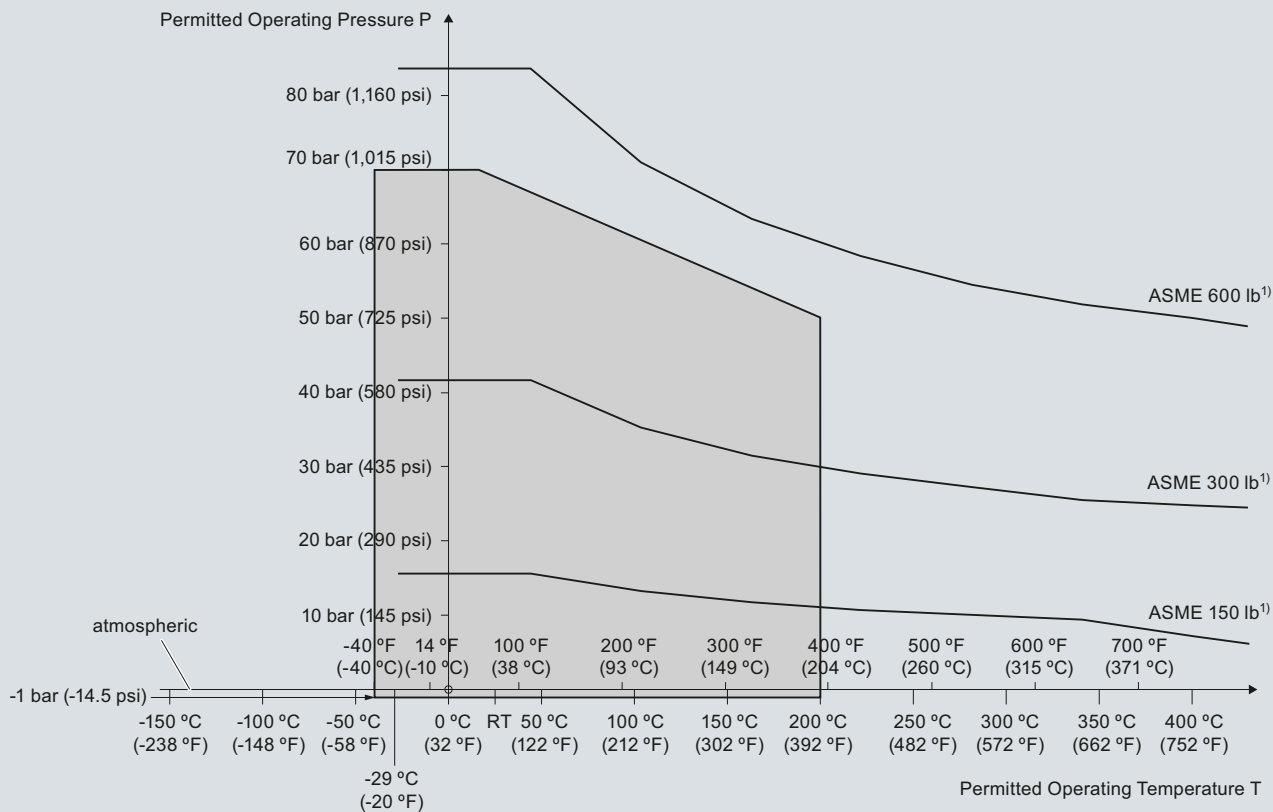
5

# Level Measurement

## Continuous level measurement - Capacitance transmitters

### SITRANS LC500

**Pressure/Temperature Curve**  
**LC500 Single Piece Flanged Rod Probes with PTFE facing**  
**ASME Flanged Process Connections**  
**(7ML5517)**



<sup>1)</sup> The curve denotes the minimum allowable flange class for the shaded area below.

SITRANS LC500 Process Pressure/Temperature derating curves (7ML5517)

5

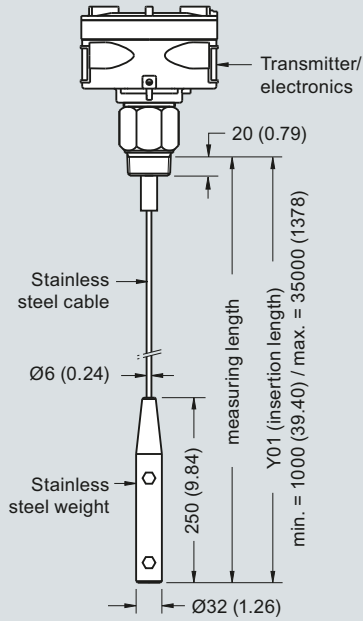
# Level Measurement

## Continuous level measurement - Capacitance transmitters

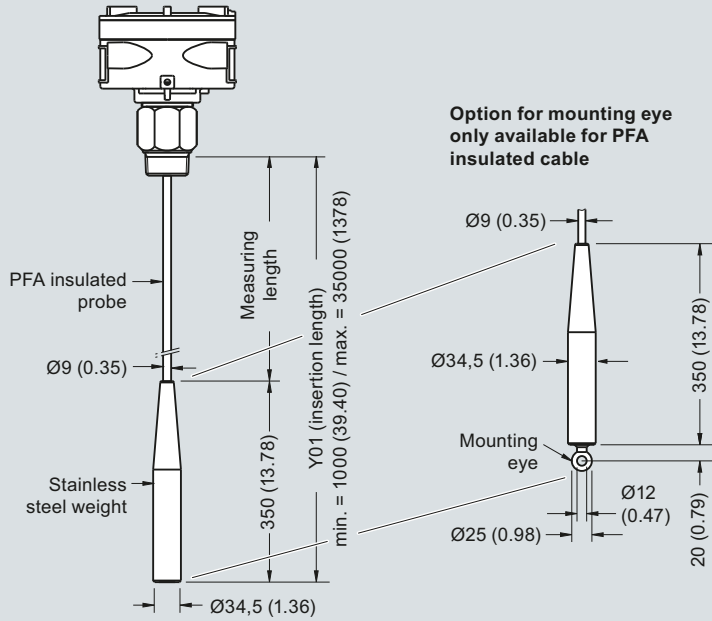
SITRANS LC500

### Dimensional drawings

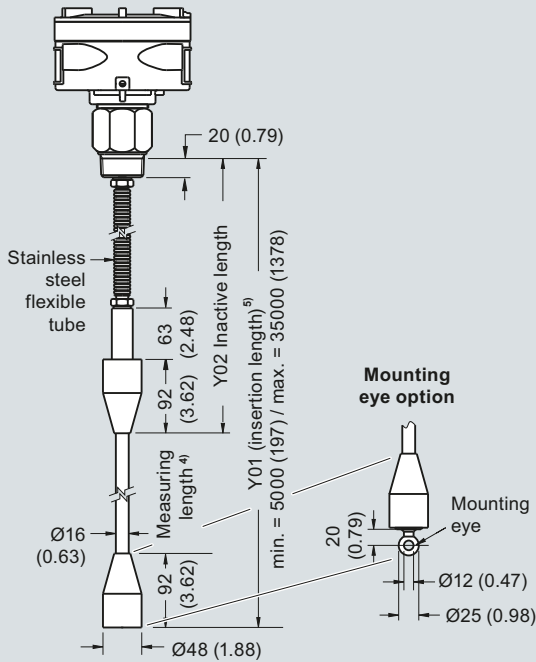
Cable version, non-insulated<sup>1)</sup>  
Welded Flange (7ML5513)



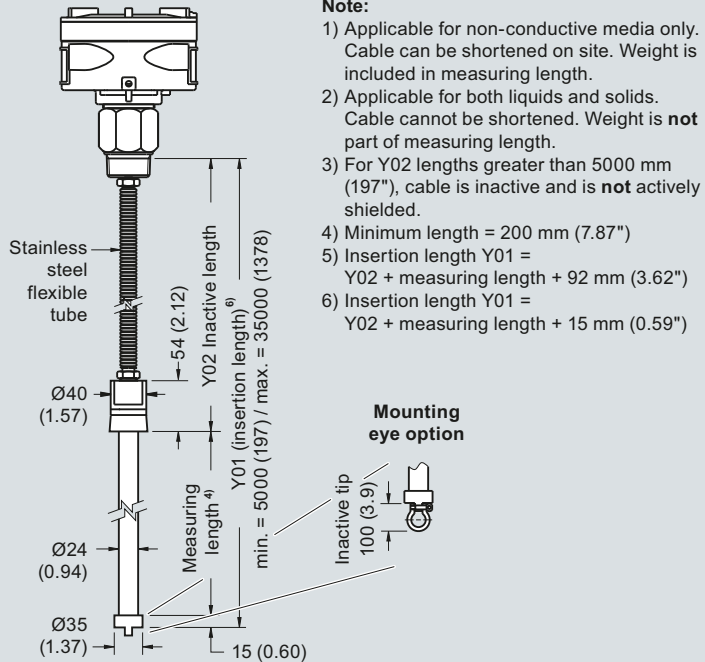
Cable version, insulated<sup>2)</sup>  
Welded Flange (7ML5513)



Extended cable version with rod sensor<sup>3)</sup>  
Welded Flange (7ML5523)



Extended cable version with rod sensor<sup>3)</sup>  
Welded Flange (7ML5523)



**Note:**

- 1) Applicable for non-conductive media only. Cable can be shortened on site. Weight is included in measuring length.
- 2) Applicable for both liquids and solids. Cable cannot be shortened. Weight is **not** part of measuring length.
- 3) For Y02 lengths greater than 5000 mm (197"), cable is inactive and is **not** actively shielded.
- 4) Minimum length = 200 mm (7.87")
- 5) Insertion length Y01 = Y02 + measuring length + 92 mm (3.62")
- 6) Insertion length Y01 = Y02 + measuring length + 15 mm (0.59")

SITRANS LC500 - Cable Versions, dimensions in mm (inch)



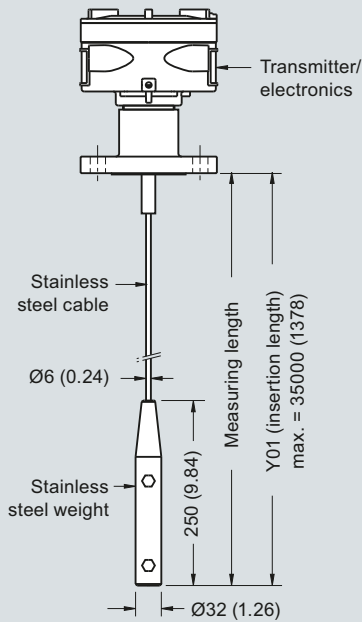
# Level Measurement

## Continuous level measurement - Capacitance transmitters

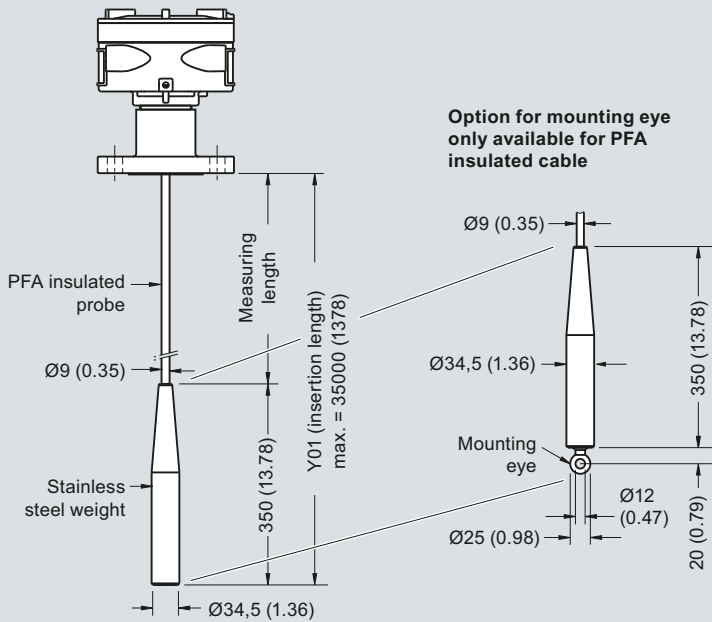
### SITRANS LC500

5

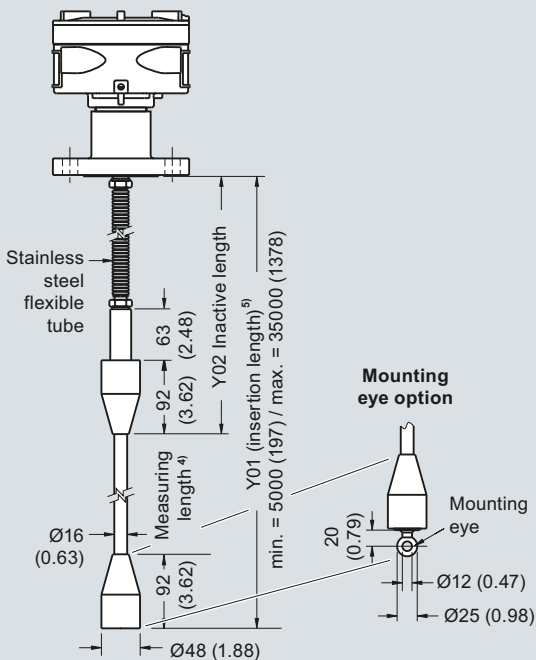
**Cable version, non-insulated<sup>1)</sup>**  
Welded Flange (7ML5513)



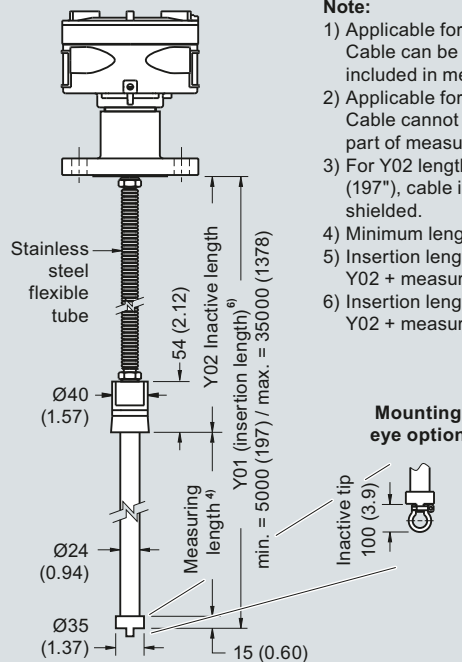
**Cable version, insulated<sup>2)</sup>**  
Welded Flange (7ML5513)



**Extended cable version with rod sensor<sup>3)</sup>**  
Welded Flange (7ML5523)



**Extended cable version with rod sensor<sup>3)</sup>**  
Welded Flange (7ML5523)



**Note:**

- 1) Applicable for non-conductive media only. Cable can be shortened on site. Weight is included in measuring length.
- 2) Applicable for both liquids and solids. Cable cannot be shortened. Weight is **not** part of measuring length.
- 3) For Y02 lengths greater than 5000 mm (197"), cable is inactive and is **not** actively shielded.
- 4) Minimum length = 200 mm (7.87")
- 5) Insertion length Y01 = Y02 + measuring length + 92 mm (3.62")
- 6) Insertion length Y01 = Y02 + measuring length + 15 mm (0.59")

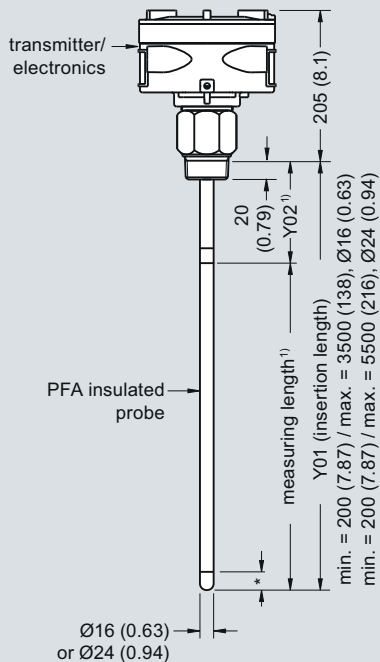
SITRANS LC500 - Cable Versions, dimensions in mm (inch)

# Level Measurement

## Continuous level measurement - Capacitance transmitters

SITRANS LC500

### Rod version Threaded (7ML5515)

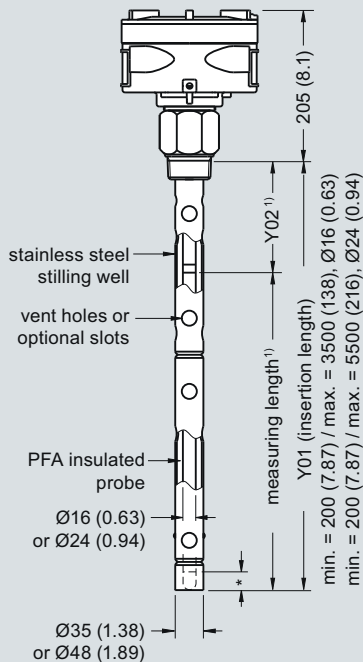


\* = 30 (1.18) Inactive tip

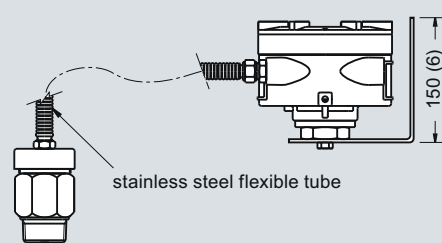
**Note:**

- 1) Minimum Y02 (active shield length) = 50 (1.96), minimum measuring length = 200 (7.87)

### Rod version with stilling well Threaded (7ML5515)

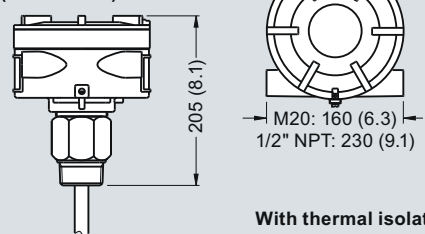


### Remote electronics with mounting bracket option Threaded (7ML5515)

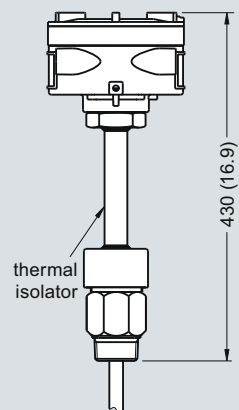


General Purpose approval only.

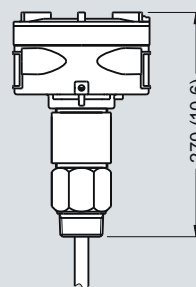
### Standard configuration (all versions)



### With thermal isolator option (all versions)



### With explosion-proof seal option (all versions)



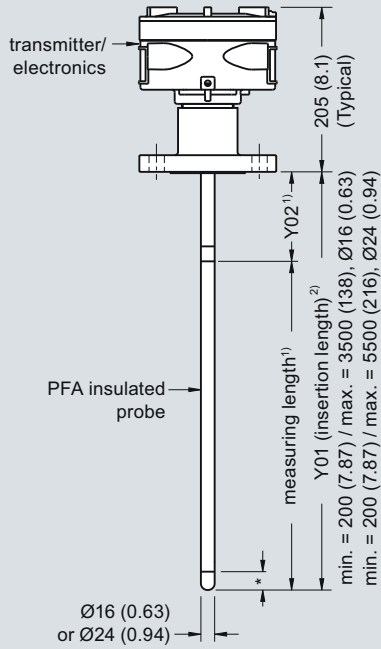
SITRANS LC500 - Rod Versions, dimensions in mm (inch)

# Level Measurement

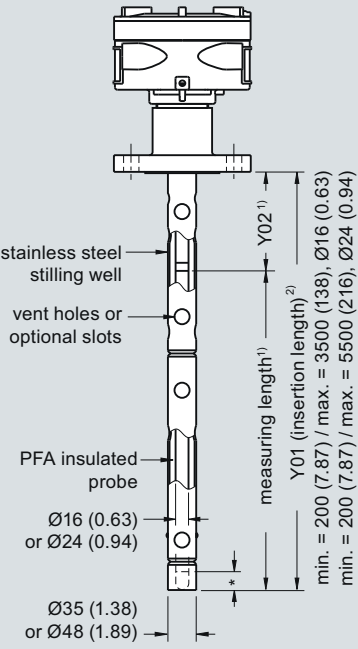
## Continuous level measurement - Capacitance transmitters

### SITRANS LC500

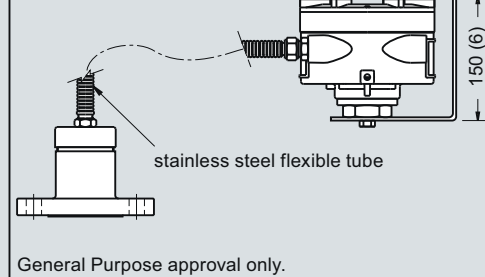
**Rod version**  
**Welded flange (7ML5515)**  
**Single piece flange (7ML5517)**



**Rod version with stilling well**  
**Welded flange (7ML5515)**  
**Single piece flange (7ML5517)**

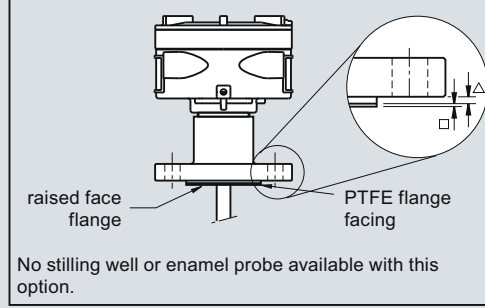


**Remote electronics with mounting bracket option**  
**Welded flange (7ML5515)**  
**Single piece flange (7ML5517)**



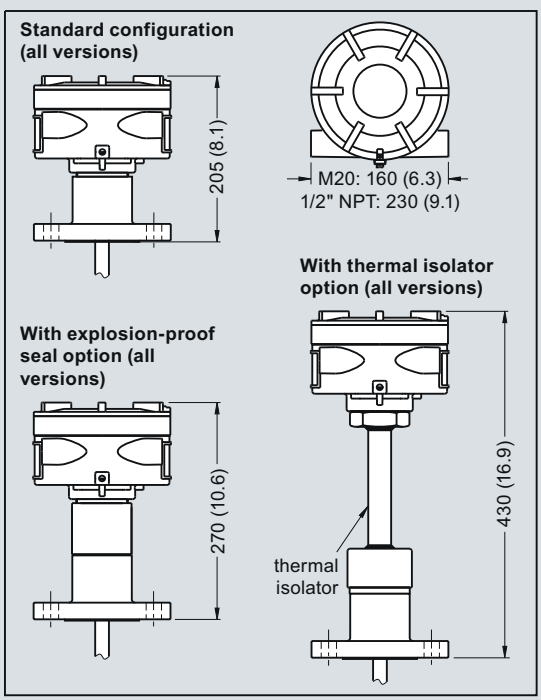
General Purpose approval only.

**PTFE flange facing option**  
**Single piece flange only (7ML5517)**



5

\* = 30 (1.18) Inactive tip



Flange Facing (raised face)	
Flange Class	Facing thickness
△ ASME 150/300	2 (0.08)
△ ASME 600/900	7 (0.28)
△ PN16/25/40/64	2 (0.08)
□ PTFE facing (additional)	2 (0.08)

- Notes:**
- 1) Minimum Y02 (active shield length) = 50 (1.96), minimum measuring length = 200 (7.87)
  - 2) Insertion length does not include any raised face/gasket face dimension (see Flange Facing table above).

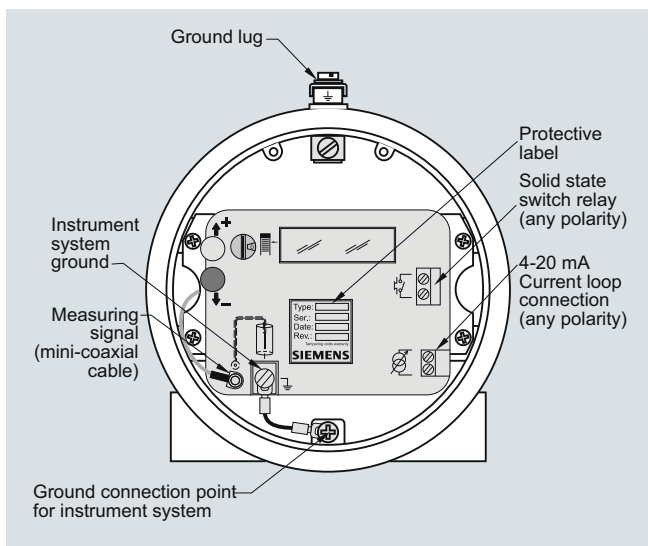
SITRANS LC500 - Rod Versions, dimensions in mm (inch)

# Level Measurement

## Continuous level measurement - Capacitance transmitters

SITRANS LC500

### Schematics



SITRANS LC500 connections

# Level Measurement

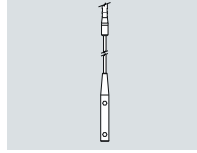
## Continuous level measurement - Capacitance transmitters

### SITRANS LC300/LC500 Specials

#### SITRANS LC300/LC500 Specials<sup>1)</sup>

Order No.

#### LC300 Cable Extensions, 316L stainless steel



Kit, Stainless steel cable extension, 1 m, adjustable by customer

**A5E01163688**

Kit, Stainless steel cable extension, 3 m, adjustable by customer

**A5E01163689**

Kit, Stainless steel cable extension, 5 m, adjustable by customer

**A5E01163690**

Kit, Stainless steel cable extension, 10 m, adjustable by customer

**A5E01163691**

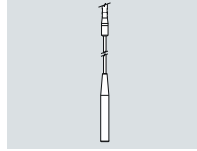
Kit, Stainless steel cable extension, 15 m, adjustable by customer

**A5E01163693**

Kit, Stainless steel cable extension, 20 m, adjustable by customer

**A5E01163695**

#### LC300 Cable Extensions, 316 stainless steel with PFA coating



Kit, PFA cable extension, 1 m

**A5E01163709**

Kit, PFA cable extension, 3 m

**A5E01163710**

Kit, PFA cable extension, 5 m

**A5E01163711**

Kit, PFA cable extension, 10 m

**A5E01163712**

Kit, PFA cable extension, 15 m

**A5E01163713**

Kit, PFA cable extension, 20 m

**A5E01163714**

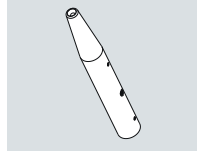
#### LC300 Mounting Eye



Spare mounting eye (LC300 PFA versions only)

**A5E01163717**

#### LC300 Weight Kit, 316L stainless steel



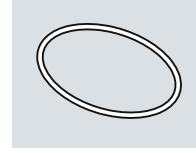
Kit, Spare stainless steel weight. To be used in any cable version of CLS300, or stainless steel cable version of LC300

**A5E01163727**

#### SITRANS LC300/LC500 Specials<sup>1)</sup>

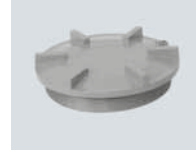
Order No.

#### LC500 Gasket (IP65), Silicone



Spare gasket, LC500 enclosure version, IP65 N) **A5E01163728**

#### LC500 Blind Lid



Spare LC500 aluminum blind lid

**A5E01163729**

#### LC500 Mounting Eye



Spare mounting eye (PFA cable version only)

**A5E01163717**

#### LC500 Mounting Bracket



Spare mounting bracket

**A5E01163730**

#### LC500 Sanitary Versions<sup>2)</sup>

<sup>1)</sup> Special flange sizes and facings are available.

<sup>2)</sup> Please contact [nacc.smpi@siemens.com](mailto:nacc.smpi@siemens.com) for part number and pricing.

Submit Application Questionnaire found on page 5/9.

J) Subject to export regulations AL: 91999 ECCN: EAR99

## Continuous measurement - Open channel flow - Ultrasonic controller

OCM III

## Overview



The OCM III is a high accuracy ultrasonic flow monitor for open channels.

## Benefits

- Influent and effluent monitor
- BS 3680 calculations provide exceptional accuracy in measuring flow
- 1 to 24 months data log, subject to logging rate
- RS-232 serial communication
- High accuracy on unique or non-standard weirs and flumes
- AC and DC operation. Automatically switches to battery operation for uninterrupted power
- Dual power input
- Low power remote monitoring
- Flow Reporter software available for remote monitoring, configuration and data retrieval

## Application

In addition to monitoring flowrate in sewage works, OCM III can monitor industrial discharge, rainfall/storm water studies, in-flow/infiltration studies and sewer system evaluations. As well as being compatible with many standard weirs and flumes, the programmable head versus flow curve (up to 16 points) accurately defines flow rate on unique or non-standard weirs and flumes.

The OCM III has data logging and is adjustable from once per minute to once a day. It records the average flow rate for that time period. Daily, it records minimum/maximum of temperature and flow rates, and the time they occurred, as well as the daily total. Advanced functions include variable rate logging. It can be pre-programmed to log at a higher rate when needed. Under steady conditions, the OCM III automatically logs less frequently to conserve data log space.

The OCM III has two-way communication via RS-232 with a modem or a bi-polar current loop with a current-to-voltage communication converter. Data logs can be downloaded to a file that can be manipulated into a spreadsheet or ASCII format.

## Technical specifications

<b>Mode of Operation</b>	
Measuring range <sup>1)</sup>	0.3 ... 1.2 m (1 ... 4 ft) or 0.6 ... 3 m (2 ... 10 ft)
<b>Output</b>	
Transducer	Echomax® XRS-5, 44 kHz
Relays	3 alarm/control relays, 1 SPDT Form C contact per relay, rated 5 A at 250 V AC non-inductive or 30 V DC
mA output	0/4 ... 20 mA, isolated
• Max. load	1 KΩ max. load
• Resolution	5 μA
• Isolation	300 V AC continuous
• DC output	+24 V DC, 20 mA average to 200 mA at 1/10 duty cycle max. 0 ... 20
<b>Accuracy</b>	
Error in measurement	±1 mm/m, calculated error less than 0.02 %
Resolution	0.2 mm (0.007")
<b>Rated operating conditions</b>	
Installation conditions	
• Location	Indoor/outdoor
• Installation category	II
• Pollution degree	4
Ambient conditions	
• Ambient temperature (enclosure)	-20 ... +50 °C (-5 ... +122 °F)
<b>Design</b>	
Weight	2.3 kg (5.1 lbs)
Material (enclosure)	Polycarbonate
Degree of protection (enclosure)	IP65/Type 4X/NEMA 4X
Cable	
Transducer and mA output signal	<ul style="list-style-type: none"> <li>• Transducer: co-axial to be RG62-A/U low capacity</li> <li>• mA output signal to be 2 copper conductors, twisted, with foil shield/drain wire, 300 V 0.5 ... 0.75 mm<sup>2</sup> (22 ... 18 AWG)</li> <li>• Relay/power to be copper conductors per local requirements to meet 250 V 5 A contact rating</li> </ul>
Max. separation between transducer and transceiver	183 m (600 ft)
<b>Displays and controls</b>	
LCD 5 x 7 dot matrix display with 2 lines of 40 characters each	
Programming	Via removable programmer and communication link
Memory	3 V battery (NEDA 5003LC or equivalent), operating life 1 year, SuperCap capacitor for back-up during battery replacement
<b>Power supply</b>	
AC version	100/115/200/230 V AC ±15 %, 50/60 Hz, 20 VA max.
DC version	9 ... 30 V DC, 8 W max.

# Level Measurement

## Continuous level measurement - Open channel flow - Ultrasonic controller

### OCM III

<b>Certificates and approvals</b>	CE, FM, CSA <sub>US/C</sub> , MCERTS, C-TICK <sup>2)</sup>
<b>Communication</b>	RS-232 or $\pm 20$ mA bipolar current loop, 300, 600, 1200, 2400, 4800, 9600, 19200 baud
<b>Options</b>	
Temperature sensor	TS-2
Remote monitoring	Flow Reporter, a Windows <sup>®</sup> -based configuration software and data extractor
Velocity sensor	Consult with factory

1) Program range is defined as the empty distance to the face of the transducer plus any range extension

2) EMC performance available upon request  
Windows<sup>®</sup> is a registered trademark of Microsoft Corporation

Selection and Ordering data	Order No.
<b>OCM III</b> High accuracy ultrasonic flow monitor for open channels.	C) <b>7ML1002 -</b>
<b>Input voltage</b> AC, voltage selector switch	<b>A 0</b>
<b>Enclosure</b> Wall mount, standard enclosure Wall mount, 6 entries, M20 holes <sup>1)</sup>	<b>0</b> <b>A</b> <b>B</b>
<b>Approvals</b> CSA <sub>US/C</sub> , FM, CE (EN61326), C-TICK CE <sup>2)</sup>	<b>5</b> <b>6</b>

1) Available with approval option 6 only

2) Available with enclosure option B only

C) Subject to export regulations AL: N, ECCN: EAR99

Selection and Ordering data	Order No.
<b>Further designs</b> Please add <b>"-Z"</b> to Order No. and specify Order code(s).	
<b>Operating Instructions</b>	
English	C) <b>7ML1998-5AB01</b>
French	C) <b>7ML1998-1AB11</b>
Spanish	C) <b>7ML1998-1AB21</b>
German	C) <b>7ML1998-1AB31</b>
Note: The Operating Instructions should be ordered as a separate line item on the order.	
This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	
<b>Required equipment</b>	
TS-2 Temperature Sensor	<b>7ML1812-1AA1</b>
TS-2, 1 m cable	<b>7ML1812-2AA1</b>
TS-2, 5 m cable	<b>7ML1812-3AA1</b>
TS-2, 10 m cable	<b>7ML1812-4AA1</b>
TS-2, 30 m cable	C) <b>7ML1812-5AA1</b>
TS-2, 50 m cable	C) <b>7ML1812-6AA1</b>
TS-2, 70 m cable	C) <b>7ML1812-7AA1</b>
TS-2, 90 m cable	C) <b>7ML1998-5EW01</b>
TS-2 Operating Instructions	C) <b>7ML1812-1AA1</b>
Note: The TS-2 Operating Instructions should be ordered as a separate line item on the order.	
<b>Accessories</b>	
Handheld programmer	<b>7ML1830-2AA</b>
Tag, stainless steel, 12 x 45 mm (0.47 x 1.77"), one text line, suitable for enclosure	<b>7ML1930-1AC</b>
M20 cable gland kit (6 M20 cable glands, 6 M20 nuts, 3 stop plugs)	<b>7ML1830-1GM</b>
Flow Reporter software license	B) <b>7ML1930-1AK</b>
Flow Reporter Kit (includes disk, authorization code and cable)	B) <b>7ML1930-1AL</b>
<b>Spare parts</b>	
Card, Mother, main	C) <b>7ML1830-1MG</b>
Card, daughter/display	C) <b>7ML1830-1LT</b>
Eprom	C) <b>7ML1830-1KW</b>
Battery	C) <b>7ML1830-1JV</b>
OCM III Lid overlay	<b>7ML1830-1KV</b>

B) Subject to export regulations AL: N, ECCN: EAR99S

C) Subject to export regulations AL: N, ECCN: EAR99



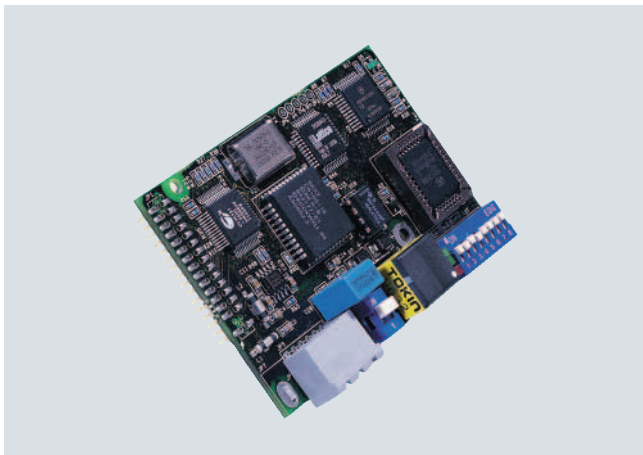


# Level Measurement

## Communications and Displays

### SmartLinx module

#### Overview



SmartLinx<sup>®</sup> modules provide direct digital connection to popular industrial communications buses with true plug-and-play compatibility with products manufactured by Siemens.

#### Benefits

- Fast, easy installation
- Direct connection: no additional installation required
- Scalable application layer allows for optimized network bandwidth and memory requirements
- Modules available for PROFIBUS DP, Allen-Bradley<sup>®</sup> Remote I/O and DeviceNet<sup>™</sup>, Modbus<sup>®</sup> RTU

<sup>®</sup>Modbus is a registered trademark of Schneider Electric.

<sup>®</sup>Allen-Bradley is a registered trademark of Rockwell Automation

<sup>™</sup>DeviceNet is a trademark of Open DeviceNet Vendor Association

#### Application

Many Siemens products include HART<sup>®</sup>, PROFIBUS PA and Modbus communications. For additional communication modules, SmartLinx cards are the answer.

They're fast and easy to install, and can be added at any time. The module simply plugs into the socket on any SmartLinx-enabled product. They require no secondary private buses or gateways and no separate wiring. There are no extra boxes to connect to your network so there's a minimum load on engineering and maintenance staff.

SmartLinx provides all data from the instrument, including measurement and status, and allows changes to operation parameters to be done over the bus or telemetry link. The user can select which data in the application layer to transfer over the bus. This selection saves bandwidth and memory and optimizes data throughput and speeds up the network, enabling you to connect more instruments to your network.

#### Technical specifications

Module type	Allen Bradley Remote I/O
Interface	RIO
Transmission rate	57.6, 115.2 or 230.4 Kbaud
Rack address	1 ... 73, ¼ to full rack
Connection	RIO slave
SmartLinx module compatibility	<ul style="list-style-type: none"> <li>• SITRANS LU01</li> <li>• SITRANS LU02</li> <li>• SITRANS LU10</li> <li>• SITRANS LUC500</li> <li>• MultiRanger 100/200</li> <li>• HydroRanger 200</li> </ul>

Module type	PROFIBUS DP
Interface	RS-485 (PROFIBUS standard)
Transmission rate	All valid PROFIBUS DP rates from 9600 Kbps to 12 Mbps
Rack address	0 ... 99
Connection	Slave
SmartLinx module compatibility	<ul style="list-style-type: none"> <li>• SITRANS LU01</li> <li>• SITRANS LU02</li> <li>• SITRANS LU10</li> <li>• SITRANS LUC500</li> <li>• MultiRanger 100/200</li> <li>• HydroRanger 200</li> </ul>

Module type	MODBUS RTU
Interface	RS-232 or RS-485
Transmission rate in bps	1200, 2400, 4800, 9600, 19200, 38400
Rack address	1 ... 247
Connection	Slave
SmartLinx module compatibility	<ul style="list-style-type: none"> <li>• SITRANS LU01</li> <li>• SITRANS LU02</li> <li>• SITRANS LU10</li> </ul> Included with product: <ul style="list-style-type: none"> <li>• SITRANS LUC500</li> <li>• MultiRanger 100/200</li> <li>• HydroRanger 200</li> </ul>

Module type	DeviceNet
Interface	DeviceNet physical layer
Transmission rate in kbps	125, 250, 500
Rack address	0 ... 63
Connection	Slave (group 2)
SmartLinx module compatibility	<ul style="list-style-type: none"> <li>• SITRANS LUC500</li> <li>• MultiRanger 100/200</li> <li>• HydroRanger 200</li> </ul>

Selection and Ordering data	Order No.
<b>SmartLinx® module for SITRANS LU01, LU02, LU10</b>	
Allen-Bradley Remote I/O module	<b>7ML1830-1CP</b>
PROFIBUS DP module	<b>7ML1830-1CQ</b>
Modbus RTU module	<b>7ML1830-1CR</b>
<b>SmartLinx module for SITRANS LUC500 Rack and Panel Mount models</b>	
Allen-Bradley Remote I/O module	<b>7ML1830-1HP</b>
PROFIBUS DP module	<b>7ML1830-1CS</b>
DeviceNet module	<b>7ML1830-1HQ</b>
<b>SmartLinx module for SITRANS LUC500 Wall Mount model, MultiRanger 100/200, HydroRanger 200</b>	
Allen-Bradley Remote I/O module	C) <b>7ML1830-1HS</b>
PROFIBUS DP module	<b>7ML1830-1HR</b>
DeviceNet module	<b>7ML1830-1HT</b>
<b>Operating Instructions</b>	
Allen-Bradley Remote I/O communications module, English	C) <b>7ML1998-1AP03</b>
PROFIBUS communications module	
• English	C) <b>7ML1998-1AQ03</b>
• French	C) <b>7ML1998-1AQ12</b>
• German	C) <b>7ML1998-1AQ33</b>
Modbus RTU communications module, English	C) <b>7ML1998-1BF01</b>
Modbus RTU communications module, French	C) <b>7ML1998-1BF11</b>
Modbus RTU communications module, German	C) <b>7ML1998-1BF31</b>
SmartLinx modem, English	C) <b>7ML1998-1BG01</b>
DeviceNet	C) <b>7ML1998-1BH02</b>
This device is shipped with the Siemens Milltronics manual CD containing Quick Starts and Operating Instructions.	
• English	C) <b>7ML1998-1BH02</b>
• French	C) <b>7ML1998-1BH12</b>
<b>Spare SmartLinx software</b>	
Allen-Bradley data diskette	C) <b>7ML1830-1CK</b>
PROFIBUS DP data diskette	C) <b>7ML1830-1CL</b>
DeviceNet data diskette	C) <b>7ML1830-1CM</b>

C) Subject to export regulations AL: N, ECCN: EAR99

# Level Measurement Communications and Displays

## Dolphin Plus Software

### Overview



Dolphin Plus is instrument configuration software that allows you to quickly and easily configure, monitor, tune and diagnose several Siemens level devices remotely (see list below). Remote access is available using your desktop PC or connected directly in the field using a laptop.

### Benefits

- Real-time monitoring and adjustment of parameters
- On-screen visualization of process values
- Saving and visualization of echo profiles for a wide range of Siemens level meters
- Copying of data for programming several devices
- Quick setup and commissioning of device
- Generation of configuration reports within seconds

### Note:

The Dolphin Plus software is only available in English.

### Application

Dolphin Plus is easy to install and use. Just load the software from the CD. In minutes, you're ready to set up or modify complete parameter configurations for one or more devices.

Following configuration, you can alter parameters, upload and download parameter sets to and from disk, and use parameter sets saved from other instruments. Reading of echo profiles permits fine tuning without the need for special instruments. Built-in quick start wizards and help functions guide you through the entire process.

### Compatibility

Dolphin Plus is compatible with Microsoft Windows 95/98/NT4/Me/2000/XP and works with a wide range of Siemens products, including:

- SITRANS LUC500
- HydroRanger Plus
- SITRANS LU10
- SITRANS LU02
- SITRANS LU01

Connection to a Siemens instrument may be a direct RS-232 serial connection or via an RS-485 converter or Siemens infrared ComVerter, depending on the instrument being configured.

Meets VDE 2187 user interface requirements.

(Most other Siemens level devices use Simatic PDM configuration software.)

Selection and Ordering data	Order No.
<b>Dolphin Plus</b>	N) <b>7ML1841 -</b>
Instrument configuration software to quickly and easily configure, monitor, tune and diagnose most Siemens devices remotely, from your desktop PC or connected directly in the field using a laptop.	<b>AA0</b>
Dolphin Plus Software includes a software CD, and a nine pin adapter with a 2.1 m (82.7") cable for connection to a PC serial port.	
<b>RS-485 to RS-232 converter</b>	
No	0
Yes	1
<b>ComVerter</b>	
No	0
Yes	1

N) Subject to export regulations AL: N, ECCN: 5D992

Selection and Ordering data	Order No.
<b>Operating Instructions</b>	
Connection manual, English: Included on Dolphin Plus CD and available at <a href="http://www.siemens.com/processautomation">www.siemens.com/processautomation</a>	
<b>Spare parts</b>	
Converter, RS 485 to RS 232 (D-Sub)	C) <b>7ML1830-1HA</b>
Kit containing one 9-pin D-Sub to RJ11 Adapter and one 2.1 meter telephone cable with two male jacks	<b>7ML1830-1MC</b>
ComVerter, Infrared link	C) <b>7ML1830-1MM</b>

C) Subject to export regulations AL: N, ECCN: EAR99