

Level Measurement



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You can download all instructions, catalogs and certificates for SITRANS L free of charge: www.siemens.com/level

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Product Overview

Overview







	Application	Device description	Page	Programming Software
Point level measurement – Capacitance switches				
	Powerful range of level switches suitable for a variety of industries	Pointek CLS100/CLS200/CLS300/CLS500		
		<ul style="list-style-type: none"> CLS100: compact 2-wire inverse frequency shift capacitance switch for level detection in constricted spaces, interfaces, solids, liquids, slurries, and foam 	4/10	-
		<ul style="list-style-type: none"> 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 	4/16	SIMATIC PDM
		<ul style="list-style-type: none"> 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 	4/43	SIMATIC PDM
		<ul style="list-style-type: none"> 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 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 	4/64	SIMATIC PDM
Point level measurement – Vibrating switches				
	Reliable vibrating point level switches for liquid and slurry applications across all industries	SITRANS LVL100/LVL200	4/82	-
		<ul style="list-style-type: none"> 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. 	4/88	-
	Reliable vibrating point level switches for bulk solids in a wide variety of applications at a competitive price	SITRANS LVS100/LVS200	4/104	-
		<ul style="list-style-type: none"> Vibrating point level switch designed to be impervious to external vibrations and to provide reliable performance in demanding bulk solids applications. 	4/107	-
Point level measurement – Rotating paddle switch				
	Reliable rotating point level switches for bulk solids in a wide variety of applications at a competitive price	SITRANS LPS200	4/116	-
		<ul style="list-style-type: none"> LPS200: 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. 		






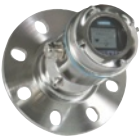
	Application	Device description	Page	Programming Software
Point level measurement –Tilt switch				
	Electro-mechanical tilt switch for point level detection, plugged chute detection, and feed loss detection on conveyor belts.	Tilt Switch Probe <ul style="list-style-type: none"> • Rugged, stainless steel encapsulated probe • Provides a signal when material tilts it through an angle of more than 17° in any direction. 	4/127	-
Point level measurement – Ultrasonic switch				
	Ultrasonic non-contacting switch with two switch points for level detection of bulk solids, liquids and slurries in a wide variety of industries	Pointek ULS200 <ul style="list-style-type: none"> • Rugged design, no moving parts and virtually maintenance-free • Transducer available in ETFE or PVDF copolymer and therefore inert to most chemicals 	4/129	-
Continuous measurement –Ultrasonic transmitters				
	2-wire loop powered ultrasonic transmitter for level, volume and flow monitoring of liquids in open channels, storage vessels and simple process vessels	SITRANS Probe LU <ul style="list-style-type: none"> • Continuous level measurement up to 12 m (40 ft) range • Patented Sonic Intelligence signal processing • Auto False-Echo Suppression of false echoes 	4/138	SIMATIC PDM
	Compact level transmitter with integrated transducer for accurate level measurement for liquid applications	The Probe <ul style="list-style-type: none"> • Simple, compact and competitively priced ultrasonic level transmitter in several versions for maximum versatility: <ul style="list-style-type: none"> - Three-wire system with alarm relay - Two-wire system with current loop 	4/143	-
Continuous measurement – Ultrasonic controllers				
 	The Siemens SITRANS LUT400 series controllers are compact, single point, long-range ultrasonic controllers for continuous level or volume measurement of liquids, slurries, and solids, and high accuracy monitoring of open channel flow.	SITRANS LUT420/430/440 <p>In addition to industry leading 1 mm accuracy, each of the three models in the series are compatible with our full range of EchoMax transducer and offer varying degrees of pump, alarm, and other control functionality, all from a very compact and easy-to-use interface.</p> <ul style="list-style-type: none"> • 1 mm accuracy • HART communications • Next Generation Sonic Intelligence 	4/146	SIMATIC PDM
	Versatile short- to medium-range ultrasonic single- and dual-vessel level controller for virtually any application in a wide range of industries	MultiRanger 100/200 <ul style="list-style-type: none"> • 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 • Auto False-Echo Suppression of false echoes 	4/154	SIMATIC PDM
	Ultrasonic level controller for up to six pumps - control, differential control and open channel flow monitoring	HydroRanger 200 <ul style="list-style-type: none"> • An economical, low-maintenance solution delivering control efficiency and productivity needed to meet today's exacting standards • Auto False-Echo Suppression of false echoes 	4/158	SIMATIC PDM
	Non-contacting, cost-effective solution for reliable control of level and flow measurements in water and wastewater applications	HydroRanger Plus <ul style="list-style-type: none"> • Available as 19 inch rack, for panel mounting or in wall enclosure • Compatible with EchoMax ultrasonic transducers 	4/162	Dolphin Plus

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	Application	Device description	Page	Programming Software
	Complete ultrasonic level controller for monitoring and control of water distribution and wastewater collection systems, with energy-saving algorithms	SITRANS LUC500 <ul style="list-style-type: none"> Monitoring and control in one device Integral telemetry interface (Modbus RTU/ASCII) Expandable platform to handle any liquid application from tank level measurement to pump control 	4/167	Dolphin Plus
	Ultrasonic long-range level monitoring system for liquids and solids	SITRANS LU01/LU02/LU10 <ul style="list-style-type: none"> Automatic conversion of level into volume for standard or custom tank shapes Easy to install and program Optional fieldbus card, e.g. PROFIBUS DP 	4/172 4/176	Dolphin Plus
	Output module for SITRANS LU10	SITRANS LU AO <ul style="list-style-type: none"> SITRANS LU AO analog output module provides remote analog outputs for the measurement points of the SITRANS LU10 transceiver 	4/180	
Continuous measurement – Ultrasonic transducers				
	ST-H: ETFE or PVDF transducer for chemicals	ST-H/EchoMax XRS-5 <ul style="list-style-type: none"> The narrow design of the ST-H allows the sensor to be mounted using a 2 inch connection 	4/183	-
	XRS-5: Standard transducer for applications to 8 m (26 ft)	<ul style="list-style-type: none"> XRS-5: narrow beam angle of only 10°, measuring range maximum 8 m (26 ft) for measurement of liquids, solids and slurries 	4/186	-
	Transducers for liquids and bulk solids	EchoMax XPS and XCT/XLT <ul style="list-style-type: none"> XPS series offers versions for various distances up to 40 m (130 ft) and up to a max. temperature of 95 °C (203 °F) 	4/189	-
	XPS and XCT series: Hermetically sealed PVDF enclosure for chemical immunity	<ul style="list-style-type: none"> XCT series for applications at high temperatures, for measurement of levels at distances up to 12 m (40 ft) and temperatures of max. 145 °C (293 °F) 	4/189	-
	XLT: Designed for high temperature and long range applications	<ul style="list-style-type: none"> XLT: measuring ranges from 0.9 to 60 m (1.8 to 200 ft) and temperatures up to 150 °C (302 °F). Beam angle of just 5° provides accurate readings in solids storage bunkers 	4/199	-
Continuous measurement – Radar transmitters				
	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 Probe LR <ul style="list-style-type: none"> Uni-Construction polypropylene rod antenna standard Patented process Intelligence signal processing Auto False-Echo Suppression of false echoes 	4/211	SIMATIC PDM

	Application	Device description	Page	Programming Software
	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 LR200 <ul style="list-style-type: none"> • Program without opening the lid, even in hazardous areas, using patented infrared IS handheld programmer • Special Uni-Construction hermetically sealed polypropylene rod antenna has integrated threaded connection • Built-in alphanumeric display with support in four languages 	4/215	SIMATIC PDM AMS SITRANS DTM
	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 LR250 <ul style="list-style-type: none"> • Simple operation using the graphical local user interface (LUI) • Plug-and-play setup using the intuitive Quick Start Wizard • 25 GHz high frequency allows for small horn antennas and easy mounting in nozzels • Process Intelligence signal processing for improved measurement reliability and Auto False-Echo Suppression of fixed obstructions 	4/232	SIMATIC PDM AMS SITRANS DTM
	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	SITRANS LR400 <ul style="list-style-type: none"> • Minimum maintenance requirements and wear as result of non-contacting measuring principle • High long-term stability resulting from self-calibration with highly stable internal reference • High measuring accuracy and repeatability as result of 24 GHz; narrow beam angle for tall, narrow vessels 	4/249	SIMATIC PDM
	2-wire, 25 GHz pulse radar level transmitter for continuous monitoring of solids up to 30 m (66 ft); ideal for measurement in extreme dust	SITRANS LR260 <ul style="list-style-type: none"> • Simple operation using the graphical local user interface (LUI) • Plug-and-play setup using the intuitive Quick Start Wizard • 25 GHz high frequency allows for small horn antennas and easy mounting in nozzels • Process Intelligence signal processing for improved measurement reliability and Auto False-Echo Suppression of fixed obstructions 	4/257	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	SITRANS LR460 <ul style="list-style-type: none"> • Process Intelligence for advanced signal processing and quick and easy adjustment • Self-guided Quick Start Wizard for plug and play start-up • 100 m (328 ft) range for long-range and difficult applications 	4/262	SIMATIC PDM
	2-wire, 78 GHz FMCW radar level transmitter for continuous monitoring of solids in silos to a range of 100 m (329 ft).	SITRANS LR560 <ul style="list-style-type: none"> • Rugged stainless steel design • 78 GHz high frequency provides very narrow beam, virtually no mounting nozzle noise, and optimal reflection from sloped solids • Aimer option to direct beam to area of interest, such as draw point of cone • Air purge connection is included for self-cleaning of extremely sticky solids • Lens antenna is highly resistant to product build up • Local display interface (LDI) allows local programming and diagnostics 	4/268	SIMATIC PDM AMS SITRANS DTM

Level measurement

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	Application	Device description	Page	Programming Software
Continuous measurement – Guided wave radar transmitters				
	<p>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.</p>	<p>SITRANS LG200</p> <ul style="list-style-type: none"> Measures accurately on materials with dielectric (dK) as low as 1.4 Guided wave radar measurement for up to 2.5 mm (0.12 inch) 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 (6 250 psi g) and temperatures as high as 427 °C (800 °F) 	4/277	SIMATIC PDM
Continuous level – Capacitance transmitters				
	<p>For liquids and solids applications, ideal for standard industrial applications in chemical, hydrocarbon processing, food and beverage and mining, aggregate and cement industries</p>	<p>SITRANS LC300</p> <ul style="list-style-type: none"> Sophisticated, but easy-to-adjust microprocessor combined with field-proven probes Patented active shield technology ensures measurements are unaffected by vapors, product deposits, dust and condensation 	4/303	-
	<p>Level and interface transmitter for extreme and critical process conditions, such as oil and liquid natural gas (LNG), toxic and aggressive chemicals and vapours</p>	<p>SITRANS LC500</p> <ul style="list-style-type: none"> Equipped with the HART Smart protocol for remote setup and calibration Patented active shield technology ensures measurements are unaffected by vapors, product deposits, dust and condensation 	4/317	SIMATIC PDM
Communications				
		<p>SmartLinX Module, Dolphin Plus software</p> <ul style="list-style-type: none"> Optional communication modules, SmartLinX, provide direct digital connection to popular industrial fieldbus systems Dolphin Plus for quick and easy configuring, monitoring, tuning and diagnostics of Siemens devices 	4/343	4/345

Level measurement

Point level measurement – Capacitance switches

Capacitance

Overview

Introduction

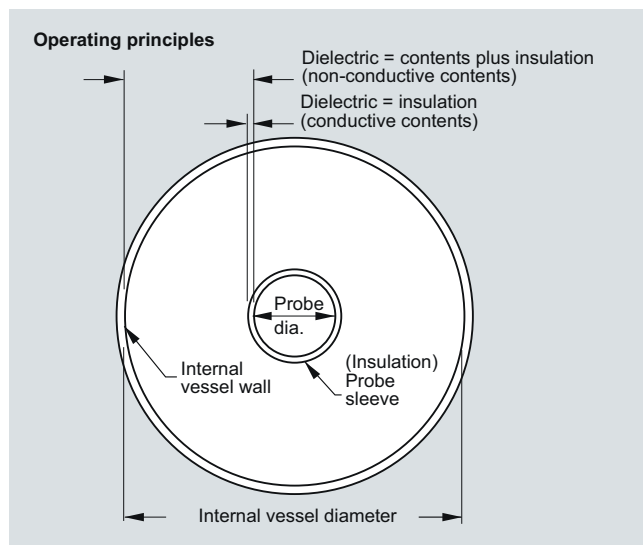
Inverse frequency shift capacitance point level switches are designed to withstand the harsh environments of high pressure and high temperature applications.

Inverse Frequency Technology

Siemens 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

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 sides of the dielectric layer oppositely charged by a source of voltage, the electrical energy of the charged system is stored in the polarized dielectric.

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.

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 vapor concentration, material buildup, dust, or condensation.

Level measurement

Point level measurement – Capacitance switches

Capacitance

Technical specifications

Point Level Measurement				
Criteria	Pointek CLS100	Pointek CLS200	Pointek CLS300	Pointek CLS500
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
Max. length including sensor	100 mm (4 inch)	Rod: 5.5 m (18 ft) Cable: up to 30 m (98 ft)	Rod: 1 m (40 inch) Cable: 25 m (82 ft)	Rod: 1 m (40 inch)
Process temperature (Temperature ratings are pressure dependent. See Pressure/Temperature curves for respective product.)	<ul style="list-style-type: none"> Stainless steel process connection: -30 ... +100 °C (-22 ... +212 °F) Fully Synthetic (PPS process connection): -10 ... +100 °C (14 ... 212 °F) 	<ul style="list-style-type: none"> -40 ... +85 °C (-40 ... +185 °F) With thermal isolator: -40 ... +125 °C (-40 ... +257 °F) 	<ul style="list-style-type: none"> -40 ... +200 °C (-40 ... +392 °F) HT version: -40 ... +400 °C (-40 ... +752 °F) 	<ul style="list-style-type: none"> -50 ... +200 °C (-58 ... +392 °F) HT version: -60 ... +400 °C (-76 ... +752 °F)
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"> Rod versions: Up to 25 bar g (365 psi g) Cable version: Up to 10 bar g (146 psi g) 	Up to 35 bar g (511 psi g)	<ul style="list-style-type: none"> Up to 150 bar g (2 175 psi g) HP version: Up to 345 bar g (5 004 psi g)
Output	Stainless steel cable or enclosure version: <ul style="list-style-type: none"> 4 ... 20/20 ... 4 mA 2-wire current loop Solid-state output Fully-synthetic version (PPS) Relay output 	Standard: <ul style="list-style-type: none"> 1 SPDT Form C relay, solid-state switch Digital: <ul style="list-style-type: none"> solid-state switch included 	Standard: <ul style="list-style-type: none"> 1 SPDT Form C relay, solid-state switch Digital: <ul style="list-style-type: none"> solid-state switch included 	<ul style="list-style-type: none"> 4 ... 20/20 ... 4 mA 2-wire current loop Solid-state switch
Communications		<ul style="list-style-type: none"> Standard: 3 LED indicators Digital: PROFIBUS PA; SIMATIC PDM compatible 	<ul style="list-style-type: none"> Standard: 3 LED indicators Digital: PROFIBUS PA; SIMATIC PDM compatible 	HART, SIMATIC PDM compatible
Power Specifications	<ul style="list-style-type: none"> Standard: 12 ... 33 V DC Intrinsically Safe (Stainless steel version only): 10 ... 30 V DC 	<ul style="list-style-type: none"> Standard: 12 ... 250 V AC/DC, 0 ... 60 Hz, 2 W max. Digital: <ul style="list-style-type: none"> bus voltage: 12 ... 30 V DC, IS version 12 ... 24 V DC current consumption: 12.5 mA 	<ul style="list-style-type: none"> Standard: 12 ... 250 V AC/DC, 0 ... 60 Hz, 2 W max. Digital: <ul style="list-style-type: none"> bus voltage: 12 ... 30 V DC, IS version 12 ... 24 V DC current consumption: 12.5 mA 	<ul style="list-style-type: none"> 12 ... 33 V DC 3.6 ... 22 mA/ 22 ... 3.6 mA (2-wire current loop)
Approvals	Stainless steel cable or enclosure version: CE, CSA, FM, ATEX, C-TICK, Lloyds Register, WHG Fully-synthetic version (PPS): CSA, FM	CSA, FM, CE, ATEX, C-TICK, Lloyds Register, WHG, Vlare II	CSA, FM, CE, ATEX, C-TICK, Lloyds Register, WHG, Vlare II	CE, CSA, FM, ATEX, C-TICK, Lloyds Register, Bureau Veritas, Current Signaling according to NAMUR NE 43

Application

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 construction:
 Metallic Non-metallic
 Agitated top, bottom or side

Dimensions:
 Height: _____ m/ft
 Width/Diameter: _____ m/ft

Pressure:
 Normal: _____
 Maximum (relief): _____

Critical Information
Nozzle Length: _____ cm/inch
Nozzle Diameter: _____ cm/inch

Tank top: Open Flat Conical Parabolic
Tank bottom: Sloped Flat Conical Parabolic
Mounting: Top Mount Side Mount Pipe Mount

Process Data

Material being measured: _____ Liquid Solid Slurry

Material temperature: Norm: _____ °C/°F Max: _____ °C/°F

Measurement type: Point level Continuous level Interface level
Constant dielectric: No Yes DK Value _____
Upper material: _____ DK Value _____
Lower material: _____ DK Value _____

Process pressure: _____ Min. _____ Max. **Atmospheric steam:** No Yes

Coating build-up: No Yes **Conductive material:** No Yes _____ DK Value

Installation

(indicate all that apply)

Power available: _____

Outputs required:
 4 ... 20 mA Relay Solid state

Communications
 HART / 4 ... 20 mA PROFIBUS PA

Products recommended:

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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 inch) 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.

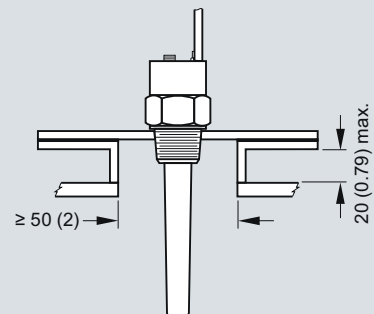
The Pointek CLS100 is available in three versions. The integral cable version has a stainless steel process connection and probe options of PPS or PVDF. The fully synthetic version has a thermoplastic polyester enclosure with a PPS process connection combined with a PPS probe. The standard enclosure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

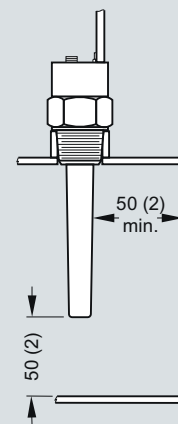
Configuration

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)
Mode of operation		
Measuring principle	Inverse frequency shift capacitive level detection	Inverse frequency shift capacitive level detection
Input		
Measured variable	Change in picoFarad (pF)	Change in picoFarad (pF)
Output		
Output signal		
• Alarm output	4 ... 20/20 ... 4 mA 2-wire loop	4 ... 20/20 ... 4 mA 2-wire loop
• Switch output ¹⁾	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.
Accuracy		
Repeatability	2 mm (0.08 inch)	2 mm (0.08 inch)
Rated operating conditions ²⁾		
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 ϵ_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 ²⁾	-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)
Design		
	<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

	Stainless steel process connection (integral cable or enclosure version) (7ML5501)	Fully synthetic process connection (enclosure version only) (7ML5610)
Sensor length (nominal)	100 mm (4 inch)	100 mm (4 inch)
Process connection material of probe/wetted parts ³⁾	Connection: 316L stainless steel; Process seal: FKM (optional FFKM); Sensor: PPS (optional PVDF) ⁴⁾	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 terminal block, ½" NPT wiring entrance, M20 x 1.5 optional
Connection (Integral cable version)	4 conductors, 1 m (3.3 ft), 0.5 mm ² (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]
Power supply		
• Standard	12 ... 33 V DC	12 ... 33 V DC
• Intrinsically Safe	10 ... 30 V DC (Intrinsically Safe barrier required)	Not applicable
Certificates and approvals		
	<ul style="list-style-type: none"> • 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) 	<ul style="list-style-type: none"> • General: CSA, FM

- 1) 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.
- 2) When operation is in areas classified as hazardous, observe restrictions according to relevant certificate. See also Pressure/Temperature curves on page 4/14.
- 3) For Caustic Materials please contact ceg.smpi@siemens.com <http://www.siemens.com/automation/support-request> for alternative O Rings
- 4) 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	Order No.
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	7ML5501- 0 ■■■
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]	A E J
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 ¹⁾ CSA/FM Class II and III, Div. 1, Groups E, F, G ¹⁾	A C G
Device version Integral cable version (PPS probe) Enclosure version (PPS probe), ½" NPT cable inlet Integral cable version with PVDF probe body Enclosure version with PVDF probe body (½" NPT cable inlet) Enclosure version (PPS probe), M20 x 1.5 cable inlet Enclosure version with PVDF probe body, M20 x 1.5 cable inlet	1 3 5 6 7 8
WHG approval, German overflow protection Not required Required	0 1

¹⁾ Barrier or Intrinsically Safe power supply required for Intrinsically Safe protection

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 inch)]: Measuring-point number/identification (max. 20 characters) specify in plain text	Y17
FFKM seal O-ring ¹⁾	A22
Inspection Certificate Type 3.1 per EN 10204	C12
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.	Order No. 7ML1998-5QJ82

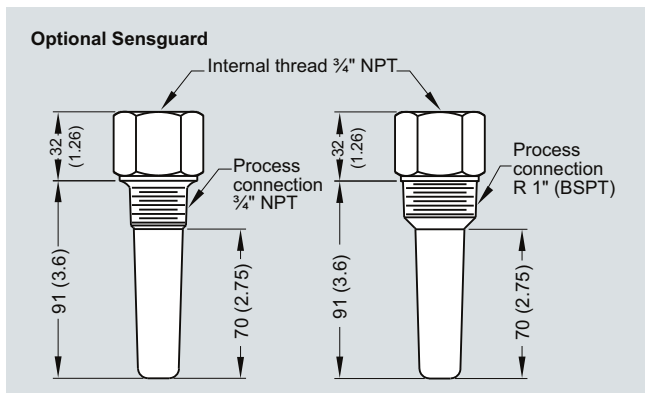
Selection and Ordering data	Order No.
Accessories Sensguard, ¾" NPT (PPS) Only available for CLS100 with ¾" NPT thread Sensguard, R 1" (BSPT) (PPS) Only available for CLS100 with ¾" NPT thread Tag, stainless steel, 12 x 45 mm (0.47 x 1.77 inch), one text line, suitable for enclosures Siemens Intrinsically 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 inch) -40 ... +100 °C (-40 ... +212 °F), IP68 (General Purpose) M20 x 1.5 cable gland, PA polyamide, ATEX II 2G EEx e II, fits cable diameter 7 ... 12 mm (0.28 ... 0.47 inch), -20 ... +70 °C (-4 ... +158 °F), IP68 (General Purpose)	7ML1830-1DL 7ML1830-1DM 7ML1930-1AC 7NG4124-0AA00 7ML1830-1JA 7ML1830-1JC
¹⁾ See Temperature restriction on page 4/14	

Selection and Ordering data	Order No.
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	7ML5610- 0 ■■■ 0
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)	A B
Approvals General Purpose: CSA, FM	D
Versions/Options Enclosure version, PPS process connection, ½" NPT cable inlet Enclosure version, PPS process connection, M20 x 1.5	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 inch)]: Measuring-point number/identification (max. 20 characters) specify in plain text	Y17
FFKM seal O-ring ¹⁾	A22
Inspection Certificate Type 3.1 per EN 10204	C12
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.	Order No. 7ML1998-5QJ83
Accessories 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	7ML1830-1DL 7ML1830-1DM

¹⁾ See Temperature restriction on page 4/14

Options



Optional Sensguard, dimensions in mm (inch)

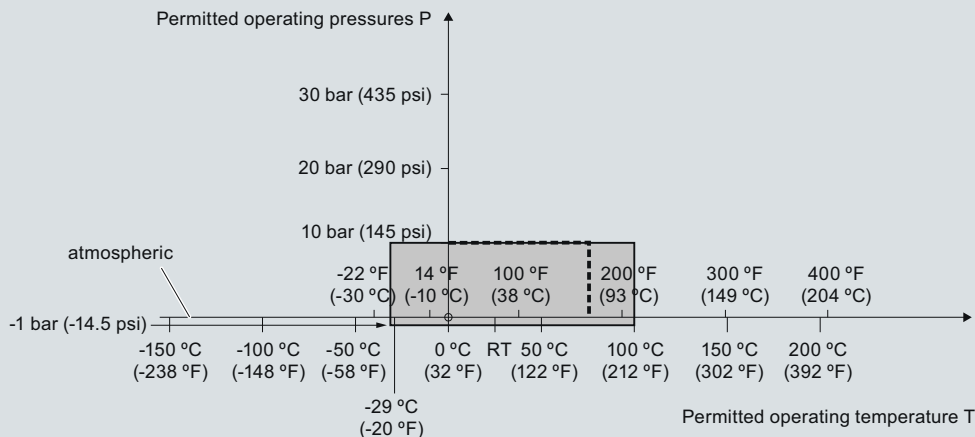
Level measurement

Point level measurement – Capacitance switches

Pointek CLS100

Characteristic curves

Pressure/temperature curve
 CLS100
 Threaded process connections
 (7ML5501)

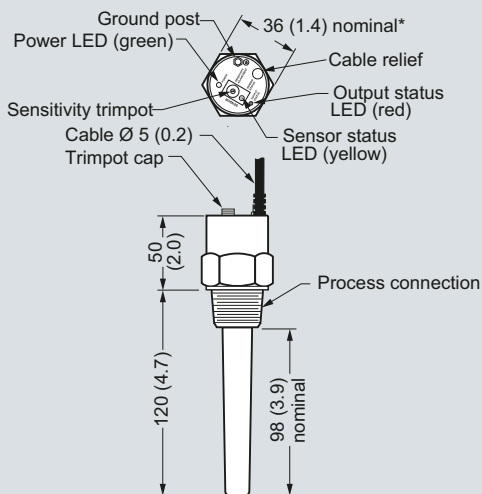


--- Example:
 Permitted operating pressure = 10 bar (145 psi) at 75 °C

Pointek CLS100 Process Pressure/Temperature derating curves

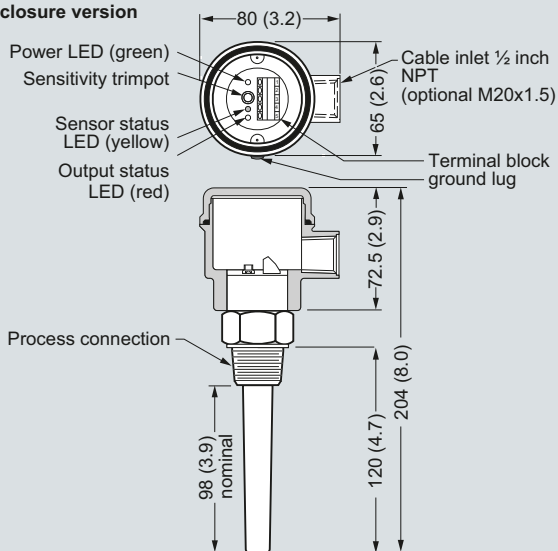
Dimensional drawings

Integral cable version



*Some G thread configurations deviate from this size.

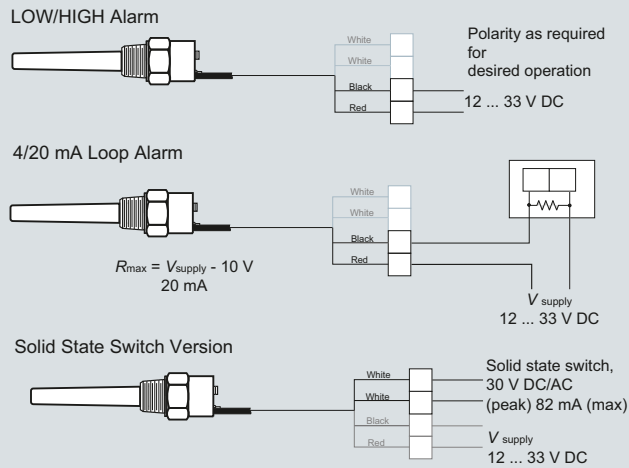
Enclosure version



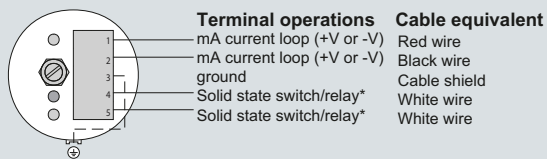
Pointek CLS100, dimensions in mm (inch)

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.

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

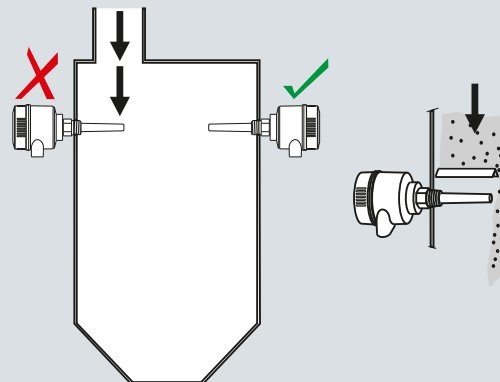
Pointek CLS200 standard version has 3 LED indicators with basic relay and solid-state switch alarms.

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

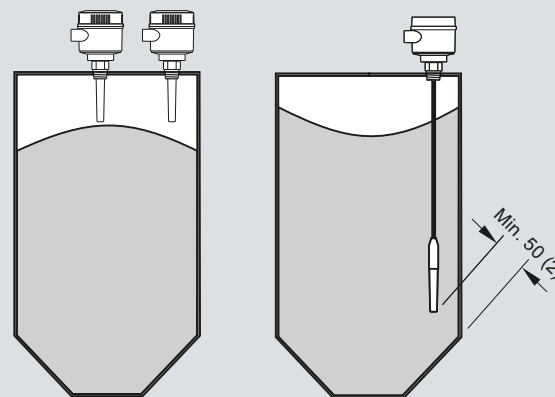
Installation



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) 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	• 30 V DC • 250 V AC
- Max. contact current	• 5 A DC • 8 A AC
- Max. switching capacity	150 W DC 2 000 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	• 30 V DC • 30 V peak AC
- Max. load current	82 mA
- Voltage drop	< 1 V, typical at 50 mA
- Time delay (pre or post switching)	1 ... 60 s
Rated operating conditions¹⁾	
Installation conditions	
• Location	Indoor/outdoor
Ambient conditions	
• Ambient temperature	-40 ... +85 °C (-40 ... +185 °F) ²⁾
• Installation category	II
• Pollution degree	4
Medium conditions	
	Liquids, bulk solids, slurries and interfaces
• Relative dielectric constant ϵ_r	Min. 1.5
• Process temperature	
- Without thermal isolator	-40 ... +85 °C (-40 ... +185 °F) ²⁾
- 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) ³⁾	
	-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 be installed per the instruction manual.

Design	
Material	Epoxy-coated aluminum with gasket
• Enclosure	316L stainless steel
• Optional thermal isolator	Removable terminal block, max. 2.5 mm ²
Connection	IP65/Type 4/NEMA 4 (optional IP68)
Degree of protection	2 x M20x1.5 thread (option: 2 x 1/2" NPT conduit entry including 1 plugged entry)
Cable inlet	
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 4/36
- 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 4/36

Level measurement

Point level measurement – Capacitance switches

Pointek CLS200 – Standard

Design: Probe

	Rod version	Sanitary version	Cable version	Sliding Coupling version
Max. length	5 500 mm (216.53 inch)	5 500 mm (216.53 inch)	30 000 mm (1 181.1 inch) liquids and slurries 5 000 mm (196.85 inch) solids (under loads)	5 500 mm (216.53 inch)
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 ¹⁾	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) ²⁾	FKM (optional FFKM) ²⁾	FKM (optional FFKM) ²⁾	FKM (optional FFKM) ²⁾
Thermal isolator ³⁾	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 ceg.smpi@siemens.com for alternative O-Rings

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

Level measurement

Point level measurement – Capacitance switches

Pointek CLS200 – Standard

Selection and Ordering data	Order No.	Selection and Ordering data	Order No.
Pointek CLS200 - Standard - Rod Version with Threaded or Flanged process connection 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 <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] <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.) Probe length (length from flange face) (threaded lengths include process thread) <u>Note: No Y01 needed in order code for standard lengths</u> Compact [threaded 120 mm (4.72 inch), Flanged 98 mm (3.86 inch)] Extended rod, 250 mm (9.84 inch) Extended rod, 350 mm (13.78 inch) Extended rod, 500 mm (19.69 inch) Extended rod, 750 mm (29.53 inch) Extended rod, 1 000 mm (39.37 inch) Extended rod, 1 250 mm (49.21 inch) Extended rod, 1 350 mm (53.15 inch) Extended rod, 1 500 mm (59.06 inch) Extended rod, 1 750 mm (68.90 inch) Extended rod, 2 000 mm (78.74 inch)	7ML5630- ■■■■ - ■■ 0 0 A 0 B 0 C 0 D 1 A 1 B 1 D 3 A 3 B 3 D 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 J K L	Pointek CLS200 - Standard - Rod Version with Threaded or Flanged process connection 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 <u>Add order code Y01 and plain text: "Insertion length ... mm"</u> Extended rod, 210 ... 1 000 mm (8.27 ... 39.37 inch) Extended rod, 1 001 ... 2 000 mm (39.41 ... 78.74 inch) Extended rod, 2 001 ... 3 000 mm (78.78 ... 118.11 inch) Extended rod, 3 001 ... 4 000 mm (118.15 ... 157.48 inch) Extended rod, 4 001 ... 5 000 mm (157.52 ... 196.85 inch) Extended rod, 5 001 ... 5 500 mm (196.89 ... 216.53 inch) Thermal isolator Without thermal isolator With thermal isolator [for process connection temperatures over 85 °C (185 °F)] Remote mount electronics and mounting bracket With 2 m (79 inch) of cable ¹⁾ With 5 m (197 inch) of cable ¹⁾ Wetted seals FKM FFKM [for process temperatures above -20 °C (-4 °F)] Probe material 316L Stainless Steel with PPS probe body 316L Stainless Steel with PVDF probe body Approvals 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 Enclosure and lid Aluminum epoxy coated 2 x ½" NPT via adapter - cable inlet, IP65 2 x M20 x 1.5 cable inlet IP65 2 x ½" NPT via adapter - cable inlet, IP68 2 x M20 x 1.5 cable inlet IP68 1) Available with Approvals options F ... H	7ML5630- ■■■■ - ■■ 0 M N P Q R S 0 1 2 3 0 1 0 1 C D E F G H J K A B C D

Level measurement

Point level measurement – Capacitance switches

Pointek CLS200 – Standard

Selection and Ordering data	Order code	Selection and Ordering data	Order No.
Further designs		Pointek CLS200 - Standard - Cable Version with Threaded or Flanged process connection	7ML5631-
Please add "-Z" 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	0
Total insertion length: enter the total insertion length in plain text description	Y01	Process connection	
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15	<u>Threaded, 316L stainless steel</u>	
Manufacturer's test certificate: M to DIN 55350, Part 18 and ISO 9000	C11	¾" NPT [(Taper), ANSI/ASME B1.20.1]	0 A
Inspection Certificate Type 3.1 per EN 10204	C12	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
Operating Instructions	See page 4/34	<u>Welded flange, 316L stainless steel, raised face</u>	
Note: The Operating Instructions should be ordered as a separate line on the order.		1" ASME, 150 lb	5 A
This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and manual library.		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
Accessories	See page 4/34	<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.)	
		Probe length (length from flange face) (threaded lengths include process thread)	
		Note: No Y01 needed in order code for standard lengths	
		<u>Extended cable, 3 000 mm (118.11 inch), length can be determined by customer on assembly¹⁾</u>	A
		<u>Extended cable, 6 000 mm (236.22 inch), length can be determined by customer on assembly¹⁾</u>	B
		<u>Add order code Y01 and plain text: "Insertion length ... mm"</u>	
		<u>Extended cable, 500 ... 5 000 mm (19.69 ... 196.85 inch)</u>	C
		<u>Extended cable, 5 001 ... 10 000 mm (196.89 ... 393.70 inch)</u>	D
		<u>Extended cable, 10 001 ... 15 000 mm (393.74 ... 590.55 inch)</u>	E
		<u>Extended cable, 15 001 ... 20 000 mm (590.59 ... 787.4 inch)</u>	F
		<u>Extended cable, 20 001 ... 25 000 mm (787.44 ... 984.25 inch)</u>	G
		<u>Extended cable, 25 001 ... 30 000 mm (984.29 ... 1 181.1 inch)</u>	H

Level measurement

Point level measurement – Capacitance switches

Pointek CLS200 – Standard

Selection and Ordering data	Order No.	Selection and Ordering data	Order code
Pointek CLS200 - Standard - Cable Version with Threaded or Flanged process connection 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	7ML5631-	Further designs Please add "-Z" to Order No. and specify Order code(s).	
Thermal isolator Without thermal isolator With thermal isolator [for process connection temperatures over 85 °C (185 °F)]	0 1	Total insertion length: enter the total insertion length in plain text description Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text 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
Remote mount electronics and mounting bracket With 2 m (79 inch) of cable ²⁾ With 5 m (197 inch) of cable ²⁾	2 3	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 4/34
Wetted seals FKM and PTFE FFKM and PTFE [for process temperatures above -20 °C (-4 °F)]	0 1	Accessories	See page 4/34
Probe material FEP jacketed cable with PPS probe body FEP jacketed cable with PVDF probe body	0 1		
Approvals 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		
Enclosure and lid Aluminum epoxy coated 2 x ½" NPT via adapter - cable inlet, IP65 2 x M20 x1.5 cable inlet, IP65 2 x ½" NPT via adapter - cable inlet, IP68 2 x M20 x1.5 cable inlet, IP68	A B C D		

1) Sensor detached to allow customer to set desired cable length

2) Available with Approvals options F ... H

Level measurement

Point level measurement – Capacitance switches

Pointek CLS200 – Standard

4

Selection and Ordering data	Order No.
Pointek CLS200 - Standard - Rod with Sanitary process connection	7ML5632-
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
Process connection <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	8 E
(Note: Sanitary connection dimensionally corresponds to the applicable ISO 2852 standard)	
Probe length (length from process connection face)	
<u>Note: No Y01 needed in order code for standard lengths</u>	
Compact 98 mm (3.86 inch)	A
Extended rod, 250 mm (9.84 inch)	B
Extended rod, 350 mm (13.78 inch)	C
Extended rod, 500 mm (19.69 inch)	D
Extended rod, 750 mm (29.53 inch)	E
Extended rod, 1 000 mm (39.37 inch)	F
Extended rod, 1 250 mm (49.21 inch)	G
Extended rod, 1 350 mm (53.15 inch)	H
Extended rod, 1 500 mm (59.06 inch)	J
Extended rod, 1 750 mm (68.90 inch)	K
Extended rod, 2 000 mm (78.74 inch)	L
<u>Add order code Y01 and plain text:</u> <u>"Insertion length ... mm"</u>	
Extended rod, 110 ... 350 mm (4.3 ... 13.78 inch)	M
Extended rod, 351 ... 1 000 mm (13.78 ... 39.37 inch)	N
Extended rod, 1 001 ... 2 000 mm (39.41 ... 78.74 inch)	P
Extended rod, 2 001 ... 3 000 mm (78.78 ... 118.11 inch)	Q
Extended rod, 3 001 ... 4 000 mm (118.15 ... 157.48 inch)	R
Extended rod, 4 001 ... 5 000 mm (157.52 ... 196.85 inch)	S
Extended rod, 5 001 ... 5 500 mm (196.89 ... 216.53 inch)	T
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	
Remote mount electronics with 2 m (79 inch) of cable ¹⁾	2
Remote mount electronics with 5 m (197 inch) of cable ¹⁾	3
Wetted seals	
FKM	0
FFKM	1
[for process temperatures above -20 °C (-4 °F)]	
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 - Rod with Sanitary process connection	7ML5632-
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
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 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
Enclosure and lid <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) Available with Approvals options F ... H	

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 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
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 4/34
Accessories	See page 4/34

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	7ML5633-
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
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)	
<u>Note: No Y01 needed in order code for standard lengths</u>	
Extended rod, 350 mm (13.78 inch)	C
Extended rod, 500 mm (19.69 inch)	D
Extended rod, 750 mm (29.53 inch)	E
Extended rod, 1 000 mm (39.37 inch)	F
Extended rod, 1 250 mm (49.21 inch)	G
Extended rod, 1 350 mm (53.15 inch)	H
Extended rod, 1 500 mm (59.06 inch)	J
Extended rod, 1 750 mm (68.90 inch)	K
Extended rod, 2 000 mm (78.74 inch)	L
<u>Add order code Y01 and plain text:</u> <u>"Insertion length ... mm"</u>	
Extended rod, 350 ... 1 000 mm (13.78 ... 39.37 inch)	M
Extended rod, 1 001 ... 2 000 mm (39.41 ... 78.74 inch)	N
Extended rod, 2 001 ... 3 000 mm (78.78 ... 118.11 inch)	P
Extended rod, 3 001 ... 4 000 mm (118.15 ... 157.48 inch)	Q
Extended rod, 4 001 ... 5 000 mm (157.52 ... 196.85 inch)	R
Extended rod, 5 001 ... 5 500 mm (196.89 ... 216.53 inch)	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 inch) of cable ¹⁾	2
With 5 m (197 inch) of cable ¹⁾	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	7ML5633-
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
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 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
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
1) Available with Approvals options F ... H	
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 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
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 4/34
Accessories	
	See page 4/34

Level measurement

Point level measurement – Capacitance switches

Pointek CLS200 – Standard

Selection and Ordering data	Order No.
Pointek CLS200 - Standard - PFA Coated Rod with PFA Coated Flanged process connection	7ML5634-
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	0
Process connection	
<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.)	
Probe length (length from flange face) (threaded lengths include process thread)	
Note: No Y01 needed in order code for standard lengths	
Compact (Threaded 98 mm (3.86 inch))	A
Extended rod, 250 mm (9.84 inch)	B
Extended rod, 350 mm (13.78 inch)	C
Extended rod, 500 mm (19.69 inch)	D
Extended rod, 750 mm (29.53 inch)	E
Extended rod, 1 000 mm (39.37 inch)	F
Extended rod, 1 250 mm (49.21 inch)	G
Extended rod, 1 350 mm (53.15 inch)	H
Extended rod, 1 500 mm (59.06 inch)	J
Extended rod, 1 750 mm (68.90 inch)	K
Extended rod, 2 000 mm (78.74 inch)	L
Add order code Y01 and plain text: "Insertion length ... mm"	
Extended rod, 200 ... 1 000 mm (7.87 ... 39.37 inch)	M
Extended rod, 1 001 ... 2 000 mm (39.41 ... 78.74 inch)	N
Extended rod, 2 001 ... 3 000 mm (78.78 ... 118.11 inch)	P
Extended rod, 3 001 ... 4 000 mm (118.15 ... 157.48 inch)	Q
Extended rod, 4 001 ... 5 000 mm (157.52 ... 196.85 inch)	R
Extended rod, 5 001 ... 5 500 mm (196.89 ... 216.53 inch)	S

Selection and Ordering data	Order No.
Pointek CLS200 - Standard - PFA Coated Rod with PFA Coated Flanged process connection	7ML5634-
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	0
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 inch) of cable	2
With 5 m (197 inch) of cable	3
Wetted seals	
FKM	0
FFKM [for process temperatures above -20°C (-4°F)]	1
Probe material	
PFA Coated 316L Stainless Steel with PPS probe body	0
PFA Coated 316L Stainless Steel with PVDF probe body	1
Approvals	
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
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

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 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
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 4/34
Accessories	See page 4/34

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, 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.

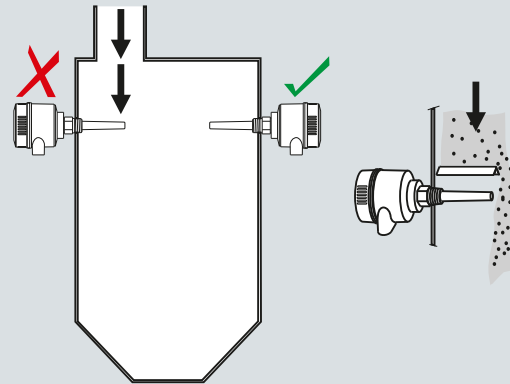
When connected to the PROFIBUS network, advanced diagnostics and set up using SIMATIC PDM are possible.

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

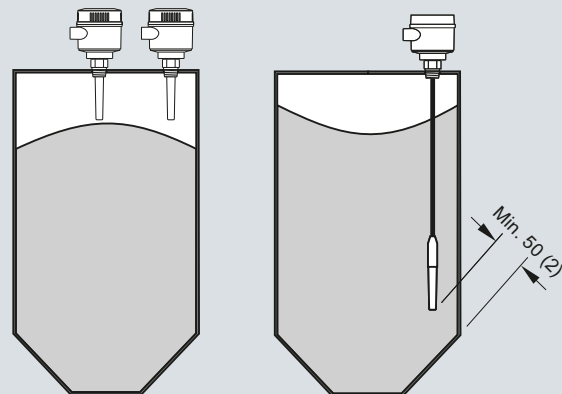
Installation



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) from tank wall.

Pointek CLS200 installation, dimensions in mm (inch)

Level measurement

Point level measurement – Capacitance switches

Pointek CLS200 – Digital

Technical specifications

Mode of operation

Measuring principle	Inverse frequency shift capacitive level detection
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Input

Measured variable	Change in picoFarad (pF)
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Output

Output signal	
• Solid-state output	
- Output	Galvanically isolated
- Protection	Against reversed polarity (bipolar)
- Max. switching voltage	<ul style="list-style-type: none"> • 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

Rated operating conditions¹⁾

Installation conditions	
• Location	Indoor/outdoor
Ambient conditions	
• Ambient temperature	-40 ... +85 °C (-40 ... +185 °F) ²⁾
• Installation category	II
• Pollution degree	4
Medium conditions	Liquids, bulk solids, slurries and interfaces
• Relative dielectric constant ϵ_r	Min. 1.5
• Process temperature	
- Without thermal isolator	-40 ... +85 °C (-40 ... +185 °F) ²⁾
- 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) ³⁾	-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)

Design

• Material	
- Enclosure	Epoxy-coated aluminum with gasket
- Optional thermal isolator	316L stainless steel
• Connection	Removable terminal block, max. 2.5 mm ²
• 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 be installed per the instruction manual.

Power supply

Bus voltage	Standard: 12 ... 30 V DC Intrinsically Safe: 12 ... 24 V DC
Current consumption	12.5 mA

Certificates and approvals

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 ⁴⁾	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)

Communication

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 on page 4/36.
- 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 4/36.
- 4) 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	5 500 mm (216.53 inch)	5 500 mm (216.53 inch)	30 000 mm (1 181.1 inch) liquids and slurries 5 000 mm (196.85 inch) solids (under loads)	5 500 mm (216.53 inch)
Process connection	R $\frac{3}{4}$ ", 1", 1 $\frac{1}{4}$ ", 1 $\frac{1}{2}$ " [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] $\frac{3}{4}$ ", 1", 1 $\frac{1}{4}$ ", 1 $\frac{1}{2}$ " NPT [(Taper), ANSI/ASME B1.20.1] G $\frac{3}{4}$ ", 1", 1 $\frac{1}{2}$ " [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] 316L stainless steel ASME/EN flange	1 $\frac{1}{2}$ ", 2" sanitary fitting clamp 316L stainless steel	R $\frac{3}{4}$ ", 1", 1 $\frac{1}{4}$ ", 1 $\frac{1}{2}$ " [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] $\frac{3}{4}$ ", 1", 1 $\frac{1}{4}$ ", 1 $\frac{1}{2}$ " NPT [(Taper), ANSI/ASME B1.20.1] G $\frac{3}{4}$ ", 1", 1 $\frac{1}{2}$ " [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] 316L stainless steel ASME/EN flange	R $\frac{3}{4}$ ", 1", 1 $\frac{1}{4}$ ", 1 $\frac{1}{2}$ " [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] $\frac{3}{4}$ ", 1", 1 $\frac{1}{4}$ ", 1 $\frac{1}{2}$ " NPT [(Taper), ANSI/ASME B1.20.1] G $\frac{3}{4}$ ", 1", 1 $\frac{1}{2}$ " [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]
Extension material	316L stainless steel optional PFA coated ¹⁾	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) ²⁾	FKM (optional FFKM) ²⁾	FKM (optional FFKM) ²⁾	FKM (optional FFKM) ²⁾
Thermal isolator ³⁾	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 ceg.smpi@siemens.com for alternative O-Rings

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

Level measurement

Point level measurement – Capacitance switches

Pointek CLS200 – Digital

4

Selection and Ordering data	Order No.
Pointek CLS200 - Digital - Rod with Threaded or Flanged process connection	7ML5640-
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
Process connection	
<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.)	
Probe length (length from flange face) (threaded lengths include process thread)	
<u>Note: No Y01 needed in order code for standard lengths</u>	
Compact [threaded 120 mm (4.72 inch), Flanged 98 mm (3.86 inch)]	A
Extended rod, 250 mm (9.84 inch)	B
Extended rod, 350 mm (13.78 inch)	C
Extended rod, 500 mm (19.69 inch)	D
Extended rod, 750 mm (29.53 inch)	E
Extended rod, 1 000 mm (39.37 inch)	F
Extended rod, 1 250 mm (49.21 inch)	G
Extended rod, 1 350 mm (53.15 inch)	H
Extended rod, 1 500 mm (59.06 inch)	J
Extended rod, 1 750 mm (68.90 inch)	K
Extended rod, 2 000 mm (78.74 inch)	L

Selection and Ordering data	Order No.
Pointek CLS200 - Digital - Rod with Threaded or Flanged process connection	7ML5640-
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
Process connection	
<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.)	
Probe length (length from flange face) (threaded lengths include process thread)	
<u>Note: No Y01 needed in order code for standard lengths</u>	
Compact [threaded 120 mm (4.72 inch), Flanged 98 mm (3.86 inch)]	A
Extended rod, 250 mm (9.84 inch)	B
Extended rod, 350 mm (13.78 inch)	C
Extended rod, 500 mm (19.69 inch)	D
Extended rod, 750 mm (29.53 inch)	E
Extended rod, 1 000 mm (39.37 inch)	F
Extended rod, 1 250 mm (49.21 inch)	G
Extended rod, 1 350 mm (53.15 inch)	H
Extended rod, 1 500 mm (59.06 inch)	J
Extended rod, 1 750 mm (68.90 inch)	K
Extended rod, 2 000 mm (78.74 inch)	L

1) Barrier or Intrinsically Safe power supply required for Intrinsically Safe protection

Level measurement

Point level measurement – Capacitance switches

Pointek CLS200 – Digital

Selection and Ordering data	Order code	Selection and Ordering data	Order No.
Further designs		Pointek CLS200 - Digital - Cable with Threaded or Flanged process connection	7ML5641-
Please add "-Z" 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	0
Total insertion length: enter the total insertion length in plain text description	Y01	Process connection	
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15	<u>Threaded, 316L stainless steel</u>	
Manufacturer's test certificate: M to DIN 55350, Part 18 and ISO 9000	C11	¾" NPT [(Taper), ANSI/ASME B1.20.1]	0 A
Inspection Certificate Type 3.1 per EN 10204	C12	1" NPT [(Taper), ANSI/ASME B1.20.1]	0 B
Operating Instructions		1¼" NPT [(Taper), ANSI/ASME B1.20.1]	0 C
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 4/34	1½" NPT [(Taper), ANSI/ASME B1.20.1]	0 D
Accessories	See page 4/34	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.)	
		Probe length (length from flange face) (threaded lengths include process thread)	
		<u>Note: No Y01 needed in order code for standard lengths</u>	
		Extended cable, 3 000 mm (118.11 inch), length can be determined by customer on assembly	A
		Extended cable, 6 000 mm (236.22 inch), length can be determined by customer on assembly	B
		<u>Add order code Y01 and plain text: "Insertion length ... mm"</u>	
		Extended cable, 500 ... 5 000 mm (19.69 ... 196.85 inch)	C
		Extended cable, 5 001 ... 10 000 mm (196.89 ... 393.70 inch)	D
		Extended cable, 10 001 ... 15 000 mm (393.74 ... 590.55 inch)	E
		Extended cable, 15 001 ... 20 000 mm (590.59 ... 787.40 inch)	F
		Extended cable, 20 001 ... 25 000 mm (787.44 ... 984.25 inch)	G
		Extended cable, 25 001 ... 30 000 mm (984.29 ... 1 181.10 inch)	H

Level measurement

Point level measurement – Capacitance switches

Pointek CLS200 – Digital

Selection and Ordering data

Selection and Ordering data	Order No.
Pointek CLS200 - Digital - Cable with Threaded or Flanged process connection	7ML5641- ■■■■■ - ■■■■ 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	
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 inch) of cable	2
With 5 m (197 inch) of cable	3
Wetted seals	
FKM and PTFE	0
FFKM and PTFE [for process temperatures above -20 °C (-4 °F)]	1
Probe material	
FEP jacketed cable with PPS probe body	0
FEP jacketed cable with PVDF probe body	1
Approvals	
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: ¹⁾ 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
Intrinsically Safe: ¹⁾ 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
Enclosure and lid	
<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

¹⁾ Barrier or Intrinsically Safe power supply required for Intrinsically Safe protection

Selection and Ordering data

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 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
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 4/34
Accessories	See page 4/34

Level measurement

Point level measurement – Capacitance switches

Pointek CLS200 – Digital

Selection and Ordering data	Order No.
Pointek CLS200 - Digital - Rod with Sanitary process connection 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	7ML5642- - - - - - 0
Process connection Sanitary 316L stainless steel	
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
Probe length (length from process connection face) <u>Note: No Y01 needed in order code for standard lengths</u>	
Compact 98 mm (3.86 inch)	A
Extended rod, 250 mm (9.84 inch)	B
Extended rod, 350 mm (13.78 inch)	C
Extended rod, 500 mm (19.69 inch)	D
Extended rod, 750 mm (29.53 inch)	E
Extended rod, 1 000 mm (39.37 inch)	F
Extended rod, 1 250 mm (49.21 inch)	G
Extended rod, 1 350 mm (53.15 inch)	H
Extended rod, 1 500 mm (59.06 inch)	J
Extended rod, 1 750 mm (68.90 inch)	K
Extended rod, 2 000 mm (78.74 inch)	L
Add order code Y01 and plain text: "Insertion length ... mm"	
Extended rod, 110 ... 350 mm (4.3 ... 13.78 inch)	M
Extended rod, 351 ... 1 000 mm (13.82 ... 39.37 inch)	N
Extended rod, 1 001 ... 2 000 mm (39.41 ... 78.74 inch)	P
Extended rod, 2 001 ... 3 000 mm (78.78 ... 118.11 inch)	Q
Extended rod, 3 001 ... 4 000 mm (118.15 ... 157.48 inch)	R
Extended rod, 4 001 ... 5 000 mm (157.52 ... 196.85 inch)	S
Extended rod, 5 001 ... 5 500 mm (196.89 ... 216.53 inch)	T
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 inch) of cable	2
With 5 m (197 inch) 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	
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: ¹⁾ 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

Selection and Ordering data	Order No.
Pointek CLS200 - Digital - Rod with Sanitary process connection 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	7ML5642- - - - - - 0
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
Intrinsically Safe: ¹⁾ 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
Enclosure and lid <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	

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 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
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 4/34
Accessories	See page 4/34

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Level measurement

Point level measurement – Capacitance switches

Pointek CLS200 – Digital

Selection and Ordering data	Order No.
Pointek CLS200 - Digital - Rod with Sliding coupling with Threaded process connection	7ML56343-
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
Process connection <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
Probe length (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 inch)	C
Extended rod, 500 mm (19.69 inch)	D
Extended rod, 750 mm (29.53 inch)	E
Extended rod, 1 000 mm (39.37 inch)	F
Extended rod, 1 250 mm (49.21 inch)	G
Extended rod, 1 350 mm (53.15 inch)	H
Extended rod, 1 500 mm (59.06 inch)	J
Extended rod, 1 750 mm (68.90 inch)	K
Extended rod, 2 000 mm (78.74 inch)	L
<u>Add order code Y01 and plain text: "insertion length ... mm"</u>	
Extended rod, 350 ... 1 000 mm (13.82 ... 39.37 inch)	M
Extended rod, 1 001 ... 2 000 mm (39.41 ... 78.74 inch)	N
Extended rod, 2 001 ... 3 000 mm (78.78 ... 118.11 inch)	P
Extended rod, 3 001 ... 4 000 mm (118.15 ... 157.48 inch)	Q
Extended rod, 4 001 ... 5 000 mm (157.52 ... 196.85 inch)	R
Extended rod, 5 001 ... 5 500 mm (196.89 ... 216.53 inch)	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 inch) of cable	2
With 5 m (197 inch) 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
Approvals 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: ¹⁾ CE, C-TICK, ATEX II 1 G EEx ia IIC T6...T4, ATEX II 1/2 D IP6X T100 °C	D

Selection and Ordering data	Order No.
Pointek CLS200 - Digital - Rod with Sliding coupling with Threaded process connection	7ML56343-
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
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
Intrinsically Safe: ¹⁾ 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
Enclosure and lid <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
¹⁾ Barrier or Intrinsically Safe power supply required for Intrinsically Safe protection	

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 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
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 4/34
Accessories	See page 4/34

Level measurement

Point level measurement – Capacitance switches

Pointek CLS200 – Digital

Selection and Ordering data	Order No.
Pointek CLS200 - Digital - PFA Rod with PFA Flanged process connection	7ML5644-
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
Process connection	
<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.)	
Probe length (length from process connection face)	
<u>Note: No Y01 needed in order code for standard lengths</u>	
Compact (Threaded 98 mm (3.86 inch))	A
Extended rod, 250 mm (9.84 inch)	B
Extended rod, 350 mm (13.78 inch)	C
Extended rod, 500 mm (19.69 inch)	D
Extended rod, 750 mm (29.53 inch)	E
Extended rod, 1 000 mm (39.37 inch)	F
Extended rod, 1 250 mm (49.21 inch)	G
Extended rod, 1 350 mm (53.15 inch)	H
Extended rod, 1 500 mm (59.06 inch)	J
Extended rod, 1 750 mm (68.90 inch)	K
Extended rod, 2 000 mm (78.74 inch)	L
<u>Add order code Y01 and plain text: "Insertion length ... mm"</u>	
Extended rod, 200 ... 1 000 mm (7.87 ... 39.37 inch)	M
Extended rod, 1 001 ... 2 000 mm (39.41 ... 78.74 inch)	N
Extended rod, 2 001 ... 3 000 mm (78.78 ... 118.11 inch)	P
Extended rod, 3 001 ... 4 000 mm (118.15 ... 157.48 inch)	Q
Extended rod, 4 001 ... 5 000 mm (157.52 ... 196.85 inch)	R
Extended rod, 5 001 ... 5 500 mm (196.89 ... 216.53 inch)	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 inch) of cable	2
With 5 m (197 inch) of cable	3

Selection and Ordering data	Order No.
Pointek CLS200 - Digital - PFA Rod with PFA Flanged process connection	7ML5644-
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
Wetted seals	
FKM	0
FFKM [for process temperatures above -20°C (-4°F)]	1
Probe material	
PFA Coated 316L Stainless Steel with PPS probe body	0
PFA Coated 316L Stainless Steel with PVDF probe body	1
Approvals	
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: ¹⁾	
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
Enclosure and lid	
<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	

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 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
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 4/34
Accessories	
	See page 4/34

Level measurement

Point level measurement – Capacitance switches

Pointek CLS200 - Standard and Digital

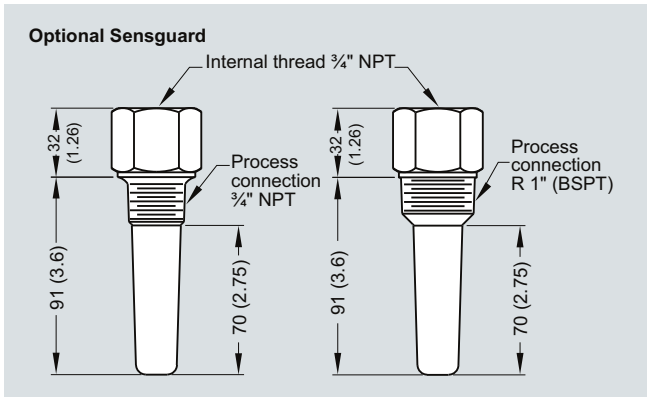
Selection and Ordering data	Order code
Operating Instructions - Standard	
English	7ML1998-5JH04
German	7ML1998-5JH34
Note: The Operating Instructions should be ordered as a separate line on the order.	
Quick Start manual, multi-language	7ML1998-5QY84
This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	
Operating Instructions - Digital	
English	7ML1998-5JJ03
German	7ML1998-5JJ34
Note: The Operating Instructions should be ordered as a separate line on the order.	
Quick Start manual, multi-language	7ML1998-5XA83
This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	
Accessories	
Sensguard, 3/4" NPT (PPS) Only available for CLS200 with 3/4" NPT thread	7ML1830-1DL
Sensguard, R 1" (BSPT) (PPS) Only available for CLS200 with 3/4" NPT thread	7ML1830-1DM
One metallic cable gland M20x1.5, -40 ... +80 °C (-40 ... +176 °F) with integrated shield connection (available for PROFIBUS PA)	7ML1930-1AQ
General Purpose	
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 inch)	7ML1830-1JA
M20x1.5 General Purpose Cable Entry IP68/IP69K NEMA6,-40 ... -100 °C (-40 ... -212 °F), cable size 7 ... 12 mm (0.275 ... 0.472 inch)	7ML1830-1JC
Hazardous Locations	
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 inch)	7ML1830-1JB
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 inch)	7ML1830-1JD
Blind threaded flanges are available. Please contact ceg.smpi@siemens.com with a completed application data sheet on page 4/9	
Pointek Specials	See page 4/80

Level measurement

Point level measurement – Capacitance switches

Pointek CLS200 - Standard and Digital

Options



Optional Sensguard, dimensions in mm (inch)

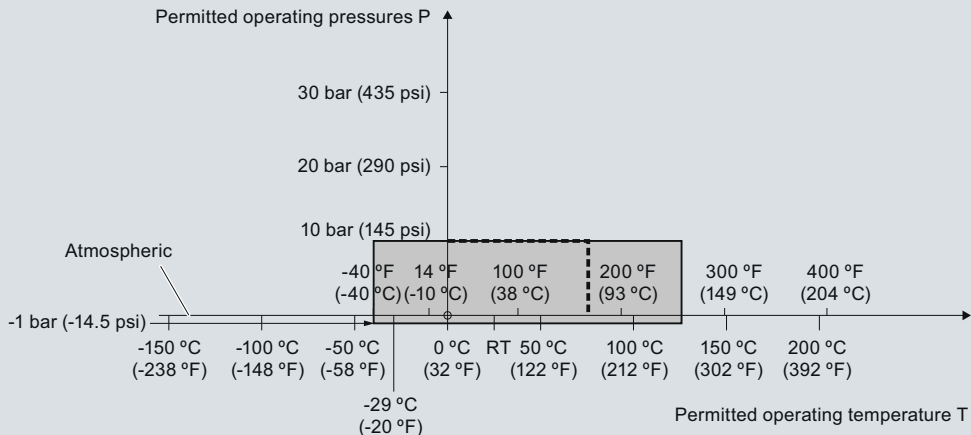
Level measurement

Point level measurement – Capacitance switches

Pointek CLS200 - Standard and Digital

Characteristic curves

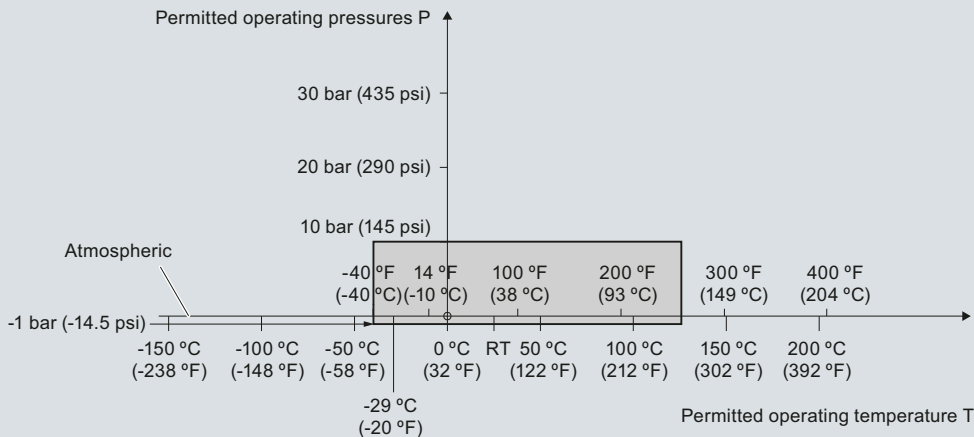
Pressure/temperature curve
 CLS200 sliding coupling
 threaded process connections
 (7ML5633 and 7ML5643)



--- 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)

4

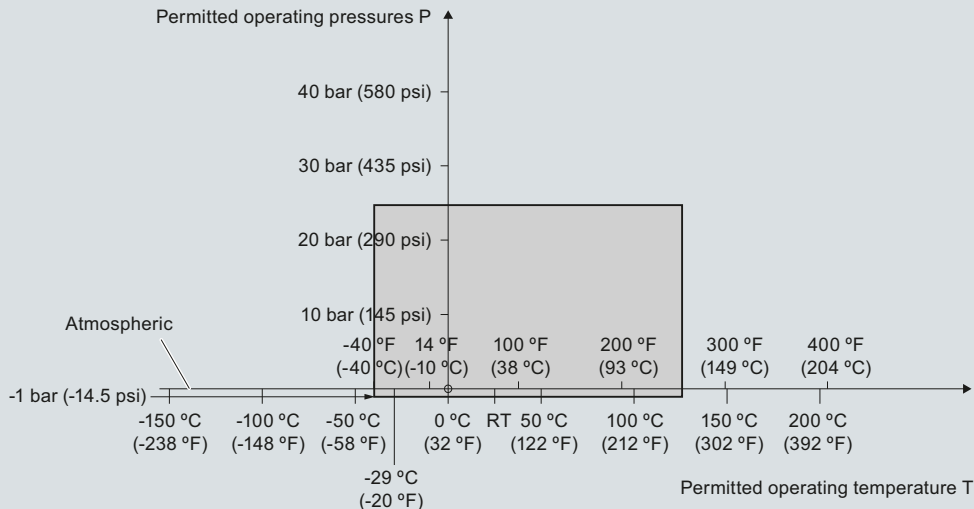
Level measurement

Point level measurement – Capacitance switches

Pointek CLS200 - Standard and Digital

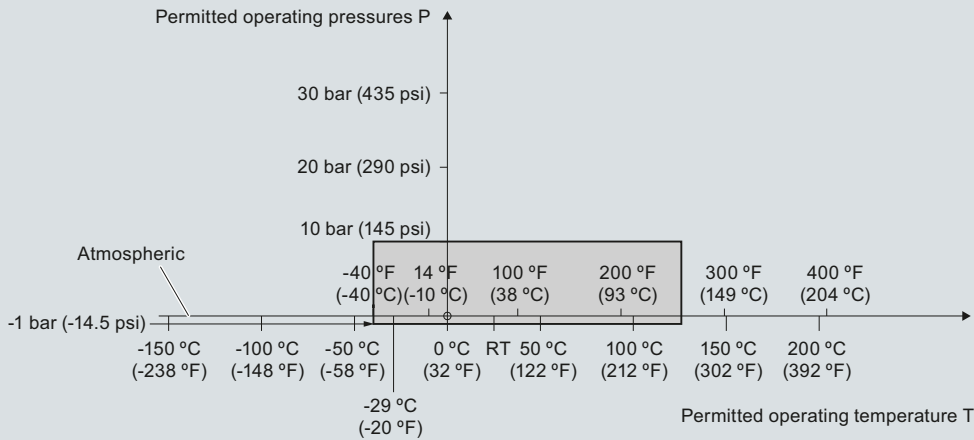
4

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)



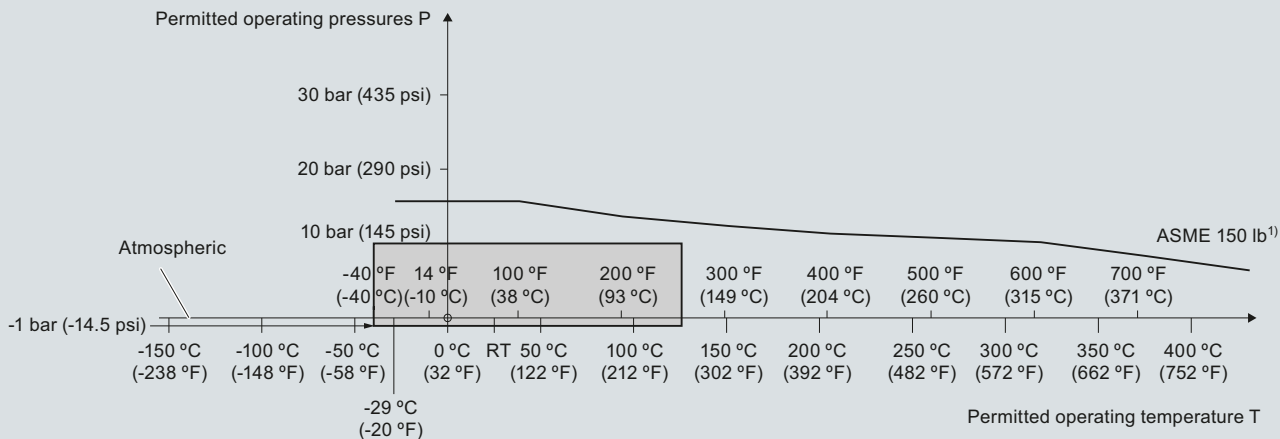
Pointek CLS200 Process Pressure/Temperature derating curves (7ML5632 and 7ML5642)

Level measurement

Point level measurement – Capacitance switches

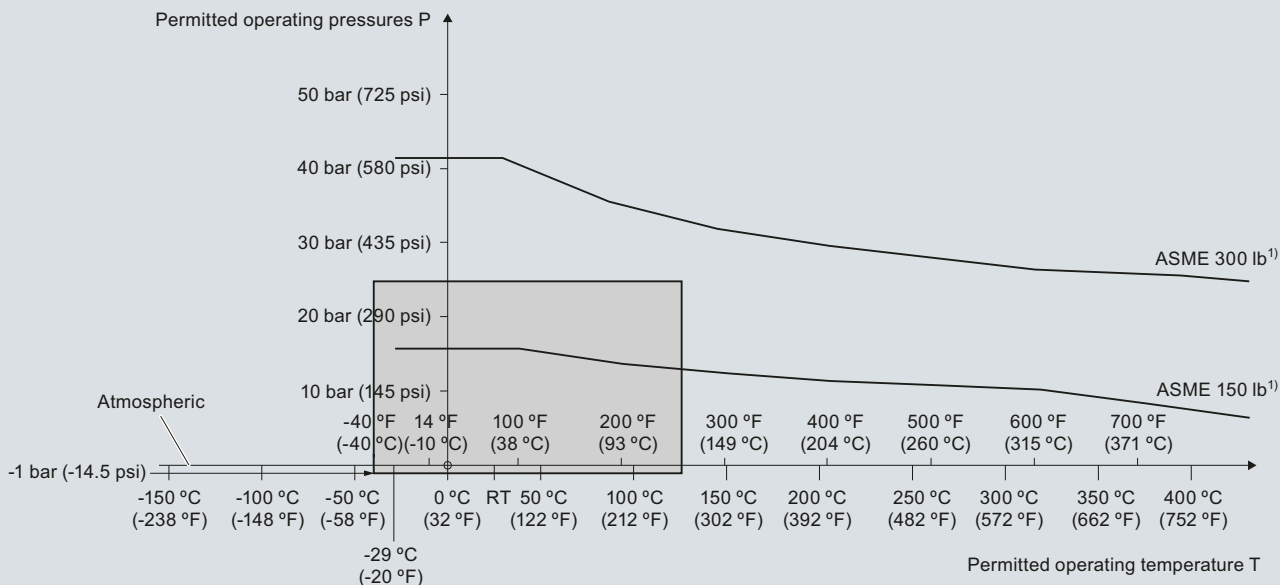
Pointek CLS200 - Standard and Digital

Pressure/temperature curve
CLS200 cable
ASME flanged process connections
(7ML5631 and 7ML5641)



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)

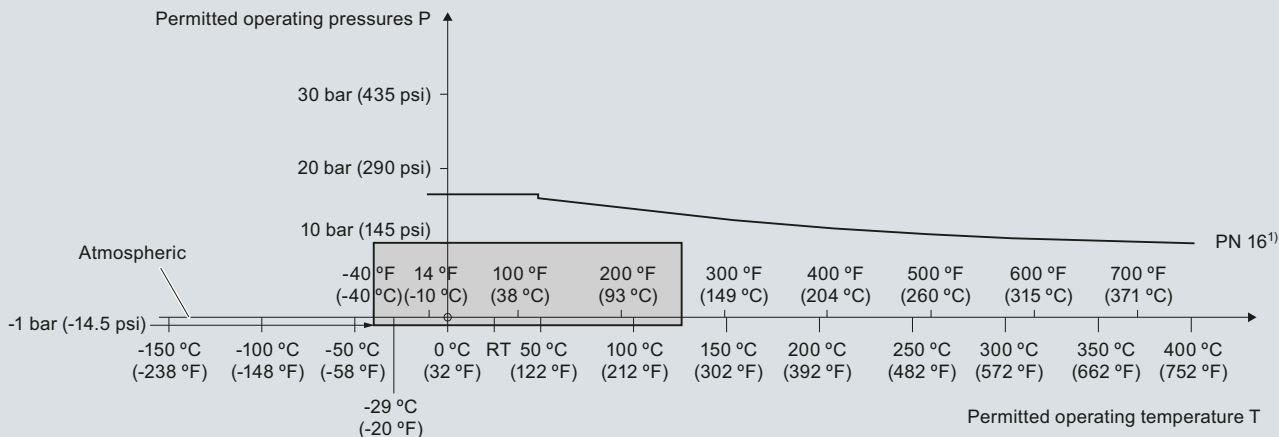
4

Level measurement Point level measurement – Capacitance switches

Pointek CLS200 - Standard and Digital

4

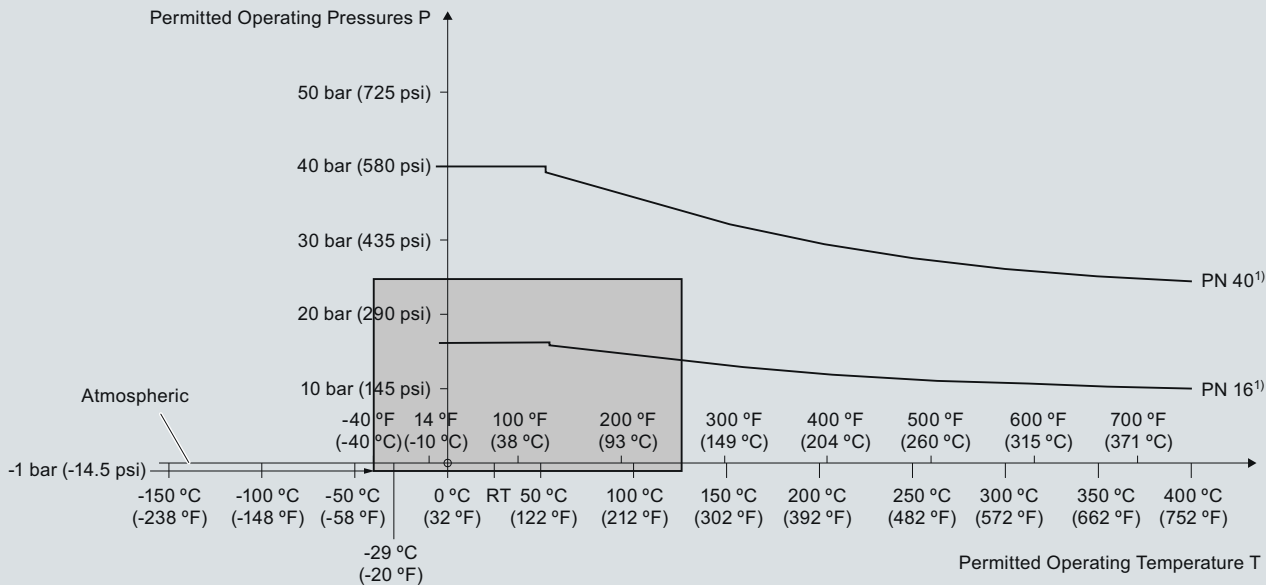
Pressure/temperature curve
CLS200 cable
EN flanged process connections
(7ML5631 and 7ML5641)



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)

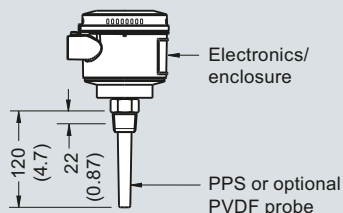
Level measurement

Point level measurement – Capacitance switches

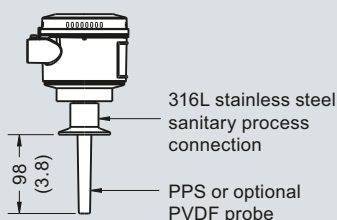
Pointek CLS200 - Standard and Digital

Dimensional drawings

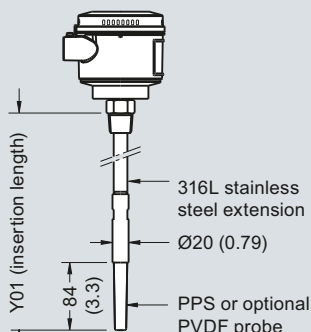
**Compact version
Threaded
(7ML5630 and 7ML5640)**



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

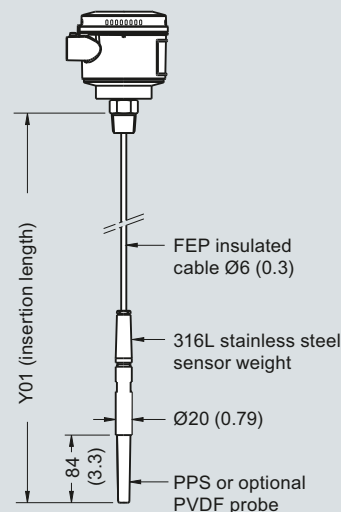


**Extended rod version
Threaded
(7ML5630 and 7ML5640)**

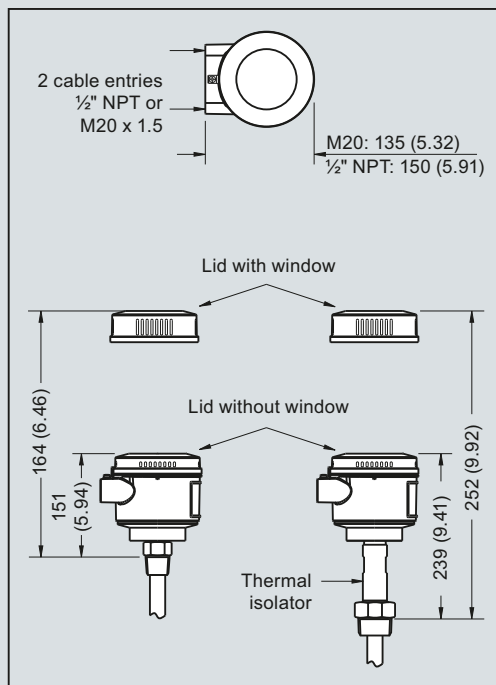


Min. insertion length = 200 (7.87)
Max. insertion length = 5 500 (216)

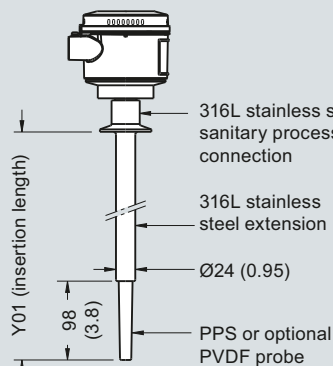
**Extended cable version
Threaded
(7ML5631 and 7ML5641)**



Min. insertion length = 500 (19.69)
Max. insertion length = 30 000 (1181)
Applicable for liquids and solids applications. Cable can be shortened on site.

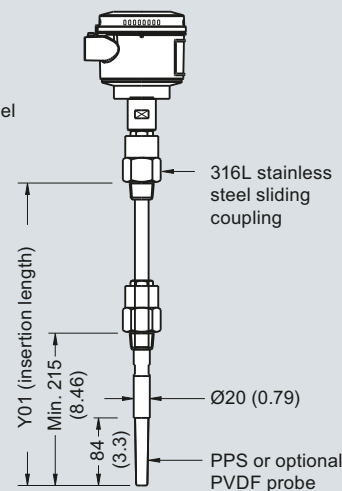


**Sanitary extended version
Sanitary fitting
(7ML5632 and 7ML5642)**



Min. insertion length = 110 (4.3)
Max. insertion length = 5 500 (216)

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



Min. insertion length = 350 (13.82)
Max. insertion length = 5 500 (216)

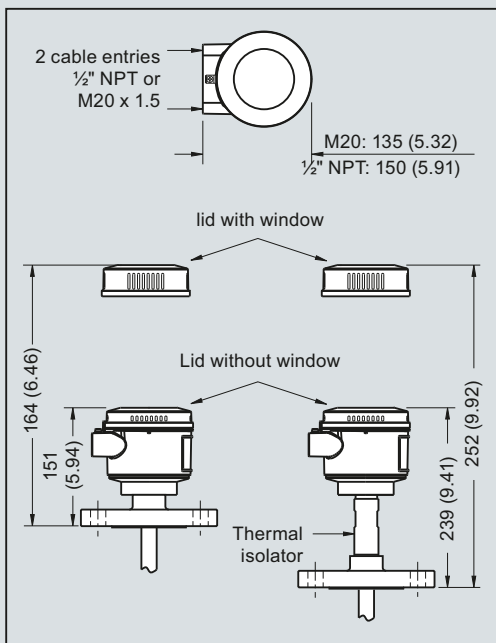
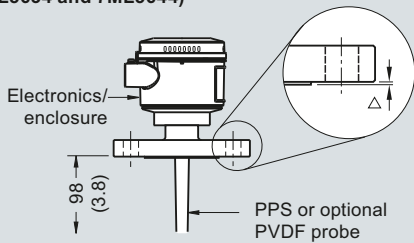
Pointek CLS200 Threaded/Sanitary Process Connections, dimensions in mm (inch)

Level measurement

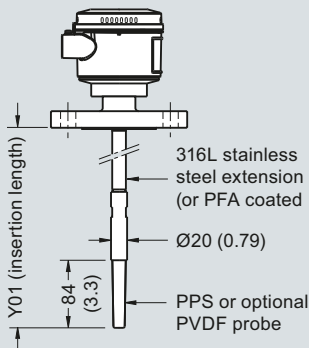
Point level measurement – Capacitance switches

Pointek CLS200 - Standard and Digital

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

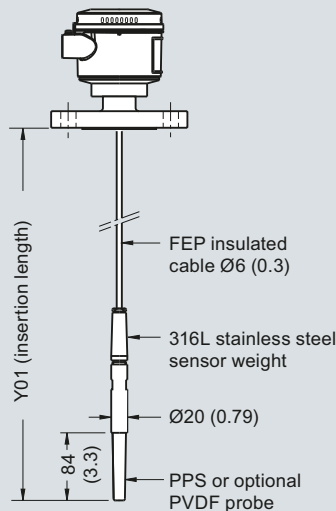


Extended rod version
Welded Flange (7ML5630 and 7ML5640)
Welded Flange, PFA coated
(7ML5634 and 7ML5644)



Min. insertion length = 200 (7.87)
 Max. insertion length = 5 500 (216)

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



Min. insertion length = 500 (19.69)
 Max. insertion length = 30 000 (1 181)
 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)

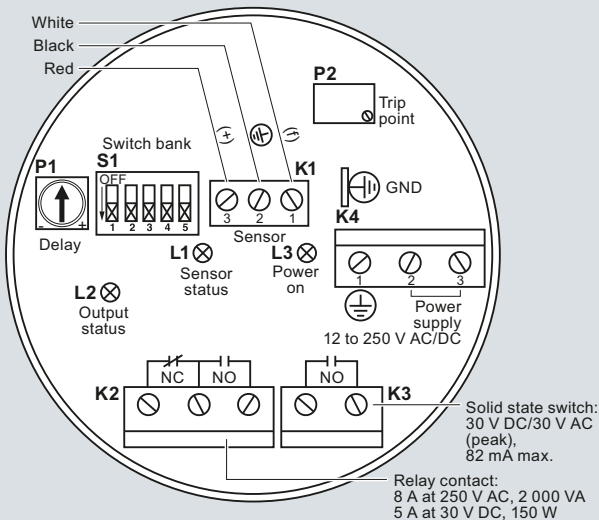
Level measurement

Point level measurement – Capacitance switches

Pointek CLS200 - Standard and Digital

Schematics

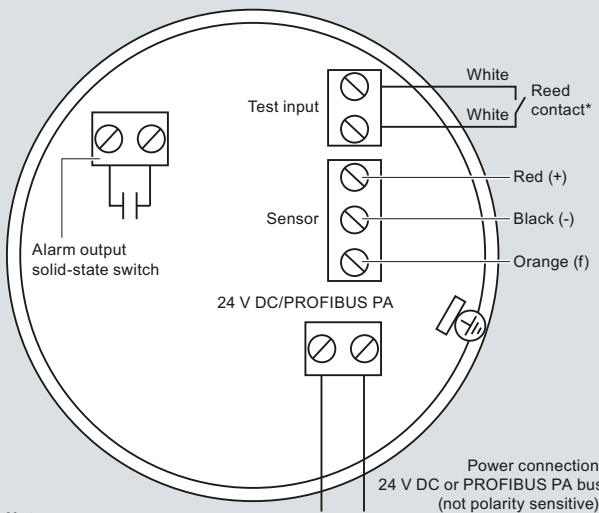
Wiring: Pointek CLS200 standard



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.



4

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.

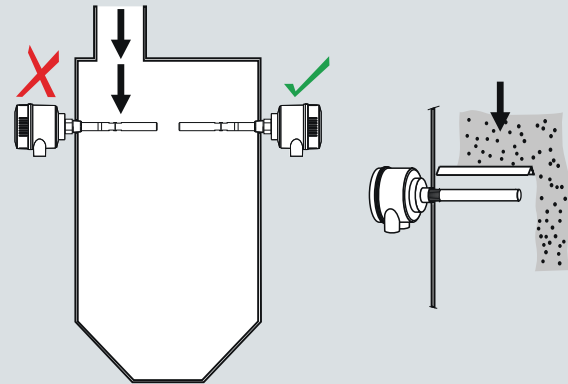
Wetted parts are made of stainless steel with a PFA shield for high chemical resistance, and of ceramic and stainless steel for high temperature version. Materials with low or high dielectric constants can be accurately detected. The unique Active Shield suppresses interference from material buildup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

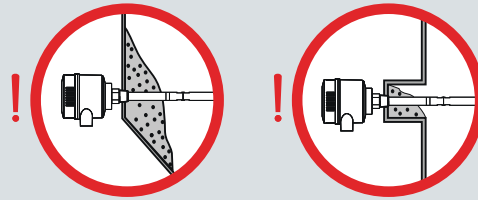
- Key Applications: liquids, slurries, bulk solids, relatively high pressure and temperature, hazardous areas, milling and mining applications

Configuration

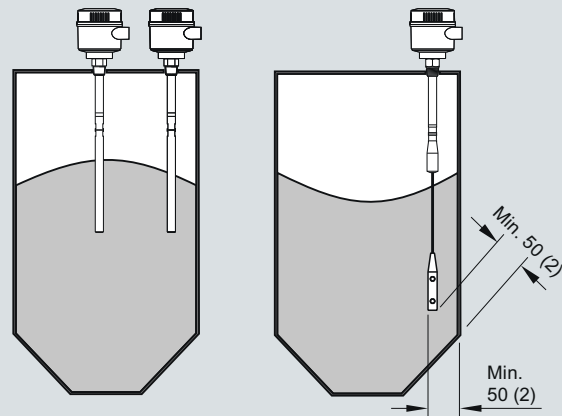
Installation



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 (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
Input		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)
Output		Controls and displays	
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	Power supply	
- Max. switching capacity	• 150 W DC • 2 000 VA AC	Supply	12 ... 250 V AC/DC, 0 ... 60 Hz, galvanically isolated, 2 W
- Time delay (ON and/or OFF)	1 ... 60 s	Certificates and approvals	
• 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)
Accuracy		1) When operation is in areas classified as hazardous, observe restrictions according to relevant certificate. See also Pressure/Temperature curves starting on page 4/58.	
Resolution		2) Thermal isolator is used if process connection temperature exceeds 85 °C (185 °F).	
• Min. sensitivity (pF)	1 % change in actual capacitance	3) Pressure rating of process seal is temperature dependent. See Pressure/Temperature curves starting on page 4/58.	
• Max. temperature error	0.2 % of actual capacitance value		
Rated operating conditions¹⁾			
Installation conditions			
• Location	Indoor/outdoor		
Ambient conditions			
• Ambient temperature	-40 ... +85 °C (-40 ... +185 °F) ²⁾		
Medium conditions			
	Liquids, bulk solids, slurries and interfaces, and applications with viscous materials		
• Relative dielectric constant ϵ_r	Min. 1.5		
• Process temperature			
- Rod/Cable version	-40 ... +200 °C (-40 ... +392 °F) ²⁾		
- High-temperature version	-40 ... +400 °C (-40 ... +752 °F)		
• Process pressure ³⁾	-1 ... +35 bar g (-14.6 ... +511 psi g)		

Level measurement

Point level measurement – Capacitance switches

Pointek CLS300 – Standard

Design: Probe

	Rod version	High Temperature version	Cable version
Length	Min. 250 mm (9.8 inch), max. 1 000 mm (40 inch)	Min. 250 mm (9.8 inch), max. 1 000 mm (40 inch)	Min. 1 000 mm (40 inch), max. 25 000 mm (984 inch)
Sensor wetted parts	PFA (no insulation on active probe), 316L stainless steel, PEEK isolators	Ceramic (ZrO ₂ ¹⁾) isolators (no insulation on active probe), 316L stainless steel	316 stainless steel, optional PFA, PEEK isolators
O-ring seal material	FKM (optional FFKM) ²⁾	Graphite ²⁾	FKM (optional FFKM) ²⁾
Thermal isolator	Optional	Standard	Optional
Extension	User selectable length	User selectable length	User selectable cable length

¹⁾ Zirconium Oxide

²⁾ For Caustic Materials, please contact ceg.smpi@siemens.com for alternative O-Rings.

Level measurement

Point level measurement – Capacitance switches

Pointek CLS300 – Standard

Selection and Ordering data

Order No.

Pointek CLS300 - Standard - Rod Version with Threaded or Flanged process connection

7ML5650-

- 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 inch) **A**
 Extended rod, length 500 mm (19.69 inch) **B**
 Extended rod, length 750 mm (29.53 inch) **C**
 Extended rod, length 1 000 mm (39.37 inch) **D**

Selection and Ordering data

Order No.

Pointek CLS300 - Standard - Rod Version with Threaded or Flanged process connection

7ML5650-

- 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 inch) **E**
 Extended rod, factory adjusted length 500 ... 749 mm (19.69 ... 29.49 inch) **F**
 Extended rod, factory adjusted length 750 ... 999 mm (29.53 ... 39.3 inch) **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 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**

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 - (125 mm threaded, 105 mm flanged) **0**
 Extended shield - (250 mm threaded, 230 mm flanged)¹ **1**
 Extended shield - (400 mm threaded, 380 mm flanged)² **2**

¹ Available with Probe version options B ... D, F, G only [≥ 500 mm (19.69 inch)]

² Available with Probe version options C, D, and, G only [≥ 750 mm (29.53 inch)]

Level measurement

Point level measurement – Capacitance switches

Pointek CLS300 – Standard

Selection and Ordering data	Order code	Selection and Ordering data	Order No.
Further designs		Pointek CLS300 - Standard - Cable Version with Threaded or Flanged process connection	7ML5651-
Please add "-Z" 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	Y01	Process connection	
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15	<u>Threaded, 316L stainless steel</u>	
Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000	C11	1/4" NPT [(Taper), ANSI/ASME B1.20.1]	0 C
Inspection Certificate Type 3.1 per EN 10204	C12	1/2" NPT [(Taper), ANSI/ASME B1.20.1]	0 D
Operating Instructions		R 1/2" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1 D
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 4/57	G 1/2" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3 D
Accessories	See page 4/57	<u>Welded flange, 316L stainless steel, raised face</u>	
		1/2" ASME, 150 lb	5 D
		1/2" ASME, 300 lb	5 E
		1/2" 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 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)	
		<u>Note: No Y01 needed in order code for standard lengths</u>	
		Extended cable, 3 000 mm (118.11 inch), length can be shortened by customer	A
		Extended cable, 6 000 mm (236.22 inch), length can be shortened by customer	B
		Add order code Y01 and plain text: <u>"Insertion length ... mm"</u>	
		Extended cable, 500 ... 1 000 mm (19.69 ... 39.37 inch)	E
		Extended cable, 1 001 ... 5 000 mm (39.41 ... 196.85 inch)	F
		Extended cable, 5 001 ... 10 000 mm (196.89 ... 393.70 inch)	G
		Extended cable, 10 001 ... 15 000 mm (393.74 ... 590.55 inch)	H
		Extended cable, 15 001 ... 20 000 mm (590.59 ... 787.40 inch)	J
		Extended cable, 20 001 ... 25 000 mm (787.44 ... 984.25 inch)	K
		Thermal isolator	
		Without thermal isolator	0
		With thermal isolator [for process connection temperatures over 85 °C (185 °F)]	1

Level measurement

Point level measurement – Capacitance switches

Pointek CLS300 – Standard

Selection and Ordering data

Order No.

Pointek CLS300 - Standard - Cable Version with Threaded or Flanged process connection

7ML5651-

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.

Wetted seals

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

Probe material

Bare 316L stainless steel cable, PEEK isolators and 316L stainless steel cable weight
PFA coated cable, PEEK isolators and 316L stainless steel cable weight

Approvals

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)

Enclosure and lid

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

Active shield length

Standard length -
(125 mm threaded, 105 mm flanged)
Extended shield -
(250 mm threaded, 230 mm flanged)¹⁾
Extended shield -
(400 mm threaded, 380 mm flanged)¹⁾

¹⁾ Available with Probe version options A, B, F ... K, only [≥ 1 000 mm (39.7 inch)]

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 inch)]:
Measuring-point number/identification
(max. 27 characters) specify in plain text

Y15

Manufacturer's test certificate: M to DIN 55350,
Part 18 and to 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 4/57

Accessories

See page 4/57

Level measurement

Point level measurement – Capacitance switches

Pointek CLS300 – Standard

Selection and Ordering data	Order No.	Selection and Ordering data	Order No.
Pointek CLS300 - Standard - High Temperature Rod Version with Threaded or Flanged process connection 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.	7ML5652- ■■■ 0 0 - 0 ■■■	Pointek CLS300 - Standard - High Temperature Rod Version with Threaded or Flanged process connection 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.	7ML5652- ■■■ 0 0 - 0 ■■■
Process connection <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		Add order code Y01 and plain text: <u>"Insertion length ... mm"</u> Extended rod, factory adjusted length 250 ... 499 mm (9.8 ... 19.65 inch) E Extended rod, factory adjusted length 500 ... 749 mm (19.69 ... 29.49 inch) F Extended rod, factory adjusted length 750 ... 999 mm (29.53 ... 39.3 inch) G	
<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		Wetted seals Graphite 0	
<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		Probe material 316L stainless steel with ceramic (ZrO ₂) isolators 0	
(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 Rod 350 mm (13.78 inch) A Extended rod, length 500 mm (19.69 inch) B Extended rod, length 750 mm (29.53 inch) C Extended rod, length 1 000 mm (39.37 inch) D		Approvals 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 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 with WHG approval (CSA, FM, CE, C-TICK) K	
		Enclosure and lid <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	
		Active shield length Standard length - 0 (125 mm threaded, 105 mm flanged) Extended shield - 1 (250 mm threaded, 230 mm flanged) ¹⁾ Extended shield - 2 (400 mm threaded, 380 mm flanged) ²⁾	
		1) Available with Probe version options B ... D, F, G only [≥ 500 mm (19.69 inch)] 2) Available with Probe version options C, D, and, G only [≥ 750 mm (29.53 inch)]	

Level measurement

Point level measurement – Capacitance switches

Pointek CLS300 – Standard

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 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Manufacturer's test certificate: M to DIN 55350, Part 18 and to 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 4/57
Accessories	See page 4/57

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.

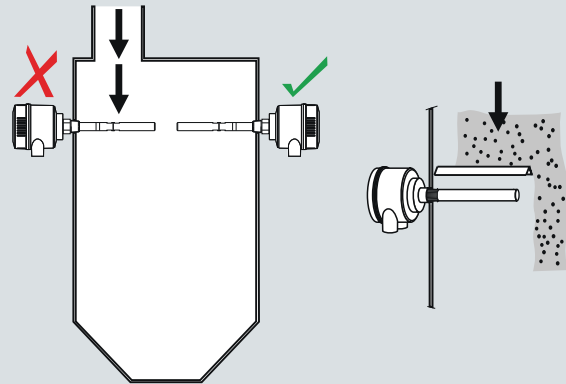
Wetted parts are made of stainless steel with a PFA shield for high chemical resistance, and of ceramic and stainless steel for high temperature version. Materials with low or high dielectric constants can be accurately detected. The unique Active Shield suppresses interference from material buildup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

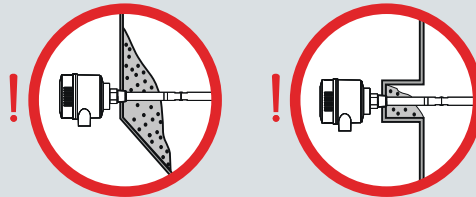
- Key Applications: liquids, slurries, bulk solids, relatively high pressure and temperature, hazardous areas, milling and mining applications

Configuration

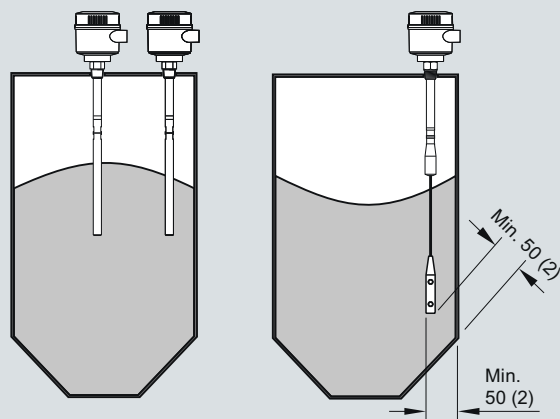
Installation



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 (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

Mode of operation		Controls and displays	
Measuring principle	Inverse frequency shift capacitive level detection	Local display	LCD
Input		Configuration	<ul style="list-style-type: none"> Locally, using 3 button keypad (for standalone operation) Remotely, using SIMATIC PDM (for installation on a network)
Measured variable	Change in picoFarad (pF)	Power supply	
Output		Bus voltage (at process connection)	<ul style="list-style-type: none"> Standard: 12 ... 30 V DC Intrinsically Safe: 12 ... 24 V DC
Solid-state output	Galvanically isolated Against reversed polarity (bipolar)	Current consumption	12.5 mA
<ul style="list-style-type: none"> Output Protection Max. switching voltage 		Certificates and approvals	
<ul style="list-style-type: none"> Max. load current Voltage drop Time delay (pre or post switching) 	<ul style="list-style-type: none"> 30 V DC 30 V peak AC 	General Purpose	CSA, FM, CE, C-TICK
Fail-safe mode	82 mA	Dust Ignition Proof	ATEX II 1/2 D, 2 D IP6X T100 °C
Connection	< 1 V, typical at 50 mA	Flameproof Enclosure With IS Probe	ATEX II 1/2 G EEx d[ia] IIC T6...T4 ATEX II 1/2 D T100 °C
Accuracy		Dust Ignition Proof With IS Probe	CSA/FM Class II, Div. 1, Gr. E, F, G CSA/FM Class III T4
Resolution	1 % change in actual capacitance 0.2 % of actual capacitance value	Intrinsically Safe ⁴⁾	ATEX II 1 G EEx ia IIC T6...T4 ATEX II 1/2 D, 2 D IP6X T100 °C
<ul style="list-style-type: none"> Min. sensitivity (pF) Max. temperature error 		Programmable by user (0 ... 100 s)	Communication
Rated operating conditions¹⁾		Non-incendive	CSA/FM Class I, Div. 1, Gr. A, B, C, D
Installation conditions	Indoor/outdoor	Explosion Proof with IS Probe	CSA/FM Class II, Div. 1, Gr. E, F, G CSA/FM Class III T4
Location		Marine	CSA/FM Class I, Div. 2, Gr. A, B, C, D
Ambient conditions	-40 ... +85 °C (-40 ... +185 °F) ²⁾ Liquids, bulk solids, slurries and interfaces, and applications with viscous materials	Others	CSA/FM Class II, Div. 2, Gr. F, G CSA/FM Class III T4 or T6
Ambient temperature		Min. 1.5	Pattern Approval (China)
Medium conditions	-40 ... +200 °C (-40 ... +392 °F) ²⁾ -40 ... +400 °C (-40 ... +752 °F)	Lloyds Register of Shipping, Categories ENV1, ENV2 and ENV5	
<ul style="list-style-type: none"> Relative dielectric constant ϵ_r Process temperature - Rod/Cable version - High Temperature version 		-1 ... +35 bar g (-14.6 ... +511 psi g)	FISCO field device
<ul style="list-style-type: none"> Process pressure³⁾ 	Design		
Material (enclosure)	Powder-coated aluminum with gasket	PROFIBUS PA (IEC 61158 CPF3 CP3/2)	
Degree of protection	Standard: Type 4/NEMA 4/IP65 Optional: Type 4/NEMA 4/IP68	Bus physical layer: IEC 61158-2 MBP-(IS)	
Cable inlet	2 x M20x1.5 thread (option: 2 x 1/2" NPT conduit entry including 1 plugged entry)	Device profile: PROFIBUS PA profile for Process Control Devices Version 3.0, Class B	

- When operation is in areas classified as hazardous, observe restrictions according to relevant certificate.
See also Pressure/Temperature curves starting on page 4/58
- Thermal isolator is used if process connection temperature exceeds 85 °C (185 °F).
- Pressure rating of process seal is temperature dependent.
See Pressure/Temperature curves starting on page 4/58
- 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 inch), max. 1 000 mm (40 inch)	Min. 250 mm (9.8 inch), max. 1 000 mm (40 inch)	Min. 1 000 mm (40 inch), max. 25 000 mm (984 inch)
Sensor wetted parts	PFA (no insulation on active probe), 316L stainless steel, PEEK isolators	Ceramic (ZrO ₂ ¹⁾) isolators (no insulation on active probe), 316L stainless steel	316 stainless steel, optional PFA, PEEK isolators
O-ring seal material	FKM (optional FFKM) ²⁾	Graphite ²⁾	FKM (optional FFKM) ²⁾
Thermal isolator	Optional	Standard	Optional
Extension	User selectable length	User selectable length	User selectable cable length



¹⁾ Zirconium Oxide

²⁾ For Caustic Materials, please contact ceg.smpi@siemens.com for alternative O-Rings

Level measurement

Point level measurement – Capacitance switches

Pointek CLS300 – Digital

Selection and Ordering data	Order No.	Selection and Ordering data	Order No.
Pointek CLS300 - Digital - Rod with Threaded or Flanged process connection 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.	7ML5660- 	Pointek CLS300 - Digital - Rod with Threaded or Flanged process connection 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.	7ML5660- 
Process connection <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		Add order code Y01 and plain text: <u>"Insertion length ... mm"</u> Extended rod, factory adjusted length E 250 ... 499 mm (9.8 ... 19.65 inch) Extended rod, factory adjusted length F 500 ... 749 mm (19.69 ... 29.49 inch) Extended rod, factory adjusted length G 750 ... 999 mm (29.53 ... 39.3 inch)	
<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		Thermal isolator Without thermal isolator 0 With thermal isolator [for process connection temperatures over 85 °C (185 °F)] 1	
<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		Wetted seals FKM 0 FFKM [for process temperatures above -20 °C (-4 °F)] 1	
(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)		Probe material 316L stainless steel with PFA lining and PEEK isolators 0	
Probe length (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 inch) A Extended rod, length 500 mm (19.69 inch) B Extended rod, length 750 mm (29.53 inch) C Extended rod, length 1 000 mm (39.37 inch) D		Approvals Dust Ignition Proof: CE, C-TICK, ATEX II 1/2 D, 2 D IP6X T100 °C B Intrinsically Safe ¹⁾ C 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 E CSA/FM Class III T4 E Intrinsically Safe ¹⁾ F CSA/FM Class I, Div. 1, Gr. A, B, C, D F 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 (CSA, FM, CE, C-TICK) J	
		Enclosure and Lid <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	
		Active shield length Standard length - 0 (125 mm threaded, 105 mm flanged) Extended shield - 1 (250 mm threaded, 230 mm flanged) ²⁾ Extended shield - 2 (400 mm threaded, 380 mm flanged) ³⁾	
		¹⁾ Barrier or Intrinsically Safe power supply required for Intrinsically Safe protection ²⁾ Available with Probe version options B ... D, F, G only [≥ 500 mm (19.69 inch)] ³⁾ Available with Probe version options C, D, and, G only [≥ 750 mm (29.53 inch)]	

Level measurement

Point level measurement – Capacitance switches

Pointek CLS300 – Digital

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 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text

Y15

Manufacturer's test certificate: M to DIN 55350, Part 18 and to 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 4/57

Accessories

See page 4/57

Selection and Ordering data

Order No.

Pointek CLS300 - Digital - Cable with Threaded or Flanged process connection

7ML5661-

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

1¼" NPT [(Taper), ANSI/ASME B1.20.1]

0 C

1½" NPT [(Taper), ANSI/ASME B1.20.1]

0 D

R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]

1 D

G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]

3 D

Welded flange, 316L stainless steel, raised face

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 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

Extended cable, 3 000 mm (118.11 inch), length can be shortened by customer

A

Extended cable, 6 000 mm (236.22 inch), length can be shortened by customer

B

Add order code Y01 and plain text:

"Insertion length ... mm"

Extended cable, 500 ... 1 000 mm
(19.69 ... 39.37 inch)

E

Extended cable, 1 001 ... 5 000 mm
(39.41 ... 196.85 inch)

F

Extended cable, 5 001 ... 10 000 mm
(196.89 ... 393.70 inch)

G

Extended cable, 10 001 ... 15 000 mm
(393.74 ... 590.55 inch)

H

Extended cable, 15 001 ... 20 000 mm
(590.59 ... 787.40 inch)

J

Extended cable, 20 001 ... 25 000 mm
(787.44 ... 984.25 inch)

K

Level measurement

Point level measurement – Capacitance switches

Pointek CLS300 – Digital

Selection and Ordering data	Order No.	Selection and Ordering data	Order code
Pointek CLS300 - Digital - Cable with Threaded or Flanged process connection 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	7ML5661- 	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 Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000 Inspection Certificate Type 3.1 per EN 10204	
Thermal isolator Without thermal isolator With thermal isolator [for process connection temperatures over 85 °C (185 °F)]	0 1	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.	Y01 Y15 C11 C12
Wetted seals FKM FFKM [for process temperatures above -20 °C (-4 °F)]	0 1		
Probe material 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		
Approvals Dust Ignition Proof: CE, C-TICK, ATEX II 1/2 D, 2 D IP6X T100 °C Intrinsically Safe ¹⁾ 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 ¹⁾ 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 C D E F G H J		
Enclosure and Lid 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	A B C D		
Active shield length Standard length - (125 mm threaded, 105 mm flanged) Extended shield - 250 mm threaded, 230 mm flanged) ²⁾ Extended shield - (400 mm threaded, 380 mm flanged) ²⁾	0 1 2		

¹⁾ Barrier or Intrinsically Safe power supply required for Intrinsically Safe protection

²⁾ Available with Probe version options A, B and, F ... K only [≥ 1 000 mm (39.7 inch)]

Level measurement

Point level measurement – Capacitance switches

Pointek CLS300 – Digital

Selection and Ordering data	Order No.
Pointek CLS300 - Digital - High Temperature Rod version with Threaded or Flanged process connection	7ML5662- 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.	
Process connection <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.)	
Probe length (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 inch)	A
Extended rod, length 500 mm (19.69 inch)	B
Extended rod, length 750 mm (29.53 inch)	C
Extended rod, length 1 000 mm (39.37 inch)	D
Add order code Y01 and plain text: "Insertion length ... mm"	
Extended rod, factory adjusted length 250 ... 499 mm (9.8 ... 19.65 inch)	E
Extended rod, factory adjusted length 500 ... 749 mm (19.69 ... 29.49 inch)	F

Selection and Ordering data	Order No.
Pointek CLS300 - Digital - High Temperature Rod version with Threaded or Flanged process connection	7ML5662- 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.	
Extended rod, factory adjusted length 750 ... 999 mm (29.53 ... 39.3 inch)	G
Wetted seals Graphite	0
Probe material 316L stainless steel with ceramic (ZrO ₂) isolators	0
Approvals Dust Ignition Proof: CE, C-TICK, ATEX II 1/2 D, 2 D IP6X T100 °C	B
Intrinsically Safe ¹⁾ 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 ¹⁾ 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 <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
Active shield length Standard length - (125 mm threaded, 105 mm flanged)	0
Extended shield - (250 mm threaded, 230 mm flanged) ²⁾	1
Extended shield - (400 mm threaded, 380 mm flanged) ³⁾	2
1) Barrier or Intrinsically Safe power supply required for Intrinsically Safe protection	
2) Available with Probe version options B ... D, F, G only [≥ 500 mm (19.69 inch)]	
3) Available with Probe version options C, D, and, G only [≥ 750 mm (29.53 inch)]	

Level measurement

Point level measurement – Capacitance switches

Pointek CLS300 - Standard and Digital

Selection and Ordering data	Order code	Selection and Ordering data	Order No.
Further designs		Operating Instructions - Standard	
Please add "-Z" to Order No. and specify Order code(s).		English	7ML1998-5JH04
Total insertion length: enter the total insertion length in plain text description	Y01	German	7ML1998-5JH34
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15	Note: The Operating Instructions should be ordered as a separate line on the order.	
Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000	C11	Quick Start manual, multi-language	7ML1998-5QY84
Inspection Certificate Type 3.1 per EN 10204	C12	This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	
Operating Instructions		Operating Instructions - Digital	
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 4/57	English	7ML1998-5JJ04
		French	7ML1998-5JJ11
		German	7ML1998-5JJ34
		Note: The Operating Instructions should be ordered as a separate line on the order.	
		Quick Start manual, multi-language	7ML1998-5XA84
		This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	
Accessories	See page 4/57	Accessories	
		One metallic cable gland M20x1.5, -40 ... +80 °C (-40 ... +176 °F) with integrated shield connection (available for PROFIBUS PA)	7ML1930-1AQ
		<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 inch)	7ML1830-1JA
		M20x1.5 General Purpose Cable Entry IP68/IP69K NEMA6, -40 ... -100 °C (-40 ... -212 °F), cable size 7 ... 12 mm (0.275 ... 0.472 inch)	7ML1830-1JC
		<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 inch)	7ML1830-1JB
		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 inch)	7ML1830-1JD
		Blind threaded flanges are available. Please contact ceg.smpi@siemens.com with a completed application data sheet on page 4/9	
		Pointek Specials	See page 4/80

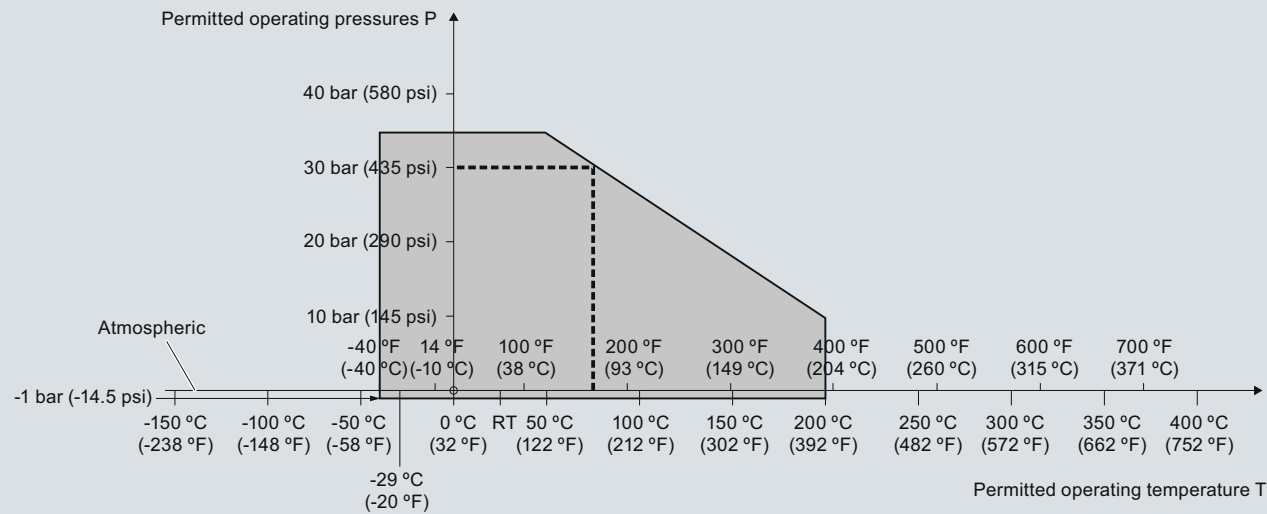
Level measurement

Point level measurement – Capacitance switches

Pointek CLS300 - Standard and Digital

Characteristic curves

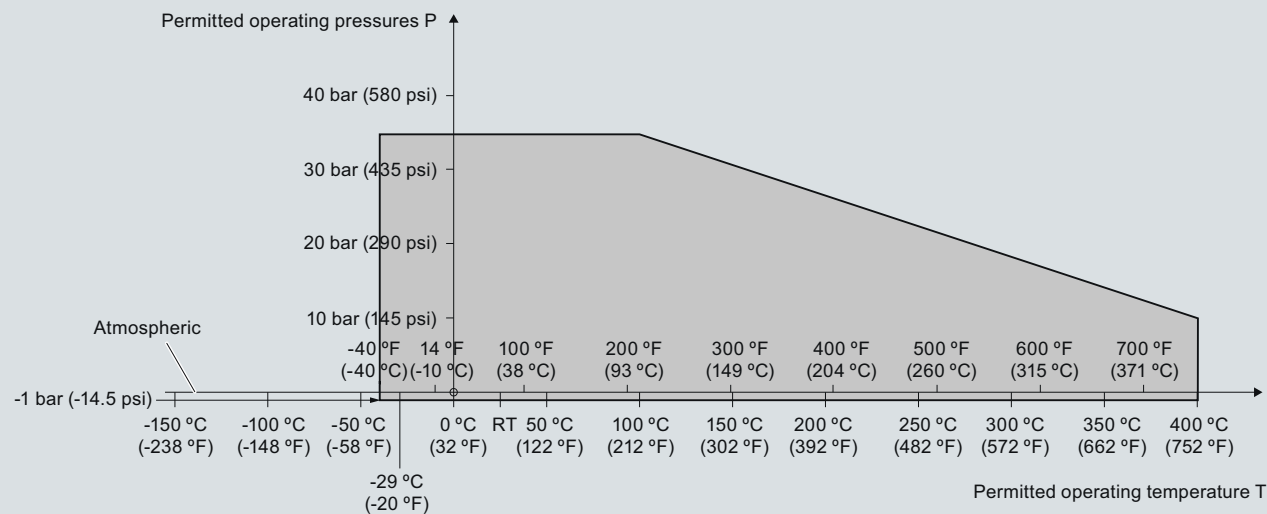
Pressure/temperature curve
CLS300 extended rod and cable probes
Threaded process connections
(7ML5650, 7ML5651, 7ML5660 and 7ML5661)



----- Example:
 Permitted operating pressure = 30 bar (435 psi) at 75 °C

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)

4

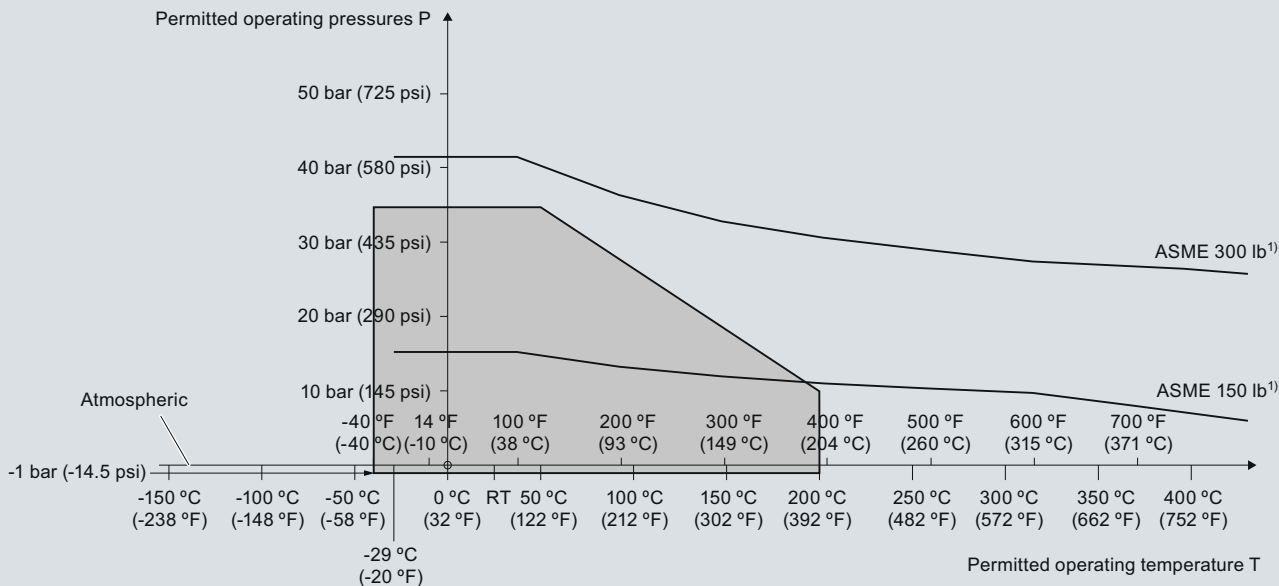
Level measurement

Point level measurement – Capacitance switches

Pointek CLS300 - Standard and Digital

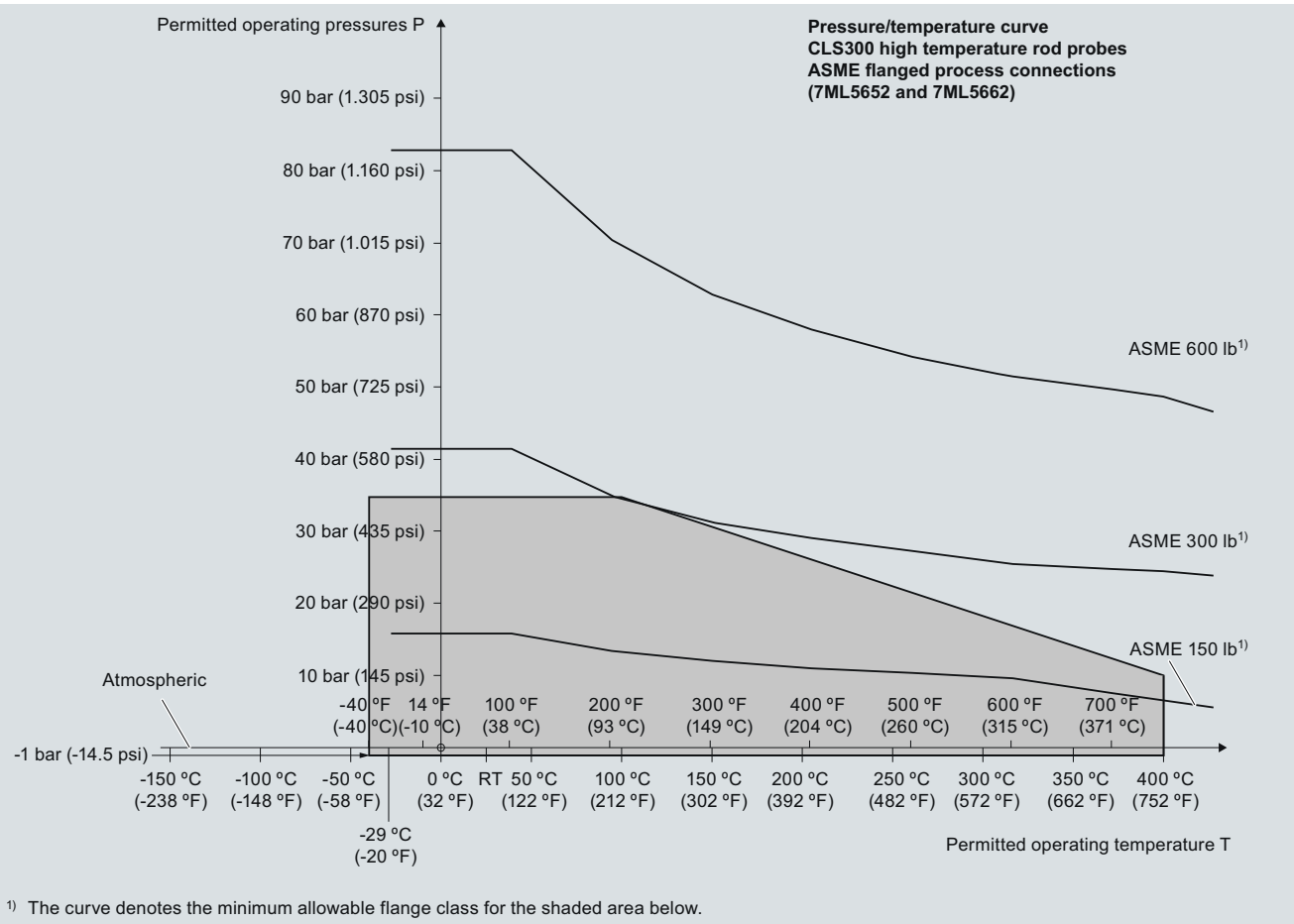
4

Pressure/temperature curve
CLS300 extended rod and cable probes
ASME 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)



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

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

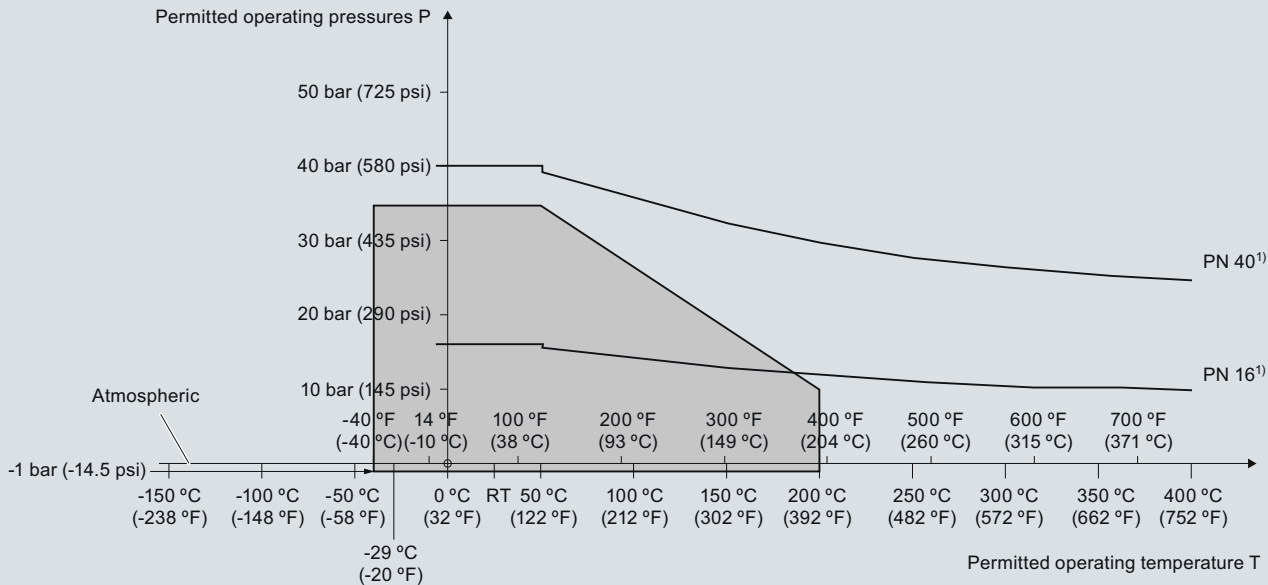
Level measurement

Point level measurement – Capacitance switches

Pointek CLS300 - Standard and Digital

4

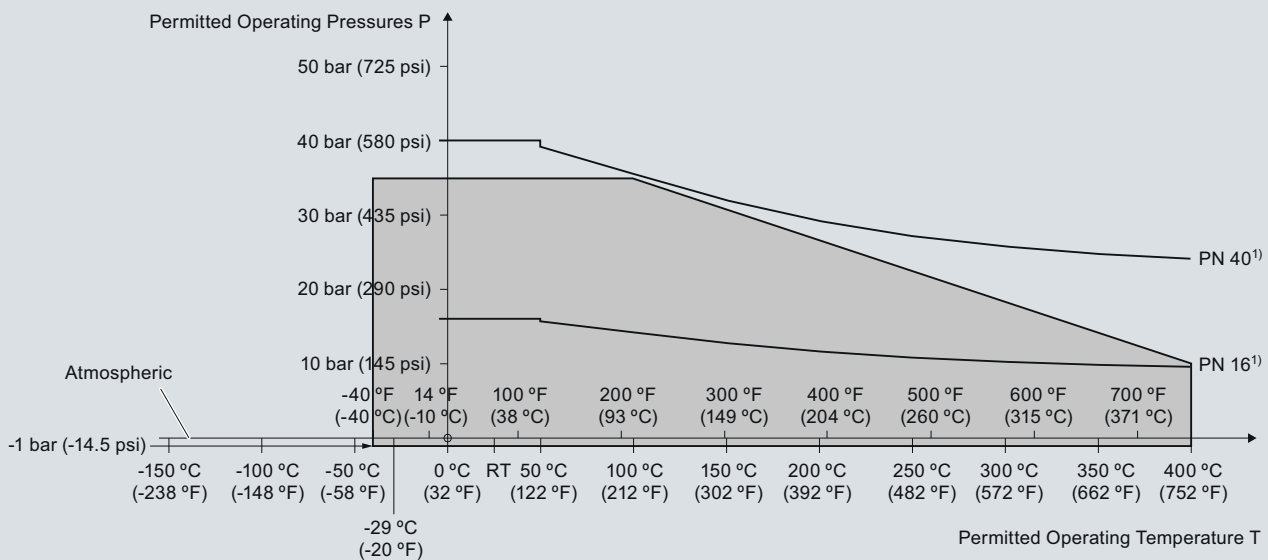
Pressure/temperature curve
CLS300 extended rod and cable probes
EN flanged process connections
(7ML5650, 7ML5651, 7ML5660 and 7ML5661)



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 (7ML5652 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)

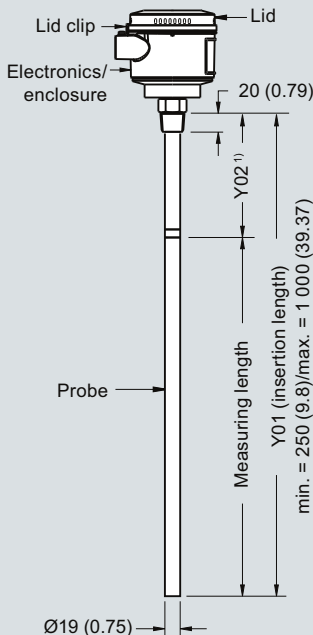
Level measurement

Point level measurement – Capacitance switches

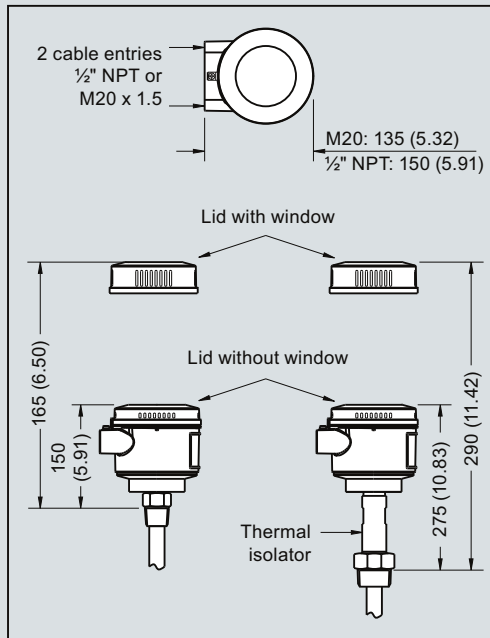
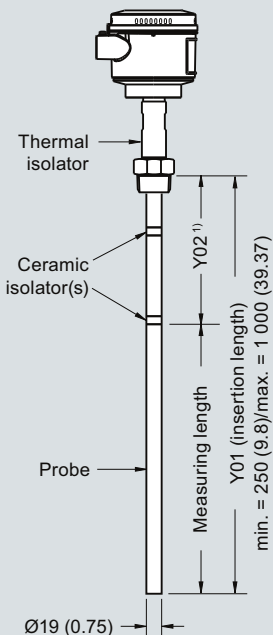
Pointek CLS300 - Standard and Digital

Dimensional drawings

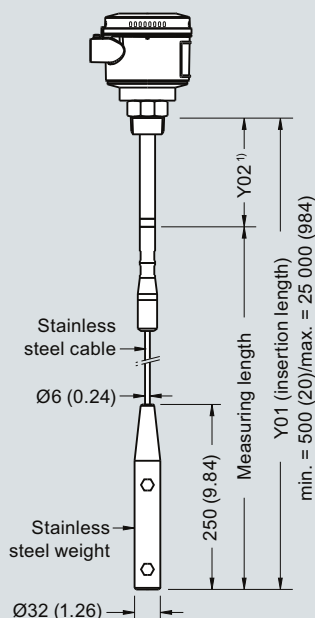
Rod version
Threaded (7ML5650 and 7ML5660)



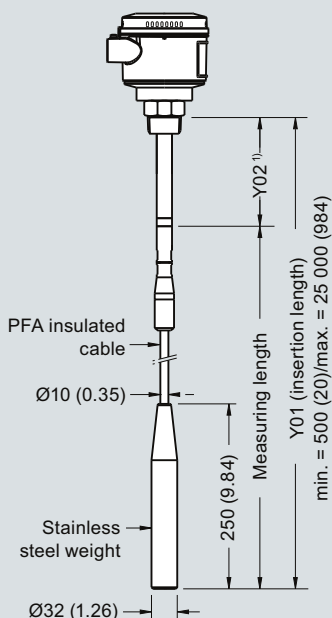
High temperature rod version
Threaded (7ML5652 and 7ML5662)



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



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



Note:

¹⁾ Extended Active Shield (Y02): standard length 125 (4.92). Optional active shield lengths: 250 (9.84) or 400 (15.75).

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

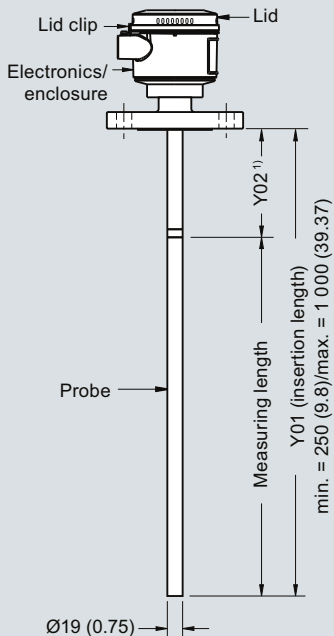
Level measurement

Point level measurement – Capacitance switches

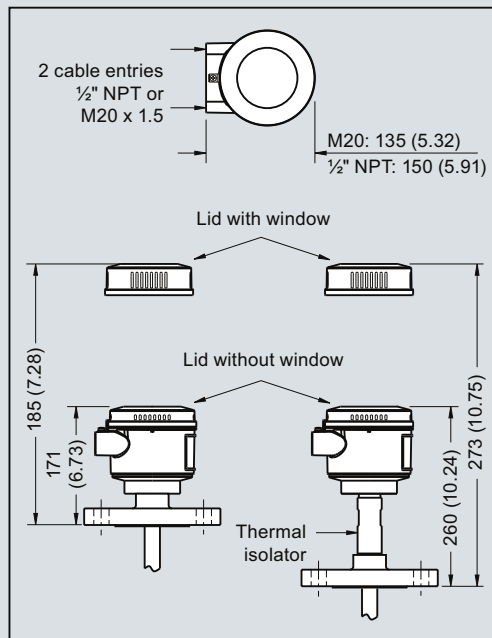
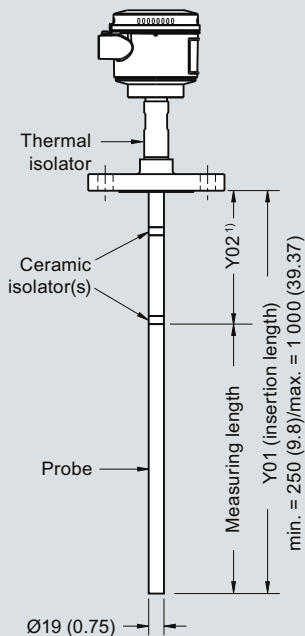
Pointek CLS300 - Standard and Digital

4

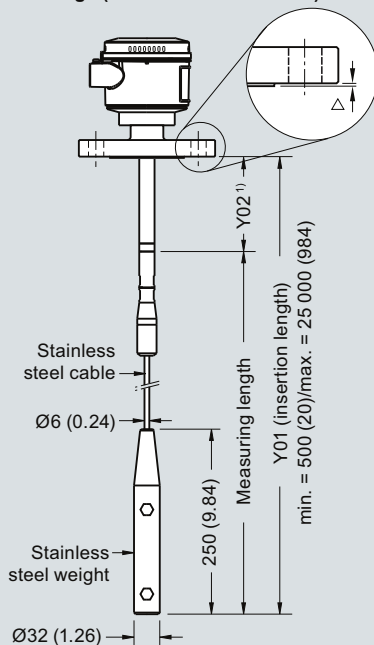
Rod version
Welded flange (7ML5650 and 7ML5660)



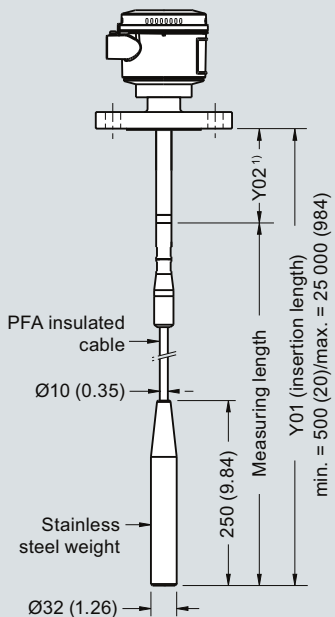
High temperature rod version
Welded flange (7ML5652 and 7ML5662)



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:

¹⁾ Extended Active Shield (Y02): standard length 105 (4.13). Optional active shield lengths: 230 (9.06) or 380 (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)

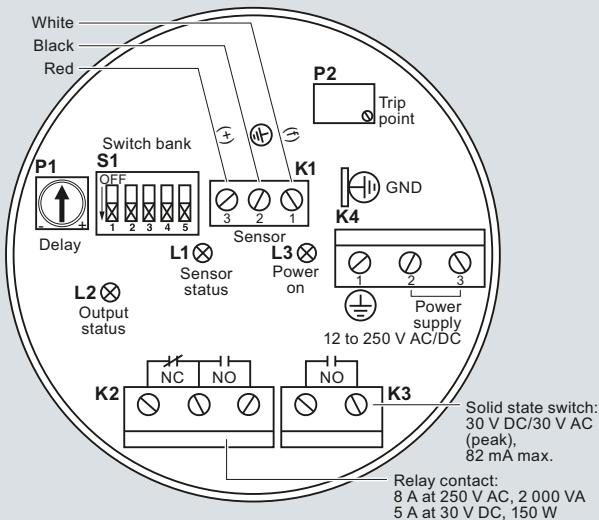
Level measurement

Point level measurement – Capacitance switches

Pointek CLS300 - Standard and Digital

Schematics

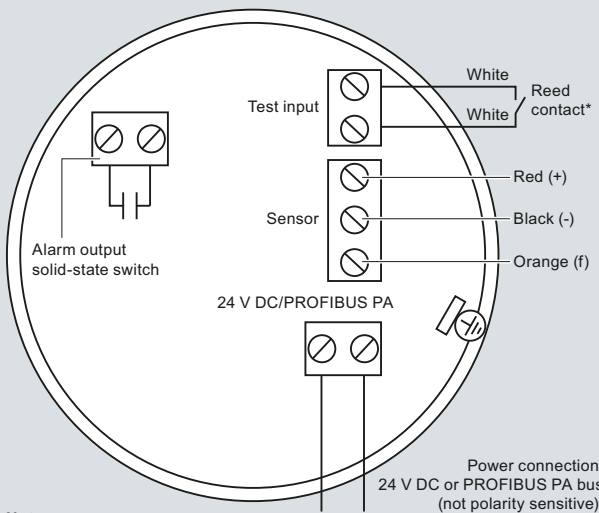
Wiring: Pointek CLS300 standard



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.



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

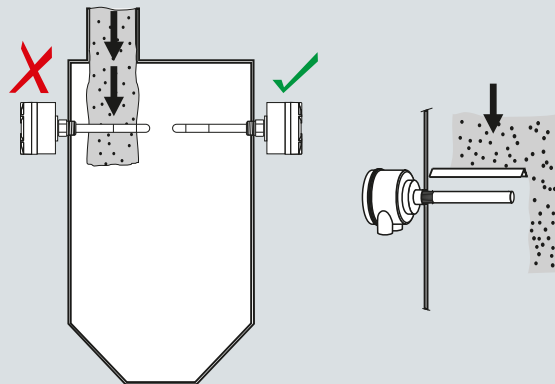
Patented Active-Shield technology ensures that measurement is unaffected by vapors, product deposits, dust and condensation. The unique mechanical probe design coupled with a high performance transmitter gives superior performance in a wide range of level detection applications.

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

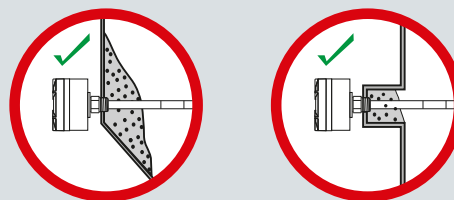
- Key Applications: foam or liquid/foam level, glycol regenerators, high-pressure coalescers, LNG applications

Configuration

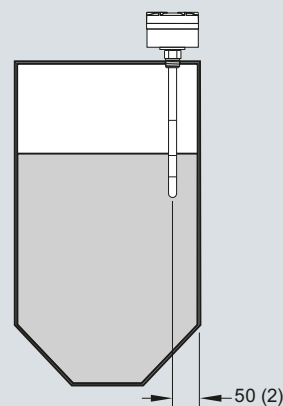
Installation



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 (2) from tank wall.

Pointek CLS500 installation, dimensions in mm (inch)

Level measurement

Point level measurement – Capacitance switches

Pointek CLS500

Technical specifications

Input			
Measuring range	0 ... 330 pF		
Span	Min. 1 pF		
Output			
Solid-state switch			
• Output	Galvanically isolated		
• Protection	Against reversed polarity (bipolar)		
• Max. switching voltage	<ul style="list-style-type: none"> • 30 V DC • 30 V peak AC 		
• Max. load current	82 mA		
• Voltage drop	< 1 V, typical at 50 mA		
• Time delay (pre or post switching)	1 ... 60 s		
Current loop	4 ... 20 mA/20 ... 4 mA		
Accuracy (transmitter)			
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		
Non-linearity and repeatability	0.1 % of full scale and actual measurement respectively		
Accuracy	Deviation < 0.1 % of measured value		
Rated operating conditions¹⁾			
Installation conditions			
- Location	Indoor/outdoor		
Ambient conditions			
• Ambient temperature (transmitter)	-40 ... +85 °C (-40 ... +185 °F) ²⁾		
• Installation category	I		
• Pollution degree	4		
Medium conditions			
• Relative dielectric constant ϵ_r	Min. 1.5		
• Process temperature	Temperature ratings are pressure dependent. See Pressure/Temperature curves on page 4/72.		
- Standard (PFA)	-50 ... +200 °C (-58 ... +392 °F)		
- High temperature stainless steel version with thermal isolator	-60 ... +400 °C (-76 ... +752 °F)		
- Cryogenic version	-200 ... +200 °C (-328 ... +392 °F)		
	Contact ceg.smpi@siemens.com for details.		
Process pressure	Pressure rating of process seal is temperature dependent. See Pressure/Temperature curves on page 4/72.		
• Standard (PFA)	-1 ... +150 bar g (-14.6 ... +2 175 psi g)		
• High temperature version (Stainless steel)	-1 ... +35 bar g (-14.6 ... +507.6 psi g)		
Design			
Material			
• Wetted parts material	- Standard rod	316L stainless steel	
• Probe isolation (rod)		PFA	
Probe diameter			
• Standard rod version (PFA)		16 mm (0.63 inch)	
• High temperature rod version (Stainless steel)		19 mm (0.75 inch)	
Probe length			
• Standard rod version (PFA)		Max. 1 000 mm (39.4 inch) with 16 mm (0.63 inch) diameter probe	
• High temperature rod version (Stainless steel)		Max. measuring length 1 000 mm (39.4 inch) with 19 mm (0.75 inch) diameter probe	
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] ASME, EN 1092-1	
• Flange mounting			
Enclosure			
• Material		Aluminum, epoxy-coated (Stainless steel option available. Contact ceg.smpi@siemens.com)	
• Cable inlet		2 x ½" NPT	
• Degree of protection		Type 4X/NEMA4X/IP65, IP68	
Power supply			
		Max. 33 V DC	
Features			
Measurement current signaling		NAMUR NE 43	
Safety		<ul style="list-style-type: none"> • Inputs/outputs fully galvanically isolated • Polarity-insensitive current loop • Fully potted • Integrated safety barrier 	
• 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)	

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 2D 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 4/72
- 2) Thermal isolator is used if process connection temperature exceeds 85 °C (185 °F).

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
Process connection materials		
316L stainless steel	Available as standard	Available as standard
Probe insulation		
None	–	HT Stainless: available as standard
PFA	Available as standard	–
Length parameters		
Max. rod length	1 000 mm (40 inch)	1 000 mm (40 inch)
Process conditions¹⁾		
Max. process pressure	150 bar g (2 175 psi g)	Stainless steel: ²⁾ 35 bar g (507 psi g)
Max. process temperature	200 °C (392 °F)	400 °C (752 °F)

- 1) When operation is in areas classified as hazardous, observe restrictions according to relevant certificate. See also Pressure/Temperature curves on page 4/72. Pressure rating of process seal is temperature dependent. See Pressure/Temperature curves on page 4/72.
- 2) Pressure rating of process seal is temperature dependent. See Pressure/Temperature curves on page 4/72.
- Not available as standard

Level measurement

Point level measurement – Capacitance switches

Pointek CLS500

Selection and Ordering data	Order No.	Selection and Ordering data	Order code
Pointek CLS500, threaded Inverse frequency shift capacitance level switch for detecting interfaces, solids, liquids, toxic and aggressive chemicals in critical conditions of extreme temperature and pressure.	7ML5601- 	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 Active Shield length - minimum length is 50 mm Y02: to mm ¹⁾ Y02 Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text Y15 Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000 C11 Inspection Certificate Type 3.1 per EN 10204 C12	
Electronic transmitter No transmitter supplied MSP 2002-1 (330 pF)	0 1		
Process connection ¾" 1" 1¼" 1½" 2"	A B C D E		
Threaded connection and rating 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		
Probe insulation/material of process connection PFA insulation/316L stainless steel	1		
Approvals 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 [ia] IIC T6 to T1 T100 °C FM Class I, Div. 1, Groups A, B, C, D T4	1 2 4 6		
Probe/electrode diameter 16 mm (0.63 inch) rigid rod, minimum insertion length 200 mm (7.9 inch), maximum insertion length 1 000 mm (39.4 inch) ¹⁾	1		
Thermal isolator/remote version Rigid thermal isolator [for process connection temperature over 85 °C (185 °F)] No thermal isolator	A B		

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

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.

Pointek Specials

¹⁾ See dimension drawings on page 4/77 for further explanation of Y02

Level measurement

Point level measurement – Capacitance switches

Pointek CLS500

Selection and Ordering data

Pointek CLS500, welded flange

Inverse frequency shift capacitance level switch for detecting interfaces, solids, liquids, toxic and aggressive chemicals in critical conditions of extreme temperature and pressure.

Electronic transmitter

MSP 2002-1 (330 pF)

Process connection and pressure rating

Welded flange, 316L stainless steel, raised face

2" ASME, 150 lb
2" ASME, 300 lb
3" ASME, 150 lb
3" ASME, 300 lb¹⁾
4" ASME, 150 lb¹⁾
4" ASME, 300 lb¹⁾
6" ASME, 150 lb¹⁾
6" ASME, 300 lb¹⁾

Welded flange, 316L stainless steel,

Type A flat faced

DN 50 PN 16

DN 50 PN 40

DN 80 PN 16

DN 80 PN 40

DN 100 PN 16¹⁾

DN 125 PN 16¹⁾

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

Probe insulation/material of process connection

PFA insulation/316L stainless steel

Approvals

General Purpose

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 [ia] IIC T6 to T1 T100 °C
FM Class I, Div. 1, Groups A, B, C, D T4

Probe/electrode diameter

16 mm (0.63 inch) rigid rod, min. length 200 mm (7.9 inch), max. length 1 000 mm (39.4 inch)

Thermal isolator

Rigid thermal isolator
[for process temperature over 85 °C (185 °F)]
No thermal isolator

Order No.

7ML5602-

AA - A 0

1

AA

AB

BA

BB

CA

CB

DA

DB

EC

ED

FC

FD

GC

HC

1

1

2

4

6

1

A

B

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

Active Shield length - minimum length is 50 mm.Y02: to mm¹⁾

Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text

Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000

Inspection Certificate Type 3.1 per EN 10204

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.

Pointek Specials

Order code

Y01

Y02

Y15

C11

C12

See page 4/71

See page 4/80

¹⁾ See dimensional drawings on page 4/77 for further explanation of Y02

Level measurement

Point level measurement – Capacitance switches

Pointek CLS500

Selection and Ordering data	Order No.
Pointek CLS500, single piece flange Inverse frequency shift capacitance level switch for detecting interfaces, solids, liquids, toxic and aggressive chemicals in critical conditions of extreme temperature and pressure.	7ML5603- A 0
Electronic transmitter MSP 2002-1 (330 pF)	1
Process connection and pressure rating <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 ¹⁾ 4" ASME, 150 lb ¹⁾ 4" ASME, 300 lb ¹⁾ 6" ASME, 150 lb ¹⁾ 6" ASME, 300 lb ¹⁾ <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 ¹⁾ DN 100 PN 25 ¹⁾ DN 125 PN 16 ¹⁾ DN 125 PN 25 ¹⁾	AA AB BA BB CA CB DA DB EC ED FC FD GC GD HC HD
Probe insulation/material of process connection PFA insulation/316L stainless steel	1
Approvals 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 [ia] IIC T6 to T1 T100 °C FM Class I, Div. 1, Groups A, B, C, D T4	1 2 4 6
Probe/electrode diameter 16 mm (0.63 inch) rigid rod, maximum length 1 000 mm (39.4 inch) (Y01)	1
Thermal isolator Rigid thermal isolator [for process connection temperature over 85 °C (185 °F)] No thermal isolator	A B

¹⁾ Custom shipping methods required. Contact factory for more details

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 Active Shield length - minimum length is 50 mm.Y02: to mm ¹⁾ Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000 Inspection Certificate Type 3.1 per EN 10204	 Y01 Y02 Y15 C11 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 4/71
Accessories	See page 4/80

¹⁾ See dimensional drawings on page 4/77 for further explanation of Y02



Level measurement

Point level measurement – Capacitance switches

Pointek CLS500

Selection and Ordering data

Pointek CLS500 High temperature

Inverse frequency shift capacitance level switch for detecting interfaces, solids, liquids, toxic and aggressive chemicals in critical conditions of extreme temperature and pressure.

Electronic transmitter

MSP 2002-1 (330 pF)

Process connection and pressure rating

316L stainless steel, raised face¹⁾

2" ASME, 150 lb

2" ASME, 300 lb

2" ASME, 600 lb

2" ASME, 900 lb

3" ASME, 150 lb

3" ASME, 300 lb²⁾

3" ASME, 600 lb²⁾

3" ASME, 900 lb²⁾

4" ASME, 150 lb²⁾

4" ASME, 300 lb²⁾

4" ASME, 600 lb²⁾

4" ASME, 900 lb²⁾

6" ASME, 150 lb²⁾

6" ASME, 300 lb²⁾

6" ASME, 600 lb²⁾

6" ASME, 900 lb²⁾

316L stainless steel, Type B1 flat faced

DN 50 PN 16

DN 50 PN 25

DN 50 PN 40

DN 50 PN 63

DN 80 PN 16

DN 80 PN 25

DN 80 PN 40²⁾

DN 80 PN 63²⁾

DN 100 PN 16²⁾

DN 100 PN 25²⁾

DN 100 PN 40²⁾

DN 100 PN 64²⁾

DN 125 PN 16²⁾

DN 125 PN 25²⁾

DN 125 PN 40²⁾

DN 125 PN 64²⁾

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

Order No.

7ML5604-

A - - - - -

1

A 1

A 2

A 3

A 4

B 1

B 2

B 3

B 4

C 1

C 2

C 3

C 4

D 1

D 2

D 3

D 4

E 1

E 2

E 3

E 4

F 1

F 2

F 3

F 4

G 1

G 2

G 3

G 4

H 1

H 2

H 3

H 4

Selection and Ordering data

Pointek CLS500 High temperature

Inverse frequency shift capacitance level switch for detecting interfaces, solids, liquids, toxic and aggressive chemicals in critical conditions of extreme temperature and pressure.

Probe material of process connection

No insulation/316L stainless steel³⁾⁴⁾

Stilling well

No stilling well

Approvals

General Purpose

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 [ia] IIC T6 to T1 T100 °C

FM Class I, Div. 1, Groups A, B, C, D T4

Probe/electrode diameter

Maximum length 1 000 mm (39.37 inch)⁴⁾

Thermal isolator

Rigid thermal isolator [for process connection temperature over 85 °C (185 °F)]

¹⁾ Welded flange for no insulation option only

²⁾ Custom shipping methods required

³⁾ Non-conductive material only, stainless steel non-insulated probe diameter 19 mm (0.75 inch)

⁴⁾ 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 4/77 for more details.

Order No.

7ML5604-

A - - - - -

1

0

A

B

D

F

A

1

Level measurement

Point level measurement – Capacitance switches

Pointek CLS500

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
Active Shield length - minimum length is 50 mm. Y02: to mm ¹⁾	Y02
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]; Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000	C11
Inspection Certificate Type 3.1 per EN 10204	C12
Operating Instructions	
Order No.	
English	7ML1998-5GG03
German	7ML1998-5GG32
French	7ML1998-5GG11
Dutch	7ML1998-5GG41
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.	
Accessories	
<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 inch)	7ML1830-1JA
M20x1.5 General Purpose Cable Entry IP68/IP69K NEMA6, -40 ... -100 °C (-40 ... -212 °F), cable size 7 ... 12 mm (0.275 ... 0.472 inch)	7ML1830-1JC
<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 inch)	7ML1830-1JB
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 inch)	7ML1830-1JD
Pointek Specials	See page 4/80

¹⁾ See dimensional drawings on page 4/77 for further explanation of Y02

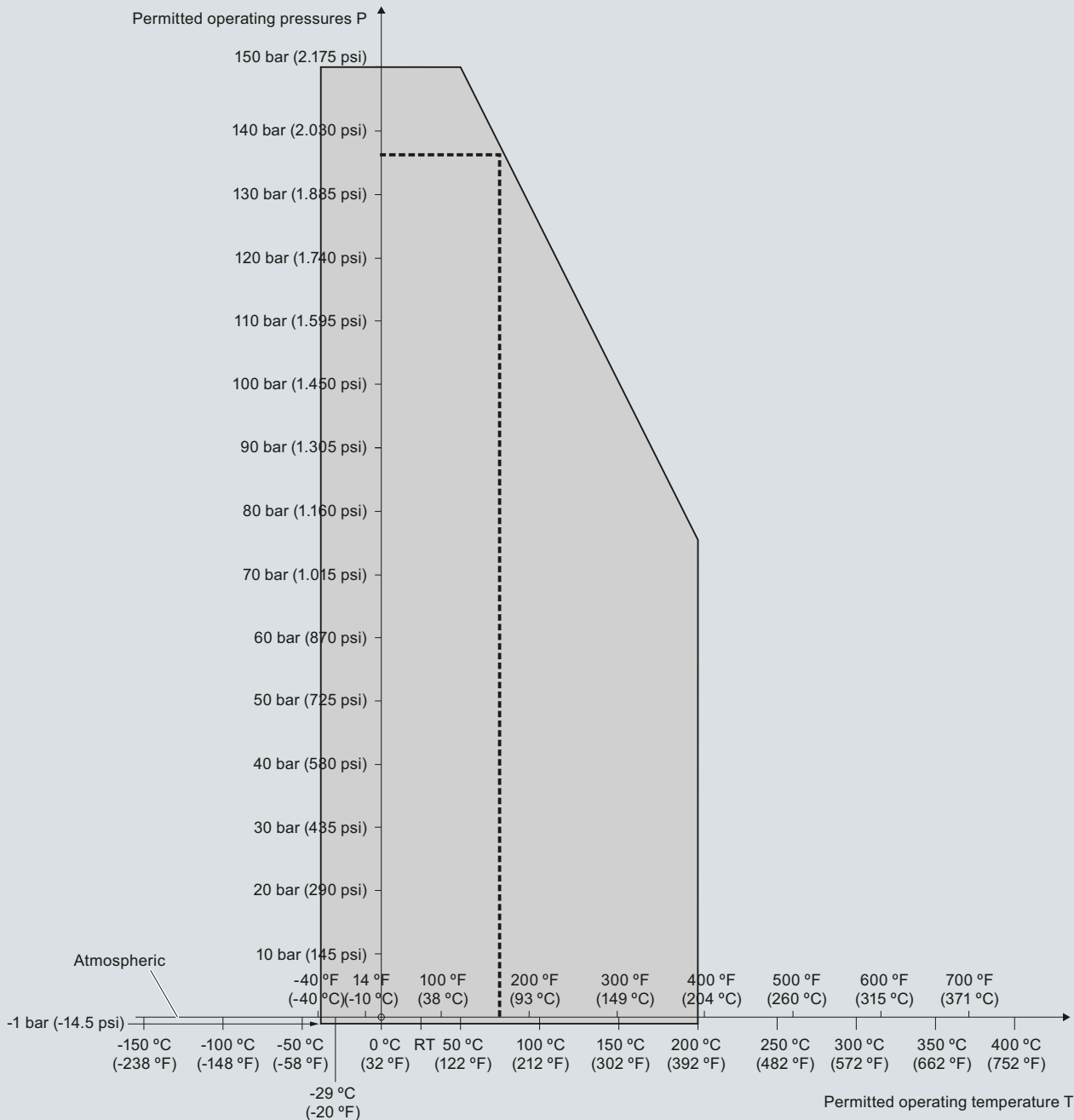
Level measurement

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 (1988 psi) at 75 °C

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

4

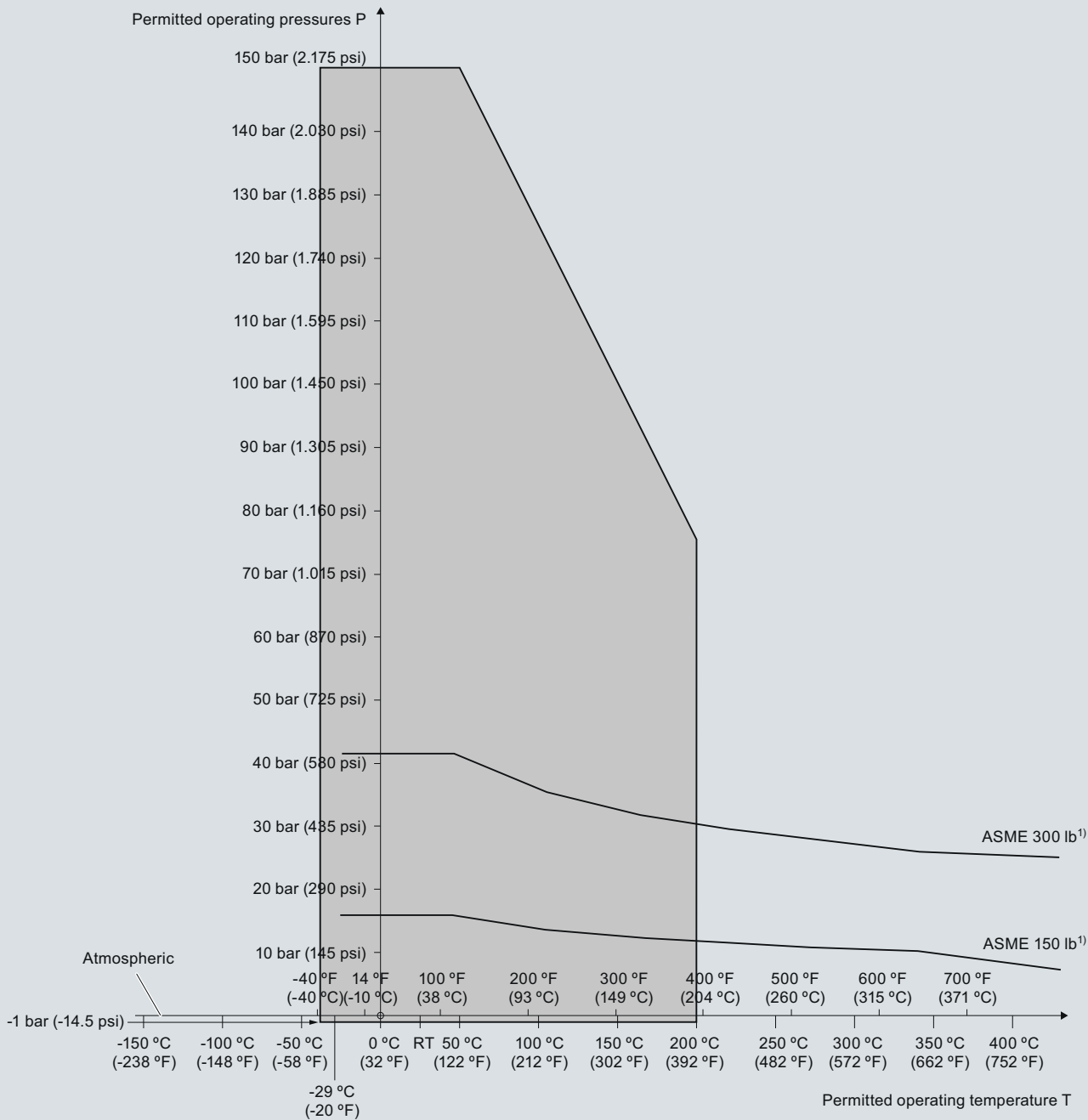
Level measurement

Point level measurement – Capacitance switches

Pointek CLS500

4

Pressure/temperature curve
CLS500 rod probes
ASME flanged process connections
(7ML5602 and 7ML5603)



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

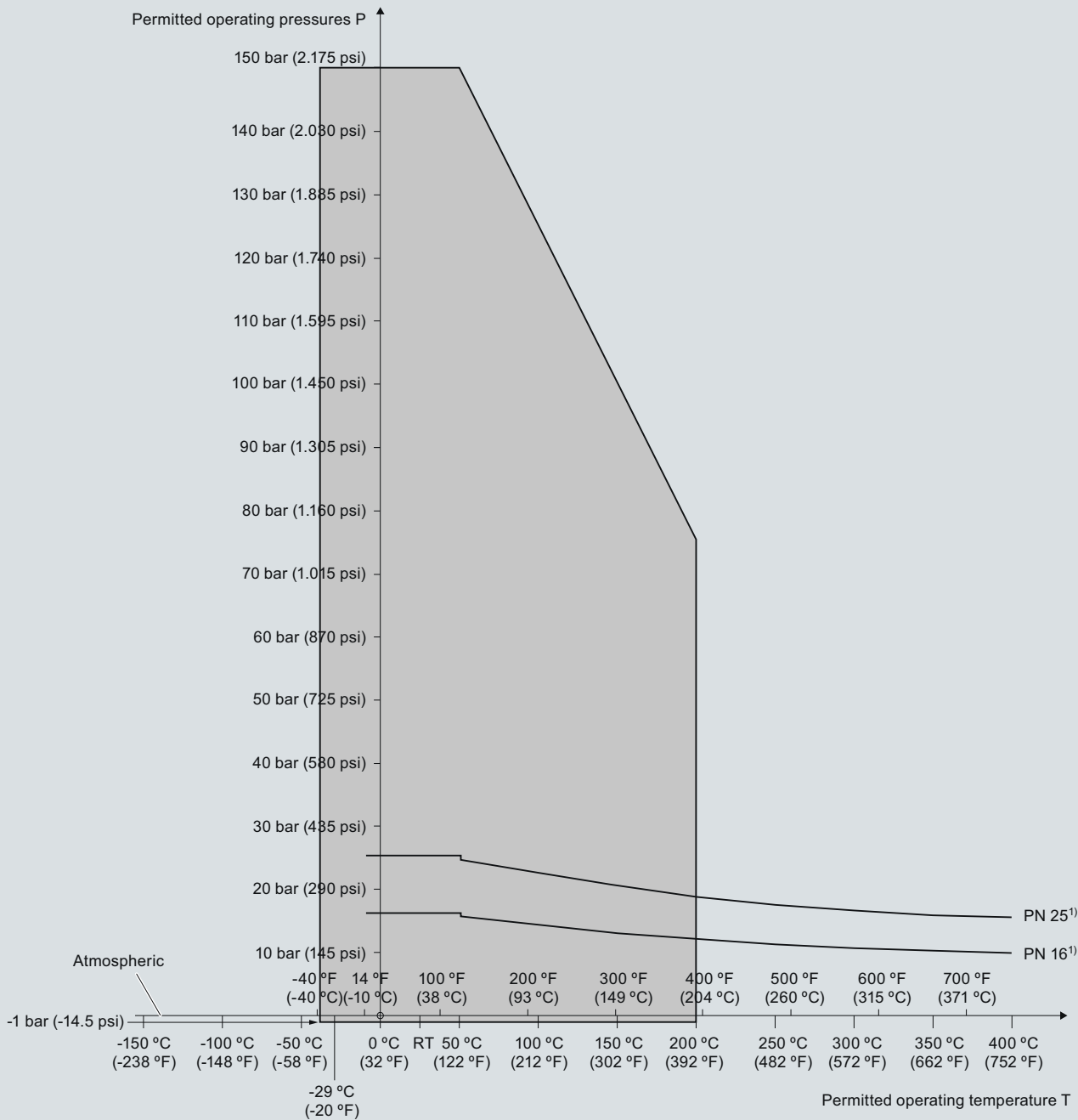
Pointek CLS500 Process Pressure/Temperature derating curves (7ML5602 and 7ML5603)

Level measurement

Point level measurement – Capacitance switches

Pointek CLS500

Pressure/temperature curve
CLS500 rod probes
EN flanged process connections
(7ML5602 and 7ML5603)



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

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

4

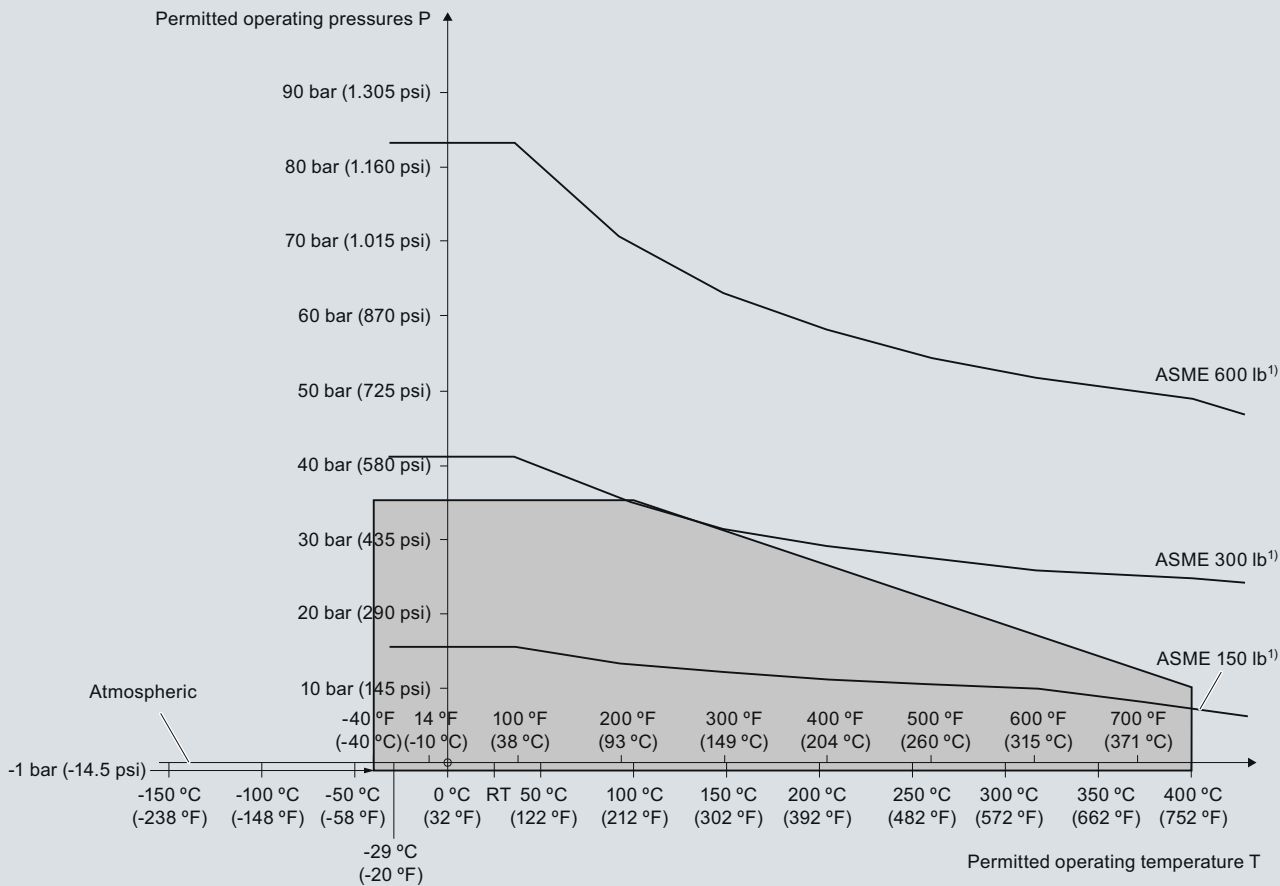
Level measurement

Point level measurement – Capacitance switches

Pointek CLS500

4

Pressure/temperature curve
CLS500 high temperature (no insulation)
ASME flanged process connections
(7ML5604)



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

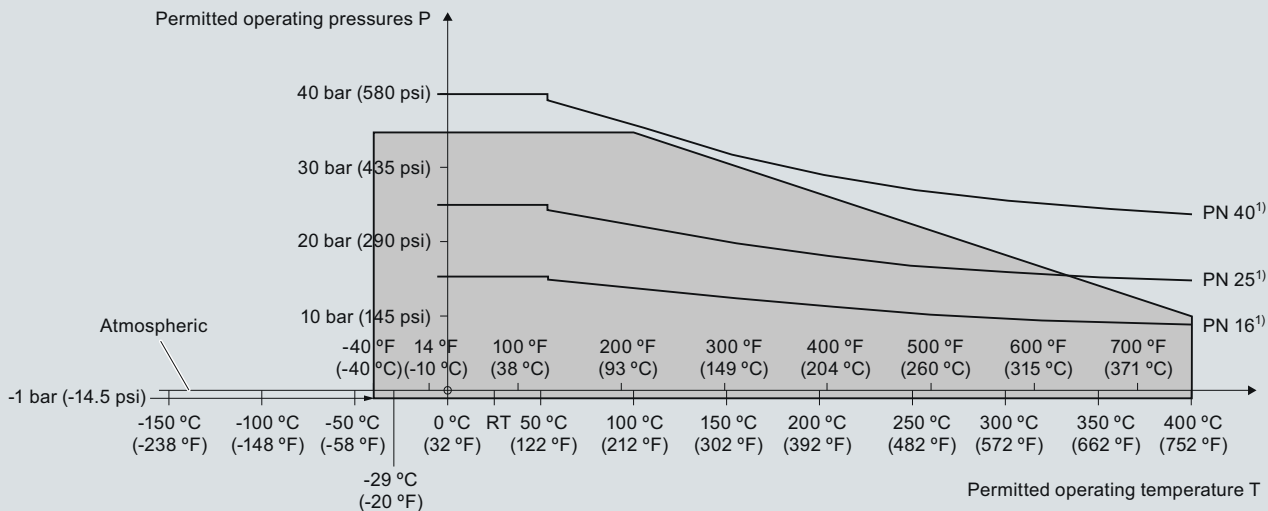
Pointek CLS500 Process Pressure/Temperature derating curves (7ML5604)

Level measurement

Point level measurement – Capacitance switches

Pointek CLS500

Pressure/temperature curve
CLS500 high temperature (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)

4

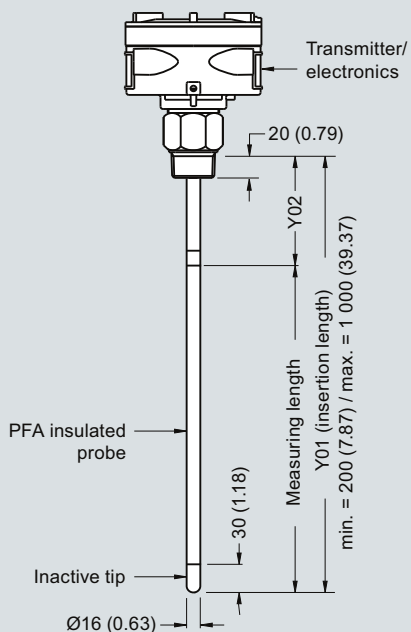
Level measurement

Point level measurement – Capacitance switches

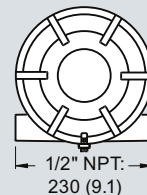
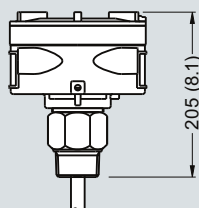
Pointek CLS500

Dimensional drawings

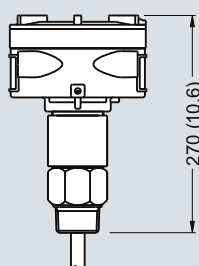
Standard rod version Threaded (7ML5601)



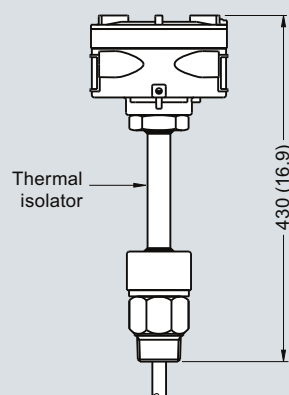
Standard configuration (7ML5601)



With explosion-proof seal option (all versions)



With thermal isolator option (all versions)



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

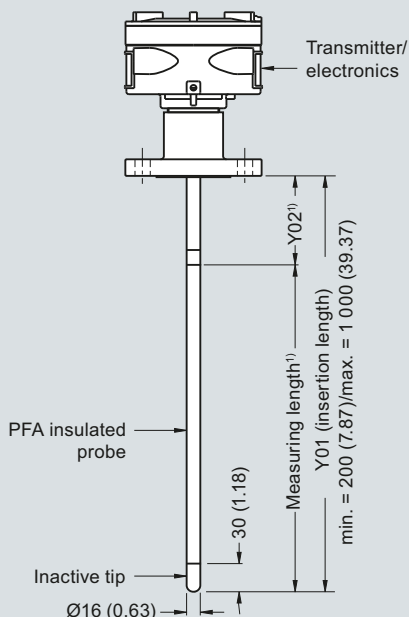
Level measurement

Point level measurement – Capacitance switches

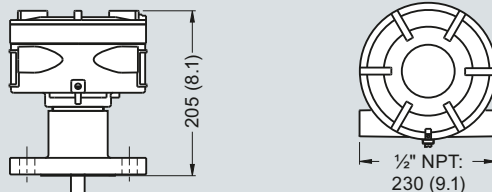
Pointek CLS500

4

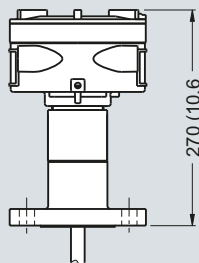
Standard Rod version
Welded Flange (7ML5602)
Single Piece Flange (7ML5603)



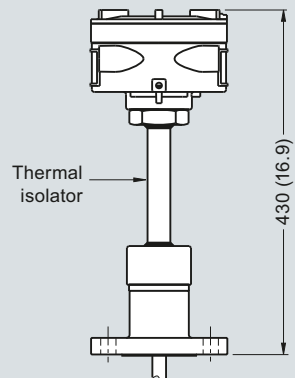
Standard configuration
(7ML5602, 7ML5603)



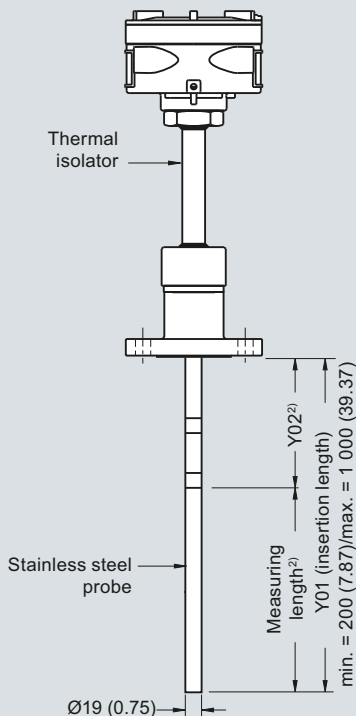
With explosion-proof seal option
(all versions)



With thermal isolator option
(all versions)



High temperature rod version
Welded Flange (7ML5604), Stainless steel rod⁴⁾



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⁾ Min. Y02 (active shield length) = 100 (3.94)
- ⁴⁾ Non conductive materials only

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

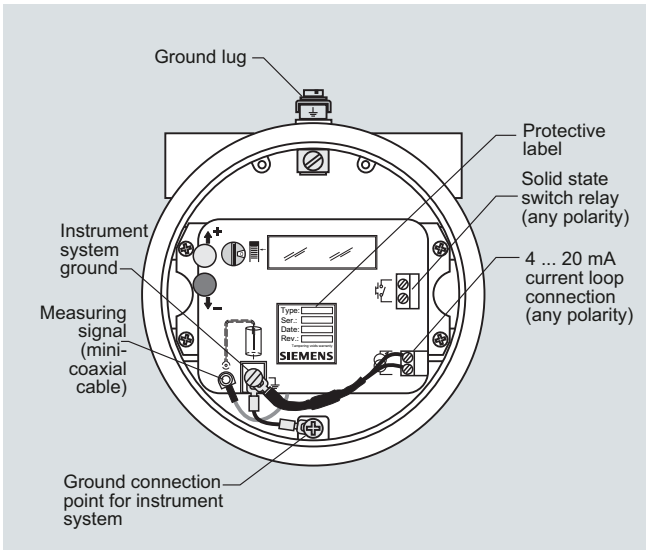
Pointek CLS500 Flanged Process Connections, dimensions in mm (inch)

Level measurement

Point level measurement – Capacitance switches

Pointek CLS500

Schematics



Pointek CLS500 connections

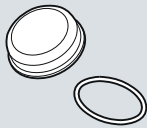
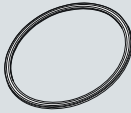

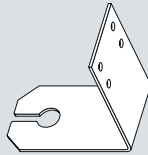
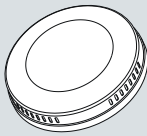

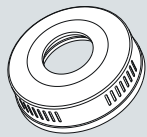


4

Level measurement

Point level measurement – Capacitance switches

Pointek CLS Specials




Selection and ordering data

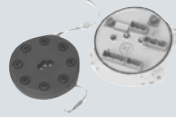
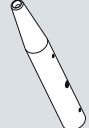

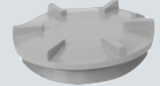
Pointek Specials ¹⁾		Pointek Specials ¹⁾	
	Order No.		
CLS100 Polycarbonate Lid and Gasket, FKM		Kit, Sensor for cable units, PPS, Digital, FKM	A5E01163678
Kit, Lid and gasket, CLS100 enclosure version	A5E01163671	Kit, Sensor for cable units, PPS, Standard, FFKM	A5E01163679
CLS100 Miscellaneous Parts		Kit, Sensor for cable units, PPS, Digital, FFKM	A5E01163680
Custom length of cable is available only for 7ML5501-xxx1x and 7ML5501-xxx5x ²⁾		Kit, Sensor for cable units, PVDF, Standard, FKM	A5E01163681
CLS200 Gasket (IP65), Synprene		Kit, Sensor for cable units, PVDF, Digital, FKM	A5E01163682
Spare gasket, enclosure version (IP65 versions only)	A5E01163672	Kit, Sensor for cable units, PVDF, Standard, FFKM	A5E01163683
CLS200 Gasket (IP68), Silicone		Kit, Sensor for cable units, PVDF, Digital, FFKM	A5E01163684
Spare gasket, enclosure version (IP68 versions)	A5E01163673	CLS200 Mounting Bracket, 316L stainless steel	
CLS200 Blind Lid		Spare mounting bracket	A5E01163685
Spare aluminum blind lid (for standard versions only)	A5E01163674	CLS200 PROFIBUS Connector (IP65)	
CLS200 Lid with window		Spare, PROFIBUS connector (IP65 versions only)	A5E01163686
Spare aluminum lid with window	A5E01163676	CLS200 Miscellaneous Parts	
CLS200 Sensor Kit for cable units		CLS200 with FFKM O-rings (any version) ²⁾	
Kit, Sensor for cable units, PPS, Standard, FKM	A5E01163677	CLS200 Electronics	
		Test magnet, digital version	7ML1830-1JE
		Amplifier/power supply kit, standard version	A5E03251681
		Amplifier/power supply, digital version	7ML1830-1JF
		LCD display, digital version	7ML1830-1JK
		CLS300 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

Level measurement

Point level measurement – Capacitance switches

Pointek CLS Specials

Pointek Specials ¹⁾	
CLS300 Cable Extensions, 316 stainless steel with PFA coating	
Kit, PFA cable extension, 1 m, adjustable by customer	A5E01163697
Kit, PFA cable extension, 3 m, adjustable by customer	A5E01163698
Kit, PFA cable extension, 5 m, adjustable by customer	A5E01163699
Kit, PFA cable extension, 10 m, adjustable by customer	A5E01163700
Kit, PFA cable extension, 15 m, adjustable by customer	A5E01163701
Kit, PFA cable extension, 20 m, adjustable by customer	A5E01163702
CLS300 Rod Kits, 316L stainless steel	
Kit, Stainless steel rod 180 mm (7.09 inch) to be used with CLS300 units only (with standard active shield). Insertion length after installation is 350 mm (13.78 inch).	A5E01163719
Kit, Stainless steel rod 330 mm (12.99 inch) to be used with CLS300 units only (with standard active shield). Insertion length after installation is 500 mm (19.69 inch).	A5E01163720
Kit, Stainless steel rod 580 mm (22.83 inch) to be used with CLS300 units only (with standard active shield). Insertion length after installation is 750 mm (29.53 inch).	A5E01163721
Kit, Stainless steel rod 830 mm (32.68 inch) to be used with CLS300 units only (with standard active shield). Insertion length after installation is 1 000 mm (39.37 inch).	A5E01163722
Kit, Stainless steel rod 1 330 mm (52.36 inch) to be used with CLS300 units only (with standard active shield). Insertion length after installation is 1 500 mm (59.06 inch). ²⁾	
Kit, Stainless steel rod 1 830 mm (72.05 inch) to be used with CLS300 units only (with standard active shield). Insertion length after installation is 2 000 mm (78.74 inch). ²⁾	
Kit, Stainless steel rod customized length up to 1 m ²⁾	
Kit, Stainless steel rod customized length up to 2 m ²⁾	
CLS300 Electronics Kits with drivers (for rod or cable versions)	
Kit, Electronics with driver, standard CLS300. To be used in rod or cable versions with length less than 5 m. ³⁾⁴⁾	A5E01163723
Kit, Electronics with driver, digital CLS300. To be used in rod or cable versions with length less than 5 m. ³⁾⁴⁾	A5E01163725

Pointek Specials ¹⁾	
CLS300 Electronics Kits with drivers (for cable versions)	
Kit, Electronics with driver, standard CLS300. To be used in cable versions with length greater than 5 m. ³⁾⁴⁾	A5E01163724
Kit, Electronics with driver, digital CLS300. To be used in cable versions with length greater than 5 m. ³⁾⁴⁾	A5E01163726
CLS300 Electronics	
Test magnet, digital version	7ML1830-1JE
Amplifier/power supply kit, standard version	A5E03251683
Amplifier/power supply, digital version	7ML1830-1JF
LCD display, digital version	7ML1830-1JK
CLS300 Weight Kit, 316L stainless steel	
Kit, Spare stainless steel weight. To be used in any cable version of CLS300	A5E01163727
CLS500 Gasket (IP65), Silicone	
Spare gasket, CLS500 enclosure version, IP65	A5E01163728
CLS500 Blind Lid	
Spare CLS500 aluminum blind lid	A5E01163729
CLS500 Electronics Kit	
Transmitter, MSP 2002-1, 330 PF	7ML1830-1JP

- 1) Special flange sizes and facings are available. Please contact ceg.smpi@siemens.com for part number and pricing. Submit Application Questionnaire found on page 4/9.
 - 2) Please contact ceg.smpi@siemens.com for part number and pricing.
 - 3) For General Purpose approvals only.
 - 4) To maintain approvals, qualified trained Siemens personnel required for part replacement.
- Please contact ceg.smpi@siemens.com for special requests.

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 inch) 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

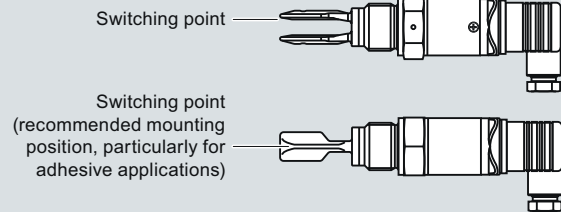
SITRANS LVL100 is a compact level switch designed for industrial use in all areas of process technology and can be used with liquids and slurries. With an insertion length of only 40 mm (1.57 inch), SITRANS LVL100 can be mounted in small pipes and confined space applications. It is virtually unaffected 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 external vibration.

The tuning fork is piezoelectrically energized and vibrates at a mechanical resonance frequency of approximately 1 200 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.

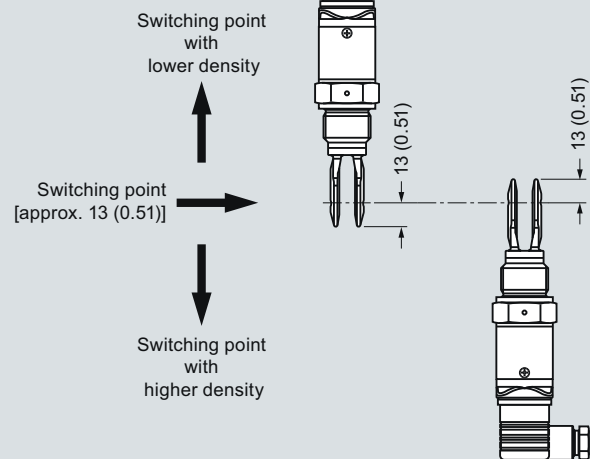
- Key Applications: For use in liquids and slurries, for level measurement, overflow, and dry run protection

Configuration

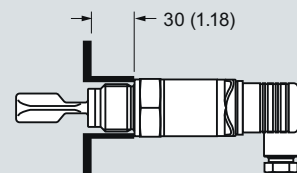
Horizontal mounting



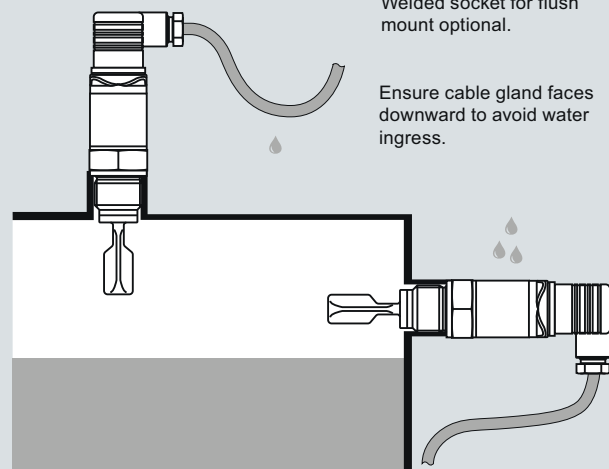
Vertical mounting



Horizontal mounting in viscous or adhesive applications



Moisture protection



SITRANS LVL100 Installation, dimensions in mm (inch)

Level measurement

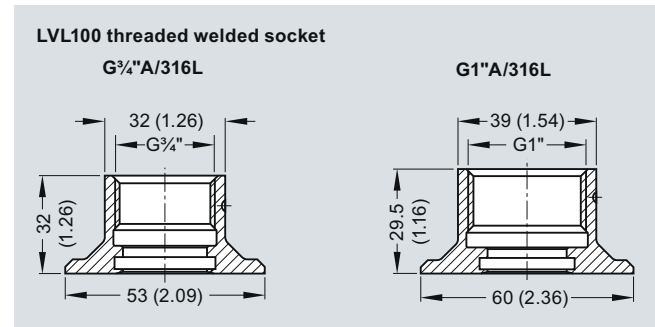
Point level measurement – Vibrating switches

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 inch) with vertical installation
• Switching delay	Approx. 500 ms (on/off)
• Frequency	Approx. 1 200 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 ³ (0.025 ... 0.09 lb/in ³)
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	Klingsil 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



SITRANS LVL100 welded socket, dimensions in mm (inch)

Level measurement

Point level measurement – Vibrating switches

SITRANS LVL100

Selection and Ordering data

SITRANS LVL100

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.

Approvals

Without approvals
Shipping approvals¹⁾
Overfill protection (WHG)²⁾

Process temperature

Standard -40 ... +100 °C (-40 ... +212 °F)³⁾
Extended -40 ... +150 °C (-40 ... +302 °F)³⁾
Hygienic applications -40 ... +150 °C
(-40 ... +302 °F)⁴⁾

Process connection

Thread G $\frac{3}{4}$ " A PN64/316L
Thread G $\frac{3}{4}$ " A PN64/316L Ra< 0.8 µm
Thread $\frac{3}{4}$ " NPT PN64/316L
Thread $\frac{3}{4}$ " NPT PN64/316L Ra< 0.8 µm
Thread G1" A PN64/316L
Thread G1" A PN64/316L Ra< 0.8 µm
Thread 1" NPT PN64/316L
Thread 1" NPT PN64/316L Ra< 0.8 µm
Tri-Clamp 1" PN16 DIN 32676/316L Ra< 0.8 µm
Tri-Clamp 1½" PN16 DIN 32676/316L Ra< 0.8 µm
Tri-Clamp 2" PN16 DIN 32676/316L Ra< 0.8 µm
Bolting DN25 PN40 DIN 11851/316L Ra< 0.8 µm
Bolting DN40 PN40 DIN 11851/316L Ra< 0.8 µm
Bolting DN50 PN25 DIN 11851/316L Ra< 0.8 µm
SMS DN38 PN6 316L Ra< 0.8 µm
Hygienic fitting with compression nut F40
PN25/316L Ra < 0.8 µm

Electronics

Contactless electronic switch 20 ... 250 V AC/DC⁵⁾
Transistor output PNP 10 ... 55 V DC

Housing

316L

Electrical connection/Protection

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)

Order No.

7ML5745-

A 0

1

2

3

A

B

C

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

1

2

1

A

B

C

D

Selection and Ordering data

Further designs

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

Cleaning including certificate
(oil, grease and silicone free)

W01

Identification Label, foil laser marking

Y16

Acceptance test certificate 3.1 for instrument

C12

Acceptance test Certificate 2.2 for material
EN10204

C15

Additional Operating Instructions

LVL100 (Contactless electronic switch)

Order No.

• English

7ML1998-5KN01

• French

7ML1998-5KN11

• Spanish

7ML1998-5KN21

• German

7ML1998-5KN31

LVL100 (Transistor PNP)

• English

7ML1998-5KP01

• French

7ML1998-5KP11

• Spanish

7ML1998-5KP21

• German

7ML1998-5KP31

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

Spare Parts

LVL100 Threaded Welded Socket

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

7ML1930-1EE

G1" A/316L with FKM Seal

7ML1930-1EF

M27x1.5/316L with FKM Seal

7ML1930-1EG

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

7ML1930-1EH

G1" A/316L with EPDM Seal

7ML1930-1EJ

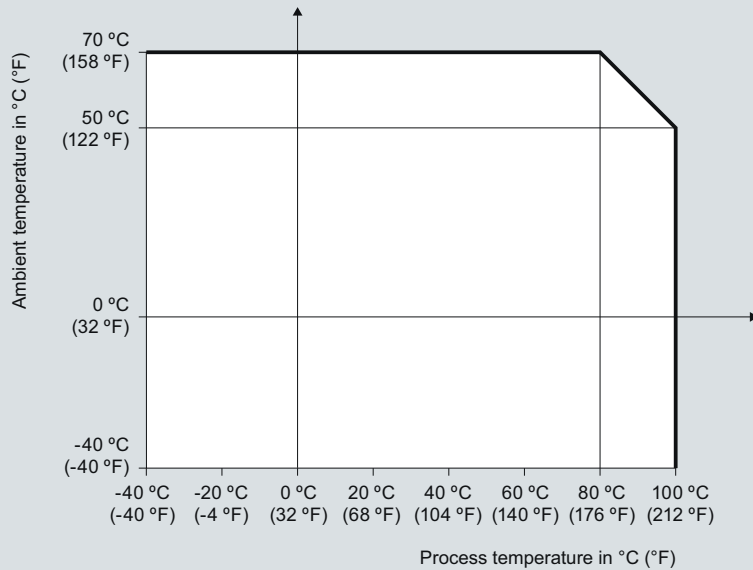
M27x1.5/316L with EPDM Seal

7ML1930-1EK

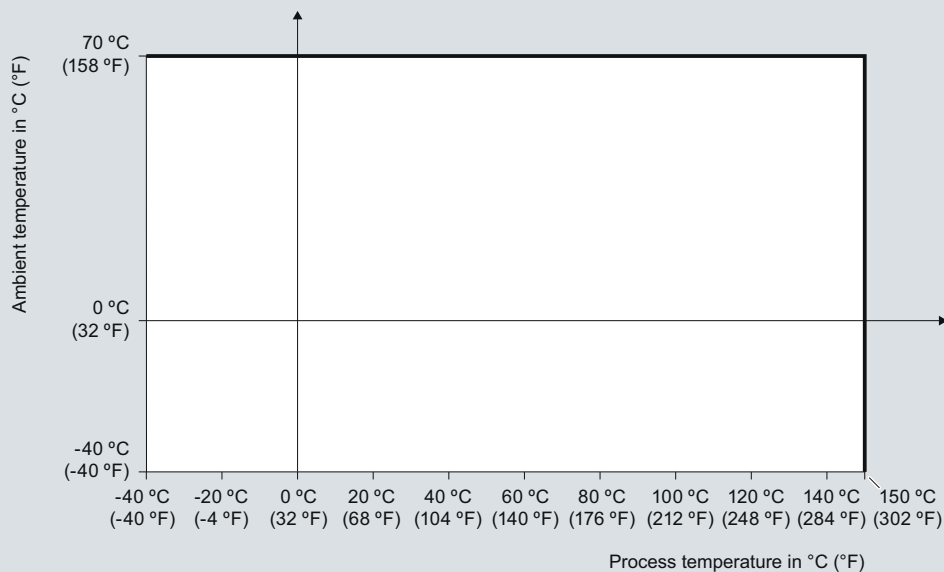
- 1) Available with Process Temperature option A only
- 2) Available with Electronics option 2 only
- 3) Available with process connection A0, A2, A4, and A6 only
- 4) Available with process connection A1, A3, A5, and A7 ... B6 only
- 5) Available with Electrical connection/Protection option B and C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

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

Level measurement

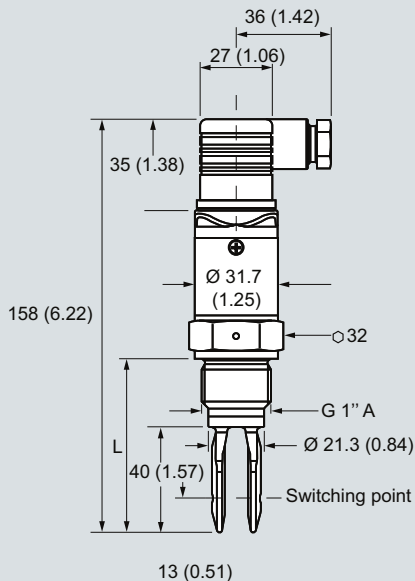
Point level measurement – Vibrating switches

SITRANS LVL100

Dimensional drawings

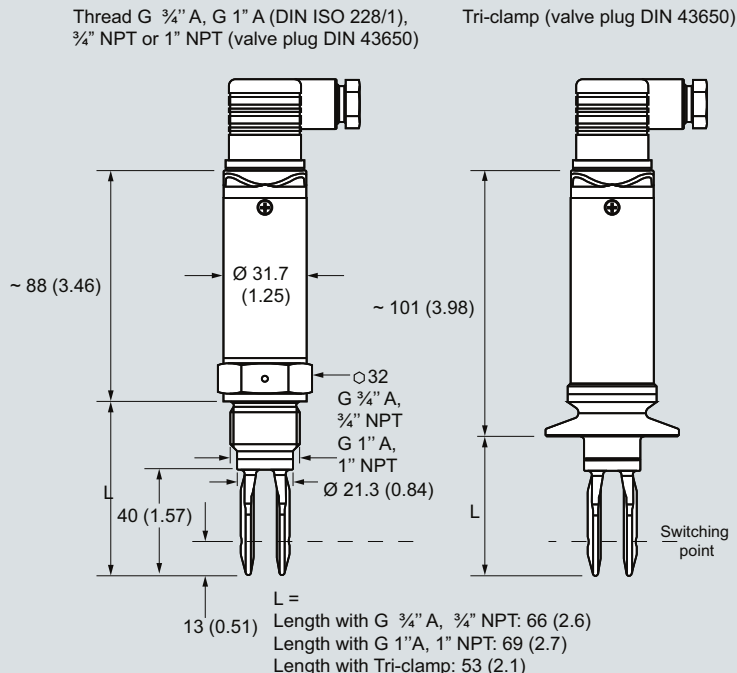
4

SITRANS LVL100 (standard)



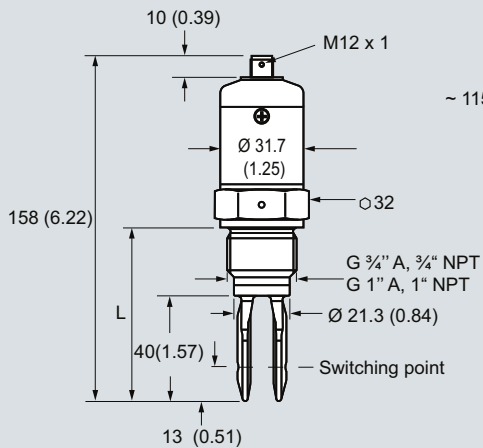
L =
 Length with G 3/4" A, 3/4" NPT: 66 (2.6)
 Length with G 1" A, 1" NPT: 69 (2.7)

SITRANS LVL100 (extended high temperature)



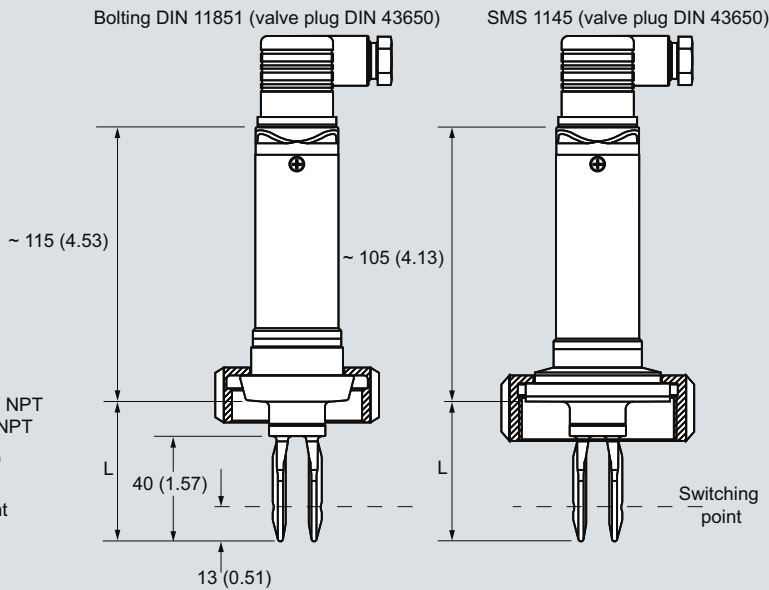
L =
 Length with G 3/4" A, 3/4" NPT: 66 (2.6)
 Length with G 1" A, 1" NPT: 69 (2.7)
 Length with Tri-clamp: 53 (2.1)

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)



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

SITRANS LVL100, dimensions in mm (inch)

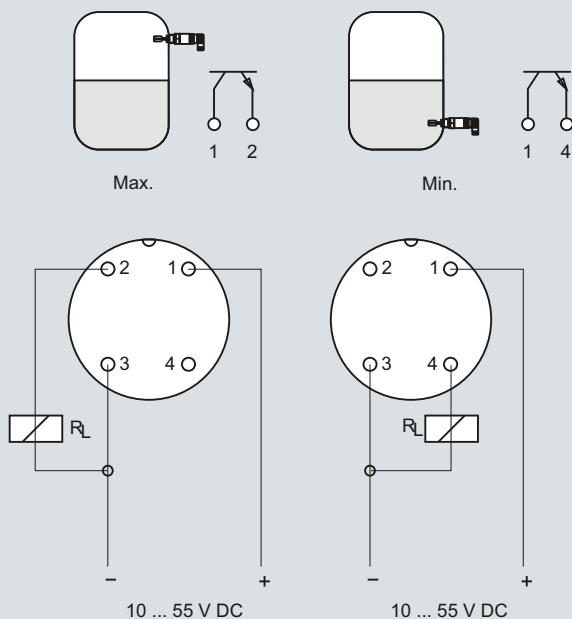
Level measurement

Point level measurement – Vibrating switches

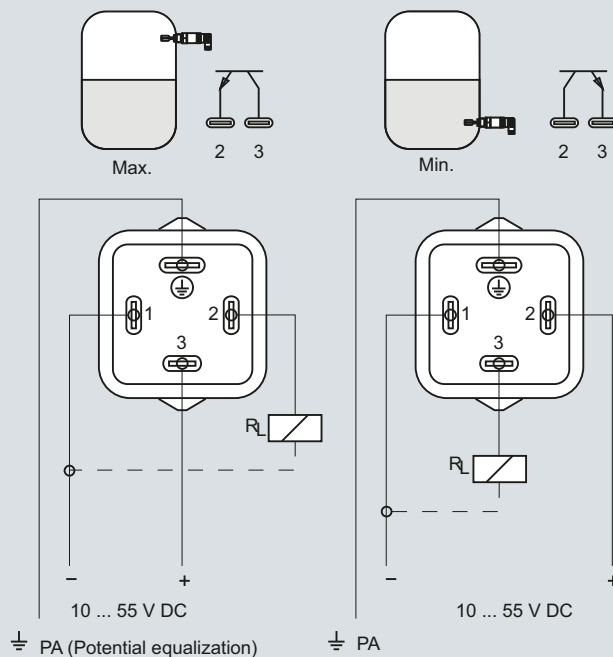
SITRANS LVL100

Schematics

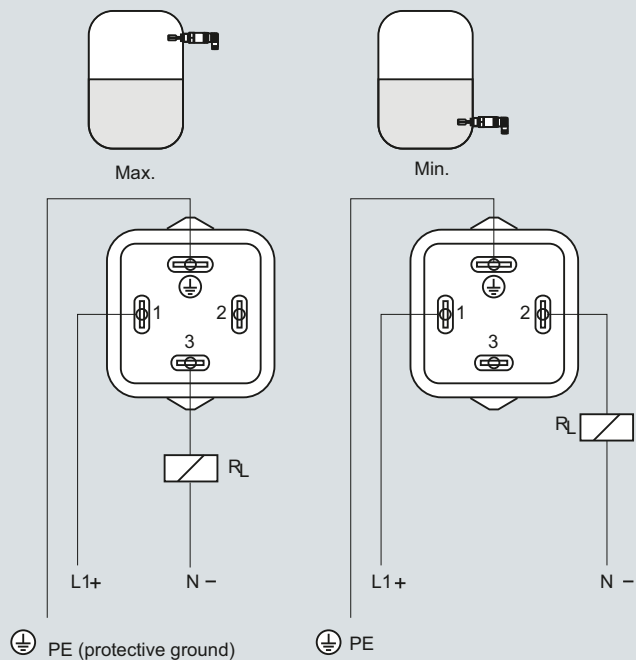
Transistor PNP (M12 x 1 plug connection)



Transistor PNP (with valve plug DIN 43650)



Contactless electronic switch (valve plug DIN 43650)



SITRANS LVL100, connections

4

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 inch) 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 inch), 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 lb/in^3). The LVL200 can be used in difficult conditions including turbulence, air bubbles, foam generation, buildup, or external vibration.

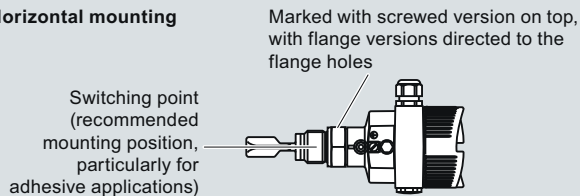
SITRANS LVL200 continuously monitors faults via frequency evaluation, providing early detection of strong corrosion or damage on the tuning fork, loss of vibration, or a line break to the piezo drive.

The tuning fork is piezoelectrically energized and vibrates at its mechanical resonance frequency of approx. 1 200 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.

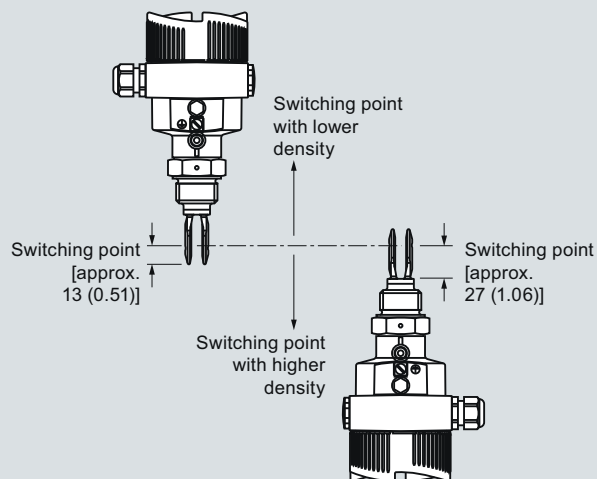
- Key Applications: For use in liquids and slurries, for level measurement, overflow, and dry run protection

Configuration

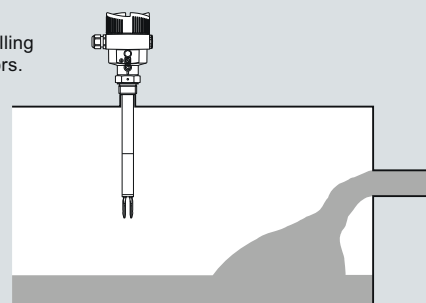
Horizontal mounting



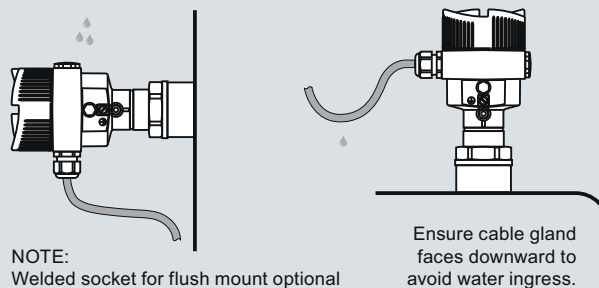
Vertical mounting



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	<ul style="list-style-type: none"> • relay output (DPDT), 2 floating SPDTs • contactless electronic switch • 2 wire Namur signal output
Measuring Accuracy	
Repeatability	0.1 mm (0.004 inch)
Hysteresis	Approx. 2 mm (0.08 inch) with vertical installation
Switching delay	Approx. 500 ms (on/off)
Frequency	Approx. 1 200 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 to 928 psi g)
• Density	0.7 ... 2.5 g/cm ³ (0.025 ... 0.09 lb/in ³); 0.5 ... 2.5 g/cm ³ (0.018 ... 0.09 lb/in ³) by switching over
Design	
Material	
• Enclosure	Aluminum die-cast AISi10Mg, powder-coated, basis: Polyester
• Tuning fork	316L (1.4404 or 1.4435), Hastelloy
• Extension tube [ø 21.3 mm (0.839 inch)]	316L (1.4404 or 1.4435), Hastelloy
• 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 Klingersil C-4400
• Process seal	
Process connection	
• Pipe thread, cylindrical (ISO 228 T1)	G¾" A, G1" 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	Type 4X/NEMA 4X/IP66/IP67
Conduit entry	<ul style="list-style-type: none"> • 1 x M20x1.5 (cable: ø5 to 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 lb)
• Tube extension (extended version)	approx 920 g/m (10 oz/ft)
Power supply	
Supply voltage	20 ... 253 V AC, 50/60 Hz, 20 ... 72 V DC [at U>60 V DC]
• Relay DPDT	20 ... 253 V AC, 50/60 Hz, 20 to 253 V DC
• Contactless	
• 2 wire Namur	
Operating voltage (characteristics according to standard) for connection to an amplifier according to NAMUR	IEC 60947-5-6, approx. 8.2 V Off-load voltage U ₀ approx. 8.2 V Short-circuit current I _U approx. 8.2 mA
Power consumption	1 ... 8 VA AC, approx. 1.3 W DC
• Relay DPDT	1 ... 8 VA AC, approx. 1.3 W DC
• Contactless	Domestic current requirement approx. 3 mA (via load circuit)
• 2 wire NAMUR	
	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 to 40 ms (not WHG specified)
	Current consumption
	- Falling characteristics
	≥ 2.6 mA uncovered/≤ 0.6 mA covered
	- ≤ 0.6 mA uncovered/≥ 2.6 mA covered
	- Failure message ≤ 0.6 mA
Certificates and approvals	
	<ul style="list-style-type: none"> • CE, CSA • Overfill Protection WHG and VLAREM II • 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 • ATEX II 1G, 1/2G, 2G EEx ia IIC T6
	Shipping approvals: ABS, DNV, LR, RINA, GL, CCS
	• BR-Ex d IIC T6...T2
	• FDA, 3A, Ehedge
	• SIL/IEC61508 Declaration of Conformity [SIL-2 (min/max detection)]

4

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.

7ML5746-

A 0

Electronics

Contactless electronic switch 20...250 V AC/DC
Double relay (DPDT) 20 ... 72 V DC/20 ... 250 V AC
NAMUR signal¹⁾

1
2
4

Approvals

Without approvals
Overfill protection (WHG)
ATEX II 1G, 1/2G, 2G EEx ia IIC T6 + WHG ²⁾
ATEX II 1/2G, 2G EEx d IIC T6 + WHG ³⁾
ATEX II 1G, 1/2G, 2G EEx ia IIC T6 + shipping approvals²⁾
ATEX II 1/2G, 2G EEx d IIC T6 + shipping approvals³⁾
ATEX II 1G, 1/2G, 2G EEx ia IIC T6 + ATEX II 1/2 D IP6X T²⁾
IECEX Ex ia IIC T6²⁾
Shipping approvals
FM (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G ^{2/4)}
FM (XP) Class I, Div. 1, Groups A, B, C, D; (DIP) Class II, III, Div. 1, Groups E, F, G^{3/4)}
FM (NI) Class I, Div. 2, Groups A, B, C, D⁴⁾
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
BR-Ex d IIC T6...T2

A
B
C
D
E
F
G
H
K
N
P
Q
R
S
T
U

Process connection

Thread G^{3/4}" A, PN64/316L
Thread G^{3/4}" A, PN64/316L Ra < 0.8 µm
Thread ^{3/4}" NPT, PN64/316L
Thread ^{3/4}" NPT, PN64/316L Ra < 0.8 µm
Thread ^{3/4}" NPT, PN64/Monel
Thread G^{3/4}" A, PN64/Hastelloy
Thread ^{3/4}" NPT, PN64/Hastelloy
Thread G1" A, PN64/316L
Thread G1" A, PN64/316L ECTFE coated MB1982⁵⁾
Thread G1" A, PN64/316L PFA coated⁵⁾
Thread G1" A, PN64/Monel
Thread G1" A, PN64 / 316L Ra<0.8µm
Thread G1" A, PN64/316L Ra < 0.8 µm
Thread 1" NPT, PN64/316L⁵⁾
Thread 1" NPT, PN64/316L ECTFE coated MB1982⁵⁾
Thread 1" NPT, PN64/316L PFA-coated
Thread 1" NPT, PN64/Monel
Thread 1" NPT, PN64/316L Ra < 0.8 µm
Thread G1" A, PN64/Hastelloy
Thread G1^{1/2}" A, PN64/316L
Thread G1^{1/2}" A, PN64/316L Ra<0,8µm
Thread G1^{1/2}" A, PN64/Hastelloy
Thread 1" NPT, PN64/Hastelloy
Thread 1^{1/2}" NPT, PN64/316L
Thread 1^{1/2}" NPT, PN64/316L Ra<0,8µm
Thread 1^{1/2}" 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)⁵⁾
Conus M52, PN40/316L
Conus M52, PN40/316L Ra < 0.3 µm

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

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.

7ML5746-

A 0

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", PN16/316L Ra < 0.8 µm
Tri-Clamp 1^{1/2}", PN16/316L Ra < 0.3 µm
Tri-Clamp 1^{1/2}", PN16/Hastelloy
Tri-Clamp 1^{1/2}", PN16/316L Ra < 0.8 µm
Tri-Clamp 2", PN16/316L Ra < 0.3 µm
Tri-Clamp 2", PN16/Hastelloy
Tri-Clamp 2", PN16/316L Ra < 0.8 µm
Tri-Clamp 2^{1/2}", PN10/316L Ra < 0.3 µm
Tri-Clamp 2^{1/2}", 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 µm⁵⁾
SMS DN51, PN6/316L Ra < 0.8 µm⁵⁾
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 µm⁵⁾
Neumo biocontrol Gr. 65, PN16/316L Ra < 0.8 µm
Neumo biocontrol Gr. 80, PN16/316L Ra < 0.8 µm
SÜDMO DN50, PN10/316L 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 µm⁵⁾
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/PFA⁵⁾
Flange DN25, PN40 Form C, DIN 2501/316L
Flange DN25, PN40 Form C, DIN 2501/Hastelloy
Flange DN25, PN40 Form C, DIN 2501/ECTFE⁵⁾
Flange DN25, PN40 Form C, DIN 2501/PFA⁵⁾
Flange DN25, PN40 Form C, DIN 2501/Enamelled
Flange DN25, PN40 Form D, DIN 2501/316L
Flange DN25, PN40 Form F, DIN 2501/316L

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

Level measurement

Point level measurement – Vibrating switches

SITRANS LVL200

Selection and Ordering data	Order No.	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.	7ML5746- 	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.	7ML5746- 
Flange DN25, PN40 Form N, DIN 2501/316L	B 06	Flange DN100, PN16 Form F, DIN 2501/316L	B 68
Flange DN25, PN40 Form N, DIN 2501/Hastelloy	B 07	Flange DN100, PN16 Form N, DIN 2501/316L	B 70
Flange DN25, PN40 Form N, DIN 2501/Monel solid	B 08	Flange DN100, PN40 Form C, DIN 2501/316L	B 71
Flange DN25, PN40 V13, DIN 2501/316L	B 10	Flange DN100, PN40 Form C, DIN 2501/ECTFE ⁵⁾	B 72
Flange DN32, PN40 Form C, DIN 2501/316L	B 11	Flange DN100, PN40 Form C, DIN 2501/PFA ⁵⁾	B 73
Flange DN32, PN40 Form C, DIN 2501/ECTFE ⁵⁾	B 12	Flange DN100, PN40 Form C, DIN 2501/Enamelled ⁶⁾	B 74
Flange DN40, PN6 Form C, DIN 2501/316L	B 13	Flange DN100, PN40 Form F, DIN 2501/316L	B 75
Flange DN40, PN6 Form C, DIN 2501/ECTFE ⁵⁾	B 14	Flange DN100, PN40 Form N, DIN 2501/316L	B 76
Flange DN40, PN40 Form C, DIN 2501/316L	B 15	Flange DN100, PN40 V13, DIN 2501/316L	B 77
Flange DN40, PN40 Form C, DIN 2501/Hastelloy	B 16	Flange DN100, PN64 Form E, DIN 2501/316L	B 78
Flange DN40, PN40 Form C, DIN 2501/ECTFE ⁵⁾	B 17	Flange DN100, PN100 Form E, DIN 2501/316L	B 80
Flange DN40, PN40 Form C, DIN 2501/PFA ⁵⁾	B 18	Flange DN100, PN100 Form L, DIN 2501/316L	B 81
Flange DN40, PN40 Form C, DIN 2501/Enamelled ⁶⁾	B 20	Flange DN125, PN16 Form F, DIN 2501/316L	B 82
Flange DN40, PN40 Form F, DIN 2501/316L	B 21	Flange DN125, PN40 Form C, DIN 2501/316L	B 83
Flange DN40, PN40 Form N, DIN 2501/316L	B 22	Flange DN125, PN40 Form N, DIN 2512/316L	B 84
Flange DN40, PN40 Form E, DIN 2501/316L	B 23	Flange DN150, PN16 Form C, DIN 2501/316L	B 85
Flange DN40, PN40 V13, DIN 2501/316L	B 24	Flange DN150, PN16 Form C, DIN 2501/Hastelloy	B 86
Flange DN50, PN40 Form C, DIN 2501/316L	B 25	Flange DN150, PN16 Form C, DIN 2501/ECTFE ⁵⁾	B 87
Flange DN50, PN40 Form C, DIN 2501/Hastelloy	B 26	Flange DN150, PN16 Form C, DIN 2501/PFA ⁵⁾	B 88
Flange DN50, PN40 Form C, DIN 2501/ECTFE ⁵⁾	B 27	Flange DN150, PN16 Form D, DIN 2501/316L	C 00
Flange DN50, PN40 Form C, DIN 2501/ECTFE (ZB3108) ⁵⁾	B 28	Flange DN150, PN40 Form C, DIN 2501/316L	C 01
Flange DN50, PN40 Form C, DIN 2501/PFA ⁵⁾	B 30	Flange DN150, PN40 Form C, DIN 2501/Hastelloy	C 02
Flange DN50, PN40 Form D, DIN 2501/316L	B 31	Flange DN150, PN40 Form F, DIN 2501/316L	C 03
Flange DN50, PN40 Form D, DIN 2501/Hastelloy	B 32	Flange DN150, PN40 Form N, DIN 2512/316L	C 04
Flange DN50, PN40 Form F, DIN 2501/316L	B 33	Flange DN200, PN10 Form C, DIN 2501/ECTFE ⁵⁾	C 05
Flange DN50, PN40 Form N, DIN 2501/316L	B 34	Flange DN200, PN16 Form C, DIN 2501/316L	C 06
Flange DN50, PN40 Form N, DIN 2501/Hastelloy	B 35	Flange DN25, PN40 Form B1, EN 1092-1/316L	C 07
Flange DN50, PN40 Form E, DIN 2501/316L	B 36	Flange DN25, PN40 Form B1, EN 1092-1/Hastelloy	C 08
Flange DN50, PN40 V13, DIN 2501/316L	B 37	Flange DN25, PN40 Form B1, EN/ 316L/ PFA ⁵⁾	C 10
Flange DN50, PN40 R13, DIN 2501/316L	B 38	Flange DN25, PN40 Form B1, EN 1092-1/Enamelled ⁶⁾	C 11
Flange DN50, PN64 Form F, DIN 2501/316L	B 40	Flange DN25, PN40 Form B2, EN 1092-1/316L	C 12
Flange DN50, PN64 Form N, DIN 2501/Hastelloy	B 41	Flange DN25, PN40 Form F, EN 1092-1/316L	C 13
Flange DN50, PN64 Form C, DIN 2501/316L	B 42	Flange DN25, PN63 Form B1, EN 1092-1/316L	C 14
Flange DN50, PN64 Form L, DIN 2501/316L	B 43	Flange DN25, PN100 Form B2, EN 1092-1/316L	C 15
Flange DN50, PN100 Form E, DIN 2501/316L	B 44	Flange DN40, PN40 Form B1, EN/ 316L	C 16
Flange DN50, PN100 Form L, DIN 2501/316L	B 45	Flange DN40, PN40 Form B1, EN 1092-1/PFA ⁵⁾	C 17
Flange DN65, PN40 Form C, DIN 2501/316L	B 46	Flange DN40, PN40 Form B2, EN/316L	C 18
Flange DN65, PN40 Form C, DIN 2501/Hastelloy	B 47	Flange DN50, PN40 Form B1, EN/316L	C 20
Flange DN65, PN40 Form C, DIN 2501/ECTFE ⁵⁾	B 48	Flange DN50, PN40 Form B1, EN 1092-1/Hastelloy	C 21
Flange DN65, PN40 Form C, DIN 2501/PFA ⁵⁾	B 50	Flange DN50, PN40 Form B1, EN 1092-1/Monel ZB2977	C 22
Flange DN65, PN40 Form F, DIN 2501/316L	B 51	Flange DN50, PN40 Form B1, EN 1092-1/ECTFE ⁵⁾	C 23
Flange DN65, PN64 Form E, DIN 2501/316L	B 52	Flange DN50, PN40 Form B1, EN/ 316L/PFA ⁵⁾	C 24
Flange DN80, PN40 Form C, DIN 2501/316L	B 53	Flange DN50, PN40 Form B1, EN 1092-1/Enamelled ⁶⁾	C 25
Flange DN80, PN40 Form C, DIN 2501/ Hastelloy	B 54	Flange DN50, PN40 Form C, EN 1092-1/316L	C 26
Flange DN80, PN40 Form C, DIN 2501/ECTFE ⁵⁾	B 55	Flange DN50, PN40 Form D, EN/316L	C 27
Flange DN80, PN40 Form C, DIN 2501/PFA ⁵⁾	B 56	Flange DN50, PN40 Form D, EN 1092-1/Hastelloy	C 28
Flange DN80, PN40 Form C, DIN 2501/Enamelled ⁶⁾	B 57	Flange DN50, PN40 Form B2, EN 1092-1/316L	C 30
Flange DN80, PN40 Form F, DIN 2501/316L	B 58	Flange DN50, PN40 Form E, EN 1092-1/316L	C 31
Flange DN80, PN40 Form N, DIN 2501/316L	B 60	Flange DN80, PN40 Form B1, EN 1092-1/316L	C 32
Flange DN80, PN40 Form N, DIN 2501/Hastelloy	B 61	Flange DN80, PN40 Form B1, EN 1092-1/Hastelloy	C 33
Flange DN100, PN16 Form C, DIN 2501/316L	B 62	Flange DN80, PN40 Form B1, EN 1092-1/ECTFE ⁵⁾	C 34
Flange DN100, PN16 Form C, DIN 2501/Hastelloy	B 63	Flange DN80, PN40 Form B1, EN 1092-1/Enamelled ⁶⁾	C 35
Flange DN100, PN16 Form C, DIN 2501/ECTFE ⁵⁾	B 64	Flange DN80, PN40 Form B2, EN 1092-1/316L	C 36
Flange DN100, PN16 Form C, DIN 2501/PFA ⁵⁾	B 65	Flange DN100, PN16 Form B1, EN 1092-1/316L	C 37
Flange DN100, PN16 Form C, DIN 2501/Enamelled ⁶⁾	B 66	Flange DN100, PN16 Form B1, EN 1092-1/Hastelloy	C 38
Flange DN100, PN16 Form D, DIN 2501/316L	B 67		

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.

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A 0

Flange DN100, PN16 Form B1, EN 1092-1/Enamelled ⁶⁾	C 4 0
Flange DN100, PN40 Form B1, EN 1092-1/316L	C 4 1
Flange DN100, PN40 Form B1, EN 1092-1/Enamelled ⁶⁾	C 4 2
Flange DN100, PN40 Form C, EN 1092-1/316L	C 4 3
Flange DN100, PN63 Form B2, EN 1092-1/316L	C 4 4
Flange DN150, PN16 Form B1, EN 1092-1/316L	C 4 5
Flange DN150, PN16 Form B1, EN 1092-1/PFA ⁵⁾	C 4 6
Flange DN150, PN40 Form B1, EN 1092-1/316L	C 4 7
Flange DN150, PN40 Form B1, EN 1092-1/ECTFE ⁵⁾	C 4 8
Flange DN150, PN40 Form B2, EN 1092-1/316L	C 5 0
Flange 1" 150 lb ANSI B16.5/316L	C 5 1
Flange 1" 150 lb RF, ANSI B16.5/Hastelloy	C 5 2
Flange 1" 150 lb RF, ANSI B16.5/Monel ZB2977	C 5 3
Flange 1" 150 lb RF, ANSI B16.5/ECTFE ⁵⁾	C 5 4
Flange 1" 150 lb RF, ANSI B16.5/PFA ⁵⁾	C 5 5
Flange 1" 150 lb RF, ANSI B16.5/Enamelled ⁶⁾	C 5 6
Flange 1" 300 lb RF, ANSI B16.5/316L	C 5 7
Flange 1" 300 lb RF, ANSI B16.5/ECTFE ⁵⁾	C 5 8
Flange 1" 600 lb RF, ANSI B16.5/316L	C 6 0
Flange 1½" 150 lb RF, ANSI B16.5/316L	C 6 1
Flange 1½" 150 lb RF, ANSI B16.5/Hastelloy	C 6 2
Flange 1½" 150 lb RF, ANSI B16.5/ECTFE ⁵⁾	C 6 3
Flange 1½" 150 lb RF, ANSI B16.5/PFA ⁵⁾	C 6 4
Flange 1½" 150 lb RF, ANSI B16.5 Enamelled ⁶⁾	C 6 5
Flange 1½" 150 lb FF, ANSI B16.5/ECTFE ⁵⁾	C 6 6
Flange 1½" 300 lb RF, ANSI B16.5/316L	C 6 7
Flange 1½" 300 lb RF, ANSI B16.5/Monel ZB2977	C 6 8
Flange 1½" 300 lb RF, ANSI B16.5/ECTFE ⁵⁾	C 7 0
Flange 1½" 600 lb RF, ANSI B16.5/316L	C 7 1
Flange 2" 150 lb RF, ANSI B16.5/316L	C 7 2
Flange 2" 150 lb RF, ANSI B16.5/Hastelloy	C 7 3
Flange 2" 150 lb RF, ANSI B16.5/Monel ZB2977	C 7 4
Flange 2" 150 lb RF, ANSI B16.5/ECTFE ⁵⁾	C 7 5
Flange 2" 150 lb RF, ANSI B16.5/PFA ⁵⁾	C 7 6
Flange 2" 150 lb RF, ANSI B16.5/Enamelled ⁶⁾	C 7 7
Flange 2" 150 lb FF, ANSI B16.5/316L	C 7 8
Flange 2" 150 lb FF, ANSI B16.5/ECTFE ⁵⁾	C 8 0
Flange 2" 150 lb SG (small groove), ANSI B16.5/316L	C 8 1
Flange 2" 300 lb RF, ANSI B16.5/316L	C 8 2
Flange 2" 300 lb RF, ANSI B16.5/Hastelloy	C 8 3
Flange 2" 300 lb RF, ANSI B16.5/Hastelloy	C 8 4
Flange 2" 300 lb RF, ANSI B16.5/ECTFE ⁵⁾	C 8 5
Flange 2" 300 lb RF, ANSI B16.5/PFA ⁵⁾	C 8 6
Flange 2" 300 lb RF, ANSI B16.5 Enamelled ⁶⁾	C 8 7
Flange 2" 300 lb RJF, ANSI B16.5/316L	C 8 8
Flange 2" 300 lb ST, ANSI B16.5/316L	D 0 0
Flange 2" 300 lb LG (large groove), ANSI B16.5/316L	D 0 1
Flange 2" 300 lb LT, ANSI B16.5/316L	D 0 2
Flange 2" 600 lb RF, ANSI B16.5/316L	D 0 3
Flange 2" 600 lb RF, ANSI B16.5/Monel ZB2977	D 0 4
Flange 2" 600 lb RF, ANSI B16.5/ECTFE ⁵⁾	D 0 5
Flange 2" 600 lb RJF, ANSI B16.5/316L	D 0 6
Flange 2" 600 lb LG, ANSI B16.5/316L	D 0 7
Flange 2" 900 lb RJF, ANSI B16.5/316L	D 0 8
Flange 2½" 150 lb RF, ANSI B16.5/316L	D 1 0
Flange 2½" 300 lb RF, ANSI B16.5/316L	D 1 1

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.

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A 0

Flange 3" 150 lb RF, ANSI B16.5/316L	D 1 2
Flange 3" 150 lb RF, ANSI B16.5/Hastelloy	D 1 3
Flange 3" 150 lb RF, ANSI B16.5/ECTFE ⁵⁾	D 1 4
Flange 3" 150 lb RF, ANSI B16.5/PFA ⁵⁾	D 1 5
Flange 3" 150 lb RF, ANSI B16.5/Enamelled ⁶⁾	D 1 6
Flange 3" 150 lb FF, ANSI B16.5/316L	D 1 7
Flange 3" 150 lb FF, ANSI B16.5/ECTFE ⁵⁾	D 1 8
Flange 3" 150 lb FF, ANSI B16.5/PFA ⁵⁾	D 2 0
Flange 3" 300 lb RF, ANSI B16.5/316L	D 2 1
Flange 3" 300 lb RF, ANSI B16.5/Hastelloy	D 2 2
Flange 3" 300 lb RF, ANSI B16.5/ECTFE ⁵⁾	D 2 3
Flange 3" 300 lb RF, ANSI B16.5/PFA ⁵⁾	D 2 4
Flange 3" 300 lb RF, ANSI B16.5/Enamelled ⁶⁾	D 2 5
Flange 3" 600 lb RF, ANSI B16.5/316L	D 2 6
Flange 3½" 150 lb RF, ANSI B16.5/316L	D 2 7
Flange 3½" 150 lb RF, ANSI B16.5/ECTFE ⁵⁾	D 2 8
Flange 4" 150 lb RF, ANSI B16.5/316L	D 3 0
Flange 4" 150 lb RF, ANSI B16.5/Hastelloy	D 3 1
Flange 4" 150 lb RF, ANSI B16.5/ECTFE ⁵⁾	D 3 2
Flange 4" 150 lb RF, ANSI B16.5/PFA ⁵⁾	D 3 3
Flange 4" 150 lb RF, ANSI B16.5/Enamelled ⁶⁾	D 3 4
Flange 4" 150 lb LT, ANSI B16.5/316L	D 3 5
Flange 4" 300 lb RF, ANSI B16.5/316L	D 3 6
Flange 4" 300 lb RF, ANSI B16.5/Hastelloy	D 3 7
Flange 4" 300 lb RF, ANSI B16.5/ECTFE ⁵⁾	D 3 8
Flange 4" 300 lb RJF, ANSI B16.5/316L	D 4 0
Flange 4" 300 lb LG, ANSI B16.5/316L	D 4 1
Flange 4" 300 lb LT, ANSI B16.5/316L	D 4 2
Flange 4" 600 lb RF, ANSI B16.5/316L	D 4 3
Flange 4" 600 lb RJF, ANSI B16.5/316L	D 4 4
Flange 6" 150 lb RF, ANSI B16.5/316L	D 4 5
Flange 6" 150 lb RF, ANSI B16.5/Hastelloy	D 4 6
Flange 6" 150 lb RF, ANSI B16.5/ECTFE ⁵⁾	D 4 7
Flange 6" 150 lb RF, ANSI B16.5/PFA ⁵⁾	D 4 8
Flange 6" 150 lb RJF, ANSI B16.5/316L	D 5 0
Flange 6" 300 lb RF, ANSI B16.5/316L	D 5 1
Flange 8" 150 lb RF, ANSI B16.5/316L	D 5 2
Flange 8" 150 lb RF, ANSI B16.5/ECTFE ⁵⁾	D 5 3
Flange 1" BS.10 Table E/316L	D 5 4
Flange 1" BS.10 Table E/PFA ⁵⁾	D 5 5
Flange 1½" BS.10 Table E/316L	D 5 6
Flange 3½" BS.10 Table E/316L	D 5 7
Flange 4" BS.10 Table E/ECTFE ⁵⁾	D 5 8
Flange DN40 10K, JIS/316L	D 6 0
Flange DN50 10K, JIS/316L	D 6 1
Flange DN80 10K, JIS/316L	D 6 2
Flange DN100 10K, JIS/316L	D 6 3

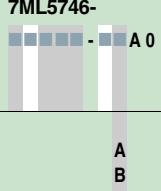
Adapter/Process temperature

Without adapter/-50 ... +150 °C (-58 ... +302 °F)	1
With adapter/-50 ... +200 °C (-58 ... +392 °F) ⁷⁾	2
With adapter/-50 ... +250 °C (-58 ... +482 °F)	3
With gas-tight leadthrough/-50 ... +150 °C (-58 ... +302 °F)	4
With gas-tight leadthrough/-50 ... +250 °C (-58 ... +482 °F)	5

Level measurement

Point level measurement – Vibrating switches

SITRANS LVL200

Selection and Ordering data	Order No.	Selection and Ordering data	Order code
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.	7ML5746- 	Further designs Please add "-Z" to Order No. and specify Order code(s).	
Housing/ Cable entry Aluminium IP66/IP67/M20x1.5 Aluminium IP66/IP67/½" NPT	A B	Cleaning including Certificate (oil, grease, and silicone free)	W01
1) Available with Approval options A ... G, and K, and Adapter/Process temperature options 1, and 3 ... 5 only 2) Available with Electronics option 4 only 3) Available with Adapter/Process temperature options 1 and 3 only 4) Available with Housing/Cable entry option B only 5) Available with Adapter/Process temperature options 1 and 4 only 6) Available with Adapter/Process temperature options 1, 2, and 4 only 7) Available with enamelled Process connection options only		Identification Label (measurement loop) SS: max. 16 characters add in plain text	Y17
		Identification Label (measurement loop) Foil: max. 16 characters add in plain text	Y18
		Acceptance test certificate 3.1 NACE MR 0775 for material EN10204	D07
		Acceptance test certificate 3.1 for instrument EN10204	C12
		Acceptance test Certificate 2.2 for material EN10204	C15
		SIL/IEC61508 Certificate of conformity (SIL-2 min. and max. detection)	C20
		Additional Operating Instructions <u>LVL200 (DPDT Relay)</u>	Order No.
		<ul style="list-style-type: none"> English 	7ML1998-5KR01
		<ul style="list-style-type: none"> French 	7ML1998-5KR11
		<ul style="list-style-type: none"> Spanish 	7ML1998-5KR21
		<ul style="list-style-type: none"> German 	7ML1998-5KR31
		<u>LVL200 (Contactless electronic switch)</u>	
		<ul style="list-style-type: none"> English 	7ML1998-5KQ01
		<ul style="list-style-type: none"> French 	7ML1998-5KQ11
		<ul style="list-style-type: none"> Spanish 	7ML1998-5KQ21
		<ul style="list-style-type: none"> German 	7ML1998-5KQ31
		<u>Electronics module LVL200 Relay</u>	
		<ul style="list-style-type: none"> English 	7ML1998-5LS01
		<ul style="list-style-type: none"> French 	7ML1998-5LS11
		<ul style="list-style-type: none"> Spanish 	7ML1998-5LS21
		<ul style="list-style-type: none"> German This device is shipped with the Siemens Milltronics manual CD containing the complete Operating Instructions library.	7ML1998-5LS31
		Spare Parts and Accessories	
		Electronics module SITRANS LVL200 Relay	7ML1830-1NC
		Electronics module SITRANS LVL200 Contactless	7ML1930-6AA
		<u>LVL200 Threaded Welded Socket</u>	
		<ul style="list-style-type: none"> G¾" A/316L with FKM Seal 	7ML1930-1EE
		<ul style="list-style-type: none"> G1" A/316L with FKM Seal 	7ML1930-1EF
		<ul style="list-style-type: none"> M27x1.5/316L with FKM Seal 	7ML1930-1EG
		<ul style="list-style-type: none"> G¾" A/316L with EPDM Seal 	7ML1930-1EH
		<ul style="list-style-type: none"> G1" A/316L with EPDM Seal 	7ML1930-1EJ
		<ul style="list-style-type: none"> M27x1.5/316L with EPDM Seal 	7ML1930-1EK

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.

7ML5747-

Electronics

Contactless electronic switch 20...250 V AC/DC
Double relay (DPDT) 20 ... 72 V DC/20 ... 250 V AC
NAMUR signal¹⁾

1
2
4

Approvals

Without approvals
Overfill protection (WHG)
ATEX II 1G, 1/2G, 2G EEx ia IIC T6 + WHG²⁾
ATEX II 1/2G, 2G EEx d IIC T6 + WHG³⁾⁴⁾
ATEX II 1G, 1/2G, 2G EEx ia IIC T6 + shipping approvals²⁾
ATEX II 1/2G, 2G EEx d IIC T6 + shipping approvals³⁾⁴⁾
ATEX II 1G, 1/2G, 2G EEx ia IIC T6 + ATEX II 1/2D IP6X T²⁾
IECEX Ex ia IIC T6²⁾
Shipping approvals
FM (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G²⁾⁵⁾
FM (XP) Class I, Div. 1, Groups A, B, C, D; (DIP) Class II, III, Div. 1, Groups E, F, G³⁾⁴⁾⁵⁾
FM (NI) Class I, Div. 2, Groups A, B, C, D⁵⁾
IECEX d IIC T6...T2 Ga/Gb⁴⁾
CSA(XP)CL I,II,III DIV 1,GP A B C D E F G...T2⁴⁾
Ga/Gb
CSA(NI)CL I,II,III, DIV 2,GP A B C D E F G
BR-Ex d IIC T6...T2

A
B
C
D
E
F
G
H
K
N
P
Q
R
S
T
U

Process connection

Thread G $\frac{3}{4}$ " A, PN64/316L A 0 0
Thread G $\frac{3}{4}$ " A, PN64/316L Ra < 0.8 µm A 0 1
Thread $\frac{3}{4}$ " NPT, PN64/316L A 0 2
Thread $\frac{3}{4}$ " NPT, PN64/316L Ra < 0.8 µm A 0 3
Thread $\frac{3}{4}$ " NPT, PN64/Monel A 0 4
Thread G $\frac{3}{4}$ " A, PN64/Hastelloy A 0 5
Thread $\frac{3}{4}$ " NPT, PN64/Hastelloy A 0 6
Thread G1" A, PN64/316L A 0 7
Thread G1" A, PN64/316L ECTFE coated MB1982⁶⁾ A 0 8
Thread G1" A, PN64/316L PFA coated⁶⁾ A 1 0
Thread G1" A, PN64/Monel A 1 1
Thread G1" A, PN64/316L Ra < 0.8 µm A 1 3
Thread 1" NPT, PN64/316L A 1 4
Thread 1" NPT, PN64/316L ECTFE coated MB1982⁶⁾ A 1 5
Thread 1" NPT, PN64/316L PFA coated⁶⁾ A 1 6
Thread 1" NPT, PN64/Monel A 1 7
Thread 1" NPT, PN64/316L Ra < 0.8 µm A 1 8
Thread G1" A, PN64/Hastelloy A 2 0
Thread G1 $\frac{1}{2}$ " A, PN64/316L A 2 1
Thread G1 $\frac{1}{2}$ " A, PN64/316L Ra < 0.8 µm A 2 2
Thread G1 $\frac{1}{2}$ " A, PN64/Hastelloy A 2 3
Thread 1" NPT, PN64/Hastelloy A 2 4
Thread 1 $\frac{1}{2}$ " NPT, PN64/316L A 2 5
Thread 1 $\frac{1}{2}$ " NPT, PN64/316L Ra < 0.8 µm A 2 6
Thread 1 $\frac{1}{2}$ " NPT, PN64/Hastelloy A 2 7
Thread G2" A, PN64/316L A 2 8
Thread M27x1.5 PN64/316L A 3 0
Cyl. socket/316Ti/1.4581 ECTFE coated ZB2984⁶⁾ A 3 1
Conus DN25 PN40/316L Ra < 0.3 µm A 3 2
Conus DN25 PN40/316L Ra < 0.8 µm A 3 3

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.

7ML5747-

Conus DN25 PN40/ECTFE (ZB3033)⁶⁾

A 3 4

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" PN16/316L 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

Tri-Clamp 1 $\frac{1}{2}$ " PN16/316L Ra < 0.3 µm

A 4 2

Tri-Clamp 1 $\frac{1}{2}$ " PN16/Hastelloy

A 4 3

Tri-Clamp 1 $\frac{1}{2}$ " PN16/316L Ra < 0.8 µm

A 4 4

Tri-Clamp 2" PN16/316L Ra < 0.3 µm

A 4 5

Tri-Clamp 2" PN16/Hastelloy

A 4 6

Tri-Clamp 2" PN16/316L Ra < 0.8 µm

A 4 7

Tri-Clamp 2 $\frac{1}{2}$ " PN10/316L Ra < 0.3 µm

A 4 8

Tri-Clamp 2 $\frac{1}{2}$ " PN10/316L Ra < 0.8 µm

A 5 0

Tri-Clamp 3" PN10/316L Ra < 0.3 µm

A 5 1

Tri-Clamp 3" PN10/316L Ra < 0.8 µm

A 5 2

Bolting DN32 PN40 DIN11851/316L Ra < 0.3 µm

A 5 3

Bolting DN32 PN40 DIN11851/316L Ra < 0.8 µm

A 5 4

Bolting DN25 PN40 DIN11851/316L Ra < 0.3 µm

A 5 5

Bolting DN25 PN40 DIN11851/316L Ra < 0.8 µm

A 5 6

Bolting DN40 PN40 DIN11851/316L Ra < 0.3 µm

A 5 7

Bolting DN40 PN40 DIN11851/316L Ra < 0.8 µm

A 5 8

Bolting DN40 PN40 DIN11864-1 A/316L

A 6 0

Ra < 0.8 µm ZB3052

Bolting DN50 PN25 DIN11851/316L Ra < 0.3 µm

A 6 1

Bolting DN50 PN25 DIN11851/316L Ra < 0.8 µm

A 6 2

Bolting DN50 PN25 DIN11864-1 A/316L

A 6 3

Ra < 0.8 µm ZB3052

Hygienic w.compr.nut F40 PN25/316L

A 6 4

Hygienic w.compr.nut F40 PN25/316L Ra < 0.3 µm

A 6 5

Hygienic w.compr.nut F40 PN25/316L Ra < 0.8 µm

A 6 6

Varivent N50-40/316L Ra < 0.3 µm

A 6 7

Varivent N50-40/316L Ra < 0.8 µm

A 6 8

Varivent N125/100/316L Ra < 0.8 µm

A 7 0

DRD flange PN40/316L ZB3007

A 7 1

SMS DN38/316L Ra < 0.8 µm⁶⁾

A 7 2

SMS DN51 PN6/316L Ra < 0.8 µm⁶⁾

A 7 3

Swagelok VCR screwing ZG2579 PN64/316L

A 7 4

Neumo biocontrol Gr.25 PN16/316L Ra < 0.8 µm

A 7 5

Neumo biocontrol Gr.50 PN16/316L Ra < 0.8 µm

A 7 6

Neumo biocontrol Gr.65 PN16/316L Ra < 0.8 µm

A 7 7

Neumo biocontrol Gr.80 PN16/316L Ra < 0.8 µm

A 7 8

SÜDMO DN50 PN10/316L Ra < 0.8 µm

A 8 0

Small flange DN25 PN1.5 DIN 28403/316L

A 8 1

pol.Ra < 0.8 µm

Small flange DN40 PN1.5 DIN 28403/316L

A 8 2

pol.Ra < 0.8 µm

Ingold connection PN16/316L Ra < 0.8 µm

A 8 3

Terminal DN33.7 PN40 DIN 11864-3-A-/316L BN2

A 8 4

Ra < 0.8 µm

Hygienic fl. DN50 PN16 DIN 11864-2-A-/316L

A 8 5

Ra < 0.8 µm

Flange DN25 PN6 Form C, DIN 2501/316L

A 8 6

Flange DN25 PN6 Form C, DIN 2501/PFA⁶⁾

A 8 7

Flange DN25 PN40 Form C, DIN 2501/316L

A 8 8

Flange DN25 PN40 Form C, DIN 2501/Hastelloy

B 0 0

Flange DN25 PN40 Form C, DIN 2501/ECTFE⁶⁾

B 0 1

Flange DN25 PN40 Form C, DIN 2501/PFA⁶⁾

B 0 2

Flange DN25 PN40 Form D, DIN 2501/316L

B 0 3

Level measurement

Point level measurement – Vibrating switches

SITRANS LVL200

Selection and Ordering data	Order No.	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.	7ML5747-	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.	7ML5747-
Flange DN25 PN40 Form F, DIN 2501/316L	B 04	Flange DN100 PN40 Form C, DIN 2501/316L	B 67
Flange DN25 PN40 Form N, DIN 2501/316L	B 05	Flange DN100 PN40 Form C, DIN 2501/ECTFE ⁶⁾	B 68
Flange DN25 PN40 Form N, DIN 2501/Hastelloy	B 06	Flange DN100 PN40 Form C, DIN 2501/PFA ⁶⁾	B 70
Flange DN25 PN40 Form N, DIN 2501/Monel solid	B 07	Flange DN100 PN40 Form C, DIN 2501/Enamelled ⁷⁾	B 71
Flange DN25 PN40 V13, DIN 2501/316L	B 08	Flange DN100 PN40 Form F, DIN 2501/316L	B 72
Flange DN32 PN40 Form C, DIN 2501/316L	B 10	Flange DN100 PN40 Form N, DIN 2501/316L	B 73
Flange DN32 PN40 Form C, DIN 2501/ECTFE ⁶⁾	B 11	Flange DN100 PN40 V13, DIN 2501/316L	B 74
Flange DN40 PN6 Form C, DIN 2501/316L	B 12	Flange DN100 PN64 Form E, DIN 2501/316L	B 75
Flange DN40 PN6 Form C, DIN 2501/ECTFE ⁶⁾	B 13	Flange DN100 PN100 Form E, DIN 2501/316L	B 76
Flange DN40 PN40 Form C, DIN 2501/316L	B 14	Flange DN100 PN100 Form L, DIN 2501/316L	B 77
Flange DN40 PN40 Form C, DIN 2501/Hastelloy	B 15	Flange DN125 PN16 Form F, DIN 2501/316L	B 78
Flange DN40 PN40 Form C, DIN 2501/ECTFE ⁶⁾	B 16	Flange DN125 PN40 Form C, DIN 2501/316L	B 80
Flange DN40 PN40 Form C, DIN 2501/PFA ⁶⁾	B 17	Flange DN125 PN40 Form N, DIN 2512/316L	B 81
Flange DN40 PN40 Form C, DIN 2501/Enamelled ⁷⁾	B 18	Flange DN150 PN16 Form C, DIN 2501/316L	B 82
Flange DN40 PN40 Form F, DIN 2501/316L	B 20	Flange DN150 PN16 Form C, DIN 2501/Hastelloy	B 83
Flange DN40 PN40 Form N, DIN 2501/316L	B 21	Flange DN150 PN16 Form C, DIN 2501/ECTFE ⁶⁾	B 84
Flange DN40 PN40 Form E, DIN 2501/316L	B 22	Flange DN150 PN16 Form C, DIN 2501/PFA ⁶⁾	B 85
Flange DN40 PN40 V13, DIN 2501/316L	B 23	Flange DN150 PN16 Form D, DIN 2501/316L	B 86
Flange DN50 PN40 Form C, DIN 2501/316L	B 24	Flange DN150 PN40 Form C, DIN 2501/316L	B 87
Flange DN50 PN40 Form C, DIN 2501/Hastelloy	B 25	Flange DN150 PN40 Form C, DIN 2501/Hastelloy	B 88
Flange DN50 PN40 Form C, DIN 2501/ECTFE ⁶⁾	B 26	Flange DN150 PN40 Form F, DIN 2501/316L	C 00
Flange DN50 PN40 Form C, DIN 2501/ECTFE (ZB3108) ⁶⁾	B 27	Flange DN150 PN40 Form N, DIN 2512/316L	C 01
Flange DN50 PN40 Form C, DIN 2501/PFA ⁶⁾	B 28	Flange DN200 PN10 Form C, DIN 2501/ECTFE ⁶⁾	C 02
Flange DN50 PN40 Form D, DIN 2501/316L	B 30	Flange DN200 PN16 Form C, DIN 2501/316L	C 03
Flange DN50 PN40 Form D, DIN 2501/Hastelloy	B 31	Flange DN25 PN40 Form B1, EN 1092-1/316L	C 04
Flange DN50 PN40 Form F, DIN 2501/316L	B 32	Flange DN25 PN40 Form B1, EN 1092-1/Hastelloy	C 05
Flange DN50 PN40 Form N, DIN 2501/316L	B 33	Flange DN25 PN40 Form B1, EN/316L/PFA ⁶⁾	C 06
Flange DN50 PN40 Form N, DIN 2501/Hastelloy	B 34	Flange DN25 PN40 Form B1, EN 1092-1/Enamelled ⁷⁾	C 07
Flange DN50 PN40 Form E, DIN 2501/316L	B 35	Flange DN25 PN40 Form B2, EN 1092-1/316L	C 08
Flange DN50 PN40 V13, DIN 2501/316L	B 36	Flange DN25 PN40 Form F, EN 1092-1/316L	C 10
Flange DN50 PN40 R13, DIN 2501/316L	B 37	Flange DN25 PN63 Form B1, EN 1092-1/316L	C 11
Flange DN50 PN64 Form F, DIN 2501/316L	B 38	Flange DN25 PN100 Form B2, EN 1092-1/316L	C 12
Flange DN50 PN64 Form N, DIN 2501/Hastelloy	B 40	Flange DN40 PN40 Form B1, EN/316L	C 13
Flange DN50 PN64 Form C, DIN 2501/316L	B 41	Flange DN40 PN40 Form B1, EN 1092-1/PFA ⁶⁾	C 14
Flange DN50 PN64 Form L, DIN 2501/316L	B 42	Flange DN40 PN40 Form B2, EN/316L	C 15
Flange DN50 PN100 Form E, DIN 2501/316L	B 43	Flange DN50 PN40 Form B1, EN/316L	C 16
Flange DN50 PN100 Form L, DIN 2501/316L	B 44	Flange DN50 PN40 Form B1, EN 1092-1/Hastelloy	C 17
Flange DN65 PN40 Form C, DIN 2501/316L	B 45	Flange DN50 PN40 Form B1, EN 1092-1/Monel ZB2977	C 18
Flange DN65 PN40 Form C, DIN 2501/Hastelloy	B 46	Flange DN50 PN40 Form B1, EN 1092-1/ECTFE ⁶⁾	C 20
Flange DN65 PN40 Form C, DIN 2501/ECTFE ⁶⁾	B 47	Flange DN50 PN40 Form B1, EN/316L/PFA ⁶⁾	C 21
Flange DN65 PN40 Form C, DIN 2501/PFA ⁶⁾	B 48	Flange DN50 PN40 Form B1, EN 1092-1/Enamelled ⁷⁾	C 22
Flange DN65 PN40 Form F, DIN 2501/316L	B 50	Flange DN50 PN40 Form C, EN 1092-1/316L	C 23
Flange DN65 PN64 Form E, DIN 2501/316L	B 51	Flange DN50 PN40 Form D, EN/316L	C 24
Flange DN80 PN40 Form C, DIN 2501/316L	B 52	Flange DN50 PN40 Form D, EN 1092-1/Hastelloy	C 25
Flange DN80 PN40 Form C, DIN 2501/Hastelloy	B 53	Flange DN50 PN40 Form B2, EN 1092-1/316L	C 26
Flange DN80 PN40 Form C, DIN 2501/ECTFE ⁶⁾	B 54	Flange DN50 PN40 Form E, EN 1092-1/316L	C 27
Flange DN80 PN40 Form C, DIN 2501/PFA ⁶⁾	B 55	Flange DN80 PN40 Form B1, EN 1092-1/316L	C 28
Flange DN80 PN40 Form F, DIN 2501/316L	B 56	Flange DN80 PN40 Form B1, EN 1092-1/Hastelloy	C 30
Flange DN80 PN40 Form N, DIN 2501/316L	B 57	Flange DN80 PN40 Form B1, EN 1092-1/ECTFE ⁶⁾	C 31
Flange DN80 PN40 Form N, DIN 2501/Hastelloy	B 58	Flange DN80 PN40 Form B1, EN 1092-1/Enamelled ⁷⁾	C 32
Flange DN100 PN16 Form C, DIN 2501/316L	B 60	Flange DN80 PN40 Form B2, EN 1092-1/316L	C 33
Flange DN100 PN16 Form C, DIN 2501/Hastelloy	B 61	Flange DN100 PN16 Form B1, EN 1092-1/316L	C 34
Flange DN100 PN16 Form C, DIN 2501/ECTFE ⁶⁾	B 62	Flange DN100 PN16 Form B1, EN 1092-1/Hastelloy	C 35
Flange DN100 PN16 Form C, DIN 2501/PFA ⁶⁾	B 63	Flange DN100 PN16 Form B1, EN 1092-1/Enamelled ⁷⁾	C 36
Flange DN100 PN16 Form D, DIN 2501/316L	B 64		
Flange DN100 PN16 Form F, DIN 2501/316L	B 65		
Flange DN100 PN16 Form N, DIN 2501/316L	B 66		

Level measurement

Point level measurement – Vibrating switches

SITRANS LVL200

Selection and Ordering data

Order No.

SITRANS LVL200, Rigid extension

7ML5747-

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.

Flange DN100 PN40 Form B1, EN 1092-1/316L	C 37
Flange DN100 PN40 Form B1, EN 1092-1/Enamelled ⁷⁾	C 38
Flange DN100 PN40 Form C, EN 1092-1/316L	C 40
Flange DN100 PN63 Form B2, EN 1092-1/316L	C 41
Flange DN150 PN16 Form B1, EN 1092-1/316L	C 42
Flange DN150 PN16 Form B1, EN 1092-1/PFA ⁶⁾	C 43
Flange DN150 PN40 Form B1, EN 1092-1/316L	C 44
Flange DN150 PN40 Form B1, EN 1092-1/ECTFE ⁶⁾	C 45
Flange DN150 PN40 Form B2, EN 1092-1/316L	C 46
Flange 1" 150 lb ANSI B16.5/316L	C 47
Flange 1" 150 lb RF, ANSI B16.5/Hastelloy	C 48
Flange 1" 150 lb RF, ANSI B16.5/Monel ZB2977	C 50
Flange 1" 150 lb RF, ANSI B16.5/ECTFE ⁶⁾	C 51
Flange 1" 150 lb RF, ANSI B16.5/PFA ⁶⁾	C 52
Flange 1" 150 lb RF, ANSI B16.5/Enamelled ⁷⁾	C 53
Flange 1" 300 lb RF, ANSI B16.5/316L	C 54
Flange 1" 300 lb RF, ANSI B16.5/ECTFE ⁶⁾	C 55
Flange 1" 600 lb RF, ANSI B16.5/316L	C 56
Flange 1½" 150 lb RF, ANSI B16.5/316L	C 57
Flange 1½" 150 lb RF, ANSI B16.5/Hastelloy	C 58
Flange 1½" 150 lb RF, ANSI B16.5/ECTFE ⁶⁾	C 60
Flange 1½" 150 lb RF, ANSI B16.5/PFA ⁶⁾	C 61
Flange 1½" 150 lb RF, ANSI B16.5 Enamelled ⁷⁾	C 62
Flange 1½" 150 lb FF, ANSI B16.5/ECTFE ⁶⁾	C 63
Flange 1½" 300 lb RF, ANSI B16.5/316L	C 64
Flange 1½" 300 lb RF, ANSI B16.5/Monel ZB2977	C 65
Flange 1½" 300 lb RF, ANSI B16.5/ECTFE ⁶⁾	C 66
Flange 1½" 600 lb RF, ANSI B16.5/316L	C 67
Flange 2" 150 lb RF, ANSI B16.5/316L	C 68
Flange 2" 150 lb RF, ANSI B16.5/Hastelloy	C 70
Flange 2" 150 lb RF, ANSI B16.5/Monel ZB2977	C 71
Flange 2" 150 lb RF, ANSI B16.5/ECTFE ⁶⁾	C 72
Flange 2" 150 lb RF, ANSI B16.5/PFA ⁶⁾	C 73
Flange 2" 150 lb RF, ANSI B16.5/Enamelled ⁷⁾	C 74
Flange 2" 150 lb FF, ANSI B16.5/316L	C 75
Flange 2" 150 lb FF, ANSI B16.5/ECTFE ⁶⁾	C 76
Flange 2" 150 lb SG (small groove), ANSI B16.5/316L	C 77
Flange 2" 300 lb RF, ANSI B16.5/316L	C 78
Flange 2" 300 lb RF, ANSI B16.5/Hastelloy	C 80
Flange 2" 300 lb RF, ANSI B16.5/Hastelloy	C 81
Flange 2" 300 lb RF, ANSI B16.5/ECTFE ⁶⁾	C 82
Flange 2" 300 lb RF, ANSI B16.5/PFA ⁶⁾	C 83
Flange 2" 300 lb RF, ANSI B16.5 Enamelled ⁷⁾	C 84
Flange 2" 300 lb RJF, ANSI B16.5/316L	C 85
Flange 2" 300 lb ST, ANSI B16.5/316L	C 86
Flange 2" 300 lb LG (large groove), ANSI B16.5/316L	C 87
Flange 2" 300 lb LT, ANSI B16.5/316L	C 88
Flange 2" 600 lb RF, ANSI B16.5/316L	D 00
Flange 2" 600 lb RF, ANSI B16.5/Monel ZB2977	D 01
Flange 2" 600 lb RF, ANSI B16.5/ECTFE ⁶⁾	D 02
Flange 2" 600 lb RJF, ANSI B16.5/316L	D 03
Flange 2" 600 lb LG, ANSI B16.5/316L	D 04
Flange 2" 900 lb RJF, ANSI B16.5/316L	D 05
Flange 2½" 150 lb RF, ANSI B16.5/316L	D 06
Flange 2½" 300 lb RF, ANSI B16.5/316L	D 07
Flange 3" 150 lb RF, ANSI B16.5/316L	D 08

Selection and Ordering data

Order No.

SITRANS LVL200, Rigid extension

7ML5747-

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.

Flange 3" 150 lb RF, ANSI B16.5/Hastelloy	D 10
Flange 3" 150 lb RF, ANSI B16.5/Monel ZB2977	D 11
Flange 3" 150 lb RF, ANSI B16.5/ECTFE ⁶⁾	D 12
Flange 3" 150 lb RF, ANSI B16.5/PFA ⁶⁾	D 13
Flange 3" 150 lb RF, ANSI B16.5/Enamelled ⁷⁾	D 14
Flange 3" 150 lb FF, ANSI B16.5/316L	D 15
Flange 3" 150 lb FF, ANSI B16.5/ECTFE ⁶⁾	D 16
Flange 3" 150 lb FF, ANSI B16.5/PFA ⁶⁾	D 17
Flange 3" 300 lb RF, ANSI B16.5/316L	D 18
Flange 3" 300 lb RF, ANSI B16.5/Hastelloy	D 20
Flange 3" 300 lb RF, ANSI B16.5/ECTFE ⁶⁾	D 21
Flange 3" 300 lb RF, ANSI B16.5/PFA ⁶⁾	D 22
Flange 3" 300 lb RF, ANSI B16.5/Enamelled ⁷⁾	D 23
Flange 3" 600 lb RF, ANSI B16.5/316L	D 24
Flange 3½" 150 lb RF, ANSI B16.5/316L	D 25
Flange 3½" 150 lb RF, ANSI B16.5/ECTFE ⁶⁾	D 26
Flange 4" 150 lb RF, ANSI B16.5/316L	D 27
Flange 4" 150 lb RF, ANSI B16.5/Hastelloy	D 28
Flange 4" 150 lb RF, ANSI B16.5/ECTFE ⁶⁾	D 30
Flange 4" 150 lb RF, ANSI B16.5/PFA ⁶⁾	D 31
Flange 4" 150 lb RF, ANSI B16.5/Enamelled ⁷⁾	D 32
Flange 4" 150 lb LT, ANSI B16.5/316L	D 33
Flange 4" 300 lb RF, ANSI B16.5/316L	D 34
Flange 4" 300 lb RF, ANSI B16.5/Hastelloy	D 35
Flange 4" 300 lb RF, ANSI B16.5/ECTFE ⁶⁾	D 36
Flange 4" 300 lb RJF, ANSI B16.5/316L	D 37
Flange 4" 300 lb LG, ANSI B16.5/316L	D 38
Flange 4" 300 lb LT, ANSI B16.5/316L	D 40
Flange 4" 600 lb RF, ANSI B16.5/316L	D 41
Flange 4" 600 lb RJF, ANSI B16.5/316L	D 42
Flange 5" 150 lb RF, ANSI B16.5/316L	D 43
Flange 6" 150 lb RF, ANSI B16.5/316L	D 44
Flange 6" 150 lb RF, ANSI B16.5/Hastelloy	D 45
Flange 6" 150 lb RF, ANSI B16.5/ECTFE ⁶⁾	D 46
Flange 6" 150 lb RF, ANSI B16.5/PFA ⁶⁾	D 47
Flange 6" 150 lb RJF, ANSI B16.5/316L	D 48
Flange 6" 300 lb RF, ANSI B16.5/316L	D 50
Flange 8" 150 lb RF, ANSI B16.5/316L	D 51
Flange 8" 150 lb RF, ANSI B16.5/ECTFE ⁶⁾	D 52
Flange 1" BS.10 Table E/316L	D 53
Flange 1" BS.10 Table E/PFA ⁶⁾	D 54
Flange 1½" BS.10 Table E/316L	D 55
Flange 3½" BS.10 Table E/316L	D 56
Flange 4" BS.10 Table E/ECTFE ⁶⁾	D 57
Flange DN40 10K, JIS/316L	D 58
Flange DN50 10K, JIS/316L	D 60
Flange DN80 10K, JIS/316L	D 61
Flange DN100 10K, JIS/316L	D 62

Level measurement

Point level measurement – Vibrating switches

SITRANS LVL200

Selection and Ordering data	Order No.	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.	7ML5747-	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.	7ML5747-
Adapter/Process temperature		Rigid Extension Enamelled version⁷⁾	
Without adapter/-50 ... +150 °C	1	80 ... 250 mm	F 0
With adapter/-50 ... +200 °C ⁸⁾	2	251 ... 500 mm	F 1
With adapter/-50... +250 °C	3	501 ... 750 mm	F 2
With gas-tight leadthrough/-50 ... +150 °C	4	751 ... 1 000 mm	F 3
With gas-tight leadthrough/-50 ... +250 °C	5	1 001 ... 1 250 mm	F 4
Housing/ Cable entry		1 251 ... 1 500 mm	F 5
Aluminium IP66/IP67/M20x1.5	A	Rigid Extension Hastelloy	
Aluminium IP66/IP67/½" NPT	B	80 ... 500 mm	G 0
NOTE:		501 ... 1 000 mm	G 1
When selecting a Rigid Extension option, extension coating must match the process connection coating and the material and surface roughness type.		1 001 ... 1 500 mm	G 2
Rigid Extension 316L		1 501 ... 2 000 mm	G 3
80 ... 500 mm	A 0	2 001 ... 2 500 mm	G 4
501 ... 1 000 mm	A 1	2 501 ... 3 000 mm	G 5
1001 ... 1 500 mm	A 2	3 001 ... 3 500 mm	G 6
1501 ... 2 000 mm	A 3	3 501 ... 4 000 mm	G 7
2001 ... 2 500 mm	A 4	Rigid Extension Monel	
2501 ... 3 000 mm	A 5	80 ... 500 mm	H 0
3001 ... 3 500 mm	A 6	501 ... 1 000 mm	H 1
3501 ... 4 000 mm	A 7	1 001 ... 1 500 mm	H 2
Rigid Extension ECTFE coated⁶⁾		1 501 ... 2 000 mm	H 3
80 ... 500 mm	B 0	2 001 ... 2 500 mm	H 4
501 ... 1 000 mm	B 1	2 501 ... 3 000 mm	H 5
1 001 ... 1 500 mm	B 2	Rigid Extension PFA coated⁶⁾	
1 501 ... 2 000 mm	B 3	80 ... 500 mm	C 0
2 001 ... 2 500 mm	B 4	501 ... 1 000 mm	C 1
2 501 ... 3 000 mm	B 5	1 001 ... 1 500 mm	C 2
Rigid Extension PFA coated⁶⁾		1 501 ... 2 000 mm	C 3
80 ... 500 mm	C 0	2 001 ... 2 500 mm	C 4
501 ... 1 000 mm	C 1	2 501 ... 3 000 mm	C 5
1 001 ... 1 500 mm	C 2	Rigid Extension 316L Ra ≤ 0.8 µm	
1 501 ... 2 000 mm	C 3	80 ... 500 mm	D 0
2 001 ... 2 500 mm	C 4	501 ... 1 000 mm	D 1
2 501 ... 3 000 mm	C 5	1 001 ... 1 500 mm	D 2
Rigid Extension 316L Ra ≤ 0.3 µm		1 501 ... 2 000 mm	D 3
80 ... 500 mm	D 0	2 001 ... 2 500 mm	D 4
501 ... 1 000 mm	D 1	2 501 ... 3 000 mm	D 5
1 001 ... 1 500 mm	D 2	3 001 ... 3 500 mm	D 6
1 501 ... 2 000 mm	D 3	3 501 ... 4 000 mm	D 7
2 001 ... 2 500 mm	D 4	Rigid Extension 316L Ra ≤ 0.3 µm	
2 501 ... 3 000 mm	D 5	80 ... 500 mm	E 0
3 001 ... 3 500 mm	D 6	501 ... 1 000 mm	E 1
3 501 ... 4 000 mm	D 7	1 001 ... 1 500 mm	E 2
Rigid Extension 316L Ra ≤ 0.3 µm		1 501 ... 2 000 mm	E 3
80 ... 500 mm	E 0	2 001 ... 2 500 mm	E 4
501 ... 1 000 mm	E 1	2 501 ... 3 000 mm	E 5
1 001 ... 1 500 mm	E 2	3 001 ... 3 500 mm	E 6
1 501 ... 2 000 mm	E 3	3 501 ... 4 000 mm	E 7
2 001 ... 2 500 mm	E 4		
2 501 ... 3 000 mm	E 5		
3 001 ... 3 500 mm	E 6		
3 501 ... 4 000 mm	E 7		

- 1) Available with Approval options A ... G, and K, and Adapter/Process temperature options 1, and 3 ... 5 only
- 2) Available with Electronics option 4 only
- 3) Available with Adapter/Process temperature options 1 and 3 only
- 4) Extension length restricted to 2 956 mm
- 5) Available with Housing/Cable entry option B only
- 6) Available with Adapter/Process temperature options 1 and 4 only
- 7) Available with Adapter/Process temperature options 1, 2, and 4 only
- 8) Available with enamelled Process connection and Extension options only

Level measurement

Point level measurement – Vibrating switches

SITRANS LVL200

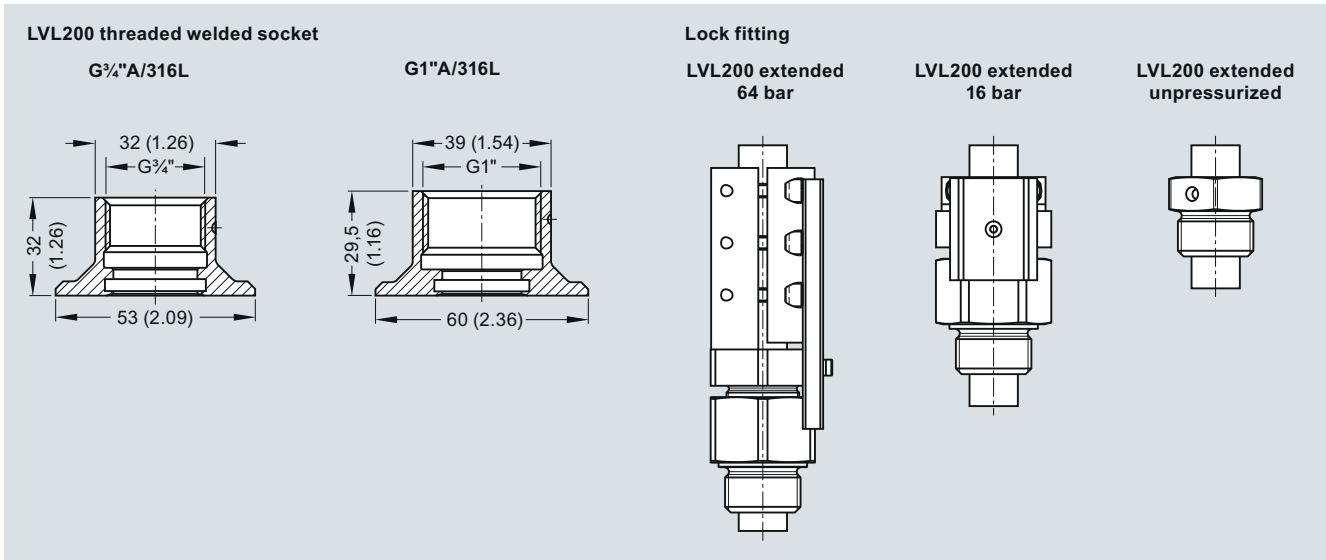
Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Order No. and specify Order code(s).	
Cleaning including Certificate (oil, grease and silicone free)	W01
Enter the total insertion length in plain text description, max. 4 000 mm (157.48 inch)	Y01
Identification Label (measurement loop) SS: max. 16 characters add in plain text	Y17
Identification Label (measurement loop) Foil: max. 16 characters add in plain text	Y18
Acceptance test certificate 3.1 NACE MR 0775 for material EN10204	D07
Acceptance test certificate 3.1 for instrument EN10204	C12
Acceptance test Certificate 2.2 for material EN10204	C15
SIL/IEC61508 Certificate of conformity (SIL-2/3 min. and max. detection)	C20
Additional Operating Instructions	
<u>LVL200 Extended (DPDT Relay)</u>	
• English	7ML1998-5KW01
• French	7ML1998-5KW11
• Spanish	7ML1998-5KW21
• German	7ML1998-5KW31
<u>LVL200 (Contactless electronic switch)</u>	
• English	7ML1998-5KV01
• French	7ML1998-5KV11
• Spanish	7ML1998-5KV21
• German	7ML1998-5KV31
<u>Electronics module LVL200 Relay</u>	
• English	7ML1998-5LS01
• French	7ML1998-5LS11
• Spanish	7ML1998-5LS21
• German	7ML1998-5LS31
This device is shipped with the Siemens Milltronics manual CD containing the complete Operating Instructions library.	
Spare Parts and Accessories	
Electronics module SITRANS LVL200 Relay	7ML1830-1NC
Electronics module SITRANS LVL200 Contactless	7ML1930-6AA
Lock fitting, unpressurized, G1A/316L	7ML1930-1DQ
Lock fitting, unpressurized, 1NPT/316L	7ML1930-1DR
Lock fitting, unpressurized, G1-1/2A/316L	7ML1930-1DS
Lock fitting, unpressurized, 1-1/2NPT/316LL	7ML1930-1DT
Lock fitting, -1... 16 bar, G1A/316L	7ML1930-1DU
Lock fitting, -1... 16 bar, 1NPT/316L	7ML1930-1DV
Lock fitting, -1... 16 bar, G1-1/2A/316L	7ML1930-1DW
Lock fitting, -1... 16 bar, 1-1/2NPT/316L	7ML1930-1DX
Lock fitting, -1... 64 bar, G1A/316L	7ML1930-1EA
Lock fitting, -1... 64 bar, 1NPT/316L	7ML1930-1EB
Lock fitting, -1... 64 bar, G1-1/2A/316L	7ML1930-1EC
Lock fitting, -1... 64 bar, 1-1/2NPT/316L	7ML1930-1ED

Level measurement

Point level measurement – Vibrating switches

SITRANS LVL200

Options



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

Level measurement

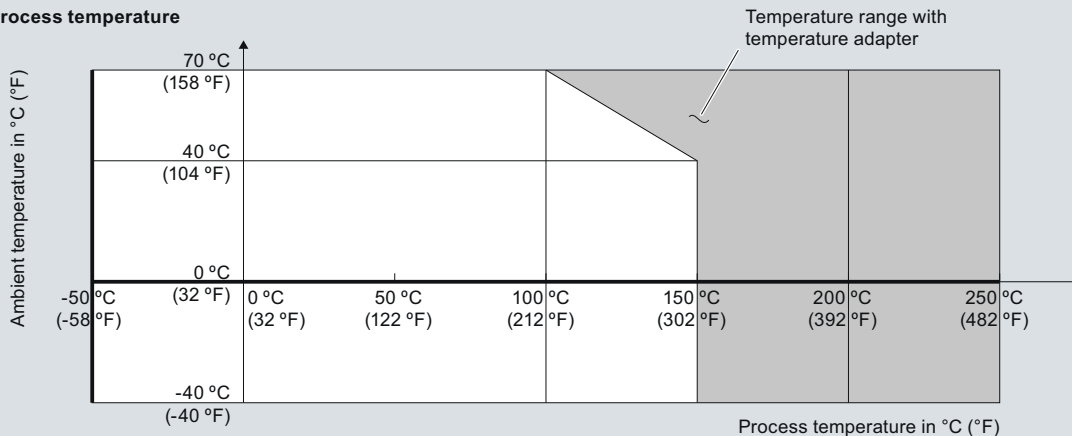
Point level measurement – Vibrating switches

SITRANS LVL200

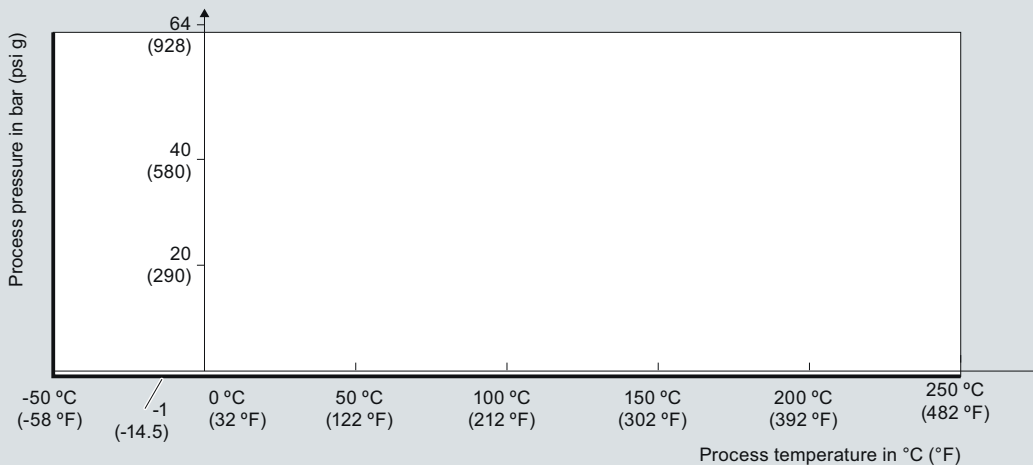
Characteristic curves

4

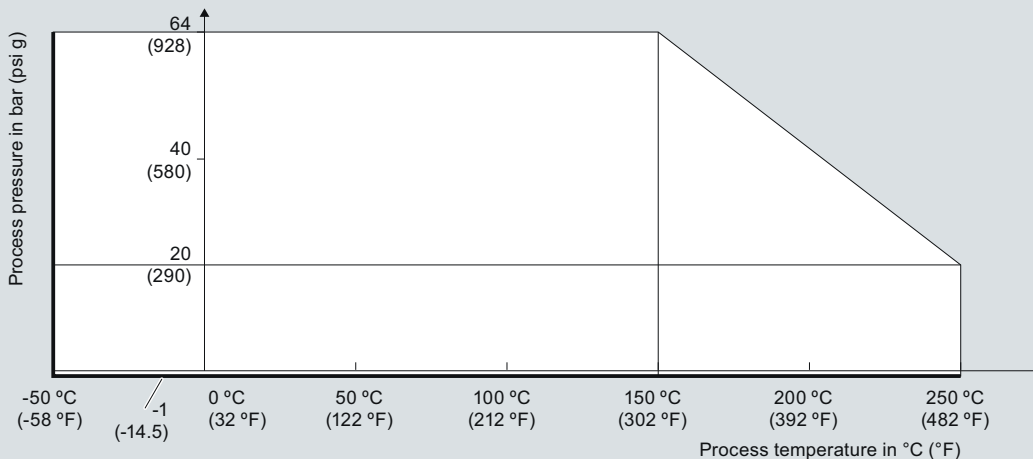
Ambient/Process temperature



Process pressure with switch position 0.7 g/cm³ (mode switch)



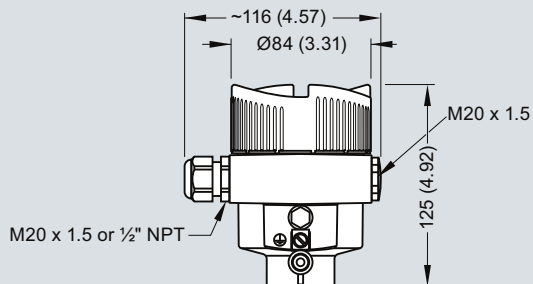
Process pressure with switch position 0.5 g/cm³ (mode switch)



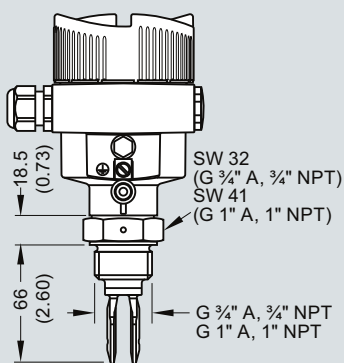
SITRANS LVL200 Process Pressure/Process Temperature/Ambient Temperature derating curves

Dimensional drawings

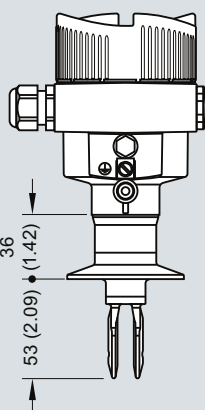
SITRANS LVL200 (Standard)



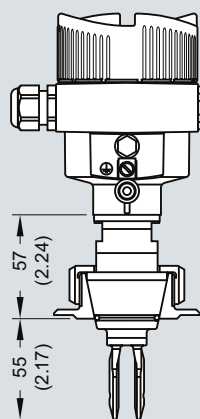
Threaded



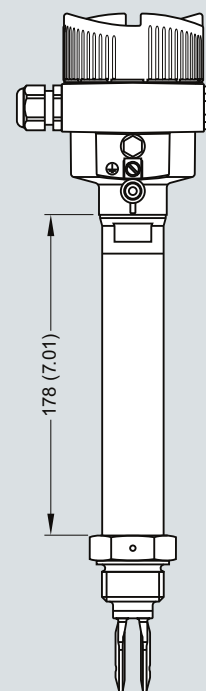
Tri-Clamp



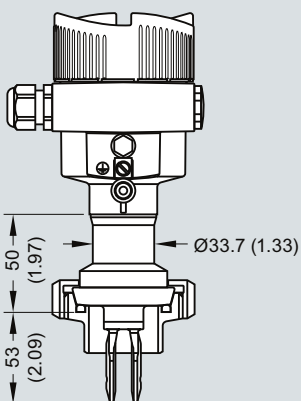
Cone DN25



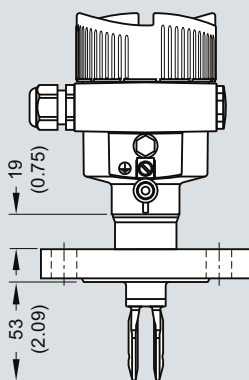
Temperature adapter



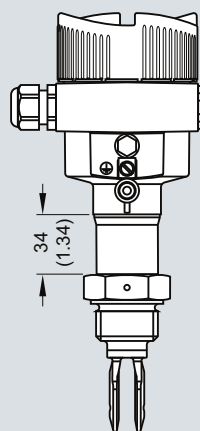
Bolting DN40



Flange



Gas-tight leadthrough



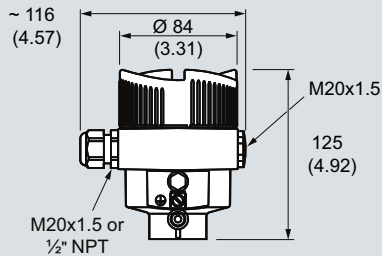
SITRANS LVL200 (Standard), dimensions in mm (inch)

Level measurement

Point level measurement – Vibrating switches

SITRANS LVL200

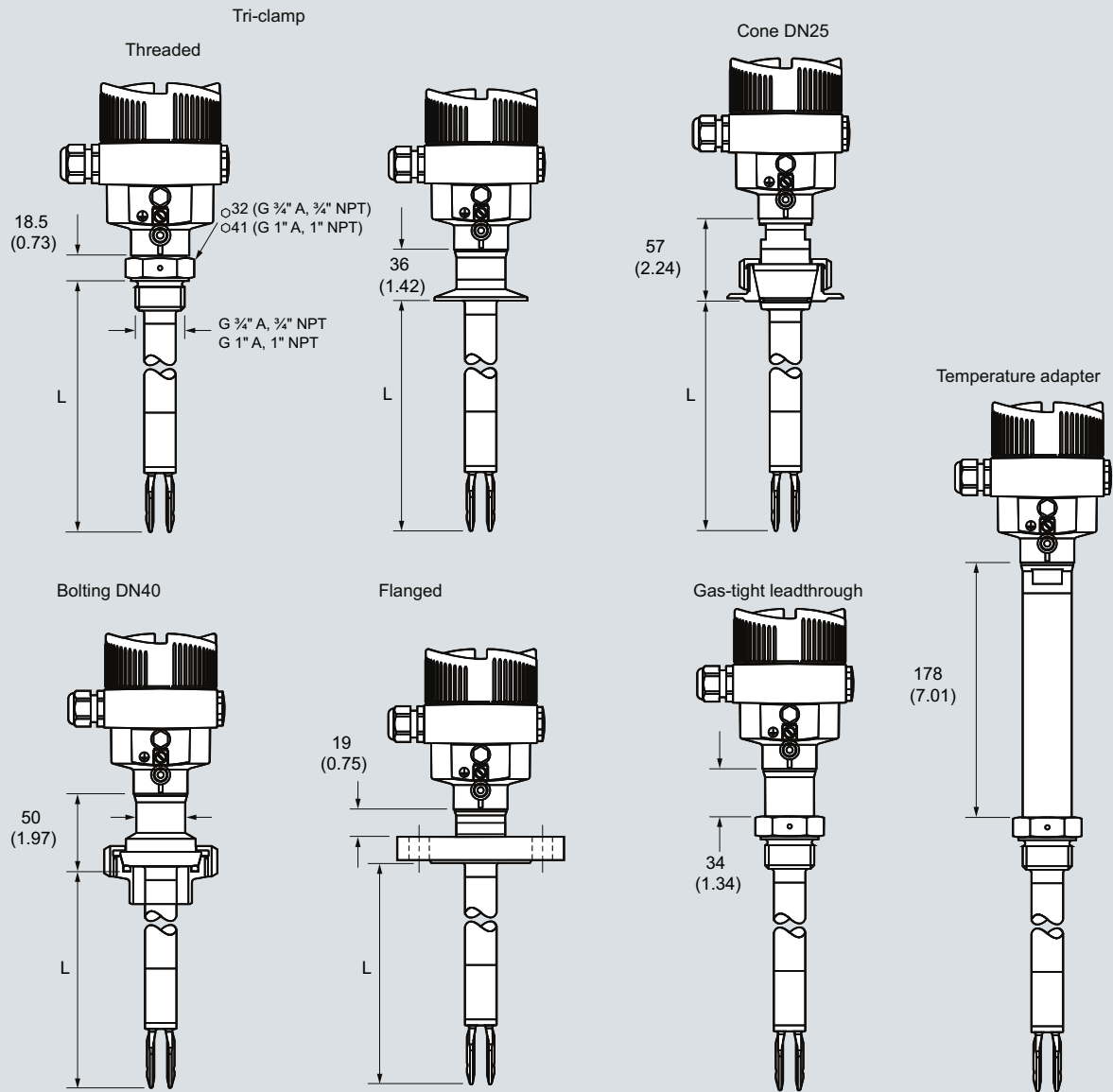
SITRANS LVL200 (Extended)



Sensor length (L)

316L, Hastelloy C4 (2.4610)	80 ... 6 000 (3.15 ... 236.2)
Hastelloy C4 (2.4610) enamelled	80 ... 1 500 (3.15 ... 59.06)
316L, ECTFE coated	80 ... 3 000 (3.15 ... 118.1)
316L, PFA coated	80 ... 3 000 (3.15 ... 118.1)

4



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

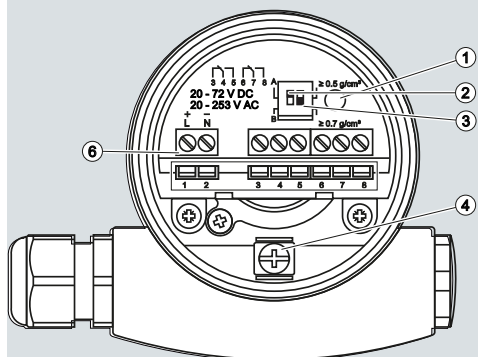
Level measurement

Point level measurement – Vibrating switches

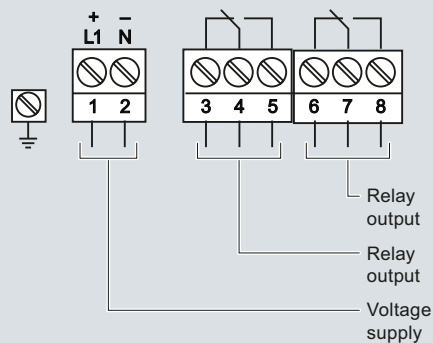
SITRANS LVL200

Schematics

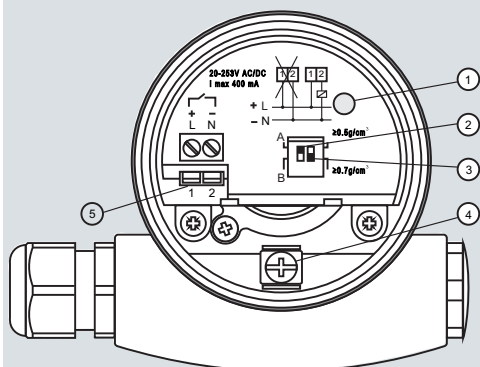
Relay (DPDT)



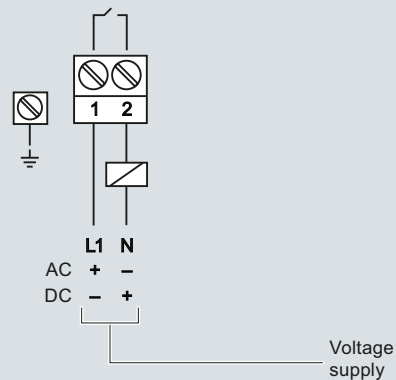
- | | |
|---|---|
| ① | Control lamp |
| ② | DIL switch for characteristics reversal |
| ③ | DIL switch for sensitivity adjustment |
| ④ | Ground terminal |
| ⑤ | Connection terminals |



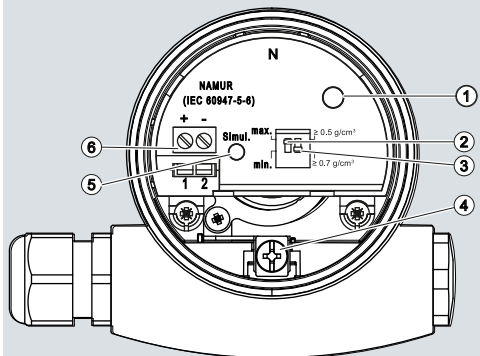
Contactless



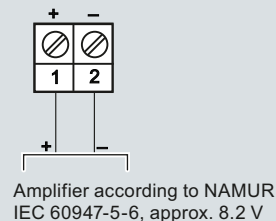
- | | |
|---|---|
| ① | Control lamp |
| ② | DIL switch for mode adjustment |
| ③ | DIL switch for switching point adaptation |
| ④ | Ground terminal |
| ⑤ | Connection terminals |



NAMUR



- | | |
|---|---|
| ① | Control lamp |
| ② | DIL switch for characteristics reversal |
| ③ | DIL switch for sensitivity adjustment |
| ④ | Ground terminal |
| ⑤ | Simulation key |
| ⑥ | Connection terminals |



SITRANS LVL200 connections

4

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
- Sliding sleeve options for adjustable insertion length and ease of cleaning
- 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/ft³)
- Customer desired extensions up to 2 000 mm (78.74 inch)

Application

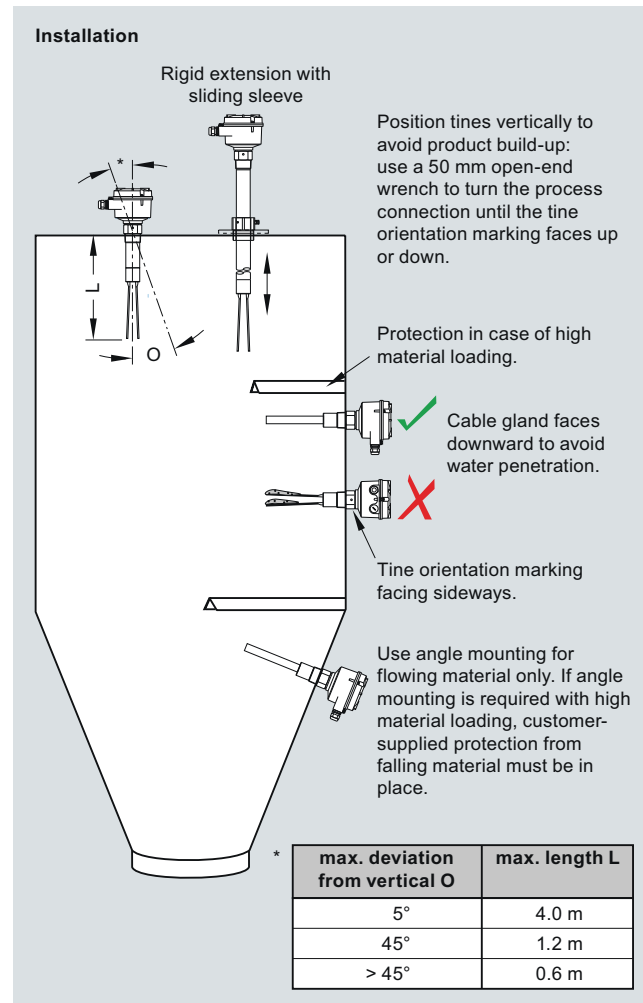
SITRANS LVS100 detects high, low or demand levels of dry bulk solids in bins, silos or hoppers.

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, dimensions in mm (inch)

Level measurement

Point level measurement – Vibrating switches

SITRANS LVS100

Technical specifications

Mode of Operation	
Measuring principle	Vibrating point level switch
Input	
Measured variable	High, low and demand
Measuring frequency	200 Hz
Output	
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
Sensitivity	
	High or low, switch selectable
Rated operating conditions	
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 ³)

Design

Material	Epoxy coated aluminum
• Enclosure	• Thread 1/4" NPT [(Taper), ANSI/ASME B1.20.1], R 1/2" [(BSPT), EN 10226]
Process connection	• Thread R 1/2" [(BSPT), EN 10226], 1/2" NPT [(Taper), ANSI/ASME B1.20.1], sliding sleeve [min. length 500 mm (19.69 inch)] • Thread material: stainless steel 304 (1.4301) or 316Ti (1.4571) depending on configuration
Tine material	Stainless steel 316Ti (1.4571)
Degree of protection	IP66/Type 4/NEMA 4
Conduit entry	2 x M20x1.5 or 2 x 1/2" NPT
Weight	Standard version, no extensions: approx 1.7 kg (3.7 lb)
Power supply	
	• 19 ... 230 V AC, +10 %, 50 ... 60 Hz, 8 VA • 19 ... 50 V DC, +10 %, 1.5 W
Certificates and approvals	
	• CSA/FM General Purpose • CE • CSA/FM Dust Ignition Proof • C-TICK • ATEX II 1/2 D • IECex

Level measurement

Point level measurement – Vibrating switches

SITRANS LVS100

Selection and Ordering data

SITRANS LVS100, standard

Vibrating point level switch for high or low level detection of bulk solids. Sensitivity > 60 g/l.

Input Voltage

DPDT Relay - 19 ... 230 V AC, 19 ... 50 V DC
DPDT Relay - 19 ... 230 V AC, 19 ... 55 V DC¹⁾

Process temperature

Up to 150 °C (302 °F)

Process connection

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 inch)

1½" NPT [(Taper), ANSI/ASME B1.20.1], sliding sleeve [min. length 500 mm (19.69 inch)]

Extension length

Stainless steel 316TI (1.4571)

Standard length, 170 mm (6.69 inch)

Add order code Y01 and plain text:

"Insertion length ... mm"

Stainless steel 304 (1.4301)

• 300 ... 500 mm (11.81 ... 19.69 inch)

• 501 ... 1 000 mm (19.72 ... 39.37 inch)

• 1 001 ... 1 500 mm (39.41 ... 59.06 inch)

• 1 501 ... 2 000 mm (59.09 ... 78.74 inch)

Approvals

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

IEC-Ex t IIIC Da/Db

¹⁾ Only available with the following configurations 7ML5735-2AA11-0AA0 or 7ML5735-2AB11-0AA0

Order No.

7ML5735-

■ ■ ■ ■ ■ - 0 ■ A 0

1

2

A

A

B

C

D

1 1

1 2

1 3

1 4

1 5

A

B

C

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. (50 mm increments)

Signal bulb inserted in M20 cable gland

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 LVS100 DPDT Relay (19 ... 253 V AC, 19 ... 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 inch)]

Order code

Y01

A20

Order No.

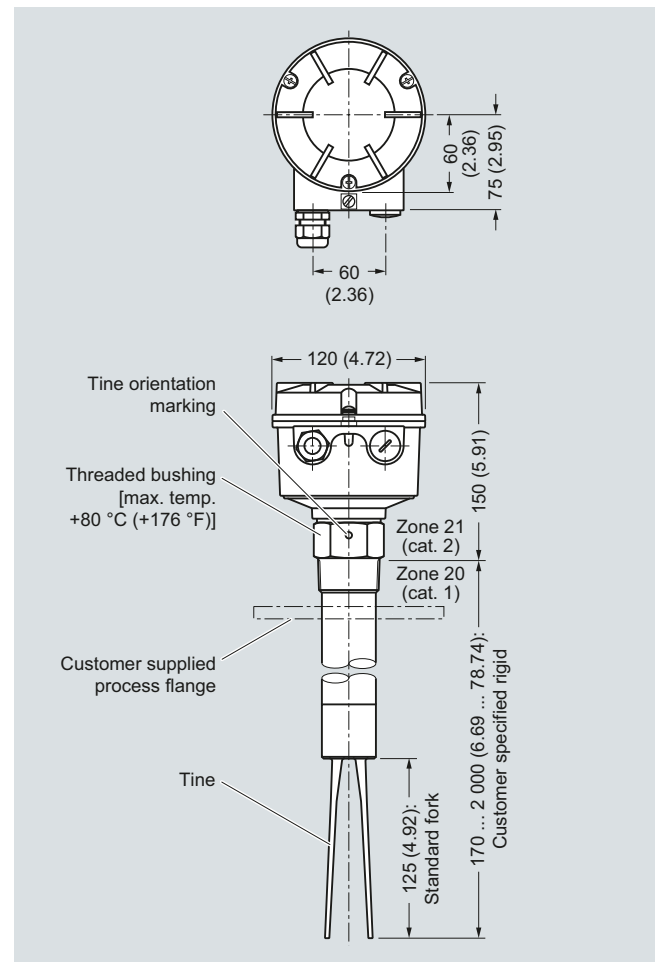
7ML1998-5FT63

7ML1830-1NS

7ML1830-1NT

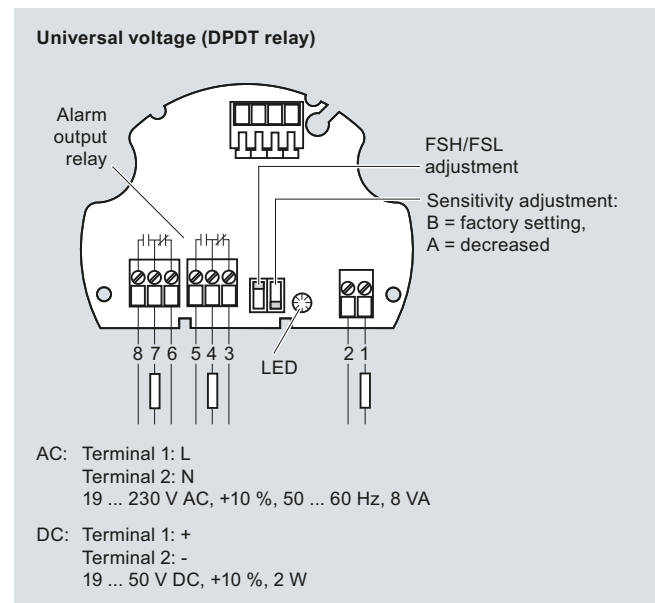
7ML1830-1NU

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 for convenient wiring
- Suitable for low density material: standard version, 20 g/l (1.3 lb/ft³); liquid/solid interface version, 50 g/l (3 lb/ft³) and low density option min. 5 g/l (0.3 lb/ft³)
- Customer desired extensions up to 20 000 mm (787 inch)
- Optional detection of solids within liquid
- Durable short fork option with 165 mm (6.5 inch) 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 ... 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)

Level measurement

Point level measurement – Vibrating switches

SITRANS LVS200

Technical specifications

Mode of operation		Medium conditions	
Measuring principle	Vibrating point level switch	• Process temperature	• All except CSA Class II, Group G: -40 ... +150 °C (-40 ... +302 °F)
Input		• Max. threaded bushing temperature	• CSA Class II, Group G: -40 ... +140 °C (-40 ... +284 °F), CSA temperature code T3B
Measured variable	High, low and demand	• Max. enclosure surface temperature (Category 2D)	80 °C (176 °F)
Measuring frequency	125 Hz	• Max. extension surface temperature (Category 1D)	90 °C (194 °F)
• Standard	350 Hz	• Pressure (vessel)	150 °C (302 °F)
• Liquid/solid interface and short fork version		• Minimum material density	Max. 10 bar g (145 psi g) European Pressure Directive 97/23/EC: Category 1
Output			• Standard version: approx. 20 g/l (1.2 lb/ft ³)
PNP	Open collector: Permanent load max. 0.4 A, short-circuit and overload protected Turn-on voltage: max. 50 V (reverse protection)		• Liquid/solid interface version: approx. 50 g/l (3 lb/ft ³)
2-wire without contact	Load current: • min. 10 mA • max. 500 mA permanent • max. 2A < 200 ms • max. 5A < 50 ms		• Optional low density version: approx. 5 g/l (0.3 lb/ft ³)
	Voltage drop on the electronic module: max. 7 V with closed electric circuit	Design	
	Cutoff current with open electric circuit: max. 5 mA	Material	Epoxy coated aluminum
Relays	SPDT relay DPDT relay	• Enclosure	• Thread 1½" NPT [(Taper), ANSI/ASME B1.20.1], R ½" [(BSPT), EN 10226] and flange options
• Version with 1 relay	• From loss of vibration: approximately 1 second	Process connection	• Optional sliding bushing with 2" NPT [(Taper), ANSI/ASME B1.20.1] or BSP thread
• Version with 2 relays	• From resumption of vibration: approximately 1 ... 2 seconds		• Thread material: stainless steel 303 (1.4301)
Relay delay	• Probe uncovered to covered: approximately 1 second	Tine material	Stainless steel 316Ti (1.4571), PTFE-coated tines are available upon special request
	• Probe covered to uncovered: approximately 1 ... 2 seconds	Degree of protection	IP65/Type 4/NEMA 4
Signal delay	High or low, switch selectable	Conduit entry	2 x M20x1.5 or 2 x ½" NPT
Relay fail-safe	• Relay 8 A at 250 V AC, non-inductive	Weight	• Standard version, no extensions: approx. 2.0 kg (4.4 lb)
Alarm output	• Relay 5 A at 30 V DC, non-inductive		• Solids/liquids version, no extensions: approx. 1.9 kg (4.2 lb)
mA output	8/16 mA or 4 ... 20 mA	Power supply	• 19 ... 230 V AC, +10 %, 50 ... 60 Hz, 8 VA
• Resolution	4 ... 20 mA ± 0.1 mA		• 19 ... 55 V DC, +10 %, 1.5 W
Sensitivity	High or low, switch selectable	Certificates and approvals	• CSA/FM General Purpose
Rated operating conditions			• CE
Installation conditions	Indoor/outdoor		• CSA/FM Dust Ignition Proof
• Location			• C-TICK
Ambient conditions			• ATEX II 1/2 D
• Ambient temperature	-40 ... +60 °C (-40 ... +140 °F)		• 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, available only with power supply option 5 and 6
• Installation category	III		• ATEX II 1G and 1/2 G Eex ia IIC; ATEX II 1D and 1/2 D, available only with power supply option 5
• Pollution degree	2		

Level measurement

Point level measurement – Vibrating switches

SITRANS LVS200

Selection and Ordering data	Order No.	Selection and Ordering data	Order No.
SITRANS LVS200, standard SITRANS LVS200 is a vibrating point level switch for high, low, or demand level detection of bulk solids.	7ML5731- ■■■■■ - ■■ A 0	SITRANS LVS200, standard SITRANS LVS200 is a vibrating point level switch for high, low, or demand level detection of bulk solids.	7ML5731- ■■■■■ - ■■ A 0
Power supply		<u>Stainless Steel 316TI (1.4571)</u> Standard length, 235 mm (9.25 inch) ⁹⁾	3 1
19 ... 230 V AC, 19 ... 55 V DC, one relay output (SPDT) ¹⁾	1	<u>Add order code Y01 and plain text:</u> <u>"Insertion length ... mm"</u>	
19 ... 230 V AC, 19 ... 55 V DC, two relay outputs (DPDT) ¹⁾	2	300 ... 500 mm (11.81 ... 19.69 inch) ⁹⁾	3 2
18 ... 50 V DC PNP ¹⁾	3	501 ... 750 mm (19.72 ... 29.53 inch) ⁹⁾	3 3
	4	751 ... 1 000 mm (29.57 ... 39.37 inch) ⁹⁾	3 4
19 ... 230 V AC/DC without contact, 2-wire loop powered ¹⁾	4	1 001 ... 1 250 mm (39.41 ... 49.21 inch) ⁹⁾	3 5
7 ... 9 V DC (requires NAMUR switch amplifier) NAMUR IEC 60947-5-6, 2-wire ²⁾	5	1 251 ... 1 500 mm (49.25 ... 59.06 inch) ⁹⁾	3 6
8/16 mA or 4 ... 20 mA; 12.5 ... 35 V DC, 2-wire ³⁾	6	1 501 ... 1 750 mm (59.09 ... 68.90 inch) ⁹⁾	3 7
19 ... 230 V AC, 19 ... 55 V DC, one relay output (SPDT) basic version ^{4) 5)}	7	1 751 ... 2 000 mm (68.94 ... 78.74 inch) ⁹⁾	3 8
Process temperature		2 001 ... 2 250 mm (78.78 ... 88.58 inch) ⁹⁾	4 1
Without temperature isolator	A	2 251 ... 2 500 mm (88.62 ... 98.43 inch) ⁹⁾	4 2
With temperature isolator	B	2 501 ... 2 750 mm (98.46 ... 108.27 inch) ⁹⁾	4 3
Separated enclosure - cable length 1.5 m (4.92 ft) [max. temperature process 150 °C (302 °F)/ max. temperature electronics 80 °C (176 °F)]	C	2 751 ... 3 000 mm (108.31 ... 118.11 inch) ⁹⁾	4 4
Separated enclosure - cable length 4.0 m (13.12 ft) [max. temperature process 150 °C (302 °F)/ max. temperature electronics 80 °C (176 °F)]	D	3 001 ... 3 250 mm (118.15 ... 127.95 inch) ⁹⁾	4 5
		3 251 ... 3 500 mm (127.99 ... 137.80 inch) ⁹⁾	4 6
		3 501 ... 3 750 mm (137.83 ... 147.64 inch) ⁹⁾	4 7
		3 751 ... 4 000 mm (147.68 ... 157.48 inch) ⁹⁾	4 8
Process connection		Material process connection/extension	
<u>Threaded</u>		Stainless steel 304 (1.4301)	1
R 1½" [(BSPT), EN 10226]	A	Stainless steel 316 TI (1.4571)	2
1½" NPT [(Taper), ANSI/ASME B1.20.1]	B		
G 2" [(BSPP), EN ISO 228-1], sliding sleeve [min. length 500 mm (19.69 inch)] ⁶⁾	C	Approvals	
2" NPT [(Taper), ANSI/ASME B1.20.1], sliding sleeve [min. length 500 mm (19.69 inch)] ⁶⁾	D	CSA/FM Dust Ignition Proof, C-TICK	A
<u>Flanged</u>		ATEX II 1/2 D, C-TICK	B
DN 100 PN 6, EN 1092-1 (1.4541/321)	E	CSA/FM General Purpose, C-TICK	C
DN 100 PN 16, EN 1092-1 (1.4541/321)	F	CE, C-TICK	D
2" ASME 150 lb B16.5 (1.4541/321)	G	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 ¹⁰⁾	E
3" ASME 150 lb B16.5 (1.4541/321)	H	ATEX II 1G and 1/2G Eex ia IIC; ATEX II 1D and 1/2D, C-TICK	F
4" ASME 150 lb B16.5 (1.4541/321)	J	IEC-Ex t IIIC Da/Db	H
Tri-clamp 2" Stainless steel 304 (1.4301) ⁷⁾	K		
Extension length			
<u>Stainless steel 304 (1.4301)</u>			
Standard length, 235 mm (9.25 inch) ⁸⁾	1 1		
<u>Add order code Y01 and plain text:</u> <u>"Insertion length ... mm"</u>			
• 300 ... 500 mm (11.81 ... 19.69 inch) ⁸⁾	1 2		
• 501 ... 750 mm (19.72 ... 29.53 inch) ⁸⁾	1 3		
• 751 ... 1 000 mm (29.57 ... 39.37 inch) ⁸⁾	1 4		
• 1 001 ... 1 250 mm (39.41 ... 49.21 inch) ⁸⁾	1 5		
• 1 251 ... 1 500 mm (49.25 ... 59.06 inch) ⁸⁾	1 6		
• 1 501 ... 1 750 mm (59.09 ... 68.90 inch) ⁸⁾	1 7		
• 1 751 ... 2 000 mm (68.94 ... 78.74 inch) ⁸⁾	1 8		
• 2 001 ... 2 250 mm (78.78 ... 88.58 inch) ⁸⁾	2 1		
• 2 251 ... 2 500 mm (88.62 ... 98.43 inch) ⁸⁾	2 2		
• 2 501 ... 2 750 mm (98.46 ... 108.27 inch) ⁸⁾	2 3		
• 2 751 ... 3 000 mm (108.31 ... 118.11 inch) ⁸⁾	2 4		
• 3 001 ... 3 250 mm (118.15 ... 127.95 inch) ⁸⁾	2 5		
• 3 251 ... 3 500 mm (127.99 ... 137.80 inch) ⁸⁾	2 6		
• 3 501 ... 3 750 mm (137.83 ... 147.64 inch) ⁸⁾	2 7		
• 3 751 ... 4 000 mm (147.68 ... 157.48 inch) ⁸⁾	2 8		
		1) Available with approval options A ... D only	
		2) Available with approval options E and F only	
		3) Available with approval option D only	
		4) 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	
		5) Basic version is cost effective and offers fast delivery	
		6) Not available with extension length options 11 and 12	
		7) Available with approval options B, C, D, and F only	
		8) Available with Material process connection/extension option 1 only	
		9) Available with Material process connection/extension option 2 only	
		10) Available with power supply option 5 and 6 only	
		► Available ex stock.	

Level measurement

Point level measurement – Vibrating switches

SITRANS LVS200

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. 4 000 mm (157.48 inch)

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

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

Signal bulb inserted in M20 cable gland¹⁾

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 (ASME B1.20.1)

Isolator switch amplifier relay output KFD2-SR2-Ex1.W

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 and D only

Order code

Y01

K05

G01

A20

Order No.

7ML1998-5FT62

7ML1830-1KL

7ML1830-1JM

7ML1830-1JN

A5E03496569

7ML5731-7AA11-1BA0

7ML5731-7AB11-1AA0

Selection and Ordering data

SITRANS LVS200, short fork for liquids/solids interface

Vibrating point level switch for solids or solids within liquid interface applications, and high load applications with short insertion requirements

Power supply

19 ... 230 V AC, 19 ... 55 V DC, one relay output (SPDT)¹⁾

19 ... 230 V AC, 19 ... 55 V DC, two relay outputs (DPDT)¹⁾

18 ... 50 V DC PNP¹⁾

19 ... 230 V AC/DC without contact, 2-wire loop powered¹⁾

8/16 mA or 4 ... 20 mA; 12.5 ... 35 V DC, 2-wire²⁾

Process temperature

Without temperature isolator

With temperature isolator

Separated enclosure - cable length 1.5 m (4.92 ft) [max. temperature process 150 °C (302 °F)/max. temperature electronics 80 °C (176 °F)]

Separated enclosure - cable length 4.0 m (13.12 ft) [max. temperature process 150 °C (302 °F)/max. temperature electronics 80 °C (176 °F)]

Process connection

Threaded

R 1½" [(BSPT), EN 10226]

1½" NPT [(Taper), ANSI/ASME B1.20.1]

G 2" [(BSPP), EN ISO 228-1], sliding sleeve [min. length 500 mm (19.69 inch)]

2" NPT [(Taper), ANSI/ASME B1.20.1], sliding sleeve [min. length 500 mm (19.69 inch)]

Flanged

DN 100 PN 6, EN 1092-1 (1.4541/321)

DN 100 PN 16, EN 1092-1 (1.4541/321)

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

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

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

Tri-clamp 2" stainless steel 304 (1.4301)¹⁾

Extension length

Stainless steel 304 (1.4301)³⁾

Standard length, 165 mm (6.50 inch)³⁾

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

200 ... 500 mm (7.87 ... 19.69 inch)³⁾

501 ... 750 mm (19.72 ... 29.53 inch)³⁾

751 ... 1 000 mm (29.57 ... 39.37 inch)³⁾

1 001 ... 1 250 mm (39.41 ... 49.21 inch)³⁾

1 251 ... 1 500 mm (49.25 ... 59.06 inch)³⁾

1 501 ... 1 750 mm (59.09 ... 68.90 inch)³⁾

1 751 ... 2 000 mm (68.94 ... 78.74 inch)³⁾

2 001 ... 2 250 mm (78.78 ... 88.58 inch)³⁾

2 251 ... 2 500 mm (88.62 ... 98.43 inch)³⁾

2 501 ... 2 750 mm (98.46 ... 108.27 inch)³⁾

2 751 ... 3 000 mm (108.31 ... 118.11 inch)³⁾

3 001 ... 3 250 mm (118.15 ... 127.95 inch)³⁾

3 251 ... 3 500 mm (127.99 ... 137.80 inch)³⁾

3 501 ... 3 750 mm (137.83 ... 147.64 inch)³⁾

3 751 ... 4 000 mm (147.68 ... 157.48 inch)³⁾

Stainless Steel 316TI (1.4571)

Standard length, 165 mm (6.50 inch)⁴⁾

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

200 ... 500 mm (7.87 ... 19.69 inch)⁴⁾

501 ... 750 mm (19.72 ... 29.53 inch)⁴⁾

751 ... 1 000 mm (29.57 ... 39.37 inch)⁴⁾

Order No.

7ML5732-

AA0

1

2

3

4

5

A

B

C

D

A

B

C

D

E

F

G

H

J

K

11

12

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21

22

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34

Level measurement

Point level measurement – Vibrating switches

SITRANS LVS200

Selection and Ordering data

Order No.

SITRANS LVS200, pipe extension

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

7ML5733-

A 0

Power supply

19 ... 230 V AC, 19 ... 55 V DC, one relay output (SPDT)¹⁾

1

19 ... 230 V AC, 19 ... 55 V DC, two relay outputs (DPDT)¹⁾

2

18 ... 50 V DC PNP¹⁾

3

19 ... 230 V AC/DC without contact, 2-wire loop powered¹⁾

4

7 ... 9 V DC (requires NAMUR switch amplifier) NAMUR IEC 60947-5-6, 2-wire²⁾³⁾

5

8/16 mA or 4 ... 20 mA; 12.5 ... 35 V DC, 2-wire⁴⁾

6

Process temperature

Up to 150 °C (302 °F)

A

Process connection

Threaded

R 1½" [(BSPT), EN 10226]

A

1½" NPT [(Taper), ANSI/ASME B1.20.1]

B

Flanged

DN 100 PN 6, EN 1092-1 (1.4541/321)

C

DN 100 PN 16, EN 1092-1 (1.4541/321)

D

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

E

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

F

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

G

Tri-clamp 2" stainless steel 304 (1.4301)⁶⁾

K

Process connection material

Stainless steel 304 (1.4301)

1

Stainless steel 316 Ti (1.4571)

2

Extension length

Customer supplied 1" pipe extension
Length: 300 ... 3800 mm (11.81 ... 149.61 inch)

1

Application type

Dry bulk solids (125 Hz)

1

Liquids/solids interface (350 Hz)

2

Approvals

CSA/FM Dust Ignition Proof, C-TICK

A

ATEX II 1/2 D, C-TICK

B

CSA/FM General Purpose, C-TICK

C

CE, C-TICK

D

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-TICK⁵⁾

E

ATEX II 1G and 1/2G Eex ia IIC; ATEX II 1D and 1/2D, C-TICK⁵⁾

F

IEC-Ex t IIIC Da/Db

H

¹⁾ Available with approval options A ... D only

²⁾ Available with application type 1 only

³⁾ Available with approval option D, E and, F only

⁴⁾ Available with approval option D only

⁵⁾ Available with power supply option 5 only

⁶⁾ Available with approval option B, C, D, and F only

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, max. 3 800 mm (149.61 inch)

Y01

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

K05

Signal bulb inserted in M20 cable gland¹⁾

A20

Operating Instructions

Multi-language

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

Order No.

7ML1998-5FT63

Spare Parts

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

7ML1830-1KL

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

7ML1830-1KM

Isolated switch amplifier relay output KFD2-SR2-Ex1.W

A5E03496569

¹⁾ Available with approval option D only

Level measurement

Point level measurement – Vibrating switches

SITRANS LVS200

Selection and Ordering data	Order No.
SITRANS LVS200, cable extended Vibrating point level switch for high or low level detection of bulk solids materials	7ML5734- - - - - - A 0
Power supply	
19 ... 230 V AC, 19 ... 55 V DC, one relay output (SPDT) ¹⁾	1
19 ... 230 V AC, 19 ... 55 V DC, two relay outputs (DPDT) ¹⁾	2
18 ... 50 V DC PNP ¹⁾	3
19 ... 230 V AC/DC without contact, 2-wire loop powered ¹⁾	4
7 ... 9 V DC (requires NAMUR switch amplifier)	5
NAMUR IEC 60947-5-6, 2-wire ²⁾³⁾	6
8/16 mA or 4 ... 20 mA; 12.5 ... 35 V DC, 2-wire ⁴⁾	6
Process temperature	
Up to 80 °C (176 °F)	A
Process connection	
Threaded	
R 1½" [(BSPT), EN 10226]	A
1½" NPT [(Taper), ANSI/ASME B1.20.1]	B
Flanged	
DN 100 PN 6, EN 1092-1 (1.4541/321)	C
DN 100 PN 16, EN 1092-1 (1.4541/321)	D
2" ASME 150 lb B16.5 (1.4541/321)	E
3" ASME 150 lb B16.5 (1.4541/321)	F
4" ASME 150 lb B16.5 (1.4541/321)	G
Extension length	
700 ... 1 000 mm (19.7 ... 39.4 inch) [max. length 2 000 mm (787.4 inch), not with Power supply option 5 (max. 1 000 mm, 393.7 inch)]	1 0
<u>Add order code Y01 and plain text: "Insertion length ... mm"</u>	
1001 ... 2 000 mm (39.41 ... 78.74 inch)	1 1
2001 ... 3 000 mm (78.78 ... 118.11 inch)	1 2
3001 ... 4 000 mm (118.15 ... 157.48 inch)	1 3
4001 ... 5 000 mm (157.52 ... 196.85 inch)	1 4
5001 ... 6 000 mm (196.89 ... 236.22 inch)	1 5
6001 ... 7 000 mm (236.26 ... 275.59 inch)	1 6
7001 ... 8 000 mm (275.63 ... 314.96 inch)	1 7
8001 ... 9 000 mm (315 ... 354.33 inch)	1 8
9001 ... 1 0000 mm (354.37 ... 393.70 inch)	2 0
1 0001 ... 11000 mm (393.74 ... 433.07 inch)	2 1
11001 ... 12 000 mm (433.11 ... 472.44 inch)	2 2
12001 ... 13 000 mm (472.48 ... 511.81 inch)	2 3
13001 ... 14 000 mm (511.85 ... 551.18 inch)	2 4
14001 ... 15 000 mm (551.22 ... 590.55 inch)	2 5
15001 ... 16 000 mm (590.59 ... 629.92 inch)	2 6
16001 ... 17 000 mm (629.96 ... 669.29 inch)	2 7
17001 ... 18 000 mm (669.33 ... 708.66 inch)	2 8
18001 ... 19 000 mm (708.70 ... 748.03 inch)	3 0
19001 ... 2 0000 mm (748.07 ... 787.40 inch)	3 1
Application type	
Dry bulk solids (125 Hz)	1
Liquid/solids interface (350 Hz) ⁵⁾	2

Selection and Ordering data	Order No.
SITRANS LVS200, cable extended Vibrating point level switch for high or low level detection of bulk solids materials	7ML5734- - - - - - A 0
Approvals	
CSA/FM Dust Ignition Proof, C-TICK	A
ATEX II 1/2 D, C-TICK	B
CSA/FM General Purpose, C-TICK	C
CE, C-TICK	D
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 ⁶⁾	E
ATEX II 1G and 1/2G Eex ia IIC; ATEX II 1D and 1/2D, C-TICK ⁶⁾	F
IEC-Ex t IIIC Da/Db	H
1) Available with approval options A ... D only	
2) Available with approval options E and F only	
3) Cable length is limited to 10 000 mm (393.70 inch)	
4) Available with approval option D only	
5) Cable length is limited to 7 000 mm (275.59 inch).	
6) Available with power supply option 5 and application type 1 only	

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, max. 4 000 mm (157.48 inch)	Y01
Enhanced sensitivity > 5 g/l via electronics and increased fork length to 195 mm (7.68 inch)	K05
Signal bulb inserted in M20 cable gland ¹⁾	A20
Operating Instructions	Order No.
Multi-language	7ML1998-5FT62
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)]	7ML1830-1KL
Replacement Electronics Module (350 Hz) [19 ... 230 V AC, 19 ... 55 V DC, one relay output (SPDT)]	7ML1830-1KM
Isolated switch amplifier relay output KFD2-SR2-Ex1.W	A5E03496569
1) Available with approval options C and D only	

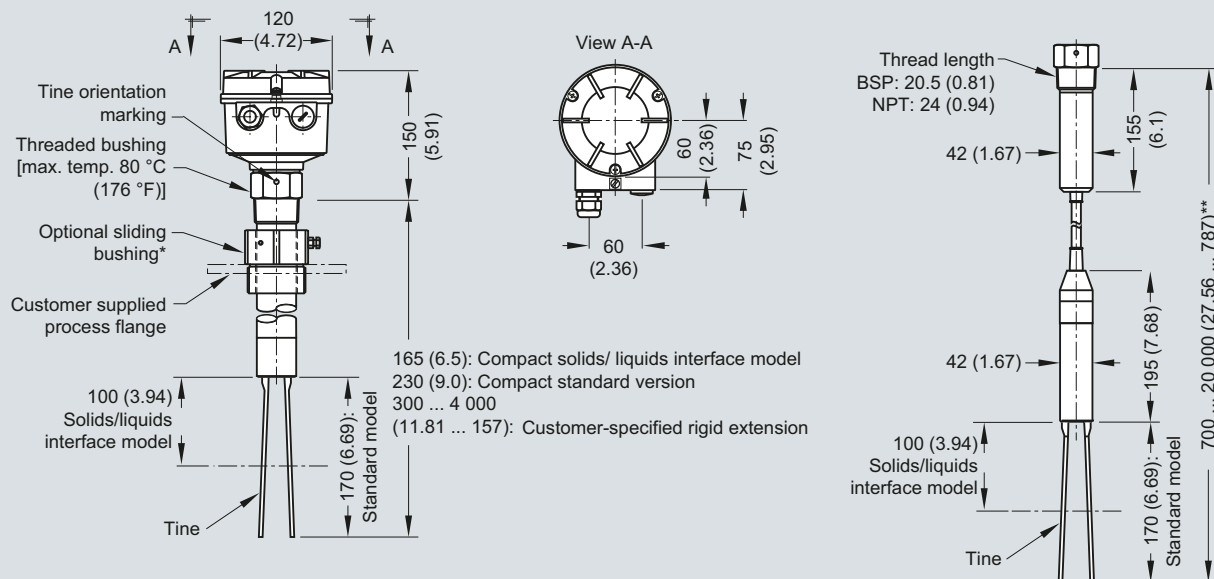
4

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 7 000 mm (275.59 inch)

Cable version with NAMUR electronics length to 10 000 mm (393.7 inch) tightened to 10 Nm.

See drawing 23650563 for pipe extended version details. (Pipe is customer supplied.)

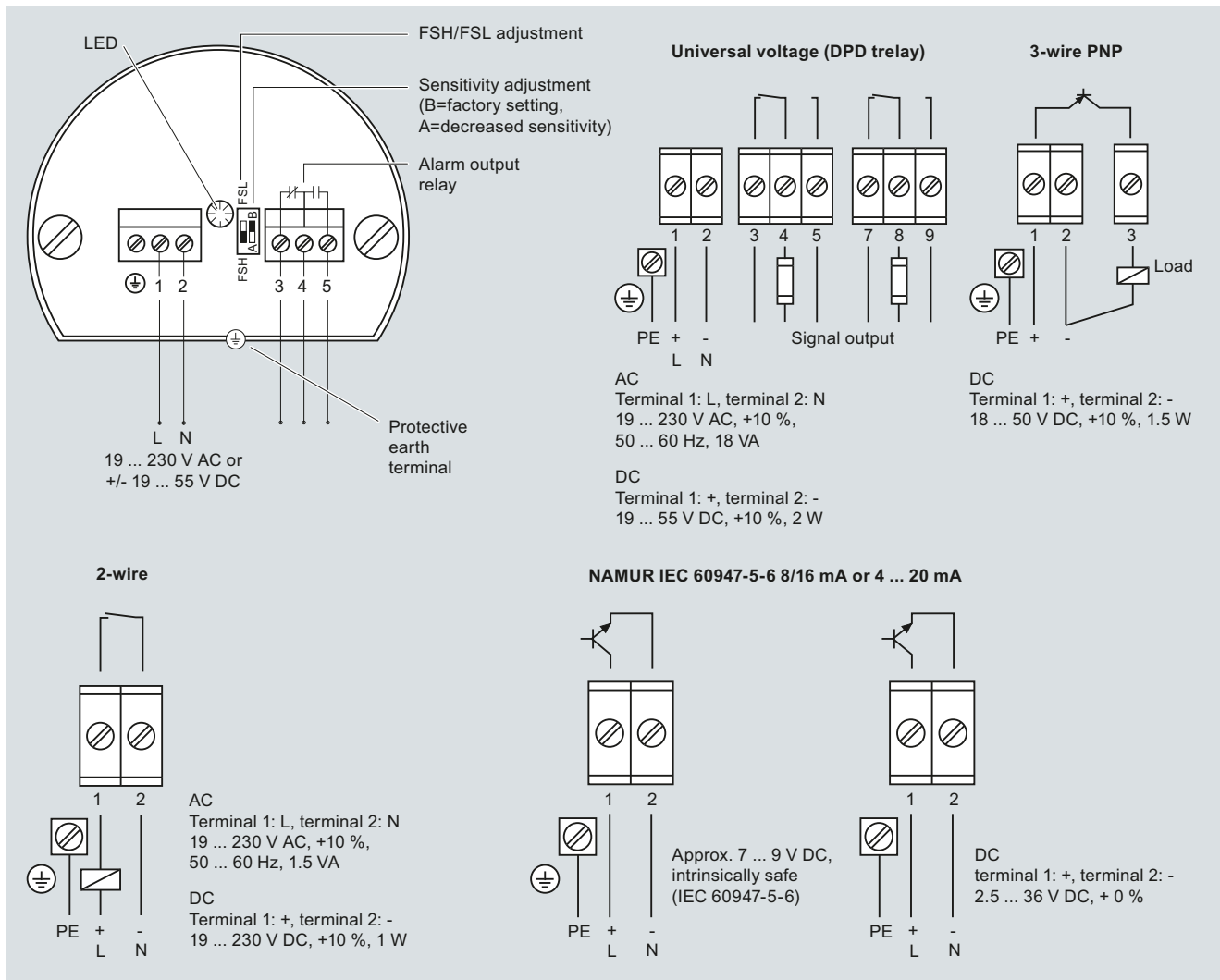
SITRANS LVS200, dimensions in mm (inch)

Level measurement

Point level measurement – Vibrating switches

SITRANS LVS200

Schematics



SITRANS LVS200 connections

4

Level measurement

Point level measurement – Rotation paddle switches

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 prevents damage from falling material
- Rotatable enclosure for convenient wiring
- Optional paddles for use with low density materials
- Small paddle makes for simple installation through existing process connection
- High temperature model and optional extension kit available
- Optional fail-safe configuration detects loss of rotation

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/ft³) with the optional rectangular vane or 100 g/l (6.25 lb/ft³) 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

Mode of operation	
Measuring principle	Rotating point level switch
Input	
Measured variable	High and low and demand
Output	
Output signal	Microswitch 5 A at 250 V AC, non inductive Microswitch SPDT contact 4 A at 30 V DC, non-inductive Standard (1 rpm model): approx 1.3 seconds Optional process applications (5 rpm model): approx. 0.26 s
• Alarm output	
• Pickup delay	
Sensitivity	
Adjustable via reset force of spring or geometry of measuring vane	
Rated operating conditions	
Installation conditions	Indoor/outdoor
• Location	
Ambient conditions	-25 ... +60 °C (-13 ... +140 °F) III 2
• Ambient temperature	
• Installation category	
• Pollution degree	
Medium conditions	Bulk solids
• Temperature	-25 ... +80 °C (-13 ... +176 °F) -25 ... +600°C (-13 ... +1 112 °F)
- Standard	
- Optional	
• Pressure (vessel)	Max. 0.5 bar g (7.25 psi g) Max. 10 bar g (145 psi g)
- Standard	
- Optional	
• Minimum material density	• Can detect down to 100 g/l (6.25 lb/ft ³) • Can detect down to 15 g/l (2.19 lb/ft ³)
- Standard measuring vane	
- Optional measuring vane	
Design	
Material	Epoxy coated aluminum Stainless steel or aluminum
• Enclosure	
• Process connection, measuring shaft and vane	
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
Power supply	
• Jumper selectable	• 115 V AC, ± 15 %, 50 to 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
Certificates and approvals	
• CSA/FM General Purpose • CE • CSA/FM Dust Ignition Proof • ATEX II 1/2 D • C-TICK • IECex	

Level measurement

Point level measurement – Rotation paddle switches

SITRANS LPS200

Selection and Ordering data	Order No.	Selection and Ordering data	Order No.
SITRANS LPS200, compact Rotary paddle switch for level detection in bulk solids. Compact design for side or top mounted applications.	7ML5725- - - - - - 0	SITRANS LPS200, compact Rotary paddle switch for level detection in bulk solids. Compact design for side or top mounted applications.	7ML5725- - - - - - 0
Process temperature Up to 80 °C (176 °F) Up to 150 °C (302 °F) Up to 250 °C (482 °F) Up to 600 °C (1 112 °F) ^{1) 10)} Up to 80 °C (176 °F) basic version aluminum ^{2) 3)} Up to 80 °C (176 °F) basic version stainless steel ^{2) 4)}	1 2 3 4 ▶ 5 ▶ 6	Measuring vane Boot shaped, 35 x 106 mm (1.38 x 4.17 inch) ⁷⁾ ▶ Hinged vane, 65 x 200 mm (2.56 x 7.87 inch) ^{7) 8)} Boot shaped, 28 x 98 mm (1.10 x 3.86 inch) Rectangular 50 x 150 mm (1.97 x 5.91 inch) ⁹⁾ Rectangular 50 x 250 mm (1.97 x 9.84 inch) ⁹⁾ Rectangular 98 x 150 mm (3.86 x 5.91 inch) ⁹⁾ Rectangular 98 x 250 mm (3.86 x 9.84 inch) ⁹⁾ Rectangular 50 x 98 mm (1.97 x 3.86 inch)	A B C D E F G H
Power supply 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	Approvals CSA/FM Dust Ignition Proof, C-TICK ▶ ATEX II 1/2 D, C-TICK ▶ CSA/FM General Purpose , C-TICK ▶ CE, C-TICK ▶ IEC Ex ta/tb IIIC	▶ A ▶ B ▶ C ▶ D ▶ E
Process connection <u>Threaded</u> G 1¼" [(BSPP), EN ISO 228-1] G 1" [(BSPP), EN ISO 228-1] G 1½" [(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, EN 1092-1 (1.4541/321) DN 100 PN 6, EN 1092-1 (1.4541/321) DN 100 PN 16, EN 1092-1 (1.4541/321) 2" ASME 150 lb B16.5 (1.4541/321) 3" ASME 150 lb B16.5 (1.4541/321) 4" ASME 150 lb B16.5 (1.4541/321)	A B C ▶ D ▶ E F G H J K L M		
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 ⁵⁾ ▶ Stainless steel 303 (1.4305) ▶	1 2		
Extension length 100 mm (3.94 inch) ⁶⁾ 150 mm (5.91 inch) ▶ 200 mm (7.87 inch) 250 mm (9.84 inch) 300 mm (11.81 inch)	1 ▶ 2 3 4 5		
		▶ Available ex stock	

Level measurement

Point level measurement – Rotation paddle switches

SITRANS LPS200

Selection and Ordering data

Order code

Further Designs

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

Heating of enclosure^{1) 2)}

A35

Signal bulb inserted in M20 cable gland¹⁾

A20

SITRANS LPS200 designed for food applications with shaft seal conforming to FDA standards

K01

Additional Operating Instructions

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

Spare Parts

Motor gear /PLC, multi-voltage

7ML1830-1KG

Replacement vane, boot shape, 35 x 106 mm (1.38 x 4.17 inch)

7ML1830-1KH

Hinged vane, 65 x 200 mm (2.56 x 7.87 inch)

7ML1830-1KJ

Rigid extension kit

(includes spring coupling, rigid tube extension and required pins)

Extension: 500, 400, 300 mm (19.7, 15.8, 11.8 inch)

7ML5711-0AA

Extension: 1 000, 900, 800, 700, 600 (39.4, 35.4, 31.5, 27.6, 23.6 inch)

7ML5711-1AA

Extension: 1 500, 1 400, 1 300, 1 200, 1 100 mm (59.1, 55.1, 51.2, 47.2, 43.3 inch)

7ML5711-2AA

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 ... H, J ... N, P only

Selection and Ordering data

Order No.

SITRANS LPS200, shaft protected

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

7ML5726-

Process temperature

Up to 80 °C (176 °F)

1

Up to 150 °C (302 °F)

2

Up to 250 °C (482 °F)

3

Up to 600 °C (1 112 °F)^{1) 2)}

4

Up to 80 °C (176 °F) basic version³⁾

5

Power supply

230 V AC, 1 rev./min.

A

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

B

230 V AC, 5 rev./min.

C

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

D

115 V AC, 1 rev./min.

E

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

F

115 V AC, 5 rev./min.

G

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

H

48 V AC, 1 rev./min.

J

24 V AC, 1 rev./min.

K

24 V DC, 1 rev./min.

L

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

M

24 V DC, 5 rev./min.

N

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

P

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

Q

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

R

Process connection

Threaded

G 1¼" [(BSPP), EN ISO 228-1]

A

G 1½" [(BSPP), EN ISO 228-1]

B

1¼" NPT [(Taper), ANSI/ASME B1.20.1]

C

1½" NPT [(Taper), ANSI/ASME B1.20.1]

D

Flanged

DN 32 PN 6, EN 1092-1 (1.4541/321)

E

DN 100 PN 6, EN 1092-1 (1.4541/321)

F

DN 100 PN 16, EN 1092-1 (1.4541/321)

G

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

H

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

J

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

K

Process pressure

Up to 0.5 bar (7.25 psi)

1

Up to 5 bar (72.5 psi)

2

Up to 10 bar (145 psi)

3

Process connection material

Aluminum^{4) 5)}

1

Stainless steel 303 (1.4305)

2

Extension length

150 mm (5.91 inch)⁶⁾

1

200 mm (7.87 inch)

2

250 mm (9.84 inch)

3

300 mm (11.81 inch)

4

Extension material (protection tube)

Aluminum⁴⁾

A

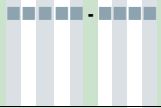
Stainless steel 303 (1.4305)

B

Level measurement

Point level measurement – Rotation paddle switches

SITRANS LPS200

Selection and Ordering data	Order No.	Selection and Ordering data	Order code
SITRANS LPS200, shaft protected 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	7ML5726- 	Further Designs Please add "-Z" to Order No. and specify Order code(s). Heating of enclosure ¹⁾²⁾ Signal bulb inserted in M20 cable gland ¹⁾	 A35 A20 K01
Measuring vane Boot shaped 35 x 106 mm (1.38 x 4.17 inch) ⁷⁾ Hinged vane 65 x 200 mm (2.56 x 7.87 inch) ⁷⁾ Rectangular 50 x 150 mm (1.97 x 5.91 inch) ⁸⁾ Rectangular 50 x 250 mm (1.97 x 9.84 inch) ⁸⁾ Rectangular 98 x 150 mm (3.86 x 5.91 inch) ⁸⁾ Rectangular 98 x 250 mm (3.86 x 9.84 inch) ⁸⁾ Rectangular 50 x 98 mm (1.97 x 3.86 inch)	 A B D E F G H	SITRANS LPS200 designed for food applications with shaft seal conforming to FDA standards Additional Operating Instructions 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
Approvals CSA/FM Dust Ignition Proof, C-TICK ATEX II 1/2 D, C-TICK CSA/FM General Purpose, C-TICK CE, C-TICK IEC Ex ta/tb IIIC	 1 2 3 4 5	Spare Parts Motor gear /PLC, multi-voltage Replacement vane, boot shape, 35 x 106 mm (1.38 x 4.17 inch) Hinged vane, 65 x 200 mm (2.56 x 7.87 inch)	 7ML1830-1KG 7ML1830-1KH 7ML1830-1KJ
¹⁾ Available with approval option 3 and 4 only, up to max. 0.8 bar ²⁾ Not available with process connection G ³⁾ 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 ⁴⁾ Available with process connections A ... D, and process temperature option 1 and 5 only ⁵⁾ Available with process pressure option 1 only ⁶⁾ Not available with measuring vane option B ⁷⁾ Add 16 mm (0.63 inch) to extension length ⁸⁾ Available with process connections E ... H, J, K, only		Available ex stock 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 option 4 only ²⁾ Available with power supply options A ... H, J ... N, P only	

▶ Available ex stock.

Level measurement

Point level measurement – Rotation paddle switches

SITRANS LPS200

Selection and Ordering data

Order No.

SITRANS LPS200, cable extension

7ML5727-

Rotary paddle switch for level detection in bulk solids

Cable extension for increased length in top-mounted applications

Process temperature

Up to 80 °C (176 °F)

Up to 150 °C (302 °F)

Up to 250 °C (482 °F)

Up to 600 °C (1 112 °F)^{1) 2)}Up to 80 °C (176 °F) basic version^{3) 5)}1
2
3
4
5

Power supply

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

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]

Flanged

DN 32 PN 6, EN 1092-1 (1.4541/321)

DN 100 PN 6, EN 1092-1 (1.4541/321)

DN 100 PN 16, EN 1092-1 (1.4541/321)

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

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

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

A
B
C
D
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

Aluminum⁴⁾

Stainless steel 303 (1.4305)

1
2

Cable extension length

Standard cable length, 2 000 mm (78.74 inch)

Add order code Y01 and plain text:

"Insertion length ... mm"

500 ... 1 000 mm (19.69 ... 39.37 inch)

Cable length 1 001 ... 2 000 mm

(39.41 ... 78.74 inch)

Cable length 2 001 ... 3 000 mm

(78.78 ... 118.11 inch)

Cable length 3 001 ... 4 000 mm

(118.15 ... 157.48 inch)

Cable length 4 001 ... 5 000 mm

(157.52 ... 196.85 inch)

Cable length 5 001 ... 6 000 mm

(196.89 ... 236.22 inch)

Cable length 6 001 ... 7 000 mm

(236.26 ... 275.59 inch)

Cable length 7 001 ... 10 000 mm

(275.63 ... 393.70 inch)

0
1
2
3
4
5
6
7
8

Selection and Ordering data

Order No.

SITRANS LPS200, cable extension

7ML5727-

Rotary paddle switch for level detection in bulk solids

Cable extension for increased length in top-mounted applications

Measuring vane

Boot shaped, 35 x 106 mm (1.38 x 4.17 inch)⁵⁾Hinged vane, 65 x 200 mm (2.56 x 7.87 inch)⁵⁾

Boot shaped, 28 x 98 mm (1.10 x 3.86 inch)

Rectangular 50 x 150 mm (1.97 x 5.91 inch)⁶⁾Rectangular 50 x 250 mm (1.97 x 9.84 inch)⁶⁾Rectangular 98 x 150 mm (3.86 x 5.91 inch)⁶⁾

Rectangular 50 x 98 mm (1.97 x 3.86 inch)

A
B
C
D
E
F
G

Approvals

CSA/FM Dust Ignition Proof, C-TICK

ATEX II 1/2 D, C-TICK

CSA/FM General Purpose, C-TICK

CE, C-TICK

IEC Ex ta/tb IIIC

A
B
C
D
E

1) Available with approval option C and D only, up to max. 0.8 bar

2) Not available with process connection G

3) 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

4) Available with process connections A ... D, process pressure option 1, and process temperature option 1 and 5 only

5) Add 16 mm (0.63 inch) to extension length

6) Available with process connections E ... H, J, K, only

Level measurement

Point level measurement – Rotation paddle switches

SITRANS LPS200

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, max. 10 000 mm (393.70 inch)	Y01
Reinforced cable (max. 28 kN pulling force)	P01
Heating of enclosure ^{1) 2)}	A35
Signal bulb inserted in M20 cable gland ¹⁾	A20
Additional Operating Instructions	
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
Spare Parts	
Motor gear /PLC, multi-voltage	7ML1830-1KG
Replacement vane, boot shape, 35 x 106 mm (1.38 x 4.17 inch)	7ML1830-1KH
Hinged vane, 65 x 200 mm (2.56 x 7.87 inch)	7ML1830-1KJ
Rope extension kit, 2 m (6.56 ft)	7ML1830-1KK
Available ex stock	
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	7ML5727-5QB12-0AB0
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	7ML5727-5QC12-0AA0

¹⁾ Available with approval option D only

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

Level measurement

Point level measurement – Rotation paddle switches

SITRANS LPS200

Selection and Ordering data

SITRANS LPS200, angled extension
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 and rotate horizontally in side mount applications

Process temperature

Up to 80 °C (176 °F)
Up to 150 °C (302 °F)
Up to 250 °C (482 °F)

Power supply

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.

Process connection

Flanged

DN 100 PN 6, EN 1092-1 (1.4541/321)
DN 100 PN 16, EN 1092-1 (1.4541/321)
4" ASME 150 lb B16.5 (1.4541/321)

Process pressure

Up to 0.5 bar (7.25 psi)
Up to 5 bar (72.5 psi)
Up to 10 bar (145 psi)

Process connection material

Stainless steel 303 (1.4305)

Extension length

125 mm (4.92 inch)
150 mm (5.91 inch)
200 mm (7.87 inch)
250 mm (9.84 inch)
300 mm (11.81 inch)

Measuring vane

Rectangular vane, 50 x 98 mm (1.97 x 3.86 inch)
Rectangular vane, 50 x 150 mm (1.97 x 5.91 inch)
Rectangular vane, 50 x 250 mm (1.97 x 9.84 inch)
Rectangular vane 98 x 150 mm (3.86 x 5.91 inch)
Rectangular vane 98 x 250 mm (3.86 x 9.84 inch)
Hinged vane, 65 x 200 mm (2.56 x 7.87 inch)

Approvals

CSA/FM Dust Ignition Proof, C-TICK
ATEX II 1/2 D, C-TICK
CSA/FM General Purpose, C-TICK
CE, C-TICK
IEC Ex ta/tb IIIC

Order No.

7ML5728-

0

1

2

3

A

B

C

D

E

F

G

H

J

K

L

M

N

P

Q

R

A

B

C

1

2

3

1

2

3

A

B

C

1

2

3

1

2

3

4

5

A

B

C

D

E

F

A

B

C

D

E

E

Selection and Ordering data

Further Designs

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

Heating of enclosure^{1) 2)}

Signal bulb inserted in M20 cable gland¹⁾

Additional 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

Motor gear /PLC, multi-voltage

Replacement vane, boot shape, 35 x 106 mm (1.38 x 4.17 inch)

Hinged vane, 65 x 200 mm (2.56 x 7.87 inch)

¹⁾ Available with approval option D only

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

Order code

A35

A20

Order No.

7ML1998-5FS62

7ML1830-1KG

7ML1830-1KH

7ML1830-1KJ

Level measurement

Point level measurement – Rotation paddle switches

SITRANS LPS200

Selection and Ordering data	Order No.	Selection and Ordering data	Order No.
SITRANS LPS200, rigid extension Rotary paddle switch for top mount point level detection in bulk solids	7ML5730-	SITRANS LPS200, rigid extension Rotary paddle switch for top mount point level detection in bulk solids	7ML5730-
Process temperature Up to 80 °C (176 °F) Up to 150 °C (302 °F) Up to 250 °C (482 °F) Up to 600 °C (1 112 °F) ^{1) 2)}	1 2 3 4	Stainless steel 303 (1.4305) 250 ... 500 mm (9.84 ... 19.69 inch) 501 ... 750 mm (19.72 ... 29.53 inch) 751 ... 1 000 mm (29.57 ... 39.37 inch) 1 001 ... 1 500 mm (39.41 ... 59.05 inch) 1 501 ... 2 000 mm (59.09 ... 78.74 inch) 2 001 ... 2 500 mm (78.78 ... 98.42 inch) 2 501 ... 3 000 mm (98.46 ... 118.11 inch) 3 001 ... 4 000 mm (118.14.78 ... 157.48 inch)	R S T U V W X Y
Power supply 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	Measuring vane Boot shaped, 35 x 106 mm (1.34 x 4.17 inch) ⁹⁾ Hinged vane, 60 x 200 mm (2.36 x 7.87 inch) Rectangular 50 x 150 mm (1.97 x 5.91 inch) ¹⁰⁾ Rectangular 50 x 250 mm (1.97 x 9.84 inch) ¹⁰⁾ Rectangular 98 x 150 mm (3.86 x 5.91 inch) ¹⁰⁾ Rectangular 98 x 250 mm (3.86 x 9.84 inch) ¹⁰⁾ Rectangular 50 x 98 mm (1.97 x 3.86 inch)	A B C D E F G
Process connection <u>Threaded</u> 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] <u>Flanged</u> DN 32 PN 6, EN 1092-1 (1.4541/321) DN 100 PN 6, EN 1092-1 (1.4541/321) DN 100 PN 16, EN 1092-1 (1.4541/321) 2" ASME 150 lb B16.5 (1.4541/321) 3" ASME 150 lb B16.5 (1.4541/321) 4" ASME 150 lb B16.5 (1.4541/321)	A B C D E F G H J K	Approvals CSA/FM Dust Ignition Proof, C-TICK ATEX II 1/2 D, C-TICK CSA/FM General Purpose, C-TICK CE, C-TICK IEC Ex ta/tb IIIC	1 2 3 4 5
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	1) Available with approval option 3 and 4 only, up to max. 0.8 bar 2) Not available with process connection G 3) Available with process connections A ... D only 4) Available with process pressure option 1 only 5) Available with extension length options A ... Q only 6) Available with extension length options R ... Y only 7) Available with process connection material option 1 only 8) Available with process temperature option 1 and 5 only 9) Add 16 mm (0.63 inch) to extension length 10) Available with process connections E ... H, J, K, only	
Process connection material Aluminum ^{3) 4) 5)} Stainless steel 303 (1.4305) ⁶⁾	1 2		
Extension material (protection tube) Aluminum ^{3) 5) 7) 8)} Stainless steel 303 (1.4305) ⁶⁾	0 1		
Extension length Aluminum 250 ... 500 mm (9.84 ... 19.69 inch) 501 ... 750 mm (19.72 ... 29.53 inch) 751 ... 1 000 mm (29.57 ... 39.37 inch) 1 001 ... 1 250 mm (39.41 ... 42.21 inch) 1 251 ... 1 500 mm (49.25 ... 59.06 inch) 1 501 ... 1 750 mm (59.09 ... 68.90 inch) 1 751 ... 2 000 mm (68.94 ... 78.74 inch) 2 001 ... 2 250 mm (78.78 ... 88.58 inch) 2 251 ... 2 500 mm (88.62 ... 98.43 inch) 2 501 ... 2 750 mm (98.46 ... 108.27 inch) 2 751 ... 3 000 mm (108.31 ... 118.11 inch) 3 001 ... 3 250 mm (118.15 ... 127.95 inch) 3 251 ... 3 500 mm (127.99 ... 137.80 inch) 3 501 ... 3 750 mm (137.83 ... 147.64 inch) 3 751 ... 4 000 mm (147.67 ... 157.48 inch)	A B C D E F G H J K L M N P Q		

Level measurement

Point level measurement – Rotation paddle switches

SITRANS LPS200

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, max. 4 000 mm (157.48 inch)	Y01
Heating of enclosure ¹⁾²⁾	A35
Signal bulb inserted in M20 cable gland ¹⁾	A20
SITRANS LPS200 designed for food applications with shaft seal conforming to FDA standards ³⁾	K01
<u>Seal at tube end for ingress protection and shaft stability</u>	
Max. temperature 80 °C (176 °F)	P06
Max. temperature 150 °C (302 °F)	P07
Max. temperature 250 °C (482 °F)	P08
Max. temperature 600 °C (1 112 °F)	P09
Sliding sleeve (standard, max. pressure 0.8 bar)	P12
Sliding sleeve (pressure tight, for over-pressure application starting from 1 bar max., dependent on pressure option ordered)	P13
Additional Operating Instructions	Order No.
Multi-language This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	7ML1998-5FS62
Spare Parts	
Motor gear/PLC, multi-voltage	7ML1830-1KG
Replacement vane, boot shape, 35 x 106 mm (1.38 x 4.17 inch)	7ML1830-1KH
Hinged vane, 65 x 200 mm (2.56 x 7.87 inch)	7ML1830-1KJ

¹⁾ Available with approval option 4 only

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

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

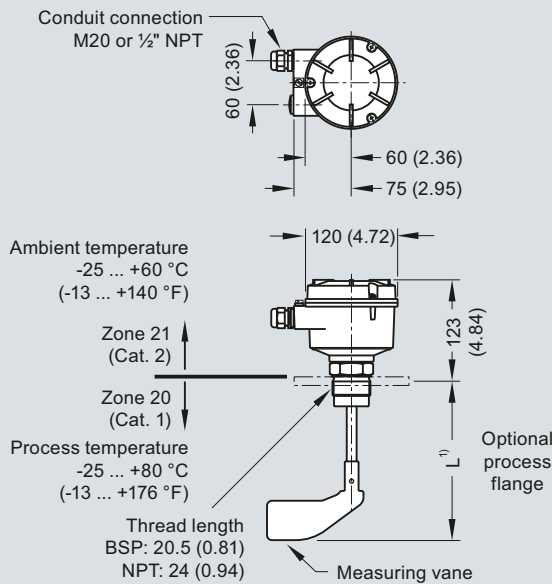
Level measurement

Point level measurement – Rotation paddle switches

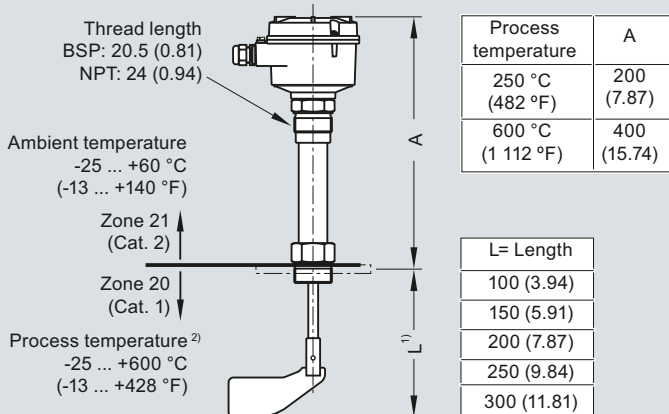
SITRANS LPS200

Dimensional drawings

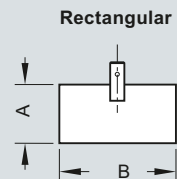
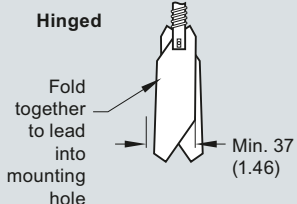
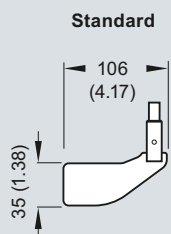
Standard model: compact version



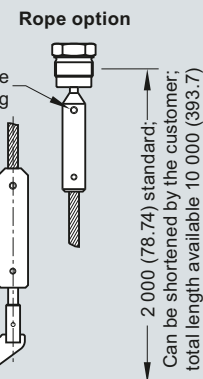
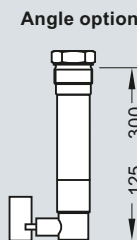
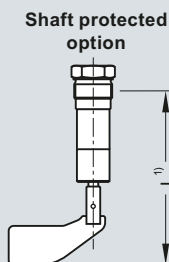
High temperature model: compact version



Measuring vanes



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 inch) with material	
	Spring adjustment			
	Light	Central (factory setting)	Light	Central (factory setting)
boot shaped 35 x 106 mm	200 g/l (12.5 lb/ft ³)	300 g/l (18.7 lb/ft ³)	100 g/l (6.2 lb/ft ³)	150 g/l (9.4 lb/ft ³)
boot shaped 28 x 98 mm	300 g/l (18.7 lb/ft ³)	500 g/l (31.2 lb/ft ³)	150 g/l (9.4 lb/ft ³)	150 g/l (9.4 lb/ft ³)
rectangular 50 x 98 mm	300 g/l (18.7 lb/ft ³)	500 g/l (31.2 lb/ft ³)	150 g/l (9.4 lb/ft ³)	250 g/l (15.6 lb/ft ³)
rectangular 50 x 150 mm	80 g/l (5.0 lb/ft ³)	120 g/l (7.5 lb/ft ³)	40 g/l (2.5 lb/ft ³)	60 g/l (3.7 lb/ft ³)
rectangular 50 x 250 mm	30 g/l (1.9 lb/ft ³)	50 g/l (3.1 lb/ft ³)	15 g/l (0.9 lb/ft ³)	25 g/l (1.6 lb/ft ³)
rectangular 98 x 150 mm	30 g/l (1.9 lb/ft ³)	50 g/l (3.1 lb/ft ³)	15 g/l (0.9 lb/ft ³)	25 g/l (1.6 lb/ft ³)
rectangular 98 x 250 mm	20 g/l (1.2 lb/ft ³)	30 g/l (1.9 lb/ft ³)	15 g/l (0.9 lb/ft ³)	15 g/l (0.9 lb/ft ³)
hinged 65 x 210 mm	70 g/l (4.4 lb/ft ³)	100 g/l (6.2 lb/ft ³)	35 g/l (2.2 lb/ft ³)	50 g/l (3.1 lb/ft ³)
hinged 60 x 200 mm	70 g/l (4.4 lb/ft ³)	100 g/l (6.2 lb/ft ³)	35 g/l (2.2 lb/ft ³)	50 g/l (3.1 lb/ft ³)

SITRANS LPS200, dimensions in mm (inch)

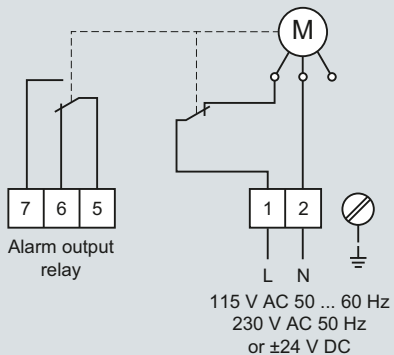
Level measurement

Point level measurement – Rotation paddle switches

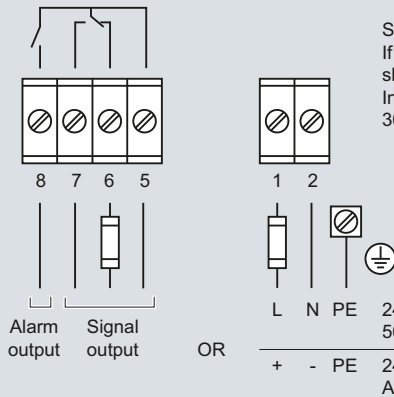
SITRANS LPS200

Schematics

Switch selectable connection

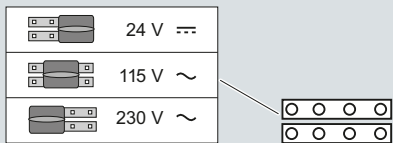


AC or DC version, SPDT relay, fail-safe



Switching and timing behaviour:
If the vane is not covered, the rotating vane shaft will send pulses at 20 second intervals. In case of fault, the pulses are missed. After 30 seconds, the alarm relay will open.

Voltage selector



SITRANS LPS200 connections

Level measurement

Point level measurement – Tilt switch

Tilt Switch Probe

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

Mode of operation	
Measuring principle	Tilting of encapsulated mercury switch
Typical application	<ul style="list-style-type: none"> • High or low level alarm on bulk solids • High or low level alarm for liquids (when used with float option)
Features	
Number of points	Single point destination
Output	• 2 A at 24 V DC
Transducers	Tilt angle sensitive mercury contacts
Characteristics	
Probe (Tilt Switch)	• Resolution: nominal 17° from vertical
Design	
Housing	• Schedule 80 stainless steel pipe with 1/2" NPT mounting for extensions
Material type	<ul style="list-style-type: none"> • Stainless steel: <ul style="list-style-type: none"> - low temperature: -40 ... +90 °C (-40 ... +194 °F) - high temperature: -40 ... +150 °C (-40 ... +302 °F)
Weight	• 2 kg (4.4 lb)
Approvals	CE, C-TICK
Options	Extensions: stainless steel wear, cross paddle, flat paddle, or float

Level measurement

Point level measurement – Tilt switch

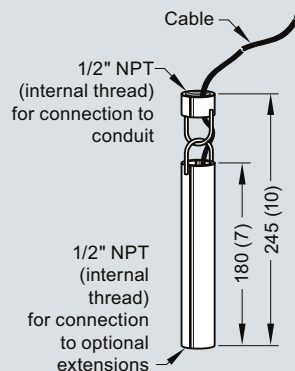
Tilt Switch Probe

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

Selection and Ordering data	Order No.
Further Designs Please add "-Z" to Order No. and specify Order code(s).	
Instruction manual 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.	7ML1998-1FL01
Spare parts Float, stainless steel Wear extension, stainless steel Cross paddle, stainless steel Flat paddle, stainless steel	7MH7723-1DH 7MH7723-1DJ 7MH7723-1DK 7MH7723-1DL

Dimensional drawings

Tilt Switch Probe

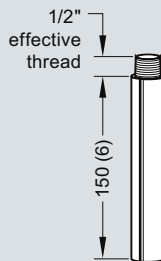


Material
304 stainless steel (1.4301)

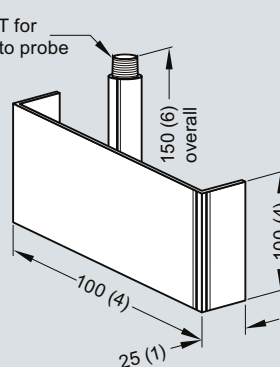
- Cable**
- Low temperature 6 m (20 ft): Type SJO 18-2
 - High temperature 1.5 m (5 ft): shielded PTFE

Optional extensions (material: 304 stainless steel)

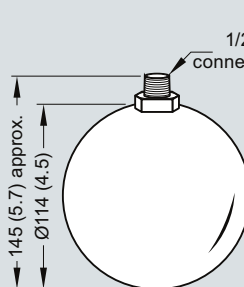
Wear



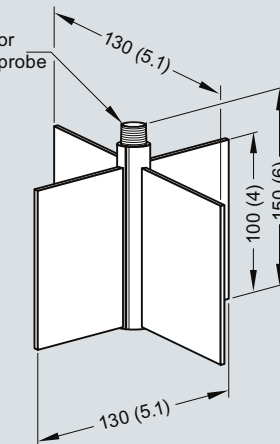
Flat paddle



Float



Cross paddle



Tilt switch, dimensions in mm (inch)

Level measurement

Pointlevel 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 inch) flange adapter for mating to 3" ASME, DN 65, PN10, and JIS 10K 3B sized flanges.

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

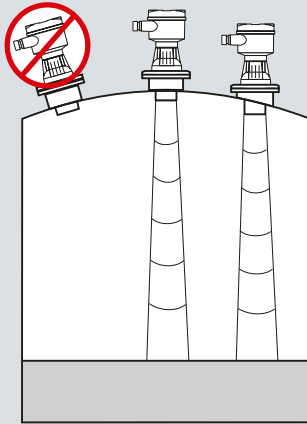
Level measurement

Pointlevel measurement – Ultrasonic switch

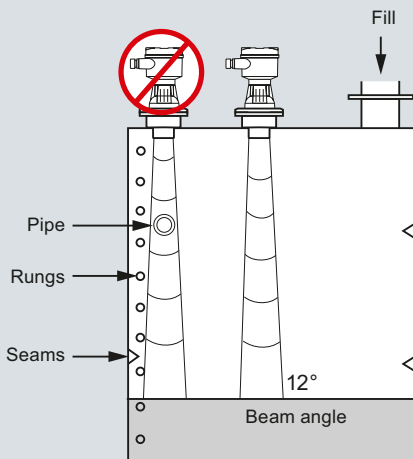
Pointek ULS200

Configuration

Parabolic mounting



Flat mounting and Beam angle



Pointek ULS200 Mounting

4

Level measurement

Pointlevel measurement – Ultrasonic switch

Pointek ULS200

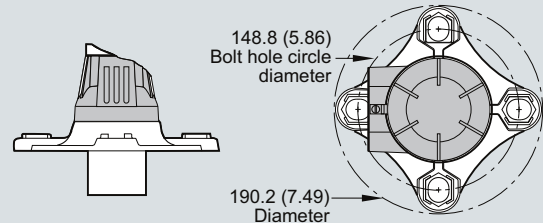
Technical specifications

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 or 30 V DC, resistive load; rated 1 A at 48 V DC resistive load
DC Version (relay)	2 SPDT Form C contacts, rated 5 A at 30 V DC, resistive load; rated 1 A at 48 V DC resistive load
DC Version (transistor)	2 switches, rated max. 100 mA, 48 V DC
Accuracy	
AC/DC version	
• Resolution	3 mm (0.1 inch)
• 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 lb)
Transducer material	PVDF or ETFE copolymer
Threaded mounting	2" NPT [(Taper), ANSI/ASME B1.20.1] R 2" [(BSPT), 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 inch) high, for display of distance between sensor face and material, multi-segment graphic for operating state
Memory	EEPROM, non-volatile
Programming	2 keys

Electronics/enclosure	Connection: terminal block, max. 2.5 mm ² (14 AWG) solid/1.5 mm ² (16 AWG) stranded
Degree of protection	IP67/Type 6/NEMA 6
Cable inlet	2 x ½" NPT or 2 x PG 13.5
Certificates and approvals	<ul style="list-style-type: none"> • CE (EMC certificate available on request), CSA US/C, FM • CSA/FM Class I, II, III, Div. 1, Gr A, B, C, D, E, F, G T4 • ATEX II 2G Ex d mb IIC T5 Gb • C-TICK, ANZEx Ex ds IIC T5, DIP A21 T5, IP65/IP67 • INMETRO Br-Ex d mb IIC T5

Options

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



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

4

Level measurement

Pointlevel measurement – Ultrasonic switch

Pointek ULS200

Selection and Ordering data	Order No.
Pointek ULS200 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	7ML1510-
Power supply 24 V DC, relay output 24 V DC, transistor output 100 ... 230 V AC, relay output	1 2 3
Approvals CE, C-TICK, CSA Class I Div. 1, Class II Div. 1, Class III ¹⁾ CE, C-TICK, FM Class I Div. 1, Class II Div. 1, Class III ¹⁾⁵⁾ CE, C-TICK, CSA Class I, II, Div. 2 ²⁾ CE, C-TICK, CSA us/c, FM CE, C-TICK, ATEX II 2G EEx dmb IIC T5 Gb ³⁾ INMETRO Br-Ex d m b IIC T5 ³⁾ C-TICK, ANZEx Ex ds IIC T5, DIP A21 T5, IP65/IP67 Class I, Zone 1 ³⁾	F G J K L M N
Transducer/Process connection 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 ⁴⁾	A B C E F G J
Enclosure/cable inlet <u>Polycarbonate</u> • Cable inlet PG 13.5 • Cable inlet ½" NPT <u>Aluminum</u> • Cable inlet PG 13.5 • Cable inlet ½" NPT	1 2 3 4

- 1) Available with Enclosure/cable inlet option 4 only and process connection options A and E only
 2) Available with Enclosure/cable inlet options 2 and 4 only
 3) Available with Enclosure/cable inlet option 4 only
 4) Available with Approvals option K only
 5) Not suitable in Hexane or Ethyl Acetate atmospheres

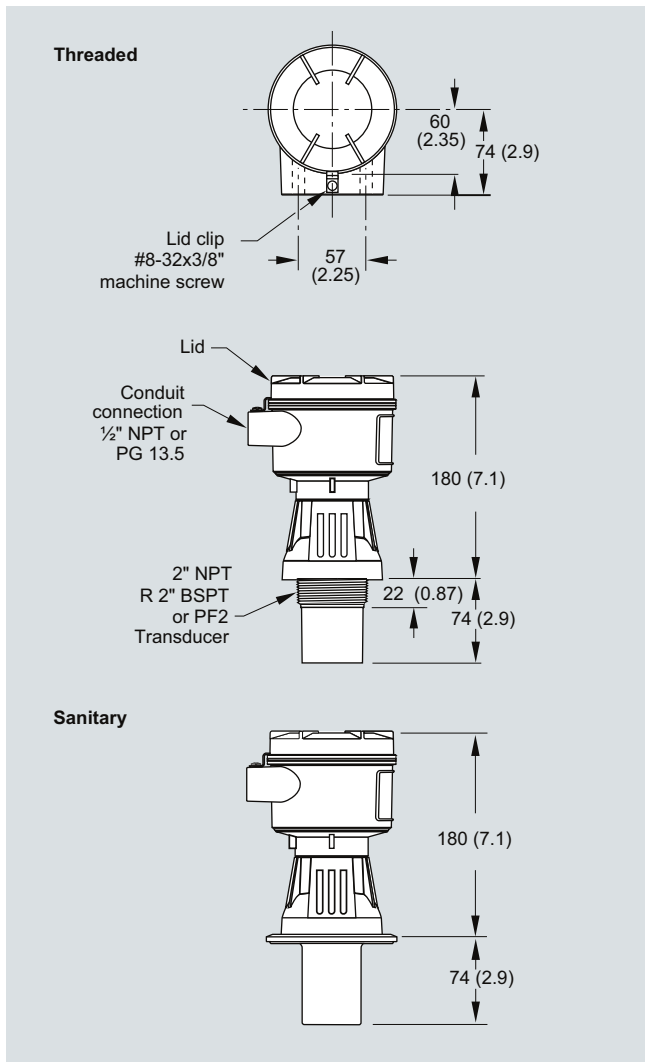
Selection and Ordering data	Order code
Further designs Please add "-Z" to Order No. and specify Order code(s) Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Operating Instructions Quick Start manual, multi-language This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	Order No. 7ML1998-1XB83
Accessories Tag, stainless steel, 12 x 45 mm (0.47 x 1.77 inch), 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" NPT 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	7ML1930-1AC 7ML1830-1BK 7ML1830-1BT 7ML1830-1BU 7ML1830-1DQ 7ML1830-1DT 7ML1830-1BR
Spare Parts Polycarbonate Lid Aluminum Lid	7ML1830-1LG 7ML1830-1LH

Level measurement

Pointlevel measurement – Ultrasonic switch

Pointek ULS200

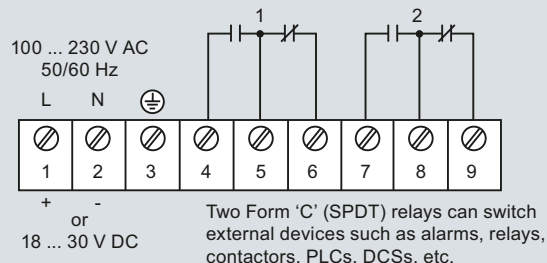
Dimensional drawings



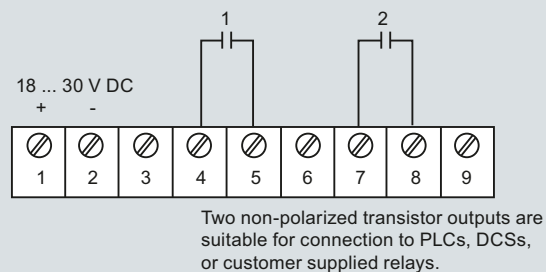
Pointek ULS200, dimensions in mm (inch)

Schematics

Relay output



Transistor output: DC version only



Pointek ULS200 connections

4

Level measurement

Continuous level measurement – Ultrasonic

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 20 000 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:

$$\text{Distance} = (\text{Velocity of Sound} \times \text{Time})/2.$$

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 (- 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

Continuous level measurement – Ultrasonic

Ultrasonic

Technical specifications

Ultrasonic Transmitter/Controller Selection Guide

Criteria	SITRANS Probe LU	SITRANS LUT400	HydroRanger 200	MultiRanger 100/200	SITRANS LUC500	SITRANS LU
Range	6 m (20 ft) or 12 m (40 ft)	0.3 ... 60 m (1 ... 196 ft), transducer and application dependent	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
Typical applications	Chemical storage vessels, filter beds, liquid storage vessels	Wet wells, reservoirs, flumes/weirs, chemical storage, liquid storage, hoppers, crusher bins, dry solids storage	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, weirs/flumes, open channels	Chemical storage, liquid storage, bulk solids storage (sugar, flour bins, grains, cereals), plastic pellets
Output	HART model: 4 ... 20 mA/HART PROFIBUS PA model: PROFIBUS	4 ... 20 mA/HART 3 relays	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
Communications	HART or PROFIBUS PA Options: • SIMATIC PDM for remote configuration and diagnostics	HART 7.0, USB	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)
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 \pm 15 %, 50/60 Hz, 36 VA Fuse: 5 x 20 mm, Slow Blow, 0.25 A, 250 V DC version: 10 ... 32 V DC, 10 W Fuse: 5 x 20 mm, Slow Blow, 1.6 A, 125 V	AC version: 100 to 230 V AC \pm 15 %, 50/60 Hz, 36 VA/17 W DC version: 12 ... 30 V DC, 20 W	AC version: 100 to 230 V AC \pm 15 %, 50/60 Hz, 36 VA/17 W DC version: 12 ... 30 V DC, 20 W	AC version: 100 to 230 V AC \pm 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 DC version: 18 ... 30 V DC, 25 W LU10: 100/115/200/230 V AC
Approvals	CE, CSA _{US/C} , FM, C-TICK, ATEX, ANZEx, IECEx	CE, CSA _{US/C} , UL Listed, FM, C-TICK	CE, CSA _{US/C} , UL Listed, FM, C-TICK	CE, CSA _{US/C} , UL Listed, FM, C-TICK	CE, CSA _{US/C} , UL Listed	CE, CSA _{US/C} , FM, Lloyd's Register

4

Level measurement

Continuous level measurement – Ultrasonic

Ultrasonic

7ML1830-2AN



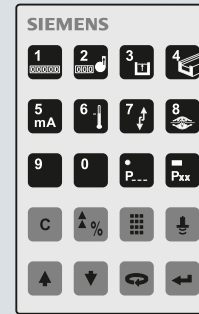
SITRANS Probe LU HART*
SITRANS LU

7ML5830-2AJ



SITRANS Probe LU PROFIBUS

7ML1830-2AK



MultiRanger 100/200
HydroRanger 200
HydroRanger Plus
SITRANS LUC500

* **Note:** To order the IS version of this hand programmer, order 7ML5830-2AH.

4

Handheld programmer selection guide

Application

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

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

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/inch
 Nozzle Diameter: _____ cm/inch

Tank top: Open Flat Conical Parabolic
 Tank bottom: Sloped Flat Conical Parabolic
 Internal equipment and/or obstructions: No Yes Please list _____
 (Eg. 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: 4 ... 20 mA Pump Interlocks (#): _____
 Outputs required: 4 ... 20 mA Relays (#): _____
 HART/4 ... 20 mA AB Remote I/O
 PROFIBUS DP AB DeviceNet
 PROFIBUS PA Other
 Modbus RTU/ASCII None

Products recommended:

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
- 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, chemical storage vessels, and small bulk hoppers.

The range of SITRANS Probe LU is 6 or 12 m (20 or 40 ft). Using Sonic Intelligence, Auto False Echo Suppression for fixed obstruction avoidance, and accuracy of 0.15 % of range or 6 mm (0.25 inch), the Probe LU provides unmatched reliability.

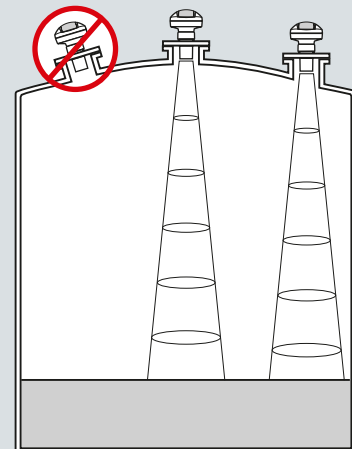
The Probe LU offers two communications options: HART or PROFIBUS PA (Profile version 3.0, Class B).

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.

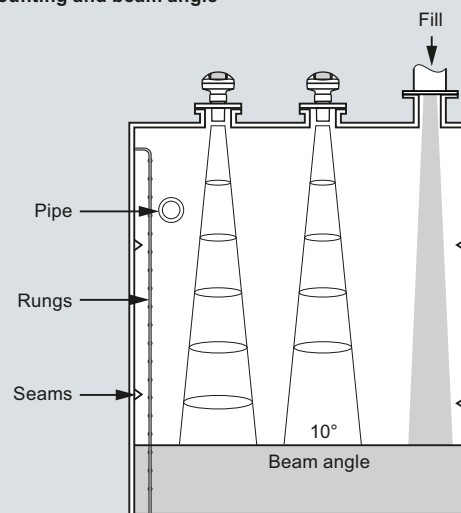
- Key Applications: chemical storage vessels, filter beds, liquid storage vessels

Configuration

Parabolic mounting



Flat mounting and beam angle



SITRANS Probe LU mounting

Level measurement

Continuous level measurement – Ultrasonic transmitters

SITRANS Probe LU

Technical specifications

Mode of operation

Measuring principle	Ultrasonic level measurement
Typical application	Level measurement in storage vessels and simple process vessels

Inputs

Measuring range	
• 6 m (20 ft) model	0.25 ... 6 m (10 inch ... 20 ft)
• 12 m (40 ft) model	0.25 ... 12 m (10 inch ... 40 ft)
Frequency	54 kHz

Outputs

mA/HART	
• Range	4 ... 20 mA
• Accuracy	± 0.02 mA
PROFIBUS PA	Profile 3, Class B

Performance

Resolution	≤ 3 mm (0.12 inch)
Accuracy	± the greater of 0.15 % of range or 6 mm (0.24 inch)
Repeatability	≤ 3 mm (0.12 inch)
Blanking distance	0.25 m (10 inch)
Update time	≤ 5 seconds
• 4/20 mA/HART version	≤ 5 seconds at 4 mA
• PROFIBUS version	≤ 4 seconds at 15 mA current loop
Temperature compensation	Built-in to compensate over temperature range
Beam angle	10°

Rated operating conditions

Ambient conditions	
• Location	Indoor/outdoor
• Ambient temperature	-40 ... +80 °C (-40 ... +176 °F)
• Relative humidity/ingress protection	Suitable for outdoor
• Installation category	I
• Pollution degree	4
• Medium conditions	
- Temperature at flange or threads	-40 ... +85 °C (-40 ... +185 °F)
- Pressure (vessel)	0.5 bar g (7.25 psi g)

Design

Material (enclosure)	PBT (Polybutylene Terephthalate)
Degree of protection	Type 4X/NEMA 4X, Type 6/NEMA 6/IP67/IP68 enclosure
Weight	2.1 kg (4.6 lb)
Cable inlet	2 x M20x1.5 cable gland or 2 x ½" NPT thread or 1 x M20 x 1.5 and 1 x ½" NPT
Material (transducer)	ETFE (Ethylene Tetrafluoroethylene) or PVDF (Polyvinylidene Fluoride)

Process connection

• Threaded connection	2" NPT [(Taper), ANSI/ASME B1.20.1] R 2" [(BSPT), EN 10226] or G 2" [(BSPP), EN ISO 228-1]
• Flange connection	3 inch (80 mm) universal flange
• Other connection	FMS 200 mounting bracket (see page 4/204) or customer supplied mount

Display and Controls

Interface	Local: LCD display with bar graph Remote: Available via HART or PROFIBUS PA
Configuration	Using Siemens SIMATIC PDM (PC) or HART handheld communicator or Siemens infrared handheld programmer
Memory	Non-volatile EEPROM

Power supply

4 ... 20 mA/HART	Nominal 24 V DC with 550 Ω maximum; maximum 30 V DC 4 ... 20 mA
PROFIBUS PA	12, 13, 15, or 20 mA depending on programming (General Purpose or Intrinsically Safe version) per IEC 61158-2

Certificates and Approvals

General	CSA _{US/C} , FM, CE, C-TICK
Marine (only applies to HART communication option)	• Lloyd's Register of Shipping • ABS Type Approval
Hazardous	
• Intrinsically Safe (Europe)	ATEX II 1G EEx ia IIC T4
• Intrinsically Safe (USA/Canada)	CSA/FM T4, Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III
• Intrinsically Safe (Australia/New Zealand)	ANZEx Ex ia IIC T4, Tamb = -40 ... +80 °C (-40 ... +176 °F) IP67, IP68
• Intrinsically Safe (International)	IECEx TSA 04.0020X Ex ia IIC T4
• Intrinsically Safe (Brazil)	INMETRO Br-Ex ia IIC T4
• Non-incendive (USA)	FM T5: Class I, Div. 2, Groups A,B,C, D

Handheld Programmer

Intrinsically Safe Siemens handheld programmer	Infrared receiver
• Approvals for handheld programmer	IS model with ATEX EEx ia IIC T4 CSA/FM Class I, Div. 1, Groups A, B, C, D
Ambient temperature	-20 ... +40 °C (-5 ... +104 °F)
Interface	Proprietary infrared pulse signal
Power	3 V lithium battery (non-replaceable)

Level measurement

Continuous level measurement – Ultrasonic transmitters

SITRANS Probe LU

Selection and Ordering data	Order No.	Selection and Ordering data	Order code
SITRANS Probe LU 2-wire, loop powered ultrasonic transmitter for level, volume and flow monitoring of liquids in open channels, storage vessels, and simple process vessels.	7ML5221- ■ ■ ■ ■ ■	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 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Enclosure/Cable Inlet Plastic (PBT), 1 x M20x1.5 and 1 x ½" NPT (no cable glands supplied) Plastic (PBT), 2 x M20x1.5 (includes 1 general purpose cable gland: 7ML1930-1AM) Plastic (PBT), 2 x ½" NPT (no cable glands supplied)	0 1 2	Operating Instructions for HART/mA device 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. 7ML1998-5HT02 7ML1998-5HT11 7ML1998-5HT32
Range/Transducer material 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	Operating Instructions for PROFIBUS PA device 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.	7ML1998-5QR81
Process connection 2" NPT [(Taper), ANSI/ASME B1.20.1] R 2" [(BSPT), EN 10226] G 2" [(BSPP), EN ISO 228-1]	A B C	Accessories 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) Probe LU, rock guard/sunshield kit, 304 SS SITRANS RD100 Remote display - see Chapter 7 SITRANS RD200 Remote display - see Chapter 7 SITRANS RD500 web, datalogging, alarming, ethernet, and modem support for instrumentation - see Chapter 7	7ML1998-5JB02 7ML1998-5JB32 7ML1998-5QV81
Communication/Output 4 ... 20 mA, HART PROFIBUS PA	1 2		
Approvals General Purpose, FM, CSA, CE, C-TICK, KCC FM, Class I, Div. 2 ¹⁾ Intrinsically Safe, CSA/FM Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III ²⁾ Intrinsically Safe, ATEX II 1G EEx ia IIC T4, INMETRO, CE, C-TICK, KCC ²⁾ Intrinsically safe, ATEX II 1 G EEx ia IIC T4, ANZEx, IECEX, INMETRO, CE, C-TICK, KCC ³⁾ Intrinsically safe, CSA/FM Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1 Group E, F, G; Class III T4 ³⁾	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.			
		Spare Parts Plastic lid	7ML5750-1AA00-0 7ML1830-1KB

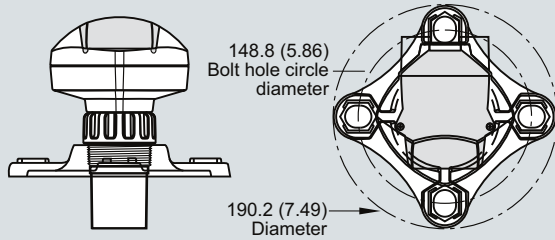
Level measurement

Continuous level measurement – Ultrasonic transmitters

SITRANS Probe LU

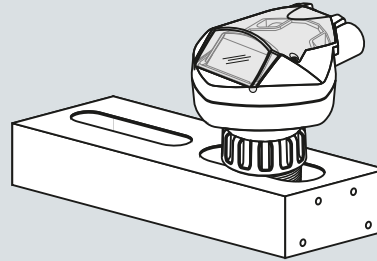
Options

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



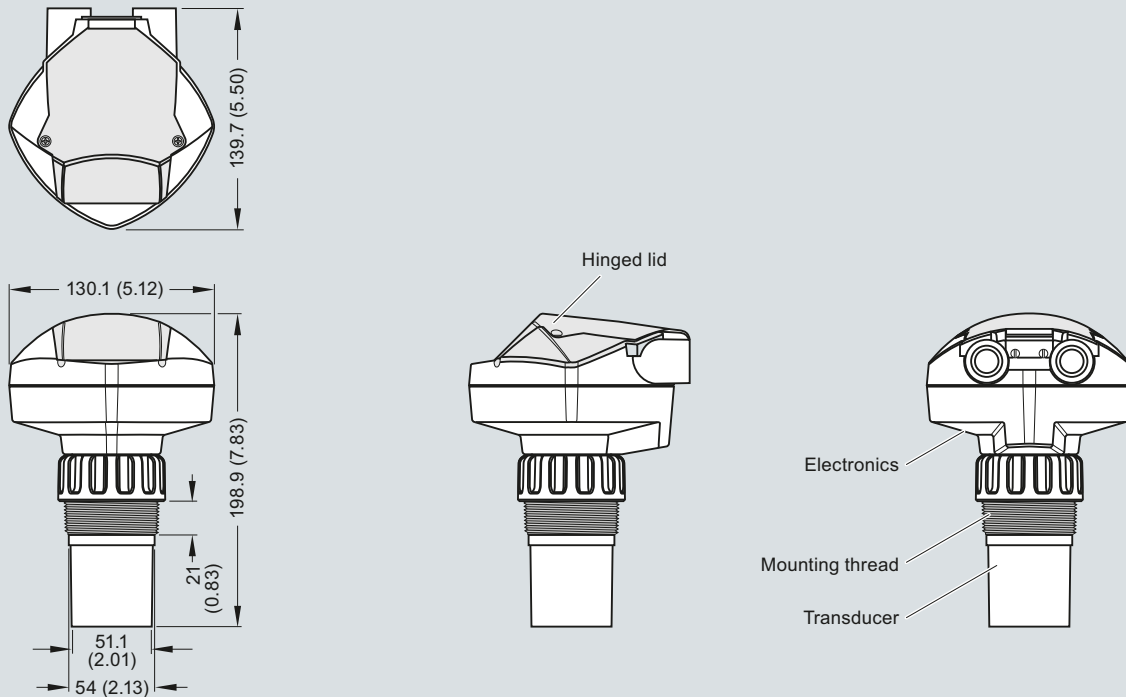
SITRANS Probe LU optional flange adapter, dimensions in mm (inch)

SITRANS Probe LU with FMS 200 mounting bracket



SITRANS Probe LU with optional mounting bracket

Dimensional drawings



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

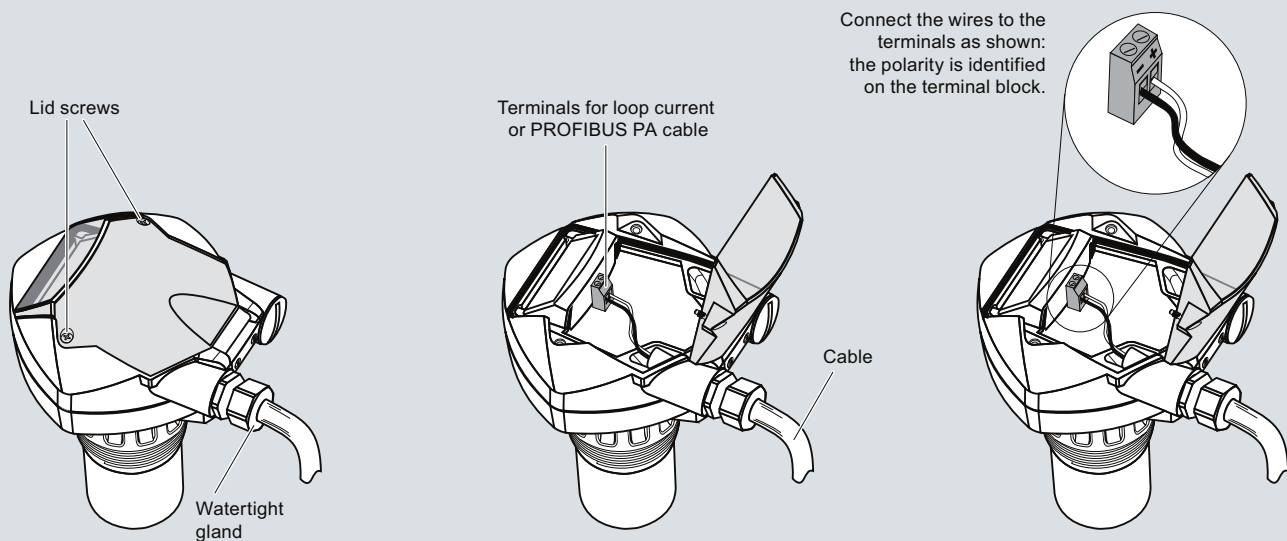
SITRANS Probe LU, dimensions in mm (inch)

Level measurement

Continuous level measurement – Ultrasonic transmitters

SITRANS Probe LU

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 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

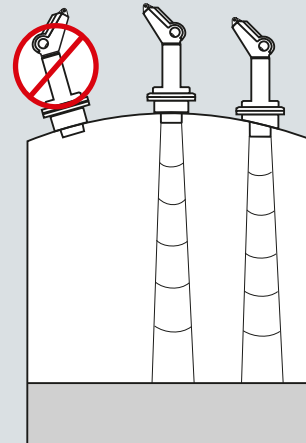
The transducer is available in PVDF copolymer, making the device suitable for use in a wide variety of applications. The Probe is easy to install and maintain, and can be quickly removed for cleaning as required by the food, beverage and pharmaceutical industries.

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.

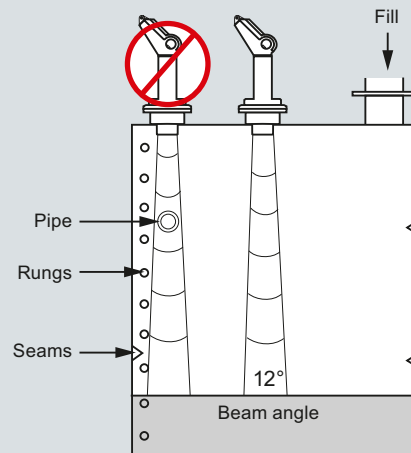
- Key Applications: chemical storage vessels, filter beds, mud pits, liquid storage vessels, food applications

Configuration

Parabolic mounting



Flat mounting and beam angle



The Probe mounting

Level measurement

Continuous level measurement – Ultrasonic transmitters

The Probe

Technical specifications

	Three-wire version	Two-wire version (standard)
Mode of operation		
Measuring principle	Ultrasonic level measurement	Ultrasonic level measurement
Input		
Measuring range	0.25 ... 5 m (0.8 ... 16.4 ft)	0.25 ... 5 m (0.8 ... 16.4 ft)
Output		
• mA	4 ... 20 mA	4 ... 20 mA
- Span	Proportional/ inversely proportional	Proportional/ inversely proportional
- Max. load	750 Ω at 24 V DC	600 Ω in the loop at 24 V DC
• Relay	For level alarm or fault	No
Power supply		
Supply voltage	18 ... 30 V DC, max. 0.2 A	12 ... 28 V DC, 0.1 A surge
Max. power consumption	5 W (200 mA at 24 V DC)	0.75 W (25 mA at 24 V DC)
Certificates and approvals		
	CE, C-TICK, CSA _{US/C} , FM	CE, C-TICK, CSA _{US/C}
Accuracy		
• Error in measurement	0.25 % of measuring range (in air)	
• Resolution	3 mm (0.125 inch)	
• Temperature compensation	Built in	
• Echo processing	Sonic Intelligence	
Rated operation conditions		
• 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	
Design		
• Weight		
- Without flange adapter	1.5 kg (3.3 lb)	
- With flange adapter	1.7 kg (3.7 lb)	
• 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.
The Probe	7ML1201-
Short-range integrated ultrasonic level transmitter, ideal for liquids and slurries in open or closed vessels	0 0
Measuring range	1
5 m (16.40 ft)	
Transducer/Process connection	E
PVDF copolymer, 2" NPT [(Taper), ANSI/ASME B1.20.1]	F
PVDF copolymer, R 2" [(BSPT), EN 10226]	G
PVDF copolymer, G 2" [(BSPP), EN ISO 228-1]	J
PVDF copolymer, 4" Sanitary mounting	
Model/Approval	E
3 Wire, 24 V DC, CE, C-TICK, CSA, FM	F
2 Wire, 24 V DC, CE, C-TICK, CSA	

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 inch)]; Measuring-point number/identification (max. 20 characters) specify in plain text	Y17
Additional Operating Instructions	
3 Wire, 24 V model, Multi-language manual	7ML1998-5GD62
2 Wire model, Multi-language manual	7ML1998-5GC63
Accessories	
Universal Box Bracket Mounting kit	7ML1830-1BK
Sanitary 4" mounting clamp	7ML1830-1BR
3" ASME, DN 65 PN 10, JIS 10K 3B ETFE Flange adapter for 2" NPT	7ML1830-1BT
3" ASME, DN 65 PN 10, JIS 10K 3B ETFE Flange adapter for 2" BSPT	7ML1830-1BU
2" NPT locknut, plastic	7ML1830-1DT
2" BSPT locknut, plastic	7ML1830-1DQ
Plastic M20 cable gland with metal locknut	7ML1930-1DB
SITRANS RD100 Remote display - see Chapter 7	
SITRANS RD200 Remote display - see Chapter 7	
SITRANS RD500 web, datalogging, alarming, ethernet, and modem support for instrumentation - see Chapter 7	7ML5750-1AA00-0

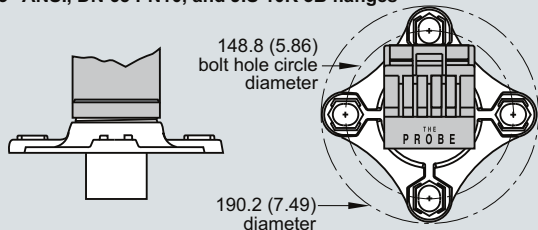
Level measurement

Continuous level measurement – Ultrasonic transmitters

The Probe

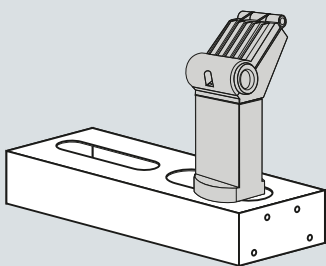
Options

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



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

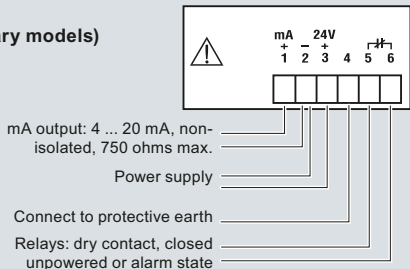
The probe with FMS 200 mounting bracket



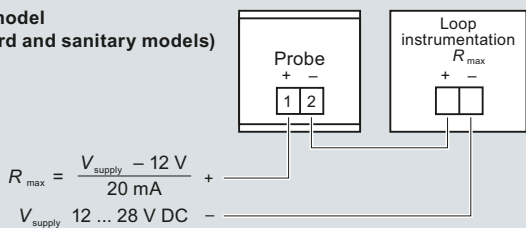
The Probe with Optional Mounting Bracket

Schematics

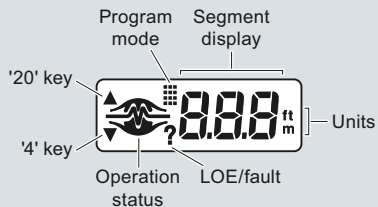
3 wire model (standard and sanitary models)



2 wire model (standard and sanitary models)



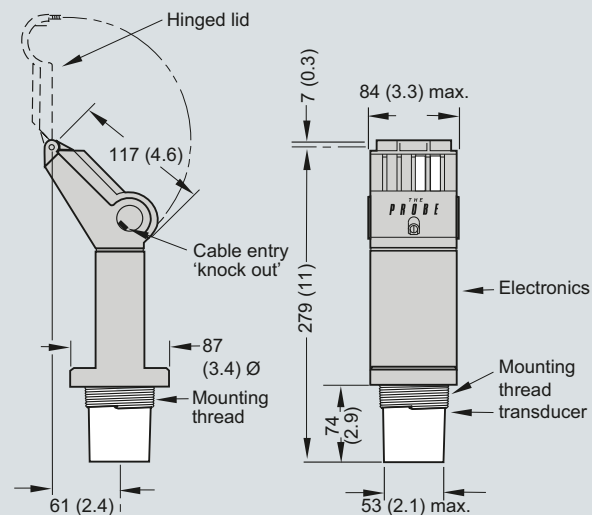
Display



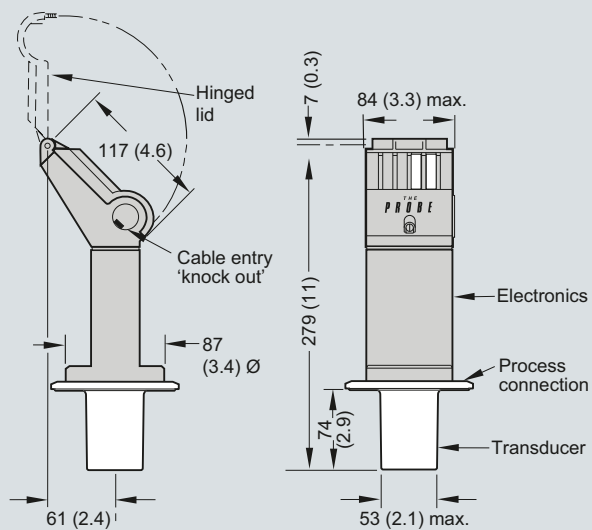
The Probe connections

Dimensional drawings

Standard model



Sanitary model



The Probe, dimensions in mm (inch)

Level measurement

Continuous level measurement – Ultrasonic controllers

SITRANS LUT400 series

Overview



The Siemens SITRANS LUT400 series controllers are compact, single point, long-range ultrasonic controllers for continuous level or volume measurement of liquids, slurries, and solids, and high accuracy monitoring of open channel flow.

Benefits

- Small 1/2 DIN enclosure [144 h x 144 d x 146 w mm (5.7 x 5.7 x 5.75 inch)] with standard universal mounting bracket for wall, pipe, and DIN rail, plus an optional panel mount
- Easy to use LUI display with local four-button programming, menu-driven parameters, and Wizard support for key applications
- Level, Volume, OCM Flow monitoring
- Three relays combined with a suite of pump, alarm, and relay control features
- HART Communications
- EDDs for SIMATIC PDM, AMS Device Manager, and Field Communicator 375/475, plus DTMs for FDTs (Field Device Tools)
- Web browser for local programming from an intuitive web-based interface
- Two discrete inputs for backup level override and pump interlock functions
- Echo profile and trend views from the local display
- Patented digital receiver for improved performance in electrically noisy applications (close proximity to VSDs)
- Real time clock with daylight savings time, supporting an integrated datalogger and energy saving algorithms for minimizing pump operation during high cost energy periods
- Removable terminal blocks for ease of wiring

Application

The SITRANS LUT400 comes in three different models, depending on the application, level of performance and functionality required:

- SITRANS LUT420 Level Controller: Level or volume measurement of liquids, slurries, and solids, as well as basic pump control functions, and basic data logging capability
- SITRANS LUT430 Level, Pump and Flow Controller: Includes all features of the LUT420 plus a full suite of advanced pump control and alarm functionality, open channel flow monitoring, and basic flow data logging capability
- SITRANS LUT440 High Accuracy OCM: Our most featured, highest accuracy model. Includes all features of the LUT430, plus the industry's best accuracy (± 1 mm within 3 m), full suite of advanced control functionality, and enhanced flow logging capability
- Key applications: wet wells, reservoirs, flumes/weirs, chemical storage, liquid storage, hoppers, crusher bins, dry solids storage

Level measurement

Continuous level measurement – Ultrasonic controllers

SITRANS LUT400 series

Technical specifications

Mode of Operation	Ultrasonic level, volume, pump, and open channel flow
Measuring principle	
Measuring range	0.3 ... 60 m (1 ... 196 ft), transducer dependent
Input	
Discrete	0 ... 50 V DC switching level Logical 0 ≤ 10 V DC Logical 1 = 10 ... 50 V DC Max. 3 mA
Output	
Transducer frequency	10 ... 52 kHz
Ultrasonic transducer	Compatible transducers: All EchoMax and ST-H series trans- ducers
Relays	<ul style="list-style-type: none"> • 1 SPDT Form C, NO or NC relay, rated 1A at 250 V AC, non-inductive and 3A at 30 V DC • 2 SPST Form A, NO relays, rated 5A at 250 V AC, non-inductive and 3 A at 30 V DC
mA output	4 ... 20 mA, isolated
• Max. load	600 Ω max. in ACTIVE mode, 750 Ω max. in PASSIVE mode
• Resolution	0.1 % of range
Accuracy	
Error in measurement	<ul style="list-style-type: none"> • Standard operation: ± 1 mm (0.04 inch) plus 0.17 % of measured distance • High accuracy OCM: ± 1 mm (0.04 inch), within 3 m (9.84 ft) range
Resolution	<ul style="list-style-type: none"> • Standard operation: 0.1 % of range or 2 mm (0.08 inch), whichever is greater • High accuracy OCM: 0.6 mm (0.02 inch), within 3 m (9.84 ft) range
Temperature compensation	<ul style="list-style-type: none"> • -40 ... +150 °C (-40 ... +300 °F) • Integral temperature sensor in transducer • External TS-3 temperature sensor (optional) • Programmable fixed temperature values
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	
• Enclosure with display lid	1.3 kg (2.87 lb)
• Enclosure with blank lid	1.2 kg (2.65 lb)
Material (enclosure)	Polycarbonate
Degree of protection	
• Enclosure with display or blank lid	IP65/Type 4X/NEMA 4X
• Enclosure with blank lid and knock-out removed	IP20
Remote display lid	IP65/Type 3/NEMA 3
Cable	
Transducer and mA output signal	<ul style="list-style-type: none"> • Transducer, mA output: 2 copper conductors, twisted, with foil shield/drain wire, 300 V 0.5 ... 0.75 mm² (22 ... 18 AWG) • Relay/power to be copper conductors per local requirements to meet 250 V 5 A contact rating
Max. separation between transducer and transceiver	365 m (1 200 ft)
Displays and controls	
	60 x 40 mm (2.36 x 1.57 inch) removeable LCD, 240 x 160 pixels resolution, operational up to 5 m from enclosure base
Programming	
• Primary	4 Local push buttons
• Secondary	<ul style="list-style-type: none"> • PC running SIMATIC PDM • PC running Emerson AMS Device Manager • PC running a web browser • PC running a Field Device Tool (FDT) • Field Communicator 375/475 (FC375/FC475)
Memory	<ul style="list-style-type: none"> • 512 kB flash EPROM • 1.5 MByte flash for data logging
Power supply	
AC version	100 ... 230 V AC ± 15 %, 50/60 Hz, 36 VA Fuse: 5 x 20 mm, Slow Blow, 0.25 A, 250 V
DC version	10 ... 32 V DC, 10 W Fuse: 5 x 20 mm, Slow Blow, 1.6 A, 125 V
Certificates and approvals	
General	CSA _{US/C} , CE, FM, UL listed, C-TICK
Hazardous	
• Non-incendive (Canada)	CSA Class I, Div. 2, Groups A, B, C, D; Class II, Div. 2, Groups F, G; Class III
Communication	HART 7.0, USB

Level measurement

Continuous level measurement – Ultrasonic controllers

SITRANS LUT400 series

Category	Feature	SITRANS LUT420 Level Controller	SITRANS LUT430 Level, pump and flow controller	SITRANS LUT440 High accuracy OCM controller
Operations	Level, space, and distance measurement	✓	✓	✓
	Open channel flow measurement		✓	✓
	Volume conversion	✓	✓	✓
Specifications	Compatible with EchoMax and ST-H transducers	✓	✓	✓
	Standard accuracy: ± 1 mm +0.17 % of measured distance	✓	✓	✓
	High accuracy: ± 1 mm within 3 meters			✓
	Mounting options: wall or panel, pipe, DIN-rail	✓	✓	✓
Data logging and communications	HART communications	✓	✓	✓
	4 ... 20 mA output (active and passive)	✓	✓	✓
	Integrated datalogger for measurement value and alarms	✓	✓	✓
	Integrated datalogger for fixed rate flow logging		✓	✓
	Integrated datalogger for variable rate flow logging			✓
	Daily data logging for maximum, minimum and average flow, daily totalized volume, and minimum and maximum temperature			✓
Flow monitoring	High accuracy open channel flow measurement			✓
	9 digit daily and running flow totalizers		✓	✓
	High and low flowrate alarms		✓	✓
	External totalizer and sampler control		✓	✓
Pump control	Energy saving algorithms for pump control		✓	✓
	Wall cling reduction	✓	✓	✓
	Pump run-on functionality		✓	✓
	Pump start and power resumption delays		✓	✓
	Alternate duty pump routines	✓	✓	✓
	Fixed duty and service ratio pump routines		✓	✓
	Pumped volume totalizer		✓	✓
	Submergence detection	✓	✓	✓
	Discrete input pump interlocks		✓	✓
Time to spill calculation			✓	

Level measurement

Continuous level measurement – Ultrasonic controllers

SITRANS LUT400 series

Selection and Ordering data	Order No.	Selection and Ordering data	Order No.
SITRANS LUT420 and LUT430 Compact ultrasonic level controllers for continuous short to long-range level or volume measurement of liquids, slurries, and solids. Both units include basic relay functions for pumps, alarms, and other controls, plus onboard data logging. LUT430 offers additional advanced pump control and alarm functionality, open channel flow monitoring, and basic flow data logging capability. Functionality varies by model.	7ML5050- 	Further designs Please add "-Z" to Order No. and specify Order code(s). Manufacturer's test certificate M to DIN 55350, Part 18 and to ISO 9000 Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text Namur NE43 failsafe setting - device preset to failsafe < 3.6 mA	C11 Y15 N07
Model SITRANS LUT420 - Level controller SITRANS LUT430 - Level, Pump & Flow controller	A B	Operating Instructions English French Spanish German Italian Note: The operating instructions should be ordered as a separate line item on the order.	7ML1998-5MV01 7ML1998-5MV11 7ML1998-5MV21 7ML1998-5MV31 7ML1998-5MV51
Enclosure display options With display With remote panel mount display No display (blank lid provided) Note: Enclosure includes back-plate for wall and pipe mounting, and an integrated clip for DIN-rail mounting. DIN-rail mounting for standard TS35 x 7.5 and TS35 x 15 mm DIN-rail to IEC 60715, EN 60715	A B C	Communications Manual English French Spanish German Italian Note: The communications manual should be ordered as a separate line item on the order.	7ML1998-5NE01 7ML1998-5NE11 7ML1998-5NE21 7ML1998-5NE31 7ML1998-5NE51
Input voltage 100 ... 230 V AC ± 15 % 10 ... 32 V DC	1 2	Accessories Tag, stainless steel, 12 x 45 mm (0.47 x 1.77 inch), one text line, suitable for enclosure TS-3 Temperature Sensor - see TS-3 in catalog Panel mount cable extension, 2.5 m (8.2 ft) Qty 3 cable glands and retaining nuts USB cable, 2 m (6.56 ft) - Standard USB-A to USB-mini B HART modem/RS-232 (for use with a PC and SIMATIC PDM) Hart modem/USB (for use with a PC and SIMATIC PDM) Sunshield, 304 stainless steel	7ML1930-1AC 7ML1813 7ML1930-1GF 7ML1930-1GB 7ML1930-1GD 7MF4997-1DA 7MF4997-1DB 7ML1930-1GE
Cable inlet 3 cable inlets, cable glands not supplied 3 cable inlets, 3 M20 plastic cable glands supplied	1 2	Spare parts Panel mount retrofit kit (convert standard unit with display to panel mount version) Terminal block replacement kit (5 piece kit with one of each removable terminal) Wall/Pipe mount plate Enclosure (include blank label) Lid (with Display) No display (blank lid provided) Fuse - AC (0.25 A, 250 V, Slow Blow) Fuse - DC (1.6 A, 125 V, Slow Blow) Battery BR2032 Panel mount gasket and fastener kit DIN-rail clip	7ML1830-1PA 7ML1830-1PB 7ML1830-1PC 7ML1830-1PD 7ML1830-1PE 7ML1830-1PF 7ML1830-1PG 7ML1830-1PH 7ML1830-1PJ 7ML1830-1PK 7ML1830-1PL
Number of measurement points Single point system (includes one transducer input, one mA output, and one external temperature sensor input)	1		
Communications and I/O HART, 2 discrete inputs, 3 relays	D		
Approvals General purpose CE, FM, CSA _{US/C} , UL, C-TICK Hazardous locations CSA Class I, II, III, Div. 2 (Groups A,B,C,D,F,G)	A C		

Level measurement

Continuous level measurement – Ultrasonic controllers

SITRANS LUT400 series

Selection and Ordering data

SITRANS LUT440

The SITRANS LUT440 is the most accurate and featured model in the LUT400 series. It includes high accuracy open channel monitoring, relay functions for external samplers, totalizers, alarms, and enhanced data logging, as well as all pump and control functions available with other models in the LUT400 series.

Model

SITRANS LUT440 - High accuracy Open Channel Monitor¹⁾

Enclosure display options

With display

With remote panel mount display

No display (blank lid provided)

Note: Enclosure includes back-plate for wall and pipe mounting, and an integrated clip for DIN-rail mounting. DIN-rail mounting for standard TS35 x 7.5 and TS35 x 15 mm DIN-rail to IEC 60715, EN 60715

Input voltage

100 ... 230 V AC ± 15 %

10 ... 32 V DC

Cable inlet

3 cable inlets, cable glands not supplied

3 cable inlets, 3 M20 plastic cable glands supplied

Number of measurement points

Single point system (includes one transducer input, one mA output, and one external temperature sensor input)

Communications and I/O

HART, 2 discrete inputs, 3 relays

Approvals

General purpose CE, FM, CSA_{US/C}, UL, C-TICK
Hazardous locations CSA Class I, II, III, Div. 2,
(Groups A,B,C,D,F,G)

¹⁾ Compatible with all EchoMax Transducers. High accuracy OCM performance with the use of an XRS-5 transducer and TS-3 temperature sensor (each sold separately).

Order No.

7ML5050-

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Selection and Ordering data

Further designs

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

Manufacturer's test certificate M to DIN 55350, Part 18 and to ISO 9000

Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]:
Measuring-point number/identification
(max. 27 characters) specify in plain text

Namur NE43 failsafe setting - device preset to fail-safe < 3.6 mA

Operating Instructions

English

French

Spanish

German

Italian

Note: The operating instructions should be ordered as a separate line item on the order.

Communications Manual

English

French

Spanish

German

Italian

Note: The communications manual should be ordered as a separate line item on the order.

Accessories

Tag, stainless steel, 12 x 45 mm (0.47 x 1.77 inch), one text line, suitable for enclosure

TS-3 Temperature Sensor - see TS-3 in catalog

Panel mount cable extension 2.5 m (8.2 ft)

Qty 3 cable glands and retaining nuts

USB cable 2 m (6.56 ft) - Standard USB-A to USB-mini B

HART modem/RS-232 (for use with a PC and SIMATIC PDM)

HART modem/USB (for use with PC and SIMATIC PDM)

Sunshield, 304 stainless steel

Spare parts

Panel mount retrofit kit (convert standard unit with display to panel mount version)

Terminal block replacement kit (5 piece kit with one of each removable terminal)

Wall/ Pipe mount plate

Enclosure (include blank label)

Lid (with Display)

No display (blank lid provided)

Fuse - AC (0.25 A, 250 V, Slow Blow)

Fuse - DC (1.6 A, 125 V, Slow Blow)

Battery BR2032

Panel mount gasket and fastener kit

DIN-rail clip

Order No.

C11

Y15

N07

7ML1998-5MV01

7ML1998-5MV11

7ML1998-5MV21

7ML1998-5MV31

7ML1998-5MV51

7ML1998-5NE01

7ML1998-5NE11

7ML1998-5NE21

7ML1998-5NE31

7ML1998-5NE51

7ML1930-1AC

7ML1813

7ML1930-1GF

7ML1930-1GB

7ML1930-1GD

7MF4997-1DA

7MF4997-1DB

7ML1930-1GE

7ML1830-1PA

7ML1830-1PB

7ML1830-1PC

7ML1830-1PD

7ML1830-1PE

7ML1830-1PF

7ML1830-1PG

7ML1830-1PH

7ML1830-1PJ

7ML1830-1PK

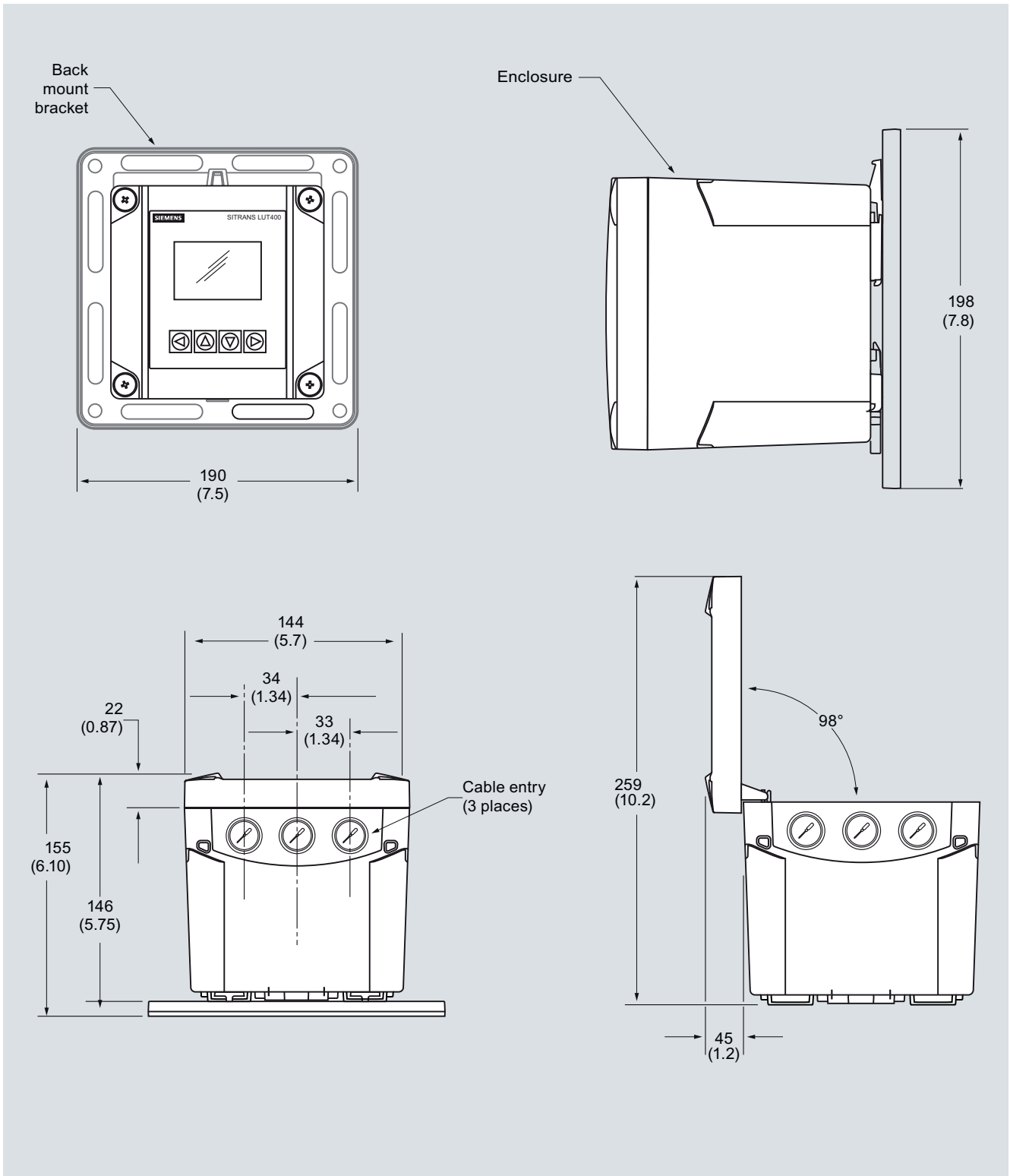
7ML1830-1PL

Level measurement

Continuous level measurement – Ultrasonic controllers

SITRANS LUT400 series

Dimensional drawings



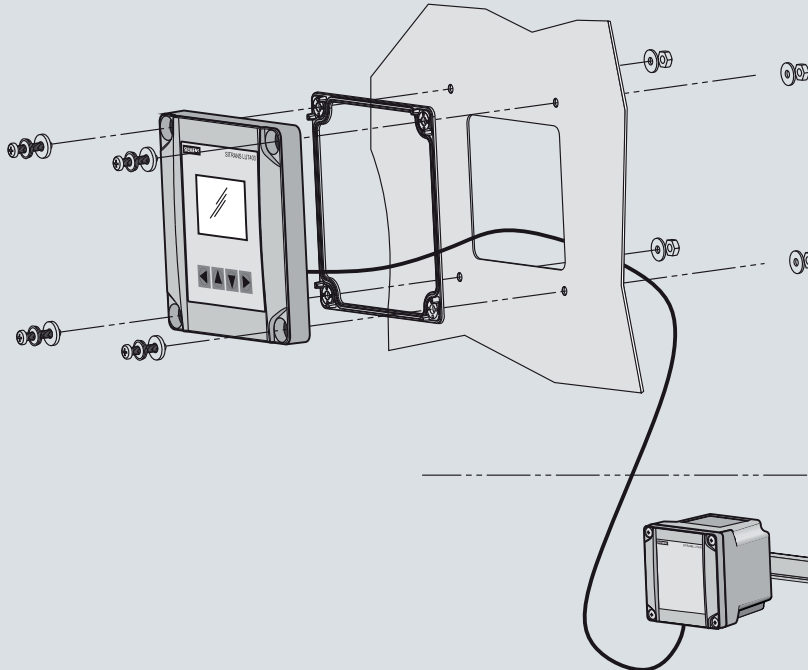
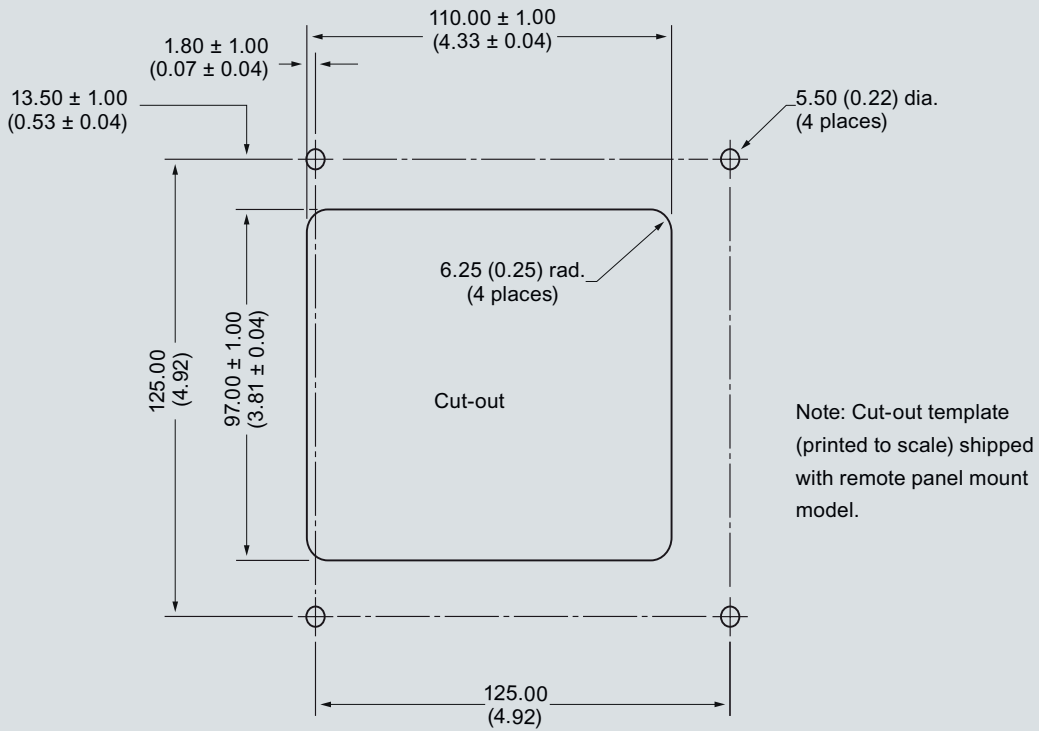
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SITRANS LUT400, dimensions in mm (inch)

Level measurement

Continuous level measurement – Ultrasonic controllers

SITRANS LUT400 series



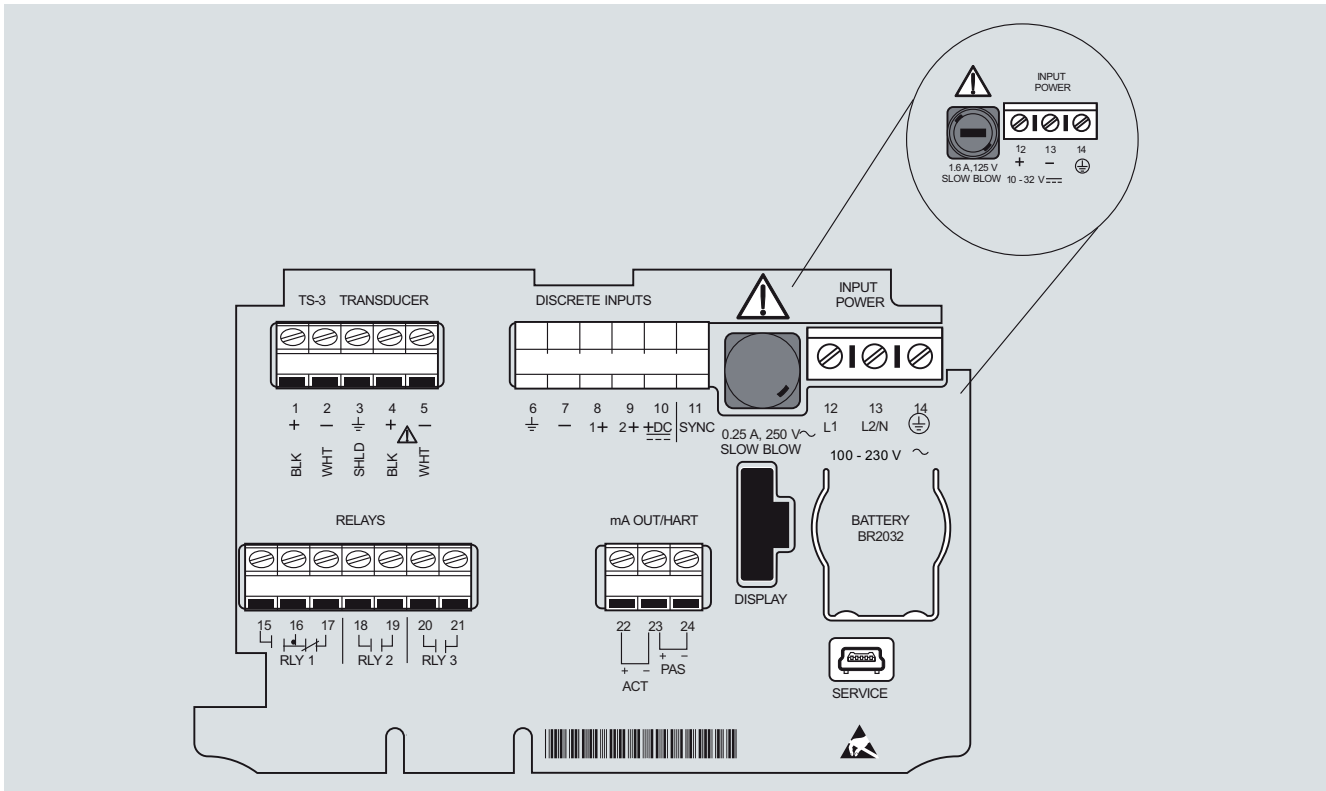
SITRANS LUT400, dimensions in mm (inch)

Level measurement

Continuous level measurement – Ultrasonic controllers

SITRANS LUT400 series

Schematics



4

SITRANS LUT400 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

Mode of Operation	
Measuring principle	Ultrasonic level measurement
Measuring range	0.3 ... 15 m (1 ... 50 ft)
Measuring points	1 or 2
Input	
• Analog (MultiRanger 200 only)	0 ... 20 mA or 4 ... 20 mA, from alternate device, scalable
• Discrete	10 ... 50 V DC switching level Logical 0 ≤ 0.5 V DC Logical 1 = 10 ... 50 V DC Max. 3 mA
Output	
EchoMax transducer	44 kHz
Ultrasonic transducer	Compatible transducers: ST-H and EchoMax series XPS-10/10F, XPS 15/15F, XCT-8, XCT-12, and XRS-5
Relays	Rating 5 A at 250 V AC, non-inductive 1 SPST Form A
• Version with 1 relay (MultiRanger 100 only)	
• Version with 3 relays	
• Version with 6 relays	
mA output	2 SPST Form A/1 SPDT Form C 4 SPST Form A/2 SPDT Form C
• Max. load	0 ... 20 mA or 4 ... 20 mA 750 Ω, isolated
• Resolution	0.1 % of range
Accuracy	
Error in measurement	0.25 % of range or 6 mm (0.24 inch), whichever is greater
Resolution	0.1 % of measuring range ¹⁾ or 2 mm (0.08 inch), whichever is greater
Temperature compensation	<ul style="list-style-type: none"> • -50 ... +150 °C (-58 ... +302 °F) • Integral temperature sensor • External TS-3 temperature sensor (optional) • Programmable fixed temperature values
Rated operating conditions	
Installation conditions	
• Location	Indoor/outdoor
• Installation category	II
• Pollution degree	4
Ambient conditions	
• Ambient temperature (housing)	-20 ... +50 °C (-4 ... +122 °F)

Design	
Weight	
• Wall mount	1.37 kg (3.02 lb)
• Panel mount	1.50 kg (3.31 lb)
Material (enclosure)	Polycarbonate
Degree of protection (enclosure)	
• Wall mount	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 ² (22 ... 18 AWG), Belden 8760 or equivalent is acceptable 365 m (1 200 ft)
• Max. separation between transducer and transceiver	
Displays and controls	
Programming	100 x 40 mm (4 x 1.5 inch) multi-block LCD with backlighting Programming using hand-held programmer, SIMATIC PDM or via PC with Dolphin Plus software
Power supply	
• AC version	100 ... 230 V AC ± 15 %, 50/60 Hz, 36 VA (17 W)
• DC version	12 ... 30 V DC (20 W)
Certificates and approvals	
	<ul style="list-style-type: none"> • CE, C-TICK²⁾ • Lloyd's Register of Shipping • ABS Type Approval • FM, CSA_{US/C}, UL listed • CSA Class I, Div. 2, Groups A, B, C and D, Class II, Div.2, Groups F and G, Class III (wall mount only), ATEX II 3D
Communication	
	<ul style="list-style-type: none"> • RS 232 with Modbus RTU or ASCII via RJ-11 connector • RS 485 with Modbus RTU or ASCII via terminal strips • Optional: SmartLinX cards for <ul style="list-style-type: none"> - PROFIBUS DP - DeviceNet - Allen-Bradley Remote I/O

- ¹⁾ Program range is defined as the empty distance to the face of the transducer plus any range extension.
²⁾ EMC performance available on request

Level measurement

Continuous level measurement – Ultrasonic controllers

MultiRanger 100/200

Selection and Ordering data	Order No.
MultiRanger 100/200 Versatile short to medium-range ultrasonic single and multi-vessel level monitor/controller for virtually any application in a wide range of industries	7ML5033- ■■■■■ - ■■
Versions MultiRanger 100, level measurement only MultiRanger 200, level, volume, flow and differential measurements	1 2
Mounting, enclosure design Wall mount, standard enclosure Wall mount, 4 entries, 4 M20 cable glands included Panel mount (CE, CSA _{USIC} , FM, UL)	A B C
Power supply 100 ... 230 V AC 12 ... 30 V DC	A B
Number of measurement points Single point version Dual point version	0 1
Communication (SmartLinX) Without module SmartLinX Allen-Bradley Remote I/O module SmartLinX PROFIBUS DP module SmartLinX DeviceNet module See SmartLinX product page 4/343 for more information.	0 1 2 3
Output relays 3 relays (2 Form A, 1 Form C), 250 V AC 6 relays (4 Form A, 2 Form C), 250 V AC 1 relay (1 Form A), 250 V AC (available on MultiRanger 100 model only)	1 2 3
Approvals General Purpose CE, FM, CSA _{USIC} , 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 ¹⁾ ATEX II 3D ²⁾	A B C

¹⁾ For wall mount applications only

²⁾ For standard enclosure wall mount, option A only

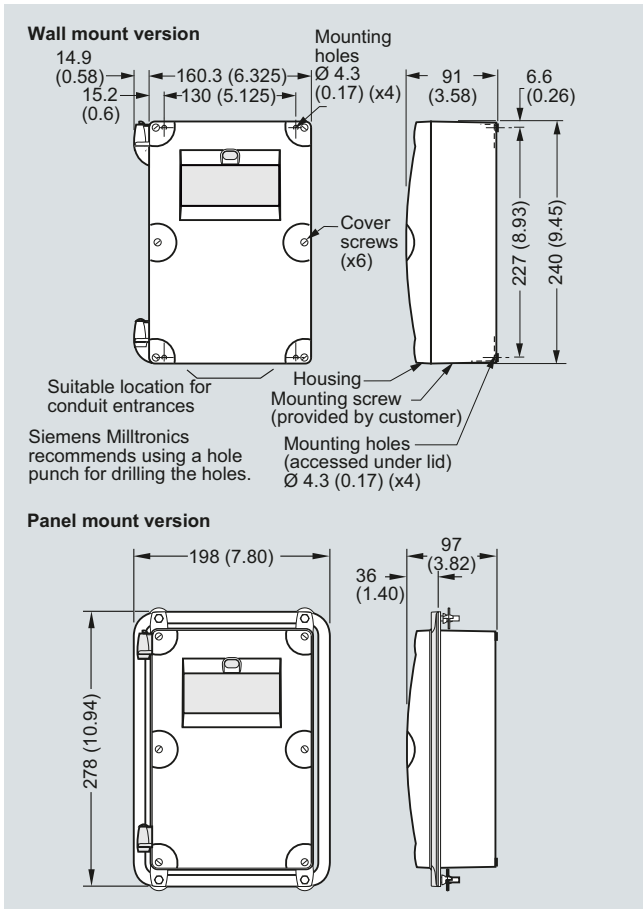
Selection and Ordering data	Order code
Further designs Please add "-Z" to Order No. and specify Order code(s). Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Operating Instructions English French Spanish German 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. 7ML1998-5FB06 7ML1998-5FB13 7ML1998-5FB23 7ML1998-5FB36 7ML1998-5QD83
Other Operating Instructions SmartLinX Allen-Bradley Remote I/O, English SmartLinX PROFIBUS DP, English SmartLinX PROFIBUS DP, German SmartLinX DeviceNet, English Note: The appropriate SmartLinX Operating Instructions should be ordered as a separate line on the order.	7ML1998-1AP03 7ML1998-1AQ03 7ML1998-1AQ33 7ML1998-1BH02
Accessories Handheld programmer Tag, stainless steel, 12 x 45 mm (0.47 x 1.77 inch), one text line, suitable for enclosure M20 cable gland kit (4 M20 cable glands, 4 M20 nuts, 4 washers) Sunshield kit, 304 SS SITRANS RD100 Remote display - see Chapter 7 SITRANS RD200 Remote display - see Chapter 7 SITRANS RD500 web, datalogging, alarming, ethernet, and modem support for instrumentation - see Chapter 7	7ML1830-2AK 7ML1930-1AC 7ML1930-1FV 7ML1930-1GA 7ML5750-1AA00-0
Spare parts Power Supply Board (100 ... 230 V AC) Power Supply Board (12 ... 30 V DC) Display Board	7ML1830-1MD 7ML1830-1ME 7ML1830-1MF

Level measurement

Continuous level measurement – Ultrasonic controllers

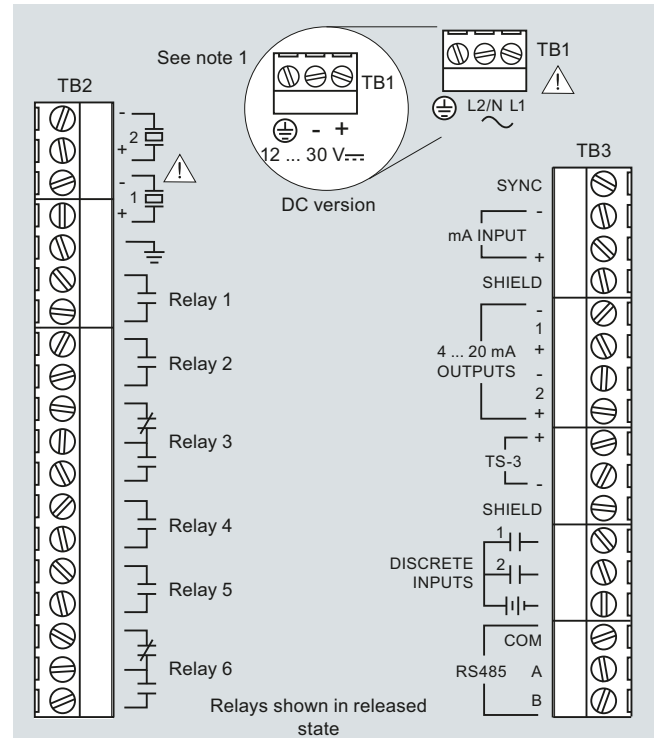
MultiRanger 100/200

Dimensional drawing



MultiRanger, dimensions in mm (inch)

Schematics



Note:

1. Use 2-core copper wire, twisted, with shield, for expansion up to 365 m (1 200 ft). Route cable in grounded metal conduit, separate from other cables.
2. Verify that all system components are installed in accordance with instructions.
3. Connect all cable shields to the MultiRanger shield connections. Avoid differential ground potentials by not connecting cable shields to ground (earth) anywhere else.
4. Keep exposed conductors on shielded cables as short as possible to reduce noise on the line caused by stray transmissions and noise pickup.

MultiRanger connections

Level measurement

Continuous level 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 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

Level measurement

Continuous level measurement – Ultrasonic controllers

HydroRanger 200

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 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 ¹⁾	Rating 5 A at 250 V AC, non-inductive
<ul style="list-style-type: none"> • Model with 1 relay²⁾ • Model with 3 relays²⁾ • Model with 6 relays 	1 SPST Form A 2 SPST Form A/1 SPDT Form C 4 SPST Form A/2 SPDT Form C
mA output	0 ... 20 mA or 4 ... 20 mA
<ul style="list-style-type: none"> • Max. load • Resolution 	750 Ω, isolated 0.1 % of range
Accuracy	
Error in measurement	0.25 % of range or 6 mm (0.24 inch), whichever is greater
Resolution	0.1 % of measuring range or 2 mm (0.08 inch), whichever is greater ³⁾
Temperature compensation	<ul style="list-style-type: none"> • -50 ... +150 °C (-58 ... +302 °F) • Integral temperature sensor in transducer • External TS-3 temperature sensor (optional) • Programmable fixed temperature values
Rated operating conditions	
Installation conditions	
<ul style="list-style-type: none"> • Location • Installation category • Pollution degree 	indoor / outdoor II 4
Ambient conditions	
Ambient temperature (enclosure)	-20 ... +50 °C (-4 ... +122 °F)

Design	
Weight	
<ul style="list-style-type: none"> • Wall mount • Panel mount 	1.37 kg (3.02 lb) 1.50 kg (3.31 lb)
Material (enclosure)	Polycarbonate
Degree of protection (enclosure)	
<ul style="list-style-type: none"> • Wall mount • Panel mount 	IP65/Type 4X/NEMA 4X IP54/Type 3/NEMA 3
Cable	
<ul style="list-style-type: none"> • Transducer and mA output signal • Max. separation between transducer and transceiver 	2-core copper conductor, twisted, shielded, 300 Vrms, 0.82 mm ² (18 AWG), Belden 8760 or equivalent is acceptable 365 m (1 200 ft)
Displays and controls	
Programming	100 x 40 mm (4 x 1.5 inch) multi-block LCD with backlighting Programming using handheld programmer or via PC with SIMATIC PDM software
Power supply ⁴⁾	
AC version	100 ... 230 V AC ± 15 %, 50/60 Hz, 36 VA (17 W)
DC version	12 ... 30 V DC (20 W)
Certificates and approvals	
	<ul style="list-style-type: none"> • CE, C-TICK⁵⁾ • Lloyd's Register of Shipping • ABS Type Approval • FM, CSA_{US/C}, UL listed • CSA_{US/C} Class I, Div. 2, Groups A, B, C and D, Class II, Div. 2, Groups F and G, Class III (wall mount only) • MCERTS Class 1 approved for Open Channel Flow
Communication	
	<ul style="list-style-type: none"> • RS 232 with Modbus RTU or ASCII via RJ-11 connector • RS 485 with Modbus RTU or ASCII via terminal blocks • Optional: SmartLinx cards for <ul style="list-style-type: none"> - PROFIBUS DP - DeviceNet - Allen-Bradley Remote I/O

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.	Selection and Ordering data	Order code
Siemens HydroRanger 200 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 number of measurement points options below.	7ML5034- 	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 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Mounting Wall mount, standard enclosure Wall mount, 4 entries, 4 M20 cable glands included Panel mount ¹⁾	1 2 3	Operating Instructions 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. 7ML1998-5FC03 7ML1998-5FC11 7ML1998-5FC33
Power supply 100 ... 230 V AC 12 ... 30 V DC	A B	Other Operating Instructions SmartLinX Allen-Bradley Remote I/O, English SmartLinX PROFIBUS DP, English SmartLinX PROFIBUS DP, German SmartLinX DeviceNet, English Note: The appropriate SmartLinX Operating Instructions should be ordered as a separate line on the order.	7ML1998-1AP03 7ML1998-1AQ03 7ML1998-1AQ33 7ML1998-1BH02
Number of measurement points Single point model, 6 relays Dual point model, 6 relays Single point model, level only, 1 relay ²⁾ Single point model, level only, 3 relays ²⁾	A B C D	Accessories Handheld programmer Tag, stainless steel, 12 x 45 mm (0.47 x 1.77 inch), one text line, suitable for enclosure Sunshield kit, 304 SS SITRANS RD100 Remote display - see Chapter 7 SITRANS RD200 Remote display - see Chapter 7 SITRANS RD500 web, datalogging, alarming, ethernet, and modem support for instrumentation - see Chapter 7	7ML1830-2AK 7ML1830-1AC 7ML1930-1GA 7ML5750-1AA00-0
Communication (SmartLinX) Without module SmartLinX Allen-Bradley Remote I/O module SmartLinX PROFIBUS DP module SmartLinX DeviceNet module See SmartLinX product page 4/343 for more information.	0 1 2 3	Spare parts Power Supply Board (100 ... 230 V AC) Power Supply Board (12 ... 30 V DC) Display Board	7ML1830-1MD 7ML1830-1ME 7ML1830-1MF
Approvals General Purpose CE, FM, CSA _{US/IC} , 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		

¹⁾ Available with approval option 1 only

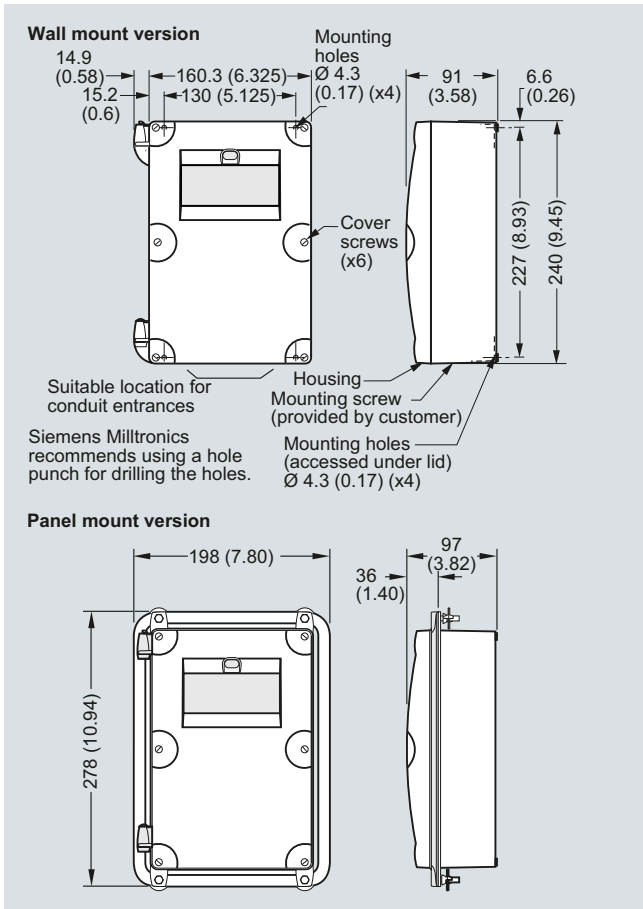
²⁾ This model is level control only; no open channel flow, differential level, or volume conversion functions.

Level measurement

Continuous level measurement – Ultrasonic controllers

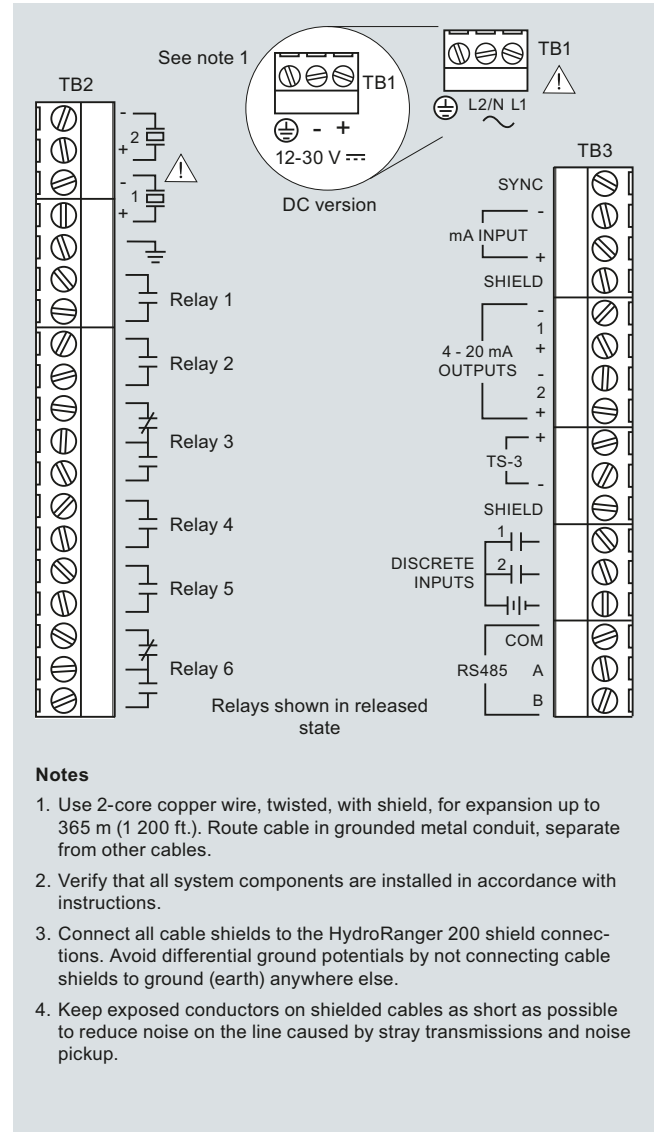
HydroRanger 200

Dimensional drawings



HydroRanger 200, dimensions in mm (inch)

Schematics



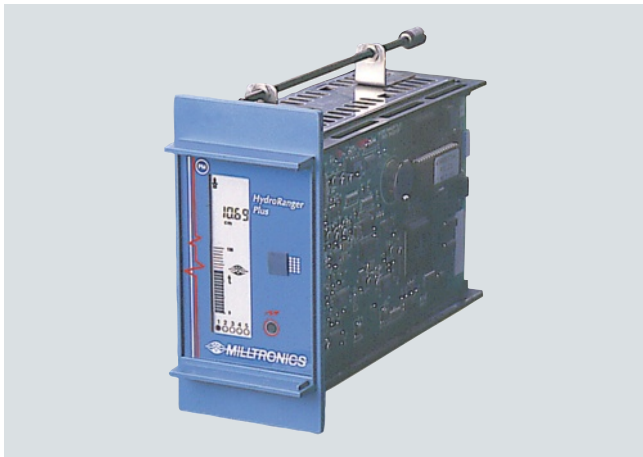
HydroRanger 200 connections

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 tank.

The system consists of the electronics housed in a wall-mounted enclosure and a hermetically sealed, corrosion-resistant Echo-Max transducer. These components can be separated by up to 365 m (1 200 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

Level measurement

Continuous level measurement – Ultrasonic controllers

HydroRanger Plus

Technical specifications

Mode of operation	
Measuring principle	Ultrasonic level measurement
Measuring range	0.3 ... 15 m (1 ... 50 ft)
Measuring points	1 or 2
Output	
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 k Ω
• Resolution	0.1 % of 20 mA
Accuracy	
Error in measurement	0.25 % of range or 6 mm (0.24 inch), whichever is greater
Resolution	0.1 % of measuring range or 2 mm (0.08 inch), whichever is greater ¹⁾
Temperature compensation	-50 ... +150 °C (-58 ... +302 °F) <ul style="list-style-type: none"> • Integral temperature sensor • External TS-3 temperature sensor (optional) • Programmable fixed temperature
Rated operating conditions	
Ambient conditions	
• Ambient temperature for enclosure	-20 ... +50 °C (-4 ... +122 °F)
Design	
Rack mount	DIN 3 HU/14 pitch, 4 rail plug-in unit suitable for standard 84 pitch (19 inch) rack
Panel mount	Suitable for standard panel cutout DIN 43 700, 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 lb)
Weight (wall mount)	1.5 kg (3.3 lb)
Material (enclosure)	Polyester/polycarbonate alloy
Electrical connection	
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 ² (22 ... 18 AWG), Belden 8760 or equivalent is acceptable

Power supply	
	100/115/200/230 V AC, \pm 15 %, 50/60 Hz, 15 VA and/or 9 ... 30 V DC, 8 W
Ultrasonic transducer	Compatible transducers: ST-H and EchoMax series XPS-10/10F, XPS 15/15F, XCT-8, XCT-12 and XRS-5
Displays and controls	
Rack and panel mount	75 x 20 mm (3 x 0.8 inch) LCD (selectable backlighting)
Wall mount	100 x 40 mm (4 x 1.5 inch) multi-field LCD, backlit
Programming	
	Removable programmer or optional Dolphin Plus
Memory	
	EEPROM (non-volatile), no backup battery required
Certificates and approvals	
	CE ²⁾ , FM, CSA _{US/C} , C-TICK

- ¹⁾ The measuring range corresponds to the distance from the zero point to the sensor face, plus any range extension.
- ²⁾ EMC certificate available on request

Level measurement

Continuous level measurement – Ultrasonic controllers

HydroRanger Plus

Selection and Ordering data	Order No.
HydroRanger Plus, rack and panel mount Non-contacting ultrasonic echo ranging technology monitor that comes standard with a backlit display Measuring range: 0.3 ... 15 m (1 ... 50 ft)	7ML1025-01
Mounting/device version Version for 19" rack (requires terminal block; see accessories) Version for panel	1 2
Approvals CE (EN 61326), CSA _{US/C} , FM, C-TICK	C
Input voltage 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 No.
HydroRanger Plus, wall mount Non-contacting ultrasonic echo ranging technology monitor that comes standard with a backlit display Measuring range: 0.3 ... 15 m (1 ... 50 ft)	7ML1028-A70
Input voltage 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
Approvals CE; FM General Purpose; CSA Class I, Div. 2, C-TICK	C
Mounting/enclosure version Standard enclosure (NEMA 4X) Standard enclosure prepared for five M20 cable glands	1 3

Selection and Ordering data	Order code
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 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Operating Instructions 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. 7ML1998-1AC02 7ML1998-1AC12 7ML1998-1AC32
Other Operating Instructions SmartLinx Allen-Bradley Remote I/O, English SmartLinx PROFIBUS DP, English SmartLinx PROFIBUS DP, German SmartLinx DeviceNet, English Note: The appropriate SmartLinx Operating Instructions should be ordered as a separate line on the order.	7ML1998-1AP03 7ML1998-1AQ03 7ML1998-1AQ33 7ML1998-1BH02
Accessories Handheld programmer Tag, stainless steel, 12 x 45 mm (0.47 x 1.77 inch), one text line, suitable for enclosure Terminal block for rack mount SITRANS RD100 Remote display - see Chapter 7 SITRANS RD200 Remote display - see Chapter 7 SITRANS RD500 web, datalogging, alarming, ethernet, and modem support for instrumentation - see Chapter 7	7ML1830-2AC 7ML1930-1AC 7ML1830-1JL 7ML5750-1AA00-0
Spare parts Card, Analog HydroRanger Plus Rack/Panel Card, daughter Card, display, backlit	7ML1830-1LR 7ML1830-1LS 7ML1830-1LX

Selection and Ordering data	Order code
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 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Operating Instructions 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. 7ML1998-1AC02 7ML1998-1AC12 7ML1998-1AC32
Accessories Handheld programmer Tag, stainless steel, 12 x 45 mm (0.47 x 1.77 inch), one text line, suitable for enclosure M20 cable gland kit (6 M20 cable glands, 6 M20 nuts, 3 stop plugs) M20 cable gland kit (4 M20 cable glands, 4 M20 nuts, 4 washers) Sunshield kit, 304 SS SITRANS RD100 Remote display - see Chapter 7 SITRANS RD200 Remote display - see Chapter 7 SITRANS RD500 web, datalogging, alarming, ethernet, and modem support for instrumentation - see Chapter 7	7ML1830-2AC 7ML1930-1AC 7ML1830-1GM 7ML1930-1FV 7ML1930-1GA 7ML5750-1AA00-0
Spare parts Card, mother main Card, daughter Card, display	7ML1830-1LV 7ML1830-1LW 7ML1830-1LU

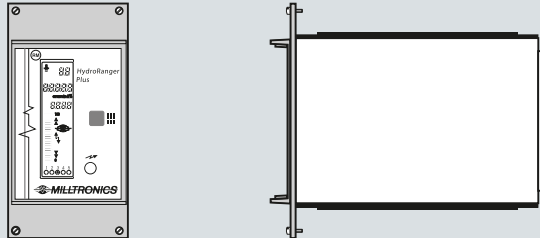
Level measurement Continuous level measurement – Ultrasonic controllers

HydroRanger Plus

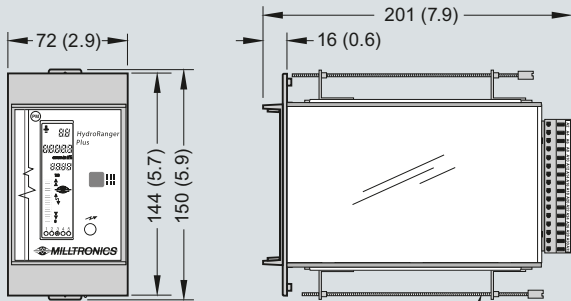
Dimensional drawings

Rack mount

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

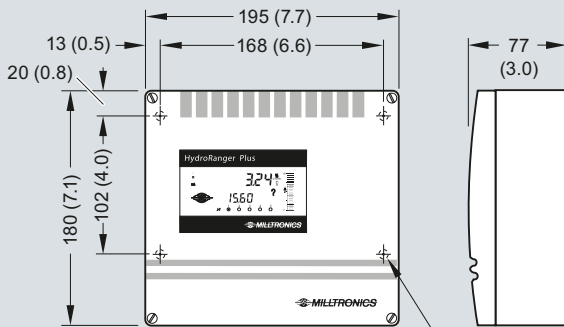


Panel mount



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

Wall mount

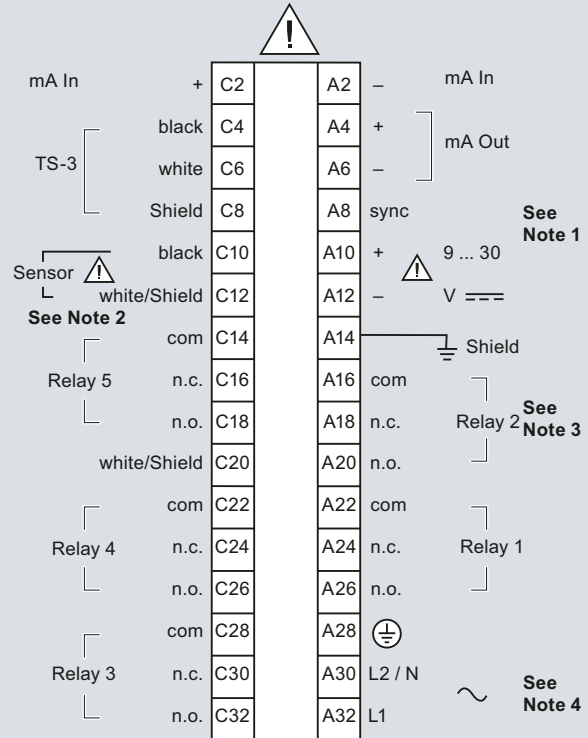


Suitable location for conduit entrances. Use watertight conduit hubs to maintain enclosure rating.

mounting holes, Ø4.5 mm (0.18 inch), 4 places

HydroRanger Plus, dimensions in mm (inch)

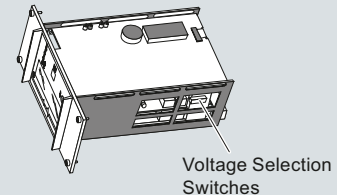
Schematics



Notes

1. Required only if mounted adjacent to other Siemens Milltronics equipment. Interconnect all 'SYNC' terminals with a single 18 AWG (0.5 mm²) wire.
2. Use RG-62 A/U coaxial (or equivalent) for extensions up to 365 m (1 200 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

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 signaling 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

4

Level measurement

Continuous level measurement – Ultrasonic controllers

SITRANS LUC500

Technical specifications

Mode of operation		Power supply	
Measuring principle	Ultrasonic level measurement		100 ... 230 V AC ± 15 %, 50/60 Hz, 36 VA (17 W) or 12 ... 30 V DC, 20 W
Measuring range	0.3 ... 15 m (1 ... 50 ft)	Ultrasonic transducer	Compatible transducers: ST-H and EchoMax series XPS-10/10F, XPS 15/15F, XCT-8, XCT-12 and XRS-5
Measuring points	1 or 2	mA output signal	2-core copper conductor, twisted, shielded, 0.5 ... 0.75 mm ² (22 ... 18 AWG), Belden 8760 or equivalent is acceptable
Output		Displays and controls	
Ultrasonic transducer	44 kHz	Rack and panel mount	75 x 20 mm (3 x 0.8 inch) LCD (selectable backlighting)
Relays	5 relays, rated 5 A at 250 V AC, non-inductive <ul style="list-style-type: none"> • Wall Mount version: 4 SPST Form A relays, 1 SPDT Form C relay • Rack and Panel Mount version: 4 SPST Form A relays, 1 SPST Form B relay 	Wall mount	100 x 40 mm (4 x 1.5 inch) multi-field LCD, backlit
Accuracy		Programming	
Error in measurement	0.25 % of range or 6 mm (0.24 inch), whichever is greater		Using removable handheld programmer (ordered separately) or Dolphin Plus software (option)
Resolution	0.1 % of measuring range or 2 mm (0.08 inch), whichever is greater ¹⁾	Memory	
Temperature compensation	-50 ... +150 °C (-58 ... +302 °F) <ul style="list-style-type: none"> • Integral temperature sensor • External TS-3 temperature sensor (optional) • Programmable fixed temperature 	1 Mbyte RAM (static) with battery, 1 Mbyte flash EPROM	
Rated operating conditions		Certificates and approvals	
Ambient conditions		CE, FM, CSA	
Ambient temperature for enclosure	-20 ... +50°C (-4 ... +122 °F)	¹⁾ The measuring range corresponds to the distance from the zero point to the sensor face, plus any range extension (P801)	
Design			
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 inch) center height		
Weight (rack and panel mount)	1.5 kg (3.3 lb)		
Weight (wall mount)	2.5 kg (5.5 lb)		
Communications			
RS 232	Siemens Dolphin protocol, Modbus RTU and ASCII		
Option	SmartLinX compatible, RS 485		

Level measurement

Continuous level measurement – Ultrasonic controllers

SITRANS LUC500

Selection and Ordering data	Order No.
SITRANS LUC500 A complete ultrasonic level controller for monitoring and control of water distribution and wastewater collection systems, with energy-saving algorithms.	7ML5001-
Mounting 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
Input voltage 100 ... 230 V AC 12 ... 30 V DC	A B
Number of measurement points Single point version Dual point version	A B
Data communications SmartLinx ready, no module SmartLinx PROFIBUS DP module SmartLinx Allen-Bradley Remote I/O module SmartLinx DeviceNet module	0 1 2 3
Protocol Modbus RTU/ASCII	1
Auxilliary memory None 1 Mbyte static RAM, including data logging module	0 1
Auxilliary I/O 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
Approvals CSA, CE, UL (not available with mounting option 5) CE	2 3
Selection and Ordering data	Order code
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 inch)]; Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Operating Instructions 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. 7ML1998-5GL01 7ML1998-5GL31
Other Operating Instructions 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.	7ML1998-1AP03 7ML1998-1AQ03 7ML1998-1AQ33 7ML1998-1AQ13 7ML1998-1BH02

Accessories	Order No.
Handheld programmer	7ML1830-2AG
ERS500 Configuration Tool software, CD, cable kit, and License	7ML1930-1AE
ERS500 Configuration Tool software, License only	7ML1930-1AF
ERS500 Configuration Tool software, demo CD only	7ML1930-1AG
M20 cable gland kit (4 M20 cable glands, 4 M20 nuts, 4 washers) See SmartLinx product page 4/343 for more information.	7ML1930-1FV
Tag, stainless steel, 12 x 45 mm (0.47 x 1.77 inch), one text line, suitable for enclosures	7ML1930-1AC
Sunshield kit, 304 SS (wall mount only)	7ML1930-1GA
SITRANS RD100 Remote display - see Chapter 7	
SITRANS RD200 Remote display - see Chapter 7	
SITRANS RD500 web, datalogging, alarming, ethernet, and modem support for instrumentation - see Chapter 7	7ML5750-1AA00-0
Auxiliary Cards. Access code required¹⁾	
1 MByte static RAM extended memory	PBD:51034040
2 analog input / 2 analog output for rack and panel mount version	PBD:51034039
2 analog input / 2 analog output for wall mount version	PBD:51034044
8 digital input for rack and panel mount version	PBD:51034042
8 digital input for wall mount version	PBD:51034043
4 analog input for rack and panel mount version	PBD:51034045
4 analog input for wall mount version	PBD:51034046
4 analog output for rack and panel mount version	PBD:51034047
4 analog output for wall mount version	PBD:51034048
8 digital inputs, 2 analog inputs, 2 analog outputs, wall mount	PBD:51034272
Access code, dual point capability	7ML1830-1KA
Auxiliary Cards²⁾	
1 MByte static RAM extended memory	7ML1830-1KR
2 analog input / 2 analog output for rack and panel mount version	7ML1830-1KS
2 analog input / 2 analog output for wall mount version	7ML1830-1KT
8 digital input for rack and panel mount version	7ML1830-1KU
8 digital input for wall mount version	7ML1830-1LA
4 analog input for rack and panel mount version	7ML1830-1LB
4 analog input for wall mount version	7ML1830-1LC
4 analog output for rack and panel mount version	7ML1830-1LD
4 analog output for wall mount version	7ML1830-1LE
8 digital inputs, 2 analog inputs, 2 analog outputs, wall mount	7ML1830-1LF

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.

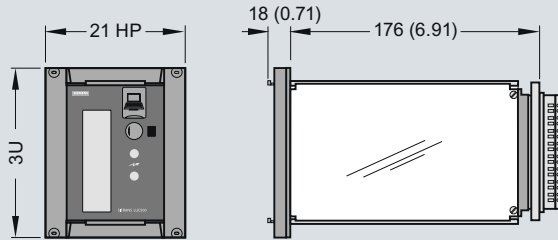
Level measurement

Continuous level measurement – Ultrasonic controllers

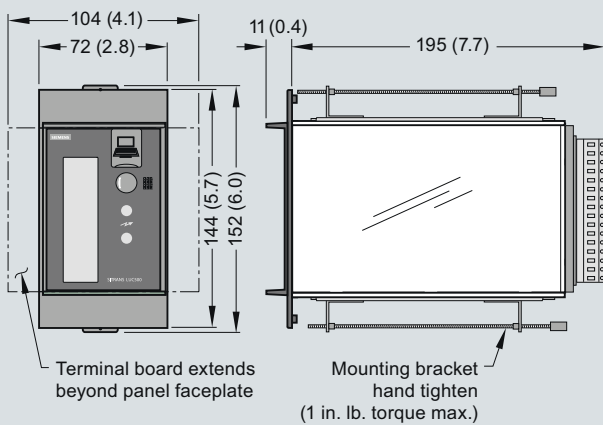
SITRANS LUC500

Dimensional drawings

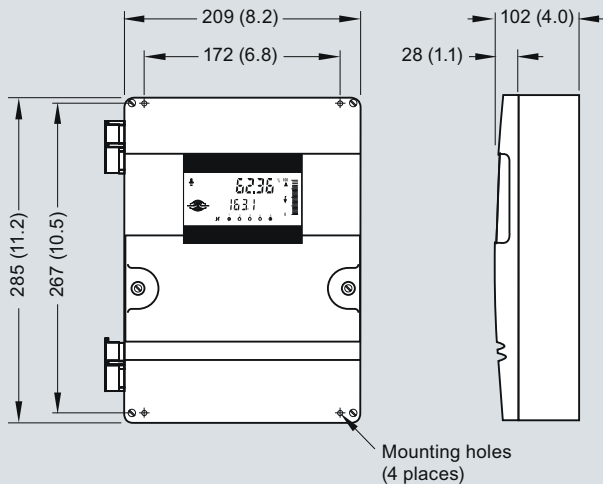
Rack mount unit



Panel mount unit



Wall mount unit



SITRANS LUC500, dimensions in mm (inch)

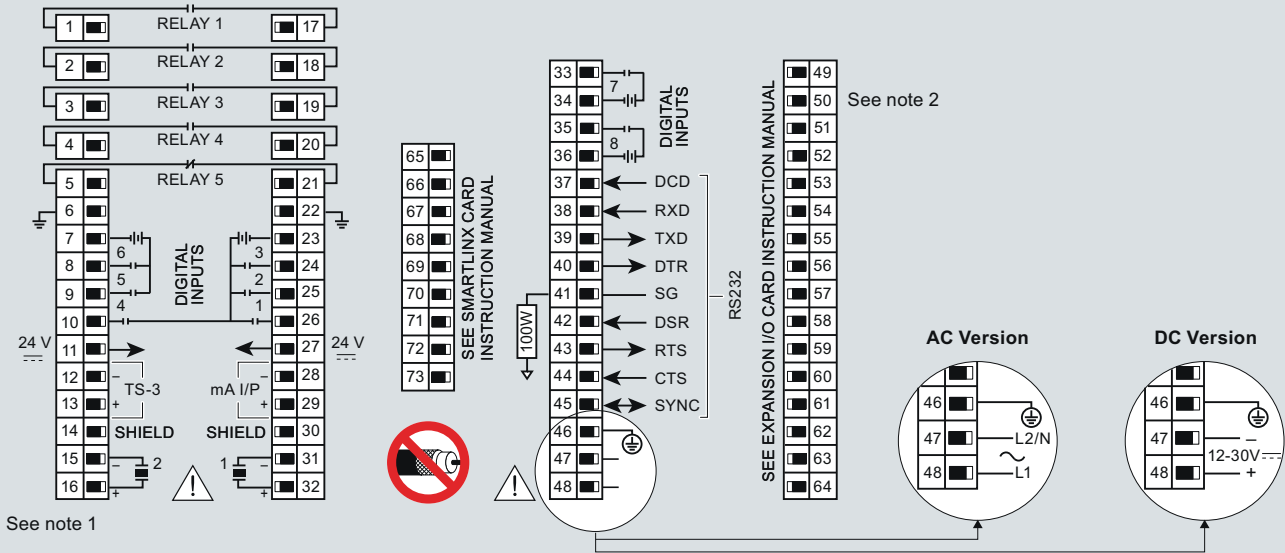
Level measurement

Continuous level measurement – Ultrasonic controllers

SITRANS LUC500

Schematics

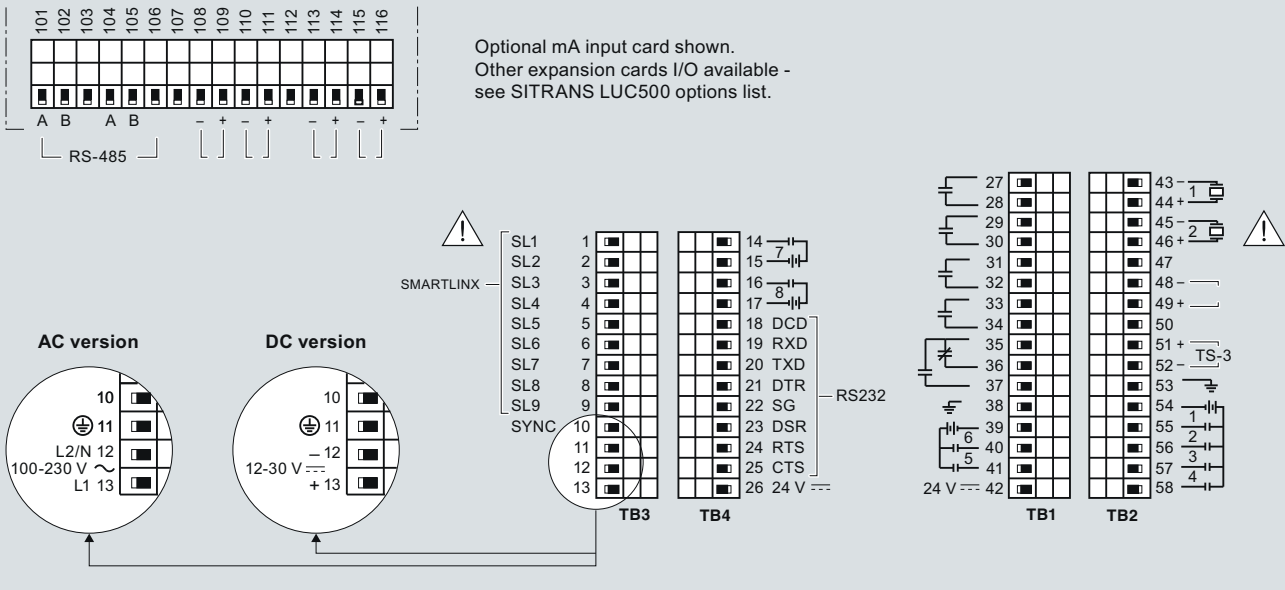
Rack and panel mount



Notes

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 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 (1 200 ft) away. The SITRANS LU01 will measure distance, level or volume, and it features patented Sonic Intelligence 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 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 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 echo processing software for superior reliability. Transducers can be mounted up to 365 m (1 200 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 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

Mode of operation	
Measuring principle	Ultrasonic level measurement
Measuring range	0.3 ... 60 m (1 ... 200 ft)
Measuring points	SITRANS LU01: Max. one point; SITRANS LU02: Max. two points
Output signal	
Ultrasonic transducer	EchoMax series, ST-H transducers
Relays	4 SPDT Form C relays, rated at 5 A at 250 V AC, resistive load
mA output	0/4 ... 20 mA, optically isolated
• Max. load	750 Ω, isolated, 30 V
• Resolution	0.1 % of range
• Outputs	SITRANS LU01: Max. one mA output SITRANS LU02: Max. two mA outputs
Accuracy	
Error in measurement	0.25 % of range or 6 mm (0.24 inch), whichever is greater
Resolution	0.1 % of measuring range or 2 mm (0.08 inch), whichever is greater
Temperature compensation	-50 ... +150 °C (-58 ... +302 °F) • Integral temperature sensor • External TS-3 temperature sensor (optional) • Programmable fixed temperature
Rated operating conditions	
Ambient conditions	
Ambient temperature for enclosure	-20 ... +50 °C (-4 ... +122 °F)
Design	
Weight	2.7 kg (6 lb)
Material (enclosure)	Polycarbonate
Degree of protection (wall mount)	IP65
Electrical connection	
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 ² (22 ... 18 AWG), Belden 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

Power supply	
AC model	100/115/200/230 V AC ± 15 %, 50/60 Hz, 31 VA
DC model	18 ... 30 V DC, 25 W
Displays and controls	
Memory	51 x 127 mm (2 x 5 inch) graphics LCD with backlighting
Programming	EEPROM (non-volatile), no backup battery required Using removable programmer (ordered separately) or Dolphin Plus (option)
Certificates and approvals	
CE, CSA _{US/C} , FM, ATEX II 3D Lloyd's register of Shipping (Categories ENV1, ENV2, ENV3 and ENV5)	
Options	
External temperature sensor	TS-3
Communications	<ul style="list-style-type: none"> SmartLinx: protocol-specific modules as interface for popular industrial fieldbus systems Dolphin Plus: Siemens Windows-compatible interface and ComVerter link (infrared)

Selection and Ordering data	Order No.
SITRANS LU01/LU02	7ML5004-
Single or dual point ultrasonic long-range level monitoring system for liquids and solids, and ranges up to 60 m (200 ft).	
Number of measuring points	1 2
LU01 version, 1 point LU02 version, 2 points	
Input voltage	A B
100/115/200/230 V AC, voltage selector switch 18 ... 30 V DC	
Feature software	A
Standard	
Application software	1
Standard	
Data communications	0 1 2 3
No module (SmartLinx ready) SmartLinx Allen-Bradley Remote I/O module SmartLinx PROFIBUS DP module SmartLinx Modbus RTU module	
Enclosure	1 3
Wall mount Wall mount, drilled, 6 x M20 Note: Cable glands are not included and should be ordered as a separate line on the order.	
Approvals	A B C
CE, CSA _{US/C} , FM ¹⁾ CE ATEX II 3D ²⁾	

¹⁾ Available with enclosure option 1 only

²⁾ Available with enclosure option 3 only

Level measurement

Continuous level measurement – Ultrasonic controllers

SITRANS LU01 and LU02

Selection and Ordering data

Order code

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 inch)]:
Measuring-point number/identification
(max. 27 characters) specify in plain text

Y15

Operating Instructions

SITRANS LU01

Order No.

English

7ML1998-5BE02

French

7ML1998-5BE12

German

7ML1998-5BE32

SITRANS LU02

English

7ML1998-5BD02

French

7ML1998-5BD12

German

7ML1998-5BD32

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.

Other Operating Instructions

SmartLinx Allen-Bradley Remote I/O, English

7ML1998-1AP03

SmartLinx PROFIBUS DP, English

7ML1998-1AQ03

SmartLinx PROFIBUS DP, German

7ML1998-1AQ33

SmartLinx PROFIBUS DP, French

7ML1998-1AQ13

SmartLinx Modbus, English

7ML1998-1BF01

SmartLinx Modbus, German

7ML1998-1BF31

SmartLinx Modbus, French

7ML1998-1BF11

SmartLinx Modem, English

7ML1998-1BG01

Note: The appropriate SmartLinx Operating Instructions should be ordered as a separate line on the order.

Accessories

Handheld programmer

7ML1830-2AN

Tag, stainless steel, 12 x 45 mm (0.47 x 1.77 inch), one text line, suitable for enclosures

7ML1930-1AC

M20 cable gland kit (6 M20 cable glands, 6 M20 nuts, 3 stop plugs)

7ML1830-1GM

M20 cable gland kit (4 M20 cable glands, 4 M20 nuts, 4 washers)

7ML1930-1FV

TS-3 Temperature Sensor - see TS-3 on page 4/206

7ML1830-2AN

Sunshield kit, 304 SS

7ML1930-1GA

Spare parts

Card, LU01 mother main, AC, comm ready

7ML1830-1KX

Card, LU02 mother main, AC, comm ready

7ML1830-1MA

Card, LU02 daughter, comm ready

7ML1830-1LP

Card, LU01 daughter, comm ready

7ML1830-1LN

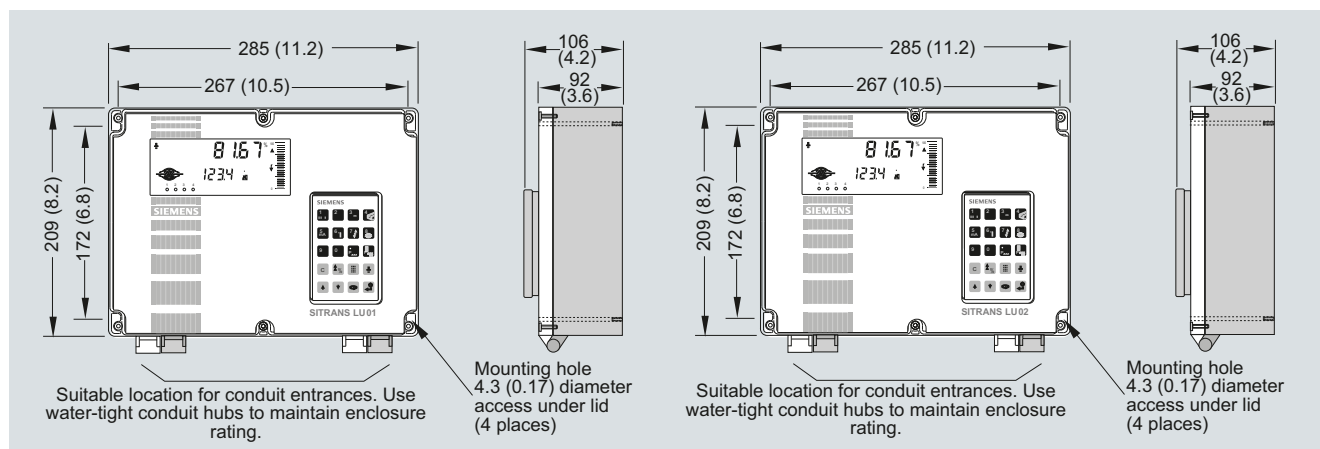
Card, display

7ML1830-1LQ

See SmartLinx product page 4/343 for more information.

4

Dimensional drawings



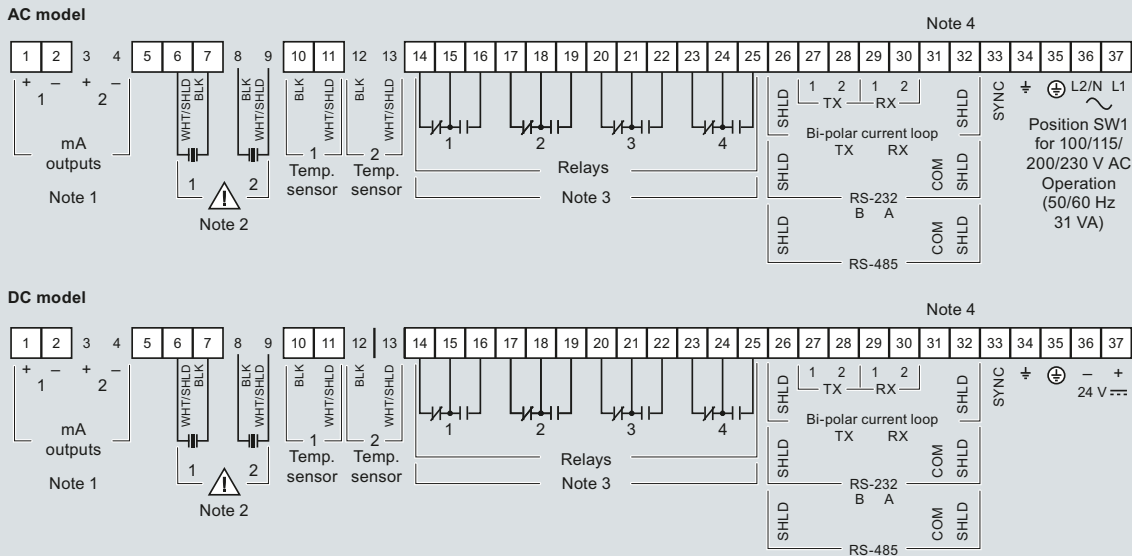
Dimensional drawings for SITRANS LU01 (left) and SITRANS LU02 (right), dimensions in mm (inch)

Level measurement

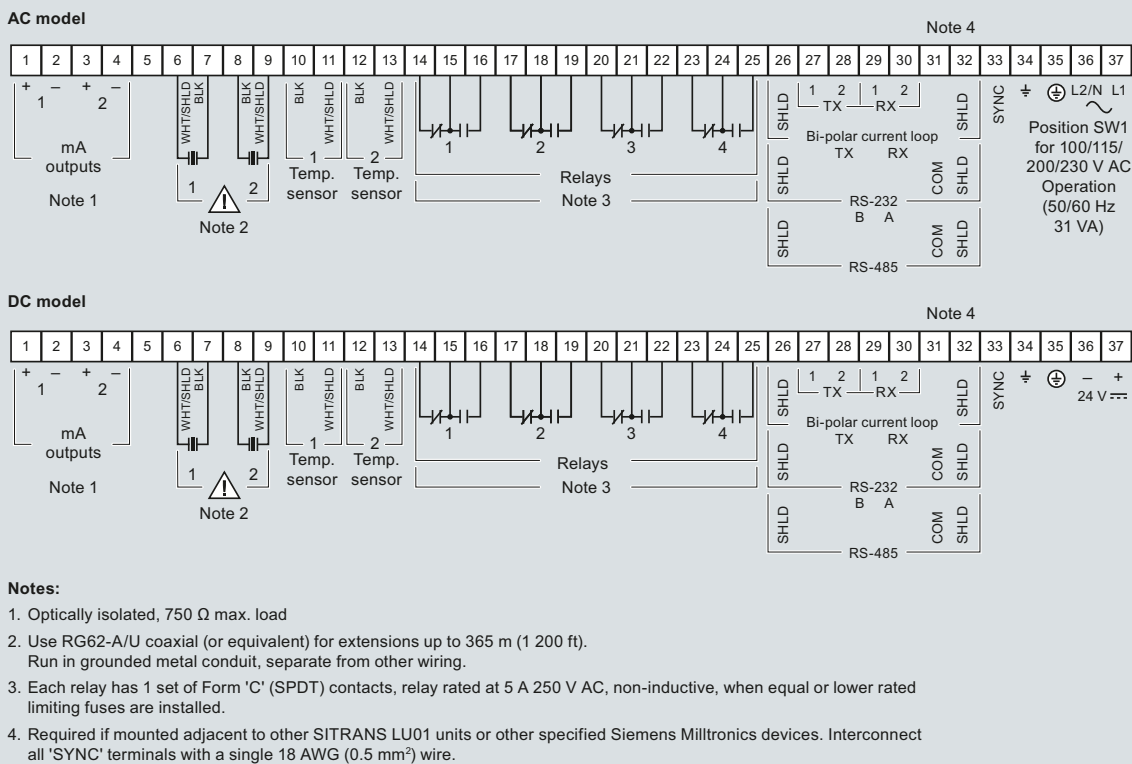
Continuous level measurement – Ultrasonic controllers

SITRANS LU01 and LU02

Schematics



SITRANS LU01 connections



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 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 (1 200 ft) from the monitor. The SITRANS LU10 features patented Sonic Intelligence 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 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

Level measurement

Continuous level measurement – Ultrasonic controllers

SITRANS LU10

Technical specifications

Mode of operation		Power supply	
Measuring principle	Ultrasonic level measurement	100/115/200/230 V AC ± 15 %, 50/60 Hz, 31 VA	
Measuring range	Max. 0.3 ... 60 m (1 ... 200 ft)	Displays and controls	
Measuring points	Max. 10	51 x 127 mm (2 x 5 inch) graphics LCD with backlighting	
Output		Memory	
Ultrasonic transducer	EchoMax series, ST-H transducers	EEPROM (non-volatile), no backup battery required	
Relays	SPDT Form C relays, rated 5 A at 250 V AC, resistive load	Programming	
mA output	SITRANS LU AO module (option): 0/4 ... 20 mA, optically isolated	Using removable programmer (ordered separately) or Dolphin Plus (option)	
• Max. load	750 Ω, isolated	Certificates and approvals	
• Resolution	0.1 % of range	<ul style="list-style-type: none"> • CE, C-TICK, FM, CSA_{US/CA}, ATEX II 3D • Lloyd's register of Shipping (Categories ENV1, ENV2, ENV3 and ENV5) 	
Accuracy		Options	
Error in measurement	0.25 % of range or 6 mm (0.24 inch), whichever is greater	Expansion card	
Resolution	0.1% of measuring range or 2 mm (0.08 inch), whichever is greater	<ul style="list-style-type: none"> • External temperature sensor • Communications 	
Temperature compensation	-50 ... +150 °C (-58 ... +302 °F) <ul style="list-style-type: none"> • Integral temperature sensor • External TS-3 temperature sensor (expandable to 10 inputs with optional TIB-9 card) • Programmable fixed temperature 	<ul style="list-style-type: none"> • I/O devices 	
Rated operating conditions		TIB-9, increases the number of TS-3 inputs from 1 ... 10	
Ambient conditions		TS-3	
Ambient temperature for enclosure	-20 ... +50 °C (-4 ... +122 °F)	<ul style="list-style-type: none"> • SmartLinX: protocol-specific modules as interface for popular industrial fieldbus systems • Dolphin Plus: Siemens Windows-compatible interface and ComVerter link (infrared) • Max. 3 I/O devices per SITRANS LU10 • SITRANS LU AO analog output module (max. 1) 	
Design			
Weight	2.7 kg (6 lb)		
Material (enclosure)	Polycarbonate		
Degree of protection (wall mount)	IP65/Type 4X/NEMA 4X		
Electrical connection			
Ultrasonic transducer	RG62-A/U coaxial cable with low capacitance		
Signal transmission	2-core copper conductor, twisted, shielded, 0.5 ... 0.75 mm ² (22 ... 18 AWG), Belden 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		

Level measurement

Continuous level measurement – Ultrasonic controllers

SITRANS LU10

Selection and Ordering data	Order No.
SITRANS LU10 Ten point ultrasonic long-range level monitoring system for liquids and solids applications, and ranges up to 60 m (200 ft).	7ML5007-
Input voltage 100/115, 200/230 V AC, selectable	1
Feature software Standard	A
Application software Standard	A
Data communications No module (SmartLinx ready) SmartLinx Allen-Bradley Remote I/O module SmartLinx PROFIBUS DP module SmartLinx Modbus RTU module	0 1 2 3
TIB-9 temperature card None With TIB-9 card	0 1
Enclosure Wall mount Wall mount, drilled, 12 x M20 x1.5 for cable glands Note: Cable glands are not included and should be ordered as a separate line on the order.	1 2
Approvals CE, CSA _{US/C} , FM ¹⁾ ATEX II 3D ¹⁾ CE, C-TICK ²⁾	A B D

¹⁾ Available with enclosure option 1 only

²⁾ Available with enclosure option 3 only

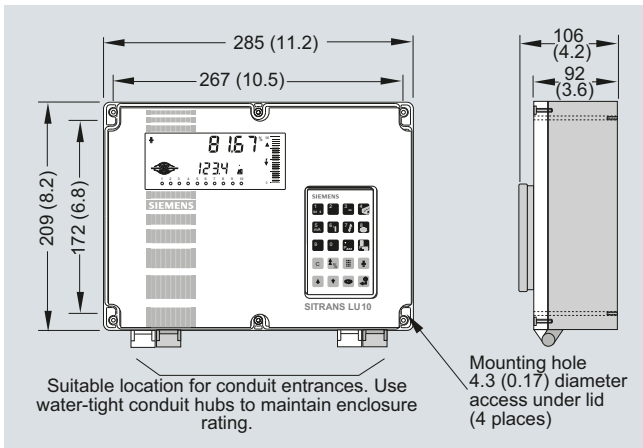
Selection and Ordering data	Order code
Further designs Please add "-Z" to Order No. and specify Order code(s). Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Operating Instructions English French German	Order No. 7ML1998-5AN02 7ML1998-5AN12 7ML1998-5AN32
Other Operating Instructions SmartLinx Allen-Bradley Remote I/O, English SmartLinx PROFIBUS DP, English SmartLinx PROFIBUS DP, German 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.	7ML1998-1AP03 7ML1998-1AQ03 7ML1998-1AQ33 7ML1998-1BF01 7ML1998-1BF31 7ML1998-1BG01
Accessories Handheld programmer Tag, stainless steel, 12 x 45 mm (0.47 x 1.77 inch), one text line, suitable for enclosures Temperature Card TIB 9-card M20 cable gland kit (6 M20 cable glands, 6 M20 nuts, 3 stop plugs) M20 cable gland kit (4 M20 cable glands, 4 M20 nuts, 4 washers) TS-3 Temperature Sensor - see TS-3 on page 4/206 Sunshield kit, 304 SS	7ML1830-2AN 7ML1930-1AC 7ML1830-1CN 7ML1830-1GM 7ML1930-1FV 7ML1930-1GA
Spare parts Card, mother main, AC, comm ready Card, daughter, comm ready Card, display See SmartLinx product page 4/343 for more information.	7ML1830-1ML 7ML1830-1LY 7ML1830-1LQ

Level measurement

Continuous level measurement – Ultrasonic controllers

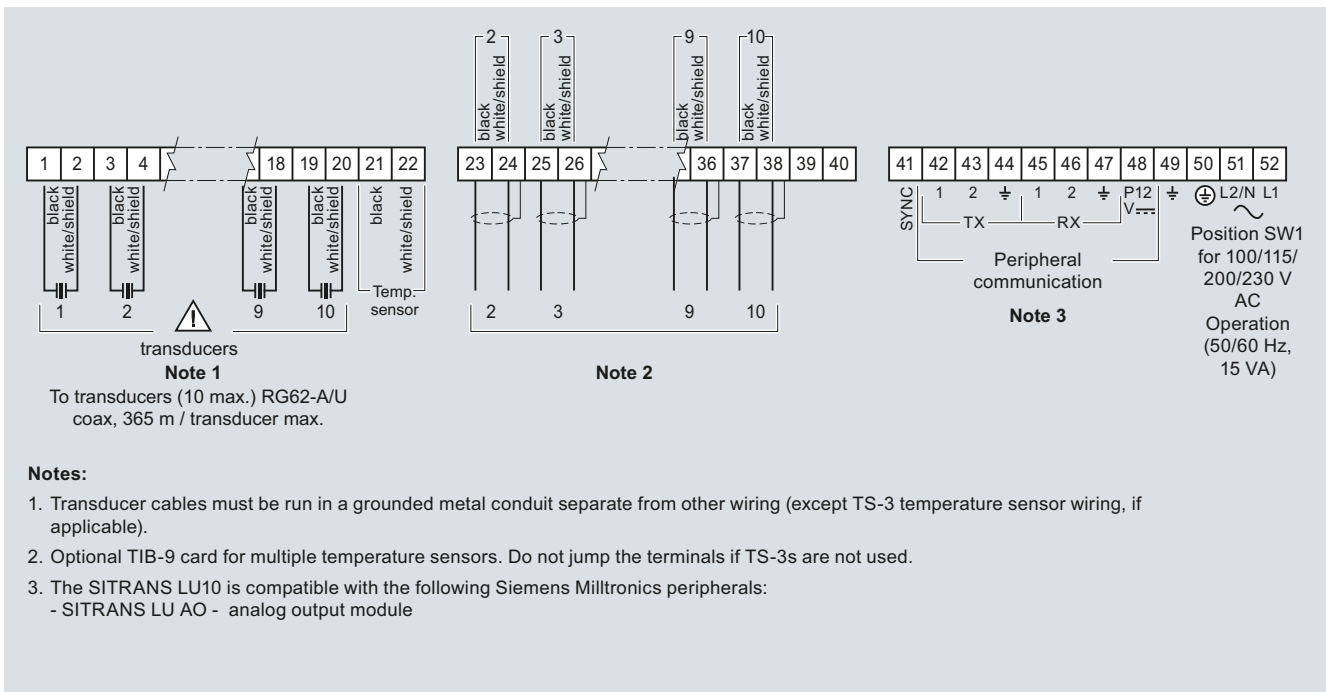
SITRANS LU10

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 AO - analog output module

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 1 500 m (5 000 ft) from the SITRANS LU 10
- 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	
Input	
Communications	Data from SITRANS LU10
Transmission rate	4 800 bits/s
Voltage	± 20 mA bipolar current loop
Polarization	Non-polarized
Max. load	1 receiving unit
Output	
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 %
Rated operating conditions	
Ambient conditions	
Ambient temperature for enclosure	-20 ... +50 °C (-5 ... +122 °F)
Location	Indoor/outdoor
Installation category	II
Pollution degree	4
Design	
Weight	2 kg (4.4 lb)
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 ² (22 ... 18 AWG)
	Copper conductor according to local requirements, rated 250 V 5 A
Electrical connection and relay connection	
Power supply	
	100/115/200/230 V AC ± 15 %, 50/60 Hz, 15 VA
Displays and controls	
	1 LED for display of voltage/communications state
Certificates and approvals	
	CE, FM, CSA _{USC} , C-TICK

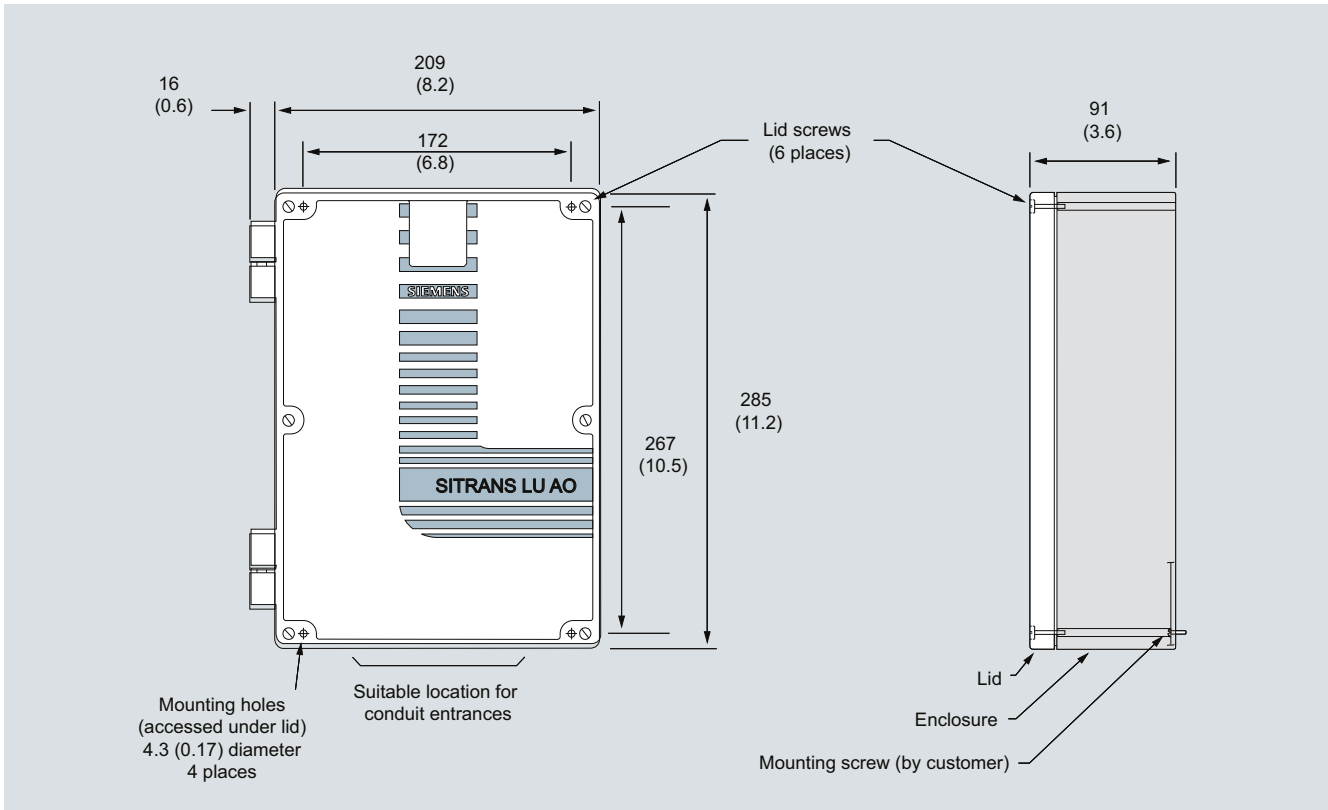
Selection and Ordering data	Order No.
SITRANS LU AO Provides remote analog output for the measurement points of the SITRANS LU10 level monitor. Approvals: CSA _{USC} , FM, CE, C-TICK	7ML5810-1A
Operating Instructions	
English	7ML1998-5CE01
German	7ML1998-5CE31
Note: Operating Instructions should be ordered 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.	
Accessories	
Sun Shield, 304SS	7ML1930-1GA

Level measurement

Continuous level measurement – Ultrasonic controllers

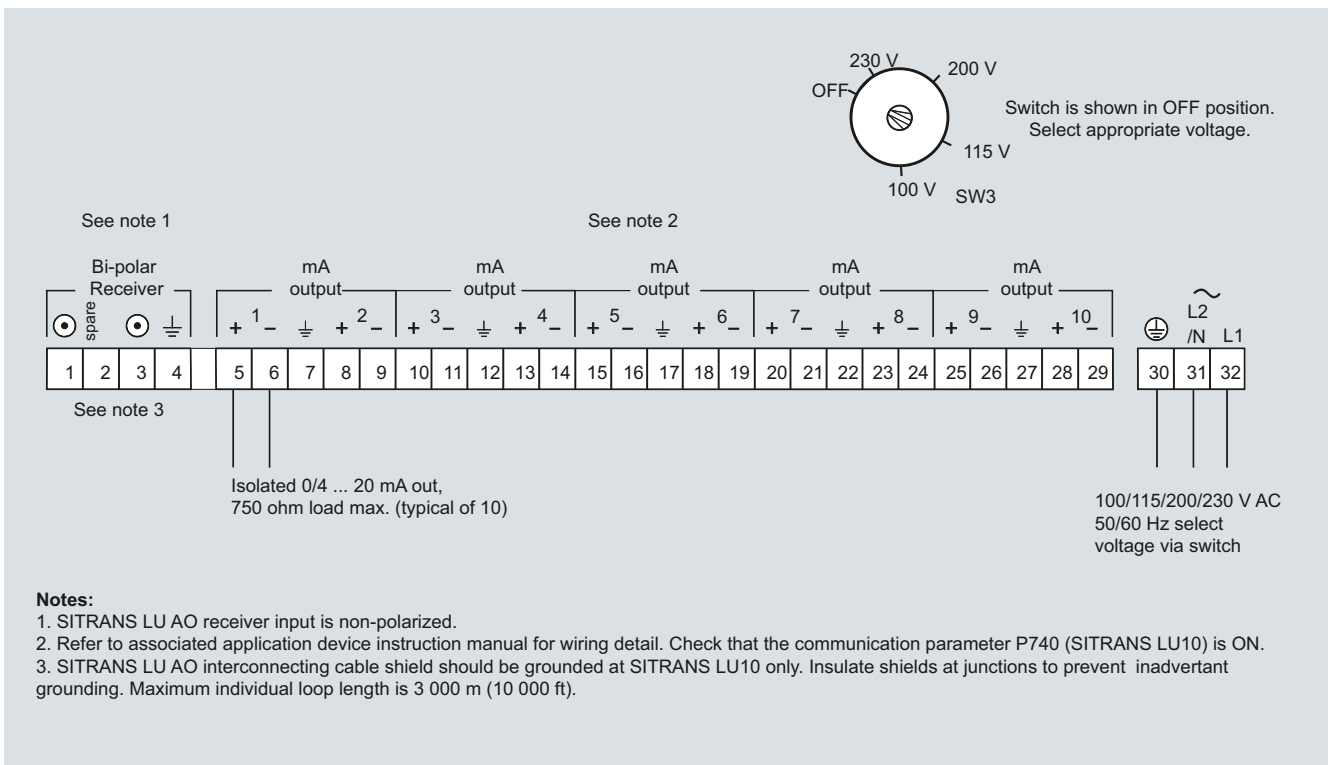
SITRANS LU AO

Dimensional drawings



SITRANS LU AO, dimensions in mm (inch)

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
Max. range¹⁾	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)
Min. range	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)
Max. temperature	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)
Min. temperature	-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)
Typical Applications	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
Frequency	44 kHz	44 kHz	44 kHz	44 kHz	30 kHz	22 kHz	44 kHz	44 kHz	22 kHz	13 kHz
Beam angle (-3dB)	10°	12°	12°	6°	6°	6°	12°	6°	5°	5°
Thread size	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
Enclosure	<ul style="list-style-type: none"> PVDF Copolymer CSM Option: Flange with PTFE facing 	<ul style="list-style-type: none"> ETFE Option: PVDF 	<ul style="list-style-type: none"> PVDF Option: Foam facing Flange with PTFE facing 	<ul style="list-style-type: none"> PVDF Option: Foam facing Flange with PTFE facing 	<ul style="list-style-type: none"> PVDF Option: Foam facing Flange with PTFE facing 	<ul style="list-style-type: none"> PVDF Option: Foam facing 	<ul style="list-style-type: none"> PVDF Option: Flange with PTFE facing Sanitary version 	<ul style="list-style-type: none"> PVDF Option: Flange with PTFE facing 	<ul style="list-style-type: none"> Aluminum 304 Stainless steel Polyester Silicone 	<ul style="list-style-type: none"> Aluminum 304 Stainless steel Polyester Silicone
Compatible with:										
SITRANS LUT400	•	•	•	•	•	•	•	•	•	•
SITRANS LU	•	•	•	•	•	•	•	•	•	•
SITRANS LUC500	•	•	•	•			•	•		
Hydro-Ranger 200	•	•	•	•			•	•		
MultiRanger 100/200	•	•	•	•			•	•		

¹⁾ 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 inch (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 inch (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 ¹⁾	1.4 kg (3 lb)
Material (enclosure)	Base and lid made of ETFE or PVDF (epoxy fitted joint) ²⁾
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 ² (20 AWG), PVC sheath
Cable (max. length)	365 m (1 200 ft) with RG 62 A/U coaxial cable
Options	
• Flange adapter	3" Universal (fits DN 65, PN 10 and 3" ASME)
Certificates and approvals	
CE ³⁾ , 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	

¹⁾ Approximate shipping weight of transducer with standard cable length

²⁾ When measuring chemicals, check compatibility of ETFE or PVDF and epoxy, or mount joint external to process.

³⁾ 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-TICK³⁾

ATEX II 2G, CSA, C-TICK, INMETRO¹⁾

ATEX II 2G, C-TICK, INMETRO²⁾

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.

¹⁾ Available with Process connection options 0 ... 2 only

²⁾ Available with Process connection options 3 ... 5 only

³⁾ Not suitable for Ketone, Hexane, Ester or Ethyl Acetate atmospheres

Order No.

7ML1100-

■ ■ A ■ 0

0

1

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5

A

B

C

D

E

2

3

4

Order No

7ML1998-5QK82

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 inch)]: 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

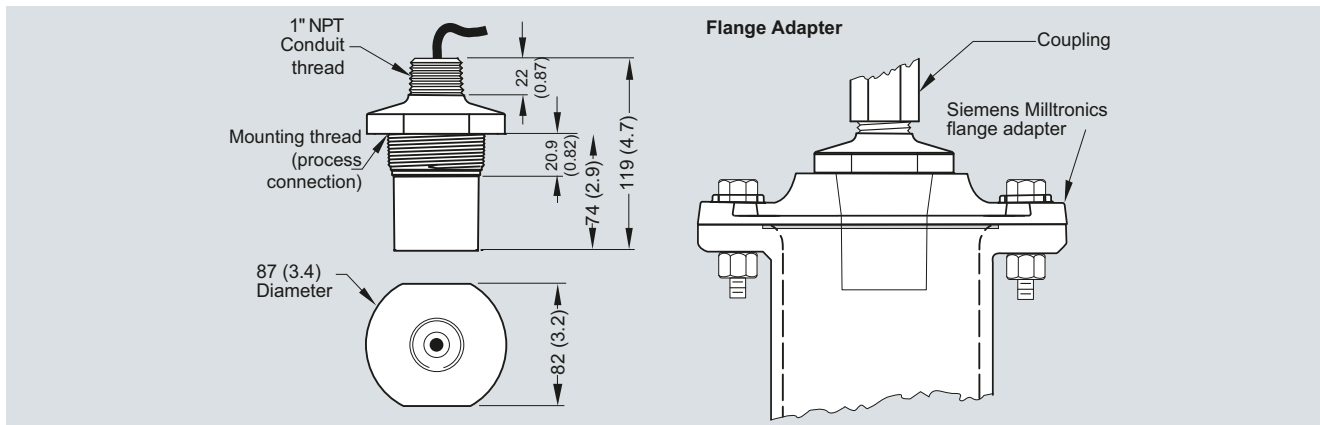
7ML1830-1GN

Level measurement

Continuous level measurement – Ultrasonic transducers

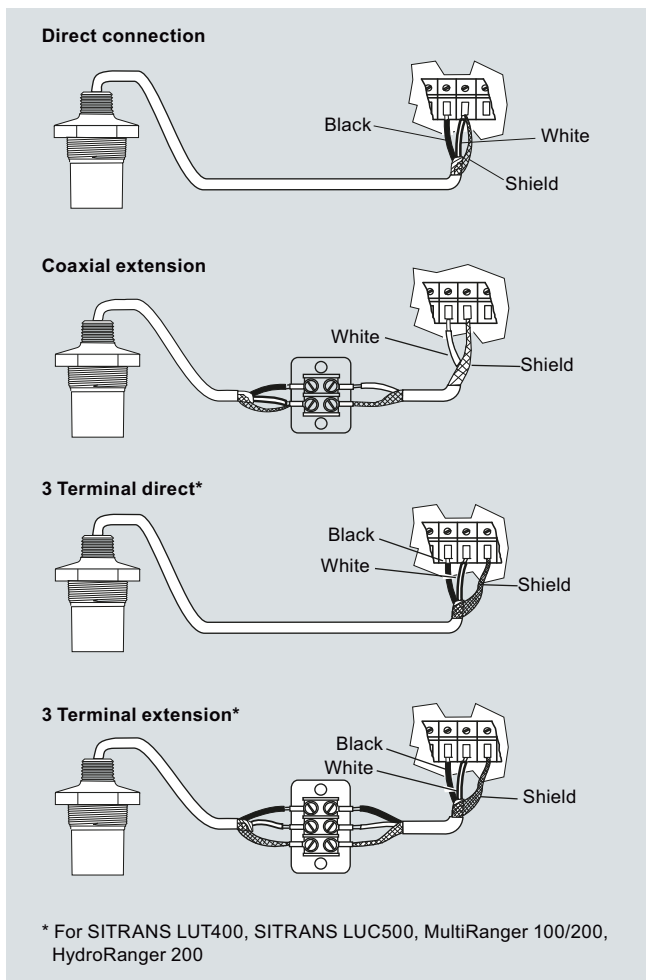
ST-H

Dimensional drawings



ST-H ultrasonic transducer, dimensions in mm (inch)

Schematics



ST-H ultrasonic transducer connections

4

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 ... 8 m (1 ... 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

Mode of operation	
Measuring principle	Ultrasonic transducer
Input	
Measuring range	0.3 ... 8 m (1 ... 26 ft), dependent on application
Output	
Frequency	44 kHz
Beam angle	10°
Accuracy	
Temperature error	Compensated by integral temperature sensor
Rated operating conditions	
Vessel pressure	Normal atmospheric pressure
Ambient conditions	
• Ambient temperature	-20 ... +65 °C (-4 ... +149 °F)
Design	
Weight (approximate shipping weight of sensor with standard cable length)	1.2 kg (2.6 lb)
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 ² (20 AWG), PVC sheath
Cable (max. length)	<ul style="list-style-type: none"> • 365 m (1 200 ft) with RG 62 A/U coaxial cable • 365 m (1 200 ft) with 2-core twisted pair, foil shield, 0.5 mm² (20 AWG), PVC sheath, only for SITRANS LUC500, MultiRanger 100/200
Options	
Flange version	Factory flange with PTFE face for ASME, EN or JIS configuration
Submergence shield	For applications with flooding possible
Certificates and approvals	
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
EchoMax XRS-5 transducer 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)	7ML1106- 	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 inch)]: Measuring-point number/identification (max. 16 characters) specify in plain text	Y17
Process connection 1" NPT [(Taper), ANSI/ASME B1.20.1] R 1" [(BSPT), EN 10226]	1 2	Accessories Tag, stainless steel with hole, 12 x 45 mm, for fastening on	Order No. 7ML1930-1BJ
Cable length 5 m (16.40 ft) 10 m (32.81 ft) 30 m (98.43 ft)	A B C	Submergence shield kit	7ML1830-1BH
Facing Standard (CSM rubber) PTFE (flange versions)	A B	Easy Aimer 2, NPT with ¾" x 1" PVC coupling	7ML1830-1AQ
Approvals CE, FM Class I, ATEX II 2G, CSA Class I Div. 2, SAA Class I	2	Easy Aimer 2, aluminum with M20 adapter and 1" and 1½" BSPT aluminum couplings	7ML1830-1AX
Mounting flange (flush mount) 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 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 stainless steel coupling Easy Aimer 304, with M20 adapter and 1" and 1½" BSPT 304 SS couplings 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 4/204 for more information)	7ML1830-1AU 7ML1830-1GN 7ML1830-1BK 7ML1830-1BL 7ML1830-1BM 7ML1830-1BN 7ML1830-1BP 7ML1830-1BQ
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.	Order No. 7ML1998-5QT81 7ML1998-5HV61	1" NPT locknut, plastic 1" BSPT locknut, plastic	7ML1830-1DS 7ML1830-1DR

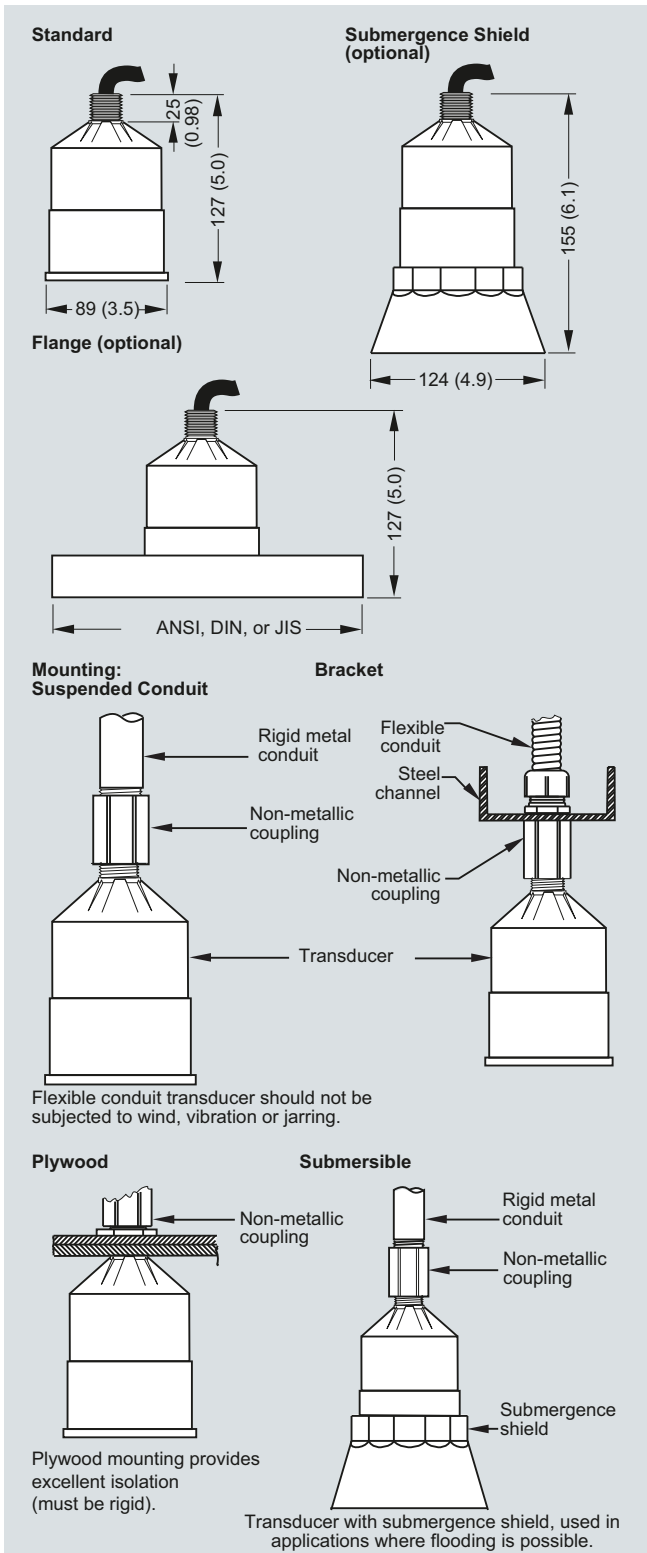
4

Level measurement

Continuous level measurement – Ultrasonic transducers

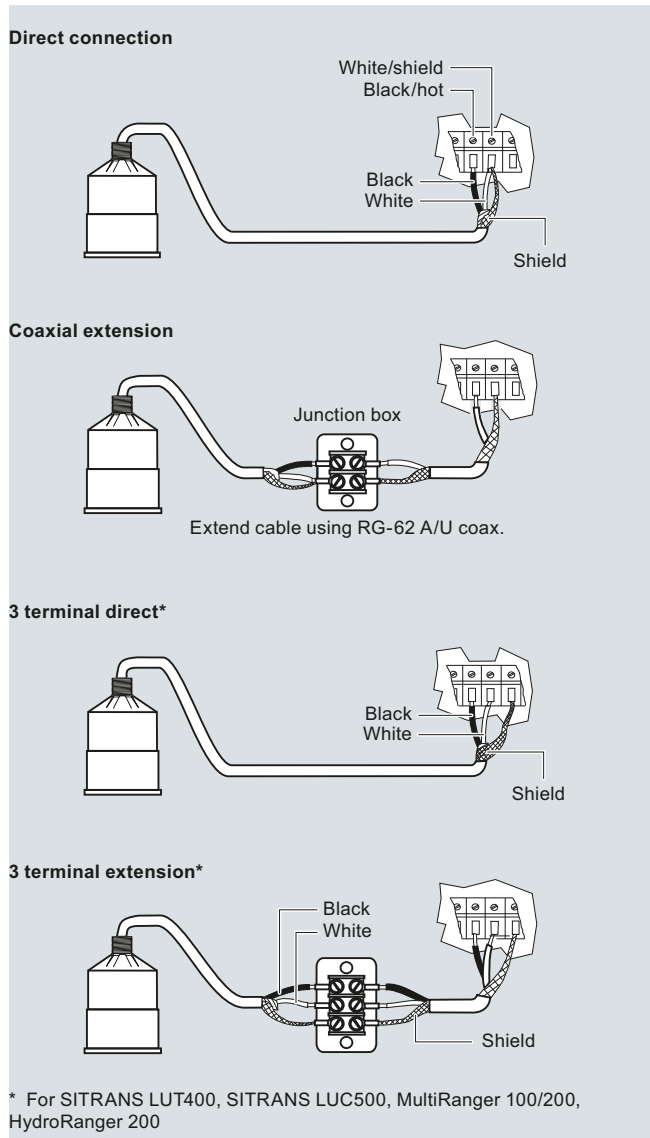
EchoMax XRS-5

Dimensional drawings



XRS-5 ultrasonic transducer, dimensions in mm (inch)

Schematics



XRS-5 ultrasonic transducer connections

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 95 °C (203 °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)
Output						
Frequency	44 kHz	44 kHz	30 kHz	22 kHz	44 kHz	44 kHz
Beam angle	12°	6°	6°	6°	12°	6°
Environmental						
Location	Indoors/outdoors					
Ambient temperature	Standard: -40 ... +95 °C (-40 ... +203 °F) F: -20 ... +95 °C (-4 ... +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)	
Design						
Weight	0.8 kg (1.8 lb)	1.3 kg (2.8 lb) Flanged: 2 kg (4.4 lb)	4.3 kg (9.5 lb)	8 kg (18 lb)	0.8 kg (1.7 lb)	1.3 kg (2.8 lb)
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 ² (20 AWG) PVC jacket				2 wire twisted pair/braided and foil shielded 0.5 mm ² (20 AWG) silicone jacket	
Separation	Max. 365 m (1 200 ft)					
Certificates and approvals	Standard: CE ¹⁾ , CSA, FM, ATEX II 2GD F: FM Class I, Div T, Groups A, B, C and D, Class II Div 1, Groups E, F and G, Class III	Standard: CE ¹⁾ , CSA, FM, ATEX II 2GD F: FM Class I, Div T, Groups A, B, C and D, Class II Div 1, Groups E, F and G, Class III	CE ¹⁾ , CSA, FM, ATEX II 2G 1D	CE ¹⁾ , CSA, FM, ATEX II 2G 1D	Standard: CE ¹⁾ , CSA, FM, ATEX II 2GD Sanitary: CE, CTICK, CSA _{US/C}	CE ¹⁾ , CSA, FM, ATEX II 2GD

¹⁾ EMC certificate available on request.

Level measurement

Continuous level measurement – Ultrasonic transducers

EchoMax XPS and XCT

Selection and Ordering data	Order No.	Selection and Ordering data	Order code
EchoMax XPS-10 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	7ML1115-	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 inch)]: Measuring point number/ identification (max. 27 characters) specify in plain text	
Mounting thread and facing 1" NPT [(Taper), ANSI/ASME B1.20.1] 1" NPT [(Taper), ANSI/ASME B1.20.1] with foam facing ¹⁾ 1" NPT [(Taper), ANSI/ASME B1.20.1] with PTFE facing ²⁾ R 1" [(BSPT), EN 10226] R 1" [(BSPT), EN 10226] with foam facing ¹⁾ R 1" [(BSPT), EN 10226] with PTFE facing ²⁾	0 1 2 3 4 5	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.	Order No. 7ML1998-5QM82 7ML1998-5HV61
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)	B C E F K	Accessories Tag, stainless steel with hole, 12 x 45 mm (0.47 x 1.77 inch), 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 4/204 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
Mounting flange 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		
Approvals ATEX II 2 GD, FM Class I Div. 2, SAA Class I Zone 1 CSA Class I Div. 1 ³⁾	3 4		

¹⁾ Not available with flanged versions

²⁾ Available with flanged versions only

³⁾ Valid with mounting thread and facing options 0 ... 2 only

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

Order No.

7ML1170-

0

1

B

C

D

E

F

A

B

C

D

E

1

Selection and Ordering data

Order code

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 inch)]:
Measuring point number/ identification (max. 27 characters) specify in plain text

Y15

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.

Order No.

7ML1998-1DU01

7ML1998-5HV61

Accessories

Tag, stainless steel with hole, 12 x 45 mm (0.47 x 1.77 inch), one text line for fastening on sensors

7ML1930-1BJ

Submergence shield kit

7ML1830-1BH

Easy Aimer 2, with 3/4" x 1" NPT PVC coupling

7ML1830-1AQ

Easy Aimer 304, with stainless steel coupling

7ML1830-1AU

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 4/204 for more information)

7ML1830-1BQ

1" NPT locknut, plastic

7ML1830-1DS

Level measurement

Continuous level measurement – Ultrasonic transducers

EchoMax XPS and XCT

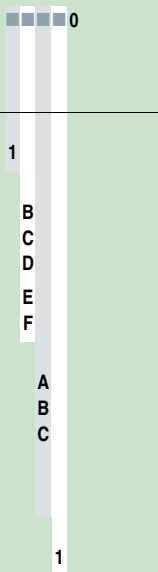
Selection and Ordering data	Order No.	Selection and Ordering data	Order code
EchoMax XPS-15 ultrasonic transducer High-frequency ultrasonic transducer designed for a wide variety of liquid and solid applications, for use with approved controllers. Includes integral temperature sensor. Measuring range: min. 0.3 m, max. 15 m	7ML1118-	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 inch)]: Measuring point number/ identification (max. 27 characters) specify in plain text	
Mounting thread and facing 1" NPT [(Taper), ANSI/ASME B1.20.1] 1" NPT [(Taper), ANSI/ASME B1.20.1] with foam facing ¹⁾ 1" NPT [(Taper), ANSI/ASME B1.20.1] with PTFE facing ²⁾ R 1" [(BSPT), EN 10226] R 1" [(BSPT), EN 10226] with foam facing ¹⁾ R 1" [(BSPT), EN 10226] with PTFE facing ²⁾	0 1 2 3 4 5	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.	Order No. 7ML1998-5QM82 7ML1998-5HV61
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)	B C E F K	Accessories Tag, stainless steel with hole, 12 x 45 mm (0.47 x 1.77 inch), 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 4/204 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	7ML1930-1BJ 7ML1830-1BJ 7ML1830-1BK 7ML1830-1BL 7ML1830-1BM 7ML1830-1BN 7ML1830-1BP 7ML1830-1BQ 7ML1830-1DS 7ML1830-1DR 7ML1830-1AQ 7ML1830-1AX 7ML1830-1AU 7ML1830-1GN
Mounting flange 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, 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		
Approvals ATEX II 2GD, FM Class I Div. 2, SAA Class I CSA Class I Div. 1 ³⁾	3 4		
¹⁾ Not available with flanged versions ²⁾ Available with flanged versions only ³⁾ Available with mounting options 0 ... 2 only			

4

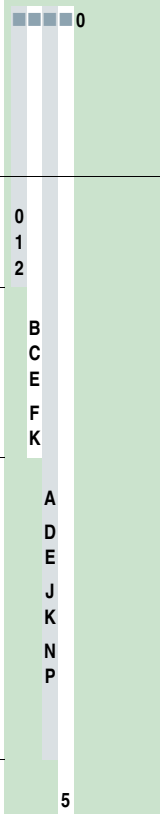
Level measurement

Continuous level measurement – Ultrasonic transducers

EchoMax XPS and XCT

Selection and Ordering data	Order No.
EchoMax XPS-15F 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. 15 m	7ML1171- 
Mounting thread and facing 1" NPT [(Taper), ANSI/ASME B1.20.1]	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)	B C D E F
Mounting flange, flush mount 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.)	A B C
Approvals FM Class I Div. 1	1

Selection and Ordering data	Order code
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 inch)]; Measuring point number/ identification (max. 27 characters) specify in plain text	Y15
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.	Order No. 7ML1998-1DU01 7ML1998-5HV61
Accessories Tag, stainless steel with hole, 12 x 45 mm (0.47 x 1.77 inch), 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 4/204 for more information) 1" NPT locknut, plastic Easy Aimer 2, with ¾" x 1" NPT PVC coupling Easy Aimer 304 with stainless steel coupling	7ML1930-1BJ 7ML1830-1BJ 7ML1830-1BK 7ML1830-1BL 7ML1830-1BM 7ML1830-1BN 7ML1830-1BP 7ML1830-1BQ 7ML1830-1DS 7ML1830-1AQ 7ML1830-1AU

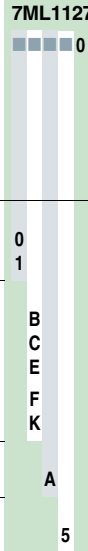
Selection and Ordering data	Order No.
EchoMax XPS-30 ultrasonic transducer High-frequency ultrasonic transducer designed for a wide variety of liquid and solid applications, for use with approved controllers. Includes integral temperature sensor. 1½" universal thread compatible with 1½" NPT and R 1½" [(BSPT), EN 10226] Measuring range: min. 0.6 m (1.97 ft), max. 30 m (98.43 ft)	7ML1123 - 
Mounting thread and facing 1½" universal thread 1½" universal thread, foam facing ¹⁾ 1½" universal thread, PTFE facing ²⁾	0 1 2
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)	B C E F K
Mounting flange 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, Type A, flat faced	A D E J K N P
Approvals ATEX II 2G 1D, FM Class I Div 2, SAA	5

- ¹⁾ Not available with flanged versions
²⁾ Available with flanged versions only

Level measurement

Continuous level measurement – Ultrasonic transducers


EchoMax XPS and XCT

Selection and Ordering data	Order code	Selection and Ordering data	Order No.
<p>Further designs</p> <p>Please add "-Z" to Order No. and specify Order code(s).</p>		<p>EchoMax XPS-40 ultrasonic transducer</p> <p>High-frequency ultrasonic transducer designed for a wide variety of liquid and solid applications, for use with approved controllers. Includes integral temperature sensor.</p> <p>1½" universal thread compatible with 1½" NPT and R 1½" [(BSPT), EN 10226]</p> <p>Measuring range: min. 0.9 m (2.95 ft), max. 40 m (131.23 ft)</p>	<p>7ML1127-0</p> 
<p>Acrylic coated, stainless steel tag [13 x 45 mm</p> <p>Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]:</p> <p>Measuring-point number/identification (max. 27 characters) specify in plain text</p>	Y15	<p>Mounting thread and facing</p> <p>1½" universal thread</p> <p>1½" universal thread, foam facing</p>	<p>0</p> <p>1</p> <p>B</p> <p>C</p> <p>E</p> <p>F</p> <p>K</p> <p>A</p> <p>5</p>
<p>Operating Instructions</p> <p>Quick Start guide, multi-language</p> <p>Applications Guidelines, multi-language</p> <p>Note: The Applications Guidelines should be ordered as a separate line item on the order.</p> <p>This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.</p>	<p>Order No.</p> <p>7ML1998-5QM82</p> <p>7ML1998-5HV61</p>	<p>Cable length</p> <p>5 m (16.40 ft)</p> <p>10 m (32.81 ft)</p> <p>30 m (98.43 ft)</p> <p>50 m (164.04 ft)</p> <p>100 m (328.08 ft)</p>	
<p>Accessories</p> <p>Tag, stainless steel with hole, 12 x 45 mm (0.47 x 1.77 inch), one text line for fastening on sensors</p> <p>1½" BSPT locknut, plastic</p> <p>Easy Aimer 2, 1½" NPT galvanized coupling</p> <p>Easy Aimer 304, NPT with 1½" coupling</p> <p>Easy Aimer 2, aluminum with M20 adapter and 1" and 1½" BSPT aluminum couplings</p> <p>Easy Aimer 304, with M20 adapter and 1" and 1½" BSPT 304 SS couplings</p>	<p>7ML1930-1BJ</p> <p>7ML1830-1DP</p> <p>7ML1830-1AN</p> <p>7ML1830-1AT</p> <p>7ML1830-1AX</p> <p>7ML1830-1GN</p>	<p>Mounting flange</p> <p>None</p>	
		<p>Approvals</p> <p>ATEX II 2G 1D, FM Class I Div 2, SAA</p>	
		<p>Selection and Ordering data</p> <p>Further designs</p> <p>Please add "-Z" to Order No. and specify Order code(s).</p>	
		<p>Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]:</p> <p>Measuring point number/ identification (max. 27 characters) specify in plain text</p>	Y15
		<p>Operating Instructions</p> <p>Quick Start guide, multi-language</p> <p>Applications Guidelines, multi-language</p> <p>Note: The Applications Guidelines should be ordered as a separate line item on the order.</p> <p>This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.</p>	<p>Order No.</p> <p>7ML1998-5QM82</p> <p>7ML1998-5HV61</p>
		<p>Accessories</p> <p>Tag, stainless steel with hole, 12 x 45 mm (0.47 x 1.77 inch), one text line for fastening on sensors</p> <p>1½" BSPT locknut, plastic</p> <p>Easy Aimer 2, 1½" NPT galvanized coupling</p> <p>Easy Aimer 304, NPT with 1½" coupling</p> <p>Easy Aimer 2, aluminum with M20 adapter and 1" and 1½" BSPT aluminum couplings</p> <p>Easy Aimer 304, with M20 adapter and 1" and 1½" BSPT 304 SS couplings</p>	<p>7ML1930-1BJ</p> <p>7ML1830-1DP</p> <p>7ML1830-1AN</p> <p>7ML1830-1AT</p> <p>7ML1830-1AX</p> <p>7ML1830-1GN</p>

Level measurement

Continuous level measurement – Ultrasonic transducers

EchoMax XPS and XCT

Selection and Ordering data	Order No.	Selection and Ordering data	Order code
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)	7ML1132- 	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 inch)]: Measuring point number/ identification (max. 27 characters) specify in plain text	Y15
Mounting thread and facing 1" NPT [(Taper), ANSI/ASME B1.20.1] 1" NPT [(Taper), ANSI/ASME B1.20.1], PTFE facing ¹⁾ R 1" [(BSPT), EN 10226] R 1" [(BSPT), EN 10226], PTFE facing ¹⁾	0 1 2 3	Operating Instructions Quick start manual, multi-language XCT-8 with Sanitary Flange, multi-language Note: This manual should be ordered as a separate line item with Mounting Option V. 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. 7ML1998-5QM82 7ML1998-5HX62 7ML1998-5HV61
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)	A B C E F K	Accessories Tag, stainless steel with hole, 12 x 45 mm (0.47 x 1.77 inch), one text line for fastening on sensors Submersible hood 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 4/204 for more information) 1" NPT locknut, plastic 1" BSPT locknut, plastic Easy Aimer 304 with stainless steel coupling Easy Aimer, aluminum, with M20 adapter and ¾ ... 1" and 1½" BSPT couplings Easy Aimer 304, with M20 adapter and 1" and 1½" BSPT 304 SS couplings Sanitary, 4" mounting clamp Sanitary, isolating gasket	7ML1930-1BJ 7ML1830-1BH 7ML1830-1BK 7ML1830-1BL 7ML1830-1BM 7ML1830-1BN 7ML1830-1BP 7ML1830-1BQ 7ML1830-1DS 7ML1830-1DR 7ML1830-1AU 7ML1830-1AX 7ML1830-1GN 7ML1830-1BR 7ML1830-1KC
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 ^{2) 3)} 4" universal ^{4) 3)} 6" universal ^{5) 3)} 4" sanitary flange ⁶⁾	A C D E G J L M P R S T U V		
Approvals ATEX II 2GD, FM Class I, Div. 2, SAA CSA Class I Div. 1 ⁷⁾ CE, C-TICK, CSA _{US/C} ⁸⁾	4 5 7		

¹⁾ Available with flange versions S, T, U and, V only

²⁾ Universal fits 3" ASME, DN 80, JIS 10K3B style

³⁾ Available for mounting thread and facing options 1 and 3 only

⁴⁾ Universal fits 4" ASME, DN 100, JIS 10K4B style

⁵⁾ Universal fits 6" ASME, DN 150, JIS 10K6B style

⁶⁾ Available with Mounting thread and facing options 1 and 3, and approval option 7 only

⁷⁾ Available with mounting thread and facing option 0 only

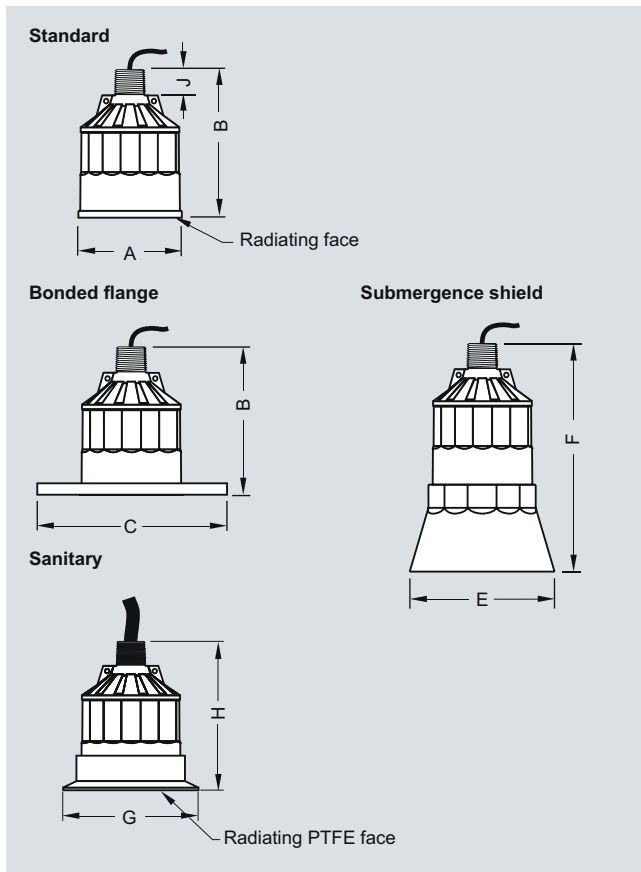
⁸⁾ Available with 4" mounting flange option V only

Level measurement

Continuous level measurement – Ultrasonic transducers

EchoMax XPS and XCT

Dimensional drawings

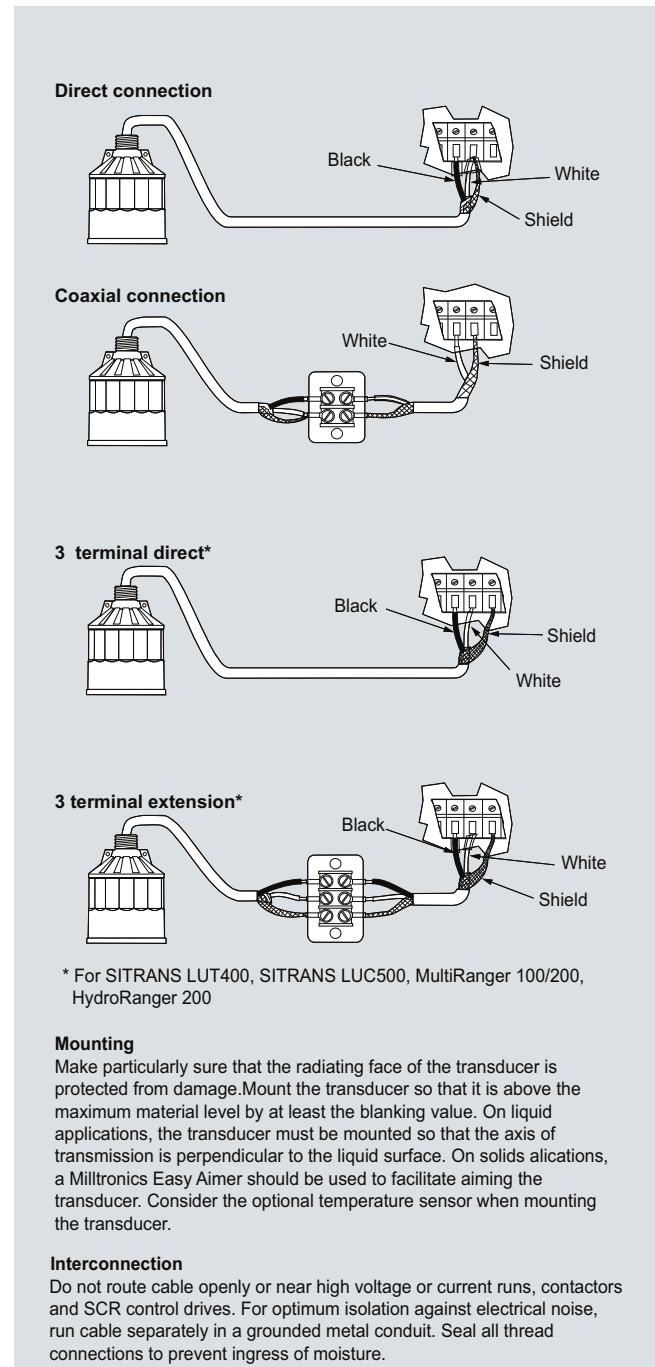


XPS and XCT ultrasonic transducer, dimensions in mm (inch)

Version	XPS-10	XPS-15	XPS-30	XPS-40
Dimension				
A	88 mm (3.464 inch)	121 mm (4.764 inch)	175 mm (6.890 inch)	206 mm (8.110 inch)
B	122 mm (4.803 inch)	132 mm (5.197 inch)	198 mm (7.795 inch)	229 mm (9.016 inch)
C	According to ASME, DIN and JIS			n/a
E	124 mm (4.882 inch)	158 mm (6.220 inch)	n/a	n/a
F	152 mm (5.984 inch)	198 mm (7.795 inch)	n/a	n/a
J	28 mm (1.1 inch)	28 mm (1.1 inch)	28 mm (1.1 inch)	28 mm (1.1 inch)

Version	XCT-8	XCT-12
Dimension		
A	88 mm (3.464 inch)	121 mm (4.764 inch)
B	122 mm (4.803 inch)	132 mm (5.197 inch)
C	According to ASME, DIN and JIS	
E	n/a	n/a
F	n/a	n/a
G	Sanitary version: 119 mm (4.68 inch)	n/a
H	Sanitary version: 122 mm (4.8 inch)	n/a
J	28 mm (1.1 inch)	28 mm (1.1 inch)

Schematics



XPS and XCT ultrasonic transducer connections

Level measurement

Continuous level measurement – Ultrasonic transducers

EchoMax XPS and XCT

Selection and Ordering data

EchoMax XCT-12 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. 12 m (40 ft)

Mounting thread and facing

1" NPT [(Taper), ANSI/ASME B1.20.1]
1" NPT [(Taper), ANSI/ASME B1.20.1], PTFE facing, available for flange options U only¹⁾
R 1" [(BSPT), EN 10226]
R 1" [(BSPT), EN 10226], PTFE facing, available for flange options U only¹⁾

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
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, 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 style²⁾

Approvals

ATEX II 2GD, FM Class I, Div. 2, SAA
CSA Class I, Div. 1, available with mounting thread and facing option 0 only

Order No.

7ML1136-

0

1

2

3

A

B

C

E

F

K

A

D

E

J

K

N

P

U

3

4

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 inch)]:
Measuring point number/ identification (max. 27 characters) specify in plain text

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.

Accessories

Tag, stainless steel with hole, 12 x 45 mm (0.47 x.77 inch), 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 4/204 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

Order code

Y15

Order No.

7ML1998-5QM82

7ML1998-5HV61

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

¹⁾ Available with universal flanges only

²⁾ For use with mounting thread and facing option 1 and 3 only

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 ... 60 m (1.8 ... 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

Mode of operation	
Measuring principle	Ultrasonic transducer
Input	
Measuring range	
• XLT-30	0.9 ... 30 m (3.0 ... 100 ft)
• XLT-60	1.8 ... 60 m (6.0 ... 200 ft)
Output	
Frequency	
• XLT-30	22 kHz
• XLT-60	13 kHz
• Beam angle ¹⁾	5°
Accuracy	
Temperature error	Compensated by transducers internal temperature sensor
Rated operating conditions	
Ambient conditions	
• Ambient temperature	
- XLT-30 and XLT-60	-40 ... +150 °C (-40 ... +300 °F)
Design	
Weight	
• XLT-30	4.3 kg (9.5 lb)
• XLT-60	6.6 kg (14.5 lb)
Material (enclosure)	Aluminum, 304 stainless steel, polyester and silicone
Degree of protection	IP68
Color	
• XLT-30 and XLT-60	Red
Mounting	
Cable connection	1" NPT [(Taper), ANSI/ASME B1.20.1]
Cable (max. length)	2-core shielded/twisted, 0.5 mm ² (20 AWG), silicone sheath
Certificates and approvals	365 m (1 200 ft) with RG 62 AU coaxial cable
	CE (EMC certificate available on request), CSA _{US/C} , FM, ATEX II 2G 1D T5

¹⁾ 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.

EchoMax XLT-30, XLT-60, 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. 0.9 m, max. 30 m

Process connection:

1" NPT [(Taper), ANSI/ASME B1.20.1]

XLT-30

7ML1141-

XLT-60

7ML1145-

E 0

Facing

XLT-30

0

XLT-60

1

XLT-30, nylon

2

XLT-60, nylon

3

Cable length

1 m (3.28 ft)

A

5 m (16.40 ft)

B

10 m (32.81 ft)

C

20 m (65.62 ft)

D

30 m (98.43 ft)

E

50 m (164.04 ft)

F

70 m (229.66 ft)

G

80 m (262.47 ft)

H

90 m (295.28 ft)

J

100 m (328.08 ft)

K

Approvals

ATEX II 2G 1D, CSA Class I Div. 1, FM Class I Div. 2, CE

3

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

Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]:

Measuring-point number/identification (max. 27 characters) specify in plain text

Y15

Operating Instructions

Order No.

Quick start manual, multi-language

7ML1998-5QS81

Applications Guidelines, multi-language

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 inch), one text line for fastening on sensors

7ML1930-1BJ

Easy Aimer 2, 1" NPT galvanized

7ML1830-1AP

Easy Aimer 304 with stainless steel coupling

7ML1830-1AU

Easy Aimer 2, aluminum with M20 adapter and 1" and 1½" BSPT aluminum couplings

7ML1830-1AX

Easy Aimer 304, with M20 adapter and 1" and 1½" BSPT 304 SS couplings

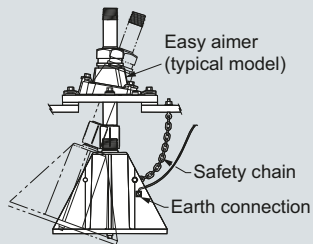
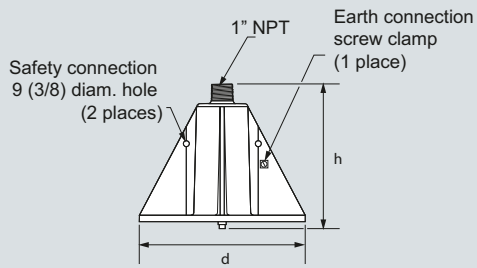
7ML1830-1GN

Level measurement

Continuous level measurement – Ultrasonic transducers

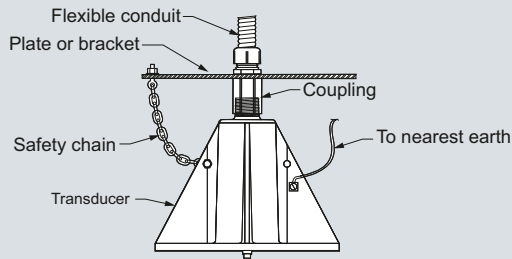
EchoMax XLT

Dimensional drawings

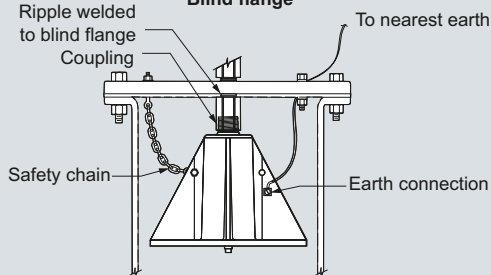


Mounting - liquid applications

Flexible conduit



Blind flange

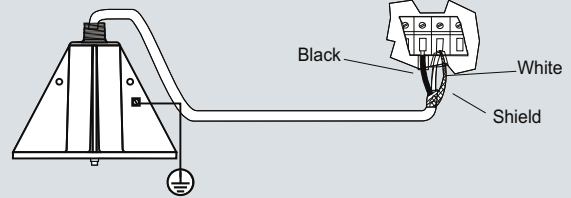


XLT ultrasonic transducer, dimensions in mm (inch)

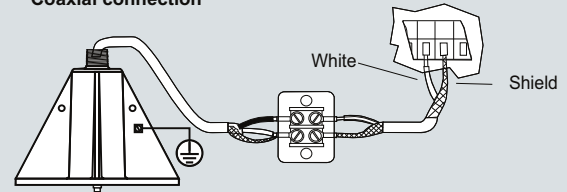
	XLT-30	XLT-60
d	264 mm (10.4 inch)	335 mm (13.2 inch)
h	249 mm (9.8 inch)	324 mm (12.75 inch)

Schematics

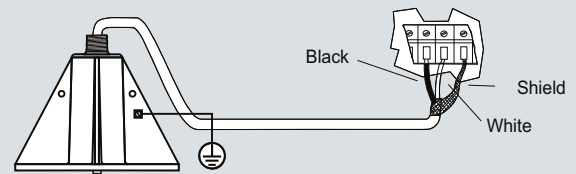
Direct connection



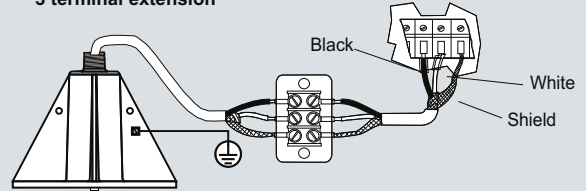
Coaxial connection



3 terminal direct*



3 terminal extension*



* For SITRANS LUT400, SITRANS LUC500, MultiRanger 100/200, HydroRanger 200

XLT ultrasonic transducer connections

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.

Application

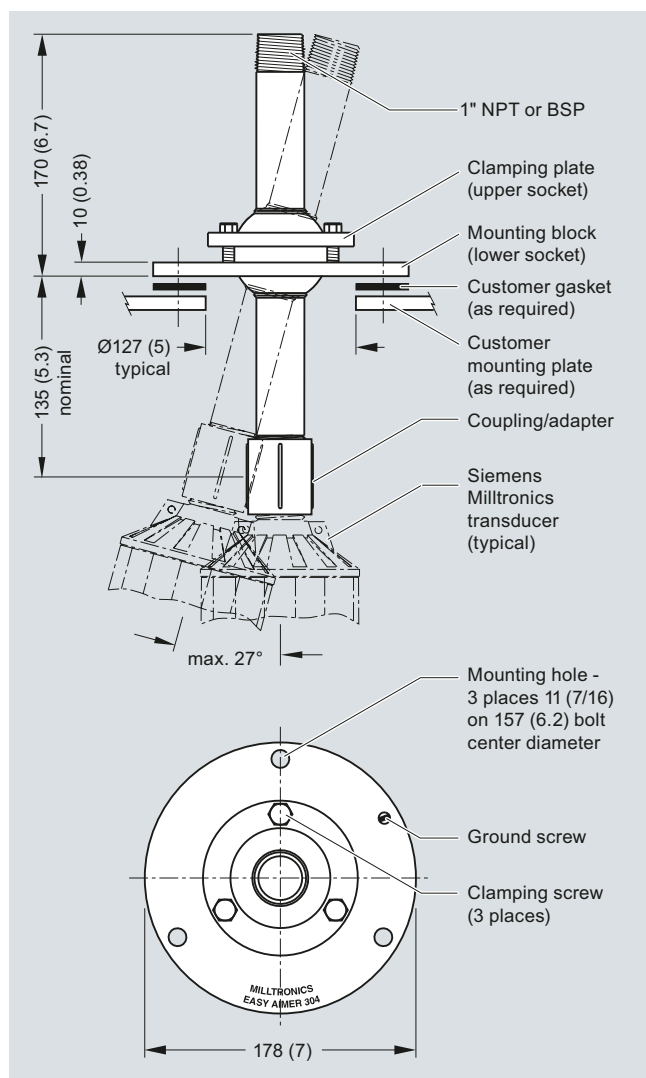
EA 2 aiming device

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.

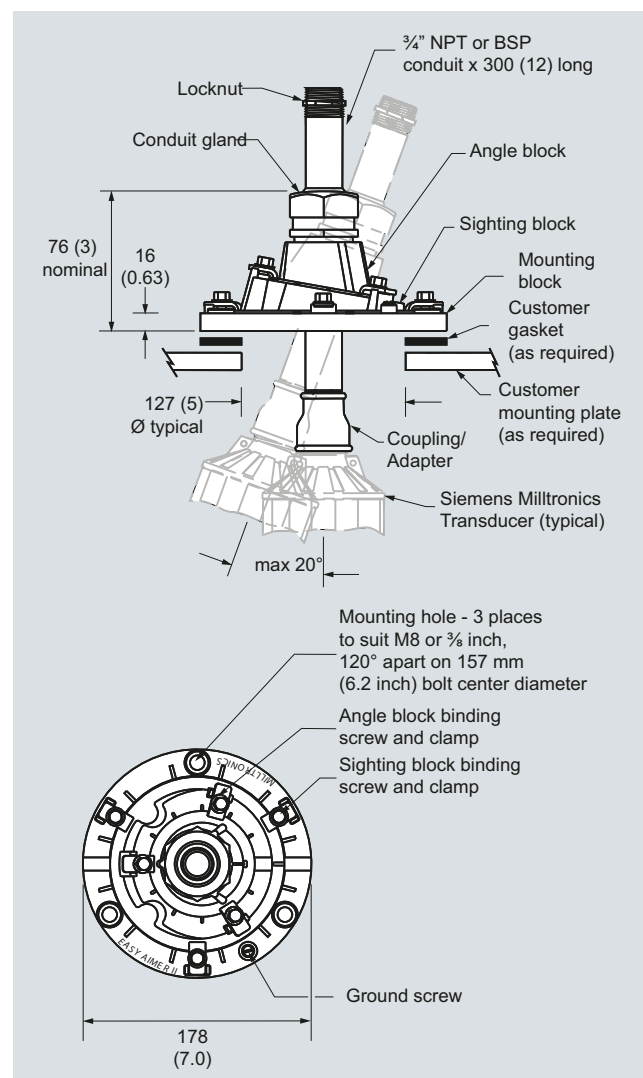
4

Dimensional drawings



EA 304 aiming device, dimensions in mm (inch)

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.
Easy aimer 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	7ML1830-1AX
Easy Aimer 304, with M20 adapter and 1" and 1½" BSPT 304 SS couplings	7ML1830-1GN
Easy Aimer 2, aluminum, BSPT conduit	7ML1830-1AL
Easy Aimer 2, aluminum, NPT with 1½" galvanized coupling ¹⁾	7ML1830-1AN
Easy Aimer 2, aluminum, NPT with 1" galvanized coupling	7ML1830-1AP
Easy Aimer 2, aluminum, NPT with ¾" x 1" PVC coupling	7ML1830-1AQ
Easy Aimer 304, BSPT conduit	7ML1830-1AS
Easy Aimer 304, NPT with 1½" coupling ¹⁾	7ML1830-1AT
Easy Aimer 304, NPT with 1" coupling	7ML1830-1AU
Operating Instructions 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.	7ML1998-5HG62

¹⁾ 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 inch).

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 inch).

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 inch).

FMS-310 **floor mounting set**

Mounting of transducers with 1" threaded connection.

Distance from transducer to floor: 20 to 48 cm (8 to 19 inch).

Distance from mounting support: 5 to 57 cm (2 to 22 inch).

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 inch).

Distance from mounting support: 41 to 108 cm (16 to 43 inch).

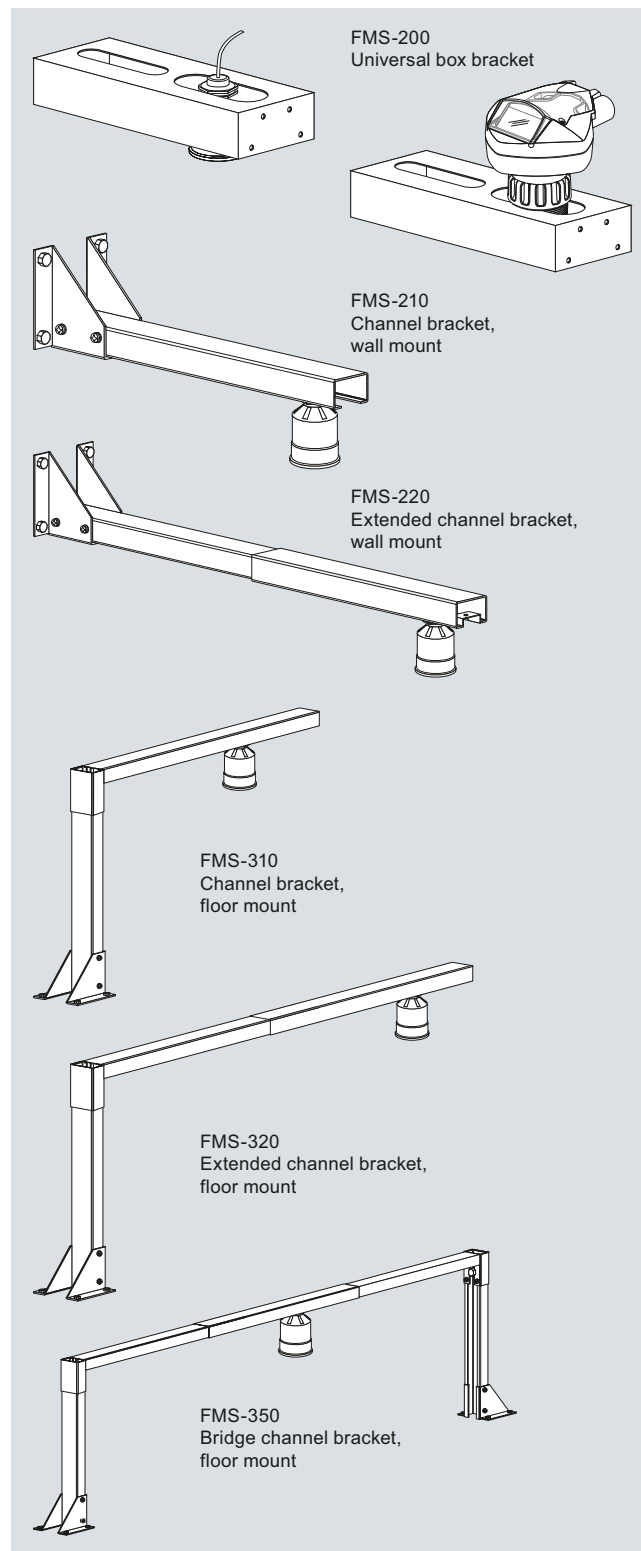
FMS-350 **floor mounting set, bridge**

Mounting of transducers with 1" threaded connection.

Distance from transducer to floor: 20 to 48 cm (8 to 19 inch), anywhere along the complete width of the bridge [166 cm (65 inch)].

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.

Integration



FMS mounting brackets

Level measurement

Continuous level measurement – Accessories for ultrasonic

FMS mounting brackets

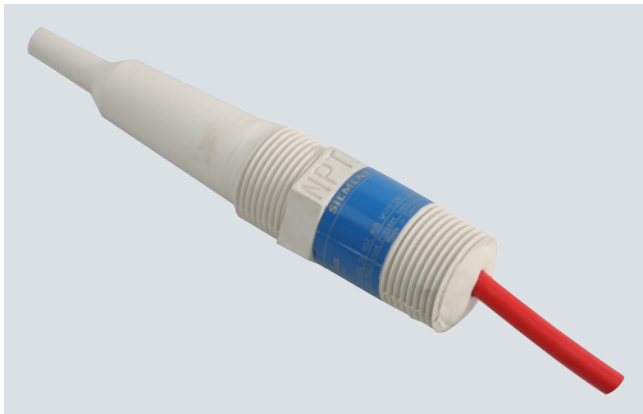
Selection and Ordering data	Order No.
Mounting brackets for XPS-10/XCT-8 sensors	
FMS-200 universal box bracket set	7ML1830-1BK
FMS-210 wall mounting set	7ML1830-1BL
FMS-220 extended wall mounting set	7ML1830-1BM
FMS-310 floor mounting set	7ML1830-1BN
FMS-320 extended floor mounting set	7ML1830-1BP
FMS-350 floor mounting set, bridge	7ML1830-1BQ
<i>Additional Operating Instructions</i>	
FMS-200	7ML1998-5BK61
FMS-210	7ML1998-5BL61
FMS-220	7ML1998-5BM61
FMS-310	7ML1998-5BN61
FMS-320	7ML1998-5BP61
FMS-350	7ML1998-5BQ61
Note: The Operating Instructions should be ordered as a separate line item on the order.	

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.

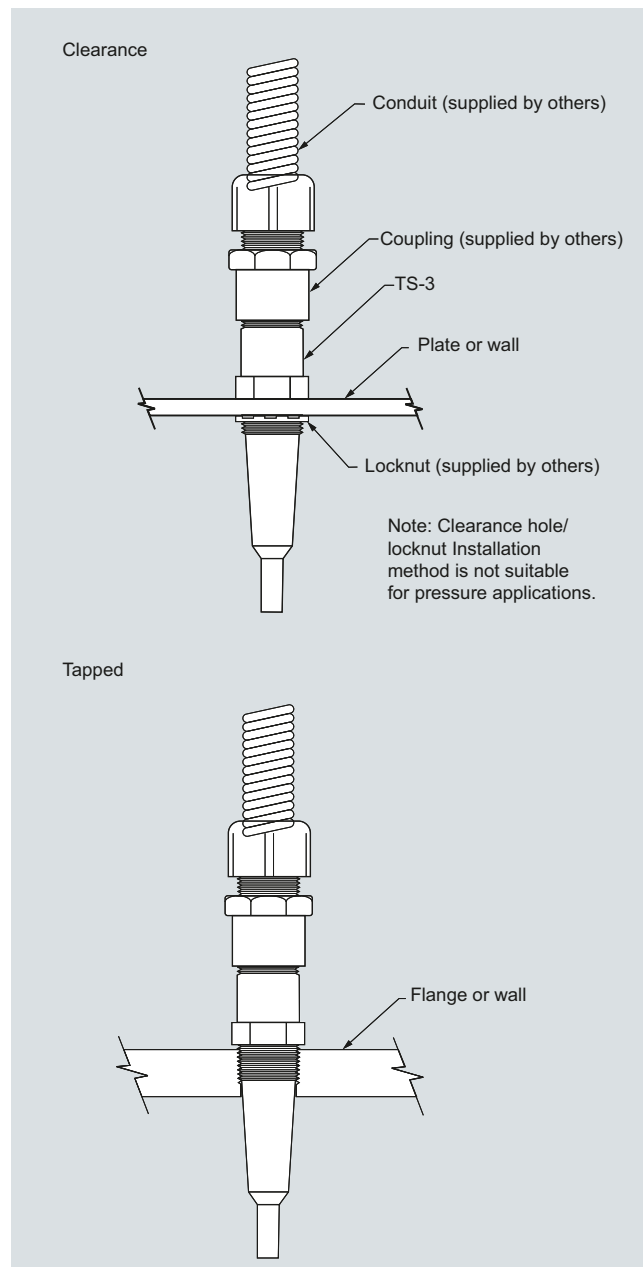
The TS-3 is used in conjunction with ultrasonic transducers that do not have an integral temperature sensor. It is also recommended in cases where the integral temperature sensor of the transducer cannot be used.

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

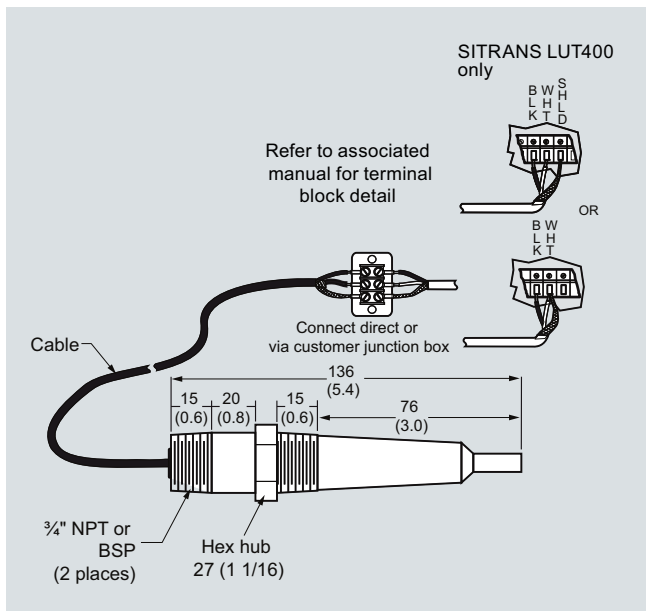
Continuous level measurement – Accessories for ultrasonic

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 ¹⁾
Cable connection	2-core, 0.5 mm ² (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	
	CE, SAA, FM, CSA, ATEX

1) 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	Order No.
TS-3 temperature sensor	7ML1813-
TS-3 provides an input signal for temperature compensation of specific Siemens ultrasonic level controllers.	B
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	A
¾" NPT [(Taper), ANSI/ASME B1.20.1]	B
R ¾" [(BSPT), EN 10226]	
Approvals	
CSA, FM	3
CE, ATEX, SAA	4
Operating Instructions	
English	7ML1998-5EM01
German	7ML1998-5EM31
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.	
Accessories	
¾" NPT locknut, aluminum	7ML1930-1BE
Tag, stainless steel with hole, 12 x 45 mm (0.47 x 1.77 inch) for fastening on sensors	7ML1930-1BJ

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 (vapor, 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, pressure, agitation, and turbulence to a range of 20 m (65 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, corrosive or aggressive materials, to a range of 20 m (66 ft). Ideal for small vessels and low dielectric media.

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 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 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.

SITRANS LR560 2-wire, 78 GHz FMCW radar level transmitter for continuous monitoring of solids in silos to a range of 100 m (329 ft).

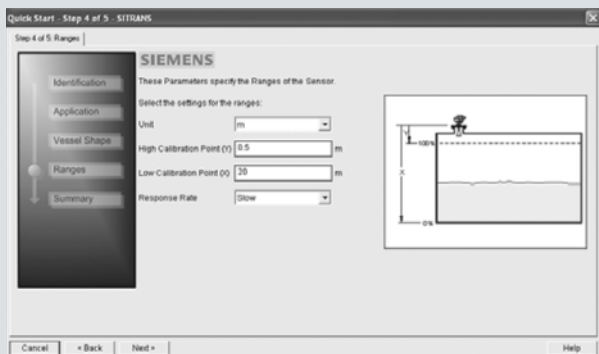
Auto False-Echo Suppression

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, LR560)



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.

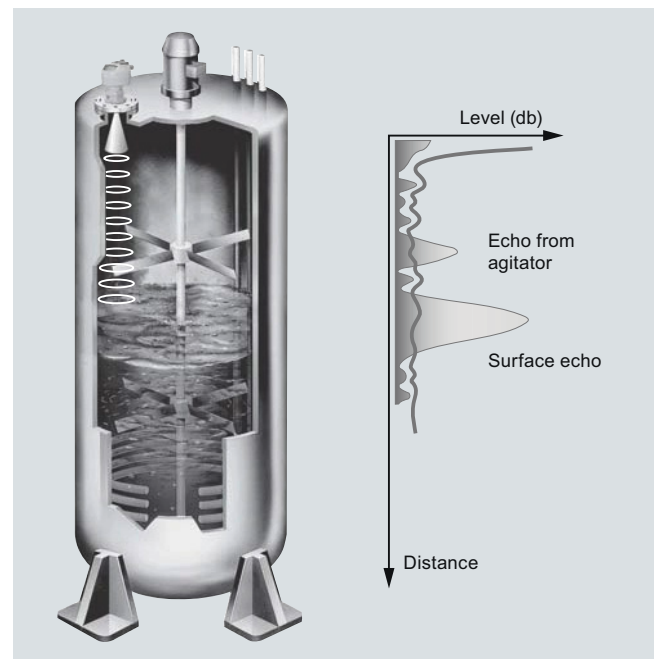
Unlike ultrasonic measurement, radar technology does not require a carrier medium and travels at the speed of light (300 000 000 m/s). Most industrial radar devices operate from 6 to 26 GHz.

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, SITRANS LR560).

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 LR400	SITRANS LR260	SITRANS LR460	SITRANS LR560
Typical industries	Chemicals	Chemicals, petrochemicals	Chemicals, petrochemicals	Chemicals, petrochemicals	Cement, power generation, food processing, mineral processing, mining	Cement, power generation, food processing, mineral processing, mining	Cement, power generation, food processing, mineral processing, mining
Typical applications	Liquids, storage vessels	Liquids, storage and process vessels with agitators, build up, and high temperatures	Liquids, storage and process vessels with agitators, vaporous liquids, high temperatures, low dielectric media	Liquids storage vessels, liquid petroleum gas (LPG), and other low dielectric media	Cement, plastics, grain, flour, coal	Cement, fly ash, grain, coal, flour, plastics	Cement, fly ash, grain, coal, flour, plastics
Range	0.3 ... 20 m (1 ... 65 ft)	0.4 ... 20 m (1.3 ... 65 ft)	50 mm (2 inch) from end of horn to 20 m (65 ft), horn dependent	0.35 ... 50 m (1.14 ... 164 ft)	30 m (98.4 ft)	100 m (328 ft)	40 m (131 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)	24 ... 25 GHz FMCW	K-band (25.0 GHz)	24 ... 25 GHz FMCW	78 ... 79 GHz
Performance accuracy	0.1 % of range or 10 mm (0.4 inch)	0.1 % of range or 10 mm (0.4 inch)	5 mm (0.02 inch)	≤ 5 mm (0.2 inch) from 2 ... 10 m (6.6 ... 32.8 ft) ≤ 15 mm (0.6 inch) from 10 ... 50 m (32.8 ... 164 ft)	25 mm (1 inch) from minimum detectable distance to 300 mm (11.8 inch) Remainder of range = 10 mm (0.39 inch) or 0.1 % of span (whichever is greater)	0.25 %	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 ... +65 °C (-40 ... +149 °F) Process: -40 ... +250 °C (-40 ... +482 °F), dependent on antenna type	Ambient: -40 ... +80 °C (-40 ... +176 °F) Process: -40 ... +200 °C (-40 ... +392 °F), dependent on antenna type	Ambient: 65 °C (149 °F) Process: 200 °C (392 °F)	Ambient: -40 ... +80 °C (-40 ... +176 °F) Process: -40 ... +100 °C (-40 ... 212 °F) optional: 200 °C (392 °F)
Output /communications/ remote configuration and diagnostics	<ul style="list-style-type: none"> 4 ... 20 mA/ HART SIMATIC PDM 	<ul style="list-style-type: none"> 4 ... 20 mA/ HART PROFIBUS PA SIMATIC PDM AMS SITRANS DTM/FDT for PACTware, Fieldcare, etc. 	<ul style="list-style-type: none"> 4 ... 20 mA/ HART PROFIBUS PA FOUNDATION Fieldbus SIMATIC PDM AMS SITRANS DTM/FDT for PACTware, Fieldcare, etc. 	<ul style="list-style-type: none"> 4 ... 20 mA/ HART PROFIBUS PA SIMATIC PDM 	<ul style="list-style-type: none"> 4 ... 20 mA/ HART PROFIBUS PA SIMATIC PDM 	<ul style="list-style-type: none"> 4 ... 20 mA/ HART PROFIBUS PA SIMATIC PDM 	<ul style="list-style-type: none"> 4 ... 20 mA/ HART PROFIBUS PA FOUNDATION Fieldbus SIMATIC PDM AMS SITRANS DTM/FDT for PACTware, Fieldcare, etc.
Power	<ul style="list-style-type: none"> 24 V DC nominal Loop powered 	<ul style="list-style-type: none"> 24 V DC nominal Loop powered 	<ul style="list-style-type: none"> 24 V DC nominal Loop powered 	<ul style="list-style-type: none"> 120 ... 230 V AC, ±15 %, 50/60 Hz 24 V DC, +25/-20 %, 6 W (optional) 	<ul style="list-style-type: none"> 24 V DC nominal Loop powered 	<ul style="list-style-type: none"> 100 ... 230 V AC, ±15 %, 50/60 Hz, 6 W 24 V DC, +25/-20 %, 6 W 	<ul style="list-style-type: none"> 24 V DC nominal Loop powered
Approvals	CE, C-TICK, Lloyds Register of Shipping, ABS, FCC, Industry Canada, R&TTE ATEX, CSA, FM, INMETRO, GOST-R, IECEx, ANZEx, TIIS	CE, C-TICK, Lloyds Register of Shipping, ABS, FCC, Industry Canada, R&TTE ATEX, CSA, FM, INMETRO, GOST-R, IECEx, ANZEx, TIIS, NEPSI	CE, C-TICK, Lloyds Register of Shipping, ABS, BV, FCC, Industry Canada, R&TTE ATEX, CSA, FM, INMETRO, GOST-R, IECEx, TIIS, NEPSI Functional safety SIL-2	CE, C-TICK, Lloyds Register of Shipping, ABS, FCC, Industry Canada, R&TTE ATEX, CSA, FM, GOST-R	CE, C-TICK, FCC, Industry Canada, R&TTE ATEX, CSA, FM, INMETRO, GOST, IECEx	CE, C-TICK, FCC, Industry Canada, R&TTE ATEX, CSA, FM, INMETRO, IECEx, GOST	CE, C-TICK, FCC, Industry Canada, R&TTE ATEX, CSA, FM, INMETRO, IECEx, NEPSI, GOST

Level measurement

Continuous level measurement – Radar transmitters

Radar transmitters

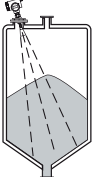
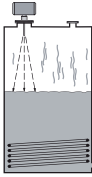


SIEMENS

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

Storage Solids  Storage Liquids  Process  Reactor 

Sketch attached

Area safety classification: (specify code required)

Height: _____ m/ft Diameter: _____ m/ft Filling method: _____

Top: Flat Parabolic Conical **Atmosphere:** (indicate all that apply)
 Foam Dust Vapor Steam Deposit (build-up)
 Pressure: _____
 Normal: _____
 Maximum (relief): _____

Mounting connection (specify type)

Distance to sidewall: _____ cm/inch

Mounting connection maximum temperature: _____ °C/°F

Max. temperature at electronics: _____ °C/°F

Critical Information	
Nozzle Length:	_____ cm/inch
Nozzle Diameter:	_____ cm/inch

Stilling well or Still Pipe mounting: Yes No Stilling well diameter: _____ cm/inch

Material

Material being measured: _____ Liquid Solid Liquefied gas

Material temperature: Norm: _____ °C/°F Max: _____ °C/°F

Material surface: Flat Tu Agitated Vortex Dielectric constant: $\epsilon_r < 3$ $\epsilon_r > 3$

Installation

Power available: _____

Communications:

HART/4 ... 20 mA
 PROFIBUS PA
 FOUNDATION Fieldbus 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 handheld communicator
- Communication using HART
- Patented Process Intelligence 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 vapors, 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).

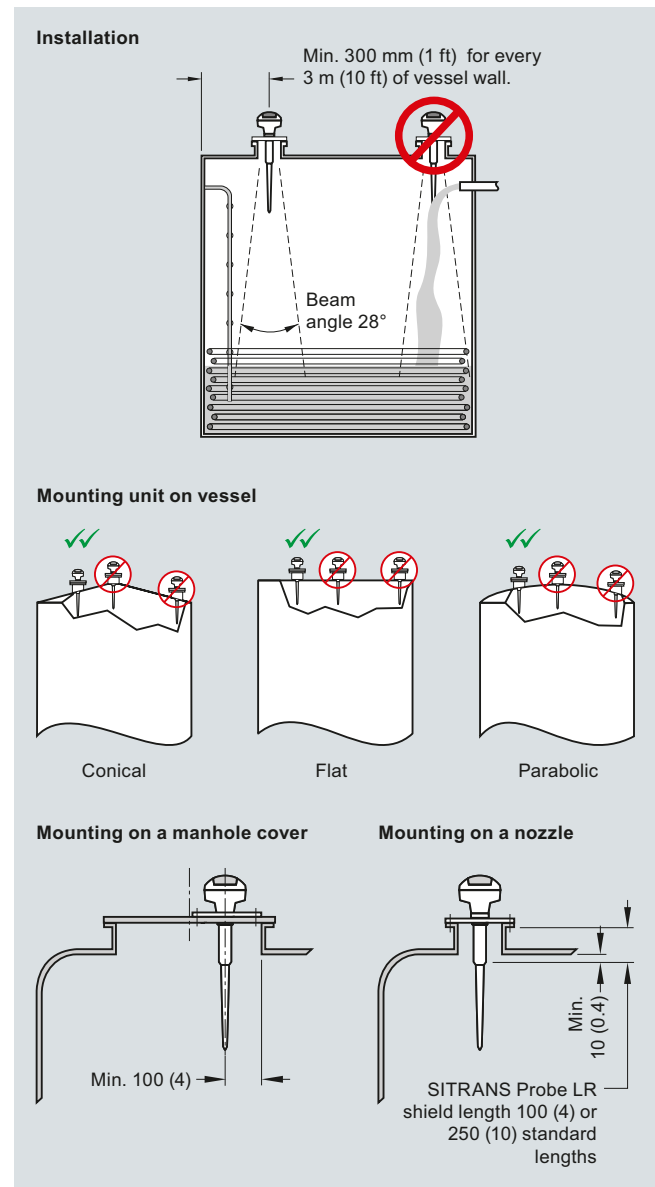
Probe LR is designed for safe and simple programming using the Intrinsically Safe handheld programmer without having to open the instrument's lid. It has a standard Uni-Construction polypropylene rod antenna that offers excellent chemical resistance and is hermetically sealed. The Uni-Construction antenna includes an internal, integrated shield that eliminates vessel nozzle interference.

SITRANS Probe LR incorporates Process Intelligence 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 handheld communicator or the Intrinsically Safe handheld programmer.

- Key Applications: tank farms, chemical storage, wastewater wet well

Configuration



SITRANS Probe LR installation, dimensions in mm (inch)

Level measurement

Continuous level measurement – Radar transmitters

SITRANS Probe LR

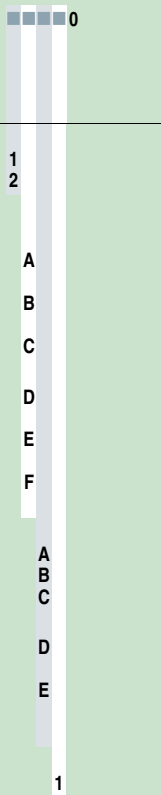
Technical specifications

Mode of operation		Power supply	
Measuring principle	Pulse radar level measurement		<ul style="list-style-type: none"> Nominal 24 V DC with max. 550 Ω, maximum 30 V DC 4 ... 20 mA
Frequency	5.8 GHz (North America 6.3 GHz)	Certificates and approvals	
Measuring range	0.3 ... 20 m (1.0 ... 65 ft)	General	CSA _{US/C} , CE, FM, C-TICK
Output		Marine	<ul style="list-style-type: none"> Lloyd's Register of Shipping ABS Type Approval
Analog output	4 ... 20 mA	Radio	FCC, Industry Canada and European (R&TTE), C-TICK
Accuracy	± 0.02 mA	Hazardous	
Span	Proportional or inversely proportional	<ul style="list-style-type: none"> Intrinsically Safe (Brazil) Intrinsically Safe (Canada) 	INMETRO Ex ia IIC T4 Ga CSA Class I, Div. 1, Groups A,B,C,D; Class II, Div. 1, Group G; Class III ATEX II 1G EEx ia IIC T4 IECEx Ex ia IIC T4 GOST-R Ex ia FM Class I, Div. 1, Groups A,B,C,D; Class II, Div. 1, Groups E,F, G; Class III
Communications	HART	<ul style="list-style-type: none"> Intrinsically Safe (Europe) Intrinsically Safe (International) Intrinsically Safe (Russia) Intrinsically Safe (USA) 	
Performance (reference conditions)		Programming	
Accuracy	± the greater of 0.1 % of range or 10 mm (0.4 inch)	Handheld programmer	HART communicator 375
Influence of ambient temperature	0.003 %/K	PC	SIMATIC PDM
Repeatability	± 5 mm (2 inch)	Intrinsically safe Siemens handheld programmer (optional)	Infrared receiver
Fail-safe	mA signal programmable as high, low or hold (LOE)	<ul style="list-style-type: none"> 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
Rated operating conditions		Display (local)	Multi-segment alphanumeric liquid crystal with bar graph (representing level) available in four languages
Installation conditions	Indoor/outdoor		
<ul style="list-style-type: none"> Location 			
Ambient conditions (enclosure)			
<ul style="list-style-type: none"> Ambient temperature Installation category Pollution degree 	-40 ... +80 °C (-40 ... +176 °F) I 4		
Medium conditions			
Dielectric constant ϵ_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)		
Design			
Enclosure			
<ul style="list-style-type: none"> Body construction Lid construction Cable inlet 	PBT (Polybutylene Terephthalate) PEI (Polyether Imide) 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			
<ul style="list-style-type: none"> Material Dimensions 	Polypropylene rod, hermetically sealed construction Standard 100 mm (4 inch) shield for maximum 100 mm (4 inch) nozzle or optional 250 mm (10 inch) 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]		

Level measurement

Continuous level measurement – Radar transmitters

SITRANS Probe LR

Selection and Ordering data	Order No.	Selection and Ordering data	Order code
SITRANS Probe LR 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)	7ML5430- 	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 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000	 Y15 C11
Enclosure/Cable inlet Plastic, (PBT), 2 x 1/2" NPT Plastic, (PBT), 2 x M20x1.5	1 2	Operating Instructions 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. 7ML1998-5HR02 7ML1998-5HR11 7ML1998-5HR21 7ML1998-5HR32
Antenna type/Material - (max. 3 bar and 80 °C) 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	A B C D E F	Additional Operating Instructions Multi-language Quick Start manual	7ML1998-5QP81
Approvals General Purpose, CE, R&TTE, C-TICK General Purpose, CSAus/c, FM, FCC CSA Class I, Div 1, Groups A, B, C, D, Class II, Div. 1 Group G, Class III, FCC, Intrinsically Safe FM, Class I, II and III, Div 1, Groups A, B, C, D, E, F, G, FCC, Intrinsically Safe IECEx Ex ia IIC T4; ATEX II 1G EEx ia IIC T4, R&TTE, C-TICK, Intrinsically Safe; INMETRO Ex ia IIC T4 Ga; GOST-R	A B C D E	Accessories Handheld programmer, Intrinsically Safe, ATEX II 1G, Ex 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)	7ML5830-2AH 7MF4997-1DA 7MF4997-1DB 7ML1930-1AP
Communication/Output 4 ... 20 mA, HART	1	SITRANS RD100 Remote display - see Chapter 7 SITRANS RD200 Remote display - see Chapter 7 SITRANS RD500 web, datalogging, alarming, ethernet, and modem support for instrumentation - see Chapter 7	7ML5750-1AA00-0
		Spare parts Plastic lid	7ML1830-1KB

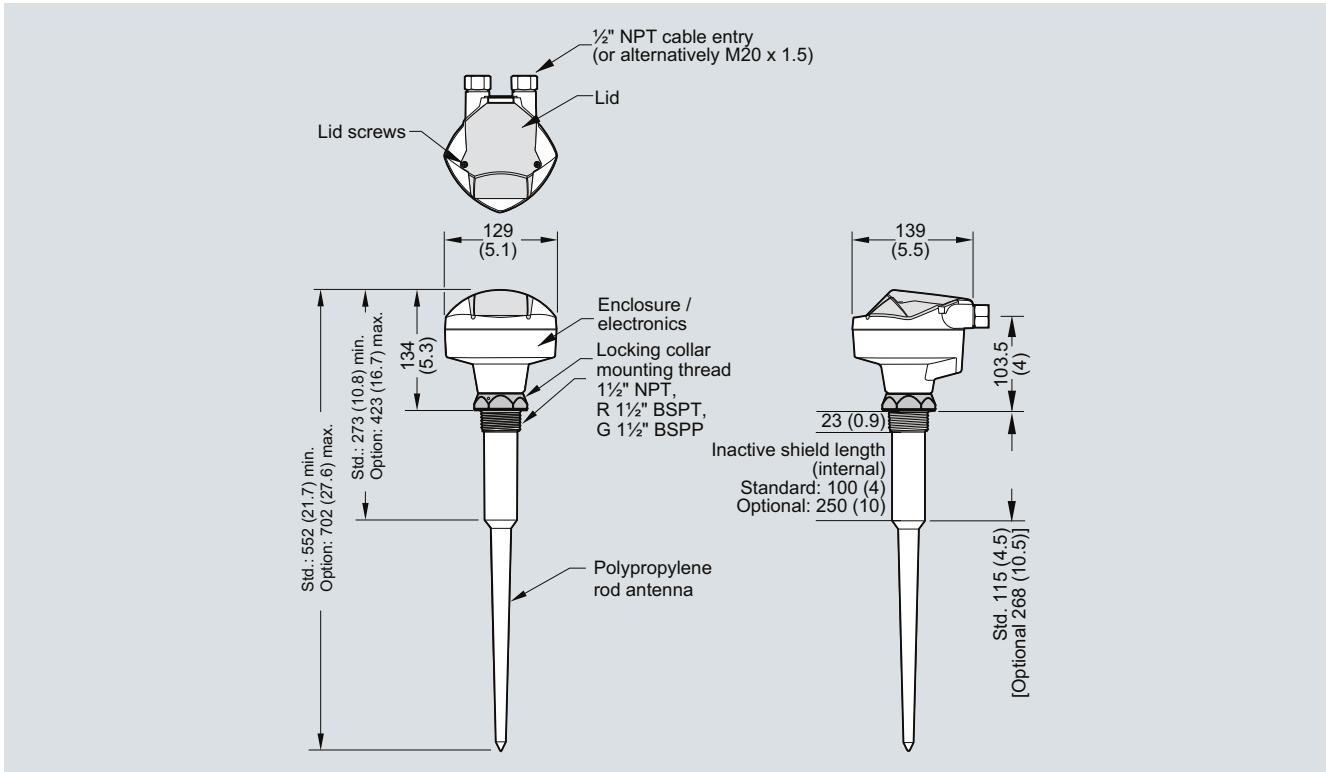
Level measurement

Continuous level measurement – Radar transmitters

SITRANS Probe LR

Dimensional drawings

4



SITRANS Probe LR, dimensions in mm (inch)

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...	Pmax
C	▲%	≡	⏴
▲	▼	↻	⏴

SITRANS Probe LR
Part number: 7ML5830-2AH

Notes:

- 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, pressure, agitation, and turbulence to a range of 20 m (65 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

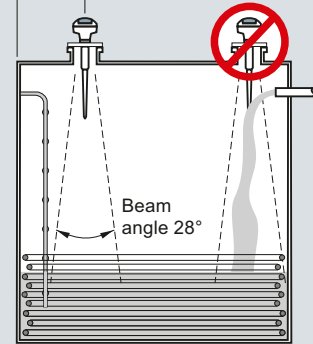
Configuration

Installation

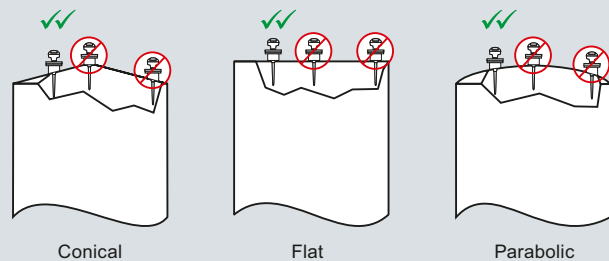
Note:

- Beam angle is the width of the cone where the energy density is half of the peak energy density.
- Beam angle for horn antenna dependent on horn size
- 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.

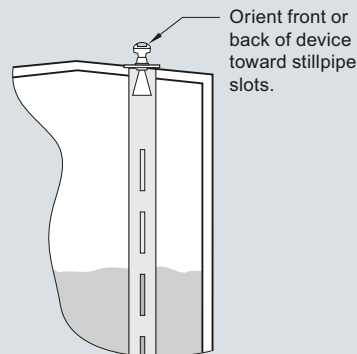
Min. 300 mm (1 ft) for every 3 m (10 ft) of vessel wall.



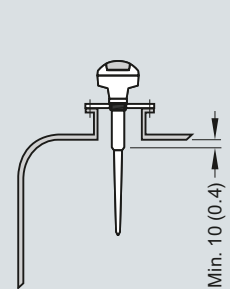
Mounting unit on vessel



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

Mode of operation		Design	
Measuring principle	Radar level measurement	Enclosure	Aluminum, polyester powder coated 2 x M20x1.5 or 2 x 1/2" NPT with adapter Type 4X/NEMA 4X, Type 6/ NEMA 6, IP67, IP68 < 2 kg (4.4 lb) (polypropylene rod antenna) Multi-segment alphanumeric liquid crystal with bar graph (representing level) available in four languages
Frequency	5.8 GHz (North America 6.3 GHz)	• Material	
Measuring range	0.3 ... 20 m (1.0 ... 65 ft)	• Cable inlet	
Output		Degree of protection	Standard 100 mm (4 inch) shield for maximum 100 mm (4 inch) nozzle, or optional 250 mm (10 inch) long shield Refer to SITRANS LR200 Antennas for optional rods, horns and waveguides
• Analog output	4 ... 20 mA	Weight	
• Accuracy	± 0.02 mA	Display (local)	
• Span	Proportional or inversely proportional	Antenna	Polypropylene rod, hermetically sealed construction, optional PTFE
• Communications	HART	• Material	
• Fail-safe	Optional: PROFIBUS PA (Profile 3.0, Class B) Programmable as high, low or hold (Loss of Echo)	• Dimensions	
Performance (according to reference conditions IEC60770-1)		• Optional rods, horn and waveguides	1 1/2" NPT [(Taper), ANSI/ASME B1.20.1] R 1 1/2" [(BSPT), EN 10226], or G 1 1/2" [(BSPP), EN ISO 228-1] (polypropylene rod antenna) Refer to SITRANS LR200 Antennas for more connections
• From end of antenna to 600 mm	40 mm (1.57 inch)	Process connections	
• Remainder of range	10 mm (0.4 inch) or 0.1 % of span (whichever is greater)	• Process connection	
Rated operating conditions		• Flange connection	Nominal 24 V DC (max. 30 V DC) with max. 550 Ω Nominal 24 V DC (max. 30 V DC) with max. 250 Ω • 10.5 mA • per IEC 61158-2
Installation conditions	Indoor/outdoor	Power supply	
• Location		4 ... 20 mA/HART	
Ambient conditions (enclosure)		• General Purpose, Non-incendive, Intrinsically Safe	
• Ambient temperature	-40 ... +80 °C (-40 ... +176 °F)	• Flame proof, Increased safety, Explosion proof	PROFIBUS PA
• Installation category	I		
• Pollution degree	4		
Medium conditions			
• Dielectric constant ϵ_r	$\epsilon_r > 1.6$ (for $\epsilon_r < 3$, use waveguide antenna or stillpipe)		
• Vessel temperature and pressure	Varies with connection type; see Pressure/Temperature curves for more information (page 4/228)		

Level measurement

Continuous level measurement – Radar transmitters

SITRANS LR200

Certificates and approvals	
General	CSA _{US/C} , CE, FM, C-TICK
Marine	<ul style="list-style-type: none"> • Lloyd's Register of Shipping • ABS Type Approval
Radio	FCC, Industry Canada and European (R&TTE), C-TICK
Hazardous	
• Intrinsically Safe (Australia)	ANZEx Ex ia IIC T4
• Intrinsically Safe (Brazil)	INMETRO Ex ia IIC T4 Ga
• 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
• 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
• Non-incendive (USA)	FM, Class I, Div. 2, Groups A, B, C, D, T5
• Flame Proof/Increased Safety (China)	NEPSI Ex dmbia IIC T4/ Ex embia IIC T4
• Flame Proof (Europe)	ATEX II 1/2 G Ex dmbia IIC T4 Ga/Gb
• Increased Safety (Europe)	ATEX II 1/2 G Ex embia IIC T4 Ga/Gb
• Intrinsically Safe (Europe)	ATEX II 1G Ex ia IIC T4
• Intrinsically Safe (International)	IECEx Ex ia IIC T4
• Intrinsically Safe (Russia)	GOST-R Ex ia
Programming	
• Intrinsically Safe Siemens handheld programmer - Approvals for handheld programmer	Infrared receiver IS model: ATEX II 1GD Ex ia IIC T4 Ga Ex iaD 20 T13 5 °C T _a = -20 ... +50 °C CSA/FM Class I, II, and III, Div. 1., Groups A, B, C, D, E, F, G, T6 T _a = 50 °C
• Handheld communicator	HART communicator 375
• PC	<ul style="list-style-type: none"> • SIMATIC PDM • AMS
• Display (local)	Multi-segment alphanumeric liquid crystal with bar graph (representing level) available in four languages

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) 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, R&TTE, C-TICK
General Purpose, CSA, FM, Industry Canada, FCC
Intrinsically Safe, CSA Class I, II, Div 1,
Gr. A,B,C,D, E,F,G, Industry Canada

Intrinsically Safe, FM Class I, II, Div 1, Gr. A,B,C,D,
E,F,G, FCC

Intrinsically Safe, IECEx/ANZEx/ATEX II 1G Ex ia
IIC T4, INMETRO Ex ia IIC T4, CE, R&TTE, C-TICK;
GOST-R

Non incendive, FM Class I, Div 2, Gr. A,B,C,D,
FCC¹⁾

Increased Safety, ATEX II 1/2G Ex embja IIC T4
Ga/Gb, CE, R&TTE, C-TICK; GOST-R²⁾³⁾

Flame Proof, ATEX II 1/2G Ex dmbja IIC T4 Ga/Gb,
CE, R&TTE, C-TICK; GOST-R³⁾

Explosion Proof, CSA/FM Class I, II, III,
Gr. A,B,C,D,E,F,G, Industry Canada, FCC¹⁾³⁾

Communication/Output

PROFIBUS PA

4 ... 20 mA, HART, startup at < 3.6 mA

¹⁾ Available with enclosure option 2 only

²⁾ Available with enclosure option 3 only

³⁾ Available with communication option 3 only

Order No.

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

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 inch)]:
Measuring-point number/identification (max. 27
characters); specify in plain text

Manufacturer's test certificate: M to DIN 55350,
Part 18 and to ISO 9000

Namur NE43 compliant, device preset to failsafe
< 3.6 mA¹⁾

Operating Instructions for HART/mA device

English

German

Note: The Operating Instructions should be orde-
red 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 orde-
red 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), HART²⁾

One metallic cable gland M20x1.5,
rated -40 ... +80 °C (-40 ... +176 °F),
PROFIBUS PA²⁾²⁾

One general purpose polymeric cable gland
M20x1.5, rated -20 ... + 80°C (-40 ... +176 °F)

SITRANS RD100 Remote display - see Chapter 7

SITRANS RD200 Remote display - see Chapter 7

SITRANS RD500 web, datalogging, alarming,
ethernet, and modem support for instrumentation -
see Chapter 7

¹⁾ Available with communication option 3 only

²⁾ Product shipped with plastic cable gland, rated to -20 °C.

If -40 °C rating required, then metallic cable gland is recommended.

Order code

Y15

C11

N07

Order No.

7ML1998-5JP02

7ML1998-5JP32

7ML1998-5XC82

7ML1998-5JR02

7ML1998-5JR32

7ML1998-5XD82

7ML1930-1BK

7MF4997-1DA

7MF4997-1DB

7ML1930-1AP

7ML1930-1AQ

7ML1930-1AM

7ML5750-
1AA00-0

Level measurement

Continuous level measurement – Radar transmitters

SITRANS LR200

Selection and Ordering data	Order No.	Selection and Ordering data	Order No.
SITRANS LR200, Flange Adapter/PTFE 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).	7ML5423-	SITRANS LR200, Flange Adapter/PTFE 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).	7ML5423-
Antenna material (uses antenna adapter) PTFE, uses antenna adapter and additional process connection below	1	Communication/Output PROFIBUS PA 4 ... 20 mA, HART, startup at < 3.6 mA	B C
Process connection (refer to Pressure/Temperature curves, page 4/228) 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 due to flange hole spacing 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	Approvals General Purpose, CE, R&TTE, C-TICK ²⁾ General Purpose, CSA, FM, Industry Canada, FCC ³⁾ Intrinsically Safe, CSA Class I, II, Div 1, Gr. A,B,C,D, E,F,G, Industry Canada ³⁾ Intrinsically Safe, FM Class I, II, Div 1, Gr. A,B,C,D, E,F,G, FCC ³⁾ Intrinsically Safe, IECEx/ANZEx/ATEX II 1G Ex ia IIC T4, INMETRO Ex ia IIC T4, CE, R&TTE, C-TICK; GOST-R ²⁾ Non incndive, FM Class I, Div 2, Gr. A,B,C,D, FCC ³⁾⁴⁾ Increased Safety, ATEX II 1/2G Ex embia IIC T4 Ga/Gb, CE, R&TTE, C-TICK; GOST-R ²⁾⁵⁾⁶⁾ Flame Proof, ATEX II 1/2G Ex dmbia IIC T4 Ga/Gb, CE, R&TTE, C-TICK; GOST-R ²⁾⁶⁾ Explosion Proof, CSA/FM Class I, II, III, Gr. A,B,C,D,E,F,G, Industry Canada, FCC ²⁾⁴⁾⁶⁾	A B C D E F G H J
Antenna extensions or Inactive shield length No antenna extension 50 mm (2 inch) extension, PTFE 100 mm (4 inch) extension, PTFE 100 mm (4 inch) extension, 316L stainless steel shield ¹⁾ 150 mm (6 inch) extension, 316L stainless steel shield ¹⁾ 200 mm (8 inch) extension, 316L stainless steel shield ¹⁾ 250 mm (10 inch) extension, 316L stainless steel shield ¹⁾	0 1 2 3 4 5 6	Pressure rating Rating per Pressure/Temperature curves in manual 0.5 bar g (7.25 psi g) maximum	0 1
Process seal/gasket Integral Gasket, for flat faced flange process connections only, not for Antenna extension options 3 ... 6 FKM O-ring, not available for combination of flat faced flanges with Antenna extension options 0, 1 or 2	0 1	Pressure rating Rating per Pressure/Temperature curves in manual 0.5 bar g (7.25 psi g) maximum	0 1
Enclosure/Cable inlet Aluminum, Epoxy painted 2 x ½" NPT, Siemens LUI interface 2 x M20x1.5, Siemens LUI interface	2 3		

- 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 C only

Level measurement

Continuous level measurement – Radar transmitters

SITRANS LR200

Selection and Ordering data	Order No.	Selection and Ordering data	Order code
SITRANS LR200, Flange Adapter, Sanitary 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).	7ML5424- 	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 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000 Inspection Certificate Type 3.1 per EN 10204 Namur NE43 compliant, device preset to failsafe < 3.6 mA ¹⁾	Y15 C11 C12 N07
Antenna material (uses antenna adapter) PTFE, one piece rod antenna UHMW-PE, one piece rod antenna	0 1	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.	Order No. 7ML1998-5JP02 7ML1998-5JP32 7ML1998-5XC82
Process connection Sanitary fitting clamp	A	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.	Order No. 7ML1998-5JR02 7ML1998-5JR32 7ML1998-5XD82
Configuration/Connection size 2" connection, rod antenna only 3" connection, rod antenna only 4" connection, rod antenna only	A B C	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 ²⁾ One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F), PROFIBUS PA ²⁾	7ML1930-1BK 7MF4997-1DA 7MF4997-1DB 7ML1930-1AP 7ML1930-1AQ
Antenna extension No extension	0	SITRANS RD100 Remote display - see Chapter 7 SITRANS RD200 Remote display - see Chapter 7	7ML5750-1AA00-0
Mounting Clamp No mounting clamp Mounting clamp included, not available with Pressure rating option 0	0 1	Sanitary fitting clamps 2", 304 stainless steel 3", 304 stainless steel 4", 304 stainless steel	7ML1830-1HD 7ML1830-1HE 7ML1830-1HF
Enclosure/Cable inlet Aluminum, Epoxy painted 2 x ½" NPT, Siemens LUI interface 2 x M20x1.5, Siemens LUI interface	2 3	SITRANS RD500 web, datalogging, alarming, ethernet, and modem support for instrumentation - see Chapter 7	7ML5750-1AA00-0
Communication/Output PROFIBUS PA 4 ... 20 mA, HART, startup at < 3.6 mA	B C		
Approvals General Purpose, CE, R&TTE, C-TICK ¹⁾ General Purpose, CSA, FM, Industry Canada, FCC ²⁾ Intrinsically Safe, CSA Class I, II, Div 1, Gr. A,B,C,D, E,F,G, Industry Canada ²⁾ Intrinsically Safe, FM Class I, II, Div 1, Gr. A,B,C,D, E,F,G, FCC ²⁾ Intrinsically Safe, IECEx/ANZEx/ATEX II 1G Ex ia IIC T4, INMETRO Ex ia IIC T4, CE, R&TTE, C-TICK; GOST-R ¹⁾ Non incandive, FM Class I, Div 2, Gr. A,B,C,D, FCC ³⁾ Increased Safety, ATEX II 1/2G Ex embia IIC T4 Ga/Gb, CE, R&TTE, C-TICK; GOST-R ¹⁾⁴⁾⁵⁾ Flame Proof, ATEX II 1/2G Ex dmbia IIC T4 Ga/Gb, CE, R&TTE, C-TICK; GOST-R ¹⁾⁵⁾ Explosion Proof, CSA/FM Class I, II, III, Gr. A,B,C,D,E,F,G, Industry Canada, FCC ²⁾³⁾⁵⁾	A B C D E F G H J		
Pressure rating Rating per Pressure/Temperature curves in Manual 0.5 bar g (7.25 psi g) maximum	0 1		

- 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 C only

- 1) Available with communication option C only
- 2) Product shipped with plastic cable gland, rated to -20 °C. If -40 °C rating required, then metallic cable gland is recommended.

Level measurement

Continuous level measurement – Radar transmitters

SITRANS LR200

Selection and Ordering data	Order code
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 inch)]; Measuring-point number/identification (max. 27 characters); specify in plain text	Y15
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 ¹⁾	N07
Operating Instructions for HART/mA device	
English	7ML1998-5JP02
German	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.	7ML1998-5XC82
Operating Instructions for PROFIBUS PA device	
English	7ML1998-5JR02
German	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.	7ML1998-5XD82
Accessories	
Handheld programmer, Intrinsically safe, EEx ia	7ML1930-1BK
HART modem/RS 232 (for use with a PC and SIMATIC PDM)	7MF4997-1DA
HART modem/USB (for use with a PC and SIMATIC PDM)	7MF4997-1DB
One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F), HART ²⁾	7ML1930-1AP
One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F), PROFIBUS PA ²⁾	7ML1930-1AQ
Antenna, rod, PTFE	7ML1830-1HC
Antenna extension, 50 mm (2 inch) PTFE	7ML1830-1CH
Antenna extension, 100 mm (4 inch) PTFE	7ML1830-1CG
SITRANS RD100 Remote display - see Chapter 7	
SITRANS RD200 Remote display - see Chapter 7	
SITRANS RD500 web, datalogging, alarming, ethernet, and modem support for instrumentation - see Chapter 7	7ML5750- 1AA00-0

¹⁾ Available with communication option 3 only

²⁾ Product shipped with plastic cable gland, rated to -20 °C.
If -40 °C rating required, then metallic cable gland is recommended.

Level measurement

Continuous level measurement – Radar transmitters

SITRANS LR200

Selection and Ordering data	Order No.
SITRANS LR200, Flange adapter/Horn Antenna version	7ML5425-
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).	
Antenna material (uses antenna adapter)	
316L stainless steel with PTFE cone emitter	0
316L stainless steel with PTFE cone emitter and purge connection with 1/8" NPT inlet ¹⁾	1
Sliding waveguide system with 1 000 mm (40 inch) waveguide ¹⁾²⁾	2
Process connection (refer to Pressure/Temperature curves, page 4/228)	
Flanges (316L stainless steel)	
DN 50 PN 16 EN 1092-1 Type A flat faced	AA
DN 80 PN 16 EN 1092-1 Type A flat faced	BA
DN 100 PN 16 EN 1092-1 Type A flat faced	CA
DN 150 PN 16 EN 1092-1 Type A flat faced	DA
DN 200 PN 16 EN 1092-1 Type A flat faced	EA
DN 80 PN 10/16 DIN EN 1092-1 Type B1 raised face ³⁾	BF
DN 100 PN 10/16 DIN EN 1092-1 Type B1 raised face ³⁾	CF
DN 150 PN 10/16 DIN EN 1092-1 Type B1 raised face ³⁾	DF
DN 200 PN 16 DIN EN 1092-1 Type B1 raised face ³⁾	EF
2" ASME 150 lb, flat faced	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 ³⁾	AC
DN 80 PN 40, flat faced ³⁾	BC
DN 100 PN 40, flat faced ³⁾	CC
DN 200 PN 40, flat faced ³⁾	EC
DN 80 PN 25/40 DIN EN 1092-1 Type B1 raised face ³⁾	CG
DN 100 PN 25/40 DIN EN 1092-1 Type B1 raised face ³⁾	DG
DN 150 PN 25/40 DIN EN 1092-1 Type B1 raised face ³⁾	EG
2" ASME 300 lb, flat faced ³⁾	FD
3" ASME 300 lb, flat faced ³⁾	GD
4" ASME 300 lb, flat faced ³⁾	HD
JIS DN 50 10K	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.)	
Communication/Output	
PROFIBUS PA	1
4 ... 20 mA, HART, startup at < 3.6 mA	2

Selection and Ordering data	Order No.
SITRANS LR200, Flange adapter/Horn Antenna version	7ML5425-
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).	
Process seal/gasket	
FKM (-40 ... +200 °C)	0
Nitrile (-40 ... +60 °C), sliding waveguide systems only	1
FFKM (-35 ... +200 °C)	2
Enclosure/Cable inlet	
Aluminum, Epoxy painted	
2 x 1/2" NPT, Siemens LUI interface	2
2 x M20x1.5, Siemens LUI interface	3
Horn size/Waveguide options	
80 mm (3 inch) horn ⁴⁾	B
100 mm (4 inch) horn ⁴⁾	C
150 (6 inch) mm horn	D
200 (8 inch) mm horn	E
100 mm (4 inch) horn with 100 mm (4 inch) waveguide extension ⁴⁾	F
100 mm (4 inch) horn with 150 mm (6 inch) waveguide extension ⁴⁾	G
100 mm (4 inch) horn with 200 mm (8 inch) waveguide extension ⁴⁾	H
100 mm (4 inch) horn with 250 mm (10 inch) waveguide extension ⁴⁾	J
150 mm (6 inch) horn with 100 mm (4 inch) waveguide extension	K
150 mm (6 inch) horn with 150 mm (6 inch) waveguide extension	L
150 mm (6 inch) horn with 200 mm (8 inch) waveguide extension	M
150 mm (6 inch) horn with 250 mm (10 inch) waveguide extension	N
200 mm (8 inch) horn with 100 mm (4 inch) waveguide extension	P
200 mm (8 inch) horn with 150 mm (6 inch) waveguide extension	Q
200 mm (8 inch) horn with 200 mm (8 inch) waveguide extension	R
200 mm (8 inch) horn with 250 mm (10 inch) waveguide extension	S
Waveguide only - Waveguide length	T
500 mm ... 3 000 mm (in 1 mm increments)	
(Add order code Y01 and plain text: <u>inchwaveguide length ... mm inch</u>)	

Level measurement

Continuous level measurement – Radar transmitters

SITRANS LR200

Selection and Ordering data	Order No.	Selection and Ordering data	Order code
SITRANS LR200, Flange adapter/Horn 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).	Order No. 7ML5425- 	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
Approvals General Purpose, CE, R&TTE, C-TICK ⁵⁾ General Purpose, CSA, FM, Industry Canada, FCC ⁶⁾ Intrinsically Safe, CSA Class I, II, Div 1, Gr. A,B,C,D, E,F,G, Industry Canada ⁶⁾ Intrinsically Safe, FM Class I, II, Div 1, Gr. A,B,C,D, E,F,G, FCC ⁶⁾ Intrinsically Safe, IECEx/ANZEx/ATEX II 1G Ex ia IIC T4, INMETRO Ex ia IIC T4, CE, R&TTE, C-TICK; GOST-R ⁵⁾ Non incndive, FM Class I, Div 2, Gr. A,B,C,D, FCC ⁶⁾⁷⁾ Increased Safety, ATEX II 1/2G Ex embia IIC T4 Ga/Gb, CE, R&TTE, C-TICK; GOST-R ⁵⁾⁸⁾⁹⁾ Flame Proof, ATEX II 1/2G Ex dmbia IIC T4 Ga/Gb, CE, R&TTE, C-TICK; GOST-R ⁵⁾⁹⁾ Explosion Proof, CSA/FM Class I, II, III, Gr. A,B,C,D,E,F,G, Industry Canada, FCC ⁶⁾⁷⁾⁹⁾	A B C D E F G H J	Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000 Inspection Certificate Type 3.1 per EN 10204 Namur NE43 compliant, device preset to failsafe < 3.6 mA ¹⁾ 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.	Y15 C11 C12 N07 Order No. 7ML1998-5JP02 7ML1998-5JP32 7ML1998-5XC82
Pressure rating Rating per Pressure/Temperature curves in manual 0.5 bar g (7.25 psi g) maximum	0 1	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.	7ML1998-5JR02 7ML1998-5JR32 7ML1998-5XD82
1) Available with pressure rating option 1 only 2) Maximum Process Temperature 60 °C (140 °F) 3) Available with Antenna Material option 0 and 1 only 4) For stillpipe applications only 5) Includes European Radio approval (R&TTE), 5.8 GHz, C-TICK 6) Includes Radio approval FCC, 6.3 GHz 7) Available with enclosure option 2 only 8) Available with enclosure option 3 only 9) Available with communication option 2 only		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 ²⁾ One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F), PROFIBUS PA ³⁾ SITRANS RD100 Remote display - see Chapter 7 SITRANS RD200 Remote display - see Chapter 7 SITRANS RD500 web, datalogging, alarming, ethernet, and modem support for instrumentation - see Chapter 7	7ML1930-1BK 7MF4997-1DA 7MF4997-1DB 7ML1930-1AP 7ML1930-1AQ 7ML5750-1AA00-0

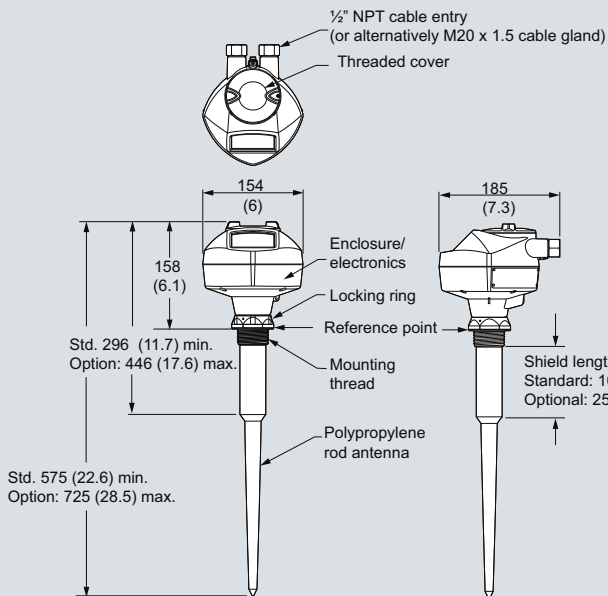
Level measurement

Continuous level measurement – Radar transmitters

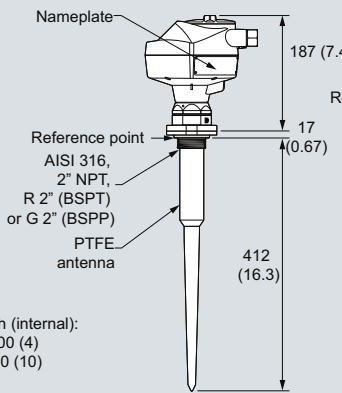
SITRANS LR200

Dimensional drawings

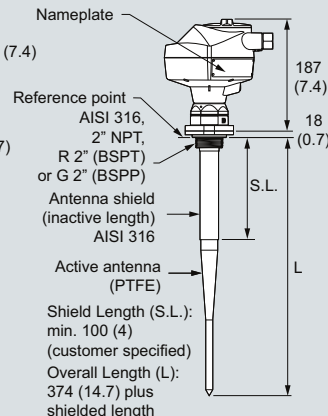
SITRANS LR200 with polypropylene shielded rod antenna



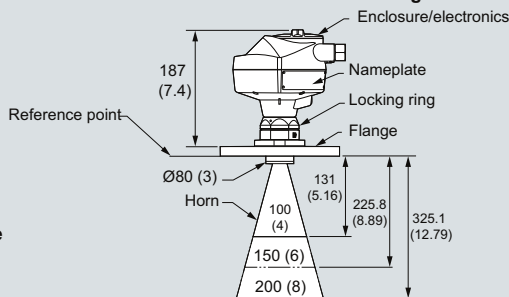
PTFE rod antenna, threaded



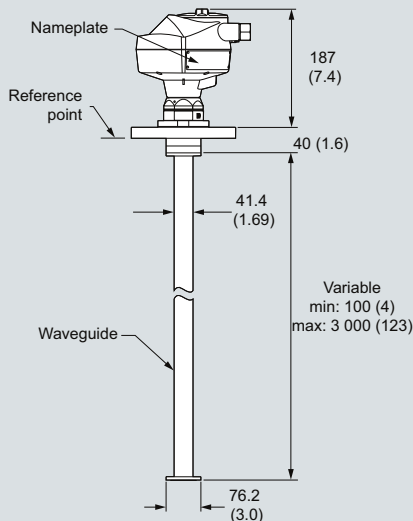
Threaded connection PTFE rod, external shield



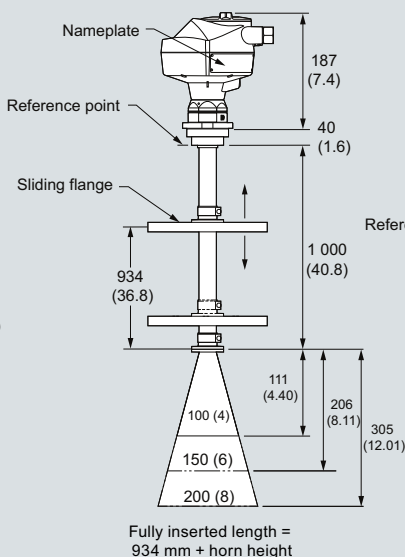
Horn antenna with flat faced flange



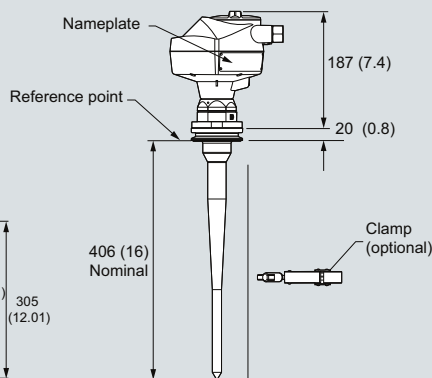
Waveguide antenna with flat faced flange



Sliding waveguide



Sanitary rod antenna



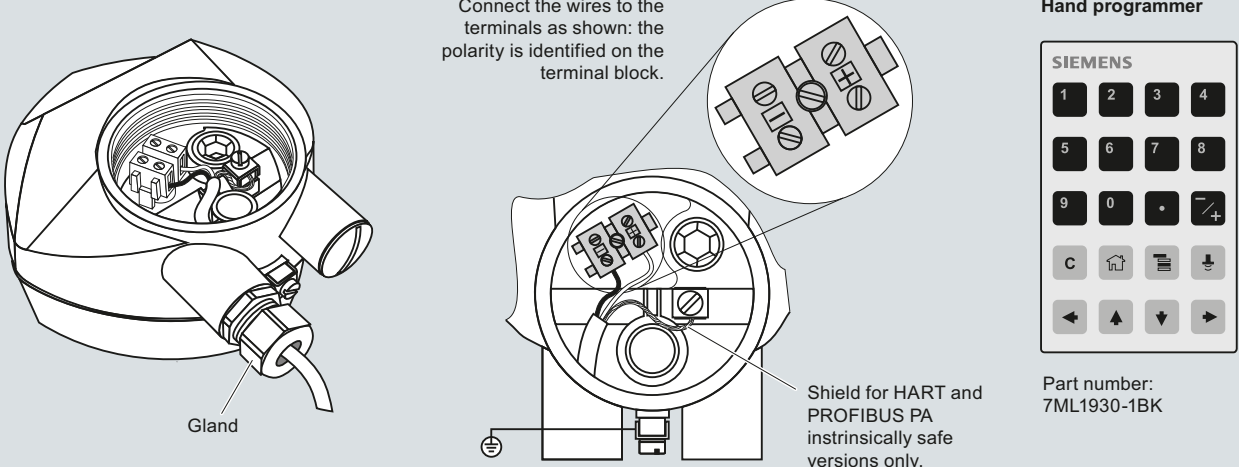
SITRANS LR200, dimensions in mm (inch)

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.

Gland

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 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 ... 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

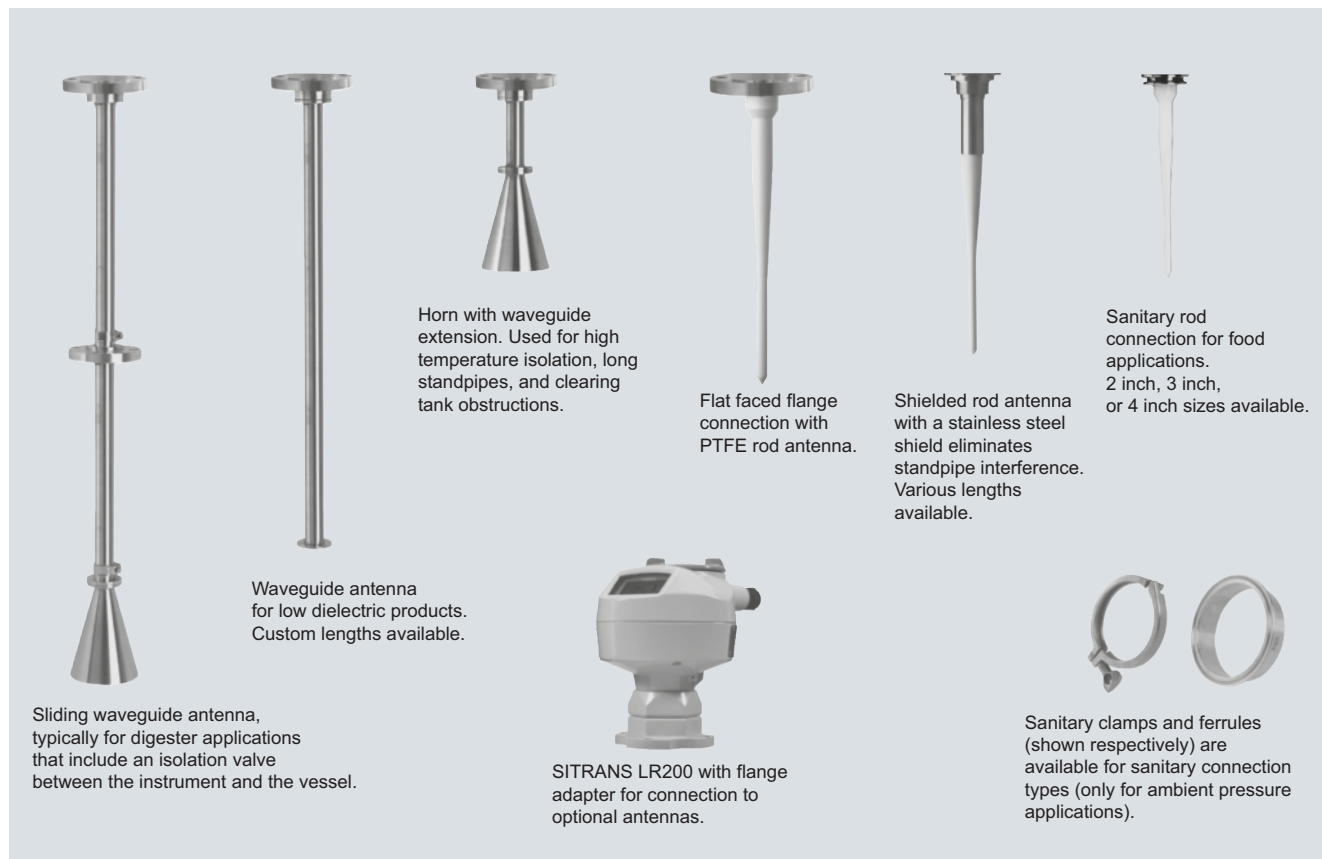
4

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
Connection type	Flat faced flange nominal pipe sizes 50, 80, 100, 150 mm (2, 3, 4, 6 inch)	Threaded 2" NPT, R 2" (BSPT), G 2" (BSPP) or flat faced flange nominal pipe sizes 80, 100 mm (3, 4 inch)	Sanitary fitting clamp 50, 80, 100 mm (2, 3, 4 inch) sizes	Flat faced flange nominal pipe sizes 50, 80, 100, 150 mm (2, 3, 4, 6 inch)	Flat faced flange nominal pipe sizes 50, 80, 100, 150 mm (2, 3, 4, 6 inch)
Wetted parts	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
Extensions	50 or 100 mm (2 or 4 inch) PTFE or UHMW-PE	100, 150, 200 or 250 mm (4, 6, 8 or 10 inch) 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)
Dielectric constant	> 3	> 3	> 3	> 3	> 1.6
Insertion length (max.)	41 cm (16.3 inch)	Variable	41 cm (16.3 inch)	Variable with extension	Variable
Purging option (liquid or gas)	No	No	No	Yes	Yes
Sliding waveguide option for digesters¹⁾	Yes	No	No	Yes	N/A
Weight²⁾	6.5 kg (14.3 lb)	5.0 kg (11 lb)	5.0 kg (11 lb)	7.5 kg (16.5 lb)	8.0 kg (17.6 lb) 1 m (39 inch) length

¹⁾ Maximum pressure 0.5 bar g at 60 °C (7.25 psi g at 140 °F)

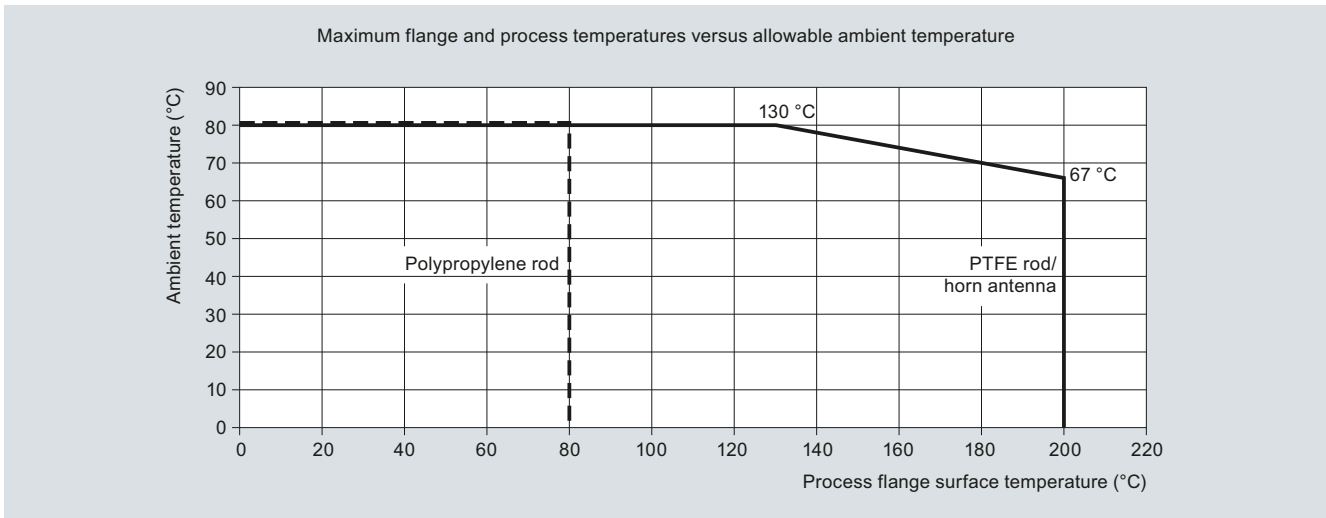
²⁾ Not including extensions, includes SITRANS LR200 and smallest process connection

Level measurement

Continuous level measurement – Radar transmitters

SITRANS LR200 antennas

Characteristic curves



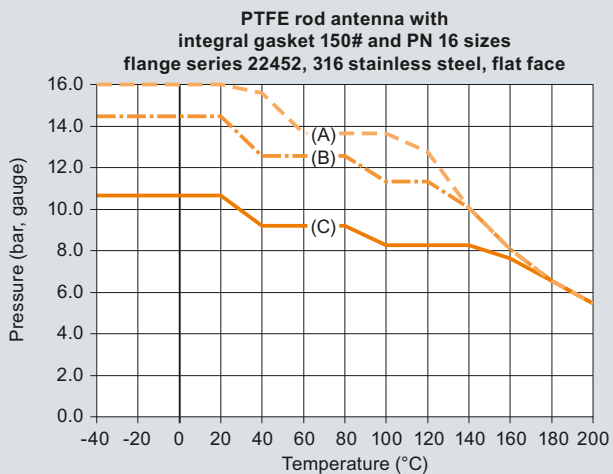
SITRANS LR200 Ambient/Process Flange Surface Temperature Curve

Level measurement

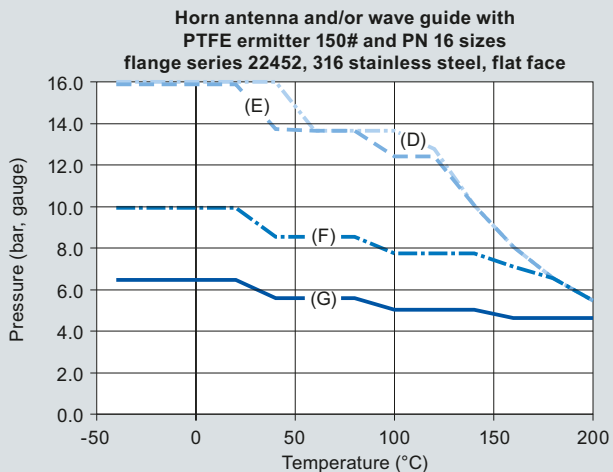
Continuous level measurement – Radar transmitters

SITRANS LR200 antennas

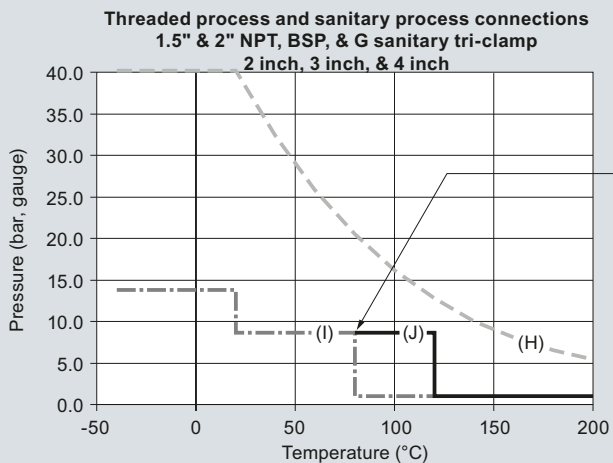
4



- (A) 22452 50 mm/2 inch nom.
- (B) 22452 80 mm/3 inch nom.
- (C) 22452 100 mm/4 inch nom.



- (D) 22452 80 mm/3 inch nom.
- (E) 22452 100 mm/4 inch nom.
- (F) 22452 150 mm/6 inch 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

Level measurement

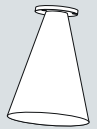
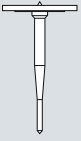
Continuous level measurement – Radar transmitters

SITRANS LR200 Specials

SITRANS LR200 Specials

	Order No.
SITRANS LR200 PROFIBUS PA Aluminum Enclosure Kit with electronics and covers (7ML5422, 7ML5423, 7ML5424, 7ML5425), calibrated for use with standard rod antenna 	
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. ⁵⁾	A5E01483420
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. ⁵⁾	A5E01483440
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. ⁵⁾	A5E01483456
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. ⁵⁾	A5E01483547
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. ⁵⁾	A5E01483559
SITRANS LR200 HART aluminum enclosure kit with electronics and covers (7ML5422, 7ML5423, 7ML5424, 7ML5425), calibrated for use with standard rod antenna 	
SITRANS LR200 aluminum enclosure with board stack, LUI display, 5.8 GHz, M20 cable inlet, approval option A, with HART communication start-up at < 3.6 mA, no process connection. ⁵⁾	A5E02956419
SITRANS LR200 aluminum enclosure with board stack, LUI display, 5.8 GHz, M20 cable inlet, approval option E, with HART communication start-up at < 3.6 mA, no process connection. ⁵⁾	A5E02956420
SITRANS LR200 aluminum enclosure with board stack, LUI display, 5.8 GHz, M20 cable inlet, approval option G, with HART communication start-up at < 3.6 mA, no process connection. ⁵⁾	A5E02956421
SITRANS LR200 aluminum enclosure with board stack, LUI display, 5.8 GHz, M20 cable inlet, approval option H, with HART communication start-up at < 3.6 mA, no process connection. ⁵⁾	A5E02956422

SITRANS LR200 Specials

	Order No.
SITRANS LR200 aluminum enclosure with board stack, LUI display, 5.8 GHz, NPT cable inlet, approval option A, with HART communication start-up at < 3.6 mA, no process connection. ⁵⁾	A5E03617085
SITRANS LR200 aluminum enclosure with board stack, LUI display, 6.3 GHz, NPT cable inlet, approval option B, with HART communication start-up at < 3.6 mA, no process connection. ⁵⁾	A5E03617086
SITRANS LR200 aluminum enclosure with board stack, LUI display, 5.8 GHz, NPT cable inlet, approval option C, with HART communication start-up at < 3.6 mA, no process connection. ⁵⁾	A5E03617087
SITRANS LR200 aluminum enclosure with board stack, LUI display, 6.3 GHz, NPT cable inlet, approval option E, with HART communication start-up at < 3.6 mA, no process connection. ⁵⁾	A5E03617088
SITRANS LR200 Horn Antenna Kits with mounting screws (no emitter supplied) 	
80 mm (3 inch) horn antenna kit	PBD:25500K02A
100 mm (4 inch) horn antenna kit	PBD:25500K03A
150 mm (6 inch) horn antenna kit	PBD:25500K05A
200 mm (8 inch) horn antenna kit	PBD:25500K07A
SITRANS LR200 Extension Kits for Horn Antenna with mounting screws	
100 mm (4 inch) extension kit for horn antenna	PBD:25501K0100A
150 mm (6 inch) extension kit for horn antenna	PBD:25501K0150A
200 mm (8 inch) extension kit for horn antenna	PBD:25501K0200A
250 mm (10 inch) extension kit for horn antenna	PBD:25501K0250A
500 mm (20 inch) extension kit for horn antenna	PBD:25501K0500A
1 000 mm (40 inch) extension kit for horn antenna	PBD:25501K1000A
SITRANS LR200 Flanged Rod Antenna Kit with 316L SS flat faced flanges 	
Flanged PTFE rod antenna kit, 2" ASME, 150 lb. See drawing 51003 on http://www.siemens.com/radar . ¹⁾⁴⁾	PBD: 51003K020AAAA
Flanged PTFE rod antenna kit, DN 50 PN16. See drawing 51003 on http://www.siemens.com/radar . ¹⁾⁴⁾	PBD: 51003K050AJAA
Flanged PTFE rod antenna kit, JIS 10K DN 50. See drawing 51003 on http://www.siemens.com/radar . ¹⁾⁴⁾	PBD: 51003K050AOAA

Level measurement

Continuous level measurement – Radar transmitters

SITRANS LR200 Specials

SITRANS LR200 Specials

Order No.

SITRANS LR200 PTFE Rod Antenna Kit with 316L SS 1½" pipe thread process connection



PTFE rod antenna kit, 1½" NPT 316L SS Process Connection, FKM O-ring; See drawing 51004 on <http://www.siemens.com/radar>.⁴⁾

PTFE rod antenna kit, R 1½" (BSPT), EN 10226 316L SS Process Connection, FKM O-ring; See drawing 51004 on <http://www.siemens.com/radar>.⁴⁾

PTFE rod antenna kit, 1½" G 316L SS Process Connection, FKM O-ring; See drawing 51004 on <http://www.siemens.com/radar>.⁴⁾

PBD:
51004K1AAA

PBD:
51004K2AAA

PBD:
51004K3AAA

SITRANS LR200 PTFE Rod Antenna Kit with 316L SS 2" pipe thread process connection



PTFE rod antenna kit, 2" NPT 316L SS Process Connection, FKM O-ring; See drawing 51005 on <http://www.siemens.com/radar>.⁴⁾

PTFE rod antenna kit, R 2" (BSPT), EN 10226 316L SS Process Connection, FKM O-ring; See drawing 51005 on <http://www.siemens.com/radar>.⁴⁾

PTFE rod antenna kit, 2" G 316L SS Process Connection, FKM O-ring; See drawing 51005 on <http://www.siemens.com/radar>.⁴⁾

PBD:
51005K1AAA

PBD:
51005K2AAA

PBD:
51005K3AAA

SITRANS LR200 Specials

Order No.

SITRANS LR200 PTFE Rod Antenna Kit (100 mm shield) with 316L SS 2" pipe thread process connection



PTFE rod antenna shielded kit, 2" NPT 316L SS Process Connection, FKM O-ring, 100 mm 316L SS shield. See drawing 51002 on <http://www.siemens.com/radar>.³⁾⁴⁾

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 <http://www.siemens.com/radar>.³⁾⁴⁾

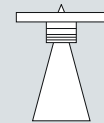
PTFE rod antenna shielded kit, 2" G 316L SS Process Connection, FKM O-ring, 100 mm 316L SS shield. See drawing 51002 on <http://www.siemens.com/radar>.³⁾⁴⁾

PBD:
51002K0100AAA

PBD:
51002K0100BAA

PBD:
51002K0100CAA

SITRANS LR200 Horn Antenna Kit with 316L SS flat faced flange, with PTFE emitter (without waveguide)



Horn antenna kit, 2" ASME 316L SS flange 3" horn, PTFE emitter¹⁾⁴⁾

Horn antenna kit, 2" ASME 316L SS flange 4" horn, PTFE emitter¹⁾²⁾

Horn antenna kit, 2" ASME 316L SS flange 6" horn, PTFE emitter¹⁾²⁾

Horn antenna kit, 2" ASME 316L SS flange 8" horn, PTFE emitter¹⁾²⁾

Horn antenna kit, DN 50 PN 16 316L SS flange 80 mm horn, PTFE emitter¹⁾²⁾

Horn antenna kit, DN 50 PN 16 316L SS flange 100 mm horn, PTFE emitter¹⁾²⁾

Horn antenna kit, DN 50 PN 16 316L SS flange 150 mm horn, PTFE emitter¹⁾²⁾

Horn antenna kit, DN 50 PN 16 316L SS flange 200 mm horn, PTFE emitter¹⁾²⁾

PBD:
51006K020AAAA

PBD:
51006K020AABA

PBD:
51006K020AACA

PBD:
51006K020AADA

PBD:
51006K050AJAA

PBD:
51006K050AJBA

PBD:
51006K050AJCA



PBD:
51006K050AJDA

4

Level measurement

Continuous level measurement – Radar transmitters

SITRANS LR200 Specials

SITRANS LR200 Specials	Order No.
SITRANS LR200 Sanitary Rod Antenna with Sanitary Fitting Clamp Flange mounting and bushing. See drawing 51010 on http://www.siemens.com/radar (Sanitary Fitting Clamps not included)	
PTFE sanitary rod antenna kit, 2" mounting connection. ⁴⁾	PBD:51010K1AA
PTFE sanitary rod antenna kit, 3" mounting connection. ⁴⁾	PBD:51010K2AA
PTFE sanitary rod antenna kit, 4" mounting connection. ⁴⁾	PBD:51010K3AA
UHMW-PE sanitary rod antenna kit, 2" mounting connection. ⁴⁾	PBD:51010K1AB
UHMW-PE sanitary rod antenna kit, 3" mounting connection. ⁴⁾	PBD:51010K2AB
UHMW-PE sanitary rod antenna kit, 4" mounting connection. ⁴⁾	PBD:51010K3AB
SITRANS LR200 PTFE flanged rod antenna kit with 316L SS shield and 316L SS flat faced flange	
PTFE shielded rod antenna kit, flanged, 3" ASME 150 lb 316L SS flange, 100 mm 316L SS shield. ¹⁾⁴⁾	PBD: 51014K0100AAA
PTFE shielded rod antenna kit, flanged, DN 80 PN 16 316L SS flange, 100 mm 316L SS shield. ¹⁾⁴⁾	PBD: 51014K0100EJA
PTFE shielded rod antenna kit, flanged, 3" ASME 150 lb 316L SS flange, 150 mm 316L SS shield. ¹⁾⁴⁾	PBD: 51014K0150AAA
PTFE shielded rod antenna kit, flanged, DN 80 PN 16 316L SS flange, 150 mm 316L SS shield. ¹⁾⁴⁾	PBD: 51014K0150EJA
PTFE shielded rod antenna kit, flanged, 3" ASME 150 lb 316L SS flange, 200 mm 316L SS shield. ¹⁾⁴⁾	PBD: 51014K0200AAA
PTFE shielded rod antenna kit, flanged, DN 80 PN 16 316L SS flange, 200 mm 316L SS shield. ¹⁾⁴⁾	PBD: 51014K0200EJA
PTFE shielded rod antenna kit, flanged, 3" ASME 150 lb 316L SS flange, 250 mm 316L SS shield. ¹⁾⁴⁾	PBD: 51014K0250AAA
PTFE shielded rod antenna kit, flanged, DN 80 PN 16 316L SS flange, 250 mm 316L SS shield. ¹⁾⁴⁾	PBD: 51014K0250EJA

SITRANS LR200 Specials	Order No.
PTFE paste Kit, PTFE paste, Tube, 250 mL	PBD:51036065
Cable gland One polymeric cable gland M20x1.5, rated -20 ... +80 °C (-4 ... +176 °F) for General Purpose and ATEX EEx e	7ML1930-1AN
One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F), HART	7ML1930-1AP
One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F), PROFIBUS PA	7ML1930-1AQ
Please contact ceg.smpi@siemens.com for special requests.	
¹⁾ Available in flange sizes including ASME, DIN and JIS: please contact ceg.smpi@siemens.com .	
²⁾ Available with no pressure rating	
³⁾ Available in other shield lengths: please contact ceg.smpi@siemens.com .	
⁴⁾ Available with Pressure rating; serial number of original unit required with completed Application Questionnaire found on page 4/210	

Level measurement

Continuous level measurement – Radar transmitters

SITRANS LR250 Horn Antenna

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 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 inch) from the end of the antenna
- 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
- Suitable for use in Safety related systems in accordance with IEC 61508/61511 (SIL-2)
- 3 mm (0.118 inch) accuracy in accordance with IEC 60770-1

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 antenna 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.

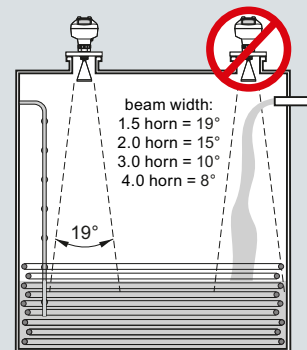
- Key Applications: liquid bulk storage tanks, process vessels with agitators, vaporous liquids, high temperatures, low dielectric media and applications with functional safety requirements

Configuration

Installation

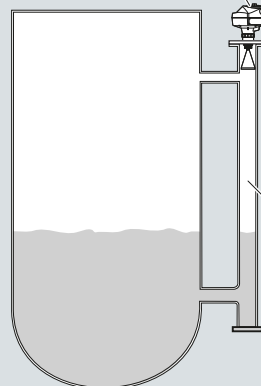
Note:

- 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.
- Use largest possible antenna.



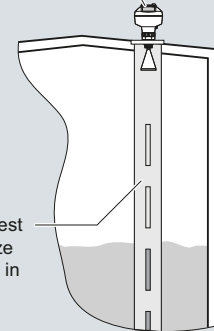
Mounting unit on bypass

Orient front or back of device toward vent.

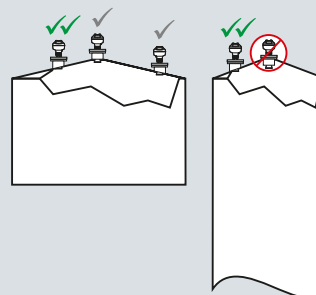


Mounting unit on stilling well

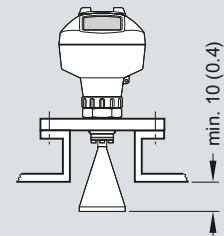
Orient front or back of device toward stillpipe slots.



Mounting unit on vessel



Mounting on a nozzle



SITRANS LR250 installation, dimensions in mm (inch)

min. 10 (0.4)

Level measurement

Continuous level measurement – Radar transmitters

SITRANS LR250 Horn Antenna

Technical specifications

Mode of operation

Measuring principle	Radar level measurement
Frequency	K-band (25.0 GHz)
Minimum measuring range	50 mm (2 inch) from end of antenna
Maximum measuring range	20 m (65 ft), antenna dependent

Output

HART:	Version 5.1
• Analog output	4 ... 20 mA
• Accuracy	± 0.02 mA
• Fail-safe	<ul style="list-style-type: none"> • Programmable as high low or hold (loss of echo) • NE 43 programmable
PROFIBUS PA	Profile 3.1
• Function blocks	2 Analog Input (AI)
FOUNDATION Fieldbus	H1
• Functionality	Basic or LAS
• Version	ITK 5.2.0
• Function blocks	2 Analog Input (AI)

Performance (according to reference conditions IEC60770-1)

Maximum measured error	3 mm (0.118 inch)
Influence of ambient temperature	< 0.003 %/K

Rated operating conditions

Installation conditions	
• Location	Indoor/outdoor
Ambient conditions (enclosure)	
• Ambient temperature	-40 ... +80 °C (-40 ... +176 °F)
• Installation category	I
• Pollution degree	4

Medium conditions

Dielectric constant ϵ_r	> 1.6, antenna 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 (page 4/238)

Design

Enclosure	
• Material	Aluminum, polyester powder-coated
• Cable inlet	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 lb) 3.75 mm (1 1/2 inch) threaded connection with 1 1/2" horn antenna
Display (local)	Graphic local user interface including quick start wizard and echo profile display
Antenna	
• Material	316L stainless steel [optional alloy N06022/2.4602 (Hastelloy C-22 or equivalent)]
• Dimensions (nominal horn sizes)	Standard 1.5 inch(40 mm), 2 inch (48 mm), 3 inch (75 mm), 4 inch(95 mm) horn and optional 100 mm (4 inch) horn extension

Process connections

• Process connection	1 1/2" or 2" NPT [(Taper), ANSI/ASME B1.20.1] R 1 1/2" or 2" [(BSPT), EN10226] G 1 1/2" or 2" [(BSPP), ENISO 228-1]
• Flange connection	2", 3", 4" (ANSI 150, 300 lb), 50, 80, 100 mm (PN 16, 40, JIS10K)

Power supply

4 ... 20 mA/HART	Nominal 24 V DC (max. 30 V DC) with max. 550 Ω
PROFIBUS PA	<ul style="list-style-type: none"> • 15 mA • per IEC 61158-2
FOUNDATION Fieldbus	<ul style="list-style-type: none"> • 20.0 mA • per IEC 61158-2

Certificates and approvals

General	CSAUS/C, CE, FM, NE 21, C-TICK
Radio	FCC, Industry Canada and Europe ETSI EN 302-372, C-TICK
Hazardous	
• Explosion Proof (Brazil)	INMETRO Ex d ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T90 °C Da IP67
• Increased Safety (Brazil)	INMETRO Ex e ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T90 °C Da IP67
• Intrinsically Safe (Brazil)	INMETRO Ex ia IIC T4 Ga, Ex ia ta IIIC T90 °C Da IP67
• 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
• 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
• Non-incendive (Canada/USA)	CSA/FM Class I, Div. 2, Groups A, B, C, D T5
• Increased Safety/Flame Proof (China)	NEPSI Ex dmbia IIC T4/ Ex embia IIC T4/ DIP A20 TA, T90 °C IP67
• Intrinsically Safe (China)	NEPSI Ex ia IIC T4/DIP A20 Ta T90 °C IP67
• Non-sparking/Energy Limited (China)	NEPSI Ex nA/nL IIC T4
• Intrinsically Safe (Europe)	ATEX II 1G EEx ia IIC T4 ATEX II 1D Ex iaD 20 tD A20 IP67 T90 °C
• Non-sparking/Energy Limited (Europe)	ATEX II 3G EEx nA/nL IIC T4 Gc
• Flame Proof (International/Europe)	IECEx/ATEX II 1/2 GD, 1D, 2D, Ex dmbia IIC T4 Ga/Gb, Ex iaD 20 tD A20 IP67 T90 °C
• Increased Safety (International/Europe)	IECEx/ATEX II 1/2 GD, 1D, 2D, Ex embia IIC T4 Ga/Gb, Ex iaD 20 tD A20 IP67 T90 °C
• Intrinsically Safe (International)	IECEx Ex ia IIC T4, Ex iaD 20 tD A20 IP67 T90 °C
• Explosion Proof (Russia)	GOST-R Ex d
• Increased Safety (Russia)	GOST-R Ex e
• Intrinsically Safe (Russia)	GOST-R Ex ia

Level measurement

Continuous level measurement – Radar transmitters

SITRANS LR250 Horn Antenna

Programming

- Intrinsically Safe Siemens handheld programmer
- Approvals for handheld programmer

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

- Handheld communicator
- PC

HART communicator 375/475

- SIMATIC PDM
- Emerson AMS
- SITRANS DTM (for connection into FDT, such as PACTware or Fieldcare)

- Display (local)

Graphic local user interface including quick start wizard and echo profile displays

Level measurement

Continuous level measurement – Radar transmitters

SITRANS LR250 Horn Antenna

Selection and Ordering data	Order No.	Selection and Ordering data	Order No.
SITRANS LR250	7ML5431-	SITRANS LR250	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 -	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 -
Process Connection and Antenna Material		Flanged connection Hastelloy C	
316L (1.4435 or 1.4404) stainless steel, PTFE emitter, FFKM seal ¹⁾	0	2" Class 150 ASME B16.5 raised faced ⁴⁾	JA
316L (1.4435 or 1.4404) stainless steel, PTFE emitter, FFKM seal ¹⁾	1	3" Class 150 ASME B16.5 raised faced ⁴⁾	JB
Hastelloy C-22/2.4602 (or equivalent), PTFE emitter, FFKM seal ²⁾	2	4" Class 150 ASME B16.5 raised faced ⁴⁾	JC
Hastelloy C-22/2.4602 (or equivalent), PTFE emitter, FFKM seal ²⁾	3	2" Class 300 ASME B16.5 raised faced ⁴⁾	JD
		3" Class 300 ASME B16.5 raised faced ⁴⁾	JE
		4" Class 300 ASME B16.5 raised faced ⁴⁾	JF
Process Connection Type		DN 50 PN 16 EN 1092-1 Type A faced faced ⁴⁾	KA
Threaded connection 316L		DN 80 PN 16 EN 1092-1 Type A faced faced ⁴⁾	KB
1½" NPT (ASME B1.20.1) (tapered thread) ³⁾	AA	DN 100 PN 16 EN 1092-1 Type A faced faced ⁴⁾	KC
R 1½" [(BSPT), EN 10226-1] (tapered thread) ³⁾	AB	DN 50 PN 40 EN 1092-1 Type A faced faced ⁴⁾	KD
G 1½" [(BSPP), EN ISO 228-1] (parallel thread) ³⁾	AC	DN 80 PN 40 EN 1092-1 Type A faced faced ⁴⁾	KE
		DN 100 PN 40 EN 1092-1 Type A faced faced ⁴⁾	KF
2" NPT (ASME B1.20.1) (tapered thread)	AD	50A 10K JIS B 2220 raised faced ⁴⁾	LA
R 2" [(BSPT), EN 10226-1] (tapered thread)	AE	80A 10K JIS B 2220 raised faced ⁴⁾	LB
G 2" [(BSPP), EN ISO 228-1] (parallel thread)	AF	100A 10K JIS B 2220 raised faced ⁴⁾	LC
3" NPT (ASME B1.20.1) (tapered thread)	AG	DN 50 PN 16 EN 1092-1 Type B1 raised face	MA
R 3" [(BSPT), EN 10226-1] (tapered thread)	AH	DN 80 PN 16 EN 1092-1 Type B1 raised face	MB
G 3" [(BSPP), EN ISO 228-1] (parallel thread)	AJ	DN 100 PN 16 EN 1092-1 Type B1 raised face	MC
Flanged connection 316L		DN 150 PN 16 EN 1092-1 Type B1 raised face	MD
2" Class 150 ASME B16.5 flat faced ⁴⁾	BA	DN 50 PN 40 EN 1092-1 Type B1 raised face	ME
3" Class 150 ASME B16.5 flat faced ⁴⁾	BB	DN 80 PN 40 EN 1092-1 Type B1 raised face	MF
4" Class 150 ASME B16.5 flat faced ⁴⁾	BC	DN 100 PN 40 EN 1092-1 Type B1 raised face	MG
2" Class 300 ASME B16.5 flat faced ⁴⁾	CA	DN 150 PN 40 EN 1092-1 Type B1 raised face	MH
3" Class 300 ASME B16.5 flat faced ⁴⁾	CB	Communication/Output	
4" Class 300 ASME B16.5 flat faced ⁴⁾	CC	PROFIBUS PA	1
DN 50 PN 16 EN 1092-1 Type A flat faced ⁴⁾	DA	4 ... 20 mA, HART, startup at < 3.6 mA	2
DN 80 PN 16 EN 1092-1 Type A flat faced ⁴⁾	DB	FOUNDATION Fieldbus	3
DN 100 PN 16 EN 1092-1 Type A flat faced ⁴⁾	DC	Enclosure/Cable inlet	
DN 50 PN 40 EN 1092-1 Type A flat faced ⁴⁾	EA	Aluminum, Epoxy painted	0
DN 80 PN 40 EN 1092-1 Type A flat faced ⁴⁾	EB	2 x ½" NPT	1
DN 100 PN 40 EN 1092-1 Type A flat faced ⁴⁾	EC	2 x M20x1.5	
50A 10K JIS B 2220 flat faced ⁴⁾	FA	Antenna	
80A 10K JIS B 2220 flat faced ⁴⁾	FB	1½" horn	A
100A 10K JIS B 2220 flat faced ⁴⁾	FC	2" horn (fits 2" ASME or DN 50 nozzles)	B
DN 50 PN 16 DIN EN 1092-1 Type B1 raised face	GA	3" horn (fits 3" ASME or DN 80 nozzles)	C
DN 80 PN 16 DIN EN 1092-1 Type B1 raised face	GB	4" horn (fits 4" ASME or DN 100 nozzles)	D
DN 100 PN 16 DIN EN 1092-1 Type B1 raised face	GC	1½" horn with 100 mm extension ⁵⁾	E
DN 150 PN 16 DIN EN 1092-1 Type B1 raised face	GD	2" horn with 100 mm extension	F
DN 50 PN 40 DIN EN 1092-1 Type B1 raised face	HA	3" horn with 100 mm extension	G
DN 80 PN 40 DIN EN 1092-1 Type B1 raised face	HB	4" horn with 100 mm extension	H
DN 100 PN 40 DIN EN 1092-1 Type B1 raised face	HC	Hastelloy C22 (or equivalent)	
DN 150 PN 40 DIN EN 1092-1 Type B1 raised face	HD	2" horn (fits 2" ASME or DN 50 nozzles)	J
		3" horn (fits 3" ASME or DN 80 nozzles)	K
		4" horn (fits 4" ASME or DN 100 nozzles)	L
		2" horn (fits 2" ASME or DN 50 nozzles) with 100 mm extension	M
		3" horn (fits 3" ASME or DN 80 nozzles) with 100 mm extension	N
		4" horn (fits 4" ASME or DN 100 nozzles) with 100 mm extension	P

Level measurement

Continuous level measurement – Radar transmitters

SITRANS LR250 Horn Antenna

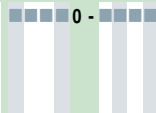
Selection and Ordering data

Order No.

SITRANS LR250

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.



Approvals

General Purpose, CE, CSA, FM, FCC, R&TTE, C-TICK

Intrinsically Safe, CSA/FM Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G, Industry Canada FCC

Intrinsically Safe, IECEx/ATEX II 1 GD Ex ia IIC T4, Ex iaD 20 tD A20 IP67 T90 °C, INMETRO Ex ia IIC T4 Ga, Ex ta IIIC T90 °C Da IP67, CE, R&TTE, C-TICK

Non-incendive, CSA/FM Class I, Div. 2, Groups A, B, C, D, FCC

Non-sparking, Energy Limited, ATEX II 3G Ex nA/nL IIC T4, CE, R&TTE, C-TICK

Increased Safety, IECEx/ATEX II 1/2 GD Ex embia IIC T4, Ex iaD 20 tD A20 IP67 T90 °C, INMETRO Ex e ia mb IIC T4 Ga/Gb, Ex tb IIIC T90 °C Db IP67, CE, R&TTE, C-TICK⁵⁾

Flame Proof, IECEx/ATEX II 1/2 GD Ex dmbia IIC T4, Ex iaD 20 tD A20 IP67 T90 °C, INMETRO Ex d ia mb IIC T4 Ga/Gb, Ex tb IIIC T90 °C Db IP67, CE, R&TTE, C-TICK⁵⁾

Explosion Proof CSA/FM Class I, II, III, Div. 1, Gr. A, B, C, D, E, F, G, Industry Canada FCC⁵⁾

Pressure rating

Rating per Pressure/Temperature curves in manual 0.5 bar g (7.25 psi g) maximum

0
1

- 1) Available with process connection options AA ... HD & Antenna Versions A ... H only
- 2) Available with process connection options JA ... MH & Antenna Versions J ... P only
- 3) Available For antenna versions A and E only, max. range 10 m (32.8 ft), dk > 3
- 4) Siemens Milltronics type flange (flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5, or EN 1092-1, or JIS B 2220 standard), see operating instructions for details
- 5) Applicable with communication option 2 only

4

Level measurement

Continuous level measurement – Radar transmitters

SITRANS LR250 Horn Antenna

Selection and Ordering data	Order code	Selection and Ordering data	Order code
Further designs		Accessories	
Please add "-Z" to Order No. and specify Order code(s).		Handheld programmer, Intrinsically safe, EEx ia	7ML1930-1BK
Plug M12 with mating Connector ¹⁾²⁾³⁾	A50	HART modem/RS 232 (for use with a PC and SIMATIC PDM)	7MF4997-1DA
Plug 7/8" with mating Connector ²⁾³⁾⁴⁾	A55	HART modem/USB (for use with a PC and SIMATIC PDM)	7MF4997-1DB
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]; Measuring-point number/identification (max. 27 characters); specify in plain text	Y15	One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F), HART (two are required)	7ML1930-1AP
Manufacturer's Test Certificate: M to DIN 55350, Part 18 and to ISO 9000	C11	One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F), PROFIBUS PA and FOUNDATION Fieldbus (two are required) ⁶⁾	7ML1930-1AQ
Acceptance test certificate 3.1 of EN 10204	C12	FDA approved FKM o-ring for 2" G (BSPP) process connections -28 ... +80 °C (-28 ... +176 °F)	7ML1830-3AN
Functional Safety - SIL-2 suitable in accordance with IEC 61508/61511 ³⁾⁵⁾	C20	SITRANS RD100 Remote display - see Chapter 7	
Namur NE43 compliant, device preset to failsafe < 3.6 mA ⁵⁾	N07	SITRANS RD200 Remote display - see Chapter 7	
Operating Instructions for HART/mA device	Order No.	SITRANS RD500 web, datalogging, alarming, ethernet, and modem support for instrumentation - see Chapter 7	7ML5750- 1AA00-0
English	7ML1998-5JE05		
German	7ML1998-5JE34		
Note: The Operating Instructions should be orde- red 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.	7ML1998-5QX83		
Operating Instructions for PROFIBUS PA device			
English	7ML1998-5JF05		
German	7ML1998-5JF34		
Note: The Operating Instructions should be orde- red 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.	7ML1998-5XE83		
Operating Instructions for FOUNDATION Fieldbus device			
English	7ML1998-5KL03		
German	7ML1998-5KL32		
Note: The Operating Instructions should be orde- red 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.	7ML1998-5XN82		

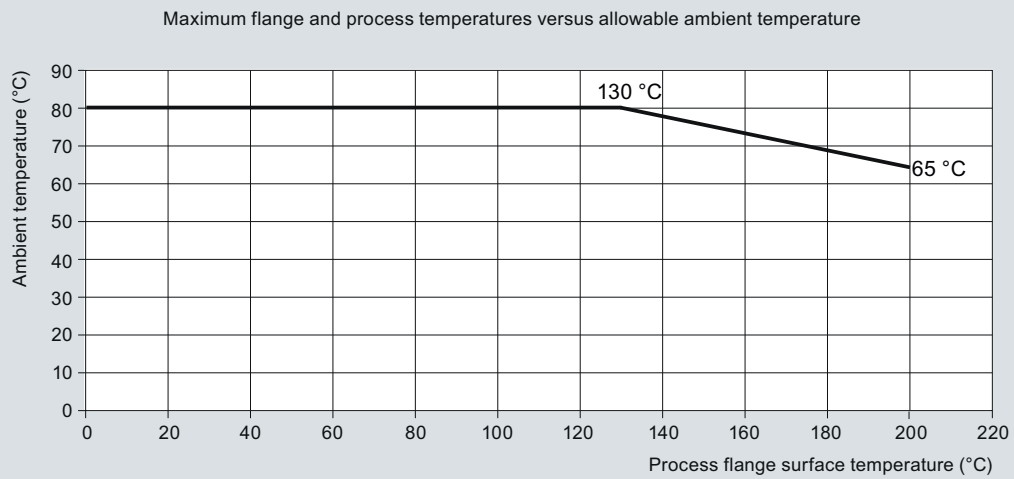
- 1) Available with enclosure option 1 only
- 2) To be used with communication options 1 and 3 only.
Connector has IP67 rating.
- 3) Available with approval options A and B. Available with approval option C
for use on intrinsically safe applications only. Not rated for dust Ex.
- 4) Available with enclosure option 0 only
- 5) Applicable to communication option 2 only
- 6) For use with communication option 1 and 3 only

Level measurement

Continuous level measurement – Radar transmitters

SITRANS LR250 Horn Antenna

Characteristic curves



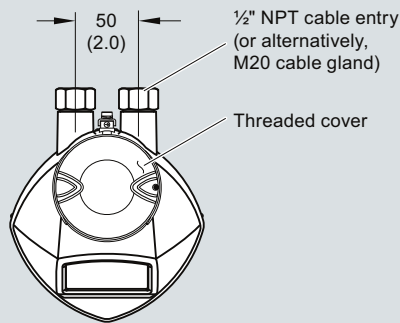
SITRANS LR250 Ambient/Process Flange Surface Temperature Curve

Level measurement Continuous level measurement – Radar transmitters

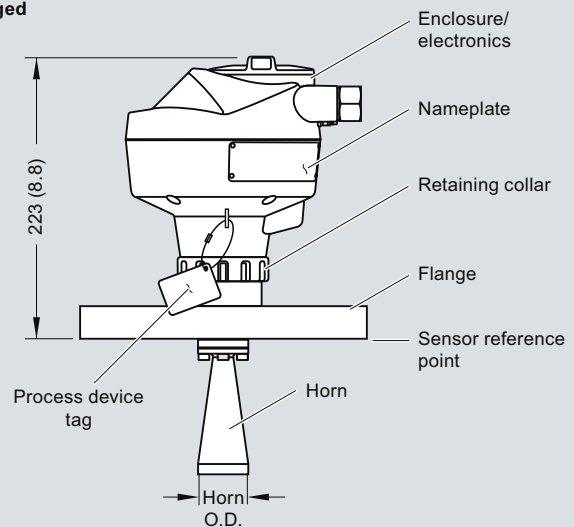
SITRANS LR250 Horn Antenna

Dimensional drawings

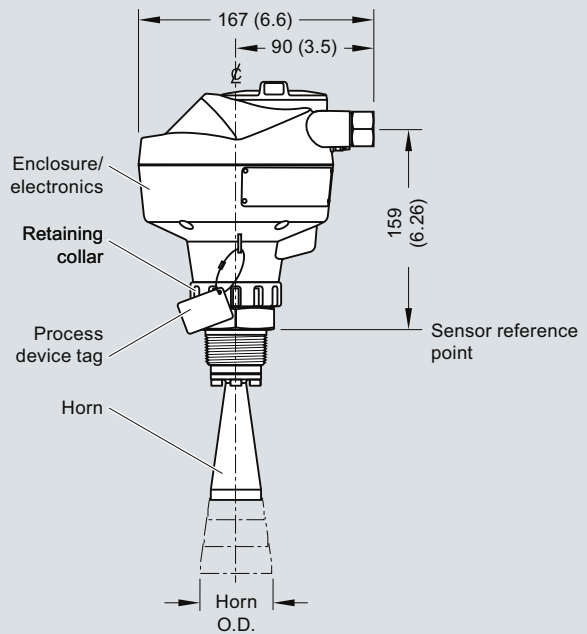
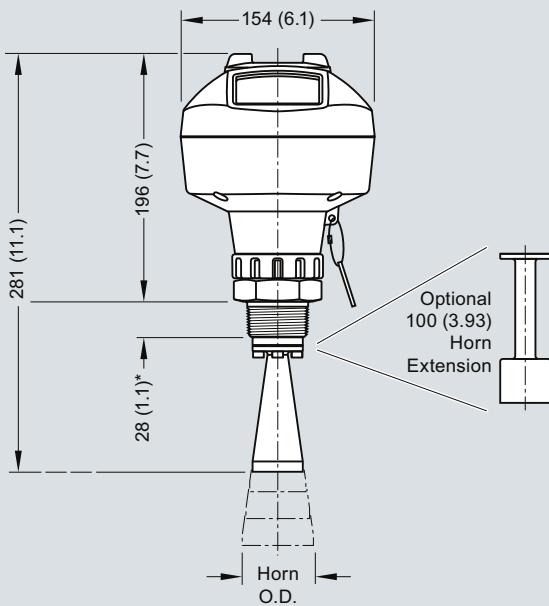
SITRANS LR250



Flanged



Threaded



*28 (1.1) for 1.5 inch and 2 inch, 42 (1.65) for 3 inch

Antenna Type	Antenna O.D.	Height to sensor reference point			Beam angle	Measurement range
		1-1/2" threaded connection	2" threaded connection	3" threaded connection		
1.5" horn	39.8 (1.57)	135 (5.3)	N/A	N/A	19 degrees	10 m (32.8 ft)
2" horn	47.8 (1.88)	N/A	166 (6.55)	180 (7.09)	15 degrees	20 m (65.6 ft)
3" horn	74.8 (2.94)	N/A	199 (7.85)	213 (8.39)	10 degrees	20 m (65.6 ft)
4" horn	94.8 (3.73)	N/A	254 (10)	268 (10.55)	8 degrees	20 m (65.6 ft)

SITRANS LR250, dimensions in mm (inch)

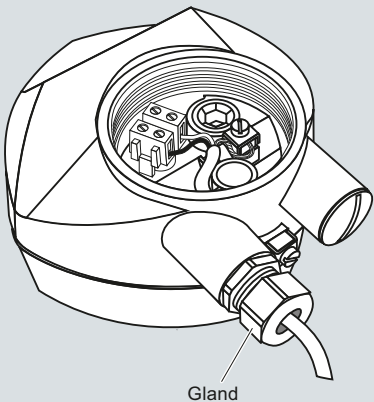
Level measurement

Continuous level measurement – Radar transmitters

SITRANS LR250 Horn Antenna

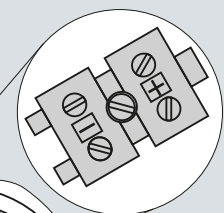
Schematics

4



Gland

Connect the wires to the terminals as shown: the polarity is identified on the terminal block.



Shield for HART, PROFIBUS PA, and FOUNDATION Fieldbus 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 ... 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 LR250 Specials

SITRANS LR250 Specials

Order No.

SITRANS LR250 horn version enclosures (PROFIBUS PA models)



LR250 horn version enclosure with board stack, NPT cable inlet, approval option A, with PROFIBUS PA communication, no process connection

A5E01156836

LR250 horn version enclosure with board stack, M20 cable inlet, approval option A, with PROFIBUS PA communication, no process connection

A5E01156838

LR250 horn version enclosure with board stack, NPT cable inlet, approval option B, with PROFIBUS PA communication, no process connection

A5E01156839

LR250 horn version enclosure with board stack, M20 cable inlet, approval option B, with PROFIBUS PA communication, no process connection

A5E01156841

LR250 horn version enclosure with board stack, NPT cable inlet, approval option C, with PROFIBUS PA communication, no process connection

A5E01156843

LR250 horn version enclosure with board stack, M20 cable inlet, approval option C, with PROFIBUS PA communication, no process connection

A5E01156844

LR250 horn version enclosure with board stack, M20 cable inlet, approval option C, with PROFIBUS PA communication, no process connection

A5E01156846

LR250 horn version enclosure with board stack, M20 cable inlet, approval option D, with PROFIBUS PA communication, no process connection

A5E01156848

LR250 enclosure with board stack, NPT cable inlet, approval option B, with FOUNDATION FIELDBUS communication, no process connection

A5E03769538

LR250 enclosure with board stack, NPT cable inlet, approval option D, with FOUNDATION FIELDBUS communication, no process connection

A5E03769539

LR250 enclosure with board stack, M20 cable inlet, approval option E, with FOUNDATION FIELDBUS communication, no process connection

A5E03769543

SITRANS LR250 horn version enclosures (FOUNDATION Fieldbus models)



LR250 horn version enclosure with board stack, M20 cable inlet, approval option C, with FOUNDATION Fieldbus communication, no process connection

A5E02654608

LR250 horn version enclosure with board stack, NPT cable inlet, approval option A, with FOUNDATION Fieldbus communication, no process connection

A5E02653792

LR250 horn version enclosure with board stack, M20 cable inlet, approval option A, with FOUNDATION Fieldbus communication, no process connection

A5E02653793

LR250 horn version enclosure with board stack, NPT cable inlet, approval option C, with FOUNDATION Fieldbus communication, no process connection

A5E02654606

SITRANS LR250 Specials

Order No.

SITRANS LR250 horn version enclosures (< 3.6 mA start-up HART)



SITRANS LR250 horn version enclosure with board stack, M20 cable inlet, approval option A, with HART communication start-up at < 3.6 mA, no process connection

A5E02956317

SITRANS LR250 horn version enclosure with board stack, M20 cable inlet, approval option C, with HART communication start-up at < 3.6 mA, no process connection

A5E02956319

SITRANS LR250 horn version enclosure with board stack, M20 cable inlet, approval option E, with HART communication start-up at < 3.6 mA, no process connection

A5E02956320

SITRANS LR250 horn version enclosure with board stack, M20 cable inlet, approval option F, with HART communication start-up at < 3.6 mA, no process connection

A5E02956322

SITRANS LR250 horn version enclosure with board stack, M20 cable inlet, approval option G, with HART communication start-up at < 3.6 mA, no process connection

A5E02956323

LR250 horn version enclosure with board stack, NPT cable inlet, approval option A, with HART communication start-up at < 3.6 mA, no process connection

A5E03441096

LR250 horn version enclosure with board stack, NPT cable inlet, approval option B, with HART communication start-up at < 3.6 mA, no process connection

A5E03441097

LR250 horn version enclosure with board stack, NPT cable inlet, approval option D, with HART communication start-up at < 3.6 mA, no process connection

A5E03441098

LR250 horn version enclosure with board stack, NPT cable inlet, approval option H, with HART communication start-up at < 3.6 mA, no process connection

A5E03441099

SITRANS LR250 horn antenna and extension kits



38 mm (1.5 inch) horn antenna kit, 1.5" Process Connections only

A5E01151539

100 mm (4 inch) horn antenna extension kit, 1.5" Process Connections only

A5E01151553

50 mm (2 inch) stainless steel 316L horn antenna kit

A5E01151569

75 mm (3 inch) stainless steel 316L horn antenna kit

A5E01151571

100 mm (4 inch) stainless steel 316L horn antenna kit

A5E01151573

100 mm (4 inch) horn antenna extension kit, 50 mm (2 inch), 75 mm (3 inch) and 100 mm (4 inch) process connection

A5E01151577

50 mm (2 inch) horn antenna kit, Hastelloy C-22

A5E01151584

75 mm (3 inch) horn antenna kit, Hastelloy C-22

A5E01151585

100 mm (4 inch) horn antenna kit, Hastelloy C-22

A5E01151587

5 Dupont 1Gr Polyback, PTFE grease kit

A5E01151626

LR250 lid with O-ring

A5E02465410

Please contact ceg.smpi@siemens.com for special requests.

Level measurement

Continuous level measurement – Radar transmitters

SITRANS LR250 threaded PVDF Antenna

Overview



SITRANS LR250 with threaded PVDF antenna is a 2-wire, 25 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including corrosives or aggressive materials, to a range of 10 m (32.8 ft).

Benefits

- Fully insulated PVDF antenna design for use in chemical and sanitary environments where aggressive and corrosive materials are used
- Cost effective replacement for transmitters made of exotic materials
- 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 and 2 inch (50 mm) process connection/antenna allow 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 inch) from the end of the antenna
- 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.
- Suitable for use in Safety Related Systems in accordance with IEC 61508/61511 (SIL-2)
- 3 mm (0.118 inch) accuracy in accordance with IEC 60770-1

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 antenna 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 in small vessels and in tanks/vessels up to 10 m (32 ft) on materials with $dk > 3$.

- Key Applications: liquid bulk storage tanks, process vessels with agitators, vaporous liquids, temperatures to 80 °C (176° F), corrosive and aggressive materials, media with dielectric (dk) ≥ 3 (application dependent) and applications requiring functional safety

Level measurement

Continuous level measurement – Radar transmitters

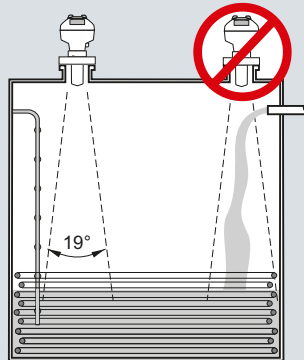
SITRANS LR250 threaded PVDF Antenna

Configuration

Installation

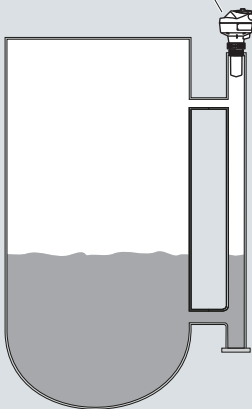
Note:

- 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 antenna.
- There is a signal transmitted outside of the beam angle; therefore false targets may be detected.



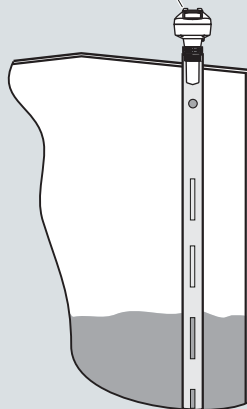
Mounting unit on bypass

Orient front or back of device toward vent.

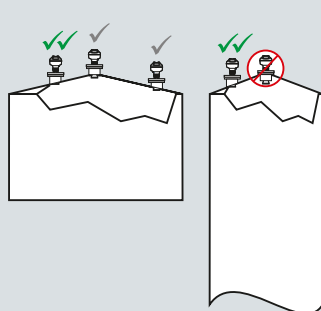


Mounting unit on stilling well

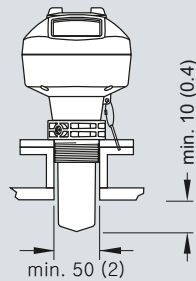
Orient front or back of device toward stillpipe slots.



Mounting unit on vessel



Mounting on a nozzle



SITRANS LR250 PVDF antenna installation, dimensions in mm (inch)

Level measurement

Continuous level measurement – Radar transmitters

SITRANS LR250 threaded PVDF Antenna

Technical specifications

Mode of operation

Measuring principle	Radar level measurement
Frequency	K-band (25.0 GHz)
Minimum measuring range	50 mm (2 inch) from end of antenna
Maximum measuring range	10 m (32.8 ft)

Output

HART	Version 5.1
• Analog output	4 ... 20 mA
• Accuracy	± 0.02 mA
• Fail-safe	<ul style="list-style-type: none"> Programmable as high low or hold (loss of echo) NE 43 programmable
PROFIBUS PA	Profile 3.1
• Function blocks	2 Analog Input (AI)
FOUNDATION Fieldbus	H1
• Functionality	Basic or LAS
• Version	ITK 5.2.0
• Function blocks	2 Analog Input (AI)

Performance (according to reference conditions IEC60770-1)

Maximum measured error	<ul style="list-style-type: none"> > 500 mm from sensor reference point: 3 mm (0.118 inch) < 500 mm from sensor reference point: 25 mm (1 inch)
Influence of ambient temperature	< 0.003 %/K

Rated operating conditions

Installation conditions	
Location	Indoor/outdoor
Ambient conditions (enclosure)	
Ambient temperature	-40 ... +80 °C (-40 ... +176 °F)
Installation category	I
Pollution degree	4

Medium conditions

Dielectric constant ϵ_r	≥ 3 (1.6 in stillpipe)
Process temperature	-40 ... +80 °C (-40 ... +176 °F) at process connection (Is suitable for CIP at 120 °C for 1/2 hr max.)
Process pressure	Up to 5 bar g (72 psi g) temperature dependent. See Pressure/Temperature curves for more information (page 4/246)

Design

Enclosure	
• Material	Aluminum, polyester powder-coated
• Cable inlet	2 x M20x1.5 or 2 x 1/2" NPT
Degree of protection	Type 4X/NEMA 4X, Type 6/NEMA 6, IP67, IP68
Weight	approximately 3.3 kg (7.27 lb)
Display (local)	Graphic local user interface including quick start wizard and echo profile display
Antenna	
• Material	PVDF (Polyvinylidene fluoride)
• Dimensions (nominal sizes)	2 inch (48 mm)

Process connections

Threaded connection	2" NPT [(Taper), ASME B1.20.1] 2" [(BSPT), EN 10226] 2" [(BSPP), EN ISO 228-1]
---------------------	--

Power supply

4 ... 20 mA/HART	Nominal 24 V DC (max. 30 V DC) with max. 550 Ω
PROFIBUS PA	<ul style="list-style-type: none"> 15 mA per IEC 61158-2
FOUNDATION Fieldbus	<ul style="list-style-type: none"> 20.0 mA per IEC 61158-2

Certificates and approvals

General	CSAUS/C, CE, FM, NE 21, C-TICK
Radio	FCC, Industry Canada and Europe ETSI EN 302-372, C-TICK
Hazardous	
• Explosion Proof (Brazil)	INMETRO Ex d ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T90 °C Da IP67
• Increased Safety (Brazil)	INMETRO Ex e ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T90 °C Da IP67
• Intrinsically Safe (Brazil)	INMETRO Ex ia IIC T4 Ga, Ex ia ta IIIC T90 °C Da IP67
• 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
• 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
• Non-incendive (Canada/USA)	CSA/FM Class I, Div. 2, Groups A, B, C, D T5
• Increased Safety/Flame Proof (China)	NEPSI Ex dmbia IIC T4/ Ex embia IIC T4/ DIP A20 TA, T90 °C IP67
• Intrinsically Safe (China)	NEPSI Ex ia IIC T4/DIP A20 T _a T90 °C IP67
• Non-sparking/Energy Limited (China)	NEPSI Ex nA/nL IIC T4
• Intrinsically Safe (Europe)	ATEX II 1G EEx ia IIC T4 ATEX II 1D Ex iaD 20 tD A20 IP67 T90 °C
• Non-sparking/Energy Limited (Europe)	ATEX II 3G EEx nA/nL IIC T4 Gc
• Flame Proof (International/Europe)	IECEX/ATEX II 1/2 GD, 1D, 2D, Ex dmbia IIC T4 Ga/Gb, Ex iaD 20 tD A20 IP67 T90 °C
• Increased Safety (International/Europe)	IECEX/ATEX II 1/2 GD, 1D, 2D, Ex embia IIC T4 Ga/Gb, Ex iaD 20 tD A20 IP67 T90 °C
• Intrinsically Safe (International)	IECEX Ex ia IIC T4, Ex iaD 20 tD A20 IP67 T90 °C
• Explosion Proof (Russia)	GOST-R Ex d
• Increased Safety (Russia)	GOST-R Ex e
• Intrinsically Safe (Russia)	GOST-R Ex ia
Programming	
Intrinsically Safe Siemens handheld programmer	Infrared receiver
• Approvals for handheld-programmer	IS model: ATEX II 1 GD Ex ia IIC T4 Ga Ex ia D 20 T135 °C T _a = -20 ... +50 °C CSA/FM Class I, II, III, Div. 1., Groups A, B, C, D, E, F, G, T6 T _a = 50 °C IECEX SIR 09.0073
Handheld communicator PC	HART communicator 375/475
	<ul style="list-style-type: none"> SIMATIC PDM Emerson AMS SITRANS DTM (for connection into FDT, such as PACTware or Fieldcare)
Display (local)	Graphic local user interface including quick start wizard and echo profile displays

Level measurement

Continuous level measurement – Radar transmitters

SITRANS LR250 threaded PVDF Antenna

Selection and Ordering data	Order No.	Selection and Ordering data	Order code
SITRANS LR250 threaded PVDF antenna 2-wire, 25 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including corrosives or aggressive materials, to a range of 10 m (32.8 ft).	7ML5431- 0 -	Further designs Please add "-Z" to Order No. and specify Order code(s).	
Process Connection and Antenna Material Threaded PVDF antenna	4	Plug M12 with mating Connector ¹⁾²⁾³⁾	A50
Process Connection Type Threaded connections PVDF 2" NPT (ASME B1.20.1) (tapered thread) R 2" [(BSPT), EN 10226-1] (tapered thread) G 2" [(BSPP), EN ISO 228-1] (parallel thread)	PA PB PC	Plug 7/8" with mating Connector ²⁾³⁾⁴⁾	A55
Communication/Output PROFIBUS PA 4 ... 20 mA, HART, startup at < 3.6 mA FOUNDATION Fieldbus	1 2 3	Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text	Y15
Enclosure/Cable inlet Aluminum, Epoxy painted 2 x 1/2" NPT 2 x M20x1.5	0 1	Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000	C11
Antenna 2 inch(50 mm) threaded PVDF antenna	R	Inspection Certificate Type 3.1 per EN 10204	C12
Approvals General Purpose, CE, CSA, FM, FCC, R&TTE, C-TICK Intrinsically Safe, CSA/FM Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G, Industry Canada FCC Intrinsically Safe, IECEx/ATEX II 1 GD Ex ia IIC T4, Ex iaD 20 tD A20 IP67 T90 °C, INMETRO Ex ia IIC T4 Ga, Ex ta IIIC T90 °C Da IP67, CE, R&TTE, C-TICK Non-incendive, CSA/FM Class I, Div. 2, Groups A, B, C, D, FCC Non-sparking, Energy Limited, ATEX II 3G Ex nA/nL IIC T4, CE, R&TTE, C-TICK Increased Safety, IECEx/ATEX II 1/2 GD Ex embia IIC T4, Ex iaD 20 tD A20 IP67 T90 °C, INMETRO Ex e ia mb IIC T4 Ga/Gb, Ex tb IIIC T90 °C Db IP67, CE, R&TTE, C-TICK ¹⁾ Flame Proof, IECEx/ATEX II 1/2 GD Ex dmbia IIC T4, Ex iaD 20 tD A20 IP67 T90 °C, INMETRO Ex d ia mb IIC T4 Ga/Gb, Ex tb IIIC T90 °C Db IP67, CE, R&TTE, C-TICK ¹⁾ Explosion Proof CSA/FM Class I, II, III, Div. 1, Gr. A, B, C, D, E, F, G, Industry Canada FCC ¹⁾	A B C D E F G H	Functional Safety - SIL ₂ suitable in accordance with IEC 61508/61511 ^{5) 6)}	C20
Pressure rating Rating per Pressure/Temperature curves in manual	2	Namur NE43 compliant, device preset to failsafe < 3.6 mA ⁵⁾	N07
		Operating Instructions for HART/mA device	Order No.
		English	7ML1998-5JE05
		German	7ML1998-5JE34
		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.	7ML1998-5QX83
		Operating Instructions for PROFIBUS PA device	
		English	7ML1998-5JF05
		German	7ML1998-5JF34
		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.	7ML1998-5XE83
		Operating Instructions for FOUNDATION Fieldbus device	
		English	7ML1998-5KL03
		German	7ML1998-5KL32
		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.	7ML1998-5XN82

¹⁾ Applicable to Communication option 2 only

Level measurement

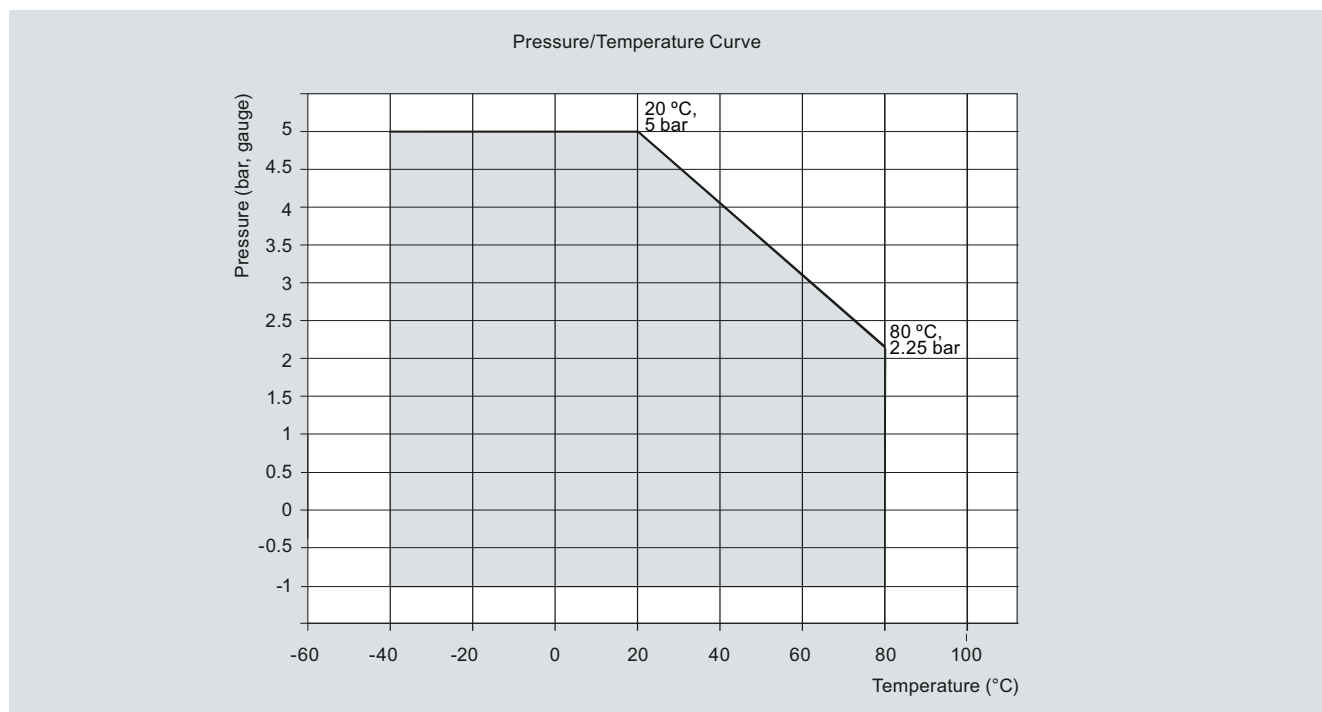
Continuous level measurement – Radar transmitters

SITRANS LR250 threaded PVDF Antenna

Selection and Ordering data	Order code
Accessories	
Handheld programmer, Intrinsically safe, EEx ia	7ML1930-1BK
HART modem/RS 232 (for use with a PC and SIMATIC PDM)	7MF4997-1DA
HART modem/USB (for use with a PC and SIMATIC PDM)	7MF4997-1DB
One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F), HART	7ML1930-1AP
One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F), PROFIBUS PA and FOUNDATION Fieldbus ⁷⁾	7ML1930-1AQ
FDA approved FKM o-ring for 2" G (BSPP) process connections -28 ... +80 °C (-28 ... +176 °F)	7ML1830-3AN
SITRANS RD100 Remote display - see Chapter 7	
SITRANS RD200 Remote display - see Chapter 7	
SITRANS RD500 web, datalogging, alarming, ethernet, and modem support for instrumentation - see Chapter 7	7ML5750- 1AA00-0

- 1) Available with Enclosure option 1 only
- 2) To be used with Communication options 1 and 3 only.
Connector has IP67 rating.
- 3) Available with approval options A and B. Available with approval option C
for use on intrinsically safe applications only. Not rated for dust Ex.
- 4) Available with Enclosure option 0 only
- 5) Applicable to Communication option 2 only
- 6) Available with Approval options A to E only
- 7) For use with Communication option 1 and 3 only

Characteristic curves

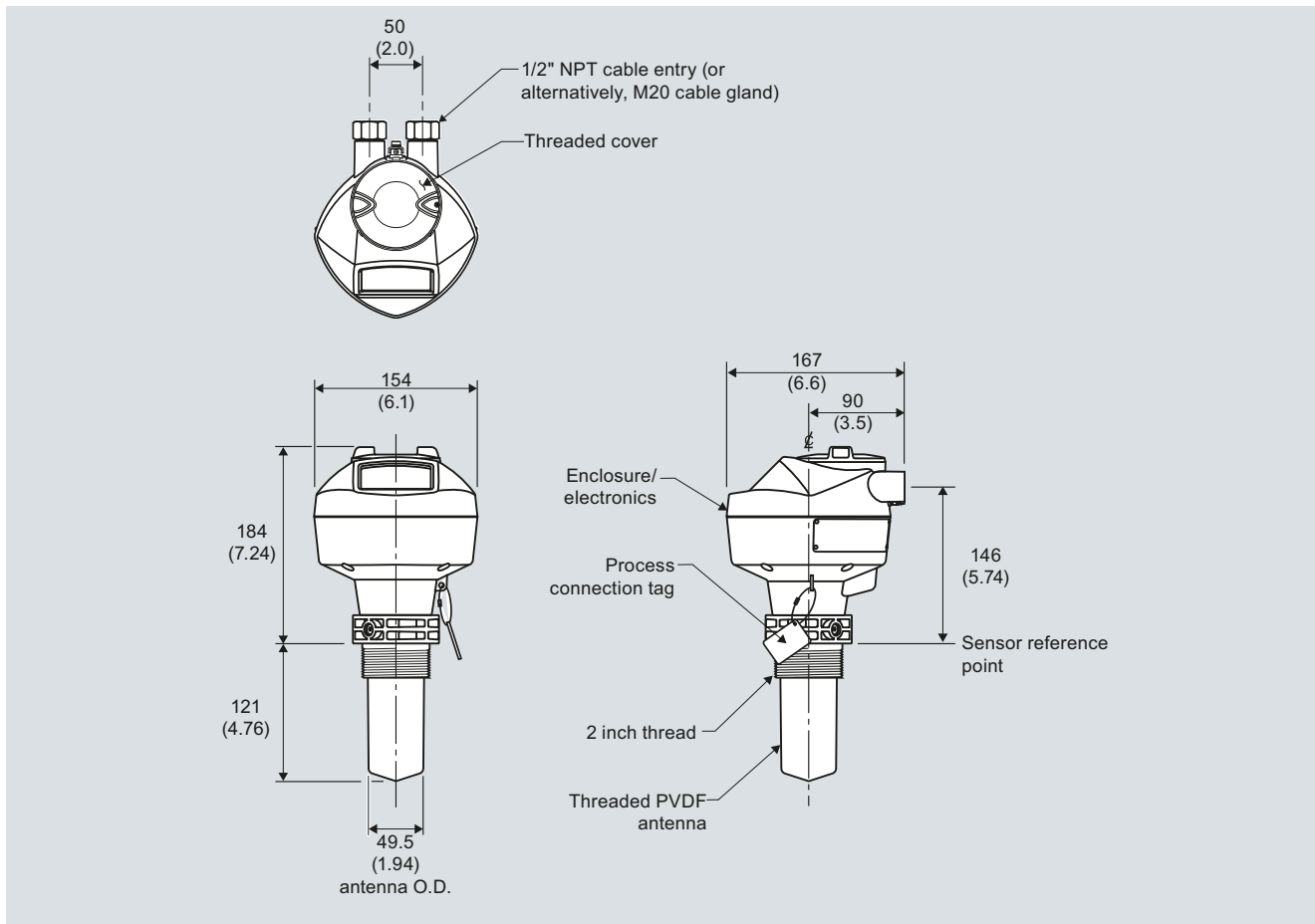


SITRANS LR250 PVDF antenna pressure/temperature curve

Level measurement Continuous level measurement – Radar transmitters

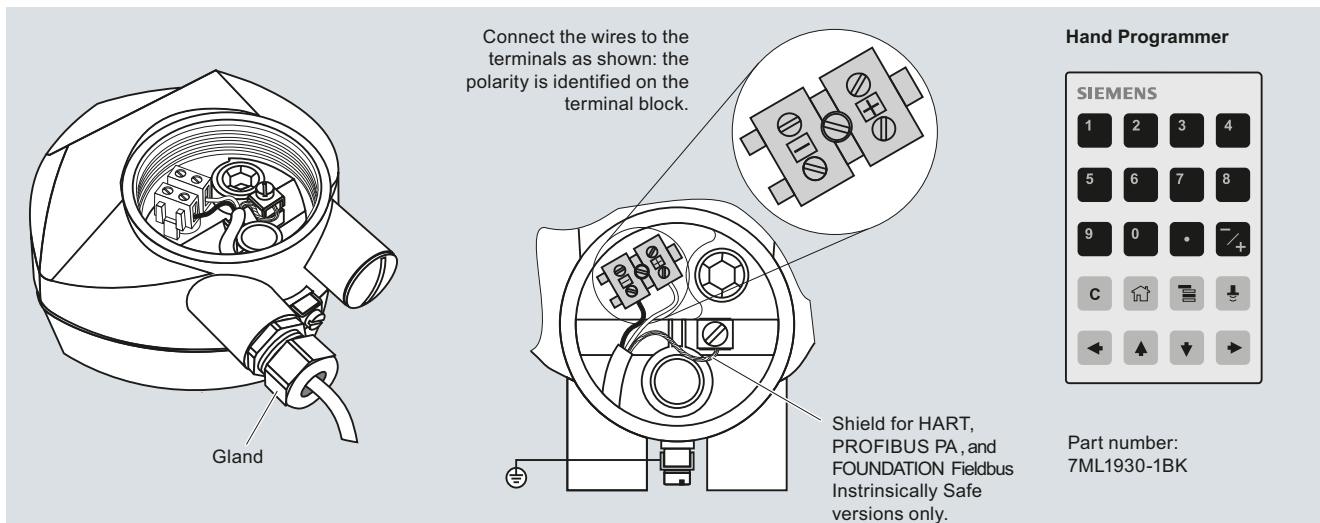
SITRANS LR250 threaded PVDF Antenna

Dimensional drawings



SITRANS LR250 PVDF antenna, dimensions in mm (inch)

Schematics



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 ... 22 AWG) for HART version.
4. Separate cables and conduit may be required to conform to standard instrumentation wiring practices or electrical codes.

Level measurement

Continuous level measurement – Radar transmitters

SITRANS LR250 threaded PVDF Specials

SITRANS LR250 threaded PVDF Specials

	Order No.
SITRANS LR250 threaded PVDF antenna version enclosures (PROFIBUS PA models)	
LR250 threaded PVDF antenna version enclosure with board stack, M20 cable inlet, approval option A, with PROFIBUS PA communication, no process connection	A5E03588171
LR250 threaded PVDF antenna version enclosure with board stack, NPT cable inlet, approval option A, with PROFIBUS PA communication, no process connection	A5E03588253
LR250 threaded PVDF antenna version enclosure with board stack, NPT cable inlet, approval option B, with PROFIBUS PA communication, no process connection	A5E03588512
LR250 threaded PVDF antenna version enclosure with board stack, M20 cable inlet, approval option C, with PROFIBUS PA communication, no process connection	A5E03589260
LR250 threaded PVDF antenna version enclosure with board stack, M20 cable inlet, approval option D, with PROFIBUS PA communication, no process connection	A5E03589262
LR250 threaded PVDF antenna version enclosure with board stack, M20 cable inlet, approval option E, with PROFIBUS PA communication, no process connection	A5E03589264
SITRANS LR250 threaded PVDF antenna version enclosures (FOUNDATION Fieldbus models)	
LR250 enclosure with board stack, M20 cable inlet, approval option A, with FOUNDATION Fieldbus communication, no process connection	A5E03589266
LR250 enclosure with board stack, NPT cable inlet, approval option A, with FOUNDATION Fieldbus communication, no process connection	A5E03589275
LR250 enclosure with board stack, NPT cable inlet, approval option B, with FOUNDATION Fieldbus communication, no process connection	A5E03589277
LR250 enclosure with board stack, M20 cable inlet, approval option C, with FOUNDATION Fieldbus communication, no process connection	A5E03589280
LR250 enclosure with board stack, NPT cable inlet, approval option D, with FOUNDATION Fieldbus communication, no process connection	A5E03589281
LR250 enclosure with board stack, M20 cable inlet, approval option E, with FOUNDATION Fieldbus communication, no process connection	A5E03589283

SITRANS LR250 threaded PVDF Specials

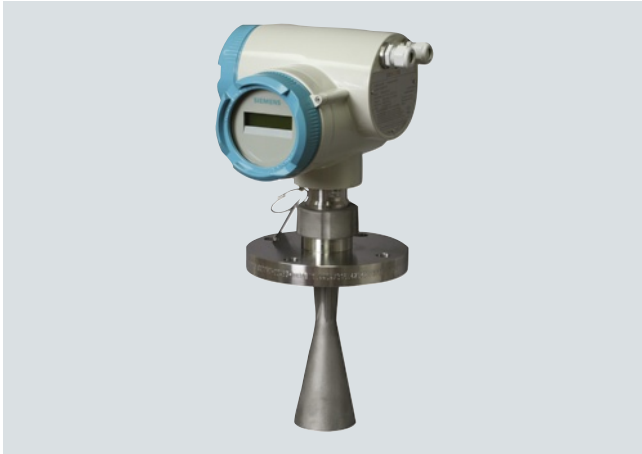
	Order No.
SITRANS LR250 threaded PVDF antenna version enclosures (< 3.6 mA start-up HART models)	
LR250 enclosure with board stack, M20 cable inlet, approval option A, with HART communication start-up at < 3.6 mA, no process connection	A5E03569747
LR250 enclosure with board stack, NPT cable inlet, approval option A, with HART communication start-up at < 3.6 mA, no process connection	A5E03586807
LR250 enclosure with board stack, NPT cable inlet, approval option B, with HART communication start-up at < 3.6 mA, no process connection	A5E03586854
LR250 enclosure with board stack, M20 cable inlet, approval option C, with HART communication start-up at < 3.6 mA, no process connection	A5E03586887
LR250 enclosure with board stack, NPT cable inlet, approval option D, with HART communication start-up at < 3.6 mA, no process connection	A5E03586961
LR250 enclosure with board stack, M20 cable inlet, approval option E, with HART communication start-up at < 3.6 mA, no process connection	A5E03587012
LR250 enclosure with board stack, M20 cable inlet, approval option F, with HART communication start-up at < 3.6 mA, no process connection	A5E03587132
LR250 enclosure with board stack, M20 cable inlet, approval option G, with HART communication start-up at < 3.6 mA, no process connection	A5E03587223
LR250 enclosure with board stack, NPT cable inlet, approval option H, with HART communication start-up at < 3.6 mA, no process connection	A5E03588125
SITRANS LR250 threaded PVDF antenna kits	
Antenna kit 2" NPT threaded PVDF	A5E03528941
Antenna kit 2" R (BSPT) threaded PVDF	A5E03528943
Antenna kit 2" G (BSPP) threaded PVDF	A5E03528947
Kit of hardware parts for LR250 threaded PVDF antenna: consists of O-rings, screws, wave-washer and loctite	A5E03528948

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.

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.

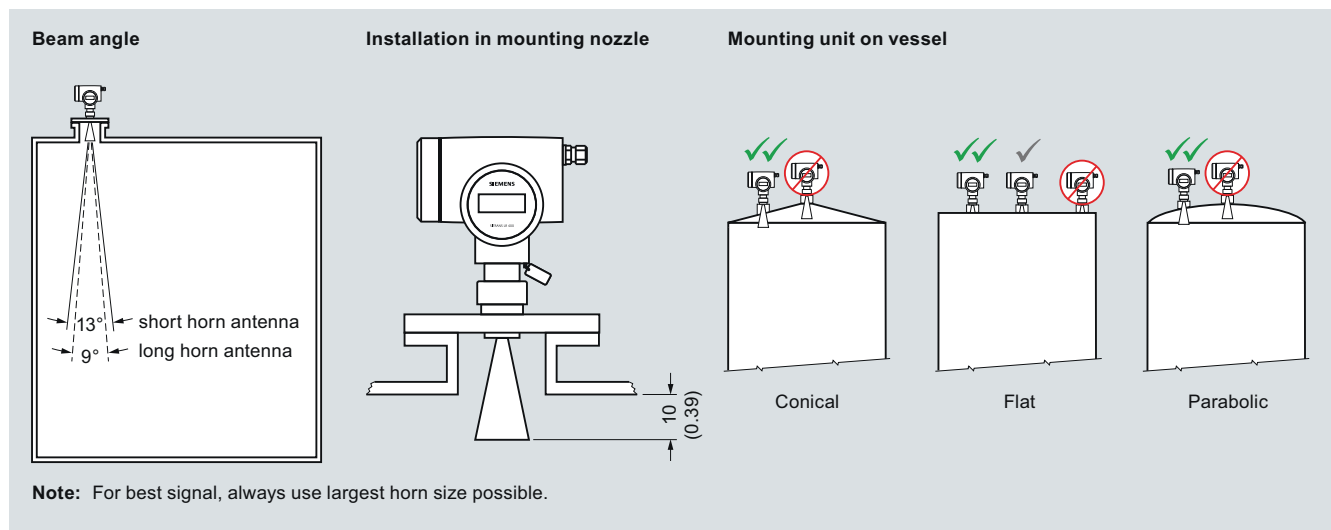
- Key applications: long-range liquid or slurry applications, high temperature or high pressure, low dielectric media, such as LPG (liquid, petroleum, gas)

4

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

Configuration



SITRANS LR400 installation, dimensions in mm (inch)

Level measurement

Continuous level measurement – Radar transmitters

SITRANS LR400

Technical specifications

Mode of operation		Design	
Measuring principle	FMCW radar level measurement	Weight	Approx. 12.2 kg (26.8 lb) with 3" 150 psi flange
Frequency	24 ... 25 GHz FMCW	Materials	Die-cast aluminum, painted IP67/Type 4X/NEMA 4X, Type 6/NEMA 6
Measuring range	0.35 ... 50 m (1.15 ... 164 ft)	<ul style="list-style-type: none"> Enclosure Degree of protection 	2x M20x1.5 or ½" NPT
Output		<ul style="list-style-type: none"> Cable inlet 	
Analog output (HART)	Optically isolated 4 ... 20 mA Max. 600 Ω (330 Ω for [ia] versions, Area classification options G, L, P, S)	Process connections	316L stainless steel, 80, 100, 150 mm, bolt holes matching EN 1092-1 and JIS B 2220
<ul style="list-style-type: none"> Signal range Load 		<ul style="list-style-type: none"> Flat faced flanges 	316L stainless steel, 3", 4", 6", bolt holes matching ASME B 16.5
<ul style="list-style-type: none"> Relay 	NC or NO function, max. DC 50 V, max. 200 mA, rating 5 W	<ul style="list-style-type: none"> Raised face flanges 	
Communication	HART, optional PROFIBUS PA	Programming	
PROFIBUS PA protocol	Layer 1 and 2, Class A, Profile 3.0	Intrinsically Safe Siemens handheld programmer (ordered separately)	Infrared receiver
Performance (Reference conditions)		<ul style="list-style-type: none"> Approvals for handheld programmer 	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)
Dead band	0 ... 350 mm from bottom edge of flange	Handheld communicator	HART communicator 375
Error in measurement at 25 °C (77 °F)	<ul style="list-style-type: none"> ≤ 5 mm from 2 ... 10 m ≤ 15 mm from 10 ... 50 m 	PC	SIMATIC PDM
<ul style="list-style-type: none"> Repeatability Fail-safe 	<ul style="list-style-type: none"> ≤ 1 mm mA signal programmable as high, low or hold (LOE) 	Display (local)	Alphanumeric LCD for readout and entry
Rated operating conditions		Power supply	
Amb. temperature for enclosure	-40 ... +65 °C (-40 ... +149 °F)	100 ... 230 V AC ± 15 % (50/60 Hz), 6 W (12 VA) or 24 V DC +25/-20 %, 6 W (optional)	
Location	Indoor/outdoor	Certificates and approvals	
Installation category	II	Safety	CSA _{US/C} , CE, FM, C-TICK
Pollution degree	4	Shipping	<ul style="list-style-type: none"> Lloyd's Register of Shipping ABS
Medium conditions		Radio	Europe (R&TTE, CETECOM), Industry Canada, FCC, C-TICK
Dielectric constant	$\epsilon_r > 1.4$	Hazardous	
Process temperature range	-40 ... +200 °C (-40 ... +392 °F) -20 ... +200 °C (-4 ... +392 °F) for SITRANS LR400 with ATEX rating	<ul style="list-style-type: none"> Flame Proof/Increased Safety (Brazil) Explosion Proof (Canada/USA) 	INMETRO
<ul style="list-style-type: none"> Standard 		-40 ... +250 °C (-40 ... +482 °F)	<ul style="list-style-type: none"> Flame Proof/Increased Safety (Europe) Flame Proof/Increased Safety with Intrinsically Safe output(Europe)
<ul style="list-style-type: none"> With optional temperature extension 		Optional equipment	
Vessel Pressure	Up to 40 bar g (process connection dependent)	Purging (self-cleaning) system PTFE dust cover	

Level measurement

Continuous level measurement – Radar transmitters

SITRANS LR400

Selection and Ordering data	Order No.
SITRANS LR400	7ML5421-
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.	
Order handheld programmer separately	
Process temperature range	
-40 °C ... +200 °C (-40 ... +392 °F), standard	0
-40 °C ... +250 °C (-40 ... +482 °F), high temperature extension	1
Process connection	
Universal flange 3 inch/80 mm ¹⁾	A
Universal flange 4 inch/100 mm ¹⁾	B
Universal flange 6 inch/150 mm ¹⁾	D
DN 80, PN 16, Type A, flat faced	S
DN 80, PN 40, Type B1, raised face	C
DN 100, PN 16, Type A, flat faced	T
DN 100, PN 40, Type B1, raised face	G
DN 150, PN 16, Type A, flat faced	U
3" ASME, 150 lb, raised face	E
3" ASME, 300 lb, raised face	F
4" ASME, 150 lb, raised face	J
4" ASME, 300 lb, raised face	K
6" ASME, 150 lb, raised face	N
JIS, DN 80 10K	Q
JIS, DN 100 10K	R
JIS, DN 150 10K	V
(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5, or EN 1092-1, or JIS B 2220 standard.)	
Antenna	
Horn antenna, long 93 mm (3.66 inch) diam. for 100 mm (4 inch) nozzles	D
Horn antenna, short 74 mm (2.91 inch) diam. for 80 mm (3 inch) nozzles	K
Antenna purging system	
None	0
Purging system	1
Note: Available with process connections A, B or D, and for area classifications A or B only	
Process seal/gasket	
PTFE for -40 ... +250 °C (-40 ... +482 °F) flange temperatures	1
FKM for -20 ... +200 °C (-4 ... +392 °F) flange temperatures ²⁾	3
Output/communication	
4 ... 20 mA, HART	0
PROFIBUS PA	1
Power supply/cable inlet	
100 ... 230 V AC	
• 2 x M20x1,5	B
• 2 x ½" NPT	C
24 V DC	
• 2 x M20x1,5	E
• 2 x ½" NPT	F
Approvals	
General Purpose, CSAUS/C, Industry Canada, FCC, CE and R&TTE	B
ATEX II 2G EEx d IIC T6; CE, R&TTE; INMETRO Ex d IIC T6	E
ATEX II 2G EEx dem IIC T6; CE, R&TTE; INMETRO Ex de mb II T6	F
ATEX II 2G EEx dem [ia] IIC T6; CE, R&TTE; INMETRO Ex de [ia] mb IIC T6 ³⁾	G
ATEX II 1/2 GD EEx d IIC T6; CE, R&TTE; INMETRO Ex d IIC T6 ²⁾	J

Selection and Ordering data	Order No.
SITRANS LR400	7ML5421-
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.	
Order handheld programmer separately	
ATEX II 1/2 GD EEx dem IIC T6; CE, R&TTE; INMETRO Ex de mb IIC T6 ²⁾	K
ATEX II 1/2 GD EEx dem [ia] II T6; CE, R&TTE; INMETRO Ex de [ia] mb IIC T6 ³⁾	L
FM Class I, Div. 1, Groups B, C, D; Class II/III, Div. 1, Groups E, F, G; FCC ²⁾	T
CSA Class I, Div. 1, Groups B, C, D; Class II/III, Div. 1, Groups E, F, G; FCC ²⁾	U
Local operation	
Local Display Only. Handheld programmer not included (Order programmer separately.)	2

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⁾ Available only with power supply option E or F

Level measurement

Continuous level measurement – Radar transmitters

SITRANS LR400

Selection and Ordering data	Order code
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 inch)]; Measuring-point number/identification (max. 27 characters); specify in plain text	Y15
Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000	C11
Inspection Certificate Type 3.1 per EN 10204	C12
Operating Instructions	
English	Order No. 7ML1998-5FH06
German	7ML1998-5FH36
French	7ML1998-5FH16
Spanish	7ML1998-5FH22
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.	7ML1998-5QN83
Accessories	
Handheld programmer Intrinsically Safe, EEx ia	Order No. 7ML5830-2AJ
Long horn dust cover, PTFE	7ML1930-1AH
Short horn dust cover, PTFE	7ML1930-1AJ
HART modem/RS 232 (for use with a PC and SIMATIC PDM)	7MF4997-1DA
HART modem/USB (for use with a PC and SIMATIC PDM)	7MF4997-1DB
One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F), HART (two required) ¹⁾	7ML1930-1AP
One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F), PROFIBUS PA (two required) ¹⁾	7ML1930-1AQ
SITRANS RD100 Remote display - see Chapter 7	
SITRANS RD200 Remote display - see Chapter 7	
SITRANS RD500 web, datalogging, alarming, ethernet, and modem support for instrumentation - see Chapter 7	7ML5750-1AA00-0

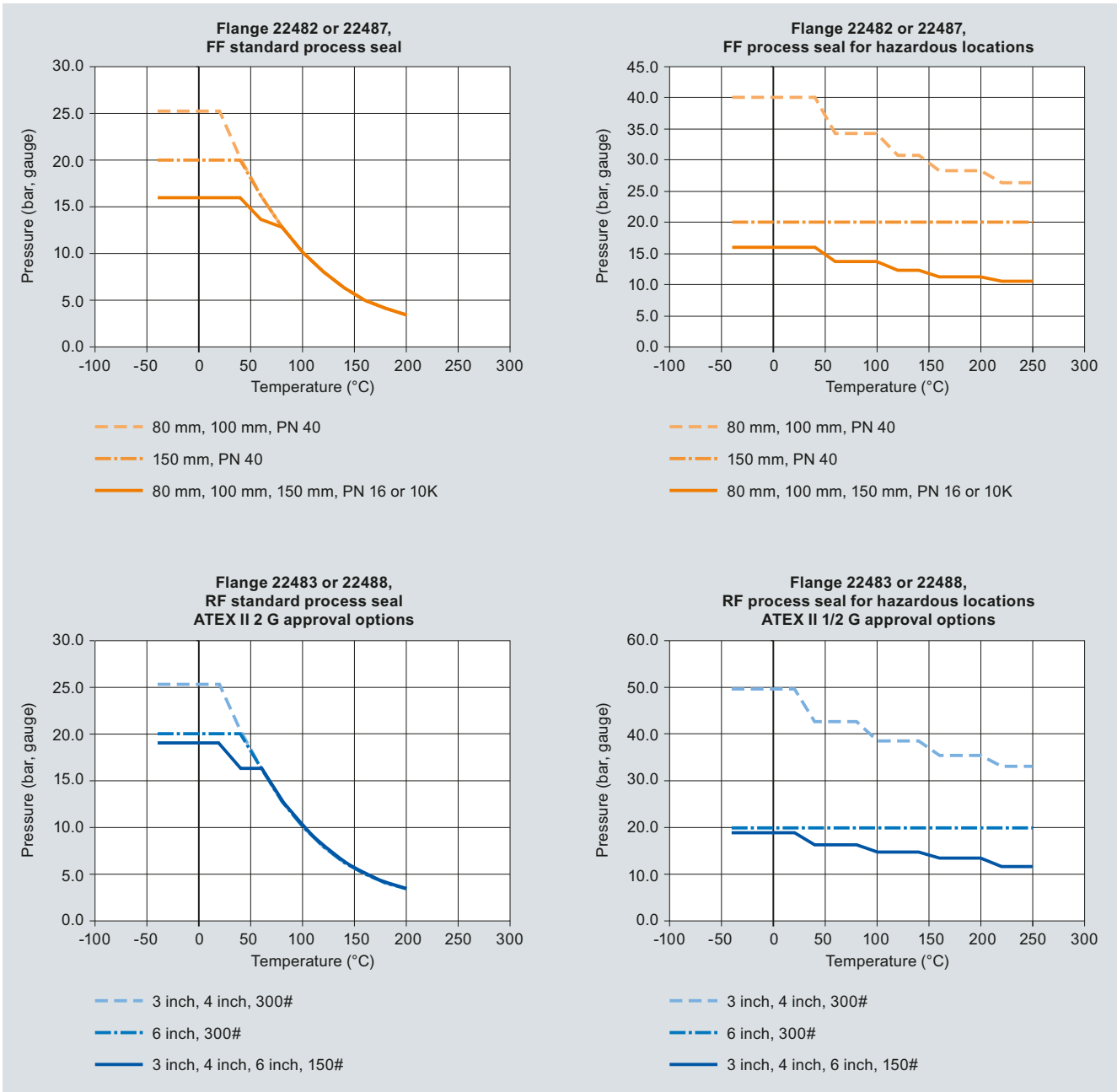
¹⁾ Product shipped with plastic cable gland, rated to -20 °C.
If -40 °C rating required, then metallic cable gland is recommended.

Level measurement

Continuous level measurement – Radar transmitters

SITRANS LR400

Characteristic curves



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SITRANS LR400 Process Pressure/Temperature derating curves

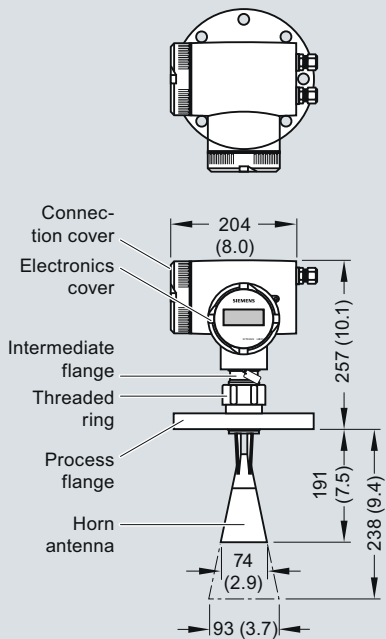
Level measurement

Continuous level measurement – Radar transmitters

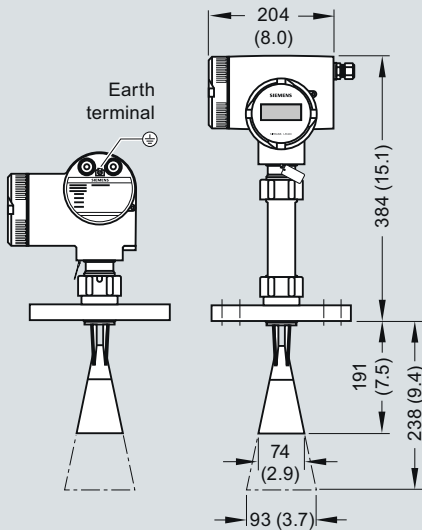
SITRANS LR400

Dimensional drawings

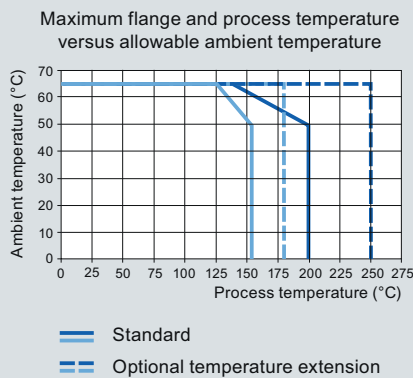
SITRANS LR400 (7ML5421)



SITRANS LR400 (with temperature extension)



SITRANS LR400



SITRANS LR400, dimensions in mm (inch)

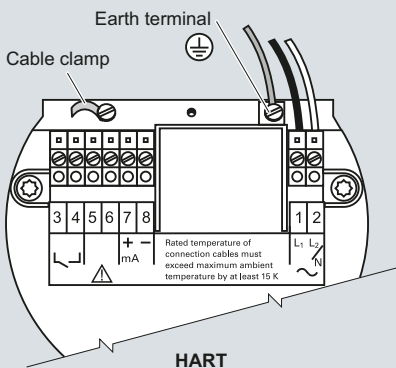
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Level measurement Continuous level measurement – Radar transmitters

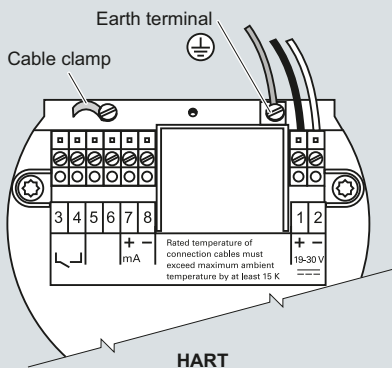
SITRANS LR400

Schematics

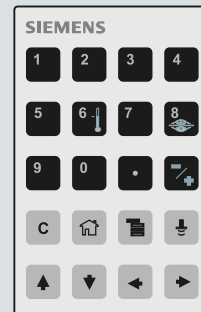
AC version



DC version

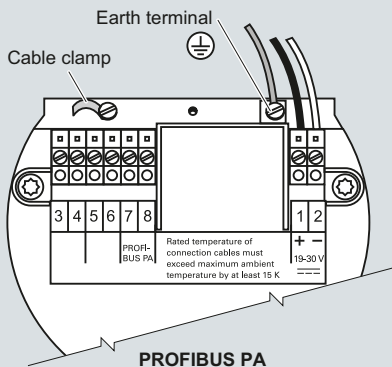
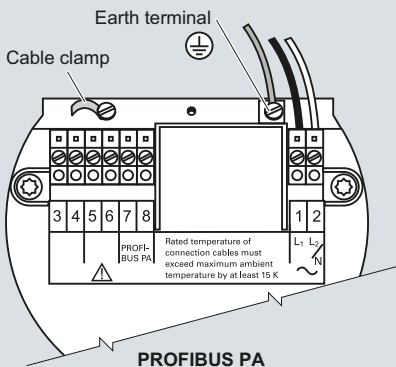


Hand programmer



SITRANS LR400

Part number:
7ML5830-2AJ



Notes

- Recommended torque on terminal clamping screws, 0.5 ... 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

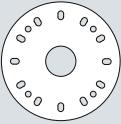
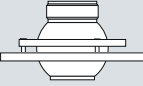


SITRANS LR400 connections

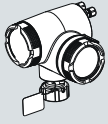
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Level measurement

Continuous level measurement – Radar transmitters

SITRANS LR400 Specials

SITRANS LR400 Specials		Order No.
3 inch/80 mm Universal Flange, without horn or hub. ¹⁾	PBD: 51035813	
4 inch/100 mm Universal Flange, without horn or hub. ¹⁾	PBD: 51035814	
6 inch/150 mm Universal Flange, without horn or hub. ¹⁾	PBD: 51035815	
8 inch/200 mm Universal Flange, without horn or hub. ¹⁾	PBD: 51035816	
Purging kit with Easy Aimer ball, no flange, no horn. ¹⁾	PBD: 51036110	
Purging kit with Easy Aimer ball with 4 inch/100 mm flange, no horn. ¹⁾	PBD: 51035810	
Purging kit with Easy Aimer ball with 6 inch/150 mm flange, no horn. ¹⁾	PBD: 51035811	
Purging Kit with Easy Aimer ball with 8 inch/200 mm flange, no horn. ¹⁾	PBD: 51035812	
Short horn antenna, no emitter supplied	PBD: 22475K1A	
Long horn antenna, no emitter supplied	PBD: 22475K2A	
Short horn antenna, purged, no emitter supplied	PBD: 22475K3A	
Long horn antenna, purged, no emitter supplied	PBD: 22475K4A	
Replacement display module, SITRANS LR400 Liquids and Solids versions	PBD: 51035410	
4" extension kit for horn antenna with General Purpose approvals	PBD: 51035474	
8" extension kit for horn antenna with General Purpose approvals	PBD: 51035473	
8" extension kit for horn antenna for hazardous units	PBD: 51036180	

SITRANS LR400 Specials		Order No.
SITRANS LR400 Aluminum enclosure with AC power, M20 cable inlet, HART communication, and GP, CE, and CETECOM approvals.	PBD: 51036479	
SITRANS LR400 Aluminum enclosure with AC power, M20 cable inlet, PROFIBUS PA communication and GP, CE, and CETECOM approvals.	PBD: 51036480	
SITRANS LR400 Aluminum enclosure with AC power, M20 cable inlet, HART communication and GP, CE, CSA, Industry Canada, FCC and R&TTE.	PBD: 51035877	
SITRANS LR400 Aluminum enclosure with AC power, M20 cable inlet, PROFIBUS PA communication and GP, CE, CSA, Industry Canada, FCC and R&TTE.	PBD: 51035871	
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.	PBD: 51035873	
SITRANS LR400 Aluminum enclosure with DC power, M20 cable inlet, HART communication and GP, CE and CETECOM approvals.	PBD: 51036481	
SITRANS LR400 Aluminum enclosure with DC power, M20 cable inlet, PROFIBUS PA communication and GP, CE and CETECOM approvals.	PBD: 51036482	
SITRANS LR400 Aluminum enclosure with DC power, M20 cable inlet, HART communication and GP, CE, CSA, Industry Canada, FCC and R&TTE	PBD: 51036483	
SITRANS LR400 Aluminum enclosure with DC power, M20 cable inlet, PROFIBUS PA communication and GP, CE, CSA, Industry Canada, FCC and R&TTE.	PBD: 51036484	
SITRANS LR400 Aluminum enclosure with DC power, M20 cable inlet, HART communication and ATEX II 1/2 GD EEx d IIC T6, CE and R&TTE approvals.	PBD: 51036485	
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.	PBD: 51036486	

¹⁾ Available with no pressure rating and with General Purpose approvals only

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.

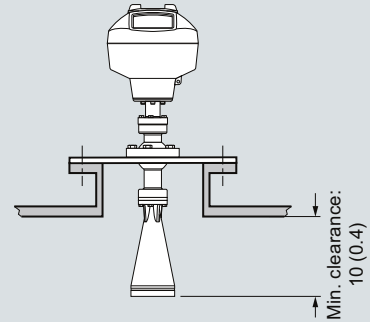
SITRANS LR260's unique design allows safe and simple programming using the Intrinsically Safe handheld programmer without having to open the instrument's lid.

SITRANS LR260 measures virtually any solids material to a range of 30 m (98.4 ft).

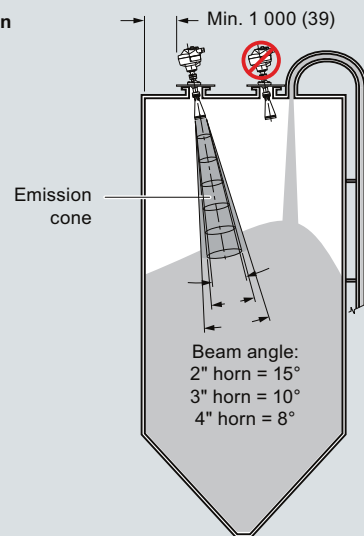
- Key Applications: cement powder, plastic powder/pellets, grain, flour, coal, solids bulk storage vessels, and other applications.

Configuration

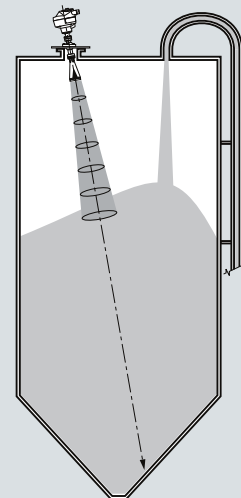
Mounting on a nozzle



Installation



Positioning with easy Aimer



SITRANS LR260 installation, dimensions in mm (inch)

Level measurement

Continuous level measurement – Radar transmitters

SITRANS LR260

Technical specifications

Mode of operation

Measuring principle	Pulse radar level measurement
Frequency	K-band (25.0 GHz)
Minimum detectable distance	0.05 m (2 inch) from end of horn
Maximum measuring range ¹⁾	<ul style="list-style-type: none"> • 2" horn: 10 m (32.8 ft) • 3" horn: 20 m (65.6 ft) • 4" horn: 30 m (98.4 ft)

Output - HART

Power	<ul style="list-style-type: none"> • 4 ... 20 mA (± 0.02 mA accuracy) • Nominal 24 V DC (max. 30 V DC)
Fail signal	3.6 mA ... 23 mA; or last value
Load	230 ... 600 Ω

Output - PROFIBUS PA

- Per IEC 61158-2
- 15.0 mA
- Profile version 3.01, Class B

Performance (according to reference conditions IEC60770-1)

Maximum measured error (including hysteresis and non-repeatability)	<ul style="list-style-type: none"> • 25 mm (1 inch) from minimum detectable distance to 300 mm (11.8 inch) • Remainder of range = 10 mm (0.39 inch) or 0.1% of span (whichever is greater)
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Rated operating conditions

Installation conditions	Indoor/outdoor
• Location	
Ambient conditions (enclosure)	-40 ... +80 °C (-40 ... +176 °F)
• Ambient temperature	
• Installation category	
• Pollution degree	

Medium conditions

Dielectric constant ϵ_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"> • 0.5 bar g (7.25 psi g) maximum • 3 bar g (43.5 psi g) optional with 80 °C (176 °F) temperature max.

Design

Enclosure	Aluminum, polyester powder-coated 2 x M20x1.5 or 2 x 1/2" NPT Type 4X/NEMA 4X, Type 6/ NEMA 6, IP67, IP68 < 8.14 kg (17.9 lb) including 4" flange and standard Easy Aimer with 4" horn antenna
• Construction	
• Conduit entry	
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	304 stainless steel 2" horn: 1.93 inch(49.0 mm) diameter 3" horn: 2.93 inch(74.5 mm) diameter 4" horn: 3.84 inch(97.5 mm) diameter
• Material	
• Dimensions (nominal horn sizes)	
Process connections	
• Universal flanges ²⁾	2 inch/50 mm, 3 inch/80 mm, 4 inch/100 mm, 6 inch/150 mm

Certificates and approvals

General	CSA _{US/C} , 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 IECEx/ATEX II 1 GD Ex ia IIC T4 CSA/FM Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G

Programming

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 = 50 °C
Handheld communicator	HART communicator 375
PC	SIMATIC PDM
Display (local)	Graphic local user interface including quick start wizard and echo profile displays

¹⁾ From sensor reference point

²⁾ Universal flange mates with EN 1092-1 (PN 16)/ASME B16.5 (150 lb)/JIS 2220 (10K) bolt hole pattern

Level measurement

Continuous level measurement – Radar transmitters

SITRANS LR260

Selection and Ordering data	Order No.
SITRANS LR260 2-wire, 25 GHz pulse radar level transmitter for continuous monitoring of solids to a range of 30 m (98.4 ft).	7ML5427-
Order handheld programmer separately	0 ■ ■ 0 - ■ ■ ■ ■
Process connection Universal flat faced flange fits ANSI/DIN/JIS flanges, Easy Aimer with integral (Easy Aimer ball)	A B C D
2 inch/50 mm	A
3 inch/80 mm	B
4 inch/100 mm	C
6 inch/150 mm	D
Antenna	A B C D E F G H J K L M N P Q
2" Horn antenna, fits 50 mm or 2" nozzles ¹⁾	A
2" Horn antenna with 100 mm extension ¹⁾	B
2" Horn antenna with 200 mm extension ¹⁾	C
2" Horn antenna with 500 mm extension ¹⁾²⁾³⁾	D
2" Horn antenna with 1 000 mm extension ¹⁾²⁾³⁾	E
3" Horn antenna, fits 80 mm or 3" nozzles ⁴⁾	F
3" Horn antenna with 100 mm extension ⁴⁾	G
3" Horn antenna with 200 mm extension ⁴⁾	H
3" Horn antenna with 500 mm extension ²⁾³⁾⁴⁾	J
3" Horn antenna with 1 000 mm extension ²⁾³⁾⁴⁾	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 ²⁾³⁾	P
4" Horn antenna with 1 000 mm extension ²⁾³⁾	Q
Purge (self cleaning) connection	0 1
No purge connection	0
Purge connection	1
Output/communication	0 1
4 ... 20 mA, HART	0
PROFIBUS PA	1
Cable inlet	A B
2 x M20x1.5	A
2 x ½" NPT	B
Note: Polymeric cable glands will be provided with M20 devices.	
Approvals	A B C D E F
General purpose, CSA _{US/C} , 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; INMETRO	C
Non-incendive, CSA/FM Class I, Div. 2, Groups A, B, C, D, Industry Canada, FCC, C-TICK	D
Intrinsically safe, IECEx/ATEX II 1 GD Ex ia IIC T4, Ex tD A20 IP67 T90C, R&TTE, C-TICK	E
Intrinsically safe, CSA/FM Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G, Industry Canada, FCC, C-TICK	F
Pressure rating	0 1
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 0 only
- 4) Maximum measurement range 20 m (65.6 ft)

Selection and Ordering data	Order code
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 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text	Y15
Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000	C11
Inspection Certificate Type 3.1 per EN 10204 ¹⁾	C12
Operating Instructions for HART/mA device	Order No.
English	7ML1998-5KE01
German	7ML1998-5KE11
Note: The Operating Instructions should be ordered as a separate line item on the order.	
Multi-language Quick Start manual	7ML1998-5KE31
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	7ML1998-5KF01
German	7ML1998-5KF31
Note: The Operating Instructions should be ordered as a separate line item on the order.	
Multi-language Quick Start manual	7ML1998-5XJ81
This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	
Accessories	
One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F), HART ²⁾	7ML1930-1AP
One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F), PROFIBUS PA ¹⁾	7ML1930-1AQ
Handheld programmer, Infrared, Intrinsically Safe	7ML1930-1BK
Dust cap, PTFE, for 2 inch/50 mm horn	7ML1930-1DE
Dust cap, PTFE, for 3 inch/75 mm horn	7ML1930-1BL
Dust cap, PTFE, for 4 inch/100 mm horn	7ML1930-1BM
HART modem/RS 232 (for use with a PC and SIMATIC PDM)	7MF4997-1DA
HART modem/USB (for use with a PC and SIMATIC PDM)	7MF4997-1DB
SITRANS RD100 Remote display - see Chapter 7	
SITRANS RD200 Remote display - see Chapter 7	
SITRANS RD500 web, datalogging, alarming, ethernet, and modem support for instrumentation - see Chapter 7	7ML5750- 1AA00-0
1) Available with pressure option 0 only	
2) Product shipped with plastic cable gland, rated to -20 °C. If -40 °C rating required, then metallic cable gland is recommended.	

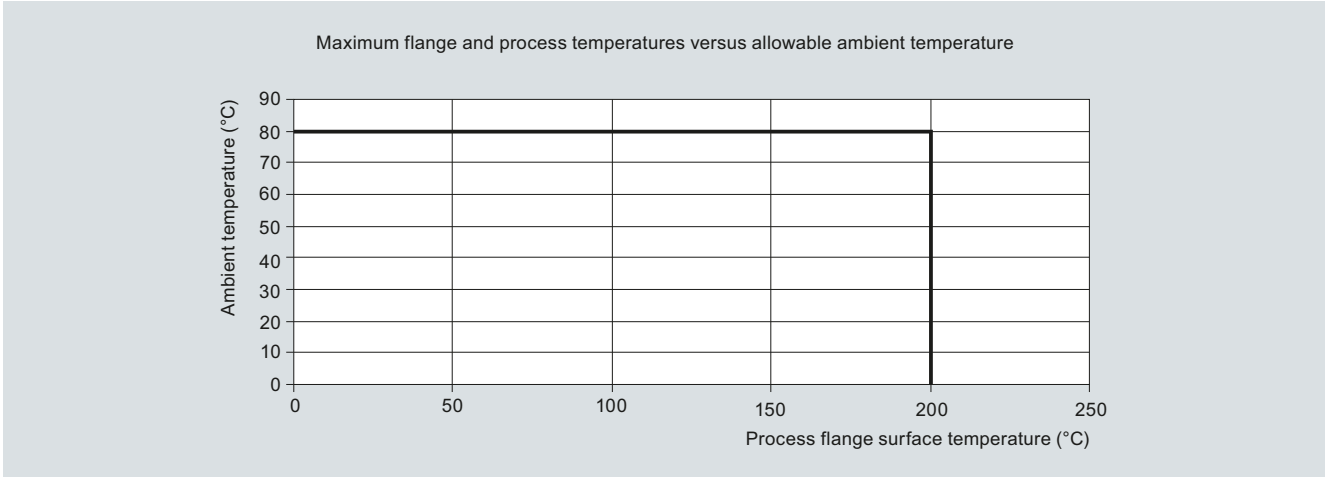
Level measurement

Continuous level measurement – Radar transmitters

SITRANS LR260

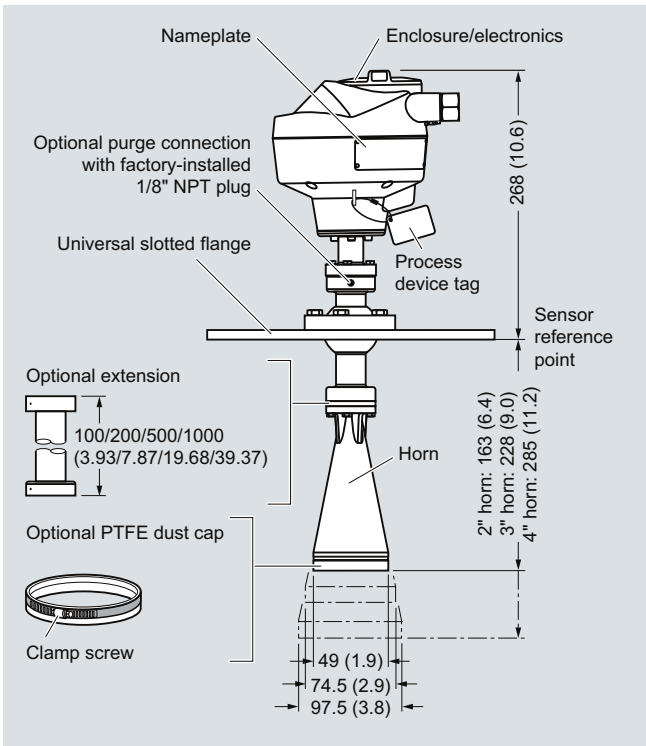
Characteristic curves

4



SITRANS LR260 Ambient/Process Flange Surface Temperature Curve

Dimensional drawings



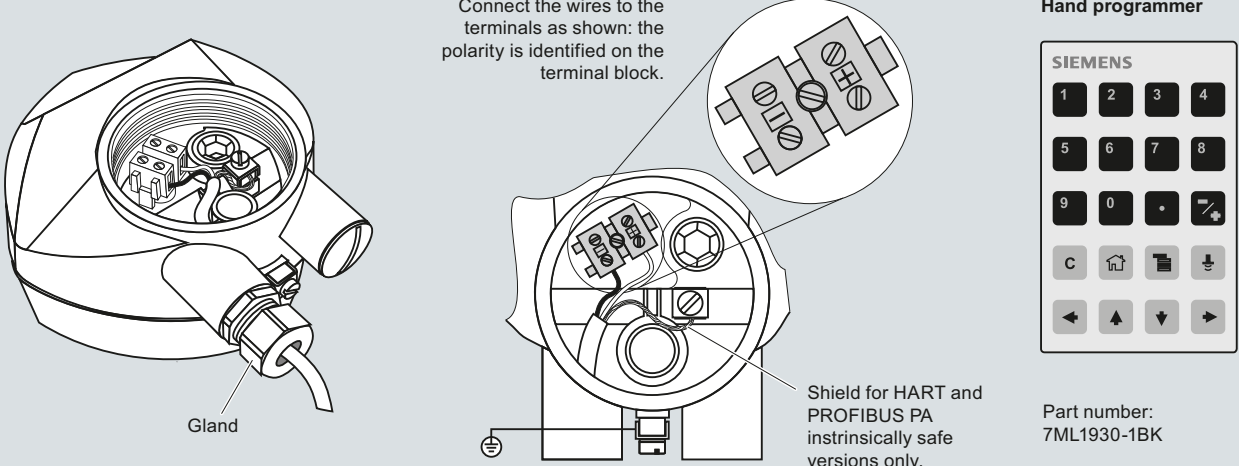
SITRANS LR260, dimensions in mm (inch)

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.

Gland

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 ... 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

4

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.

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 Intrinsically Safe handheld programmer. SIMATIC PDM can be used for easy remote programming using HART or PROFIBUS PA.

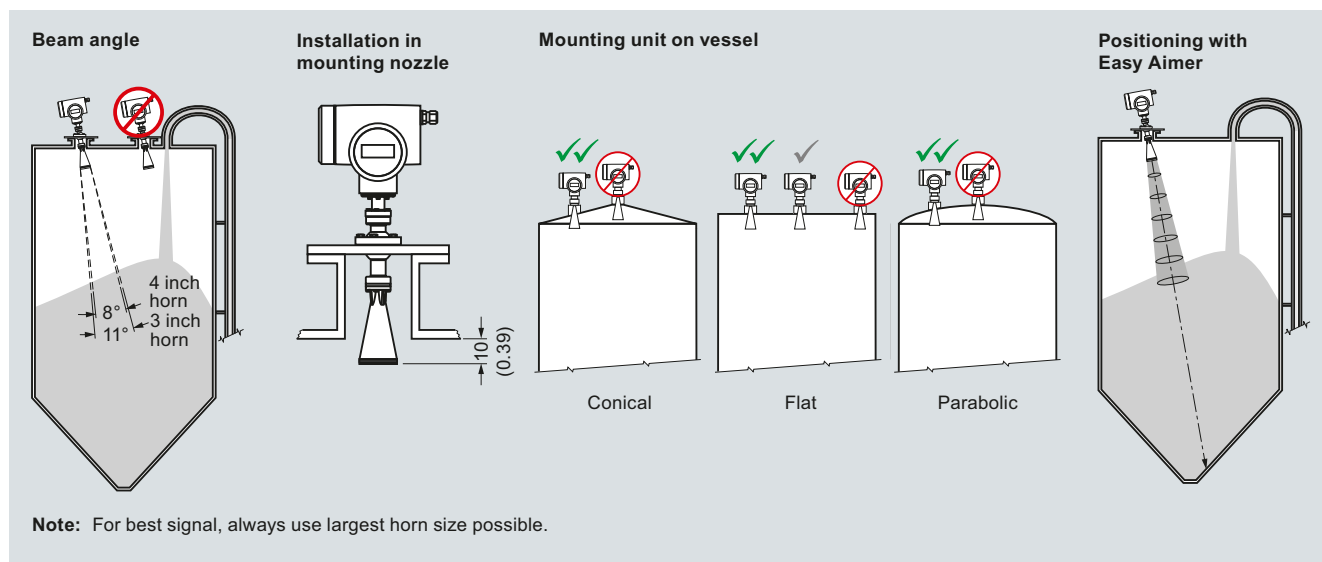
The characteristics of 24 GHz and high signal-to-noise ratio contribute to exceptional signal reflection, regardless of the dielectric value of the medium.

- Key applications: long-range dusty applications, cement powder, fly-ash, coal, flour, grain, plastics

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 Intrinsically Safe handheld programmer or with SIMATIC PDM or HART handheld device

Configuration



SITRANS LR460 installation, dimensions in mm (inch)

Level measurement

Continuous level measurement – Radar transmitters

SITRANS LR460

Technical specifications

Mode of operation		Programming	
Measuring principle	FMCW radar level measurement	Intrinsically Safe Siemens handheld programmer (ordered separately)	Infrared receiver
Frequency	24.2 ... 25.2 GHz FMCW	• Approvals for handheld programmer	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)	Handheld communicator	HART Communicator 375
Output		PC	SIMATIC PDM
Analog output (HART)		Display (local)	Alphanumeric LCD for readout and entry
• Signal range	Optically isolated	Power supply	
• Load	Max. 600 Ω	100 ... 230 V AC ± 15 % (50/60 Hz), 6 W (12 VA)	
• Fail-safe	mA signal programmable as high, low or hold (LOE)	or	
Communication	HART, optional PROFIBUS PA	24 V DC +25/-20 %, 6 W (optional)	
Digital output	Relay, NC or NO function, max. 50 V DC, max. 200 mA, rating 5 W	Certificates and approvals	
PROFIBUS PA protocol	Layer 1 and 2, Class A, Profile 3.01	General	CSA _{US/C} , CE, FM, C-TICK
Performance (Reference conditions according to IEC 60770-1)		Radio	European Radio (R&TTE), Industry Canada, FCC, C-TICK
• Non-linearity	Greater of 25 mm (1 inch) or 0.25 % of span (including hysteresis and non-repeatability), over the full ambient temperature range	Hazardous Areas	CSA/FM Class II, Div. 1, Groups E, F and G, Class III
• Non-repeatability	≤ 10 mm (0.4 inch)		ATEX II 1D, 1/2 D, 2D T85 °C
Rated operating conditions			INMETRO ExtD A20 IP67 T85 °C
• Amb. temperature for enclosure	-40 ... +65 °C (-40 ... +149 °F)	Optional equipment	
• Location	Indoor/outdoor	Dust cap	PTFE
• Installation category	II	Air purge connection	1/8" NPT
• Pollution degree	4		
Medium conditions			
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		
Design			
Weight	Approx. 6.1 kg (13.4 lb) with 3" universal flange		
Materials			
• Enclosure	Die-cast aluminum, painted		
• Degree of protection	IP67/Type 4X/NEMA 4X/Type 6/NEMA 6		
• Cable inlet	2 x M20x1.5 or 1/2" NPT		
Process connections			
• Universal flanges, 304 stainless steel, flat faced, with integral Easy Aimer	3 inch/80 mm, 4 inch/100 mm, 6 inch/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

SITRANS LR460

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.

Order handheld programmer separately

Process connection

Universal, flat faced, 0.5 bar g (7.25 psi g) maximum with integral Easy Aimer ball
 3 inch(80 mm)
 4 inch(100 mm)
 6 inch(150 mm)

Antenna

3" horn antenna, fits 80 mm (3 inch) nozzles
 3" horn antenna, fits 80 mm (3 inch) nozzles with 100 mm extension
 3" horn antenna, fits 80 mm (3 inch) nozzles with 200 mm extension
 3" horn antenna, fits 80 mm (3 inch) nozzles with 500 mm extension¹⁾
 3" horn antenna, fits 80 mm (3 inch) nozzles with 1 000 mm extension¹⁾
 4" horn antenna, fits 100 mm (4 inch) nozzles
 4" horn antenna, fits 100 mm (4 inch) nozzles with 100 mm extension
 4" horn antenna, fits 100 mm (4 inch) nozzles with 200 mm extension
 4" horn antenna, fits 100 mm (4 inch) nozzles with 500 mm extension¹⁾
 4" horn antenna, fits 100 mm (4 inch) nozzles with 1 000 mm extension¹⁾

Purge (self-cleaning) connection

No purge connection
 Purge connection

Output/Communication

4 ... 20 mA, HART
 PROFIBUS PA

Power supply/cable inlet

100 ... 230 V AC
 • 2 x M20x1.5
 • 2 x ½" NPT
 24 V DC
 • 2 x M20x1.5
 • 2 x ½" NPT

Approvals

General Purpose, CSA_{US/IC}, 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

¹⁾ Available with Purge option 0 only

Order No.

7ML5426-

0 0 0 - 0 0

A B C

A
B
C

A
B
C

D
E
F
G
H
J
K

0
1

0
1

A
B
C
D

A
B
C

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 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text

Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000

Operating Instructions

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.

Accessories

Handheld programmer, Infra-red, Intrinsically Safe, EEx ia

Dust cap, PTFE, for 3 inch/80 mm horn

Dust cap, PTFE, for 4 inch/100 mm horn

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), HART¹⁾

One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F), PROFIBUS PA¹⁾

SITRANS RD100 Remote display - see Chapter 7

SITRANS RD200 Remote display - see Chapter 7

SITRANS RD500 web, datalogging, alarming, ethernet, and modem support for instrumentation - see Chapter 7

¹⁾ Product shipped with plastic cable gland, rated to -20 °C. If -40 °C rating required, then metallic cable gland is recommended.

Order code

Y15

C11

Order No.

7ML1998-5JM02

7ML1998-5JM11

7ML1998-5JM32

7ML1998-5QW82

7ML5830-2AJ

7ML1930-1BL

7ML1930-1BM

7MF4997-1DA

7MF4997-1DB

7ML1930-1AP

7ML1930-1AQ

7ML5750-1AA00-0

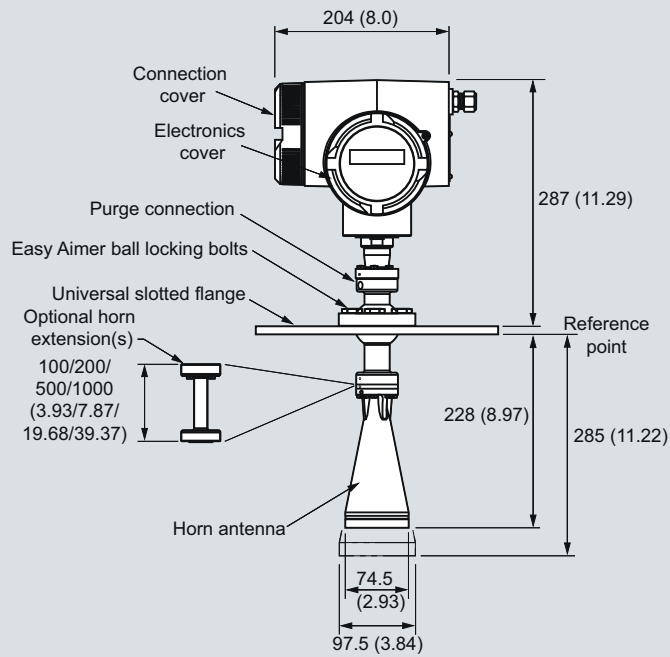
Level measurement

Continuous level measurement – Radar transmitters

SITRANS LR460

Dimensional drawings

SITRANS LR460 (7ML5426)



SITRANS LR460, dimensions in mm (inch)

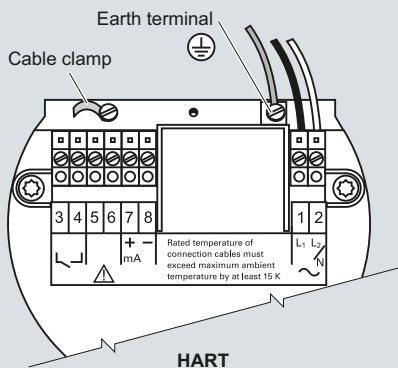
Level measurement

Continuous level measurement – Radar transmitters

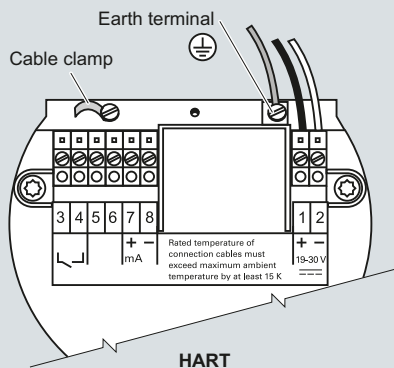
SITRANS LR460

Schematics

AC version



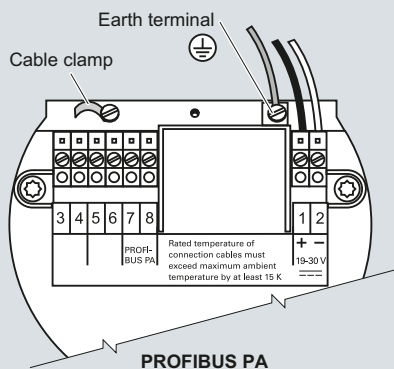
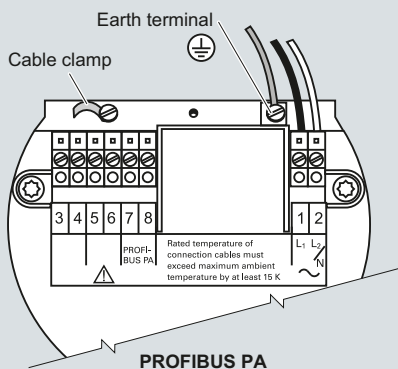
DC version



Hand programmer



SITRANS LR460
Part number:
7ML5830-2AJ



Notes


- Recommended torque on terminal clamping screws, 0.5 ... 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

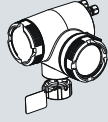
SITRANS LR460 connections

Level measurement

Continuous level measurement – Radar transmitters

SITRANS LR260/LR460 Specials

SITRANS LR260/LR460 Specials	Order No.
Process connection part kits - non-pressure-rated	
LR260/LR460, 100 mm extension for horn antenna, no purge ¹⁾	A5E01087872
LR260/LR460, 200 mm extension for horn antenna, no purge ¹⁾	A5E01091262
LR260/LR460, 100 mm extension for horn antenna with purge ¹⁾	A5E01261979
LR260/LR460, 200 mm extension for horn antenna with purge ¹⁾	A5E01261981
LR260/LR460, horn 2", no purge, no emitter ¹⁾	A5E02083905
LR260/LR460, horn 3", no purge, no emitter ¹⁾	A5E01623511
LR260/LR460, horn 4", no purge, no emitter ¹⁾	A5E01623512
LR260/LR460, horn 2", with purge, no emitter ¹⁾	A5E02083906
LR260/LR460, horn 3", with purge, no emitter ¹⁾	A5E01623513
LR260/LR460, horn 4", with purge, no emitter ¹⁾	A5E01623514
LR260/LR460, 3" universal flat faced flange ¹⁾	A5E02303897
LR260/LR460, 4" universal flat faced flange ¹⁾	A5E01259467
LR260/LR460, 6" universal flat faced flange ¹⁾	A5E01261834
LR260/LR460 O-Rings for Easy Aimer ¹⁾	A5E01261836
Kit, Emitter for LR260/LR460 ¹⁾	A5E02360694
LR260 lid with O-ring	A5E02465410
Purge conversion kit – non-pressure-rated (no flange or extension included)	
LR260/LR460 purge conversion, 2" horn ¹⁾	A5E02083914
LR260/LR460 purge conversion, 3" horn ¹⁾	A5E02083915
LR260/LR460 purge conversion, 4" horn ¹⁾	A5E02083916
Enclosure with electronics	
	
LR260 enclosure with board stack, HART communication, M20 cable inlet, approval option A, no process connection	A5E02203605
LR260 enclosure with board stack, PROFIBUS PA communication, M20 cable inlet, approval option A, no process connection	A5E02213423
LR260 enclosure with board stack, HART communication, NPT cable inlet, approval option A, no process connection	A5E02165924
LR260 enclosure with board stack, PROFIBUS PA communication, NPT cable inlet, approval option A, no process connection	A5E02213428
Sitrans LR260 enclosure with board stack, HART communication, NPT cable inlet, approval option D, no process connection	A5E03934184
Sitrans LR260 enclosure with board stack, HART communication, M20 cable inlet, approval option E, no process connection	A5E03934187
Sitrans LR260 enclosure with board stack, HART communication, M20 cable inlet, approval option F, no process connection	A5E03934191

SITRANS LR260/LR460 Specials	Order No.
Enclosure with electronics (LR460)	
	
LR460 enclosure with board stack, HART communication, AC power, M20 cable inlet, approval option A, no process connection	A5E02182085
LR460 enclosure with board stack, PROFIBUS PA communication, AC power, M20 cable inlet, approval option A, no process connection	A5E02212422
LR460 enclosure with board stack, HART communication, AC power, NPT cable inlet, approval option A, no process connection	A5E02212423
LR460 enclosure with board stack, PROFIBUS PA communication, AC power, NPT cable inlet, approval option A, no process connection	A5E02212424
LR460 enclosure with board stack, HART communication, DC power, M20 cable inlet, approval option A, no process connection	A5E02212425
LR460 enclosure with board stack, PROFIBUS PA communication, DC power, M20 cable inlet, approval option A, no process connection	A5E02212426
LR460 enclosure with board stack, HART communication, DC power, NPT cable inlet, approval option A, no process connection	A5E02212428
LR460 enclosure with board stack, PROFIBUS PA communication, DC power, NPT cable inlet, approval option A, no process connection	A5E02212429

¹⁾ Available with no pressure rating, 0.5 bar g maximum.
Please contact ceg.smpi@siemens.com for special requests.

Level measurement

Continuous level measurement – Radar transmitters

SITRANS LR560

Overview



SITRANS LR560 2-wire, 78 GHz FMCW radar level transmitter for continuous monitoring of solids in silos to a range of 100 m (329 ft).

Benefits

- Rugged stainless steel design for industrial applications
- 78 GHz high frequency provides very narrow beam, virtually no mounting nozzle noise, and optimal reflection from sloped solids
- Aimer option to direct beam to area of interest, such as draw point of cone
- Lens antenna is highly resistant to product build up
- Air purge connection is included for self-cleaning of extremely sticky solids
- Local display interface (LDI) allows local programming and diagnostics

Application

SITRANS LR560's plug and play performance is ideal for most solids applications, including those with extreme dust and high temperatures to 200 °C (392 °F). Unique design allows safe and simple programming using the Intrinsically Safe handheld programmer without having to open the instrument's lid. SITRANS LR560 includes an optional graphical local display interface (LDI) that improves setup and operation using an intuitive Quick Start Wizard, and echo profile display for diagnostic support. Startup is easy using the Quick Start wizard with a few parameters required for basic operation. SITRANS LR560 measures practically any solids material to a range of 100 m (328 ft).

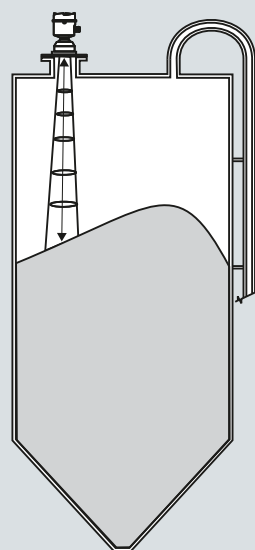
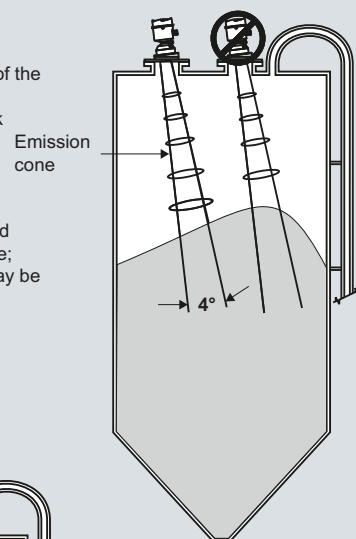
- Key Applications: cement powder, plastic powder/pellets, grain, coal, wood powder, fly ash

Configuration

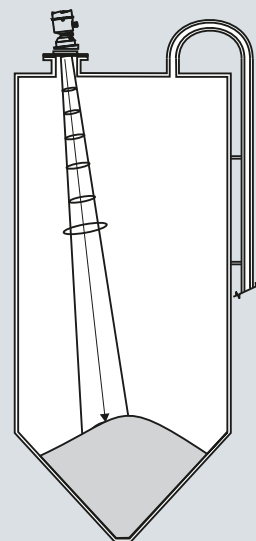
Installation

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 antenna
- There is signal transmitted outside of the beam angle; therefore false targets may be detected



Aiming is rarely required for signal optimization with 78 GHz frequency.



SITRANS LR560 installation, dimensions in mm (inch)

Level measurement

Continuous level measurement – Radar transmitters

SITRANS LR560

Technical specifications

Mode of operation	
Measuring principle	Radar level measurement
Frequency	78 GHz FMCW
Minimum detectable distance	400 mm (15.75 inch) from sensor reference point
Maximum measuring range ¹⁾	<ul style="list-style-type: none"> • 40 m (131 ft) version • 100 m (328 ft) version
Output	
<ul style="list-style-type: none"> • Analog output • Communications 	4 ... 20 mA <ul style="list-style-type: none"> • HART • Optional: PROFIBUS PA • Optional: Foundation Fieldbus
<ul style="list-style-type: none"> • Fail-safe 	<ul style="list-style-type: none"> • Programmable as high, low or hold (Loss of Echo) • NE43 programmable
Performance (according to reference conditions IEC60770-1)	
<ul style="list-style-type: none"> • Maximum measured error (including hysteresis and non-repeatability) 	<ul style="list-style-type: none"> • Greater of 25 mm (1 inch) or 0.25 % of range from minimum detectable distance to full range
Rated operating conditions (according to reference conditions IEC60770-1)	
Installation conditions	Indoor/outdoor
<ul style="list-style-type: none"> • Location 	
Ambient conditions (enclosure)	
<ul style="list-style-type: none"> • ambient temperature • installation category • pollution degree 	-40 ... +80 °C (-40 ... +176 °F) I 4
Medium conditions	
<ul style="list-style-type: none"> • Dielectric constant ϵ_r 	> 1.6
Process temperature and pressure	See chart below
Design	
Enclosure	
<ul style="list-style-type: none"> • Construction • Conduit entry • Lens material 	316L/1.4404 stainless steel M20x1.5, or ½" NPT via adapter <ul style="list-style-type: none"> • 40 m version: PEI • 100 m version: PEEK
<ul style="list-style-type: none"> • Degree of protection 	Type 4X/NEMA 4X, Type 6/NEMA 6, IP68 with lid closed
<ul style="list-style-type: none"> • Weight 	3.15 kg (6.94 lb) including 3" flange
<ul style="list-style-type: none"> • Optional local display interface 	Graphic LCD, with bar graph representing level
Process connections	
Universal flat-faced flanges ²⁾	<ul style="list-style-type: none"> • 3, 4, 6 inch/80, 100, 150 mm, 304 stainless steel • 3, 4, 6 inch/80, 100, 150 mm, 316L/1.4404 or 316L/1.4435 stainless steel
Aimer flanges ²⁾	3, 4, 6 inch/80, 100, 150 mm, polyurethane powder-coated cast aluminum

Power supply	
4 ... 20 mA/HART	Nominal 24 V DC (max. 30 V DC) with max. 550 Ω
PROFIBUS PA/Foundation Fieldbus	13.5 mA 9 ... 32 V DC, per IEC 61158-2
Certificates and approvals	
General	CSA _{US/C} , CE, FM
Radio	Europe (R&TTE), FCC, Industry Canada, C-TICK
Hazardous	
<ul style="list-style-type: none"> • Europe/International 	IECEx SIR 09.0149X ATEX II 1D, 1/2D, 2D Ex ta IIIC T139 °C Da IP68 ATEX II 3G Ex nA II T4 Gc Ex nL IIC T4 Gc
<ul style="list-style-type: none"> • US/Canada 	FM/CSA Class II, Div. 1, Groups E, F, G Class III T4 FM/CSA Class I, Div. 2, Groups A, B, C, D, T4
<ul style="list-style-type: none"> • China 	NEPSI Ex nA II T4 Ex nL IIC T4 DIP A20 TA, T139 °C, IP68
<ul style="list-style-type: none"> • Brazil 	INMETRO BR-Ex nA/nL II T4 IP68
Programming	
Intrinsically Safe Siemens handheld programmer	Infrared receiver
<ul style="list-style-type: none"> • 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 = 50 °C
Handheld communicator	HART communicator 375/475
PC	SIMATIC PDM, AMS, PACTware
Display (local)	Graphic local user interface including quick start wizard and echo profile displays
¹⁾ From sensor reference point ²⁾ Universal flange mates with EN 1092-1 (PN16)/ASME B16.5 (150 lb)/JIS 2220 (10K) bolt hole pattern.	

Process temperature and pressure

Version	Stainless steel	Aimer flange: -1 to 0.5 bar	Aimer flange: -1 to 3.0 bar
40 m	-40 ... +100 °C (-40 ... +212 °F)	-40 ... +100 °C (-40 ... +212 °F)	-40 ... +100 °C (-40 ... +212 °F)
100 m	-40 ... +200 °C (-40 ... +392 °F)	-40 ... +200 °C (-40 ... +392 °F)	-40 ... +120 °C (-40 ... +248 °F)

Level measurement

Continuous level measurement – Radar transmitters

SITRANS LR560

Selection and Ordering data

SITRANS LR560

2-wire, 78 GHz FMCW radar level transmitter for continuous monitoring of solids in silos to a range of 100 m (329 ft).

Order handheld programmer separately

Measurement and process temperature range

40 m (131 ft) max range, -40 ... +100 °C
100 m (329 ft) max range, -40 ... +200 °C

Process connection

Universal flat-faced flange fits ANSI/DIN/JIS flanges

3 inch/80 mm, 304 stainless steel
4 inch/100 mm, 304 stainless steel
6 inch/150 mm, 304 stainless steel

3 inch/80 mm, 316L stainless steel
4 inch/100 mm, 316L stainless steel
6 inch/150 mm, 316L stainless steel

3 inch/80 mm, painted aluminum, with integral aimer¹⁾

4 inch/100 mm, painted aluminum, with integral aimer¹⁾

6 inch/150 mm, painted aluminum, with integral aimer¹⁾

Enclosure (with cable inlet)

Stainless Steel, 1 X ½" NPT
Stainless Steel, 1 X M20 x 1.5
(plastic gland included)

Pressure rating

0.5 bar g (7.5 psi g) maximum
3 bar g (40 psi g) maximum

Output/communication

4 ... 20 mA, HART
PROFIBUS PA
Foundation Fieldbus

Approvals

General Purpose, CSA_{US/C}, Industry Canada, FCC, CE, R&TTE, C-TICK
CSA/FM Class I, Div. 2, Gr. A,B,C,D, Class II, Div. 1, Gr. E,F,G, Class III

ATEX II 1 D, ½ D, 2 D, 3G Ex nA/nL, CE, R&TTE, C-TICK

Local display interface

Without LDI (local display interface)
With LDI (local display interface)

Order No.

7ML5440-

0 0 -

0 1

A

B

C

D

E

F

G

H

J

A

B

0

1

A

B

C

A

B

C

1

2

Selection and Ordering data

Further designs

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

Plug M12 with mating connector¹⁾²⁾³⁾

Plug 7/8" with mating connector¹⁾³⁾⁴⁾

Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]:
Measuring-point number/identification
(max. 27 characters); specify in plain text

Manufacturer's test certificate: M to DIN 55350,
Part 18 and to ISO 9000

Inspection Certificate Type 3.1 per EN 10204⁴⁾

NAMUR NE43 compliant, device preset to failsafe
< 3.6 mA⁵⁾

Operating Instructions for HART device

English

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.

Operating Instructions for PROFIBUS PA device

English

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.

Operating Instructions for Foundation Fieldbus device

English

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.

Accessories

Hand Programmer, Intrinsically safe

Local display interface

Sun Shield Cover

Housing lid with window

One metallic cable gland M20x1.5,
rated -40 ... +80 °C (-40 ... +176 °F), HART⁶⁾

One metallic cable gland M20x1.5, rated
-40 ... +80 °C (-40 ... +176 °F), PROFIBUS PA⁶⁾

SITRANS RD100 Remote display - see Chapter 7

SITRANS RD200 Remote display - see Chapter 7

SITRANS RD500 web, datalogging, alarming,
ethernet, and modem support for instrumentation -
see Chapter 7

Order code

A50

A55

Y15

C11

C12

N07

Order No.

7ML1998-5KB02

7ML1998-5KB31

7ML1998-5XF81

7ML1998-5LT02

7ML1998-5LT31

7ML1998-5XQ81

7ML1998-5LY02

7ML1998-5LY31

7ML1998-5XR81

7ML1930-1BK

7ML1930-1FJ

7ML1930-1FK

7ML1930-1FL

7ML1930-1AP

7ML1930-1AQ

7ML5750-
1AA00-0

¹⁾ Rated to 120 °C max. when used with Pressure rating option 1

¹⁾ Available with Approval option A only

²⁾ Available with Enclosure option B only

³⁾ Available with Output/communication options B and C only

⁴⁾ Available with Pressure rating option 1 only

⁵⁾ Available with Output/communication option A only

⁶⁾ Product shipped with plastic cable gland, rated to -20 °C.

If -40 °C rating required, then metallic cable gland is recommended.

Options

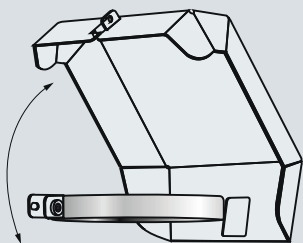
Handheld programmer

Part number:
7ML1930-1BK



Sun shield cover

Part number:
7ML1930-1FK



SITRANS LR560 handheld programmer and sun shield cover

Level measurement

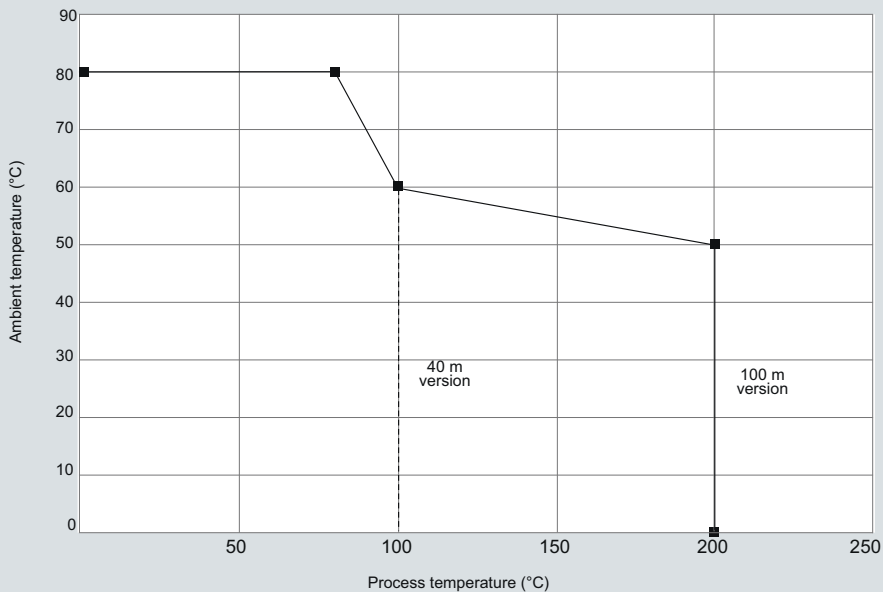
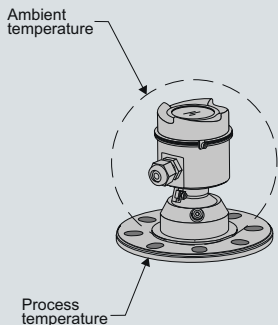
Continuous level measurement – Radar transmitters

SITRANS LR560

Characteristic curves

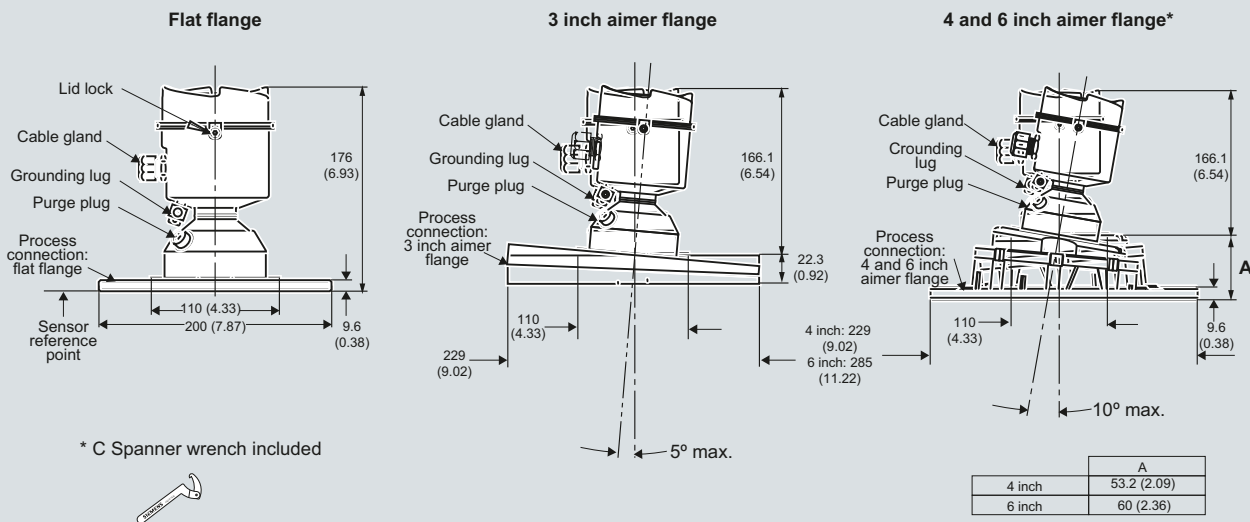
4

Temperature derating curve



SITRANS LR560 temperature derating curve

Dimensional drawings



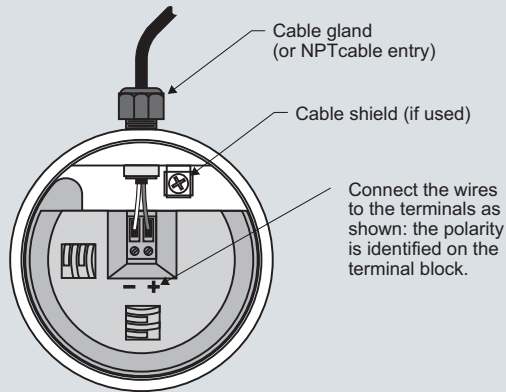
SITRANS LR560, dimensions in mm (inch)

Level measurement

Continuous level measurement – Radar transmitters

SITRANS LR560 Specials

Schematics



Notes:

1. Depending on the approval rating, glands and plugs may be supplied with your instrument.
2. 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.
3. All field wiring must have insulation suitable for rated input voltages.
4. Use shielded twisted pair cable (14 to 22 AWG) for HART version.
5. Separate cables and conduit may be required to conform to standard instrumentation wiring practices or electrical codes.

SITRANS LR560 connections

SITRANS LR560 Specials

Order No.

LR560 Electronics Modules

LR560 Electronics Module, HART, 100 m range, compatible with 7ML54401XX00XAXX, no enclosure or process connection included.

7ML1830-3AC

LR560 Electronics Module, PROFIBUS PA, 100 m range, compatible with 7ML54401XX00XBXX, no enclosure or process connection included.

7ML1830-3AH

LR560 Electronics Module, Foundation Fieldbus, 100 m range, compatible with 7ML54401XX00XCXX, no enclosure or process connection included.

7ML1830-3AJ

LR560 Electronics Module, HART, 40 m range, compatible with 7ML54400XX00XAXX, no enclosure or process connection included.

7ML1830-3AK

LR560 Electronics Module, PROFIBUS PA, 40 m range, compatible with 7ML54400XX00XBXX, no enclosure or process connection included.

7ML1830-3AL

LR560 Electronics Module, Foundation Fieldbus, 40 m range, compatible with 7ML54400XX00XCXX, no enclosure or process connection included.

7ML1830-3AM

LR560 Miscellaneous Spare Kits

Kit, Lid Gasket, EPDM, LR560

7ML1830-3AA

Kit, Wrench for 4" and 6" Aimers, LR560

7ML1830-3AB

Kit, O-rings for 3" Aimer, LR560

7ML1830-3AD

Kit, O-rings for 4" Aimer, LR560

7ML1830-3AE

Kit, O-rings for 6" Aimer, LR560

7ML1830-3AF

Kit, Lid Screw and Purge Plug set with Hex Keys, LR560

7ML1830-3AG

Kit, Lid, No Window, LR560

7ML1830-3AP

Please contact ceg.smpi@siemens.com for special requests.

Level measurement

Continuous level measurement – Guided wave radar transmitters

Overview

Introduction

Guided Wave Radar transmitters combine TDR (time domain reflectometry), ETS (equivalent time sampling) and modern low power circuitry.

Time Domain Reflectometry (TDR)

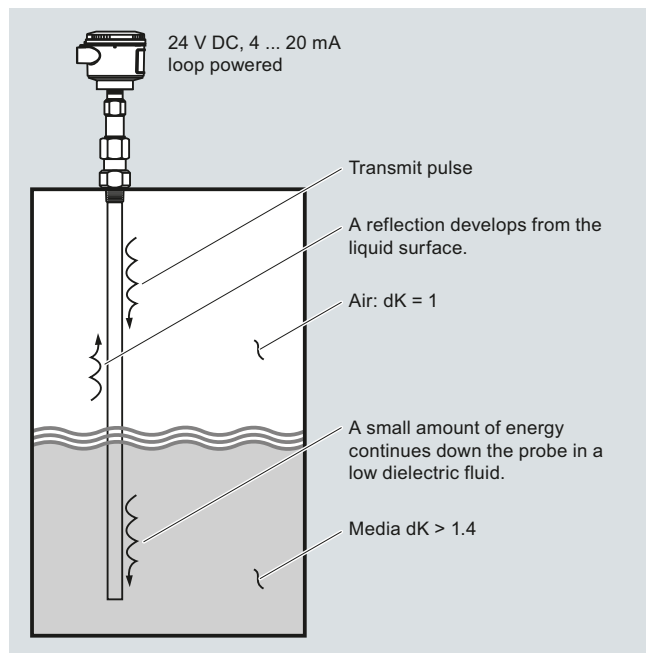
TDR uses pulses of electromagnetic (EM) energy to measure distances or levels. When a pulse reaches a dielectric discontinuity (created by media surface), part of the energy is reflected. The greater the dielectric difference, the greater the amplitude (strength) of the reflection.

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)

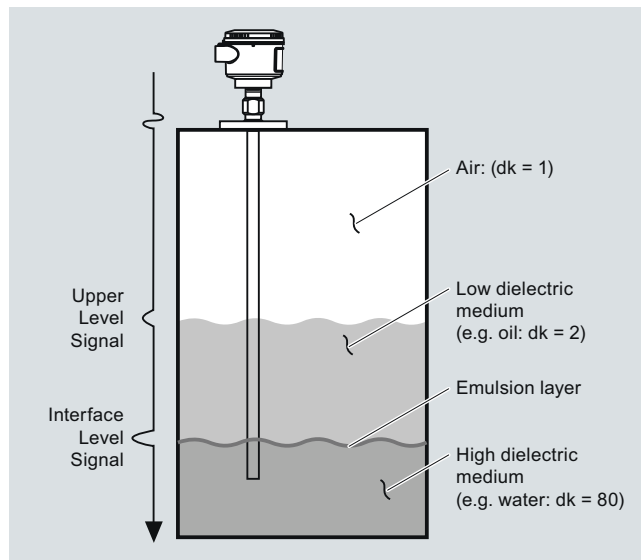
ETS (Equivalent Time Sampling) is used to measure the high speed, low power EM energy. ETS is critical in the application of TDR to vessel level measurement technology. The high speed EM energy (1 000 ft/ μ s) is difficult to measure over short distances and at the resolution required in the process 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 transmitters

4

Application

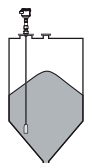
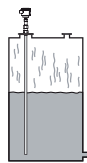
SIEMENS

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

<input type="checkbox"/> Solids 	<input type="checkbox"/> Liquids 	<input type="checkbox"/> Sketch attached
<p>Tank top:</p> <input type="checkbox"/> Open <input type="checkbox"/> Flat <input type="checkbox"/> Conical <input type="checkbox"/> Parabolic	<p>Tank bottom:</p> <input type="checkbox"/> Sloped <input type="checkbox"/> Flat <input type="checkbox"/> Conical <input type="checkbox"/> Parabolic	<p>Mounting location:</p> <input type="checkbox"/> Top mount <input type="checkbox"/> Thread mount <input type="checkbox"/> Flange mount <input type="checkbox"/> Bypass/Sidepipe mount <input type="checkbox"/> Pipe mount <input type="checkbox"/> Displacer replacement <small>(please supply drawings)</small>

Tank dimensions:

Height: _____ m/ft
 Diameter: _____ m/ft
 Nozzle Length: _____ cm/inch
 Nozzle Diameter: _____ cm/inch
 Process connection type: _____
 Process connection size: _____
 Distance to sidewall: _____ cm/inch

Pressure:

Normal: _____
 Maximum (relief): _____

Material

Material being measured: _____ Liquid Solid Slurry

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/m³
Kinematic Viscosity (cSt) = Dynamic Viscosity (cP) / Density (kg/m³)

<input type="checkbox"/> 1 ... 5 cSt (like water)	<input type="checkbox"/> 50 ... 100 cSt (like honey)
<input type="checkbox"/> 5 ... 20 cSt (like machine oil)	<input type="checkbox"/> 100 ... 500 cSt (like syrup/molasses)
<input type="checkbox"/> 20 ... 50 cSt (like cooking oil)	<input type="checkbox"/> >500 cSt (like tar)

Particle size:

Fine dust/powder, <0.5 cm (0.2 inch)
 Grains (rice, corn), <2 cm (0.8 inch)
 Small stones/gravel, <2 cm (0.8 inch)
 Small rocks/chunks, >2 cm (0.8 inch)
 Large particles, <9 cm (3.5 inch)

Foam type:

None Wet
 Dry Wet/dense

Installation (indicate all that apply)

Power available: _____ **Communications:** HART/4 ... 20 mA **Outputs required:** 4 ... 20 mA
 Other (please specify) _____

Products recommended:

Level measurement

Continuous level measurement – Guided wave radar transmitters

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 top:	Tank bottom:	Mounting location:	Tank dimensions:
<input type="checkbox"/> Open	<input type="checkbox"/> Sloped	<input type="checkbox"/> Top mount	Height: _____ m/ft
<input type="checkbox"/> Flat	<input type="checkbox"/> Flat	<input type="checkbox"/> Thread mount	Diameter: _____ m/ft
<input type="checkbox"/> Conical	<input type="checkbox"/> Conical	<input type="checkbox"/> Flange mount	Nozzle Length: _____ cm/inch
<input type="checkbox"/> Parabolic	<input type="checkbox"/> Parabolic	<input type="checkbox"/> Bypass/Sidepipe Mount	Nozzle Diameter: _____ cm/inch
		<input type="checkbox"/> Pipe mount	Process connection type: _____
Pressure:		<input type="checkbox"/> Displacer replacement (please supply drawings)	Process connection size: _____
Normal: _____			Distance to sidewall: _____ cm/inch
Maximum (relief): _____			

Interface Data

Upper material: _____ Lower material: _____ Emulsion layer: Yes
 Upper material thickness: _____ cm/inch Lower material thickness: _____ cm/inch No (preferred)
 Upper material dielectric: _____ Lower material dielectric: _____ Emulsion thickness: _____ cm/inch

Material

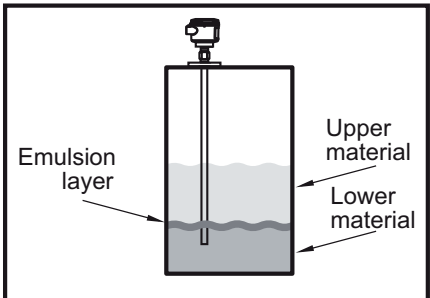
Material being measured: _____ Liquid Slurry

Material temperature: Norm: _____ °C/°F Max: _____ °C/°F

Coating buildup: Yes No Turbulence: Yes No

Maximum Viscosity: _____ Density: _____ kg/m³
 Kinematic Viscosity (cSt) = Dynamic Viscosity (cP) / Density (kg/m³)

1 ... 5 cSt (like water) 50 ... 100 cSt (like honey)
 5 ... 20 cSt (like machine oil) 100 ... 500 cSt (like syrup/molasses)
 20 ... 50 cSt (like cooking oil) >500 cSt (like tar)



Installation

Power available: _____ Outputs required: 4 ...20 mA
 Communications: HART/ 4 ... 20 mA Other (please specify) _____

Products recommended: _____

Level measurement

Continuous level measurement – Guided wave radar transmitters

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 inch) 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 (6 250 psi g) and temperatures as high as 427 °C (800 °F).
- Suitable for use in SIL-1 and SIL-2 Loops

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.
Applications on ammonia are also possible with the HT/HP coaxial probe design which incorporates a glass seal that is not susceptible to the vapors seen in this application.

4

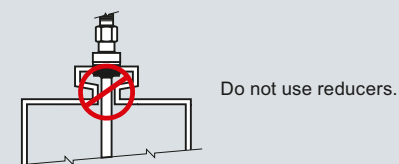
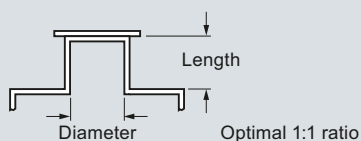
Level measurement

Continuous level measurement – Guided wave radar transmitters

SITRANS LG200

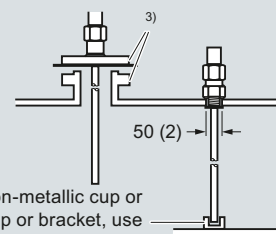
Configuration

Mounting on a nozzle



Single rod mounting

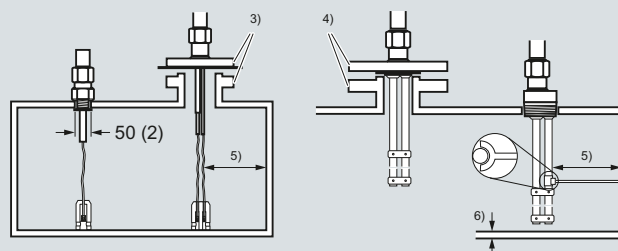
1. Do not mount in nozzles <math>< 50 (2)</math> in diameter.
2. Mount in applications where ratio of diameter to length is 1:1 or greater. Any ratio less than 1:1 (i.e. 2 inch x 6 inch nozzle = 1:3) may require a blanking distance and/or dielectric adjustment.
3. Do not use pipe reducers.
4. Keep conductive 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).

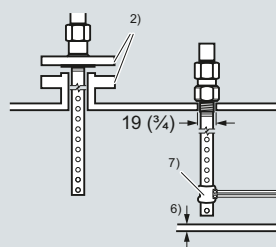
Twin rod mounting 7ML1302-x

1. Active rod must be mounted at least 25 (1) away from any obstructions.
2. Minimum stillwell or nozzle diameter for probe is 76 (3), inactive part needs to be flush with inside tank wall.



Coaxial 7ML1301-x/coaxial-interface 7ML1301-6

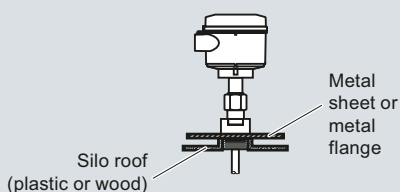
1. Minimum 25 (1) from tank bottom
2. Minimum 2 inch process connection for enlarged coaxial probe
3. Distance to obstructions not important due to enclosed design



Installation in non-metallic silos¹⁾

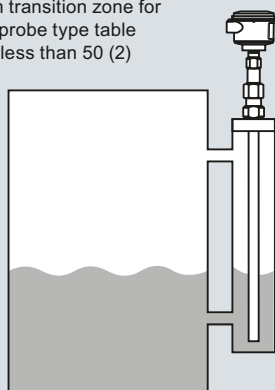
For installation in vessels of a non-metallic construction or possibly open vessels, a suitable launch plate is required to optimize the impedance of the transmitted signal as it travels along the probe. Optimal performance cannot be guaranteed if a suitable transition is not available at the process 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.



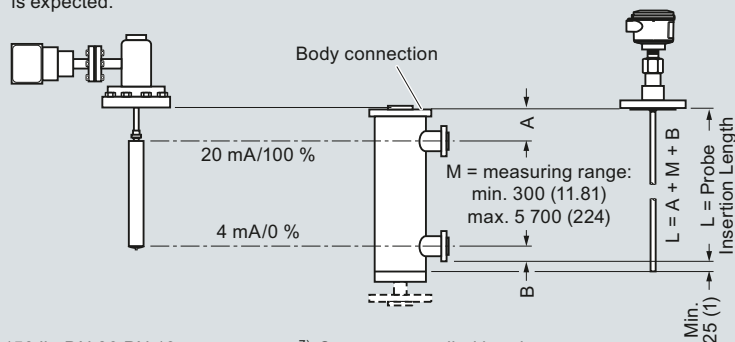
Bypass pipe

1. Minimum pipe diameter 50 (2)
2. Minimum 25 (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 (2) consult factory



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 inch/DN 50, twin rod 3 inch/DN 80, single rod 2 inch/DN 50
3. 22 (0.875) Coaxial probes should be used where limited build up is expected.



¹⁾ See electromagnetic compatibility
²⁾ Min. 1 inch - 150 lb, DN 25 PN 16
³⁾ Min. 2 inch - 150 lb, DN 25 PN 16

⁴⁾ Min. 3 inch - 150 lb, DN 80 PN 16
⁵⁾ Min. 25 (1) from any metal object
⁶⁾ Min. 25 (1) from tank bottom

⁷⁾ Customer supplied brackets
 Recommended:
 1 bracket per 3 m length

SITRANS LG200 installation, dimensions in mm (inch)

Level measurement

Continuous level measurement – Guided wave radar transmitters

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	3.8 ... 20.5 mA usable
• Analog	4.0 mA
• Start-up current	
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 inch) Coaxial Probe with water at 20 °C (70F) and CFD Threshold
Non-linearity	< 0.1% of probe length or 2.5 mm (0.1 inch), whichever is greater
• Coaxial/twin rod probes	[(top 60 cm (24 inch) of twin rod probes 30 mm (1.2 inch))]
• Single rod probes	< 0.3 % or 0.3 inch (8 mm), whichever is greater
• Interface models	Upper layer: ± 25.4 mm (1 inch) Interface layer: ± 25.4 mm (1 inch) (distinct interface surface required)
Resolution and repeatability	≤ 2.5 mm (0.1 inch)
Accuracy	< 0.1 % of probe length or 0.1 inch (2.5 mm), whichever is greater [Top 60 cm (24 inch) of twin rod probes 30 mm (1.2 inch)]
• Coaxial/twin rod probes	± 0.5 % of probe length or 0.5 inch (13 mm), whichever is greater
• Single rod probes	± 1 inch (25 mm) (distinct Interface required)
• Interface models	
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 conditions¹⁾

• 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 conditions¹⁾

Dielectric constant	dK ≥ 1.4
Process temperature range ²⁾	-196 ... +427 °C (-321 ... +800 °F)
Vessel pressure ³⁾	Full vacuum to 431 bar g (6 250 psi g), probe dependent

Design

Weight of transmitter with solid lid	1.28 kg (2.83 lb)
Weight of transmitter with glass window lid	1.60 kg (3.52 lb)
Materials	Aluminum, epoxy-coated
• Enclosure	Type 4/NEMA 4, IP65
• Degree of protection	2x M20x1.5 or 2 x ½" NPT
• Cable inlet	
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	
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Certificates and approvals

General Purpose	CSA/FM, CE, C-TICK FM Class I, Div. 1, Groups A, B, C, D, Class II, Div. 1, Groups E, F, G T4, Class III, Type 4, IP65
Intrinsically Safe	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 IECEX Ex ia IIC Ga IECEX DEK 11.00067X
Intrinsically Safe (International)	FM Class I, Div. 1, Groups B, C, D, Class II, Div. 1, Groups E, F, G T4, Class III, Type 4, IP65
Explosion Proof/Flame Proof	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
Non-Incendive	ATEX II 1/2 D IP65 T85 °C FM Class I, Div. 2, Groups A, B, C, D, Class II, Div. 2, Groups F, G T4, Class III, Type 4, IP65
Non-Sparking	CSA Class I, Div. 2, Groups A, B, C, D, Class II, Div. 2, Groups E, F, G T4, Class III, Type 4, IP65 ATEX II 3G EEx nA (nL) IIC T4 to T6
Others	ATEX II 3G EEx nA II T4 to T6 • Functional Safety to SIL-1 in accordance with IEC 61508 Safe Failure Fraction (SFF) of 85.5 % (Third party FMEDA Analysis - hardware only) • Functional Safety to SIL-2 in accordance with IEC 61508 Safe Failure Fraction (SFF) of 91 % (Third party FMEDA Analysis - hardware only) • Lloyds Steam Vessel Approval conforming to EN12952-11 & EN12953-9 • GOST R

¹⁾ If installation is in areas classified as hazardous, please observe relevant certificates

²⁾ Temperature rating is pressure dependent

³⁾ Pressure rating is temperature dependent

Level measurement

Continuous level measurement – Guided wave radar transmitters

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
Recommended applications	General purpose: clean, low viscosity liquids < 150 °C (300 °F)	Clean, high temperature/high pressure liquids > 200 °C (400 °F), ammonia, chlorine, LNG ¹⁾ , LPG ¹⁾	Clean, high pressure liquids < 200 °C (400 °F), ammonia, chlorine, LNG, LPG	General applications, overflow, temperatures to 200 °C (400 °F), clean, low viscosity liquids, displacer/torque-tube replacement
Not recommended for:	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 ²⁾	316L SS, Alumina spacers ³⁾ , (option PEEK ⁴⁾ or TFE ⁵⁾ , Borosilicate	316L SS, TFE spacers, Borosilicate	316L SS, TFE spacers, O-ring ²⁾
Process seal	O-ring ²⁾	Borosilicate (no O-ring)	Borosilicate (no O-ring)	O-Ring ²⁾
Rod/tube diameter				
Standard	ø 8 mm (0.3125 inch) rod ø 22 mm (0.875 inch) tube	ø 8 mm (0.3125 inch) rod ø 22 mm (0.875 inch) tube	ø 8 mm (0.3125 inch) rod ø 22 mm (0.875 inch) tube	ø 8 mm (0.3125 inch) rod ø 22 mm (0.875 inch) tube
Enlarged	ø 15 mm (0.63 inch) rod ø 45 mm (1.75 inch) tube	ø 15 mm (0.63 inch) rod ø 45 mm (1.75 inch) tube	ø 15 mm (0.63 inch) rod ø 45 mm (1.75 inch) tube	ø 15 mm (0.63 inch) rod ø 45 mm (1.75 inch) 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]
Flange ASME (EN/DIN)				
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 inch)	60 ... 610 cm (24 ... 240 inch)	60 ... 610 cm (24 ... 240 inch)	60 ... 610 cm (24 ... 240 inch)
Transition Zone ⁶⁾				
Top	25 mm (1 inch) at dk = 1.4 150 mm (6 inch) at dk = 80	none	25 mm (1 inch) at dk = 1.4 150 mm (6 inch) at dk = 80	none
Bottom	150 mm (6 inch) at dk = 1.4 25 mm (1 inch) at dk = 80	150 mm (6 inch) at dk = 1.4 25 mm (1 inch) at dk = 80	150 mm (6 inch) at dk = 1.4 25 mm (1 inch) at dk = 80	150 mm (6 inch) at dk = 1.4 25 mm (1 inch) 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 2 000 psi g) ⁷⁾	200 °C at 379 bar g (400 °F at 5 500 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 1 000 psi g)	-196 °C at 430 bar g (-321 °F at 6 250 psi g)	-196 °C at 430 bar g (-321 °F at 6 250 psi g)	-40 °C at 70 bar g (-40 °F at 1 000 psi g)
Process pressure				
Process pressure maximum	70 bar g at 20 °C (1 000 psi g at 70 °F)	431 bar g at 20 °C (6 250 psi g at 70 °F)	431 bar g at 20 °C (6 250 psi g at 70 °F)	70 bar g at 20 °C (1 000 psi g at 70 °F)
Process pressure minimum/vacuum service	Yes, not hermetic ⁸⁾	Yes, hermetic (<10 ⁻⁸ cc/sec at 1 atmosphere)	Yes, hermetic (<10 ⁻⁸ cc/sec at 1 atmosphere)	Yes, not hermetic
Dielectric range (dk)	1.4 ... 100	1.4 ... 100 ¹⁾	1.4 ... 100	1.4 ... 100
Maximum viscosity (cP)				
Standard	500	500	500	500
Enlarged	1 500	1 500	1 500	1 500
Coating/buildup	No	No	No	No
Foam	No	No	No	No
Corrosives	Yes	Yes	Yes	Yes
Sanitary	No	No	No	No
Overflow	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

Level measurement

Continuous level measurement – Guided wave radar transmitters

SITRANS LG200

	Coaxial Steam Probe (7ML1301-5)	Coaxial Interface Probe (7ML1301-6)	Single Rigid Rod Probe (7ML1303-1)	Single Rigid Rod HT/HP Probe (7ML1303-2)	Single Rigid Rod Probe, PFA rod insulation (7ML1303-1J)
Model reference number	7xS-x	7xT-x	7xF-x	7xJ-x	7xF-4
Recommended applications	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) ¹⁾	Low dielectric media (dK < 10) ¹⁾	Low dielectric media (dK < 10) ¹⁾
Materials/wetted parts	316L SS, PEEK spacers, Aegis PF128 O-ring ²⁾	316L SS, TFE spacers, O-ring ²⁾	316L SS, TFE, O-ring ²⁾	316L SS, TFE, O-ring ²⁾	316L SS, PFA, TFE, O-ring ²⁾
Process seal	Aegis PF128 O-ring ²⁾ , PEEK only	O-ring ²⁾	O-ring ²⁾	Aegis PF128 O-ring only ²⁾	O-ring ²⁾
Rod/Tube diameter					
Standard	ø 8 mm (0.3125 inch) rod, ø 22 mm (0.875 inch) tube	ø 8 mm (0.3125 inch) rod, ø 22 mm (0.875 inch) tube	ø 12 mm (0.5 inch) rod	ø 12 mm (0.5 inch) rod	ø 12 mm (0.5 inch) rod ø 16 mm (0.625 inch) insulation
Enlarged	N/A	ø 15 mm (0.63 inch) rod ø 45 mm (1.75 inch) 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
Flange ASME (EN/DIN)					
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 inch)	60 ... 610 cm (24 ... 240 inch)	60 ... 610 cm (24 ... 240 inch)	60 ... 610 cm (24 ... 240 inch)	60 ... 610 cm (24 ... 240 inch)
Transition Zone³⁾					
Top	25 mm (1 inch) at dk ≥ 10	none	Application, installation, and dielectric dependent	Application, installation, and dielectric dependent	Application, installation, and dielectric dependent
Bottom	25 mm (1 inch) at dk ≥ 10	150 mm (6 inch) at dk = 1.4 25 mm (1 inch) at dk = 80	25 mm (1 inch) at dk > 10	25 mm (1 inch) at dk > 10	25 mm (1 inch) at dk > 10
Process temperature maximum	343 °C at 165 bar g (650 °F at 2 400 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 2 400 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 3 000 psi g)	-40 °C at 70 bar g (-40 °F at 1 000 psi g)	-40 °C at 70 bar g (-40 °F at 1 000 psi g)	-40 °C at 70 bar g (-40 °F at 1 000 psi g)	-40 °C at 50 bar g (-40 °F at 750 psi g)
Process pressure maximum	165 bar g at 343 °C (2 400 psi g at 650 °F)	70 bar g at 20 °C (1 000 psi g at 70 °F)	70 bar g at 20 °C (1 000 psi g at 70 °F)	207 bar g at 20 °C (3 000 psi g at 70 °F)	70 bar g at 20 °C (1 000 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 ¹⁾	1.9 ... 100 ¹⁾	1.9 ... 100 ¹⁾
Max. viscosity (cP)					
Standard	500 cP	500 cP	10 000 cP (consult factory if severe agitation/turbulence)		
Enlarged	N/A	1 500 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

¹⁾ With dK of 1.9 ... 10, the device must be mounted between 50 and 150 mm (2 ... 6 inch) of metal tank wall or in chamber/bride

²⁾ See O-ring Selection Guide for guidance

³⁾ 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 transmitters

SITRANS LG200

	Single Rigid Rod Probe, Sanitary (7ML1303-1D)	Single Rigid Rod Probe, PFA faced flange(7ML1303-1E)	Single Flexible Rod Probe (7ML1304-1)	Single Flexible Rod Probe for Bulk Solids (7ML1304-2)
Model reference number	7xF-E	7xF-F	7x1-x	7x2-x
Recommended applications:	Applications demanding sanitary specifications	Extreme corrosives, coating/buildup, foam	Coating and buildup, foam; lengths > 6 m (20 ft) headroom	Granular bulk solids applications (powders, grain, dust) 3 000 lb pull down force
Not recommended for	Low dielectric media (dK < 10) ¹⁾	Low dielectric media (dK < 10) ¹⁾	Low dielectric media (dK < 4)	Solids with dK < 4
Materials/wetted parts	316L SS, TFE, 15 µ-inch (<0.4 µm) R _a	All PFA - wetted surfaces	316L SS, TFE, O-ring ²⁾	316L SS, TFE, O-ring ²⁾
Optional	AL6XN SS	N/A	N/A	N/A
Process seal	316L SS, TFE, O-ring ²⁾	PFA, no O-ring	O-ring ²⁾	Sealant
Rod/tube diameter	ø 12 mm (0.5 inch) rod	ø 12 mm (0.5 inch) rod ø 16 mm (0.625 inch) insulation	ø 5 mm (0.188 inch) cable	ø 6 mm (0.25 inch) 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 inch)	60 ... 610 cm (24 ... 240 inch)	1 ... 22.5 meters (3 ... 75 ft)	1 ... 22.5 meters (3 ... 75 ft)
Transition Zone³⁾				
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 inch) at dk >10	25 mm (1 inch) at dk >10	305 mm (12 inch)	305 mm (12 inch)
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 1 000 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 (1 000 psi g at 70 °F)	70 bar g at 20 °C (1 000 psi g at 70 °F)	3.4 bar g at 66 °C (50 psi g at 150 °F)
Process pressure minimum/vacuum service	Not suitable for vacuum applications			
Dielectric range	1.9 ... 100 ¹⁾	1.9 ... 100 ¹⁾	4 ... 100 ¹⁾	4 ... 100
Maximum viscosity (cP)	10 000 (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

¹⁾ With dK of 1.9 ... 10, the device must be mounted between 50 and 150 mm (2 ... 6 inch) of metal tank wall or in chamber/bride.

²⁾ See O-ring Selection Guide for guidance

³⁾ 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 transmitters

SITRANS LG200

	Twin Rod Probe (7ML1302-1)	Flexible Twin Rod Probe (7ML1302-3)	Flexible Twin Rod Bulk Solids Probe (7ML1302-2)
Model reference number	7xB-x	7x7-x	7x5-x
Recommended applications:	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), 3 000 lb pull-down force
Not recommended for:	Media bridging between rods or building up on spacers	Dielectric > 10: media bridging on flexible elements, dielectrics < 5 with lengths > 10 m (30 ft)	Media bridging flexible elements
Materials/wetted parts	316L SS, TFE spacers, O-ring ¹⁾	316L SS, FEP webbing, O-ring ¹⁾	316L SS, FEP webbing, O-ring ¹⁾
Process seal	O-ring ¹⁾	O-ring ¹⁾	Sealant
Rod/tube diameter	Two, ø 12 mm (0.5 inch) rod; 22 mm (0.875 inch) C _L ... C _L	Two, ø 6 mm (0.25 inch) cables; 22 mm (0.875 inch) C _L ... C _L	Two, ø 6 mm (0.25 inch) cables; 22 mm (0.875 inch) C _L ... C _L
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 inch)	1 ... 22.5 m (3 ... 75 ft)	1 ... 22.5 m (3 ... 75 ft)
Transition Zone²⁾:			
Top	150 mm (6 inch) at dK > 1.9 Blocking distance: none	150 mm (6 inch) at dK > 1.9 Blocking distance: 12 ... 50 cm (4.8 ... 20 inch)	150 mm (6 inch) at dK > 1.9 Blocking distance: 12 ... 50 cm (4.8 ... 20 inch)
Bottom	150 mm (6 inch) at dK = 1.9 25 mm (1 inch) at dK = 80	305 mm (12 inch)	305 mm (12 inch)
Process temperature max. ³⁾	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 1 000 psi g)		-40 °C at 3.4 bar g (-40 °F at 50 psi g)
Process pressure max.	70 bar g at 20 °C (1 000 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)	1 500	1 500	Not suitable
Coating/buildup	Yes, maximum error 3 % of coated length with conductive media Bridging not recommended. ⁴⁾		
Foam	Yes	Yes	Yes
Corrosives	Yes	No	Yes
Sanitary	No	No	No
Overfill	No	No	No

¹⁾ See O-ring Selection Guide for guidance

²⁾ Transition zone is dielectric dependent: dK = dielectric permittivity. Unit will function but accuracy will decrease in Transition Zone.

³⁾ Refer to Ambient Temperature vs Process Temperature graphs or instruction manual

⁴⁾ 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:
Viton GFLT	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
EPDM	Acetone, MEK, skydrol fluids	Petroleum oils, di-ester base lubricants, propane, steam, anhydrous ammonia
Kalrez (4079)	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
Aegis PF128	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
Borosilicate (HT/HP probes only)	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

SITRANS LG200 Transmitter

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.

Note:

In addition to the transmitter, please select a probe configuration to complete the SITRANS LG200 (ordered separately).

For orders of 10 or more, please consult factory.

Power

24 V DC, 2-wire

Signal Output

4 ... 20 mA HART

Options

SIL-1 Approved (FMEDA analysis) SFF = 85.5 %

SIL-2 Approved (FMEDA analysis) SFF = 91 %

Enclosure/lid

Aluminum

Aluminum with glass window

Cable inlet

2 x ½" NPT, IP65

2 x M20x1.5, IP65

Approvals (Please select for your region)

North America

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)

Europe

General Purpose and Intrinsically Safe (ATEX II 1G EEx ia IIC T4); IECEx Ex ia IIC T4 Ga

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]

Order No.

7ML1300-

1 - A 0

1

A

A

B

1

2

0

1

A

B

C

D

E

Selection and Ordering data

Further designs

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

Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000 [Available only when ordered in conjunction with a probe (7ML130x-x). Testing requires transmitter with probe.]

Operating Instructions

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.

Accessories

SITRANS RD100 Remote display - see Chapter 7

SITRANS RD200 Remote display - see Chapter 7

SITRANS RD500 web, datalogging, alarming, ethernet, and modem support for instrumentation - see Chapter 7

Order code

C11

Order No.

7ML1998-5KA02

7ML1998-5KA11

7ML1998-5KA32

7ML1998-5XG81

7ML5750-1AA00-0

Level measurement

Continuous level measurement – Guided wave radar transmitters

SITRANS LG200

Selection and Ordering data	Order No.	Selection and Ordering data	Order No.
SITRANS LG200 Coaxial Probes	7ML1301-	SITRANS LG200 Coaxial Probes	7ML1301-
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).	0	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).	0
Note: In addition to the probe, please select a transmitter configuration to complete the SITRANS LG200 (ordered separately). For orders of 10 or more, please consult factory.		<u>Add order code Y01 and plain text:</u> <u>"Insertion length ... cm"</u>	
Model		Model options 3, 6 with Material of Construction option E: 60 ... 100 cm (23.6 ... 39.4 inch)	C 1
Coaxial ^{1) 2)}	1	Model options 3, 6 with Material of Construction option E: 101 ... 200 cm (39.8 ... 78.7 inch)	C 2
Coaxial, High Temperature/High Pressure ²⁾³⁾	2	Model options 3, 6 with Material of Construction option E: 201 ... 300 cm (79.1 ... 118.1 inch)	C 3
Coaxial, High Pressure ²⁾³⁾	3	Model options 3, 6 with Material of Construction option E: 301 ... 400 cm (118.5 ... 157.5 inch)	C 4
Coaxial, Overfill/Flooded Cage ¹⁾²⁾	4	Model options 3, 6 with Material of Construction option E: 401 ... 500 cm (157.9 ... 196.9 inch)	C 5
Coaxial Steam ⁴⁾⁵⁾	5	Model options 3, 6 with Material of Construction option E: 501 ... 610 cm (197.2 ... 240.2 inch)	C 6
Coaxial, Interface ¹⁾²⁾	6	<u>Add order code Y01 and plain text:</u> <u>"Insertion length ... cm"</u>	
Material of Construction		Model option 2 with Material of Construction options A, E, H, J: 60 ... 100 cm (23.6 ... 39.4 inch)	E 1
316/316L (1.4401/1.4404) stainless steel probe and process connection	A	Model option 2 with Material of Construction options A, E, H, J: 101 ... 200 cm (39.8 ... 78.7 inch)	E 2
316/316L (1.4401/1.4404) SS probe ASME B31.1 specifications ⁶⁾	D	Model option 2 with Material of Construction options A, E, H, J: 201 ... 300 cm (79.1 ... 118.1 inch)	E 3
Enlarged Coaxial, 316/316L (1.4401/1.4404) stainless steel probe and process connection with PEEK Spacers ⁷⁾	E	Model option 2 with Material of Construction options A, E, H, J: 301 ... 400 cm (118.5 ... 157.5 inch)	E 4
316/316L (1.4401/1.4404) stainless steel probe and process connection with PEEK HT spacers dk ≥ 1.4 ⁸⁾	H	Model option 2 with Material of Construction options A, E, H, J: 401 ... 500 cm (157.9 ... 196.9 inch)	E 5
316/316L (1.4401/1.4404) stainless steel probe and process connection with Teflon spacers dk ≥ 2 ⁸⁾⁹⁾	J	Model option 2 with Material of Construction options A, E, H, J: 501 ... 610 cm (197.2 ... 240.2 inch)	E 6
Probe Insertion Length		<u>Add order code Y01 and plain text:</u> <u>"Insertion length ... mm"</u>	
<u>Add order code Y01 and plain text:</u> <u>"Insertion length ... cm"</u>		Model option 5 with Material of Construction options A, D: 60 ... 100 cm (23.6 ... 39.4 inch)	F 1
Model option 1, 4 and Material of Construction option A, E: 60 ... 100 cm (23.6 ... 39.4 inch)	A 1	Model option 5 with Material of Construction options A, D: 101 ... 200 cm (39.8 ... 78.7 inch)	F 2
Model option 1, 4 and Material of Construction option A, E: 101 ... 200 cm (39.8 ... 78.7 inch)	A 2	Model option 5 with Material of Construction options A, D: 201 ... 300 cm (79.1 ... 118.1 inch)	F 3
Model option 1, 4 and Material of Construction option A, E: 201 ... 300 cm (79.1 ... 118.1 inch)	A 3	Model option 5 with Material of Construction options A, D: 301 ... 400 cm (118.5 ... 157.5 inch)	F 4
Model option 1, 4 and Material of Construction option A, E: 301 ... 400 cm (118.5 ... 157.5 inch)	A 4	Model option 5 with Material of Construction options A, D: 401 ... 455 cm (157.9 ... 180 inch)	F 5
Model option 1, 4 and Material of Construction option A, E: 401 ... 500 cm (157.9 ... 196.9 inch)	A 5		
Model option 1, 4 and Material of Construction option A, E: 501 ... 610 cm (197.2 ... 240.2 inch)	A 6	O-rings	
<u>Add order code Y01 and plain text:</u> <u>"Insertion length ... cm"</u>		Viton	1 1
Model options 3, 6 with Material of Construction option A: 60 ... 100 cm (23.6 ... 39.4 inch)	B 1	EPDM (Ethylene Propylene Rubber)	1 2
Model options 3, 6 with Material of Construction option A: 101 ... 200 cm (39.8 ... 78.7 inch)	B 2	Kalrez 4079	1 3
Model options 3, 6 with Material of Construction option A: 201 ... 300 cm (79.1 ... 118.1 inch)	B 3	HSN (Nitrile)	1 4
Model options 3, 6 with Material of Construction option A: 301 ... 400 cm (118.5 ... 157.5 inch)	B 4	Buna-N	1 5
Model options 3, 6 with Material of Construction option A: 401 ... 500 cm (157.9 ... 196.9 inch)	B 5	Neoprene	1 6
Model options 3, 6 with Material of Construction option A: 501 ... 610 cm (197.2 ... 240.2 inch)	B 6	Chemraz	1 7
		Polyurethane	1 8
		Aegis PF128 (can be used on steam applications)	2 1
		Kalrez 2035	2 2
		None (Borosilicate glass seal, not for steam applications) ¹⁰⁾	2 3

4

Level measurement

Continuous level measurement – Guided wave radar transmitters

SITRANS LG200

Selection and Ordering data

Order No.

SITRANS LG200 Coaxial Probes

7ML1301-

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).



Process Connection (Size/Type)

Threaded

¾" NPT [(Taper), ANSI/ASME B1.20.1] **AA**

G 1" [(BSPP), EN ISO 228-1] **AB**

G 2" [(BSPP), EN ISO 228-1]¹¹⁾ **AC**

2" NPT [(Taper), ANSI/ASME B1.20.1]¹⁾ **AD**

ASME flanges

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" 900/1 500 lb ASME raised face flange¹⁰⁾ **BD**

1" 2 500 lb ASME raised face flange¹⁰⁾ **BE**

1" 900/1 500 lb ASME ring joint flange¹⁰⁾ **BF**

1" 2 500 lb ASME ring joint flange¹⁰⁾ **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" 900/1 500 lb ASME raised face flange¹⁰⁾ **CD**

1½" 2 500 lb ASME raised face flange¹⁰⁾ **CE**

1½" 600 lb ASME ring joint flange **CF**

1½" 900/1 500 lb ASME ring joint flange¹⁰⁾ **CG**

1½" 2 500 lb ASME ring joint flange¹⁰⁾ **CH**

2" 150 lb ASME raised face flange **DA**

2" 300 lb ASME raised face flange **DB**

2" 600 lb ASME raised face flange **DC**

2" 900/1 500 lb ASME raised face flange¹⁰⁾ **DD**

2" 2 500 lb ASME raised face flange¹⁰⁾ **DE**

2" 600 lb ASME ring joint flange **DF**

2" 900/1 500 lb ASME ring joint flange¹⁰⁾ **DG**

2" 2 500 lb ASME ring joint flange¹⁰⁾ **DH**

3" 150 lb ASME raised face flange **EA**

3" 300 lb ASME raised face flange **EB**

3" 600 lb ASME raised face flange **EC**

3" 900 lb ASME raised face flange¹⁰⁾ **ED**

3" 1 500 lb ASME raised face flange¹⁰⁾ **EE**

3" 2 500 lb ASME raised face flange¹⁰⁾ **EF**

3" 600 lb ASME ring joint flange **EG**

3" 900 lb ASME ring joint flange¹⁰⁾ **EH**

3" 1 500 lb ASME ring joint flange¹⁰⁾ **EJ**

3" 2 500 lb ASME ring joint flange¹⁰⁾ **EK**

4" 150 lb ASME raised face flange **FA**

4" 300 lb ASME raised face flange **FB**

4" 600 lb ASME raised face flange **FC**

4" 900 lb ASME raised face flange¹⁰⁾ **FD**

4" 1 500 lb ASME raised face flange¹⁰⁾ **FE**

4" 2 500 lb ASME raised face flange¹⁰⁾ **FF**

4" 600 lb ASME ring type joint flange **FG**

4" 900 lb ASME ring type joint flange¹⁰⁾ **FH**

4" 1 500 lb ASME ring type joint flange¹⁰⁾ **FJ**

4" 2 500 lb ASME ring type joint flange¹⁰⁾ **FK**

Selection and Ordering data

Order No.

SITRANS LG200 Coaxial Probes

7ML1301-

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).



EN flanges

DN 25 PN 16 EN 1092-1 **GA**

Type A flat faced flange

DN 25 PN 25/40 EN 1092-1 **GB**

Type A flat faced flange

DN 25 PN 64/100 EN 1092-1 **GC**

Type B2 raised faced flange

DN 25 PN 160 EN 1092-1 **GD**

Type B2 raised faced flange¹⁰⁾

DN 25 PN 250 EN 1092-1 **GE**

Type B2 raised faced flange¹⁰⁾

DN 25 PN 320 EN 1092-1 **GF**

Type B2 raised faced flange¹⁰⁾

DN 25 PN 400 EN 1092-1 **GG**

Type B2 raised faced flange¹⁰⁾

DN 40 PN 16 EN 1092-1 **HA**

Type A flat faced flange

DN 40 PN 25/40 EN 1092-1 **HB**

Type A flat faced flange

DN 40 PN 64/100 EN 1092-1 **HC**

Type B2 raised faced flange

DN 40 PN 160 EN 1092-1 **HD**

Type B2 raised faced flange¹⁰⁾

DN 40 PN 250 EN 1092-1 **HE**

Type B2 raised faced flange¹⁰⁾

DN 40 PN 320 EN 1092-1 **HF**

Type B2 raised faced flange¹⁰⁾

DN 40 PN 400 EN 1092-1 **HG**

Type B2 raised faced flange¹⁰⁾

DN 50 PN 16 EN 1092-1 **JA**

Type A flat faced flange

DN 50 PN 25/40 EN 1092-1 **JB**

Type A flat faced flange

DN 50 PN 64 EN 1092-1 **JC**

Type B2 raised faced flange

DN 50 PN 100 EN 1092-1 **JD**

Type B2 raised faced flange

DN 50 PN 160 EN 1092-1 **JE**

Type B2 raised faced flange¹⁰⁾

DN 50 PN 250 EN 1092-1 **JF**

Type B2 raised faced flange¹⁰⁾

DN 50 PN 320 EN 1092-1 **JG**

Type B2 raised faced flange¹⁰⁾

DN 50 PN 400 EN 1092-1 **JH**

Type B2 raised faced flange¹⁰⁾

DN 80 PN 16 EN 1092-1 **KA**

Type A flat faced flange

DN 80 PN 25/40 EN 1092-1 **KB**

Type A flat faced flange

DN 80 PN 64 EN 1092-1 **KC**

Type B2 raised faced flange

DN 80 PN 100 EN 1092-1 **KD**

Type B2 raised faced flange

DN 80 PN 160 EN 1092-1 **KE**

Type B2 raised faced flange¹⁰⁾

DN 80 PN 250 EN 1092-1 **KF**

Type B2 raised faced flange¹⁰⁾

DN 80 PN 320 EN 1092-1 **KG**

Type B2 raised faced flange¹⁰⁾


DN 80 PN 400 EN 1092-1 **KH**

Type B2 raised faced flange¹⁰⁾

Level measurement

Continuous level measurement – Guided wave radar transmitters

SITRANS LG200

Selection and Ordering data	Order No.	Selection and Ordering data	Order code
SITRANS LG200 Coaxial Probes	7ML1301-	Further designs	
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).		Please add "-Z" to Order No. and specify Order code(s).	
DN 100 PN 16 EN 1092-1 Type A flat faced flange	LA	Enter the total insertion length in plain text description, max. 610 cm (240.2 inch)	Y01
DN 100 PN 25/40 EN 1092-1 Type A flat faced flange	LB	Stainless steel tag. Measuring-point number/identification (max. 27 characters); specify in plain text	Y15
DN 100 PN 64 EN 1092-1 Type B2 raised faced flange	LC	Inspection Certificate Type 3.1 per EN 10204	C12
DN 100 PN 100 EN 1092-1 Type B2 raised faced flange	LD	Manufacturer's test report (Hydrostatic Test)	C18
DN 100 PN 160 EN 1092-1 Type B2 raised faced flange ¹⁰⁾	LE	NACE MR-0175 materials traceability	D07
DN 100 PN 250 EN 1092-1 Type B2 raised faced flange ¹⁰⁾	LF	Operating Instructions	Order No.
DN 100 PN 320 EN 1092-1 Type B2 raised faced flange ¹⁰⁾	LG	English	7ML1998-5KA02
DN 100 PN 400 EN 1092-1 Type B2 raised faced flange ¹⁰⁾	LH	French	7ML1998-5KA11
Fisher torque tube flange, carbon steel (249B)	MA	German	7ML1998-5KA32
Fisher torque tube flange, 316 stainless steel (249C)	MB	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.	7ML1998-5XG81
Masoneilan torque tube flange, carbon steel	MC	Accessories	
Masoneilan torque tube flange, 316 stainless steel	MD	Kit, spacer coax probe with parts	A5E03523523
		SITRANS RD100 Remote display - see Chapter 7	
		SITRANS RD200 Remote display - see Chapter 7	
		SITRANS RD500 web, datalogging, alarming, ethernet, and modem support for instrumentation - see Chapter 7	7ML5750-1AA00-0

- 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)

Level measurement

Continuous level measurement – Guided wave radar transmitters

SITRANS LG200

Selection and Ordering data

Order No.

SITRANS LG200 Twin Rod Probes

7ML1302-

SITRANS LG200 twin rod probes are used in applications where coating and buildup are possible. Used in application with dielectric constant ≥ 1.9 .

- - - - - 0

Note:

In addition to the probe, please select a transmitter configuration to complete the SITRANS LG200 (ordered separately).

For orders of 10 or more, please consult factory.

Model

Twin rigid rod 1
Flexible twin rod bulk solids probe¹⁾ 2
Flexible twin rod probe²⁾ 3

Material of Construction

316/316L (1.4401/1.4404) stainless steel probe and process connection A

Process Connection (size/type)

2" NPT [(Taper), ANSI/ASME B1.20.1] A 1
G 2" [(BSPP), EN ISO 228-1] A 2
2" 150 lb ASME raised face flange³⁾ A 3
2" 300 lb ASME raised face flange³⁾ B 1
3" 150 lb ASME raised face flange B 2
2" 600 lb ASME raised face flange B 3
3" 300 lb ASME raised face flange C 1
4" 150 lb ASME raised face flange C 2
3" 600 lb ASME raised face flange C 3
4" 300 lb ASME raised face flange D 1
DN 50 PN 16 EN 1092-1 Type A flat faced flange D 2
4" 600 lb ASME raised face flange D 3
DN 50 PN 25/40 EN 1092-1 Type A flat faced flange E 1
DN 80 PN 16 EN 1092-1 Type A flat faced flange E 2
DN 80 PN 25/40 EN 1092-1 Type A flat faced flange E 3
DN 100 PN 16 EN 1092-1 Type A flat faced flange E 4
DN 100 PN 25/40 EN 1092-1 Type A flat faced flange E 5
Fisher Torque Tube flange, 316SS (249C) F 1
Masoneilan Torque Tube flange, 316SS G 1
Carbon Steel
Fisher Torque Tube flange, Carbon Steel (249B) K 1
Masoneilan Torque Tube flange, Carbon Steel L 1

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

Probe Insertion Length

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

Model option 1 and Material of Construction option A: 60 ... 100 cm (23.6 ... 39.4 inch) A A
Model option 1 and Material of Construction option A: 101 ... 200 cm (39.8 ... 78.7 inch) A B
Model option 1 and Material of Construction option A: 201 ... 300 cm (79.1 ... 118.1 inch) A C

Selection and Ordering data

Order No.

SITRANS LG200 Twin Rod Probes

7ML1302-

SITRANS LG200 twin rod probes are used in applications where coating and buildup are possible. Used in application with dielectric constant ≥ 1.9 .

- - - - - 0

Model option 1 and Material of Construction option A: 301 ... 400 cm (118.5 ... 157.5 inch) AD

Model option 1 and Material of Construction option A: 401 ... 500 cm (157.9 ... 196.9 inch) AE

Model option 1 and Material of Construction option A: 501 ... 610 cm (197.2 ... 240.2 inch) AF

Standard lengths⁴⁾

Model option 2,3 and Material of Construction option A: 1 m (39.4 inch) EA

Model option 2,3 and Material of Construction option A: 2 m (78.7 inch) EB

Model option 2,3 and Material of Construction option A: 3 m (118.1 inch) EC

Model option 2,3 and Material of Construction option A: 4 m (157.5 inch) ED

Model option 2,3 and Material of Construction option A: 5 m (196.9 inch) EE

Model option 2,3 and Material of Construction option A: 6 m (236.2 inch) EF

Model option 2,3 and Material of Construction option A: 7 m (275.6 inch) EG

Model option 2,3 and Material of Construction option A: 8 m (315.0 inch) EH

Model option 2,3 and Material of Construction option A: 9 m (354.3 inch) EJ

Model option 2,3 and Material of Construction option A: 10 m (393.7 inch)²⁾³⁾ EK

Model option 2,3 and Material of Construction option A: 11 m (433.1 inch)²⁾³⁾ EL

Model option 2,3 and Material of Construction option A: 12 m (472.4 inch)²⁾³⁾ EM

Model option 2,3 and Material of Construction option A: 13 m (511.8 inch)²⁾³⁾ EN

Model option 2,3 and Material of Construction option A: 14 m (551.2 inch)²⁾³⁾ EP

Model option 2,3 and Material of Construction option A: 15 m (590.6 inch)²⁾³⁾ EQ

Model option 2,3 and Material of Construction option A: 16 m (629.9 inch)²⁾³⁾ ER

Model option 2,3 and Material of Construction option A: 17 m (669.3 inch)²⁾³⁾ ES

Model option 2,3 and Material of Construction option A: 18 m (708.7 inch)²⁾³⁾ ET

Model option 2,3 and Material of Construction option A: 19 m (748.0 inch)²⁾³⁾ EU

Model option 2,3 and Material of Construction option A: 20 m (787.4 inch)²⁾³⁾ EV

Model option 2,3 and Material of Construction option A: 21 m (826.8 inch)²⁾³⁾ EW

Model option 2,3 and Material of Construction option A: 22.5 m (885.8 inch)²⁾³⁾ EX

¹⁾ Available with O-ring 11 only

²⁾ When used with model option 3, not suitable for $dk < 5$

³⁾ Available with model option 1 only

⁴⁾ No Y01 needed in order code

Level measurement

Continuous level measurement – Guided wave radar transmitters

SITRANS LG200

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Order No. and specify Order code(s).	
Enter the total insertion length in plain text description, max. 610 cm (240.2 inch)	Y01
Stainless steel tag. Measuring-point number/identification (max. 27 characters); specify in plain text	Y15
Inspection Certificate Type 3.1 per EN 10204	C12
Manufacturer's test report (Hydrostatic Test)	C18
NACE MR-0175 materials traceability	D07
Operating Instructions	
English	7ML1998-5KA02
French	7ML1998-5KA11
German	7ML1998-5KA32
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.	7ML1998-5XG81
Accessories	
SITRANS RD100 Remote display - see Chapter 7	
SITRANS RD200 Remote display - see Chapter 7	
SITRANS RD500 web, datalogging, alarming, ethernet, and modem support for instrumentation - see Chapter 7	7ML5750-1AA00-0

Level measurement

Continuous level measurement – Guided wave radar transmitters

SITRANS LG200

Selection and Ordering data

Order No.

SITRANS LG200 Single Rod Rigid Probes

7ML1303-

SITRANS LG200 single rod rigid probes are used in applications where coating and buildup are likely. Used in applications with dielectric constant ≥ 10 , or $dk > 1.9$ when installed within 2 ... 6 inch of a metal tank wall or in cage or bridle.

Note:

In addition to the probe, please select a transmitter configuration to complete the SITRANS LG200 (ordered separately).

For orders of 10 or more, please consult factory.

Model

Single rod rigid probe¹⁾

1

High Temperature/High Pressure Single rod²⁾³⁾

2

Material of Construction

316/316L (1.4401/1.4404) stainless steel probe and process connection

A

316/316L (1.4401/1.4404) stainless steel sanitary probe and process connection¹⁾⁴⁾

D

PFA faced-flange and rod insulation, all PFA wetted parts (316 SS rod)¹⁾⁵⁾

E

316 AL6XN stainless steel sanitary probe and process connection¹⁾⁶⁾

F

PFA rod insulation (316 SS rod and process connection)

J

Process Connection (size/type)

1 or 1½" Tri-Clover 16 amp sanitary fitting⁷⁾

A 1

2" NPT [(Taper), ANSI/ASME B1.20.1]⁸⁾

A 2

G 2" [(BSPP), EN ISO 228-1]⁸⁾

A 3

2" 150 lb ASME raised face flange⁸⁾

A 4

2" 300 lb ASME raised face flange⁸⁾

A 5

2" Tri-Clover 16 amp sanitary fitting⁷⁾

A 6

¾" Tri-Clover 16 amp sanitary fitting^{7) 9)}

A 7

2½" Tri-Clover 16 amp sanitary fitting⁷⁾

B 0

3" 150 lb ASME raised face flange⁸⁾

B 1

3" 300 lb ASME raised face flange⁸⁾

B 2

3" Tri-Clover 16 amp sanitary fitting⁷⁾

B 3

4" 150 lb ASME raised face flange⁸⁾

C 1

4" 300 lb ASME raised face flange⁸⁾

C 2

4" Tri-Clover 16 amp sanitary fitting⁷⁾

C 3

DN 50, PN 16, EN 1092-1

D 1

Type A flat faced flange⁸⁾

DN 50, PN 25/40, EN 1092-1

D 2

Type A flat faced flange⁸⁾

DN 80, PN 16, EN 1092-1

D 3

Type A flat faced flange⁸⁾

DN 80, PN 25/40, EN 1092-1

D 4

Type A flat faced flange⁸⁾

DN 100, PN 16, EN 1092-1

D 5

Type A flat faced flange⁸⁾

DN 100, PN 25/40, EN 1092-1

D 6

Type A flat faced flange⁸⁾

Selection and Ordering data

Order No.

SITRANS LG200 Single Rod Rigid Probes

7ML1303-

SITRANS LG200 single rod rigid probes are used in applications where coating and buildup are likely. Used in applications with dielectric constant ≥ 10 , or $dk > 1.9$ when installed within 2 ... 6 inch of a metal tank wall or in cage or bridle.

AL6XN¹⁰⁾

¾" Tri-Clover 16 amp sanitary fitting⁹⁾¹⁰⁾

E 0

1½" Tri-Clover 16 amp sanitary fitting¹⁰⁾

E 1

2" Tri-Clover 16 amp sanitary fitting¹⁰⁾

E 2

2½" Tri-Clover 16 amp sanitary fitting¹⁰⁾

E 3

3" Tri-Clover 16 amp sanitary fitting¹⁰⁾

F 1

4" Tri-Clover 16 amp sanitary fitting¹⁰⁾

G 1

PFA Coated 316 stainless steel flange¹¹⁾

2" 150 lb ASME raised face flange¹¹⁾

H 1

2" 300 lb ASME raised face flange¹¹⁾

H 2

3" 150 lb ASME raised face flange¹¹⁾

J 1

3" 300 lb ASME raised face flange¹¹⁾

J 2

4" 150 lb ASME raised face flange¹¹⁾

K 1

4" 300 lb ASME raised face flange¹¹⁾

K 2

DN 50, PN 16, EN 1092-1

L 1

Type A flat faced flange¹¹⁾

DN 50, PN 25/40, EN 1092-1

L 2

Type A flat faced flange¹¹⁾

DN 80, PN 16, EN 1092-1

L 3

Type A flat faced flange¹¹⁾

DN 80, PN 25/40, EN 1092-1

L 4

Type A flat faced flange¹¹⁾

DN 100, PN 16, EN 1092-1

L 5

Type A flat faced flange¹¹⁾

DN 100, PN 25/40, EN 1092-1

L 6

Type A flat faced flange¹¹⁾

Level measurement

Continuous level measurement – Guided wave radar transmitters

SITRANS LG200

Selection and Ordering data	Order No.	Selection and Ordering data	Order No.
SITRANS LG200 Single Rod Rigid Probes	7ML1303-	SITRANS LG200 Single Rod Rigid Probes	7ML1303-
SITRANS LG200 single rod rigid probes are used in applications where coating and buildup are likely. Used in applications with dielectric constant ≥ 10 , or $dk > 1.9$ when installed within 2 ... 6 inch 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 ≥ 10 , or $dk > 1.9$ when installed within 2 ... 6 inch of a metal tank wall or in cage or bridle.	
Higher Pressure rated flanges		EN flanges	
<u>ANSI/ASME</u>		DN 50, PN 64, EN 1092-1 Type B2 raised faced flange ⁸⁾	T 0
2" 600 lb ASME raised face flange ⁸⁾	M 0	DN 50, PN 100, EN 1092-1 Type B2 raised faced flange ⁸⁾	T 1
2" 900/1 500 lb ASME raised face flange ¹²⁾	M 1	DN 50, PN 160, EN 1092-1 Type B2 raised faced flange ¹²⁾	T 2
2" 2 500 lb ASME raised face flange ¹²⁾	M 2	DN 50, PN 250, EN 1092-1 Type B2 raised faced flange ¹²⁾	T 3
3" 600 lb ASME raised face flange ⁸⁾	N 0	DN 80, PN 64, EN 1092-1 Type B2 raised faced flange ⁸⁾	U 0
3" 900 lb ASME raised face flange ¹²⁾	N 3	DN 80, PN 100, EN 1092-1 Type B2 raised faced flange ⁸⁾	U 1
3" 1 500 lb ASME raised face flange ¹²⁾	N 4	DN 80, PN 160, EN 1092-1 Type B2 raised faced flange ¹²⁾	U 2
3" 2 500 lb ASME raised face flange ¹²⁾	N 5	DN 80, PN 250, EN 1092-1 Type B2 raised faced flange ¹²⁾	U 3
4" 600 lb ASME raised face flange ⁸⁾	P 0	DN 100, PN 64, EN 1092-1 Type B2 raised faced flange ⁸⁾	V 0
4" 900 lb ASME raised face flange ¹²⁾	P 3	DN 100, PN 100, EN 1092-1 Type B2 raised faced flange ⁸⁾	V 1
4" 1 500 lb ASME raised face flange ¹²⁾	P 4	DN 100, PN 160, EN 1092-1 Type B2 raised faced flange ¹²⁾	V 2
4" 2 500 lb ASME raised face flange ¹²⁾	P 5	DN 100, PN 250, EN 1092-1 Type B2 raised faced flange ¹²⁾	V 3
2" 600 lb ASME ring type joint flange ⁸⁾	Q 0		
2" 900/1 500 lb ASME ring type joint flange ¹²⁾	Q 1		
2" 2 500 lb ASME ring type joint flange ¹²⁾	Q 2		
3" 600 lb ASME ring type joint flange ⁸⁾	R 0		
3" 900 lb ASME ring type joint flange ¹²⁾	R 3		
3" 1 500 lb ASME ring type joint flange ¹²⁾	R 4		
3" 2 500 lb ASME ring type joint flange ¹²⁾	R 5		
4" 600 lb ASME ring type joint flange ⁸⁾	S 0		
4" 900 lb ASME ring type joint flange ¹²⁾	S 3		
4" 1 500 lb ASME ring type joint flange ¹²⁾	S 4		
4" 2 500 lb ASME ring type joint flange ¹²⁾	S 5		

Level measurement

Continuous level measurement – Guided wave radar transmitters

SITRANS LG200

Selection and Ordering data

Order No.

SITRANS LG200 Single Rod Rigid Probes

7ML1303-

SITRANS LG200 single rod rigid probes are used in applications where coating and buildup are likely. Used in applications with dielectric constant ≥ 10 , or $dk > 1.9$ when installed within 2 ... 6 inch 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 ¹⁾	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 inch)

AA

Model option 1, 2 and Material of Construction option A: 101 ... 200 cm (39.8 ... 78.7 inch)

AB

Model option 1, 2 and Material of Construction option A: 201 ... 300 cm (79.1 ... 118.1 inch)

AC

Model option 1, 2 and Material of Construction option A: 301 ... 400 cm (118.5 ... 157.5 inch)

AD

Model option 1, 2 and Material of Construction option A: 401 ... 500 cm (157.9 ... 196.9 inch)

AE

Model option 1, 2 and Material of Construction option A: 501 ... 610 cm (197.2 ... 240.2 inch)

AF

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 inch)

BA

Model option 1 and Material of Construction option D: 101 ... 200 cm (39.8 ... 78.7 inch)

BB

Model option 1 and Material of Construction option D: 201 ... 300 cm (79.1 ... 118.1 inch)

BC

Model option 1 and Material of Construction option D: 301 ... 400 cm (118.5 ... 157.5 inch)

BD

Model option 1 and Material of Construction option D: 401 ... 500 cm (157.9 ... 196.9 inch)

BE

Model option 1 and Material of Construction option D: 501 ... 610 cm (197.2 ... 240.2 inch)

BF

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 inch)

CA

Model option 1 and Material of Construction option F: 101 ... 200 cm (39.8 ... 78.7 inch)

CB

Model option 1 and Material of Construction option F: 201 ... 300 cm (79.1 ... 118.1 inch)

CC

Model option 1 and Material of Construction option F: 301 ... 400 cm (118.5 ... 157.5 inch)

CD

Model option 1 and Material of Construction option F: 401 ... 500 cm (157.9 ... 196.9 inch)

CE

Model option 1 and Material of Construction option F: 501 ... 610 cm (197.2 ... 240.2 inch)

CF

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 inch)

DA

Model option 1 and Material of Construction option E: 101 ... 200 cm (39.8 ... 78.7 inch)

DB

Model option 1 and Material of Construction option E: 201 ... 300 cm (79.1 ... 118.1 inch)

DC

Selection and Ordering data

Order No.

SITRANS LG200 Single Rod Rigid Probes

7ML1303-

SITRANS LG200 single rod rigid probes are used in applications where coating and buildup are likely. Used in applications with dielectric constant ≥ 10 , or $dk > 1.9$ when installed within 2 ... 6 inch 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 inch)

DD

Model option 1 and Material of Construction option E: 401 ... 500 cm (157.9 ... 196.9 inch)

DE

Model option 1 and Material of Construction option E: 501 ... 610 cm (197.2 ... 240.2 inch)

DF

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 inch)

EA

Model option 1 and Material of Construction option J: 101 ... 200 cm (39.8 ... 78.7 inch)

EB

Model option 1 and Material of Construction option J: 201 ... 300 cm (79.1 ... 118.1 inch)

EC

Model option 1 and Material of Construction option J: 301 ... 400 cm (118.5 ... 157.5 inch)

ED

Model option 1 and Material of Construction option J: 401 ... 500 cm (157.9 ... 196.9 inch)

EE

Model option 1 and Material of Construction option J: 501 ... 610 cm (197.2 ... 240.2 inch)

EF

Add order code Y01 and plain text:

"Insertion length ... cm"

($\frac{3}{4}$ " Process Connection only)

Model option 1 and Material of Construction option D and F: 60 ... 100 cm (23.6 ... 39.4 inch)¹³⁾

FA

Model option 1 and Material of Construction option D and F: 101 ... 180 cm (39.8 ... 72 inch)¹³⁾

FB

- 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 ($\frac{3}{4}$ ")

Level measurement

Continuous level measurement – Guided wave radar transmitters

SITRANS LG200

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Order No. and specify Order code(s).	
Enter the total insertion length in plain text description, max. 610 cm (240.2 inch)	Y01
Stainless steel tag. Measuring-point number/identification (max. 27 characters); specify in plain text	Y15
Inspection Certificate Type 3.1 per EN 10204	C12
Manufacturer's test report (Hydrostatic Test)	C18
NACE MR-0175 materials traceability	D07
Operating Instructions	
English	7ML1998-5KA02
French	7ML1998-5KA11
German	7ML1998-5KA32
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.	7ML1998-5XG81
Accessories	
TFE bottom spacer/endplate	7ML1930-1DJ
SITRANS RD100 Remote display - see Chapter 7	
SITRANS RD200 Remote display - see Chapter 7	
SITRANS RD500 web, datalogging, alarming, ethernet, and modem support for instrumentation - see Chapter 7	7ML5750-1AA00-0

Level measurement

Continuous level measurement – Guided wave radar transmitters

SITRANS LG200

Selection and Ordering data

Order No.

SITRANS LG200 Single Rod Flexible Probes

7ML1304-

SITRANS LG200 single rod flexible probes are used in applications where coating and buildup are possible. Used in applications with dielectric constant ≥ 10 or $dk > 1.9$ when installed within 2 ... 6" of a metal tank wall or in cage or bridle. For solids version only, $dk > 4$.

Note:

In addition to the probe, please select a transmitter configuration to complete the SITRANS LG200 (ordered separately).

For orders of 10 or more, please consult factory.

Model

Single rod flexible probe 1
Single rod bulk solids flexible probe¹⁾ 2

Material of Construction

316/316L (1.4401/1.4404) stainless steel probe and process connection A

Process Connection (size/type)

316/316L (1.4401/1.4404)
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

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

Selection and Ordering data

Order No.

SITRANS LG200 Single Rod Flexible Probes

7ML1304-

SITRANS LG200 single rod flexible probes are used in applications where coating and buildup are possible. Used in applications with dielectric constant ≥ 10 or $dk > 1.9$ when installed within 2 ... 6" of a metal tank wall or in cage or bridle. For solids version only, $dk > 4$.

Flexible Rod Length

(To be shortened by customer as required)

1 meter (39.4 inch) AA
2 meters (78.7 inch) AB
3 meters (118.1 inch) AC
4 meters (157.5 inch) AD
5 meters (196.9 inch) AE
6 meters (236.2 inch) AF
7 meters (275.6 inch) AG
8 meters (315.0 inch) AH
9 meters (354.3 inch) AJ
10 meters (393.7 inch) AK
11 meters (433.1 inch) AL
12 meters (472.4 inch) AM
13 meters (511.8 inch) AN
14 meters (551.2 inch) AP
15 meters (590.6 inch) AQ
16 meters (629.9 inch) AR
17 meters (669.3 inch) AS
18 meters (708.7 inch) AT
19 meters (748.0 inch) AU
20 meters (787.4 inch) AV
21 meters (826.8 inch) AW
22.5 meters (885.8 inch) AX

¹⁾ Available with O-ring option 1 1 only (others on request)

Selection and Ordering data

Order code

Further designs

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

Stainless steel tag. Measuring-point number/identification (max. 27 characters); specify in plain text Y15

Operating Instructions

English 7ML1998-5KA02
French 7ML1998-5KA11
German 7ML1998-5KA32
Multi-language Quick Start manual 7ML1998-5XG81
This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.

Accessories

SITRANS RD100 Remote display - see Chapter 7

SITRANS RD200 Remote display - see Chapter 7

SITRANS RD500 web, datalogging, alarming, ethernet, and modem support for instrumentation - see Chapter 7 7ML5750-1AA00-0

Level measurement

Continuous level measurement – Guided wave radar transmitters

SITTRANS LG200

Selection and Ordering data	Order No.	Selection and Ordering data	Order code
SITTRANS LG200 Chamber Replacement Probe Replaces existing aging torque tube transmitters. Proprietary flanges can be used with existing chambers and cages.	7ML1305-	Further designs Please add "-Z" to Order No. and specify Order code(s). Stainless steel tag. Measuring-point number/identification (max. 27 characters); specify in plain text Inspection Certificate Type 3.1 per EN 10204 NACE MR-0175 materials traceability	
Note: In addition to the probe, please select a transmitter configuration to complete the SITTRANS LG200 (ordered separately). For this option, please consult factory		Operating Instructions 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.	Y15 C12 D07
Model Chamber Replacement Probe ¹⁾	1	Accessories SITTRANS RD100 Remote display - see Chapter 7 SITTRANS RD200 Remote display - see Chapter 7 SITTRANS RD500 web, datalogging, alarming, ethernet, and modem support for instrumentation - see Chapter 7	Order No. 7ML1998-5KA02 7ML1998-5KA11 7ML1998-5KA32 7ML1998-5XG81
Chamber/Process Connection Material of Construction 316/316L stainless steel (B31.1 construction) Carbon Steel (106 Grade B) ²⁾ Carbon Steel (B31.1 construction)	A B C		
Process Connection (size/type) 1½" NPT [(Taper), ANSI/ASME B1.20.1] thread 1½", 150 lb ASME raised face flange 1½", 300 lb ASME raised face flange 1½", 600 lb ASME raised face flange 1½" Socket weld 2" NPT [(Taper), ANSI/ASME B1.20.1] thread 2", 150 lb ASME raised face flange 2", 300 lb ASME raised face flange 2", 600 lb ASME raised face flange 2" Socket weld Other flange sizes available. Please consult factory.	A 0 A 1 A 2 A 3 B 1 B 2 C 1 C 2 D 1 D 2		
Level Range 14 inch (0.356 meters) Other level ranges available. Please consult factory.	1		
Process Connection Configuration Top In, Bottom Out Top In, Bottom Out, with Sight Glass Connections Other configurations available. Please consult factory.	1 2		
Temperature Range 316 °C (600 °F) (Dielectric constant ≥ 10) 260 °C (500 °F) (Dielectric constant ≥ 1.4)	A B		
Chamber Type Fisher 249B Fisher 259B Fisher 249	A B C		

¹⁾ Probe is always 316/316L (1.4401/1.4404) Stainless Steel construction regardless of chamber and process connection materials.

²⁾ Available Process Connection Configuration option 1 only

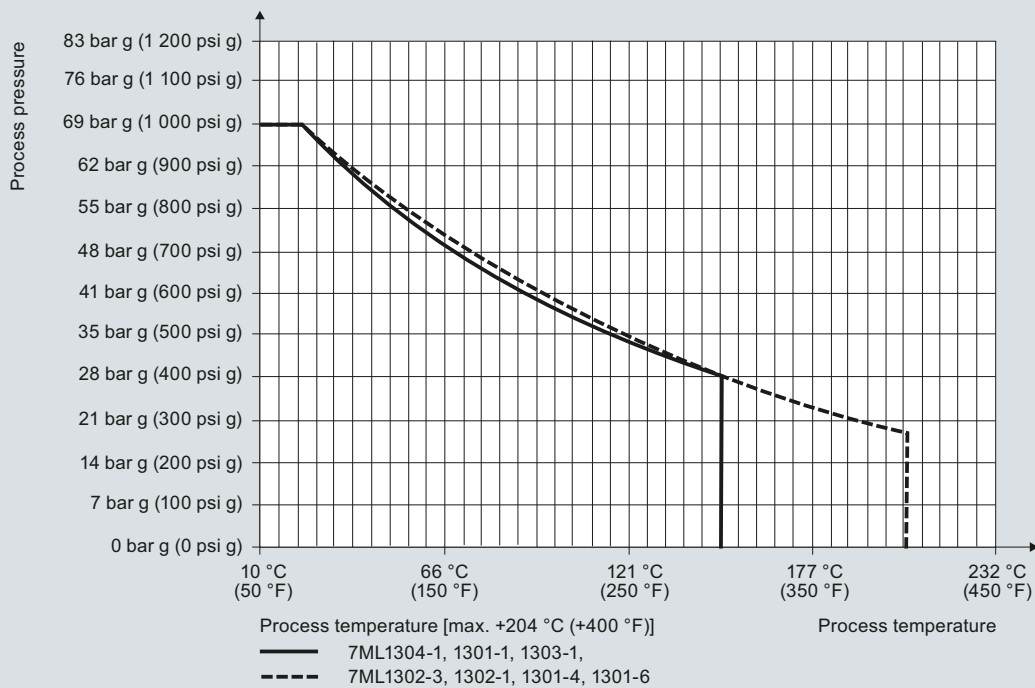
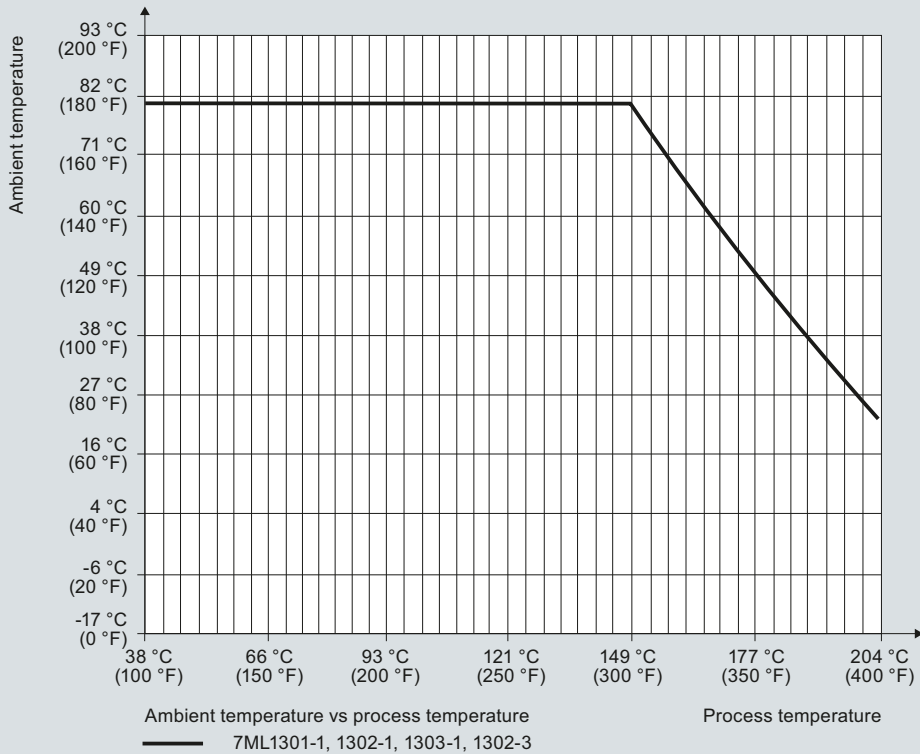
Level measurement

Continuous level measurement – Guided wave radar transmitters

SITRANS LG200

Characteristic curves

4



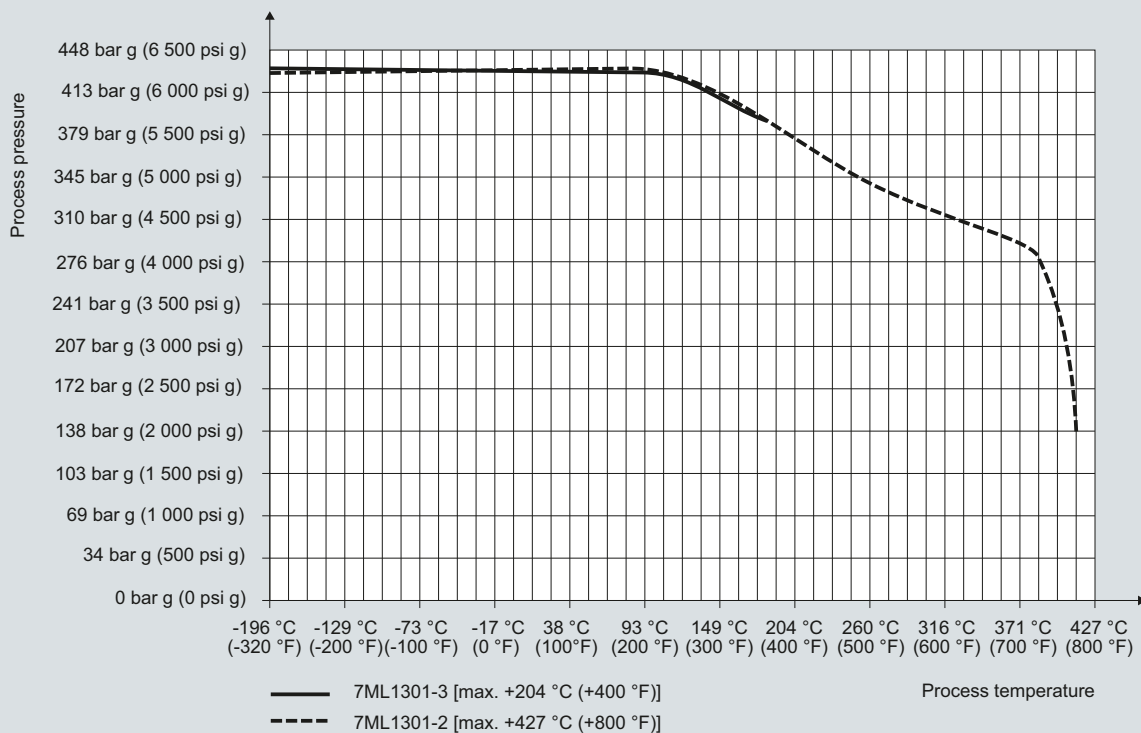
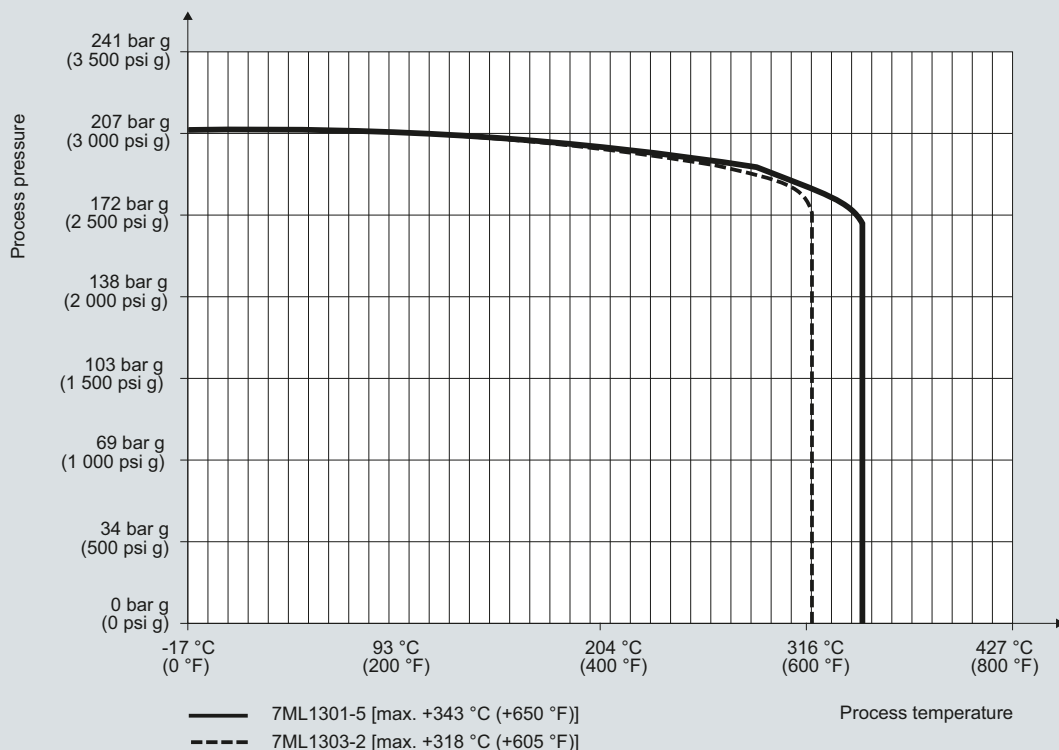
SITRANS LG200 Process Pressure/Temperature derating curves

Level measurement

Continuous level measurement – Guided wave radar transmitters

SITRANS LG200

4



SITRANS LG200 Process Pressure/Temperature derating curves

Level measurement

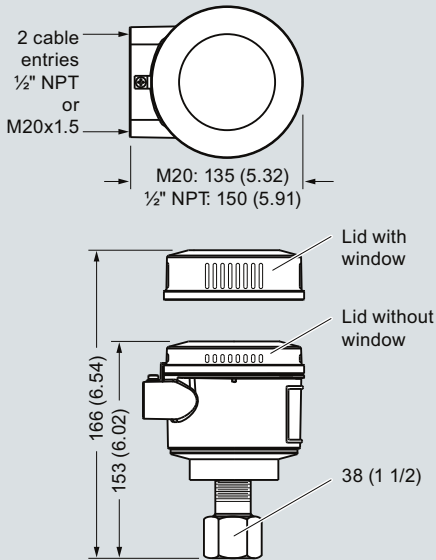
Continuous level measurement – Guided wave radar transmitters

SITRANS LG200

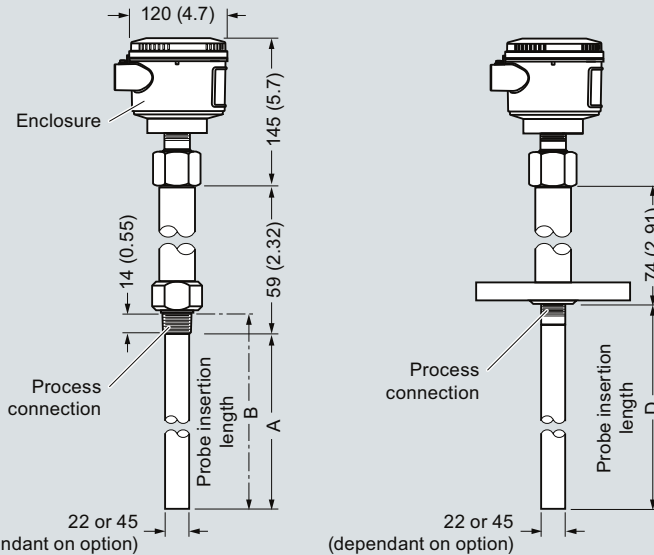
Dimensional drawings

4

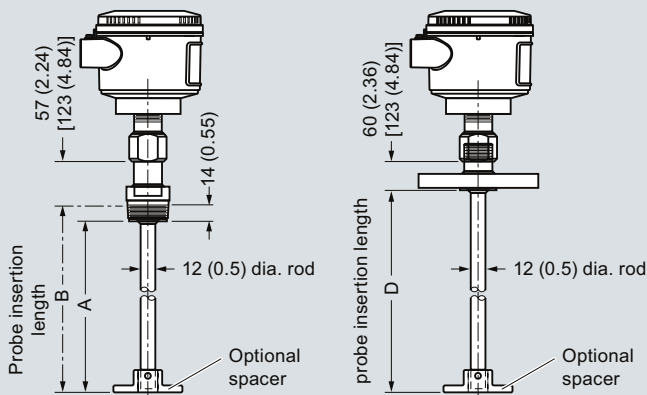
SITRANS LG200 enclosure 7ML1300



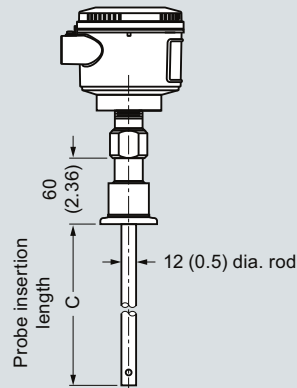
7ML1301-1 (7xA-x) probe, threaded and flanged connection



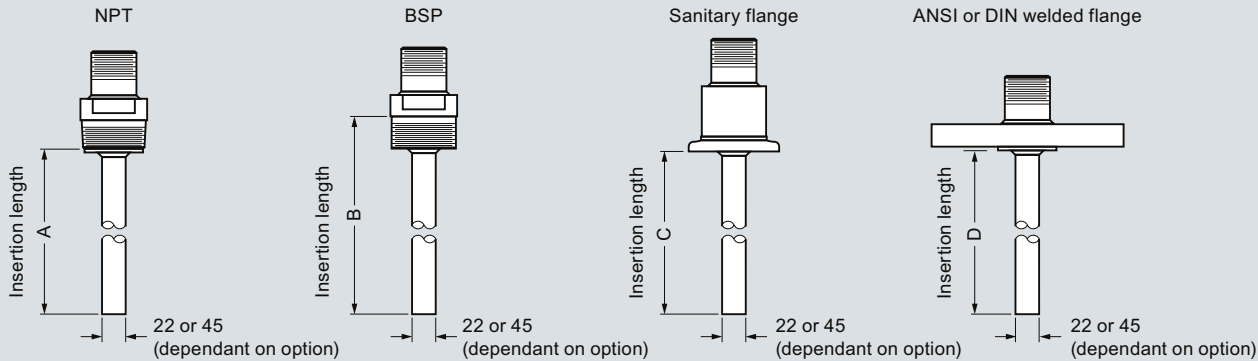
7ML1303-1 (7xF-x) probe, threaded and flanged connection
[7ML1303-2 HT Probe (7xJ-x)]



7ML1303-1D (7xF-E) probe, sanitary connection



Probe connections and insertion lengths (Note: BSP connections differ from NPT)



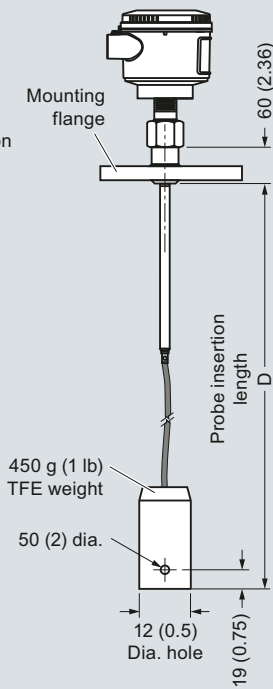
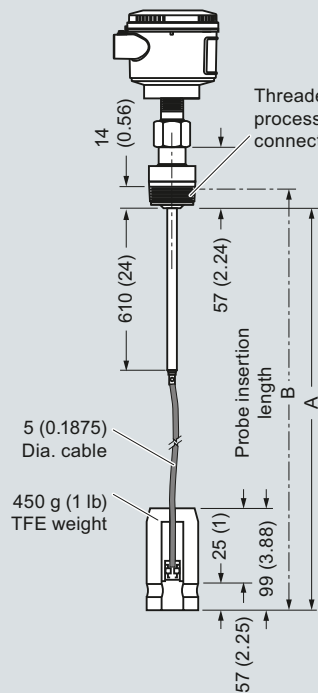
SITRANS LG200, (threaded process connection dimensions shown are NPT connections unless stated otherwise) dimensions in mm (inch)

Level measurement

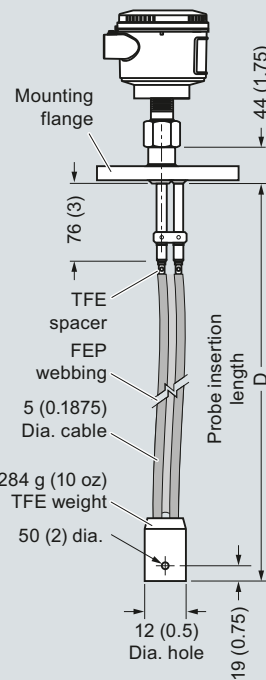
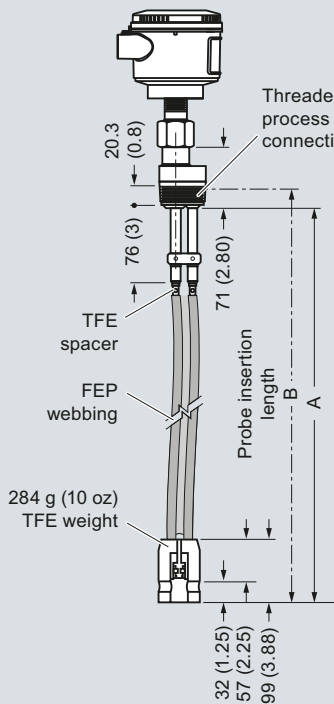
Continuous level measurement – Guided wave radar transmitters

SITRANS LG200

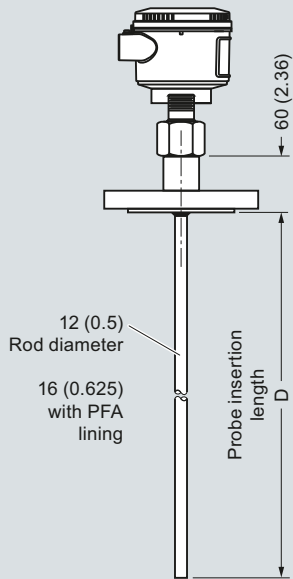
SITRANS LG200
7ML1304-1 (7x1-x) flexible probe,
Threaded or flanged connection



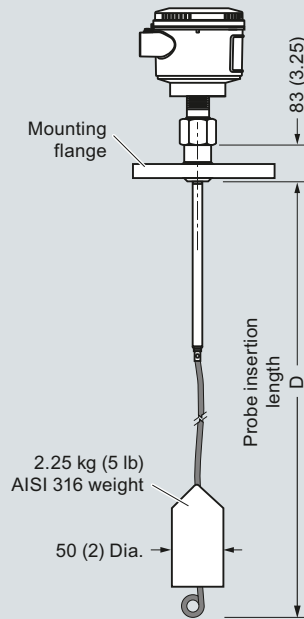
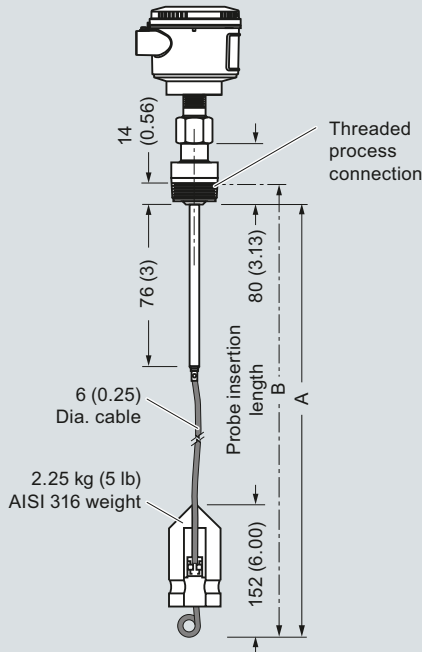
7ML1302-3 (7x7-x) twin rod flexible probe,
Threaded or flanged connection



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)

4

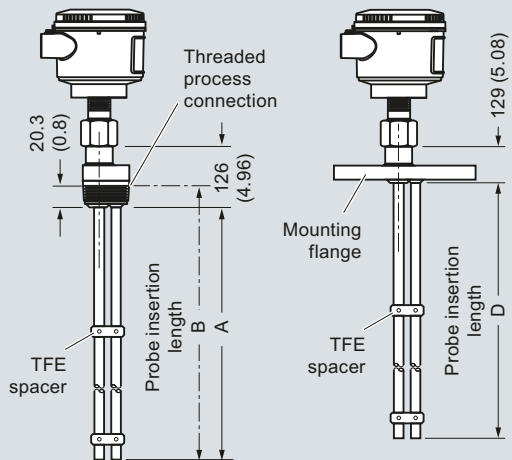
Level measurement

Continuous level measurement – Guided wave radar transmitters

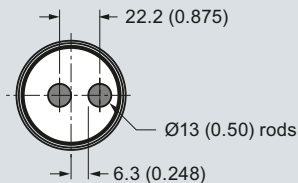
SITRANS LG200

4

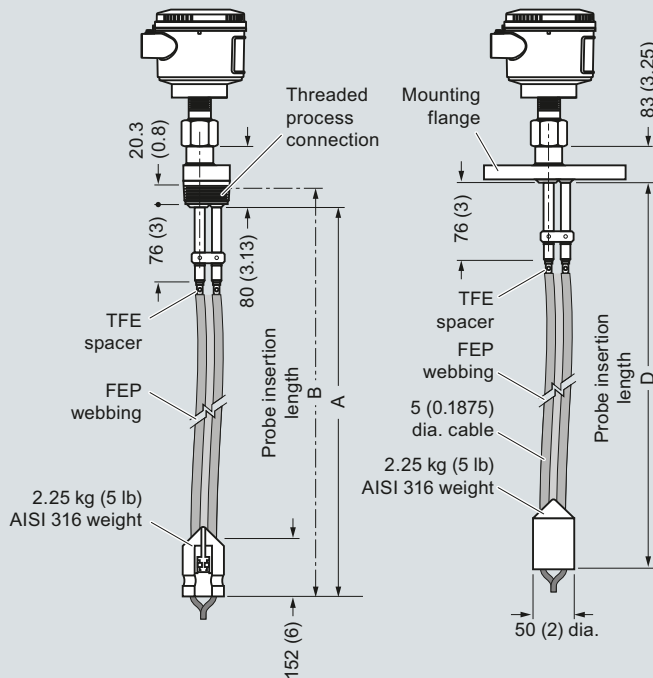
SITRANS LG200
7ML1302-1 (7xB-x) twin rod probe,
threaded and flanged connection



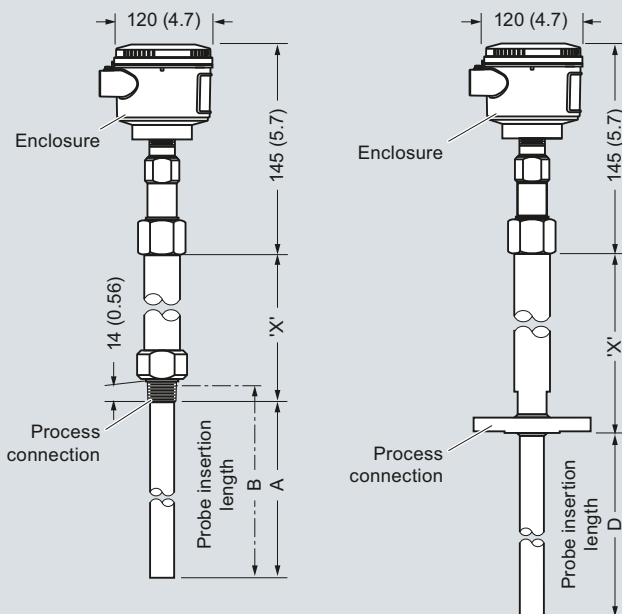
Twin rod end view



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**



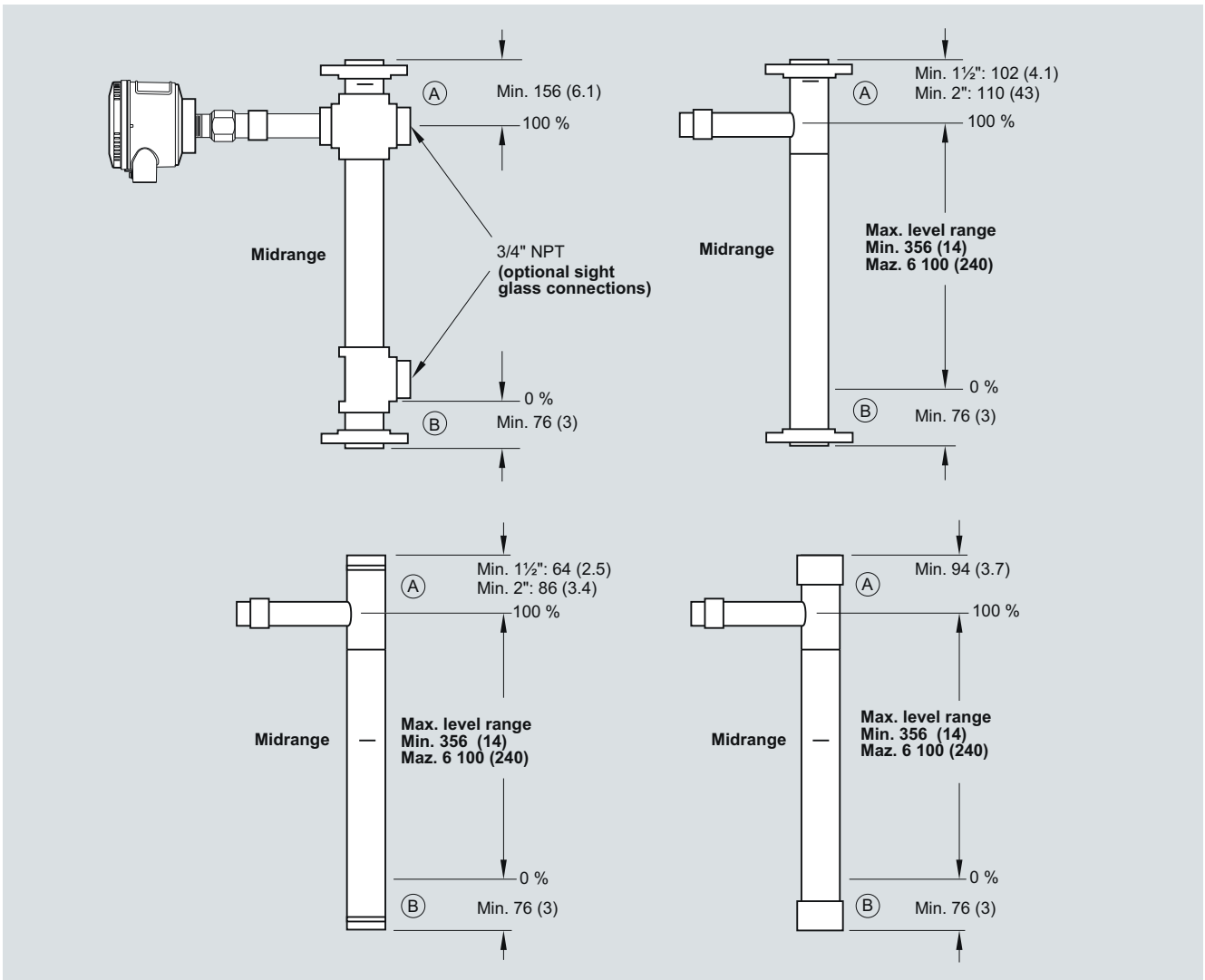
Probes	'X' Dimension (NPT)	'X' Dimension (flanged)
7ML1301-2 (coaxial HT/HP probe)	217 (8.55)	277 (10.91)
7ML1301-3 (coaxial HP probe)	106 (4.18)	166 (6.54)
7ML1301-4 (coaxial overfill/flooded cage probe), 7ML1301-6 (coaxial interface probe)	150 (5.89)	167 (6.57)
7ML1301-5 (coaxial HT/HP steam probe)	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)

4

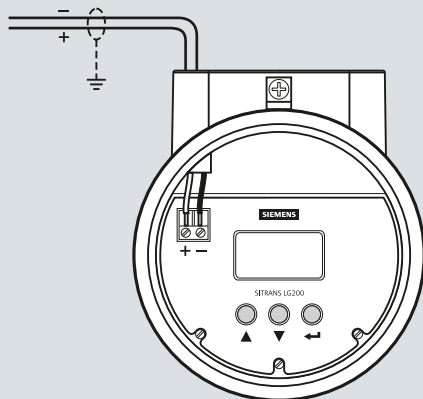
Level measurement

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 inch) 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 signaling according to NAMUR NE 43
- Push-button calibration and programming
- Stilling well (ground tube) version for low dielectric media and non-metallic vessels

Application

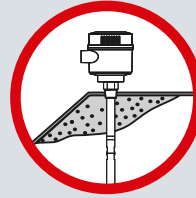
SITRANS LC300 is a 2-wire level measurement instrument combining a sophisticated, yet easy-to-adjust microprocessor with field-proven probes. It is available in four versions: rod, rod with stilling well, cable with PFA insulation, and cable without PFA insulation.

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.

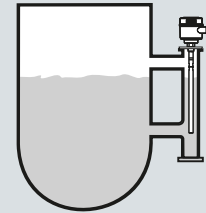
- Key Applications: Conductive and non-conductive media including: liquids and solids in standard industrial processes, bulk solids applications involving dust, and chemical processes involving vapor

Configuration

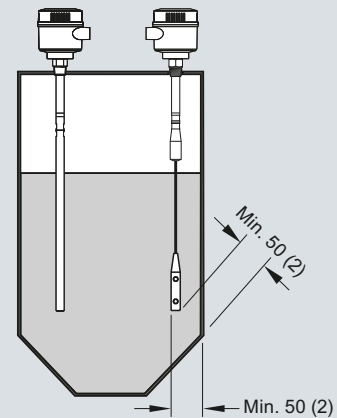
Installation



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 (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

Input	
Measuring range	1.66 ... 3 300 pF
Span	Min. 3.3 pF
Output	
Loop current	Continuous signal 4 ... 20 mA/20 ... 4 mA according to NAMUR 43
Accuracy (transmitter)	
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
Rated operating conditions¹⁾	
Ambient conditions	
• Ambient temperature	-40 ... +85 °C (-40 ... +185 °F) ²⁾
• Installation category	I
• Pollution degree	4
• Ingress protection	Type 4/NEMA 4/IP65 (optional IP68)
Installation conditions	
• Location	Indoor/outdoor
Process pressure	-1 ... +35 bar g (-14.6 ... +511 psi g)
Process temperature	-40 ... +200 °C (-40 ... +392 °F) ³⁾
Min. dielectric constant ϵ_r	1.5
Design	
Material	
• Enclosure	Aluminum, epoxy-coated
Probe diameter	
• Rod version	19 mm (0.75 inch) with PFA jacket
• Cable version	9 mm (0.35 inch) with PFA jacket, 6 mm (0.24 inch) without PFA jacket
Active shield length	
• Rod version	Threaded: 120 mm (4.72 inch) Flanged: 100 mm (3.94 inch)
• Cable version	Threaded: 125 mm (4.92 inch) Flanged: 105 mm (4.13 inch)
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
Power supply	
	12 ... 30 V DC any polarity, 2-wire current loop circuit
User Interface	
Display	Local LCD, 4 digit, each 0 ... 9 and limited alpha characters

Safety	
Measurement current signaling	According to NAMUR NE 43, signal 3.8 ... 20.5 mA, fault \leq 3.6 or \geq 21 mA (22 mA)
Certificates and approvals	
General	CE, CSA _{US/C} , FM, C-TICK (Europe)
Dust Ignition Proof (Intrinsically Safe probe circuit)	ATEX 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 4/312.
- 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 inch), max. 5 000 mm (197 inch)	Min. 300 mm (12 inch), max. 5 000 mm (197 inch)	Min. 1 000 mm (40 inch), max. 25 000 mm (984 inch)
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.	Selection and Ordering data	Order No.
SITRANS LC300, rod version	7ML5670-	SITRANS LC300, rod version	7ML5670-
An inverse frequency shift capacitance continuous level transmitter for liquids and solids applications.	■■■■■ - ■■■■ 0	An inverse frequency shift capacitance continuous level transmitter for liquids and solids applications.	■■■■■ - ■■■■ 0
Process connection		Wetted seals	
Threaded, 316L stainless steel		FKM	0
¾" NPT [(Taper), ANSI/ASME B1.20.1]	0 A	FFKM [for process temperatures above -20 °C (-4 °F)]	1
1" NPT [(Taper), ANSI/ASME B1.20.1]	0 B		
1¼" NPT [(Taper), ANSI/ASME B1.20.1]	0 C	Probe material	
1½" NPT [(Taper), ANSI/ASME B1.20.1]	0 D	19 mm (0.75 inch) diameter 316L stainless steel, PFA lined rod	0
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	Approvals	
R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1 D	General Safety (CSA, FM, CE, C-TICK)	A
G ¾" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3 A	Dust Ignition Proof With IS Probe CE, C-TICK, ATEX II 1/2 D T100 °C	B
G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3 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
G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3 D	Dust Ignition Proof With IS Probe CSA/FM Class II, Div. 1, Gr. E, F, G CSA/FM Class III T4	D
<u>Welded flange, 316L stainless steel, raised face¹⁾</u>		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
1" ASME, 150 lb	5 A		
1" ASME, 300 lb	5 B	Enclosure	
1" ASME, 600 lb	5 C	Aluminum epoxy coated 2 x ½" NPT via adapter - cable inlet, IP65	A
1½" ASME, 150 lb	5 D	Aluminum epoxy coated 2 x M20 x 1.5 cable inlet, IP65	B
1½" ASME, 300 lb	5 E	Aluminum epoxy coated 2 x ½" NPT via adapter - cable inlet, IP68	C
1½" ASME, 600 lb	5 F	Aluminum epoxy coated 2 x M20 x 1.5 cable inlet, IP68	D
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 faced¹⁾</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		
Probe Length (from flange face or including process thread)			
<u>Add order code Y01 and plain text:</u> <u>"Insertion length ... mm"</u>			
300 ... 1 000 mm (11.81 ... 39.37 inch)	A		
1 001 ... 2 000 mm (39.41 ... 78.74 inch)	B		
2 001 ... 3 000 mm (78.78 ... 118.11 inch)	C		
3 001 ... 4 000 mm (118.15 ... 157.48 inch)	D		
4 001 ... 5 000 mm (157.52 ... 196.85 inch)	E		
Thermal isolator			
Without thermal isolator	0		
With thermal isolator [for process connection temperatures over 85 °C (185 °F)]	1		

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

Level measurement

Continuous level measurement – Capacitance transmitters

SITRANS LC300

Selection and Ordering data	Order code
Further designs	
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 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Manufacturer's Test Certificate: M to DIN 55350, Part 18 and to ISO 9000	C11
Inspection Certificate Type 3.1 per EN 10204	C12
Operating Instructions	
English	7ML1998-5HE03
French	7ML1998-5HE11
German	7ML1998-5HE33
Spanish	7ML1998-5HE21
Multi-language Quick Start manual	7ML1998-5QH81
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	
Electronic transmitter kit (includes transmitter and driver)	7ML1830-1KN
SITRANS RD100 Remote display - see Chapter 7	
SITRANS RD200 Remote display - see Chapter 7	
SITRANS RD500 web, datalogging, alarming, ethernet, and modem support for instrumentation - see Chapter 7	7ML5750- 1AA00-0

Level measurement

Continuous level measurement – Capacitance transmitters

SITRANS LC300

Selection and Ordering data	Order No.
SITRANS LC300, stilling well version	7ML5671-
An inverse frequency shift capacitance continuous level transmitter for liquid applications.	0
Process connection	
Threaded, 316L stainless steel	
1½" NPT [(Taper), ANSI/ASME B1.20.1]	0 D
R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1 D
G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3 D
<u>Welded flange, 316L stainless steel, raised face¹⁾</u>	
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 faced¹⁾</u>	
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
Probe Length (from flange face or including process thread)	
<u>Add order code Y01 and plain text: "Insertion length ... mm"</u>	
300 ... 1 000 mm (11.81 ... 39.37 inch)	A
1 001 ... 2 000 mm (39.41 ... 78.74 inch)	B
2 001 ... 3 000 mm (78.78 ... 118.11 inch)	C
3 001 ... 4 000 mm (118.15 ... 157.48 inch)	D
4 001 ... 5 000 mm (157.52 ... 196.85 inch)	E
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	
35 mm (1.38 inch) diameter stilling well, with 19 mm (0.75 inch) diameter 316L stainless steel, PFA lined rod with PTFE spacers	1
Approvals	
General Safety (CSA, FM, CE, C-TICK)	A
Dust Ignition Proof With IS Probe	B
CE, C-TICK, ATEX II 1/2 D T100 °C	C
Flame Proof Enclosure With IS Probe	C
CE, C-TICK, ATEX II 1/2 G EEx d [ia] IIC T6 ... T1, ATEX II 1/2 D T100 °C	D
Dust Ignition Proof With IS Probe	D
CSA/FM Class II, Div. 1, Gr. E, F, G	
CSA/FM Class III T4	

Selection and Ordering data	Order No.
SITRANS LC300, stilling well version	7ML5671-
An inverse frequency shift capacitance continuous level transmitter for liquid applications.	0
Explosion Proof Enclosure With IS Probe	E
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	
Enclosure	
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
Further designs	
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 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Manufacturer's Test Certificate: M to DIN 55350, Part 18 and to ISO 9000	C11
Inspection Certificate Type 3.1 per EN 10204	C12
Operating Instructions	Order No.
English	7ML1998-5HE03
French	7ML1998-5HE11
German	7ML1998-5HE33
Spanish	7ML1998-5HE21
Multi-language Quick Start manual	7ML1998-5QH81
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	
Electronic transmitter kit (includes transmitter and driver)	7ML1830-1KN
SITRANS RD100 Remote display - see Chapter 7	
SITRANS RD200 Remote display - see Chapter 7	
SITRANS RD500 web, datalogging, alarming, ethernet, and modem support for instrumentation - see Chapter 7	7ML5750-1AA00-0

Level measurement

Continuous level measurement – Capacitance transmitters

SITRANS LC300

Selection and Ordering data	Order No.
SITRANS LC300, cable version	7ML5672-
An inverse frequency shift capacitance continuous level transmitter for non-conductive liquids and solids applications.	0
Process connection	
Threaded, 316L stainless steel	
1½" NPT [(Taper), ANSI/ASME B1.20.1]	0 D
R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1 D
G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3 D
<u>Welded flange, 316L stainless steel, raised face¹⁾</u>	
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 faced¹⁾</u>	
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
Probe Length (from flange face or including process thread)	
<u>Add order code Y01 and plain text:</u> <u>"Insertion length ... mm"</u>	
1 000 ... 2 000 mm (39.37 ... 78.74 inch)	A
2 001 ... 4 000 mm (78.78 ... 157.48 inch)	B
4 001 ... 6 000 mm (157.52 ... 236.22 inch)	C
6 001 ... 8 000 mm (236.26 ... 314.96 inch)	D
8 001 ... 10 000 mm (315.00 ... 393.70 inch)	E
10 001 ... 12 000 mm (393.74 ... 472.44 inch)	F
12 001 ... 14 000 mm (472.48 ... 551.18 inch)	G
14 001 ... 16 000 mm (551.22 ... 629.92 inch) ²⁾	H
16 001 ... 18 000 mm (629.96 ... 708.66 inch) ²⁾	J
18 001 ... 20 000 mm (708.70 ... 787.40 inch) ²⁾	K
20 001 ... 22 000 mm (787.44 ... 866.14 inch) ²⁾	L
22 001 ... 24 000 mm (866.18 ... 944.88 inch) ²⁾	M
24 001 ... 25 000 mm (944.92 ... 984.25 inch) ²⁾	N
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	
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

Selection and Ordering data	Order No.
SITRANS LC300, cable version	7ML5672-
An inverse frequency shift capacitance continuous level transmitter for non-conductive liquids and solids applications.	0
Approvals	
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
Enclosure	
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.

²⁾ Cable lengths from 15 000 (590.55 inch) to 25 000 mm (984.25 inch) can be used in non-conductive media. Contact Factory for assistance.

Level measurement

Continuous level measurement – Capacitance transmitters

SITRANS LC300

Selection and Ordering data	Order code
Further designs	
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 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Manufacturer's Test Certificate: M to DIN 55350, Part 18 and to ISO 9000	C11
Inspection Certificate Type 3.1 per EN 10204	C12
Operating Instructions	
English	7ML1998-5HE03
French	7ML1998-5HE11
German	7ML1998-5HE33
Spanish	7ML1998-5HE21
Multi-language Quick Start manual	7ML1998-5QH81
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	
Electronic transmitter kit (includes transmitter and driver)	7ML1830-1KN
SITRANS RD100 Remote display - see Chapter 7	
SITRANS RD200 Remote display - see Chapter 7	
SITRANS RD500 web, datalogging, alarming, ethernet, and modem support for instrumentation - see Chapter 7	7ML5750- 1AA00-0

Level measurement

Continuous level measurement – Capacitance transmitters

SITRANS LC300

Selection and Ordering data	Order No.
SITRANS LC300, PFA coated cable version	7ML5673-
An inverse frequency shift capacitance continuous level transmitter for liquids and solids applications.	
Process connection	
Threaded, 316L stainless steel	
1½" NPT [(Taper), ANSI/ASME B1.20.1]	0 D
R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1 D
G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3 D
<u>Welded flange, 316L stainless steel, raised face¹⁾</u>	
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 faced¹⁾</u>	
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
Probe Length (from flange face or including process thread)	
<u>Add order code Y01 and plain text: "Insertion length ... mm"</u>	
1 000 ... 2 000 mm (39.37 ... 78.74 inch)	A
2 001 ... 4 000 mm (78.78 ... 157.48 inch)	B
4 001 ... 6 000 mm (157.52 ... 236.22 inch)	C
6 001 ... 8 000 mm (236.26 ... 314.96 inch)	D
8 001 ... 10 000 mm (315.00 ... 393.70 inch)	E
10 001 ... 12 000 mm (393.74 ... 472.44 inch)	F
12 001 ... 14 000 mm (472.48 ... 551.18 inch)	G
14 001 ... 16 000 mm (551.22 ... 629.92 inch) ²⁾	H
16 001 ... 18 000 mm (629.96 ... 708.66 inch) ²⁾	J
18 001 ... 20 000 mm (708.70 ... 787.40 inch) ²⁾	K
20 001 ... 22 000 mm (787.44 ... 866.14 inch) ²⁾	L
22 001 ... 24 000 mm (866.18 ... 944.88 inch) ²⁾	M
24 001 ... 25 000 mm (944.92 ... 984.25 inch) ²⁾	N
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

Selection and Ordering data	Order No.
SITRANS LC300, PFA coated cable version	7ML5673-
An inverse frequency shift capacitance continuous level transmitter for liquids and solids applications.	
Probe material	
PFA coated cable and 316L stainless steel cable weight, PEEK isolator and PFA lined active shield	1
Approvals	
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
Enclosure	
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
Mounting eye	
Without Mounting eye	0
With mounting eye	1

- Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.
- Cable lengths from 15 000 (590.55 inch) to 25 000 mm (984.25 inch) can be used in non-conductive media. Contact Factory for assistance.

Level measurement

Continuous level measurement – Capacitance transmitters

SITRANS LC300

Selection and Ordering data	Order code
Further designs	
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 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Manufacturer's Test Certificate: M to DIN 55350, Part 18 and to ISO 9000	C11
Inspection Certificate Type 3.1 per EN 10204	C12
Operating Instructions	
English	7ML1998-5HE03
French	7ML1998-5HE11
German	7ML1998-5HE33
Spanish	7ML1998-5HE21
Multi-language Quick Start manual	7ML1998-5QH81
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	
Electronic transmitter kit (includes transmitter and driver)	7ML1830-1KN
SITRANS RD100 Remote display - see Chapter 7	
SITRANS RD200 Remote display - see Chapter 7	
SITRANS RD500 web, datalogging, alarming, ethernet, and modem support for instrumentation - see Chapter 7	7ML5750- 1AA00-0

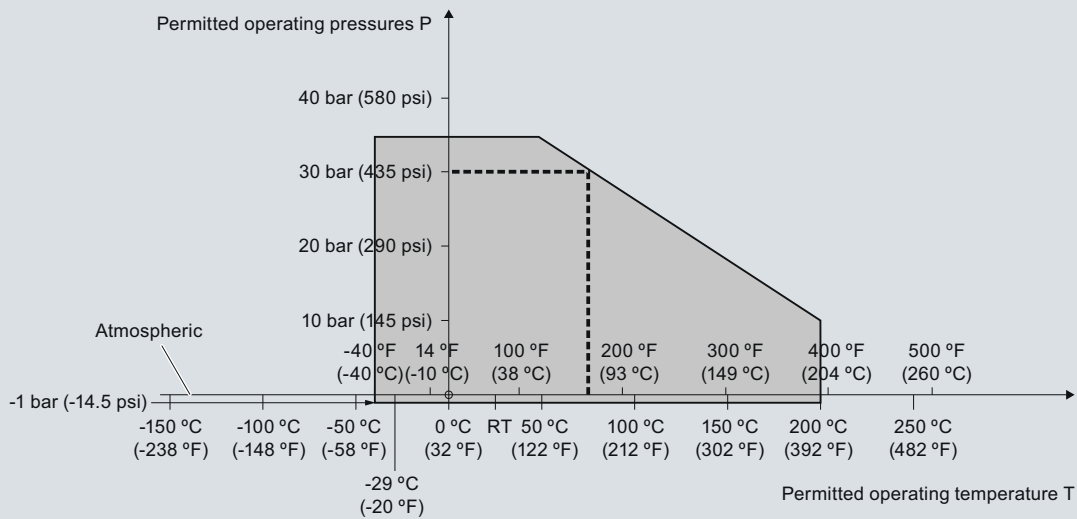
Level measurement

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 (7ML5625)

4

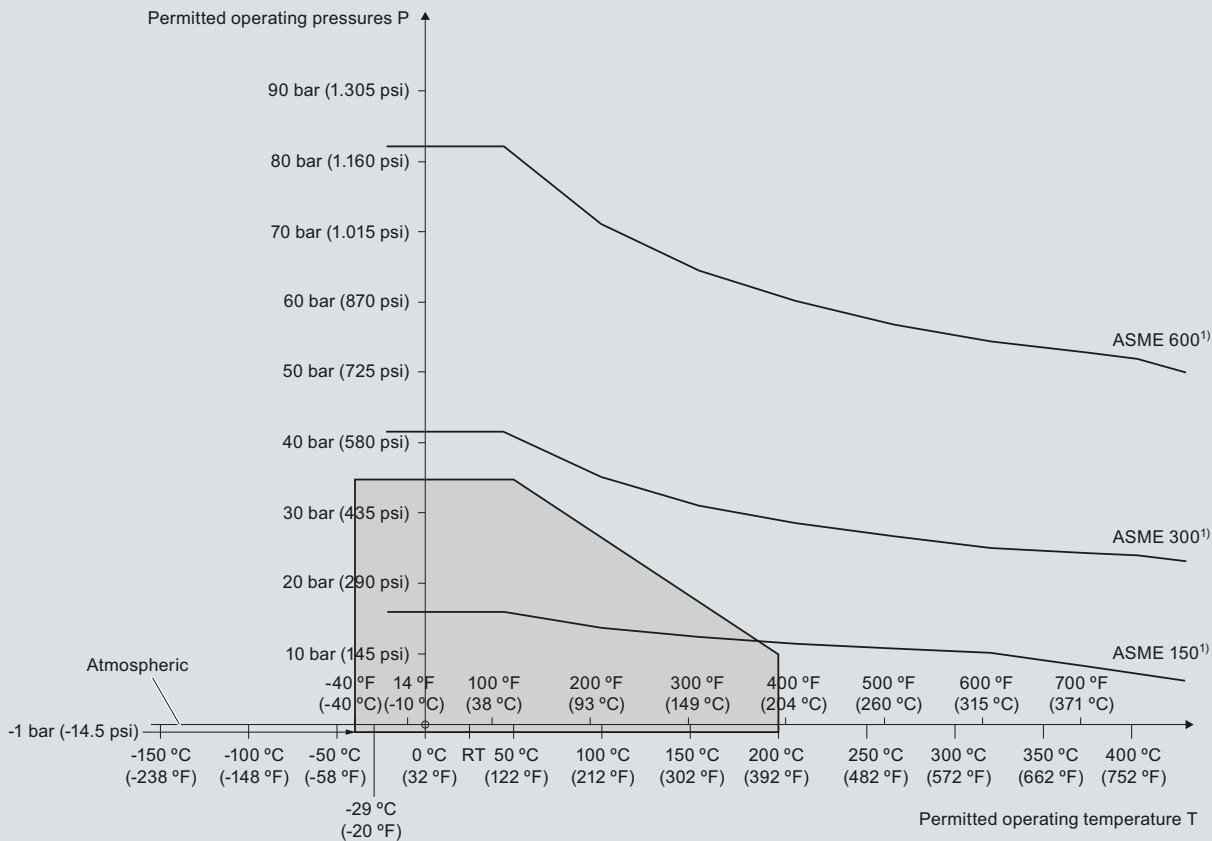
Level measurement

Continuous level measurement – Capacitance transmitters

SITRANS LC300

4

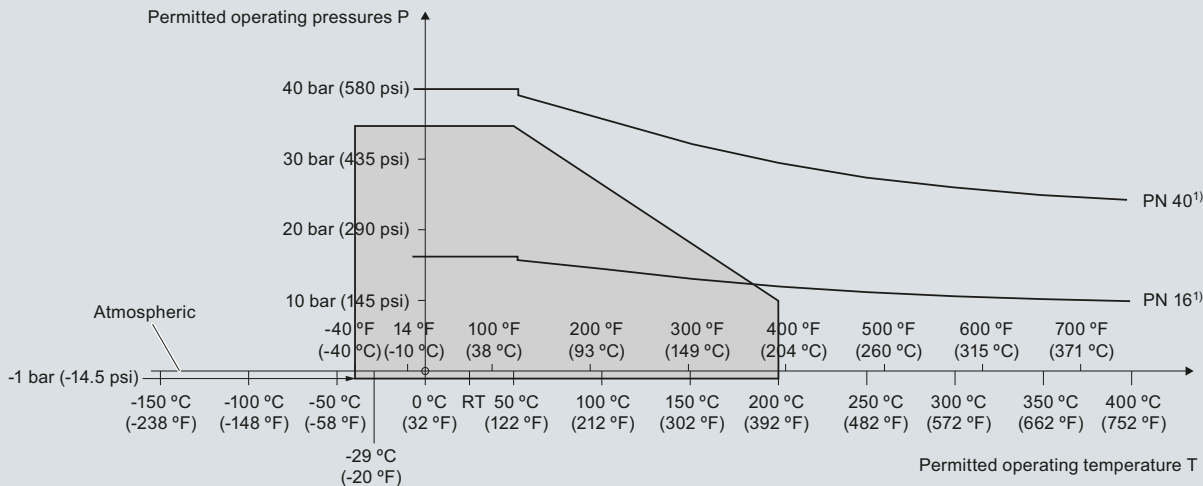
Pressure/temperature curve
 LC300 standard, extended rod and cable probes
 ASME flanged process connections
 (7ML5670, 7ML5671, 7ML5672 and 7ML5673)



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

SITRANS LC300 Process Pressure/Temperature derating curves (7ML5626)

Pressure/temperature curve
 LC300 standard, extended rod and cable probes
 EN flanged process connections
 (7ML5670, 7ML5671, 7ML5672 and 7ML5673)



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

SITRANS LC300 Process Pressure/Temperature derating curves (7ML5626)

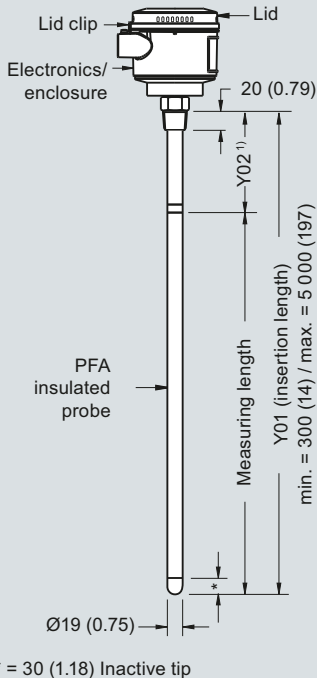
Level measurement

Continuous level measurement – Capacitance transmitters

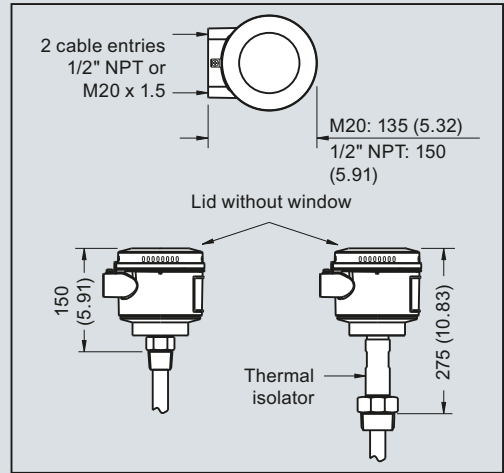
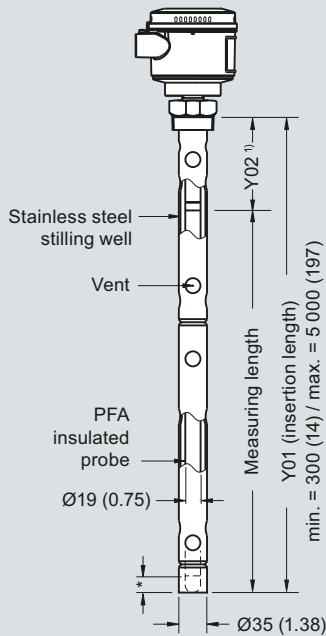
SITRANS LC300

Dimensional drawings

Threaded (7ML5670)



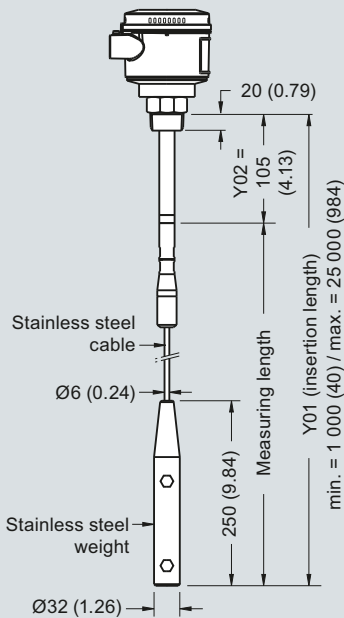
Threaded (7ML5671)



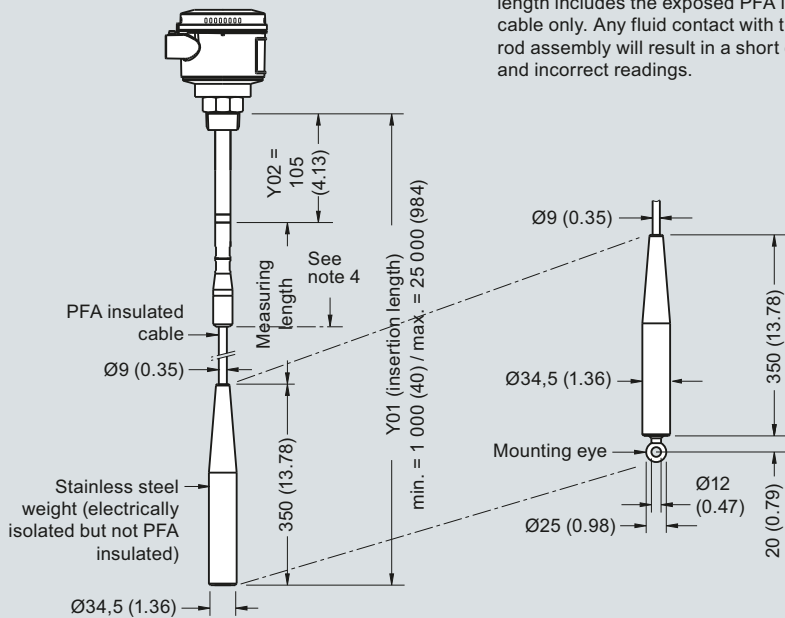
Note:

- 1) Rod version Y02: Shield length = 100 mm (3.9 inch) for threaded including process connection thread length, 100 mm (3.9 inch) 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-insulated²⁾
Threaded (7ML5672)



Cable version, insulated³⁾
Threaded (7ML5673)



SITRANS LC300 - Threaded Process Connections, dimensions in mm (inch)

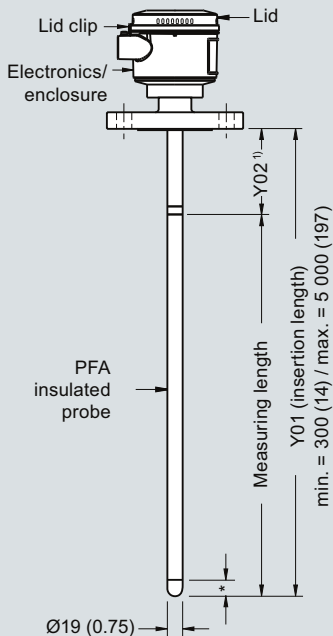
4

Level measurement

Continuous level measurement – Capacitance transmitters

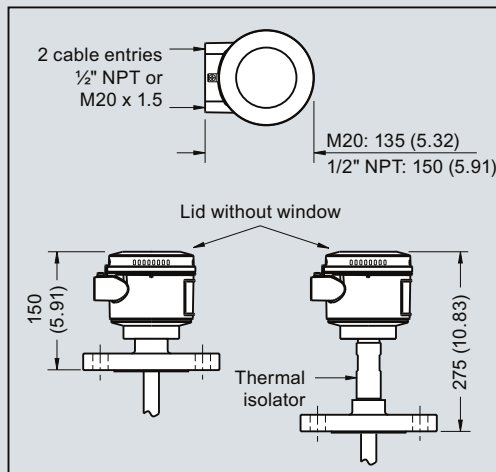
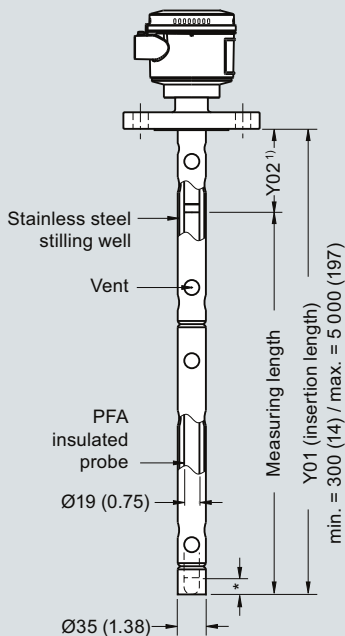
SITRANS LC300

Welded Flange (7ML5670)



* = 30 (1.18) inactive tip

Welded Flange (7ML5671)

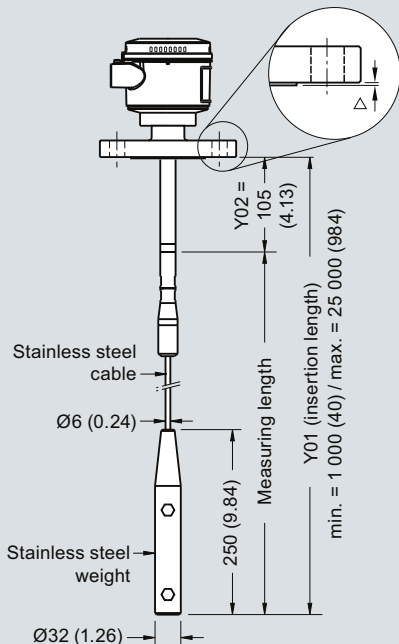


Flange Facing (raised face)	
Flange Class	Facing thickness
△ ASME 150/300	2 (0.08)
△ ASME 600/900	7 (0.28)
△ PN16/40	2 (0.08)

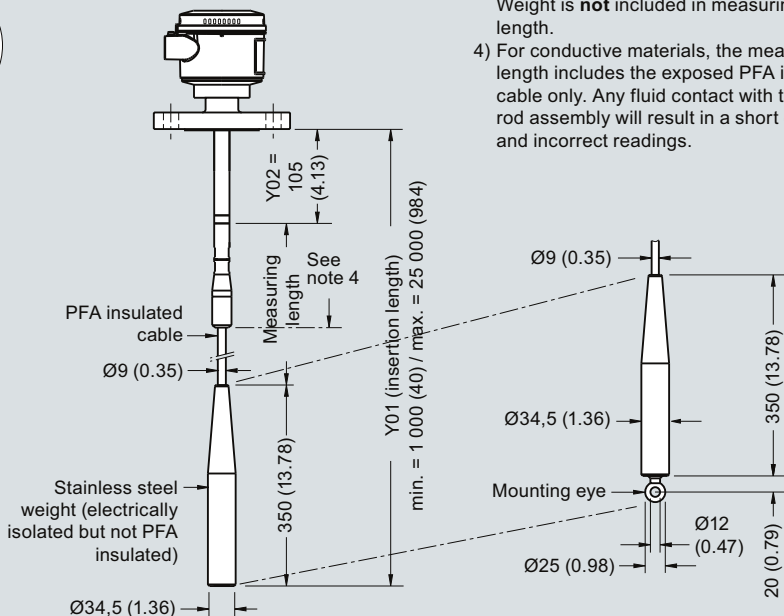
Notes:

- 1) Rod version Y02: Shield length = 100 (3.9) for threaded including process connection thread length, 100 (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-insulated²⁾ Welded Flange (7ML5672)



Cable version, insulated³⁾ Welded Flange (7ML5673)



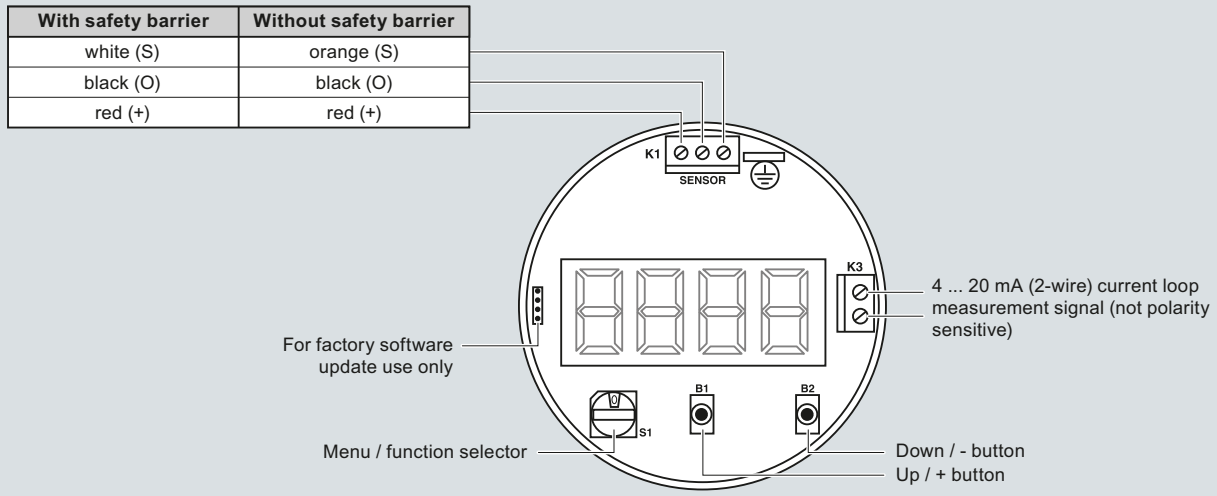
SITRANS LC300 - Flanged Process Connections, dimensions in mm (inch)

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 vapors.

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.

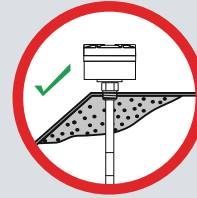
The unique mechanical probe design coupled with a high performance transmitter gives superior performance in toxic and aggressive chemicals, acids, caustics, adhesives and in viscous conductive and non-conductive materials.

The SMART 2-wire transmitter has HART communications for remote commissioning and inspection.

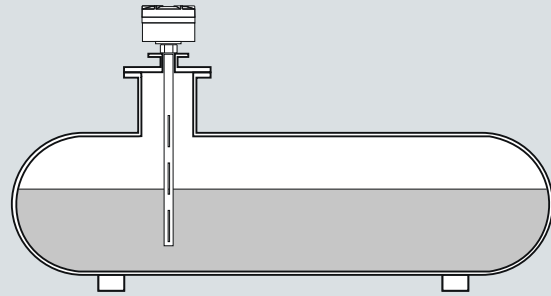
- Key Applications: Oil/water or foam/liquid interface measurement in separators or coalescers, cryogenic applications including CO₂ and liquified natural gas (LNG), distillation/regeneration tanks with high temperatures

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, dimensions in mm (inch)

Technical specifications

Input

Measuring range	1 ... 3 300 pF
Span	Min. 3.3 pF

Output

Solid-state switch	
• Output	Galvanically isolated
• Protection	Bipolar
• Max. switching voltage	<ul style="list-style-type: none"> • 30 V DC • 30 V peak AC
• 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

Rated operating conditions¹⁾

Installation conditions	
• Location	Indoor/outdoor
Ambient conditions	
• Ambient temperature (transmitter)	-40 ... +85 °C (-40 ... +185 °F) ²⁾
• Installation category	II
• Pollution degree	4
Medium conditions	
• Relative dielectric constant ϵ_r	Min. 1.5
• Process temperature	Temperature rating of process seal is pressure dependent. See Pressure/Temperature curves on page 4/327.
- Standard (PFA) ³⁾	-50 ... +200 °C (-58 ... +392 °F)
- Cryogenic version	-200 ... +200 °C (-328 ... +392 °F) Contact ceg.smpi@siemens.com for details.
• Process pressure	Pressure rating of process seal is temperature dependent. See Pressure/Temperature curves on page 4/327.
• Standard (PFA)	-1 ... 150 bar g (2 175 psi g)

Design

Material	
• Wetted parts material	
- Standard rod	316L stainless steel
• Probe insulation (rod)	PFA
• Cable	316 stainless steel/ 316 stainless steel PFA
Probe diameter	
• Rod version	16 mm (0.63 inch) or 24 mm (0.95 inch)
• Cable version	9 mm (0.35 inch) with PFA jacket, 6 mm (0.24 inch) without PFA jacket
Active shield length	
• Minimum (rod version)	50 mm (1.97 inch), customer selectable (order number Y02)
Probe length	
• Rod version	Max. 3.5 m (138 inch) with 16 mm rod, PFA Max. 5.5 m (216 inch) with 24 mm rod, PFA
• Cable version	Max. 35 m (1 378 inch)
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	Aluminum, epoxy-coated
• Cable inlet	2 x 1/2" NPT (2 x M20x1.5, IP68 adapter, optional)
• Degree of protection	Type 4X/NEMA4X/IP65, IP68

Power supply	12 ... 33 V DC
User Interface	
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
Features	
Measurement current signaling	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"> • Inputs/outputs fully galvanically isolated • Polarity-insensitive current loop • Fully potted • Integrated safety barrier
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)
Certificates and approvals	
General Purpose	CE, CSA, FM, C-TICK
Non-incendive/Non-sparking	<ul style="list-style-type: none"> • CSA/FM Class 1, Div. 2, Groups A, B, C, D T4 ATEX II 3G 2D EEx nA [ib] IIC • T6 ... T4 T100 °C
Dust Ignition Proof (Intrinsically Safe Probe Circuit)	<ul style="list-style-type: none"> • CSA/FM Class II and III, Div. 1, Groups E, F, G • ATEX II 1/2 GD EEx d [ia] T6 to T1 T100 °C
Explosion Proof (Intrinsically Safe Probe Circuit)	<ul style="list-style-type: none"> • FM Class 1, Div. 1, Groups A, B, C, D T4 • ATEX II 1/2 GD EEx d [ia] IIC T6 to T1
Marine	Lloyds Register of Shipping, Categories ENV1, ENV2, ENV3 and 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 4/327.

²⁾ Thermal isolator is used if process connection temperature exceeds 85 °C (185 °F).

³⁾ Not recommended for steam environments

Level measurement

Continuous level measurement – Capacitance transmitters

SITRANS LC500

SITRANS LC500 probe version	Standard		Extended Cable version with Rod Sensor
Process connection types	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
Process connection materials			
Stainless steel 316L	Available as standard	Available as standard	Available as standard
Probe insulation			
PFA	Available as standard	Available as standard	Available as standard
Length and Process parameters¹⁾			
Rod length for PFA 16 mm version	Min. 200 mm (7.87 inch) Max. 3 500 mm (137.80 inch)	Min. 200 mm (7.87 inch) Max. 3 500 mm (137.80 inch)	Min. 200 mm (7.87 inch) Max. 3 500 mm (137.80 inch)
Rod length for PFA 24 mm version	Min. 200 mm (7.87 inch) Max. 5 500 mm (216.54 inch)	Min. 200 mm (7.87 inch) Max. 5 500 mm (216.54 inch)	Min. 200 mm (7.87 inch) Max. 5 500 mm (216.54 inch)
Cable length	Min. 1 000 mm (39.37 inch) Max. 35 000 mm (1 377.95 inch)	Min. 1 000 mm (39.37 inch) Max. 35 000 mm (1 377.95 inch)	Min. 5 000 mm (196.85 inch) ²⁾ Max. 35 000 mm (1 377.95 inch) ²⁾
Maximum process pressure	See Pressure/Temperature curves for specific probe type		5 bar g (73 psi g)
Maximum process temperature			100 °C (212 °F)

¹⁾ See Pressure/Temperature curves for specific probe type

²⁾ Refers to total insertion length. See dimension drawing on page 4/337 for further explanation - Not available as standard

Level measurement

Continuous level measurement – Capacitance transmitters

SITRANS LC500

Selection and Ordering data

Order No.

SITRANS LC500, Threaded or Welded Flange with Cable Sensor

7ML5513-

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.

Version¹⁾

Cable, 9 mm (0.35 inch) diameter, 316 stainless steel with PFA insulation, weighted

Add order code Y01 and plain text:

"Insertion length ... mm"

1 000 ... 2 000 mm (39.37 ... 78.74 inch)

0 E

2 001 ... 4 000 mm (78.78 ... 157.48 inch)

1 E

4 001 ... 6 000 mm (157.52 ... 236.22 inch)

2 E

6 001 ... 8 000 mm (236.26 ... 314.96 inch)

3 E

8 001 ... 10 000 mm (315 ... 393.70 inch)

4 E

Longer lengths possible to a max. of 35 000 mm (114.83 ft). Contact ceg.smpi@siemens.com for details.

Cable, 6 mm (0.24 inch) diameter, 316L stainless steel, non-insulated, weighted (non-conductive media only)

Add order code Y01 and plain text:

"Insertion length ... mm"

1 000 ... 2 000 mm (39.37 ... 78.74 inch)²⁾

0 F

2 001 ... 4 000 mm (78.78 ... 157.48 inch)²⁾³⁾

1 F

4 001 ... 6 000 mm (157.52 ... 236.22 inch)²⁾³⁾

2 F

6 001 ... 8 000 mm (236.26 ... 314.96 inch)²⁾³⁾

3 F

8 001 ... 10 000 mm (315 ... 393.70 inch)²⁾³⁾

4 F

Cable lengths up to 25 000 mm (984.25 inch) are possible for non-conductive media. Cable lengths up to 15 000 mm (590.55 inch) are possible for conductive media.

Contact ceg.smpi@siemens.com for details.

Process connection (316L Stainless steel)

Threaded connection

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

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 lb³⁾

D 1

3", ASME, 300 lb³⁾

D 2

3", ASME, 600 lb³⁾

D 3

4", ASME, 150 lb³⁾

E 1

4", ASME, 300 lb³⁾

E 2

4", ASME, 600 lb³⁾

E 3

6", ASME, 150 lb³⁾

F 1

6", ASME, 300 lb³⁾

F 2

6", ASME, 600 lb³⁾

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 40³⁾

M 5

DN 100, PN 16³⁾

N 4

DN 100, PN 40³⁾

N 5

DN 125, PN 16³⁾

P 4

DN 125, PN 40³⁾

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.

SITRANS LC500, Threaded or Welded Flange with Cable Sensor

7ML5513-

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.

Approvals

General Purpose: CE, CSA, FM, C-TICK, KC

1

CSA / FM Class I, Div 2, Groups A, B, C, D

2

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

ATEX II 3G 2D EEx nA [ib] IIC T6 ... T4 T 100 °C

4

ATEX II 1/2 GD EEx d [ia] IIC T6 ... T1 T 100 °C

6

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)

1

2

Options

No additional options

With mounting eye⁴⁾

A

B

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)

A

B

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⁾ Available with non-conductive media only

³⁾ Custom shipping methods required. Contact factory for more details.

⁴⁾ Available in PFA insulated version only

Selection and Ordering data

Order code

Further designs

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 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text

Y15

Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000

C11

Inspection Certificate Type 3.1 per EN 10204

C12

Operating Instructions

See page 4/326

Accessories

See page 4/326

Level measurement

Continuous level measurement – Capacitance transmitters

SITRANS LC500

Selection and Ordering data	Order No.	Selection and Ordering data	Order No.
SITRANS LC500, Threaded or Welded Flange, with Rod 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.	7ML5515-	SITRANS LC500, Threaded or Welded Flange, with Rod 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.	7ML5515-
Version Rod, 16 mm (0.63 inch), PFA insulated <u>Add order code Y01 and Y02 and plain text:</u> <u>"Insertion length ... mm and active shield length ... mm"</u> 200 ... 1 000 mm (7.87 ... 39.37 inch) ¹⁾ 1 001 ... 2 000 mm (39.41 ... 78.74 inch) 2 001 ... 3 000 mm (78.78 ... 118.11 inch) ²⁾ 3 001 ... 3 500 mm (118.15 ... 137.80 inch) ²⁾	0 A 1 A 2 A 3 A	Welded flange, raised face 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 ²⁾ 3", ASME, 300 lb ²⁾ 3", ASME, 600 lb ²⁾ 4", ASME, 150 lb ²⁾ 4", ASME, 300 lb ²⁾ 4", ASME, 600 lb ²⁾ 6", ASME, 150 lb ²⁾ 6", ASME, 300 lb ²⁾ 6", ASME, 600 lb ²⁾	B 1 B 2 B 3 C 1 C 2 C 3 D 1 D 2 D 3 E 1 E 2 E 3 F 1 F 2 F 3
Rod, 16 mm (0.63 inch), PFA insulated with 35 mm (1.38 inch) stilling well in 316L stainless steel <u>Add order code Y01 and Y02 and plain text:</u> <u>"Insertion length ... mm and active shield length ... mm"</u> 200 ... 1 000 mm (7.87 ... 39.37 inch) ¹⁾³⁾ 1 001 ... 2 000 mm (39.41 ... 78.74 inch) ³⁾ 2 001 ... 3 000 mm (78.78 ... 118.11 inch) ²⁾³⁾ 3 001 ... 3 500 mm (118.15 ... 137.80 inch) ²⁾³⁾	0 B 1 B 2 B 3 B	Welded flange, Type A flat faced DN 40, PN 16 DN 40, PN 40 DN 50, PN 16 DN 50, PN 40 DN 80, PN 16 DN 80, PN 40 ²⁾ DN 100, PN 16 ²⁾ DN 100, PN 40 ²⁾ DN 125, PN 16 ²⁾ DN 125, PN 40 ²⁾	K 4 K 5 L 4 L 5 M 4 M 5 N 4 N 5 P 4 P 5
Rod, 24 mm (0.94 inch), PFA insulated <u>Add order code Y01 and Y02 and plain text:</u> <u>"Insertion length ... mm and active shield length ... mm"</u> 200 ... 1 000 mm (7.87 ... 39.37 inch) ⁴⁾ 1 001 ... 2 000 mm (39.41 ... 78.74 inch) ⁴⁾ 2 001 ... 3 000 mm (78.78 ... 118.11 inch) ²⁾⁴⁾ 3 001 ... 4 000 mm (118.15 ... 157.48 inch) ²⁾⁴⁾ 4 001 ... 5 000 mm (173.26 ... 196.88 inch) ²⁾⁴⁾ 5 001 ... 5 500 mm (196.89 ... 216.54 inch) ²⁾⁴⁾	0 C 1 C 2 C 3 C 4 C 5 C	(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5, or EN 1092-1 standard.)	
Rod, 24 mm (0.94 inch), PFA insulated with 48 mm (1.89 inch) stilling well in 316L stainless steel <u>Add order code Y01 and Y02 and plain text:</u> <u>"Insertion length ... mm and active shield length ... mm"</u> 200 ... 1 000 mm (7.87 ... 39.37 inch) ⁵⁾ 1 001 ... 2 000 mm (39.41 ... 78.74 inch) ⁵⁾ 2 001 ... 3 000 mm (78.78 ... 118.11 inch) ²⁾⁵⁾ 3 001 ... 4 000 mm (118.15 ... 157.48 inch) ²⁾⁵⁾ 4 001 ... 5 000 mm (173.26 ... 196.88 inch) ²⁾⁵⁾ 5 001 ... 5 500 mm (196.89 ... 216.54 inch) ²⁾⁵⁾	0 D 1 D 2 D 3 D 4 D 5 D	Approvals General Purpose: CE, CSA, FM, C-TICK, KC CSA / FM Class I, Div 2, Groups A, B, C, D CSA / FM Class II, III, Div 1, Groups E, F, G, T4 ATEX II 3G 2D EEx nA [ib] IIC T6 ... T4 T 100 °C ATEX II 1/2 GD EEx d [ia] IIC T6 ... T1 T 100 °C FM Class I, Div.1, Groups A, B, C, D, T4	1 2 4 6
Process connection (316L Stainless steel) Threaded connection ¾" NPT [(Taper), ANSI/ASME B1.20.1] 1" NPT [(Taper), ANSI/ASME B1.20.1] 1½" NPT [(Taper), ANSI/ASME B1.20.1] 2" 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] R 2" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] 1¼" NPT [(Taper), ANSI/ASME B1.20.1] 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] G 2" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	A 0 B 0 C 0 D 0 E 0 F 0 J 0 K 0 N 0 P 0 R 0 S 0 T 0	Enclosure/Cable inlet Aluminum epoxy coated 2 x ½" NPT, IP68 2 x M20 x1.5 (IP68, adapter)	1 2
		Options No additional options Slotted holes instead of standard vent holes in stilling well (refer to Operating Instructions for dimensions.) ⁶⁾	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) Remote electronics with mounting bracket and cable ⁷⁾	A B C D E F
		<ul style="list-style-type: none"> Length: 2 m (79 inch) Length: 3 m (118 inch) Length: 4 m (158 inch) Length: 5 m (197 inch) 	C D E F

Level measurement

Continuous level measurement – Capacitance transmitters

SITRANS LC500

Selection and Ordering data

Order No.

SITRANS LC500, Threaded or Welded Flange, with Rod 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.

7ML5515-



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 ... 3B, 0D ... 5D and 0F only
- 7) Available with approval option 1 only

Selection and Ordering data

Order code

Further designs

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

Insertion length, specify in plain text: Y01: ... mm

Y01

Active shield length, specify in plain text [min. length is 50 mm (2 inch)]: Y02: ... mm

Y02

Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]:
Measuring-point number/identification (max. 27 characters) specify in plain text

Y15

Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000

C11

Inspection Certificate Type 3.1 per EN 10204

C12

Manufacturing Test Report (Electrode Test)

C18

Operating Instructions

See page 4/326

Accessories

See page 4/326

Level measurement

Continuous level measurement – Capacitance transmitters

SITRANS LC500

Selection and Ordering data	Order No.	Selection and Ordering data	Order No.
SITRANS LC500, Single Piece Flanged with Rod Sensor	7ML5517-	SITRANS LC500, Single Piece Flanged with Rod Sensor	7ML5517-
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.		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		<u>Single piece flange, Type B1 raised face</u>	
Rod, 16 mm (0.63 inch), PFA insulated <u>Add order code Y01 and Y02 and plain text:</u> <u>"Insertion length ... mm and active shield length ... mm"</u> 250 ... 1 000 mm (9.84 ... 39.37 inch) ¹⁾	0 A	DN 40, PN 16	K 4
1 001 ... 2 000 mm (39.41 ... 78.74 inch)	1 A	DN 40, PN 40	K 5
2 001 ... 3 000 mm (78.78 ... 118.11 inch) ²⁾	2 A	DN 50, PN 16	L 4
3 001 ... 3 500 mm (118.15 ... 137.80 inch) ²⁾	3 A	DN 50, PN 40	L 5
Rod, 16 mm (0.63 inch), PFA insulated with 35 mm (1.34 inch) stilling well in 316L stainless steel <u>Add order code Y01 and Y02 and plain text:</u> <u>"Insertion length ... mm and active shield length ... mm"</u> 250 ... 1 000 mm (9.84 ... 39.37 inch)	0 B	DN 80, PN 16	M 4
1 001 ... 2 000 mm (39.41 ... 78.74 inch)	1 B	DN 80, PN 40 ²⁾	M 5
2 001 ... 3 000 mm (78.78 ... 118.11 inch) ²⁾	2 B	DN 100, PN 16 ²⁾	N 4
3 001 ... 3 500 mm (118.15 ... 137.80 inch) ²⁾	3 B	DN 100, PN 40 ²⁾	N 5
Rod, 24 mm (0.94 inch), PFA insulated <u>Add order code Y01 and Y02 and plain text:</u> <u>"Insertion length ... mm and active shield length ... mm"</u> 250 ... 1 000 mm (9.84 ... 39.37 inch)	0 C	DN 125, PN 16 ²⁾	P 4
1 001 ... 2 000 mm (39.41 ... 78.74 inch)	1 C	DN 125, PN 40 ²⁾	P 5
2 001 ... 3 000 mm (78.78 ... 118.11 inch) ²⁾	2 C	<u>Single piece flange with PTFE flange facing (applicable with versions 0A ... 3A and 0C ... 5C)⁴⁾</u>	
3 001 ... 4 000 mm (118.15 ... 157.48 inch) ²⁾	3 C	1½" ASME, 150 lb	B 4
4 001 ... 5 000 mm (173.26 ... 196.88 inch) ²⁾	4 C	1½", ASME, 300 lb	B 5
5 001 ... 5 500 mm (196.89 ... 216.54 inch) ²⁾	5 C	1½", ASME, 600 lb	B 6
Rod, 24 mm (0.94 inch), PFA insulated with 48 mm (1.89 inch) stilling well in 316L stainless steel <u>Add order code Y01 and Y02 and plain text:</u> <u>"Insertion length ... mm and active shield length ... mm"</u> 250 ... 1 000 mm (9.84 ... 39.37 inch)	0 D	2", ASME, 150 lb	C 4
1 001 ... 2 000 mm (39.41 ... 78.74 inch) ²⁾³⁾	1 D	2", ASME, 300 lb	C 5
2 001 ... 3 000 mm (78.78 ... 118.11 inch) ²⁾³⁾	2 D	2", ASME, 600 lb	C 6
3 001 ... 4 000 mm (118.15 ... 157.48 inch) ²⁾³⁾	3 D	3", ASME, 150 lb ²⁾	D 4
4 001 ... 5 000 mm (173.26 ... 196.88 inch) ²⁾³⁾	4 D	3", ASME, 300 lb ²⁾	D 5
5 001 ... 5 500 mm (196.89 ... 216.54 inch) ²⁾³⁾	5 D	3", ASME, 600 lb ²⁾	D 6
Process connection (316L Stainless steel)		4", ASME, 150 lb ²⁾	E 4
<u>Single piece flange, raised face</u>		4", ASME, 300 lb ²⁾	E 5
1½", ASME, 150 lb	B 1	4", ASME, 600 lb ²⁾	E 6
1½", ASME, 300 lb	B 2	6", ASME, 150 lb ²⁾	F 4
1½", ASME, 600 lb	B 3	6", ASME, 300 lb ²⁾	F 5
2", ASME, 150 lb	C 1	6", ASME, 600 lb ²⁾	F 6
2", ASME, 300 lb	C 2	<u>Single piece flange with PTFE flange facing (applicable with versions 0A ... 3A, 0C ... 5C)⁴⁾</u>	
2", ASME, 600 lb	C 3	DN 40, PN 16	K 6
3", ASME, 150 lb ²⁾	D 1	DN 40, PN 40	K 7
3", ASME, 300 lb ²⁾	D 2	DN 50, PN 16	L 6
3", ASME, 600 lb ²⁾	D 3	DN 50, PN 40	L 7
4", ASME, 150 lb ²⁾	E 1	DN 80, PN 16	M 6
4", ASME, 300 lb ²⁾	E 2	DN 80, PN 40 ²⁾	M 7
4", ASME, 600 lb ²⁾	E 3	DN 100, PN 16 ²⁾	N 6
6", ASME, 150 lb ²⁾	F 1	DN 100, PN 40 ²⁾	N 7
6", ASME, 300 lb ²⁾	F 2	DN 125, PN 16 ²⁾	P 6
6", ASME, 600 lb ²⁾	F 3	DN 125, PN 40 ²⁾	P 7
		(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5, or EN 1092-1 standard.)	

Level measurement

Continuous level measurement – Capacitance transmitters

SITRANS LC500

Selection and Ordering data

Order No.

SITRANS LC500, Single Piece Flanged with Rod Sensor

7ML5517-

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.

Approvals

General Purpose: CE, CSA, FM, C-TICK, KC
 CSA / FM Class I, Div 2, Groups A, B, C, D
 CSA / FM Class II, III, Div 1, Groups E, F, G T4
 ATEX II 3G 2D EEx nA [ib] IIC T6 ... T4 T 100 °C
 ATEX II 1/2 GD EEx d [ia] IIC T6 ... T1 T 100 °C
 FM Class I, Div.1, Groups A, B, C, D, T4

Enclosure/Cable inlet

Aluminum epoxy coated
 2 x ½" NPT, IP68
 2 x M20 x1.5 (IP68, adapter)

Options

None
 Slotted holes instead of standard vent holes in stilling well (Refer to manual for dimensions)⁵⁾

Thermal isolator/remote version

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 cable⁶⁾

- Length: 2 m (79 inch)
- Length: 3 m (118 inch)
- Length: 4 m (158 inch)
- Length: 5 m (197 inch)

Electronic output

2-wire loop current 4 ... 20 mA
 (transmitter MSP 2002-2_3300 pF)

- 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 ... F3, L4 ... P5
- 4) Not available with versions 0E and 0F
- 5) Available with version 0B ... 3B, 0D ... 5D and 0F only
- 6) Available with approval option 1 only

Selection and Ordering data

Order code

Further designs

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

Insertion length, specify in plain text: Y01: ... mm

Y01

Active shield length, specify in plain text [min. length is 50 mm (2 inch)]: Y02: ... mm

Y02

Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]:
 Measuring-point number/identification (max. 27 characters) specify in plain text

Y15

Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000

C11

Inspection Certificate Type 3.1 per EN 10204

C12

Manufacturing Test Report (Electrode Test)

C18

Operating Instructions

See page 4/326

Accessories

See page 4/326

Level measurement

Continuous level measurement – Capacitance transmitters

SITRANS LC500

Selection and Ordering data	Order No.
SITRANS LC500, Extended Cable version with Rod Sensor, threaded connection or welded flange¹⁾ Inverse frequency shift capacitance level and interface transmitter for short range continuous measurement in large storage vessels.	7ML5523-
Version²⁾ Rod, 16 mm (0.63 inch), PFA insulated and 316L stainless steel flexible extension tube Total insertion length: <u>Add order code Y01 and 4/320ain text: "Total insertion length ... mm and Y02 and plain text: "</u> <u>Active shield length ... mm"</u> ³⁾⁴⁾	
<ul style="list-style-type: none"> • 5 000 ... 10 000 mm (196.85 ... 393.70 inch)¹⁾ • 10 001 ... 15 000 mm (393.74 ... 590.55 inch)¹⁾ • 15 001 ... 20 000 mm (590.59 ... 787.40 inch)¹⁾ • 20 001 ... 25 000 mm (787.44 ... 984.25 inch)¹⁾ • 25 001 ... 30 000 mm (984.29 ... 1 181.10 inch)¹⁾ • 30 001 ... 35 000 mm (1 181.14 ... 1 377.95 inch)¹⁾ 	0 A 1 A 2 A 3 A 4 A 5 A
Rod, 24 mm (0.94 inch), PFA insulated and 316L stainless steel flexible extension tube Total insertion length: <u>Add order code Y01 and plain text: "Total insertion length ... mm and Y02 and plain text: "</u> <u>Active shield length ... mm"</u> ³⁾⁴⁾	
<ul style="list-style-type: none"> • 5 000 ... 10 000 mm (196.85 ... 393.70 inch)¹⁾ • 10 001 ... 15 000 mm (393.74 ... 590.55 inch)¹⁾ • 15 001 ... 20 000 mm (590.59 ... 787.40 inch)¹⁾ • 20 001 ... 25 000 mm (787.44 ... 984.25 inch)¹⁾ • 25 001 ... 30 000 mm (984.29 ... 1 181.10 inch)¹⁾ • 30 001 ... 35 000 mm (1 181.14 ... 1 377.95 inch)¹⁾ 	0 B 1 B 2 B 3 B 4 B 5 B
Process connection (316L stainless steel)	
<u>Threaded connection</u>	
2" NPT [(Taper), ANSI/ASME B1.20.1]	A 0
R 2" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	B 0
G 2" [(BSPP), EN ISO 228-1/PF (JIS-P) JIS B 0202]	D 0
<u>Welded flange, raised face</u>	
2", ASME, 150 lb	C 1
2", ASME, 300 lb	C 2
3", ASME, 150 lb ¹⁾	D 1
3", ASME, 300 lb ¹⁾	D 2
4", ASME, 150 lb ¹⁾	E 1
4", ASME, 300 lb ¹⁾	E 2
6", ASME, 150 lb ¹⁾	F 1
6", ASME, 300 lb ¹⁾	F 2
<u>Welded flange, Type A flat faced</u>	
DN 50, PN 16	L 4
DN 50, PN 40	L 5
DN 80, PN 16	M 4
DN 80, PN 40 ¹⁾	M 5
DN 100, PN 16 ¹⁾	N 4
DN 100, PN 40 ¹⁾	N 5
DN 125, PN 16 ¹⁾	P 4
DN 125, PN 40 ¹⁾	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, KC	1
CSA / FM Class I, Div 2, Groups A, B, C, D	2
CSA / FM Class II, III, Div 1, Groups E, F, G T4	
ATEX II 3G 2D EEx nA [ib] IIC T6 ... T4 T 100 °C	
ATEX II 1/2 GD EEx d [ia] IIC T6 ... T1 T 100 °C	4
FM Class I, Div 1, Groups A, B, C, D T4	6

Selection and Ordering data	Order No.
SITRANS LC500, Extended Cable version with Rod Sensor, threaded connection or welded flange¹⁾ Inverse frequency shift capacitance level and interface transmitter for short range continuous measurement in large storage vessels.	7ML5523-
Enclosure/Cable inlet <u>Aluminum epoxy coated</u> 2 x 1/2" NPT, IP68 2 x M20x1.5 (IP68, adapter)	1 2
Options No additional options With mounting eye	A B
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)	A B
Electronic output 2-wire loop current 4 ... 20 mA (transmitter MSP 2002-2 _3300 pF)	1

- 1) Custom shipping methods required. Contact factory for more details.
- 2) A minimum span of 3 pF must be maintained.
- 3) See dimension drawings on page 4/337 for further explanation of Y01.
- 4) Inactive length is equal to the flexible extension plus transition. See dimension drawings on page 4/337 for further explanation of Y02.

Level measurement

Continuous level measurement – Capacitance transmitters

SITRANS LC500

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Order No. and specify Order code(s).	
Insertion length, specify in plain text: Y01: to mm	Y01
Active shield length, specify in plain text [min. length is 50 mm (2 inch)]: Y02: to mm	Y02
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Manufacturer's test certificate M to DIN 55350, Part 18 and to ISO 9000	C11
Inspection Certificate Type 3.1 per EN 10204	C12
Operating Instructions	
English	7ML1998-5GE04
French	7ML1998-5GE12
Spanish	7ML1998-5GE21
German	7ML1998-5GE33
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	
<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 inch)	7ML1830-1JA
M20x1.5 General Purpose Cable Entry IP68/IP69K NEMA6, -40 ... -100 °C (-40 ... -212 °F), cable size 7 ... 12 mm (0.275 ... 0.472 inch)	7ML1830-1JC
<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 inch)	7ML1830-1JB
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 inch)	7ML1830-1JD
Transmitter, MSP 2002-1, 330 PF ¹⁾	7ML1830-1JP
Transmitter, MSP 2002-2, 3 300 PF ¹⁾	7ML1830-1JQ
Transmitter, MSP 2002-3, 6 600 PF (used with conductive fluids and probe lengths >10 000 mm) ¹⁾	7ML1830-1JR
SITRANS RD100 Remote display - see Chapter 7	
SITRANS RD200 Remote display - see Chapter 7	
SITRANS RD500 web, datalogging, alarming, ethernet, and modem support for instrumentation - see Chapter 7	7ML5750-1AA00-0

¹⁾ Transmitters not suitable for Intrinsically Safe application (ATEX II 1G EEx ia IIC T4 or CSA/FM Class 1 Div 1 Groups A,B,C and D)

Please contact ceg.smpi@siemens.com for special requests.

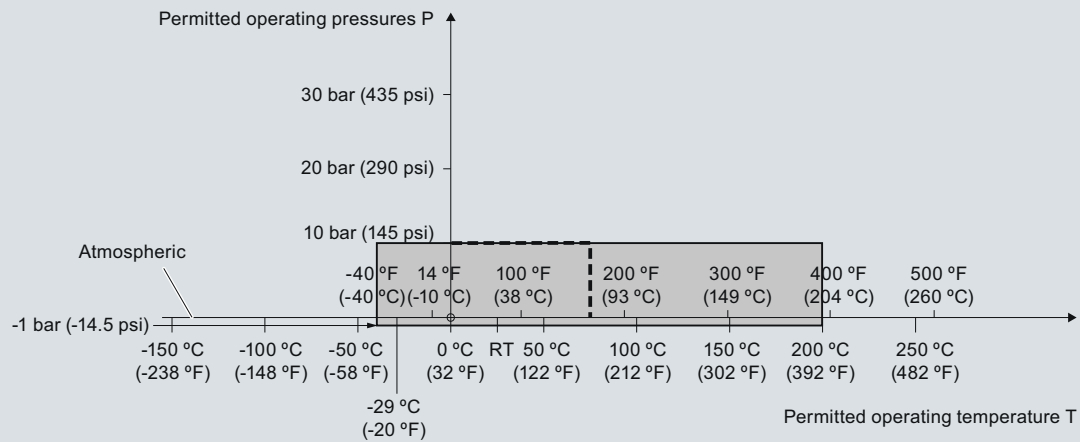
Level measurement

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

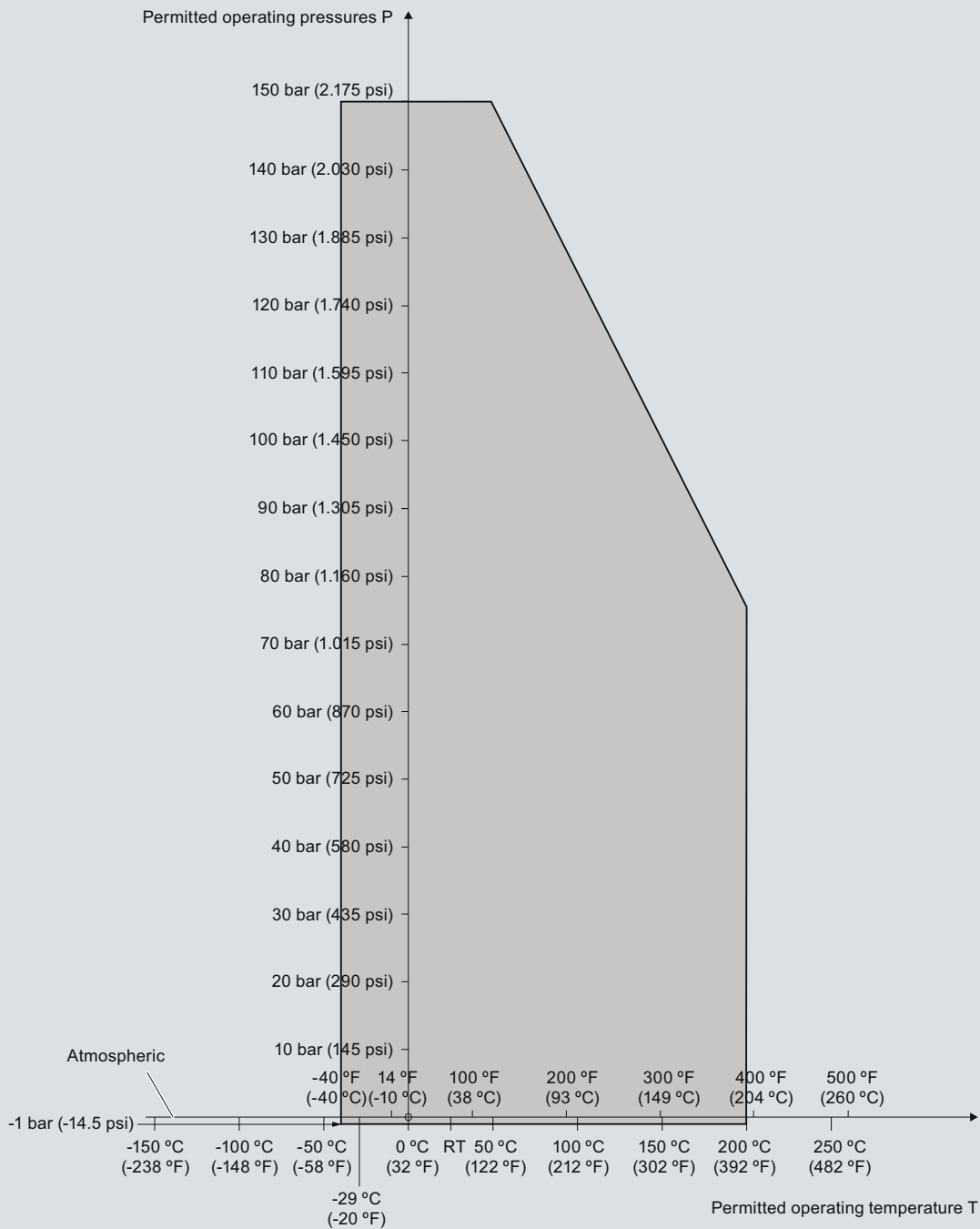
SITRANS LC500 Process Pressure/Temperature derating curves (7ML5513)

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)

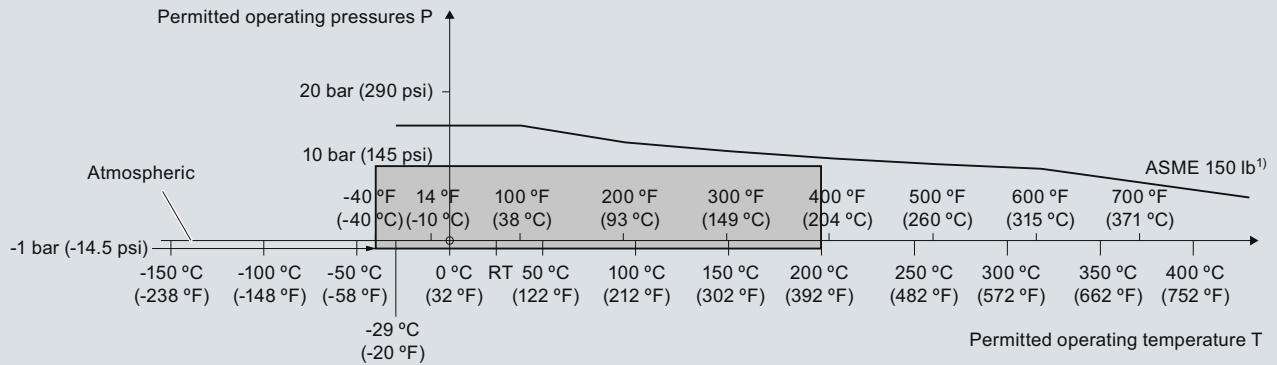
4

Level measurement

Continuous level measurement – Capacitance transmitters

SITRANS LC500

Pressure/temperature curve
LC500 cable probes
ASME flanged process connections
(7ML5513)



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

SITRANS LC500 Process Pressure/Temperature derating curves (7ML5513)

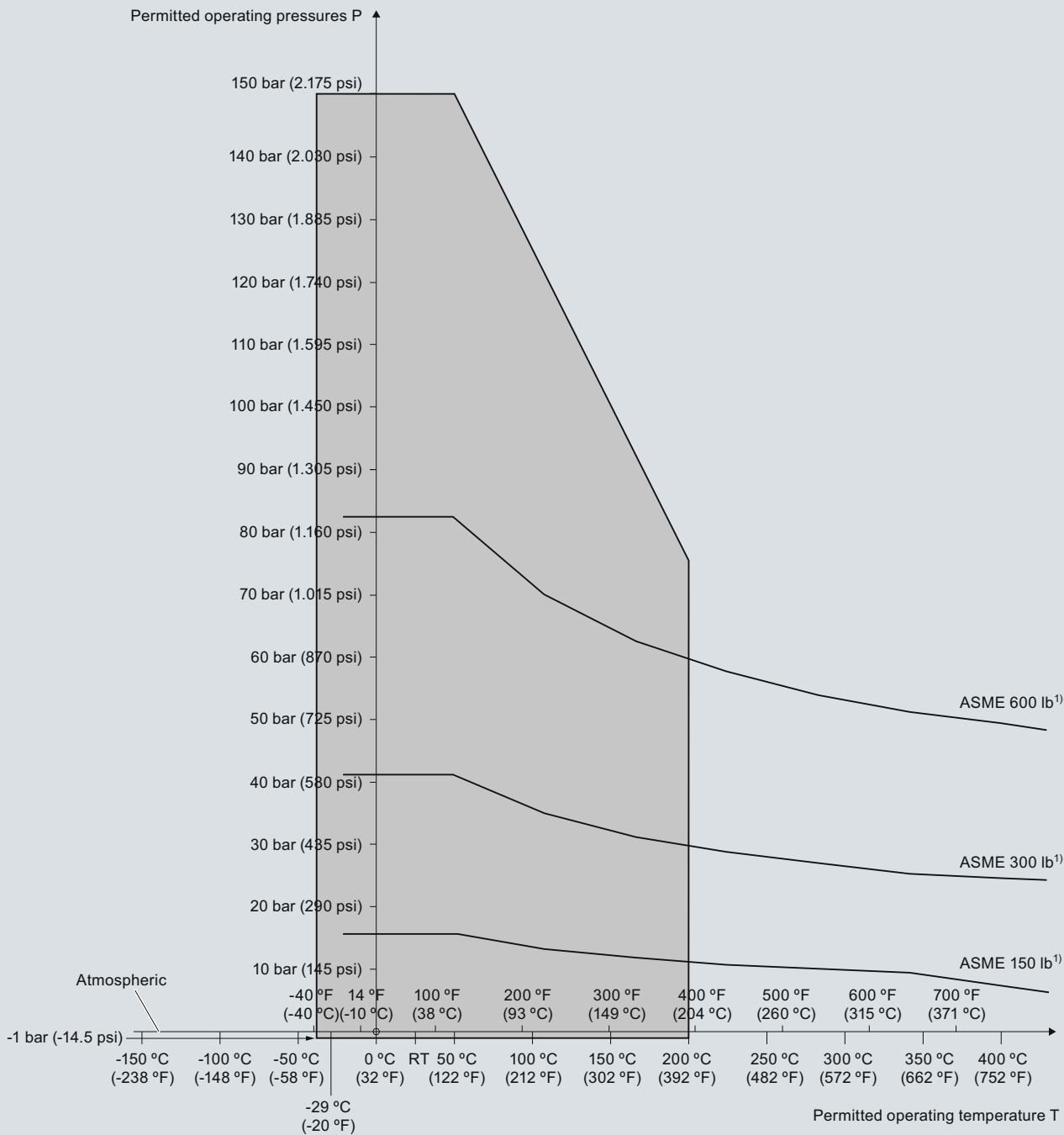
Level measurement

Continuous level measurement – Capacitance transmitters

SITRANS LC500

Pressure/temperature curve
LC500 PFA rod probes
ASME flanged process connections
(7ML5515 and 7ML5517)

4



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

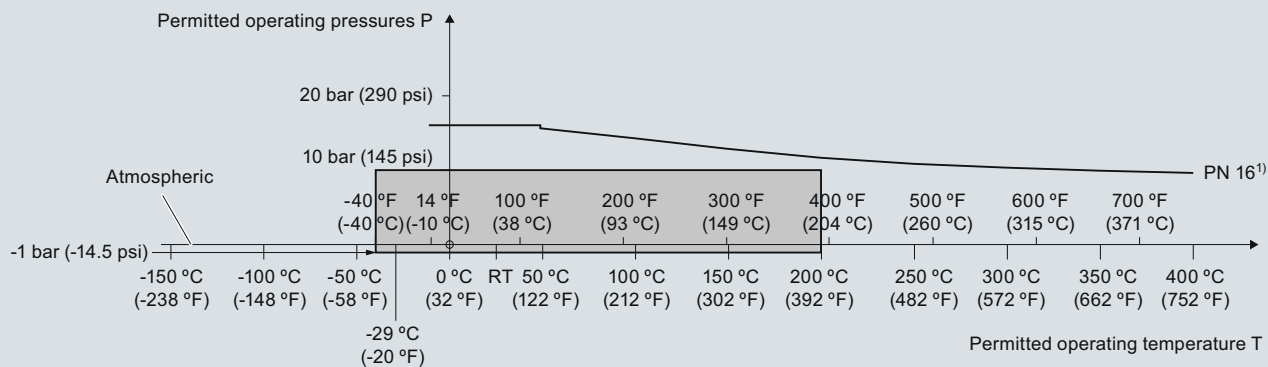
SITRANS LC500 Process Pressure/Temperature derating curves (7ML5515 and 7ML5517)

Level measurement – Capacitance transmitters

Level measurement

SITRANS LC500

Pressure/temperature curve
LC500 cable probes
EN flanged process connections
(7ML5513)



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

SITRANS LC500 Process Pressure/Temperature derating curves (7ML5513)

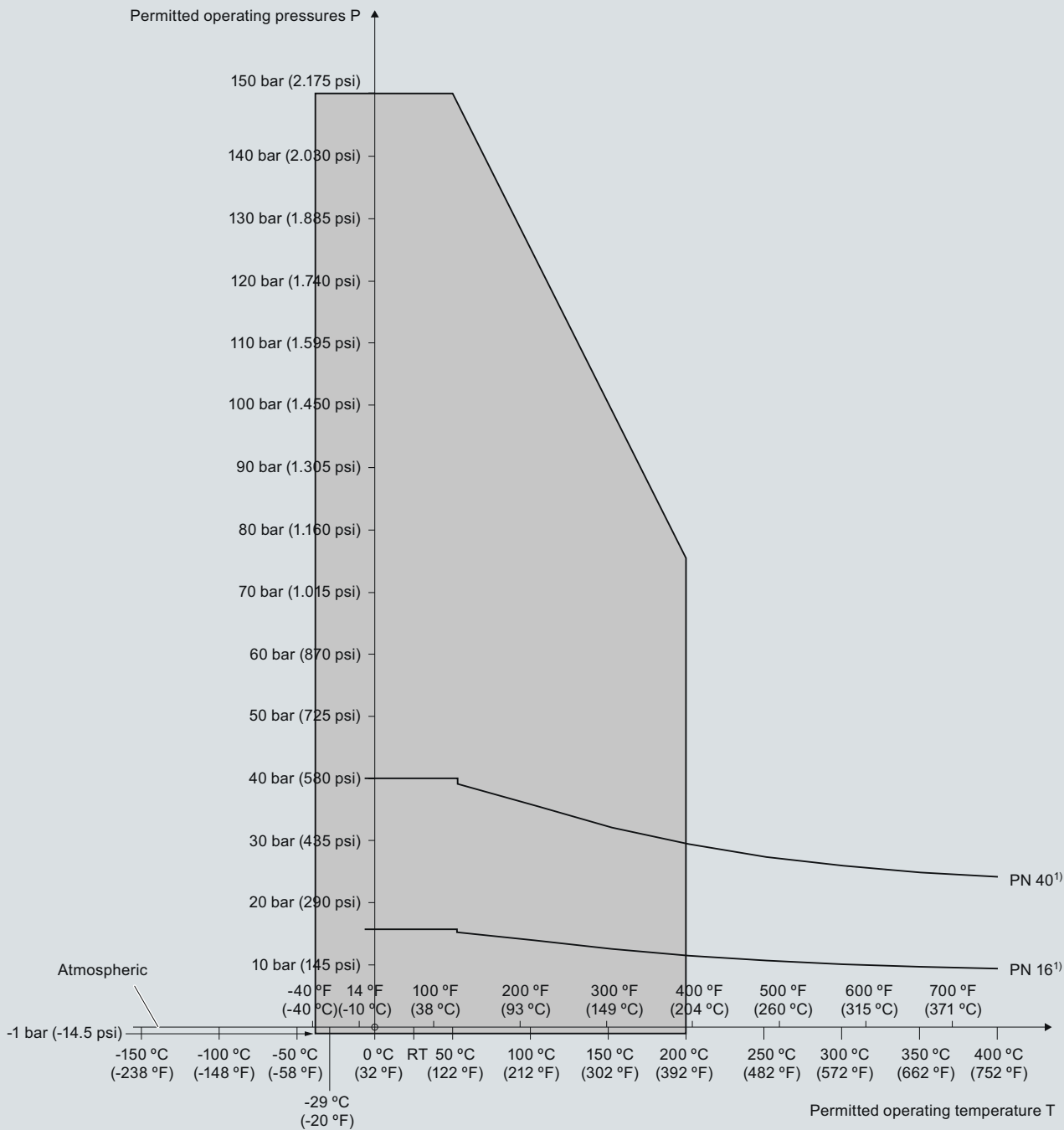
Level measurement

Continuous level measurement – Capacitance transmitters

SITRANS LC500

Pressure/temperature curve
 LC500 PFA rod probes
 EN flanged process connections
 (7ML5515 and 7ML5517)

4



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

SITRANS LC500 Process Pressure/Temperature derating curves (7ML5515 and 7ML5517)

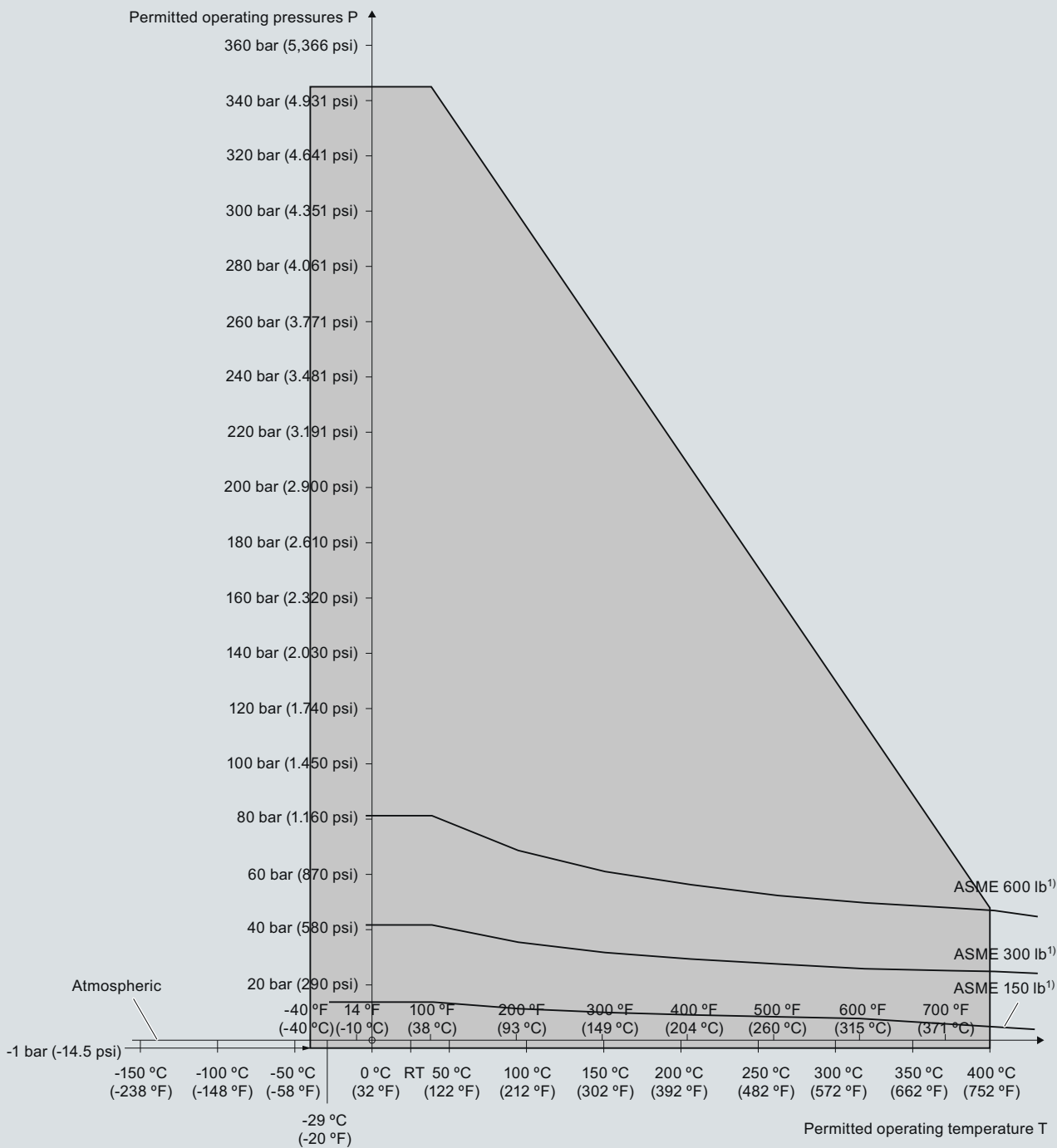
Level measurement

Continuous level measurement – Capacitance transmitters

SITRANS LC500

4

Pressure/temperature curve
LC500 enamel rod probes
ASME flanged process connections (7ML5515 and 7ML5517)



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

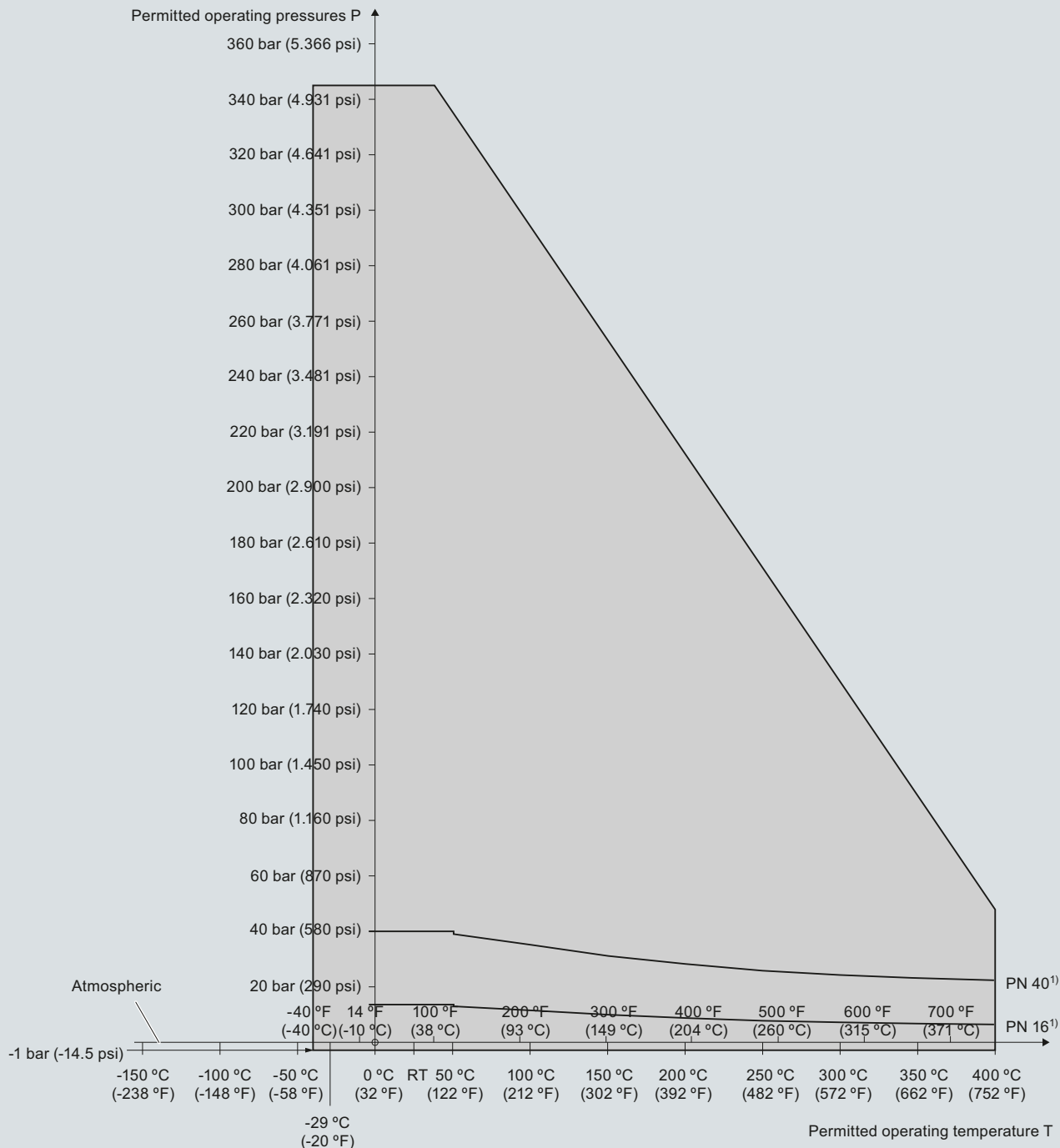
SITRANS LC500 Process Pressure/Temperature derating curves (7ML5515 and 7ML5517)

Level measurement

Continuous level measurement – Capacitance transmitters

SITRANS LC500

Pressure/temperature curve
 LC500 enamel rod probes
 EN flanged process connections (7ML5515 and 7ML5517)



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

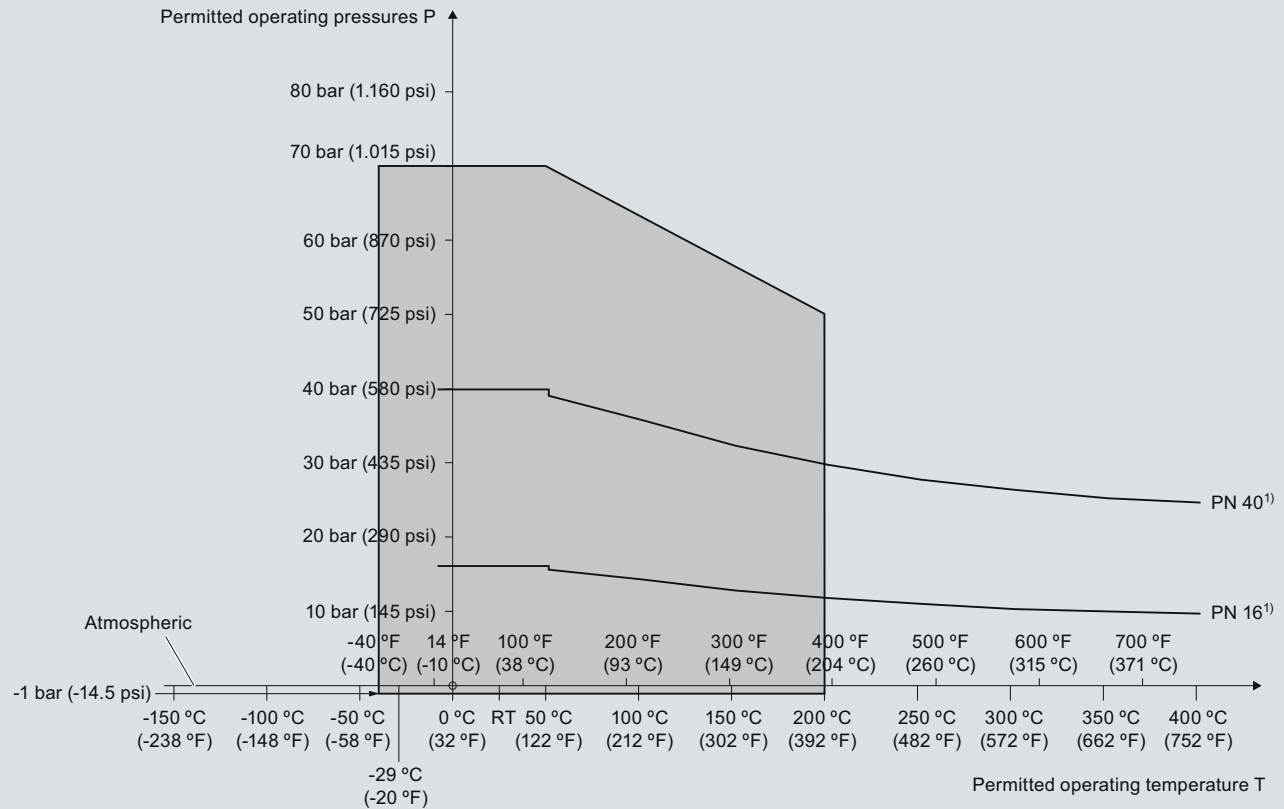
SITRANS LC500 Process Pressure/Temperature derating curves (7ML5515 and 7ML5517)

4

Level measurement – Capacitance transmitters

SITRANS LC500

Pressure/temperature curve
LC500 single piece flanged rod probes with PTFE facing
EN flanged process connections
(7ML5517)



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

SITRANS LC500 Process Pressure/Temperature derating curves (7ML5517)

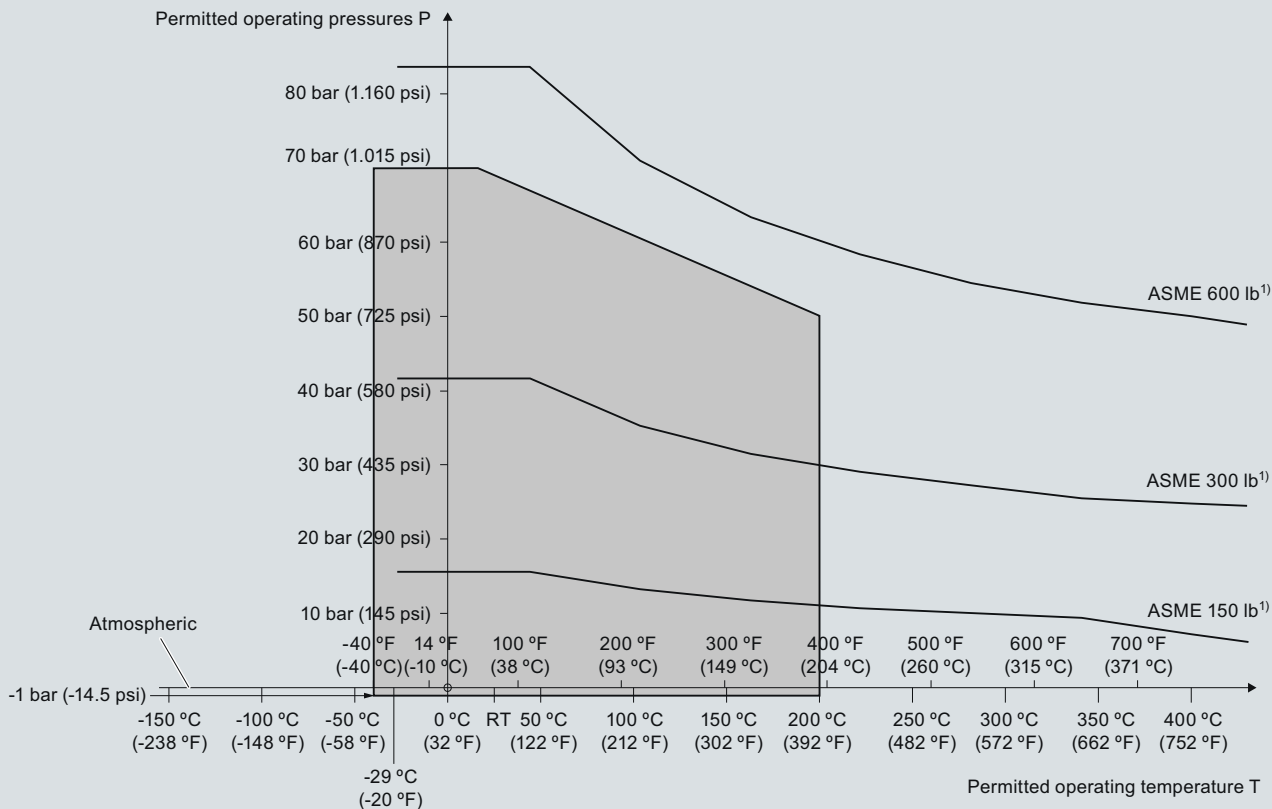
4

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)



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

SITRANS LC500 Process Pressure/Temperature derating curves (7ML5517)

4

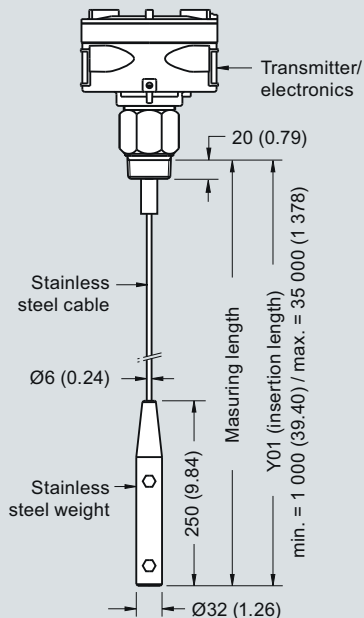
Level measurement

Continuous level measurement – Capacitance transmitters

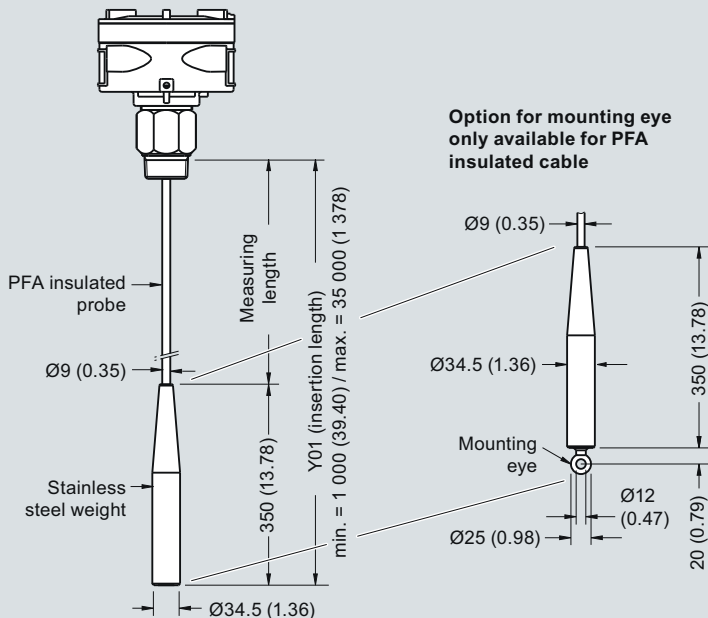
SITRANS LC500

Dimensional drawings

Cable version, non-insulated¹⁾
welded flange (7ML5513)

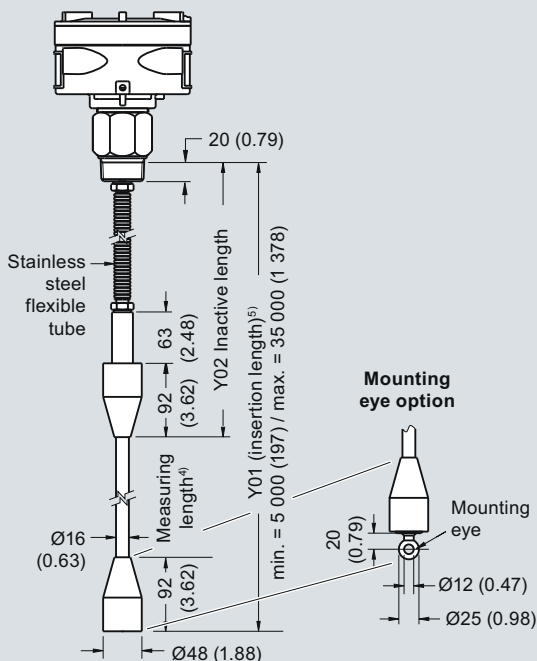


Cable version, insulated²⁾
welded flange (7ML5513)

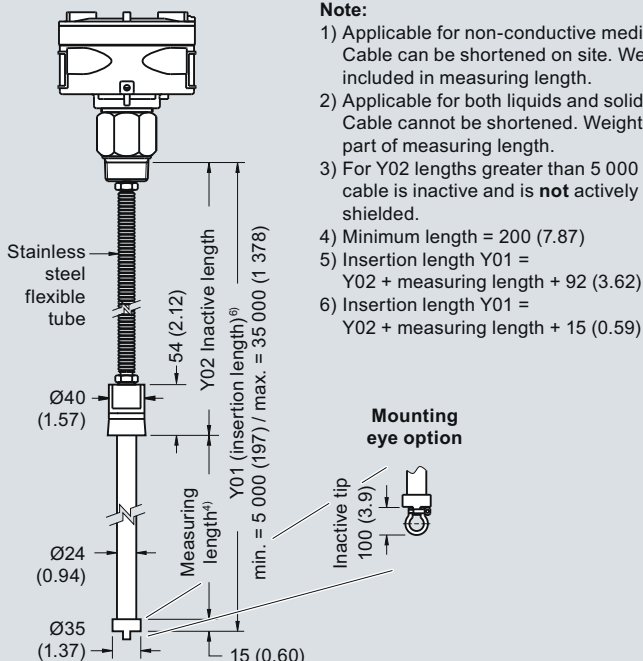


Option for mounting eye
only available for PFA
insulated cable

Extended cable version with rod sensor³⁾
welded flange (7ML5523)



Extended cable version with rod sensor³⁾
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 5 000 (197), cable is inactive and is **not** actively shielded.
- 4) Minimum length = 200 (7.87)
- 5) Insertion length Y01 = Y02 + measuring length + 92 (3.62)
- 6) Insertion length Y01 = Y02 + measuring length + 15 (0.59)

SITRANS LC500 - Cable Versions, dimensions in mm (inch)

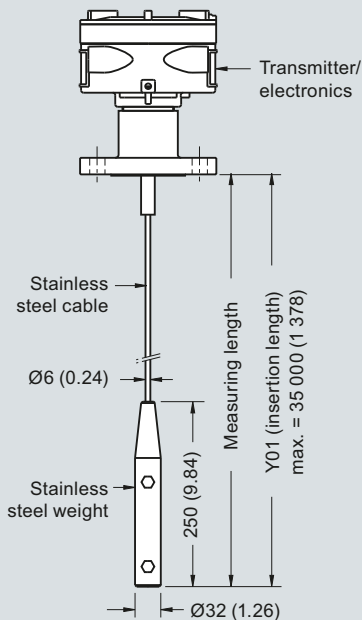
Level measurement

Continuous level measurement – Capacitance transmitters

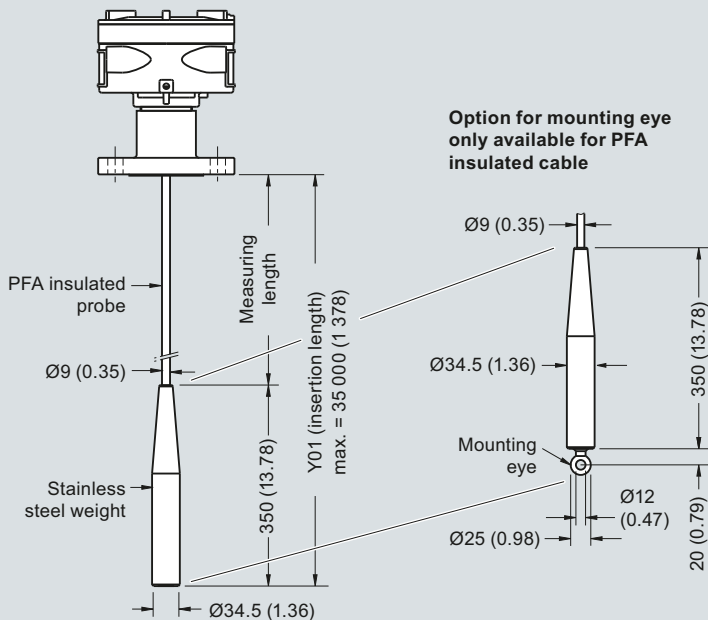
SITRANS LC500

4

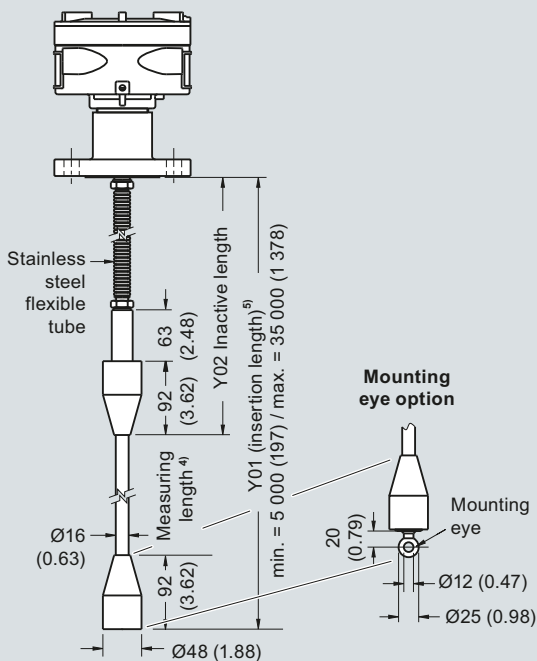
Cable version, non-insulated¹⁾
Welded flange (7ML5513)



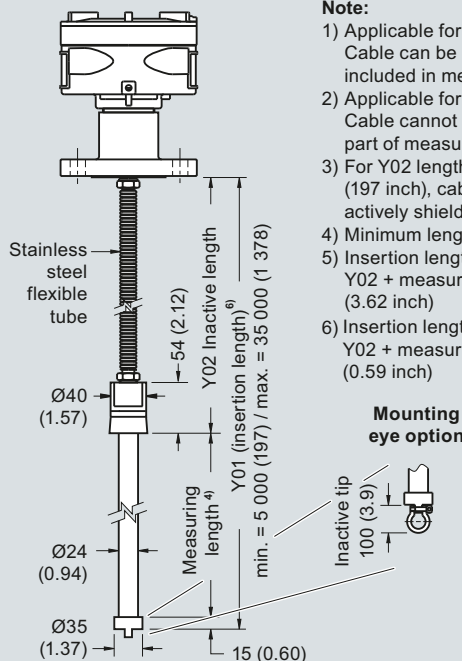
Cable version, insulated²⁾
Welded flange (7ML5513)



Extended cable version with rod sensor³⁾
Welded flange (7ML5523)



Extended cable version with rod sensor³⁾
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 5 000 mm (197 inch), cable is inactive and is **not** actively shielded.
- 4) Minimum length = 200 mm (7.87 inch)
- 5) Insertion length Y01 = Y02 + measuring length + 92 mm (3.62 inch)
- 6) Insertion length Y01 = Y02 + measuring length + 15 mm (0.59 inch)

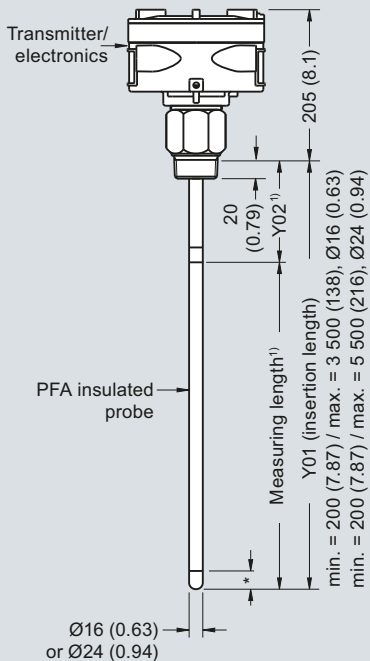
SITRANS LC500 - Cable Versions, dimensions in mm (inch)

Level measurement

Continuous level measurement – Capacitance transmitters

SITRANS LC500

Rod version threaded (7ML5515)

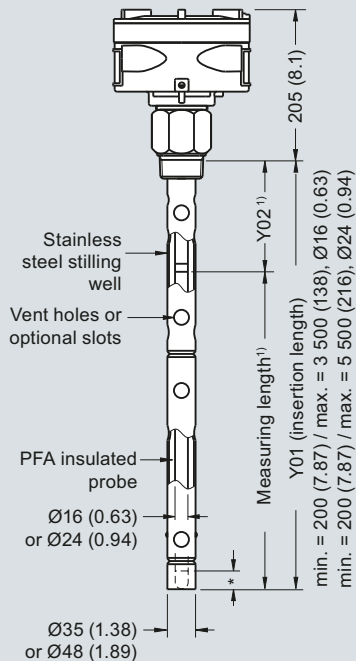


* = 30 (1.18) inactive tip

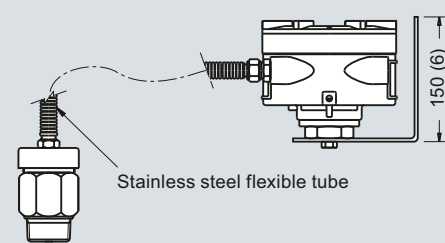
Note:

1) Minimum Y02 (active shield length) = 50 (1.96), minimum measuring length = 200 (7.87)

Rod version with stilling well threaded (7ML5515)

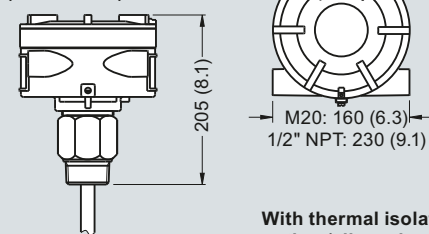


Remote electronics with mounting bracket option threaded (7ML5515)

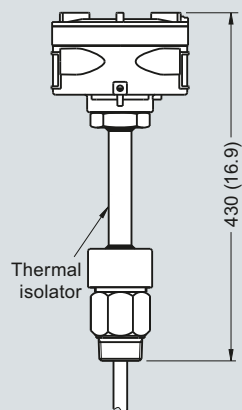


General purpose approval only.

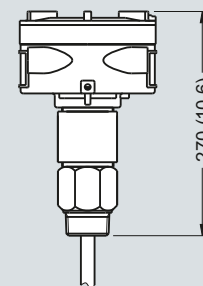
Standard configuration (all versions)



With thermal isolator option (all versions)



With explosion-proof seal option (all versions)



SITRANS LC500 - Rod Versions, dimensions in mm (inch)

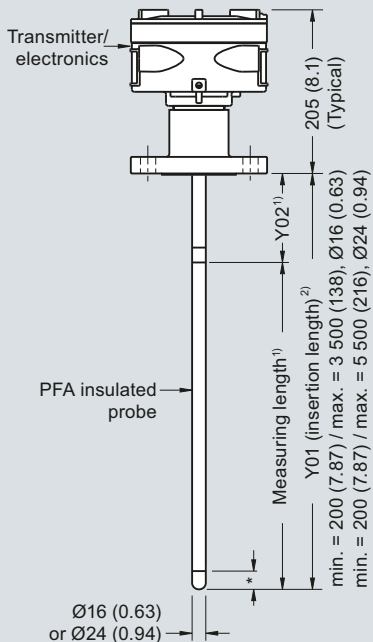
Level measurement

Continuous level measurement – Capacitance transmitters

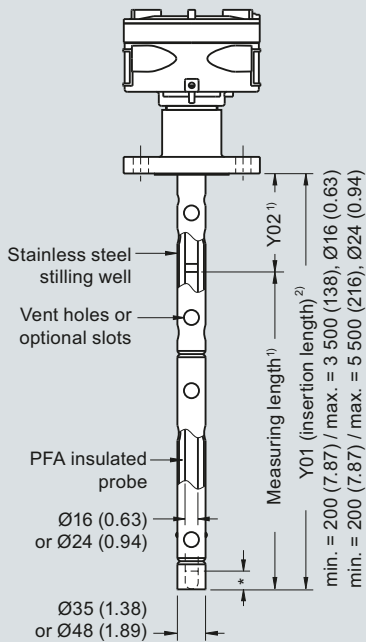
SITRANS LC500

4

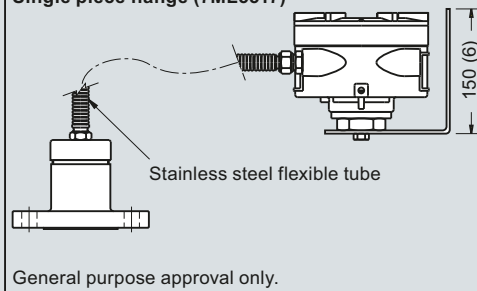
Rod version
Welded flange (7ML5515)
Single piece flange (7ML5517)



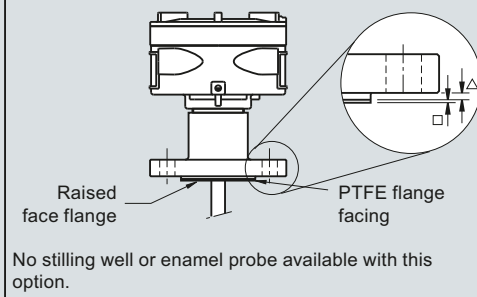
Rod version with stilling well
Welded flange (7ML5515)
Single piece flange (7ML5517)



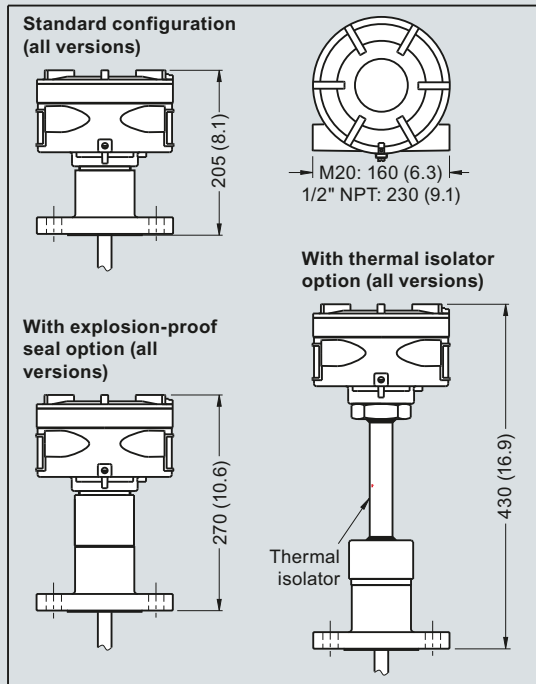
Remote electronics with mounting bracket option
Welded flange (7ML5515)
Single piece flange (7ML5517)



PTFE flange facing option
single piece flange only (7ML5517)



* = 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).

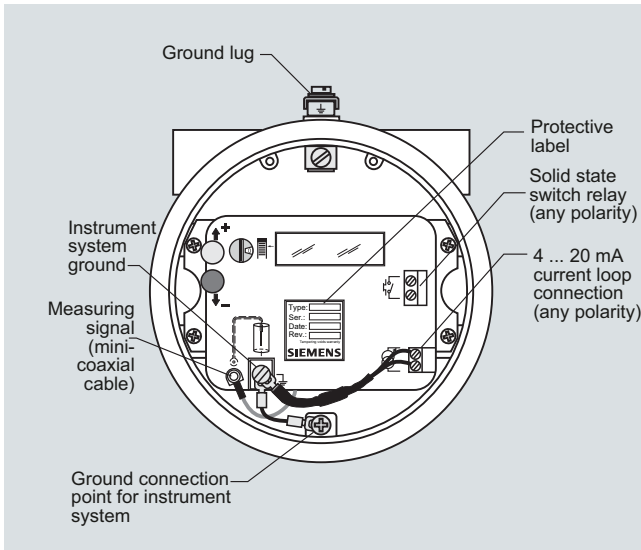
SITRANS LC500 - Rod Versions, dimensions in mm (inch)

Level measurement

Continuous level measurement – Capacitance transmitters

SITRANS LC500

Schematics



SITRANS LC500 connections



Level measurement

Continuous level measurement – Capacitance transmitters


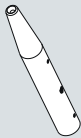
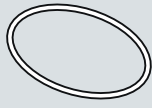
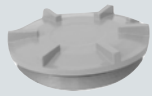



SITRANS LC300 and LC500 Specials

Selection and ordering data

LC300 and LC500 Specials¹⁾

	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 and LC500 Specials¹⁾

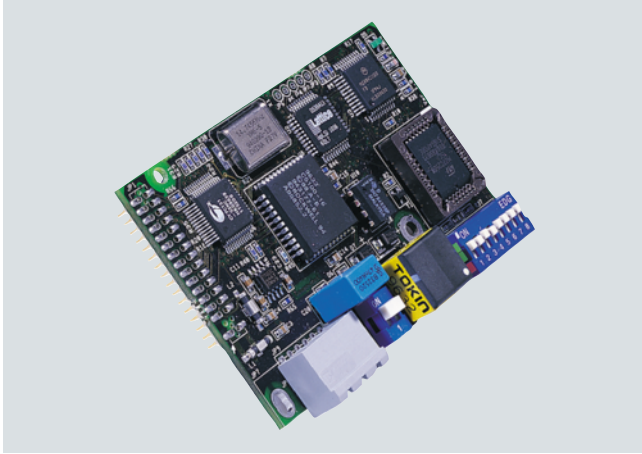
	Order No.
LC300 Mounting Eye	
Spare mounting eye (LC300 PFA versions only)	A5E01163717
LC300 Weight Kit, 316L stainless steel	
Kit, Spare stainless steel weight. To be used in any cable version of CLS300, or stainless steel cable version of LC300	A5E01163727
LC500 Gasket (IP65), Silicone	
Spare gasket, LC500 enclosure version, IP65	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 Versions²⁾	

¹⁾ Special flange sizes and facings are available. Please contact ceg.smpi@siemens.com for part number and pricing. Submit Application Questionnaire found on page 5/9.

²⁾ Please contact ceg.smpi@siemens.com for part number and pricing. Submit Application Questionnaire found on page 5/9.

Please contact ceg.smpi@siemens.com for special requests.

Overview



SmartLinx 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 Remote I/O and DeviceNet, Modbus RTU

Application

Many Siemens products include HART, 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"> • SITRANS LU01 • SITRANS LU02 • SITRANS LU10 • SITRANS LUC500 • MultiRanger 100/200 • HydroRanger 200

Module type	PROFIBUS DP
• Interface	RS 485 (PROFIBUS standard)
• Transmission rate	All valid PROFIBUS DP rates from 9 600 Kbps to 12 Mbps
• Rack address	0 ... 99
• Connection	Slave
• SmartLinx module compatibility	<ul style="list-style-type: none"> • SITRANS LU01 • SITRANS LU02 • SITRANS LU10 • SITRANS LUC500 • MultiRanger 100/200 • HydroRanger 200

Module type	Modbus RTU
• Interface	RS 232 or RS 485
• Transmission rate in bps	1 200, 2 400, 4 800, 9 600, 19 200, 38 400
• Rack address	1 ... 247
• Connection	Slave
• SmartLinx module compatibility	<ul style="list-style-type: none"> • SITRANS LU01 • SITRANS LU02 • SITRANS LU10 Included with product: <ul style="list-style-type: none"> • SITRANS LUC500 • MultiRanger 100/200 • HydroRanger 200

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"> • SITRANS LUC500 • MultiRanger 100/200 • HydroRanger 200

Level measurement

Communication

SmartLinx module

Selection and Ordering data	Order No.
SmartLinx module for SITRANS LU01, LU02, LU10	
Allen-Bradley Remote I/O module	7ML1830-1CP
PROFIBUS DP module	7ML1830-1CQ
Modbus RTU module	7ML1830-1CR
SmartLinx module for SITRANS LUC500 Rack and Panel Mount models	
Allen-Bradley Remote I/O module	7ML1830-1HP
PROFIBUS DP module	7ML1830-1CS
DeviceNet module	7ML1830-1HQ
SmartLinx module for SITRANS LUC500 Wall Mount model, MultiRanger 100/200, HydroRanger 200	
Allen-Bradley Remote I/O module	7ML1830-1HS
PROFIBUS DP module	7ML1830-1HR
DeviceNet module	7ML1830-1HT
Operating Instructions	
Allen-Bradley Remote I/O communications module, English	7ML1998-1AP03
PROFIBUS communications module	
• English	7ML1998-1AQ03
• French	7ML1998-1AQ13
• German	7ML1998-1AQ33
Modbus RTU communications module, English	7ML1998-1BF01
Modbus RTU communications module, French	7ML1998-1BF11
Modbus RTU communications module, German	7ML1998-1BF31
SmartLinx modem, English	7ML1998-1BG01
DeviceNet	7ML1998-1BH02
This device is shipped with the Siemens Milltronics manual CD containing Quick Starts and Operating Instructions.	
• English	7ML1998-1BH02
• French	7ML1998-1BH12
Spare SmartLinx software	
Allen-Bradley data diskette	7ML1830-1CK
PROFIBUS DP data diskette	7ML1830-1CL
DeviceNet data diskette	7ML1830-1CM

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

Dolphin Plus

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.

Dolphin Plus Software includes a software CD, and a nine pin adapter with a 2.1 m (82.7 inch) cable for connection to a PC serial port.

RS 485 to RS 232 converter

No
Yes

ComVerter

No
Yes

Order No.

7ML1841-

AA 0

0
10
1

Selection and Ordering data

Operating Instructions

Connection manual, English:
Included on Dolphin Plus CD and available at
www.siemens.com/processautomation

Spare parts

Converter, RS 485 to RS 232 (D-Sub)

Kit containing one 9-pin D-Sub to RJ11 Adapter
and one 2.1 meter telephone cable with two male
jacks

ComVerter, Infrared link

Order No.

7ML1830-1HA

7ML1830-1MC

7ML1830-1MM

Level measurement

Notes

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