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Indicators

WIKA WMI Magnetic Level Indicators	Call	19
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Switches

Mechanical Bottle and Float-Type Level Switches	\$37.00	2
Kobold Economical Level Switches	\$659.00	2
Siemens CLS100 Two-Wire Capacitance Point Level Switch	\$201.00	5
Siemens CLS200 Capacitance Point Level Detection Switches	\$480.00	6
Siemens CLS300 Capacitance Point Level Switch for Harsh Environments	\$658.00	8
Siemens CLS500 Capacitance Point Level Switch for Extreme Conditions	\$721.00	10
Siemens LPS200 Rotating Paddle Switch for Bulk Solids	\$305.00	3
Siemens LVS200 Vibrating Fork Switch for Bulk Solids	\$514.00	4
Siemens ULS200 Ultrasonic Point Level Detection Switch	\$857.07	11

Terminal Inventory Control and Tank Gauging

Honeywell Enraf 854ATG/854XTG Servo Gauges	Call	50
Honeywell Enraf SmartRadar Flexline Precision Tank Gauging System	Call	52
Honeywell Enraf SmartRadar 970 Series for Storage Tank Measurements	Call	54

Transmitters

	Call	18
Honeywell ST700 Flange Mount Smart Transmitter for Liquid Level	\$1718.00	20
Sartorius Contego® Hygienic Weighing System	Call	14
Sartorius PanCake® Load Cells for Level by Weight	Call	12
Siemens HydroRanger 200 Wastewater Monitoring and Control System	\$1007.64	31
Siemens MultiRanger 100/200 Ultrasonic Continuous Level Transceivers	\$976.91	30
Siemens Probe Ultrasonic Continuous Level Transmitter for Liquid Level	\$550.00	25
Siemens SITRANS LC300 Capacitance Continuous Level Transmitters	\$876.62	22
Siemens SITRANS LC500 Capacitance Continuous Level Transmitters	\$694.00	23
Siemens SITRANS LG200 Guided Wave Radar System	Call	48
Siemens SITRANS LR250 Radar for Continuous Liquid Storage Levels	\$1721.44	38
Siemens SITRANS LR260 Radar for Dry Bulk Solids Level	\$2164.52	44
Siemens SITRANS LR400 Long Range FM Radar for Liquids	Call	42
Siemens SITRANS LR460 Long Range FM Radar for Bulk Solids	\$3381.40	45
Siemens SITRANS LR560 78GHz Long Range FM Radar for Bulk Solids	\$3381.40	46
Siemens SITRANS LU Long Range Ultrasonic Transceivers	\$2288.00	32
Siemens SITRANS LUT400 Ultrasonic Controller for Open Channel Flow	\$914.10	28
Siemens SITRANS Probe LR/LR200 Radar for Continuous Liquid Storage	\$1001.70	40
Siemens SITRANS Probe LU Ultrasonic Transmitter for Liquid Level	\$970.96	26
Siemens SITRANS P MPS Submersible Transmitter for Liquid Level	\$484.00	17
WIKA LH-10 and LS-10 Submersible Transmitter for Liquid Level	\$481.40	16

Accessories

Siemens Echomax Ultrasonic Level Transducers and Accessories	\$486.72	34
Siemens SIMATIC PDM Configuration Software Utility	\$689.00	96

Prices in this catalog are current at the publication date, and are subject to change without notice.



Float-Type Level Switches

Stop Nuisance Switching

Liquids sloshing around can cause a float to bob up and down rapidly, if the liquid surface is in contact with the float. This creates nuisance switching, an off/on condition that wears on your patience and your reed switch. A slosh shield creates a pocket of calm liquid, so the switch can operate as designed.

Construction: *Wetted materials:* Stainless steel, beryllium copper, nickel, Buna-N. *Slosh shield:* Lucite

Environment: *Operating temperature:* -40° to 140° F; *Liquid specific gravity:* 0.55 min.; *Pressure:* 150 PSI max.

Switch: SPST, 20 VA

Model Selection Guide

Shielded Switch	Catalog Number	Price
Normally Open	43765	\$140.00
Normally Closed	43760	140.00



Tethered Float Switches for Liquid Level

- For all liquid types
- SPDT mercury switch
- Polyethylene, Teflon, or 316 Ti stainless steel float
- Temperatures to 320° F, Pressures to 30 PSIG

Need a float switch in polypropylene? Call us.



Model Selection Guide

Material		Maximum		Catalog Number	Price
Float	Cable Cladding	Pressure	Temp.		
Polyethylene	PVC	30 PSIG	190° F	NSP-5101	\$243.00
Teflon	Teflon	15 PSIG	320° F	NST-5101	888.00
316 SS	Silicone, SS Braid	90 PSIG	320° F	NSE-5101	1229.00
316 SS	Silicone, SS Braid	220 PSIG	320° F	NSE-5201	1117.00

Chemical-Resistant Level Switch

- Ideal for tanks with inaccessible tops or bottoms
- Normally open or normally closed switch contact
- Polypropylene housing with NEMA 6 protection rating provides great chemical resistance
- Maintenance-free, easy to install



Also available with PVDF housing

Specifications

Maximum Operating Conditions: *Temperature:* 175° F; *Pressure:* 145 PSIG; *Fluid Density:* 0.6 g/ml

Materials: *Float, housing:* Polypropylene; *Fittings:* 1/2" NPT or bulkhead; *Orientation:* Horizontal ±30°; *Cable:* 3 ft. PVC, AWG 20/2

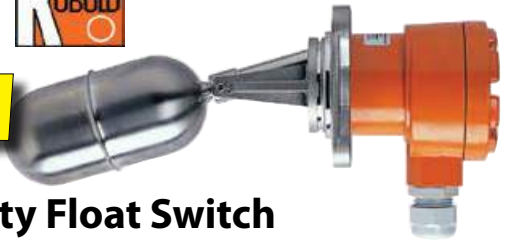
Reed Switch: Gas encapsulated; Normally open or normally closed operation; *Voltage:* 250 VAC max.; *Current:* 1.5A max.; *Power:* 50 watts max.

Model Selection Guide

Housing	Fittings	Catalog Number	Price
Polypropylene	1/2" NPT	NKP-2401	\$37.00
	Bulkhead	NKP-6401	37.00



Stainless steel float



Heavy Duty Float Switch

- Temperatures to 480° F, Pressures to 360 PSIG
- High capacity 10 Amp switch
- All 316 stainless steel wetted parts
- All-metal design ideal for harsh environments

Specifications

Operating Conditions: *Media temperature:* 480° F; *Pressure:* 360 PSIG max

Process Medium: Specific gravity 0.7 minimum

Construction: NEMA 4/IP65 epoxy-coated aluminum housing, 316SS wetted materials with square flange or 2" NPT fitting; optional 1/2" NPT conduit

Switch: SPDT microswitch, 10 Amp @ 250 VAC, 0.6 Amp @ 220 VDC, 3/4" switch hysteresis

Model Selection Guide

Fitting Style		Catalog Number	Price
NGS float switch with square flange fitting		NGS-2100	\$659.00
NGS float switch with 2" NPT fitting		NGS-2200	659.00
Options	1/2" NPT electrical conduit connection	-C	21.00
	NGS-2100 Carbon steel mating flange	NGS-MFF1	158.00
	NGS-2100 316 stainless steel mating flange	NGS-MFF2	331.00

Microwave Level Switch

- Good to 212° F (to 302° F for 30 minutes for CIP applications)
- EHEDG approved for use in food applications
- For conductive and non-conductive media
- Level measurement, even with foam or deposits



Food-safe radar level switch



Specifications

Operating Conditions: *Process temperature:* 32° to 212° F (302° F for 30 minutes for Clean-in-Place use); *Ambient temperature:* 150° F max; *Working pressure:* 145 PSI

Construction: Stainless steel head and thread supports, PEEK coupler, hygienic weld-in sleeves, IP67 protection rating

Connections: *Process:* G1/2, M12x1.5; *Cable:* M16x15 threaded connection

Output: Open collector, PNP, 50 mA

Switch Delay: 0.2 seconds standard, 0.3–1.0s available on request

Power Supply: 18-36 VDC, <50 mA without load

Dielectric Constant: >20

SIEMENS



Rotary Paddle Switch for Bulk Solids

SITRANS LPS200 Paddle Switch

- Proven paddle switch technology for bulk solids
- High integrity mechanical switch
- Switch-selectable power supply
- Unique friction clutch mechanism prevents damage caused by falling materials
- Stainless steel 1-1/4" NPT or 1-1/2" BSP threaded connection
- Hinged paddle option for use with low-density materials
- Simple installation through process connection — Either paddle fits into small threaded nozzle — fits where other manufacturer's models won't
- High temperature model and optional extension kit available

How It Works:

- Motorized paddle rotates in free air
- Material contact stops rotation
- Transferred torque activates switch
- Clutch avoids gear failure/replacement

Siemens SITRANS LPS200 rotary paddle switch detects full, empty, or demand conditions on materials like grain, feed, cement, plastic granulate, and wood chips. The LPS paddle switch can handle bulk densities as low as 100 g/l with the standard measuring vane, or 35g/l with the hinged vane.

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

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

Specifications

Temperature: -4° to 176° F (-20° to 80° C); *Optional:* -4° to 662° F (-20° to 350° C)

Max. Pressure: 7 PSI (0.5 bar); *Optional:* 145 PSI (10 bar)

Minimum Material Density: *Standard Vane:* Down to 100 g/l; *Hinged Vane:* Down to 15 g/l; (depends on shaft/vane coverage)

Power: Jumper selectable; 115 VAC, ±15%, 50-60 Hz, 4 VA, 230 VAC, ±15%, 50 Hz, 6 VA, or 24 VDC, ±15%, 2.5 W

Alarm Output: Relay 5A at 250 VAC, noninductive

Material: *Enclosure:* Epoxy coated aluminum, Type 4/NEMA 4/IP65; *Process connection:* 1-1/4" NPT, stainless steel; *Conduit entry:* 2 x 1/2" NPT; *Measuring shaft and vane:* Stainless steel

Approvals: FM/CSA Class II, Div. 2, Groups E-G; ATEX II 1/2 D (dust explosion); CE



Accessories

Description	Catalog Number	Price
SITRANS LPS200 Instruction Manual	7ML1998-5FS62	\$24.38
Motor Gear/PLC-Multivoltage	7ML1830-1KG	195.04
Replacement Vane, Boot Shape, 35 x 106 mm	7ML1830-1KH	25.44
Hinged Vane, 65 x 210 mm	7ML1830-1KJ	56.14
Rigid Extension Kit: Spring coupling, rigid tube extension, and required pins.		
Length	500, 400, and 300 mm	7ML5711-0AA 34.98
	1000, 900, 800, 700, and 600 mm	7ML5711-1AA 47.70
	1500, 1400, 1300, 1200, and 1100 mm	7ML5711-2AA 62.54

Ordering Instructions

Make one selection from each table section below. Check the availability column to be sure the unit you need is available. A finished catalog number looks like this: 7ML5725-5EE11-2AC0

Model Selection Guide

Description	Model	Price
LPS200 compact version with 1.25" NPT threaded connection, Process pressure to 7.25 psi (0.5 bar), measuring vane 1.38" x 4.17"		
Process Temperature	Up to 176° F (80° C)	7ML5725-1 \$305.00
	Up to 302° F (150° C)	7ML5725-2 437.00
	Up to 482° F (250° C)	7ML5725-3 514.00
	Up to 662° F (350° C)	7ML5725-4 614.00
Power	115 VAC, 1 Rev/Min	_ EE1 _ 0.00
	Switch Selectable, 1 Rev/Min	_ QE1 _ 65.00
	Switch Selectable, 5 Rev/Min	_ RE1 _ 79.00
Connection Material	Aluminum	___ _1- 0.00
	303 Stainless Steel	___ _2- 33.00
Extension Length	3.94" (100 mm) with Boot-Shaped Vane	1A __ 0.00
	5.91" (150 mm) with Boot-Shaped Vane	2A __ 0.00
Agency Approvals	CSA/FM Dust Ignition Proof	_ _ A0 94.00
	CSA/FM General Purpose	_ _ C0 0.00

Quick Ship Models

(Two week standard delivery)

Compact LPS200, aluminum, 115 VAC power, 1 rev/min, 1.25" NPT thread, 7.25 PSI max pressure, 3.94" extension, 1.38" x 4.17" boot shaped vane, CSA/FM General Purpose approval		
LPS200 compact aluminum model	7ML5725-5EE11-2AC0	\$235.00
Compact LPS200, stainless steel, switch-selectable power, 1 rev/min, 1.25" NPT thread, 7.25 PSI max pressure, 5.91" extension, 1.38" x 4.17" boot shaped vane, CSA/FM Dust Ignition Proof approval		
LPS200 compact stainless steel model	7ML5725-6QE12-2AA0	344.00
Extended design LPS200, 303 stainless steel, switch-selectable power, 1 rev/min, 1.25" NPT thread, 7.25 PSI max pressure, 7.87" extension, 1.38" x 4.17" boot shaped vane, CSA/FM Dust Ignition Proof approval		
LPS200 extended stainless steel model	7ML5726-5QC12-2BA1	567.00

Extended design models and cable extension models also available. Call for current pricing and model selection options.

SITRANS LVS200 Vibrating Fork Switch for Bulk Solids



LVS200 with pipe extensions start at \$713.00
Cable extension LVS200 models start at \$668.00

- High resistance to mechanical forces
- Suitable for low density materials: standard version 20 g/l (1.3 PCF), liquids/solids interface version 60 g/l (3 PCF)
- Extension lengths to 4000 mm (157")
- Low frequency, low energy operation
- Best self-cleaning properties
- Won't burrow into the material
- High or low level alarm in solids — Simple failsafe high/low selection

Vibrating Fork Technology

As soon as you apply power, the LVS200 forks vibrate. The forks are very active and sensitive at the tip — not at the base — to help resist detecting material buildup between the forks.

A dual crystal pack is directly coupled to the vibrating legs to generate high amplitude, low frequency (125 Hz) vibration, providing optimum self-cleaning characteristics during operation.

A third passive crystal senses the fork vibration. Relays activate when fork vibration is damped by

material contact, and the resulting signal falls below the sensitivity threshold.

The forks vibrate at a high amplitude, but with low energy. This ensures reliable detection of even the lightest material, and avoids the tendency to burrow and lose contact.

Factory sensitivity setting fits most applications, especially for light materials. For higher density materials, operating sensitivity can be switched lower to avoid some material adhesion.

The SITRANS LVS200 is an electromechanical vibratory switch for level detection of powder and granular solids.

The SITRANS LVS200 is an excellent solution for low bulk density, low humidity/adhesion, and free flowing applications. This unit is ideal for new installations or for replacing:

- Diaphragm-based switches subject to rupture
- Problematic rotating paddle switches
- Electrostatic discharge sensitive switches
- Material dielectric sensitive switches
- Switches that require special application configuration or multiple

The standard LVS200 detects high or low levels of dry bulk solids in bins, silos, or hoppers. The liquid/solid interface version can also detect settled solids within liquids or solids in confined spaces, like 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.

The LVS has a compact design, and can be top- or side-mounted. The vibrating fork design ensures the lines are kept clean. The unique design of the fork and crystal assembly eliminates false high level readings.

Specifications

Material Density: 20 g/l (1.3 lb/ft³) min.; *Liquid/Solid interface version:* 60 g/l (3 lb/ft³)

Process Temperature: -40° to 302° F (-40° to 150° C); *CSA Class II, Group G:* -40° to 284° F (-40° to 140° C), CSA temperature code T3B

Pressure: 145 PSI maximum

Sensitivity: High or low, switch selectable

Measuring Frequency: 125 Hz; *Liquid/Solid interface version:* 350 Hz

Power: 19-230 VAC, ±10%, 50-60 Hz, 8 VA or 19-55 VDC, ±10%, 1.5 W

Alarm Output: *Relay delay:* Approx. 1 second from loss of vibration; Approx. 1 to 2 seconds from resumption of vibration; *Relay failsafe:* High or low, switch selectable; Relay 8A at 250 VAC, noninductive

Material: *Enclosure:* Epoxy coated aluminum, NEMA 4/Type 4/IP65; *Process connection:* 1.5" NPT; *Sensor:* Stainless steel; *Conduit entry:* 1/2" NPT

Approvals: FM/CSA Class II, Div. 1, Groups E-G, Class III; ATEX II 1/2 D (Dust Explosion Proof); CE



Ordering Instructions

Make one selection from each table section below. Check the availability column to be sure the unit you need is available. A finished catalog number looks like this: 7ML5731-7AB11-1AA0

Model Selection Guide

Basic LVS200, 19-230 VAC/19-55 VDC, one SPDT relay output, no temperature isolator, 1.5" NPT threaded process connection, 304SS standard extension, with CSA/FM dust-ignition proof approval 7ML5731-7AB11-1AA0 \$484.00

Description	Model	Price
LVS200 standard vibrating point level switch for high or low levels of bulk solids.		
19-230 VAC, 19-55 VDC, One Relay Output (SPDT)	7ML5731-1	\$467.00
19-230 VAC, 19-55 VDC, Two Relay Outputs (DPDT)	7ML5731-2	\$14.00
Process Temperature	No Temperature Isolator Temperature Isolator	_ A _ _ _ 0.00 _ B _ _ _ 125.00
Process Connection	1.5" NPT Threaded (ANSI/ASME B1.20.1) 2" NPT Threaded, Sliding Sleeve 2" ASME Flange 150 Lb 3" ASME Flange 150 Lb 4" ASME Flange 150 Lb	_ _ B _ _ 0.00 _ _ D _ _ 188.00 _ _ G _ _ 222.00 _ _ H _ _ 291.00 _ _ J _ _ 381.00
Extension Length	Standard Length, 230 mm (9.06") 300-500 mm (11.81"-19.69") 501-750 mm (19.72"-29.53")	_ _ _ 31- 0.00 _ _ _ 32- 215.00 _ _ _ 33- 257.00
[Note 1]	751-1000 mm (29.57"-39.37") 1001-1250 mm (39.41"-49.21") 1251-1500 mm (49.25"-59.06")	_ _ _ 34- 286.00 _ _ _ 35- 312.00 _ _ _ 36- 342.00
Material	316 SS Ti (1.4571) Connection, Extension	2 _ _ _ 47.00
Approvals	CSA/FM General Service CSA/FM Dust-Ignition Proof CSA/FM Intrinsically Safe	_ CA0 0.00 _ AA0 94.00 _ EA0 94.00

Note 1: For extensions other than 230 mm standard length (Code 31), add the following to your model number: Y01: Insertion Length ____ mm

Call for remote enclosure and cable, extensions to 4000 mm.

Accessories

Description	Catalog Number	Price
SITRANS LVS200 User Manual	7ML1998-5FT63	\$28.62
Replacement Electronics Module (125Hz)	7ML1830-1KL	226.84
2" NPT Sliding Sleeve	7ML1830-1JN	219.42

CLS100 Capacitance Point Level Switch

SIEMENS



- Very short (4") insertion length
- Suitable for use with both conductive and nonconductive process media
- Accurate, repeatable switchpoint due to advanced tip-sensing technology
- Extremely high chemical resistance
- Level detection independent of tank wall or pipe system
- Simple setup procedure, verification with built-in LEDs
- Precision 20-turn potentiometer for adjustable sensitivity
- Two level outputs: Two-wire current loop detection and solid-state transistor relay
- Low maintenance costs. No moving parts
- Can be connected directly to most PLCs
- Intrinsically safe and dust/ignition-proof models

Specifications

Models: Standard, intrinsically safe

Modes of Operation: High/low

Switchpoint Repeatability: 0.08"

Operating Frequency: 5.5 MHz

Dielectric Constant: 1.5 min.

Temperature Range: -40° to 257° F

Pressure (Vessel) Range: 0 absolute to 2500 kPa (25 bar or 365 PSI) gauge

Adjustment Potentiometer: 20-turn

Current Output: 0/4-20 mA loop supplied;
Current Reversible: By polarity change power supply; **Load:** 600Ω max. @ 24VDC

Solid-State Switch: **Output:** Galvanically isolated, 100 mA max. load current; **Switch voltage:** 28 VAC/40 VDC max.

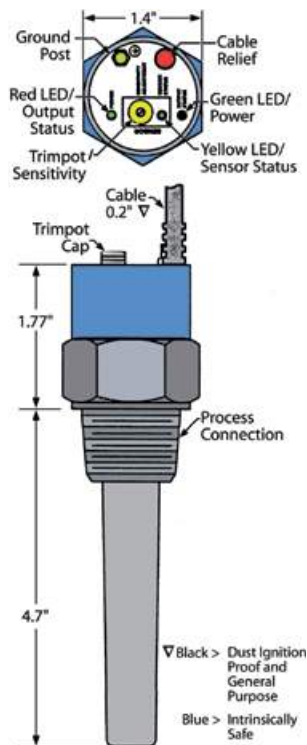
Integrated Enclosure: **Housing (Electronics)/Connection:** AISI 316L stainless steel; **Ingress Protection:** Type 4X/NEMA 4X/IP65; **Connection:** 4 conductor, 22 AWG, shielded, 3.3 ft. black polyester cable

Signal Indicators: LEDs for adjustment control, output status, and power

Power: **Standard Model:** 10-33VDC; **Intrinsically Safe Model:** 10-30 VDC

Sensor Probe: PVDF Kynar®, 4" insertion, 3/4" NPT process connection

Approvals: **Standard Model:** CE/KEMA/FM. CSA approvals (Class II, III, Div. 1, Groups E, F, G); **Intrinsically Safe Model:** CE/CENELEC/FM. CSA approvals (Class I, Div. 1, Groups A-D)



SensGuard Chemical-Resistant Probe Cover

Pressure Range: Full vacuum to 365 PSI (FV to 25 bar)

Temperature Range: -40° to 257° F (-40° to 125° C)

Construction: Polyphenylene Sulfide, fiberglass filled

Process Connections: *External:* 3/4" NPT; *Internal:* 3/4" NPT

Insert Length: 2.75"

Flexural Strength: 315 lbs.



Ordering Instructions

Select one option from each table section below. A completed catalog number looks like this: 7ML5501 - _____

Model Selection Guide

Description	Catalog Number	Price Each
CLS100: Capacitance Point Level Detection Sensor, 3/4" NPT Thread	7ML5501 -	\$201.00
Approvals	General Purpose	0AA __ 0.00
	Intrinsically Safe	0AC __ 55.00
Versions Options	Standard Integrated Cable	___ 10 0.00
	ABS Enclosure, 1/2" NPT Conduit	___ 30 41.00
	Integrated Cable, Kynar Probe Body	___ 50 77.00
	ABS Enclosure, Kynar Probe Body	___ 60 107.00

Accessories

SensGuard 3/4" NPT Chem-Resistant Probe Cover	7ML1830-1DL	68.90
Stainless Steel Tag (Single Text Line)	7ML1930-1AC	46.64
English Quick Start Guide	A532146158	33.92

CLS Flange, 3/4" Thread for Mounting any 3/4" NPT Pointek CLS Level Switch

		Pressure Rating (ANSI B16.5)		
		150 Lbs. (A)	300 Lbs. (B)	600 Lbs. (C)
Flanged Process Connection Size	1" (A)	\$193.00	\$234.00	\$246.00
	1.5" (B)	230.00	270.00	294.00
	2" (C)	274.00	308.00	357.00
	3" (D)	328.00	400.00	432.00
	4" (E)	395.00	505.00	600.00

CLS100 Through the "Looking Glass"



CLS100 has been field-tested in many applications. It's sensitive enough to measure levels accurately through tank windows and site glasses made of plastic, glass, or fiberglass.

It works with a heavy material buildup on the sensor (like chocolate or dust), and even in sludge interfaces. Want a demo? Call us!

Pointek CLS200: Capacitance Point Level Detection Sensors



Pointek CLS capacitance point level detection devices:

- Work accurately without a reference electrode.
- Detect a single, high, or low level for liquids, solids, slurries, or foam (any material with a dielectric constant >1.5).
- Work in a vessel of any shape, constructed of conductive or nonconductive material.
- Operate in temperatures up to 257° F.
- Accept voltage from 12 to 250 VAC/DC, without jumpers.

How is our capacitance offering different?

- Compact design and 3.9" insertion length, so you can use more of your tank for product.
- Adjustable insertion lengths: Slide coupling lets you put more probe into the process.
- Mounting options: 3/4", 1", 1.5" NPT, 3A sanitary, and flanges.
- Electronics tested to 4G vibration levels in three dimensions.
- Flame-, explosion-, and dust/ignition-proof approvals.

Models

Choose from several configurations, including rigid, sanitary and cable sensors. While the base unit remains constant, each model can have a different selection of process connections, extensions, and approvals. Both standard and extended length units are designed to operate in clean-in-place (CIP) applications in the food industry.

Standard Models: Suitable for use in virtually any point level detection application. With a minimum insertion length of just 4 inches compared with 14 inches on competitive products, the standard model can be easily installed in small diameter pipes. In tank applications, content capacity can be maximized.

Sanitary Models: Meet industry requirements for temperatures exceeding 212° F. The process connection is a sanitary standard tri-clamp. Wetted parts of 316L stainless steel and PVDF (Kynar®) are 3A compliant and food-grade safe.

Extended Models: Available in both cable and rigid versions. When it is not possible to penetrate the tank wall near the bottom, Pointek CLS cable versions provide excellent application flexibility through the use of cable extension, protected by a PVDF jacket.

Effective in both liquids and solids, these versatile units can also be used for level detection and for interface detection (e.g. oil/water) in large storage tanks. Cable can be supplied at lengths up to 115 feet to meet specific application requirements.

Rigid versions have short or extended rod lengths up to 18 feet. An adjustable sliding process mount is available.

Options

Thermal Isolator (Thermopart): In applications where the ambient temperature of the transmitter can exceed 185° F due to hot processes. The isolator extension raises the enclosure approximately 4" above the process fitting.

Process Connections: Process connection sizes range from 3/4" to 1.5 NPT and 1" to 3" sanitary flange.

Adjustable Sliding Process Mount: For applications where the exact level sensing point is in doubt, a sliding process sealing gland is available to provide exact adjustment of the sensor's position.

See what makes Pointek different.

NEMA 4/IP65 Aluminum Enclosure

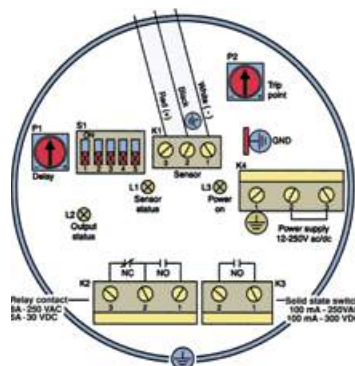
The cast aluminum enclosure is epoxy coated to provide additional chemical resistance. Remove the lid to gain access to wiring, dip switch settings, and LED functions.

Alarm/Control Functions and Failsafe Operation

The SPDT relay provides normally open and normally closed contacts. You can use the failsafe relay operation for alarm purposes to alarm on material detection or instrument power interruption.

The solid-state relay (300 VDC or 250 VAC) is polarity insensitive for simplified wiring, and galvanically isolated for circuit protection.

You can add a relay across the power source to generate a two-wire output based on the drawn power supply current.



Material Sensitivity Adjustment Reduces Spare Parts

When you're detecting a sticky conductive material, you can easily adjust the level detection switchpoint using either the range selection switch or potentiometer.

No Relay Chatter!

An adjustable output delay prevents chatter when material is at the critical detection level. It is adjusted by a single potentiometer and applied to both the SPDT relay and transistor outputs.

It can also be applied when entering or leaving alarm. The delay can be temporarily disabled to confirm output operation, without readjusting the delay setting.

LED Indicators

The Power On, Sensor Status, and Output Status LED indicators provide a simple way to verify performance during installation.

Power On confirms that power is supplied to the unit. Sensor Status indicates that material has been detected. Output Status shows the change in output state.

SIEMENS

Common Specifications

Supply Voltage: 12 to 260 VAC/DC, any polarity, galvanically isolated

Power Consumption: 2VA/2 Watts

Signal Indicators: 3 LEDs provide adjustment, output status, and power

Adjustment: *Potentiometers:* 2, for adjustment of time delay and sensitivity;

Switches: 1 SPST dip switch for time delay select. Failsafe high/low, and time delay test/adjust, high low sensitivity

Temperature Range: -40° to 185° F operation and storage

Materials: *Process Connection:* 316L Stainless Steel; *Probe:* PPS (Ryton);
Enclosure: Epoxy Coated Aluminum (NEMA 4X, 7/9, IP65)

Switch Point Repeatability: 0.08"; *Hysteresis:* 0.08"

Dielectric Constant: 1.5 minimum

Operating Frequency: 5 MHz maximum

Cable Entry: 1/2" NPT; *Cable Gland:* PG 13.5 (available)

Output Functions

Relay Contact: Form C SPDT, NC or NO contact selectable

Contact Load: 10 mA/50 VDC min., 50A/30 VDC max.; 8A/250 VAC max.

Switching Capacity: 2000VA/150 Watt max.

Solid-State Switch: Galvanically isolated, with sensor failure detection

Safety: Non-polarity sensitive (no wiring errors)

Switch Voltage: 250 VAC/300 VDC max.; *Voltage Drop:* <1 Volt

Load: 2 Watt max. *Load Current:* 100 mA max.

Time Delay: (On/Off) 1-60 seconds

Approvals: General Purpose; *Dust/Ignition-Proof*
worth IS Probe: CSA/FM Class II, Div. 1, Group E-G,
Class III T4; *Explosion-Proof:* CSA Class I, Div. 1,
Groups A-D



Standard Model

Process Connections: 3/4" NPT

Maximum Length: 4"

Resistance: 365 PSI maximum

Sanitary Model

Process Connections: 1", 1.5" or 2"
Tri-Clamp

Maximum Length: 4"

Resistance: 365 PSI maximum

Extended Rigid Model

Process Connections: 3/4" NPT

Maximum Length: 216"

Resistance: 365 PSI maximum

Extended Cable Model

Process Connections: 3/4" NPT

Maximum Length: 1,378"

Tensile Strength: 396 Lbs. max

Resistance: 150 PSI maximum

**Use the CLS in More Applications
than Ever Before**

**With the SensGuard abrasive- and chemical-
resistant cover for the CLS standard probe.**

- NPT threaded process connection sizes
- Handles pressure ranges from full vacuum to 365 PSIG, temperatures from -40° to 257° F



Ordering Instructions

Select one option from each table section below. A complete catalog number looks like this: 7ML5630-_____-_____

Model Selection Guide

Catalog Description		Price Number	Each
CLS200 Capacitance Point Level Detection Sensor		7ML5630 -	\$480.00
316L SS Process Connection	Threaded, 3/4" NPT	0A_ _ _	0.00
	Threaded, 1" NPT	0B_ _ _	31.50
	Threaded, 1.25" NPT	0C_ _ _	42.00
	Threaded, 1.5" NPT	0D_ _ _	71.40
	1" ASME, 150 Lb Welded Flange	5A_ _ _	234.15
	1.5" ASME, 150 Lb Welded Flange	5D_ _ _	282.45
	2" ASME, 150 Lb Welded Flange	5G_ _ _	337.05
	3" ASME, 150 Lb Welded Flange	5K_ _ _	401.10
4" ASME, 150 Lb Welded Flange	5N_ _ _	480.90	
Standard Insertion Lengths (No Y01 code needed.) Length from flange face. Threaded lengths include process connection			
Standard Compact (Threaded 120 mm, Flanged 98 mm)		_ _ _ A _ _	0.00
Standard Extended Rod 250 mm 9.84"		_ _ _ B _ _	70.35
Standard Extended Rod 350 mm 13.78"		_ _ _ C _ _	139.65
Standard Extended Rod 500 mm 19.69"		_ _ _ D _ _	161.70
Standard Extended Rod 750 mm 29.53"		_ _ _ E _ _	207.90
Standard Extended Rod 1000 mm 39.37"		_ _ _ F _ _	220.50
Standard Extended Rod 1250 mm 49.21"		_ _ _ G _ _	231.00
Standard Extended Rod 1350 mm 53.15"		_ _ _ H _ _	243.60
Standard Extended Rod 1500 mm 59.06"		_ _ _ J _ _	254.10
Standard Extended Rod 1750 mm 68.09"		_ _ _ K _ _	266.70
Standard Extended Rod 2000 mm 78.74"		_ _ _ L _ _	277.20
Temp/ Electronics	No Thermal Isolator	_ _ _ _ 0 _	0.00
	Thermal Isolator (Process Temps >185° F)	_ _ _ _ 1 _	47.00
	Remote Mount Electronics, 2 m Cable	_ _ _ _ 2 _	268.00
	Remote Mount Electronics, 5 m Cable	_ _ _ _ 3 _	282.00
Wetted Materials	FKM	_ _ _ _ _ 0 -	0.00
	FFKM (Process Temps > -47° F)	_ _ _ _ _ 1 -	116.00
Probe Material	316L SS with PPS Probe Body	0 _ _ _ _	0.00
	316L SS with PVDF Probe Body	1 _ _ _ _	47.00
Approvals	CSA/FM/CE General Service	_ _ H _ _	0.00
	CSA/FM Dust-Ignition Proof, IS Probe	_ _ F _ _	47.00
	CSA/FM Explosion Proof, IS Probe	_ _ G _ _	110.00
Enclosure	IP65 Rating	_ _ A0	0.00
	IP68 Rating	_ _ C0	42.00
CLS Flange, 3/4" Thread for Mounting any 3/4" NPT Pointek CLS Level Switch		7ML1500-0_ _ 0	0.00
		Pressure Rating (ANSI B16.5)	
		150 Lbs. (A)	300 Lbs. (B) 600 Lbs. (C)
Flanged Process Connection Size	1" (A)	\$193.00	\$234.00 \$246.00
	1.5" (B)	230.00	270.00 294.00
	2" (C)	274.00	308.00 357.00
	3" (D)	328.00	400.00 432.00
	4" (E)	395.00	505.00 600.00
Spare Parts and Accessories			
1/2" HF Cable Gland (GP, Dust/Ignition-Proof)		7ML1830-1JA	\$15.90
1/2" HF Cable Gland (Explosion-Proof)		7ML1830-1JB	29.68
3/4" NPT Ryton SensGuard (PPS) Cover		7ML1830-1DL	68.90
CLS200 English Instruction Manual		7ML1998-5JH04	24.38
CLS200 Quick-Start Guide		A5E32221251	33.92

**Dielectric constants table
available on page 488.**

Level Measurement Instruments
Flow Measurement Instruments
Pressure Transmitter
Temperature Sensors and Transmitters
Wireless Sensing and Communications
Analytical Instruments and Systems

Pointek CLS300: Capacitance Point Level Detection Sensors

SIEMENS



Features

- One design fits all, even in harsh and heavy duty environments; suitable for high pressures and high temperatures in liquids, solids, slurries, and interfaces
- All wetted parts made of stainless steel and PFA, Teflon, or ceramics for high-chemical resistance
- High-sensitivity probe provides accurate level detection without the effects of conductive material buildup. Works equally well in wood chips or tomato sauce!
- Patented LC500 active technology for reliable point level detection, unaffected by vapor concentration, product deposits, dust, and condensation
- Simple threshold/air calibration for rapid, cost-effective setup with LED verification
- Universal galvanically isolated power supply and one universal transmitter provide low cost of ownership and minimal requirements for stocking spare parts
- Multiple switch outputs provide relay, solid state (transistor), or two-wire point detection with one design, including time delays for on/off

The Pointek CLS300 offers accurate, reliable level detection even in harsh, heavy duty industrial applications with high pressures and high temperatures.

It's effective in liquids, solids, slurries, interfaces, and applications involving viscous (conductive and nonconductive) materials. The fully potted transmitter is unaffected by condensation, dust, or vibration.

All metal parts are made of stainless steel, with a PFA Teflon shield section for high chemical resistance. For higher temperature applications, ceramics can be supplied. Materials with low or high dielectric properties are accurately detected, and the unique active shield helps in ignoring the effects of buildup.

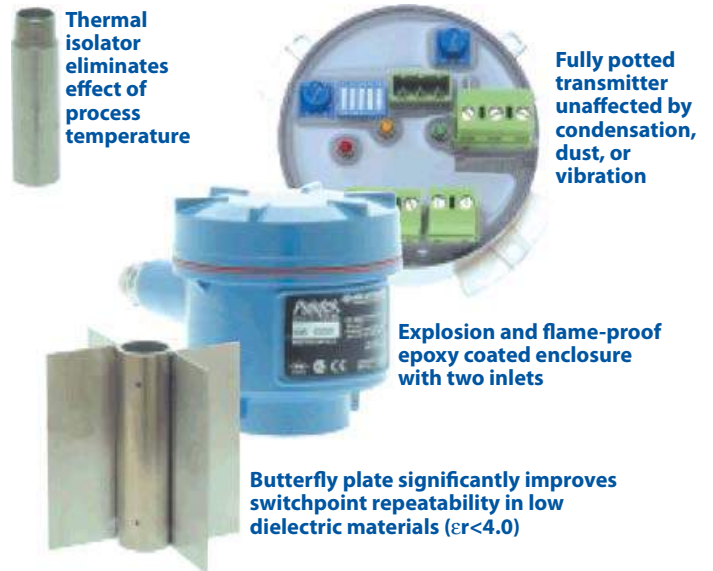
Its unique modular design provides for a wide range of configurations, process connections, extensions, and approvals to meet the precise temperature and pressure requirements of specific applications. The modular design makes it easy to specify and reduces stocking requirements. A wide range of probe configurations is available, including rod and cable/rope models.

The Technology Behind the Performance

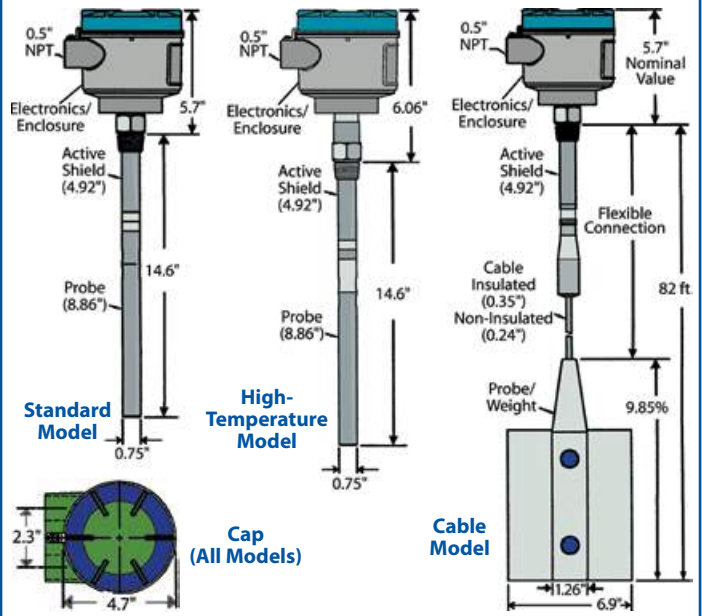
The Pointek CLS300 is based on the patented, field-proven LC500 level measurement technology. It combines active shield technology with a wide input range, temperature stability, and inverse frequency operation. The active shield is electrically isolated from an active measurement section. The active measurement section becomes the frequency-determining component for the triangular wave oscillator in the transmitter.

When the capacitance increases or decreases with the level of material, the measuring frequency changes inversely. The same signal is also connected to the active shield portion of the probe, effectively eliminating the electrical potential difference between the shield and the measurement section. The probe will not be affected by changes in vapor concentration, dust, or condensation.

The CLS300 will provide accurate level detection even in highly conductive materials with build-up on the probe.



Dimensions



Specifications

Approvals: FM/CSA Class I, Div. 1, Groups A-D, Class II/III, Div. 1 Grps E-G (Dust/Ignition Proof), CE, NRTL/C, CENELEC EEx d [ia] IIC, T6..T4



Probe

Probe Lengths: Rod version: 14" to 40"; Rope/cable version: 20" to 985"

Wetted Parts: AISI 316L/PFA/Peek; High-temperature version: AISI 316L/ ceramics Al₂O₃ (99.7%)

Temperature Range: -40° to 398° F; High-temperature version: -40° to 752° F

Pressure Range: 511 PSIG

Dielectric Constant: 1.5 min.

Tensile Force: 4,188 lbs. max.

Enclosure: Epoxy coated, NEMA 4/Type 4/IP65

Process Connection: NPT/BSPT/JIS

Need to find your media dielectric constant? See page 488.

Power Supply and Transmitter

Supply Voltage: 12-250 VAC/VDC any polarity galvanically isolated

Power Consumption: 2 VA/2 Watt

Wiring Connections: Max. 0.009"; Temperature range: -40° to 185° F

Signal Indicators: 3 LEDs for adjustment control, output status and power

Adjustment Potentiometers: 2 PCS, for time delay and sensitivity

Adjustment Switches: 5 PST dip switch for time delay select. Failsafe high/low and time delay test/adjust, high/low sensitivity

Sensitivity: 1% max. change in actual capacitance

Temperature Drift: 0.2% max. of actual capacitance value

Measurement Frequency: 600 kHz max.

E.S.D. Protection (kV): Protected to 55 kV continuous discharge

Output Functions

Relay Contact (with Signal Failure Detection): Contact: Form C SPDT (selectable NC or NO contact); Max. contact load: DC: 5A/30 VDC; AC: 8A/250 VAC (cosφ=1); Max. switching capacity: 150 Watt/2000 VA; Min. contact load: 10 mA/5 VDC; Time delay (on and/or off): 1-60 seconds

Solid-State Switch (with Signal Failure Detection): Output: Galvanically isolated; Safety: Non-polarity sensitive transmitter; Max. load: 2 Watt; Max. switch voltage: 250 VAC/300 VDC; Max. load current: 100 mA; Voltage drop: Below 1 Volt typical at 50 mA; Time delay (on and/off): 1-60 seconds.

Two-Wire Switch: With customer-supplied external trip devices

Ordering Instructions

Select one option from each table section below. A complete catalog number looks like this: 7ML5650-_____-_____-Z

Model Selection Guide

Catalog Description		Price Number	Each	
CLS300 Capacitance Point Level Detection Sensor		7ML5650-	\$658.00	
316L SS Process Connection	Threaded, 3/4" NPT	0A_ _ _	0.00	
	Threaded, 1" NPT	0B_ _ _	32.00	
	Threaded, 1.25" NPT	0C_ _ _	42.00	
	Threaded, 1.5" NPT	0D_ _ _	71.00	
	1" ASME, 150 Lb Welded Flange	5A_ _ _	234.00	
	1" ASME, 300 Lb Welded Flange	5B_ _ _	285.00	
	1.5" ASME, 150 Lb Welded Flange	5D_ _ _	282.00	
	1.5" ASME, 300 Lb Welded Flange	5E_ _ _	331.00	
	2" ASME, 150 Lb Welded Flange	5G_ _ _	337.00	
	2" ASME, 300 Lb Welded Flange	5H_ _ _	377.00	
	3" ASME, 150 Lb Welded Flange	5K_ _ _	401.00	
3" ASME, 300 Lb Welded Flange	5L_ _ _	489.00		
4" ASME, 150 Lb Welded Flange	5N_ _ _	481.00		
4" ASME, 300 Lb Welded Flange	5P_ _ _	618.00		
Standard Probe Lengths (No Y01 code needed.) Length from flange face. Threaded lengths include process connection				
Standard Extended Rod	350 mm 13.78"	_ _ _ A _ _	0.00	
Standard Extended Rod	500 mm 19.69"	_ _ _ B _ _	41.00	
Standard Extended Rod	750 mm 29.53"	_ _ _ C _ _	79.00	
Standard Extended Rod	1000 mm 39.37"	_ _ _ D _ _	100.00	
Temp. Options	No Thermal Isolator	_ _ _ 0 _	0.00	
	Thermal Isolator (Process Temps >185° F)	_ _ _ 1 _	66.00	
Wetted Seals	FKM	_ _ _ _ 0 -	0.00	
	FFKM (Process Temps > -47° F)	_ _ _ _ 1 -	364.00	
Probe	316L SS, PFA Lining, PEEK Isolators	0 _ _ _	0.00	
Approvals	CSA/FM/CE General Service	_ _ H _ _	0.00	
	CSA/FM Dust-Ignition Proof, IS Probe	_ _ F _ _	38.00	
	CSA/FM Explosion Proof, IS Probe	_ _ G _ _	50.00	
Enclosure	IP65 Rating	_ _ _ A _	0.00	
	IP68 Rating	_ _ _ C _	42.00	
Active Shield Length	125 mm Threaded, 105 mm Flanged	_ _ _ 0	0.00	
	250 mm Threaded, 230 mm Flanged **	_ _ _ 1	247.00	
	400 mm Threaded, 380 mm Flanged **	_ _ _ 2	267.00	
CLS Flange, 3/4" Thread for Mounting any 3/4" NPT Pointek CLS Level Switch		7ML1500-0_ _ 0	0.00	
Pressure Rating (ANSI B16.5)				
		150 Lbs. (_ A)	300 Lbs. (_ B)	600 Lbs. (_ C)
Flanged	1" (A _)	\$193.00	\$234.00	\$246.00
Process	1.5" (B _)	230.00	270.00	294.00
Connection	2" (C _)	274.00	308.00	357.00
Size	3" (D _)	328.00	400.00	432.00
	4" (E _)	395.00	505.00	600.00
Spare Parts and Accessories				
1/2" HF Cable Gland (GP, Dust/Ignition-Proof)		7ML1830-1JA	\$15.90	
1/2" HF Cable Gland (Explosion-Proof)		7ML1830-1JB	29.68	
3/4" NPT Ryton SensGuard (PPS) Cover		7ML1830-1DL	68.90	
CLS300 English Instruction Manual		7ML1998-5JH04	24.38	
CLS300 Quick-Start Guide		ASE32221251	33.92	

** 250 mm Extended shield available only on probe lengths >500 mm.
400 mm Extended shield available only on probe lengths >750 mm.

Pointek CLS500 Point Level Switch for Extreme Conditions

Features

- Wide range of applications in high pressure and temperature, chemically aggressive, and other extreme process environments
- Viscous, conductive and non-conductive liquids, solids, slurries, and interfaces
- Integrated local display for service and commissioning or remote adjustable programming and control via HART®
- Two-wire analog mA output with two-state functionality (4–20 mA or 20–4 mA)
- Adjustable hysteresis on/off for solid-state output and for current signal; Damping function
- Signal current compliant to NAMUR NE 43
- Full range of local/remote diagnostics
- Pre-detection of trip point for high safety requirements
- Polarity-insensitive current loop
- General purpose, dust ignition proof, explosion proof and intrinsically safe approved models

Good for use in environments up to 392°F and 7665 PSI!



Specifications

Measurement Range: 0 to 330 pF; *Span:* Minimum 1 pF

Measurement Frequency: 420 kHz

Accuracy: Deviation <0.1% of actual measurement value; *Non-Linearity and Reproducibility:* 0.1% full scale and actual measurement respectively

Temperature Stability: Greater of 0.15 pF (0 pF) or <0.25% (typical <0.1%) actual measurement value over full temperature range

Process Connection: NPT thread; ANSI, DIN flat-faced flanges

Process Material: AISI 316 L standard; C 22.8 N, Monel 400, Hastelloy C22, Duplex optional

Safety: Current signaling according to NAMUR NE 43; 3.6 or 22 mA, probe input ESD protected to 55 kV, inputs/outputs fully galvanically isolated, polarity-insensitive current loop, fully potted, integrated safety barrier

Diagnostics: Includes fault alarm when primary variable (PV) out of limits, system failure in measurement circuit, deviation between A/D and D/A converter, checksum, watch dog and self-checking facility probe

Probe Length: *Rod version:* Up to 1000 mm (216") with 16 or 24 mm diameter probe; *Diameter:* 16 mm (0.63") or 24 mm (0.95") rod

Probe Installation: PFA, Enamel

Function Rotary Switch: Positions 0 to 9, A to F

Remote Communication: HART® Foundation

Pressure Rating: FV to 50 bar (725 PSI), up to 525 bar (7665 PSI) optional

Enclosure: Aluminum, epoxy coated Type 4X/NEMA 4X/IP65; 2 x 1/2" NPT cable entry

Temperature Rating: -328° to 392° F, up to 752° F optional

Supply Voltage: 12 to 33 VDC (30 VDC for IS model)

Loop Current: 3.6 to 22 mA / 22 to 3.6 mA (2-wire current loop)

Environmental: *Location:* indoor/outdoor; *Altitude:* 2000 m maximum; *Ambient Temperature:* -40° to 185° F standard and for T5 to T1 ATEX explosion proof, -40° to 158° F for T6; *Installation category:* II; *Pollution degree:* 4

Approvals: CE; FM/CSA: Class I, II & III, Div. 1 Groups A-D (Intrinsically Safe), Class I, Div. 2, Class II, Div. 2, Class III, Div. 1 & 2 (Hazardous Locations); FM: Class I, II & III, Div. 1 Groups A-D (Explosion Proof); 3A Sanitary



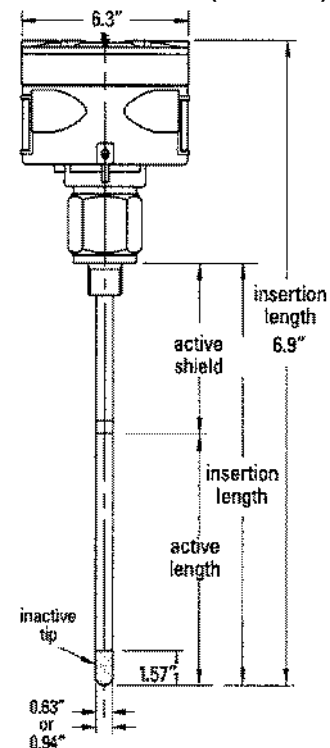
Siemens Pointek CLS500 is a two-wire capacitance point level switch for detecting interface solids, liquids, slurries, and viscous materials in critical conditions of extreme pressure. It uses a unique, frequency-based measurement system and patented Active-Shield technology to deliver highly accurate, repeatable results.

Measurement is unaffected by moisture, vapors, foam, temperature and pressure variations, or material build-up around the mounting glands.

The CLS500 combines a sophisticated, easy-to-adjust transmitter (MSP-2002-1) with a measurement electrode and process seal designed to accommodate numerous configurations. The advanced electronics and integrated local display provide for one-point calibration without interrupting the process, and the probe shield design eliminates the need for frequent recalibration.

Pointek CLS500 can be used as a pump controller, by connecting the 2-state mA output and/or the solid state switch to a relay, and activating a pump via an auxiliary power circuit.

Standard S-Series (Threaded)



Call for pricing on welded flange, single piece flange and high-temp configurations.

Ordering Instructions

Make one selection from each table below. A complete catalog number looks like this: 7ML5601-_____-AO_Z

Model Selection Guide

Description	Catalog Number	Price
Pointek CLS 500, S-series, threaded		
Two-Wire capacitance point level detection device, PFA probe insulation, 316LSS connection		
	7ML5601-	\$721.00
Electronic Transmitter	None	0.00
	MSP2002-1 (330 pF)	1148.00
Process Connection	1" Threaded NPT	_BA1_- 0.00
	1 1/2" Threaded NPT	_DA1_- 0.00
	2" Threaded NPT	_EA1_- 0.00
Approvals	General Purpose	____1- 0.00
	FM/CSA Approved	____2- 95.00
Probe/Electrode Diameter	16 mm Rigid Rod, 1000 mm max length	1____- 0.00
	Rigid Thermal Isolator	_AA0 142.00
Options	Total Insertion Length	Z-Y01 ____ 0.00
	Active Shield Length (50 mm Min.)	Z-Y02 ____ 0.00
MSP 2002-1 Transmitter, 330 PF	7ML1830-1JP	1025.02
CLS500 Instruction Manual	7ML1998-5GG03	29.68

Pointek ULS200: Ultrasonic Point Level Detection Sensor

Features

- Noncontacting point level detection on bulk solids (0.8 to 9.8 ft.), liquids and slurries (0.8 to 16.4 ft.)
- Type 6, NEMA 6/IP67 polycarbonate or aluminum enclosure
- Built-in temperature compensation
- Two-button setup, simple cable-entry wiring, and a self-cleaning sensor
- AC or DC power supply
- Sanitary version available, with an industry standard flange



In Case of Emergency...

You can use your Pointek ULS200 as a high-level emergency shutoff switch!

It's a good engineering practice to have a backup high-level switch that uses a different technology than your continuous level devices.

Look at all the ULS200 offers...

- Two independent settings that allow for high- and low-level switch points from a single unit
- Noncontacting, self-cleaning sensor, made of Tefzel® or Kynar-Flex®
- Polycarbonate or Epoxy enclosure available

The perfect point level backup device for your capacitance applications.

Specifications

Detection Range: *Liquids:* 0.8 to 16.4 ft.
Solids: 0.8 to 9.8 ft.

Operating Modes: High, low, high-high, high-low, low-low level indication

Repeatability: 0.25% of full range

Resolution: 0.1"

Echo Processing: Patented Sonic Intelligence® software

Memory: Nonvolatile EEPROM

Operating Pressure: 30 PSI

Beam Angle: 10° at 3db boundary

Ambient/Process Temperature: -40° to 140° F. *Metal mounting:* -5° to 140° F

Outputs: *AC Version:* Two Form C SPDT contacts, rated 5A at 250 VAC noninductive; *DC Version:* Two nonpolarized transistor switches rated 48 VDC, 100 mA max. or two Form C SPDT contacts, rated 5A at 48 VDC

LCD Display: Displays three 0.35" digits for programming distance between sensor face and material. Multi-segment graphic for operation status.

Programming: 2 keys

Power Supply: 18 to 30 VDC, 3W max. or 100 to 230 VAC max.

Terminal Block Wiring: 14 gauge solid/16 gauge stranded max.

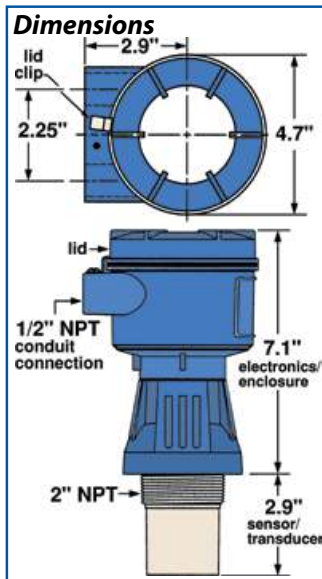
Cable Entry (2 connections): *Polycarbonate enclosure:* PG 13.5 or 1/2" NPT.
Aluminum enclosure: 1/2" NPT or PG 13.5

Sensor Mounting: *Threaded:* 2" NPT, 2" BSP or PF2.

Electronics Enclosure: *Material:* Polycarbonate or Epoxy coated aluminum with gasket. *Ingress protection:* Type 6/NEMA 6/IP67.
Sensor: ETFE or PVDF

Environmental : *Location:* Indoor/outdoor; *Altitude:* 6562 ft. max.; *Installation category:* II; *Pollution degree:* 4

Approvals: CE, CSA/FM Class I, II, III, Div 1, Gr A-G T4, ATEX II, C-TIC, INMETRO



Ordering Instructions

Select one option from each table following. A complete catalog number looks like this: 7ML1510 - _____

Model Selection Guide

Description		Catalog Number	Price
ULS200: Ultrasonic Point Level Detection Sensor		7ML1510 -	\$857.07
Power	24 VDC, Relay Output	1 _____	0.00
	24 VDC, Transistor Output	2 _____	0.00
	100 to 230 VAC, Relay Output	3 _____	117.70
Approvals	CE, CSA, CI I Div 2, Zone 2, CI 2 Div 2	_ J _ _ _ _	0.00
	CE, C-TICK, CSA, FM, GP	_ K _ _ _ _	0.00
Process Connection	2" NPT ETFE	_ _ A _ _ _	42.80
	2" NPT PVDF Copolymer	_ _ E _ _ _	0.00
Housing/ Cable Entry	Polycarbonate, 1/2" NPT	_ _ _ 02	0.00
	Aluminum, 1/2" NPT	_ _ _ 04	143.00
Parts and Accessories	FMS200 Universal Box Bracket	7ML1830-1BK	134.62
	Universal Adaptor, 2" NPT	7ML1830-1BT	125.08
	Polycarbonate Lid	7ML1830-1LG	15.90
	Aluminum Lid	7ML1830-1LH	32.86
	English Quick Start Manual	A5E2268616	41.34

Note: The ultrasonic Pointek ULS200 is intended to be a primary measurement and control device. For overflow or level safe protection, Siemens advises using Pointek contacting technology, like the CLS200 on pages 6 to 7 of this catalog.



Load Cells for Level by Weight

Features

- Easy mounting
- Only 25/35 mm installation height
- Hermetically welded seal IP68 equivalent to NEMA 6
- Stainless steel construction
- Direct 4 to 20 mA output (LA)
- CENELEC Ex-version available (LE)
- Level control for liquid and bulk materials

This is the perfect solution to all your level control requirements: Sartorius' revolutionary PanCake® technology for level-by-weight applications. This system is extremely durable for the utmost precision in most applications. It works independent of material properties and the surrounding environment. Retrofitting is fast and easy. PanCake technology is tried and tested in many installations, and is available at an affordable price.

Conventional level control instrumentation can lead to errors of 5% and more. In extreme cases this could result in interruption of the associated process. New PanCake level-by-weight technology gives extremely accurate readings better than 1% in "real-life" applications over a complete range of capacities up to more than 35,000 pounds.

Exceptionally price competitive, the PanCake system offers not only great technical advantages, it also offers exceptional value for the money. Compared to ultrasonic or radar systems, savings of up to 50% are possible.

The extremely reliable, tough and durable design of sensors and the use of high quality materials lead to unequaled reliability, even under harsh industrial conditions. Maintenance or recalibration is rarely needed, except in case of mechanical changes to the tank.

The high quality sensor maintains calibration for years, without drift or creep. The stainless steel housing is hermetically sealed by welding and complies to the highest rating (IP68) for 10,000 hours at 1.5m (5'), equivalent to NEMA 6.

PanCake Capabilities

The model LA provides 4 to 20 mA output for direct connection to process instrumentation or PLCs/DCS. Models L and LE featuring mV/V output are connected via Sartorius transmitters and indicators. Usually only one PanCake is required (three legs). If two are used (four legs) you still require only one input channel in your PLC or Process Indicator by simply switching the two outputs in parallel.



Specifications

Load Cell Construction: Hermetically sealed, welded stainless steel construction, filled with Polyurethane

Material: 500kg; 10t: 1.4021 (DIN), 420 S 37 (B.S.); 16t: 1.4542 (DIN), S 604/S 622 (B.S.), 17 to 4 pH (Int.)

Protection: IP68, IEC 529, equivalent to NEMA 6. The load cell can be submerged in water to a depth of 1.5 m for 10,000 hours.

Cable: Robust, flexible, screened; **Sheath:** Thermopl, Elastomer; **Color:** gray (LE: blue, LA/LAC: green); **Diameter:** 5mm, wires 4 x 0.35 mm²; **Length:** 5 m; **Bending radius:** ≤ 50 mm

Certificate of Conformity: EEx ia IIC T6 (PTB Nr. Ex-00.E.2040, II 2G EEx ia II T6 (PBTB 00 ATEX 2039)

Technical Data	L	LA/LAC	LE
Accuracy Class	0.5%		
Minimum Dead Load	0% E_{max}	5% E_{max}	0% E_{max}
Safe Overload	150% E_{max}	100% E_{max}	150% E_{max}
Destructive Load	300% E_{max}		
Rated Output	2.0	16mA	2.0
Tolerance on Rated Output	< 4		
Tolerance on Zero Signal	< 4	4mA	< 4
Repeatability Error	<0.1		
Creep During 30 Minutes	<0.1		
Non-Linearity	<0.25	<0.25	<0.25
Hysteresis	<0.15		
Temperature Effect on Zero	<0.15% $C_n/10K$		
Temperature Effect on Output	<0.1% $C_n/10K$	<0.1% $C_n/10K$	<0.1% $C_n/10K$
Input Impedance	645±60Ω		645±60Ω
Output Impedance	635±15Ω		635±15Ω
Insulation Impedance	>5000x10Ω		>5000x10Ω
Recommended Supply Voltage	4 to 21V	20 to 28V	4 to 24V
Maximum Supply Voltage	32V	28V	25V
Ambient Temperature	-10° to 70° C (Nominal) -30° to 95° C (Usable)	-30° to 55° C (Nominal) -30° to 70° C (Usable)	-10° to 55° C (Nominal) -30° to 95° C (Usable)
Storage Temperature	-40° to 95° C	-40° to 80° C	-40° to 95° C
Permissible Eccentricity	10 mm		
Vibration Resistance	20g, 100h, 10 to 150 Hz		
Air Pressure Effects	≤20g/kPa		
Nominal Deflection	Up to 2t <0.1/16t <0.2 mm		

Precise for All Materials

The new PanCake level-by-weight technology determines the actual content of a vessel directly in kilograms or pounds. One sensor provides reliable readings for all measured materials.



Example 1: Formation of foam and bubbles, phase transition and evaporation may affect others, but not PanCake.



Example 2: Material sticking to the wall of a vessel, variable moisture content and deviations in particle size, but PanCake gets it right.



Example 3: Material comes from filling or discharging, but cannot comprise readings of PanCake.

Easy to Install

Just lift one leg of the vessel for a little more than an inch, slide the PanCake into the gap, setup is ready, in many instances without additional mounting kits, complicated mechanical conversion of the vessel, or changes to the pipework. Easy to start up. No calibration weights required.



Example 1: The vessel is lifted at one side only. The resulting inclination is small enough not to disturb the readings.



Example 2: One leg of the vessel is just shortened by an inch. No inclination occurs.



Example 3: The vessel is lifted leg-by-leg, one leg is supported by PanCake. Other legs are leveled out by adding shimming plates.

Why Use a Load Cell for Level?**Easy Start Up... Better Performance... Low Maintenance**

Calibration without weights — Competitors calibration of 50,000lb vessel normally takes 4 to 6 hours. There are usually no weights available. Sartorius calibration time is less than 20 minutes.

No shimming or corner adjustments — Sartorius PanCake only takes 5 minutes, by hand rotating the load cell to determine whether or not there is a load. Only a minimal 1% of the load is required.

No resistors or trim pots in the junction box — Resistors and potentiometers tend to be temperature and moisture sensitive. This can affect system accuracy.

Matched load cells — All Sartorius load cells are totally matched and can be replaced without the need for re-calibration.

No influence from the effect of mixers (moving center of gravity) — Due to matched load cells and unique mounting design

No side load effects due to temperature expansion of the vessel — Side forces are taken by the mounting kits which have freedom for temperature expansion.

Load cells have lighting protection — Special strain gauge design in combination with our junction box makes it possible.

Stainless steel and hermetically sealed — The load cells can be submerged in water under 5 feet for 10,000 hours.

Special load cell cable for harsh environments — No PVC insulation, PTFE is used for high chemical resistance and a Kevlar fiber for "Pull Protection."

High Ω load cell design — 650 to 1200 Ω input resistance for minimizing the effect of cabling on accuracy and higher signal under intrinsically safe conditions

NOW limited LIFETIME WARRANTY on most STAR Line load cells

Load cells remain within all specifications up to a usable load of 150 to 200% of nominal

All controls are designed with a built-in test function and can be "calibrated without weights."

We offer a wide range of weighing and batching solutions, from simple indication to complex batching systems.



Sartorius Accuracy Class is calculated using these criteria: Hysteresis, linearity, temperature effects on zero and span, repeatability, and creep.

These compression load cells are available with several accuracies:

PR6201 (Left): 0.25% to 0.5%; 0.04% to 0.05%; or 0.015%

PR6211 (Center): 0.04% to 0.05%

PR6241 (Right): 0.04% to 0.05%; 0.015%; or 0.008%

Such a small solution to a big problem!



Contego® Hygienic Weighing System



Features

- For production, mixing, charging, and storage vessels where cleaning is critical
- For containers with total load of 100kg to 2t
- 6.6" diameter for installation in tight spaces
- Head and base plates made of AISI 316L stainless steel for corrosion-resistance and hygienic connections
- Accuracy classes D1 ($\pm 0.04\%$) and C3 ($\pm 0.015\%$)
- EHEDG-certified, FDA-compliant silicone cover, Weights and Measures approval to IOML R60

Food and pharmaceutical industries are known for high standards regarding hygiene in the production process. Many sensitive areas, from delivery to packaging and distribution are located next to one another, making it particularly challenging to combine precise measurement results with compliance to hygiene requirements.

The most critical requirements are those regarding components of machines and systems that come directly into contact with the product. They must have a high level of corrosion resistance, must not give off any chemical substances and will ideally have surfaces that have been optimized for ease of cleaning.

Depending on the contamination type (flour, cocoa, egg white, fat), system components must withstand cleaning methods like compressed air, suction, fluids or water, or steam blasting. High-quality materials, like stainless steel or highly resistant plastics offer effective protection against dust and moisture.

For small-to medium-size process containers with a total load of 100kg–8t or anywhere meeting hygienic standards is important, Sartorius' Contego® combines a load cell and mounting kit into a single hygienic solution.

The stainless steel construction protects the central components from corrosion and the FDA-compliant silicone sleeve offers the highest level of hygienic security. The small diameter unit fits in tight spaces, and a built-in jack-up function makes it easy to lift and lower the process vessel during maintenance, without the need for additional tools.

The Contego module is easily installed under the foot of the container, so a separate structure isn't necessary. The head and base plates are made of stainless steel AISI 316 L (1.4404). They protect all central components against corrosion and offer an extremely hygienic and stable solution for attaching to the container and base element.

An integrated jack-up function provides simple and correct lifting or lowering of the container during maintenance work, without the need for additional tools. As a special element for stabilizing the container, Contego has an integrated lift-off protector and a constrictor. These ensure reliable stability of the container during operation. If the floor is sealed with silicone, an optional adapter plate is directly cast as well, that prevents the risk of dirt accumulating.

The FDA-compliant silicone casing is also approved for the pharmaceutical industry, and offers the highest levels of hygienic security. It's securely connected to the head and base plates through a special geometric seal to avoid the formation of gaps that can cause contamination. This protective casing also has high chemical resistance to most cleaning agents.

Overall, the advantage of this weighing solution lies in its impressive hygienic properties, combined with significant cost savings in planning, design and operation. The Contego is available in two versions, with the cable outlet on the side or on the top, and has an appropriately hygienic cable connection. Both load cell models are naturally available as an explosion-proof version suitable for use in potentially explosive areas. An intrinsically safe load cell supply can be integrated for use in potentially explosive areas.

Specifications

Load Cell Construction: S-shaped version for torque-free load application. Pure stainless steel, hermetically sealed and filled with protective gas.

Material: Load cell: 1.4542 (AISI 630, 17-4PH) Mounting parts: 1.4404 (AISI 316L) Below: Silicone

Ingress Protection: Load cell: IP68 in accordance with IEC 60529: 1.5 m water column/10,000h. Weighing module: IP69K, according to DIN 40050: water under high pressure, steam cleaning

Cable: Robust, flexible, screened, Cable 4 + 0.35 mm²; Sheath: TPE thermoplastic elastomer; Diameter: 5 mm; Length: 5 m; Bending Radius: Fixed installation: >25 mm; Flexible installation: >75 mm

Certificates of Conformity: Ex Marking: II 1G EEx ia IIC T6, II 1D IP65 85° C

Registration number: PTB 02 ATEX 2059, TÜV 03 ATEX 2301x. Usable for explosion hazard subgroups IIA, IIB and III. IIC on request.

Technical Data

Metrological	D1	C3	
Accuracy Class	0.04	0.015	% E _{max}
Minimum LC Verification	5,000	14,000	
Deadload Output Return	1,000	3,000	
Tolerance on Rated Output	< 0.25	< 0.07	% C _n
Repeatability Error	< 0.01	< 0.005	% C _n
Creep (30 Minute Duration)	< 0.03	< 0.015	% C _n
Linearity	< 0.03	< 0.01	% C _n
Hysteresis	< 0.04	< 0.015	% C _n
Temperature Effect on Smin	< 0.028	< 0.01	% C _n /10 K
Temperature Effect on C	< 0.03	< 0.01	% C _n /10 K
Ambient Pressure Impact	≤ 0.005	≤ 0.0025	% C _n /kPa

Nominal Deflection: < 0.5 mm

Minimal Dead Load: 0

Usable Load: 150% E_{max}

Destructive Load: > 300% E_{max}

Zero Output Signal: < 1.0 % C_n

Rated Output: 2 mV/V

Supply Voltage: 4–24 V

Ambient Temperature Range: -40°–203° F

Permissible Eccentricity: 5 mm

Vibration Resistance: 20 g, 100 h, 10–150 Hz

Mechanical

Permissible Horizontal Force: 7 kN; Destructive force: > 30 kN max.

Permissible Vertical Load: 1.5 t max. without load cell

Permissible Lift-Off Force: 8 kN max.

Permissible Load for Jack-Up: 1.5 t max.

Call for pricing
and delivery.

Batch Processing and Recipe Management System

Sartorius ProBatch+ Recipe Management System

- Open batch system for PLC controllers
- Simple, user-friendly operation with clear process data
- Material management with stock monitoring and tracking
- Built-in script language for customer specific process requirements
- Connection of controllers in accordance with Batch Standard ANSI/ISA S88.01 via OPC
- Creates production and batch reports, consumption quantity lists



Batch processes are optimized and production resources put to optimal use through simple adaptation of batch parameters to variable raw material characteristics, automatic calculation of batch sizes, and the optional automatic start from the daily production plan.

ProBatch+ manages raw materials, creates recipes, and runs and starts production cycles. It can be connected to batch controllers and PLC systems directly via Ethernet, or indirectly via field bus to a PLC. Recipe steps can be carried out directly on an PLC.

Specifications

Computing minimum requirements

- Pentium III, 700MHz, 256 MB RAM, 10 GB hard drive
- Serial or ethernet interface, USB port for hardware key
- SVGA Graphics: Resolution of 1024 x 768
- Uninterruptible power supply prevents data losses from power failure
- Microsoft® Windows XP with SP1, ProBatch+ software and the OPC Server run on the same PC. One copy of ProBatch+ per computer

Standard interfaces

- Serial RS232, RS485, Ethernet TCP / IP
- Batch standard: S88
- Database interfaces: ODBC/SQL; Dynamic data exchange via DDE or OPC with other Windows programs
- PC-PLC-Link for Siemens S7-300/400, Phoenix RFC430
- Support for field bus protocols: Profibus, Interbus, DeviceNet, CC-Link, Modbus

User access rights

- Production planning, recipe production, operation, data security
- Report access
- System functions

ProBatch+ controls...

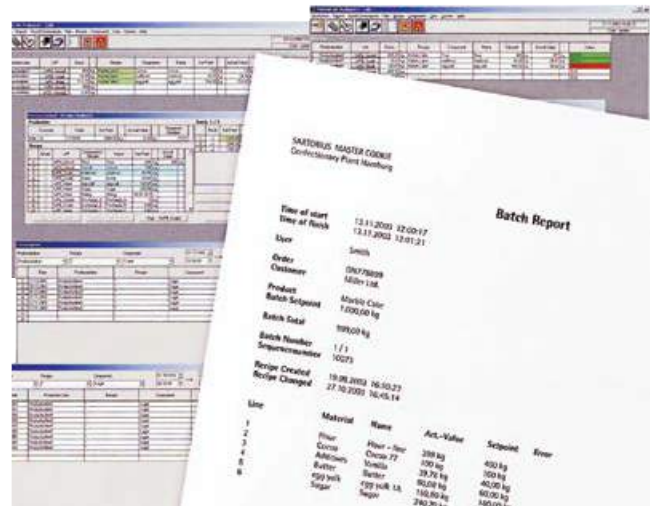
- Maximum 16 batch controllers, 16 parallel running real and logic balances, 16 production lines
- Max. 9999 recipes per production line
- Max. 9999 components per production line
- 30/20 place recipe name/ID, 30/20 place component name/ID, 3 lines x 30 character + date for raw material batch ID
- Microsoft® Access® database with data security also in ZIP files

Production start modes

- Start direct on the controller
- Start single production
- Start number of batches
- Start production quantity; automatic calculation of batch quantities
- Start in accordance with % details

Reports

- Batch report
- Production report
- Consumption quantities and stock
- Production quantities, recipe related
- Alarms and messages
- Printing: Automatically at the end of a production run or batch, or on request by operator



Model Selection Guide

Description	Catalog Number	Price
ProBatch+ for Windows Software, CD, Manuals	9405 384 00001	\$120.00
Basis License, 4 Weighing Points, Hardware Key	9405 384 00111	4015.00
Upgrade from 4 to 8 Weighing Points	9405 384 00121	2020.00
Upgrade from 8 to 12 Weighing Points	9405 384 00131	2020.00
Upgrade from 12 to 16 Weighing Points	9405 384 00141	2020.00
Optional Production Plan/Stock Mgmt License	9405 384 00211	1705.00
Optional DDE Interface License	9405 384 00311	875.00
Optional Remote Control License	9405 384 00411	875.00

WIKAL® Submersible Liquid Level Transmitters

Features

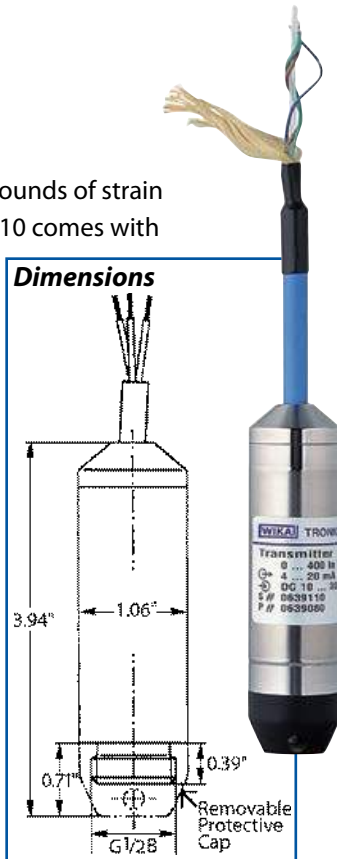
- Standard ranges available from stock
- Rated IP68 for permanent submersion
- 4-20 mA two-wire output signal
- Vented polyurethane cable withstands 220 pounds of strain
- Custom cable lengths available on LS-10. LH-10 comes with integral 40' cable.

WIKA LS-10 liquid level transmitter is designed for economical and reliable performance in a variety of level measurement applications. The LS-10 provides a 4-20 mA signal output and an accuracy of 0.25% span.

The high performance LH-10 provides 0.125% accuracy. The LH-10 includes a dual cable entry design that prevents ingress of moisture into the electronics, even if the cable is damaged.

Both models feature watertight vented cable that can withstand more than 220 pounds of strain. This means the transmitters can be supported without the need for additional cabling.

Both the LS-10 and LH-10 can be ordered with the LevelGuard™ (below) for protection in difficult environments.



Model Selection Guide

Pressure Range	Maximum Pressure*	Burst** Pressure	Catalog Number	Price Each
LH-10: 0.125% Accuracy, 316 SS, Polyurethane, Polyamid wetted parts, G1/2B pressure connection, 4-20 mA output. <i>Integral 40' vented polyurethane cable.</i>				
0-50"WC	14 PSI	29 PSI	9699703	\$682.77
0-100"WC	30 PSI	35 PSI	9699711	682.77
0-150"WC	30 PSI	35 PSI	9699729	682.77
0-250"WC	60 PSI	70 PSI	9699737	682.77
0-400"WC	72 PSI	87 PSI	9699745	682.77
0-5 PSI	30 PSI	35 PSI	8371846	682.77
0-10 PSI	60 PSI	70 PSI	9699754	682.77
0-15 PSI	72 PSI	87 PSI	9736225	682.77
0-25 PSI	145 PSI	170 PSI	9699762	682.77
0-50 PSI	240 PSI	290 PSI	9699770	682.77
0-100 PSI	500 PSI	600 PSI	9699788	682.77
LS-10: 0.25% Accuracy, 316 SS, Polyurethane, Polyamid wetted parts, G1/2B pressure connection, 4-20 mA output. <i>Select cable length below and append to catalog number.</i>				
0-100"WC	30 PSI	35 PSI	4262761	\$481.40
0-150"WC	30 PSI	35 PSI	4262779	481.40
0-250"WC	60 PSI	70 PSI	4262787	481.40
0-5 PSI	30 PSI	35 PSI	4262809	481.40
0-10 PSI	60 PSI	70 PSI	4262817	481.40
0-15 PSI	72 PSI	87 PSI	4262825	481.40
0-25 PSI	145 PSI	170 PSI	4262833	481.40
0-30 PSI	145 PSI	170 PSI	4262841	481.40
0-50 PSI	240 PSI	290 PSI	4262850	481.40
0-100 PSI	500 PSI	600 PSI	4262868	481.40
Vented Polyurethane Cable (Append to Transmitter Model Number e.g., 4262850/4360903)	5'		4347868	0.00
	10'		4347876	17.25
	15'		4347885	34.49
	20'		4347893	51.74
	25'		4347906	68.98
	30'		4347915	86.23
	40'		4347931	120.66
	50'		4347957	155.21
	60'		4347974	189.64
	70'		4347990	224.13
75'		4348006	241.38	
100'		4348040	327.55	
Accessories				
Stainless Steel LevelGuard™			50077091	544.81
Desiccant Drying Cartridge			9836700	19.33
Vent Tube Filter			7193131	13.81
Cable Clamp			2074257	28.97
Additional Weight			1524399	89.66
Cable Junction Box			2459686	103.47

Ordering an LS-10? Don't forget to order a desiccant drying cartridge. Helps prevent moisture buildup inside the transmitter's vent tube.

Notes

- * Maximum pressure, causing no permanent changes in specifications but may lead to adjustable zero/span shifts.
- ** Burst pressure, leading to destruction of transmitter.

Need a cable longer than 100 feet? Call for pricing and availability.

WIKA LevelGuard™ Anti-Clog Attachment for Submersible Liquid Level Transmitters

Features

- For lift stations, wet wells, and other level applications
- All 316 stainless steel construction for durability
- 2" diameter diaphragm provides excellent measurement sensitivity
- Birdcage-style enclosure protects diaphragm from physical damage and turbulence
- Added weight prevents unwanted transmitter movement

The WIKA LevelGuard attachment is designed for difficult level sensing applications where sludge, slurry, or turbulence may be present.

The large 2" diaphragm provides excellent sensitivity and performance, even when used to monitor extremely low liquid levels, or when the assembly is buried in a layer of sludge or slurry. The cable supplied with the WIKA LS-10 submersible transmitter is designed to withstand more than 200 pounds of strain, so no additional support or conduit connections are required.



Great for dirty media applications and turbulent processes!

SITRANS P MPS Submersible Liquid Level Transmitter

SIEMENS

Features

- 0.3% accuracy
- Transmitter for hydrostatic depth measurement
- Piezoresistive flush-mounted sensor
- Stainless steel sensor and enclosure
- 4-20 mA two-wire output
- Easy installation with junction box or cable hanger

Specifications

Measuring Range	Maximum Working Pressure	
0–2 m (0–6 ft) H ₂ O	1.4 bar (20.3 psi)	14 m (42 ft) H ₂ O
0–4 m (0–12 ft) H ₂ O	1.4 bar (20.3 psi)	14 m (42 ft) H ₂ O
0–6 m (0–18 ft) H ₂ O	3.0 bar (43.5 psi)	30 m (90 ft) H ₂ O
0–10 m (0–30 ft) H ₂ O	3.0 bar (43.5 psi)	30 m (90 ft) H ₂ O
0–20 m (0–60 ft) H ₂ O	6.0 bar (87.0 psi)	60 m (180 ft) H ₂ O

Zero and Span: Influence of Ambient Temperature: 1–6 m (3–18 ft) H₂O: 0.45%/10 K full scale; ≥6 m (18 ft) H₂O: 0.3%/10 K full scale; Long-Term Stability: 1–6 m (3–18 ft) H₂O: 0.25% full scale; ≥6 m (18 ft) H₂O: 0.2% full-scale

Ambient Operating Temperature: 14°–176° F (-10°–80° C)

Material: Sensor/Casing: Stainless steel, mat. No. 1.4571/316Ti; Gasket: Viton; Connecting Cable: PE/HFFR sheath (non-halogen)

Degree of Protection to DIN EN: IP68

Electrical Connection: Cable with 2 conductors with screen and vent pipe, strength cord (max. 300 N (67.44 lbf))

Power Supply: Terminal voltage on pressure transmitter: 10–36 VDC

Explosion Protection: Intrinsic safety “i” TÜV 03 ATEX 2004X; Identification: Ex II 1 G EEx ia IIC T4

Junction Box: For connecting the transmitter cable; Enclosure: Polycarbonate, with vent pipe for atmospheric pressure and screw for cable strength cord; Electrical Connection: 2x 3-way (28–18 AWG); Cable Entry: 2x M20x1.5; Degree of protection to DIN EN 60529: IP54

Cable Hanger: For mounting the transmitter; Galvanized steel, polyamid



SITRANS P MPS pressure transmitters have a flush-mounted piezoresistive sensor with stainless steel diaphragm, for measuring liquid levels in wells, tanks, channels, and dams.

On one side of the sensor, the diaphragm is exposed to the hydrostatic pressure, which is proportional to the submersion depth. This pressure is compared with atmospheric pressure. Pressure compensation is carried out using the vent pipe in the connection cable.

The liquid column’s hydrostatic pressure acts on the diaphragm, and transmits the pressure to the sensor’s piezoresistive bridge.

Ordering Instructions

Select one option from each table following. A complete catalog number looks like this: 7MF1570 - - - - -

Model Selection Guide

Description	Catalog Number	Price
SITRANS P MPS Submersible Transmitter for Level	7MF1570 -	
Range/ Cable Length	0–2 m H ₂ O, 10 m Cable	1CA01 \$484.00
	0–4 m H ₂ O, 10 m Cable	1DA01 484.00
	0–6 m H ₂ O, 25 m Cable	1EA01 595.32
	0–10 m H ₂ O, 25 m Cable	1FA01 595.32
	0–20 m H ₂ O, 25 m Cable	1GA01 595.32
	0–6 Ft H ₂ O, 32 Ft Cable	1KA01 484.00
	0–12 Ft H ₂ O, 32 Ft Cable	1LA01 484.00
	0–18 Ft H ₂ O, 82 Ft Cable	1MA01 595.32
	0–30 Ft H ₂ O, 82 Ft Cable	1NA01 595.32
Accessories	Plastic Junction Box, IP54	7MF1570-8AA 70.31
	Carbon Steel Cable Hanger	7MF1570-8AB 17.79

Intrinsically Safe Loop-Powered Submersible Level Transmitter

- 2-5/8" Teflon-coated Buna-N diaphragm
- FM/CSA Intrinsically safe, Class I, Div. 1, Group A-D rated with approved barrier
- 4-20 mA output, 0.25% full scale accuracy, 0.2% full scale/year long-term stability



Holds up in the most severe wastewater applications

Specifications

Max Overpressure Range: 1.5 PSI 8X full scale; 5.0 PSI 4X full scale; 15 PSI & 30 PSI 2X full scale

Temperature Range: -40° to 185° F (Liquid must remain fluid)

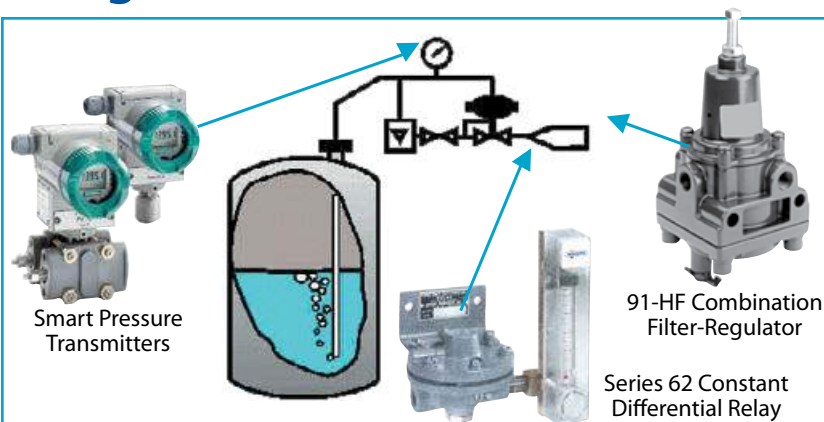
Materials: Housing: 316 Cast Stainless Steel, Teflon® coated; Sensing head: Two layer diaphragm with Teflon and Buna-N; Exposed materials: 316 cast stainless steel, Teflon-coated, PVC, synthetic rubber and Urethane; Cable: Heavy-duty Polyethylene, vent tube, shielded 18 AWG conductors

Atmosphere Ventilation: No-maintenance sealed breather system

Power Required: 9-30 VDC (750Ω load @ 24VDC)

Call for pressure ranges, cable lengths, and accessories. Prices start at \$1000.00.

Using a Pressure Transmitter as a Bubbler for Liquid Level



Air Bubbler Theory

- 1 A constant flow of pressurized air is applied to the tube
- 2 A pressure transducer monitors the air pressure in the tube
- 3 The pressure in the tube equals the pressure at the tank's bottom
- 4 The liquid level equals the pressure inside the tube divided by the liquid's density
- 5 As long as the material density remains constant, the pressure is proportional to the liquid level in the tank

Advantages

- Not affected by foam or turbulence
- Can be used in small diameter pipes
- Easy to understand/proven technology
- Large installed base

Common Applications

- Determine head through a flume or weir
- Level in a lift station
- Tank level when foam is present
- Can be used with atmospheres other than air

A bubbler system is an inexpensive but accurate means of measuring the fluid level in open or vented containers, especially those in harsh environments such as cooling tower sumps, swimming pools, reservoirs, vented fuel tanks, drain sumps, or air washers.

A complete system consists of a source of compressed air, air flow restrictor, sensing tube, and pressure transmitter. The only component exposed to the elements is the sensing tube. All others can be remotely located in a protected area.



- NEMA 4 panel with hinged door, sub-panel and wall mount bracket kit
- Coalescing filter (replaceable element)
- Siemens SITRANS PS-III gauge pressure HART® transmitter, FM, I/S and explosion-proof, configured for level (local control system or optional panel meter provides 24 VDC transmitter power)
- Siemens 62VA constant differential relay for air flow volumetric rate with indicating flow rotameter
- Polyflo plastic tubing and brass push-to-connect fittings inside the panel, compression fitting bulkhead connections for air and bubbler supply
- Panel label (specify up to 24 characters)
- Options include: air supply filter/regulators, solenoid valves, power supplies, and any other components necessary for your specific application

Model Selection Guide

To build a complete model number, choose one option from each section below.

Description	Catalog Number
Panel Material	Carbon Steel, 16" H x20" W x8" D Stainless Steel, 16" H x20" W x8" D Plastic, 18" H x16" W x10" D
Regulator and Filter	0-60 PSIG Air Supply Regulator, 0.3 Micron Coalescing Filter 0-60 PSIG Regulator, 0.01 Micron Filter (for Residual Oil)
HART® Smart Pressure Transmitter Range	4" to 400" (33') Water Column: Siemens DS-III, Accuracy: ≤0.075% 33' to 133' Water Column: Siemens DS-III, Accuracy: ≤0.075% 133' to 275' Water Column: Siemens DS-III, Accuracy: ≤0.075% 14' to 275' Water Column: Honeywell ST700, Accuracy: ±0.065% 14' to 275' Water Column: Honeywell ST800, Accuracy: ±0.055%
Door-Mounted Digital Indicator	None (Control System Must Supply Power to Transmitter) No Display, 24 VDC Transmitter Power 6-Digit Indicator 6-Digit Indicator, 2 Alarm Relays 6-Digit Indicator, 4-20 mA Retransmit Output 6-Digit Indicator, 2 Alarm Relays, 4-20 mA Retransmit Output 6-Digit Indicator, 4 Alarm Relays, 4-20 mA Retransmit Output
Level Range	Specify Level: (0-XXX), units (inches, meters, feet), specific gravity
Panel Meter Range	Specify Indicator Range: For volume or mass corresponding to the level range (0-XXXXXX), up to 6 digits, units (gallons, liters, pounds)
Panel Label	Specify Label: Up to 40 characters

Example: Bubbler-CS-91-E-SB-1XX
Level Range: 0-22 feet, SG = 1.00 (water),
Meter Range: 0-7200 gallons
Panel Label: North side sump, Capacity 7200 Gallons

What's the Right Level Technology for Your Application?

Need help figuring out which level measurement instrumentation to use in your process? Start with the reference charts below. Find your media type, process conditions, and tank design to help narrow down your choices. Depending on your application, there may be more than one technology for you.

Key
 ▲ Excellent: Recommended.
 ○ Good: Works in most cases.
 ◆ Fair: Works, but others are better.
 ▼ Poor: Do not use.

Point Level Technologies

Media Properties	Floats	Rotary Paddle	Vibratory Fork	Capacitance	Ultrasonic
Liquids - Clean	○	▼	▼	▲	▲
Liquids - Coating	▼	▼	▼	○	▲
Slurries	▼	▼	▼	○	▲
Liquid/Liquid Interfaces	▼	▼	▼	▲	▼
Liquid/Solid Interfaces	▼	▼	▼	▼	▼
Solids - Low Dust	▼	○	○	○	○
Solids - High Dust	▼	○	○	○	▼
Process Environment					
Vapors	○	▼	▼	○	▼
Foam	◆	▼	▼	◆	▼
Temp >350° F	○	▼	▼	○	▼
Pressure >50PSI	○	▼	▼	○	▼
Vacuum	○	▼	▼	○	▼
Turbulence	▼	▼	○	○	○
Tank Design and Structural Properties					
Agitators	▼	▼	○	○	○
Obstructions	○	○	○	○	○

See dielectric constants for common materials, page 488.

Continuous Level Technologies

Media Properties	Load Cells	Bubbler	Head Pressure	Guided Wave Radar	Capacitance	Ultrasonic	Radar
Liquids - Clean	▲	▲	▲	▲	▲	▲	▲
Liquids - Coating	▲	▼	◆	▼	○	▲	▲
Slurries	▲	▼	○	▼	○	▲	▲
Liquid/Liquid Interfaces	▼	▼	▼	▲	▼	○	▼
Liquid/Solid Interfaces	▼	▼	▼	▼	▼	▲	▼
Solids - Low Dust	◆	▼	▼	▼	◆	▲	◆
Solids - High Dust	◆	▼	▼	▼	◆	▼	▲
Liquid - Shifting Specific Gravity	▼	▼	▼	▼	▲	▲	▲
Dielectric <2	▲	○	◆	○	▼	▲	○
Shifting Dielectric	▲	○	▲	○	▼	▲	▼
Process Environment							
Vapors	○	○	○	○	○	▼	▲
Foam	◆	◆	○	▲	▼	▼	▼
Temp >350° F	▲	○	○	▼	○	▼	▲
Pressure >50PSI	▲	▼	○	▲	○	▼	▲
Vacuum	▲	▼	○	▲	○	▼	▲
Turbulence	▲	◆	○	◆	▼	○	○
Tank Design and Structural Properties							
Agitators	▲	◆	○	◆	▼	○	○
Obstructions	▲	◆	○	◆	○	○	○

WMI Magnetic Liquid Level Indicator

- Dependable liquid and interface level indication for years with little or no maintenance required
- Bright, dependable two-color indicator with a scale for easy reading from up to 200 feet away
- Measuring lengths from 6" to 20 feet standard, longer lengths available
- Temperature ranges from 320° to 1000°F; Pressures from full vacuum to 5000 PSI
- Liquid and interface specific gravities as low as 0.35
- Floats built specific to your application for best possible accuracy
- Outputs: Magnetostrictive or reed chain transmitter, dry contact or reed switch, thermocouple or RTD

Condensed Specifications

Indicator: Red and silver flags; Ruler display in feet/inches, metric, percent, or special (no charge for custom rulers)

Construction: 304L, 314L, 317, 329, and 347 stainless steel (per AMSE B31.1, B31.3 or NACE requirements); Hastelloy B or C; Alloy 20; Inconel 625; Monel

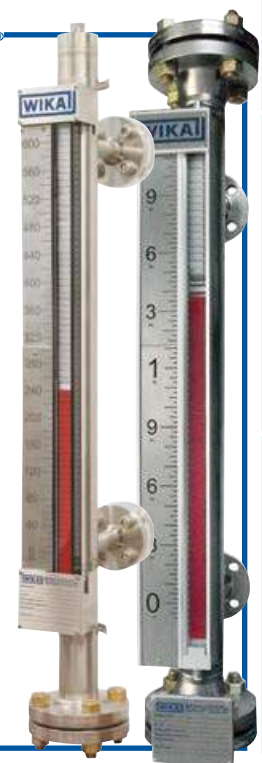
Available Outlets: Extruded, saddled, or welded T

Process Connections: ANSI flanges, NPTM or NPTF threads, O-lets, welded ends; Sizes: 1/2" to 8" standard

Vent and Drain Options: Flat caps, dome caps, weld neck or slip-on flanges, weld ends, threads, reducing flanges, valves (per user specification)

Mounting: Horizontally with side connections to tank, or vertically on top of tank

Additional options: High temperature or cryogenic insulation, steam or electrical heat tracing, reinforced flange supports, liquid gas chamber construction



Flange-Mounted Liquid Level Transmitter

Features:

- Accuracies up to 0.05% standard
- Stability up to 0.015% URL per year for ten years
- Automatic static pressure and temperature compensation
- Rangeability up to 100:1
- Response times as fast as 90ms
- Multiple local display capabilities
- External zero, span, and configuration capability
- Modular design
- World-class overpressure protection
- Polarity insensitive electrical connections
- Integral dual seal design for highest safety per ANSI/NFPA 70-202 and ANSI/ISA 12.27.0
- Comprehensive on-board diagnostic capabilities
- Communications Options: Honeywell Digitally Enhanced (DE), HART[®] Version 7.0, FOUNDATION[™] Fieldbus
- Full compliance to SIL 2/3 requirements
- Available with 15 year warranty



Replaces the retired Honeywell STF924



SmartLine family pressure transmitters are designed around a high performance piezo-resistive sensor; One sensor integrates multiple sensors, linking process pressure measurement with on-board static pressure (DP Models) and temperature compensation measurements. This allows the ST 700 to replace most competitive transmitters available today.

Indication/Display Option: Honeywell's ST700 modular design accommodates a basic alphanumeric LCD display.

LCD Display Features:

- Can be added or removed in the field
- 16 most-common engineering measurement units
- 2 Lines 16 Characters alphanumeric display
- Position display at 0°, 90°, 180°, and 270° for easy reading
- Square root output indication ($\sqrt{\quad}$)

Diagnostics: SmartLine transmitters offer digitally accessible diagnostics that help provide advanced warning of possible failure events, minimizing shutdowns, and providing lower operational costs.

Ready for cal
Call Ops when done

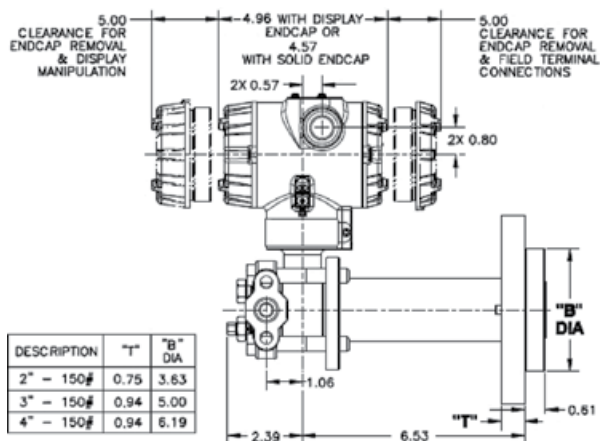
Configuration Tools

Integral Three Button Configuration Option: SmartLine offers the ability to configure the transmitter and display via three externally accessible buttons. Zero/span capabilities are also optionally available via these buttons with or without selection of the display option.

Hand Held Configuration: SmartLine transmitters feature two-way communication and configuration capability between the operator and the transmitter via Honeywell's field-rated Multiple Communication Configurator (MCT202). The MCT202 is capable of field configuring DE and HART Devices and can be ordered for use in intrinsically safe environments. Honeywell transmitters are designed and tested for compliance with the offered communication protocols and are designed to operate with any validated hand held configuration device.

Personal Computer Configuration: Honeywell's SCT 3000 Configuration Toolkit provides an easy way to configure Digitally Enhanced (DE) instruments using a personal computer as the configuration interface. Field Device Manager (FDM) Software and FDM Express are also available for managing HART and Fieldbus device configurations.

Dimensions



Modular Design: ST 700 transmitters are modular in design, so you can replace meter bodies, add indicators or change electronic modules without affecting performance or approval body certifications. Each meter body is uniquely characterized to provide in-tolerance performance over a range of variations in temperature and pressure.

Modular Features:

- Meter body replacement
- Exchange/replace electronics/comms modules
- Add or remove integral indicator
- Add or remove lightning protection (terminal connection)

SITRANS LC500 Capacitance Continuous Level Detector



Features

- Smart transmitter with built-in HART® communications — Fully potted integral transmitter is impervious to condensation, dust, and vibration
- Integrated local display and optional handheld communicator for easy on-site or remote commissioning and inspection
- Pushbutton calibration for easy installation and setup; One-point calibration for setup without shutting down production
- Two-wire analog 4-20/20-4 mA current loop output
- Pre-detection without using a PLC, allowing for corrections and moderations of the process before the trip point
- Output time delay and damping function for clearly defined, reliable readings of turbulent processes, like fraction levels in distillation column trays
- Full-function diagnostics that comply with NAMUR NE 43 for both local and remote diagnostics, showing all the relevant variables at the same instant
- Measurement range of 3300 pF for high accuracy
- Rod probe versions to 5.5m (18 Ft), and cable probe versions to 35m (115 Ft)
- Integrated zener safety barrier for intrinsically safe conditions
- Patented spring package and cone construction in the process gland resist pressure and temperature changes for maximum safety

Specifications—Transmitter

Measurement range: 0 to 3300 pF with 3.3 pF minimum span

Measurement frequency: 420 kHz @ Cx=0 pF

Accuracy: ±<0.1% actual value

Safety: ESD protected to 55 kV; Current signaling according to NAMUR NE 43; Galvanically isolated inputs/outputs; Polarity-insensitive current loop; Fully potted; Integrated safety barrier

Diagnostics: Primary variable (PV) out of limits; System failure measurement circuit; Deviation between A/D and D/A converter values; Check sum; Watchdog; Self-checking facility

Outputs (current loop): Galvanically isolated 4-20/20-4 mA; two-state functionality 4-20 or 20-4 mA, on or off; Solid state switch 40VDC/28VAC/100 mA at 2 VA max.; Time delay 1 to 100 sec. activating / de-activating; Adjustable hystereses (on / off) 0 to 100%, min. 1% range; Damping range 1 to 10,000

Supply power: max. 33 VDC (30 VDC for IS) min. 12 VDC @ 3.6 mA min. 9.5 VDC @ 22 mA

Loop current: 3.6 to 22 mA / 22 to 3.6 mA (2-wire current loop)

User interface: 4-1/2 digit LCD Integrated local display; Rotary switch; 16 menu items divided between two menu levels: 0 to 9, and A to F; Pushbuttons

Communications: HART® protocol; Profibus-PA (optional)

Environmental: Location: Indoor/outdoor; Altitude: 2000m (6562 Ft) max.; Ambient temperature: -40° to 185° F for standard and ATEX XP T5 to T1, -40° to 158° F for ATEX T6; Relative humidity: Suitable for outdoors (Type 4X/NEMA 4X/IP65 enclosure); Installation category: II; Pollution degree: 4

Process conditions: Temperature rating: -328° to 392° F standard, up to 752° F optional; Pressure rating: FV to 2920 psi standard, up to 7665 psi optional

Approvals: CE: Complies with requirements of ECC per EN 55011 and EN 61326; Dust-Ignition Proof: FM/CSA (CL. I, Div. 2, Grps. A-D T4/CL. II, III Div. 1 Grps. E-G T4); ATEX II 3 GD (EEx nA[ib] IIC T6...T4); Intrinsically Safe: FM/CSA (CL. I, Div. 1, Groups A-D T4); ATEX II 1 G (EEx ia IIC T6...T4); Explosion-proof Enclosure: FM/CSA (CL. I, Div. 1, Groups A-D T4); ATEX II 1/2 GD (EEx d [ia] IIC T6...T1); Marine: Lloyd's Register ENV1, ENV2, ENV3, ENV5; Sanitary: 3A



Standard Combinations of LC500 Probes

Features		Series S	Series D	Series SD	Series DD	Series HP	Interface	Sanitary
Process Connection	Threaded	✓					✓	
	Flanged	✓	✓	✓	✓	✓	✓	
Types	Tri-Clamp							✓
	Sanitary Thread							✓
Process Connection Materials	Stainless Steel AISI 316L	✓	✓	✓	✓	✓	✓	✓
	Carbon Steel C22.8 N		✓	✓	✓			
	Duplex Steel					✓		
	Hastelloy ¹ B2 or C22	✓						
	Monel 400	✓						
	Tantalum	✓						
Probe Insulations	PFA	✓	✓	✓	✓	✓	✓	✓
	PE ²	✓						
	Ceramic	✓				✓		
Length Parameters	Max Rod Length	216"	216"	216"	216"	100"	N/A	216"
	Max Cable Length	1378"	1378"	1378"	1378"	N/A	1378"	N/A
	Max Pressure ³	2900 PSI	2175 PSI	2175 PSI	2175 PSI	7613 PSI	73 PSI	145 PSI
	Max Temperature ³	392° F	392° F	392° F	392° F	842° F	212° F	392° F

¹ Flange made of AISI-316L SS with a 0.19" welded Hastelloy plate. ² For general purpose applications only. ³ Depends on range.

How to Select an Ultrasonic Level Measurement System



To choose the best ultrasonic system for your plant, it's important to weight your application needs against the many available features.

Analyzing your application

A good supplier will tell you about the details of your application before recommending a technology or product. Begin with the material being measured — the type, temperature, and any related characteristics. Do you need to measure level, volume, and/or flow? If you are measuring level in a tank, determine the dimensions and shape of the tank, and include details about process connections and internal obstructions.

The most important criteria in selecting a transducer are measuring range and environment. Consider all the environmental conditions the sensor will experience, so the model you choose will be suitable and rated for those conditions. Is the transducer inside a building in a controlled climate, or outdoors in harsh weather conditions?

If the transducer is located in direct sunlight or is subject to extreme temperature fluctuations, consider a sun shield, and check that the transducer has built-in temperature compensation. Is it monitoring corrosive chemicals? Are there vapors or foam present? If so, you may need a transducer with a special facing to ensure material compatibility. Hazardous area approvals may be required, or a longer-range unit may be needed to compensate for signal attenuation. If the sensor will be installed in a constricted space, you will need a compact instrument.

Will the transducer be submerged, like in a flooded wet well? If so, you will need a submergence shield. It will maintain an air pocket in front of the transducer and maintain a high level reading during submergence.

Many applications require continuous monitoring to provide a constant readout of the material level at all times. In some cases, however, you may also want to install point level devices as high and low alarms.

What power sources are available in the plant? If your application will be integrated into a control system, how will the transceiver receive power?

Once you have assessed all the needs of the application, you can select the products and accessories that best serve your process needs.

Analyzing your needs in this way will help you choose the right functionality while also helping you scale the system to your application. While you don't want to overspecify, be careful not to limit your options.

It's a good idea to think about your future needs as well. Does the instrument have functions and features you could or may want to use in the future, such as pump efficiency monitoring or communications?

As more plants integrate their systems for central control, communication capabilities are in higher demand. Consider choosing ultrasonic systems that offer digital communications with standard protocols like HART® or PROFIBUS. Even if your systems are not integrated today, you may want this capability in the future.

Assessing products

Using the application details you've gathered, assess the appropriateness of various ultrasonic products. Consider accuracy, repeatability, reliability, features, functions, smarts, and modularity.

Remember, manufacturers express system specs in different ways. If the meaning is fuzzy, ask for clarification. Remember that the quality of the measurement needs to be your first priority.

When selecting a transceiver, make sure it is compatible with the transducer. You can select from rack, panel, or wall mount versions, depending on your plant configuration.

Above all, look for models that are easy to install and set up. Commissioning is easier and more secure if the unit uses a handheld programmer and quick-start wizards.

Some instruments have a swivel head that makes it easy to line up with conduit — a nice feature, especially in tight spaces. Some models offer backlit displays for easy readability. This is useful if you will be taking readings at the instrument location, but irrelevant if the instrument is connected to a central monitoring station.

Instrument smarts

More emphasis today is placed on the instrument's "smarts" or software for signal processing and communications.

We know that, to obtain the maximum signal, a transducer should be mounted directly over the material to be measured with the transducer face perpendicular to a flat target. The reality in a wet well includes inflows and outflows, turbulence, splashing, debris, and obstructions such as pipes, cables, braces, guide rails, pump cases, and ladders.

Ideally, you want to mount the transducer clear of all these obstructions, but often, that isn't possible. Careful mounting and aiming to optimize beam angle can help. A better solution is a system with built-in signal-processing software that compensates for these situations.

Advanced functions

When assessing transceiver functions, look beyond the individual application and determine your objectives for overall plant management. Make a list of your applications and determine how the data obtained from each fit into your overall plan. Are there simple applications where a standalone instrument is all you require?

Do you want all points integrated into a central system for monitoring and control? Do you need advanced functions to optimize certain aspects of your operation such as pump control, energy use, or chemical dosing? Do you require data logging and documentation of storms, overflows, or other events to meet regulatory reporting requirements?

Making these decisions will create a list of the advanced functions you require, and will help you design the right system for your plant.

The Probe: Ultrasonic Continuous Level Transmitter

SIEMENS



Features

- Noncontacting
- Proven ultrasonic technology
- One-piece design
- Easy to install and calibrate
- Measurement reliability
- Versatile range of options
- Low maintenance
- Built-in temperature compensation
- Two-year guarantee

Now available in 10-foot measuring range for use in short tanks. Prices start at just \$550.00!

Award-Winning Integrated Design: This sleek, durable package combines the sensor and electronics in a single molded body. Electronics are potted in rugged PVC; the wetted part, encasing the transducer and temperature sensor, is made of injection-molded Tefzel, a fluoropolymer inert to most chemicals. The seamless sensor housing resists buildup and cleans easily. It is ideal for corrosive environments and in applications where cleaning and washdowns are frequent.

Sonic Intelligence™: The Probe provides ultrasonic measurement reliability, maintenance-free operation, and Sonic Intelligence. Siemens' advanced software effectively discriminates between real and false echoes to add to the inherent accuracy of the unit. So, the Probe meets your needs in the demanding applications where conventional contacting methods can fail.

Simplicity: Bolt, clamp, or screw the unit to the mounting surface above the material being monitored. You won't need to empty the tank. And, unlike load cells, there are no special mechanical considerations. Because the compact one-piece unit houses both sensor and electronics, you can connect wiring easily through one of the two cable entry knockouts.

Two-Step Calibration: Open the Probe's hinged lid to access the control panel for calibration push-buttons and data display. With the material at its corresponding 4 mA (low) level, push the 4 button twice. With the material at its corresponding 20 mA (high) level, press the 20 button twice. That's it!

Low Maintenance Costs: Probe's ultrasonics and advanced design lower maintenance costs dramatically in comparison to competitive technologies. There are no mechanical moving parts and, as a result, the unit requires no periodic maintenance due to fouling or wear.

Specifications

Measurement Range: 0.8 to 16.4 ft. (0.8 to 26.2 ft. for 3-wire models)

Operating Conditions: *Temperature:* -40° to 140° F (-5° F with metallic mount). Built-in temperature compensation. *Pressure:* 14.5 PSI in vessel max. static.

mA Output: *Range:* 4–20 mA; *Accuracy:* 0.25% target range (air); *Resolution:* 0.125"; *Loading:* 3-Wire: 750Ω max. @ 24 VDC; 2-Wire Loop-Powered: 800Ω @ 28 VDC max. load.

Power: 3-Wire: 18–30 VDC supply, 5w (200 mA @ 24 VDC) max. consumption; 2-Wire Loop Powered: 23–28 VDC supply, 0.75w (25 mA @ 28 VDC) max. consumption

Selectable Damping: Immediate, 5m-, 1 m- or 0.03 m/min.

Beam Angle: 10° @ -3 dB boundary.

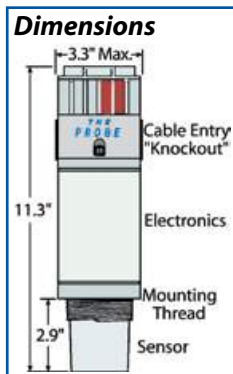
Integrated Housing: *Electronics:* Molded PVC; *Transducer:* Seamless Tefzel® or Kynar Flex.

Enclosure Rating: IP65, NEMA 4X, Type 4

Mounting: 2" threaded NPT

Cable Entry: Two 0.87" holes for 0.5" conduit connector.

Approvals: 3-Wire: CSA, FM approved for general use, CE; 2-Wire Loop-Powered: CSA approved for general use, Intrinsically safe (IS version only), CSA/FM Class I and II, Div. 1, Groups A-G, BASEEFA/CENELEC EExialICT4, CE.



Ordering Instructions

Make one selection from each table section below. A complete catalog number looks like this: 7ML1201 - _ _ _ _

Model Selection Guide

Description	Catalog Number	Price
The Probe Ultrasonic Transmitter	10 Foot (3 meter) Measuring Range 16.5 Foot (5 meter) Measuring Range 26 Foot (8 meter) Measuring Range	7ML1201-0_ _ _ _ \$550.00 7ML1201-1_ _ _ _ 929.25 7ML1201-2_ _ _ _ 929.25
Sensor	PVDF Copolymer (Kynar Flex), 2" NPT	_ E _ _ _ 0.00
Model and Approval	3 Wire, 24 VDC, CSA/CE/FM 2 Wire, CE (Note 1) 2 Wire, IS, ATEX, CSA, FM (Note 1)	_ _ E00 0.00 _ _ F00 0.00 _ _ K00 249.90
Accessories		
Stainless Steel Tag	7ML1930-1AC	46.64
Universal Box Bracket Mounting Kit	7ML1830-1BK	134.62
Universal Mounting Adapter for 3" Flange, 2" NPT	7ML1830-1BT	125.08
Instruction Manual for 24 Volt 3-Wire Probe	7ML1998-5GD62	24.38
Instruction Manual for 2-Wire Probe	A5E32243983	24.38

Note 1: Two-wire models available with 16.5 foot (5 m) range only.



SITRANS Probe LU for Ultrasonic Level Measurement

Features

- Continuous level measurement up to 12 m (40 ft) range
- Easy installation and simple startup — set two parameters and go!
- Patented Sonic Intelligence signal processing
- Auto False-Echo Suppression for fixed obstruction avoidance
- Short blanking distance, even on long range applications
- Programming using Siemens' infrared intrinsically safe handheld programmer, HART® communicator, or Siemens SIMATIC PDM software and a laptop PC
- ETFE or PVDF transducers for chemical compatibility
- Built-in alphanumeric display — visible through the transparent lid

SITRANS Probe LU is a two-wire loop powered ultrasonic transmitter for level, volume, and flow monitoring of liquids in storage vessels and simple process vessels, as well as in open channels. The Probe LU is ideal for level monitoring in the water/wastewater industry and for overseeing chemical storage vessels.

Siemens took the time-tested Milltronics Probe and applied new revolutionary features — including the latest microprocessor and communication technologies. The low noise transmitter and noise shield result in an excellent signal-to-noise ratio, providing higher accuracy and reliability.

You can choose a SITRANS Probe LU with either an ETFE or a PVDF transducer to suit the chemical conditions of your application. Both have built-in temperature sensors, to compensate for the varying process temperatures in your application.

Using the handheld infrared programmer, you can set up the unit or change configurations without ever opening the lid — even in hazardous areas.

SIEMENS



Siemens' Self-Learning Echo Suppression Technology

Features

- Patented self-learning algorithm is standard in all Siemens non-contacting instruments
- No laptop PC or special software required
- Five-minute setup eliminates false echoes
- Accessible via \$100 infrared handheld programmer

The Simple Solution

You'll run Siemens' self-learning algorithm when the tank is empty or near empty.

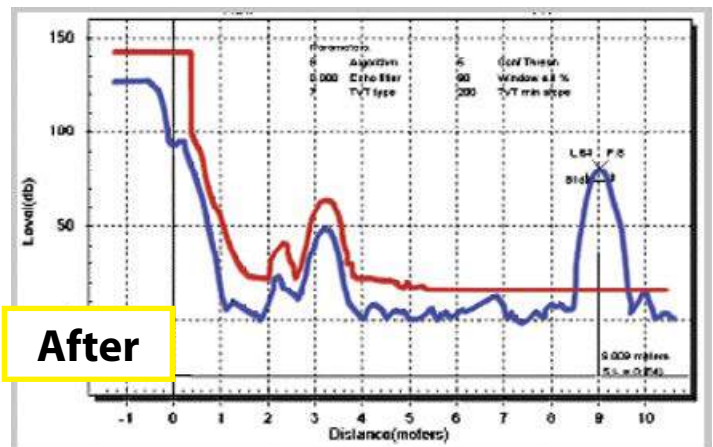
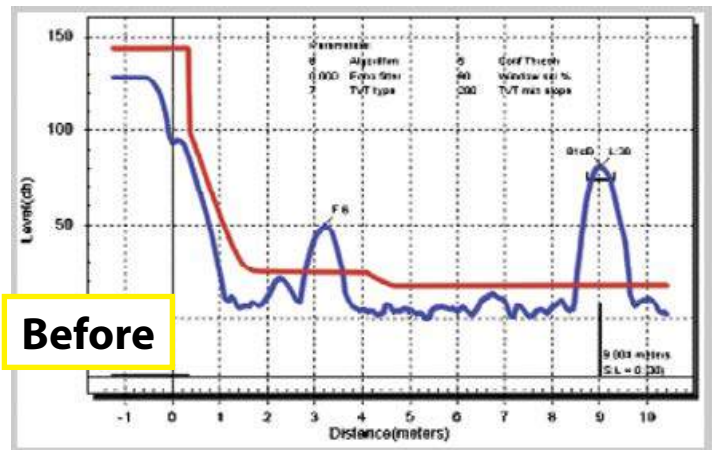
To implement the automatic obstruction suppression feature with the handheld programmer, you need to know (a) where the actual level is and (b) the distance from the transducer face to the material level.

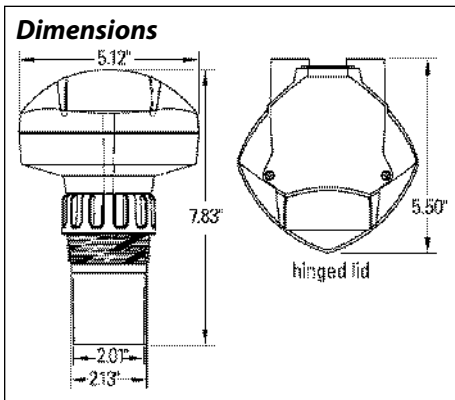
1. On the handheld, select parameter P838 and key in the distance from the transducer face to the material level minus 0.5 m.
2. Select parameter P837, press 2, and press ENTER.

After a few seconds, the level device calculates the new echo profile, and automatically modifies the filter around the area of the obstruction to ignore its echo.

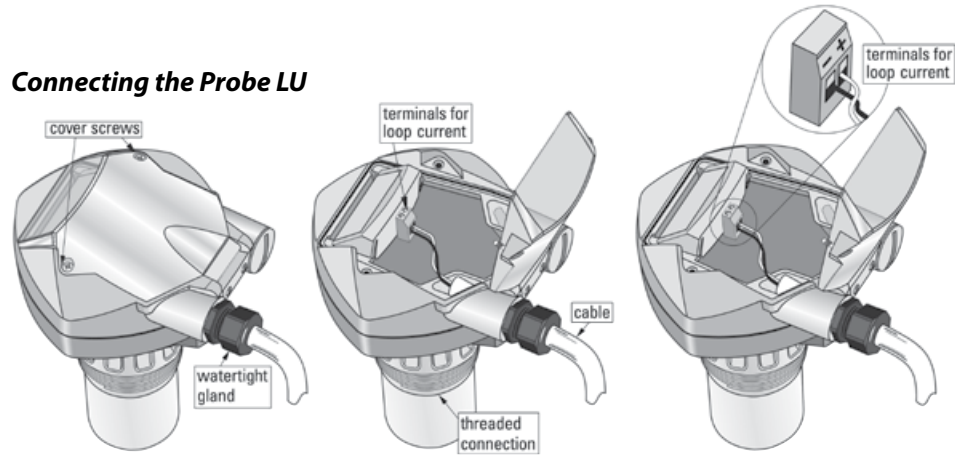
Before: The **BLUE** line represents the echo being returned to the level instrument, including all echoes from obstructions. The **RED** line represents a default filter applied by the unit to suppress the nominal noise returned with the echo. The first echo could be from an agitator or tank brace. The second signal is the data you really want: the reflection from the surface of the level being measured.

After: The level unit is instructed to "learn" where the obstructions (false echoes) are between the device and the level of the material. The **RED** line represents the "learned filter" that is set above the false echoes, screening them out. All that's left is the "true" echo from the material surface.





Connecting the Probe LU



Specifications

Measuring Range: 10" to 20' (6 M) or 10" to 40' (12 M); **Blanking Distance:** 10" (0.25 M); **Beam Angle:** 10° at -3 dB boundary

Accuracy: Greater of ±0.15% range or ±0.25"; **Repeatability:** ≤3 mm (0.12"); **Resolution:** ≤3 mm (0.12")

Frequency: 54 KHz (ultrasonic)

Update Time: <5 seconds

Output: 4-20 mA; **Accuracy:** ±0.02 mA

Temperature: Ambient: -40 to 176° F (-40 to 80° C); Process temperature at flange or threads: -40 to 185° F (-40 to 85° C)

Temperature Compensation: Built in to compensate over full range

Power: Nominal 24 VDC with max. 550Ω; 30 VDC max.; 4 to 20 mA

Enclosure: PBT polymer, hard-coated polyether imide lid; Type 4X/NEMA 4X, Type 6/IP68 protection

Sensor: EFTE (Tefzel) or PVDF (Kynar®)

Process Connection: Threaded: 2" NPT, BSP, or G/PF; Flange: 3" universal

Cable Inlets: Two 1/2" NPT threads

Design: Rotating head aligns with conduit, adjusts for optimal visibility

Local Display: Alphanumeric display, visible through the transparent lid

Communication: HART® standard, integral to analog output; Configuration using Siemens SIMATIC PDM (PC) or HART handheld communicator, or Siemens infrared hand programmer

Approvals: ATEX Ex II 1 G, EEx ia IIC T4, SIRA certificate 01ATEX2147; ATEX hazardous area II 1G EEx ia IIC T4; FM Class 1, Div. 1, Groups A-D (barrier required); Class II, Div. 1, Groups E-G; Class III; CSA Class I, Div. 1, Groups A-D (barrier required); Class II, Div. 1, Group G; Class III

See page 96 for details and pricing on Simatic PDM.

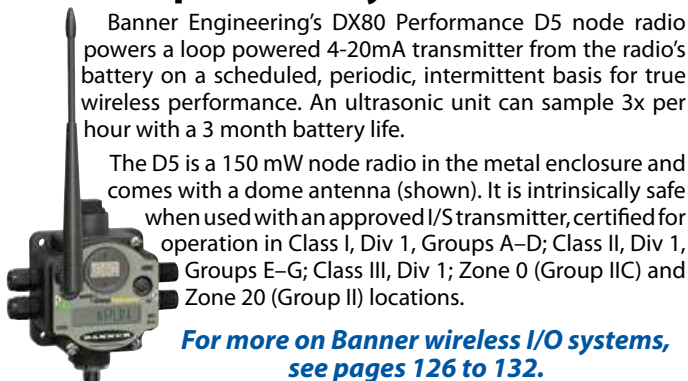
Ordering Instructions

Make one selection from each table section below. A complete catalog number looks like this: 7ML5221 - _____

Model Selection Guide

Description		Catalog Number	Price
SITRANS Probe LU: Ultrasonic Level Transmitter		7ML5221 -	\$970.96
Range	20 Ft (6 M) ETFE	2A ___	81.62
	20 Ft (6 M) PVDF Copolymer	2B ___	18.02
	40 Ft (12 M) ETFE	2C ___	267.12
	40 Ft (12 M) PVDF Copolymer	2D ___	195.04
Communication	HART® and 4-20 mA Output	__ A1 _	0.00
	Profibus PA	__ A2 _	183.38
Approvals	General Purpose FM, CSA, CE	_____ 1	0.00
	FM Class I, Div 2	_____ 4	0.00
	Intrinsically Safe (HART) FM/CSA	_____ 8	244.86
	Intrinsically Safe (Profibus) FM/CSA	_____ 5	183.38
	Accessories		
Intrinsically Safe Handheld Programmer		7ML5830-2AH	151.58
Universal Mounting Adapter for 3" Flange, 2" NPT		7ML1830-1BT	125.08
SITRANS Probe LU Instruction Manual		A5E32337695	29.68
SITRANS Probe LU Quick-Start Guide		A5E32168031	34.98
USB HART® Modem for PC and Simatic PDM		7MF4997-1DB	591.10
RS-232 HART® Modem for PC and Simatic PDM		7MF4997-1DA	449.65

Wireless power for your Probe LU!



Banner Engineering's DX80 Performance D5 node radio powers a loop powered 4-20mA transmitter from the radio's battery on a scheduled, periodic, intermittent basis for true wireless performance. An ultrasonic unit can sample 3x per hour with a 3 month battery life.

The D5 is a 150 mW node radio in the metal enclosure and comes with a dome antenna (shown). It is intrinsically safe when used with an approved I/S transmitter, certified for operation in Class I, Div 1, Groups A-D; Class II, Div 1, Groups E-G; Class III, Div 1; Zone 0 (Group IIC) and Zone 20 (Group II) locations.

For more on Banner wireless I/O systems, see pages 126 to 132.

DX80 D5 Performance Node Radio

Description	Catalog Number	Price
120mW Performance Node Radio, Internal Battery	20178	\$1475.00
Direct mounting hardware		
1/2" NPT SS Hex nipple for close coupling	122SS8	6.50
3/4"x 1/2" NPT SS reducer for threaded port	110SS12x8	5.95
For remote antenna connection		
1/2" NPT feedthrough, RPSMA-F antenna connector	11835	66.00
3/4" NPT feedthrough, RPSMA-F antenna connector	11834	62.00
18" 5 dBi omni antenna, RPSMA-M connector	HG905RD-RSP	49.00
18" 5 dBi omni antenna, RPSMA-M swivel connector	17721	60.00
0.5 m (20") RPSMA x N-male adapter cable	77486	40.00

SITRANS LUT400 Ultrasonic Controller



- SITRANS LUT400's $\pm 0.04''$ accuracy gives you confidence in your measurements
- Next generation Sonic Intelligence — improved performance in noisy environments
- Enhanced diagnostics — echo profile and trend view on the display
- Communications convenience — HART® communications with access via the local user interface, SIMATIC PDM, Emerson handhelds, and web-browser
- Quick to configure — graphical Quick Start Wizards guide you through setup
- Easy to use — local user interface with four-button programming, menu-driven parameters, and Wizard support for key applications
- Integrated datalogger — record historic performance and alarm events
- Universal 4-20 mA analog output with sourcing/sinking reduces ground loops!
- Cost-efficiency — energy-saving algorithms and real time clock help you reduce pump operation cost by avoiding peak energy periods
- Case design includes wall, pipe, and DIN rail mounting configurations with removable terminal strips for hassle-free wiring

Comparing Features of SITRANS LUT400 Models

- SITRANS LUT420 level controller: Level or volume measurement of liquids, slurries, and solids, as well as basic pump control function, and basic data logging capability
- SITRANS LUT430 level, volume, pump, and flow controller: Includes all features of the SITRANS 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: Siemens' most featured, highest accuracy model. Includes all features of the SITRANS LUT430, plus the industry's best accuracy ($\pm 0.04''$), full suite of advanced control functionality, and enhanced flow logging capability

Replacing an old
MiniRanger Plus?
Try the new
SITRANS LUT420.



For more on the LUT440 open
channel flowmeter, see page 76.

Category	Feature	LUT420 Level controller	LUT430 Level, pump and flow controller	LUT440 Open channel flow controller
Operations	Level, space, and distance measurement	✓	✓	✓
	Volume conversion	✓	✓	✓
	Open channel flow measurement		✓	✓
Specifications	Compatible with EchoMax and ST-H transducers	✓	✓	✓
	Standard accuracy: ± 1 mm $+0.17$ % of measured distance	✓	✓	✓
	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 logging for min/max/avg flow, totalized volume, and min/max temperature			✓
Flow monitoring	9 digit daily and running flow totalizers		✓	✓
	High and low flowrate alarms		✓	✓
	External totalizer and sampler control		✓	✓
	High accuracy open channel flow measurement			✓
Pump control	Wall cling reduction	✓	✓	✓
	Alternate duty pump routines	✓	✓	✓
	Submergence detection	✓	✓	✓
	Energy saving algorithms for pump control		✓	✓
	Pump run-on functionality		✓	✓
	Pump start and power resumption delays		✓	✓
	Fixed duty and service ratio pump routines		✓	✓
	Discrete input pump interlocks		✓	✓
	Pumped volume totalizer		✓	✓
	Time to spill calculation		✓	✓

A complete LUT400 system includes:

1. LUT400 series controller
2. Echomax transducer (page 34-35)
3. TS3 temperature sensor (optional for added accuracy)
4. Point level solution for storage tank overfill protection (recommended good engineering practice per API 2350 standard).

Specifications

Range: 1 to 200 ft, depending on transducer

Accuracy: ±1 mm (0.04") plus 0.17% distance

Resolution: Greater of 0.1% measured range or 0.08"

Temperature: Ambient: -4° to 122° F; Process: -40° to 302° F

Communications: HART®, USB

Interface: Back-lit LCD; Removable display, operational up to 16 ft from enclosure base

Programming: Four local push buttons, SIMATIC PDM Emerson AMSTM, web browser (IE), Field Device Tool (DT), Field Communicator 375/475 (FC375/FC475)

Output: One Form C SPDT relay, two Form A SPST relays; One 4–20 mA output (active or passive)

Input: Two discrete inputs (0-50 VDC max switching level) with 24 VDC bias for contact level device and/or pump interlock; One TS3 temperature sensor input optional

Enclosure: Wall/Pipe/DIN Rail mount; 1/2 DIN; Type 4X/ NEMA 4X/IP65, panel mount display IP 54 (Type 3/NEMA 3/ IP54); Polycarbonate.

Approvals: General purpose: CE, CSAUS/C, FM, UL Listed, C-TICK; Hazardous location: CSA Class I, II, III, Div 2 (Groups A–G), CE, ATEX 3D, IECEx, C-TICK

Ordering Instructions

Select one option from each table section below. A complete catalog number looks like this: 7ML5050-_____-_____-Z

Model Selection Guides

Description		Catalog Number	Price
SITRANS LUT400 Single Channel Ultrasonic Controller		7ML5050-	\$ 914.10
Model	SITRANS LUT420 Level controller	0A ____-	0.00
	SITRANS LUT430 Level, pump, flow controller	0B ____-	410.30
Enclosure	With display	__ A __-	130.90
Display	With remote panel mount display	__ B __-	299.20
Options	No display (blank lid provided)	__ C __-	0.00
Input Voltage	100 to 230 VAC ± 15%	___ 1 _-	0.00
	10 to 32 VDC	___ 2 _-	0.00
Cable Inlet	3 cable inlets, cable glands not supplied	___ 1-	0.00
	3 cable inlets, M20 plastic cable glands supplied	___ 2-	15.40
Approvals	General purpose CE, FM, CSA US/C, UL, C-TICK	1DA0	0.00
	CSA Class I, II, III, Div 2 Groups A–G	1DC0	63.80
Optional Adders	Manufacturer's test certificate	-Z-C11	23.10
	Stainless steel tag: Max. 27 characters plain text	-Z-Y15	16.50
	Preset Namur NE43 Failsafe setting <3.6mA	-Z-NO7	41.80
Documentation	Printed English User Manual	7ML1998-5MV01	46.64
	Printed Quick-Start Guide	7ML1998-5XU81	41.34
	Printed Communications Manual	7ML1998-5NE01	29.68
Accessories	Stainless steel tag, 0.47 x 1.77", one text line	7ML1930-1AC	46.64
	Panel Mount Cable Extension 2.5 m (8.2 ft)	7ML1930-1GF	54.06
	3-Pack Cable Glands and Retaining Nuts	7ML1930-1GB	18.02
	HART Modem, USB	7MF4997-1DB	591.10
	LUT400 Sunshield, 304 Stainless Steel	7ML1930-1GE	228.96

Need even better accuracy? Add a TS-3 temperature sensor. Call for pricing.

MultiRanger 100/200 Ultrasonic Level Transceiver System



- Dual point or single point monitoring option
- MultiRanger 200 functions include open channel flow monitoring, volume, pump control, pump volume
- Advanced echo-processing fine-tunes parameters
- Improved signal-to-noise ratio for enhanced reliability
- Use the MultiRanger 200's 4-20 mA input to connect to another level measurement device
- Overflow protection feature: a float, point level detector, or contact device wired into MultiRanger will override the level monitor as a failsafe against overflowing
- System protection: mA outputs are isolated from ground to protect your equipment, PLCs, and chart recorders
- Easy diagnostics let you download a program or echo profile and e-mail it to a service technician for review
- Digital communications with built-in Modbus RTU
- Easy compatibility with PLCs using SmartLinx® modules for Allen-Bradley Remote I/O, and Profibus DP
- Compatible with Dolphin Plus software for easy parameter setup, diagnostics, and viewing echo profiles

A complete continuous level measurement system includes:

1. Ultrasonic transceiver
2. Transducer (compatible with ST-H, XRS-5, XPS-10, XPS-10F, XPS-15, and XPS-15F). See pages 34 to 35.
3. Additional cable lengths, as necessary
4. Handheld programmer/calibrator
5. Optional flanges, as necessary
6. Aiming kits, software, and communications, as necessary
7. Point level solution for storage tank overflow protection (recommend good engineering practice per API 2350 standard)

Specifications

Range: 1 to 50 ft. (depending on transducer)

Accuracy: Greater of 0.25% of maximum

Resolution: Greater of 0.1% program range or 0.08"

Inputs (Model 200): mA analog: 0/4-20 mA, from alternate device, scalable; Discrete: 10-50VDC switching level; logical 0 = <0.5VDC, logical 1 = 10-50VDC; 3 mA max. draw

Outputs: mA outputs: 0-20 mA or 4-20 mA; Transducer drive: 315V peak, 44 KHz; Relays: Three: 2 Form A/ 1 Form C; Six: 4 Form A/2 Form C. (All relays rated at 5 Amp at 250 VAC, non-inductive.)

Temperature: Compensation: -58° to 302° F; Source: Integral transducer sensor, TS-3 temperature sensor, programmable fixed temperature; Error: Sensor: 0.09% range; Fixed: 0.17%/° C deviation from programmed value

Display: 4" x 1.5" multi-field backlit LCD

Communication: RS232 running Modbus RTU or ASCII via RJ11 connector, RS485 running Modbus RTU or ASCII via terminal blocks

Programming: Handheld programmer or PC with Dolphin Plus software

Power Supply: AC model: 100-230 VAC ±15%, 50/60 Hz, 36 VA (17W); DC Model: 12-30 VDC (20W)

Cable: Signal to be 2-3 copper conductors, twisted with shield (braided screen preferred), drain wire 300V, 0.5 mm² (22-18 AWG)

Enclosure: Polycarbonate Type X/NEMA 4X, IP65

Environment: Indoor/outdoor; Altitude: 6561 ft.; Installation category: II; Pollution degree: 4

Approvals (Pending): CE, FM, UL Listed; CSA Class I, Div. 2 Grp. A-D, Class II, Div. 2 Grp. F-G, Class III



Looking to replace your single-channel ultrasonic transceiver? See the new SITRANS LUT400 on page 28.

Ordering Instructions

Make one selection from each table below. A complete catalog number looks like this: 7ML5033 - _____

Model Selection Guide

Description		Catalog Number	Price
MultiRanger: Transceiver Electronics		7ML5033 -	\$976.91
Model	MultiRanger 100: Level Only	1 _____	99.51
	MultiRanger 200: Level, Volume, and Flow	2 _____	432.42
Mounting	Wall, Standard Enclosure	_ A _ _ _ -	0.00
	Panel Mount	_ C _ _ _ -	64.20
Input Voltage	100 to 230 VAC	_ _ A _ _ -	0.00
	12 to 30 VDC	_ _ B _ _ -	0.00
Software	Single Point System	_ _ _ 0 _ -	0.00
	Dual Point System	_ _ _ 1 _ -	241.17
Communications	SmartLinx Ready (No Module)	_ _ _ _ 0 -	0.00
	SmartLinx Profibus-DP Module	_ _ _ _ 2 -	679.45
Output Relays	3 Relays: 2 Form A, 1 Form C (250 VAC)	1 _	18.19
	6 Relays: 4 Form A, 2 Form C (250 VAC)	2 _	141.24
	1 Relay: Form A, 250 VAC (MultiRanger 100)	3 _	0.00
Approvals	CE, CSA, FM Pending, UL Listed Pending	_ A	0.00
Accessories	English Instruction Manual	7ML1998-5FB06	46.64
	Handheld Programmer for MultiRanger	7ML1830-2AK	100.00

HydroRanger 200 Wastewater Monitoring and Control System

SIEMENS

Features

- Single-point level for wet wells, weirs, and flumes
- Six relays standard
- Digital communications with RS485/Modbus RTU
- Simple setup — Easy to install and program with infrared handheld programmer or SIMATIC PDM software
- Anti-grease ring/tide mark buildup



HydroRanger is a non-contacting level monitoring controller that features advanced relay alarming, differential level measurement, open flow monitoring, and volume conversion.

For water authorities, municipal water, and wastewater plants, HydroRanger is an economical, low-maintenance solution delivering control efficiency and productivity needed to meet today's exacting standards. It offers single-point monitoring with 6 relays standard, as well as digital communications with built-in Modbus RTU via RS485.

HydroRanger is compatible with Siemens SIMATIC PDM software, allowing for PC configuration and setup. Sonic Intelligence® advanced echo-processing software provides increased reading reliability.

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

A complete ultrasonic continuous level measurement system includes:

1. Transceiver
2. Echomax transducer (compatible with XPS-10, XPS-15/15F, and XRS-5)
3. Additional cable lengths, as necessary
4. Handheld programmer/calibrator
5. Optional flanges, as necessary
6. Aiming kits, software, and communications, as necessary.

See transducers on pages 34-35.



Specifications

Range: 1 to 50 ft. (dependent on transducer)

Accuracy: Greater of 0.25% of maximum range or 0.24"

Resolution: Greater of 0.1% program range (defined as the empty distance to the face of the transducer plus any range extension) or 0.08"

Inputs: mA analog: 0-20 mA or 4-20 mA, from alternate device, scalable; Discrete: 10-50 VDC switching level; logical 0 = <0.5 VDC, logical 1 = 10-50 VDC; 3 mA max. draw

Outputs: mA outputs: 0-20 mA or 4-20 mA., max. loading 750Ω, 0.1% resolution; Transducer drive: 315V peak; Relays: Six: 4 Form A/2 Form C. (All relays rated at 5 Amp at 250 VAC, non-inductive.)

Temperature: Compensation: Range: -58° to 302° F; Source: Integral transducer sensor, TS-3 temperature sensor, programmable fixed temperature; Error: Sensor: 0.09% of range; Fixed: 0.17% °C deviation from programmed value

Display: 4" x 1.5" multi-field backlit LCD

Programming: Primary: Infrared handheld programmer; Secondary: PC running SIMATIC PDM software

Communication: RS232 running Modbus RTU or ASCII via RJ-11 connector, RS485 running Modbus RTU or ASCII via terminal blocks, SmartLinX® compatible with RS485 modem kit

Power Supply: AC model: 100-230 VAC ±15%, 50/60 Hz, 36 VA (17W); DC Model: 12-30 VDC (20W)

Transducers: Echomax® series and ST-H series

Enclosure: Polycarbonate Type X/NEMA 4X, IP65

Cable: Transducer and mA output signal to be 2-3 copper conductors, twisted with shield (braided screen preferred), drain wire 300V, 0.5 to 0.75 mm² (22-18 AWG)

Environment: Location: Indoor/outdoor; Altitude: 6561 ft.; Installation category: II; Pollution degree: 4

Dimensions (HWD): 9.45" x 6.325" x 3.58"

Approvals: CE (EMC performance available on request), FM, CSA, UL Listed; CSA Class I, Div. 2 Grp. A-D, Class II, Div. 2 Grp. F-G, Class III



Ordering Instructions

Make a selection from each table section below. A complete catalog number looks like this: 7ML5034 - _____. All models ship with one printed user manual.

Model Selection Guide

Description		Catalog Number	Price
HydroRanger 200 Wastewater Monitoring System		7ML5034 -	\$1007.64
Mounting	Wall, Standard Enclosure	1 _____	0.00
	Panel Mount	3 _____	64.80
Input Voltage	100 to 230 VAC	_ A _ _ _ _	0.00
	12 to 30 VDC	_ B _ _ _ _	0.00
Feature Software	Single Point System	_ _ A _ _ _	413.64
	Dual Point System	_ _ B _ _ _	663.12
Data Communications	SmartLinX Ready (No Module)	_ _ _ 0 _ _	0.00
	SmartLinX Profibus-DP Module	_ _ _ 2 _ _	685.80
	SmartLinX Devicenet Module	_ _ _ 3 _ _	685.80
Approvals	CE, CSA, FM, UL Listed	_ _ _ _ 1	0.00
Accessories	Handheld Programmer	7ML1830-2AK	100.00
	Printed English Instruction Manual	7ML1998-5FC03	46.64

See page 96 for details and pricing on Simatic PDM.

SITRANS LU Long Range Ultrasonic Level Transmitters

For long shots in
solids or liquids!



Features

- Single point or dual point long range level monitoring in tanks up to 200 feet
- Accuracy to 0.25% target range
- Easy to install and program using infrared keypad
- Backlit LCD displays level, space, distance, or volume; Shows icons for vessel filling/emptying and bargraph for quick view of changing levels
- Automatic level-to-volume conversion for standard or custom tank shapes
- Single 0- or 4-20 mA analog output plus four SPDT alarm control relays
- Compatible with Dolphin Plus programming software and SmartLinx communication interface modules



The SITRANS LU01 system reliably monitors static or dynamically changing level of liquids, slurries, or solids in processes involving high temperatures, harsh chemicals, caustics, steaming solids, and fine powders.

The SITRANS LU02 adds the flexibility of a multi-frequency capability. One monitor to scan liquids, solids or both, in any two bins of differing size, shape, and configuration. The electronics are so powerful it is possible to place the unit up to 1200 feet from its transducers.

The SITRANS LU02 is shipped from the factory pre-calibrated for typical liquid and solid applications without the need for detailed setup. Select a single parameter to switch between liquid and solid materials, enter the bin dimensions and the control unit is up and running.

A complete level transmitter system includes:

1. Transceiver
2. Ultrasonic transducer (see pages 34 and 35)
3. Additional cable lengths
4. Handheld programmer/calibrator
5. Optional flanges, as necessary
6. Aiming kits, software, communications, as needed
7. Point level solution for storage tank overflow protection (recommended good engineering practice per API 2350 standard)

Specifications

Range (Level): From 1 ft. to 200 ft. max.

Accuracy: 0.25% of target range subject to application.

Resolution: Greater of 0.1% of target range or 0.08".

Programming: Removable magnetic base programmer communicating through an infrared interface or Dolphin interface.

Display: Graphic 2" x 5" LCD for measurement readings, operating status; *Reading:* Level, space or distance in cm, mm, ft., in., %, or any other units as programmed. Volume in desired units; *Operating Status:* Level bargraph, alarm, data communication, filling/emptying, temperature, rate of change

Temperature: *Ambient:* -5° to 122° F; *Compensation:* -58° to 302° F. *Error:* 0.09% of range with compensation. 0.31% per ° F deviation from programmed temperature.

Single mA Output: 0-20 or 4-20 mA, scalable 0.1% resolution 350Ω max. load (common ground) or 750Ω max. load (floating common) or 600Ω isolated (LIS-1 required).

Relay Outputs: Four alarm/control relays; one form C SPDT contact per relay, rated 5A at 250 VAC, non-inductive.

Enclosure: Type 4X/NEMA 4X/IP65 polycarbonate enclosure. 11.2"W x 8.2"H x 3.6"D.

Cable: *Transducer:* RG-62U Coaxial for extensions to 1,200 ft. Run in grounded metal conduit, separate from other wiring. *TS-3:* Belden 8760 2 wire shielded/twisted, 18 AWG or equivalent, good to 1,200 ft.

Programmer: *Power:* 9V (ANSI/NEDA 1604, PP3 or equivalent); *Keypad:* 20 keys, tactile feedback; *Interface:* Noninvasive, infrared.

Compatible Transducers: *Echomax®:* XPS 10,15, 30, 40; XCT 8, 12; XLS 30, 60; XLT 30, 60; *Ultrason®:* STH

Approval: CE, CSA (NRTL/C)



Ordering Instructions

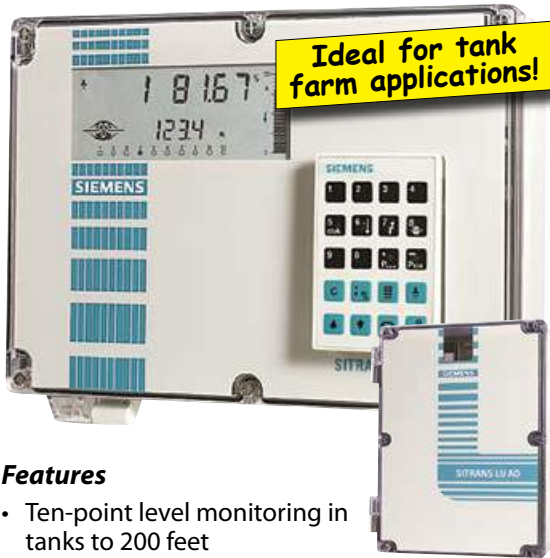
Make one selection from each table below. A complete catalog number looks like this:
7ML5004 - _____ - 1A

Model Selection Guide

Description		Catalog Number	Price
SITRANS LU Long Range Ultrasonic Level Transceivers		7ML5004 -	\$2288.00
Version	LU01, Single Point	1 _____	0.00
	LU02, Dual Point	2 _____	289.90
Input Voltage	AC, Voltage Selector Switch	__AA10 -	0.00
Enclosure	Standard: CSA NRTL/C, FM Approvals	- 1A	0.00
Accessories	Handheld Programmer	7ML1830-2AN	100.00
	Dolphin Plus, RS485 to RS232 Link	7ML1841-1AA00	360.40
	Dolphin Plus and Converter	7ML1841-0AA01	439.90
	LU01 Main Mother Card, Comms-Ready	7ML1830-1KX	1468.10
	LU01 Daughter Card, Comms-Ready	7ML1830-1LN	1174.48
	LU02 Main Mother Card, Comms-Ready	7ML1830-1MA	1468.10
	LU02 Daughter Card, Comms-Ready	7ML1830-1LP	1174.48
	Display Card	7ML1830-1LQ	337.08
Additional Manuals	SITRANS LU01	7ML1998-5BE02	29.68
	SITRANS LU02	7ML1998-5BD02	29.68

Need to add SmartLinx communications? Call us!

SIEMENS Multichannel Ultrasonic Level Transmitter



Features

- Ten-point level monitoring in tanks to 200 feet
- Accuracy to 0.25% target range
- Easy to program using infrared keypad
- Program the backlit LCD display for level, space, distance, or volume; Icons for vessel filling/emptying and bargraph for quick viewing of changing levels
- Automatic level-to-volume conversion for standard or custom tank shapes
- On-board analog and relay for programming only. Add AO-10 for additional 0/4-20 mA outputs
- Compatible with Dolphin Plus programming software and SmartLinx interface modules

The SITRANS LU10 controls and measures efficiently in multiple tank applications. It has been field-proven in extremely high temperatures, as well as steamy, dusty, and corrosive environments.

If your processes demand reliable level measurement data in one to 10 vessels of any shape or size, in any liquid or bulk solid, and in any environment, a single SITRANS LU10 has the flexibility to get the job done.

The SITRANS LU10 is shipped from the factory pre-calibrated for typical liquid and solid applications without the need for detailed setup. Select a single parameter to switch between liquid and solid materials, enter the bin dimensions and the control unit is up and running.

You can view program values during setup and operation, so you don't have to shut down the process or switch between display modes to interrogate.



See Echomax transducers on 34-35.

Specifications

Range: 1 to 200 feet, depending on transducer; *Span:* 196 ft max., 2" min.

Channels: Max. 10 active channels per LU10 unit.

Accuracy: Greater of 0.25% range or 0.24"; *Resolution:* Greater of 0.1% range or 0.08".

Temperatures: *Operating:* -5° to 140° F; *Electronics:* -5° to 122° F; *Process:* -40° F to 300° F; *Compensation:* Common temp sensor input; Option T1B-10 temp sensor input board to provide independent compensation per channel.

Volume Conversion: User-selected units for eight common tank shapes.

Power: 100/115/200/230 VAC ±15%, jumper selective; 50/60Hz, 15VA.

Display: 2" x 5" graphic LCD. Two 4-digit 0.7" numeric displays. *AO10/SAM20 Display:* 1 power/comms status LED; 20 relay status LEDs (SAM-20).

Programmer: Removable, non-intrusive infrared programmer with magnetic retainer, general purpose ABS plastic enclosure.

Enclosure: NEMA 4X polycarbonate, stainless steel screws

Cable: For extensions to 333 ft. total, use 18 AWG shielded twisted pair cable. For extensions to 1,200 feet max., use RG-62 A/U coaxial cable.

Transducer Drive: 44 kHz, 315V peak pulses of max. 1 mSec duration typical; 22 kHz, 150V peak pulses of max. 1.7 mSec. duration typical; or 13 kHz, 150V peak pulses of max 1.7 mSec. duration typical; *Max. repetition rate:* 200 mSec/transmit.

Analog Output: Programming only, no on-board output. *AO-10 Output Module:* 10 analog outputs. Isolated 0-20 or 4-20 mA into 750Ω max., 0.1% resolution.

Relay Outputs: Programming only, no on-board relays.

Data Link: Transmit only; Single ±20 mA bi-polar current loop @ 4800 baud. 10,000 feet max loop. *Loading:* 3 peripheral devices max.

Memory: 10 minutes minimum data retention.

Interconnection Cable: Belden 8760, 1 pair shielded/twisted, 18 GA.

A complete level transmitter system includes:

1. Transceiver
2. Transducer (see pages 34 and 35)
3. Additional cable lengths
4. Handheld programmer/calibrator
5. Optional flanges, as necessary
6. Aiming kits, software, communications, as needed

Ordering Instructions

Make one selection from each table section below. A complete catalog number looks like this:
7ML5007 - _____ - 1A

Model Selection Guide

Description	Catalog Number	Price
SITRANS LU10 Long-Range Ultrasonic Level Transceiver	7ML5007 -	\$5069.90
Configuration	AC, Voltage Selector Switch, Standard SmartLinx Ready (No Module)	1AA0 _ - 0.00
Temperature Option	None Standard (TIB9)	_____ 0 - 0.00 _____ 1 - 249.70
Enclosure	Standard Enclosure, CE, CSA, FM Approved	- 1A 0.00
Accessories	SITRANS LU AO: 10 Output Module	7ML5810-1A 1434.18
	Handheld Programmer	7ML1830-2AN 100.00
	TIB-9 Temperature Card	7ML1830-1CN 274.64
	Communications Ready Main Mother Card	7ML1830-1ML 3876.42
	Communications Ready Daughter Card	7ML1830-1LY 2054.28
	Display Card	7ML1830-1LQ 337.08
Instruction Manuals	SITRANS LU10 Instruction Manual	7ML1998-5AN02 41.34
	SITRANS LU AO Instruction Manual	7ML1998-5CE01 13.78

Need to add SmartLinx communications? Call us!

Echomax Ultrasonic Level Transducers



Features

- Two-way dynamic impedance matching provides high output and sensitive echo capture
- Unique unidriver construction gives highest temperature operation available in any ultrasonic system: 150° C (300° F)
- Uniformity as close as 1 foot, so you can depend on short-range reliability
- Reliable in liquids and solids from 1 to 200 feet
- No moving parts to cause downtime
- Simple, economical installation
- Mounting location is more flexible, so obstacles can be avoided
- Chemically resistant
- Hermetically sealed models immune to dust, steam, turbulence, corrosives
- Aiming is less critical
- 1" NPT conduit connection with NEMA 4 ingress protection (except XRS-5, which has IP68 rating)
- Models available with CSA, FM, CE, 3A, and FDA approvals



Transducers Compatible with All Siemens Continuous Ultrasonic Transmitter Systems

Beam Angle	Measuring Distance	Temperature Range	Process Connection	Series	Cable Length	Catalog Number	Price
For Wet Applications: Blue Kynar Housing and Aluminum Sensor Face. ATEX and FM Approvals.							
6°	1 to 50 Ft	-40 to 203° F	1" NPT Thread	XPS-15	5M	7ML1118-0BA30	\$804.56
6°	1 to 50 Ft	-40 to 203° F	1" NPT Thread	XPS-15	10M	7ML1118-0CA30	832.81
6°	1 to 50 Ft	-40 to 203° F	1" NPT Thread	XPS-15	30M	7ML1118-0EA30	872.36
6°	1 to 50 Ft	-40 to 203° F	6" CPVC Flange	XPS-15-6	5M	7ML1118-0BD30	1166.16
6°	1 to 50 Ft	-40 to 203° F	6" CPVC Flange	XPS-15-6	10M	7ML1118-0CD30	1194.41
6°	1 to 50 Ft	-40 to 203° F	6" CPVC Flange	XPS-15-6	30M	7ML1118-0ED30	1233.96
6°	1 to 50 Ft	-40 to 203° F	8" CPVC Flange	XPS-15-8	5M	7ML1118-0BE30	1259.95
6°	1 to 50 Ft	-40 to 203° F	8" CPVC Flange	XPS-15-8	10M	7ML1118-0CE30	1288.20
6°	1 to 50 Ft	-40 to 203° F	8" CPVC Flange	XPS-15-8	30M	7ML1118-0EE30	1327.75
12°	1 to 33 Ft	-40 to 203° F	1" NPT Thread	XPS-10	5M	7ML1115-0BA30	633.78
12°	1 to 33 Ft	-40 to 203° F	1" NPT Thread	XPS-10	10M	7ML1115-0CA30	665.28
12°	1 to 33 Ft	-40 to 203° F	1" NPT Thread	XPS-10	30M	7ML1115-0EA30	709.38
12°	1 to 33 Ft	-40 to 203° F	3" CPVC Flange	XPS-10-3	5M	7ML1115-0CE30	847.98
12°	1 to 33 Ft	-40 to 203° F	3" CPVC Flange	XPS-10-3	10M	7ML1115-0CC30	879.48
12°	1 to 33 Ft	-40 to 203° F	3" CPVC Flange	XPS-10-3	30M	7ML1115-0EC30	923.58
12°	1 to 33 Ft	-40 to 203° F	4" CPVC Flange	XPS-10-4	5M	7ML1115-0BD30	885.78
12°	1 to 33 Ft	-40 to 203° F	4" CPVC Flange	XPS-10-4	10M	7ML1115-0CD30	917.28
12°	1 to 33 Ft	-40 to 203° F	4" CPVC Flange	XPS-10-4	30M	7ML1115-0ED30	961.38
12°	1 to 33 Ft	-40 to 203° F	6" CPVC Flange	XPS-10-6	5M	7ML1115-0BE30	1089.90
12°	1 to 33 Ft	-40 to 203° F	6" CPVC Flange	XPS-10-6	10M	7ML1115-0CE30	1121.40
12°	1 to 33 Ft	-40 to 203° F	6" CPVC Flange	XPS-10-6	30M	7ML1115-0EE30	1165.50
For Corrosive and Wet Applications: Blue Kynar Housing, Teflon-Coated Aluminum Sensor Face. ATEX, FM Approvals.							
12°	1 to 33 Ft	-40 to 203° F	3" CPVC Flange	XPS-10T-3	5M	7ML1115-2BC30	962.64
12°	1 to 33 Ft	-40 to 203° F	3" CPVC Flange	XPS-10T-3	10M	7ML1115-2CC30	994.14
12°	1 to 33 Ft	-40 to 203° F	3" CPVC Flange	XPS-10T-3	30M	7ML1115-2EC30	1038.24
12°	1 to 33 Ft	-40 to 203° F	4" CPVC Flange	XPS-10T-4	5M	7ML1115-2BD30	1000.44
12°	1 to 33 Ft	-40 to 203° F	4" CPVC Flange	XPS-10T-4	10M	7ML1115-2CD30	1031.94
12°	1 to 33 Ft	-40 to 203° F	4" CPVC Flange	XPS-10T-4	30M	7ML1115-2ED30	1076.04
12°	1 to 33 Ft	-40 to 203° F	6" CPVC Flange	XPS-10T-6	5M	7ML1115-2BE30	1204.56
12°	1 to 33 Ft	-40 to 203° F	6" CPVC Flange	XPS-10T-6	10M	7ML1115-2CE30	1236.06
12°	1 to 33 Ft	-40 to 203° F	6" CPVC Flange	XPS-10T-6	30M	7ML1115-2EE30	1280.16
6°	1 to 50 Ft	-40 to 203° F	6" CPVC Flange	XPS-15T-6	5M	7ML1118-2BD30	1268.99
6°	1 to 50 Ft	-40 to 203° F	6" CPVC Flange	XPS-15T-6	10M	7ML1118-2CD30	1297.24
6°	1 to 50 Ft	-40 to 203° F	6" CPVC Flange	XPS-15T-6	30M	7ML1118-2ED30	1336.79
For Hazardous Environments: Blue Kynar Housing, Aluminum Sensor Face. FM (Class 1, Division 1) Approval.							
6°	1 to 50 Ft	-40 to 203° F	1" NPT Thread	XPS-15F	5M	7ML1171-1BA10	935.64
6°	1 to 50 Ft	-40 to 203° F	1" NPT Thread	XPS-15F	10M	7ML1171-1CA10	963.89
6°	1 to 50 Ft	-40 to 203° F	1" NPT Thread	XPS-15F	30M	7ML1171-1DA10	1003.44
10°	1 to 16.5 Ft	-4 to 149° F	1" NPT Thread	XRS-5	5M	7ML1106-1AA20-0A	\$486.72
10°	1 to 16.5 Ft	-4 to 149° F	1" NPT Thread	XRS-5	10M	7ML1106-1BA20-0A	513.76
10°	1 to 16.5 Ft	-4 to 149° F	1" NPT Thread	XRS-5	30M	7ML1106-1CA20-0A	550.15
10°	1 to 16.5 Ft	-4 to 149° F	3" ANSI Flange	XRS-5-3	5M	7ML1106-1AA20-0B	667.68
10°	1 to 16.5 Ft	-4 to 149° F	3" ANSI Flange	XRS-5-3	10M	7ML1106-1BA20-0B	694.72
10°	1 to 16.5 Ft	-4 to 149° F	3" ANSI Flange	XRS-5-3	30M	7ML1106-1CA20-0B	731.12
For FM Class I, Div 1 Liquid and Solid Applications, including Hazardous, Corrosive and Wastewater Environments. Tefzel Base and Lid Epoxy Fitted Joint). CE, CSA, CENELEC Approvals.							
12°	1 to 33 Ft	-40 to 164° F	2" NPT Thread	ST-H	5M	7ML1100-0AA20	860.36
12°	1 to 33 Ft	-40 to 164° F	2" NPT Thread	ST-H	10M	7ML1100-0BA20	895.98
12°	1 to 33 Ft	-40 to 164° F	2" NPT Thread	ST-H	30M	7ML1100-0CA20	945.30

Transducers Compatible Only with Siemens LU (AiRanger) Series Ultrasonic Transmitters

Beam Angle	Measuring Distance	Temperature Range	Process Connection	Series	Cable Length	Catalog Number	Price
For Wet Applications: Blue Kynar Housing, Aluminum Sensor Face. CSA, FM Approvals. 1-1/2" NPT Mounting Thread.							
6°	2 to 100 Ft	-40 to 203 F	1.5" NPT Thread	XPS-30	5M	7ML1123-0BA50	\$1221.15
6°	2 to 100 Ft	-40 to 203° F	1.5" NPT Thread	XPS-30	10M	7ML1123-0CA50	1248.45
6°	2 to 100 Ft	-40 to 203° F	1.5" NPT Thread	XPS-30	30M	7ML1123-0EA50	1285.20

Don't see the process connection or cable length you need? Call us!

Level Measurement Instruments

Flow Measurement Instruments

Pressure Transmitter

Temperature Sensors and Transmitters

Wireless Sensing and Communications

Analytical Instruments and Systems



XRS-5

**FMS Series Mounting
Brackets Compatible With**

- Probe (FMS-200 Only)
- ULS200 (FMS-200 Only)
- XPS-15 XPS-10
- XPS-15F XRS-5
- ST-H







FMS Mounting Brackets

Siemens mounting brackets make installing Echomax ultrasonic transducers quick and easy. These rugged high-quality mounting brackets are made of 304 stainless steel, and are suitable for use in both indoor and outdoor installations. They adjust to fit almost any application, saving you the time and expense of building custom brackets.

Each kit contains all necessary mounting parts.

Mounting Brackets for Ultrasonic Sensors

- **Built-in temperature compensation** automatically adjusts for velocity variations caused by air temperature changes in the vessel, ensuring optimum accuracy from -4° to 149° F (-20° to 65° C)
- **Narrow beam pattern** with negligible side lobes gives reliable performance over full temperature range, even in narrow tanks.
- **Low ringing cuts blanking distance** to a minimum, so you can use the full tank capacity and eliminate the need for tall standpipes
- **Closed cell foam** is immune to moisture and temperature-independent
- **High sensitivity** across the transducer face improves performance on solids and is especially effective for long shots up to 200 feet
- **Self-cleaning, low maintenance.** Condensation, liquid, and dust won't build up on the active transducer face

	FMS-200 Universal Box Bracket Allows any unit with a threaded 1" or 2" connection to be mounted 8" to 12" out from a wall or beam. Box design also acts as a sun shield.	Kit Includes Two 1" mounting nuts One 2" mounting nut	Order 7ML1830-1BK \$134.62
	FMS-210 Wall Mount Channel Bracket Lets any transducer with a threaded 1" connection be mounted 5" to 19" out from a wall or beam.	Kit Includes Four 1/4" lock washers Two 1" mounting nuts Two 2" mounting nuts Four M6x12 bolts	Order 7ML1830-1BL \$187.62
	FMS-220 Extended Channel Bracket Allows any transducer with a threaded 1" connection to be mounted 13" to 39" out from a wall or beam.	Kit Includes Four 1/4" lock washers Two 1" mounting nuts Four M6x12 bolts Two M6x30 bolts	Order 7ML1830-1BM \$322.24
	FMS-310 Floor Mount Channel Bracket Lets any transducer with a threaded 1" connection be mounted from 19" high and 22" out past the mounting.	Kit Includes Four 1/4" lock washers Two 1" mounting nuts Four M6x12 bolts One M8x50 bolt	Order 7ML1830-1BN \$310.58
	FMS-320 Floor Mount Extended Channel Bracket Allows any transducer with a threaded 1" connection to be mounted from 19" high and from 16" to 43" out past the mount.	Kit Includes Four 1/4" lock washers Two 1" mounting nuts Six M6x12 bolts Two M6x30 bolts One M8x50 bolt	Order 7ML1830-1BP \$445.20
	FMS-350 Floor Mount Bridge Channel Bracket Lets any transducer with a threaded 1" connection be mounted from 19" high, anywhere along a 65" beam. Great for open channel flow applications. Provides a stable mount for the transducer above a flume or weir.	Kit Includes Four 1/4" lock washers Two 1" mounting nuts Twelve M6x12 bolts Three M6x30 bolts Two M8x50 bolts	Order 7ML1830-1BQ \$731.40



**Need an aiming kit
or field mounting
hardware for your
level sensor?**

Aluminum Easy Aimer Kits	Catalog Number	Price	304SS Easy Aimer Kits	Catalog Number	Price
NPT, 1.5" Galvanized Coupling*	7ML1830-1AN	\$133.56	NPT with 1.5" Coupling	7ML1830-1AT	\$583.00
NPT, 1" Galvanized Coupling	7ML1830-1AP	133.56	NPT with 1" Coupling	7ML1830-1AU	583.00
NPT, 3/4" x 1" PVC Coupling	7ML1830-1AQ	133.56	Easy Aimer User Manual	7ML1998-5HG62	15.90

* For use with XPS-30 or XPS-40 transducers only.

Tired of Level Headaches?

Ask yourself...

Do steam and vapors affect the accuracy and dependability of your existing level device?

Do you work with tanks or silos with coned bottoms? Have they caused problems getting reliable low level readings?

Is your current contacting level technology undependable, unreliable, or maintenance-intensive?

Have you considered non-contact technology, but rejected it because of excessive blanking distance requirements?

Have you tried radar, but experienced unexplained "loss of echo" errors?

Have you tried radar technology, but couldn't get it "tuned" to ignore false echoes caused by obstructions in the vessel?

Are you using radar technology now, but need to call a factory guy to set it up or retune it when operating conditions change?

When was the last time you installed a new radar unit? How long did it take? Have you ever had it configured and working in less than four minutes?

Did you know that for less than \$1000, you can buy a radar unit that works in liquids for vessels up to 66 feet?

Siemens Radar Technology Has the Answers!

- ✓ Reliable liquid and bulk solid level measurements, unaffected by steam and vapor
- ✓ Narrow beam angle radars that provide strong level signals, even in tanks and silos with coned bottoms
- ✓ Dependable, low-maintenance non-contact level technology
- ✓ Short blanking distances — 2" from the horn!
- ✓ Dynamic TVT thresholds that adjust depending on the signal strength, reducing "loss of echo" errors
- ✓ Self-learning algorithms, like automatic false echo suppression, ignore echoes caused by in-tank obstructions
- ✓ Process Intelligence Quick Start, easy menus, and step-by-step tuning, so you can configure the unit in a few as two parameters and less than five minutes — and reprogram the unit without a factory guy, if your needs change
- ✓ Models for any application, from simple liquid storage tank monitoring to bulk solids and tall tanks — with prices starting under \$1000!

See What's Hot...

SITRANS LR250
See Page 38

2-Wire 25 GHz Pulse Radar
Liquids and Slurries
Short or Narrow Tanks
Low Dielectrics Materials
66 Feet Max.
5 mm Accuracy

**SITRANS LR200
and Probe LR**
See Page 40

2-Wire 6.3 GHz Pulse Radar
Liquids and Slurries
Storage or Process Vessels
Large Diameter Tanks
66 Feet Max.
10 mm Accuracy

SITRANS LR460
See Page 42

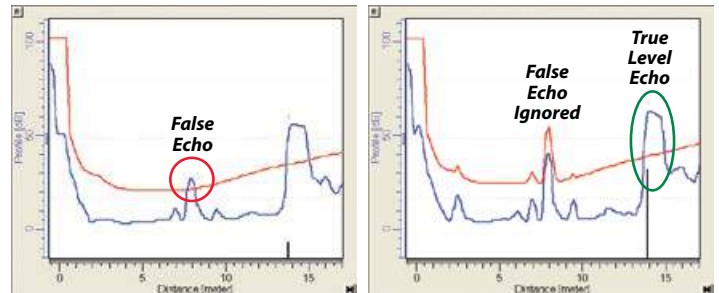
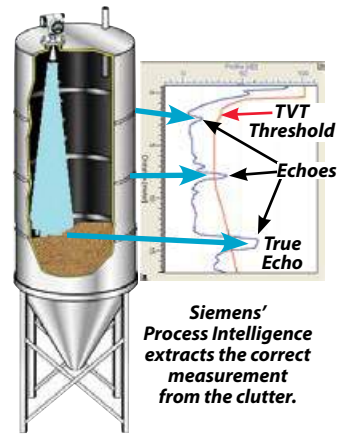
4-Wire 24 GHz FMCW Radar
Bulk Solids
Tall Tanks and Silos
Low Dielectric Materials
328 Feet Max.
0.25% Accuracy

Siemens Process Intelligence Provides Error-Free Results

Multiple signals, indirect path signals, weak signals, and false echoes from internal obstructions all contribute to the headaches of measuring level in tanks and silos. Your instrument has to learn how to ignore all of the noise and lock onto the correct echo signal for the material.

Process Intelligence software differentiates between true echoes from the material and false echoes generated by obstructions or electrical noise. It includes sophisticated algorithms, multiple-shot averaging, and automatic false-echo suppression for advanced echo selection.

For fast startup, the Process Intelligence Quick Start menu and Siemens' self-learning technology allows easy setup in minutes.



Automatic False Echo Suppression

A false echo can be a silo seam, structural member, material buildup, or other interference, resulting in a low echo confidence. Siemens self-learning algorithm detects false echoes and instructs the radar to ignore them. All Process Intelligence algorithms can be fine-tuned using a handheld programmer or SIMATIC PDM software and your laptop PC.

Siemens LG200 Guided Wave Radar

- Horizontal cylinders
- Measuring in side pipes or bypass
- Liquid interfaces
- Applications with steam or ammonia
- Processes with turbulence inside the tank
- Medium range solids
- See pages 48 and 49 for details

SIEMENS Comparing Radar Instruments for Liquid Level



	SITRANS Probe LR/LR200	SITRANS LR250	SITRANS LR400
Function	Two-wire loop powered pulse radars for bulk liquid chemical storage in simple process vessels and tank farms.	Two-wire pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels.	Long range FM radar for difficult applications, low dielectric liquids, or narrow vessels requiring a smaller beam angle.
Range	66 feet (20 meters)	66 feet (20 meters)	164 feet (50 meters)
Frequency	6.3 GHz	25 GHz	24 GHz FMCW
Process Temperature	Probe LR: -40° to 176° F LR200: -40° to 392° F	-40° to 320° F (using process connection with FKM O-ring)	-40° to 382° F, option allows use to 482° F
Process Pressure	Probe LR: To 43.5 PSI LR200: To 580 PSI	To 580 PSI	To 580 PSI
Dielectric Constant	>3 (for <3 use waveguide antenna or stillpipe)	>1.6, horn and application-independent	>1.6
Accuracy	± Greater of 0.1% range or 10mm	±0.02 mA	≤5 mm at 2 m to 10 m, ≤15 mm at 10 m to 50 m
Output	Probe LR: 4-20 mA, HART® LR200: 4-20 mA, HART or Profibus PA, NAMUR NE 21, NE 43	4-20 mA, HART or Profibus PA, NAMUR NE 21, NE 43	4-20 mA, HART or Profibus PA, 1 relay
Communications	HART (Both) or Profibus PA (LR200 only), SIMATIC PDM for configuration and diagnostics	HART or Profibus PA, SIMATIC PDM for configuration and diagnostics	HART or Profibus PA, SIMATIC PDM for configuration and diagnostics
Process Connections	1.5" NPT, BSP, or G (polypropylene), flanges, sanitary	1.5" or 2" NPT, BSPT, or G; 2", 3", or 4" (ANSI 150, 300 Lb) flange connections, PN 16, 40, JIS 10K	Flat-faced flanges: stainless steel, 3", 4" and 6", bolt hole pattern to ANSI, DIN and JIS sizes
Antenna	Hermetically sealed polypropylene rod. Standard: 4" shield for max. 4" nozzle; Optional: 10" long shield; Rod: Teflon® (PTFE); Other antenna types available; Purge optional	316L stainless steel standard, Hastelloy C-22 or equivalent optional, 1.5", 2", 3", 4" horns, with optional 4" horn extension Now available with PVDF antenna!	74 mm diameter horn antenna; 93 mm diameter horn antenna; Purge optional
Display	Multi-segment alphanumeric liquid crystal with bar graph (representing level)	Graphical user interface including quick-start wizard and echo profile display	Alphanumeric liquid crystal for readout and entry
Enclosure	Probe LR: PBT polymer, polyether imide lid; Type 4X/NEMA 4X, Type 6/IP68; LR200: Aluminum, polyester powder-coated; Type 4X/NEMA 4X, NEMA 6, IP67 protection	Polyester powder-coated aluminum; Ingress protection: Type 4X/NEMA 4X, Type 6/NEMA 6, IP67, IP68	Polyester powder-coated diecast aluminum; Ingress protection: Type 4X/NEMA 4X, Type 6/NEMA 6, IP67
Approvals	CE, CSA, FM, ATEX	CE, CSA, FM, ATEX	CE, CSA, FM, ATEX
See page	40	38	42

SITRANS LR250 Two-Wire 25GHz Pulse Radar for Level

**Features**

- 25 GHz high frequency for small horn antennas for easy mounting in nozzles
- Short blanking distance for improved minimum measuring range to 50 mm from the end of the horn — provides high accuracy of low and high levels, even with low dielectric media
- Small horn (1.5" to 4") and narrow beam angle allows installation practically anywhere in your vessel
- Now available with a 2" threaded PVDF antenna. Great for measuring acids, alkalis, and other corrosive chemicals!
- Graphical local user interface — displays echo profiles and diagnostic information, makes operation simple
- Fast and easy to configure — Quick Start Wizard guides you during setup
- Insensitive to mounting location and obstructions, and less sensitive to nozzle interference
- Process Intelligence — Advanced signal processing for improved measurement reliability, and automatic false echo suppression of fixed obstructions
- Operational in minutes — infrared handheld programmer for local operation or SIMATIC PDM via HART® — without exposing the electronics to the environment

Making Radar Work for Liquid and Slurry Level Monitoring

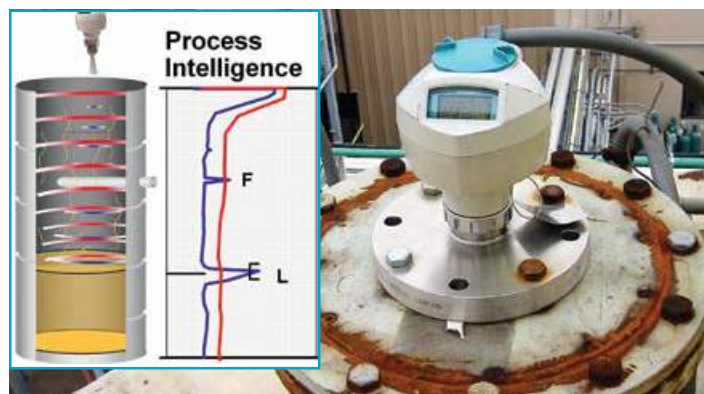
Siemens' SITRANS LR250 two-wire 25 GHz radar level transmitter measures liquids and slurries in vessels up to 20 m (66 ft).

The LR250 is the easiest to install and quickest to configure on the market today. With its narrow beam and small antenna, SITRANS LR250 can be installed practically anywhere on your vessel.

The small horns (1.5" to 4" models) allow for installation in existing openings, and the concentrated high-frequency beam ensures minimal interference from the vessel walls.

The Quick Start Wizard guides you through programming the transmitter using a few key parameters, so the LR250 can be measuring in minutes. The transmitter can be programmed using the intrinsically safe handheld programmer, or remotely via HART® — without opening the transmitter lid and exposing the electronics to aggressive atmospheres.

Process Intelligence evaluates dynamic echo signals. It applies algorithms (based on field data collected from more than a million level measurement applications) to raw echoes, to produce accurate and reliable measurement readings. It can automatically ignore obstructions, and is the processor behind the advanced diagnostic tools, the Quick Start Wizard, and automatic false-echo suppression. Sonic Intelligence significantly improves the measurement accuracy in low level vessels and low dielectric media.

**Specifications**

Frequency: 25 GHz (k-band)

Measurement Range: *Minimum:* 2" from the end of the horn; *Maximum:* 65 feet (20 m), depending on horn size

Non-repeatability: 0.2" (5 mm)

Dielectric Constant: >1.6, horn and application dependent

Output: 4 to 20 mA; Accuracy: ±0.02 mA

Failsafe: Programmable as high, low, or hold (loss of echo); NE 43 programmable

Power: 24 VDC nominal, 30 VDC max.

Display: Local graphic interface with Quick Start Wizard and echo profiles

Programming: SIMATIC PDM or Intrinsically safe infrared handheld

Communication: HART®; PROFIBUS PA optional (Profile 3.0, Class B)

**Process Conditions**

Temperature: *Ambient:* -40° to 176° F; *Process:* -40° to 302° F at process connection with FKM O-ring

Pressure: 580 psi max., depending on temperature and process connection

Design

Enclosure: Die-cast aluminum, polyester powder-coated; *Ingress Protection:* Type 4X/NEMA 4X, Type 6/NEMA 6, IP67, IP68; *Cable Inlet:* Two 1/2" NPT inlets; *Process Connections:* 1.5" or 2" NPT

Horn Antenna: *Material:* 316L Stainless steel; *Sizes:* 1.5", 2", 3", or 4" nominal (40, 48, 75, or 95 mm); 4" (100 mm) optional horn extension; Threaded PVDF antenna for corrosive media

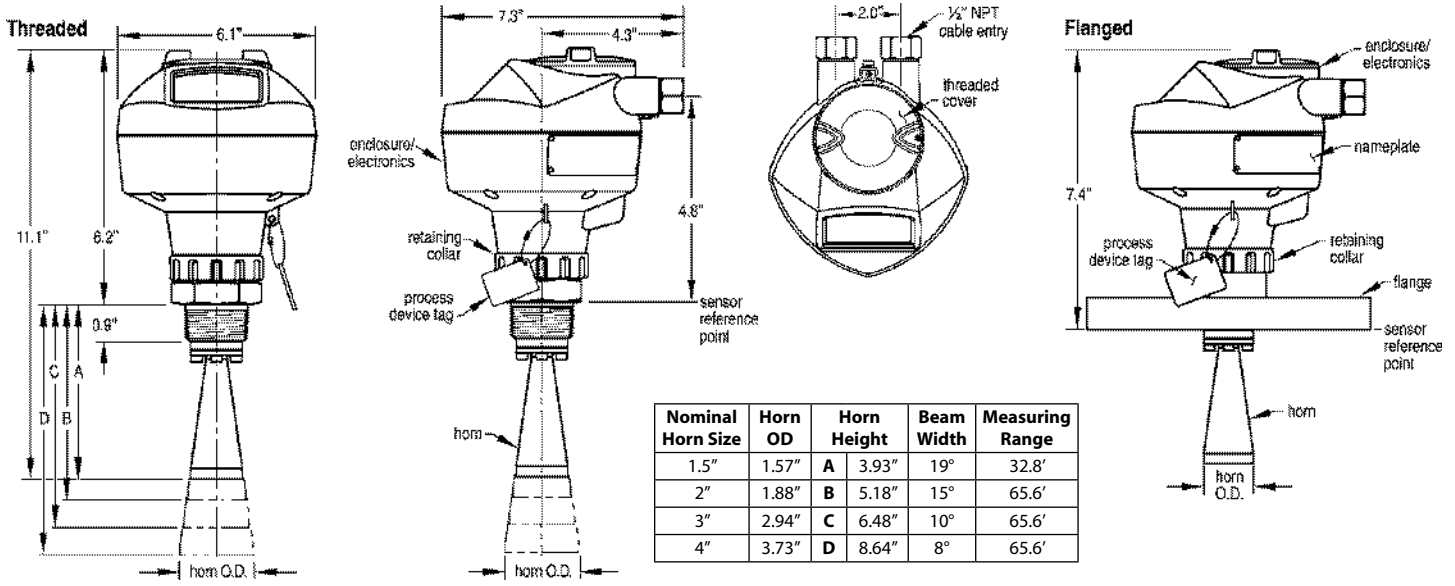
Approvals

General: CSAus/c, CE, FM, NE 21, NE 43, C-Tick

Radio: FCC, Industry Canada, Europe ETSI EN302-372, C-Tick

Hazardous Areas: *Intrinsically Safe (barrier required):* FM/CSA Class I, Div 1, Groups A-D; Class II, Div 1, Groups E-G; Class III T4; *Non-Incendive:* FM/CSA Class I, Div 2, Groups A-D T5; *Explosion-Proof:* FM Class I, II, III, Div 1, Groups A-G, no barrier required.





Ordering Instructions

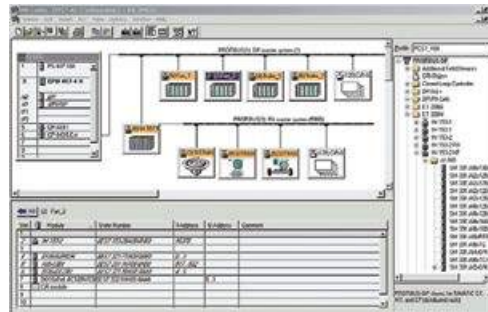
Make one selection from each table section below. A complete catalog number will look like this: 7ML5431-____0-____

Model Selection Guide

Description		Catalog Number	Price
Sitrans LR250 Two-Wire 25GHz Pulse Radar		7ML5431-	\$1721.44
Process Connect	316L SS, PTFE Emitter, FKM Seal	0 ____	471.70
	316L SS, PTFE Emitter, FFKM Seal	1 ____	666.74
Process Connect. Type	1.5" NPT Taper (ANSI/ASME B1.20.1) [1]	_ AA _	0.00
	2" NPT Taper (ANSI/ASME B1.20.1)	_ AD _	55.12
	2" ASME, 150 Lb	_ BA _	226.84
	3" ASME, 150 Lb	_ BB _	346.62
	4" ASME, 150 Lb	_ BC _	403.86
Communication	4-20 mA, HART® (Startup at <3.6 mA)	___ 20-	0.00
	PROFIBUS PA	___ 10-	184.44
Enclosure	Aluminum, Epoxy Paint, 2 x 1/2" NPT Inlets	0 ___	0.00
Antenna	1.5" Horn	_ A _	0.00
	2" Horn (Fits ASME Nozzles)	_ B _	0.00
	3" Horn (Fits ASME Nozzles)	_ C _	0.00
	4" Horn (Fits ASME Nozzles)	_ D _	0.00
	1.5" Horn with 100 mm Extension	_ E _	114.48
	2" Horn with 100 mm Extension	_ F _	114.48
	3" Horn with 100 mm Extension	_ G _	114.48
	4" Horn with 100 mm Extension	_ H _	114.48
Approvals	General Purpose CE, CSA, FM, FCC	___ A _	0.00
	Intrinsically Safe CSA/FM, FCC [2]	___ B _	184.44
	Non-Incendive CSA/FM, FCC	___ D _	0.00
	Explosion Proof FM [3]	___ H _	214.12
Pressure	7.5 PSI (0.5 bar) Max. Pressure Rating	___ 1	0.00
SIL2 [4]	Functional Safety, SIL 2 Compliance Cert	, Z-C20	106.00
Accessories	English User Manual	7ML1998-5JE06	33.92
	English User Manual, Profibus	7ML1998-5JF06	33.92
	Handheld Programmer, IS	7ML1930-1BK	151.58
	HART® Modem, RS-232	7MF4997-1DA	449.65
	HART® Modem, USB	7MF4997-1DB	591.10

Model Selection Guide

Description		Catalog Number	Price
Sitrans LR250 Two-Wire 25GHz Pulse Radar		7ML5431-	
Connect	2" NPT Threaded PVDF Antenna	4PA __	\$1721.44
Communication	4-20 mA, HART® (Startup at <3.6 mA) PROFIBUS PA	___ 20-	0.00
		___ 10-	184.44
Enclosure	Aluminum, Epoxy Paint, 2 x 1/2" NPT Inlets	OR __	0.00
Approvals	General Purpose CE, CSA, FM, FCC Intrinsically Safe CSA/FM, FCC [2] Non-Incendive CSA/FM, FCC Explosion Proof FM [3]	___ A _	0.00
		___ B _	184.44
		___ D _	0.00
		___ H _	214.12
Pressure	Rating per Pressure/Temperature Curves	___ 2	0.00
SIL2 [4]	Functional Safety, SIL 2 Compliance Cert	, Z-C20	106.00
Accessories	English User Manual	7ML1998-5JE06	33.92
	English User Manual, Profibus	7ML1998-5JF06	33.92
	Handheld Programmer, IS	7ML1930-1BK	151.58
	HART® Modem, RS-232	7MF4997-1DA	449.65
	HART® Modem, USB	7MF4997-1DB	591.10



See page 96 for Simatic PDM software.

Notes

- [1] For 1.5" horn antennae only.
- [2] Intrinsic safety barrier required.
- [3] No IS barrier required. Available only with HART® communications option
- [4] For HART models with general purpose or intrinsically safe approvals only.

SITRANS Probe LR and LR200 for Bulk Liquid Storage Levels



Probe LR (left) has a plastic enclosure — ideal for chemical applications. LR200 (right) has an aluminum enclosure.

Probe LR and LR200 are designed for safe and simple programming, using the intrinsically safe hand programmer, without having to open the instrument's lid. Both units offer a standard uni-construction, hermetically sealed, polypropylene rod antenna that offers excellent chemical resistance.

A local alphanumeric display is standard to all models. A primary display shows engineering units or percent of level, distance, or volume; a secondary display shows mA, temperature, signal status, faults, and parameter values, and an active bargraph reports material level.

Startup is easy, with as few as two parameters for basic operation. You can make parameter changes

Specifications

Range: 66 ft. (20 m)

Frequency: 6.3 GHz

Dielectric Constant: >3 (for <3 use waveguide antenna or stillpipe)

Accuracy: ± greater of 0.1% range or 10mm; Repeatability: ±5mm

Analog Output: 4 to 20 mA ±0.02 mA accuracy max. 550Ω @ 24 VDC

Local Display: Multi-segment alphanumeric liquid crystal with bar graph (representing level)

Communications: HART®, Infrared handheld programmer, SIMATIC PDM

Process Connections: 1.5" NPT, BSP, or G (polypropylene), flanges, sanitary

Features

- Two-wire loop-powered radars offer low-cost installation.
- Great for bulk liquid storage in simple process vessels and tank farms.
- Low frequency of 6.3 GHz offers high immunity against condensation or deposits.
- Very high signal-to-noise ratio for reliable performance to ranges to 66 feet. Ample signal to withstand condensation, turbulence, or low dielectrics.
- Initial setup and configuration can be completed with as few as two parameters — with no need for an echo profile.
- Program using intrinsically safe handheld programmer, Simatic PDM software and a PC, or HART® handheld communicator. You don't have to open the cover — exposing the terminals to the elements and corrosion.
- Built-in display has a primary reading, an auxiliary reading and a level bargraph.
- Rotating head swivels to line up with conduit or wiring connections. After installation, just rotate the head to the desired position for easy display viewing. After orientation, the head can be locked into place for permanent use.
- "Uni-construction" polypropylene rod antenna. The threads and rod antenna are made of the same material, and hermetically sealed to prevent chemical ingress. The internal shield ensures that no nozzle noise is introduced by the installation.
- Flange adapter version offers optional process connections and antennae.
- Advanced Sonic Intelligence signal-processing software includes Auto False-Echo Suppression for automatic detection and suppression of echoes from tank obstructions.
- Rugged, encapsulated enclosure is submersible and corrosion resistant. The potted design provides an extremely high level of shock and vibration resistance.



using the hand programmer, a HART® handheld communicator, or with a PC and Siemens Simatic PDM configuration software.

An echo status indicator ensures that your echo is reliable. If the echo confidence drops below the echo confidence threshold, the failsafe timer starts running. When the timer expires, a Loss of Echo status shows on the display. When a valid reading is received, the level reading display returns to normal operation.

Antenna: Hermetically sealed polypropylene rod. Standard: 100 mm (4") shield for max. 100 mm (4") nozzle; *Optional:* 250 mm (10") long shield; *Rod:* Teflon® (PTFE); Other antenna types available; Purge optional

Enclosure: *Probe LR:* PBT polymer, hard-coated polyether imide lid; Type 4X/NEMA 4X, Type 6/IP68; *LR200:* Aluminum, polyester powder-coated; Type 4X/NEMA 4X, NEMA 6, IP67 protection

Power: 4 to 20 mA loop powered

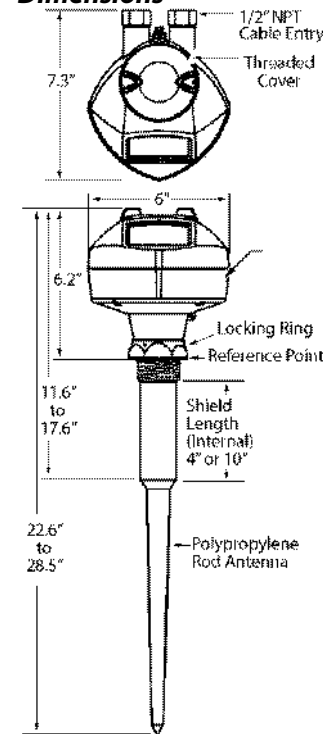
Temperature: *Ambient:* -40° to 176° F (-40° to 80° C); *Process:* -40° to 392° F (-40° to 200° C) process conn. type-dependent

Vessel Pressure: Up to 40 bar (600 PSI) process connections type-dependent

Approvals: CE, CSA US/C, FM, ATEX, Industry Canada, FCC, R&TTE, 3A



Dimensions



Ordering Instructions

Find the table for the model you need. Make one selection from each table section. Complete catalog numbers will look like: 7ML5430-___ 10, 7ML5422-___ 0, 7ML5424-___ - 0 ___ or 7ML5425-___ - 0 ___.

Notes and Restrictions — All Models

- 1 Requires flange connection >2", threaded connection larger than 1.5"
- 2 For flanged connections only. FKM O-ring for threaded connections or shielded antenna extension models.
- 3 All approvals include radio FCC 6.3 GHz; Unit only rated FM intrinsically safe when used with a suitable barrier. Approval J not valid with Profibus PA output.
- 6 Available only with Horn Size Options C, D, or E

SITRANS Probe LR

Description	Catalog Number	Price
Sitrans Probe LR: PBT Enclosure, 2x0.5" NPT Cable Inlet	7ML5430-	\$1001.70
Antenna	1A ___ 329.66 1D ___ 450.50	
Approvals (Note 3)	___ B ___ 0.00 ___ D ___ 184.44	
Output	___ 10 0.00	

SITRANS LR200 Uni-Construction Rod Antenna

Description	Catalog Number	Price
Sitrans LR200 Uni-Construction PP Rod Antenna Model	7ML5422-	\$1221.00
Antenna Type	2A ___ 357.50	
Approvals	___ B ___ 0.00 ___ D ___ 191.40 ___ F ___ 0.00 ___ J ___ 222.20	
Output	___ 10 0.00	

SITRANS LR200 Rod Antenna, Flange Connection

Description	Catalog Number	Price
Sitrans LR200 Flange Adapter, PTFE Teflon Rod Antenna	7ML5423-	\$1644.50
Process Conn. (316 SS)	1FB ___ 583.00 1GB ___ 804.10 1HB ___ 1048.20 1LA ___ 564.30 1MA ___ 597.30	
Antenna Extension	___ 0 ___ 0.00 ___ 1 ___ 62.70 ___ 2 ___ 77.00 ___ 3 ___ 0.00 ___ 4 ___ 167.20 ___ 5 ___ 206.80 ___ 6 ___ 246.40	
Process Seal	___ 0- 138.60 ___ 1- 0.00	
Output	2C ___ 0.00	
Approvals	___ B ___ 0.00 ___ D ___ 191.40 ___ F ___ 0.00 ___ J ___ 222.20	
Pressure Rating	___ 0 67.10 ___ 1 0.00	

Also available with 300# flanges. Call for details.

SITRANS LR200 Horn Antenna, Flange Connection

Description	Catalog Number	Price
Sitrans LR200 Flange Adapter Horn Antenna Version	7ML5425-	\$1644.50
Antenna	0 ___ - 0.00 2 ___ - 666.60	
Process Connect. (316 SS)	___ FB ___ 124.30 ___ GB ___ 167.20 ___ HB ___ 246.40 ___ JB ___ 476.30 ___ KB ___ 850.30	
Output	___ 0 ___ 0.00	
Process Seal	___ 0- 0.00 ___ 1- 0.00	
Horn Size	2B ___ 464.20 2C ___ 464.20 2D ___ 464.20 2E ___ 464.20 2G ___ 850.30 2L ___ 850.30	
Approval	___ B ___ 0.00	
Pressure Rating	___ 0 67.10 ___ 1 0.00	

Also available with 300# flange process connections and waveguide extensions. Call for price and availability.

Accessories — All Models

Description	Catalog Number	Price
Probe LR IS/HART® Handheld Programmer	7ML1930-1BK	\$151.58
IS/Infrared Profibus Handheld Programmer	7ML5830-2AJ	148.40
RS-232 HART® Modem for Simatic PDM/PC	7MF4997-1DA	449.65
USB HART® Modem for Simatic PDM/PC	7MF4997-1DB	591.10
Instruction Manual, LR200 HART® Models	7ML1998-5JP02	32.86
Quick-Start Guide, LR200 HART® Models	A5E31993614	46.64
Instruction Manual, Probe LR	7ML1998-5HR02	28.69
Quick-Start Manual, Probe LR	A5E32106153	34.98
SIMATIC PDM v8.1 Software Utility for Configuring, Commissioning, and Diagnostics; (Profibus, HART®, 4 Tags)	TGX:PDM-3AB18-0YA5	689.00

Programming Options

L: Siemens' RS-232 to HART® modem for SIMATIC PDM; **R:** Siemens' intrinsically-safe handheld programmer. Learn more on pages 94 to 96.



SIEMENS SITRANS LR400 Radar for Level Measurement



Features

- Four-wire frequency modulated, continuous wave (FMCW) radar for high power and ranges to 147 feet
- 24GHz frequency offers strong signals in dusty solids and liquids with dielectrics as low as 1.6
- Advanced echo processing includes false-echo suppression and dynamic threshold
- Narrow beam angle allows for mounting flexibility
- Self-diagnostics for sensor and electronics ensure reliability
- Self-calibration with internal reference provides long-term stability and repeatability
- Non-contacting technology for maintenance-free operation
- Local or remote programming with SIMATIC PDM or HART® handheld devices
- 4-20 mA HART communications protocol standard
- Standard and explosion-proof models available
- Stainless steel Easy Aimer for highly sloped surfaces and purging systems for sticky solids
- Optional PTFE dust cover

Specifications

Measuring Range: 0.35 to 50 m (1.15 to 164 ft)

Measuring Principle: 24 GHz frequency modulated continuous wave

Dielectric Constant: >1.4

Signal Processing: Digital echo processing; Calibrates via internal reference

Deadband: 0 to 350 mm from bottom edge of flange

Measurement Error at 25°C: ≤5 mm from 2–10 m, ≤15 mm from 10–50 m

Repeatability: ≤ 1 mm

Failsafe: mA signal programmable as high, low or hold (LOE)

Analog Output: HART®, Optically isolated
4 to 20 mA signal

Communication: HART or Profibus PA

Digital Output: Relay, normally open or closed function, max. DC 50 V,
max. 200 mA, rating 5 W

Power Supply: 120–230 VAC ±15%, 6 W (12 VA) or 24 VDC +, 6 W

Enclosure: Painted diecast aluminum; IP67/Type 4X/NEMA 4X, Type 6/
NEMA 6; M20 x 1.5 or ½" NPT (QTY 2) cable inlets

Antenna: Stainless steel, PTFE emitter; Short (2.9" diameter) or long horn
(3.66" diameter), optional purge and PTFE lens dust cover

Process Connections: 316 stainless steel flat-faced flanges, 80, 100, 150
mm, bolt holes matching DIN 2527 and JIS B 2238; 316 stainless steel
raised-face flanges, 3", 4", 6", bolt holes matching ANSI B 16.5

Temperatures: Ambient: -40° to 149° F; Process: Standard: -40° to 392° F;
With temperature extension: -40° to 482° F

Vessel Pressure: Up to 40 bar (process connection dependent)

Location: Indoor/outdoor; *Installation Category:* II; *Pollution Degree:* 4

Certificates and Approvals: Safety: CSA US/C, CE, FM; Radio: Europe (R&TTE,
CETECOM), Industry Canada, FCC; Hazardous Areas: ATEX II 1/2G EEx dem
[ia] IIC T6; ATEX II 1/2G EEx dem IIC T6; CSA/FM Class I, Div. 1, Groups B-D;
Class II, Div. 1, Groups E-G; Class III T6

Programming

Infrared: Intrinsically Safe Siemens Milltronics infrared receiver handheld
programmer; *Approvals:* IS model with ATEX EEx ia IIC T4; FM/CSA Class I,
Div. 1, Groups A-D T6 @ ambient temperature 40° C (104° F) max.

HART®: With handheld communicator

PC: Siemens Simatic PDM, Windows®-based software

Display: Local Alphanumeric LCD for readout and entry

Ordering Instructions

Select one option from each table section below. A complete catalog
number looks like this: 7ML5421 - _ _ _ _ - _ _ _ _ - _ _ _ _

Model Selection Guide

Description	Catalog Number	Price
SITRANS LR400 for LI	5421-	—
Process Temperature	-40° to 482° F -40° to 250° C	0.00 366.00
Process Connection	3", ANSI 150 lb. Class, Raised Face 4", ANSI 150 lb. Class, Raised Face 6", ANSI 150 lb. Class, Raised Face	234.00 295.00 379.00
Antenna Horn	Long, 3.66" Diameter, for 4" Nozzles Short, 2.9" Diameter, for 3" Nozzles	0.00 0.00
Purging	None	0.00
Process Seal	PTFE for -40° to 482° F Flange	101.00
Output	HART, 4 to 20 mA Profibus PA	0.00 323.00
Power Supply	120 to 230 VAC, 2 x 1/2" NPT 24 VDC, 2 x 1/2" NPT	0.00 129.00
Approvals	CSA, General Purpose FM, Hazardous Locations (Note 2)	0.00 351.00
Display	Local Display	0.00
Accessories		
Intrinsically Safe Infrared Handheld Programmer	7ML5830-2AJ	148.40
PTFE Dust Cover, Long Horn	7ML1930-1AH	155.00
USB HART® Modem for PC/Simatic PDM	7MF4997-1DB	591.10
English Operation Manual	7ML1998-5FH06	29.00
LR400 Quick-Start Manual	A5E32007509	29.00

SITRANS LR400 has been retired. Call for a suitable replacement.

Picking the Right Radar for Bulk Solids Level

	LR260	LR460	LR560
Method	25 GHz pulse radar	24.2 to 25.2 GHz FMCW Radar	78 GHz FMCW Radar
Range	98 feet (30 m)	328 feet (100 m)	329 feet (100 m)
Power	Nominal 24 VDC, 30 VDC max, 4-20 mA Profibus PA: 15.0 mA	100-230 VAC ±15%, 50/60 Hz, 6W (12A) or 24 VDC +25/-20% 6W optional	Nominal 24 VDC or 9 to 32 VDC (PROFIBUS)
Media Dielectric Constant	$\epsilon_r > 1.6$	$\epsilon_r > 1.4$	$\epsilon_r > 2.0$
Analog Output	4-20 mA loop powered	4-20 mA optically isolated	4-20 mA
Local Display	Graphic LCD with bargraph and echo profile	Alphanumeric LCD	Graphic LCD, with bar graph for level
Communications and Programming	HART®, Profibus PA, SIMATIC PDM, Intrinsically safe handheld programmer, local operation	HART®, Profibus PA, SIMATIC PDM, Intrinsically safe handheld programmer, local operation	HART® communicator 375/475, SIMATIC PDM, AMS, PACTware, Infrared receiver
Enclosure	Polyester powder-coated aluminum Type 4X/NEMA 4X, Type 6/NEMA 6, IP67, IP68 Two 1/2" NPT cable inlets	Polyester powder-coated aluminum Type 4X/NEMA 4X, Type 6/NEMA 6, IP67 Two 1/2" NPT cable inlets	Type 4X/NEMA 4X, Type 6/NEMA 6, IP68 with lid closed, 316L/1.4404 stainless steel
Process Connections	Universal: 2", 3", 4", or 6" with integral EasyAimer	Universal: 3", 4", or 6" with integral EasyAimer	Universal: 3", 4", or 6" with integral EasyAimer
Horn Antenna	2", 3", or 4" diameter horn, optional dust cover, optional 1/8" NPT purge connection	3" or 4" diameter horn, optional dust cover, optional 1/8" NPT purge connection	None required
Process Conditions	Ambient: -40° to 176° F; Process: -40° to 392° F	Ambient: -40° to 149° F; Process: -40° to 392° F	Ambient: -40° to 176° F; Process: -40° to 392° F
Approvals	General: CSA us/c, CE, FM Radio: FCC, Industry Canada, European (R&TTE), C-TICK Hazardous Areas: CSA, FM, ATEX, IEC Ex	General: CSA us/c, CE, FM Radio: FCC, Industry Canada, European (R&TTE), C-TICK Hazardous Areas: CSA, FM, ATEX, IEC Ex	General: CSA _{US/C} , CE, FM Radio: Europe (R&TTE), FCC, Industry Canada, C-TICK FM/CSA Class II, Div. 1, Groups E-G; Class III T4: FM/CSA Class I, Div. 2, Groups A-D, T4
See Page	44	45	46

Sensor design cures material buildup headaches

A local flour processing plant has more than 30 different storage tanks: outdoor holding tanks for when the grain comes off the rail cars, and indoor tanks for holding the wheat flour after processing.

When they first installed their level detection system 15 years ago, ultrasonics were the only available solution. Radar level systems for dry solids didn't exist.

Their problem was the dust buildup on the ultrasonic transducer, which was mounted at the floor. When the sensors stopped seeing level, they'd come by and kick the transducer to knock the flour buildup off. The sensor would start working again, and all was fine... till the next time.

The Siemens LR560's lens antenna was designed specifically to resist material buildup, and includes a built-in air purge to keep the sensor face clean at all times.

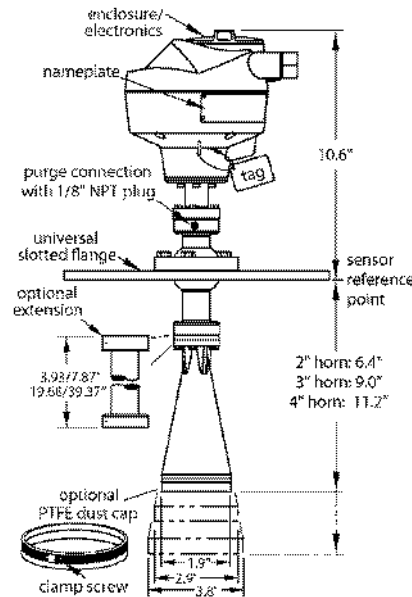
After a one-week demonstration, the customer bought 10 LR560s for their processing plant, and has since recommended the devices to their end-user customers who were having similar level monitoring issues.



SITRANS LR260 Radar for Dry Bulk Solids

Features

- Two-wire loop-powered radar for low cost of ownership
 - Small antenna, narrow beam, flexible mounting locations, short and long ranges, excellent reflection properties on solids and low dielectric media
 - Built-in Easy Aimer for optimal signal reflection
 - Quick start Wizard guides you through basic function setup. Enhanced EDD with quick-start wizard for SIMATIC PDM
 - Patented Process Intelligence differentiates between true media echoes and false echoes generated by obstructions
 - Intrinsically safe programmer for local operation in hazardous areas; Digital communications with HART® and PROFIBUS PA
 - Improved diagnostic messaging so you can define which errors are important and direct the error codes to where they are needed
- New built-in timers let you schedule cleaning or replacement activities with automated alerts



Ordering Instructions

Make a selection from each table section below. A complete catalog number will look like this: 7ML5424-0__-0 - __-0. Don't forget to order a handheld programmer and a manual. (One quick-start guide is included with each unit.)

Specifications

Measuring Principle: 25 GHz K-band pulse radar

Detectable Distance: 0.05 m (2") minimum from end of horn

Measuring Range: 2" horn: 10 m (32.8 ft) max.; 3" horn: 20 m (65.6 ft) max.; 4" horn: 30 m (98.4 ft) max.

Media Dielectric Constant: $\epsilon_r > 1.6$, antenna and application dependent

HART® Output: 4 to 20 mA (± 0.2 mA accuracy); Nominal 24 VDC; *Fail signal:* 3.6–23 mA or last value; *Load:* 230–600 Ω ; *Line length:* Multiwire, ≤ 1500 m (4921 ft) max; *Protocol:* HART Version 5.1

PROFIBUS PA Output: Per IEC 61158-2, 15.0 mA; Profile V3.01, Class B

Accuracy: 25 mm (1") from minimum detectable distance to 300 mm (11.8"); *Remainder of range:* Greater of 10 mm (0.39") or 0.1% span. Accuracy includes hysteresis and non-repeatability

Operating Conditions: *Ambient temperature:* -40° to 176° F; *Process temperature:* -40° to 392° F; *Process pressure:* 7.25 PSIG max (0.5 bar) standard, 43.5 PSIG (3 bar) optional with 176° F max temperature; *Installation category:* 1; *Pollution degree:* 4

Enclosure: Type 4X/NEMA 4X, Type 6/NEMA 6, IP67, IP68 rated, polyester powder-coated aluminum; Two 1/2" NPT conduit entries; 304 SS flange and horn; *Process connections:* 2", 3", 4", and 6" universal flanges

Display: Graphic LCD, with bargraph representing level

Approvals: *General:* CSAUS/C, CE, FM; *Radio:* Europe (R&TTE), FCC, Industry Canada, C-Tick; *Hazardous:* CSA/FM Class II, Div. 1, Groups E–G, Class III, ATEX II 1D, 1/2D, 2D Ex tD A20 IP67, DP68 T 100° C

Programming: Local interface with quick-start wizard and echo profile displays; Siemens handheld programmer and infrared receiver; Intrinsically safe, ATEX II 1G EEx ia IIC T4, CSA/FM Class I, Div. 1, Groups A–D; HART® handheld; Siemens SIMATIC PDM Windows-based software

Model Selection Guide

Description		Catalog Number	Price
Sitrans LR260 Two-Wire 25GHz Pulse Radar		7ML5427-	\$2164.52
Process Connect.	Universal Flat Faced 3" (80mm)	0B ___	256.52
	Universal Flat Faced 4" (100mm)	0C ___	256.52
	Universal Flat Faced 6" (150mm)	0D ___	329.66
Antenna	3" Horn, Fits 3" Nozzles	___ F ___	0.00
	3" Horn, 100 mm Extension	___ G ___	118.72
	3" Horn, 200 mm Extension	___ H ___	233.20
	3" Horn, 500 mm Extension [1]	___ J ___	577.70
	3" Horn, 1000 mm Extension [1]	___ K ___	1154.34
	4" Horn, Fits 4" Nozzles	___ L ___	0.00
	4" Horn, 100 mm Extension	___ M ___	118.72
	4" Horn, 200 mm Extension	___ N ___	233.20
	4" Horn, 500 mm Extension [1]	___ P ___	577.70
4" Horn, 1000 mm Extension [1]	___ Q ___	1154.34	
Purge	None	___ 00-	0.00
	Purge (Self-Cleaning) Connection	___ 10-	268.18
Communication	4-20 mA, HART®	0 ___	0.00
	Profibus PA	1 ___	184.44
Cable Inlet	Two 1/2" NPT Cable Inlets	___ B ___	0.00
Approvals	General Purpose CSAUs/c, FCC, CE, R&TTE	___ A _	0.00
	CSA/FM Class II, Div 1, Gr E-G, Class III	___ B _	142.04
Pressure Rating	43.51 PSI (3 bar) pressure rating in Bar	___ 0	63.60
	7.25 PSI (0.5 bar) maximum	___ 1	0.00
Accessories	LR260 Instruction Manual, HART	7ML1998-5KE03	29.68
	LR260 Quick Start Guide, HART	ASE32106122	41.34
	LR260 Instruction Manual, Profibus	7ML1998-5KF01	29.68
	LR260 Quick Start Guide, Profibus	ASE32114443	41.34
	Handheld Programmer, IS	7ML5830-2AJ	148.40
	HART® Modem, USB	7MF4997-1DB	591.10
	HART® Modem, RS-232	7MF4997-1DA	449.65
PTFE Dust Cover for 3" Horn	7ML1930-1BL	147.34	
PTFE Dust Cover for 4" Horn	7ML1930-1BM	147.34	

[1] Not available with Purge Connection option.

SIEMENS

SITRANS LR460 Radar for Bulk Solids Level

Features

- 24 GHz FMCW 4-wire radar provides excellent reflection from solids
- Process Intelligence for advanced echo processing and quick, easy adjustment
- Extremely high signal-to-noise ratio yields high performance
- 328 ft (100m) range for long-range and difficult applications
- Built-in Easy Aimer for optimizing signal on sloped surfaces
- Self-guided quick start wizard for fast simple setup — in just eight parameters
- Program using infrared intrinsically safe handheld programmer or HART handheld device and SIMATIC PDM
- Dynamic TVT threshold automatically adjusts echo detection sensitivity depending on echo strength



What Makes the LR460 Unique?

- **Four-Wire Power, 24 GHz FMCW Radar Technology:** High frequency radar provides a narrow beam angle, reducing side-wall path interference and false signals from internal obstructions in tall silos. Combined with 4-wire power, this results in extremely high signal-to-noise ratio, ensuring exceptional performance in long-range applications.
- **Process Intelligence Echo Processing:** Differentiates between true echoes from the material and false echoes generated by obstructions. Dynamic threshold adjusts automatically to changing conditions in the vessel. The result is repeatable, fast and reliable measurement, even through severe dust.
- **Digital Communications:** HART®; PROFIBUS PA; Connectivity with commonly used communications buses makes for flexible networking with a DCS or PLC.
- **Infrared Handheld Programmer:** No need to open the device for programming. Intrinsically safe for hazardous areas. Make changes without interrupting your process or exposing electronics to the environment.
- **Enhanced Electronic Device Description (EDD) with Quick Start Wizard:** One of the first instruments to have an Enhanced EDD file that can be used in configuration software, like SIMATIC PDM and Emerson AMS. A number of new advanced features are built in, including, easy-to-use graphical Quick Start Wizard and the ability to save echo profiles. The quick start wizard is also available via the infrared handheld programmer.

Specifications

Frequency: 24.2 to 25.2 GHz FMCW radar

Range: 1.15 to 328 feet (0.35 to 100 m)

Medium: Dielectric constant $\epsilon_r > 1.4$

Accuracy: *Non-Linearity:* Greater of 1" (25 mm) or 0.25% span; *Non-Repeatability:* ≤ 0.4 " (10 mm)

Analog Output: Optically isolated 4 to 20 mA, 600 Ω max load; *Failsafe:* MA signal programmable as high, low or hold (loss-of-echo)

Digital Output: Relay, NC or NO function, max. 50 VDC, 200 mA, rating 5 W

Communication: HART; PROFIBUS PA

Vessel Pressure: 7.25 psi (0.5 bar) max.

Temperature: *Ambient for enclosure:* -40° to 149° F; *Process:* -40° to 392° F

Enclosure: Diecast aluminum, IP67/Type 4X/NEMA 4X/Type 6/NEMA 6; *Cable Inlet:* Two 1/2" NPT; *Location:* Indoor/outdoor; *Installation category:* II; *Pollution Degree:* 4; *Optional:* PTFE dust cap, 1/8" NPT air purge connection

Horn Antenna: Universal flanges, 316L stainless steel, flat faced, with integral Easy Aimer; 3", 4" or 6" (80 mm, 100 mm, or 150 mm) mates with flange EN 1092-1, ASME B16.5, or JIS B2238 bolt pattern

Power Supply: 100 to 230 VAC, 6 W (12 VA) or 24 VDC, 6 W (optional)

Programming: Intrinsically safe handheld programmer, ATEX II 1G EEx ia, IIC T4, CSA/FM Class I, Div. 1, Groups A-D T6 @ max. ambient temperature 104° F (40° C); *HART® Handheld:* HART Communicator 375; *PC Software:* SIMATIC PDM

Local Display: Alphanumeric LCD for readout and entry

Approvals: *General:* CSAUS/C, CE, FM; *Radio:* European Radio (R&TTE), Industry Canada, FCC; *Hazardous Areas:* CSA/FM Class II, Div. 1, Groups E-G, Class III; ATEX II 1D, 1/2 D, 2D T85° C

Dielectric constants table available on page 488.



Ordering Instructions

Make a selection from each table section below. A complete catalog number will look like this: 7ML5424-0__0-__0. Don't forget to order a handheld programmer and a manual. (One quick-start guide included with each unit.)

Model Selection Guide

Description		Catalog Number	Price
Sitrans LR460 Four-Wire 24GHz FMCW Radar		7ML5426-	\$3381.40
Process Connect.	Universal Flat Faced 3" (80 mm)	0A ___-	256.52
	Universal Flat Faced 4" (100 mm)	0B ___-	256.52
	Universal Flat Faced 6" (150 mm)	0C ___-	329.66
Antenna	3" Horn, Fits 3" Nozzles	__A __-	0.00
	4" Horn, Fits 4" Nozzles	__F __-	0.00
	4" Horn, 200 mm Extension	__H __-	233.20
Purge	None	___00-	0.00
	Purge (Self-Cleaning) Connection	___10-	268.18
Communication	4-20 mA, HART®	0 ___-	0.00
	Profibus PA	1 ___-	184.44
Power/Cable Inlet	100 to 230 VAC, Two 1/2" NPT Cable Inlets	__B __-	0.00
	24 VDC, Two 1/2" NPT Cable Inlets	__D __-	0.00
Approvals	General Purpose CSAus/c, FCC, CE, R&TTE	__A0	0.00
	CSA/FM Class II, Div 1, Gr E-G, Class III	__B0	142.04
Accessories	English Instruction Manual	7ML1998-5JM02	34.98
	Handheld Programmer, IS	7ML5830-2AJ	148.40
	HART® Modem, USB	7MF4997-1DB	591.10
	PTFE Dust Cover for 3" Horn	7ML1930-1BL	147.34
	PTFE Dust Cover for 4" Horn	7ML1930-1BM	147.34

SITRANS LR560 78GHz Radar for Bulk Solids

Features

- 78GHz frequency allows for a narrow 4° beam width
- Virtually unaffected by dust, vapor, pressure, or temperature
- Installs almost anywhere on top of a silo, and can even measure cone area
- Short wavelength for excellent reflection, even on highly sloped surfaces
- Lens antenna with built-in air purge feature resists material and dust build-up
- 2.5" antenna fits into almost any tank opening or nozzle
- Quick-start wizard gets the transmitter up and operational in minutes
- Local display interface for pushbutton programming diagnostics



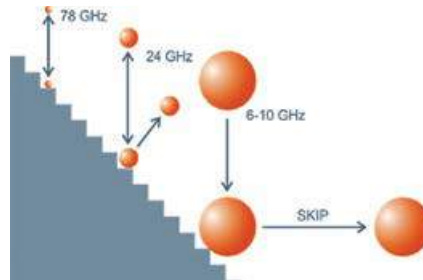
Extreme dust? No problem. Siemens two-wire, loop-powered SITRANS LR560 is a state-of-the-art transmitter for continuous solids level measurement. The LR560 is the first radar transmitter on the market to operate at the 78 GHz frequency. It has an exceptionally narrow 4° beam, short wavelength and a unique non-clogging lens antenna.

The narrow beam angle means the transmitter can be installed practically anywhere on the top of a silo and still achieve accurate readings. Its small size and 2.5" lens antenna allow the unit to be installed on any existing nozzle or tank opening. To set the LR560 on a correct angle, you can easily add an aiming flange.

The traditional problems of noisy signals due to the standpipe or nozzle are now eliminated.

Wider beam angles typical of lower frequency radars can have difficulty measuring the cone area of a silo. They tend to see the sides of the silo and miss the true level reading in the cone area. Not so with the LR560. Since the narrow beam can be aimed into the cone, the LR560 can measure it effectively.

The other critical aspect of a 78 GHz radar is its short wavelength. All solids have an angle of repose that causes the transmit signal to split into two returning paths, one direct and one indirect, leading to complicated signal and measurement drift. The high frequency of 78 GHz minimized this issue. The short wavelength yields exceptional reflection from sloped solids, even without aiming, and less skip. Less skip means more signal and better reliability.



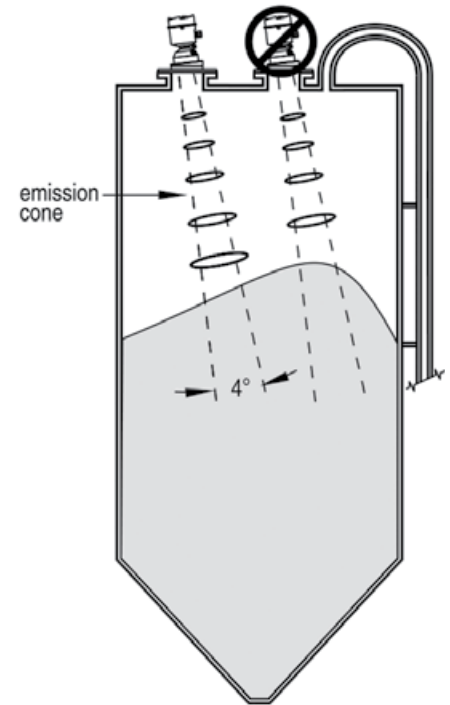
The SITRANS LR560 is the first radar to have a lens antenna, designed from the start to be highly resistant to material build-up. It comes standard with an air purge which blows directly across the lens face in a circular path. Most LR560s in dry solid applications will require little to no maintenance or cleaning.

Do you prefer buttons for programming or an infrared handheld? With the LR560, you can use either one. A quick-start booklet comes with the unit, and can be stored in the transmitter lid for use in the field, though most users don't require the paper guide. The graphical quick start wizard on the display makes the LR560 easy to program.

You also have the option of configuring the transmitter and viewing echo profiles using Siemens SIMATIC PDM, PACTware, or Emerson AMS software. SITRANS LR560 models are available with HART®, PROFIBUS PA, or Foundation™ Fieldbus protocols.

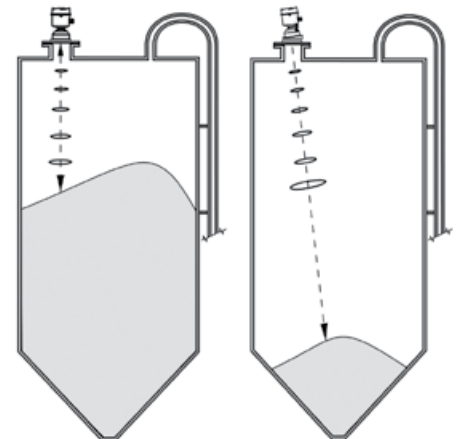
It's available in two versions, one for 40 meters and process temperatures to 212° F, one for 100 meters and 392° F. Designed for rugged field use, the LR560 is approved for hazardous conditions. The stainless steel enclosure is rated IP68, and the encapsulated electronics cup is easily replaceable.

Nozzle location



- 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
- A signal is transmitted outside the beam angle, so false targets can be detected

Aimer Adjustment

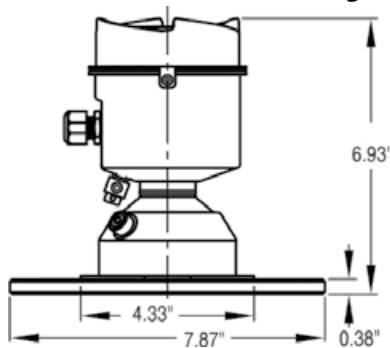


With 78 GHz frequency, aiming is rarely required for signal optimization. Still, proper aiming will improve your ability to measure material in the cone of your vessel.

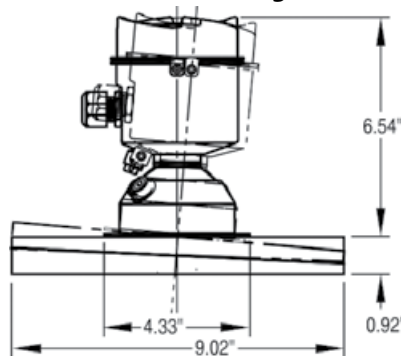


Look!!! No horn for material to build up on!

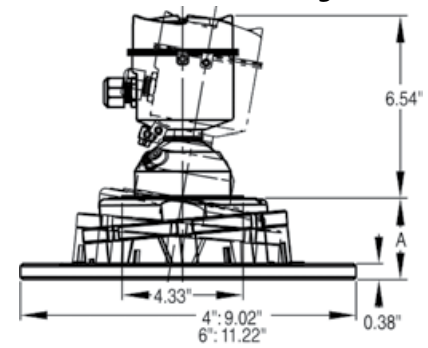
Universal Flat-Faced Flange



3" Aimer Flange



4" or 6" Aimer Flange



Specifications

Measurement Principle: 78 GHz FMCW radar level
Detectable Distance: 15.75" to 131 feet (400 mm to 40 m) or 15.75" to 328 feet (400 mm to 100 m) from reference point
Output: Analog: 4 to 20 mA; Communications: HART standard, PROFIBUS PA or Foundation Fieldbus; Fail-safe: Programmable as high, low or hold. Loss of Echo, NAMUR NE43 programmable
Accuracy: Greater of 1" or ±0.25% range from minimum detectable distance to full range
Rated Operating Conditions: Ambient temperature: -40° to 176° F, Installation category: I; Pollution degree: 4
Media Conditions: Dielectric constant >2.0; Process temperature: 40 m version: -40° to 212° F; 100 m version: -40° to 392° F
Enclosure: 316L/SS, M20x1.5" conduit entry, or 1/2" NPT via adapter; with PEI or PEEK lens; Degree of protection: Type 4X/ NEMA 4X, Type 6/NEMA 6, IP68 with lid closed
Display: Graphic LCD, with bargraph representing level
Process connections: 3", 4", or 6" universal flat-faced flanges in 304 or 316L stainless steel; Aimer flanges: 3", 4", or 6" polyurethane powder-coated cast aluminum
Power Supply: 4-20 mA/HART: Nominal 24 VDC (max. 30 VDC) with max. 550W, PROFIBUS PA/Foundation Fieldbus: 13.5 mA, 9 to 32 VDC, per IEC 61158-2
Approvals: General: CSAUS/C, CE, FM; Radio Europe (R&TTE), FCC, Industry Canada, C-TICK; Hazardous: FM/CSA Class II, Div. 1, Groups E-G, Class III, T4, Class I, Div. 2, Groups A-D, T4
Programming: Intrinsically safe Siemens programmer: ATEX, CSA/ FM Class I, II, III, Div. 1., Gr. A-G, T6 Ta=50C; HART® communicator: HART communicator 375/475; PC with SIMATIC PDM, AMS, or PACTware; Local graphical display with quick start wizard and echo profiles

Notes

(1) Universal flat flange with integral aimer rated to 248° F when used with pressure rating option 1 (7.5 PSIG max.)

Ordering Instructions

Select one option from each table section below. A complete catalog number looks like this: 7ML5440 - _____

Model Selection Guide

Description		Catalog Number	Price
SITRANS LR560: Two-Wire 78GHz Radar Transmitter, Stainless Steel Enclosure, 1x1/2" NPT Cable Inlet		7ML5440-	\$2186.80
Measuring Range	131 Feet Max Range, -40° to 212° F	0 _____	0.00
	329 Feet Max Range -40° to 392° F	1 _____	852.50
Process Connection (See Note 1)	3" (80mm) Universal Flat Flange, 304 SS	_ AA00	0.00
	4" (100mm) Universal Flat Flange, 304 SS	_ BA00	99.00
	6" (150mm) Universal Flat Flange, 304 SS	_ CA00	147.40
	3" (80mm) Universal Flat Flange, 316L SS	_ DA00	62.70
	4" (100mm) Universal Flat Flange, 316L SS	_ EA00	159.50
	6" (150mm) Universal Flat Flange, 316L SS	_ FA00	209.00
Pressure Rating	7.5 PSIG Max (0.5 bar g)	0 ___	0.00
	40 PSIG Max (3 bar g)	1 ___	62.70
Output/Interface	4-20 mA and HART	_ A ___	0.00
	Profibus PA	_ B ___	191.40
	Foundation Fieldbus	_ C ___	311.30
Agency Approvals	CSA, CE, FM General Purpose	___ A _	0.00
	CSA/FM Hazardous Environments	___ B _	99.00
Local Display	None	___ 1	0.00
	Removable Local Display Interface	___ 2	183.70
Options	Stainless Steel Tag: 16 Characters	, Z-Y15	16.50
Accessories	Infrared Hand Programmer, IS	7ML1930-1BK	151.58
	LR560 Sun Shield Cover	7ML1930-1FK	142.04
	Printed LR560 User Manual, English	7ML1998-5KB02	34.98

Unit ships with electronic manual and quick-start guide. Order printed manual separately.



No power? No problem!

Banner Engineering's DX80 Performance D5 node radio powers a SITRANS LR560 from the radio's battery on a scheduled, periodic, intermittent basis for true wireless performance. A radar level transmitter can sample 3x per hour with a 3 month battery life.

The D5 is a 150 mW node radio in the metal enclosure and comes with a dome antenna (shown). It is intrinsically safe when used with an approved I/S transmitter, certified for operation in Div 1 locations.

For more on Banner wireless I/O systems, see pages 126 to 132.

DX80 D5 Performance Node Radio

Description	Catalog Number	Price
120mW Performance Node Radio, Internal Battery	20178	\$1475.00
Direct mounting hardware		
1/2" NPT SS Hex nipple for close coupling	1225S8	6.50
3/4"x 1/2" NPT SS reducer for threaded port	1105S12x8	5.95
For remote antenna connection		
1/2" NPT feedthrough, RPSMA-F antenna connector	11835	66.00
3/4" NPT feedthrough, RPSMA-F antenna connector	11834	62.00
0.5 m (20") RPSMA x N-male adapter cable	77486	40.00

Level Measurement Instruments

Flow Measurement Instruments

Pressure Transmitter

Temperature Sensors and Transmitters

Wireless Sensing and Communications

Analytical Instruments and Systems

SITRANS LG200 Guided Wave Radar



Features

- Loop-powered guided wave radar transmitter for level and interface measurement
- Unaffected by change in density and dielectric properties — Accurately measures materials with a dielectric range of 1.4 and higher. Can even measure light hydrocarbons.
- Reliable, accurate measurement to 0.12"
- Easy setup – Three-button pushbutton configuration for quick setup. HART® communications for more advanced control and greater functionality
- Sixteen different probe types (see below): One instrument for many applications in a plant simplifies plant operations and results in cost savings (stocking parts, training operators and maintenance staff). Probe lengths up to 75 ft
- Reliable measurement on harsh applications with pressures from full vacuum to 6250 PSI and temperatures as high as 800 ° F
- Intrinsically safe, explosion-proof, and non-incendive approvals

Siemens' SITRANS LG200 is an advanced loop-powered, guided wave radar level transmitter for liquids, slurries, interface, and bulk solids with a dielectric range of 1.4 and higher. It is unaffected by changes in process conditions, high temperatures and pressures, and steam. For short and extended applications, LG200 offers coaxial, single or twin rod probes, and single or twin cable probes up to 75 feet.

The wide selection of models and the echo processing software ensure reliable measurement in liquids with corrosive vapors, foam, saturated steam, high viscosity, surface agitation, high fill/empty rates, low tank levels and varying dielectric or density.

Guided wave radar combines time-domain reflectometry (TDR), equivalent time sampling (ETS), and modern low power circuitry. TDR uses pulses of electromagnetic energy to measure distances or levels. When a pulse reaches a dielectric discontinuity created by the medium's surface, part of the energy is reflected. The greater the dielectric difference, the greater the amplitude (strength) of the reflection.

In the SITRANS LG200, a waveguide with a characteristic impedance in air is used as a probe. When part of the probe is immersed in a medium other than air, it creates a lower impedance (due to the increased dielectric.) When an EM pulse sent down the probe meets the dielectric discontinuity, it generates a reflection.

ETS is a critical key in the application of TDR-to-vessel level measurement. The high speed EM energy (1000 ft/μs) is difficult to measure over short distances at the resolution required in the process industry. ETS captures the EM signals in real time (nanoseconds), and reconstructs them in equivalent time (milliseconds), which is much easier to measure with today's technology. LG200 takes about eight scans per second, and each scan gathers more than 30,000 samples.

16 Different Probes Make LG200 Fit Almost Any Level Application

Coaxial probes		Single rod probes		Twin rod probes	
Probe Type	Application	Probe Type	Application	Probe Type	Application
General purpose	Liquids with dielectric as low as 1.4	Rigid	Liquids and slurries with a dielectric ≥ 1.9 (>10 if away from tank wall)	Standard twin rod	For applications where buildup is possible. Dielectric ≥ 1.9
High pressure	5000 psig	Flexible for liquids	Applications with severe coating and buildup, ranges up to 75 ft	Extended twin rod	Dirty, viscous or low-dielectric media
High temperature, high pressure	750° F at 2000 psig	Non-stick	High viscosity liquids	Flexible twin rod	Bulk solids
Steam	Saturated steam environments	Sanitary	Food and beverages, pharmaceuticals, semiconductors, 3A approval	Dielectric constants table available on page 488.	
Interface	Measures both upper liquid level and interface level	Corrosion	Aggressive media		
Overfill	Measures 100% full point of a tank	High temperature, high pressure	Viscous materials		
		Flexible for solids	Bulk solids ranges up to 75 ft		

Level Measurement Instruments

Flow Measurement Instruments

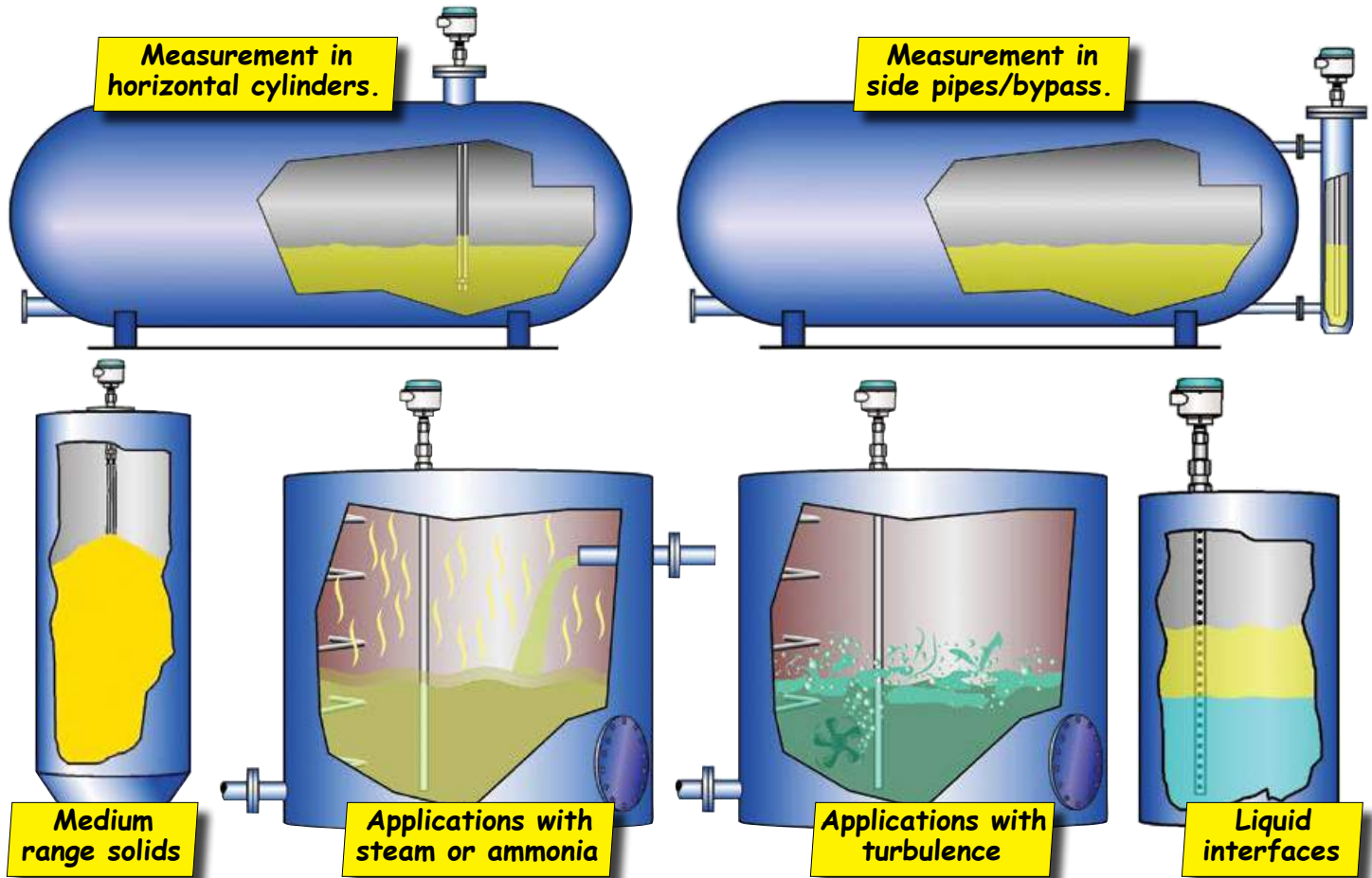
Pressure Transmitter

Temperature Sensors and Transmitters

Wireless Sensing and Communications

Analytical Instruments and Systems

Applications in Key Industries



Condensed Specifications

Measurement Range: Up to 75 ft

Linearity: *Coaxial/Twin rod probes:* Greater of $\lt;0.1\%$ of probe length or 0.1"; *Single rod probes:* Greater of $\lt;0.3\%$ of probe length or 0.3"; *Interface models:* $\lt;0.5\text{''}$

Measured Error: *Coaxial/Twin rod probes:* Greater of $\pm 0.1\%$ of probe length or 0.1"; *Single rod probes:* Greater of $\pm 0.5\%$ of probe length or 12.7 mm (0.5"); *Interface models:* Upper layer: $\pm 1\text{''}$; Interface layer: $\pm 1\text{''}$ (clean distinct interface required)

Resolution: $\pm 0.1\text{''}$

Repeatability/Hysteresis: $\lt;0.1\text{''}$

Output: 4 to 20 mA with HART digital signal

Communication: HART®

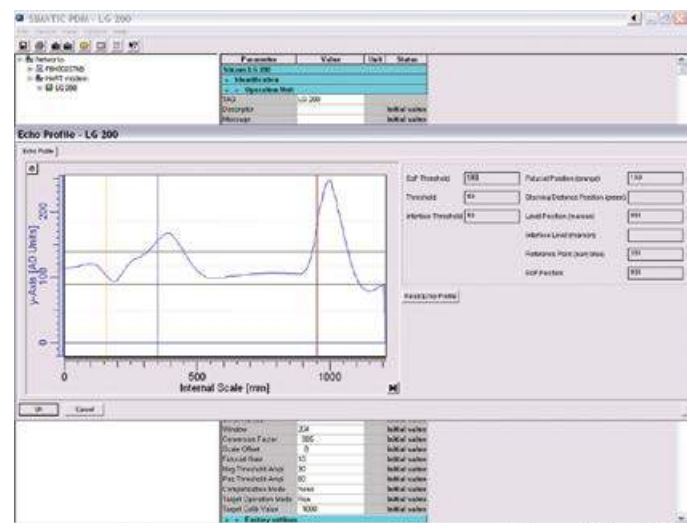
Programming: Button menu-driven data entry and system security; *Local:* Three button, menu driven data entry with security; *Remote:* SIMATIC PDM via HART®

Power: 11 to 36 V DC

Enclosure: Type 4/NEMA 4/IP65 epoxy-coated aluminum, two 1/2" NPT cable inlets

Process Conditions: *Ambient temperature:* -40° to 176° F; *Process temperature:* -320° to 800° F, probe dependent; *Vessel pressure:* Full vacuum to 6250 PSIG, probe dependent

Approvals: CSAus/c, CE, FM, 3A for general service; CSA, FM, ATEX for hazardous areas



SITRANS LG200 is compatible with Windows-based SIMATIC PDM software for configuration and management. See page 96 for software and communication accessories.

Inventory Control by Servo Gauging

Honeywell Enraf

Safety, reliability, and efficiency are universal concerns in the world of tank and intermediate storage. As prices and performance demands increase, the concept of total cost of ownership grows in importance. Honeywell Enraf servo tank gauges offer optimized operations, enhanced safety, and a high degree of accuracy and reliability.

Honeywell Enraf servo systems deliver optimized measurement performance in any environment. Characteristic features are robust design and modular construction which let you add precisely those functionalities that your specific operating environment demands.

All Honeywell Enraf instruments and systems combine the latest technology with decades of experience reflected in user-friendly programmability for fast and simple startup.

Industry Approvals

Honeywell Enraf systems are approved worldwide by national weights and measures authorities and by customs and excise services. Honeywell Enraf servo tank gauging systems have set the standard for officially certified automatic tank gauging systems such as those approved by the American Petroleum Institute and International Standardization Organization for the installation and operation of automatic tank gauging systems, and the International Organization of Legal Metrology and the Netherlands Metrology Institute for the performance requirements relating to those systems.

Honeywell Enraf tank gauging systems receive type approval in conformity with national legislation and in accordance with the OIML recommendations. The automatic gauging systems and their accuracy are tested both before and after installation to ensure reliability, reproducibility, sensitivity and integrity of the instruments. These instruments easily exceed the requirements for overflow protection equipment and therefore are approved to be used in any kind of safety system.

Reliable Measurement Principle

Honeywell Enraf servo tank gauging systems are based on a proven measurement concept. Level measurement is performed by a displacer, a strong and flexible measuring wire, a measuring drum, force transducer and servo motor.

The weight of the displacer ensures that the wire is constantly tensioned, even on turbulent liquid surfaces, avoiding measurement errors caused by displacer drift.

The level measurement is performed by lowering the displacer on the measurement wire down into the liquid. It will be partly immersed because the displacer has a greater density than the liquid. In accordance with Archimedes' principle, the weight of the displacer will diminish by the weight of displaced product. The weight of the displacer less the weight of displaced product — the apparent weight — then serves as unit of measurement to determine the displacer position, and measure the level of the liquid.

A highly accurate and advanced force transducer continuously measures the apparent weight of the displacer. That apparent weight can be simply programmed by software settings. In the equilibrium state,



the weight of the partly immersed displacer will be in balance with the programmed weight as measured by the force transducer.

When the storage tank is emptied, as the liquid level starts to fall, the upward force on the displacer will decrease. The force transducer will actuate the servo controller so the measuring drum unwinds, allowing the displacer to descend until it again becomes partly immersed in the liquid and its apparent weight corresponds to the programmed weight.

Measuring Interface Levels

Besides measuring the liquid level, Honeywell Enraf's 854 XTG and 854 ATG gauges can also be used for measuring the interface level between two liquids. For this purpose, the servo motor, actuated by an interface command, lowers the displacer to the point where its apparent weight corresponds to the programmed interface setpoint of the second liquid. This functionality is particularly useful to determine the sediment level or the interface level between water and tank liquid or between two liquids.

Intelligent Software

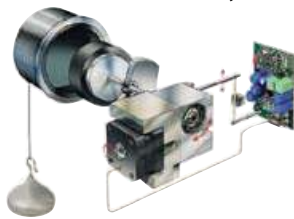
Honeywell Enraf servo gauges are fully microprocessor controlled tank level gauges. All instrument functions are driven by means of intelligent software, which filters out possible imperfections thereby optimizing measurement accuracy.

In addition, the software compensates for hydrostatic deformation of the tank. This method, without a standpipe, ensures an extremely high degree of accuracy.



Simple Installation and Fast Startup

Honeywell Enraf servo gauging systems are designed for easy installation. Electrical cabling and mechanical installation are quick and simple to perform. The systems are attached by a 2" mounting flange.

In order to simplify the startup, calibration and servicing procedures as much as possible, the portable Honeywell Enraf terminal can be interfaced with an optical infrared port. This device enables these jobs to be performed quickly, while bypassing the central system.



Comparing Honeywell Enraf Servo Gauges

		
Description	Servo Gauge 854 ATG As tank gauging has evolved, the series 854 ATG servo level gauge has become an industrial standard all over the world. Very reliable, versatile and accurate automatic tank gauge with a minimum of moving parts, meeting all international standards, regulations and recommendations.	Servo gauge 854 XTG Honeywell Enraf offers the 854XTGH servo gauge as a superior alternative to mechanical float and tape gauges or other low-cost level measuring devices. The 854XTG servo gauge offers the proven accuracies and performances of the 854 ATG, without the local display.
Measuring Range	Standard: 0–88 ft (0–27 m); Optional: 0–121 ft (37 m), 0–115 ft (0–35 m) with measuring wire up to 492 ft (150 m)	
Accuracy	Level: ±0.016" (4 mm) Density: ± 0.19 Lb/Ft ³ (3 Kg/m ³) Interface: ±0.08" (2 mm) Temperature: ±0.18° F (0.1° C) Sensitivity/Repeatability: ±0.004" (0.1 mm)	Level: ±0.04" (1 mm) Density: ± 0.31 Lb/Ft ³ (5 Kg/m ³) Interface: ±0.08" (2 mm) Temperature: ±0.18° F (0.1° C) Sensitivity/Repeatability: ±0.004" (0.1 mm)
Wave Integration	Programmable, three setpoints, between 0.5 s and 10 s	
Operating Pressure	M/C versions: Up to 90 PSI (6 bar) H version: Up to 600 PSI (40 bar) in accordance to PED	Up to 90 PSI (6 bar)
Ambient Temperature	-40° to 149° F (-40° to 65° C)	
Protection Class	NEMA 4/IP65 according to EN 60529	
Safety Rating	FM: Class I, Div 1, Groups B-D in accordance to ANSI/NFPA 70 ATEX: II 1/2 G EEx d IIB T6, EEx de IIB T6, EEx d [ia/ib] IIB T6 or EEx de [ia/ib] IIB T6	FM: Class I, Div 1, Groups B-D in accordance to ANSI/NFPA 70 ATEX: II 1/2 G EEx d IIB T6, or EEx d [ia/ib] IIB T6
Materials	Housing: Chromitized-finish cast aluminum Drum Compartment: M Version: Cast aluminum; C/H Versions: Stainless steel; Magnet Cap: Stainless steel O-Rings: Drum cover Silicone FEP or NBR 70	Housing: Chromitized-finish cast aluminum Measuring Drum/Shaft: Stainless steel O-Rings: Drum cover Silicone FEP or NBR 70
Power Supply	110/130/220 V (+10% to -20%) and 230 V (±15%), optional 65 V (+10% to -20%), also suitable for 240 V (+10% to -20%) Frequency Variation: 50/60 Hz (+10%); Power Ratings: 25 VA, I _{max} =2A	
Communications	Infrared transmission to portable Enraf terminal (PET), serial, ASCII coded, Bio-Phase Mark (BPM) modulated; Standard Enraf fieldbus (GPU) protocol; Two-wire twisted pair cabling, >1500V isolating voltage; Lightning protection via isolating transformers; >150 dB common mode rejection	
Options	Two SPDT 3-Amp alarm relay outputs; Density measurement; 4-20 mA level output (accuracy to ±0.1% full scale); Input boards for spot RTD, VITO probes for average temperature and/or water measurement, HART® devices (e.g., transmitters); Modbus RS-232 or RS-485 data transmission	

SmartRadar FlexLine for Precision Tank Gauging

The ever increasing requirements on tank gauging systems are placing a premium on flexibility, expandability and quality. Quick installation, seamless communication, reliable measuring under all conditions, trouble-free service and operation are concepts that are now being taken for granted. But how often does one tank level measuring system satisfy these requirements effectively and combine security, reliability and unprecedented levels of accuracy?

Honeywell Enraf's SmartRadar FlexLine tank gauging system successfully addresses all these requirements and guarantees cost control, smooth operation, environmental management and security.

SmartRadar FlexLine is a complete set of products and accessories for tank gauging that use cutting-edge radar and state-of-the-art signal processing technologies. Advanced digital signal processing technology, optimum connectivity and compact planar antennae make the SmartRadar FlexLine series the ultimate measuring system for tank gauging and custody transfer applications. It's an ideal solution for stock management and administration, customs transfer, quality control, processing and operation.

The SmartRadar FlexLine measuring system is airtight, and the integrated display is intrinsically safe. All basic functions are instantly available through the flip-top display. The display can show basic parameters and 24-hour trends. In addition to the standard display, an extra display can easily be connected to the SmartRadar FlexLine.

SmartRadar FlexLine tank gauging systems come in three versions: FlexLine XP for the strictest custody transfer requirements, FlexLine HP for standard custody transfer and FlexLine AP for transit and intermediate storage tanks.



Complete digital signal processing technology

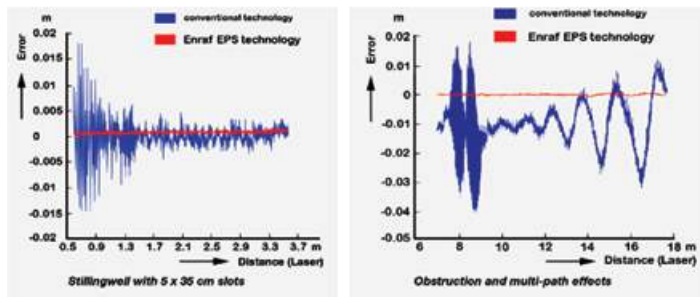
The SmartRadar FlexLine measuring system uses digital signal processing technology that eliminates the need for regular verification and calibration required by analog components.

Digital signal processing ensures that the highest levels of measuring quality and accuracy are attained from the date of installation, and maintained over long periods even under extreme conditions.

SmartRadar FlexLine's digital signal processing technology also offers advanced diagnostics, including storage of vital component trend information. Diagnostics take place at parameter level, and the electronics are continually monitored at component level. The diagnostic monitoring functions support a proactive maintenance strategy and contribute to a further simplification of remote service.

Enhanced signal processing capabilities

Honeywell Enraf's latest Enhanced Performance Signal (EPS) Processing makes it possible, even under the most difficult circumstances, to measure the level with extreme precision.



Enhanced functions include correction of the amplification factor, automatic amplification monitoring, zone-identification and ullage-correction. So, not only can the FlexLine be installed close to the tank wall, but objects and other elements that cause disturbances (like sealants) do not influence signal processing quality. Even a deviation in the diameter of the still-pipe length or clogging is compensated by EPS technology.

Maximizing tank measurement area

Traditional tank gauging systems require a minimum innage of 30 to 50 cm (12" to 20") for accurate measurement. The SmartRadar FlexLine possesses an accuracy down to levels of just 10 cm (4"). This high degree of accuracy also applies to measuring level in close proximity to the radar antenna. Traditional systems require ullage of 0.5 to 1 m (20" to 40"), SmartRadar FlexLine requires only 30 cm (12").

Open Communication

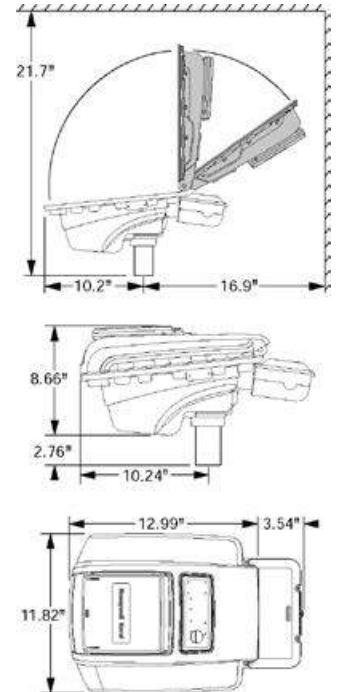
SmartRadar FlexLine systems are equipped with a broad set of communications protocols, including Honeywell Enraf's field-proven Bi-Phase Mark (BPM) communications, the de facto standard for field communication in tank terminals.

A comprehensive array of input/output (I/O) options also includes SPDT alarm outputs. Field equipment, like pressure transmitters, HART instrumentation and VITO probes for temperature or spot measuring can be easily connected to the SmartRadar FlexLine.

Antennae for every field of application

In order to satisfy every application, the SmartRadar FlexLine series offers a wide range of antennae including traditional horn and rod antennae and flat or planar antennae for long term stability and excellent measuring performances.

The practical advantages of these multi-feeder antennae are their small size, the perfect control of the microwave indicator and the measurement of the antenna contamination. The ability to automatically recognize



Honeywell Enraf

Three SmartRadar FlexLine Models to Fit Your Application

SmartRadar FlexLine XP: Weights and Measures-Approved for Custody Transfer

With an accuracy of ± 0.4 mm (± 0.016 "), the FlexLine Xtreme Performance is the top of the range. FlexLine XL complies with all essential standards for tank level measurements, including API, ISO, OIML and NMI. The XL tank gauging system, with a measuring range up to 75 m (246 ft), lends itself to Weights-and-Measures regulated customs transfer.

antenna contamination is essential toward trusting the maximum reliability of the measuring equipment at all times.

The antennae are further enhanced by the absence of mechanical alignment equipment, standard on parabola or horn antennae. The result is a reflection signal that ensures a higher degree of accuracy.

Planar antennae can be used on tanks for level measuring free space or measuring on still pipes. A special hinged antenna allows assembly through a 6" opening, so you can measure close to the tank wall without losing reliability and accuracy. Honeywell Enraf's tank separator enables easy installation of all antennae.

SmartRadar components and accessories also include antennae for applications in open spaces, still pipes and in areas of high pressure and high temperatures.

Antenna Types

Free space antennae: Planar free space antennae can be mounted on a roof nozzle or manhole for most applications.

Still pipe antennae: For stilling well applications. Performs reliably, even on rusty and contaminated stilling wells. No cone adapters needed.

Free space wide array linear planar (WALP) antennae: For applications where the antenna position is close to the tank shell. The hinged construction of the T06 enables mounting through a standard 6" nozzle.

Measuring Range: 131 feet (40 m)

Temperature Range: -40° to 212° F (-40° to 100° C)

Operating Pressure: To 87 PSI (6 Bar)

Wetted Parts: AISI 316 stainless steel and FEP

High temperature antennae: For free space applications at high temperatures and aggressive chemical elements.

Measuring Range: 59 feet (18 m)

Temperature Range: -40° to 446° F (-40° to 230° C)

Operating Pressure: To 87 PSI (6 Bar)

Wetted Parts: AISI 316 stainless steel, and reinforced TFM

High pressure cone antennae: For use in spheres and bullet tanks at high pressures. The reference pin function allows safe verification without opening the tank. The tank separation provides an approved and safe process seal. A 1" or 4" optional full bore ball valve can also be included.

Measuring Range: 131 feet (40 m)

Temperature Range: -330° to 482° F (-200° to 250° C)

Operating Pressure: To 580 PSI (40 Bar)

Wetted Parts: AISI 316 stainless steel, PTFE, and CF8M for optional ball valve

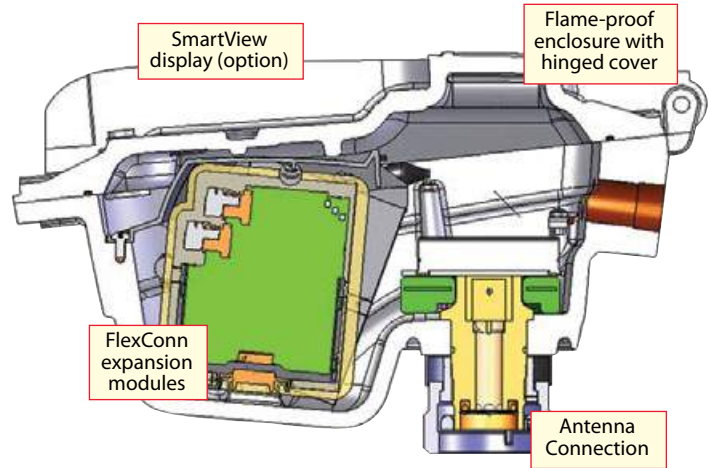


SmartRadar FlexLine HP: API-Compliant for Custody Transfer

SmartRadar FlexLine High Performance offers all the necessary functions for tank gauging in large bulk storage tanks. The accuracy of ± 1 mm (± 0.04 ") makes the FlexLine HP ideal for custody transfer. It has a measuring range of 75 m (246 ft) and satisfies all essential standards for tank level measuring, including API, ISO, and IML.

SmartRadar FlexLine AP: API-Compliant for Intermediate Storage

With an accuracy of ± 3 mm (± 0.12 "), the SmartRadar FlexLine Advanced Performance is the right choice for transit and shipment tanks. The AP system satisfies OIML R85 and API's recommended practices. Depending on the antenna type, the measuring range of the FlexLine AP is 75 m (246 ft).



Condensed Specifications

Measuring Range: Up to 75 m (246 ft); Resolution: 0.1 mm (0.001 ft)

Accuracy: FlexLine XP: ± 0.4 mm (0.016"); FlexLine HP: ± 1 mm (0.04"); FlexLine AP: ± 3 mm (0.12")

Measuring Method: FMCW Synthesized Pulse Reflectometer, X-band (9.538 GHz) R&TTE FCC compliant

Ambient Temperature: -40° to 149° F (-40° to 65° C)

Safety Approvals: ATEX, CD, IECEx, OIML, CB Scheme, FM, CSA, FCC, API, NMI, TÜV certified Overfill Protection

Explosion Proof: FM/CSA: Class I, Div 1, Groups C-D according to ANSI/NFPA 70; ATEX: II 1/2 G Ex d IIB T6 or Ex d [ia] IIB T6 or Ex de IIB t6 or Ex de [ia] IIB T6; IEC: EX ZONE 0/1, Ex d IIB T6 or Ex d [ia] IIB T6 or Ex de IIB t6 or Ex de [ia] IIB T6




Materials: IP66/IP67, NEMA 4X hard anodized aluminum alloy housing, NBR 70 O-rings and 3/4" NPT cable entries

Power Supply: Autoselect 65-240 VAC (+10% to -15%) 50/60 Hz, or 24-65 VDC (+10% to -15%), Rated 15W max typical (23W with options)

Expansion Modules: Five module slots available. Interfaces for VITO temperature/water sensor, HART communications, HART communications with density calculation, and SPDT alarm contact outputs



Honeywell Enraf SmartRadar for Storage Tank Measurement

			
	SmartRadar 970 ATi High precision radar for custody transfer tank level gauging under Weights & Measures regulations	SmartRadar 971 LTi Advanced radar for tank level gauging with custody transfer accuracy	SmartRadar 973 LT For radar tank gauging in intermediate liquid storage applications
Accuracy	±0.016" (±0.4 mm)	±0.04" (±1 mm)	±0.12" (±3 mm)
Signal Processing	Advanced digital signal processing (ADSP)	Advanced digital signal processing (ADSP)	Digital signal processing (DSP)
Output	Standard Modbus or GPU via RS-232C or RS-485, 4-20 mA with HART protocol, (accuracy of analog level signal 0.1% full scale), Foundation Fieldbus	Standard Modbus via RS-232C or RS-485, 4-20 mA with HART protocol, (accuracy of analog level signal 0.1% full scale)	RS-232C or RS-485 for indoor use or radio modem connection, 4-20 mA with HART protocol, (accuracy of analog level signal 0.1% full scale)
Input	VITO probes for average temperature, HART devices (e.g., pressure transmitters)	VITO probes for average temperature or water bottom measurement, HART devices	—
Range	0-131 ft (0-40 m)		
Resolution	0.004" (0.1 mm)		
Measuring Principle	FMCW synthesized pulse radar, 9.25 GHz to 10.75 GHz (X-band)		
Ambient Temperature	-40° to 140° F (-40° to 60° C)		
Approvals	FM/CSA: Explosion proof Class I, Div 1, Groups B-D (per ANSI/NFPA 70); ATEX explosion proof also available.		
Construction	Chromatized, polyurethane-coated aluminum alloy housing, rated NEMA 4/IP67. FPM (Viton) wetted O-rings, Buna-N non-wetted O-rings, three 3/4" NPT cable entries		
Power Supply	110- 240 VAC 45/65 Hz or 24-64 VDC; Autoselect -20% to +10%		
Power Rating	Basic 10 VA, 25 VA max with options		
Lightning Protection	Full galvanic isolation		
Communication	Serial ASCII coded, BiPhase Mark modulated (BPM) standard Enraf fieldbus (GPU protocol)		
Alarm Relay Output	Two SPDT, galvanically isolated		
Infrared Connector	Serial communication with Portable Enraf Terminal (PET)		



Compatible Antenna Types

Planar free space antennae: Can be mounted on a roof nozzle or manhole for most applications.

Still pipe antennae: For stilling well applications. Performs reliably, even on rusty and contaminated stilling wells. No cone adapters needed.

Free space wide array linear planar (WALP) antennae: For applications where the antenna position is close to the tank shell. The hinged construction of the T06 enables mounting through a standard 6" nozzle.

Measuring Range: 131 feet (40 m)

Temperature Range: -40° to 212° F (-40° to 100° C)

Operating Pressure: To 87 PSI (6 Bar)

Wetted Parts: AISI 316 stainless steel and FEP

High temperature antennae: For free space applications at high temperatures and aggressive chemical elements.

Measuring Range: 59 feet (18 m)

Temperature Range: -40° to 446° F (-40° to 230° C)

Operating Pressure: To 87 PSI (6 Bar)

Wetted Parts: AISI 316 stainless steel, reinforced TFM

High pressure cone antennae: For use in spheres and bullet tanks at high pressures. The reference pin function allows safe verification without opening the tank. A 1" or 4" full bore ball valve can also be included.

Measuring Range: 131 feet (40 m)

Temperature Range: -330° to 482° F (-200° to 250° C)

Operating Pressure: To 580 PSI (40 Bar)

Wetted Parts: AISI 316 stainless steel, PTFE, and CF8M for optional ball valve