

Radar level measurement

solutions



SIEMENS

Global network of innovation

SITRANS LR 200

This 2-wire, loop-powered radar instrument is designed for liquid storage applications in the chemical, hydrocarbon processing and pharmaceutical industries. It offers high performance at a competitive price. Its many features make it the easiest instrument of its kind to install and operate.

- 2-wire loop-powered radar offers low-cost installation
- Low frequency of 5.8 GHz (6.3 in North America) offers high immunity against condensation or deposits, making it ideal for liquid storage applications
- Easy to install and set up using as few as two parameters, and no echo profile needed
- Program without opening the lid, even in hazardous areas, using patented infrared Intrinsically Safe hand-held programmer
- Built-in alphanumeric display with support in four languages
- Rotating head lines up with conduit for easy wiring, adjusts for best visibility
- Very high signal-to-noise ratio, comparable to 4-wire devices
- Special Uni-Construction polypropylene rod antenna has integrated threaded connection and is hermetically sealed for superior chemical resistance; only one material to consider for chemical compatibility
- The internal integrated shield eliminates vessel nozzle interference; shield available in lengths of 100 mm and 250 mm
- Flange adaptor version offers modular fit with other process connections and antenna options
- Easy to program and diagnose with SIMATIC® PDM configuration software
- Built-in HART® communications



The built-in alphanumeric display is standard and is easy to read even down to -30 °C (-22 °F).



SITRANS LR 200 is ideal for chemical storage applications.

The patented infrared Intrinsically Safe hand-held programmer lets you program any of the Radar devices even in hazardous areas, without opening the cover.




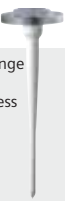

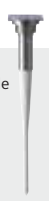



SITRANS LR 300

This high performance 4-wire radar instrument is designed specifically for process control applications. With a frequency of 5.8 GHz (6.3 in USA), very fast response times, and advanced echo processing, it is ideal for process vessels and reactor applications with agitated surfaces, internal obstructions and dynamic material level changes.

- Low frequency is ideal for turbulent or agitated surfaces, and offers low sensitivity to heavy condensation and other deposits
- Compact, rugged, and easy to install and maintain
- Easy to set up with as few as three parameters
- No need to fill or empty the vessel for calibration
- High resistance PTFE rod antenna is chemically immune and resistant to material build-up
- High signal-to-noise ratio for superior performance in dynamic or turbulent conditions
- 32-point linearization (strapping table) ensures accuracy on non-standard tanks
- Modbus® and HART communications built in, optional PROFIBUS PA
- Choice of epoxy-painted aluminum or stainless steel enclosure
- Modular design for maximum application flexibility features full line of process connections, horns and waveguide antenna options to suit any tank or application
- Patented universal ac/dc power supply simplifies power requirements and is immune to spikes, surges, and brownouts
- Standard and explosion proof versions
- Lloyd's Register of Shipping approved



Antenna configurations

SITRANS LR 200 and SITRANS LR 300 radar antenna configurations							
 <p>SITRANS LR 200</p>							
Antenna version	Flat faced flange with rod and integral process seal	Threaded rod for vessels without a nozzle	Shielded rod eliminates nozzle interference	Sanitary rod (1-piece construction) for food and pharmaceutical applications	Horn (4", 6", 8" sizes available) for high temperature isolation, long nozzles	Waveguide for low dielectric products	
Process connection types	Nominal pipe sizes 50, 80, 100, 150 mm (2, 3, 4, 6")	1½" and 2" sizes, NPT, BSP, G,	• 2" threaded NPT, BSP, G, • Flat-face flange nominal pipe sizes 80, 100 mm (3", 4")	Sanitary tri-clamp 2", 3", 4" sizes	Flat-face flanges ANSI, DIN, JIS	Flat-face flanges ANSI, DIN, JIS	
Wetted parts †	PTFE	• PTFE • 316 stainless steel • FKM O-ring	• PTFE • 316 stainless steel • FKM O-ring	• UHMW-PE or • PTFE	• 316 stainless steel • PTFE • FKM O-ring	• FKM O-ring • PTFE • 316 stainless steel	
Insertion length (max.)	41 cm (16.3")	41 cm (16.3")	Variable	41 cm (16.3")	Variable	Variable up to 3 m (9.8 ft.)	
Extensions / options	50 or 100 mm (2 or 4") PTFE	50 or 100 mm (2 or 4") PTFE	100, 150, 200 or 250 mm (4, 6, 8 or 10") standard shield length, or longer by request	N/A	Variable waveguide extensions Options: • Sliding waveguide for digester applications • Purging	Two sections (max.) can be connected together	

Special configurations for particular applications are designed and made on request

* Maximum pressure 0.5 bar at 60 °C.

† Alternative materials are available upon request by special order, consult your local Siemens Milltronics representative.

SITRANS LR 400

This radar instrument has the high power, high frequency (24 GHz) and high performance needed for reliable long-range measurement on dusty solids such as fly-ash, cement and plastic powders, as well as on low dielectric liquids such as solvents, petrochemicals, oils, or liquefied petroleum gas (LPG). The high frequency design allows use of a smaller antenna, and offers narrow beam angle and optimum reflection properties on solids.

- 4-wire FMCW (Frequency Modulated Continuous Wave) radar instrument for high power and long range
 - High frequency (24 GHz) signal delivers outstanding performance on low dielectric liquids and dusty solids
 - Narrow beam angle offers mounting flexibility and allows smaller antennas
 - Self-calibration reference system ensures long term repeatability
 - Intrinsically Safe hand-held infrared programmer
 - Program locally or remotely with SIMATIC PDM or HART hand-held devices
 - Communications via 4-20 mA HART (standard) or optional PROFIBUS PA
 - Robust housing, flange and horn antenna
- Standard and explosion-proof models available
 - Optional Easy Aimer for highly sloped surfaces and purging system for sticky solids
 - Installation is simple and usually without interruption to the process
 - Auto-Setup makes start-up easy with its menu-driven steps
 - Modular design with removable threaded collar connection allows for servicing or turning of the enclosure without opening the process vessel



An option available for the SITRANS LR 400 is the Easy Aimer LR, a mounting mechanism that swivels to position the radar instrument at the optimum angle when measuring materials like plastic pellets, powders and other bulk solids that have a high angle of repose. Adjustment to 30° is possible.



Easy programming with SIMATIC PDM

Siemens radar instruments can easily be programmed with SIMATIC Process Device Manager (PDM), the ideal software tool for configuration, parameter setting, record keeping and diagnostics, including trending and echo profiles. PDM offers communications via HART, PROFIBUS and other protocols.

Siemens gives you radar choices

Radar technology offers important advantages for level measurement. Non-contacting technology is low maintenance, making radar a cost-effective choice over TDR, or other contacting devices. Because microwaves require no carrier medium, they are virtually unaffected by the process atmosphere (vapor, pressure, dust or temperature extremes). Siemens offers you a choice of models to meet the specific needs of your application.



SITRANS LR 200

- Cost-effective 2-wire 5.8 GHz pulse radar
- Bulk chemical storage vessels
- Tank farms
- Simple process vessels
- Liquid applications up to 20 m (66 ft.)

SITRANS LR 300

- 5.8 GHz pulse radar
- Chemical process or reactor tanks
- Processes with dynamic level changes
- Tanks with agitators, obstructions and heating coils
- Bitumen or liquid asphalt
- Liquids and slurries up to 20 m (66 ft.)

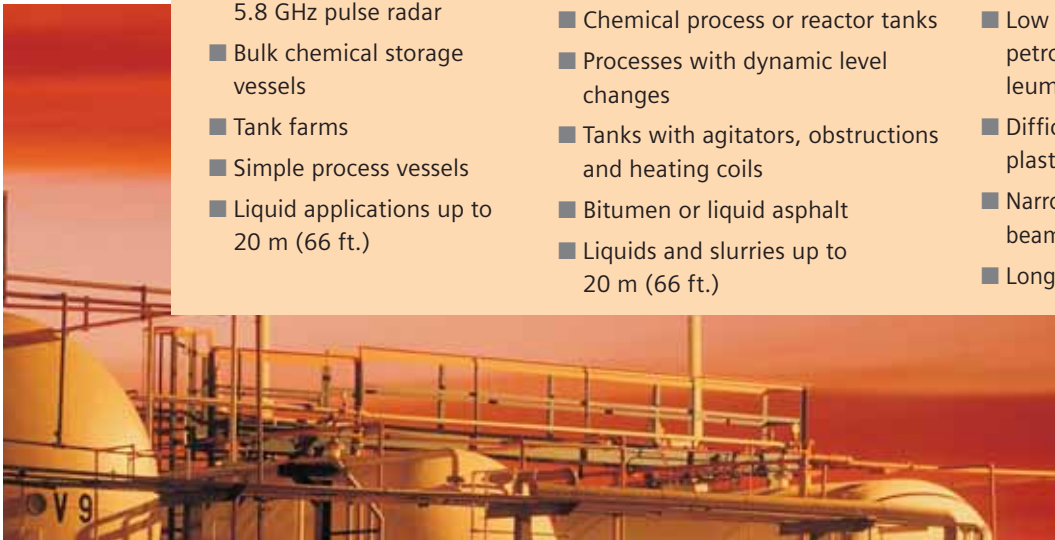
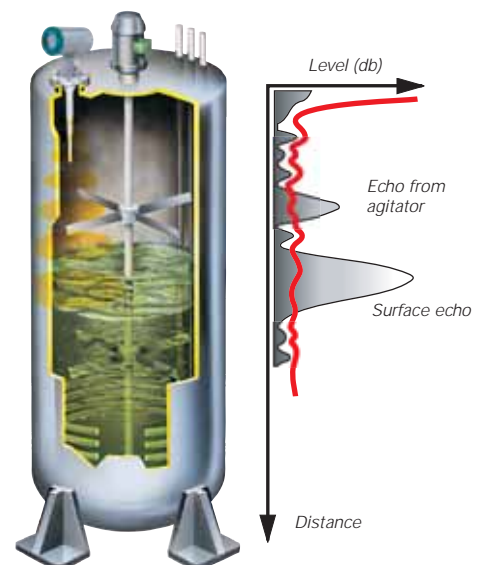
SITRANS LR 400

- 24 GHz FMCW radar
- Low dielectric liquids such as solvents, petrochemicals, oils or liquefied petroleum gas (LPG)
- Difficult dusty applications (such as plastic powders)
- Narrow vessels requiring the smaller beam angle
- Long ranges up to 45 m (147 ft.)

Advanced signal processing

SITRANS LR instruments offer the unique advantage of patented Sonic Intelligence® signal processing technology. This sophisticated software is supported by field data gained from more than 500,000 ultrasonic and radar level applications in many industries. This in-depth knowledge and experience is built into the software's advanced algorithms to provide intelligent processing of echo profiles. The result is repeatable, fast and reliable measurement you can trust.

A special feature of SITRANS radar devices is Auto False-Echo Suppression, an echo-processing technique that automatically detects and suppresses false echoes from vessel obstructions. You can implement this feature using just a few entries on the local interface or SIMATIC PDM.



Technical specifications

	SITRANS LR 200	SITRANS LR 300	SITRANS LR 400
Power	4 - 20 mA loop powered ■ Maximum 30 Vdc ■ 4 to 20 mA ■ Nominal 24 Vdc at max. 550 Ohm	Universal ac/dc power supply ■ 24-230 Vac, ±15%, 40-70 Hz, 28 VA (11W) or ■ 24-230 Vdc, ±15%, (9W)	■ 120-230 Vac, ±15%, 50-60Hz, 6W (12 VA) or ■ 24 Vdc, +25/-20%, 6W (optional)
Performance*			
Measurement range	20 m (66 ft.)	20 m (66 ft.)	45 m (147 ft.)
Accuracy	± the greater of: 0.1% of range, or 10 mm	± the greater of: 0.15% of range, or 15 mm	■ ±5 mm from 1 to 10 m (±0.2" from 6.5 to 33 ft.) ■ ±15 mm from 10 to 45 m (±0.6" from 33 to 147 ft.)
Repeatability	±5 mm	■ ±2 mm (range <3 m), ±3 mm (range <5 m), ■ ±5 mm (range <10 m), ±10 mm (range <20 m)	±1 mm
Frequency	5.8 GHz (6.3 GHz in North America)	5.8 GHz (6.3 GHz in USA)	24 GHz FMCW
Dielectric constant	ε _r >3 (for <3 use waveguide antenna or stillpipe)	ε _r >3 (for <3 use waveguide antenna or stillpipe)	ε _r >1.6
Interface			
Analog output	4-20 mA into 550 Ω max. @ 24 Vdc	Optically-isolated 4-20 mA into 450 Ω max.	Optically-isolated 4-20 mA into 600 Ω max.
Display (local)	Multi-segment alphanumeric liquid crystal with bar graph (representing level)	Multi-graphic liquid crystal for readout and entry	Alphanumeric liquid crystal for readout and entry
Communications	■ HART ■ Infrared hand-held programmer ■ SIMATIC PDM	■ HART ■ Modbus ■ PROFIBUS PA (optional) ■ Infrared hand-held programmer ■ SIMATIC PDM ■ RS-485	■ HART ■ PROFIBUS PA (optional) ■ Infrared hand-held programmer ■ SIMATIC PDM
Relay			Relay, NCC or NOC function, max. dc 50V, max. 200 mA, rating 5W
Mechanical			
Enclosure	■ Construction: aluminum, polyester powder-coated ■ Ingress protection: Type 4X / NEMA 4X, Type 6 / NEMA 6, IP67	■ Construction: aluminum, epoxy-coated, or optional 316 stainless steel ■ Ingress protection: Type 4X / NEMA 4X, Type 6, / NEMA 6, IP67	■ Construction: aluminum, polyester powder coated ■ Ingress protection: Type 4X / NEMA 4X, Type 6, / NEMA 6, IP67
Process connections	■ 1.5" NPT, BSP, or G (polypropylene) ■ Flanges ■ Sanitary ■ Configurations per chart inside	■ Flanges ■ Sanitary ■ Threaded ■ Configurations per chart inside	■ Flat faced flanges: stainless steel, 80, 100, 150 mm (3, 4, 6"), bolt hole pattern to ANSI, DIN and JIS sizes ■ Easy Aimer, ball swivel type, stainless steel ■ Other connections available
Antenna	■ Polypropylene rod: hermetically sealed construction. Standard: 100 mm (4") shield for maximum 100 mm (4") nozzle ■ Optional: 250 mm (10") long shield ■ Rod: PTFE ■ Other antenna types available (see chart inside) ■ Purge optional	■ Rod: PTFE ■ Other antenna types available (see chart inside) ■ Purge optional	■ 74 mm diameter horn antenna ■ 93 mm diameter horn antenna ■ Purge optional
Process conditions**			
Ambient temperature	-40 to 80 °C (-40 to 176 °F)	-40 to 60 °C (-40 to 140 °F)	-40 to 65 °C (-40 to 149 °F)
Process temperature	-40 to 80 °C (-40 to 176 °F) polypropylene version -40 to 200 °C (-40 to 392 °F) PTFE versions	-40 to 200 °C (-40 to 392 °F)	■ -40 to 200 °C (-40 to 392 °F) ■ -40 to 250 °C (-40 to 482 °F) (optional)
Pressure (vessel)	Up to 40 bar (600 psi) process connections type dependent	Up to 40 bar (600 psi) process connections type dependent	Up to 40 bar (600 psi) process connections type dependent
Approvals			
Safety	CE, CSA _{US/CA} , FM, ATEX	CE, CSA _{US/CA} , FM, ATEX	CE, CSA _{US/CA} , FM, ATEX
Radio	Industry Canada, FCC, R&TTE	Industry Canada, FCC, R&TTE	Industry Canada, FCC, R&TTE, BZT
Other	3A	Lloyd's Register, 3A	

* Reference conditions.

** For applications beyond these specifications, custom configured units are available, contact your local representative.

Specifications are subject to change without notice.

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Certification No. 002284