

SITRANS L Level instruments

Continuous measurement - Radar transmitters

SITRANS LR250

Overview



SITRANS LR250 is a 2-wire, 25 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including high temperature and pressure, to a range of 20 m (66 ft).

Benefits

- Graphical local user interface (LUI) makes operation simple with plug-and-play setup using the intuitive Quick Start Wizard
- LUI displays echo profiles for diagnostic support
- 25 GHz high frequency allows for small horn antennas for easy mounting in nozzles
- Insensitive to mounting location and obstructions, and less sensitive to nozzle interference
- Short blanking distance for improved minimum measuring range to 50 mm from the end of the horn
- Communication using HART® or PROFIBUS PA (pending)
- Process Intelligence signal processing for improved measurement reliability and Auto False-Echo Suppression of fixed obstructions
- Programming using infrared Intrinsically Safe handheld programmer or SIMATIC PDM

Application

SITRANS LR250 includes a graphical local user interface (LUI) that improves setup and operation by including an intuitive Quick Start Wizard, and echo profile displays for diagnostic support. Startup is easy using the Quick Start wizard with a few parameters required for basic operation.

The 25 GHz frequency creates a narrow, focused beam allowing for smaller horn options and decreasing sensitivity to obstructions.

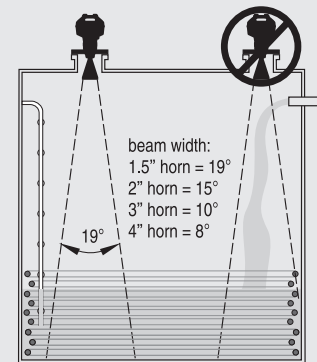
SITRANS LR250's unique design allows safe and simple programming using the Intrinsically Safe handheld programmer without having to open the instrument's lid.

SITRANS LR250 measures superbly on low dielectric media, and in small vessels, as well as tall and narrow vessels.

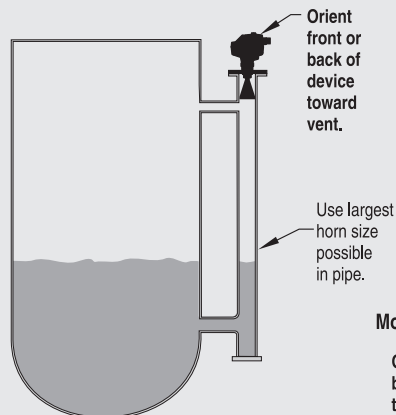
- Key Applications: liquid bulk storage tanks, process vessels with agitators, vaporous liquids, high temperatures, low dielectric media

Configuration

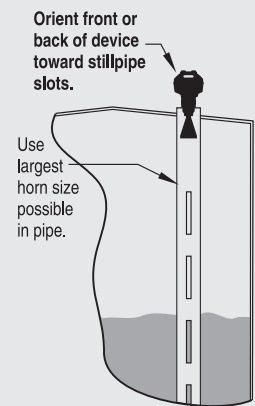
Installation



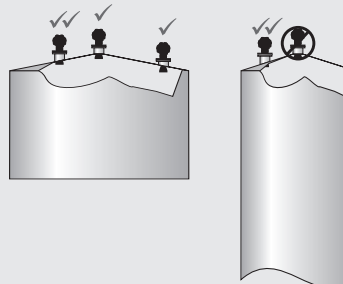
Mounting unit on bypass



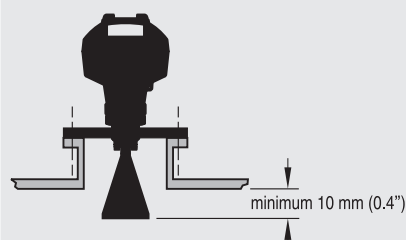
Mounting unit on stilling well



Mounting unit on vessel



Mounting on a nozzle



SITRANS LR250 installation

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Technical specifications

Mode of operation

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

Output

• Analog output	4 to 20 mA
• Accuracy	± 0.02 mA
• Communications	HART® Optional: PROFIBUS PA (Profile 3.0, Class B)
• Fail-safe	• Programmable as high, low or hold (Loss of Echo) • NE 43 programmable

Performance (according to reference conditions IEC60770-1)

• Maximum measured error	= 5 mm (0.2")
• Influence of ambient temperature	<0.003%/K

Rated operating conditions

Installation conditions

• Location	Indoor/outdoor
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Ambient conditions (enclosure)

• Ambient temperature	-40 to +80 °C (-40 to +176 °F)
• Installation category	I
• Pollution degree	4

Medium conditions

• Dielectric constant ϵ_r	$\epsilon_r > 1.6$, horn and application dependent
• Process temperature	-40 to 150 °C (-40 to +302 °F) (at process connection with FKM o-ring)
• Process pressure	Up to 40 bar g (580 psi g), process connection and temperature dependent. See derating curves for more information

Design

• Enclosure	
- Material	Aluminium, polyester powder-coated
- Cable inlet	2 x M20x1.5 or 2 x 1/2" NPT
• Degree of protection	Type 4X/NEMA 4X, Type 6/NEMA 6, IP67, IP68
• Weight	< 3 kg (6.6 lb) 3.75 mm (1 1/2") threaded connection with 1 1/2" horn antenna
• Display (local)	graphic local user interface including quick start wizard and echo profile display
• Antenna	
- Material	316 L stainless steel [optional alloy N06022/2.4602 (Hastelloy® C-22® or equivalent)]
- Dimensions (nominal horn sizes)	standard 1.5" (40 mm), 2" (48 mm), 3" (75 mm), 4" (95 mm) horn and optional 100 mm (4") horn extension

Process connections

• Process connection	1 1/2" or 2" NPT (ASME 1.20.1), BSPT (EN 10226-1), or G (BS EN ISO 228-1)
• Flange connection	2", 3", 4" (ANSI 150, 300 lb), 50, 80, 100 mm (PN 16, 40, JIS 10K)

Power supply

4 to 20 mA/HART	Nominal 24 V DC (max. 30 V DC) with max. 550 Ω
PROFIBUS PA	• 15.0 mA • per IEC 61158-2

Certificates and approvals

• General	CSA US/C, CE, FM, NE 21, C-Tick
• Radio	FCC, Industry Canada and Europe ETSI EN 302-372, C-Tick
• Hazardous	
- Intrinsically Safe (Europe)	ATEX II 1G EEx ia IIC T4 ATEX II 1D EEx tD A20 IP67 T90 °C
- Intrinsically Safe (USA/Canada)	FM/CSA (barrier required) Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III T4
- Intrinsically Safe (International)	IECEX SIR 05.0031X, Ex ia IIC T4, EX tD A20 IP67 T90 °C
- Non-incendive (USA/Canada)	FM/CSA Class I, Div. 2, Groups A, B, C, D T5

Programming

• Intrinsically Safe Siemens Milltronics handheld programmer	Infrared receiver
- Approvals for handheld programmer	IS model with ATEX II 1G EEx ia IIC T4, FM/CSA Class I, Div. 1, Groups A, B, C, D
• Handheld communicator	HART® 5
• PC	SIMATIC PDM
• Display (local)	graphic local user interface including quick start wizard and echo profile displays

HART is a registered trademark of the Hart Communications Foundation.
Hastelloy and C-22 are registered trademarks of Haynes International Inc.

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Selection and Ordering data	Order No.
SITRANS LR250	C) 7 ML 5 4 3 1 -
2-wire, 25 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including high temperature and pressure, to a range of 20 m (66 ft). Ideal for small vessels and low dielectric media.	
Process Connection and Antenna Material	
316L (1.4435 or 1.4404) stainless steel, PTFE emitter, FKM seal	0
316L (1.4435 or 1.4404) stainless steel, PTFE emitter, FFKM seal	1
Hastelloy C-22/2.4602, PTFE emitter, FKM seal ¹⁾	2
Hastelloy C-22/2.4602, PTFE emitter, FFKM seal ¹⁾	3
Process Connection Type	
1½" NPT (ANSI/ASME B1.20.1)	AA
1½" BSPT (EN 10226-1)	AB
1½" G (parallel thread) (EN ISO 228-1)	AC
2" NPT (ANSI/ASME B1.20.1)	AD
2" BSPT (EN 10226-1)	AE
2" G (parallel thread) (EN ISO 228-1)	AF
2" ASME, 150 lb	BA
3" ASME, 150 lb	BB
4" ASME, 150 lb	BC
2" ASME, 300 lb	CA
3" ASME, 300 lb	CB
4" ASME, 300 lb	CC
DN 50 PN16	DA
DN 80 PN16	DB
DN 100 PN16	DC
DN 50 PN40	EA
DN 80 PN40	EB
DN 100 PN40	EC
JIS 50A 10K	FA
JIS 80A 10K	FB
JIS 100A 10K	FC
(Note: Stainless steel flanges provided as flat faced; Hastelloy flanges provided as raised face. Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5, or EN 1092-1, or JIS B 2238 standard.)	
Communication/Output	
4 to 20 mA, HART	0
Enclosure/Cable inlet	
Aluminum, Epoxy painted	0
2 x ½" NPT	1
2 x M20x1.5	
Antenna	
1½" horn ²⁾	A
2" horn (fits 2" ASME or DN 50 nozzles)	B
3" horn (fits 3" ASME or DN 80 nozzles)	C
4" horn (fits 4" ASME or DN 100 nozzles)	D
1½" horn with 100 mm extension ²⁾	E
2" horn with 100 mm extension	F
3" horn with 100 mm extension	G
4" horn with 100 mm extension	H
(Note: Please use largest horn size possible.)	
Approvals	
General Purpose, CE, CSA, FM, FCC, R&TTE, C-Tick	A
CSA/FM Class I and II, Div. I, Groups A to G Intrinsically safe, barrier required, FCC, C-Tick	B
ATEX II 1 GD EEx ia IIC T4, Intrinsically safe, barrier required, R&TTE, C-Tick, INMETRO	C
CSA/FM Class I, Div. 2, Non-Incendive, no barrier required, FCC, C-Tick	D
Pressure rating	
Rating per pressure/temperature curves in Manual	0
0.5 bar (7.25 psi) maximum	1

Selection and Ordering data	Order No.
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2-wire, 25 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including high temperature and pressure, to a range of 20 m (66 ft). Ideal for small vessels and low dielectric media.	
Further designs	Order code
Please add "-Z" to Order No. and specify Order code(s).	
Acceptance test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and to ISO 9000	C11
Inspection Certificate Type 3.1 per EN 10204	C12
Stainless steel tag [69 mm x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 27 characters) specify in plain text	Y15
Instruction manual for HART/ma device	
English	C) 7ML1998-5JE01
German	C) 7ML1998-5JE31
Note: The instruction manual should be ordered as a separate line item on the order.	
Multi-language Quick start manual	C) 7ML1998-5QX81
This device is shipped with the Siemens Milltronics manual CD containing the complete instruction manual library.	
Accessories	
Handheld programmer, Intrinsically Safe, EEx ia (LUI enabled)	C) 7ML1930-1BK
HART modem/RS-232 (for use with a PC and SIMATIC PDM)	D) 7MF4997-1DA
One metallic cable gland M20x1.5, rated -40 °C (-40 °F) to +80 °C (+176 °F) ³⁾	7ML1930-1AP

- 1) Not available with Process connection options AA to AF
2) for 1½" threaded connection only, max. range 10 m (32.8 ft), dK >3.
3) for Enclosure/Cable Inlet option 1 (M20x1.5) only.

C) Subject to export regulations AL: N, ECCN: EAR99
D) Subject to export regulations AL: N, ECCN: EAR99H

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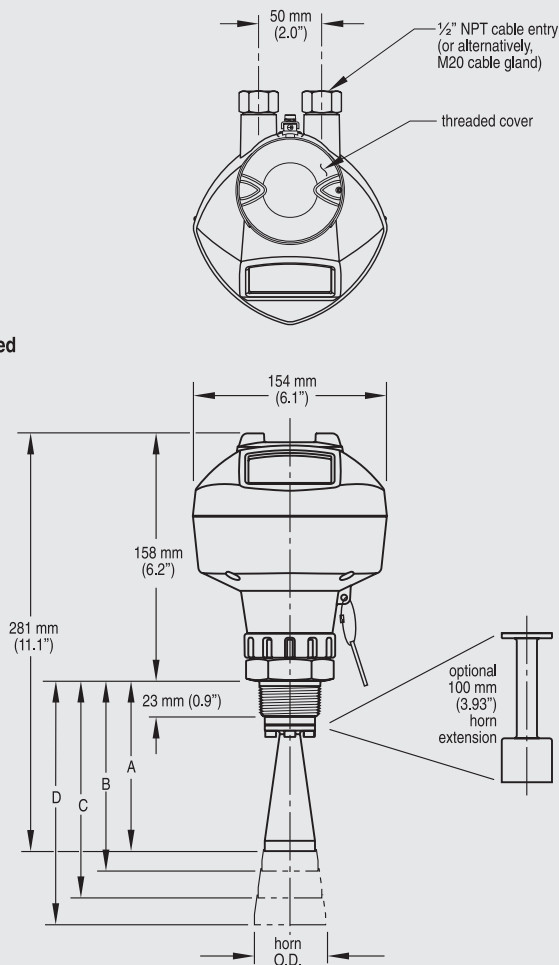
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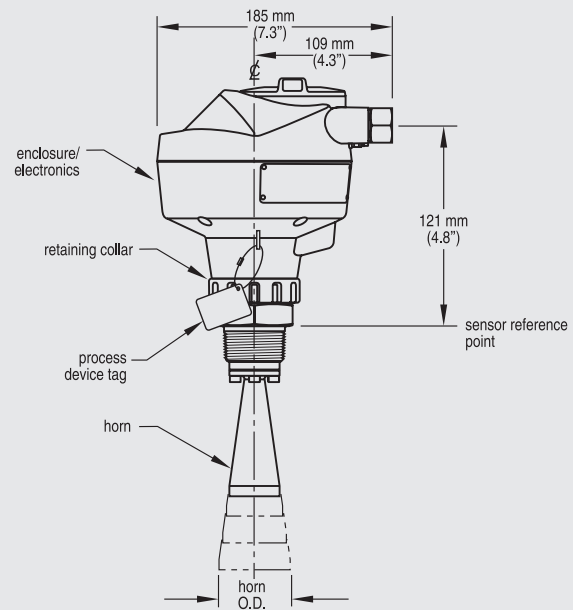
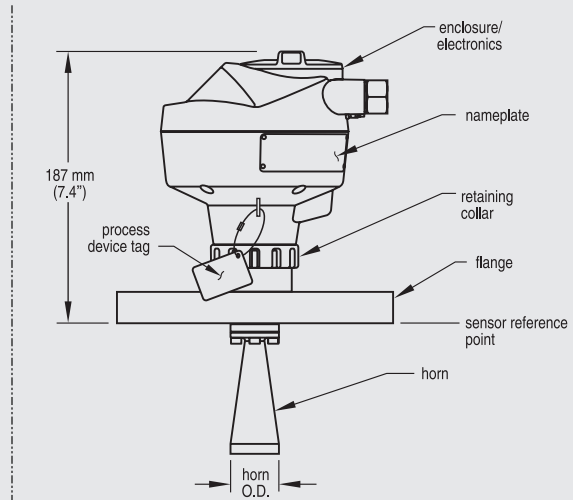
Dimensional drawings

SITRANS LR250

Threaded



Flanged



Nominal Horn Size	Horn O.D.	Horn Height		Beam Width	Measurement Range
40 mm (1.5")	39.8 mm (1.57")	A	100 mm (3.93")	19 degrees	10 m (32.8 ft)
50 mm (2")	47.8 mm (1.88")	B	131.5 mm (5.18")	15 degrees	20 m (65.6 ft)
80 mm (3")	74.8 mm (2.94")	C	164.5 mm (6.48")	10 degrees	20 m (65.6 ft)
100 mm (4")	94.8 mm (3.73")	D	219.5 mm (8.64")	8 degrees	20 m (65.6 ft)

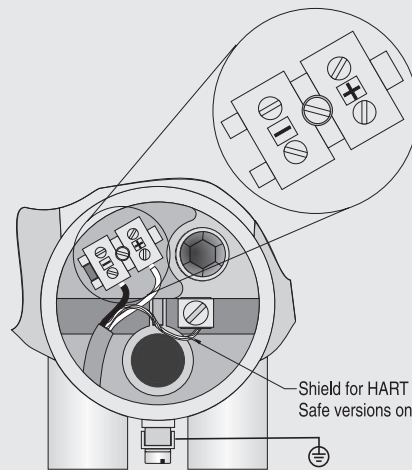
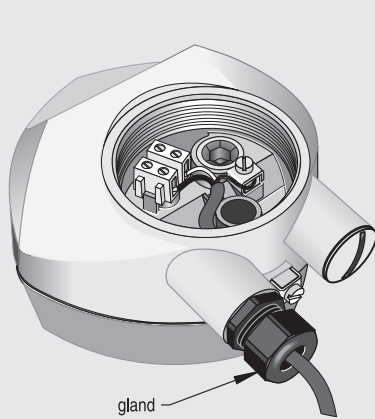
SITRANS LR250 dimensions

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Schematics



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

Notes:

1. DC terminal shall be supplied from a source providing electrical isolation between the input and output, to meet the applicable safety requirements of IEC 61010-1.
2. All field wiring must have insulation suitable for rated input voltages.
3. Use shielded twisted pair cable (14 to 22 AWG) for HART version.
4. Separate cables and conduit may be required to conform to standard instrumentation wiring practices or electrical codes.

Hand Programmer

SITRANS LR250 HART

Part number:
7ML1930-1BK



SITRANS LR250 connections