

## Level measurement

Continuous level measurement  
Radar level transmitters

### SITRANS LR250 Polypropylene Lens Antenna

#### Overview



SITRANS LR250 Polypropylene lens antenna is a 25 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including corrosive materials to a range of 20 m (65.6 ft).

#### Benefits

- For use in chemical environments where aggressive and corrosive materials are present.
- Graphical local user interface (LUI) makes operation simple with plug-and-play setup using the intuitive Quick Start Wizard
- LUI displays echo profiles for diagnostic support
- Communication using HART, PROFIBUS PA, or FOUNDATION Fieldbus
- Process Intelligence signal processing for improved measurement reliability and Auto False-Echo Suppression of fixed obstructions
- Programming using infrared, Intrinsically Safe, handheld programmer or over a network using SIMATIC PDM, Emerson AMS, or Field Device Tools such as PACTware or Fieldcare via SITRANS DTM
- 3 mm (0.118 inch) accuracy in accordance with IEC 60770-1

#### Application

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

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

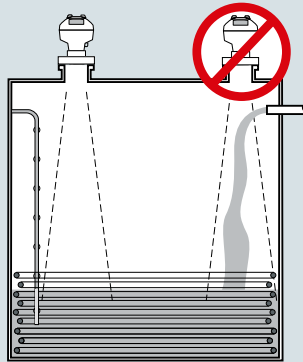
- Key Applications: liquid bulk storage tanks, process vessels with agitators, vaporous liquids, corrosive and aggressive materials.

**Configuration**

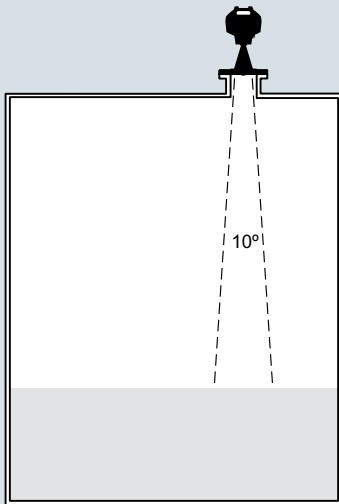
**Installation of SITRANS LR250 Level Probing Radar**

Note:

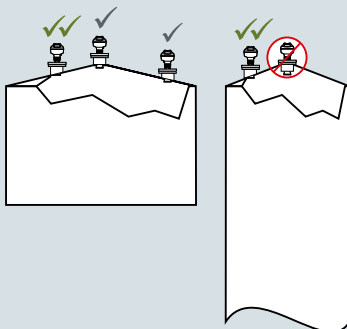
- Beam angle is the width of the cone where the energy density is half of the peak energy density.
- The peak energy density is directly in front of and in line with the antenna.
- There is a signal transmitted outside of the beam angle; therefore false targets may be detected.



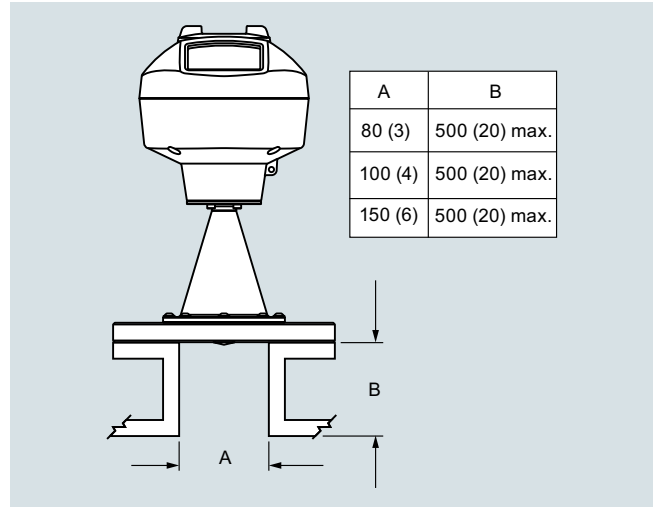
Polypropylene lens antenna



**Mounting on vessel**



SITRANS LR250 Polypropylene lens antenna installation



SITRANS LR250 Polypropylene lens antenna, mounting on a nozzle, dimensions in mm (inch)

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#### Technical specifications

<b>Mode of operation</b>		<b>Power supply</b>	
Measuring principle	Radar level measurement	4 ... 20 mA/HART	Nominal 24 V DC (max. 30 V DC) with max. 550 Ω
Frequency	K-band (25.0 GHz)	PROFIBUS PA	<ul style="list-style-type: none"> <li>• 15 mA</li> <li>• per IEC 61158-2</li> </ul>
Minimum measuring range	50 mm (2 inch) from end of antenna	FOUNDATION Fieldbus	<ul style="list-style-type: none"> <li>• 20.0 mA</li> <li>• per IEC 61158-2</li> </ul>
Maximum measuring range	20 m (66 ft)		
<b>Output</b>		<b>Certificates and approvals</b>	
HART	Version 5.1	General	CSA <sub>US/C</sub> , CE, FM, RCM
<ul style="list-style-type: none"> <li>• Analog output</li> <li>• Accuracy</li> <li>• Fail-safe</li> </ul>	4 ... 20 mA ± 0.02 mA <ul style="list-style-type: none"> <li>• Programmable as high, low or, hold (loss of echo)</li> <li>• NE 43 programmable</li> </ul>	Radio	FCC, Industry Canada, RED, RCM
PROFIBUS PA	Profile 3.1	Hazardous	
<ul style="list-style-type: none"> <li>• Function blocks</li> </ul>	2 Analog Input (AI)	<ul style="list-style-type: none"> <li>• Explosion Proof (Brazil)</li> <li>• Increased Safety (Brazil)</li> <li>• Intrinsically Safe (Brazil)</li> <li>• Explosion Proof (Canada/USA)</li> <li>• Intrinsically Safe (Canada/USA)</li> <li>• Non-incendive (Canada/USA)</li> <li>• Flame Proof/Increased Safety (China)</li> <li>• Intrinsically Safe (China)</li> <li>• Non-sparking (China)</li> <li>• Intrinsically Safe (Europe)</li> <li>• Non-sparking/Energy Limited (Europe)</li> <li>• Flame Proof (International/Europe)</li> </ul>	INMETRO Ex d ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da INMETRO Ex e ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da INMETRO Ex ia IIC T4 Ga, Ex ia ta IIIC T100 °C Da CSA/FM Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III T4 CSA/FM Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III T4 CSA/FM Class I, Div. 2, Groups A, B, C, D T5 Ex d ia mb IIC T4 Ga/Gb, Ex e ia mb IIC T4 Ga/Gb, Ex iaD 20 T90 IP67 DIP A20 T <sub>A</sub> 90 °C Ex ia IIC T4 Ga, Ex iaD 20 T90 IP67 DIP A20 T <sub>A</sub> 90 °C NEPSI Ex nA IIC T4 Gc ATEX II 1G Ex ia IIC T4 Ga, ATEX II 1D Ex ia ta IIC T100 °C Da ATEX II 3G Ex nA IIC T4 Gc
FOUNDATION Fieldbus	H1	<ul style="list-style-type: none"> <li>• Increased Safety (International/Europe)</li> <li>• Intrinsically Safe (International)</li> <li>• Explosion Proof (Russia/Kazakhstan)</li> <li>• Increased Safety (Russia/Kazakhstan)</li> <li>• Intrinsically Safe (Russia/Kazakhstan)</li> <li>• Marine</li> </ul>	IECEX/ATEX II ½ GD, 1D, 2D, Ex d mb ia IIC T4 Ga/Gb, Ex ia ta IIC T100 °C Da IECEX/ATEX II ½ GD, 1D, 2D, Ex e mb ia IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da IECEX/ATEX II 1 G Ex ia IIC T4 Ga, IECEX/ATEX II 1D Ex ia ta IIC T100 °C Da EAC Ex d EAC Ex e EAC Ex ia <ul style="list-style-type: none"> <li>• Lloyd's Register of Shipping</li> <li>• ABS Type Approval</li> <li>• Bureau Veritas</li> </ul>
<ul style="list-style-type: none"> <li>• Functionality</li> <li>• Version</li> <li>• Function blocks</li> </ul>	Basic or LAS ITK 5.2.0 2 Analog Input (AI)		
<b>Performance (according to reference conditions IEC 60770-1)</b>		<b>Programming</b>	
Maximum measured error	<ul style="list-style-type: none"> <li>• &gt; 500 mm from sensor reference point: 3 mm (0.118 inch)</li> <li>• &lt; 500 mm from sensor reference point: 25 mm (1 inch)</li> </ul>	Intrinsically Safe Siemens handheld programmer	Infrared receiver
Influence of ambient temperature	< 0.003 %/K	<ul style="list-style-type: none"> <li>• Approvals for handheld programmer</li> </ul>	IS model: ATEX II 1 GD Ex ia IIC T4 Ga, Ex ia D 20 T135 °C T <sub>a</sub> = -20 ... +50 °C, CSA/FM Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G, T6, T <sub>a</sub> = +50 °C, IECEX SIR 09.0073
<b>Rated operating conditions</b>		Handheld communicator	HART communicator 375/475
Installation conditions		PC	<ul style="list-style-type: none"> <li>• SIMATIC PDM</li> <li>• Emerson AMS</li> <li>• SITRANS DTM (for connection into FDT, such as PACTware or Fieldcare)</li> </ul>
<ul style="list-style-type: none"> <li>• Location</li> </ul>	Indoor/outdoor	Display (local)	Graphic local user interface including quick start wizard and echo profile displays.
Ambient conditions (enclosure)			
<ul style="list-style-type: none"> <li>• Ambient temperature</li> <li>• Storage temperature</li> <li>• Installation category</li> <li>• Pollution degree</li> </ul>	-40 ... +80 °C (-40 ... +176 °F) -40 ... +80 °C (-40 ... +176 °F) I 4		
<b>Medium conditions</b>			
Dielectric constant ε <sub>r</sub>	> 1.6		
Process temperature	-40 ... +80 °C (-40 ... +176 °F) at process connection		
Process pressure	Up to 5 bar g (72 psi g) temperature dependent.		
<b>Design</b>			
Enclosure			
<ul style="list-style-type: none"> <li>• Material</li> <li>• Cable inlet</li> </ul>	Aluminum, polyester powder-coated 2 x M20 x 1.5 or 2 x ½" NPT		
Degree of protection	Type 4X/NEMA 4X, Type 6/NEMA 6, IP67, IP68		
Weight	Polypropylene lens antenna with 3 inch (80 mm) polypropylene flange <ul style="list-style-type: none"> <li>• Approximately 3.4 kg (7.5 lb)</li> </ul>		
Display (local)	Graphic local user interface including quick start wizard and echo profile display		
Polypropylene lens antenna			
<ul style="list-style-type: none"> <li>• Materials</li> </ul>	<ul style="list-style-type: none"> <li>• Polyester powder coated exterior</li> <li>• 3 inch cast aluminum</li> <li>• Polypropylene lens</li> <li>• FKM seal</li> </ul>		
<ul style="list-style-type: none"> <li>• Process connections</li> <li>- Material</li> <li>- Dimensions</li> </ul>	Polypropylene Universal flange: 3 inch (80 mm), 4 inch (100 mm), 6 inch (150 mm)		



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### SITRANS LR250 Polypropylene Lens Antenna

#### Selection and ordering data

#### Article No.

#### Article No.

#### SITRANS LR250 Polypropylene Lens Antenna Specials

##### SITRANS LR250 threaded PVDF antenna version enclosures (PROFIBUS PA models)

SITRANS LR250 threaded PVDF antenna version enclosure with board stack, M20 cable inlet, approval option A, with PROFIBUS PA communication, no process connection

**A5E03588171**

SITRANS LR250 threaded PVDF antenna version enclosures (< 3.6 mA start-up HART models)

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

**A5E035869747**

SITRANS LR250 threaded PVDF antenna version enclosure with board stack, NPT cable inlet, approval option A, with PROFIBUS PA communication, no process connection

**A5E03588253**

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

**A5E03586807**

SITRANS LR250 threaded PVDF antenna version enclosure with board stack, NPT cable inlet, approval option B, with PROFIBUS PA communication, no process connection

**A5E03588512**

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

**A5E03586854**

SITRANS LR250 threaded PVDF antenna version enclosure with board stack, M20 cable inlet, approval option C, with PROFIBUS PA communication, no process connection

**A5E03589260**

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

**A5E03586887**

SITRANS LR250 threaded PVDF antenna version enclosure with board stack, NPT cable inlet, approval option D, with PROFIBUS PA communication, no process connection

**A5E03589262**

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

**A5E03586961**

SITRANS LR250 threaded PVDF antenna version enclosure with board stack, M20 cable inlet, approval option E, with PROFIBUS PA communication, no process connection

**A5E03589264**

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

**A5E03587012**

SITRANS LR250 threaded PVDF antenna version enclosures (FOUNDATION Fieldbus models)

**A5E03589264**

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

**A5E03587132**

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

**A5E03589266**

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

**A5E03587223**

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

**A5E03589275**

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

**A5E03588125**

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

**A5E03589277**

SITRANS LR250 threaded PVDF antenna kits

Antenna kit 2" NPT threaded PVDF

**A5E03528941**

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

**A5E03589280**

Antenna kit 2" R (BSPT) threaded PVDF

**A5E03528943**

Antenna kit 2" G (BSPP) threaded PVDF

**A5E03528947**

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

**A5E03589281**

Kit of hardware parts for LR250 threaded PVDF antenna: consists of O-rings, screws, wavewasher, and loctite

**A5E03528948**

Ex-proof plugs

Ex-proof plugs kit, 1/2" NPT, qty 5

**A5E039979991**

Ex-proof plugs kit, M20, qty 5

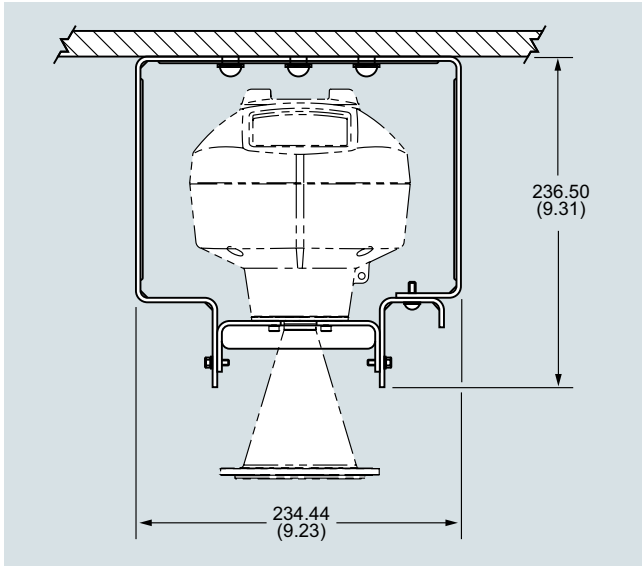
**A5E039979992**

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

**A5E03589283**

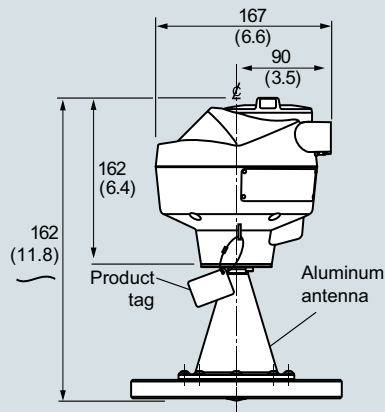
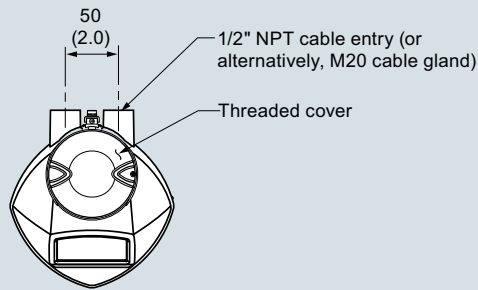
**SITRANS LR250 Polypropylene Lens Antenna**

**Options**



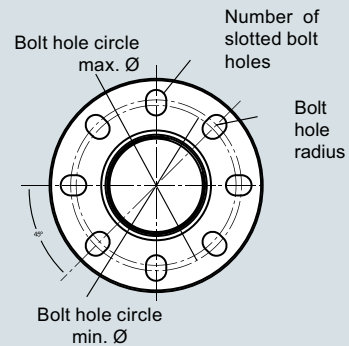
SITRANS LR250 Polypropylene lens antenna, wall/ceiling mount

**Dimensional drawings**



**Polypropylene Flange**

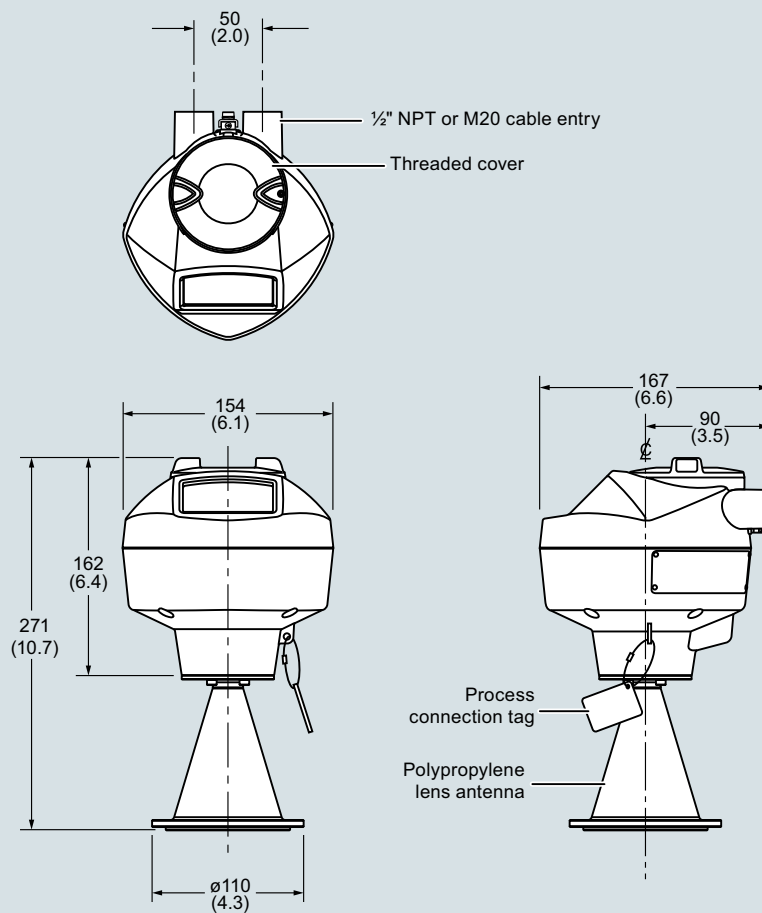
Nominal pipe size	OD ± 1	B.C.D. max. for slotted holes (bmax.) ± 0.75	B.C.D. min. for slotted holes (bmin.) ± 0.75	Bolt hole radius ± 0.25	Number of slotted holes
3	200	160	150	R 9.5	8
4	229	191	175	R 9.5	8
6	285	242	240	R 11.5	8



SITRANS LR250 Polypropylene lens antenna, dimensions in mm (inch)

**Level measurement**

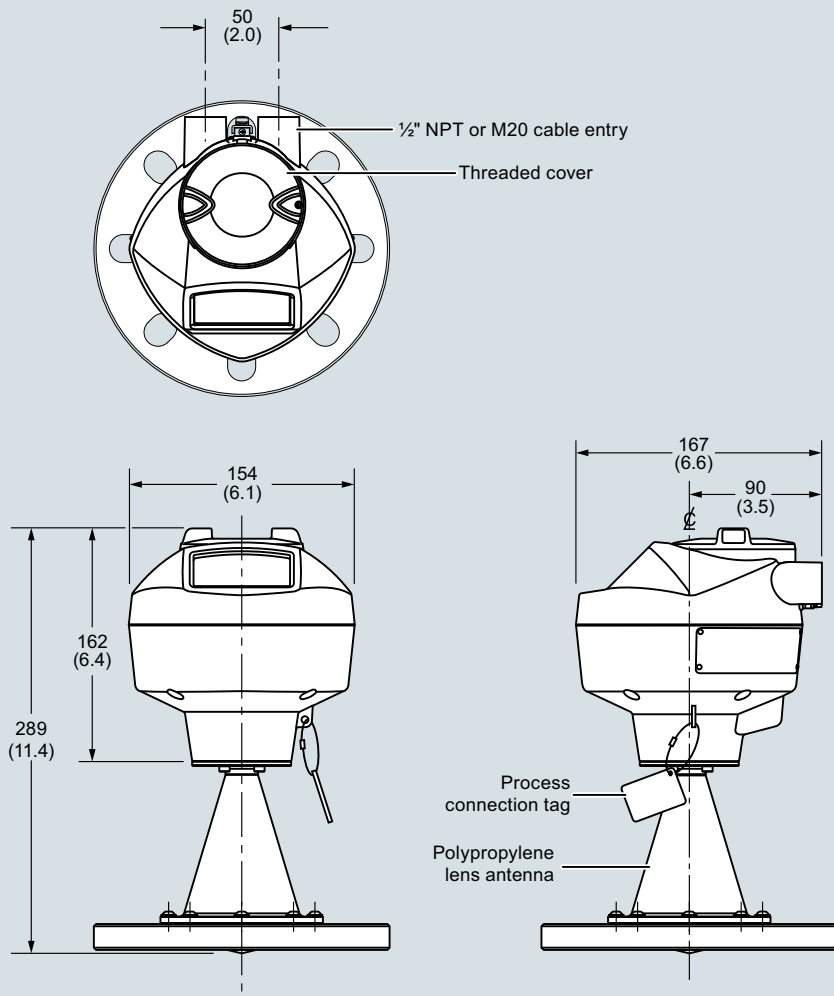
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**SITRANS LR250 Polypropylene Lens Antenna****Dimensional drawings** (continued)

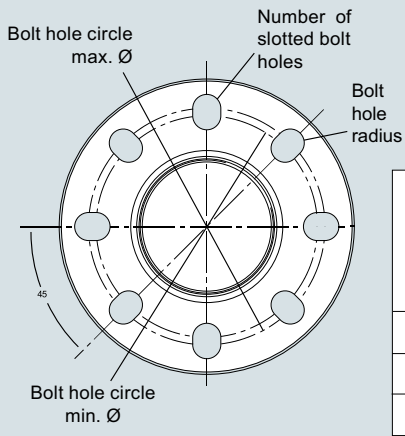
SITRANS LR250 Polypropylene lens antenna, dimensions in mm (inch)

**SITRANS LR250 Polypropylene Lens Antenna**

**Dimensional drawings** (continued)



**Universal polymeric flange**



Nominal pipe size	OD ± 1	B.C.D. max. for slotted holes (bmax.) ± 0.75	B.C.D. min. for slotted holes (bmin.) ± 0.75	Bolt hole radius ± 0.25	# of slotted holes
3 (80)	7.87 (200)	6.30 (160)	5.91 (150)	0.37 (9.5)	8
4 (100)	9.00 (229)	17.52 (191)	6.89 (175)	0.37 (9.5)	8
6 (150)	11.22 (285)	9.53 (242)	9.45 (140)	0.45 (11.5)	8

SITRANS LR250 Polypropylene lens antenna with universal polymeric flange, dimensions in mm (inch)



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### SITRANS LR250 Polypropylene Lens Antenna

#### Circuit diagrams

4

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

Gland may or may not be provided depending on approval option.

Shield for HART, PROFIBUS PA, and FOUNDATION Fieldbus Intrinsically Safe versions only.

**Hand Programmer**

SIEMENS			
1	2	3	4
5	6	7	8
9	0	.	+/−
C	⏪	⏩	⏴
←	↑	↓	→

Part number:  
7ML1930-1BK

**Notes:**

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

SITRANS LR250 connections