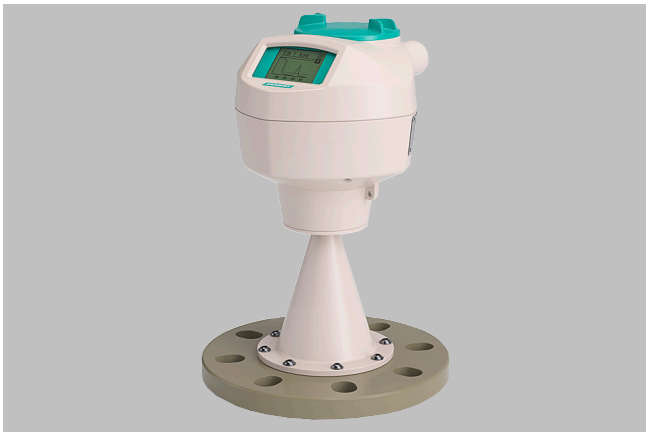
Overview



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 or PROFIBUS PA
- Process Intelligence signal processing for improved measurement reliability and Auto False-Echo Suppression of fixed obstructions
- Programming using infrared, Intrinsically Safe, handheld programmer or 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

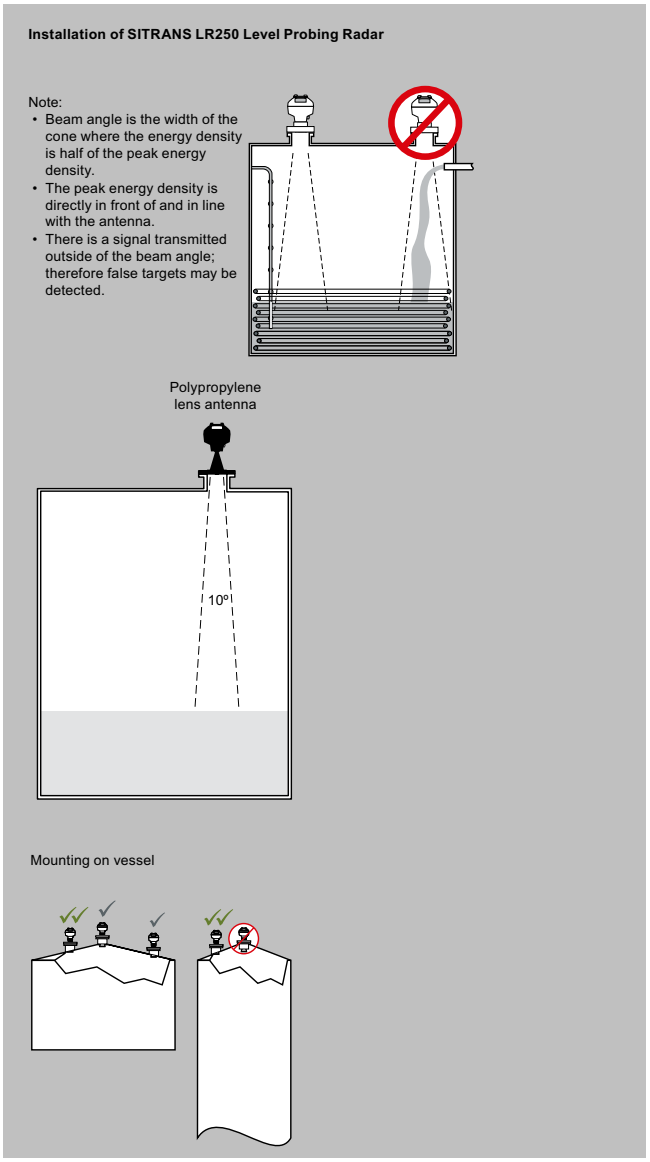
Application

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.

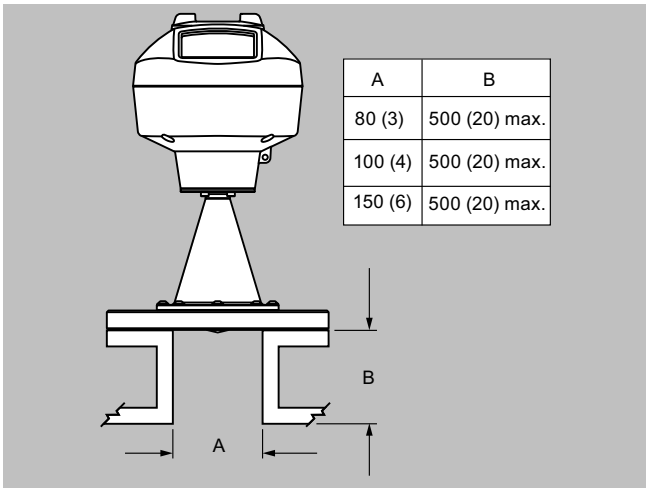
- Key Applications: liquid bulk storage tanks, process vessels with agitators, vaporous liquids, corrosive and aggressive materials.

Configuration



SITRANS LR250 Polypropylene lens antenna installation

Configuration (continued)



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

Selection and ordering data

SITRANS LR250 Radar level transmitter Continuous, non-contact, 20 m (66 ft) range, for liquids and slurries.	Article No. 7ML5431-	●	●	●	●	0	-	●	●	●	●
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.											
Process Connection and Antenna Material											
Painted aluminum 3" horn antenna[1)]		5									
Process Connection Type											
Engineered polymer flange connections											
Without flange, without mounting bracket, no polypropylene lens			Q	A							
Without flange, with mounting bracket, no polypropylene lens			Q	B							
Universal polymeric flange, flat face, with polypropylene lens, FKM seal											
DN80 PN16, ANSI 3", 150 lb, DN80 PN16/10K			Q	C							
DN100 PN16, ANSI 4", 150 lb, DN100 PN16/10K			Q	D							
DN150 PN16, ANSI 6", 150 lb, DN150 PN16/10K			Q	E							
Communication/Output											
PROFIBUS PA					1						
4 ... 20 mA, HART, start-up at < 3.6 mA					2						
Enclosure/Cable inlet											
Aluminum, Epoxy painted											
2 x ½" NPT								0			
2 x M20 x 1.5								1			
Antenna											
3 inch (80 mm) polypropylene lens antenna									S		
Approvals											
Ordinary Locations/General Purpose (Non-Ex), CE, UKCA, CSA, FM, FCC, RED, RCM										A	
Intrinsically Safe: CSA/FM Class I, Div. 1, Groups A, B, C, D, Class II, Div. 1, Groups E, F, G, Class III T4 FCC, Industry Canada										B	
Intrinsically Safe: ATEX II 1G Ex ia IIC T4 Ga, ATEX II 1D Ex ia ta IIIC T100°C Da; UKEX II 1G Ex ia IIC T4 Ga, UKEX II 1D Ex ia ta IIIC T100°C Da; IECEx Ex ia IIC T4 Ga, IECEx 1D Ex ia ta IIIC T100°C Da; INMETRO Ex ia IIC T4 Ga, INMETRO Ex ia ta IIIC T100°C Da, IP67/IP68; EAC Ex 0Ex ia IIC T4 Ga X, EAC Ex 0Ex ia ta IIIC T100°C Da X; CE, UKCA, RED, RCM										C	
Non-incendive: CSA/FM Class I, Div. 2, Groups A, B, C, D T5, FCC, Industry Canada										D	
Increased Safety / Non Sparking: ATEX II 3G Ex ec IIC T4 Gc; UKEX II 3G Ex ec IIC T4 Gc; EAC Ex 2Ex nA IIC T4 Gc X; CE, UKCA, RED, RCM										E	
Increased Safety: ATEX II 1/2 GD, 1D, 2D, Ex eb mb ia IIC T4 Ga/Gb; UKEX II 1/2 GD, 1D, 2D, Ex eb mb ia IIC T4 Ga/Gb; IECEx Ex eb ia mb IIC T4 Ga/Gb; INMETRO Ex e ia mb IIC T4 Ga/Gb, INMETRO Ex ia ta IIIC T100°C Da, IP67/IP68; EAC Ex Ga/Gb Ex ia/e+mb IIC T4 X; CE, UKCA, RED, RCM[2)]										F	
Flameproof: ATEX II 1/2 GD, 1D, 2D, Ex db mb ia IIC T4 Ga/Gb; ATEX II 1/2 GD, 1D, 2D, Ex ia ta IIIC T100°C Da; UKEX II 1/2 GD, 1D, 2D, Ex db mb ia IIC T4 Ga/Gb; UKEX II 1/2 GD, 1D, 2D, Ex ia ta IIIC T100°C Da; IECEx Ex db mb ia IIC T4 Ga/Gb, IECEx Ex ia ta IIIC T100°C Da; INMETRO Ex d ia mb IIC T4 Ga/Gb, INMETRO Ex ia ta IIIC T100°C Da, IP67/IP68; EAC Ex Ga/Gb Ex ia/db+mb IIC T4 X, EAC Ex Ex ia ta IIIC T100°C Da; CE, UKCA, RED, RCM[2)]										G	
Explosion proof: CSA/FM Class I, II and III, Div. 1, Groups A, B, C, D, E, F, G, FCC, Industry Canada[2)]										H	

Selection and ordering data (continued)

SITRANS LR250 Radar level transmitter Continuous, non-contact, 20 m (66 ft) range, for liquids and slurries.	Article No. 7ML5431- ● ● ● ● 0 - ● ● ● ●
Non Sparking: NEPSI Ex nA IIC T4 Gc	K
Intrinsically Safe: NEPSI Ex ia IIC T4 Ga, Ex iaD 20 T90 IP67 DIP A20 T_A90 °C	L
Flameproof: NEPSI Ex d ia mb IIC T4 Ga/Gb, Ex iaD 20 T90 IP67 DIP A20 T_A90 °C[2)]	M
Increased Safety: NEPSI Ex e ia mb IIC T4 Ga/Gb, Ex iaD 20 T90 IP67 DIP A20 T_A90 °C[2)]	N
Pressure rating	
0.5 bar (7.25 psi g) max.	1
Rating per Pressure/Temperature curves in manual[3)]	2

Selection and Ordering data	Order code
Further designs	
Please add "**-Z**" to Article No. and specify Order code(s).	
Plug M12, incl. cable socket, IP68[4)5)6)]	**A50**
Plug 7/8", incl. cable socket, IP68[5)6)7)]	**A55**
Long tag (device parameter, max. 27 characters) plate stainless steel 304/1.4301	**Y15**
Factory test certificate - M to DIN 55350, Part 18	**C11**
Inspection certificate 3.1 (EN 10204) - material of pressure-containing and wetted parts	**C12**
Namur NE43 compliant: device preset to failsafe < 3.6 mA[2)]	**N07**

Accessories	Article No.
Operating Instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Accessories	
Mounting bracket suitable for wall or ceiling mounting, for aluminum painted horn versions only	**A5E46342367**
Polypropylene lens replacement kit, polypropylene lens antenna and polymeric flange versions	**A5E46342366**
One metallic cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F), HART[9)]	**7ML1930-1AP**
One metallic cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F), PROFIBUS PA	**7ML1930-1AQ**
Handheld programmer, Intrinsically safe, EEx ia	**7ML1930-1BK**
HART modem with USB interface	**7MF4997-1DC**
FDA approved FKM o-ring for 2" G (BSPP) process connections -28 ... +80 °C (-28 ... +176 °F)	**7ML1830-3AN**
SITRANS RD100, loop powered display -see Chapter 7	**7ML5741-.....-.**
SITRANS RD150, remote digital display for 4 ... 20 mA and HART devices - see Chapter 7	**7ML5742-.....-....**
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	**7ML5740-.....-..**
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	**7ML5744-.....-..**
For applicable back up point level switch - see point level measurement section	

1) Available only with Process connection options QA ... QE and Antenna option S.
2) Available only with Communication option 2 and Process connection and antenna material option 4.
3) Available only with Process connection and Antenna material option 5 and Process connection type option QC.
4) Available only with Enclosure option 1.
5) Available only with Communication options 1 and 3.
6) Available only with Approval options A, B, C, and L.
7) Available only with Enclosure option 0.
8) Available only with Approval options A, B, C, D, E, K, and L.
9) Product shipped with plastic cable gland, rated to -20 °C (-4 °F). If -40 °C (-40 °F) rating required, then metallic cable gland is recommended.

SITRANS LR250 Polypropylene Lens Antenna and Threaded PVDF Specials	Article No.
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 enclosure with board stack, NPT cable inlet, approval option A, with PROFIBUS PA communication, no process connection	**A5E03588253**
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 threaded PVDF antenna version enclosure with board stack, M20 cable inlet, approval option C, with PROFIBUS PA communication, no process connection	**A5E03589260**
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 threaded PVDF antenna version enclosure with board stack, M20 cable inlet, approval option E, with PROFIBUS PA communication, no process connection	**A5E03589264**
SITRANS LR250 threaded PVDF antenna version enclosures (FOUNDATION Fieldbus models)	
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	**A5E03569747**
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 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 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 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 enclosure with board stack, M20 cable inlet, approval option E, with HART communication start-up at < 3.6 mA, no process connection	**A5E03587012**

Selection and ordering data (continued)

SITRANS LR250 Polypropylene Lens Antenna and Threaded PVDF Specials	
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 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 H, with HART communication start-up at < 3.6 mA, no process connection	**A5E03588125**

SITRANS LR250 Polypropylene Lens Antenna and Threaded PVDF Specials	
SITRANS LR250 threaded PVDF antenna kits	
Antenna kit 2" NPT threaded PVDF	**A5E03528941**
Antenna kit 2" R (BSPT) threaded PVDF	**A5E03528943**
Antenna kit 2" G (BSPP) threaded PVDF	**A5E03528947**
Kit of hardware parts for LR250 threaded PVDF antenna: consists of O-rings, screws, wavewasher, and loctite	**A5E03528948**
Ex-proof plugs	
Ex-proof plugs kit, 1/2" NPT, qty 5	**A5E39979991**
Ex-proof plugs kit, M20, qty 5	**A5E39979992**

Technical specifications

SITRANS LR250 Polypropylene Lens Antenna	
Mode of operation	
Measuring principle	Radar level measurement
Frequency	K-band (25.0 GHz)
Minimum measuring range	50 mm (2 inch) from end of antenna
Maximum measuring range	20 m (66 ft)
Output	
HART	Version 5.1
• Analog output	4 ... 20 mA
• Accuracy	± 0.02 mA
• Fail-safe	• Programmable as high, low or, hold (loss of echo) • NE 43 programmable
PROFIBUS PA	Profile 3.1
• Function blocks	2 Analog Input (AI)
Performance (according to reference conditions IEC 60770-1)	
Maximum measured error	• > 500 mm from sensor reference point: 3 mm (0.118 inch) • < 500 mm from sensor reference point: 25 mm (1 inch)
Influence of ambient temperature	< 0.003 %/K
Rated operating conditions	
Installation conditions	
• Location	Indoor/outdoor
Ambient conditions (enclosure)	
• Ambient temperature	-40 ... +80 °C (-40 ... +176 °F)
• Storage temperature	-40 ... +80 °C (-40 ... +176 °F)
• Installation category	I
• Pollution degree	4
Medium conditions	
Dielectric constant ϵ_r	> 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.
Design	
Enclosure	
• Material	Aluminum, polyester powder-coated
• Cable inlet	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 • Approximately 3.4 kg (7.5 lb)
Display (local)	Graphic local user interface including quick start wizard and echo profile display
Polypropylene lens antenna	
• Materials	• Polyester powder coated exterior • 3 inch cast aluminum • Polypropylene lens • FKM seal
• Process connections	
- Material	Polypropylene
- Dimensions	Universal flange: 3 inch (80 mm), 4 inch (100 mm), 6 inch (150 mm)

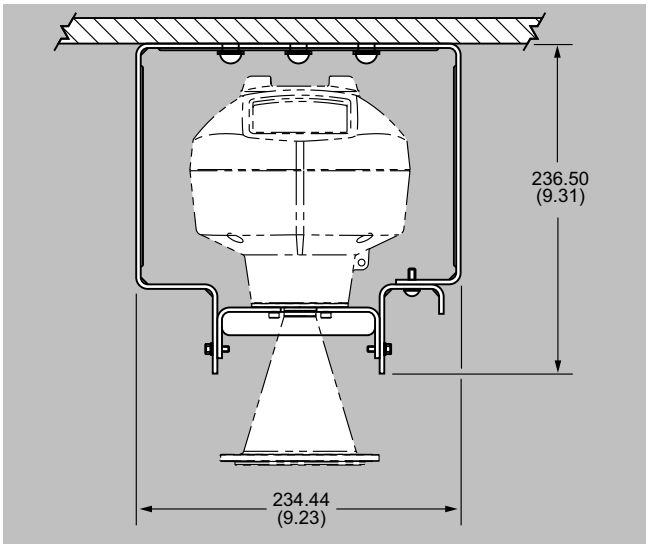
Technical specifications (continued)

SITRANS LR250 Polypropylene Lens Antenna	
Power supply	
4 ... 20 mA/HART	Nominal 24 V DC (max. 30 V DC) with max. 550 Ω
PROFIBUS PA	• 15 mA • per IEC 61158-2
Certificates and approvals	
General	$_{c}CSA_{US}$, CE, UKCA, FM, RCM
Radio	FCC, Industry Canada, RED, RCM
Hazardous	
• Explosion Proof (Brazil)	INMETRO Ex d ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da
• Increased Safety (Brazil)	INMETRO Ex e ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da
• Intrinsically Safe (Brazil)	INMETRO Ex ia IIC T4 Ga, Ex ia ta IIIC T100 °C Da
• Explosion Proof (Canada/USA)	CSA/FM Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III T4
• Intrinsically Safe (Canada/USA)	CSA/FM Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III T4
• Non-incendive (Canada/USA)	CSA/FM Class I, Div. 2, Groups A, B, C, D T5
• Flame Proof/Increased Safety (China)	Ex d ia mb IIC T4 Ga/Gb, Ex e ia mb IIC T4 Ga/Gb, Ex iaD 20 T90 IP67 DIP A20 T_A90 °C
• Intrinsically Safe (China)	Ex ia IIC T4 Ga, Ex iaD 20 T90 IP67 DIP A20 T_A 90 °C
• Non-sparking (China)	NEPSI Ex nA IIC T4 Gc
• Intrinsically Safe (EU)	ATEX II 1G Ex ia IIC T4 Ga, ATEX II 1D Ex ia ta IIIC T100°C Da;
• Intrinsically Safe (UK)	UKEX II 1G Ex ia IIC T4 Ga, UKEX II 1D Ex ia ta IIIC T100°C Da;
• Intrinsically Safe (International)	IECEx Ex ia IIC T4 Ga, IECEx Ex ia ta IIIC T100°C Da;
• Increased Safety - Zone 2 (EU)	ATEX II 3G Ex ec IIC T4 Gc;
• Increased Safety - Zone 2 (UK)	UKEX II 3G Ex ec IIC T4 Gc;
• Non-sparking (EAC)	EAC Ex 2Ex nA IIC T4 Gc;
• Flameproof (EU)	ATEX II 1/2 GD, 1D, 2D, Ex db mb ia IIC Ga/Gb, Ex ia ta IIIC T100°C Da;
• Flameproof (UK)	UKEX II 1/2 GD, 1D, 2D, Ex db mb ia IIC Ga/Gb, Ex ia ta IIIC T100°C Da
• Flameproof (International)	IECEx Ex db mb ia IIC T4 Ga/Gb, Ex ia ta IIIC T100°C Da;
• Increased Safety - Zone 1 (EU)	ATEX II 1/2 GD, 1D, 2D, Ex eb mb ia IIC T4 Ga/Gb, Ex ia ta IIIC T100°C Da;
• Increased Safety - Zone 1 (UK)	UKEX II 1/2 GD, 1D, 2D, Ex eb mb ia IIC T4 Ga/Gb, Ex ia ta IIIC T100°C Da;
• Increased Safety - Zone 1 (International)	IECEx Ex eb mb ia IIC T4 Ga/Gb, Ex ia ta IIIC T100°C Da
• Explosion Proof (Russia/Kazakhstan)	EAC Ex d
• Increased Safety (Russia/Kazakhstan)	EAC Ex e
• Intrinsically Safe (Russia/Kazakhstan)	EAC Ex ia
• Marine	• Lloyd's Register of Shipping • ABS Type Approval

Technical specifications (continued)

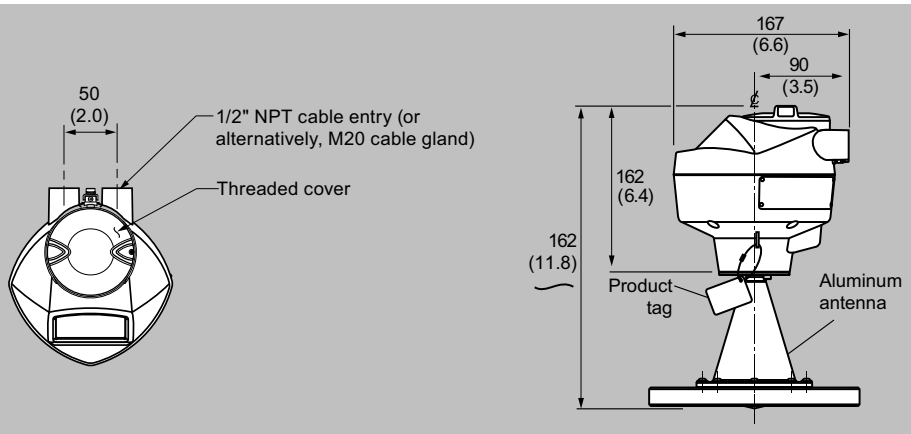
SITRANS LR250 Polypropylene Lens Antenna	
Programming	
Intrinsically Safe Siemens handheld programmer	Infrared receiver
• Approvals for handheld programmer	IS model: ATEX II 1 GD Ex ia op is IIC T4 Ga ATEX II 1 GD Ex ia op is IIIC T135°C Da UKEX II 1 GD Ex ia op is IIC T4 Ga UKEX II 1 GD Ex ia op is IIIC T135°C Da Ta = -20 ... +50°C CSA/FM Class I, II, III, Div. 1, Groups A, B, C, D, E, G, T6 Ta = 50°C IECEx SIR 09.0073
Handheld communicator	HART communicator 375/475
PC	• SIMATIC PDM • Emerson AMS • SITRANS DTM (for connection into FDT, such as PACTware or Fieldcare)
Display (local)	Graphic local user interface including quick start wizard and echo profile displays.

Options



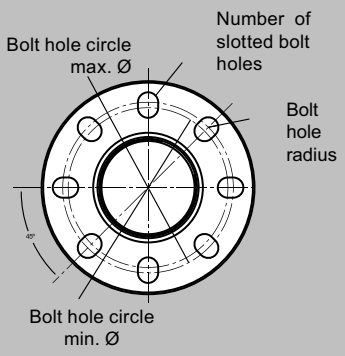
SITRANS LR250 Polypropylene lens antenna, wall/ceiling mount

Dimensional drawings



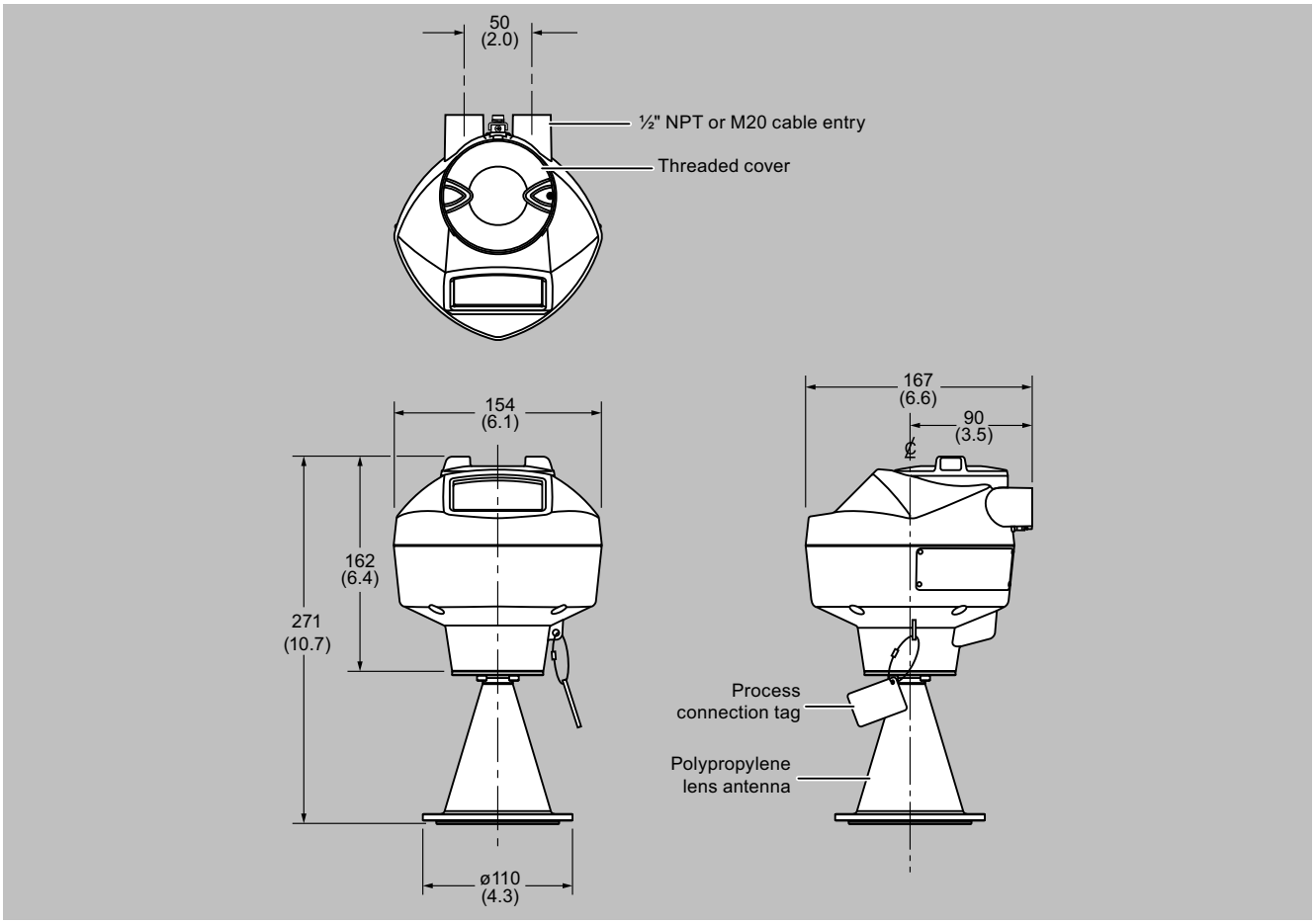
Nominal pipe size	OD ± 1	B.C.D. max. for slotted holes (bmax.) ± 0.75	B.C.D. min. for slotted holes (bmin.) ± 0.75	Bolt hole radius ± 0.25	Number of slotted holes
3	200	160	150	R 9.5	8
4	229	191	175	R 9.5	8
6	285	242	240	R 11.5	8

Polypropylene Flange



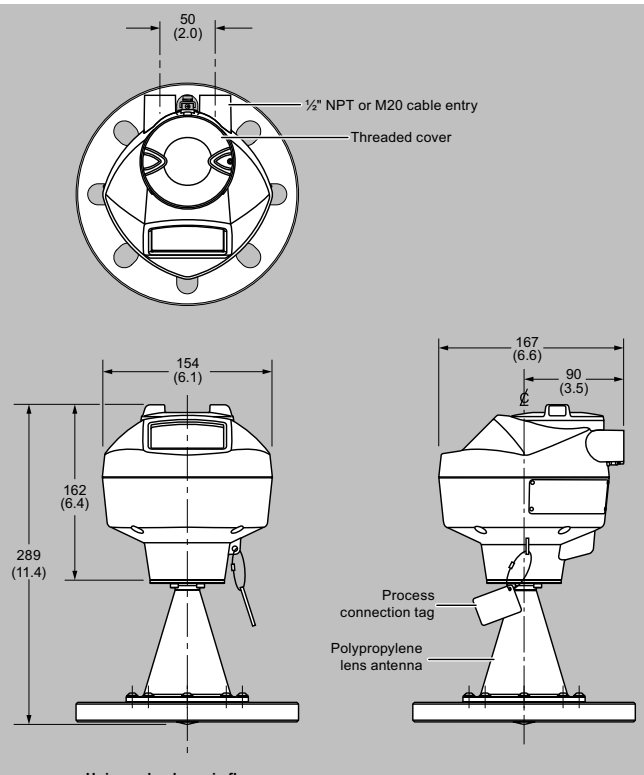
SITRANS LR250 Polypropylene lens antenna, dimensions in mm (inch)

Dimensional drawings (continued)

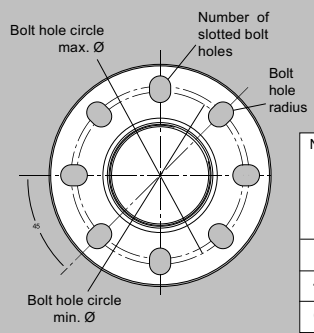


SITRANS LR250 Polypropylene lens antenna, dimensions in mm (inch)

Dimensional drawings (continued)



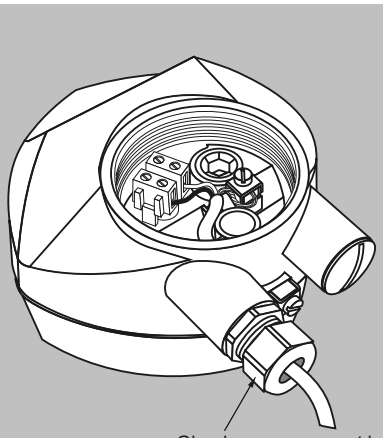
Universal polymeric flange



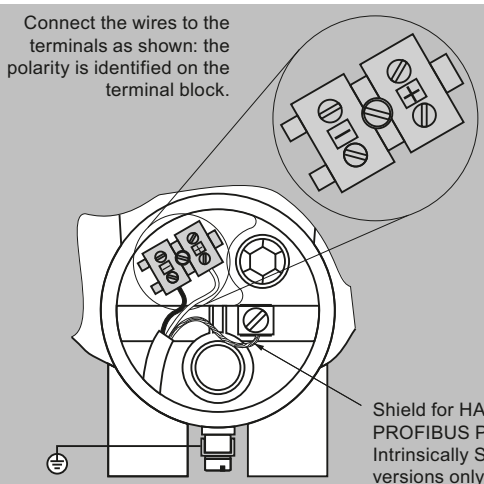
Nominal pipe size	OD ± 1	B.C.D. max. for slotted holes (bmax.) ± 0.75	B.C.D. min. for slotted holes (bmin.) ± 0.75	Bolt hole radius ± 0.25	# of slotted holes
3 (80)	7.87 (200)	6.30 (160)	5.91 (150)	0.37 (9.5)	8
4 (100)	9.00 (229)	17.52 (191)	6.89 (175)	0.37 (9.5)	8
6 (150)	11.22 (285)	9.53 (242)	9.45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

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

Circuit diagrams



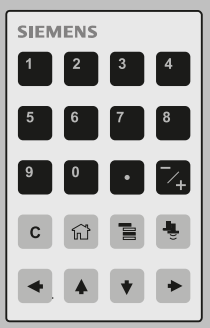
Gland may or may not be provided depending on approval option.



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

Shield for HART and PROFIBUS PA Intrinsically Safe versions only.

Hand Programmer



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