

SITRANS LR500 series

Overview



SITRANS LR500 series are 80 GHz radar level transmitters for continuous monitoring of liquids, slurries, and solids in storage and process vessels including high temperature and pressure, to a range of 120 m (393 ft).

Benefits

- Continuous level measurement up to 120 m (393 ft)
- Easy installation and simple startup
- Programming using 4-button HMI, mobile IQ app using Bluetooth, or SIMATIC PDM
- IQ Guard for health monitoring, NE107 diagnostic messaging and quality verification report
- Communication using HART 7
- Graphical HMI with echo profile display and backlight
- Near Range Suppression for automatic detection and suppression of material build up noise
- Process Intelligence signal processing
- 1 mm accuracy in accordance with IEC 60770-1
- Suitable for API 2350
- Auto False Echo Suppression for fixed obstruction avoidance
- Low power consumption with EPD (environmental product declaration)
- Optional SLOD (second line of defense) for toxic material safety
- 100 000 points of data logging memory for process control analysis and optimization

Application

SITRANS LR500 series radar level transmitters include a graphical local user interface that improves setup and operation by including an intuitive Quick Start Wizard, and echo profile displays for diagnostic support.

The 80 GHz frequency creates a narrow, focused beam allowing for smaller antenna and decreasing sensitivity to obstructions.

SITRANS LR500 series radar level transmitters measure superbly on low dielectric media with high accuracy and repeatability. A very fast measurement response is ideal for process control applications.

- Key Applications: SITRANS LR500 Radar level transmitters are available with four antenna types for level measurement of liquid, slurry, and solid materials:
 - Threaded lens antenna
 - Flanged encapsulated antenna
 - Polymeric horn antenna
 - Flanged lens antenna

Selection and ordering data

	Article No.
SITRANS LR500 Series Continuous, non-contact, 120 m (394 ft) range, for liquids, slurries, and solids in storage and process vessels, including high temperature and pressure.	
Antenna versions	
Threaded lens antenna	7ML751.....
Flanged encapsulated antenna	7ML753.....
Polymeric horn antenna	7ML755.....
Flanged lens antenna	7ML758.....

Technical specifications

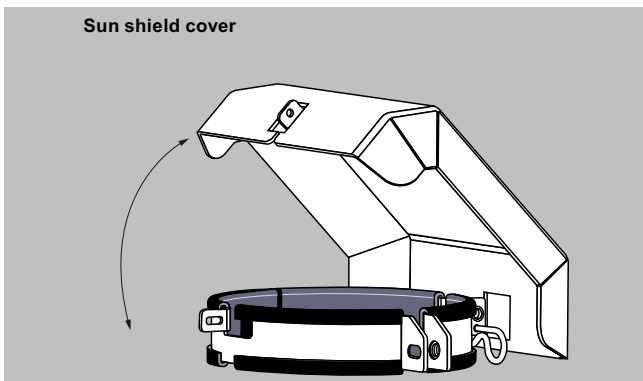
SITRANS LR500 Series	
Mode of operation	
Measuring principle	Radar level measurement
Frequency	W band (80 GHz nominal)
Minimum detectable distance	0 mm from end of the antenna (antenna dependent, reference conditions)
Maximum measuring range	120 m (394 ft), antenna dependent
Output	
HART	Version 7
• Analog output	4 ... 20 mA
• Fail-safe	Programmable as high, low, or hold (loss of echo)
• Update time	Up to 3 measurements per second
Performance (according to reference conditions IEC60770-1)	
Maximum measured error	1 mm (0.039 inch)
Influence of ambient temperature	Less than 3 mm/10 K and maximum ± 5 mm over full range from -40 ... +80 °C (-40 ... +176 °F)
	API 3.1B Inventory
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, antenna and application dependent
Process temperature	-196 ... 250 °C (-321 ... 482 °F), antenna and seal dependent
Process pressure	Up to 40 bar g (580 psi g), process connection and temperature dependent.
Design	
Weight	Range from 2 ... 20 kg (4.4 ... 44.1 lb), version dependent
Enclosure	
• Material	Aluminum, polyester powder-coated, C5 corrosion equivalent
• Cable inlet	2 x M20 x 1.5 or 2 x 1/2" NPT
Degree of protection	Type 4X, Type 6, IP66, IP68
Display (local)	Optional graphical HMI with NE107 diagnostic data, echo profile display and backlight
Trend Logging	100 000 points, up to 8 variables including level, distance, space, volume, signal strength, confidence, temperature
Limit Monitoring	Min/Max of 3 variables with count function
Terminal voltage	Available from HMI or EDD
Asset management	Diagnostic logbook, parameter change logbook
Power supply	
4 ... 20 mA/HART	Nominal 24 V DC (max. 30 V DC) with max. 800 Ω
Certificates and approvals	
Ordinary locations	FM, cCSAUS, CE
Radio	CE, FCC, IC, RCM

Technical specifications (continued)

Hazardous areas	ATEX, IECEx, UKCA Intrinsically Safe Ex ia IIC T6 Ga ATEX, IECEx, UKCA Intrinsically Safe Ex ia IIIC Txx°C Da ATEX, IECEx, UKCA Dust Ignition proof Ex ta IIIC Txx°C Da ATEX, IECEx, CSA, FM, UKEX, NEPSI, PESO, INMETRO EX II 1GD EX ia IIC T6 ... T4 Ga Ex ia IIIC T ₂₀₀ 95 °C Da Ta Ex ta IIIC T ₂₀₀ 137 °C Da CSA/FM Intrinsically Safe Ex ia Class I, II, III, Div 1, Groups A, B, C, D, E, F, G T6 CSA/FM Non-Incendive Class I, Div. 2, Groups A, B, C, D T6
Materials	3.1 of EN 10204, NACE MR 0175 and MR 0103, 2.2 of EN 10204, PMI CRN, PED
Pressure	Canadian Registration Number (CRN) Note: CRN is not applicable for process temperatures below -40 °C (-40 °F).
• British Columbia	0F7424.1
• Alberta	0F22399.2
• Saskatchewan	0F7424.13
• Manitoba	0F7424.14
• Ontario	0F7424.15
• Quebec	0F07424.16
• Atlantic Canada and Territories	0F1384.9870YNT
Materials	3.1 of EN 10204, NACE MR 0175 and MR 0103, 2.2 of EN 10204, PMI
Programming	
PC	SIMATIC PDM
Display (local)	Optional graphical HMI with NE107 diagnostic data, echo profile display and backlight
SITRANS mobile IQ app	Optional AW050 Bluetooth module, for non-hazardous applications only

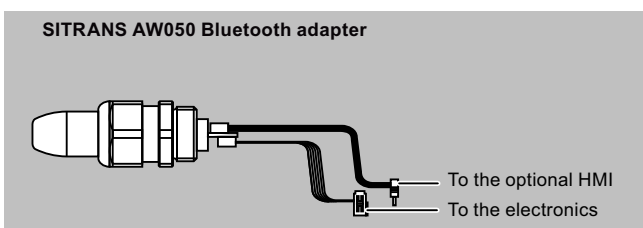
Options

Sun shield cover



SITRANS LR500 series sunshield

SITRANS AW050 Bluetooth adapter

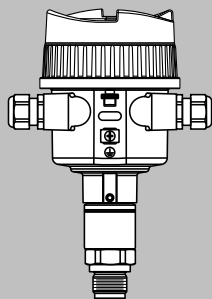


SITRANS AW050 Bluetooth adapter

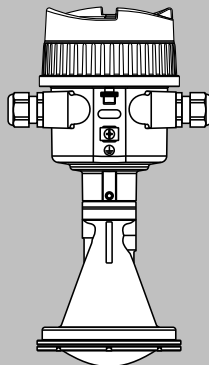
Dimensional drawings

SITRANS LR500 series antenna versions

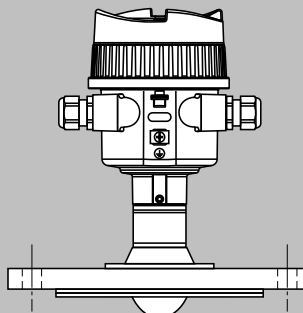
Thread with integrated antenna system



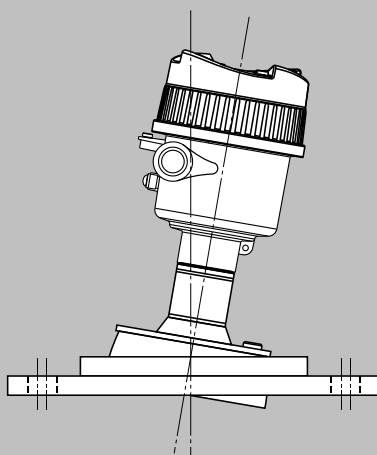
Plastic horn antenna



Flange with encapsulated antenna system



Flange with lens antenna



SITRANS LR500 Series antenna versions

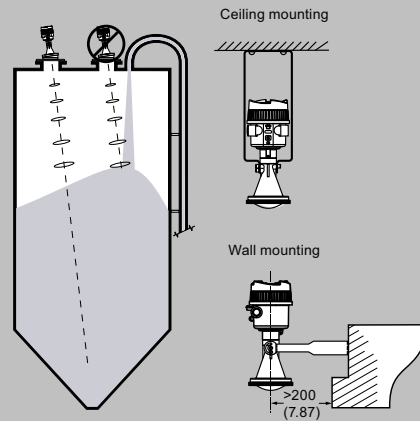
Overview



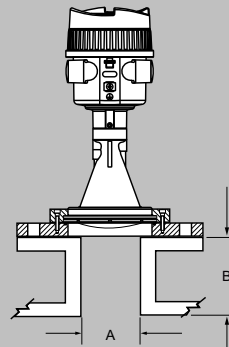
SITRANS LR550 polymeric horn antenna provides continuous monitoring of solids or liquids to a range of 120 m (394 ft). The light-weight design is suitable for open air applications and inventory measurement of basic materials in silos and vessels, or river level monitoring.

Configuration

Installation of SITRANS LR550



SITRANS LR550 nozzle mounting restrictions



Nozzle diameter "A"		Nozzle height "B"	
80 mm	3"	≤400 mm	≤ 15.8"
100 mm	4"	≤500 mm	≤ 19.7"
150 mm	6"	≤800 mm	≤ 31.5"

SITRANS LR550 Nozzle installation

Selection and ordering data

		Article No.									
SITRANS LR550 polymeric horn antenna Continuous, non-contact, 120 m (394 ft) range, for solids or liquids.		7	M	L	7	5	5	0	-	-	-
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.											
Communications											
4 ... 20 mA, HART		0									
Sealing material of the antenna/process connection											
PP / PP / -40 ... +80 °C (-40 ... +176 °F) ⁷⁾		0									
PP / FKM / -40 ... +80 °C (-40 ... +176 °F) ⁶⁾		1									
PP / EPDM / -40 ... +80 °C (-40 ... +176 °F) ⁶⁾		2									
Process connection type and material											
Universal, plastic horn antenna / PP/PBT				D		A					
Without flange, with mounting bracket 300 mm / 316/316L				D		C					
Universal bolted flange 3" 150 lb, DN80 PN16 / PP-GF30				E		C					
DN100 PN 6, flat face, / PP-GF30				F		L					
DN100 PN16, flat face, / PP-GF30				F		D					
DN150 PN16, flat face, / PP-GF30				F		E					
DN200 PN16, flat face, / PP-GF30				F		F					
DN250 PN16, flat face, / PP-GF30				F		G					
3" 150lb FF, PP-GF30				H		C					
4" 150lb FF, PP-GF30				H		D					
6" 150lb FF, PP-GF30				H		E					
8" 150lb FF, PP-GF30				H		F					
DN100 10K FF, JIS / PP-GF30				J		D					
DN150 10K FF, JIS / PP-GF30				J		E					
Purge (self-cleaning) connection											
No purge connection		0									
With purge connection ⁵⁾ / ⁹⁾ / ¹⁰⁾		1									
Enclosure											
Single compartment enclosure		4									
Type of protection											
Non Ex - General purpose		A									
Intrinsically safe Ex ia / IS (Class I, II, III, Division 1) ¹⁾		B									
Non-incendive (Class I, Division 2) ²⁾		D									
Dust Ignition proof, Ex t / DIP (Class II, Division 1) ¹⁾		M									
Electrical connection											
M20		F									
1/2" NPT		K									
Local HMI											
None, with blind lid		0									
Included, with blind lid		1									
Included, with window lid		3									

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Article No. and specify Order code(s).	
Test certificates	
Manufacturer's test certificate M to DIN 55350, Part 18 and to ISO 9000 - performance	C11
Tagging	
Stainless steel tag [69 mm x 50 mm (2.71 x 1.97 inch)]	
Tag (device parameters, max. 27 characters), plate, stainless steel 304/1.4301	Y15

Selection and Ordering data	Order code
Regional Ex Approval ³⁾	
NEPSI (China)	E27
ATEX (Europe), IECEx (International), and UKEX (Great Britain)	E47
CSA (Canada) and FM (USA)	E48
ATEX (Europe), IECEx (International), UKEX (Great Britain), CSA (Canada), and FM (USA)	E49
Process connection specials	
Non-return valve for purging air connection ⁸⁾	J01

Selection and ordering data (continued)

Selection and Ordering data	Order code
Operating instructions	
All literature is available to download for free, in a range of languages, at http://www.siemens.com/processin-strumentation/	
Accessories	
Sun shield cover	A5E52107153
AW050 Bluetooth module kit, M20 (General purpose only)	A5E51857118
AW050 Bluetooth module kit, 1/2" NPT (General purpose only)	A5E52095588
Lightning Arrestor M20	7MF7903-7AB
Lightning Arrestor 1/2" NPT	7MF7903-7AC
Mounting bracket, 300 mm	A5E52885008
EPDM Aiming Gasket DN80	A5E52607563
EPDM Aiming Gasket DN100	A5E52607570
EPDM Aiming Gasket 3"	A5E52607582
EPDM Aiming Gasket 4"	A5E52607584
SIMATIC RTU3010C compact, remote data manager with alarming	6NH3112-0BA00-0XX0
SIMATIC RTU3030C compact, remote data manager with alarming	6NH3112-3BA00-0XX0
Intrinsically Safe barrier	7NG4124-1AA00
SITRANS RD100, loop powered display	7ML5741-.....-
SITRANS RD150, remote digital display for 4 to 20 mA and HART devices	7ML5742-.....-
SITRANS RD200, universal input display with Modbus conversion	7ML5740-.....-
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion	7ML5744-.....-

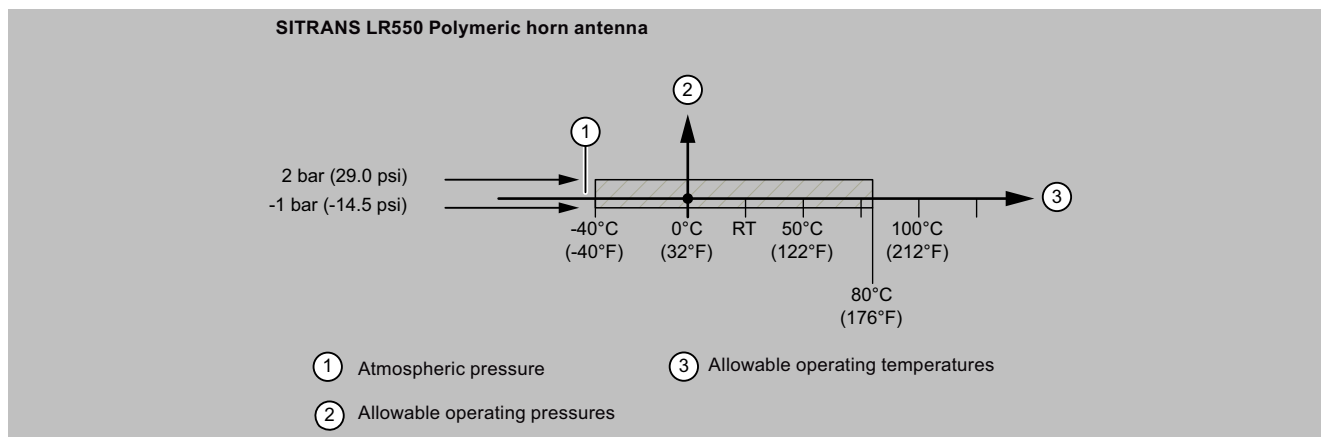
Selection and Ordering data	Order code
SITRANS LT500, a versatile, single and multi-vessel level monitor/controller for virtually any application in a wide range of industries.	7ML60-.....-
For applicable back up point level switch - see point level measurement catalog	
Spare parts	
Electronic module, LR530, LR550, LR580, >DN50 / 2 inch, mA/HART	A5E53276249
LR500 lid with window, Non-Exd/XP	A5E53276250
LR500 no window, Non-Exd/XP	A5E53276252
HMI graphical display, with interconnection cable	A5E53276247

- 1) Available only with one -Z Regional hazardous Approval options.
- 2) Available only with -Z Regional hazardous Approval option E48.
- 3) Not available with Type of Protection option A.
- 4) Must be used with -Z option Y01.
- 5) If selecting Type of Protection options B, C, D, or M, then -Z option J01 must also be selected.
- 6) Not available with Process connection type and material options DA, DC, and EC.
- 7) Available only with Process connection type and material options DA, DC, and EC.
- 8) Available only with Purge connection option 1.
- 9) Not available with Process connection type and material options DA, DC, EC, and HC.
- 10) Only suitable for use with 15 psi or less process pressure applications.

Technical specifications

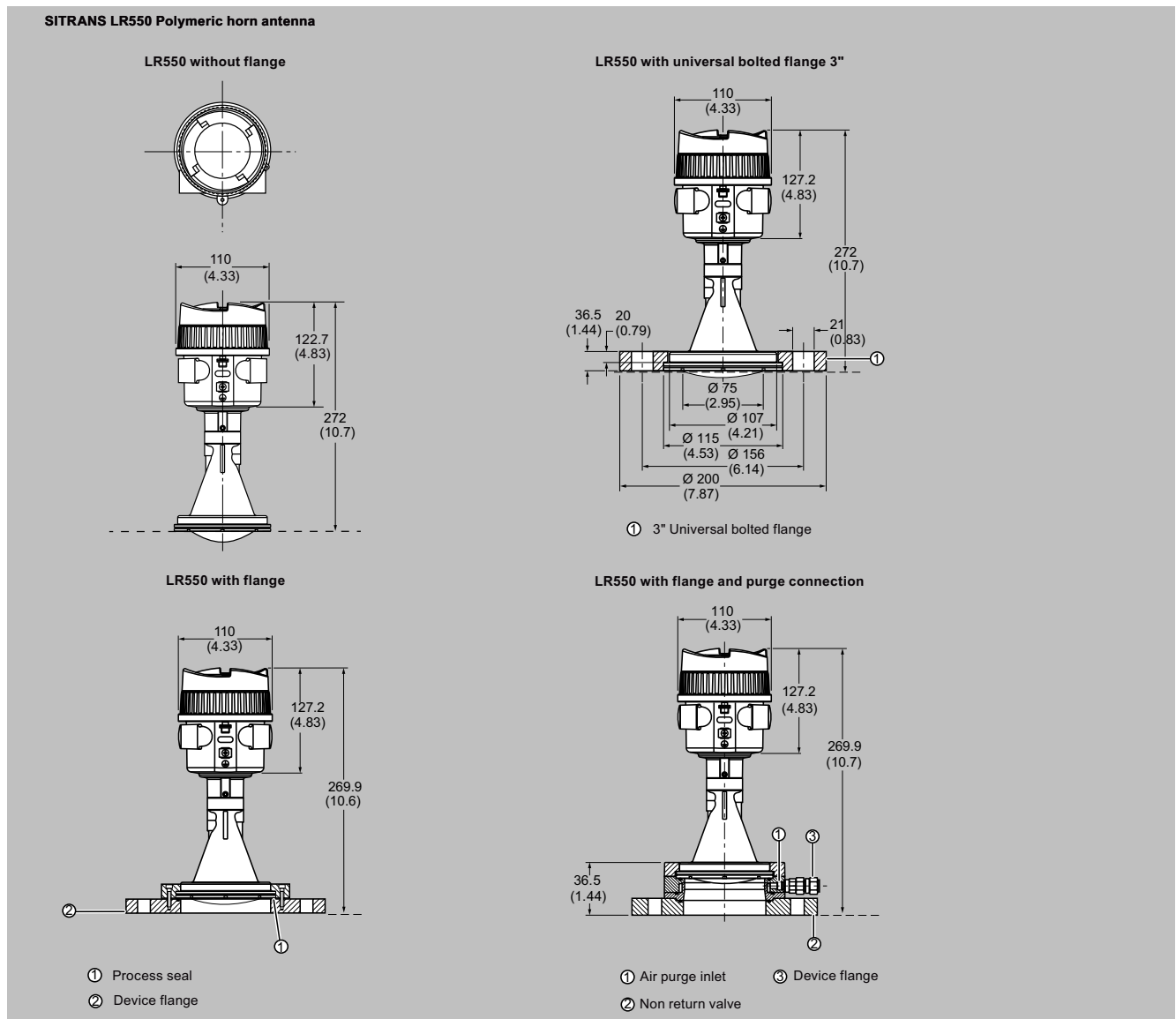
SITRANS LR550	
Mode of operation	
Recommended measuring range	Beam angle 3°: 120 m (394 ft)
Medium conditions	
Process temperature	<ul style="list-style-type: none"> • PP lens, PP seal: -40 ... +80 °C (-40 ... +176 °F) • PP lens, FKM seal: -40 ... +80 °C (-40 ... +176 °F) • PP lens, EPDM: -40 ... +80 °C (-40 ... +176 °F)
Process pressure	2 bar max.
Design	
Flange material	PP-GF30
Wetted materials	
• Antenna lens	PP, FKM, or EPDM
• Antenna seal	FKM or EPDM
Wall and ceiling bracket	316/316L stainless steel
Process connections	<ul style="list-style-type: none"> • DN100 PN 6, flat face • DN100 PN16, flat face • DN150 PN16, flat face • DN200 PN16, flat face • DN250 PN16, flat face • 3" 150lb FF • 4" 150lb FF • 6" 150lb FF • 8" 150lb FF • DN100 10K FF, JIS • DN150 10K FF, JIS

Characteristic curves



SITRANS LR550 Polymeric horn antenna, process pressure/temperature derating curve

Dimensional drawings

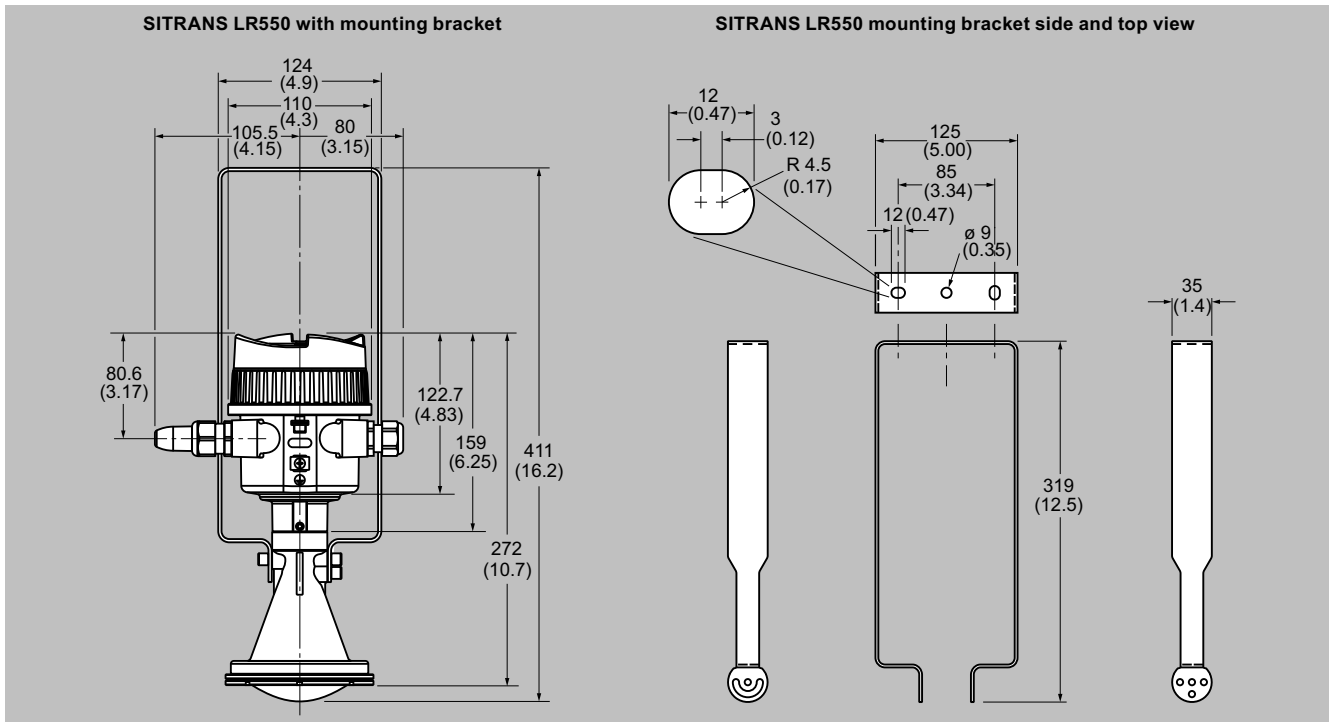


SITRANS LR550 Polymeric horn antenna, dimensions in mm (inch)

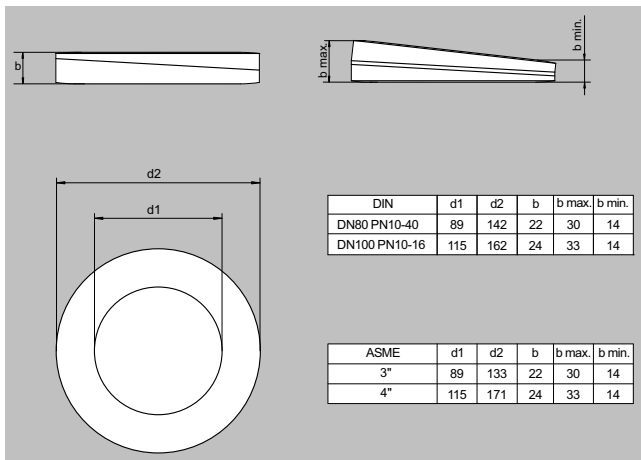
SITRANS LR550 with flange

Flange	Flange O.D. [mm (inch)]	Bolt hole circle Ø [mm (inch)]	Bolt hole Ø [mm (inch)]	No. of bolt holes	Flange thickness [mm (inch)]
DN100 PN 6, flat face	210 (8.27)	170 (6.7)	18 (0.71)	4	20 (0.79)
DN100 PN16, flat face	220 (8.99)	180 (7.09)	18 (0.71)	8	
DN150 PN16, flat face	285 (11.22)	240 (9.49)	22 (0.87)	8	
DN200 PN16, flat face	340 (13.38)	295 (11.61)	22 (0.87)	12	
DN250 PN16, flat face	405 (15.94)	355 (13.98)	26 (1.02)	12	
3" 150lb FF	190.5 (7.5)	152.4 (6)	19.1 (0.75)	4	
4" 150lb FF	228.6 (9)	190.5 (7.5)	19.1 (0.75)	8	
6" 150lb FF	279.4 (11)	241.3 (9.5)	22.4 (0.88)	8	
8" 150lb FF	342.9 (13.5)	298.5 (11.75)	22.4 (0.88)	8	
DN100 10K FF, JIS	210 (8.27)	175 (6.89)	19 (0.75)	8	
DN150 10K FF, JIS	280 (11.02)	240 (9.49)	23 (0.9)	8	

Dimensional drawings (continued)



SITRANS LR550 with mounting bracket, dimensions in mm (inch)



SITRANS LR550 EPDM aiming gasket