

Level Measurement

Continuous level measurement - Radar transmitters

SITRANS LR250 Horn Antenna

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 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 (2 inch) from the end of the antenna
- 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
- Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511
- 3 mm (0.118 inch) accuracy in accordance with IEC 60770-1
- Suitable for API 2350

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 antenna 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.

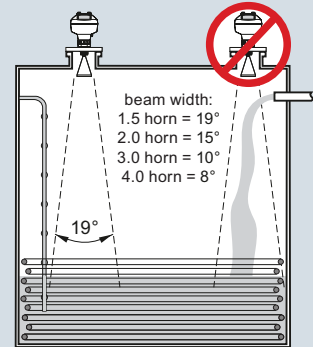
- Key Applications: liquid bulk storage tanks, process vessels, vaporous liquids, high temperatures, low dielectric media and applications with functional safety requirements

Configuration

Installation

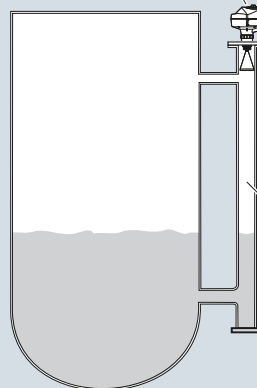
Note:

- 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 horn antenna.
- There is a signal transmitted outside of the beam angle; therefore false targets may be detected.
- Use largest possible antenna.



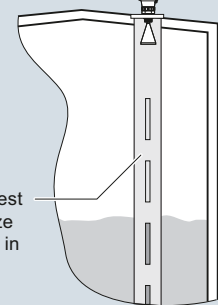
Mounting on bypass

Orient front or back of device toward vent.



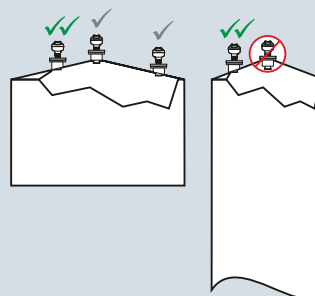
Mounting on stilling well

Orient front or back of device toward stillpipe slots.

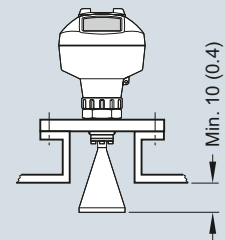


Use largest horn size possible in pipe.

Mounting on vessel



Mounting on a nozzle



SITRANS LR250 installation, dimensions in mm (inch)

Technical specifications

Mode of operation		Power supply	
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"> • 15 mA • Per IEC 61158-2
Minimum measuring range	50 mm (2 inch) from end of antenna	FOUNDATION Fieldbus	<ul style="list-style-type: none"> • 20.0 mA • Per IEC 61158-2
Maximum measuring range	20 m (65 ft), antenna dependent		
Output		Certificates and approvals	
HART	Version 5.1	General	CSA _{US/IC} , CE, FM, NE 21, RCM
<ul style="list-style-type: none"> • Analog output • Accuracy • Fail-safe 	4 ... 20 mA ± 0.02 mA <ul style="list-style-type: none"> • Programmable as high low or hold (loss of echo) • NE 43 programmable 	Radio	FCC, Industry Canada, and Europe ETSI EN 302-372, RCM
PROFIBUS PA	Profile 3.01	Hazardous	
<ul style="list-style-type: none"> • Function blocks 	2 Analog Input (AI)	<ul style="list-style-type: none"> • Explosion Proof (Brazil) 	INMETRO Ex d ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da
FOUNDATION Fieldbus	H1	<ul style="list-style-type: none"> • Increased Safety (Brazil) 	INMETRO Ex e ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da
<ul style="list-style-type: none"> • Functionality • Version • Function blocks 	Basic or LAS ITK 5.2.0 2 Analog Input (AI)	<ul style="list-style-type: none"> • Intrinsically Safe (Brazil) 	INMETRO Ex ia IIC T4 Ga, Ex ia ta IIIC T100 °C Da
Performance (according to reference conditions IEC60770-1)		<ul style="list-style-type: none"> • 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
Maximum measured error	3 mm (0.118 inch)	<ul style="list-style-type: none"> • 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
Influence of ambient temperature	< 0.003 %/K	<ul style="list-style-type: none"> • Non-incendive (Canada/USA) 	CSA/FM Class I, Div. 2, Groups A, B, C, D T5
Rated operating conditions		<ul style="list-style-type: none"> • Flame Proof/Increased Safety (China) 	NEPSI Ex d ia mb IIC T4 Ga/Gb, Ex e ia mb IIC T4 Ga/Gb, Ex iaD tD A20 IP67 T100 °C
Installation conditions		<ul style="list-style-type: none"> • Intrinsically Safe (China) 	NEPSI Ex ia IIC T4 Ga, Ex iaD tD A20 IP67 T100 °C
<ul style="list-style-type: none"> • Location 	Indoor/outdoor	<ul style="list-style-type: none"> • Non-sparking (China) 	NEPSI Ex nA IIC T4 Gc
Ambient conditions (enclosure)		<ul style="list-style-type: none"> • Intrinsically Safe (Europe) 	ATEX II 1G Ex ia IIC T4 Ga ATEX II 1D Ex ia IIIC T100 °C Da
<ul style="list-style-type: none"> • Ambient temperature • Installation category • Pollution degree 	-40 ... +80 °C (-40 ... +176 °F) I 4	<ul style="list-style-type: none"> • Non-sparking (Europe) • Flame Proof (International/Europe) 	ATEX II 3G Ex nA IIC T4 Gc IECEX/ATEX II 1/2 GD, 1D, 2D, Ex d mb ia IIC T4 Ga/Gb, Ex ia ta IIC T100 °C Da
Medium conditions		<ul style="list-style-type: none"> • Increased Safety (International/Europe) 	IECEX/ATEX II 1/2 GD, 1D, 2D, Ex e mb ia IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da
Dielectric constant ϵ_r	> 1.6, antenna and application dependent	<ul style="list-style-type: none"> • Intrinsically Safe (International) 	IECEX/ATEX II 1 G Ex ia IIC T4 Ga, IECEX/ATEX II 1D Ex ia ta IIC T100 °C Da
Process temperature	-40 ... +200 °C (-40 ... +392 °F) (at process connection with FKM O-ring) -20 ... +200 °C (-4 ... +392 °F) (at process connection with FFKM O-ring)	<ul style="list-style-type: none"> • Explosion Proof (Russia/Kazakhstan) • Increased Safety (Russia/Kazakhstan) • Intrinsically Safe (Russia/Kazakhstan) • Marine 	EAC Ex d EAC Ex e EAC Ex ia
Process pressure	Up to 40 bar g (580 psi g), process connection and temperature dependent. See Pressure/Temperature curves for more information	<ul style="list-style-type: none"> • Functional Safety 	<ul style="list-style-type: none"> • Lloyd's Register of Shipping • ABS Type Approval • Bureau Veritas SIL-2 suitable in accordance with IEC 61508/61511
Design			
Enclosure			
<ul style="list-style-type: none"> • Material • Cable inlet 	Aluminum, polyester powder-coated 2 x M20 x 1.5 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 inch) threaded connection with 1 1/2" horn antenna		
Display (local)	Graphic local user interface including quick start wizard and echo profile display		
Antenna			
<ul style="list-style-type: none"> • Material 	316L stainless steel [optional alloy N06022/2.4602 (Hastelloy C-22 or equivalent)]		
<ul style="list-style-type: none"> • Dimensions (nominal horn sizes) 	Standard 1.5 inch (40 mm), 2 inch (48 mm), 3 inch (75 mm), 4 inch (95 mm) horn, and optional 100 mm (4 inch) horn extension		
Process connections			
<ul style="list-style-type: none"> • Process connection 	1 1/2", 2" or 3" NPT [(Taper), ANSI/ASME B1.20.1] R 1 1/2", 2" or 3" [(BSPT), EN 10226] G 1 1/2", 2" or 3" [(BSPP), EN ISO 228-1]		
<ul style="list-style-type: none"> • Flange connection 	2", 3", 4" (ANSI 150, 300 lb), 50, 80, 100 mm (PN 16, 40, JIS 10K)		

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Programming

Intrinsically Safe Siemens handheld programmer	Infrared receiver
• Approvals for handheld programmer	IS model: ATEX II 1 GD Ex ia IIC T4 Ga Ex ia D 20 T135 °C T _a = -20 ... +50 °C CSA/FM Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G, T6 T _a = +50 °C IECEX SIR 09.0073
Handheld communicator	HART communicator 375/475
PC	<ul style="list-style-type: none"> • 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

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Selection and Ordering data	Article No.	Selection and Ordering data	Article No.
SITRANS LR250 horn antenna	7ML5431-0	SITRANS LR250 horn antenna	7ML5431-0
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) (antenna dependent). Ideal for small vessels and low dielectric media.		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) (antenna dependent). Ideal for small vessels and low dielectric media.	
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
Process Connection and Antenna Material		Flanged connection Hastelloy C	
316L (1.4435 or 1.4404) stainless steel, PTFE emitter, FKM seal ¹⁾	0	2" Class 150 ASME B16.5 raised face ⁴⁾	JA
316L (1.4435 or 1.4404) stainless steel, PTFE emitter, FFKM seal ¹⁾	1	3" Class 150 ASME B16.5 raised face ⁴⁾	JB
Hastelloy C-22/2.4602 (or equivalent), PTFE emitter, FKM seal ²⁾	2	4" Class 150 ASME B16.5 raised face ⁴⁾	JC
Hastelloy C-22/2.4602 (or equivalent), PTFE emitter, FFKM seal ²⁾	3	2" Class 300 ASME B16.5 raised face ⁴⁾	JD
		3" Class 300 ASME B16.5 raised face ⁴⁾	JE
		4" Class 300 ASME B16.5 raised face ⁴⁾	JF
Process Connection Type		DN 50 PN 16 EN 1092-1 Type B1 raised face ⁴⁾	KA
Threaded connection 316L		DN 80 PN 16 EN 1092-1 Type B1 raised face ⁴⁾	KB
1½" NPT (ASME B1.20.1) (tapered thread) ³⁾	AA	DN 100 PN 16 EN 1092-1 Type B1 raised face ⁴⁾	KC
R 1½" [(BSPT), EN 10226-1] (tapered thread) ³⁾	AB	DN 50 PN 40 EN 1092-1 Type B1 raised face ⁴⁾	KD
G 1½" [(BSPP), EN ISO 228-1] (parallel thread) ³⁾	AC	DN 80 PN 40 EN 1092-1 Type B1 raised face ⁴⁾	KE
2" NPT (ASME B1.20.1) (tapered thread)	AD	DN 100 PN 40 EN 1092-1 Type B1 raised face ⁴⁾	KF
R 2" [(BSPT), EN 10226-1] (tapered thread)	AE	50A 10K JIS B 2220 raised face ⁴⁾	LA
G 2" [(BSPP), EN ISO 228-1] (parallel thread)	AF	80A 10K JIS B 2220 raised face ⁴⁾	LB
3" NPT (ASME B1.20.1) (tapered thread)	AG	100A 10K JIS B 2220 raised face ⁴⁾	LC
R 3" [(BSPT), EN 10226-1] (tapered thread)	AH	DN 50 PN 16 EN 1092-1 Type B1 raised face	MA
G 3" [(BSPP), EN ISO 228-1] (parallel thread)	AJ	DN 80 PN 16 EN 1092-1 Type B1 raised face	MB
Flanged connection 316L		DN 100 PN 16 EN 1092-1 Type B1 raised face	MC
2" Class 150 ASME B16.5, raised face	BD	DN 150 PN 16 EN 1092-1 Type B1 raised face	MD
3" Class 150 ASME B16.5, raised face	BE	DN 50 PN 40 EN 1092-1 Type B1 raised face	ME
4" Class 150 ASME B16.5, raised face	BF	DN 80 PN 40 EN 1092-1 Type B1 raised face	MF
2" Class 300 ASME B16.5, raised face	CD	DN 100 PN 40 EN 1092-1 Type B1 raised face	MG
3" Class 300 ASME B16.5, raised face	CE	DN 150 PN 40 EN 1092-1 Type B1 raised face	MH
4" Class 300 ASME B16.5, raised face	CF		
50A 10K JIS B 2220 flat face ⁴⁾	FA	Communication/Output	
80A 10K JIS B 2220 flat face ⁴⁾	FB	PROFIBUS PA ⁶⁾	1
100A 10K JIS B 2220 flat face ⁴⁾	FC	4 ... 20 mA, HART, start-up at < 3.6 mA	2
DN 50 PN 16 EN 1092-1 Type B1 raised face	GA	FOUNDATION Fieldbus ⁶⁾	3
DN 80 PN 16 EN 1092-1 Type B1 raised face	GB		
DN 100 PN 16 EN 1092-1 Type B1 raised face	GC	Enclosure/Cable inlet	
DN 150 PN 16 EN 1092-1 Type B1 raised face	GD	Aluminum, Epoxy painted	
DN 50 PN 40 EN 1092-1 Type B1 raised face	HA	2 x ½" NPT	0
DN 80 PN 40 EN 1092-1 Type B1 raised face	HB	2 x M20 x 1.5	1
DN 100 PN 40 EN 1092-1 Type B1 raised face	HC		
DN 150 PN 40 EN 1092-1 Type B1 raised face	HD	Antenna	
		1½" horn ³⁾	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 ³⁾	E
		2" horn with 100 mm extension	F
		3" horn with 100 mm extension	G
		4" horn with 100 mm extension	H
		Hastelloy C22 (or equivalent)	
		2" horn (fits 2" ASME or DN 50 nozzles)	J
		3" horn (fits 3" ASME or DN 80 nozzles)	K
		4" horn (fits 4" ASME or DN 100 nozzles)	L
		2" horn (fits 2" ASME or DN 50 nozzles) with 100 mm extension	M
		3" horn (fits 3" ASME or DN 80 nozzles) with 100 mm extension	N
		4" horn (fits 4" ASME or DN 100 nozzles) with 100 mm extension	P



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Selection and Ordering data	Article No.
SITRANS LR250 horn antenna	7ML5431-
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) (antenna dependent). Ideal for small vessels and low dielectric media.	0 -
Approvals	
General Purpose, CE, CSA, FM, FCC, R&TTE, 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: IECEX/ATEX II 1 G Ex ia IIC T4 Ga, IECEX/ATEX II 1D Ex ia ta IIIC T100 °C Da, INMETRO Ex ia IIC T4 Ga, Ex ia ta IIIC T100 °C Da, CE, R&TTE, RCM	C
Non-incendive: CSA/FM Class I, Div. 2, Groups A, B, C, D T5, FCC, Industry Canada	D
Non Sparking: ATEX II 3G Ex nA IIC T4 Gc, CE, R&TTE, RCM	E
Increased Safety: IECEX/ATEX II 1/2 GD, 1D, 2D Ex e mb ia 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, CE, R&TTE, RCM ⁴⁾	F
Flameproof: IECEX/ATEX II 1/2 GD 1D, 2D Ex d mb ia IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da, INMETRO Ex d ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da, CE, R&TTE, RCM ⁵⁾	G
Explosion proof: CSA/FM Class I, II, and III, Div. 1, Groups A, B, C, D, E, F, G, FCC, Industry Canada ⁵⁾	H
Non Sparking: NEPSI Ex nA IIC T4 Gc	K
Intrinsically Safe: NEPSI Ex ia IIC T4 Ga, Ex iaD tD A20 IP67 T100 °C	L
Flameproof: NEPSI Ex d ia mb IIC T4 Ga/Gb, Ex iaD tD A20 IP67 T100 °C ⁵⁾	M
Increased Safety: NEPSI Ex e ia mb IIC T4 Ga/Gb, Ex iaD tD A20 IP67 T100 °C ⁵⁾	N
Pressure rating	
Rating per Pressure/Temperature curves in manual	0
0.5 bar g (7.25 psi g) maximum ⁷⁾	1

1) Available with process connection options AA ... HD and Antenna Versions A ... H only

2) Available with process connection options JA ... MH and Antenna Versions J ... P only

3) Available for Antenna versions A and E only, max. range 10 m (32.8 ft), dk > 3 and A and E only available for Process Connection options AA, AB, and AC

4) Applicable with communication option 2 only

5) Available with Approval options A, B, C, D, K, and L

7) Available with Process Connection and Antenna Material 0, 1, 2, and 3 only

◆ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ◆. For details see page 10/11 in the appendix.

Level Measurement

Continuous level measurement - Radar transmitters

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Selection and Ordering data	Order code	Selection and Ordering data	Article No.
Further designs Please add "-Z" to Article No. and specify Order code(s).		Compact Operating Instructions for FOUNDATION Fieldbus device English, French, German, Spanish, Italian, Dutch, Danish, Finnish, Greek, Portuguese (Portugal), Swedish A5E33472700 English, Bulgarian, Czech, Estonian, Hungarian, Latvian, Lithuanian, Polish, Romanian, Slovakian, Slovenian A5E33472738 English, Portuguese (Brazil), Chinese A5E34046626 Note: The Operating Instructions should be ordered as a separate line item on the order. All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Plug M12 with mating Connector ¹⁾²⁾³⁾	◆ A50	Other Operating Instructions SITRANS LR250 Functional Safety manual, English A5E32286471 Note: The Operating Instructions should be ordered as a separate line item on the order. All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation Accessories Handheld programmer, Intrinsically safe, EEx ia 7ML1930-1BK 7MF4997-1DB HART modem/USB (for use with a PC and SIMATIC PDM) 7ML1930-1AP One metallic cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F), HART (two are required) 7ML1930-1AQ One metallic cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F), PROFIBUS PA and FOUNDATION Fieldbus (two are required) ⁶⁾ 7ML1830-3AN FDA approved FKM O-ring for 2" G (BSP) process connections -28 ... +80 °C (-28 ... +176 °F) 7ML5741-... SITRANS RD100, loop powered display - see Chapter 7 7ML5740-... SITRANS RD200, universal input display with Modbus conversion - see Chapter 7 7ML5744-... SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7 7ML5750-... SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7 For applicable back up point level switch - see point level measurement section	
Plug 7/8" with mating Connector ²⁾³⁾⁴⁾	◆ A55		
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text	◆ Y15		
Manufacturer's Test Certificate: M to DIN 55350, Part 18 and to ISO 9000	◆ C11		
Material inspection certificate 3.1 of EN 10204	◆ C12		
Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511 ³⁾⁵⁾	◆ C20		
Namur NE43 compliant, device preset to failsafe < 3.6 mA ⁵⁾	◆ N07		
Compact Operating Instructions for HART/ mA device English, French, German, Spanish, Italian, Dutch, Danish, Finnish, Greek, Portuguese (Portugal), Swedish A5E33469191 English, Bulgarian, Czech, Estonian, Hungarian, Latvian, Lithuanian, Polish, Romanian, Slovakian, Slovenian A5E33469171 English, Portuguese (Brazil), Chinese A5E34046583 Note: The Operating Instructions should be ordered as a separate line item on the order. All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation			
Compact Operating Instructions for PROFIBUS PA device English, French, German, Spanish, Italian, Dutch, Danish, Finnish, Greek, Portuguese (Portugal), Swedish A5E33469239 English, Bulgarian, Czech, Estonian, Hungarian, Latvian, Lithuanian, Polish, Romanian, Slovakian, Slovenian A5E33472685 English, Portuguese (Brazil), Chinese A5E34046624 Note: The Operating Instructions should be ordered as a separate line item on the order. All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation			

- 1) Available with enclosure option 1 only
- 2) To be used with communication options 1 and 3 only. Connector has IP67 rating.
- 3) Available with approval options A and B. Available with approval option C for use on intrinsically safe applications only. Not rated for dust Ex.
- 4) Available with enclosure option 0 only
- 5) Applicable to communication option 2 only
- 6) For use with communication options 1 and 3 only

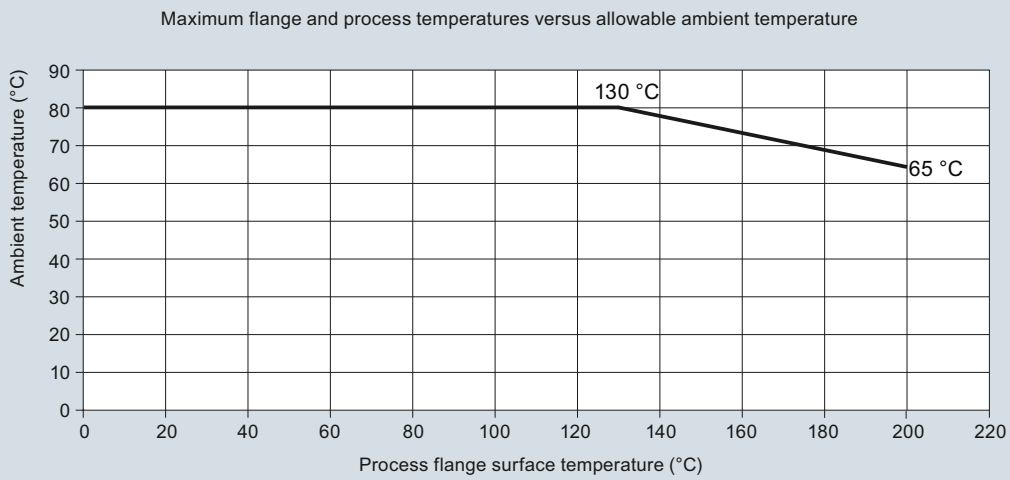
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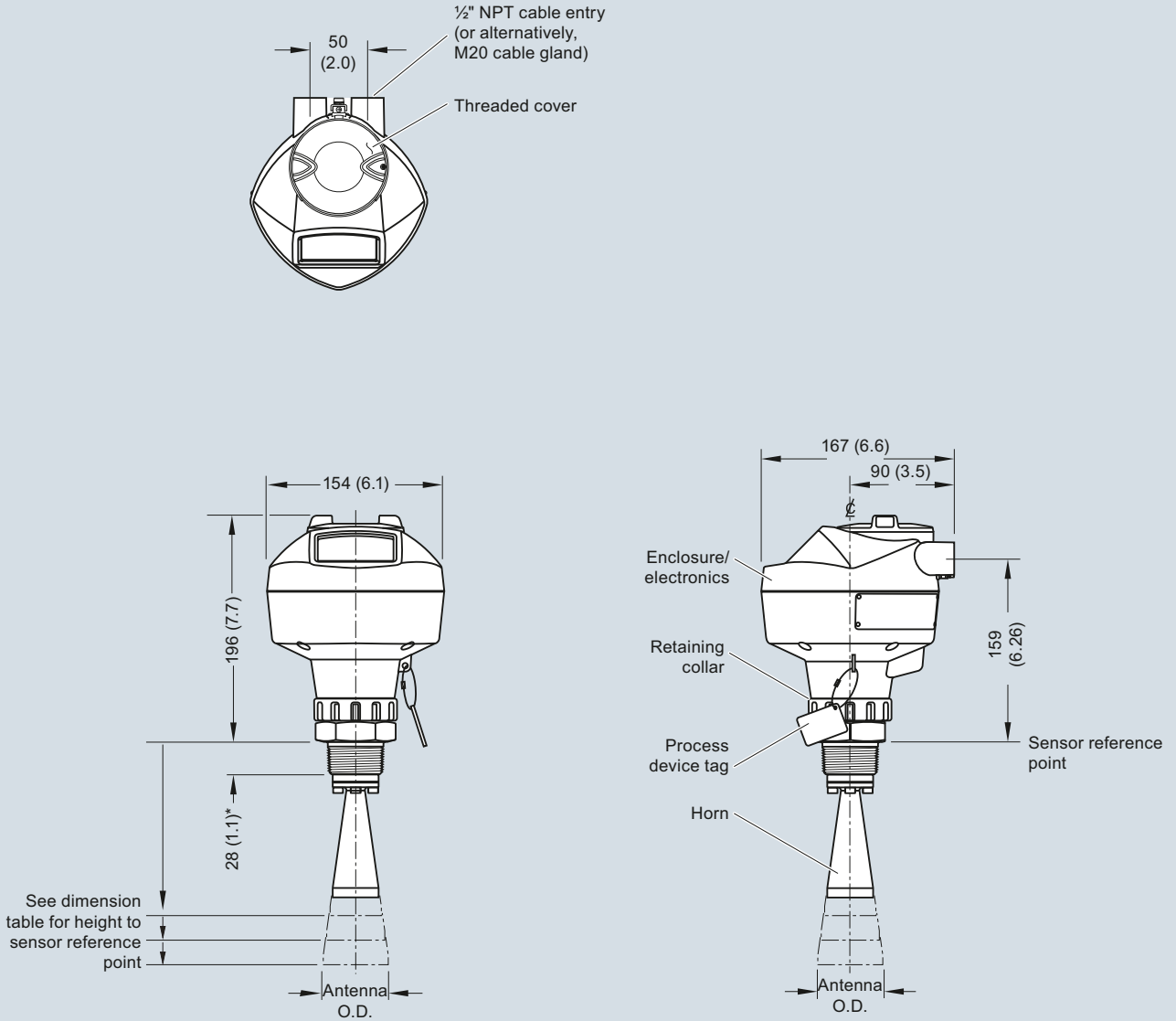
Characteristic curves



SITRANS LR250 ambient/process flange surface temperature curve

Dimensional drawings

Threaded Horn Antenna



*28 mm (1.1) for 1.5 inch and 2 inch, 42 mm (1.65) for 3 inch

Antenna Type	Antenna O.D.	Height to sensor reference point			Beam angle	Measurement range
		1-1/2" threaded connection	2" threaded connection	3" threaded connection		
1.5" horn	39.8 (1.57)	135 (5.3)	N/A	N/A	19 degrees	10 m (32.8 ft)
2" horn	47.8 (1.88)	N/A	166 (6.55)	180 (7.09)	15 degrees	20 m (65.6 ft)
3" horn	74.8 (2.94)	N/A	199 (7.85)	213 (8.39)	10 degrees	20 m (65.6 ft)
4" horn	94.8 (3.73)	N/A	254 (10)	268 (10.55)	8 degrees	20 m (65.6 ft)

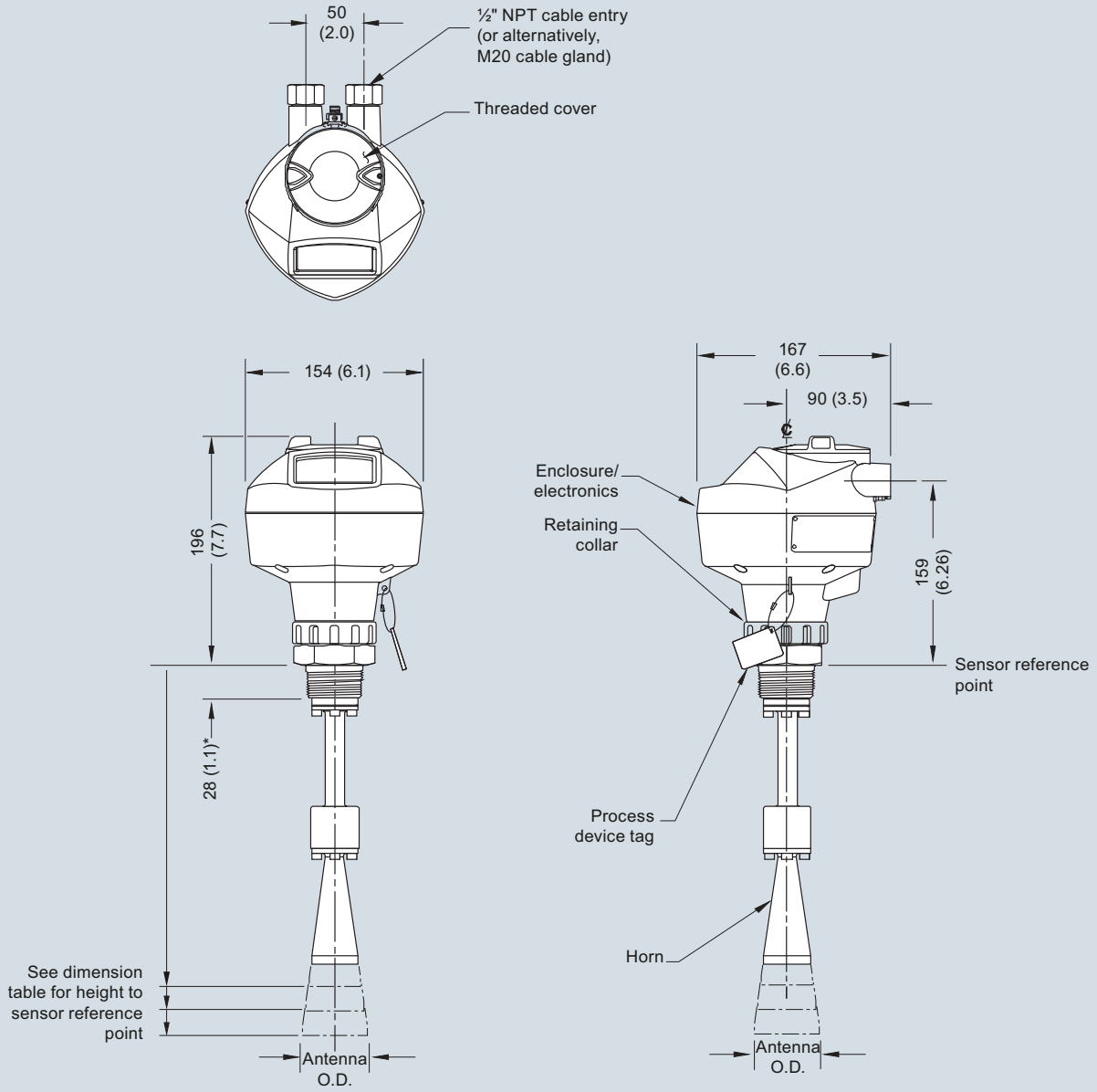
SITRANS LR250 Threaded Horn Antenna, dimensions in mm (inch)

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Continuous level measurement - Radar transmitters

SITRANS LR250 Horn Antenna

Threaded Horn Antenna with Extension

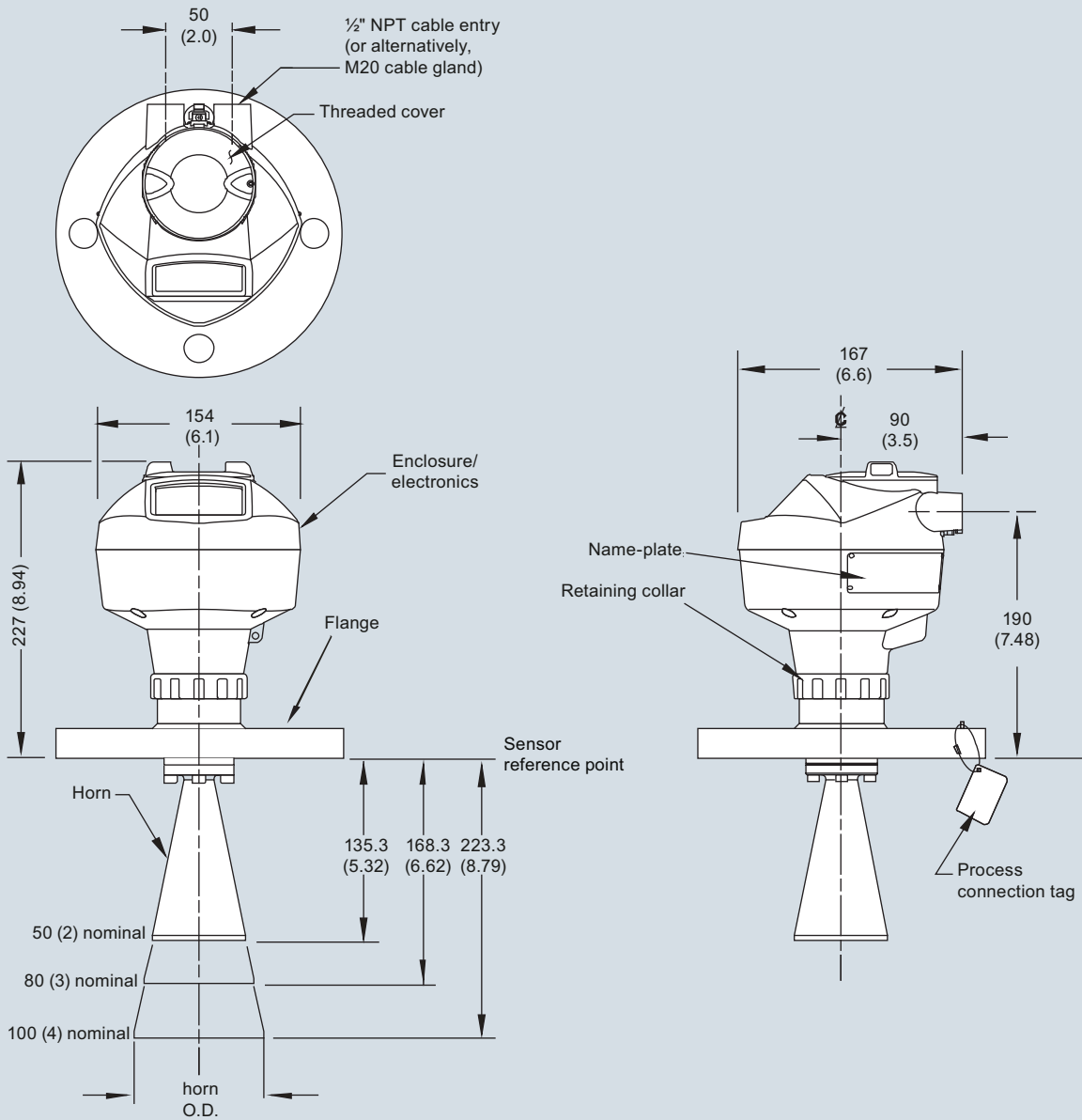


*28 mm (1.1) for 1.5 inch and 2 inch, 42 mm (1.65) for 3 inch

Antenna Type	Antenna O.D.	Height to sensor reference point			Beam angle	Measurement range
		1-1/2" threaded connection	2" threaded connection	3" threaded connection		
1.5" horn	39.8 (1.57)	235 (9.3)	N/A	N/A	19 degrees	10 m (32.8 ft)
2" horn	47.8 (1.88)	N/A	266 (10.47)	280 (11.02)	15 degrees	20 m (65.6 ft)
3" horn	74.8 (2.94)	N/A	299 (11.77)	313 (12.32)	10 degrees	20 m (65.6 ft)
4" horn	94.8 (3.73)	N/A	354 (13.94)	368 (14.49)	8 degrees	20 m (65.6 ft)

SITRANS LR250 Threaded Horn Antenna with extension, dimensions in mm (inch)

Flanged Horn



Nominal Horn Size	Horn O.D.	Height to sensor reference point		Beam angle	Measurement range
		Stainless steel flange raised or flat-faced	Optional alloy flange		
50 (2)	47.8 (1.88)	135.3 (5.32)	138.3 (5.44)	15 degrees	20 m (65.6 ft)
80 (3)	74.8 (2.94)	168.3 (6.62)	171.3 (6.74)	10 degrees	20 m (65.6 ft)
100 (4)	94.8 (3.73)	223.3 (8.79)	226.3 (8.90)	8 degrees	20 m (65.6 ft)

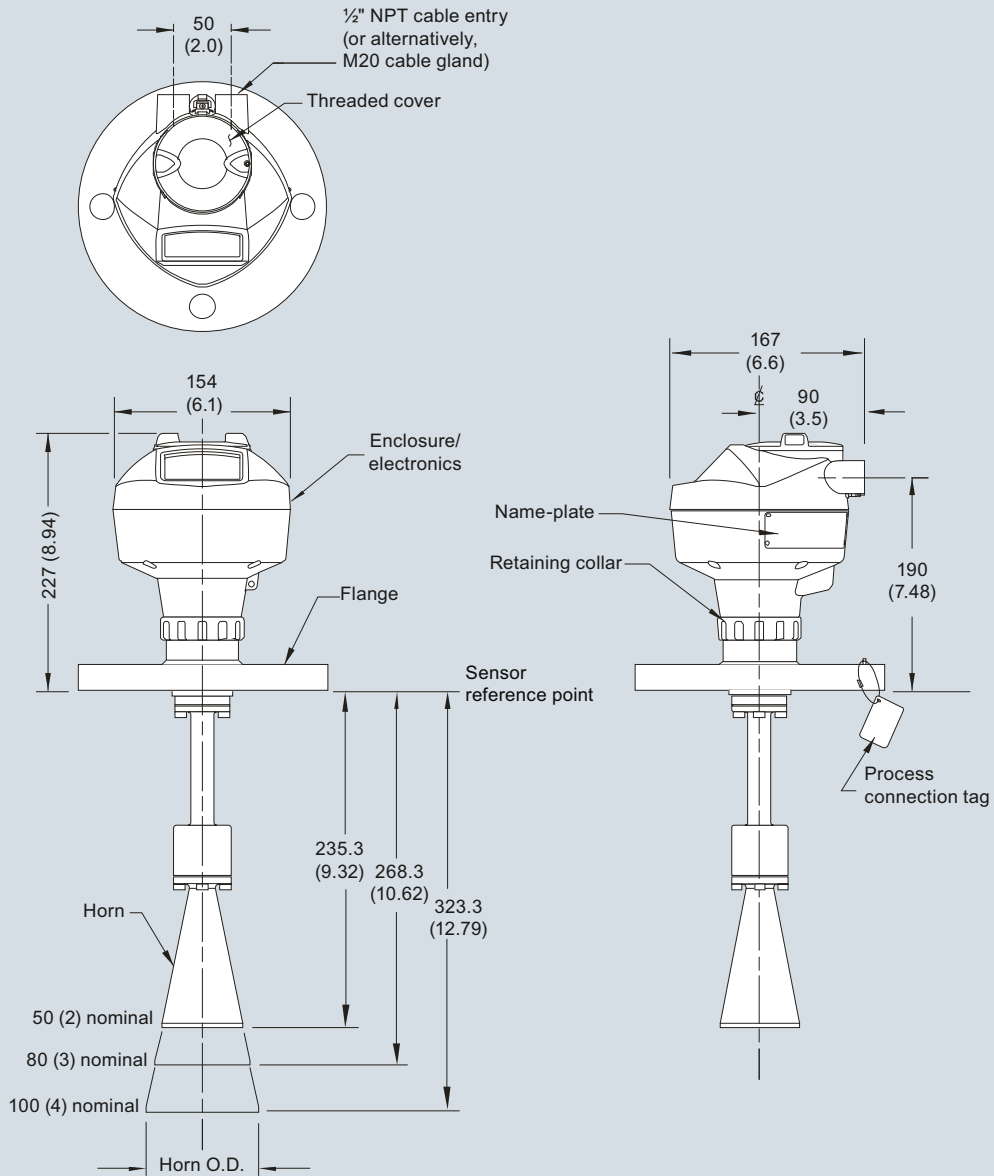
SITRANS LR250 Flanged Horn Antenna, dimensions in mm (inch)

Level Measurement

Continuous level measurement - Radar transmitters

SITRANS LR250 Horn Antenna

Flanged Horn with Extension



Nominal Horn Size	Horn O.D.	Height to sensor reference point		Beam angle	Measurement range
		Stainless steel flange raised or flat-faced	Optional alloy flange		
50 (2)	47.8 (1.88)	235.3 (9.26)	238.3 (9.38)	15 degrees	20 m (65.6 ft)
80 (3)	74.8 (2.94)	268.3 (10.56)	271.3 (10.68)	10 degrees	20 m (65.6 ft)
100 (4)	94.8 (3.73)	323.3 (12.73)	326.3 (12.85)	8 degrees	20 m (65.6 ft)

SITRANS LR250 Flanged Horn Antenna with extension, dimensions in mm (inch)

Schematics

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

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

Level Measurement

Continuous level measurement - Radar transmitters

SITRANS LR250 Specials

Selection and ordering data

SITRANS LR250 Specials

Article No.

SITRANS LR250 horn version enclosures (PROFIBUS PA models)



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

A5E01156836

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

A5E01156838

SITRANS LR250 horn version enclosure with board stack, M20 cable inlet, approval option B, with PROFIBUS PA communication, no process connection

A5E01156841

SITRANS LR250 horn version enclosure with board stack, NPT cable inlet, approval option C, with PROFIBUS PA communication, no process connection

A5E01156843

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

A5E01156844

SITRANS LR250 horn version enclosure with board stack, NPT cable inlet, approval option D, with PROFIBUS communication, no process connection

A5E01156846

SITRANS LR250 horn version enclosure with board stack, M20 cable inlet, approval option D, with PROFIBUS PA communication, no process connection

A5E01156848

SITRANS LR250 horn version enclosures (FOUNDATION Fieldbus models)



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

A5E03769538

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

A5E03769539

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

A5E03769543

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

A5E02654608

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

A5E02653792

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

A5E02653793

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

A5E02654606

SITRANS LR250 Specials

Article No.

SITRANS LR250 horn version enclosures (< 3.6 mA start-up HART)



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

A5E02956317

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

A5E02956319

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

A5E02956320

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

A5E02956322

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

A5E02956323

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

A5E03441096

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

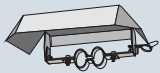

A5E03441097

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

A5E03441098

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

A5E03441099

SITRANS LR250 Specials	
	Article No.
Sun shield for SITRANS LR250 enclosure, stainless steel	
	A5E39142556
SITRANS LR250 horn antenna and extension kits	
38 mm (1.5 inch) horn antenna kit, 1.5" process connections only	A5E01151539
100 mm (4 inch) horn antenna extension kit, 1.5" process connections only	A5E01151553
50 mm (2 inch) stainless steel 316L horn antenna kit	A5E01151569
75 mm (3 inch) stainless steel 316L horn antenna kit	A5E01151571
100 mm (4 inch) stainless steel 316L horn antenna kit	A5E01151573
100 mm (4 inch) horn antenna extension kit, 50 mm (2 inch), 75 mm (3 inch), and 100 mm (4 inch) process connection	A5E01151577
50 mm (2 inch) horn antenna kit, Hastelloy C-22	A5E01151584
75 mm (3 inch) horn antenna kit, Hastelloy C-22	A5E01151585
100 mm (4 inch) horn antenna kit, Hastelloy C-22	A5E01151587
5 Dupont 1Gr Polyback, PTFE grease kit	A5E01151626
SITRANS LR250 lid with O-ring	A5E02465410

Level Measurement

Continuous level measurement - Radar transmitters

SITRANS LR250 threaded PVDF antenna

Overview



SITRANS LR250 with threaded PVDF antenna is a 2-wire, 25 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including corrosives or aggressive materials, to a range of 10 m (32.8 ft) or 20 m (66 ft) when used in a stilling pipe.

Benefits

- Fully insulated PVDF antenna design for use in chemical and sanitary environments where aggressive and corrosive materials are used
- Cost effective replacement for transmitters made of exotic materials
- 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 and 50 mm (2 inch) process connection/antenna allow for easy mounting in nozzles
- Short blanking distance for improved minimum measuring range to 50 mm (2 inch) from the end of the antenna
- Communication using HART or 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
- Suitable for use in Safety Related Systems in accordance with IEC 61508/61511 (SIL-2)
- 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.

The 25 GHz frequency creates a narrow, focused beam allowing for smaller antenna 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 in small vessels and in tanks/vessels up to 10 m (32 ft) on materials with $dk > 3$ or 20 m (66 ft) when used in a stilling pipe with $dk \geq 1.6$.

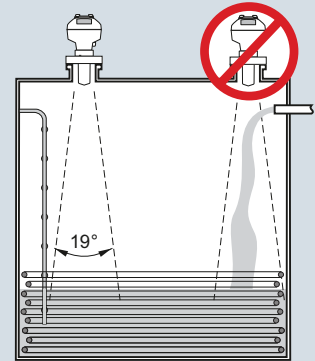
- Key Applications: liquid bulk storage tanks, process vessels with agitators, vaporous liquids, temperatures to 80 °C (176 °F), corrosive and aggressive materials and applications requiring functional safety

Configuration

Installation

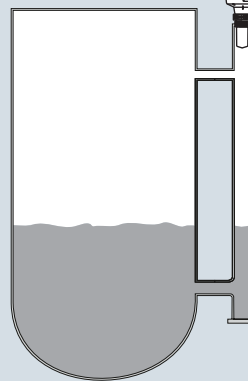
Note:

- 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.



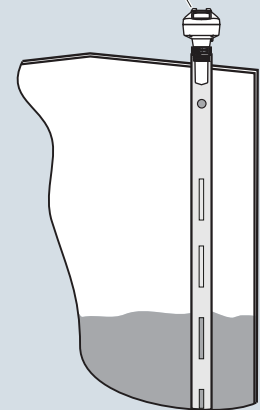
Mounting on bypass

Orient front or back of device toward vent.

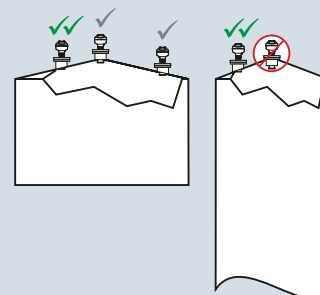


Mounting on stilling well

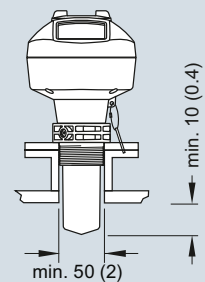
Orient front or back of device toward stillpipe slots.



Mounting on vessel



Mounting on a nozzle



SITRANS LR250 PVDF Antenna installation, dimensions in mm (inch)

Level Measurement

Continuous level measurement - Radar transmitters

SITRANS LR250 threaded PVDF antenna

Technical specifications

Mode of operation		Certificates and approvals	
Measuring principle	Radar level measurement	General	CSA _{US/IC} , CE, FM, NE 21, RCM
Frequency	K-band (25.0 GHz)	Radio	FCC, Industry Canada, and Europe ETSI EN 302-372, RCM
Minimum measuring range	50 mm (2 inch) from end of antenna	Hazardous	
Maximum measuring range	10 m (32.8 ft) or 20 m (66 ft) when used in a stilling pipe with $dk \geq 1.6$	• Explosion Proof (Brazil)	INMETRO Ex d ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da
Output		• Increased Safety (Brazil)	INMETRO Ex e ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da
HART	Version 5.1	• Intrinsically Safe (Brazil)	INMETRO Ex ia IIC T4 Ga, Ex ia ta IIIC T100 °C Da
• Analog output	4 ... 20 mA	• 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
• Accuracy	± 0.02 mA	• 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
• Fail-safe	<ul style="list-style-type: none"> Programmable as high low or hold (loss of echo) NE 43 programmable 	• Non-incendive (Canada/USA)	CSA/FM Class I, Div. 2, Groups A, B, C, D T5
PROFIBUS PA	Profile 3.1	• 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 _A 90 °C
• Function blocks	2 Analog Input (AI)	• Intrinsically Safe (China)	Ex ia IIC T4 Ga, Ex iaD 20 T90 IP67 DIP A20 T _A 90 °C
FOUNDATION Fieldbus	H1	• Non-sparking (China)	NEPSI Ex nA IIC T4 Gc
• Functionality	Basic or LAS	• Intrinsically Safe (Europe)	ATEX II 1G Ex ia IIC T4 Ga
• Version	ITK 5.2.0	• Non-sparking/Energy Limited (Europe)	ATEX II 1D Ex ia ta IIC T100 °C Da
• Function blocks	2 Analog Input (AI)	• Flame Proof (International/Europe)	ATEX II 3G Ex nA IIC T4 Gc
Performance (according to reference conditions IEC60770-1)		• Increased Safety (International/Europe)	IECEX/ATEX II 1/2 GD, 1D, 2D, Ex d mb ia IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da
Maximum measured error	<ul style="list-style-type: none"> > 500 mm from sensor reference point: 3 mm (0.118 inch) < 500 mm from sensor reference point: 25 mm (1 inch) 	• Intrinsically Safe (International)	IECEX/ATEX II 1 G Ex ia IIC T4 Ga, IECEX/ATEX II 1D Ex ia ta IIC T100 °C Da
Influence of ambient temperature	< 0.003 %/K	• Explosion Proof (Russia/Kazakhstan)	EAC Ex d
Rated operating conditions		• Increased Safety (Russia/Kazakhstan)	EAC Ex e
Installation conditions		• Intrinsically Safe (Russia/Kazakhstan)	EAC Ex ia
• Location	Indoor/outdoor	• Marine	<ul style="list-style-type: none"> Lloyd's Register of Shipping ABS Type Approval Bureau Veritas
Ambient conditions (enclosure)		Functional Safety	SIL-2 suitable in accordance with IEC 61508/61511
• Ambient temperature	-40 ... +80 °C (-40 ... +176 °F)	Programming	
• Installation category	I	Intrinsically Safe Siemens handheld programmer	Infrared receiver
• Pollution degree	4	• Approvals for handheld programmer	IS model: ATEX II 1 GD Ex ia IIC T4 Ga Ex ia D 20 T135 °C T _A = -20 ... +50 °C CSA/FM Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G, T6 T _A = +50 °C IECEX SIR 09.0073
Medium conditions		Handheld communicator	HART communicator 375/475
Dielectric constant ϵ_r	≥ 3 (1.6 in stillpipe)	PC	<ul style="list-style-type: none"> SIMATIC PDM Emerson AMS SITRANS DTM (for connection into FDT, such as PACTware or Fieldcare)
Process temperature	-40 ... +80 °C (-40 ... +176 °F) at process connection (Is suitable for CIP at 120 °C for 1/2 hr max.)	Display (local)	Graphic local user interface including quick start wizard and echo profile displays
Process pressure	Up to 5 bar g (72 psi g) temperature dependent. See Pressure/Temperature curves for more information	Power supply	
Design		4 ... 20 mA/HART	Nominal 24 V DC (max. 30 V DC) with max. 550 Ω
Enclosure		PROFIBUS PA	<ul style="list-style-type: none"> 15 mA per IEC 61158-2
• Material	Aluminum, polyester powder-coated	FOUNDATION Fieldbus	<ul style="list-style-type: none"> 20.0 mA per IEC 61158-2
• Cable inlet	2 x M20 x 1.5 or 2 x 1/2" NPT		
Degree of protection	Type 4X/NEMA 4X, Type 6/NEMA 6, IP67, IP68		
Weight	Approximately 3.3 kg (7.27 lb)		
Display (local)	Graphic local user interface including quick start wizard and echo profile display		
Antenna			
• Material	PVDF (Polyvinylidene fluoride)		
• Dimensions (nominal sizes)	2 inch (48 mm)		
Process connections			
• Process connection	2" NPT [(Taper), ASME B1.20.1] 2" [(BSPT), EN 10226] 2" [(BSPP), EN ISO 228-1]		

Level Measurement

Continuous level measurement - Radar transmitters

SITRANS LR250 threaded PVDF antenna

Selection and Ordering data	Article No.
SITRANS LR250 threaded PVDF antenna 7ML5431- 2-wire, 25 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including corrosives or aggressive materials, to a range of 10 m (32.8 ft) or 20m (66ft) when used in a stilling pipe. Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Process Connection and Antenna Material Threaded PVDF antenna 4	
Process Connection Type Threaded connections PVDF 2" NPT (ASME B1.20.1) (tapered thread) PA R 2" [(BSPT), EN 10226-1] (tapered thread) PB G 2" [(BSPP), EN ISO 228-1] (parallel thread) PC	
Communication/Output PROFIBUS PA 1 4 ... 20 mA, HART, start-up at < 3.6 mA 2 FOUNDATION Fieldbus 3	
Enclosure/Cable inlet Aluminum, Epoxy painted 2 x 1/2" NPT 0 2 x M20 x 1.5 1	
Antenna 2 inch(50 mm) threaded PVDF antenna R	
Approvals General Purpose, CE, CSA, FM, FCC, R&TTE, 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: IECEx/ATEX II 1 G Ex ia IIC T4 Ga, IECEx/ATEX II 1D Ex ia ta IIIC T100 °C Da, INMETRO Ex ia IIC T4 Ga, Ex ia ta IIIC T100 °C Da, CE, R&TTE, RCM C Non-incendive: CSA/FM Class I, Div. 2, Groups A, B, C, D T5, FCC, Industry Canada D Non Sparking: ATEX II 3G Ex nA IIC T4 Gc, CE, R&TTE, RCM E Increased Safety: IECEx/ATEX II 1/2 GD, 1D, 2D Ex e mb ia 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, CE, R&TTE, RCM ¹⁾ F Flameproof: IECEx/ATEX II 1/2 GD 1D, 2D Ex d mb ia IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da, INMETRO Ex d ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da, CE, R&TTE, RCM ¹⁾ G Explosion proof: CSA/FM Class I, II and III, Div. 1, Groups A, B, C, D, E, F, G, FCC, Industry Canada ¹⁾ H 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 _A 90 °C L Flameproof: NEPSI Ex d ia mb IIC T4 Ga/Gb, Ex iaD 20 T90 IP67 DIP A20 T _A 90 °C ¹⁾ M Increased Safety: NEPSI Ex e ia mb IIC T4 Ga/Gb, Ex iaD 20 T90 IP67 DIP A20 T _A 90 °C ¹⁾ N	
Pressure rating Rating per Pressure/Temperature curves in manual 2	

¹⁾ Applicable to Communication option 2 only

We can offer shorter delivery times for configurations designated with the Quick Ship Symbol . For details see page 10/11 in the appendix.

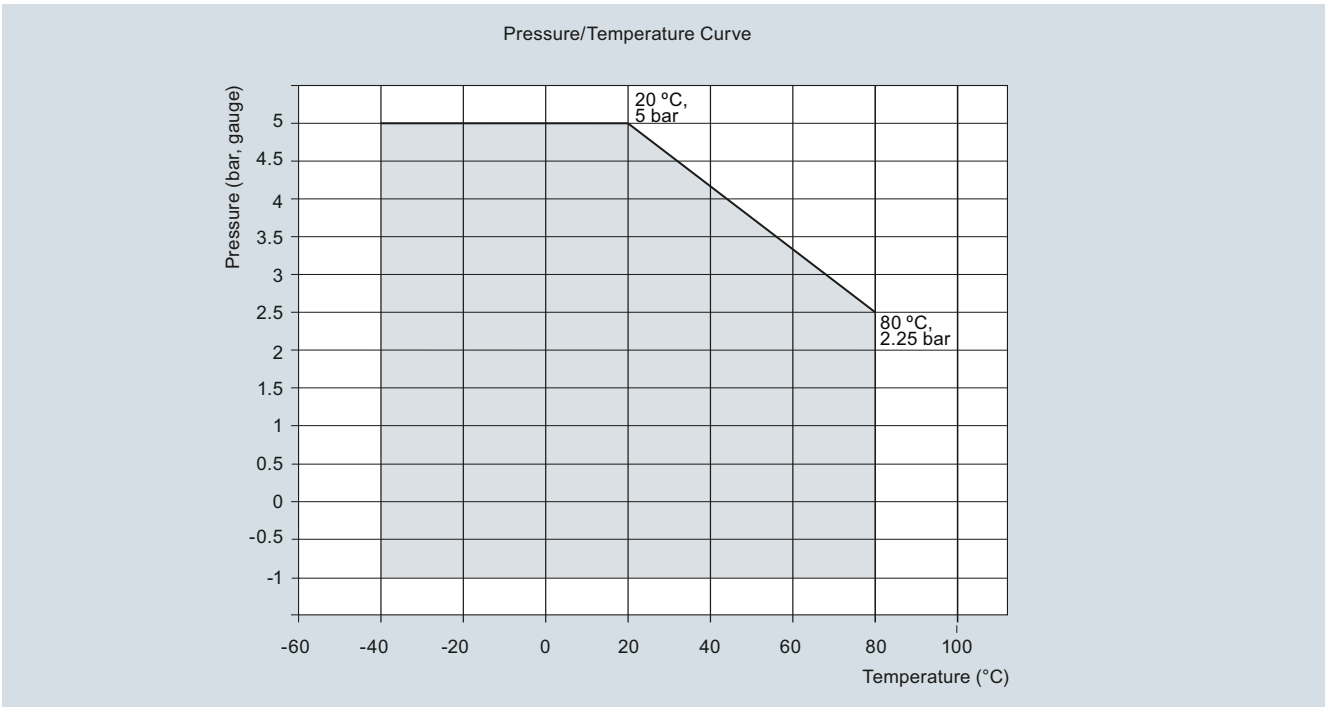
Selection and Ordering data	Order code
Further designs Please add "-Z" to Article No. and specify Order code(s).	
Plug M12 with mating Connector ¹⁾²⁾³⁾ A50	
Plug 7/8" with mating Connector ²⁾³⁾⁴⁾ A55	
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text Y15	
Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000 C11	
Material inspection Certificate Type 3.1 per EN 10204 C12	
Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511 ⁵⁾⁶⁾ C20	
Namur NE43 compliant, device preset to failsafe < 3.6 mA ⁵⁾ N07	
Compact Operating Instructions for HART/ mA device	Article No.
English, French, German, Spanish, Italian, Dutch, Danish, Finnish, Greek, Portuguese (Portugal), Swedish A5E33469191	
English, Bulgarian, Czech, Estonian, Hungarian, Latvian, Lithuanian, Polish, Romanian, Slovakian, Slovenian A5E33469171	
English, Portuguese (Brazil), Chinese A5E34046583	
Note: The Operating Instructions should be ordered as a separate line item on the order. All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Compact Operating Instructions for PROFIBUS PA device	
English, French, German, Spanish, Italian, Dutch, Danish, Finnish, Greek, Portuguese (Portugal), Swedish A5E33469239	
English, Bulgarian, Czech, Estonian, Hungarian, Latvian, Lithuanian, Polish, Romanian, Slovakian, Slovenian A5E33472685	
English, Portuguese (Brazil), Chinese A5E34046624	
Note: The Operating Instructions should be ordered as a separate line item on the order. All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
We can offer shorter delivery times for configurations designated with the Quick Ship Symbol . For details see page 10/11 in the appendix.	

Level Measurement
Continuous level measurement - Radar transmitters

SITRANS LR250 threaded PVDF antenna

Selection and Ordering data	Article No.	Selection and Ordering data	Article No.
<p>Compact Operating Instructions for FOUNDATION Fieldbus device</p> <p>English, French, German, Spanish, Italian, Dutch, Danish, Finnish, Greek, Portuguese (Portugal), Swedish</p> <p>English, Bulgarian, Czech, Estonian, Hungarian, Latvian, Lithuanian, Polish, Romanian, Slovakian, Slovenian</p> <p>English, Portuguese (Brazil), Chinese</p> <p>Note: The Operating Instructions should be ordered as a separate line item on the order.</p> <p>All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation</p>	<p>A5E33472700</p> <p>A5E33472738</p> <p>A5E34046626</p>	<p>Accessories</p> <p>Handheld programmer, Intrinsically safe, EEx ia</p> <p>HART modem/USB (for use with a PC and SIMATIC PDM)</p> <p>One metallic cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F), HART</p> <p>One metallic cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F), PROFIBUS PA and FOUNDATION Fieldbus²⁾</p> <p>FDA approved FKM o-ring for 2" G (BSPP) process connections -28 ... +80 °C (-28 ... +176 °F)</p> <p>SITRANS RD100, loop powered display - see Chapter 7</p> <p>SITRANS RD200, universal input display with Modbus conversion - see Chapter 7</p> <p>SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7</p> <p>SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7</p> <p>For applicable back up point level switch - see point level measurement section</p>	<p>7ML1930-1BK</p> <p>7MF4997-1DB</p> <p>7ML1930-1AP</p> <p>7ML1930-1AQ</p> <p>7ML1830-3AN</p> <p>7ML5741-...</p> <p>7ML5740-...</p> <p>7ML5744-...</p> <p>7ML5750-...</p>
<p>Other Operating Instructions</p> <p>SITRANS LR250 Functional Safety manual, English</p> <p>Note: The Operating Instructions should be ordered as a separate line item on the order.</p> <p>All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation</p>	<p>A5E32286471</p>	<p>¹⁾ Available with Enclosure option 1 only</p> <p>²⁾ To be used with Communication options 1 and 3 only. Connector has IP67 rating.</p> <p>³⁾ Available with Approval options A and B. Available with approval option C for use on intrinsically safe applications only. Not rated for dust Ex.</p> <p>⁴⁾ Available with Enclosure option 0 only</p> <p>⁵⁾ Available with communication option 2 only</p> <p>⁶⁾ Available with approval options A, B, C, D, E, K, and L only</p>	

Characteristic curves



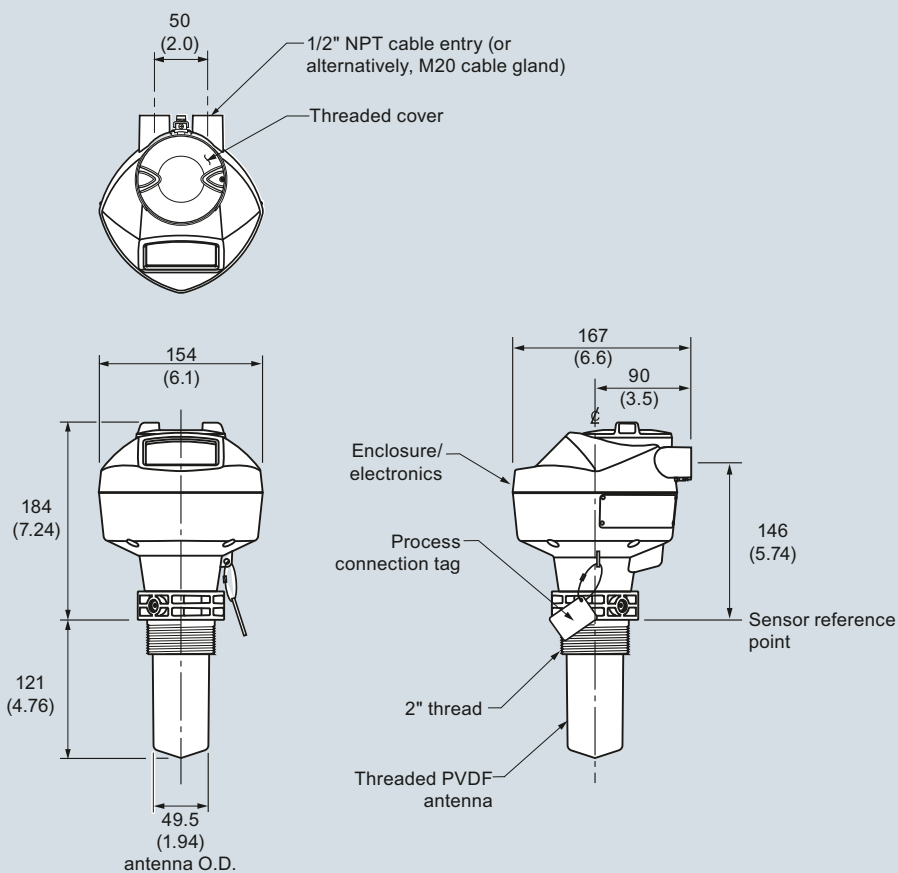
SITRANS LR250 PVDF Antenna pressure/temperature curve

Level Measurement

Continuous level measurement - Radar transmitters

SITRANS LR250 threaded PVDF antenna

Dimensional drawings



SITRANS LR250 PVDF Antenna, dimensions in mm (inch)

Schematics

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

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	Home	Menu	Download
←	↑	↓	→

Part number: 7ML1930-1BK

Notes:

- 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.
- All field wiring must have insulation suitable for rated input voltages.
- Use shielded twisted pair cable (14 ... 22 AWG) for HART version.
- Separate cables and conduit may be required to conform to standard instrumentation wiring practices or electrical codes.

SITRANS LR250 connections

Selection and ordering data

SITRANS LR250 threaded PVDF Specials	Article No.	SITRANS LR250 threaded PVDF Specials	Article No.
SITRANS LR250 threaded PVDF antenna version enclosures (PROFIBUS PA models)		SITRANS LR250 threaded PVDF antenna version enclosures (< 3.6 mA start-up HART 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 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 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, M20 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, NPT 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, M20 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)		SITRANS LR250 enclosure with board stack, NPT 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	
SITRANS LR250 enclosure with board stack, M20 cable inlet, approval option C, with FOUNDATION Fieldbus communication, no process connection	A5E03589280	Antenna kit 2" NPT threaded PVDF	A5E03528941
SITRANS LR250 enclosure with board stack, NPT cable inlet, approval option D, with FOUNDATION Fieldbus communication, no process connection	A5E03589281	Antenna kit 2" R (BSPT) threaded PVDF	A5E03528943
SITRANS LR250 enclosure with board stack, M20 cable inlet, approval option E, with FOUNDATION Fieldbus communication, no process connection	A5E03589283	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

Level Measurement

Continuous level measurement - Radar transmitters

SITRANS LR250 Flanged Encapsulated Antenna

Overview



SITRANS LR250 with flanged encapsulated antenna is a 2-wire, 25 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including corrosives or aggressive materials, to a range of 20 m (66 ft) (antenna dependent).

SITRANS LR250 measures superbly in small vessels and in tanks/vessels up to 20 m (66 ft) on materials with $dk > 1.6$.

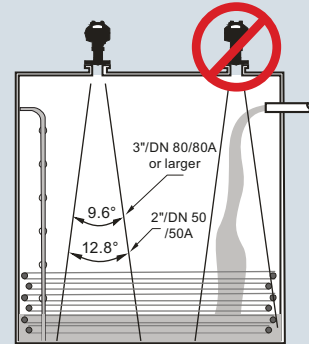
- Key Applications: liquid bulk storage tanks, process vessels with agitators, vaporous liquids, temperatures to 170 °C (338 °F), corrosive and aggressive materials and applications where ease of cleaning is required such as food or fine chemicals

Configuration

Installation

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.



Benefits

- Fully encapsulated horn antenna design with FDA approved TFM 1600 PTFE lens for use in chemical and sanitary environments where aggressive and corrosive materials are used
- Cost effective replacement for transmitters made of exotic materials
- 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 and 50 mm (2 inch) process connection/antenna allow for easy mounting
- Insensitive to mounting location and obstructions, and less sensitive to nozzle interference
- Short blanking distance for improved minimum measuring range to 50 mm (2 inch) from the end of the antenna
- 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
- Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511
- Suitable for API 2350

Application

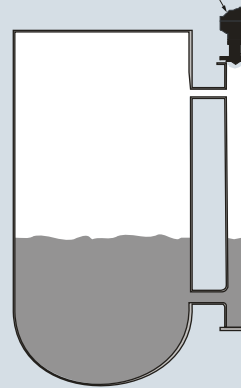
SITRANS LR250 includes a graphical local user interface (LUI) that improves setup and operation by including an intuitive Quick Start Wizard, and echo profile displays for diagnostic support. Startup is easy using Quick Start Wizard with a few parameters required for basic operation.

The 25 GHz frequency creates a narrow, focused beam allowing for smaller antenna 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.

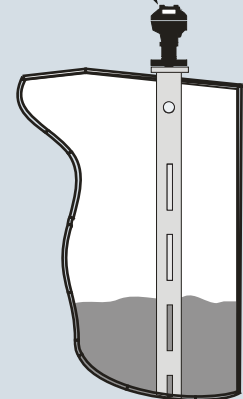
Mounting on bypass

Orient front or back of device toward vent.

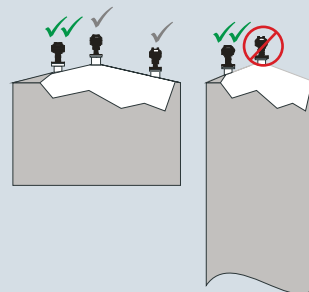


Mounting on stilling well

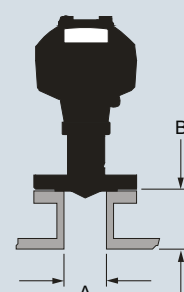
Orient front or back of device toward stillpipe slots.



Mounting on vessel



Mounting on a nozzle



A	B*
ø 50 (2)	500 (20) max.
ø 80 (3)	500 (20) max.
ø 100 (4)	500 (20) max.
ø 150 (6)	500 (20) max.

*Reference conditions

SITRANS LR250 Flanged Encapsulated Antenna installation, dimensions in mm (inch)

Level Measurement

Continuous level measurement - Radar transmitters

SITRANS LR250 Flanged Encapsulated Antenna

Technical specifications

Mode of operation		Process connections	
Measuring principle	Radar level measurement	Flanged connection	Raised Face
Frequency	K-band (25.0 GHz)		<ul style="list-style-type: none"> • 2, 3, 4, 6" Class 150 ASME B16.5 • 50A, 80A, 100A, 150A 10K JIS B 2220 • DN 50, DN 80, DN 100 & DN 150 PN 10/16 EN 1092-1 type B1
Minimum measuring range	50 mm (2 inch) from end of antenna		
Maximum measuring range	20 m (66 ft)		
Output		Power supply	
HART	Version 5.1	4 ... 20 mA/HART	Nominal 24 V DC (max. 30 V DC) with max. 550 Ω
<ul style="list-style-type: none"> • Analog output • Accuracy • Fail-safe 	4 ... 20 mA ± 0.02 mA <ul style="list-style-type: none"> • Programmable as high low or hold (loss of echo) • NE 43 programmable 	PROFIBUS PA	<ul style="list-style-type: none"> • 15 mA • Per IEC 61158-2
PROFIBUS PA	Profile 3.01	FOUNDATION Fieldbus	<ul style="list-style-type: none"> • 20.0 mA • Per IEC 61158-2
<ul style="list-style-type: none"> • Function blocks 	2 Analog Input (AI)		
FOUNDATION Fieldbus	H1		
<ul style="list-style-type: none"> • Functionality • Version • Function blocks 	Basic or LAS ITK 5.2.0 2 Analog Input (AI)		
Performance (according to reference conditions IEC60770-1)		Certificates and approvals	
Maximum measured error	<ul style="list-style-type: none"> • > 500 mm from sensor reference point: 3 mm (0.118 inch) • < 500 mm from sensor reference point: 25 mm (1 inch) 	General	CSA _{US/CA} , CE, FM, NE 21, RCM
Influence of ambient temperature	< 0.003 %/K	Radio	FCC, Industry Canada, and Europe ETSI EN 302-372, RCM
Rated operating conditions		Hazardous	
Installation conditions		<ul style="list-style-type: none"> • Explosion Proof (Brazil) 	INMETRO Ex d ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da
<ul style="list-style-type: none"> • Location 	Indoor/outdoor	<ul style="list-style-type: none"> • Increased Safety (Brazil) 	INMETRO Ex e ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da
Ambient conditions (enclosure)		<ul style="list-style-type: none"> • Intrinsically Safe (Brazil) 	INMETRO Ex ia IIC T4 Ga, Ex ia ta IIIC T100 °C Da
<ul style="list-style-type: none"> • Ambient temperature 	-40 ... +80 °C (-40 ... +176 °F)	<ul style="list-style-type: none"> • 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
<ul style="list-style-type: none"> • Installation category 	I	<ul style="list-style-type: none"> • 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
<ul style="list-style-type: none"> • Pollution degree 	4	<ul style="list-style-type: none"> • Non-incendive (Canada/USA) 	CSA/FM Class I, Div. 2, Groups A, B, C, D T5
Medium conditions		<ul style="list-style-type: none"> • Flame Proof/Increased Safety (China) 	NEPSI Ex d ia mb IIC T4 Ga/Gb, Ex e ia mb ia IIC T4 Ga/Gb, Ex iaD tD A20 IP67 T100 °C
Dielectric constant ϵ_r	≥ 1.6 (antenna dependent)	<ul style="list-style-type: none"> • Intrinsically Safe (China) 	NEPSI Ex ia IIC T4 Ga, Ex iaD tD A20 IP67 T100 °C
Process temperature	-40 ... +170 °C (-40 ... +338 °F) at process connection	<ul style="list-style-type: none"> • Non-sparking/Energy Limited (China) 	NEPSI Ex nA IIC T4 Gc
Process pressure	See Pressure/Temperature curves for more information (page 4/228)	<ul style="list-style-type: none"> • Intrinsically Safe (Europe) 	ATEX II 1G Ex ia IIC T4 Ga
Design		<ul style="list-style-type: none"> • Non-sparking/Energy Limited (Europe) 	ATEX II 1D Ex ia ta IIIC T100 °C Da
Enclosure		<ul style="list-style-type: none"> • Flame Proof (International/Europe) 	ATEX II 3G Ex nA IIC T4 Gc
<ul style="list-style-type: none"> • Material • Cable inlet 	Aluminum, polyester powder-coated 2 x M20 x 1.5 or 2 x 1/2" NPT	<ul style="list-style-type: none"> • Increased Safety (International/Europe) 	IECEX/ATEX II 1/2 GD, 1D, 2D Ex d mb ia IIC T4 Ga/Gb, Ex ia ta IIC T100 °C Da
Degree of protection	Type 4X/NEMA 4X, Type 6/NEMA 6, IP67, IP68	<ul style="list-style-type: none"> • Intrinsically Safe (International) 	IECEX/ATEX II 1/2 GD, 1D, 2D, Ex e mb ia IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da
Weight (dependent on process connection)	<ul style="list-style-type: none"> • Approx. 7 kg (15.43 lb) for 2" Class 150 ASME B16.5 raised face flange (smallest size) • Approx. 17.7 kg (39.02 lb) for 6" Class 150 ASME B16.5 raised face flange (largest size) 	<ul style="list-style-type: none"> • Explosion Proof (Russia/Kazakhstan) • Increased Safety (Russia/Kazakhstan) • Intrinsically Safe (Russia/Kazakhstan) • Marine 	IECEX/ATEX II 1 G Ex ia IIC T4 Ga, IECEX/ATEX II 1D Ex ia ta IIIC T100 °C Da
Display (local)	Graphic local user interface including quick start wizard and echo profile display	<ul style="list-style-type: none"> • Functional Safety 	EAC Ex d
Antenna			EAC Ex e
<ul style="list-style-type: none"> • Material 	Stainless Steel 316L (1.4435 or 1.4404) and TFM 1600 PTFE Lens (lens is the only wetted part)		EAC Ex ia
<ul style="list-style-type: none"> • Dimensions (nominal sizes) 	48 mm (2 inch), 80 mm (3 inch), 100 mm (4 inch), 150 mm (6 inch)		<ul style="list-style-type: none"> • Lloyd's Register of Shipping • ABS Type Approval • Bureau Veritas
			SIL-2 suitable in accordance with IEC 61508/61511

Level Measurement

Continuous level measurement - Radar transmitters

SITRANS LR250 Flanged Encapsulated Antenna

Programming

Intrinsically Safe Siemens handheld programmer

- Approvals for handheld-programmer

Handheld communicator

PC

Display (local)

Infrared receiver


IS model: ATEX II 1 GD Ex ia IIC T4 Ga Ex ia D 20 T135 °C
 T_a = -20... +50 °C CSA/FM Class I, II, III, Div. 1,
 Groups A, B, C, D, E, F, G, T6
 T_a = 50 °C IECEx SIR 09.0073


HART communicator 375/475

- SIMATIC PDM
- Emerson AMS
- SITRANS DTM (for connection into FDT such as PACTware or Field-care)

Graphic local user interface including quick start wizard and echo profile displays

Selection and Ordering data

SITRANS LR250 flanged encapsulated antenna  **7ML5432-**
 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) (antenna dependant). Ideal for corrosive, aggressive and low dielectric media.













 Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Process Connection Material




Stainless steel 1.4404/1.4435

Process Connection Type




Flanged Process Connection Types
 (stainless steel 1.4404/1.4435)

- 2" Class 150 ASME B16.5 raised face¹⁾  **BF**
- 3" Class 150 ASME B16.5 raised face  **BG**
- 4" Class 150 ASME B16.5 raised face  **BH**
- 6" Class 150 ASME B16.5 raised face  **BJ**
- 50A 10K JIS B 2220 raised face¹⁾  **FD**
- 80A 10K JIS B 2220 raised face  **FE**
- 100A 10K JIS B 2220 raised face  **FF**
- 150A 10K JIS B 2220 raised face  **FG**
- DN 50 PN 10/16 EN 1092-1 type B1 raised face¹⁾  **GA**
- DN 80 PN 10/16 EN 1092-1 type B1 raised face  **GB**
- DN 100 PN 10/16 EN 1092-1 type B1 raised face  **GC**
- DN 150 PN 10/16 EN 1092-1 type B1 raised face  **GD**

Communication/Output

- PROFIBUS PA  **1**
- 4 ... 20 mA, HART, start-up at < 3.6 mA  **2**
- FOUNDATION Fieldbus  **3**













Enclosure/Cable inlet

- Aluminum, Epoxy painted  **0**
- 2 x 1/2" NPT  **1**
- 2 x M20 x 1.5  **1**

Antenna lens material

- TFM 1600 PTFE Flush Lens  **A**



Approvals

- General Purpose, CE, CSA, FM, FCC, R&TTE, 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: IECEx/ATEX II 1 G Ex ia IIC T4 Ga, IECEx/ATEX II 1D Ex ia ta IIIC T100 °C Da, INMETRO Ex ia IIC T4 Ga, Ex ia ta IIIC T100 °C Da, CE, R&TTE, RCM  **C**
- Non-incendive: CSA/FM Class I, Div. 2, Groups A, B, C, D T5, FCC, Industry Canada  **D**
- Non Sparking: ATEX II 3G Ex nA IIC T4 Gc, CE, R&TTE, RCM  **E**
- Increased Safety: IECEx/ATEX II 1/2 GD, 1D, 2D Ex e mb ia 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, CE, R&TTE, RCM²⁾  **F**
- Flameproof: IECEx/ATEX II 1/2 GD 1D, 2D Ex d mb ia IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da, INMETRO Ex d ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da, CE, R&TTE, RCM²⁾  **G**
- Explosion proof: CSA/FM Class I, II and III, Div. 1, Groups A, B, C, D, E, F, G, FCC, Industry Canada²⁾  **H**
- Non Sparking: NEPSI Ex nA IIC T4 Gc  **K**
- Intrinsically Safe: NEPSI Ex ia IIC T4 Ga, Ex iaD tD A20 IP67 T100 °C  **L**
- Flameproof: NEPSI Ex d ia mb IIC T4 Ga/Gb, Ex iaD tD A20 IP67 T100 °C²⁾  **M**
- Increased Safety: NEPSI Ex e ia mb IIC T4 Ga/Gb, Ex iaD tD A20 IP67 T100 °C²⁾  **N**

Pressure rating

- Rating per Pressure/Temperature curves in instruction manual  **0**

- 1) Maximum range 10 m (32.8 ft), dk > 3 [20 m (66 ft)] and dk > 1.6 when mounted in stillpipe]
- 2) Applicable with communication option 2 only

 We can offer shorter delivery times for configurations designated with the Quick Ship Symbol . For details see page 10/11 in the appendix.

Level Measurement

Continuous level measurement - Radar transmitters

SITRANS LR250 Flanged Encapsulated Antenna

Selection and Ordering data	Order code	Selection and Ordering data	Article No.	
Further designs Please add *-Z to Article No. and specify Order code(s).				
Plug M12 with mating Connector ¹⁾²⁾³⁾	◆ A50	Compact Operating Instructions for FOUNDATION Fieldbus device English, French, German, Spanish, Italian, Dutch, Danish, Finnish, Greek, Portuguese (Portugal), Swedish English, Bulgarian, Czech, Estonian, Hungarian, Latvian, Lithuanian, Polish, Romanian, Slovakian, Slovenian English, Portuguese (Brazil), Chinese Note: The Operating Instructions should be ordered as a separate line item on the order. All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	A5E33472700 A5E33472738 A5E34046626	
Plug 7/8" with mating Connector ²⁾³⁾⁴⁾	◆ A55			
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text	◆ Y15			
Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000	◆ C11	Other Operating Instructions SITRANS LR250 Functional Safety manual, English Note: The Operating Instructions should be ordered as a separate line item on the order. All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	A5E32286471	
Material inspection Certificate Type 3.1 per EN 10204	◆ C12			
Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511 ⁵⁾⁶⁾	◆ C20			
Namur NE43 compliant, device preset to failsafe < 3.6 mA ⁵⁾	◆ N07			
Compact Operating Instructions for HART/ mA device English, French, German, Spanish, Italian, Dutch, Danish, Finnish, Greek, Portuguese (Portugal), Swedish English, Bulgarian, Czech, Estonian, Hungarian, Latvian, Lithuanian, Polish, Romanian, Slovakian, Slovenian English, Portuguese (Brazil), Chinese Note: The Operating Instructions should be ordered as a separate line item on the order. All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation				Article No
	A5E33469191			
	A5E33469171			
	A5E34046583			
Compact Operating Instructions for PROFIBUS PA device English, French, German, Spanish, Italian, Dutch, Danish, Finnish, Greek, Portuguese (Portugal), Swedish English, Bulgarian, Czech, Estonian, Hungarian, Latvian, Lithuanian, Polish, Romanian, Slovakian, Slovenian English, Portuguese (Brazil), Chinese Note: The Operating Instructions should be ordered as a separate line item on the order. All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation		Accessories Handheld programmer, Intrinsically safe, EEx ia HART modem/USB (for use with a PC and SIMATIC PDM) One metallic cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F), HART (2 are required) ⁶⁾ One metallic cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F), PROFIBUS PA and FOUNDATION Fieldbus (2 are required) ²⁾ SITRANS RD100, loop powered display - see Chapter 7 SITRANS RD200, universal input display with Modbus conversion - see Chapter 7 SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7 SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7 For applicable back up point level switch - see point level measurement section	7ML1930-1BK 7MF4997-1DB 7ML1930-1AP 7ML1930-1AQ 7ML5741-... 7ML5740-... 7ML5744-... 7ML5750-...	
	A5E33469239			
	A5E33472685			
	A5E34046624			

- 1) Available with enclosure option 1 only
- 2) Available with communication options 1 and 3 only
- 3) Available with approval options A, B, C, and L only
- 4) Available with enclosure option 0 only
- 5) Applicable with communication option 2 only
- 6) Available with approval options A, B, C, D, E, K, and L only

◆ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ◆. For details see page 10/11 in the appendix.

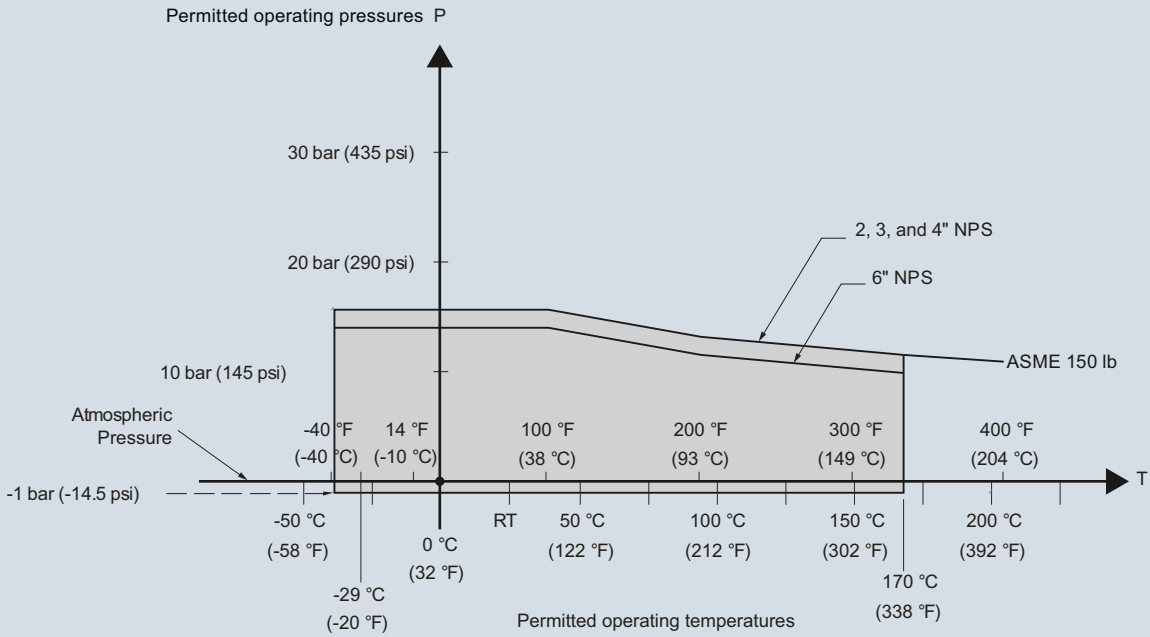
Level Measurement

Continuous level measurement - Radar transmitters

SITRANS LR250 Flanged Encapsulated Antenna

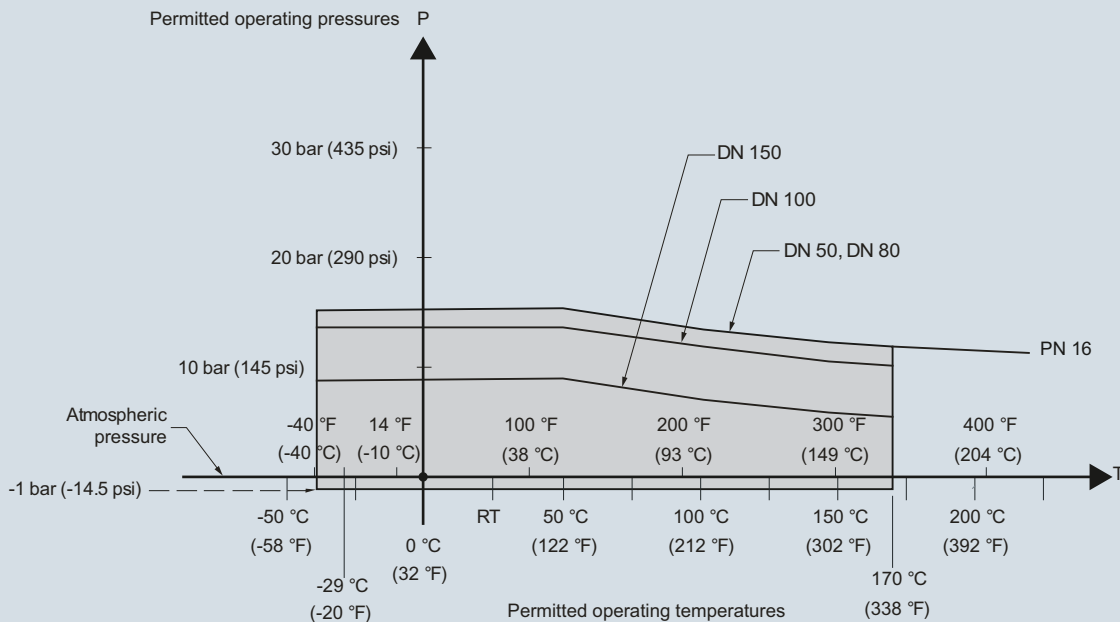
Characteristic curves

Pressure/ temperature curve
 LR250 Flanged Encapsulated Antenna
 ASME flanged process connections
 (7ML5432)



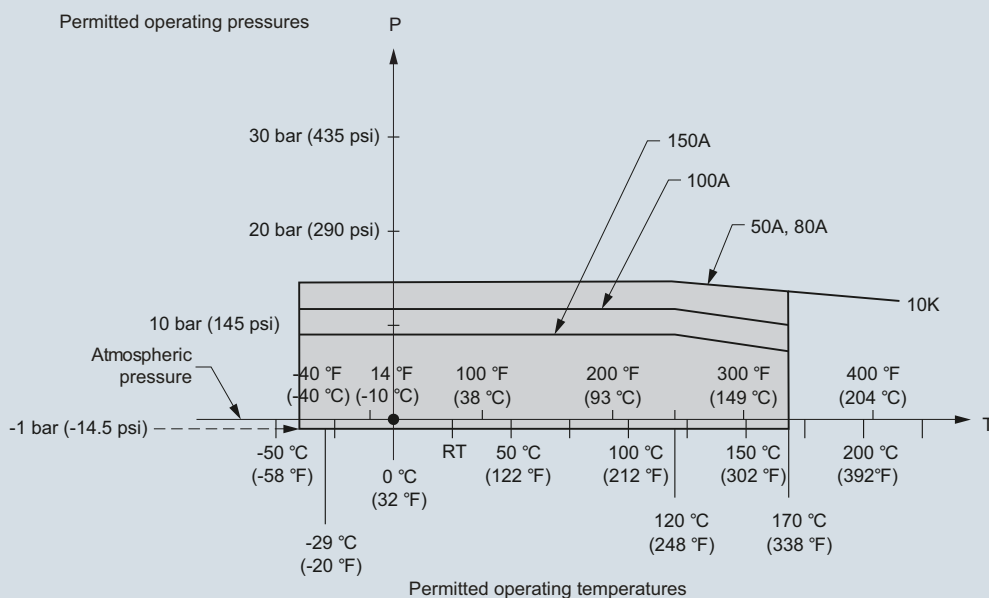
SITRANS LR250 Flanged Encapsulated Antenna pressure/temperature curve

Pressure/ temperature curve
LR250 Flanged Encapsulated Antenna
EN 1092-1 flanged process connections
(7ML5432)



SITRANS LR250 Flanged Encapsulated Antenna pressure/temperature curve

Pressure/ temperature curve
LR250 Flanged Encapsulated Antenna
JIS B 2220 flanged process connections
(7ML5432)



SITRANS LR250 Flanged Encapsulated Antenna pressure/temperature curve

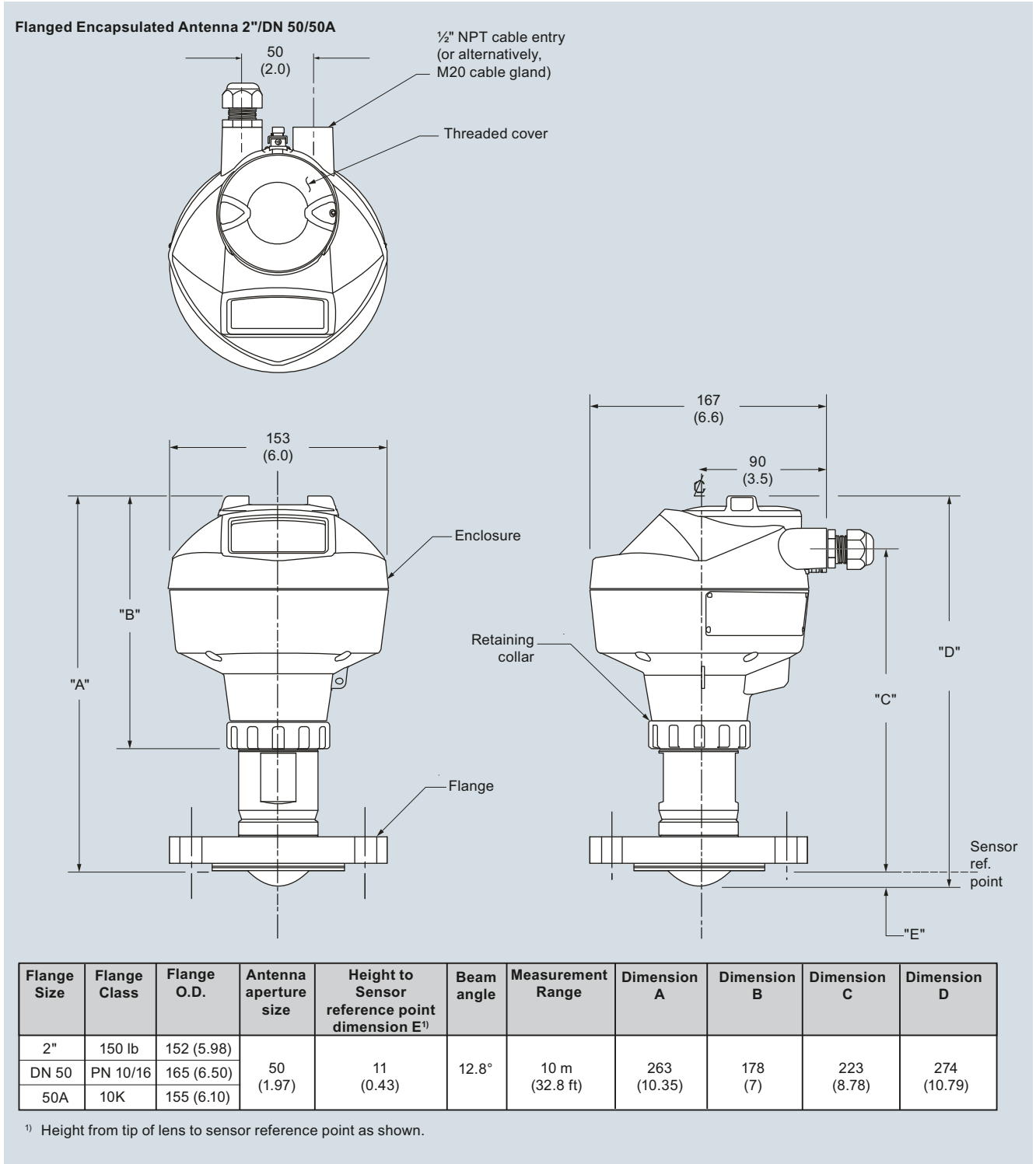
4

Level Measurement

Continuous level measurement - Radar transmitters

SITRANS LR250 Flanged Encapsulated Antenna

Dimensional drawings

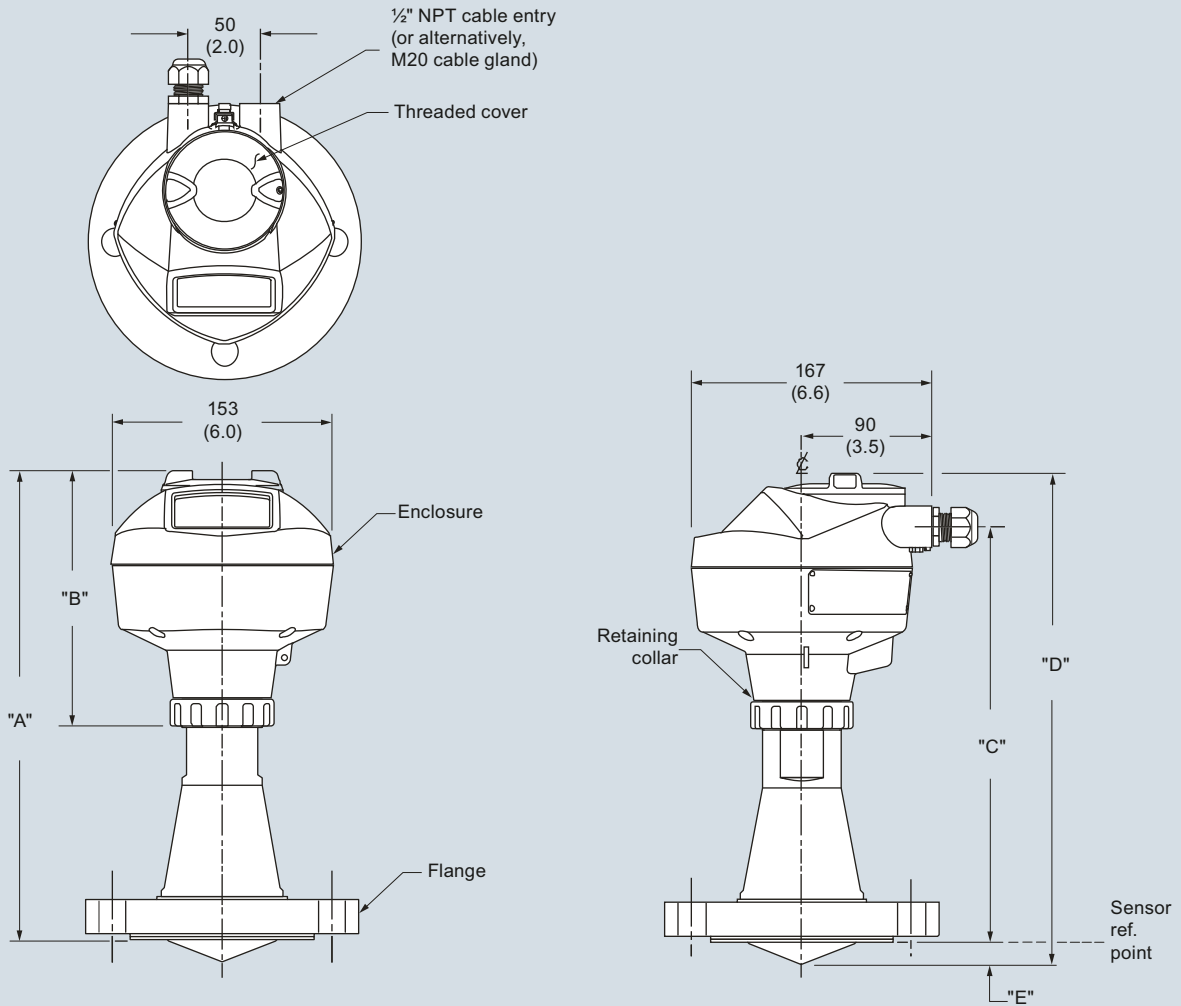


SITRANS LR250 Flanged Encapsulated Antenna, dimensions in mm (inch)

Level Measurement
Continuous level measurement - Radar transmitters

SITRANS LR250 Flanged Encapsulated Antenna

Flanged Encapsulated Antenna 3"/DN 50/80A or greater



Flange Size	Flange Class	Flange O.D.	Antenna aperture size	Height to Sensor reference point dimension E ¹⁾	Beam angle	Measurement Range	Dimension A	Dimension B	Dimension C	Dimension D
3"	150 lb	190 (7.48)	75 (2.95)	15 (0.59)	9.6°	20 m (65.6 ft)	328 (12.91)	178 (7)	288 (11.34)	343 (13.54)
DN 80	PN 10/16	200 (7.87)								
80A	10K	185 (7.28)								
4"	150 lb	230 (9.06)	75 (2.95)	13 (0.51)	9.6°	20 m (65.6 ft)	328 (12.91)	178 (7)	288 (11.34)	343 (13.50)
DN 100	PN 10/16	220 (8.66)								
100A	10K	210 (8.27)								
6"	150 lb	280 (11.02)	75 (2.95)	15 (0.59)	9.6°	20 m (65.6 ft)	333 (13.11)	178 (7)	293 (11.54)	348 (13.70)
DN 150	PN 10/16	285 (11.25)								
150A	10K	280 (11.02)								

¹⁾ Height from tip of lens to sensor reference point as shown.

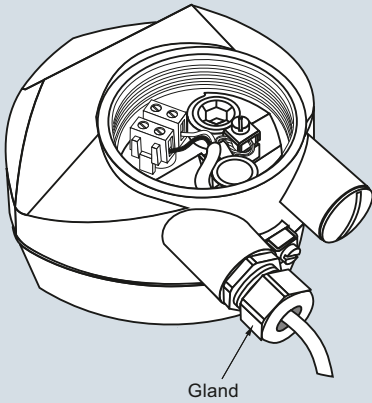
SITRANS LR250 Flanged Encapsulated Antenna, dimensions in mm (inch)

Level Measurement

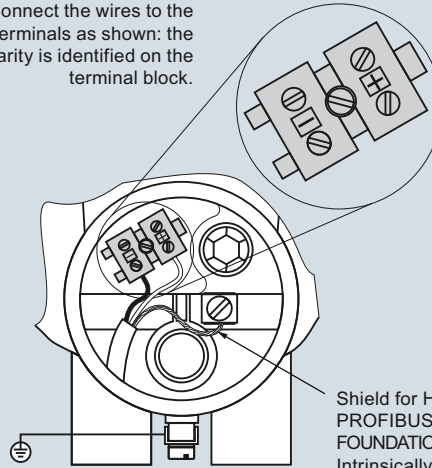
Continuous level measurement - Radar transmitters

SITRANS LR250 Flanged Encapsulated Antenna

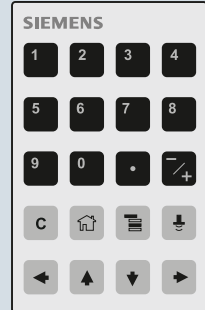
Schematics



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



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

Level Measurement

Continuous level measurement - Radar transmitters

SITRANS LR250 Flanged Encapsulated Specials

Selection and ordering data

SITRANS LR250 Flanged Encapsulated Specials

	Article No.
SITRANS LR250 flanged encapsulated antenna version enclosures (PROFIBUS PA models) SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, M20 cable inlet, approval option A, with PROFIBUS PA communication, no process connection	A5E32462853
SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, NPT cable inlet, approval option A, with PROFIBUS PA communication, no process connection	A5E32462854
SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, NPT cable inlet, approval option B, with PROFIBUS PA communication, no process connection	A5E32462855
SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, M20 cable inlet, approval option C, with PROFIBUS PA communication, no process connection	A5E32462856
SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, NPT cable inlet, approval option D, with PROFIBUS PA communication, no process connection	A5E32462857
SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, M20 cable inlet, approval option E, with PROFIBUS PA communication, no process connection	A5E32462858
SITRANS LR250 flanged encapsulated antenna version enclosures (FOUNDATION Fieldbus models) SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, M20 cable inlet, approval option A, with FOUNDATION Fieldbus communication, no process connection	A5E32462859
SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, NPT cable inlet, approval option A, with FOUNDATION Fieldbus communication, no process connection	A5E32462860
SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, NPT cable inlet, approval option B, with FOUNDATION Fieldbus communication, no process connection	A5E32462861
SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, M20 cable inlet, approval option C, with FOUNDATION Fieldbus communication, no process connection	A5E32462862
SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, NPT cable inlet, approval option D, with FOUNDATION Fieldbus communication, no process connection	A5E32462863
SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, M20 cable inlet, approval option E, with FOUNDATION Fieldbus communication, no process connection	A5E32462864
SITRANS LR250 flanged encapsulated antenna version enclosures (< 3.6 mA start-up HART models) SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, M20 cable inlet, approval option A, with HART communication start-up at < 3.6 mA, no process connection	A5E32462865

SITRANS LR250 Flanged Encapsulated Specials

	Article No.
SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, NPT cable inlet, approval option A, with HART communication start-up at < 3.6 mA, no process connection	A5E32462866
SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, NPT cable inlet, approval option B, with HART communication start-up at < 3.6 mA, no process connection	A5E32462867
SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, M20 cable inlet, approval option C, with HART communication start-up at < 3.6 mA, no process connection	A5E32462868
SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, NPT cable inlet, approval option D, with HART communication start-up at < 3.6 mA, no process connection	A5E32462869
SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, M20 cable inlet, approval option E, with HART communication start-up at < 3.6 mA, no process connection	A5E32462830
SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, M20 cable inlet, approval option F, with HART communication start-up at < 3.6 mA, no process connection	A5E32462831
SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, M20 cable inlet, approval option G, with HART communication start-up at < 3.6 mA, no process connection	A5E32462832
SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, NPT cable inlet, approval option H, with HART communication start-up at < 3.6 mA, no process connection	A5E32462833
SITRANS LR250 flanged encapsulated antenna lens kits Replacement TFM 1600 Lens and Spring Washer Kit for 2" Class 150 ASME B16.5 raised face	A5E32462817
Replacement TFM 1600 Lens and Spring Washer Kit for 3" Class 150 ASME B16.5 raised face	A5E32462819
Replacement TFM 1600 Lens and Spring Washer Kit for 4" Class 150 ASME B16.5 raised face	A5E32462820
Replacement TFM 1600 Lens and Spring Washer Kit for 6" Class 150 ASME B16.5 raised face	A5E32462821
Replacement TFM 1600 Lens and Spring Washer Kit for 50A 10K JIS B 2220 raised face	A5E32462822
Replacement TFM 1600 Lens and Spring Washer Kit for 80A 10K JIS B 2220 raised face	A5E32462823
Replacement TFM 1600 Lens and Spring Washer Kit for 100A 10K JIS B 2220 raised face	A5E32462824
Replacement TFM 1600 Lens and Spring Washer Kit for 150A 10K JIS B 2220 raised face	A5E32462825
Replacement TFM 1600 Lens and Spring Washer Kit for DN 50 PN 10/16 EN 1092-1 type B1 raised face	A5E32462826
Replacement TFM 1600 Lens and Spring Washer Kit for DN 80 PN 10/16 EN 1092-1 type B1 raised face	A5E32462827
Replacement TFM 1600 Lens and Spring Washer Kit for DN 100 PN 10/16 EN 1092-1 type B1 raised face	A5E32462828
Replacement TFM 1600 Lens and Spring Washer Kit for DN 150 PN 10/16 EN 1092-1 type B1 raised face	A5E32462829

Level Measurement

Continuous level measurement - Radar transmitters

SITRANS LR250 Hygienic Encapsulated Antenna

Overview



The SITRANS LR250 Hygienic Encapsulated Antenna is a 2-wire 25 GHz pulse radar level transmitter with sanitary and hygienic approvals for continuous monitoring of liquids, slurries, and pastes within the food, beverage, chemical, and pharmaceutical industries to a range of 20 m (66 ft) (antenna dependent).

Picture shown with accessories sold separately.

Benefits

- Fully encapsulated horn antenna design with FDA approved and USP Class VI compliant, TFM 1600 PTFE lens
- $0.8 \mu\text{m}$ Ra surface finish for maximum cleanability and hygiene requirements commonly required in sanitary environments
- Chemically resistant TFM 1600 PTFE lens is also suitable for aggressive or corrosive materials
- Approved device in accordance with 3-A, EHEDG EL Class I and/or EHEDG EL Aseptic Class I
- Cost effective replacement for transmitters made of exotic materials
- Graphical local user interface (LUI) makes operation simple with plug-and-play set-up using the intuitive Quick Start Wizard
- Industry standard process connections including ISO 2852, DIN 11851, DIN 11864-1, DIN 11864-2, DIN 11864-3, and Tuchenhausen Varivent Type F and N
- LUI displays echo profiles for diagnostic support
- 25 GHz high frequency and 2 inch (50 mm) process connection/antenna allow for easy mounting
- Insensitive to mounting location and obstructions, and less sensitive to nozzle interference
- 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 Intrinsicly Safe handheld programmer or over a network using SIMATIC PDM, Emerson AMS, or Field Device Tools, such as PACTware or Fieldcare via SITRANS DTM.
- Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511

Application

SITRANS LR250 includes a graphical local user interface (LUI) that improves set-up 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 few parameters required for basic operation.

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

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

SITRANS LR250 measures superbly in small vessels and in tanks/vessels up to 20 m (66 ft) on materials with $dk > 1.6$.

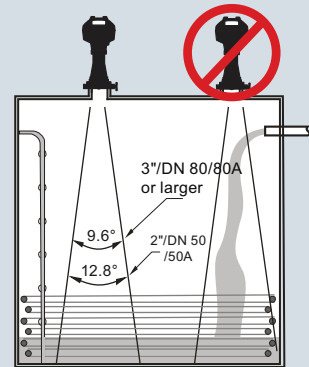
- Key Applications: applications within the food, beverage, chemical and pharmaceutical industries where sanitary, aseptic, or hygienic approvals are required or easy install/clean flush antennas are preferable, such as ice cream, fruit juice, milk, beer, and pharmaceutical or chemical additives and ingredients.

Configuration

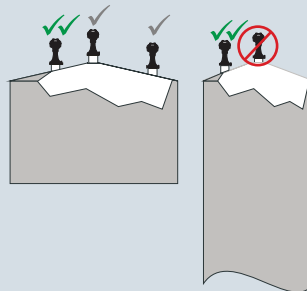
Installation

Note:

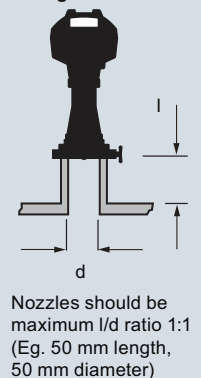
- Beam angle is the width of the cone where the energy density is half of the peak energy density.
- The peak energy density is directly in front of and in line with the antenna.
- There is a signal transmitted outside of the beam angle; therefore false targets may be detected.



Mounting on vessel



Mounting on a nozzle



LR250 Hygienic Encapsulated Antenna, dimensions in mm (inch)

Level Measurement

Continuous level measurement - Radar transmitters

SITRANS LR250 Hygienic Encapsulated Antenna

Technical specifications

Mode of Operation		Process connections	
Measuring principle	Radar level measurement	Hygienic/Sanitary connections	<ul style="list-style-type: none"> • 2", 3" & 4" Sanitary Clamp according to ISO 2852 • DN 50, DN 80 & DN 100 Aseptic/Hygienic threaded to DIN 11864-1 [Form A] • DN 50, DN 80 & DN 100 Aseptic/Hygienic flanged to DIN 11864-2 [Form A] • DN 50, DN 80 & DN 100 Aseptic/Hygienic Clamp according to DIN 11864-3 [Form A] • DN 50, DN 80 & DN 100 Hygienic Union according to DIN 11851 • Type F (50 mm) & Type N (68 mm) Tuchenhausen Varivent
Frequency	K-band (25.0 GHz)	Power supply	
Minimum measuring range	50 mm (2 inch) from end of antenna	4 ... 20 mA/HART	Nominal 24 V DC (max. 30 V DC) with max. 550 Ω
Maximum measuring range	20 m (66 ft)	PROFIBUS PA	<ul style="list-style-type: none"> • 15 mA • Per IEC 61158-2
Output		FOUNDATION Fieldbus	<ul style="list-style-type: none"> • 20.0 mA • Per IEC 61158-2
HART	Version 5.1	Certificates and approvals	
<ul style="list-style-type: none"> • Analog output • Accuracy • Fail-safe 	4 ... 20 mA ± 0.02 mA <ul style="list-style-type: none"> • Programmable as high low or hold (loss of echo) • NE 43 programmable 	General	CSA _{US/C} , CE, FM, NE 21, RCM
PROFIBUS PA	Profile 3.01	Radio	FCC, Industry Canada and Europe ETSI EN 302-372, RCM
<ul style="list-style-type: none"> • Function blocks 	2 Analog Input (AI)	Hazardous	
FOUNDATION Fieldbus	H1	<ul style="list-style-type: none"> • Explosion Proof (Brazil) 	INMETRO Ex d ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da
<ul style="list-style-type: none"> • Functionality • Version • Function blocks 	Basic or LAS ITK 5.2.0 2 Analog Input (AI)	<ul style="list-style-type: none"> • Increased Safety (Brazil) 	INMETRO Ex e ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da
Performance (according to reference conditions IEC60770-1)		<ul style="list-style-type: none"> • Intrinsically Safe (Brazil) 	INMETRO Ex ia IIC T4 Ga, Ex ia ta IIIC T100 °C Da
Maximum measured error	<ul style="list-style-type: none"> • > 500 mm from sensor reference point: 3 mm (0.118 inch) • < 500 mm from sensor reference point: 25 mm (1 inch) 	<ul style="list-style-type: none"> • 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
Influence of ambient temperature	< 0.003 %/K	<ul style="list-style-type: none"> • 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
Rated operating conditions		<ul style="list-style-type: none"> • Non-incendive (Canada/USA) 	CSA/FM Class I, Div. 2, Groups A, B, C, D T5
Installation conditions		<ul style="list-style-type: none"> • Flame Proof/Increased Safety (China) 	NEPSI Ex d ia mb IIC T4 Ga/Gb, Ex e ia mb IIC T4 Ga/Gb, Ex ia d tD A20 IP67 T100 °C
Location	Indoor/outdoor	<ul style="list-style-type: none"> • Intrinsically Safe (China) 	NEPSI Ex ia IIC T4 Ga, Ex ia d tD A20 IP67 T100 °C
Ambient conditions (enclosure)		<ul style="list-style-type: none"> • Non-sparking (China) 	NEPSI Ex nA IIC T4 Gc
Ambient temperature	-40 ... +80 °C (-40 ... +176 °F)	<ul style="list-style-type: none"> • Intrinsically Safe (Europe) 	ATEX II 1G Ex ia IIC T4 Ga ATEX II 1D Ex ia ta IIIC T100 °C Da
Installation category	I	<ul style="list-style-type: none"> • Non-sparking (Europe) 	ATEX II 3G Ex nA IIC T4 Gc
Pollution degree	4	<ul style="list-style-type: none"> • Flame Proof (International/Europe) 	IECEX/ATEX II 1/2 GD, 1D, 2D Ex d mb ia IIC T4 Ga/Gb, Ex ia ta IIC T100 °C Da
Medium conditions		<ul style="list-style-type: none"> • Increased Safety (International/Europe) 	IECEX/ATEX II 1/2 GD, 1D, 2D, Ex e mb ia IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da
Dielectric constant ϵ_r	≥ 1.6 (antenna dependent)	<ul style="list-style-type: none"> • Intrinsically Safe (International) 	IECEX/ATEX II 1 G Ex ia IIC T4 Ga, IECEX/ATEX II 1D Ex ia ta IIIC T100 °C Da
Process temperature	-40 ... +170 °C (-40 ... +338 °F) at process connection	<ul style="list-style-type: none"> • Explosion Proof (Russia/Kazakhstan) 	EAC Ex d
Process pressure	See Pressure/Temperature curves for more information	<ul style="list-style-type: none"> • Increased Safety (Russia/Kazakhstan) 	EAC Ex e
Design		<ul style="list-style-type: none"> • Intrinsically Safe (Russia/Kazakhstan) 	EAC Ex ia
Enclosure		Hygienic/Sanitary	EHEDG EL Class I EHEDG EL Aseptic Class I
<ul style="list-style-type: none"> • Material • Cable inlet 	Aluminum, polyester powder coated 2 x M20 x 1.5 or 2 x 1/2" NPT		
Degree of protection	Type 4X/NEMA 4X, Type 6/NEMA 6, IP67, IP68		
Weight (dependent on process connection)	<ul style="list-style-type: none"> • Approx. 4.7 kg (10.4 lb) for 2" ISO 2852 (smallest size) • Approx. 7.9 kg (17.4 lb) for DN 100 DIN 11864-2 (largest size) 		
Display (local)	Graphic local user interface including quick start wizard and echo profile display		
Antenna			
<ul style="list-style-type: none"> • Material 	Stainless steel 316L (1.4435 or 1.4404) and TFM 1600 PTFE Lens (lens is the only wetted part)		
<ul style="list-style-type: none"> • Lens surface finish (R_a) 	0.8 μm		

Level Measurement

Continuous level measurement - Radar transmitters

SITRANS LR250 Hygienic Encapsulated Antenna

Programming

Intrinsically Safe Siemens handheld programmer	Infrared receiver
• Approvals for handheld programmer	IS model: ATEX II 1 GD Ex ia IIC T4 Ga Ex ia D 20 T135 °C Ta = -20 ... +50 °C CSA/FM Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G, T6 T _a = 50 °C IECEX SIR 09.0073
Handheld communicator	HART communicator 375/475
PC	<ul style="list-style-type: none"> • SIMATIC PDM • Emerson AMS • SITRANS DTM (for connection into FDT, such as PACTware or Field-care)
Display (local)	Graphic local user interface including quick start wizard and echo profile displays

Level Measurement

Continuous level measurement - Radar transmitters

SITRANS LR250 Hygienic Encapsulated Antenna

Selection and Ordering data	Article No.
SITRANS LR250 hygienic encapsulated antenna	7ML5433-
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, up to a range of 20 m (66 ft) (Antenna dependant). Ideal for Hygienic applications including small vessels and low dielectric media.	0 - A
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Hygienic/Sanitary Approvals	
EHEDG EL Class I ¹⁾	1
EHEDG EL Aseptic Class I ¹⁾	2
3-A (Tuchenhagen connections only - FC ... FF) ²⁾³⁾	3
EHEDG EL Class I & 3-A (excludes Tuchenhagen connections) ²⁾⁴⁾	4
Process Connection Types (all types have TFM1600 PTFE lens)	
<u>316L st/st [1.4435 or 1.4404]</u>	
2" Sanitary Clamp according to ISO 2852 ⁵⁾	AA
3" Sanitary Clamp according to ISO 2852	AB
4" Sanitary Clamp according to ISO 2852	AC
<u>316L st/st (1.4435 or 1.4404) & 304L st/st (1.4301)</u>	
DN 50 Aseptic/Hygienic nozzle/ slotted nut (instrument side) to DIN 11864-1 [Form A] ⁵⁾	BA
DN 80 Aseptic/Hygienic nozzle/ slotted nut (instrument side) to DIN 11864-1 [Form A]	BB
DN 100 Aseptic/Hygienic nozzle/ slotted nut (instrument side) to DIN 11864-1 [Form A]	BC
<u>316L st/st [1.4435 or 1.4404]</u>	
DN 50 Aseptic/Hygienic flanged to DIN 11864-2 [Form A] ⁵⁾	CA
DN 80 Aseptic/Hygienic flanged to DIN 11864-2 [Form A]	CB
DN 100 Aseptic/Hygienic flanged to DIN 11864-2 [Form A]	CC
<u>316L st/st [1.4435 or 1.4404]</u>	
DN 50 Aseptic/Hygienic Clamp according to DIN 11864-3 [Form A] ⁵⁾	DA
DN 80 Aseptic/Hygienic Clamp according to DIN 11864-3 [Form A]	DB
DN 100 Aseptic/Hygienic Clamp according to DIN 11864-3 [Form A]	DC
<u>316L st/st (1.4435 or 1.4404) & 304L st/st (1.4301)</u>	
DN 50 Hygienic nozzle/ slotted nut (instrument side) to DIN 11851 ⁵⁾	EA
DN 80 Hygienic nozzle/ slotted nut (instrument side) to DIN 11851	EB
DN 100 Hygienic nozzle/ slotted nut (instrument side) to DIN 11851	EC
<u>316L st/st [1.4435 or 1.4404]</u>	
Type F (50 mm) Tuchenhagen Varivent (EHEDG only) ⁵⁾	FA
Type N (68 mm) Tuchenhagen Varivent (EHEDG only) ⁵⁾	FB
Type F (50 mm) Tuchenhagen Varivent [3-A only & EPDM process seal -40 ... 120 °C (-40 ... 248 °F)] ⁵⁾	FC
Type N (68 mm) Tuchenhagen Varivent [3-A only & EPDM process seal -40 ... 120 °C (-40 ... 248 °F)] ⁵⁾	FD
Type F (50 mm) Tuchenhagen Varivent [3-A only & FKM process seal -20 ... 170 °C (-4 ... 338 °F)] ⁵⁾	FE
Type N (68 mm) Tuchenhagen Varivent [3-A only & FKM process seal -20 ... 170 °C (-4 ... 338 °F)] ⁵⁾	FF
EXCLUDE Process Connection - Electronics Head assembly spare only (select all other options as normal)	YY

Selection and Ordering data	Article No.
SITRANS LR250 hygienic encapsulated antenna	7ML5433-
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, up to a range of 20 m (66 ft) (Antenna dependant). Ideal for Hygienic applications including small vessels and low dielectric media.	0 - A
Communication	
PROFIBUS PA	1
4 ... 20 mA HART, start-up at < 3.6 mA	2
FOUNDATION Fieldbus	3
Enclosure (with Cable Inlets)	
Aluminum, Epoxy paint, 2 X 1/2" NPT	0
Aluminum, Epoxy paint, 2 X M20 x 1.5	1
Approvals	
General Purpose, CE, CSA, FM, FCC, R&TTE, 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: IECEx/ATEX II 1 GD Ex ia IIC T4 Ga, Ex ia ta IIIC T100 °C Da, INMETRO Ex ia IIC T4 Ga, Ex ia ta IIIC T100 °C Da, CE, R&TTE, RCM	C
Non-incendive: CSA/FM Class I, Div. 2, Groups A, B, C, D T5, FCC, Industry Canada	D
Non Sparking: ATEX II 3G Ex nA IIC T4 Gc, CE, R&TTE, RCM	E
Increased Safety: IECEx/ATEX II 1/2 GD, 1D, 2D Ex e mb ia 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, CE, R&TTE, RCM ⁶⁾	F
Flameproof: IECEx/ATEX II 1/2 GD 1D, 2D Ex d mb ia IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da, INMETRO Ex d ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da, CE, R&TTE, RCM ⁶⁾	G
Explosion proof: CSA/FM Class I, II and III, Div. 1, Groups A, B, C, D, E, F, G, FCC, Industry Canada ⁶⁾	H
Non Sparking: NEPSI Ex nA IIC T4 Gc	K
Intrinsically Safe: NEPSI Ex ia IIC T4 Ga, Ex iaD tD A20 IP67 T100 °C	L
Flameproof: NEPSI Ex d ia mb IIC T4 Ga/Gb, Ex iaD tD A20 IP67 T100 °C ⁶⁾	M
Increased Safety: NEPSI Ex e ia mb IIC T4 Ga/Gb, Ex iaD tD A20 IP67 T100 °C ⁶⁾	N
Pressure Rating	
Rating per pressure/temperature curves in instruction manual	0

We can offer shorter delivery times for configurations designated with the Quick Ship Symbol . For details see page 10/11 in the appendix.

Level Measurement

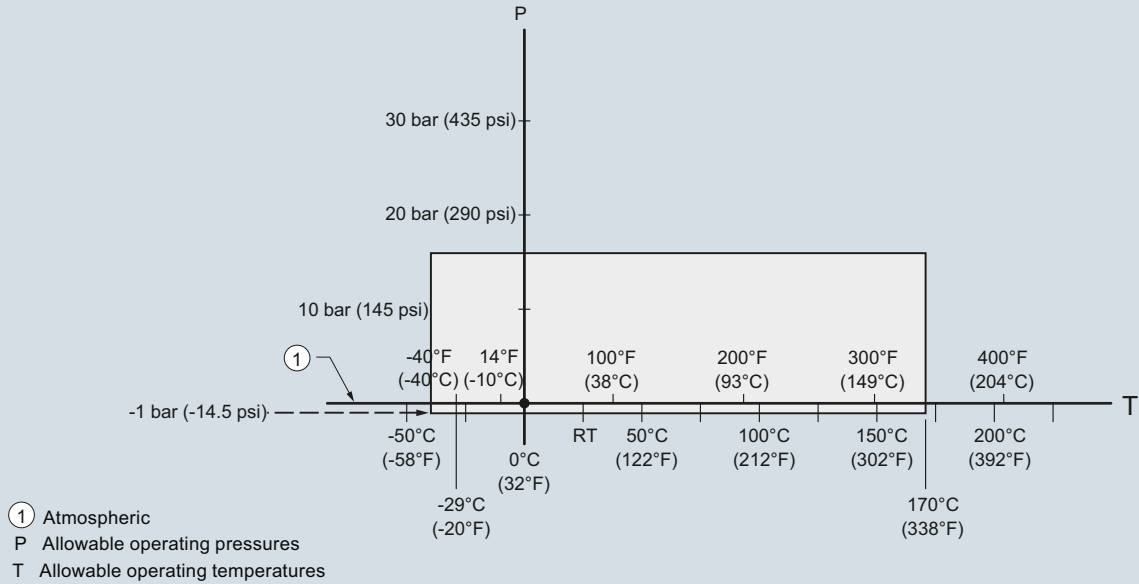
Continuous level measurement - Radar transmitters

SITRANS LR250 Hygienic Encapsulated Antenna

Selection and Ordering data	Order code	Selection and Ordering data	Article No.
Further designs		Compact Operating Instructions for FOUNDATION Fieldbus device	
Please add "-Z" to Article No. and specify Order code(s).		English, French, German, Spanish, Italian, Dutch, Danish, Finnish, Greek, Portuguese (Portugal), Swedish	A5E33472700
Electrical Connection cable entry:		English, Bulgarian, Czech, Estonian, Hungarian, Latvian, Lithuanian, Polish, Romanian, Slovakian, Slovenian	A5E33472738
Plug M12 (IP 67 rating) with mating connector ²⁾⁷⁾⁸⁾	● A50	English, Portuguese (Brazil), Chinese	A5E34046626
Plug 7/8" (IP 67 rating) with mating Connector ²⁾⁸⁾⁹⁾	● A55	Note: The Operating Instructions should be ordered as a separate line item on the order. All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Test Certificates		Other Operating Instructions	
Manufacturer's Test Certificate M to DIN 55350, Part 18 and to ISO 9000	● C11	SITRANS LR250 Functional Safety manual, English	A5E32286471
Material inspection Certificate 3.1 of EN 10204	● C12	Note: The Operating Instructions should be ordered as a separate line item on the order. All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation	
Functional Safety		Accessories	
Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511 ⁶⁾¹⁰⁾	● C20	Handheld programmer, Intrinsically safe, EEx ia (LUI enabled)	7ML1930-1BK
Namur		HART modem/USB (for use with a PC and SIMATIC PDM)	7MF4997-1DB
Namur NE43 compliant, device preset to failsafe < 3.6 mA ⁶⁾	● N07	One metallic cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F), HART (two are required) ⁶⁾	7ML1930-1AP
Tagging		One metallic cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F), PROFIBUS PA and FOUNDATION Fieldbus (two are required) ⁸⁾	7ML1930-1AQ
Stainless steel tag [69 mm x 50 mm (2.71 x 1.97 inch)]	● Y15	SITRANS RD100, loop powered display - see Chapter 7	7ML5741-...
Measuring-point number / identification (max. 27 characters) specify in plain text		SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	7ML5740-...
Compact Operating Instructions for HART/ mA device	Article No.	SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	7ML5744-...
English, French, German, Spanish, Italian, Dutch, Danish, Finnish, Greek, Portuguese (Portugal), Swedish	A5E33469191	SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7	7ML5750-...
English, Bulgarian, Czech, Estonian, Hungarian, Latvian, Lithuanian, Polish, Romanian, Slovakian, Slovenian	A5E33469171	For applicable back up point level switch - see point level measurement section	
English, Portuguese (Brazil), Chinese	A5E34046583	● We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ●. For details see page 10/11 in the appendix.	
Note: The Operating Instructions should be ordered as a separate line item on the order. All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation		1) Available with process connection options AA ... FB & YY only	
Compact Operating Instructions for PROFIBUS PA device		2) Available with Approval options A, B, C, L only	
English, French, German, Spanish, Italian, Dutch, Danish, Finnish, Greek, Portuguese (Portugal), Swedish	A5E33469239	3) Available with Process connections FC ... FF only	
English, Bulgarian, Czech, Estonian, Hungarian, Latvian, Lithuanian, Polish, Romanian, Slovakian, Slovenian	A5E33472685	4) Available with process connection options AA ... EC & YY only	
English, Portuguese (Brazil), Chinese	A5E34046624	5) Max. range 10 m (32.8 ft), dk > 3 [20 m (66 ft) and dk > 1.6 if installed in a stillpipe]	
Note: The Operating Instructions should be ordered as a separate line item on the order. All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation		6) Applicable with Communication option 2 only	
		7) Available with Enclosure option 1 only	
		8) Available with Communication options 1 and 3 only	
		9) Available with Enclosure option 0 only	
		10) Available with Approval options A, B, C, D, E, K, L only	

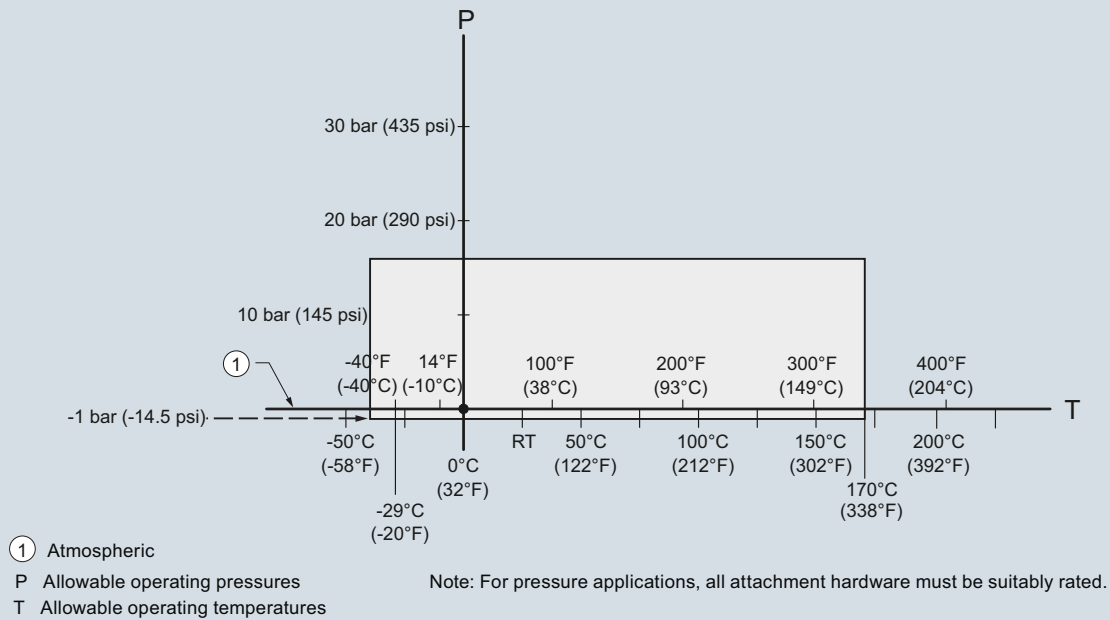
Characteristic curves

DIN 11851 Sanitary/Hygienic nozzle/slotted nut: DN 50, DN 80, and DN 100
 DIN 11864-1 Aseptic/Hygienic nozzle/slotted nut: DN 50, DN 80, and DN 100



SITRANS LR250 Hygienic Encapsulated Antenna, allowable operating temperatures and pressures, DIN 11851 Sanitary/Hygienic nozzle/slotted nut: DN 50, DN 80, and DN 100

DIN 11864-2 Aseptic/Hygienic flanged: DN 50, DN 80, and DN 100



SITRANS LR250, Hygienic Encapsulated Antenna, allowable pressures and temperatures, DIN 11864-2 Aseptic/Hygienic flanged: DN 50, DN 80, and DN 100

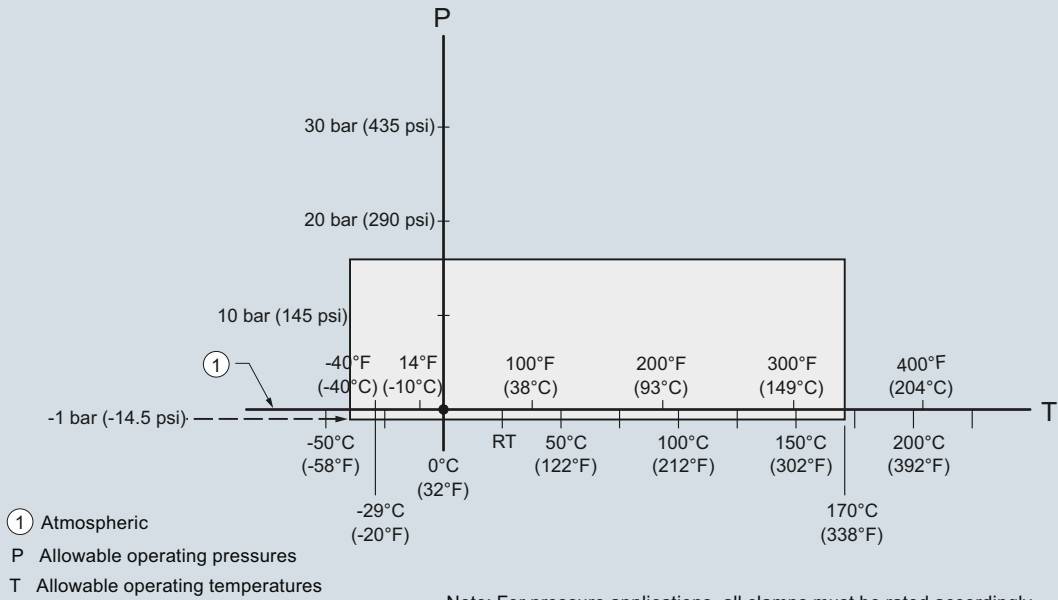
Level Measurement

Continuous level measurement - Radar transmitters

SITRANS LR250 Hygienic Encapsulated Antenna

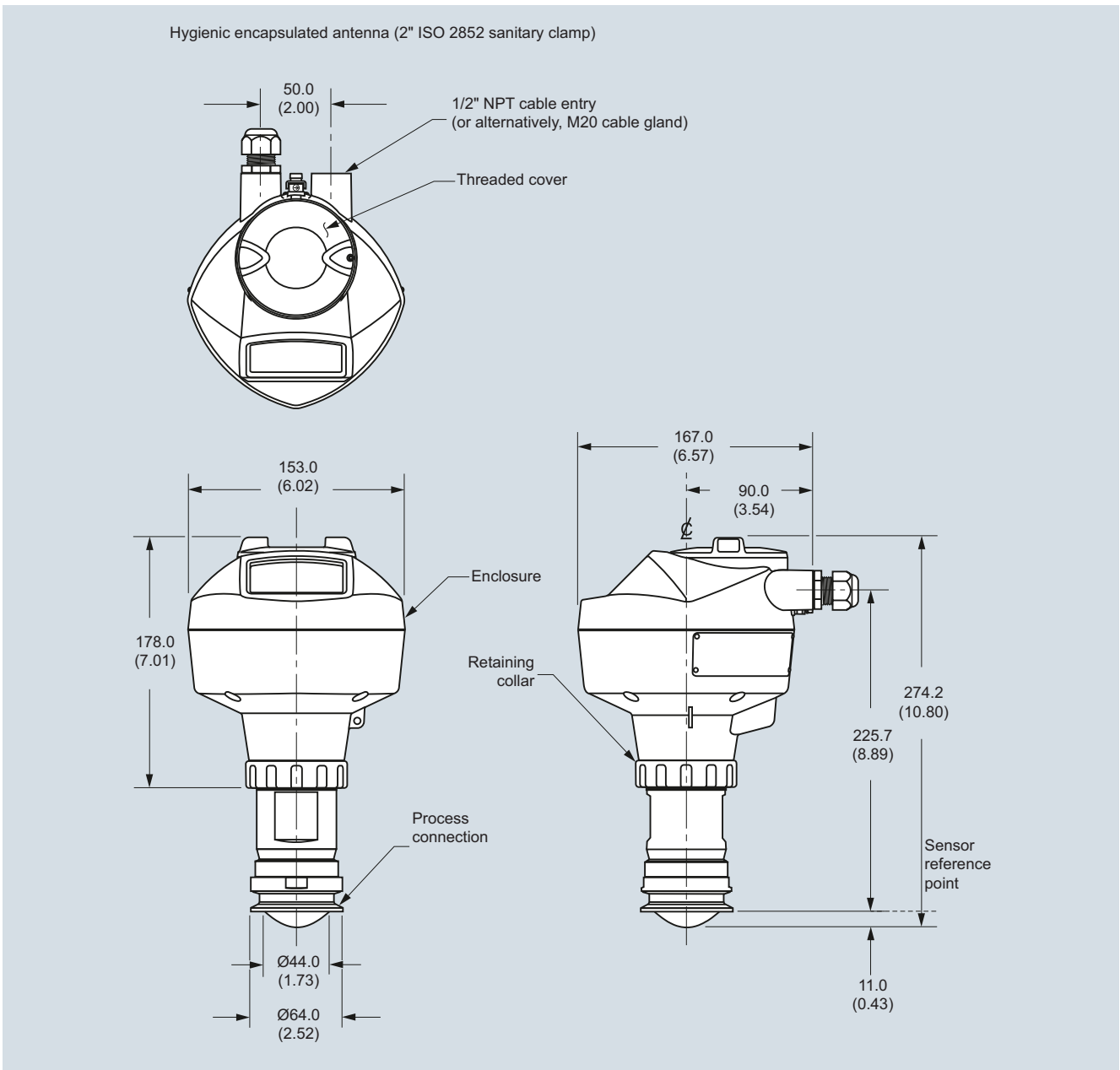
DIN 11864-3 Aseptic/Hygienic clamp: DN 50, DN 80, and DN 100
 ISO 2852 Sanitary/Hygienic clamp: 2", 3", and 4"
 Tuohenhagen Varivent face seal clamp: Type N (68 mm) and Type F (50 mm)

4



SITRANS LR250 Hygienic Encapsulated Antenna, allowable pressures and temperatures, DIN 11864-3 Aseptic/Hygienic clamp: DN 50, DN 80, and DN 100

Dimensional drawings



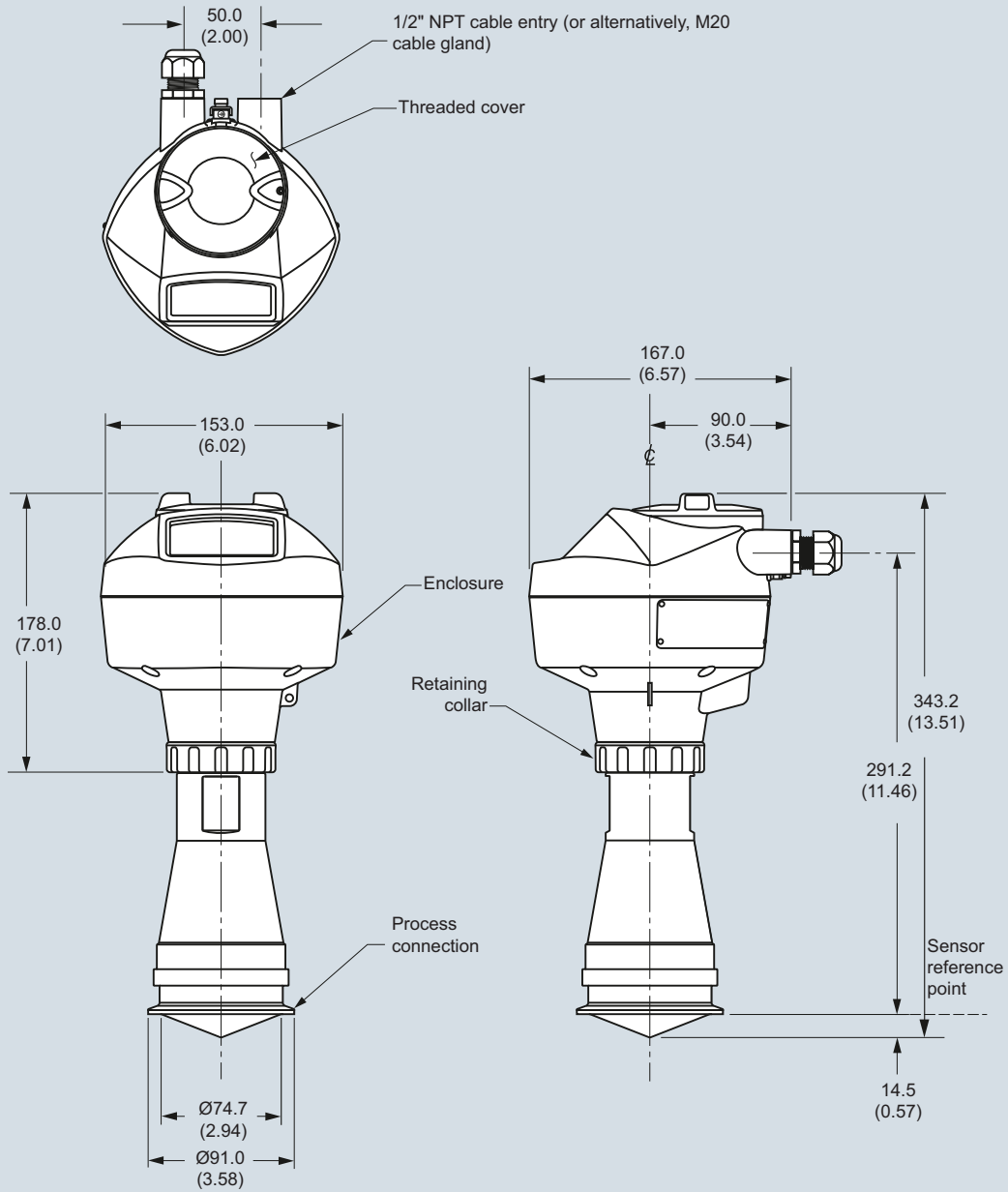
SITRANS LR250 Hygienic Encapsulated Antenna (2" ISO 2852 sanitary clamp), dimensions in mm (inch)

Level Measurement

Continuous level measurement - Radar transmitters

SITRANS LR250 Hygienic Encapsulated Antenna

Hygienic encapsulated antenna (3" ISO 2852 sanitary clamp)

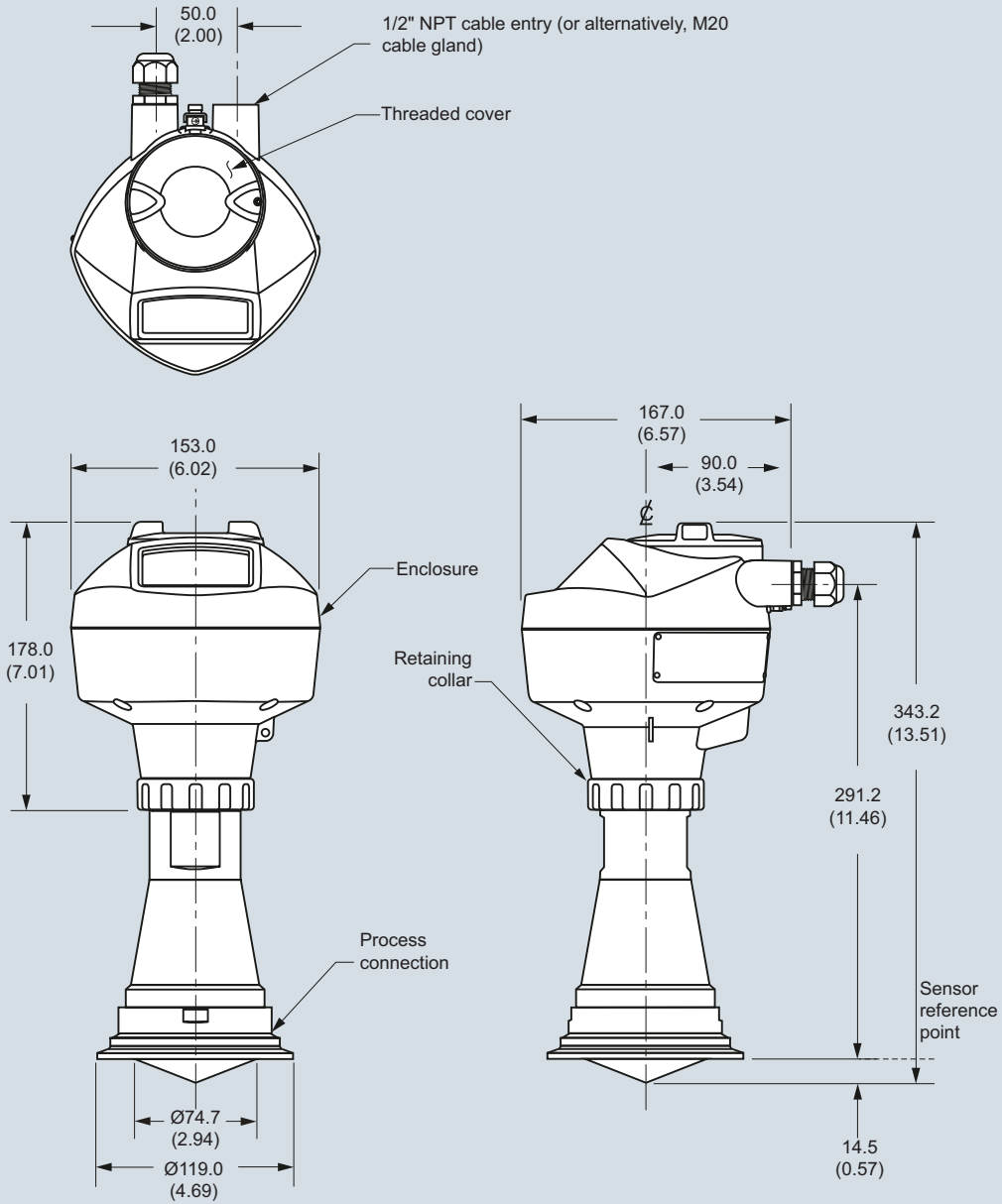


SITRANS LR250 Hygienic Encapsulated Antenna (3" ISO 2852 sanitary clamp), dimensions in mm (inch)

Level Measurement
Continuous level measurement - Radar transmitters

SITRANS LR250 Hygienic Encapsulated Antenna

Hygienic encapsulated antenna (4" ISO 2852 sanitary clamp)



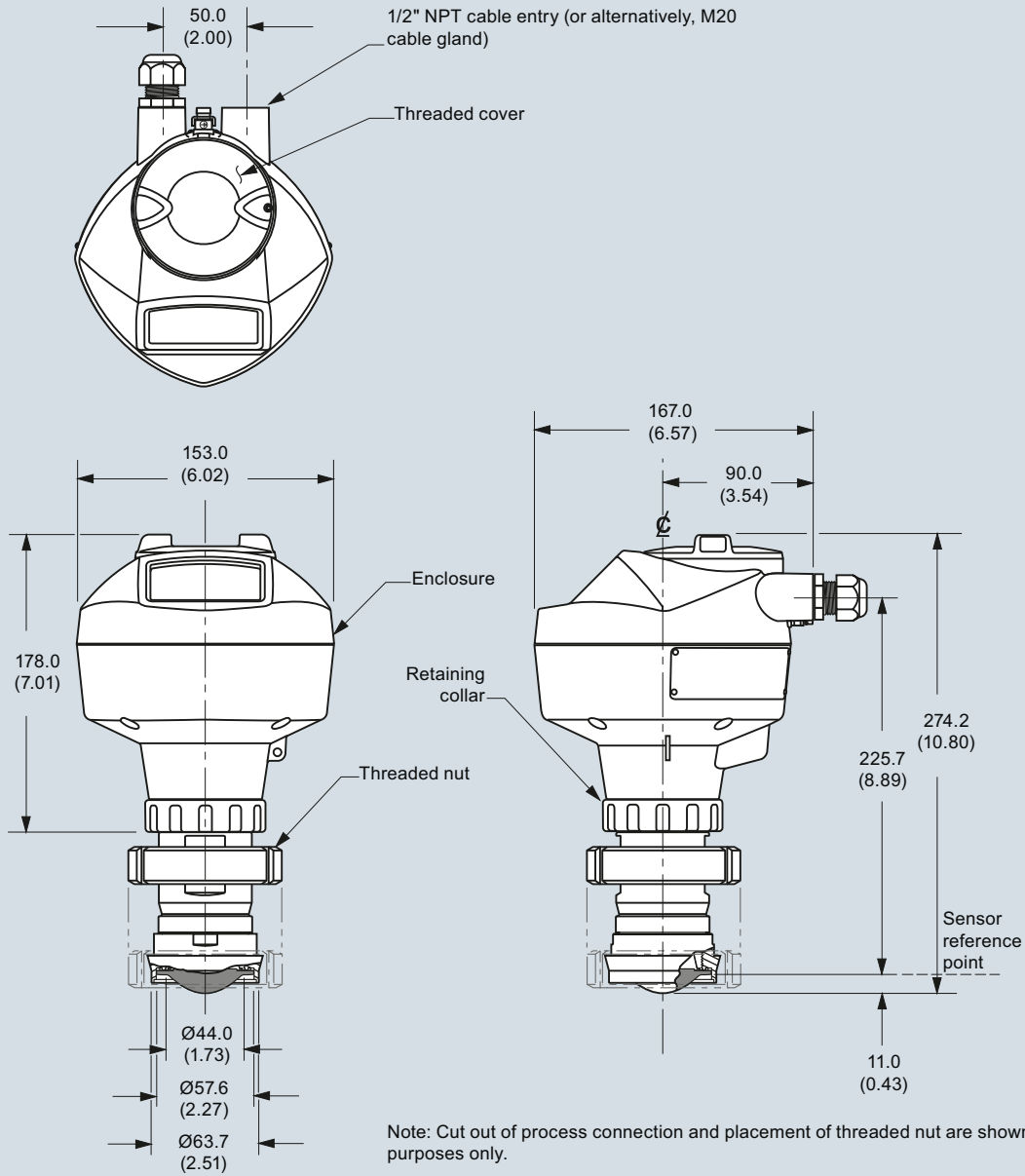
SITRANS LR250 Hygienic Encapsulated Antenna (4" ISO 2852 sanitary clamp), dimensions in mm (inch)

Level Measurement

Continuous level measurement - Radar transmitters

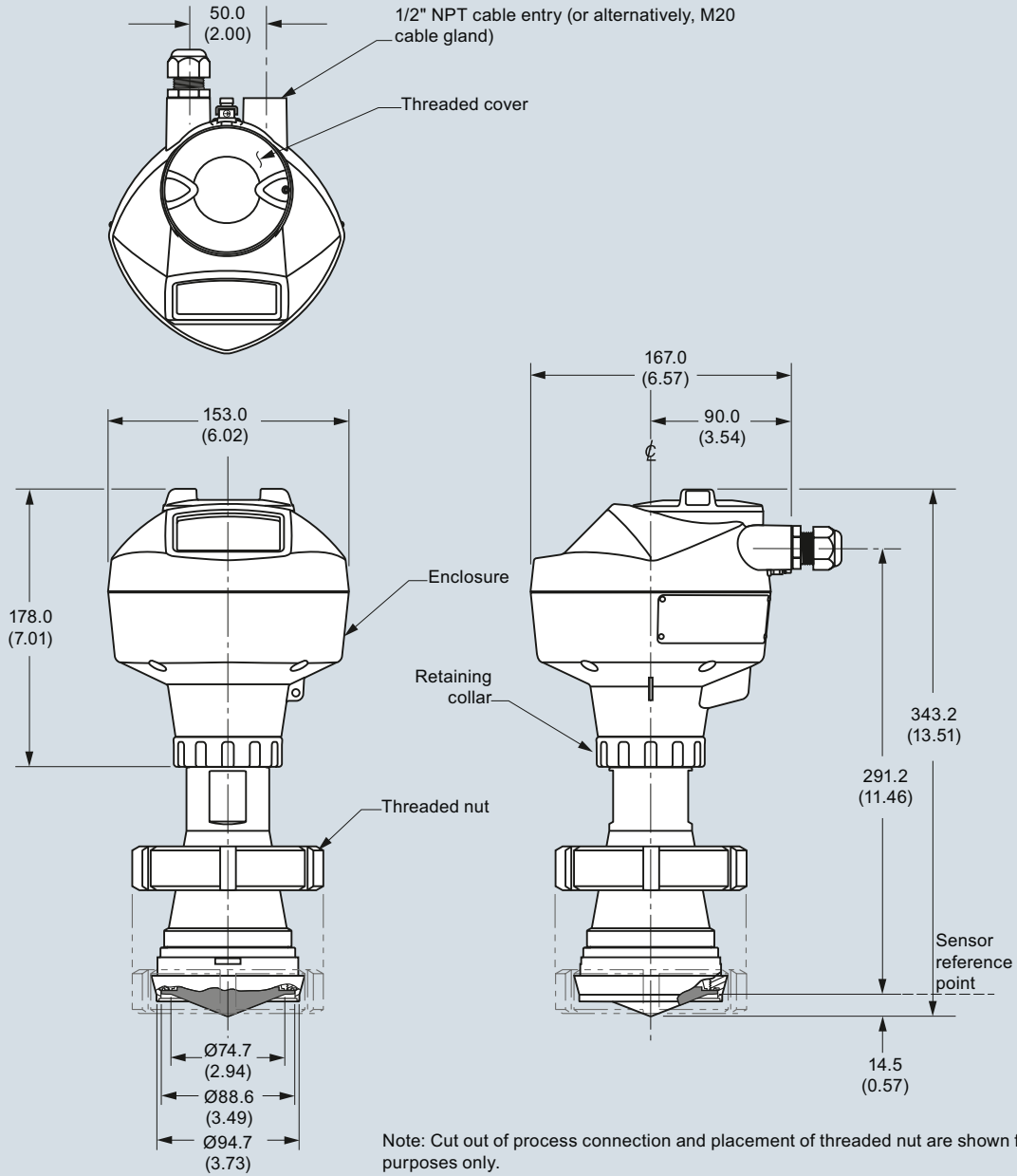
SITRANS LR250 Hygienic Encapsulated Antenna

Hygienic encapsulated antenna (DN 50 nozzle/slotted nut to DIN 11851)



SITRANS LR250 Hygienic Encapsulated Antenna (DN 50 nozzle/slotted nut to DIN 11851), dimensions in mm (inch)

Hygienic encapsulated antenna (DN 80 nozzle/slotted nut to DIN 11851)



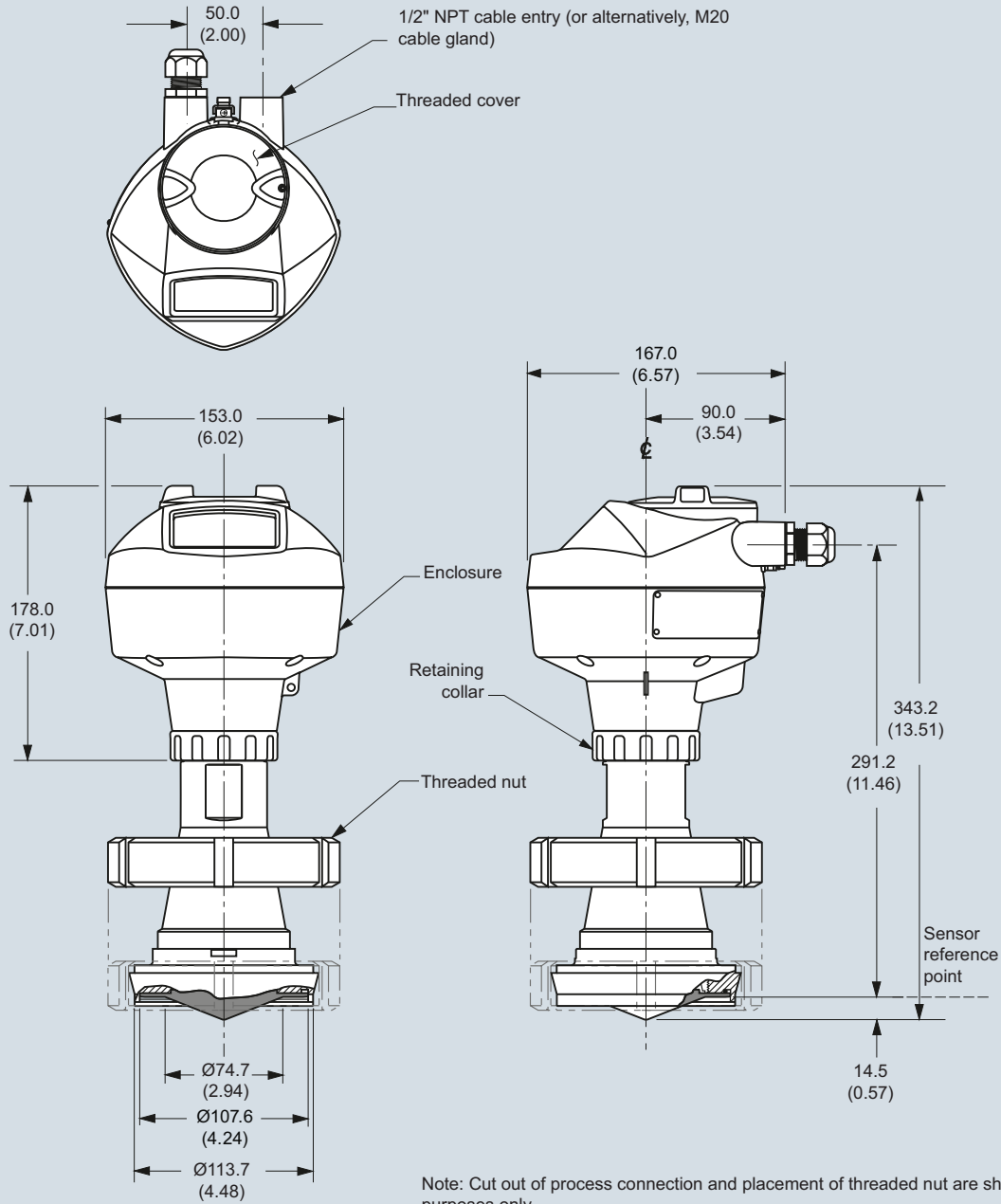
SITRANS LR250 Hygienic Encapsulated Antenna (DN 80 nozzle/slotted nut to DIN 11851), dimensions in mm (inch)

Level Measurement

Continuous level measurement - Radar transmitters

SITRANS LR250 Hygienic Encapsulated Antenna

Hygienic encapsulated antenna (DN 100 nozzle/slotted nut to DIN 11851)

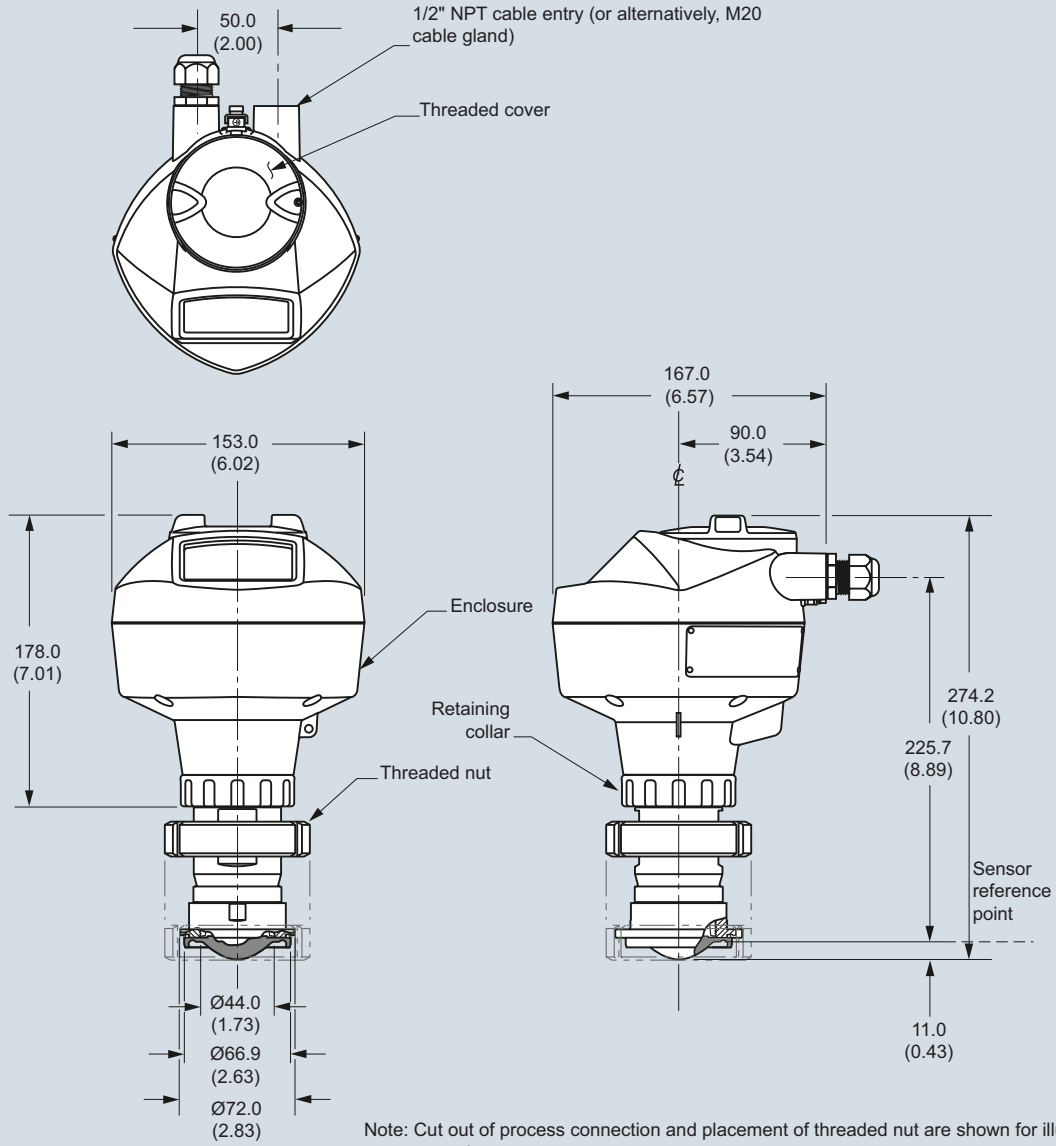


SITRANS LR250 Hygienic Encapsulated Antenna (DN 100 nozzle/slotted nut to DIN 11851), dimensions in mm (inch)

Level Measurement
Continuous level measurement - Radar transmitters

SITRANS LR250 Hygienic Encapsulated Antenna

Hygienic encapsulated antenna (DN 50 aseptic clamp to DIN 11864-1)



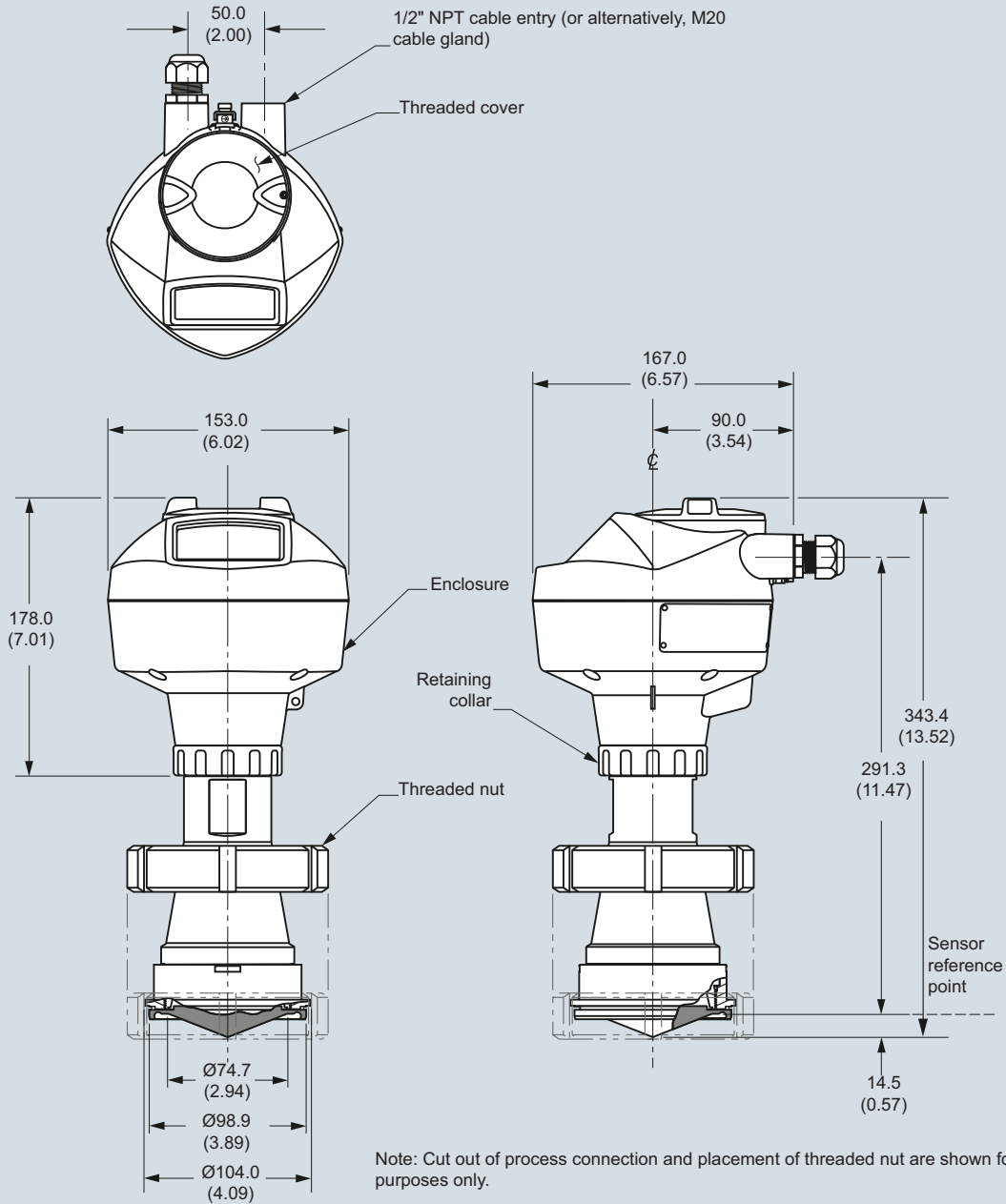
SITRANS LR250 Hygienic Encapsulated Antenna (DN 50 aseptic clamp to DIN 11864-1), dimensions in mm (inch)

Level Measurement

Continuous level measurement - Radar transmitters

SITRANS LR250 Hygienic Encapsulated Antenna

Hygienic encapsulated antenna (DN 80 aseptic clamp to DIN 11864-1)

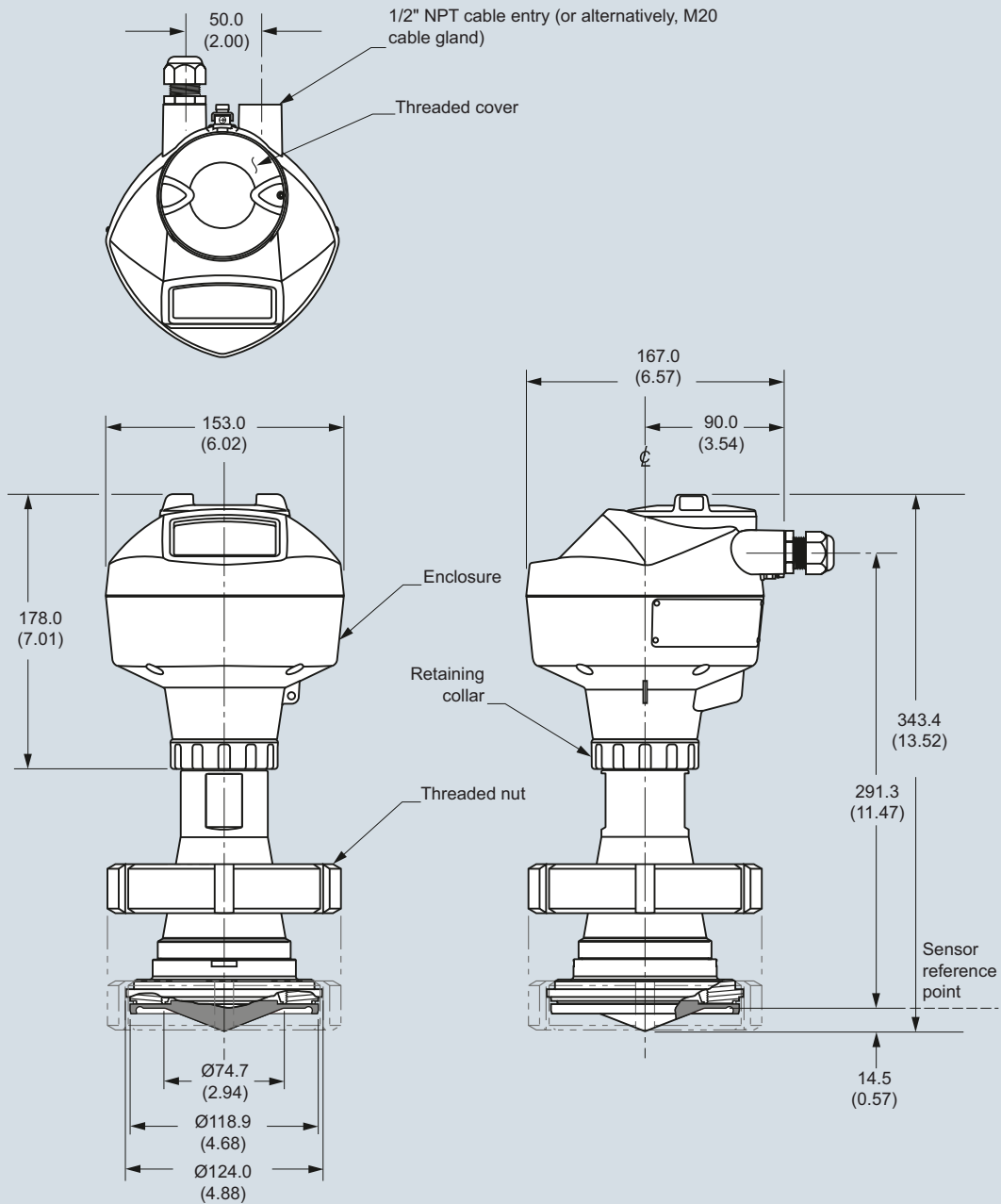


SITRANS LR250 Hygienic Encapsulated Antenna (DN 80 aseptic clamp to DIN 11864-1), dimensions in mm (inch)

Level Measurement
Continuous level measurement - Radar transmitters

SITRANS LR250 Hygienic Encapsulated Antenna

Hygienic encapsulated antenna (DN 100 aseptic clamp to DIN 11864-1)



Note: Cut out of process connection and placement of threaded nut are shown for illustration purposes only.

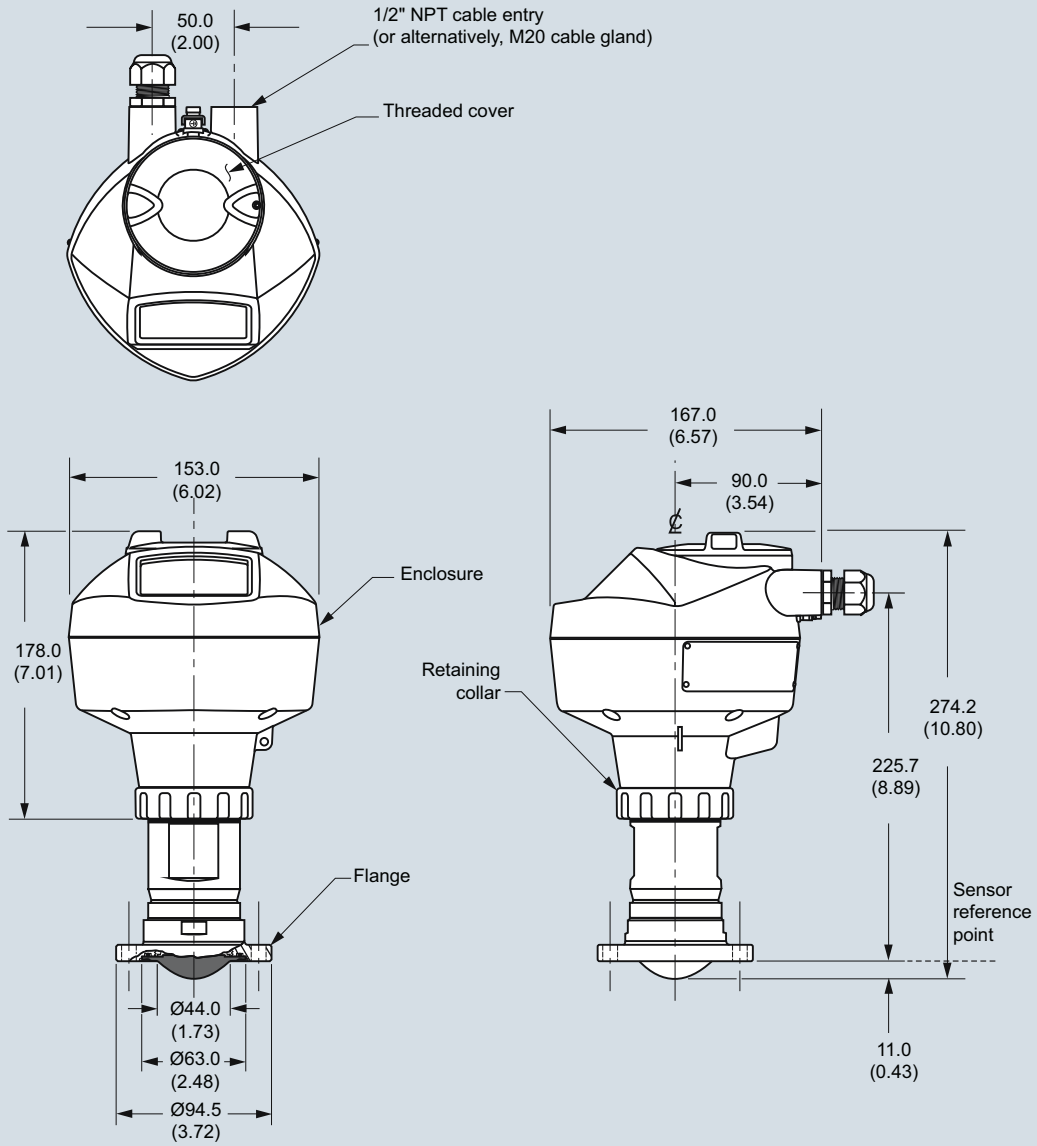
SITRANS LR250 Hygienic Encapsulated Antenna (DN 100 aseptic clamp to DIN 11864-1), dimensions in mm (inch)

Level Measurement

Continuous level measurement - Radar transmitters

SITRANS LR250 Hygienic Encapsulated Antenna

Hygienic encapsulated antenna (DN 50 aseptic flange to DIN 11864-2)



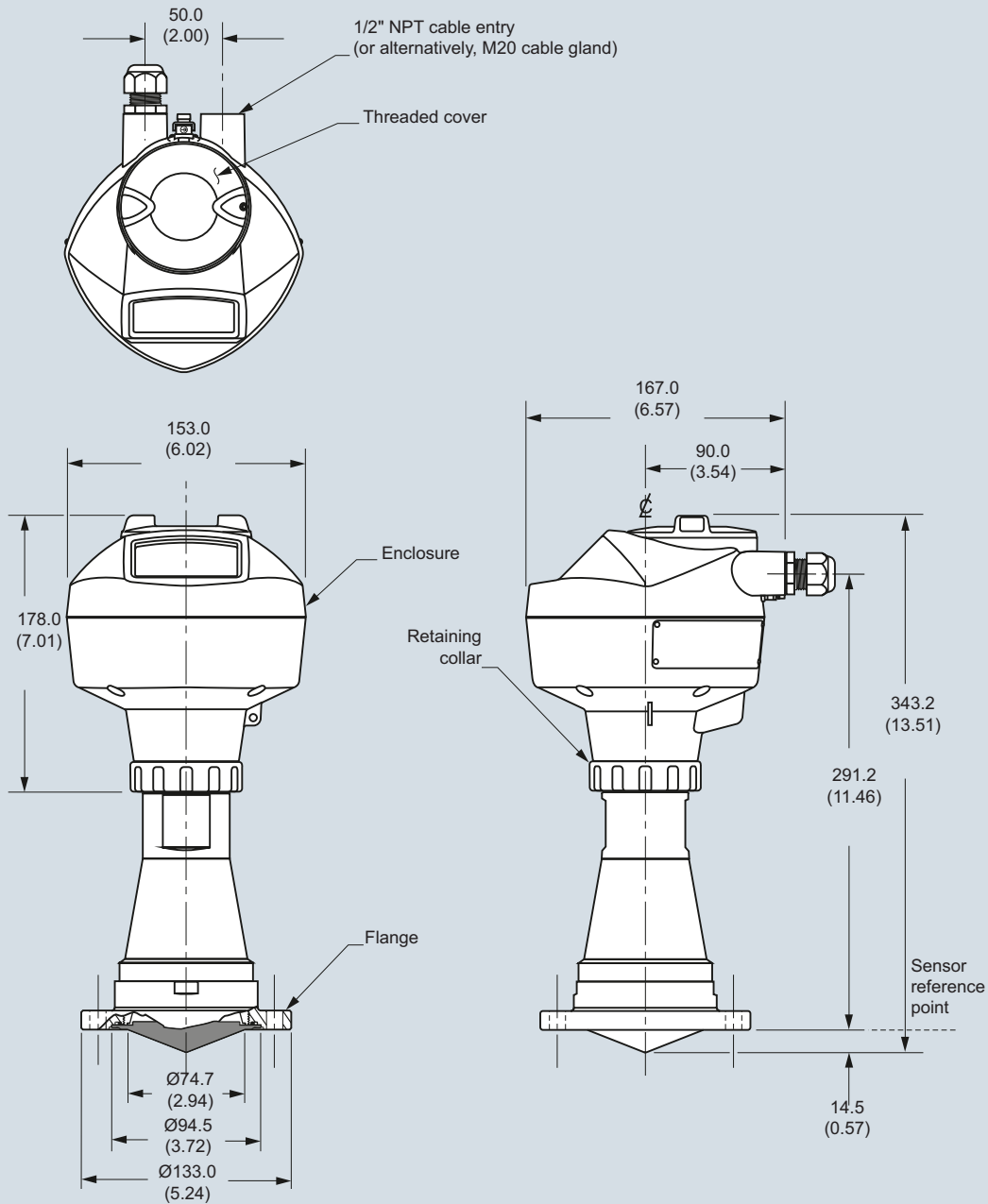
Note: Cut out of process connection and flange are shown for illustration purposes only.

SITRANS LR250 Hygienic Encapsulated Antenna (DN 50 aseptic flange to DIN 11864-2), dimensions in mm (inch)

Level Measurement
Continuous level measurement - Radar transmitters

SITRANS LR250 Hygienic Encapsulated Antenna

Hygienic encapsulated antenna (DN 80 aseptic flange to DIN 11864-2)



Note: Cut out of process connection and flange are shown for illustration purposes only.

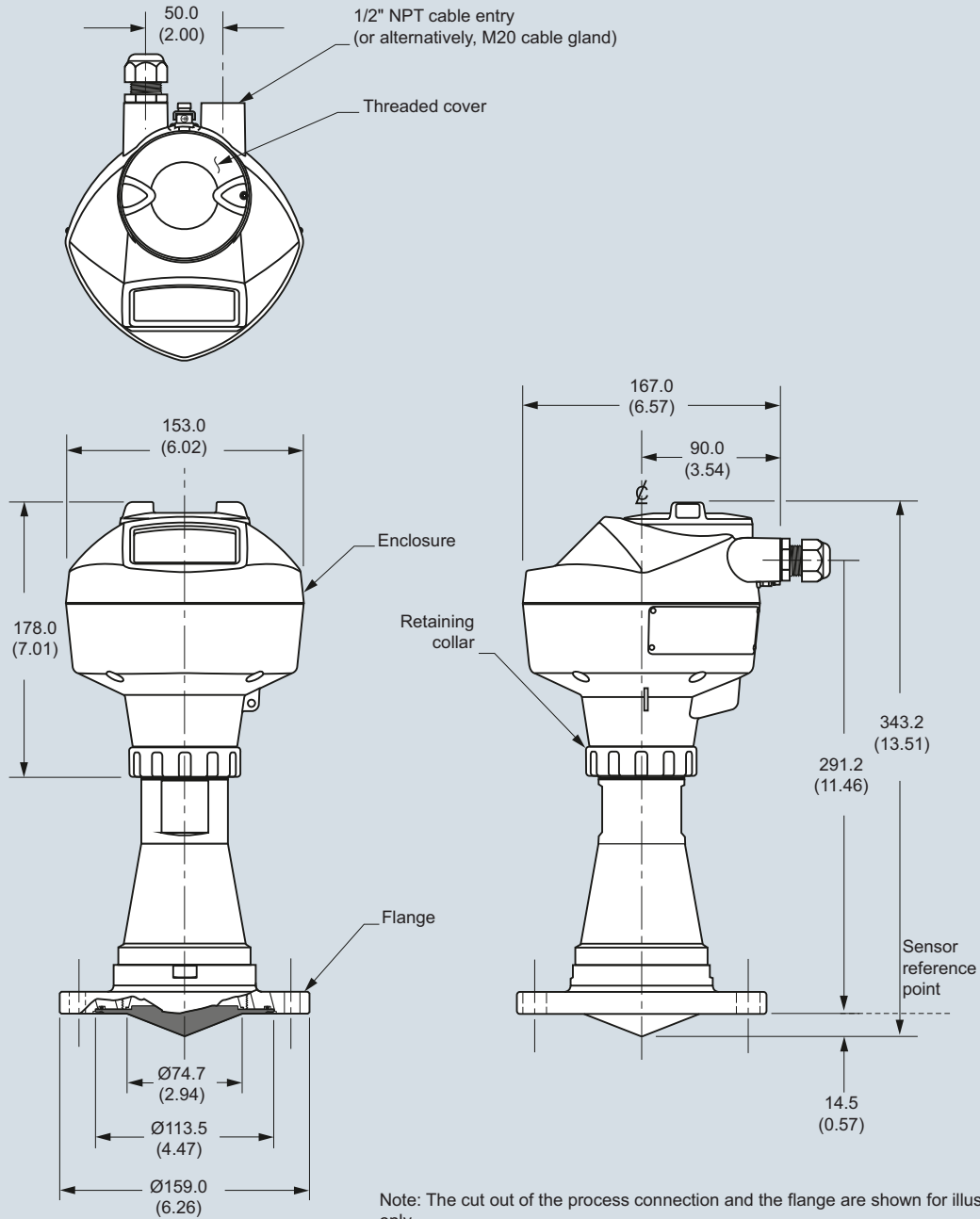
SITRANS LR250 Hygienic Encapsulated Antenna (DN 80 aseptic flange to DIN 11864-2), dimensions in mm (inch)

Level Measurement

Continuous level measurement - Radar transmitters

SITRANS LR250 Hygienic Encapsulated Antenna

Hygienic encapsulated antenna (DN 100 aseptic flange to DIN 11864-2)

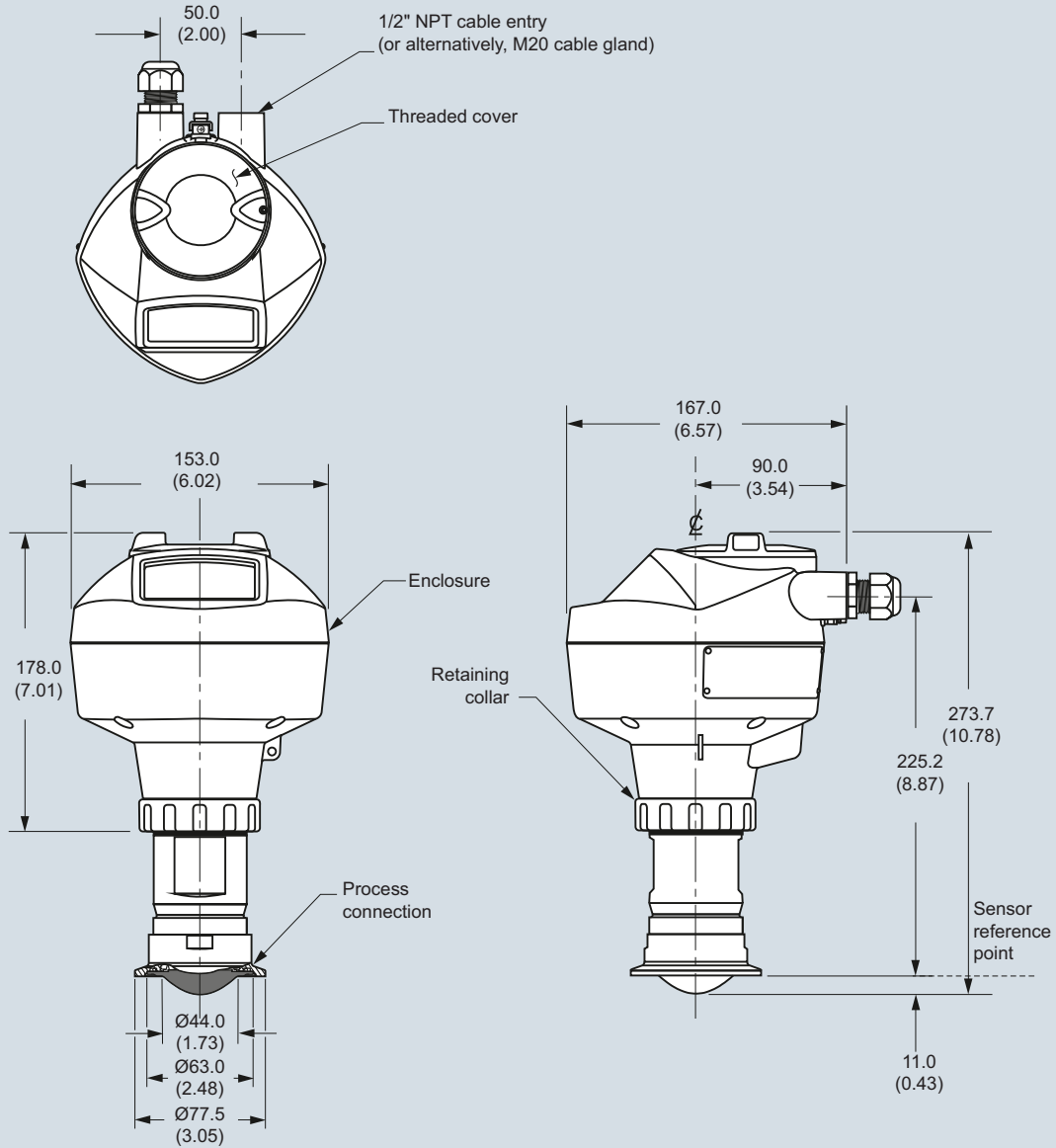


SITRANS LR250 Hygienic Encapsulated Antenna (DN 100 aseptic flange to DIN 11864-2), dimensions in mm (inch)

Level Measurement
Continuous level measurement - Radar transmitters

SITRANS LR250 Hygienic Encapsulated Antenna

Hygienic encapsulated antenna (DN 50 aseptic clamp to DIN 11864-3)



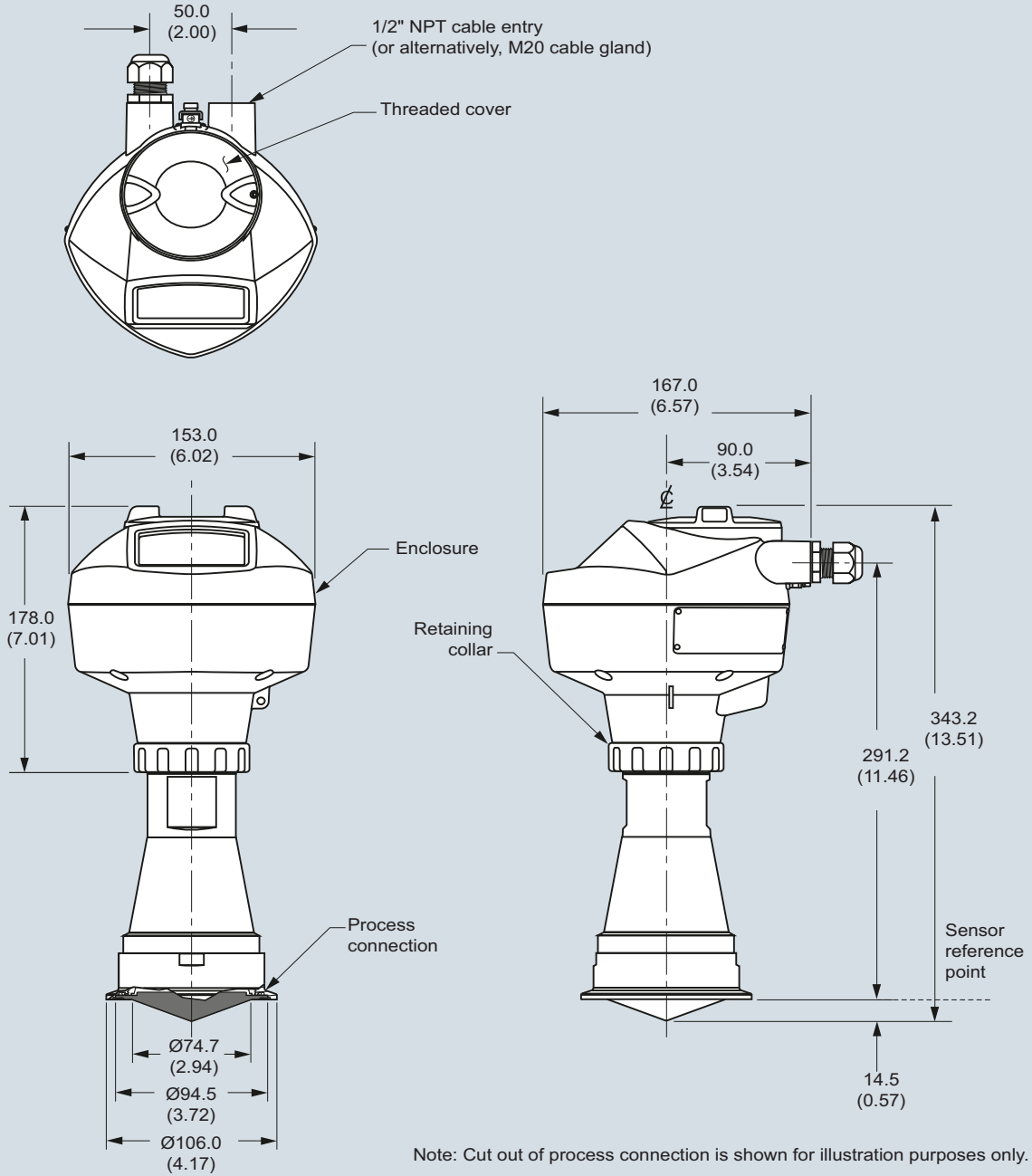
SITRANS LR250 Hygienic Encapsulated Antenna (DN 50 aseptic clamp to DIN 11864-3), dimensions in mm (inch)

Level Measurement

Continuous level measurement - Radar transmitters

SITRANS LR250 Hygienic Encapsulated Antenna

Hygienic encapsulated antenna (DN 80 aseptic clamp to DIN 11864-3)

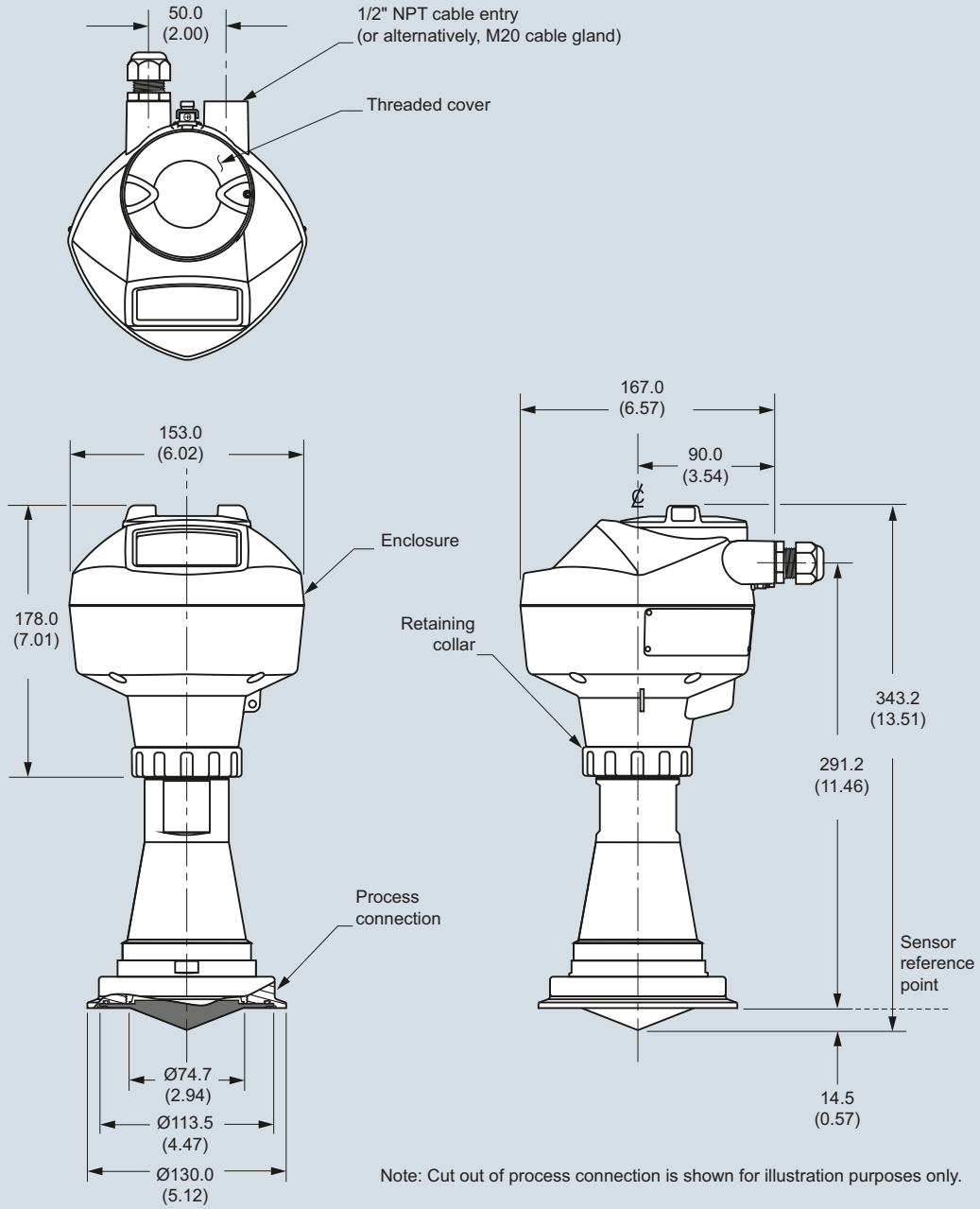


SITRANS LR250 Hygienic Encapsulated Antenna (DN 80 aseptic clamp to DIN 11864-3), dimensions in mm (inch)

Level Measurement
Continuous level measurement - Radar transmitters

SITRANS LR250 Hygienic Encapsulated Antenna

Hygienic encapsulated antenna (DN 100 aseptic clamp to DIN 11864-3)



SITRANS LR250 Hygienic Encapsulated Antenna (DN 100 aseptic clamp to DIN 11864-3), dimensions in mm (inch)

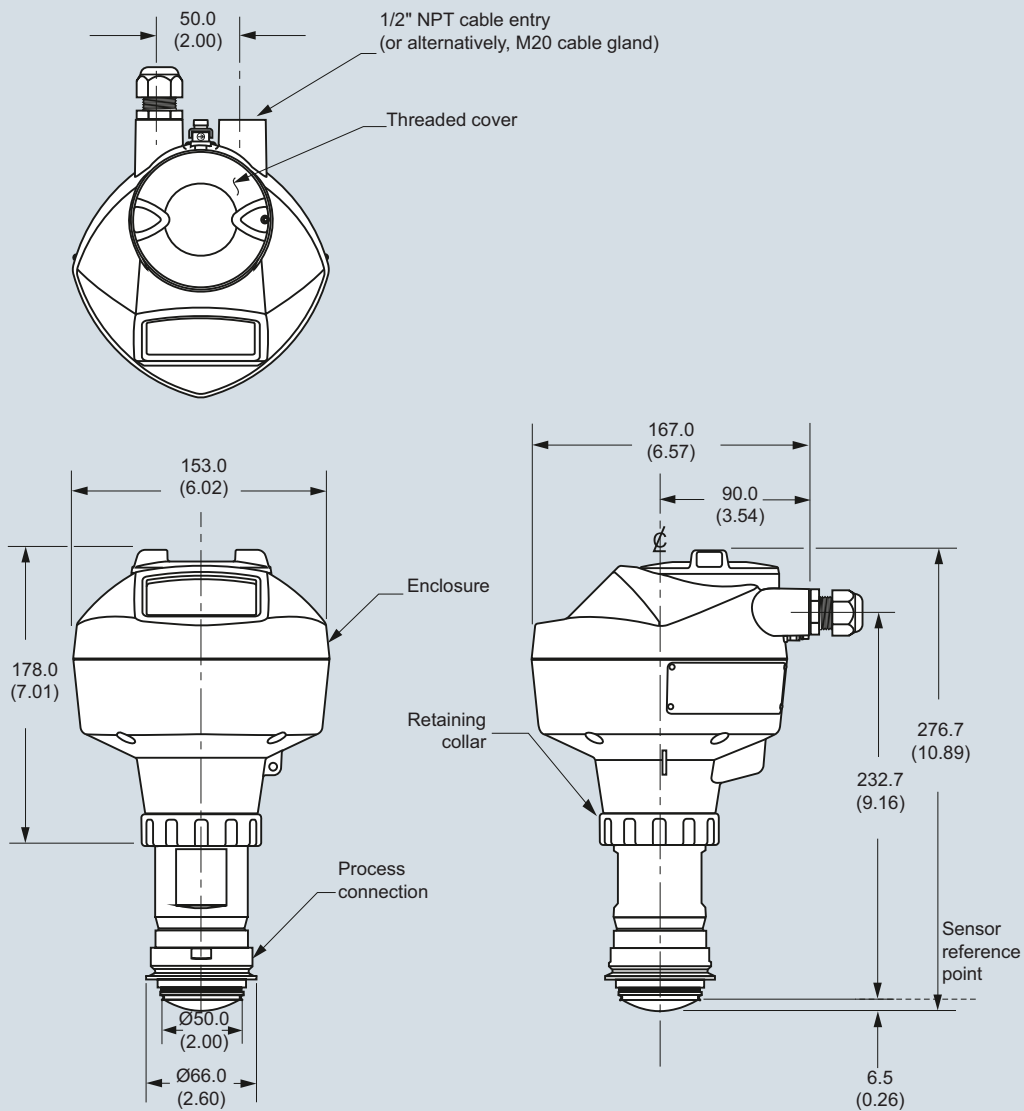
Level Measurement

Continuous level measurement - Radar transmitters

SITRANS LR250 Hygienic Encapsulated Antenna

4

Hygienic encapsulated antenna (Tuchenhagen Type F, 50 mm)

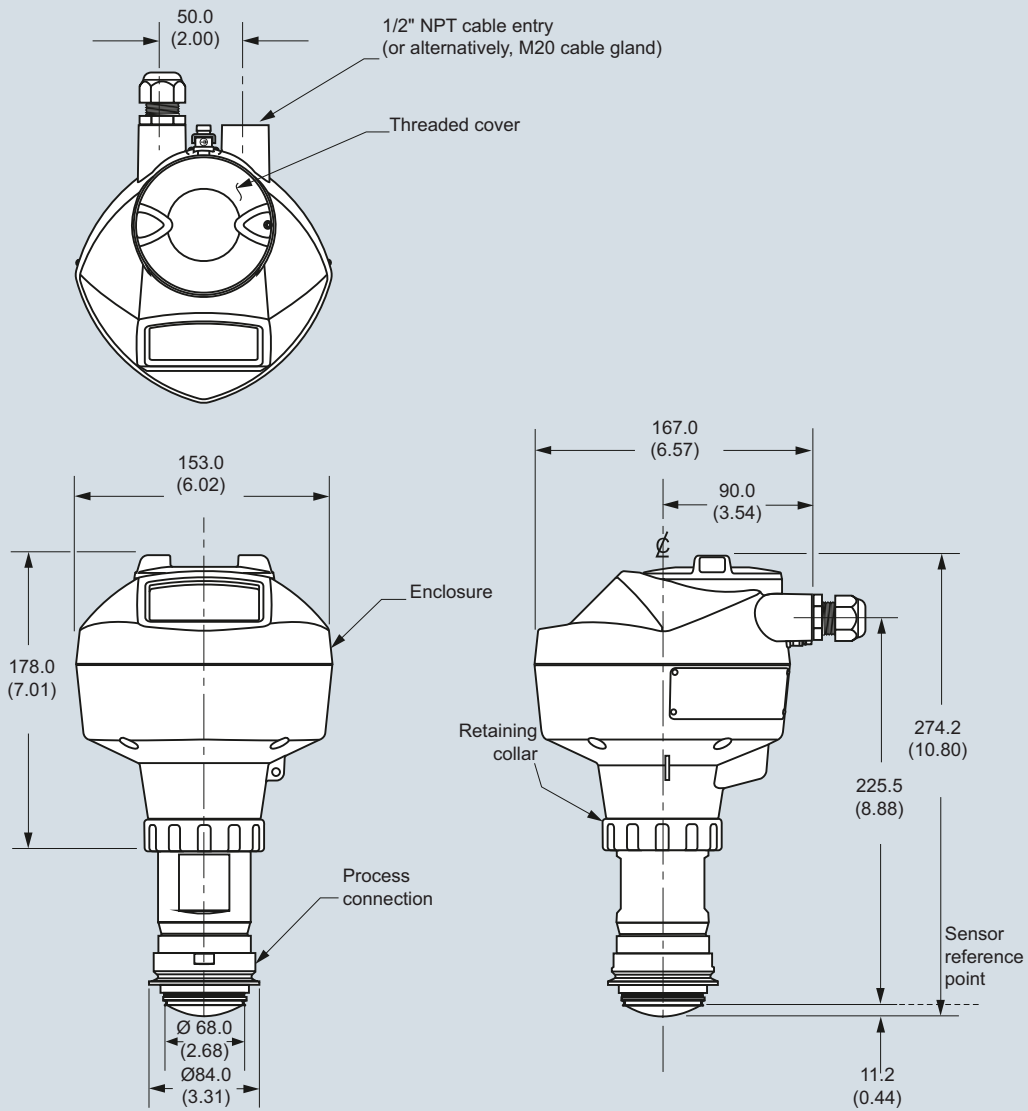


SITRANS LR250 Hygienic Encapsulated Antenna (Tuchenhagen Type F), dimensions in mm (inch)

Level Measurement
Continuous level measurement - Radar transmitters

SITRANS LR250 Hygienic Encapsulated Antenna

Hygienic encapsulated antenna (Tuchenhagen Type N, 68 mm)



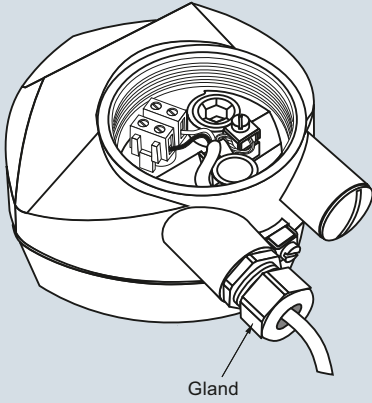
SITRANS LR250 Hygienic Encapsulated Antenna (Tuchenhagen Type N), dimensions in mm (inch)

Level Measurement

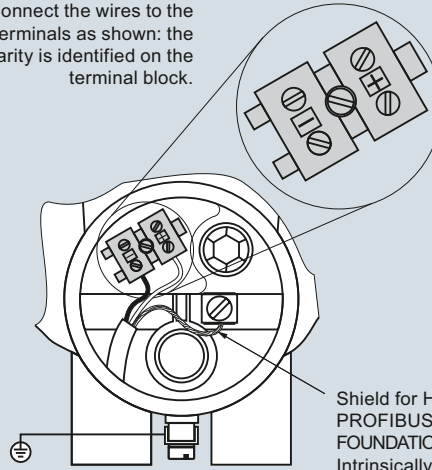
Continuous level measurement - Radar transmitters

SITRANS LR250 Hygienic Encapsulated Antenna

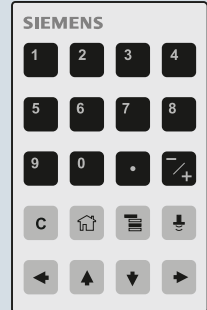
Schematics



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



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

Level Measurement

Continuous level measurement - Radar transmitters

SITRANS LR250 Hygienic Encapsulated Antenna Specials

Selection and ordering data

SITRANS LR250 Hygienic Encapsulated Specials	
	Article No.
<p>For "Electronics Head only" follow the standard configuration and choose YY option on positions 9 and 10 of the full part number.</p> <p>For example: 7ML5433-1YY20-1AA0 will order an electronics head for the following:</p> <p>EHEDG EL Class 1 approval, 4 ... 20 mA HART, M20 cable entries, General purpose Haz Loc approval, pressure rating as per manual.</p>	
<p>Spare Lens Kits (Lens and O-ring)</p>	
Kit, 2 inch, ISO 2852, HEA, Lens, silicone secondary O-ring	A5E32572731
Kit, 3 inch, ISO 2852, HEA, Lens, silicone secondary O-ring	A5E32572745
Kit, 4 inch, ISO 2852, HEA, Lens, silicone secondary O-ring	A5E32572747
Kit, DN 50, DIN 11851, HEA, Lens, silicone secondary O-ring	A5E32572758
Kit, DN 80, DIN 11851, HEA, Lens, silicone secondary O-ring	A5E32572770
Kit, DN 100, DIN 11851, HEA, Lens, silicone secondary O-ring	A5E32572772
Kit, DN 50, DIN 11864-1, HEA, Lens, silicone secondary O-ring	A5E32572773
Kit, DN 80, DIN 11864-1, HEA, Lens, silicone secondary O-ring	A5E32572779
Kit, DN 100, DIN 11864-1, HEA, Lens, silicone secondary O-ring	A5E32572782
Kit, DN 50, DIN 11864-2/3, HEA, Lens, silicone secondary O-ring	A5E32572785
Kit, DN 80, DIN 11864-2/3, HEA, Lens, silicone secondary O-ring	A5E32572790
Kit, DN 100, DIN 11864-2/3, HEA, Lens, silicone secondary O-ring	A5E32572791
Kit, Tuchenhagen, Type F, HEA, Lens, silicone secondary O-ring	A5E32572794
Kit, Tuchenhagen, Type N, HEA, Lens, silicone secondary O-ring	A5E32572795
<p>Accessories (customer side process connection and FKM and EPDM seal for each size and type)</p>	
Kit DN50 DIN11864-1 GS Form A tank connection, EPDM Seal Class II	A5E32910638
Kit, DN80 DIN11864-1 GS Form A tank connection, EPDM Seal Class II	A5E32910649
Kit, DN100 DIN11864-1 GS Form A tank connection, EPDM Seal Class II	A5E32910657
Kit DN50 DIN11864-1 GS Form A tank connection, FKM Seal Class I	A5E32910658
Kit, DN80 DIN11864-1 GS Form A tank connection, FKM Seal Class I	A5E32910671
Kit, DN100 DIN11864-1 GS Form A tank connection, FKM Seal Class I	A5E32910681
Kit 2" ISO2852 tank connection, Clamp, Cleanable EPDM Seal Class II	A5E32910686

SITRANS LR250 Hygienic Encapsulated Specials	
	Article No.
Kit 3" ISO2852 tank connection, Clamp, Cleanable EPDM Seal Class II	A5E32910697
Kit 4" ISO2852 tank connection, Clamp, Cleanable EPDM Seal Class II	A5E32910708
Kit 2" ISO2852 tank connection, Clamp, Cleanable FKM Seal	A5E32910718
Kit 3" ISO2852 tank connection, Clamp, Cleanable FKM Seal	A5E32910723
Kit 4" ISO2852 tank connection, Clamp, Cleanable FKM Seal	A5E32910734
Kit DN50 DIN11851 SC Tank connection, EPDM Seal Class II ¹¹⁾	A5E32910746
Kit DN80 DIN11851 SC Tank connection, EPDM Seal Class II ¹¹⁾	A5E32910771
Kit DN100 DIN11851 SC Tank connection, EPDM Seal Class II ¹¹⁾	A5E32910780
Kit DN50 DIN11851 SC Tank connection, FKM Seal Class II	A5E32910784
Kit DN80 DIN11851 SC Tank connection, FKM Seal Class II	A5E32910789
Kit DN100 DIN11851 SC Tank connection, FKM Seal Class II	A5E32910790
Kit DN50 DIN11864-2 Form A tank connection, M8 Hardware (nut/bolt/washer), EPDM Seal Class II	A5E32910791
Kit DN80 DIN11864-2 Form A tank connection, M10 Hardware (nut/bolt/washer), EPDM Seal Class II	A5E32910793
Kit DN100 DIN11864-2 Form A tank connection, M10 Hardware (nut/bolt/washer), EPDM Seal Class II	A5E32910799
Kit DN50 DIN11864-2 Form A tank connection, M8 Hardware (nut/bolt/washer), FKM Seal Class I	A5E32910805
Kit DN80 DIN11864-2 Form A tank connection, M10 Hardware (nut/bolt/washer), FKM Seal Class I	A5E32910809
Kit DN100 DIN11864-2 Form A tank connection, M10 Hardware (nut/bolt/washer), FKM Seal Class I	A5E32910812
Kit DN50 DIN11864-3 Form A tank connection, Clamp, EPDM Seal Class II	A5E32910813
Kit DN80 DIN11864-3 Form A tank connection, Clamp, EPDM Seal Class II	A5E32910814
Kit DN100 DIN11864-3 Form A tank connection, Clamp, EPDM Seal Class II	A5E32910815
Kit DN50 DIN11864-3 Form A tank connection, Clamp, FKM Seal Class I	A5E32910816
Kit DN80 DIN11864-3 Form A tank connection, Clamp, FKM Seal Class I	A5E32910817
Kit DN100 DIN11864-3 Form A tank connection, Clamp, FKM Seal Class I	A5E32910818
Kit Type F, Tuchenhagen, Clamp, EPDM Seal Class II (EHEDG only) - no tank connection	A5E33489537
Kit Type N, Tuchenhagen, Clamp, EPDM Seal Class II (EHEDG only) - no tank connection	A5E33489543
Kit Type F, Tuchenhagen, Clamp, FKM Seal Class I (EHEDG only) - no tank connection	A5E33489828
Kit Type N, Tuchenhagen, Clamp, FKM Seal Class I (EHEDG only) - no tank connection	A5E33489830

¹¹⁾ Class II for low fat applications when EPDM seal used on DIN11851